Preface

This manual is Great Wall POER Passenger Pickup Truck Service Manual

The manual below is applicable for this vehicle model; please keep it for your reference.

Manual name	Version No.
Circuit Diagram of Great Wall POER Passenger Pickup Truck	01-20.07-00EM

All the information included in the manual is up-to-date for publishing. However, because the models are constantly updated, it cannot be guaranteed that the latest information is timely and accurately delivered to you.

Should you come across any errors or omissions in the manual content, we would be very grateful if you could point them out.

It would be highly appreciated if you could send your suggestions for the content and formatting of this manual to cywx@gwm.cn!

If you have other repair and maintenance technical questions, please contact our after-sale service personnel by calling +86-312-2197955.

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Great Wall Motor Co., Ltd

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Version No.:01-20.07-00SM

Information accurate as of:July, 2020

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Total contents

Basic repair

General engine information (GW4D20M)

Engine control system (GW4D20M)

Engine mechanical system (GW4D20M)

Intake/exhaust system (GW4D20M)

Emission control system (GW4D20M)

Fuel supply system (GW4D20M)

Cooling system (GW4D20M)

Lubrication system (GW4D20M)

Turbocharger system (GW4D20M)

Starter and generator system (GW4D20M)

Mount device (GW4D20M)

Clutch system (GW4D20M)

Transmission system (ZM6T82BF)

Transmission system (R640B1)

Transmission system (GA8HP50Z)

Transfer case (47-80)

All terrain control system
Electronic differential lock system
Drive shaft
Propeller shaft
Main reducer
Wheel alignment
Front suspension
Rear suspension
Wheels and tires
Tire pressure monitoring system
Hydraulic power steering system
Electric power steering system
Hydraulic brake
Wheel brake - mechanical
Wheel brake - electronic
Parking brake - mechanical
Parking brake - electronic
Vehicle stabilization system
Engine hood
Vehicle door
Rear trunk plate
Rainproof canopy - high cover

Fuel filler cap
Bumper
Glass
Instrument panel
Seat
Side footboard
Interior trim
Exterior trim
Other parts of vehicle body
Collision repair
A/C system
Seat belt system
Supplemental restraint system
Lighting system
Wiper & washer
Horn
Combination instrument
Power window
Rearview mirror
Audio and video system
Passive entry & passive start system
Vehicle door lock

Battery & power interface
Switch
Cruise system
Parking assist system
Emergency call system
Vehicle body controller
Network system

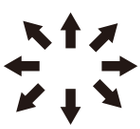
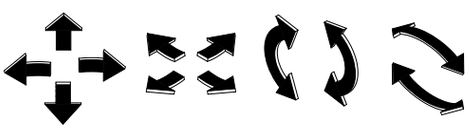
Basic repair

Instructions for use .....1－1
Symbol explanation .....1－1
Abbreviations .....1－3
VIN identification information .....1－9
VIN meaning .....1－9
VIN position .....1－11
Engine identification information (GW4D20M) .....1－12
Engine No. position .....1－12
Transmission identification information (ZM6T82BF) .....1－13
Transmission No. position .....1－13
Transmission identification information (R640B1) .....1－14
Transmission No. position .....1－14
Transmission identification information (GA8HP50Z) .....1－15
Transmission No. position .....1－15
General maintenance .....1－16
Traction and transportation .....1－16
Lifting and supporting .....1－17

Instructions for use

Symbol explanation

Symbol	Name	Positions where they are used	Meaning of symbols
N • m	Specified torque	Structural diagram	Tightening torque for tightening the parts and components
◆	Non-reusable parts	Structural diagram	Such parts and components are non-reusable
×2 ×3 ×X	Quantity of parts and components with a same specification	Structural diagram	If there are 2 or more than 2 parts of same model or specification, the symbol indicates number of same parts
○	Snap	Step diagram	Clip-type fastener, with outline magnified in the illustration When there is only one type of snap, the symbol indicates specific position of the snap
1 2 X	Snap	Step diagram	Clip-type fastener, with outline magnified in the illustration When there are 2 or more than 2 types of snap, the symbol indicates specific positions of the snaps
□	Clip	Step diagram	Clip-type fastener, with outline magnified in the illustration When there is only 1 type of clip, the symbol indicates specific position of the clip

Symbol	Name	Positions where they are used	Meaning of symbols
	Clip	Step diagram	Clip-type fastener, with outline magnified in the illustration When there are 2 or more than 2 types of clip, the symbol indicates specific positions of the clips
	Dog	Step diagram	Clip-type fastener, with outline magnified in the illustration When there is only 1 type of dog, the symbol indicates specific position of the dog
	Dog	Step diagram	Clip-type fastener, with outline magnified in the illustration When there are 2 or more than 2 types of dog, the symbol indicates specific positions of the dogs
	Enlarged local view	Location diagram or structural diagram or step diagram	For magnifying outline or inner structure or details or positions of parts and components
	Indicating arrow or position arrow	Step diagram	For indicating parts and components or positions of the parts and components
	Arrow direction	Step diagram	For indicating operating or rotating direction of the parts and components

Abbreviations

Abbreviations	Meaning
ABM	Airbag Module
ABS	Anti-lock Braking System
AC	Air Conditioning System
ACC	Adaptive Cruise System/Accessory
AC-FCP	A/C-Front Control Panel
ACP	A/C Control Panel
ACU	Axle Control Unit / Shift controller
AD-CAN	Assist CAN/Driving Assist CAN
AF-FCP	A/C-Front Control Panel
AFS	Adaptive Front-lighting System
ALCM	Ambient Lamp Control Module
ALS	Automatic Headlamp Level Adjustment System
AMP	Amplifier
ANC	Automatic Noise Controller
APA	Automatic Parking Assist System
APS	Automatic Parking System
ATSM	All Terrain Switch Module
AVM	Around View Monitor
Ballast_L/Lballast	Ballast_L/Lballast
Ballast_R/Rballast	Ballast_R/Rballast
BAT	Battery
BCM	Body Control Module
BD-CAN	Body CAN
BLE	Bluetooth Low Energy
BMS	Battery Management System
BPH	Battery Pack Heater Assembly
BSG	Belt Driven Starter Generator
BWV	Two-way valve
CAN	Controller Area Network
CANFD	CAN with Flexible Date-Rate
CCSM	Central Control Switch Module
CD	CD Host
CF-CAN	Comfort CAN
CMP	Electronic A/C Compressor

Abbreviations	Meaning
CMS	CAN Signal Conversion Module
CSA	Combination Switch Assembly
CR_R	Right front Corner Radar Control Module
CR_L	Left front Corner Radar Control Module
CP	Controler Pedal
CSM_L	Left Control Switch Module
CSM_R	Right Control Switch Module
CVVL	Continuously Variable Valve Lift
DCT	Dual Clutch Transmission
DCDC	DC/DC Converter
DCU	Dosing Control Unit
DDCM	Driver Door Control Module
DG-CAN	Diagnostic CAN
DHL	Left Door Handle Module
DHR	Right Door Handle Module
Digital IP	Digital Instrument Panel
DMD_L	Left Digital Micromirror Device
DMD_R	Right Digital Micromirror Device
DMS	Data Management System
DMSM	Driving Mode Switch Module
DPSA	Drive Mode Selector Switch
DPWM	Driver's Power Window Module
DSM	Driver's Seat Module
DVD	DVD host
DVR	Digital Video Recorder
EAC	A/C Compressor Assembly
EAH	A/C Heater Assembly
EBS	Battery Sensor
ECM	Engine Control Module
ECU	Electronic Control Unit
ECLK	Electronic Clock
EGD	Electronic Lock Differential
EGR	Exhaust Gas Recirculation
ELD	Electronically Controlled Differential Lock
EMS	Engine Management System

Abbreviations	Meaning
E_Park	Electronic Parking System
EPB	Electronic Parking Brake System
EPS	Electrical Power Steering System
ePump	ePump
ESCL	Electronic Steering Column Lock
ESOF	Electric Four-wheel-drive Control Unit
ESP	Electronic Stability Program
ETS	Exhaust Temperature Sensor
EXV	Electronic Expansion Valve
FCM	Front Camera Main Control Unit
FR	Front Radar Control Module
F-PBOX	Front Power Box
FCP	Front Control Panel
FPAS	Front Parking Assist System
FWV	Four-way Valve
GLO-NASS	GLO-NASS
GW	Gateway
HAP	Highly Automatic Parking
HC	Headlamp Controller/Hybrid Control
HC-CAN	Hybrid Control-CAN
HCM	HVAC Control Module
HCU	Vehicle Controller
HDL	Left Door Handle Module
HDR	Right Door Handle Module
HFA	Back Door Automatic Open Sensor
HFA_L	Left back Door Automatic Open Sensor
HFA_R	Right Back Door Automatic Open Sensor
HID	High Intensity Discharge
HMI	Human-Machine Interface
HP-CAN	Hybrid Power-CAN
HTR	Heater
HUT	Navigation Host System
HVAC	Heater, ventilation And A/C system
HVH	High Voltage Heater
HVSM	Heat Vent Seat Module

Abbreviations	Meaning
iBooster	Intelligent Booster
iPAS	Integration Park Assistant System
IESS	Engine Sound Simulator Assembly
IFC	Intelligent Forward Camera
IGC	Intelligent Front Camera
InMirror	Inside Rearview Mirror Module
IF-CAN	Infotainment CAN
IDC_L2	Intelligent Driving Controller_L2
IFV	Intelligent Front View Camera
IP	Instrument Panel
IPMSM	Instrument Panel Small Switch Module
KBCM	Body Electronics Domain Control Unit With Integrated PEPS And BCM
LAM_L	Laser Headlamp Assist Module-Left
LAM_R	Laser Headlamp Assist Module-Right
LDM_L	Left LED Drive Module
LDM_R	Right LED Drive Module
LDW	Lane Departure Warning
LHD	Left Hand Drive
LIN	Local Interconnect Network
MCU	Micro-program Controller/Drive Motor Control Unit
MFSW	Multi-function Steering Wheel
ModeSW	Mode Switch
MP5	MP5 Player
Nextrac	Intelligent Front Drive System/Intelligent Front Drive Control Module
OBC	Onboard Charger
OTR	Out Terminator Resistance
PAS	Parking Assist System
P-Box	Fuse Box Module
PDCM	Front Passenger Side Door Control Module
PEPS	Passive Entry And Passive Start System
PLG	Power Lift Gate Module
PM2.5	PM2.5 Sensor/PM2.5 Detection Module
Power-Box	Power Box
PPWM	Passenger Side Power Window Switch Module
PTC	Electric Heater with Forward Temperature Coefficient

Abbreviations	Meaning
PT-CAN	Power CAN
PWM	Power Window Module
Radio	Radio
RCP	Rear Control Panel
RHD	Right Hand Drive
RHDS	Rear Seat Hand Rest Display Assembly
RLPWM	Rear Left Power Window Switch Module
R-PBOX	Rear Power Box
RLS	Rain Light Sensor
RMC	Remote Monitoring Controller
RMT	Remote Monitoring Controller
RPAS	Rear Parking Assist System
RRPWM	Rear Right Power Window Switch Module
RSDS_L	Left Radar Detection System
RSDS_R	Right Radar Detection System
RVC	Rear View Camera
SAS	Steering Angle Sensor
SBR	Seat Belt Reminder
SBWM	Electronic Shifter Module/Line Control Gear Shifter Module
STBS	Screen Touch Button Switch Controller
SC-CAN	Safety-CAN
SC-CANFD	Safety CANFD
SCM	Seat Control Module
SCU	Transmission Electronic Parking Control Unit
SE-CAN	Safety-CAN
SHM	Seat Heating Module
SHM_R	Seat Heating Module-Rear
SIP	Sub Instrument Panel
SIPSM	Sub Instrument Panel Switch Module
Siren	Siren
SRS	Supplemental Restraint System
SunRoof	Sunroof
SunShade	Sunshade
SVHM	Seat Ventilation And Heating Module
SVM	Smart Rearview Mirror

Abbreviations	Meaning
SWHM	Steering Wheel Heating Module
TBK	Telematics, Bluetooth and Key
T-BOX	Telematics Box
TMM	Thermal Management Module
TCU	Transmission Control Unit
Tester Interface	Diagnostic Interface
TOD	Torque On Demand
TPC	Immobilizer Controller
TPMS	Tire Pressure Monitoring System
Trailer	Trailer
TWV	Three-way Valve
VCU	Vehicle Controller
VIN	Vehicle Identification Number
VSG	Vehicle Sound Generator
VVT	Variable Valve Timing
WP	Wiper
WPC	Wireless Power Charger

VIN identification information

VIN meaning

The vehicle identification number is the unique 17-digit code indicating vehicle identity.

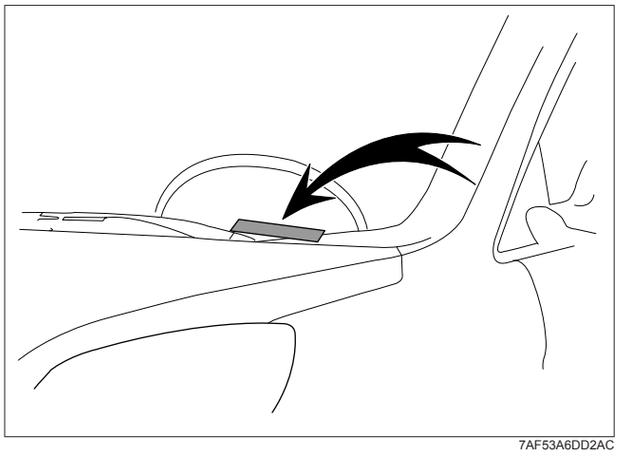
For example: ☆LGWEF6A5XGH010000☆

Position	Characters	Definitions	Description	
1-3	LGW	World manufacturer identifier (WMI)	Great Wall Motor Co., Ltd	
4	E	Vehicle type	C: N1 4×2, D: N1 4×4, E: M1 4×2, F: M1 4×4	
5	F	Maximum total mass or overall length of vehicle	Maximum total mass (N)	A：≤2500kg B：(2501～3000)kg
			Total vehicle length (M)	D：(3501～4000)mm E：(4001～4500)mm F：(4501～5000)mm G：(5001～5500)mm
6	6	Engine type (Engine drive only)	Maximum gasoline net power	2：(59～78)kW 3：(79～98)kW 4：(99～118)kW 5：(119～138)kW 6：(139～158)kW 7：(159～175)kW
			Maximum diesel net power	C：(59～78)kW D：(79～98)kW E：(99～118)kW
		Engine displacement (Hybrid electric vehicle)	M, N, P, R, S, T, U, V:＞ 0.8 L	
		Motor type (Electric vehicle or hybrid electric vehicle)	Motor peak power	M：(11～35)kW N：(36～50)kW P：(51～65)kW R：(66～75)kW S：(76～90)kW T：(91～110)kW U：(111～160)kW V：>160kW
7	A	Vehicle body type	1: long-head double-row; 3: long-head single-row; A: two-cabin, four-door passenger vehicle; K: three-cabin, four-door passenger vehicle	
8	5	Wheelbase	4：(2451～2600)mm 5：(2601～2750)mm 6：(2751～2900)mm 7：(2901～3050)mm 8：(3051～3200)mm 9：(3201～3350)mm	
9	X	Check bit	Any number or letter “X” from 0 to 9	

Position	Characters	Definitions	Description
10	G	Year of manufacture	F：2015 G：2016 H：2017 J：2018 K：2019 L：2020 M：2021 N：2022 P：2023 R：2024 S：2025 T：2026 V：2027 W：2028 X：2029 Y：2030 1：2031 2：2032 3：2033 4：2034 5：2035 6：2036 7：2037 8：2038 9：2039 A：2040
11	H	Assembly plant	A: Great Wall Motor Co., Ltd. B: Second Assembly Plant C: Third Assembly Plant D: Fourth Assembly Plant E: Fifth Assembly Plant F: Tianjin Branch H: Xushui Assembly Plant J: Chongqing Branch K: Taizhou Branch L: Pinghu Branch M: Rizhao Assembly Plant
12-17	010000	Manufacture s/n	—

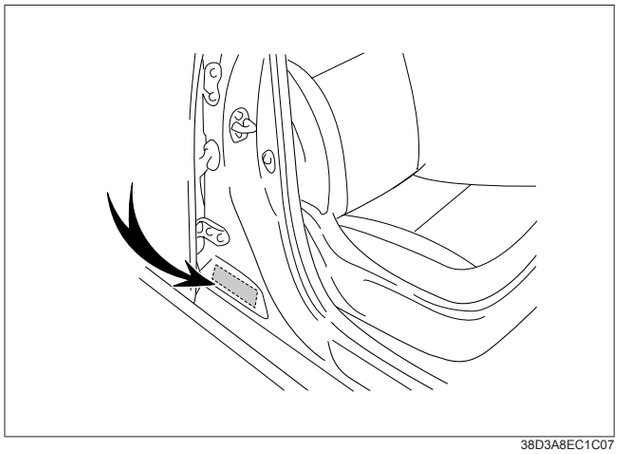
VIN position

Vehicle identification number (1) is located at the left upper part of the instrument panel. It can be seen through the front windshield from the outside.



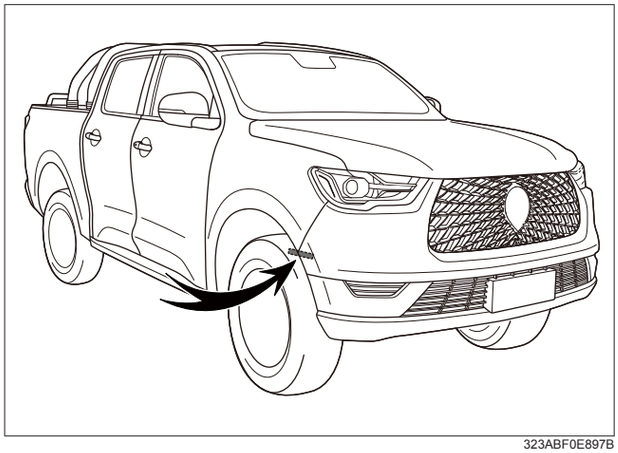
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The vehicle identification number (2) is located on the vehicle certification label under the right Pillar B.



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The vehicle identification number (3) is located in the front of the right stringer of the frame.

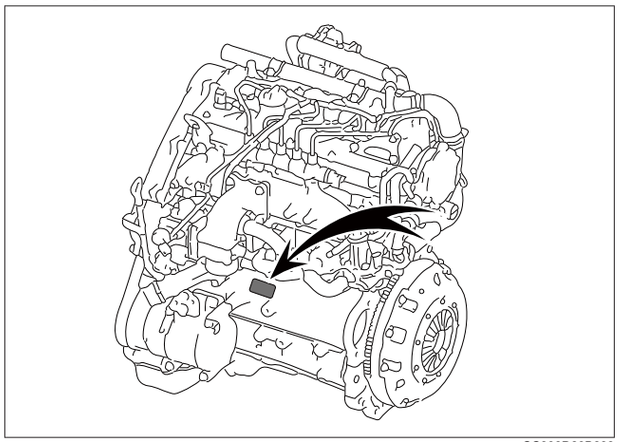


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Engine identification information (GW4D20M)

Engine No. position

Engine No. is provided at the position shown on the diagram.

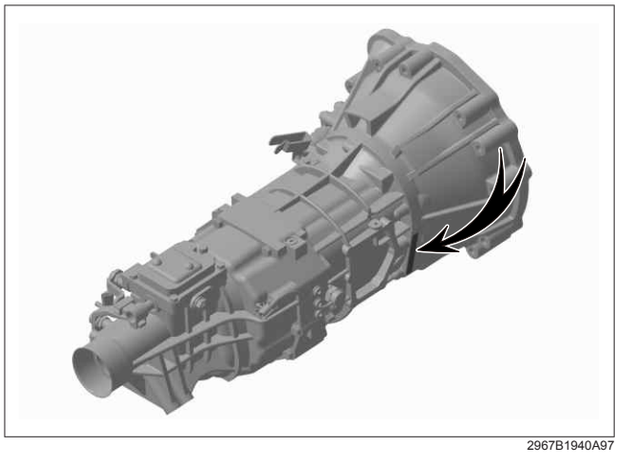


CC906D80B893

Transmission identification information (ZM6T82BF)

Transmission No. position

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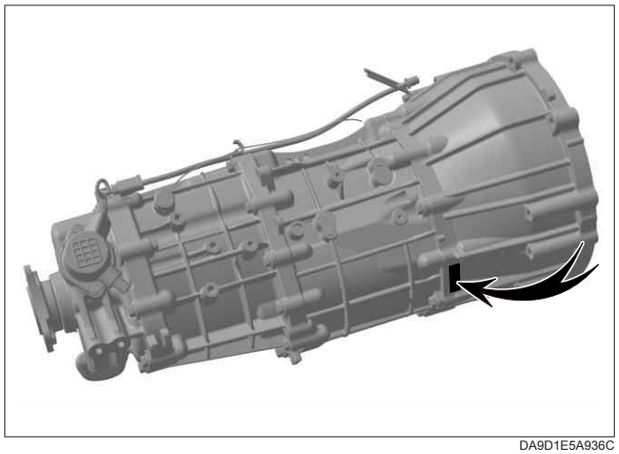


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Transmission identification information (R640B1)

Transmission No. position

transmission No. is provided at the position shown on the diagram.

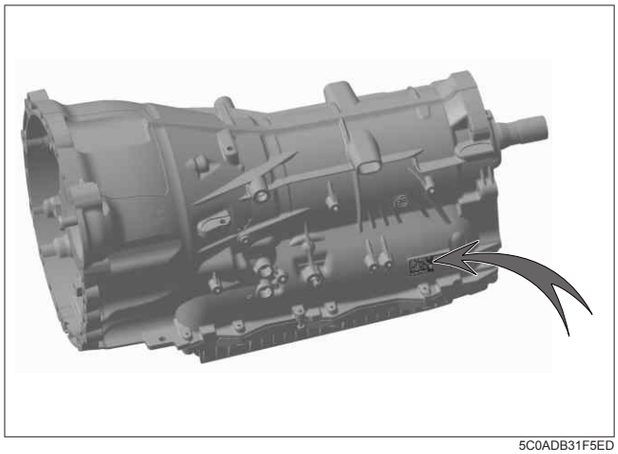


DA9D1E5A936C

Transmission identification information (GA8HP50Z)

Transmission No. position

The transmission No. is engraved on the label on the left side of the transmission housing.



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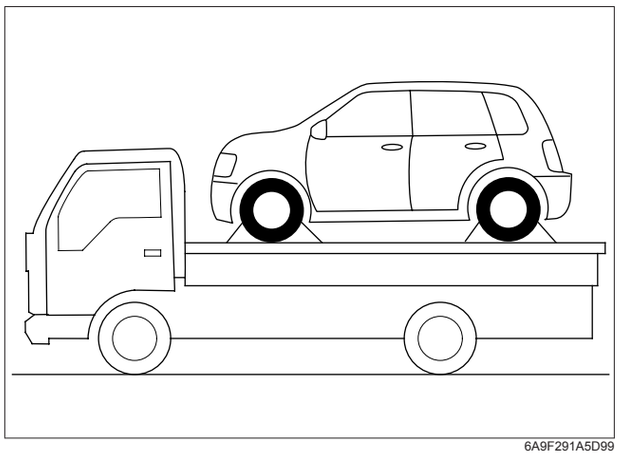
General maintenance

Traction and transportation

⚠ Caution

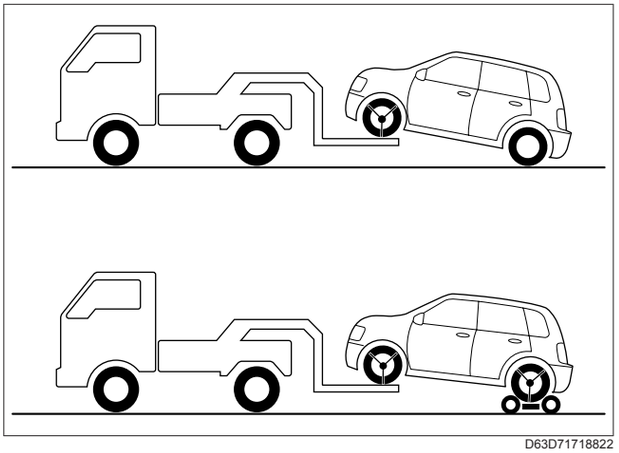
- When towing or hauling the vehicle, you must observe the local regulatory requirements for vehicle traction.
- It is forbidden to use a tow rope or chain to tow the vehicle when the fault occurs to the wheels, transmission, brake, steering system and the front and rear lights of the vehicle.
- When you use tow hooks to tow a vehicle, the distance between towing and towed vehicle should be kept in the range of 4 m to 10 m.
- When it is towed by a tow hook, the brake shall be fully released.
- Refer to the speed and distance as specified in the manual attached with the vehicle to tow the automatic transmission vehicle model.
- Refer to the method as specified in the manual attached with the vehicle to tow the four-wheel drive vehicle model.
- Do not tow a broken down vehicle which is heavier than yours.

Hauling by flatbed truck

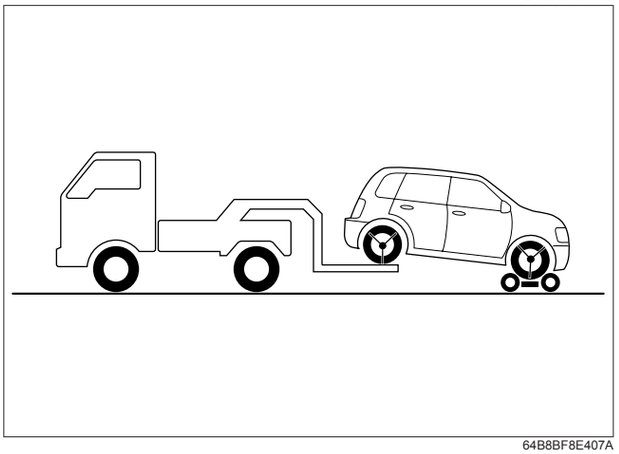


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Use a lift truck to tow



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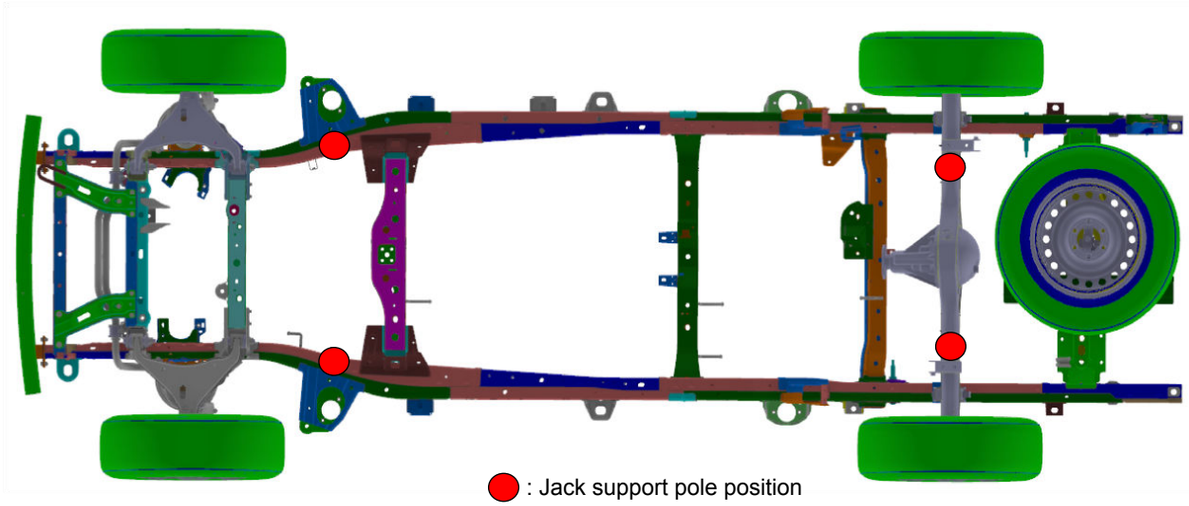
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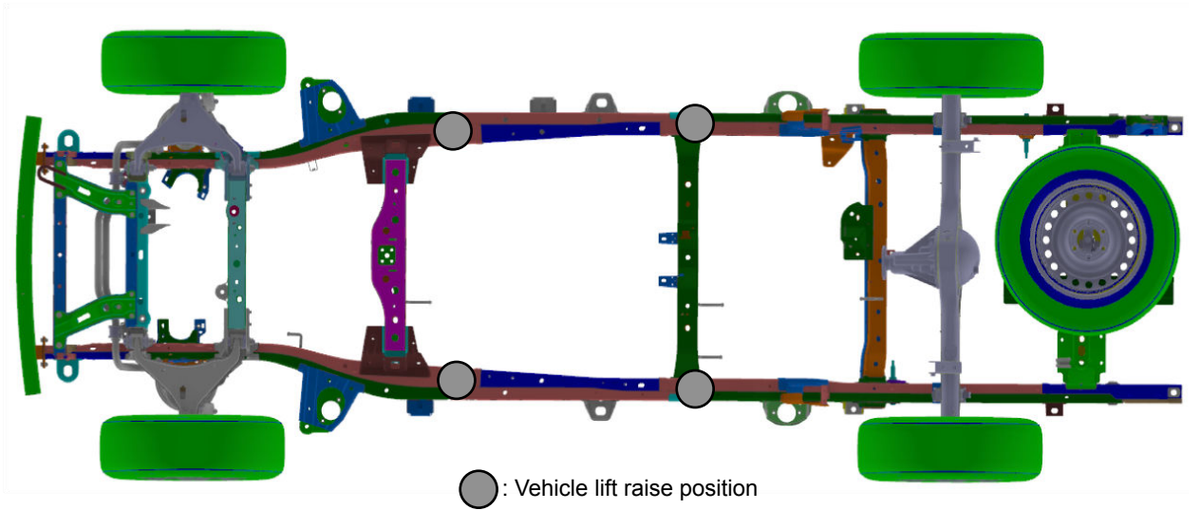
Lifting and supporting

⚠ Caution

- To avoid damages of the vehicle chassis or inclination of the vehicle, support the vehicle only at the specified supporting positions.
- When performing the work under the vehicle, you must use proper bracket to support the vehicle in a secure manner.
- After the vehicle is lifted, do not start the engine or put into gear if drive wheels are still on the ground.

Lifting position of vehicle is as shown in the figure.





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General engine information (GW4D20M)

Basic engine information .....2－1
Engine parameters .....2－1
Engine fluid .....2－2
Engine lubricant oil recommendation.....2－3
Special maintenance tools.....2－4

Basic engine information

Engine parameters

Item	Parameter
Engine model	GW4D20M
Type	Inline four-cylinder, forced water-cooled, ω type combustion chamber, 16-valve, double overhead camshaft, electrically controlled high-voltage common rail, electronically controlled single-stage turbocharging, high-pressure EGR, hydraulic lash adjuster, roller rocker arm, and intake intercooled diesel engine
Cylinder bore × stroke (mm × mm)	83.1×92
Total displacement (L)	1.996
Compression ratio	16.2:1
Maximum net power (kW)	110/3600
Maximum net torque (N·m/rpm)	400/(1500～2500)
Idle speed (r/min)	750±50

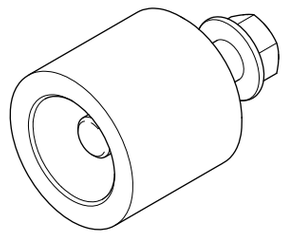
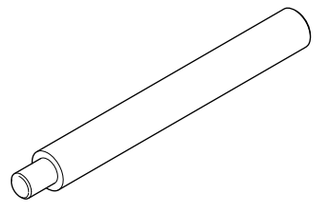
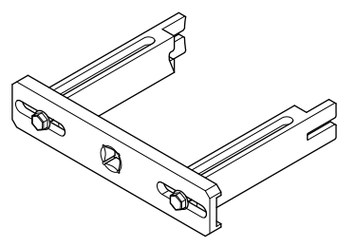
Engine fluid

Item	Capacity (L)	Specification
Engine lubricant (L)	5.0 (replace engine oil filter) 4.7 (not replace engine oil filter)	See engine lubricant oil recommendation
Engine coolant (L)	7.7±0.5	Ethylene glycol based-#35 for regions other than alpine regions
		Ethylene glycol based-#45 for alpine regions
Automotive diesel (L)	78	0# (for areas with 4℃ or higher lowest temperature)
		-10# (for areas with -5℃ or higher lowest temperature)
		-35# (for areas with -32℃ or higher lowest temperature)

Engine lubricant oil recommendation

It is suggested that C3 5W-30 full synthetic engine oil be used in the area with environment temperature above -30 ℃. If the temperature is lower in your area, C3 0W-30 full synthetic engine oil is suggested.

Special maintenance tools

Code	Name	Purpose	Schematic diagram
ZEZF068763	Front crankshaft oil seal installation tool	Install front crankshaft oil seal	
ZEZF068764	Clutch driven plate assembly alignment tool	Align the clutch driven plate assembly.	
ZEZF000025	Gasoline pump gland removal tools	Remove/install fuel pump gland	

Engine control system (GW4D20M)

Engine control system (6MT) ....3－1
Precautions ....3－1
System diagram ....3－2
Specified torque ....3－5
Engine control system (8AT) ....3－6
Precautions ....3－6
System diagram ....3－7
Specified torque ....3－10
Diagnostic information ....3－11
List of DTC ....3－11
P181600/P181700/P181800/P181900/P181A00//P181B00 ....3－26
P192100/P192200/P192300/P192400 ....3－28
P226D00 ....3－30
P246300/P243F00 ....3－31
P245900 ....3－32
P242D00/P242C00 ....3－34
P182200 ....3－36
P145600/U120100 ....3－38
P183B00 ....3－39
P24A200 ....3－40
P145400 ....3－41
P330000/P330700/P330800/P331000/P19A000/P331200/P331300/
P331400/P332000/P332200/P330900/P333B00/P333C00/P333D00/
P334000/P334100/P334200/P333700/P333A00/P331A00/P331B00/
P334300/P334400/P334500/P334600/P334700/P334800/P334900/
P334A00/P334B00/P334C00/P334D00/P335000 ....3－43
P040500/P040600 ....3－49
P140800/P140900 ....3－51
P185000/P240F00 ....3－53
P143100/P143300/P143400 ....3－56
P245700/P245A00/P245C00/P245D00 ....3－59
P040200/P04D900/P140A00/P2BAB00 ....3－63
P140600/P140700/P182500 ....3－67
P040300/P048900/P049000 ....3－70
P140C00/P140D00 ....3－73
P182400/P040C00/P040D00 ....3－76
P062F00 ....3－79
P05D800 ....3－80
P063000 ....3－81
P06A600/P06A700/P06A800/P06A900 ....3－82
P150100/P150000 ....3－84
P249F00 ....3－85

P222700/P222800/P222900.....3－86
P050D00/P183300/P183400.....3－88
P183A00.....3－89
P183700/P183800.....3－90
P211100/P310100/P310200.....3－92
P183C00/P212600.....3－96
P312700/P312800/P312900.....3－99
P183E00/P210000/P210200/P210300.....3－102
P212700/P212800.....3－106
P111000/P111200/P111800/P111400/P111300//P111700.....3－109
P182600.....3－113
P242800.....3－116
P030000/P030100/P030200/P030300/P030400.....3－118
P021900.....3－120
P054500/P054600/P183F00.....3－123
P103200/P119800.....3－126
P119C00/P119700/P019100/P019300/P019200.....3－129
P119200/P119300/P119B00.....3－132
P103600/P053F00/P119900/P183D00/P120E00.....3－135
P008800/P108800.....3－138
P226400/P226600/P226700/P226900.....3－141
P007200/P007300/P182B00.....3－145
P012400/P022700/P022800/P212200/P212300//P229900.....3－148
P009700/P009800/P010700/P010800.....3－152
P010600/P110600/P110900.....3－156
P010200/P010300/P110400/P110500.....3－160
P011200/P011300/P183500.....3－163
P053300/P053200/P064500/P064600/P064700.....3－166
P182700/P182800/P182900/P182A00/P21B600/P21B700/P21B800/
P21B900/P19A300/P19A400/P19A500/P19A600.....3－169
C003208/C00A900/C003100/C003200/C00A000/C00A100/C003508/
C00AA00/C003408/C003500/C00A200/C00A300/C003808/C00AB00/
C003708/C003B00/C003800/C00A400/C00A500/C00AC00/C003A08/
C003B08/C00A600/C00A700/C100B00/C109904.....3－171
P062D00/P062E00/P162D00/P162E00.....3－174
P026200/P026500/P026800/P027100.....3－176
P020100/P020200/P020300/P020400.....3－178
P026300/P026600/P026900/P027200.....3－180
P16C000/P16C100/P16C200/P16C300/P160800.....3－183
P033500/P033600/P033900/P133500.....3－185
P018300/P018200/P018100/P183200.....3－189
P011800/P011700.....3－192
P034000/P034100/P034400.....3－194
P200800/P200900/P201000.....3－198
P191900/P192000.....3－201

P191300/P191400/P200A00 .....3－204
P201600/P201700 .....3－207
P190700/P190800/P190900/P191000/P191100//P191200.....3－210
P056200/P056300 .....3－213
P056C00/P056500/P057900/P056700.....3－215
P245300 .....3－217
P245500/P245400 .....3－218
P224300/P224600/P224500/P2A0000/P22AE00/P22B100/P22B000/
P2A0100 .....3－220
P013300/P013900 .....3－223
P013500/P109100/P109200/P014100/P109500//P109600 .....3－224
P013000/P013600 .....3－227
P262600/P262800/P262700/P22B500/P263100//P263000 .....3－228
P013100/P013200/P013700/P013800 .....3－231
P000300/P000400 .....3－234
P000200/P10A200.....3－236
P025100/P025300/P025400.....3－238
P10A700/P10A600/P10A900/P10A800.....3－240
P10A500 .....3－243
P119600.....3－245
P038200/P038300/P066B00/P066A00/P066D00/P066C00/P066F00/
P066E00/P067B00/P067A00/P038000/P054300/P052F00/P054200/
P054100/P068300/P068400 .....3－247
P181D00/P226C00.....3－253
P023400/P104D00/P029900 .....3－256
P181400/P181500/P180700/P180800/P180900.....3－259
P256400/P256500 .....3－263
P180100/P180200/P180300/P180400/P180500//P180600 .....3－266
P026A00 .....3－269
P050400 .....3－270
P068500 .....3－271
P068800/P068900/P068700/P068600 .....3－273
P192500 .....3－276
U100087/U100281/U100300/U100400/U100500/U100600/U100E00/
U041600/U012287/U040129/U010600/U101500/U101800/U101900/
U040186/U101B00/U003088/U003188/U004600/U007300/U010087/
U029D00/U029E00/U040086/U040182/U100700/U100800/U100900/
U100A00/U120200.....3－278
P048300/P100E00/P101400/P101300/P158400 .....3－282
P100F00/P101100/P101200.....3－286
P085D00/P085E00/P085100/P085200 .....3－287
P070400/P083000/P083300/P083F00 .....3－288
P161700/P161500/P161600/P061500/P061600//P061700 .....3－292
P011900/P011600 /P182000/P012800.....3－295
Engine control unit (6MT) .....3－297

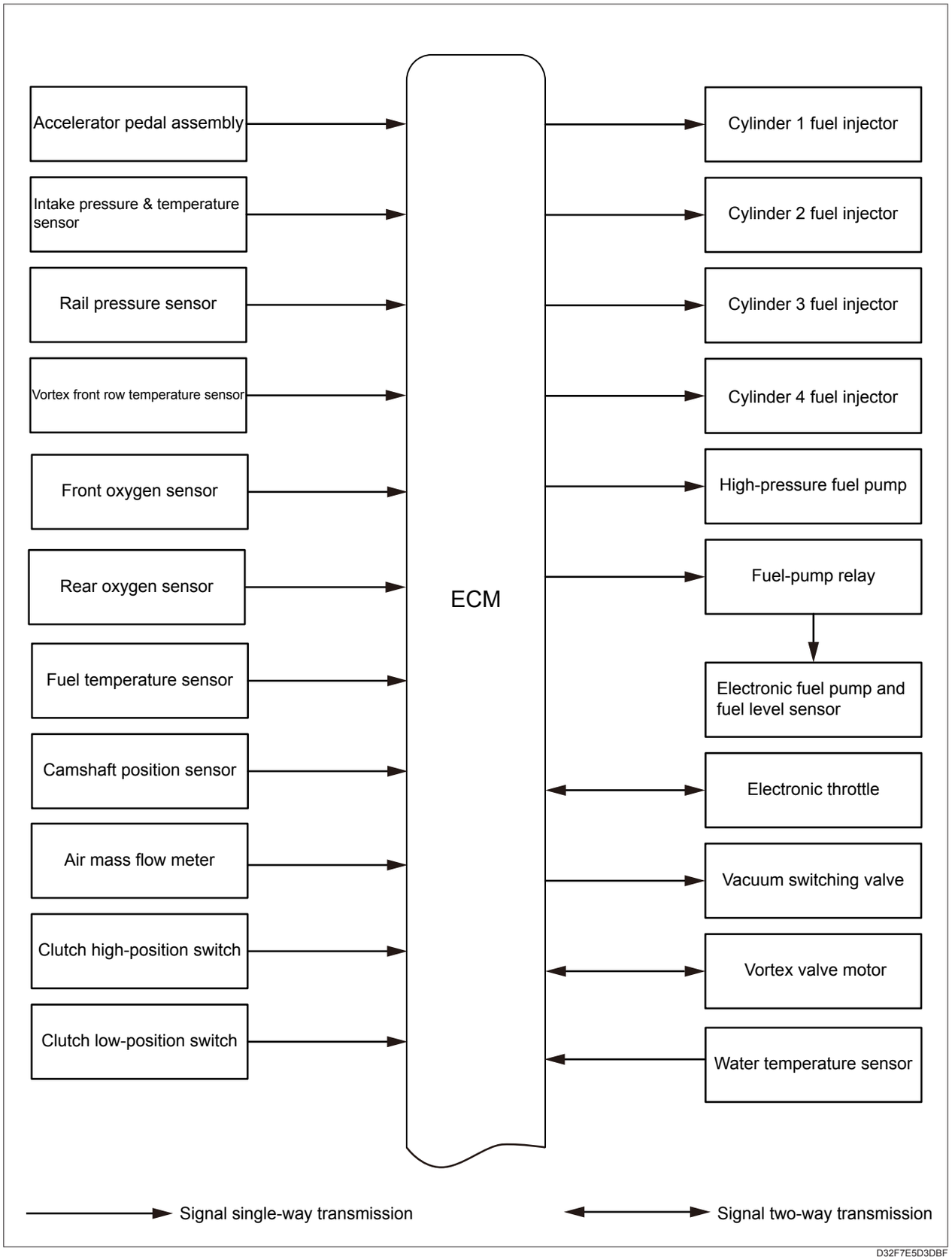
Location diagram .....3－297
Pin definition .....3－298
Removal/installation.....3－302
Engine control unit (8AT) .....3－303
Location diagram .....3－303
Pin definition .....3－304
Removal/installation.....3－308
Camshaft phase sensor .....3－309
Operating principle.....3－309
Structural diagram .....3－310
Pin definition .....3－311
Removal/installation.....3－311
Crankshaft position sensor .....3－313
Operating principle.....3－313
Structural diagram .....3－314
Pin definition .....3－315
Check.....3－315
Removal/installation.....3－316
High temperature sensor .....3－318
Operating principle.....3－318
Structural diagram .....3－319
Pin definition .....3－320
Check.....3－320
Removal/installation.....3－321

Engine control system (6MT)

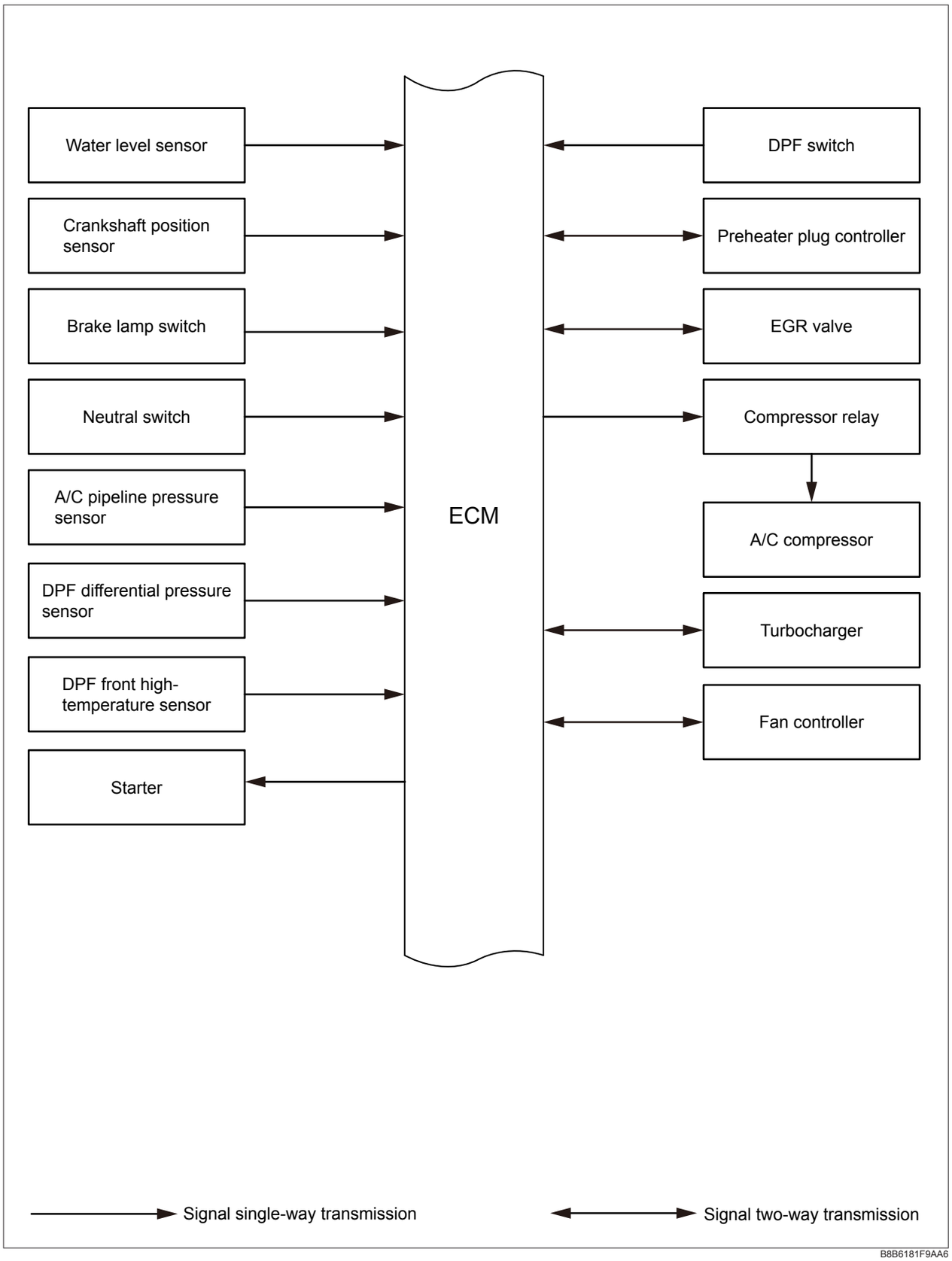
Precautions

- Only the digital multimeter or diagnostic tester is allowed for check of the control system.
- Please use the specified components, otherwise the control system may work abnormally.
- Perform maintenance work according to standard maintenance and diagnosis flowchart.
- Disassembling control system components is prohibited.
- Detecting the input or output signal from any components by means of piercing the wiring sheath is not allowed.
- Take care to prevent electronic elements (e.g., electronic control unit and sensor) from collision or falling on the ground in disassembling.
- Do not arbitrarily remove any parts or connectors of the control system from their installation position, otherwise damage or entry of foreign objects into the connectors may be caused which may affect normal operation of the control system.
- In connecting or disconnecting connectors, turn off ignition switch, otherwise damage to electrical components may be caused. Electronic control unit temperature over 80℃ is not allowed during maintenance which may give rise to temperature rise.
- According to local regulations, the waste generated during the maintenance process should be properly handled.
- In connecting a battery, take care to avoid faulty connection which may cause damage to electronic elements.
- Do not disconnect battery harness while the engine is running.

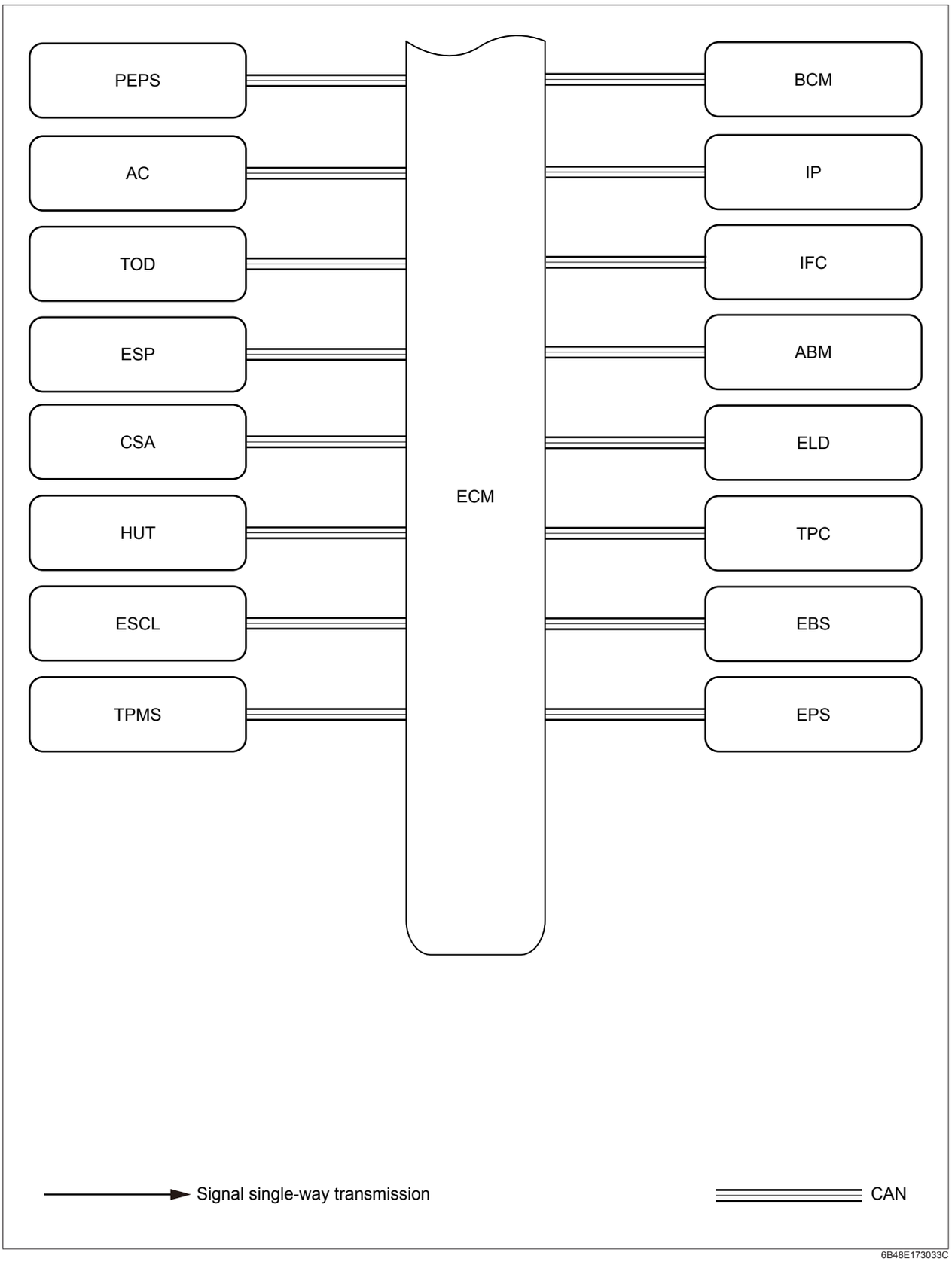
System diagram



D32F7E5D3DBF



B8B6181F9AA6



6B48E173033C

Specified torque

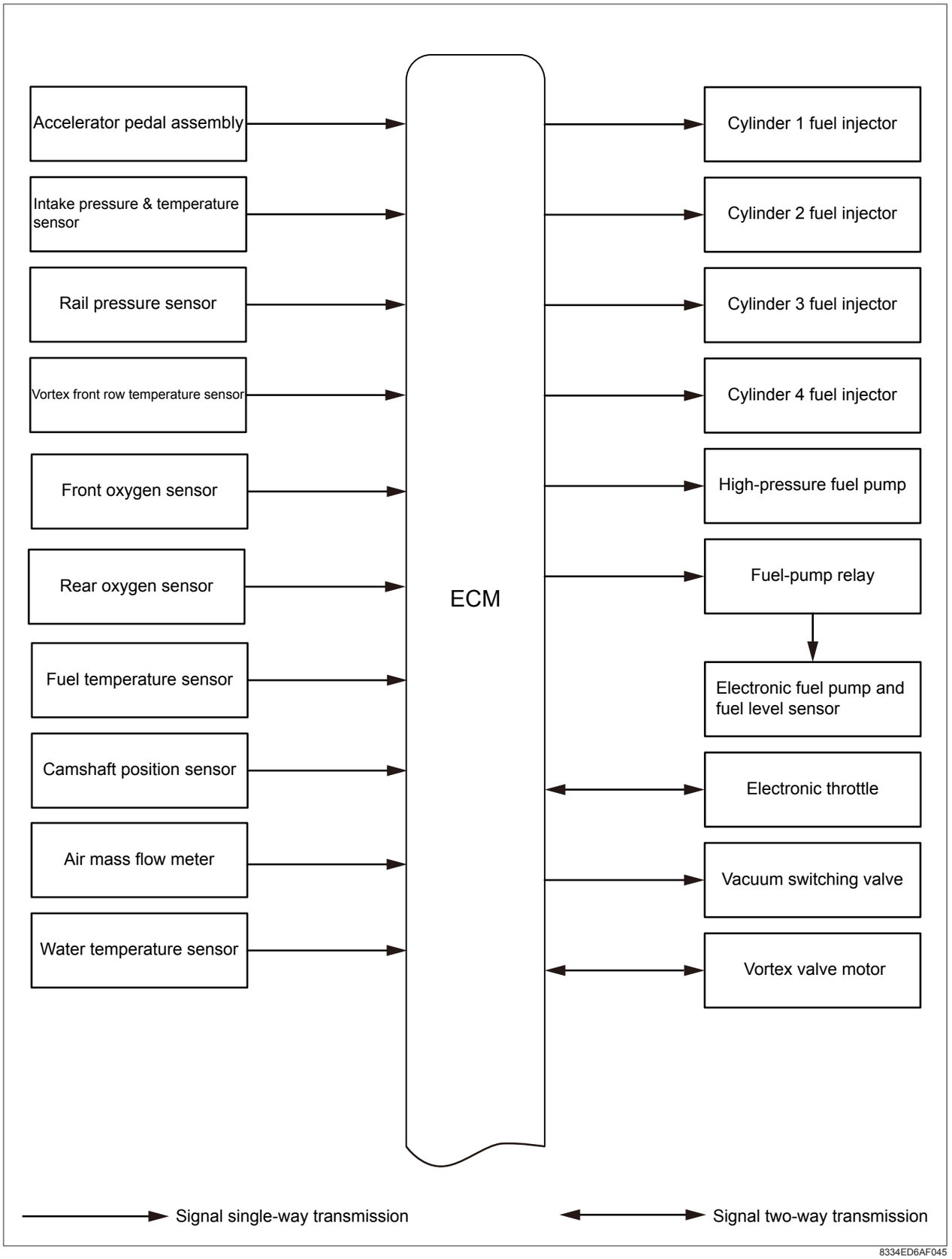
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Camshaft position sensor × cylinder head cover	10±1	1	—
Bolt	Crankshaft position sensor × cylinder block	10±1	1	—
High-temperature sensor	High-temperature sensor x exhaust manifold	45±6	1	—
Bolt	Engine control unit × engine control unit bracket 1	9±1	4	—
Nut	Engine control unit bracket 2 × vehicle body	9±1	1	—
Bolt	Engine control unit bracket 2 × engine control unit bracket 1	9±1	1	—
Bolt	Engine control unit bracket 1 x front right wheel cover	9±1	4	—

Engine control system (8AT)

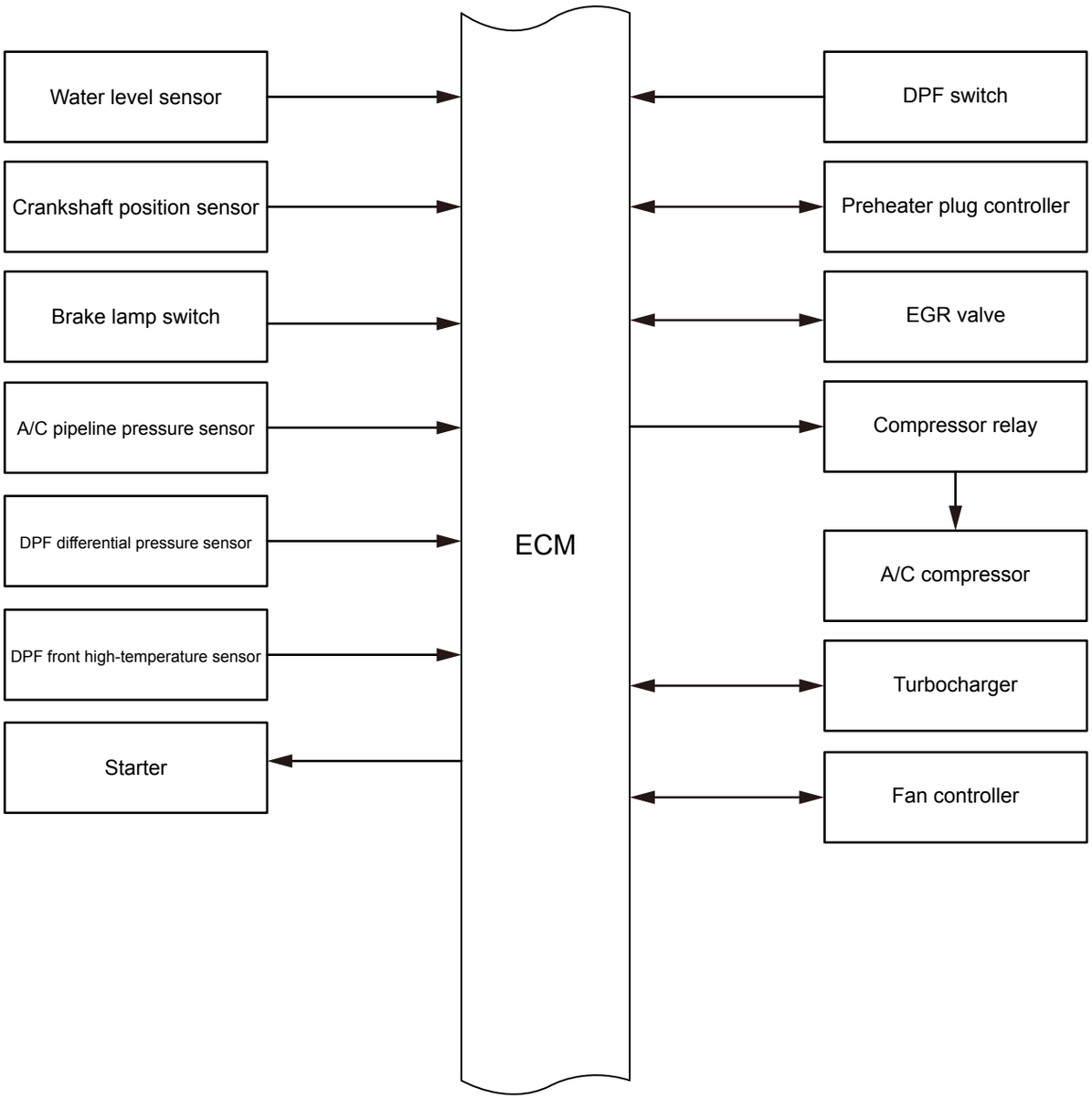
Precautions

- Only the digital multimeter or diagnostic tester is allowed for check of the control system.
- Please use the specified components, otherwise the control system may work abnormally.
- Perform maintenance work according to standard maintenance and diagnosis flowchart.
- Disassembling control system components is prohibited.
- Detecting the input or output signal from any components by means of piercing the wiring sheath is not allowed.
- Take care to prevent electronic elements (e.g., electronic control unit and sensor) from collision or falling on the ground in disassembling.
- Do not arbitrarily remove any parts or connectors of the control system from their installation position, otherwise damage or entry of foreign objects into the connectors may be caused which may affect normal operation of the control system.
- In connecting or disconnecting connectors, turn off ignition switch, otherwise damage to electrical components may be caused. Electronic control unit temperature over 80℃ is not allowed during maintenance which may give rise to temperature rise.
- According to local regulations, the waste generated during the maintenance process should be properly handled.
- In connecting a battery, take care to avoid faulty connection which may cause damage to electronic elements.
- Do not disconnect battery harness while the engine is running.

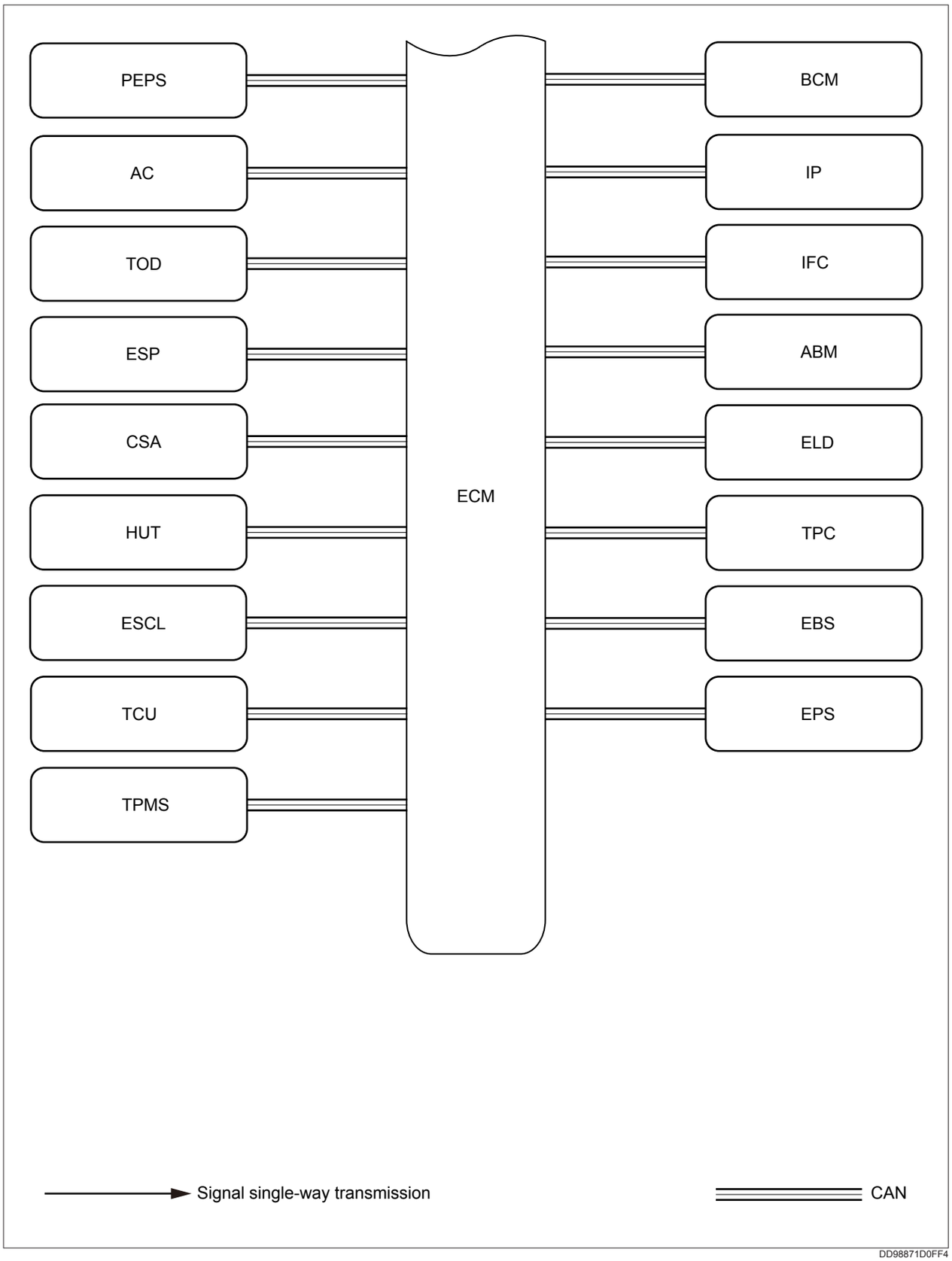
System diagram



8334ED6AF045



089AA3B7D72D


PEPS
AC
TOD
ESP
CSA
HUT
ESCL
TCU
TPMS
ECM
BCM
IP
IFC
ABM
ELD
TPC
EBS
EPS
Signal single-way transmission
CAN
DD98871D0FF4

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Camshaft position sensor × cylinder head cover	10±1	1	—
Bolt	Crankshaft position sensor × cylinder block	10±1	1	—
High-temperature sensor	High-temperature sensor x exhaust manifold	45±6	1	—
Bolt	Engine control unit × engine control unit bracket 1	9±1	4	—
Nut	Engine control unit bracket 2 × vehicle body	9±1	1	—
Bolt	Engine control unit bracket 2 × engine control unit bracket 1	9±1	1	—
Bolt	Engine control unit bracket 1 x front right wheel cover	9±1	4	—

Diagnostic information

List of DTC

S/N	DTC	DTC description
1	C003100	Reasonable fault of front left wheel sensor signals
2	C003200	Open circuit of front left wheel sensor
3	C003208	Direction of front left wheel sensor opposite to that of other 3 wheels
4	C003408	Reasonable fault of front right wheel sensor signals
5	C003500	Open circuit of front right wheel sensor
6	C003508	Direction of front right wheel sensor opposite to that of other 3 wheels
7	C003708	Reasonable fault of rear left wheel sensor signals
8	C003800	Open circuit of rear left wheel sensor
9	C003808	Direction of rear left wheel sensor opposite to that of other 3 wheels
10	C003A08	Reasonable fault of rear right wheel sensor signals
11	C003B00	Direction of rear right wheel sensor opposite to that of other 3 wheels
12	C003B08	Open circuit of rear right wheel sensor
13	C00A000	Front left wheel sensor short-circuited to ground
14	C00A100	Front left wheel sensor short-circuited to power
15	C00A200	Front right wheel sensor short-circuited to ground
16	C00A300	Front right wheel sensor short-circuited to power
17	C00A400	Rear left wheel sensor short-circuited to ground
18	C00A500	Rear left wheel sensor short-circuited to power
19	C00A600	Rear right wheel sensor short-circuited to ground
20	C00A700	Rear right wheel sensor short-circuited to power
21	C00A900	Unknown circuit fault of front left wheel sensor
22	C00AA00	Unknown circuit fault of front right wheel sensor
23	C00AB00	Unknown circuit fault of rear left wheel sensor
24	C00AC00	Unknown circuit fault of rear right wheel sensor
25	C100B00	Wrong direction of wheel speed sensor, unable to determine target faulty wheel
26	C109904	General fault of wheel speed sensor
27	P000200	Resistance of drive circuit of fuel metering valve higher than limit value
28	P000300	Low monitoring feedback current of drive current of fuel metering valve

S/N	DTC	DTC description
29	P000400	High monitoring feedback current of drive current of fuel metering valve
30	P008800	High rail pressure in the control mode of fuel metering valve
31	P009700	Circuit fault of intake manifold temperature sensor - short circuit to ground (T22)
32	P009800	Circuit fault of temperature sensor of intake manifold - open-circuited or short-circuited to power (T22)
33	P010200	Air-flow meter open-circuited
34	P010300	Air-flow meter short-circuited
35	P010600	Reasonable fault of intake manifold pressure and atmospheric pressure - high intake manifold pressure
36	P010700	Circuit fault of pressure sensor of intake manifold - open-circuited or short-circuited to ground (P22)
37	P010800	Circuit fault of pressure sensor of intake manifold - short-circuited to power (P22)
38	P011200	Intake air temperature sensor circuit fault before intercooling - short circuit to ground (T1)
39	P011300	Circuit fault of front intake temperature sensor of intercooler - open-circuited or short-circuited to power (T1)
40	P011500	Water temperature sensor fault
41	P011700	Circuit fault of coolant temperature sensor - short circuit to ground
42	P011800	Circuit fault of water temperature sensor - open-circuited or short-circuited to power
43	P011900	Water temperature unreasonably high when engine running normally
44	P012400	Two signals from accelerator pedal position sensor not consistent
45	P012500	Unreasonable water temperature - too long to reach the temperature for closed loop
46	P012800	Unreasonable water temperature - thermostat stuck
47	P018200	Line fault of fuel temperature sensor—short circuit to ground
48	P018300	Circuit fault of fuel temperature sensor - open circuit or short circuit to power supply
49	P019200	Line fault of rail pressure sensor—short circuit to ground
50	P019300	Circuit fault of rail pressure sensor - open circuit or short circuit to power supply
51	P020100	Fault in drive circuit of fuel injector 1 - open circuit (cylinder 1)
52	P020200	Fault in drive circuit of fuel injector 4 - open circuit (cylinder 2)
53	P020300	Fault in drive circuit of fuel injector 2 - open circuit (cylinder 3)
54	P020400	Fault in drive circuit of fuel injector 3 - open circuit (cylinder 4)

S/N	DTC	DTC description
55	P021900	High engine speed fault
56	P022700	First signal voltage of accelerator pedal position sensor low
57	P022800	First signal voltage of accelerator pedal position sensor high
58	P023400	Control pressure of high pressure VGT too high
59	P025100	Fault in drive circuit of fuel metering valve - open circuit
60	P025300	Fault in drive circuit of fuel metering valve - short circuit to ground
61	P025400	Fault in drive circuit of fuel metering valve - short circuit to power supply
62	P026200	Fault in drive circuit of fuel injector 1 - short circuit of high and low ends (cylinder 1)
63	P026300	Cylinder balance problem caused by misfire of cylinder 1 caused by injector 1 (cylinder 1)
64	P026500	Fault in drive circuit of fuel injector 4 - short circuit of high and low ends (cylinder 2)
65	P026600	Cylinder balance problem caused by misfire of cylinder 4 caused by injector 2 (cylinder 2)
66	P026800	Fault in drive circuit of fuel injector 2 - short circuit of high and low ends (cylinder 3)
67	P026900	Cylinder balance problem caused by misfire of cylinder 2 caused by injector 3 (cylinder 3)
68	P026A00	Low cooling efficiency of turbo intercooler
69	P027100	Fault in drive circuit of fuel injector 3 - short circuit of high and low ends (cylinder 4)
70	P027200	Cylinder balance problem caused by misfire of cylinder 3 caused by injector 4 (cylinder 4)
71	P029900	High pressure VGT control pressure too low
72	P030000	Multi cylinder fire
73	P030100	Single cylinder fire (cylinder 1)
74	P030200	Single cylinder fire (cylinder 2)
75	P030300	Single cylinder fire (cylinder 3)
76	P030400	Single cylinder fire (cylinder 4)
77	P033500	Loss of crankshaft position sensor signal
78	P033600	High resolution signal fault of timing reference voltage - too many pulses
79	P033900	High resolution signal fault of timing reference voltage - too few pulses
80	P034000	Loss of camshaft position sensor signal
81	P034100	Unstable signal of camshaft position sensor

S/N	DTC	DTC description
82	P034400	Camshaft position signal edge not within normal range, resulting in failure to capture
83	P038000	Information modal fault of communication between preheater plug controller and ECU
84	P038200	Feedback communication format error of preheater plug (too many high levels)
85	P038300	Feedback communication format error of preheater plug (too many low levels)
86	P040200	The flow control error of EGR control valve is too large, air intake is insufficient.
87	P040300	Drive axle fault of high pressure EGR – open-circuited
88	P040500	Circuit fault of high pressure EGR position sensor - open-circuited or short-circuited to ground
89	P040600	Circuit fault of high pressure EGR position sensor - short-circuited to power
90	P040C00	Circuit fault of intake port temperature sensor of high pressure EGR - short-circuited to ground
91	P040D00	Circuit fault of intake port temperature sensor of high pressure EGR - open-circuited or short-circuited to power
92	P042100	Failure of ignition due to decline LNT hydrocarbon conversion efficiency
93	P048300	Electric fan stuck
94	P048900	Drive axle fault of high pressure EGR short-circuited to ground
95	P049000	Drive axle fault of high pressure EGR short-circuited to power
96	P04D900	Saturation of EGR flow correction
97	P050400	Inconsistence of main and auxiliary brakes
98	P050D00	Large deviation in idle speed control during cold start
99	P052F00	Power supplied to preheater plug too low
100	P053200	Feedback pressure of A/C refrigerant pressure sensor below lower limit
101	P053300	Feedback pressure of A/C refrigerant pressure sensor above upper limit
102	P053F00	Emission reduction fault at cold start - negative deviation of rail pressure control too large
103	P054100	Drive circuit of preheater plug controller short-circuited to ground
104	P054200	Drive circuit of preheater plug controller short-circuited
105	P054300	Drive circuit of preheater plug controller open-circuited
106	P054500	Temperature sensor circuit fault before turbine - short circuit to ground (T3)

S/N	DTC	DTC description
107	P054600	Circuit fault of turbine inlet temperature sensor - open-circuited or short-circuited to power (T3)
108	P056200	Battery undervoltage fault
109	P056300	Battery overvoltage fault
110	P056500	Cruise CONTROL button stuck
111	P056700	Cruise RESUME button stuck
112	P056800	Cruise SET button stuck
113	P056C00	Cruise CANCEL button stuck
114	P057900	Reasonable fault of cruise button
115	P05D800	PCV valve disconnected
116	P060A92	Temperature of printed circuit board beyond limit
117	P060A93	Unreasonable temperature sensor values of printed circuit board
118	P060A94	ECU printed circuit board temperature too high
119	P061500	Fault in low end control circuit of starting relay - open circuit
120	P061600	Fault in low end control circuit of starting relay - short circuit to ground
121	P061700	Fault in low end control circuit of starting relay - short circuit to power supply
122	P062D00	Drive circuit fault of group 1 fuel injector - short-circuited to ground
123	P062E00	Drive circuit fault of group 2 fuel injector - short-circuited to ground
124	P062F00	NVM fault
125	P063000	VIN not written
126	P064500	Relay control circuit fault of A/C compressor clutch - open-circuited
127	P064600	Relay control circuit fault of A/C compressor clutch - short-circuited to ground
128	P064700	Relay control circuit fault of A/C compressor clutch - short-circuited to power
129	P066800	Circuit fault of ECU inner temperature sensor - short circuit to ground
130	P066900	Circuit fault of ECU inner temperature sensor - open circuit or short circuit to power supply
131	P066A00	Open circuit of 2# circuit of preheater plug (#1 cylinder)
132	P066B00	Short circuit of 2# circuit of preheater plug (#1 cylinder)
133	P066C00	Short circuit of 1# circuit of preheater plug (#2 cylinder)
134	P066D00	Open circuit of 1# circuit of preheater plug (#2 cylinder)
135	P066E00	Short circuit of 4# circuit of preheater plug (#3 cylinder)
136	P066F00	Open circuit of 4# circuit of preheater plug (#3 cylinder)

S/N	DTC	DTC description
137	P067A00	Short circuit of 3# circuit of preheater plug (#4 cylinder)
138	P067B00	Open circuit of 3# circuit of preheater plug (#4 cylinder)
139	P068300	End flag error of preheater plug diagnostic information
140	P068400	Timeout of preheater plug diagnostic synchronization
141	P068500	Main relay stuck
142	P068600	Control circuit fault of main relay - overheated
143	P068700	Fault in main relay control circuit - short circuit to power supply
144	P068800	Fault in main relay circuit - open circuit
145	P068900	Fault in main relay circuit - overload
146	P069100	Control circuit fault of No. 1 electric fan relay - short-circuited to ground
147	P069200	Control circuit fault of No. 1 electric fan relay - short-circuited to power
148	P069300	Control circuit fault of No. 2 electric fan relay - short-circuited to ground
149	P069400	Control circuit fault of No. 2 electric fan relay - short-circuited to power
150	P06A600	Reference voltage fault - module 1
151	P06A700	Reference voltage fault - module 2
152	P06A800	Reference voltage fault - module 3
153	P06A900	Reference voltage fault - module 4
154	P070400	Fault of clutch switch
155	P083000	High-level switch fault of clutch
156	P083300	Low-level switch fault of clutch
157	P083F00	Consistency fault of high and low switches of clutch
158	P085100	Neutral switch stuck in closed position (non-neutral position)
159	P085200	Neutral switch stuck in open position (neutral position)
160	P085D00	Neutral switch stuck in closed state (non-neutral position)
161	P085E00	Neutral switch stuck in open state (neutral position)
162	P100E00	Electric fan overloaded
163	P100F00	Control line fault of PWM fan—open circuit
164	P101100	Control line fault of PWM fan—short circuit to ground
165	P101200	Control line fault of PWM fan—short circuit to power supply
166	P101300	High temperature of electric fan
167	P101400	Abnormal voltage of electric fan

S/N	DTC	DTC description
168	P101600	Unreasonable water temperature - stays below lower limit of max. enabled temperature
169	P101700	Unreasonable water temperature - stays above upper limit of min. enabled temperature
170	P103200	Measured value of second rail pressure sensor beyond limit
171	P103600	Negative deviation of rail pressure feedback too large
172	P104D00	Position control deviation of high voltage VGT beyond limit
173	P108800	High rail pressure in other control modes
174	P10A200	Resistance of drive circuit of fuel metering valve lower than limit value
175	P10A500	Fuel pressure control failure of fuel metering valve - pulse drive signal clamped at high potential
176	P10A600	Fuel metering valve oil pressure control failure - the corrected current of fuel inlet control valve is lower than the limit value at a large fuel supply demand
177	P10A700	Fuel metering valve oil pressure control failure - the corrected current of fuel inlet control valve is higher than the limit value at a large fuel supply demand
178	P10A900	Fuel metering valve oil pressure control failure - the corrected current of fuel inlet control valve is higher than the limit value at a low fuel supply demand
179	P10DDA2	Heater power supply voltage too low
180	P110400	Negative correction in full flow range of air-flow meter too high
181	P110500	Positive correction in full flow range of air-flow meter too high
182	P110600	Reasonable fault of intake manifold pressure and atmospheric pressure - low intake manifold pressure
183	P110900	Intake manifold pressure too high
184	P111000	First full-closed position self-learning of air throttle beyond limit
185	P111400	Deviation of short-term learning values of full-closed position self-learning of air throttle (two times of successful consecutive self-learning)
186	P111500	Unreasonable water temperature - unreasonable drop
187	P111600	Start water temperature too high at cold start of engine
188	P111800	Deviation of long-term learning values of full-closed position self-learning of air throttle (current and first self-learning)
189	P119200	Small static value drift of rail pressure sensor
190	P119300	Big static value drift of rail pressure sensor
191	P119600	Build-up of rail pressure at normal fuel level of fuel tank failed
192	P119800	Measured values of first and second rail pressure sensor not match

S/N	DTC	DTC description
193	P119900	Positive deviation of rail pressure feedback too large
194	P119B00	Static value of rail pressure sensor overflowed
195	P120E00	Long time of high rail pressure
196	P133500	High crankshaft speed detected by crankshaft position sensor
197	P140600	One-way seizure of high-pressure EGR valve (seizure-preventing operation failed)
198	P140700	Position deviation of high-pressure EGR valve beyond limit values (requirement and feedback)
199	P140800	Battery voltage beyond upper limit of safe voltage of high-pressure EGR valve
200	P140900	Battery voltage beyond lower limit of safe voltage of high-pressure EGR valve
201	P140A00	High-pressure EGR valve seized in certain position (seizure-preventing operation failed)
202	P143100	First full-closed position self-learning of high-pressure EGR valve beyond limit
203	P143300	Deviation of long-term learning values of full-closed position self-learning of high-pressure EGR valve (current and first self-learning)
204	P143400	Deviation of short-term learning values of full-closed position self-learning of high-pressure EGR valve (two times of successful consecutive self-learning)
205	P145400	Main relay turned off early due to abnormal power failure of ECU
206	P146F00	Cross-check fault of temperature sensor - unreasonable inlet temperature of SCR
207	P150000	Vehicle speed signal bus fault
208	P150100	Speed consistency fault (unreasonable speed)
209	P158100	Control circuit fault of No. 1 electric fan relay - open-circuited
210	P158300	Control circuit fault of No. 2 electric fan relay - open-circuited
211	P158400	Internal fault of electric fan
212	P160800	Correction code integrity fault of fuel injector - incomplete check
213	P161500	Fault in high end control circuit of starting relay - short circuit to ground
214	P161600	Fault in high end control circuit of starting relay - short circuit to power supply
215	P161700	Fault in high end control circuit of starting relay - open circuit
216	P162D00	Drive circuit fault of group 1 fuel injector - short-circuited to power
217	P162E00	Drive circuit fault of group 2 fuel injector - short-circuited to power
218	P16C000	Correction code of fuel injector 1# not written or incorrect (cylinder 1)

S/N	DTC	DTC description
219	P16C100	Correction code of fuel injector 2# not written or incorrect (cylinder 3)
220	P16C200	Correction code of fuel injector 3# not written or incorrect (cylinder 4)
221	P16C300	Correction code of fuel injector 4# not written or incorrect (cylinder 2)
222	P180700	Drive axle fault of high pressure VGT – short-circuited to ground (axle H)
223	P180800	Drive axle fault of high pressure VGT – open-circuited (axle H)
224	P180900	Drive axle fault of high pressure VGT – short-circuited to power (axle H)
225	P181400	Battery voltage beyond upper limit of safe voltage of high-pressure VGT (axle H)
226	P181500	Battery voltage beyond lower limit of safe voltage of high-pressure VGT (axle H)
227	P181600	ADC0 module fault
228	P181700	ADC1 module fault
229	P181800	ADC2 module fault
230	P181900	ADC5 module fault
231	P181A00	ADC6 module fault
232	P181B00	ADC7 module fault
233	P181D00	Closed-loop control of turbocharger failed
234	P182000	Cross-check fault of temperature sensor - unreasonable water temperature
235	P182200	Cross-check fault of temperature sensor - unreasonable inlet temperature of DPF
236	P182400	Cross-diagnosis of intake port temperature sensor of high pressure EGR
237	P182500	Position deviation of high-pressure EGR valve beyond limit values at cold start
238	P182700	Emission reduction fault at cold start - fuel injection mode fault of cylinder 1
239	P182800	Emission reduction fault at cold start - fuel injection mode fault of cylinder 3
240	P182900	Emission reduction fault at cold start - fuel injection mode fault of cylinder 2
241	P182A00	Emission reduction fault at cold start - fuel injection mode fault of cylinder 4
242	P182B00	Cross-check fault of temperature sensor - unreasonable air temperature around the vehicle
243	P183200	Cross-check fault of temperature sensor - unreasonable fuel temperature

S/N	DTC	DTC description
244	P183300	Idle speed too high
245	P183400	Idle speed too low
246	P183500	Cross-check fault of temperature sensor - unreasonable front intake temperature of intercooler (T1)
247	P183600	Cross-check fault of temperature sensor - unreasonable temperature of intake manifold (T22)
248	P183700	Open-loop fault of low-voltage control drive circuit
249	P183800	Low-voltage control drive circuit short-circuited to ground
250	P183A00	Reverse switch stuck
251	P183B00	Frequent interruption of DPF regeneration
252	P183C00	Emission reduction fault at cold start - control position deviation of air throttle beyond limit
253	P183D00	Emission reduction fault at cold start - positive deviation of rail pressure control too large
254	P183E00	Fault in throttle drive axle - short circuit to power supply
255	P183F00	Cross-check fault of temperature sensor - unreasonable turbine inlet temperature
256	P185000	Slow response when EGR valve opened
257	P190700	Deviation of long-term learning values of full-closed position self-learning of vortex valve (current and first self-learning)
258	P190800	Deviation of short-term learning values of full-closed position self-learning of vortex valve (two times of successful consecutive self-learning)
259	P190900	Deviation of long-term learning values of full-open position self-learning of vortex valve (current and first self-learning)
260	P191000	Deviation of short-term learning values of full-open position self-learning of vortex valve (two times of successful consecutive self-learning)
261	P191100	First full-closed position self-learning of vortex valve beyond limit
262	P191200	First full-open position self-learning of vortex valve beyond limit
263	P191300	One-way seizure of air throttle (seizure-preventing operation failed)
264	P191400	Position deviation of vortex valve beyond limit values (requirement and feedback)
265	P191900	Battery voltage beyond upper limit of safe voltage of vortex valve
266	P192000	Battery voltage beyond lower limit of safe voltage of vortex valve
267	P192100	Reference voltage VCCLBUCK module fault
268	P192200	Reference voltage VCC module fault
269	P192300	Reference voltage module overheated

S/N	DTC	DTC description
270	P192400	Reference voltage SPI fault
271	P192500	Main relay drive fault
272	P19A000	ECU safety monitoring- failure of fuel cut at collision detected
273	P19A100	ABM node fault - 089
274	P19A300	Emission reduction fault at cold start - fuel injection length fault of cylinder 1
275	P19A400	Emission reduction fault at cold start - fuel injection length fault of cylinder 3
276	P19A500	Emission reduction fault at cold start - fuel injection length fault of cylinder 2
277	P19A600	Emission reduction fault at cold start - fuel injection length fault of cylinder 4
278	P200100	Low efficiency of LNT nitrogen and oxygen conversion
279	P200200	Low DPF capture efficiency (based on PM sensor)
280	P200800	Axle H drive of vortex valve open-circuited
281	P200900	Axle H drive of vortex valve short-circuited to ground
282	P200A00	Air throttle seized in certain position (seizure-preventing operation failed)
283	P201000	Axle H drive of vortex valve short-circuited to power
284	P201600	Position feedback signal of vortex valve below lower limit
285	P201700	Position feedback signal of vortex valve above upper limit
286	P210000	Drive axle fault of air throttle – open-circuited (axle H)
287	P210200	Fault in throttle drive axle - short circuit to ground (H axle)
288	P211100	Air throttle seized in certain position (seizure-preventing operation failed)
289	P212200	Second signal voltage of accelerator pedal position sensor low
290	P212300	Second signal voltage of accelerator pedal position sensor high
291	P212600	Position deviation of air throttle beyond limit values (requirement and feedback)
292	P212700	Circuit fault of air throttle position sensor - open-circuited or short-circuited to ground
293	P212800	Circuit fault of throttle position sensor - short circuit to power supply
294	P21B600	Emission reduction fault at cold start - fuel injection timing fault of cylinder 1
295	P21B700	Emission reduction fault at cold start - fuel injection timing fault of cylinder 3
296	P21B800	Emission reduction fault at cold start - fuel injection timing fault of cylinder 2

S/N	DTC	DTC description
297	P21B900	Emission reduction fault at cold start - fuel injection timing fault of cylinder 4
298	P222700	Embedded module fault of atmospheric pressure sensor
299	P222800	Circuit fault of atmospheric pressure sensor - short circuit to ground
300	P222900	Circuit fault of atmospheric pressure sensor - open-circuited or short-circuited to power
301	P226900	Fault of fuel with water
302	P226C00	Slow response of turbocharger
303	P226D00	DPF removal fault
304	P229900	Position sensor fault of accelerator pedal (pedal signal jamming)
305	P240F00	Slow response when EGR valve closed
306	P242800	Excessively high exhaust temperature
307	P242C00	Smart sensor fault of DPF inlet temperature - temperature below lower limit
308	P242D00	Smart sensor fault of DPF inlet temperature - temperature above upper limit
309	P243F00	DPF jam warning (based on differential pressure of differential pressure sensor)
310	P245300	Reversed connection of intake pipe and outlet pipe of DPF differential pressure sensor
311	P245700	Low cooling efficiency of EGR intercooler
312	P245900	Frequent DPF regeneration
313	P245A00	Control circuit fault of high-pressure EGR cooling bypass valve – open-circuited
314	P245C00	Control circuit fault of high-pressure EGR cooling bypass valve – short-circuited to ground
315	P245D00	Control circuit fault of high-pressure EGR cooling bypass valve – short-circuited to power
316	P246300	DPF overload warning (based on differential pressure of differential pressure sensor)
317	P249F00	Too long to reach DPF regeneration conditions
318	P24A200	DPF regeneration incomplete
319	P256400	Circuit fault of high pressure VGT position sensor - open-circuited or short-circuited to ground
320	P256500	Circuit fault of high pressure VGT position sensor - short-circuited to power
321	P26E100	External voltage fault
322	P2BAB00	EGR flow too low

S/N	DTC	DTC description
323	P310100	Battery voltage beyond upper limit of safe voltage of air throttle
324	P310200	Battery voltage beyond lower limit of safe voltage of air throttle
325	P330000	Safety monitoring module of ECU software - zero torque fault detected
326	P330700	Safety monitoring module of ECU software - AD conversion module fault detected
327	P330800	Safety monitoring module of ECU software - battery fault detected
328	P330900	Safety monitoring module of ECU software - timing fault of software calling detected
329	P331000	Safety monitoring module of ECU software - ECU clock drift fault detected
330	P331200	Safety monitoring module of ECU software - cruise control fault detected
331	P331300	Safety monitoring module of ECU software - failure of cruise shutdown detected
332	P331400	Safety monitoring module of ECU software - reasonable fault of engine speed detected
333	P331A00	Safety monitoring module of ECU software - accelerator pedal signal fault detected
334	P331B00	Safety monitoring module of ECU software - software program flow fault detected
335	P332000	Safety monitoring module of ECU software - enabled monitoring fault of functional safety detected
336	P332200	Safety monitoring module of ECU software - second layer of main program fault of functional safety detected
337	P333700	Safety monitoring module of ECU software - query abnormality of monitoring module detected
338	P333A00	Safety monitoring module of ECU software - software reset detected
339	P333B00	Safety monitoring module of ECU software - detected that injector or starter not locked properly
340	P333C00	Safety monitoring module of ECU software - MDP self-learning fault detected
341	P333D00	Safety monitoring module of ECU software - memory error detected
342	P334000	Safety monitoring module of ECU software - flash memory integrity fault detected
343	P334100	Safety monitoring module of ECU software - memory protection function fault detected
344	P334200	Safety monitoring module of ECU software - RAM memory integrity error detected

S/N	DTC	DTC description
345	P334300	Safety monitoring module of ECU software - reasonable fault of fuel injection pulse detected
346	P334400	Safety monitoring module of ECU software - inconsistence of required pulse and actual pulse of fuel injection detected
347	P334500	Safety monitoring module of ECU software - torque limiter fault detected
348	P334600	Safety monitoring module of ECU software - ECU reset fault detected
349	P334700	Safety monitoring module of ECU software - timing fault of software detected
350	P334800	Safety monitoring module of ECU software - channel closing test failed
351	P334900	Safety monitoring module of ECU software - CAN channel fault in channel closing test
352	P334A00	Safety monitoring module of ECU software - function controller failed to lock fuel injector in channel closing test
353	P334B00	Safety monitoring module of ECU software - fuel pump fault in channel closing test
354	P334C00	Safety monitoring module of ECU software - monitoring module failed to lock fuel injector in channel closing test
355	P334D00	Safety monitoring module of ECU software - starter drive module failed to shut down in channel closing test
356	P335000	Safety monitoring module of ECU software - main chip watchdog fault detected
357	U003088	CAN1 communication lost
358	U003188	CAN2 communication lost
359	U004600	CAN0 bus short-circuited
360	U007300	CAN1 bus short-circuited
361	U010087	CAN communication lost (reception timeout)
362	U010600	CAN communication lost (speed value invalid)
363	U012281	ABS 231 node signal error
364	U012287	ESP node missing
365	U014087	BCM node lost
366	U040086	CAN communication lost (temperature value in front of vehicle AdBlue nozzle invalid)
367	U040129	CAN communication lost (ambient air temperature value invalid)
368	U040182	CAN communication lost
369	U040186	CAN communication lost (vehicle lateral acceleration value invalid)
370	U041600	ESP 166 node signal error

S/N	DTC	DTC description
371	U100087	ABM node lost
372	U100281	ABM 245 node signal error
373	U100300	ABM 231 node signal error
374	U100400	ABS 246 node signal error
375	U100500	ABS 265 node signal error
376	U100600	CSA 0A1 node signal error
377	U100E00	Missing GW node
378	U100F00	ESP 211 node signal error
379	U101500	CAN communication lost (temperature value of vehicle engine coolant invalid)
380	U101800	CAN communication lost (vehicle exhaust mass flow value invalid)
381	U101900	CAN communication lost (vehicle intake temperature value invalid)
382	U101B00	CAN communication lost (vehicle longitudinal acceleration value invalid)
383	U120100	SENT signal of DPF sensor lost

P181600/P181700/P181800/P181900/P181A00//P181B00

P181600

DTC definition: ADC0 module fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: Any one of two self-inspection cnt values of ADC0 module exceeds the range of M1 cnt > 380 or < 300 and M2 cnt > 720 or < 640.

P181700

DTC definition: ADC1 module fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: Any one of two self-inspection cnt values of ADC1 module exceeds the range of M1 cnt > 380 or < 300 and M2 cnt > 720 or < 640.

P181800

DTC definition: ADC2 module fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: Any one of two self-inspection cnt values of ADC2 module exceeds the range of M1 cnt > 380 or < 300 and M2 cnt > 720 or < 640.

P181900

DTC definition: ADC3 module fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: Any one of two self-inspection cnt values of ADC3 module exceeds the range of M1 cnt > 380 or < 300 and M2 cnt > 720 or < 640.

P181A00

DTC definition: ADC4 module fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: Any one of two self-inspection cnt values of ADC4 module exceeds the range of M1 cnt > 380 or < 300 and M2 cnt > 720 or < 640.

P181B00

DTC definition: ADC5 module fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: Any one of two self-inspection cnt values of ADC5 module exceeds the range of M1 cnt > 380 or < 300 and M2 cnt > 720 or < 640.

i Notice

› The cnt value corresponds to a voltage value, for example, 1050cnt corresponds to 5V, and more

than 1050cnt means more than 5V.

› M1 refer to 1/3 of 5V.

› M2 refers to 2 / 3 of 5V voltage.

Possible fault description

› OBD indicator is on.

› Shutdown is delayed.

› The functions of hydraulic test, IMV test and rail pressure test are disabled.

Possible Causes

› ADC module

Troubleshooting

1. Replace ECM

P192100/P192200/P192300/P192400

P192100

DTC definition: The reference voltage VCC/LBUCK module fails.

P192200

DTC definition: The reference voltage VCC module fails.

P192300

DTC definition: The reference voltage module is overheated.

P192400

DTC definition: The reference voltage SPI fails.

DTC detection conditions: The ECU/C2PS chip performs the self-diagnosis.

Possible fault description

› OBD indicator is on.

Possible Causes

› The ECU reference voltage module fails.

Troubleshooting

1. Use a fault scanner to read if there are other DTCs together with it.
   - › Yes: Eliminate the faults.
   - › No: Go to the next step.
2. Check the sensor or actuator pin corresponding to the reference voltage module.

Reference voltage	Sensor	Pin No.
Reference voltage 1	Exhaust back pressure valve position sensor	A05
	Vortex valve position sensor	
	Turbocharger position sensor	A54
	Intake manifold pressure and temperature sensor	
	A/C pressure sensor	A55
	Air throttle position sensor	A60
	Low-pressure EGR valve position sensor	
	Low-pressure EGR valve differential pressure sensor	

Reference voltage	Sensor	Pin No.
Reference voltage 2	Air mass flow meter	B33
	DPF differential pressure sensor	B35
	Accelerator-pedal sensor 2	B36
	High-pressure EGR valve position sensor	A56
	Camshaft position sensor	A58
	Exhaust manifold pressure sensor	
	Engine oil level sensor	A59
Reference voltage 3	Rail pressure sensor	A46
Reference voltage 4	Accelerator-pedal sensor 1	B32

P226D00

P226D00

DTC definition: DPF removal failure

DTC detection conditions:

1. The engine speed is > 1,000 rpm and the running time is > 500s.

DTC occurring condition: pressure difference between front and rear parts < -1 kPa (MT)

DTC occurring condition: pressure difference between front and rear parts < -1.2 kPa (AT)

Possible fault description

- The OBD failure indicator is on.
- DPF regeneration is disabled.
- Power is insufficient and torque is limited.

Possible Causes

- DPF is subject to serious cracking and damage, resulting in an extremely low differential pressure.
- The DPF pipe is empty.
- DPF is removed.
- The reading of differential pressure sensor is very low.

Troubleshooting

1. Check the DPF appearance for damage.
   - Yes: Replace DPF.
   - No: Go to the next step.
2. Check whether the differential pressure sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the differential pressure sensor.
3. Use a diagnostic apparatus to read whether there are other faults.
   - Yes: Eliminate the faults.
   - No: Go to the next step.
4. Can the forced regeneration triggered by using the diagnostic apparatus be completed?
   - Yes: The system is normal.
     - It may be caused by insufficient mileage or driving time.
   - No: Replace DPF.

P246300/P243F00

P246300

DTC definition: DPF overload warning (based on differential pressure of differential pressure sensor)

DTC detection conditions:

1. The exhaust flow rate is > 20 g/s.

DTC occurring condition: DPF differential pressure sensor value > 7.8 kPa

P243F00

DTC definition: DPF blockage warning (based on differential pressure of differential pressure sensor)

DTC detection conditions:

1. The exhaust flow rate is > 20 g/s.

DTC occurring condition: DPF differential pressure sensor value > 10kpa.

Possible fault description

- The OBD failure indicator is on.
- DPF indicator is on.
- The CE lamp flashes frequently.
- Power is insufficient and torque is limited.

Possible Causes

- The regeneration temperature is too low to complete the regeneration.
- The differential pressure sensor is blocked.
- DPF is filled with foreign matters.

Troubleshooting

1. Check whether the differential pressure sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the sensor.
2. Meet the regeneration conditions and complete the parking DPF regeneration.
   - Yes: Finished.
   - No: Replace DPF.

P245900

P245900

DTC definition: DPF regeneration occurs frequently.

DTC detection conditions:

1. When the engine is under its normal operating conditions, regeneration is performed after the engine runs two times.

DTC occurring condition: regeneration cumulative time > 7,200s

Possible fault description

- The OBD failure indicator is on.
- DPF regeneration is disabled.
- Power is insufficient and torque is limited.

Possible Causes

- When the vehicle is running, the engine runs at a low speed for a long time (like less than 1,500 rpm) or at a medium and low speed with large throttle opening for a long time.
- The vehicle is stopped/shut down frequently after short-distance running (including frequent idling and frequent shutdown with key).
- The diesel oxidation catalyst in vehicle is aged or the catalytic efficiency is decreased due to the use of unacceptable fuel/engine oil.
- It is difficult for DPF inlet temperature to rise during active regeneration due to other reasons (such as throttle damage and related temperature sensor failure).
- The engine combustion is poor and the carbon emission is high.
- The intake system leaks.
- Differential pressure sensor failure.

Troubleshooting

1. Check the DPF appearance for damage.
   - Yes: Replace DPF.
   - No: Go to the next step.
2. Check whether the differential pressure sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the differential pressure sensor.
3. Check whether other combustion related components such as EGR or throttle are normal.
   - Yes: proceed to the next step.
   - No: Troubleshoot.
4. Check whether the engine combustion is poor.
   - Yes: Eliminate the faults.
   - No: Go to the next step.
5. Use a diagnostic apparatus to read whether there are other faults.
   - Yes: Eliminate the faults.

- No: Go to the next step.

6. Can the forced regeneration triggered by using the diagnostic apparatus be completed?
   - Yes: The system is normal.
     - It may be caused by insufficient mileage or driving time.
   - No: Replace DPF.

P242D00/P242C00

P242D00

DTC definition: DPF front high-temperature sensor fault - temperature exceeding high limit

DTC occurring condition: voltage signal of DPF front high-temperature sensor > 4.76V

P242C00

DTC definition: DPF front high-temperature sensor fault - temperature exceeding low limit

DTC occurring condition: voltage signal of DPF front high-temperature sensor < 0.25V

Possible fault description

› The OBD failure indicator is on.

› DPF regeneration is disabled.

Possible Causes

› P242D00: The DPF front high-temperature sensor circuit is open or short-circuited to power supply.

› P242C00: The DPF front high-temperature sensor is short-circuited to ground.

Troubleshooting

1. Check whether the DPF front high-temperature sensor is normal.
   › Yes: proceed to the next step.
   › No: Replace the sensor.
2. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the harness connector of DPF front high-temperature sensor.
4. Place the ignition switch in the ON position.
5. Measure the voltage between the DPF front high-temperature sensor harness connector position sensor power pin and the ground.

   Normal voltage: about 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
   › The harness is damaged.
   › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Place the ignition switch in the OFF position

i Notice

› Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of DPF front high-temperature sensor harness connector

and the corresponding pin of ECM harness connector.

Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between pin of harness connector of DPF front high-temperature sensor and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of DPF front high-temperature sensor.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Replace ECM
12. Install the ECM harness connector.
13. Install the DPF front high-temperature sensor harness connector.
14. Place the ignition switch in the ON position.
15. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the DTC still exists, the DPF front high-temperature sensor may be damaged.

P182200

P182200

DTC definition: temperature sensor cross-check fault - DPF inlet temperature unacceptable

DTC detection conditions:

1. The sensor has no other faults.
2. When the shutdown time is more than 8h, start the engine to run less than 5s.

DTC occurring condition: temperature sensor cross-diagnosis > 40°C

Possible fault description

- The OBD failure indicator is on.
- DPF regeneration is disabled.

Possible Causes

- In the first few seconds after an engine is stopped for a long time (like after 8h) and then restarted, the sensor readings detected by ECM are obviously different from those of other nearby sensors (such as DOC inlet temperature sensor and SCR inlet temperature sensor), and this fault may be caused by the following factors:
  - Temperature sensor failure
  - Harness and connector failure
  - Sensor power supply malfunction
  - Sensor falling off
  - Sensor not installed in the correct position

Troubleshooting

1. Check whether the sensor is installed normally.
   - Yes: proceed to the next step.
   - No: Correctly install the sensor.
2. Check whether the sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the sensor.
3. Place the ignition switch in the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Disconnect the temperature sensor harness connector.
5. Place the ignition switch in the ON position.
6. Measure the voltage between the temperature sensor harness connector position sensor power pin and the ground.

   Normal voltage: about 5V

i Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:

- The harness is damaged.
- The connector is damaged.

- If the measured voltage is within range of normal voltage, go on with the next operation.

7. Place the ignition switch in the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

8. Disconnect ECM harness connector
9. Measure the resistance between the pin of temperature sensor harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Replace ECM
11. Install the ECM harness connector.
12. Install the temperature sensor harness connector.
13. Place the ignition switch in the ON position.
14. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the DTC still exists, the temperature sensor may be damaged.

P145600/U120100

P145600

DTC definition: DPF differential pressure sensor fault - deviation of DPF differential pressure static value is unacceptable.

DTC occurring condition: The differential pressure of DPF differential pressure sensor is less than < 1 kPa (MT).

DTC occurring condition: The differential pressure of DPF differential pressure sensor is less than 2 kPa (AT).

U120100

DTC definition: The DPF sensor SENT signal is lost.

DTC occurring condition: The DPF sensor SENT signal is lost.

Possible fault description

- The OBD failure indicator is on.
- DPF regeneration is disabled.

Possible Causes

- The sensor harness is not well connected.
- The sensor signal is inaccurate.

Troubleshooting

1. Check the sensor harness for poor connection.
   - Yes: Repair the harness.
   - No: Go to the next step.
2. Check whether the sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the sensor.
3. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - Yes: Diagnostic assistance
   - No: Finished.

P183B00

P183B00

DTC definition: DPF regeneration is frequently interrupted.

DTC detection conditions:

1. The amount of regenerated residual carbon in DPF regeneration state is > 12g.

DTC occurring condition: interrupted times > 5

Possible fault description

- The OBD failure indicator is on.
- The service indicator flashes.
- The DPF indicator flashes.
- DPF regeneration is disabled.
- Power is insufficient and torque is limited.

Possible Causes

- The DPF regeneration conditions are not met, or regeneration is artificially interrupted.

Troubleshooting

1. Manual perform the parking regeneration.
2. Check whether the regeneration conditions are met.

Regeneration activation conditions:

- At present, there is no relevant fault that will prohibit regeneration.
- The environmental conditions such as engine coolant temperature and engine running time are met.
- Regeneration is triggered when one of differential pressure/model/mileage conditions is met.

P24A200

P24A200

DTC definition: DPF regeneration is incomplete.

DTC detection conditions:

1. After regeneration, the carbon load of DPF is > 6g.

DTC occurring condition: The differential pressure of DPF differential pressure sensor is > 2 kPa.

Possible fault description

- The OBD failure indicator is on.

Possible Causes

- Differential pressure sensor failure.
- There is water or ice in the high- and low-pressure pipes connected by the differential pressure sensor.
- The DPF efficiency is low.

Troubleshooting

1. Check whether the differential pressure sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the differential pressure sensor.
2. Check whether the high- and low-pressure pipes of the differential pressure sensor are abnormal inside.
   - Yes: Eliminate the fault.
   - No: Go to the next step.
3. Check the exhaust system for leakage.
   - Yes: Eliminate the fault.
     - Leakage points may include: exhaust pipe, differential pressure sensor pipeline, and DPF.
   - No: Go to the next step.
4. Use a diagnostic apparatus to read whether there are other faults.
   - Yes: Eliminate the faults.
   - No: Go to the next step.
5. Can the forced regeneration triggered by using the diagnostic apparatus be completed?
   - Yes: The system is normal.
     - It may be caused by insufficient mileage or driving time.
   - No: Replace DPF.

P145400

P145400

DTC definition: The main relay is shut down early due to abnormal power failure of ECU.

DTC occurring condition: The relay performs the self-diagnosis (abnormal power failure).

Possible causes: The main relay is shut down early due to abnormal power failure of ECU.

Troubleshooting

1. Place the ignition switch in the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Pull out the main relay.
3. Measure whether the main relay is normal.
   - › Yes: Proceed to the next step.
   - › No: Replace the main relay.
4. Measure socket voltage of main relays 30 and 85.

   Normal voltage: about 12V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
   - › The circuit from main relay to battery is open.
   - › The circuit from main relay to battery is short-circuited.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Disconnect the ECM harness connector.
6. Measure the resistance between the main relay socket pin and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
   - › The harness circuit is open.
   - › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between the main relay socket pin and ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

- Harness is short-circuited to ground.
- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pins of the main relay socket.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Replace main relay
10. Install the ECM harness connector.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.
    - If the DTC disappears, the main relay may be damaged.
    - If the DTC still exists, the ECM may be damaged.

P330000/P330700/P330800/P331000/P19A000/P331200/P331300/P331400/P332000/P332200/P330900/P333B00/P333C00/P333D00/P334000/P334100/P334200/P333700/P333A00/P331A00/P331B00/P334300/P334400/P334500/P334600/P334700/P334800/P334900/P334A00/P334B00/P334C00/P334D00/P335000

P330000

DTC definition: ECU software safety monitoring module - zero torque detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P330700

DTC definition: ECU software safety monitoring module - AD converter module fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P330800

DTC definition: ECU software safety monitoring module - battery fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P331000

DTC definition: ECU software safety monitoring module - ECU clock drift fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P19A000

DTC definition: ECU safety monitoring - collision and fuel cut-off fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P331200

DTC definition: ECU software safety monitoring module - cruise control fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P331300

DTC definition: ECU software safety monitoring module - cruise shutdown fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P331400

DTC definition: ECU software safety monitoring module - engine speed rationality fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P332000

DTC definition: ECU software safety monitoring module - functional safety enabled monitoring fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P332200

DTC definition: ECU software safety monitoring module - functional safety level II main program fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P330900

DTC definition: ECU software safety monitoring module - software call timing fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P333B00

DTC definition: ECU software safety monitoring module - fuel injector or starter locking fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P333C00

DTC definition: ECU software safety monitoring module - MDP self-learning fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P333D00

DTC definition: ECU software safety monitoring module - memory error detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334000

DTC definition: ECU software safety monitoring module - flash memory integrity fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P334100

DTC definition: ECU software safety monitoring module - memory protection fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334200

DTC definition: ECU software safety monitoring module - RAM integrity error detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P333700

DTC definition: ECU software safety monitoring module - monitoring module inquiry fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P333A00

DTC definition: ECU software safety monitoring module - software reset detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P331A00

DTC definition: ECU software safety monitoring module - accelerator pedal signal fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled, and the limp home mode is started.

P331B00

DTC definition: ECU software safety monitoring module - program flow fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334300

DTC definition: ECU software safety monitoring module - fuel injection pulse rationality fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P334400

DTC definition: ECU software safety monitoring module - inconsistency between required fuel injection pulse and actual fuel injection pulse detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P334500

DTC definition: ECU software safety monitoring module - torque limiter fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P334600

DTC definition: ECU software safety monitoring module - ECU reset fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334700

DTC definition: ECU software safety monitoring module - software timing sequence fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible fault description: The service indicator lights up, and the cruise function is disabled.

P334800

DTC definition: ECU software safety monitoring module - channel close test failure

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334900

DTC definition: ECU software safety monitoring module - CAN channel fault in channel close test

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334A00

DTC definition: ECU software safety monitoring module - functional controller failure to lock fuel injector in channel close test

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334B00

DTC definition: ECU software safety monitoring module - fuel pump fault in channel close test

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334C00

DTC definition: ECU software safety monitoring module - monitoring module failure to lock fuel injector in channel close test

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P334D00

DTC definition: ECU software safety monitoring module - failure to close starter drive module in channel close test

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

P335000

DTC definition: ECU software safety monitoring module - master chip watchdog fault detected

DTC detection conditions:

1. When the ignition switch is in the ON position, and the ECM is powered on, proceed the ECM self-diagnosis.

Possible Causes

› ECM software running error or ECM damaged

Troubleshooting method

1. Check whether the vehicle chassis and grounding points are secure.
   › Yes: proceed to the next step.

› No: Troubleshoot.

2. Check whether the ECM connector is badly connected.
   › Yes: reconnect it.
   › No: Go to the next step.
3. Check the harness for short circuit and open circuit.
   › Yes: Repair the harness.
   › No: Go to the next step.
4. Check whether the resistance from the positive and negative poles of harness to ECM is too high.
   › Yes: Eliminate the fault.
   › No: Go to the next step.
5. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   › Yes: Replace ECM.
   › No: Finished.
6. Repeat step 5.
   › Yes: Diagnostic assistance
   › No: Finished.

P040500/P040600

P040500

DTC definition: high-pressure EGR position sensor line fault - open circuit or short circuit to ground

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: line voltage signal of EGR position sensor is less than < 0.02V

P040600

DTC definition: high-pressure EGR position sensor line fault - short circuit to power supply

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: line voltage signal of EGR position sensor > 4.98V

Possible Causes

- The EGR position sensor is short-circuited to power supply.
- The EGR position sensor circuit is open or short-circuited to ground.

Possible fault description

- The failure indicator is on.
- Power is insufficient and torque is limited.
- The EGR starting function is disabled.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the EGR valve harness connector.
3. Place the ignition switch in the ON position.
4. Measure the voltage between EGR valve harness connector position sensor power pin and ground.

   Normal voltage: about 5V

i Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Place the ignition switch in the OFF position

i Notice

- Wait at least 60s before proceeding with subsequent operations.

6. Disconnect ECM harness connector
7. Measure the resistance between the pin of EGR valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between EGR valve harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between pins of EGR valve harness connector.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Replace ECM
11. Install the ECM harness connector.
12. Install the EGR valve harness connector.
13. Place the ignition switch in the ON position.
14. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the DTC still exists, the EGR valve may be damaged.

P140800/P140900

P140800

DTC definition: The battery voltage exceeds the upper limit of safe voltage of high-pressure EGR valve.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: battery voltage > 16V

P140900

DTC definition: The battery voltage exceeds the lower limit of safe voltage of high-pressure EGR valve.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: battery voltage < 10V

Possible Causes

› The supply voltage exceeds the safe voltage limit of EGR valve.

Possible fault description

› The EGR function is disabled.

Troubleshooting

1. Check the battery voltage

i Notice

› If the battery voltage is too high or too low, charge, discharge or replace the battery.

› If the battery voltage is normal, proceed to the next step.

2. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the ECM harness connector.
4. Measure the resistance between the ECM harness connector GND pin and ground.

   Normal resistance: about 0Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

5. Place the ignition switch in the ON position.
6. Measure the voltage of ECM harness connector power supply pin.

Normal voltage: approximately equal to the battery voltage

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
  - The battery terminal is in poor contact.
- If the measured voltage is within the normal range, check the harness between ECM and EGR valve.

P185000/P240F00

P185000

DTC definition: slow response when the EGR valve is opened.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The deviation between the EGR valve demand and the feedback position is > 12%.

Possible cause of fault: The EGR drive motor is damaged and the response is slow.

P240F00

DTC definition: slow response when the EGR valve is closed.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The deviation between the EGR valve demand and the feedback position is <-12%.

Possible cause of fault: The EGR drive motor is damaged and the response is slow.

Troubleshooting method

1. Turn the ignition switch to the ON position, and start the engine
2. Use the diagnostic instrument to read the expected EGR value and the actual EGR position
3. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Remove the EGR valve and check the EGR valve status
   - › Clean or replace the EGR valve if there are too many foreign matters in the EGR valve or the EGR valve is stuck.
   - › If the EGR valve is normal, proceed to the next step.
5. Check whether the EGR valve is normal
   - › If the EGR valve is damaged, replace the EGR valve.
   - › If the EGR valve is normal, proceed to the next step.
6. Disconnect the EGR valve harness connector.
7. Measure the voltage between EGR valve harness connector position sensor power pin and ground.

   Normal voltage: about 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
   - › The harness is damaged.
   - › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Measure the voltage of the motor power pin of the harness connector for the EGR valve

   Normal voltage: about 9V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

10. Disconnect ECM harness connector

11. Measure the resistance between the pin of EGR valve harness connector and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between EGR valve harness connector pin and ground.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between pins of EGR valve harness connector.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

14. Replace ECM
15. Install the ECM harness connector.
16. Install the EGR valve harness connector.
17. Place the ignition switch in the ON position.
18. Check whether the DTC disappears.
    - › If the DTC disappears, the ECM may be damaged.
    - › If the DTC still exists, the EGR valve may be damaged.

P143100/P143300/P143400

P143100

DTC definition: The first self-learning of EGR valve at fully closed position is out of range.

DTC detection conditions:

1. EGR power-on self-learning.

DTC occurring condition: The first self-learning value of EGR valve at fully closed position exceeds 1.5V or is less than 0.5V.

Possible cause of fault: EGR valve is incompatible with ECU software.

P143300

DTC definition: The long-term self-learning value of EGR valve at fully closed position deviates from fault (current value and first self-learning value).

DTC detection conditions:

1. EGR power-on self-learning.

DTC occurring condition: The difference between the self-learning value of the current EGR valve at fully closed position and the first self-learning value is more than 0.5V.

Possible cause of fault: Excessive carbon deposition in EGR valve changes the fully closed position.

P143400

DTC definition: The short-term self-learning value of EGR valve at fully closed position deviates from fault (between twice contiguous and successful self-learning).

DTC detection conditions:

1. EGR power-on self-learning.

DTC occurring condition: The difference between the self-learning value of the EGR valve at fully closed position and the previous self-learning value is more than 0.5V.

Possible cause of fault: A single EGR valve block occurred during the most recent self-learning.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check EGR valve and current ECU software version.

i Notice

› If the software is unavailable, rewrite the software.

› If it is available, proceed to the next step.

3. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Remove the EGR valve and check the EGR valve status

i Notice

› Clean or replace the EGR valve if there are too many foreign matters in the EGR valve or the EGR valve is stuck.

› If the EGR valve is normal, proceed to the next step.

5. Disconnect the EGR valve harness connector.
6. Place the ignition switch in the ON position.
7. Measure the voltage between EGR valve harness connector position sensor power pin and ground.

   Normal voltage: about 5V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › The harness is damaged.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Measure the voltage of the motor power pin of the harness connector for the EGR valve

   Normal voltage: about 9V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › The harness is damaged.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

10. Disconnect ECM harness connector
11. Measure the resistance between the pin of EGR valve harness connector and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between EGR valve harness connector pin and ground.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

- Harness is short-circuited to ground.
- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between pins of EGR valve harness connector.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Place the ignition switch in the ON position.
15. Measure the voltage between each pin of EGR valve harness connector and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

16. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

17. Replace ECM
18. Install the ECM harness connector.
19. Install the EGR valve harness connector.
20. Place the ignition switch in the ON position.
21. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the DTC still exists, the EGR valve may be damaged.

P245700/P245A00/P245C00/P245D00

P245700

DTC definition: low cooling efficiency of EGR cooler

DTC detection conditions:

1. Engine speed > 800 rpm.
2. Exhaust temperature > 350℃.
3. EGR flow > 10 g/s.
4. Water temperature (60~95)℃.
5. EGR cooling bypass valve is closed.

DTC occurring condition: The ratio of actual EGR temperature drop to theoretical temperature drop is less than 0.70.

Possible cause of faults:

- EGR cooler bypass valve is jammed and opened normally.
- The cooling water pipeline of EGR cooler does not circulate.

P245A00

DTC definition: open circuit of control line of HP EGR cooling bypass valve

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-check for fault information of bypass valve controller

Possible cause of fault: The control line of HP EGR cooling bypass valve is open.

P245C00

DTC definition: short circuit to ground of control line of HP EGR cooling bypass valve

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-check for fault information of bypass valve controller

Possible cause of fault: The control line of HP EGR cooling bypass valve is short circuited to ground.

P245D00

DTC definition: short circuit to power supply of control line of HP EGR cooling bypass valve

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-check for fault information of bypass valve controller

Possible cause of fault: The control line of HP EGR cooling bypass valve is short circuited to power supply.

Possible fault description

- The failure indicator is on.
- Power is insufficient and torque is limited.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Check the cooling water pipeline of EGR cooler.

Notice

› If the cooling water pipeline of EGR cooler is blocked or the water flow is not smooth, check and repair the cooling water pipeline.

› If the cooling water pipeline of EGR cooler is normal, proceed to the next step.

3. Check the status of EGR cooler bypass valve.

Notice

› Clean the EGR cooler bypass valve if it is stuck or has foreign matter.

› If the EGR cooler bypass valve is normal, proceed to the next step.

4. Disconnect the harness connector of HP EGR cooling bypass valve.
5. Place the ignition switch in the ON position.
6. Measure the voltage between the power pin of harness connector of HP EGR cooling bypass valve and the ground.

   Normal voltage: about 12V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

7. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

8. Disconnect ECM harness connector
9. Measure the resistance between the pin of harness connector of HP EGR cooling bypass valve and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pin of harness connector of HP EGR cooling bypass valve

and the ground.

Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between pins of harness connector of HP EGR cooling bypass valve.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Place the ignition switch in the ON position.
13. Measure the voltage between pins of harness connector of HP EGR cooling bypass valve and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

14. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

15. Replace ECM
16. Install the ECM harness connector.
17. Install harness connector of HP EGR cooling bypass valve.
18. Place the ignition switch in the ON position.
19. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.

› If the DTC still exists, the EGR valve may be damaged.

P040200/P04D900/P140A00/P2BAB00

P040200

DTC definition: The flow control error of EGR control valve is too large, air intake is insufficient.

Possible causes of fault: The EGR valve is not closed tightly or leaks air.

P04D900

DTC definition: EGR flow correction saturation

DTC detection conditions:

1. EGR closed-loop control state.

DTC occurring condition: EGR flow correction is 3 or 0.33.

Possible causes of fault: the EGR passage is blocked or the EGR valve cannot be opened and closed normally.

P140A00

DTC definition: The high-pressure EGR valve is stuck in a certain position (anti-jamming operation fails).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: EGR anti-jamming fails and the EGR is jammed more than twice.

Possible cause of fault: EGR valve is completely stuck.

P2BAB00

DTC definition: EGR flow is too low.

DTC detection conditions:

1. Engine speed ＞ 900rpm
2. Water temperature > 80℃.
3. Exhaust manifold pressure > 140 Kpa.

DTC occurring condition: The difference between air flow measured by air-flow meter and by velocity density method is less than 5 g/s.

Possible cause of fault: EGR passage is blocked.

Possible fault description

- The OBD failure indicator is on.
- The service indicator lights up.
- DPF regeneration is prohibited.
- The EGR self-learning function is stopped.
- EGR open-loop control mode is on.

Troubleshooting method

1. Check the air filter for blockage.

i Notice

- In case of blockage, remove the blocking matter or replace the air filter element.

› If it is not blocked, proceed to the next step.

2. Check the exhaust pipeline in front of the turbocharger for air leakage.

Notice

› In case of air leakage, reconnect the exhaust pipe or replace the damaged exhaust pipe.

› If there is no air leakage, proceed to the next step.

3. Check whether the throttle valve is jammed or leaking.

Notice

› In case of jamming or air leakage, remove the fault.

› If there is no jamming or air leakage, proceed to the next step.

4. Check the vacuum pump for jamming.

Notice

› If it is stuck, troubleshoot it.

› If it is not stuck, proceed to the next step.

5. Check whether the vacuum pipe connecting to the vacuum control valve leaks.

Notice

› If it leaks, remove the fault.

› If there is no air leakage, proceed to the next step.

6. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect the EGR valve harness connector.
8. Place the ignition switch in the ON position.
9. Measure the voltage between EGR valve harness connector position sensor power pin and ground.

   Normal voltage: about 5V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

10. Measure the voltage of the motor power pin of the harness connector for the EGR valve

    Normal voltage: about 9V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

12. Disconnect ECM harness connector
13. Measure the resistance between the pin of EGR valve harness connector and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Measure the resistance between EGR valve harness connector pin and ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Measure the resistance between pins of EGR valve harness connector.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

16. Replace ECM
17. Install the ECM harness connector.

18. Install the EGR valve harness connector.
19. Place the ignition switch in the ON position.
20. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the EGR valve may be damaged.

P140600/P140700/P182500

P140600

DTC definition: one-way jam of EGR valve (anti-jamming operation failed).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The anti-jamming operation of the EGR valve fails and the number of EGR valve operation allowed within a certain range is > 6 (MT).

DTC occurring condition: The anti-jamming operation of the EGR valve fails and the number of EGR valve operation allowed within a certain range is > 5 (AT).

Possible cause of fault: The EGR valve is stuck.

P140700

DTC definition: Deviation of EGR valve position exceeds limit (demand and feedback).

DTC detection conditions:

1. The engine is in operation.
2. The engine coolant temperature > 0℃.
3. The battery voltage is ＞ 11V.

DTC occurring condition: The deviation between the EGR valve demand and the feedback position is > 10%.

Possible cause of fault: Impurities in the EGR valve block the movement of the valve body or the driving motor is damaged.

P182500

DTC definition: Deviation of EGR valve position exceeds limit during cold start.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The deviation between the EGR valve demand and the feedback position is > 10%.

Possible cause of fault: impurities in EGR valve block the movement of valve body or the driving motor is damaged during cold start.

Possible fault description

› The OBD failure indicator is on.

› The EGR function is disabled.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the EGR valve harness connector.
3. Place the ignition switch in the ON position.
4. Measure the voltage between EGR valve harness connector position sensor power pin and

ground.

Normal voltage: about 5V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Measure the voltage of the motor power pin of the harness connector for the EGR valve

   Normal voltage: about 9V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of EGR valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between EGR valve harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of EGR valve harness connector.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Replace ECM
12. Install the ECM harness connector.
13. Install the EGR valve harness connector.
14. Place the ignition switch in the ON position.
15. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the EGR valve may be damaged.

P040300/P048900/P049000

P040300

DTC definition: high pressure EGR drive axle fault - open circuit.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The control chip of EGR gives fault information and ECU performs self-diagnosis.

P048900

DTC definition: short circuit of high pressure EGR drive axle to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The control chip of EGR gives fault information and ECU performs self-diagnosis.

P049000

DTC definition: short circuit of high pressure EGR drive axle to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The control chip of EGR gives fault information and ECU performs self-diagnosis.

Possible fault description

- The failure indicator is on.
- Power is insufficient and torque is limited.
- The EGR starting function is disabled.

Possible Causes

- EGR drive axle is open-circuited.
- EGR drive axle is short-circuited to the power supply.
- EGR drive axle is short-circuited to ground.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Check the EGR valve harness connector
3. Place the ignition switch in the ON position.
4. Measure the voltage of the motor power pin of the harness connector for the EGR valve

   Normal voltage: about 9V

i Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:

- The harness is damaged.
- The connector is damaged.

- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

6. Disconnect the ECM harness connector.
7. Measure the resistance between the pin of EGR valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between EGR valve harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between pins of EGR valve harness connector.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Place the ignition switch in the ON position.
11. Measure the voltage between the pin of EGR valve harness connector and the ground

    Normal voltage: 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

12. Measure the voltage of 3 power pins of ECM harness connector

Notice

- If the voltage is too high or too low, repair the circuit from ECM to battery.
- If the voltage is normal, proceed to the next step.

13. Measure the resistance between 3 ground pins of ECM harness connector and the ground

    Normal resistance: 0Ω

Notice

- If the measured resistance is not within the normal resistance range, repair the circuit from ECM to the ground.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

15. Replace ECM
16. Install the harness connector of ECM and EGR valve
17. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the EGR valve may be damaged.

P140C00/P140D00

P140C00

DTC definition: too low temperature of EGR downstream temperature sensor.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage of EGR downstream temperature sensor is ＜ 0.02V.

Possible cause of fault: The EGR downstream temperature sensor fails.

P140D00

DTC definition: too high temperature of EGR downstream temperature sensor.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage of EGR downstream temperature sensor is ＞ 4.98V.

Possible cause of fault: The EGR downstream temperature sensor fails.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the EGR downstream temperature sensor
3. Check the EGR downstream temperature sensor for damage

i Notice

› Replace the EGR downstream temperature sensor if it is damaged.

› If the EGR downstream temperature sensor is normal, proceed to the next operation.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the EGR downstream temperature sensor and the ground

   Normal voltage: About 5V

i Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

i Notice

› Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the EGR downstream temperature sensor and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between each pin of harness connector of the EGR downstream temperature sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the EGR downstream temperature sensor

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of the EGR downstream temperature sensor and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.

› The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

14. Replace the EGR downstream temperature sensor
15. Install the ECM harness connector.
16. Install the harness connector of the EGR downstream temperature sensor
17. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

› If the DTC still exists, the ECM may be damaged.

› If the DTC disappears, the EGR downstream temperature sensor may be damaged.

P182400/P040C00/P040D00

P182400

DTC definition: cross diagnosis of EGR downstream temperature sensor.

DTC detection conditions:

1. The engine shutdown time is > 8h.
2. The running time is < 5s.

DTC occurring condition: The cross diagnosis shows the EGR downstream temperature sensor is > 30℃.

Possible cause of fault: The EGR downstream temperature sensor fails.

P040C00

DTC definition: short circuit of EGR downstream temperature sensor line to ground.

DTC detection conditions:

1. The engine is in operation.
2. The vehicle speed is > 0 km/h.

DTC occurring condition: The voltage value of the EGR downstream temperature sensor is less than ＜ 0.02V.

Possible cause of fault: The EGR downstream temperature sensor line is short-circuited to ground.

P040D00

DTC definition: open circuit or short circuit of EGR downstream temperature sensor line to the power supply.

DTC detection conditions:

1. The engine is in operation.
2. The vehicle speed is > 0 km/h.

DTC occurring condition: The voltage value of the EGR downstream temperature sensor is > 4.98V.

Possible cause of fault: open circuit or short circuit of EGR downstream temperature sensor line to the power supply.

Possible fault description

- The EOBD light is on.
- Power is insufficient and torque is limited.
- The EGR function is prohibited.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the EGR downstream temperature sensor
3. Check the EGR downstream temperature sensor for damage

Notice

› Replace the EGR downstream temperature sensor if it is damaged.

› If the EGR downstream temperature sensor is normal, proceed to the next operation.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the EGR downstream temperature sensor and the ground

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the EGR downstream temperature sensor and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between each pin of harness connector of the EGR downstream temperature sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the EGR downstream temperature sensor

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of the EGR downstream temperature sensor and the ground

    Normal voltage: About 0V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

14. Replace ECM
15. Install the ECM harness connector.
16. Install the harness connector of the EGR downstream temperature sensor
17. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

› If the DTC still exists, the EGR downstream temperature sensor may be damaged.

› If the DTC disappears, the ECM may be damaged.

P062F00

P062F00

DTC definition: NVM nonvolatile memory failure

DTC occurring condition: ECM self-inspection for power on with the key

Possible fault description

- The service indicator lights up.
- Disable the fuel injector quick oil drain strategy.
- The fault detection of IMV control current correction value is stopped.
- Start the limp-in mode.

Possible Causes

- ECM is damaged.

Troubleshooting

1. Check whether the vehicle chassis and grounding points are secure.
   - Yes: proceed to the next step.
   - No: Troubleshoot.
2. Check whether the ECM connector is badly connected.
   - Yes: reconnect it.
   - No: Go to the next step.
3. Check the harness for short circuit and open circuit.
   - Yes: Repair the harness.
   - No: Go to the next step.
4. Check whether the resistance from the positive and negative poles of harness to ECM is too high.
   - Yes: Eliminate the fault.
   - No: Go to the next step.
5. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - Yes: Replace ECM.
   - No: Finished.
6. Repeat step 5.
   - Yes: Diagnostic assistance
   - No: Finished.

P05D800

P05D800

DTC definition: PCV valve is open.

DTC detection conditions:

1. Battery voltage range: (6 ~ 18) V.
2. Engine running time after ignition is > 2s.

DTC occurring condition: The voltage of PCV valve line is > 90%.

Possible fault description

- The OBD service lamp is on.

Possible Causes

- The PCV valve line fails.
- The PCV valve fails.

Troubleshooting

1. Check whether the PCV line is properly connected.
   - Yes: proceed to the next step.
   - No: Repair or replace the harness.
2. Replace the PCV valve.

P063000

P063000

DTC definition: VIN is not written.

DTC occurring condition: The current VIN is 0.

Troubleshooting

1. Rewrite VIN

P06A600/P06A700/P06A800/P06A900

P06A600

DTC definition: reference voltage fault - module 1

P06A700

DTC definition: reference voltage fault - module 2

P06A800

DTC definition: reference voltage fault - module 3

P06A900

DTC definition: reference voltage fault - module 4

DTC detection condition: The ECU C2PS chip performs the self-diagnosis.

Possible fault description

- OBD indicator is on.
- Start the limp-in mode.
- A/C ON is disabled.
- Vortex valve function is disabled.

Possible Causes

- The ECU reference voltage module fails.

Troubleshooting

1. Use a fault scanner to read if there are other DTCs together with it.
   - Yes: Eliminate the faults.
   - No: Go to the next step.
2. Check the sensor or actuator pin corresponding to the reference voltage module.

Reference voltage	Sensor	Pin No.
Reference voltage 1	Exhaust back pressure valve position sensor	A05
	Vortex valve position sensor	
	Turbocharger position sensor	A54
	Intake manifold pressure and temperature sensor	
	A/C pressure sensor	A55
	Air throttle position sensor	A60
	Low-pressure EGR valve position sensor	
	Low-pressure EGR valve differential pressure sensor	

Reference voltage	Sensor	Pin No.
Reference voltage 2	Air mass flow meter	B33
	DPF differential pressure sensor	B35
	Accelerator-pedal sensor 2	B36
	High-pressure EGR valve position sensor	A56
	Camshaft position sensor	A58
	Exhaust manifold pressure sensor	
	Engine oil level sensor	A59
Reference voltage 3	Rail pressure sensor	A46
Reference voltage 4	Accelerator-pedal sensor 1	B32

P150100/P150000

P150100

DTC definition: vehicle speed consistency fault (unacceptable vehicle speed).

DTC detection conditions:

1. Engine indicated torque > 150 N.m
2. Engine speed ＞ 2000rpm
3. Not in neutral position

DTC occurring condition: vehicle speed < 10 km/h (MT).

DTC occurring condition: vehicle speed < 3km/h (AT).

P150000

DTC definition: vehicle speed signal bus fault

DTC detection conditions:

1. Engine running time > 0s
2. 10V < battery voltage < 16V, and kept at least 9V for 500 ms

DTC occurring conditions: The vehicle speed signal bus fails, and the sensor or CAN communication vehicle speed signal fails.

Possible fault description

- OBD indicator is on.
- The cruise function is disabled.

Possible Causes

- Vehicle speed signal transmission line or connector adapter has bad contact or open-circuit.
- The vehicle speed sensor fails.

Troubleshooting

1. Check if vehicle speed signal transmission line or connector adapter has bad contact or open-circuit
   - Yes: Repair or replace the relevant harness.
   - No: Go to the next step.
2. Check the vehicle speed sensor for damage.
   - Yes: Replace the vehicle speed sensor.
   - No: Go to the next step.
3. Turn the ignition switch to "ON", connect the diagnostic apparatus to send a DTC clearing command, start the engine to reach the inspection starting condition, and observe whether the DTC occurs again or not.
   - Yes: Diagnostic assistance
   - No: Finished.

P249F00

P249F00

DTC definition: It takes too long to reach the DPF regeneration condition.

DTC occurring conditions:

1. In the non-idle state, when DPF is regenerated, the regeneration temperature of DPF is not enough.

DTC occurring conditions: When the regeneration target temperature and regeneration demand state are reached, the engine load during regeneration is > 400s (MT).

DTC occurring conditions: When the regeneration target temperature and regeneration demand state are reached, the engine load during regeneration is > 450s (AT).

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› The DPF regeneration temperature is insufficient.

Troubleshooting

1. Check the exhaust system for leakage.
   - › Yes: Eliminate the fault.
     - › Leakage points may include: exhaust pipe, differential pressure sensor pipeline, and DPF.
   - › No: Go to the next step.
2. Use a diagnostic apparatus to read whether there are other faults.
   - › Yes: Eliminate the faults.
   - › No: Go to the next step.
3. Can the forced regeneration triggered by using the diagnostic apparatus be completed?
   - › Yes: The system is normal.
     - › It may be caused by insufficient mileage or driving time.
   - › No: Replace DPF.

P222700/P222800/P222900

P222700

DTC definition: The atmospheric pressure sensor embedded module fails.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The atmospheric pressure sensor self-diagnosis pressure value exceeds the limit.

P222800

DTC definition: The atmospheric pressure sensor line is short-circuited to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: voltage value < 0.15V

P222900

DTC definition: The atmospheric pressure sensor circuit is open or short-circuited to power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: voltage value > 4.9V

Possible Causes

- The atmospheric pressure sensor fails.
- The atmospheric pressure sensor circuit is open or short-circuited to power supply or ground.

Possible fault description

- The OBD failure indicator is on.

Troubleshooting

1. Place the ignition switch in the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect ECM harness connector
3. Place the ignition switch in the ON position.
4. Measure the voltages between 3 power pins of ECM harness connector and ground.

   Normal voltage: (10~14)V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The fuse is damaged.
  - The harness fails.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Place the ignition switch in the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

6. Measure the resistance between 3 ground pins of ECM harness connector and the ground

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Install the ECM harness connector.
8. Place the ignition switch in the ON position.
9. Read the atmospheric pressure sensor data with diagnostic apparatus

   Normal value: about 1bar (when the altitude is 0)

Notice

› If the measured value is not within the normal range, the possible causes are as follows:

  › ECM is damaged.

› If the measured value is within the normal range, the test is finished.

P050D00/P183300/P183400

P050D00

DTC definition: The deviation of idle speed control during cold start is too large.

P183300

DTC definition: The speed under the idle operating conditions is more than the normal value.

P183400

DTC definition: The speed under the idle operating conditions is less than the normal value.

DTC detection conditions:

1. Engine running state, throttle position < 1%
2. Atmospheric pressure > 75 kPa
3. -7°C < air inlet temperature < 60°C
4. -15°C < coolant temperature < 60°C
5. Engine indicator torque < 100 N.m

DTC occurring condition: The engine speed deviates from its target value, and the idle speed is less than its target value by 30%.

Possible Causes

› The idle speed control has problems.

Troubleshooting

1. Check whether there are other DTCs.
   - › Yes: Eliminate the faults.
   - › No: Go to the next step.
2. Refresh the ECM.

P183A00

P183A00

DTC definition: The reverse switch is subject to jamming.

DTC detection conditions:

1. Turn the ignition switch to the ON position.
2. The vehicle starts and runs by a distance of > 2,000m.
3. The reverse switch signal is active.

DTC occurring condition: The reverse switch signal is Ture.

Possible Causes

- The line fails.
- The switch fails.

Troubleshooting

1. Check whether the relevant harness is normal.
   - Yes: proceed to the next step.
   - No: Repair or replace the harness.
2. Replace the reverse switch

P183700/P183800

P183700

DTC Definition: open-loop fault of the LV control drive circuit.

DTC detection conditions:

1. The ignition switch is placed at ON, and the ECM performs self-inspection.

P183800

DTC Definition: Short circuit of LV control drive circuit to ground.

DTC detection conditions:

1. The ignition switch is placed at ON, and the ECM performs self-inspection.

Possible fault description

- The failure indicator is on.
- The vehicle cannot be started.

Possible Causes

- The low pressure fuel pump line fails.
- The low pressure fuel pump fails.

Troubleshooting method

1. Check whether the fuel pressure is too low
   - If the fuel pressure is too low, the possible causes are as follows:
     - The primary fuel filter is blocked due to excessive impurities in fuel.
     - The fuel pipeline of the system is blocked or the fuel filter on the pipeline is blocked and the fuel cannot pass through.
     - The fuel pump turbine is seriously worn.
     - The fuel pipeline leaks.
   - If the fuel pressure is normal, proceed to the next step.
2. Check whether the electric fuel pump does not supply oil
   - If the electric fuel pump does not supply oil, the possible causes are as follows:
     - The fuse of the circuit of the system is short-circuited.
     - The electric fuel pump control relay is short-circuited or open-circuited.
     - The DC motor of the fuel pump fails (reverse connection of the terminals, physical damage, internal short circuit caused by excessive water content in fuel).
     - The fuel pump and filter screen are blocked due to fuel sintering.
     - The electric appliance connectors of the positive and negative electrodes of the fuel pump are of poor contact.
   - If the electric fuel pump supplies oil normally, proceed to the next step.
3. Check whether the fuel level sensor works abnormally
   - If the fuel level sensor does not work properly, the possible causes are as follows:
     - The fuel float fails or is damaged and falls off or the swing rod element is deformed during assembly.

- Impurities in fuel accumulate in the sensor, resulting in poor contact between the sliding assembly and the sensor.
- The sensor is excessively corroded and damaged by dirty fuel.
- The fuel level indication of the instrument panel, the fuel level sensor and the height of fuel tank fuel level do not match.

› If the fuel level sensor works normally, proceed to the next step.

4. Check whether the low pressure fuel pump line is normal
   - › Yes: Repair the harness.
   - › No: Go to the next step.
5. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

6. Disconnect the harness connector of the low pressure fuel pump
7. Disconnect the ECM harness connector.
8. Measure the resistance between the pin of harness connector of the low pressure fuel pump and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
   - › The harness circuit is open.
   - › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of harness connector of the low pressure fuel pump and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
   - › Harness is short-circuited to ground.
   - › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
    - › Yes: Diagnostic assistance
    - › No: Finished.

P211100/P310100/P310200

P211100

DTC definition: The electronic throttle is stuck in a certain position (anti-jamming operation fails).

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The anti-jamming operation for the electronic throttle fails and the number of failure to actuate the throttle is more than 2.

Possible cause of fault: The electronic throttle is stuck.

P310100

DTC definition: The power supply voltage exceeds the upper limit of throttle safe voltage.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: power supply voltage > 17V.

Possible cause of fault: The battery voltage is too high.

P310200

DTC definition: The power supply voltage exceeds the lower limit of throttle safe voltage.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: power supply voltage < 9V.

Possible cause of fault: The battery voltage is too low.

Possible fault description

› The OBD failure indicator is on.

Troubleshooting method

1. Check the battery voltage

i Notice

› If the battery voltage is too high or too low, charge, discharge or replace the battery.

› If the battery voltage is normal, proceed to the next step.

2. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Remove the electronic throttle and check the appearance and functional status of it.

i Notice

› Clean or replace the electronic throttle if it contains too many foreign matters or it is stuck.

› If it is normal, proceed to the next step.

4. Disconnect the ECM harness connector.

5. Measure the resistance between the ground pin of ECM harness connector and the ground.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

6. Place the ignition switch in the ON position.
7. Measure the voltage of ECM harness connector power supply pin.

   Normal voltage: approximately equal to the battery voltage

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
  - The battery terminal is in poor contact.
- If the measured voltage is within range of normal voltage, go on with the next operation.

8. Disconnect harness connector of electronic throttle
9. Measure the resistance between the pin of harness connector of electronic throttle and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pin of harness connector of electronic throttle and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between the pins of the harness connector of electronic throttle.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the voltage between the pins of the harness connector of electronic throttle and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

14. Install the ECM harness connector.
15. Place the ignition switch in the ON position.
16. Measure the voltage of the motor power pin in the harness connector of electronic throttle.

    Normal voltage: about 9V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

17. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

18. Replace the electronic throttle.
19. Install the harness connector of electronic throttle.
20. Place the ignition switch in the ON position.
21. Check whether the DTC disappears.

Notice

- If the DTC disappears, the electronic throttle may be damaged.
- If the DTC still exists, the ECM may be damaged.

P183C00/P212600

P183C00

DTC definition: cold start emission reduction fault (electronic throttle control position deviation exceeds limit).

DTC detection conditions:

1. The anti-jamming state of valve is not activated.
2. The engine coolant temperature > 0℃.
3. The battery voltage is ＞ 11V.

DTC occurring condition: The deviation between the required electronic throttle position and the actual position is > 10% (MT).

DTC occurring condition: The deviation between the required electronic throttle position and the actual position is > 12% (AT).

Possible cause of faults:

- Electronic throttle control motor is damaged during cold start.
- Impurities in the electronic throttle block the throttle movement.
- Electronic throttle control motor is damaged.

P212600

DTC definition: deviation of electronic throttle position exceeds limit (demand and feedback).

DTC detection conditions:

1. The engine coolant temperature > 0℃.
2. The battery voltage is ＞ 11V.

DTC occurring condition: The deviation between the required electronic throttle position and the response position is > 10%.

Possible cause of faults:

- Impurities in the electronic throttle block the throttle movement.
- Electronic throttle control motor is damaged.

Possible fault description

- The OBD failure indicator is on.
- Stop the anti-jamming policy.
- Stop learning state.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Remove the electronic throttle and check the appearance and functional status of it.

i Notice

- Clean or replace the electronic throttle if it contains too many foreign matters or it is stuck.

› If it is normal, proceed to the next step.

3. Check the resistance between positive and negative pins of electronic throttle motor.

   Normal resistance: about 2Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The electronic throttle valve is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

4. Place the ignition switch in the ON position.
5. Measure the voltage of the motor power pin in the harness connector of electronic throttle.

   Normal voltage: about 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of electronic throttle and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of harness connector of electronic throttle and the ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pins of the harness connector of electronic throttle.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between the pins of the harness connector of electronic throttle and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

14. Replace the electronic throttle.
15. Install the ECM harness connector.
16. Install the harness connector of electronic throttle.
17. Place the ignition switch in the ON position.
18. Check whether the DTC disappears.

Notice

- If the DTC disappears, the electronic throttle may be damaged.
- If the DTC still exists, the ECM may be damaged.

P312700/P312800/P312900

P312700

DTC definition: open circuit of the PWM drive circuit of the electronic throttle control motor.

DTC occurring condition: The control chip of the electronic throttle gives fault information and ECU performs self-diagnosis.

Possible cause of fault: The drive circuit of the electronic throttle control motor is open-circuited.

P312800

DTC definition: short circuit of the PWM drive circuit of the electronic throttle control motor to ground.

DTC occurring condition: The control chip of the electronic throttle gives fault information and ECU performs self-diagnosis.

Possible cause of fault: The drive circuit of the electronic throttle control motor is short-circuited to ground.

P312900

DTC definition: short circuit of the PWM drive circuit of the electronic throttle control motor to the power supply.

DTC occurring condition: The control chip of the electronic throttle gives fault information and ECU performs self-diagnosis.

Possible cause of fault: The drive circuit of the electronic throttle control motor is short-circuited to the power supply.

Possible fault description

› The OBD failure indicator is on.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect harness connector of electronic throttle
3. Check the resistance between positive and negative pins of electronic throttle motor.

   Normal resistance: about 2Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The electronic throttle valve is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

4. Place the ignition switch in the ON position.
5. Measure the voltage of the motor power pin in the harness connector of electronic throttle.

   Normal voltage: about 10V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of electronic throttle and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of harness connector of electronic throttle and the ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pins of the harness connector of electronic throttle.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.

12. Measure the voltage between the pins of the harness connector of electronic throttle and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

14. Replace the electronic throttle.
15. Install the ECM harness connector.
16. Install the harness connector of electronic throttle.
17. Place the ignition switch in the ON position.
18. Check whether the DTC disappears.

Notice

- If the DTC disappears, the electronic throttle may be damaged.
- If the DTC still exists, the ECM may be damaged.

P183E00/P210000/P210200/P210300

P183E00

DTC definition: short circuit to power supply of electronic throttle drive axle

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of electronic throttle control chip fault information

Possible cause of fault: The electronic throttle drive axle is short-circuited to power supply.

P210000

DTC definition: open circuit of electronic throttle drive axle

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of electronic throttle control chip fault information

Possible cause of fault: open circuit of electronic throttle drive axle

P210200

DTC definition: short circuit to ground of electronic throttle drive axle

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of electronic throttle control chip fault information

Possible cause of fault: The electronic throttle drive axle is short-circuited to the ground.

P210300

DTC definition: short circuit to power supply of electronic throttle drive axle

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of electronic throttle control chip fault information

Possible cause of fault: The electronic throttle drive axle is short-circuited to power supply.

Possible fault description

- The OBD failure indicator is on.
- Stop the anti-jamming policy.
- Stop learning state.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check the battery voltage

Notice

- If the battery voltage is too high or too low, charge, discharge or replace the battery.
- If the battery voltage is normal, proceed to the next step.

3. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Disconnect the ECM harness connector.
5. Place the ignition switch in the ON position.
6. Check the voltage of 3 power pins of ECM harness connector.

Notice

› If the voltage is too high or too low, repair the circuit from ECM to battery.

› If the voltage is normal, proceed to the next step.

7. Check whether the 3 ground pins of ECM harness connector are connected to the ground point.

Notice

› If they are disconnected, repair the circuit from ECM to ground point.

› If they are connected, proceed to the next step.

8. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

9. Install the ECM harness connector.
10. Disconnect the harness connector of electronic throttle.
11. Place the ignition switch in the ON position.
12. Measure the voltage between the motor power pin in the harness connector of electronic throttle and the ground.

    Normal voltage: About 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

14. Disconnect ECM harness connector
15. Measure the resistance between the pin of harness connector of electronic throttle and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

16. Measure the resistance between the pin of harness connector of electronic throttle and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

17. Measure the resistance between the pins of the harness connector of electronic throttle.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

18. Place the ignition switch in the ON position.
19. Measure the voltage between each pin of harness connector of electronic throttle and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

20. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

21. Replace the electronic throttle.
22. Install the ECM harness connector.

23. Check whether the DTC disappears.

Notice

› If the DTC disappears, the electronic throttle may be damaged.

› If the DTC still exists, the ECM may be damaged.

P212700/P212800

P212700

DTC definition: open circuit or short circuit of position sensor circuit of the electronic throttle to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of the position sensor of the electronic throttle is ＜ 0.25V.

Possible cause of fault: The position sensor line of the electronic throttle is open-circuited or short-circuited to ground.

P212800

DTC definition: short circuit of position sensor line of the electronic throttle to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of electronic throttle position sensor is ＞ 4.9V.

Possible cause of fault: The position sensor line of the electronic throttle is short-circuited to the power supply.

Possible fault description

- The OBD failure indicator is on.
- Stop the anti-jamming policy.
- Stop learning state.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of electronic throttle.
3. Place the ignition switch in the ON position.
4. Measure the voltage between the power pin of harness connector position sensor of the electronic throttle and the ground

   Normal voltage: about 5V

i Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Measure the conductivity between the position sensor ground pin of harness connector of the electronic throttle and the ground.

Notice

- If it does not conductive, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
  - ECM fault
- If they are connected, proceed to the next step.

6. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of electronic throttle and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of harness connector of electronic throttle and the ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pins of the harness connector of electronic throttle.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of electronic throttle and the ground.
    Normal voltage: about 0V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › Harness is short-circuited to power.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

14. Replace the electronic throttle.
15. Install the ECM harness connector.
16. Check whether the DTC disappears.

Notice

› If the DTC disappears, the electronic throttle may be damaged.
› If the DTC still exists, the ECM may be damaged.

P111000/P111200/P111800/P111400/P111300//P111700

P111000

DTC definition: The first self-learning of electronic throttle at fully closed position is out of range.

DTC occurring condition: The first self-learning value of electronic throttle at fully closed position exceeds 0.77V or is less than 0.22V.

Possible cause of fault: the electronic throttle does not match the current ECU software version.

P111200

DTC definition: The first self-learning of electronic throttle at fully opened position is out of range.

DTC occurring condition: The first self-learning value of electronic throttle at fully opened position exceeds 4.9V or is less than 3.77V.

Possible cause of fault: the electronic throttle does not match the current ECU software version.

P111800

DTC definition: The long-term self-learning value of electronic throttle at fully closed position deviates from fault (current value and first self-learning value).

DTC occurring condition: The difference between the self-learning value of the current electronic throttle at fully closed position and the first self-learning value is more than 0.5V.

Possible cause of fault: Excessive impurities in electronic throttle result in deviation of the fully closed position.

P111400

DTC definition: The short-term self-learning value of electronic throttle at fully closed position deviates from fault (between twice contiguous and successful self-learning).

DTC occurring condition: The difference between the self-learning value of the current electronic throttle at fully opened position and the first self-learning value is more than 0.25V.

Possible cause of fault: A single item is jammed during the most recent self-learning.

P111300

DTC definition: The long-term self-learning value of electronic throttle at fully opened position deviates from fault (current value and first self-learning value).

DTC occurring condition: The difference between the self-learning value of the current electronic throttle at fully opened position and the first self-learning value is more than 0.43V.

Possible cause of fault: Excessive impurities in electronic throttle result in deviation of the fully closed position.

P111700

DTC definition: The short-term self-learning value of electronic throttle at fully opened position deviates from fault (between twice contiguous and successful self-learning).

DTC occurring condition: The difference between the self-learning value of the electronic throttle at fully opened position and the previous self-learning value is more than 0.22V.

Possible cause of fault: A single item is jammed during the most recent self-learning.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check the electronic throttle and the current ECU software version.

Notice

› If the software is unavailable, rewrite the software.

› If it is available, proceed to the next step.

3. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Remove the electronic throttle and check the appearance and functional status of it.

Notice

› Clean or replace the electronic throttle if it contains too many foreign matters or it is stuck.

› If it is normal, proceed to the next step.

5. Check the resistance between positive and negative pins of electronic throttle motor.

   Normal resistance: about 2Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The electronic throttle valve is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

6. Place the ignition switch in the ON position.

7. Measure the voltage between the power pin of harness connector position sensor of the electronic throttle and the ground

   Normal voltage: about 5V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Measure the voltage of the motor power pin in the harness connector of electronic throttle.

   Normal voltage: about 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

10. Disconnect ECM harness connector
11. Measure the resistance between the pin of harness connector of electronic throttle and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between the pin of harness connector of electronic throttle and the ground.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness is short-circuited to ground.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between the pins of the harness connector of electronic throttle.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness short-circuited.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

14. Place the ignition switch in the ON position.
15. Measure the voltage between the pins of the harness connector of electronic throttle and the ground.

    Normal voltage: about 0V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › Harness short-circuited.
  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

16. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

17. Replace the electronic throttle.
18. Install the ECM harness connector.
19. Install the harness connector of electronic throttle.
20. Place the ignition switch in the ON position.
21. Check whether the DTC disappears.

Notice

› If the DTC disappears, the electronic throttle may be damaged.

› If the DTC still exists, the ECM may be damaged.

P182600

P182600

DTC definition: engine overheating fault

DTC detection conditions:

1. No coolant sensor fault
2. Engine running time > 1000s

DTC occurring condition: coolant temperature > 115°C

Possible Causes

- Poor fuel quality
- Coolant temperature sensor and its circuit fault
- Coolant insufficiency, deterioration and leakage
- The cooling system is blocked.
- Radiator fan and its line fault
- The generator and A/C compressor have heavy loads.
- Battery is aged.
- The intake system is blocked or the electronic throttle gets stuck.
- The exhaust system is blocked or EGR valve gets stuck.
- The cylinder pressure is abnormal.
- Fuel injector leakage.
- The oil level is incorrect.
- ECM fault.

Troubleshooting

1. Use a diagnostic apparatus to read ECM DTCs and confirm whether there are other DTCs.

i Notice

- Yes: Check the system or component corresponding to the DTC.
- No: Go to the next step.

2. Check whether the fuel contains water or whether the fuel has inferior quality.

i Notice

- Yes: Replace the inferior fuel with acceptable fuel.
- No: Go to the next step.

3. Check the coolant for deterioration, insufficiency and leakage.

i Notice

- Yes: Replace the coolant.
- No: Go to the next step.

4. Check the cooling pipeline for blockage or air.

Notice

› Yes: Eliminate the pipeline blockage and exhaust air in the pipeline.

› No: Go to the next step.

5. Check the coolant temperature sensor and its line for faults.

Notice

› Yes: Eliminate the coolant temperature sensor and its line faults.

› No: Go to the next step.

6. Check the radiator fan and its line for faults.

Notice

› Yes: Eliminate the radiator fan and its line faults.

› No: Go to the next step.

7. Check whether the generator load is too heavy.

Notice

› Yes: Eliminate the generator faults.

› No: Go to the next step.

8. Check whether the A/C compressor load is too heavy.

Notice

› Yes: Eliminate the A/C pressure faults.

› No: Go to the next step.

9. Check whether the battery is aged.

Notice

› Yes: Replace the battery.

› No: Go to the next step.

10. Check the fuel injector for leakage.

Notice

› Yes: Replace the fuel injector.

› No: Go to the next step.

11. Check whether the intake system fails (the intake pipeline is blocked, the throttle gets stuck, and so on).

Notice

› Yes: Eliminate the intake system faults.

› No: Go to the next step.

12. Check whether the exhaust system fails (the intake and exhaust pipelines are blocked, the EGR valve gets stuck, and so on).

Notice

› Yes: Eliminate the intake system faults.

› No: Go to the next step.

13. Check whether the cylinder pressure is abnormal.

Notice

› Yes: Check the cylinder leakage point.

› No: Go to the next step.

14. Check whether the engine lubricant level is correct.

Notice

› Yes: proceed to the next step.

› No: Adjust the engine lubricant level.

15. Check whether the ECM and its line are abnormal.

Notice

› Yes: Troubleshoot the ECM and its line faults.

› No: Technical support

P242800

P242800

DTC definition: The exhaust temperature is too high.

DTC detection conditions:

1. T3 sensor has no other faults.

DTC occurring condition: T3 temperature > 819°C by more than 10s.

Fault Description

- Power is insufficient and torque is limited.

Possible Causes

- Poor fuel quality
- Coolant temperature sensor and its circuit fault
- Coolant insufficiency, deterioration and leakage
- The cooling system is blocked.
- Radiator fan and its line fault
- The generator and A/C compressor have heavy loads.
- Battery is aged.
- The intake system is blocked or the electronic throttle gets stuck.
- The exhaust system is blocked or EGR valve gets stuck.
- The cylinder pressure is abnormal.
- Fuel injector leakage.
- The oil level is incorrect.
- ECM fault.

Troubleshooting

1. Use a diagnostic apparatus to read ECM DTCs and confirm whether there are other DTCs.
   - Yes: Check the system or component corresponding to the DTC.
   - No: Go to the next step.
2. Check whether the fuel contains water or whether the fuel has inferior quality.
   - Yes: Replace the inferior fuel with acceptable fuel.
   - No: Go to the next step.
3. Check the coolant for deterioration, insufficiency and leakage.
   - Yes: Replace the coolant.
   - No: Go to the next step.
4. Check the cooling pipeline for blockage or air.
   - Yes: Eliminate the pipeline blockage and exhaust air in the pipeline.
   - No: Go to the next step.
5. Check the coolant temperature sensor and its line for faults.
   - Yes: Eliminate the coolant temperature sensor and its line faults.

› No: Go to the next step.

6. Check the radiator fan and its line for faults.
   › Yes: Eliminate the radiator fan and its line faults.
   › No: Go to the next step.
7. Check whether the generator load is too heavy.
   › Yes: Eliminate the generator faults.
   › No: Go to the next step.
8. Check whether the A/C compressor load is too heavy.
   › Yes: Eliminate the A/C pressure faults.
   › No: Go to the next step.
9. Check whether the battery is aged.
   › Yes: Replace the battery.
   › No: Go to the next step.
10. Check the fuel injector for leakage.

i Notice

› Yes: Replace the fuel injector.

› No: Go to the next step.

11. Check whether the intake system fails (the intake pipeline is blocked, the throttle gets stuck, and so on).
    › Yes: Eliminate the intake system faults.
    › No: Go to the next step.
12. Check whether the exhaust system fails (the intake and exhaust pipelines are blocked, the EGR valve gets stuck, and so on).
    › Yes: Eliminate the intake system faults.
    › No: Go to the next step.
13. Check whether the cylinder pressure is abnormal.
    › Yes: Check the cylinder leakage point.
    › No: Go to the next step.
14. Check whether the engine lubricant level is correct.
    › Yes: proceed to the next step.
    › No: Adjust the engine lubricant level.
15. Check whether the ECM and its line are abnormal.
    › Yes: Troubleshoot the ECM and its line faults.
    › No: Technical support

P030000/P030100/P030200/P030300/P030400

P030000

DTC definition: multi-cylinder misfire fault

DTC detection conditions:

1. Engine speed < 3,300 r/min
2. 75% maximum torque > engine net output torque > 0

DTC occurring condition: comprehensive misfire rate of multi-cylinder > 5%

P030100

DTC definition: cylinder #1 misfire fault

DTC detection conditions:

1. Engine speed < 3,300 r/min
2. 75% maximum torque > engine net output torque > 0

DTC occurring condition: comprehensive misfire rate of multi-cylinder > 5%

P030200

DTC definition: cylinder #2 misfire fault

DTC detection conditions:

1. Engine speed < 3,300 r/min
2. 75% maximum torque > engine net output torque > 0

DTC occurring condition: comprehensive misfire rate of multi-cylinder > 5%

P030300

DTC definition: cylinder #3 misfire fault

DTC detection conditions:

1. Engine speed < 3,300 r/min
2. 75% maximum torque > engine net output torque > 0

DTC occurring condition: comprehensive misfire rate of multi-cylinder > 5%

P030400

DTC definition: cylinder #4 misfire fault

DTC detection conditions:

1. Engine speed < 3,300 r/min
2. 75% maximum torque > engine net output torque > 0

DTC occurring condition: comprehensive misfire rate of multi-cylinder > 5%

Possible fault description

› The idle speed increases.

Possible Causes

› Fuel injector is damaged.

› The cylinder pressure is insufficient.

Troubleshooting

1. When the engine is idling, remove the oil return hose of the fuel injector and observe whether the oil return amount is very small.
   - Yes: proceed to the next step.
   - No: Replace the fuel injector.
2. Check whether the appearance of fuel injector is damaged or deformed.
   - Yes: Replace the fuel injector.
   - No: Go to the next step.
3. Measure whether the coil resistance of fuel injector is (179±15) mΩ.
   - Yes: proceed to the next step.
   - No: Replace the fuel injector.
4. Measure whether the resistance between two pins of fuel injector and injector housing is greater than 10 MΩ.
   - Yes: proceed to the next step.
   - No: Replace the fuel injector.
5. Check whether the valve leaks.
   - In case of air leakage, the possible causes are as follows:
     - The elasticity of valve spring decreases.
     - The valve tapered surface is not tightly sealed.
   - If there is no air leakage, proceed to the next step.
6. Check whether the joint between the cylinder head and the engine body leaks.
   - Yes: Replace the cylinder gasket.
   - No: Go to the next step.
7. Check whether the piston ring is worn or scorched, and whether the opening position overlaps.
   - Yes: Remove the coked parts, replace the piston ring, and adjust the opening position of the piston ring.
   - No: Go to the next step.
8. Measure whether the cylinder bore or piston wear exceeds the specified limit.
   - Yes: Replace the engine body or piston.
   - No: Go to the next step.
9. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - Yes: Diagnostic assistance
   - No: Finished.

P021900

P021900

DTC definition: extremely high engine speed fault

DTC detection conditions:

1. A brake pedal signal is detected.
2. The accelerator pedal opening is ≤ 3%.

DTC occurring condition: engine speed > 6,000 r/min

Possible Causes

- Engine hardware problems lead to runaway.
- The external power supply fails.
- ECU fault

Troubleshooting

1. Use a diagnostic apparatus to read ECM DTCs and confirm whether there are other DTCs.

i Notice

- Yes: Check the system or component corresponding to the DTC.
- No: Go to the next step.

2. Check whether the engine lubricant level is too high.

i Notice

- Yes: Adjust the engine lubricant level.
- No: Go to the next step.

3. Check whether the fuel contains water or whether the fuel has inferior quality.

i Notice

- Yes: Replace the inferior fuel with acceptable fuel.
- No: Go to the next step.

4. Check the coolant for deterioration, insufficiency and leakage.

i Notice

- Yes: Replace the coolant.
- No: Go to the next step.

5. Check the cooling pipeline for blockage or air.

i Notice

- Yes: Eliminate the pipeline blockage and exhaust air in the pipeline.
- No: Go to the next step.

6. Check the coolant temperature sensor and its line for faults.

Notice

› Yes: Eliminate the coolant temperature sensor and its line faults.

› No: Go to the next step.

7. Check the radiator fan and its line for faults.

Notice

› Yes: Eliminate the radiator fan and its line faults.

› No: Go to the next step.

8. Check whether the generator load is too heavy.

Notice

› Yes: Eliminate the generator faults.

› No: Go to the next step.

9. Check whether the A/C compressor load is too heavy.

Notice

› Yes: Eliminate the A/C pressure faults.

› No: Go to the next step.

10. Check whether the battery is aged.

Notice

› Yes: Replace the battery.

› No: Go to the next step.

11. Check the fuel injector for leakage.

Notice

› Yes: Replace the fuel injector.

› No: Go to the next step.

12. Check whether the intake system fails (the intake pipeline is blocked, the throttle gets stuck, and so on).

Notice

› Yes: Eliminate the intake system faults.

› No: Go to the next step.

13. Check whether the exhaust system fails (the intake and exhaust pipelines are blocked, the EGR valve gets stuck, and so on).

Notice

› Yes: Eliminate the intake system faults.

› No: Go to the next step.

14. Check whether the cylinder pressure is abnormal.

Notice

› Yes: Check the cylinder leakage point.

› No: Go to the next step.

15. Check whether the ECM and its line are abnormal.

Notice

› Yes: Troubleshoot the ECM and its line faults.

› No: Technical support

P054500/P054600/P183F00

P054500

DTC definition: short circuit of high temperature sensor line to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of high temperature sensor is ＜ 0.05V.

Possible cause of fault: The high temperature sensor is short-circuited to ground.

P054600

DTC definition: open circuit or short circuit of high temperature sensor line to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of high temperature sensor is ＞ 4.88V.

Possible cause of fault: The high temperature sensor is open-circuited or short-circuited to the power supply.

P183F00

DTC definition: cross-check fault of temperature sensor (unreasonable temperature of high temperature sensor).

DTC detection conditions:

1. The transmitter is shut down for over 8h.
2. Run the engine for less than 5s.

DTC occurring condition: The cross diagnosis of the temperature sensor is > 40℃.

Possible cause of fault: The temperature of high temperature sensor is unreasonable.

Possible fault description

› OBD indicator is on.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the high temperature sensor
3. Check the high temperature sensor for damage

i Notice

› If the high temperature sensor is damaged, replace it.

› If the high temperature sensor is normal, proceed to the next step.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the high temperature sensor and the ground

Normal voltage: About 12V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the high temperature sensor and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between each pin of harness connector of the high temperature sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the high temperature sensor

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:

- Harness short-circuited.
- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of the high temperature sensor and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

14. Replace the high temperature sensor
15. Install the ECM harness connector.
16. Install the harness connector of the high temperature sensor
17. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

- If the DTC still exists, the ECM may be damaged.
- If the DTC disappears, the high temperature sensor may be damaged.

P103200/P119800

P103200

DTC definition: The measured value of the second rail pressure sensor exceeds the limit.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is ＜-1,000 bar.

Possible cause of fault: The second rail pressure sensor is open-circuited or short-circuited.

P119800

DTC definition: mismatch between the measured values of the first and second rail pressure sensors.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The ratio of the first rail pressure to the second rail pressure is > 1.05 or < 0.95.

Possible cause of fault: The first or second rail pressure sensor fails.

Possible Causes

› Rail pressure sensor is damaged.

Possible fault description

› OBD indicator is on.

› The limp-in mode is on.

› The cylinder balance strategy is disabled and relevant fault detection is stopped.

› The fault detection of fuel quantity metering valve control current correction value is prohibited.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the rail pressure sensor
3. Place the ignition switch in the ON position.
4. Measure the voltage between the power pin of harness connector of the rail pressure sensor and the ground

   Normal voltage: 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

6. Disconnect ECM harness connector
7. Measure the resistance between the pin of harness connector of the rail pressure sensor and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pin of harness connector of the rail pressure sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness is short-circuited to ground.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pins of harness connector of the rail pressure sensor

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness short-circuited.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Replace rail pressure sensor
11. Install the harness connector of the rail pressure sensor
12. Install the ECM harness connector.
13. Place the ignition switch in the ON position.
14. Check whether the DTC disappears.

Notice

- If the DTC disappears, the rail pressure sensor may be damaged.
- If the DTC still exists, the ECM may be damaged.

P119C00/P119700/P019100/P019300/P019200

P119C00

DTC definition: rail pressure rationality fault (unreasonable rail pressure drop).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is ＜-1,000 bar.

Possible cause of fault: The rail pressure sensor lines are connected in a false way.

P119700

DTC definition: the feedback rail pressure value does not change.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is > 1,000 bar.

Possible cause of fault: The rail pressure sensor is damaged.

P019100

DTC definition: intermittent fault of rail pressure sensor.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is equal to 0bar.

Possible cause of fault: The rail pressure sensor is damaged.

P019300

DTC definition: open circuit or short circuit of rail pressure sensor line to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The output value of the rail pressure sensor is ＞ 4.75V.

Possible cause of fault: The rail pressure sensor line is open-circuited or short-circuited to the power supply.

P019200

DTC definition: short circuit of rail pressure sensor line to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The output value of the rail pressure sensor is ＜ 0.25V.

Possible cause of fault: The rail pressure sensor line is short-circuited to ground.

Possible fault description

- OBD indicator is on.
- Power is insufficient and torque is limited.

› Start the limp-in mode.

› The rail pressure control correction strategy is prohibited.

› The fuel injector drain strategy is prohibited.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the rail pressure sensor
3. Place the ignition switch in the ON position.
4. Measure the voltage between the power pin of harness connector of the rail pressure sensor and the ground

   Normal voltage: 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

6. Disconnect ECM harness connector
7. Measure the resistance between the pin of harness connector of the rail pressure sensor and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pin of harness connector of the rail pressure sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pins of harness connector of the rail pressure sensor

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Replace rail pressure sensor
11. Install the harness connector of the rail pressure sensor
12. Install the ECM harness connector.
13. Place the ignition switch in the ON position.
14. Check whether the DTC disappears.

Notice

- If the DTC disappears, the rail pressure sensor may be damaged.
- If the DTC still exists, the ECM may be damaged.

P119200/P119300/P119B00

P119200

DTC definition: too small static value drift of the rail pressure sensor.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The static value of the rail pressure sensor is too small.

P119300

DTC definition: too large static value drift of the rail pressure sensor.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The static value of the rail pressure sensor is too large.

P119B00

DTC definition: overrun of the static value of the rail pressure sensor.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The static value of the rail pressure sensor is abnormal.

Possible Causes

- Rail pressure sensor is damaged.

Possible fault description

- OBD indicator is on.
- The limp-in mode is on.
- The cylinder balance strategy is disabled and relevant fault detection is stopped.
- The fault detection of fuel quantity metering valve control current correction value is prohibited.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the rail pressure sensor
3. Place the ignition switch in the ON position.
4. Measure the voltage between the power pin of harness connector of the rail pressure sensor and the ground

   Normal voltage: 5V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

6. Disconnect ECM harness connector
7. Measure the resistance between the pin of harness connector of the rail pressure sensor and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pin of harness connector of the rail pressure sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pins of harness connector of the rail pressure sensor

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Replace rail pressure sensor
11. Install the harness connector of the rail pressure sensor
12. Install the ECM harness connector.
13. Place the ignition switch in the ON position.

14. Check whether the DTC disappears.

Notice

› If the DTC disappears, the rail pressure sensor may be damaged.

› If the DTC still exists, the ECM may be damaged.

P103600/P053F00/P119900/P183D00/P120E00

P103600

DTC definition: too large negative deviation of rail pressure feedback.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is ＜-250 bar.

P053F00

DTC definition: cold start emission reduction fault (too large negative deviation of rail pressure control).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is ＜-250 bar.

P119900

DTC definition: too large positive deviation of rail pressure feedback.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is > 250bar.

P183D00

DTC definition: cold start emission reduction fault (too large positive deviation of rail pressure control).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference of rail pressure monitored at synchromesh gears is > 250bar.

P120E00

DTC definition: too high rail pressure too long.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The duration of too high rail pressure exceeds 600s.

Possible Causes

- The fuel inlet pipe is blocked.
- The high-pressure fuel pump is damaged.
- The fuel metering valve is abnormal.
- Pressure relief of the fuel injector is abnormal.
- Fuel return of the fuel injector is abnormal.
- The low pressure fuel pipeline fails

Possible fault description

- OBD indicator is on.

› The correction strategy of the fuel injector is prohibited based on speed.

› Stop the fault detection of rail pressure establishment.

Troubleshooting method

1. Check whether the fuel is sufficient

i Notice

› If the fuel is insufficient, replenish the fuel.

2. Check whether the fuel is qualified

i Notice

› If the fuel is unqualified, replace it with the qualified fuel and cleaning the fuel pipeline is suggested.

3. Check whether the electronic fuel pump is normal

i Notice

› If the electronic fuel pump is abnormal, troubleshoot the faults.

4. Check the low pressure fuel pipeline for bending and leakage

i Notice

› If the low pressure fuel pipe is abnormal, replace it.

5. Check whether the fuel filter is blocked or installed in the wrong direction

i Notice

› If the fuel filter is abnormal, replace or reinstall it.

6. Check whether there are bubbles in the low pressure fuel pipeline

i Notice

› If there are bubbles, eliminate them.

7. Check the high pressure pipeline for bending and leakage

i Notice

› If the high pressure pipeline is abnormal, replace it.

8. Check whether the rail pressure sensor and its circuit are abnormal

i Notice

› If the rail pressure sensor and its circuit are abnormal, troubleshoot the faults.

9. Check whether the fuel metering valve and its circuit are abnormal

i Notice

› If the fuel metering valve and its circuit are abnormal, troubleshoot the faults.

10. Place the ignition switch in the ON position.

11. Test the actions of the fuel gauge valve with the diagnostic instrument

12. Disconnect the fuel return pipes of the 4 cylinder fuel injectors
13. Connect a transparent pipe of about 30 cm long to the fuel return pipe of each cylinder
14. Turn the ignition switch to the OFF position

i Notice

› Wait at least 60s before proceeding with subsequent operations.

15. Disconnect plug of the fuel metering valve and the fuel injector
16. Start the motor to rotate for 5s, and observe the length of liquid level in the transparent pipe

i Notice

› Determine the fuel injector whose fuel return amount is significantly different from those of other fuel injectors, and replace it.

› If there is no obvious difference in fuel return amount, the high pressure fuel pump may fail.

P008800/P108800

P008800

DTC definition: The rail pressure is too high under the control mode of the fuel metering valve.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The feedback rail pressure is too high.

P108800

DTC definition: The rail pressure is too high under other control modes.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The feedback rail pressure is too high.

Possible Causes

- The fuel metering valve is damaged or stuck in the normally open position.
- The rail pressure sensor fails.
- The low-pressure fuel pipeline fails.
- The high-pressure fuel pipeline fails.

Possible fault description

- OBD indicator is on.
- Start the limp-in mode.
- The rail pressure control correction strategy is prohibited.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check the existence of DTCs related to the fuel metering valve

i Notice

- If there is a DTC related to the fuel metering valve, troubleshoot the faults related to the fuel metering valve.
- If there is no DTC related to the fuel metering valve, proceed to the next step.

3. Check whether the fuel metering valve is stuck or not

i Notice

- If the fuel metering valve is stuck, troubleshoot the faults of it.
- If the fuel metering valve is normal, proceed to the next operation.

4. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

5. Disconnect the harness connector of the rail pressure sensor

6. Place the ignition switch in the ON position.
7. Measure the voltage between the power pin of harness connector of the rail pressure sensor and the ground

   Normal voltage: 5V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › The harness is damaged.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

9. Disconnect ECM harness connector
10. Measure the resistance between the pin of harness connector of the rail pressure sensor and the corresponding pin of the ECM harness connector

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between the pin of harness connector of the rail pressure sensor and the ground

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness is short-circuited to ground.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between the pins of harness connector of the rail pressure sensor

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

- Harness short-circuited.
- The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

13. Check the low-pressure fuel pipeline for faults

Notice

› If there is a fault in the low-pressure fuel pipeline, eliminate the fault.

› If the low-pressure fuel pipeline is normal, proceed to the next step.

14. Check whether there is a fault in the high-pressure fuel pipeline

Notice

› If there is a fault in the high-pressure fuel pipeline, eliminate the fault.

› If the high-pressure fuel pipeline is normal, proceed to the next step.

15. Check the fuel injector and the high-pressure fuel pump for faults

Notice

› If there is a fault, eliminate the fault.

› If they are normal, proceed to the next step.

16. Replace ECM
17. Install the ECM harness connector.
18. Install the harness connector of the rail pressure sensor
19. Place the ignition switch in the ON position.
20. Check whether the DTC disappears.

Notice

› If the DTC disappears, the ECM may be damaged.

› If the fault still exists, the rail pressure sensor may be damaged.

P226400/P226600/P226700/P226900

P226400

DTC definition: fault of water in fuel sensor

DTC detection conditions:

1. Chip self-diagnosis.

DTC occurring condition: open circuit of signal voltage.

P226600

DTC definition: line fault of water in fuel sensor - short circuit to ground

DTC detection conditions:

1. Chip self-diagnosis.

DTC occurring condition: the signal voltage is short-circuited to the ground.

P226700

DTC definition: line fault of water in fuel sensor - short circuit to power supply

DTC detection conditions:

1. Chip self-diagnosis.

DTC occurring condition: the signal voltage is short-circuited to the power supply.

P226900

DTC definition: fault of water in fuel

DTC detection conditions:

1. Ignition switch at ON position.
2. Coolant temperature > -40℃.
3. Battery voltage > 10V.

DTC occurring condition: When water in oil is detected, the sensor outputs high level.

Possible fault description

- The service indicator lights up.
- When the DTC is P226900, the engine is limited in torque and the limp-in mode is started.

Possible Causes

- DTC P226900 indicates that the filter failed to discharge water in time.
- DTCs P226400, P226600 and P226700 indicate that the sensor circuit or the sensor itself is faulted.

Troubleshooting method

1. Check whether the fuel-water separator in the filter contains too much water.
   - Yes: Eliminate the fault.
   - No: Go to the next step.
2. Check the fuel quality or check the filter for fault.
   - Yes: change the fuel or filter.
   - No: Finished.

3. Check whether there is any problem with the appearance of water in fuel sensor.
   - Yes: replace the water in fuel sensor.
   - No: Go to the next step.
4. Check whether the connector of water in fuel sensor is well connected.
   - Yes: reconnect it.
   - No: Go to the next step.
5. Check whether the resistance of water in fuel sensor is normal.
   - Yes: proceed to the next step.
   - No: replace the water in fuel sensor.
6. Check whether the ECM connector is poorly connected.
   - Yes: reconnect it.
   - No: Go to the next step.
7. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

8. Check the harness connector of water in fuel sensor.
9. Place the ignition switch in the ON position.
10. Measure the voltage of power pin of harness connector of water in fuel sensor.

    Normal voltage: about 12V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

12. Disconnect the ECM harness connector.
13. Measure the resistance between the pin of harness connector of water in fuel sensor and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:

- The harness circuit is open.
- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Measure the resistance between the pin of harness connector of water in fuel sensor and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Measure the resistance between pins of harness connector of water in fuel sensor.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

16. Place the ignition switch in the ON position.
17. Measure the voltage between the pin of harness connector of water in fuel sensor and the ground.

    Normal voltage: 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

18. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

19. Replace ECM
20. Install ECM and harness connector of water in fuel sensor.
21. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.

› If the DTC still exists, the water in fuel sensor may be damaged.

P007200/P007300/P182B00

P007200

DTC definition: short circuit of the control line of the ambient temperature sensor to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of the ambient temperature sensor is ＜ 0.1V.

Possible cause of fault: short circuit of the control line of the ambient temperature sensor to ground.

P007300

DTC definition: open circuit or short circuit of the control line of the ambient temperature sensor to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of the ambient temperature sensor is ＞ 4.97V.

Possible cause of fault: The control line of the ambient temperature sensor is open-circuited or short-circuited to the power supply.

P182B00

DTC definition: cross-check fault of temperature sensor (unreasonable air temperature around the vehicle).

DTC detection conditions:

1. The shutdown time is > 8h.
2. The engine runs for < 5s.

DTC occurring condition: The deviation between the ambient temperature model value and the measured value is > 30℃.

Possible fault description

› OBD indicator is on.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the ambient temperature sensor
3. Check whether the ambient temperature sensor is damaged

i Notice

› If the ambient temperature sensor is damaged, replace it.

› If the ambient temperature sensor is normal, proceed to the next step.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the signal pin of harness connector of the ambient temperature sensor and the ground

Normal voltage: About 5V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the ambient temperature sensor and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between each pin of harness connector of the ambient temperature sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the ambient temperature sensor

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.

- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of the ambient temperature sensor and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

14. Replace the ambient temperature sensor
15. Install the harness connector of the ambient temperature sensor
16. Install the ECM harness connector.
17. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

- If the DTC disappears, the ambient temperature sensor may be damaged.
- If the DTC does not disappear, the ECM may be damaged.

P012400/P022700/P022800/P212200/P212300//P229900

P012400

DTC definition: Two signals from accelerator pedal position sensor are inconsistent.

DTC occurring condition: The difference between two position feedbacks of accelerator pedal exceeds the limit.

P022700

DTC definition: The first position sensor signal voltage of accelerator pedal is low.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The first position sensor voltage of accelerator pedal is lower than 0.54V.

P022800

DTC definition: The first position sensor signal voltage of accelerator pedal is high.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The first position sensor voltage of accelerator pedal is higher than 4.9V.

P212200

DTC definition: The second position sensor signal voltage of accelerator pedal is low.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The second position sensor voltage of accelerator pedal is lower than 0.22V.

P212300

DTC definition: The second position sensor signal voltage of accelerator pedal is high.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The second position sensor voltage of accelerator pedal is higher than 2.25V.

P229900

DTC definition: fault of position sensor of accelerator pedal (pedal signal is jammed)

DTC detection conditions:

1. No other fault of accelerator pedal
2. Engine speed > 1000 r/min.
3. The vehicle speed is > 30km/h.
4. Accelerator pedal position > 18%.

DTC occurring condition: The change of accelerator pedal position feedbacks is less than 0.5%.

Possible Causes

- The position sensor for the accelerator pedal is failed.
- The accelerator pedal position sensor is short circuited to power supply.
- The accelerator pedal position sensor is short circuited to the ground.

› The accelerator pedal position sensor is open circuited.

Possible fault description

› The engine service indicator lights up.

› Power is insufficient and torque is limited.

› Start the limp home mode.

› Raise the target idle speed.

Troubleshooting method

1. Turn the ignition switch to ON position
2. Step on the accelerator pedal repeatedly, and read the voltage of two sensors of the accelerator pedal with a diagnostic apparatus.

   Standard voltage: One signal voltage is about twice the other signal voltage.

i Notice

› If it is not the standard voltage, the accelerator pedal or accelerator pedal circuit is faulted.

3. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Disconnect the harness connector of accelerator pedal.
5. Check whether the accelerator pedal is normal.

i Notice

› No, the accelerator pedal is faulted.

› Yes: Proceed to the next step.

6. Turn the ignition switch to ON position
7. Measure the voltage between the power pin of accelerator pedal sensor 1 of accelerator pedal harness connector and the ground.

   Normal voltage: about 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Measure the voltage between the power pin of accelerator pedal sensor 2 of accelerator pedal harness connector and the ground.

   Normal voltage: about 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

- The harness is damaged.
- The connector is damaged.

- If the measured voltage is within range of normal voltage, go on with the next operation.

9. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

10. Disconnect ECM harness connector
11. Measure the resistance between the pin of harness connector of accelerator pedal and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between the pin of accelerator pedal harness connector and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between pins of accelerator pedal harness connector.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Turn the ignition switch to ON position
15. Measure the voltage between each pin of accelerator pedal harness connector and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

16. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

17. Replace the accelerator pedal.
18. Install the accelerator pedal harness connector.
19. Install the ECM harness connector.
20. Place the ignition switch in the ON position.
21. Check whether the DTC disappears.

Notice

- If the DTC disappears, the accelerator pedal may be damaged.
- If the DTC still exists, the ECM may be damaged.

P009700/P009800/P010700/P010800

P009700

DTC definition: short circuit to ground of circuit of intake temperature sensor

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of intake temperature sensor is smaller than 0.15V.

Possible cause of fault: short circuit to ground of circuit of intake temperature sensor

P009800

DTC definition: short circuit to power supply of circuit of or open circuit of intake temperature sensor

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of intake temperature sensor is larger than 4.9V.

Possible cause of fault: short circuit to power supply of circuit of or open circuit of intake temperature sensor

P010700

DTC definition: short circuit to ground of circuit of or open circuit of intake pressure sensor

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of intake pressure sensor is smaller than 0.2V.

Possible cause of fault: short circuit to ground of circuit of or open circuit of intake pressure sensor

P010800

DTC definition: short circuit to power supply of circuit of intake pressure sensor

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of intake pressure sensor is larger than 4.9V.

Possible cause of fault: short circuit to power supply of circuit of intake pressure sensor

Possible fault description

- OBD indicator is on.
- Insufficient power, limiting torque
- EGR function is unavailable.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of intake pressure and temperature sensor.
3. Check the intake pressure and temperature sensor for damage.

Notice

› If it is damaged, replace it.

› If it is normal, proceed to the next step.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of intake pressure and temperature sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Measure the voltage between the voltage signal pin of harness connector of intake pressure and temperature sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

7. Measure the voltage between the temperature signal pin of harness connector of intake pressure and temperature sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

9. Disconnect ECM harness connector
10. Measure the resistance between the pin of harness connector of intake pressure and temperature sensor and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between each pin of harness connector of intake pressure and temperature sensor and the ground.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness is short-circuited to ground.
  › The connector is damaged.
  › The ignition switch is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between pins of harness connector of intake pressure and temperature sensor.

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness short-circuited.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

13. Place the ignition switch in the ON position.
14. Measure the voltage between each pin of harness connector of intake pressure and temperature sensor and the ground.

    Normal voltage: About 0V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as

follows:

- The harness is damaged.
- The connector is damaged.

- If the measured voltage is within range of normal voltage, go on with the next operation.

15. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

16. Replace the air intake pressure & temperature sensor
17. Install the harness connector of intake pressure and temperature sensor.
18. Install the ECM harness connector.
19. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

- If the DTC does not disappear, the ECM may be damaged.
- If the DTC disappears, the intake pressure and temperature sensor may be damaged.

P010600/P110600/P110900

P010600

DTC definition: rationality fault of intake manifold pressure and atmospheric pressure (high intake manifold pressure)

DTC detection conditions:

1. Engine shutdown status

DTC occurring condition: intake manifold pressure - atmospheric pressure > 20 kpa.

Possible cause of fault: high intake manifold pressure

P110600

DTC definition: rationality fault of intake manifold pressure and atmospheric pressure (low intake manifold pressure)

DTC detection conditions:

1. Engine shutdown status

DTC occurring condition: intake manifold pressure - atmospheric pressure < -20 kpa.

Possible cause of fault: low intake manifold pressure

P110900

DTC definition: ultrahigh intake manifold pressure

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: intake manifold pressure - atmospheric pressure > 250Kpa.

Possible cause of fault: ultrahigh intake manifold pressure

Possible fault description

- OBD indicator is on.
- DPF regeneration is disabled.
- Insufficient power, limiting torque
- VGT open-loop control
- Use atmospheric pressure as an alternative value.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Check whether the intake pressure and temperature sensor is installed correctly.

i Notice

- No, reinstall the intake pressure and temperature sensor.
- If the intake pressure and temperature sensor is installed correctly, proceed to the next step.

3. Disconnect the harness connector of intake pressure and temperature sensor.

4. Check the intake pressure and temperature sensor for damage.

Notice

› If it is damaged, replace it.

› If it is normal, proceed to the next step.

5. Place the ignition switch in the ON position.

6. Measure the voltage between the power pin of harness connector of intake pressure and temperature sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

7. Measure the voltage between the voltage signal pin of harness connector of intake pressure and temperature sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Measure the voltage between the temperature signal pin of harness connector of intake pressure and temperature sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

10. Disconnect ECM harness connector

11. Measure the resistance between the pin of harness connector of intake pressure and temperature sensor and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between each pin of harness connector of intake pressure and temperature sensor and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between pins of harness connector of intake pressure and temperature sensor.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Place the ignition switch in the ON position.
15. Measure the voltage between each pin of harness connector of intake pressure and temperature sensor and the ground.

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

16. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

17. Replace the air intake pressure & temperature sensor
18. Install the harness connector of intake pressure and temperature sensor.
19. Install the ECM harness connector.
20. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

› If the DTC disappears, the intake pressure and temperature sensor may be damaged.

› If the DTC does not disappear, the ECM may be damaged.

P010200/P010300/P110400/P110500

P010200

DTC definition: open circuit fault of air-flow meter.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The chip feedback of the air-flow meter fails.

P010300

DTC definition: short circuit fault of air-flow meter.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The chip feedback of the air-flow meter fails.

P110400

DTC definition: too high negative correction of the air-flow meter in the full flow range.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The average value of correction coefficient of the air-flow meter is $<$ -0.34 (MT).

DTC occurring condition: The average value of correction coefficient of the air-flow meter is $<$ -0.35 (AT).

Possible cause of faults:

- The sensor is damaged or is not installed properly.
- The sensor harness fails.

P110500

DTC definition: too high positive correction of the air-flow meter in the full flow range.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The average value of correction coefficient of air-flow meter is > 0.35.

Possible cause of faults:

- The sensor is damaged or the air intake pipe leaks seriously.
- The sensor harness fails.

Possible fault description

- The EOBD light is on.
- Power is insufficient and torque is limited.
- The EGR flow diagnosis and correction function is disabled.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the air mass flow meter
3. Check the air mass flow meter for damage

Notice

› If the air mass flow meter is damaged, replace it.

› If the air mass flow meter is normal, proceed to the next operation.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the air mass flow meter and the ground

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the air mass flow meter and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between each pin of harness connector of air mass flow meter and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the air mass flow meter

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Replace the air mass flow meter
12. Install the harness connector of the air mass flow meter
13. Install the ECM harness connector.
14. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

- If the DTC still exists, replace the engine control unit.
- If the fault disappears, the system is normal.

P011200/P011300/P183500

DTC definition: short circuit of the air intake temperature sensor (air-flow meter) line to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The output value of the temperature sensor (the air-flow meter) is less than ＜ 0.2V.

Possible cause of fault: The air intake temperature sensor (air-flow meter) is short-circuited to ground.

DTC definition: open circuit or short circuit of air intake temperature sensor (air-flow meter) line to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The output value of the temperature sensor (air-flow meter) is > 4.9V.

Possible cause of fault: The air intake temperature sensor (air-flow meter) is open-circuited or it is short-circuited to the power supply.

DTC definition: cross check fault of the temperature sensor - unreasonable intake air temperature.

DTC detection conditions:

1. The vehicle is stopped for > 8h.
2. The engine runs for < 5s.

DTC occurring condition: Cross validation of the temperature sensor is > 30℃.

Possible fault description

› The EOBD light is on.

› Power is insufficient and torque is limited.

› The EGR function is prohibited.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the air-flow meter
3. Check the air-flow meter for damage

i Notice

› If the air-flow meter is damaged, replace it.

› If the air-flow meter is normal, proceed to the next step.

4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of the harness connector of the air-flow meter and the ground

   Normal voltage: About 5V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the air-flow meter and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between each pin of harness connector of the air-flow meter and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the air-flow meter

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.

› The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Install the harness connector of the air-flow meter
12. Install the ECM harness connector.
13. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

› If the DTC still exists, replace the engine control unit.

› If the fault disappears, the system is normal.

P053300/P053200/P064500/P064600/P064700

DTC definition: Feedback pressure of A/C refrigerant pressure sensor exceeds the upper limit.

DTC occurring condition: The feedback pressure of A/C refrigerant pressure sensor exceeds 37 kpa.

DTC definition: Feedback pressure of A/C refrigerant pressure sensor exceeds the lower limit.

DTC occurring condition: The feedback pressure of A/C refrigerant pressure sensor is lower than 0.5 kpa.

DTC definition: open circuit of control circuit of compressor relay

DTC occurring condition: open circuit of control circuit of compressor relay

DTC definition: short circuit to ground of control circuit of compressor relay

DTC occurring condition: short circuit to ground of control circuit of compressor relay

DTC definition: short circuit to power supply of control circuit of compressor relay

DTC occurring condition: short circuit to power supply of control circuit of compressor relay

Possible Causes

- Open circuit of control circuit of compressor relay
- Short circuit of control circuit of compressor relay
- Compressor relay is damaged.

Possible fault description

- The A/C does not work.

Troubleshooting method

1. Check whether the A/C refrigerant pressure sensor and its circuit are normal.

i Notice

- No, find and eliminate faults of the A/C refrigerant pressure sensor and its circuit.
- Yes: Proceed to the next step.

2. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Pull out the compressor relay.
4. Measure whether the compressor relay is normal.

i Notice

- Yes: Proceed to the next step.
- No, replace the compressor relay.

5. Place the ignition switch in the ON position.
6. Measure the voltage at #30 pin and #85 pin (power supply) sockets of compressor relay.

   Normal voltage: about 12V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The circuit from compressor relay to battery is opened.
  - The circuit from compressor relay to battery is short circuited.
- If the measured voltage is within range of normal voltage, go on with the next operation.

7. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

8. Disconnect the ECM harness connector.
9. Measure the resistance between the compressor relay socket pin (to ECM) and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between compressor relay socket pin (to ECM) and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Disconnect the compressor harness connector.
12. Measure the resistance between the compressor relay socket pin (to compressor) and the corresponding pin of compressor harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between compressor relay socket pin (to compressor) and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Measure the resistance between compressor relay socket pin (to ECM and to compressor) and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Place the ignition switch in the ON position.
16. Measure the voltage between compressor relay socket pin (to ECM and to compressor) and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

17. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

18. Replace the compressor relay.
19. Install the ECM harness connector.
20. Place the ignition switch in the ON position.
21. Check whether the DTC disappears.

Notice

- If the DTC disappears, the compressor relay may be damaged.
- If the DTC still exists, the ECM may be damaged.

P182700/P182800/P182900/P182A00/P21B600/P21B700/P21B800/P21B900/P19A300/P19A400/P19A500/P19A600

P182700

DTC definition: cold start emission reduction fault (Cylinder 1 fuel injection mode fault).

DTC occurring condition: The difference between the demand and the actual number of fuel injection pulses during cold start is ≠0.

P182800

DTC definition: cold start emission reduction fault (Cylinder 3 fuel injection mode fault).

DTC occurring condition: The difference between the demand and the actual number of fuel injection pulses during cold start is ≠0.

P182900

DTC definition: cold start emission reduction fault (Cylinder 2 fuel injection mode fault).

DTC occurring condition: The difference between the demand and the actual number of fuel injection pulses during cold start is ≠0.

P182A00

DTC definition: cold start emission reduction fault (Cylinder 4 fuel injection mode fault).

DTC occurring condition: The difference between the demand and the actual number of fuel injection pulses during cold start is ≠0.

P21B600

DTC definition: cold start emission reduction fault (Cylinder 1 fuel injection timing fault).

DTC occurring condition: The difference between the demand and the actual fuel injection timing angle during cold start is ＞ 6°.

P21B700

DTC definition: cold start emission reduction fault (Cylinder 3 fuel injection timing fault).

DTC occurring condition: The difference between the demand and the actual fuel injection timing angle during cold start is ＞ 6°.

P21B800

DTC definition: cold start emission reduction fault (Cylinder 2 fuel injection timing fault).

DTC occurring condition: The difference between the demand and the actual fuel injection timing angle during cold start is ＞ 6°.

P21B900

DTC definition: cold start emission reduction fault (Cylinder 4 fuel injection timing fault).

DTC occurring condition: The difference between the demand and the actual fuel injection timing angle during cold start is ＞ 6°.

P19A300

DTC definition: cold start emission reduction fault (Cylinder 1 fuel injection duration fault).

DTC occurring condition: The difference between demand and actual fuel injection pulse width during cold start is ＞ 200us.

P19A400

DTC definition: cold start emission reduction fault (Cylinder 3 fuel injection duration fault).

DTC occurring condition: The difference between demand and actual fuel injection pulse width during cold start is ＞ 200us.

P19A500

DTC definition: cold start emission reduction fault (Cylinder 2 fuel injection duration fault).

DTC occurring condition: The difference between demand and actual fuel injection pulse width during cold start is ＞ 200us.

P19A600

DTC definition: cold start emission reduction fault (Cylinder 4 fuel injection duration fault).

DTC occurring condition: The difference between demand and actual fuel injection pulse width during cold start is ＞ 200us.

Possible fault description

› OBD indicator is on.

Troubleshooting method

1. Start the engine
2. Read the working parameters of the fuel injector with a diagnostic instrument

i Notice

› If the parameters of the fuel injector are abnormal, check the corresponding fuel injector.

› If the parameters of the fuel injector are normal, proceed to the next step.

3. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Replace ECM
5. Install the ECM harness connector.
6. Place the ignition switch in the ON position.
7. Check whether the DTC disappears.

i Notice

› If the DTC disappears, the ECM may be damaged.

› If the DTC still exists, contact for technical support.

C003208/C00A900/C003100/C003200/C00A000/C00A100/C003508/C00AA00/C003408/C003500/C00A200/C00A300/C003808/C00AB00/C003708/C003B00/C003800/C00A400/C00A500/C00AC00/C003A08/C003B08/C00A600/C00A700/C100B00/C109904

C003208

DTC definition: opposite sensor direction of the other 3 wheels with that of the front left wheel.

C00A900

DTC definition: line fault of unknown causes of the front left wheel sensor.

C003100

DTC definition: signal rationality fault of the front left wheel sensor.

C003200

DTC definition: open circuit of the front left wheel sensor.

C00A000

DTC definition: short circuit of the front left wheel sensor to the ground.

C00A100

DTC definition: short circuit of the front left wheel sensor to the power supply.

C003508

DTC definition: opposite sensor direction of the other 3 wheels with that of the front right wheel.

C00AA00

DTC definition: line fault of unknown causes of the front right wheel sensor.

C003408

DTC definition: signal rationality fault of the front right wheel sensor.

C003500

DTC definition: open circuit of the front right wheel sensor.

C00A200

DTC definition: short circuit of the front right wheel sensor to the ground.

C00A300

DTC definition: short circuit of the front right wheel sensor to the power supply.

C003808

DTC definition: opposite sensor direction of the other 3 wheels with that of the rear left wheel.

C00AB00

DTC definition: line fault of unknown causes of the rear left wheel sensor.

C003708

DTC definition: signal rationality fault of the rear left wheel sensor.

C003800

DTC definition: open circuit of the rear left wheel sensor.

C00A400

DTC definition: short circuit of the rear left wheel sensor to the ground.

C00A500

DTC definition: short circuit of the rear left wheel sensor to the power supply.

C003B00

DTC definition: opposite sensor direction of the other 3 wheels with that of the rear right wheel.

C00AC00

DTC definition: line fault of unknown causes of the rear right wheel sensor.

C003A08

DTC definition: signal rationality fault of the rear right wheel sensor.

C003B08

DTC definition: open circuit of the rear right wheel sensor.

C00A600

DTC definition: short circuit of the rear right wheel sensor to the ground.

C00A700

DTC definition: short circuit of the rear right wheel sensor to the power supply.

C100B00

DTC definition: wrong direction of wheel speed sensor and failure to decide the target faulty wheel.

C109904

DTC definition: general fault of wheel speed sensor.

DTC detection conditions:

1. The signal of the corresponding node is not lost.
2. The engine is in operation.
3. The voltage of the battery is ＞ 10V and ＜ 16V and maintained at no less than 9V for 500ms.
4. The number of signal frames on the CAN bus is > 0 after the first power-on.

Possible Causes

- The line fails.
- The sensor fails.

Troubleshooting method

1. Check whether the sensor connector is poorly plugged
   - Yes: reconnect it.
   - No: Go to the next step.
2. Check the appearance of the sensor for damage
   - Yes: Replace the sensor.
   - No: Go to the next step.
3. Check whether the ECM connector is badly connected.
   - Yes: reconnect it.
   - No: Go to the next step.
4. Check the harness from the sensor to ECM for short circuit or open circuit to the power supply or ground

› Yes: Repair the harness.

› No: Replace the sensor.

5. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again

› Yes: Diagnostic assistance

› No: Finished.

P062D00/P062E00/P162D00/P162E00

P062D00

DTC definition: first group of fuel injector drive circuit short-circuited to ground

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

P062E00

DTC definition: second group of fuel injector drive circuit short-circuited to ground

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

P162D00

DTC definition: first group of fuel injector drive circuit short-circuited to power supply

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

P162E00

DTC definition: second group of fuel injector drive circuit short-circuited to power supply

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

Possible Causes

› The fuel injector drive circuit fails.

Possible fault description

› The OBD failure indicator is on.

› DPF regeneration is disabled.

› The engine idle speed increases.

› The fuel injector cylinder balance strategy is disabled.

› Power is insufficient and torque is limited.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel injector harness connector.
3. Check the fuel injector status.

i Notice

› If the fuel injector is damaged, replace it.

› If the fuel injector is normal, proceed to the next step.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel injector harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between fuel injector harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of fuel injector harness connector.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace fuel injector
9. Install the fuel injector harness connector.
10. Install the ECM harness connector.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

› If the DTC disappears, the fuel injector may be damaged.

› If the DTC still exists, the ECM may be damaged.

P026200/P026500/P026800/P027100

P026200

DTC definition: The HV and LV ends of the fuel injector #1 drive circuit is short-circuited (cylinder #1).

DTC detection conditions:

1. Engine running state; ECM self-diagnosis

P026500

DTC definition: The HV and LV ends of the fuel injector #4 drive circuit is short-circuited (cylinder #2).

DTC detection conditions:

1. Engine running state; ECM self-diagnosis

P026800

DTC definition: The HV and LV ends of the fuel injector #2 drive circuit is short-circuited (cylinder #3).

DTC detection conditions:

1. Engine running state; ECM self-diagnosis

P027100

DTC definition: The HV and LV ends of the fuel injector #3 drive circuit is short-circuited (cylinder #4).

DTC detection conditions:

1. Engine running state; ECM self-diagnosis

Possible Causes

› The fuel injector or its line fails.

Possible fault description

› The OBD failure indicator is on.

› DPF regeneration is disabled.

› The engine idle speed increases.

› The fuel injector cylinder balance strategy is disabled.

› Power is insufficient and torque is limited.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel injector harness connector.
3. Check the fuel injector status.

i Notice

› If the fuel injector is damaged, replace it.

› If the fuel injector is normal, proceed to the next step.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel injector harness connector and the corresponding

pin of ECM harness connector.

Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between fuel injector harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of fuel injector harness connector.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace fuel injector
9. Install the fuel injector harness connector.
10. Install the ECM harness connector.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

- If the DTC disappears, the fuel injector may be damaged.
- If the DTC still exists, the ECM may be damaged.

P020100/P020200/P020300/P020400

P020100

DTC definition: The fuel injector #1 drive circuit is open (cylinder #1).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

P020200

DTC definition: The fuel injector #4 drive circuit is open (cylinder #2).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

P020300

DTC definition: The fuel injector #2 drive circuit is open (cylinder #3).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

P020400

DTC definition: The fuel injector #3 drive circuit is open (cylinder #4).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-diagnosis after being powered on.

Possible Causes

› The fuel injector or its line fails.

Possible fault description

› The OBD failure indicator is on.

› DPF regeneration is disabled.

› The engine idle speed increases.

› The fuel injector cylinder balance strategy is disabled.

› Power is insufficient and torque is limited.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel injector harness connector.
3. Check the fuel injector status.

i Notice

› If the fuel injector is damaged, replace it.

› If the fuel injector is normal, proceed to the next step.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel injector harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between fuel injector harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of fuel injector harness connector.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace fuel injector
9. Install the fuel injector harness connector.
10. Install the ECM harness connector.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

› If the DTC disappears, the fuel injector may be damaged.

› If the DTC still exists, the ECM may be damaged.

P026300/P026600/P026900/P027200

P026300

DTC definition: cylinder balance trouble due to misfire of cylinder 1 caused by fuel injector #1 (#1 cylinder)

DTC occurring condition: The difference between the instantaneous speed of cylinder 1 and that of previous cylinder is lower than the minimum speed difference.

P026600

DTC definition: cylinder balance trouble due to misfire of cylinder 4 caused by fuel injector #2 (#2 cylinder)

DTC occurring condition: The difference between the instantaneous speed of cylinder 2 and that of previous cylinder is lower than the minimum speed difference.

P026900

DTC definition: cylinder balance trouble due to misfire of cylinder 2 caused by fuel injector #3 (#3 cylinder)

DTC occurring condition: The difference between the instantaneous speed of cylinder 3 and that of previous cylinder is lower than the minimum speed difference.

P027200

DTC definition: cylinder balance trouble due to misfire of cylinder 3 caused by fuel injector #4 (#4 cylinder)

DTC occurring condition: The difference between the instantaneous speed of cylinder 4 and that of previous cylinder is lower than the minimum speed difference.

Possible fault description

- The engine fault indicator light is on.
- Engine shaking
- The engine idle speed increases.
- Power shortage
- IMV deviation correction compensation strategy is stopped.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel injector harness connector.
3. Check the status of the fuel injector (whether there are deformation and leakage of high-pressure fuel pipe, and blockage, leakage, wear and jamming of fuel injector)

Notice

- If the fuel injector is damaged, replace it.
- If the fuel injector is normal, proceed to the next step.

4. Disconnect ECM harness connector

5. Measure the resistance between the pin of fuel injector harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between fuel injector harness connector pin and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of fuel injector harness connector.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace the fuel injector
9. Install the fuel injector harness connector.
10. Install the ECM harness connector.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

- If the DTC disappears, the fuel injector may be damaged.
- If the DTC still exists, proceed to the next step.

13. Check the status of crankshaft position sensor.

Notice

- If the crankshaft position sensor is not installed properly, or the crankshaft position sensor or its

circuit is faulty, reinstall or replace it or remove the fault of the crankshaft position sensor circuit.

› If the crankshaft position sensor is in normal condition, proceed to the next step.

14. Check whether the engine cylinder pressure is normal.

Notice

› If the cylinder pressure is abnormal, check the air leakage point of the cylinder.

› If the cylinder pressure is normal, proceed to the next step.

15. Check the timing of engine.

Notice

› If the engine timing is wrong, readjust the engine timing.

› If the engine timing is correct, proceed to the next step.

16. Check the engine for serious carbon deposition.

Notice

› Remove the carbon deposit (if any) in the engine.

› If the engine is free of carbon deposit, proceed to the next step.

17. Check the fuel quality.

Notice

› If the fuel quality is bad, replace the fuel.

› If the fuel quality is normal, proceed to the next step.

18. Check engine lubricant.

Notice

› If the engine lubricant is of poor quality or has not been replaced for a long time, replace it with qualified engine lubricant.

› If the engine lubricant is normal, contact for technical support.

P16C000/P16C100/P16C200/P16C300/P160800

P16C000

DTC definition: No. 1 correction code of fuel injector is not written in (cylinder #1).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and the ECM performs the self-inspection after being powered on.

P16C100

DTC definition: No. 3 correction code of fuel injector is not written in (cylinder 2#).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and confirmation is performed after the ECM is powered on.

P16C200

DTC definition: No. 4 correction code of fuel injector is not written in (cylinder 3#).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and confirmation is performed after the ECM is powered on.

P16C300

DTC definition: No. 4 correction code of fuel injector is not written in (cylinder #2).

DTC detection conditions:

1. The ignition switch is turned to the ON position, and confirmation is performed after the ECM is powered on.

P160800

DTC definition: fuel injector correction code subject to integrity fault (incomplete verification)

DTC detection conditions:

1. The ignition switch is turned to the ON position, and confirmation is performed after the ECM is powered on.

Possible Causes

› C3I code is not written in the ECU.

Possible fault description

› OBD indicator is on.

› The fault detection of IMV control current correction value is stopped.

› Start the limp-in mode.

Troubleshooting

1. Place the ignition switch in the ON position.
2. If the DTC is P160800, the letter or number of the fuel injector correction code is entered incorrectly.
3. Enter the fuel injector correction code with the diagnostic apparatus.

Notice

› Fuel injector quantity adjustment (IQA) code is as shown below:



3A7A0EFCE9BE

› If the fuel injector correction code is written in unsuccessfully, try to disconnect the negative terminal of the battery, and then power it on again.

4. Clear DTC
5. Place the ignition switch in the OFF position

Notice

› When it is at OFF position, wait 60 s and then continue the operation.

6. Place the ignition switch in the ON position.
7. Check if the DTC still exists

Notice

› If there is a DTC, the fuel injector correction code is incorrect.

› If there is no DTC, the check is completed.

P033500/P033600/P033900/P133500

P033500

DTC definition: The crankshaft position sensor signal is lost.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: the loss of crankshaft position signal triggers the diagnostic information, and no crankshaft signal is detected between two consecutive cam signals.

P033600

DTC definition: fault of high resolution signal of timing reference voltage (excessive pulse)

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The crankshaft position signal triggers too much diagnostic information.

P033900

DTC definition: fault of high resolution signal of timing reference voltage (too little pulse)

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The crankshaft position signal triggers too little diagnostic information.

P133500

DTC definition: The crankshaft position sensor detects crankshaft overspeed.

DTC occurring condition: crankshaft speed > 5000 r/min.

Possible fault description

- OBD indicator is on.
- Stop it immediately.
- Power is insufficient and torque is limited.

Possible Causes

- Crankshaft signal is disturbed.
- Crankshaft position sensor is damaged or its circuit is disconnected.
- Engine overspeed

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Check whether the connector of crankshaft position sensor is securely connected.

i Notice

- No, reseat the connector of crankshaft position sensor.
- Yes: Proceed to the next step.

3. Check whether the crankshaft position sensor is installed correctly.

Notice

› No, reinstall the crankshaft position sensor.

› Yes: Proceed to the next step.

4. Disconnect the harness connector of crankshaft position sensor.
5. Check whether the crankshaft position sensor is abnormal.

Notice

› Yes, replace the crankshaft position sensor.

› No, proceed to the next step.

6. Place the ignition switch in the ON position.
7. Check whether the battery voltage is normal

Notice

› Yes: Proceed to the next step.

› No, eliminate the battery fault.

8. Measure the voltage between the power pin of harness connector of crankshaft position sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Check whether the ground pin of harness connector of crankshaft position sensor and the ground are connected.

Notice

› No, eliminate the ground wire fault.

› Yes: Proceed to the next step.

10. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

11. Disconnect ECM harness connector
12. Measure the resistance between the pin of harness connector of crankshaft position sensor and the corresponding pin of ECM harness connector.

Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between each pin of harness connector of crankshaft position sensor and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Measure the resistance between pins of harness connector of crankshaft position sensor.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Place the ignition switch in the ON position.
16. Measure the voltage between each pin of harness connector of crankshaft position sensor and the ground.

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

17. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

18. Check whether the signal panel is abnormal.

Notice

› Yes, find and eliminate the fault of signal panel.

› No, proceed to the next step.

19. Check whether there are signal interference sources such as additional equipment.

Notice

› Yes, remove the signal interference source.

› No, proceed to the next step.

20. Replace crankshaft position sensor
21. Install the ECM harness connector.
22. Install the harness connector of crankshaft position sensor.
23. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

› If the DTC still exists, the ECM may be damaged.

› If the DTC disappears, the crankshaft position sensor may be damaged.

P018300/P018200/P018100/P183200

P018300

DTC definition: line fault of fuel temperature sensor - open circuit or short circuit to the power supply.

DTC detection conditions:

1. When the ignition switch is in the ON position, the ECM is powered on.

DTC occurring condition: The voltage value of fuel temperature sensor is > 4.95V.

P018200

DTC definition: line fault of fuel temperature sensor - short circuit to ground.

DTC detection conditions:

1. When the ignition switch is in the ON position, the ECM is powered on.

DTC occurring condition: The voltage value of fuel temperature sensor is ＜ 0.05V.

P018100

DTC Definition: unreasonable fuel temperature.

DTC occurring condition: The temperature difference between fuel and engine coolant at power-on is > 50℃.

P183200

DTC definition: temperature sensor cross-check fault - unreasonable fuel temperature.

DTC detection conditions:

1. The fuel temperature sensor does not fail.
2. After the engine shutdown time is more than 8h, start the engine to run less than 5s.

DTC occurring condition: The cross diagnosis difference of the temperature sensor is > 30℃ (comparison of water temperature and fuel temperature).

Possible fault description

- When the DTCs are P018200 and P018300, the OBD lamp lights up and the torque is limited due to insufficient power.
- The water temperature value is substituted.

Possible Causes

- The sensor is open-circuited or short-circuited to the power supply.
- The sensor is short-circuited to ground.
- The sensor fails.

Troubleshooting method

1. Check whether the fuel temperature sensor is normal
   - Yes: proceed to the next step.
   - No: Replace the fuel temperature sensor.
2. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the harness connector of the fuel temperature sensor
4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the fuel temperature sensor and the ground

   Normal voltage: about 5V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The plug is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Disconnect ECM harness connector
7. Measure the resistance between each pin of harness connector of the fuel temperature sensor and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

9. Measure the resistance between the pin of harness connector of the fuel temperature sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Place the ignition switch in the ON position.
11. Measure the voltage between each pin of harness connector of the fuel temperature sensor and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

12. Replace ECM
13. Install the ECM harness connector.
14. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the fault does not disappear, the fuel temperature sensor may be damaged.

P011800/P011700

P011800

DTC definition: line fault of water temperature sensor - open circuit or short circuit to the power supply.

DTC occurring condition: The voltage value of coolant temperature sensor is > 4.95V.

P011700

DTC definition: water temperature sensor line fault - short circuit to ground.

DTC occurring condition: The voltage value of coolant temperature sensor is < 0.05V.

Possible fault description

- The OBD indicator is on.
- Power is insufficient and torque is limited.
- Cruise is prohibited.

Possible Causes

- The sensor line fails.
- The sensor fails.

Troubleshooting method

1. Check whether the coolant temperature sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the coolant temperature sensor.
2. Measure whether the resistance between any pin of the coolant temperature sensor and the grounding point is greater than 10 MΩ.
   - Yes: Replace the coolant temperature sensor.
   - No: Go to the next step.
3. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Disconnect the harness connector of the water temperature sensor
5. Place the ignition switch in the ON position.
6. Measure the voltage between the power pin of harness connector of the water temperature sensor and the ground

   Normal voltage: about 5V

i Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The plug is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

7. Disconnect ECM harness connector
8. Measure the resistance between each pin of harness connector of the water temperature sensor and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

10. Measure the resistance between the pin of harness connector of the water temperature sensor and the ground

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of the water temperature sensor and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Replace ECM
14. Install ECM and the harness connector of the water temperature sensor
15. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the DTC still exists, the water temperature sensor may be damaged.

P034000/P034100/P034400

P034000

DTC definition: The camshaft position sensor signal is lost.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The diagnostic information of camshaft position signal is lost (no camshaft signal is detected during 40 consecutive crankshaft gears.)

Possible cause of faults:

- Camshaft position sensor is damaged.
- Camshaft position sensor is open circuited.

P034100

DTC definition: camshaft position sensor signal is unstable.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: the unstable event counts of camshaft position signal are more than 40.

Possible cause of faults:

- Signal interference
- The installation clearance of camshaft position sensor is large.
- Abnormal signal gear

P034400

DTC definition: The camshaft position signal is not within the normal range, so the signal cannot be captured.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The camshaft position signal triggers too little diagnostic information (no camshaft signal is detected during 32 consecutive crankshaft gears.)

Possible cause of faults:

- Camshaft position sensor is damaged.
- Camshaft position sensor is open circuited.
- Abnormal signal gear

Possible fault description

- OBD indicator is on.
- The engine is difficult to start or cannot be started.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Check whether the connector of camshaft position sensor is securely connected.

Notice

› No, reseat the connector of camshaft position sensor.

› Yes: Proceed to the next step.

3. Check whether the camshaft position sensor is installed correctly.

Notice

› No, reinstall the camshaft position sensor.

› Yes: Proceed to the next step.

4. Disconnect the harness connector of camshaft position sensor.
5. Check whether the camshaft position sensor is abnormal.

Notice

› Yes, replace the camshaft position sensor.

› No, proceed to the next step.

6. Place the ignition switch in the ON position.
7. Measure the voltage between the power pin of harness connector of camshaft position sensor and the ground.

   Normal voltage: About 5V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

  › The harness is damaged.

  › The connector is damaged.

  › The ignition switch is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Check whether the ground pin of harness connector of camshaft position sensor and the ground are connected.

Notice

› No, eliminate the ground wire fault.

› Yes: Proceed to the next step.

9. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

10. Disconnect ECM harness connector
11. Measure the resistance between the pin of harness connector of camshaft position sensor and the corresponding pin of ECM harness connector.

Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between each pin of harness connector of camshaft position sensor and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
  - The ignition switch is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between pins of harness connector of camshaft position sensor.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Place the ignition switch in the ON position.
15. Measure the voltage between each pin of harness connector of camshaft position sensor and the ground.

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

16. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

17. Check whether the signal panel is abnormal.

Notice

› Yes, find and eliminate the fault of signal panel.

› No, proceed to the next step.

18. Check whether there are signal interference sources such as additional equipment.

Notice

› Yes, remove the signal interference source.

› No, proceed to the next step.

19. Replace camshaft position sensor
20. Install the ECM harness connector.
21. Install the harness connector of camshaft position sensor.
22. Turn the ignition switch to the ON position and check whether the DTC still exists

Notice

› If the DTC still exists, the ECM may be damaged.

› If the DTC disappears, the camshaft position sensor may be damaged.

P200800/P200900/P201000

P200800

DTC definition: open circuit of H-bridge driver of vortex valve.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The control chip of vortex valve gives fault information and ECU performs self-diagnosis.

Possible cause of fault: The H-bridge driver of the vortex valve is open-circuited.

P200900

DTC definition: short circuit of H-bridge driver of vortex valve to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The control chip of vortex valve gives fault information and ECU performs self-diagnosis.

Possible cause of fault: The H-bridge driver of the vortex valve is short-circuited to ground.

P201000

DTC definition: short circuit of H-bridge driver of vortex valve to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The control chip of vortex valve gives fault information and ECU performs self-diagnosis.

Possible cause of fault: The H-bridge driver of the vortex valve is short-circuited to the power supply.

Possible fault description

› OBD indicator is on.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check the battery voltage

i Notice

› If the battery voltage is too high or too low, charge, discharge or replace the battery.

› If the battery voltage is normal, proceed to the next step.

3. Turn the ignition switch to the OFF position

i Notice

› Wait at least 60s before proceeding with subsequent operations.

4. Disconnect ECM harness plug
5. Disconnect the vortex valve harness connector
6. Check whether the 3 ground pins of ECM harness connector are connected to the ground point.

Notice

› If they are disconnected, repair the circuit from ECM to the ground point.

› If they are connected, proceed to the next step.

7. Place the ignition switch in the ON position.
8. Check the voltage of 3 power pins of ECM harness connector.

Notice

› If the voltage is too high or too low, repair the circuit from ECM to battery.

› If the voltage is normal, proceed to the next step.

9. Measure the voltage between each pin of harness connector of the vortex valve and the ground

   Normal voltage: about 0V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

10. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

11. Measure the resistance between the pin of harness connector of the vortex valve and the corresponding pin of ECM harness connector

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between the pin of harness connector of the vortex valve and the ground

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between pins of harness connector of the vortex valve

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

14. Install the ECM harness connector.
15. Place the ignition switch in the ON position.
16. Measure the voltage between the motor power pin of harness connector of the vortex valve and the ground

    Normal voltage: 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › ECM fault

› If the measured voltage is within range of normal voltage, go on with the next operation.

17. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

18. Replace the vortex valve
19. Install the harness connector of the vortex valve
20. Place the ignition switch in the ON position.
21. Check whether the DTC disappears.

Notice

› If the fault disappears, the vortex valve may be damaged.

› If the DTC still exists, the ECM may be damaged.

P191900/P192000

P191900

DTC definition: The battery voltage exceeds the upper limit of safe voltage of the vortex valve.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: battery voltage > 16V

P192000

DTC definition: The battery voltage exceeds the lower limit of safe voltage of the vortex valve.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: battery voltage < 8V

Possible fault description

› The OBD failure indicator is on.

Troubleshooting method

1. Check the battery voltage

i Notice

› If the battery voltage is too high or too low, charge, discharge or replace the battery.

› If the battery voltage is normal, proceed to the next step.

2. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the ECM harness connector.
4. Measure the resistance between the ground pin of ECM harness connector and the ground.

   Normal resistance: about 0Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

5. Place the ignition switch in the ON position.
6. Measure the voltage of ECM harness connector power supply pin.

   Normal voltage: approximately equal to the battery voltage

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

- The harness is damaged.
- The connector is damaged.
- The battery terminal is in poor contact.

- If the measured voltage is within the normal voltage range, proceed to the next step.

7. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

8. Disconnect the vortex valve harness connector
9. Measure the resistance between the pin of harness connector of the vortex valve and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pin of harness connector of the vortex valve and the ground

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between pins of harness connector of the vortex valve

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Place the ignition switch in the ON position.
13. Measure the voltage between each pin of harness connector of the vortex valve and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

14. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

15. Replace the vortex valve
16. Install the harness connector of the vortex valve
17. Install the ECM harness connector.
18. Place the ignition switch in the ON position.
19. Check whether the DTC disappears.

Notice

- If the fault disappears, the vortex valve may be damaged.
- If the DTC still exists, the ECM may be damaged.

P191300/P191400/P200A00

P191300

DTC definition: one-way jam of throttle (anti-jamming operation failed).

DTC occurring condition: The anti-jamming operation of the vortex valve fails and the number of vortex valve operation allowed within a certain range is > 4.

Possible cause of fault: The feedback signal of vortex valve position exceeds the limit.

P191400

DTC definition: Deviation of vortex valve position exceeds limit (demand and feedback).

DTC occurring condition: Deviation between vortex valve demand and feedback position is > 10%.

Possible cause of fault: The feedback signal of vortex valve position exceeds the limit.

P200A00

DTC definition: The throttle is jammed at a certain position (anti-jamming operation fails).

DTC occurring condition: The anti-jamming operation of the vortex valve fails and the number of vortex valve operation failure is > 3.

Possible cause of fault: The feedback signal of vortex valve position exceeds the limit.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› The vortex valve is subject to one-way jam.

› There are impurities or foreign matters in the vortex valve.

› The control motor of the vortex valve is damaged.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Remove the vortex valve and check the appearance and functional status of the vortex valve

i Notice

› Clean or replace the vortex valve if there are too many impurities in the vortex valve or the vortex valve is stuck.

› If the vortex valve is normal, proceed to the next step.

3. Check the resistance between positive and negative pins of vortex valve motor

   Normal resistance: about (1.665 ~ 2.035) Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The vortex valve is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

4. Disconnect the vortex valve harness connector
5. Disconnect ECM harness connector
6. Measure the resistance between the pin of harness connector of the vortex valve and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between the pin of harness connector of the vortex valve and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness is short-circuited to ground.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between pins of harness connector of the vortex valve

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › Harness short-circuited.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Place the ignition switch in the ON position.
10. Measure the voltage between each pin of harness connector of the vortex valve and the ground

    Normal voltage: about 0V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › Harness short-circuited.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

12. Replace the vortex valve
13. Install the ECM harness connector.
14. Install the harness connector of the vortex valve
15. Place the ignition switch in the ON position.
16. Check whether the DTC disappears.

Notice

› If the fault disappears, the vortex valve may be damaged.

› If the DTC still exists, the ECM may be damaged.

P201600/P201700

P201600

DTC definition: position feedback signal of the vortex valve exceeding lower limit.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The position feedback signal of the vortex valve is < 0.1V.

Possible cause of fault: The feedback signal of vortex valve position exceeds the limit.

P201700

DTC definition: position feedback signal of the vortex valve exceeding upper limit.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The position feedback signal of the vortex valve is > 4.9V.

Possible cause of fault: The feedback signal of vortex valve position exceeds the limit.

Possible fault description

› The OBD failure indicator is on.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the vortex valve harness connector
3. Place the ignition switch in the ON position.
4. Measure the voltage of the power pin of the position sensor for the harness connector of the vortex valve

   Normal voltage: about 5V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › The harness is damaged.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Turn the ignition switch to the OFF position

i Notice

› Wait at least 60s before proceeding with subsequent operations.

6. Disconnect ECM harness connector
7. Measure the resistance between the pin of harness connector of the vortex valve and the corresponding pin of ECM harness connector

Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pin of harness connector of the vortex valve and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between pins of harness connector of the vortex valve

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Place the ignition switch in the ON position.
11. Measure the voltage between each pin of harness connector of the vortex valve and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

12. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

13. Replace the vortex valve

14. Install the ECM harness connector.
15. Install the harness connector of the vortex valve
16. Place the ignition switch in the ON position.
17. Check whether the DTC disappears.

Notice

- If the fault disappears, the vortex valve may be damaged.
- If the DTC still exists, the ECM may be damaged.

P190700/P190800/P190900/P191000/P191100//P191200

P190700

DTC definition: The long-term self-learning value of vortex valve at fully closed position deviates from fault (current value and first self-learning value).

DTC occurring condition: The difference between the self-learning value of the current vortex valve at fully closed position and the first self-learning value is more than 0.5V.

Possible cause of fault: Excessive impurities in vortex valve result in deviation of the fully closed position.

P190800

DTC definition: The short-term self-learning value of vortex valve at fully closed position deviates from fault (between twice contiguous and successful self-learning).

DTC occurring condition: The difference between the self-learning value of the vortex valve at fully closed position and the previous self-learning value is more than 0.25V.

Possible cause of fault: A single item is jammed during the most recent self-learning.

P190900

DTC definition: The long-term self-learning value of vortex valve at fully opened position deviates from fault (current value and first self-learning value).

DTC occurring condition: The difference between the self-learning value of the current vortex valve at fully opened position and the first self-learning value is more than 0.5V.

Possible cause of fault: Excessive impurities in vortex valve result in deviation of the fully opened position.

P191000

DTC definition: The short-term self-learning value of vortex valve at fully opened position deviates from fault (between twice contiguous and successful self-learning).

DTC occurring condition: The difference between the self-learning value of the vortex valve at fully opened position and the previous self-learning value is more than 0.25V.

Possible cause of fault: A single item is jammed during the most recent self-learning.

P191100

DTC definition: The first self-learning of vortex valve at fully closed position is out of range.

DTC occurring condition: The first self-learning value of vortex valve at fully closed position exceeds the range by more than 4.76V or less than 4.26V.

Possible cause of fault: The vortex valve is incompatible with ECU software.

P191200

DTC definition: The first self-learning of vortex valve at fully opened position is out of range.

DTC occurring condition: The first self-learning value of vortex valve at fully opened position exceeds the range by more than 0.75V or less than 0.24V.

Possible cause of fault: The vortex valve is incompatible with ECU software.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check vortex valve and current ECU software version.

Notice

› If the software is unavailable, rewrite the software.

› If it is available, proceed to the next step.

3. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Remove the vortex valve and check the appearance and functional status of the vortex valve

Notice

› Clean or replace the vortex valve if there are too many impurities in the vortex valve or the vortex valve is stuck.

› If the vortex valve is normal, proceed to the next step.

5. Check the resistance between positive and negative pins of vortex valve motor

   Normal resistance: about (1.665 ~ 2.035) Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The vortex valve is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

6. Disconnect ECM harness connector

7. Measure the resistance between the pin of harness connector of the vortex valve and the corresponding pin of ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pin of harness connector of the vortex valve and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between pins of harness connector of the vortex valve

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Place the ignition switch in the ON position.
11. Measure the voltage between each pin of harness connector of the vortex valve and the ground

    Normal voltage: about 0V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

12. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

13. Replace the vortex valve
14. Install the harness connector of the vortex valve
15. Install the ECM harness connector.
16. Place the ignition switch in the ON position.
17. Check whether the DTC disappears.

Notice

› If the fault disappears, the vortex valve may be damaged.

› If the DTC still exists, the ECM may be damaged.

P056200/P056300

P056200

DTC definition: low battery voltage fault

DTC detection conditions:

1. The engine is started or shut down.
2. There is no starter relay fault or ADC module fault.

DTC occurring condition: ultra-low limit of battery voltage < 6V

P056300

DTC definition: high battery voltage fault

DTC detection conditions:

1. The engine is started or shut down.
2. There is no starter relay fault or ADC module fault.

DTC occurring condition: ultra-high limit of battery voltage > 18V

Possible fault description

- The failure indicator is on.
- Power is insufficient and torque is limited.
- A/C is prohibited from being turned on.
- The automatic cruise function is disabled.

Possible Causes

- Battery fault.
- The battery voltage signal line fails.

Troubleshooting

1. Check whether the battery voltage is normal.
   - Yes: proceed to the next step.
   - No: Check and charge the battery.
2. Check whether the battery voltage is normal when the engine is running.
   - Yes: proceed to the next step.
   - No: Check the charging circuit and generator.
3. When the ignition switch is in the ON position, use a diagnostic apparatus to read whether the battery voltage value matches the value measured at both ends of the battery.
   - Yes: proceed to the next step.
   - No: Check the ECM power line and ECM GND line.
4. When the engine is running, use a diagnostic apparatus to read whether the battery voltage value matches the value measured at both ends of the battery.
   - Yes: proceed to the next step.
   - No: Check the ECM power line and ECM GND line.
5. Check whether the starter circuit (cable status, tightness of terminals, starter fixing, starter cable problem) is normal.

› Yes: Eliminate the fault.

› No: Go to the next step.

6. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again

› Yes: Request technical support from the manufacturer.

› No: Finished.

P056C00/P056500/P057900/P056700

P056C00

DTC definition: The cruise CANCEL button gets stuck.

DTC occurring condition: The cruise button CANCEL signal input is always > 100S.

P056500

DTC definition: The cruise CONTROL button gets stuck.

DTC occurring condition: The cruise button CONTROL signal input is always > 100S.

P057900

DTC definition: cruise button rationality fault

DTC occurring condition: CNT value of CANCEL button is > 0.74V or < 0.49V.

P056700

DTC definition: The cruise RESUME button gets stuck.

DTC occurring conditions:

- CNT value of CANCEL button is > 150cnts or < 100cnts.
- CNT value of CONTROL button is > 70cnts or < 30cnts.
- CNT value of RESUME button is > 250cnts or < 200cnts.
- CNT value of SET button is > 360cnts or < 320cnts.

P056800

DTC definition: The cruise SET button gets stuck.

DTC occurring condition: The cruise button SET signal input is always > 100S.

Possible fault description

- The engine service indicator lights up.
- The cruise function is disabled.

Possible Causes

- The key gets stuck.
- The cruise button fails.
- The line fails.

Troubleshooting

1. Check the system (key cruise-control switch input) for strong electromagnetic interference (its harness must be carefully installed and arranged to keep it away from known serious electronic noise sources, such as electric motors, ignition coils, high-voltage ignition wires, spark plugs, fuel injectors and their control wires and generators.)
   - Yes: Eliminate interference.
   - No: Go to the next step.
2. Check whether the input line voltage of cruise-control switch is beyond the normal range (compared to normal vehicles).
   - Yes: Eliminate the line faults.
   - No: Go to the next step.

3. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - Yes: Repair or replace the cruise-control switch.
   - No: Finished.
4. Repeat step 3.
   - Yes: Diagnostic assistance
   - No: Finished.

P245300

P245300

DTC definition: For the DPF differential pressure sensor, its air inlet pipe is connected to the outlet while its air outlet pipe is connected to the inlet.

DTC occurring condition: exhaust flow < -2 kPa

Possible fault description

- The OBD failure indicator is on.
- DPF regeneration is disabled.

Possible Causes

- For the differential pressure sensor, its air inlet pipe is connected to the outlet while its air outlet pipe is connected to the inlet.
- The connected lines or connectors fail.
- The differential pressure pipeline connected to the differential pressure sensor falls off or is damaged on both sides.

Troubleshooting

1. Check whether the air inlet pipe and outlet pipe of differential pressure sensor are installed in the incorrect positions.
   - Yes: Connected correctly
   - No: Go to the next step.
2. Check whether differential pressure pipeline connected to the differential pressure sensor falls off or is damaged on both sides.
   - Yes: Eliminate the fault.
   - No: Go to the next step.
3. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - Yes: Diagnostic assistance
   - No: Finished.

P245500/P245400

P245500

DTC definition: DPF differential pressure sensor line fault - open circuit or short circuit to power supply

DTC occurring condition: voltage information of differential pressure sensor > 4.9V

P245400

DTC definition: differential pressure sensor line fault - short circuit to ground

DTC occurring condition: voltage information of differential pressure sensor < 0.15V

Possible fault description

- The OBD failure indicator is on.
- DPF regeneration is disabled.

Possible Causes

- The differential pressure sensor is damaged.
- The differential pressure sensor circuit is open or short-circuited to power supply.
- The differential pressure sensor is short-circuited to ground.

Troubleshooting

1. Check the differential pressure sensor for damage.
   - Yes: Replace the differential pressure sensor.
   - No: Go to the next step.
2. Place the ignition switch in the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the differential pressure sensor harness connector.
4. Place the ignition switch in the ON position.
5. Measure the voltage between power pin of harness connector of differential pressure sensor and ground.

   Normal voltage: about 5V

i Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The plug is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Place the ignition switch in the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect ECM harness connector

8. Measure the resistance between each pin of harness connector of the differential sensor harness and the corresponding pin of the ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between pin of harness connector of differential pressure sensor and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Place the ignition switch in the ON position.
11. Measure the voltage between each pin of harness connector of differential pressure sensor and ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

12. Replace ECM
13. Install the ECM and differential pressure sensor harness connector.
14. Check whether the DTC disappears.
    - If the DTC disappears, the ECM may be damaged.
    - If the DTC still exists, the differential pressure sensor may be damaged.

P224300/P224600/P224500/P2A0000/P22AE00/P22B100/P22B000/P2A0100

P224300

DTC definition: front oxygen sensor line fault - open circuit of reference signal.

P224600

DTC definition: high reference signal of the front oxygen sensor.

P224500

DTC definition: low reference signal of the front oxygen sensor.

P2A0000

DTC definition: front oxygen sensor line fault - open circuit of oxygen signal.

P22AE00

DTC definition: rear oxygen sensor line fault - open circuit of reference signal.

P22B100

DTC definition: high reference signal of the rear oxygen sensor.

P22B000

DTC definition: low reference signal of the rear oxygen sensor.

P2A0100

DTC definition: rear oxygen sensor line fault - open circuit of oxygen signal.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› The harness connection is poor.

› Oxygen sensor is damaged.

Troubleshooting method

1. Check the harness connector for poor connection
   - › Yes: reconnect it.
   - › No: Go to the next step.
2. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the harness connector of the oxygen sensor
4. Check the oxygen sensor for damage
   - › If the oxygen sensor is damaged, replace it.
   - › If the oxygen sensor is normal, proceed to the next step.

5. Place the ignition switch in the ON position.
6. Measure the voltage between the power pin of harness connector of the oxygen sensor and the ground

   Normal voltage: About 12V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

7. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

8. Disconnect ECM harness connector
9. Measure the resistance between the reference signal pin of the oxygen sensor and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the reference signal pin of the oxygen sensor and the ground

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between the reference signal pin of the oxygen sensor and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as

follows:

› Harness is short-circuited to power.

› The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

14. Replace oxygen sensor
15. Install the ECM harness connector.
16. Install the harness connector of the oxygen sensor
17. Turn the ignition switch to the ON position and check whether the DTC still exists

› If the DTC still exists, the ECM may be damaged.

› If the DTC disappears, the oxygen sensor may be damaged.

P013300/P013900

P013300

DTC definition: rationality when the oil supply of front oxygen sensor is cut off

P013900

DTC definition: rationality when the oil supply of rear oxygen sensor is cut off

DTC detection conditions:

1. The fuel injector is cut off.

DTC occurring condition: The instantaneous time of oxygen sensor air-fuel ratio signal from rich to lean is > 5s.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› Air intake, exhaust system leakage.

› The oxygen sensor signal terminal pin is in poor contact, and the ECM oxygen sensor signal receiving terminal is also in poor contact.

› The sensor is aged, poisoned, or damaged.

› The oxygen sensor is poisoned by heavy metal, phosphorus or sulfur due to fuel pollution.

› The oxygen sensor is poisoned by phosphorus due to excessive oil consumption.

Troubleshooting

1. Check intake/exhaust system for leakage
   - › Yes: Eliminate air leakage.
   - › No: Go to the next step.
2. Remove and reconnect the oxygen sensor connector and ECM connector.
3. Start the vehicle. Carry out the road test for the vehicle until it meets the fault detection starting condition, and observe whether the fault is reported.
   - › Yes: proceed to the next step.
   - › No: Finished.
4. Check whether the sensor signal terminal pin is in poor contact, and whether the ECM oxygen sensor signal receiving terminal is also in poor contact.
   - › Yes: Repair or replace the harness.
   - › No: Go to the next step.
5. Replace the oxygen sensor
6. Connect the diagnostic apparatus, turn the ignition switch to "ON", send the DTC clearing command, start the vehicle, conduct the road test for the vehicle until it meets the fault detection starting conditions, and observe whether the fault is reported.
   - › Yes: Diagnostic assistance
   - › No: Finished.

P013500/P109100/P109200/P014100/P109500//P109600

P013500

DTC definition: heating signal open circuit of the front oxygen sensor.

P109100

DTC definition: high heating signal of the front oxygen sensor.

P109200

DTC definition: low heating signal of the front oxygen sensor.

P014100

DTC definition: heating signal open circuit of the rear oxygen sensor.

P109500

DTC definition: high heating signal of the rear oxygen sensor.

P109600

DTC definition: low heating signal of the rear oxygen sensor.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› The line between the oxygen sensor heater and the ECM is short-circuited or open-circuited to the power supply or ground.

› Oxygen sensor is damaged.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the oxygen sensor
3. Check the oxygen sensor for damage
   - › If the oxygen sensor is damaged, replace it.
   - › If the oxygen sensor is normal, proceed to the next step.
4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the oxygen sensor and the ground

   Normal voltage: About 12V

Notice

› If the measured voltage value is not within the normal voltage range, the possible causes are as follows:

- The harness is damaged.
- The connector is damaged.

- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of the oxygen sensor heater and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of the oxygen sensor heater and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Place the ignition switch in the ON position.
11. Measure the voltage between the pin of the oxygen sensor heater and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

12. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

13. Replace oxygen sensor
14. Install the ECM harness connector.
15. Install the harness connector of the oxygen sensor
16. Turn the ignition switch to the ON position and check whether the DTC still exists
    - › If the DTC still exists, the ECM may be damaged.
    - › If the DTC disappears, the oxygen sensor may be damaged.

P013000/P013600

P013000

DTC definition: The air-fuel ratio of front oxygen sensor is too small.

DTC detection conditions:

1. The fuel injection quantity is more than 20g/s per stroke.

DTC occurring condition: The air-fuel ratio signal of oxygen sensor is > 7.

P013600

DTC definition: The air-fuel ratio of rear oxygen sensor is too small.

DTC detection conditions:

1. The fuel injection quantity is more than 20g/s per stroke.

DTC occurring condition: The air-fuel ratio signal of oxygen sensor is > 7.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› The sensor is damaged and aged.

Troubleshooting

1. Replace the oxygen sensor

P262600/P262800/P262700/P22B500/P263100//P263000

P262600

DTC definition: front oxygen sensor line fault - open circuit of the drive pump.

P262800

DTC definition: high current signal of the front oxygen sensor pump.

P262700

DTC definition: low current signal of the front oxygen sensor pump.

P22B500

DTC definition: rear oxygen sensor line fault - open circuit of the drive pump.

P263100

DTC definition: high current signal of the rear oxygen sensor pump.

P263000

DTC definition: low current signal of the rear oxygen sensor pump.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› The harness connection is poor.

› Oxygen sensor is damaged.

Troubleshooting method

1. Check the harness connector for poor connection
   - › Yes: reconnect it.
   - › No: Go to the next step.
2. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

3. Disconnect the harness connector of the oxygen sensor
4. Check the oxygen sensor for damage
   - › If the oxygen sensor is damaged, replace it.
   - › If the oxygen sensor is normal, proceed to the next step.
5. Place the ignition switch in the ON position.
6. Measure the voltage between the power pin of harness connector of the oxygen sensor and the ground

   Normal voltage: About 12V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

7. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

8. Disconnect ECM harness connector
9. Measure the resistance between the pin of the oxygen sensor pump and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the pin of the oxygen sensor pump and the ground

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between the pin of the oxygen sensor pump and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

14. Replace oxygen sensor
15. Install the ECM harness connector.
16. Install the harness connector of the oxygen sensor
17. Turn the ignition switch to the ON position and check whether the DTC still exists
    - › If the DTC still exists, the ECM may be damaged.
    - › If the DTC disappears, the oxygen sensor may be damaged.

P013100/P013200/P013700/P013800

P013100

DTC definition: too low signal of the front oxygen sensor.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

P013200

DTC definition: too high signal of the front oxygen sensor.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

P013700

DTC definition: too low signal of the rear oxygen sensor.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

P013800

DTC definition: too high signal of the rear oxygen sensor.

DTC detection conditions:

1. The engine runs.

DTC occurring condition: Hardware bottom diagnosis.

Possible fault description

› The OBD failure indicator is on.

Possible Causes

› P013200/P013800: The line between ECM terminal and oxygen sensor signal is short-circuited to the power supply.

› P013100/P013700: The line between ECM terminal and oxygen sensor signal is short-circuited to the ground wire

› P013200/P013800: The line of the oxygen sensor signal terminal is short-circuited to the power supply.

› P013100/P013700: The line of the oxygen sensor signal terminal is short-circuited to the ground wire.

› Oxygen sensor is damaged.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the oxygen sensor
3. Check the oxygen sensor for damage
   - If the oxygen sensor is damaged, replace it.
   - If the oxygen sensor is normal, proceed to the next step.
4. Place the ignition switch in the ON position.
5. Measure the voltage between the power pin of harness connector of the oxygen sensor and the ground

   Normal voltage: About 12V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect ECM harness connector
8. Measure the resistance between the signal pin of the oxygen sensor and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Place the ignition switch in the ON position.
10. Measure the voltage between the signal pin of the oxygen sensor and the ground

    Normal voltage: About 0V

Notice

- If the measured voltage value is not within the normal voltage range, the possible causes are as follows:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

12. Replace oxygen sensor
13. Install the ECM harness connector.
14. Install the harness connector of the oxygen sensor
15. Turn the ignition switch to the ON position and check whether the DTC still exists
    - › If the DTC still exists, the ECM may be damaged.
    - › If the DTC disappears, the oxygen sensor may be damaged.

P000300/P000400

P000300

DTC definition: fuel metering valve drive current monitoring feedback low current fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: fuel metering valve drive current monitoring feedback current < 61 mA

P000400

DTC definition: fuel metering valve drive current monitoring feedback high current fault

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: fuel metering valve drive current monitoring feedback current > 2,490 mA

Possible fault description

- OBD indicator is on.
- Functions of hydraulic test, rail pressure test and metering valve test are disabled.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel metering valve harness connector.
3. Check the resistance between two pins of fuel metering valve.

   Normal value: (4.77~5.83) Ω (at 20℃)

i Notice

- If the measured resistance is not within the normal resistance range, replace the fuel metering valve.
- If the measured resistance is within range of normal resistance, go on with the next operation.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel metering valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

i Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between pin of harness connector of fuel metering valve and ground.

Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of harness connector of fuel metering valve.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace ECM
9. Install the ECM harness connector.
10. Install the harness connector of fuel metering valve.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the fuel metering valve may be damaged.

P000200/P10A200

P000200

DTC definition: resistance of fuel metering valve drive circuit > limit

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: resistance of fuel metering valve drive circuit > 10Ω

P10A200

DTC definition: resistance of fuel metering valve drive circuit < limit

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: resistance of fuel metering valve drive circuit < 1Ω

Possible fault description

› OBD indicator is on.

› Functions of hydraulic test, rail pressure test and metering valve test are disabled.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel metering valve harness connector.
3. Check the resistance between two pins of fuel metering valve.

   Normal value: (4.77~5.83) Ω (at 20℃)

i Notice

› If the measured resistance is not within the normal resistance range, replace the fuel metering valve.

› If the measured resistance is within range of normal resistance, go on with the next operation.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel metering valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between pin of harness connector of fuel metering valve and ground.

Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of harness connector of fuel metering valve.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace ECM
9. Install the ECM harness connector.
10. Install the harness connector of fuel metering valve.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the fuel metering valve may be damaged.

P025100/P025300/P025400

P025100

DTC definition: The fuel metering valve drive circuit is open.

DTC detection conditions:

1. When the ignition switch is turned to the ON position, the chip performs the self-diagnoses after the ECM is powered on.

DTC occurring condition: The fuel metering valve circuit is open.

P025300

DTC definition: The fuel metering valve drive circuit is short-circuited to ground.

DTC detection conditions:

1. When the ignition switch is turned to the ON position, the chip performs the self-diagnoses after the ECM is powered on.

DTC occurring condition: The fuel metering valve is short-circuited to ground.

P025400

DTC definition: The fuel metering valve drive circuit is short-circuited to power supply.

DTC detection conditions:

1. When the ignition switch is turned to the ON position, the chip performs the self-diagnoses after the ECM is powered on.

DTC occurring condition: The fuel metering valve is short-circuited to power supply.

Possible Causes

› The fuel metering valve circuit fails.

Possible fault description

› OBD indicator is on.

› The limp-in mode is on.

› The fuel injector discharge function is disabled.

› The fuel injector cylinder balance strategy is disabled.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel metering valve harness connector.
3. Check the resistance between two pins of fuel metering valve.

   Normal value: (4.77~5.83) Ω (at 20℃)

i Notice

› If the measured resistance is not within the normal resistance range, replace the fuel metering valve.

› If the measured resistance is within range of normal resistance, go on with the next operation.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel metering valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between pin of harness connector of fuel metering valve and ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of harness connector of fuel metering valve.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace ECM
9. Install the ECM harness connector.
10. Install the harness connector of fuel metering valve.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the fuel metering valve may be damaged.

P10A700/P10A600/P10A900/P10A800

P10A700

DTC definition: failed to control oil pressure by the fuel metering valve (the current correction of fuel metering valve is higher than the limit value when the fuel supply demand is high).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The current correction of fuel metering valve is higher than 450 mA.

P10A600

DTC definition: failed to control oil pressure by the fuel metering valve (the current correction of fuel metering valve is lower than the limit value when the fuel supply demand is high).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The current correction of fuel metering valve is lower than -450 mA.

P10A900

DTC definition: failed to control oil pressure by the fuel metering valve (the current correction of fuel metering valve is higher than the limit value when the fuel supply demand is low).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The current correction of fuel metering valve is higher than 500mA.

P10A800

DTC definition: failed to control oil pressure by the fuel metering valve (the current correction of fuel metering valve is lower than the limit value when the fuel supply demand is low).

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The current correction of fuel metering valve is lower than -500mA.

Possible fault description

› OBD indicator is on.

› Functions of hydraulic test, rail pressure test and metering valve test are disabled.

Troubleshooting method

1. Check the fuel pipeline for any bend or fuel leakage.

i Notice

› If yes, replace the fuel pipeline.

› If the fuel pipeline is normal, proceed to the next step.

2. Check the fuel filter for blockage.

i Notice

› If the fuel filter is blocked, replace it.

› If the fuel filter is normal, proceed to the next step.

3. Check the electronic fuel pump for any fault.

Notice

› If the electronic fuel pump fails, replace it.

› If the electronic fuel pump is normal, proceed to the next step.

4. Check the fuel injector for any fault.

Notice

› If the fuel injector fails, replace it.

› If the fuel injector is normal, proceed to the next step.

5. Check the rail pressure sensor for any fault.

Notice

› If the rail pressure sensor fails, replace it.

› If the rail pressure sensor is normal, proceed to the next step.

6. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect the fuel metering valve harness connector.
8. Check the resistance between two pins of fuel metering valve.

   Normal value: (4.77~5.83) Ω (at 20℃)

Notice

› If the measured resistance is not within the normal resistance range, replace the fuel metering valve.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Disconnect ECM harness connector
10. Measure the resistance between the pin of fuel metering valve harness connector and the corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between pin of harness connector of fuel metering valve and ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between pins of harness connector of fuel metering valve.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Replace ECM
14. Install the ECM harness connector.
15. Install the harness connector of fuel metering valve.
16. Place the ignition switch in the ON position.
17. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the fuel metering valve may be damaged.

P10A500

P10A500

DTC definition: The oil pressure control of fuel metering valve fails (driving signal is clamped at high potential).

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The duty ratio of fuel metering valve driving signal is > 97%.

Possible fault description

› OBD indicator is on.

Troubleshooting

1. Place the ignition switch in the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the fuel metering valve harness connector.
3. Check the resistance between two pins of fuel metering valve.

   Normal value: (4.77~5.83) Ω (at 20℃)

Notice

› If the measured resistance is not within the normal resistance range, replace the fuel metering valve.

› If the measured resistance is within range of normal resistance, go on with the next operation.

4. Disconnect ECM harness connector
5. Measure the resistance between the pin of fuel metering valve harness connector and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

6. Measure the resistance between pin of harness connector of fuel metering valve and ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

- The connector is damaged.

- If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between pins of harness connector of fuel metering valve.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Replace ECM
9. Install the ECM harness connector.
10. Install the harness connector of fuel metering valve.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the DTC still exists, the fuel metering valve may be damaged.

P119600

P119600

DTC Definition: failure to establish rail pressure under normal fuel level of fuel tank.

DTC occurring condition: It takes > 10s to establish rail pressure.

Possible fault description

- The failure indicator is on.
- The vehicle cannot be started.

Possible Causes

- The low pressure fuel pump line fails.
- The low pressure fuel pump fails.
- The low-pressure fuel pipeline fails.
- The high-pressure fuel pipeline fails.

Troubleshooting method

1. Check whether the fuel pressure is insufficient
   - If the fuel pressure is insufficient, the possible causes are as follows:
     - The fuel pump filter screen is blocked due to excessive impurities in fuel.
     - Whether the low pressure fuel pipeline is blocked or not, resulting in poor fuel flow.
     - The fuel pressure regulating valve has bad valve seat or insufficient spring force.
     - The fuel pump turbine is seriously worn; the pressure regulating valve fails, etc.
   - If the fuel pressure is normal, proceed to the next step.
2. Check whether the fuel pressure is too high
   - If the fuel pressure is too high, the possible causes are as follows:
     - The regulating valve of fuel pressure is jammed.
     - The fuel return pipe is blocked.
   - If the fuel pressure is normal, proceed to the next step.
3. Check whether the electric fuel pump does not provide fuel or not
   - If no fuel comes from the electric fuel pump, the possible causes are as follows:
     - The power supply is abnormal, and the fuel pump relay is short-circuited or open-circuited.
     - The DC motor of the fuel pump fails and does not run.
     - The fuel pump and filter screen are blocked due to fuel sintering.
     - The connection between the positive and negative poles of the fuel pump is poor.
     - The positive and negative poles of the power supply are connected reversely, leading to backward rotation.
     - There is too much water or other conductive liquids in the fuel, causing short circuit in the pump.
   - If the electric fuel pump provides fuel normally, proceed to the next step.
4. Check whether the fuel level sensor works abnormally

- If the fuel level sensor does not work properly, the possible causes are as follows:
  - The fuel float fails or is damaged.
  - Impurities in fuel accumulate in the sensor, resulting in poor contact between the sliding assembly and the sensor.
  - The fuel level indication of the instrument panel, the fuel level sensor and the height of fuel tank fuel level do not match.
- If the fuel level sensor works normally, proceed to the next step.

5. Check whether the low pressure fuel pump line is normal
   - Yes: Repair the harness.
   - No: Go to the next step.
6. Check whether the low pressure fuel pipe is abnormal (leakage, bending and blockage of inlet and outlet pipes)
   - Yes: Eliminate the fault.
   - No: Go to the next step.
7. Check whether the fuel inlet and outlet of the fuel filter are connected correctly
   - Yes: Eliminate the fault.
   - No: Go to the next step.
8. Check whether the engine can be started
   - Yes: Go to Step 7.
   - No: Go to Step 6.
9. Check whether the fuel return amount of the fuel return hose of the fuel injector is very small (static test) and whether the pressure-release valve of the fuel rail leaks
   - Yes: Replace the corresponding fuel injector.
   - No: Go to Step 9.
10. Check whether the IMV valve can be driven normally with a diagnostic instrument
    - Yes: proceed to the next step.
    - No: Replace the IMV valve.
11. Check whether the fuel return amount of fuel return hose of the fuel injector is very small (dynamic test)
    - Yes: proceed to the next step.
    - No: Replace the corresponding fuel injector.
12. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
    - Yes: Diagnostic assistance
    - No: Finished.

P038200/P038300/P066B00/P066A00/P066D00/P066C00/P066F00/P066E00/P067B00/P067A00/P038000/P054300/P052F00/P054200/P054100/P068300/P068400

P038200

DTC definition: feedback communication format error of preheater plug (excessive high level)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: the number of high level sent by GCU is more than 33.

P038300

DTC definition: feedback communication format error of preheater plug (excessive low level)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: the number of low level sent by GCU is more than 33.

P066B00

DTC definition: open circuit of 2# circuit of preheater plug (#1 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P066A00

DTC definition: open circuit of 2# circuit of preheater plug (#2 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P066D00

DTC definition: open circuit of 1# circuit of preheater plug (#2 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P066C00

DTC definition: open circuit of 1# circuit of preheater plug (#2 cylinder)

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P066F00

DTC definition: open circuit of 4# circuit of preheater plug (#3 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P066E00

DTC definition: open circuit of 4# circuit of preheater plug (#3 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P067B00

DTC definition: open circuit of 3# circuit of preheater plug (#4 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P067A00

DTC definition: open circuit of 3# circuit of preheater plug (#4 cylinder)

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P038000

DTC occurring condition: The communication information mode between preheater plug controller and ECM fails.

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P054300

DTC definition: open circuit of drive circuit of preheater plug controller

DTC occurring condition: ECM bottom chip diagnosis The driving duty ratio of preheater plug is less than 100%.

P052F00

DTC definition: low power supply to preheater plug

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: ECM bottom chip diagnosis

P054200

DTC definition: short circuit of drive circuit of preheater plug controller

DTC occurring condition: ECM bottom chip diagnosis The driving duty ratio of preheater plug is not more than 0%.

P054100

DTC definition: short circuit to the ground of drive circuit of preheater plug controller

DTC occurring condition: ECM bottom chip diagnosis The driving duty ratio of preheater plug is not more than 100%.

P068300

DTC definition: diagnostic information ending bit error of preheater plug

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

P068400

DTC definition: diagnostic synchronization timeout of preheater plug

DTC detection conditions:

1. The battery voltage is ＞ 10.5V.
2. The PWM output signal of preheater plug is larger than 5% and smaller than 97%.

DTC occurring condition: GCU internal judgment fails and sends fault information to ECM.

Possible Causes

- Short circuit of preheater plug
- Open circuit of preheater plug
- Preheater plug hardware fault
- GCU fault

Possible fault description

- OBD indicator is on.
- The engine service indicator lights up.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect ECM harness connector
3. Disconnect the GCU harness connector (to ECM)
4. Place the ignition switch in the ON position.
5. Measure the voltage of preheater plug power supply terminal on GCU.

Normal voltage: (10~14)V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The fuse is damaged.
  - The harness fails.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Measure the voltage between power pin of GCU harness connector (to ECM) and the ground.

   Normal voltage: (10~14)V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The fuse is damaged.
  - The harness fails.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

7. Measure the resistance between the ground pin of GCU harness connector (to ECM) and the ground.

   Normal resistance: 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness fails.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pin of GCU harness connector (to ECM) and the corresponding pin of the ECM harness connector.

   Normal resistance: 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness fails.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the signal pin of GCU harness connector (to ECM) and the ground.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness fails.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the voltage between the signal pin of GCU harness connector (to ECM) and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

12. Install the ECM harness connector.
13. Install the GCU harness connector (to ECM).
14. Disconnect the GCU harness connector (to preheater plug).
15. Disconnect the preheater plug connector.
16. Check whether the preheater plug is normal.

Notice

- Yes: Proceed to the next step.
- No, replace the preheater plug.

17. Measure the resistance between the pin of GCU harness connector (to preheater plug) and each preheater plug connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

18. Measure the resistance between the pin of GCU harness connector (to preheater plug) and the ground.

Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

19. Place the ignition switch in the ON position.
20. Measure the voltage at the pin of GCU powering the preheater plug.

Notice

- If the voltage is abnormal, replace the GCU.
- If the voltage is normal, proceed to the next step.

21. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

22. Replace GCU
23. Connect the GCU connector.
24. Connect the preheater plug connector.
25. Place the ignition switch in the ON position.
26. Check whether the DTC disappears.

Notice

- If the DTC disappears, the GCU may be damaged.
- If the DTC still exists, the ECM may be damaged.

P181D00/P226C00

P181D00

DTC definition: failure of closed-loop control of the turbocharger.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The closed-loop control of the turbocharger fails.

P226C00

DTC definition: low response of the turbocharger.

DTC detection conditions:

1. The engine is in operation.
2. Coolant temperature > 65℃.
3. The intake flow of the turbocharger is > 40 g/s.

DTC occurring condition: The average ratio of demand pressure change to actual pressure change is > 2.3.

Possible Causes

› The ECU drive module fails.

› The turbocharger is jammed and the drive circuit fails.

Possible fault description

› The OBD failure indicator is on.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Check the status of the turbocharger actuator

i Notice

› If the turbocharger actuator is jammed, eliminate the fault.

› If the turbocharger actuator is not jammed, proceed to the next step.

3. Disconnect the harness connector of the turbocharger
4. Place the ignition switch in the ON position.
5. Measure the voltage between the motor power pin of harness connector of the turbocharger and the ground

   Normal voltage: 10V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the turbocharger and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of harness connector of the turbocharger and the ground

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the turbocharger

    Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Replace ECM
12. Install the ECM harness connector.
13. Check whether the DTC disappears.

Notice

› If the DTC disappears, the ECM may be damaged.

› If the DTC still exists, the turbocharger actuator may be damaged.

P023400/P104D00/P029900

P023400

DTC definition: too high turbocharger control pressure.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference between the model value and the actual value of supercharger pressure is greater than the limit value.

P104D00

DTC definition: Deviation of turbocharger position control exceeds limit.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: Deviation between VGT position demand and feedback value is > 10%.

P029900

DTC definition: Too low turbocharger control pressure.

DTC detection conditions:

1. The engine is in operation.

DTC occurring condition: The difference between the model value of turbocharged pressure and the actual value is less than the limit value.

Possible Causes

- The variable cross-section turbine is stuck.
- The control motor is damaged.
- The rear air intake pipeline of the turbocharger is disconnected.

Possible fault description

- The OBD failure indicator is on.
- Power is insufficient and torque is limited.
- The VGT function is prohibited

Troubleshooting method

1. Check the engine intake pipeline

i Notice

- If the air intake pipeline leaks, repair it.
- If the air inlet pipeline is normal, proceed to the next step.

2. Check the working state of the turbocharger turbine

i Notice

- If the turbocharger turbine is stuck, replace the turbocharger.
- If the turbocharger turbine is normal, proceed to the next step.

3. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Disconnect the harness connector of the turbocharger
5. Place the ignition switch in the ON position.
6. Measure the voltage between the motor power pin of harness connector of the turbocharger and the ground

   Normal voltage: 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › The harness is damaged.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

7. Measure the voltage between the power pin of position sensor of the turbocharger harness connector and the ground

   Normal voltage: about 5V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  › The harness is damaged.
  › The connector is damaged.
› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

9. Disconnect ECM harness connector
10. Measure the resistance between the pin of harness connector of the turbocharger and the corresponding pin of the ECM harness connector

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  › The harness circuit is open.
  › The connector is damaged.
› If the measured resistance is within range of normal resistance, go on with the next operation.

11. Measure the resistance between the pin of harness connector of the turbocharger and the ground

Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

12. Measure the resistance between pins of harness connector of the turbocharger

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

13. Place the ignition switch in the ON position.
14. Measure the voltage between each pin of harness connector of the turbocharger and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

15. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

16. Replace ECM
17. Install the ECM harness connector.
18. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the fault still exists, the turbocharger may be damaged.

P181400/P181500/P180700/P180800/P180900

P181400

DTC definition: The battery voltage exceeds the upper limit of HP VGT safe voltage (H bridge).

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of turbocharger control chip fault.

P181500

DTC definition: The battery voltage exceeds the lower limit of HP VGT safe voltage (H bridge).

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of turbocharger control chip fault.

P180700

DTC definition: short circuit to ground of HP VGT drive axle (H bridge)

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of turbocharger control chip fault.

P180800

DTC definition: open circuit of HP VGT drive axle (H bridge)

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of turbocharger control chip fault.

P180900

DTC definition: short circuit to power supply of HP VGT drive axle (H bridge)

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: ECU self-diagnosis of turbocharger control chip fault.

Possible fault description

- The OBD failure indicator is on.
- Power is insufficient and torque is limited.
- The VGT function is prohibited

Possible Causes

- The turbocharger drive circuit is faulted.
- Turbocharger actuator is faulted.
- Battery is faulted.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check the battery voltage

Notice

› If the battery voltage is too high or too low, charge, discharge or replace the battery.

› If the battery voltage is normal, proceed to the next step.

3. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Disconnect the ECM harness connector.
5. Place the ignition switch in the ON position.
6. Check the voltage of 3 power pins of ECM harness connector.

Notice

› If the voltage is too high or too low, repair the circuit from ECM to battery.

› If the voltage is normal, proceed to the next step.

7. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

8. Install the ECM harness connector.
9. Disconnect the harness connector of the turbocharger
10. Place the ignition switch in the ON position.
11. Measure the voltage between the motor power pin of harness connector of the turbocharger and the ground

    Normal voltage: 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

12. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

13. Disconnect ECM harness connector
14. Measure the resistance between the pin of harness connector of the turbocharger and the corresponding pin of the ECM harness connector

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Measure the resistance between the pin of harness connector of the turbocharger and the ground

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

16. Measure the resistance between pins of harness connector of the turbocharger

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

17. Place the ignition switch in the ON position.
18. Measure the voltage between each pin of harness connector of the turbocharger and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

19. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

20. Replace ECM
21. Install the ECM harness connector.

22. Check whether the DTC disappears.

Notice

› If the DTC disappears, the ECM may be damaged.

› If the fault still exists, the turbocharger may be damaged.

P256400/P256500

P256400

DTC definition: open circuit or short circuit of turbocharger position sensor line to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of the turbocharger position sensor is < 0.1.

P256500

DTC definition: short circuit of turbocharger position sensor line to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The voltage signal of turbocharger position sensor is ＞ 4.9V.

Possible Causes

- The turbocharger position signal is short-circuited to the power supply.
- The turbocharger position signal is open-circuited or short-circuited to ground.
- The control circuit of the turbocharger bypass valve is open-circuited.
- The control circuit of the turbocharger bypass valve is open-circuited or short-circuited to ground.

Possible fault description

- The OBD failure indicator is on.
- Power is insufficient and torque is limited.
- The VGT function is prohibited

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of the turbocharger
3. Place the ignition switch in the ON position.
4. Measure the voltage between the motor power pin of harness connector of the turbocharger and the ground

   Normal voltage: 10V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Measure the voltage between the power pin of position sensor of the turbocharger harness connector and the ground

Normal voltage: about 5V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

6. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

7. Disconnect ECM harness connector
8. Measure the resistance between the pin of harness connector of the turbocharger and the corresponding pin of the ECM harness connector

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Measure the resistance between the pin of harness connector of the turbocharger and the ground

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between pins of harness connector of the turbocharger

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Place the ignition switch in the ON position.
12. Measure the voltage between each pin of harness connector of the turbocharger and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

13. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

14. Replace ECM
15. Install the ECM harness connector.
16. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the fault still exists, the turbocharger may be damaged.

P180100/P180200/P180300/P180400/P180500//P180600

P180100

DTC definition: The first self-learning of turbocharger bypass valve at fully closed position is out of range.

P180200

DTC definition: The first self-learning of turbocharger bypass valve at fully opened position is out of range.

P180300

DTC definition: The long-term self-learning value of turbocharger bypass valve at fully closed position deviates from fault (current value and first self-learning value).

P180400

DTC definition: The short-term self-learning value of turbocharger bypass valve at fully closed position deviates from fault (between twice contiguous and successful self-learning).

P180500

DTC definition: The long-term self-learning value of turbocharger bypass valve at fully opened position deviates from fault (current value and first self-learning value).

P180600

DTC definition: The short-term self-learning value of turbocharger bypass valve at fully opened position deviates from fault (between twice contiguous and successful self-learning).

Possible Causes

- The turbocharger model does not match the current software version.
- Position drift of turbocharger bypass valve.
- A single item is jammed during the most recent self-learning.

Troubleshooting method

1. Place the ignition switch in the ON position.
2. Check whether hardware and software of turbocharger match.

i Notice

- If no, replace it with correct hardware or software.
- If yes, proceed to the next step.

3. Turn the ignition switch to the OFF position

i Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

4. Check the status of the turbocharger actuator

i Notice

- If the turbocharger actuator is jammed, eliminate the fault.
- If the turbocharger actuator is not jammed, proceed to the next step.

5. Check the internal status of turbocharger.

Notice

› If there are many impurities in the turbocharger, remove the impurities.

› If there are no impurities in the turbocharger, proceed to the next step.

6. Disconnect the harness connector of the turbocharger
7. Place the ignition switch in the ON position.
8. Measure the voltage between the motor power pin of harness connector of the turbocharger and the ground

   Normal voltage: 10V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Measure the voltage between the power pin of position sensor of the turbocharger harness connector and the ground

   Normal voltage: about 5V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

10. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

11. Disconnect ECM harness connector
12. Measure the resistance between the pin of harness connector of the turbocharger and the corresponding pin of the ECM harness connector

    Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

13. Measure the resistance between the pin of harness connector of the turbocharger and the ground

Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Measure the resistance between pins of harness connector of the turbocharger

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Place the ignition switch in the ON position.
16. Measure the voltage between each pin of harness connector of the turbocharger and the ground

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

17. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

18. Replace ECM
19. Install the ECM harness connector.
20. Check whether the DTC disappears.

Notice

- If the DTC disappears, the ECM may be damaged.
- If the fault still exists, the turbocharger may be damaged.

P026A00

P026A00

DTC definition: low cooling efficiency of intercooler

DTC detection conditions:

1. The vehicle speed is > 50km/h.
2. Engine speed ＞ 1300rpm
3. Water temperature (70~100)℃.

DTC occurring condition: The ratio of theoretical value to actual value of temperature drop before and after intercooler is less than 0.55.

Possible Causes

› The intercooler is covered or the fan does not work.

› The intercooler or cooling pipeline fails.

Possible fault description

› The OBD failure indicator is on.

Troubleshooting

1. Check the intercooler appearance.

i Notice

› If the intercooler is covered or damaged, remove the cover or replace the intercooler.

› If the intercooler is normal, proceed to the next step.

2. Check the state of intercooler air inlet and outlet pipes.

i Notice

› If the intercooler air inlet and outlet pipes fail, remove the fault point.

› If the intercooler air inlet and outlet pipes are normal, proceed to the next step.

3. Place the ignition switch in the ON position.
4. Drive the radiator fan with diagnostic apparatus.

i Notice

› If the radiator is not working properly, repair the radiator fan.

› If the radiator works properly, proceed to the next step.

5. Check whether there are other DTCs and eliminate them.

P050400

P050400

DTC definition: Main and auxiliary brakes are inconsistent.

DTC occurring condition: The brake pedal signal status is inconsistent.

Possible Causes

- The connecting line between brake switch or brake lamp switch and ECM is open-circuited or short-circuited.
- The brake switch has hardware-related problems (e.g. jamming, two unsynchronized signals, and long stroke).

Troubleshooting

1. Check if the connecting line between brake switch or brake lamp switch and ECM is open-circuited or short-circuited
   - Yes: Repair or replace the relevant harness.
   - No: Go to the next step.
2. Turn the ignition switch to "ON". Start the engine to meet the inspection starting condition. Connect the diagnostic apparatus. Depress the brake pedal and observe whether the brake switch signal and the brake-lamp signal are out of sync (e.g. jamming, two unsynchronized signals, and long stroke).
   - Yes: Replace the brake switch or related harness.
   - No: Go to the next step.
3. Repeat Step 2 to check if DTC occurs again or not.
   - Yes: Diagnostic assistance
   - No: Finished.

P068500

P068500

DTC definition: The main relay gets stuck.

DTC occurring condition: relay jamming counter > 3

Possible causes: The main relay is shut down early due to abnormal power failure of ECU.

Troubleshooting

1. Place the ignition switch in the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Pull out the main relay.
3. Measure whether the main relay is normal.

i Notice

› Yes: Proceed to the next step.

› No: Replace the main relay.

4. Measure socket voltage of main relays 30 and 85.

   Normal voltage: about 12V

i Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The circuit from main relay to battery is open.

  › The circuit from main relay to battery is short-circuited.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Disconnect the ECM harness connector.
6. Measure the resistance between the main relay socket pin and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between the main relay socket pin and ground.

   Normal resistance value: over 1 MΩ

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated

below:

› Harness is short-circuited to ground.

› The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pins of the main relay socket.

   Normal resistance value: over 1 MΩ

i Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

› Harness short-circuited.

› The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Replace main relay
10. Install the ECM harness connector.
11. Place the ignition switch in the ON position.
12. Check whether the DTC disappears.

i Notice

› If the DTC disappears, the main relay may be damaged.

› If the DTC still exists, the ECM may be damaged.

P068800/P068900/P068700/P068600

P068800

DTC definition: open circuit of the main relay line.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The relay self-diagnosis line fails (open circuit).

Possible cause of fault: The main relay line is open-circuited.

P068900

DTC definition: short circuit of the main relay line.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The relay self-diagnosis line fails (short circuit).

Possible cause of fault: The main relay line is short-circuited.

P068700

DTC definition: short circuit of the main relay control line to the power supply.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The relay self-diagnosis line fails (short circuit to the power supply).

Possible cause of fault: The main relay control line is short-circuited to the power supply.

P068600

DTC definition: short circuit of the main relay control line to ground.

DTC detection conditions:

1. The ignition switch is turned to the ON position and the ECM is powered on.

DTC occurring condition: The relay self-diagnosis line fails (short circuit to ground).

Possible cause of fault: The main relay control line is short-circuited to ground.

Possible fault description

› The engine service indicator lights up.

Troubleshooting method

1. Turn the ignition switch to the OFF position

i Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Pull out the main relay.
3. Measure whether the main relay is normal.

i Notice

› Yes: Proceed to the next step.

› No: Replace the main relay.

4. Measure socket voltage of main relays 30 and 85.

   Normal voltage: about 12V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The circuit from main relay to battery is open.

  › The circuit from main relay to battery is short-circuited.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Disconnect the ECM harness connector.

6. Measure the resistance between the main relay socket pin and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between the main relay socket pin and ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pins of the main relay socket.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Place the ignition switch in the ON position.

10. Measure the voltage between the main relay socket pins (pins 86 and 87) and the ground

Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

12. Replace main relay
13. Install the ECM harness connector.
14. Place the ignition switch in the ON position.
15. Check whether the DTC disappears.

Notice

- If the DTC disappears, the main relay may be damaged.
- If the DTC still exists, the ECM may be damaged.

P192500

P192500

DTC definition: main relay drive fault

DTC occurring condition: relay jamming counter > 3 (MT).

DTC occurring condition: relay jamming counter > 2 (AT).

Possible Causes:

- Main relay fault.
- ECU drive fault

Possible fault description

- The OBD failure indicator is on.

Troubleshooting

1. Place the ignition switch in the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Pull out the main relay.
3. Measure whether the main relay is normal.

Notice

- Yes: Proceed to the next step.
- No: Replace the main relay.

4. Measure socket voltage of main relays 30 and 85.

   Normal voltage: about 12V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The circuit from main relay to battery is open.
  - The circuit from main relay to battery is short-circuited.
- If the measured voltage is within range of normal voltage, go on with the next operation.

5. Disconnect the ECM harness connector.
6. Measure the resistance between the main relay socket pin and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between the main relay socket pin and ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between the pins of the main relay socket.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

9. Place the ignition switch in the ON position.
10. Measure the voltage between the main relay socket pins (pins 86 and 87) and the ground

    Normal voltage: about 0V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › Harness short-circuited.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

11. Place the ignition switch in the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

12. Replace main relay
13. Install the ECM harness connector.
14. Place the ignition switch in the ON position.
15. Check whether the DTC disappears.

Notice

› If the DTC disappears, the main relay may be damaged.

› If the DTC still exists, the ECM may be damaged.

U100087/U100281/U100300/U100400/U100500/U100600/U100E00/U041600/U012287/U040129/U010600/U101500/U101800/U101900/U040186/U101B00/U003088/U003188/U004600/U007300/U010087/U029D00/U029E00/U040086/U040182/U100700/U100800/U100900/U100A00/U120200

U100087

DTC definition: ABM node loss

DTC occurring condition: loss of signal

Possible fault description: CE light is on.

U100281

DTC definition: ABM 245 node signal error

DTC occurring condition: ABM 245 CAN node receives the message incorrectly.

Possible fault description: CE light is on.

U100300

DTC definition: ABM 231 node signal error

DTC occurring condition: ABM 231 CAN node receives the message incorrectly.

Possible fault description: CE light is on.

U100400

DTC definition: ABS 246 node signal error

DTC occurring condition: ABS 246 CAN node receives the message incorrectly.

Possible fault description: CE light is on.

U100500

DTC definition: ABS 265 node signal error

DTC occurring condition: ABS 265 CAN node receives the message incorrectly.

U100600

DTC definition: CSA 0A1 node signal error

Possible fault description: CE light is on.

U100E00

DTC definition: GW node loss

DTC occurring condition: GW node loss

Possible fault description: CE light is on.

U041600

DTC definition: ESP 166 node signal error

DTC occurring condition: ESP 166 node receives the message incorrectly.

U012287

DTC definition: ESP node loss

DTC occurring condition: ESP node loss

U040129

DTC definition: CAN communication loss (the ambient air temperature value is invalid)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U010600

DTC definition: CAN communication loss (invalid speed value)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U101500

DTC definition: CAN communication loss (invalid engine coolant temperature)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U101800

DTC definition: CAN communication loss (invalid exhaust mass flow)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U101900

DTC definition: CAN communication loss (invalid air intake temperature value)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U040186

DTC definition: CAN communication loss (invalid lateral acceleration value)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

Possible fault description: OBD light is on.

U101B00

DTC definition: CAN communication loss (invalid longitudinal acceleration value)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

Possible fault description: OBD light is on.

U003088

DTC definition: CAN1 communication loss

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U003188

DTC definition: CAN2 communication loss

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

U004600

DTC definition: CAN0 bus short circuit

DTC occurring condition: CAN0 bus OFF counter

Possible fault description: OBD light is on.

U007300

DTC definition: CAN1 bus short circuit

DTC occurring condition: CAN1 bus OFF counter

Possible fault description: OBD light is on.

U010087

DTC definition: CAN communication loss (receiving timeout)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

Possible fault description: OBD light is on.

U029D00

DTC definition: NOX1 sensor signal loss

DTC occurring condition: downstream sensor CAN signal loss

Possible fault description: OBD light is on.

U029E00

DTC definition: NOX2 sensor signal loss

DTC occurring condition: upstream sensor CAN signal loss

Possible fault description: OBD light is on.

U040086

DTC definition: CAN communication loss (invalid AdBlue nozzle upstream temperature value)

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

Possible fault description: OBD light is on.

U040182

DTC definition: CAN communication loss

DTC occurring condition: ECM receives fault information sent by AdBlue injection system control unit.

Possible fault description: OBD light is on.

U100700

DTC definition: error sending frame 1 data from post-processing control unit

DTC occurring condition: error sending frame 1 data from post-processing control unit

Possible fault description: OBD light is on.

U100800

DTC definition: error sending frame 2 data from post-processing control unit

DTC occurring condition: error sending frame 2 data from post-processing control unit

Possible fault description: OBD light is on.

U100900

DTC definition: error sending frame 3 data from post-processing control unit

DTC occurring condition: error sending frame 3 data from post-processing control unit

Possible fault description: OBD light is on.

U100A00

DTC definition: error sending frame 4 data from post-processing control unit

DTC occurring condition: error sending frame 4 data from post-processing control unit

Possible fault description: OBD light is on.

U120200

DTC definition: DCU signal loss

DTC occurring condition: post-processing CAN signal loss

Possible fault description: OBD light is on.

Notice

› These errors may be occurred only when the CAN bus is used in the system. For example, time-out of the communication between ABS/ABM controller, automatic gearbox controller or instrument panel and ECM When carrying out relevant inspection, please ensure whether the vehicle to be inspected uses CAN network to communicate with relevant components.

Possible Causes

› Node signal error

› CAN bus fault

› DCU fault

Troubleshooting method

1. Check whether the ECM connector is poorly connected.
   › Yes: reconnect it.
   › No: Go to the next step.
2. Turn the ignition switch to the OFF position
3. Disconnect ECM harness connector
4. Disconnect connectors of ABS/ABM, TCU and instrument panel
5. Measure the resistance from the communication pin of ABS/ABM, TCU and instrument panel connector to ECM harness connector. The normal value is close to 0Ω.
   › Yes: proceed to the next step.
   › No: It may be caused by damage of harness, that is, the harness from ECM pin to CAN bus is open circuited.
6. Measure the resistance from the communication pin of ABS/ABM, TCU and instrument panel connector to the ground. The normal value is larger than 1 MΩ.
   › Yes: proceed to the next step.
   › No: It may be caused by damage of harness, that is, the CAN bus harness is short circuited to the ground.
7. Check whether the network is normal.
   › Yes: Request technical support.
   › No: Troubleshoot.

P048300/P100E00/P101400/P101300/P158400

P048300

DTC definition: electric fan jamming

DTC detection conditions:

1. Battery voltage range: (11 ~ 20) V.

DTC occurring condition: short circuit signal time to power supply of (2.4 ~ 2.6)s.

P100E00

DTC definition: electric fan overload

DTC detection conditions:

1. Battery voltage range: (11 ~ 20) V.

DTC occurring condition: short circuit signal time to power supply of (2.9 ~ 3.1)s.

P101400

DTC definition: abnormal voltage of electric fan

DTC detection conditions:

1. Battery voltage range: (11 ~ 20) V.

DTC occurring condition: short circuit signal time to power supply of (3.4 ~ 3.6)s.

P101300

DTC definition: overtemperature of electric fan

DTC detection conditions:

1. Battery voltage range: (11 ~ 20) V.

DTC occurring condition: short circuit signal time to power supply of (3.9 ~ 4.1)s.

P158400

DTC definition: internal fault of electric fan

DTC detection conditions:

1. Battery voltage range: (11 ~ 20) V.

DTC occurring condition: short circuit signal time to power supply of (4.4 ~ 4.6)s.

Possible Causes

- Electric fan fault
- Electric fan circuit fault

Troubleshooting method

1. Check the radiator fan for foreign matter

Notice

- Yes: remove foreign matter.
- No: proceed to the next step.

2. Check the radiator fan for interference

Notice

- Yes: remove the interference source.
- No: proceed to the next step.

3. Check the radiator fan for damage

Notice

- Yes: replace the radiator fan.
- No: proceed to the next step.

4. Place the ignition switch in the ON position.
5. Test the radiator fan with a diagnostic tester.

Notice

- If the test indicates that the radiator fan is normal, the ECM may be damaged.
- If the test indicates that the radiator fan is faulty, proceed to the next step.

6. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

7. Disconnect radiator fan harness connector.
8. Place the ignition switch in the ON position.
9. Measure the voltage of power pin of radiator fan harness connector.

   Normal voltage: about 12V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

10. Measure the resistance between the ground pin of radiator fan harness connector and the ground.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Check whether the circuit from radiator fan harness connector to IG1 relay is normal.

Notice

- Yes: proceed to the next step.
- No: troubleshoot the harness.

12. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

13. Disconnect the ECM harness connector.
14. Measure the resistance between PWM signal pin of radiator fan harness connector and corresponding pin of ECM harness connector.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Measure the resistance between the OWM signal pin of radiator fan harness connector and the ground.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

16. Place the ignition switch in the ON position.
17. Measure the voltage between the OWM signal pin of radiator fan harness connector and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness is short-circuited to power.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

18. Turn the ignition switch to the OFF position

Notice

› Wait at least 60s before proceeding with subsequent operations.

19. Replace ECM
20. Install the ECM harness connector.
21. Check whether the DTC disappears.

Notice

› If the DTC disappears, the ECM may be damaged.

› If the DTC still exists, the radiator fan may be damaged.

P100F00/P101100/P101200

P100F00

DTC definition: PWM fan control line fault - open circuit

DTC detection conditions:

1. When the ignition switch is in the ON position, the ECM is powered on.

DTC occurring condition: PWM self-diagnosis line fault - open circuit

P101100

DTC definition: PWM fan control line fault - short circuit to ground

DTC detection conditions:

1. When the ignition switch is in the ON position, the ECM is powered on.

DTC occurring condition: PWM self-diagnosis line fault - short circuit to ground

P101200

DTC definition: PWM fan control line fault - short circuit to power supply

DTC detection conditions:

1. When the ignition switch is in the ON position, the ECM is powered on.

DTC occurring condition: PWM self-diagnosis line fault - short circuit to power supply

Possible fault description

› The service indicator lights up.

Possible Causes

› The line fails.

Troubleshooting

1. Check if control circuit between fan and ECM is short-circuited to power supply or ground or open-circuited
   - › Yes: Repair or replace the harness.
   - › No: Go to the next step.
2. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - › Yes: Replace the fan.
   - › No: Finished.
3. Repeat step 2.
   - › Yes: Diagnostic assistance
   - › No: Finished.

P085D00/P085E00/P085100/P085200

P085D00

DTC definition: The neutral switch gets stuck in the engaged state (not in the neutral position).

DTC detection conditions:

1. The vehicle speed is ≤ 0/km/h.
2. The engine is in the idle state.

DTC occurring condition: The neutral safety switch signal fails.

P085E00

DTC definition: The neutral switch gets stuck in the opening state (neutral position).

DTC detection conditions:

1. Accelerator pedal position > 20%
2. The vehicle speed is > 40km/h.
3. Torque demand value > 130 N.m

DTC occurring condition: The neutral safety switch signal is activated.

P085100

DTC definition: The neutral switch gets stuck in the closing position (not in the neutral position).

DTC detection conditions:

1. The vehicle speed is > 60km/h.

DTC occurring condition: The neutral switch signal fails.

P085200

DTC definition: The neutral switch gets stuck in the opening position (neutral position).

DTC detection conditions:

1. Accelerator pedal position > 10%
2. The vehicle speed is > 60km/h.
3. Torque demand value > 100 N.m.

DTC occurring condition: The neutral switch signal is activated.

Possible fault description

› The service indicator lights up.

Possible Causes

› The neutral safety switch has a problem.

Troubleshooting

1. Check whether the neutral safety switch is normal.
   - › Yes: Replace the neutral safety switch.
   - › No: Go to the next step.
2. Check whether the neutral switch is normal.
   - › Yes: Replace the neutral switch.
   - › No: Finished.

P070400/P083000/P083300/P083F00

P070400

DTC definition: clutch switch fault

DTC occurring condition: the status of clutch high-position switch and clutch low-position switch is invalid.

P083000

DTC definition: clutch high-position switch fault

DTC detection conditions:

1. Engine speed > 800r/min.
2. The vehicle speed is (3~10) km/h before acceleration and more than 60 km/h after acceleration.
3. Rapid acceleration time is shorter than 10s.
4. Engine indicated torque > 40N.m

DTC occurring condition: The clutch high-/low-position switch signal does not change before and after acceleration.

P083300

DTC definition: clutch low-position switch fault

DTC detection conditions:

1. Engine speed > 800r/min.
2. The vehicle speed is (3~10) km/h before acceleration and more than 70km/h after acceleration.
3. Rapid acceleration time is shorter than 10s.
4. Engine indicated torque > 40N.m

DTC occurring condition: The clutch low-position switch signal does not change before and after acceleration.

P083F00

DTC definition: The consistency of clutch high- and low-position switches is faulted.

DTC occurring condition: As to the status of clutch high-position switch and clutch low-position switch, the former is false and the latter is true.

Possible Causes

- Clutch switch fault
- Harness of clutch switch is faulted.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

- If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Disconnect the harness connector of clutch low-position switch.
3. Disconnect the harness connector of clutch high-position switch.
4. Check whether the clutch low-position switch is abnormal.

Notice

› Yes, reinstall or replace the clutch low-position switch.

› No, proceed to the next step.

5. Check whether the clutch high-position switch is abnormal.

Notice

› Yes, reinstall or replace the clutch high-position switch.

› No, proceed to the next step.

6. Place the ignition switch in the ON position.
7. Measure the voltage between the input pin of harness connector of clutch low-position switch and the ground.

   Normal voltage: (10~14)V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

8. Measure the voltage between the input pin of harness connector of clutch low-position switch and the ground.

   Normal voltage: (10~14)V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured voltage is within range of normal voltage, go on with the next operation.

9. Measure the resistance between the output pin of harness connector of clutch low-position switch and the ground.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness is damaged.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

10. Measure the resistance between the output pin of harness connector of clutch high-position switch and the ground.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness is damaged.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

12. Disconnect ECM harness connector
13. Measure the resistance between the input pin of harness connector of clutch low-/high-position switch and the corresponding pin of ECM harness connector respectively.

    Normal resistance: about 0Ω

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - The harness circuit is open.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

14. Measure the resistance between the input pin of harness connector of clutch low-/high-position switch and the ground respectively.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness is short-circuited to ground.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

15. Measure the resistance between the pins of harness connector of clutch low-/high-position switch respectively.

    Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

16. Replace ECM
17. Install the ECM harness connector.
18. Install the harness connector of clutch low-/high-position switch.
19. Place the ignition switch in the ON position.
20. Check whether the DTC disappears.

Notice

- If the DTC disappears, the clutch low-position switch or the clutch high-position switch may be damaged.
- If the DTC still exists, the ECM may be damaged.

P161700/P161500/P161600/P061500/P061600//P061700

P161700

DTC definition: open circuit of high-end control circuit of starter relay

DTC detection conditions:

1. Test condition: after the ignition switch is placed ON and power-on of ECM

DTC occurring condition: open circuit of ECM self-diagnosis relay circuit

P161500

DTC definition: short circuit of high-end control circuit of starter relay to the ground

DTC detection conditions:

1. Test condition: after the ignition switch is placed ON and power-on of ECM

DTC occurring condition: short circuit of ECM self-diagnosis relay circuit to the ground

P161600

DTC definition: short circuit of high-end control circuit of starter relay to the power supply

DTC detection conditions:

1. Test condition: after the ignition switch is placed ON and power-on of ECM

DTC occurring condition: short circuit of ECM self-diagnosis relay circuit to the power supply

P061500

DTC definition: open circuit of low-end control circuit of starter relay

DTC detection conditions:

1. Test condition: after the ignition switch is placed ON and power-on of ECM

DTC occurring condition: open circuit of ECM self-diagnosis relay circuit

P061600

DTC definition: short circuit of low-end control circuit of starter relay to the ground

DTC detection conditions:

1. Test condition: after the ignition switch is placed ON and power-on of ECM

DTC occurring condition: short circuit of ECM self-diagnosis relay circuit to the ground

P061700

DTC definition: short circuit of low-end control circuit of starter relay to the power supply

DTC detection conditions:

1. Test condition: after the ignition switch is placed ON and power-on of ECM

DTC occurring condition: short circuit of ECM self-diagnosis relay circuit to the power supply

Possible Causes

- Control circuit of starter relay is faulted.
- Starter relay is faulted.

Possible fault description

- The service indicator lights up.
- Starter cannot work.

Troubleshooting method

1. Turn the ignition switch to the OFF position

Notice

› If preceding state of ignition switch is ON, after it is at OFF position, wait 60 s and then continue the operation.

2. Pull out the starter relay.
3. Check whether the starter relay is normal.

Notice

› Yes: Proceed to the next step.

› No, replace the starter relay.

4. Measure the voltage of #3 pin socket of starter relay.

   Normal voltage: about 12V

Notice

› If the measured voltage is not within range of normal voltage, the causes may be as stated below:

  › The circuit from starter relay to battery is opened.

  › The circuit from starter relay to battery is short circuited.

› If the measured voltage is within range of normal voltage, go on with the next operation.

5. Disconnect the ECM harness connector.
6. Measure the resistance between the socket pin of starter relay and the corresponding pin of ECM harness connector.

   Normal resistance: about 0Ω

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › The harness circuit is open.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

7. Measure the resistance between the socket pin (relay control line pin) of starter relay and the ground.

   Normal resistance value: over 1 MΩ

Notice

› If the measured resistance is not within range of normal resistance, the causes may be as stated below:

  › Harness is short-circuited to ground.

  › The connector is damaged.

› If the measured resistance is within range of normal resistance, go on with the next operation.

8. Measure the resistance between two socket pins (relay control line pin) of starter relay.

   Normal resistance value: over 1 MΩ

Notice

- If the measured resistance is not within range of normal resistance, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured resistance is within range of normal resistance, go on with the next operation.

9. Place the ignition switch in the ON position.
10. Measure the voltage between the socket pin (relay control line pin) of starter relay and the ground.

    Normal voltage: about 0V

Notice

- If the measured voltage is not within range of normal voltage, the causes may be as stated below:
  - Harness short-circuited.
  - The connector is damaged.
- If the measured voltage is within range of normal voltage, go on with the next operation.

11. Turn the ignition switch to the OFF position

Notice

- Wait at least 60s before proceeding with subsequent operations.

12. Replace the starter relay.
13. Install the ECM harness connector.
14. Place the ignition switch in the ON position.
15. Check whether the DTC disappears.

Notice

- If the DTC disappears, the starter relay may be damaged.
- If the DTC still exists, the ECM may be damaged.

P011900/P011600 /P182000/P012800

P011900

DTC definition: The coolant temperature is irrationally high when the engine is running normally.

DTC detection conditions:

1. The engine is in operation.
2. No coolant sensor line fault
3. The coolant temperature is < 45°C during cold start.

DTC occurring condition: coolant temperature > 120℃

P011600

DTC definition: Irrational coolant temperature change fault

DTC detection conditions:

1. The engine is in operation.
2. No coolant sensor line fault

DTC occurring condition: The change gradient of output value of coolant temperature sensor is less than 5°C.

P182000

DTC definition: temperature sensor cross-check fault - unacceptable coolant temperature

DTC detection conditions:

1. The engine shutdown time is > 8h.
2. The engine runs for < 5s.

DTC occurring condition: cross-diagnosis > 30°C

P012800

DTC definition: unacceptable coolant temperature - thermostat jamming

DTC detection conditions:

1. The engine is in operation.
2. The lowest air inlet temperature limit is > -7°C.
3. The warm-up counter value exceeds the limit value (consult the table).
4. Downtime < 5s; accumulated shutdown time < 55s
5. Average high load < 80 N.m; time < 50s

DTC occurring condition: coolant temperature < the temperature in the attached table

Ambient temperature	Water thermometer
-7	10
0	25
10	35
23	61
25	61
41	61

Possible fault description

- The OBD fault indicator is on.
- When the DTC is P182000, the A/C is forbidden from being started.

Possible Causes

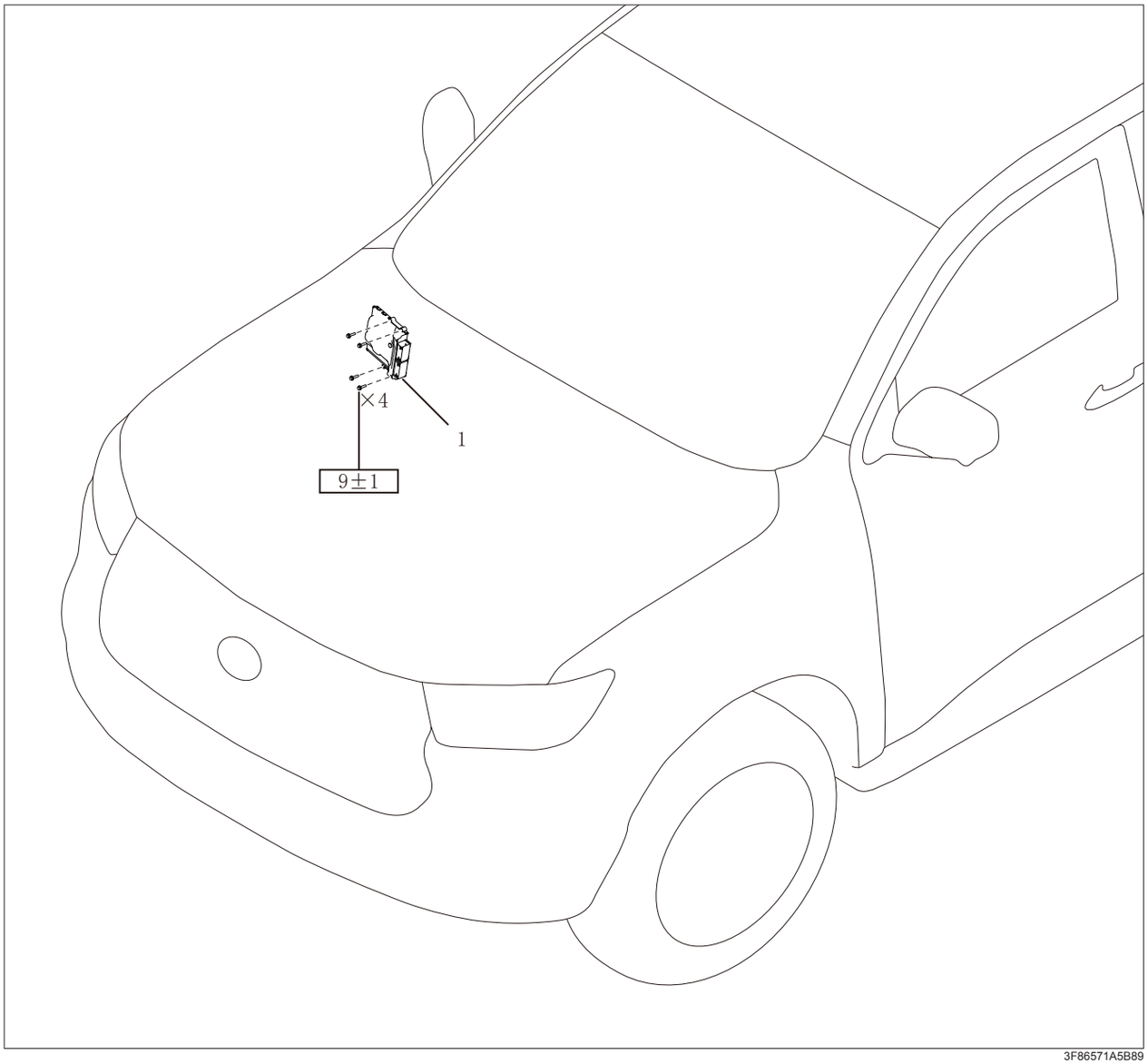
- The sensor fails.
- The cooling system fails.
- The thermostat gets stuck in the full open position.

Troubleshooting

1. Check whether the coolant temperature sensor is normal.
   - Yes: proceed to the next step.
   - No: Replace the coolant temperature sensor.
2. Measure whether the resistance between any pin of the coolant temperature sensor and the grounding point is greater than 10 MΩ.
   - Yes: Replace the coolant temperature sensor.
   - No: Go to the next step.
3. Check whether the engine coolant is insufficient or deteriorates.
   - Yes: Add or replace the engine coolant.
   - No: Go to the next step.
4. Check whether the water pump operates normally.
   - Yes: proceed to the next step.
   - No: Replace the water pump.
5. Check to ensure that the thermostat gets stuck in the full open position.
   - Yes: Replace the thermostat.
   - No: Go to the next step.
6. Set the ignition switch to “ON”, connect the scanner to send DTC clear instruction, start the engine for detection requirements, and check whether the DTC is indicated again
   - Yes: Diagnostic assistance
   - No: Finished.

Engine control unit (6MT)

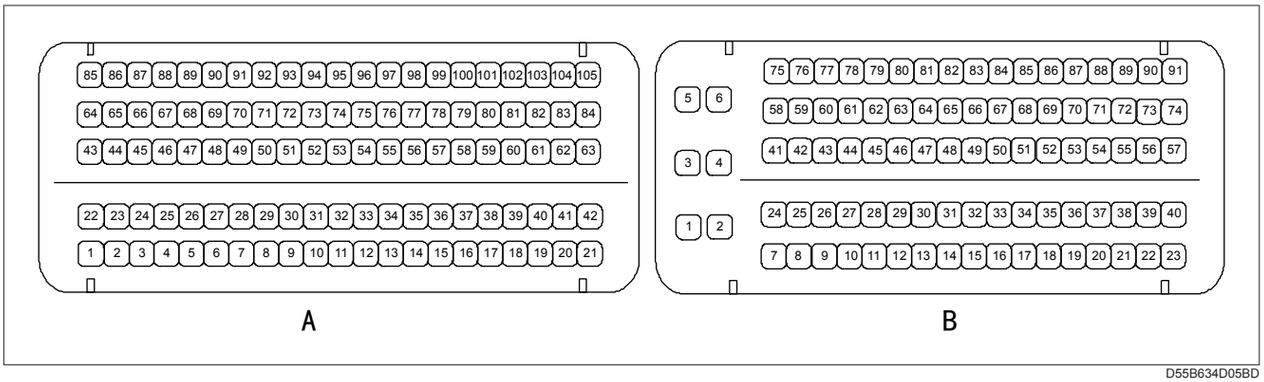
Location diagram



3F86571A5B89

1. Engine control unit

Pin definition



D55B634D05BD

Pin No.	Function	Pin No.	Function
A01	Low side of cylinder 4 fuel injector	A02	Low side of cylinder 1 fuel injector
A03	—	A04	Engine water temperature sensor/ vortex control valve position sensor (intake manifold) GND
A05	Vortex control valve position sensor power supply (intake manifold)	A06	Turbocharger position sensor signal
A07	Air conditioner pressure sensor signal	A08	Signal of vortex control valve position sensor (intake manifold)
A09	—	A10	—
A11	—	A12	—
A13	Feedback signal of preheater plug controller	A14	—
A15	Electronic throttle position sensor/ turbocharger position sensor GND	A16	—
A17	Fuel temperature sensor/turbine front high temperature sensor GND	A18	—
A19	Rail pressure sensor GND	A20	Intake pressure & temperature sensor
A21	DPF front high-temperature sensor	A22	High side of cylinder 1 fuel injector
A23	High side of cylinder 4 fuel injector	A24	—
A25	Inlet metering valve	A26	Signal of DPF front high-temperature sensor
A27	—	A28	—
A29	—	A30	—
A31	—	A32	—
A33	Rail pressure sensor signal 2	A34	—
A35	Engine coolant temperature sensor signal	A36	Intake pressure and temperature sensor temperature signal
A37	—	A38	Signal of turbine front high-temperature sensor

Pin No.	Function	Pin No.	Function
A39	Fuel temperature sensor signal	A40	Rail pressure sensor signal 1
A41	—	A42	—
A43	Camshaft position sensor GND	A44	Air conditioner pressure sensor GND
A45	EGR valve position sensor GND	A46	Rail pressure sensor power
A47	—	A48	—
A49	—	A50	—
A51	—	A52	—
A53	—	A54	Intake pressure and temperature sensor/turbocharger position sensor power
A55	Air conditioner pressure sensor power	A56	EGR valve position sensor power supply
A57	—	A58	Camshaft position sensor power supply
A59	—	A60	Electronic throttle position sensor power supply
A61	—	A62	Electronic throttle position sensor signal
A63	—	A64	High side of cylinder 3 fuel injector
A65	High side of cylinder 2 fuel injector	A66	Electronic throttle motor power
A67	DC motor power of turbocharger	A68	DC motor power of EGR valve
A69	—	A70	DC motor power of vortex control valve (intake manifold)
A71	—	A72	Vacuum switching valve
A73	EGR valve position sensor signal	A74	—
A75	Intake pressure and temperature sensor pressure signal	A76	Camshaft position sensor signal
A77	Crankshaft position sensor power supply	A78	Crankshaft position sensor GND
A79	Shielded line of crankshaft position sensor	A80	Electronic fuel pump relay
A81	—	A82	—
A83	—	A84	Control signal of preheater plug controller
A85	Low side of cylinder 3 fuel injector	A86	Low side of cylinder 2 fuel injector
A87	Electronic throttle DC motor GND	A88	DC motor of turbocharger GND
A89	DC motor of EGR valve GND	A90	—
A91	DC motor of vortex control valve GND (intake manifold)	A92	—
A93	—	A94	—

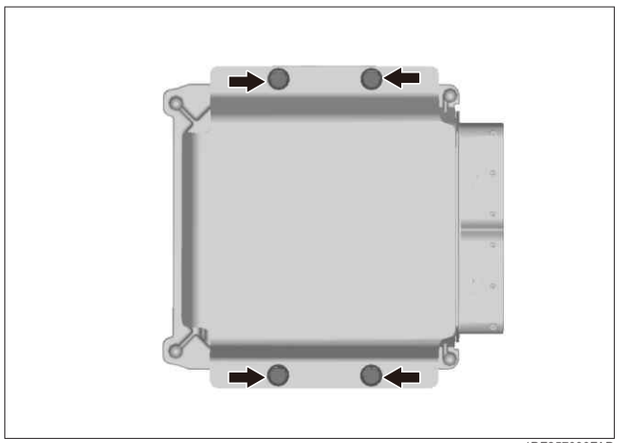
Pin No.	Function	Pin No.	Function
A95	—	A96	—
A97	—	A98	LIN communication
A99	—	A100	—
A101	—	A102	—
A103	—	A104	—
A105	—	—	—
B01	GND	B02	GND
B03	Main relay power source	B04	GND
B05	Main relay power source	B06	Main relay power source
B07	Calibration resistance of rear oxygen sensor resistance (positive)	B08	High level of reference battery of rear oxygen sensor
B09	High level of reference battery of front oxygen sensor	B10	Calibration resistance of front oxygen sensor resistance (positive)
B11	Low-level switch of clutch	B12	—
B13	—	B14	—
B15	Accelerator pedal sensor 1 GND	B16	—
B17	Air mass flow meter/differential pressure sensor GND	B18	—
B19	Accelerator pedal sensor 2 GND	B20	—
B21	—	B22	—
B23	—	B24	Calibration resistance of rear oxygen sensor resistance (negative)
B25	Pump battery and reference battery of rear oxygen sensor GND	B26	Pump battery and reference battery of front oxygen sensor GND
B27	Calibration resistance of front oxygen sensor resistance (negative)	B28	Signal of line 1 neutral switch
B29	Signal of line 2 neutral switch	B30	Start feedback signal
B31	—	B32	Accelerator pedal sensor 1 power supply
B33	Power supply of air mass flow meter	B34	—
B35	Differential pressure sensor power	B36	Accelerator pedal sensor 2 power supply
B37	—	B38	—
B39	—	B40	—
B41	Constant power	B42	Signal of water level sensor (fuel filter)
B43	—	B44	Brake signal
B45	Air mass flow meter flow signal	B46	Brake lamp signal

Pin No.	Function	Pin No.	Function
B47	—	B48	DPF regeneration request switch
B49	—	B50	High-level switch of clutch
B51	—	B52	—
B53	—	B54	—
B55	—	B56	—
B57	Heating element of rear oxygen sensor (negative)	B58	—
B59	Accelerator pedal sensor 1 signal	B60	Accelerator pedal sensor 2 signal
B61	—	B62	—
B63	—	B64	Key switch signal input
B65	Temperature signal of air mass flow meter	B66	—
B67	—	B68	—
B69	—	B70	High side of starter relay
B71	Compressor relay	B72	—
B73	—	B74	Heating element of front oxygen sensor (negative)
B75	—	B76	—
B77	—	B78	—
B79	—	B80	CAN1 low
B81	CAN1 high	B82	Differential pressure sensor signal
B83	—	B84	—
B85	—	B86	Low side of starter relay
B87	Main relay	B88	—
B89	PWM fan controller	B90	—
B91	—	—	—

Removal/installation

Removal

1. Turn off the ignition switch, and wait for 720 seconds
2. Disconnect the negative terminal of the battery.
3. Disconnect engine control unit harness connector
4. Remove 4 bolts



1DF257036FAD

5. Remove engine control unit cover and engine control unit

⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

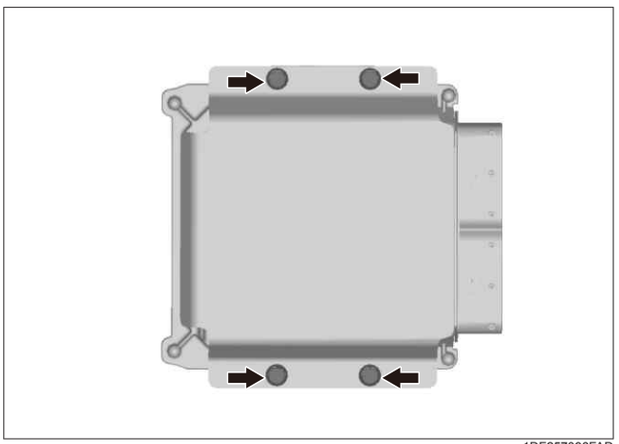
› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install engine control unit and engine control unit cover into proper position
2. Fasten the 4 bolts



1DF257036FAD

3. Connect engine control unit harness connector

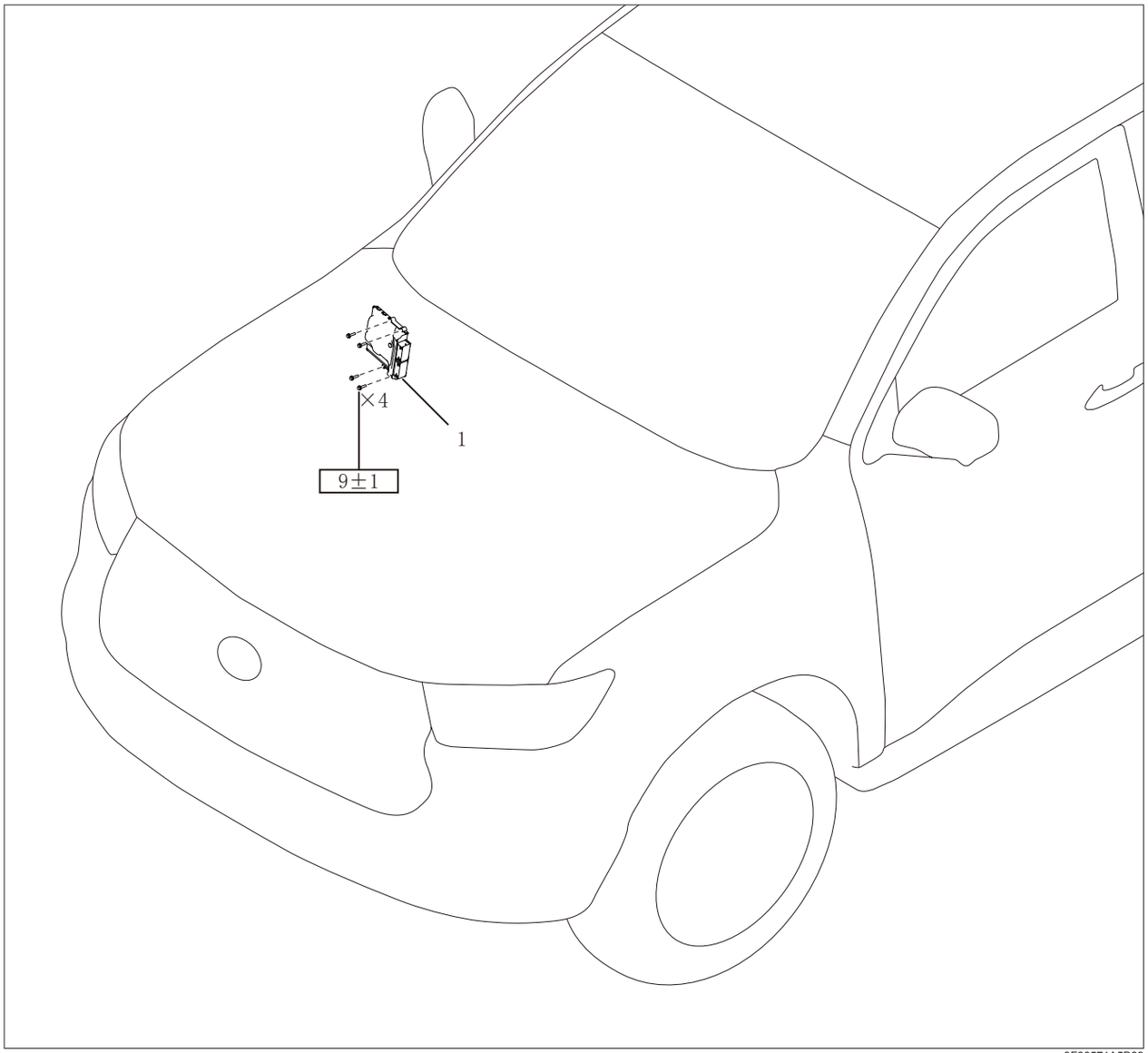
⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

4. Connect the negative terminal of the battery

Engine control unit (8AT)

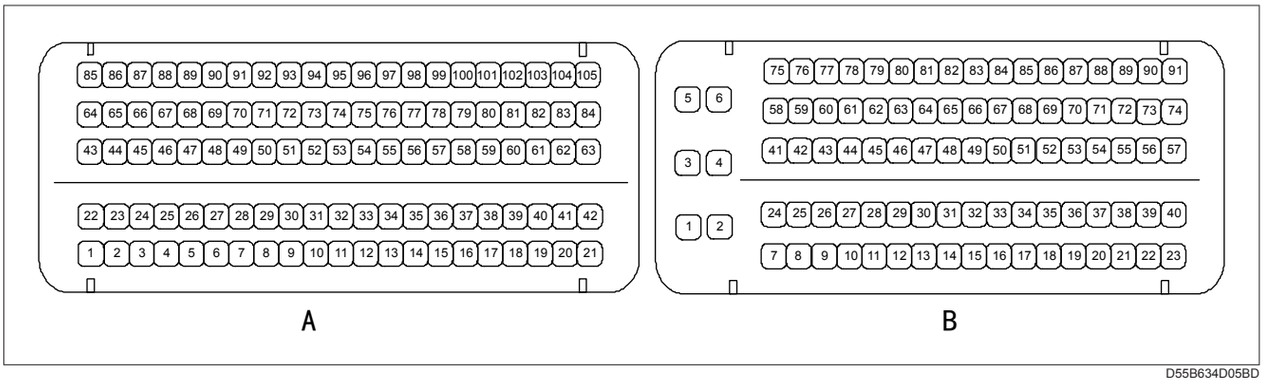
Location diagram



3F86571A5B89

1. Engine control unit

Pin definition



D55B634D05BD

Pin No.	Function	Pin No.	Function
A01	Low side of cylinder 4 fuel injector	A02	Low side of cylinder 1 fuel injector
A03	—	A04	Engine water temperature sensor/ vortex control valve position sensor (intake manifold) GND
A05	Vortex control valve position sensor power supply (intake manifold)	A06	Turbocharger position sensor signal
A07	Air conditioner pressure sensor signal	A08	Signal of vortex control valve position sensor (intake manifold)
A09	—	A10	—
A11	—	A12	—
A13	Feedback signal of preheater plug controller	A14	—
A15	Electronic throttle position sensor/ turbocharger position sensor GND	A16	—
A17	Fuel temperature sensor/turbine front high temperature sensor GND	A18	—
A19	Rail pressure sensor GND	A20	Intake pressure & temperature sensor
A21	DPF front high-temperature sensor	A22	High side of cylinder 1 fuel injector
A23	High side of cylinder 4 fuel injector	A24	—
A25	Inlet metering valve	A26	Signal of DPF front high-temperature sensor
A27	—	A28	—
A29	—	A30	—
A31	—	A32	—
A33	Rail pressure sensor signal 2	A34	—
A35	Engine coolant temperature sensor signal	A36	Intake pressure and temperature sensor temperature signal
A37	—	A38	Signal of turbine front high-temperature sensor

Pin No.	Function	Pin No.	Function
A39	Fuel temperature sensor signal	A40	Rail pressure sensor signal 1
A41	—	A42	—
A43	Camshaft position sensor GND	A44	Air conditioner pressure sensor GND
A45	EGR valve position sensor GND	A46	Rail pressure sensor power
A47	—	A48	—
A49	—	A50	—
A51	—	A52	—
A53	—	A54	Intake pressure and temperature sensor/turbocharger position sensor power
A55	Air conditioner pressure sensor power	A56	EGR valve position sensor power supply
A57	—	A58	Camshaft position sensor power supply
A59	—	A60	Electronic throttle position sensor power supply
A61	—	A62	Electronic throttle position sensor signal
A63	—	A64	High side of cylinder 3 fuel injector
A65	High side of cylinder 2 fuel injector	A66	Electronic throttle motor power
A67	DC motor power of turbocharger	A68	DC motor power of EGR valve
A69	—	A70	DC motor power of vortex control valve (intake manifold)
A71	—	A72	Vacuum switching valve
A73	EGR valve position sensor signal	A74	—
A75	Intake pressure and temperature sensor pressure signal	A76	Camshaft position sensor signal
A77	Crankshaft position sensor power supply	A78	Crankshaft position sensor GND
A79	Shielded line of crankshaft position sensor	A80	Electronic fuel pump relay
A81	—	A82	—
A83	—	A84	Control signal of preheater plug controller
A85	Low side of cylinder 3 fuel injector	A86	Low side of cylinder 2 fuel injector
A87	Electronic throttle DC motor GND	A88	DC motor of turbocharger GND
A89	DC motor of EGR valve GND	A90	—
A91	DC motor of vortex control valve GND (intake manifold)	A92	—
A93	—	A94	—

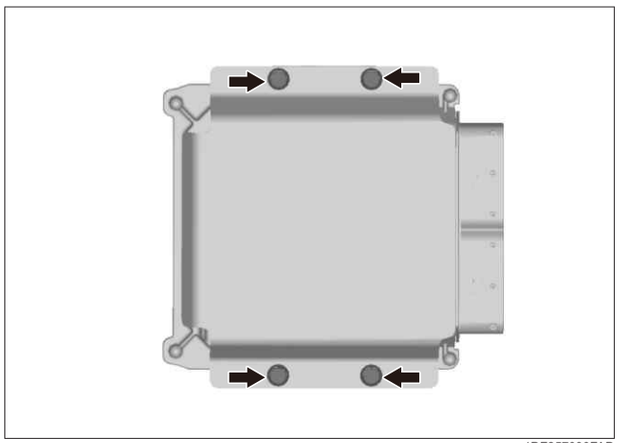
Pin No.	Function	Pin No.	Function
A95	—	A96	—
A97	—	A98	LIN communication
A99	—	A100	—
A101	—	A102	—
A103	—	A104	—
A105	—	—	—
B01	GND	B02	GND
B03	Main relay power source	B04	GND
B05	Main relay power source	B06	Main relay power source
B07	Calibration resistance of rear oxygen sensor resistance (positive)	B08	High level of reference battery of rear oxygen sensor
B09	High level of reference battery of front oxygen sensor	B10	Calibration resistance of front oxygen sensor resistance (positive)
B11	—	B12	—
B13	—	B14	—
B15	Accelerator pedal sensor 1 GND	B16	—
B17	Air mass flow meter/differential pressure sensor GND	B18	—
B19	Accelerator pedal sensor 2 GND	B20	—
B21	—	B22	—
B23	—	B24	Calibration resistance of rear oxygen sensor resistance (negative)
B25	Pump battery and reference battery of rear oxygen sensor GND	B26	Pump battery and reference battery of front oxygen sensor GND
B27	Calibration resistance of front oxygen sensor resistance (negative)	B28	—
B29	—	B30	Start feedback signal
B31	—	B32	Accelerator pedal sensor 1 power supply
B33	Power supply of air mass flow meter	B34	—
B35	Differential pressure sensor power	B36	Accelerator pedal sensor 2 power supply
B37	—	B38	—
B39	—	B40	—
B41	Constant power	B42	Signal of water level sensor (fuel filter)
B43	—	B44	Brake signal
B45	Air mass flow meter flow signal	B46	Brake lamp signal

Pin No.	Function	Pin No.	Function
B47	—	B48	—
B49	—	B50	—
B51	—	B52	—
B53	—	B54	—
B55	—	B56	—
B57	Heating element of rear oxygen sensor (negative)	B58	—
B59	Accelerator pedal sensor 1 signal	B60	Accelerator pedal sensor 2 signal
B61	—	B62	—
B63	—	B64	Key switch signal input
B65	Temperature signal of air mass flow meter	B66	—
B67	—	B68	—
B69	—	B70	High side of starter relay
B71	Compressor relay	B72	—
B73	—	B74	Heating element of front oxygen sensor (negative)
B75	—	B76	—
B77	—	B78	—
B79	—	B80	CAN1 low
B81	CAN1 high	B82	Differential pressure sensor signal
B83	—	B84	—
B85	—	B86	Low side of starter relay
B87	Main relay	B88	—
B89	PWM fan controller	B90	—
B91	—	—	—

Removal/installation

Removal

1. Turn off the ignition switch, and wait for 720 seconds
2. Disconnect the negative terminal of the battery.
3. Disconnect engine control unit harness connector
4. Remove 4 bolts



1DF257036FAD

5. Remove engine control unit cover and engine control unit

⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

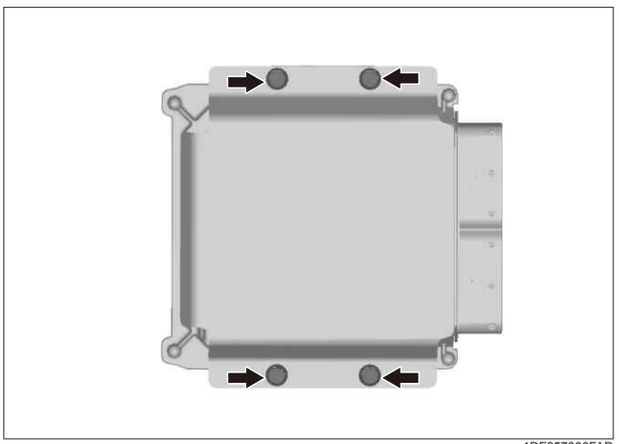
› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install engine control unit and engine control unit cover into proper position
2. Fasten the 4 bolts



1DF257036FAD

3. Connect engine control unit harness connector

⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

4. Connect the negative terminal of the battery

Camshaft phase sensor

Operating principle

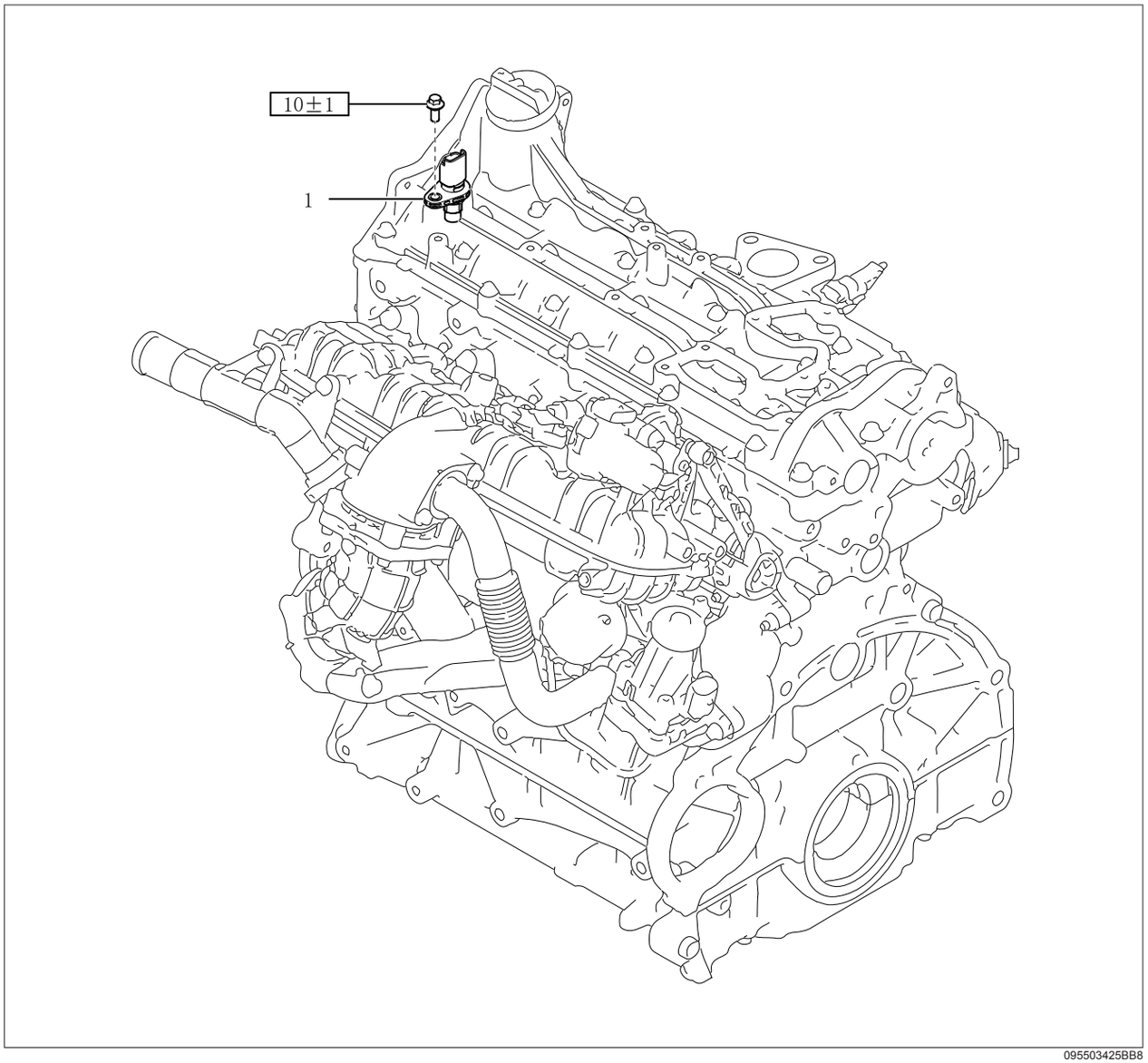
The camshaft phase sensor is an active phase sensor. The supply voltage of the sensor is a DC voltage, and the signal is output through the interface. The camshaft phase sensor is mounted on the engine block to detect the position of camshaft. The sensor detects the teeth and grooves of the (magnetic) iron signal wheel and outputs corresponding electrical signals as the signal wheel rotates. Therefore, the output signal can denote the position of camshaft.

Fault description: can not be started.

Precautions for repair:

› It is not allowed for any repair of the sensor.

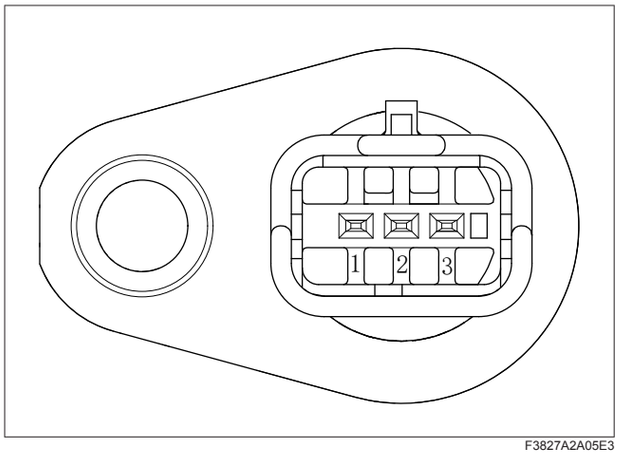
Structural diagram



095503425BB8

1. Camshaft position sensor

Pin definition



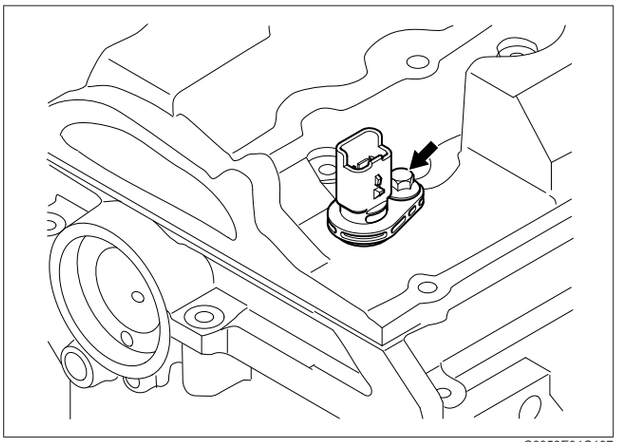
F3827A2A05E3

Pin No.	Function
1	Signal output
2	GND
3	5 V input voltage

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connector of camshaft position sensor
3. Remove 1 bolt



C6858E34C187

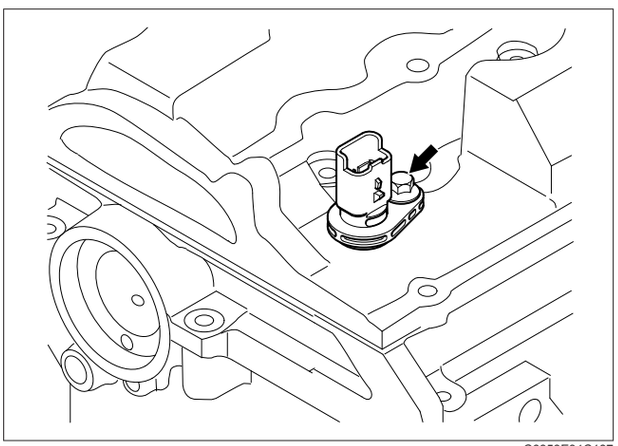
4. Remove camshaft position sensor

Notice

› Replace the sensor or actuator if they were knocked or dropped.

Installation

1. Apply cleaning engine oil evenly to O-ring of sensor
2. Install camshaft position sensor to cylinder head cover



C6858E34C187

3. Tighten 1 bolt

   Tightening torque (10±1) N·m

4. Check that mounting plane of sensor and mounting plane of cylinder head cover fit tightly
5. Connect harness connector of camshaft position sensor

Crankshaft position sensor

Operating principle

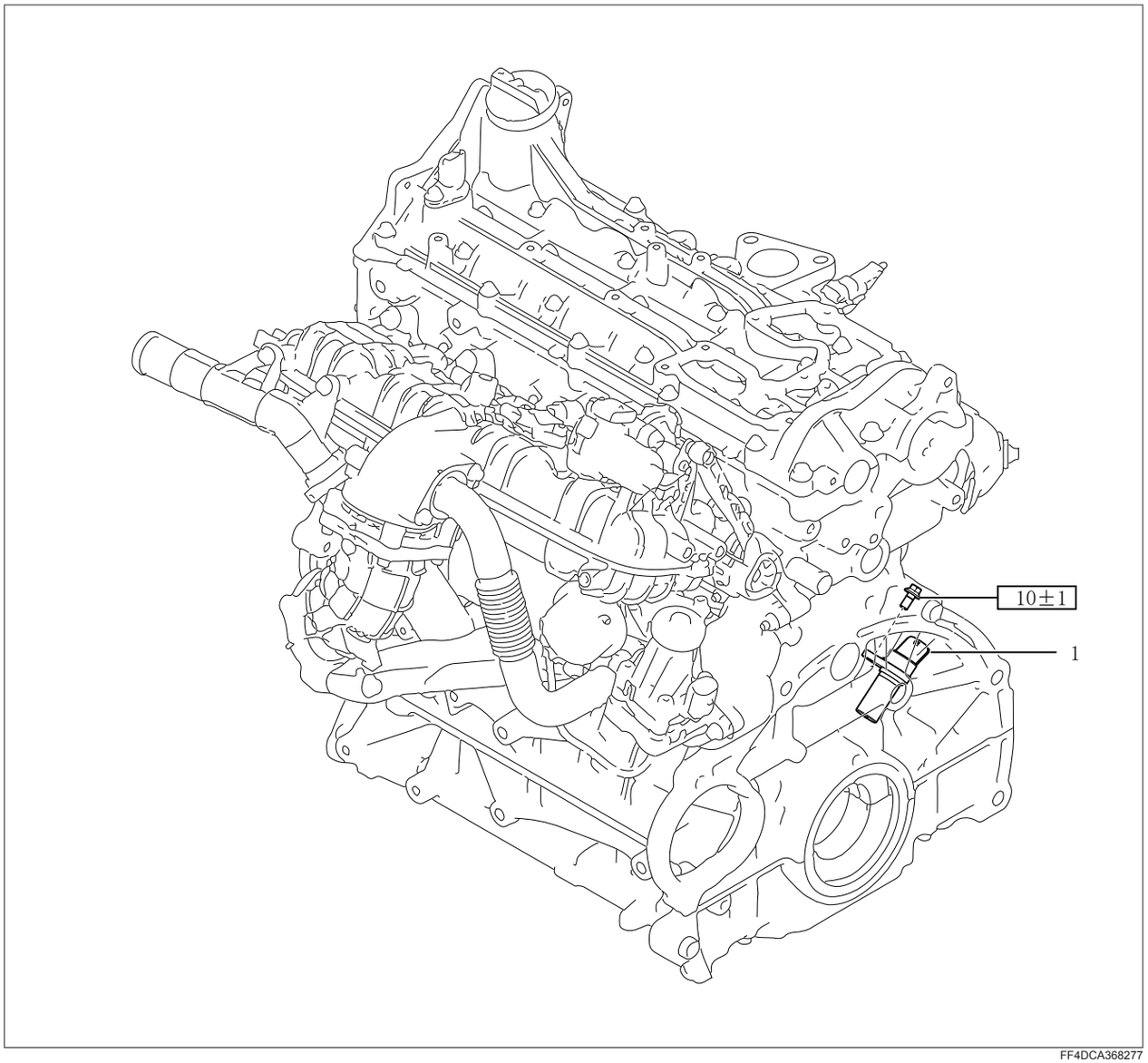
The crankshaft position sensor is a passive phase sensor. The operating principle of crankshaft position sensor is to utilize the magnetoelectric effect; when the crankshaft rotates, the sensing signal wheel is rotated with it, and the teeth on the sensing signal wheel will cut the magnetic field lines of the sensor; the change in magnetic flux will cause an output voltage of a certain frequency generated at both ends of the sensor coil, which is output to electronic control unit ; the output signal can be used to determine the speed and position of the crankshaft.

Fault description: cannot be started.

Precautions for repair:

› It is not allowed for any repair of the sensor.

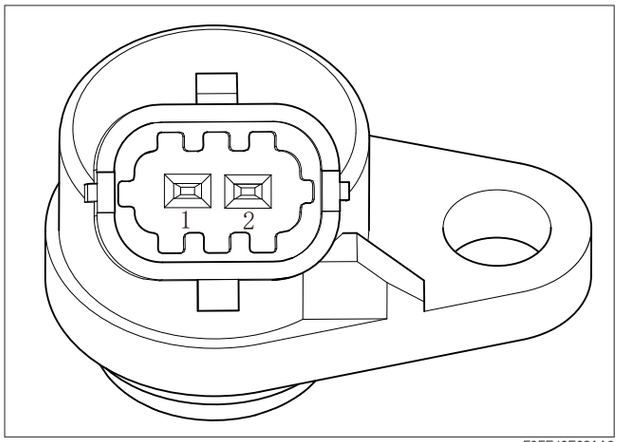
Structural diagram



FF4DCA368277

1. Crankshaft position sensor

Pin definition



F3FE49E02AA9

Pin No.	Function
1	Negative terminal
2	Positive terminal

Check

1. Place ignition switch at OFF position (if preceding state of ignition switch is ON, after it is at OFF position, wait at least 2 min before subsequent operation to avoid plug and pull at live state)
2. Pull out crankshaft position sensor harness connector
3. Measure the resistance between crankshaft position sensor pins

   Normal value (at 20°C): (770~950) Ω

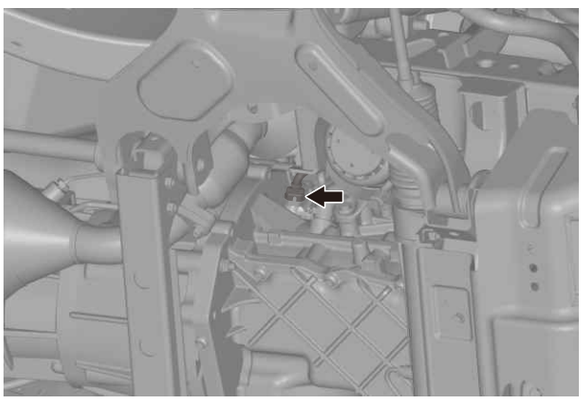
Removal/installation

Removal

⚠ Warning

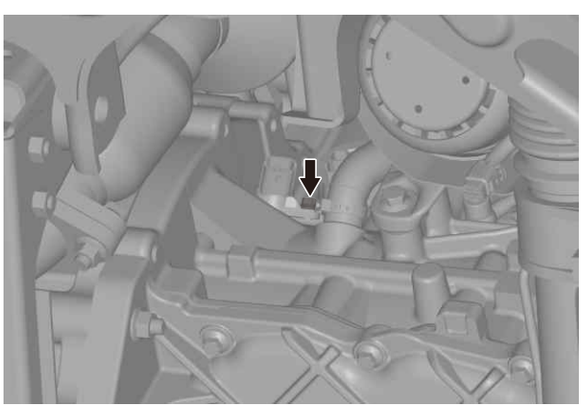
› To avoid burns, do not operate while the engine is still at a high temperature.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Raise the vehicle to an appropriate position
4. Disconnect harness connector of crankshaft position sensor



F145B05A8B97

5. Remove 1 bolt



01F2CFB51E94

6. Remove crankshaft position sensor

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Replace the sensor or actuator if they were knocked or dropped.

Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install crankshaft position sensor to proper position

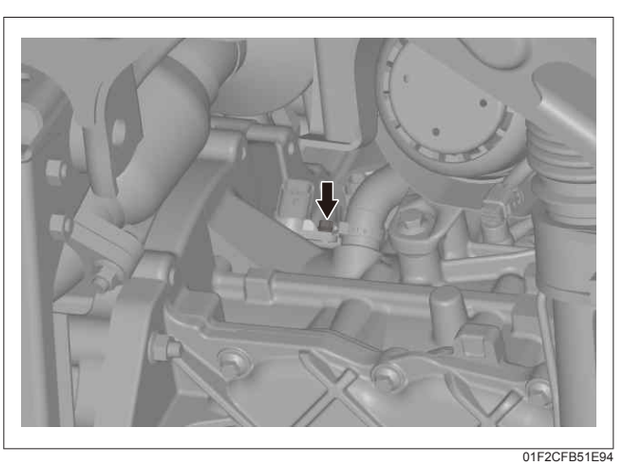
⚠ Caution

› Before installation, evenly apply a layer of clean oil on the O-ring of sensor.

› Before installation, make sure that the mounting surface and nearby positions are clean and free of impurity.

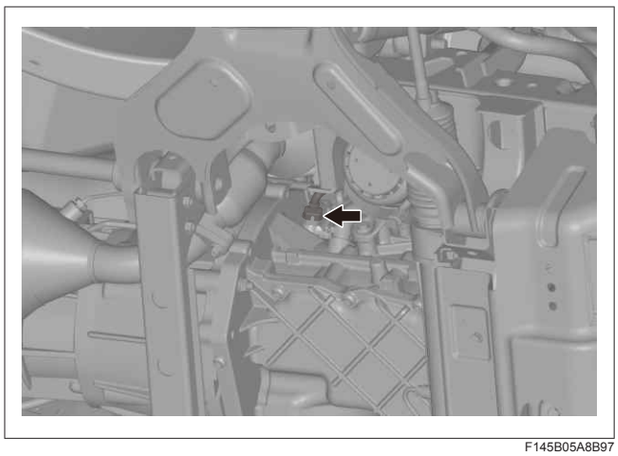
› After installation is completed, check that the mounting plane fits well with the mounting plane of cylinder block assembly.

2. Tighten 1 bolt



01F2CFB51E94

3. Connect harness connector of crankshaft position sensor



F145B05A8B97

⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

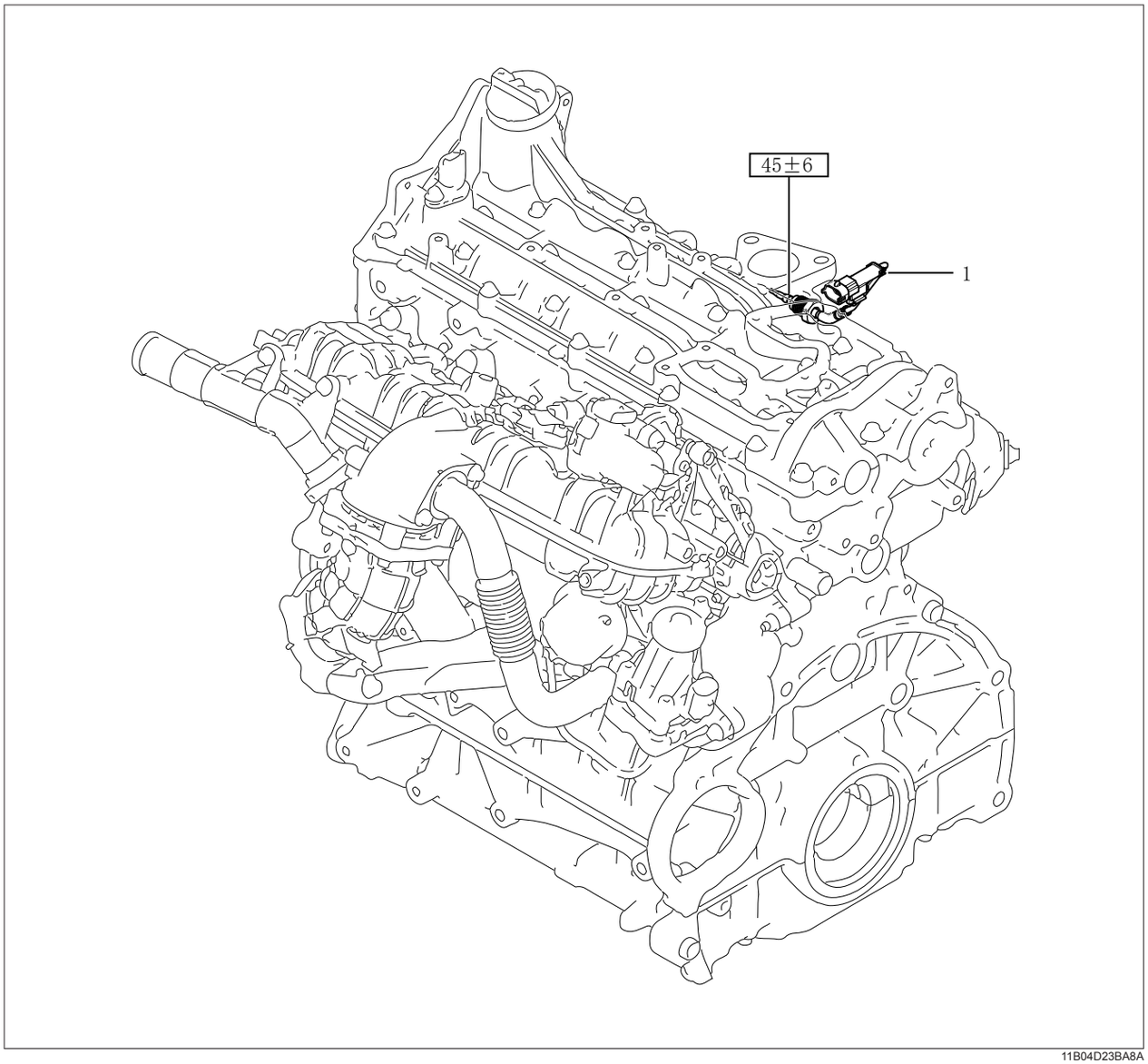
4. Connect negative terminal of the battery

High temperature sensor

Operating principle

The high temperature sensor is a thermal resistor. Its resistance value rises with the increase of temperature. It is installed on the exhaust manifold to detect the temperature of exhaust gas after the exhaust manifold.

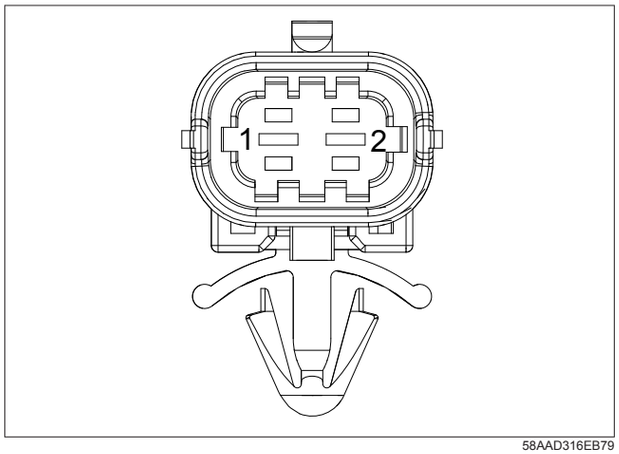
Structural diagram



11B04D23BA8A

1. High-temperature sensor

Pin definition



58AAD316EB79

Pin No.	Function
1	High-temperature sensor signal
2	High-temperature sensor ground

Check

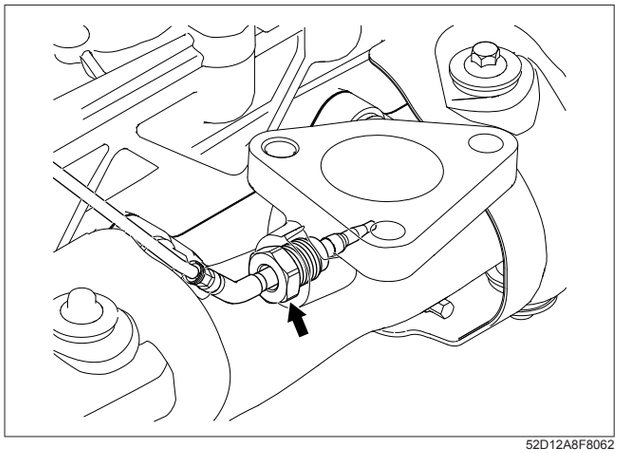
1. Check sensor pins for bends, corrosion, or other damages
2. Check the resistance between the two pins of high temperature sensor at different temperatures

Temperature (℃)	Resistance (Ω)
0	201.0
50	239.0
100	276.4
200	349.5
400	488.6
600	618.3
800	738.7

Removal/installation

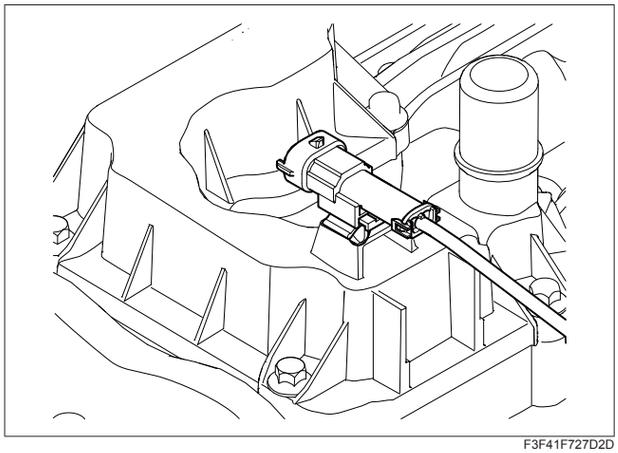
Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect connector end of high-temperature sensor
3. Loosen locking nut of high-temperature sensor at the position of exhaust manifold



52D12A8F8062

4. Loosen clip attached to oil-gas separator components



F3F41F727D2D

5. Remove high-temperature sensor

Installation

1. Perform installation work in reverse order of removal

Engine mechanical system (GW4D20M)

Engine mechanical system (6MT) ..... 4－1
Specified torque ..... 4－1
Engine mechanical system (8AT) ..... 4－4
Specified torque ..... 4－4
Engine assembly (6MT) ..... 4－6
Removal/installation ..... 4－6
Engine assembly (8AT) ..... 4－11
Removal/installation ..... 4－11
Vacuum pump ..... 4－16
Structural diagram ..... 4－16
Removal/installation ..... 4－17
Generator belt (6MT) ..... 4－19
Structural diagram ..... 4－19
Check ..... 4－20
Removal/installation ..... 4－20
Generator belt (8AT) ..... 4－22
Structural diagram ..... 4－22
Check ..... 4－23
Removal/installation ..... 4－23
Steering pump belt (6MT) ..... 4－25
Removal/installation ..... 4－25
Front crankshaft oil seal ..... 4－26
Removal/installation ..... 4－26
Crankshaft rear oil seal (6MT) ..... 4－27
Removal/installation ..... 4－27
Crankshaft rear oil seal (8AT) ..... 4－28
Removal/installation ..... 4－28
Timing cover (6MT) ..... 4－30
Structural diagram ..... 4－30
Removal/installation ..... 4－31
Timing cover (8AT) ..... 4－34
Structural diagram ..... 4－34
Removal/installation ..... 4－35
Timing gear ..... 4－38
Structural diagram ..... 4－38
Removal/installation ..... 4－39
Camshaft ..... 4－45
Structural diagram ..... 4－45
Check ..... 4－46
Camshaft axial clearance inspection ..... 4－47

Removal/installation....4－47
Cylinder head....4－51
Structural diagram....4－51
Removal/installation....4－52
Valve mechanism....4－55
Structural diagram....4－55
Valve spring inspection....4－56
Check of valve and valve conduit....4－57
Removal/installation....4－58
Piston link (6MT)....4－61
structural diagram....4－61
Link bearing matching....4－62
Piston link inspection....4－63
Inspection of link bearing oil film clearance....4－65
Removal/installation....4－66
disassembly/assembly....4－68
Piston link (8AT)....4－71
structural diagram....4－71
Link bearing matching....4－72
Piston link inspection....4－73
Inspection of link bearing oil film clearance....4－75
Removal/installation....4－76
disassembly/assembly....4－78
Crankshaft (6MT)....4－81
Structural diagram....4－81
Crankshaft check....4－82
Removal/installation....4－83
Disassembly/assembly....4－86
Crankshaft (8AT)....4－88
Structure Diagram of....4－88
Crankshaft check....4－89
Removal/installation....4－90
Disassembly/assembly....4－93
Cylinder block (6MT)....4－95
Structural diagram....4－95
Main bearing shell matching....4－96
Inspection of the oil film clearance of main bearing shell....4－97
Removal/installation....4－98
Cylinder block (8AT)....4－100
Structural diagram....4－100
Main bearing shell matching....4－101
Inspection of the oil film clearance of main bearing shell....4－102
Removal/installation....4－103
Balance shaft....4－105
Structural diagram....4－105

Removal/installation.....4－106

Engine mechanical system (6MT)

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Accessory tension pulley assembly × compressor bracket	20±2	2	—
Bolt	Generator assembly x compressor bracket	45±2	2	—
Bolt	Compressor bracket x cylinder block	24±2	4	—
Bolt	Power-steering oil pump bracket x cylinder block, engine oil pump assembly	24±2	2	—
Nut	Power-steering oil pump bracket x cylinder block, engine oil pump assembly	24±2	1	—
Bolt	Power-steering oil pump x power-steering oil pump bracket	24±2	2	—
Nut	Power-steering oil pump x power-steering oil pump bracket	24±2	2	—
Bolt	Refrigerating compressor assembly × compressor bracket	24±2	3	—
Bolt	Cylinder head cover x cylinder head	10±1	31	—
Bolt	Cylinder head cover x cylinder head	24±2	3	—
Cylinder head bolt component	Cylinder head x cylinder block	50+90°+90°+90°	10	—
Double-end stud	Double-end stud x cylinder head	10±3	1	—
Bolt	Overflow pipe joint components × cylinder head	10±1	1	—
Bolt	Timing cover component x cylinder head, timing cover, rear timing cover	7±1	9	—
Bolt	Lower timing cover component x water pump housing, oil pump housing, timing cover	7±1	5	—
Bolt M10	Timing cover × cylinder block	45±2	1	—
Bolt M8	Timing cover x cylinder block, water pump housing	24±2	6	—
Bolt	Rear timing cover x cylinder head, water pump assembly	7±1	2	—

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
High-pressure fuel pump belt pulley nut	Fuel pump pulley x high-pressure fuel pump assembly	65±3	1	—
Timing idler bolt	Timing idler x water pump assembly	27～36	1	—
Bolt-washer assembly of camshaft timing pulley	Camshaft timing pulley x exhaust camshaft	90±5	1	—
Fastening bolt for timing tension pulley	Timing tension pulley assembly x cylinder head	25±3	1	—
Bolt for large timing idler component	Large timing idler component x timing idler bracket	45±2	1	—
Bolt M10	Timing idler bracket x water pump assembly	45±2	1	—
Bolt M8	Timing idler bracket x water pump assembly	24±2	1	—
Link bolt	Link cap × link body	25+90°	8	—
Flywheel bolt	Flywheel assembly × crankshaft	75±5	8	—
Bolt	Crankshaft position signal panel x crankshaft	12±1.5	3	—
Bolt	Damping pulley assembly x timing pulley of crankshaft	35±3	4	—
Crankshaft timing pulley bolt	Crankshaft timing pulley component x crankshaft	40+90°	1	—
Bolt	Connecting pipe components of water outlet x intake manifold	10±1	2	—
Bolt	Piston cooling nozzle x cylinder block	10±1	1	—
Fastening bolt of lower cylinder block	Lower cylinder block x upper cylinder block	35±3	2	—
Bolt	Lower cylinder block x upper cylinder block	35±3	8	—
Main bearing cap bolt	Lower cylinder block x upper cylinder block	40+90°+90°	10	—
Bolt	Vacuum pump assembly x cylinder head cover, cylinder head	24±2	3	—

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Vacuum switching valve x Intake manifold assembly	4±0.5	2	—
Balance shaft bolt 2	Balance shaft assembly x lower cylinder block	60±3	8	—

Engine mechanical system (8AT)

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Accessory tension pulley assembly × compressor bracket	20±2	2	—
Bolt	Generator assembly x compressor bracket	45±2	2	—
Bolt	Compressor bracket x cylinder block	24±2	4	—
Bolt	Refrigerating compressor assembly × compressor bracket	24±2	3	—
Bolt	Cylinder head cover x cylinder head	10±1	31	—
Bolt	Cylinder head cover x cylinder head	24±2	3	—
Cylinder head bolt compo-nent	Cylinder head x cylinder block	50+90°+90°+90°	10	—
Double-end stud	Double-end stud x cylinder head	10±3	1	—
Bolt	Overflow pipe joint components × cyl-inder head	10±1	1	—
Bolt	Timing cover component x cylinder head, timing cover, rear timing cover	7±1	9	—
Bolt	Lower timing cover component x wa-ter pump housing, oil pump housing, timing cover	7±1	5	—
Bolt M10	Timing cover × cylinder block	45±2	1	—
Bolt M8	Timing cover x cylinder block, water pump housing	24±2	6	—
Bolt	Rear timing cover x cylinder head, water pump assembly	7±1	2	—
High-pressure fuel pump belt pulley nut	Fuel pump pulley x high-pressure fuel pump assembly	65±3	1	—
Timing idler bolt	Timing idler x water pump assembly	27～36	1	—
Bolt-washer assembly of camshaft tim-ing pulley	Camshaft timing pulley x exhaust camshaft	90±5	1	—

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Fastening bolt for timing tension pulley	Timing tension pulley assembly x cylinder head	25±3	1	—
Bolt for large timing idler component	Large timing idler component x timing idler bracket	45±2	1	—
Bolt M10	Timing idler bracket x water pump assembly	45±2	1	—
Bolt M8	Timing idler bracket x water pump assembly	24±2	1	—
Link bolt	Link cap × link body	25+90°	8	—
Flywheel bolt	Flywheel assembly × crankshaft	75±5	8	—
Bolt	Crankshaft position signal panel x crankshaft	12±1.5	3	—
Bolt	Damping pulley assembly x timing pulley of crankshaft	35±3	4	—
Crankshaft timing pulley bolt	Crankshaft timing pulley component x crankshaft	40+90°	1	—
Bolt	Connecting pipe components of water outlet x intake manifold	10±1	2	—
Bolt	Piston cooling nozzle x cylinder block	10±1	1	—
Fastening bolt of lower cylinder block	Lower cylinder block x upper cylinder block	35±3	2	—
Bolt	Lower cylinder block x upper cylinder block	35±3	8	—
Main bearing cap bolt	Lower cylinder block x upper cylinder block	40+90°+90°	10	—
Bolt	Vacuum pump assembly x cylinder head cover, cylinder head	24±2	3	—
Bolt	Vacuum switching valve x Intake manifold assembly	4±0.5	2	—
Balance shaft bolt 2	Balance shaft assembly x lower cylinder block	60±3	8	—

Engine assembly (6MT)

Removal/installation

Removal

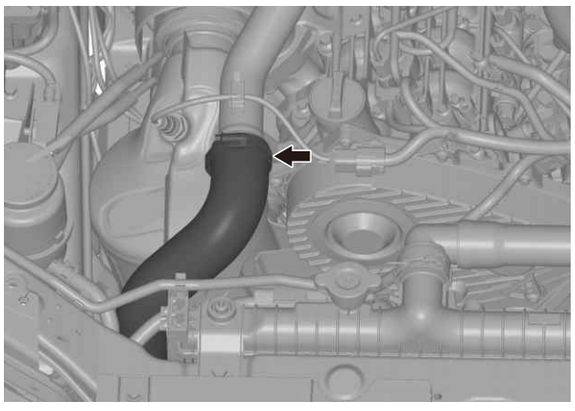
⚠ Warning

- To avoid burns, do not operate while the engine is still at a high temperature.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.
- Do not turn the crankshaft counterclockwise (toward the end of the engine belt).

⚠ Caution

- If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty engine coolant
4. Empty engine oil
5. Empty transmission oil
6. Empty power steering oil
7. Recycle refrigerant
8. Remove engine hood
9. Remove crankcase ventilation pipe
10. Remove air filter outlet pipe
11. Disconnect 1 pipeline

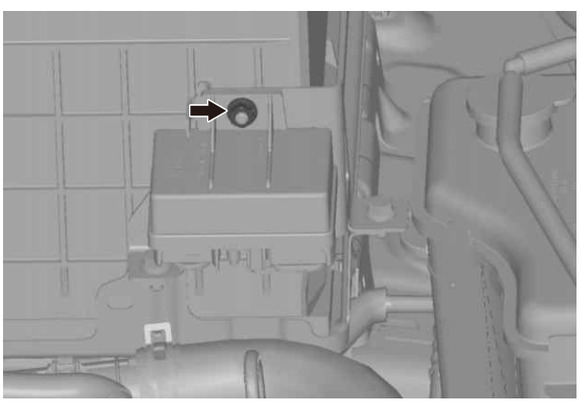


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⚠ Caution

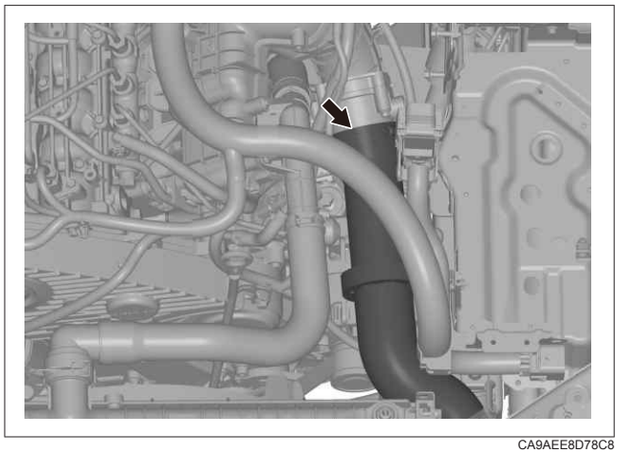
- The disconnected pipelines and joints must be protected from entering debris.

12. Remove tank radiator fan with overflow tank
13. Remove radiator
14. Remove 1 nut



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15. Disconnect 1 pipeline

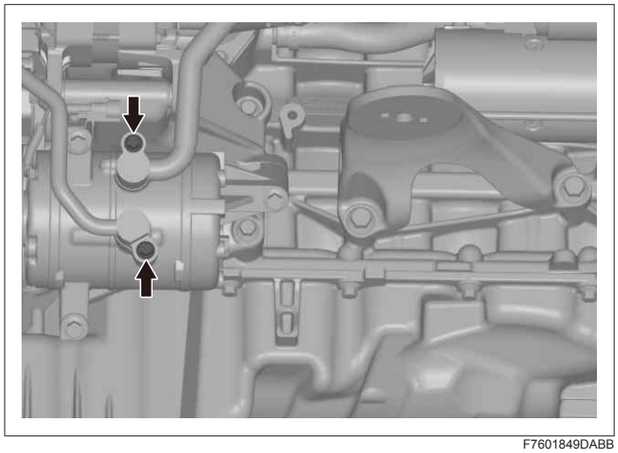


CA9AEE8D78C8

⚠ Caution

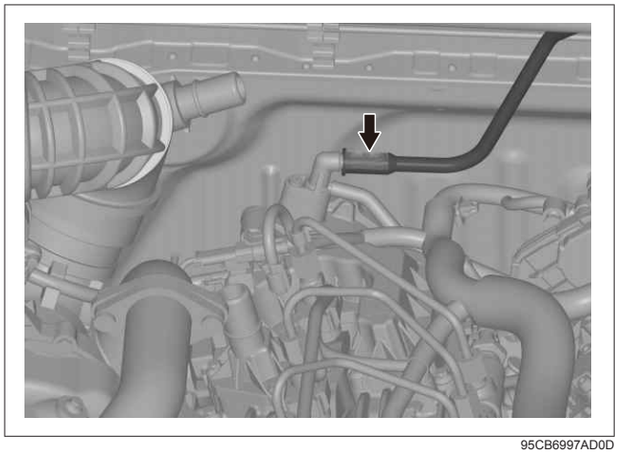
› The disconnected pipelines and joints must be protected from entering debris.

16. Remove 2 bolts



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17. Disconnect 1 pipeline

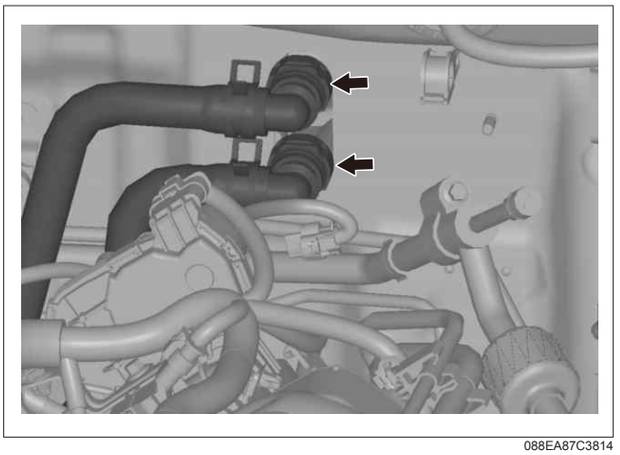


95CB6997AD0D

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

18. Disconnect heater inlet and outlet pipes



088EA87C3814

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

19. Disconnect 2 pipelines



9E13AC1D55EA

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

20. Disconnect connector of generator
21. Remove starter
22. Disconnect connector of engine control unit
23. Disconnect engine harness from body harness
24. Remove lean NOx trap
25. Remove diesel particulate filter

26. Disconnect inlet and outlet pipes of power steering pump

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

27. Lift the vehicle to a proper position
28. Remove transmission assembly
29. Lower the vehicle
30. Remove nuts for left and right engine mounts
31. Lift out engine assembly

Installation

⚠ Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› Clean all ground points involved before installation.

› Make sure that pipelines, harnesses and ground points are firmly connected.

› Replace the seal with a new one.

› Tighten the fastener according to the specified torque value.

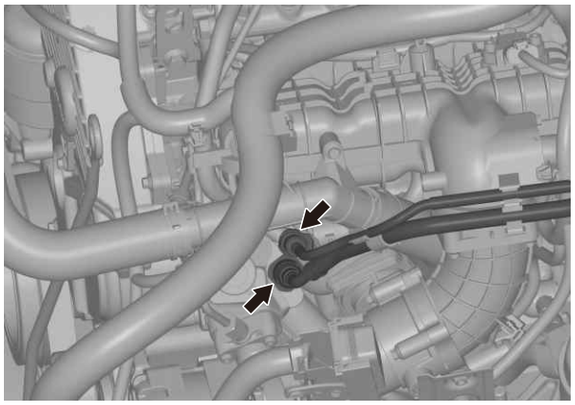
1. Lift the engine to a proper position
2. Install nuts for left and right engine mounts
3. Lift the vehicle to a proper position
4. Install transmission assembly
5. Connect inlet and outlet pipes of power steering pump

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

6. Install diesel particulate filter
7. Install lean NOx trap
8. Connect engine harness and body harness
9. Connect connector of engine control unit
10. Install starter
11. Connect connector of generator
12. Connect 2 pipelines



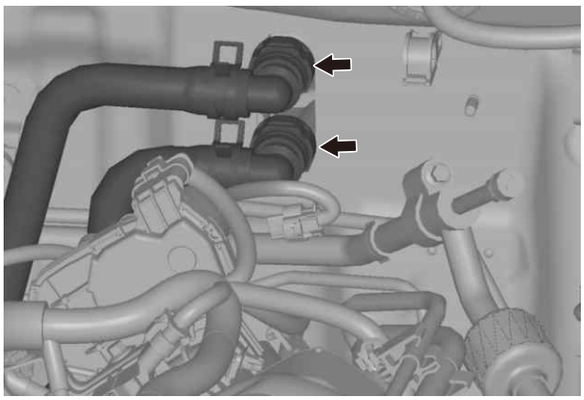
9E13AC1D55EA

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

13. Connect heating inlet and outlet pipes



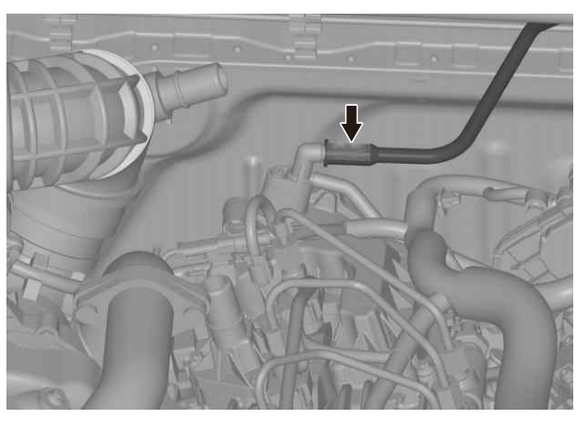
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⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

14. Connect 1 pipeline



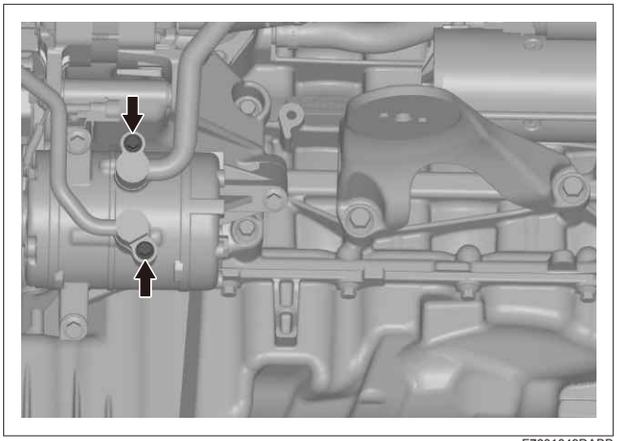
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⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

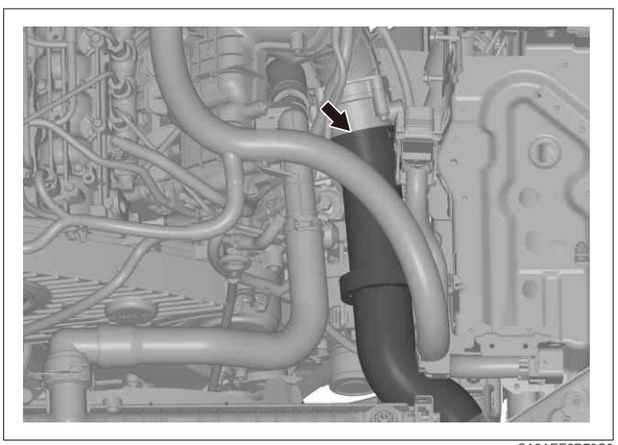
› After installation, ensure that the pipeline joint is securely connected.

15. Install 2 bolts



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16. Connect 1 pipeline



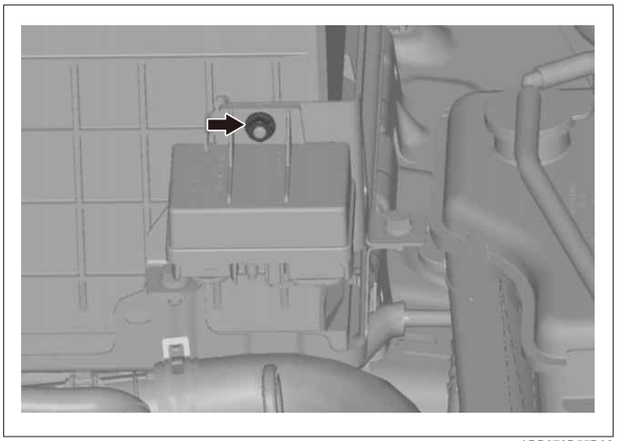
CA9AEE8D78C8

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

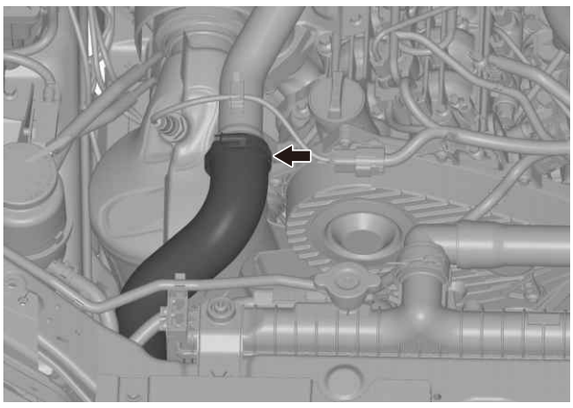
17. Install 1 nut



ADB376D55D92

18. Install radiator

19. Install tank radiator fan with overflow tank
20. Connect 1 pipeline



63FBD0444CA5

⚠ Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

21. Install air filter outlet pipe
22. Install crankcase ventilation pipe
23. Install engine hood
24. Install negative terminal of the battery
25. Add transmission oil
26. Fill the engine oil
27. Add power steering fluid and engine coolant
28. Add refrigerant

Engine assembly (8AT)

Removal/installation

Removal

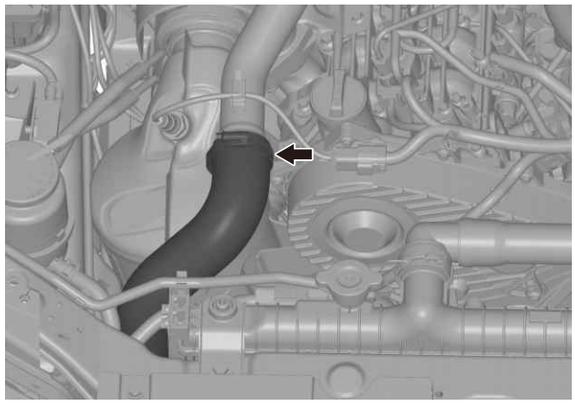
⚠ Warning

- To avoid burns, do not operate while the engine is still at a high temperature.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.
- Do not turn the crankshaft counterclockwise (toward the end of the engine belt).

⚠ Caution

- If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain off the engine coolant
4. Empty engine oil
5. Empty transmission oil
6. Recycle refrigerant
7. Remove engine hood
8. Remove crankcase vent pipe
9. Remove air filter outlet pipe
10. Disconnect 1 pipeline

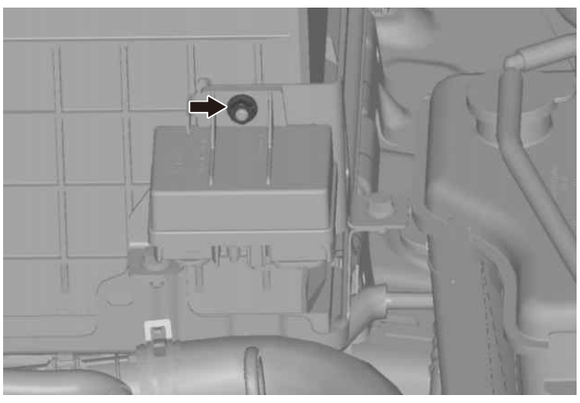


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⚠ Caution

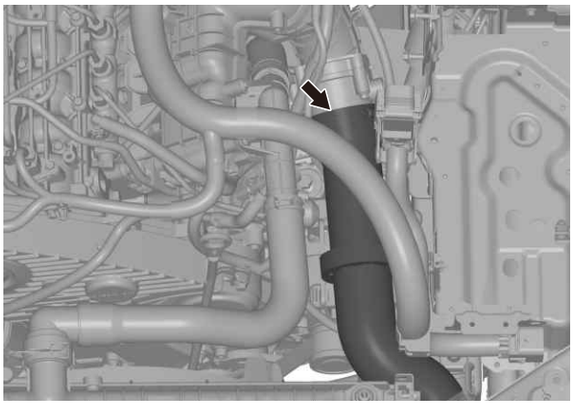
- The disconnected pipelines and joints must be protected from entering debris.

11. Remove tank radiator fan with overflow tank
12. Remove radiator
13. Remove 1 nut



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14. Disconnect 1 pipeline

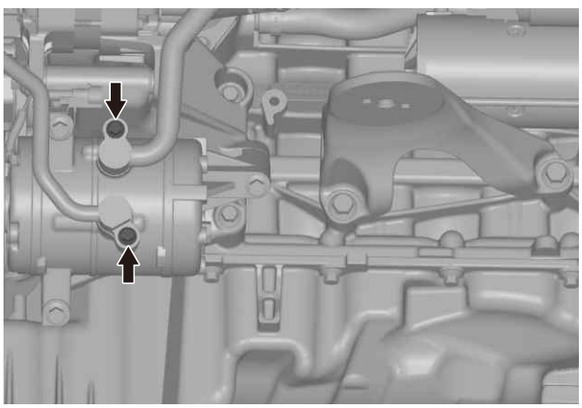


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⚠ Caution

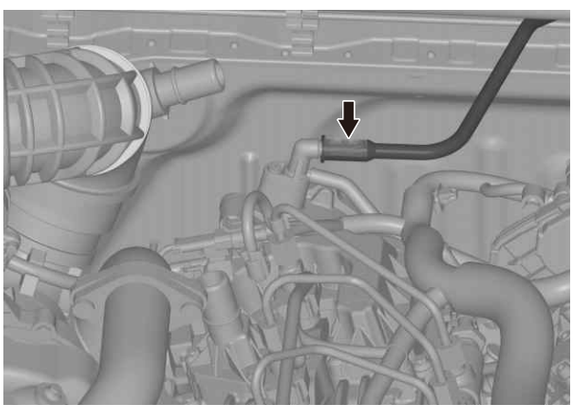
› The disconnected pipelines and joints must be protected from entering debris.

15. Remove 2 bolts



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16. Disconnect 1 pipeline

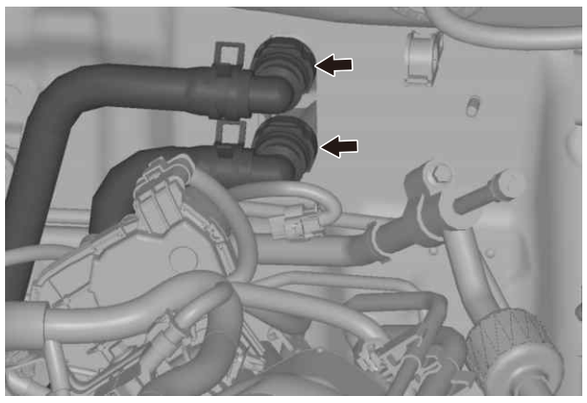


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⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

17. Disconnect heater inlet and outlet pipes

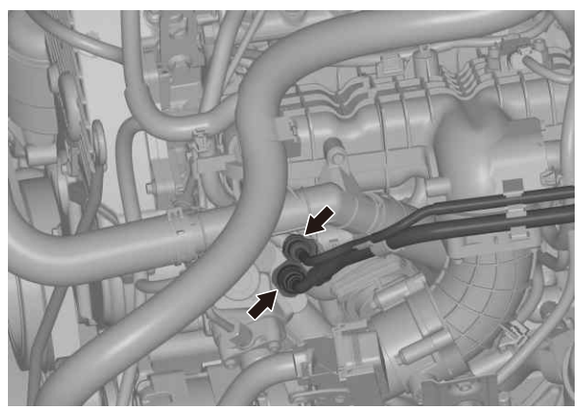


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⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

18. Disconnect 2 pipelines



9E13AC1D55EA

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

19. Disconnect connector of generator
20. Remove starter
21. Disconnect connector of engine control unit
22. Disconnect engine harness from body harness
23. Remove lean NOx trap
24. Remove diesel particulate filter
25. Lift the vehicle to a proper position
26. Remove transmission assembly

27. Lower the vehicle
28. Remove nuts for left and right engine mounts
29. Lift out engine assembly

Installation

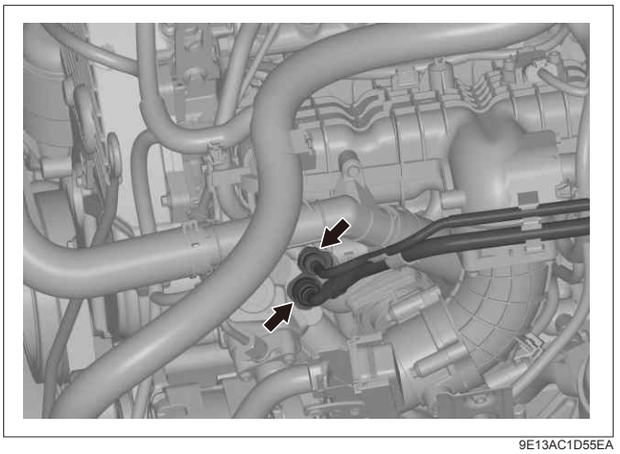
⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

- Clean all ground points involved before installation.
- Make sure that pipelines, harnesses and ground points are firmly connected.
- Replace the seal with a new one.
- Tighten the fastener according to the specified torque value.

1. Lift the engine to a proper position
2. Install nuts for left and right engine mounts
3. Lift the vehicle to a proper position
4. Install transmission assembly
5. Install diesel particulate filter
6. Install lean NOx trap
7. Connect engine harness and body harness
8. Connect connector of engine control unit
9. Install starter
10. Connect connector of generator
11. Connect 2 pipelines

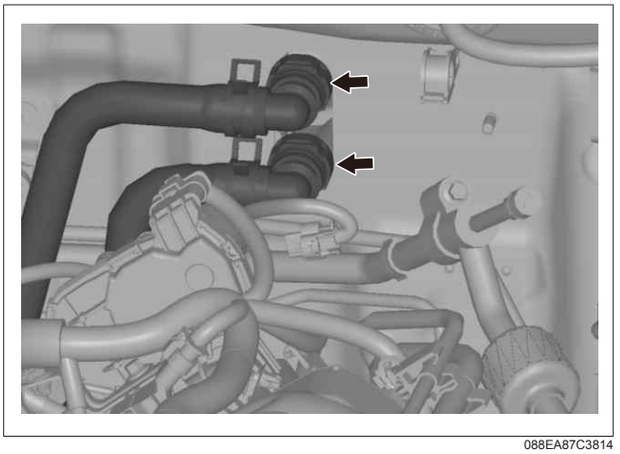


9E13AC1D55EA

⚠ Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

12. Connect heating inlet and outlet pipes

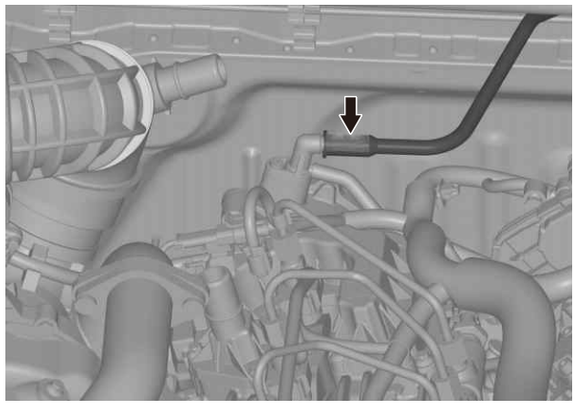


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⚠ Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

13. Connect 1 pipeline

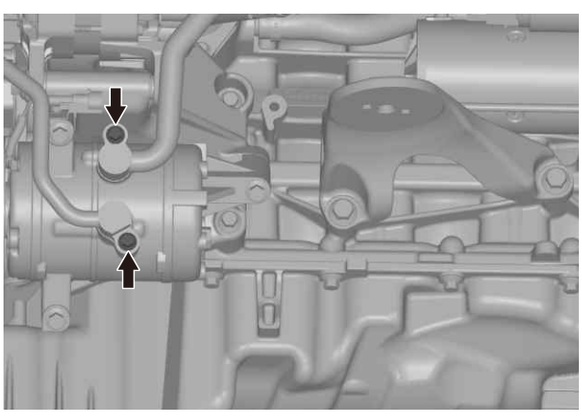


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Caution

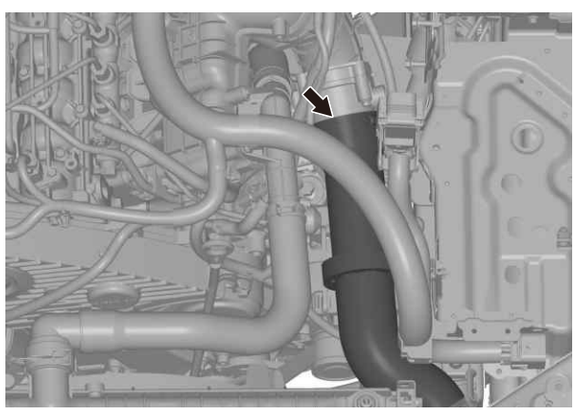
- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

14. Install 2 bolts



F7601849DABB

15. Connect 1 pipeline

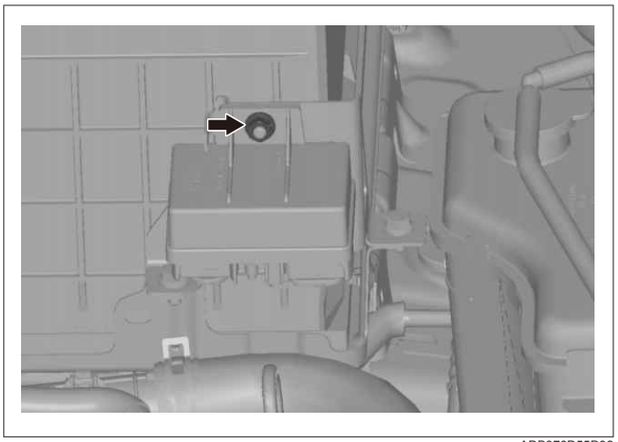


CA9AEE8D78C8

Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

16. Install 1 nut

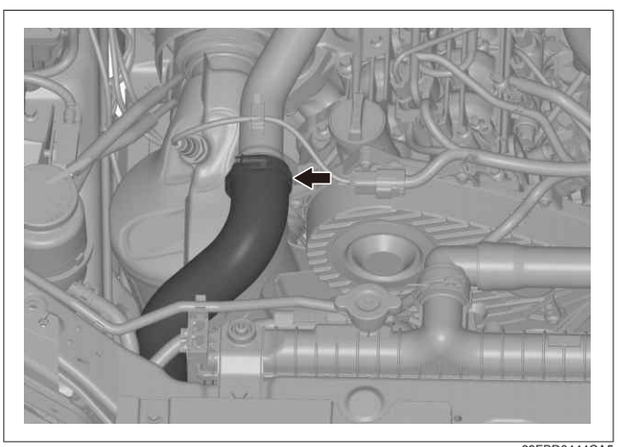


ADB376D55D92

17. Install radiator

18. Install tank radiator fan with overflow tank

19. Connect 1 pipeline



63FBD0444CA5

Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

20. Install air filter outlet pipe

21. Install crankcase ventilation pipe

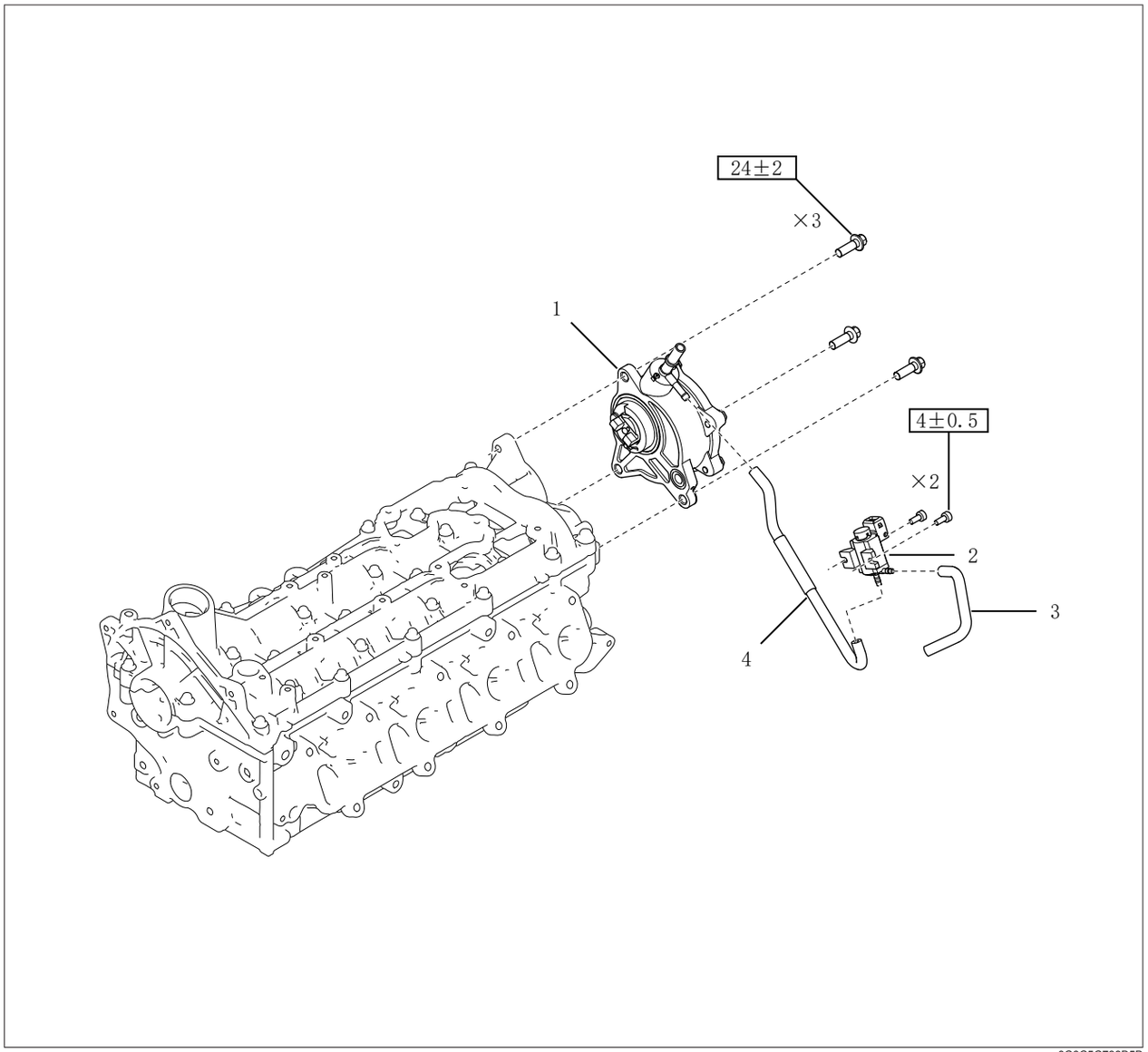
22. Install engine hood

23. Install negative terminal of the battery

24. Add transmission oil
25. Fill the engine oil
26. Add engine coolant
27. Add refrigerant

Vacuum pump

Structural diagram



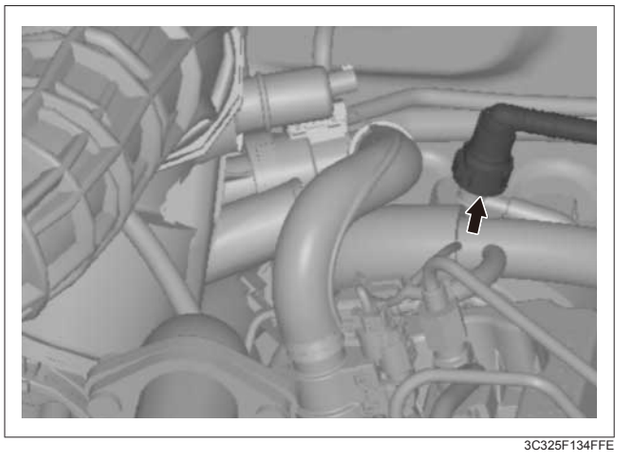
0C6C5C738B5B

1. Vacuum pump assembly
2. Vacuum switching valve
3. Vacuum switching valve hose 2
4. Vacuum switching valve hose component 1

Removal/installation

Removal

1. Turn off the ignition switch.
2. Remove trim cover of the engine
3. Disconnect 1 pipeline

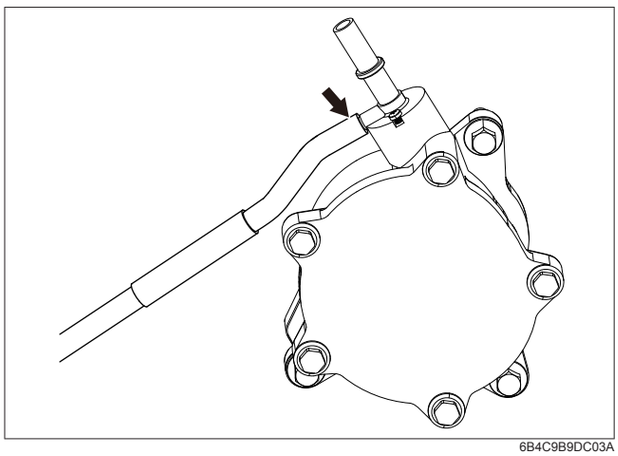


3C325F134FFE

⚠ Caution

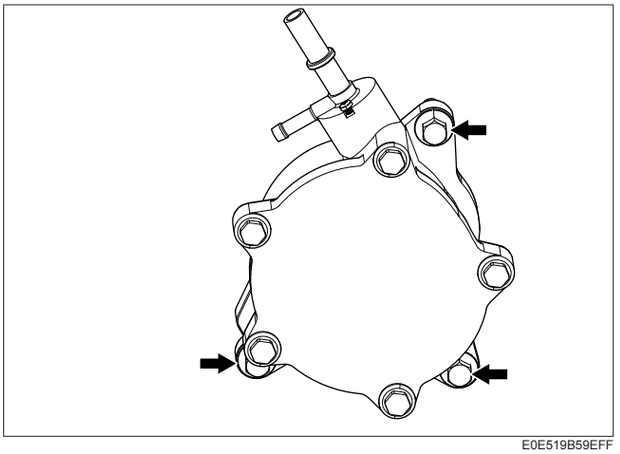
› The disconnected pipelines and joints must be protected from entering debris.

4. Disconnect vacuum pump connecting pipeline



6B4C9B9DC03A

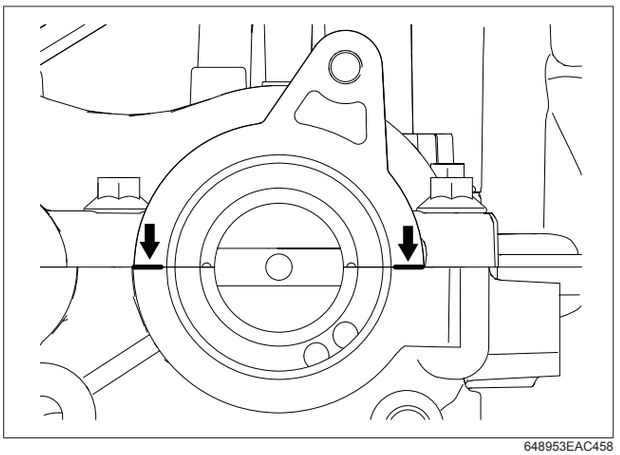
5. Remove 3 bolts, and remove vacuum pump assembly



E0E519B59EFF

Installation

1. Apply sealant to T joint area of vacuum pump, cylinder head and cylinder head cover



648953EAC458

Type: Loctite 5900H silicone rubber plane sealant

Starting position of sealant line is (2~3) mm from chamfer of camshaft bore

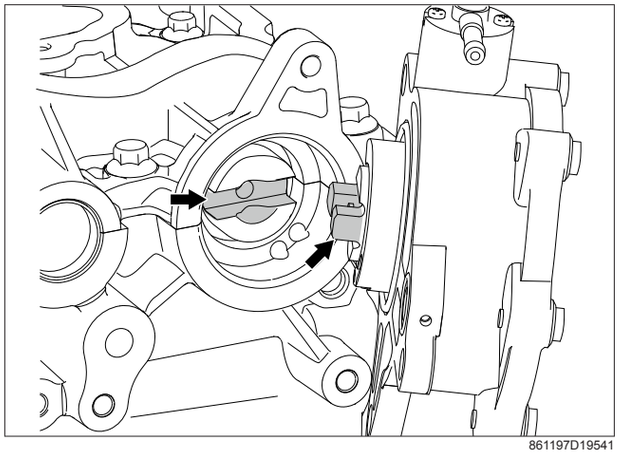
Sealant line diameter: (3±5) mm

⚠ Caution

› Sealant line shall not enter the camshaft bore before or after assembly.

2. Check if the O-ring of vacuum pump is damaged

3. Correspondingly insert the flat protruding block of the vacuum pump into the groove on rear end spindle nose of the exhaust camshaft, with spigot and round hole fitting well

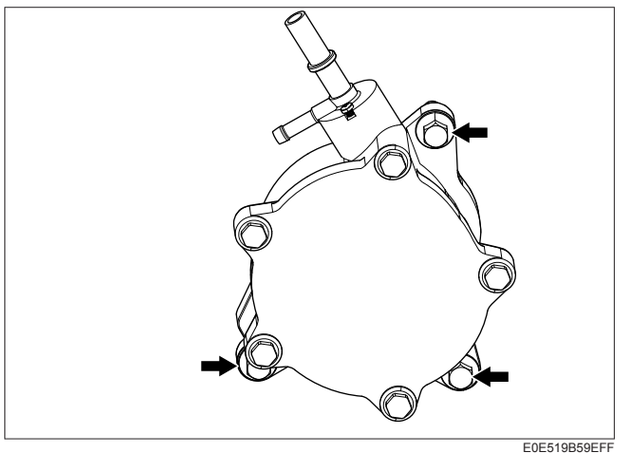


861197D19541

⚠ Caution

› Keep the vacuum pump installed face up or upright during the process, so as to prevent the O-ring from dismounting.

4. Tighten 3 bolts

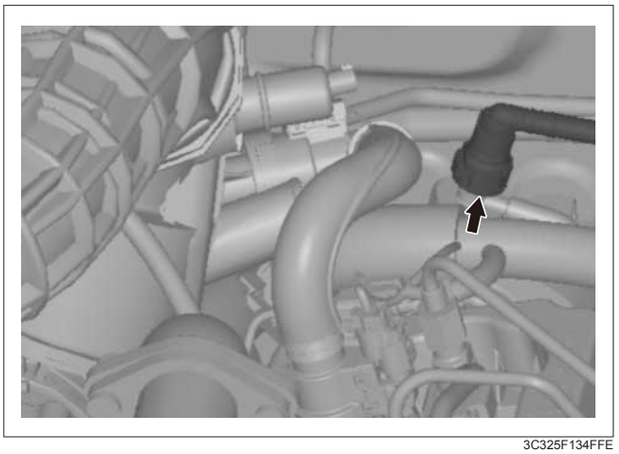


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Tightening torque: (24±2) N·m

5. Connect pipeline of vacuum pump

6. Connect 1 pipeline



3C325F134FFE

⚠ Caution

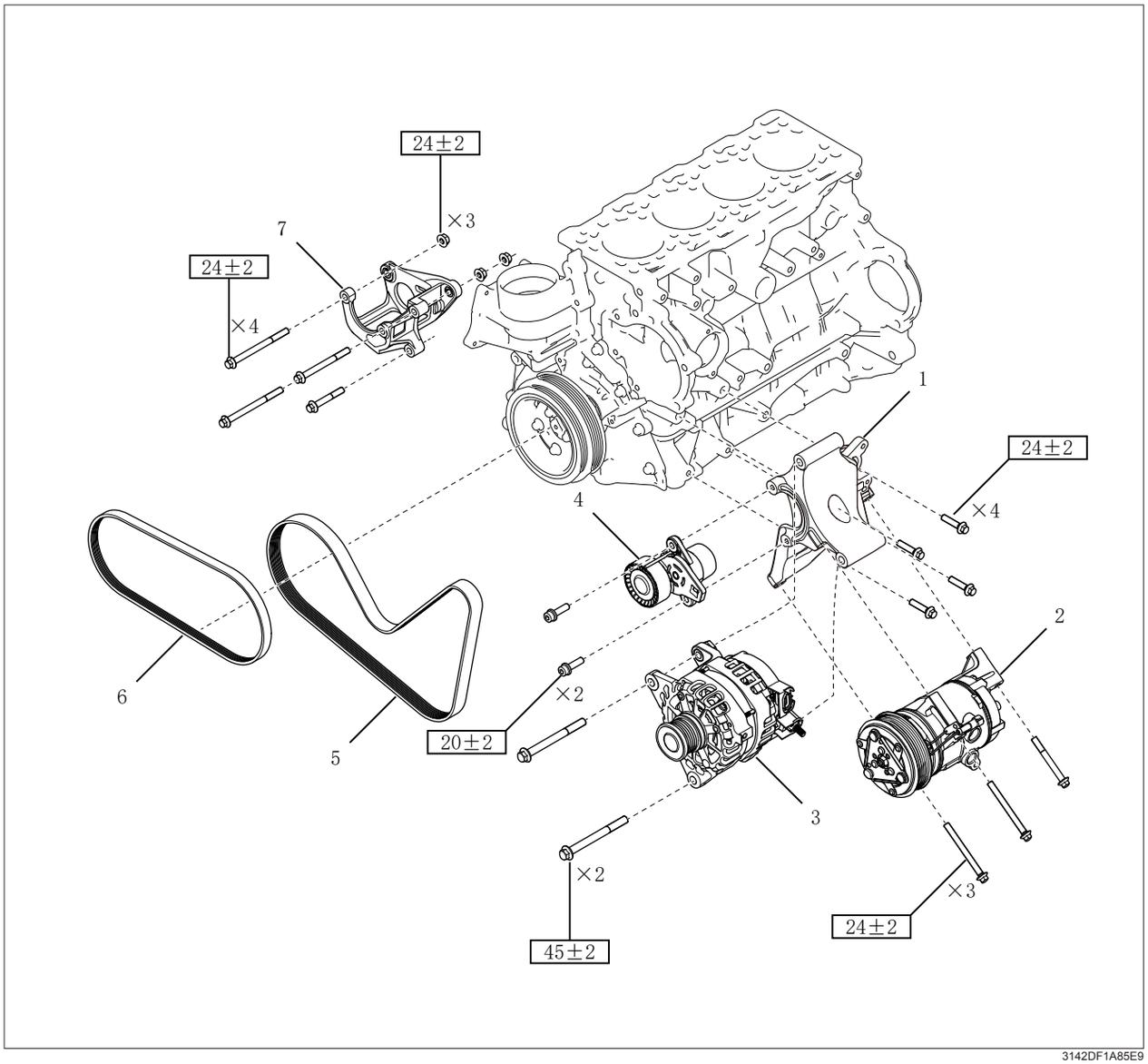
› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

7. Install trim cover of the engine

Generator belt (6MT)

Structural diagram



3142DF1A85E9

1. Compressor bracket
2. Refrigerating compressor assembly
3. Generator assembly
4. Accessory tension pulley assembly
5. Generator belt
6. Steering pump belt
7. Power-steering oil pump bracket component

Check

1. Check belt for wear, fracture and other damage, and replace belt if the problems listed below exist
   - Belt breakage.
   - Belt worn, wire exposed.
   - Edge plane fallen off.
2. Make sure that belt is properly installed in wheel groove
   - If the belt is out of wheel groove, replace generator belt.

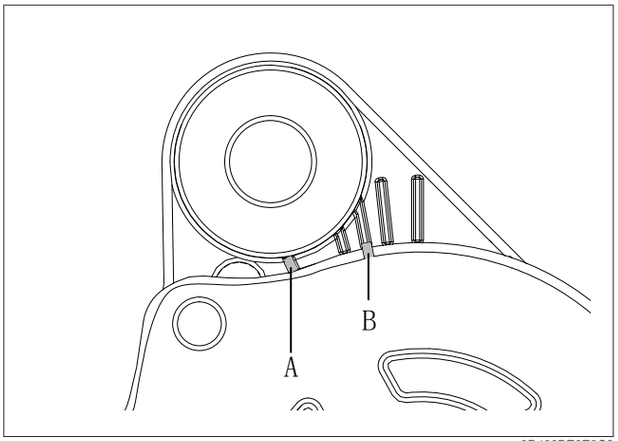
Removal/installation

Removal

⚠ Caution

- For easy re-installation, it needs to mark the moving direction of ribbed belt before removal.

1. Disconnect the negative terminal of the battery.
2. Remove steering pump belt
3. Check indicator position of accessory tension pulley assembly



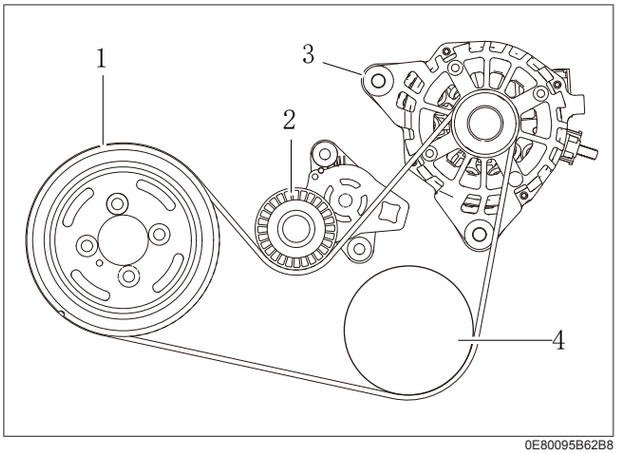
6D490BE0E3C2

In the diagram:

A. Belt replacement position (when the pointer points at this position, belt replacement is required)

B. Pointer position

4. Identify generator belt rotating direction



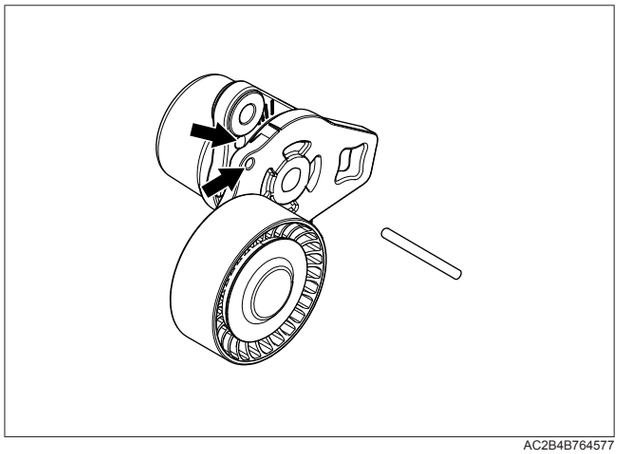
0E80095B62B8

In the diagram:

1. Damping pulley assembly

2. Accessory tension pulley assembly
3. Generator assembly
4. Refrigerating compressor assembly

5. Turn accessory tension pulley assembly clockwise to allow hole alignment. Insert pin shaft into alignment hole of accessory tension pulley assembly

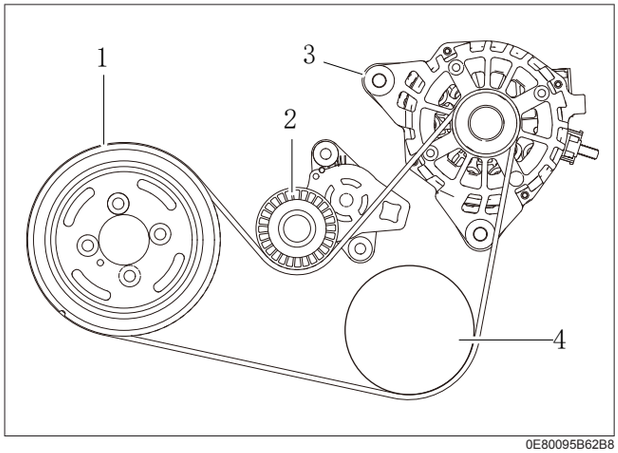


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6. Remove generator belt

Installation

1. Install generator belt
2. Install generator belt back to its original position in the direction of rotation



0E80095B62B8

In the diagram:

1. Damping pulley assembly
2. Accessory tension pulley assembly
3. Generator assembly
4. Refrigerating compressor assembly

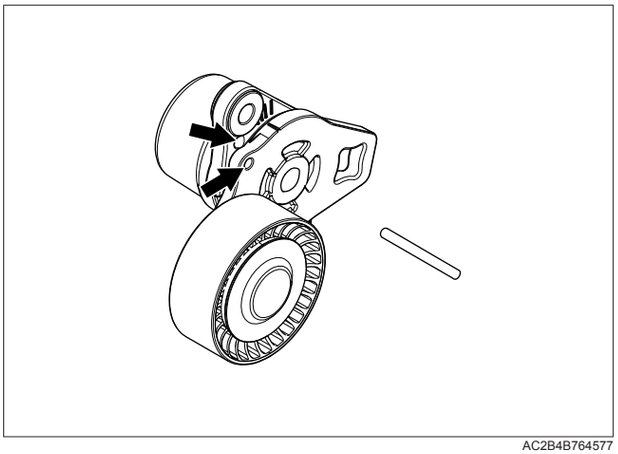
i Notice

› In installing a belt, allow perfect fit of the belt to the belt pulley slot.

› Prevent engine oil and engine coolant from spattering on the belt.

› Do not excessively twine or bend the belt.

3. Pull out the pin shaft to allow natural tensioning of the generator belt

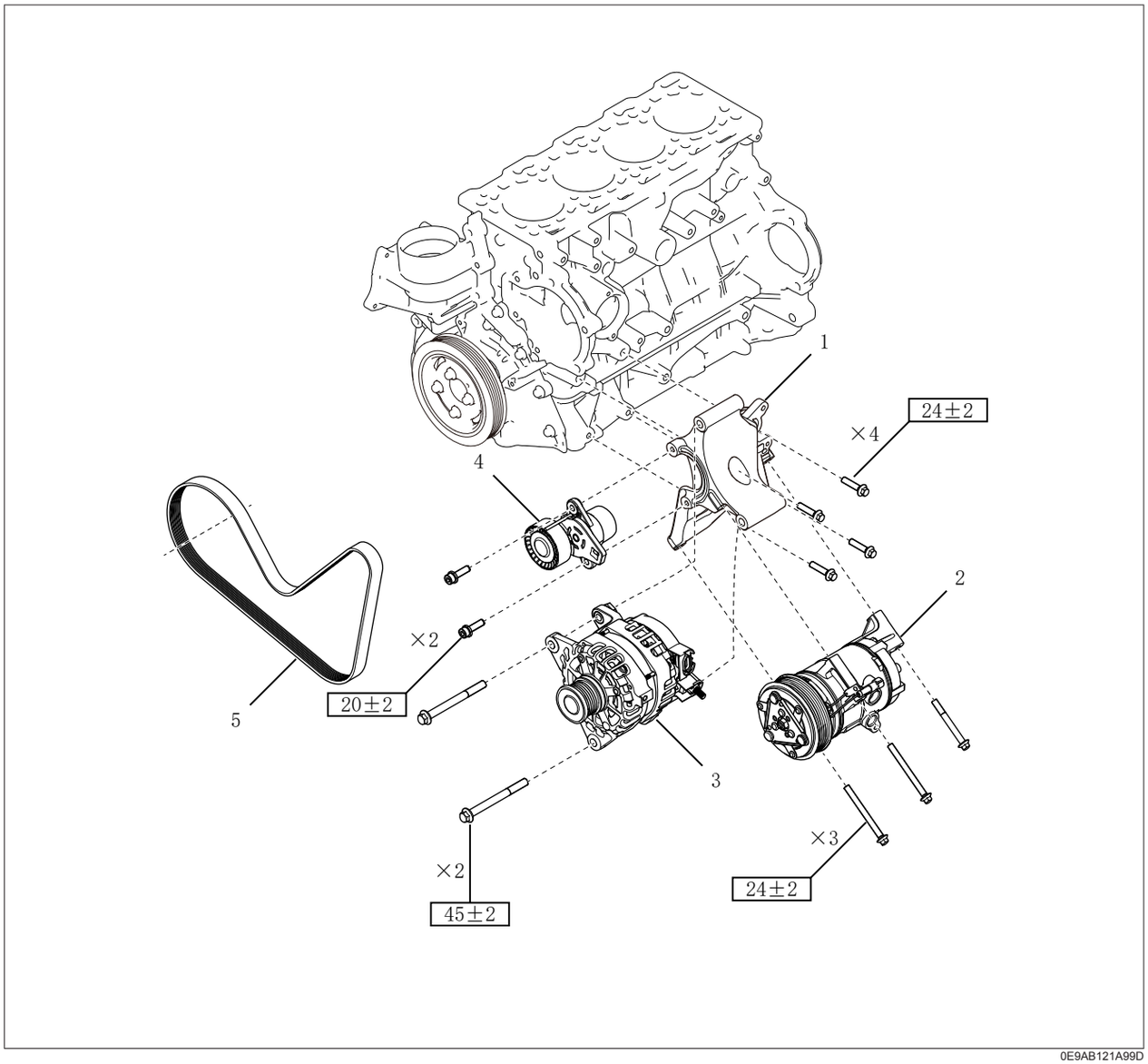


AC2B4B764577

4. Ensure perfect fit of wedge-shaped teeth of belt to wedge-shaped teeth slot of the pulley
5. Complete other installations in the reverse order of removal

Generator belt (8AT)

Structural diagram



0E9AB121A99D

1. Compressor bracket
2. Refrigerating compressor assembly
3. Generator assembly
4. Accessory tension pulley assembly
5. Generator belt

Check

1. Check belt for wear, fracture and other damage, and replace belt if the problems listed below exist
   - Belt breakage.
   - Belt worn, wire exposed.
   - Edge plane fallen off.
2. Make sure that belt is properly installed in wheel groove
   - If the belt is out of wheel groove, replace generator belt.

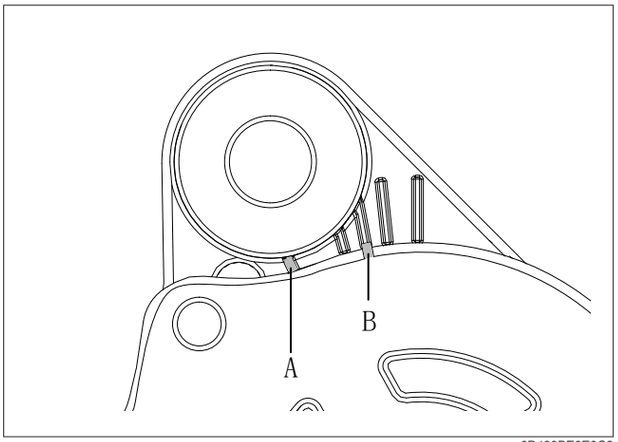
Removal/installation

Removal

⚠ Caution

- For easy re-installation, it needs to mark the moving direction of ribbed belt before removal.

1. Disconnect the negative terminal of the battery.
2. Check indicator position of accessory tension pulley assembly



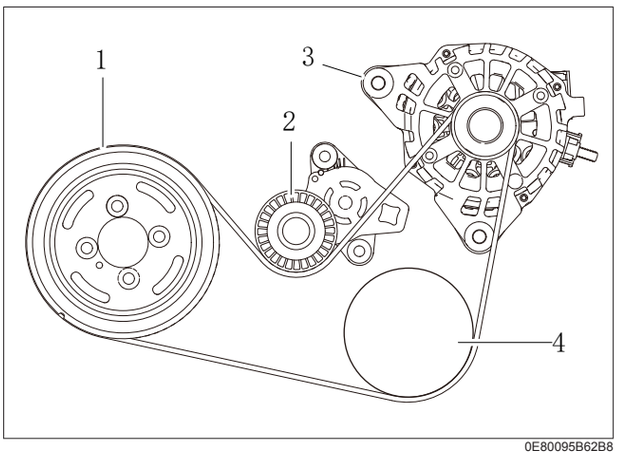
6D490BE0E3C2

In the diagram:

A. Belt replacement position (when the pointer points at this position, belt replacement is required)

B. Pointer position

3. Identify generator belt rotating direction



0E80095B62B8

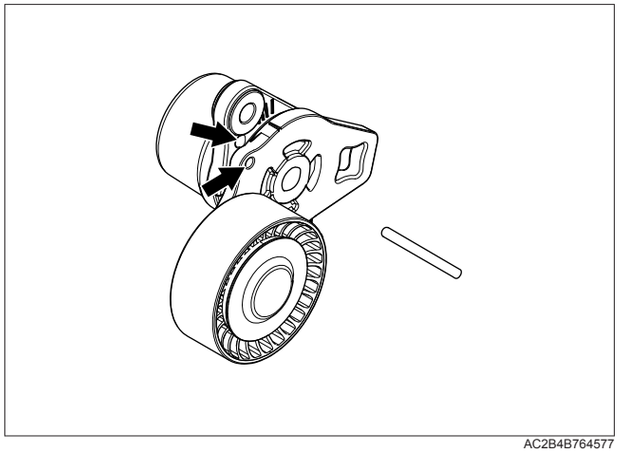
In the diagram:

1. Damping pulley assembly
2. Accessory tension pulley assembly

3. Generator assembly

4. Refrigerating compressor assembly

4. Turn accessory tension pulley assembly clockwise to allow hole alignment. Insert pin shaft into alignment hole of accessory tension pulley assembly



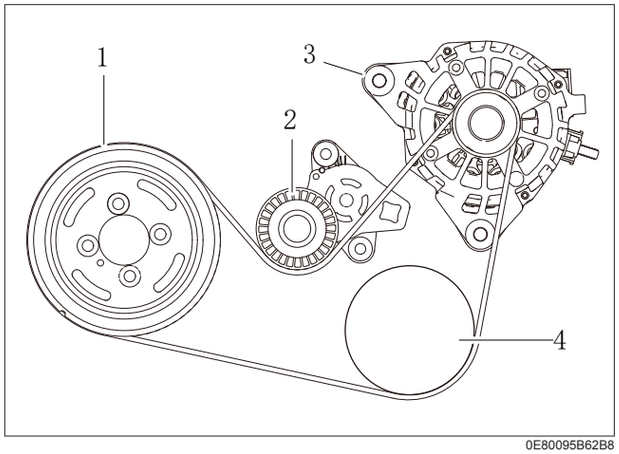
AC2B4B764577

5. Remove generator belt

Installation

1. Install generator belt

2. Install generator belt back to its original position in the direction of rotation



0E80095B62B8

In the diagram:

1. Damping pulley assembly

2. Accessory tension pulley assembly

3. Generator assembly

4. Refrigerating compressor assembly

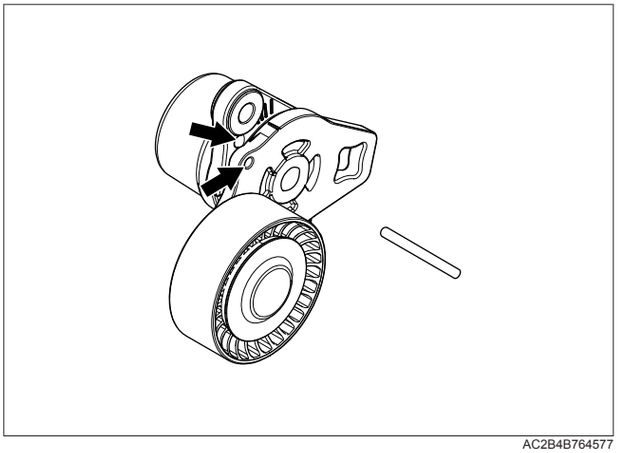
Notice

› In installing a belt, allow perfect fit of the belt to the belt pulley slot.

› Prevent engine oil and engine coolant from spattering on the belt.

› Do not excessively twine or bend the belt.

3. Pull out the pin shaft to allow natural tensioning of the generator belt



AC2B4B764577

4. Ensure perfect fit of wedge-shaped teeth of belt to wedge-shaped teeth slot of the pulley

5. Complete other installations in the reverse order of removal

Steering pump belt (6MT)

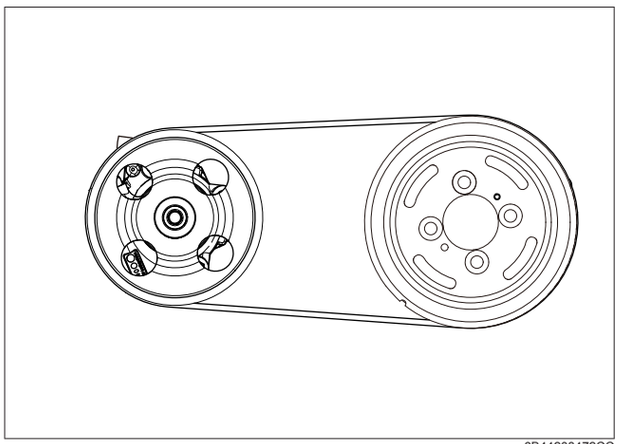
Removal/installation

Removal

⚠ Caution

› During removal or installation of engine oil cooler, the gear train accessories and belts must be protected to prevent the oil from spilling on the steering pump belt, causing belt slip and failure.

1. Mount the dedicated tool between steering pump pulley and belt
2. Turn the crankshaft clockwise to remove belt from the steering pump pulley



6B44208472CC

⚠ Caution

› Do not turn the crankshaft counterclockwise (toward the front end of the engine).

3. Check whether the pulley edge of steering pump is too sharp.

⚠ Caution

› If it is too sharp, replace the steering pump pulley.

Installation

1. Attach the belt onto the damping pulley
2. Wind the belt to the lower part of the steering pump pulley, and mount the dedicated tool between steering pump pulley and belt
3. Turn the damping pulley clockwise to attach the belt onto the steering pump pulley

⚠ Caution

› Do not turn the crankshaft counterclockwise (toward the front end of the engine).

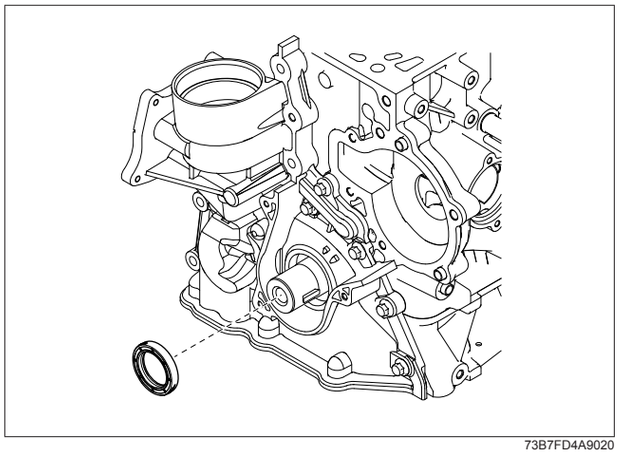
4. After assembling, confirm whether the steering pump belt is cut or not.
5. Make sure that the wedge-shaped teeth of steering pump belt and that of steering pump pulley are well matched.

Front crankshaft oil seal

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove timing cover, upper timing cover assembly and lower timing cover assembly
3. Remove timing belt
4. Remove crankshaft timing pulley
5. Remove crankshaft front oil seal assembly



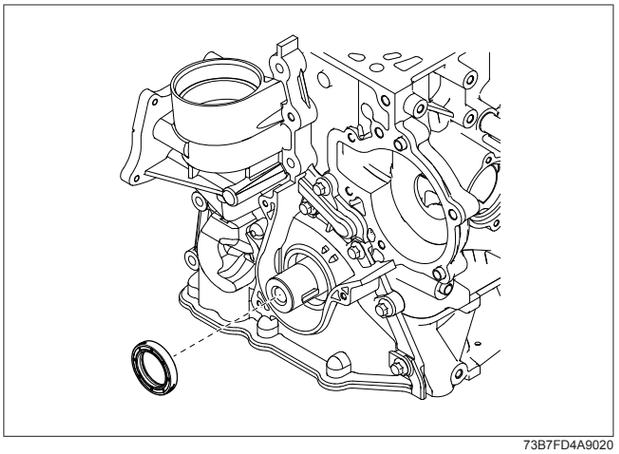
73B7FD4A9020

Notice

- Oil seals are disposable parts.
- Be careful when removing the oil seal to prevent damage to working faces and seal surfaces of the components.

Installation

1. Apply cleaning engine oil evenly to outer circle of crankshaft front oil seal, and ensure that the outer circle of crankshaft front oil seal is covered with cleaning engine oil
2. Use the special tool to press new crankshaft front oil seal to engine oil pump assembly



73B7FD4A9020

Pressing depth is (0.25 ± 0.25) mm from front end face of oil pump.

Parallelism ≤ 0.4 mm.

Notice

- No scratches, skews and improper positioning are not allowed.
- Evenly apply force when installing oil seal. Do not strike oil seal obliquely. Do not touch oil seal lip to prevent scratch of seal lip, which may result in oil leakage. Do not apply grease to oil seal lip.
- After installing the oil seal, wipe off the residual oil on the oil seal surface to prevent false leakage.

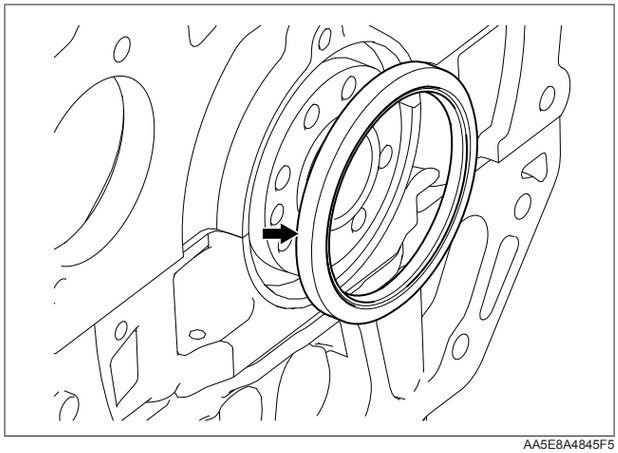
3. Install timing belt and align timing marks of each wheel
4. Remaining steps are to be performed in reverse order as compared with removal

Crankshaft rear oil seal (6MT)

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove transmission assembly
4. Remove clutch assembly
5. Remove flywheel gear ring assembly
6. Use a plastic hammer and screwdriver to pry gently around the rear crankshaft oil seal, and remove rear crankshaft oil seal



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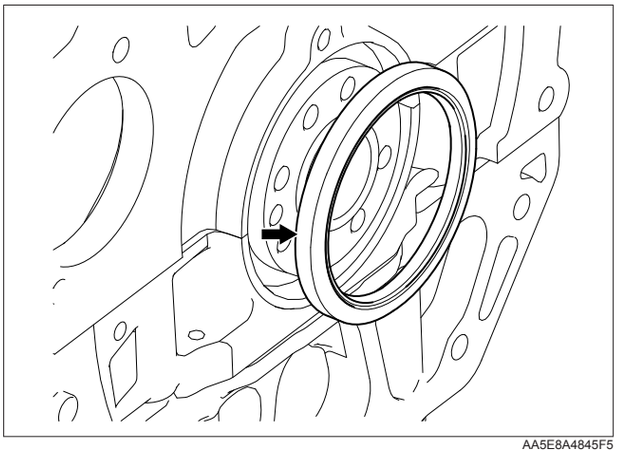
Notice

› Oil seals are disposable parts.

› Be careful when removing the oil seal to prevent damage to working faces and seal surfaces of the components.

Installation

1. Use the special tool to press in rear oil seal assembly of crankshaft into the corresponding hole in cylinder block



AA5E8A4845F5

Pressing depth of oil seal assembly: (0.3±0.3) mm

Parallelism ≤ 0.4 mm

Notice

› Evenly apply force when installing oil seal. Do not strike oil seal obliquely. Do not touch oil seal lip to prevent scratch of seal lip, which may result in oil leakage. Do not apply grease to oil seal lip.

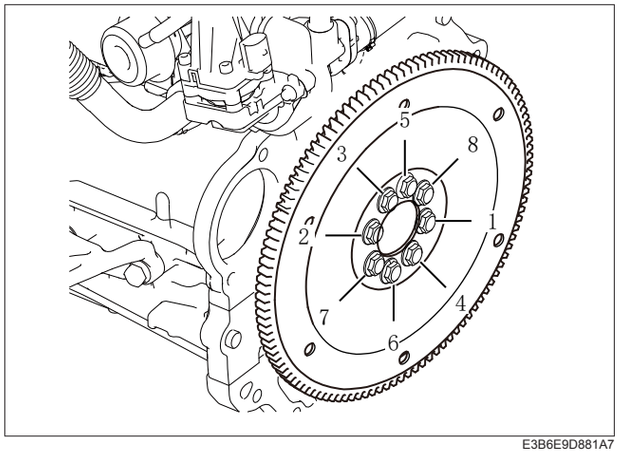
2. Install flywheel gear ring assembly
3. Install clutch assembly
4. Install transmission assembly
5. Install negative terminal of the battery

Crankshaft rear oil seal (8AT)

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove the transmission assembly
4. Brake the flexible flywheel assembly with the flywheel brake tooling to prevent the flywheel assembly from rotating.
5. Remove 8 bolts in the sequence shown in the figure, and remove the flexible flywheel assembly.

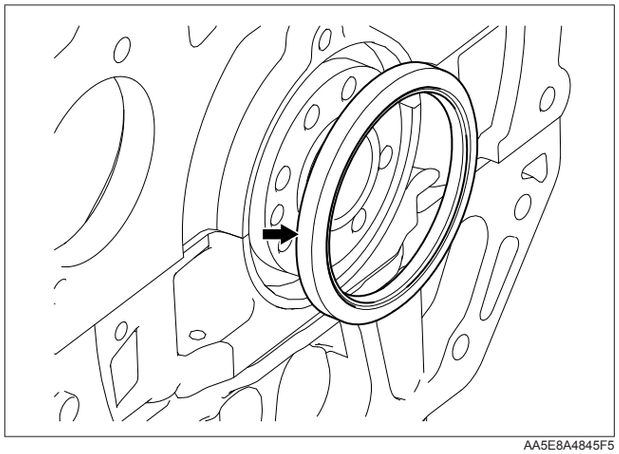


E3B6E9D881A7

Notice

› Flywheel bolts are disposable parts.

6. Remove the flywheel brake tooling.
7. Use a plastic hammer and screwdriver to pry gently around the rear crankshaft oil seal, and remove rear crankshaft oil seal



AA5E8A4845F5

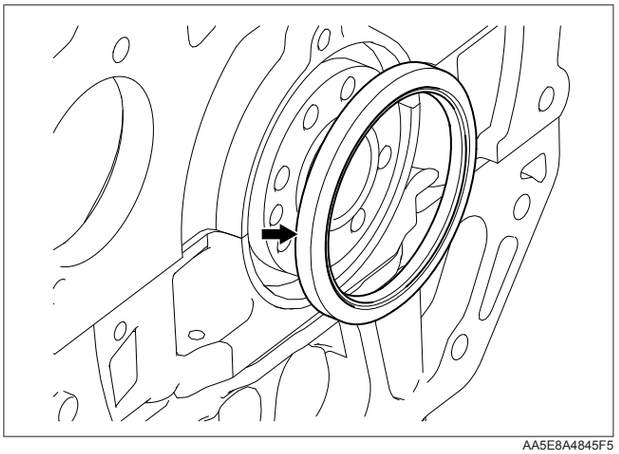
Notice

› Oil seals are disposable parts.

› Be careful when removing the oil seal to prevent damage to working faces and seal surfaces of the components.

Installation

1. Use the special tool to press in rear oil seal assembly of crankshaft into the corresponding hole in cylinder block



AA5E8A4845F5

Pressing depth of oil seal assembly: (0.3±0.3) mm

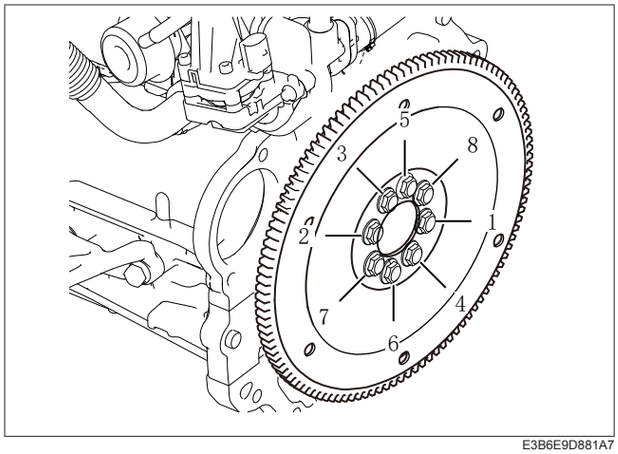
Parallelism ≤ 0.4 mm

Notice

› Evenly apply force when installing oil seal. Do not strike oil seal obliquely. Do not touch oil seal lip to prevent scratch of seal lip, which may result in oil leakage. Do not apply grease to oil seal lip.

2. Install the flexible flywheel assembly with the corresponding locating pin on the crankshaft, and make sure that the chamfered side faces the cylinder block.
3. Pre-tighten 8 new flywheel bolts.
4. Brake the flexible flywheel assembly with the flywheel brake tooling to prevent the flywheel assembly from rotating.

5. Tighten 8 bolts in the sequence as shown on the diagram



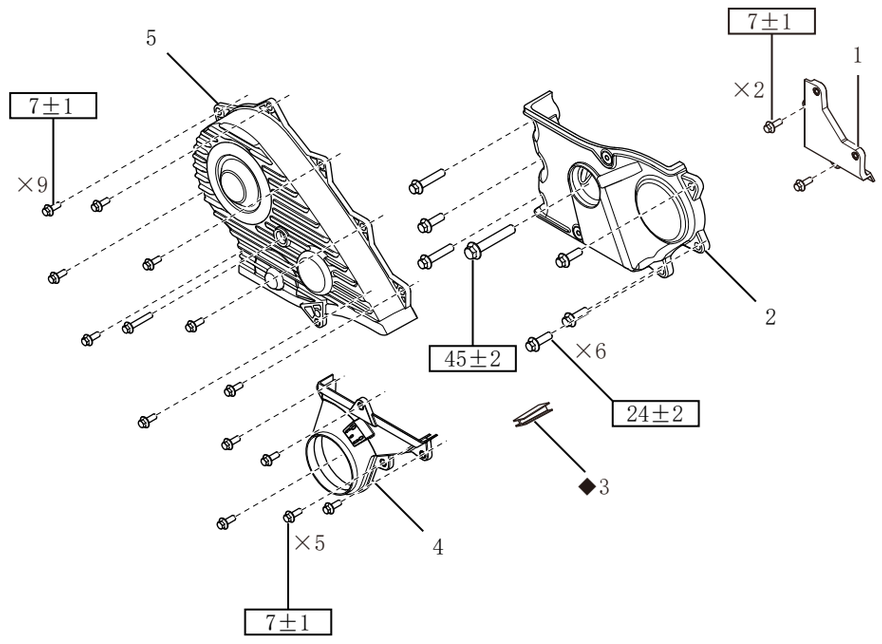
E3B6E9D881A7

Tightening torque: (75±5) N·m

6. Remove the flywheel brake tooling.
7. Install the transmission assembly
8. Install negative terminal of the battery

Timing cover (6MT)

Structural diagram



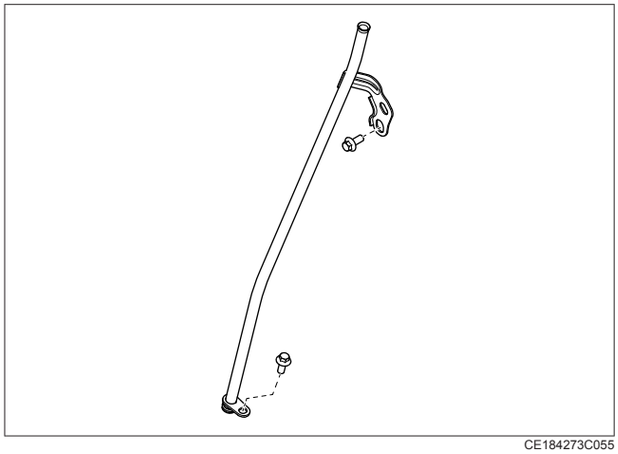
441671F45CC6

1. Rear timing cover component
2. Timing cover
3. Timing seal strip
4. Lower timing cover component
5. Upper timing cover component

Removal/installation

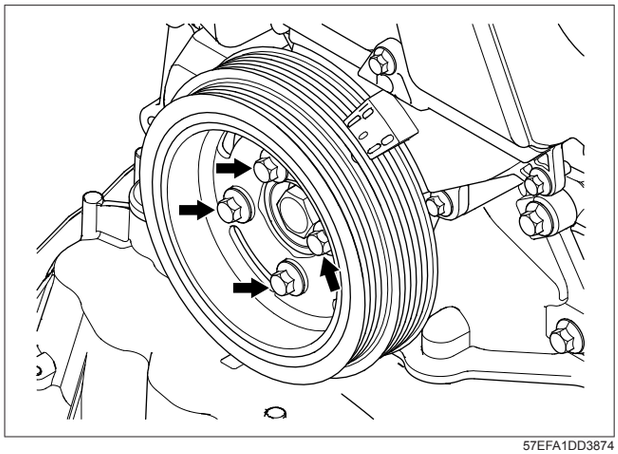
Removal

1. Disconnect the negative terminal of the battery.
2. Remove generator belt
3. Remove steering pump belt
4. Remove 2 bolts, and remove dipstick guide pipe assembly with dipstick assembly



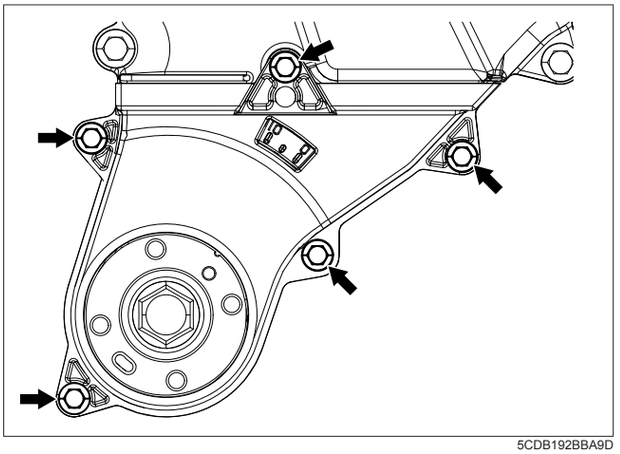
CE184273C055

5. Remove 4 bolts, and remove damping pulley assembly



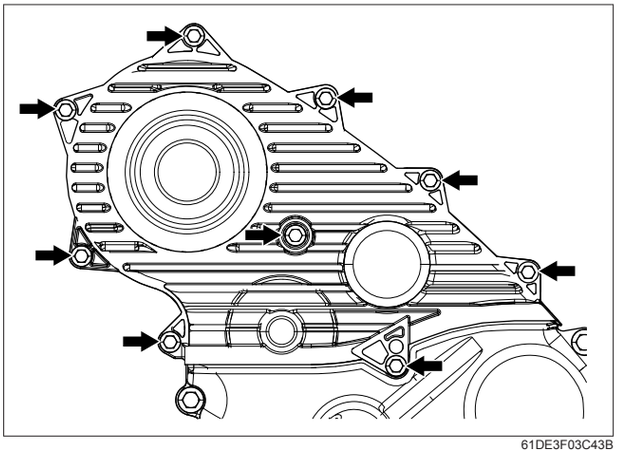
57EFA1DD3874

6. Remove 5 bolts, and remove lower timing cover component



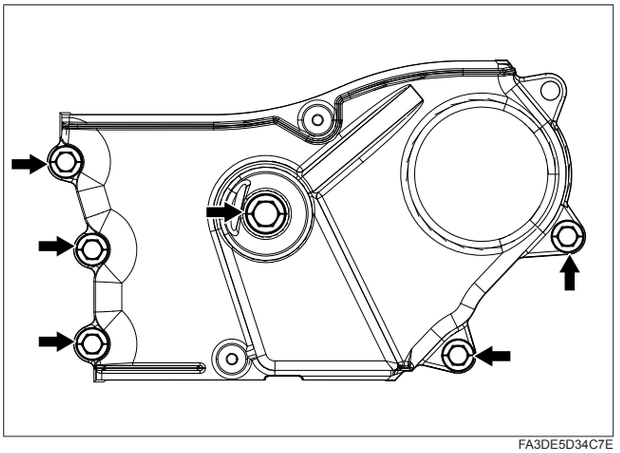
5CDB192BBA9D

7. Remove 9 bolts, and remove upper timing cover component



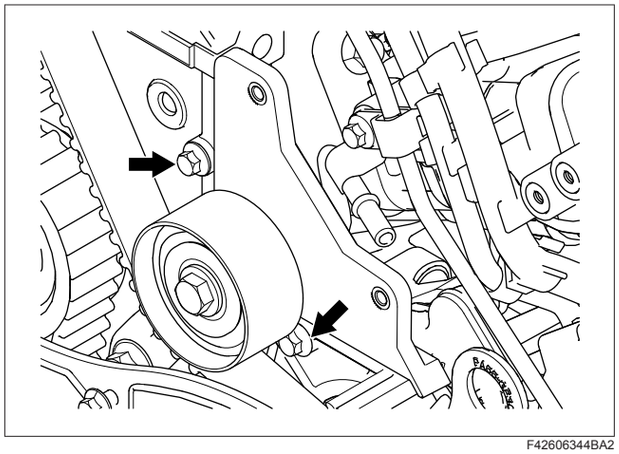
61DE3F03C43B

8. Remove 6 bolts, and remove timing cover



FA3DE5D34C7E

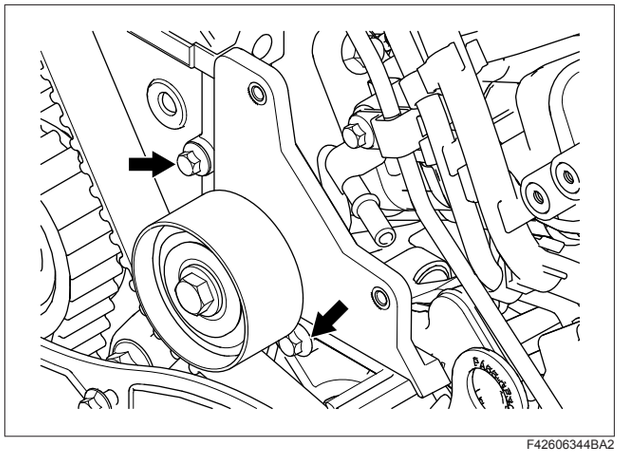
9. Remove 2 bolts, and remove rear timing cover



F42606344BA2

Installation

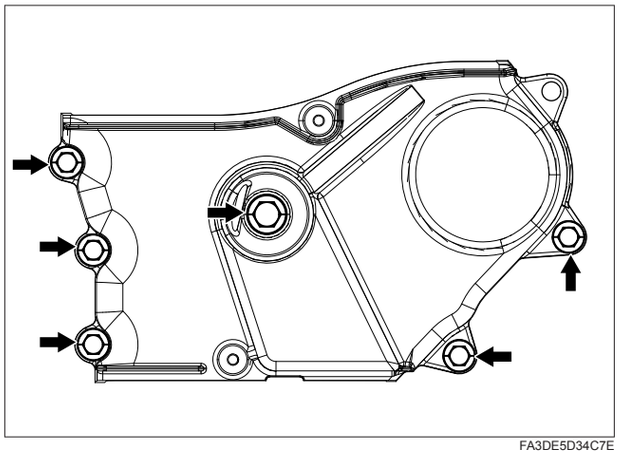
1. Install rear timing cover component, and tighten 2 bolts after aligning the mounting holes



F42606344BA2

Tightening torque: (7±1) N·m

2. Install timing cover, and tighten 6 bolts after aligning the mounting holes

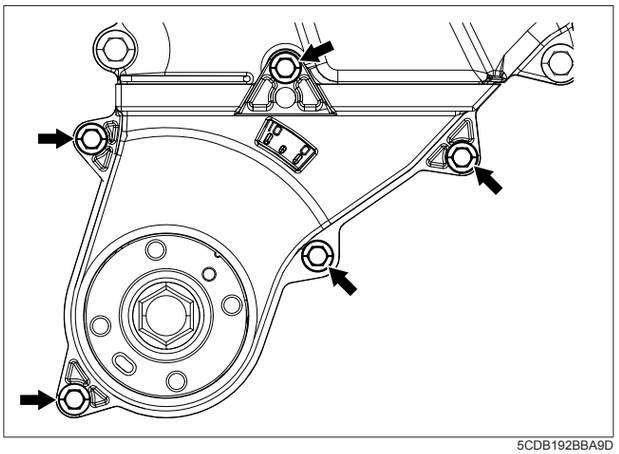


FA3DE5D34C7E

Tightening torque of M10 bolt: (45±2) N·m

Tightening torque of M8 bolt: (24±2) N·m

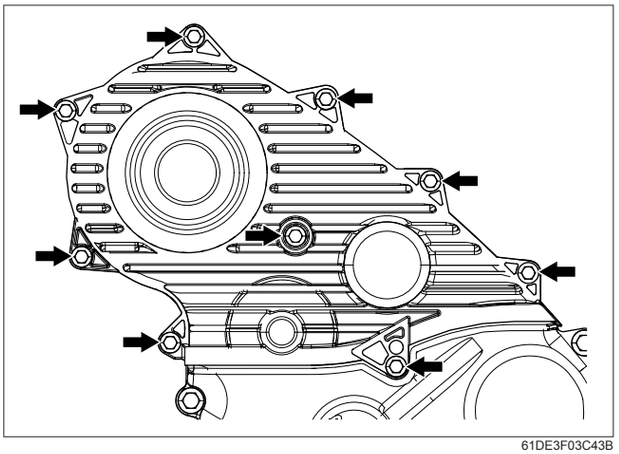
3. Install lower timing cover component, and tighten 5 bolts



5CDB192BBA9D

Tightening torque: (7±1) N·m

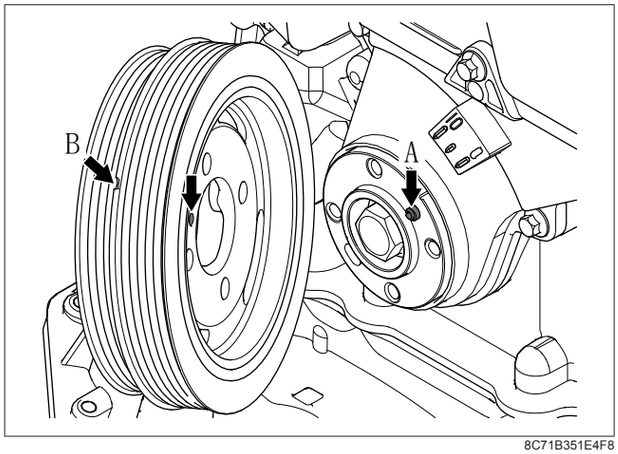
4. Install upper timing cover component, and tighten 9 bolts



61DE3F03C43B

Tightening torque: (7±1) N·m

5. Install damping pulley by aligning the elastic cylindrical pin, and make sure that the notch of damping pulley faces the front of the engine

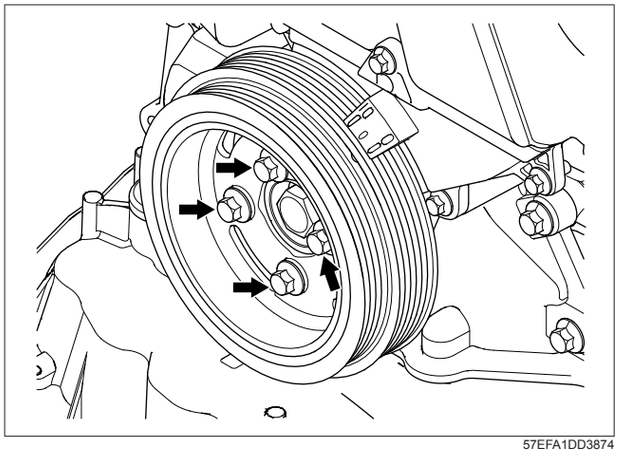


8C71B351E4F8

A - elastic cylindrical pin

B - notch of damping pulley

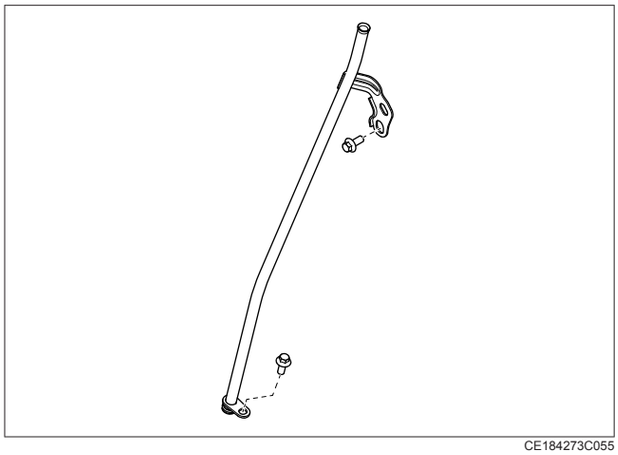
6. Tighten 4 bolts



57EFA1DD3874

Tightening torque: (35±3) N·m

7. Install dipstick guide pipe assembly with dipstick assembly, and tighten 2 bolts

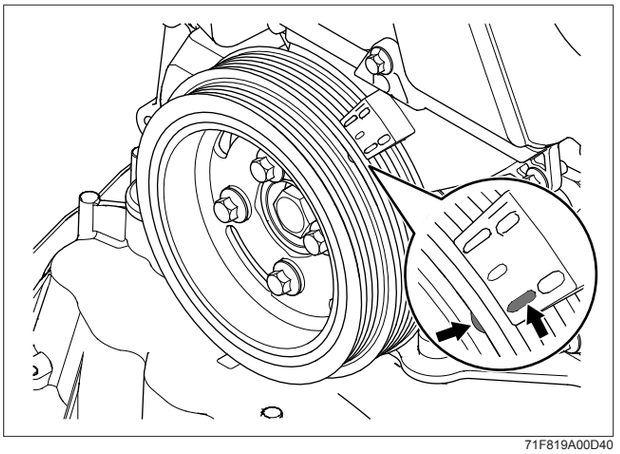


CE184273C055

Tightening torque of M6 bolt: (10±1) N·m

Tightening torque of M8 bolt: (24±2) N·m

8. Align the notch of the damping pulley and the number 0 on the lower timing cover component



71F819A00D40

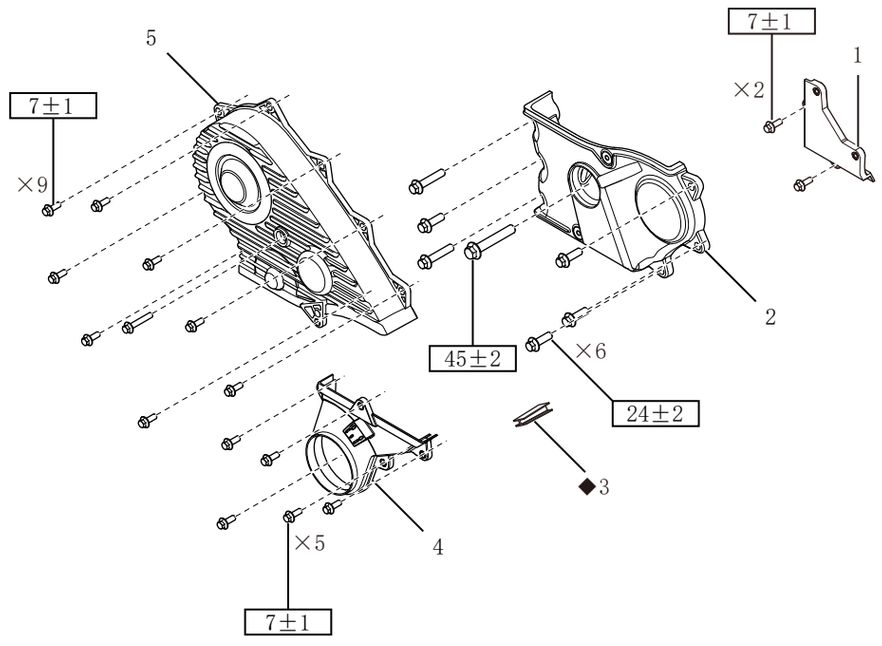
⚠ Caution

Do not turn the crankshaft counterclockwise (toward the front end of the engine).

9. Remaining steps are to be performed in reverse order as compared with removal

Timing cover (8AT)

Structural diagram



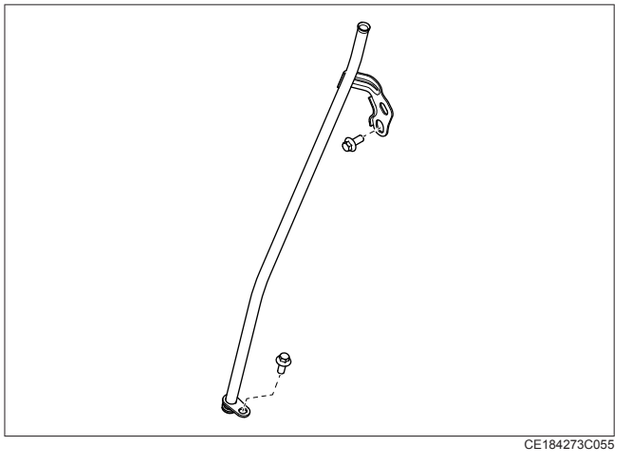
441671F45CC6

1. Rear timing cover component
2. Timing cover
3. Timing seal strip
4. Lower timing cover component
5. Upper timing cover component

Removal/installation

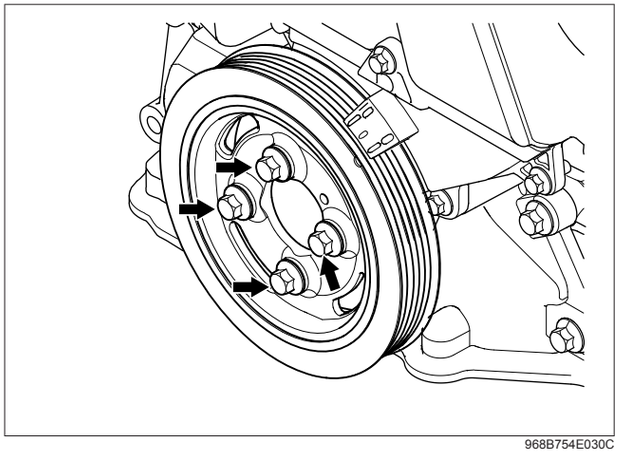
Removal

1. Disconnect the negative terminal of the battery.
2. Remove generator belt
3. Remove 2 bolts, and remove dipstick guide pipe assembly with dipstick assembly



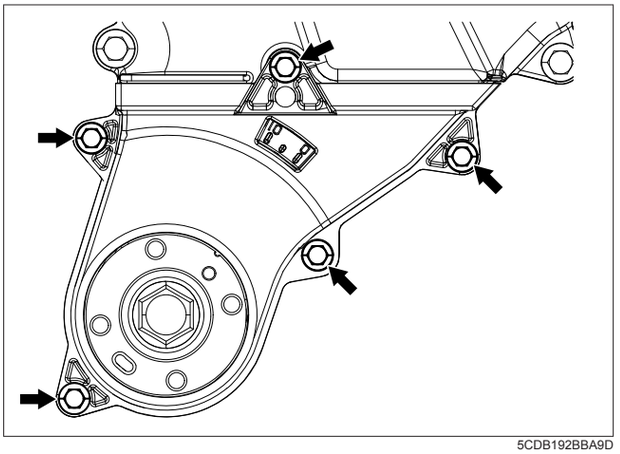
CE184273C055

4. Remove 4 bolts, and remove damping pulley assembly



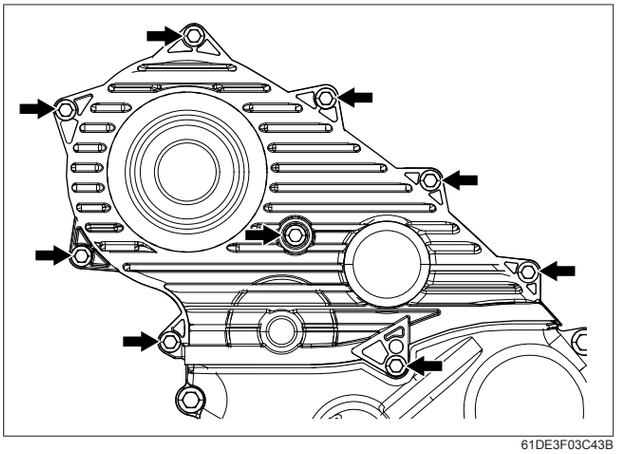
968B754E030C

5. Remove 5 bolts, and remove lower timing cover assembly



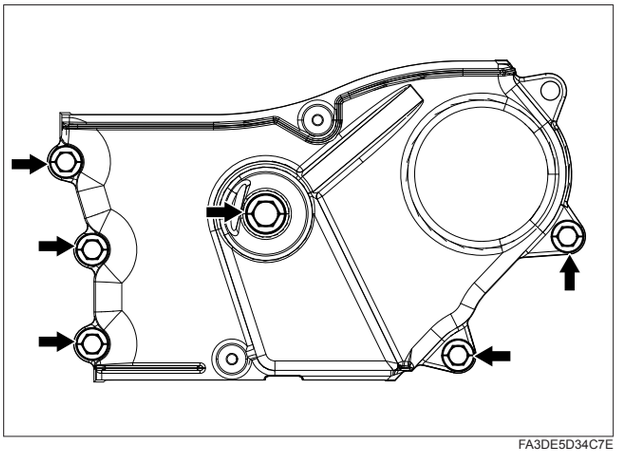
5CDB192BBA9D

6. Remove 9 bolts, and remove upper timing cover assembly



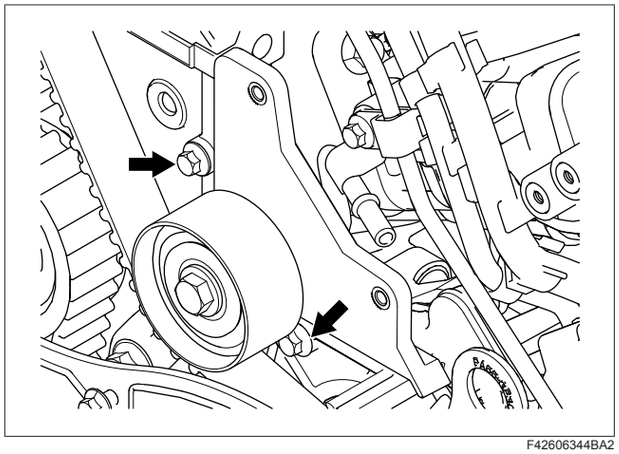
61DE3F03C43B

7. Remove 7 bolts, and remove timing cover



FA3DE5D34C7E

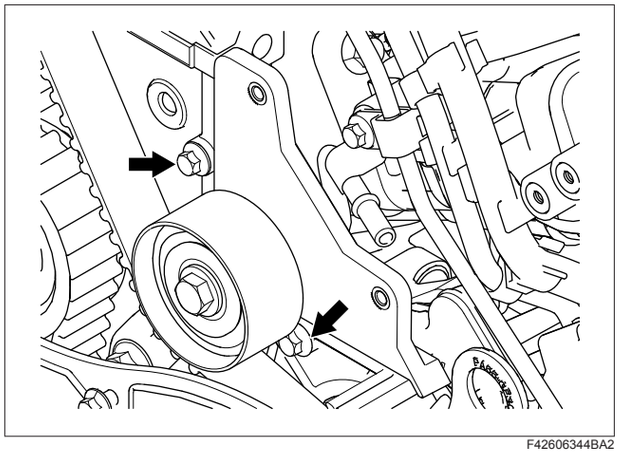
8. Remove 2 bolts, and remove rear timing cover



F42606344BA2

Installation

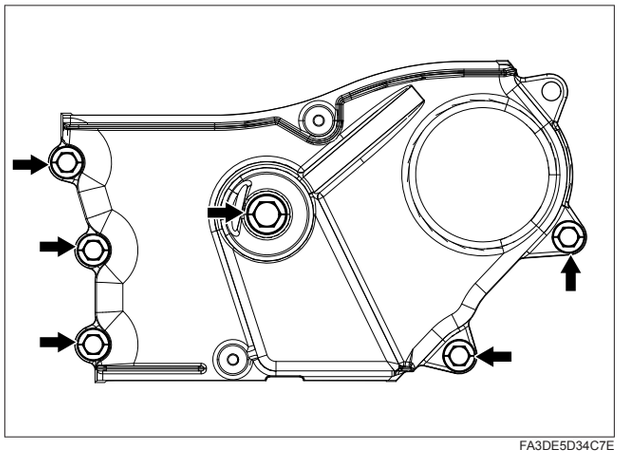
1. Install rear timing cover components, and tighten 2 bolts after aligning the mounting holes



F42606344BA2

Tightening torque: (7 ± 1) N·m

2. Install timing cover, and tighten 7 bolts after aligning the mounting holes

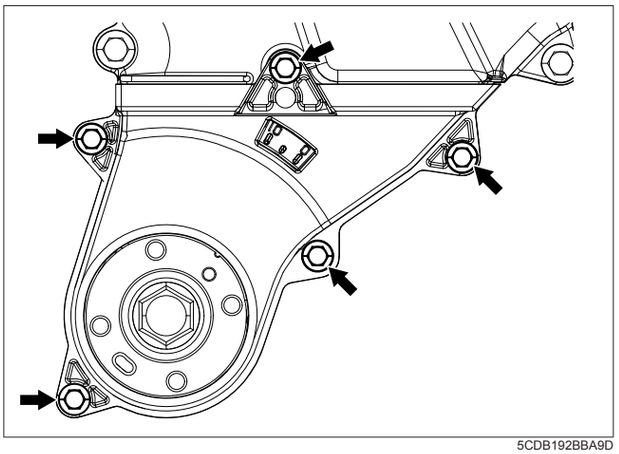


FA3DE5D34C7E

Tightening torque of M10 bolt: (45 ± 2) N·m

Tightening torque of M8 bolt: (24 ± 2) N·m

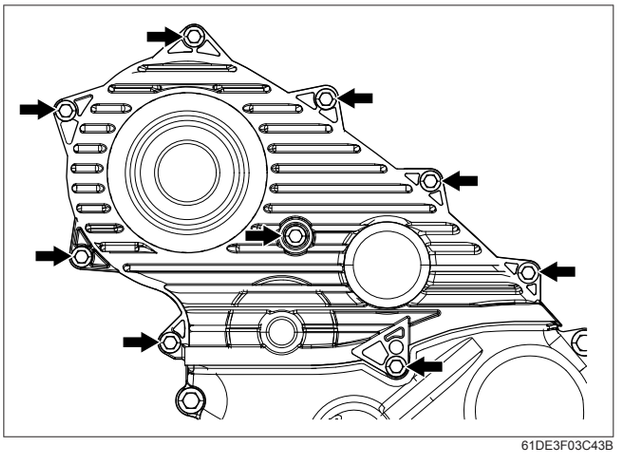
3. Install lower timing cover assembly, and tighten 5 bolts



5CDB192BBA9D

Tightening torque: (7 ± 1) N·m

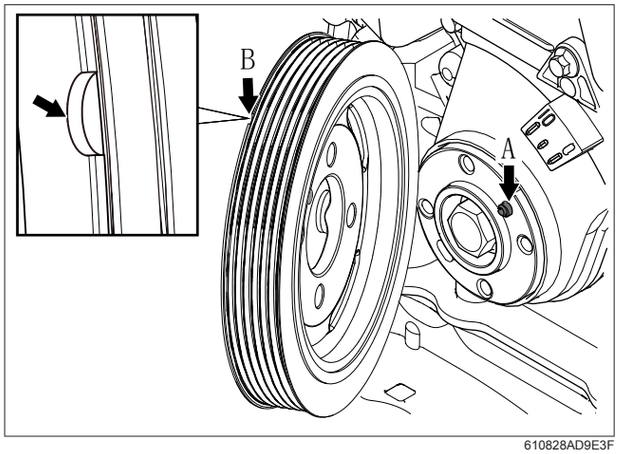
4. Install upper timing cover assembly, and tighten 9 bolts



61DE3F03C43B

Tightening torque: (7 ± 1) N·m

5. Install damping pulley by aligning the elastic cylindrical pin, and make sure that the notch of damping pulley faces the front of the engine

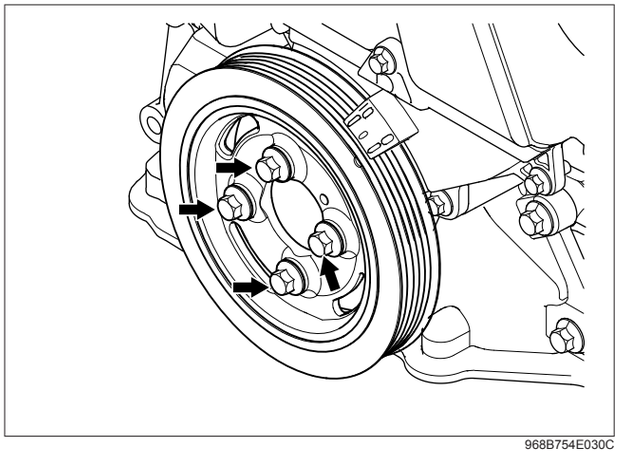


610828AD9E3F

A - elastic cylindrical pin

B - notch of damping pulley

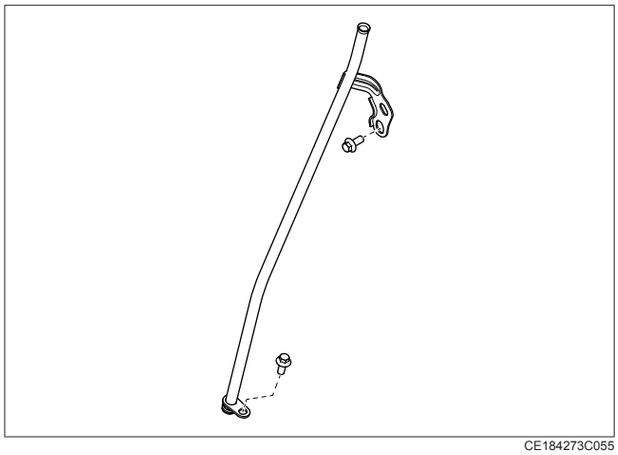
6. Fasten the 4 bolts



968B754E030C

Tightening torque: (35 ± 3) N·m

7. Install dipstick guide pipe assembly with dipstick assembly, and tighten 2 bolts

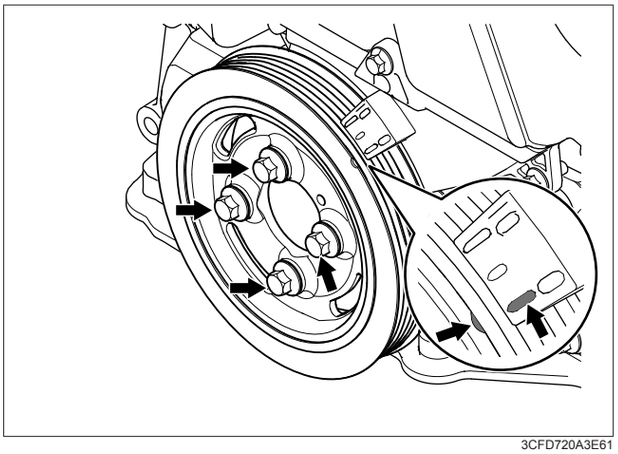


CE184273C055

Tightening torque of M6 bolt: (10 ± 1) N·m

Tightening torque of M8 bolt: (24 ± 2) N·m

8. Align the notch of the damping pulley and the number 0 on the lower timing cover assembly



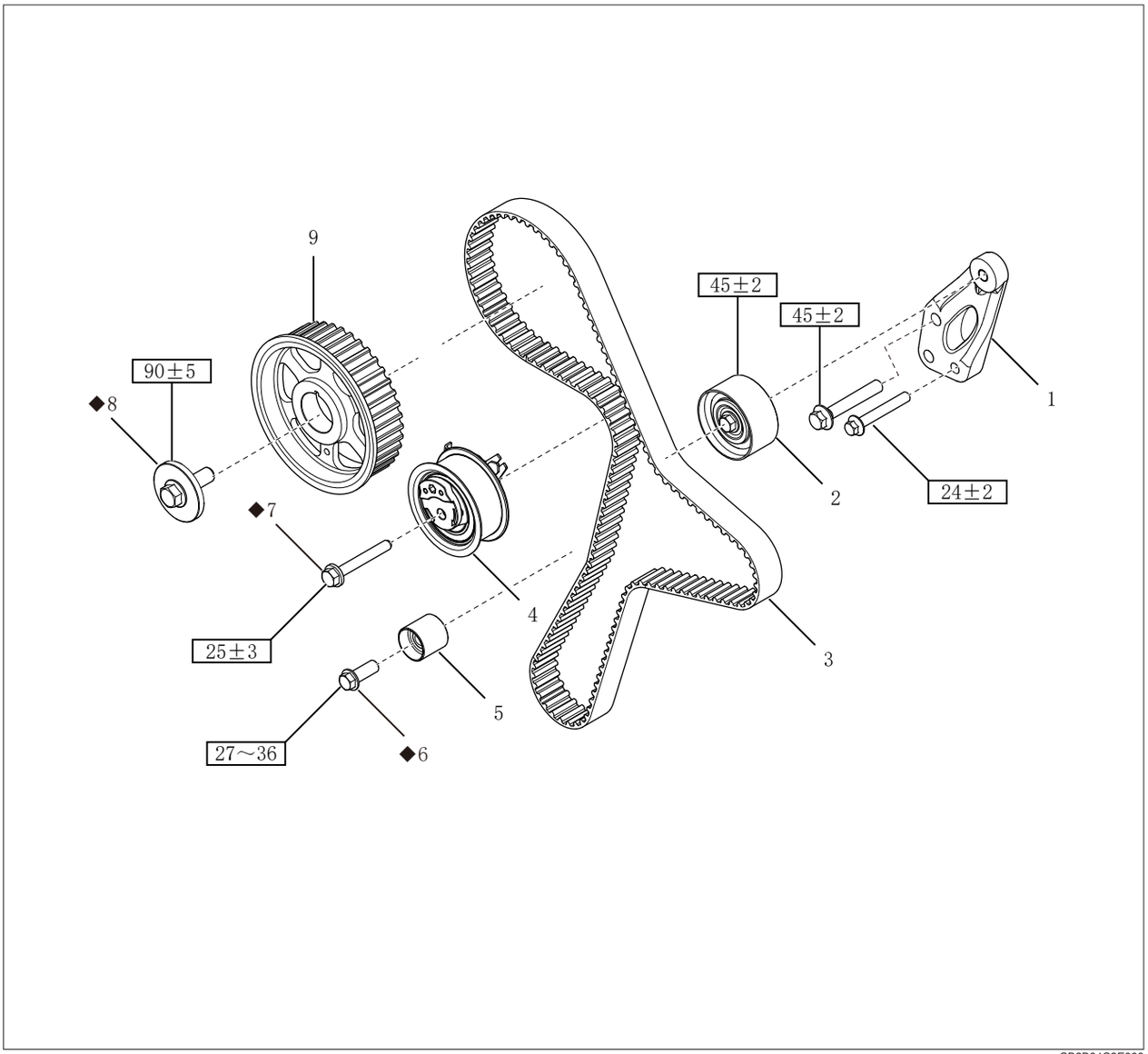
3CFD720A3E61

9. Install generator belt

10. Remaining steps are to be performed in reverse order as compared with removal

Timing gear

Structural diagram



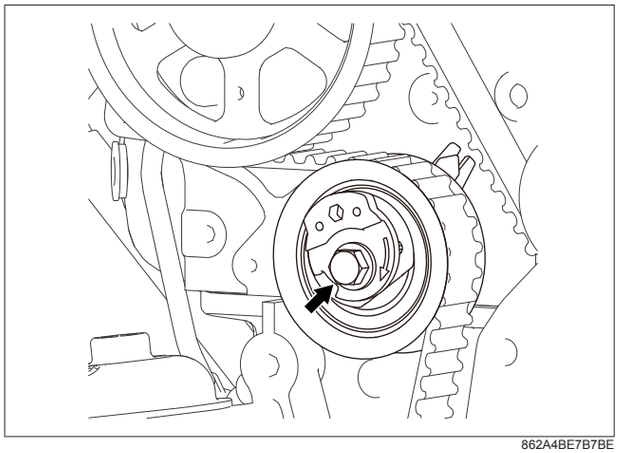
CB2B84C2E863

1. Timing idler bracket
2. Large timing idler component
3. Timing belt
4. Timing tension pulley assembly
5. Timing idler
6. Timing idler bolt
7. Fastening bolt for timing tension pulley
8. Bolt-washer assembly of camshaft timing pulley
9. Camshaft timing pulley

Removal/installation

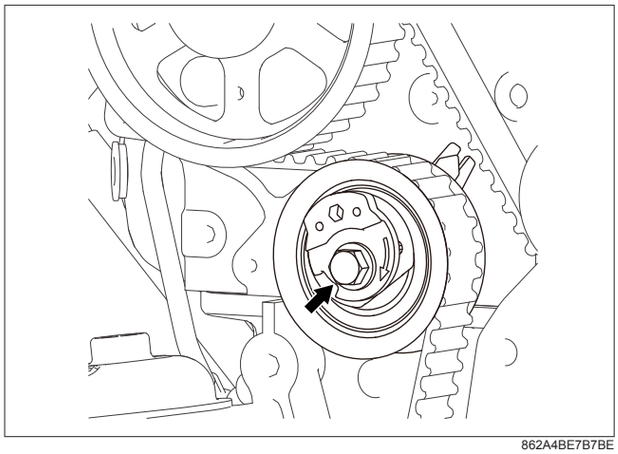
Removal

1. Disconnect the negative terminal of the battery.
2. Remove timing cover, upper timing cover assembly and lower timing cover assembly
3. Loosen fastening bolt for timing tension pulley



862A4BE7B7BE

4. Remove timing belt
5. Remove fastening bolt for timing tension pulley, and remove timing tension pulley assembly

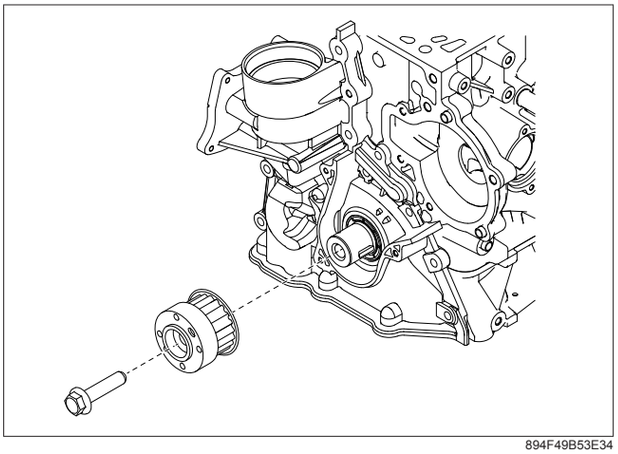


862A4BE7B7BE

Notice

› The fastening bolt for timing tension pulley is a disposable part.

6. Remove crankshaft timing pulley bolt, and remove timing pulley of crankshaft

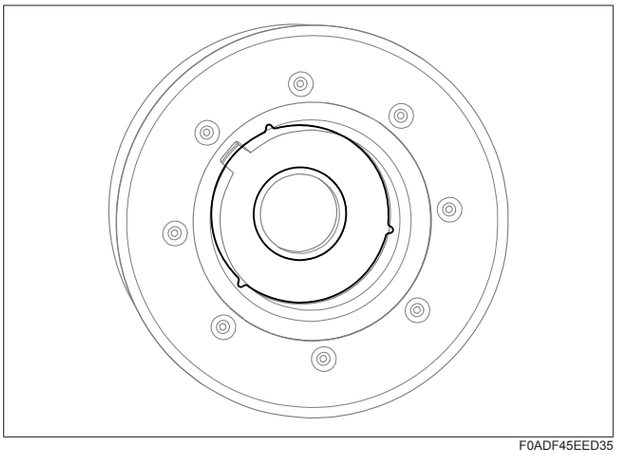


894F49B53E34

Notice

› The crankshaft timing pulley bolt is a disposable part.

7. Remove crankshaft gasket from timing pulley of crankshaft

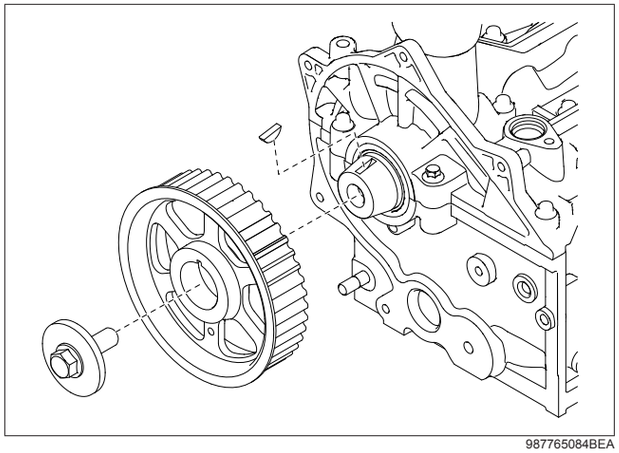


F0ADF45EED35

Notice

› Crankshaft gaskets are disposable parts.

8. Remove bolt-washer assembly of camshaft timing pulley, and remove camshaft timing pulley and woodruff key

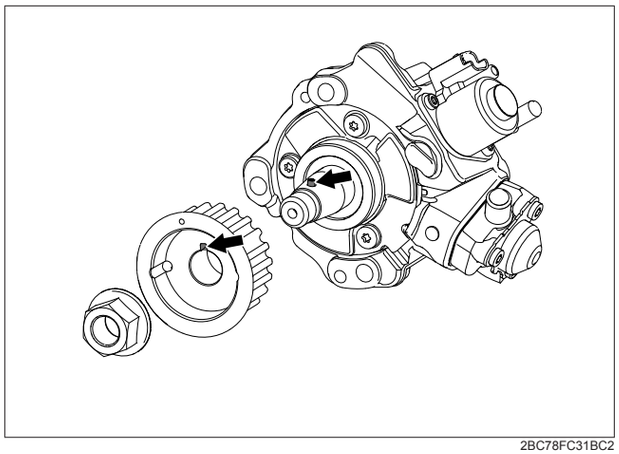


987765084BEA

Notice

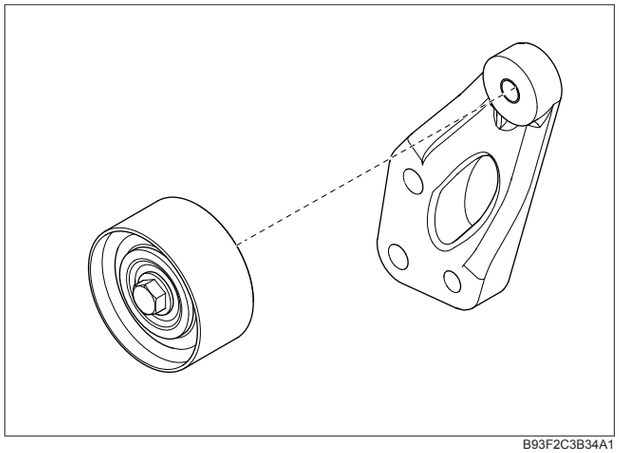
› The bolt-washer assembly of camshaft timing pulley is a disposable part.

9. Remove locking nut for fuel pump pulley, and remove fuel pump pulley



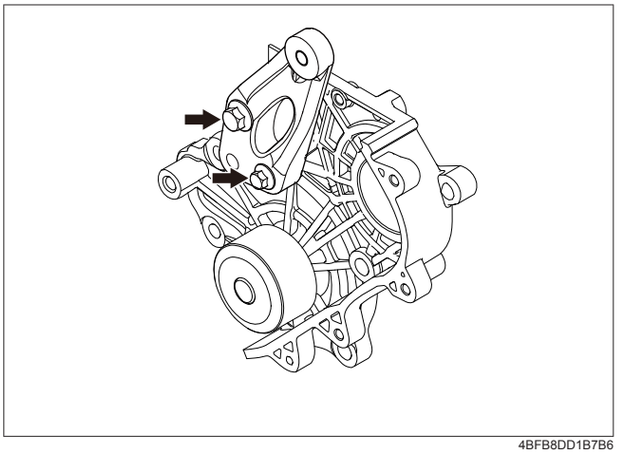
2BC78FC31BC2

10. Loosen bolt for large timing idler component, and remove large timing idler component



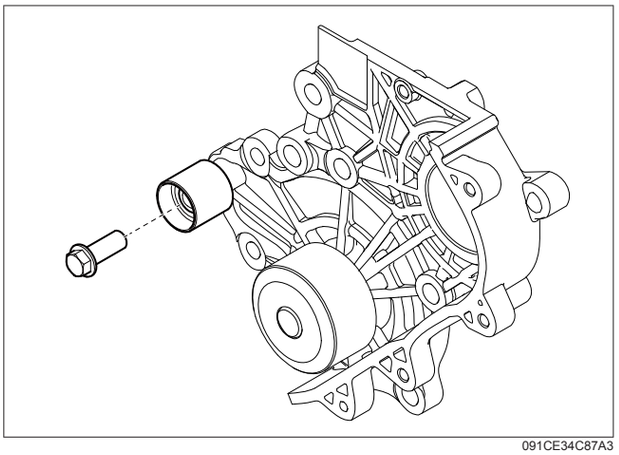
B93F2C3B34A1

11. Remove 2 bolts, and remove large timing idler bracket



4BFB8DD1B7B6

12. Remove timing idler bolt, and remove timing idler assembly



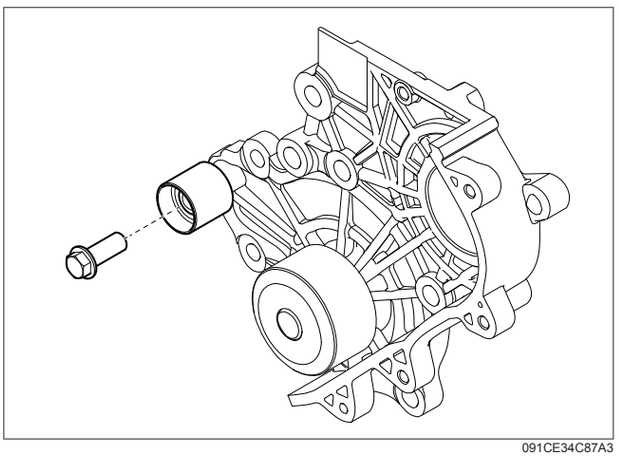
091CE34C87A3

Notice

› The timing idler bolt is a disposable part.

Installation

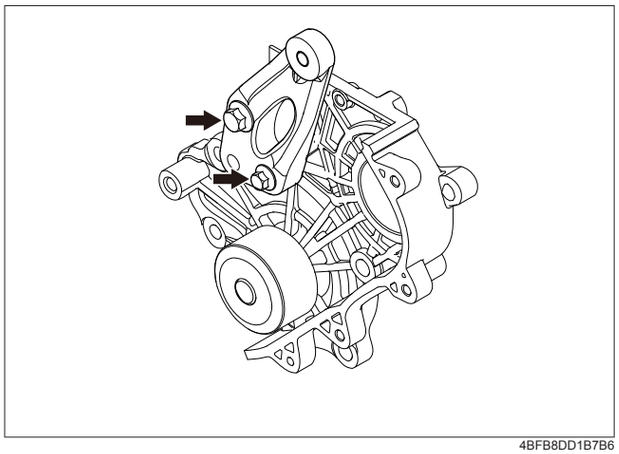
1. Install timing idler assembly, and tighten a new timing idler bolt



091CE34C87A3

Tightening torque: (27~36) N·m

2. Install large timing idler bracket, and tighten 2 bolts

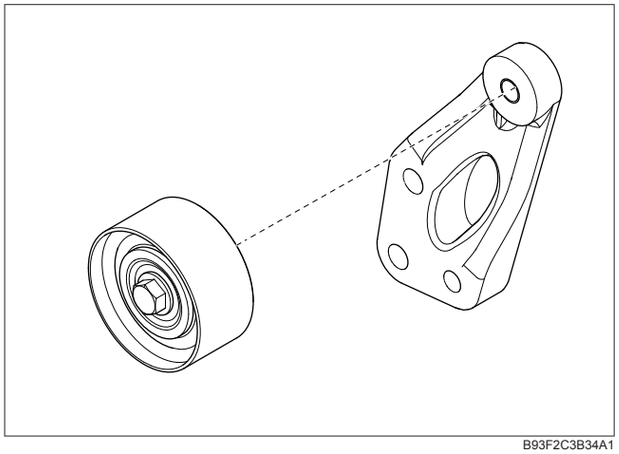


4BFB8DD1B7B6

Tightening torque of M8 bolt: (24±2) N·m

Tightening torque of M10 bolt: (45±2) N·m

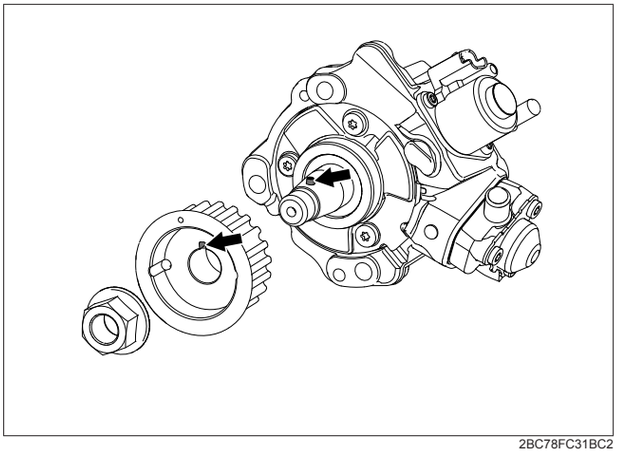
3. Install large timing idler component, and tighten the bolt for large timing idler component



B93F2C3B34A1

Tightening torque: (45±2) N·m

4. Align the positioning groove of fuel pump pulley with the Spiral spring pin and install it on the high-pressure fuel pump shaft

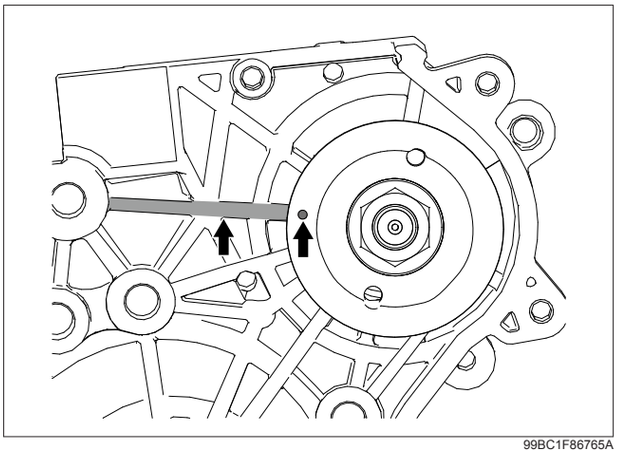


2BC78FC31BC2

5. Tighten the locking nut for fuel pump pulley

Tightening torque: (65±3) N·m

6. Align the single-point timing mark on the fuel pump pulley with the horizontal bar on the pump casing



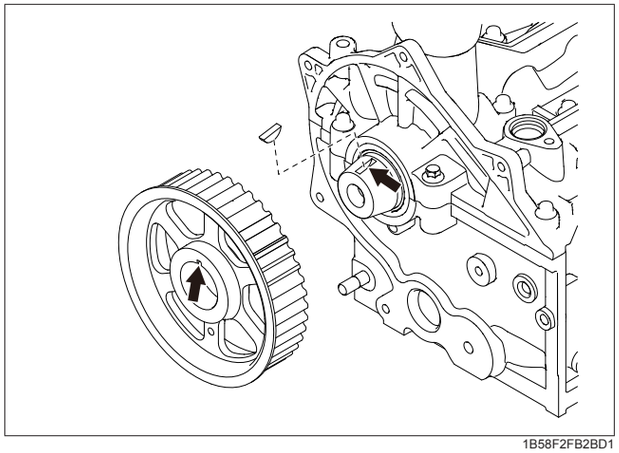
99BC1F86765A

7. Install woodruff key on the exhaust camshaft

Notice

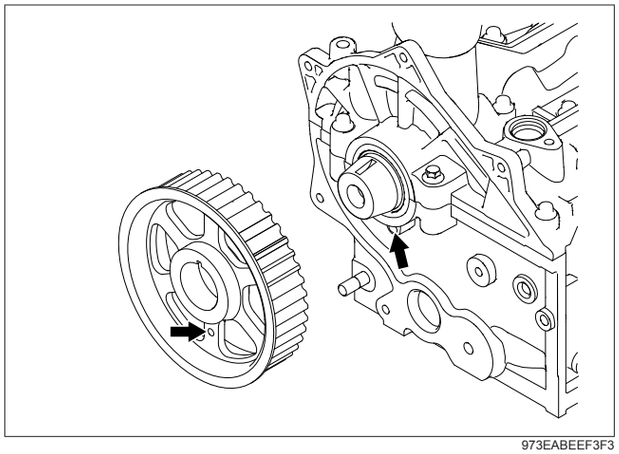
› The exposed top plane of the key shall be parallel to the edge of the keyway.

8. Align the positioning keyway of camshaft timing pulley to the woodruff key on the camshaft for installation



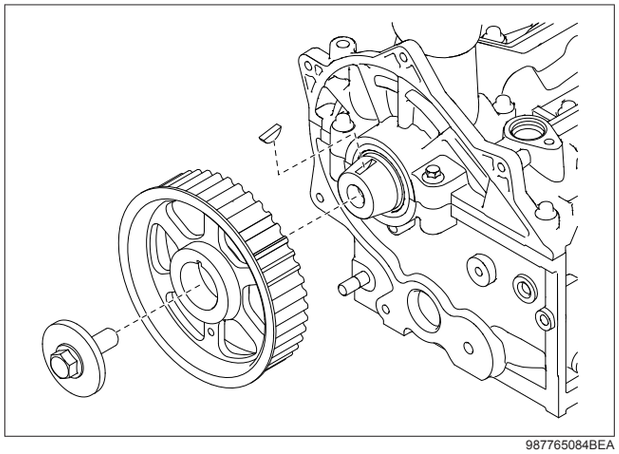
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9. Rotate the camshaft timing pulley, insert the positioning cylindrical pin into the positioning hole of the camshaft timing pulley and fix it in the positioning hole on the cylinder head



973EABEEF3F3

10. Tighten the new bolt-washer assembly of camshaft timing pulley



987765084BEA

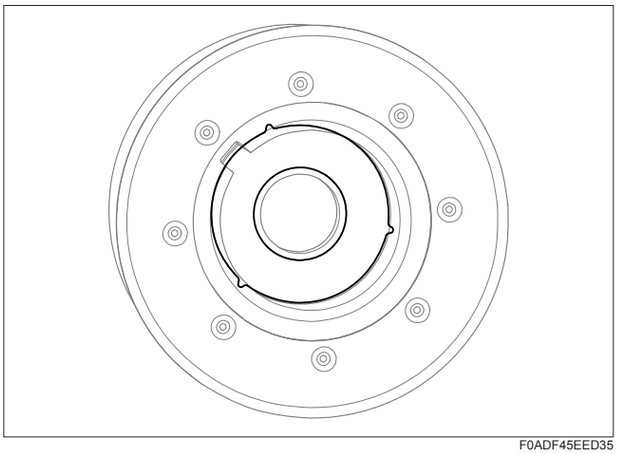
Tightening torque: (90±5) N·m

11. Install woodruff key on the crankshaft

Notice

› The exposed top plane of the key shall be parallel to the edge of the keyway.

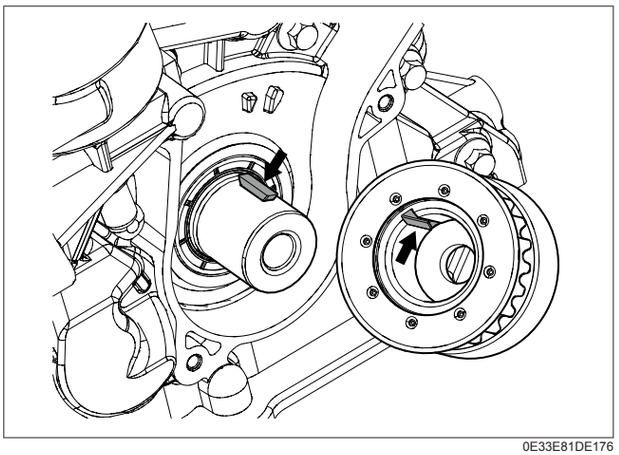
12. Install new crankshaft gasket into the timing pulley of crankshaft



F0ADF45EED35

Install crankshaft gasket in the groove of the timing pulley of crankshaft (the gasket dogs cannot be caught in the keyway), and ensure that they fit well. Dead folds are not allowed within the contact area between the gasket and end face of the crankshaft. Bend dog is not allowed in the contact area of the crankshaft, which is only allowed in the groove of the timing pulley.

13. Align the crankshaft timing pulley component to the woodruff key on the crankshaft and install it to the crankshaft, and turn the timing pulley of crankshaft by hand to make sure that it cannot rotate



0E33E81DE176

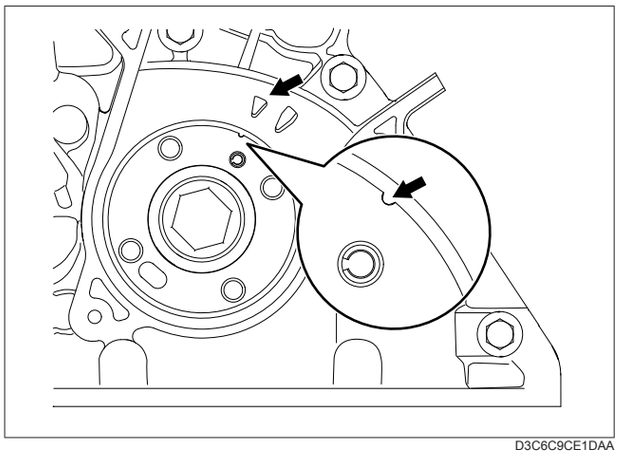
14. Tighten the crankshaft timing pulley bolt

    Tightening torque:

    Step 1: tighten 40 N·m

    Step 2: rotate 90° clockwise

15. Turn the crankshaft clockwise to align the notch mark of timing pulley of crankshaft with the small timing mark on the engine oil pump assembly

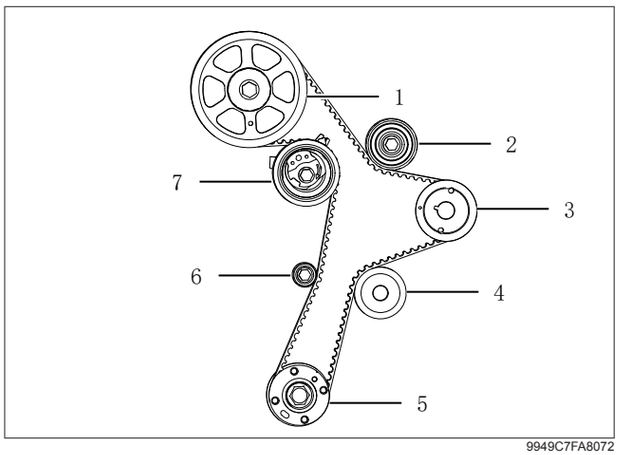


D3C6C9CE1DAA

⚠ Caution

- Do not turn the crankshaft counterclockwise (toward the front end of the engine).

16. Install timing belt, and make sure that all of the belt shall be firmly attached to the pulley without looseness except for the timing tension pulley



9949C7FA8072

In the diagram:

1- Camshaft timing pulley

2- Large timing idler assembly

3- Fuel pump pulley

4- Water pump belt pulley

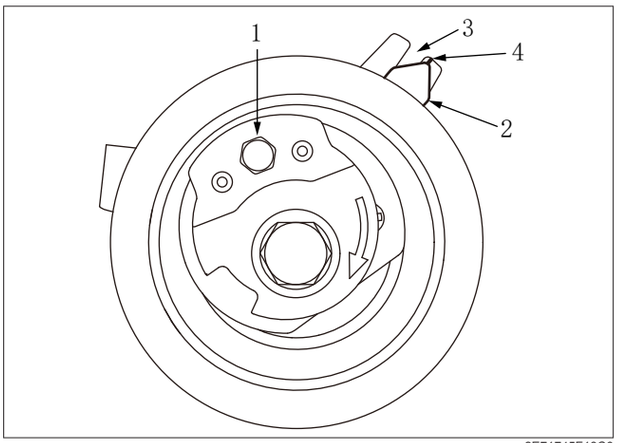
5- Timing pulley of crankshaft

6- Timing idler assembly

7- Timing tension pulley assembly

17. Snap the position limiter of the timing tension pulley into the bowl-type plug of cylinder head. Align the new fastening bolt of timing tension pulley with the corresponding threaded hole and screw in 2~3 threads

18. Adjust the mounting arm of tension pulley with a hexagon socket spanner until the Indicator of the tension pulley arm is aligned with the assembly mark (4° from the lower edge of the groove)



2E71745F18C6

In the diagram:

1- mounting arm of tension pulley

2- indicator

3- groove

4- assembly mark

19. Tighten the fastening bolt for timing tension pulley

    Tightening torque: (25±3) N·m

20. Remove locating pin of camshaft timing pulley

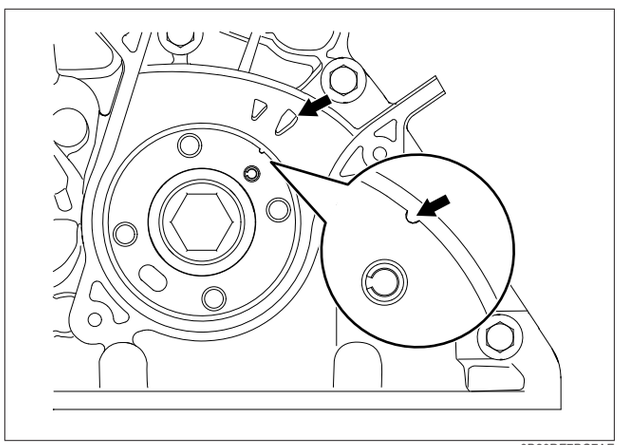
21. After removing the hexagon socket spanner, turn the crankshaft clockwise twice to check that the timing marks of camshaft timing pulley and fuel pump timing pulley are aligned with the corresponding timing marks, and the timing mark of timing pulley of crankshaft is aligned with the arrow on the oil pump housing. View straight the pointer position after the rotation is completed

    - If the indicator is within the range between the lower edge of the groove and the 4° scale, it is acceptable.
    - If it is not within the range specified, loosen the timing tension pulley fastening bolt, adjust the timing pulley to align it with the marked point. Repeat the assembly process from 14 to 20 until the timing tension pulley is assembled correctly.

⚠ Caution

- Do not turn the crankshaft counterclockwise (toward the front end of the engine).

22. Make sure that the notch mark of timing pulley of crankshaft is aligned with the large timing mark on the engine oil pump assembly

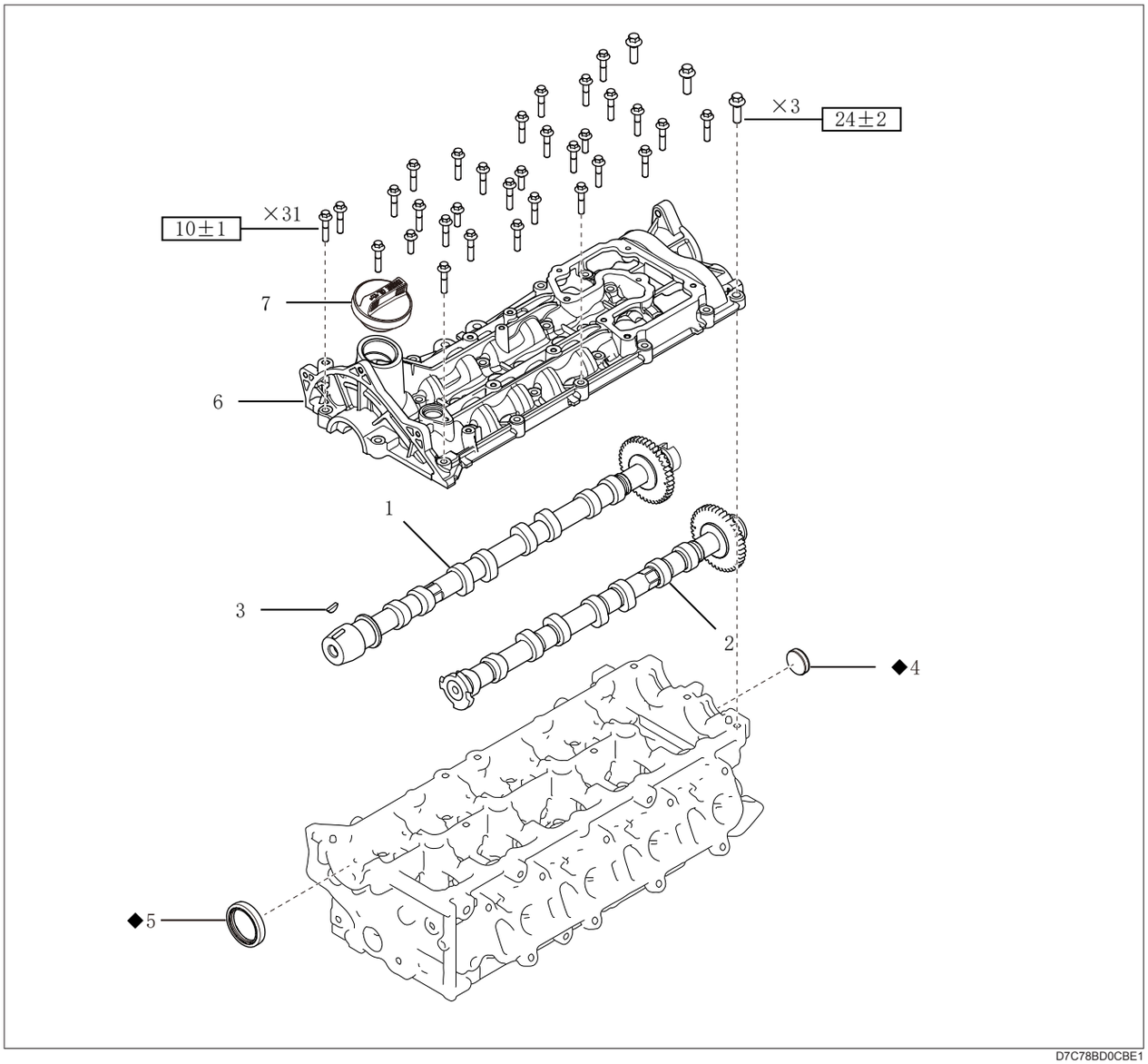


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23. Check that the timing marks of the camshaft timing pulley, fuel pump pulley and timing pulley of crankshaft are aligned
24. Install timing cover, upper timing cover assembly and lower timing cover assembly
25. Complete the rest installation in the reverse order of removal

Camshaft

Structural diagram



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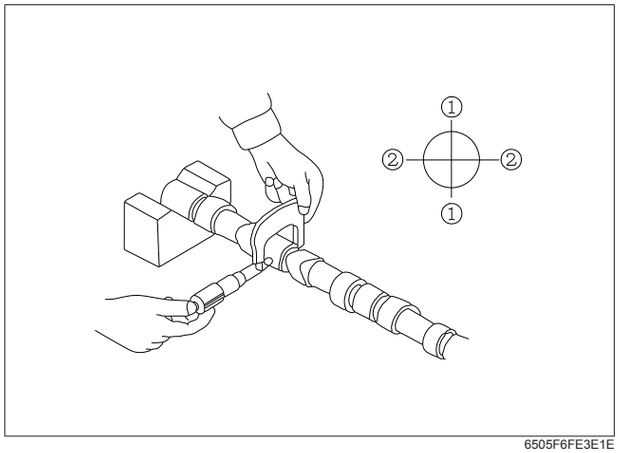
1. Exhaust camshaft assembly
2. Intake camshaft assembly
3. Woodruff key
4. Plug cover
5. Front oil seal of camshaft
6. Cylinder head cover
7. Fuel filler cap assembly

Check

Notice

› Excessively worn or damaged parts found in inspection shall be adjusted, repaired or replaced if necessary.

1. Check outer diameter of camshaft journal

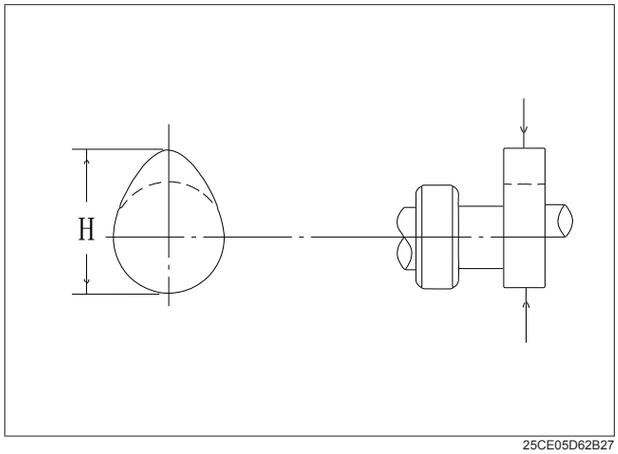


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Outer diameter of camshaft journal		Parameters (mm)
Intake camshaft assembly	Each camshaft journal	22.947 ～ 22.960
Exhaust camshaft assembly	The first journal	29.947 ～ 29.960
	Other camshaft journals	22.947 ～ 22.960

If measured value is less than the specified value, replace the camshaft.

2. Measure cam height H with a micrometer



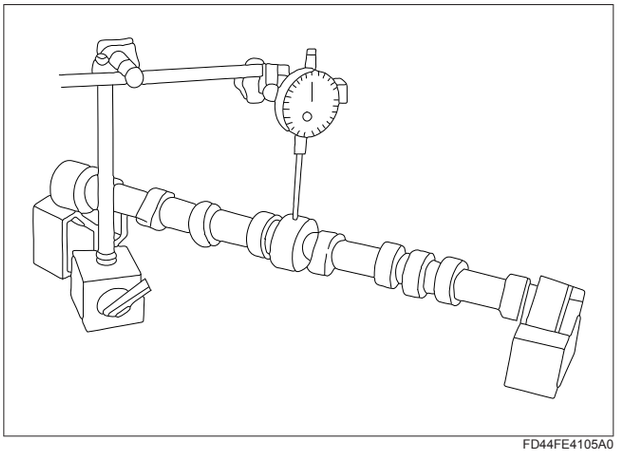
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Cam height	Parameters (mm)
Intake camshaft assembly	33.06～33.16
Exhaust camshaft assembly	33.31～33.41

If measured value is less than the specified value, replace the camshaft.

3. Set camshaft on V block

4. Measure radial run-out of camshaft journal with a micrometer gauge



FD44FE4105A0

Radial run-out of camshaft journal	Parameters (mm)
Intake camshaft assembly	≤0.025
Exhaust camshaft assembly	≤0.025

If measured value exceeds the specified value, replace the camshaft.

Camshaft axial clearance inspection

1. Install camshaft
2. While moving the camshaft back and forth, measure the axial clearance of the camshaft

   Intake side: (0.100~0.200) mm

   Exhaust side: (0.060~0.115) mm

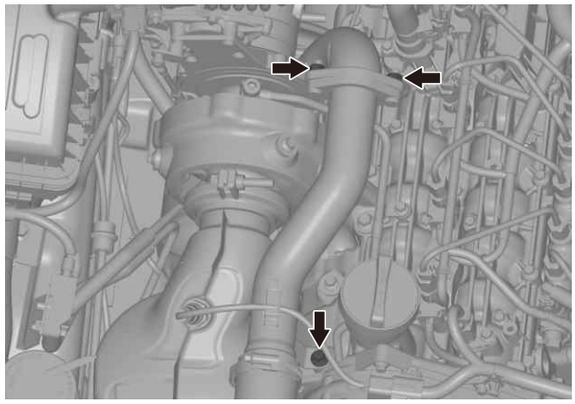
Notice

› If the axial clearance of camshaft is greater than the max. value, replace the camshaft. If necessary, replace the cylinder head cover and cylinder head as a complete set.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove 2 nuts and 1 bolt



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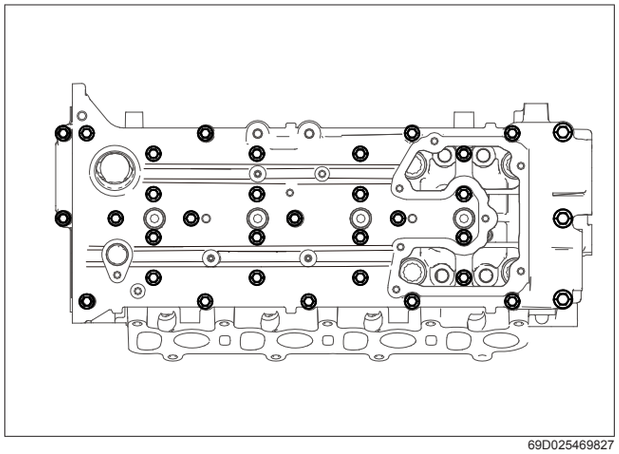
4. Remove intercooler intake pipe

Caution

› The disconnected pipelines and joints must be protected from entering debris.

5. Remove camshaft position sensor
6. Remove crankcase ventilation pipe and oil-gas separator assembly
7. Remove thermal shroud component of turbocharger
8. Remove turbocharger bracket components
9. Remove timing cover
10. Remove timing belt
11. Remove vacuum pump assembly
12. Remove camshaft timing pulley
13. Remove fuel injector and inlet/return pipeline

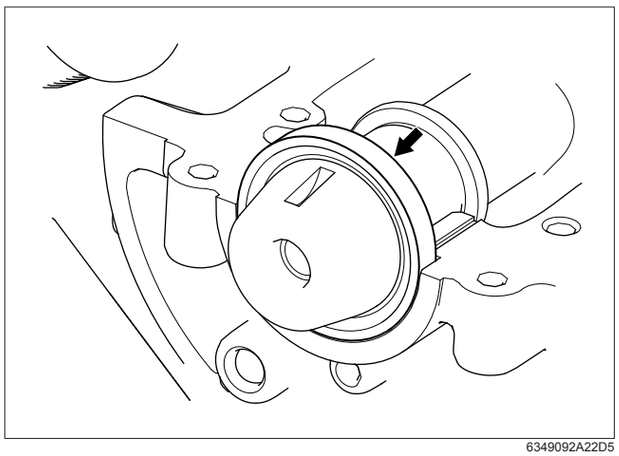
14. Remove 34 bolts in a sequence from two ends to the middle



69D025469827

15. Remove cylinder head cover

16. Remove camshaft front oil seal

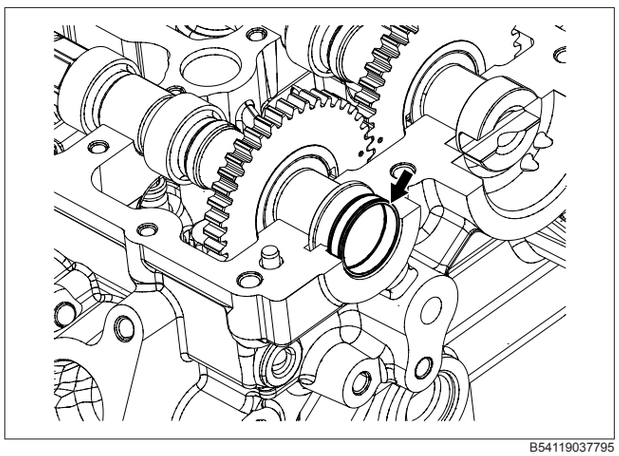


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Notice

› Oil seals are disposable parts.

17. Remove plug cover



B54119037795

Notice

› Plug covers are disposable parts.

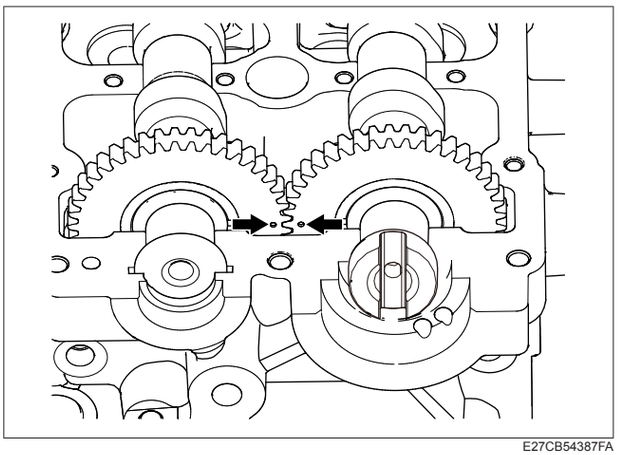
18. Remove intake camshaft assembly

19. Remove exhaust camshaft assembly

Installation

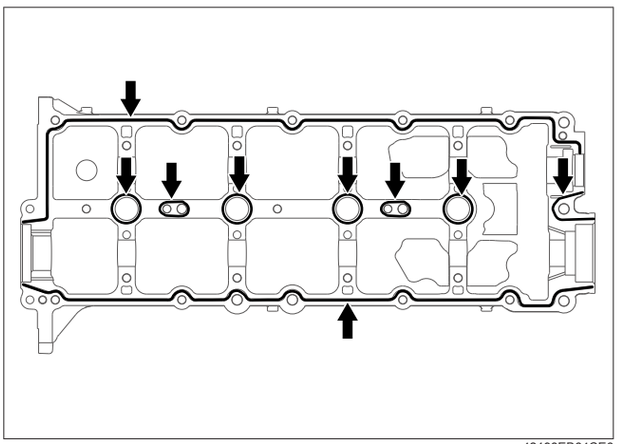
1. Before and after assembling camshaft, apply an appropriate amount of lubricant to camshaft journal, camshaft thrust location, cam location, camshaft gears, and bearing holes of intake and exhaust camshaft of cylinder head.

2. Install intake camshaft and exhaust camshaft to cylinder head with dot marks on intake and exhaust camshafts aligned, level with the top surface of cylinder head



E27CB54387FA

3. Apply sealant on underside of cylinder head cover



42198EB64CE6

1) Apply sealant on joint surface of underside of cylinder head cover and cylinder head

   Type: Loctite 5188 anaerobic plane sealant

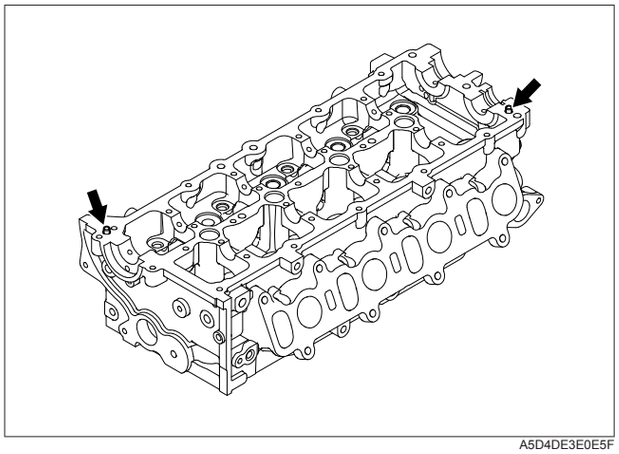
   Sealant line diameter: (2.0±2.4) mm

2) Apply sealant around injector hole and mounting hole of hold-down block bolt

   Type: Loctite 5188 anaerobic plane sealant

   Sealant line diameter: (1.7±2.1) mm

4. Install cylinder head cover corresponding to locating pin

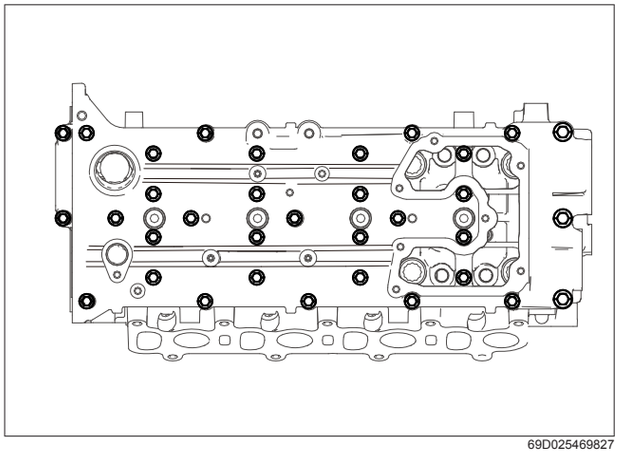


A5D4DE3E0E5F

⚠ Caution

› After cylinder head cover is installed in place, tighten the bolts immediately to prevent the rocker arm from coming out due to impact or shake.

5. Tighten the 34 bolts in a sequence from the middle to both ends



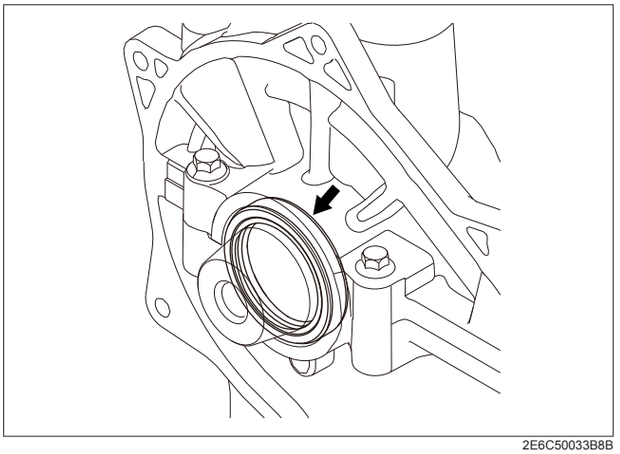
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   Tightening torque of M6 bolt: (10±1) N·m

   Tightening torque of M8 bolt: (24±2) N·m

6. Apply cleaning engine oil evenly on outer surface of front oil seal assembly of camshaft

7. Press fit new front oil seal of camshaft to cylinder head assembly



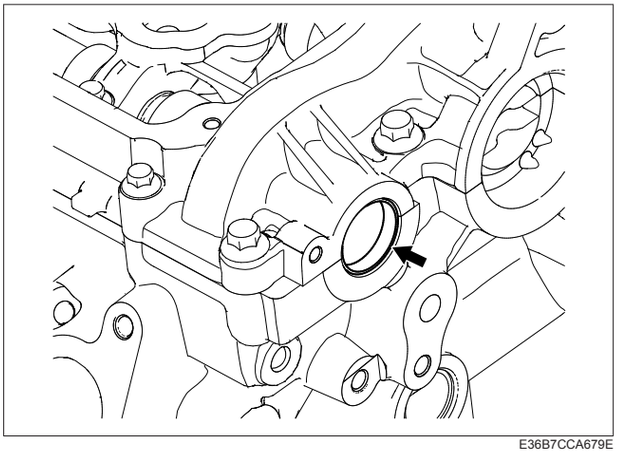
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   Press-fit depth of front oil seal of camshaft is (0~0.5) mm.

   Parallelism between front oil seal of camshaft and mounting surface is ≤ 0.4 mm.

8. Apply cleaning engine oil evenly on outer surface of new plug cover

9. Press fit plug cover to cylinder head and cylinder head cover



E36B7CCA679E

   Press-fit depth of plug cover is (0.6~0.9) mm.

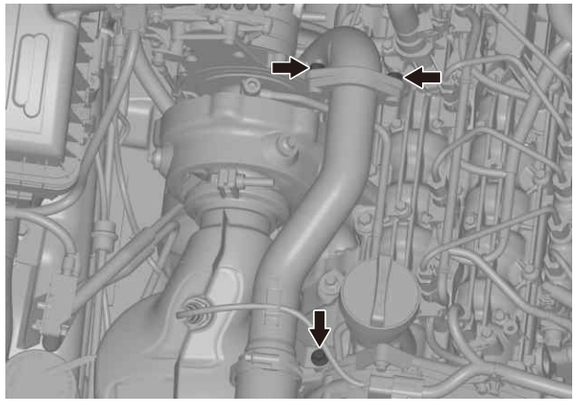
   Parallelism between plug cover and mounting surface is ≤ 0.4 mm.

10. Install fuel injector and inlet/return pipeline

11. Install vacuum pump

12. Install camshaft timing pulley

13. Install timing belt
14. Install timing cover
15. Install turbocharger bracket components
16. Install thermal shroud component of turbocharger
17. Install crankcase ventilation pipe and oil-gas separator
18. Install camshaft position sensor
19. Install intercooler intake pipe to proper position
20. Install 2 nuts and 1 bolt

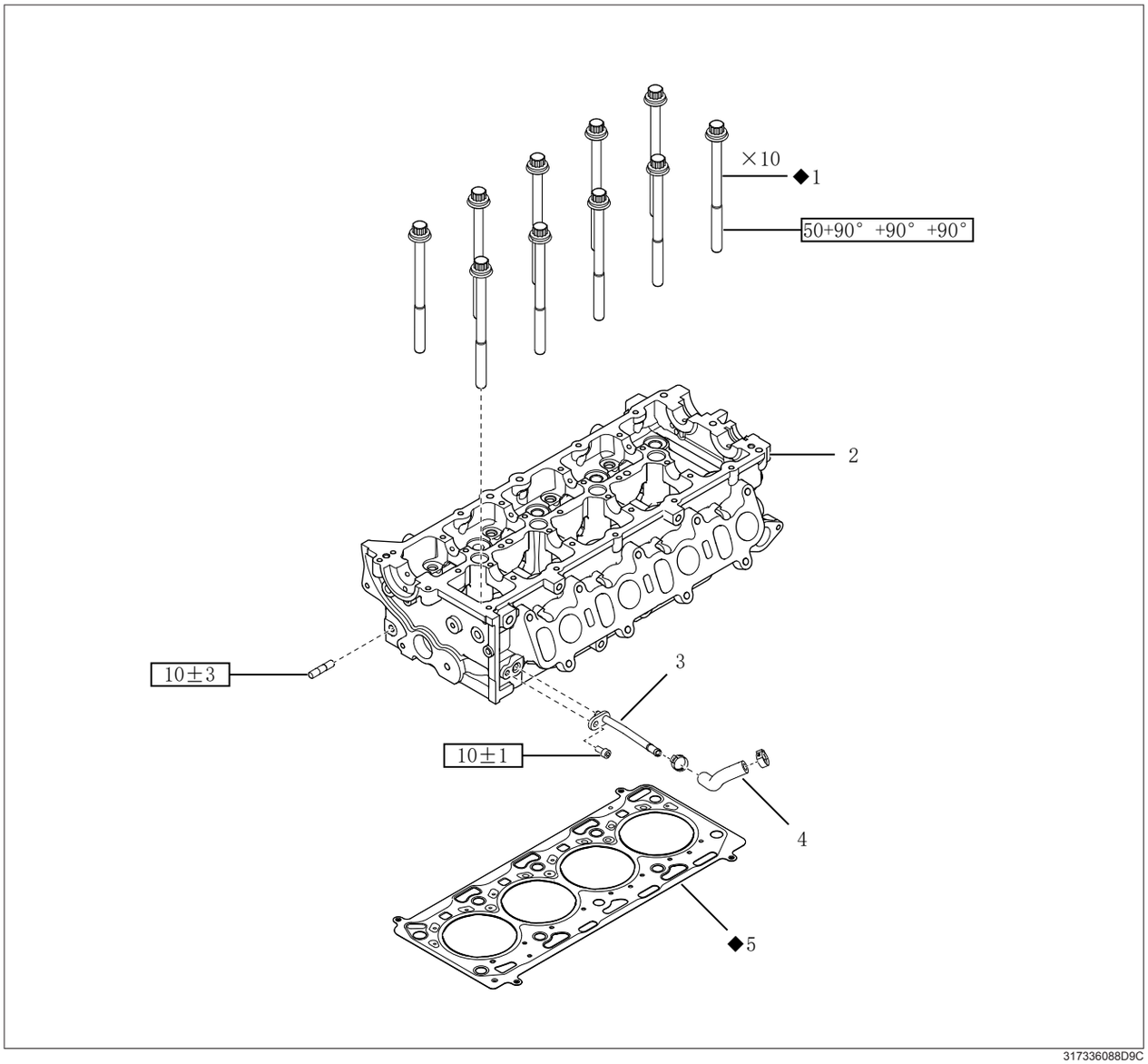


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21. Install negative terminal of the battery

Cylinder head

Structural diagram



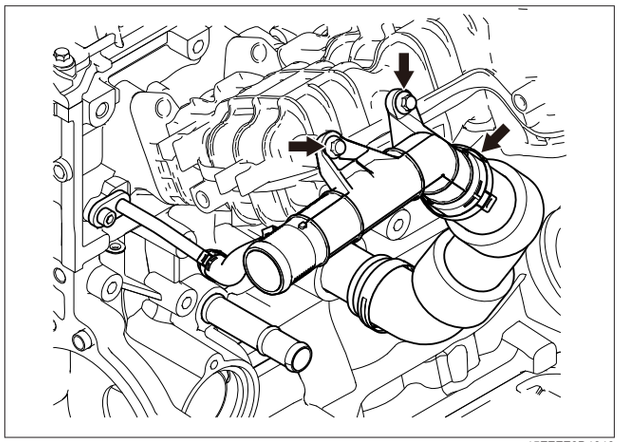
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1. Cylinder head bolt component
2. Cylinder head
3. Overflow pipe joint component
4. Connecting hose of overflow pipe
5. Cylinder head gasket

Removal/installation

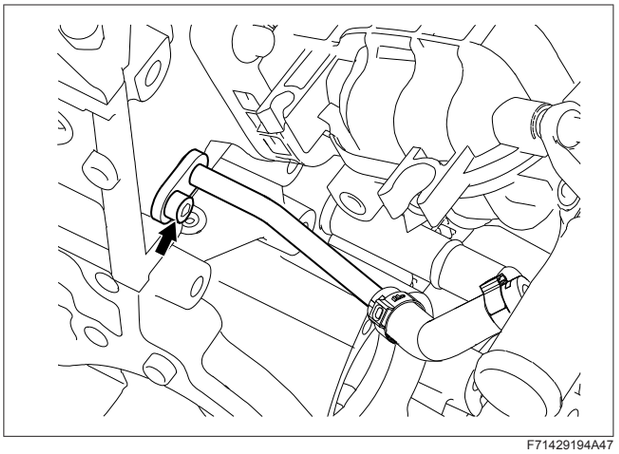
Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty engine coolant
4. Remove lean NOx trap
5. Remove diesel particulate filter
6. Remove electronic throttle
7. Remove connecting pipe for intake manifold
8. Remove the turbocharger assembly.
9. Remove exhaust manifold
10. Remove fuel rail assembly
11. Remove cylinder head cover
12. Remove timing gear
13. Remove camshaft assembly
14. Remove hydraulic lash adjuster and rocker arm
15. Remove preheater plug assembly
16. Remove 2 bolts and 1 clamp, and remove connecting pipe components of water outlet



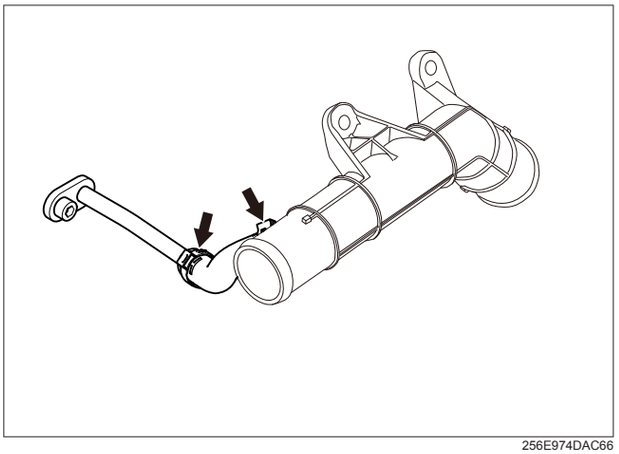
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17. Remove 1 bolt, and remove overflow pipe joint components



F71429194A47

18. Remove intake manifold
19. Remove EGR assembly
20. Disconnect connecting hose for overflow pipe

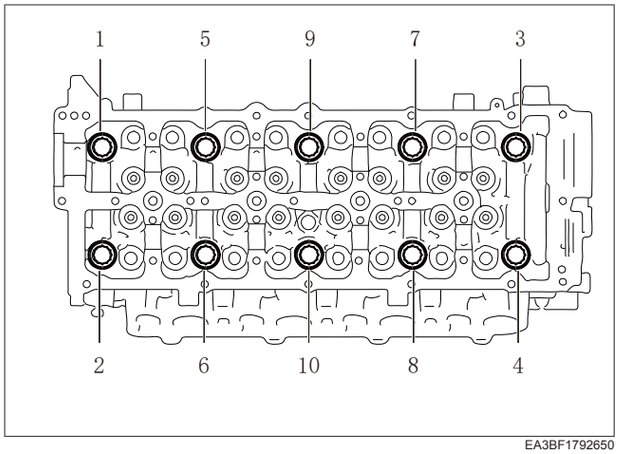


256E974DAC66

⚠ Caution

› After removal, the overflow pipe joint component shall be placed horizontally or upwards to ensure that the O-ring seal does not fall off.

21. Remove 10 cylinder head bolts in the order shown in the figure



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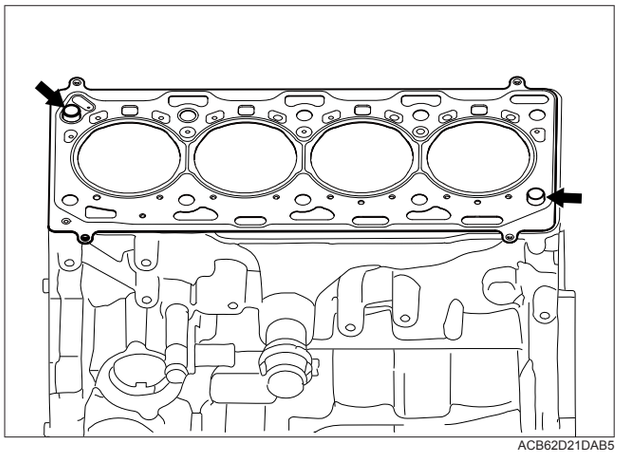
Notice

› Do not remove it when warming up the car to avoid deforming of the cylinder head.

› Failure to remove cylinder head bolts in the correct order may cause warping or breaking of cylinder head.

› Cylinder head bolts are disposable parts.

22. Remove cylinder head gasket



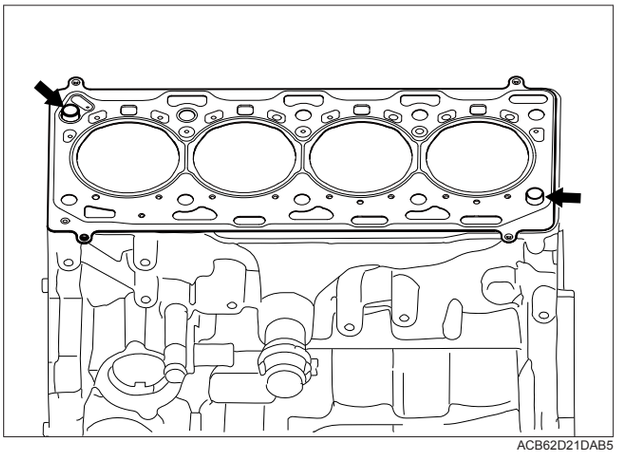
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Notice

› Cylinder head gasket is a disposable part.

Installation

1. Check fitting surface of cylinder head for leakage, corrosion and blow-by gas. If any, determine the cause
   - › Installation sequence of cylinder head bolts incorrect.
   - › Loose or warped cylinder head.
   - › Insufficient tightening torque of cylinder head bolt.
   - › Warped surface of cylinder block.
2. Clean the joint face of cylinder head and cylinder block
3. Install a new cylinder head gasket corresponding to alignment sleeve



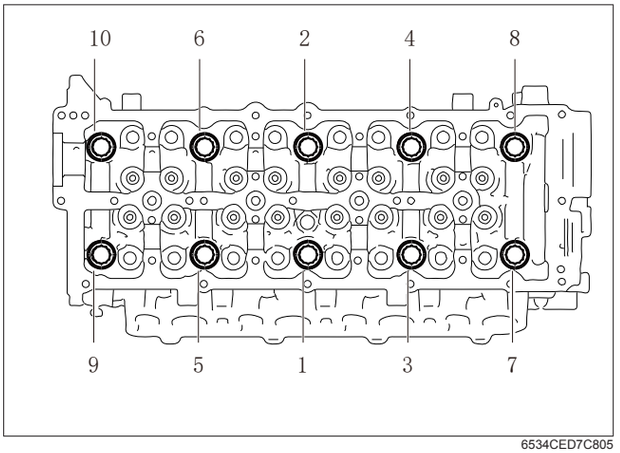
ACB62D21DAB5

4. After installation, check that the cylinder head gasket is positioned in correct directions
5. Adjust the height of piston so that the piston is about half of the stroke from top dead center

Caution

› Do not turn the crankshaft counterclockwise (toward the front end of the engine).

6. Install cylinder head corresponding to alignment sleeve
7. Loosen 10 cylinder head bolts in four steps in the order shown in the figure



6534CED7C805

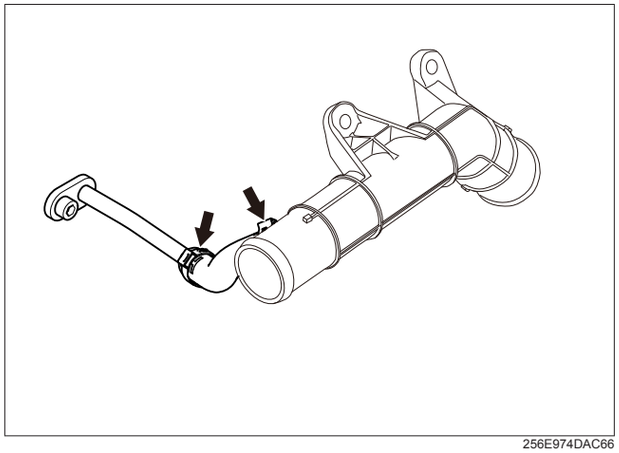
Step 1: pre-tightening torque 50 N·m

Step 2: Turn by 90°.

Step 3: turn 90°

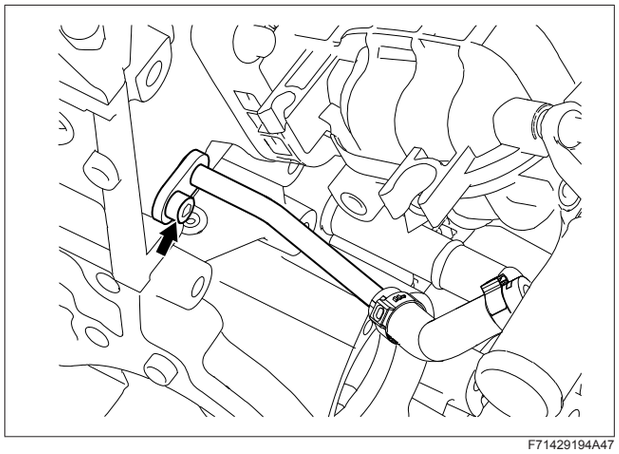
Step 4: turn 90°

8. Install EGR assembly
9. Install intake manifold assembly
10. Connect connecting hose of overflow pipe



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11. Install overflow pipe joint components, and tighten 1 bolt



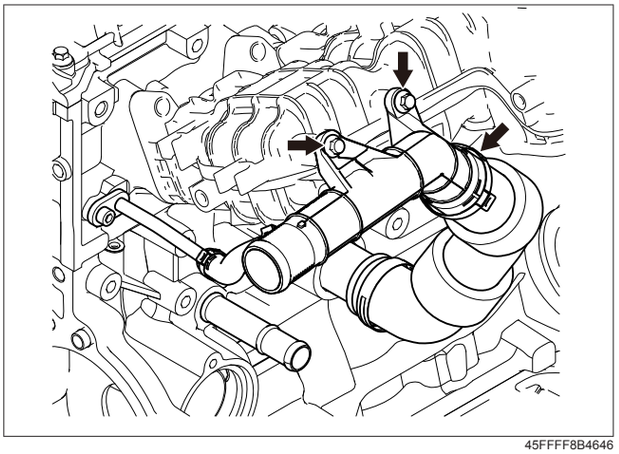
F71429194A47

Tightening torque: (10±1) N·m

⚠ Caution

› Check to ensure that the O-ring seal of overflow pipe joint component does not fall off before assembling.

12. Install connecting pipe components of water outlet, and tighten 2 bolts and 1 clamp



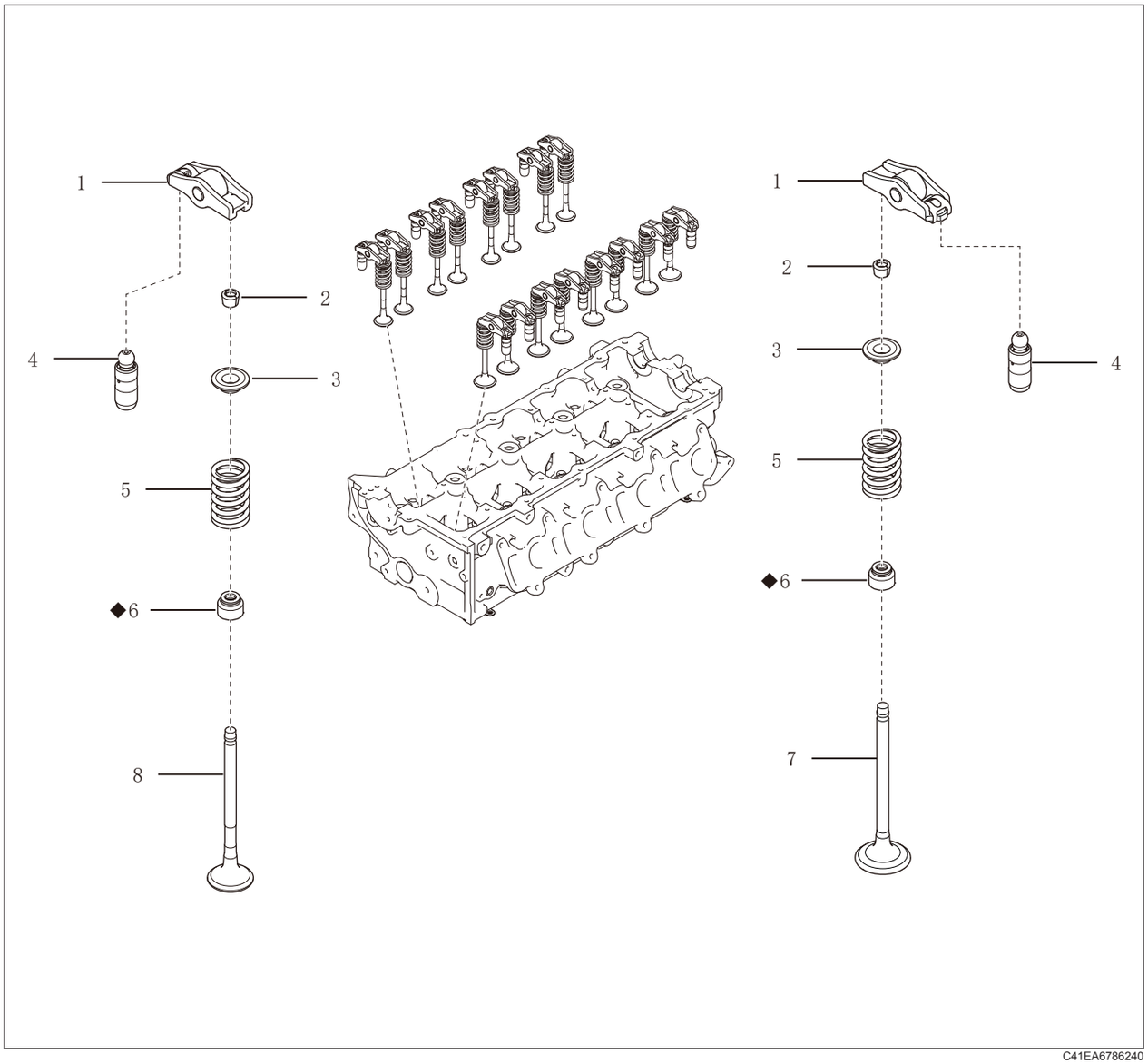
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Tightening torque: (10±1) N·m

13. Install preheater plug assembly
14. Install hydraulic lash adjuster and rocker arm
15. Install camshaft assembly
16. Install timing gear
17. Install cylinder head cover
18. Install fuel rail assembly
19. Install exhaust manifold
20. Install turbocharger assembly
21. Install connecting pipe for intake manifold
22. Install electronic throttle
23. Install diesel particulate filter
24. Install lean NOx trap
25. Install negative terminal of the battery
26. Add engine coolant

Valve mechanism

Structural diagram

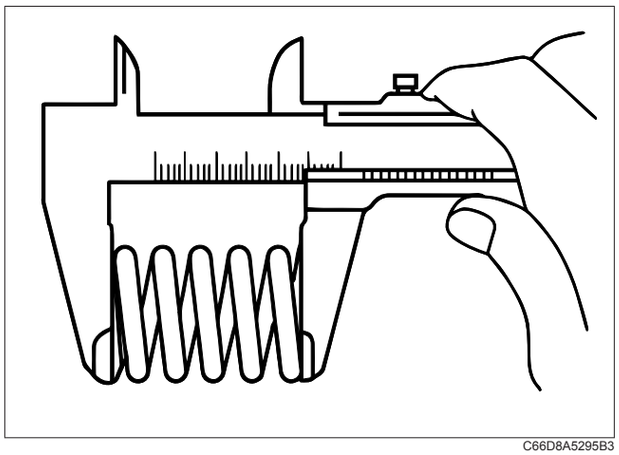


C41EA6786240

1. Rocker arm
2. Valve locking clamp
3. Valve spring seat
4. Hydraulic lash adjuster
5. Valve spring
6. Valve oil seal assembly
7. Intake valve
8. Exhaust valve

Valve spring inspection

1. Measure free height of valve spring

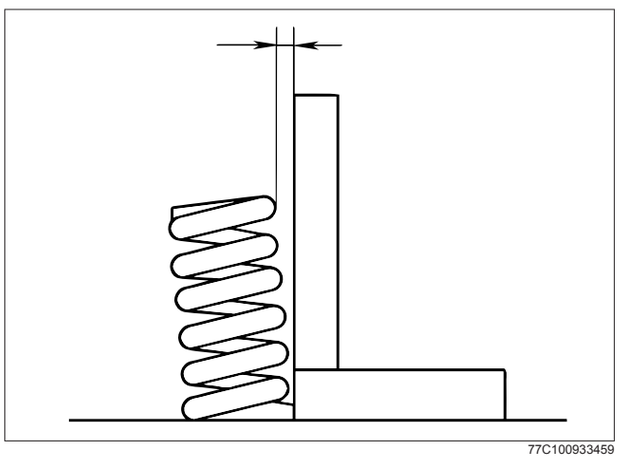


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Free height of valve spring	Parameters (mm)
Standard value	43.6±1

When the height is smaller than specified value, replace the spring.

2. Measure verticality of valve spring

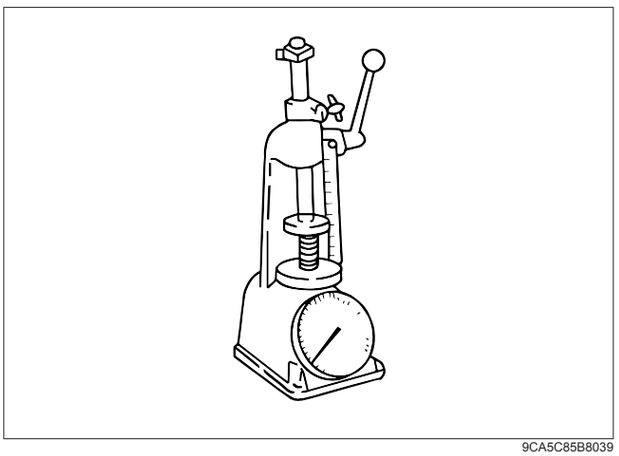


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Verticality of valve spring	Parameters (mm)
Standard value	1.3

If measured value exceeds the specified value, replace valve spring.

3. Compress the spring to mounting height and working height with a spring tester, and measure the compression spring tension



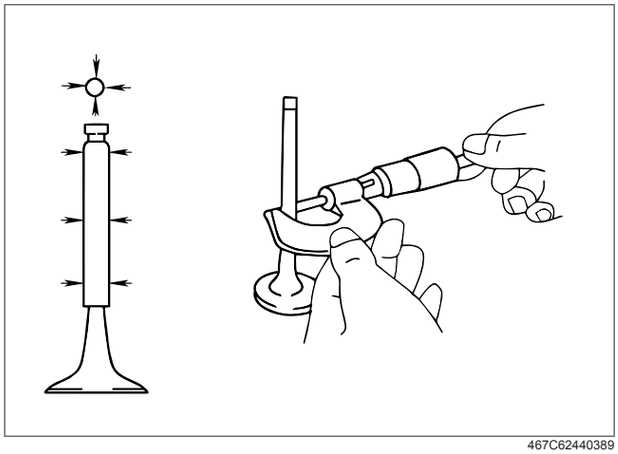
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Valve spring tension	Parameter (N)
Mounting height (31.2 mm)	194±11
Working height (22.65 mm)	344±15

If measured tension is lower than the specified value, replace valve spring.

Check of valve and valve conduit

1. Measure outer diameter of valve rod with a micrometer



467C62440389

Outer diameter of valve rod	Parameters (mm)
Intake valve	5.960～5.975
Exhaust valve	5.945～5.960

If the outer diameter of valve rod is less than the specified value, replace the valves in pairs.

2. Measure inner diameter of valve conduit with a micrometer

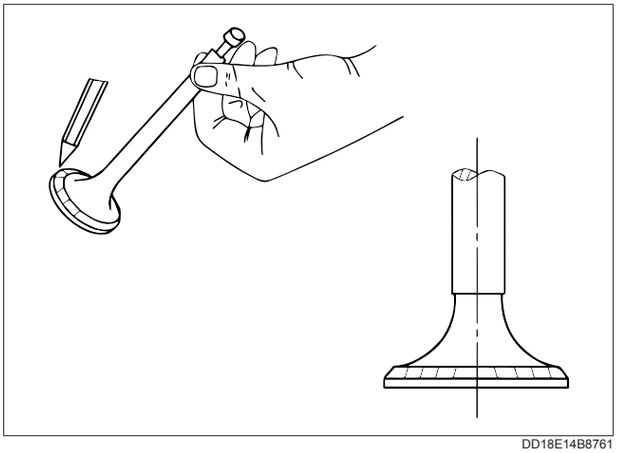
Inner diameter of valve conduit	Parameters (mm)
Valve conduit	6.000～6.015

3. Subtract the measured inner diameter of valve conduit from the measured outer diameter of valve rod

Clearance of valve conduit	Parameters (mm)
Intake side	0.025～0.055
Exhaust side	0.040～0.070

If the subtraction value exceeds the specified value, replace the valve and, if necessary, replace cylinder head.

4. Draw 8 to 12 pencil lines evenly along circumference on tapered surface of the valve head



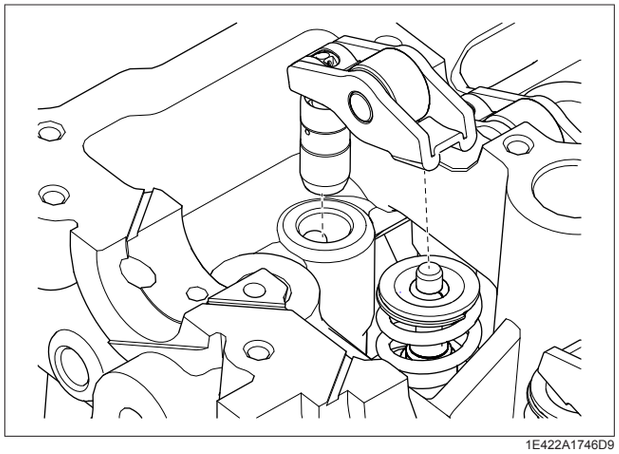
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5. Reinstall the valve, and tap the valve seat a few times (note that the valve cannot be rotated). If all the pencil lines are interrupted on the circle, it indicates good valve tightness.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty engine coolant
4. Remove radiator fan
5. Remove generator belt
6. Remove timing cover
7. Remove timing belt
8. Remove high-temperature sensor
9. Remove camshaft phase sensor
10. Remove cylinder head cover
11. Remove fuel injector
12. Remove high-pressure fuel rail
13. Remove vacuum pump
14. Remove camshaft
15. Remove preheater plug
16. Remove starter
17. Remove EGR assembly
18. Remove vacuum switching valve
19. Remove intake manifold
20. Remove turbocharger
21. Remove exhaust manifold
22. Remove intake and exhaust camshaft assembly
23. Remove 16 hydraulic lash adjusters and rocker arms

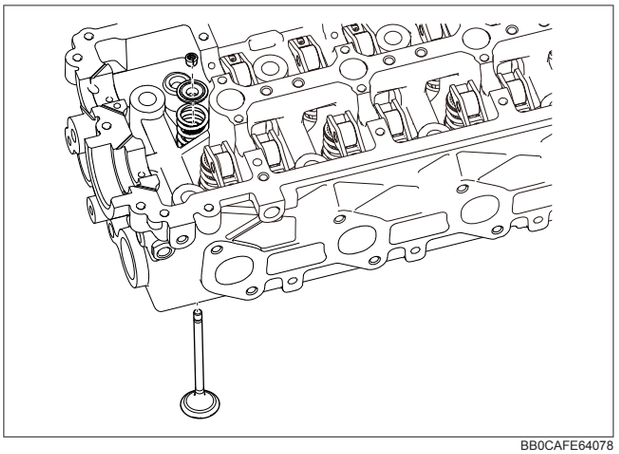


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Notice

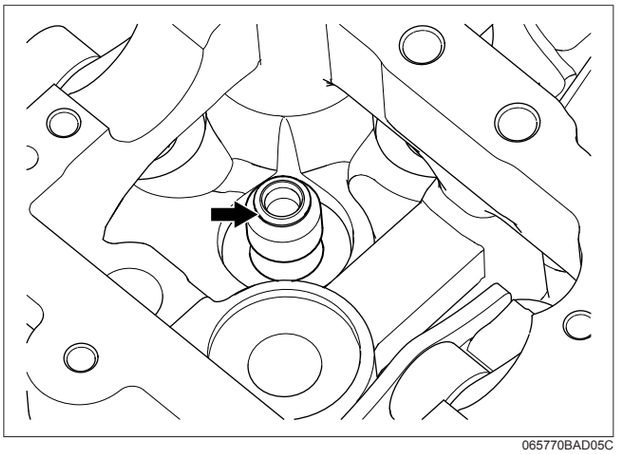
› If stable rotation of hydraulic lash adjuster and rocker arm cannot be achieved, replace the hydraulic lash adjuster and rocker arm.

24. Place the removed rocker arm and hydraulic lash adjuster in order, so as to install them in original order
25. Remove cylinder head assembly
26. Compress valve spring and remove valve locking clamp
27. Remove valve spring seat and valve spring



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28. Remove valve from the bottom of cylinder head
29. Place the removed valves according to the cylinder number
30. Remove valve oil seal assembly



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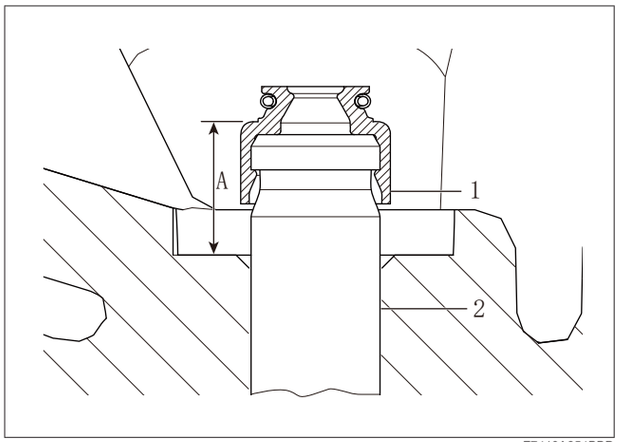
Caution

› Oil seals are disposable parts.

› Do not remove it if not necessary.

Installation

1. Wet new valve oil seal assembly with engine oil
2. Use a special tool to press the valve oil seal assembly into the valve conduit head



F7418A254BBD

In the diagram:

1 - Valve oil seal assembly

2 - Valve conduit

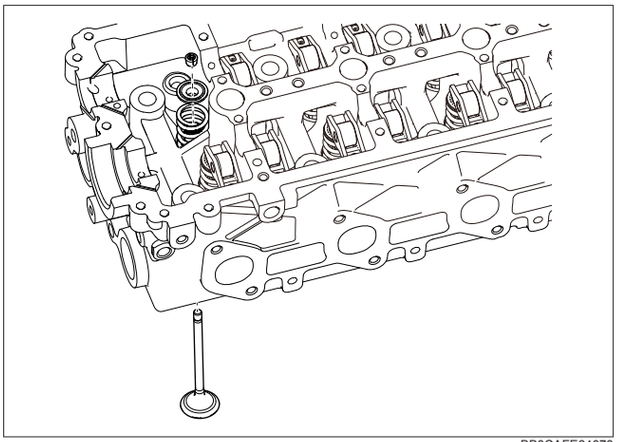
After the valve oil seal is installed, height A (schematic dimension A) from the shoulder of valve oil seal to the valve spring seat should be (14.4±0.5) mm

3. Dip engine oil on the end face of the intake and exhaust valve rods as well as on the rod surface not less than 60 mm from the rod end
4. Install valve

Notice

› Intake valve head is larger than exhaust valve head.

5. Install valve spring and the valve spring seat



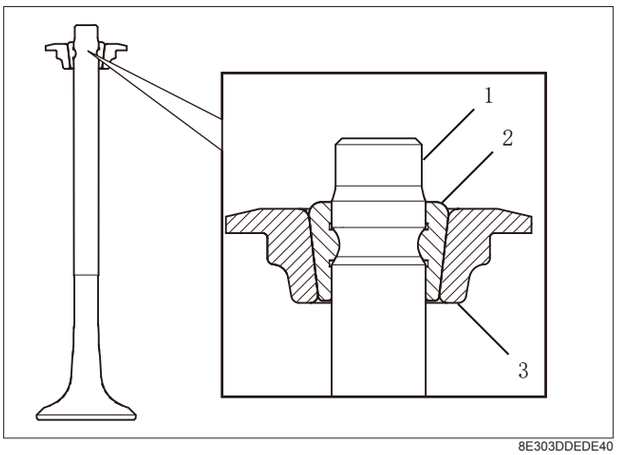
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Notice

› The original parts shall be installed in their original positions based on the original combination.

› The valve spring shall contact the plane of the upper positioning pole of the cylinder head, not allowed to be stuck in the pole surface.

6. Compress valve spring to install valve locking clamp into the valve spring seat



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In the diagram:

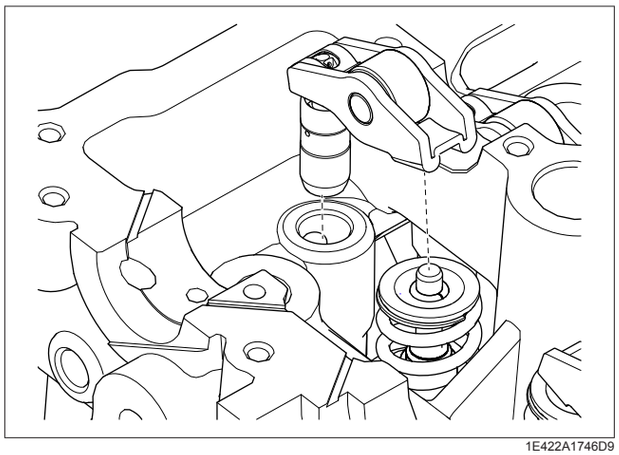
1 - Valve rod

2 - Valve locking clamp

3 - Valve spring seat

7. Install cylinder head assembly
8. Apply an appropriate amount of lubricant to the spherical head of hydraulic lash adjuster
9. Snap the hydraulic lash adjuster into the clip at the rear of rocker arm

10. After applying lubricant on the surface of rocker arm and hydraulic lash adjuster, sequentially install them as a whole into the corresponding holes of cylinder head with the other end of rocker arm resting on the valve

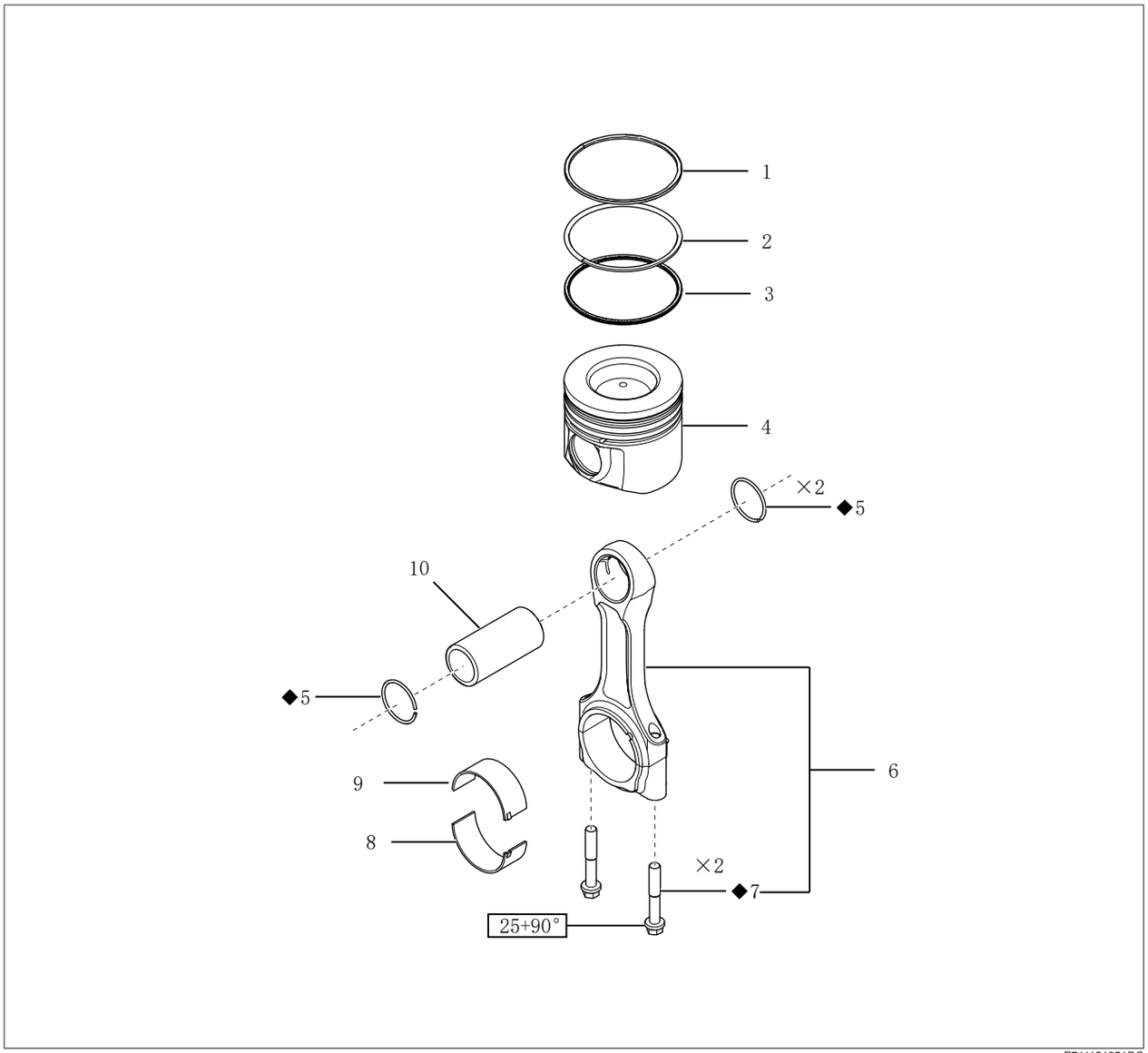


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11. Install intake and exhaust camshaft assembly
12. Install exhaust manifold
13. Install turbocharger
14. Install intake manifold
15. Install vacuum switching valve
16. Install EGR assembly
17. Install starter
18. Install preheater plug
19. Install camshaft
20. Install vacuum pump
21. Install high-pressure fuel rail
22. Install fuel injector
23. Install cylinder head cover
24. Install camshaft phase sensor
25. Install high-temperature sensor
26. Install timing belt
27. Install timing cover
28. Install generator belt
29. Install radiator fan
30. Install negative terminal of the battery
31. Add engine coolant

Piston link (6MT)

structural diagram

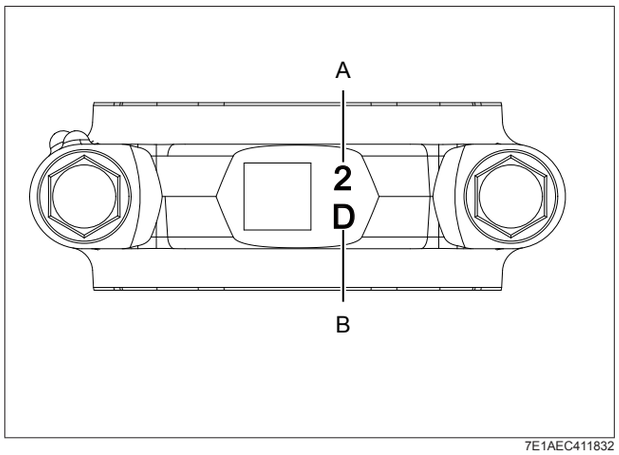


E711151351DC

1. Top compression ring
2. Second compression ring
3. Oil ring components
4. Piston component
5. Circlip
6. Link assembly
7. Link bolt
8. Lower link bearing
9. Upper link bearing
10. Piston pin

Link bearing matching

1. Verify link big-end hole diameter grouping



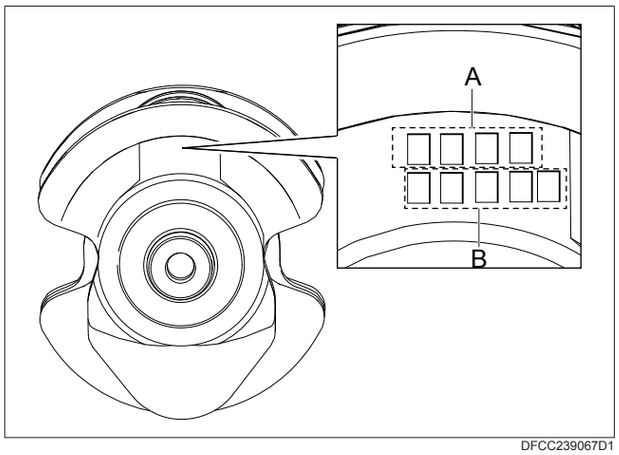
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In the diagram:

Mark A: group number mark of big-end hole diameter

Group number mark	Parameters (mm)
1	φ53.000～φ53.006
2	＞ φ53.006～φ53.012
3	＞ φ53.012～φ53.018

2. Confirm groups of link journal diameter of crankshaft



DFCC239067D1

In the diagram:

Mark A: the first to fourth group number marks of link journals is from left to right in sequence

Group number mark	Parameters (mm)
1	＞ φ50.020～φ50.026
2	＞ φ50.014～φ50.020
3	φ50.008～φ50.014

3. Check thickness grouping of link bearings

Group number mark	Parameters (mm)
1	1.473～1.477
2	＞ 1.477～1.481
3	＞ 1.481～1.485

Notice

› The grouping marks of link bearings are located at the lips of steel back, marked as 1, 2, and 3.

4. Link bearing matching

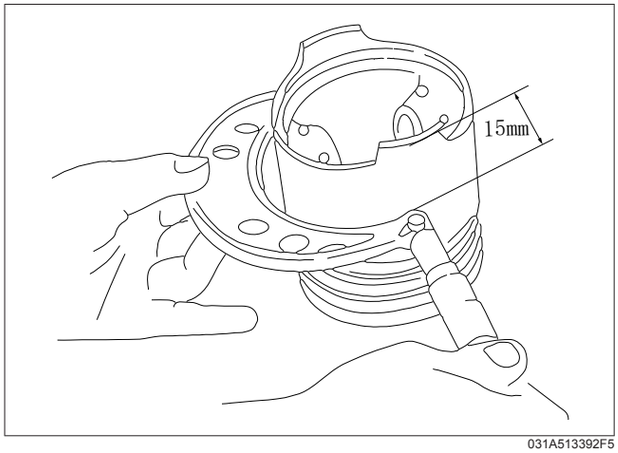
Group No. of bottom end aperture of link + group No. of crankshaft link journal	Link bearing group No.	Clearance parameters (mm)
＝ 2～3	Yellow/1	0.020～0.046
＝ 4	Colorless/2	0.024～0.044
＝ 5～6	Blue/3	0.022～0.048

Notice

› The grouping mark numbers of link bearings are located at the lips of steel back, marked as 1, 2, and 3.

Piston link inspection

1. Check outer diameter of piston

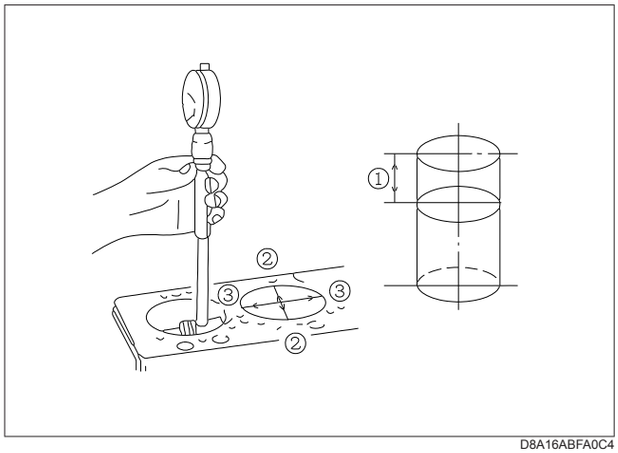


031A513392F5

Item	Parameters (mm)
Size of piston skirt	83.054～83.090

2. Check cylinder bore diameter

   Measure the cylinder bore at the measurement point ① (height 20 mm) along the thrust direction ②-② and axial direction of crankshaft ③-③ with an micrometer gauge for inner diameter.



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Item	Parameters (mm)
Cylinder bore diameter	83.10～83.11

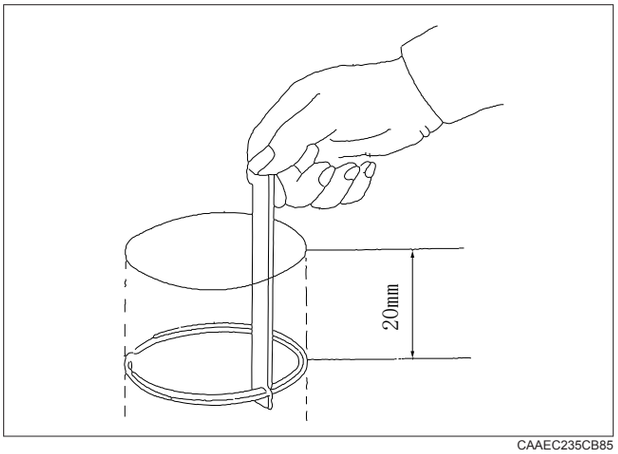
3. Calculate auxiliary cylinder clearance

   Calculate auxiliary cylinder clearance by subtracting piston diameter from cylinder bore diameter

Item	Parameters (mm)
Auxiliary cylinder clearance	0.010～0.056

4. Check opening clearance of piston ring

   Put the piston ring into the cylinder, and measure its opening clearance with a feeler gauge.

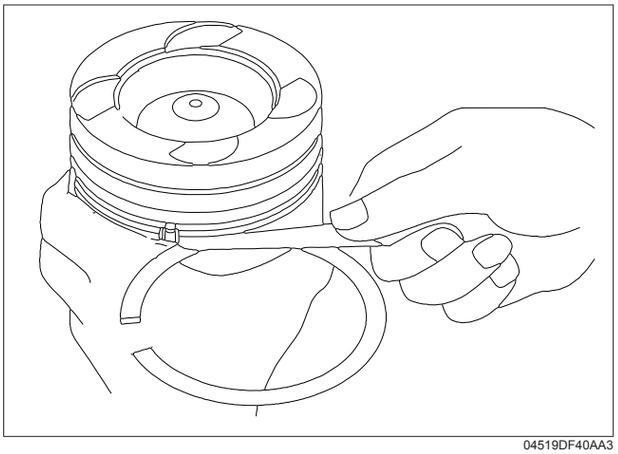


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Opening clearance of piston ring	Parameters (mm)
Top compression ring	0.20～0.35
Second compression ring	0.65～0.85

5. Axial clearance of piston ring and piston ring groove

   Measure axial clearance between piston ring and piston ring groove with a feeler gauge.

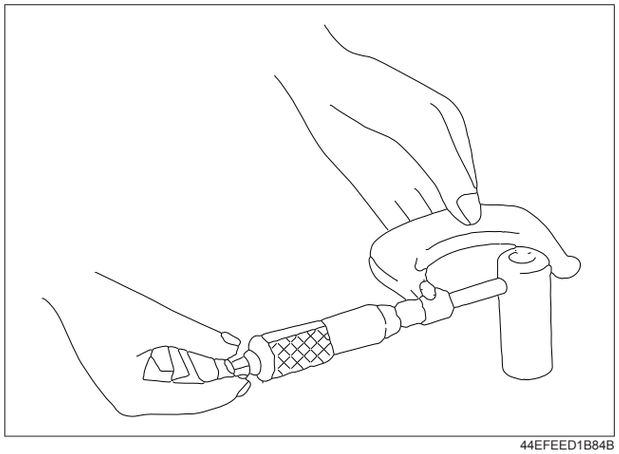


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Axial clearance of piston ring	Parameters (mm)
Top compression ring	0.100～0.140
Second compression ring	0.055～0.100
Oil ring	0.030～0.070

6. Check outer diameter of piston pin

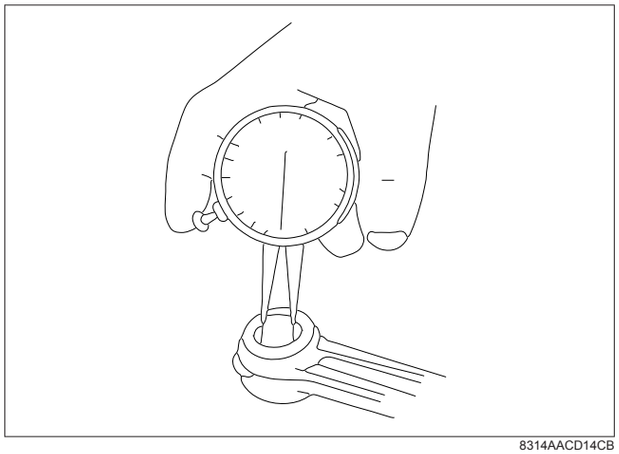
   Use a screw micrometer to measure the outer diameter of piston pin in two directions at three different positions.



44EFEED1B84B

Item	Parameters (mm)
Outer diameter of piston pin	32.007～32.010

7. Measure the inner diameter of the small-end hole of link with an inner diameter gauge



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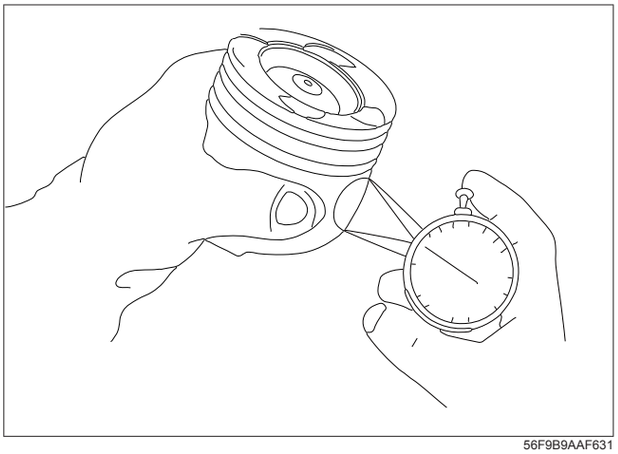
Item	Parameters (mm)
Inner diameter of small-end hole of link	32.020～32.031

8. Check clearance between small-end hole of link and piston pin

   Subtract the piston pin diameter from the diameter of small-end hole of link.

Item	Parameters (mm)
Clearance between small-end hole of link and piston pin	0.010～0.024

9. Measure inner diameter of piston pin seat hole with an inner diameter gauge



56F9B9AAF631

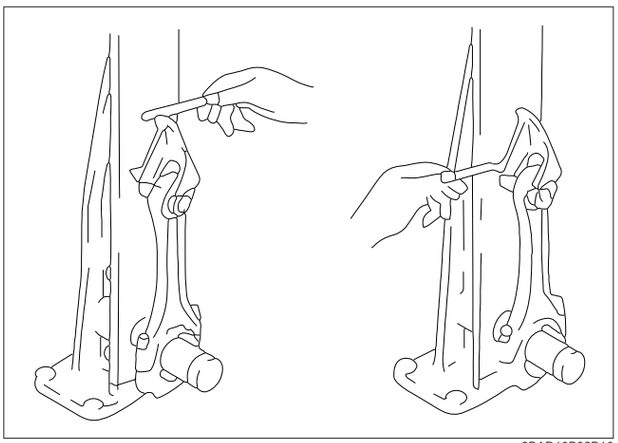
Item	Parameters (mm)
Inner diameter of piston pin seat hole	32.013～32.018

10. Check the clearance between piston pin and piston pin seat hole

    Subtract the piston pin diameter from the diameter of the piston pin seat bore.

Item	Parameters (mm)
Clearance between piston pin and piston pin seat hole	0.003～0.011

11. Check for error of axis lines of big-end and small-end holes



2BAD16B32B16

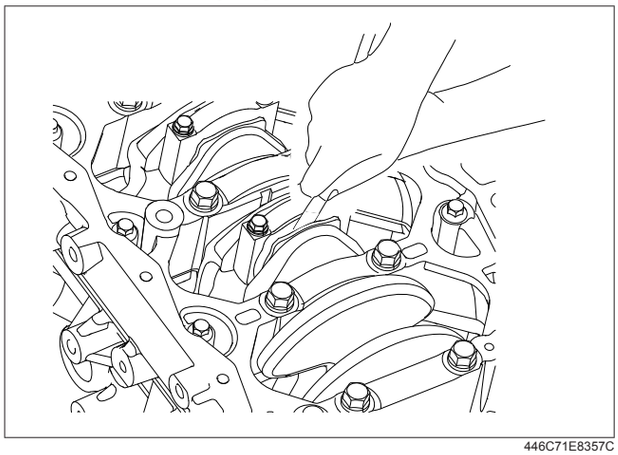
Check error of axis of holes at bottom and smaller ends of link with link calibrator.

When bending or torsion exceeds specified value, replace link.

Item	Parameters (mm)
Curvature of link	0.03/100 mm or less
Torsion of link	0.06/100 mm or less

12. Check axial clearance of link

    Measure thrust clearance at larger end of link with a feeler gauge.



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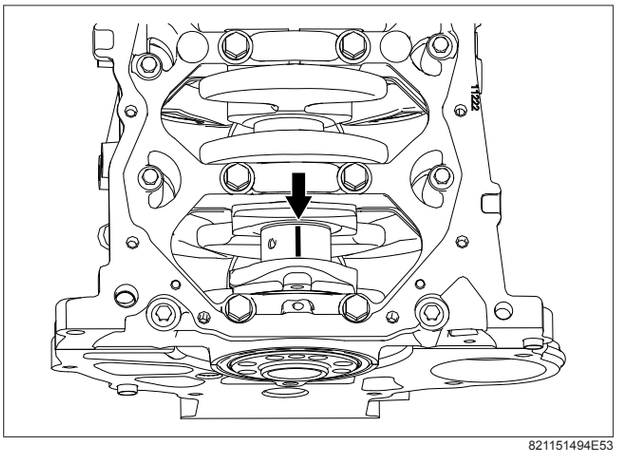
Item	Parameters (mm)
Axial clearance of link	0.19 ～0.37

Inspection of link bearing oil film clearance

Notice

› When checking the clearance of oil film, do not turn the crankshaft to avoid measurement error.

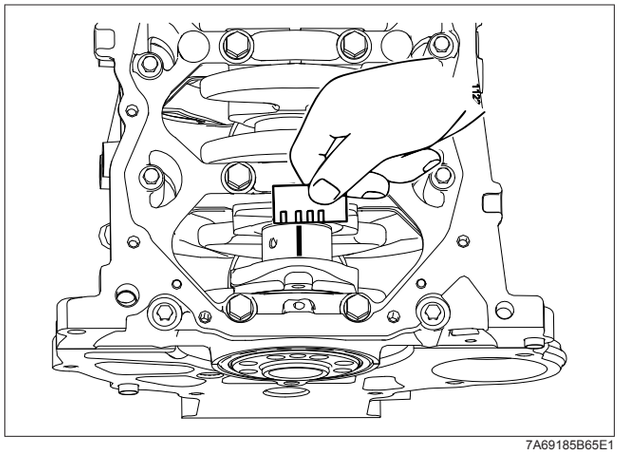
1. Remove link bolt and link cap
2. Clean link bearings and surface of crankshaft link journals
3. Carefully check link bearing for damage. Even if only one link bearing is found to be damaged or severely worn, all link bearings must be replaced as a whole
4. Reinstall the link bearings to their original positions
5. Put the plastic clearance gauge on the crankshaft link journal



821151494E53

6. Reinstall the link caps to their original positions
7. Tighten the link bolts to the specified torque
8. Remove link caps

9. Measure width of plastic clearance gauge and determine oil clearance



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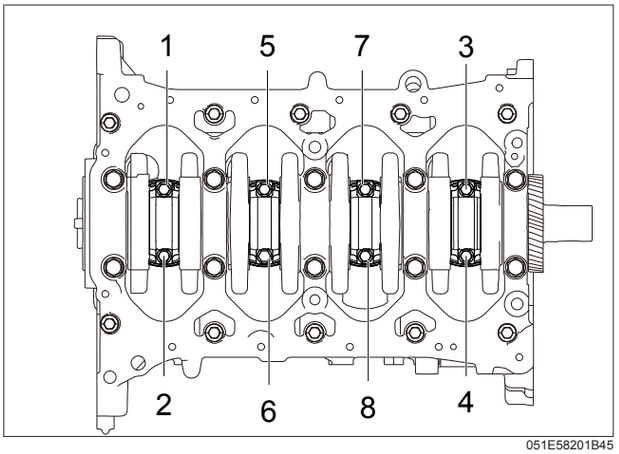
Item	Parameters (mm)
Oil clearance	0.020 ～0.048

10. Remove plastic clearance gauge from crankshaft link journal

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Empty engine oil
5. Remove engine assembly
6. Remove steering pump belt
7. Remove steering pump
8. Remove generator belt
9. Remove compressor
10. Remove timing cover
11. Remove timing belt
12. Remove the cylinder head cover
13. Remove camshaft
14. Remove cylinder head assembly
15. Remove oil pan assembly
16. Loosen 8 link bolts in the order shown



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Notice

› Link bolts are disposable parts.

17. Remove 4 link caps and 4 lower link bearings

Notice

› Do not damage the upper and lower link bearings in removal process.

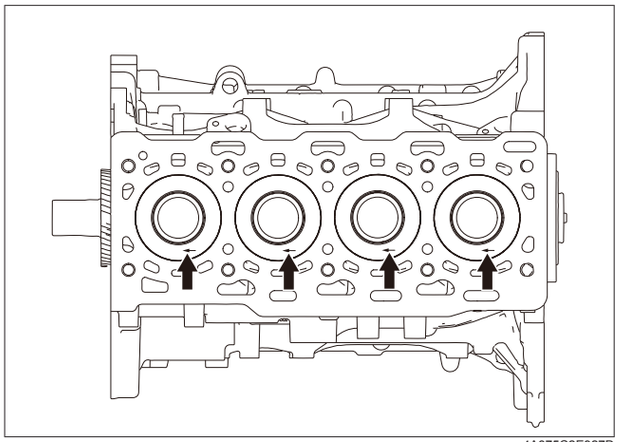
18. Place parts removed from the cylinders in order and mark the parts. All parts shall be installed in their original position when reinstalled
19. Remove carbon deposits on the upper part of the cylinder wall
20. Move the piston component to the top of cylinder, and push the lower part of link upward with hammer handle or its equivalent
21. Remove piston component and link

Notice

- The removed piston link components and the upper and lower link bearings shall be placed in the order of the cylinder number.
- Be careful not to damage the cylinder wall and the crankcase by the big end of the link.
- Avoid piston cooling nozzle to prevent any damage.

Installation

1. Apply lubricant to cylinder bores, link bearings and crankshaft link journals as well as each piston ring and piston surface
2. Install piston and link assembly into each cylinder with piston ring compressor

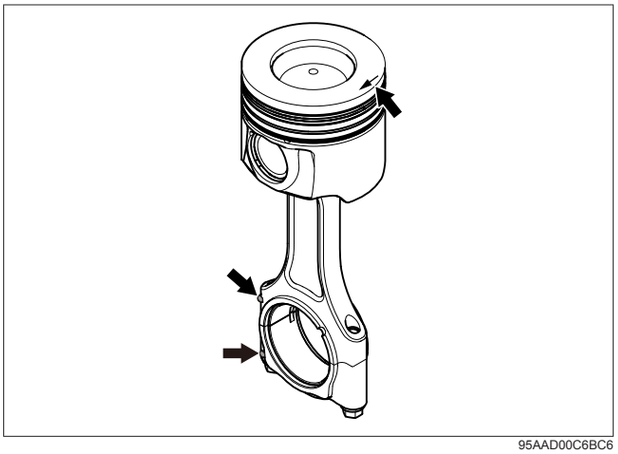


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Notice

- The forward mark of piston shall face the front end of the engine.

3. Keep the forward mark of link cap facing to the front end of crankcase for installation

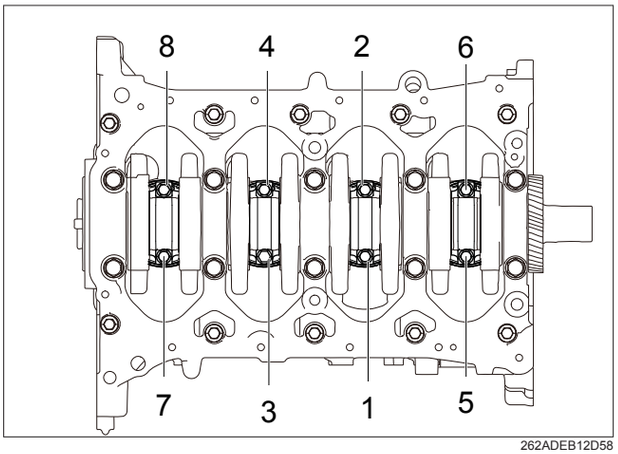


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Notice

- The link caps and link body shall be installed according to the original combination.

4. Install link caps and new link bolts, and tighten the link bolts twice in the order shown.



262ADEB12D58

Step 1: pre-tightening torque: 25N·m

Step 2: rotate 90°

Notice

- Rotate both bolts 90° after they are pre-tightened to 25 N·m.

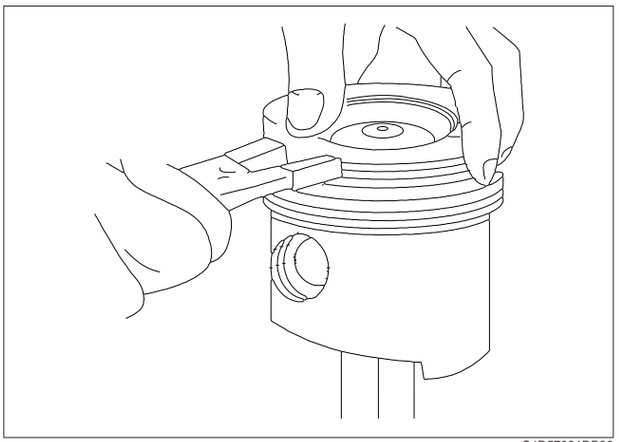
5. Install oil pan assembly
6. Install cylinder head assembly
7. Install the camshaft
8. Install cylinder head cover
9. Install timing belt
10. Install timing cover

11. Install compressor
12. Install generator belt
13. Install steering pump
14. Install steering pump belt
15. Install engine assembly
16. Install negative terminal of the battery
17. Fill the engine oil
18. Add engine coolant

disassembly/assembly

Disassembly

1. Disconnect the negative terminal of the battery.
2. Remove piston link assembly
3. Remove top compression ring and the second compression ring respectively with a piston ring expander

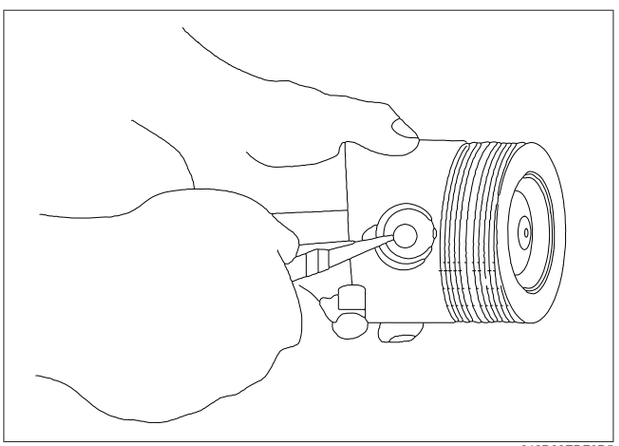


C4D57021DB99

Notice

› Be careful not to damage the piston when removing the piston ring.

4. Remove oil ring components by hand
5. Arrange the removed piston rings according to cylinder numbers
6. Pull the elastic springs at both ends of the piston pin out of the piston ring groove with sharp-nose pliers



812D88EDF0D5

7. Check the piston pin circlip, and replace it if it is cracked or deformed

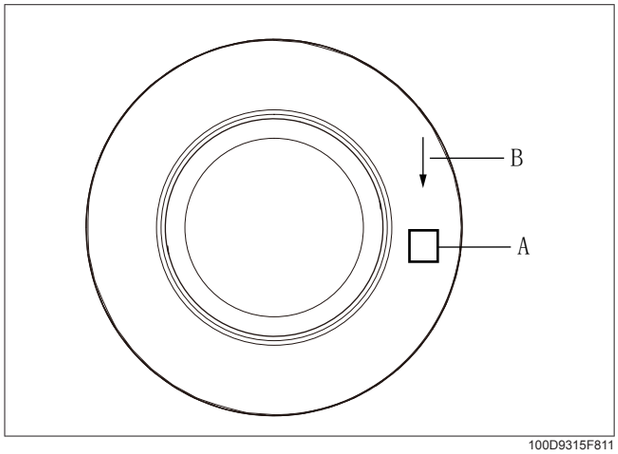
8. Push out the piston pin

Notice

› If the piston and piston pin can be reused, mark the cylinder number and installation position of each piston component and piston pin.

Assembly

1. Choose 4 pistons of same mass group (pistons are divided into 2 groups by mass, marked as numbers)



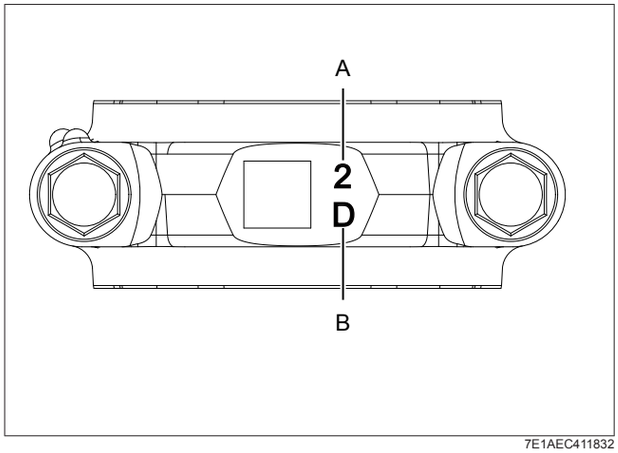
100D9315F811

In the diagram:

A - mass group number mark

B - forward mark

2. Choose 4 links of same mass group (links are divided into 10 groups by mass, marked as letters)



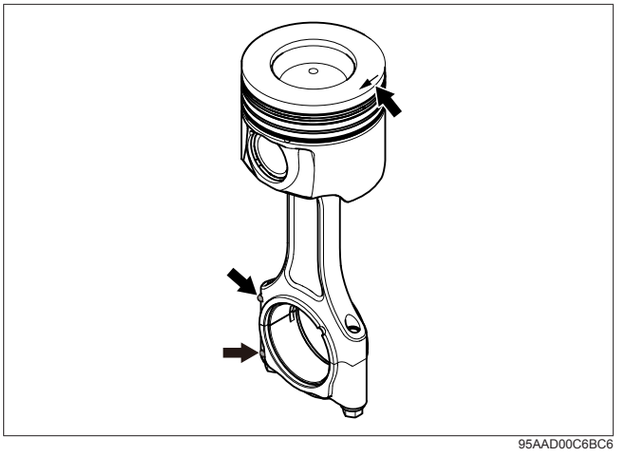
7E1AEC411832

In the diagram:

A - group number mark of big-end hole diameter

B - mass group number mark

3. Install piston on the link with the forward mark on the top of piston in the same direction as the forward mark on the link.



95AAD00C6BC6

Notice

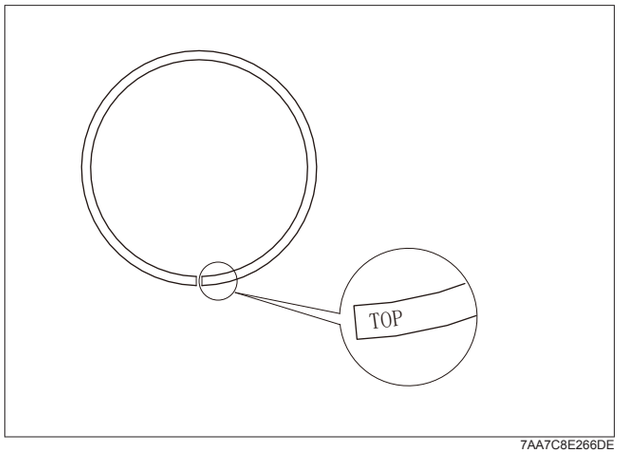
› Do not change the fit between piston and piston pin unless piston link assembly is to be replaced.

4. Apply cleaning oil to the surface of piston pin seat hole, the surface of piston pin, and inside the small-end hole of link
5. Fit the piston pin into the piston pin hole. It should move flexibly without jamming after installation
6. Install circlips at both ends of the piston pin. The circlip should fall into the piston circlip groove completely. It is not allowed that part of the circlip remains outside the circlip groove or stuck on the grooves without coming into the bottom of the groove.

Notice

› The notch on the circlip end and the notch section on the piston pin hole are offset by 180° from each other.

7. Install piston ring into the piston ring groove



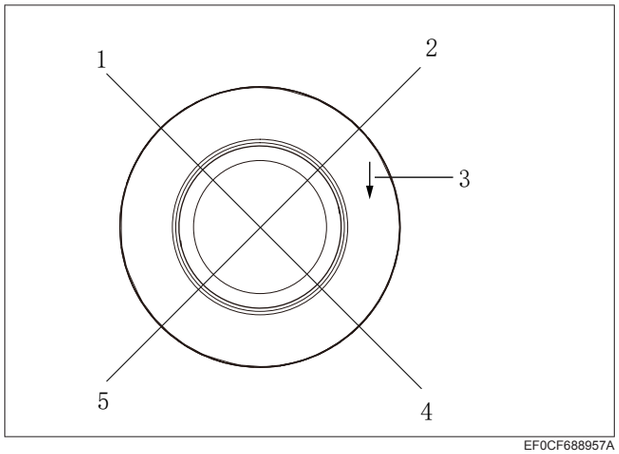
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The upward mark (ATG) of first compression ring faces upward, the upward mark (ATOP) of second compression ring faces upward, and the upward mark (TOP) of oil ring faces upward. The piston ring should move flexibly in the ring groove without jamming, and the clearance should meet the requirement.

Notice

- Two compression rings are not interchangeably.
- No warping is allowed for piston ring.
- No defects or impurities shall be allowed in the piston ring groove.

8. Arrange the opening position of piston ring crosswise. Check for correct opening position of piston ring after installation



EF0CF688957A

In the diagram:

1 - Opening position of top compression ring

2 - Opening position of oil ring

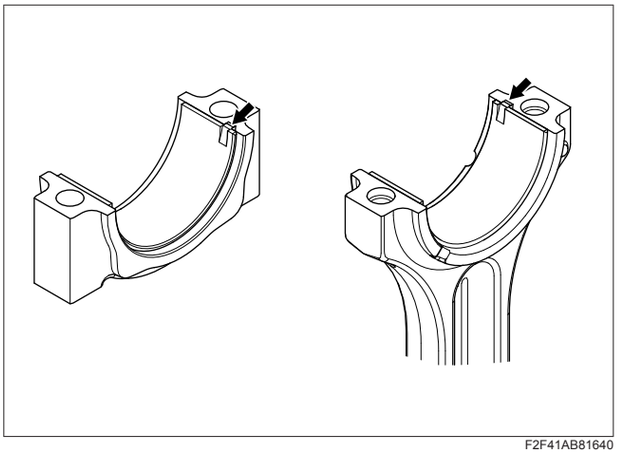
3 - Forward mark

4 - Opening position of second compression ring

5 - Spring opening position of oil ring

9. Link bearing matching

10. Put the link bearing into the link body and link cap with its projecting part aligned with the grooves on the link and the link cap, and apply an appropriate amount of lubricant to the inner surface of link bearing.



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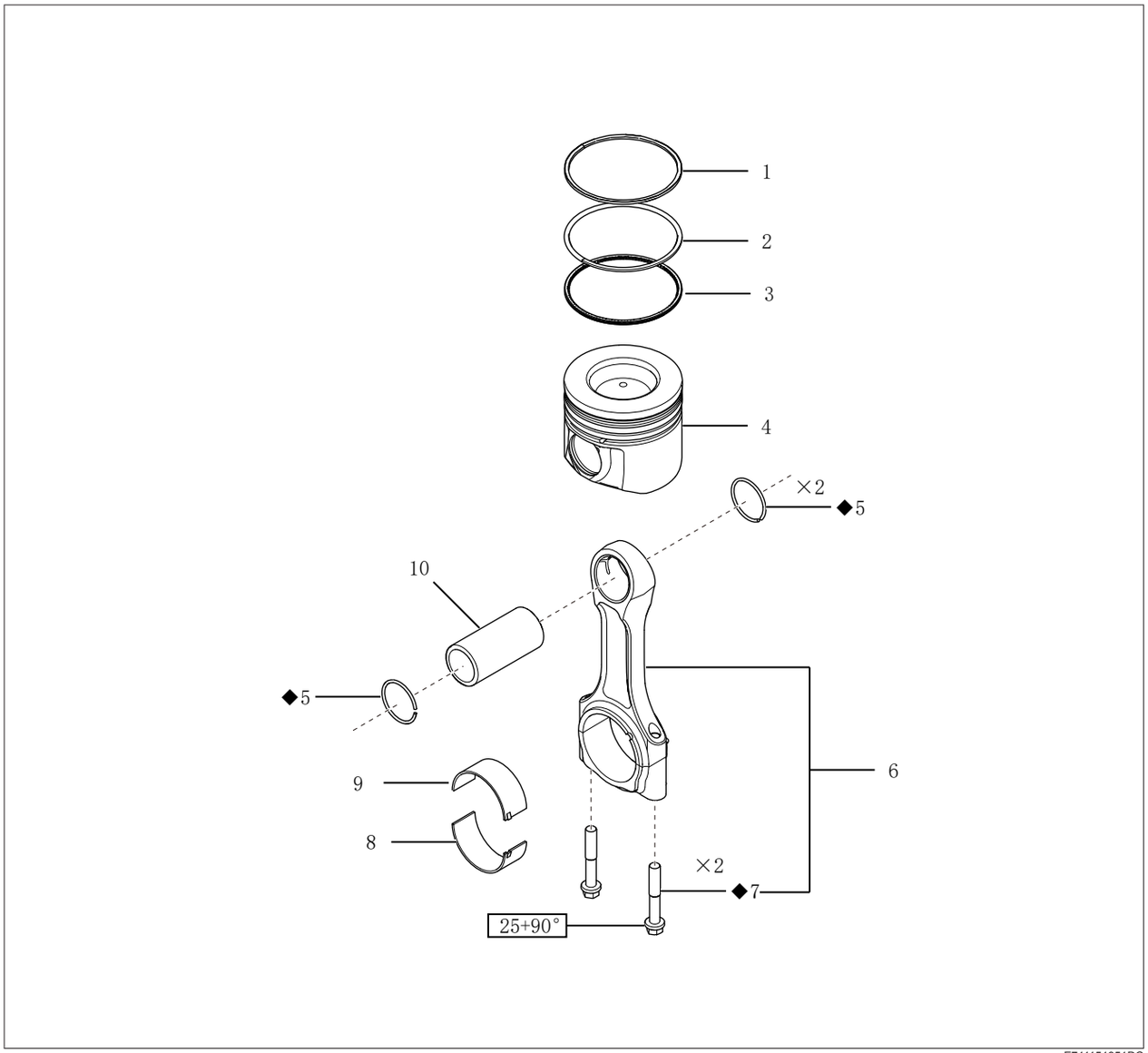
Notice

- Used link bearings are not interchangeable.
- Clearances on both sides of the link bearing shall be equal.
- Make sure that the link bearing is firmly seated.

11. Arrange the piston link assembly of each cylinder in sequence

Piston link (8AT)

structural diagram

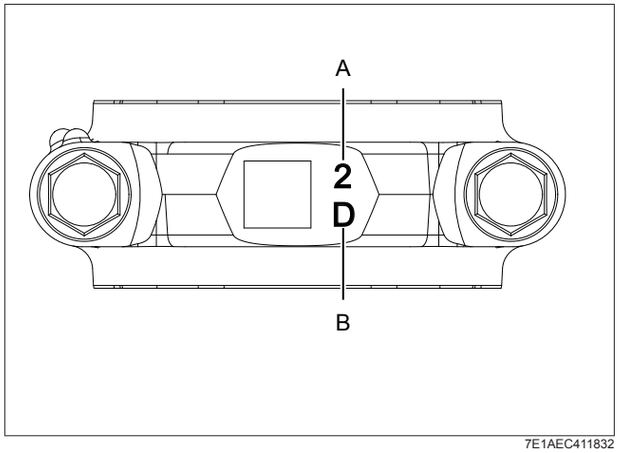


E711151351DC

1. Top compression ring
2. Second compression ring
3. Oil ring components
4. Piston component
5. Circlip
6. Link assembly
7. Link bolt
8. Lower link bearing
9. Upper link bearing
10. Piston pin

Link bearing matching

1. Verify link big-end hole diameter grouping



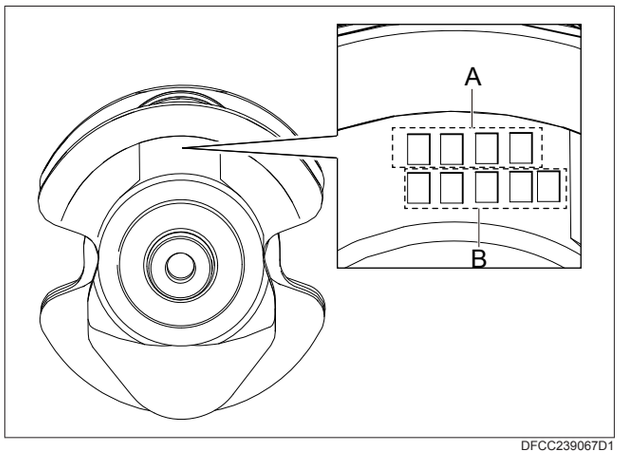
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In the diagram:

Mark A: group number mark of big-end hole diameter

Group number mark	Parameters (mm)
1	φ53.000～φ53.006
2	＞ φ53.006～φ53.012
3	＞ φ53.012～φ53.018

2. Confirm groups of link journal diameter of crankshaft



DFCC239067D1

In the diagram:

Mark A: the first to fourth group number marks of link journals is from left to right in sequence

Group number mark	Parameters (mm)
1	＞ φ50.020～φ50.026
2	＞ φ50.014～φ50.020
3	φ50.008～φ50.014

3. Check thickness grouping of link bearings

Group number mark	Parameters (mm)
1	1.473～1.477
2	＞ 1.477～1.481
3	＞ 1.481～1.485

Notice

› The grouping marks of link bearings are located at the lips of steel back, marked as 1, 2, and 3.

4. Link bearing matching

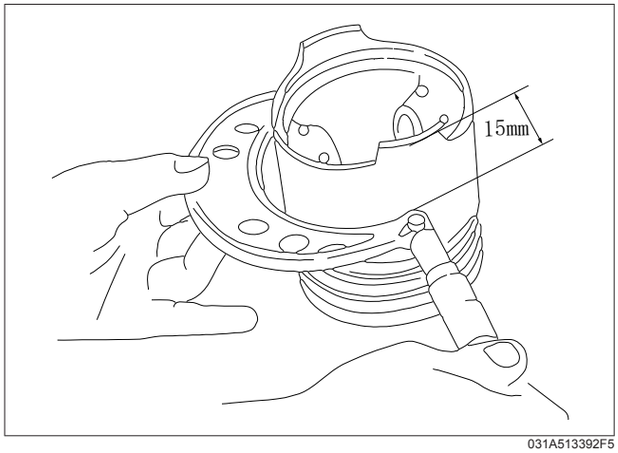
Group No. of bottom end aperture of link + group No. of crankshaft link journal	Link bearing group No.	Clearance parameters (mm)
＝ 2～3	Yellow/1	0.020～0.046
＝ 4	Colorless/2	0.024～0.044
＝ 5～6	Blue/3	0.022～0.048

Notice

› The grouping mark numbers of link bearings are located at the lips of steel back, marked as 1, 2, and 3.

Piston link inspection

1. Check outer diameter of piston

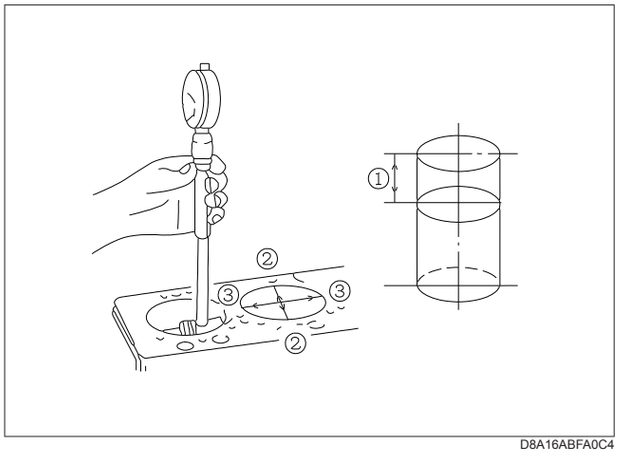


031A513392F5

Item	Parameters (mm)
Size of piston skirt	83.054～83.090

2. Check cylinder bore diameter

   Measure the cylinder bore at the measurement point ① (height 20 mm) along the thrust direction ②-② and axial direction of crankshaft ③-③ with an micrometer gauge for inner diameter.



D8A16ABFA0C4

Item	Parameters (mm)
Cylinder bore diameter	83.10～83.11

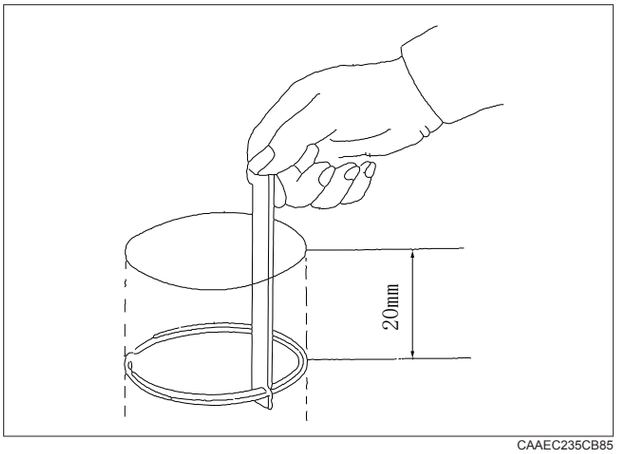
3. Calculate auxiliary cylinder clearance

   Calculate auxiliary cylinder clearance by subtracting piston diameter from cylinder bore diameter

Item	Parameters (mm)
Auxiliary cylinder clearance	0.010～0.056

4. Check opening clearance of piston ring

   Put the piston ring into the cylinder, and measure its opening clearance with a feeler gauge.

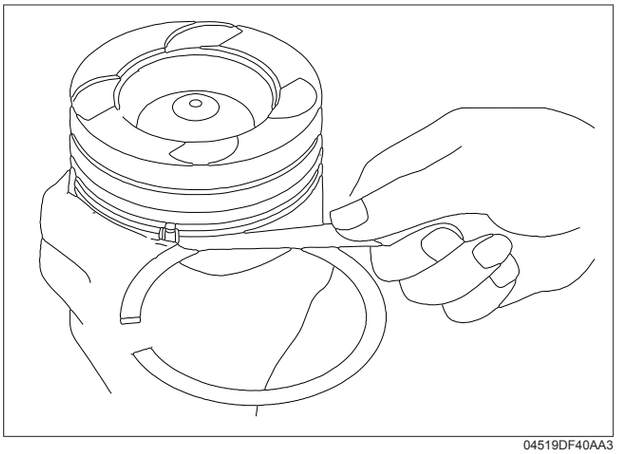


CAAEC235CB85

Opening clearance of piston ring	Parameters (mm)
Top compression ring	0.20～0.35
Second compression ring	0.65～0.85

5. Axial clearance of piston ring and piston ring groove

   Measure axial clearance between piston ring and piston ring groove with a feeler gauge.

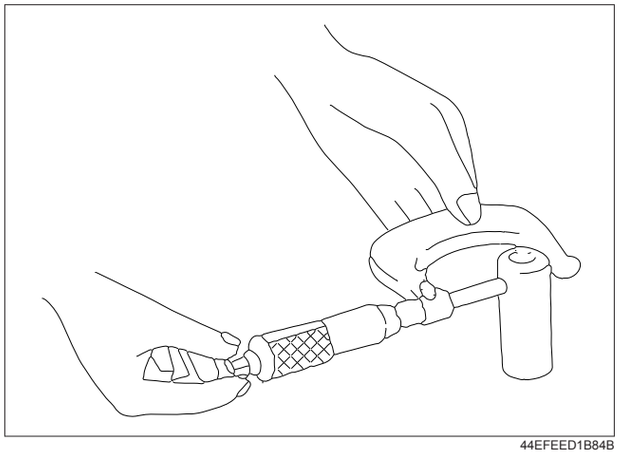


04519DF40AA3

Axial clearance of piston ring	Parameters (mm)
Top compression ring	0.100～0.140
Second compression ring	0.055～0.100
Oil ring	0.030～0.070

6. Check outer diameter of piston pin

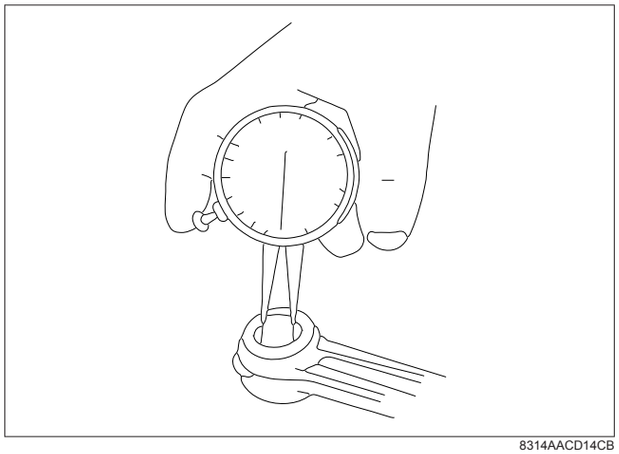
   Use a screw micrometer to measure the outer diameter of piston pin in two directions at three different positions.



44EFEED1B84B

Item	Parameters (mm)
Outer diameter of piston pin	32.007～32.010

7. Measure the inner diameter of the small-end hole of link with an inner diameter gauge



8314AACD14CB

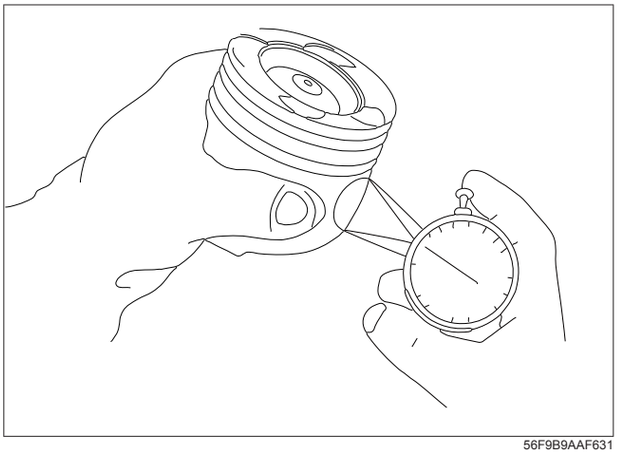
Item	Parameters (mm)
Inner diameter of small-end hole of link	32.020～32.031

8. Check clearance between small-end hole of link and piston pin

   Subtract the piston pin diameter from the diameter of small-end hole of link.

Item	Parameters (mm)
Clearance between small-end hole of link and piston pin	0.010～0.024

9. Measure inner diameter of piston pin seat hole with an inner diameter gauge



56F9B9AAF631

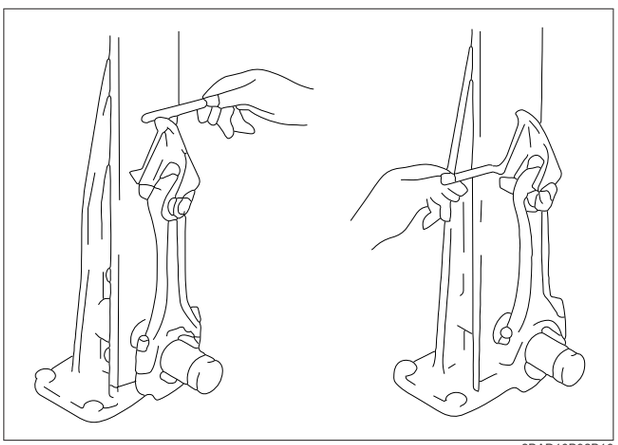
Item	Parameters (mm)
Inner diameter of piston pin seat hole	32.013～32.018

10. Check the clearance between piston pin and piston pin seat hole

    Subtract the piston pin diameter from the diameter of the piston pin seat bore.

Item	Parameters (mm)
Clearance between piston pin and piston pin seat hole	0.003～0.011

11. Check for error of axis lines of big-end and small-end holes



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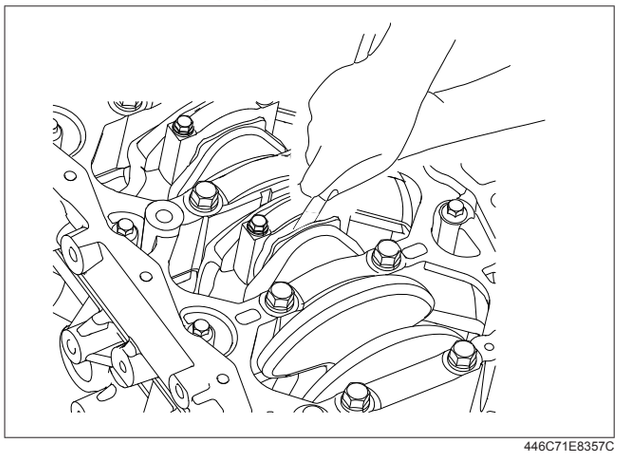
    Check error of axis of holes at bottom and smaller ends of link with link calibrator.

    When bending or torsion exceeds specified value, replace link.

Item	Parameters (mm)
Curvature of link	0.03/100 mm or less
Torsion of link	0.06/100 mm or less

12. Check axial clearance of link

    Measure thrust clearance at larger end of link with a feeler gauge.



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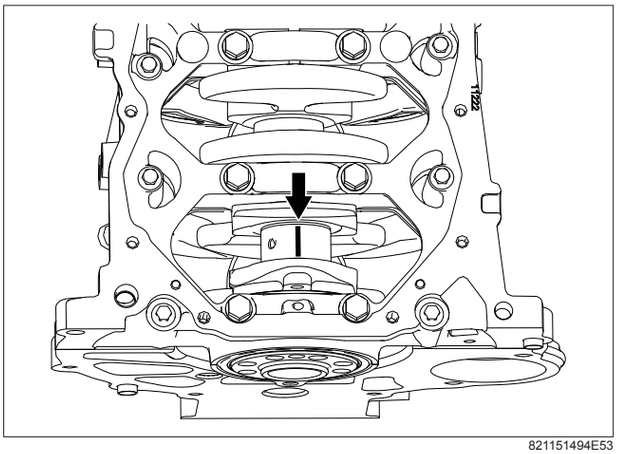
Item	Parameters (mm)
Axial clearance of link	0.19 ～0.37

Inspection of link bearing oil film clearance

Notice

When checking the clearance of oil film, do not turn the crankshaft to avoid measurement error.

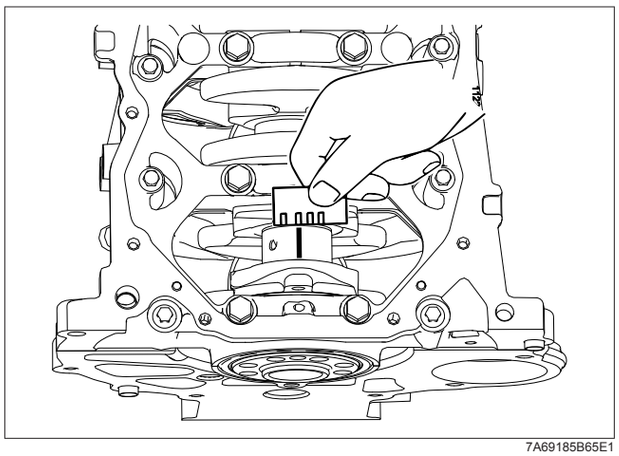
1. Remove link bolt and link cap
2. Clean link bearings and surface of crankshaft link journals
3. Carefully check link bearing for damage. Even if only one link bearing is found to be damaged or severely worn, all link bearings must be replaced as a whole
4. Reinstall the link bearings to their original positions
5. Put the plastic clearance gauge on the crankshaft link journal



821151494E53

6. Reinstall the link caps to their original positions
7. Tighten the link bolts to the specified torque
8. Remove link caps

9. Measure width of plastic clearance gauge and determine oil clearance



7A69185B65E1

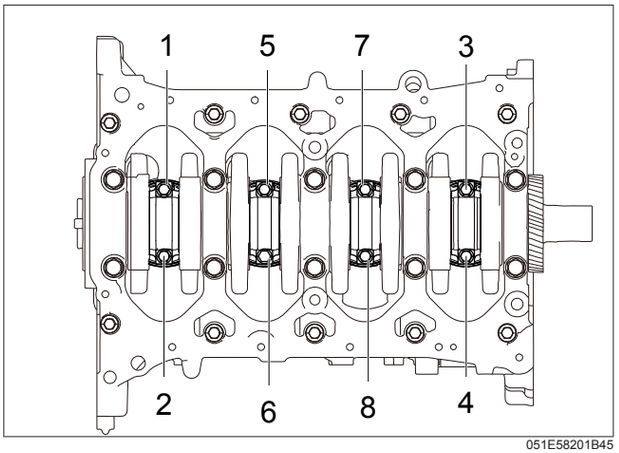
Item	Parameters (mm)
Oil clearance	0.020 ～0.048

10. Remove plastic clearance gauge from crankshaft link journal

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Empty engine oil
5. Recycle A/C refrigerant
6. Remove engine assembly
7. Remove generator belt
8. Remove compressor
9. Remove timing cover
10. Remove timing belt
11. Remove the cylinder head cover
12. Remove camshaft
13. Remove cylinder head assembly
14. Remove oil pan assembly
15. Loosen 8 link bolts in the order shown



051E58201B45

Notice

› Link bolts are disposable parts.

16. Remove 4 link caps and 4 lower link bearings

Notice

› Do not damage the upper and lower link bearings in removal process.

17. Place parts removed from the cylinders in order and mark the parts. All parts shall be installed in their original position when reinstalled

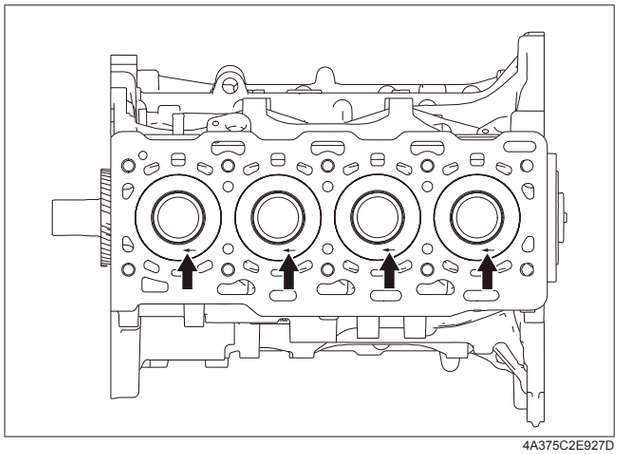
18. Remove carbon deposits on the upper part of the cylinder wall
19. Move the piston component to the top of cylinder, and push the lower part of link upward with hammer handle or its equivalent
20. Remove piston component and link

Notice

- The removed piston link components and the upper and lower link bearings shall be placed in the order of the cylinder number.
- Be careful not to damage the cylinder wall and the crankcase by the big end of the link.
- Avoid piston cooling nozzle to prevent any damage.

Installation

1. Apply lubricant to cylinder bores, link bearings and crankshaft link journals as well as each piston ring and piston surface
2. Install piston and link assembly into each cylinder with piston ring compressor

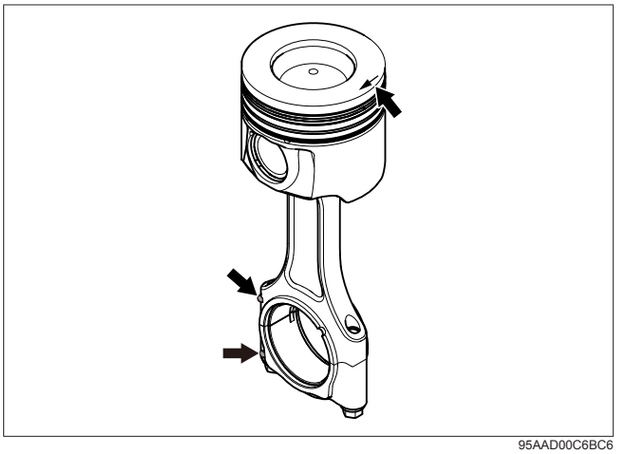


4A375C2E927D

Notice

- The forward mark of piston shall face the front end of the engine.

3. Keep the forward mark of link cap facing to the front end of crankcase for installation

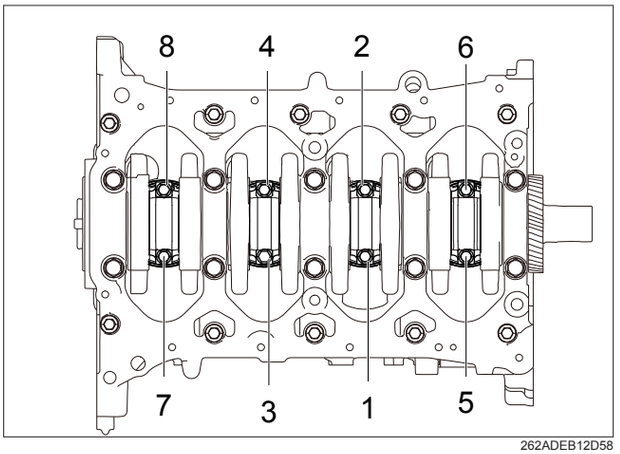


95AAD00C6BC6

Notice

- The link caps and link body shall be installed according to the original combination.

4. Install link caps and new link bolts, and tighten the link bolts twice in the order shown.



262ADEB12D58

Step 1: pre-tightening torque: 25N·m

Step 2: rotate 90°

Notice

- Rotate both bolts 90° after they are pre-tightened to 25 N·m.

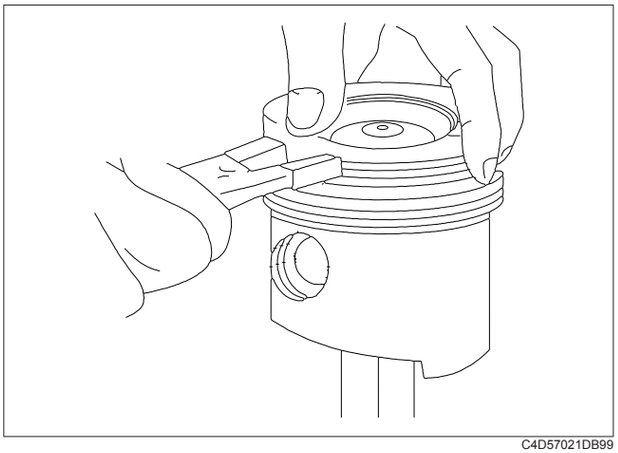
5. Install the camshaft
6. Install cylinder head cover
7. Install timing belt
8. Install timing cover
9. Install compressor
10. Install generator belt

11. Install engine assembly
12. Install negative terminal of the battery
13. Fill the engine oil
14. Add engine coolant
15. Fill A/C refrigerant

disassembly/assembly

Disassembly

1. Disconnect the negative terminal of the battery.
2. Remove piston link assembly
3. Remove top compression ring and the second compression ring respectively with a piston ring expander

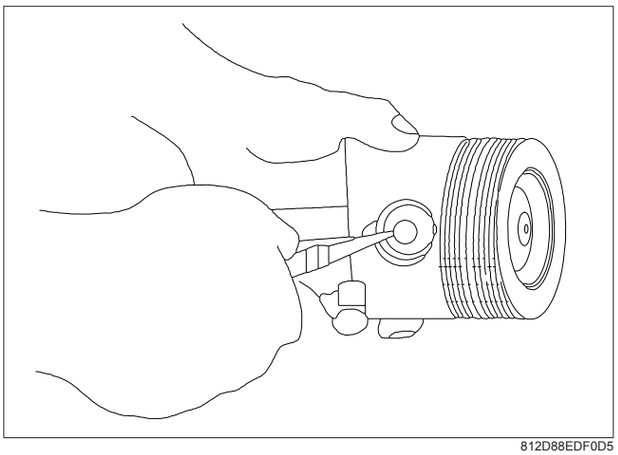


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Notice

Be careful not to damage the piston when removing the piston ring.

4. Remove oil ring components by hand
5. Arrange the removed piston rings according to cylinder numbers
6. Pull the elastic springs at both ends of the piston pin out of the piston ring groove with sharp-nose pliers



812D88EDF0D5

7. Check the piston pin circlip, and replace it if it is cracked or deformed

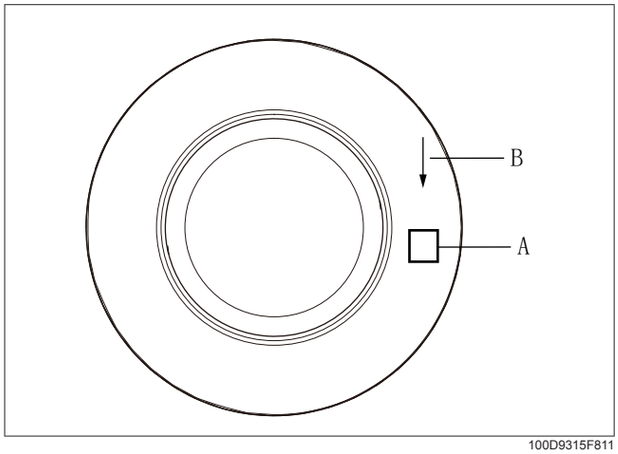
8. Push out the piston pin

Notice

› If the piston and piston pin can be reused, mark the cylinder number and installation position of each piston component and piston pin.

Assembly

1. Choose 4 pistons of same mass group (pistons are divided into 2 groups by mass, marked as numbers)



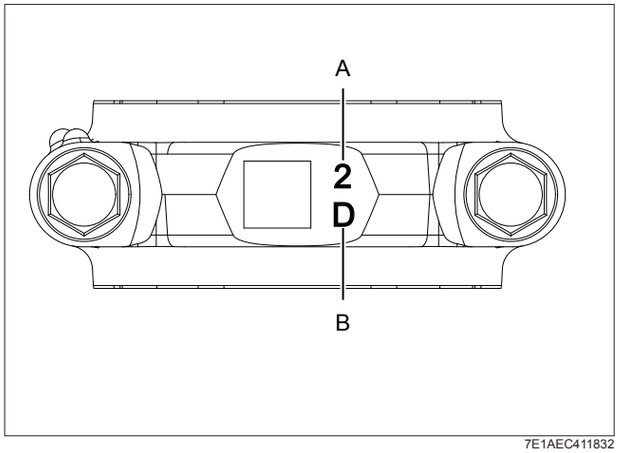
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In the diagram:

A - mass group number mark

B - forward mark

2. Choose 4 links of same mass group (links are divided into 10 groups by mass, marked as letters)



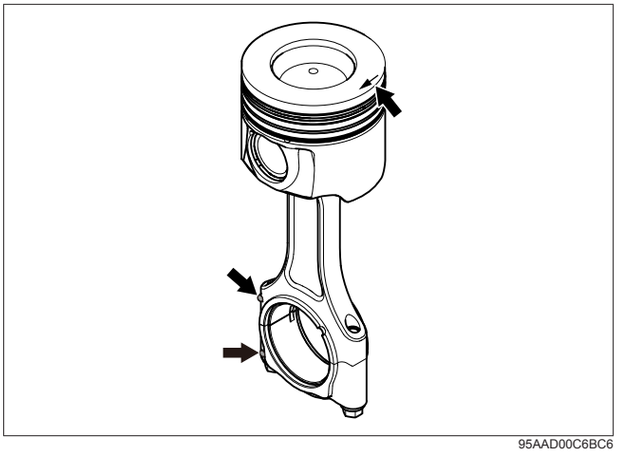
7E1AEC411832

In the diagram:

A - group number mark of big-end hole diameter

B - mass group number mark

3. Install piston on the link with the forward mark on the top of piston in the same direction as the forward mark on the link.



95AAD00C6BC6

Notice

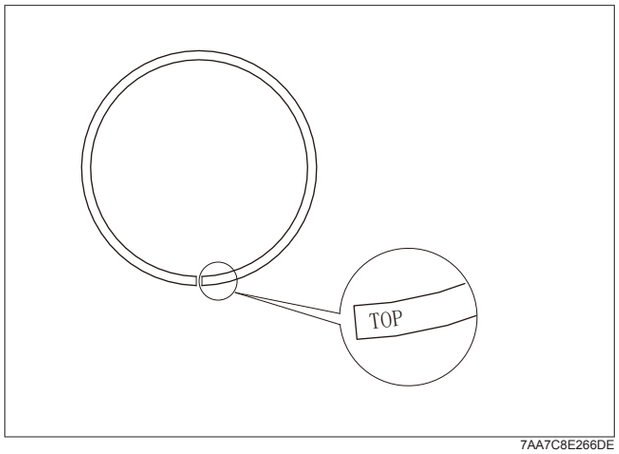
› Do not change the fit between piston and piston pin unless piston link assembly is to be replaced.

4. Apply cleaning oil to the surface of piston pin seat hole, the surface of piston pin, and inside the small-end hole of link
5. Fit the piston pin into the piston pin hole. It should move flexibly without jamming after installation
6. Install circlips at both ends of the piston pin. The circlip should fall into the piston circlip groove completely. It is not allowed that part of the circlip remains outside the circlip groove or stuck on the grooves without coming into the bottom of the groove.

Notice

› The notch on the circlip end and the notch section on the piston pin hole are offset by 180° from each other.

7. Install piston ring into the piston ring groove



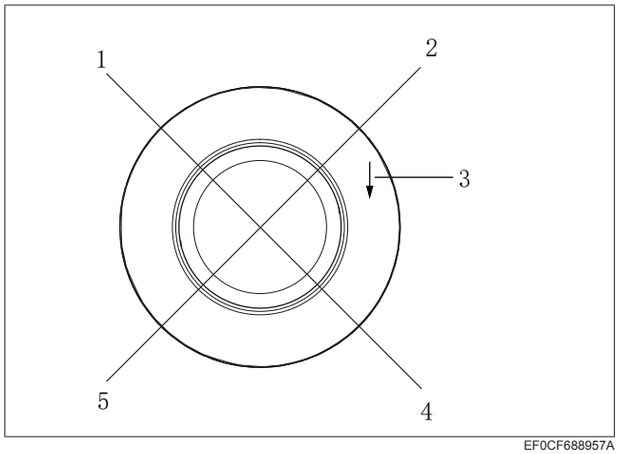
7AA7C8E266DE

The upward mark (ATG) of first compression ring faces upward, the upward mark (ATOP) of second compression ring faces upward, and the upward mark (TOP) of oil ring faces upward. The piston ring should move flexibly in the ring groove without jamming, and the clearance should meet the requirement.

Notice

- Two compression rings are not interchangeably.
- No warping is allowed for piston ring.
- No defects or impurities shall be allowed in the piston ring groove.

8. Arrange the opening position of piston ring crosswise. Check for correct opening position of piston ring after installation



EF0CF688957A

In the diagram:

1 - Opening position of top compression ring

2 - Opening position of oil ring

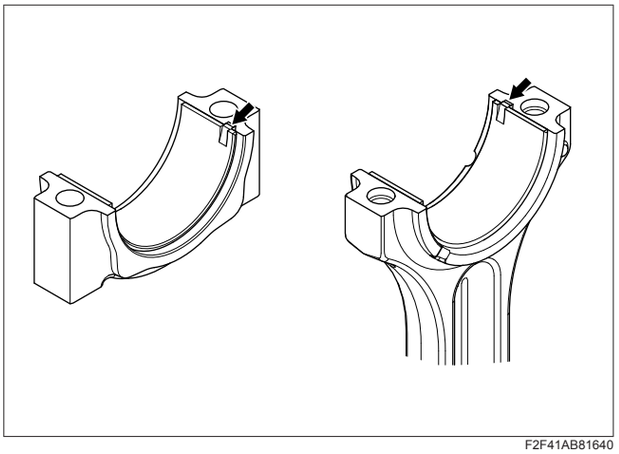
3 - Forward mark

4 - Opening position of second compression ring

5 - Spring opening position of oil ring

9. Link bearing matching

10. Put the link bearing into the link body and link cap with its projecting part aligned with the grooves on the link and the link cap, and apply an appropriate amount of lubricant to the inner surface of link bearing.



F2F41AB81640

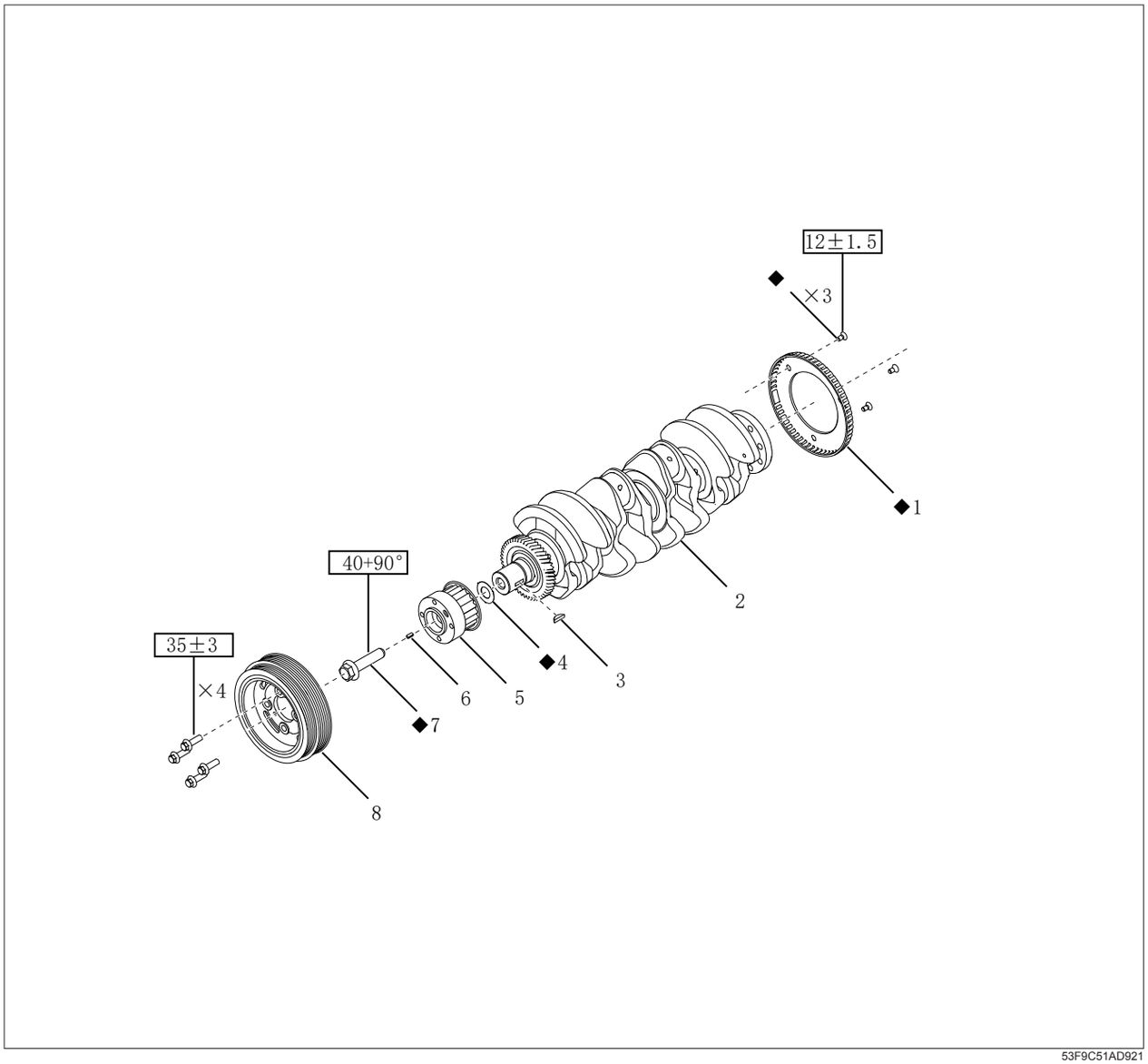
Notice

- Used link bearings are not interchangeable.
- Clearances on both sides of the link bearing shall be equal.
- Make sure that the link bearing is firmly seated.

11. Arrange the piston link assembly of each cylinder in sequence

Crankshaft (6MT)

Structural diagram

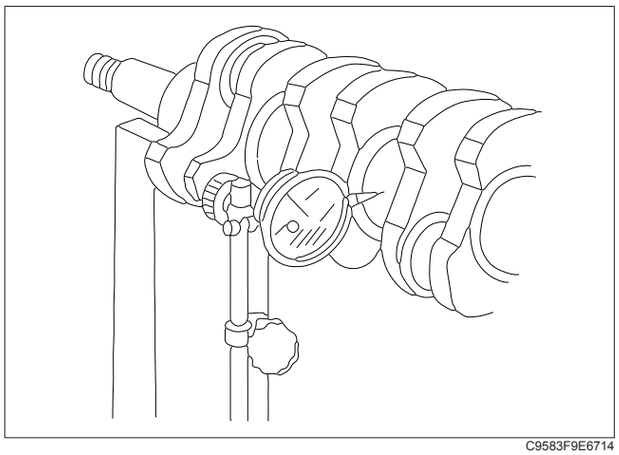


53F9C51AD921

1. Crankshaft position signal panel
2. Crankshaft assembly
3. Woodruff key
4. Crankshaft gasket
5. Crankshaft timing pulley component
6. Elastic cylindrical pin
7. Crankshaft timing pulley bolt
8. Damping pulley assembly

Crankshaft check

1. Check radial run-out of crankshaft



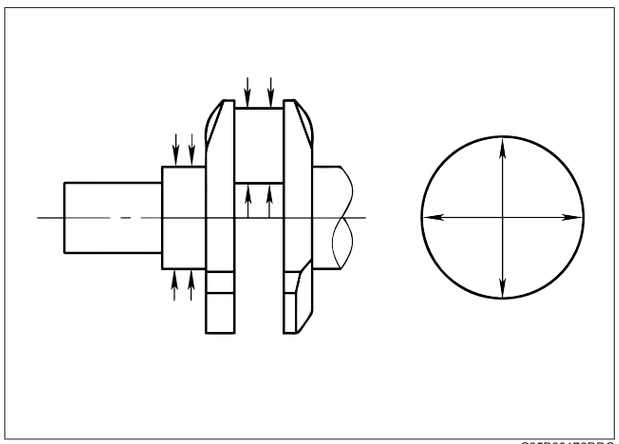
C9583F9E6714

Place crankshaft on the V-shaped block carefully. Slowly rotate crankshaft and measure radial run-out.

Radial run-out of crankshaft	Parameters (mm)
Standard value	0.03

When radial runout of crankshaft goes beyond the limit, replace the crankshaft.

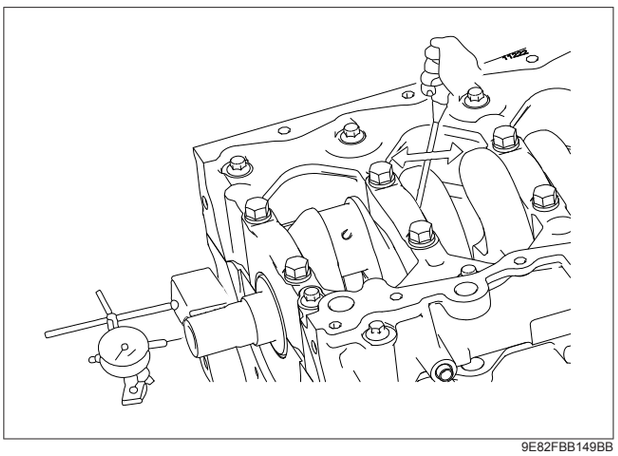
2. Measure the diameter of main journal of crankshaft and link journal of crankshaft



C85B30176DDC

Item	Parameters (mm)
Diameter of the main journal of crankshaft	60.002～60.020
Diameter of crankshaft link journal	50.008～50.026

3. Check thrust clearance of crankshaft



9E82FBB149BB

Install dial indicator as shown, and measure thrust clearance of crankshaft.

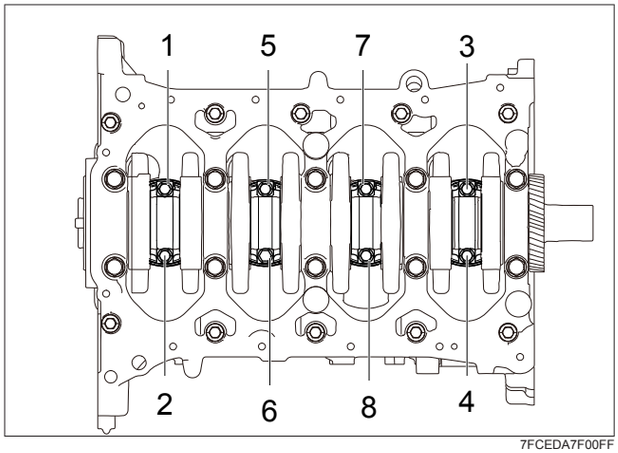
Thrust clearance of crankshaft	Parameters (mm)
Standard value	0.10～0.29

If thrust clearance exceeds the specified value, replace thrust plates in groups.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Empty engine lubricant
5. Remove engine assembly
6. Remove steering pump belt
7. Remove generator belt
8. Remove the rear crankshaft oil seal.
9. Remove oil pan assembly
10. Remove engine oil pump assembly
11. Remove generator bracket
12. Loosen 8 link bolts in the order shown

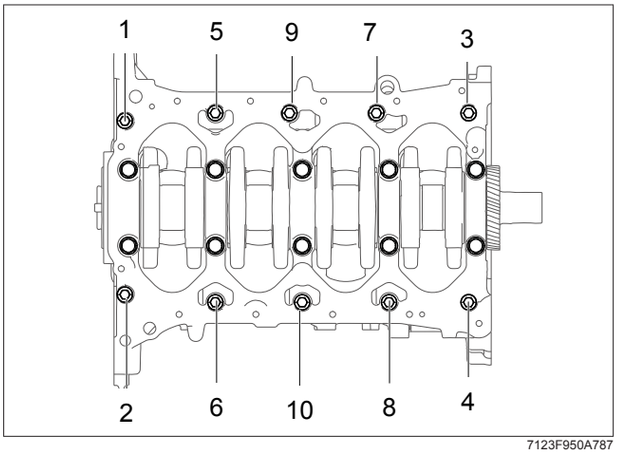


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Notice

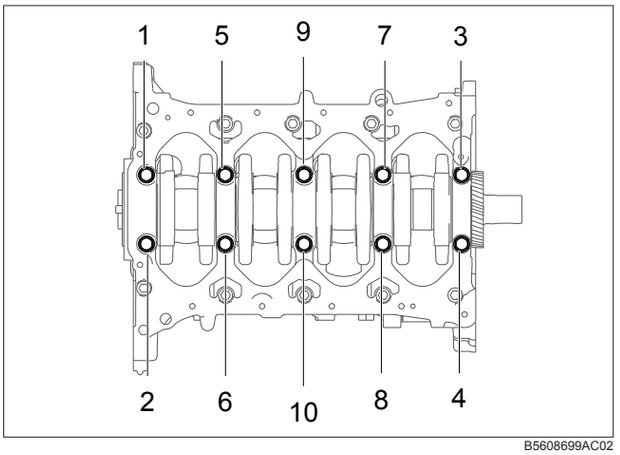
› Link bolts are disposable parts.

13. Loosen 10 bolts connecting upper and lower cylinder blocks in the order shown



7123F950A787

14. Loosen 10 main bearing cap bolts in the order shown



B5608699AC02

Notice

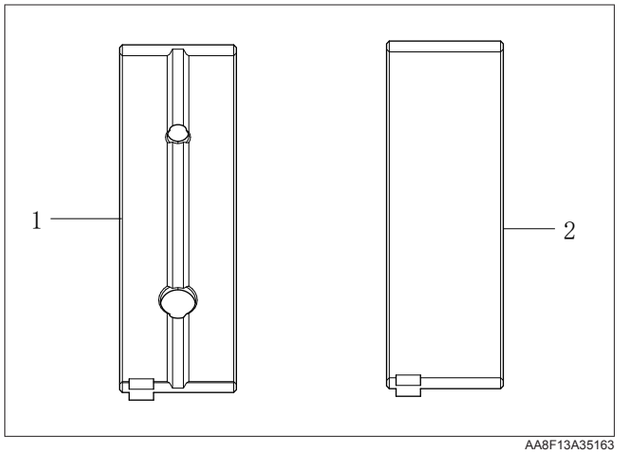
› Main bearing cap bolts are disposable parts.

15. Remove lower cylinder block
16. Remove crankshaft with crankshaft position signal panel
17. Remove lower thrust plate

Installation

1. Apply an appropriate amount of lubricant to inner surface of main bearing shell

2. Install main bearing shell to upper cylinder block and lower cylinder block



AA8F13A35163

In the diagram:

1 - Upper main bearing shell

2 - Lower main bearing shell

Notice

› The main bearing shell needs to be selected in combination with the cylinder block main bearing hole diameter group and the crankshaft main journal diameter group.

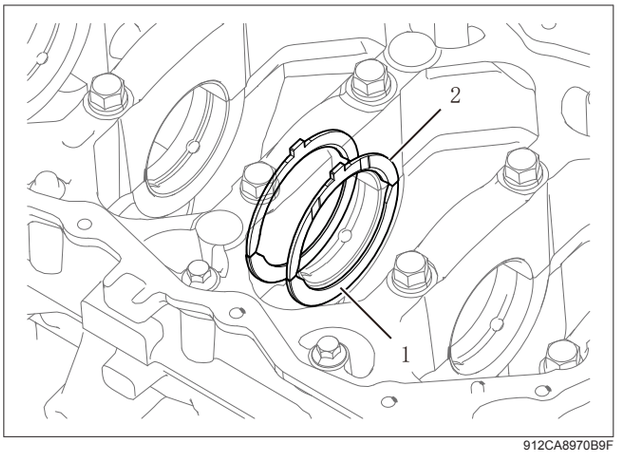
› Install upper main bearing shell with oil sink and oil hole on upper cylinder block; Install lower main bearing shell without oil sink and oil hole on lower cylinder block. Mismatch in installation is never allowed.

› Used main bearing shells are not interchangeable.

3. Apply an appropriate amount of lubricant between thrust plate of crankshaft and thrust face of crank arm

4. Apply grease respectively on non-oil sink side of lower thrust plates, with grease width (2 ± 0.5) mm and length (10~ 15) mm to prevent them from falling during installation

5. Install upper thrust plate in spigot of upper cylinder block with its oil sink side facing the crank arm; install lower thrust plate in spigot of lower cylinder block with its non-oil sink side facing the crank arm



912CA8970B9F

In the diagram:

1 - Upper thrust plate

2 - Lower thrust plate

Notice

› The upper thrust plate has no positioning tabs while the lower thrust plate has positioning tabs.

6. After assembly is completed, apply an appropriate amount of lubricant to the position oil sink of lower thrust plate

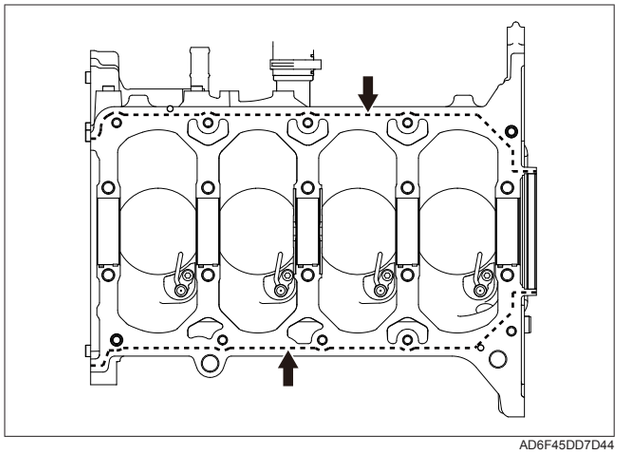
7. Set crankshaft with crankshaft signal panel assembly

8. Apply an appropriate amount of lubricant to main journal of crankshaft assembly and rotate the crankshaft a circle to make gear oil even on inner side of upper main bearing shell and main journal

Notice

› Avoid shifting of upper main bearing shell in rotation of crankshaft.

9. Apply sealant to the bottom of upper cylinder block

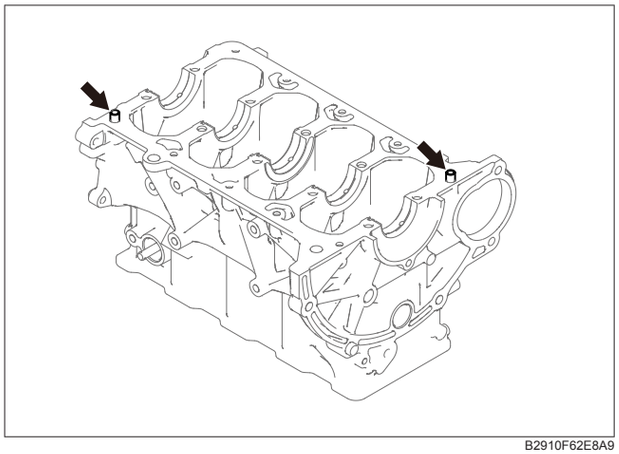


AD6F45DD7D44

Type: Loctite 5188 anaerobic plane sealant

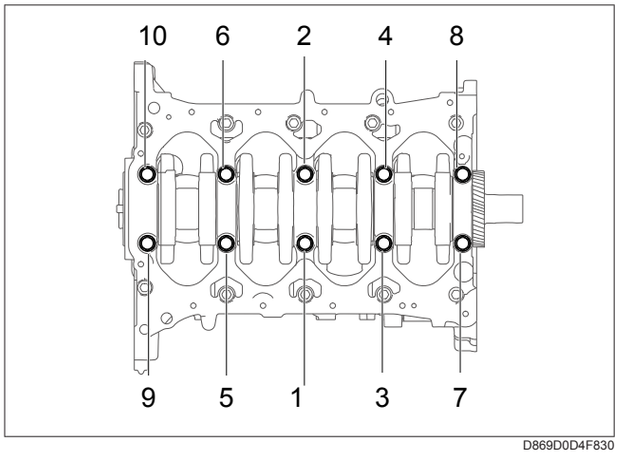
The glue line diameter is (1.5±0.3) mm.

10. Align alignment sleeve of upper cylinder block and install lower cylinder block



B2910F62E8A9

11. Tighten 10 new main bearing cap bolts in three steps in the order shown



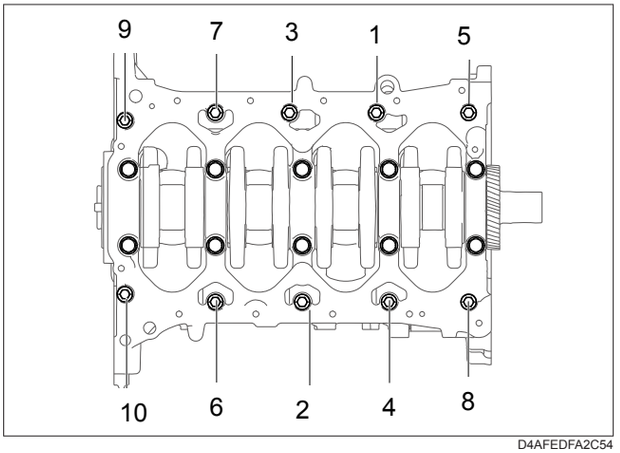
D869D0D4F830

Step 1: pre-tightening torque 40 N·m

Step 2: Turn by 90°.

Step 3: turn 90°

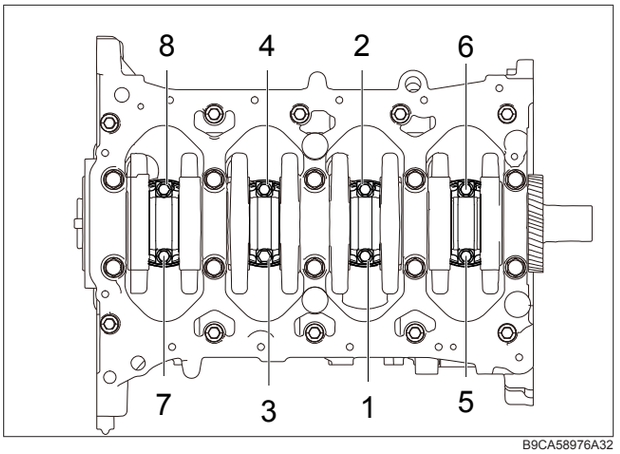
12. Tighten 10 bolts in the sequence as shown on the diagram



D4AFEDFA2C54

Tightening torque: (35±3) N·m

13. Install link caps and new link bolts, and tighten the link bolts twice in the order shown.



B9CA58976A32

Step 1: pre-tightening torque: 25N·m

Step 2: rotate 90°

Notice

› Rotate both bolts 90° after they are pre-tightened to 25 N·m.

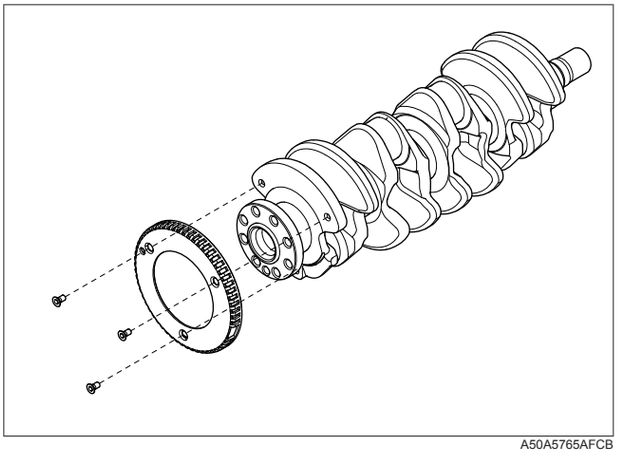
14. Install oil pan assembly
15. Install engine oil pump assembly
16. Install rear crankshaft oil seal
17. Install generator bracket
18. Install generator belt
19. Install steering pump belt

20. Install engine assembly
21. Install negative terminal of the battery
22. Add engine lubricant
23. Add engine coolant

Disassembly/assembly

Disassembly

1. Disconnect the negative terminal of the battery.
2. Remove crankshaft assembly
3. Remove 3 bolts for fastening signal panel at the rear end of crankshaft



A50A5765AFCB

Notice

› Do not remove it if not necessary.

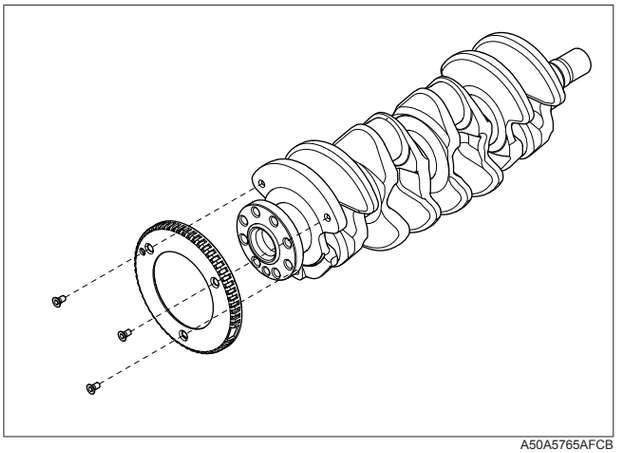
4. Remove crankshaft position signal panel

Notice

› Crankshaft signal panel and bolts for crankshaft signal panel are disposable parts.

Assembly

1. Install new crankshaft position signal panel on the 8th crank arm of crankshaft



A50A5765AFCB

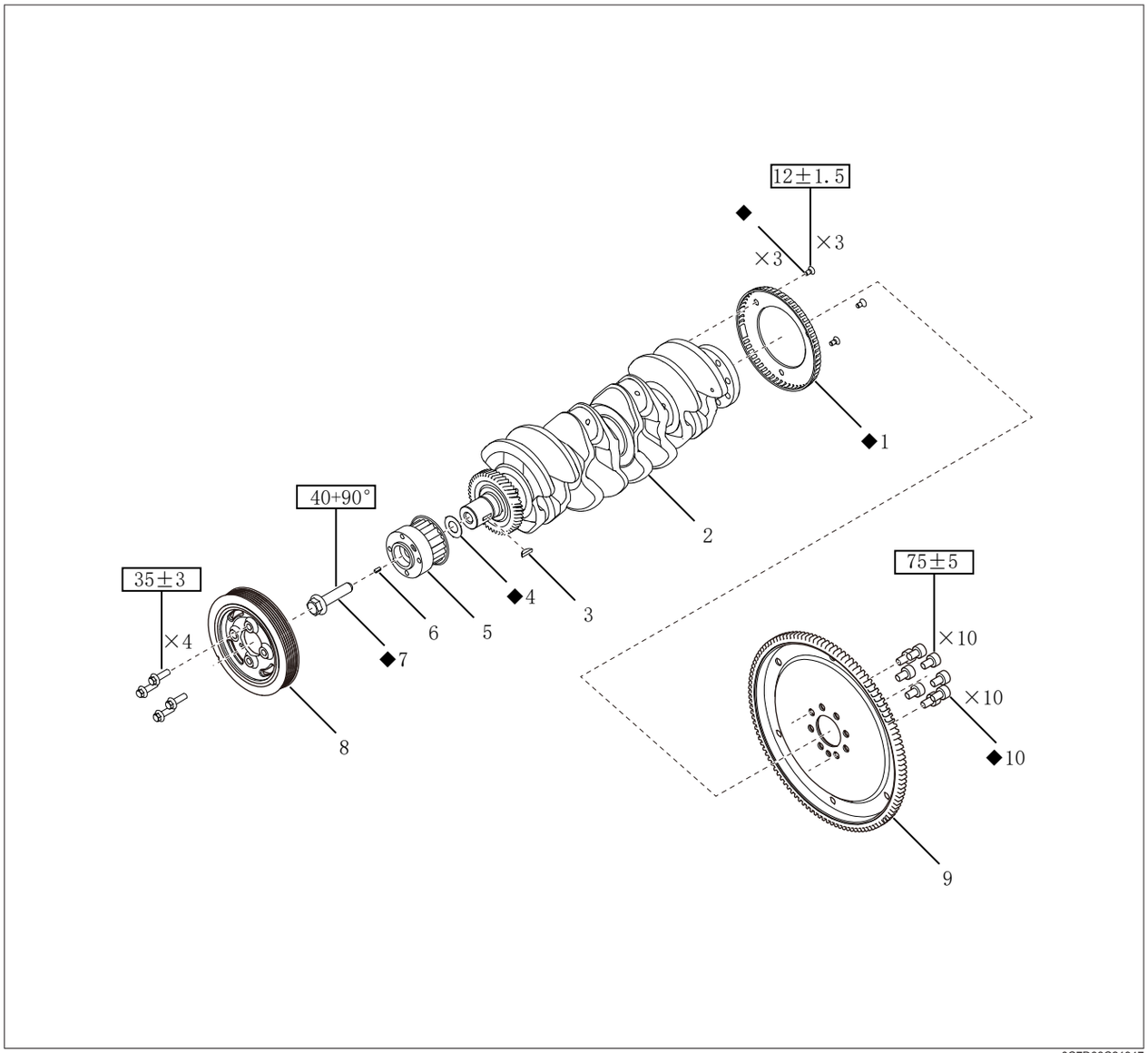
2. Tighten 3 bolts

   Tightening torque: (12±1.5) N·m

3. Remaining steps are to be performed in reverse order as compared with removal

Crankshaft (8AT)

Structure Diagram of

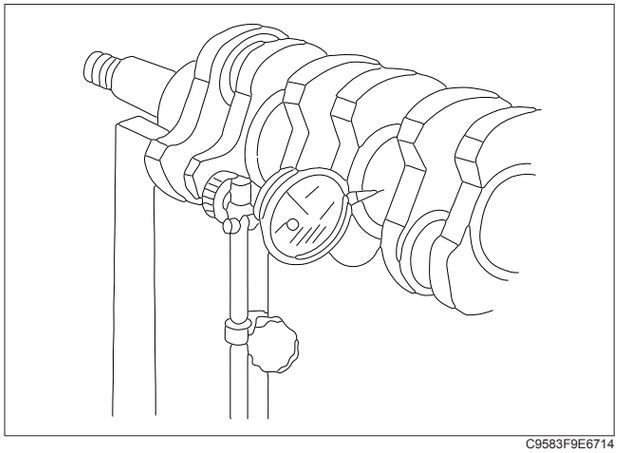


0C7D68C21947

1. Crankshaft position signal panel
2. Crankshaft assembly
3. Woodruff key
4. Crankshaft gasket
5. Crankshaft timing pulley component
6. Elastic cylindrical pin
7. Crankshaft timing pulley bolt
8. Damping pulley assembly
9. Flexible flywheel assembly
10. Flexible flywheel bolt

Crankshaft check

1. Check radial run-out of crankshaft



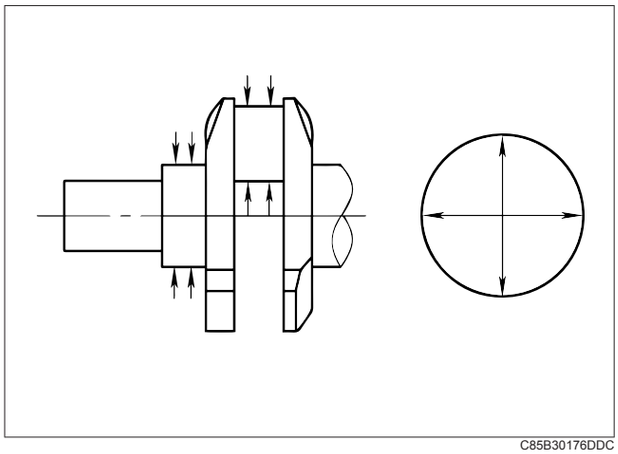
C9583F9E6714

Place crankshaft on the V-shaped block carefully. Slowly rotate crankshaft and measure radial run-out.

Radial run-out of crankshaft	Parameters (mm)
Standard value	0.03

When radial runout of crankshaft goes beyond the limit, replace the crankshaft.

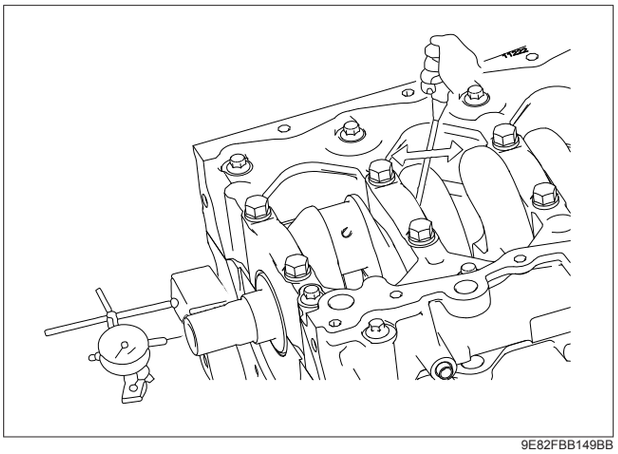
2. Measure the diameter of main journal of crankshaft and link journal of crankshaft



C85B30176DDC

Item	Parameters (mm)
Diameter of the main journal of crankshaft	60.002～60.020
Diameter of crankshaft link journal	50.008～50.026

3. Check thrust clearance of crankshaft



9E82FBB149BB

Install dial indicator as shown, and measure thrust clearance of crankshaft.

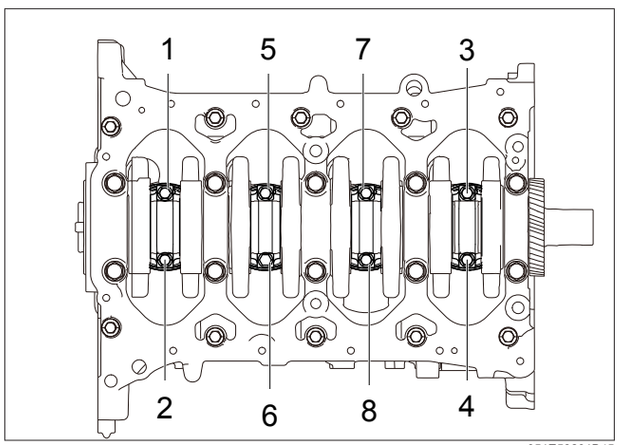
Thrust clearance of crankshaft	Parameters (mm)
Standard value	0.10～0.29

If thrust clearance exceeds the specified value, replace thrust plates in groups.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Empty engine lubricant
5. Remove engine assembly
6. Remove generator belt
7. Remove rear crankshaft oil seal
8. Remove oil pan assembly
9. Remove engine oil pump assembly
10. Remove balance shaft assembly
11. Loosen 8 link bolts in the order shown



051E58201B45

Notice

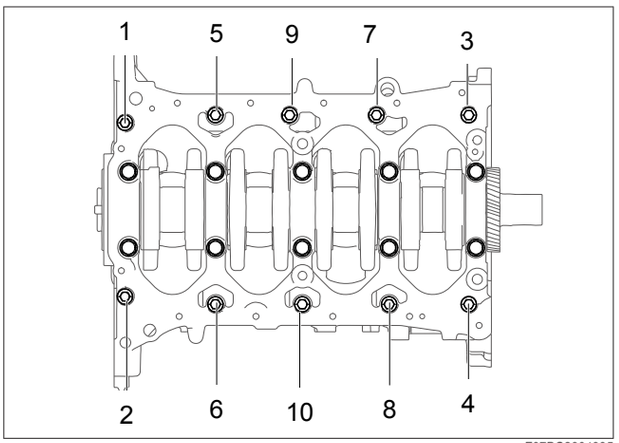
› Link bolts are disposable parts.

12. Remove 4 link caps and 4 lower link bearings

Notice

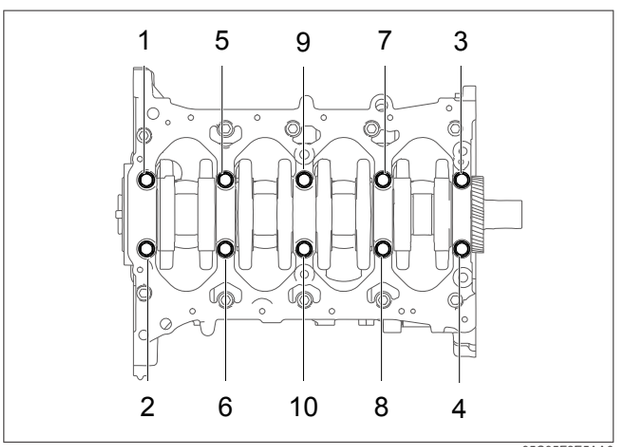
› Do not damage the upper and lower link bearings in removal process.

13. Loosen 10 bolts connecting upper and lower cylinder blocks in the order shown



F07BC2304335

14. Loosen 10 main bearing cap bolts in the order shown

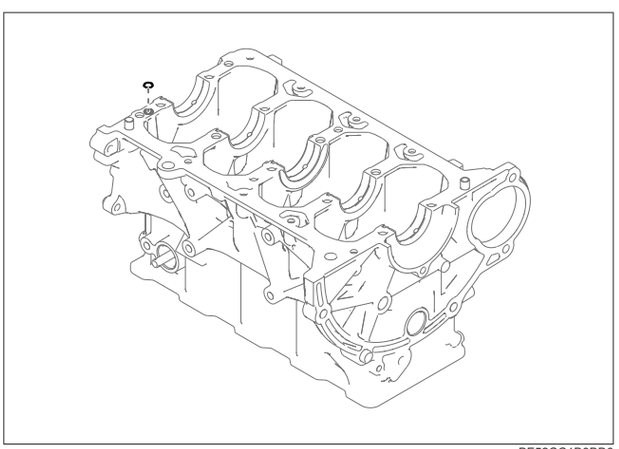


95C95F2E5AA6

Notice

› Main bearing cap bolts are disposable parts.

15. Remove lower cylinder block
16. Remove O-ring at the front end of upper cylinder block



BF52CC1B3BB6

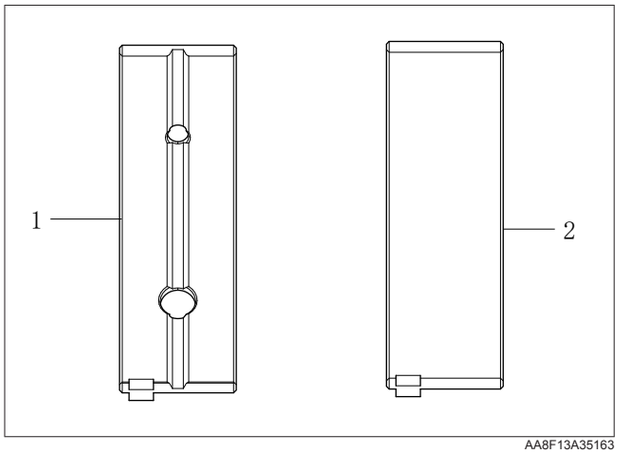
Notice

› O-rings are disposable parts.

17. Remove crankshaft with crankshaft position signal panel
18. Remove lower thrust plate

Installation

1. Apply an appropriate amount of lubricant to inner surface of main bearing shell
2. Install main bearing shell to upper cylinder block and lower cylinder block



AA8F13A35163

In the diagram:

1 - Upper main bearing shell

2 - Lower main bearing shell

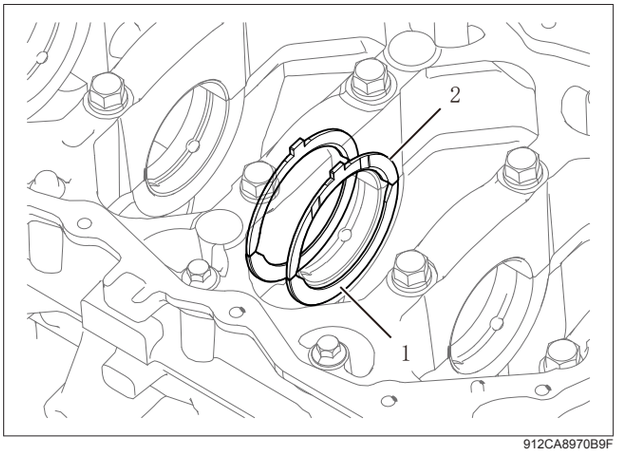
Notice

› Main bearing shell shall be matched according to diameter group of main bearing hole of cylinder block and diameter group of main journal hole of crankshaft.

› Install upper main bearing shell with oil sink and oil hole on upper cylinder block; Install lower main bearing shell without oil sink and oil hole on lower cylinder block. Mismatch in installation is never allowed.

› Used main bearing shells are not interchangeable.

3. Apply an appropriate amount of lubricant between thrust plate of crankshaft and thrust face of crank arm
4. Apply grease respectively on non-oil sink side of lower thrust plates, with grease width (2 ± 1) mm and length (10~ 15) mm to prevent them from falling during installation
5. Install upper thrust plate in spigot of upper cylinder block with its oil sink side facing the crank arm; install lower thrust plate in spigot of lower cylinder block with its non-oil sink side facing the crank arm



912CA8970B9F

In the diagram:

1 - Upper thrust plate

2 - Lower thrust plate

Notice

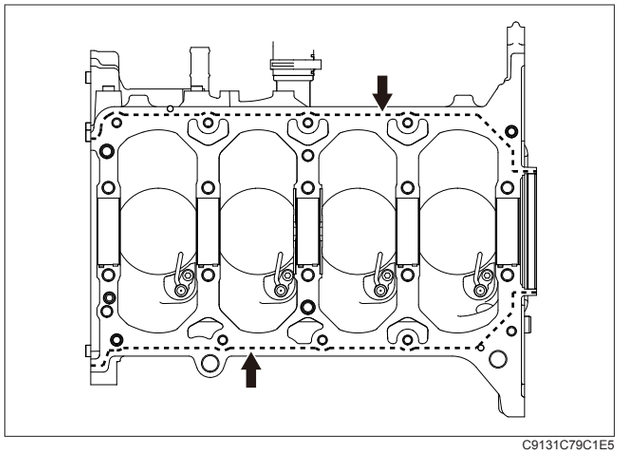
› No positioning tabs are provided for upper thrust plate, and positioning tabs are provided for lower thrust plate.

6. After assembly is completed, apply an appropriate amount of lubricant to the position oil sink of lower thrust plate
7. Set crankshaft with crankshaft signal panel assembly
8. Apply an appropriate amount of lubricant to main journal of crankshaft assembly and rotate the crankshaft a circle to make gear oil even on inner side of upper main bearing shell and main journal

Notice

› Avoid shifting of upper main bearing shell in rotation of crankshaft.

9. Apply sealant to the bottom of upper cylinder block

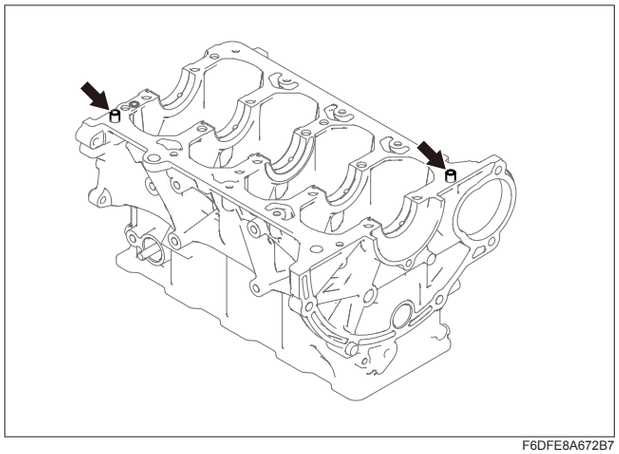


C9131C79C1E5

Type: Loctite 5188 anaerobic plane sealant

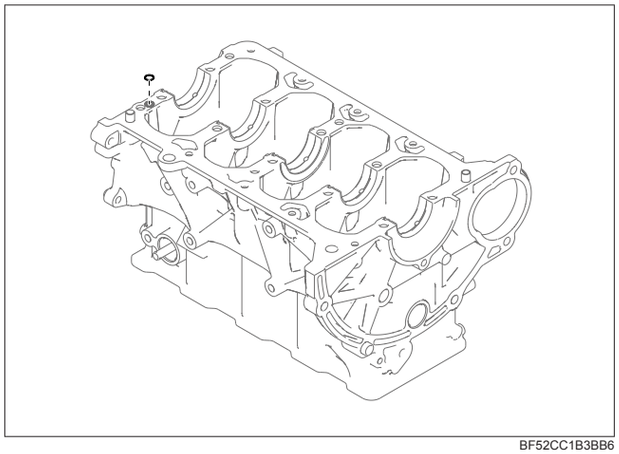
Sealant line diameter: (1.5±0.3) mm

10. Align alignment sleeve of upper cylinder block and install lower cylinder block



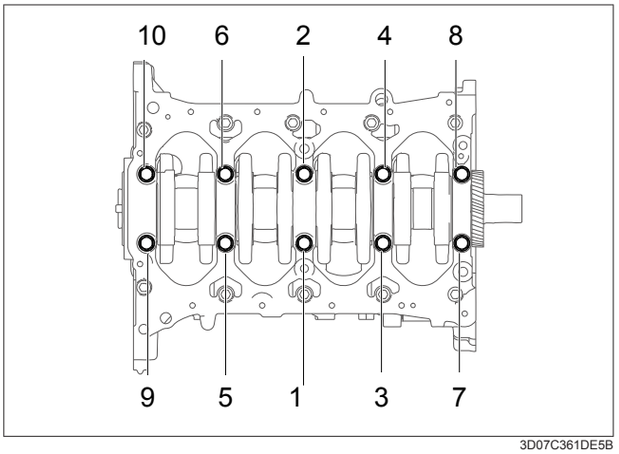
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11. Install new O-ring at the front end of upper cylinder block



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12. Tighten 10 new main bearing cap bolts in three steps in the order shown



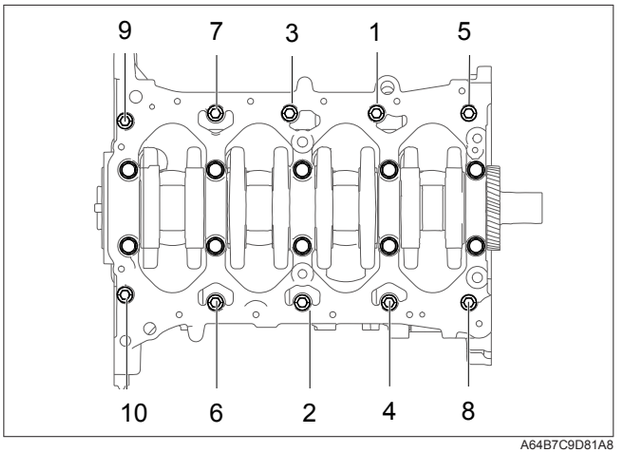
3D07C361DE5B

Step 1: pre-tightening torque 40N·m

Step 2: rotate 90°

Step 3: turn 90°

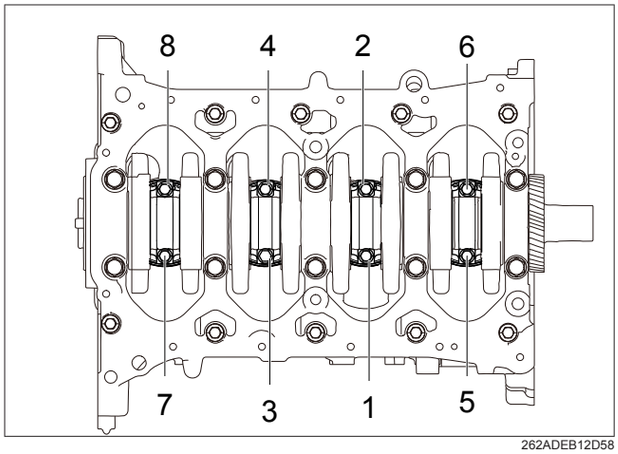
13. Tighten 10 bolts in the sequence as shown on the diagram



A64B7C9D81A8

Tightening torque: (35±3) N·m

14. Install link caps and new link bolts, and tighten the link bolts twice in the order shown.



262ADEB12D58

Step 1: pre-tightening torque: 25N·m

Step 2: rotate 90°

Notice

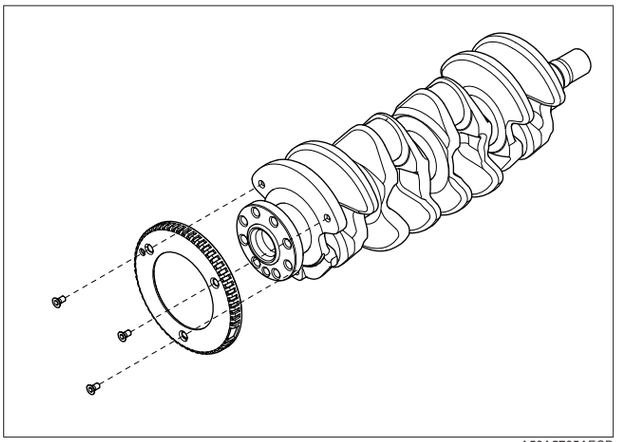
› Rotate both bolts 90° after they are pre-tightened to 25 N·m.

15. Install oil pan assembly
16. Install engine oil pump assembly
17. Install rear crankshaft oil seal
18. Install generator bracket
19. Install generator belt
20. Install engine assembly
21. Install negative terminal of the battery
22. Add engine lubricant
23. Add engine coolant

Disassembly/assembly

Disassembly

1. Disconnect the negative terminal of the battery.
2. Remove crankshaft assembly
3. Remove 3 bolts for fastening signal panel at the rear end of crankshaft


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Notice

› Do not remove it if not necessary.

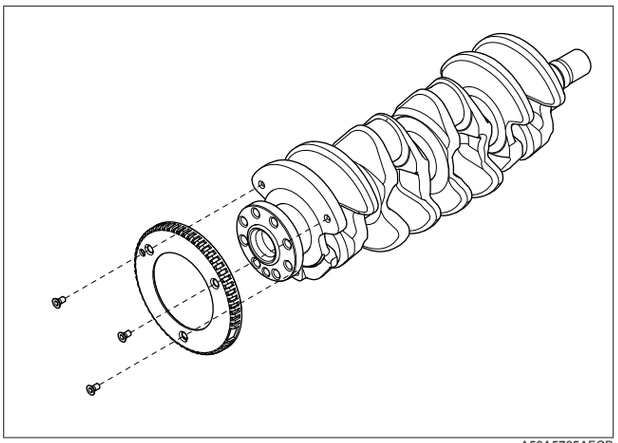
4. Remove crankshaft position signal panel

Notice

› Crankshaft signal panel and bolts for crankshaft signal panel are disposable parts.

Assembly

1. Install new crankshaft position signal panel on the 8th crank arm of crankshaft


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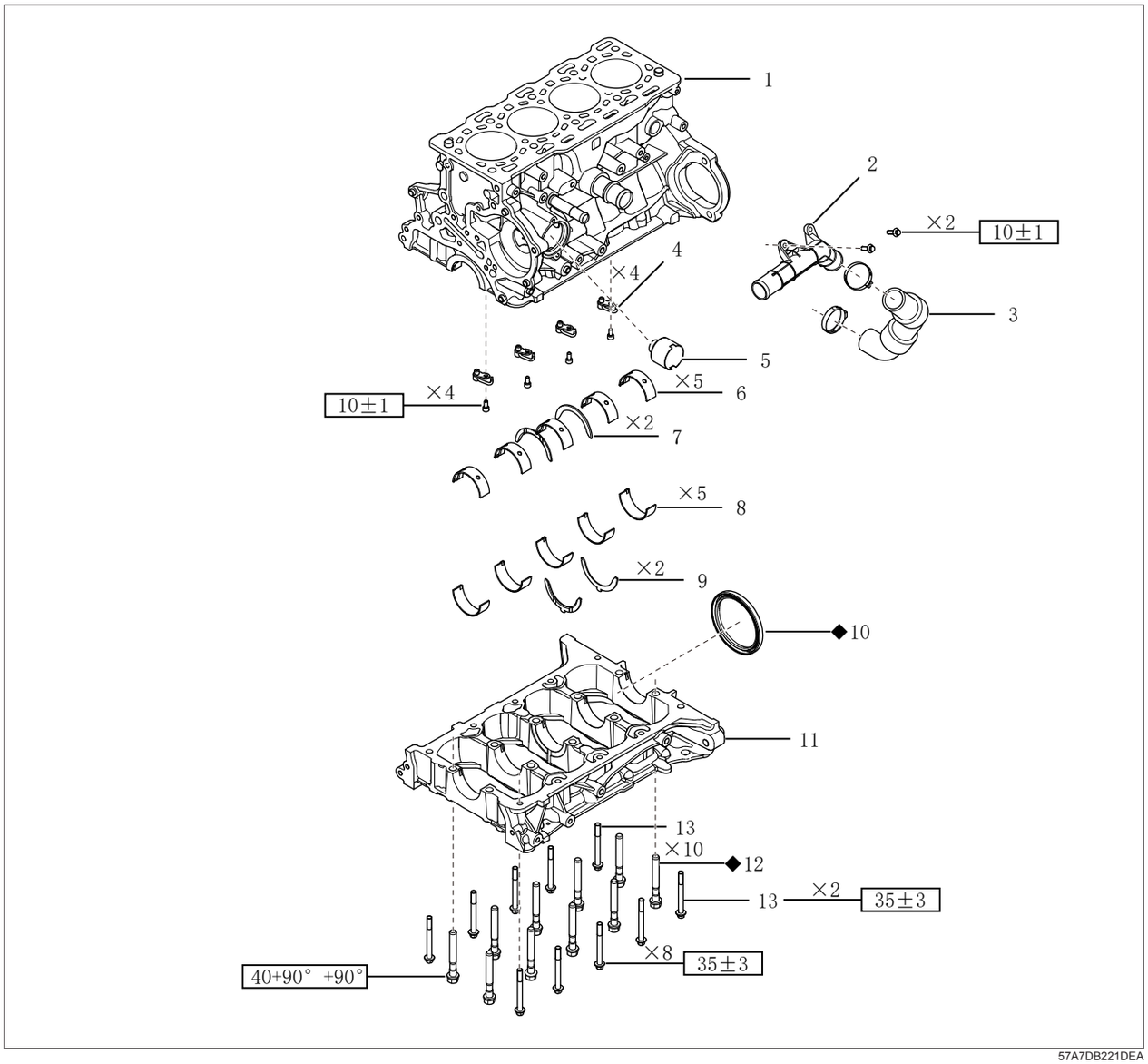
2. Tighten 3 bolts

Tightening torque: (12±1.5) N·m

3. Remaining steps are to be performed in reverse order as compared with removal

Cylinder block (6MT)

Structural diagram

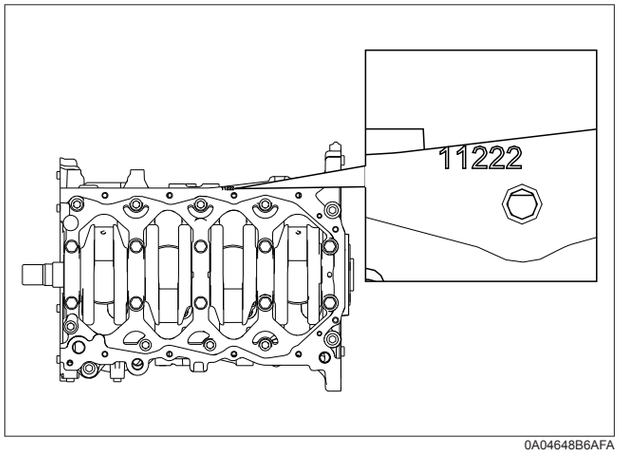


57A7DB221DEA

1. Upper cylinder block
2. Connecting pipe components of water outlet
3. Connecting hose components of water outlet
4. Cooling nozzle assembly
5. Thermostat hood
6. Upper main bearing shell
7. Upper thrust plate
8. Lower main bearing shell
9. Lower thrust plate
10. Rear crankshaft oil seal assembly
11. Lower cylinder block
12. Main bearing cap bolt
13. Fastening bolt of lower cylinder block

Main bearing shell matching

1. Confirm groups of main bearing hole diameter of cylinder block

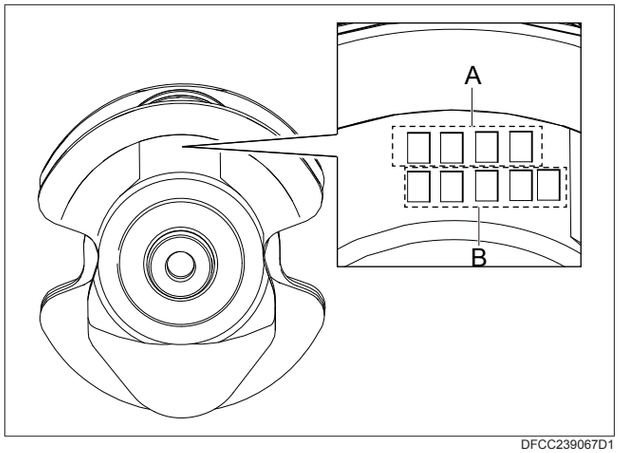


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The first to fifth group numbers of main bearing hole diameter is from left to right in sequence

Group No.	Parameters (mm)
1	φ64.000～φ64.006
2	＞ φ64.006～φ64.012
3	＞ φ64.012～φ64.018

2. Confirm groups of main journal diameter of crankshaft



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Mark B: the first to fifth group numbers of main bearing diameter is from left to right in sequence

Group No.	Parameters (mm)
1	＞ φ60.014～φ60.020
2	＞ φ60.008～φ60.014
3	φ60.002～φ60.008

3. Confirm groups of main bearing shell thickness

Group No.	Parameters (mm)
1	1.976～1.980
2	＞ 1.980～1.984
3	＞ 1.984～1.988

4. Main bearing shell matching

Group No. of main bearing hole of cylinder block + group No. of main journal of crankshaft	Group No. of main bearing shell	Clearance parameters (mm)
＝ 2～3	1	0.020～0.046
＝ 4	2	0.024～0.044
＝ 5～6	3	0.022～0.048

Notice

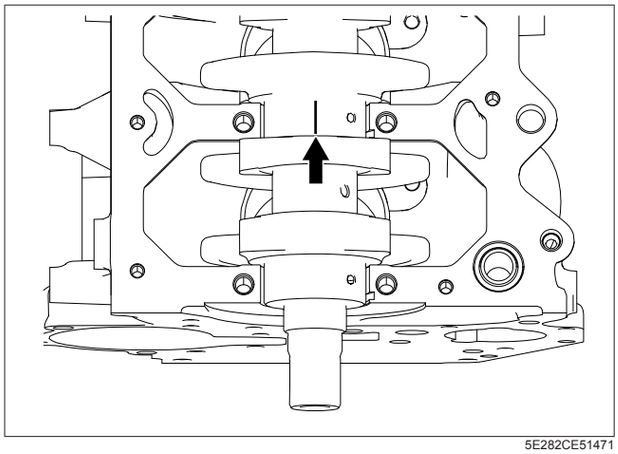
› Main bearing shell group identifications (i.e., 1, 2 and 3) are provided at steel-backed lip.

Inspection of the oil film clearance of main bearing shell

Notice

› When checking the clearance of oil film, do not turn the crankshaft to avoid measurement error.

1. Remove lower cylinder block and lower main bearing shell
2. Install plastic clearance gauge on main journal of crankshaft

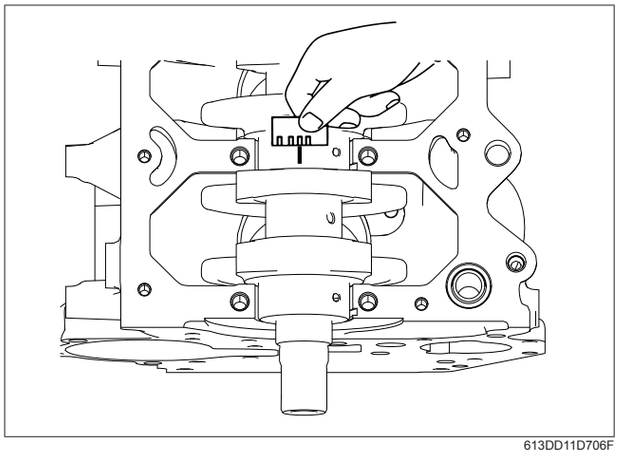


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Notice

› The plastic clearance gauge must be set in the center of main bearing shell.

3. Install lower cylinder block and lower main bearing shell
4. Remove lower cylinder block and lower main bearing shell
5. Measure width of plastic clearance gauge and determine oil clearance



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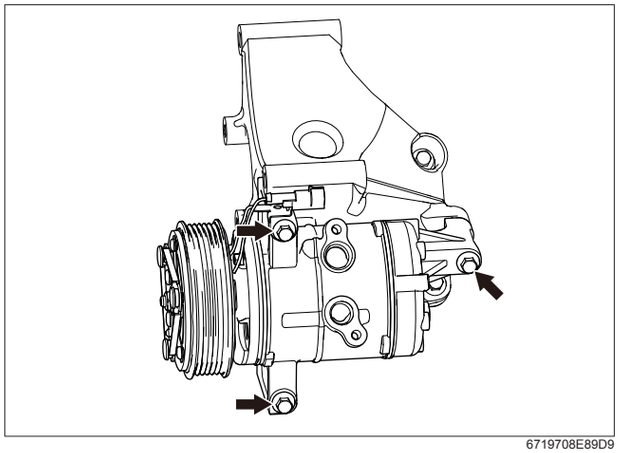
Item	Parameters (mm)
Oil clearance	0.020～0.048

If oil clearance exceeds specified value, replace main bearing shell and/or crankshaft in groups.

Removal/installation

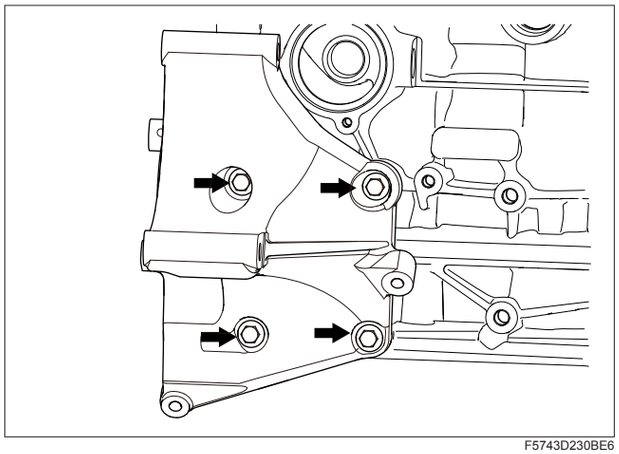
Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Empty engine lubricant
5. Remove engine assembly
6. Remove steering pump belt
7. Remove generator belt
8. Remove 3 bolts, and remove refrigerating compressor assembly



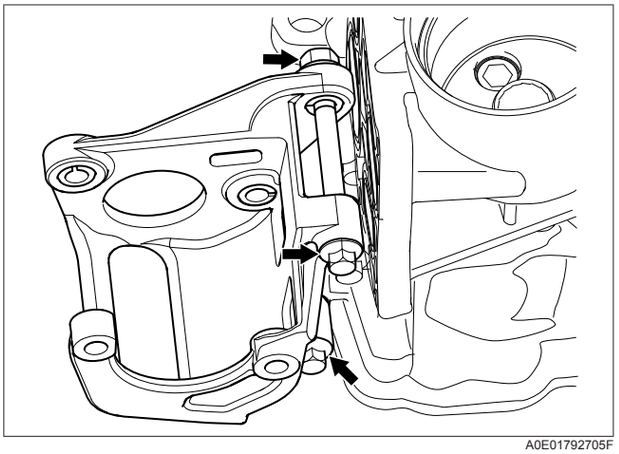
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9. Remove generator assembly
10. Remove 4 bolts, and remove compressor bracket



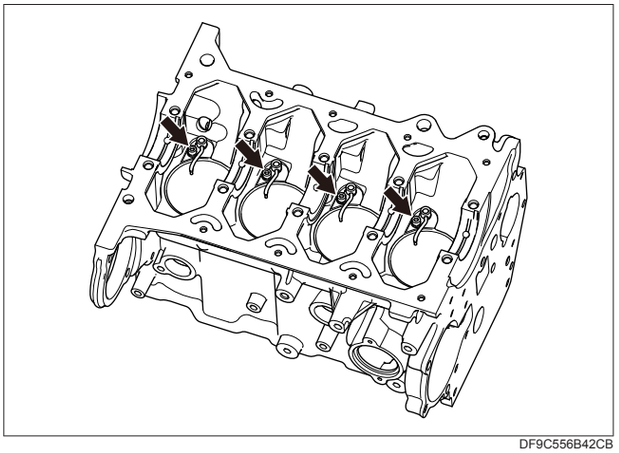
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11. Remove power-steering oil pump assembly
12. Remove 2 bolts, and remove steering pump bracket and 1 nut



A0E01792705F

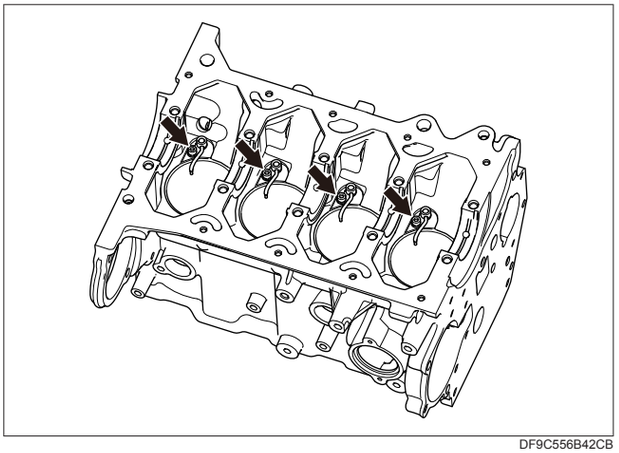
13. Remove engine oil pump assembly
14. Remove cylinder head assembly
15. Remove piston link assembly
16. Remove crankshaft assembly
17. Remove piston cooling nozzle



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Installation

1. Install cooling nozzle assembly

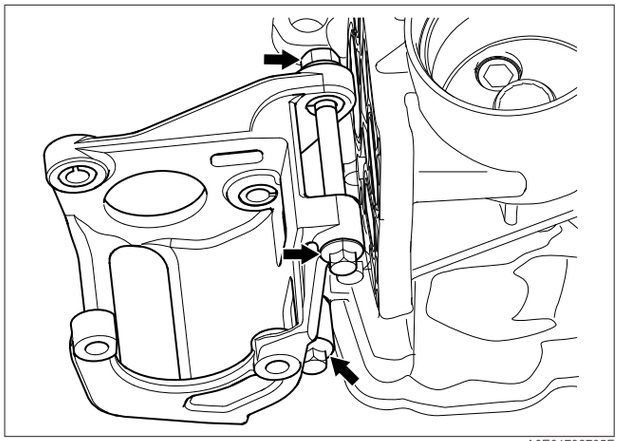


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2. Tighten 4 bolts

   Tightening torque: (10±1) N·m

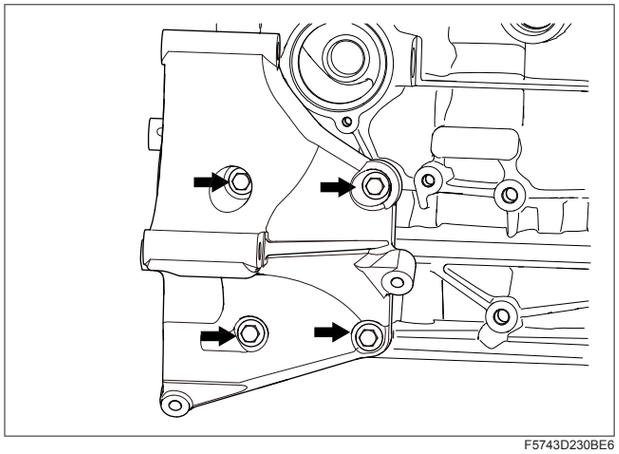
3. Install crankshaft assembly
4. Install piston link assembly
5. Install cylinder head assembly
6. Install steering pump bracket, tighten 2 bolts and 1 nut



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   Tightening torque: (24±2) N·m

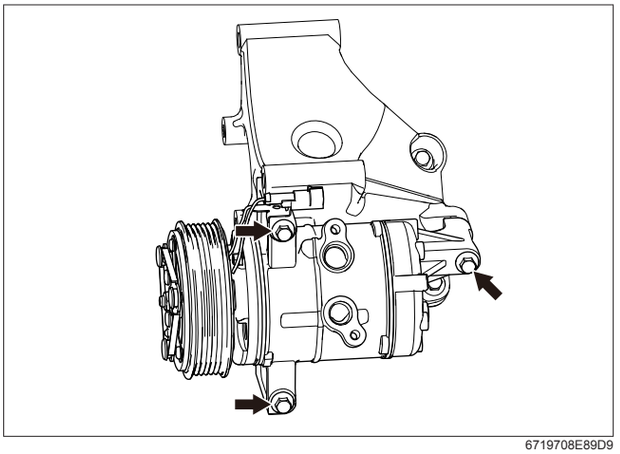
7. Install compressor bracket, and tighten 4 bolts



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   Tightening torque: (24±2) N·m

8. Install refrigerating compressor assembly, and tighten 3 bolts



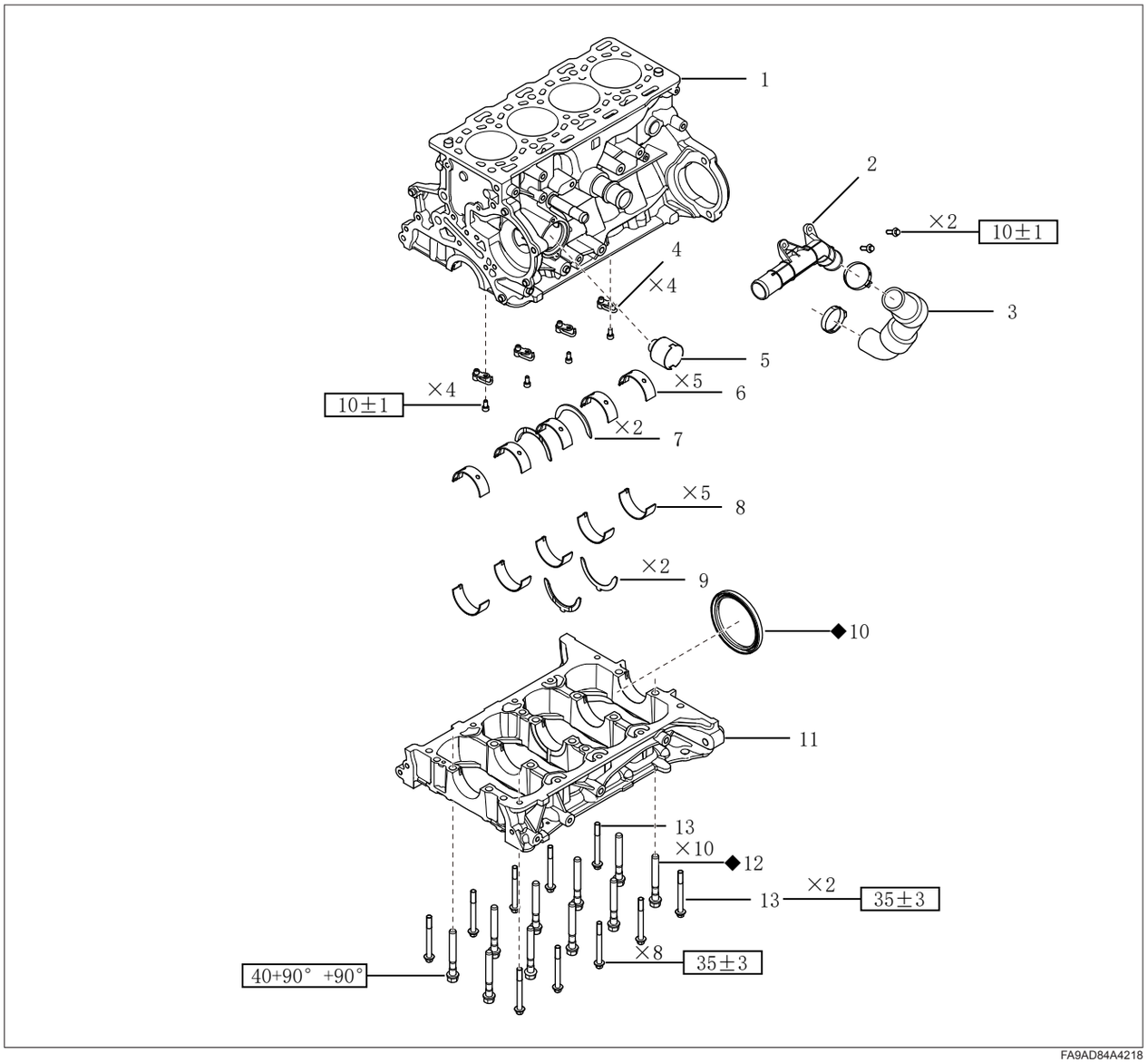
6719708E89D9

   Tightening torque: (24±2) N·m

9. Install generator assembly
10. Install generator belt
11. Install steering pump belt
12. Install engine assembly
13. Install negative terminal of the battery
14. Add engine lubricant
15. Add engine coolant

Cylinder block (8AT)

Structural diagram

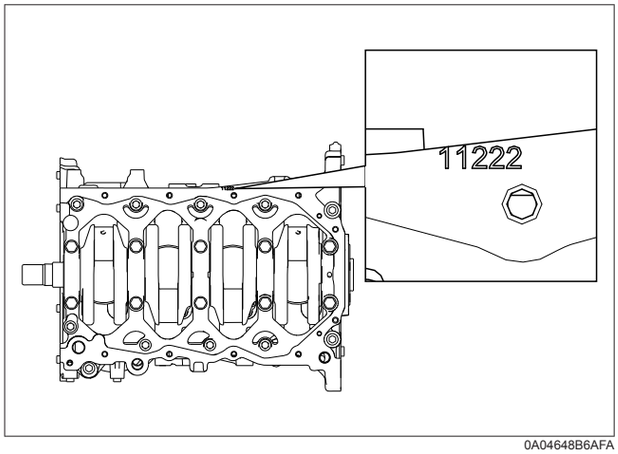


FA9AD84A4218

1. Upper cylinder block
2. Connecting pipe components of water outlet
3. Connecting hose components of water outlet
4. Cooling nozzle assembly
5. Thermostat hood
6. Upper main bearing shell
7. Upper thrust plate
8. Lower main bearing shell
9. Lower thrust plate
10. Rear crankshaft oil seal assembly
11. Lower cylinder block
12. Main bearing cap bolt
13. Fastening bolt of lower cylinder block

Main bearing shell matching

1. Confirm groups of main bearing hole diameter of cylinder block

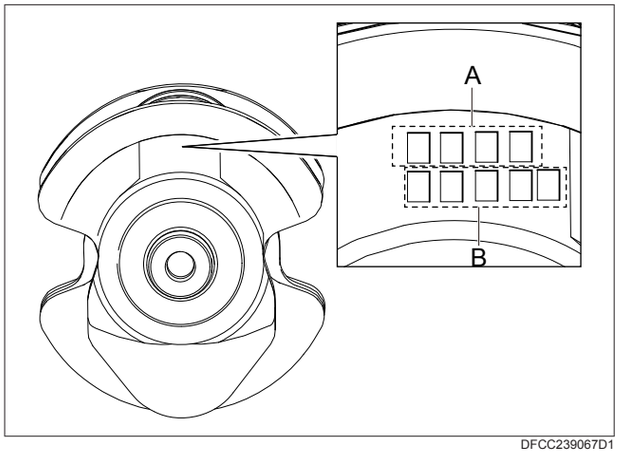


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The first to fifth group numbers of main bearing hole diameter is from left to right in sequence

Group No.	Parameters (mm)
1	φ64.000～φ64.006
2	＞ φ64.006～φ64.012
3	＞ φ64.012～φ64.018

2. Confirm groups of main journal diameter of crankshaft



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Mark B: the first to fifth group numbers of main bearing diameter is from left to right in sequence

Group No.	Parameters (mm)
1	＞ φ60.014～φ60.020
2	＞ φ60.008～φ60.014
3	φ60.002～φ60.008

3. Confirm groups of main bearing shell thickness

Group No.	Parameters (mm)
1	1.976～1.980
2	＞ 1.980～1.984
3	＞ 1.984～1.988

4. Main bearing shell matching

Group No. of main bearing hole of cylinder block + group No. of main journal of crankshaft	Group No. of main bearing shell	Clearance parameters (mm)
＝ 2～3	1	0.020～0.046
＝ 4	2	0.024～0.044
＝ 5～6	3	0.022～0.048

Notice

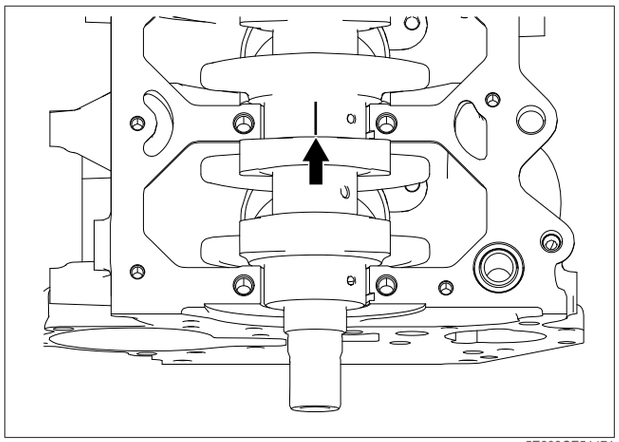
› Main bearing shell group identifications (i.e., 1, 2 and 3) are provided at steel-backed lip.

Inspection of the oil film clearance of main bearing shell

Notice

› When checking the clearance of oil film, do not turn the crankshaft to avoid measurement error.

1. Remove lower cylinder block and lower main bearing shell
2. Install plastic clearance gauge on main journal of crankshaft

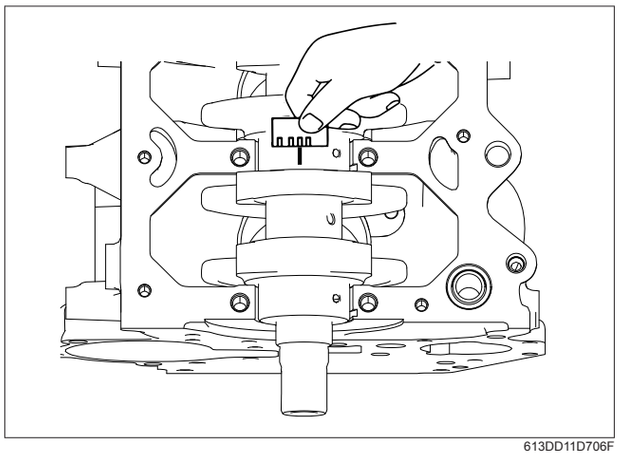


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Notice

› The plastic clearance gauge must be set in the center of main bearing shell.

3. Install lower cylinder block and lower main bearing shell
4. Remove lower cylinder block and lower main bearing shell
5. Measure width of plastic clearance gauge and determine oil clearance



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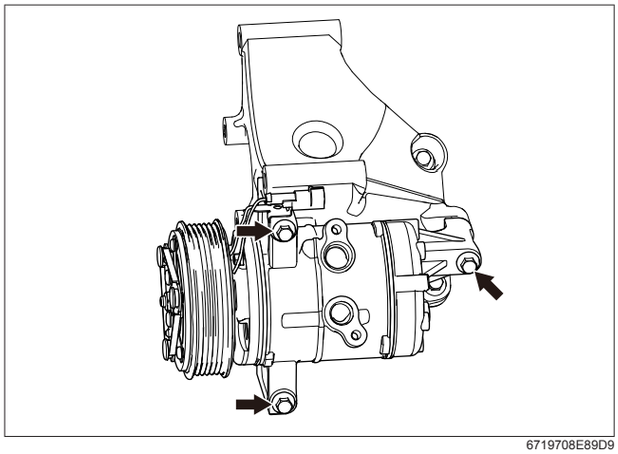
Item	Parameters (mm)
Oil clearance	0.020～0.048

If oil clearance exceeds specified value, replace main bearing shell and/or crankshaft in groups.

Removal/installation

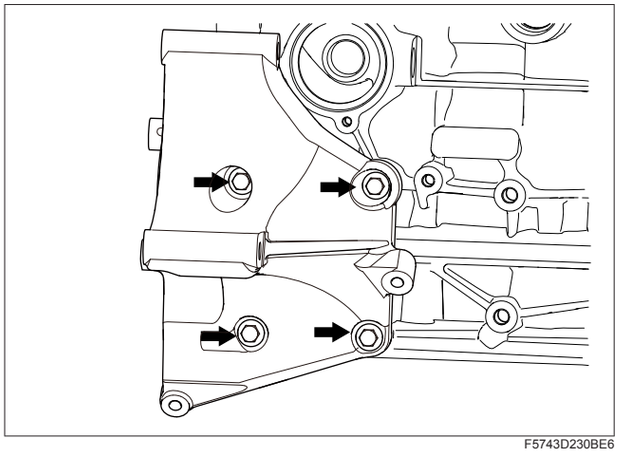
Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Empty engine lubricant
5. Remove engine assembly
6. Remove generator belt
7. Remove 3 bolts, and remove refrigerating compressor assembly



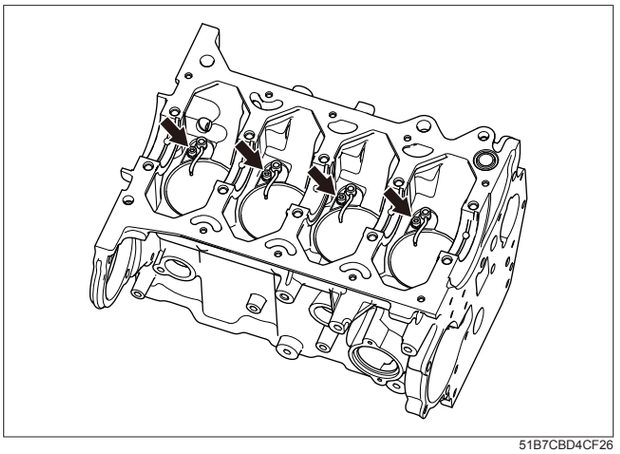
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8. Remove generator assembly
9. Remove 4 bolts, and remove compressor bracket



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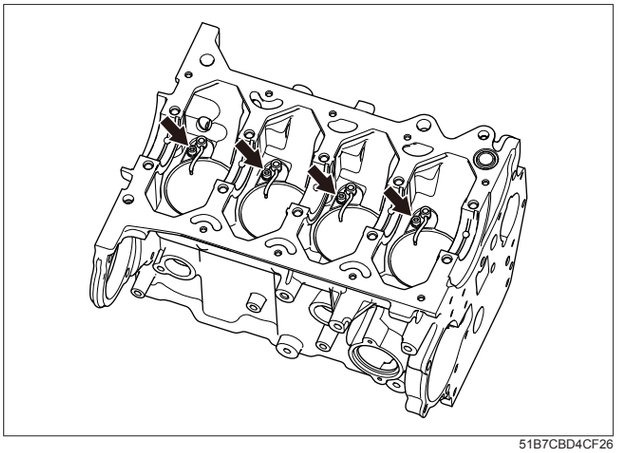
10. Remove engine oil pump assembly
11. Remove cylinder head assembly
12. Remove piston link assembly
13. Remove crankshaft assembly
14. Remove piston cooling nozzle



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Installation

1. Install cooling nozzle assembly

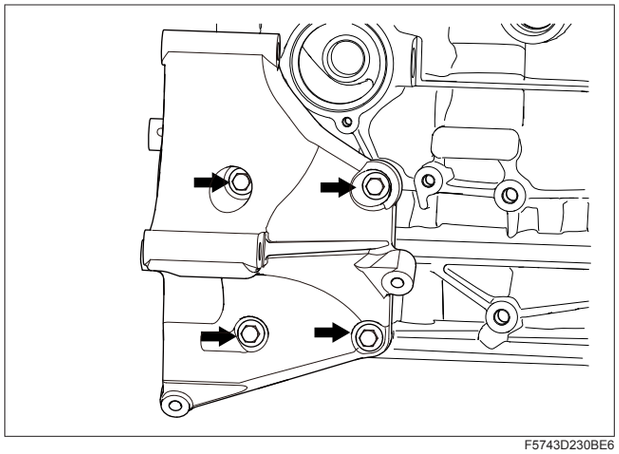


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2. Fasten the 4 bolts

   Tightening torque: (10 ± 1) N·m
3. Install crankshaft assembly
4. Install piston link assembly
5. Install cylinder head assembly

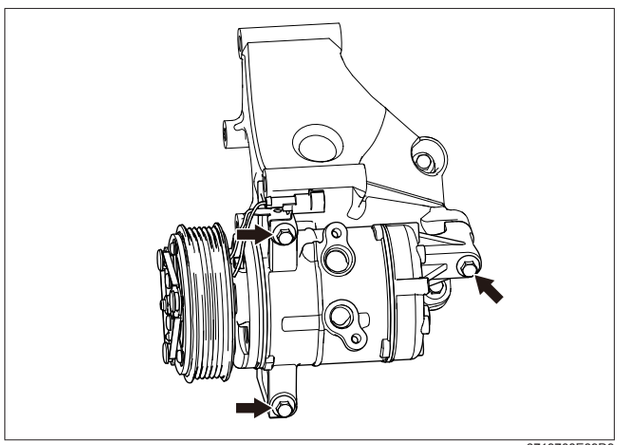
6. Install compressor bracket, and tighten 4 bolts



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Tightening torque: (24 ± 2) N·m

7. Install refrigerating compressor assembly, and tighten 3 bolts



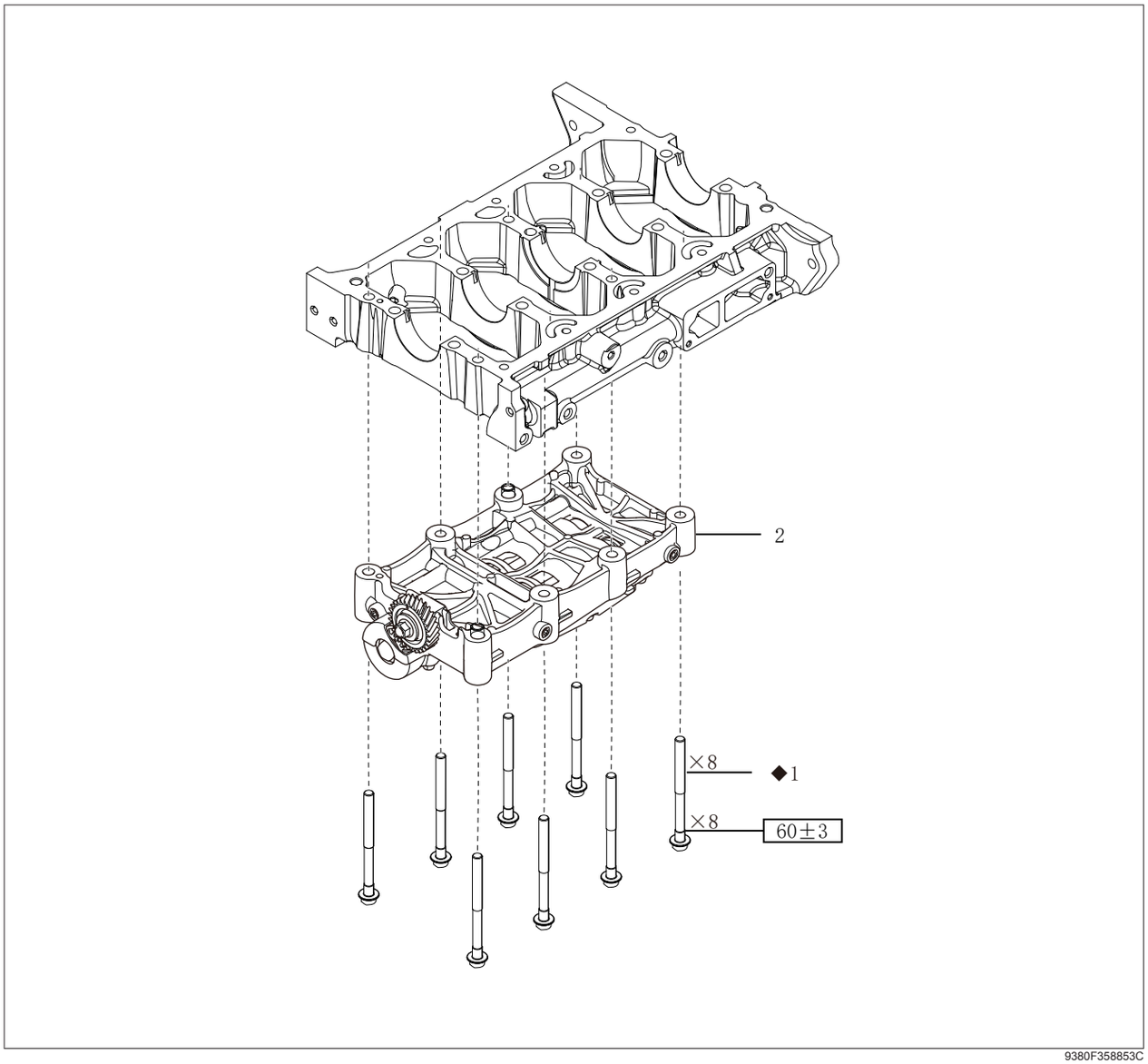
6719708E89D9

Tightening torque: (24 ± 2) N·m

8. Install generator assembly
9. Install generator belt
10. Install engine assembly
11. Install negative terminal of the battery
12. Add engine lubricant
13. Add engine coolant

Balance shaft

Structural diagram



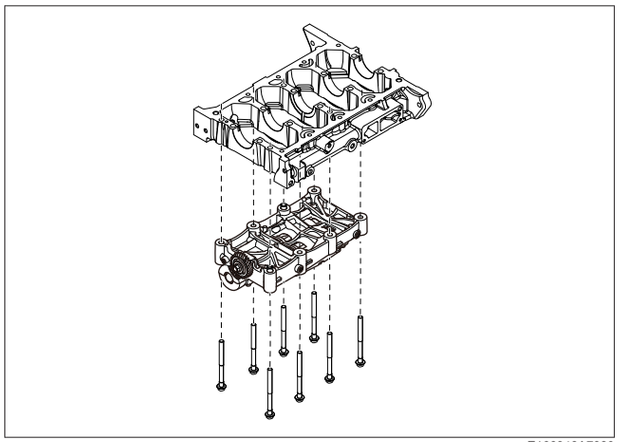
9380F358853C

1. Balance shaft bolt 2
2. Balance shaft assembly

Removal/installation

Removal

1. Drain engine oil
2. Lift the vehicle to a proper position
3. Remove oil pan assembly
4. Remove engine oil collector assembly
5. Remove 8 balance shaft bolts 2, and remove balance shaft assembly



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Notice

› Balance shaft bolts 2 are disposable parts.

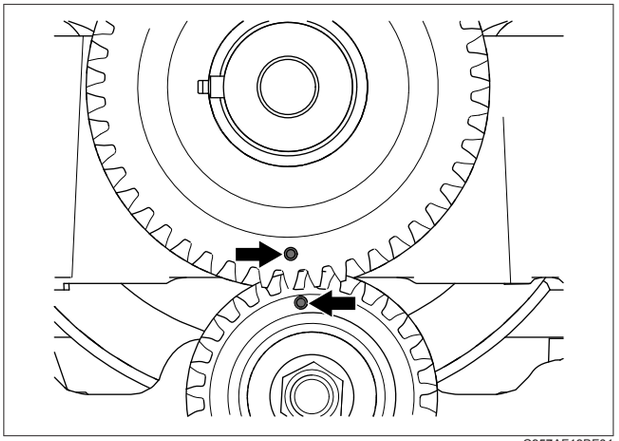
Installation

1. Apply cleaning engine oil to each balance shaft gear and check that the balance shaft assembly rotates freely
2. Turn the crankshaft clockwise to the position of top dead center of cylinder 1 and 4

Caution

› Do not turn the crankshaft counterclockwise (toward the front end of the engine).

3. Align the gear timing mark on balance shaft idler assembly and the timing mark on the crankshaft drive gear

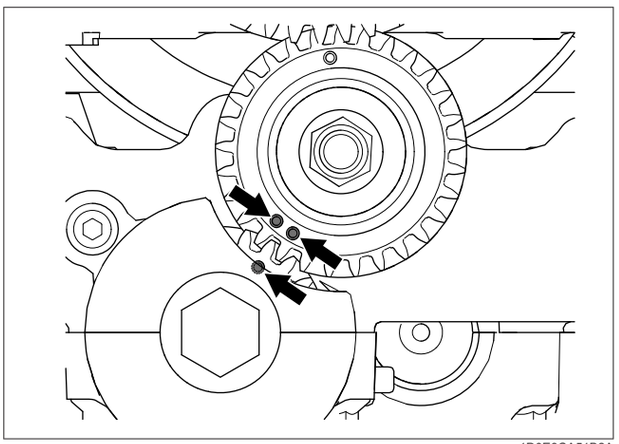


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Caution

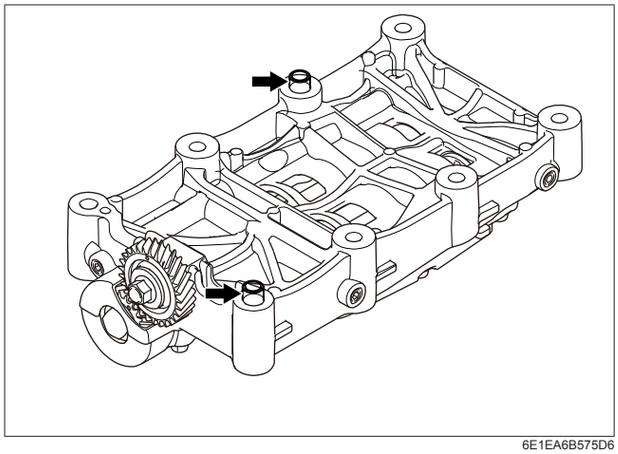
› If there are 2 mark holes on the crankshaft drive gear, take the shallow hole as the timing mark hole.

4. Check that the drive gear of balance shaft and the gear of idler assembly are aligned



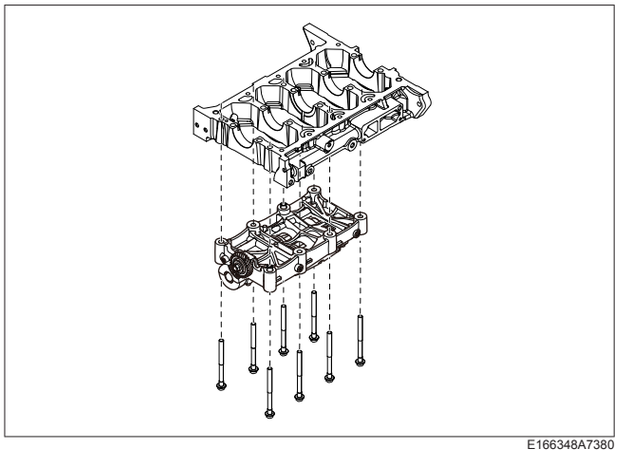
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5. Align the alignment sleeve, install balance shaft assembly to lower cylinder block



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6. Tighten 8 new balance shaft bolts 2



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Tightening torque: (60±3) N·m

7. Check that the balance shaft rotates freely. The timing mark on balance shaft gear and the timing mark on crankshaft gear shall be aligned after rotating the crankshaft clockwise by two turns

⚠ Caution

› Do not turn the crankshaft counterclockwise (toward the front end of the engine).

8. Install the engine oil collector assembly
9. Install oil pan assembly
10. Lower the vehicle
11. Fill the engine oil

Intake/exhaust system (GW4D20M)

Intake/exhaust system.....5－1
Specified torque.....5－1
Air mass flow meter.....5－3
Operating principle.....5－3
Structural diagram.....5－5
Pin definition.....5－6
Check.....5－6
Removal/installation.....5－7
Intake pressure and temperature sensor.....5－8
Operating principle.....5－8
Structural diagram.....5－9
Pin definition.....5－10
Check.....5－10
Removal/installation.....5－11
Electronic throttle.....5－12
Operating principle.....5－12
Structural diagram.....5－13
Pin definition.....5－14
Check.....5－14
Cleaning.....5－15
Self-Learning.....5－16
Removal/installation.....5－16
Air filter element.....5－19
Structural diagram.....5－19
Removal/installation.....5－20
Air filter.....5－21
Structural diagram.....5－21
Removal/installation.....5－22
Intercooler.....5－24
Structural diagram.....5－24
Removal/installation.....5－25
Air intake manifold.....5－27
Operating principle.....5－27
Structural diagram.....5－28
Pin definition.....5－29
Check.....5－29
Removal/installation.....5－30
Exhaust manifold.....5－34
Structural diagram.....5－34
Removal/installation.....5－35
Muffler.....5－38
Structural diagram.....5－38

Removal/installation.....5－39

Intake/exhaust system

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Turbine worm hoop	Air filter x air filter outlet pipe	3.5±0.5	1	—
Turbine worm hoop	Air filter outlet pipe x turbocharger	5.5±0.5	1	—
Bolt	Air filter intake pipe x vehicle body	9±1	1	—
Bolt	Air filter x vehicle body	23±3	3	—
Screw	Air mass flow meter x air filter	1.3~1.5	2	—
Nut	Intercooler intake pipe x turbocharger	23±3	2	—
Nut	Intercooler intake pipe × engine	23±3	1	—
Nut	Intercooler x radiator	9±1	2	—
Bolt	Intercooler x radiator	9±1	2	—
Turbine worm hoop	Intercooler intake hose x intercooler air inlet pipe	5.5±0.5	1	—
Turbine worm hoop	Intercooler intake hose x intercooler	5.5±0.5	1	—
Turbine worm hoop	Intercooler air outlet hose x electronic throttle	5.5±0.5	1	—
Bolt	Front section of exhaust pipe x muffler	55±5	2	—
Exhaust hoop	Front section of exhaust pipe x particulate filter	15±1	1	—
Bolt	Rear section of exhaust pipe x muffler	55±5	2	—
Stud	Intake manifold assembly × cylinder head	10±3	2	—
Nut	Intake manifold assembly × cylinder head	24±2	2	—
Bolt	Intake manifold assembly × cylinder head	24±2	7	—
Bolt	Intake adapter bracket x cylinder block	24±2	2	—
Bolt	Intake adapter bracket x intake adapter components	24±2	1	—
Bolt	Intake adapter components x intake manifold assembly	10±1	4	—
Bolt	Air throttle × inlet adapter	10±1	4	—

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Intake pressure and temperature sensor x intake manifold	10±1	2	—
Stud	Exhaust manifold x cylinder head	12±4	10	—
Nut	Exhaust manifold × cylinder head	30±3	10	—
Bolt	Thermal shroud at front end of exhaust manifold x exhaust manifold	10±1	3	—
Bolt	Thermal shroud at rear end of exhaust manifold x exhaust manifold	10±1	3	—

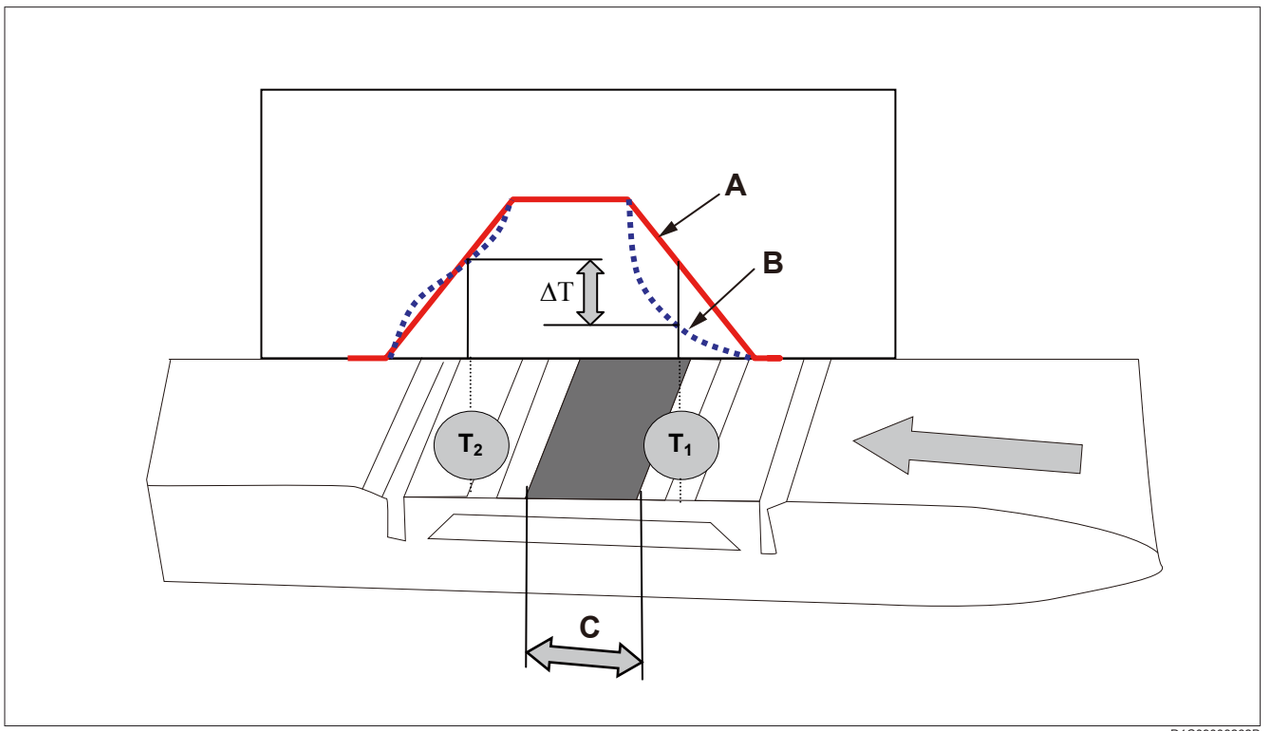
Air mass flow meter

Operating principle

Air flow meter is a hot-film flow meter. A diaphragm is attached on the sensor; heating area is in the middle of the diaphragm with temperature sensors symmetrically arranged on both sides.

Temperature of heating area is controlled based on intake temperature of air flowing through the sensing element via bypass air passage. In case of no air flow, the temperature of heating area to the edge of diaphragm reduces linearly. Upstream and downstream temperature sensors have the same temperature. When there is an air flow, the diaphragm part in upstream heating area is cooled through heat transfer of boundary layers. However, the temperature of downstream temperature sensor remains almost unchanged. There is a certain temperature difference between the two temperature sensors, which is related to the air flow and direction. The difference signal of the two sensors is processed by a bridge circuit. Flow characteristic curve after temperature compensation can be obtained through digital processing of measured bridge voltage and intake temperature sensor signal.

Schematic diagram is as follows:



D1C09008262B

In the diagram:

A: no air flows through

B: air flows through

C: heating area

ΔT: temperature signal

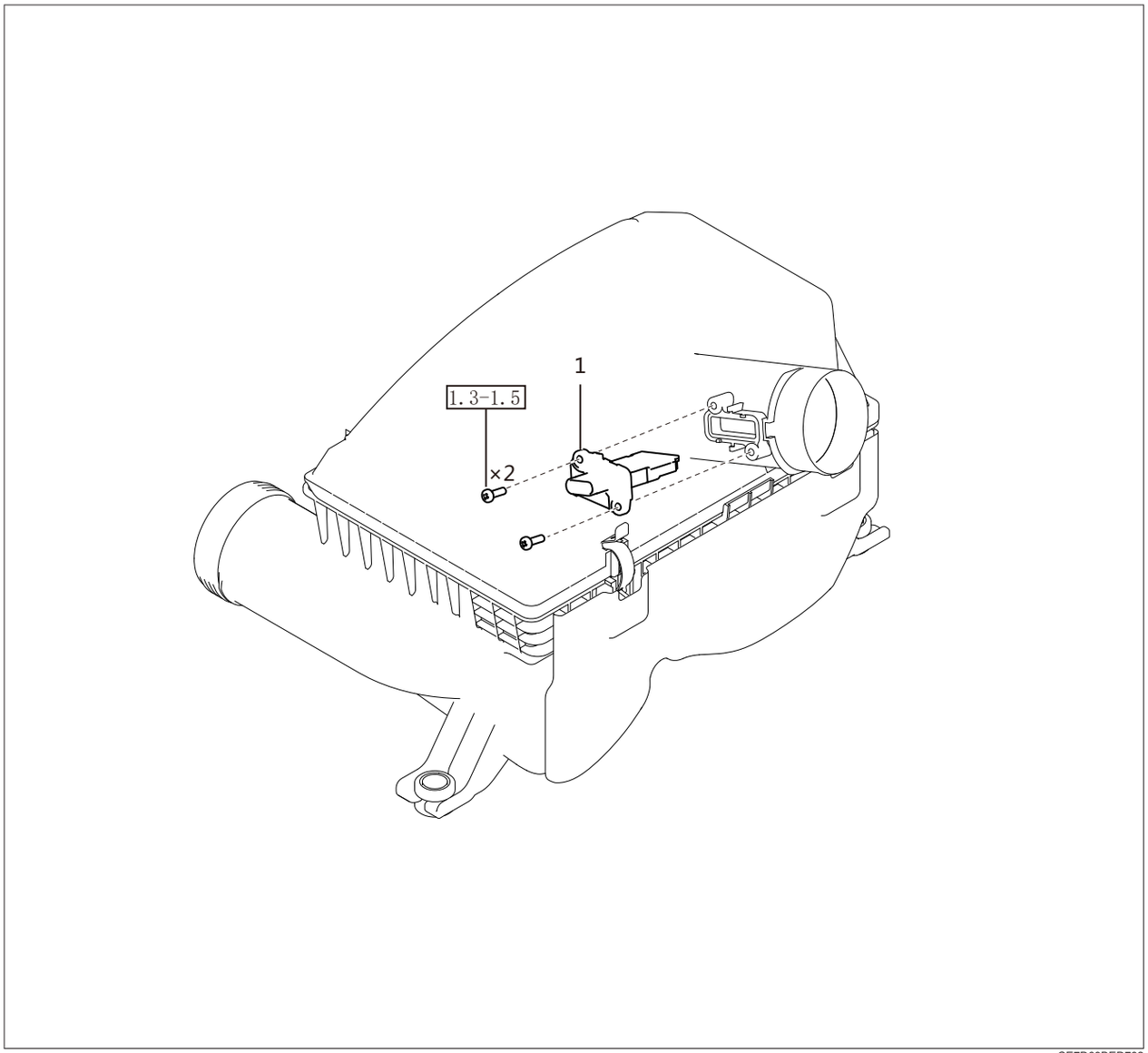
Fault description and judgment:

When the engine is running, the engine fault indicator (CHECKENGINE) lights up, indicating a fault in engine system.

- Troubleshoot short-circuited or open-circuited line in harness system.
- Use a scanner specified by the OEM to communicate with the ECU of EFI system and read the

fault data in the ECU, thereby judging the failure of air mass flow meter.

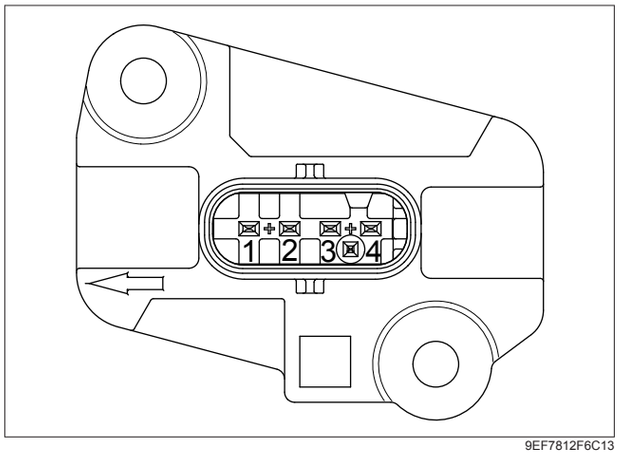
Structural diagram



CE7D69BED782

1. Air mass flow meter

Pin definition



9EF7812F6C13

Pin No.	Function
1	Air flow signal
2	Input voltage (5V)
3	Sensor GND
4	Intake temperature signal

Check

1. Set ignition switch to OFF position (if the ignition switch was at ON previously, wait for at least 2 minutes before performing subsequent operations after setting it to OFF, so as to avoid live plugging)
2. Check resistance between temperature signal and ground signal of air flow meter

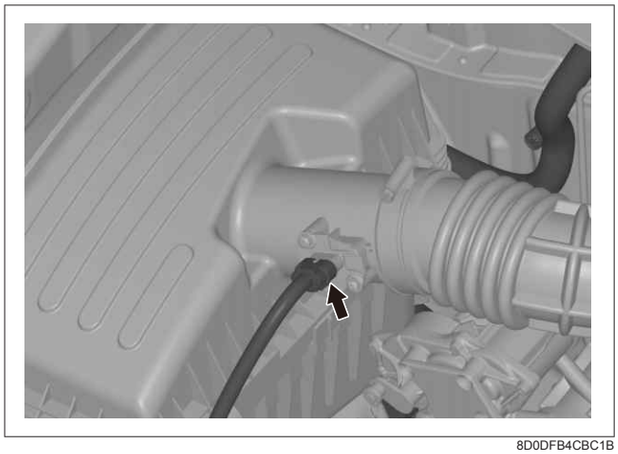
Resistance - temperature characteristics table

Temperature (℃)	Resistance (Ω)
15	2986
18	2642
21	2341
24	2080
27	1851
30	1651

Removal/installation

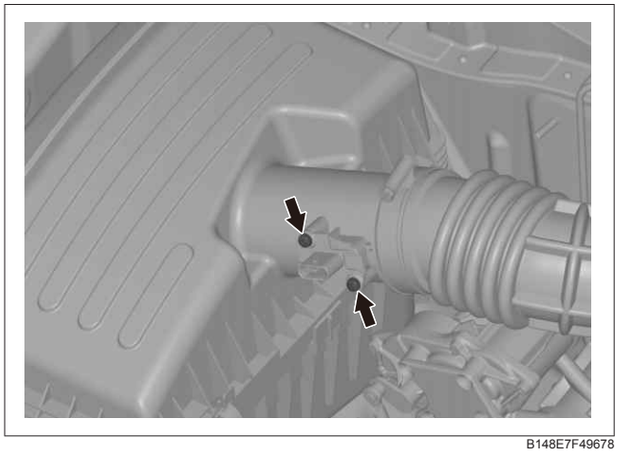
Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect 1 harness connector



8D0DFB4CBC1B

4. Remove 2 bolts



B148E7F49678

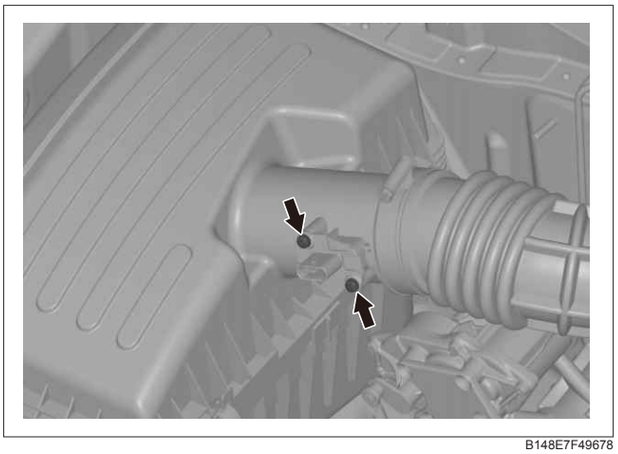
⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

5. Remove air mass flow meter

Installation

1. Install air mass flow meter onto correct position
2. Install 2 bolts



B148E7F49678

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

3. Install 1 harness connector



8D0DFB4CBC1B

⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

4. Connect negative terminal of the battery
5. Turn on the ignition switch and check the vehicle

Intake pressure and temperature sensor

Operating principle

The air intake pressure and temperature sensor is used to measure the intake pressure and temperature in the intake manifold, including the pressure sensor section and the temperature sensor section.

The absolute pressure sensor element of air intake manifold consists of a piece of silicon chip. A pressure diaphragm is etched on the silicon chip. There are 4 piezoresistors on the pressure diaphragm. These 4 piezoresistors form a Wheatstone bridge as a strain element. In addition to the pressure diaphragm, a signal processing circuit is also integrated on the silicon chip. The active side of the silicon chip is subjected to a pressure close to zero, and its surface is subjected to absolute pressure of the air intake manifold to be tested. The thickness of the silicon chip is only a few microns, so the change of absolute pressure of the air intake manifold will cause mechanical deformation of the silicon chip, and the 4 piezoresistors will be deformed with it, resulting in change of the resistance value. After it is processed by the signal processing circuit of the silicon chip, a voltage signal linearly related to the pressure is formed.

The sensor element of intake air temperature is a resistor of negative temperature coefficient (NTC). Its resistance varies with the intake air temperature, and the sensor delivers to the controller a voltage indicative of the change in intake air temperature.

Fault description: stalled engine, poor idle speed, etc.

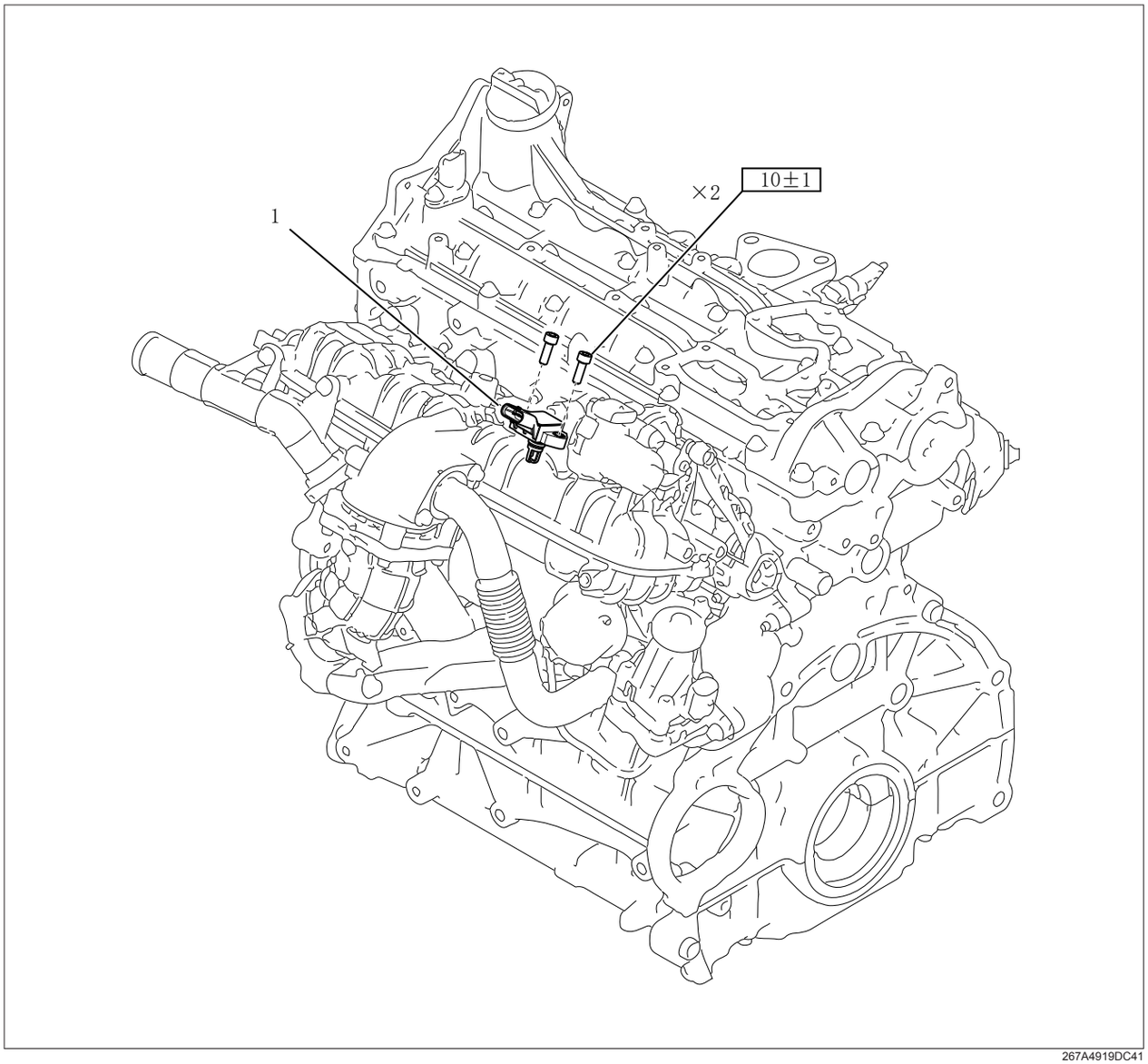
Common causes of failure:

- Abnormal high voltage or reverse large current when in use;
- Damage of vacuum elements in repair process.

Precautions for repair:

- It is not allowed to use high pressure gas to impact the vacuum elements in repair process;
- When replacing the sensor due to a fault detected, check that the generator output voltage and current are normal.

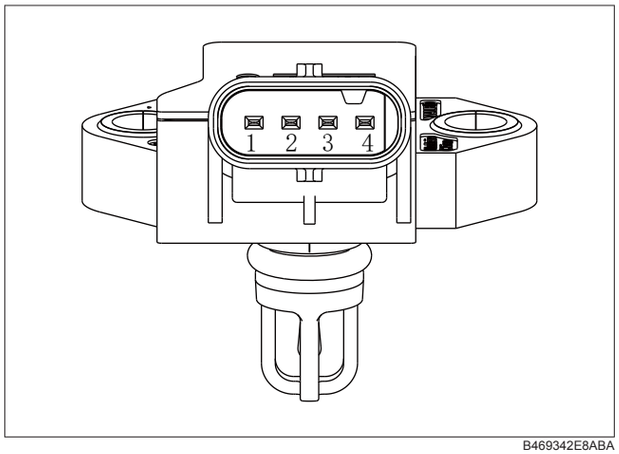
Structural diagram



267A4919DC41

1. Intake pressure and temperature sensor

Pin definition



B469342E8ABA

Pin No.	Function
1	Ground
2	Temperature signal output
3	Input voltage
4	Pressure signal output

Check

1. Pressure sensor testing: use a scanner to read the atmospheric pressure value of the intake pressure and temperature sensor

Notice

› If there is great deviation from standard atmospheric pressure, replace air intake pressure and temperature sensor.

2. Temperature sensor testing: remove intake pressure and temperature sensor, and measure the resistance of the temperature sensor at different temperatures

Resistance - temperature characteristics table

Temperature (℃)	Resistance (Ω)		
	Min. value	Standard value	Maximum value
0	5450	5895	6339
20	2333	2500	2666
60	564.4	595.4	626.3
80	307.7	322.5	337.3
100	179.1	186.6	194.1

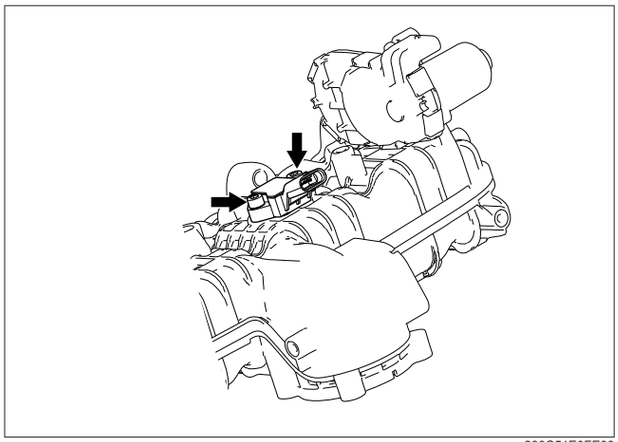
Notice

› If it is not within the range specified in the “resistance-temperature characteristics table”, replace the air intake pressure and temperature sensor.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connector of intake pressure and temperature sensor
3. Remove 2 bolts



230C51E0FE63

4. Remove intake pressure and temperature sensor

i Notice

› Replace the sensor or actuator if they were knocked or dropped.

Installation

1. Perform installation work in reverse order of removal

Electronic throttle

Operating principle

Air throttle is used to adjust the angle of valve piece inside intake duct of air throttle. The position of air throttle valve piece is monitored by non-contact sensor.

The actuator motor inside air throttle valve drives air throttle valve piece through two-stage transmission, and the opening angle of the position of air throttle valve piece is adjusted by ECU.

When the actuator is not energized, the internal reset spring keeps air throttle valve piece in full-open position.

If power is disconnected or circuit failure is detected, the butterfly valve will return to its full-open position by return spring. If failure of integrated circuit is detected, the failure will be fed back to ECU.

Fault description: weak vehicle acceleration and the air throttle valve piece frequently returns to original position or jams.

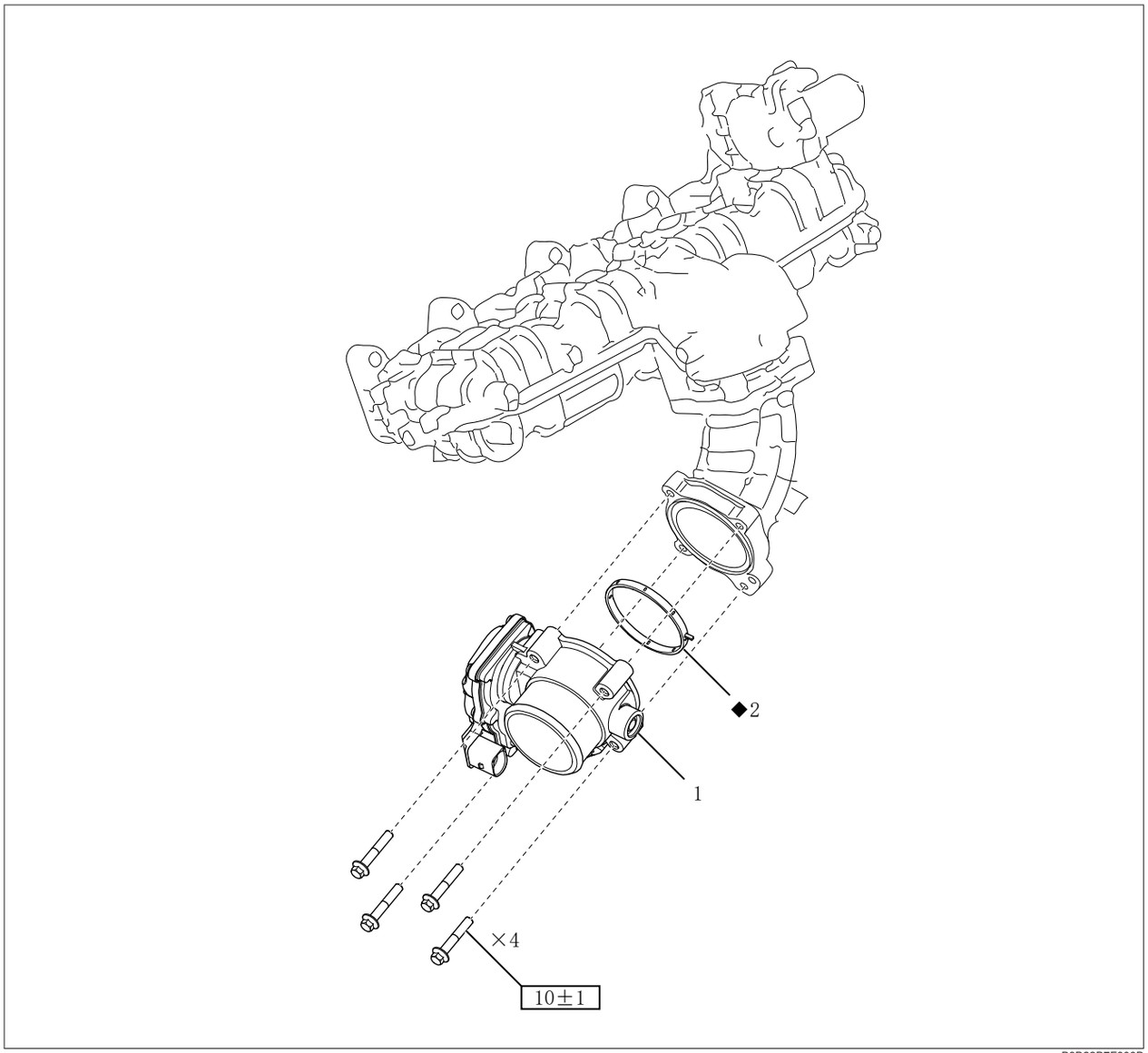
Common causes of failure:

- The harness or the sensor is not working properly, causing ECU misjudgment and controlling the air throttle compulsively in a small opening state.
- Drop or collision during use or repair causes internal parts (magnet steel, etc.) to rupture.
- Vibration level at the engine manifold exceeds the standard.
- Serious carbon deposit is found on the electronic-throttle body due to engine problems.

Precautions for repair:

- It is forbidden to collide with the electronic-throttle body during repair process, and the electronic-throttle body is not allowed to use if it dropped.
- When detecting the fault seemingly caused by electronic-throttle body, simply measure the change of resistance between the PIN pins and use cross test method to verify it.

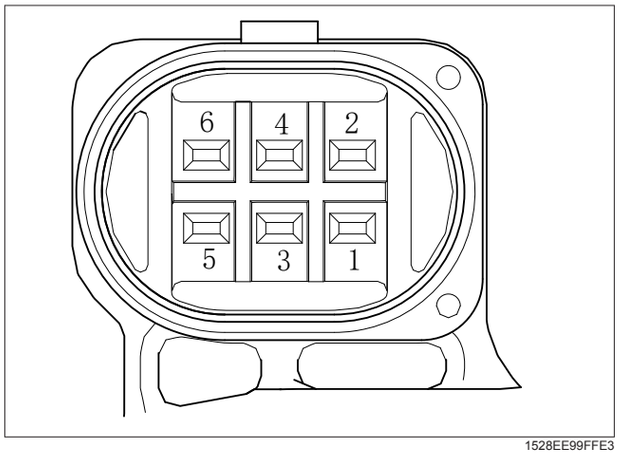
Structural diagram



B3B22B7F806B

1. Air throttle assembly
2. Air throttle gasket

Pin definition



1528EE99FFE3

Pin No.	Function
1	Output signal
2	Positive terminal of sensor
3	Motor positive
4	——
5	Motor negative
6	Negative terminal of sensor

Check

1. Place ignition switch at OFF position (if preceding state of ignition switch is ON, after it is at OFF position, wait at least 2 min before subsequent operation to avoid plug and pull at live state)
2. Pull out air throttle harness connector
3. Directly measure the resistance between air throttle actuator motor positive and negative pins

   Normal value: about 2 Ω

Notice

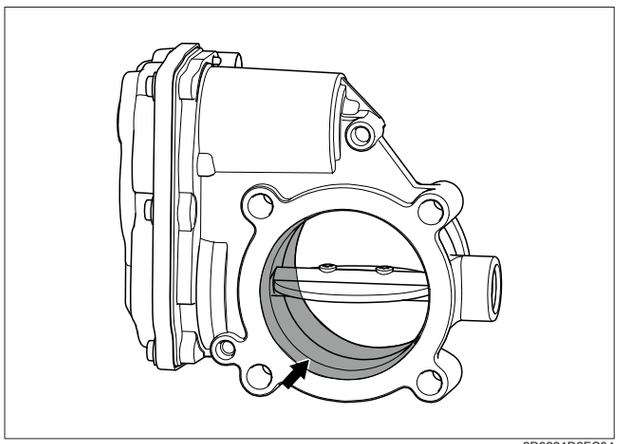
› After replacing air throttle, trigger air throttle position self-learning by ECU using scanner.

Cleaning

⚠ Caution

- **Soak air throttle into cleaning fluid for cleaning.**
- **Use of ultrasonic wave for cleaning air throttle is forbidden.**
- **Spraying detergent against air throttle bearing or valve block shaft is forbidden.**

1. Spray special-purpose air throttle detergent on soft cloth
2. Clean the dirt of the mains channel



2D3221D2FC84

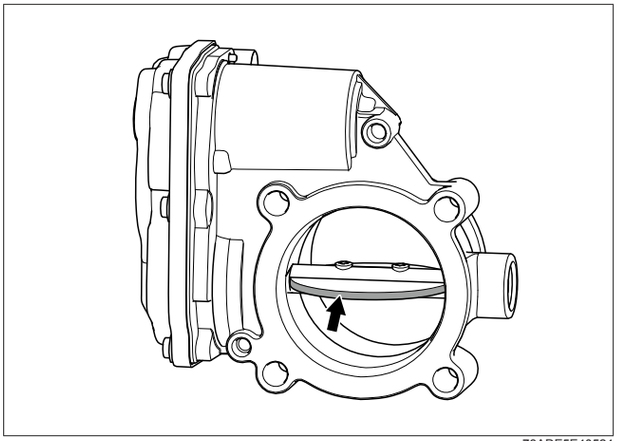
⚠ Caution

- Use of hard objects for cleaning air throttle is forbidden, because hard objects will cause physical damage to flow channel surface and cause valve block jamming.

ℹ Notice

- In some areas of the main channel, dirt gradually solidifies after it has accumulated for a long time, and it is difficult to remove it completely using a cleaning agent, so it can be repeatedly wiped and removed with a soft cloth.

3. Pull valve block with hand, clean the portion that is covered by valve block edge
4. Clean the dirt on the end face of the valve plate and wipe it off repeatedly with a soft cloth



73ADE5E40524

5. Perform air throttle self-learning

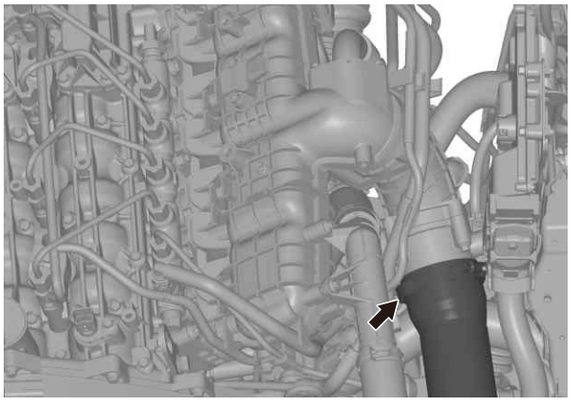
Self-Learning

1. Turn ignition switch to "ON" position, wait for a while and start the engine.
2. Shut down and power off, the throttle completes self-learning.
3. Check if air throttle operates normally

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect 1 pipeline

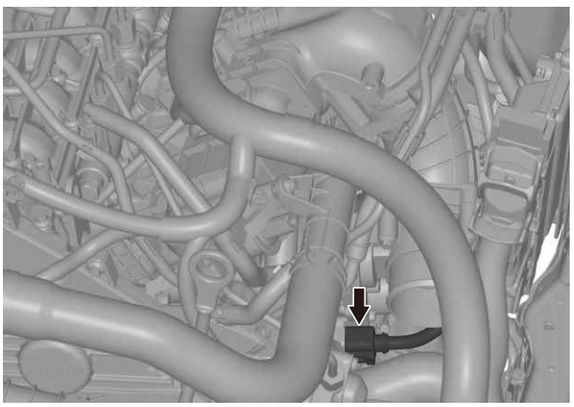


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⚠ Caution

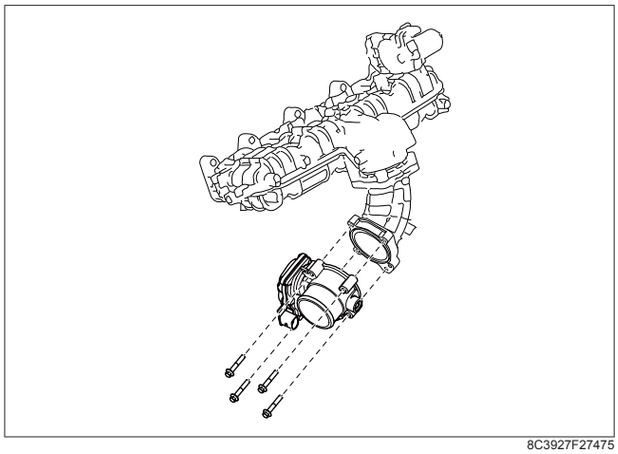
› The disconnected pipelines and joints must be protected from entering debris.

4. Disconnect 1 connector



C2D5D880F358

5. Remove 4 bolts



8C3927F27475

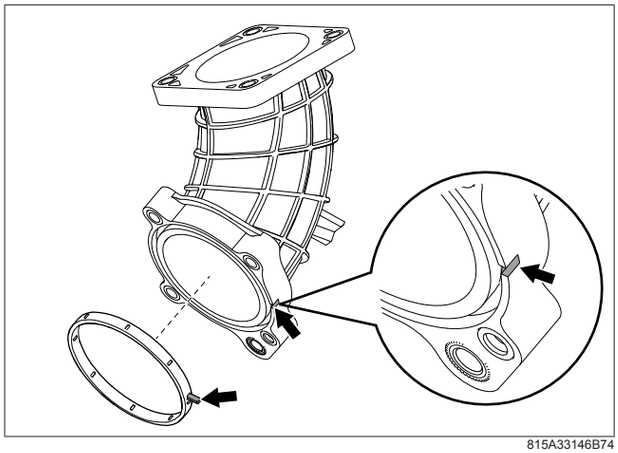
6. Remove air throttle assembly and air throttle gasket

Notice

› Gaskets are disposable parts.

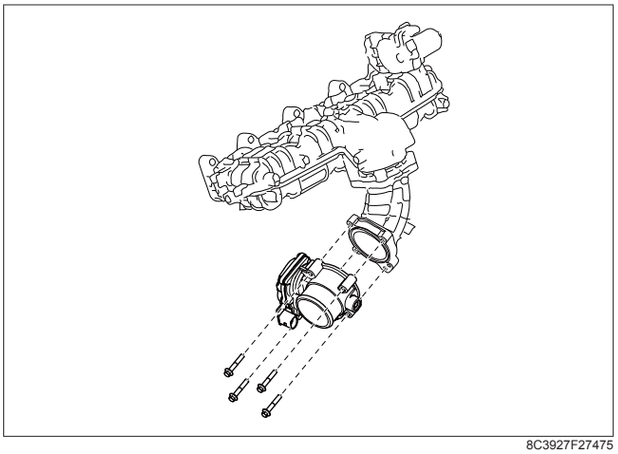
Installation

1. Install a new air throttle gasket corresponding to air throttle gasket and limit groove of intake adapter



815A33146B74

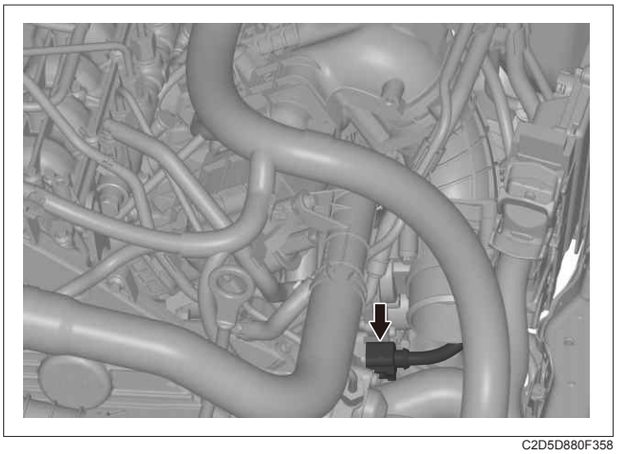
2. Install throttle assembly, fasten 4 bolts diagonally



8C3927F27475

Tightening torque: (10±1) N·m

3. Install 1 connector

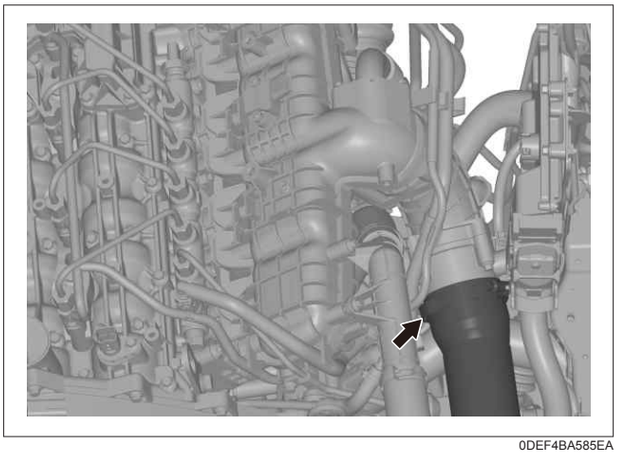


C2D5D880F358

Caution

› Before installing the connector, check that the connector terminals are intact.

4. Install 1 pipeline



0DEF4BA585EA

⚠ Caution

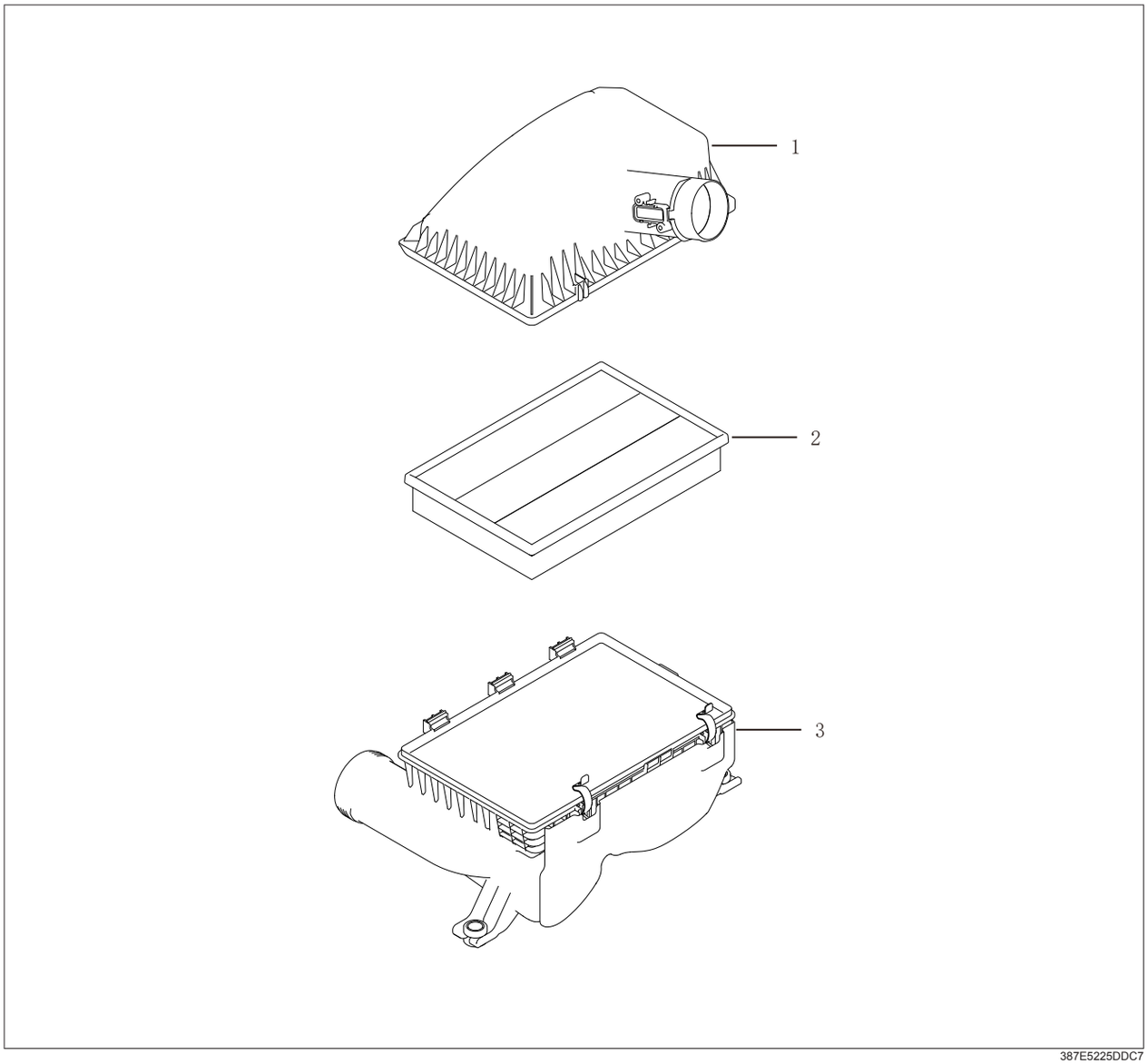
› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

5. Install negative terminal of the battery

Air filter element

Structural diagram



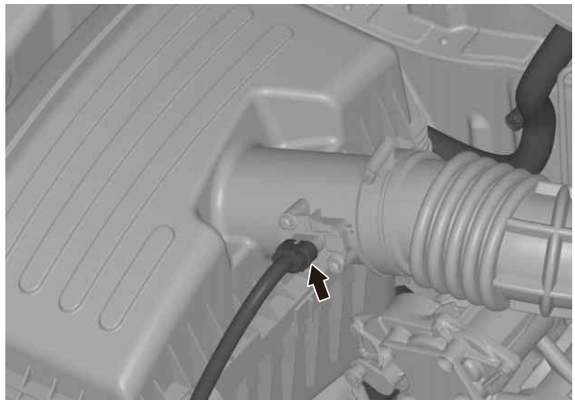
387E5225DDC7

1. Upper housing of air filter
2. Air filter element
3. Lower housing of air filter

Removal/installation

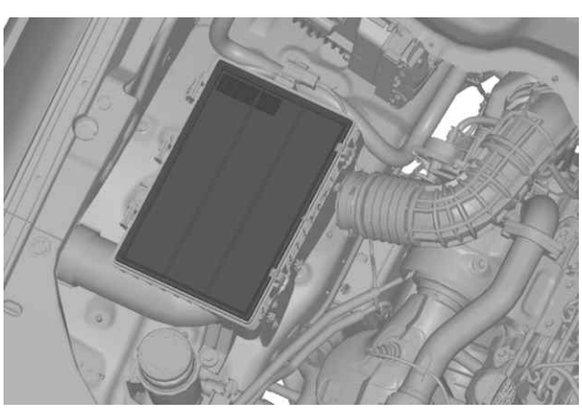
Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect 1 connector



8D0DFB4CBC1B

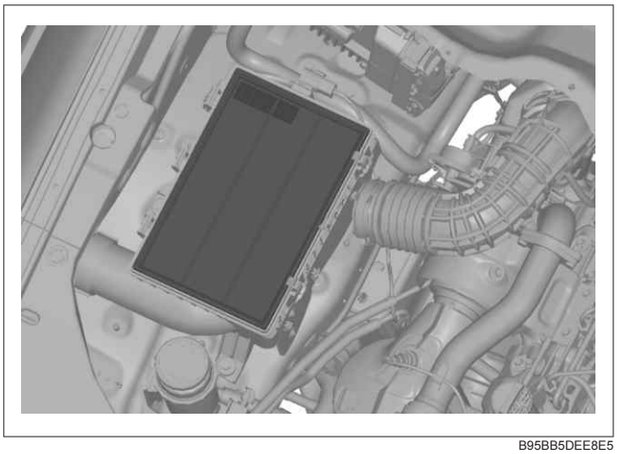
3. Loosen clips of upper air filter housing
4. Move the upper air filter housing to a proper position and fix it firmly
5. Remove air filter element



B95BB5DEE8E5

Installation

1. Install air filter element

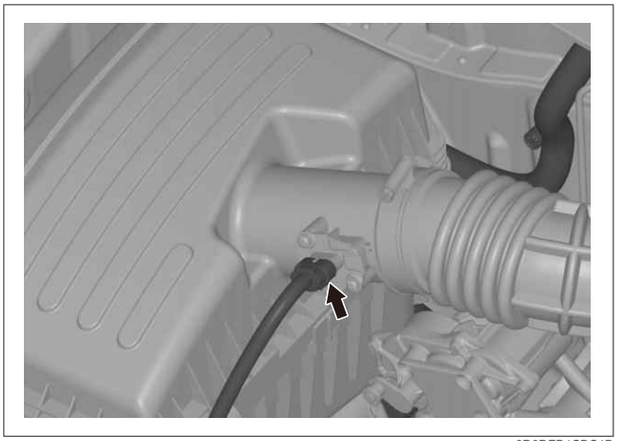


B95BB5DEE8E5

⚠ Caution

- Make sure there is no debris in the air filter housing.
- Make sure the filter element is in place.

2. Install upper air filter housing
3. Install clips of upper air filter housing
4. Install 1 connector

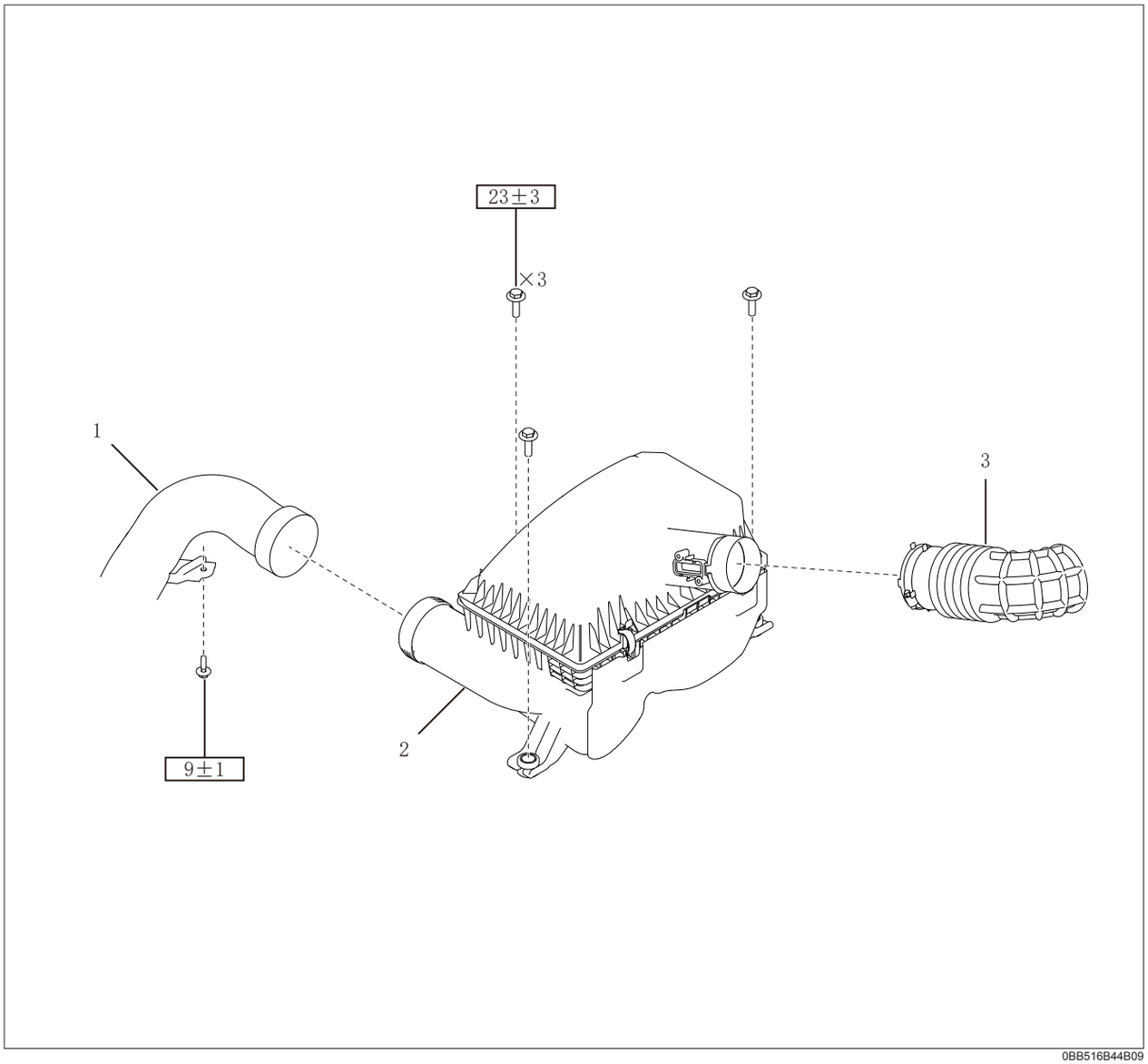


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5. Connect negative terminal of the battery

Air filter

Structural diagram



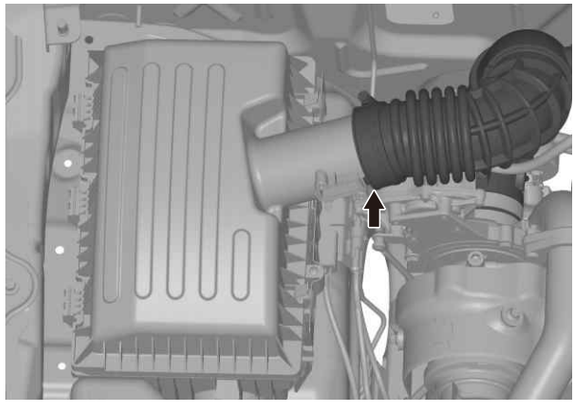
0BB516B44B09

1. Air filter intake pipe
2. Air filter
3. Air filter outlet pipe

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove air mass flow meter
4. Disconnect air filter outlet pipe

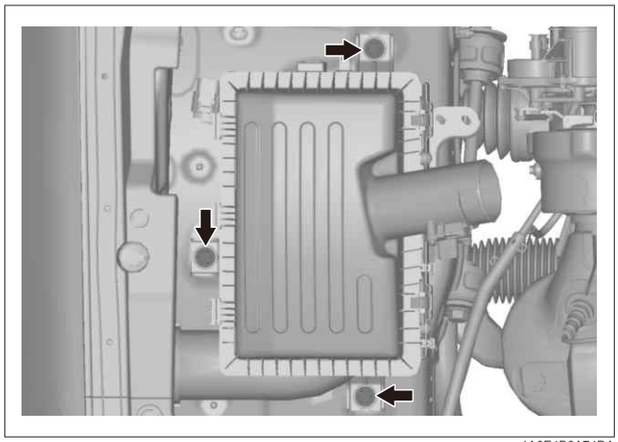


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⚠ Caution

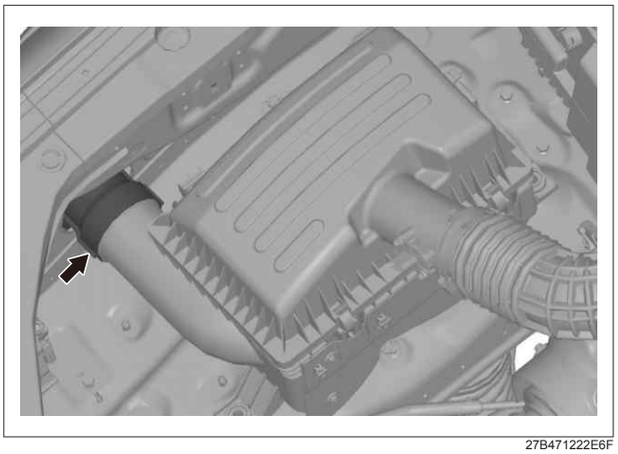
› The disconnected pipelines and joints must be protected from entering debris.

5. Separate harness fixing points of air filter housing
6. Remove 3 bolts



1A6E4B3A74DA

7. Disconnect 1 pipeline



27B471222E6F

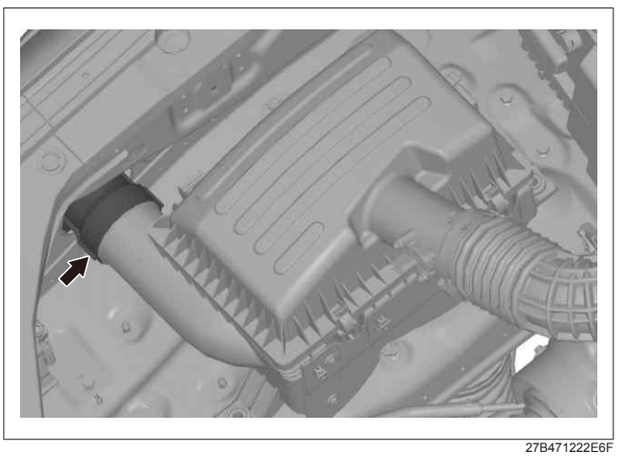
8. Remove air filter

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

Installation

1. Install air filter to proper position
2. Connect 1 pipeline

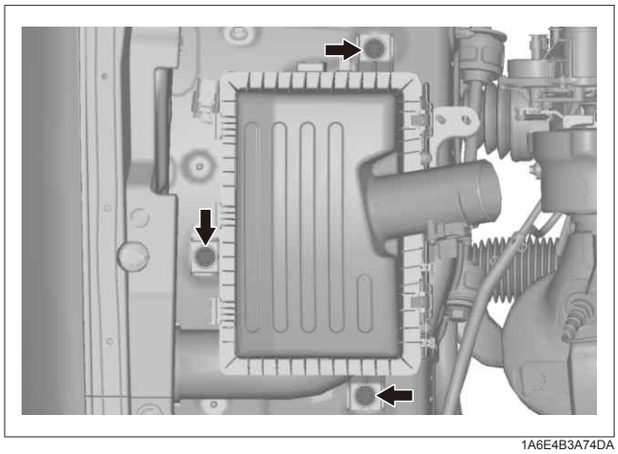


27B471222E6F

⚠ Caution

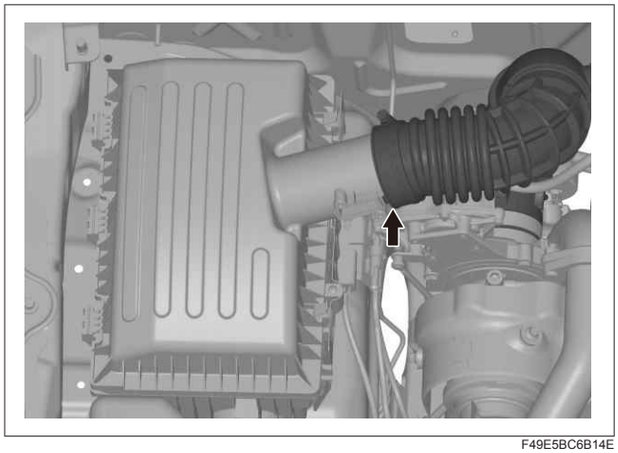
› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

3. Install 3 bolts



1A6E4B3A74DA

4. Install air filter outlet pipe



F49E5BC6B14E

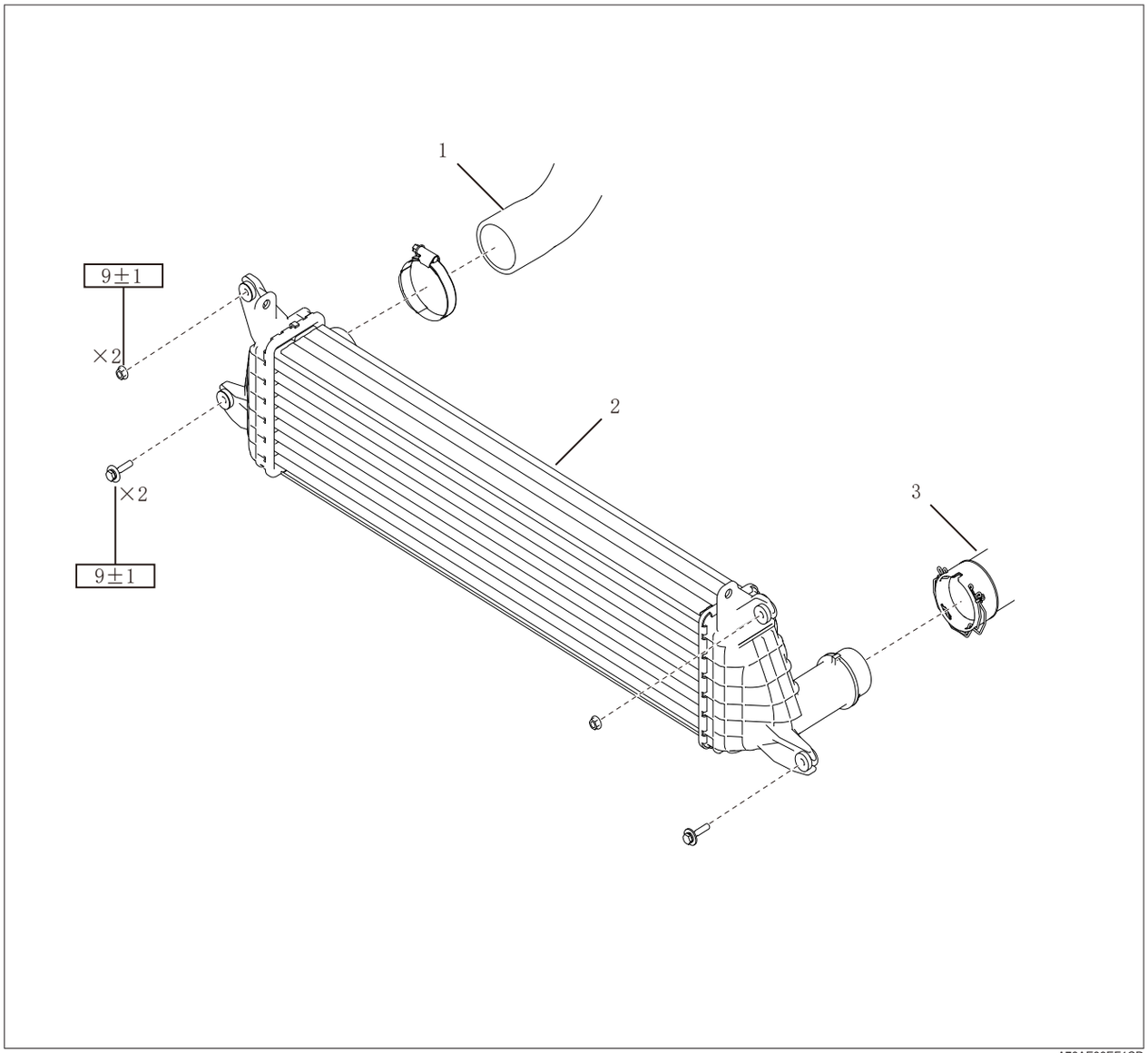
⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

5. Install air mass flow meter
6. Connect negative terminal of the battery

Intercooler

Structural diagram



A78AE83EF1CD

1. Intercooler intake hose
2. Intercooler
3. Intercooler air outlet hose

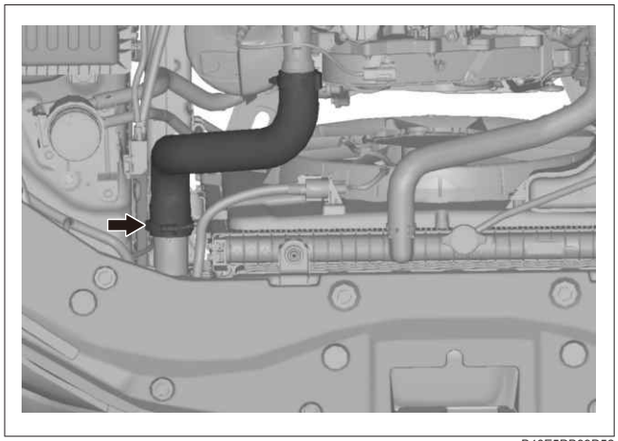
Removal/installation

Removal

⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

1. Disconnect the negative terminal of the battery.
2. Remove front bumper
3. Remove engine hood lock bracket
4. Remove left and right deflectors
5. Disconnect intercooler air inlet pipe

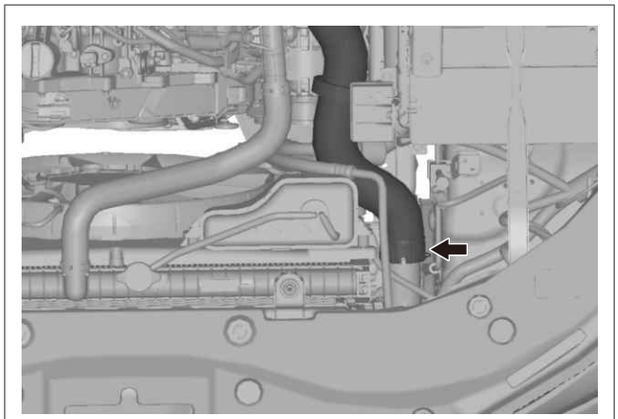


B46E5DB99D52

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

6. Disconnect intercooler air outlet pipe

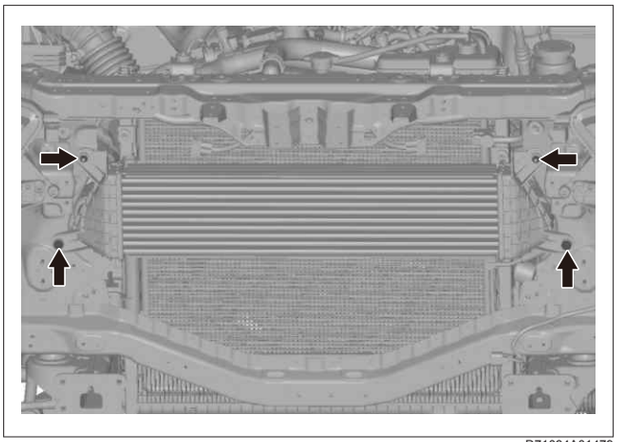


F5A77BB95DDA

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

7. Remove 2 bolts and 2 nuts



D71034A01479

8. Remove intercooler

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

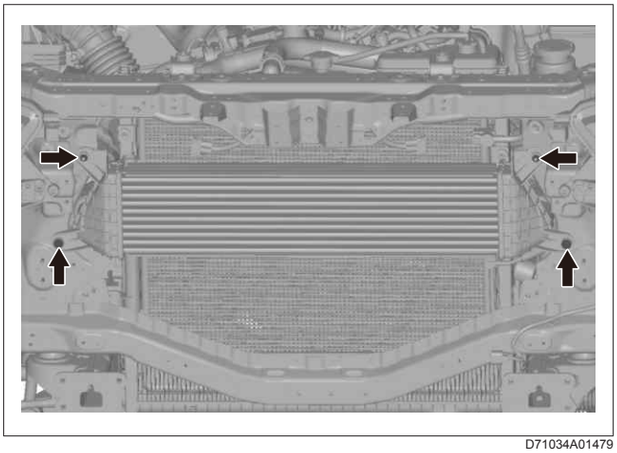
⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

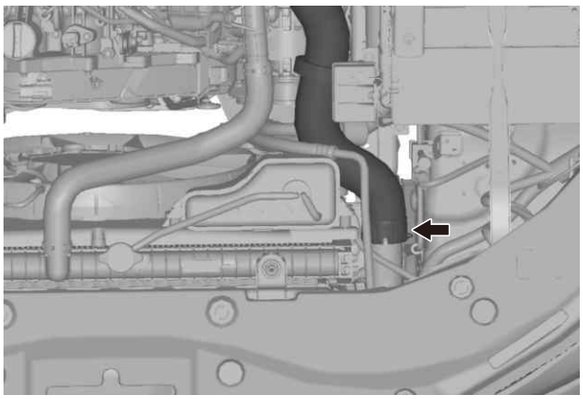
› Tighten the fastener according to the specified torque value.

1. Install intercooler
2. Tighten 2 bolts and 2 nuts



D71034A01479

3. Connect intercooler air outlet pipe



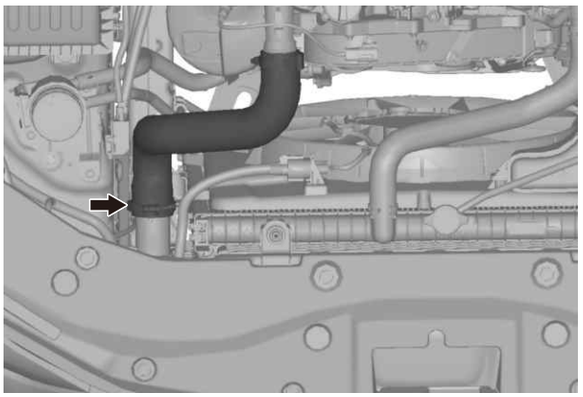
F5A77BB95DDA

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

4. Connect intercooler air inlet pipe



B46E5DB99D52

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

5. Install left and right deflectors
6. Install engine hood lock bracket
7. Install front bumper
8. Connect negative terminal of the battery

Air intake manifold

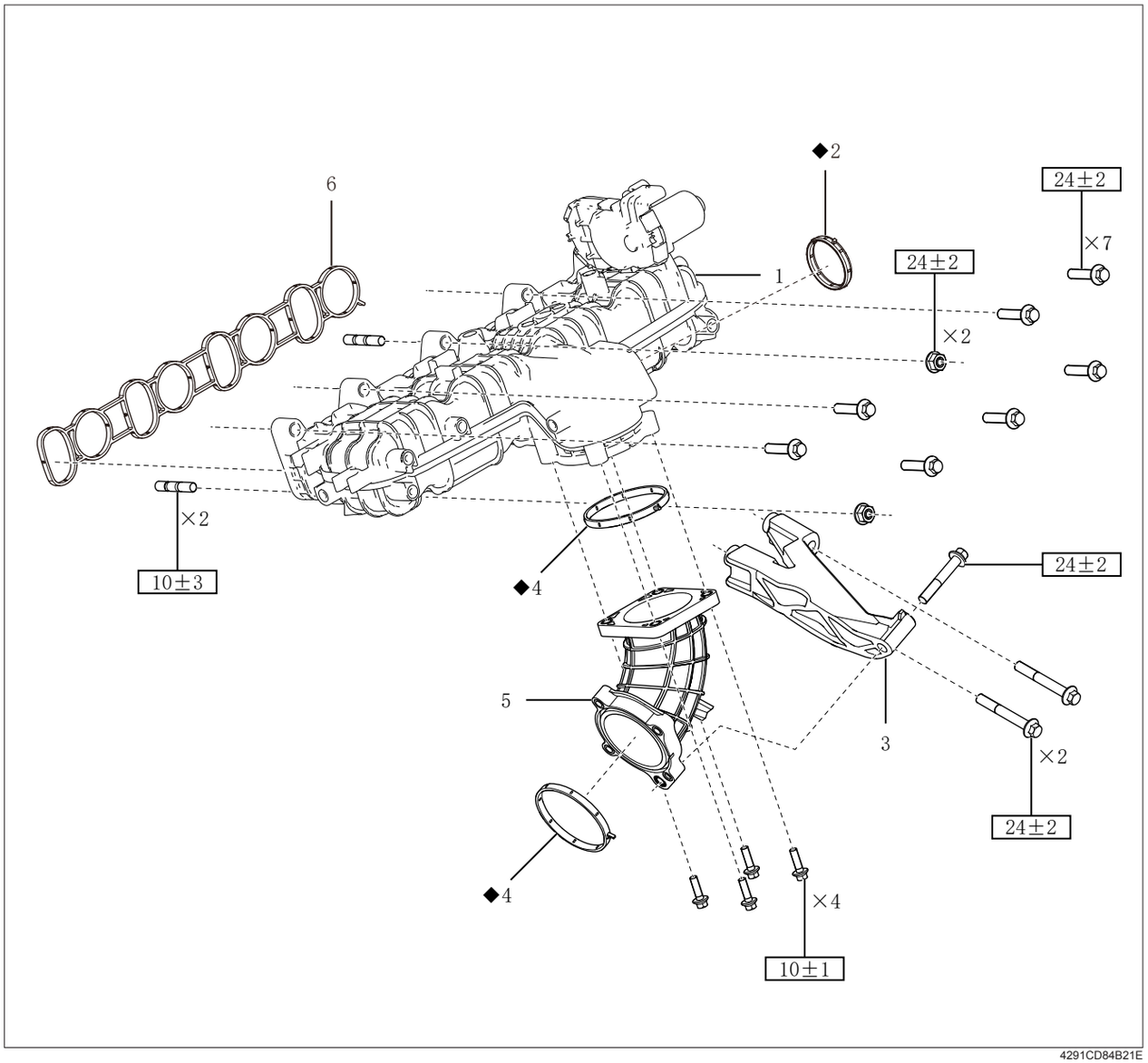
Operating principle

The intake manifold integrates a vortex control valve to adjust intake manifold vortex, improve fuel utilization rate, control emissions and enhance driving comfort.

The position of actuator rocker arm is controlled by DC motor. The positioning module in engine control unit controls rotation of the motor. The position of rocker arm is detected by non-contact Hall sensor, which feeds back the signal to the engine control unit, creating a closed-loop control system.

The actuator consists of four parts: rocker arm, gear transmission system, DC motor and sensor/connector.

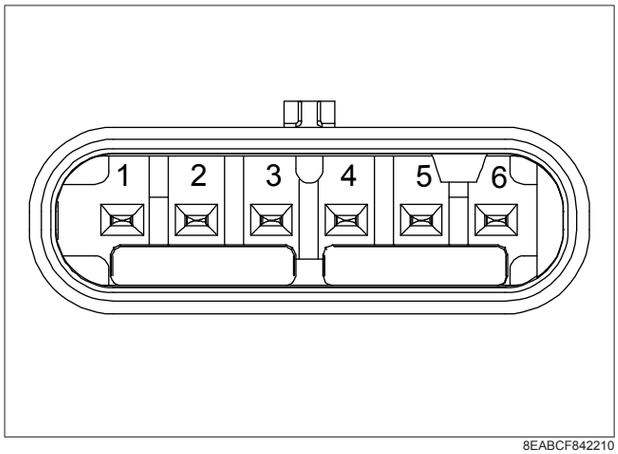
Structural diagram



4291CD84B21E

1. Intake manifold assembly
2. EGR gasket of intake adapter
3. Intake adapter bracket
4. Air throttle gasket
5. Intake adapter assembly
6. Intake manifold gasket

Pin definition



8EABCF842210

Pin No.	Function
1	DC motor negative
2	DC motor positive
3	——
4	Supply voltage of sensor
5	Sensor GND
6	Output signal of sensor

Check

1. Set ignition switch to OFF position (if the ignition switch was at ON previously, wait for at least 2 minutes before performing subsequent operations after setting it to OFF, so as to avoid live plugging)
2. Pull out harness connector of intake manifold
3. Measure resistance between positive and negative pins of intake manifold actuator motor

   Resistance value at normal temperature: about (1.665~2.035) Ω

Notice

› After replacing intake manifold, complete self-learning once again of the position of vortex control valve actuator of intake manifold.

Removal/installation

Removal

⚠ Warning

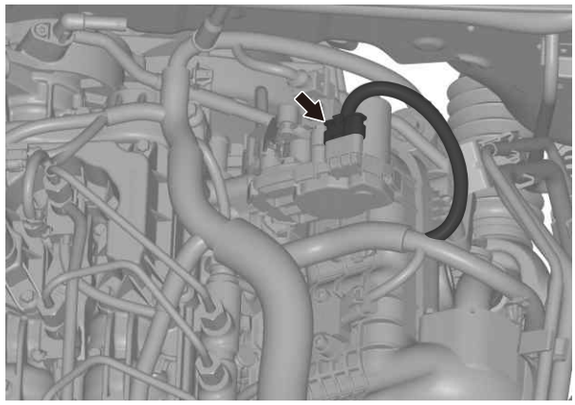
› To avoid burns, do not operate while the engine is still at a high temperature.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

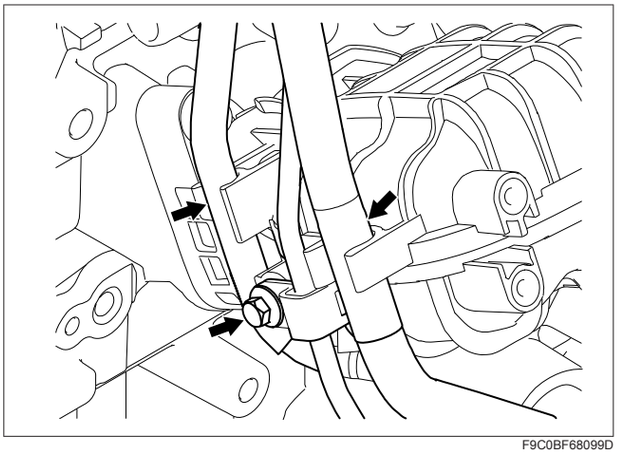
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect 1 connector



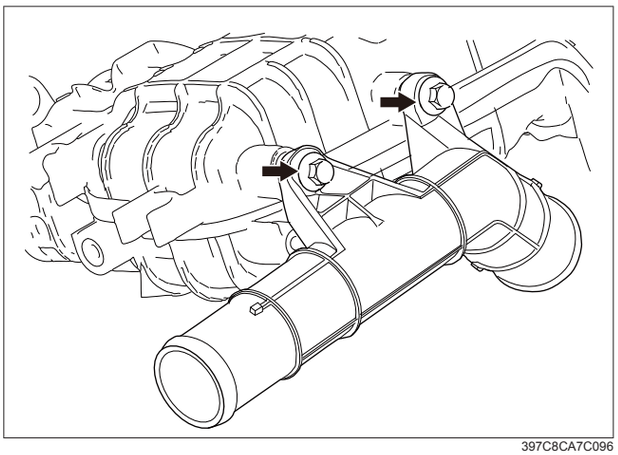
F5B2B03D0BBC

4. Remove vacuum switching valve
5. Disconnect harness from intake manifold and intake adapter bracket
6. Remove 1 bolt, and disconnect fuel rail inlet pipe clamp assembly to intake manifold



F9C0BF68099D

7. Take out the high-pressure fuel rail inlet pipe and fuel injector return pipe component that are limited to intake manifold
8. Remove 2 bolts for connecting pipe components of water outlet



397C8CA7C096

9. Remove air vent bellows component, EGR gasket of intake adapter and EGR air vent gasket

ℹ Notice

› EGR gasket of intake adapter is a disposable part.

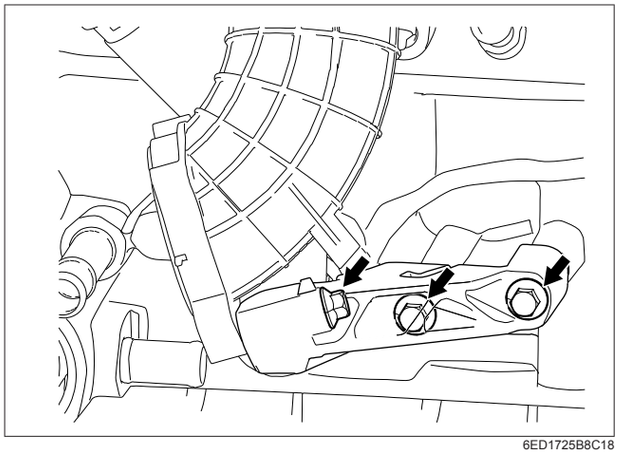
› EGR air vent gasket is a disposable part.

10. Remove intake pressure and temperature sensor
11. Remove air throttle assembly and air throttle gasket

ℹ Notice

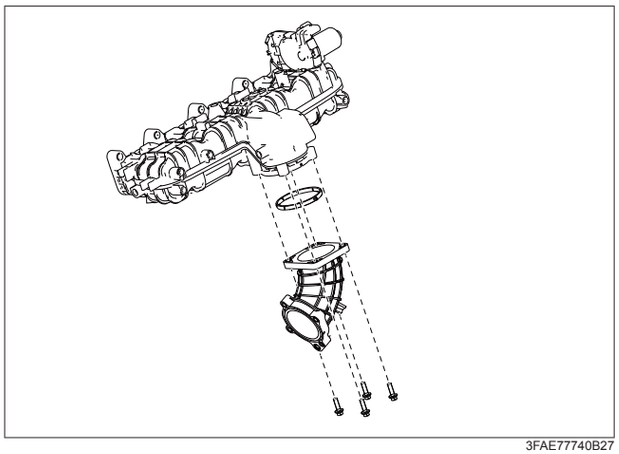
› Air throttle gaskets are disposable parts.

12. Remove 3 bolts, and remove intake adapter bracket



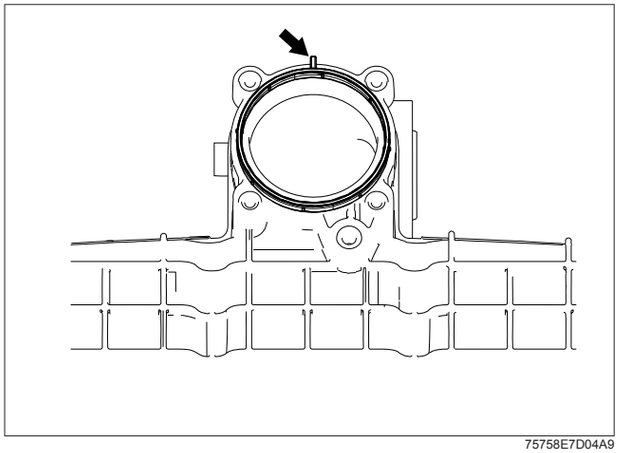
6ED1725B8C18

13. Remove 4 bolts, and remove intake adapter



3FAE77740B27

14. Remove air throttle gasket

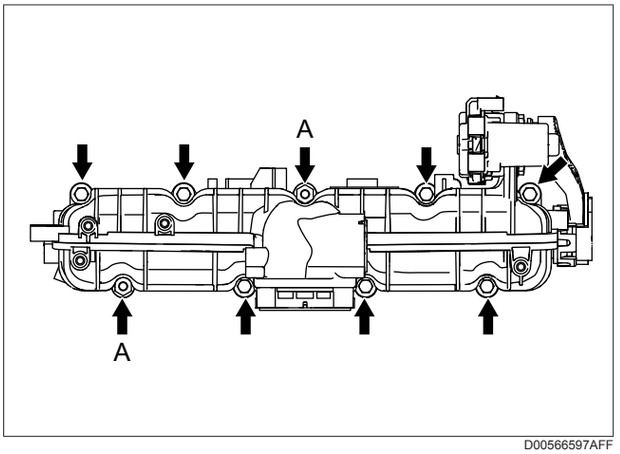


75758E7D04A9

Notice

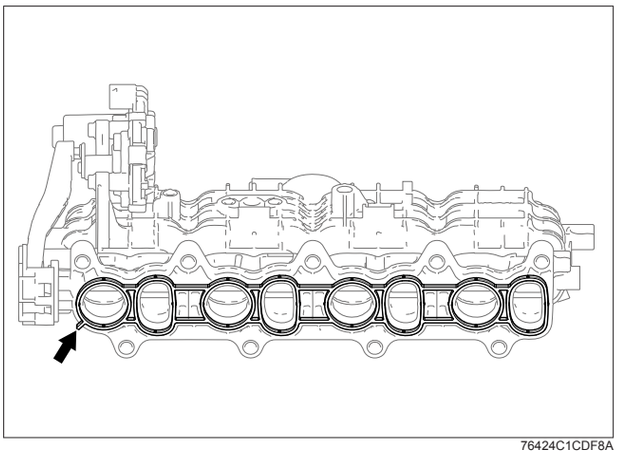
- Air throttle gaskets are disposable parts.

15. Remove 7 bolts and 2 nuts (A), and remove intake manifold



D00566597AFF

16. Remove intake manifold gasket



76424C1CDF8A

Notice

- Intake manifold gaskets are disposable parts.

Installation

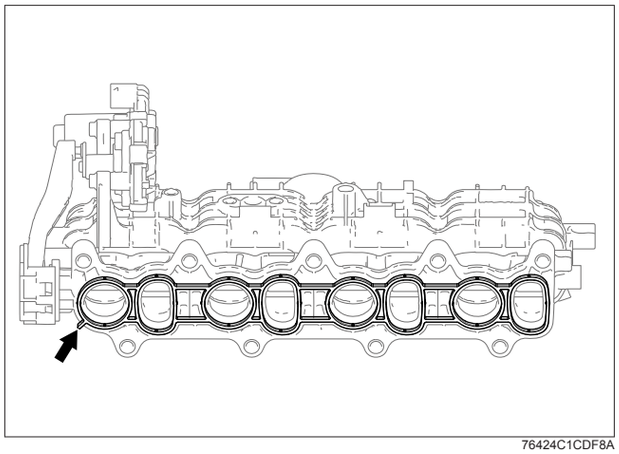
Warning

- To avoid burns, do not operate while the engine is still at a high temperature.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

Caution

- Replace the seal with a new one.
- Tighten the fastener according to the specified torque value.

1. Install new intake manifold gasket

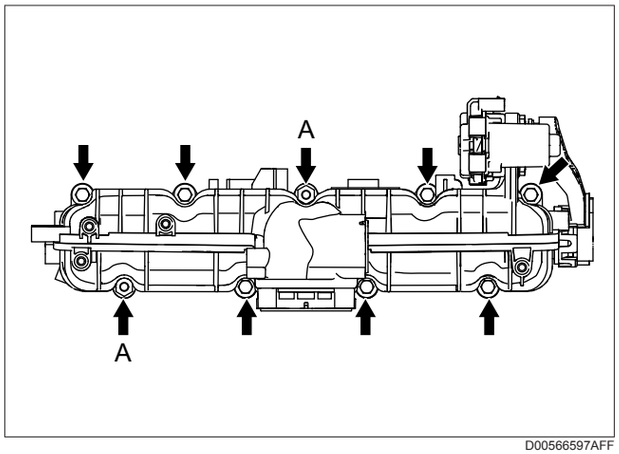


76424C1CDF8A

Notice

› The arrow position is the missing-part-preventing mark, which should be snapped into the corresponding groove of intake manifold.

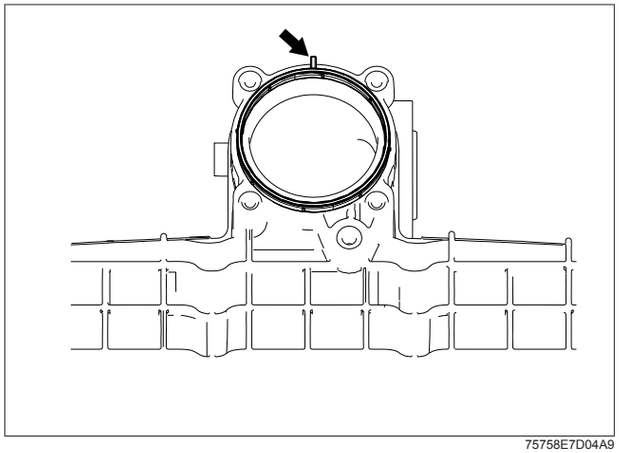
2. Install intake manifold, tighten 7 bolts and 2 nuts (A)



D00566597AFF

Tightening torque: (24±2) N·m

3. Install new intake adapter gasket

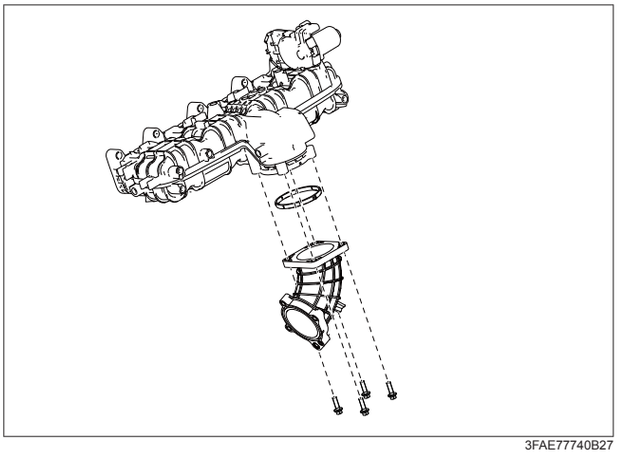


75758E7D04A9

Notice

› The arrow position is the missing-part-preventing mark, which should be snapped into the corresponding groove of intake manifold.

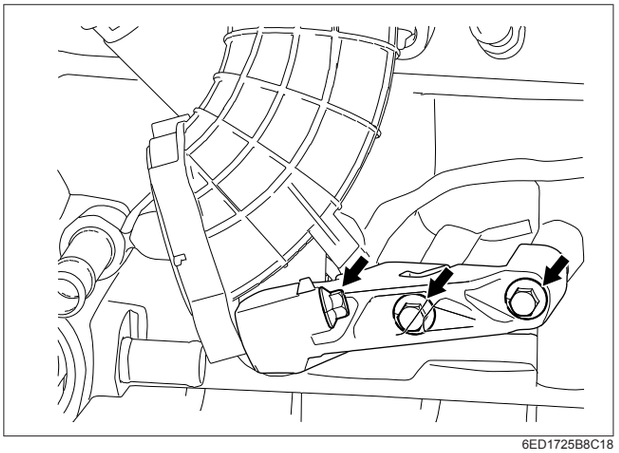
4. Install intake adapter to the intake manifold with 4 bolts, and tighten the 4 bolts



3FAE77740B27

Tightening torque: (10±1) N·m

5. Install intake adapter bracket, and tighten 3 bolts



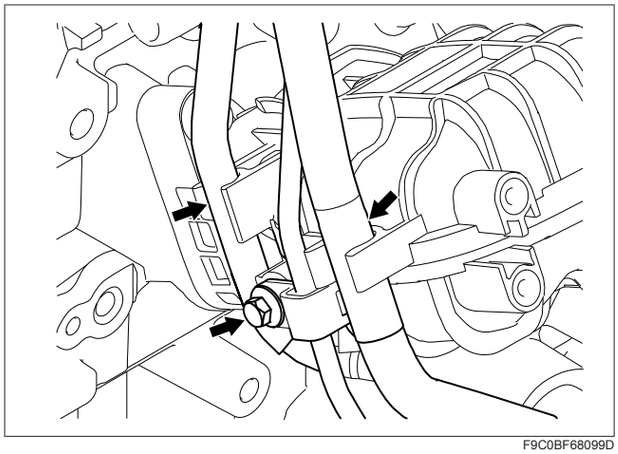
6ED1725B8C18

Tightening torque: (24±2) N·m

6. Install air throttle assembly and new air throttle gasket

7. Limit the high-pressure fuel rail inlet pipe and fuel injector return pipe component to intake manifold

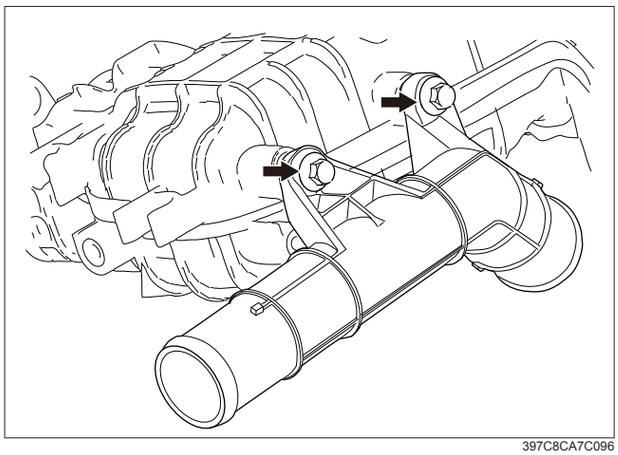
8. Tighten 1 bolt of fuel rail inlet pipe clamp assembly to intake manifold



F9C0BF68099D

Tightening torque: (10±1) N·m

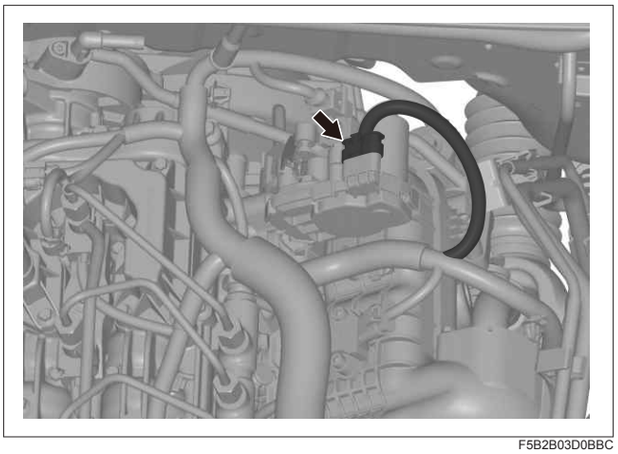
9. Tighten 2 bolts for connecting pipe components of water outlet



397C8CA7C096

Tightening torque: (10±1) N·m

10. Install air vent bellows component, new EGR gasket of intake adapter and new EGR air vent gasket
11. Install intake pressure and temperature sensor
12. Install vacuum switching valve
13. Connect harness to intake manifold and intake adapter bracket
14. Install 1 connector

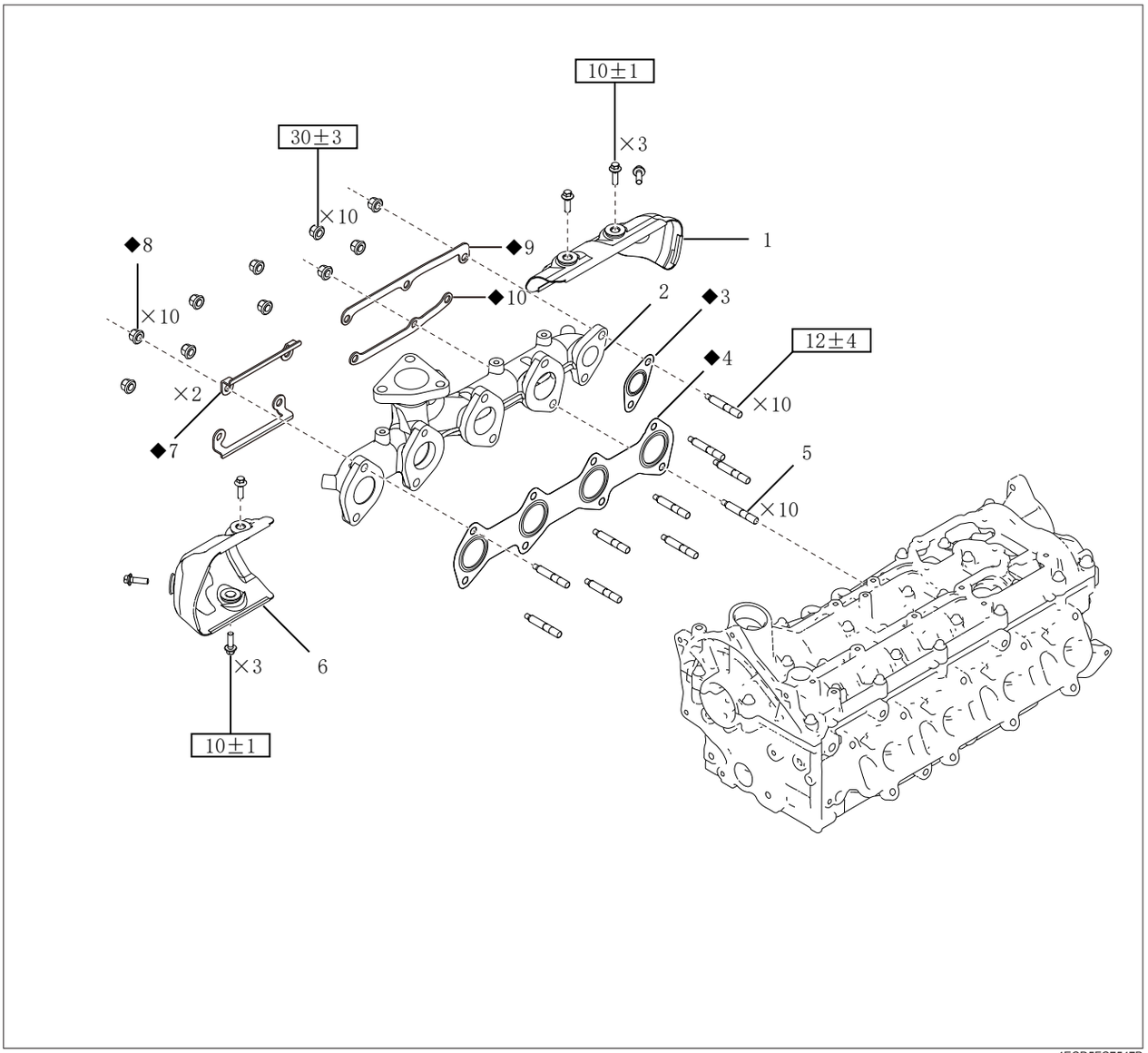


F5B2B03D0BBC

15. Connect negative terminal of the battery

Exhaust manifold

Structural diagram



4ECD5FC7547B

1. Thermal shroud at rear end of exhaust manifold
2. Exhaust manifold
3. Exhaust manifold gasket component 2
4. Exhaust manifold gasket component
5. Exhaust manifold fastening bolt
6. Thermal shroud at front end of exhaust manifold
7. Exhaust manifold nut gasket
8. Exhaust manifold locking nut
9. Upper nut gasket of exhaust manifold
10. Lower nut gasket of exhaust manifold

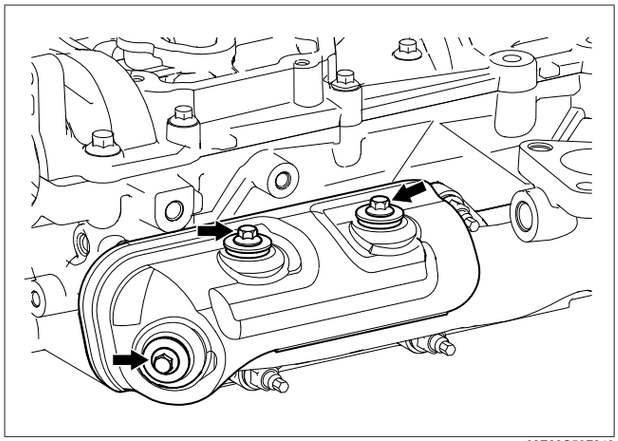
Removal/installation

Removal

⚠ Warning

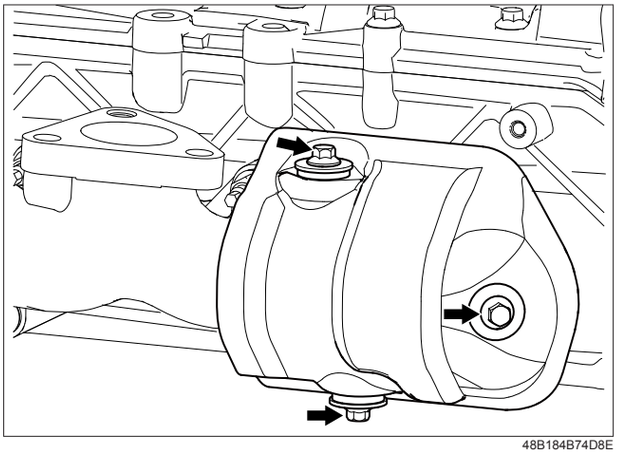
- To avoid burns, do not operate while the engine is still at a high temperature.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove lean NOx trap
4. Remove differential pressure sensor
5. Remove DPF front high-temperature sensor
6. Remove turbocharger
7. Remove high-temperature sensor
8. Remove diesel particulate filter
9. Remove 3 bolts, and remove thermal shroud at rear end of exhaust manifold



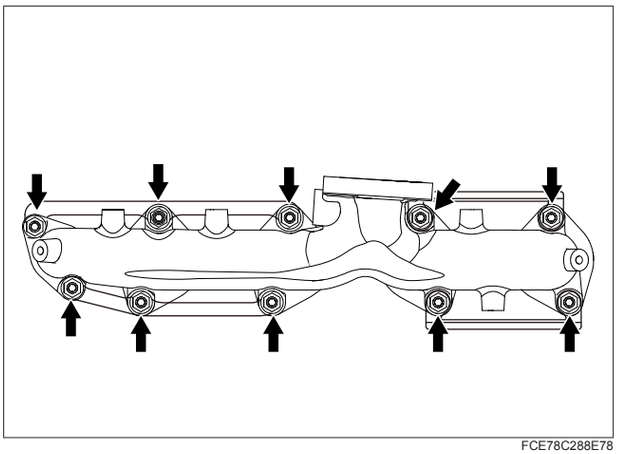
62E22C53F243

10. Remove 3 bolts, and remove thermal shroud at front end of exhaust manifold



48B184B74D8E

11. Remove 10 locking nuts of exhaust manifold



FCE78C288E78

ℹ Notice

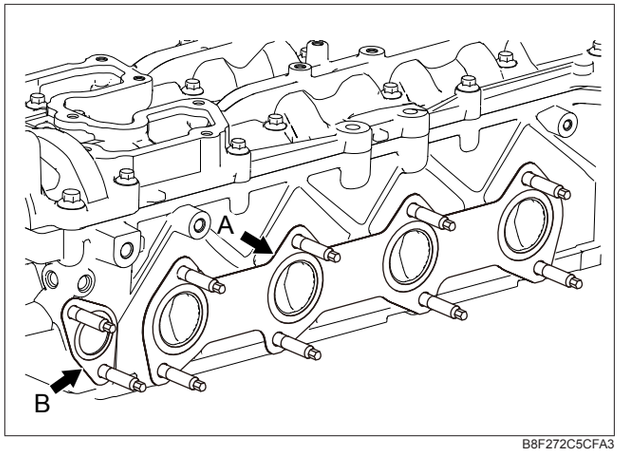
- Locking nuts of exhaust manifold are disposable parts.

12. Remove 2 exhaust manifold nut gaskets, 1 upper nut gasket of exhaust manifold, 1 lower nut gasket of exhaust manifold, and exhaust manifold

ℹ Notice

- Exhaust manifold nut gaskets, upper nut gasket of exhaust manifold and lower nut gasket of exhaust manifold are disposable parts.

13. Remove gasket component (A) of exhaust manifold assembly and gasket component 2 (B) of exhaust manifold



B8F272C5CFA3

Notice

› Seal gaskets are disposable parts.

Installation

Warning

› To avoid burns, do not operate while the engine is still at a high temperature.

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

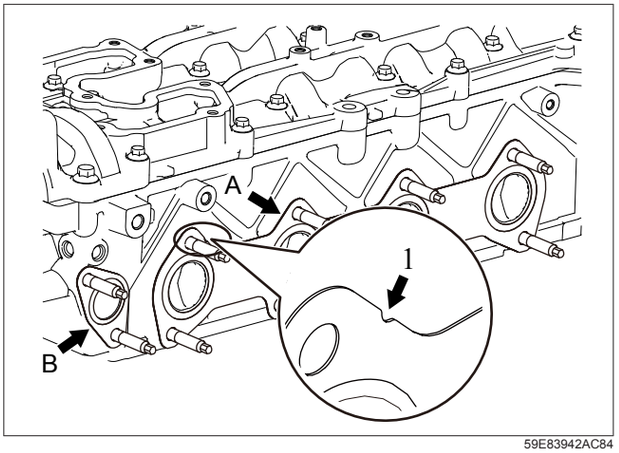
› According to local regulations, the waste generated during the maintenance process should be properly handled.

Caution

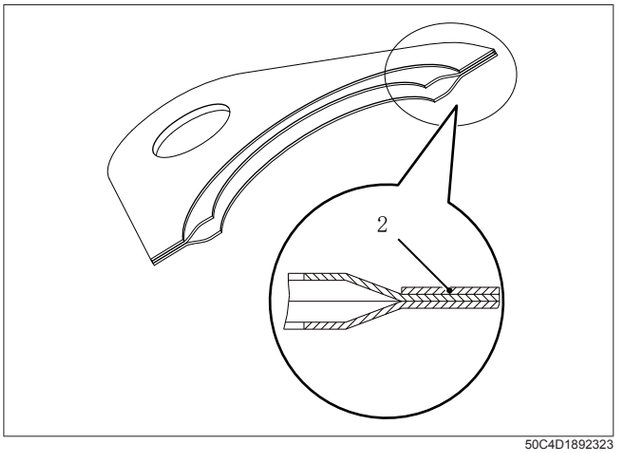
› Tighten the fastener according to the specified torque value.

› Replace the seal with a new one.

1. Install new gasket component (A) of exhaust manifold assembly and gasket component 2 (B) of exhaust manifold



59E83942AC84



50C4D1892323

In the diagram:

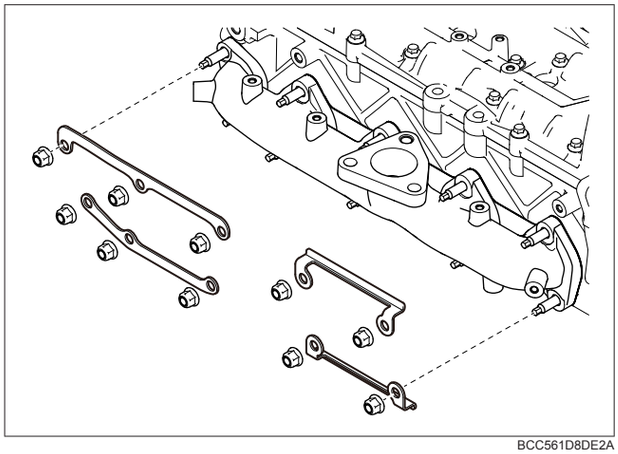
1 - Notch position of gasket of exhaust manifold

2 - Crushproof layer of gasket component 2 of exhaust manifold

Notice

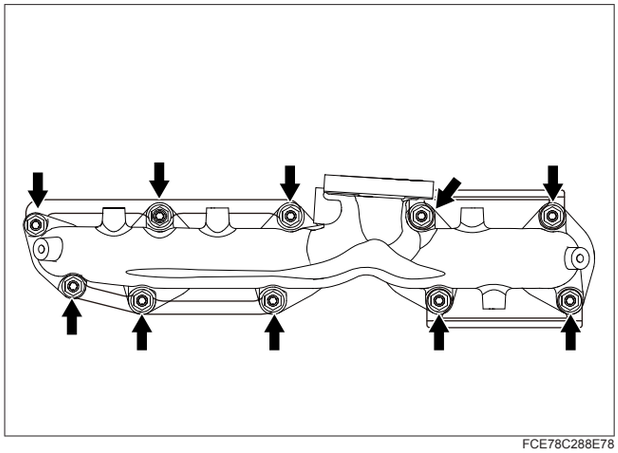
› When installing the gasket of gasket component 2 of exhaust manifold, make sure that the crushproof layer of the gasket faces the exhaust manifold side, with the notch position of gasket component of exhaust manifold at the position of cylinder 4 of the engine.

2. Install exhaust manifold and 2 new exhaust manifold nut gaskets, 1 new upper nut gasket of exhaust manifold, and 1 new lower nut gasket of exhaust manifold



BCC561D8DE2A

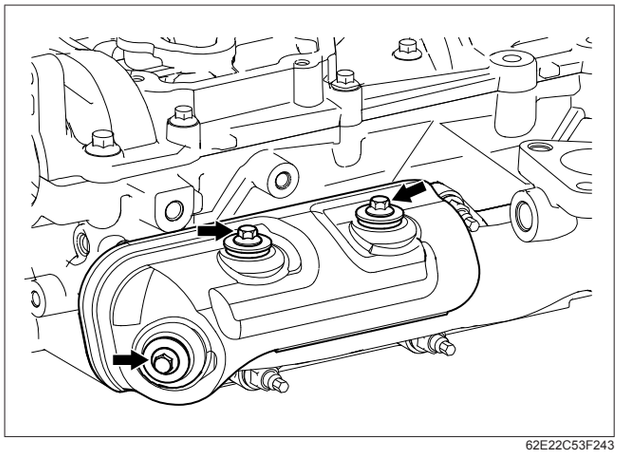
3. Tighten 10 new locking nuts of exhaust manifold



FCE78C288E78

Tightening torque: (30±3) N·m

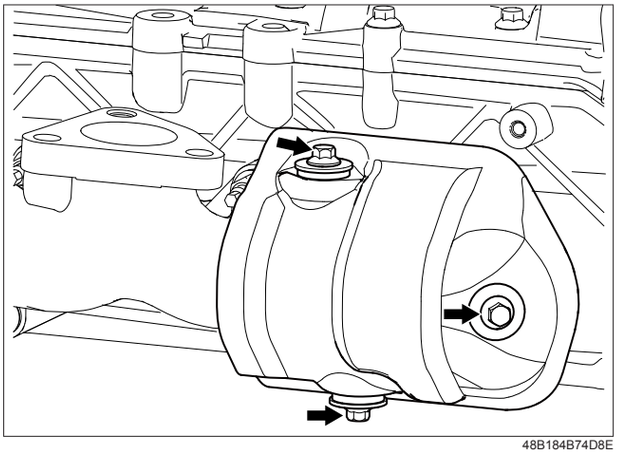
4. Install thermal shroud at rear end of exhaust manifold, and tighten 3 bolts



62E22C53F243

Tightening torque: (10±1) N·m

5. Install thermal shroud at front end of exhaust manifold, and tighten 3 bolts



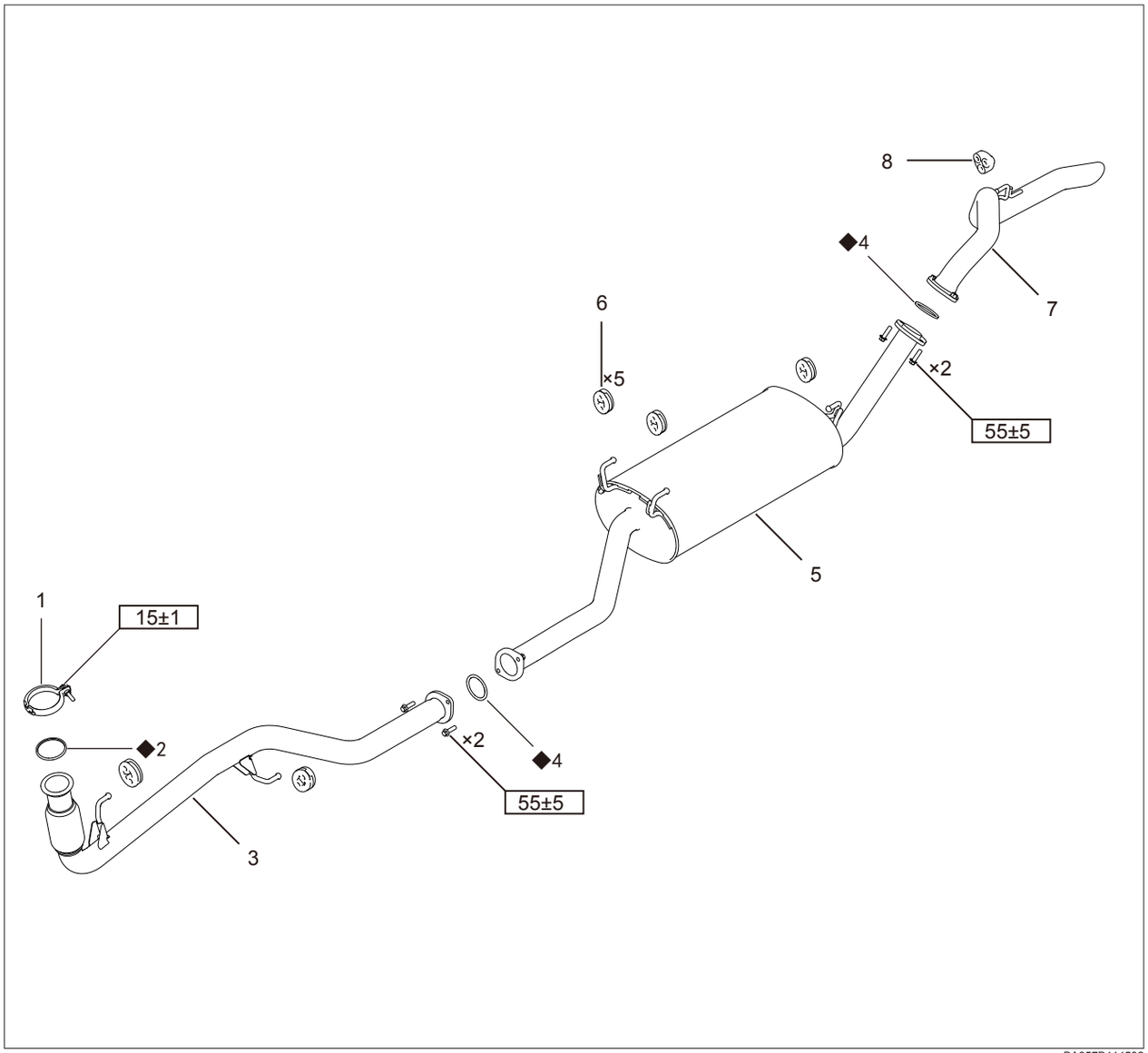
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Tightening torque: (10±1) N·m

6. Install diesel particulate filter
7. Install high-temperature sensor
8. Install turbocharger
9. Install DPF front high-temperature sensor
10. Install differential pressure sensor
11. Install lean NOx trap
12. Connect negative terminal of the battery

Muffler

Structural diagram



BA857B414582

1. Exhaust hoop
2. Seal ring
3. Front section of exhaust pipe
4. Seal ring
5. Muffler
6. Rubber hanger
7. Rear section of exhaust pipe
8. Three-hole rubber hanger

Removal/installation

Removal

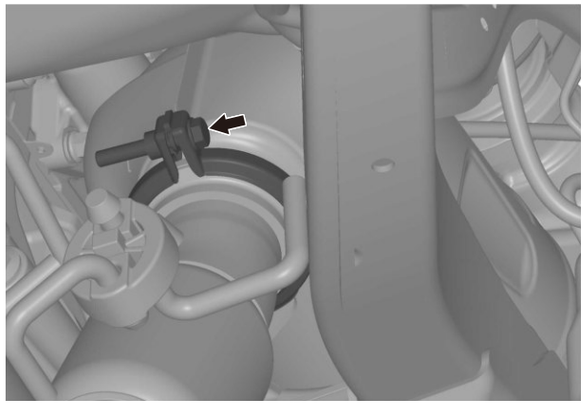
⚠ Warning

- Make sure that the hot parts are cooled before proceeding to avoid burns.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

⚠ Caution

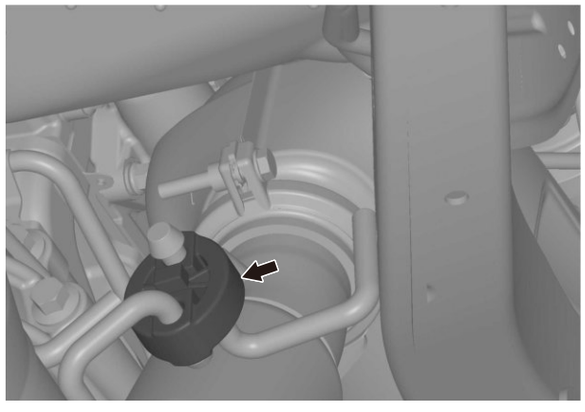
- If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Raise the vehicle to an appropriate position
2. Loosen 1 bolt, and remove 1 seal ring



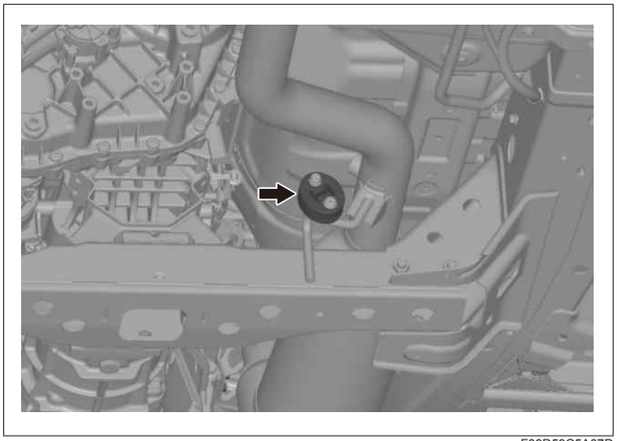
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3. Loosen 1 rubber hanger



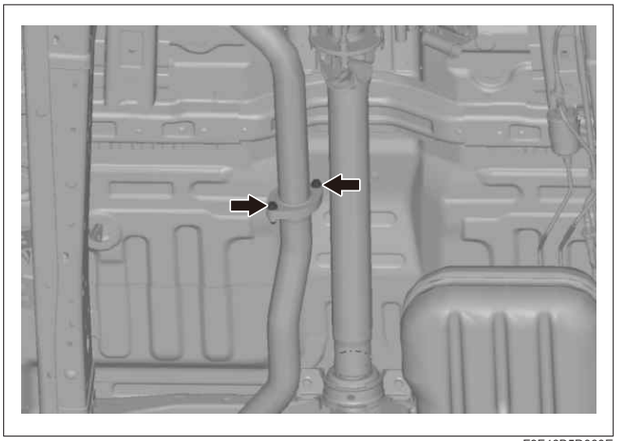
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4. Loosen 1 rubber hanger



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5. Remove 2 bolts and remove seal ring

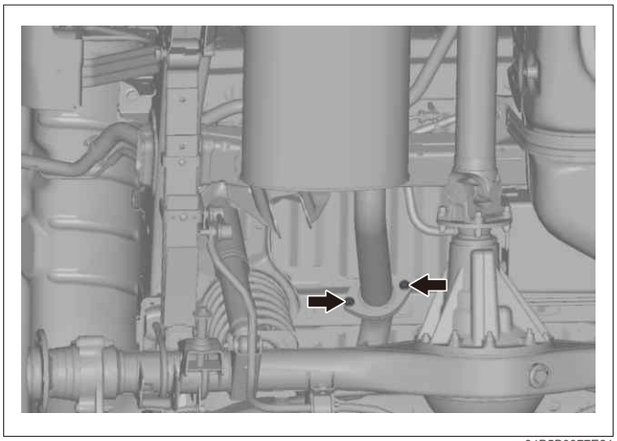


F9F46B5D060E

⚠ Caution

- The disconnected pipelines and joints must be protected from entering debris.
- Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

6. Remove front section of exhaust pipe
7. Remove 2 bolts and remove seal ring



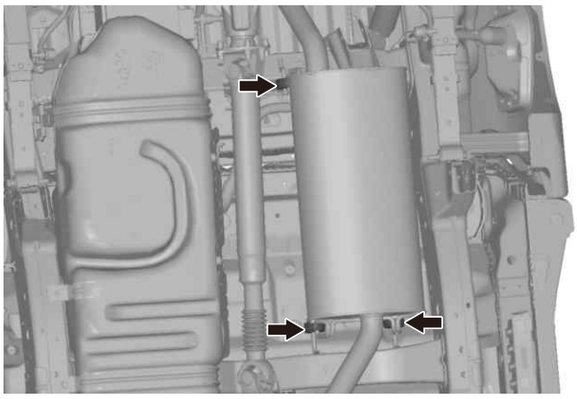
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⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

8. Separate 3 rubber hangers



F8C2E81C5221

9. Remove muffler

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

10. Remove rear section of exhaust pipe

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

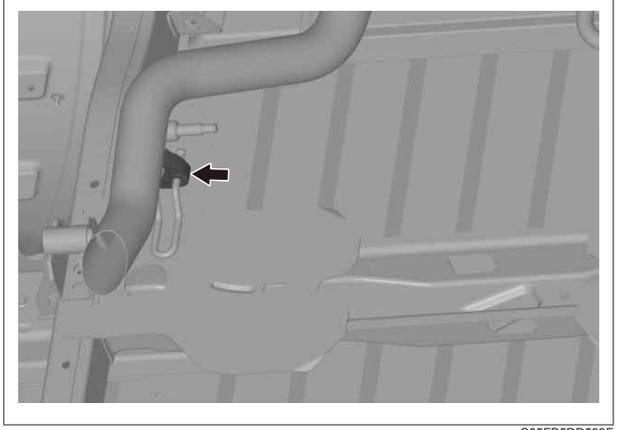
⚠ Caution

› Replace the seal with a new one.

› Tighten the fastener according to the specified torque value.

1. Install rear section of exhaust pipe to proper position

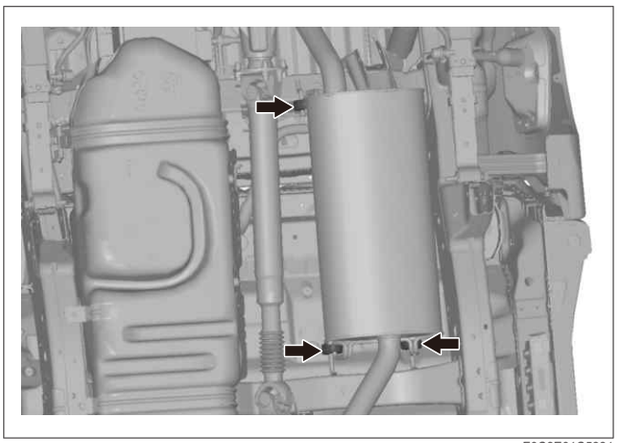
2. Install 1 rubber hanger



C85FB5DD593F

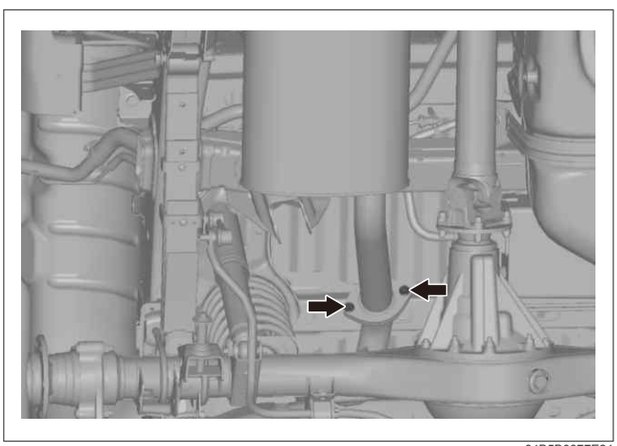
3. Install muffler to proper position

4. Install 3 rubber hangers



F8C2E81C5221

5. Replace with new seal ring and install 2 bolts



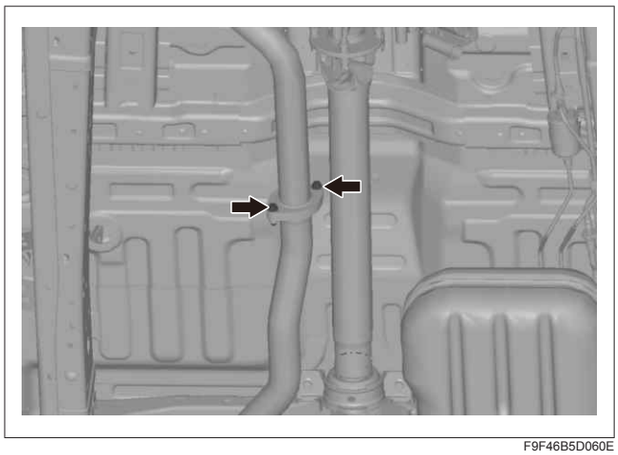
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⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

6. Install front section of exhaust pipe
7. Replace with new seal ring and install 2 bolts

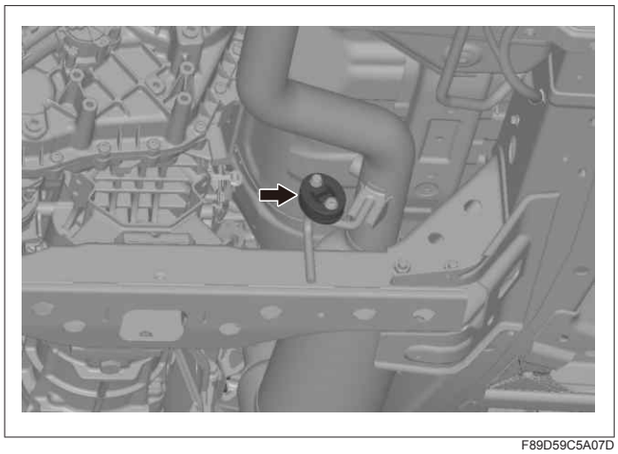


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⚠ Caution

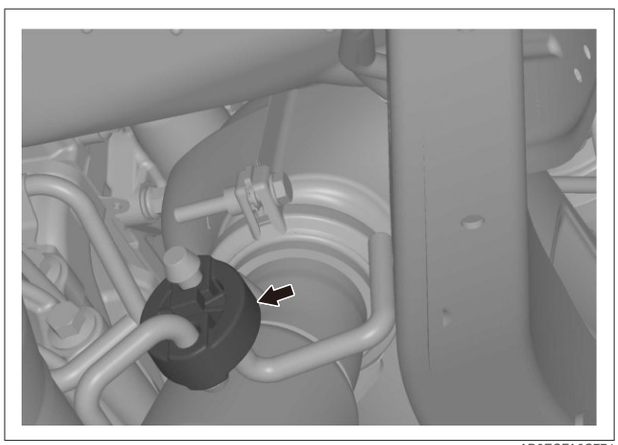
- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

8. Install 1 rubber hanger



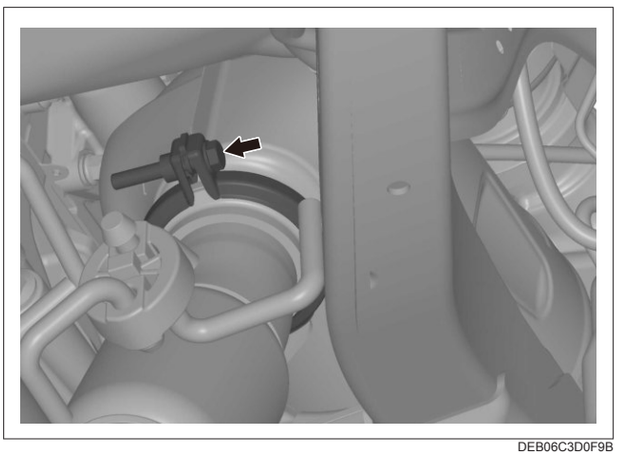
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9. Install 1 rubber hanger



AD8ECFA6C774

10. Install 1 seal ring and tighten 1 bolt



DEB06C3D0F9B

11. Lower the vehicle slowly

Emission control system (GW4D20M)

Emission control system ..... 6－1
DPF regeneration ..... 6－1
Specified torque ..... 6－3
Preheater plug controller ..... 6－5
Structural diagram ..... 6－5
Pin definition ..... 6－6
Removal/installation ..... 6－6
Preheater plug ..... 6－8
Operating principle ..... 6－8
Structural diagram ..... 6－9
Removal/installation ..... 6－10
EGR assembly ..... 6－11
Structural diagram ..... 6－11
Removal/installation ..... 6－12
EGR valve ..... 6－16
Operating principle ..... 6－16
Structural diagram ..... 6－17
Pin definition ..... 6－18
Check ..... 6－18
Removal/installation ..... 6－19
Vacuum switching valve ..... 6－20
operating principle ..... 6－20
Structural diagram ..... 6－21
Pin definition ..... 6－22
Check ..... 6－22
Removal/installation ..... 6－23
Crankcase ventilation ..... 6－24
Structural diagram ..... 6－24
Removal/installation ..... 6－25
Differential pressure sensor ..... 6－26
Structural diagram ..... 6－26
Pin definition ..... 6－27
Removal/installation ..... 6－27
Front oxygen sensor ..... 6－30
Operating principle ..... 6－30
Pin definition ..... 6－31
Check ..... 6－31
Removal/installation ..... 6－32
Rear oxygen sensor ..... 6－34
Operating principle ..... 6－34
Pin definition ..... 6－35
Inspection ..... 6－35

Removal/installation.....6－36
DPF front high-temperature sensor.....6－38
Structural diagram .....6－38
Pin definition .....6－39
Check.....6－39
Removal/installation.....6－40
Lean NOx trap .....6－42
Structural diagram .....6－42
Removal/installation.....6－43
Diesel particulate filter .....6－46
Structural diagram .....6－46
Removal/installation.....6－47

Emission control system

DPF regeneration

⚠ Warning

› In process of DPF regeneration, all local traffic laws and regulations must be observed.

ℹ Notice

› It is normal for vehicles equipped with a particulate filter to start regeneration program within a certain mileage.

› Always add quality diesel required by laws and regulations to prevent increased particulate matter or catalytic converter poisoning due to fuel quality problems.

› Replace with the engine oil of specified model according to the maintenance cycle recommended by the manufacturer.

› Avoid prolonged/frequent operation of the engine with full throttle at low speed.

› Avoid frequent short-distance driving and frequent stopping/engine shutdown.

› Avoid prolonged/frequent operation at idle speed.

Diesel particulate filter

A ceramic filter installed in the diesel engine exhaust system, Diesel Particulate Filter (DPF) captures tiny particles before they enter the atmosphere to reduce atmospheric pollution. DPF is automatically regenerated during vehicle driving under normal circumstances.

Regenerating indication of diesel particulate filter

Particulate filter regeneration indicates the current working state of particulate filter. When the engine enters particulate filter regeneration mode, the vehicle displays “Self-cleaning, please wait”; after regeneration is completed, the vehicle displays “Self-cleaning completed. Thanks for waiting”.

When the diesel particulate filter needs to perform manual regeneration, the vehicle text prompts “Please turn on the exhaust self-cleaning in situ”.

Automatic regeneration

⚠ Warning

› During this process, you must comply with all traffic regulations.

⚠ Caution

› In some particular cases, an alarm message will be triggered due to insufficient regeneration of particulate filter.

› When the instrument display screen has a text prompt of “Please turn on the exhaust self-cleaning in situ” while the engine repair alarm lamp is flashing and the engine malfunctioning warning indicator is always lit, it indicates that the diesel particulate filter needs to immediately perform the manual regeneration procedure.

› When the alarm information appears, the engine will have a certain degree of torque limit.

› The manual regeneration procedure should be carried out in strict accordance with the manual regeneration procedure of the diesel particulate filter.

During driving process, when particulates captured in particulate filter reaches a certain condition, the

vehicle will start regeneration program automatically to burn the particulates completely, so that the particulate filter restores the ability to capture particulates.

When the vehicle starts the regeneration procedure and enters the regeneration, the vehicle text prompts “Self-cleaning, please wait a moment”. In order to facilitate the regeneration, it is suggested that you follow the following operation until the text prompt disappears:

1. On a road in good conditions, try to keep the engine speed at about 2,000 r/min to maintain a smooth speed.
2. Try to prevent the engine from operation at idle speed.
3. Try to avoid vehicle stop and engine stall.

Manual regeneration procedure

⚠ Warning

- When the manual regeneration procedure is running, it will generate heat, so do not park the vehicle near hay, wood and other combustibles.
- Do not perform the manual regeneration procedure in a closed environment such as a garage.

⚠ Caution

- Do not perform any operation while regeneration process is in progress, otherwise regeneration process may exit automatically.
- For emergency use of the vehicle, exit the process by stepping on the clutch pedal, the brake pedal, throttle, but the alarm information may not be eliminated and still needs to be disposed of.

1. Stop the vehicle on a flat and safe place, set the gear to neutral position, shut down the engine and apply parking brake.
2. Ensure enough battery capacity.
3. Shut down the engine and wait for 15 min, and then check the fluid level of engine oil. If the liquid level is not between the upper and lower limits, adjust fluid level of engine oil to keep it between the upper and lower limits.
4. If at normal liquid level, start the engine so that the water temperature of engine reaches above 40°C.
5. Set ignition switch to LOCK and hold it for 2 min.
6. Complete the following operations within 1 min: set the ignition switch to ON, press and hold the active regeneration switch for 5 seconds; do not release it until the text “Start vehicle with idle” appears on the instrument, and start the engine and release the clutch immediately.
7. Turn on the air conditioner (A/C is ON), the particulate filter will enter regeneration process, the engine speed will automatically increase to 2000 rpm, and the prompt “DPF Self-cleaning” appears on the instrument.
8. Wait for (10~20) min. At the end of the regeneration process, the text prompt “Self-cleaning over. Thx for waiting” appears.
9. The engine repair warning lamp will go off during the regeneration procedure, and the engine malfunctioning warning indicator will go off when the regeneration is complete and after the three driving cycles, indicating that the regeneration is successful and the vehicle can be used normally.

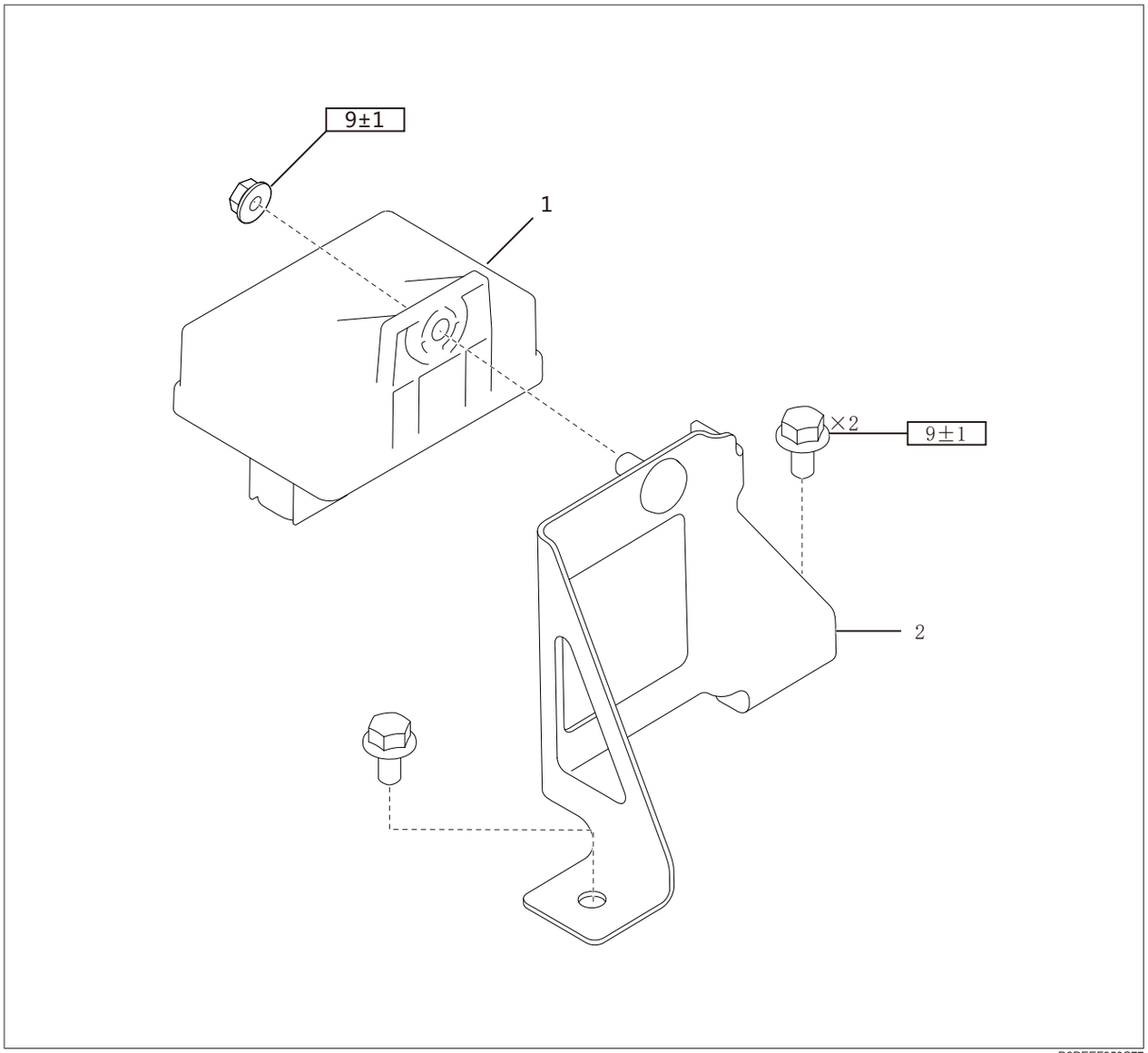
Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Exhaust hoop	Turbocharger x lean NOx trap	15±1	1	—
Exhaust hoop	lean NOx trap x particulate filter	15±1	1	—
Exhaust hoop	Particulate filter x front section of exhaust pipe	15±1	1	—
Nut	Bracket of lean NOx trap x engine	23±3	1	—
Bolt	Pre-catalytic converter bracket x engine	23±3	1	—
Bolt	Pre-catalytic converter bracket x particulate filter	23±3	2	—
Nut	Lower bracket of particulate filter x right mount bracket	23±3	2	—
HP hard tube of differential pressure sensor	HP hard tube of differential pressure sensor x particulate filter	23±3	1	—
LP hard tube of differential pressure sensor	LP hard tube of differential pressure sensor x particulate filter	23±3	1	—
Thermocouple of high-temperature sensor	Thermocouple of high-temperature sensor x particulate filter	45±5	1	—
Thermocouple of oxygen sensor	Thermocouple of oxygen sensor x lean NOx trap	50±5	2	—
Bolt	Differential pressure sensor x differential pressure sensor bracket	9±1	1	—
Bolt	Differential pressure sensor bracket x vehicle body	9±1	1	—
Bolt	Bracket for preheater plug controller x battery bracket	9±1	2	—
Bolt	Bracket for preheater plug controller x preheater plug controller	9±1	1	—
Preheater plug	Preheater plug × cylinder head	9±1	4	—
Bolt	EGR assembly × cylinder block	24±2	3	—
Stud	EGR assembly × cylinder head	5±2	2	—
Nut	EGR assembly × cylinder head	10±1	2	—

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	EGR air vent bellows assembly × EGR assembly	10±1	2	—
Bolt	EGR air vent bellows component x intake manifold assembly	10±1	2	—
Bolt	EGR valve assembly x EGR cooler component	10±1	2	—
Bolt	Vacuum switching valve × air inlet manifold	4±0.5	2	—
Bolt	Oil-gas separator assembly x cylinder head cover	10±1	7	—

Preheater plug controller

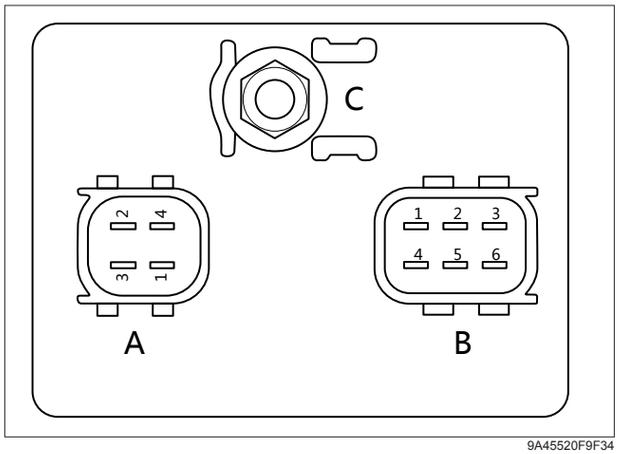
Structural diagram



D8DEEF950C77

1. Preheater plug controller
2. Bracket for preheater plug controller

Pin definition



9A45520F9F34

Connector A

Pin No.	Function
1	Input signal
2	Power supply
3	Diagnostic signal
4	Ground

Connector B

Pin No.	Function
1	Preheater plug 1
2	—
3	Preheater plug 2
4	Preheater plug 3
5	—
6	Preheater plug 4

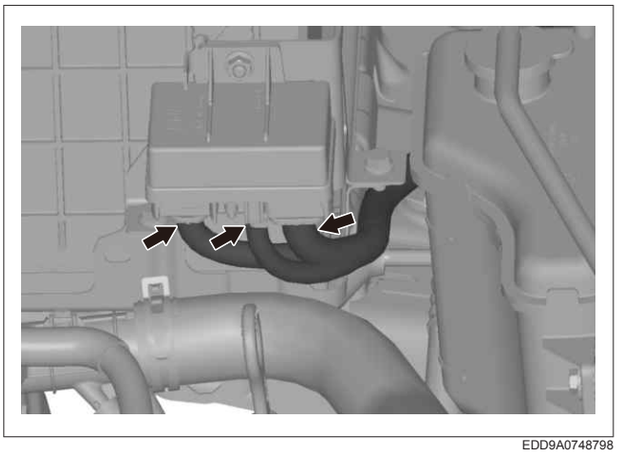
Connector C

Pin No.	Function
1	Power supplied to preheater plug

Removal/installation

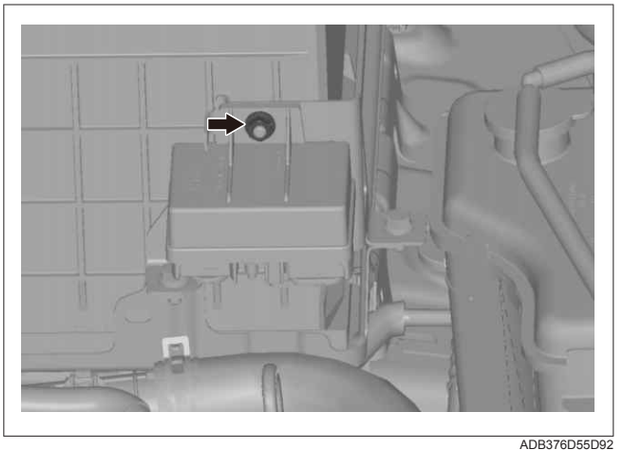
Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect 3 connectors



EDD9A0748798

3. Remove 1 nut



ADB376D55D92

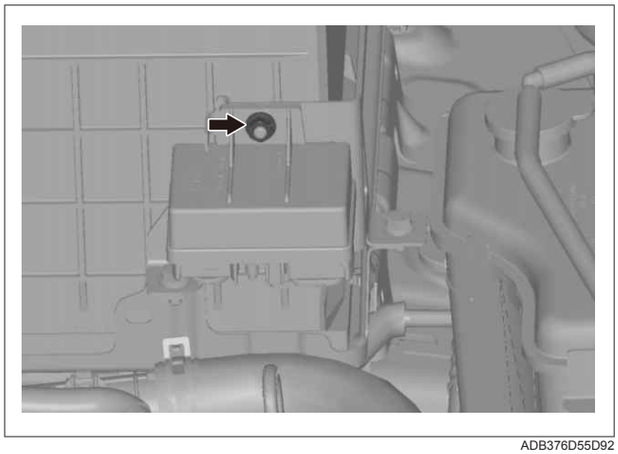
4. Remove preheater plug controller

⚠ Caution

- Under no circumstances should the parts and components be disassembled to avoid irreparable damage.
- Put the removed parts in a clean and safe place to prevent the parts from colliding.

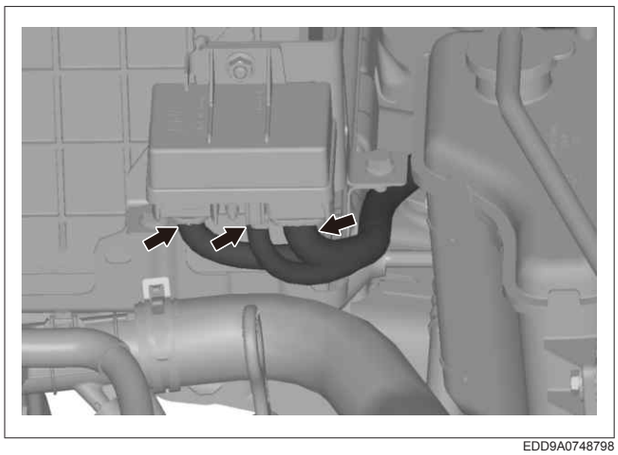
Installation

1. Install 1 nut



ADB376D55D92

2. Install 3 connectors



EDD9A0748798

3. Connect negative terminal of the battery

Preheater plug

Operating principle

For direct injection engines, air in cylinder block can be directly heated by preheater plug to optimize starting performance. The max. temperature of the whole preheating process is 1000℃. It only takes about 2 s for preheater plug to reach the required temperature. Preheating after starting can not only optimize emission but also reduce noise at the time.

Preheater plug is used with preheater plug controller. In preheating process, the preheater plug controller brings preheater plug to a very high temperature in a short time according to quick preheating instruction issued by ECU and achieve a rapid cold start of engine. After quick preheating at starting stage, ECU adjusts duty ratio of voltage, and reduces battery voltage to ensure that the preheater plug is not burned due to overheating.

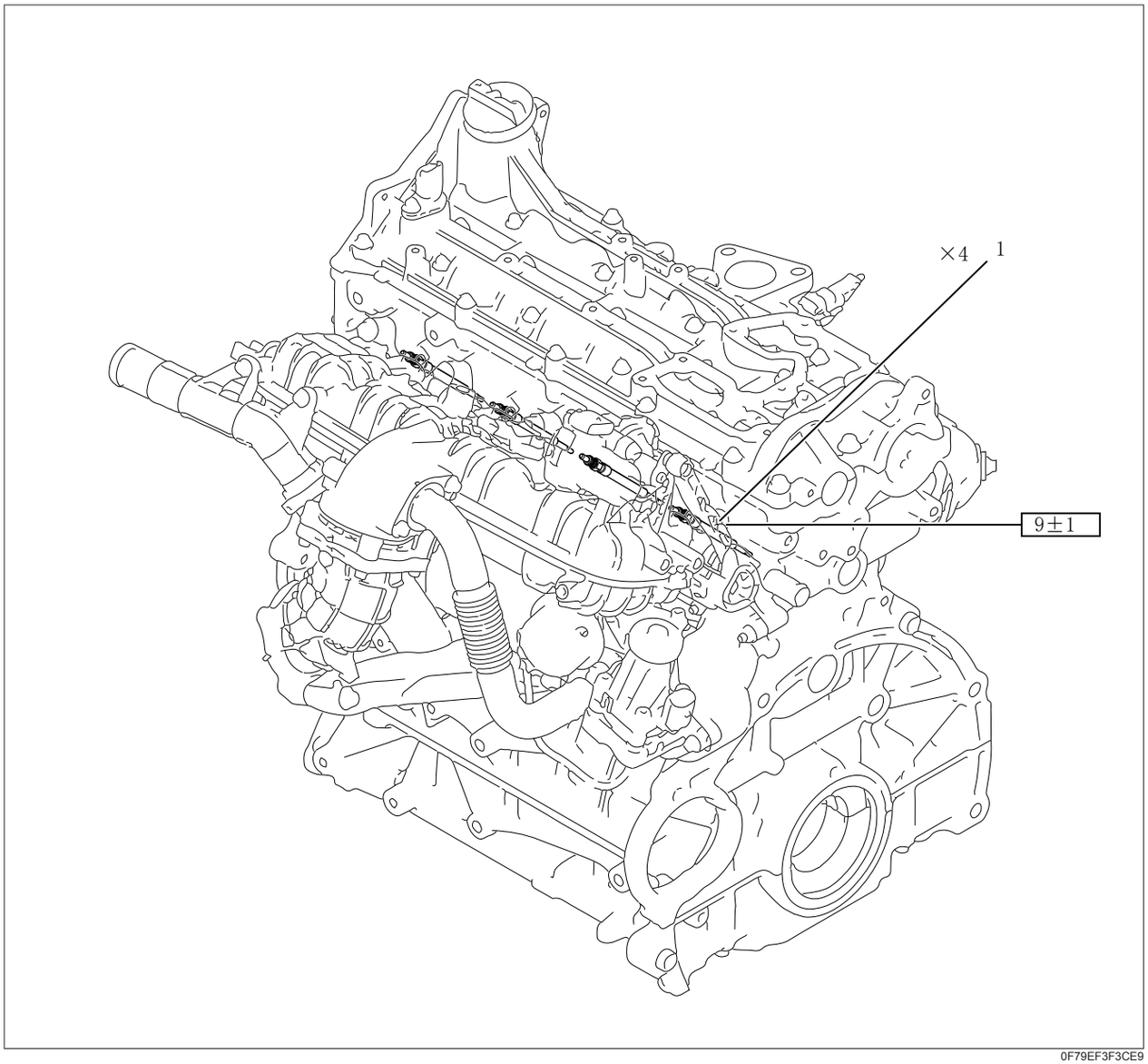
Preheater plug is used to improve engine performance in the following combustion stages:

- Improves the engine's ability to start at cold start of engine.
- Ensure stable idling of engine.
- Increase air temperature in the combustion chamber.
- Realizes easier ignition and combustion.
- Reduces hydrocarbon emission in case of long post-heating time.
- Compensates for possible cooling effects in combustion chamber.

Operating voltage:

- Start stage: voltage 11 V; time required ≤ 2 s
- Normal stage: voltage 5 V; time required ≤ 58 s
- Peak current: 30 A (max.)
- Steady-state current: 10 A (max.)

Structural diagram



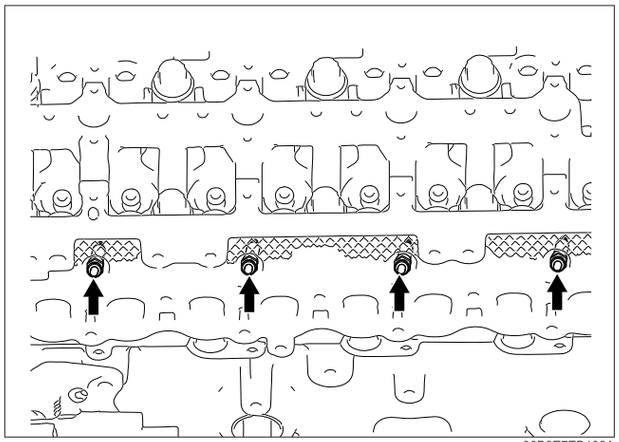
0F79EF3F3CE9

1. Preheater plug

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove connecting harness of preheater plug
3. Use a socket wrench to remove 4 preheater plugs in the hole at intake end of cylinder head



39B8E7EB102A

Notice

› The removed preheater plugs shall be placed separately to prevent collision and contamination.

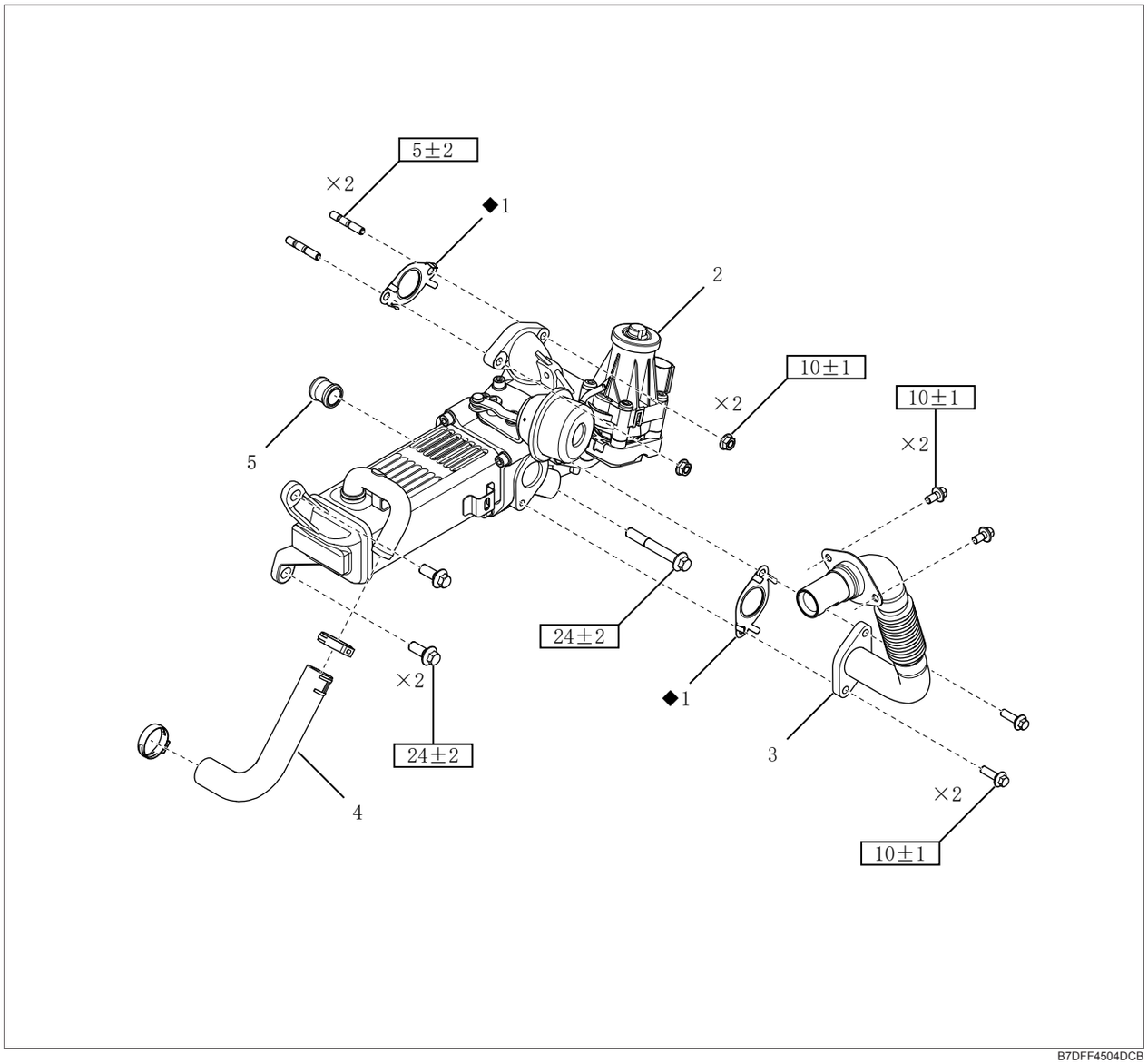
4. Check for air leakage at installation position of preheater plug, and eliminate the fault if any.

Installation

1. Perform installation work in reverse order of removal

EGR assembly

Structural diagram



B7DFF4504DCB

1. EGR air vent gasket
2. EGR assembly
3. EGR air vent bellows assembly
4. EGR water outlet hose
5. Connecting pipe components of oil cooler

Removal/installation

Removal

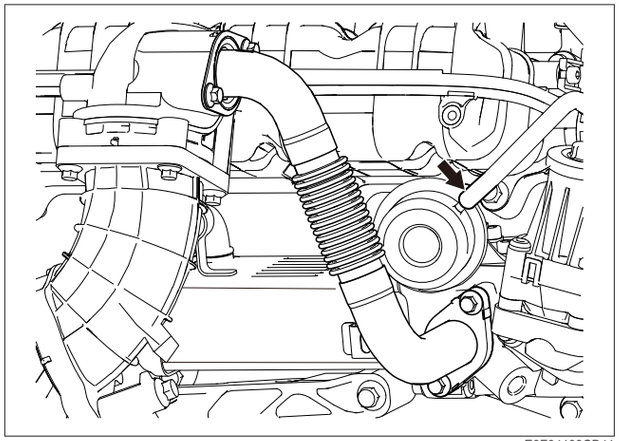
⚠ Warning

- To avoid burns, do not operate while the engine is still at a high temperature.
- If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

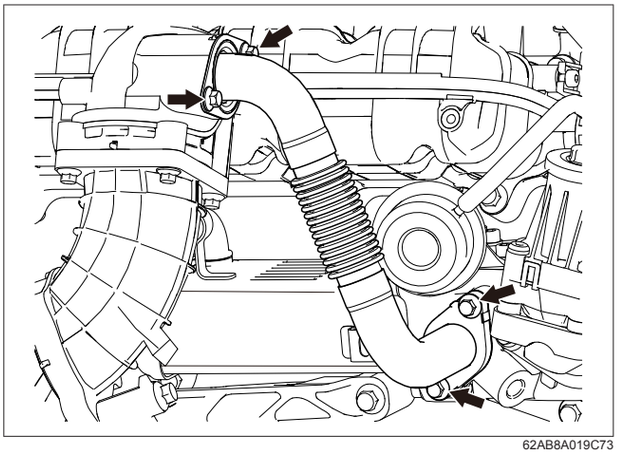
- If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Recover engine coolant
4. Remove electronic throttle
5. Remove intake adapter
6. Remove intake adapter bracket
7. Disconnect vacuum switching valve connecting hose component II



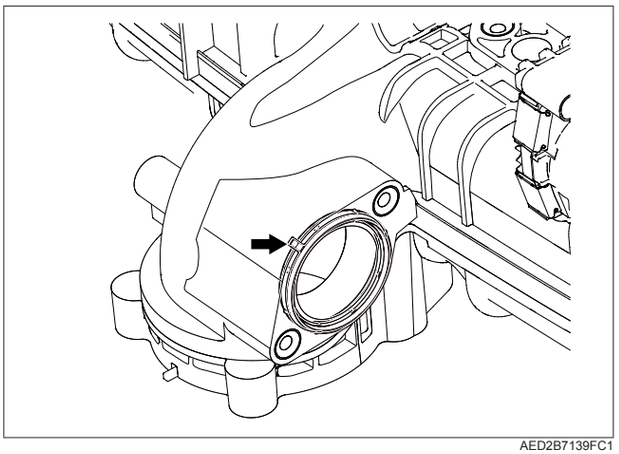
E3F64139CB41

8. Remove 4 bolts, and remove EGR air vent bellows assembly



62AB8A019C73

9. Remove intake adapter EGR gasket

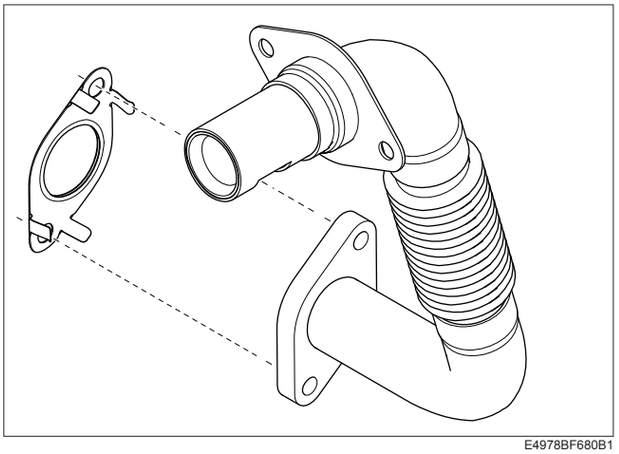


AED2B7139FC1

ℹ Notice

- Gaskets are disposable parts.

10. Remove EGR air vent gasket

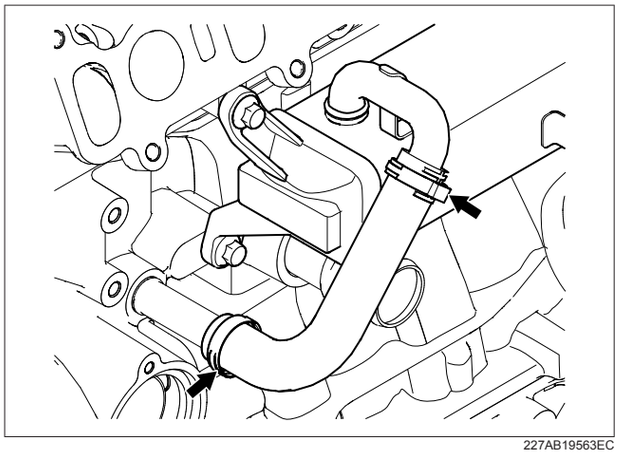


E4978BF680B1

ℹ Notice

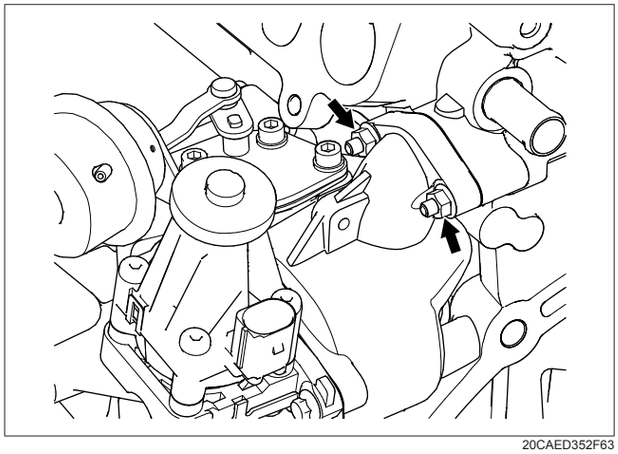
- Gaskets are disposable parts.

11. Remove intake manifold assembly
12. Disconnect EGR water outlet hose



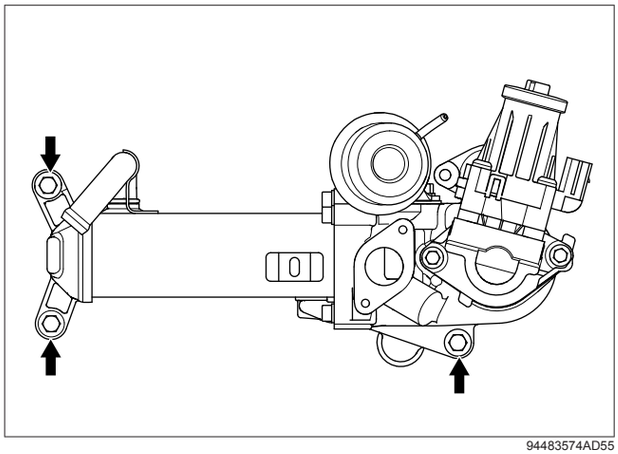
227AB19563EC

13. Remove 2 nuts



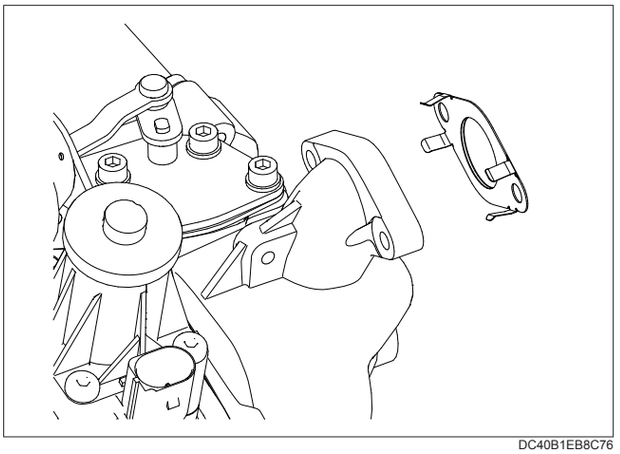
20CAED352F63

14. Remove 3 bolts and then remove EGR assembly



94483574AD55

15. Remove EGR air vent gasket

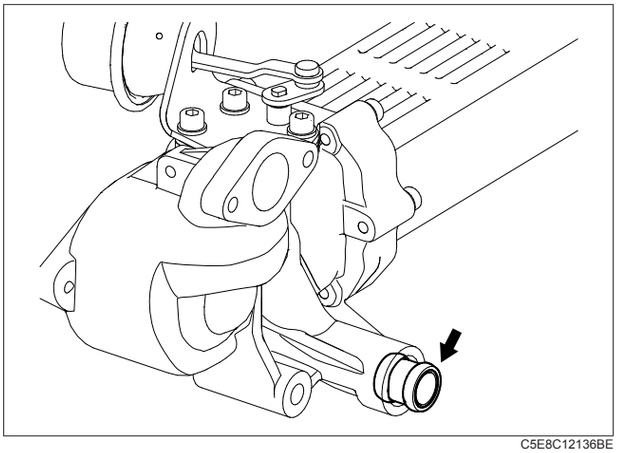


DC40B1EB8C76

Notice

› Gaskets are disposable parts.

16. Remove connecting pipe components of oil cooler



C5E8C12136BE

Installation

Warning

› To avoid burns, do not operate while the engine is still at a high temperature.

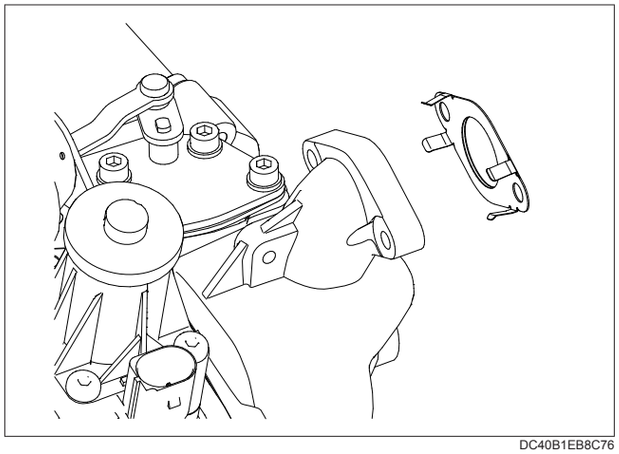
› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

Caution

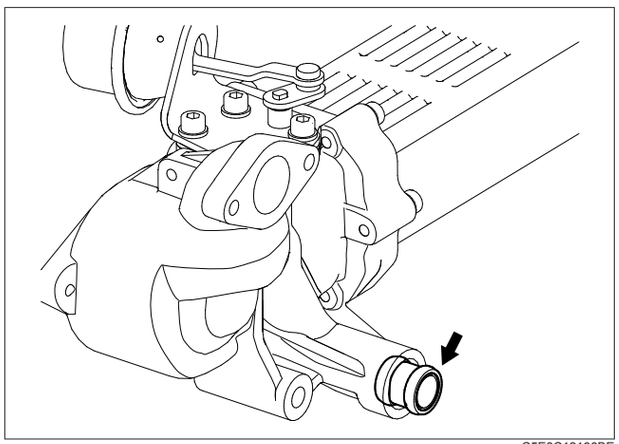
› Tighten the fastener according to the specified torque value.

1. Install a new EGR air vent gasket to EGR assembly



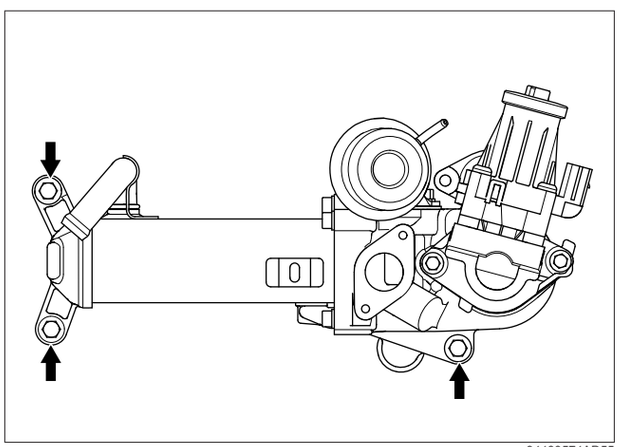
DC40B1EB8C76

2. Install oil connecting pipe components of oil cooler to EGR assembly, align EGR water inlet pipe component and bolt hole to install EGR assembly



C5E8C12136BE

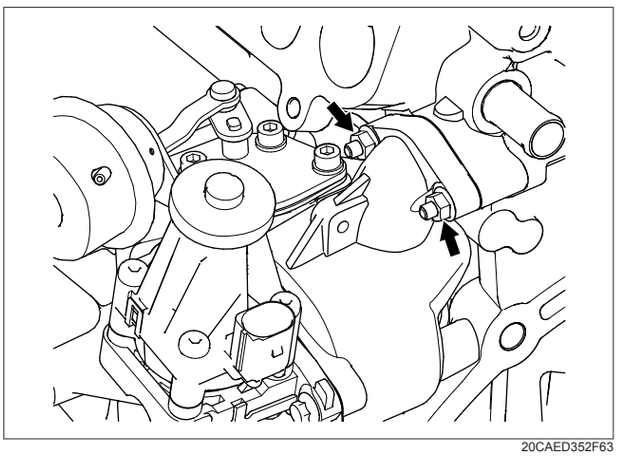
3. Fasten the 3 bolts



94483574AD55

Tightening torque:(24±2)N·m

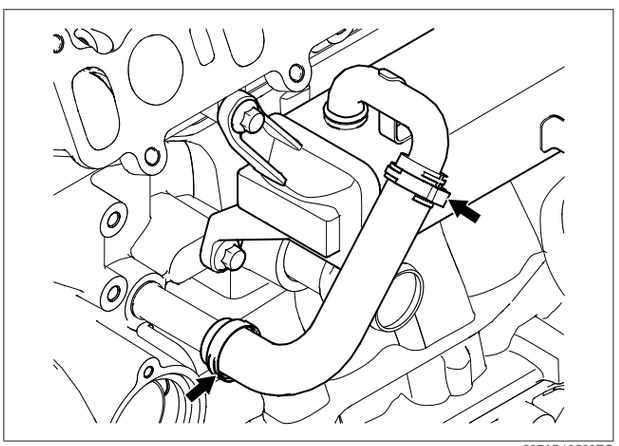
4. Tighten 2 nuts



20CAED352F63

Tightening torque: (10±1) N·m

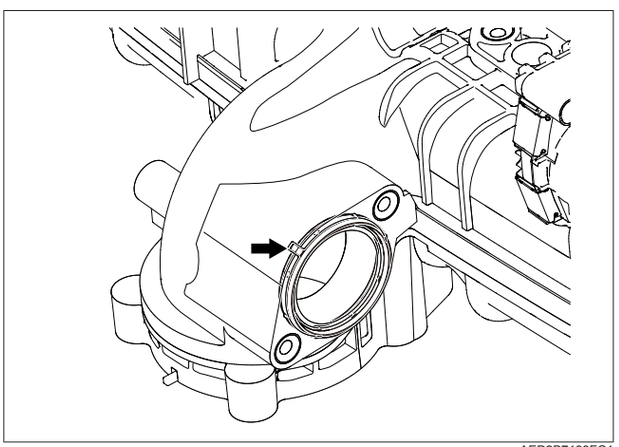
5. Connect EGR water outlet hose



227AB19563EC

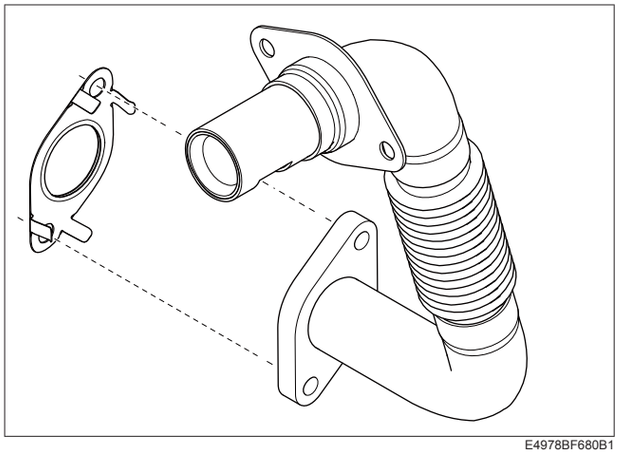
6. Install intake manifold assembly with intake adapter and air throttle

7. Install new intake adapter EGR gasket on intake adapter



AED2B7139FC1

8. Install a new EGR air vent gasket to EGR air vent bellows component

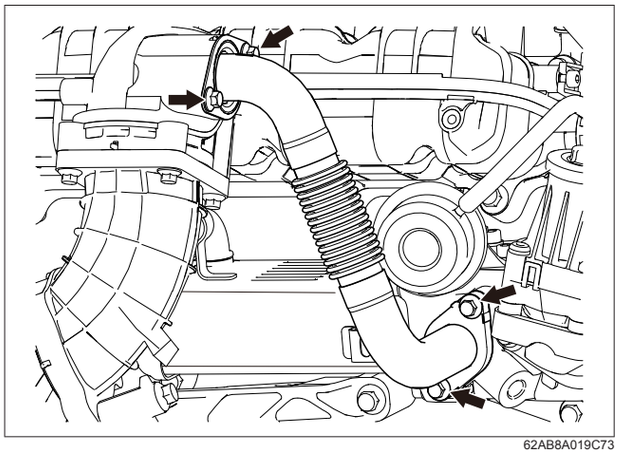


E4978BF680B1

Notice

› Gaskets are disposable parts.

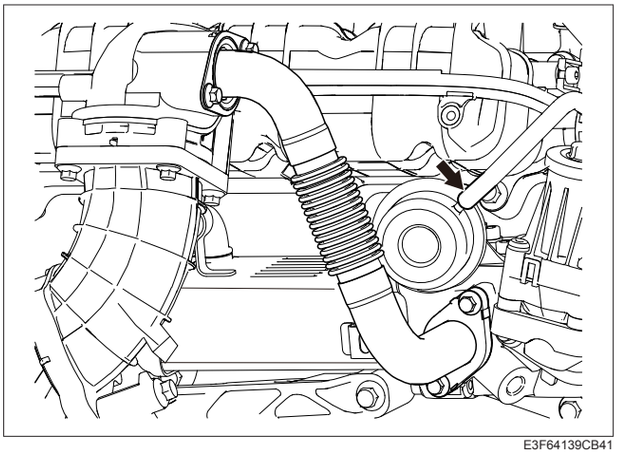
9. Insert one end EGR air vent bellows component into intake adapter
10. Use 4 bolts to tighten both ends of EGR air vent bellows assembly at the same time



62AB8A019C73

Tightening torque: (10±1) N·m

11. Connect vacuum switching valve connecting hose component II



E3F64139CB41

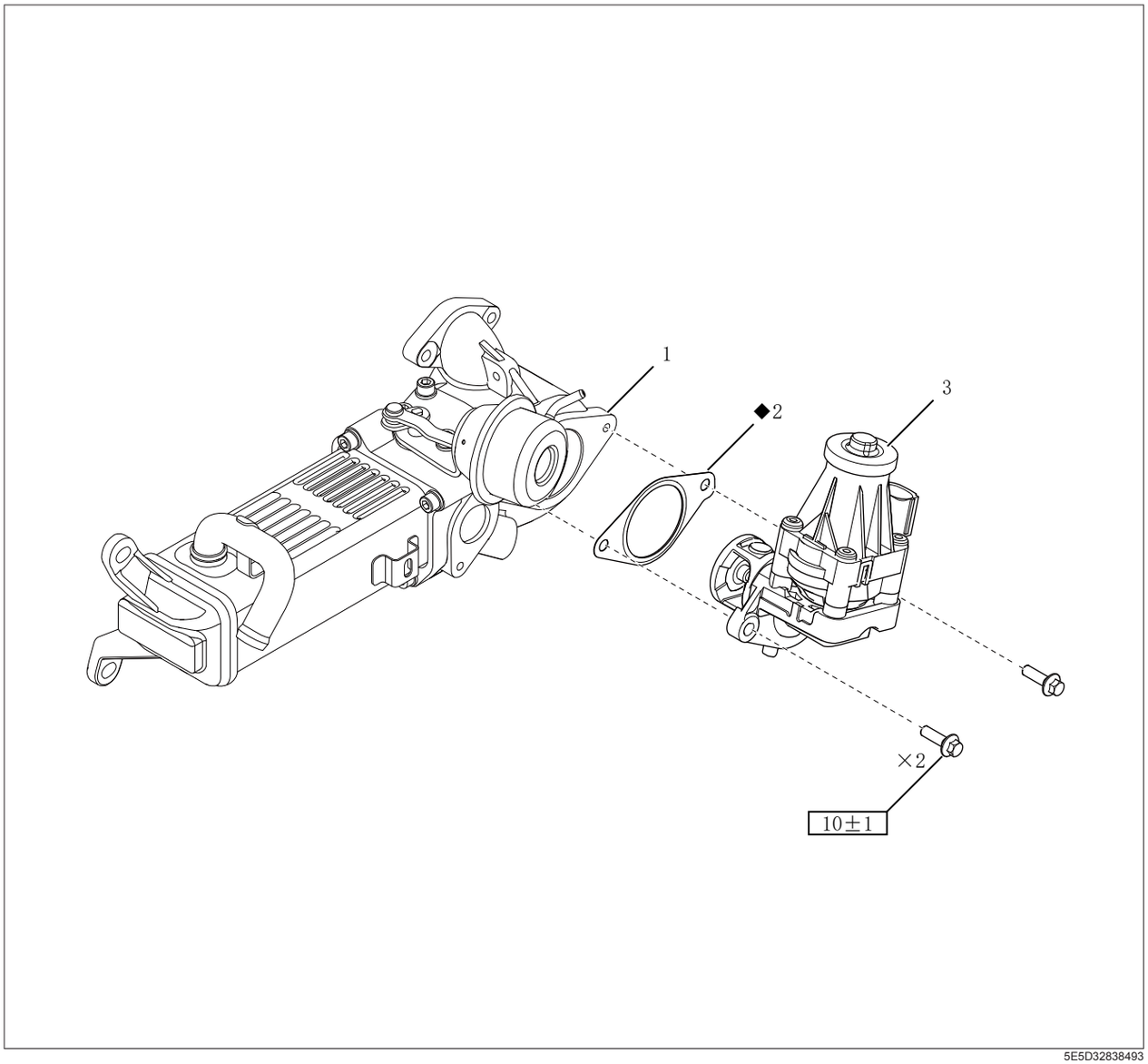
12. Install the intake adapter bracket
13. Install the intake adapter
14. Install electronic throttle
15. Install negative terminal of the battery
16. Add engine coolant

EGR valve

Operating principle

EGR valve is a mechanical-electrical product installed on engine for controlling exhaust gas recirculation in intake system. A short metal pipe leading to exhaust manifold is connected to it. It is for controlling volume of exhaust gas entering exhaust manifold so that a certain volume of exhaust gas flows into air inlet manifold for recirculation. EGR valve is an exhaust gas purification device for removing NOx, one of the hazardous gases in engine exhaust.

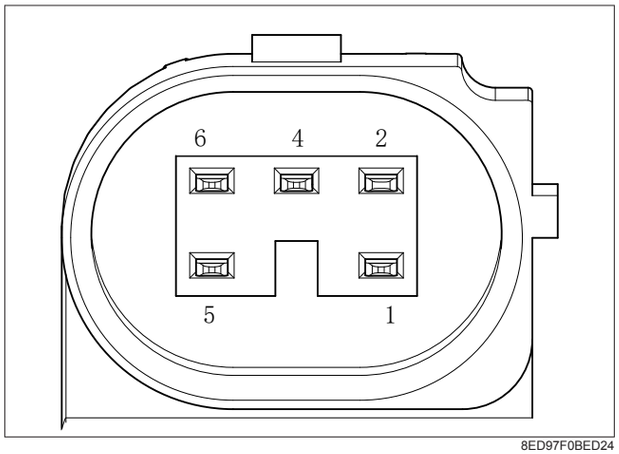
Structural diagram



5E5D32838493

1. EGR cooler component
2. EGR valve gasket
3. EGR valve

Pin definition



8ED97F0BED24

Pin No.	Function
1	EGR valve motor positive terminal
2	EGR sensor position signal
3	—
4	EGR sensor ground
5	EGR valve motor negative terminal
6	EGR sensor input voltage 5 V

Check

1. Place ignition switch on OFF gear (If preceding state of ignition switch is ON, after it is at OFF, wait for at least 60 seconds for subsequent operations)
2. Unplug EGR valve harness connector
3. Measure the resistance of EGR valve drive motor

   Normal value: about 2.4 Ω

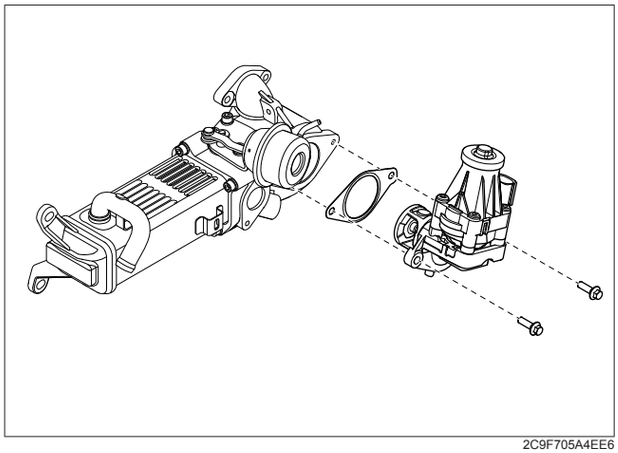
Notice

› After replacing EGR valve, use scanner to trigger ECU to self-learn the EGR valve position again.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect the harness connector of EGR valve assembly
3. Remove 2 bolts and then remove EGR valve assembly



2C9F705A4EE6

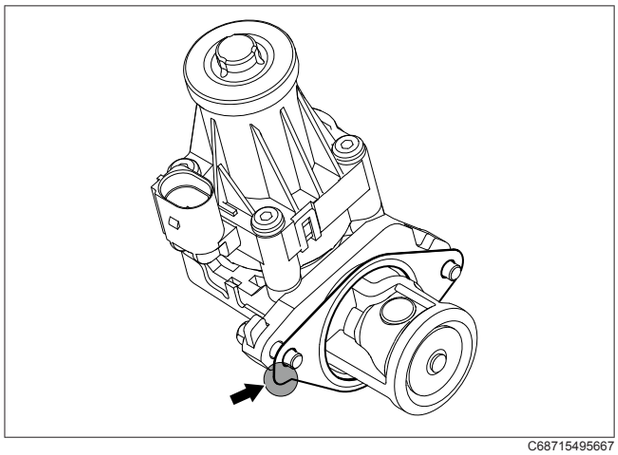
4. Remove EGR valve gasket

Notice

Gaskets are disposable parts.

Installation

1. Install EGR valve assembly and new EGR valve gasket

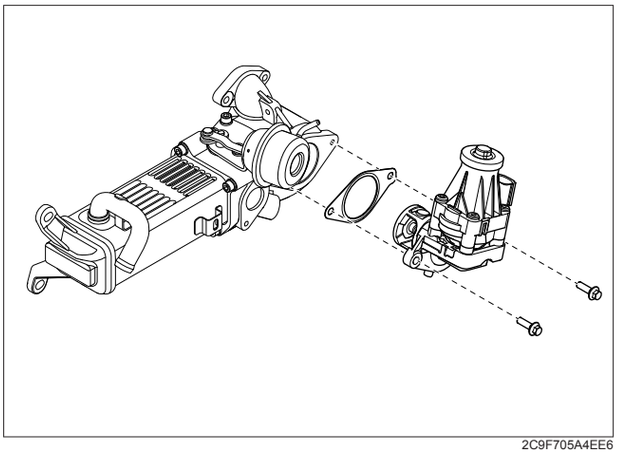


C68715495667

In the diagram:

Arrow: leakage proof sign

2. Fasten the 2 bolts



2C9F705A4EE6

Tightening torque: (10±1) N·m

3. Connect harness connector

Vacuum switching valve

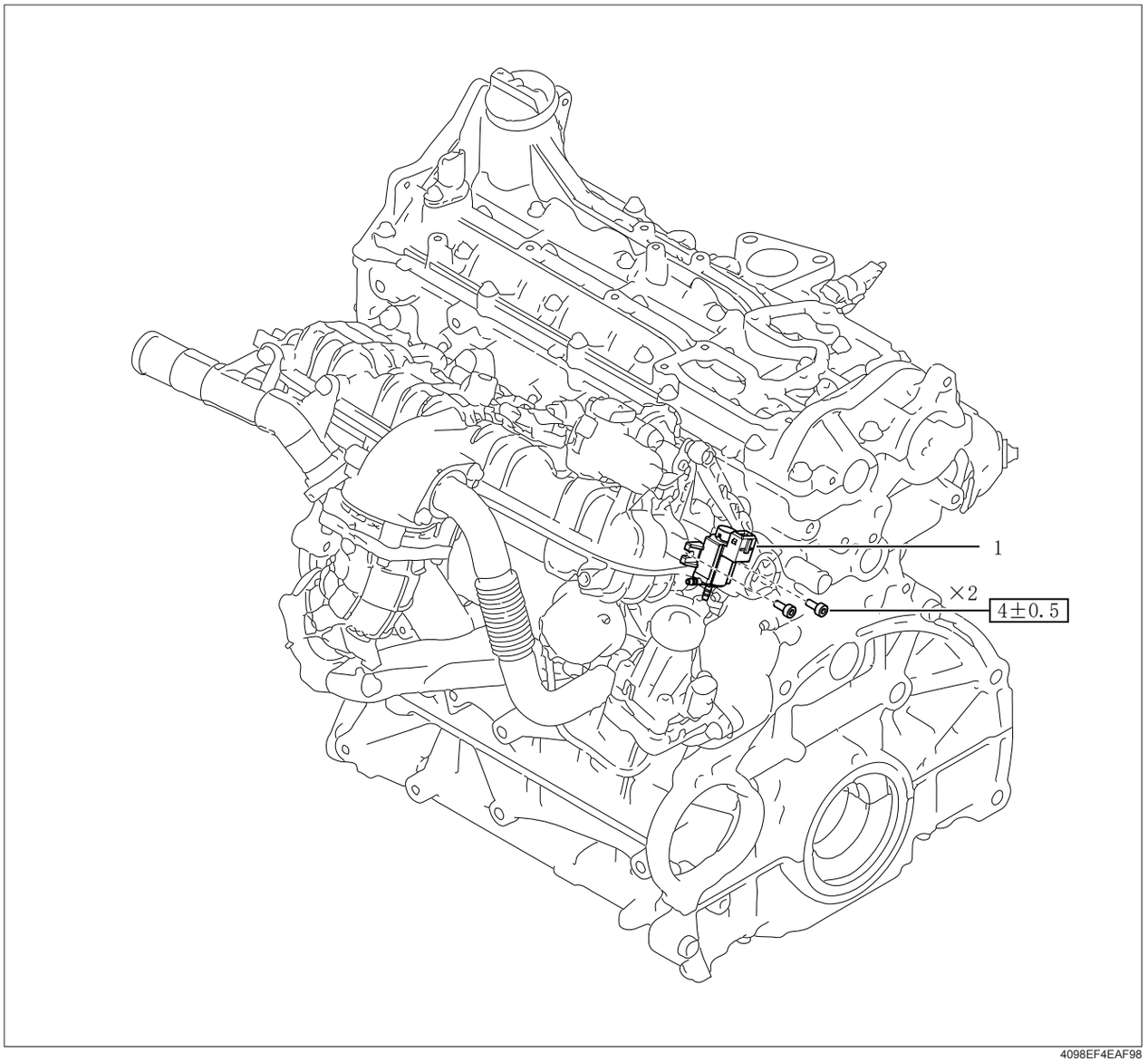
operating principle

Vacuum switching valve is for controlling EGR bypass valve opening/closing and controlling exhaust gas passage through EGR cooler. EGR exhaust bypassing is allowed at power-on state

Power-off state: vacuum pump pipeline and EGR bypass valve are not at breakover state, exhaust gas passes through EGR cooler and is cooled and then flows into air inlet manifold.

Power-on state: vacuum pump pipeline and EGR bypass valve are at breakover state, exhaust gas does not pass through EGR cooler directly flows into air inlet manifold.

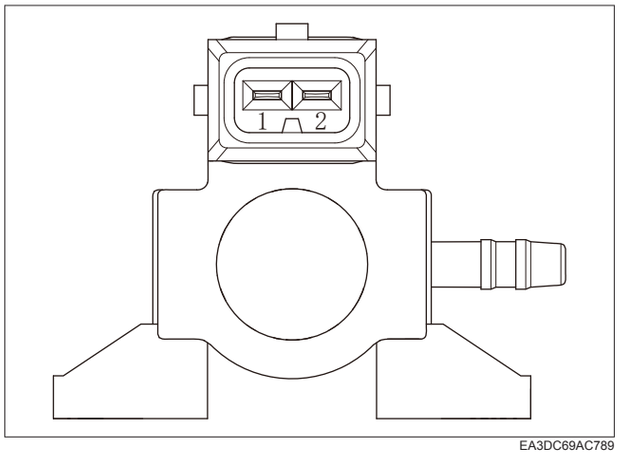
Structural diagram



4098EF4EAF98

1. Vacuum switching valve

Pin definition



EA3DC69AC789

Pin No.	Function
1.	Positive terminal
2	Negative terminal

Check

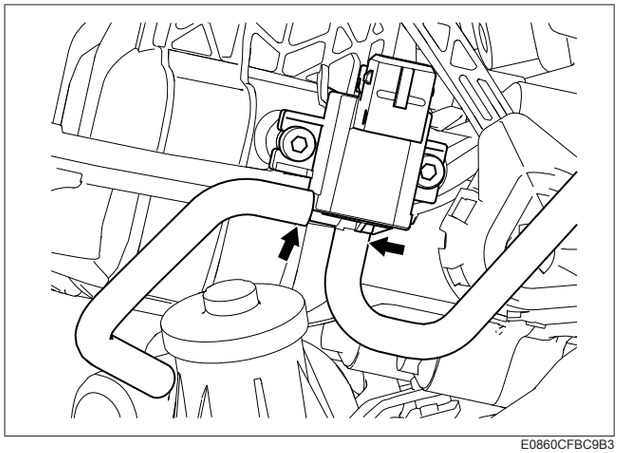
1. Set ignition switch to OFF position (if the ignition switch was at ON previously, wait for at least 2 minutes before performing subsequent operations after setting it to OFF, so as to avoid live plugging)
2. Disconnect harness connector of vacuum switching valve
3. Check the resistance value between the two pins of vacuum switching valve

   Standard value: (26.3±1.4) Ω

Removal/installation

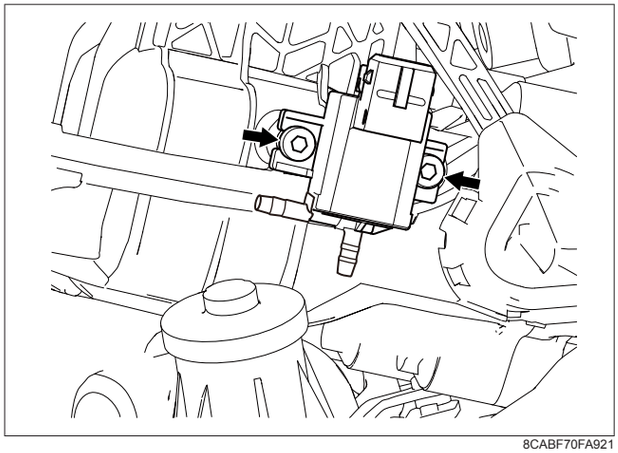
Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connector of vacuum switching valve
3. Disconnect connecting pipeline



E0860CFBC9B3

4. Remove 2 bolts, and remove vacuum switching valve



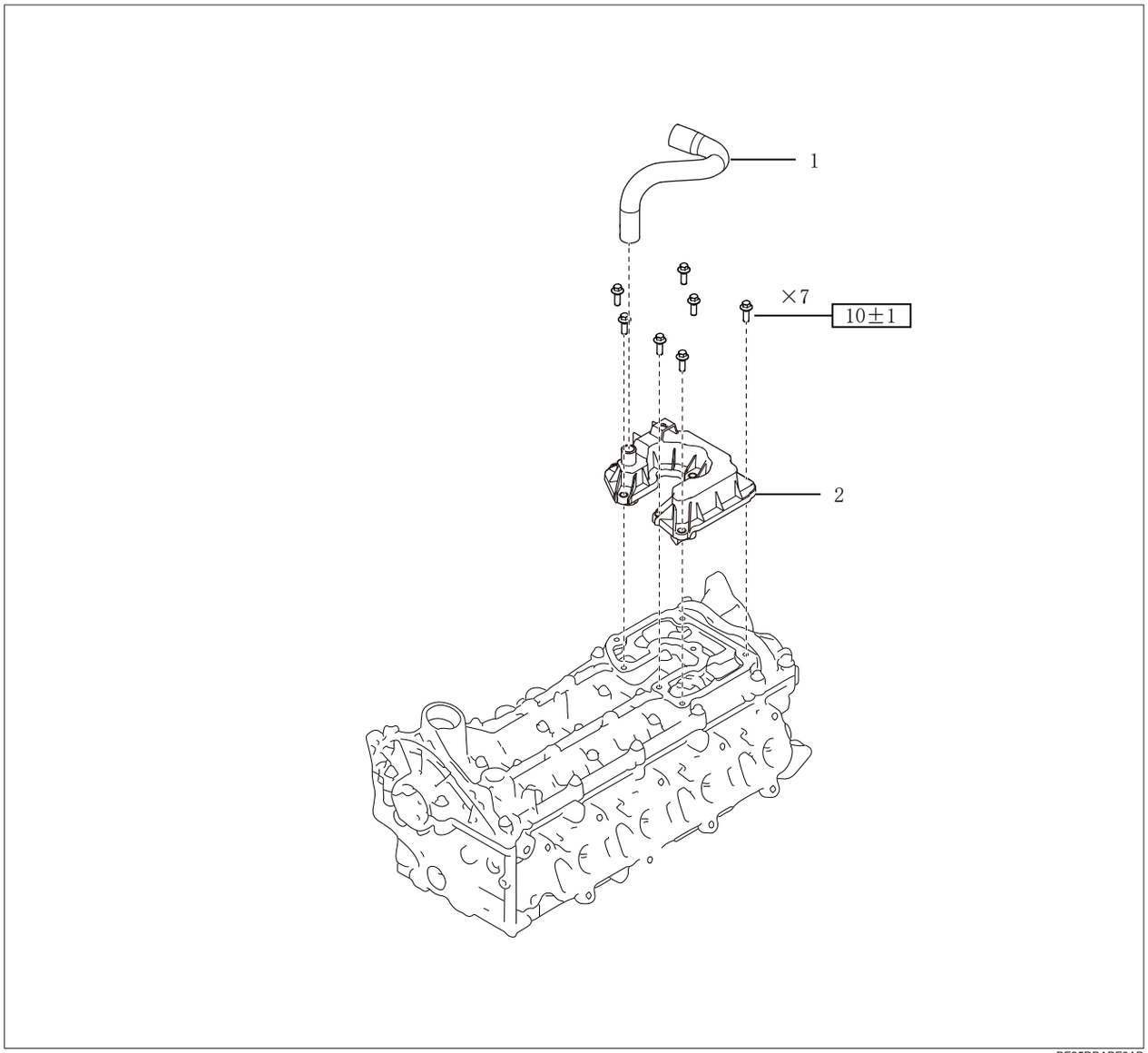
8CABF70FA921

Installation

1. Perform installation work in reverse order of removal

Crankcase ventilation

Structural diagram



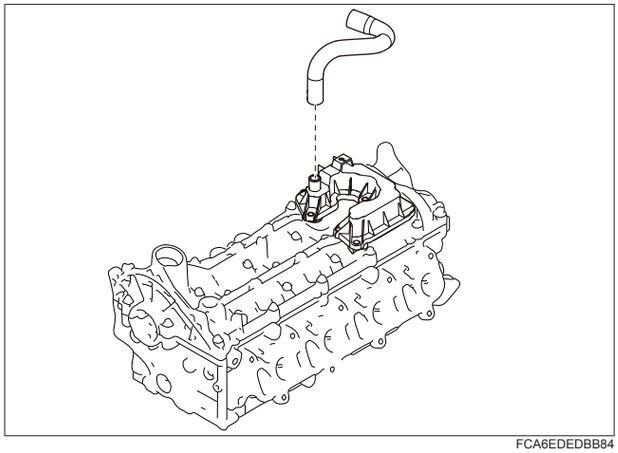
BF25DBABF8AB

1. Crankcase ventilation hose
2. Oil-gas separator assembly

Removal/installation

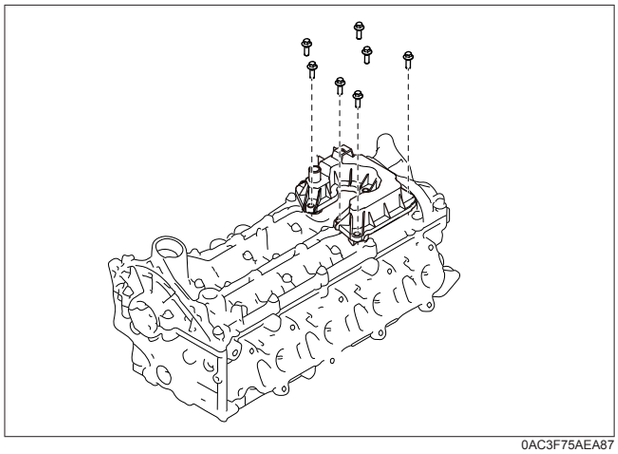
Removal

1. Disconnect the negative terminal of the battery.
2. Remove crankcase ventilation hose



FCA6EDEDBB84

3. Remove 7 bolts, and remove oil-gas separator assembly



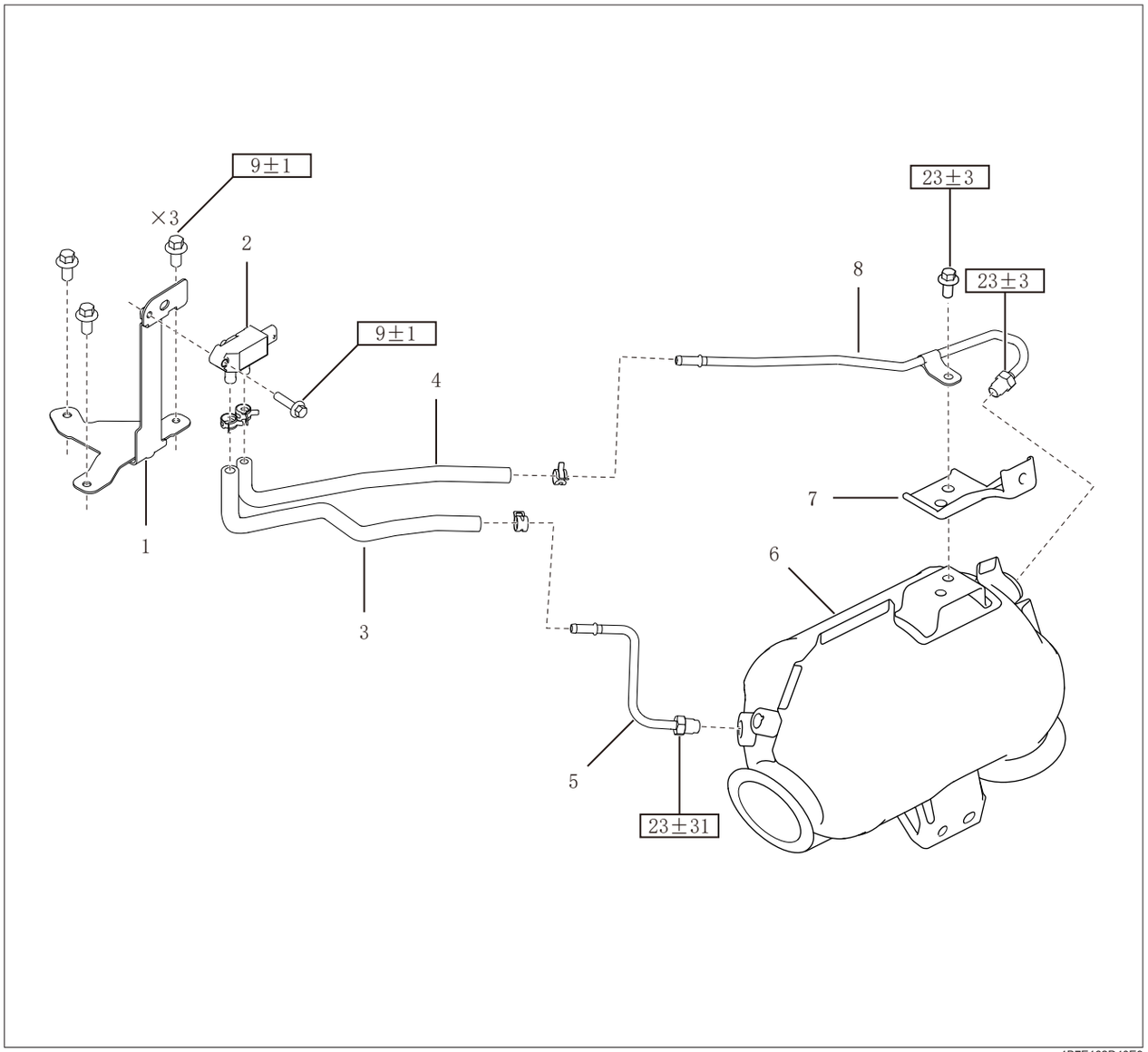
0AC3F75AEA87

Installation

1. Perform installation work in reverse order of removal

Differential pressure sensor

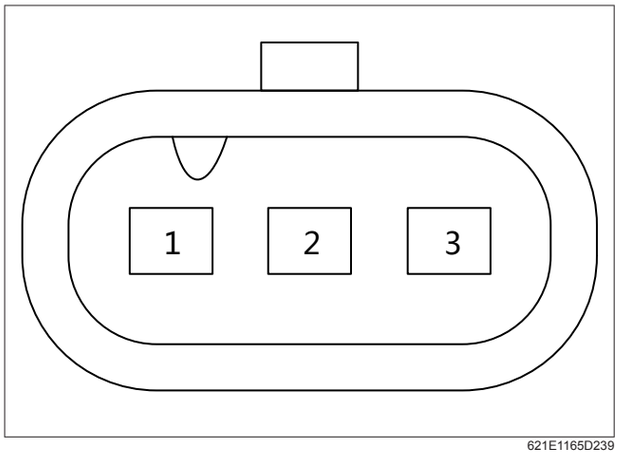
Structural diagram



1B7E162D40E9

1. Differential pressure sensor bracket
2. Differential pressure sensor
3. High-pressure hose of differential pressure sensor
4. Low-pressure hose of differential pressure sensor
5. High-pressure rigid pipe of differential pressure sensor
6. Diesel particulate filter
7. Front catalytic converter bracket
8. Low-pressure rigid pipe of differential pressure sensor

Pin definition



621E1165D239

Pin No.	Function
1	Signal
2	Ground
3	Power

Removal/installation

Removal

⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

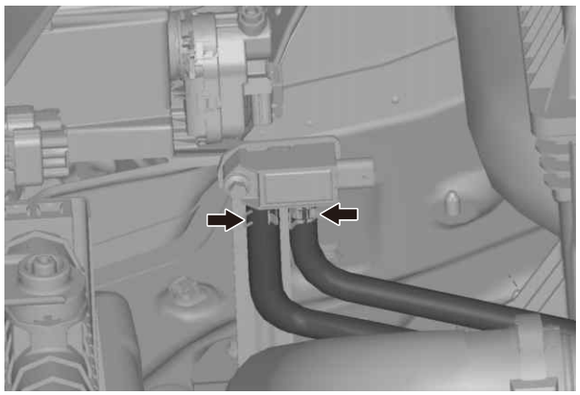
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect 1 harness connector



EA9592CC550C

4. Disconnect rubber pipe of differential pressure sensor

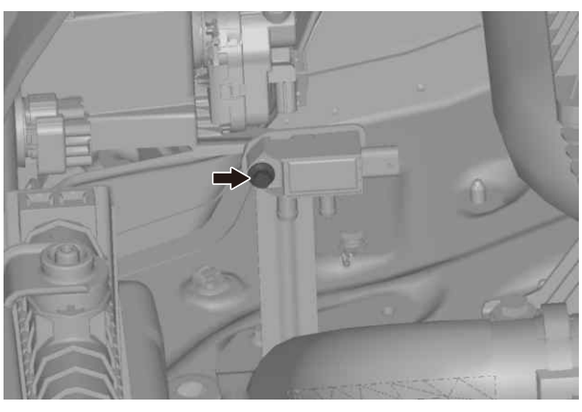


335998D71D23

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

5. Remove 1 bolt



722398AB8B9D

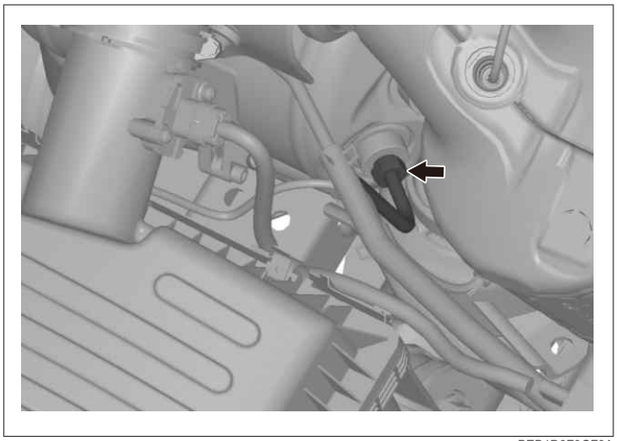
6. Remove differential pressure sensor

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

7. Remove high-pressure rigid pipe of differential pressure sensor

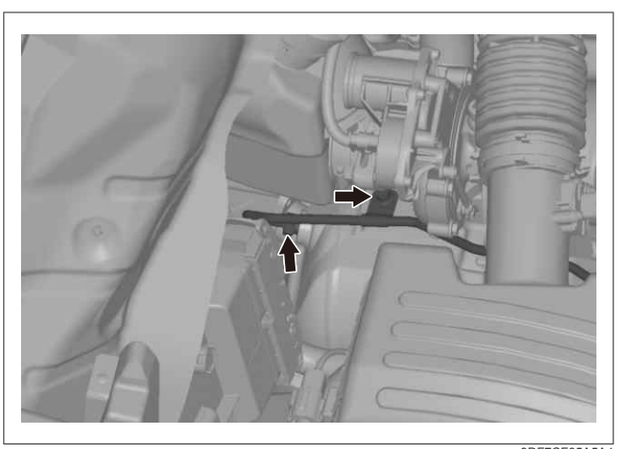


BEB1D8F3CF9A

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

8. Remove 1 bolt, and remove low-pressure rigid pipe of differential pressure sensor



9DF7CF95A5A4

Installation

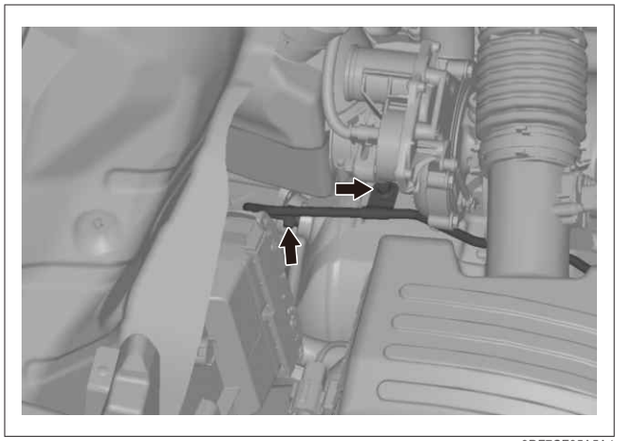
⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install low-pressure rigid pipe of differential pressure sensor, and install 1 bolt

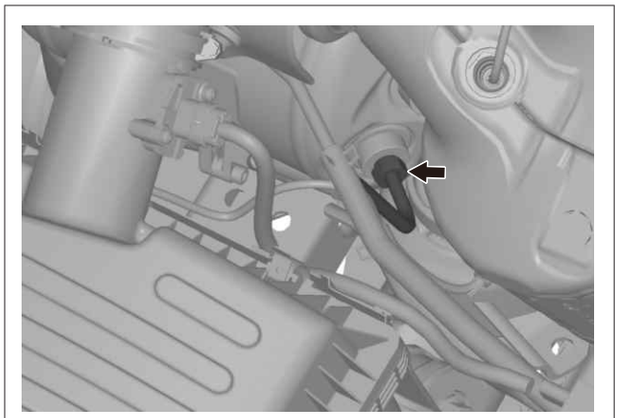


9DF7CF95A5A4

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

2. Install high-pressure rigid pipe of differential pressure sensor



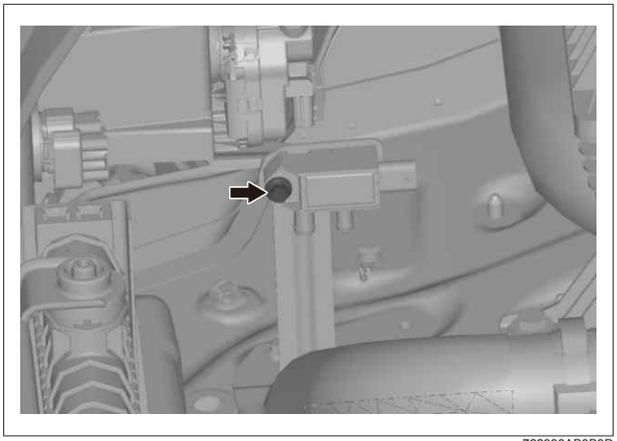
BEB1D8F3CF9A

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

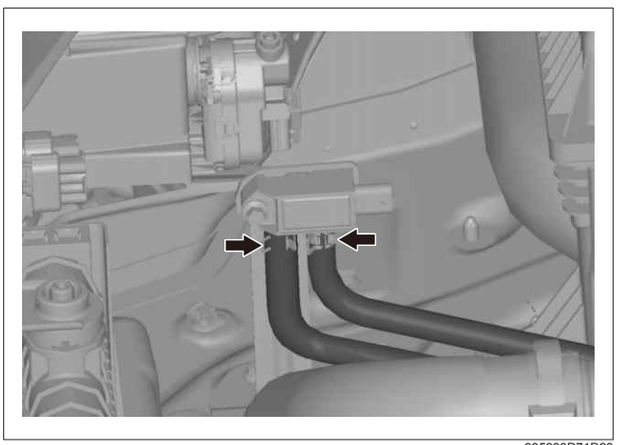
3. Install differential pressure sensor

4. Tighten 1 bolt



722398AB8B9D

5. Install rubber pipe of differential pressure sensor

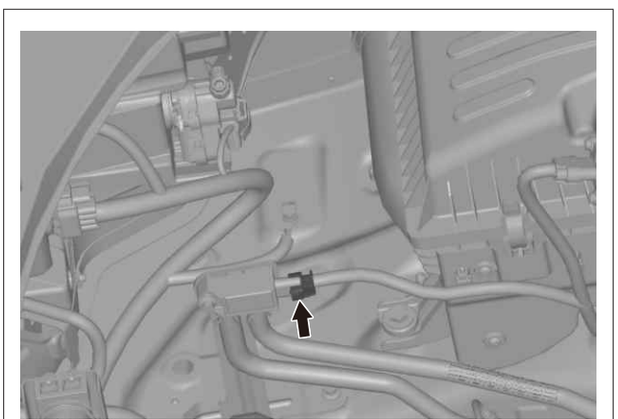


335998D71D23

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

6. Install 1 harness connector



EA9592CC550C

7. Connect negative terminal of the battery

Front oxygen sensor

Operating principle

The sensor compares oxygen content in ambient air with oxygen content in exhaust stream. Heating elements for heating the sensor are provided in each heated oxygen sensor. ECM controls heating control circuit of heated oxygen sensor. This allows the system to enter the closed-loop mode earlier and allows the control module to calculate air-fuel ratio earlier. The engine control module instructs the heater to turn on or off, keeping the heating type oxygen sensor within the specified operating temperature range. The engine control module determines the temperature by measuring the current of the heater.

Fault description: poor idle speed, poor acceleration, excessive exhaust, excessive fuel consumption, etc.

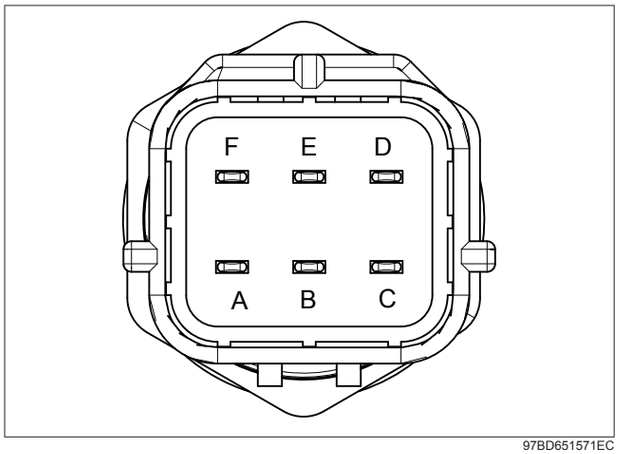
Common causes of failure:

- Moisture vapor enters sensor, temperature changes suddenly, and probe breaks.
- Oxygen sensor is "poisoned". (Pb, S, Br, Si).
- Mechanical shock such as flying stones, etc. causes damage to the sensor.
- Moisture, condensed water or contaminants enter the sensor, causing sensor failure or poor signal.
- After-combustion of exhaust pipe caused by fire leads to burn-out of sensing elements of oxygen sensor.

Precautions for repair:

- It not allowed to use cleaning fluid, oily liquid or volatile solid for oxygen sensor during maintenance.

Pin definition



97BD651571EC

Pin No.	Function
A	Pump battery signal (positive electrode of calibration resistor)
B	Calibration resistor ground
C	Heating element negative
D	Heating element positive
E	Pump battery, reference battery ground
F	Reference battery high level

Check

1. Unplug harness connector of oxygen sensor
2. Place the digital multimeter in the ohm range
3. Measure resistance between pin C and pin D of oxygen sensor

   Standard resistance: (3.4 ± 0.6) Ω

⚠ Caution

› If the resistance value is inconsistent with the standard value, replace the front oxygen sensor.

4. Measure resistance between pin A and pin B of oxygen sensor

   Standard resistance: (250~1500) Ω

⚠ Caution

› If the resistance value is inconsistent with the standard value, replace the rear oxygen sensor.

Removal/installation

Removal

⚠ Warning

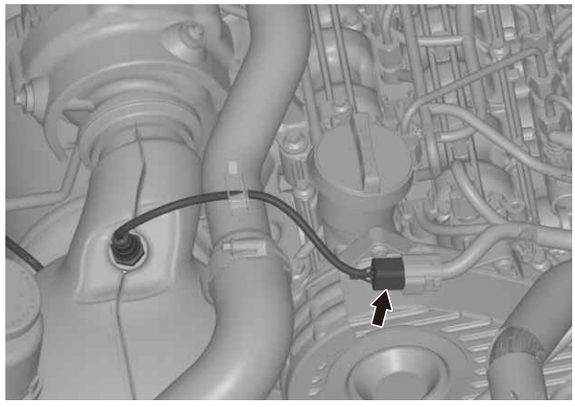
› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

› Replace the sensor or actuator if they were knocked or dropped.

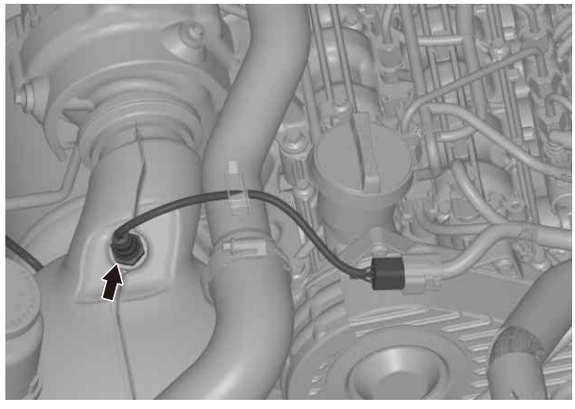
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connector of the front oxygen sensor



ED584510C04B

3. Remove front oxygen sensor



3F45F75A2967

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

Installation

⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

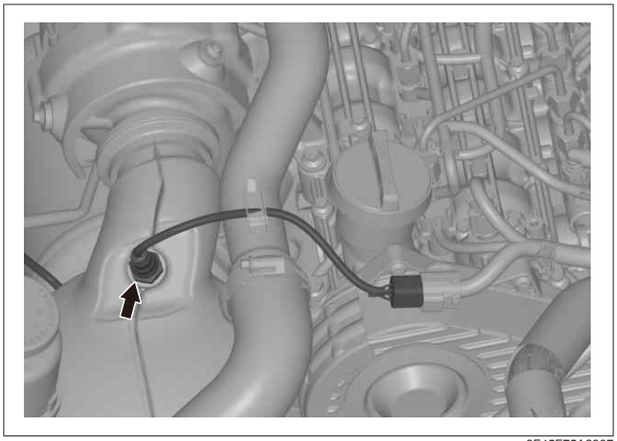
⚠ Caution

› Replace the sensor or actuator if they were knocked or dropped.

ℹ Notice

› Tighten the fastener according to the specified torque value.

1. Install front oxygen sensor

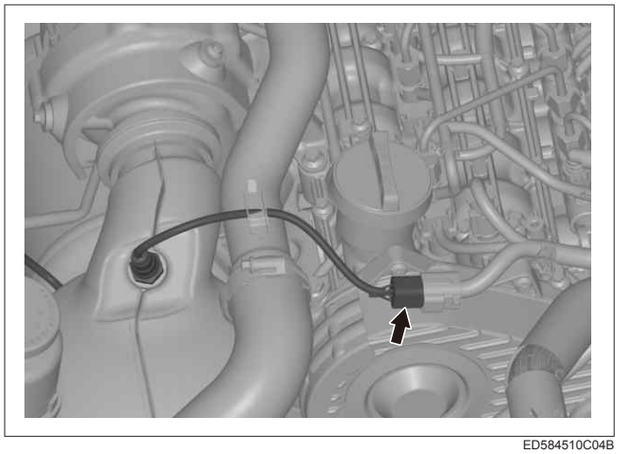


3F45F75A2967

⚠ Caution

› Before installation, make sure that the mounting surface and nearby positions are clean and free of impurity.

2. Install front oxygen sensor harness connector



ED584510C04B

3. Connect negative terminal of the battery

Rear oxygen sensor

Operating principle

The heating type oxygen sensor is used to monitor the working state of the three-way catalytic converter. The sensor compares oxygen content in ambient air with oxygen content in exhaust stream. Heating elements for heating the sensor are provided in each heated oxygen sensor. ECM controls heating control circuit of heated oxygen sensor. This allows the system to enter the closed-loop mode earlier and allows the control module to calculate air-fuel ratio earlier. The engine control module instructs the heater to turn on or off, keeping the heating type oxygen sensor within the specified operating temperature range. The engine control module determines the temperature by measuring the current of the heater.

Fault description: poor idle speed, poor acceleration, excessive exhaust, excessive fuel consumption, etc.

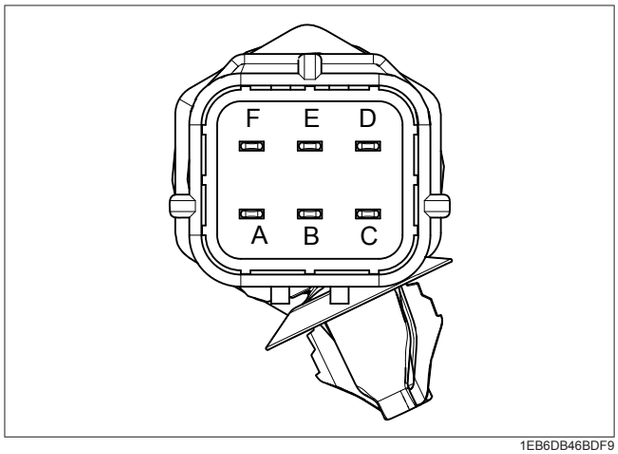
Common causes of failure:

- Moisture vapor enters sensor, temperature changes suddenly, and probe breaks.
- Oxygen sensor is "poisoned". (Pb, S, Br and Si)
- Mechanical shock such as flying stones, etc. causes damage to the sensor.
- Moisture, condensed water or contaminants enter the sensor, causing sensor failure or poor signal.
- After-combustion of exhaust pipe caused by fire leads to burn-out of sensing elements of oxygen sensor.

Precautions for repair:

- It not allowed to use cleaning fluid, oily liquid or volatile solid for oxygen sensor during maintenance.

Pin definition



1EB6DB46BDF9

Pin No.	Function
A	Pump battery signal (positive electrode of calibration resistor)
B	Calibration resistor ground
C	Heating element negative
D	Heating element positive
E	Pump battery, reference battery ground
F	Reference battery high level

Inspection

1. Unplug harness connector of oxygen sensor
2. Place the digital multimeter in the ohm range
3. Measure resistance between pin C and pin D of oxygen sensor

   Standard resistance: (3.4 ± 0.6) Ω

⚠ Caution

› If the resistance value is inconsistent with the standard value, replace the rear oxygen sensor.

4. Measure resistance between pin A and pin B of oxygen sensor

   Standard resistance: (250~1500) Ω

⚠ Caution

› If the resistance value is inconsistent with the standard value, replace the rear oxygen sensor.

Removal/installation

Removal

⚠ Warning

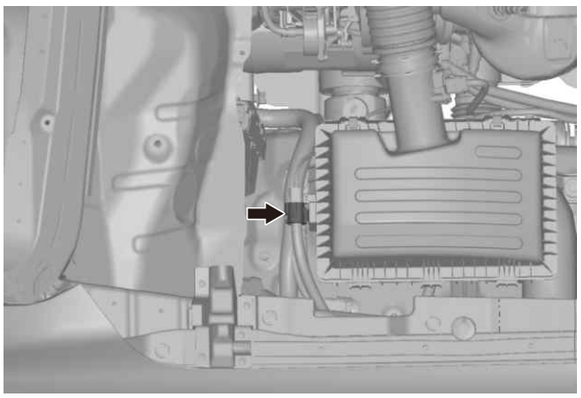
› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

› Replace the sensor or actuator if they were knocked or dropped.

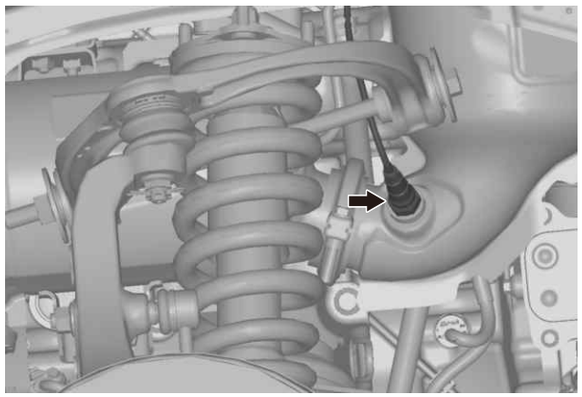
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Disconnect the negative terminal of the battery.
2. Disconnect connector of rear oxygen sensor and fixing point



3E2FC2DB64E0

3. Disconnect harness fixing point of rear oxygen sensor
4. Raise the vehicle to an appropriate position
5. Remove rear oxygen sensor



F392326A1BD5

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

Installation

⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

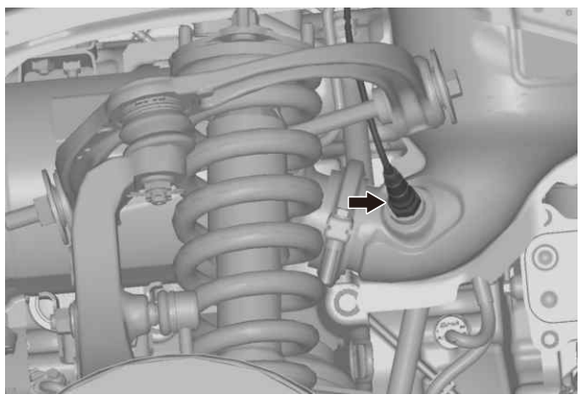
⚠ Caution

› Replace the sensor or actuator if they were knocked or dropped.

ℹ Notice

› Tighten the fastener according to the specified torque value.

1. Install rear oxygen sensor



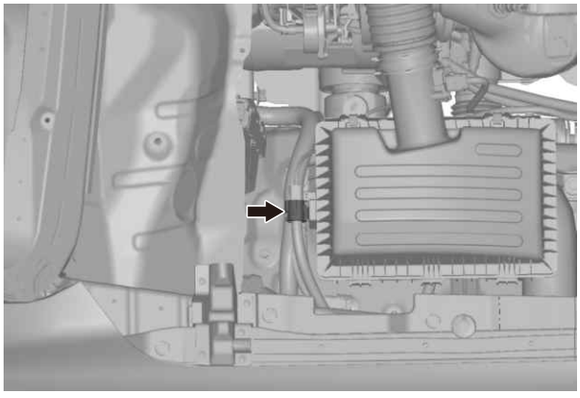
F392326A1BD5

⚠ Caution

› Before installation, make sure that the

mounting surface and nearby positions are clean and free of impurity.

2. Lower the vehicle
3. Install rear oxygen sensor harness fixing point
4. Install connector of rear oxygen sensor and fixing point

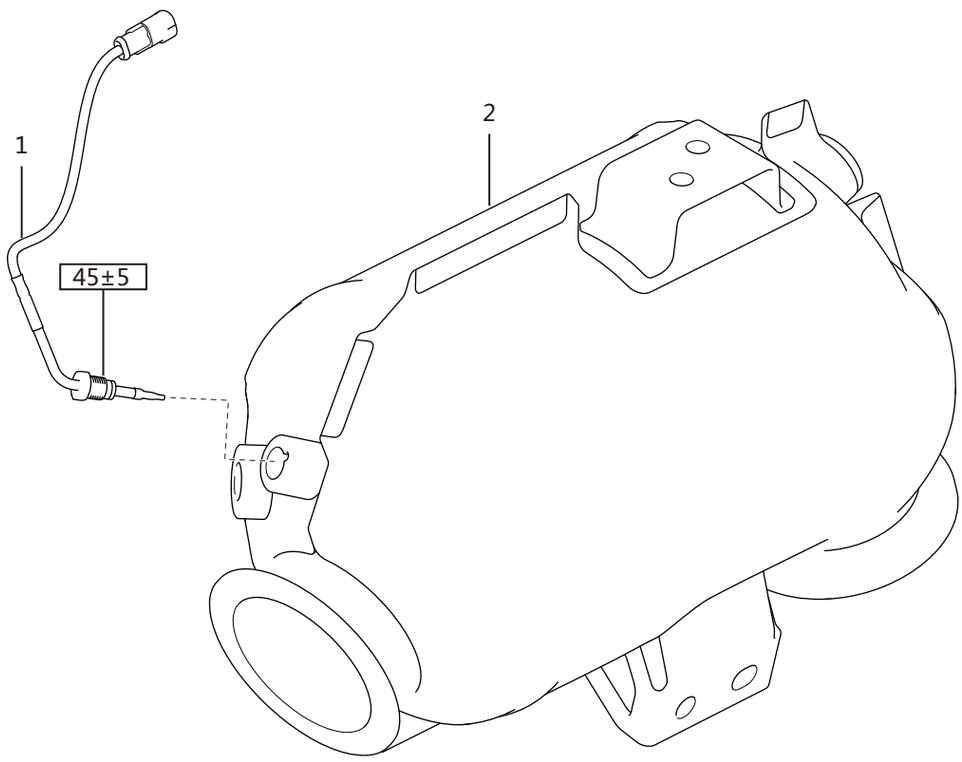


3E2FC2DB64E0

5. Connect negative terminal of the battery

DPF front high-temperature sensor

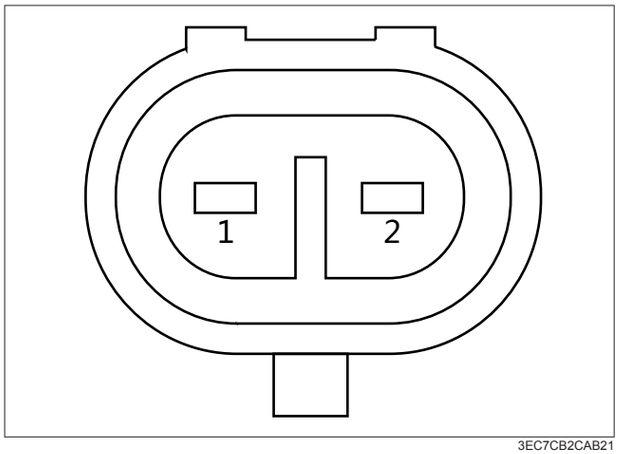
Structural diagram



7143D22D2161

1. DPF front high-temperature sensor
2. Particulate filter

Pin definition



3EC7CB2CAB21

Pin No.	Function
1	Signal
2	Ground

Check

1. Verify that the sensor pins are not bent, corroded, or otherwise damaged
2. Measure the resistance between the two pins of the high-temperature sensor at different temperatures

Temperature (℃)	Resistance (Ω)
0	200.5
50	238.5
100	275.9
200	349.0
400	488.1
600	617.8
800	738.2
1000	849.2

Notice

› If the measured values differ significantly from the values in the table above, the component is defective.

Removal/installation

Removal

⚠ Warning

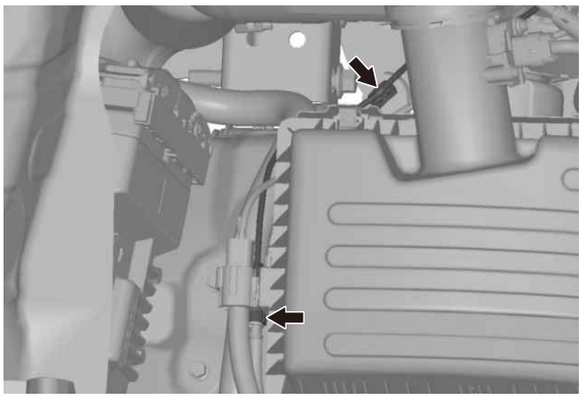
› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

› Replace the sensor or actuator if they were knocked or dropped.

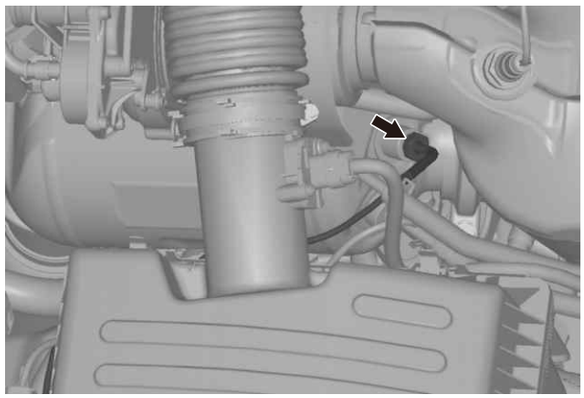
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect DPF front high-temperature sensor connector and harness fixing point



72374649A70F

4. Remove DPF front high-temperature sensor



150D0864FADB

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

⚠ Warning

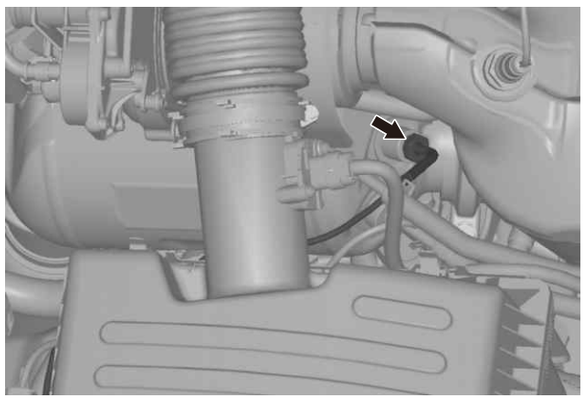
› Make sure that the hot parts are cooled before proceeding to avoid burns.

⚠ Caution

› Replace the sensor or actuator if they were knocked or dropped.

› Tighten the fastener according to the specified torque value.

1. Install DPF front high-temperature sensor

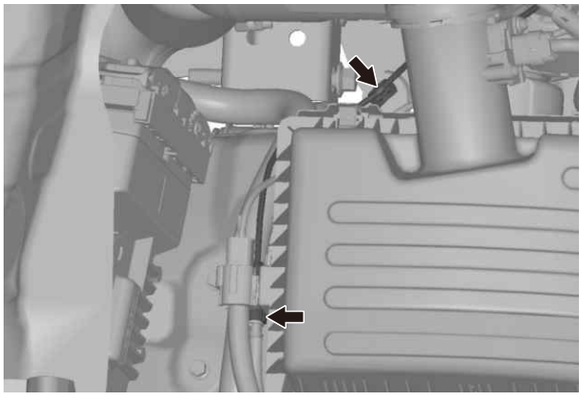


150D0864FADB

⚠ Caution

› Before installation, make sure that the mounting surface and nearby positions are clean and free of impurity.

2. Install DPF front high-temperature sensor harness connector and fixing point

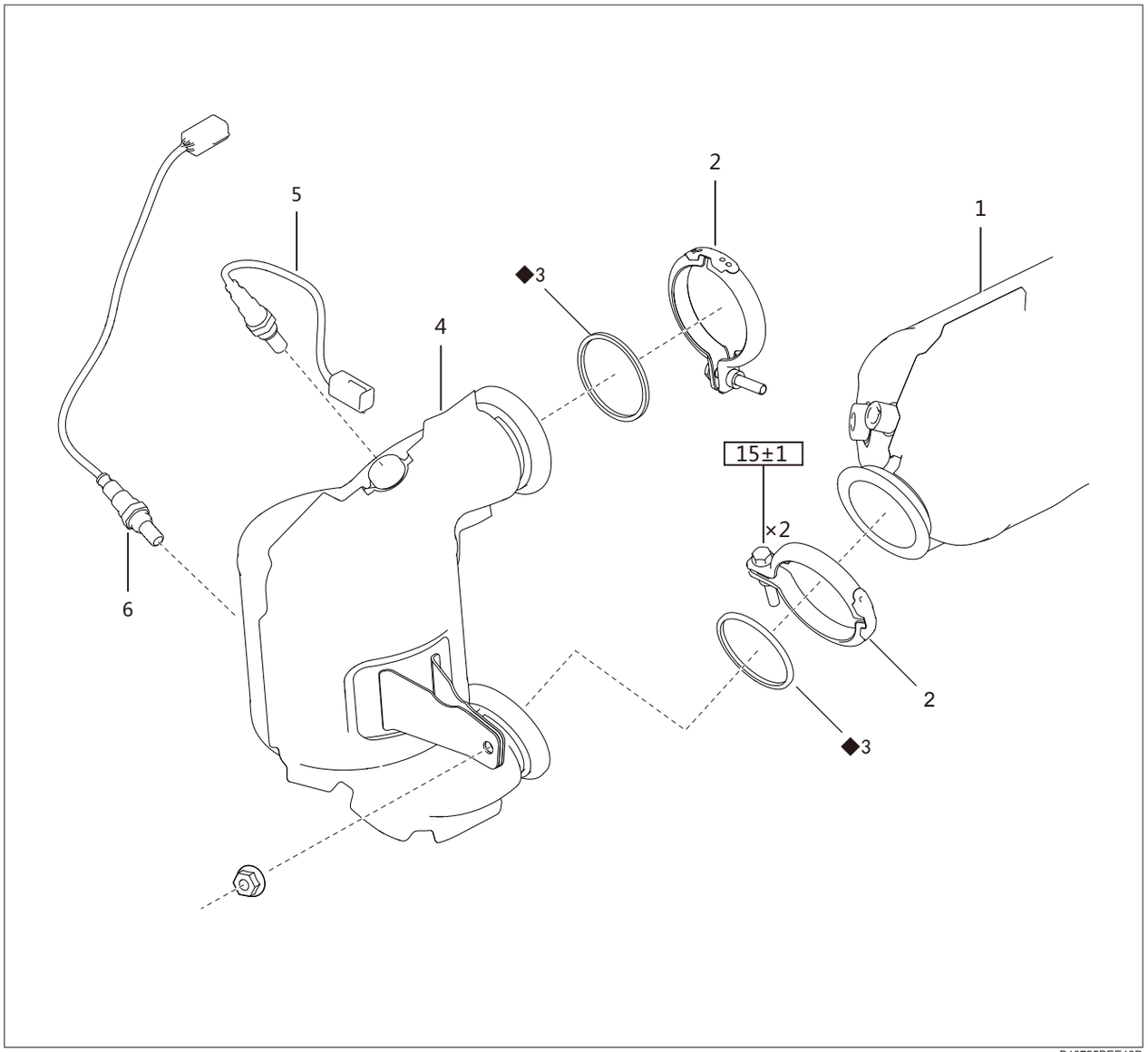


72374649A70F

3. Connect the negative terminal of the battery

Lean NOx trap

Structural diagram



B40725BEE19D

1. Diesel particulate filter
2. Exhaust hoop
3. Seal ring
4. Lean NOx trap
5. Front oxygen sensor
6. Rear oxygen sensor

Removal/installation

Removal

⚠ Warning

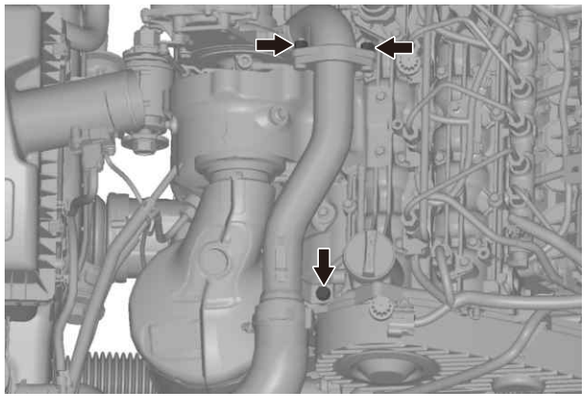
› Make sure that the hot parts are cooled before proceeding to avoid burns.

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

⚠ Caution

› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Remove 2 nuts and 1 bolt



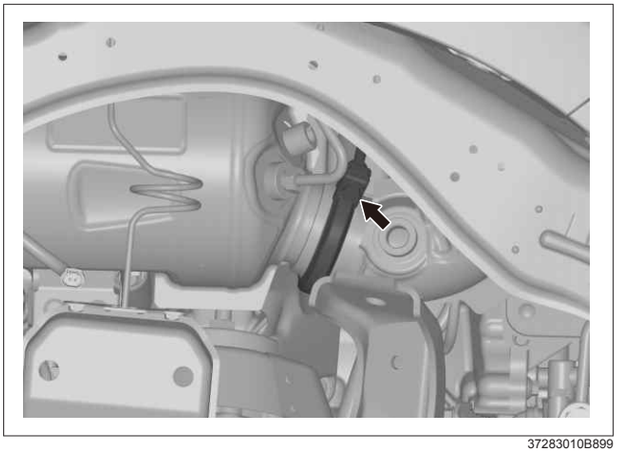
D50BD9FBC8A3

2. Remove air intake pipe of intercooler

⚠ Caution

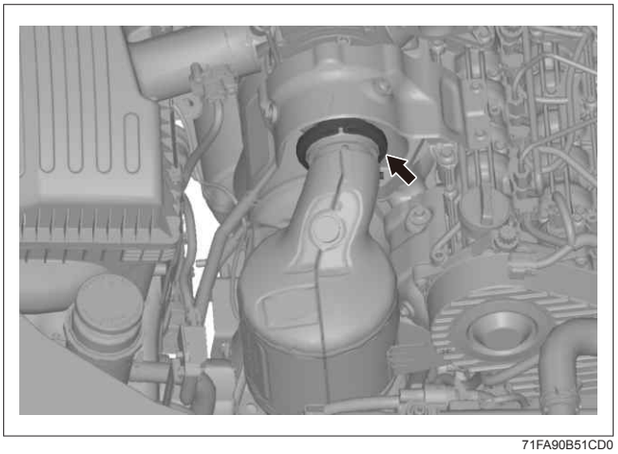
› The disconnected pipelines and joints must be protected from entering debris.

3. Lift vehicle to proper position
4. Loosen 1 bolt



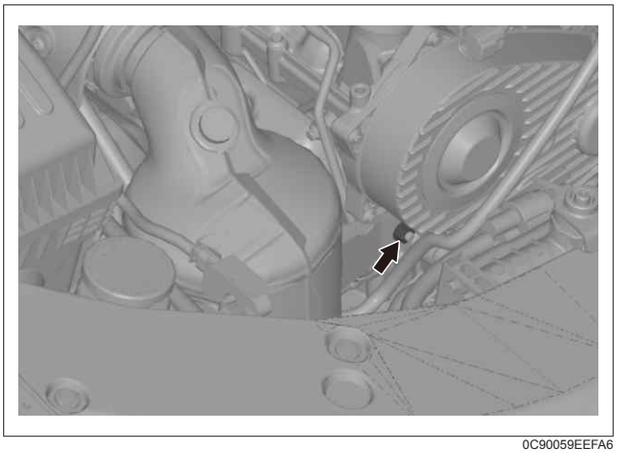
37283010B899

5. Lower the vehicle slowly
6. Loosen 1 bolt



71FA90B51CD0

7. Remove 1 nut



0C90059EEFA6

8. Remove lean NOx trap, and remove 2 seal rings

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

⚠ Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

⚠ Caution

› Replace the seal with a new one.

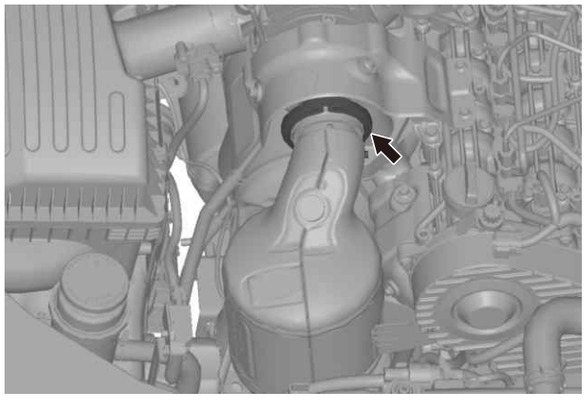
› Tighten the fastener according to the specified torque value.

1. Install seal ring and lean NOx trap to proper position

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

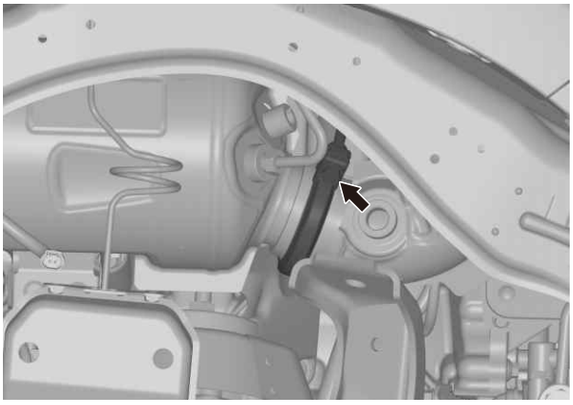
2. Install 1 bolt



71FA90B51CD0

3. Lift vehicle to proper position

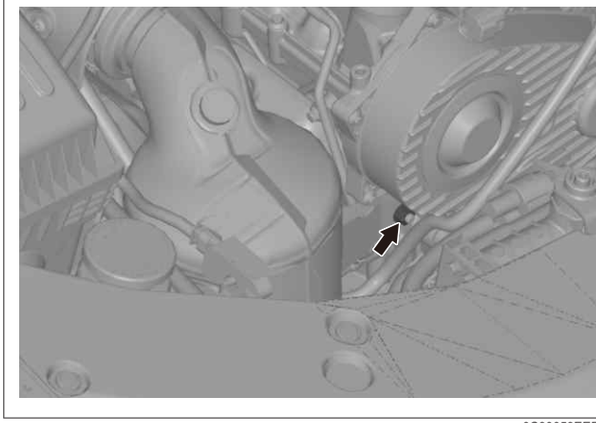
4. Install 1 bolt



37283010B899

5. Lower the vehicle slowly

6. Install 1 nuts



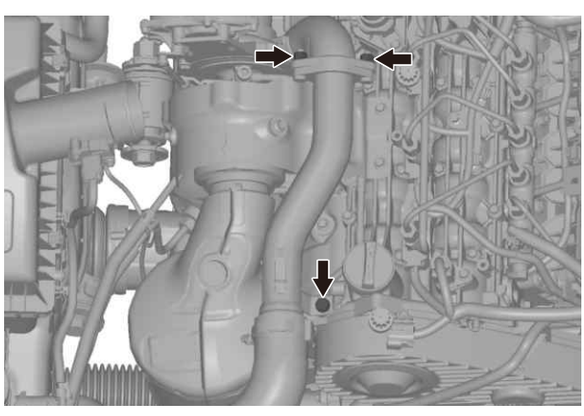
0C90059EEFA6

7. Install air intake pipe of intercooler to proper position

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

8. Install 2 nuts and 1 bolt



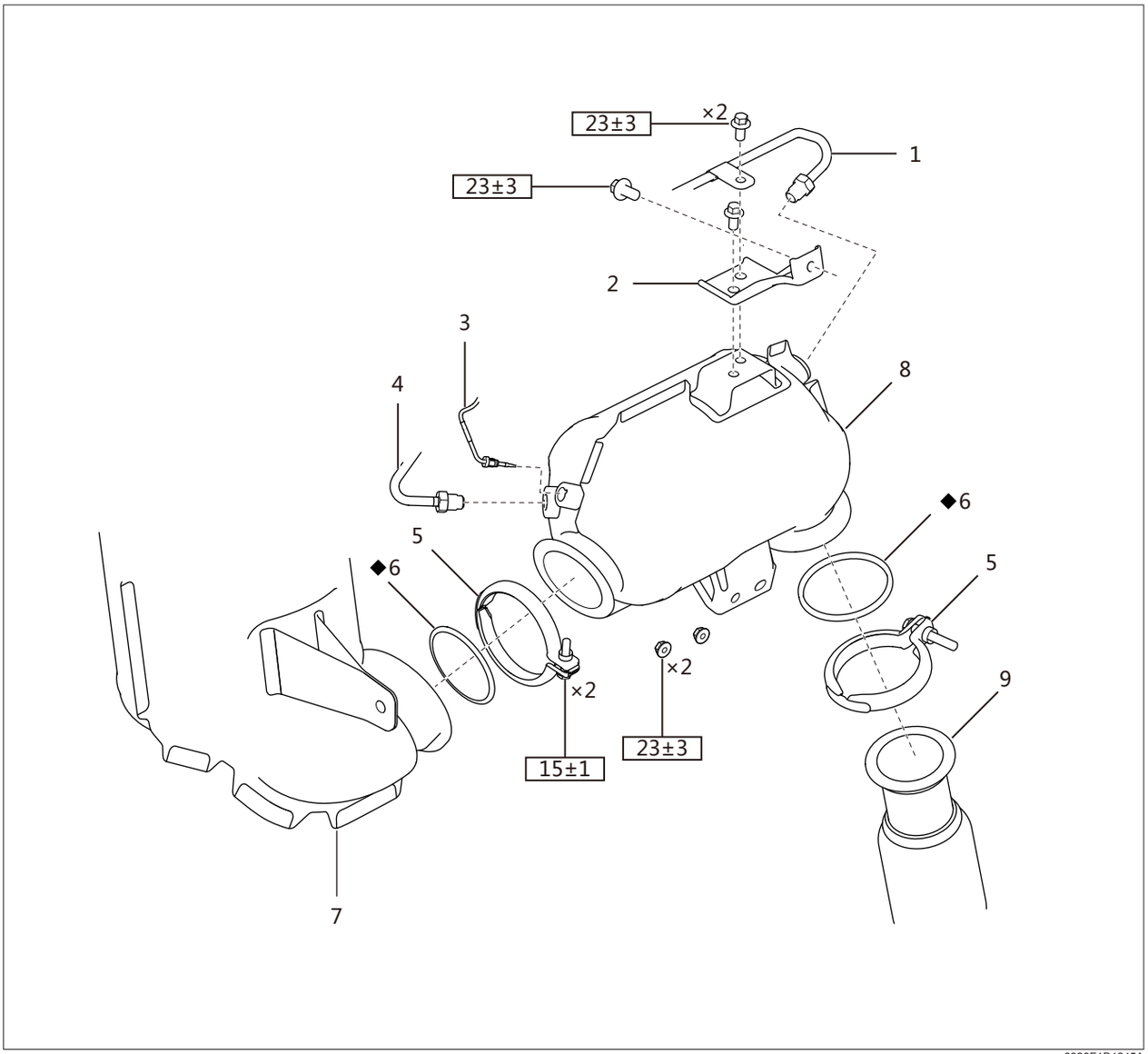
D50BD9FBC8A3

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

Diesel particulate filter

Structural diagram



6328F1B4245A

1. Low-pressure rigid pipe of differential pressure sensor
2. Pre-catalytic converter bracket
3. DPF front high-temperature sensor
4. High-pressure rigid pipe of differential pressure sensor
5. Exhaust hoop
6. Seal ring
7. Lean NOx trap
8. Diesel particulate filter
9. Front section of exhaust pipe

Removal/installation

Removal

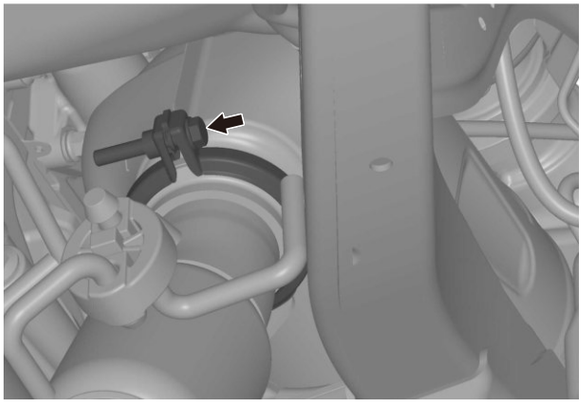
⚠ Warning

- Make sure that the hot parts are cooled before proceeding to avoid burns.
- According to local regulations, the waste generated during the maintenance process should be properly handled.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

⚠ Caution

- If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove turbocharger intake pipe
4. Remove lean NOx trap
5. Remove differential pressure sensor
6. Remove DPF front high-temperature sensor
7. Loosen 1 bolt, and remove seal ring

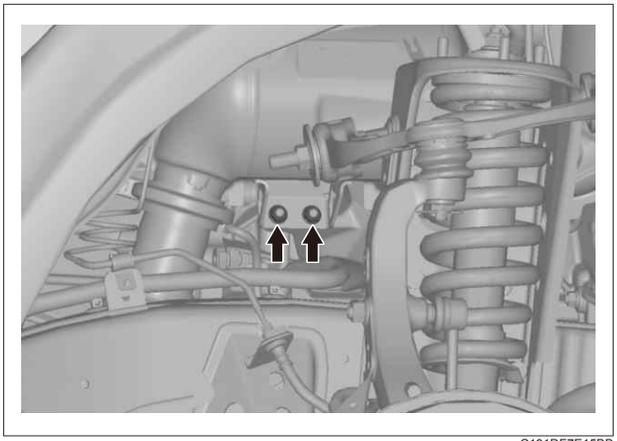


DEB06C3D0F9B

⚠ Caution

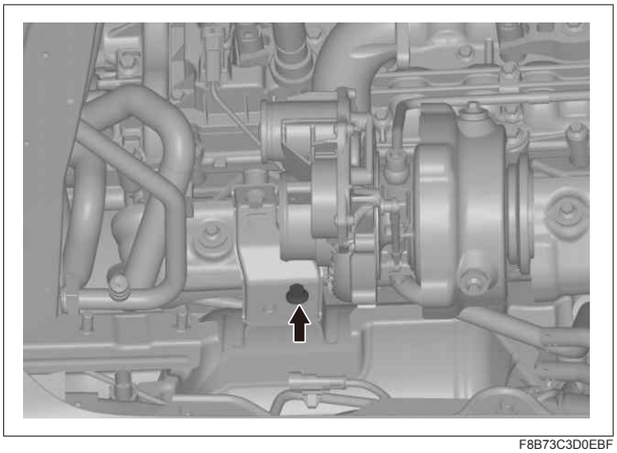
- The disconnected pipelines and joints must be protected from entering debris.

8. Remove 2 nuts



C131DF7E15BB

9. Remove 1 bolt



F8B73C3D0EBF

10. Remove particulate filter forwards

⚠ Caution

- The disconnected pipelines and joints must be protected from entering debris.
- Under no circumstances should the parts and components be disassembled to avoid irreparable damage.
- Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

⚠ Warning

- Make sure that the hot parts are cooled before proceeding to avoid burns.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- According to local regulations, the waste generated during the maintenance process

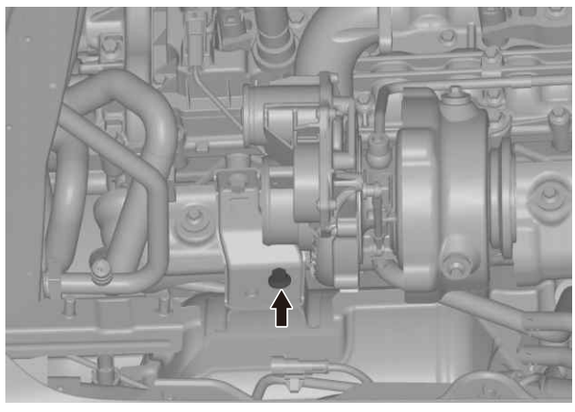
should be properly handled.

⚠ Caution

› Replace the seal with a new one.

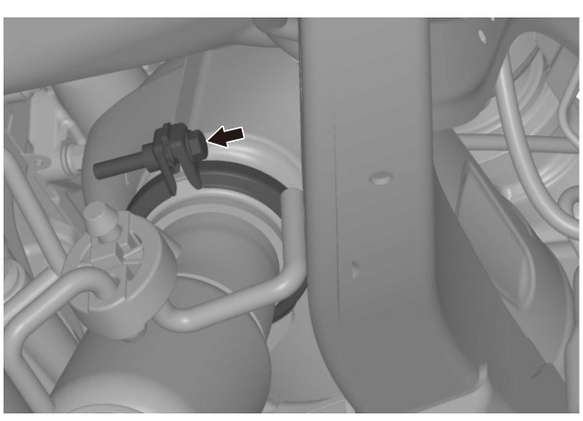
› Tighten the fastener according to the specified torque value.

1. Install particulate filter to proper position
2. Install 1 bolt



F8B73C3D0EBF

3. Install new seal ring to proper position, and tighten 1 bolt



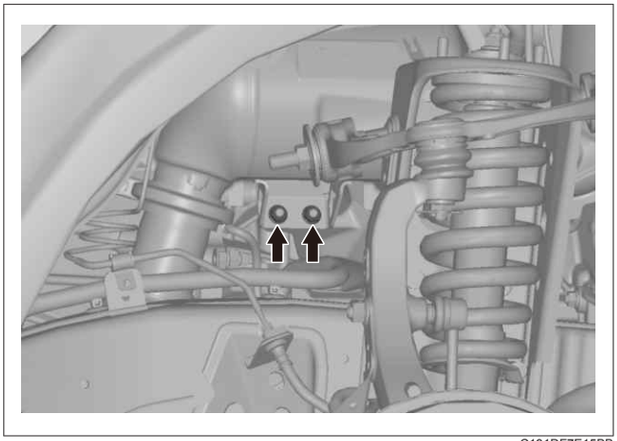
DEB06C3D0F9B

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

4. Install 2 nuts



C131DF7E15BB

5. Install DPF front high-temperature sensor
6. Install differential pressure sensor
7. Install lean NOx trap
8. Install turbocharger intake pipe
9. Install negative terminal of the battery

Fuel supply system (GW4D20M)

Fuel supply system ..... 7－1
Precautions ..... 7－1
Specified torque ..... 7－2
Pressure relief/pressure building ..... 7－3
Quick connectors ..... 7－4
Quick connector 1 ..... 7－4
Quick connector 2 ..... 7－5
Quick connector 3 ..... 7－7
Quick connector 4 ..... 7－8
Quick connector 5 ..... 7－9
Quick connector 6 ..... 7－11
Fuel filter ..... 7－13
Operating principle ..... 7－13
Pin definition ..... 7－14
Check ..... 7－15
Replacement of fuel filter element ..... 7－16
Removal/installation ..... 7－18
Electronic fuel pump and fuel level sensor ..... 7－21
Operating principle ..... 7－21
Structural diagram ..... 7－22
Pin definition ..... 7－23
Check ..... 7－23
Removal/installation ..... 7－24
Fuel tank ..... 7－26
Structural diagram ..... 7－26
Removal/installation ..... 7－27
Accelerator pedal ..... 7－32
Operating principle ..... 7－32
Structural diagram ..... 7－33
Specification ..... 7－34
Pin definition ..... 7－35
Check ..... 7－35
Removal/installation ..... 7－36
High-pressure fuel pump ..... 7－37
Operating principle ..... 7－37
Structural diagram ..... 7－38
Pin definition ..... 7－39
Inspection ..... 7－39
Removal/installation ..... 7－40
Rail pressure sensor ..... 7－44
Operating principle ..... 7－44
Structural diagram ..... 7－45

Pin definition .....7－46
Inspection .....7－46
Fuel injector .....7－47
Operating principle.....7－47
Structural diagram .....7－48
Pin definition .....7－49
Check of fuel injector .....7－49
Removal/installation.....7－50

Fuel supply system

Precautions

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.
- The fuel pipeline must be sealed and protected.
- According to local regulations, the waste generated during the maintenance process should be properly handled.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Reinforcing plate for fuel tank cover x fuel tank cover	23±3	8	—
Hoop	Refueling pipe assembly x fuel tank	3.5±0.5	1	—
Bolt	Front/rear strap for fuel tank x frame	63±5	2	Apply screw thread glue
Bolt	Refueling pipe assembly x frame	23±3	2	—
Bolt	Fuel filler x vehicle body	6±1	3	—
Bolt	Fuel filter support × frame	23±3	2	—
Bolt	Fuel filter × fuel filter support	23±3	1	—
Bolt	Accelerator pedal x vehicle body	9±1	3	—
Bolt	Fuel pipeline bracket x engine	9±1	1	—
Bolt	High-pressure fuel pump x water pump assembly	24±2	3	—
High-pressure fuel pump belt pulley nut	Fuel pump pulley x high-pressure fuel pump assembly	65±3	1	—
Fuel rail inlet pipe components	Fuel rail inlet pipe components x high-pressure fuel pump, high-pressure fuel rail assembly	32±3	1	—
Inlet pipe component of fuel injector	Inlet pipe component of fuel injector x high-pressure fuel rail assembly, fuel injector	32±3	4	—
Bolt	High-pressure fuel rail assembly x cylinder head	22±2	2	—
Hold-down block bolt	Fuel injector clamp plate, spherical washer x cylinder head	30±4	2	—
Bolt	Pipe clamp for fuel rail inlet pipe components x intake manifold	10±1	1	—

Notice

› The screw thread glue is an anaerobic thread locking sealant, and the grade is 1271.

Pressure relief/pressure building

⚠ Caution

› After the fuel system is relieved, there may still be some pressure in the system. Therefore, protective measures are also required in repair after pressure relief.

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› Near the workplace, a dry powder fire extinguisher (Class B) must be available.

Relive the pressure in the fuel supply system

1. Disconnect the fuel pump fuse
2. Start the engine until the engine shuts down automatically
3. Turn off the ignition switch

⚠ Caution

› Engine ECU may store DTCs.

4. Restart the engine and make sure that the engine cannot be started

⚠ Caution

› If the engine can be started, repeat steps (2 ～4).

Build the pressure in the fuel supply system

1. Connect the fuel pump fuse
2. Turn on and then turn off the ignition switch repeatedly to build up fuel pressure inside fuel system
3. Check if there is DTC stored in engine ECU, and clear it when necessary.

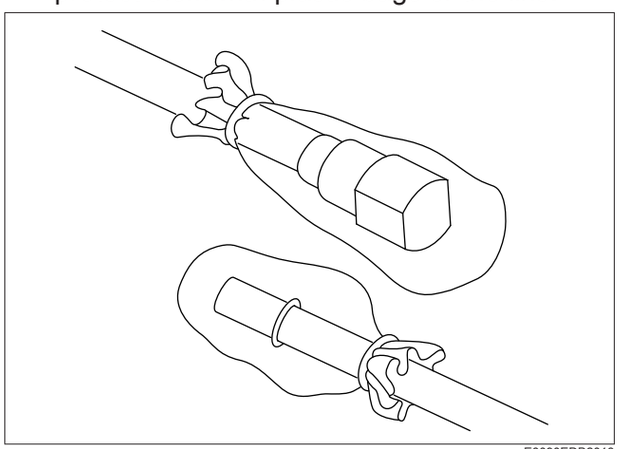
Quick connectors

Quick connector 1

Removal/installation

⚠ Caution

- After connecting the fuel pipeline quick connector, check that the quick connector is secure.
- Make sure the connector and the resin tube are not in contact with any adjacent parts.
- Avoid the quick connector from being heated.
- Avoid acid liquids such as battery electrolyte coming into contact with the quick connector and its pipeline.
- Do not bend or twist the nylon tube during installation and removal.
- To keep the connections clean and prevent damage and foreign objects from entering, protect them with plastic bags or the like.

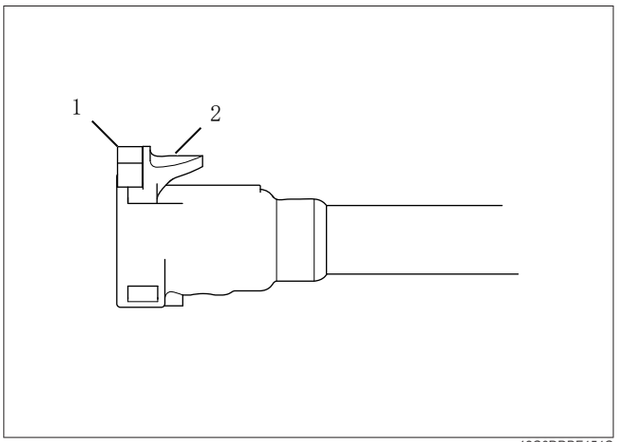


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Removal

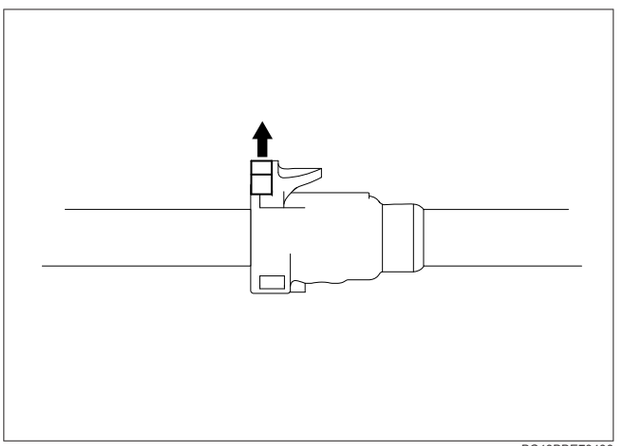
ℹ Notice

- As shown in the figure, 1 indicates the latch knob, and 2 indicates the button.



12C6DDBF454C

1. Hold the latch button on both sides and pull it up

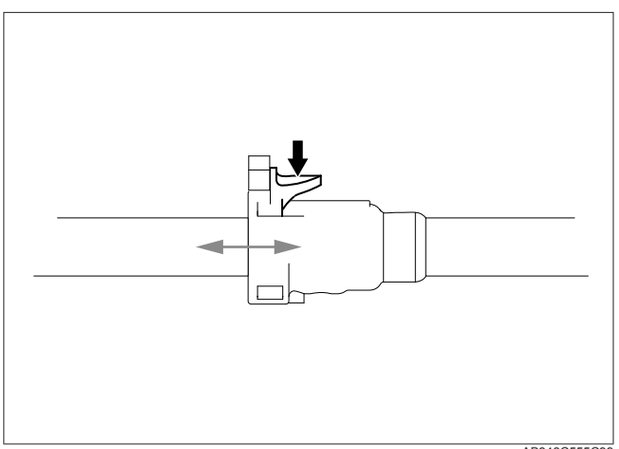


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ℹ Notice

- Remove debris, etc. from the quick connector before operation.

2. Press the button and pull out the plug



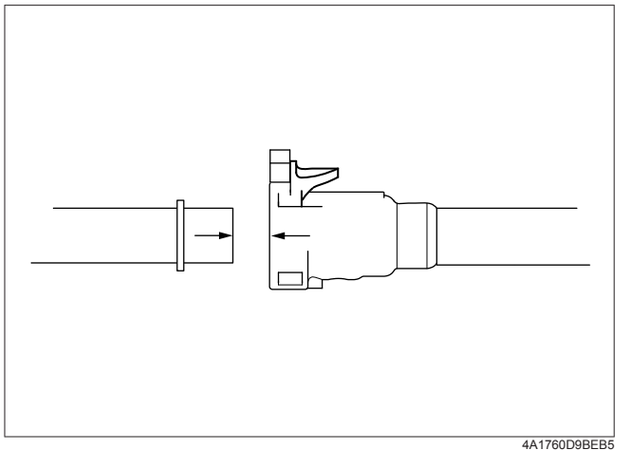
AB348C555C99

Notice

› After pulling out the connector, protect the connectors at both ends.

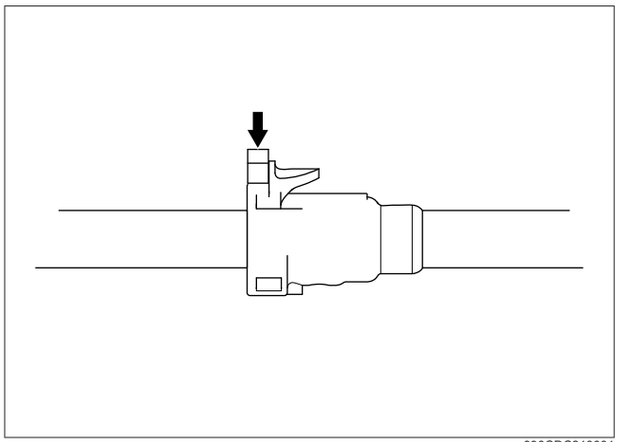
Installation

1. Insert the connector straight until you hear a "click"



4A1760D9BEB5

2. Press the latch button to confirm that the connector is in place



898CDC213661

3. Pull the pipe and the connector to check that they are firmly connected
4. Turn the ignition switch to the "ON" position (while the engine is stopped) and apply fuel pressure to the fuel pipeline to check for leakage at the connection
5. Start the engine, idle the engine and check for fuel leakage at the connection of the fuel system

Quick connector 2

Removal/installation

Caution

› After connecting the fuel pipeline quick connector, check that the quick connector is secure.

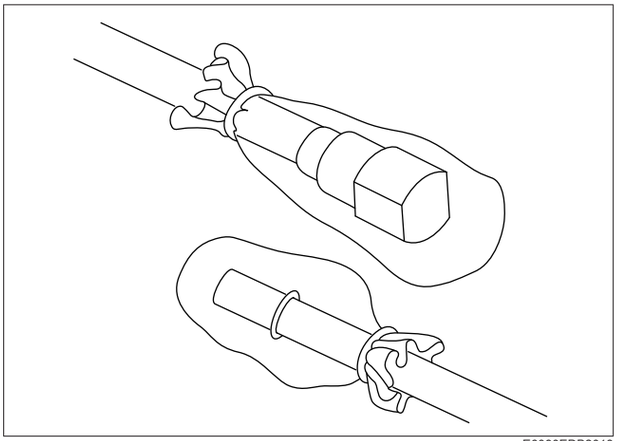
› Make sure the connector and the resin tube are not in contact with any adjacent parts.

› Avoid the quick connector from being heated.

› Avoid acid liquids such as battery electrolyte coming into contact with the quick connector and its pipeline.

› Do not bend or twist the nylon tube during installation and removal.

› To keep the connections clean and prevent damage and foreign objects from entering, protect them with plastic bags or the like.



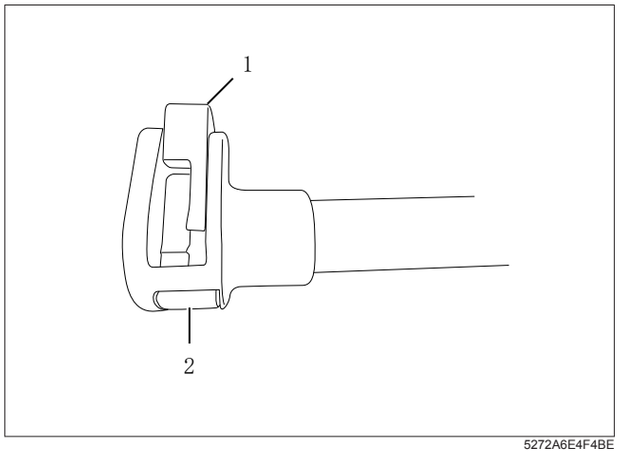
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Removal

Notice

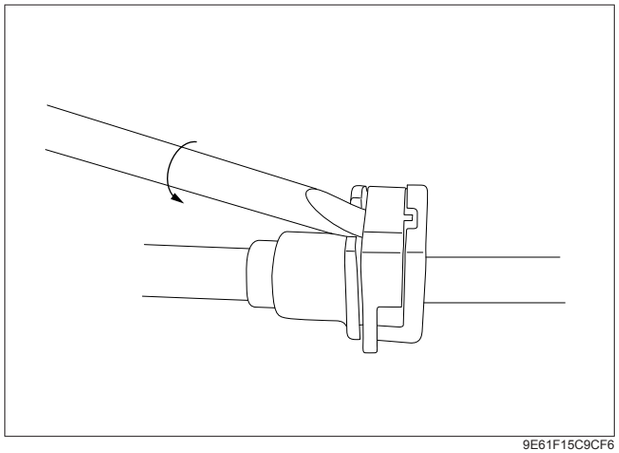
› As shown in the figure, 1 indicates the latch

knob, and 2 indicates the button.



5272A6E4F4BE

1. Use a flathead screwdriver to place it in the position shown in the figure. Gently rotate the screwdriver to hear a "click"

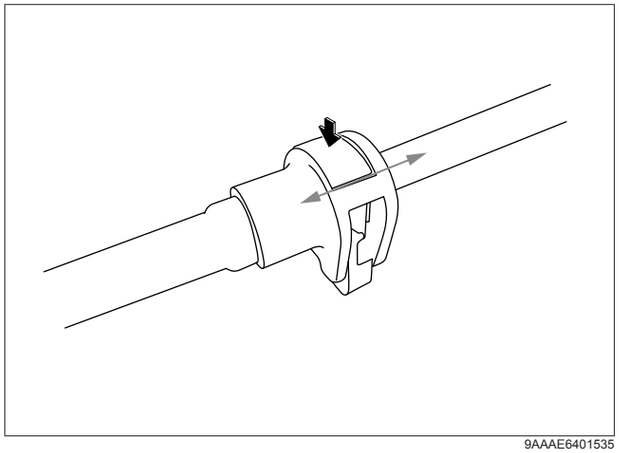


9E61F15C9CF6

Notice

› Remove debris, etc. from the quick connector before operation.

2. Press the quick connector button and pull out the plug



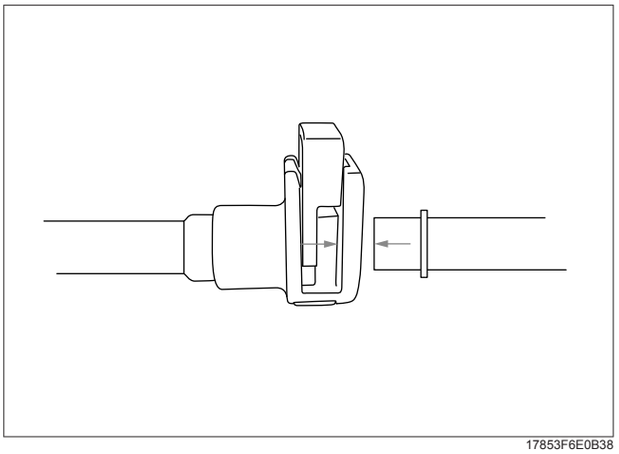
9AAAE6401535

Notice

› After pulling out the connector, protect the connectors at both ends.

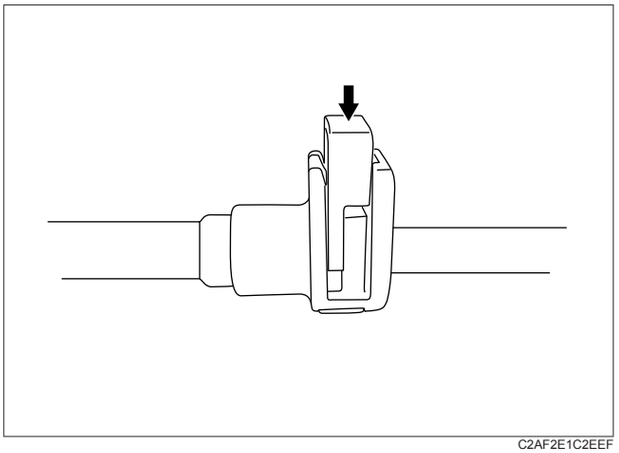
Installation

1. Insert the connector straight until you hear a "click"



17853F6E0B38

2. Press the latch button to confirm that the connector is in place



C2AF2E1C2EEF

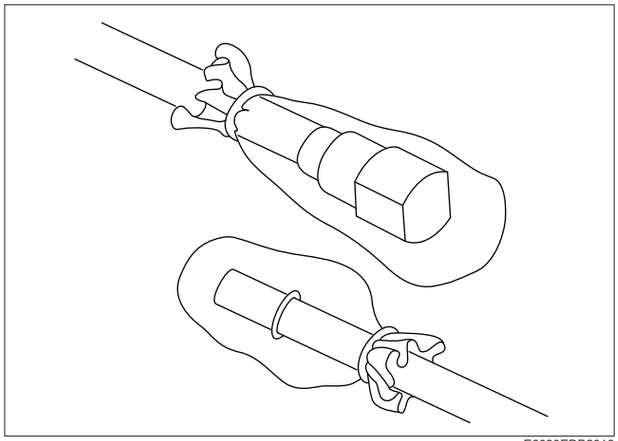
3. Pull the pipe and the connector to check that they are firmly connected
4. Turn the ignition switch to the "ON" position (while the engine is stopped) and apply fuel pressure to the fuel pipeline to check for leakage at the connection
5. Start the engine, idle the engine and check for fuel leakage at the connection of the fuel system

Quick connector 3

Removal/installation

Caution

- After connecting the fuel pipeline quick connector, check that the quick connector is secure.
- Make sure the connector and the resin tube are not in contact with any adjacent parts.
- Avoid the quick connector from being heated.
- Avoid acid liquids such as battery electrolyte coming into contact with the quick connector and its pipeline.
- Do not bend or twist the nylon tube during installation and removal.
- To keep the connections clean and prevent damage and foreign objects from entering, protect them with plastic bags or the like.

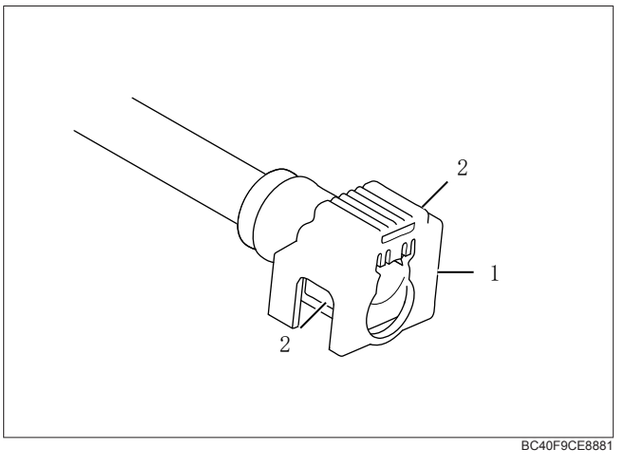


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Removal

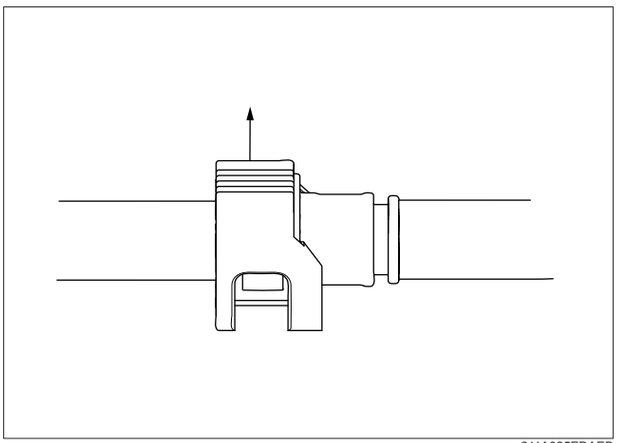
Notice

- As shown in the figure, 1 indicates the latch knob, and 2 indicates the button.



BC40F9CE8881

1. Lift up the latch knob

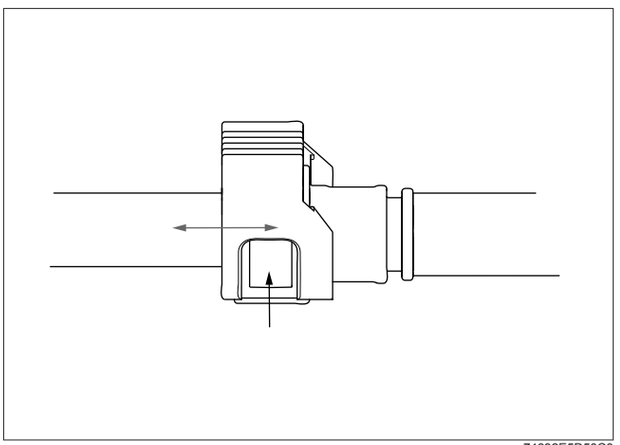


211A325EDAEB

Notice

- Remove debris, etc. from the quick connector before operation.

2. Press the quick connector button and pull out the plug



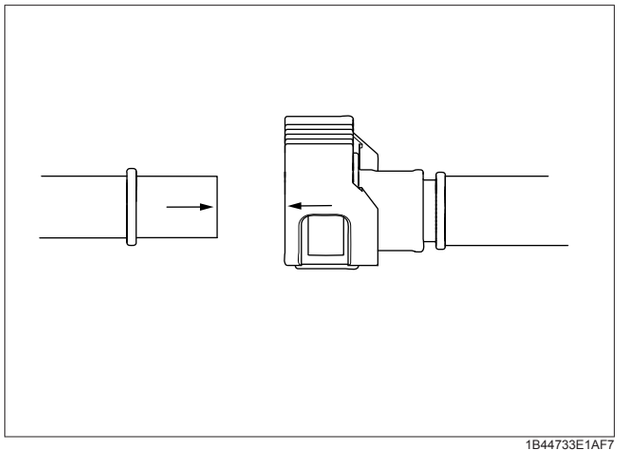
74692E5D50C8

Notice

› After pulling out the connector, protect the connectors at both ends.

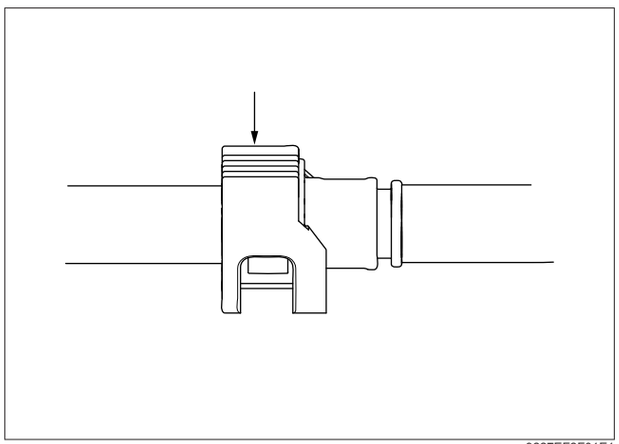
Installation

1. Insert the connector straight until you hear a "click"



1B44733E1AF7

2. Press the latch button to confirm that the connector is in place



9227EF2F01E1

3. Pull the pipe and the connector to check that they are firmly connected
4. Turn the ignition switch to the "ON" position (while the engine is stopped) and apply fuel pressure to the fuel pipeline to check for leakage at the connection
5. Start the engine, idle the engine and check for fuel leakage at the connection of the fuel system

Quick connector 4

Removal/installation

Caution

› After connecting the fuel pipeline quick connector, check that the quick connector is secure.

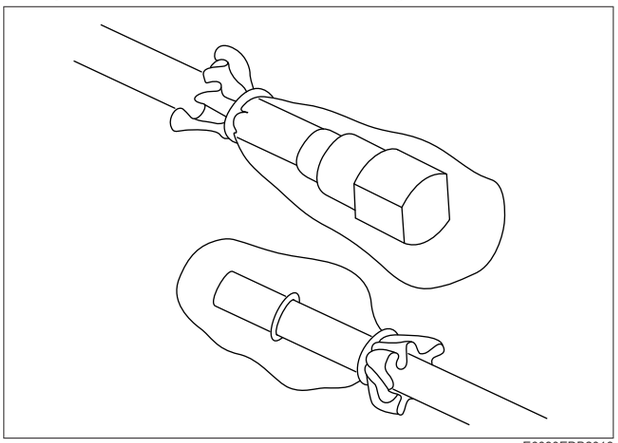
› Make sure the connector and the resin tube are not in contact with any adjacent parts.

› Avoid the quick connector from being heated.

› Avoid acid liquids such as battery electrolyte coming into contact with the quick connector and its pipeline.

› Do not bend or twist the nylon tube during installation and removal.

› To keep the connections clean and prevent damage and foreign objects from entering, protect them with plastic bags or the like.



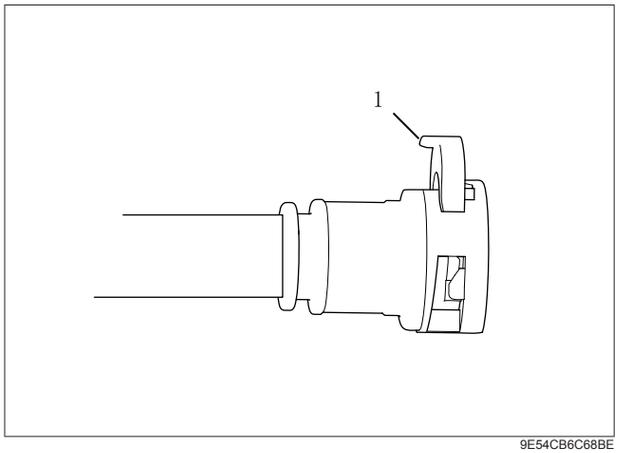
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Removal

Notice

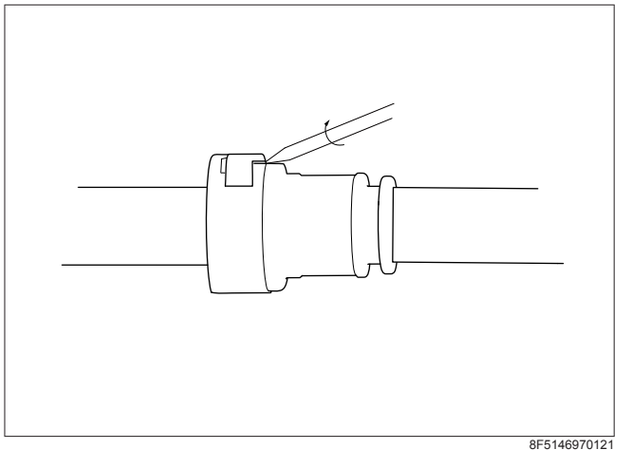
› As shown in the figure, 1 indicates the latch

knob.



9E54CB6C68BE

1. Use a flathead screwdriver to place it in the position shown in the figure. Gently rotate the screwdriver to hear a "click"

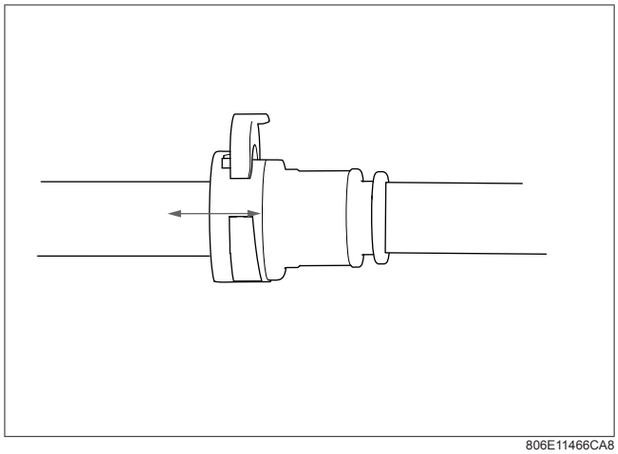


8F5146970121

Notice

› Remove debris, etc. from the quick connector before operation.

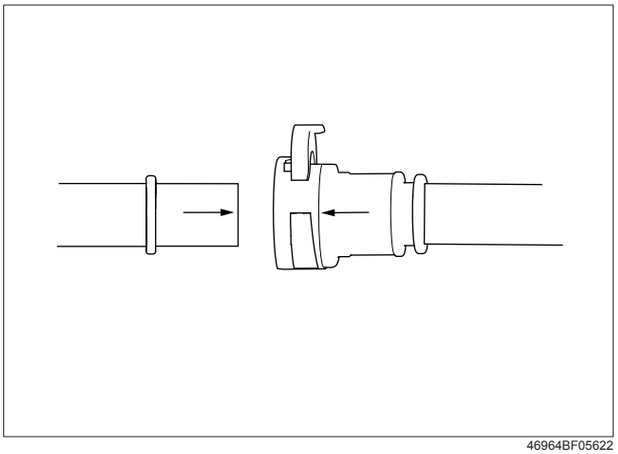
2. Pull out the quick connector



806E11466CA8

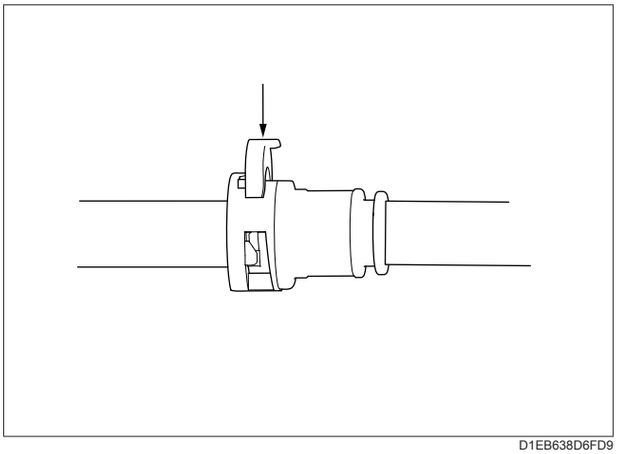
Installation

1. Insert the connector straight into the end



46964BF05622

2. Press the latch button to confirm that the connector is in place



D1EB638D6FD9

3. Pull the pipe and the connector to check that they are firmly connected
4. Turn the ignition switch to the "ON" position (while the engine is stopped) and apply fuel pressure to the fuel pipeline to check for leakage at the connection
5. Start the engine, idle the engine and check for fuel leakage at the connection of the fuel system

Quick connector 5

Removal/installation

Caution

› After connecting the fuel pipeline quick connector, check that the quick connector is secure.

› Make sure the connector and the resin tube

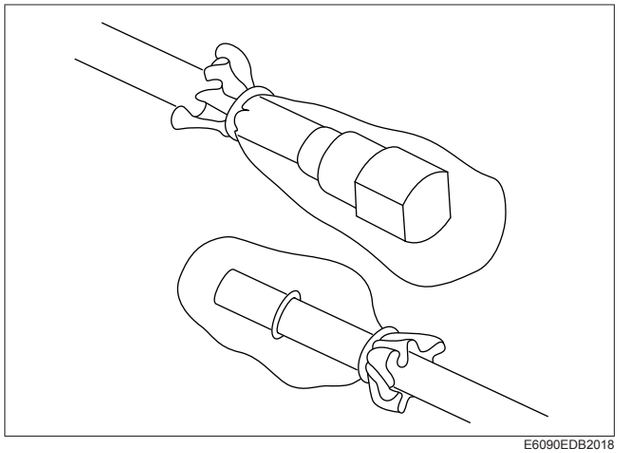
are not in contact with any adjacent parts.

› Avoid the quick connector from being heated.

› Avoid acid liquids such as battery electrolyte coming into contact with the quick connector and its pipeline.

› Do not bend or twist the nylon tube during installation and removal.

› To keep the connections clean and prevent damage and foreign objects from entering, protect them with plastic bags or the like.

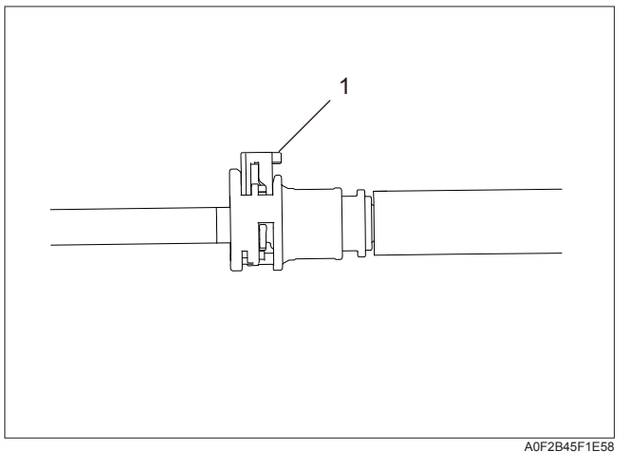


E6090EDB2018

Removal

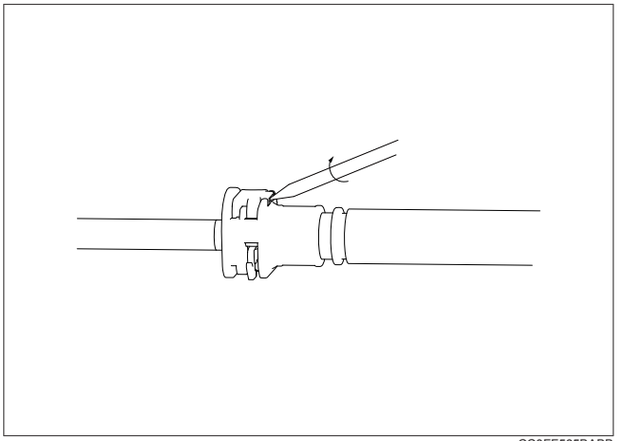
Notice

› As shown in the figure, 1 indicates the latch knob.



A0F2B45F1E58

1. Use a flathead screwdriver to place it in the position shown in the figure. Gently rotate the screwdriver to hear a "click"

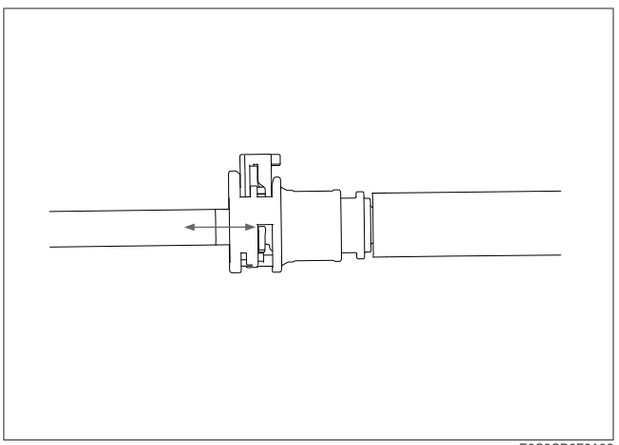


CC0FF565BABB

Notice

› Remove debris, etc. from the quick connector before operation.

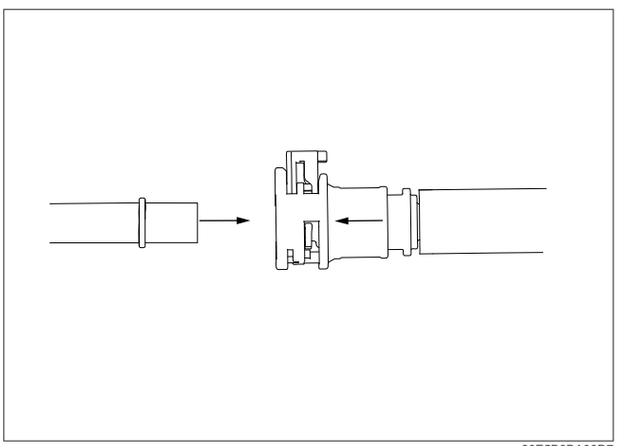
2. Pull out the quick connector



E0C9CD9F0A32

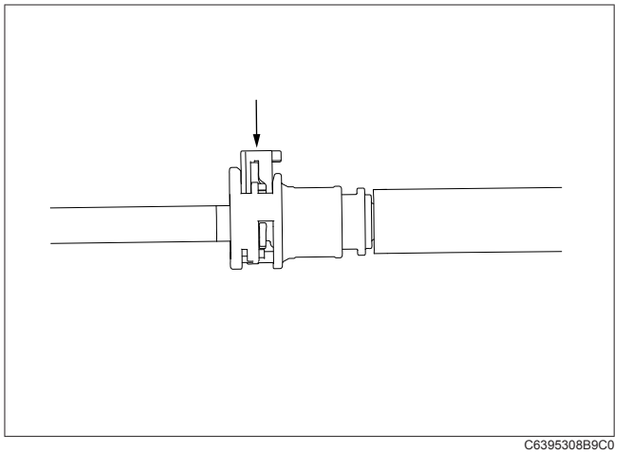
Installation

1. Insert the connector straight into the end



26E5B8BA08D7

2. Press the latch button to confirm that the connector is in place



C6395308B9C0

3. Pull the pipe and the connector to check that they are firmly connected
4. Turn the ignition switch to the "ON" position (while the engine is stopped) and apply fuel pressure to the fuel pipeline to check for leakage at the connection
5. Start the engine, idle the engine and check for fuel leakage at the connection of the fuel system

Quick connector 6

Removal/installation

⚠ Caution

› After connecting the fuel pipeline quick connector, check that the quick connector is secure.

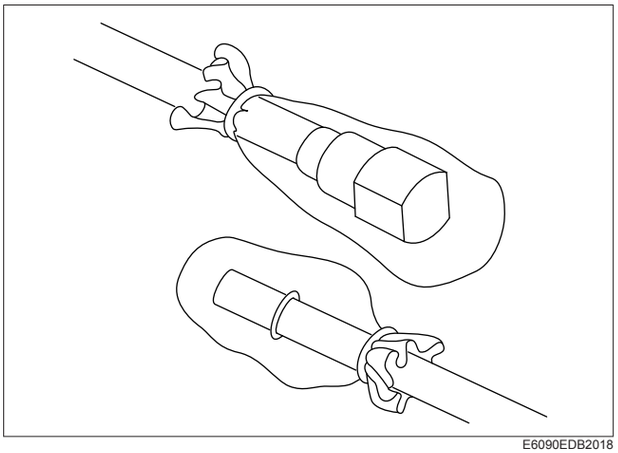
› Make sure the connector and the resin tube are not in contact with any adjacent parts.

› Avoid the quick connector from being heated.

› Avoid acid liquids such as battery electrolyte coming into contact with the quick connector and its pipeline.

› Do not bend or twist the nylon tube during installation and removal.

› To keep the connections clean and prevent damage and foreign objects from entering, protect them with plastic bags or the like.

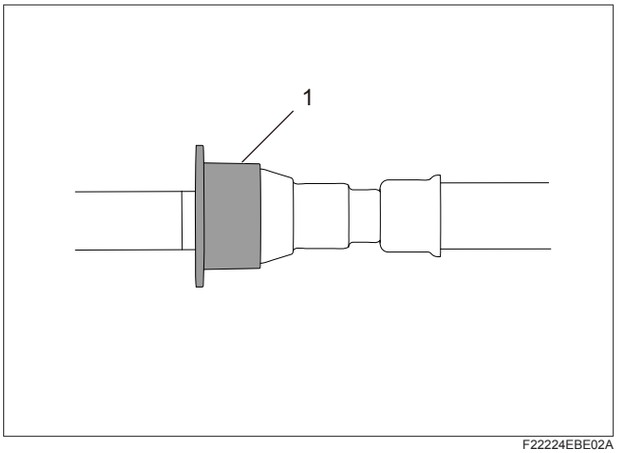


E6090EDB2018

Removal

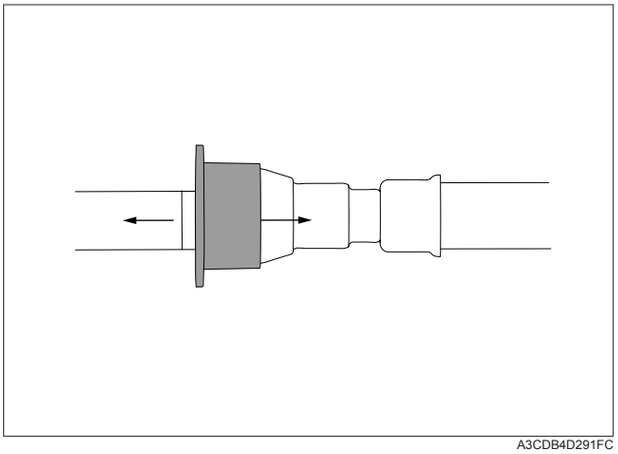
ℹ Notice

› As shown in the figure, 1 indicates the latch knob.



F22224EBE02A

1. Move the gray latch button in the direction of the arrow and pull out the pipe joint in the opposite direction.



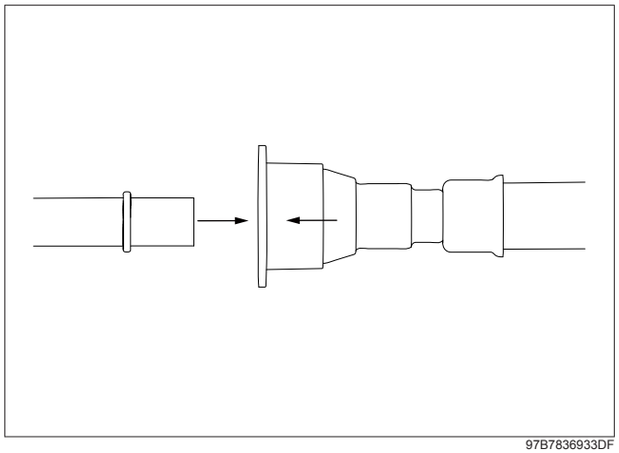
A3CDB4D291FC

Notice

› Remove debris, etc. from the quick connector before operation.

Installation

1. Insert the connector straight until you hear a "click"



97B7836933DF

2. Pull the pipe and the connector to check that they are firmly connected
3. Turn the ignition switch to the "ON" position (while the engine is stopped) and apply fuel pressure to the fuel pipeline to check for leakage at the connection
4. Start the engine, idle the engine and check for fuel leakage at the connection of the fuel system

Fuel filter

Operating principle

Function of fuel filter:

› Particulate filtration: reducing particulate impurities is a fundamental function of the filter. This protects components that are easy to wear in fuel injection system. Fuel injection system requires necessary filtration accuracy. In addition to wear prevention, the filter also needs a sufficient capacity for particulate storage. Otherwise, the filter may be clogged before replacement. If blockage occurs, fuel delivery will decrease, resulting in degradation of engine performance at the same time.

› Fuel-water separation: the second major function of diesel filter is to separate the water from the diesel to avoid corrosion and damage to the engine.

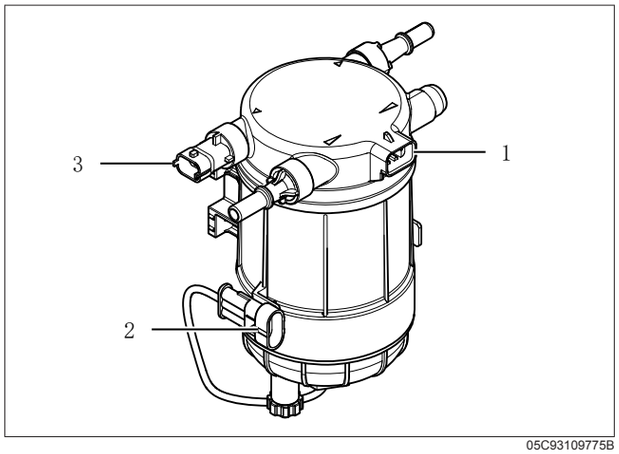
Water level sensor is part of the fuel filter. Water level sensor is used to detect and prompt that a large amount of water is stored in the filter; its signal can be sent to electronic control unit (ECU) and light up fuel-water separator indicator on the instrument.

Common fault analysis

Fault description	Check and treatment
Fuel leakage at drain valve	› Check for loosened or damaged drain valve, and retighten it. › Replace O-ring of drain valve or replace drain valve.
Water level sensor indicator stays on	› Diesel fuel contains much water. Loosen water level sensor to drain off water, and wipe the electrode. › Check that correct model is used. › Input voltage of vehicle lower than operating voltage of sensor. › Pulse voltage too high at the movement vehicle starts, causing water level sensor to burn out.
Fuel leakage at lower cover assembly	› Check for loosened or damaged lower cover, and retighten it. › Replace seal washer or lower cover assembly.

Pin definition

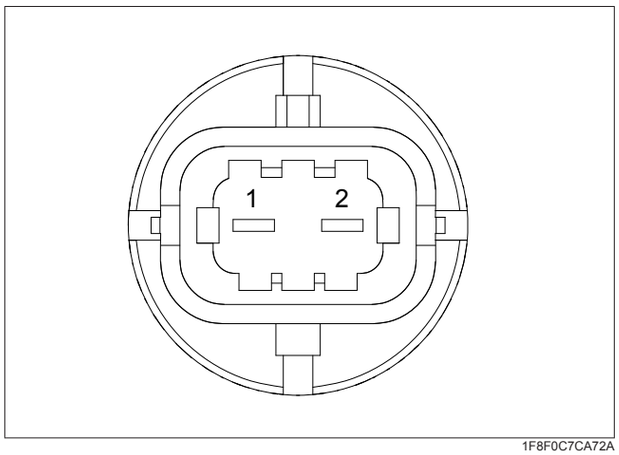
Structural of fuel filter



05C93109775B

No.	Connector
1	Heating circuit
2	Water level sensor
3	Fuel temperature sensor

Fuel temperature sensor



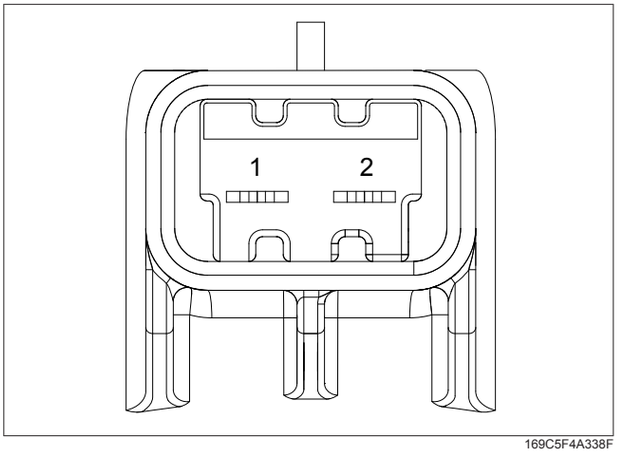
1F8F0C7CA72A

Pin No.	Function
1/2	Fuel temperature signal
2/1	Ground

Notice

› The sensor is an NTC resistor with no difference of positive and negative electrodes.

Heating circuit



169C5F4A338F

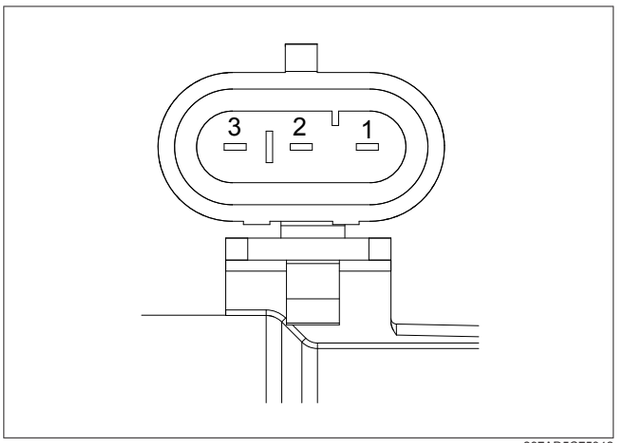
Pin No.	Function
1/2	Input voltage 12 V
2/1	Ground

Operating conditions: breakover temperature (5 ± 3) ℃; disconnection temperature (15 ± 3) ℃.

Notice

› No difference of positive and negative electrodes for heater.

Water level sensor



297AD5C75342

Pin No.	Function
1	Ground
2	Output signal
3	Input voltage

Operating conditions:

Power-on self-test time (1~3) seconds, high level output.

When water level exceeds the height of test electrode, output alarm voltage is above 10 V (at rated voltage).

Water alarm delay: (1~3) seconds.

When water level is lower than the height of test electrode, output voltage is below 1 V.

Check

1. Set ignition switch to OFF position (if the ignition switch was at ON previously, wait for at least 2 minutes before performing subsequent operations after setting it to OFF, so as to avoid live plugging)
2. Pull out harness connector of fuel temperature sensor
3. Measure resistance between pins of fuel temperature sensor

Temperature (℃)	Resistance (kΩ)
20	2.35~2.65
40	1.12~1.23
80	0.31~0.33
100	0.18~0.19

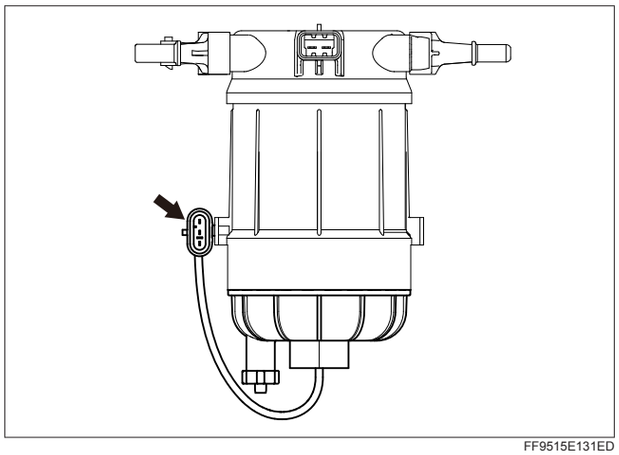
4. Set ignition switch to ON

Replacement of fuel filter element

⚠ Warning

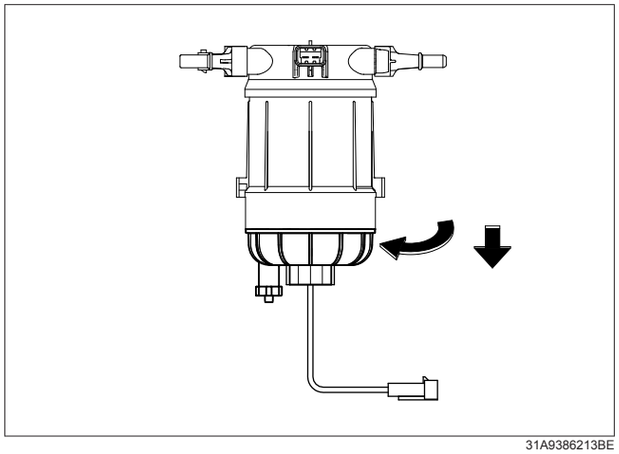
› Properly dispose the waste according to the local laws and regulations. It is not allowed to discard it at will.

1. Disconnect the negative terminal of the battery.
2. Disconnect the water level sensor harness
3. Remove the water level sensor connector



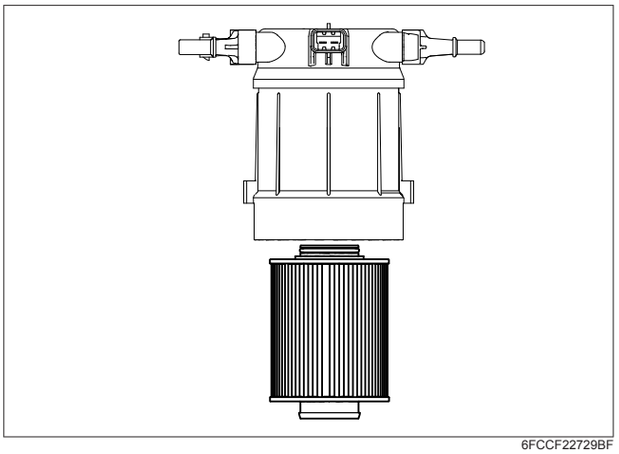
FF9515E131ED

4. Turn lower cap component of fuel filter counterclockwise and remove it



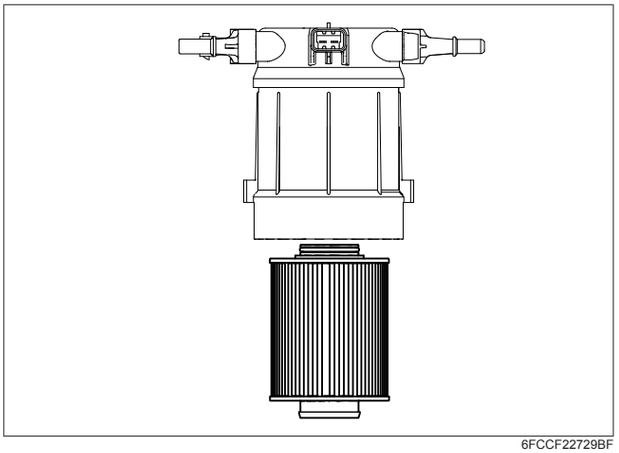
31A9386213BE

5. Remove fuel filter element



6FCCF22729BF

6. Install new element into fuel filter element



6FCCF22729BF

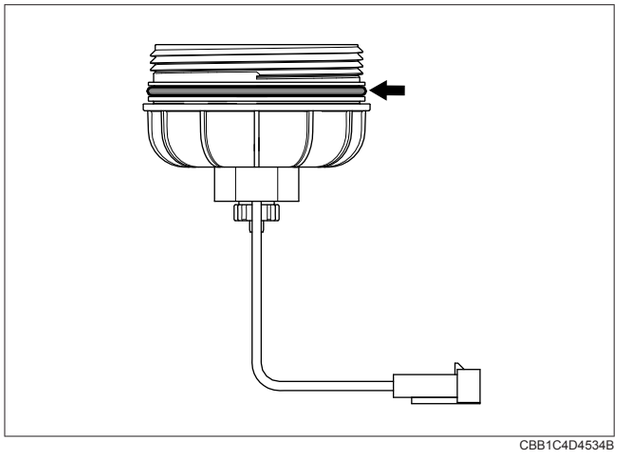
ℹ Notice

› The side of fuel filter element with seal ring faces upward.

› When replacing filter element, pay attention to cleanliness, avoiding oil stains and impurities on the surface of filter element.

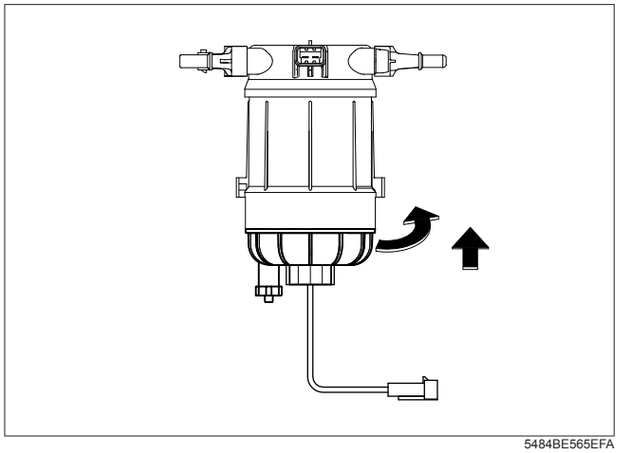
› When replacing the filter element, it is strictly prohibited to touch the surface and inside of the filter paper of the filter element. The outer packaging can be used to install the filter element.

7. Replace O seal ring on lower cover component of fuel filter, and apply lubricant to the position of seal ring on lower cover component of fuel filter.



CBB1C4D4534B

8. Turn lower cap component of fuel filter clockwise and tighten it



5484BE565EFA

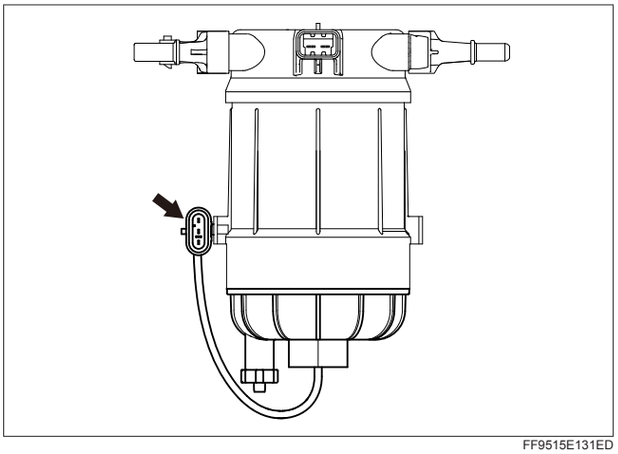
Tightening torque: (25~30) N·m

Notice

› Make sure that threads fit properly before tightening to prevent rubber ring from being damaged.

› Keep threads clean during maintenance to prevent false leakage.

9. Install water level sensor to its original position



FF9515E131ED

10. Connect the water level sensor harness

11. Connect the negative terminal of the battery

Removal/installation

Removal

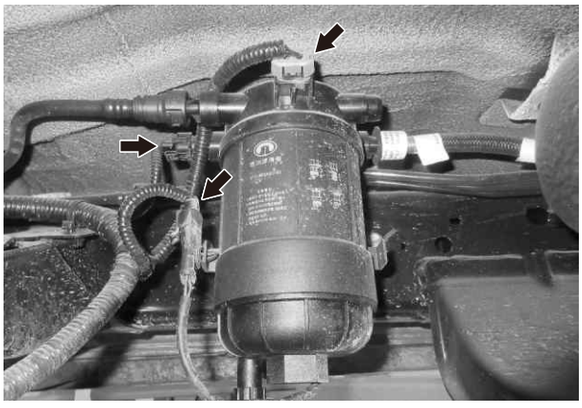
⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

- When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.

1. Release pressure of fuel system
2. Lift the vehicle to a proper position
3. Disconnect 3 connectors



D40C28F24E12

4. Disconnect 2 oil pipes

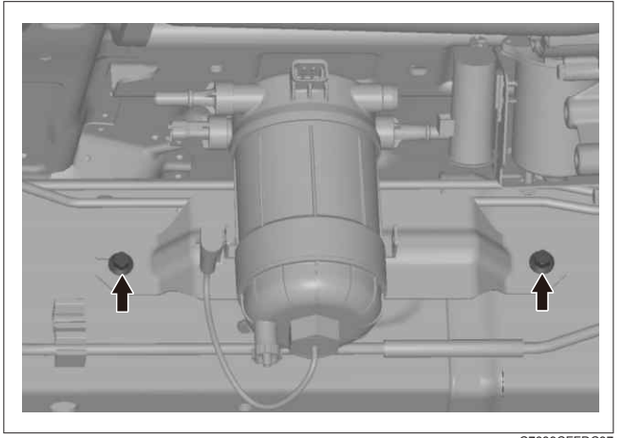


470ED14021A8

⚠ Caution

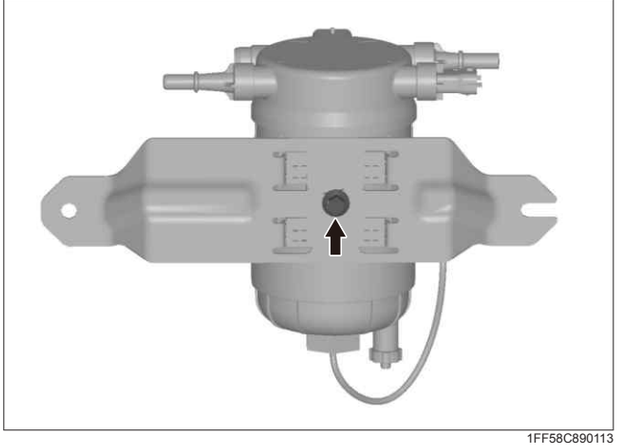
- The disconnected pipelines and joints must be protected from entering debris.

5. Remove 2 bolts



C7689CFFDC37

6. Remove fuel filter and bracket
7. Remove 1 bolt



1FF58C890113

8. Push up fuel filter to separate it from bracket

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

⚠ Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

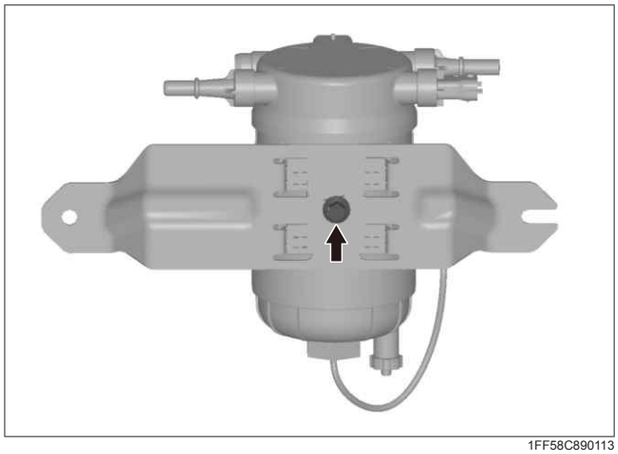
› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› After installation, ensure that the pipeline joint is securely connected.

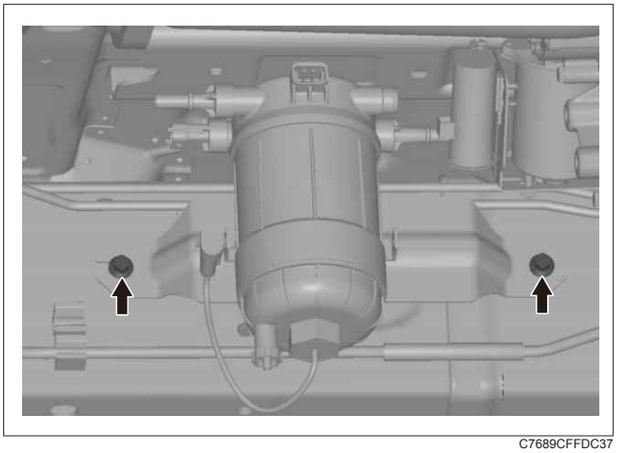
› Tighten the fastener according to the specified torque value.

1. Install fuel filter to bracket
2. Tighten 1 bolt



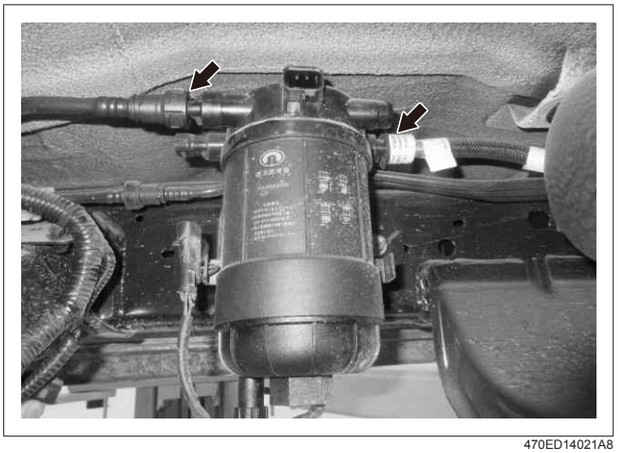
1FF58C890113

3. Tighten 2 bolts



C7689CFFDC37

4. Install 2 oil pipes



470ED14021A8

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

5. Install 3 connectors



D40C28F24E12

⚠ Caution

› Before installing the connector, check that

the connector terminals are intact.

6. Lower the vehicle
7. Build up the pressure in the fuel system

Electronic fuel pump and fuel level sensor

Operating principle

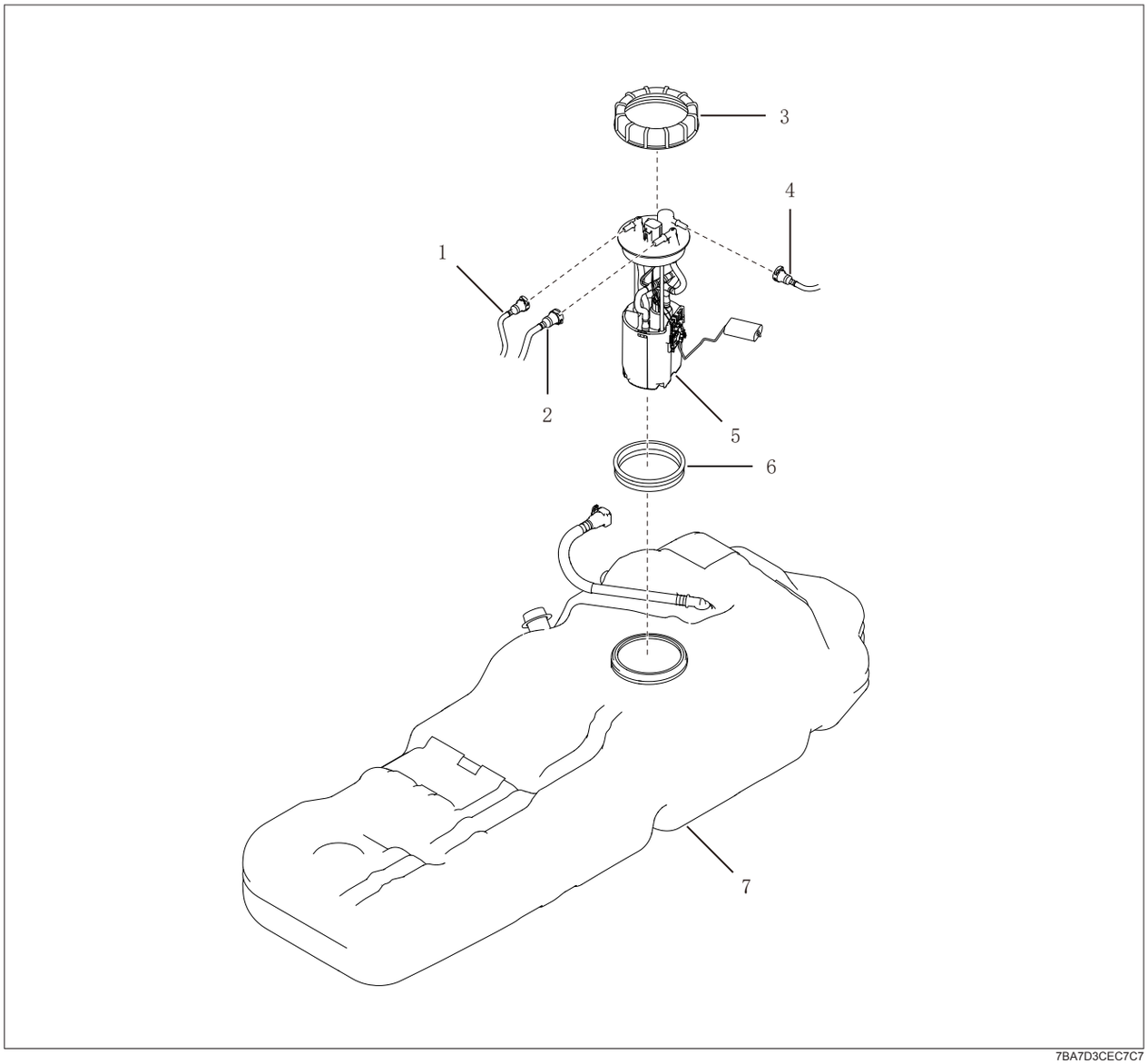
Electronic fuel pump

After the fuel pump assembly is energized, the fuel is delivered from the fuel tank through the pipeline, and the redundant fuel flows to the oil reservoir of fuel pump through fuel return pipe. When the system reaches the rated pressure, pressure is relieved for excess fuel by the regulator to stabilize the system pressure.

Fuel level sensor

Change of fuel level inside fuel tank will result in fuel level sensor float upward and downward movement; there is different resistance when the float is at different position, and fuel level in the fuel tank can be displayed when resistance value is input into instrument ECU.

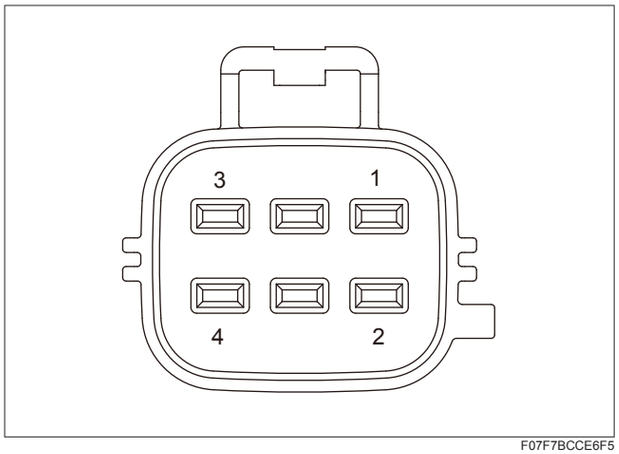
Structural diagram



7BA7D3CEC7C7

1. Fuel tank return pipe
2. Fuel tank outlet pipe
3. Fuel pump gland
4. Fuel tank ventilation valve pipe
5. Electronic fuel pump and fuel level sensor
6. Seal ring
7. Fuel tank

Pin definition



F07F7BCCE6F5

Pin No.	Function
1	Main pump sensor -
2	Main pump sensor +
3	Fuel pump -
4	Fuel pump +

Check

1. Check if fuel pump harness connector is disconnected or inadequately connected
2. Connect scanner and check engine ECU data
3. Check if fuel pump harness connector is electrified
4. Check if fuel pump harness is disconnected or inadequately connected
5. Disconnect fuel inlet hose in connection with high-pressure fuel pump, connect fuel pressure gauge, switch on the power, set the ignition switch to ON and read fuel pressure value

   Rated operating conditions of normal fuel pressure is (480±20) kPa

Notice

› If pressure measured is not within normal range of fuel pressure, occurrence of fuel pump failure can be determined.

6. Use a multimeter to check if the resistance between the two pins of the fuel level sensor meets the standard value.

   Normal resistance value is about (346~354) Ω when fuel level sensor is at bottom dead center

   Normal resistance value is about (46~54) Ω when fuel level sensor is at top dead center

Notice

› If the value measured differs greatly from normal value, presence of electronic fuel pump and fuel level sensor failure can be determined.

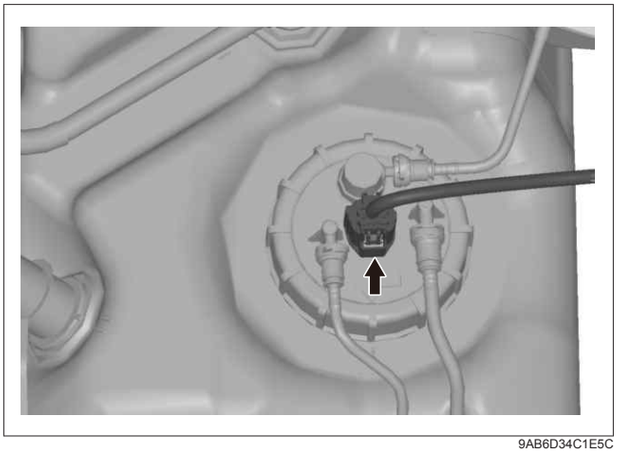
Removal/installation

Removal

⚠ Warning

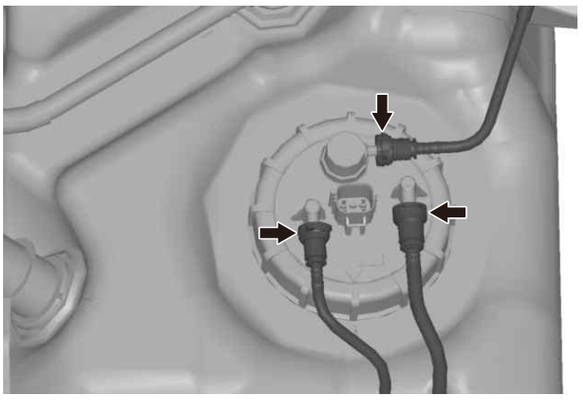
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Release the pressure of fuel system
2. Disconnect the negative terminal of the battery.
3. Remove fuel tank
4. Disconnect 1 connector



9AB6D34C1E5C

5. Disconnect 3 pipelines

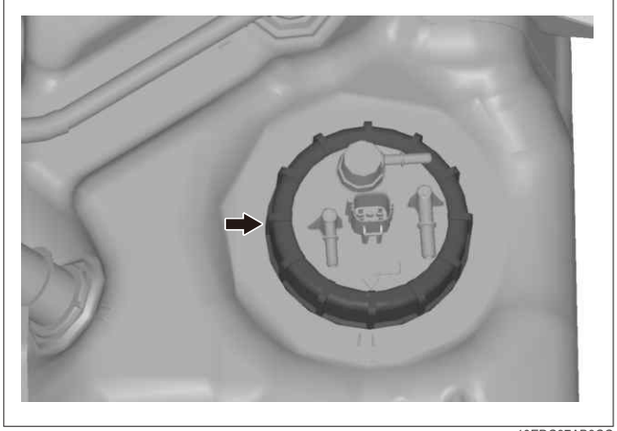


BC05705A69E5

⚠ Caution

- When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.
- If there is much fuel in the fuel tank, small amount of fuel may come out from the tank when you disconnect the refueling pipe connecting hose, so pay attention to safety protection.
- The disconnected pipelines and joints must be protected from entering debris.

6. Remove fuel pump gland



10EDC97AB3CC

Special tool: ZEZF000025

7. Remove electronic fuel pump and fuel level sensor and seal ring

Installation

⚠ Warning

- When performing this operation, assistance from an assistant is needed to prevent parts

from falling and causing injury to personnel.

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

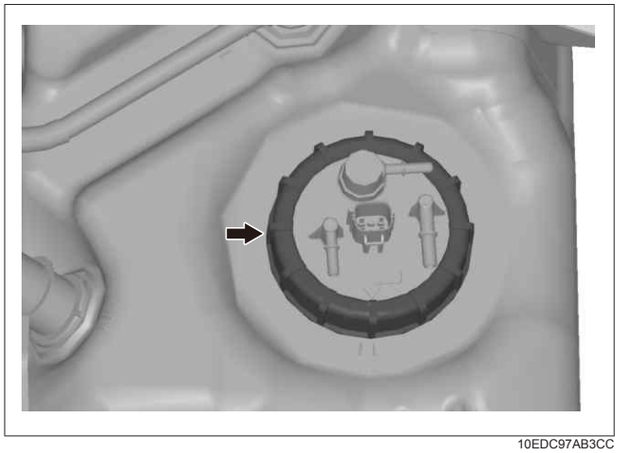
› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› Replace the seal with a new one.

› Tighten the fastener according to the specified torque value.

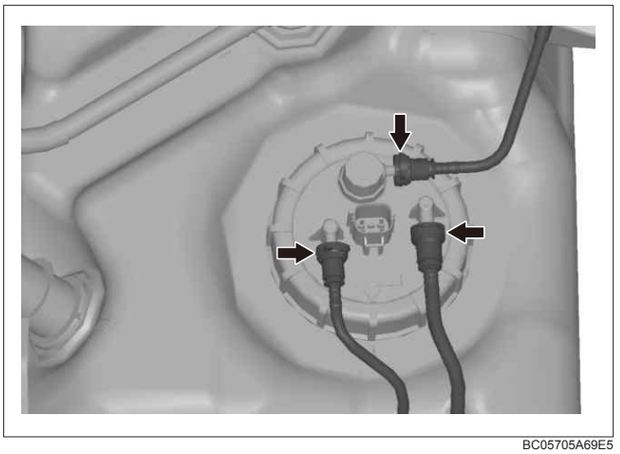
1. Install seal ring
2. Install electronic fuel pump and fuel level sensor
3. Install fuel pump gland



10EDC97AB3CC

Special tool: ZEZF000025

4. Install 3 pipelines



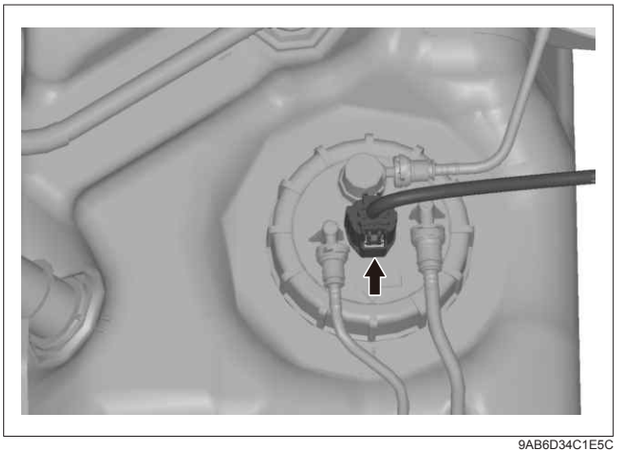
BC05705A69E5

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

5. Install 1 connector



9AB6D34C1E5C

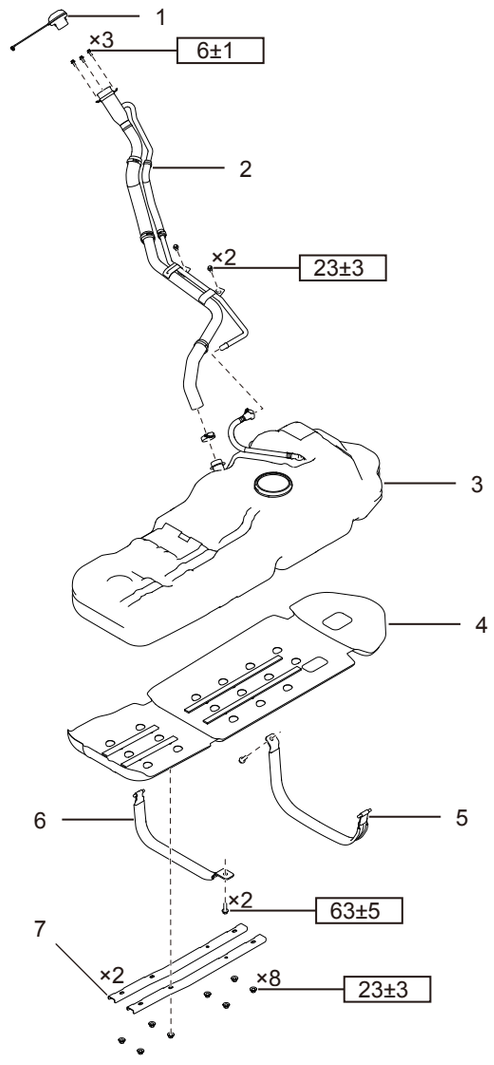
⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

6. Install fuel tank
7. Connect the negative terminal of the battery
8. Build up the pressure in the fuel system

Fuel tank

Structural diagram



5785CC9377AC

1. Fuel tank lock
2. Refueling pipe assembly
3. Fuel tank
4. Fuel tank cover
5. Rear mounting strap for fuel tank
6. Front mounting strap for fuel tank
7. Reinforcing plate for fuel tank cover

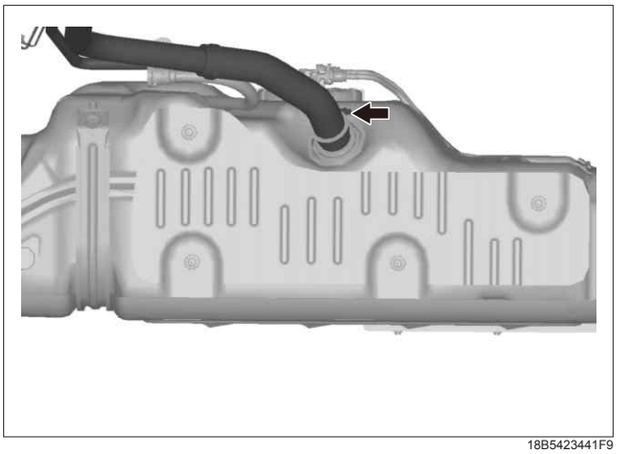
Removal/installation

Removal

⚠ Warning

- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Pressure relief of fuel system
2. Turn off the ignition switch.
3. Disconnect the negative terminal of the battery.
4. Unscrew fuel tank cap to release pressure of fuel tank
5. Tighten fuel tank cap
6. Lift the vehicle to a proper position
7. Disconnect refueling hose

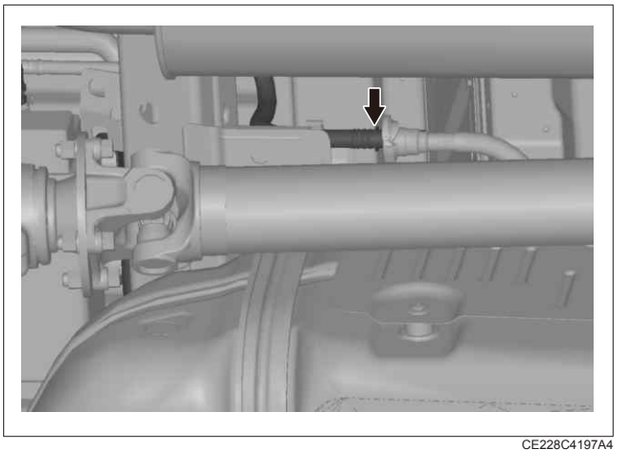


18B5423441F9

⚠ Caution

- When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.
- If there is much fuel in the fuel tank, small amount of fuel may come out from the tank when you disconnect the refueling pipe connecting hose, so pay attention to safety protection.
- The disconnected pipelines and joints must be protected from entering debris.

8. Disconnect 1 pipeline

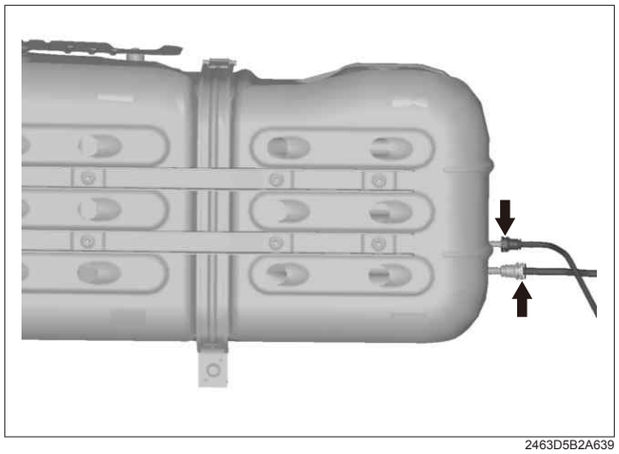


CE228C4197A4

⚠ Caution

- The disconnected pipelines and joints must be protected from entering debris.

9. Disconnect 2 pipelines



2463D5B2A639

⚠ Caution

› When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.

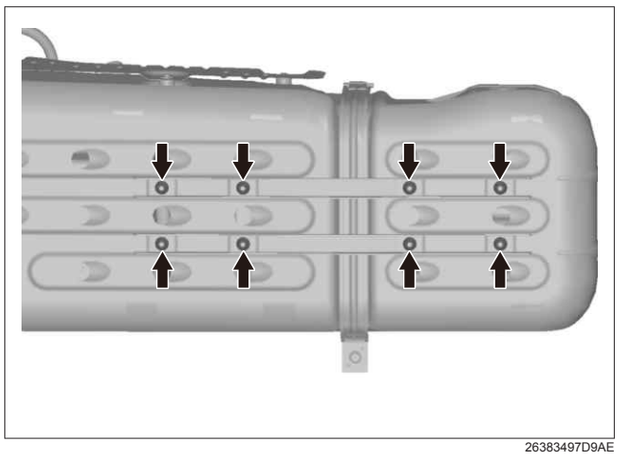
› The disconnected pipelines and joints must be protected from entering debris.

10. Support fuel tank

⚠ Caution

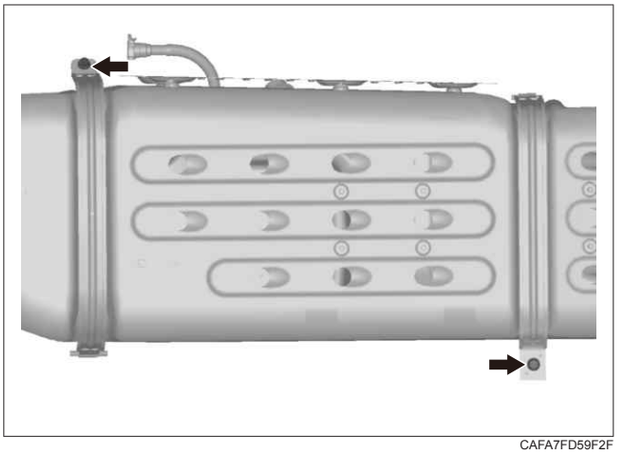
› Use a device with a lift function to hold the fuel tank so as to avoid injury caused by falling objects.

11. Remove 8 nuts, and remove reinforcing plate for fuel tank cover



26383497D9AE

12. Remove 2 bolts, and remove front and rear mounting straps for fuel tank



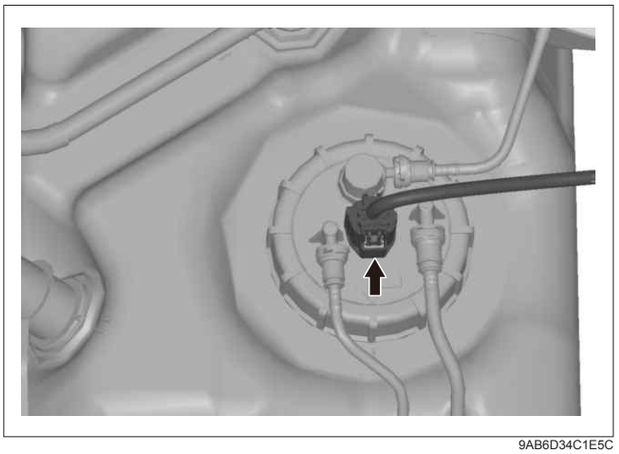
CAFA7FD59F2F

13. Slowly lower the fuel tank to a proper position

ℹ Notice

› Take care when the fuel tank is lowered slowly, preventing damage to harness.

14. Disconnect 1 connector



9AB6D34C1E5C

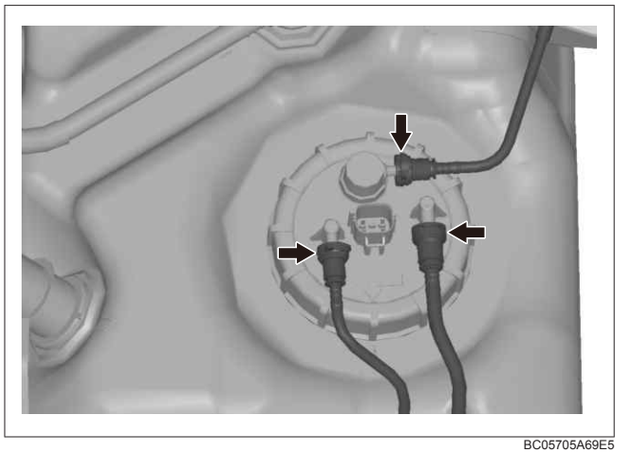
15. Disconnect ventilation valve pipe of fuel tank from frame

16. Remove fuel tank, and take off fuel tank cover

⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

17. Disconnect 3 pipelines



BC05705A69E5

⚠ Caution

- When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.
- The disconnected pipelines and joints must be protected from entering debris.

18. Remove electronic fuel pump and fuel level sensor
19. Empty fuel

⚠ Caution

- Drain the fuel into the designated clean container.

Installation

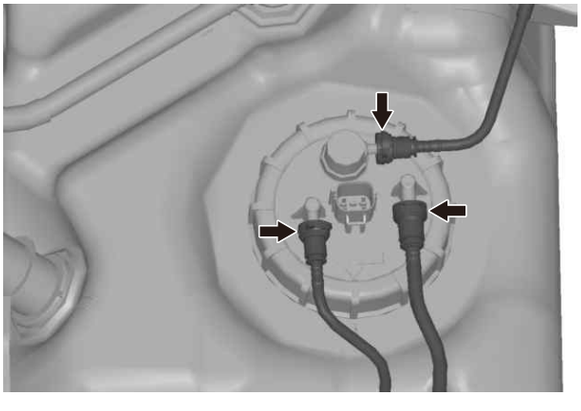
⚠ Warning

- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

- Replace the seal with a new one.
- Tighten the fastener according to the specified torque value.

1. Install electronic fuel pump and fuel level sensor
2. Install 3 pipelines

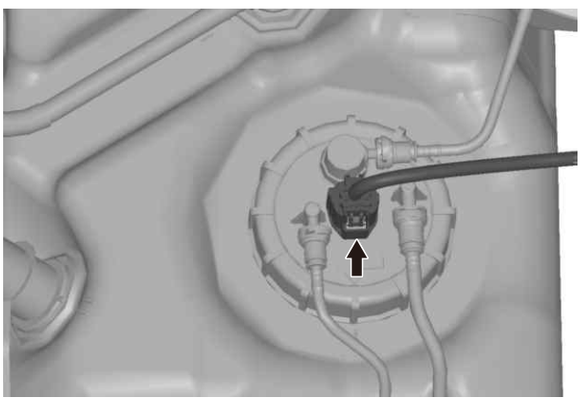


BC05705A69E5

⚠ Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

3. Install fuel tank and fuel tank cover, put them on lifting equipment, and slowly lift the fuel tank
4. Connect ventilation valve pipe of fuel tank to frame
5. Install 1 connector

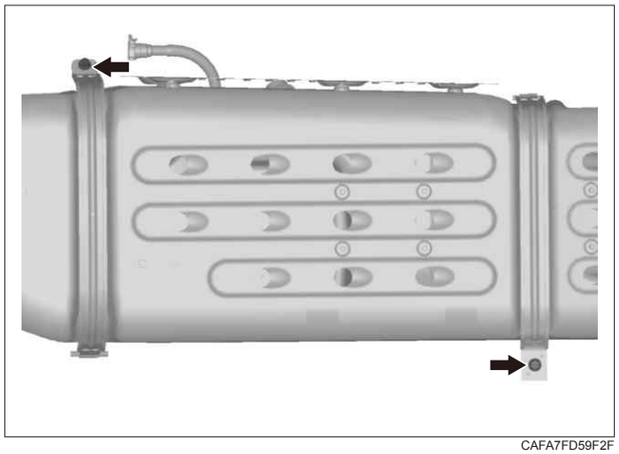


9AB6D34C1E5C

⚠ Caution

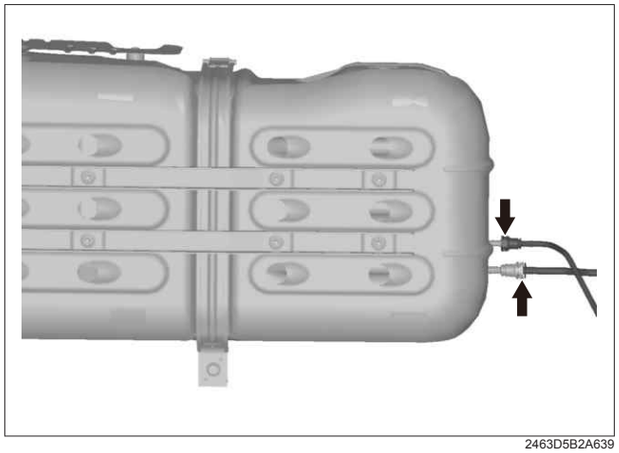
› Before installing the connector, check that the connector terminals are intact.

6. Slowly lift fuel tank to a proper position
7. Install front and rear mounting straps for fuel tank, and remove 2 bolts



CAFA7FD59F2F

8. Install 2 pipelines



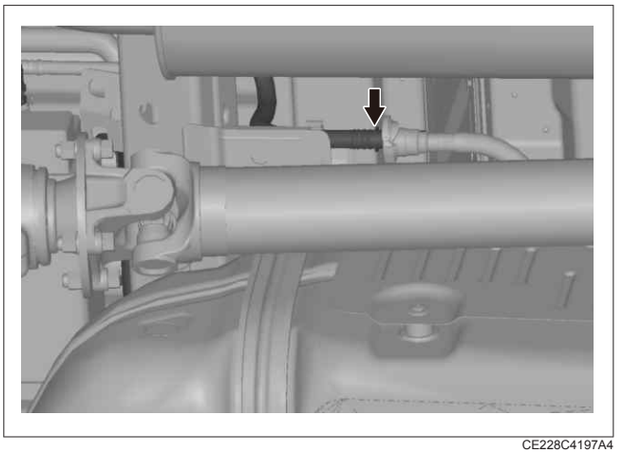
2463D5B2A639

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

9. Install 1 pipelines



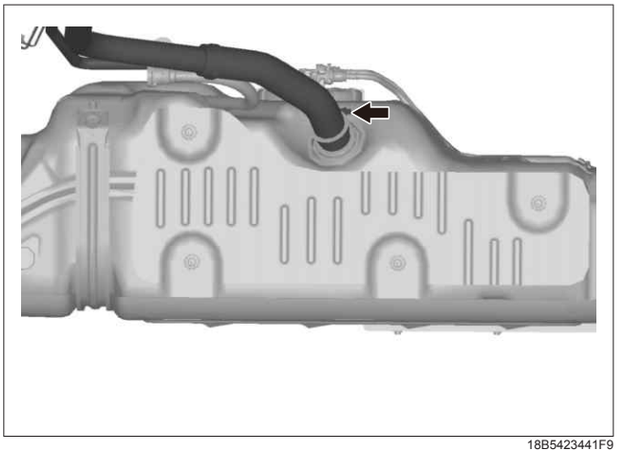
CE228C4197A4

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

10. Install refueling hose



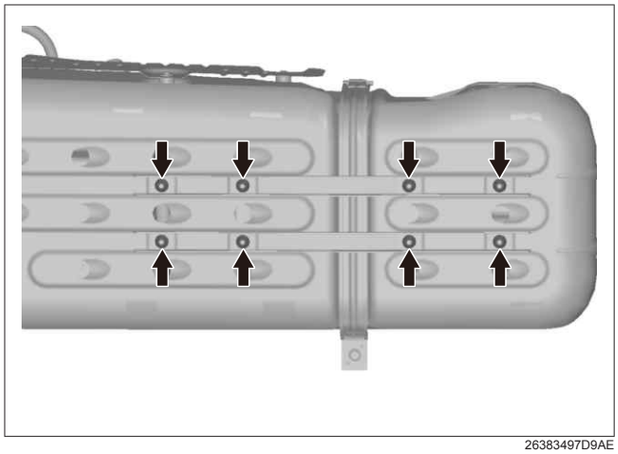
18B5423441F9

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

11. Install reinforcing plate for fuel tank cover, and tighten 8 nuts



26383497D9AE

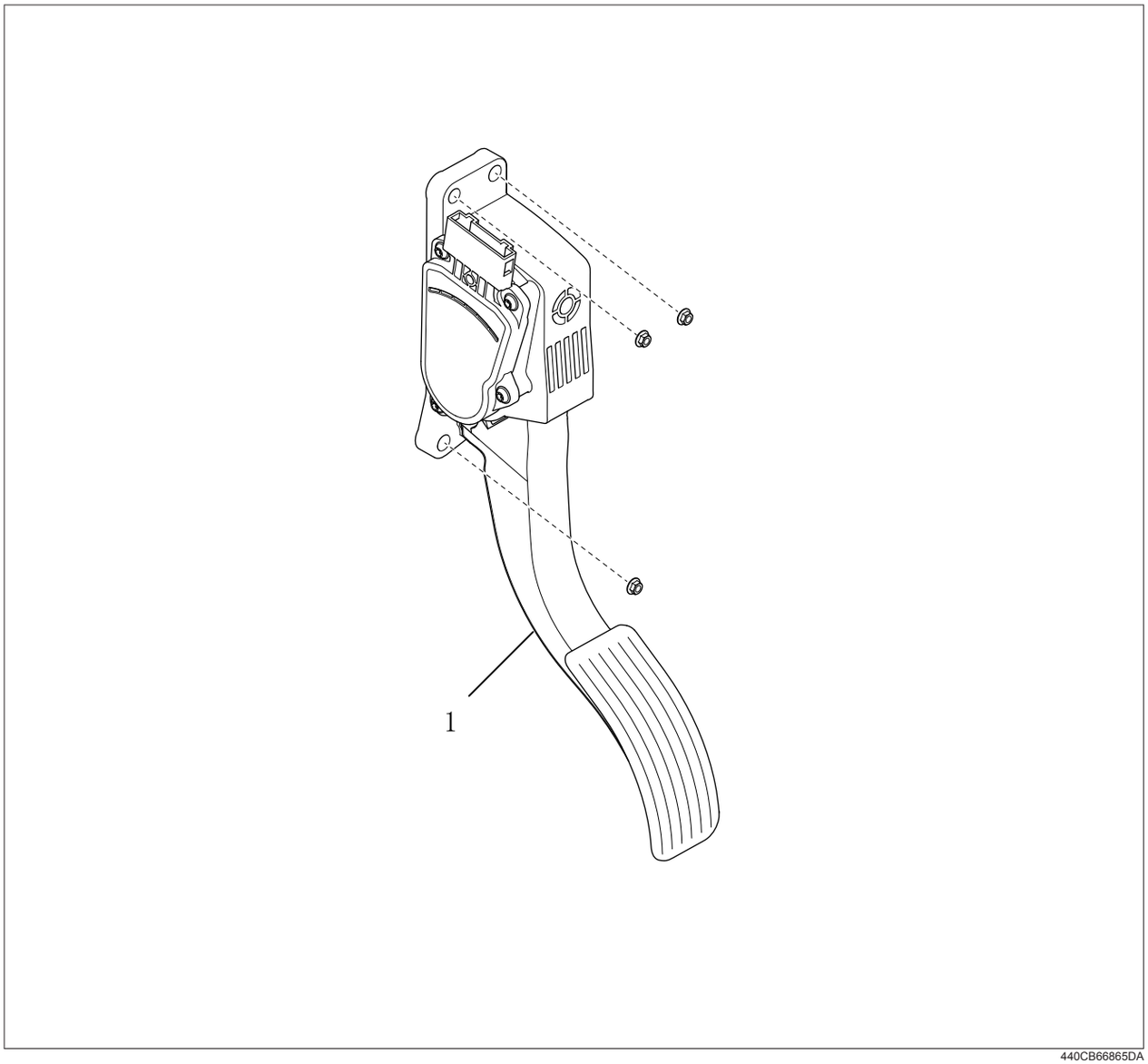
12. Add fuel
13. Connect negative terminal of the battery
14. Build up the pressure in the fuel system

Accelerator pedal

Operating principle

The accelerator pedal assembly consists of pedals, position sensors that detect angle changes, reset springs and damping mechanisms, etc. The accelerator pedal assembly converts the pedal stroke into an electrical signal and sends it to the engine ECU, and the engine ECU performs overall control of the entire electronic control system based on changes of the electrical signal.

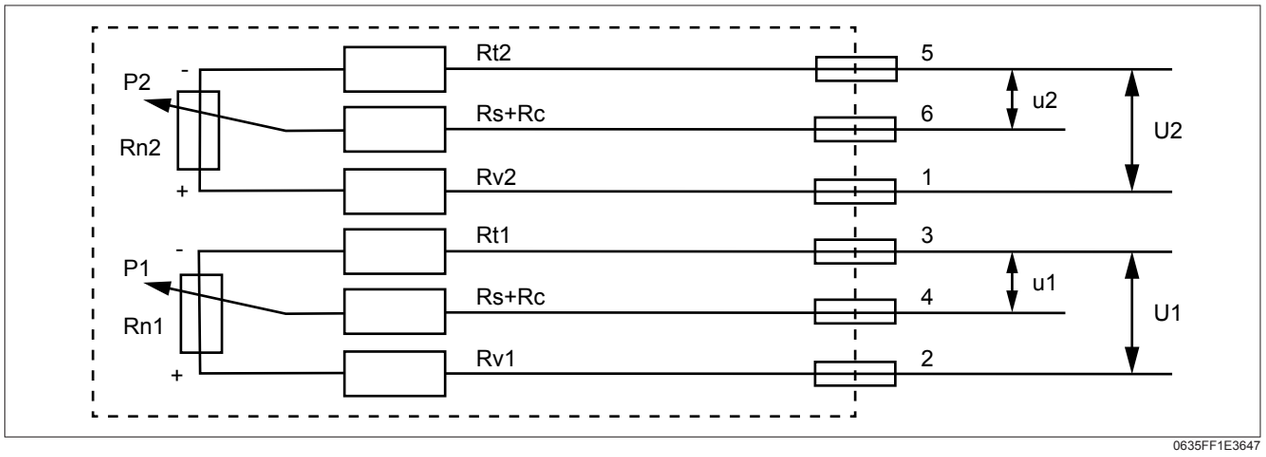
Structural diagram



440CB66865DA

1. Accelerator pedal assembly

Specification



0635FF1E3647

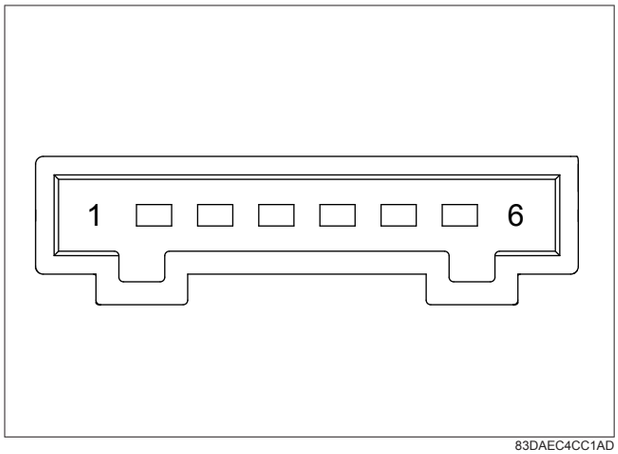
Potentiometer characteristics

Working voltage	（5±0.3）V
Potentiometer Rt1+Rn1+RV1	(1.2±0.5)kΩ
Potentiometer Rt2+Rn2+RV2	（1.7±0.8）kΩ

Electrical and mechanical properties

Function	(u_1/U_1)%	(u_2/U_2)%
Idle speed (accelerator pedal is not stepped on)	15±2	7.5±1
Mechanical dead center (accelerator pedal is floored)	82±4	41±2

Pin definition



83DAEC4CC1AD

Pin No.	function
1	Power supply 2
2	Power supply 1
3	GND 1
4	Output 1
5	GND 2
6	Output 2

Check

1. Use a multimeter to check the resistance between pins 1 and 5; the normal resistance is (1.7 ± 0.8) kΩ
2. Use a multimeter to check the resistance between pins 2 and 3; the normal resistance is (1.2 ± 0.5) kΩ

Notice

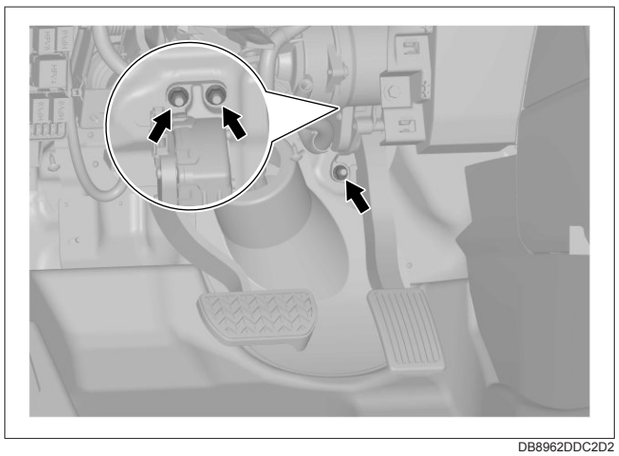
› If any of the resistance values are not within the specified range, replace the accelerator pedal assembly.

3. Check if accelerator pedal locknut is loose

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the lower left guard of the instrument panel
3. Disconnect accelerator pedal harness connector
4. Remove 3 nuts

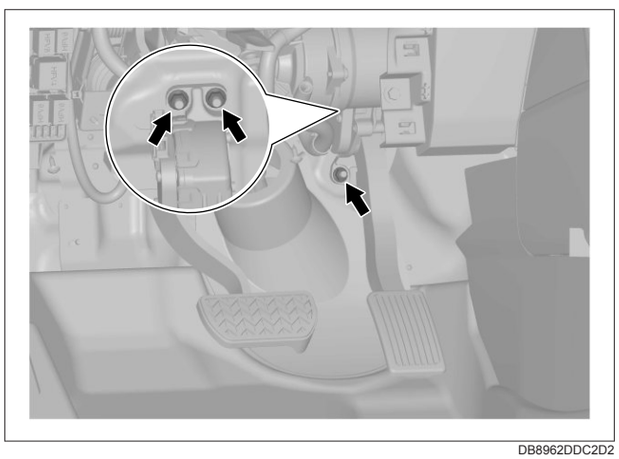


DB8962DDC2D2

5. Remove accelerator pedal

Installation

1. Install accelerator pedal
2. Tighten 3 nuts



DB8962DDC2D2

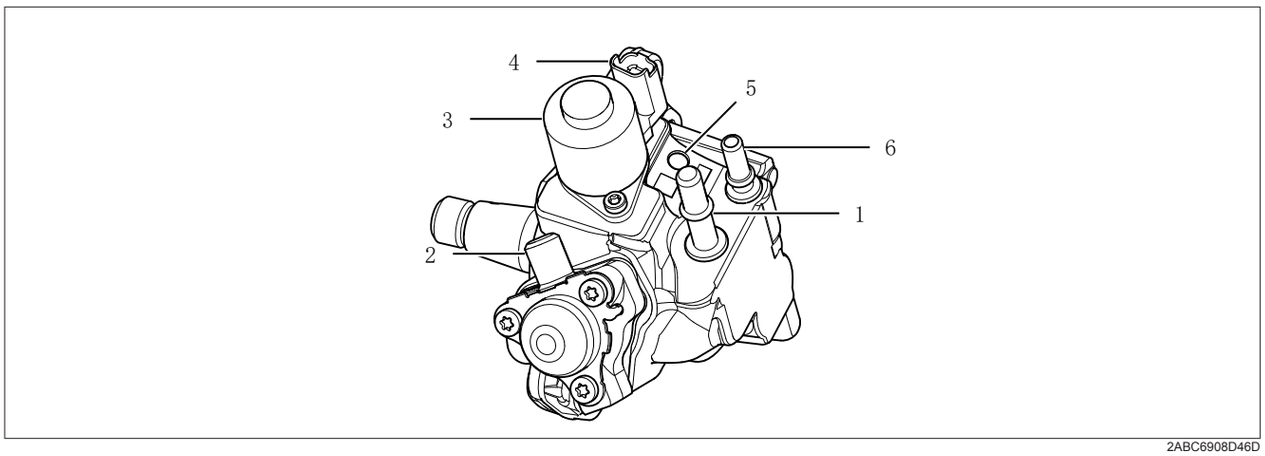
3. Connect accelerator pedal harness connector
4. Install lower left guard of the instrument panel

High-pressure fuel pump

Operating principle

High-pressure fuel pump

The high-pressure fuel pump is used to provide and control the amount of fuel supply. It is a single plunger pump with 2 pressure strokes at 1 revolution of pump shaft. The pump itself is not integrated with an feed pump, and fuel is supplied by an electronic feed pump installed in the fuel tank. The electronic fuel pump delivers fuel from the fuel tank to the filter. The fuel then enters the fuel metering unit on the upper part of high-pressure fuel pump. The fuel metering unit controls the amount of fuel entering the high-pressure fuel pump for compression according to actual fuel demand.



2ABC6908D46D

In the diagram:

1 - Inlet of high-pressure fuel pump

2 - Outlet of high-pressure fuel pump

3 - Metering valve of fuel pump

4 - Metering valve connector of fuel pump

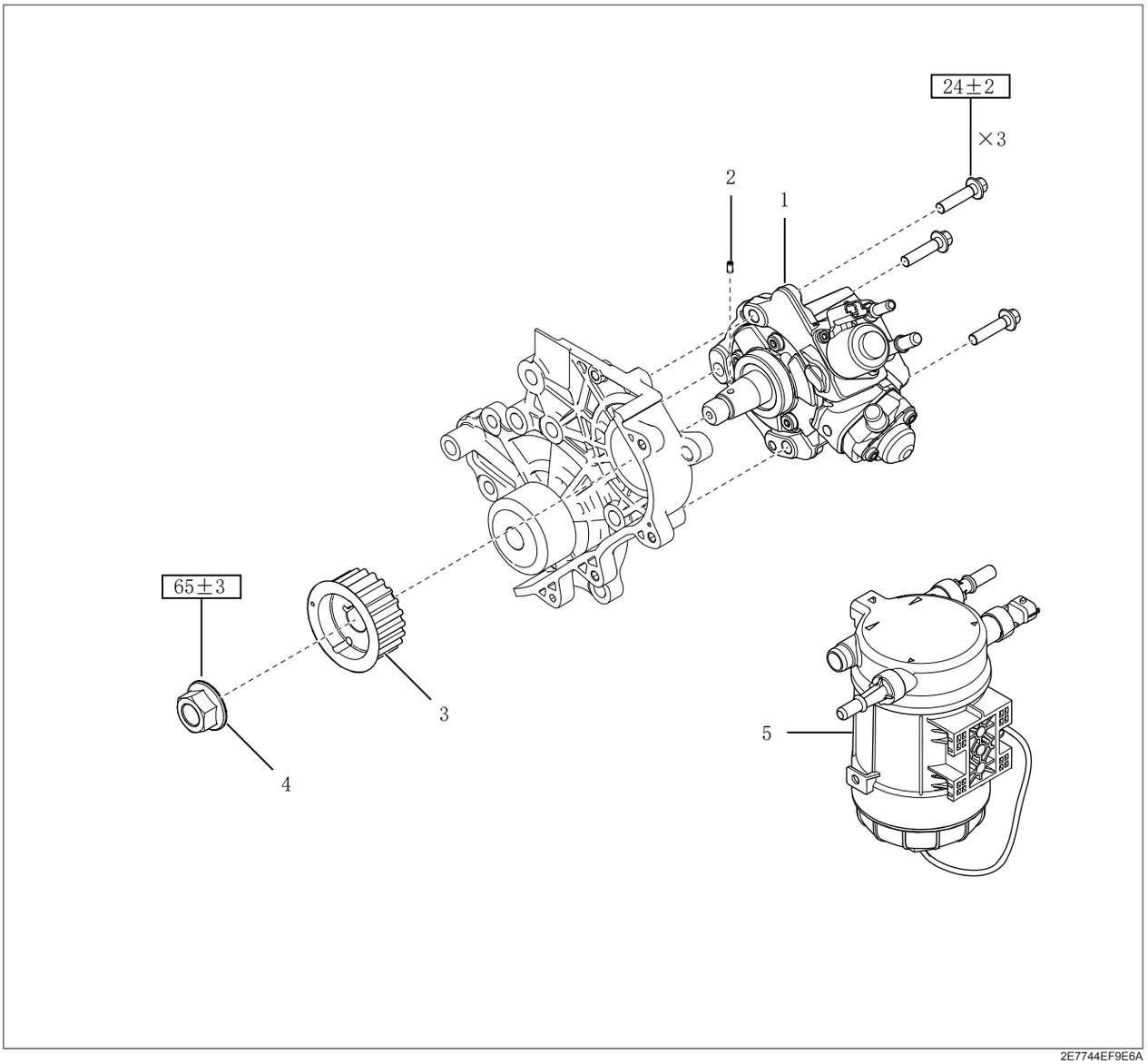
5 - Return hole of fuel injector

6 - Return port of high-pressure fuel pump

Fuel metering unit (metering valve of fuel pump)

The fuel metering unit is a proportional solenoid valve controlled by an electronic control unit (ECU), which controls the amount of fuel entering the high-pressure fuel pump, thereby controlling the fuel pressure in high-pressure fuel rail.

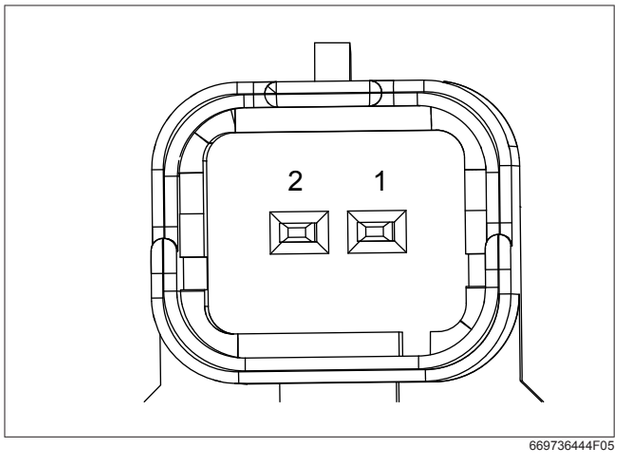
Structural diagram



2E7744EF9E6A

1. High-pressure fuel pump assembly
2. Spiral spring pin
3. Fuel pump pulley
4. High-pressure fuel pump belt pulley nut
5. Fuel filter assembly

Pin definition



669736444F05

The metering valve of the high-pressure fuel pump is controlled by PWM waveform of ECU. No difference between positive and negative poles for pins.

Inspection

1. Set ignition switch to OFF position (if the ignition switch was at ON previously, wait for at least 60 seconds before performing subsequent operations after setting it to OFF)
2. Pull out harness connector of fuel metering unit on high-pressure fuel pump
3. Measure the resistance between the two pins of fuel metering unit

   Normal value: (4.77~5.83) Ω (at 20℃)

Removal/installation

Removal

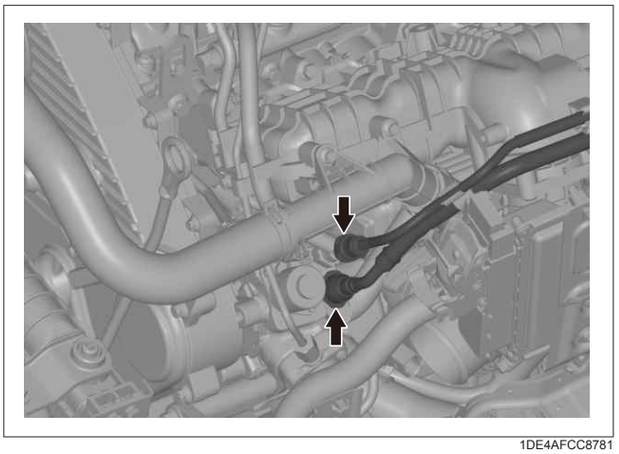
⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- There may be some fuel overflow after disconnection of the fuel pipeline. To reduce the risk of personal injury, block the pipeline joint with a clean cloth. Store the cloth into the designated container after work has been concluded.
- If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

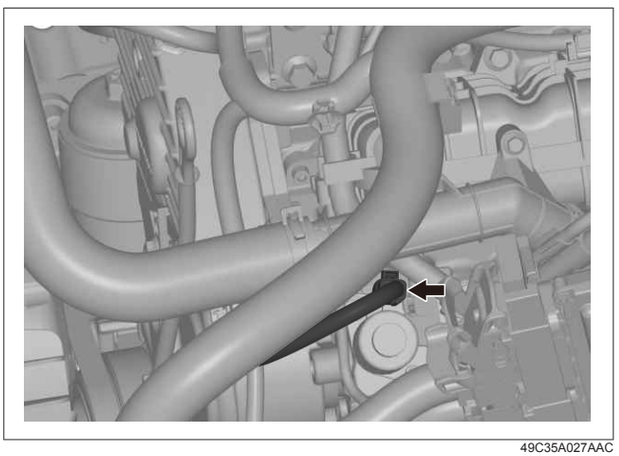
- When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.

1. Release pressure of fuel system
2. Disconnect the negative terminal of the battery.
3. Remove electronic throttle
4. Remove connecting pipe for intake manifold
5. Disconnect 2 pipelines



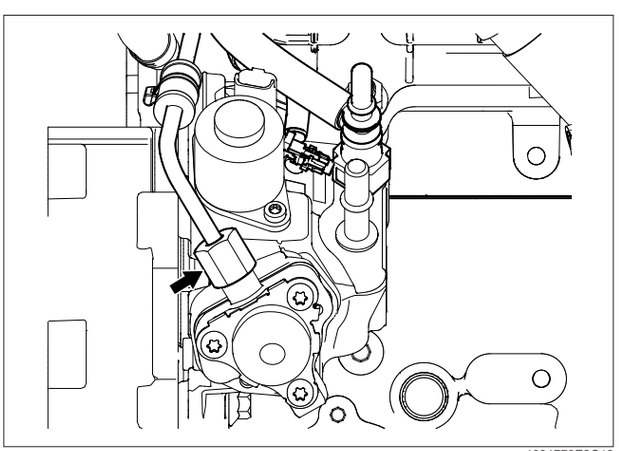
1DE4AFCC8781

6. Disconnect harness connector of high-pressure fuel pump



49C35A027AAC

7. Remove steering pump belt
8. Remove generator belt
9. Remove timing cover
10. Remove timing belt
11. Loosen locking nut at high-pressure fuel pump end of fuel rail inlet pipe

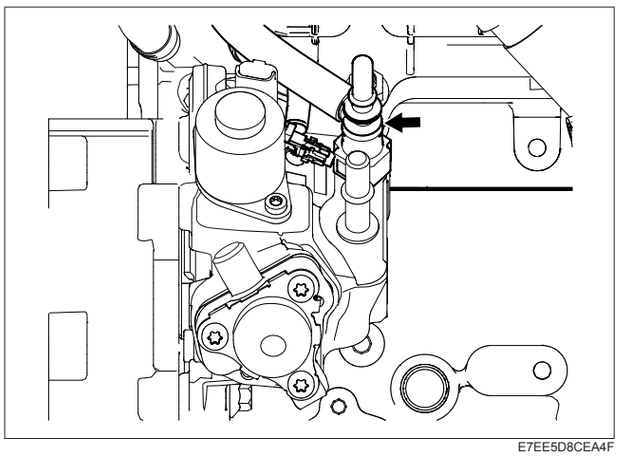


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Notice

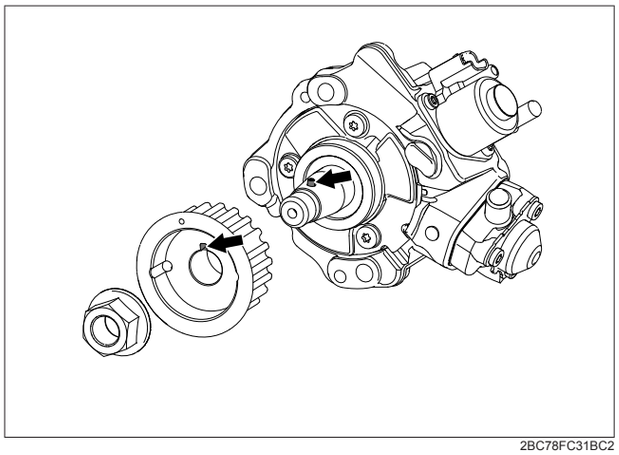
› Take care of fuel leakage.

12. Disconnect high pressure fuel pump end of return pipe of high-pressure fuel rail



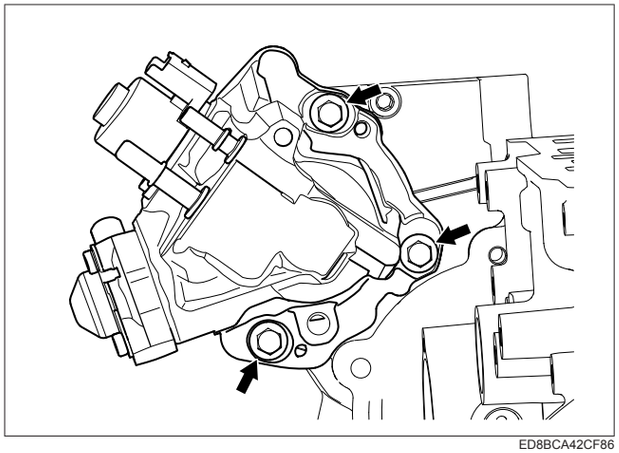
E7EE5D8CEA4F

13. Remove nut for high-pressure fuel pump pulley, and remove fuel pump pulley



2BC78FC31BC2

14. Remove 3 bolts, and remove high-pressure fuel pump assembly



ED8BCA42CF86

Installation

Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

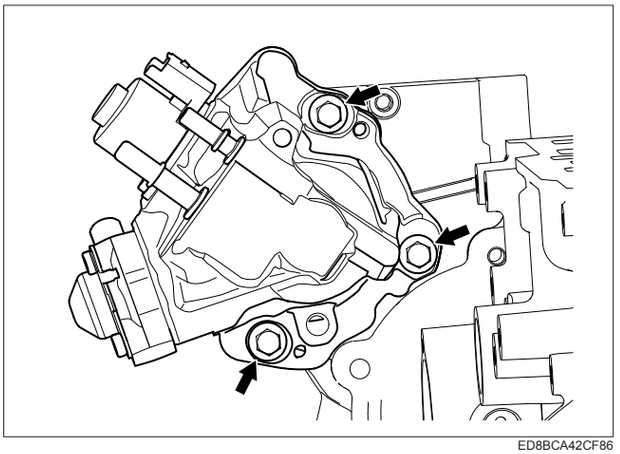
› According to local regulations, the waste generated during the maintenance process should be properly handled.

Caution

› After installation, ensure that the pipeline joint is securely connected.

› Tighten the fastener according to the specified torque value.

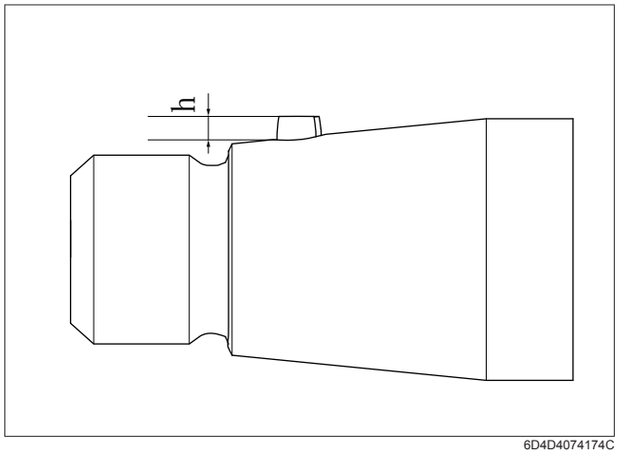
1. Install high-pressure fuel pump by aligning the bolt hole, and tighten 3 bolts



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Tightening torque: (24±2) N·m

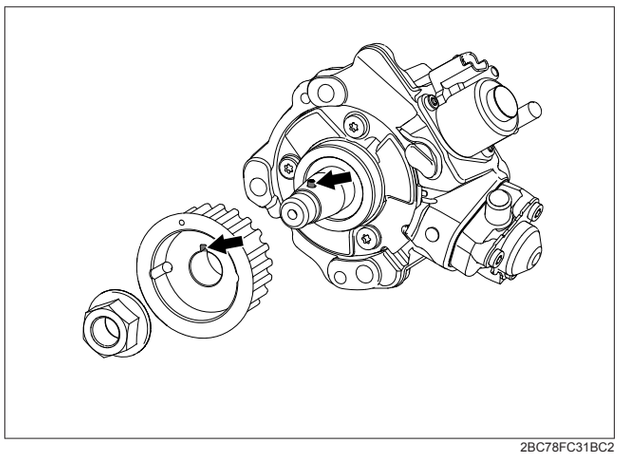
2. Measure the height of spiral spring pin, and adjust it if it is not within the specified range



6D4D4074174C

Standard value (h): (2.0 ± 0.5) mm

3. Align the positioning groove of fuel pump timing pulley with the spiral spring pin and install it on the fuel pump shaft

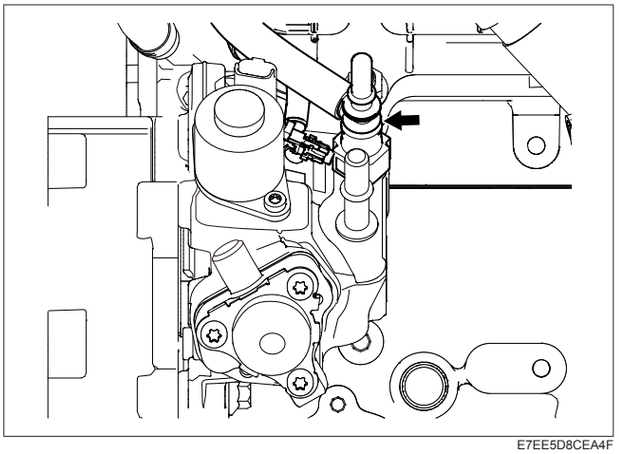


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4. Tighten the nut for high-pressure fuel pump pulley

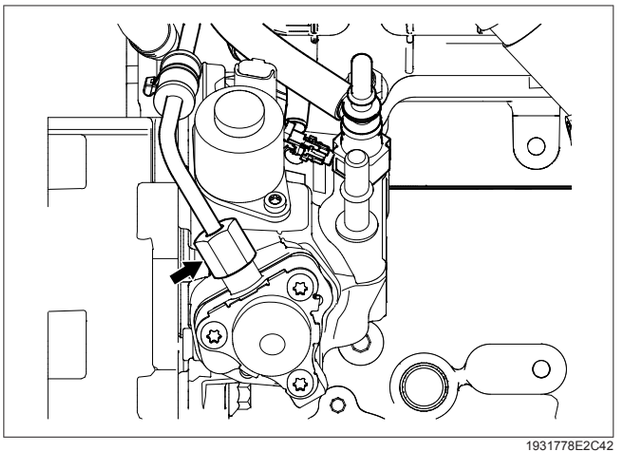
Tightening torque: (65±3) N·m

5. Connect return pipe of high-pressure fuel rail to high-pressure fuel pump



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6. Tighten the locking nut at high-pressure fuel pump end of fuel rail inlet pipe



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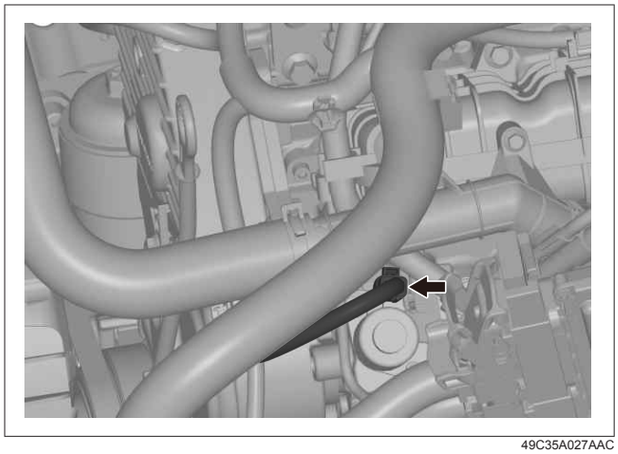
Tightening torque: (32±3) N·m

Notice

› Take care of fuel leakage.

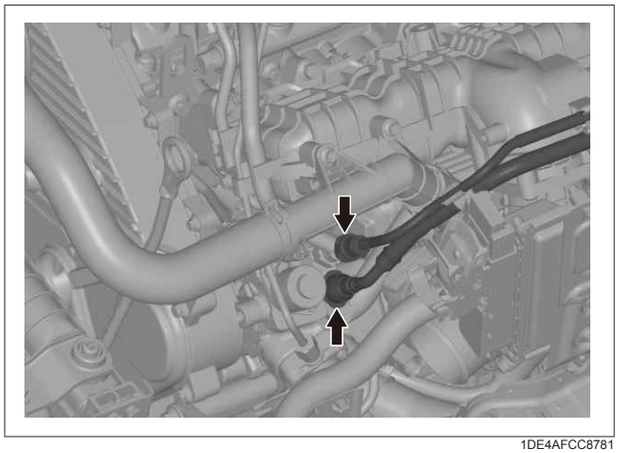
7. Install timing belt
8. Install timing cover
9. Install generator belt
10. Install steering pump belt

11. Install harness connector of high-pressure fuel pump



49C35A027AAC

12. Install 2 pipelines



1DE4AFCC8781

13. Install connecting pipe for intake manifold
14. Install electronic throttle
15. Install negative terminal of the battery
16. Build up the pressure in the fuel system

Rail pressure sensor

Operating principle

The rail pressure sensor is a piezoresistive sensor for feeding back the pressure information in the fuel rail to the engine ECU. When working, the pressure inside the fuel rail/high-pressure fuel rail presses the diaphragm inside the sensor, causing a change in the resistance of the silicon strain gauge on the diaphragm, which results in a change in the sensor output voltage. Engine ECU can determine the fuel pressure value in the fuel rail/high-pressure fuel rail according to the output voltage.

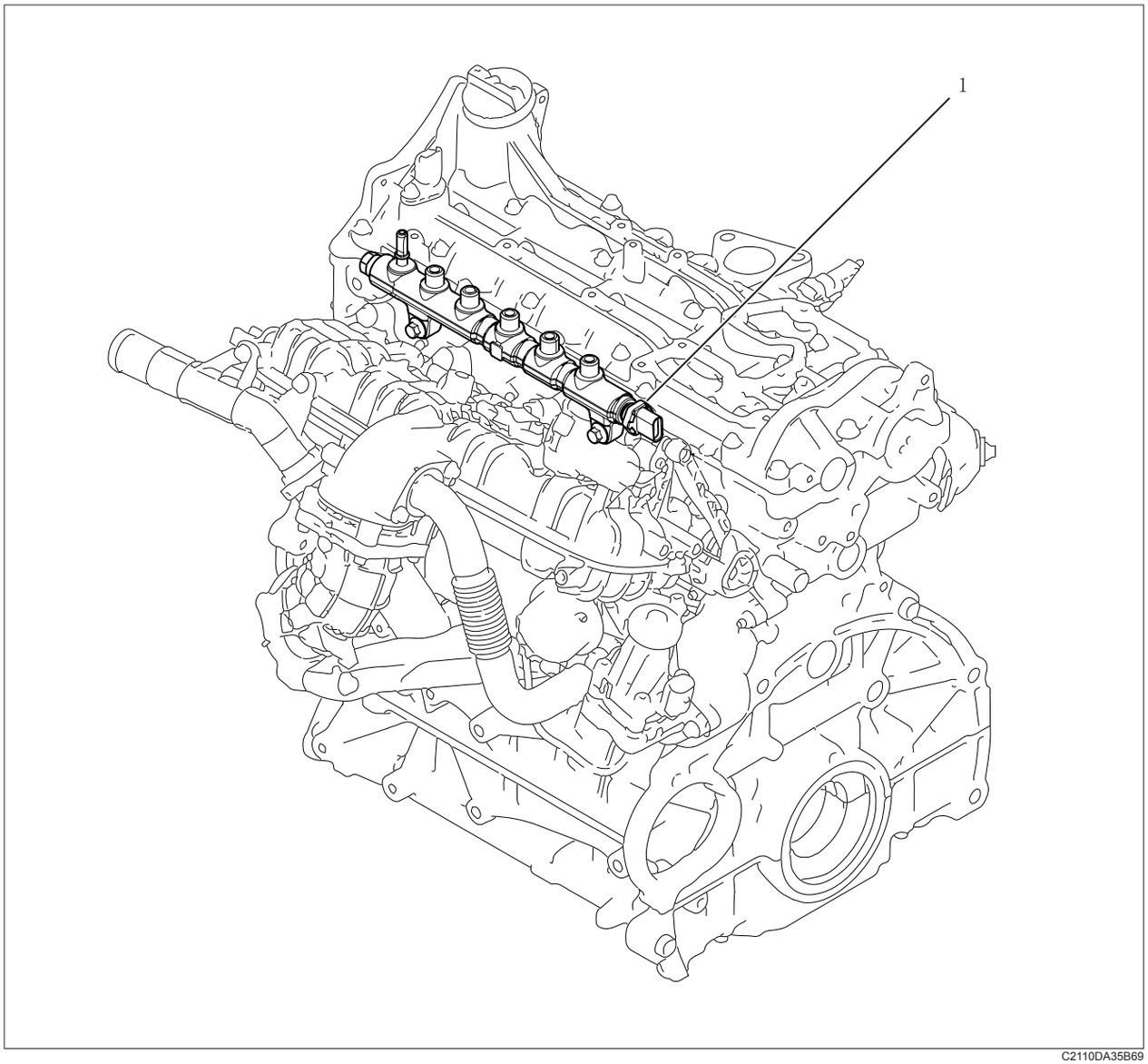
Common causes of failure:

› Improper use, such as use of unsealed connectors, reverse large voltage and current. etc.

Precautions for repair:

› Any repair of the sensor is strictly prohibited.

Structural diagram



C2110DA35B69

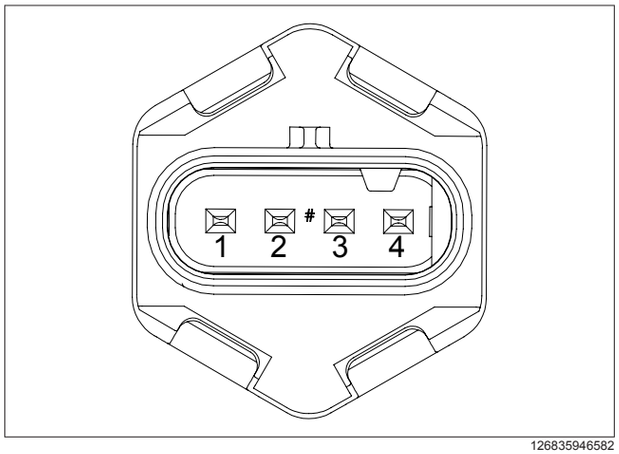
1. Rail pressure sensor

⚠ Caution

› If rail pressure sensor is damaged, replace high-pressure fuel rail assembly.

› It is not allowed to remove or install rail pressure sensor without permission.

Pin definition



126835946582

Pin No.	Function
1	Input voltage
2	Output signal 2
3	Ground
4	Output signal 1

Inspection

Caution

› The rail pressure sensor shall be driven by a 5 V electrical signal from the electronic control module (ECU) of the engine. Direct connection of a 12 V power supply may damage the sensor.

› Replace the sensor or actuator if they were knocked or dropped.

1. Connect 5 V power supply between the sensor power supply and the GND pin

Notice

› Be careful when connecting the leads. Connecting the leads to wrong pins may damage the rail pressure sensor.

2. Measure voltages between signal 1 pin and ground pin, and between signal 2 pin and ground pin separately

   Output range of signal: 0.5 V to 4.5 V

Notice

› The measured voltages of signal 1 and signal 2 should be complementary, and the sum of the voltages is about 5 V.

Fuel injector

Operating principle

Common rail fuel injector is used to inject a very small amount of high pressure fuel accurately into combustion chamber. Fuel injector is mounted to the cylinder head in the form of tapered lock, and seals the combustion chamber by a copper gasket.

Fuel injection of common rail fuel injector is controlled by an electronic injector. Injection start time is controlled by the timing system of electronic diesel control system.

Fault description: poor idle speed, poor acceleration, unable to start (difficult to start), etc.

Common causes of failure:

› Failure caused by accumulation of glue inside the fuel injector due to lack of maintenance.

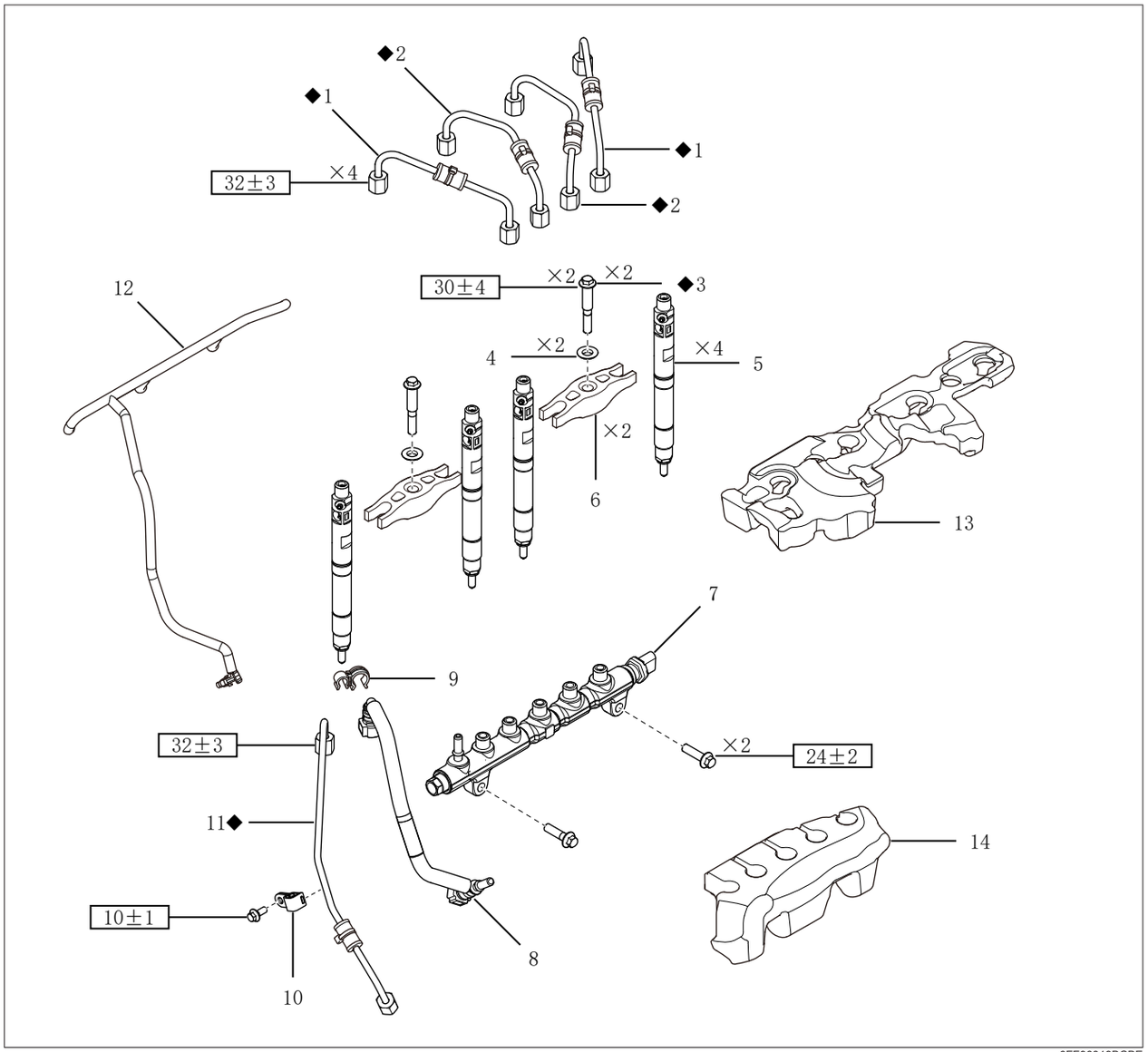
Precautions for repair:

› Ensure a clean installation environment during installation.

› O-rings and copper washers of all fuel injectors must be replaced when new injectors are installed.

› After replacing the new injector, always write the new injector code into ECU.

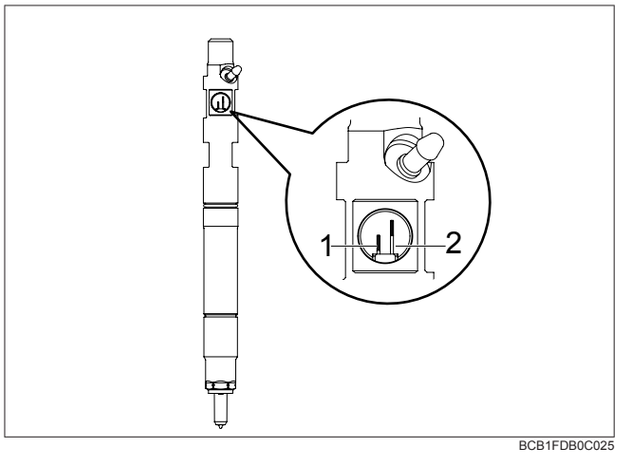
Structural diagram



6FF96819BCBE

1. Inlet pipe component of fuel injector 1
2. Inlet pipe component of fuel injector 2
3. Hold-down block bolt
4. Spherical washer
5. Fuel injector assembly
6. Fuel injector clamp plate
7. High-pressure fuel rail assembly
8. Fuel rail return pipe component
9. Fuel return pipe clamp I
10. Fuel rail inlet pipe clamp assembly
11. Fuel rail inlet pipe components
12. Return pipe components of fuel injector
13. Soundproofing cover of fuel injector
14. Acoustic shield of the high-pressure fuel rail

Pin definition



BCB1FDB0C025

Pin No.	Function
1	Low side
2	High side

Check of fuel injector

1. Set ignition switch to OFF position (if the ignition switch was at ON previously, wait for at least 60 seconds before performing subsequent operations after setting it to OFF)
2. Pull out harness connectors of all fuel injectors
3. Measure resistance of fuel injector

   Resistance value at normal temperature: (0.2~1.0) Ω

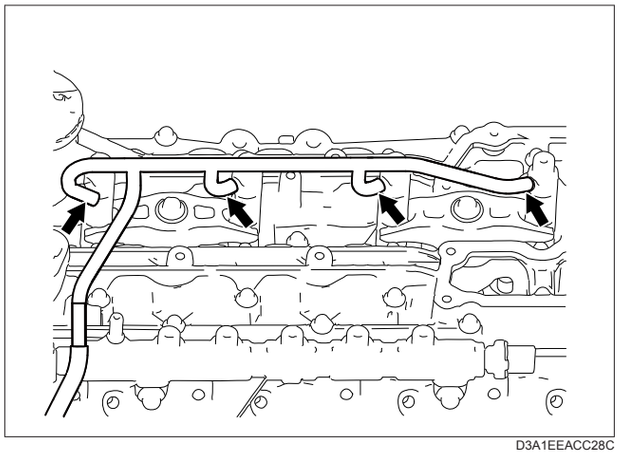
Removal/installation

Removal

⚠ Caution

- During engine operation or within 30 seconds after engine shutdown, no disassembly operation is allowed because high-pressure fuel may leak.
- Always ensure cleanliness of fuel injector when handling and assembling fuel injectors.
- Always ensure cleanliness of work place and the tools used (the cylinder head and the area around the fuel injector also need to be kept clean).
- Do not remove protective cap until assembly begins, and the joint shall be covered with the protective cap immediately after disassembly. Ensure that some spare clean protective caps are prepared. Ultrasonic cleaning is required for used protective caps.
- Prior to installation, all seals (O-rings) shall be lubricated (applying assembly oil, engine oil or diesel).
- Do not use any hydrous lubricant or glidant.

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connector of injection nozzle
3. Disconnect return pipe components of fuel injector

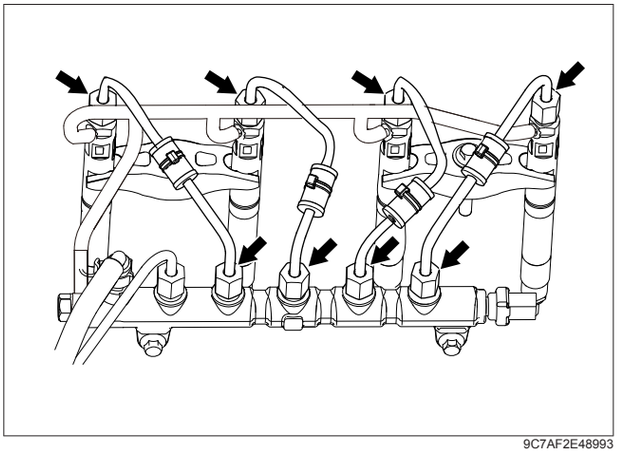


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ℹ Notice

- Cover the return pipe component of fuel injector with a plastic bag to prevent damage and contamination.
- If it is necessary to remove fuel return pipes of all injectors, start with the first or last cylinder of the engine to avoid generation of tensile stress or compressive stress.
- All fuel injectors with fuel return connectors removed shall be immediately covered with protective caps.
- Do not use any tools during the installation and removal of fuel return pipe.
- The number of assembly and disassembly of return pipe components of fuel injector shall not be more than 2 times.

4. Remove acoustic shield of the high-pressure fuel rail
5. Remove locking nut of inlet pipe component of fuel injector, and remove 2 inlet pipe components of fuel injector 1 and 2 inlet pipe components of fuel injector 2.



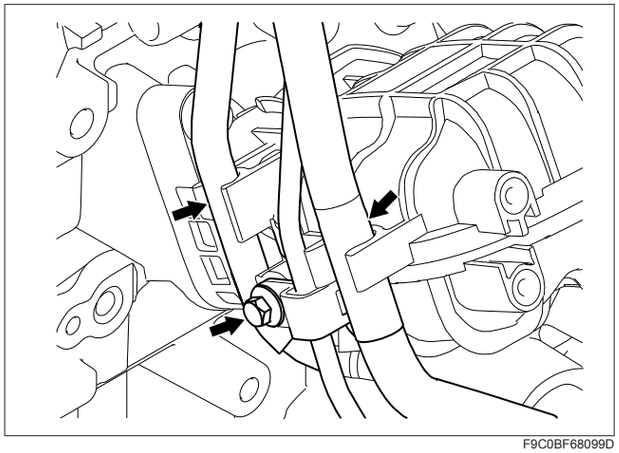
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ℹ Notice

- To prevent the high-pressure connection from becoming loose, special care must be taken during operation. When removing the high-pressure fuel pipe, make sure that no torque acts on the high-pressure connector. If the high-pressure connector is loosened, the entire fuel injector must be replaced.
- Inlet pipes of fuel injector are disposable parts.

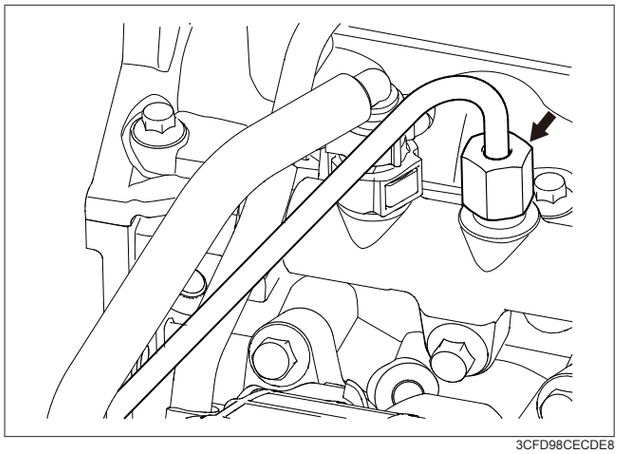
6. Remove soundproofing cover of fuel injector

7. Remove 1 bolt, and disconnect fastener of inlet pipe component of fuel rail to intake manifold



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8. Remove locking nut at high-pressure fuel rail end of fuel rail inlet pipe components

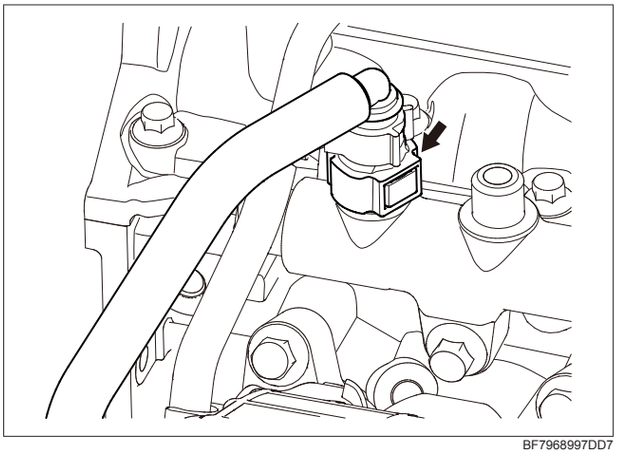


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Notice

- Fuel rail inlet pipes are disposable parts.
- Take care of fuel leakage.

9. Disconnect high-pressure fuel rail end of fuel rail return pipe components

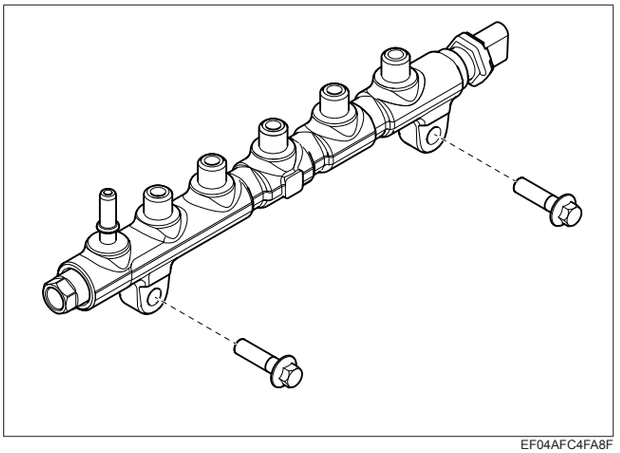


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Notice

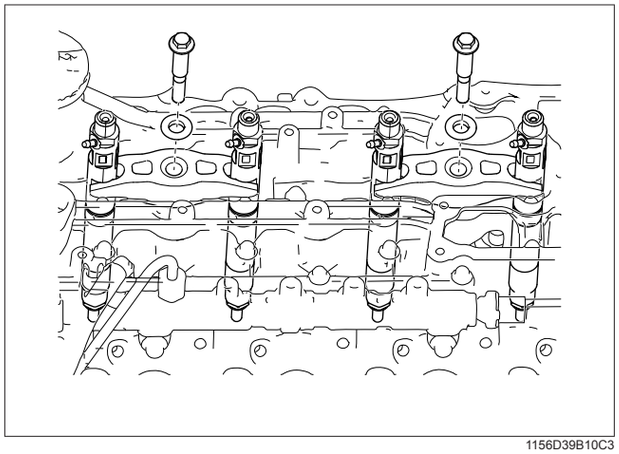
- Cover the fuel rail return pipe component with a plastic bag to prevent damage and contamination.
- After removing fuel rail return pipe component, cover the high-pressure fuel rail assembly with a protective cap immediately.

10. Disconnect harness connector of rail pressure sensor
11. Remove 2 bolts, and remove high-pressure fuel rail assembly



EF04AFC4FA8F

12. Remove 2 hold-down block bolts and remove spherical washer



1156D39B10C3

Notice

› Hold-down block bolts are disposable parts.

13. Remove fuel injector with fuel injector clamp plate from fuel injector hole

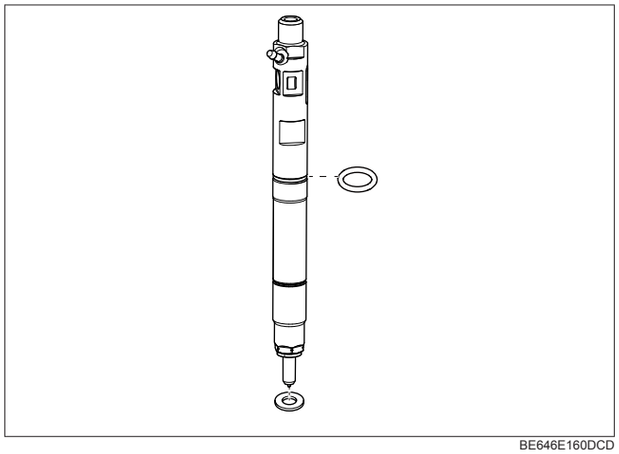
Caution

› Completely remove dirt, particulates and residual liquid in the mounting hole of cylinder head fuel injector, cover fuel injector hole to prevent entering of dirt.

› When removing multiple fuel injectors, always use a water-proof pen to mark distinct cylinder numbers on the fuel injectors and the corresponding high-pressure fuel pipes.

› Make sure that the copper washer does not fall into the hole of cylinder head fuel injector. The seal ring cannot be reused.

14. Remove fuel injector copper washer and O-ring



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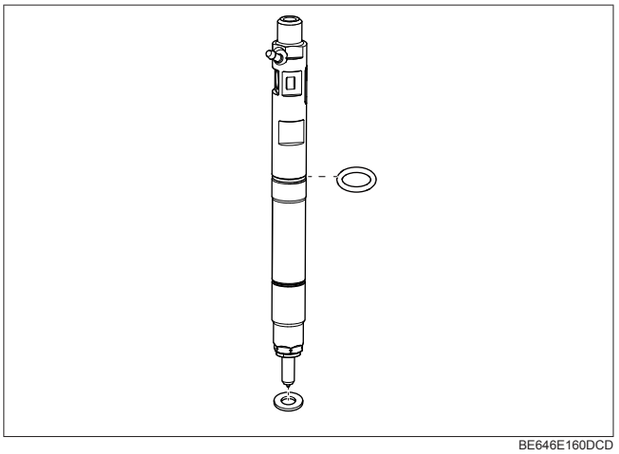
Caution

› Fuel injector copper washer is a disposable part.

› O-ring of fuel injector is a disposable part.

Installation

1. Install new fuel injector copper washer and O-ring



BE646E160DCD

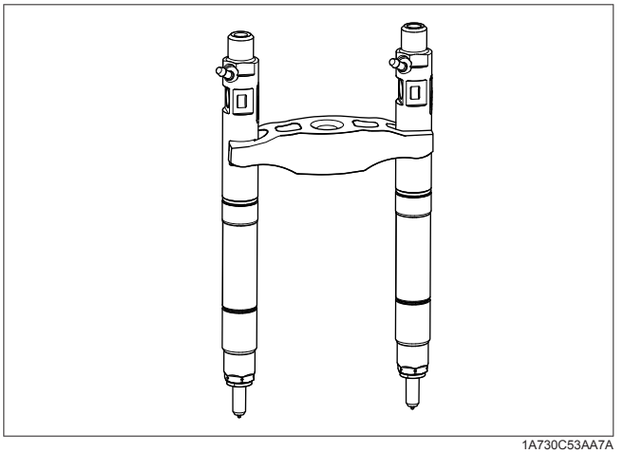
Notice

› When installing fuel injector and high-pressure fuel pipe, make sure which cylinder the fuel injector and high-pressure pipe belong to.

› O-rings must be lightly lubricated with special engine oil or diesel.

› After installation, fuel return pipe nozzle of the fuel injector assembly faces the front intake side of the engine.

2. Snap the two ends of the fuel injector clamp plate into the limit grooves of fuel injector



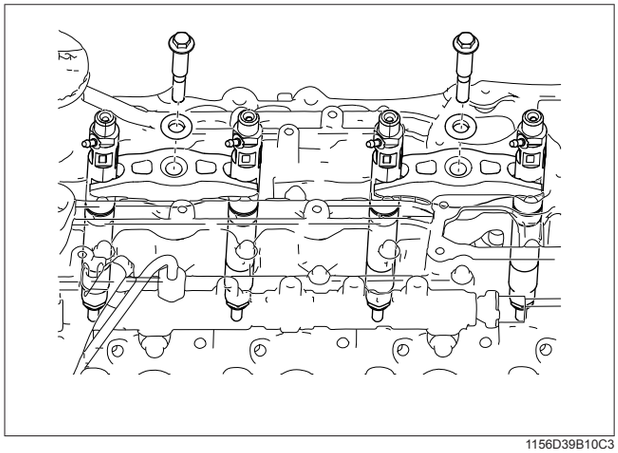
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3. Install 4 fuel injectors and 2 fuel injector clamp plates to the mounting holes of cylinder head fuel injector

⚠ Caution

› After fuel injector is replaced, rewrite the IQA code of the injector replaced into ECU.

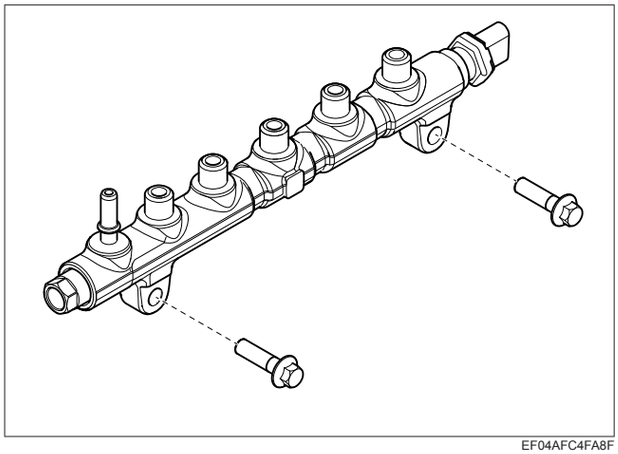
4. Install spherical washer, and tighten 2 new hold-down block bolts



1156D39B10C3

Tightening torque: (30±4) N·m

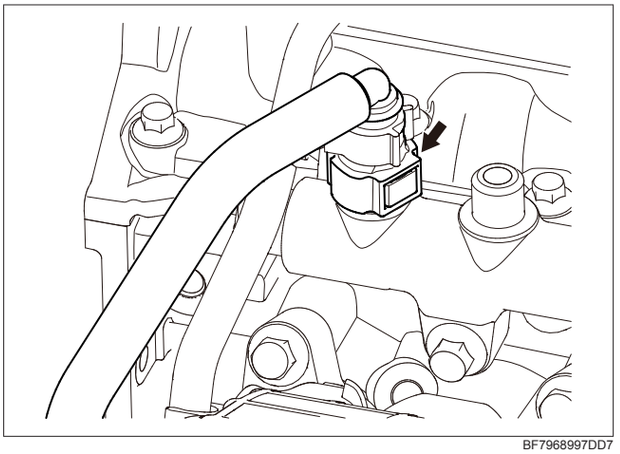
5. Install high-pressure fuel rail, and tighten 2 bolts



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Tightening torque: (24±2) N·m

6. Connect high-pressure fuel rail end of fuel rail return pipe components

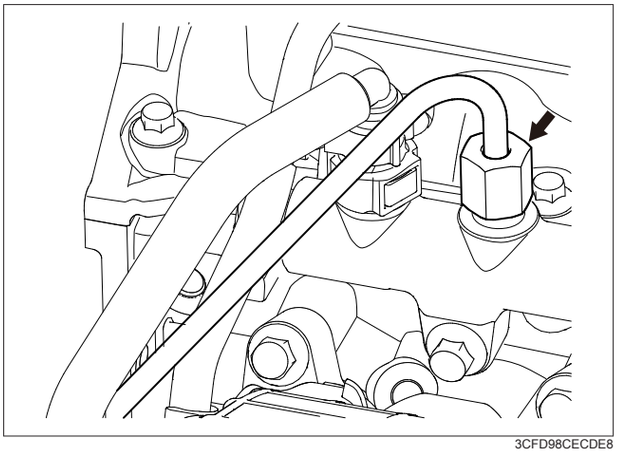


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7. Install new fuel rail inlet pipe components

   Manually insert the ball head part into grooves of high-pressure fuel rail and fuel port of high-pressure fuel pump. After alignment is confirmed, hold the high-pressure fuel rail inlet pipe with one hand, and meanwhile screw the nut to the end by hand.

8. Tighten the locking nut at high-pressure fuel rail end of fuel rail inlet pipe components



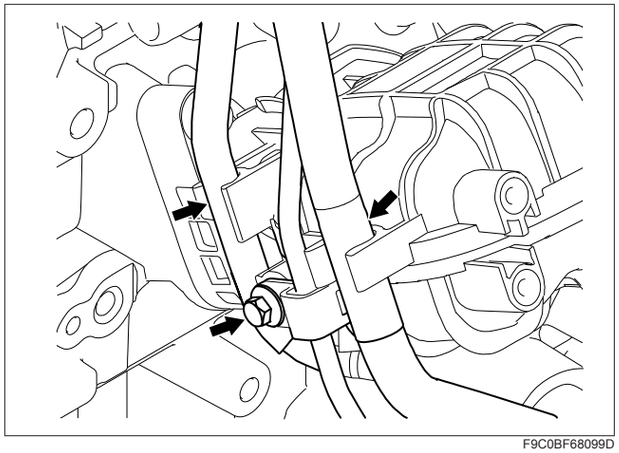
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Tightening torque: (32±3) N·m

⚠ Caution

› When tightening, first tighten the high-pressure fuel pump end, and then tighten the nut at high-pressure fuel rail end.

9. Install fuel rail inlet pipe clamp assembly to fuel rail inlet pipe components, and tighten 1 bolt



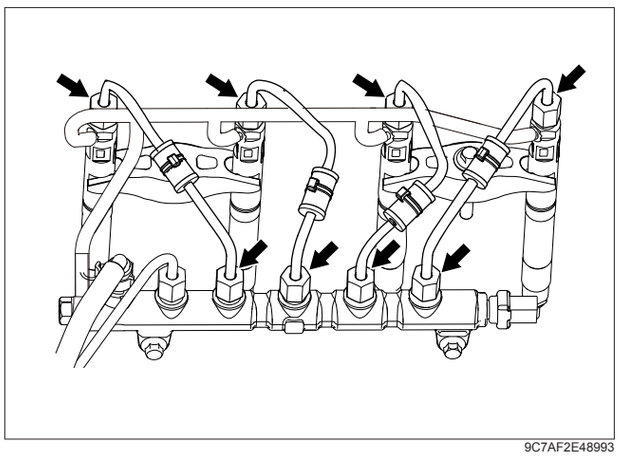
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Tightening torque: (10±1) N·m

10. Install soundproofing cover of fuel injector to its original position
11. Install new inlet pipe component of fuel injector

    Manually insert the ball head part into grooves of fuel injector and outlet of high-pressure fuel rail. After alignment is confirmed, hold the inlet pipe of fuel injector with one hand, and meanwhile screw the nut to the end by hand.

12. Tighten the locking nut for inlet pipe component of fuel injector



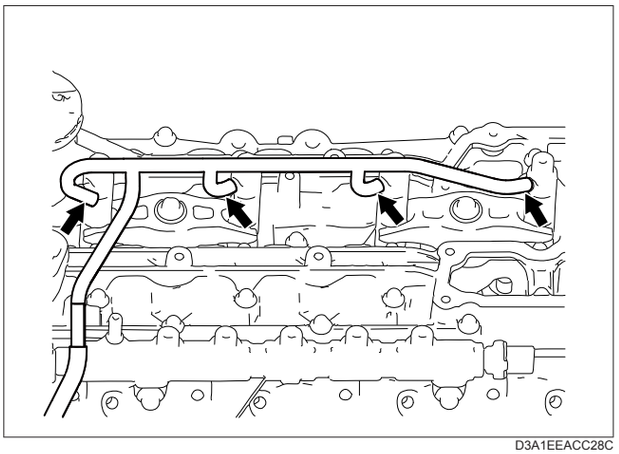
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Tightening torque: (32±3) N·m

⚠ Caution

› When tightening, first tighten the fuel injector end, and then tighten the nut at high-pressure fuel rail end.

13. Install acoustic shield of the high-pressure fuel rail to its original position
14. Connect return pipe of fuel injector



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⚠ Caution

› Move fuel return pipe by hand to check for correct installation.

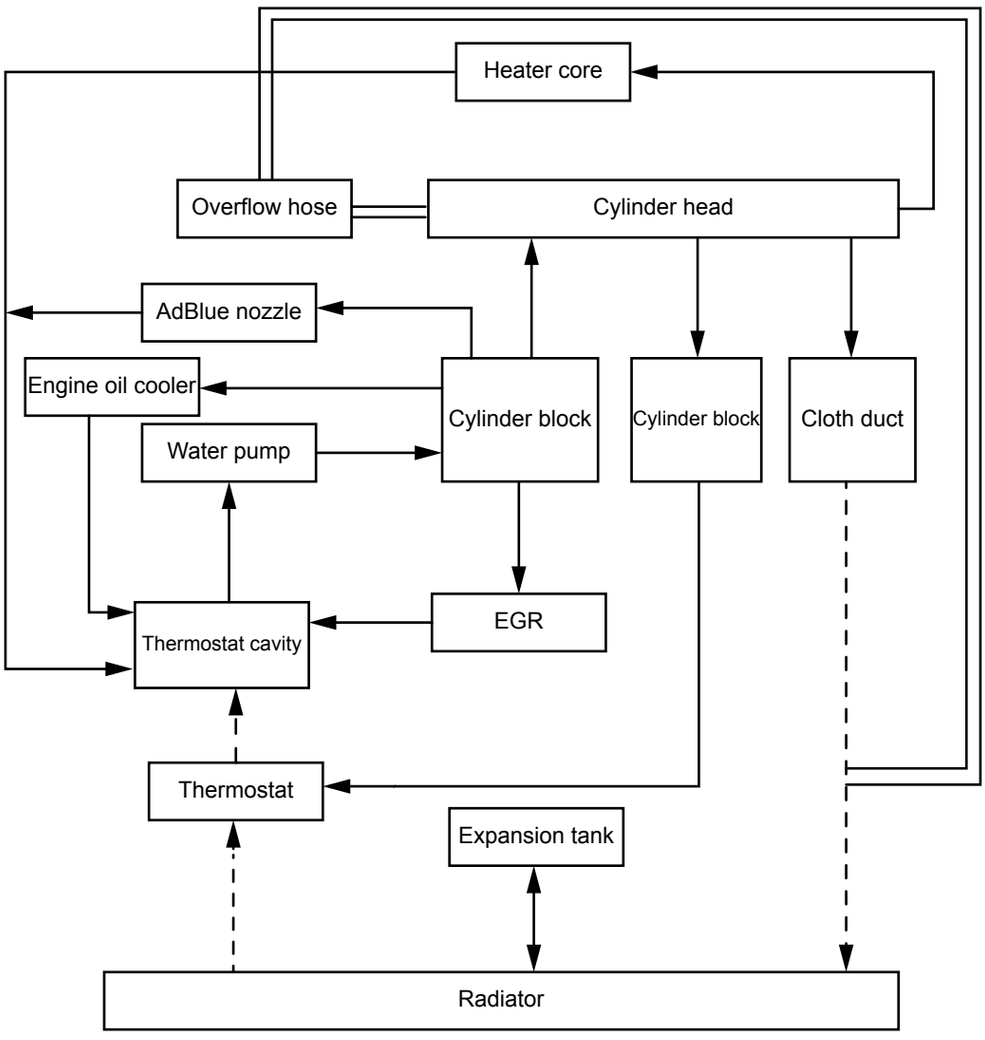
15. Remaining steps are to be performed in reverse order as compared with removal

Cooling system (GW4D20M)

Cooling System .....8－1
Schematic diagram .....8－1
Specified torque .....8－2
Coolant .....8－3
Replacement .....8－3
Overflow tank .....8－5
Removal/installation .....8－5
Water temperature sensor .....8－7
Operating principle .....8－7
Structural diagram .....8－8
Pin definition .....8－9
Check .....8－9
Removal/installation .....8－10
Water pump .....8－11
Structural Diagram .....8－11
Removal/installation .....8－12
Thermostat .....8－14
Structural diagram .....8－14
Specifications .....8－15
Check .....8－16
Removal/installation .....8－17
Radiator fan .....8－19
Operating principle .....8－19
Structural diagram .....8－20
Pin definition .....8－21
Check .....8－21
Removal/installation .....8－22
Radiator .....8－24
Structural diagram .....8－24
Removal/installation .....8－25

Cooling System

Schematic diagram



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Notice

- The arrows in the figure indicate the flow of coolant.
- The solid lines in the figure indicate the cooling water circuit that is conductive in the state of both large and small circulations.
- The dashed lines in the figure indicate the cooling water circuit that is not conductive in small circulation state and conductive after large circulation is started.

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Radiator bracket x upper radiator crossbeam	9±1	2	—
Bolt	Bracket for radiator water outlet pipe x frame	9±1	1	—
Nut	Radiator fan × radiator	6±1	2	—
Bolt	Radiator fan × radiator	6±1	2	—
Bolt	Overflow tank x radiator fan	6±1	3	—
Bolt	Thermostat cap components × cylinder block	10±1	2	—
Bolt	Heater return pipe components x cylinder block	10±1	2	—
M10 bolt	Water pump assembly × cylinder block	45±3	1	—
M8 bolt	Water pump assembly × cylinder block	24±2	4	—
Water temperature sensor	Water temperature sensor × cylinder head	20±2	1	—

Coolant

Replacement

⚠ Warning

› To avoid burns, do not operate while the engine is still at a high temperature.

› To avoid burns, do not screw off the radiator cap when the engine and radiator are still at a high temperature.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

Drain coolant

1. Turn off the ignition switch.
2. Open the radiator cap
3. Raise the vehicle to an appropriate position
4. Remove engine lower guard
5. Connect a rubber hose at the water outlet of the radiator drain switch
6. Open the radiator drain switch
7. Empty engine coolant
8. Drain the engine coolant in the overflow tank

Add coolant

1. Turn off the radiator drain switch
2. Slowly fill the radiator fill port with coolant until it is full

ℹ Notice

› Press the radiator inlet and outlet pipelines several times during the filling process.

› After filling up, wait for a few minutes. If the liquid level drops, add coolant.

3. Tighten the radiator cap
4. Slowly fill the overflow tank with coolant until it is added to the “MAX” position
5. Install overflow tank cover
6. Start the engine and stop immediately
7. After about 30 seconds, remove radiator cap and check the coolant level.
8. Repeat steps 6 and 7 until the liquid level no longer drops
9. Install radiator cap
10. Check that the overflow tank level is at “MAX”
    - › If it is below the “MAX” position, fill the coolant until the liquid level is at “MAX”
    - › If it is above the “MAX” position, drain the coolant until the liquid level is at “MAX”
11. Start the engine, warm up until the thermostat is turned on, then continue to run for a few minutes

⚠ Warning

› Protective gloves must be worn to prevent burns.

› Be careful with the radiator fan, as the radiator fan may start at any time during warm-up.

⚠ Caution

› If the overflow tank becomes empty during warm-up, stop the engine immediately.

› Attention should be paid to the coolant temperature when warming up to ensure that the engine does not experience abnormally high temperatures.

ℹ Notice

› Press the radiator inlet and outlet pipelines several times during the warm-up process.

12. Stop the engine and wait for the engine coolant temperature to drop to room temperature
13. Open the radiator cap and check the coolant level
    - › If the coolant level drops, fill the coolant and perform steps 9, 10, 11, 12, 13
    - › If the coolant level does not drop, proceed to the next step.
14. Check that the overflow tank level is at “MAX”
    - › If it is below the “MAX” position, fill the coolant until the liquid level is at “MAX”

› If it is above the “MAX” position, drain the coolant until the liquid level is at “MAX”

15. Check for coolant leaks

Overflow tank

Removal/installation

Removal

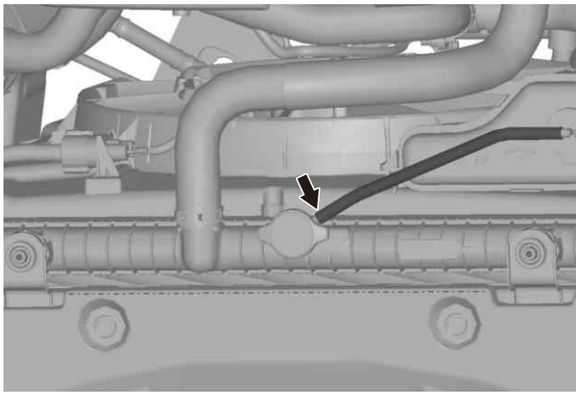
⚠ Warning

› To avoid burns, do not remove the overflow tank cover when the engine and radiator are still at a high temperature.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Check that the engine is cooled
2. Disconnect inlet pipe of overflow tank

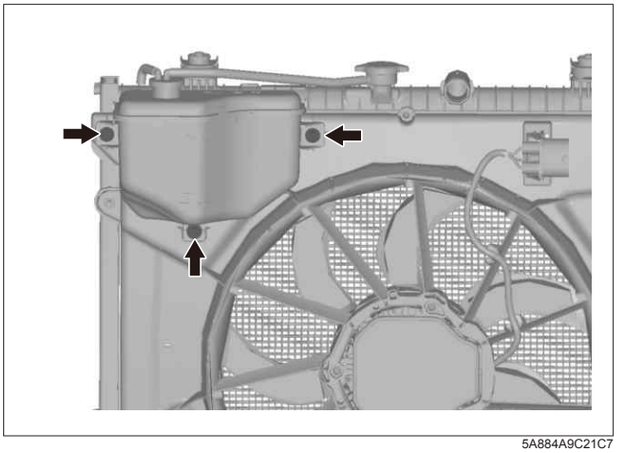


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⚠ Caution

› After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

3. Remove 3 bolts



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4. Remove overflow tank
5. Pour coolant into a clean container from overflow tank

Installation

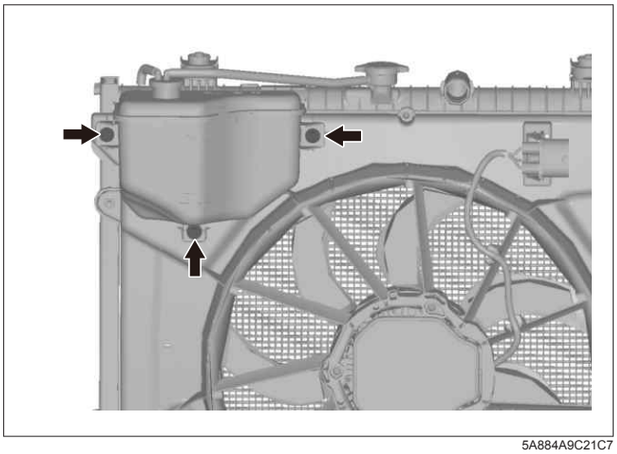
⚠ Warning

› To avoid burns, do not remove the overflow tank cover when the engine and radiator are still at a high temperature.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

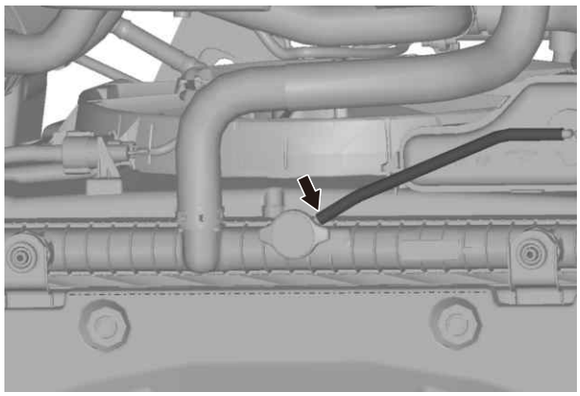
› According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Install overflow tank to proper position
2. Install 3 bolts



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3. Install intake pipe of overflow tank



B7C3C5DA1E66

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

4. Fill overflow tank with an appropriate amount of coolant

ℹ Notice

› Coolant level is between the upper and lower scale marks of overflow tank.

Water temperature sensor

Operating principle

The water temperature sensor is used to monitor the temperature of the engine coolant, which outputs resistance signal so that the electronic system judges engine operating conditions.

Engine control module supplies 5 V reference voltage to sensor, and voltage increases at cold state and drops at hot state. Through voltage variation measurement, engine control module can determine engine coolant temperature. The sensor is of vital importance for corrected value of ignition timing and volume of fuel injection.

And the signal is also transmitted to instrument through CAN network for displaying current engine operating temperature.

Fault description: abnormal water temperature indication, difficult startup, and constant working of the fan.

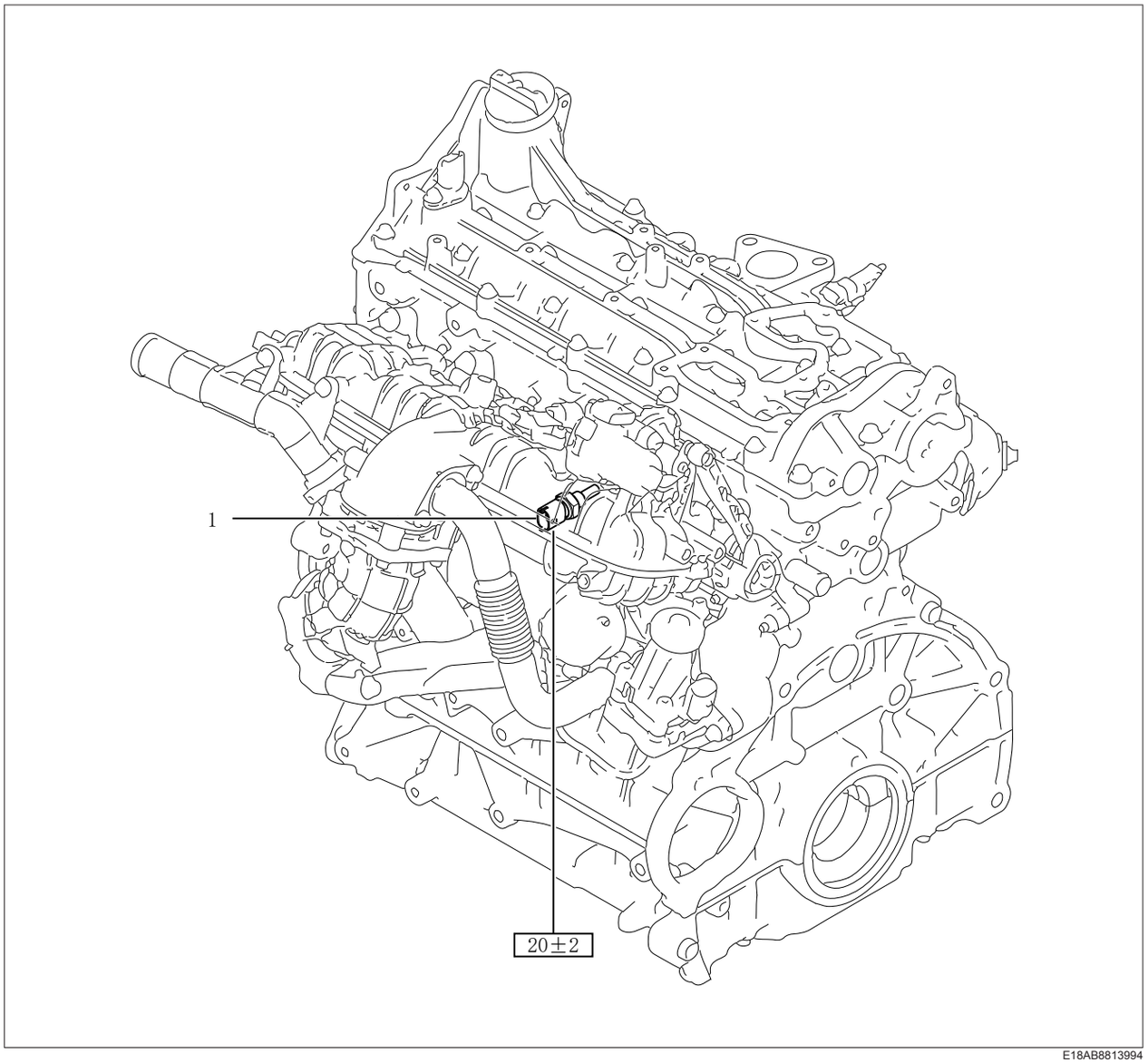
Common causes of failure:

- Abnormal high voltage or large current when in use.
- Sensor housing damaged in repair, and water enters the sensor.

Precautions for repair:

- When replacing the sensor due to a fault detected, check that the voltage and current are normal.

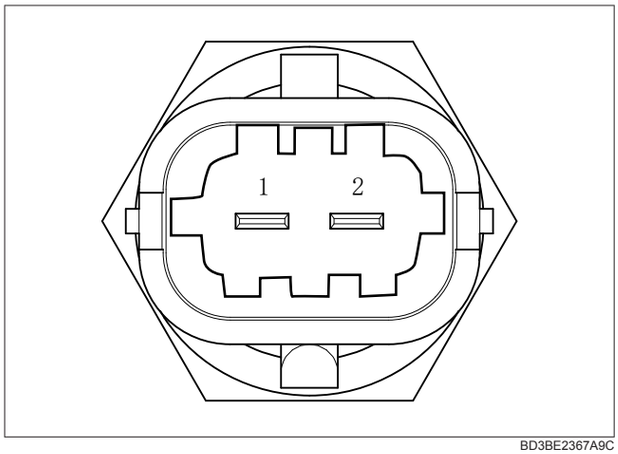
Structural diagram



E18AB8813994

1. Water temperature sensor

Pin definition



BD3BE2367A9C

Pin No.	Function
1	GND
2	Sensor signal

Check

1. Place ignition switch at OFF position (if preceding state of ignition switch is ON, after it is at OFF position, wait at least 2 min before subsequent operation to avoid plug and pull at live state)
2. Pull out water temperature sensor harness connector
3. Measure resistance between water temperature sensor pins

Temperature (℃)	Resistance (Ω)
-10	8642～10152
0	5466～6326
20	2351～2649
80	313～332
90	237～250
100	182～191

Notice

- If it is not within the specified range, it needs to replace the water temperature sensor.
- When using water to test the resistance of water temperature sensor, it is not allowed to drop water onto the sensor pins.
- After the test is completed, wipe and dry the sensor.

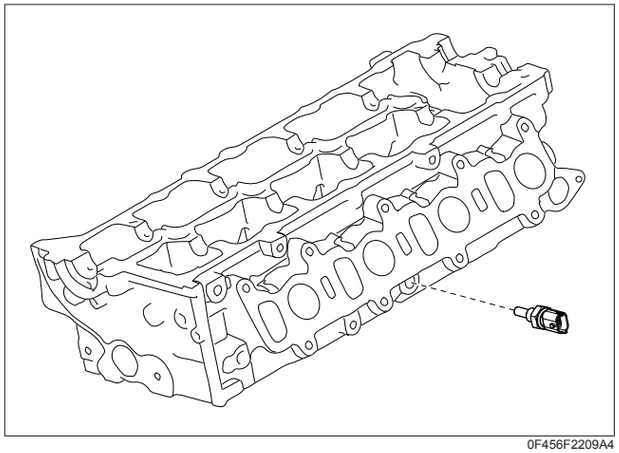
Removal/installation

Removal

⚠ Warning

- To avoid burns, do not operate while the engine is still at a high temperature.
- If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty engine coolant
4. Remove electronic throttle
5. Remove connecting pipe for intake manifold
6. Disconnect sensor harness plug
7. Remove water temperature sensor



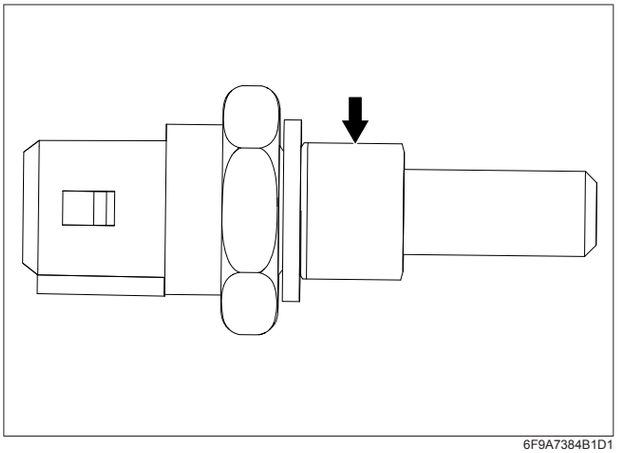
0F456F2209A4

ℹ Notice

- Replace the sensor or actuator if they were knocked or dropped.

Installation

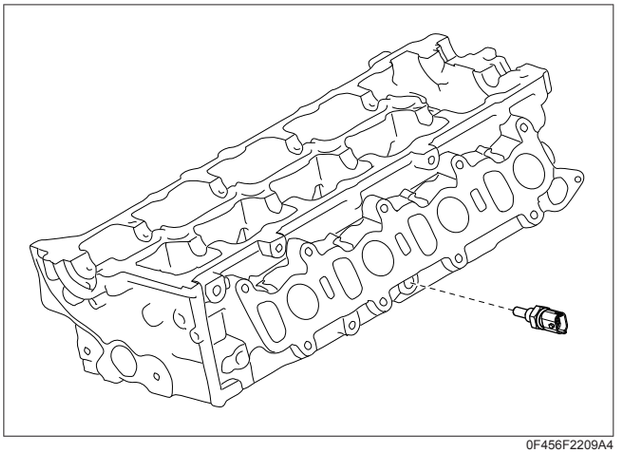
1. Apply sealant on water temperature sensor threads



6F9A7384B1D1

Type: Tonsan 1243 anaerobic thread locking sealant

2. Fix water temperature sensor to cylinder head



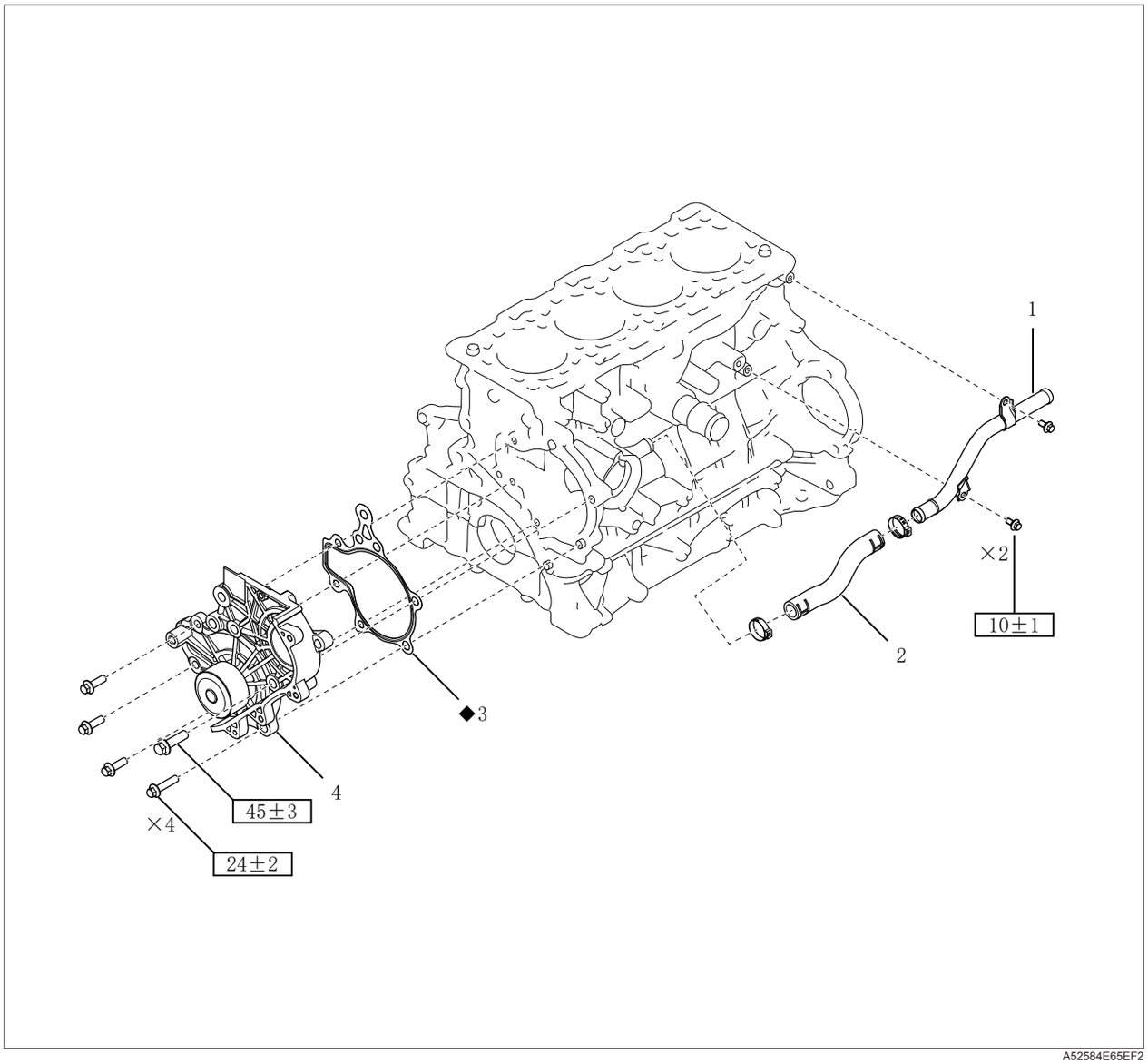
0F456F2209A4

Tightening torque: (20±2) N·m

3. Connect sensor harness plug
4. Install connecting pipe for intake manifold
5. Install electronic throttle
6. Connect negative terminal of the battery
7. Add engine coolant
8. Start the engine and check for leaks

Water pump

Structural Diagram



A52584E65EF2

1. Heater return pipe components
2. Connecting hose of heater return pipe
3. Water pump gasket
4. Water pump assembly

Removal/installation

Removal

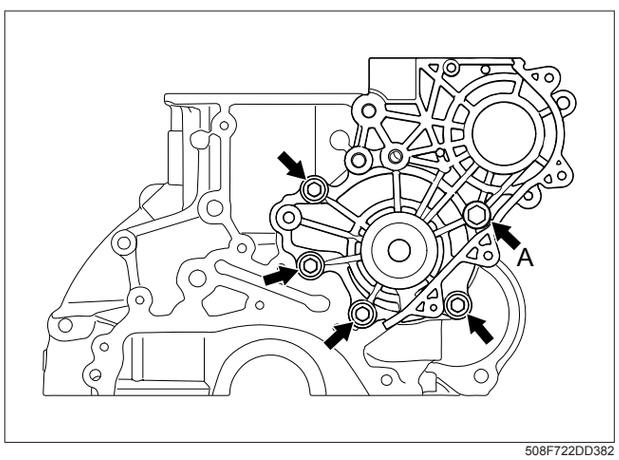
⚠ Warning

› To avoid burns, do not operate while the engine is still at a high temperature.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty engine coolant
4. Remove generator belt
5. Remove timing cover
6. Remove timing belt
7. Remove rear timing cover component
8. Remove timing idler and timing idler bracket with large timing idler component
9. Remove high-pressure fuel pump
10. Remove 5 bolts, and remove water pump assembly and water pump gasket



508F722DD382

ℹ Notice

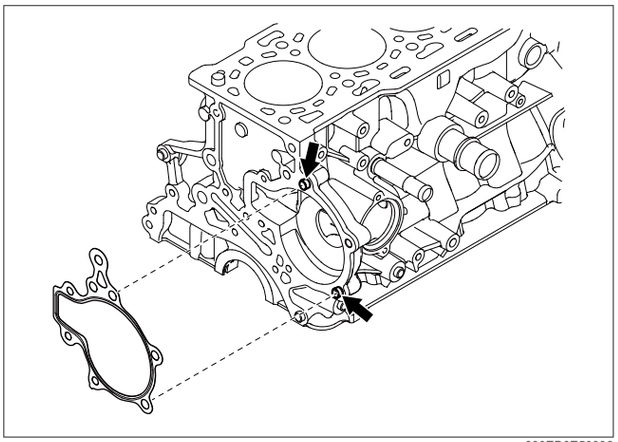
› Water pump gaskets are disposable parts.

Installation

⚠ Caution

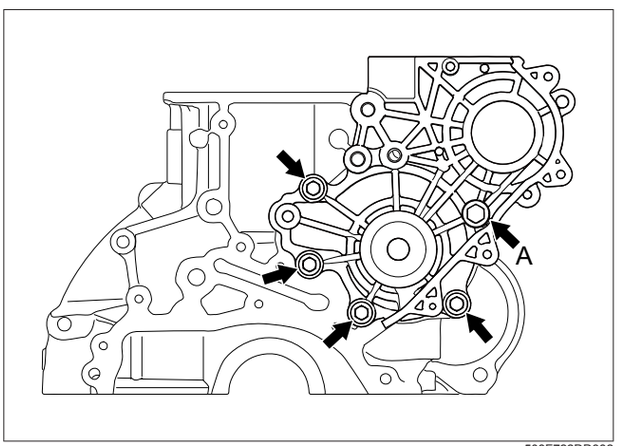
› Tighten the fastener according to the specified torque value.

1. Install a new water pump gasket corresponding to alignment sleeve



890EB6E50392

2. Install water pump assembly to the front of cylinder block corresponding to alignment sleeve
3. Tighten 5 bolts



508F722DD382

Tightening torque of M8 bolt: (24±2) N·m

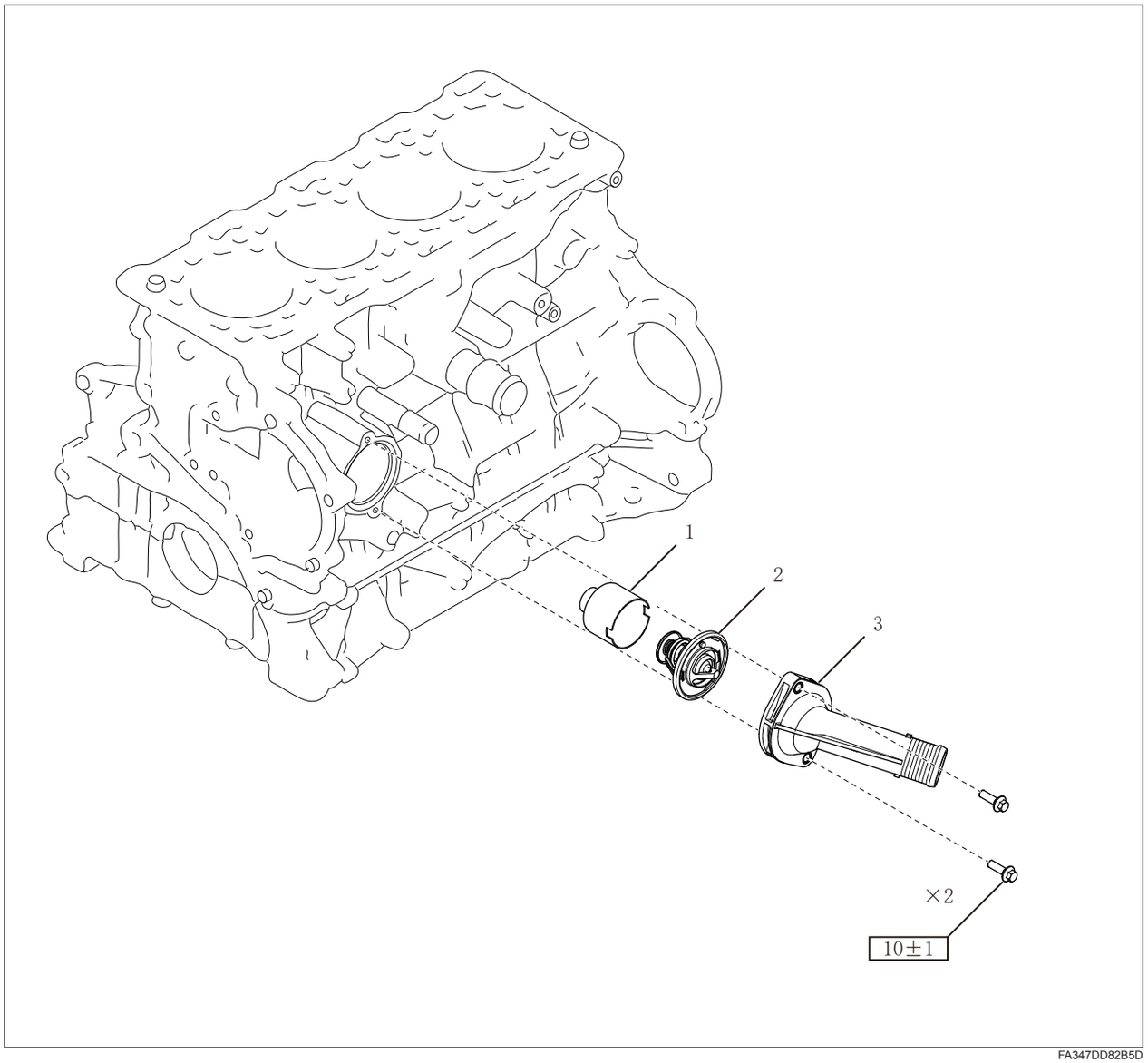
Tightening torque of M10 bolt A: (45±3) N·m

4. Turn water pump belt pulley after installation to make sure it is flexible without jamming
5. Install high-pressure fuel pump
6. Install timing idler and timing idler bracket with large timing idler component
7. Install rear timing cover component
8. Install timing belt

9. Install timing cover
10. Install generator belt
11. Install negative terminal of the battery
12. Add engine coolant

Thermostat

Structural diagram



FA347DD82B5D

1. Thermostat hood
2. Thermostat assembly
3. Thermostat cap components

Specifications

Standard for thermostat

Item	Parameter
Temperature when thermostat is just opened	(76±2)℃
Temperature when thermostat is fully open	88℃
Lift when thermostat is fully open	≥8.5mm

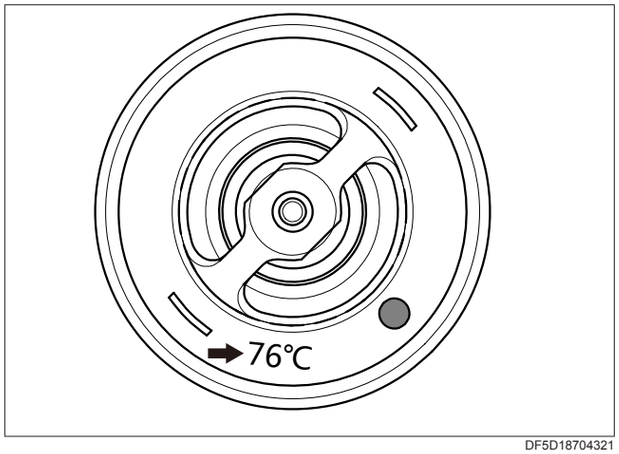
Check

1. Check the thermostat cap components for deformation or cracks

Notice

› If damaged, replace the thermostat cap components.

2. Check the valve opening temperature marked on the thermostat



DF5D18704321

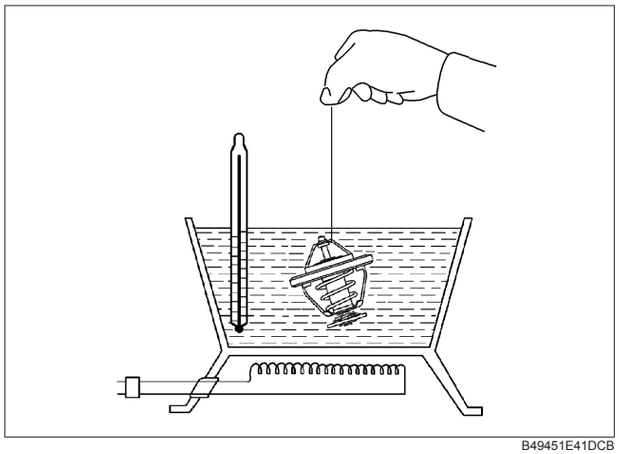
Valve opening temperature: (74~78)℃

3. Immerse the whole thermostat in the coolant and slowly heat the water

Caution

› Do not heat the thermostat directly.

4. Inspect the thermostat valve opening temperature by observing the temperature change indicated by the thermometer in the coolant

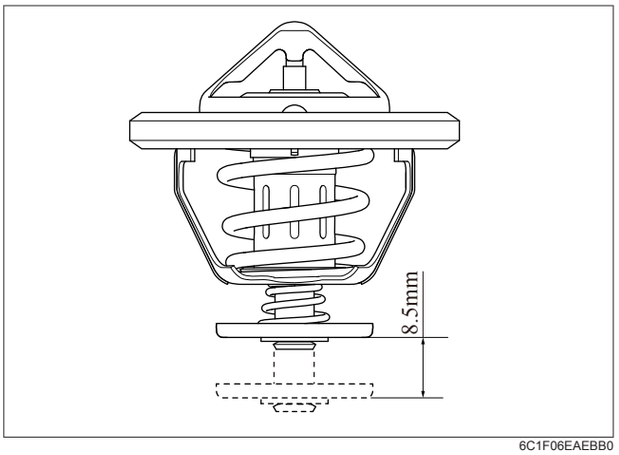


B49451E41DCB

Notice

› If the valve opening temperature does not meet the requirements, replace the thermostat.

5. Check the valve lift



6C1F06EAEBB0

Valve lift: at least 8.5 mm at temperatures above 88℃

Notice

› If thermostat valve lift does not meet the requirements, replace the thermostat.

6. Check if the valve is closed when the temperature is below the thermostat opening temperature (74℃)

Notice

› If thermostat valve is not closed, replace the thermostat.

7. Check if the rubber sealing ring of the thermostat is aged and deformed

Notice

› If seal rings of thermostat degraded or deformed, replace the thermostat.

Removal/installation

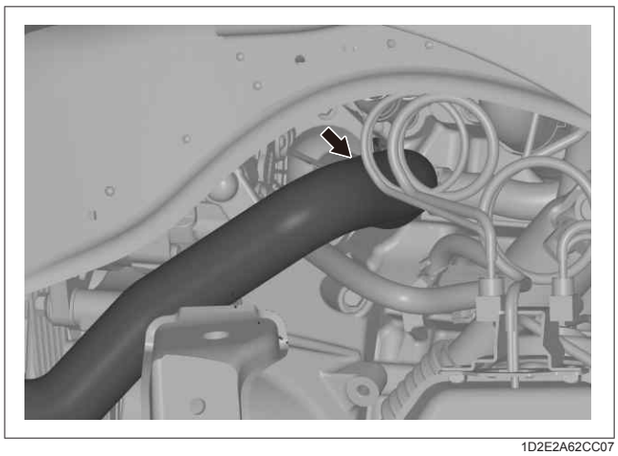
Removal

⚠ Warning

› To avoid burns, do not operate while the engine is still at a high temperature.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Empty engine coolant
2. Disconnect radiator water outlet hose

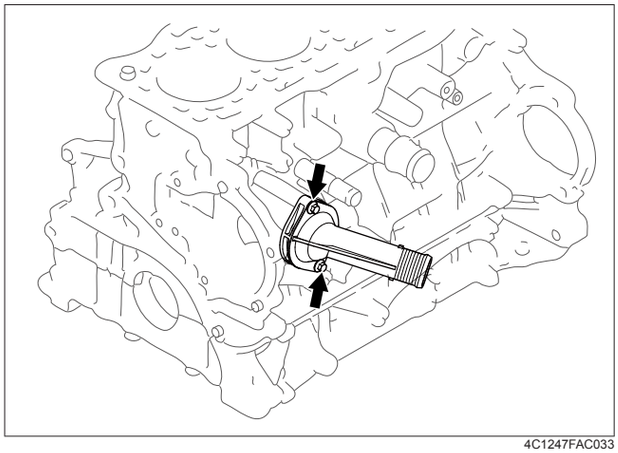


1D2E2A62CC07

⚠ Caution

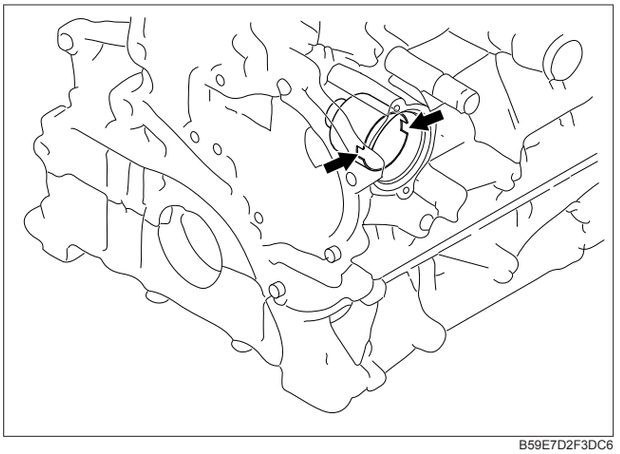
› The disconnected pipelines and joints must be protected from entering debris.

3. Remove 2 bolts, and remove thermostat cap



4C1247FAC033

4. Take out thermostat assembly from thermostat hood on intake side of cylinder block
5. Check that the notch of thermostat hood is in a horizontal position



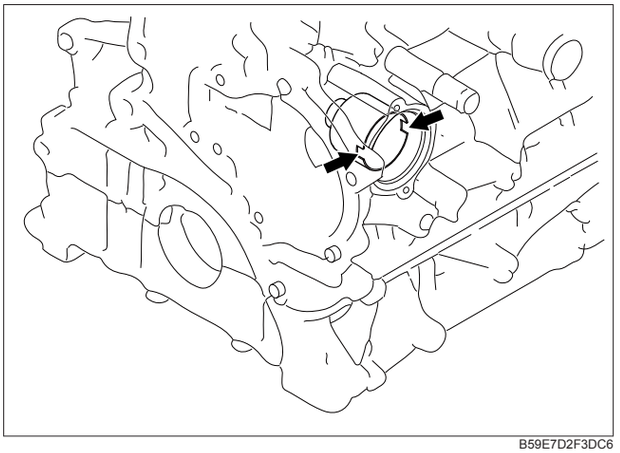
B59E7D2F3DC6

Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

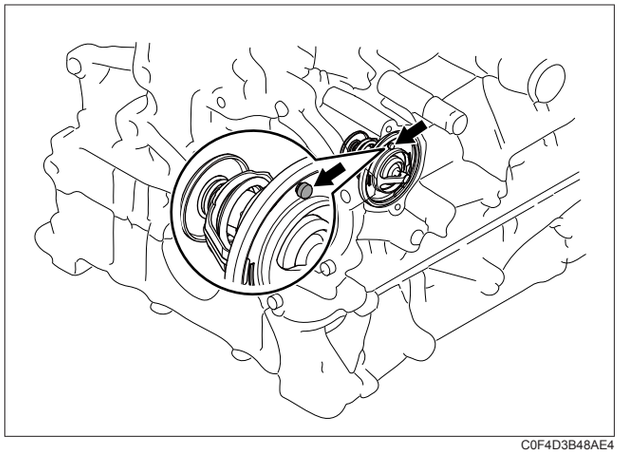
1. Clean thermostat cavity on intake side of cylinder block
2. Check that the notch of thermostat hood is in a horizontal position



B59E7D2F3DC6

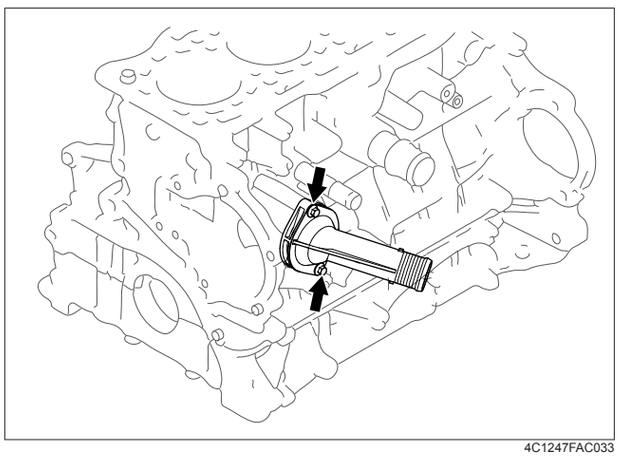
3. Install thermostat assembly into the thermostat hood of cylinder block, and make sure it is installed with thermostat bracket aligned with the notch on thermostat hood

4. Check that thermostat bleed valve is facing the upper part of the engine



C0F4D3B48AE4

5. Install thermostat cap, and tighten 2 bolts



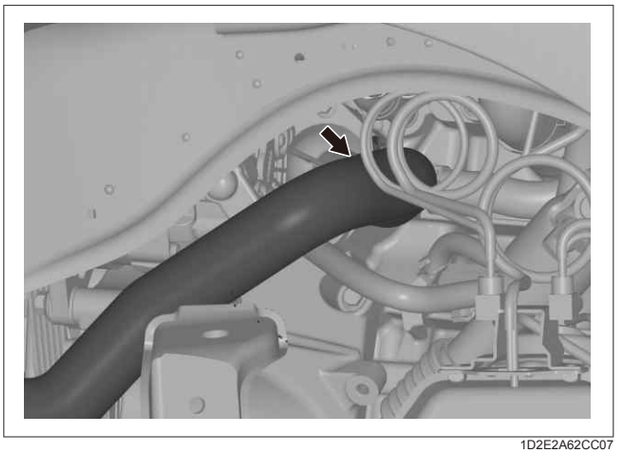
4C1247FAC033

Tightening torque: (10±1) N·m

Notice

- The pipe nozzle of thermostat cap should face the lower part of the engine rear end.
- After the thermostat cap is installed on the mounting surface, it shall never be removed to prevent the seal ring from being squeezed after the thermostat is removed, resulting in poor tightness and water leakage.

6. Install radiator water outlet hose



1D2E2A62CC07

Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, ensure that the pipeline joint is securely connected.

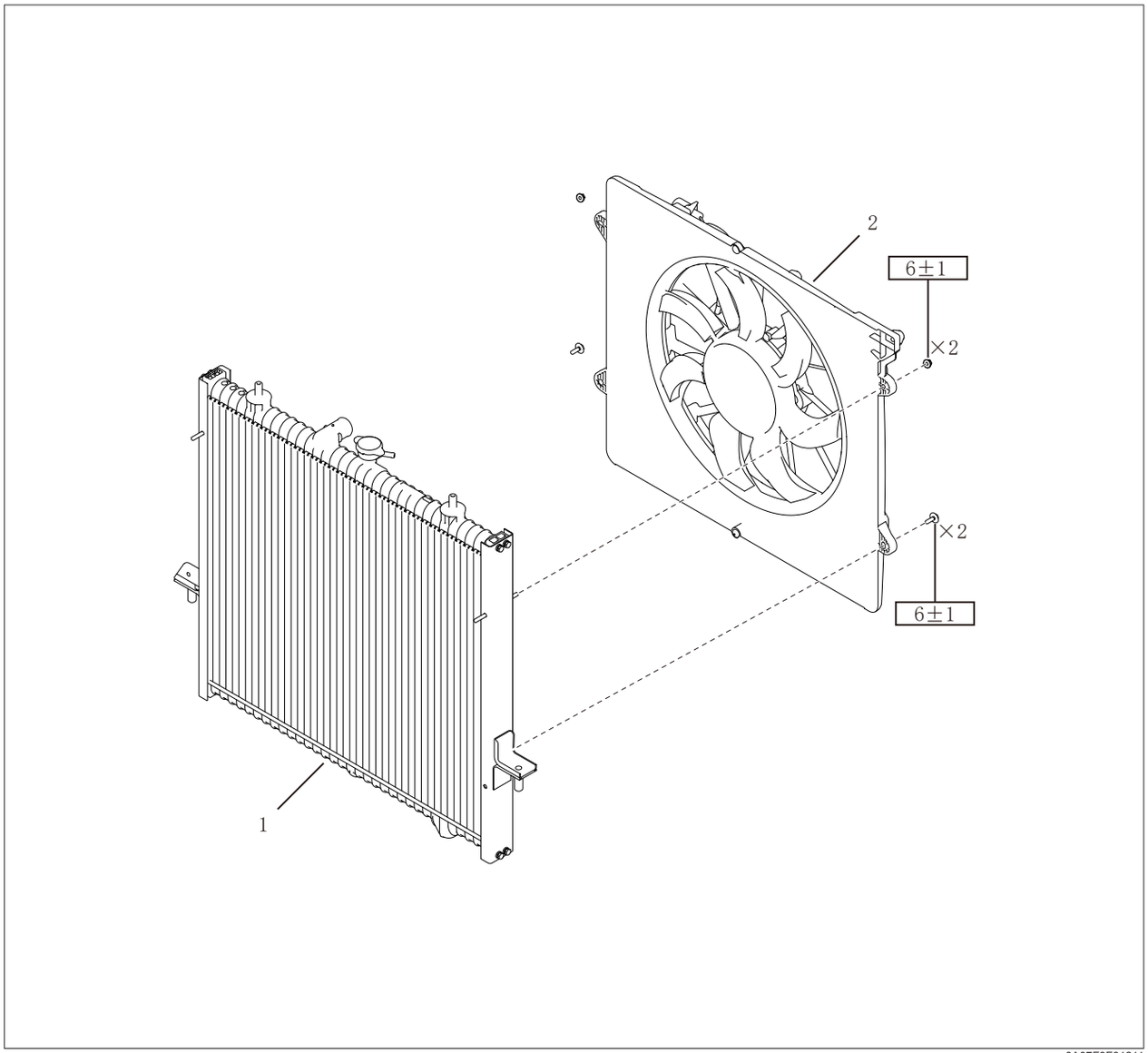
7. Add engine coolant

Radiator fan

Operating principle

The fan is a brushless motor with a PWM stepless speed regulating fan, and the engine ECU adjusts the fan speed by adjusting the PWM signal input by the fan. The fan has a fault feedback function. When the fan rotates, it sucks in air to pass through the radiator to speed up the cooling of the coolant.

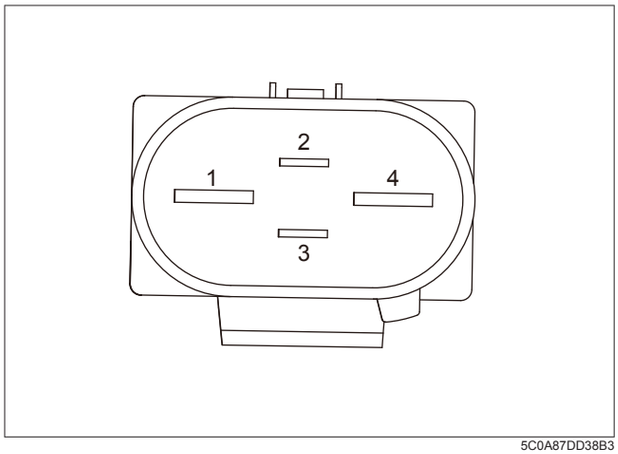
Structural diagram



0A07F9F31211

1. Radiator
2. Radiator fan

Pin definition



5C0A87DD38B3

Pin No.	Function
1	Power supply
2	Ignition switch signal
3	PWM signal
4	GND

Check

1. Check if PWM signal line is short-circuited to ground or open-circuited
2. Check whether A/C pressure and water temperature sensor are faulty
3. Check whether the battery voltage is normal
4. Check fan fuse for damage
5. Check whether harness connector is connected into place
6. Check whether harness connector is energized
7. Check whether A/C pressure, transmission oil temperature and water temperature sensors are faulty
8. Check whether surrounding parts interferes with fan blade
9. Check if there is foreign object in the fan and if fan blade is damaged
10. Check whether there is interference between blade, cover and motor motion

Removal/installation

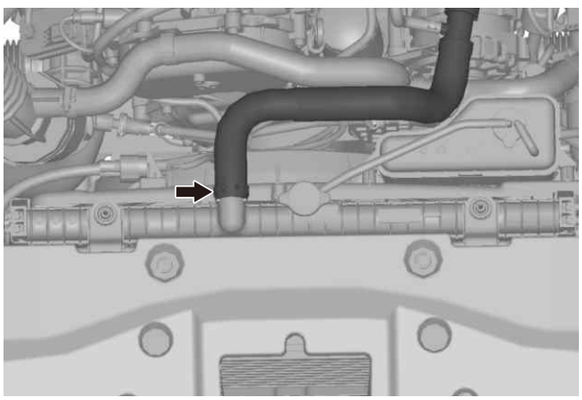
Removal

⚠ Warning

› To avoid burns, do not remove the overflow tank cover when the engine and radiator are still at a high temperature.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty engine coolant
4. Disconnect radiator inlet pipe

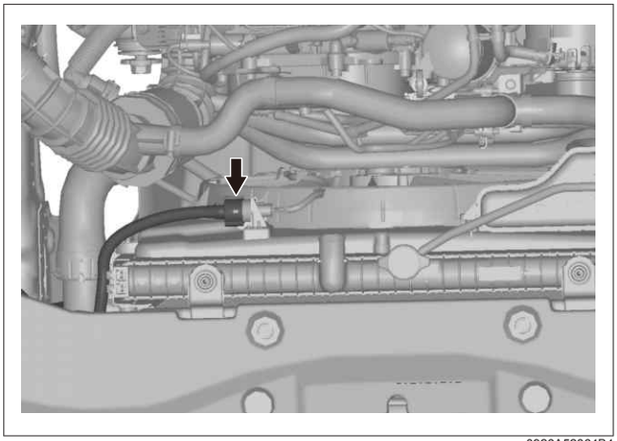


26A7638086C3

⚠ Caution

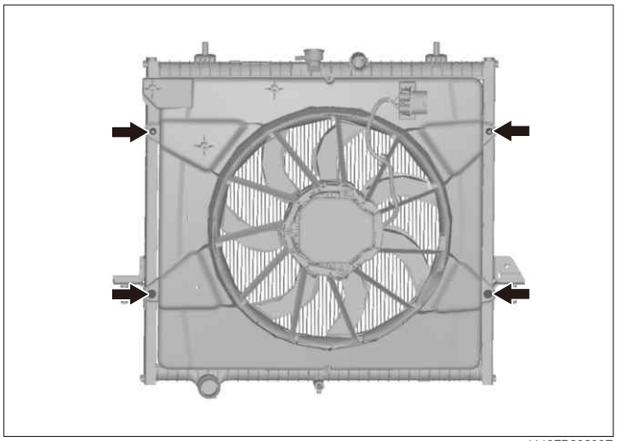
› After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

5. Remove overflow tank
6. Disconnect radiator fan connector



0926A52864B4

7. Disconnect upper harness fixing points of radiator fan
8. Remove 2 bolts and 2 nuts



4148FB28230E

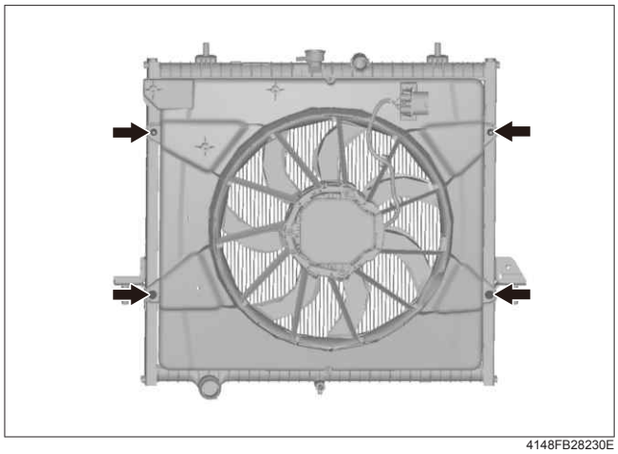
9. Remove radiator fan

Installation

⚠ Caution

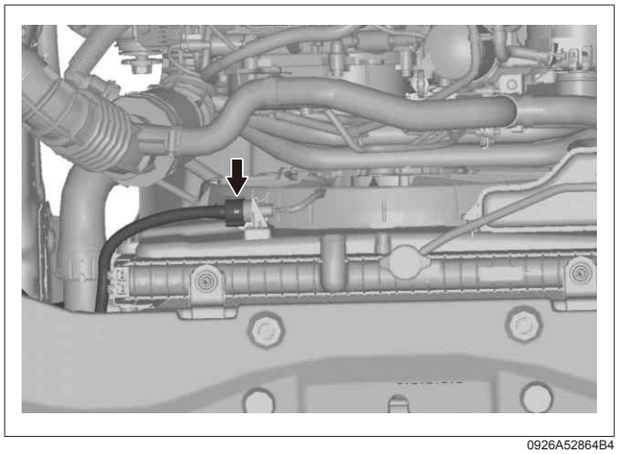
› Tighten the fastener according to the specified torque value.

1. Install 2 bolts and 2 nuts



4148FB28230E

2. Install upper harness fixing points of radiator fan
3. Install connectors of radiator fan

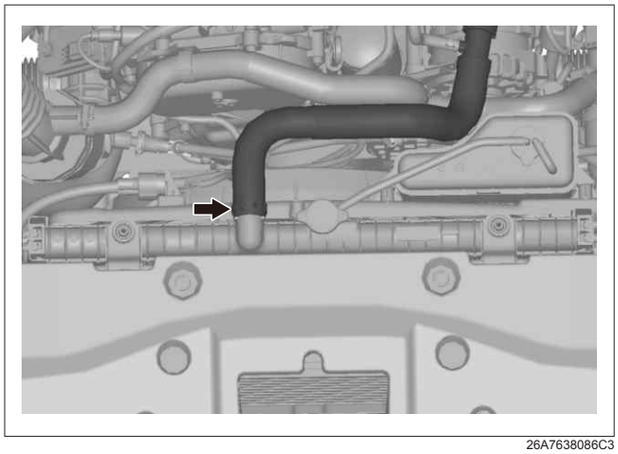


0926A52864B4

⚠ Caution

Before installing the connector, check that the connector terminals are intact.

4. Install overflow tank
5. Install radiator inlet pipe

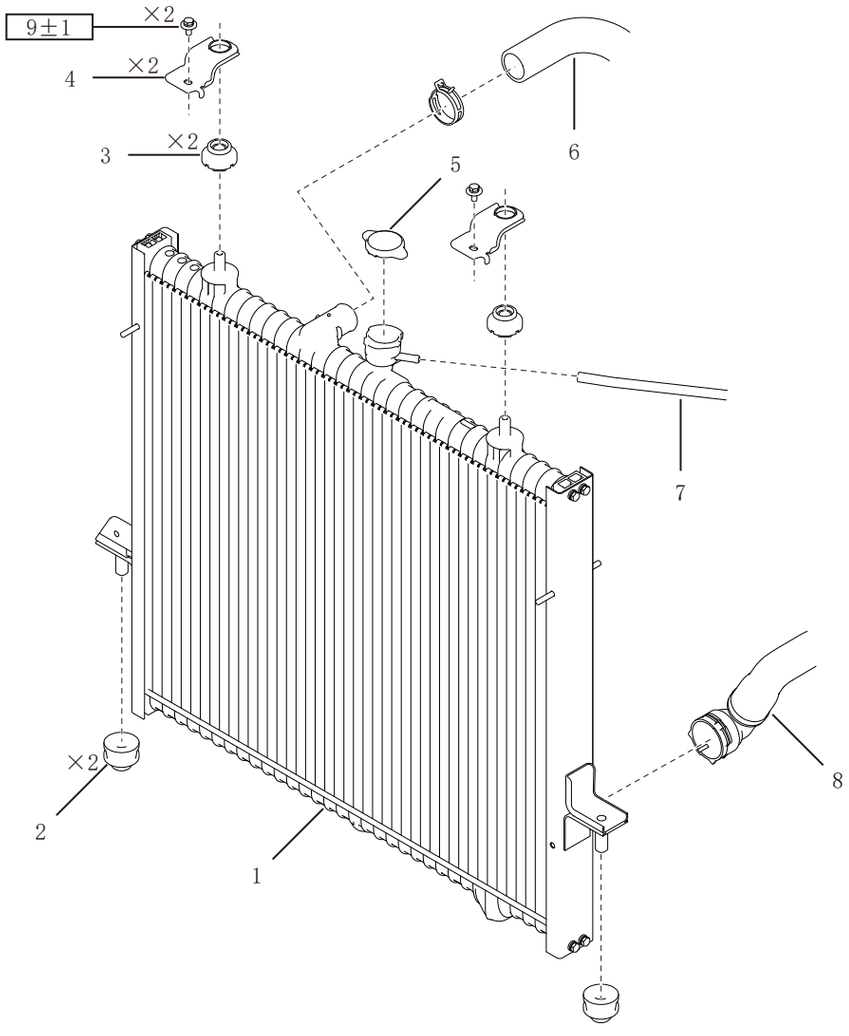


26A7638086C3

6. Connect negative terminal of the battery
7. Fill engine coolant and check if there is coolant leakage

Radiator

Structural diagram



2E089B457258

1. Radiator
2. Radiator lower mount
3. Radiator upper mount
4. Radiator bracket
5. Radiator filler cap
6. Radiator inlet pipe
7. Radiator gas bleeding pipe
8. Radiator water outlet pipe

Removal/installation

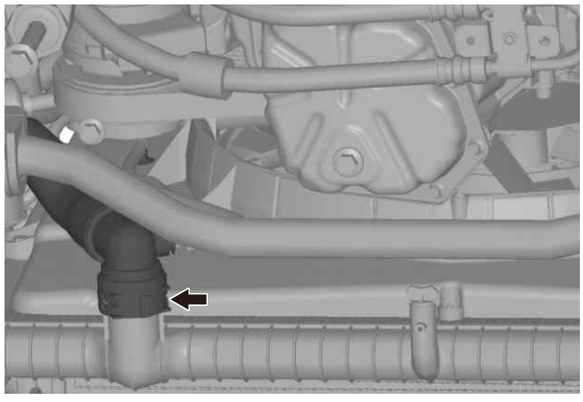
Removal

⚠ Warning

› To avoid burns, do not remove the overflow tank cover when the engine and radiator are still at a high temperature.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove front bumper
4. Remove engine lower guard
5. Empty engine coolant
6. Disconnect radiator water outlet pipe

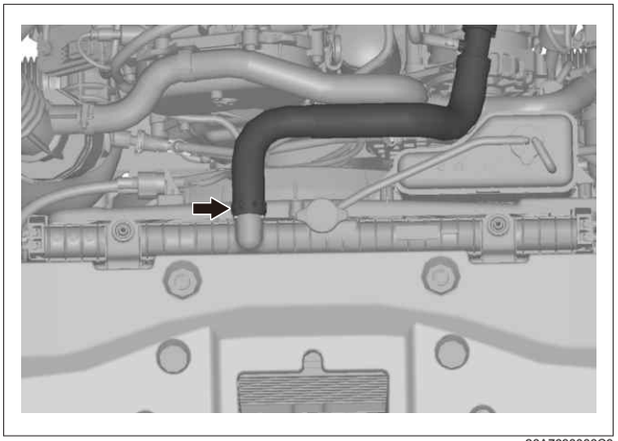


8C761C27382A

⚠ Caution

› After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

7. Disconnect radiator inlet pipe

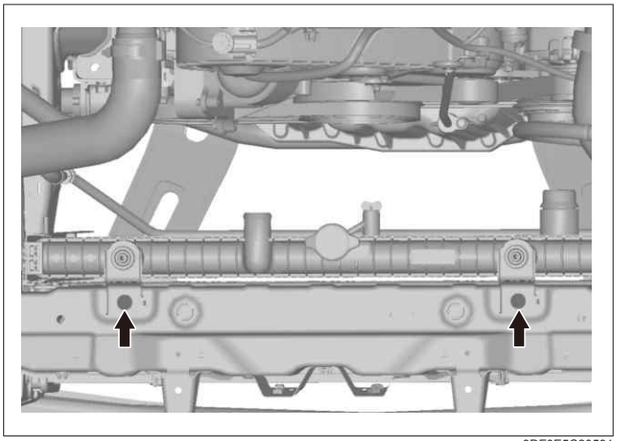


26A7638086C3

⚠ Caution

› After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

8. Remove overflow tank
9. Remove radiator fan
10. Remove 2 bolts and 2 nuts for condenser
11. Remove 2 bolts



9DF0E5C20591

12. Remove upper radiator mounting bracket
13. Remove radiator

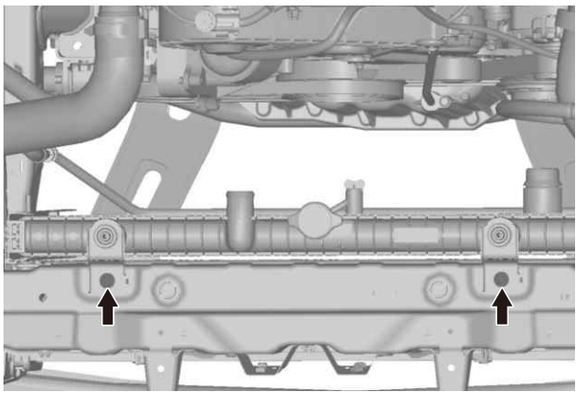
Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

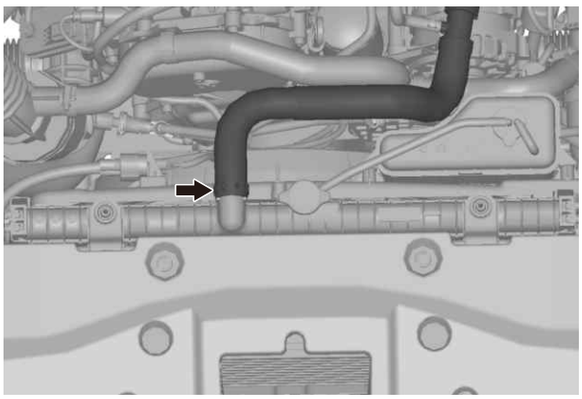
1. Install radiator
2. Install upper radiator mounting bracket

3. Install 2 bolts



9DF0E5C20591

4. Install 2 bolts and 2 nuts for condenser
5. Install radiator fan
6. Install overflow tank
7. Install radiator inlet pipe



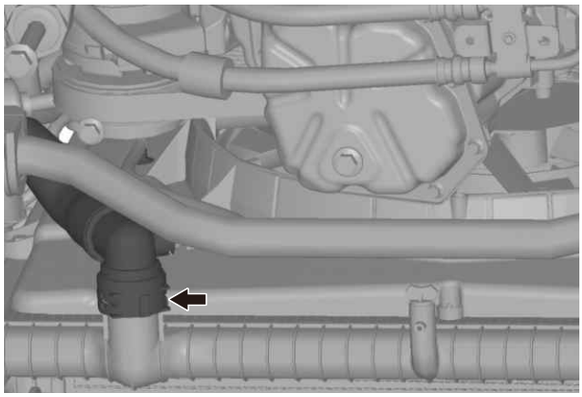
26A7638086C3

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

8. Connect radiator water outlet pipe



8C761C27382A

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, ensure that the pipeline joint is securely connected.

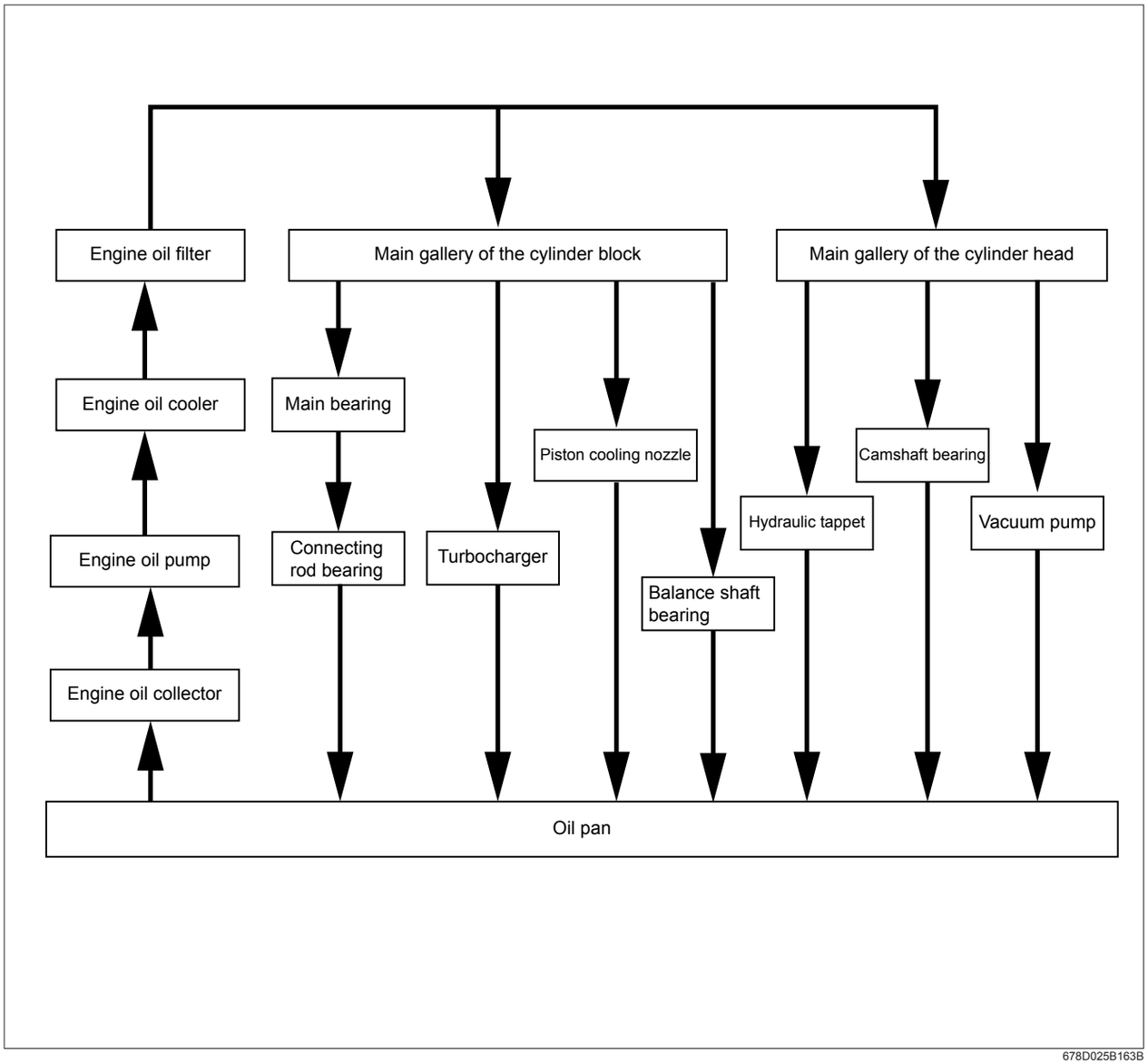
9. Install engine lower guard
10. Install front bumper
11. Connect negative terminal of the battery
12. Fill engine coolant and check if there is coolant leakage

Lubrication system (GW4D20M)

Lubrication system .....9－1
Schematic diagram .....9－1
Specified torque .....9－2
Engine oil and engine oil filter .....9－3
Engine oil level inspection .....9－3
Oil pressure inspection .....9－4
Replacement .....9－5
Engine oil pressure alarm .....9－7
Operating principle .....9－7
Structural diagram .....9－8
Pin definition .....9－9
check .....9－9
Removal/installation .....9－10
Oil pan .....9－12
Structural diagram .....9－12
Removal/installation .....9－13
Engine oil pump (6MT) .....9－16
Operating principle .....9－16
Structural diagram .....9－17
Removal/Installation of .....9－18
Engine oil pump (8AT) .....9－22
Operating principle .....9－22
Structural diagram .....9－23
Removal/Installation of .....9－24
Engine oil cooler .....9－27
Structural diagram .....9－27
Removal/installation .....9－28

Lubrication system

Schematic diagram



678D025B163B

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Engine oil cooler assembly x engine oil pump assembly	10±1	5	—
Bolt	Lower oil pan assembly x upper oil pan	10±1	15	—
Drain screw plug	Drain screw plug × lower oil pan	35～40	1	—
Bolt	Upper oil pan x lower cylinder block	24±2	15	—
Bolt	Dipstick guide pipe assembly x upper oil pan	10±1	1	—
Bolt	Engine oil collector assembly x upper oil pan	10±1	2	—
Bolt	Engine oil pump assembly × cylinder block	24±2	8	—
Bolt	Cylinder block x engine oil pump assembly	24±2	1	—
Engine oil filter cover components	Engine oil filter cover components x engine oil pump assembly	25±5	1	—
Oil pressure alarm	Oil pressure alarm × cylinder block	15±2	1	—

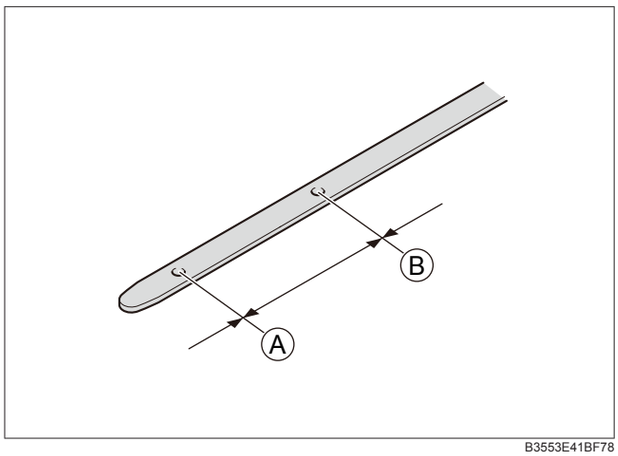
Engine oil and engine oil filter

Engine oil level inspection

Caution

- Regularly check and replace the engine oil. Otherwise, as a result of insufficient amount of engine oil or oil aging, the moving parts within the engine may do not get lubrication they need, leading to sintering and damage to the engine.
- The decreasing amount of the engine oil depends on the driving conditions. When the oil level is close to or below the lower scale mark, add oil until the oil level is between the upper and lower scale marks. Th engine oil performs functions of lubrication and cooling. Even in normal driving, part of the oil that lubricates the piston and the throttle may be mixed and burned in the combustion chamber, causing the amount of oil to decrease with driving.

1. Check if the engine oil is deteriorating and if the oil is mixed with water, discolored or thinning. If so, replace the engine oil and engine oil filter
2. Park the vehicle on a flat road surface. Warm up the engine to normal working water temperature. Then shut down the engine. After 15 minutes, check the engine oil level.
3. Draw out the dipstick
4. After cleaning the oil trace of the dipstick with a rag, insert it into the dipstick guide pipe, and then pull it out to check the oil level



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In the diagram:

A - lower limit

B - upper limit

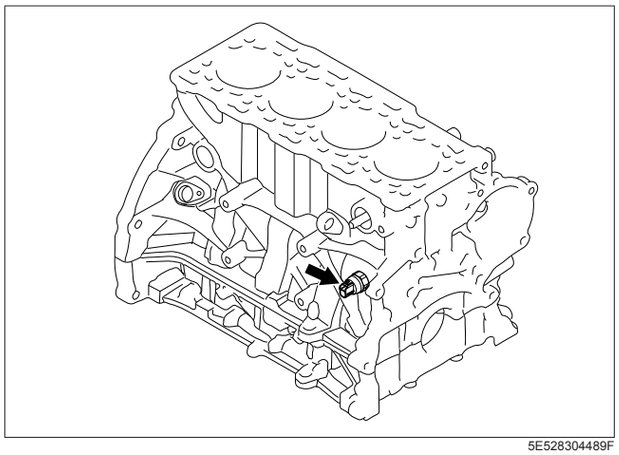
Notice

- The engine oil level shall be between the upper and lower limits of the oil dipstick.
- The shape of the oil dipstick varies depending on the engine.

5. If the engine oil level is close to or below the lower limit mark, check the oil for leakage and add oil according to the requirements of the engine maintenance to raise the liquid level to the position between the lower limit and the upper limit.

Oil pressure inspection

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connector of oil pressure alarm
3. Remove oil pressure alarm



5E528304489F

⚠ Warning

› As engine oil is very hot, care must be taken to prevent scalding.

› Replace the sensor or actuator if they were knocked or dropped.

4. Install oil pressure gauge to the installation position of oil pressure alarm

⚠ Warning

› Replace the sensor or actuator if they were knocked or dropped.

5. Connect negative terminal of the battery
6. Warm up the engine to the normal water temperature of (90~100) ℃
7. Check the pressure of engine oil

   Pressure at idle speed: ≥100 kPa

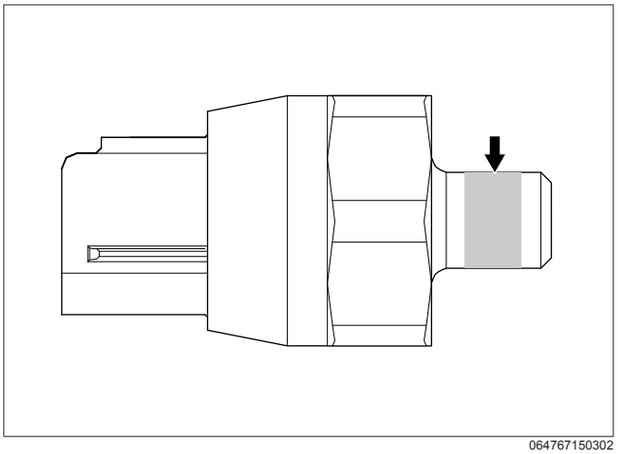
   Pressure at 4000 r/min: ≥ 350 kPa

ℹ Notice

› If engine oil pressure exceeds specified value, check the oil pump, engine oil filter and lubrication pipeline.

› If engine oil pressure warning indicator lights up and engine oil pressure is within the standard value, it is necessary to confirm the state of the engine oil pressure sensor, connector and harness.

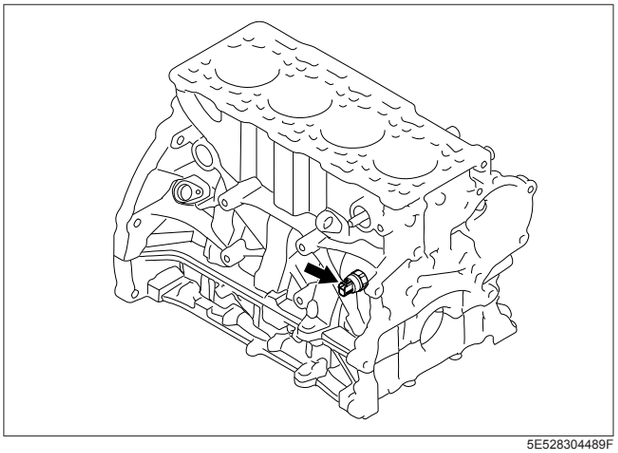
8. Remove engine oil pressure gauge
9. Apply sealant to threads of oil pressure alarm



064767150302

   Type: Tonsan 1243 anaerobic thread locking sealant

10. Tighten oil pressure alarm to cylinder block



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   Tightening torque: (15±2) N·m

⚠ Warning

› As engine oil is very hot, care must be taken to prevent scalding.

11. Connect sensor harness plug
12. Start the engine and check the engine for oil leakage

Replacement

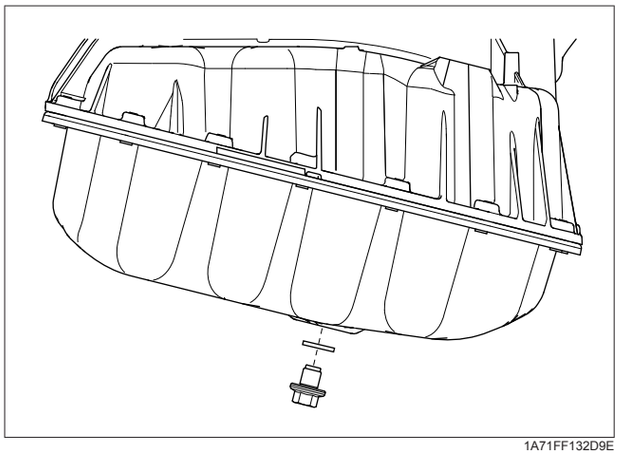
⚠ Warning

› As engine oil is very hot, care must be taken to prevent scalding.

› When replacing engine oil, do observe relevant precautions in order to reduce the danger resulting from skin contact with used engine oil. Wear protective clothing and gloves that are impervious to engine oil. Use soap and water, or water-free hand cleaners to clean your skin, and thoroughly remove any engine oil stained on your body.

› Properly dispose the waste according to the local laws and regulations. It is not allowed to discard it at will.

1. Heat the engine and check engine component for engine oil leakage
2. Place the vehicle on a level ground and shut down engine
3. Shut down engine and wait for 10 minutes
4. Unscrew fuel filler cap
5. Remove drain screw plug and the bonded washer to discharge the engine oil



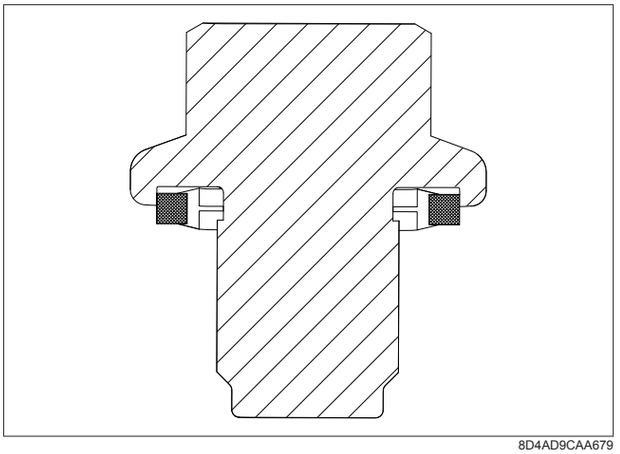
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⚠ Warning

› Bonded washers are disposable parts.

› Properly dispose the waste according to the local laws and regulations. It is not allowed to discard it at will.

6. Apply a small amount of engine oil on the edges on both sides of the new bonded washer
7. Put the bonded washer into the locating ring groove of the drain screw plug (make sure that the washer is flush all around without tilting)

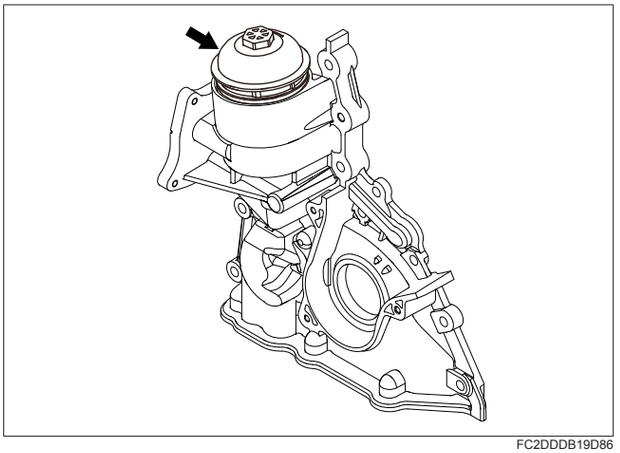


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8. Install drain screw plug

   Tightening torque: (35~40) N·m

9. Remove engine oil filter cover components

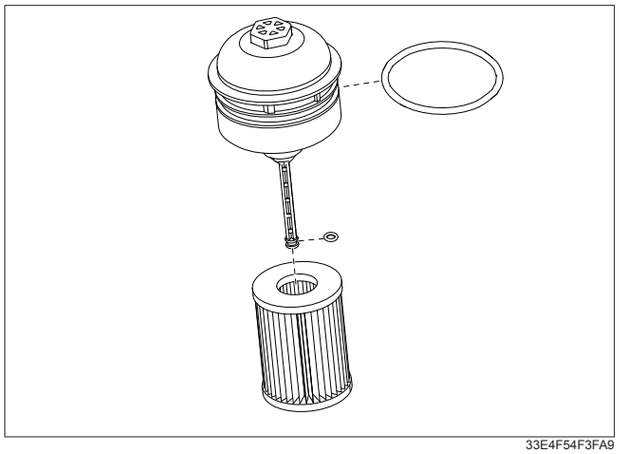


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⚠ Caution

› In removal process, prepare a rag to absorb leaking or splashing engine oil.

10. Remove oil filter element and 2 seal rings

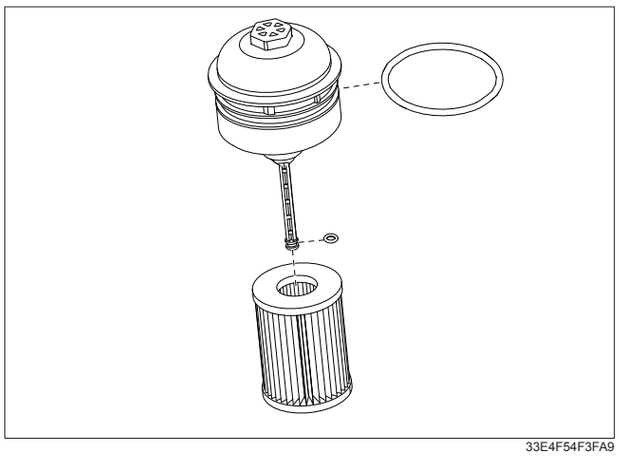


33E4F54F3FA9

Notice

› Seal rings are disposable parts.

11. Remove foreign matter from the mounting surface of engine oil filter
12. Install 2 new seal rings on engine oil filter assembly



33E4F54F3FA9

Notice

› Before installing the seal ring, apply a layer of engine oil evenly.

13. Install new engine oil filter element to the engine oil filter housing

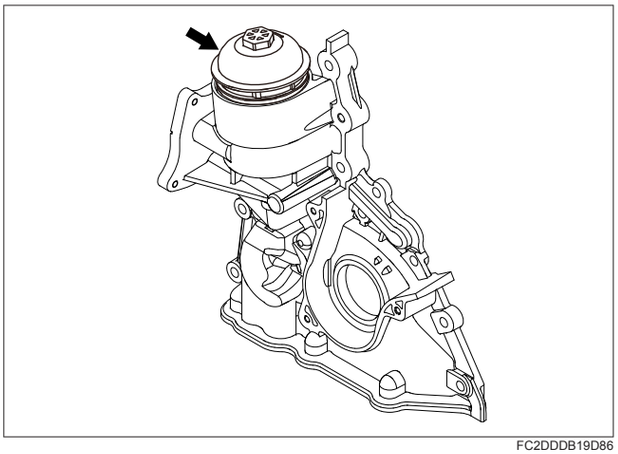
Caution

› Always use original oil filter element.

› In order to facilitate after-sales repair and maintenance, engine oil filter elements, fuel return seal rings of filter, and seal rings of filter cover shall be packaged as "element replacement components" (three parts cannot be purchased separately) or as "engine oil filter assembly" for procurement.

› When replacing the engine oil filter element, do not wear gloves, keep your hands clean, and avoid contaminating the engine oil filter element.

14. Install engine oil filter cover components



FC2DDDB19D86

Tightening torque: (25±5) N·m

15. Remove fuel filler cap
16. Add new engine oil from the fuel filler
17. Install fuel filler cap and tighten it
18. Heat the engine and check oil drain screw plug and engine oil filter for engine oil leakage
19. Shut down engine and wait for 10 minutes
20. Check the engine oil level

Notice

› The engine oil level shall be between the upper and lower limits of the oil dipstick.

Engine oil pressure alarm

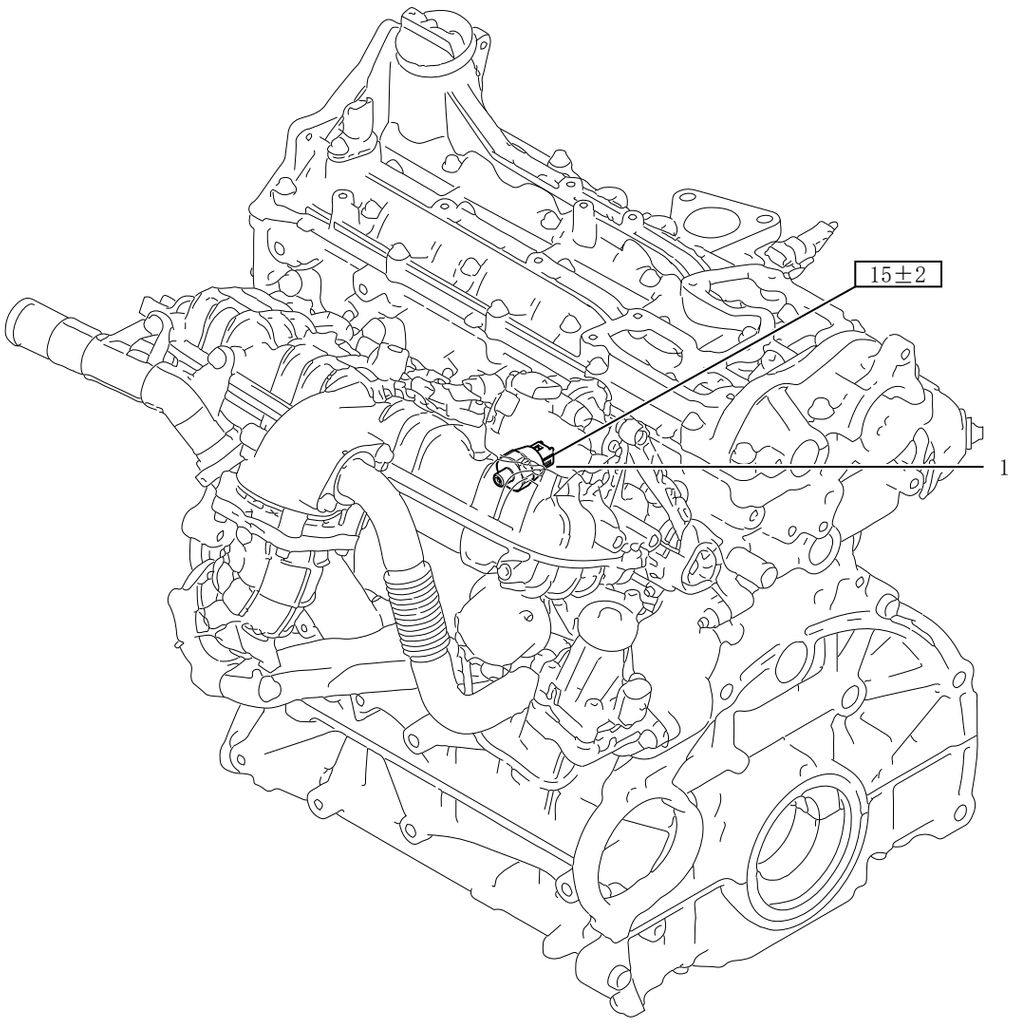
Operating principle

Oil pressure alarm is a normally closed sensor.

When there is no oil pressure, the spring inside the oil pressure alarm pushes the movable contact tab to touch the stationary contact tab; as a result of it, the circuit is in the closed state and the oil pressure alarm indicator turns on.

When the oil pressure reaches the specified value, the diaphragm of internal pressure sensing element is deformed under the oil pressure, which pushes the movable contact tab to overcome spring resistance and detaches itself from the stationary contact tab, so that the circuit is disconnected and the oil pressure alarm indicator turns off.

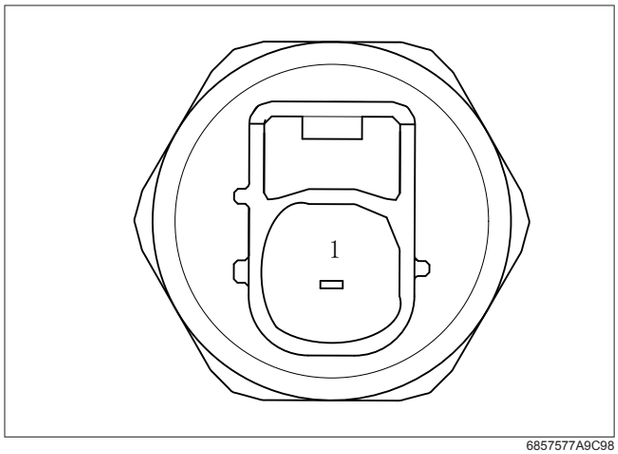
Structural diagram



64E991D64423

1. Oil pressure alarm

Pin definition



6857577A9C98

Pin No.	Function
1	Engine oil pressure signal

check

1. Check if oil pressure alarm housing and pin 1 are connected when engine is not started or oil pressure alarm has been removed

   Initial alarm pressure of oil pressure alarm: (22 ± 8) kPa

Notice

› If connected, it indicates that the oil pressure sensor functions correctly in the absence of pressure.

2. Start the engine or apply oil pressure greater than its working pressure to oil pressure alarm, and check if the oil pressure alarm housing and pin 1 are disconnected

Notice

› If disconnected, it indicates that the oil pressure sensor functions correctly under working state.

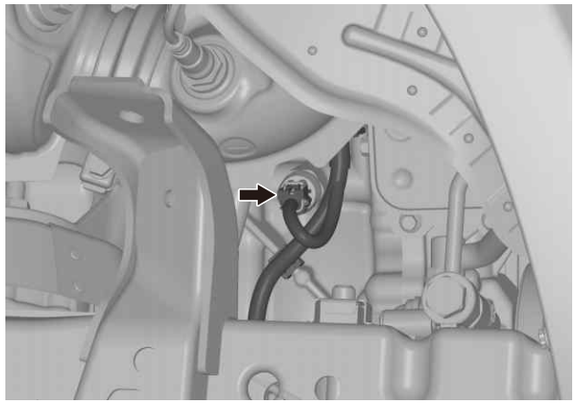
Removal/installation

Removal

⚠ Warning

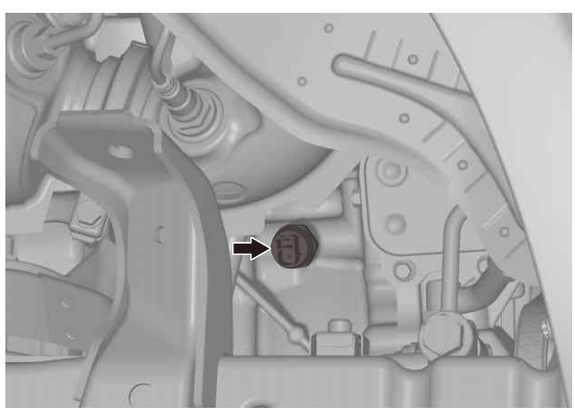
› To avoid burns, do not operate while the engine is still at a high temperature.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Raise the vehicle to an appropriate position
4. Disconnect harness connector of oil pressure alarm



595EDA350DC8

5. Remove oil pressure alarm



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⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

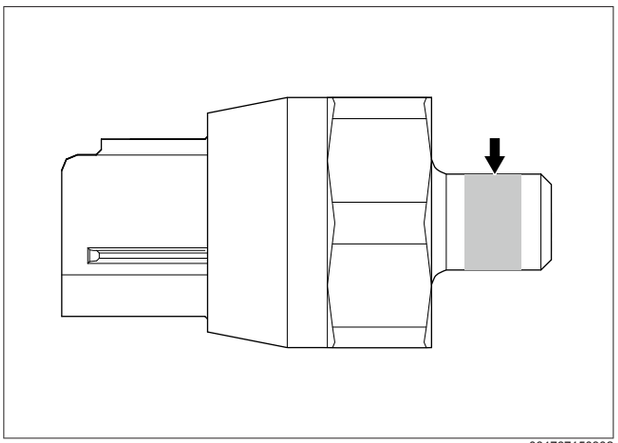
› Replace the sensor or actuator if they were knocked or dropped.

Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

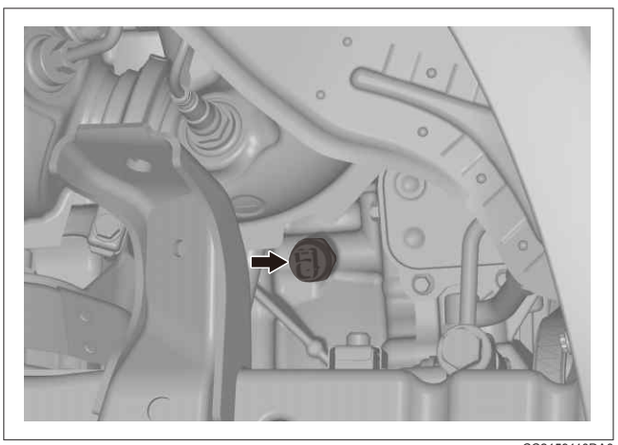
1. Apply sealant to threads of oil pressure alarm



064767150302

Type: Tonsan 1243 anaerobic thread locking sealant

2. Install oil pressure alarm

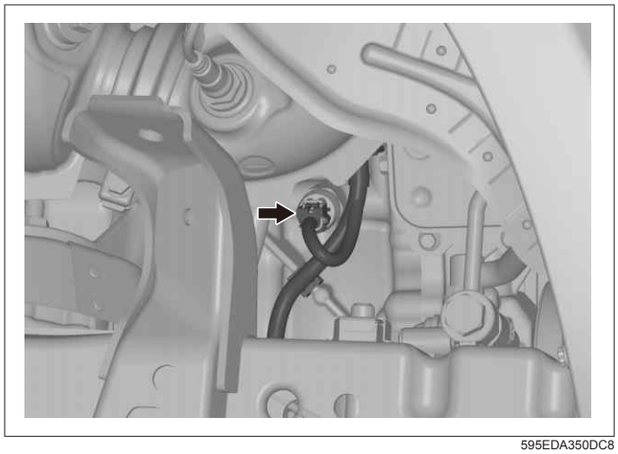


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⚠ Caution

› Before installation, make sure that the mounting surface and nearby positions are clean and free of impurity.

3. Connect harness connector of oil pressure alarm



595EDA350DC8

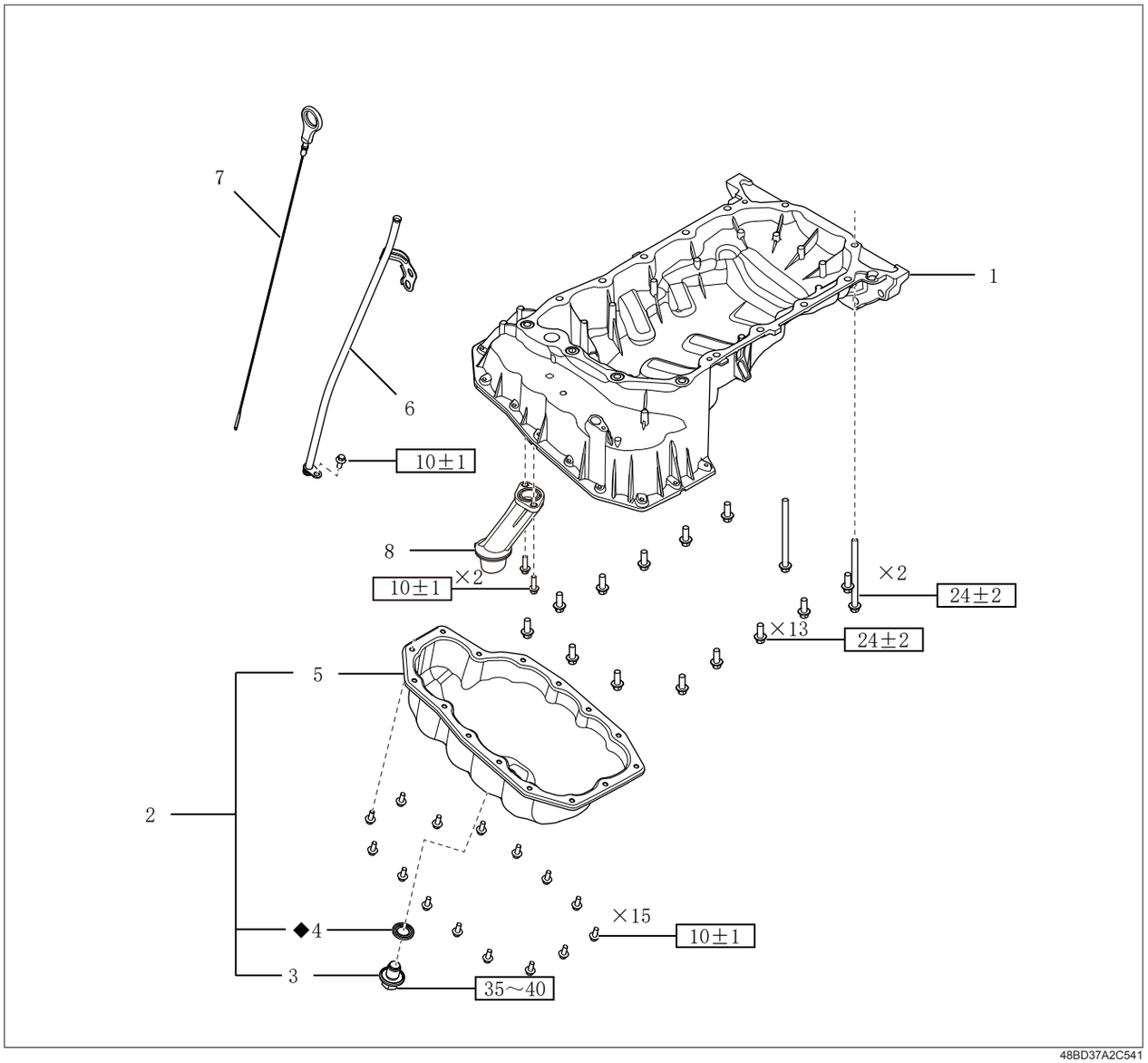
⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

4. Connect negative terminal of the battery

Oil pan

Structural diagram



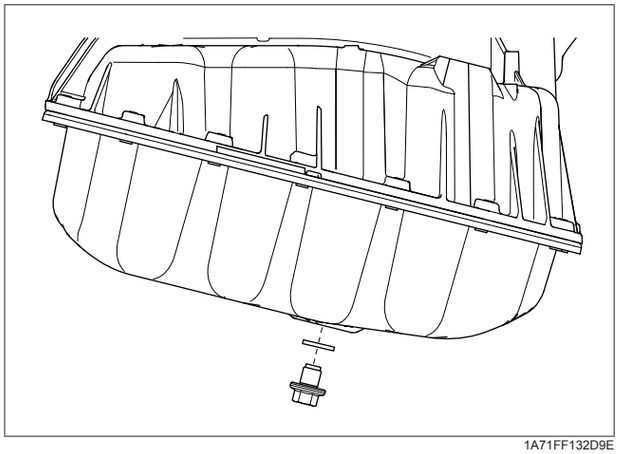
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1. Upper oil pan
2. Lower oil pan assembly
3. Drain screw plug
4. Bonded washer
5. Lower oil pan
6. Dipstick guide pipe assembly
7. Dipstick assembly
8. Engine oil collector assembly

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Drain the engine oil in the engine lubrication system



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Warning

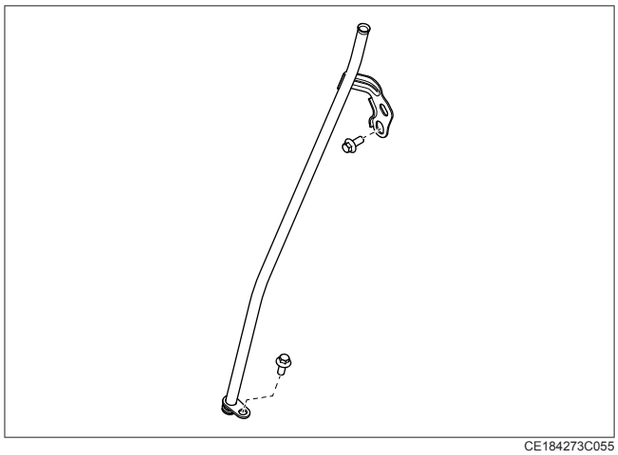
› Beware of burns from hot engine oil (lubricant), dispose old oil properly and protect the environment.

3. Remove bonded washer

Notice

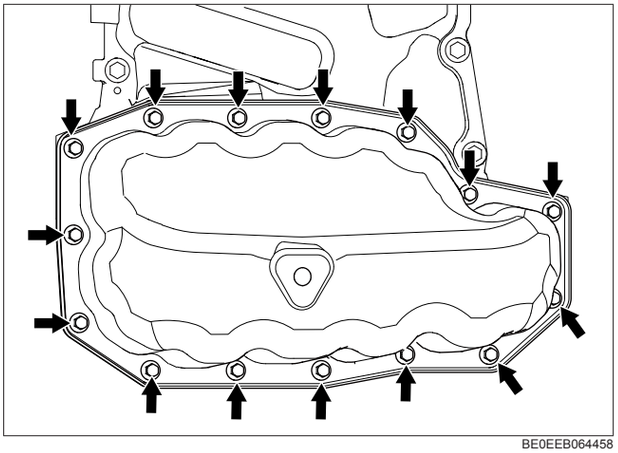
› Bonded washers are disposable parts.

4. Pull out the dipstick assembly
5. Remove 2 bolts, and pull out the dipstick guide pipe assembly



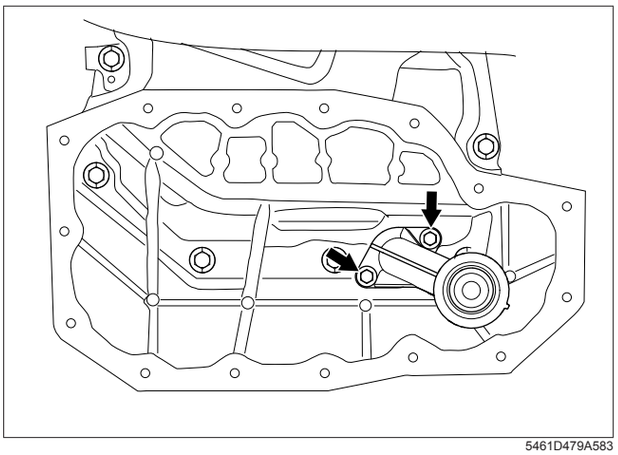
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6. Remove 15 bolts in order from both sides to the middle, and remove lower oil pan assembly



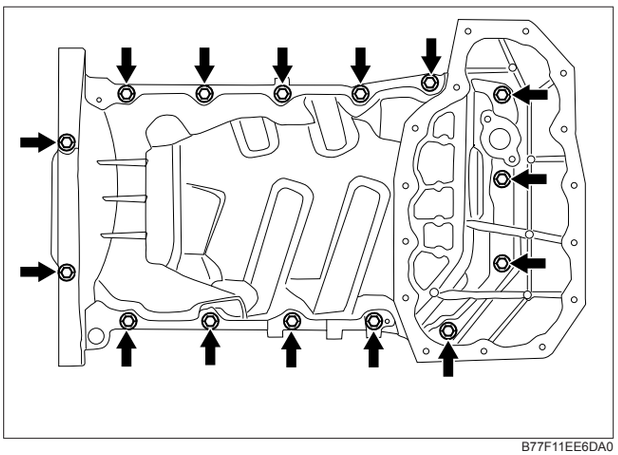
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7. Remove 2 bolts, and remove engine oil collector assembly



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8. Remove 15 bolts in a sequence from two ends to the middle

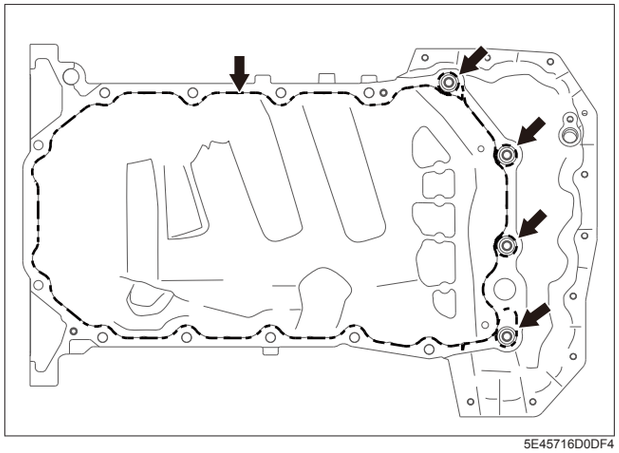


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9. Remove upper oil pan

Installation

1. Remove sealant and foreign matter on the joint surface of each component and part
2. Apply sealant on top surface of upper oil pan

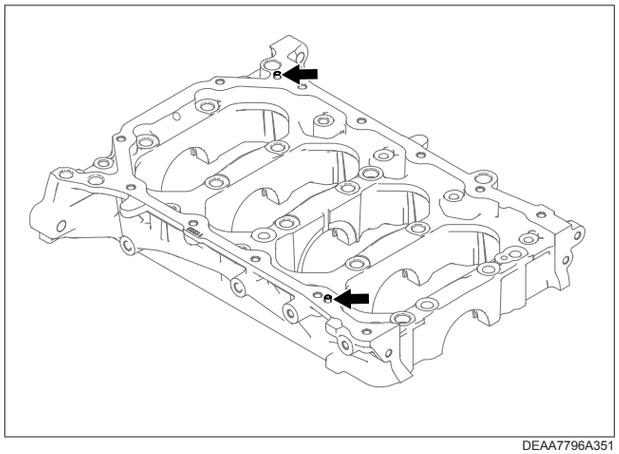


5E45716D0DF4

Type: Loctite 5900H silicone rubber plane sealant

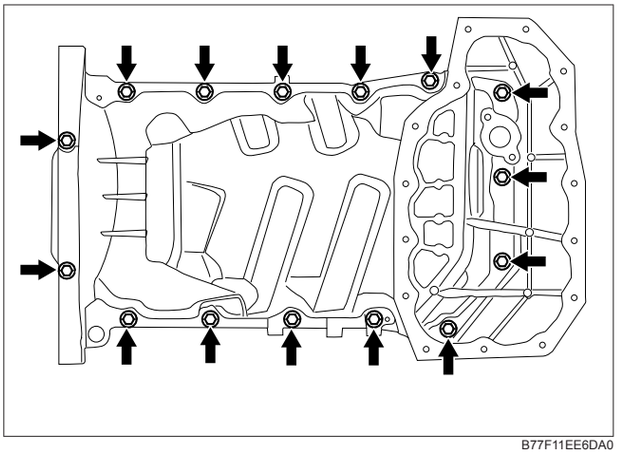
Sealant line diameter: (3.0±0.2) mm

3. Install upper oil pan corresponding to the locating pin on the cylinder block



DEAA7796A351

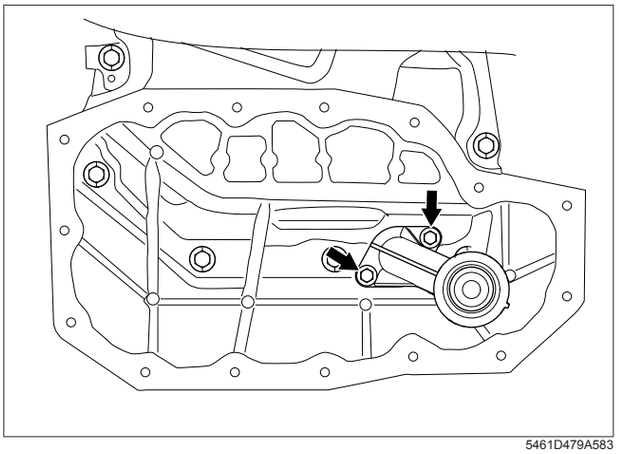
4. Tighten the 15 bolts in a sequence from the middle to both ends



B77F11EE6DA0

Tightening torque: (24±2) N·m

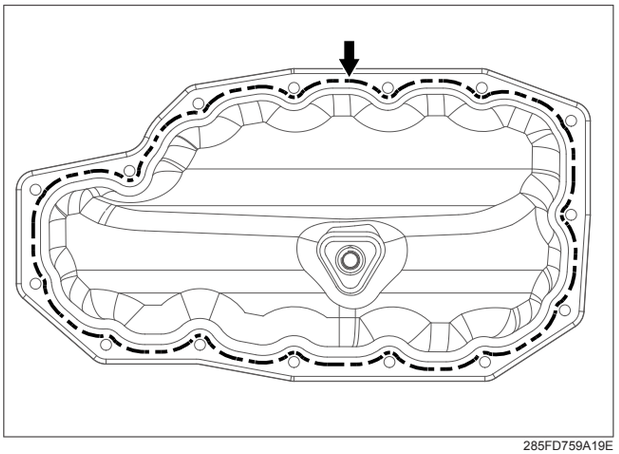
5. Apply an appropriate amount of lubricant to the seal ring of engine oil collector
6. Install engine oil collector assembly into the oil suction hole of upper oil pan, and tighten 2 bolts



5461D479A583

Tightening torque: (10±1) N·m

7. Apply sealant to the lower oil pan assembly

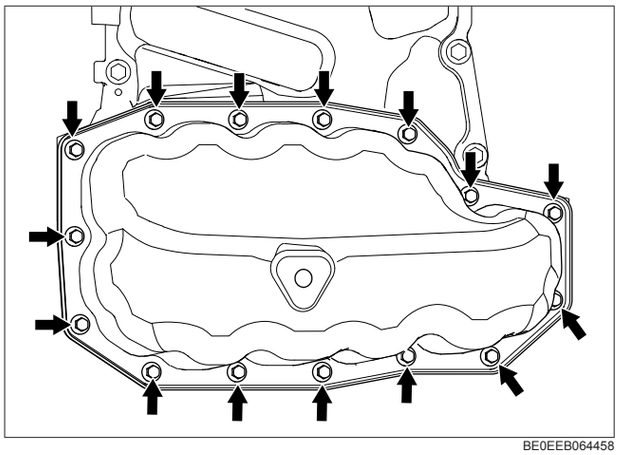


285FD759A19E

Type: Loctite 5900H silicone rubber plane sealant

Sealant line diameter: (3.0±0.2) mm

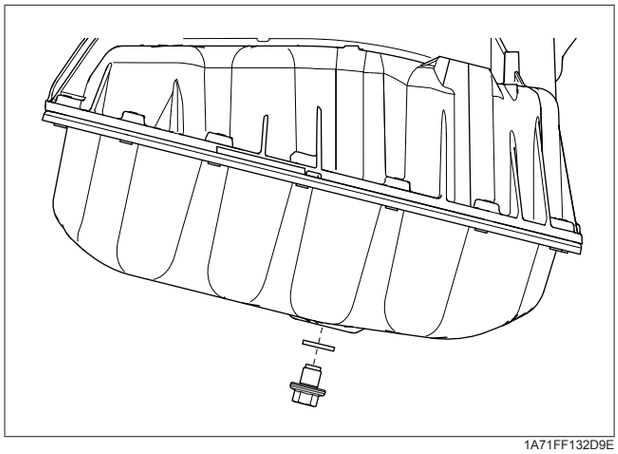
8. Install lower oil pan assembly, and tighten 15 bolts in the order from middle to both sides



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Tightening torque: (10±1) N·m

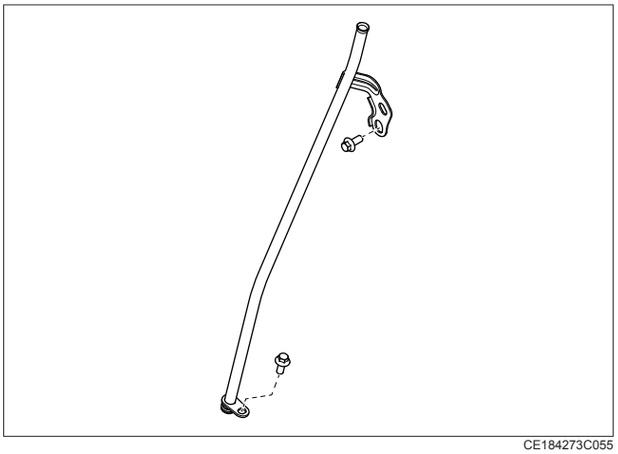
9. Install drain screw plug and bonded washer



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Tightening torque: (35~40) N·m

10. Install dipstick guide pipe assembly, and tighten 2 bolts



CE184273C055

Tightening torque of M6 bolt: (10±1) N·m

Tightening torque of M8 bolt: (24±2) N·m

11. Install dipstick assembly
12. Fill the engine oil
13. Check engine oil level
14. Complete the rest installation in the reverse order of removal

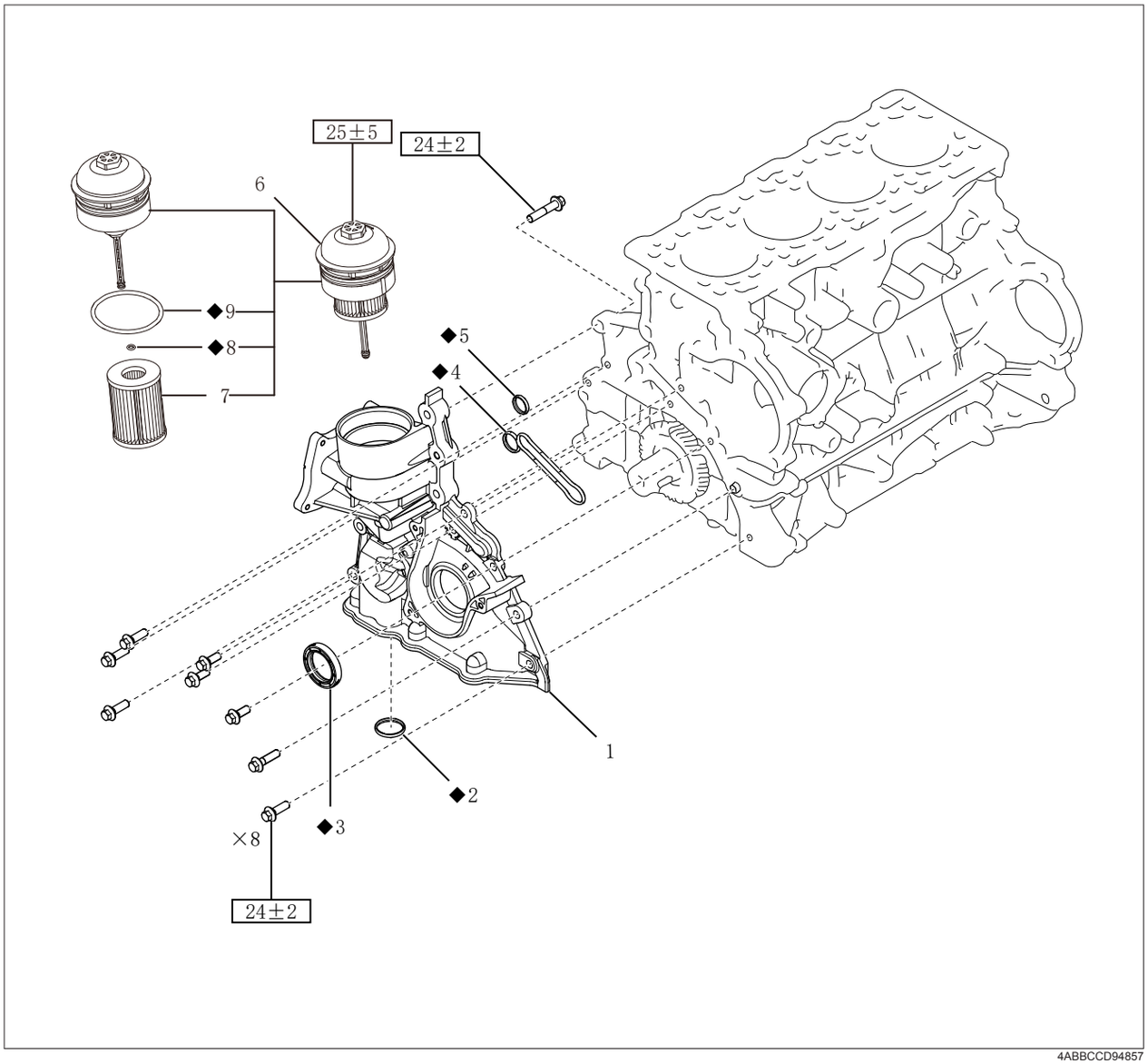
Engine oil pump (6MT)

Operating principle

Oil pump draws engine oil from oil pan and deliver it to parts of the engine. Oil pump inlet has engine oil collector, clogging of engine oil collector will cause damage to oil pump and result in failure of normal oil pumping, and hence lubrication system fails to have normal lubricant pressure, and damage to mechanical parts of engine will be caused.

As oil pump is driven by crankshaft, oil pump will operate so long as crankshaft rotates. When engine is running at high speed, oil pump output pressure will be higher than what the engine lubrication system requires. Therefore, a safety valve is provided on engine oil pump assembly, with pressure relief cavity of the safety valve connected to oil inlet cavity. When output pressure comes up to a certain value, safety valve is opened, and excessive oil flows back to oil inlet cavity of oil pump. When oil supply is normal, the safety valve keeps the bypass closed.

Structural diagram



4ABBCCD94857

1. Engine oil pump assembly
2. Oil suction seal ring of oil pump
3. Crankshaft front oil seal assembly
4. Oil outlet seal ring of oil pump
5. Water inlet seal ring of oil pump
6. Engine oil filter assembly
7. Oil filter element
8. Fuel return seal rings of filter
9. Seal ring of filter cover

Notice

› In order to facilitate after-sales repair and maintenance, engine oil filter elements (7), fuel return seal rings of filter (8), and seal rings of filter cover (9) shall be packaged as "element replacement components" or as "engine oil filter assembly" for procurement (the three parts of No.7, No.8, and No.9 cannot be purchased separately).

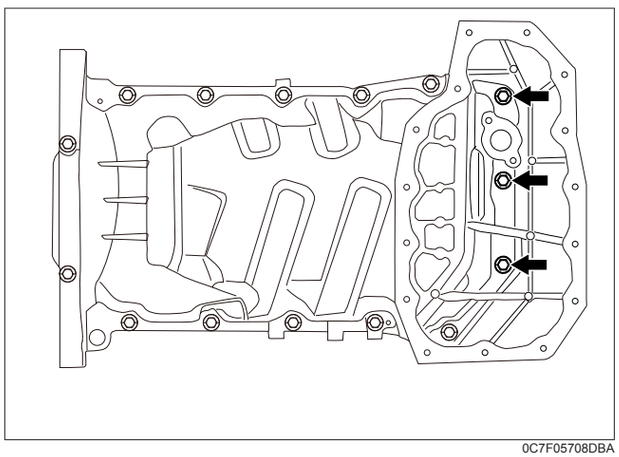
Removal/Installation of

Removal

⚠ Warning

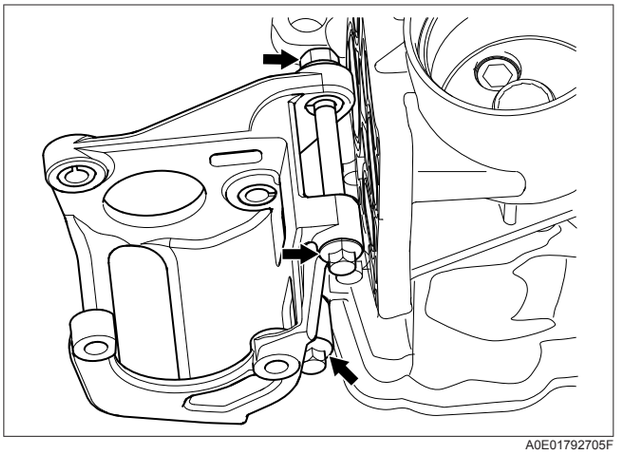
- To avoid burns, do not operate while the engine is still at a high temperature.
- If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Drain engine oil
5. Remove steering pump belt
6. Remove generator belt
7. Remove steering pump
8. Remove timing cover
9. Remove timing belt
10. Remove crankshaft timing pulley component
11. Remove lower oil pan assembly
12. Remove crankshaft front oil seal assembly
13. Remove 3 bolts of upper oil pan



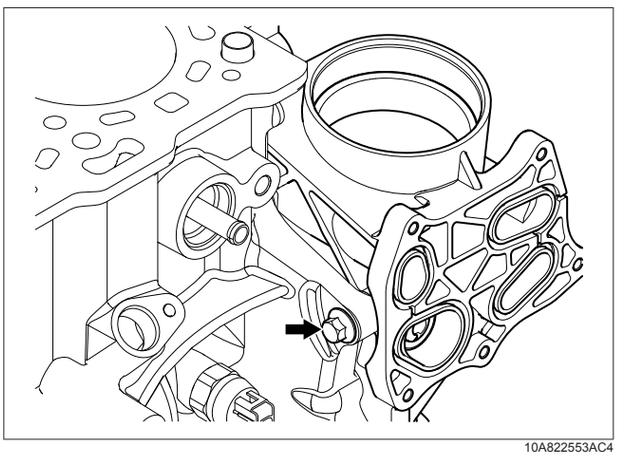
0C7F05708DBA

14. Remove 2 bolts, and remove steering pump bracket and 1 nut



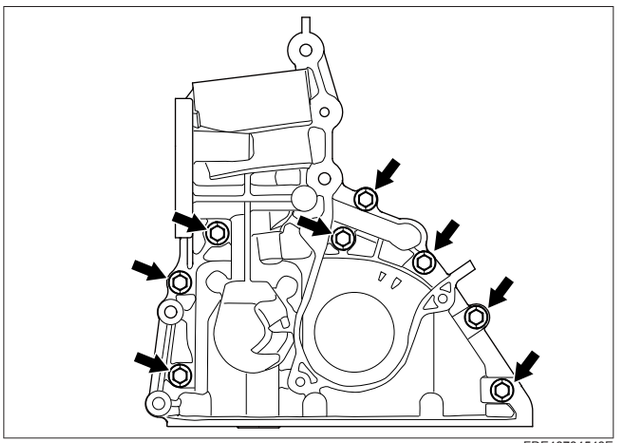
A0E01792705F

15. Remove engine oil cooler assembly
16. Remove engine oil filter assembly
17. Remove 1 bolt



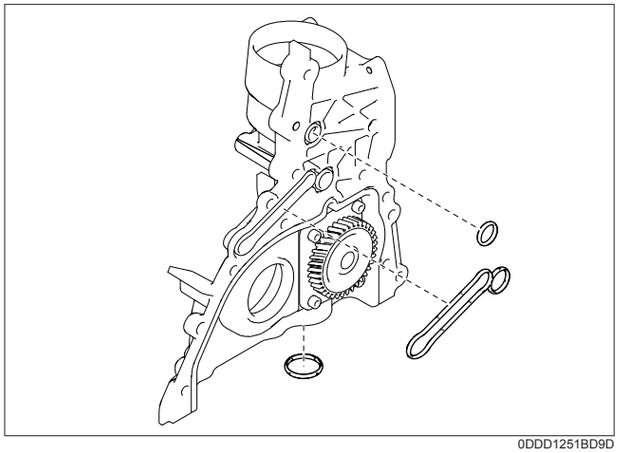
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18. Remove 8 bolts, and remove engine oil pump assembly



FDE48784543E

19. Remove oil suction seal ring of oil pump, oil outlet seal ring of oil pump and water inlet seal ring of oil pump



0DDD1251BD9D

Notice

› Seal rings are disposable parts.

Installation

Warning

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

› To avoid burns, do not operate while the engine is still at a high temperature.

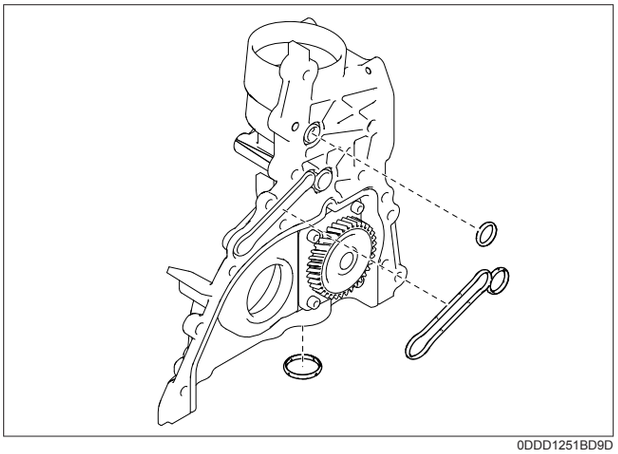
› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

Notice

› Tighten the fastener according to the specified torque value.

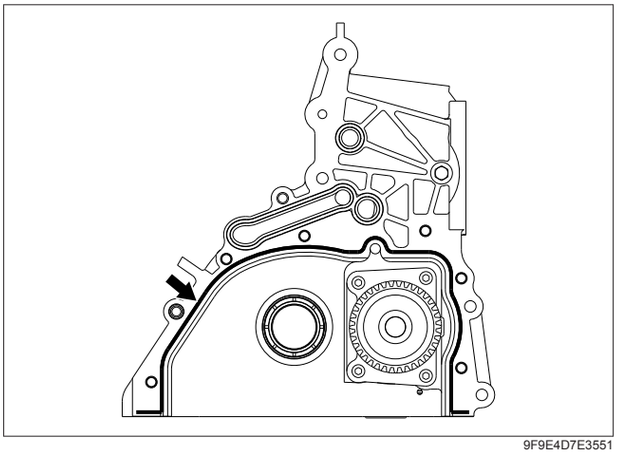
1. Embed new oil suction seal ring of oil pump, oil outlet seal ring of oil pump and water inlet seal ring of oil pump into the corresponding seal grooves in the pump housing



0DDD1251BD9D

The rubber ring should be embedded in the bottom of groove with the protrusion on the rubber ring stuck in the seal groove. No part outside the groove is allowed.

2. Fill the oil passage of lower cylinder block to the rotor cavity of oil pump with an appropriate amount of cleaning engine oil, and make sure that the engine oil enters the rotor cavity of oil pump
3. Apply cleaning engine oil to the oil pump gear
4. Apply sealant to the mounting surface of the oil pump

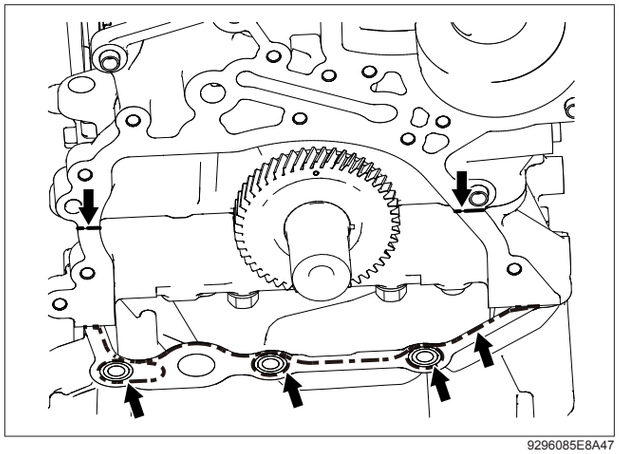


9F9E4D7E3551

Type: Loctite 5900H silicone rubber plane sealant

Sealant line diameter: (3±0.2) mm

5. Apply sealant to the joint seam of the upper cylinder block and lower cylinder block as well as the joint surface of the oil pump and the upper oil pan



9296085E8A47

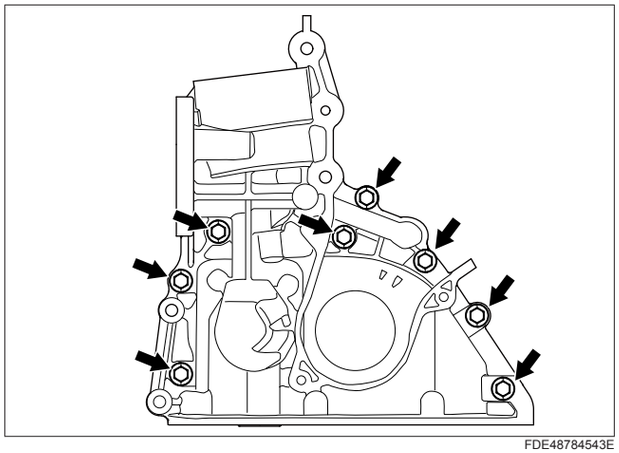
Type: Loctite 5900H silicone rubber plane sealant

Sealant line diameter: (3±0.2) mm

Notice

› Take care to avoid the oil pump inlet to prevent sealant from entering the lubrication duct and causing engine failure.

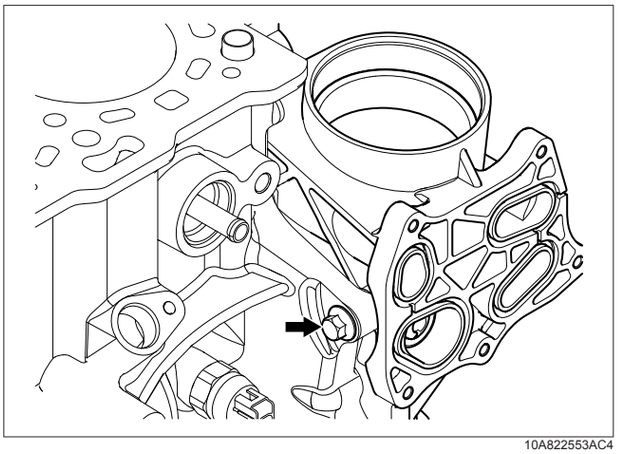
6. Install engine oil pump assembly, and tighten 8 bolts



FDE48784543E

Tightening torque: (24±2) N·m

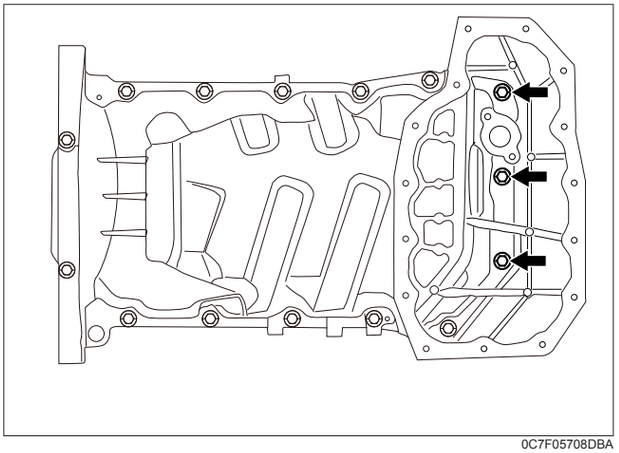
7. Tighten 1 bolt



10A822553AC4

Tightening torque: (24±2) N·m.

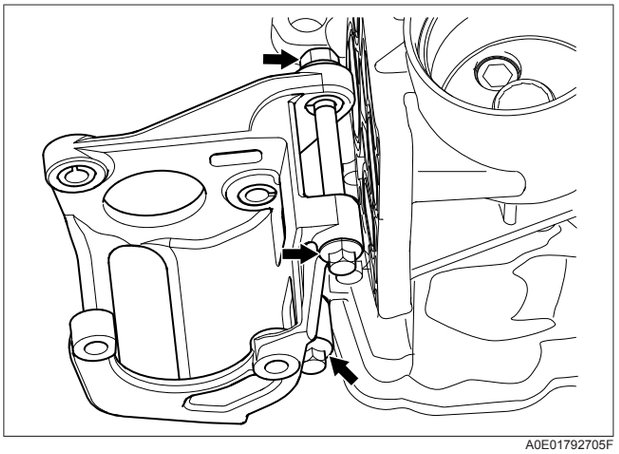
8. Install new crankshaft front oil seal
9. Install 3 bolts of upper oil pan



0C7F05708DBA

Tightening torque: (24± 2) N·m

10. Install lower oil pan assembly
11. Install steering pump bracket, tighten 2 bolts and 1 nut



A0E01792705F

Tightening torque: (24±2) N·m

12. Install engine oil filter
13. Install engine oil cooler
14. Install crankshaft timing pulley component
15. Install timing belt
16. Install timing cover
17. Install steering pump
18. Install generator belt
19. Install steering pump belt
20. Install negative terminal of the battery
21. Fill the engine oil
22. Add engine coolant

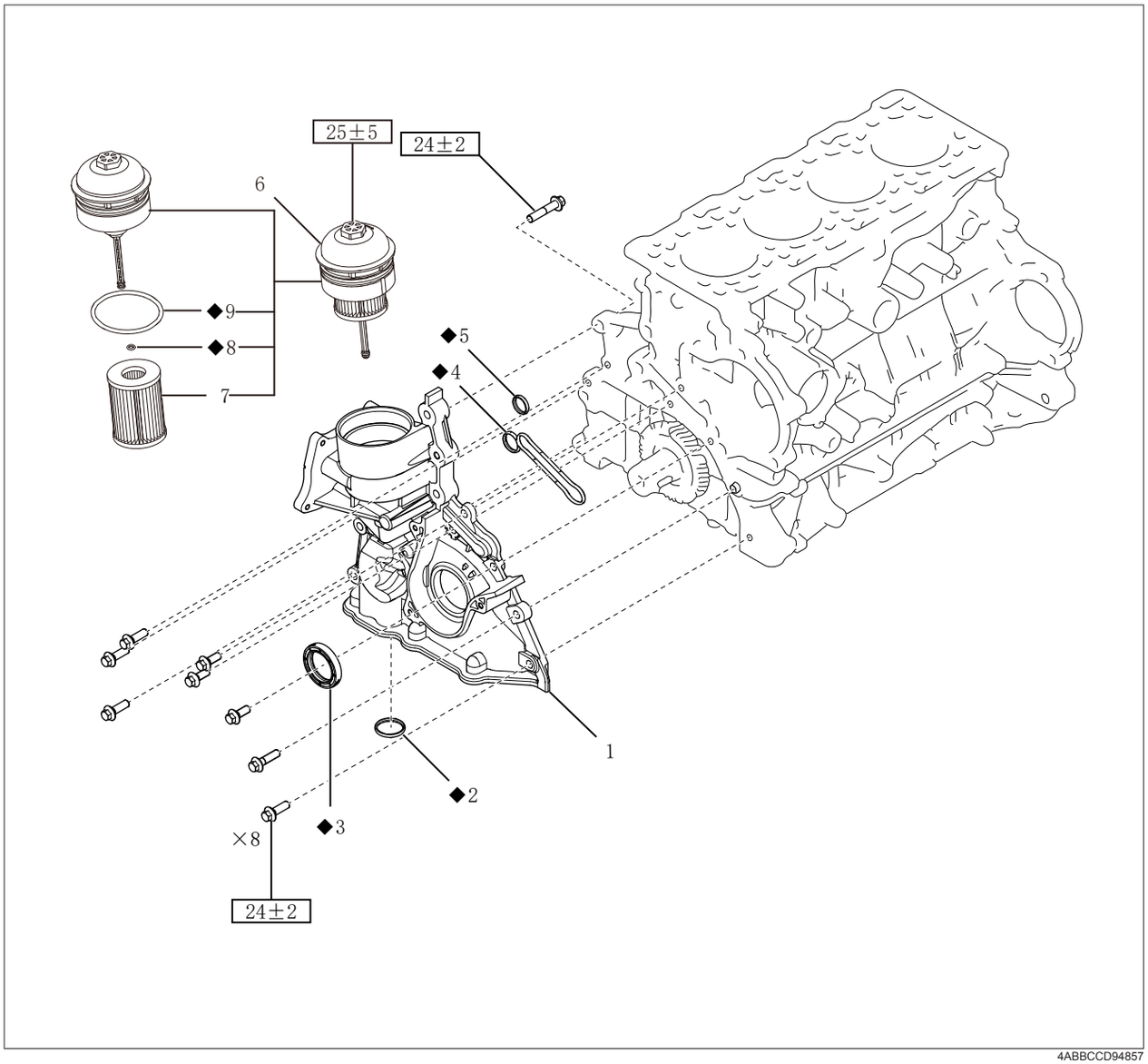
Engine oil pump (8AT)

Operating principle

Oil pump draws engine oil from oil pan and deliver it to parts of the engine. Oil pump inlet has engine oil collector, clogging of engine oil collector will cause damage to oil pump and result in failure of normal oil pumping, and hence lubrication system fails to have normal lubricant pressure, and damage to mechanical parts of engine will be caused.

As oil pump is driven by crankshaft, oil pump will operate so long as crankshaft rotates. When engine is running at high speed, oil pump output pressure will be higher than what the engine lubrication system requires. Therefore, a safety valve is provided on engine oil pump assembly, with pressure relief cavity of the safety valve connected to oil inlet cavity. When output pressure comes up to a certain value, safety valve is opened, and excessive oil flows back to oil inlet cavity of oil pump. When oil supply is normal, the safety valve keeps the bypass closed.

Structural diagram



4ABBCCD94857

1. Engine oil pump assembly
2. Oil suction seal ring of oil pump
3. Crankshaft front oil seal assembly
4. Oil outlet seal ring of oil pump
5. Water inlet seal ring of oil pump
6. Engine oil filter assembly
7. Oil filter element
8. Fuel return seal rings of filter
9. Seal ring of filter cover

Notice

› In order to facilitate after-sales repair and maintenance, engine oil filter elements (7), fuel return seal rings of filter (8), and seal rings of filter cover (9) shall be packaged as "element replacement components" or as "engine oil filter assembly" for procurement (the three parts of No.7, No.8, and No.9 cannot be purchased separately).

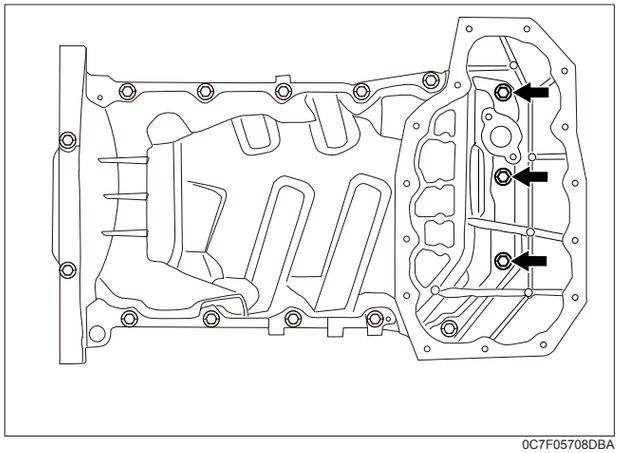
Removal/Installation of

Removal

⚠ Warning

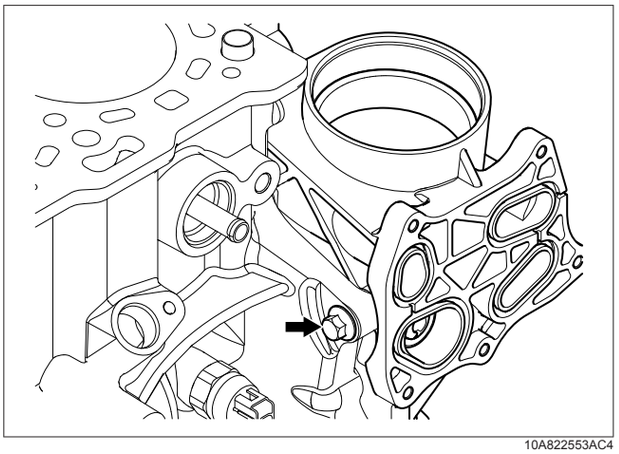
- To avoid burns, do not operate while the engine is still at a high temperature.
- If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Drain the engine coolant
4. Drain engine oil
5. Remove generator belt
6. Remove timing cover
7. Remove timing belt
8. Remove crankshaft timing pulley component
9. Remove lower oil pan assembly
10. Remove crankshaft front oil seal assembly
11. Remove 3 bolts of upper oil pan



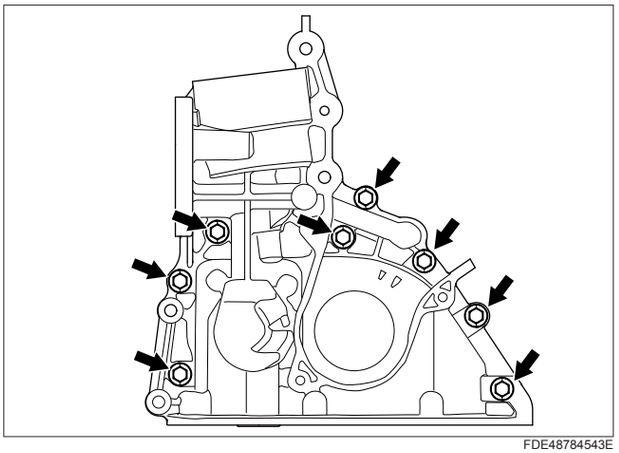
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12. Remove engine oil cooler assembly
13. Remove engine oil filter assembly
14. Remove 1 bolt



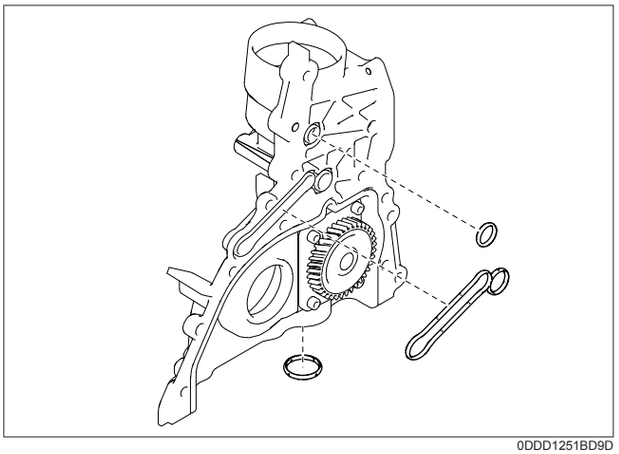
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15. Remove 8 bolts, and remove engine oil pump assembly



FDE48784543E

16. Remove oil suction seal ring of oil pump, oil outlet seal ring of oil pump and water inlet seal ring of oil pump



0DDD1251BD9D

ℹ Notice

- Seal rings are disposable parts.

Installation

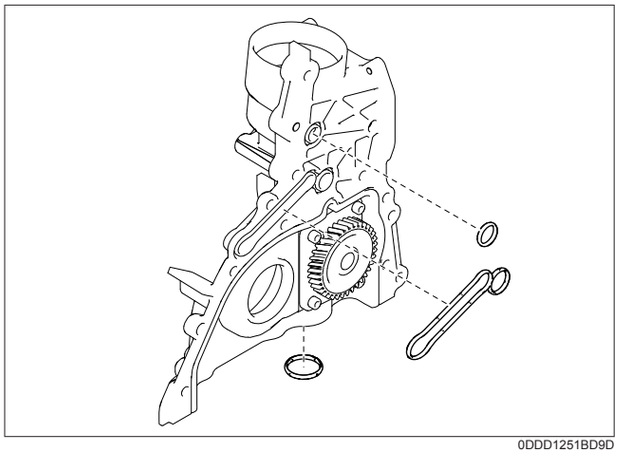
Warning

- When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.
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- If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
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Notice

- Tighten the fastener according to the specified torque value.

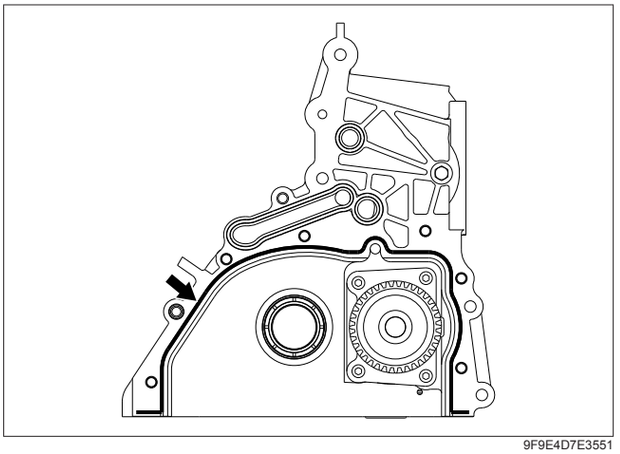
1. Embed new oil suction seal ring of oil pump, oil outlet seal ring of oil pump and water inlet seal ring of oil pump into the corresponding seal grooves in the pump housing



0DDD1251BD9D

The rubber ring should be embedded in the bottom of groove with the protrusion on the rubber ring stuck in the seal groove. No part outside the groove is allowed.

2. Fill the oil passage of lower cylinder block to the rotor cavity of oil pump with an appropriate amount of cleaning engine oil, and make sure that the engine oil enters the rotor cavity of oil pump
3. Apply cleaning engine oil to the oil pump gear
4. Apply sealant to the mounting surface of the oil pump

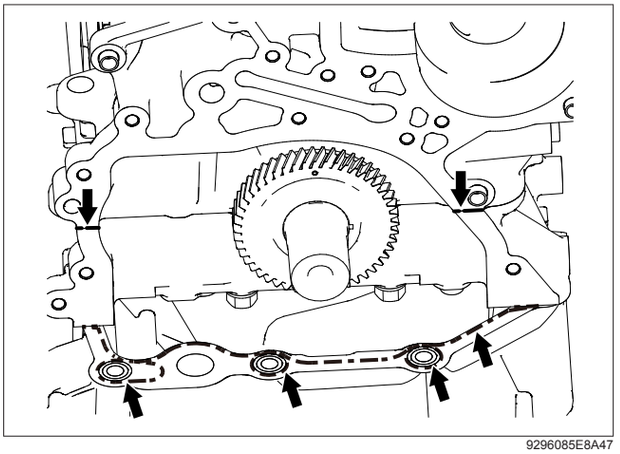


9F9E4D7E3551

Type: Loctite 5900H silicone rubber plane sealant

Sealant line diameter: (3 ± 0.2) mm

5. Apply sealant to the joint seam of the upper cylinder block and lower cylinder block as well as the joint surface of the oil pump and the upper oil pan



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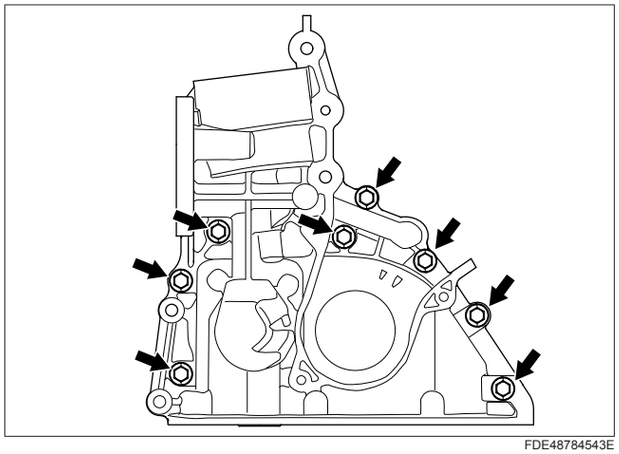
Type: Loctite 5900H silicone rubber plane sealant

Sealant line diameter: (3 ± 0.2) mm

Notice

- Take care to avoid the oil pump inlet to prevent sealant from entering the lubrication duct and causing engine failure.

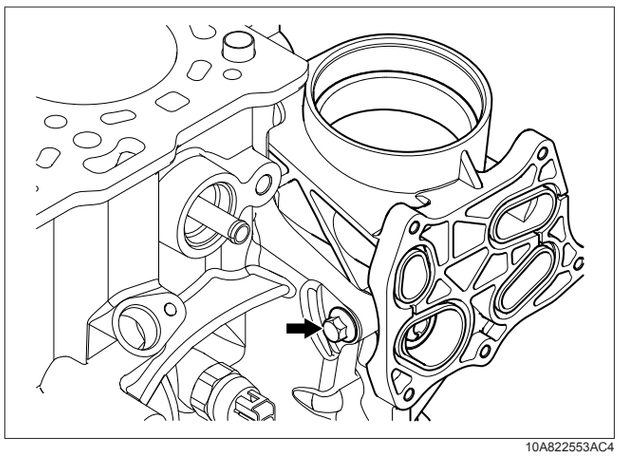
6. Install engine oil pump assembly, and tighten 8 bolts



FDE48784543E

Tightening torque: (24 ± 2) N·m

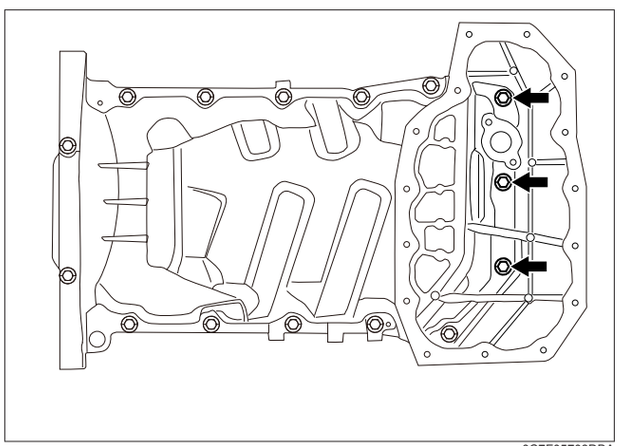
7. Fasten the 1 bolts



10A822553AC4

Tightening torque: (24 ± 2) N·m

8. Install new crankshaft front oil seal
9. Install 3 bolts of upper oil pan



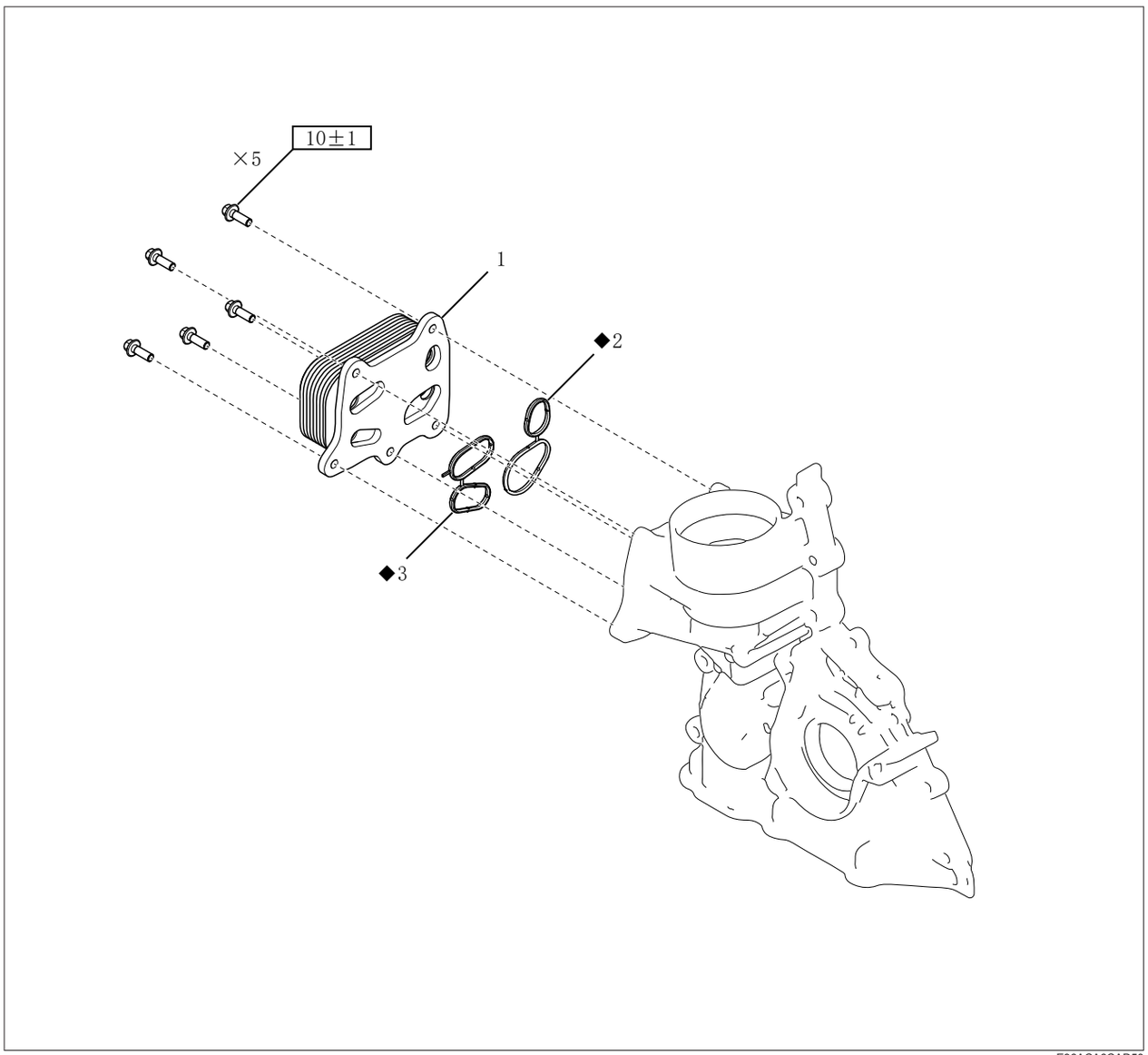
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Tightening torque: (24 ± 2) N·m

10. Install lower oil pan assembly
11. Install engine oil filter
12. Install engine oil cooler
13. Install crankshaft timing pulley component
14. Install timing belt
15. Install timing cover
16. Install generator belt
17. Install negative terminal of the battery
18. Fill the engine oil
19. Add engine coolant

Engine oil cooler

Structural diagram



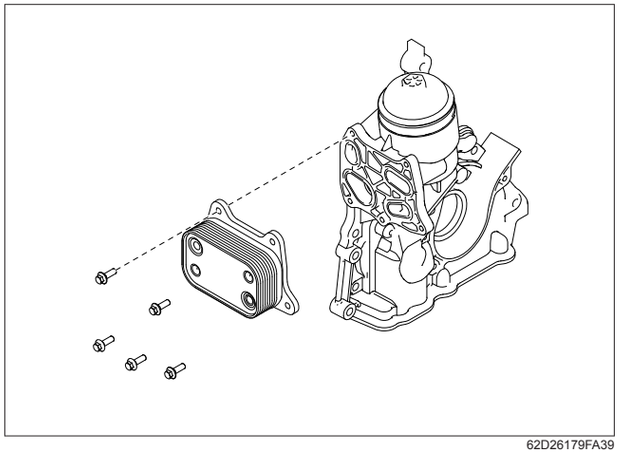
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1. Engine oil cooler assembly
2. Engine oil cooler seal ring I
3. Engine oil cooler seal ring II

Removal/installation

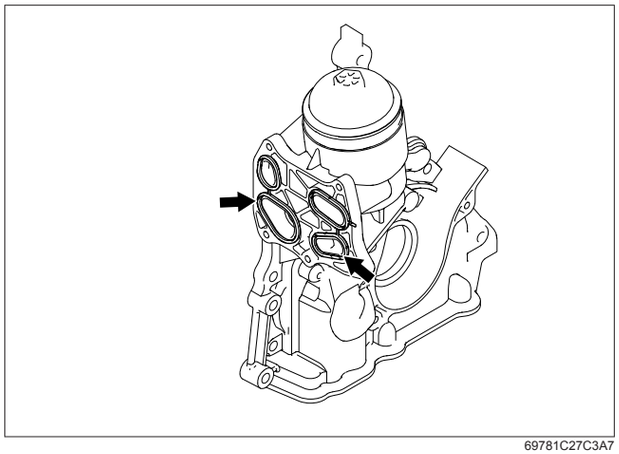
Removal

1. Disconnect the negative terminal of the battery.
2. Discharge engine oil
3. Discharge engine coolant
4. Remove 5 bolts, and remove engine oil cooler assembly



62D26179FA39

5. Remove seal ring of oil cooler I and seal ring of oil cooler II.



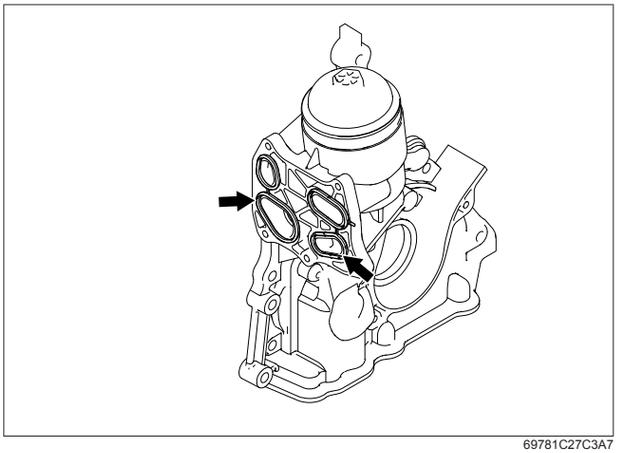
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Notice

› Seal ring of oil cooler I and seal ring of oil cooler II are disposable parts

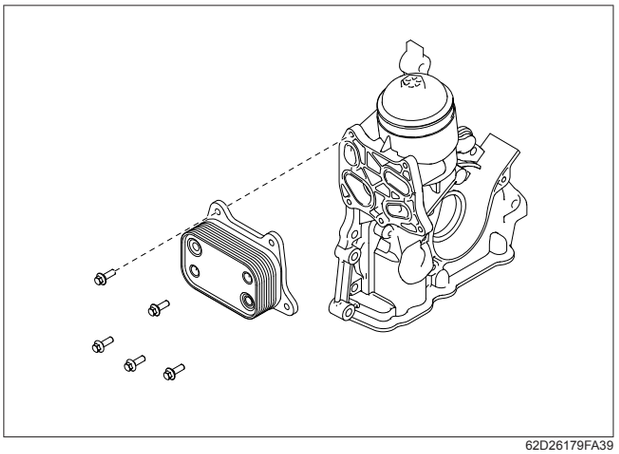
Installation

1. Install seal ring of oil cooler I and seal ring of oil cooler II to engine oil pump assembly



69781C27C3A7

2. Install engine oil cooler assembly, and tighten 5 bolts



62D26179FA39

Tightening torque: (10±1) N·m

3. Fill the engine oil

Turbocharger system (GW4D20M)

Turbocharger system.....10－1
Specified torque.....10－1
Turbocharger.....10－2
Structural diagram.....10－2
Pin definition.....10－3
Removal/installation.....10－3

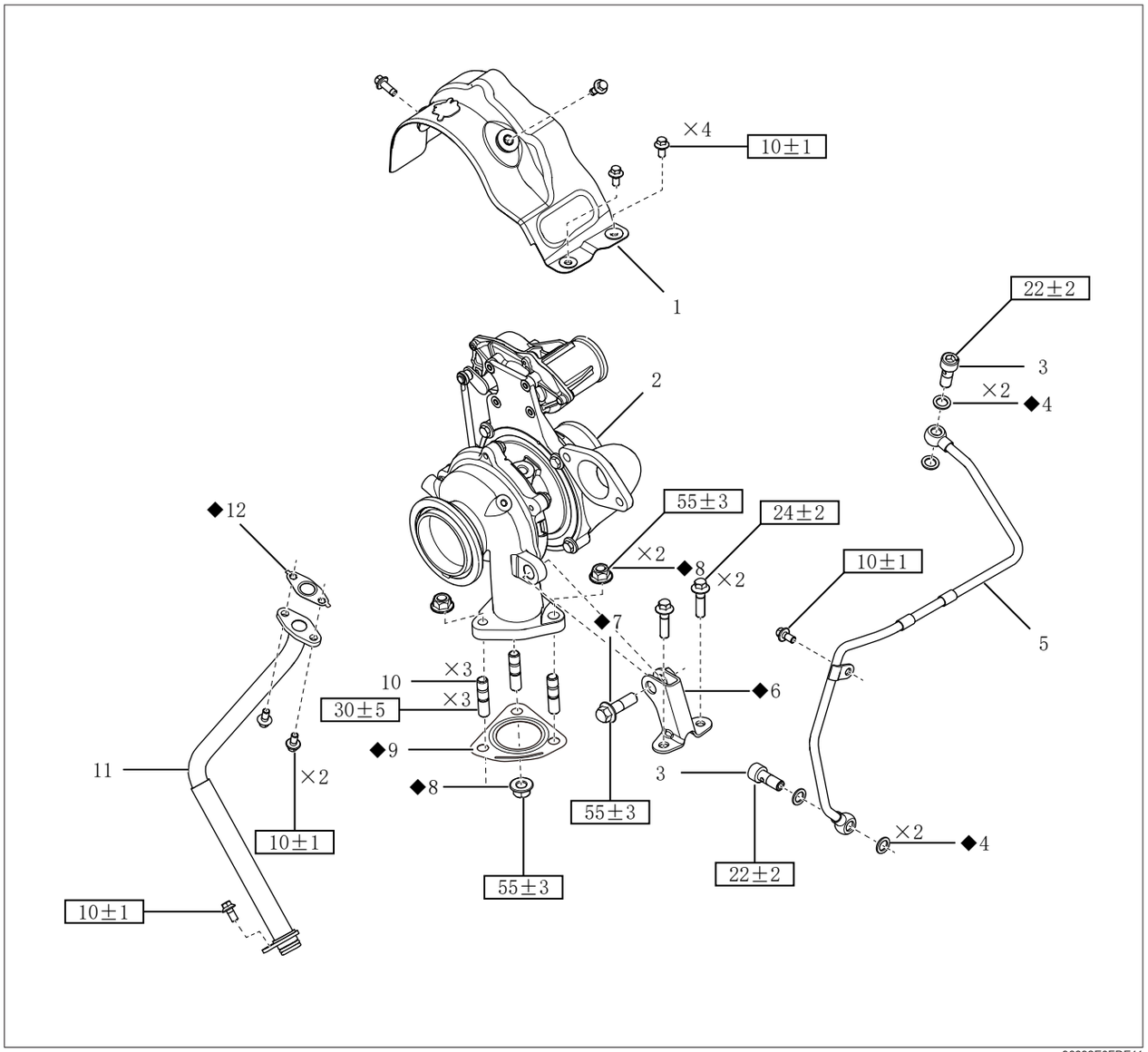
Turbocharger system

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Turbocharger connecting stud	Turbocharger assembly x exhaust manifold	30±5	3	—
Turbocharger retaining nut	Turbocharger assembly x exhaust manifold	55±3	3	—
Turbocharger bracket bolt	Turbocharger bracket × turbocharger assembly	55±3	1	—
Long oil inlet bolt	Oil inlet pipe component of turbocharger x turbocharger assembly, cylinder block	22±2	2	—
Bolt	Oil inlet pipe component of turbocharger x cylinder head	10±1	1	—
Bolt	Turbocharger oil return pipe component x cylinder block, turbocharger assembly	10±1	3	—
Bolt	Thermal shroud component of turbocharger × turbocharger assembly	10±1	4	—
Bolt	Turbocharger bracket x cylinder head cover	24±2	2	—

Turbocharger

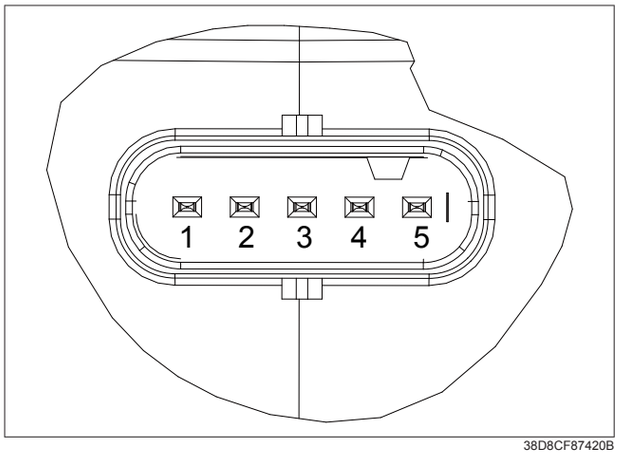
Structural diagram



96892E0FDE11

1. Thermal shroud component of turbocharger
2. Turbocharger assembly
3. Long oil inlet bolt
4. Oil inlet bolt gasket
5. Oil inlet pipe component of turbocharger
6. Turbocharger bracket components
7. Turbocharger bracket bolt
8. Turbocharger retaining nut
9. Turbocharger inlet gasket
10. Turbocharger connecting stud
11. Return pipe component of turbocharger
12. Gasket of return pipe component

Pin definition



38D8CF87420B

Pin No.	Function
1	Sensor power supply
2	Sensor GND
3	Sensor signal output
4	DC motor positive
5	DC motor negative

Removal/installation

Removal

⚠ Warning

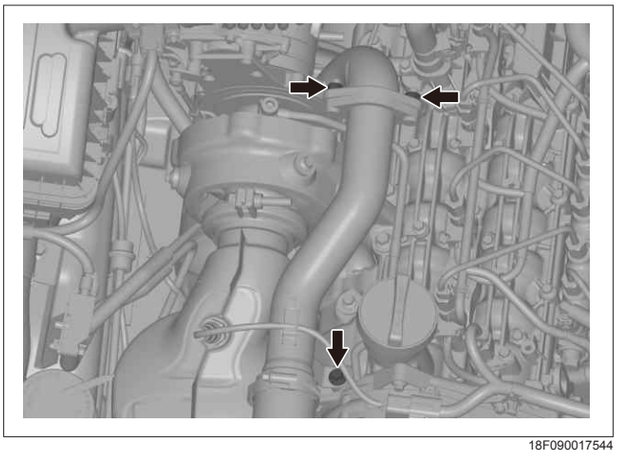
› Make sure that the hot parts are cooled before proceeding to avoid burns.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove crankcase vent pipe
4. Remove air filter outlet pipe
5. Remove 2 nuts and 1 bolt



18F090017544

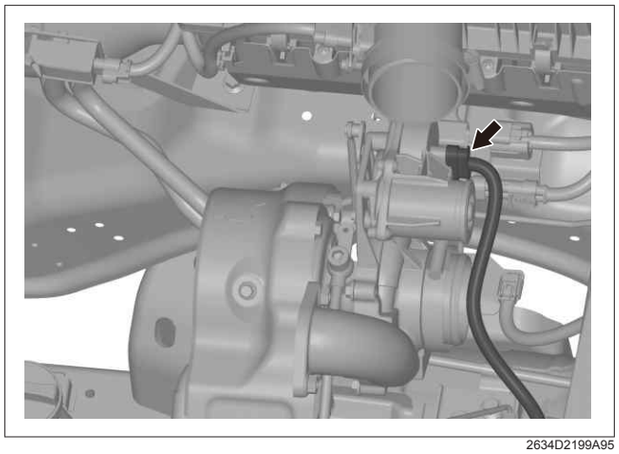
6. Remove air intake pipe of intercooler

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

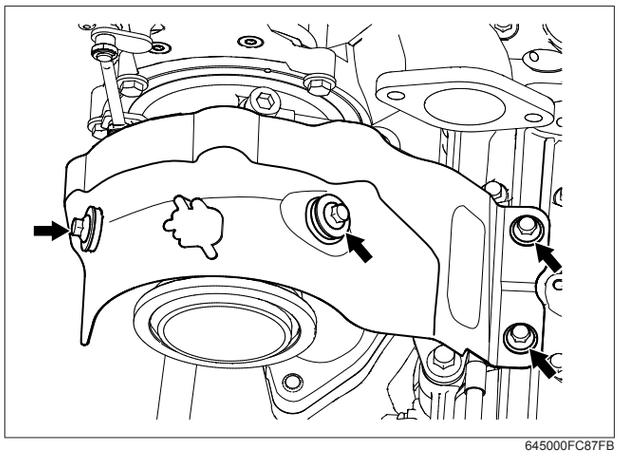
7. Remove lean NOx trap

8. Disconnect 1 connector



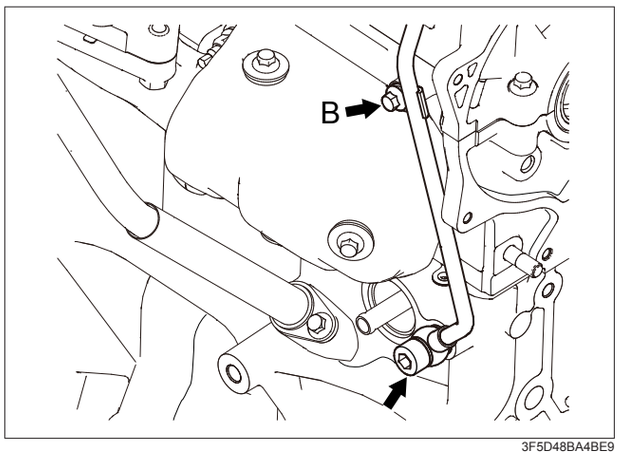
2634D2199A95

9. Remove 4 bolts, and remove thermal shroud component of turbocharger



645000FC87FB

10. Remove bolt B and the long oil inlet bolt at the cylinder block end of the oil inlet pipe component of turbocharger, and remove 2 oil inlet bolt gaskets

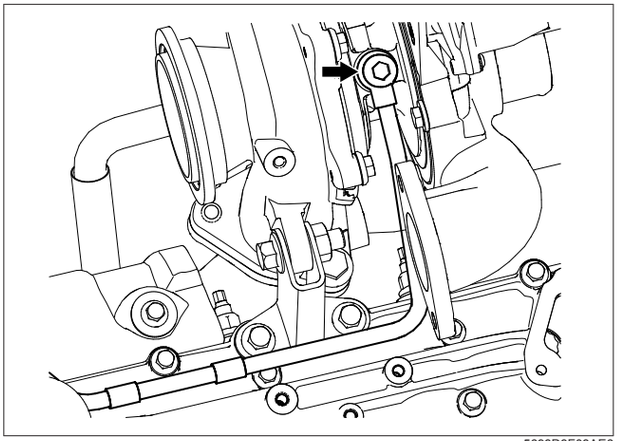


3F5D48BA4BE9

Notice

› Oil inlet bolt gaskets are disposable parts.

11. Remove long oil inlet bolt at the turbocharger end of the oil inlet pipe component of turbocharger, and remove 2 oil inlet bolt gaskets



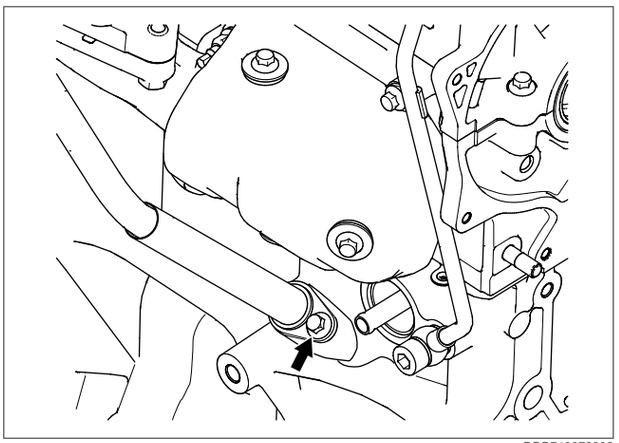
5693D3F03AE6

Notice

› Oil inlet bolt gaskets are disposable parts.

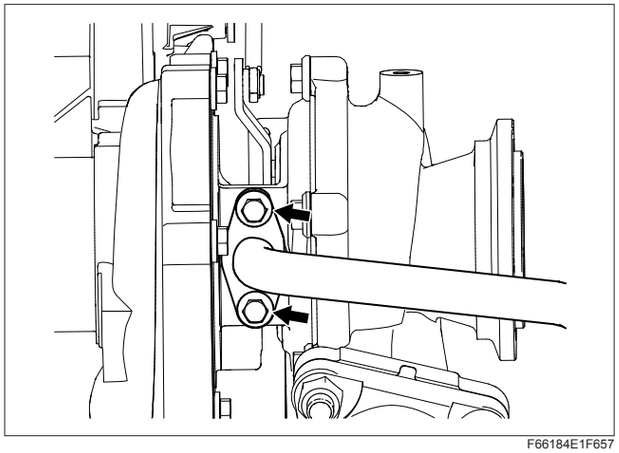
12. Remove supercharger oil intake pipe assembly

13. Remove bolt at the cylinder block end of return pipe component of turbocharger



DDB740672308

14. Remove 2 bolts, and remove return pipe component of turbocharger and the gasket of return pipe component of turbocharger

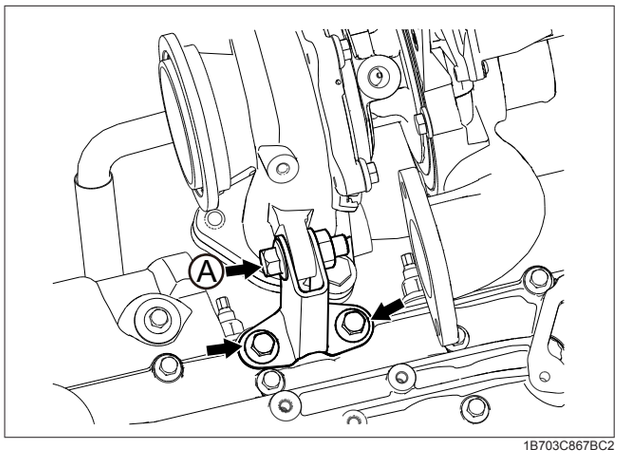


F66184E1F657

Notice

› Gasket of return pipe component of turbocharger is a disposable part.

15. Remove 3 bolts, and remove turbocharger bracket



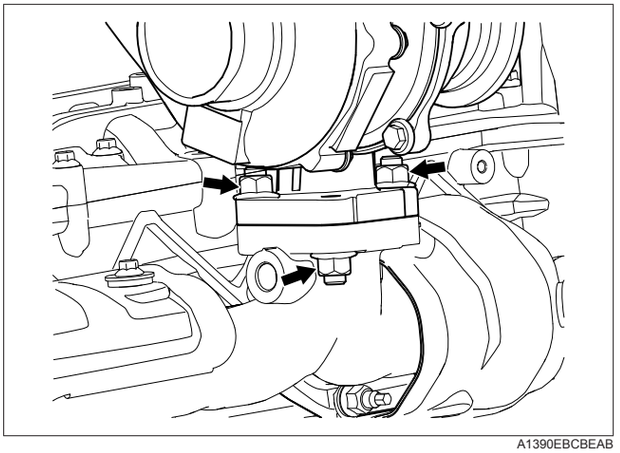
1B703C867BC2

Notice

› Bolt A is a disposable part.

› Turbocharger bracket is a disposable part.

16. Remove 3 turbocharger retaining nuts, and remove turbocharger assembly and the turbocharger inlet gasket



A1390EBCBEAB

Notice

› Turbocharger inlet gasket is a disposable part.

› Turbocharger retaining nut is a disposable part.

Installation

Warning

› Make sure that the hot parts are cooled before proceeding to avoid burns.

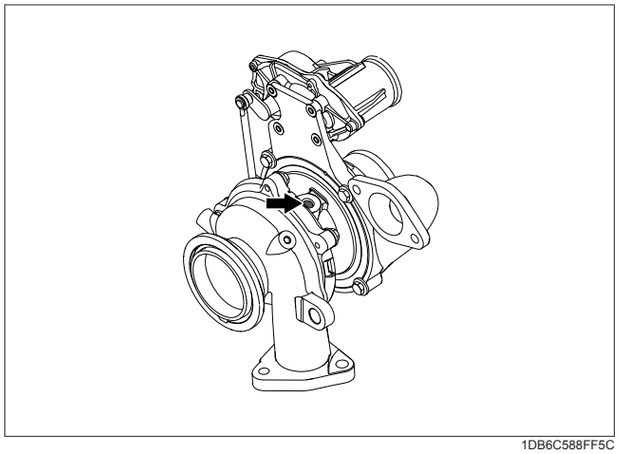
› According to local regulations, the waste generated during the maintenance process should be properly handled.

Caution

› Replace the seal with a new one.

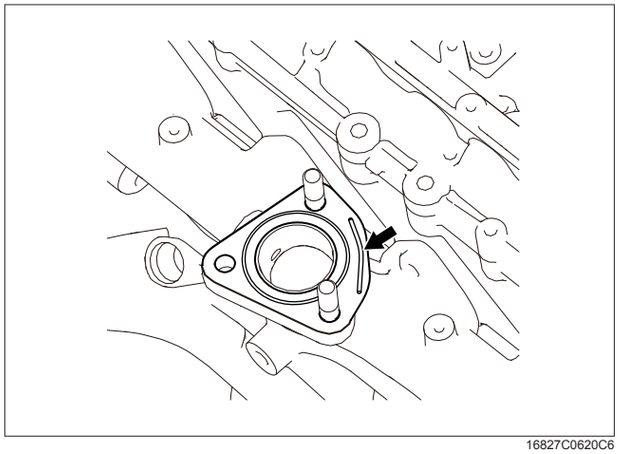
› Tighten the fastener according to the specified torque value.

1. Add an appropriate amount of oil at the oil inlet of turbocharger



1DB6C588FF5C

2. Gently turn the pinch wheel of turbocharger to check that no jamming or housing abrasion is found during rotation
3. Wipe off residual oil on the housing surface of turbocharger
4. Install new turbocharger inlet gasket to exhaust manifold

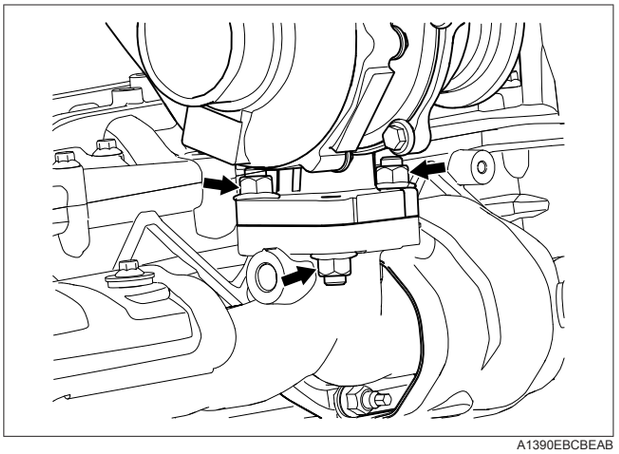


16827C0620C6

Notice

› The position shown serves as a reminder for preventing omission in installation.

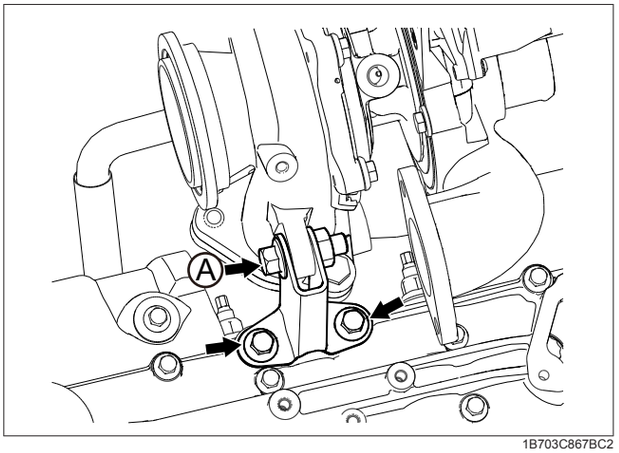
5. Visually check for missing, bent or rusted pins of turbocharger electric control actuator
6. Install turbocharger assembly, and tighten 3 new turbocharger retaining nuts



A1390EBCBEAB

Tightening torque: (55 ± 3) N·m

7. Install new turbocharger bracket components and bolt A, and tighten 3 bolts

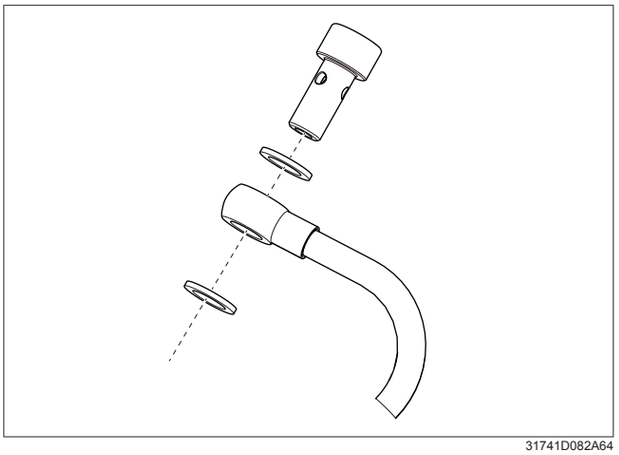


1B703C867BC2

The tightening torque of bolt A: (55±3)N·m

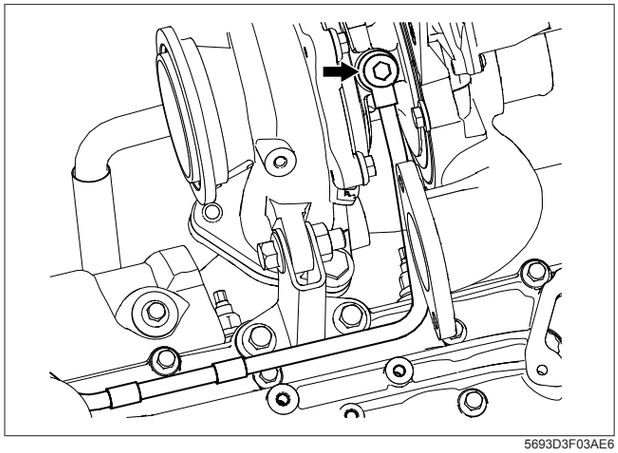
The tightening torque of bolt M8: (24±2)N·m

8. Install 1 long oil inlet bolt and 2 new oil inlet bolt gaskets at each end of the oil inlet pipe component of turbocharger



31741D082A64

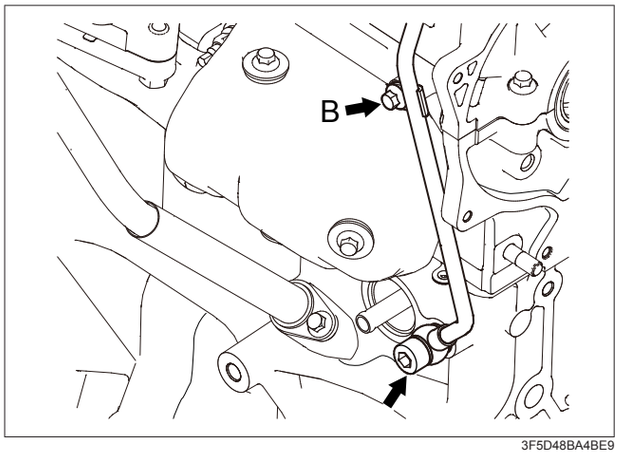
9. Tighten the long oil inlet bolts at the turbocharger end of the oil inlet pipe component of turbocharger



5693D3F03AE6

Tightening torque: (22 ± 2) N·m

10. Tighten bolt B and the long oil inlet bolts at the cylinder block end of the oil inlet pipe component of turbocharger

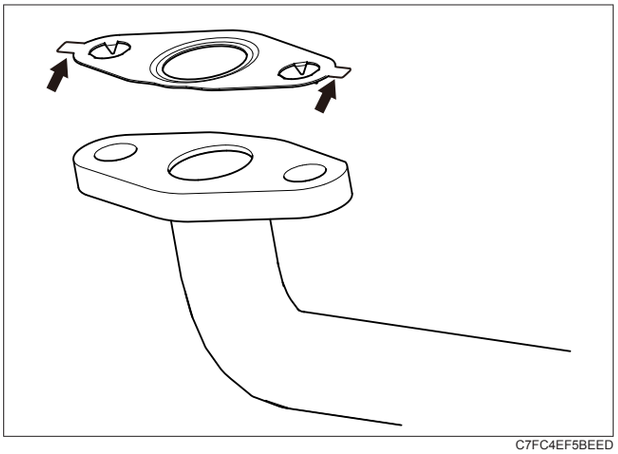


3F5D48BA4BE9

The tightening torque of bolt B: (10±1)N·m

Tightening torque of long oil inlet bolt: (22±2) N·m

11. Install return pipe component of turbocharger and new gasket of return pipe component

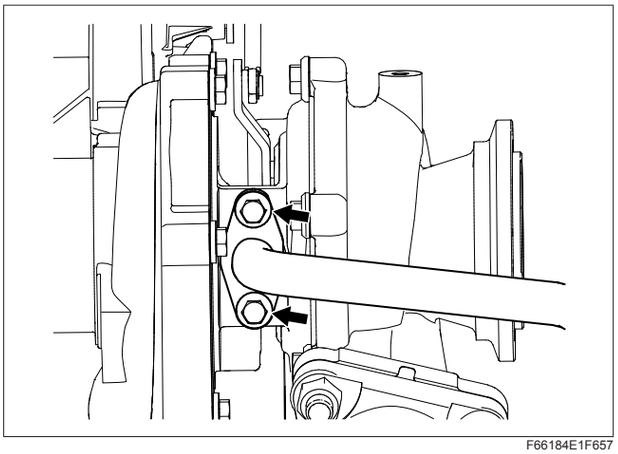


C7FC4EF5BEED

Notice

- The arrow position shown in the figure is the missing-part-preventing mark.
- The dog of the gasket mounting hole shall face the side of return pipe component of turbocharger.

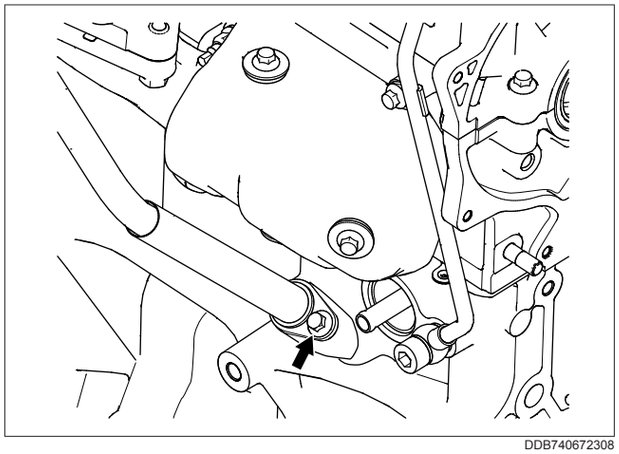
12. Tighten 2 bolts at the turbocharger end of the return pipe component of turbocharger



F66184E1F657

Tightening torque: (10 ± 1) N·m

13. Tighten 1 bolt at the cylinder block end of the return pipe component of turbocharger



DDB740672308

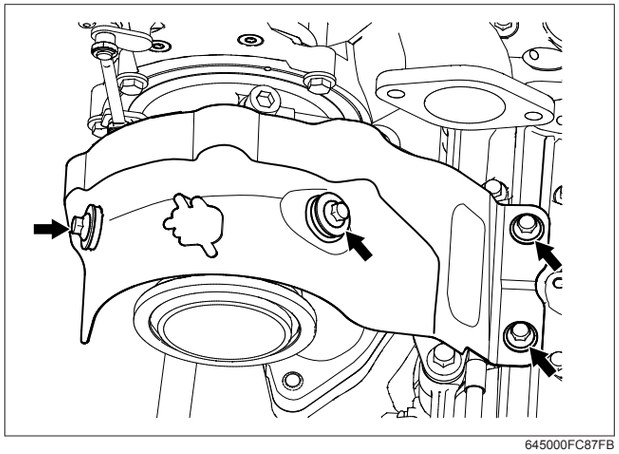
Tightening torque: (10 ± 1) N·m

⚠ Caution

› Before installation, apply lubricating oil of appropriate amount to the joint of the fuel return pipe assembly, to avoid the accumulation of oil film at the edge of the joint surface after assembly.

› After assembly, the oil stains around the fuel return holes shall be removed to prevent false leakage.

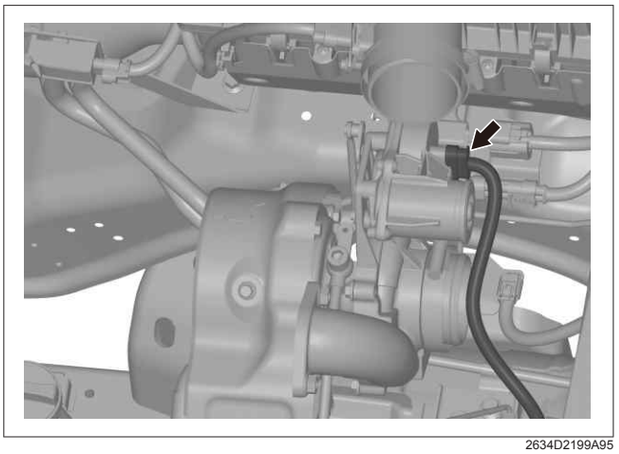
14. Install thermal shroud component of turbocharger, and tighten 4 bolts



645000FC87FB

Tightening torque: (10 ± 1) N·m

15. Install 1 connector



2634D2199A95

16. Install lean NOx trap

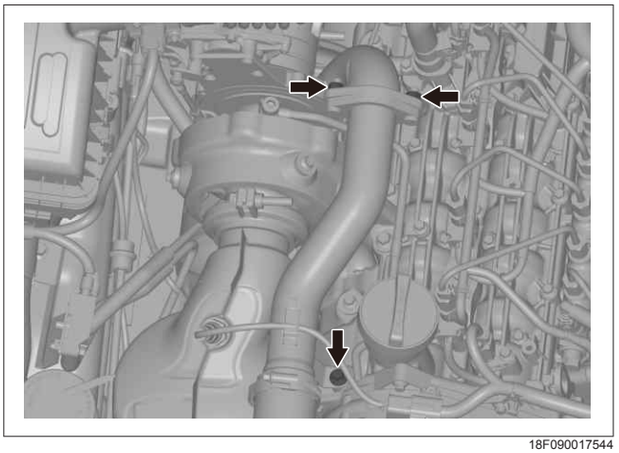
17. Install intercooler intake pipe and turbocharger outlet flange gasket

⚠ Caution

› The disconnected pipelines and joints must be protected from entering debris.

› Turbocharger outlet flange gaskets are disposable parts.

18. Install 2 nuts and 1 bolt



18F090017544

19. Install air filter outlet pipe

20. Install crankcase ventilation pipe

21. Connect the negative terminal of the battery.

Starter and generator system (GW4D20M)

Starter/generator system ..... 11－1
Specified torque ..... 11－1
Starter ..... 11－2
Structural diagram ..... 11－2
Inspection ..... 11－3
Removal/installation ..... 11－4
Generator ..... 11－5
Structural diagram ..... 11－5
Check ..... 11－6
Removal/installation ..... 11－7

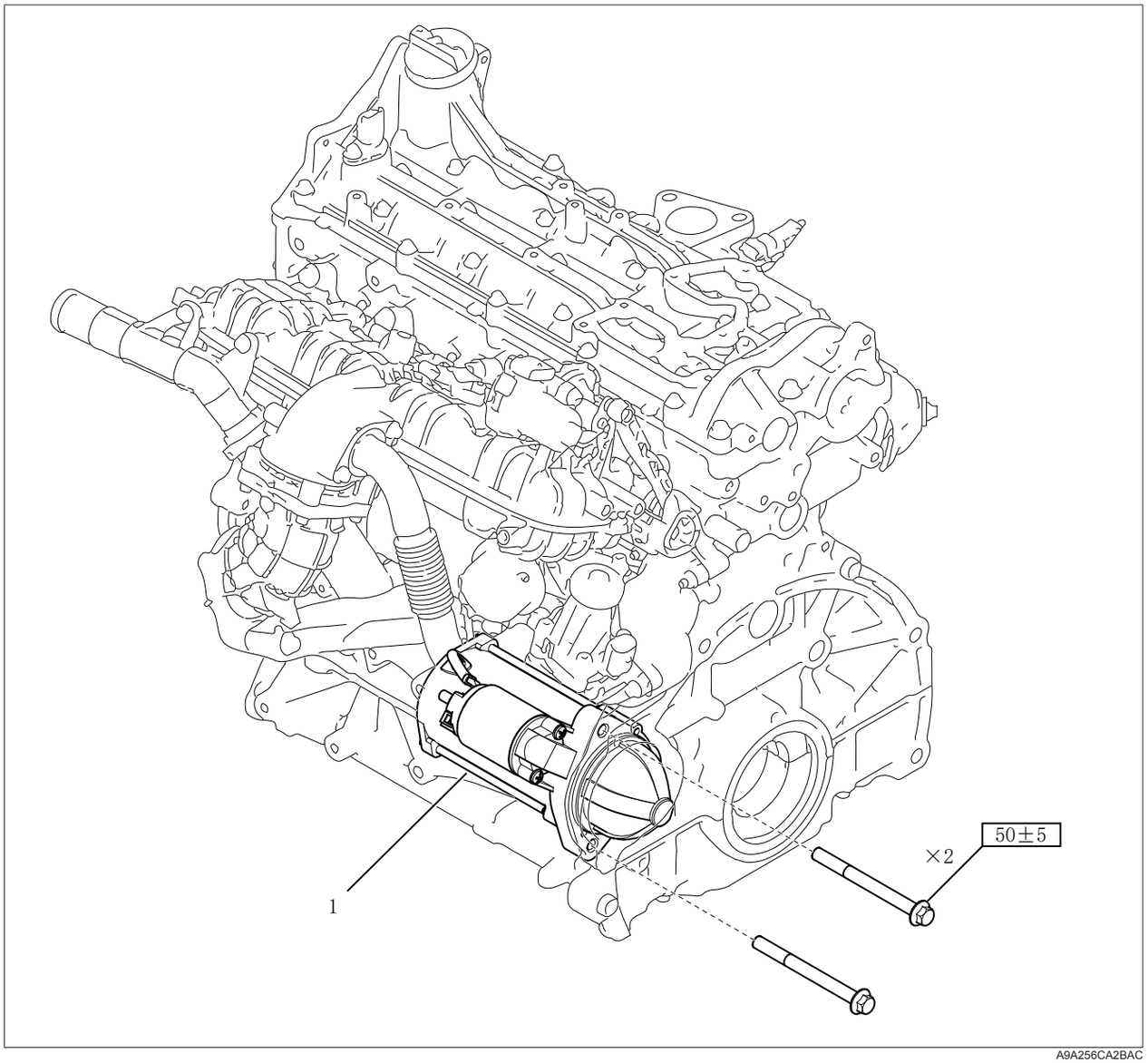
Starter/generator system

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Starter x cylinder block, transmission housing	50±5	2	—
Nut	Nut x starter B+ terminal	13±2	1	—
Bolt	Generator assembly x compressor bracket	45±2	2	—

Starter

Structural diagram

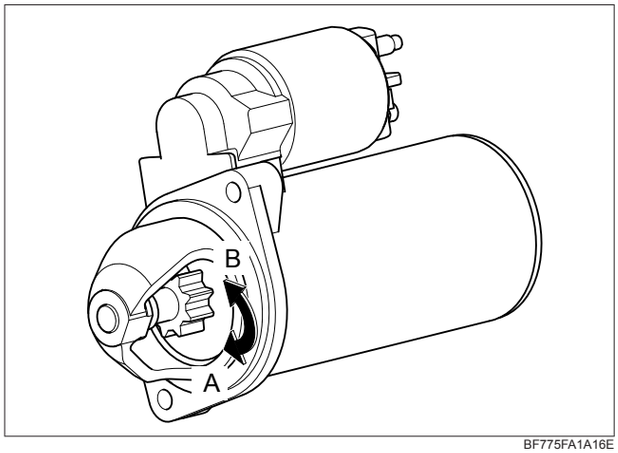


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1. Starter

Inspection

1. Confirm the working state of the starter on the vehicle and confirm the speed at which the starter drives the engine to rotate
   - If the engine does not rotate or the engine speed is above 120 rpm, it is necessary to check other parts for problems.
   - If the engine speed is slow, check if the voltage of the battery is > 10 V when the starter is driving the engine to rotate. If it is <10 V, please check the battery state.
2. Remove starter
3. Turn the starter drive gear by hand to confirm that it can rotate clockwise and cannot rotate counterclockwise



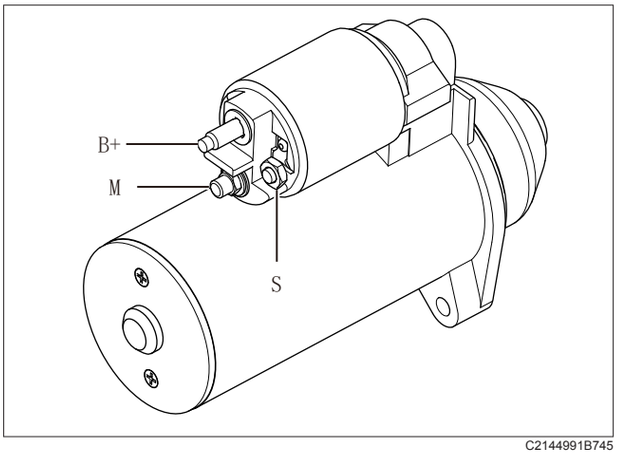
BF775FA1A16E

In the diagram:

A: Turn clockwise

B: Turn counterclockwise

4. The battery passes through the harness (the harness is as thick as possible, otherwise it will be very hot). The negative electrode is connected to the starter casing. Ensure good ground contact. Connect B+ and S terminals to the positive electrode and confirm whether the starter drive gear is popped or rotated



C2144991B745

In the diagram:

M: motor end

B+: starter power supply terminal, directly connected to the positive terminal of the battery

S: the starter control terminal. When the power is on, the starter works. When the power is off, the starter does not work

⚠ Warning

- Ensure to complete step within 5 s to prevent ablation of starter coil.
- Avoid multiple starts in succession to prevent damage to the starter.

5. Disconnect negative lead from the starter housing, and check to make sure that the clutch small gear stops moving and returns to original position

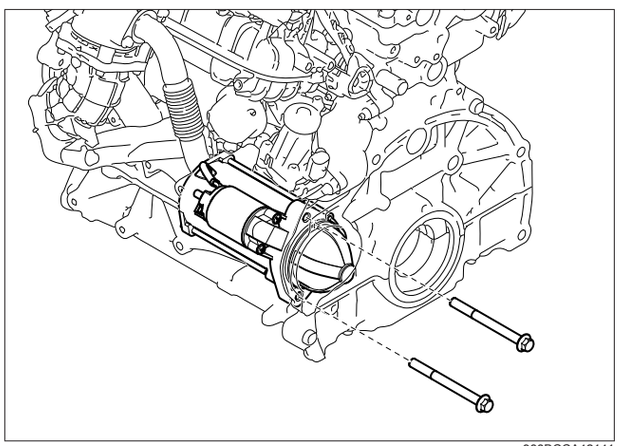
Removal/installation

Removal

⚠ Warning

› To avoid burns, do not operate while the engine is still at a high temperature.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove electronic throttle
4. Remove connecting pipe for intake manifold
5. Remove starter B+ nut, and remove harness
6. Disconnect harness at starter S end
7. Remove 2 bolts



988BCCA42141

8. Remove starter assembly

Installation

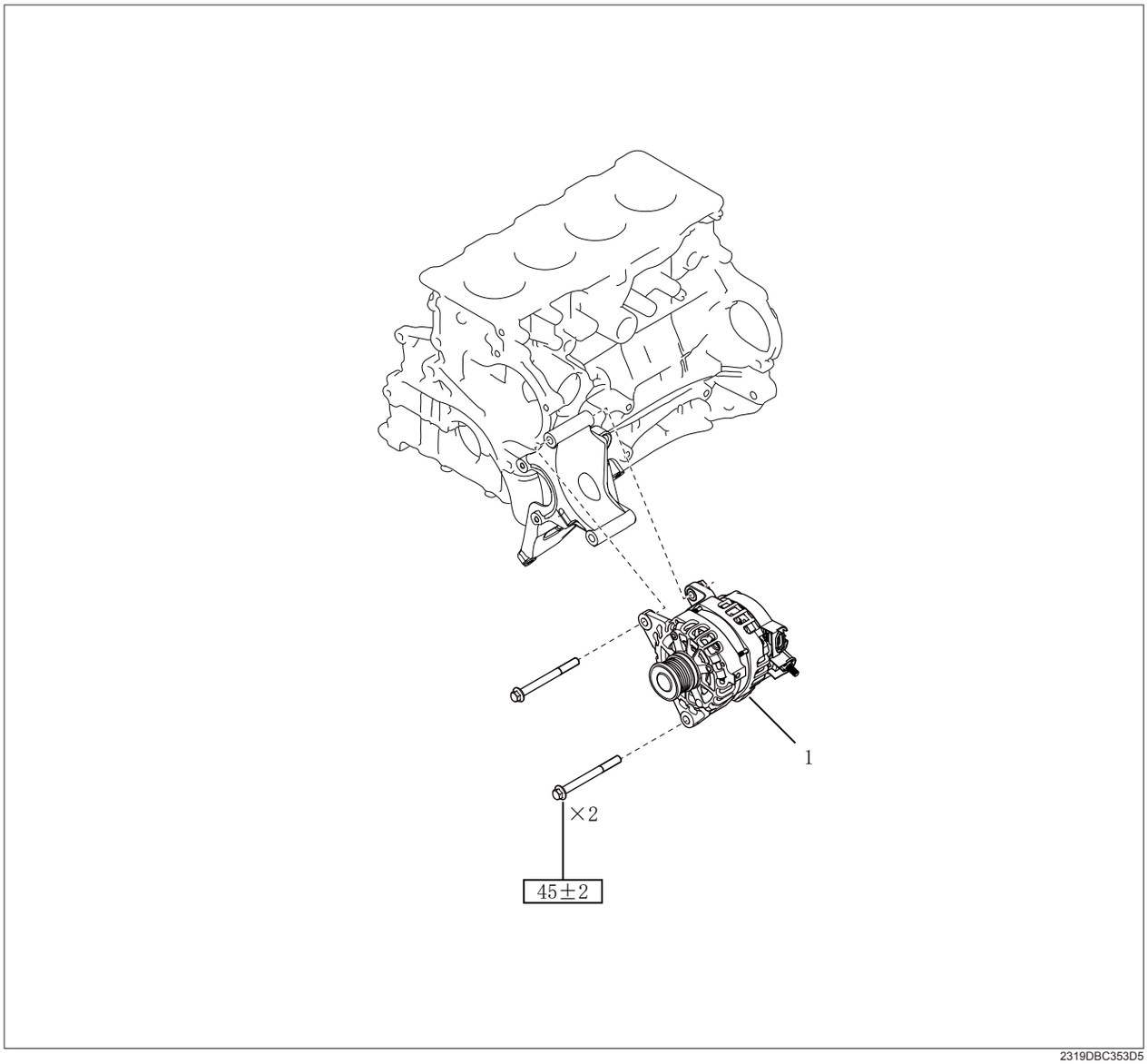
⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Perform installation work in reverse order of removal

Generator

Structural diagram



2319DBC353D5

1. Generator assembly

Check

Common causes of failure:

› Generator belt is too loose.

› Poor contact or open-circuit of battery terminal, vehicle body ground, generator terminal B+ and generator terminals.

› Internal fault of generator.

› Excessive generating capacity due to regulator ablation.

1. Check if generator belt is too loose
2. Check if battery terminal is loose
3. Check if the connecting harness of the generator B+ and L terminals is loose
4. Check if the battery fuses and connection lines are loose, corroded or ablated
5. Place multimeter at DC voltage scale
6. Connect the red and black probes to the positive and negative terminals of the battery respectively

   Voltage indicated on the multimeter shall be no lower than 12 V.

Notice

› If the battery voltage is below 12 V, charge the battery according to charging requirements. After charging, use the battery tester to check the results, showing the voltage, lifespan and necessity for replacement.

7. When the engine is shut down and the power is cut off, set the multimeter to the buzzer.
8. Measure the continuity of the line between the generator housing and the negative terminal of the battery, and the line between the generator B+ and the positive terminal of the battery.

   If the line is broken, replace the harness.
9. Place multimeter at DC voltage scale
10. Start the engine to accelerate the engine speed to 3000 rpm, and measure the voltage between the generator terminal B+ and the generator housing.

    The normal voltage is (13~15.5) V

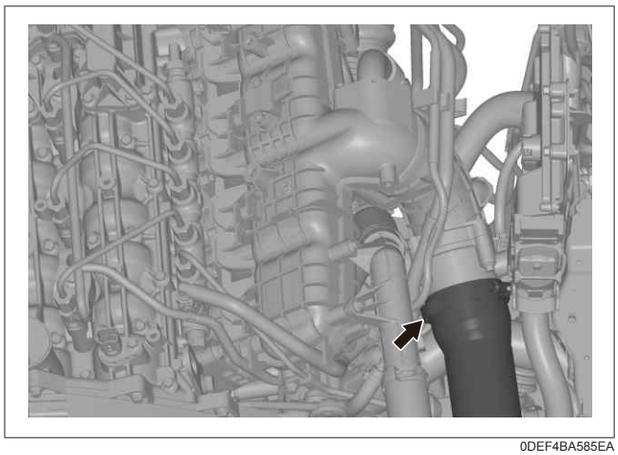
Notice

› If the power generated is lower than 13 V or higher than 15.5 V, replace the generator.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect 1 pipeline

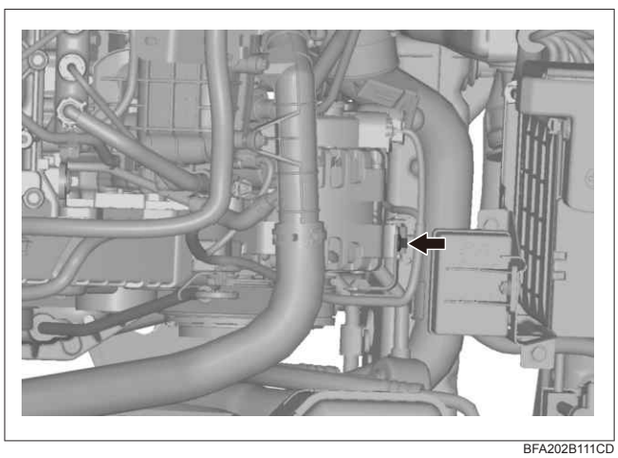


0DEF4BA585EA

⚠ Caution

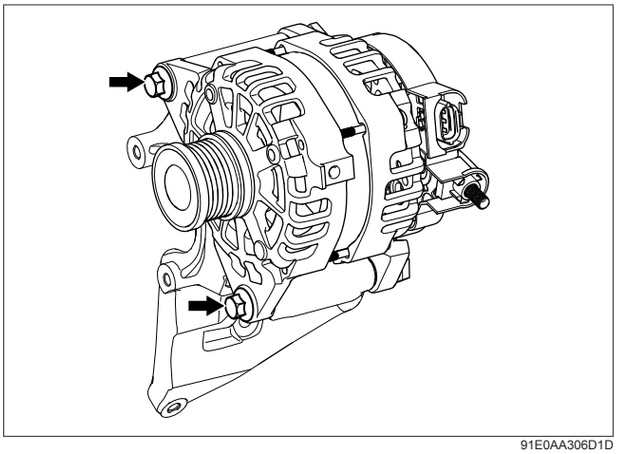
› The disconnected pipelines and joints must be protected from entering debris.

4. Remove 1 bolt for harness bracket



BFA202B111CD

5. Remove generator belt
6. Unscrew generator B+ nut, and remove harness
7. Disconnect harness at connector end of generator
8. Remove 2 bolts, and remove generator assembly



91E0AA306D1D

Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

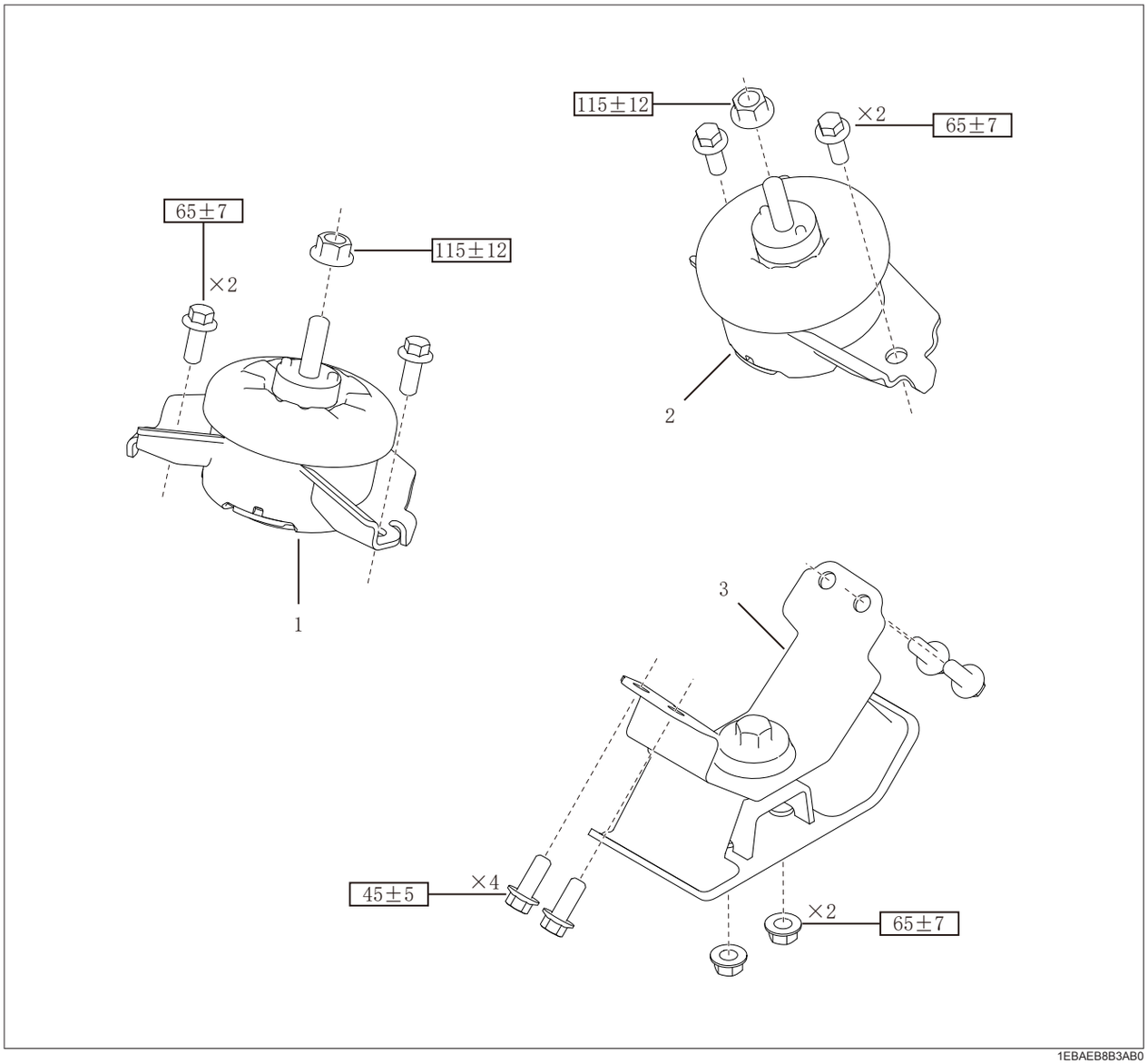
1. Perform installation work in reverse order of removal

Mount device (GW4D20M)

Mount device .....12－1
Structural diagram .....12－1
Specified torque.....12－2
Left mount .....12－3
Removal/installation.....12－3
Right mount .....12－5
Removal/Installation of .....12－5
Transmission mount .....12－7
Removal/installation.....12－7
Mount bracket.....12－9
Structural diagram .....12－9

Mount device

Structural diagram



1EBAEB8B3AB0

1. Left engine mount
2. Right engine mount
3. Transmission mount

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Left mount x frame	65±7	2	Sealant application
Bolt	Right mount x frame	65±7	2	Sealant application
Nut	Left mount x left engine mount bracket	115±12	1	Sealant application
Nut	Right mount x right engine mount bracket	115±12	1	Sealant application
Bolt	Transmission mount x transmission	45±5	4	Sealant application
Nut	Transmission mount x four beams of frame	65±7	2	Sealant application
Bolt	Left engine mount bracket x cylinder block	60±2	4	—
Bolt	Right engine mount bracket x cylinder block	60±2	4	—

Left mount

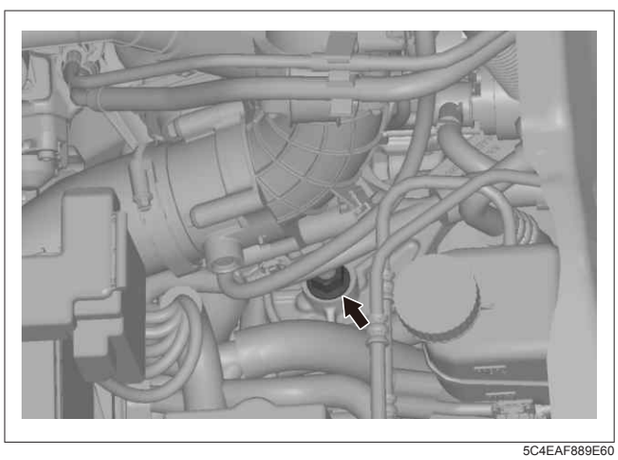
Removal/installation

Removal

⚠ Caution

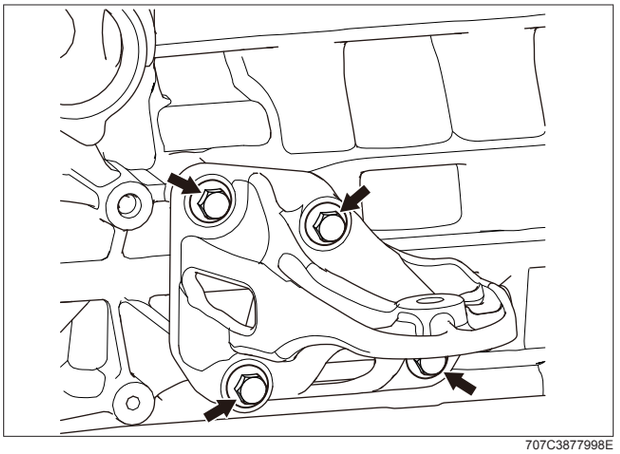
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Disconnect intercooler air outlet pipe
2. Remove inlet pipe bracket
3. Disconnect intake adapter
4. Remove intake adapter bracket
5. Remove harness bracket
6. Remove ground wire
7. Support the engine in a proper manner
8. Remove 1 nut



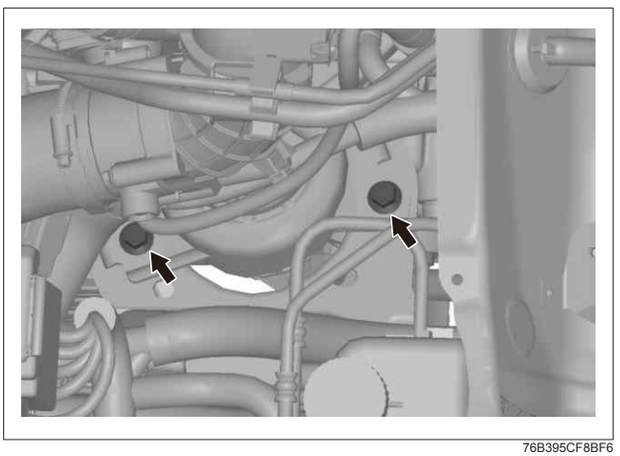
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9. Remove 4 bolts, and remove left engine mount bracket



707C3877998E

10. Remove 2 bolts



76B395CF8BF6

11. Remove left engine mount

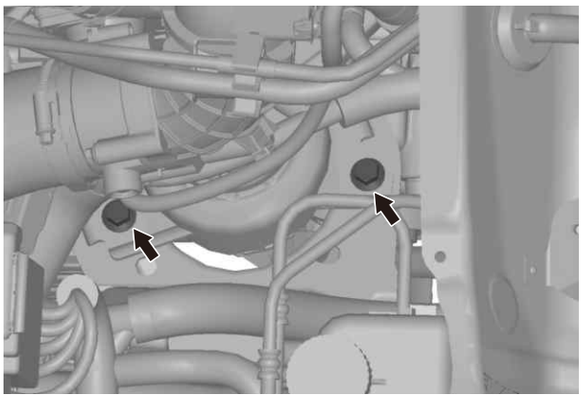
Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install left engine mount to the proper position

2. Install 2 bolts

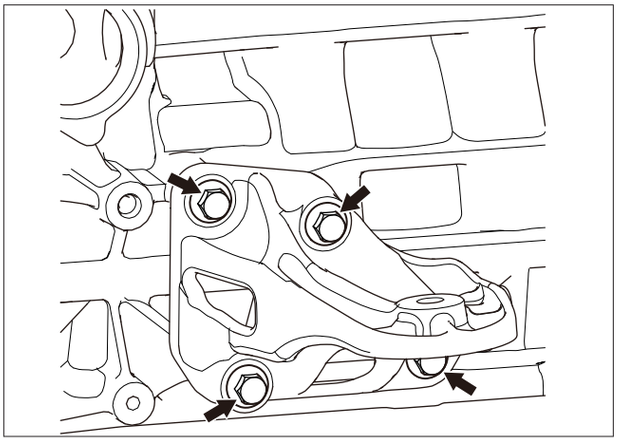


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⚠ Caution

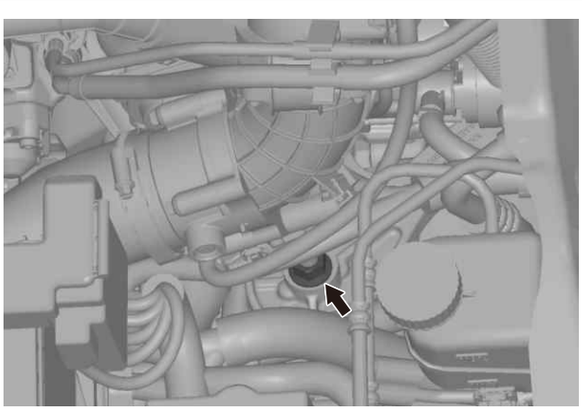
› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

3. Install left engine mount bracket, fasten the 4 bolts



707C3877998E

4. Install 1 nut



5C4EAF889E60

5. Install ground wire
6. Install harness bracket
7. Install the intake adapter bracket
8. Connect intake adapter
9. Install inlet pipe bracket
10. Connect intercooler air outlet pipe

Right mount

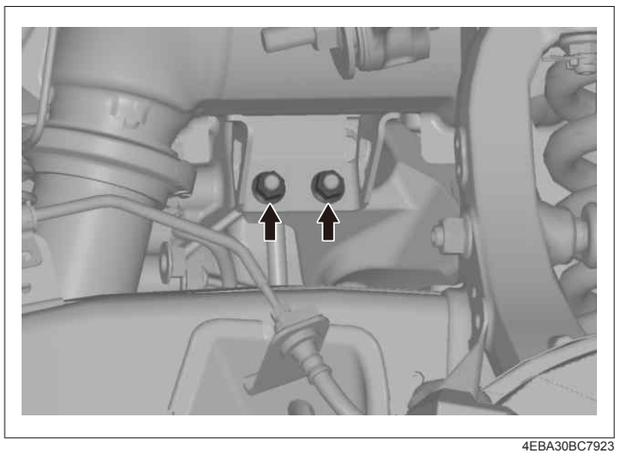
Removal/Installation of

Removal

⚠ Caution

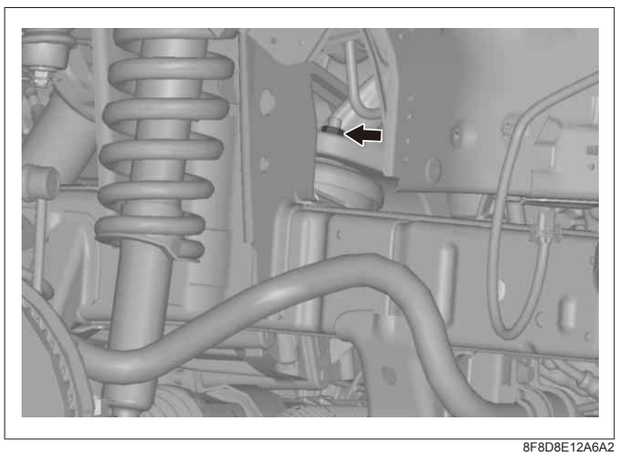
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove lean NOx trap
4. Remove diesel particulate filter
5. Remove engine lower guard
6. Remove 2 nuts



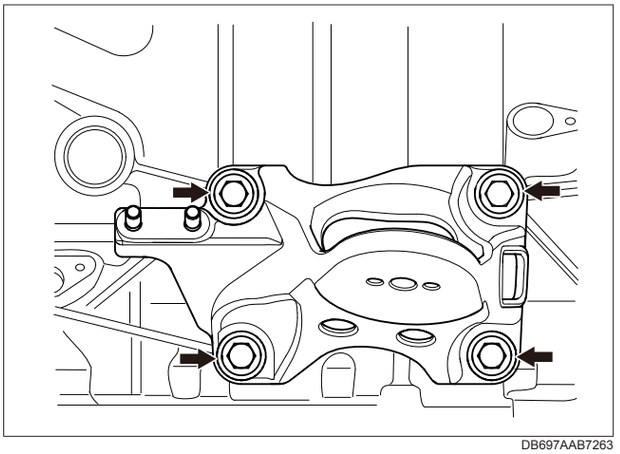
4EBA30BC7923

7. Support the engine in a proper manner
8. Remove 1 nut



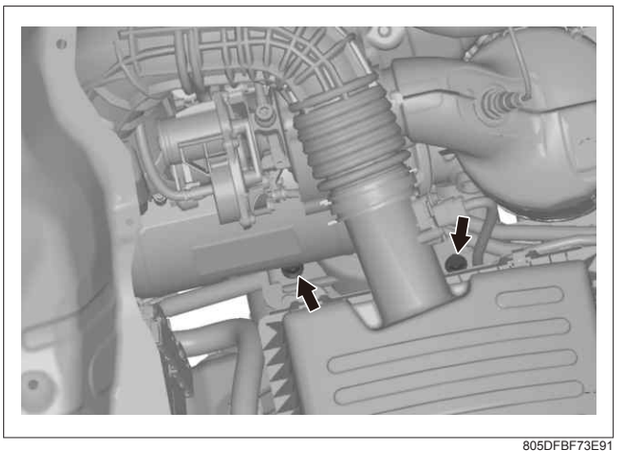
8F8D8E12A6A2

9. Remove 4 bolts, and remove right engine mount bracket



DB697AAB7263

10. Remove 2 bolts



805DFBF73E91

11. Remove right engine mount

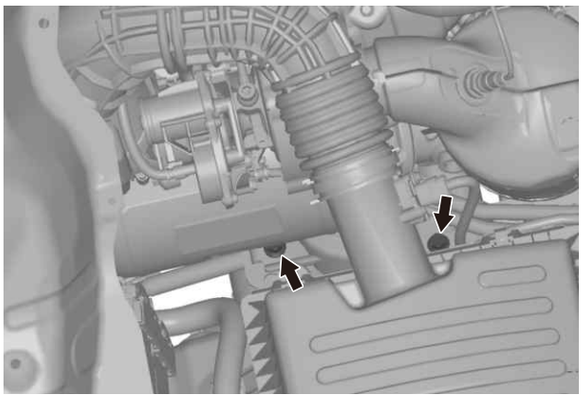
Installation

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install right engine mount to the proper position

2. Install 2 bolts

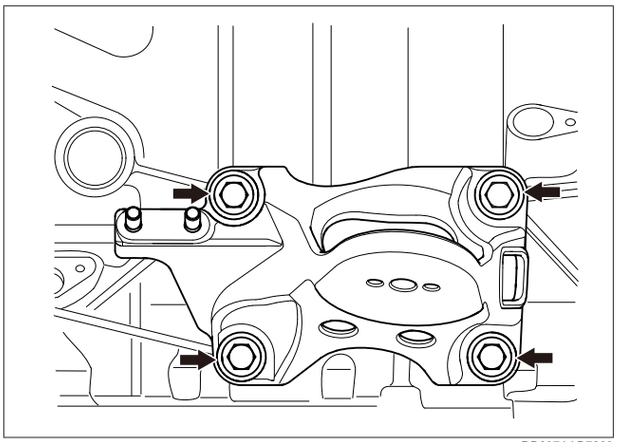


805DFBF73E91

⚠ Caution

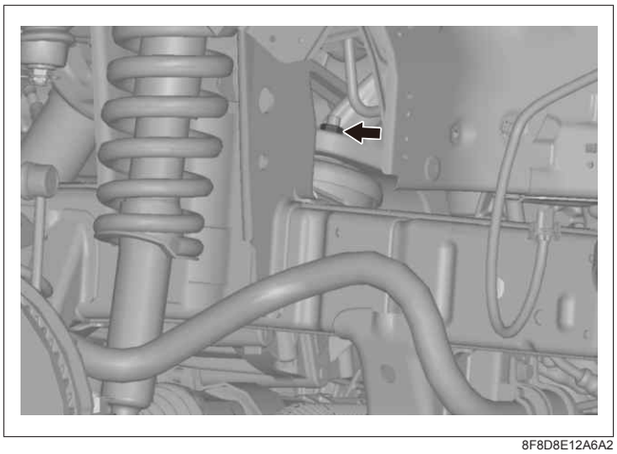
› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

3. Install the right engine mount bracket, and tighten 4 bolts.



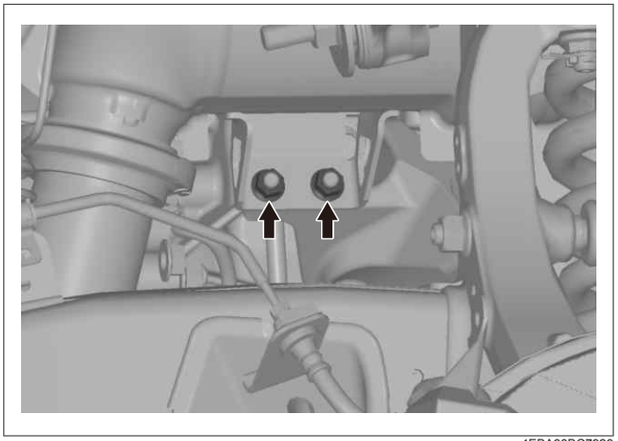
DB697AAB7263

4. Install 1 nut



8F8D8E12A6A2

5. Install 2 nuts



4EBA30BC7923

6. Install engine lower guard
7. Install diesel particulate filter
8. Install lean NOx trap
9. Connect the negative terminal of the battery.

Transmission mount

Removal/installation

Removal

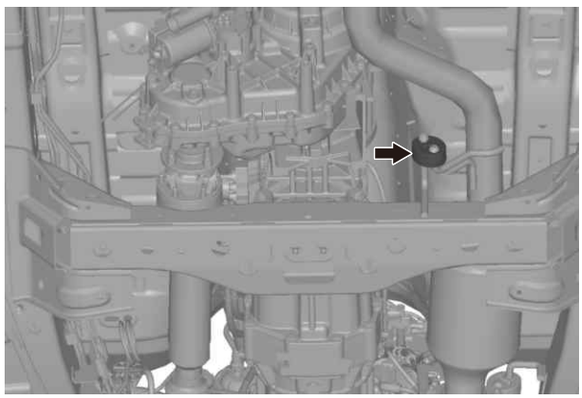
⚠ Warning

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

⚠ Caution

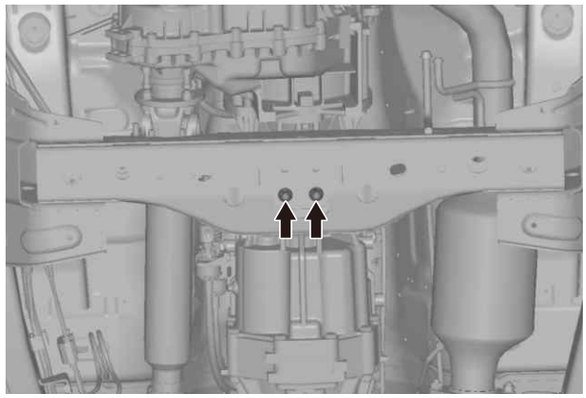
› If it is difficult to remove the fastener, spray an appropriate amount of rust agent on the fastener, and remove it in the order of tightening and loosening, that is, turn it in tightening direction, and then slowly loosen it in bilateral symmetry.

1. Turn off the ignition switch.
2. Raise the vehicle to an appropriate position
3. Properly support the transmission
4. Loosen 1 rubber hanger



63FE71C36B4B

5. Remove 2 nuts

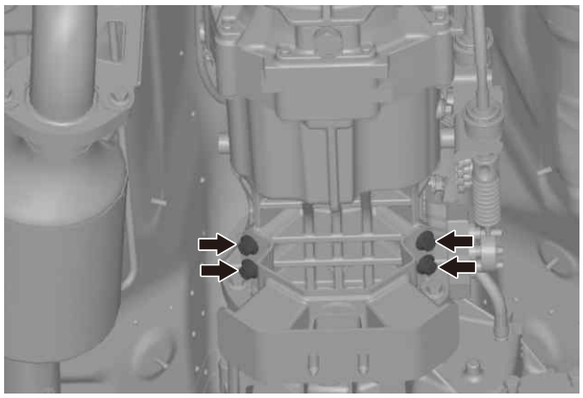


DE2B570A6D33

⚠ Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

6. Remove fourth beam
7. Remove 4 bolts



EDE2B4109F72

⚠ Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

8. Remove transmission mount

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

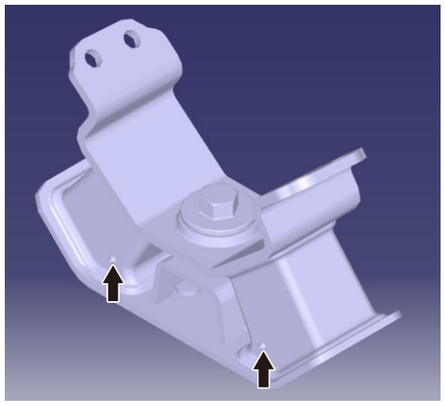
⚠ Warning

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

⚠ Caution

› Tighten the fastener according to the specified torque value.

1. Install transmission mount correctly

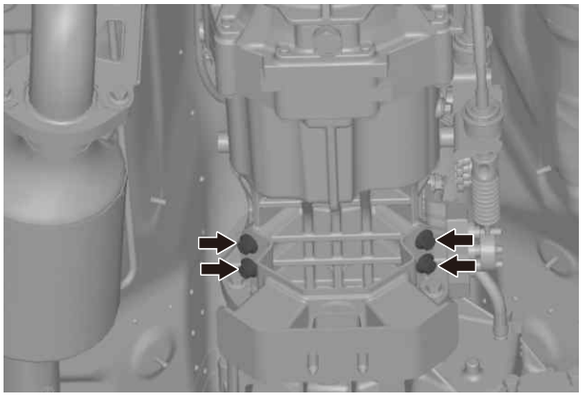


78EA56452C27

⚠ Caution

› The injecting port (where the gel is raised) faces toward the rear of the vehicle.

2. Tighten 4 bolts



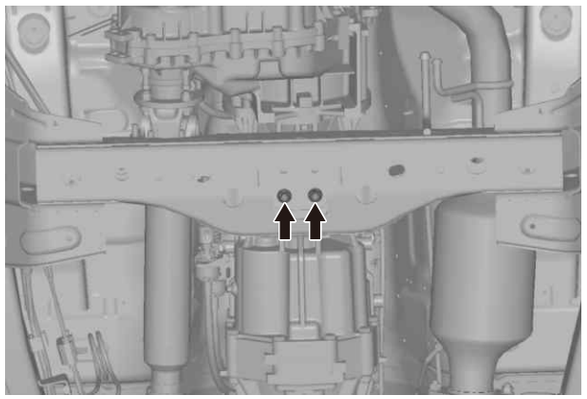
EDE2B4109F72

⚠ Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

3. Install the 4th beam

4. Tighten 2 nuts

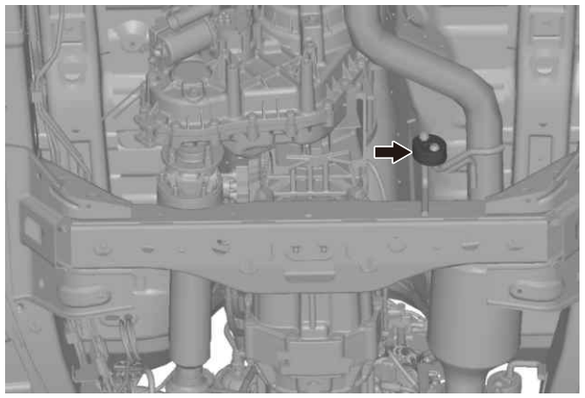


DE2B570A6D33

⚠ Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

5. Install 1 rubber hanger

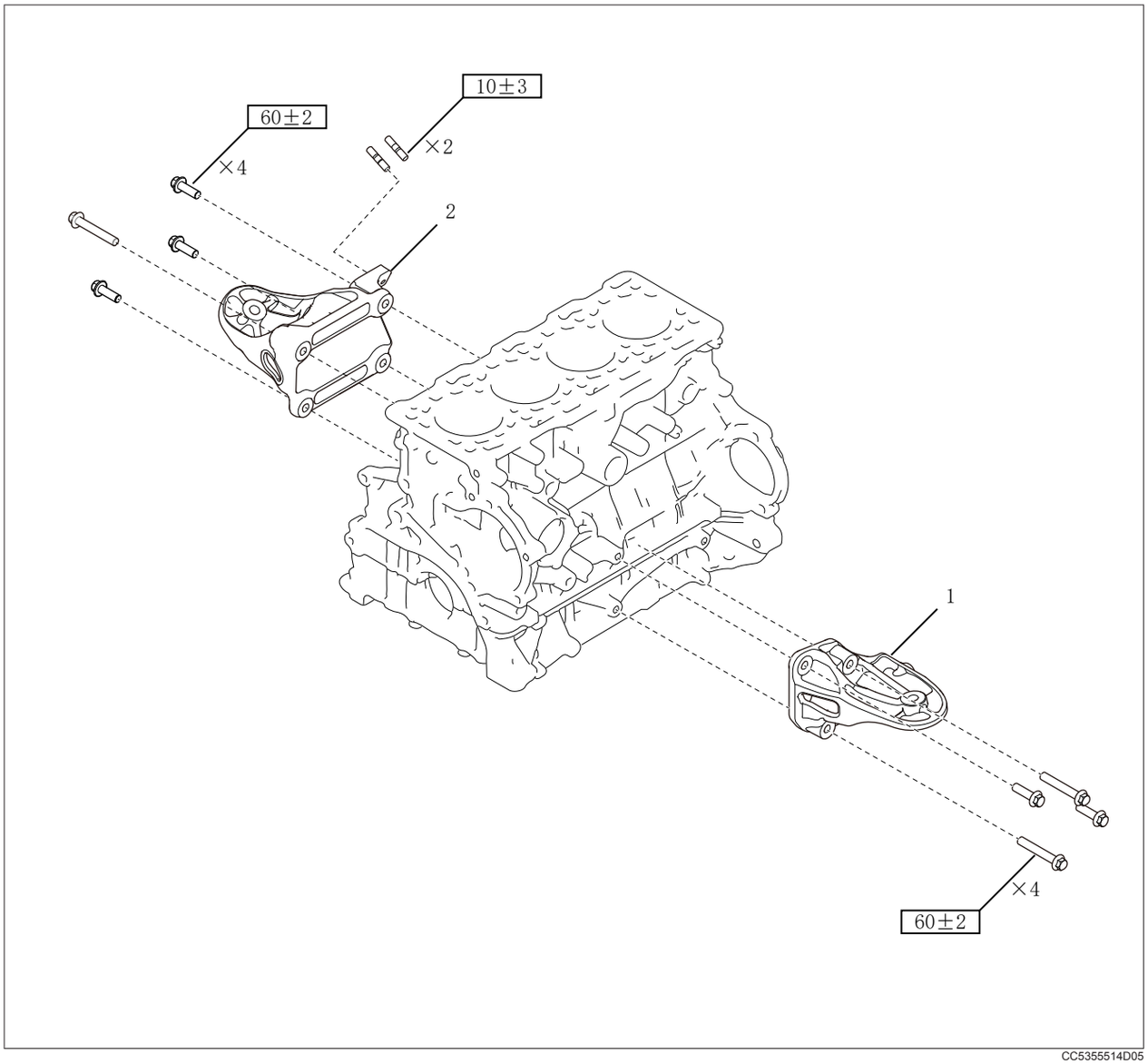


63FE71C36B4B

6. Lower the vehicle

Mount bracket

Structural diagram



CC5355514D05

1. Left engine mount bracket
2. Right engine mount bracket

Clutch system (GW4D20M)

Clutch system ..... 13－1
Fault symptom checklist ..... 13－1
Specified torque ..... 13－2
Clutch hydraulic system air bleed ..... 13－3
Clutch pedal ..... 13－4
Structural diagram ..... 13－4
Specification ..... 13－5
Removal/installation ..... 13－6
Clutch switch ..... 13－8
Location diagram ..... 13－8
Pin definition ..... 13－9
Check ..... 13－9
Removal/installation ..... 13－10
Clutch master cylinder ..... 13－12
Structural diagram ..... 13－12
Removal/installation ..... 13－13
Clutch ..... 13－15
Structural diagram ..... 13－15
Check ..... 13－16
Removal/installation ..... 13－16

Clutch system

Fault symptom checklist

Symptom	Suspected position of symptom
Clutch shakes	› Engine mount loosened › Excessive run-out, oil stain, wear, abrasion, or damaged hub spline groove of clutch driven plate › Separation finger of diaphragm spring deformed › Flywheel worn
Loose clutch pedal	› Intake of clutch pipeline › Clutch master cylinder cup damaged
Strange noise from clutch	› Clutch release bearing worn, dirty or damaged › Fingertip of diaphragm spring worn › Oil stain or damaged hub spline groove of clutch driven plate
Clutch slips	› Oil stain, wear, or exposed rivet of clutch driven plate › Diaphragm spring damaged › Pressure plate deformed › Flywheel deformed
Drag separation of clutch	› Intake of clutch pipeline › Clutch master cylinder cup damaged › Clutch slave cylinder damaged › Incorrect installation, excessive run-out, cracking, dirt or burnout, oil stain, lack of grease on spline parts, damage of clutch driven plate › Release bearing damaged › Link strip spring of clutch cover broken and deformed

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Pipeline joint M10	High-pressure hose of clutch x clutch slave cylinder	20±2	1	—
Nut	Clutch pedal x vehicle body	23±3	4	—
Bolt	Clutch x flywheel	23±3	6	—

Clutch hydraulic system air bleed

⚠ Caution

› Before clutch system repair or if you suspect the presence of air inside the clutch pipeline, you should first discharge air from the clutch hydraulic system.

› The operation is to be completed by multiple persons.

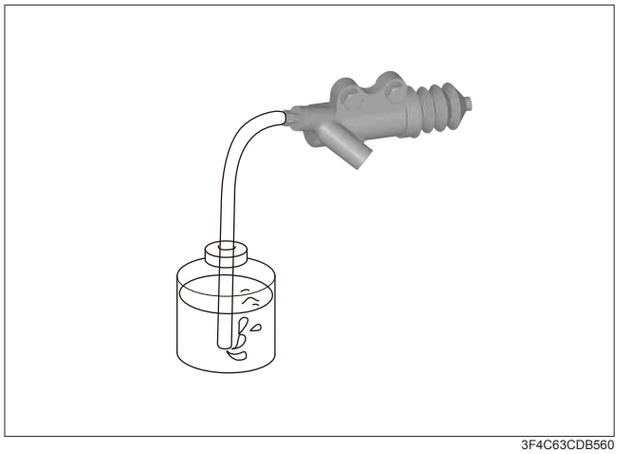
1. Top-up reservoir with brake fluid

⚠ Caution

› Brake fluid model: DOT4 synthetic brake fluid.

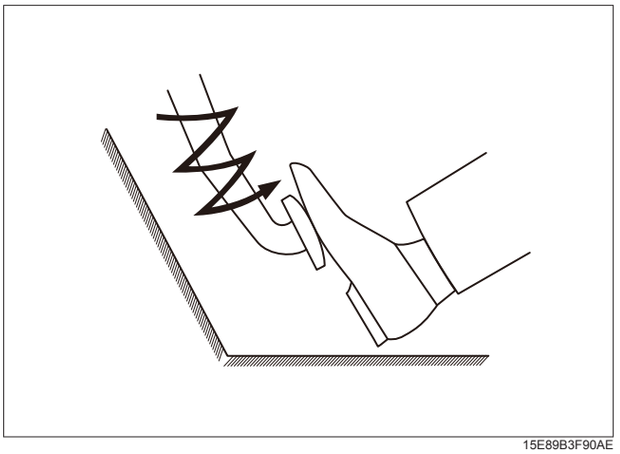
› The brake fluid level inside the reservoir should be somewhere between the “MAX” and “MIN” marks indicated.

2. Raise the vehicle to an appropriate position
3. Remove brake fluid reservoir and remove clutch bleed valve connection rubber cap
4. Connect one end of the plastic tube to bleed valve connection and hang the other end in the container



3F4C63CDB560

5. Step on the clutch pedal for a few times



15E89B3F90AE

6. Step clutch pedal down to lower limit and keep it, unscrew bleed valve connection and brake fluid flows out
7. Tighten bleed valve switch and then release clutch pedal
8. Repeat step 5 through step 7 until air in brake fluid is discharged

⚠ Caution

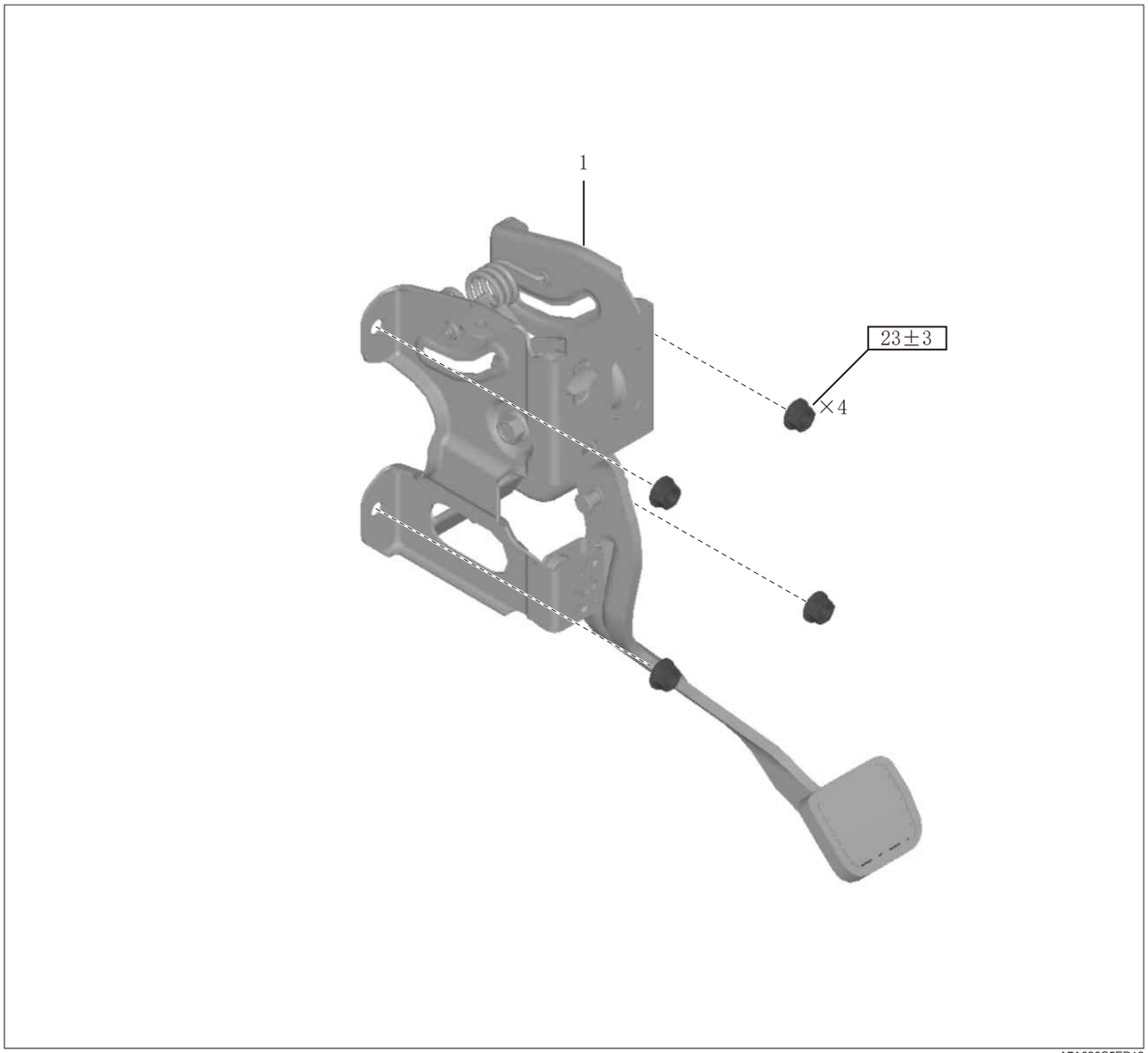
› Air bleeding are to be completed by multiple persons.

› Make sure that the brake fluid level is always between the MIN and MAX lines during the discharge, and add the fluid if it is not so.

9. After air bleeding, fill brake fluid until the level is at MAX position of brake fluid reservoir
10. Close bleed valve rubber cap and close brake fluid reservoir
11. Check and adjust clutch pedal free stroke once again

Clutch pedal

Structural diagram



A7A626C5ED12

1. Clutch pedal

Specification

Clutch pedal stroke: 140 mm

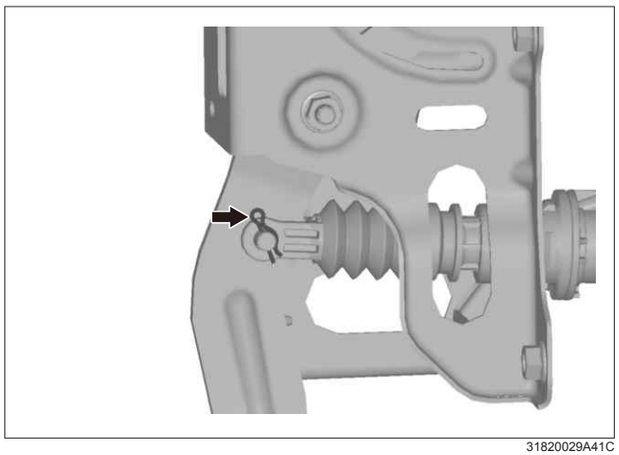
Clutch pedal free stroke: ≤ 15 mm

Clutch pedal height (distance from front wall): (180±10) mm

Removal/installation

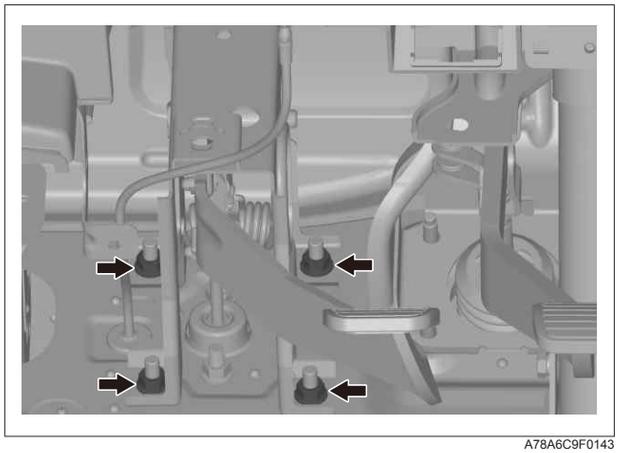
Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove fuse box cover of instrument panel
4. Remove clutch high-position and low-position switch
5. Disconnect the harness fixing point on clutch pedal
6. Remove 1 locking pin



31820029A41C

7. Remove 4 nuts

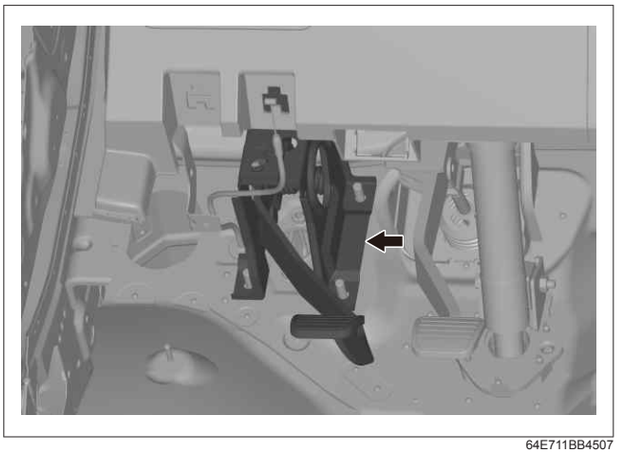


A78A6C9F0143

⚠ Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

8. Remove the clutch pedal



64E711BB4507

⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

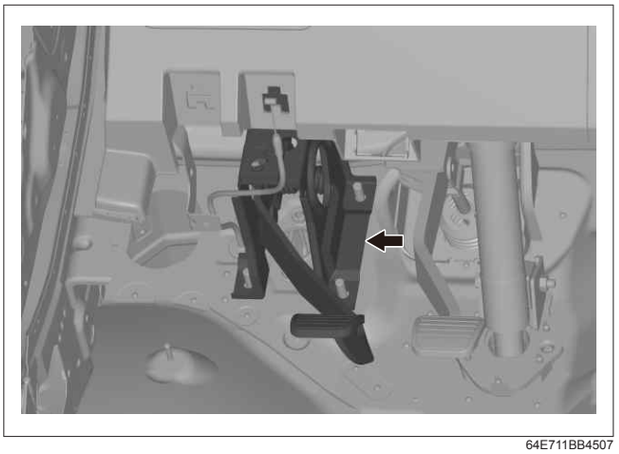
› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

Installation

⚠ Caution

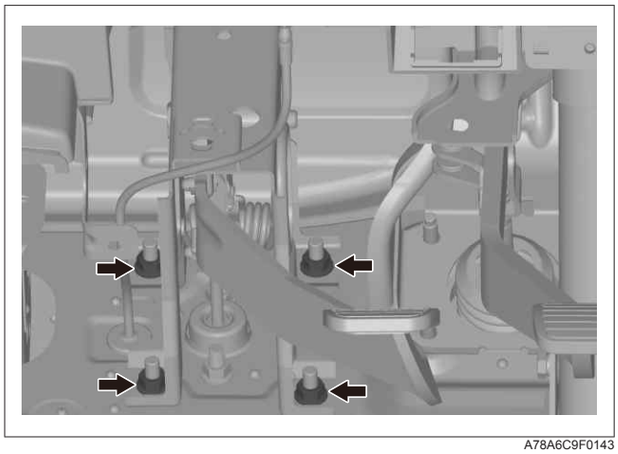
› Tighten the fastener according to the specified torque value.

1. Install clutch pedal to proper position



64E711BB4507

2. Install 4 nuts

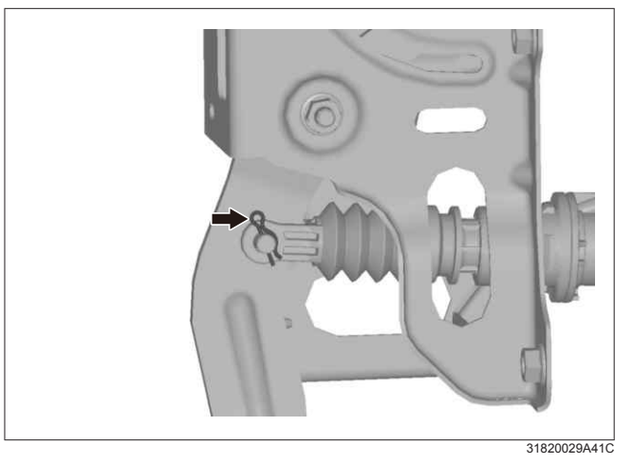


A78A6C9F0143

⚠ Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

3. Install 1 locking pin

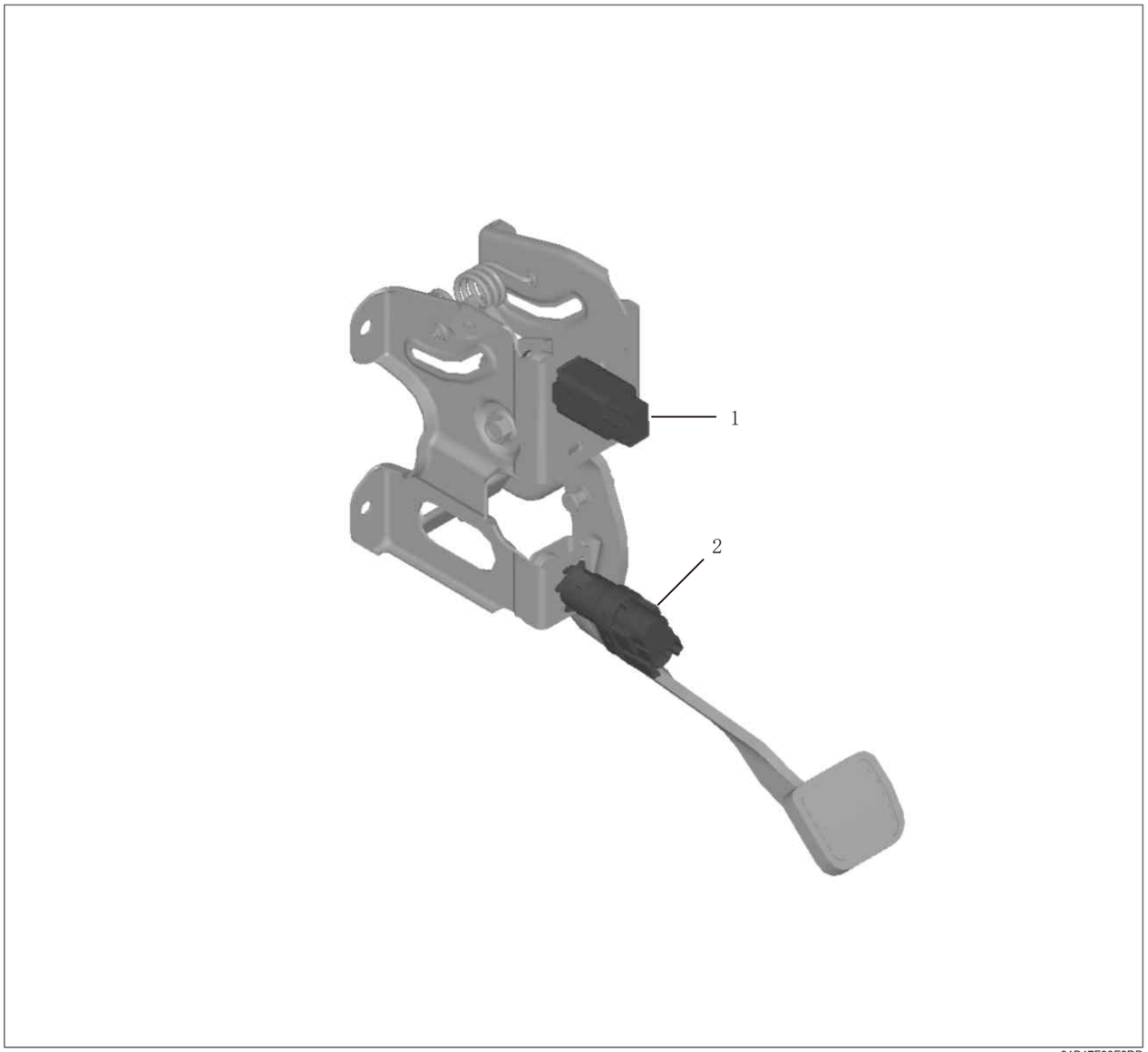


31820029A41C

4. Install the harness fixing point on clutch pedal
5. Install clutch high-position and low-position switch
6. Install fuse box cover of instrument panel
7. Install negative terminal of the battery

Clutch switch

Location diagram

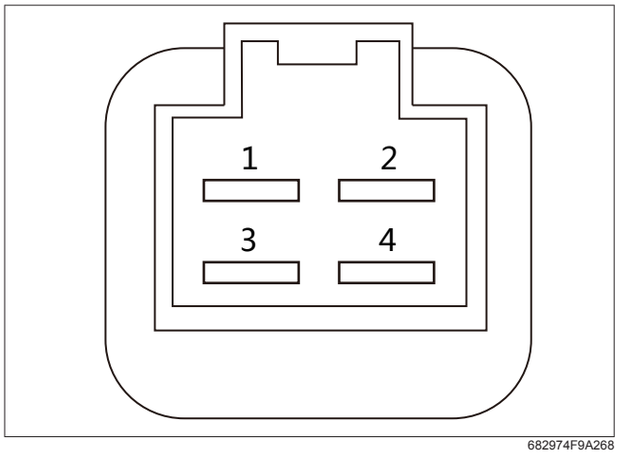


31B47F90F2DB

1. Clutch low-position switch
2. Clutch high-position switch

Pin definition

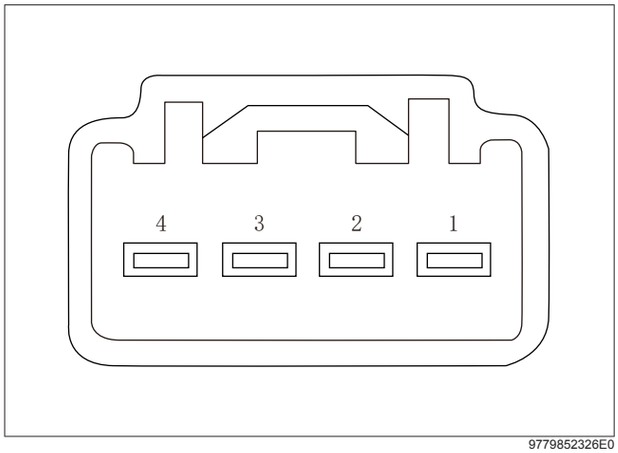
Clutch low-position switch



682974F9A268

Pin No.	Function
1	Power supply
2	GND
3	Signal input
4	Signal output

Clutch high-position switch



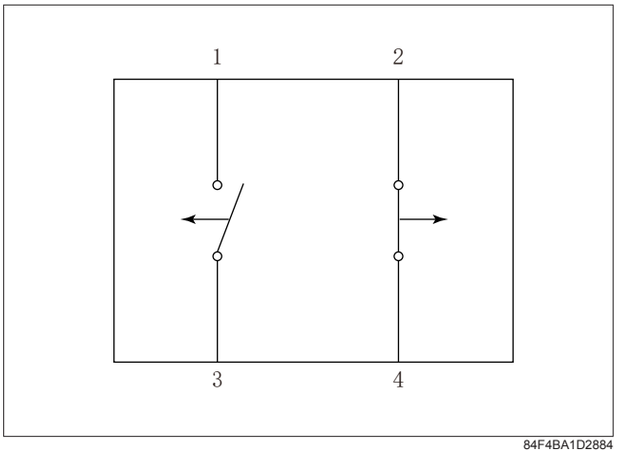
9779852326E0

Pin No.	Function
1	GND
2	—
3	—
4	Clutch signal

Check

1. Disconnect clutch switch plug
2. Check continuity between terminals

   Low clutch switch: terminal 1 and terminal 3 are conducting when clutch pedal is released, and terminal 2 and terminal 4 are conducting when clutch pedal is depressed.

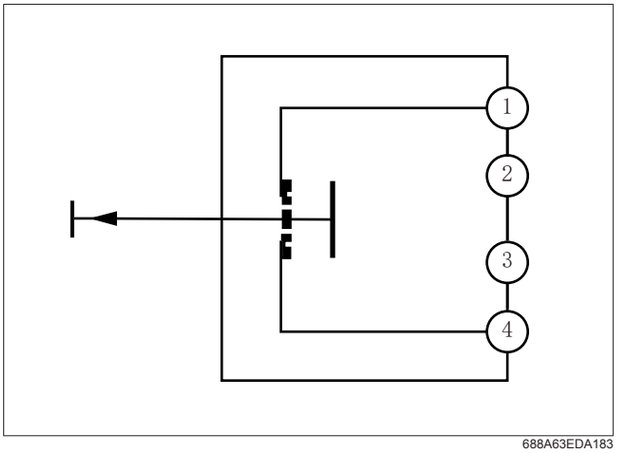


84F4BA1D2884

Notice

› The figure shows the pressed state of low clutch switch.

High clutch switch: terminal 1 and terminal 4 are conducting when clutch pedal is depressed, and not conducting when clutch pedal is released.



688A63EDA183

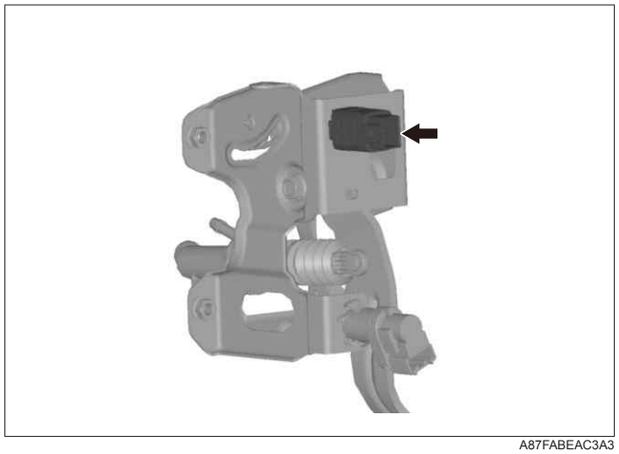
Notice

› If breakover does not meet the requirements, replace the clutch switch.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Disconnect 2 clutch switch harness connectors
4. Rotate 90° and remove clutch low-position switch



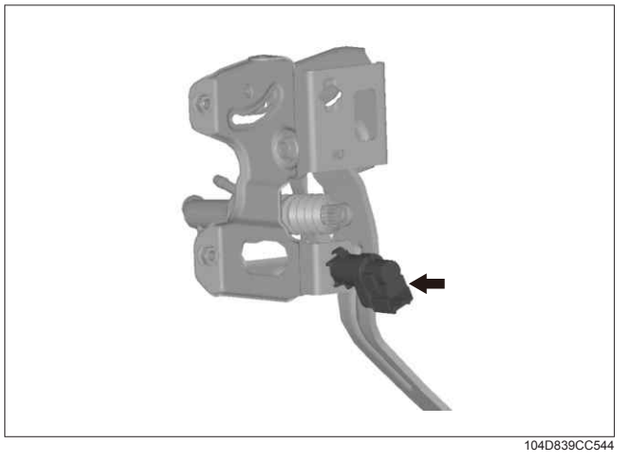
A87FABEAC3A3

⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

5. Step on clutch pedal, jack up the switch plunger to the end with fingers, and turn the switch 45° clockwise to unplug the clutch high-position switch



104D839CC544

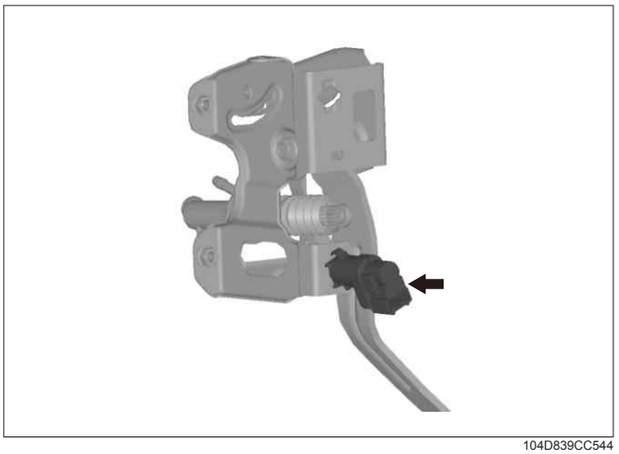
⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

Installation

1. Insert the clutch high-position switch into mounting hole, and then turn it 45° counterclockwise until a clicking sound is heard



104D839CC544

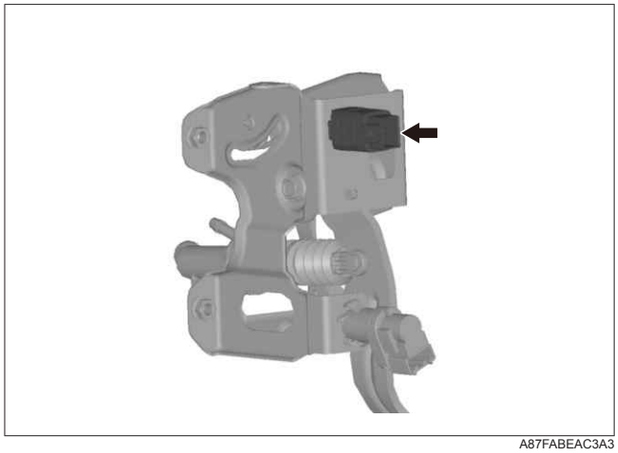
ℹ Notice

› Do not step on clutch pedal before installation.

› Before installation, make sure that the clutch switch lever is in free state. If not, slowly pull the clutch switch lever outward to free state.

› Make sure that the distance between the clutch switch pressure plate and the switch mounting bracket is the same as the state after installation.

2. Insert the clutch low-position switch into mounting hole, and then turn it 90° to make it clamped



A87FABEAC3A3

Notice

› Do not step on clutch pedal before installation.

› Before installation, make sure that the clutch switch lever is in free state. If not, slowly pull the clutch switch lever outward to free state.

3. Step on clutch pedal down to the end and then release it
4. Connect 2 clutch switch harness connectors

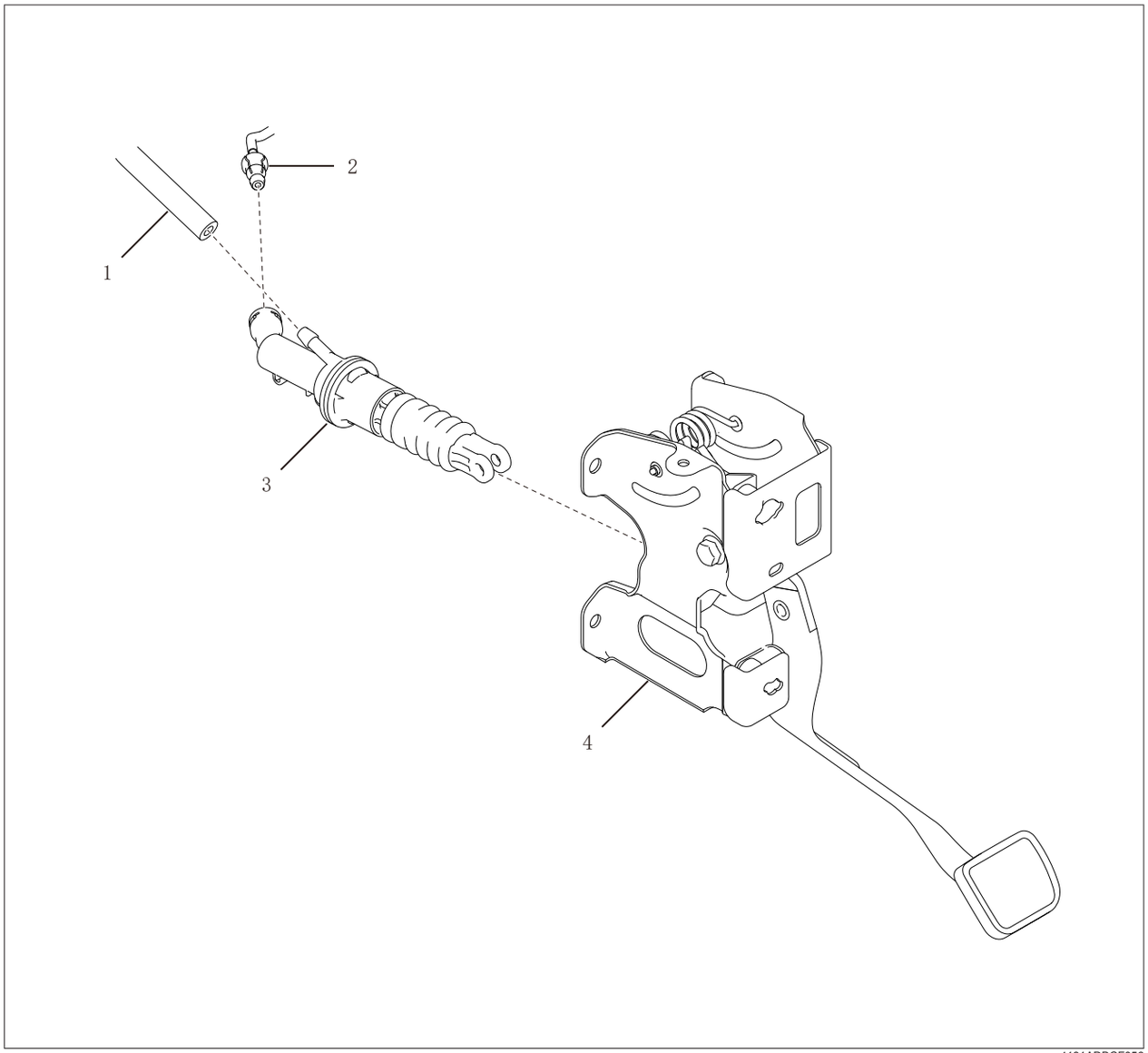
Caution

› Before installing the connector, check that the connector terminals are intact.

5. Install negative terminal of the battery

Clutch master cylinder

Structural diagram



4181ADBCF056

1. Low-pressure pipe of clutch
2. High-pressure pipe of clutch
3. Clutch master cylinder
4. Clutch pedal

Removal/installation

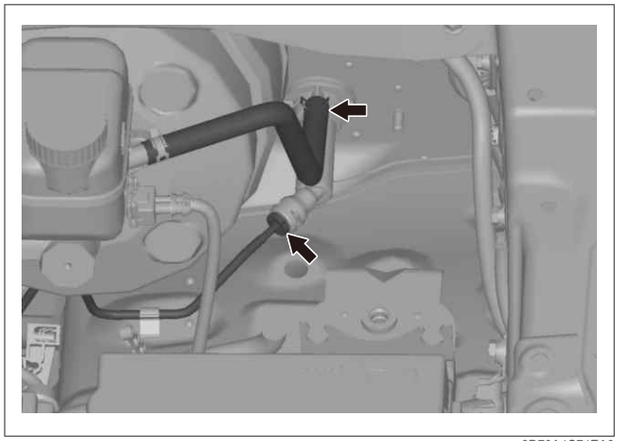
Removal

⚠ Warning

› If the fluid splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Empty brake fluid in clutch pipe
4. Disconnect 2 oil pipes



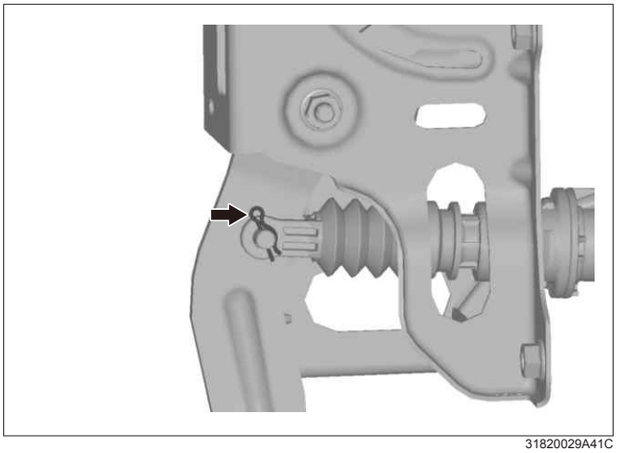
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⚠ Caution

› When disconnecting the fuel pipe, you must wear labor protection against oil and perform shielding protection.

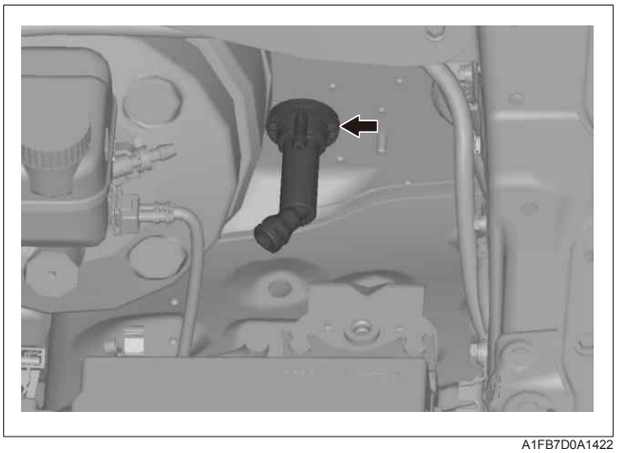
› The disconnected pipelines and joints must be protected from entering debris.

5. Remove 1 locking pin



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6. Turn counterclockwise and remove the clutch master cylinder



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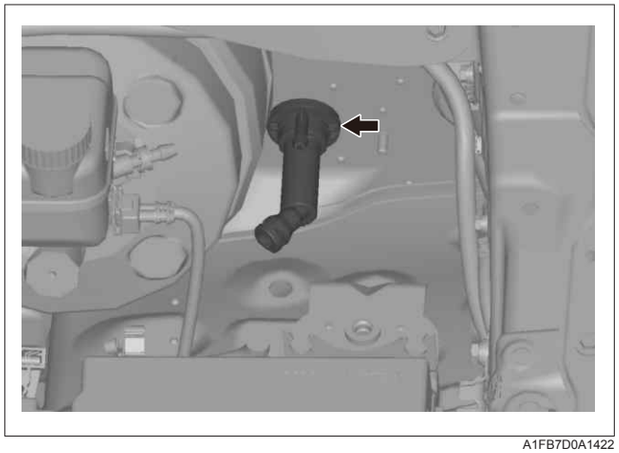
⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

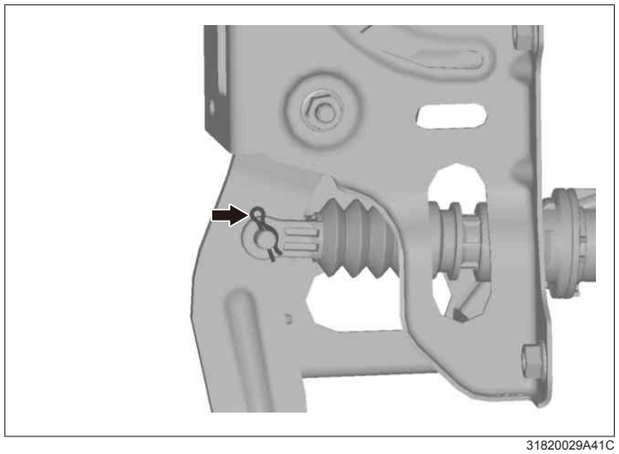
Installation

1. Install the clutch master cylinder clockwise to the correct position



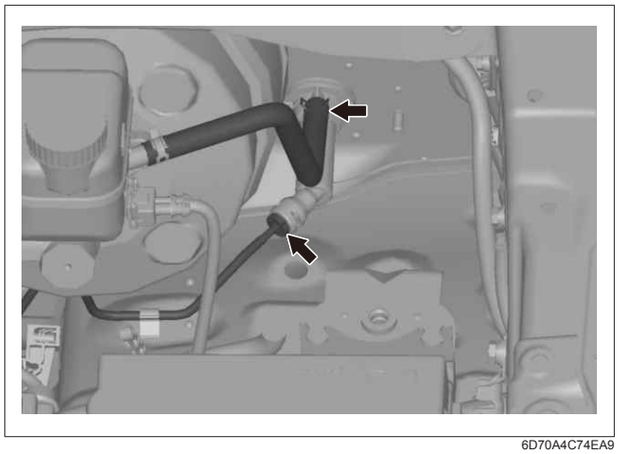
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2. Install 1 locking pin



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3. Install 2 oil pipes



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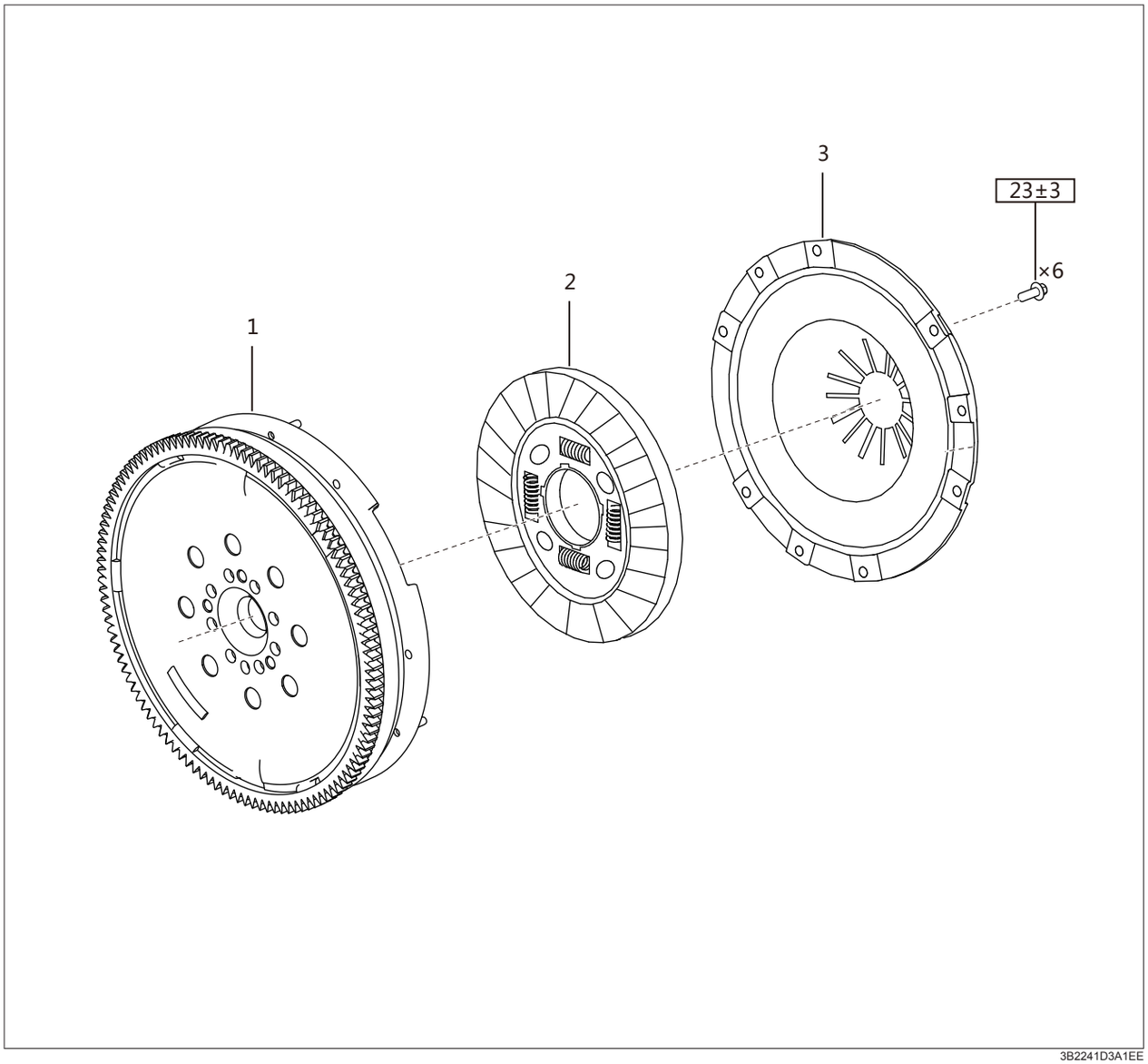
⚠ Caution

› After installation, ensure that the pipeline joint is securely connected.

4. Add brake fluid
5. Install negative terminal of the battery
6. Discharge air from clutch hydraulic system

Clutch

Structural diagram



3B2241D3A1EE

1. Flywheel
2. Clutch driven plate
3. Clutch press plate

Check

1. Measure rivet depth using caliper rule

   Minimum rivet depth: 0.3mm

Notice

› If rivet depth exceeds the limit, replace clutch driven plate.

2. Check axial run-out of diaphragm spring separation finger using a micrometer gauge

   Maximum axial run-out: 0.8mm

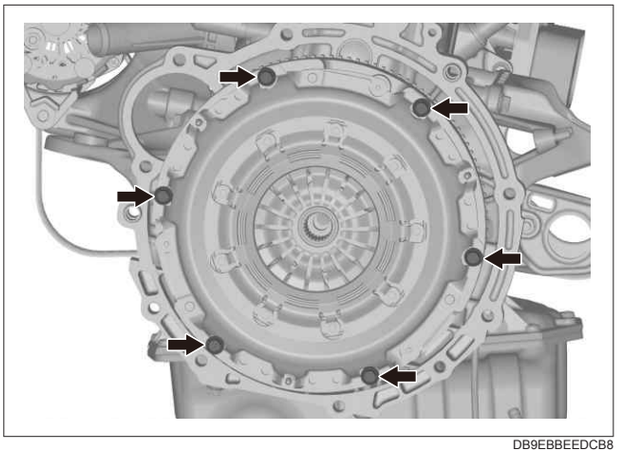
Notice

› If axial run-out exceeds the maximum value, replace clutch press plate.

Removal/installation

Removal

1. Turn off the ignition switch.
2. Disconnect the negative terminal of the battery.
3. Remove transmission
4. Remove 6 bolts



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Caution

› Remove or install bolts/nuts symmetrically so as to avoid mechanical damage.

5. Remove clutch press plate

Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

6. Remove clutch driven plate

Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

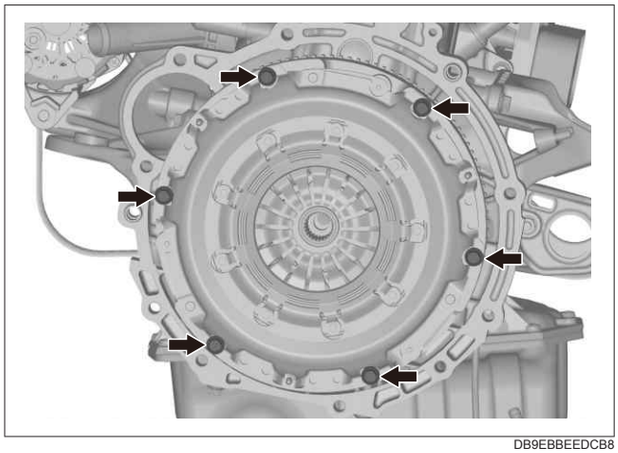
› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

Installation

Caution

› Tighten the fastener according to the specified torque value.

1. Install clutch driven plate to proper position
2. Install clutch press plate to proper position
3. Tighten 6 bolts



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⚠ Caution

› Make sure that driven plate is concentric with engine crankshaft.

› Tighten 6 bolts in a diagonal sequence, 1 turn at a time according to tightening torque in a diagonal sequence.

4. Install transmission
5. Install negative terminal of the battery

Transmission system (ZM6T82BF)

Transmission system ..... 14－1
System description ..... 14－1
Location diagram ..... 14－2
Basic parameters ..... 14－3
Specified torque ..... 14－4
Special tool ..... 14－6
Fault symptom checklist ..... 14－7
Transmission lubricant ..... 14－9
Specifications ..... 14－9
Check ..... 14－10
Replacement ..... 14－11
Transmission assembly ..... 14－12
Structural diagram ..... 14－12
Cross-sectional view ..... 14－19
Specified torque ..... 14－20
Removal/installation ..... 14－21
Disassembly/assembly ..... 14－23
Check/Adjustment ..... 14－27
Clutch slave cylinder assembly ..... 14－28
Removal/installation ..... 14－28
Reverse switch assembly ..... 14－29
Removal/installation ..... 14－29
Neutral switch assembly ..... 14－30
Pin definition ..... 14－30
Removal/installation ..... 14－30
Check ..... 14－31
Shifter assembly ..... 14－32
Specified torque ..... 14－32
Removal/installation ..... 14－33
Shift cable assembly ..... 14－36
Specified torque ..... 14－36
Removal/installation ..... 14－37
Adjustment ..... 14－39

Transmission system

System description

Structure characteristics

- This transmission is a tri-axial manual mechanical transmission which is operated in the form of rear end remote control and has 6 forward gears and 1 reverse gear.
- All gears are equipped with sliding type synchronizers, the first and second gears are triple cone synchronizers, the third and fourth gears are double cone synchronizers, and the fifth, sixth and reverse gears are single cone synchronizers.
- This transmission adopts a building block split structure as a whole.

Proper use and maintenance

Correct gear shift

- The right time for gear shift shall be selected considering vehicle speed and road conditions. For gear shift, the clutch shall be completely separated and shifting force shall be moderate and excessive force which results in synchronization failure shall be avoided.
- Starting at high speed which results in tooth breaking shall be avoided.
- When the vehicle is running, do not leave a hand on the shift lever, otherwise transmission shift fork and synchronizer component will wear prematurely.
- When reversing, park the vehicle for shift so as to prevent shift noise and damage to gears.

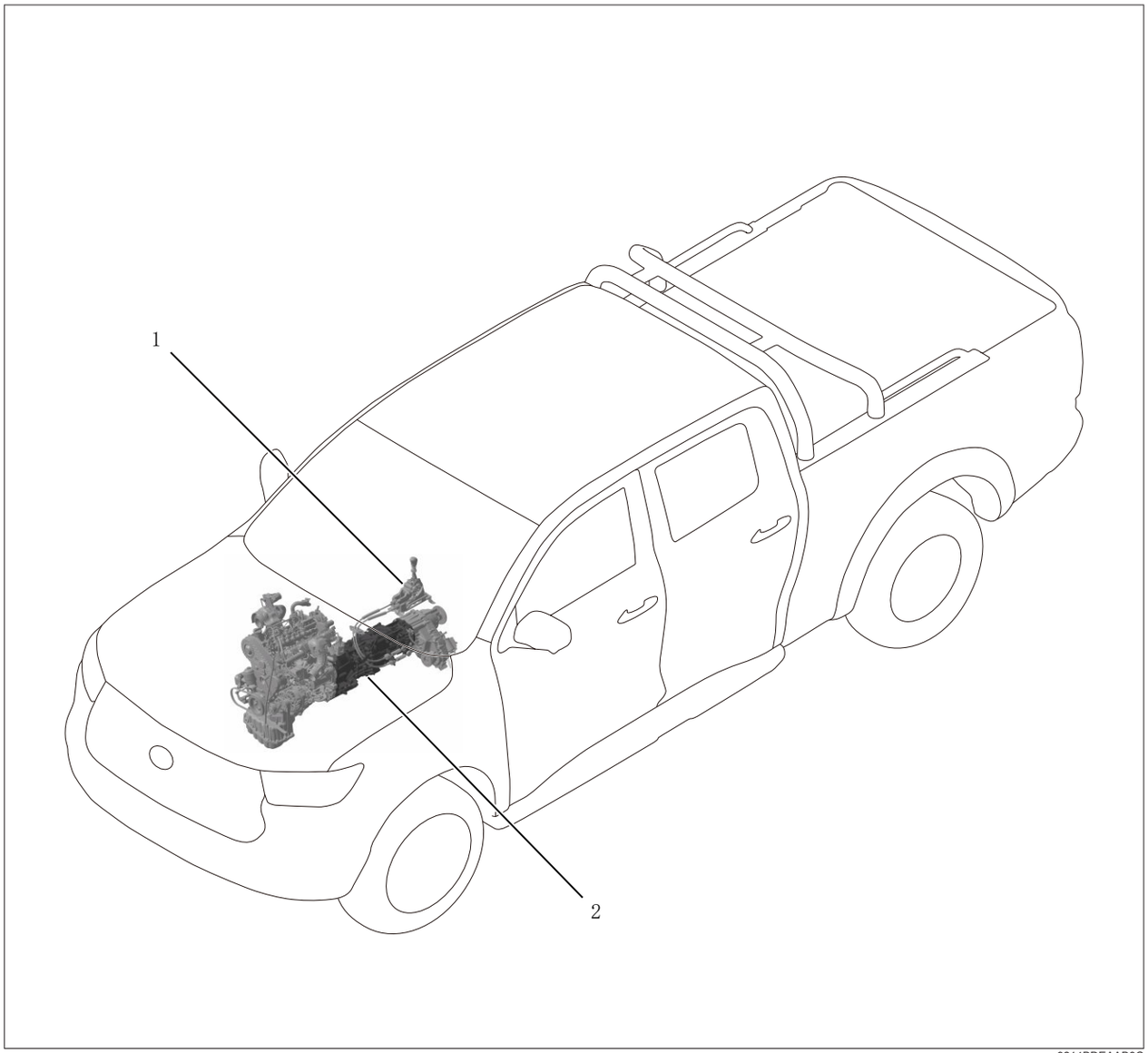
Adequate lubrication

- Use specified lubricant, do not use lubricant of poor quality, avoid mixing lubricants of different grades.
- This transmission is lubricated by splash. Add lubricant as required.

Proper maintenance

- Perform corresponding maintenance within specified time or mileage based on the items specified in the manual supplied with the vehicle.

Location diagram



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1. Shifter assembly
2. Manual transmission assembly

Basic parameters

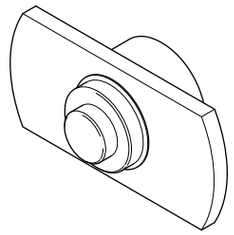
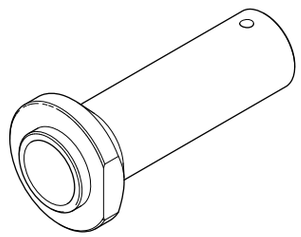
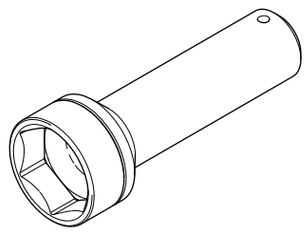
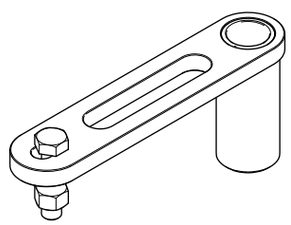
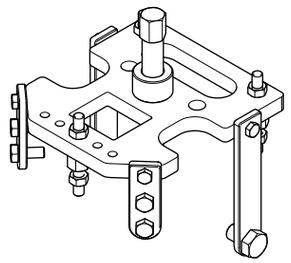
Item	Parameter	
Transmission type	Manual transmission	
Final ratio	3.900	
Gear transmission ratio	First gear	4.906
	Second gear	2.839
	Third gear	1.721
	Fourth gear	1.223
	Fifth gear	1
	Sixth gear	0.794
	Reverse gear	4.439

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front cover x housing	15～20	8	Sealant
Bolt	Clutch housing x housing	30～45	9	—
Bolt	Housing x intermediate plate x rear housing	30～45	9	—
Bolt	Housing x intermediate plate x rear housing	30～45	2	—
Bolt	Rear housing × cover plate	15～20	3	—
Bolt	Slave cylinder x clutch housing	15～20	2	—
Bolt	Cable bracket x rear housing	30～45	2	—
Hexagon head screw plug	Hexagon head screw plug × housing	30～50	2	Sealant
Bolt	Flanged self-sealing bolt x rear housing	15～20	1	—
Screw	Locking screw x intermediate plate	15～20	2	—
Pin shaft	Shaft pin × rear housing × cover plate	25～30	2	Sealant
Fork pin shaft	Fork pin shaft x housing (rear housing)	30～45	6	Sealant
Self-locking mechanism assembly	Self-locking mechanism × housing (rear housing)	30～45	4	Sealant
Main positioning mechanism assembly	Main positioning mechanism x rear housing	30～50	1	Sealant
Reverse gear switch assembly	Reverse switch x housing	30～45	1	Sealant
Bolt	Neutral switch x housing	12～16	1	Sealant
Bolt	Clip x housing (side)	12～16	1	—
Clutch fork pillar	Fork support pillar x clutch housing	25～40	1	—
Positioning mechanism assembly	Positioning mechanism component x rear housing	25～45	1	Sealant
Rear bearing locknut	Rear bearing locknut × output shaft	170～190	1	Sealant
Bolt	Clip x clutch housing	15～20	1	—
Bolt	Bearing baffle × rear housing	15～20	4	Sealant

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw	Shift gear shaft x magnet steel	6～8	1	—

Special tool

Code	Name	Purpose	Schematic diagram
ZEZF068788	Front cover oil seal installation tool	Install the front cover oil seal	
ZEZF068790	Rear housing oil seal installation tool (4WD)	Install the rear housing oil seal	
ZEZF068791	Rear bearing lock nut removal/installation tool	Install and remove rear bearing lock nut	
ZEZF068749	Shaft 1 spine fastening tool	Fix the shaft 1 to facilitate the removal and installation of the rear bearing lock nut	
ZEZF068751	Rear cover puller	Remove the 2WD and 4WD transmission rear cover shell	

Fault symptom checklist

Common faults	Possible causes	Troubleshooting
Excessive or abnormal noises	Bearing damaged	Replace the bearing
	Gear tooth surface scratch or pitting	Repair or replace the gear
	Inappropriate axial position of gear or clearance, or internal parts scratching	Check, repair and make adjustment
	Lubricant level is too low or lubrication is inadequate	Add lubricant to specified level
	Lubricant of poor quality is used	Replace with specified lubricant
	Parts in the clutch damaged	Check, repair and make adjustment
Gear engagement is difficult	Clutch improperly adjusted and clutch not fully separated	Make adjustment
	Control mechanism improperly adjusted	Make adjustment
	Synchronizer gear ring badly worn	Replace gear ring
Oil leakage	Oil seal worn or damaged	Replace oil seal
	Too much oil is filled and the oil level is too high	Check and make adjustment
	Uneven sealant coating or seal gasket damaged	Reapply adhesive or replace the gasket
	Joint surface scratched and not smoothened	Repair
	Vent plug plugged	Clean and penetrate
Out of gear	Gear sleeve or coupling gear badly worn	Replace
	Control mechanism improperly installed or damaged	Check, make adjustment or replace
	Shift fork severely deformed or worn	Replace
	Positioning spring or steel ball severely deformed or damaged	Check and replace
	Excessive axial clearance of gear	Check and make adjustment
Gear disorder	Interlock pin lost or severely damaged	Replace

Common faults	Possible causes	Troubleshooting
Abnormal bearing failure	Insufficient lubrication or unacceptable lubricant	Check and replace
	Lubricant contaminated	Replace
	Poor cleanliness of parts in the housing	Clean
	Poor bearing quality	Replace
The clutch fork location makes a strange noise while the clutch pedal is stepped on	Lock of grease at clutch fork and support nail location	Clean up the dust and reapply grease to clutch fork and support nail

Transmission lubricant

Specifications

Item	Parameter
Lubricant capacity (L)	2.8±0.1
Lubricant type	GL-5 140 for high-temperature regions
	GL-4 75W-80 for regions outside high-temperature regions

Check

⚠ Caution

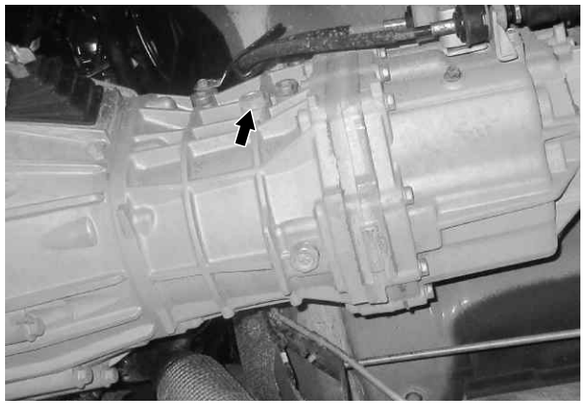
- Properly handle the waste.
- Before checking lubricant level, make sure the vehicle stays horizontal.
- Before adding lubricant, make sure the vehicle stays horizontal.
- Too much or too little lubricant can cause malfunctions.
- After changing lubricant, drive the vehicle and check the lubricant level.

1. Lift vehicle to proper position
2. Unscrew the fuel filler screw plug



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3. Check oil level of transmission, which shall be at the lowest position of lower end face of fuel filler at fuel filler screw plug. Add lubricant in transmission if necessary
4. If lubricant level is low, check if there is oil leakage
5. Check the quality of transmission lubricant. Replace transmission lubricant if it is unsuitable for use or dilution, gelation, dirt or deterioration, etc. is found
6. Install oil filler screw plug



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Tightening torque: (30~50) N·m

Replacement

⚠ Caution

› Properly handle the waste.

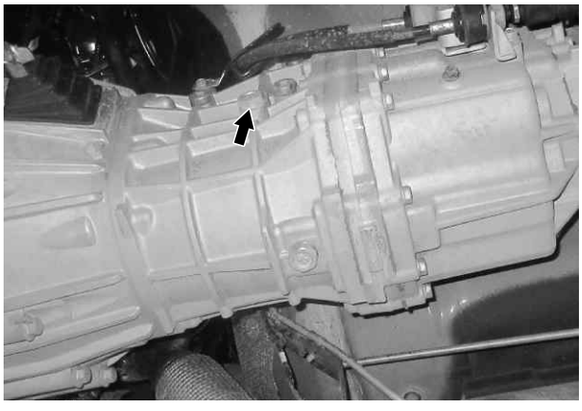
› Before checking lubricant level, make sure the vehicle stays horizontal.

› Before adding lubricant, make sure the vehicle stays horizontal.

› Too much or too little lubricant can cause malfunctions.

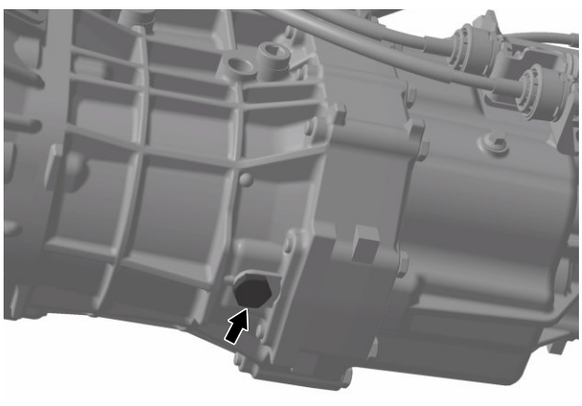
› After changing lubricant, drive the vehicle and check the lubricant level.

1. Lift vehicle to proper position
2. Unscrew the fuel filler screw plug



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3. Unscrew drain screw plug, and empty transmission lubricant



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⚠ Caution

› Properly handle the waste.

4. Install drain screw plug after cleaning drain screw plug

   Tightening torque: (30~50) N·m

5. Add transmission lubricant from the fuel filler until lubricant flows out of the fuel filler

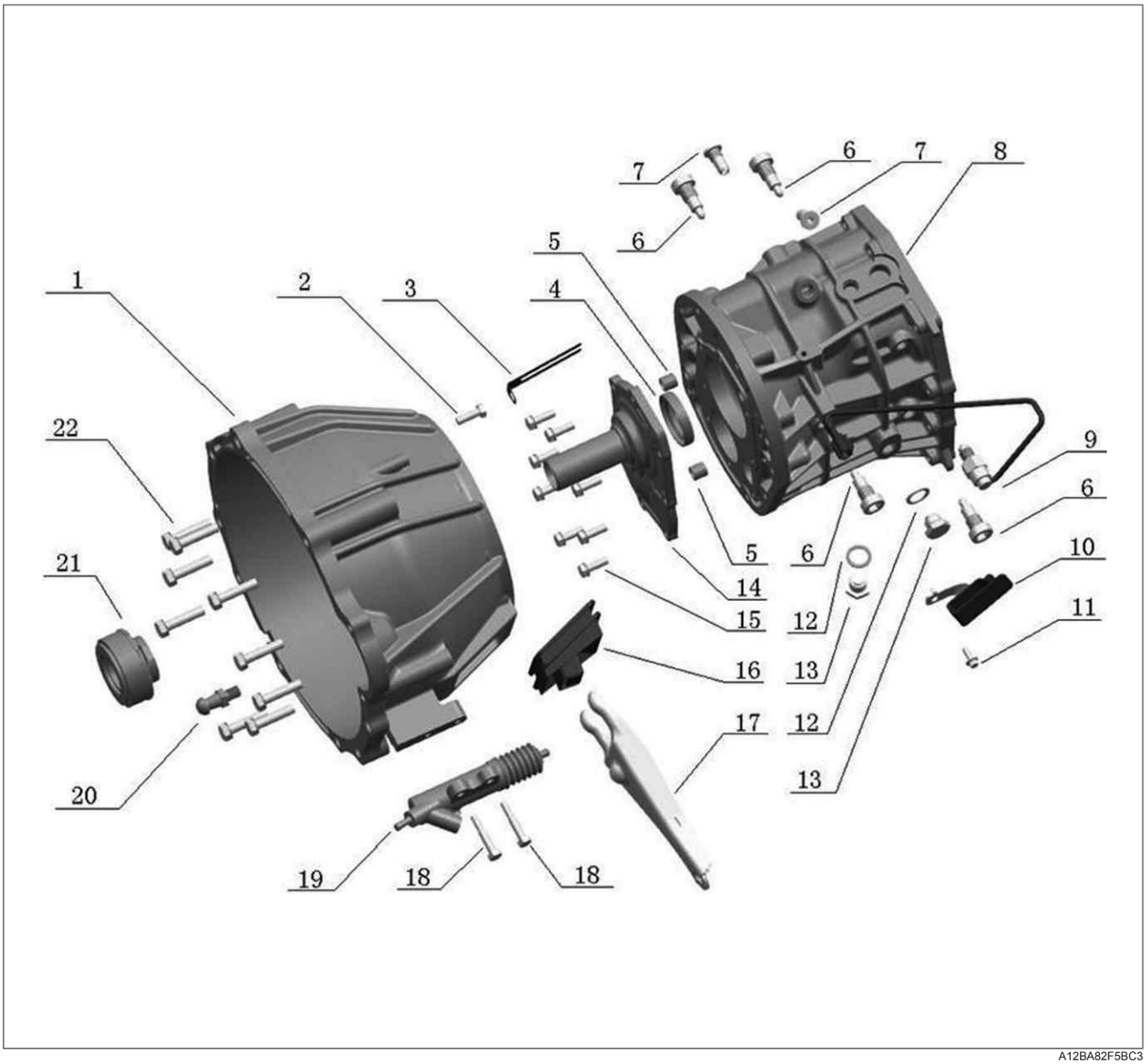
   Filling amount: (2.8 ± 0.1) L

6. Install the oil filler screw plug after cleaning it

   Tightening torque: (30~50) N·m

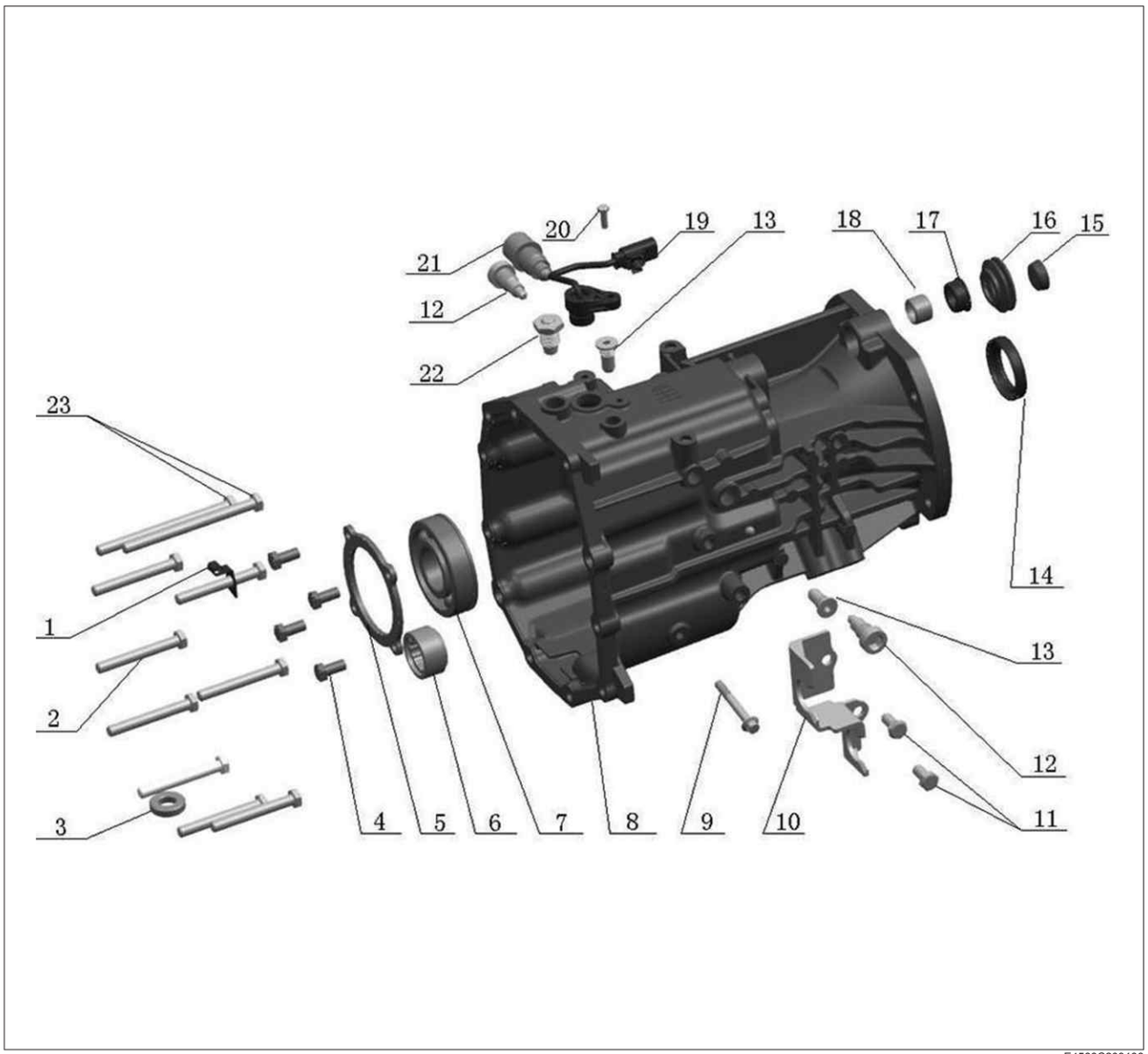
Transmission assembly

Structural diagram



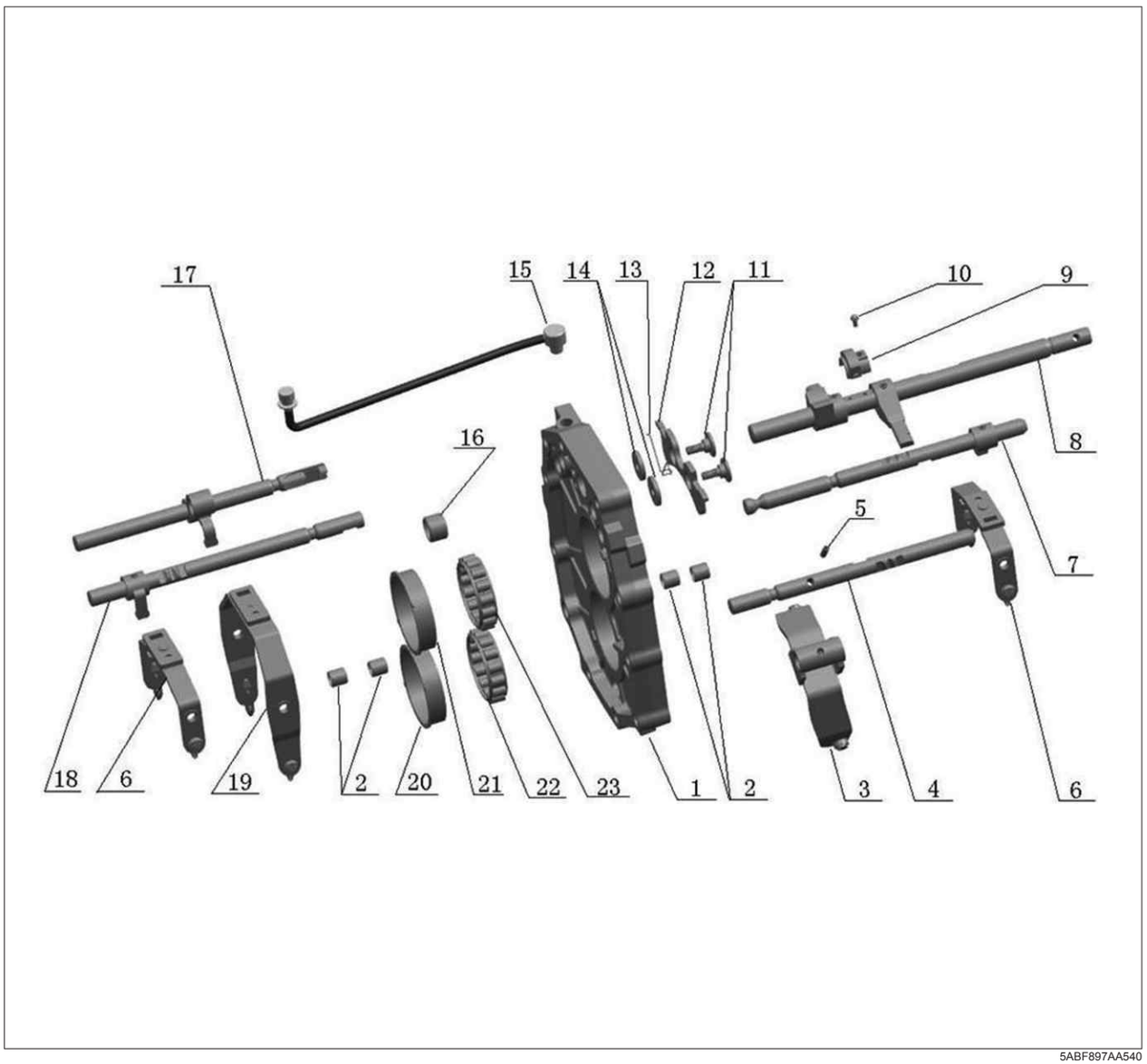
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1. Clutch housing
2. Hexagonal head bolt with gasket
3. Clip
4. Front cover oil seal
5. Cylindrical pin
6. Fork pin shaft
7. Self-locking mechanism assembly
8. Housing component
9. Reverse gear switch assembly
10. Clip
11. Hexagonal head bolt with gasket
12. Seal washer
13. Hexagon head screw plug
14. Front cover
15. Hexagonal head bolt with gasket
16. Clutch fork cover
17. Clutch release fork assembly
18. Hexagonal head bolt with gasket
19. Clutch slave cylinder
20. Clutch fork pillar
21. Release bearing subassembly
22. Hexagonal head bolt with gasket



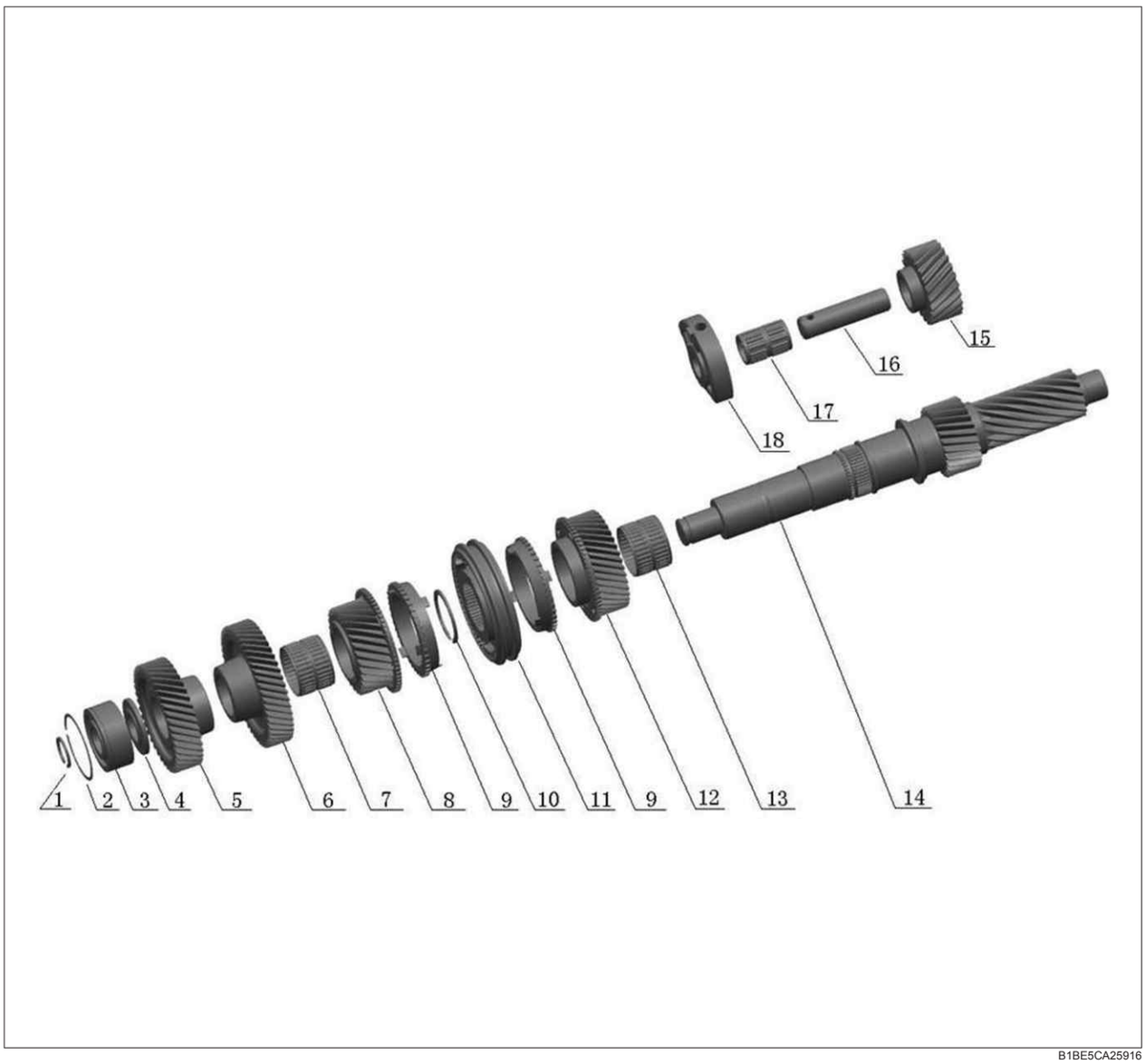
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1. Clip
2. Hexagonal head bolt with gasket
3. Magnet
4. Hexagonal head bolt with gasket
5. Rear bearing baffle
6. Rear bearing of intermediate shaft
7. Output shaft rear bearing
8. Rear housing component
9. Hexagon flange self-sealing bolt
10. Cable bracket
11. Hexagonal head bolt with gasket
12. Fork pin shaft
13. Self-locking mechanism assembly
14. Rear housing oil seal
15. Bowl type expansion plug
16. Dust boot
17. Shift shaft oil seal
18. Linear bearing
19. Neutral gear switch assembly
20. Hexagonal head bolt with gasket
21. Main positioning mechanism assembly
22. Positioning mechanism assembly
23. Hexagonal head bolt with gasket



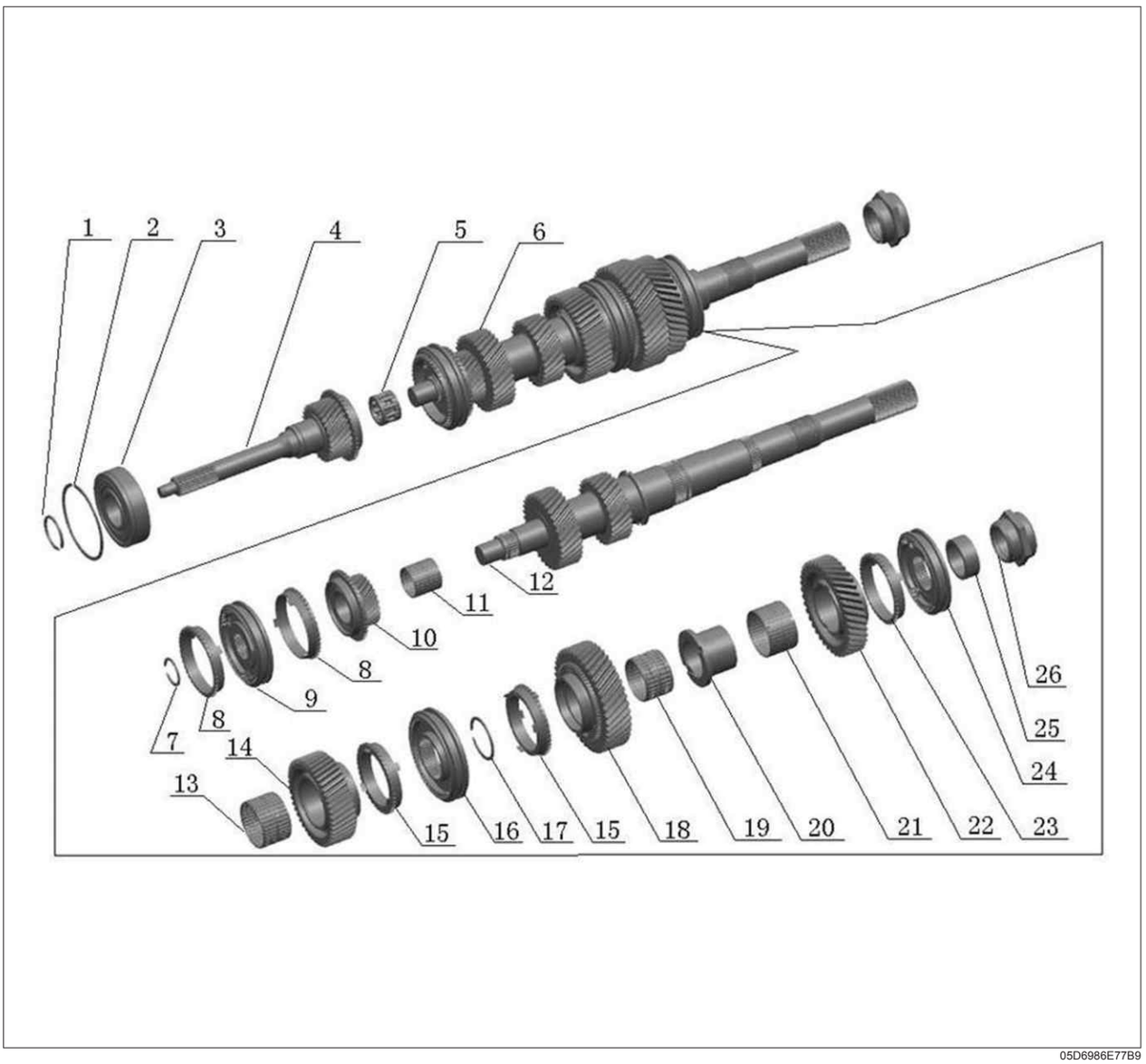
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1. Intermediate plate assembly
2. Hollow cylindrical pin
3. First/second gear shift fork assembly
4. First/second gear shift fork shafts
5. Spiral spring pin
6. Fifth/sixth reverse gear shift fork assembly
7. Reverse gear shift fork shaft component
8. Shift shaft component
9. Magnet steel
10. Cross-recess pan head screw
11. Locking screw
12. Interlock plate
13. Reset torsion spring
14. Interlock block
15. Normally closed vent plug
16. Linear bearing
17. Third/fourth gear shift fork shaft component
18. Fifth/sixth gear shift fork shaft component
19. Third/fourth gear shift fork assembly
20. Drawn roller bearing outer ring
21. Drawn roller bearing outer ring
22. Rolling body
23. Rolling body



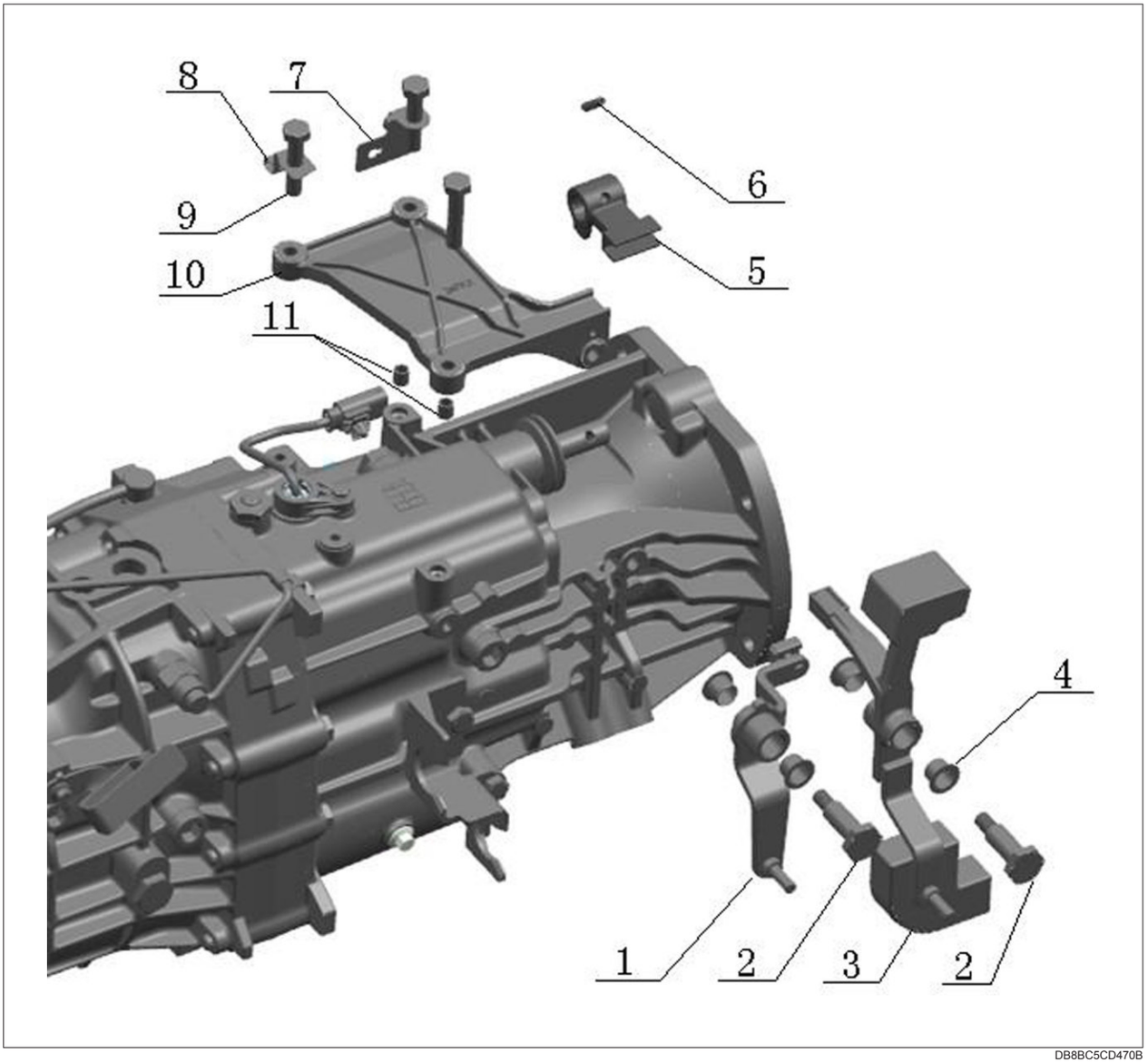
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1. Intermediate shaft front bearing ring washer
2. Intermediate shaft front bearing snap ring
3. Intermediate shaft front bearing
4. Spacer
5. Intermediate shaft engagement gear wheel
6. Intermediate shaft sixth gear wheel
7. Third gear wheel needle roller bearing
8. Third gear wheel component
9. Third/fourth gear synchronizer ring component
10. Third/fourth gear hub retaining ring
11. Third/fourth gear synchronizer component
12. Fourth gear wheel component
13. Fourth gear wheel needle roller bearing
14. Intermediate shaft coupling gear
15. Reverse idler
16. Reverse idler shaft
17. Reverse gear idler roller bearing
18. Reverse idler shaft supporting plate



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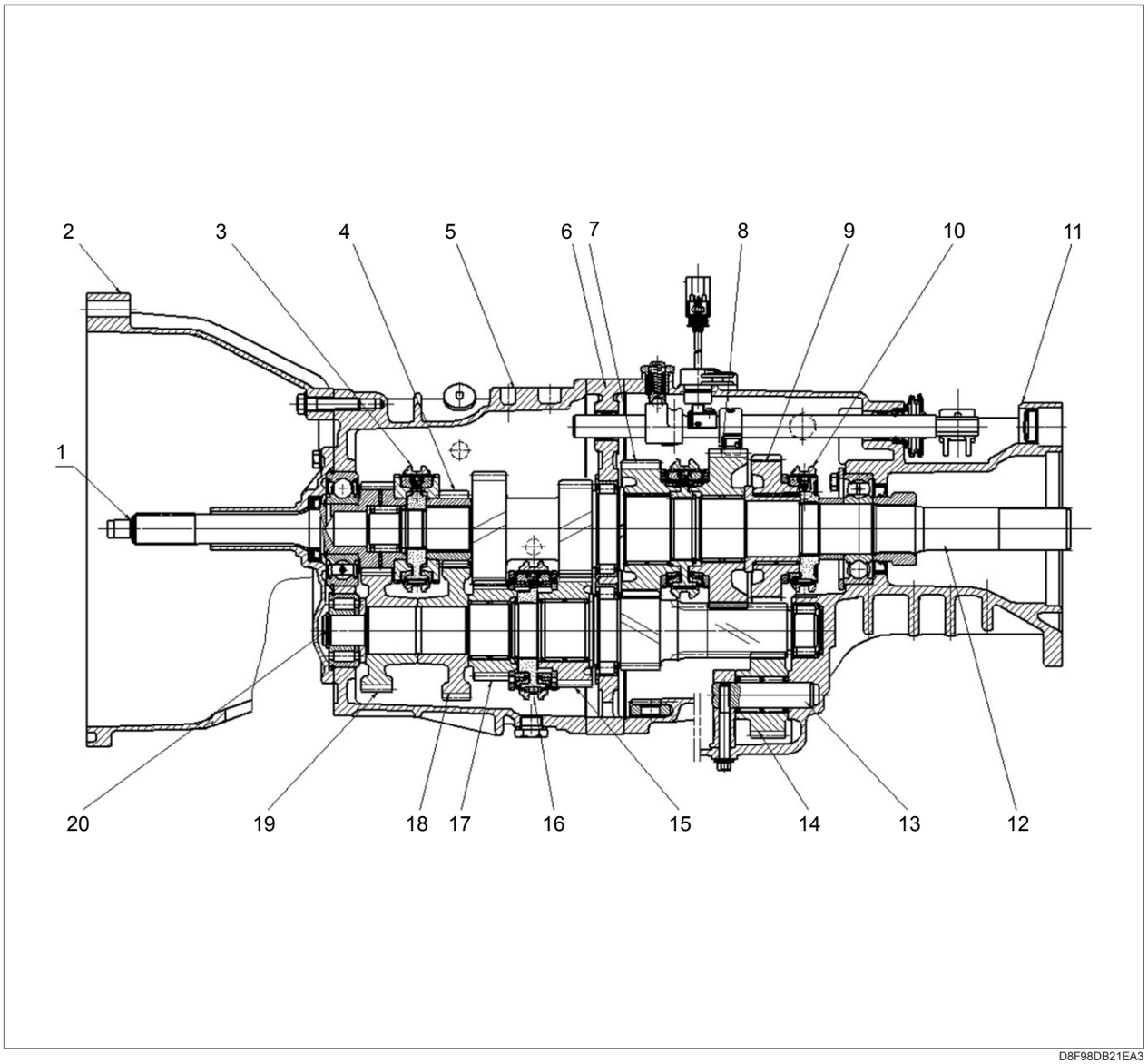
1. Input shaft retaining ring
2. Input shaft bearing snap ring
3. Input shaft bearing
4. Input shaft assembly
5. Needle roller bearing
6. Output shaft string
7. Fifth/sixth gear hub retaining ring
8. Fifth/sixth gear synchronizer gear ring
9. Fifth/sixth gear synchronizer component
10. Sixth gear wheel component
11. Sixth gear wheel needle roller bearing
12. Output shaft
13. Second gear needle roller bearing
14. Second gear wheel component
15. First/second gear synchronizer ring component
16. First/second gear synchronizer component
17. First/second gear hub retaining ring
18. First gear wheel component
19. First gear wheel roller bearing
20. Reverse gear shaft bushing
21. Reverse gear needle roller bearing
22. Reverse gear wheel component
23. Reverse gear synchronizer gear ring
24. Reverse gear synchronizer component
25. Reverse gear spacing sleeve
26. Rear bearing locknut



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1. Gear shift rocker arm component
2. Pin Shaft
3. Gear shift rocker arm component
4. Flange bearing
5. Gear shift block
6. Spiral spring pin
7. Clip
8. Clip
9. Hexagonal head bolt with gasket
10. Cover plate
11. Small hollow locating pin

Cross-sectional view



D8F98DB21EA3

1. Input shaft
2. Clutch housing
3. Fifth/sixth gear synchronizer component
4. Sixth gear wheel component
5. Housing
6. Intermediate plate
7. Second gear wheel component
8. First gear wheel component
9. Reverse gear wheel component
10. Reverse gear synchronizer component
11. Rear housing component
12. Output shaft
13. Reverse idler shaft
14. Reverse idler
15. Fourth gear wheel component
16. Third/fourth gear synchronizer component
17. Third gear wheel component
18. Intermediate shaft sixth gear wheel
19. Intermediate shaft engagement gear wheel
20. Intermediate shaft coupling gear

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt A	Starter × engine × transmission	50±5	1	—
Bolt B	Starter × engine × transmission	50±5	1	—
Bolt C	Engine × transmission	50±5	6	—
Bolt D	Engine × transmission	50±5	2	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift vehicle to proper position
3. Drain the transmission lubricant
4. Remove 4 bolts and remove No.3 frame beam welding assembly



9427A1064721

5. Remove front axle propeller shaft assembly

⚠ Caution

› Make assembly marks before disassembly.

6. Remove rear axle propeller shaft assembly

⚠ Caution

› Make assembly marks before disassembly.

7. Remove the transfer case assembly
8. Disconnect high temperature sensor connector

ℹ Notice

› Disconnect high temperature sensor connector from the front end of transmission.

9. Remove nitrogen-oxygen sensor 1

ℹ Notice

› Remove nitrogen-oxygen sensor 1 from the nitrogen-oxygen sensor bracket 1 at the front end of the transmission.

10. Remove nitrogen-oxygen sensor bracket 1

ℹ Notice

› Remove nitrogen-oxygen sensor bracket 1 from the front of transmission.

11. Remove nitrogen-oxygen sensor 2

ℹ Notice

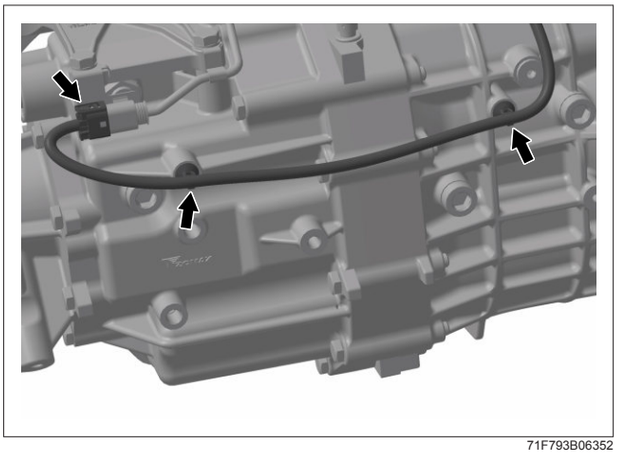
› Remove nitrogen-oxygen sensor 2 from the nitrogen-oxygen sensor bracket 2 at the rear end of the transmission.

12. Remove nitrogen-oxygen sensor bracket 2

ℹ Notice

› Remove nitrogen-oxygen sensor bracket 2 from the rear end of transmission.

13. Disconnect neutral switch connector, and separate harness clip



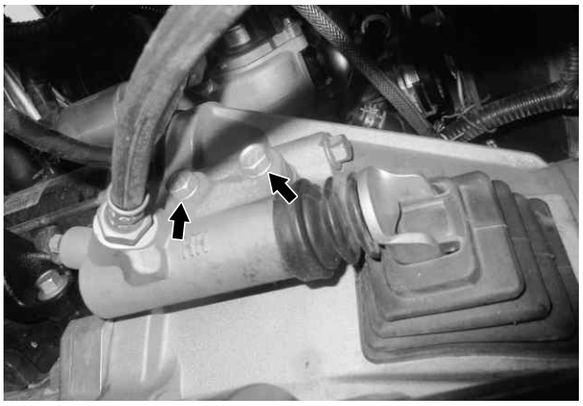
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14. Disconnect reverse switch connector, and separate harness clip



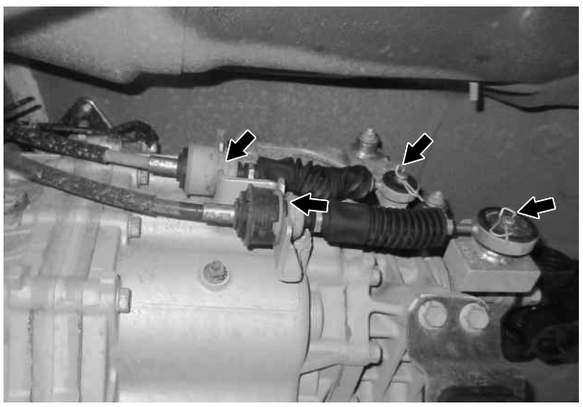
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15. Separate clutch slave cylinder with hose

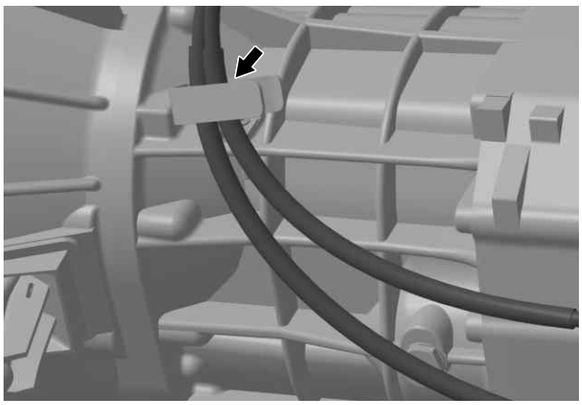


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16. Separate shift cable assembly

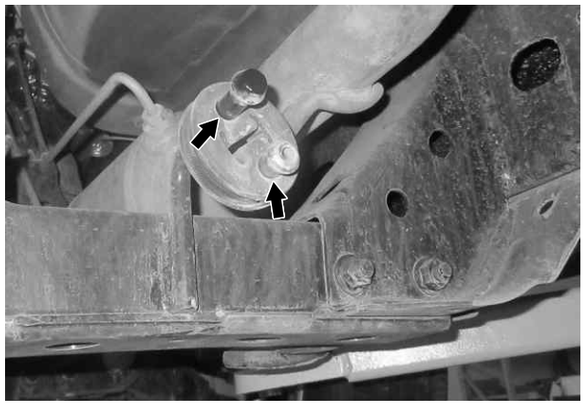


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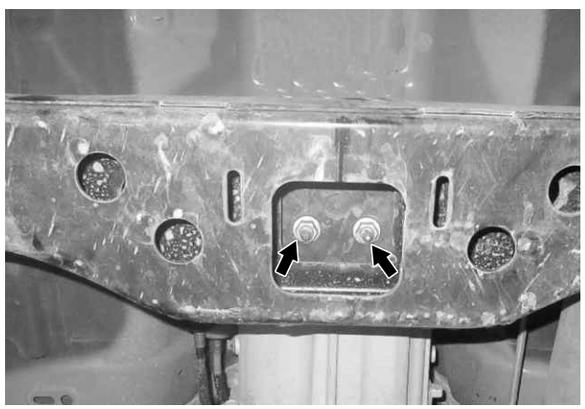
17. Remove exhaust pipe rubber hanger



C0DF3C366622

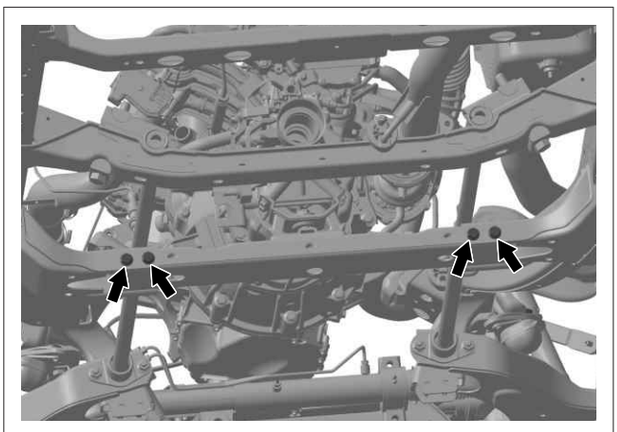
18. Properly support the transmission assembly

19. Remove 2 nuts, disconnect transmission mount assembly and the 4th beam welding assembly of the frame



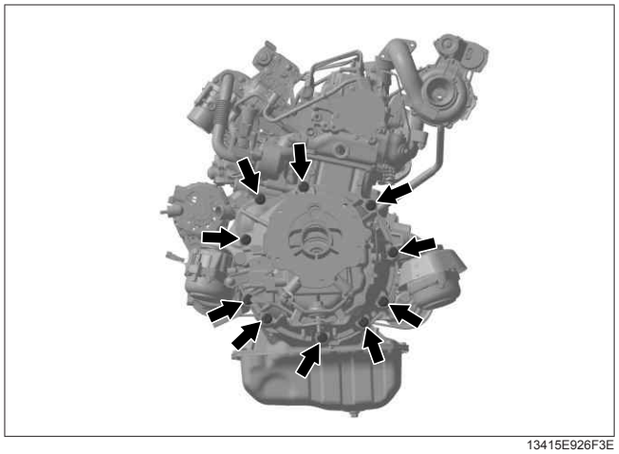
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20. Remove 4 bolts and 4 nuts, remove the 4th beam welding assembly of the frame



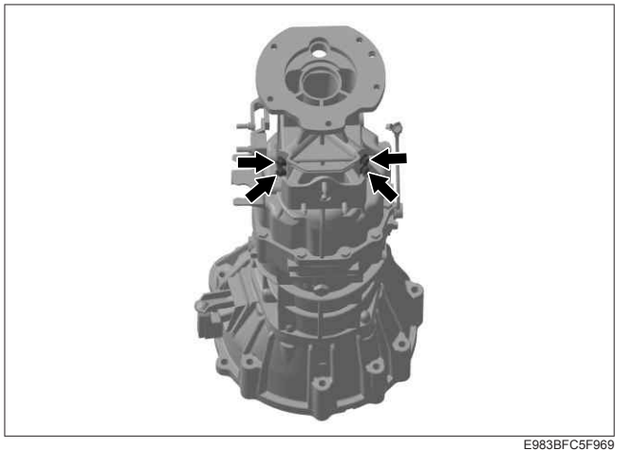
B1D115D1B7EA

21. Remove 10 bolts, and remove transmission assembly with transmission mount assembly



13415E926F3E

22. Remove 4 bolts, then separate transmission mount assembly



E983BFC5F969

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

› Add the transmission lubricant and check the transmission lubricant level.

Disassembly/assembly

Disassembly

⚠ Caution

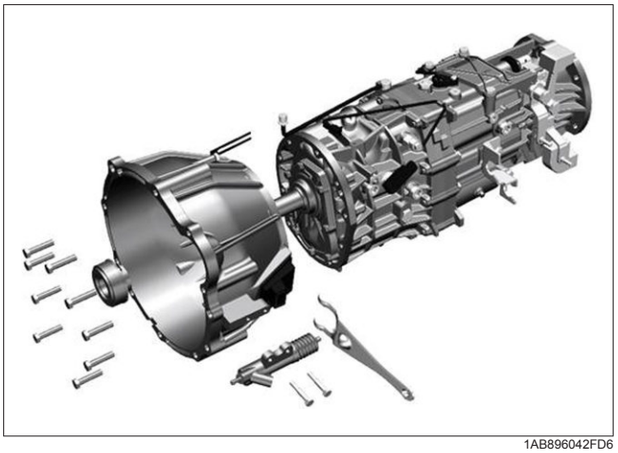
› Before disassembly, remove drain screw plug and drain oil.

› Before disassembly, thoroughly clean exterior of transmission to prevent impurities on gearbox from entering gearbox during disassembly.

› Prepare a clean container for storing disassembled components so as to prevent component loss or mix-ups and help the technician to determine if all components have been re-installed.

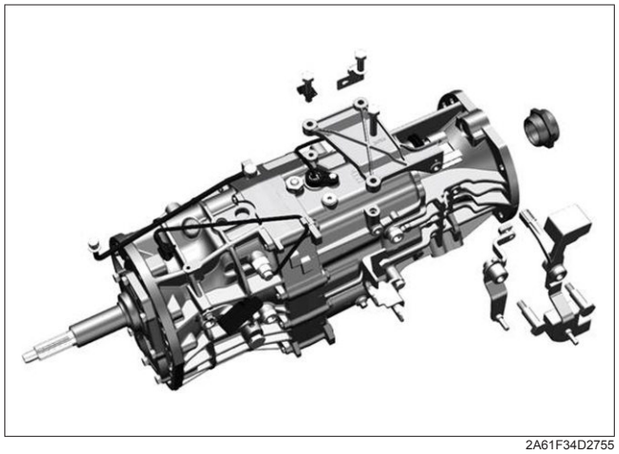
› In the process of disassembly, check that each component is working normally and that there are no signs of damage, deformation or other faults.

1. Remove clutch release bearing, slave cylinder, release fork, clutch housing in sequence



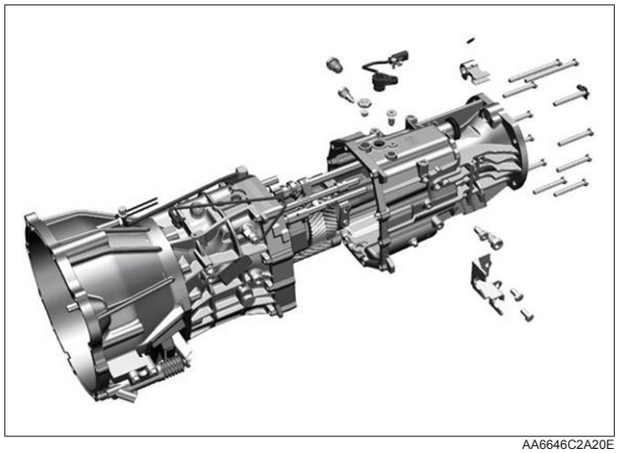
1AB896042FD6

2. Remove rear bearing locknut, gear shift rocker component, and cover plate



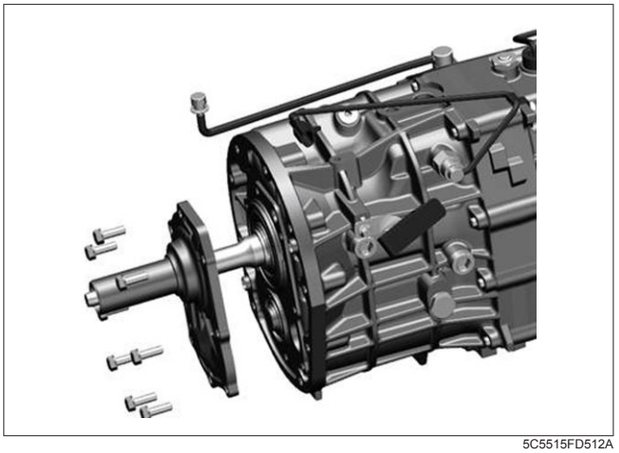
2A61F34D2755

3. Remove elastic cylindrical pin at shift shaft component and shift block (use a punch to punch out the elastic cylindrical pin when removing the elastic cylindrical pin) and remove shift block; remove all fork pin shafts, self-locking mechanism component, box bolts, and neutral switch assemblies, positioning mechanism component, and remove rear housing subassembly



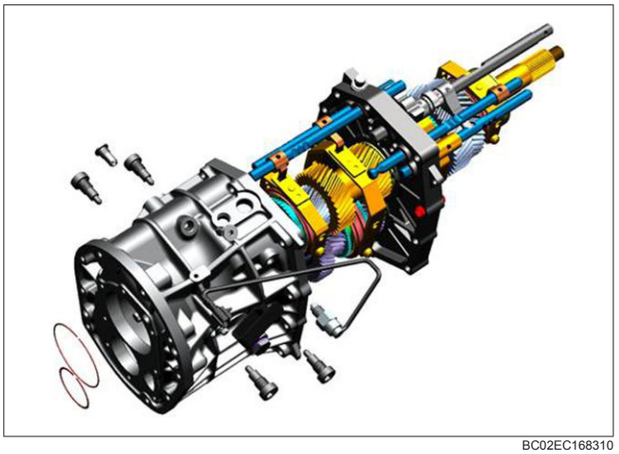
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4. Remove front cover bolts, strike the side of the front cover with a rubber hammer, and remove the front cover



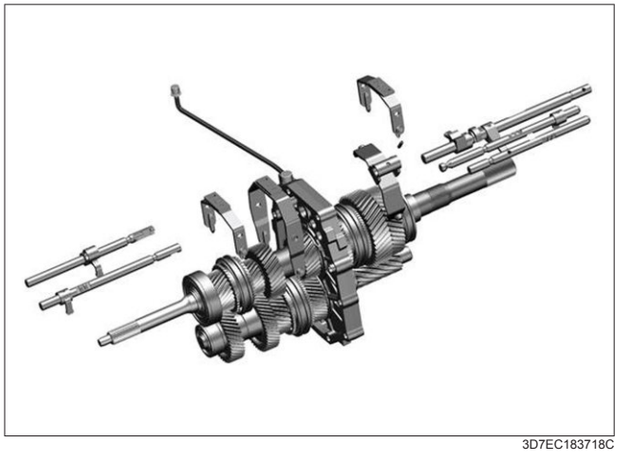
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5. Remove input shaft bearing snap ring and middle front bearing snap ring, reverse switch assembly; and remove all fork pin shaft from the housing section, self-locking mechanism assembly, and remove housing assembly



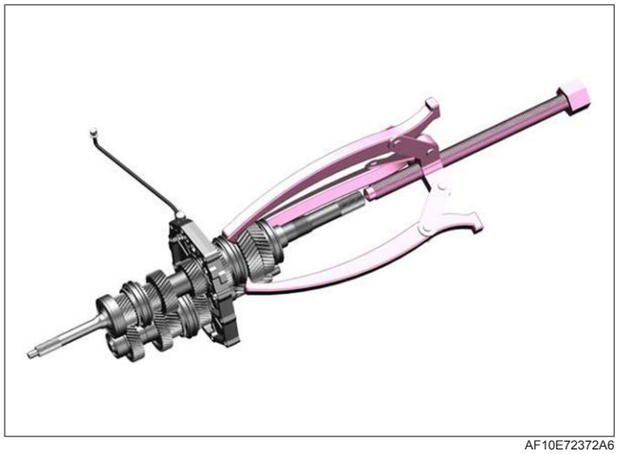
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6. Remove two fifth/sixth reverse gear shift fork subassembly, third/fourth gear shift fork subassembly (after removing the housing, rear housing, the three forks are automatically detached and can be removed directly); remove the spiral spring pin at first/second gear shift fork (when removing the spiral spring pin, the spiral spring pin can be punched out with a punch); remove third/fourth gear shift fork shaft component, fifth/sixth gear shift fork shaft component, shift shaft component, reverse shift fork shaft component, first/second gear shift fork shaft (fork shafts need to be removed when in neutral position)

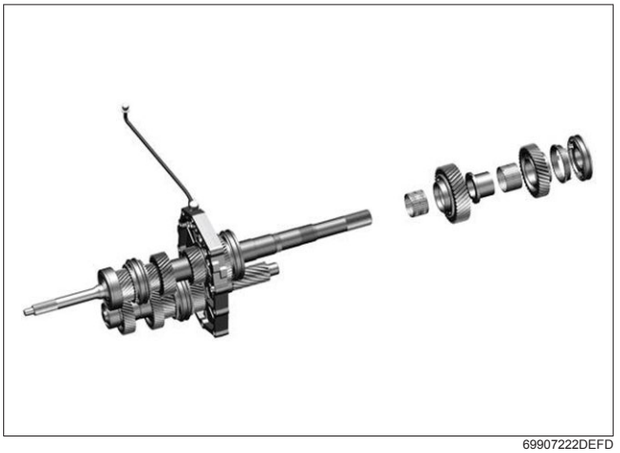


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7. Remove reverse gear spacing sleeve, and hook the first gear wheel assembly with puller, and pull out first gear wheel component, reverse gear wheel component, reverse gear shaft bushing, reverse gear wheel needle roller bearing, reverse gear ring and the reverse synchronizer assembly together. (Use 20" puller to remove, as shown below. It can also be removed in other ways). Remove first gear wheel needle roller bearing.

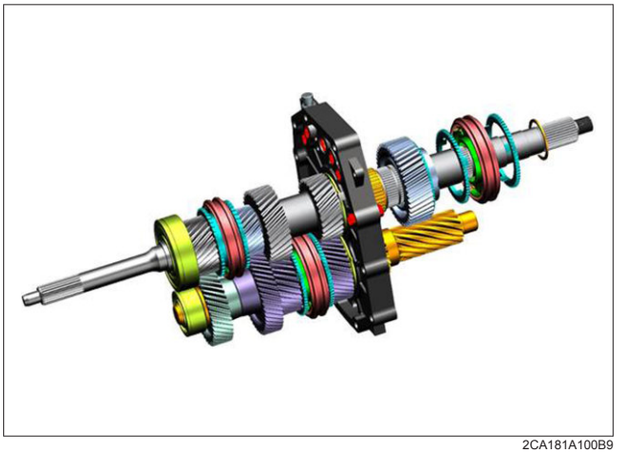


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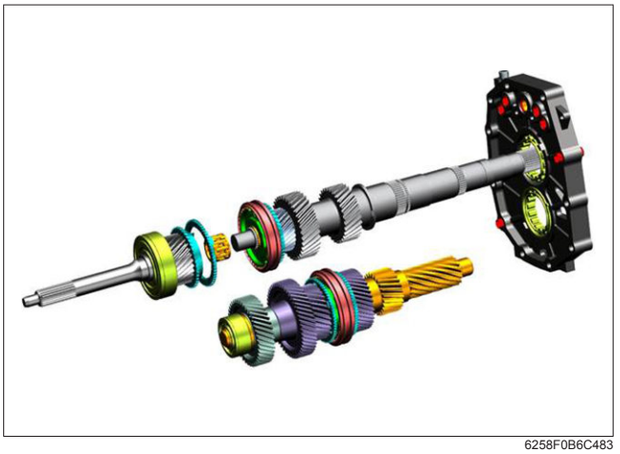
69907222DEFD

8. Remove first gear synchronizer ring, and remove first/second gear hub retaining ring with pincer, then remove first/second gear synchronizer component, first gear synchronizer ring component, second gear wheel component and second gear wheel needle roller bearing in sequence



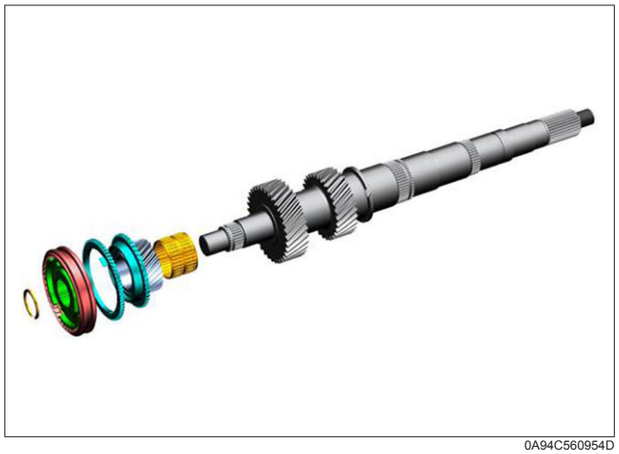
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9. Remove intermediate plate in the direction of the output shaft, and separate input shaft, output shaft, and intermediate shaft



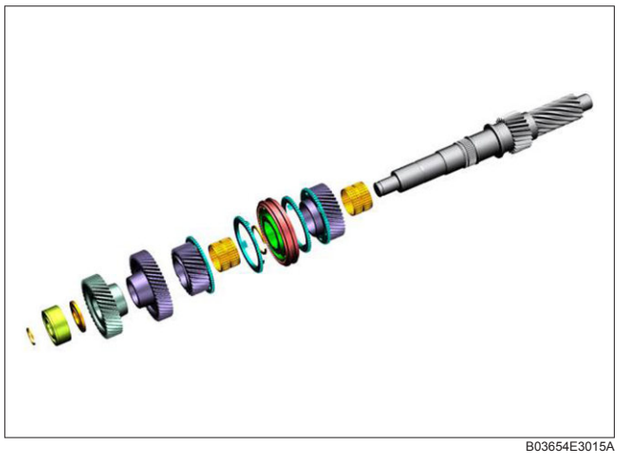
6258F0B6C483

10. Remove fifth/sixth gear hub retaining ring, and remove fifth/sixth gear synchronizer component, fifth/sixth gear synchronizer gear ring, sixth gear wheel component, sixth gear wheel needle roller bearing



0A94C560954D

11. Remove intermediate shaft front bearing ring washer, press out intermediate shaft front bearing, spacer, intermediate shaft constant engagement gear wheel, intermediate shaft sixth gear wheel with a press, and remove third gear wheel component, third gear wheel needle roller bearing and third gear synchronizer ring component. Remove third/fourth gear hub retaining ring, and remove third/fourth gear synchronizer component, third gear synchronizer ring component, fourth gear wheel component and fourth gear wheel needle roller bearing



B03654E3015A

Assembly

1. Assembly follows the reverse order of disassembly

⚠ Caution

› When assembling, the transmission needs to be turned over to facilitate the installation of the third/fourth and fifth/sixth three forks.

› Do not reuse oil seals, shaft retainer rings and spring pins removed.

› All parts must be kept clean and free of dust, cuttings, rust, oil stain and other impurities.

› Friction surfaces of the parts where there is relative motion must be coated with lubricant.

› The oil seal lips shall be greased and then press fitted vertically.

› In assembling the bearings, pressure transmission by a rolling body is not allowed.

› When assembling synchronizer components, two openings of the spring-loaded piston ring at both sides shall be staggered.

› The assembly shall be placed at a certain gear position during transport and installation, and keeping the assembly upright or exposure to violent shock when it is at neutral gear is strictly forbidden.

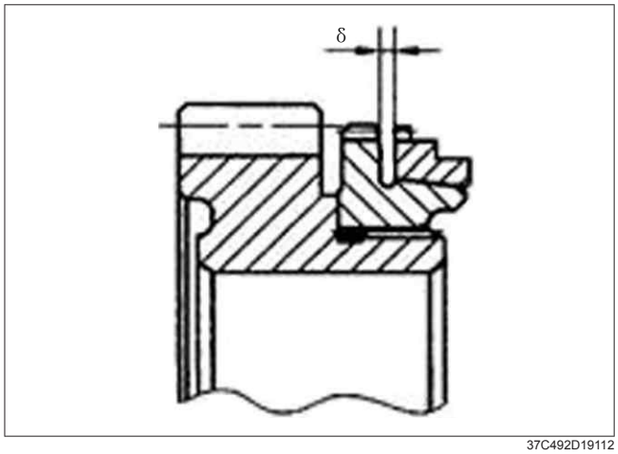
› A shaft retainer ring with axial clearance less than 0.1 mm is required to be installed optionally after assembly.

› Apply planar sealant to the joint surfaces of the front cover and housing, housing and intermediate plate, intermediate plate and rear housing, rear housing and shift lever cover, rear housing and small rear housing.

› Tighten the fastener according to the specified torque value.

Check/Adjustment

1. Check synchronizer ring reserve amount of the gear positions δ at the gear positions



37C492D19112

Item	Standard gap (mm)	Limit backlash (mm)
First/ second/ third/fourth gear	1.05～1.75	0.85
Fifth/sixth gear	1.05～1.35	0.85
Reverse gear	1.15～1.55	0.85

2. Check axial clearance of gear at different gear positions

Item	Parameters (mm)
First gear	0.15～0.30
Second gear	0.10～0.30
Third gear	0.15～0.35
Fourth gear	0.15～0.25
Sixth gear	0.10～0.20
Reverse gear	0.07～0.35

Clutch slave cylinder assembly

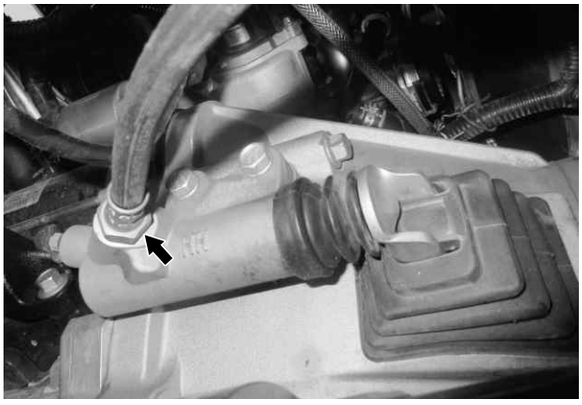
Removal/installation

Removal

⚠ Caution

› Be sure not to splash the brake fluid onto vehicle, because it can damage the paint. If the brake fluid contacts the paint, immediately wash it away with water.

1. Lift the vehicle to a proper position
2. Remove 1 bolt and 2 washers, and disconnect clutch hose

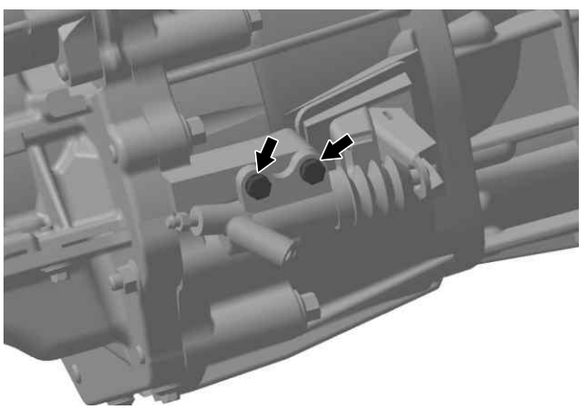


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ℹ Notice

› Use a container to collect clutch/brake fluid.

3. Remove 2 bolts, and remove clutch slave cylinder assembly



7DB80CB4A6A8

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Bleed air in clutch system, fill clutch/brake fluid into fluid reservoir and discharge air in clutch system.

› Check the clutch/brake fluid for leakage.

› Check fluid level in fluid reservoir, fill clutch/brake fluid up to the MAX (highest) mark in the fluid reservoir.

Reverse switch assembly

Removal/installation

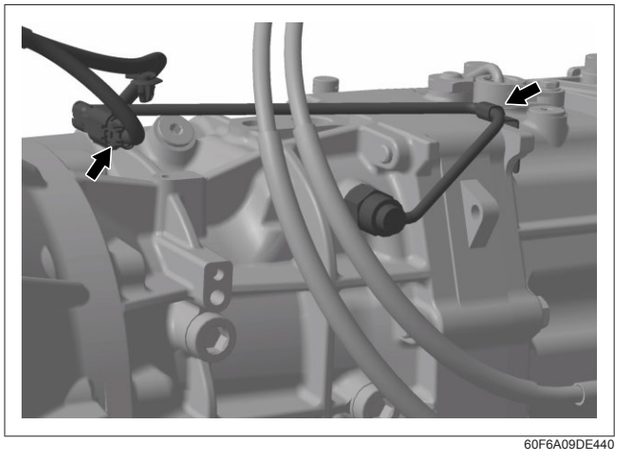
Removal

1. Disconnect the negative terminal of the battery.
2. Lift vehicle to proper position
3. Remove 1 bolt



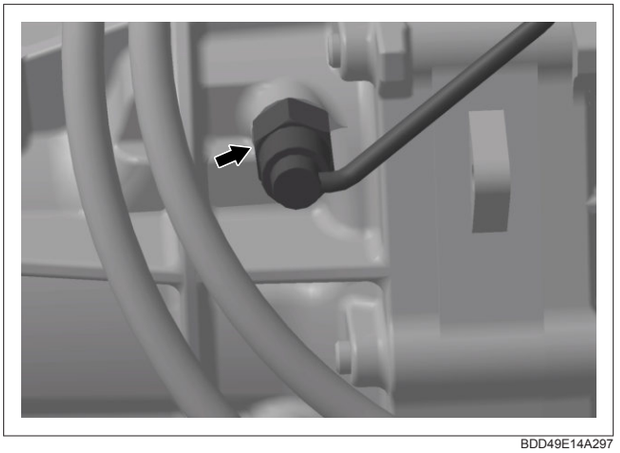
5AD3EFCB973D

4. Remove shift cable clip
5. Disconnect reverse switch connector, and separate harness clip



60F6A09DE440

6. Remove reverse switch assembly



BDD49E14A297

Installation

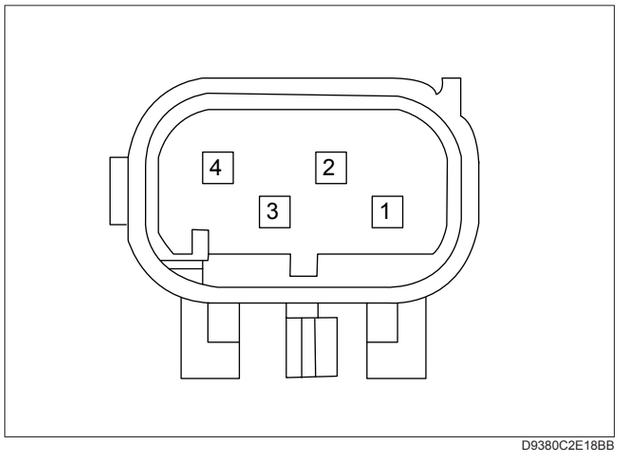
1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Neutral switch assembly

Pin definition



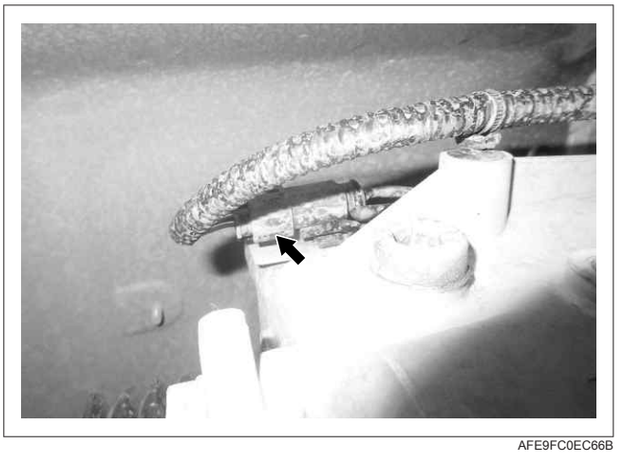
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Pin No.	Function
1	Neutral position/in-gear signal
2	Neutral position/in-gear signal
3	Ground
4	12V power

Removal/installation

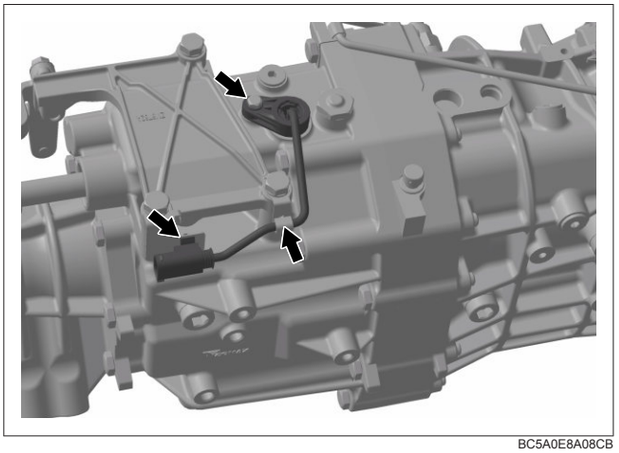
Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Disconnect neutral switch connector



AFE9FC0EC66B

4. Separate harness clips, and remove 1 bolt



BC5A0E8A08CB

5. Remove neutral switch assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Check

1. Check neutral switch voltage. When VCC voltage is provided to pins 1 and 2 by the battery, single high and low level signals can be provided.

   Neutral position: low level, voltage lower than 1.5 V

   In gear: high level, voltage higher than or equal to (VCC-2.5) V

⚠ Caution

› When checking the voltage of neutral switch signal terminal, make sure that the connection of neutral switch signal terminal and the engine ECU are in a conducting state.

2. Check the failure mode. There are three failure modes for neutral switch. Repair or replace it as necessary.

ℹ Notice

› If neutral switch itself failed, just replace the neutral switch.

› If magnetic steel on the shift shaft failed, just replace the magnetic steel.

› If both neutral switch and magnetic steel failed, replace both parts.

Shifter assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Shifter x shifter bracket	23±3	4	—
Bolt	Shifter bracket x floor	23±3	4	—
Nut	Shift cable x floor	9±1	2	—

Removal/installation

Removal

Warning

- You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



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Notice

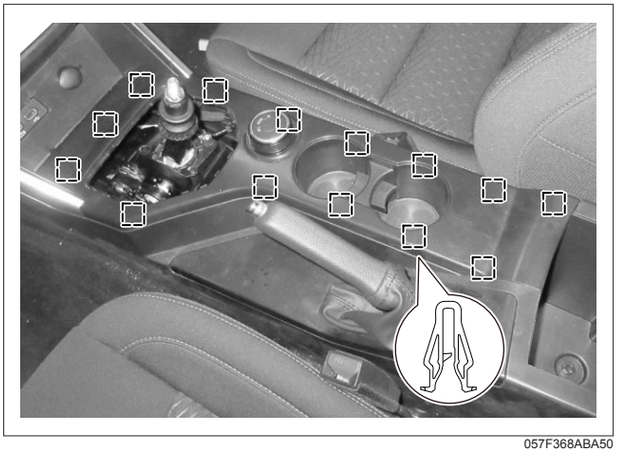
- Turn gear shift lever counterclockwise to unscrew it.

4. Remove shifter dust boot assembly



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5. Open auxiliary instrument panel elbow pillow assembly
6. Separate 14 clips



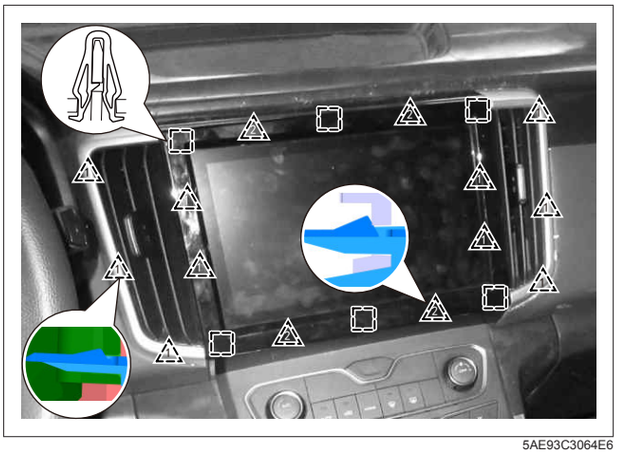
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7. Disconnect harness connector



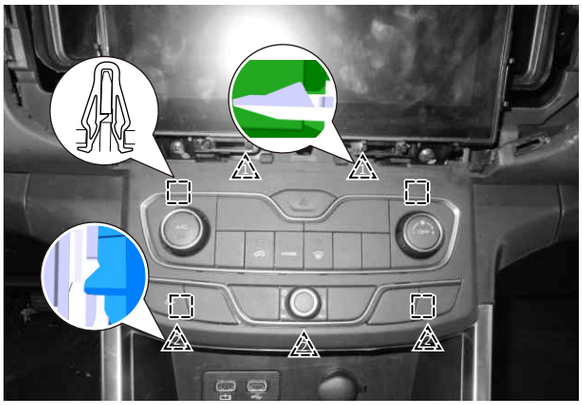
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8. Remove console panel of auxiliary instrument panel
9. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



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10. Separate 4 clips and 5 joints



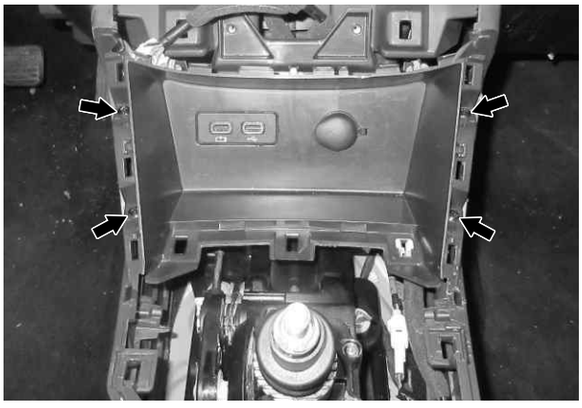
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11. Disconnect connectors of the console panel switch



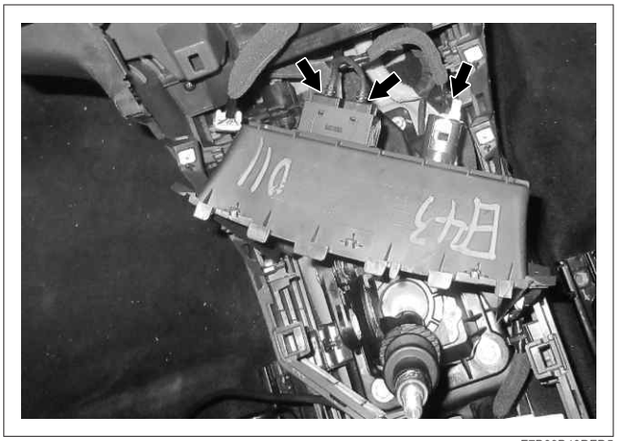
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12. Remove console panel switch
13. Remove auxiliary instrument panel left trim plate assembly
14. Remove auxiliary instrument panel right trim plate assembly
15. Remove 4 screws



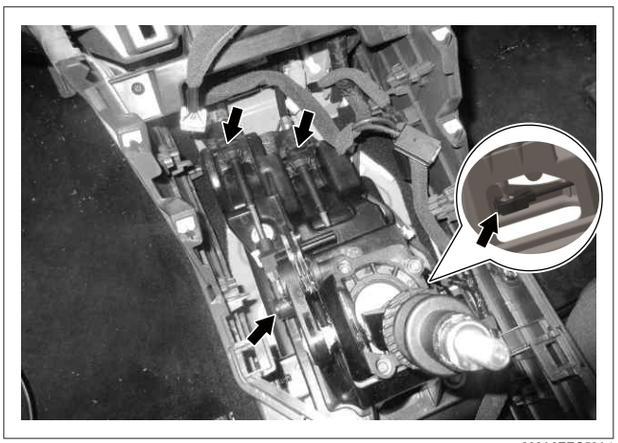
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16. Disconnect front storage box harness connector of auxiliary instrument panel



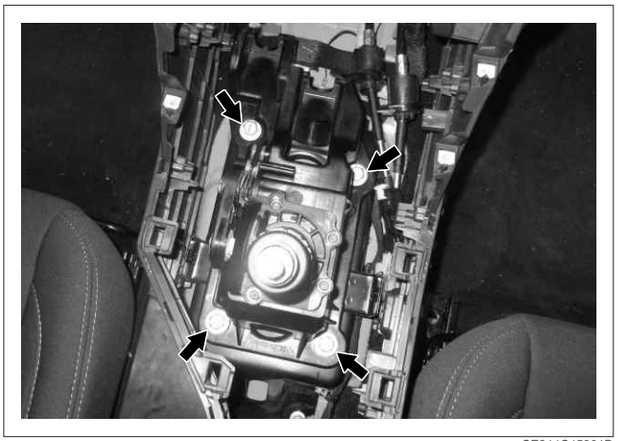
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17. Remove front storage box of auxiliary instrument panel
18. Disconnect shift cable assembly and shifter assembly



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19. Remove 4 bolts

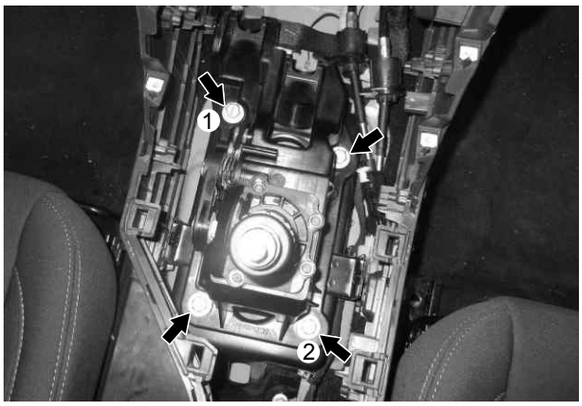


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20. Remove shifter assembly

Installation

1. Perform installation work in reverse order of removal



8DE47D2954D9

⚠ Caution

› When installing the shifter assembly, you shall first install #1 bolt and the #2 bolt later. Then install the other bolts in the diagonal order. Finally, tighten the bolts in the diagonal order and the specified torque.

› Adjust shift cable assembly when installing shift cable assembly.

Shift cable assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Shift cable x floor	9±1	2	—

Removal/installation

Removal

Warning

- You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



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Notice

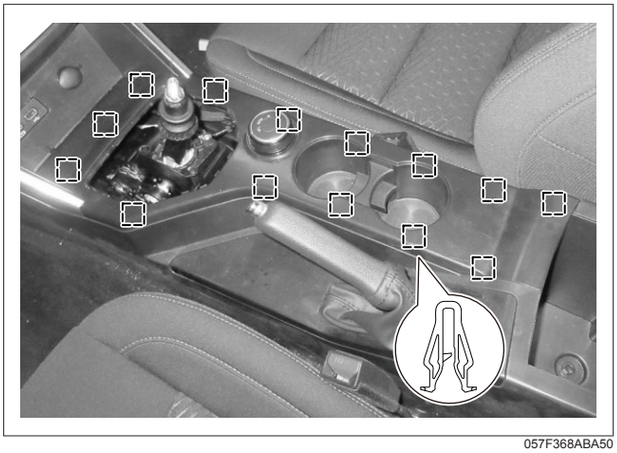
- Turn gear shift lever counterclockwise to unscrew it.

4. Remove shifter dust boot assembly



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5. Open auxiliary instrument panel elbow pillow assembly
6. Separate 14 clips



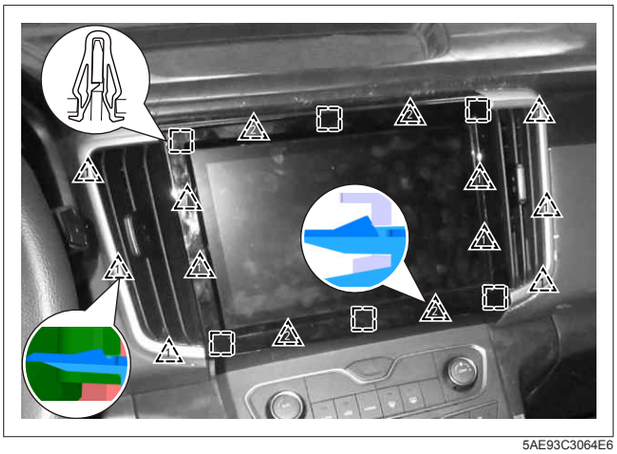
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7. Disconnect harness connector



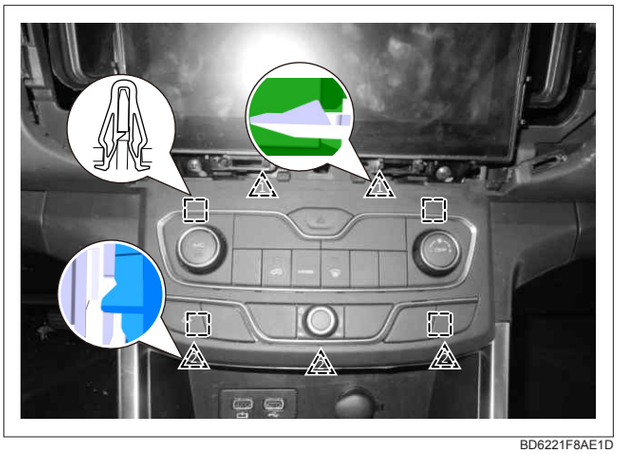
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8. Remove console panel of auxiliary instrument panel
9. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

10. Separate 4 clips and 5 joints



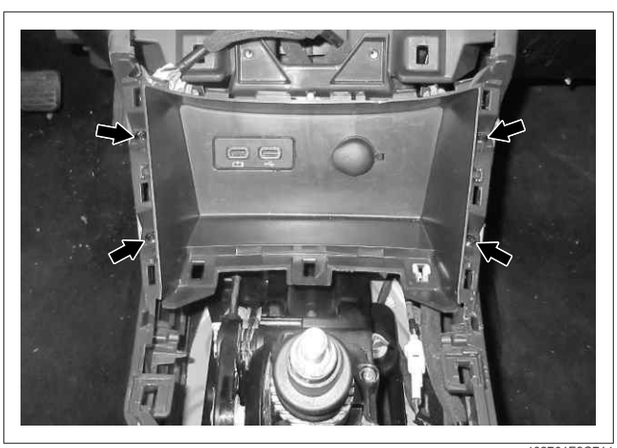
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11. Disconnect connectors of the console panel switch



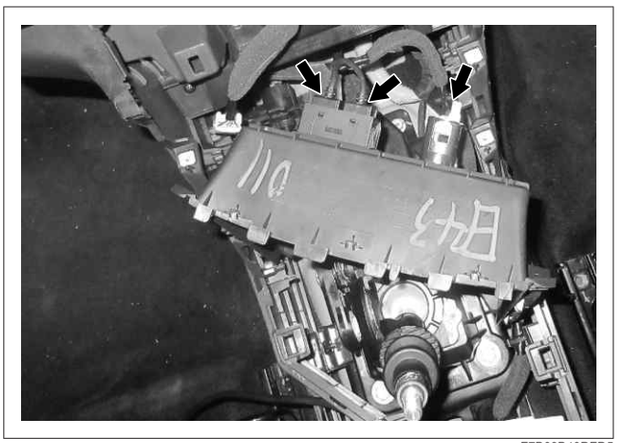
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12. Remove console panel switch
13. Remove auxiliary instrument panel left trim plate assembly
14. Remove auxiliary instrument panel right trim plate assembly
15. Remove 4 screws



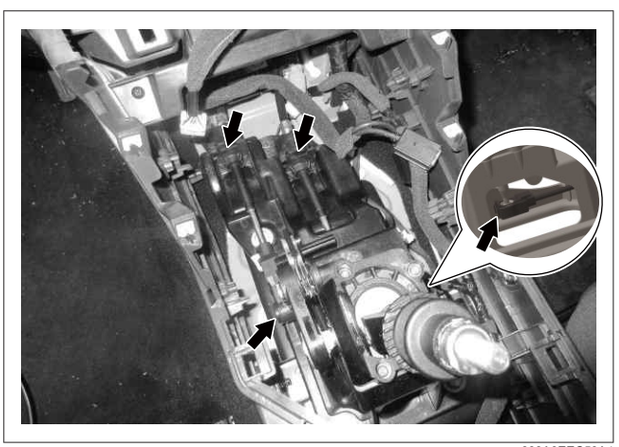
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16. Disconnect front storage box harness connector of auxiliary instrument panel



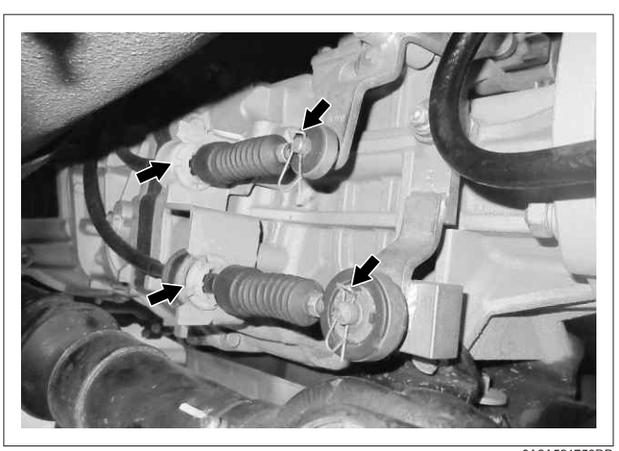
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17. Remove front storage box of auxiliary instrument panel
18. Disconnect shift cable assembly and shifter assembly



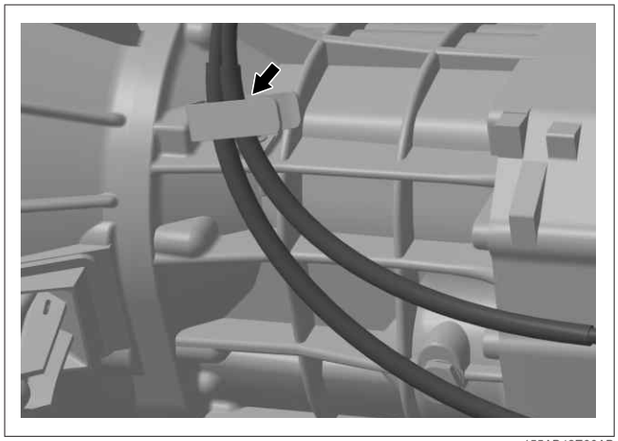
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19. Lift vehicle to proper position
20. Remove 2 circlips, and disconnect shift cable assembly from transmission assembly



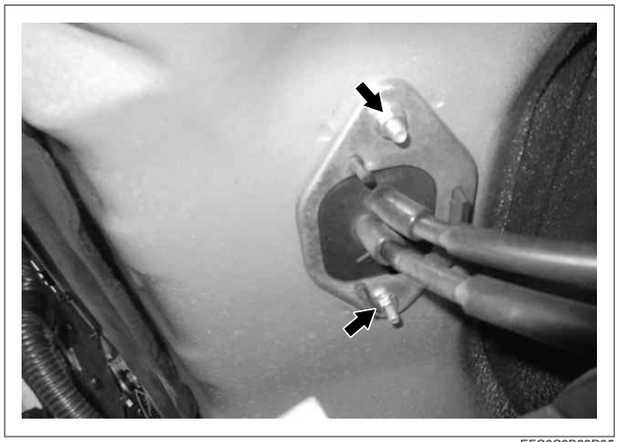
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21. Separate 1 clip, and disconnect shift cable assembly and clip



155AB42E86AB

22. Remove 2 nuts



EFC6C3B22D35

23. Remove shift cable assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Adjust shift cable assembly.

› Tighten the fastener according to the specified torque value.

Adjustment

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



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ℹ Notice

› Turn gear shift lever counterclockwise to unscrew it.

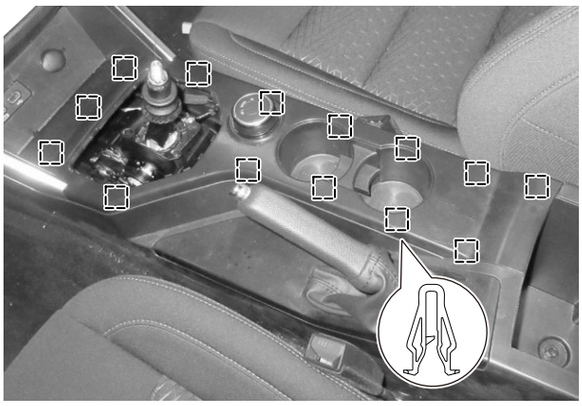
4. Remove shifter dust boot assembly



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5. Open auxiliary instrument panel elbow pillow assembly

6. Separate 14 clips



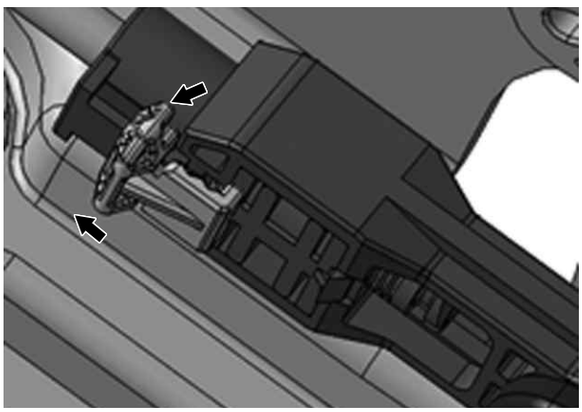
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7. Disconnect harness connector

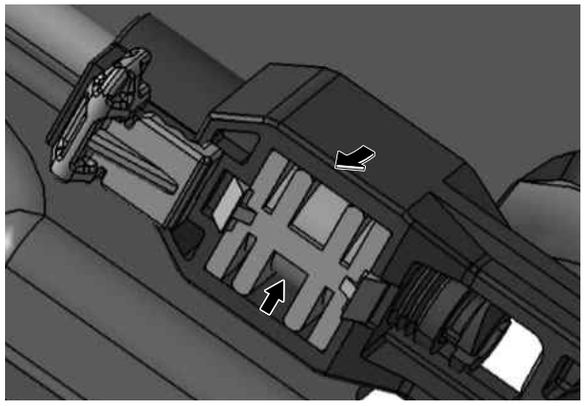


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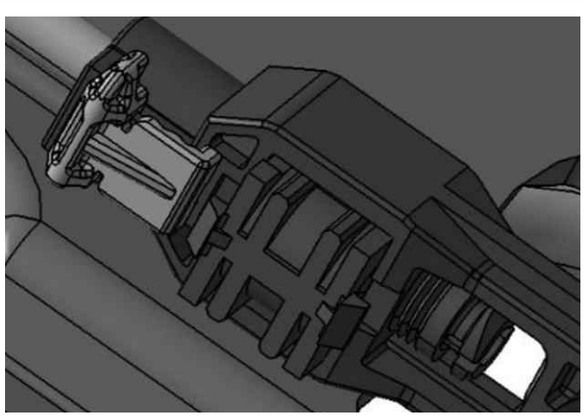
8. Remove console panel of auxiliary instrument panel
9. Pull the snap of the adjustable mechanism of shift cable assembly gear selecting cable out of the mechanism



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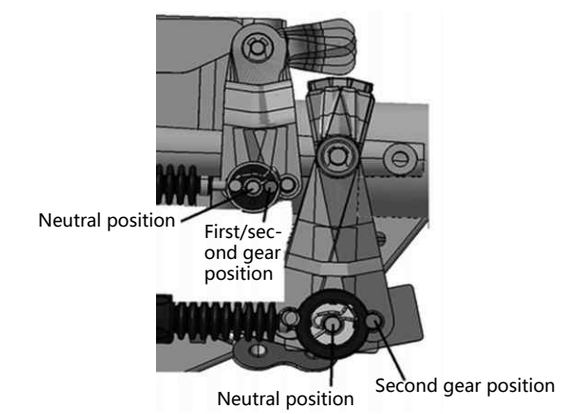


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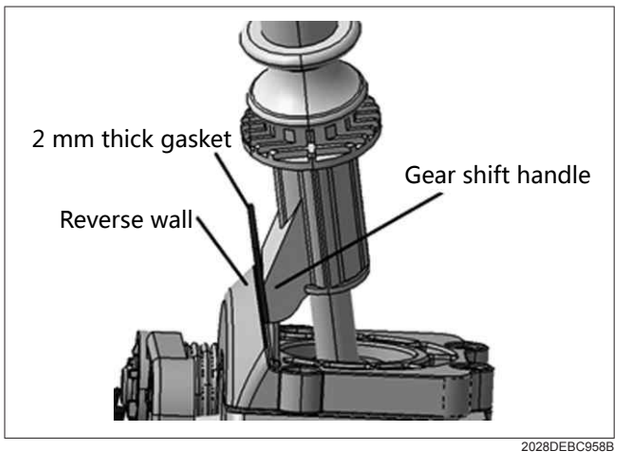
10. Lift vehicle to proper position
11. Place the transmission in second gear under the vehicle by moving the transmission gear selecting rocker arm backward to 1st/2nd gear position, and then move the gear selecting rocker arm backward



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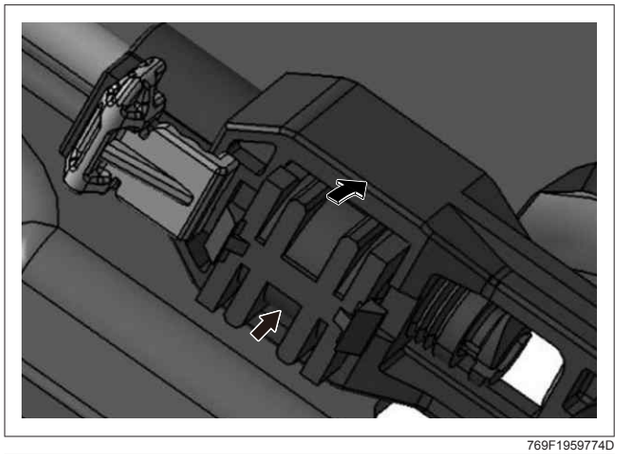
12. Lower the vehicle

13. In the cab, adjust shift lever to the 2nd gear position by selecting 2 mm thick gasket, placing the gasket on reverse gear wall,and then moving the lever along the transverse direction of the vehicle toward the reverse gear wall so that the lever handle is lightly attached to the gasket, where the shift lever is in the 2nd position

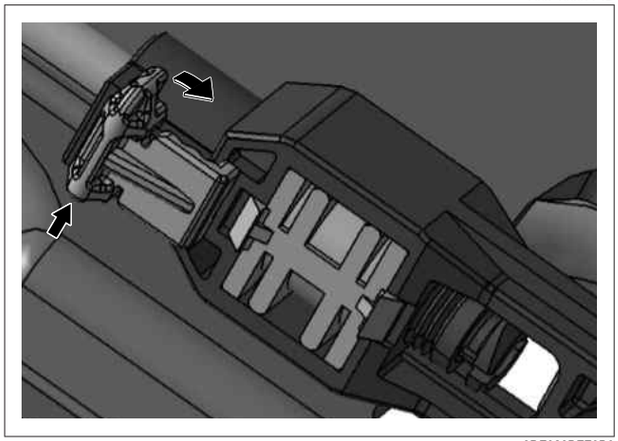


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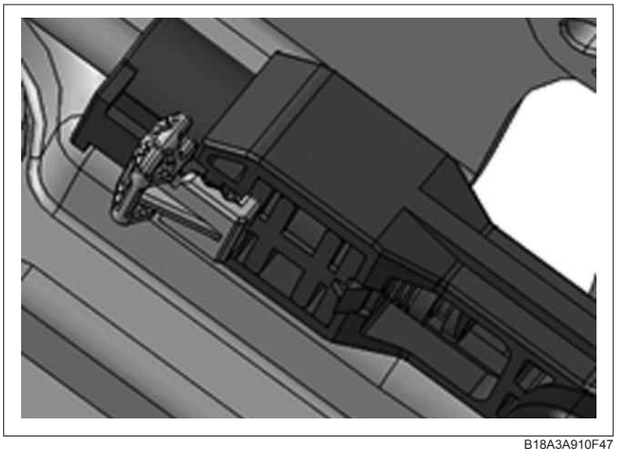
14. Hold the snap of shift cable connector



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15. Remove 2 mm thick gasket
16. Install console panel of auxiliary instrument panel
17. Install shifter dust boot assembly
18. Install gear shift lever
19. Connect the negative terminal of the battery

Transmission system (R640B1)

Transmission system ..... 15－1
System description ..... 15－1
Location diagram ..... 15－2
Basic parameters ..... 15－3
Specified torque ..... 15－4
Special tool ..... 15－6
Fault symptom checklist ..... 15－7
Transmission lubricant ..... 15－9
Specifications ..... 15－9
Check ..... 15－10
Replacement ..... 15－11
Transmission assembly ..... 15－12
Structural diagram ..... 15－12
Cross-sectional View of ..... 15－16
Specified torque ..... 15－18
Removal/installation ..... 15－19
..... 15－21
Check/Adjustment ..... 15－34
Input shaft subassembly ..... 15－35
Structural Diagram of ..... 15－35
Disassembling/Assembling of ..... 15－36
Output shaft subassembly ..... 15－37
Structural Diagram of ..... 15－37
Disassembling/Assembling of ..... 15－39
Intermediate shaft subassembly ..... 15－41
Structural Diagram of ..... 15－41
Disassembling/Assembling of ..... 15－42
Front cover assembly ..... 15－44
Structural Diagram of ..... 15－44
Disassembling/Assembling of ..... 15－45
Rear housing subassembly ..... 15－46
Structural Diagram of ..... 15－46
Disassembling/Assembling of ..... 15－47
Rear housing subassembly ..... 15－48
Structural Diagram of ..... 15－48
Disassembling/Assembling of ..... 15－49
Transmission front housing subassembly ..... 15－51
Structural Diagram of ..... 15－51
Disassembling/Assembling of ..... 15－52
Transmission clutch housing sub-assembly ..... 15－53
Structural Diagram of ..... 15－53
Disassembling/Assembling of ..... 15－54

Clutch slave cylinder assembly .....15－55
Removal/installation.....15－55
Reverse switch assembly.....15－56
Removal/installation.....15－56
Check.....15－56
Neutral switch assembly.....15－57
Pin definition .....15－57
Removal/installation.....15－57
Check.....15－58
Shifter assembly.....15－59
Specified torque.....15－59
Removal/installation.....15－60
Shift cable assembly .....15－63
Specified torque.....15－63
Removal/installation.....15－64
Adjustment.....15－66

Transmission system

System description

Structure features

- This transmission is a tri-axial manual mechanical transmission which is operated in the form of rear end remote control and has 6 forward gears and 1 reverse gear.
- A slider type synchronizer is used in all gears, with a three-cone synchronizer for the first, second, third and fourth gears while a single-cone synchronizer for the fifth, sixth and reverse gears.
- This transmission adopts a building block split structure as a whole.

Proper use and maintenance

Correct gear shift

- Choose the right time to shift gears properly based on the vehicle speed and road conditions. During gear shifting, the clutches shall be released thoroughly. The gear shifting force shall be gentle (overexertion is forbidden) to avoid desynchronization.
- Starting at high speed which results in tooth breaking shall be avoided.
- When the vehicle is running, do not leave a hand on the shift lever, otherwise transmission shift fork and synchronizer component will wear prematurely.
- When reversing, park the vehicle for shift so as to prevent shift noise and damage to gears.

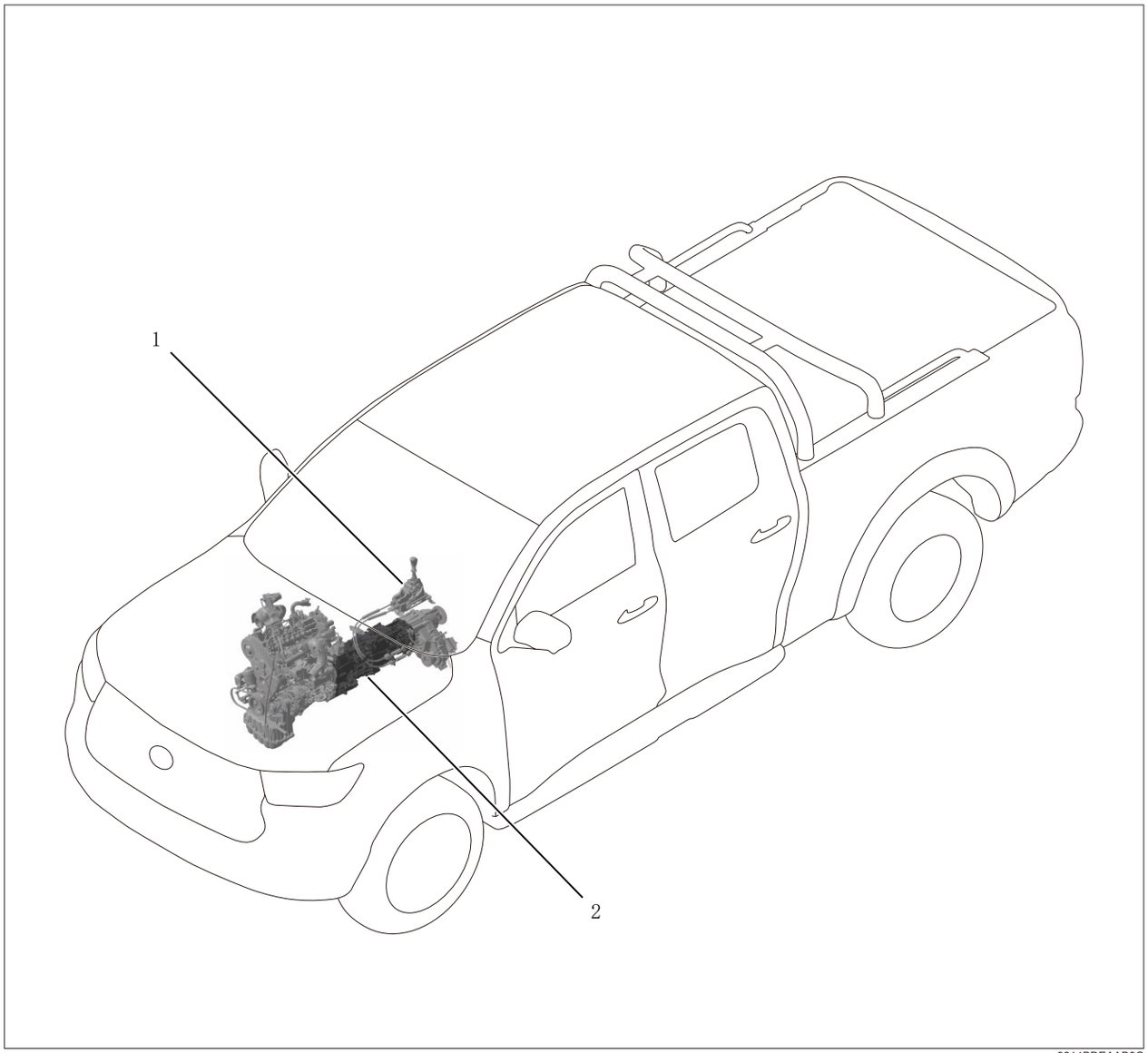
Adequate lubrication

- Use specified lubricant, do not use lubricant of poor quality, avoid mixing lubricants of different grades.
- This transmission is lubricated by splash. Add lubricant as required.

Proper maintenance

- Perform corresponding maintenance within specified time or mileage based on the items specified in the manual supplied with the vehicle.

Location diagram



9214BDEAAB9C

1. Shifter assembly
2. Manual transmission assembly

Basic parameters

Item	Parameter	
Transmission type	Manual transmission	
Final ratio	3.900	
Gear transmission ratio	First gear	4.906
	Second gear	2.839
	Third gear	1.721
	Fourth gear	1.223
	Fifth gear	1
	Sixth gear	0.794
	Reverse gear	4.439

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Slave cylinder x clutch housing	16.5±4.95	2	Pre-applied coatings
Bolt	Front cover × clutch housing	16.5±4.95	4	Pre-applied coatings
Magnetic hexagon head bolt	On the transmission front housing	42.65±10.15	1	Oil discharge
Hexagon head bolt	On the transmission front housing	42.65±10.15	1	Fill
Bolt	Clutch housing × transmission front housing	36.5±7.5	10	—
	Front housing × rear housing	36.5±7.5	10	—
	Rear housing × rear body	36.5±7.5	9	—
Bolt	Shift rocker arm subassembly × rear body	16.5±4.95	2	—
	Shift rocker arm subassembly × rear body	16.5±4.95	2	—
Bolt	Reverse idler shaft × transmission housing	30±9	1	—
Nut	Output shaft	219±43.8	1	Pre-applied coatings
Intermediate shaft locknut	Intermediate shaft head	95±5	1	Pre-applied coatings
Bolt	Process bracket × front housing	18.5±5.55	1	—
Fork positioning bolt	No. 1 fork × fork shaft	19.5±4	1	Pre-applied coatings
Bolt	Neutral switch × shift lever cover subassembly	5.5±2.5	1	—
Bolt	Shift lever cover subassembly × rear body	16.5±5	2	—
Screw	Bearing cover plate	18.5±5.5	12	Apply the sealant. The number of input/intermediate/output bearing cover plate is 4 respectively.

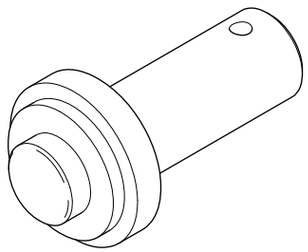
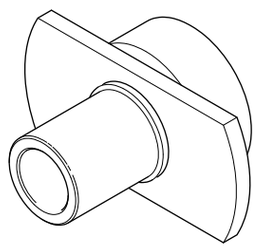
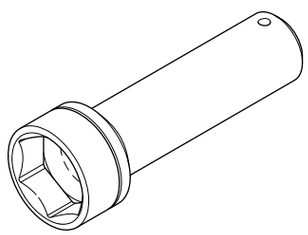
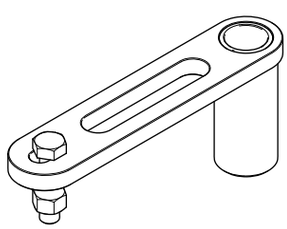
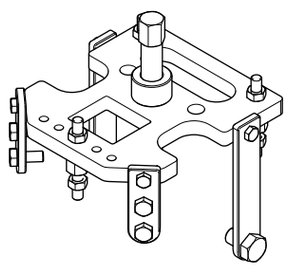
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Release fork support	Release fork	37±11.1	1	—
Reverse gear switch assembly	Reverse gear switch assembly	44±8.8	1	—
Bolt	Cable bracket × transmission rear housing subassembly	20±2	3	—
Bolt	Fork positioning support pin × front housing	18.5±5.5	4	—

⚠ Caution

› Pre-coated bolts are disposable parts and cannot be reused.

› The torque values of the fork positioning bolts shall all be confirmed.

Special tool

Code	Name	Purpose	Schematic diagram
ZEZF068792	T-shape oil seal installation tool	Install the input shaft T-shape oil seal	
ZEZF068794	Rear housing oil seal assembly installation tool (4WD)	Install the rear housing oil seal assembly.	
ZEZF068795	Locknut removal/installation tool	Remove and install the lock nut	
ZEZF068749	Shaft 1 spine fastening tool	Fix the shaft 1 to facilitate the removal and installation of the lock nut	
ZEZF068751	Rear cover puller	Remove the 2WD and 4WD transmission rear cover shell	

Fault symptom checklist

Common faults	Possible causes	Troubleshooting
Difficulty in gear engagement	Clutch not used	Adopt the correct driving method
	Drag separation of clutch	Check and adjust
	Synchronizer gear ring badly worn	Replace parts and components
	Positioning spring is hard	Replace parts and components
Extremely high or abnormal noises	The oil level is too low	Oil filled to the specified level
	Poor quality of lubricant	Replace oil with specified one
	Oil not replaced in time	Replace oil and damaged parts
	Improper axial position and clearance of gears	Check and make adjustment
	Bearing damaged	Replace parts and components
	Burrs or bumps in gear wheel	Repair or replace gears
Oil leakage and seepage	Too much oil is filled and the oil level is too high	Fill oil to the specified level
	Loose or missing bolts	Install and tighten bolts as required
	Failure of vent plug	Replacement
	Seal damaged	Replacement
The synchronizer is damaged	Shifting with overexertion	Replacement
	The clutch is not used	Adopt the correct driving method
	Synchronizer slider damaged	Replacement
	Incorrect installation of propeller shaft	Check and make adjustment
Improper gear engagement	Control mechanism fails	Check and make adjustment
	Missing positioning spring or steel ball	Supplement
	Positioning spring failure	Replacement
	Gear sleeve fork groove seriously worn	Replace it
	The shift fork is seriously worn	Replace it
The bearing is burned or the gear is burned	The oil level is too low	Replace the part and add oil
	The quality of lubricating oil is inferior	Replace the part and lubricating oil
	The oil is not replaced in time and is too dirty	Replace the part and lubricating oil
	The oil of different designation is used or any additive is used	Replace the part and lubricating oil

Common faults	Possible causes	Troubleshooting
Difficulty in engagement of neutral gear	Synchronizer slider fails	Replace it
	The inner groove of synchronizer annulus is worn	Replacement
	The synchronizer gear ring is seized at the tapered surface	Replace it
	The shift fork or shift fork shaft is deformed	Replace it
	The shift fork is seriously worn.	Replace it

Transmission lubricant

Specifications

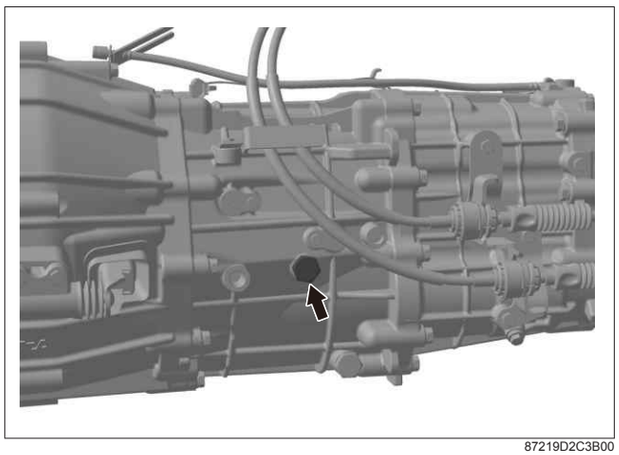
Item	Parameter
Lubricant capacity (L)	2.8±0.1
Lubricant type	GL-5 140 for high-temperature regions
	GL-4 75W-80 for regions outside high-temperature regions

Check

⚠ Caution

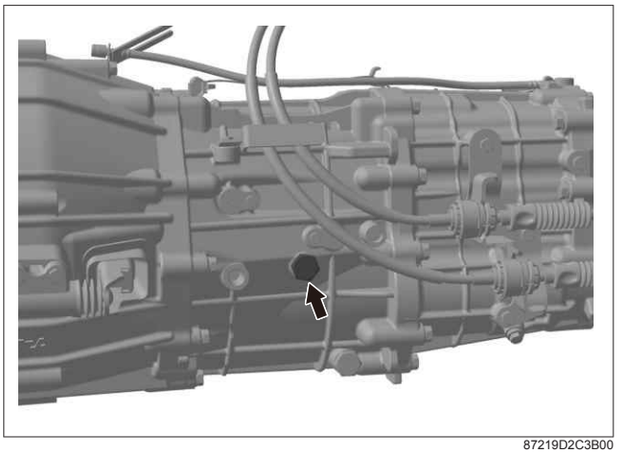
- Properly handle the waste.
- Before checking lubricant level, make sure the vehicle stays horizontal.
- Before adding lubricant, make sure the vehicle stays horizontal.
- Too much or too little lubricant can cause malfunctions.
- After changing lubricant, drive the vehicle and check the lubricant level.

1. Lift the vehicle to a proper position
2. Unscrew the fuel filler screw plug



87219D2C3B00

3. Check the oil level of transmission. The oil level shall be flush with the lowest point of the lower end face of the oil filler at the screw plug. Add lubricant in transmission if necessary
4. If lubricant level is low, check if there is oil leakage
5. Check the quality of transmission lubricant. Replace transmission lubricant if it is unsuitable for use or dilution, gelation, dirt or deterioration, etc. is found
6. Install oil filler screw plug



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Tightening torque: (42.65±10.15) N·m

Replacement

⚠ Caution

› Properly handle the waste.

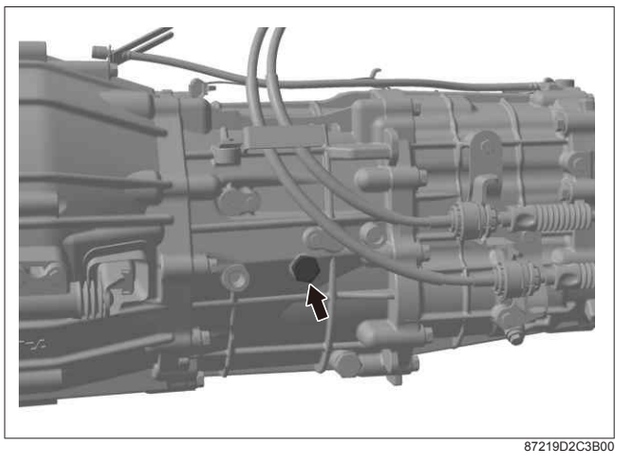
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› Too much or too little lubricant can cause malfunctions.

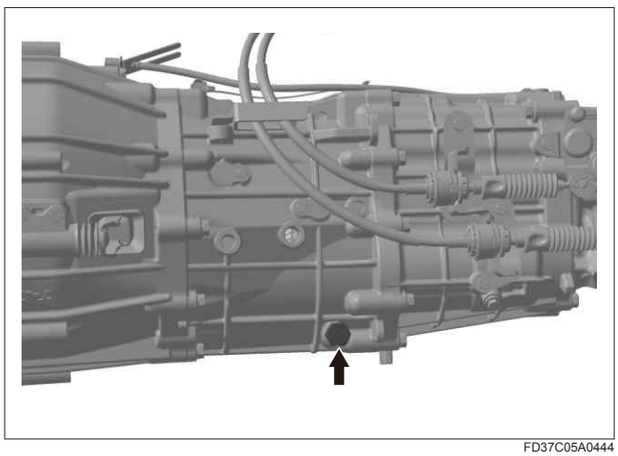
› After changing lubricant, drive the vehicle and check the lubricant level.

1. Lift the vehicle to a proper position
2. Unscrew the fuel filler screw plug



87219D2C3B00

3. Unscrew drain screw plug, and empty transmission lubricant



FD37C05A0444

⚠ Caution

› Properly handle the waste.

4. Install drain screw plug after cleaning drain screw plug

   Tightening torque: (42.65±10.15) N·m

5. Add transmission lubricant from the fuel filler until lubricant flows out of the fuel filler

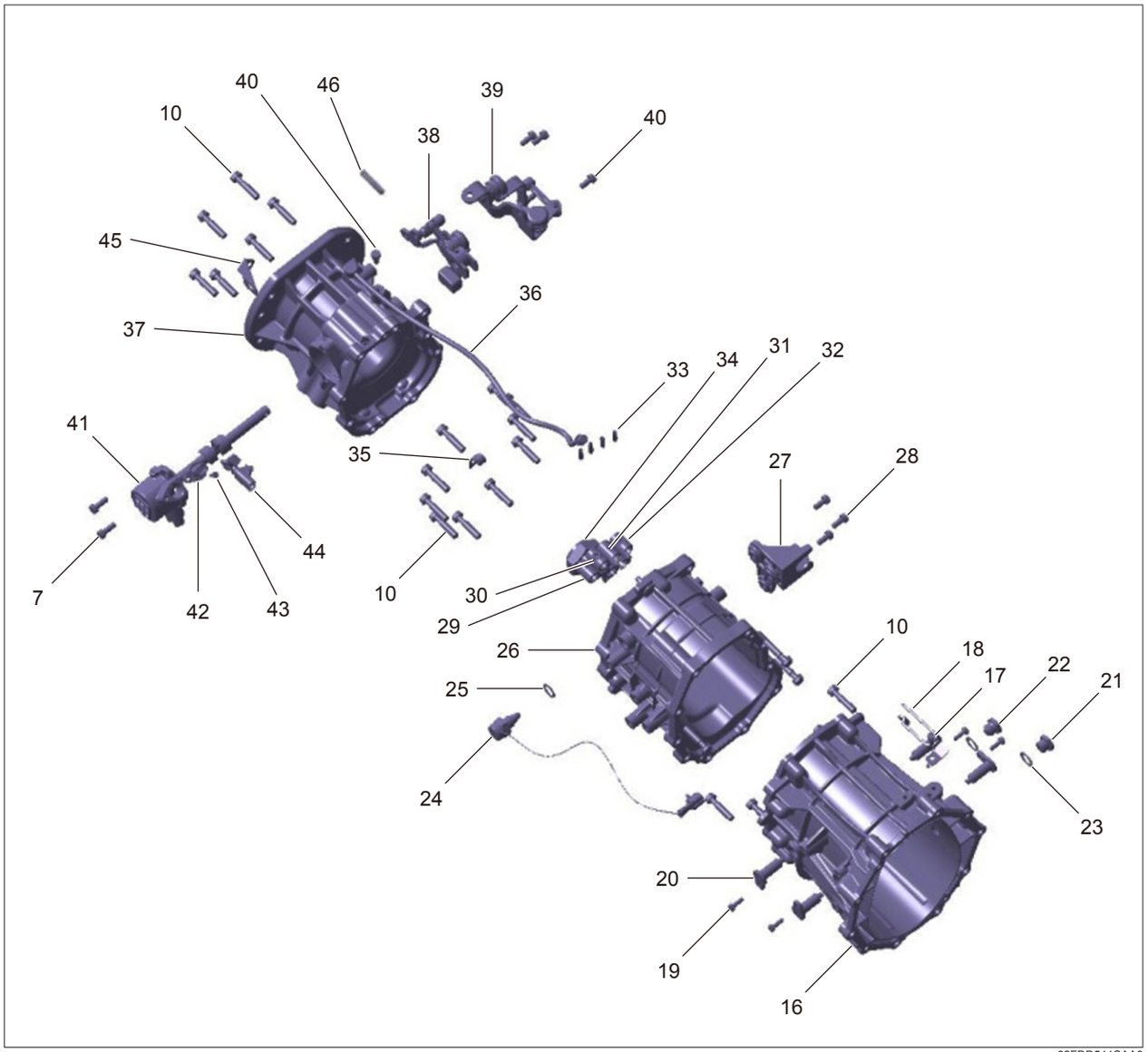
   Filling amount: (2.8 ± 0.1) L

6. Clean and then install the oil filler screw plug

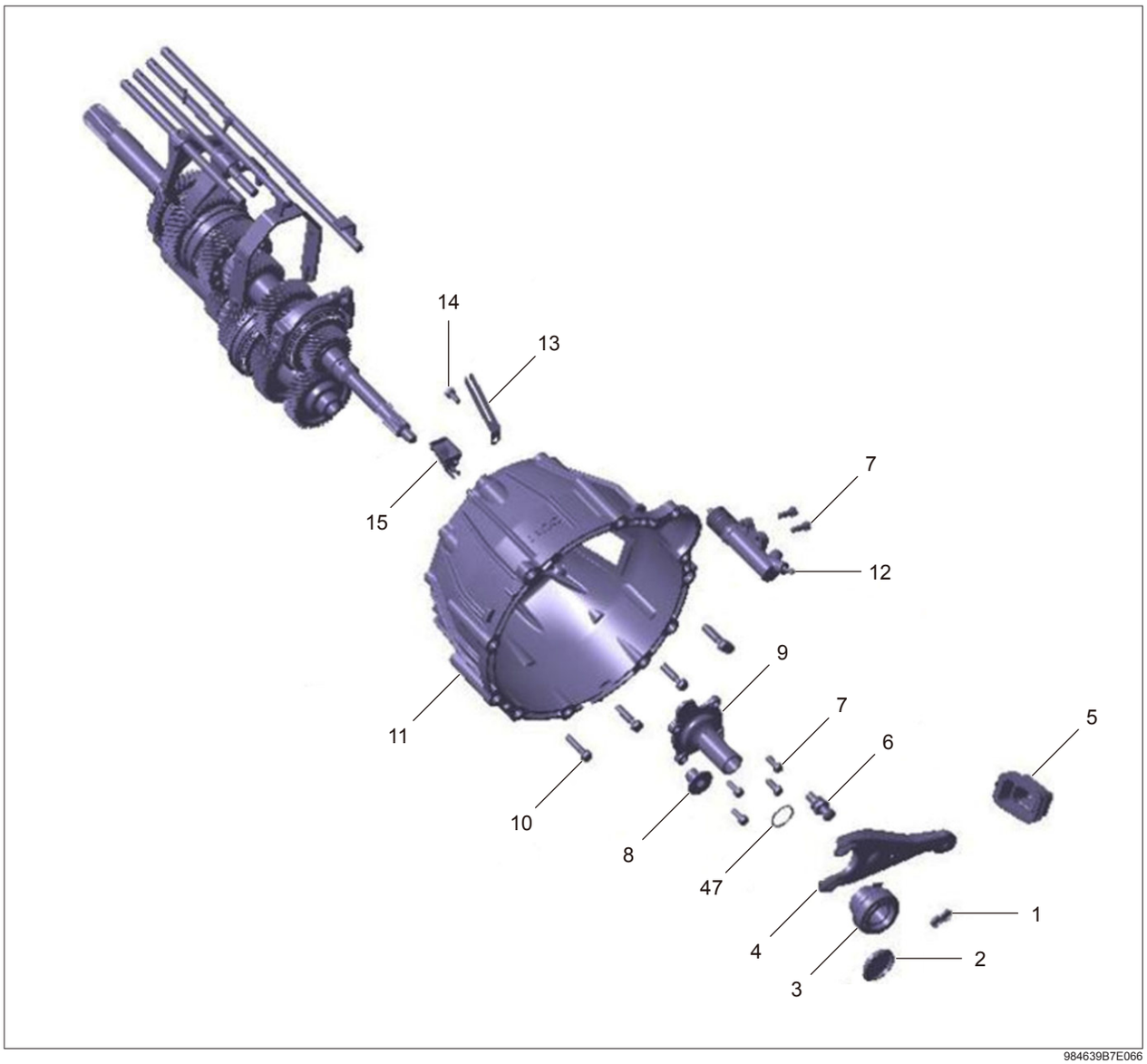
   Tightening torque: (42.65±10.15) N·m

Transmission assembly

Structural diagram

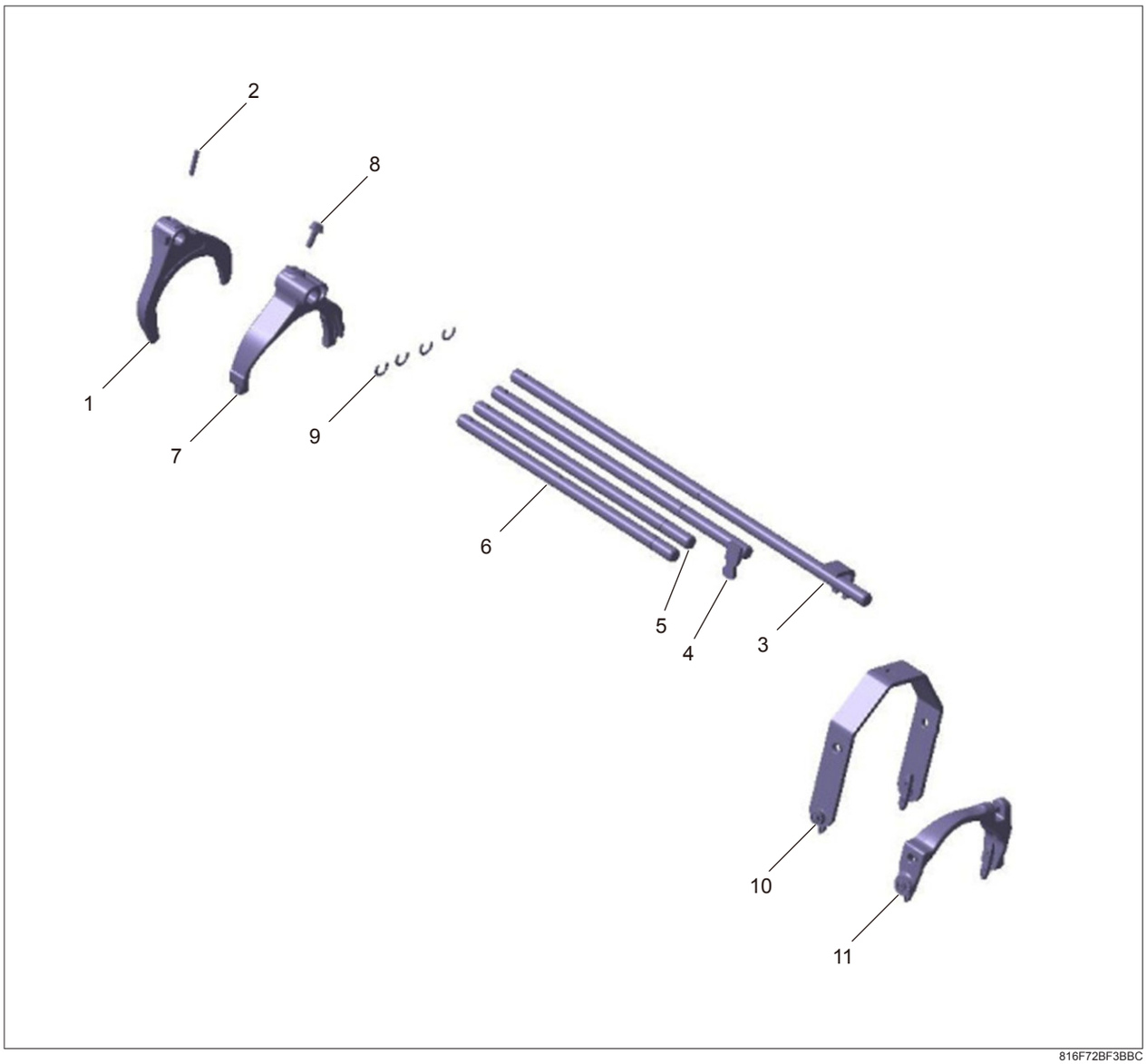


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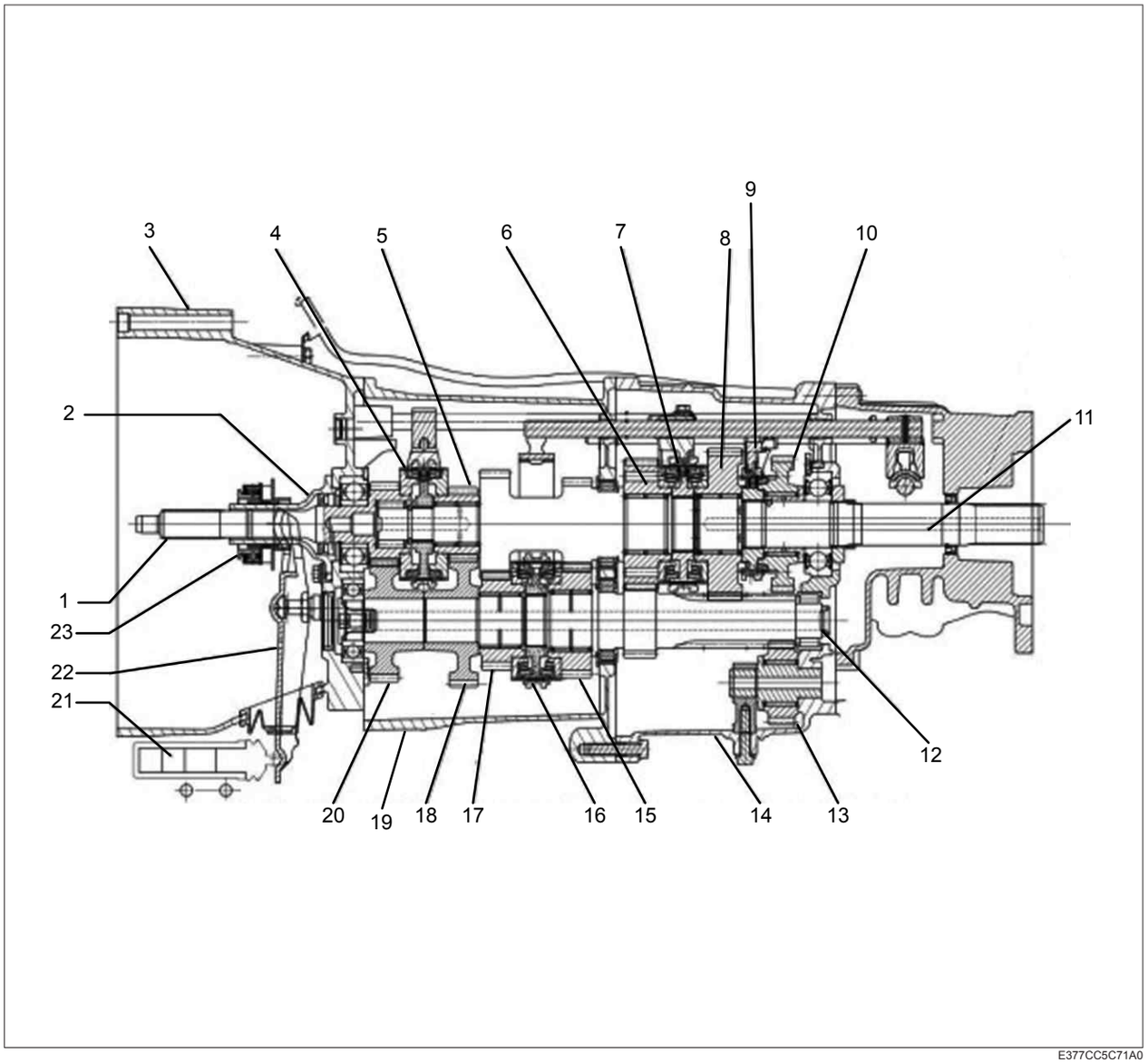
1. Bowl-type plug
2. Sealing plug
3. Clutch release bearing
4. Release fork assembly
5. Release fork guard
6. Release fork support
7. Hexagon bolt M8 with washer
8. Intermediate shaft locknut
9. Front cover assembly
10. Hexagon bolt M10X1.25 with washer
11. Clutch housing subassembly
12. Clutch slave cylinder
13. Long clip
14. Hexagon bolt with washer M8X1.25
15. Oil guide groove
16. Transmission front housing subassembly
17. Bolt with washer
18. Process bracket
19. Hex bolts with gasket
20. Support pin component
21. Hexagon head bolt
22. Magnetic hexagon head bolt
23. Seal washer
24. Reverse gear switch assembly
25. Seal washer
26. Transmission rear housing subassembly
27. Cable bracket assembly
28. Hexagon flange bolt with washer
29. No. 4 guide block
30. No. 3 guide block
31. No. 2 guide block
32. No.1 guide block
33. Elastic cylindrical pin
34. Locknut
35. Clip
36. Vent plug assembly
37. Transmission rear housing subassembly
38. Shift rocker arm subassembly
39. Shift rocker arm subassembly
40. Bolt with washer
41. Shift lever cover subassembly
42. Neutral switch
43. Hex bolts with gasket
44. Adapter harness
45. Wire clip bracket
46. Roll pin
47. Shaft retainer ring



816F72BF3BBC

1. Reverse fork
2. Elastic cylindrical pin
3. No. 3 fork shaft
4. No. 2 fork shaft
5. No. 1 fork shaft
6. Reverse fork shaft
7. No. 1 fork
8. Fork positioning bolt
9. Clamping retainer ring
10. No. 2 fork assembly
11. No. 3 fork assembly

Cross-sectional View of



E377CC5C71A0

1. Input shaft assembly
2. Front cover
3. Clutch housing
4. No. 3 synchronizer component
5. Sixth gear wheel component
6. Second gear subassembly
7. No. 1 synchronizer component
8. First gear subassembly
9. Reverse gear synchronizer component
10. Output shaft reverse gear
11. Output shaft
12. Intermediate shaft
13. Reverse idler
14. Rear housing
15. Fourth gear subassembly
16. No .2 synchronizer component
17. Third gear subassembly
18. Intermediate shaft sixth gear
19. Front housing
20. Constant meshing driven gear
21. Clutch slave cylinder
22. Release fork
23. Release bearing

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt A	Starter × engine × transmission	50±5	1	—
Bolt B	Starter × engine × transmission	50±5	1	—
Bolt C	Engine × transmission	50±5	6	—
Bolt D	Engine × transmission	50±5	2	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Drain the transmission lubricant
4. Remove 4 bolts and remove No.3 frame beam welding assembly



9427A1064721

5. Remove front axle propeller shaft assembly

Caution

› Make assembly marks before disassembly.

6. Remove rear axle propeller shaft assembly

Caution

› Make assembly marks before disassembly.

7. Remove the transfer case assembly
8. Disconnect high temperature sensor connector

Notice

› Disconnect high temperature sensor connector from the front end of transmission.

9. Remove nitrogen-oxygen sensor 1

Notice

› Remove nitrogen-oxygen sensor 1 from the nitrogen-oxygen sensor bracket 1 at the front end of the transmission.

10. Remove nitrogen-oxygen sensor bracket 1

Notice

› Remove nitrogen-oxygen sensor bracket 1 from the front of transmission.

11. Remove nitrogen-oxygen sensor 2

Notice

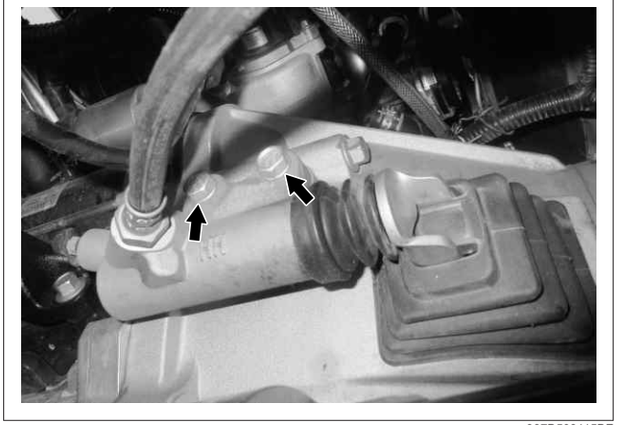
› Remove nitrogen-oxygen sensor 2 from the nitrogen-oxygen sensor bracket 2 at the rear end of the transmission.

12. Remove nitrogen-oxygen sensor bracket 2

Notice

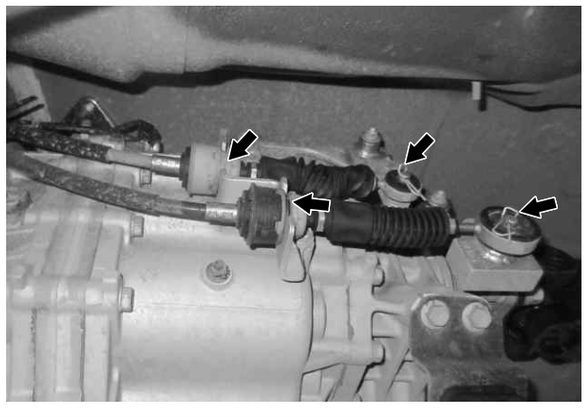
› Remove nitrogen-oxygen sensor bracket 2 from the rear end of transmission.

13. Disconnect the neutral switch adapter harness connector.
14. Disconnect the reverse switch connector.
15. Separate clutch slave cylinder with hose

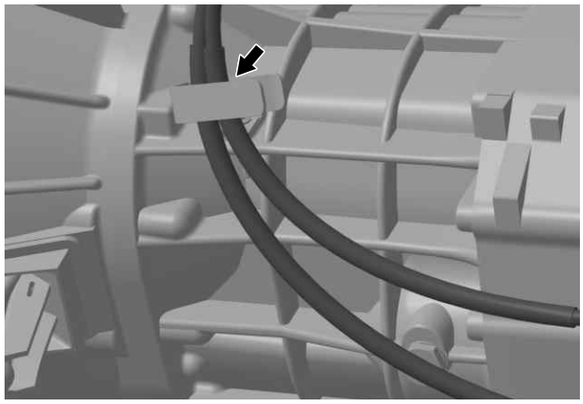


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16. Separate shift cable assembly



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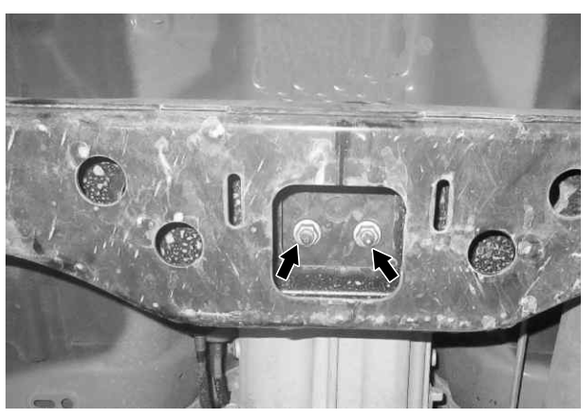
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17. Remove rubber hanger of exhaust pipe



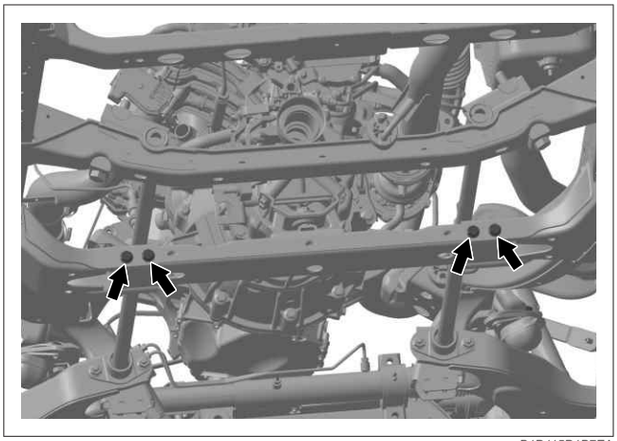
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18. Properly support the transmission assembly
19. Remove 2 nuts and disconnect the welding assembly between the transmission suspension assembly and the fourth beam of the frame.



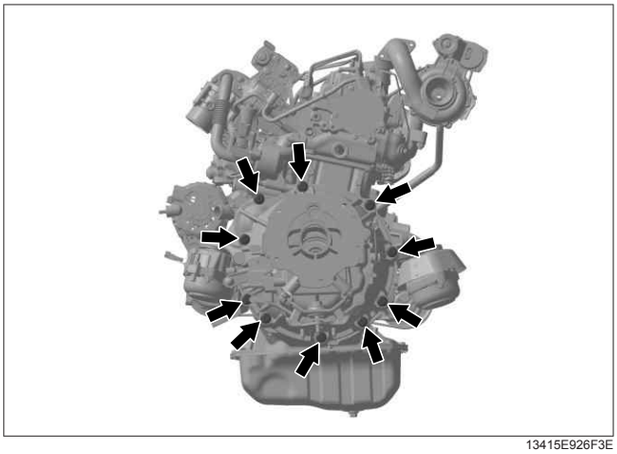
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20. Remove 4 bolts and 4 nuts, remove the 4th beam welding assembly of the frame



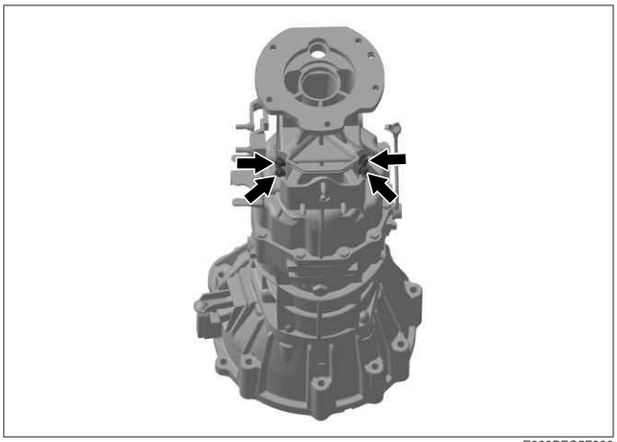
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21. Remove 10 bolts, and remove transmission assembly with transmission mount assembly



13415E926F3E

22. Remove 4 bolts, then separate transmission mount assembly



E983BFC5F969

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

› Add the transmission lubricant and check the transmission lubricant level.

Disassembling

⚠ Caution

› Clean the outside of the transmission before disassembly to avoid impurities on it falling inside during disassembly.

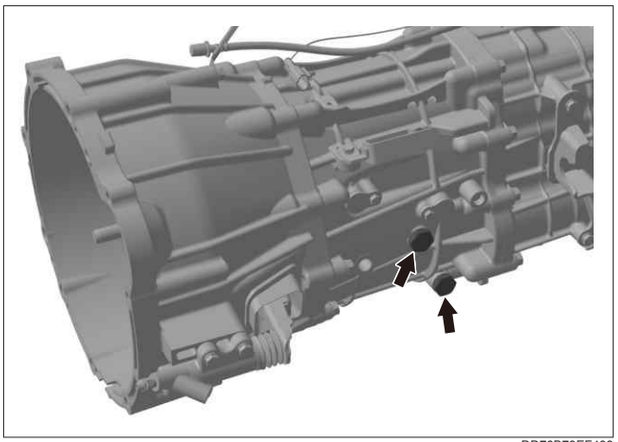
› During disassembly of the transmission, handle all parts and components with care to avoid bumping, especially the joint surface.

› During the disassembly of the transmission, place all parts and components in order to avoid loss or misplacement.

› Prepare a clean container to hold the disassembled parts, so as to avoid the parts being lost or confused with other parts, and check whether the parts are missing during assembly.

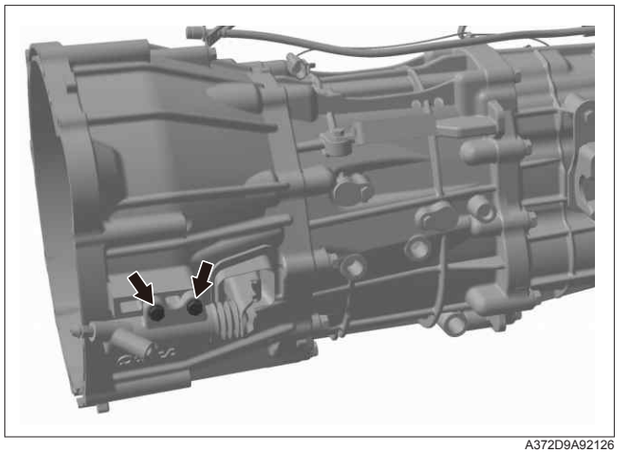
› Carefully check whether each component works normally, and whether there are damages, deformation or other faults during disassembly.

1. Remove hexagon head screw plug (inlet plug), magnetic hexagon head bolt (outlet plug) and sealing gasket, and drain the lubricant in the transmission.



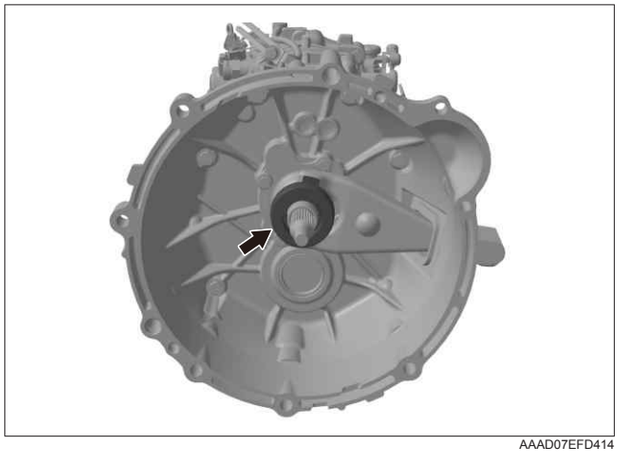
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2. Remove the clutch slave cylinder.



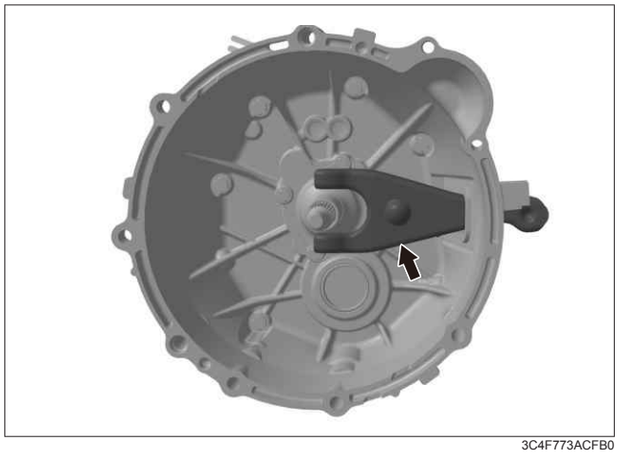
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3. Remove the release bearing subassembly.



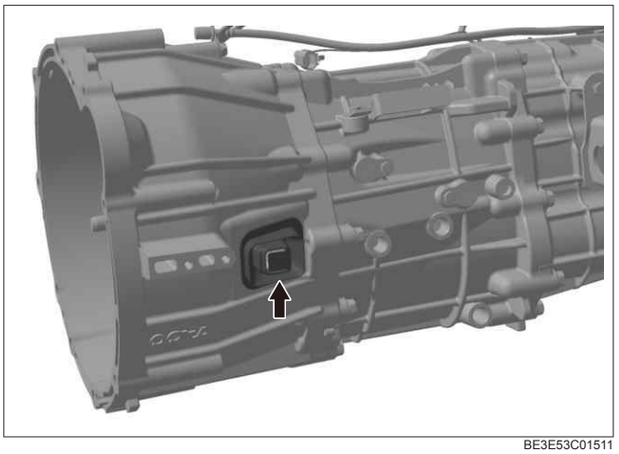
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4. Remove the fork assembly.



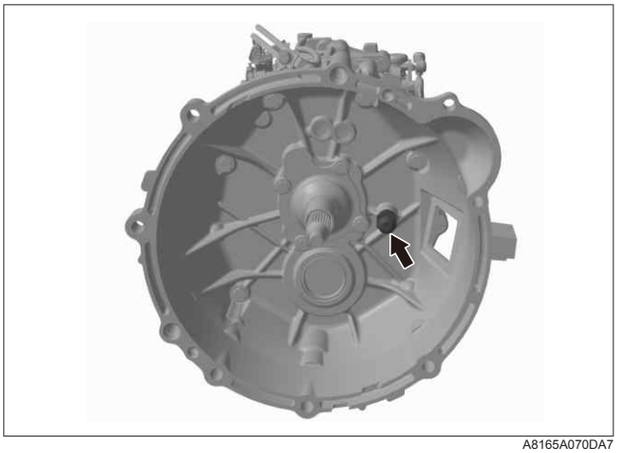
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5. Remove the fork cover.



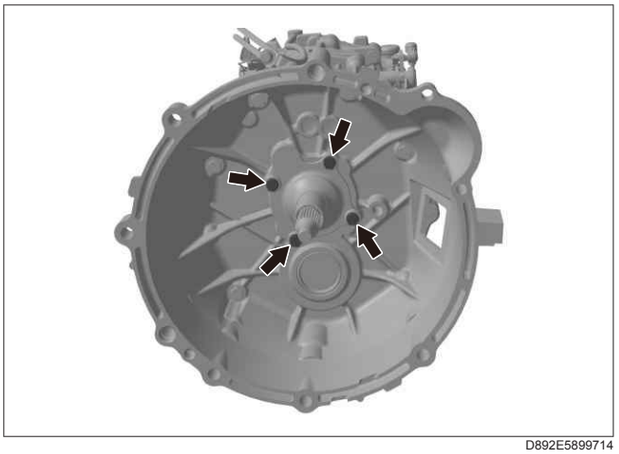
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6. Remove the release fork support.

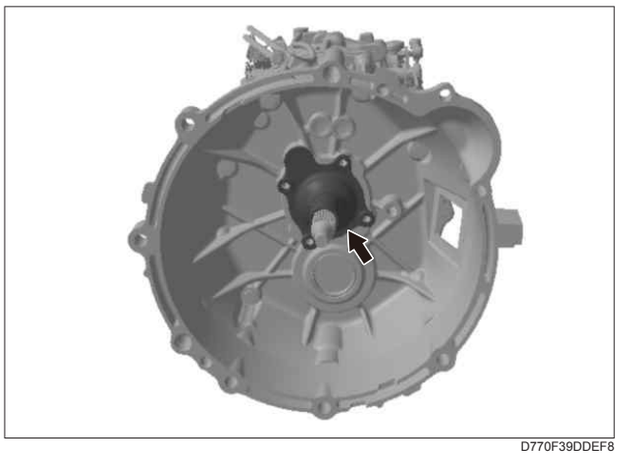


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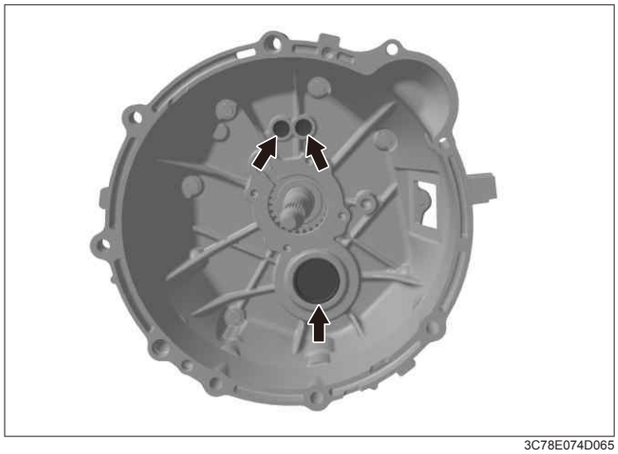
7. Remove the front cover subassembly.



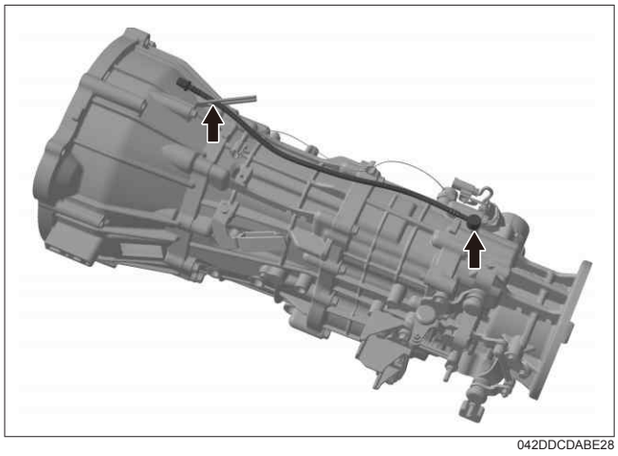
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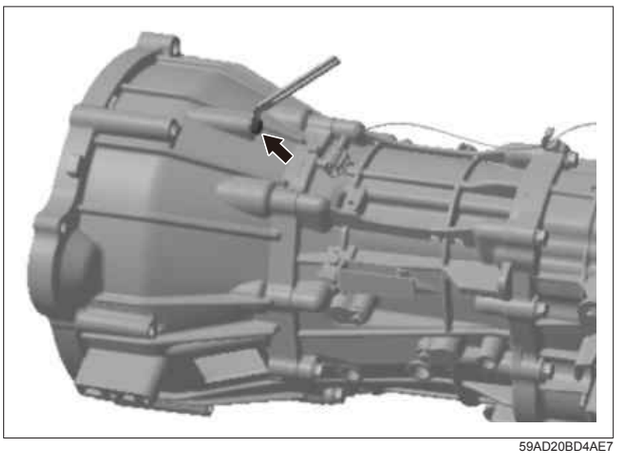

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8. Remove the bowl-type plug and sealing plug.

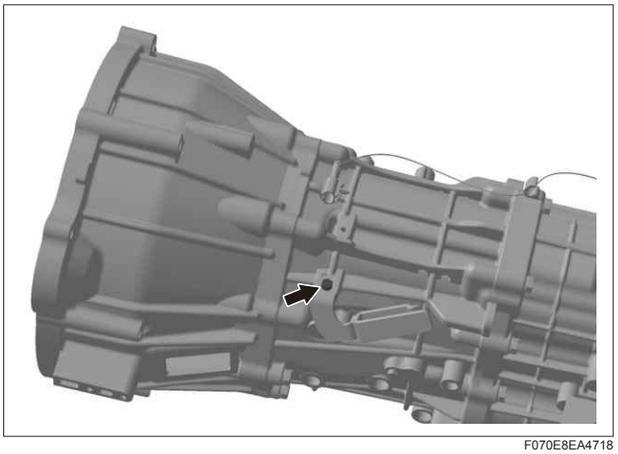

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9. Remove the vent plug and clip.

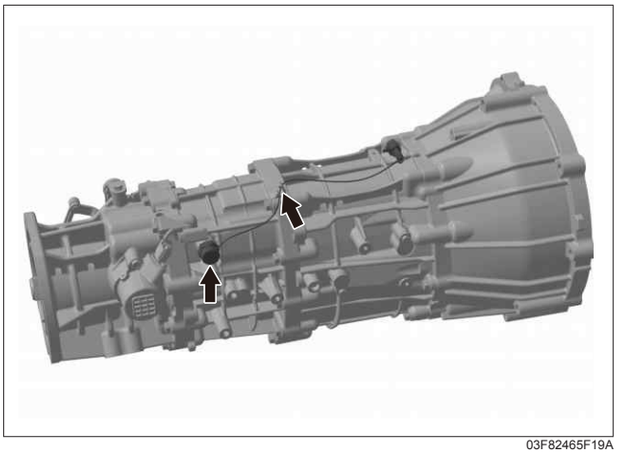

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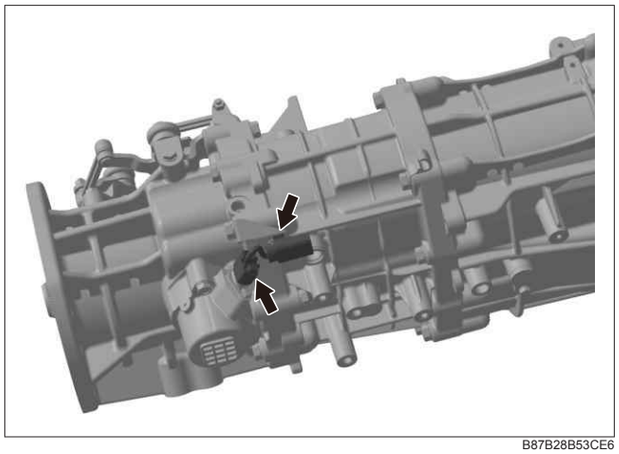
10. Remove the process bracket.


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11. Remove the reverse switch.

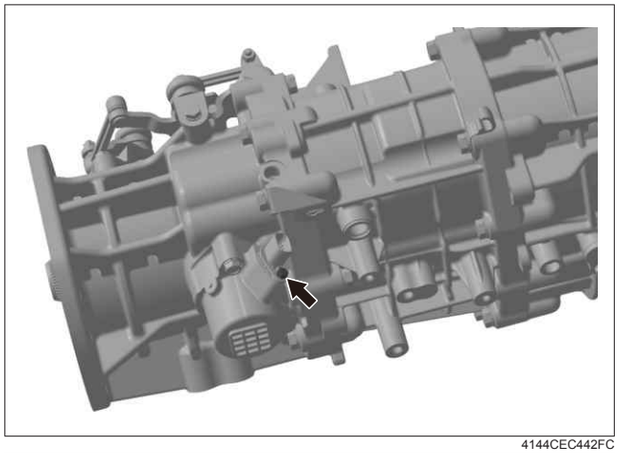

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12. Remove the switch harness.

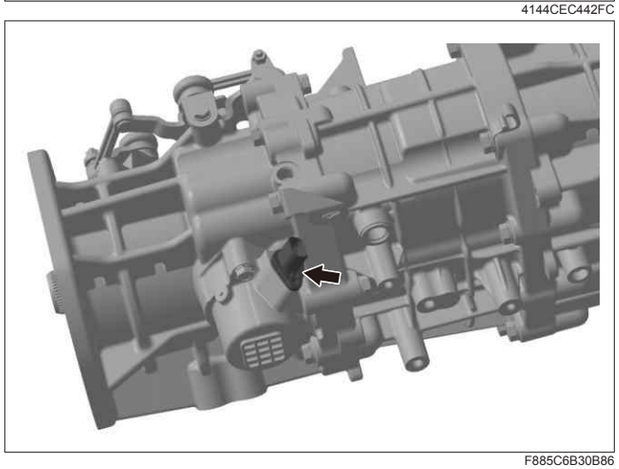


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13. Remove the neutral switch.

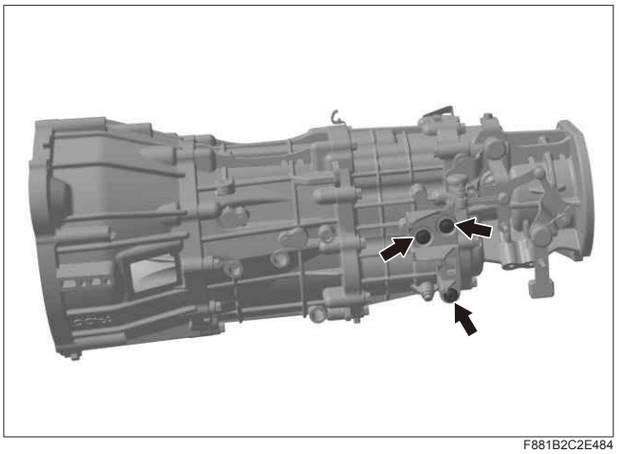


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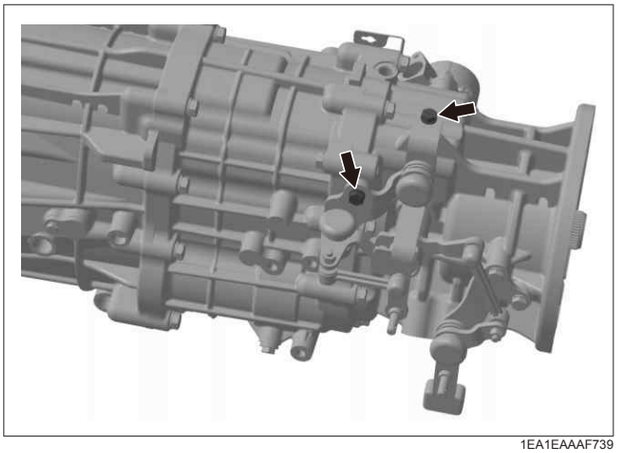
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14. Remove the cable bracket.



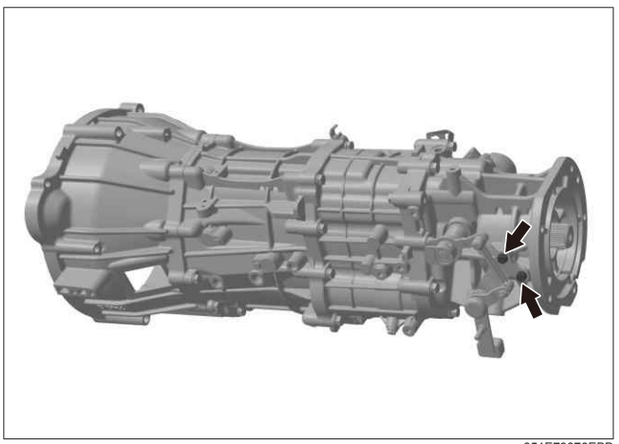
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15. Remove the gear shift rocker assembly.

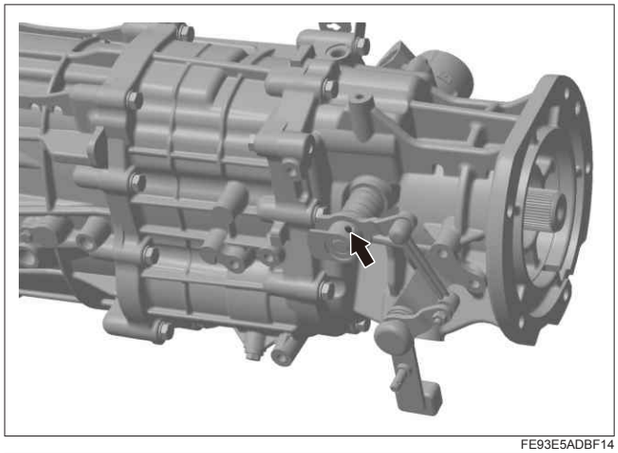


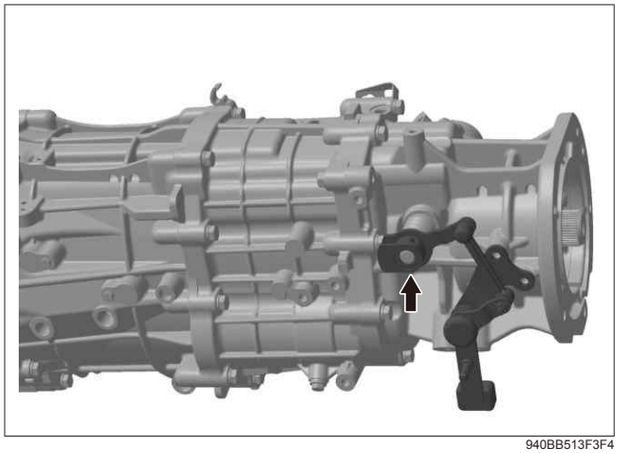
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16. Remove 2 bolts, 1 coil pin and gear shift rocker assembly.

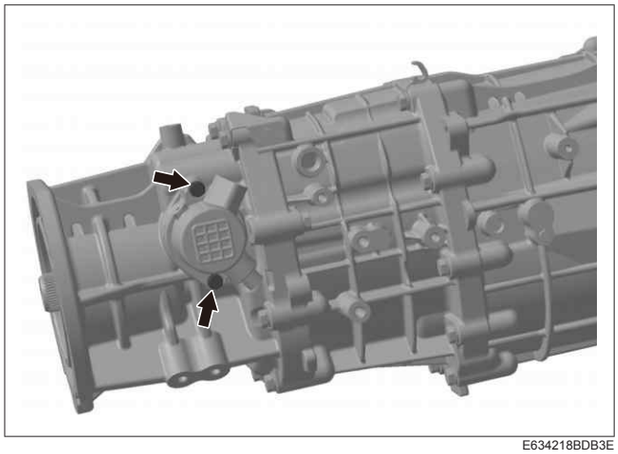


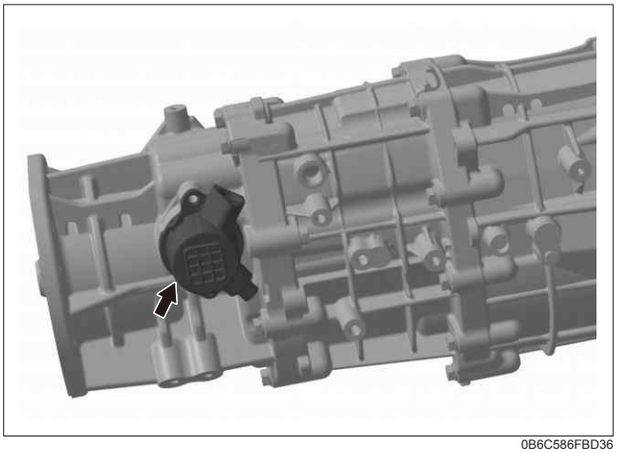
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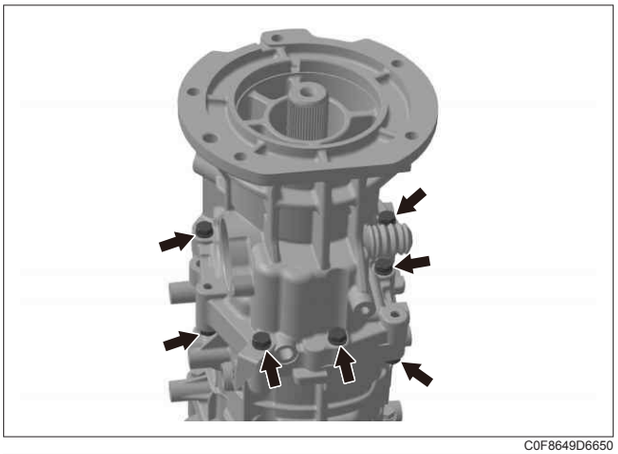

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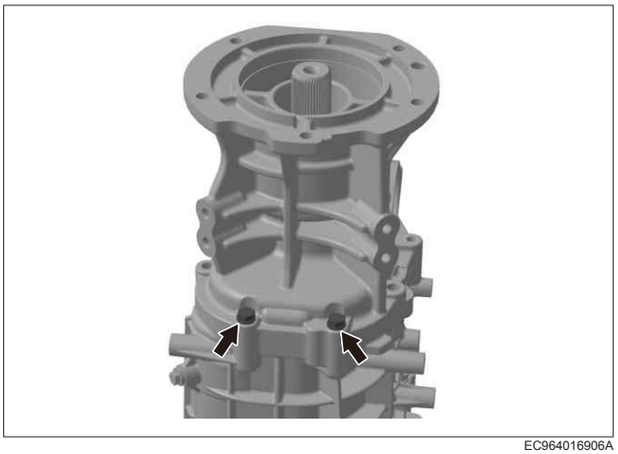
17. Remove the shift lever cover subassembly.

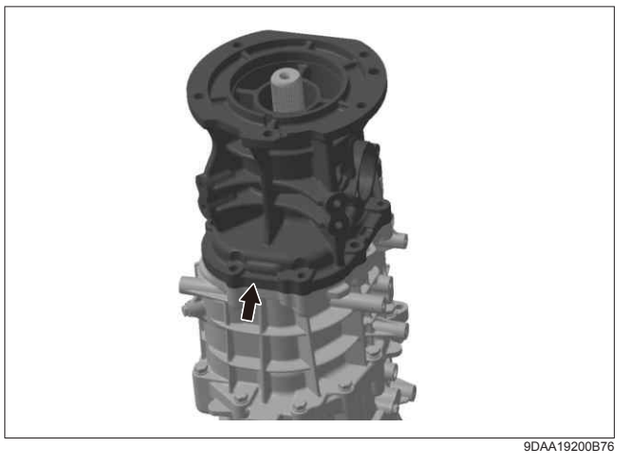

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18. Remove the rear housing. Remove the hexagon bolt with washer and the wire clip bracket on the rear housing, and gently knock the rear housing subassembly to remove it.

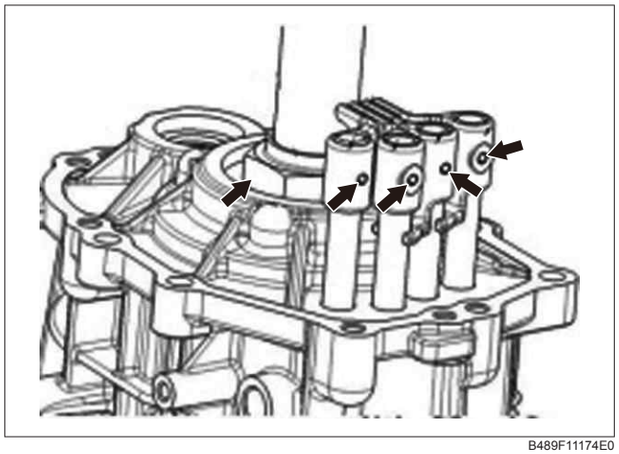

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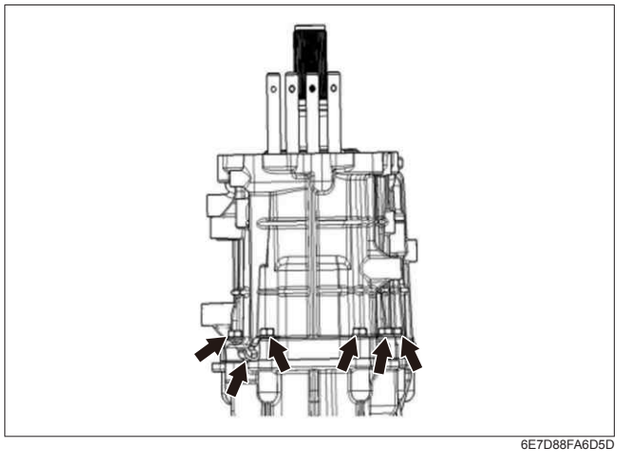
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19. Remove the guide block and locking nut. Remove the locking nut, take out the elastic cylindrical pins on the four guide blocks, and remove the guide blocks.



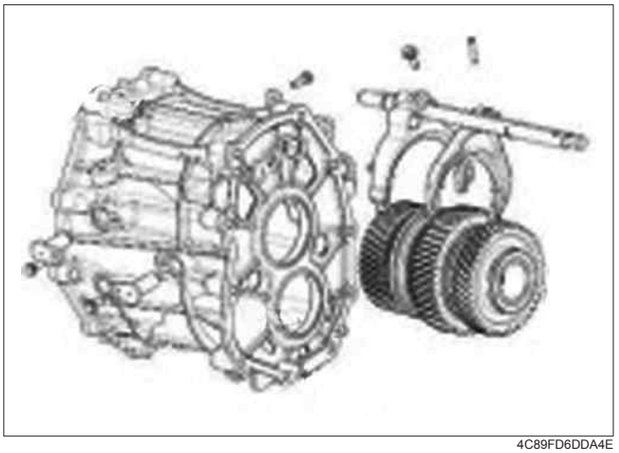
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20. Remove the transmission rear housing assembly. Remove the rear housing bolts and wire clips, and pull down the transmission rear housing assembly with tools.



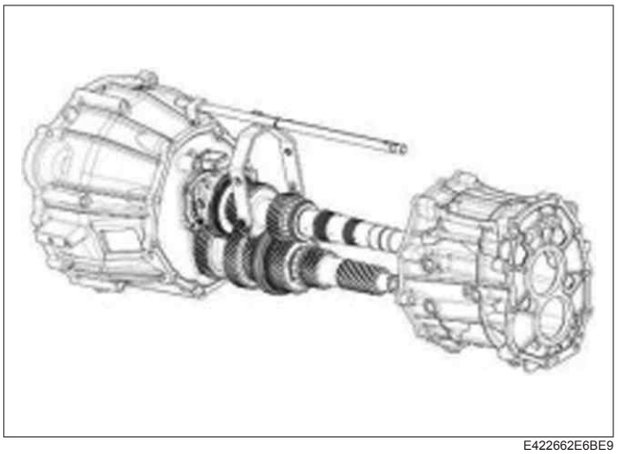
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21. Remove output shaft reverse gear, reverse synchronizer assembly, reverse fork and reverse fork shaft, #1 gear subassembly, #1 synchronizer assembly, #1 fork and #1 fork shaft, #2 gear subassembly and four pin assemblies in turn.



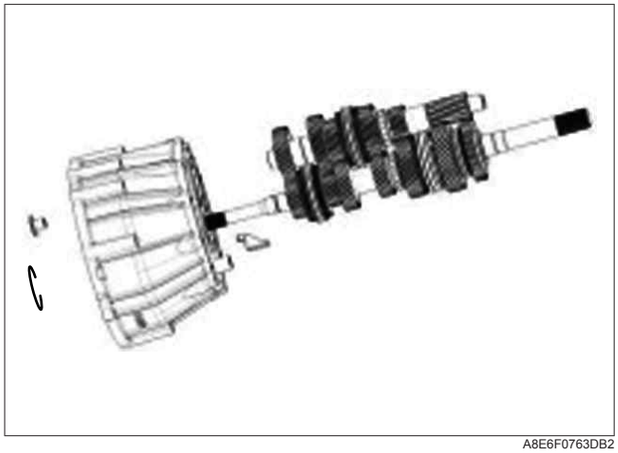
4C89FD6DDA4E

22. Remove the front housing bolt and front transmission housing subassembly, and remove the #2 fork and #2 fork shaft, #3 fork and #3 fork shaft respectively.



E422662E6BE9

23. Remove the intermediate shaft locknut, input shaft snap ring, press out the shaft string, and remove the oil guide groove.



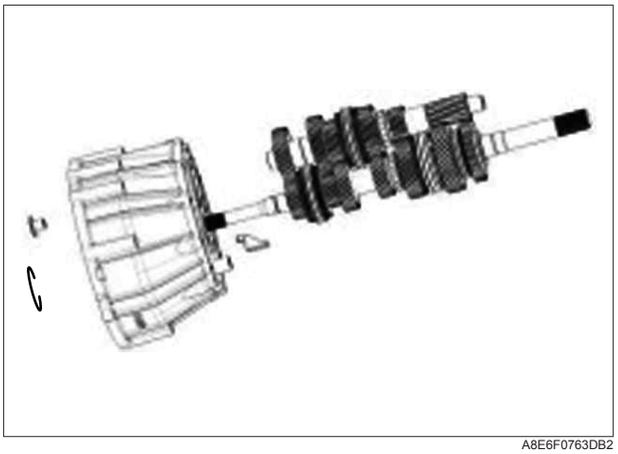
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Assembling

⚠ Caution

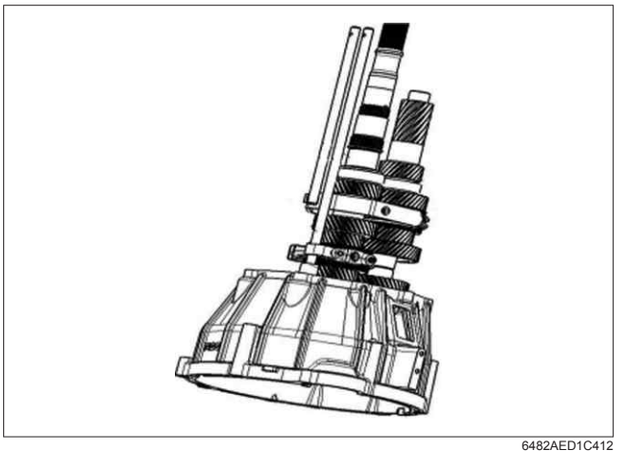
- Clean all parts (except for bearings, rubber parts and gaskets) before assembling.
- During assembling of the transmission, handle all parts and components with care to avoid bumping, especially the joint surface.
- Do not reuse oil seals, shaft retainer rings, spring pins, or packing rings.
- Apply gear oil to each rotating part and contact surface with relative movement, and confirm whether they can rotate or slide flexibly after assembling. (For example, input/output splines, gear tapered surface, etc.)
- Do not use rolling element to transfer pressure when bearing is assembled.
- When installing oil seals, coat the lips with grease and confirm the direction of the assembly; pay attention to be centered, and do not tilt.
- No leakage of lubricating oil is allowed for each part when the transmission is in the normal working position.

1. Hot assemble the shaft string. Fix the shaft string on the fixture with the input shaft head facing upwards, heat the inner holes of the input shaft front bearing and the intermediate shaft front bearing to 100℃ ~ 110℃, then assemble the clutch housing subassembly on the shaft string, tighten the intermediate shaft locknut, install the proper snap ring and the oil guide groove.



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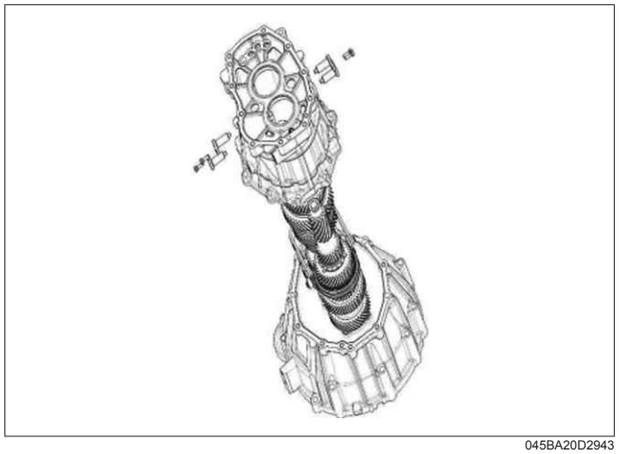
2. Install #2 and #3 fork shafts and forks. Fix the #2 and #3 fork shafts and forks at the position shown in the figure with tooling.



6482AED1C412

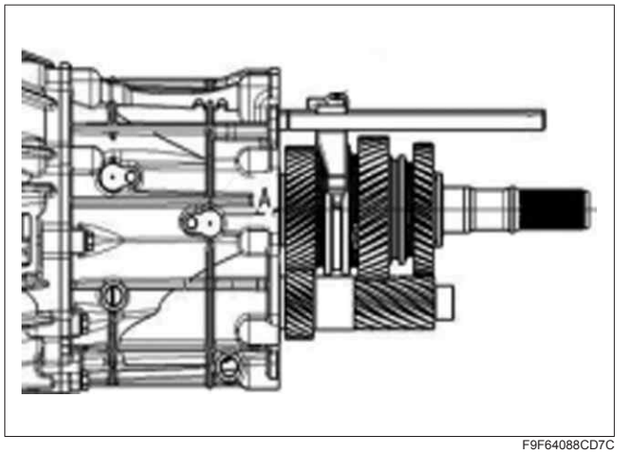
3. Glue the sealing surface of the clutch housing. Apply sealant to the center of the small face (namely seal surface) of the clutch housing.

4. Install the transmission front housing assembly. Fasten the transmission front housing assembly to the aforesaid assembly, and then install the pin assemblies and bolts.

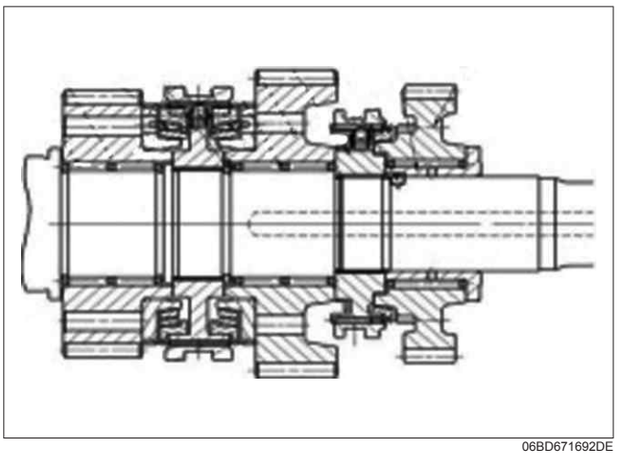


045BA20D2943

5. Install the rest of the shaft string. First, install the #1 gear & #2 gear needle roller bearing, #2 gear subassembly and #2 gear synchronizer gear ring assembly on the output shaft in turn, assemble the #1 synchronizer assembly with the #1 fork and press them on the output shaft together, and select the shaft retainer ring to achieve the minimum axial clearance (< 0.1 mm). Next, install the #1 gear needle spacing sleeve, #1 gear synchronizer gear ring assembly and #1 gear subassembly on the output shaft in turn, and press the reverse gear synchronizer assembly on the output shaft; Then, install the steel balls, #3 gear synchronizer gear ring, reverse gear needle bearing, output shaft reverse gear and reverse shaft bushing on the output shaft in turn.

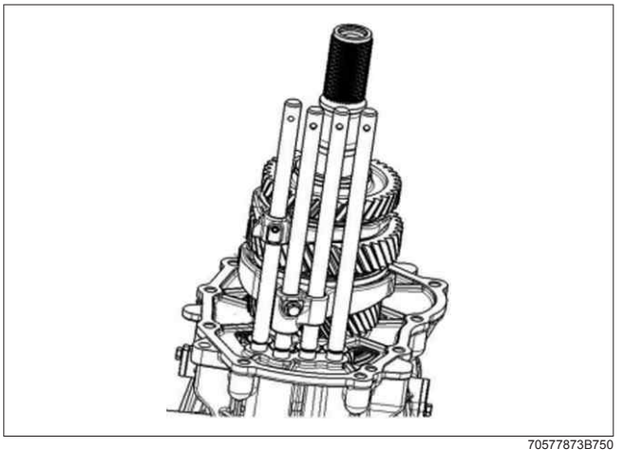


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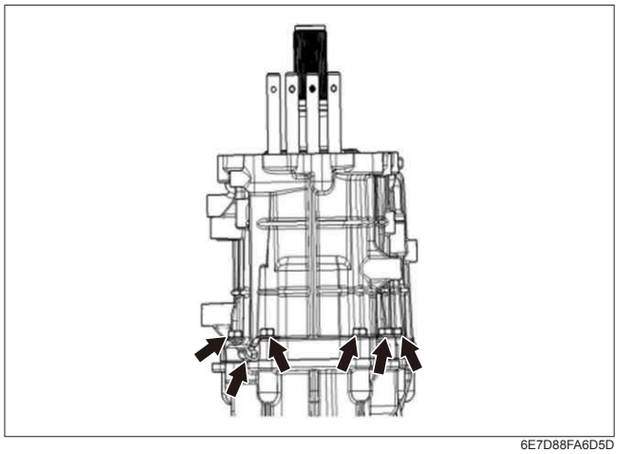
06BD671692DE

6. Install the remaining forks and fork shafts. First, place the 1# fork shaft and fix it with the fork positioning bolt. Next, place the reverse fork shaft and reverse fork, and fix them with elastic cylindrical pins.



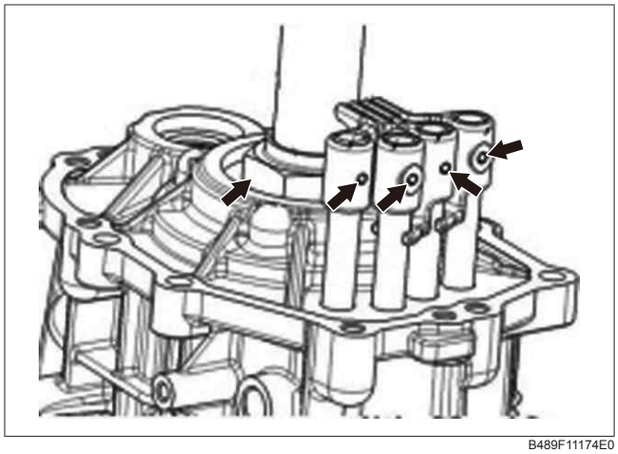
70577873B750

7. Install the transmission rear housing assembly. Apply sealant on the center of the small face (namely the seal surface) of the front housing, heat the inner bore of the output shaft/intermediate shaft rear bearing on the rear transmission housing to 100~110℃, then fasten it on the aforesaid assembly, and tighten them with bolts; install the wire clip on the rear housing before installing the bolts.



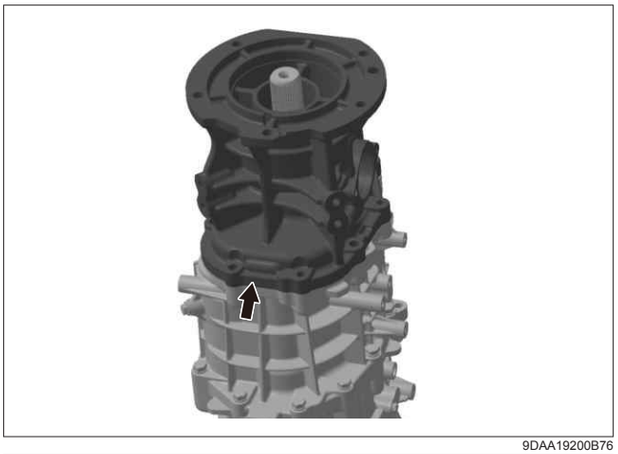
6E7D88FA6D5D

8. Install guide blocks and locking nuts. Install the guide blocks on the fork shafts in turn and fix them with cylindrical pins. Install the locking nut directly on the output shaft.

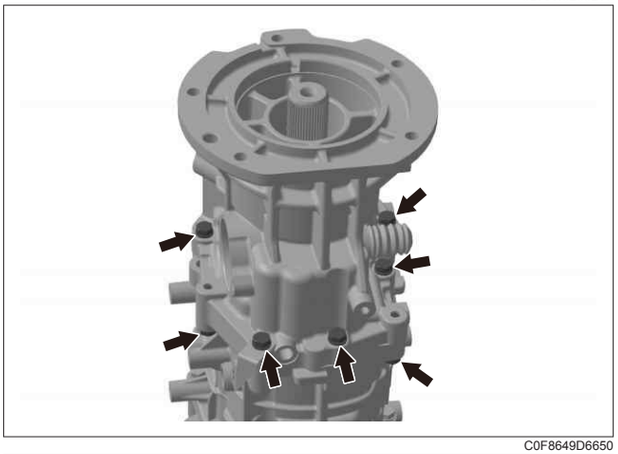


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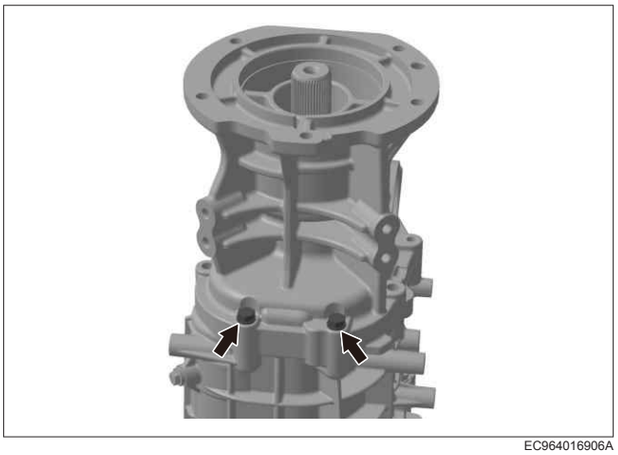
9. Install the rear housing. Apply sealant on the center of the small face (namely the seal surface) of the rear housing, install the rear housing subassembly on the aforesaid assembly, and tighten them with bolts; install the wire clip support on the rear housing before installing the bolts.



9DAA19200B76

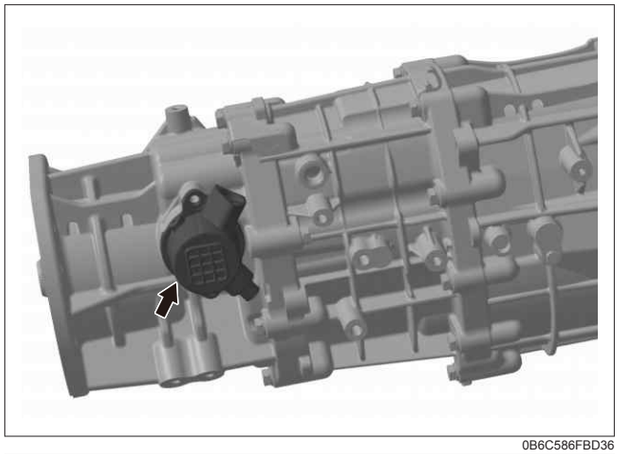


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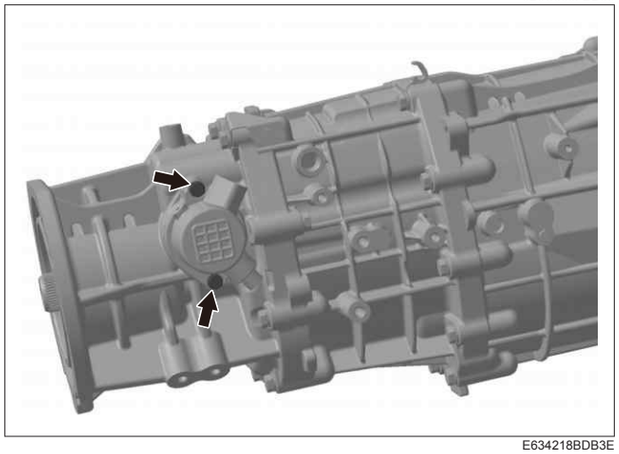


EC964016906A

10. Install shift lever cover assembly. Install the shift lever cover directly on the rear housing according to the position shown in the figure and fix it with bolts.

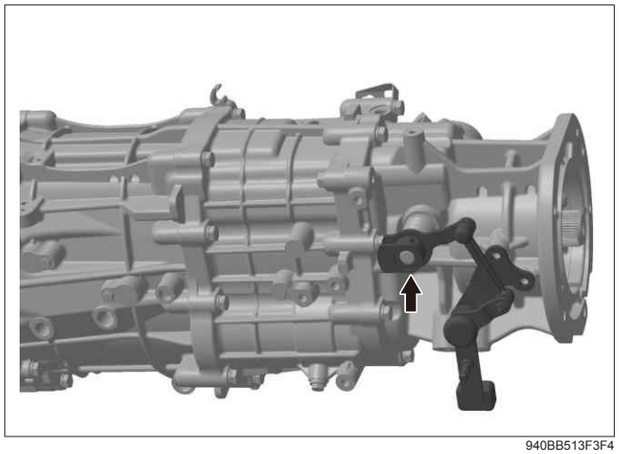


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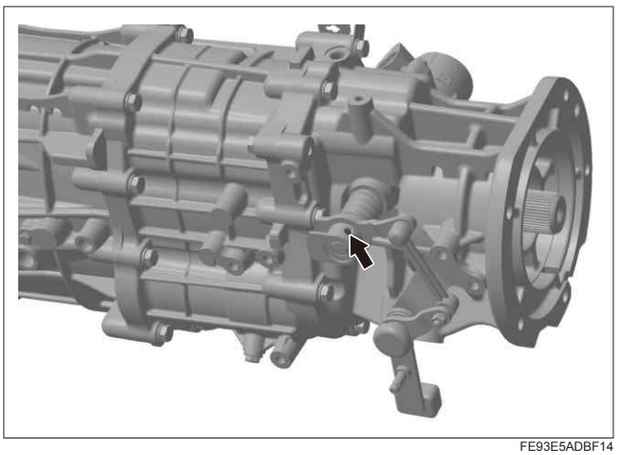


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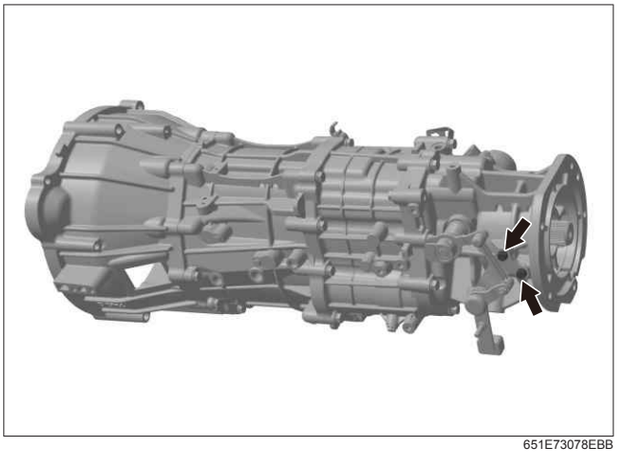
11. Install the remaining external shift levers. First, install the gear shift rocker assembly on the shift shaft of the shift lever cover according to the position shown in drawings, fix it with a coil pin, and install two bolts.



940BB513F3F4

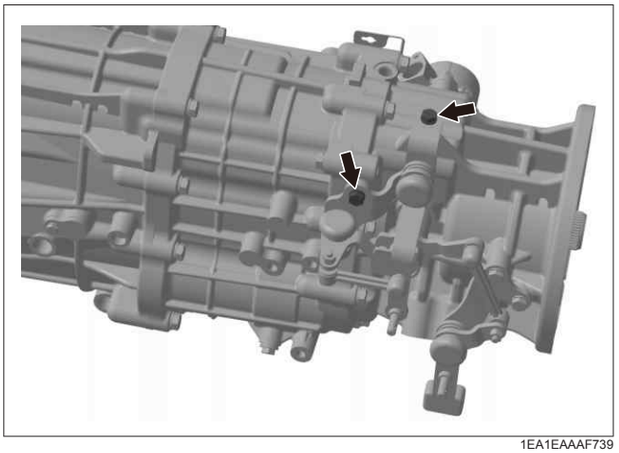


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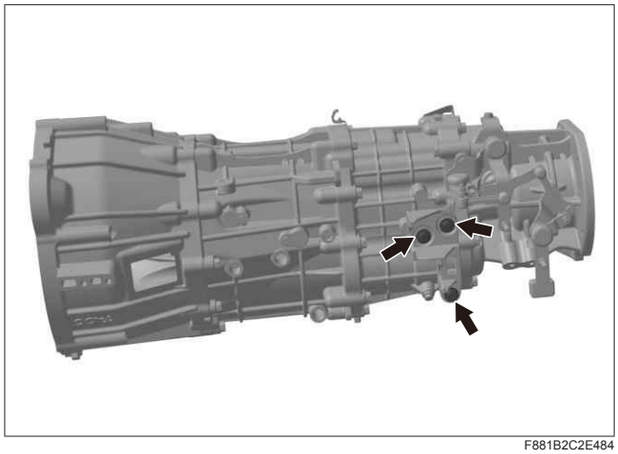
651E73078EBB

12. Assemble the gear shift rocker assembly as shown in the figure and fix it on the rear housing with bolts.



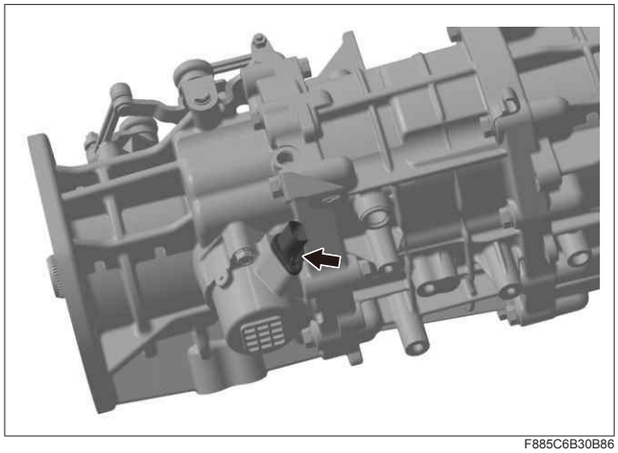
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13. Install the cable bracket. Install the cable bracket on the rear housing according to the position shown in the figure and fix it with bolts.

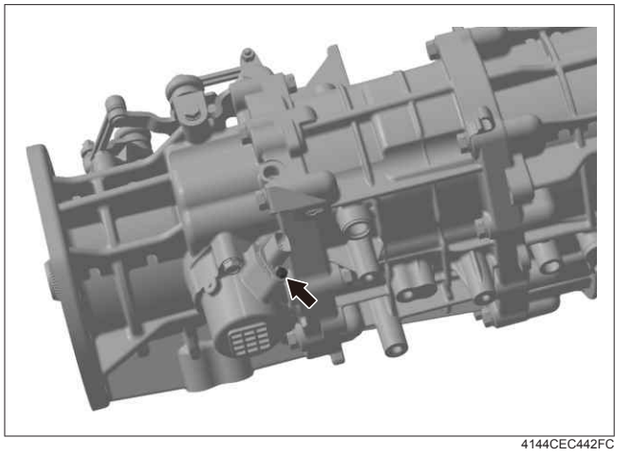


F881B2C2E484

14. Install the neutral switch directly on the shift lever cover and fix it with screws.

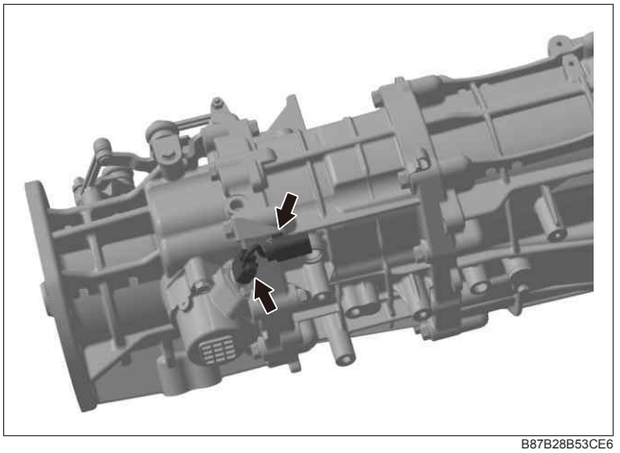


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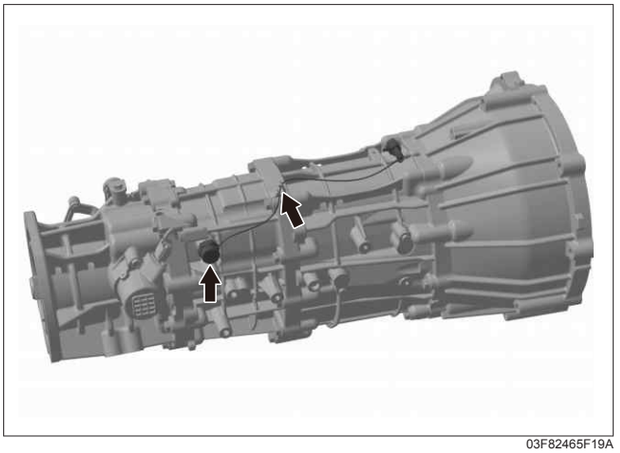
4144CEC442FC

15. Install the switch harness directly on the neutral position sensor, and fix the other end with a wire clip bracket.



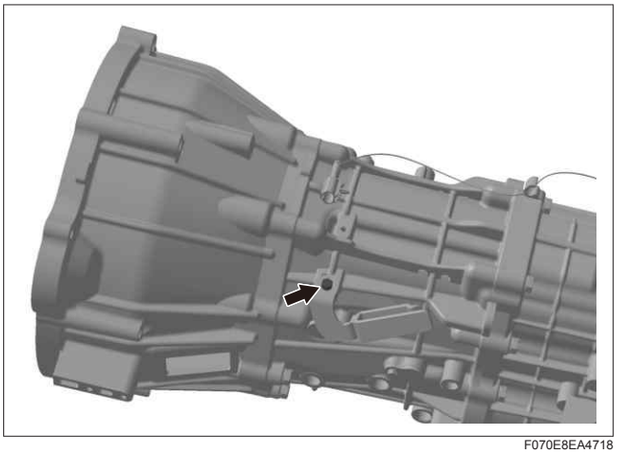
B87B28B53CE6

16. Install the reverse switch on the rear housing according to the position shown in the figure, and fix the harness with clips.



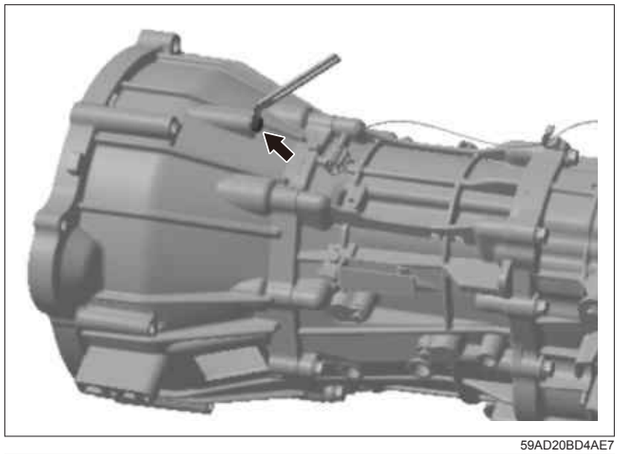
03F82465F19A

17. Install the process bracket. Install the process bracket on the front housing and fix it with bolts.

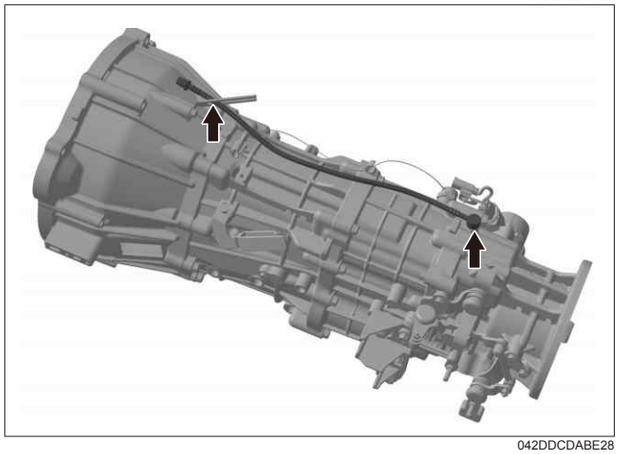


F070E8EA4718

18. Install the vent plug. First, install the clips on the clutch housing and fix them with bolts, then install one end of the vent plug on the rear housing and fix the other end with clips.

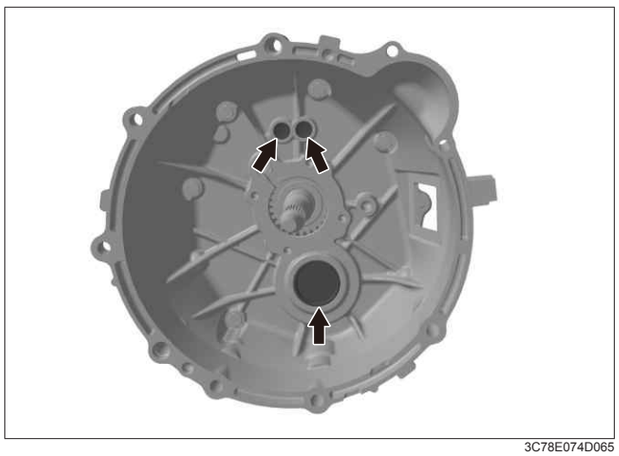


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042DDCDABE28

19. Install the bowl-type plug and sealing plug.

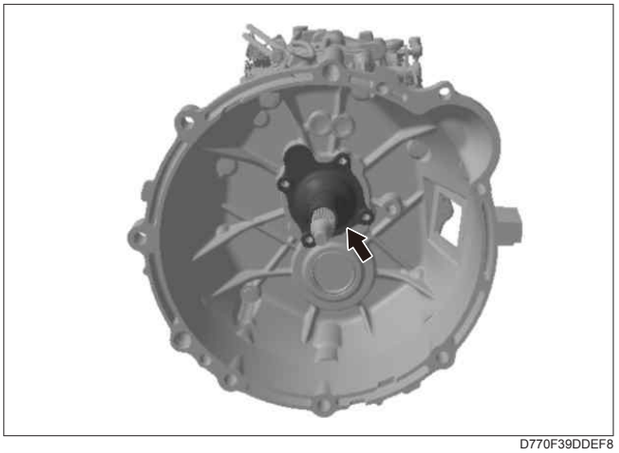


3C78E074D065

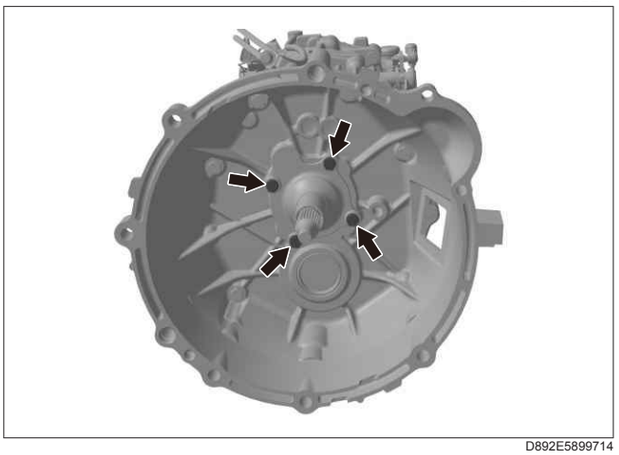
The press-in depth of the bowl-type plug is (1 ± 0.5) mm.

The press-in depth of the sealing plug is (1.5 ± 0.5) mm.

20. Install the front cover subassembly. Install the front cover assembly on the clutch housing as shown in the figure and fix it with bolts.

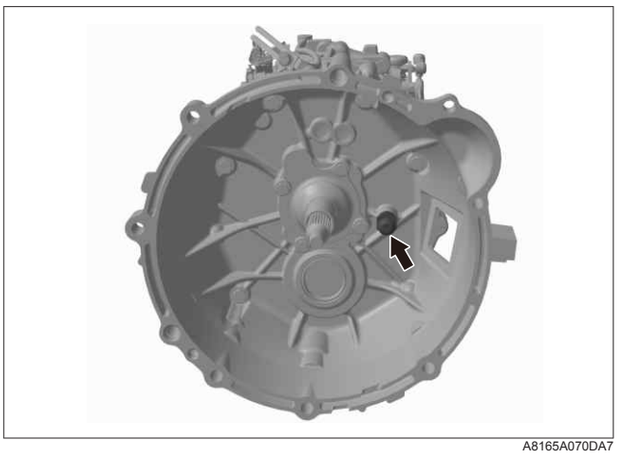


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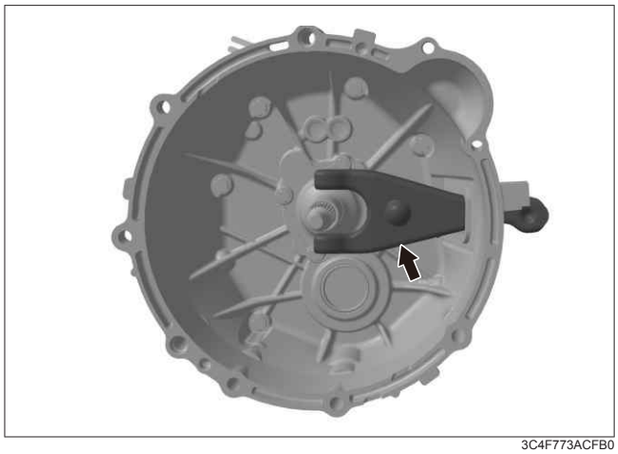
D892E5899714

21. Install the release fork support. Install the release fork support directly on the clutch housing.



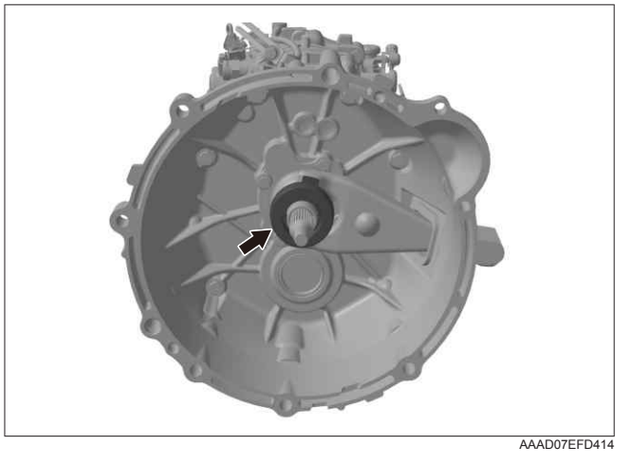
A8165A070DA7

22. Install the release fork assembly.



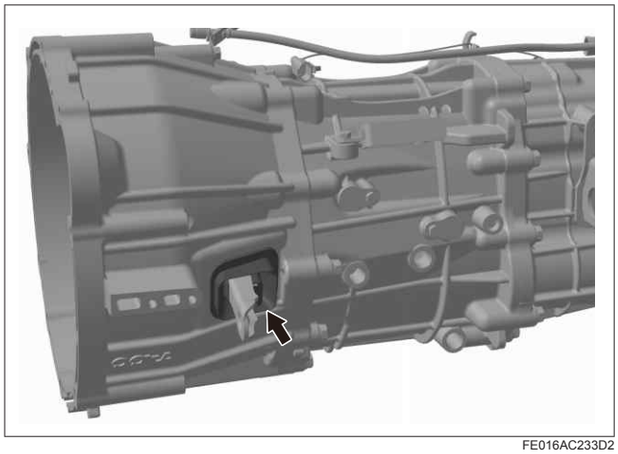
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23. Install the clutch release bearing.



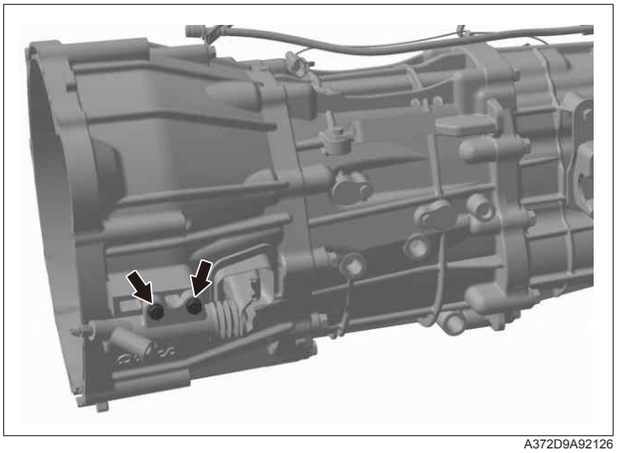
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24. Install the clutch release fork guard.



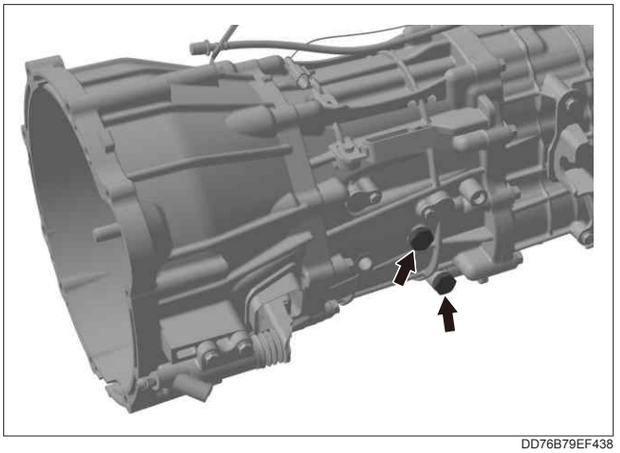
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25. Fix the clutch slave cylinder on the housing with bolts and connect it with the release fork.



A372D9A92126

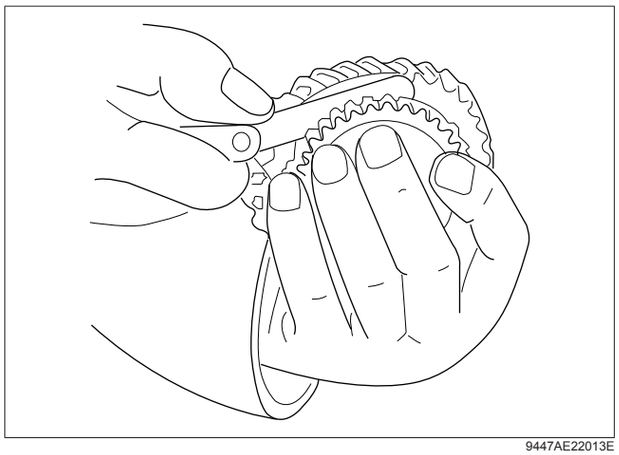
26. Install the oil plug. Install hexagon head bolts and magnetic hexagon head bolts on the front housing.



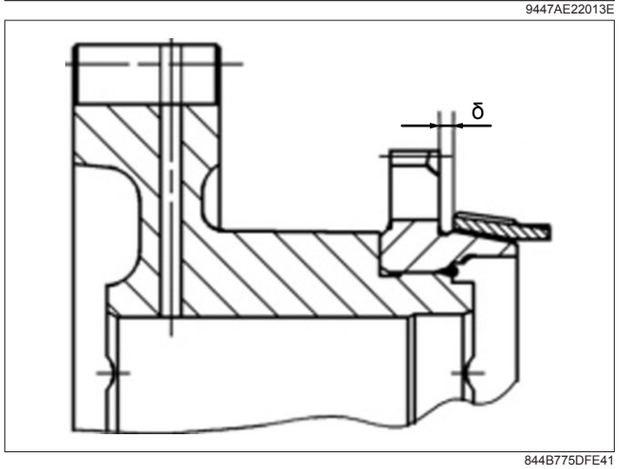
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Check/Adjustment

1. Check the gear ring reserved amount (δ) after assembling the synchronizer gear ring and the gear subassembly.



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844B775DFE41

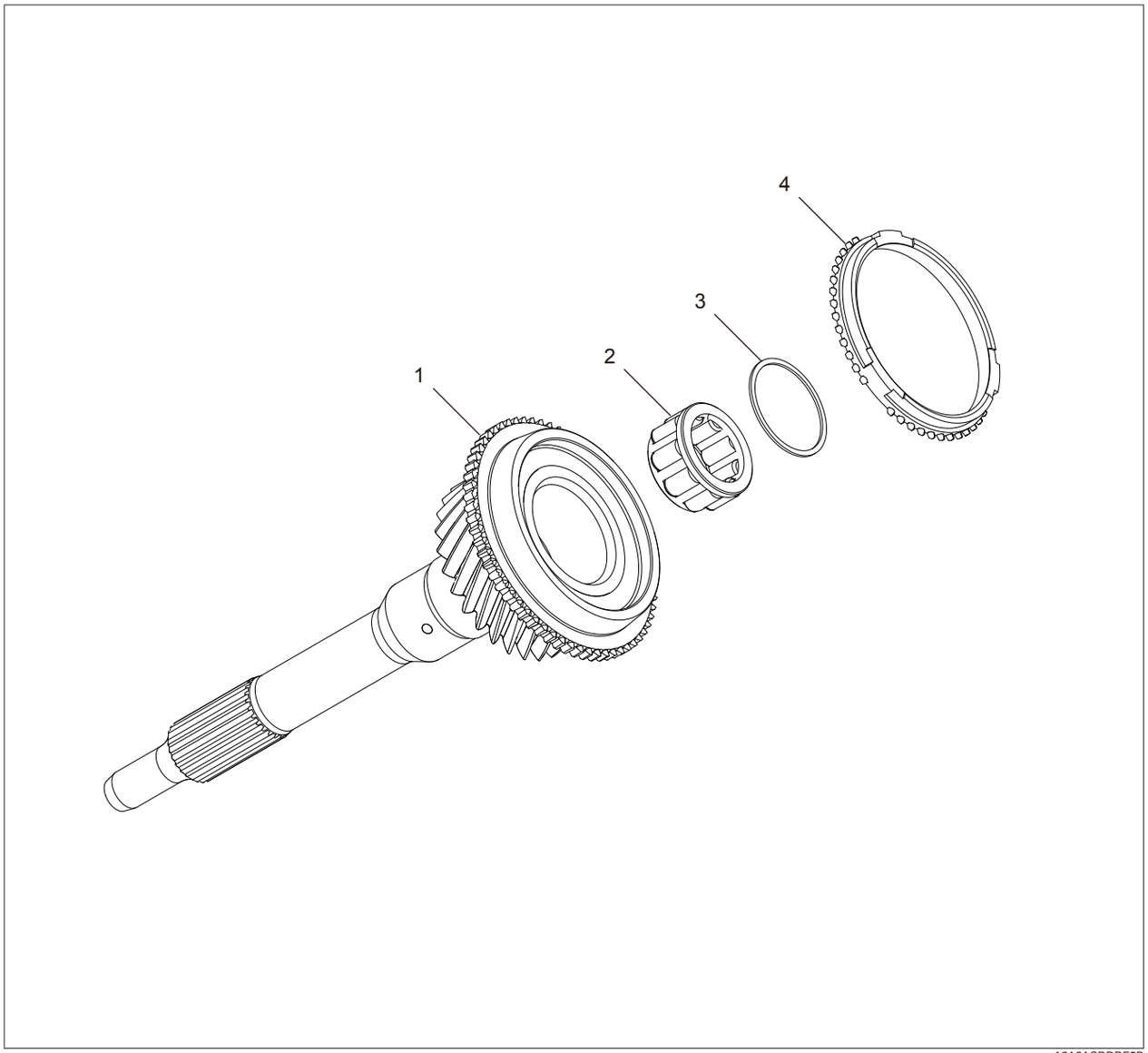
Gear	Reserved amount (mm)
First gear (δ1)	1.2±0.58
Second gear (δ1)	1.2±0.58
Third gear (δ2)	1.2±0.47
Fourth gear (δ3)	1.1±0.45
Fifth gear (δ4)	1.3±0.32
Sixth gear (δ4)	1.3±0.32
Sixth gear (δ5)	1.2±0.37

2. Check axial clearance of gear at different gear positions

Gear	Axial clearance (mm)
First gear	0.1～0.45
Second gear	0.105～0.355
Third gear	0.125～0.475
Fourth gear	0.175～0.425
Sixth gear	0.205～0.425
Reverse gear	0.125～0.375
Reverse idler	0.275～0.675

Input shaft subassembly

Structural Diagram of



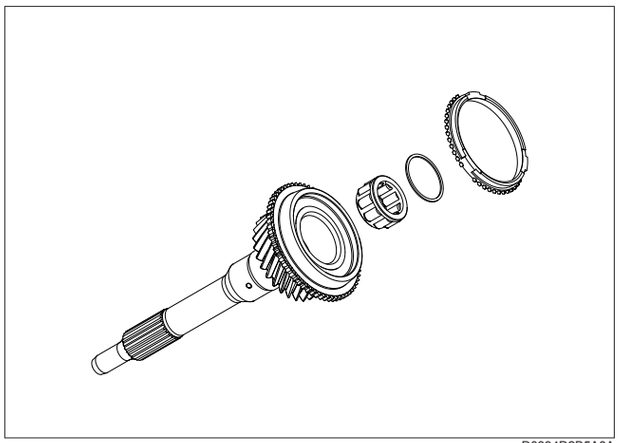
A2A2ACDDDF5B

1. Input shaft assembly
2. Input shaft needle roller bearing
3. Input shaft needle roller bearing spacing sleeve
4. Fifth gear synchronizer gear ring

Disassembling/Assembling of

Disassembly

1. Remove the fifth synchronizer gear ring, the input shaft needle roller bearing spacing sleeve and the input shaft needle roller bearing in turn.



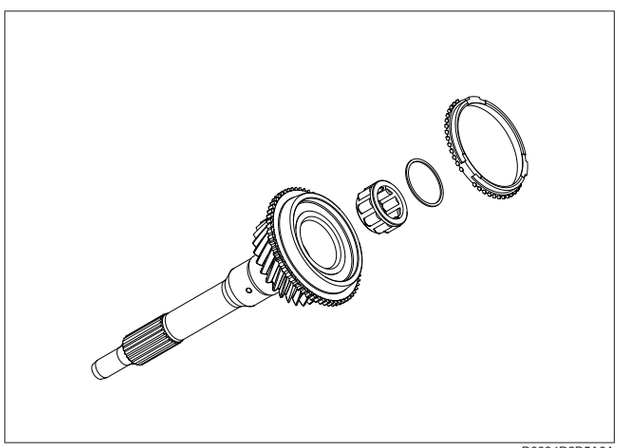
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⚠ Caution

› The input shaft needle roller bearing spacing sleeve is a disposable component and cannot be reused.

Assembling

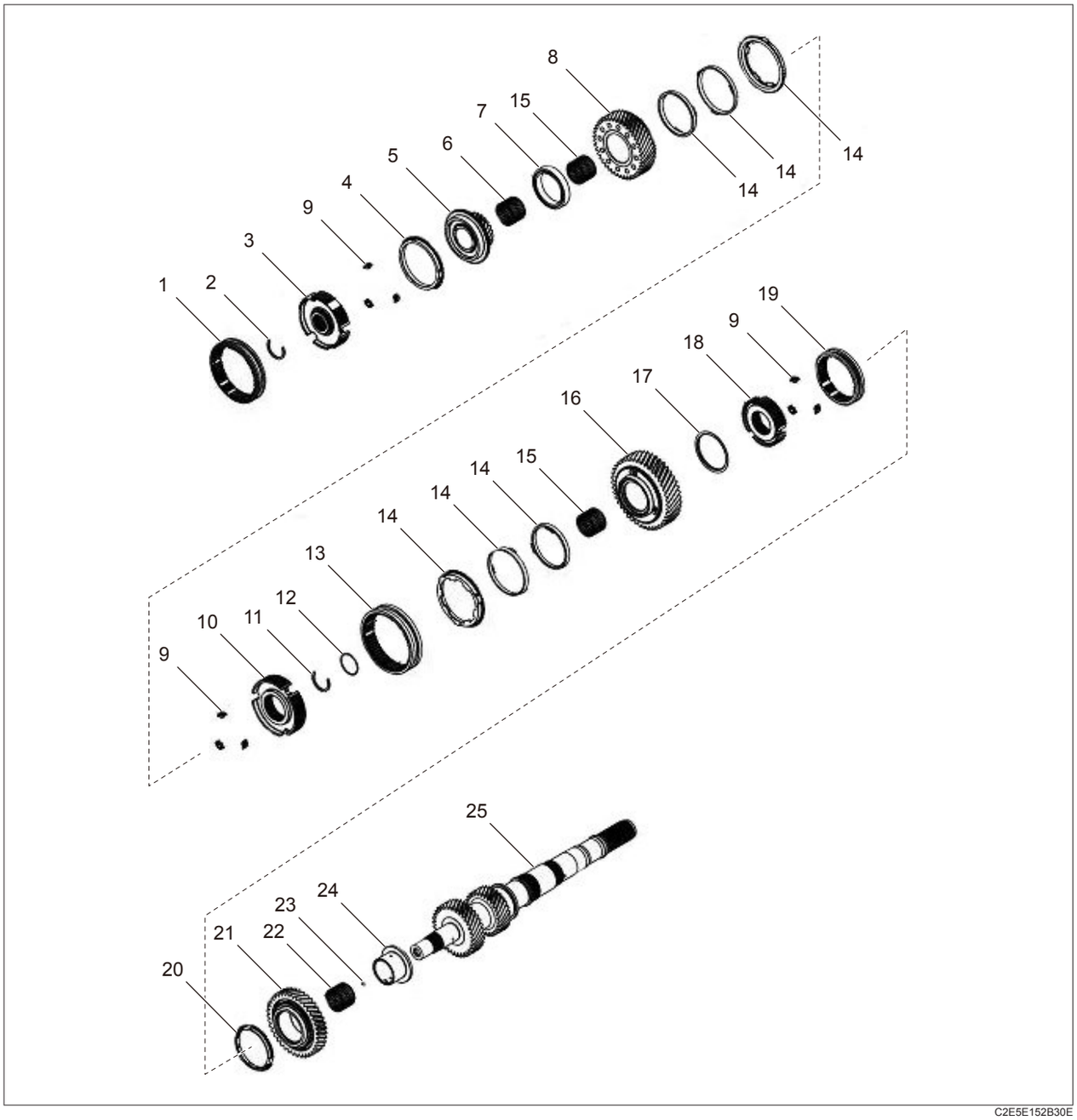
1. Install the input shaft needle roller bearing, the input shaft needle roller bearing spacing sleeve and the fifth gear synchronizer gear ring in turn.



D0394D2B5A8A

Output shaft subassembly

Structural Diagram of



C2E5E152B30E

1. No. 3 synchronizer gear sleeve
2. Shaft retainer ring
3. No. 3 synchronizer gear hub
4. Fifth gear synchronizer gear ring
5. Sixth gear subassembly
6. Sixth gear needle roller bearing
7. Output shaft front bearing inner ring
8. Second gear subassembly
9. No. 1 synchronizer slider
10. No. 1 synchronizer gear hub
11. Shaft retainer ring
12. First gear needle roller bearing spacing sleeve
13. No. 1 synchronizer gear sleeve
14. First gear synchronizer gear ring assembly
15. First/second gear needle roller bearing
16. First gear subassembly
17. Slider retaining ring
18. Reverse synchronizer gear hub
19. Reverse synchronizer gear sleeve
20. Third gear synchronizer gear ring
21. Output shaft reverse gear
22. Reverse gear needle roller bearing
23. Steel ball SΦ 4.7625
24. Reverse shaft bushing
25. Output shaft

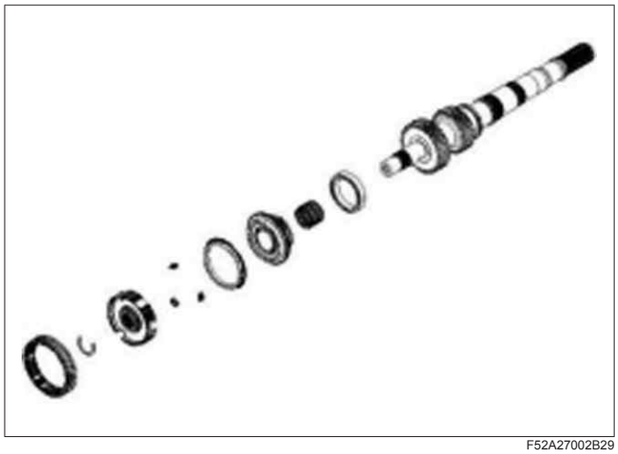
Disassembling/Assembling of

Disassembly

Notice

- The output shaft assembly needs to be disassembled before the transmission assembly.
- This disassembling step is to remove the remaining parts.

1. Remove No. 3 synchronizer gear sleeve, No. 1 synchronizer slider, shaft retaining ring, No. 3 synchronizer gear hub, fifth gear synchronizer gear ring, sixth gear subassembly, sixth gear needle roller bearing, and output shaft front bearing inner ring in turn.



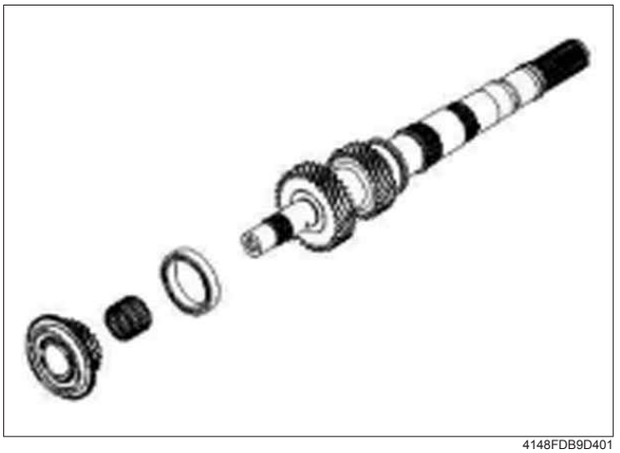
F52A27002B29

Caution

- The first gear needle roller bearing spacing sleeve and the shaft retaining ring are disposable parts and cannot be reused.

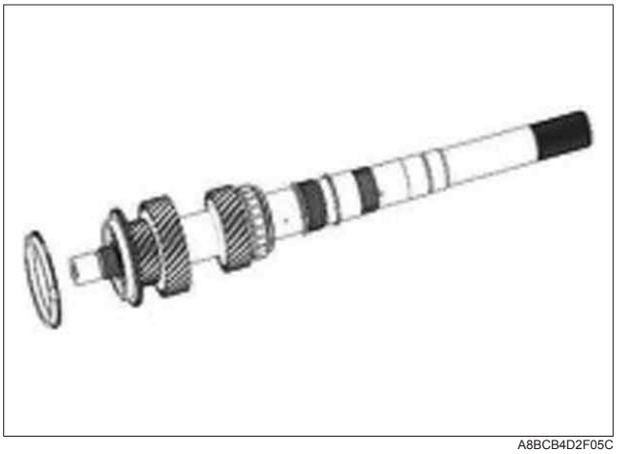
Assembling

1. Install the output shaft front bearing inner ring, the sixth gear needle roller bearing, and the sixth gear subassembly in turn.



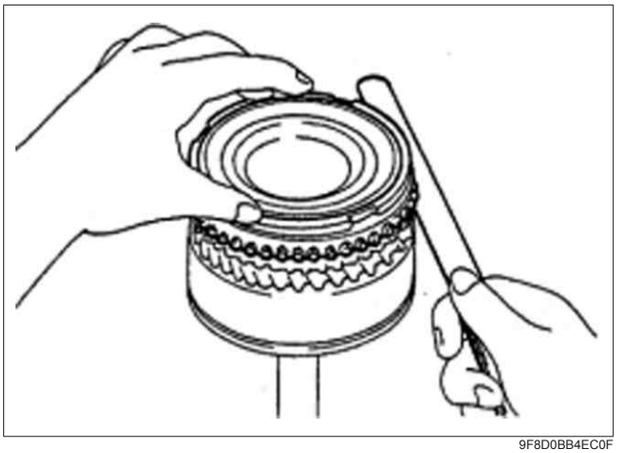
4148FDB9D401

2. Install the fifth gear synchronizer gear ring, first apply the gear oil on the input shaft coupling gear tapered surface, and then install the fifth gear synchronizer gear ring.



A8BCB4D2F05C

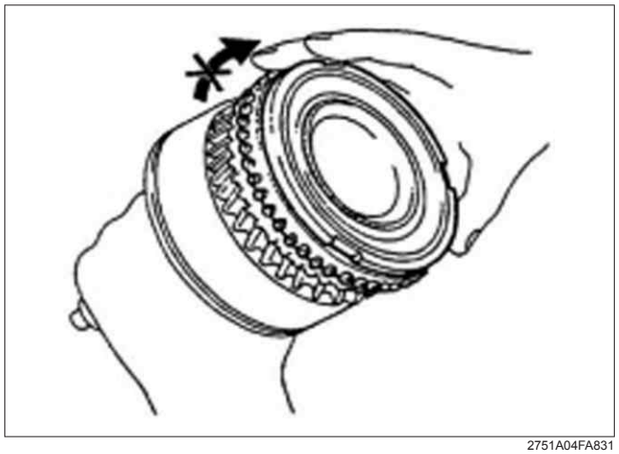
3. Check the axial clearance between the gear ring and the coupling gear of the fifth gear synchronizer.



9F8D0BB4EC0F

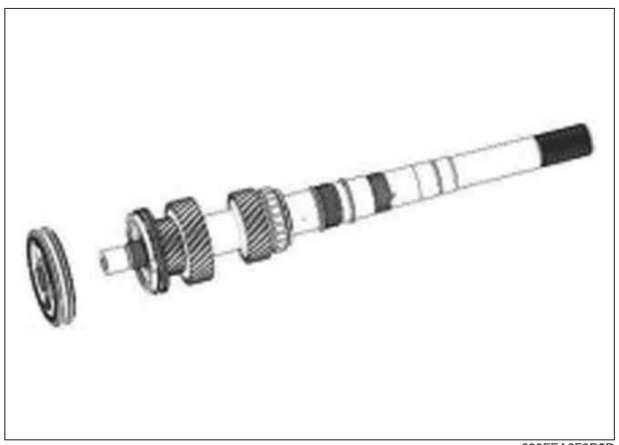
Reference value: (1.3± 0.32) mm

4. Check the synchronizer ring, turn the gear ring and push it in to check the braking action.



2751A04FA831

5. Press the No. 3 synchronizer in.



833FEA6F8D5D

6. Select and install the shaft retaining ring.

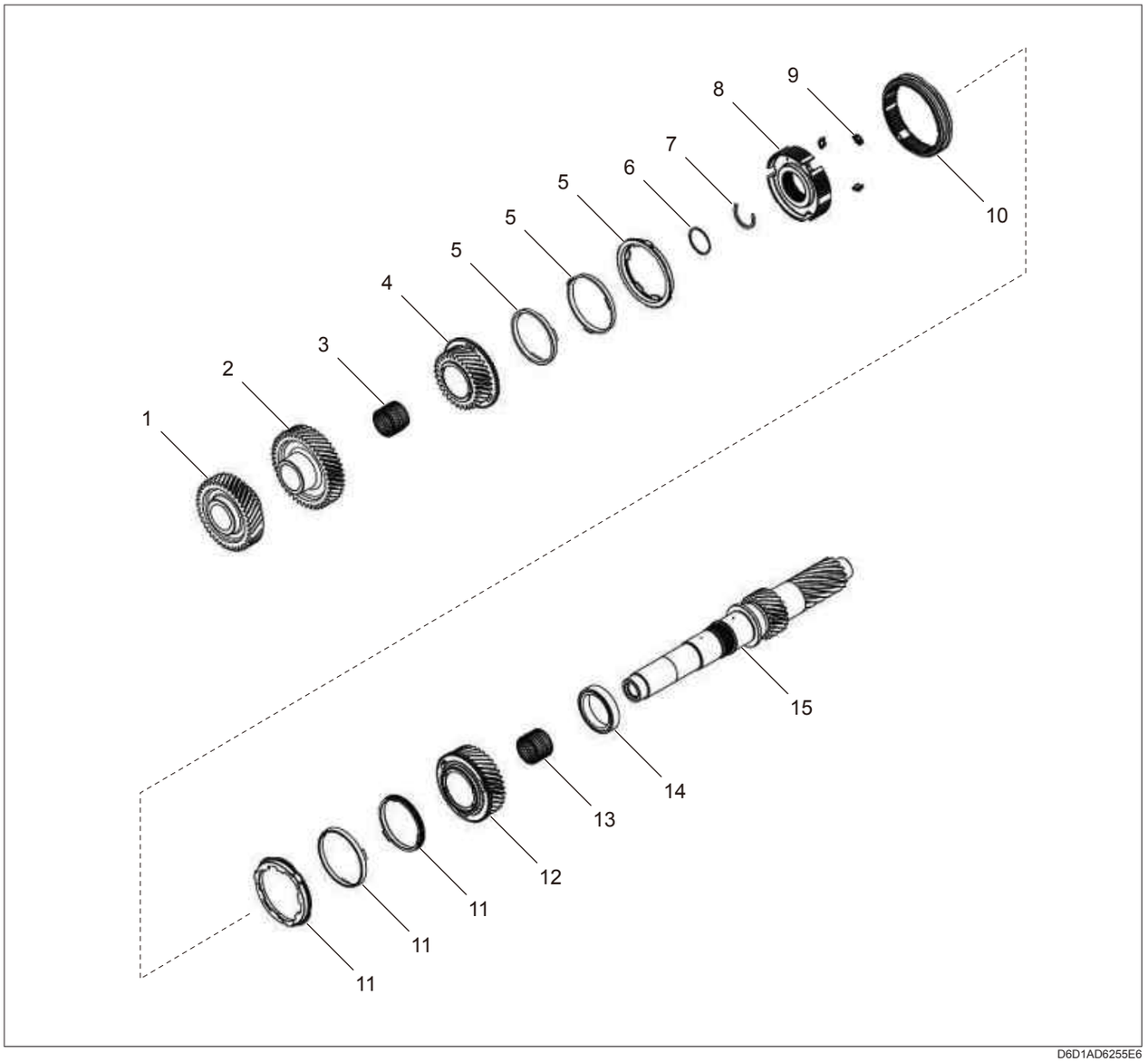
   Axial clearance: < 0.1 mm

⚠ Caution

› It is required to reach the minimum axial clearance.

Intermediate shaft subassembly

Structural Diagram of



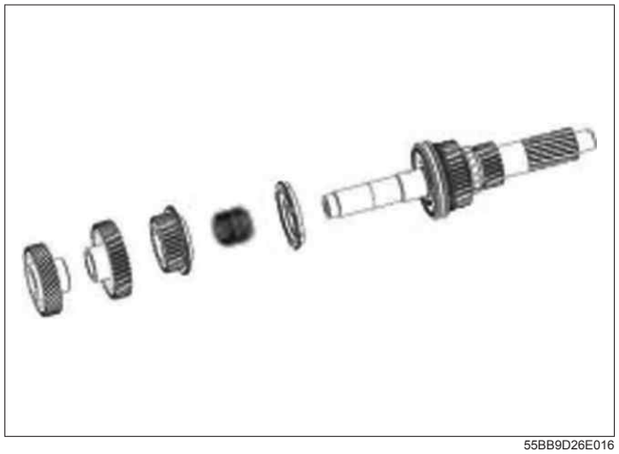
D6D1AD6255E6

1. Constant meshing driven gear
2. Intermediate shaft sixth gear
3. Third gear needle roller bearing
4. Third gear subassembly
5. Second gear synchronizer gear ring assembly
6. Fourth gear needle roller bearing spacing sleeve
7. Shaft retainer ring
8. No. 2 synchronizer gear hub
9. No. 1 synchronizer slider
10. No.2 synchronizer gear sleeve
11. Fourth gear synchronizer gear ring assembly
12. Fourth gear subassembly
13. Fourth gear needle roller bearing
14. Intermediate shaft middle bearing inner ring
15. Intermediate shaft

Disassembling/Assembling of

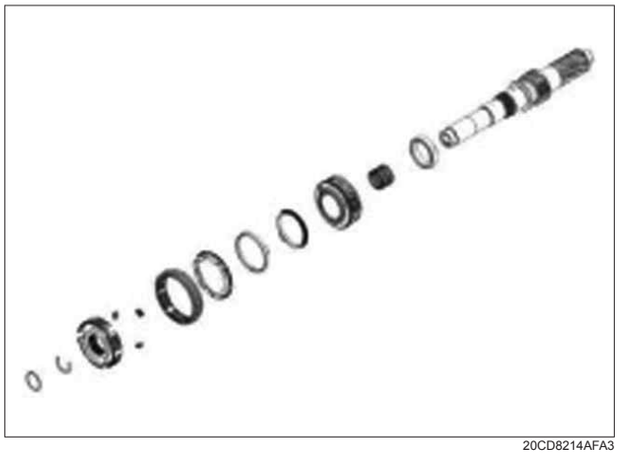
Disassembly

1. Remove the normally engaged driven gear and the intermediate shaft sixth gear. Take out the third gear subassembly, third gear needle roller bearing, and second synchronizer gear ring assembly in turn.



55BB9D26E016

2. Remove the fourth gear needle roller bearing spacing sleeve, shaft retaining ring, No. 2 synchronizer gear sleeve, No. 1 synchronizer slider, No. 2 synchronizer gear hub, fourth gear synchronizer gear ring assembly, fourth gear subassembly, fourth gear needle roller bearing, and intermediate shaft middle bearing inner ring.



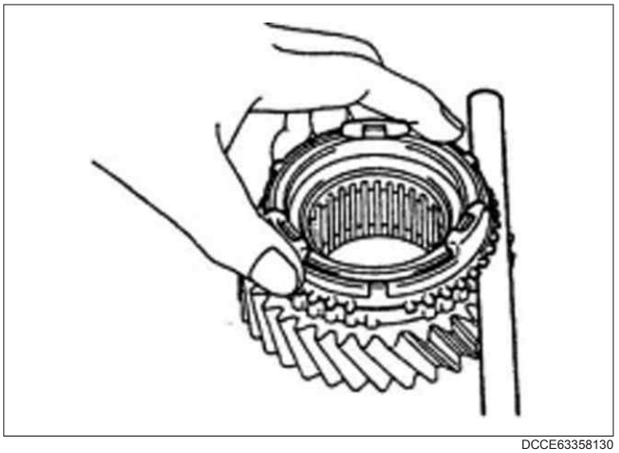
20CD8214AFA3

⚠ Caution

› The fourth gear needle roller bearing spacing sleeve and the shaft retaining ring are disposable parts and cannot be reused.

Assembling

1. Measure the synchronizer gear ring and gear axial clearance of each gear



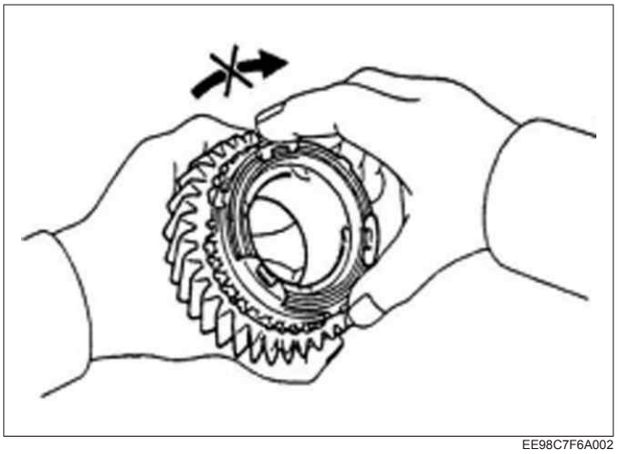
DCCE63358130

Gear	Reference value (mm)
Third gear	1.2± 0.47
Fourth gear	1.1± 0.45

ℹ Notice

› Measure the axial clearance between the gear ring and the linkage gear using a feeler gauge.

2. Inspect the synchronizer ring

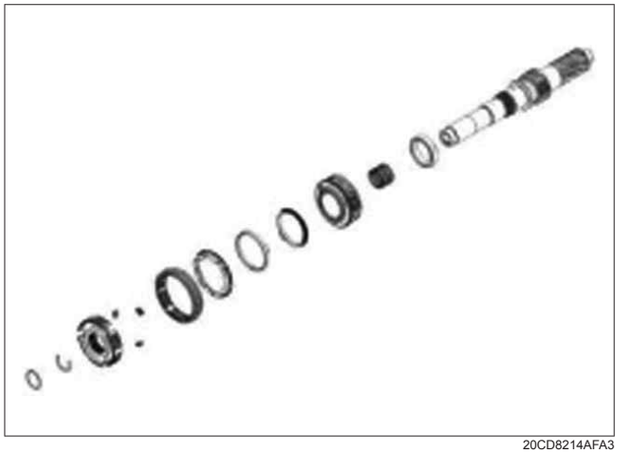


EE98C7F6A002

ℹ Notice

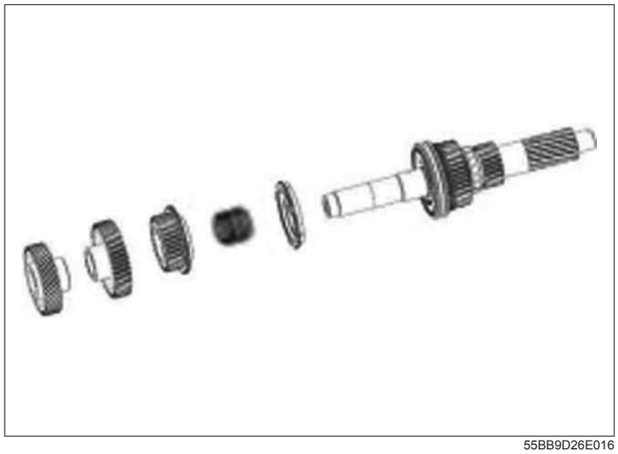
› Rotate the gear ring and push it in to check the brake operation.

3. Install the intermediate shaft middle bearing inner ring, fourth gear needle roller bearing, fourth gear subassembly, fourth gear synchronizer gear ring assembly, No. 2 synchronizer gear hub, No. 1 synchronizer slider, and No. 2 synchronizer gear sleeve onto the intermediate shaft in turn. Select the shaft retaining ring to achieve the minimum axial clearance (< 0.1 mm). Install the fourth gear needle roller bearing spacing sleeve



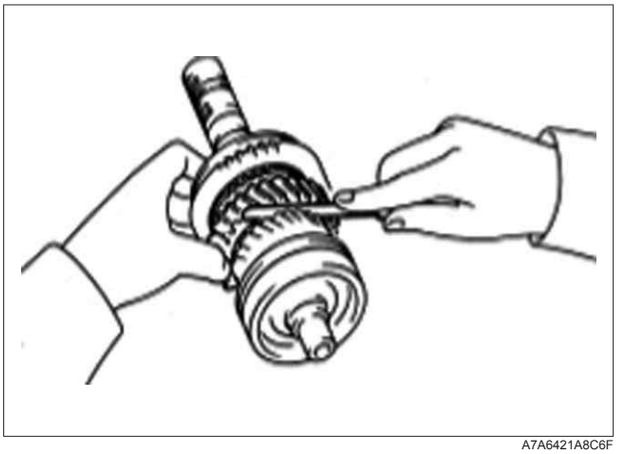
20CD8214AFA3

4. Install the second gear synchronizer gear ring assembly, the third gear needle roller bearing, the third gear subassembly, the intermediate shaft sixth gear, and the normally engaged driven gear.



55BB9D26E016

5. Measure the axial clearance of each gear subassembly with a feeler gauge.

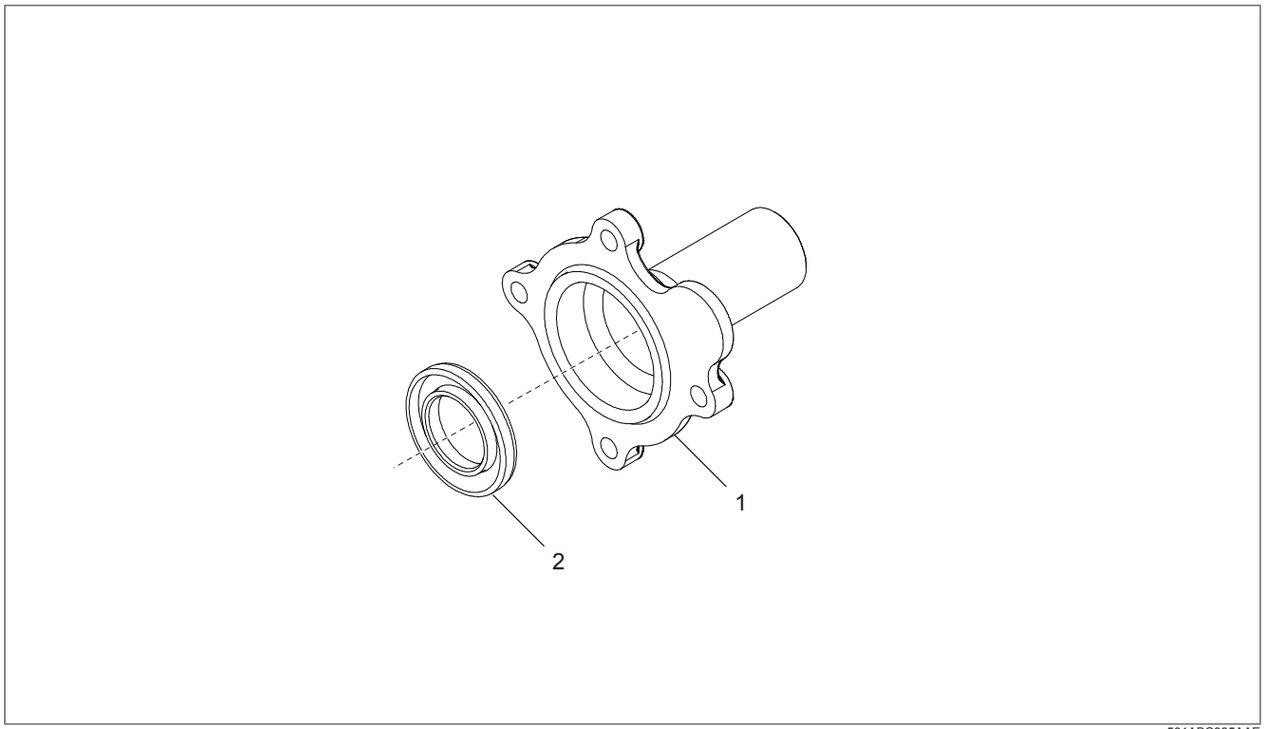


A7A6421A8C6F

Gear	Reference value (mm)
Third gear	0.125~0.475
Fourth gear	0.175~0.425

Front cover assembly

Structural Diagram of



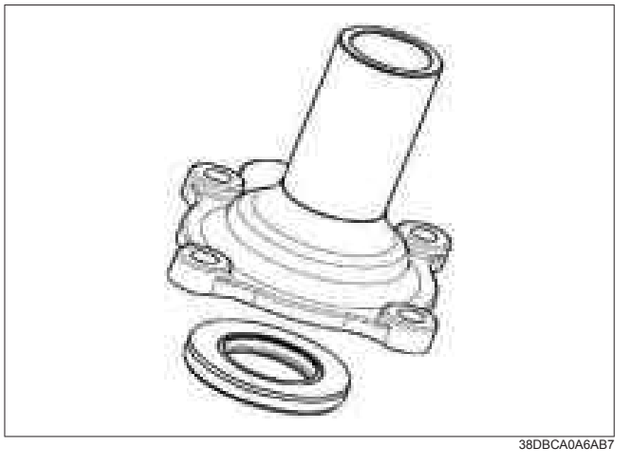
561ABC385AAE

1. Front cover
2. T-shape oil seal

Disassembling/Assembling of

Disassembly

1. Remove the T-shaped oil seal



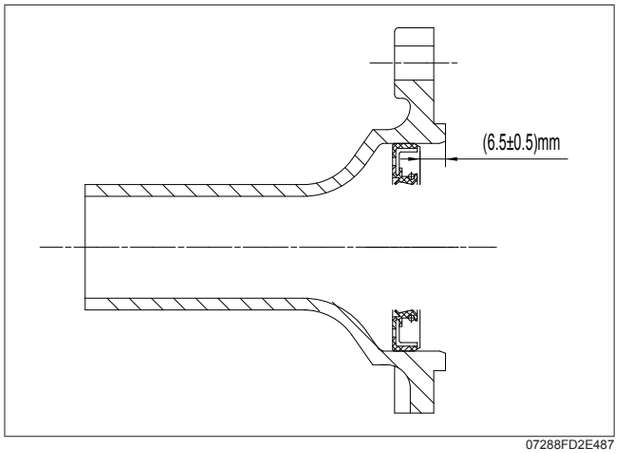
38DBCA0A6AB7

⚠ Caution

› The T-shaped oil seal is a disposable part and cannot be reused.

Assembling

1. Press the T-shaped oil seal in



07288FD2E487

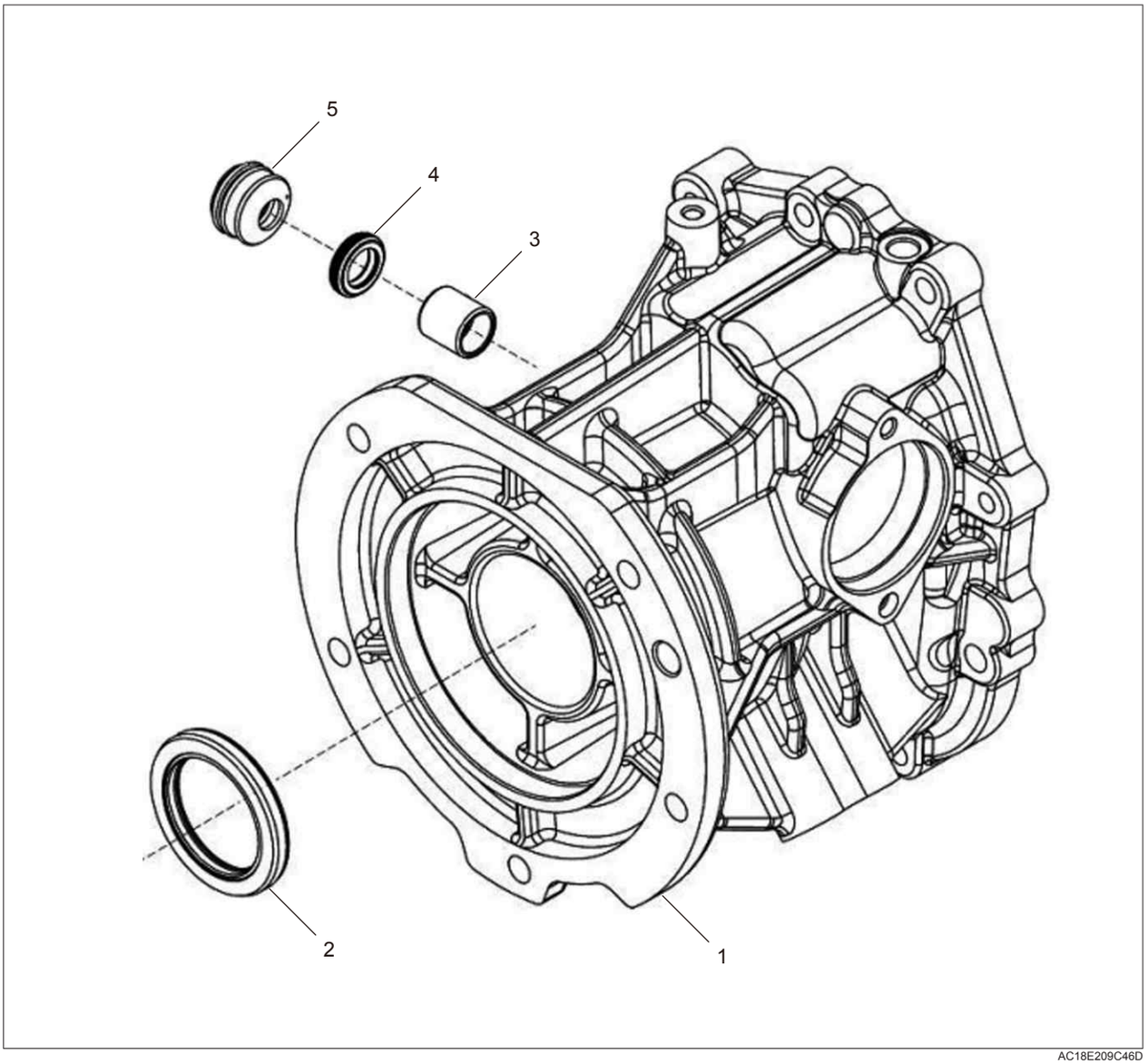
Press-in depth: (6.5±0.5)mm

⚠ Caution

› Grease the outside of the oil seal before press-in fitting of oil seal.

Rear housing subassembly

Structural Diagram of



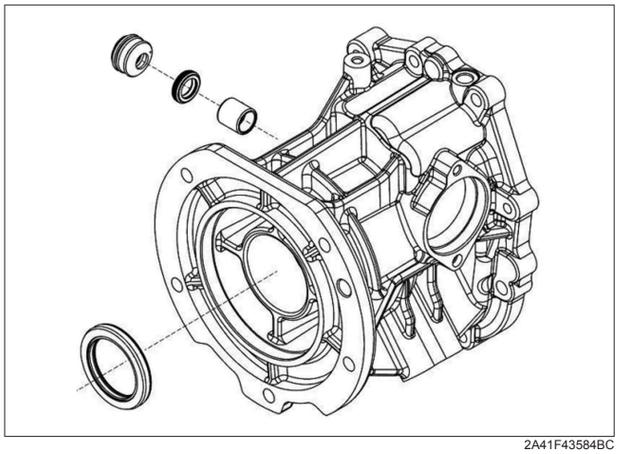
AC18E209C46D

1. Rear housing
2. Rear housing oil seal assembly
3. Linear bearing
4. S-shaped oil seal
5. Oil seal dust boot

Disassembling/Assembling of

Disassembly

1. Remove the rear housing oil seal assembly, oil seal dust boot, S-shaped oil seal, and linear bearing in turn.



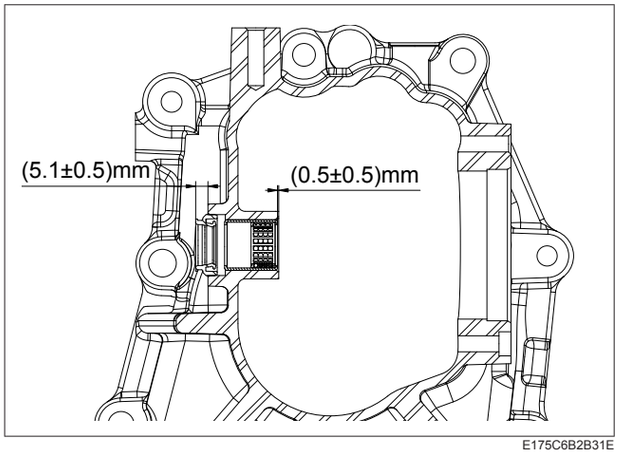
2A41F43584BC

⚠ Caution

› The rear housing oil seal assembly, S-shaped oil seal, and linear bearing are disposable parts and cannot be reused.

Assembling

1. Press in the linear bearing and S-shaped oil seal.

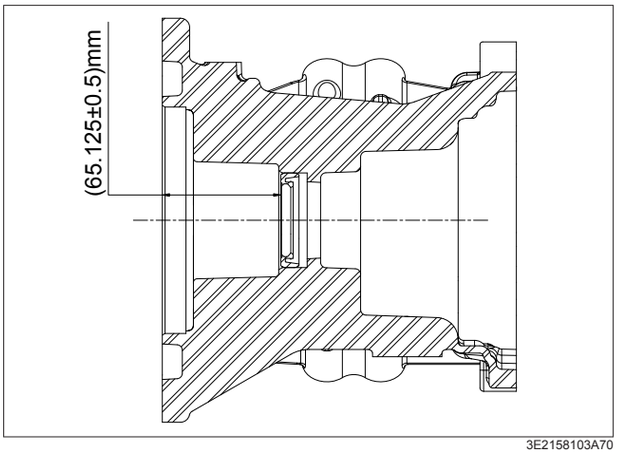


E175C6B2B31E

The press-in depth of linear bearing is (0.5±0.5) mm.

The press-in depth of S-shaped oil seal is (5.1±0.5) mm.

2. Install the rear housing oil seal

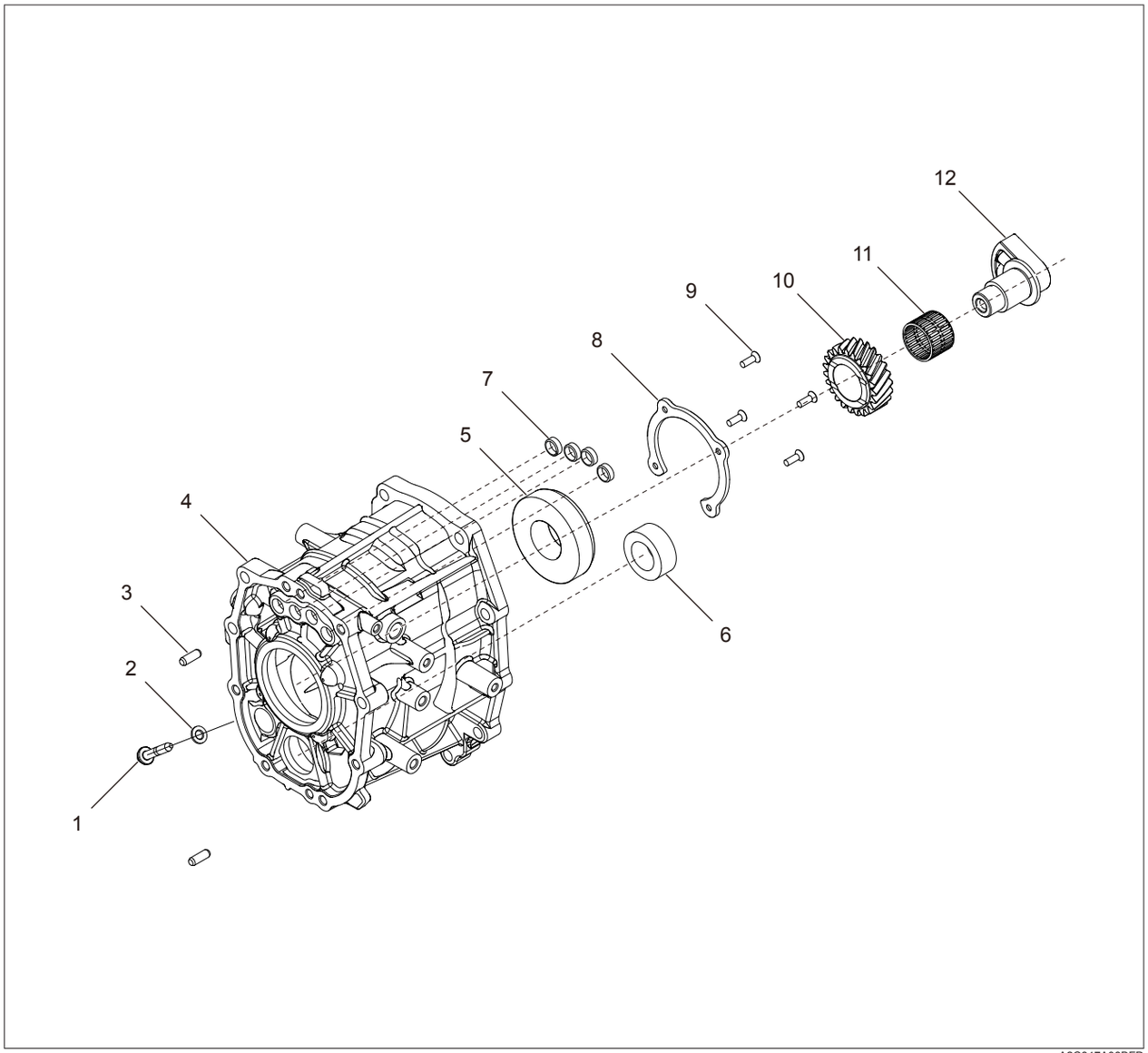


3E2158103A70

The clearance between the oil seal surface and the rear oil seal mounting surface is (65.125±0.5) mm.

Rear housing subassembly

Structural Diagram of



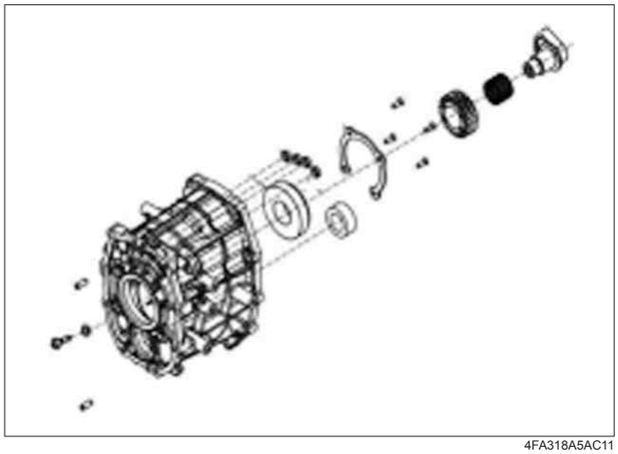
A2C847A08BFD

1. Flange bolt
2. Packing ring
3. Cylindrical pin
4. Rear transmission housing
5. Output shaft rear bearing
6. Rear bearing of intermediate shaft
7. Bush
8. Output shaft bearing cover plate
9. Hexagonal countersunk head screws
10. Reverse idler
11. Reverse idler needle roller bearing
12. Reverse idler shaft assembly

Disassembling/Assembling of

Disassembling

1. Remove the flange bolt, gasket ring, reverse idler shaft assembly, reverse idler, reverse idler needle roller bearing, hexagonal countersunk head screw, output shaft bearing cover plate, output shaft rear bearing, intermediate shaft rear bearing, bush, and cylindrical pin in turn.



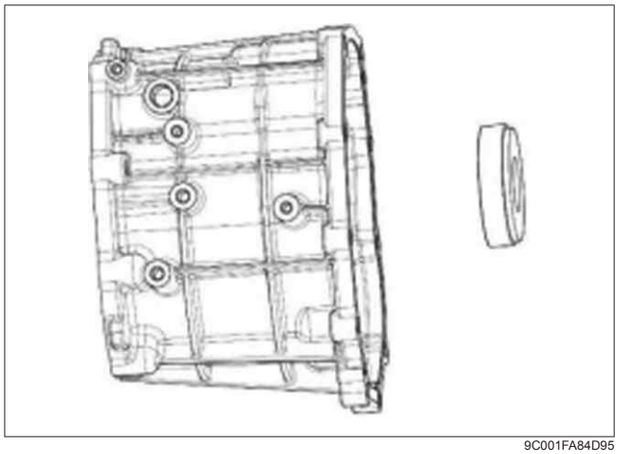
4FA318A5AC11

Caution

› The flange bolt, gasket ring, hexagonal countersunk head screw and bush are disposable parts and cannot be reused.

Assembling

1. Hot assembling of bearing

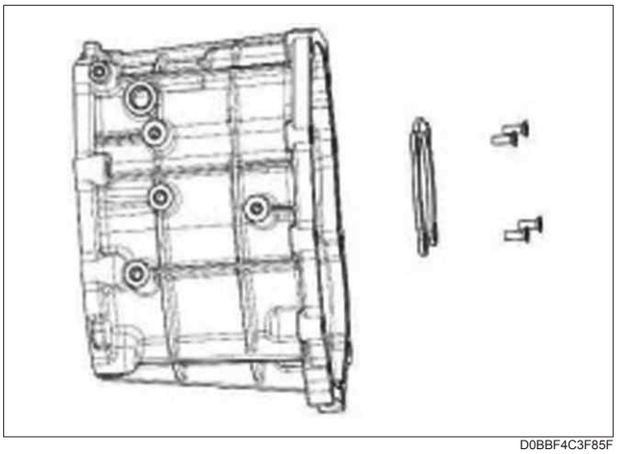


9C001FA84D95

Notice

› Heat the bearing position of the output shaft rear bearing of transmission rear housing to 100~110°C, and then assemble the bearing.

2. Install the bearing cover plate.

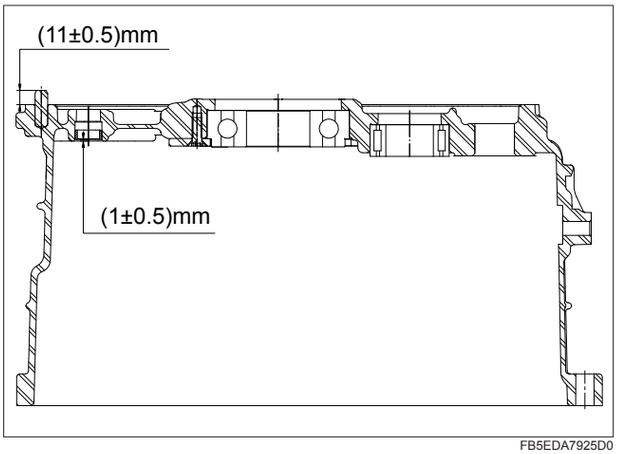


D0BBF4C3F85F

Notice

› Install the output shaft bearing cover plate in time, and tighten it with a hexagonal countersunk head screw to limit the bearing.

3. Press the intermediate shaft rear bearing, cylindrical pin and bush in.

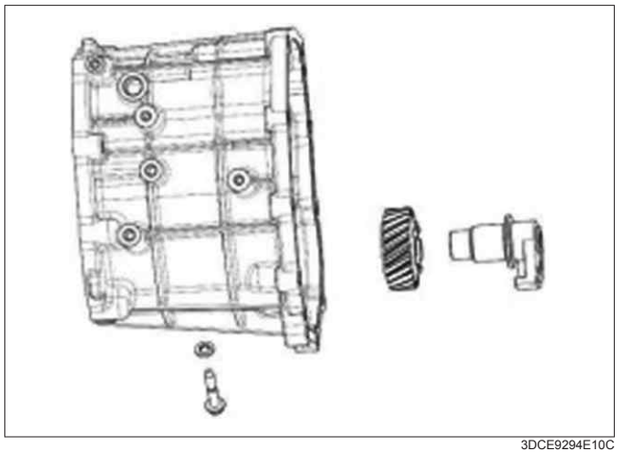


FB5EDA7925D0

The press-in depth of the bush is (1±0.5) mm.

The protrusion height of the cylindrical pin is (11±0.5) mm.

4. Install the reverse idler subassembly.



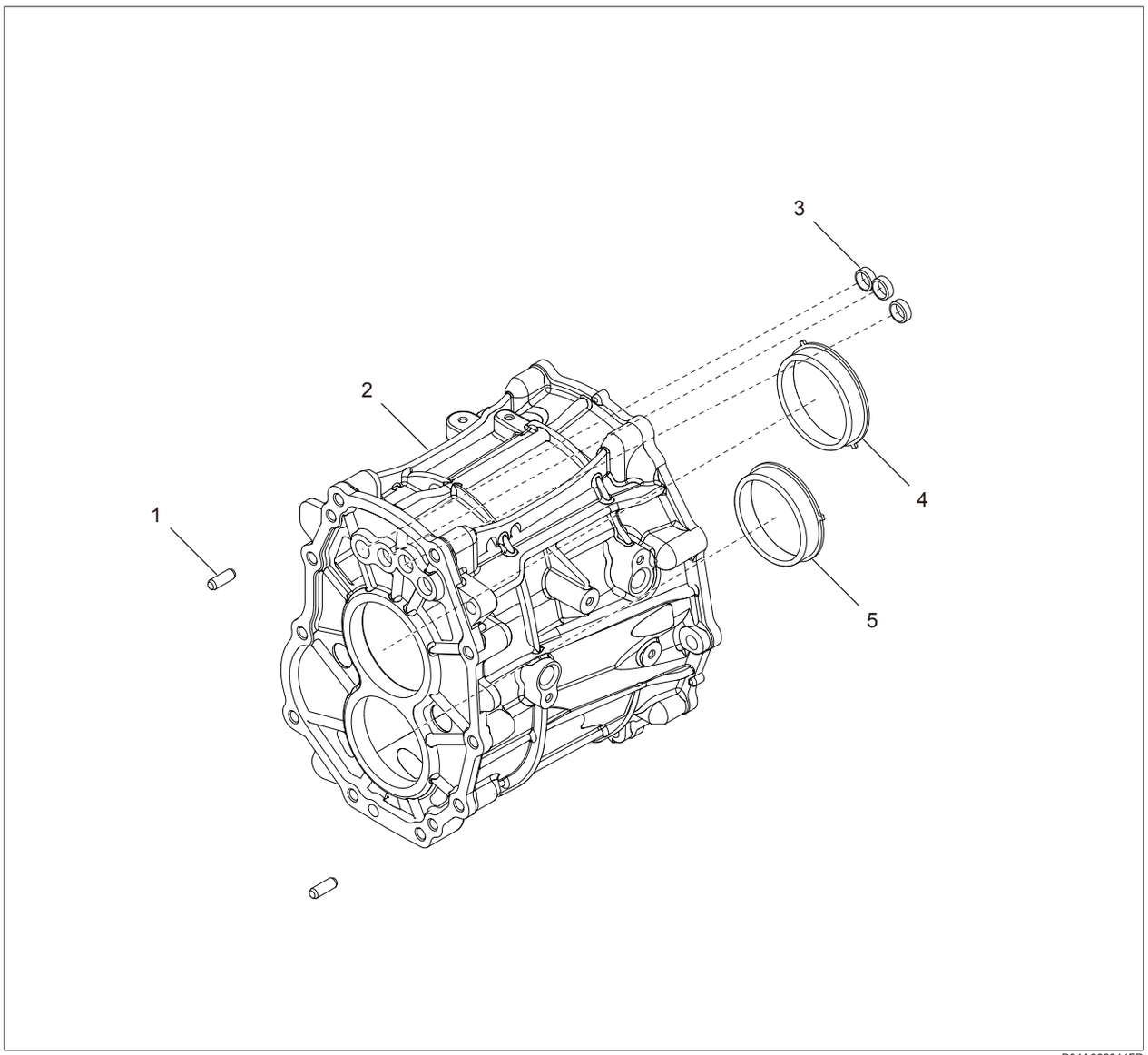
3DCE9294E10C

Notice

› Install the reverse idler, the reverse idler needle roller bearing, and the reverse idler shaft assembly in turn. Then tighten and fix them with flange bolts.

Transmission front housing subassembly

Structural Diagram of



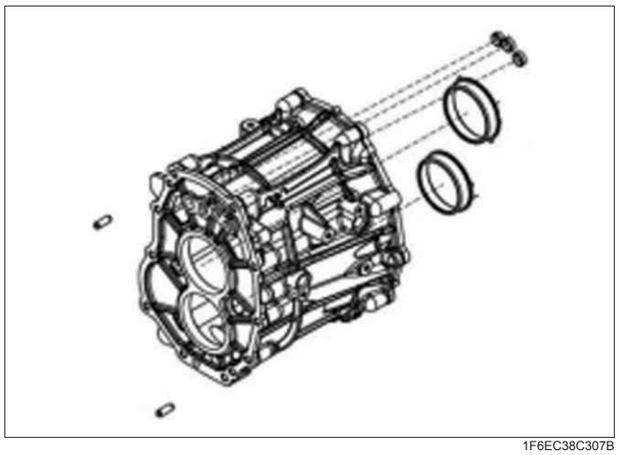
D91A266314FD

1. Cylindrical pin
2. Front transmission housing
3. Bush
4. Output shaft front bearing outer ring
5. Intermediate shaft middle bearing outer ring

Disassembling/Assembling of

Disassembling

1. Remove the cylindrical pin, bush, output shaft front bearing outer ring, and intermediate bearing outer ring in turn.



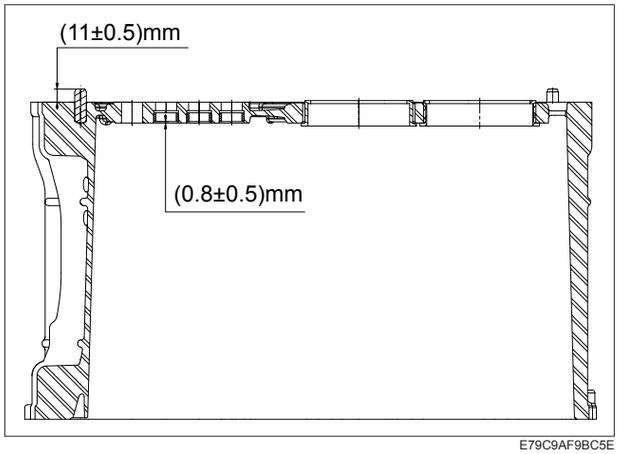
1F6EC38C307B

⚠ Caution

› The bush is a disposable component and cannot be reused.

Assembling

1. Press in the intermediate shaft middle bearing outer ring, output shaft front bearing outer ring, bush, and cylindrical pin respectively.



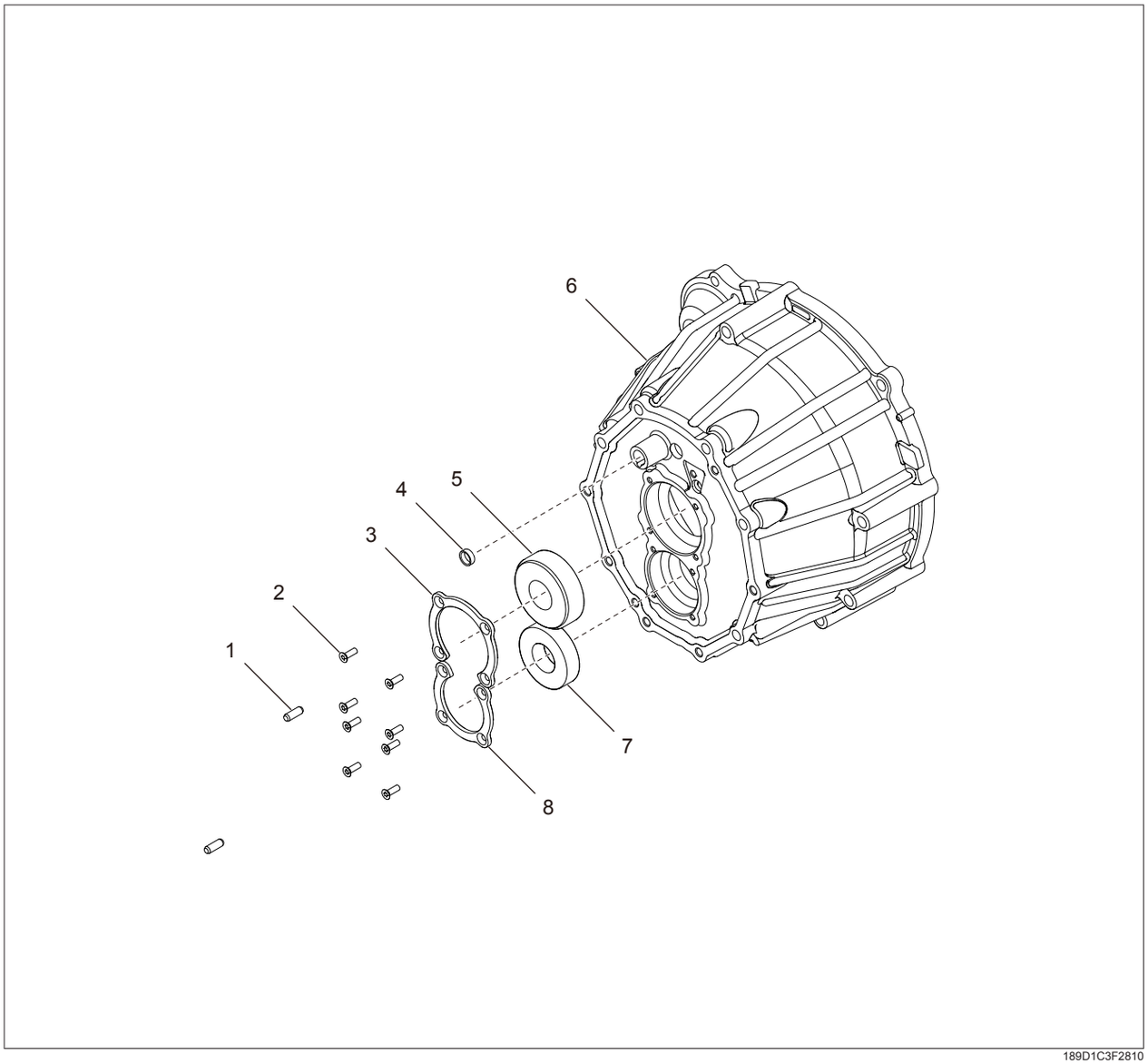
E79C9AF9BC5E

The press-in depth of the bush is (0.8±0.5) mm.

The protrusion height of the cylindrical pin is (11±0.5) mm.

Transmission clutch housing sub-assembly

Structural Diagram of



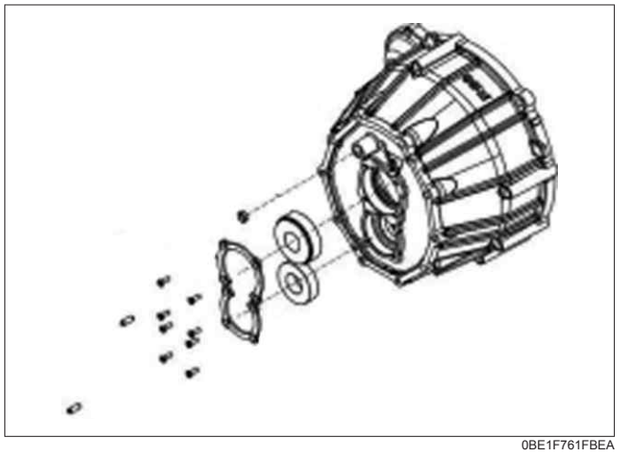
189D1C3F2810

1. Cylindrical pin
2. Hexagonal countersunk head screws
3. Input shaft bearing cover plate
4. Bush
5. Input shaft front bearing
6. Clutch housing
7. Intermediate shaft front bearing
8. Intermediate shaft bearing cover plate

Disassembling/Assembling of

Disassembling

1. Remove the hexagonal countersunk head screws, input shaft bearing cover plate, intermediate shaft bearing cover plate, input shaft front bearing, intermediate shaft front bearing, bush, and cylindrical pin in turn.



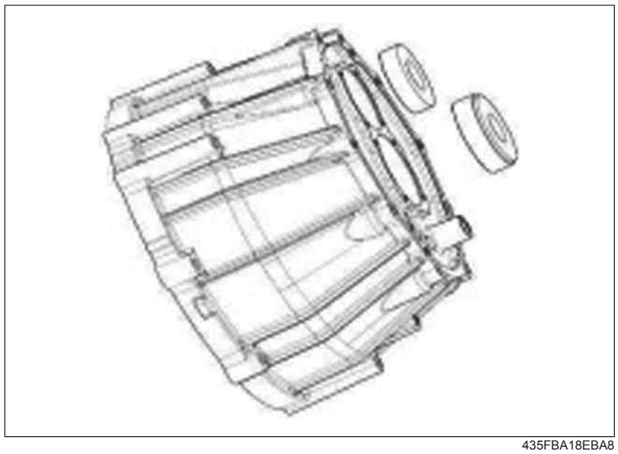
0BE1F761FBEA

⚠ Caution

› The hexagonal countersunk head screws and bushes are disposable parts and cannot be reused.

Assembling

1. Hot assembling of bearing

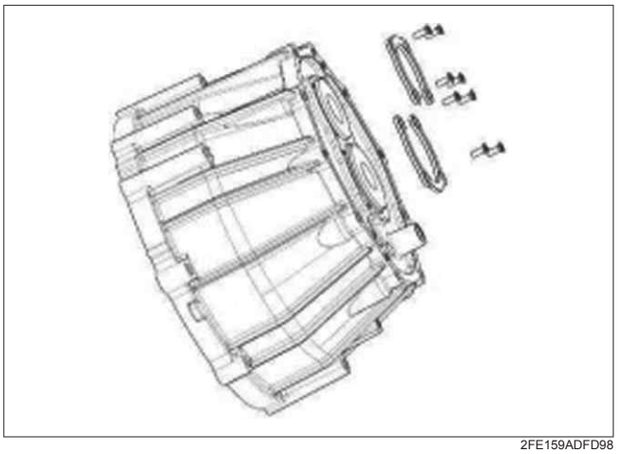


435FBA18EBA8

ⓘ Notice

› Heat two bearing positions of the clutch housing to 100~110°C, and then install the input shaft front bearing and the intermediate shaft front bearing into the bearing positions.

2. Install the bearing cover plate.

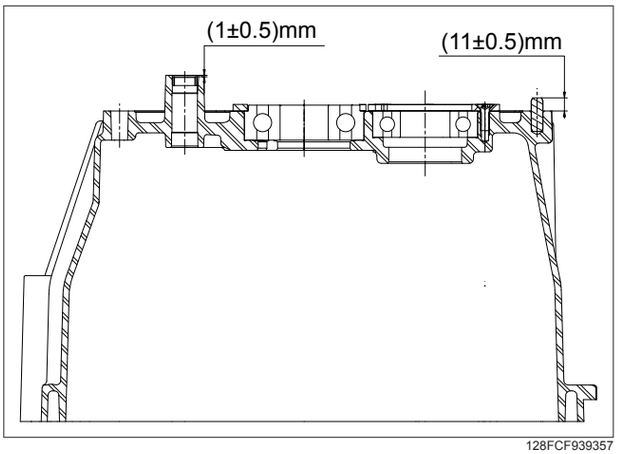


2FE159ADFD98

ⓘ Notice

› Install the input shaft bearing cover plate and intermediate shaft bearing cover plate in time, and tighten them with hexagonal countersunk head screws to limit the bearings.

3. Press the bush and the cylindrical pin respectively.



128FCF939357

The press-in depth of the bush is (1±0.5) mm.

The protrusion height of the cylindrical pin is (11±0.5) mm.

Clutch slave cylinder assembly

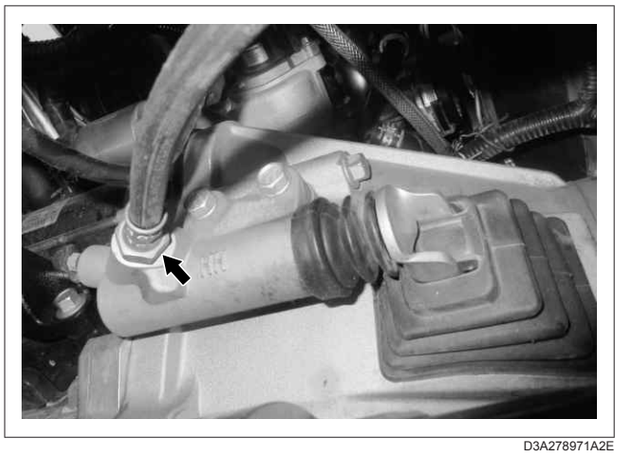
Removal/installation

Removal

⚠ Caution

› Be sure not to splash the brake fluid onto vehicle, because it can damage the paint. If the brake fluid contacts the paint, immediately wash it away with water.

1. Lift the vehicle to a proper position
2. Remove 1 bolt and 2 washers, and disconnect clutch hose

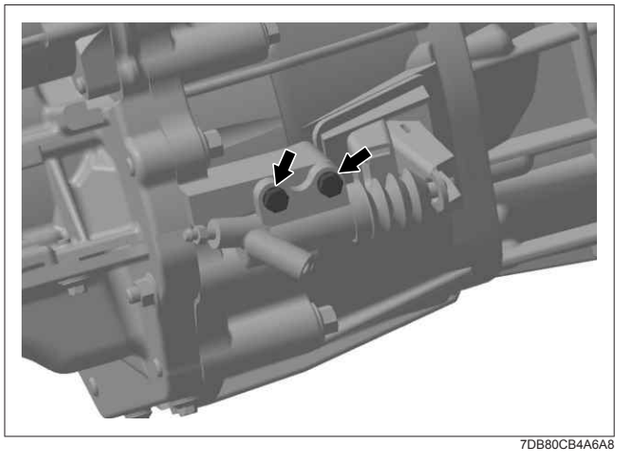


D3A278971A2E

ℹ Notice

› Use a container to collect clutch/brake fluid.

3. Remove 2 bolts, and remove clutch slave cylinder assembly



7DB80CB4A6A8

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Bleed air in clutch system, fill clutch/brake fluid into fluid reservoir and discharge air in clutch system.

› Check the clutch/brake fluid for leakage.

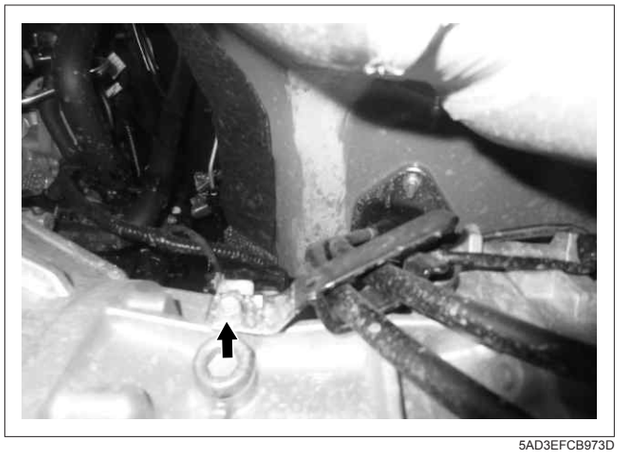
› Check fluid level in fluid reservoir, fill clutch/brake fluid up to the MAX (highest) mark in the fluid reservoir.

Reverse switch assembly

Removal/installation

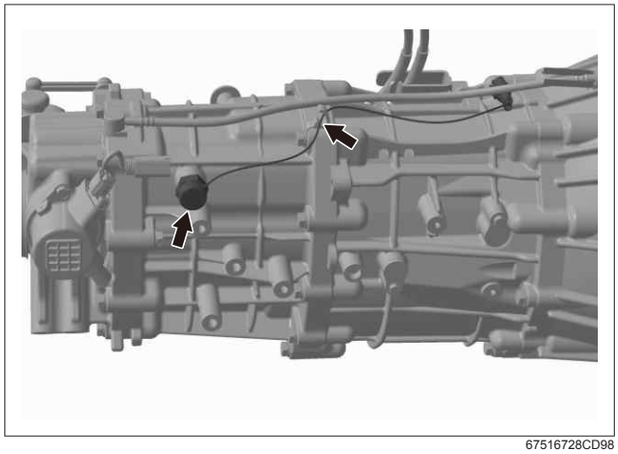
Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Remove 1 bolt



5AD3EFCB973D

4. Remove the shift cable process bracket
5. Disconnect the reverse switch connector.
6. Separate the harness clips and remove the reverse switch assembly



67516728CD98

Installation

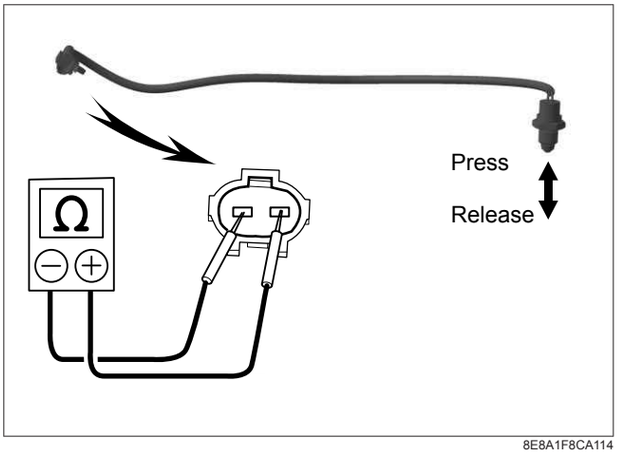
1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Check

1. Check the conductivity of reverse switch, and measure pins 1 and 2 with ohmmeter.



8E8A1F8CA114

It is conductive when pressed.

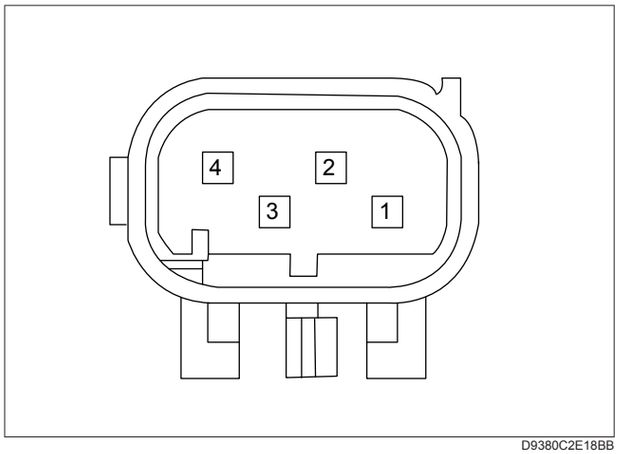
It is not conductive when released.

ℹ Notice

› If the measurement result is inconsistent with the actual situation, the reverse switch assembly shall be replaced.

Neutral switch assembly

Pin definition



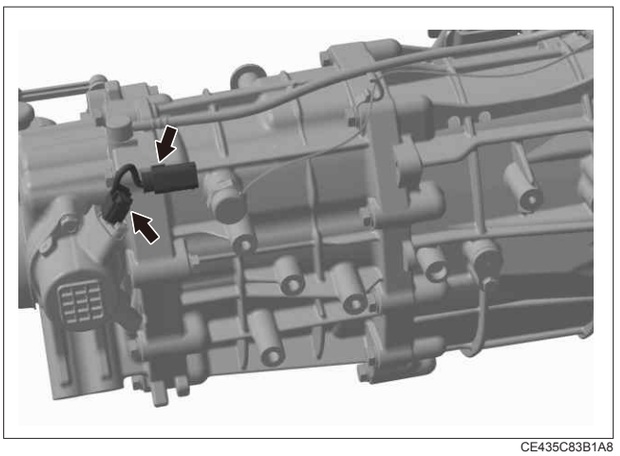
D9380C2E18BB

Pin No.	Function
1	Neutral/engaged signal of engine ECU
2	Signal end
3	Neutral switch GND
4	Power supply (9~16)V

Removal/installation

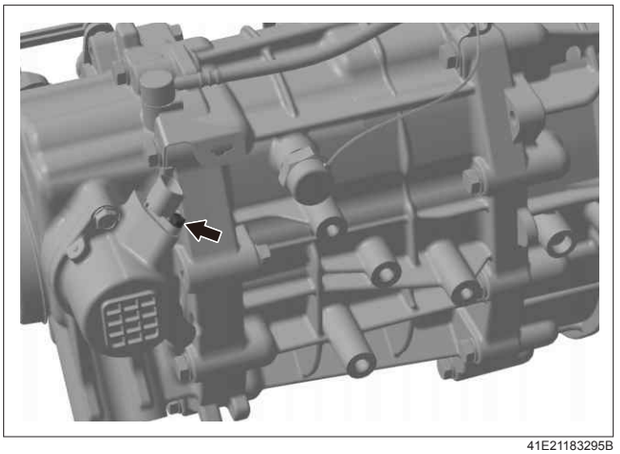
Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Disconnect the neutral switch adapter harness connector.
4. Separate the harness clips and remove the adapter harness



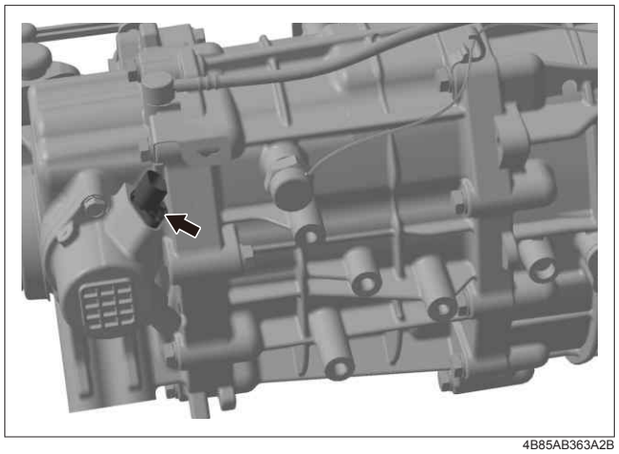
CE435C83B1A8

5. Remove 1 bolt



41E21183295B

6. Remove neutral switch assembly



4B85AB363A2B

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Check

1. Check neutral switch voltage. When VCC voltage is provided to pins 1 and 2 by the battery, single high and low level signals can be provided.

   Neutral: low level, voltage ≤ 1.5V

   Gear engaged: high level, voltage ≥ (VCC-2.5) V

⚠ Caution

› When checking the voltage of neutral switch signal terminal, make sure that the connection of neutral switch signal terminal and the engine ECU are in a conducting state.

2. Check the failure mode. There are three failure modes for neutral switch. Repair or replace it as necessary.

ℹ Notice

› If neutral switch itself failed, just replace the neutral switch.

› If the sensor target on the shift lever cover subassembly fails, just replace the subassembly.

› If the neutral switch and the sensor target fail at the same time, replace the neutral switch and the subassembly at the same time.

Shifter assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Shifter x shifter bracket	23±3	4	—
Bolt	Shifter bracket x floor	23±3	4	—
Nut	Shift cable x floor	9±1	2	—

Removal/installation

Removal

⚠ Warning

› You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



7B484CA2CCD6

ℹ Notice

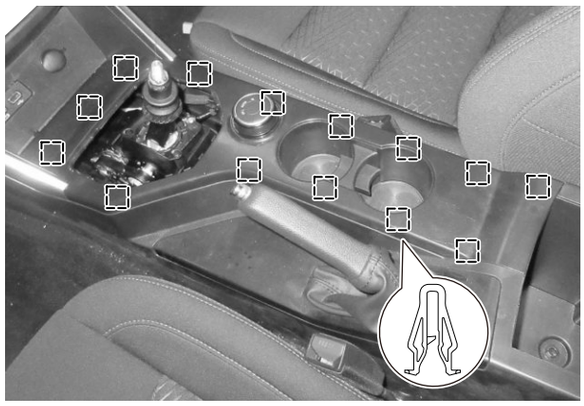
› Turn gear shift lever counterclockwise to unscrew it.

4. Remove shifter dust boot assembly



E69D028111A0

5. Open auxiliary instrument panel elbow pillow assembly
6. Separate 14 clips



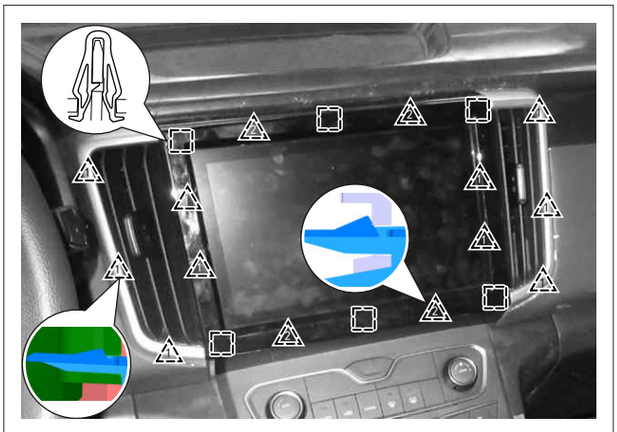
057F368ABA50

7. Disconnect harness connector



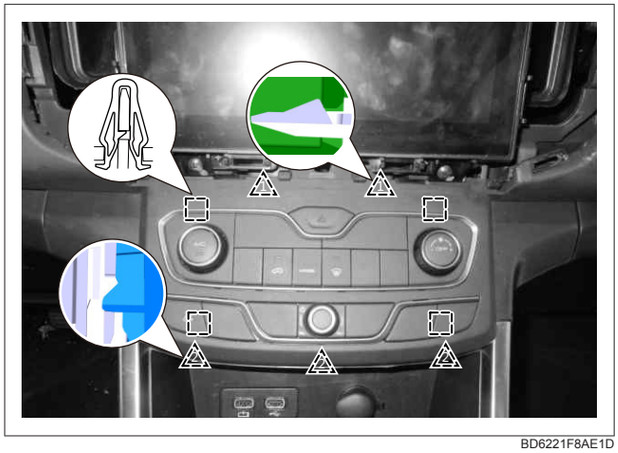
765F2AEADDA3

8. Remove console panel of auxiliary instrument panel
9. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

10. Separate 4 clips and 5 joints



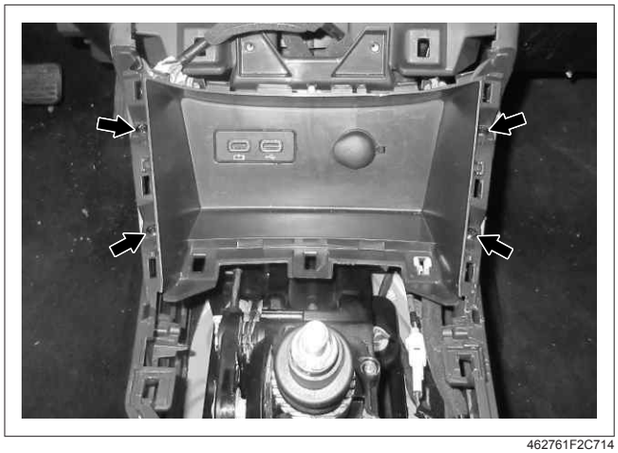
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11. Disconnect connectors of the console panel switch



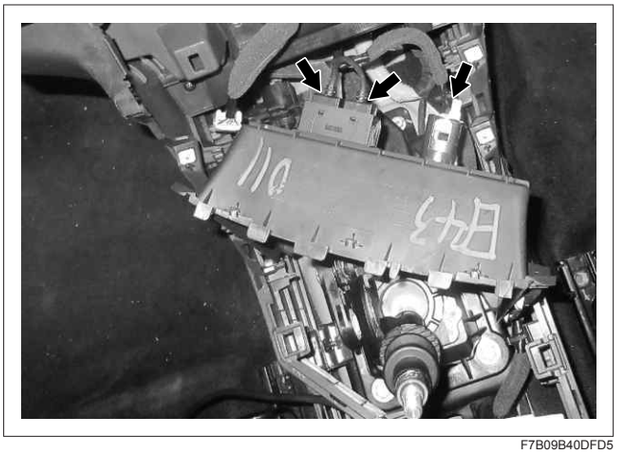
FB5BA43E2F1B

12. Remove console panel switch
13. Remove auxiliary instrument panel left trim plate assembly
14. Remove auxiliary instrument panel right trim plate assembly
15. Remove 4 screws



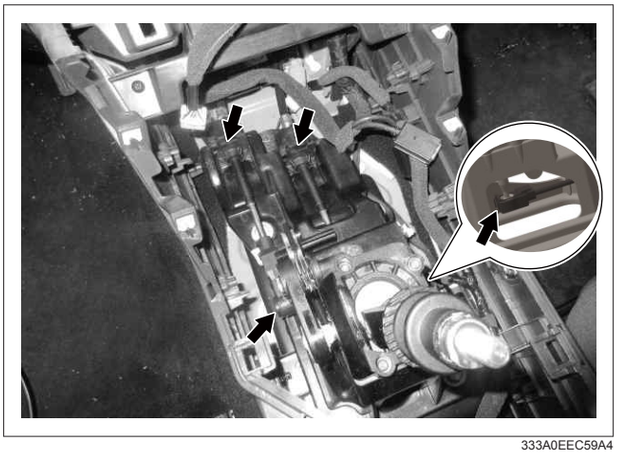
462761F2C714

16. Disconnect front storage box harness connector of auxiliary instrument panel



F7B09B40DFD5

17. Remove front storage box of auxiliary instrument panel
18. Disconnect shift cable assembly and shifter assembly



333A0EEC59A4

19. Remove 4 bolts

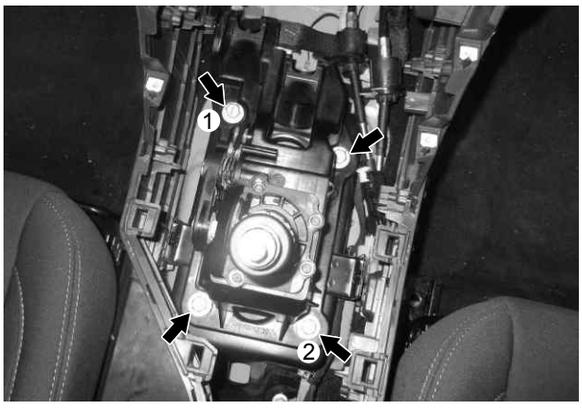


CE244C45801D

20. Remove shifter assembly

Installation

1. Perform installation work in reverse order of removal



8DE47D2954D9

⚠ Caution

› When installing the shifter assembly, you shall first install #1 bolt and the #2 bolt later. Then install the other bolts in the diagonal order. Finally, tighten the bolts in the diagonal order and the specified torque.

› Adjust shift cable assembly when installing shift cable assembly.

Shift cable assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Shift cable x floor	9±1	2	—

Removal/installation

Removal

⚠ Warning

› You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



7B484CA2CCD6

ℹ Notice

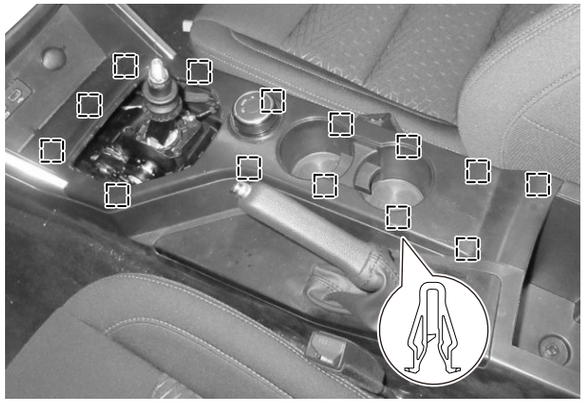
› Turn gear shift lever counterclockwise to unscrew it.

4. Remove shifter dust boot assembly



E69D028111A0

5. Open auxiliary instrument panel elbow pillow assembly
6. Separate 14 clips



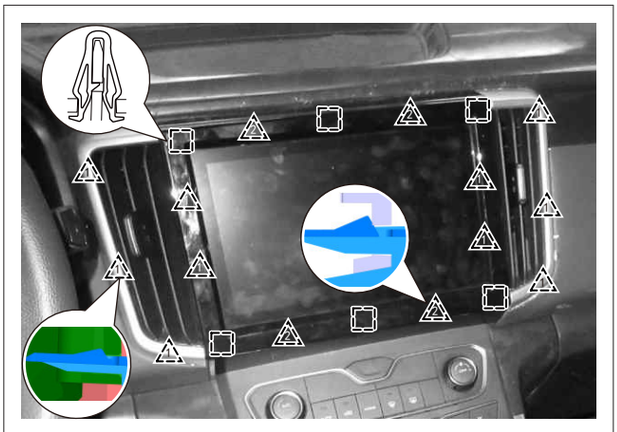
057F368ABA50

7. Disconnect harness connector



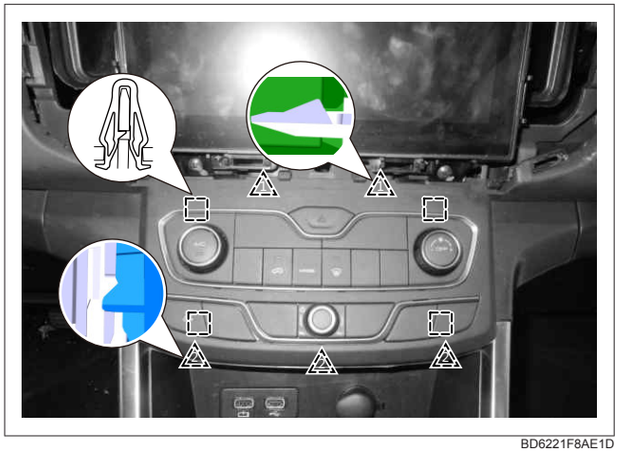
765F2AEADDA3

8. Remove console panel of auxiliary instrument panel
9. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

10. Separate 4 clips and 5 joints



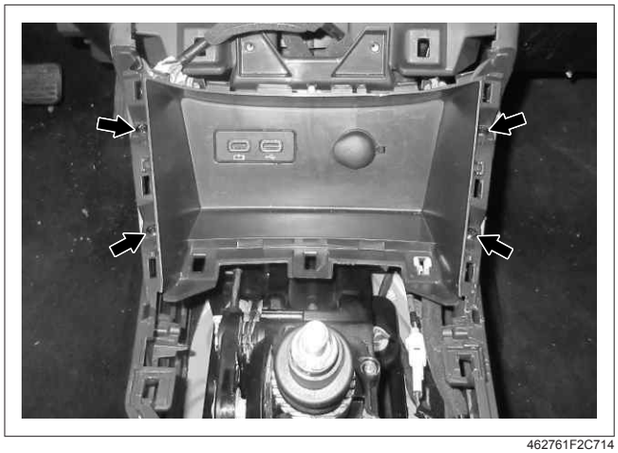
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11. Disconnect connectors of the console panel switch



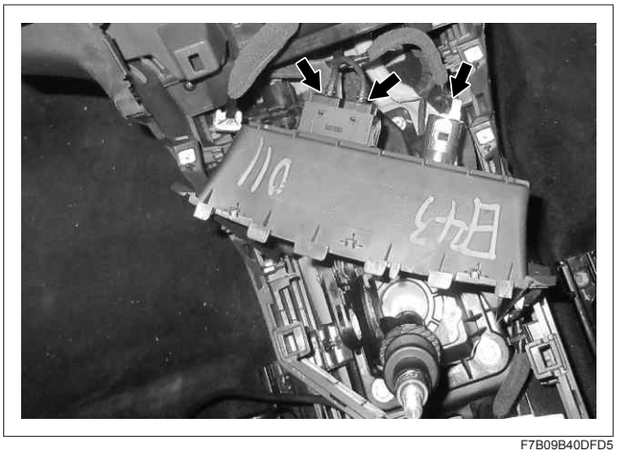
FB5BA43E2F1B

12. Remove console panel switch
13. Remove auxiliary instrument panel left trim plate assembly
14. Remove auxiliary instrument panel right trim plate assembly
15. Remove 4 screws



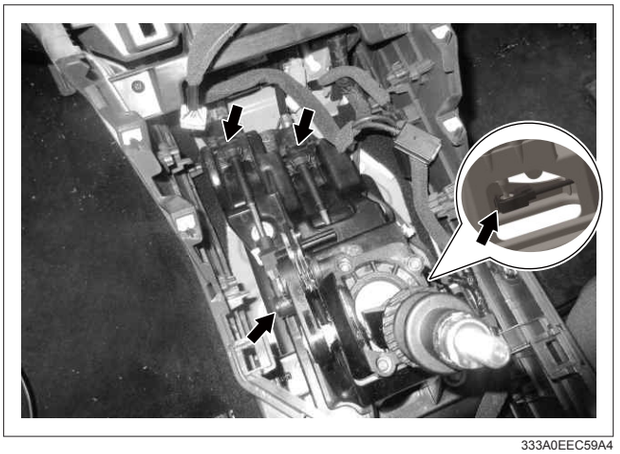
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16. Disconnect front storage box harness connector of auxiliary instrument panel



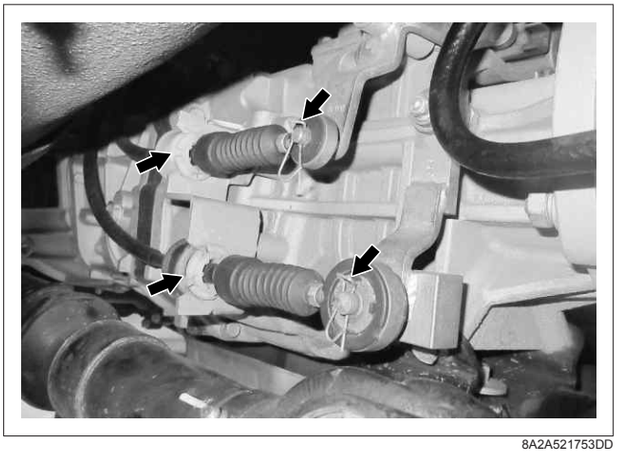
F7B09B40DFD5

17. Remove front storage box of auxiliary instrument panel
18. Disconnect shift cable assembly and shifter assembly



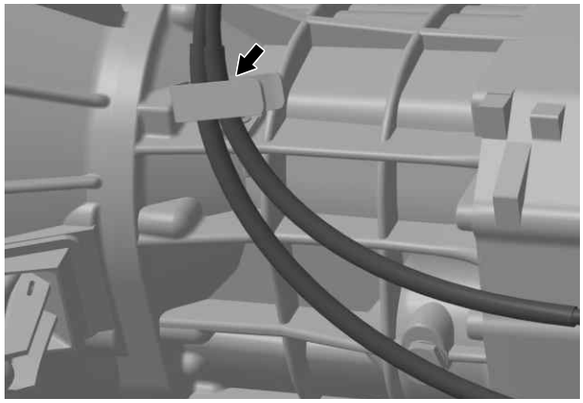
333A0EEC59A4

19. Lift vehicle to proper position
20. Remove 2 circlips, and disconnect shift cable assembly from transmission assembly



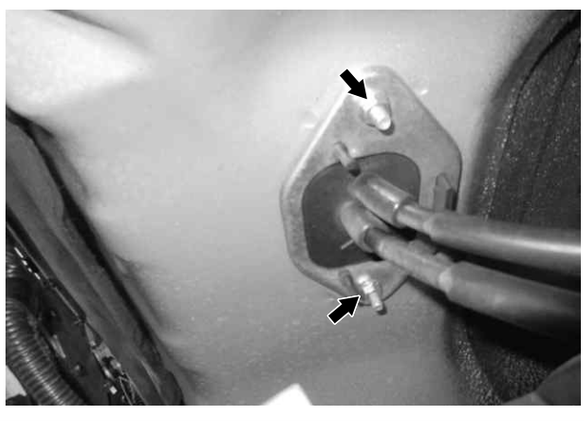
8A2A521753DD

21. Separate 1 clip, and disconnect shift cable assembly and clip



155AB42E86AB

22. Remove 2 nuts



EFC6C3B22D35

23. Remove shift cable assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Adjust shift cable assembly.

› Tighten the fastener according to the specified torque value.

Adjustment

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



7B484CA2CCD6

ℹ Notice

› Turn gear shift lever counterclockwise to unscrew it.

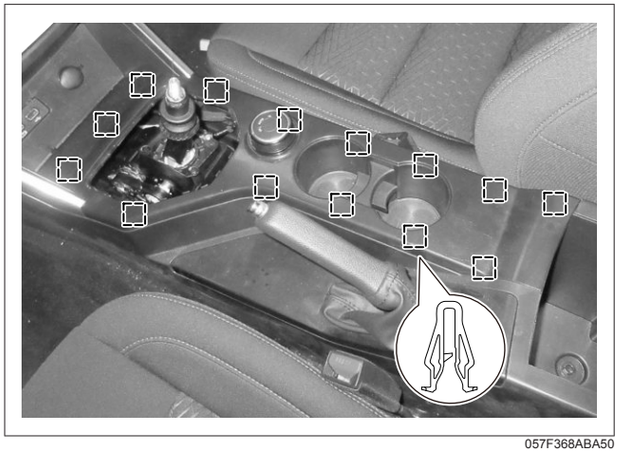
4. Remove shifter dust boot assembly



E69D028111A0

5. Open auxiliary instrument panel elbow pillow assembly

6. Separate 14 clips



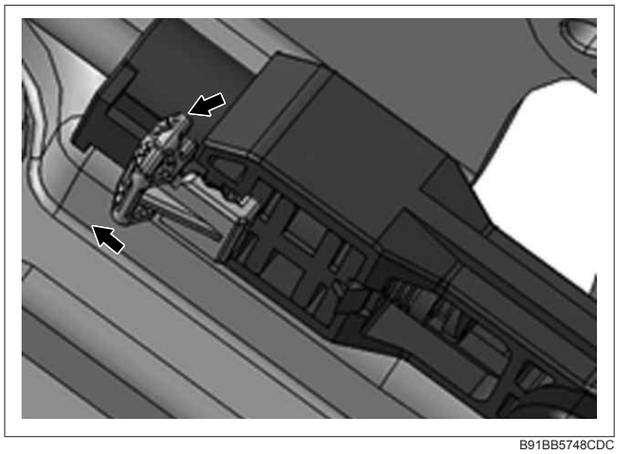
057F368ABA50

7. Disconnect harness connector

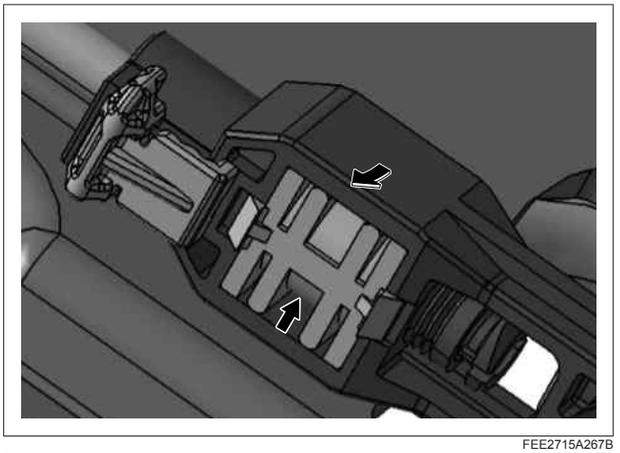


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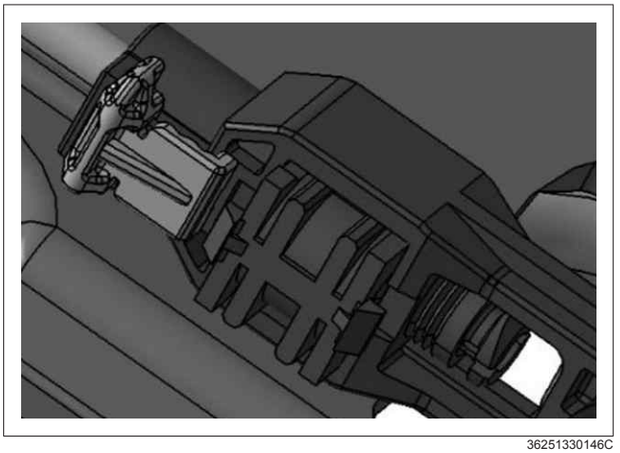
8. Remove console panel of auxiliary instrument panel
9. Pull the snap of the adjustable mechanism of shift cable assembly gear selecting cable out of the mechanism



B91BB5748CDC

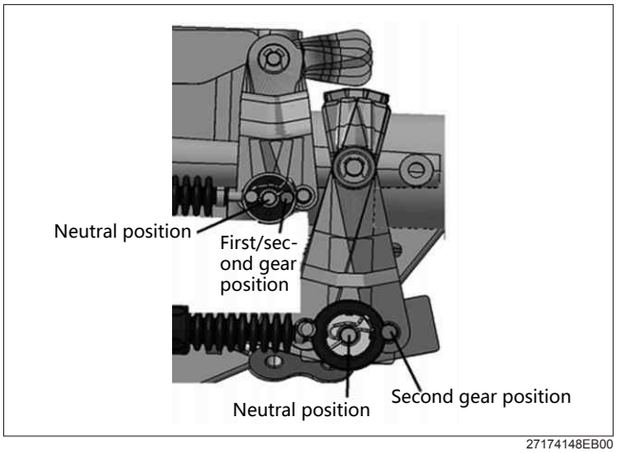


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36251330146C

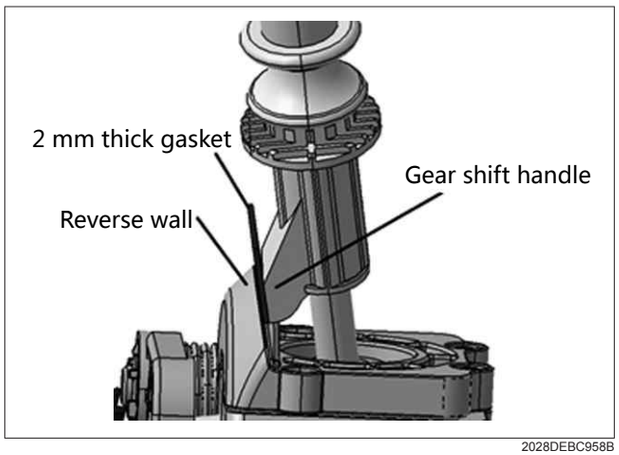
10. Lift vehicle to proper position
11. Place the transmission in second gear under the vehicle by moving the transmission gear selecting rocker arm backward to 1st/2nd gear position, and then move the gear selecting rocker arm backward



27174148EB00

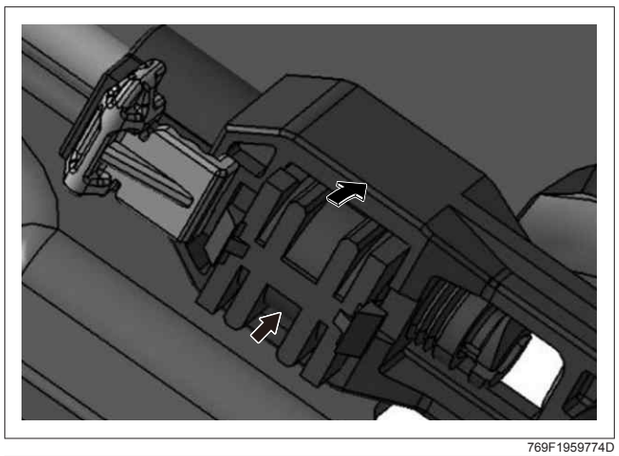
12. Lower the vehicle

13. In the cab, adjust shift lever to the 2nd gear position by selecting 2 mm thick gasket, placing the gasket on reverse gear wall,and then moving the lever along the transverse direction of the vehicle toward the reverse gear wall so that the lever handle is lightly attached to the gasket, where the shift lever is in the 2nd position

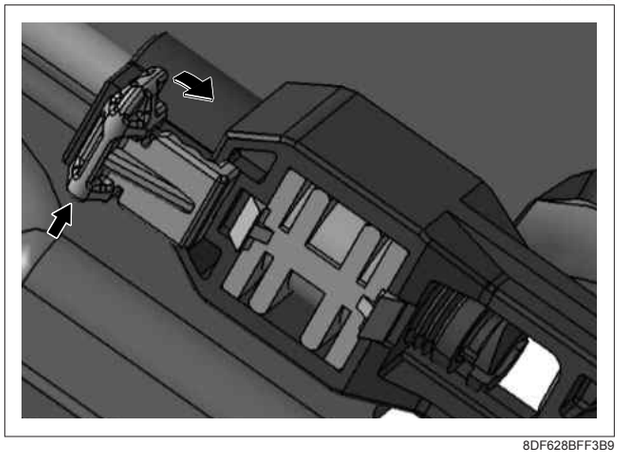


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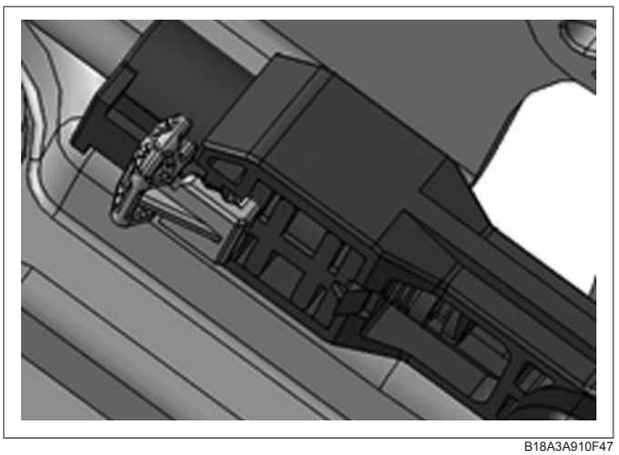
14. Hold the snap of shift cable connector



769F1959774D



8DF628BFF3B9



B18A3A910F47

15. Remove 2 mm thick gasket
16. Install console panel of auxiliary instrument panel
17. Install shifter dust boot assembly
18. Install gear shift lever
19. Connect the negative terminal of the battery

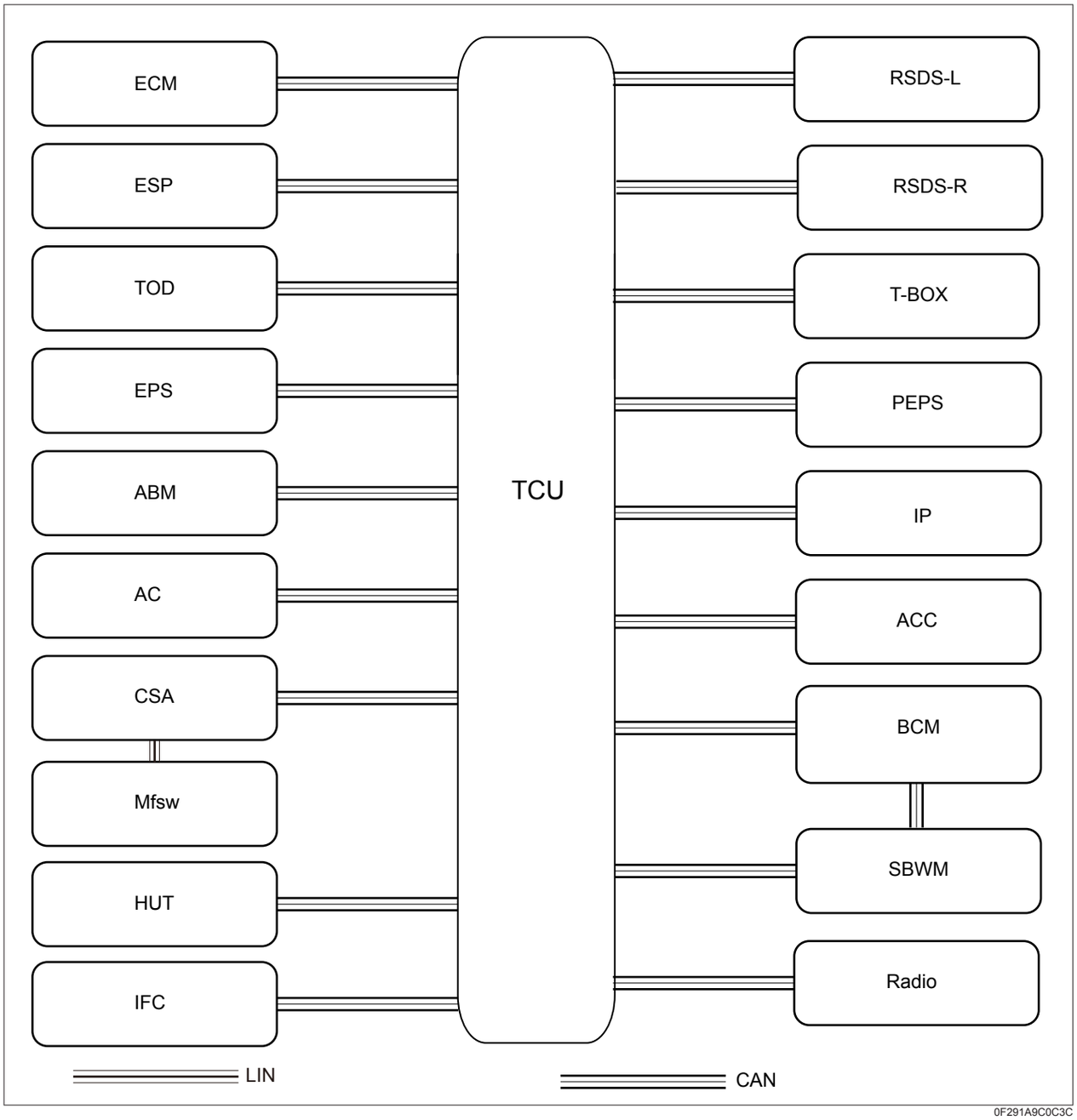
Transmission system (GA8HP50Z)

Transmission system ..... 16－1
System diagram ..... 16－1
Location diagram ..... 16－2
Basic parameters ..... 16－3
Specified torque ..... 16－4
Special tool ..... 16－5
DTC checklist & troubleshooting ..... 16－6
P gear emergency unlock - method 1 ..... 16－18
P gear emergency unlock - method 2 ..... 16－19
Transmission lubricant ..... 16－20
Specifications ..... 16－20
Adjustment ..... 16－21
Automatic transmission assembly ..... 16－22
Specified torque ..... 16－22
Pin definition ..... 16－23
Removal/installation ..... 16－23
Oil pan ..... 16－26
Removal/installation ..... 16－26
Valve plate ..... 16－27
Removal/installation ..... 16－27
Output shaft seal ..... 16－31
Removal/installation ..... 16－31
Torque converter ..... 16－35
Removal/installation ..... 16－35
Input shaft seal ..... 16－36
Removal/installation ..... 16－36
Input shaft O-ring ..... 16－38
Removal/installation ..... 16－38
Selector shaft seal ..... 16－39
Removal/installation ..... 16－39
Unlocking cable of P gear ..... 16－41
Specified Torque ..... 16－41
Removal/Installation of ..... 16－42
Transmission oil cooler assembly ..... 16－44
Structural diagram ..... 16－44
Specified Torque ..... 16－45
Removal/installation ..... 16－46
Shifter assembly ..... 16－48
Structural diagram ..... 16－48
Specified torque ..... 16－49
DTC checklist ..... 16－50
DTC troubleshooting method ..... 16－51

Pin definition .....16－53
Removal/Installation of .....16－54
Paddle shifter assembly .....16－56
Removal/installation.....16－56

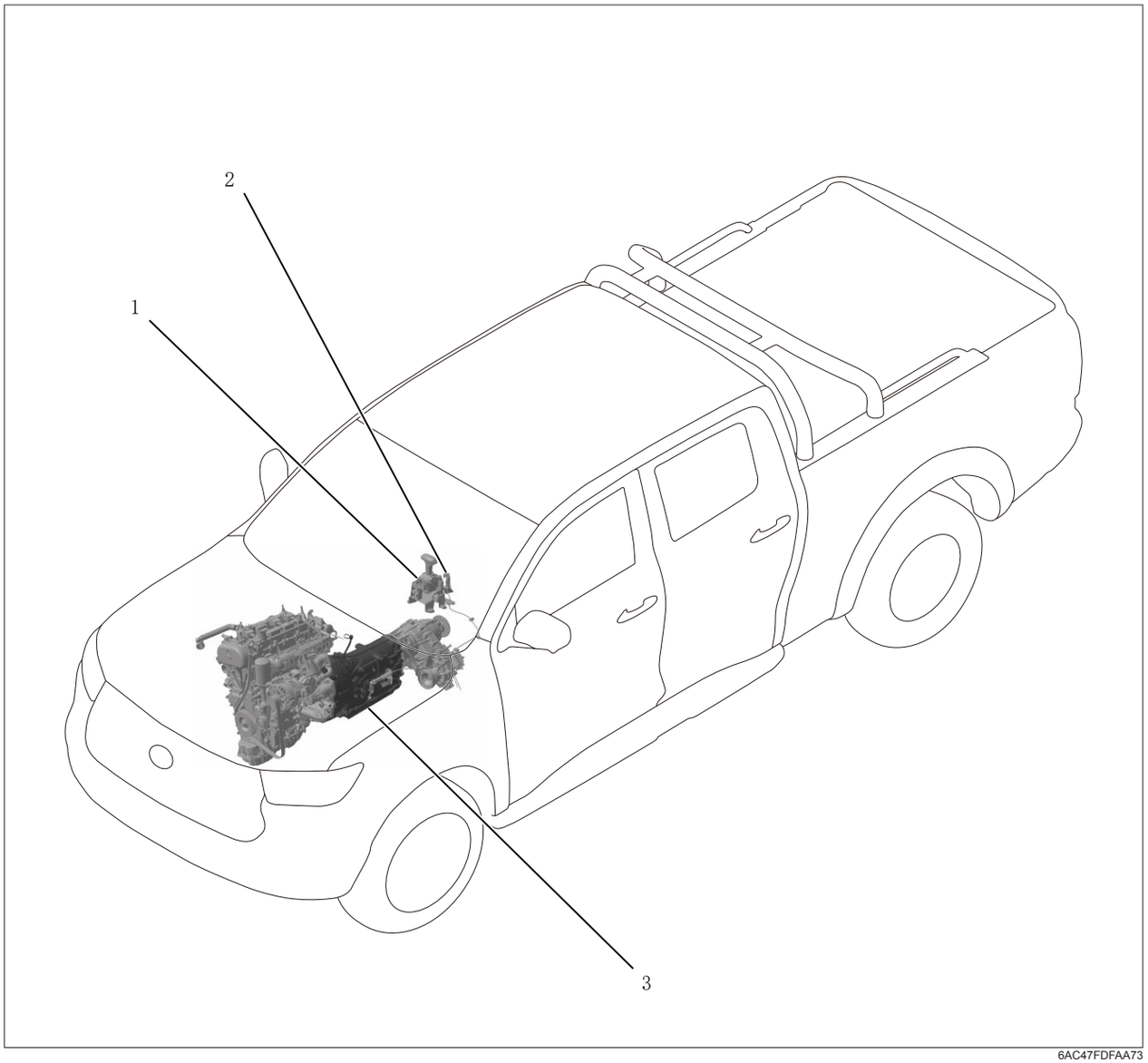
Transmission system

System diagram



0F291A9C0C3C

Location diagram



6AC47FDFAA73

1. Shifter assembly
2. P gear unlock cable
3. Automatic transmission assembly

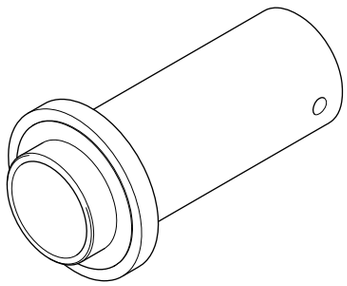
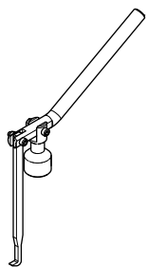
Basic parameters

Item	Parameter	
Transmission type	Automatic transmission	
Final ratio	4.1	
Gear transmission ratio	First gear	5.000
	Second gear	3.200
	Third gear	2.143
	Fourth gear	1.720
	Fifth gear	1.314
	Sixth gear	1.000
	Seventh gear	0.822
	Eighth gear	0.640
	Reverse gear	3.456

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw plug (oil filler plug)	Oil filler plug x transmission housing	35±3.5	1	—
Bolt (oil pan)	Oil pan x transmission housing	10±1	13	—
Bolt A (valve plate)	Valve plate x transmission housing	8±0.8	2	—
Bolt B (valve plate)	Valve plate x transmission housing	8±0.8	15	—
Bolt (output speed sensor)	Output speed sensor x transmission housing	4±1	1	—
Screw plug (drain plug)	Drain plug × oil pan	8±3.5	1	—
Bolt (oil pump)	Fuel pump x transmission housing	10±1	13	—
Screw plug (parking lock)	Parking lock x transmission housing	35±3.5	1	—
Screw plug (PZT)	PZT x transmission housing	10±1	1	—
Bolt	Pawl locking plate x transmission housing	8±0.8	4	—

Special tool

Code	Name	Purpose	Schematic diagram
ZEZF068651	Hydraulic torque converter oil seal installation tool	Install hydraulic torque converter oil seal	
ZEZF068779	Input shaft oil seal removal tool	Remove input shaft oil seal.	

DTC checklist & troubleshooting

No.	DTC	DTC description	Troubleshooting
1	P0973	Pressure control valve A short-circuited to ground	Replace electromechanical unit
2	P0974	Pressure control valve A short-circuited to battery	Replace electromechanical unit
3	P0972	Pressure control valve A current out of range	Replace electromechanical unit
4	P0972	Pressure control valve A open-circuited	Replace electromechanical unit
5	P0976	Pressure control valve B short-circuited to ground	Replace electromechanical unit
6	P0977	Pressure control valve B short-circuited to battery	Replace electromechanical unit
7	P0975	Pressure control valve B current out of range	Replace electromechanical unit
8	P0975	Pressure control valve B open-circuited	Replace electromechanical unit
9	P0982	Pressure control valve D short-circuited to ground	Replace electromechanical unit
10	P0983	Pressure control valve D short-circuited to battery	Replace electromechanical unit
11	P0981	Pressure control valve D current out of range	Replace electromechanical unit
12	P0982	Pressure control valve D open-circuited	Replace electromechanical unit
13	P0985	Pressure control valve E short-circuited to ground	Replace electromechanical unit
14	P0986	Pressure control valve E short-circuited to battery	Replace electromechanical unit
15	P0984	Pressure control valve E current out of range	Replace electromechanical unit
16	P0985	Pressure control valve E open-circuited	Replace electromechanical unit
17	P0979	Pressure control valve C short-circuited to ground	Replace electromechanical unit
18	P0980	Pressure control valve C short-circuited to battery	Replace electromechanical unit
19	P0978	Pressure control valve C current out of range	Replace electromechanical unit
20	P0979	Pressure control valve C open-circuited	Replace electromechanical unit

No.	DTC	DTC description	Troubleshooting
21	P2759	Hydraulic torque converter clutch pressure control valve short-circuited to ground	Replace electromechanical unit
22	P2759	Hydraulic torque converter clutch pressure control valve short-circuited to battery	Replace electromechanical unit
23	P2757	Hydraulic torque converter clutch current out of range	Replace electromechanical unit
24	P2761	Hydraulic torque converter clutch pressure control valve open-circuited	Replace electromechanical unit
25	P0748	System pressure control valve short-circuited to ground	Replace electromechanical unit
26	P0748	System pressure control valve short-circuited to battery	Replace electromechanical unit
27	P0748	System pressure control valve current out of range	Replace electromechanical unit
28	P0748	System pressure control valve open-circuited	Replace electromechanical unit
29	P0966	Gear control solenoid valve short-circuited to ground	Replace electromechanical unit
30	P0967	Gear control solenoid valve short-circuited to battery	Replace electromechanical unit
31	P0965	Gear control solenoid valve current our of range	Replace electromechanical unit
32	P0966	Gear control solenoid valve open-circuited	Replace electromechanical unit
33	U0163	HUT message node missing	Check HUT module
34	U0464	HUT message check error	Check HUT module
35	U0128	EPB message node missing	Check EPB module
36	U0417	EPB message check error	Check EPB module
37	U0235	ACC message node missing	Check ACC module
38	U0405	ACC message check error	Check ACC module
39	P084F	P gear lock solenoid valve short-circuited to ground	Replace electromechanical unit
40	P084F	P gear lock solenoid valve short-circuited to battery	Replace electromechanical unit
41	P084F	P gear lock solenoid valve serial external interface error	Replace electromechanical unit

No.	DTC	DTC description	Troubleshooting
42	P084F	P gear lock solenoid valve open-circuited	Replace electromechanical unit
43	P0657	Actuator internal power supply voltage circuit fault	Replace electromechanical unit
44	P062F	Read-only memory error	Clear DTC and re-read DTC, if stock-in DTC still exists, replace electromechanical unit
45	P0601	Read-only memory check error	Clear DTC and re-read DTC, if stock-in DTC still exists, replace electromechanical unit
46	P0613	TCU processor error	Replace electromechanical unit
47	P0700	Microcontroller system error	Replace electromechanical unit
48	P0634	TCU temperature too high	Check whole vehicle or transmission cooling system. Clear DTC and test vehicle.
49	U0243	APA message node missing	Check APA module
50	U045A	APA message check error	Check APA module
51	P0560	System voltage fault	Replace electromechanical unit
52	U1101	RND gear voltage under-voltage (lower than 6.5 V)	Check whole vehicle generator, voltage control valve and battery
53	U1101	Power supply voltage under-voltage (lower than 7 V)	Check whole vehicle generator, voltage control valve and battery
54	U1101	supply voltage too low (lower than 9 V)	Check whole vehicle generator, voltage control valve and battery (voltage lower than 7-9 V)
55	U1100	Power supply voltage too high (higher than 17 V)	Check whole vehicle generator, voltage control valve and battery (Voltage higher than 16 V)
56	P0642	Sensor supply voltage low	Replace electromechanical unit
57	P0643	Sensor supply voltage high	Replace electromechanical unit
58	U0422	IG electrical signal untrustworthy	1) DTC relates to other control units, TCU receives invalid signal 2) Check KL15, check DTC for TCU and sending unit
59	P07B3	P gear pawl sensor (circuit 3) short-circuited to ground	Replace electromechanical unit
60	P07B4	P gear pawl sensor (circuit 3) short-circuited to battery	Replace electromechanical unit
61	P07B9	P gear pawl sensor (circuit 4) short-circuited to ground	Replace electromechanical unit

No.	DTC	DTC description	Troubleshooting
62	P07BA	P gear pawl sensor (circuit 4) short-circuited to battery	Replace electromechanical unit
63	P0850	P gear pawl mechanical failure	1) Clear DTC. Test vehicle, joint/ open P gear lock several times. If the fault re-occurs. 2) If P gear lock unit needs to be checked or replaced 3) If the fault re-occurs, replace electromechanical unit
64	P0715	Input speed sensor short-circuited to ground or open-circuited	Replace electromechanical unit
65	P0715	Input speed sensor short-circuited to battery	Replace electromechanical unit
66	P0716	Input speed sensor voltage too high	Replace electromechanical unit
67	P0720	Output speed sensor short-circuited to ground or open-circuited	Replace electromechanical unit
68	P0720	Output speed sensor short-circuited to battery	Replace electromechanical unit
69	P0721	Output speed sensor voltage too high	Replace electromechanical unit
70	P0668	Chip 1 temperature sensor short-circuited to ground	Replace electromechanical unit
71	P0669	Chip 1 temperature sensor short-circuited to battery	Replace electromechanical unit
72	P06AC	Chip 2 temperature sensor voltage too low	Replace electromechanical unit
73	P06AC	Chip 2 temperature sensor voltage too high	Replace electromechanical unit
74	P0712	Fuel temperature sensor short-circuited to ground	Replace electromechanical unit
75	P0713	Fuel temperature sensor short-circuited to battery	Replace electromechanical unit
76	P0710	Fuel temperature sensor open-circuited	Replace electromechanical unit
77	U0001	CAN bus fault	Whole vehicle problem; CAN Bus off, check entire wire harness
78	U0001	CAN bus node missing	Whole vehicle problem; CAN Bus off, check entire wire harness
79	P0700	Transmission output shaft overspeed	Replace electromechanical unit

No.	DTC	DTC description	Troubleshooting
80	P0700	Primary CPU and secondary processor interaction error, or secondary processor software version error	Replace electromechanical unit
81	P0700	Secondary processor reset or secondary processor memory error	Replace electromechanical unit
82	P0700	Primary CPU safe calculation error or secondary processor deletion electronic failure, but no primary CPU failure	Replace electromechanical unit
83	U0155	BCM message node missing	Check BCM module
84	U0423	BCM message check error	Check BCM module
85	P0736	N gear position untrustworthy	1) using scanner to check and update the latest transmission relevant software 2) clear DTC and retest, if fault re-occurs, replace electromechanical unit
86	P1712	P gear or N gear engage clutch rationality check activated	1) using scanner to check and update the latest transmission relevant software 3) clear DTC and retest, if fault re-occurs, replace electromechanical unit
87	P2793	Drive direction error	Replace electromechanical unit
88			
89	P2793	D gear or R gear target position or actuator control untrustworthy	Replace electromechanical unit
90	P0801	Forward direction R gear engagement	Replace electromechanical unit
91	P1706	Unexpected P gear pawl engaged	Replace electromechanical unit
92	P2711	Unexpected P gear pawl not engaged	Replace electromechanical unit
93	P0752	Do not allow pressure supply position valve to fail	Replace electromechanical unit
94	P061A	Engine positive torque request rationality check	Replace electromechanical unit
95	P061B	Engine positive torque request accuracy rationality check	Replace electromechanical unit
96	P061B	Rationality check of speed change during gear shift	Replace electromechanical unit

No.	DTC	DTC description	Troubleshooting
97	P07AD	Unexpected power transmission of N gear	Replace electromechanical unit
98	P0810	Untrustworthy request from actuator to current solenoid valve	Replace electromechanical unit
99	P0741	Lock-up clutch sliding friction control	Lock-up clutch fault exists. Replace hydraulic torque converter (change transmission assembly if fluid is insufficient and dirty)
100	P2700	Speed ratio monitoring fault (clutch A slipping and friction)	Replacing of transmission assembly
101	P2701	Speed ratio monitoring fault (clutch B slipping and friction)	Replacing of transmission assembly
102	P2702	Speed ratio monitoring fault (clutch C slipping and friction)	Replacing of transmission assembly
103	P2703	Speed ratio monitoring fault (clutch D slipping and friction)	Replacing of transmission assembly
104	P2704	Speed ratio monitoring fault (clutch E slipping and friction)	Replacing of transmission assembly
105	P177A	Speed ratio monitoring fault (clutch A or B slipping and friction)	Replacing of transmission assembly
106	P177C	Speed ratio monitoring fault (clutch A or D slipping and friction)	Replacing of transmission assembly
107	P177F	Speed ratio monitoring fault (clutch B or D slipping and friction)	Replacing of transmission assembly
108	P178A	Speed ratio monitoring fault (clutch B or E slipping and friction)	Replacing of transmission assembly
109	P178B	Speed ratio monitoring fault (clutch C or D slipping and friction)	Replacing of transmission assembly
110	P177D	Speed ratio monitoring fault (clutch A or E slipping and friction)	Replacing of transmission assembly
111	P177B	Speed ratio monitoring fault (clutch A or C slipping and friction)	Replacing of transmission assembly
112	P177E	Speed ratio monitoring fault (clutch B or C slipping and friction)	Replacing of transmission assembly

No.	DTC	DTC description	Troubleshooting
113	P178C	Speed ratio monitoring fault (clutch C or E slipping and friction)	Replacing of transmission assembly
114	P178D	Speed ratio monitoring fault (clutch D or E slipping and friction)	Replacing of transmission assembly
115	P0731	Speed ratio monitoring fault (clutch A or B or C slipping and friction)	Replacing of transmission assembly
116	P0732	Speed ratio monitoring fault (clutch A or B or E slipping and friction)	Replacing of transmission assembly
117	P0733	Speed ratio monitoring fault (clutch B or C or D slipping and friction)	Replacing of transmission assembly
118	P0734	Speed ratio monitoring fault (clutch B or D or E slipping and friction)	Replacing of transmission assembly
119	P0735	Speed ratio monitoring fault (clutch B or C or D slipping and friction)	Replacing of transmission assembly
120	P0729	Speed ratio monitoring fault (clutch C or D or E slipping and friction)	Replacing of transmission assembly
121	P076F	Speed ratio monitoring fault (clutch A or C or D slipping and friction)	Replacing of transmission assembly
122	P07D9	Speed ratio monitoring fault (clutch A or D or E slipping and friction)	Replacing of transmission assembly
123	P0736	Speed ratio monitoring fault (clutch A or B or D slipping and friction)	Replacing of transmission assembly
124	P07DC	Speed ratio monitoring fault during gear shift (leaving gear 1)	Replacing of transmission assembly
125	P07DD	Speed ratio monitoring fault during gear shift (leaving gear 2)	Replacing of transmission assembly
126	P07DE	Speed ratio monitoring fault during gear shift (leaving gear 3)	Replacing of transmission assembly
127	P07DF	Speed ratio monitoring fault during gear shift (leaving gear 4)	Replacing of transmission assembly
128	P07E0	Speed ratio monitoring fault during gear shift (leaving gear 5)	Replacing of transmission assembly

No.	DTC	DTC description	Troubleshooting
129	P07E1	Speed ratio monitoring fault during gear shift (leaving gear 6)	Replacing of transmission assembly
130	P07E2	Speed ratio monitoring fault during gear shift (leaving gear 7)	Replacing of transmission assembly
131	P07E3	Speed ratio monitoring fault during gear shift (leaving gear 8)	Replacing of transmission assembly
132	P0730	All speed ratios error	Replacing of transmission assembly
133	P2787	Clutch overheat (level 1)	Check transmission oil level and oil quality, check transmission oil cooling system
134	P2787	Clutch overheat (level 2)	Check transmission oil level and oil quality, check transmission oil cooling system
135	P2787	Clutch overheat (level 3)	Check transmission oil level and oil quality, check transmission oil cooling system
136	P2787	Clutch overheat (level 4)	Check transmission oil level and oil quality, check transmission oil cooling system
137	P2787	Clutch overheat (level 5)	Check transmission oil level and oil quality, check transmission oil cooling system
138	P167A	Software or pressure system mismatched	ZF after sales check and refresh optimization data or replace electromechanical unit
139	P0219	Engine overspeed	Whole vehicle problem; engine overspeed or transmission input overspeed; check ECM or ABS module
140	P0746	Position valve 1 monitoring fault	Clear DTC and retest, if fault reoccurs, replace electromechanical unit
141	P0746	Position valve 2 monitoring fault	Clear DTC and retest, if fault reoccurs, replace electromechanical unit
142	P0613	Gear change (shift) without driver request	Clear DTC and retest, if fault reoccurs, replace electromechanical unit
143	P0780	Gear not change (no shift) with driver request	Clear DTC and retest, if fault reoccurs, replace electromechanical unit

No.	DTC	DTC description	Troubleshooting
144	P1713	Position calculation failure	Clear DTC and retest, if fault re-occurs, replace electromechanical unit
145	P0606	Incorrect gear transmission in shift control	Clear DTC and retest, if fault re-occurs, replace electromechanical unit
146	P0780	Abnormal forward gear position display	Clear DTC and retest, if fault re-occurs, replace electromechanical unit
147	P352B	System position untrustworthy	None
148	P1707	P gear pawl position failure (error engagement)	1) Clear DTC. Test vehicle, joint/ open P gear lock several times. If the fault re-occurs. 2) If P gear lock unit needs to be checked or replaced 3) If the fault re-occurs, replace electromechanical unit
149	P1707	P gear pawl position failure (no error engagement)	1) Clear DTC. Test vehicle, joint/ open P gear lock several times. If the fault re-occurs. 2) If P gear lock unit needs to be checked or replaced 3) If the fault re-occurs, replace electromechanical unit
150	P1702	TCU restarts	On the whole vehicle, check shifter, voltage stabilizer and battery supply.
151	P0700	Driver alert messages may not be sent	Replace electromechanical unit
152	P0701	Driver interface information has safety risks	Clear DTC and restart, if fault re-occurs, replace electromechanical unit.
153	P061B	Positive torque for calculation too high	Clear DTC and restart, if fault re-occurs, replace electromechanical unit.
154	P0716	Input shaft speed sensor untrustworthy	Replace electromechanical unit
155	P0721	Output shaft speed sensor untrustworthy	Clear DTC record and test vehicle. Check the credibility of turbine speed and vehicle speed based on output shaft speed. If the error occurs again, replace electromechanical unit
156	P2159	Wheel speed signal untrustworthy	Wheel speed signal untrustworthy, check ABS module.

No.	DTC	DTC description	Troubleshooting
157	P215B	Output shaft to wheel speed calculation incorrect in N/P gear, or during shift	Replace electromechanical unit
158	P2784	Engine speed error and engine speed effective bit Incorrect	Replace electromechanical unit
159	P2784	Speed sensor double fault	Replace electromechanical unit
160	P0721	Level 2 speed fault	Replace electromechanical unit
161	P0721	Transmission jamming is monitored when ABS status is invalid	Problem with whole vehicle, check ABS system. output shaft speed change rate untrustworthy
162	P0710	Transmission oil temperature sensor untrustworthy	Replace electromechanical unit
163	P0710	Transmission oil temperature sensor escapes check	Replace electromechanical unit
164	P0667	Chip temperature sensor 1 untrustworthy	Replace electromechanical unit
165	P06AC	Chip temperature sensor 2 untrustworthy	Replace electromechanical unit
166	P077E	Temperature sensor double fault	Allow cooling time, clear DTC record and test vehicle.
167	P0700	Substitution function conflict (double error)	Clear DTC record, test vehicle, and If there is a fault, investigate according to separately stored DTC.
168	P279D	I/O: speed ratio conversion untrustworthy	Problem with entire vehicle, check signal from speed ratio conversion unit
169	U0403	4L signal untrustworthy	Problem with entire vehicle, check signal from speed ratio conversion unit
170	U0401	Accelerator pedal signal invalid	Whole vehicle problem, check air throttle pedal signal
171	U0416	Wheel speed signal invalid	Problem with whole vehicle, wheel speed signal invalid, check ABS module
172	U0404	Shift lever position signal invalid	1) check shifter control module 2) clear DTC, power up again, and if the problem persists, replace the shifter control module
173	U0401	Engine speed signal invalid	Problem with whole vehicle, engine speed signal error, check EMS module

No.	DTC	DTC description	Troubleshooting
174	U0401	Engine torque signal invalid	Problem with whole vehicle, engine torque signal error, check EMS module
175	U0415	Monitor brake signal invalid	Brake signal error, check brake system
176	U0416	Brake pressure signal invalid	Brake pressure signal error, check brake system
177	U0404	Monitor P gear demand signal invalid	Problem with whole vehicle, check electronic shifter module
178	U0100	EMS message node missing	Problem with whole vehicle, check EMS module
179	U0401	EMS message check error	Problem with whole vehicle, check EMS module
180	U0103	SBWM message node missing	Problem with whole vehicle, check electronic shifter module
181	U0404	SBWM message check error	Problem with whole vehicle, check electronic shifter module
182	U0122	ESP/ABS message node missing	Problem with whole vehicle, check ESP module
183	U0415	ESP/ABS message check error	Problem with whole vehicle, check ESP module
184	U0126	SAS message node missing	Problem with whole vehicle, check SAS module
185	U0428	SAS message check error	Problem with whole vehicle, check SAS module
186	U0114	TOD message node missing	Problem with whole vehicle, check TOD system
187	U0414	TOD message check error	Problem with whole vehicle, check TOD system
188	U1000	BCM message node error, signal missing	Problem with whole vehicle, check ABM module
189	U0422	BCM message check error	Problem with whole vehicle, check ABM module
190	P0826	Paddle signal invalid	Problem with whole vehicle, paddle signal error, check paddle unit
191	P1707	Monitor P gear pawl position (off gear error)	1) clear DTC record, test vehicle, shift off and in P gear several times to see if the fault has occurred again. 2) check the P gear lock module and replace if necessary. 3) if the error occurs again, replace electromechanical unit.

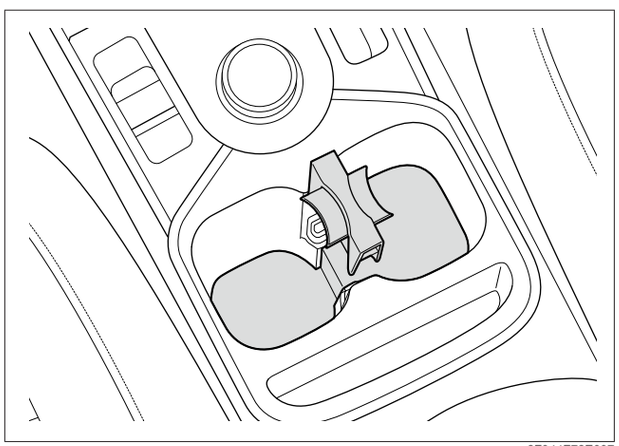
No.	DTC	DTC description	Troubleshooting
192	U0544	Parking operation assist status transition error	Problem with whole vehicle, assist parking fault, check APA module

P gear emergency unlock - method 1

⚠ Caution

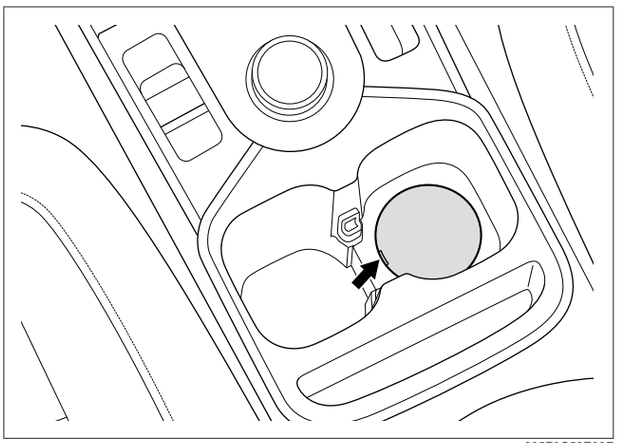
- If the transmission fails or normal operation does not change the shift lever from P to another gear, the P gear emergency unlock method can be used.
- It is forbidden to use this function if the shifter can work normally.
- It is only allowed for slow and short-distance towing of broken down vehicle.
- When the vehicle is towed, the gear must be shifted to N gear.
- When the vehicle is towed, the towing speed must not exceed 30 km/h and the towing distance must not exceed 50 km.

1. Shut down the engine and apply parking brake
2. Remove cup holder clip and cup holder pad in sequence



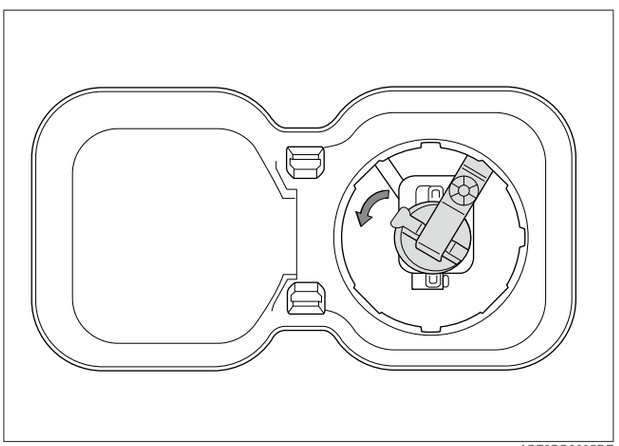
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3. Use a screwdriver to pry the cover plate off and remove it



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4. Turn the P gear unlock cable lever 60 degrees counterclockwise to make it enter into the slide slot



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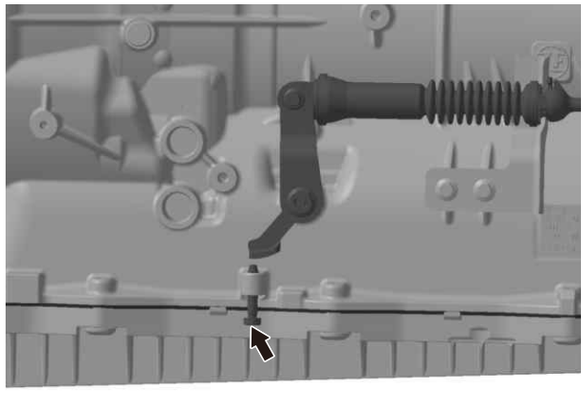
5. Lift the rope and lift the lever upwards by about 27 mm
6. While holding the cable, turn the P gear unlock cable lever approximately 60 degrees clockwise to get the puller stuck, and at this time the vehicle emits a "trickle" tone and the instrument displays "Transmission P Gear Position Fault" to indicate that the transmission is in P gear unlock status, and the transmission is in N gear status
7. Immediately after troubleshooting, please follow the reversed procedure described above to return the P gear unlock cable to its original position

P gear emergency unlock - method 2

⚠ Caution

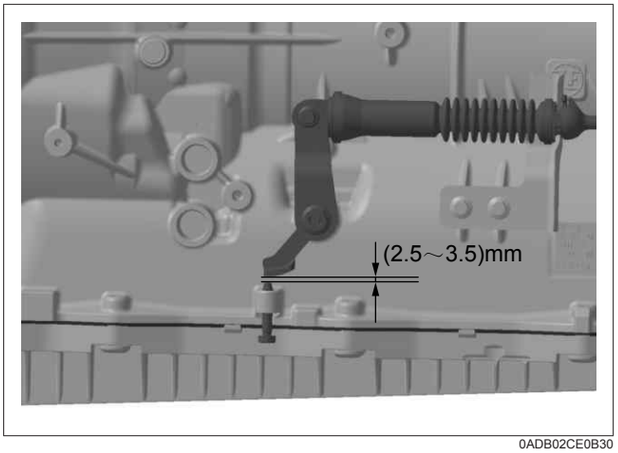
- If the transmission fails or normal operation does not change the shift lever from P to another gear, the P gear emergency unlock method can be used.
- It is forbidden to use this function if the shifter can work normally.
- It is only allowed for slow and short-distance towing of broken down vehicle.
- When the vehicle is towed, the gear must be shifted to N gear.
- When the vehicle is towed, the towing speed must not exceed 30 km/h and the towing distance must not exceed 50 km.
- The P gear emergency unlock bolt is a non-reusable part, and you should replace it after using it.

1. Shut down the engine and apply parking brake
2. Lift vehicle to proper position
3. Use the allen tool (5mm) to unscrew the P gear emergency unlock bolt on the transmission to the end, jack up the rocker arm, and the transmission P gear lock mechanism can be unlocked



A3995CFCF9D6

4. After troubleshooting, replace with the new P gear emergency unlock bolt and turn the bolt back to its original position



0ADB02CE0B30

The distance between the P gear emergency unlock bolt and the rocker arm:(2.5～3.5) mm

⚠ Caution

- The P gear emergency unlock bolt is a non-reusable part, and you should replace it after using it.

Transmission lubricant

Specifications

Item	Parameter
Lubricant capacity (L)	9.05±0.15
Lubricant type	Shell ATF L12108
	ZF-Lifeguardfluid 8

Adjustment

⚠ Caution

› For a vehicle with an oil cooling thermostat, it is necessary to ensure that the transmission oil temperature exceeds the turning on temperature of the thermostat 85℃, and after that the oil temperature can be reduced to 30℃ or below.

› Make sure that the vehicle is in horizontal position before adjusting the oil level.

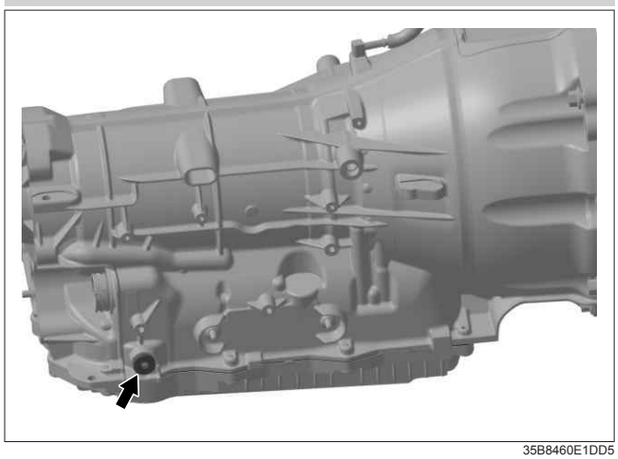
› Make sure that the oil temperature of the transmission is below 30℃ when opening oil filling bolt.

› Apply the parking brake.

› If there is no oil inside the transmission, it is necessary to top up the transmission oil before starting the engine until the oil overflows.

1. Lift vehicle to proper position
2. Check transmission oil level, first start the engine, then open oil filling bolt, and add transmission oil quickly when the engine is idling until the oil overflows, and then tighten the oil filling bolt

ℹ Notice



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› During this process, make sure that the transmission oil temperature is below 30°C, which will ensure that the transmission is full of oil and prevent air from entering.

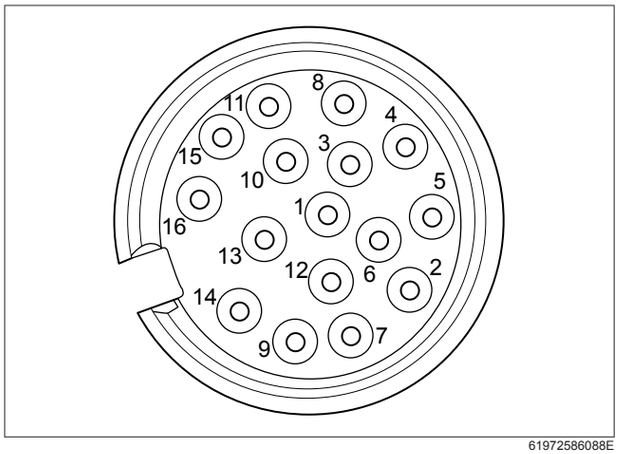
3. Fill clutch and brake with oil (output speed must be 0), shift to R gear for 5 seconds first, then D gear for 5 seconds, and shift from 1 gear to 2 gear in manual mode, holding each gear for 5 seconds, and then return to N gear
4. Fill hydraulic torque converter with oil, raise engine speed to 2000 rpm and hold for 30 seconds when in N gear, then shift to P gear to make engine in idle speed
5. When the transmission oil temperature is 35°C, open the oil filling. When the temperature rises to 40°C, tighten the oil filling bolt if oil overflows; otherwise, fill oil until the oil overflows, and let the oil temperature rise to 45°C (not to exceed 50°C in any case) and tighten the oil filling bolt

Automatic transmission assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Transmission × engine	50±5	9	—
Bolt	Starter × transmission	50±5	2	—
Bolt	Cover plate for the mounting hole of hydraulic torque converter	9±1	2	—
Bolt	Hydraulic torque converter x flexible disk of engine	55±6	6	—

Pin definition



61972586088E

Pin No.	Function
1	—
2	—
3	—
4	—
5	CAN high
6	CAN low
7	—
8	—
9	Ignition power supply
10	—
11	—
12	—
13	Positive terminal of the power supply
14	Negative terminal of the power supply
15	—
16	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transmission lubricant
4. Remove front axle propeller shaft assembly

⚠ Caution

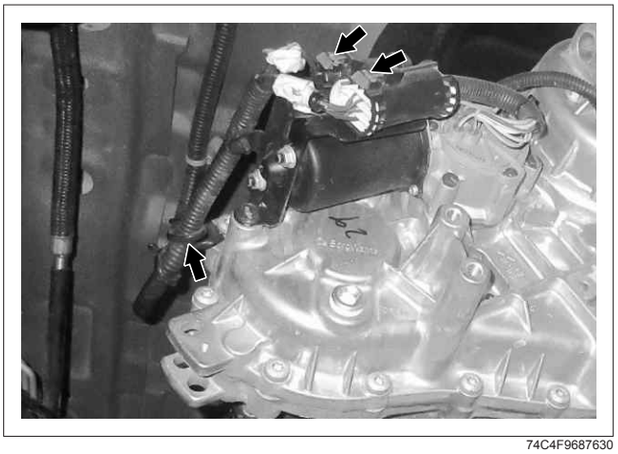
› Make assembly marks before disassembly.

5. Remove rear axle propeller shaft assembly

⚠ Caution

› Make assembly marks before disassembly.

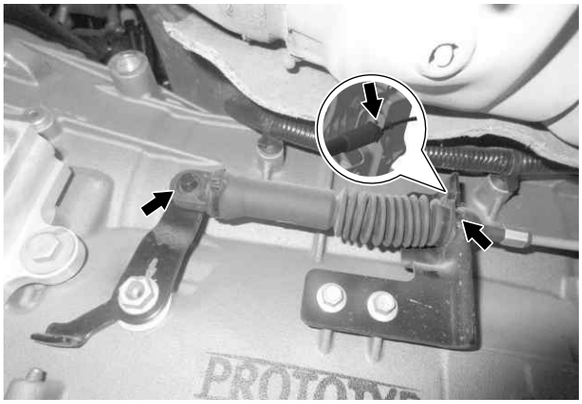
6. Disconnect harness connector of transfer case and separate harness clip



74C4F9687630

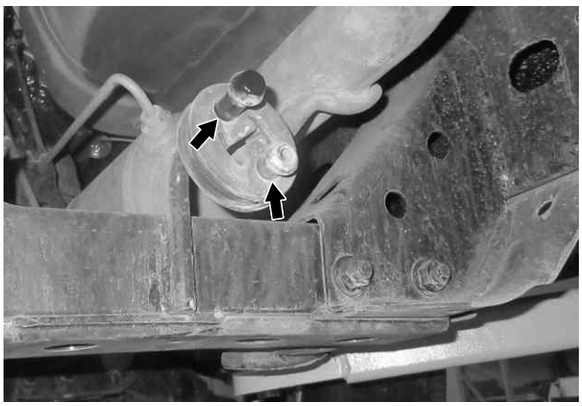
7. Disconnect transmission harness connector
8. Separate transmission harness from transmission

9. disconnect P gear unlock cable from transmission



62A1C949DD40

10. Disconnect inlet and outlet pipe assembly of oil cooler and transmission
11. Remove access opening cover for hydraulic torque converter
12. Remove 6 bolts connecting hydraulic torque converter and engine flywheel
13. Remove rubber hanger of exhaust pipe



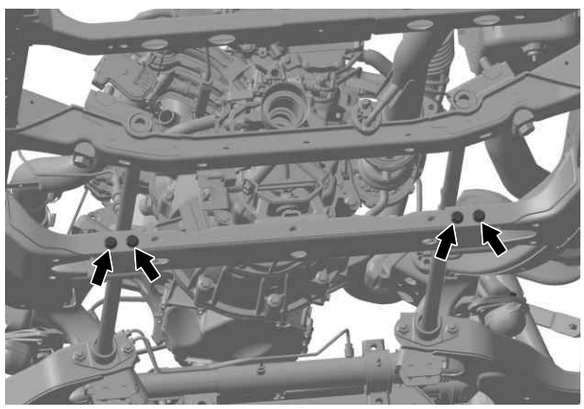
C0DF3C366622

14. Support transmission and transfer case properly
15. Disconnect transmission mount and the fourth beam subassembly of the frame



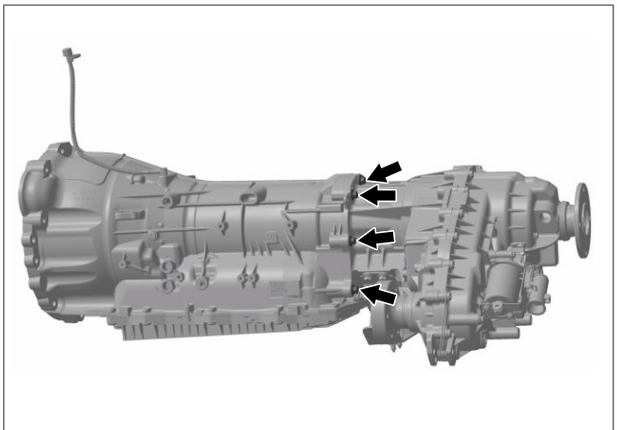
1808BABE740A

16. Remove fourth beam subassembly of the frame

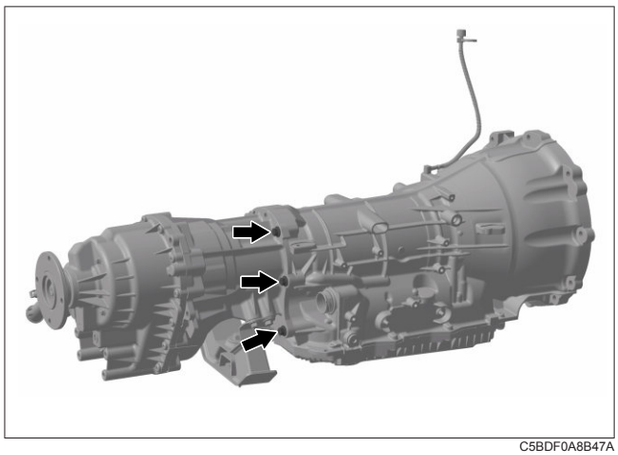


B1D115D1B7EA

17. Remove 11 bolts, and then remove transmission, transfer case and transmission mount from the engine
18. Remove 7 bolts, and then separate transmission and transfer case



EAC60555D518



C5BDF0A8B47A

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

› Add transmission lubricant, and adjust the level of transmission lubricant.

› After replacing the automatic transmission assembly, the TCU configuration word (single configuration word) must be flashed with the scanner.

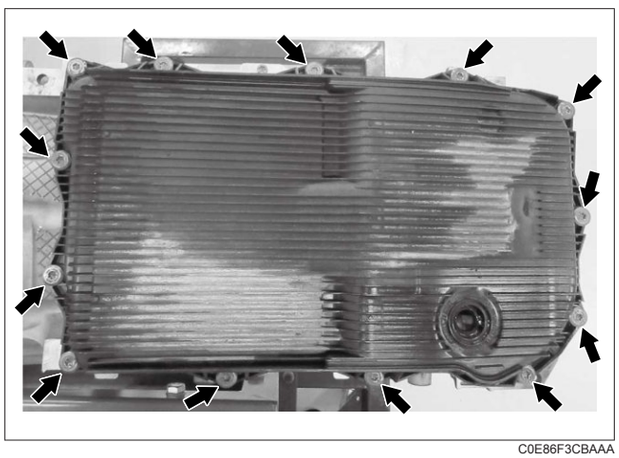
› Read and clear the DTCs of all control units, and then check if the DTCs still exist, if any, please perform troubleshooting.

Oil pan

Removal/installation

Removal

1. Lift the vehicle to a proper position
2. Empty transmission lubricant
3. Remove 13 bolts



C0E86F3CBAAA

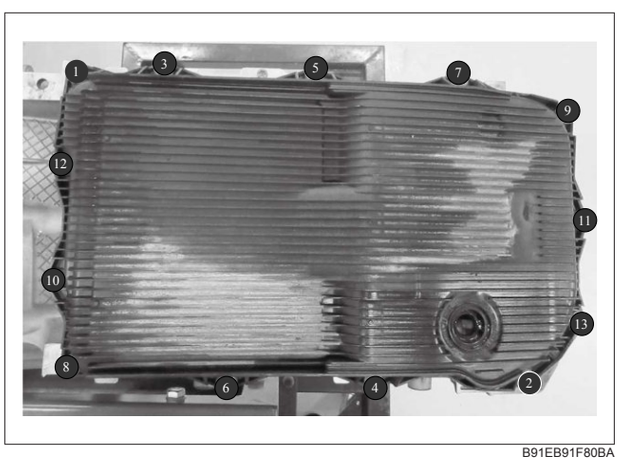
4. Remove lower oil pan

⚠ Caution

› Since the plastic oil filter is integrated in the oil pan, they should be replaced together.

Installation

1. Perform installation work in reverse order of removal



B91EB91F80BA

⚠ Caution

› Replace the plastic oil pan together because the oil filtration is integrated in it.

› If the oil pan is not replaced, the sealing surface should be clean and free of oil (you shall not use corrosive cleaner), and you shall not use the sealant.

› Tighten the fastener according to the specified torque value.

› Tighten the fastener according to the specified sequence.

› Add the transmission lubricant and adjust the transmission lubricant level.

Valve plate

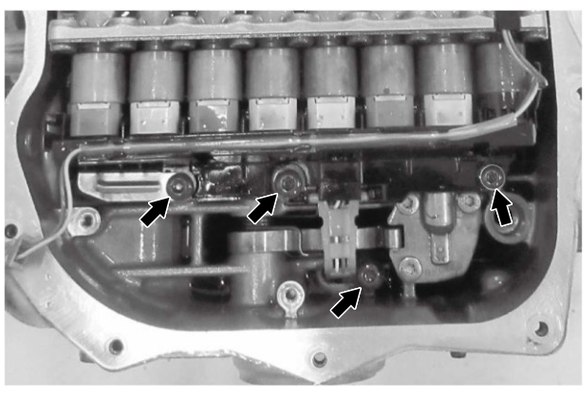
Removal/installation

Removal

⚠ Caution

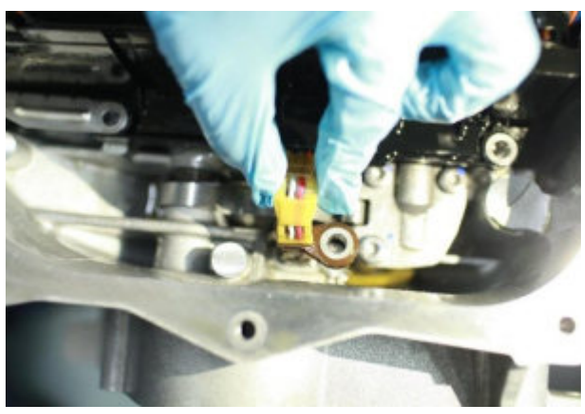
- When operating valve plate, you must take appropriate measures to prevent static electricity, including wearing anti-static shoes, clothes, etc., so as not to damage the valve plate.
- In the whole removal and installation process of valve plate, do not touch the pin for connecting the harness.

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transmission lubricant
4. Remove oil pan
5. Remove 4 bolts



0C604B464F5B

6. Separate output speed sensor



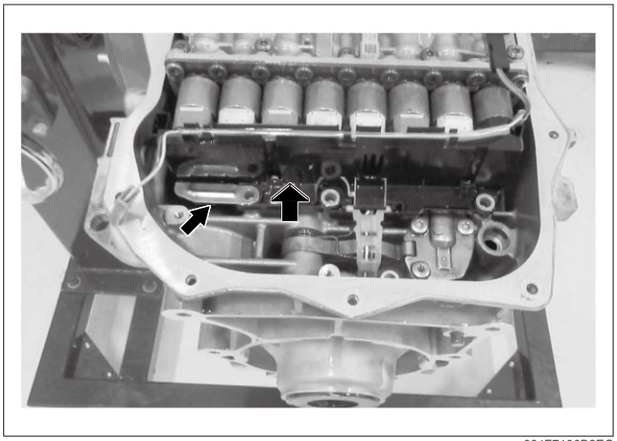
985EEC245AED

7. Insert the output speed sensor into the protective slot on the valve plate



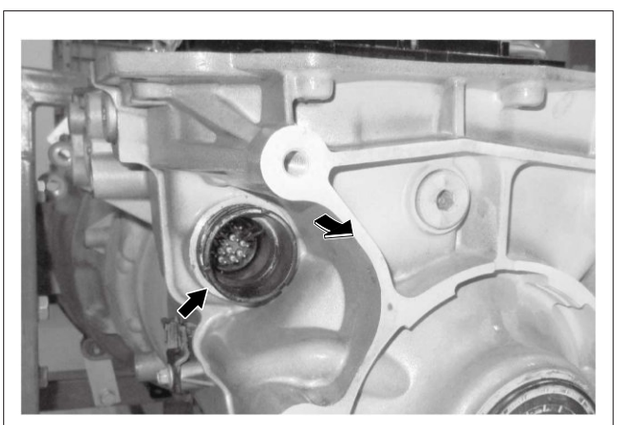
CEA37CCB6336

8. Pull upward to release the locking piece of guide sleeve



664F7106B2EC

9. Pull out the guide sleeve outward



84FF9CD4B255

⚠ Caution

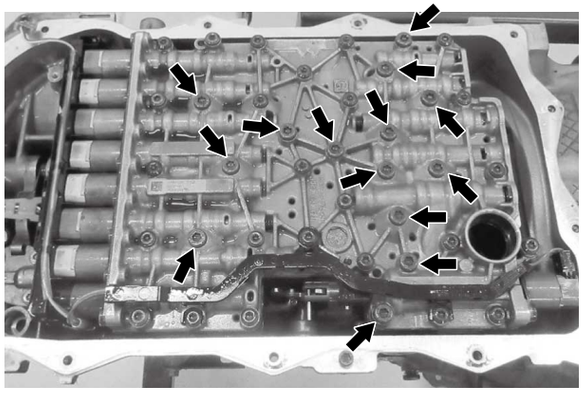
- Do not touch the pins for harness connection.
- The guide sleeve is a disposable part.

10. Use tool to lock gear selecting shaft



308D057AC80B

11. Remove 14 bolts



80B7B52B7C73

12. Remove valve plate



B7BFC3B79900

13. Remove sealing sleeve



A89D7362337D

14. Remove adapter and check O-ring



68CFCAE8AF10

⚠ Caution

› If O-ring damaged, replace with new adapter.

Installation

⚠ Caution

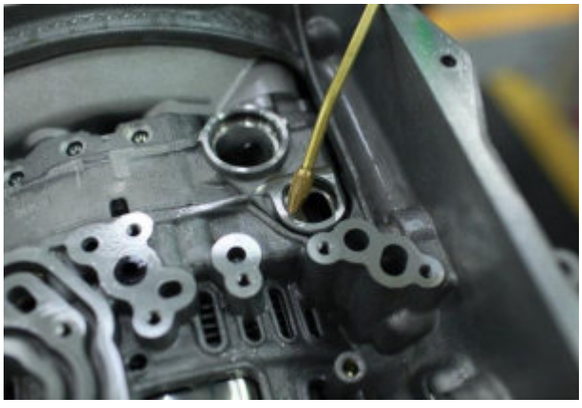
› After replacing the transmission valve plate, the TCU configuration word (single configuration word) must be flashed with the scanner.

› Read and clear the DTCs of all control units, and then check if the DTCs still exist, if any, please perform troubleshooting.

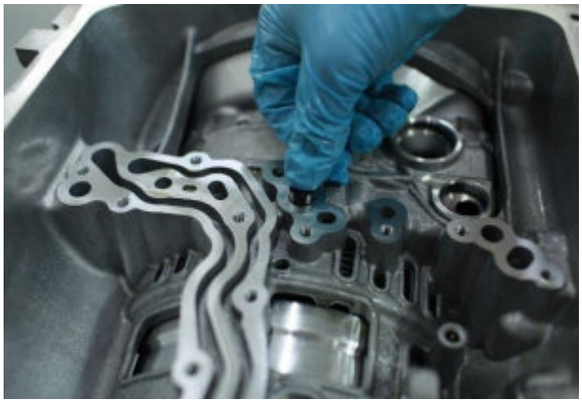
1. Install adapter and sealing sleeve



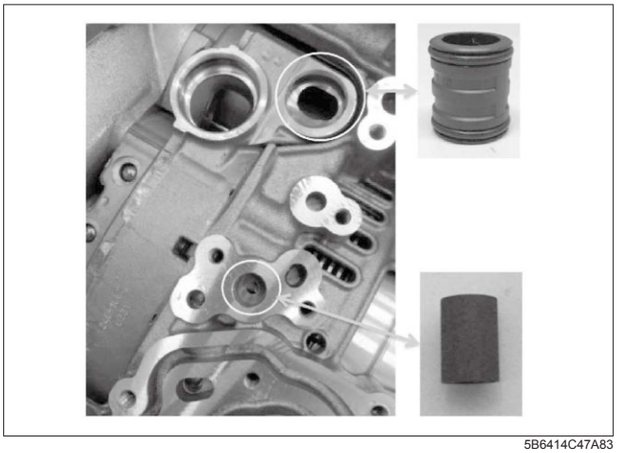
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0AECC8A6F8B2



2FCFF23C3588

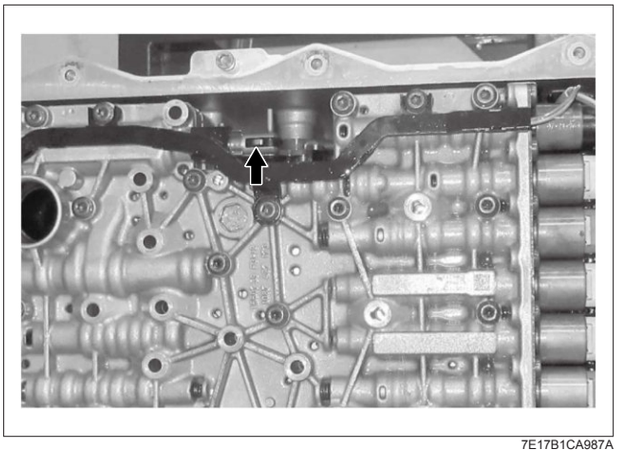


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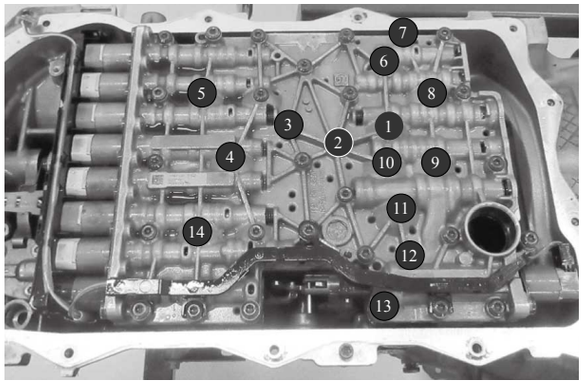
⚠ Caution

- Replace with new adapter and sealing sleeve.
- Apply some transmission lubricant to the surface of two O-rings on the adapter and the surface of transmission case connection hole, and install the adapter to the transmission case connection hole.
- Before installing the valve plate, make sure that the adapter and sealing sleeve are installed in place.

2. Use tool to fix the position of selector lever
3. Install valve plate



7E17B1CA987A



C652E9C26E17

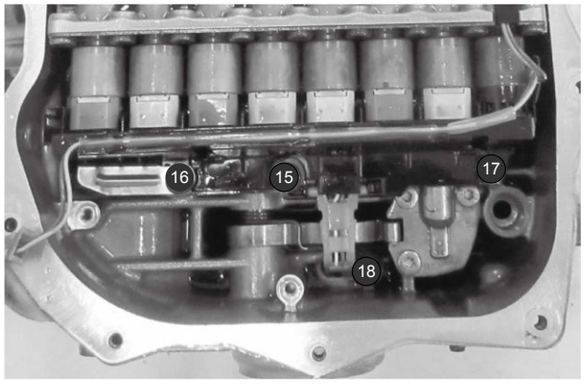
⚠ Caution

- Make sure that the selector shaft head is properly seated in the slot of the valve plate.
- Tighten fasteners as per the specified torque values.
- Tighten fastener according to the specified sequence.

4. Install guide sleeve and output speed sensor



9E5A2722EA9B



D70848E4AA85

⚠ Caution

- Before installing the guide sleeve, apply some transmission oil to the O-ring surface of the guide sleeve.
- When the guide sleeve is installed, the guide sleeve protrudes against the harness plug connector.
- Make sure that the output speed sensor is installed correctly, otherwise it may cause damage.
- Tighten fasteners as per the specified torque values.
- Tighten fastener according to the specified sequence.

5. Install oil pan
6. Add transmission lubricant and adjust the transmission lubricant level.
7. Lower the vehicle
8. Connect the negative terminal of the battery.
9. Use a diagnostic apparatus to write TCU configuration words
10. Read and clear the DTCs of all control units, and recheck whether there still are DTCs. If so, please eliminate the faults.

Output shaft seal

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Remove front axle propeller shaft assembly

⚠ Caution

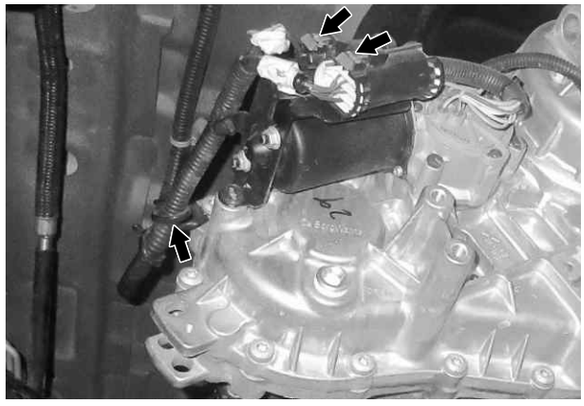
› Make assembly marks before disassembly.

4. Remove rear axle propeller shaft assembly

⚠ Caution

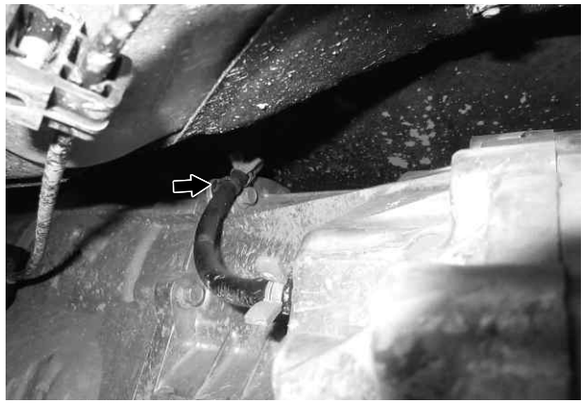
› Make assembly marks before disassembly.

5. Disconnect harness connector of transfer case and separate harness clip



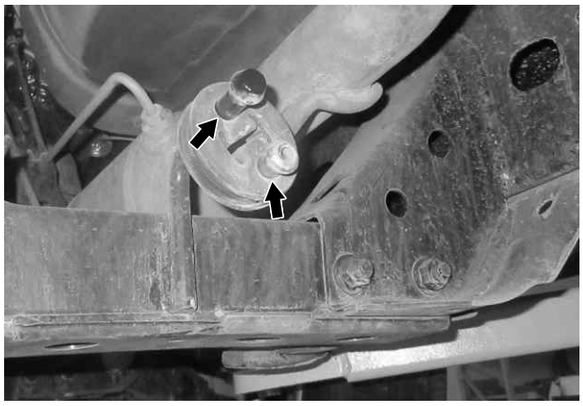
74C4F9687630

6. Separate clip for transfer case vent pipe, and disconnect vent pipe and transfer case housing



0EB4B6B116BC

7. Remove rubber hanger of exhaust pipe



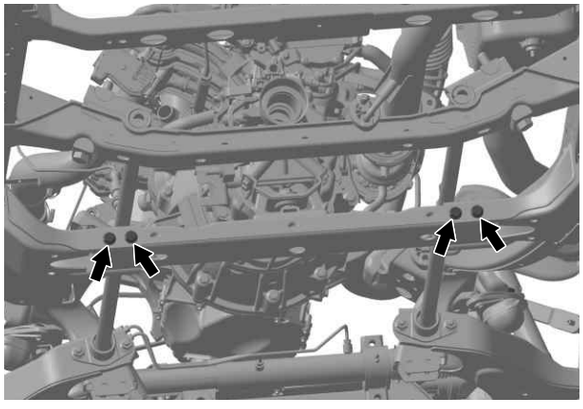
C0DF3C366622

8. Support transmission and transfer case properly
9. Disconnect transmission mount and the fourth beam subassembly of the frame



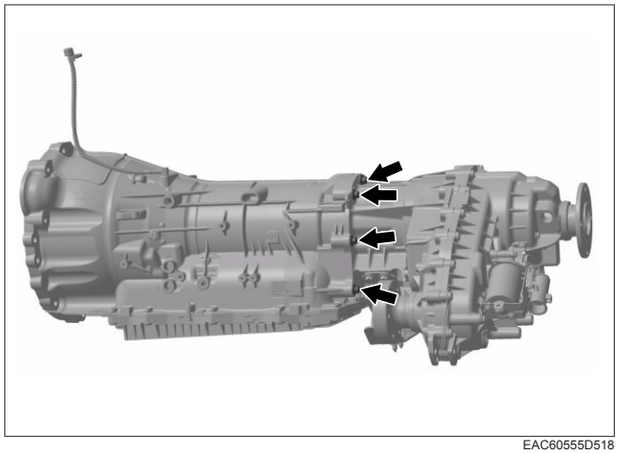
1808BABE740A

10. Remove fourth beam subassembly of the frame

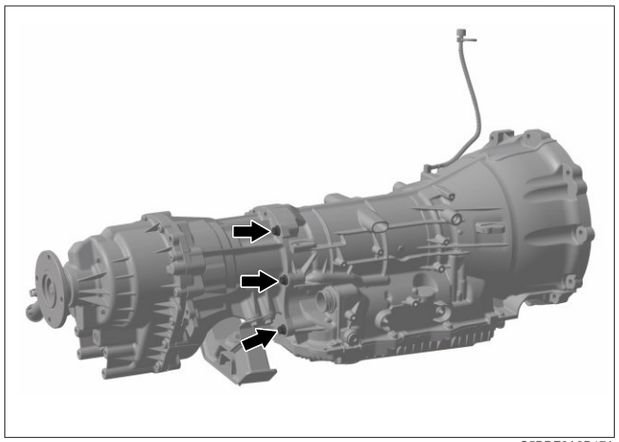


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11. Remove 7 bolts, and remove transfer case with transmission mount



EAC60555D518



C5BDF0A8B47A

12. Remove output shaft seal



A15F6932E58B

⚠ Caution

› Output shaft seal is a non-reusable part, which must be replaced after removal.

› Do not scratch other parts when removal.

Installation

⚠ Caution

› Replace with new output shaft seal.

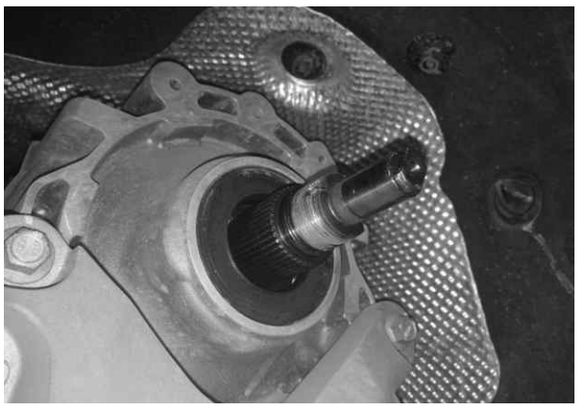
› Before installation, choose suitable tools and clean them.

› Before installation, check that work surface contacted with output shaft seal is flat.

› Keep output shaft seal flat in position.

1. Install new output shaft seal
2. Position new output shaft seal on corresponding spline shaft of transmission
3. Gently press the output shaft seal with a suitable tool to press output shaft seal in place

⚠ Caution



42DFE59FB479

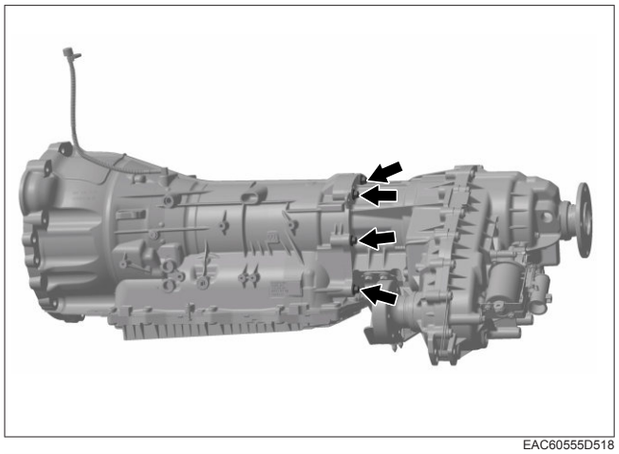
› Apply force uniformly.

4. Remove tool after output shaft seal is pressed in place

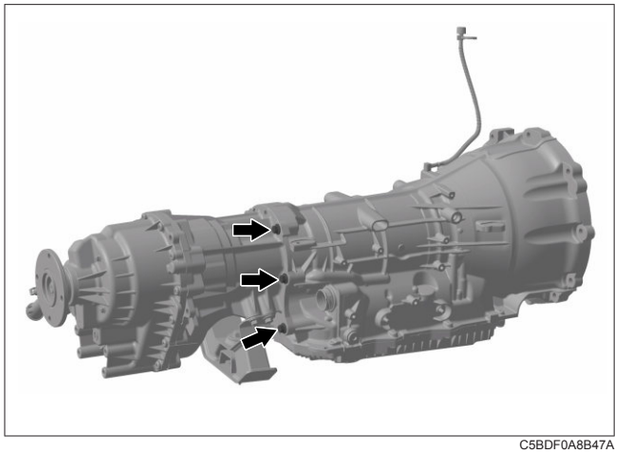
⚠ Caution

› Check that output shaft seal is pressed in place.

5. Install transfer case with transmission mount

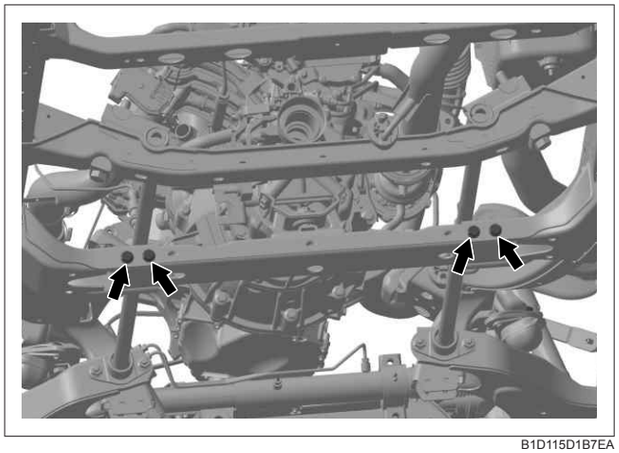


EAC60555D518



C5BDF0A8B47A

6. Install fourth beam subassembly of the frame



B1D115D1B7EA

7. Connect transmission mount and the fourth beam subassembly of the frame



1808BABE740A

8. Install rubber hanger of exhaust pipe



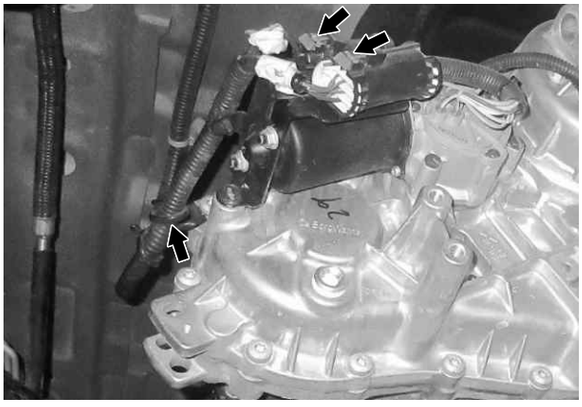
C0DF3C366622

9. Install clip for transfer case vent pipe, and connect vent pipe and transfer case housing



0EB4B6B116BC

10. Connect harness connector of transfer case and install harness clip



74C4F9687630

11. Install front axle propeller shaft assembly
12. Install rear axle propeller shaft assembly
13. Lower the vehicle
14. Connect the negative terminal of the battery.

Torque converter

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transmission lubricant
4. Remove the automatic transmission assembly.
5. Remove torque converter



53481A3E08D9

⚠ Caution

› Be careful not to damage the oil seal.

› Be careful not to drop the torque converter assembly.

› Oil pan can not be stressed.

Installation

1. Install the torque converter to the automatic gearbox



79D449996EAA

⚠ Warning

› Be careful not to pinch your fingers.

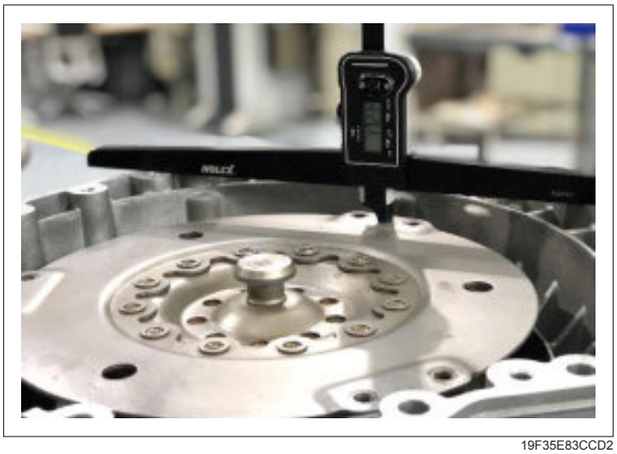
⚠ Caution

› Be careful not to damage the oil seal.

› Do not drop the torque converter assembly.

› Oil pan can not be stressed.

2. Check the mounting position of the torque converter assembly



19F35E83CCD2

Specification: A=23.6 (+0.84/-1.05) mm (from the joint surface of transmission housing engine cylinder block to the surface of torque converter bolt hole)

ℹ Notice

› If it is not in place, turn the propulsion torque converter until it is pushed into the correct position.

⚠ Caution

› Be careful not to damage the oil seal.

3. Install automatic transmission assembly
4. Add transmission lubricant and adjust the transmission lubricant level.
5. Lower the vehicle
6. Connect the negative terminal of the battery.

Input shaft seal

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transmission lubricant
4. Remove automatic transmission assembly
5. Remove hydraulic torque converter
6. Remove input shaft seal



1341B6FD5876

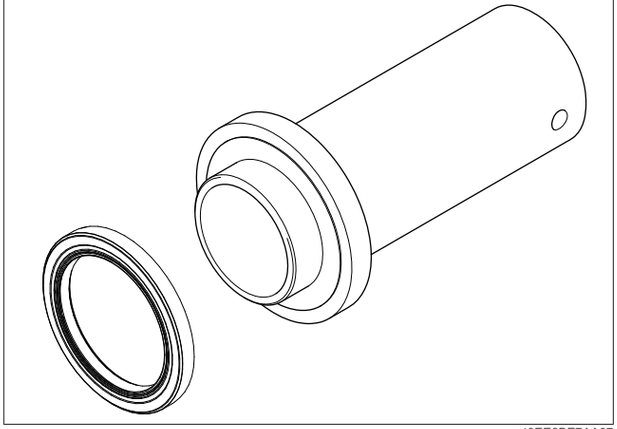
⚠ Caution

› Input shaft seal is a non-reusable part, which must be replaced after removal.

› Do not damage input shaft and drive gear of oil pump when removal.

Installation

1. Install the new oil seal on tool ZEZF068651



43EE2BE7AA87

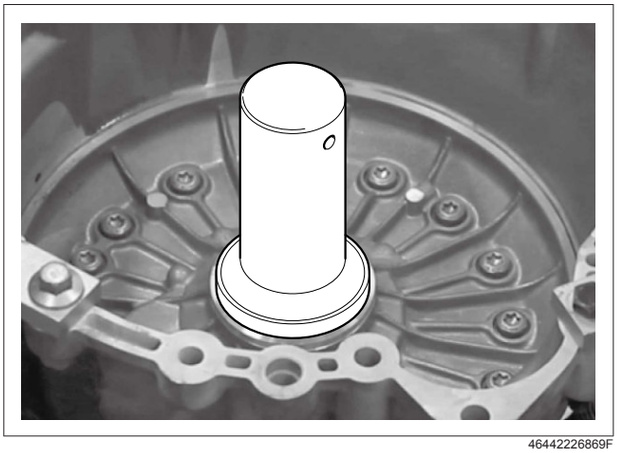
⚠ Caution

› Clean the tool ZEZF068651 before installation.

› Lay oil seal flat.

› Before installation, make sure that the working surface coming into contact with oil seal is smooth.

2. Position the tool ZEZF068651 with new oil seal to the corresponding shaft of transmission



46442226869F

3. Knock gently with mounting hammer to install the oil seal of hydraulic torque converter in place

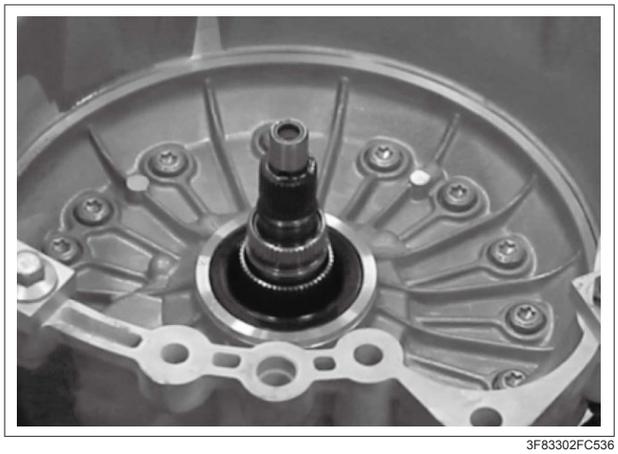
⚠ Caution

› Apply force uniformly.

⚠ Warning

› Knocking with metal hammer will damage tool ZEZF068651.

4. Remove tool ZEZF068651 after oil seal is installed in place



3F83302FC536

⚠ Caution

› Make sure that oil seal is installed in place.

Input shaft O-ring

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transmission lubricant
4. Remove automatic transmission assembly
5. Remove hydraulic torque converter
6. Remove O-ring of input shaft



A18F802616AB

⚠ Caution

› O-ring is a non-reusable part, which must be replaced after removal.

› Do not damage input shaft and drive gear of oil pump when removal.

Installation

1. Perform installation work in reverse order of removal

Selector shaft seal

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transmission lubricant
4. Remove oil pan
5. Separate output speed sensor
6. Remove guide sleeve
7. Remove valve plate
8. Remove locking pin with a punch tool



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9. Remove selector rod



6F16B2F85DFE

10. Remove selector shaft seal



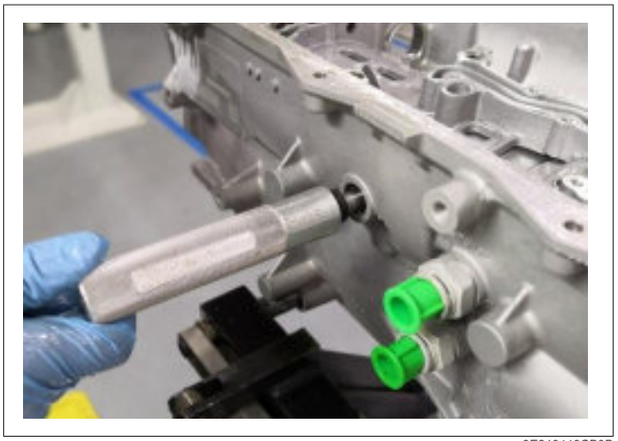
D9C79BC89CF7

⚠ Caution

Selector shaft seals are disposable parts.

Installation

1. Install new selector shaft seal



8E219449CB3B

2. Install new selector rod



B6BD47A9CE42

3. Install new locking pin



5D67187697D7

⚠ Caution

› When installing locking pin, pay attention to installation direction with small end of the locking pin facing down.

4. Install fixing tool for selector rod fix the position of selector rod



1D80F87A39B8



2980F101180D

5. Install valve plate assembly
6. Install guide sleeve
7. Install output speed sensor
8. Install oil pan
9. Add transmission lubricant and adjust the transmission lubricant level.
10. Lower the vehicle
11. Connect the negative terminal of the battery.

Unlocking cable of P gear

Specified Torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	P gear unlock cable bracket × floor	9±3	2	—
Nut	P gear unlock cable cover plate × floor	9±3	2	—
Bolt	Gear shift cable bracket x transmission	9±3	2	—
Nut	Shift rocker arm × transmission installation	9±3	1	—

Removal/Installation of

Removal

1. Apply the electronic parking and engage the P gear.
2. Disconnect the negative terminal of the battery.
3. Remove upper part of gear shift lever



61B008865104

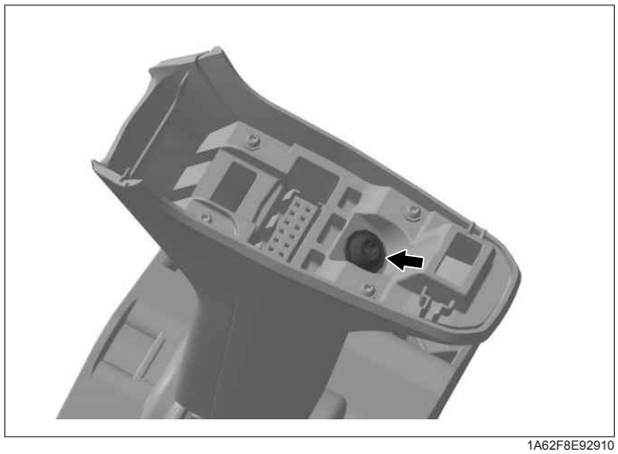
⚠ Caution

› In removing upper component of gear shift lever, support upper component of gear shift lever with two hands and pull it out in vertical direction (about 95 N pulling force).

› Prying out or pulling out in inclined direction using other tool is forbidden, otherwise damage to the component will be caused.

› Do not disassemble upper component of gear shift lever, otherwise the component will be damaged.

4. Remove 1 gear shift lever mounting bolt



1A62F8E92910

5. Remove lower part of gear shift lever

⚠ Caution

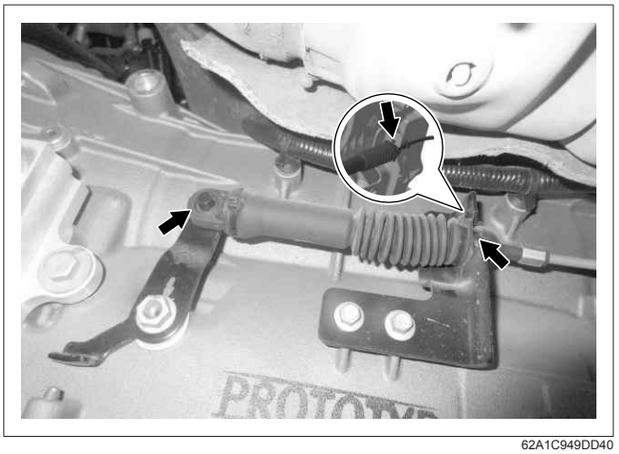
› Do not disassemble lower component of gear shift lever, otherwise the component will be damaged.

6. Open the auxiliary instrument panel elbow pillow assembly
7. Remove the console panel assembly of the auxiliary instrument panel
8. Disconnect console panel connector of the auxiliary instrument panel
9. Separate 1 dog, and disconnect the unlocking cable of P gear and the parking brake harness bracket.



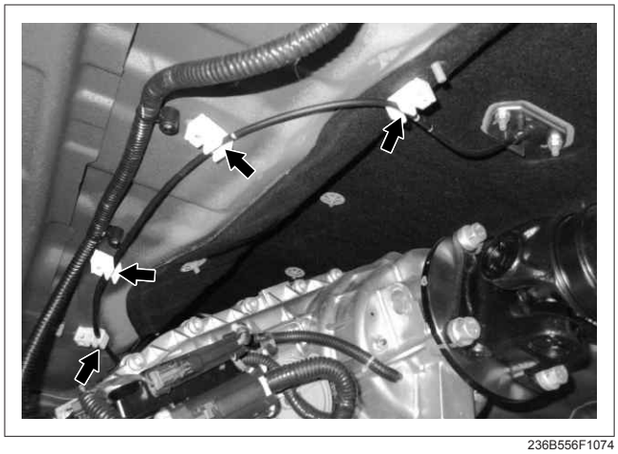
C5A340A96ADA

10. Lift vehicle to a proper position
11. disconnect P gear unlock cable from transmission



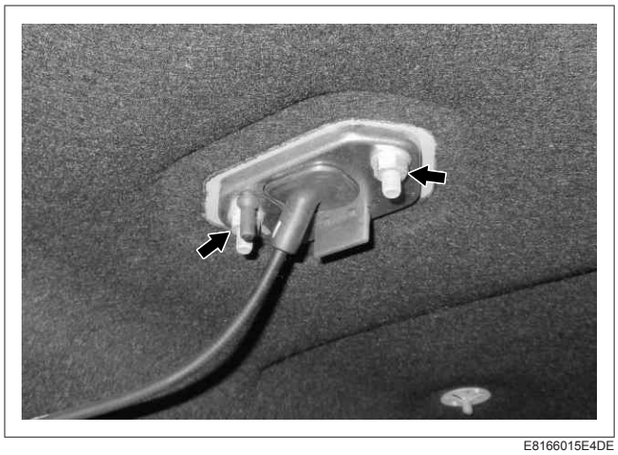
62A1C949DD40

12. Separate 4 double-hole pipe clamps, disconnect P gear unlock cable from floor



236B556F1074

13. Remove 2 nuts, disconnect P gear unlock cable cover plate from floor



E8166015E4DE

14. Remove P gear unlock cable

Installation

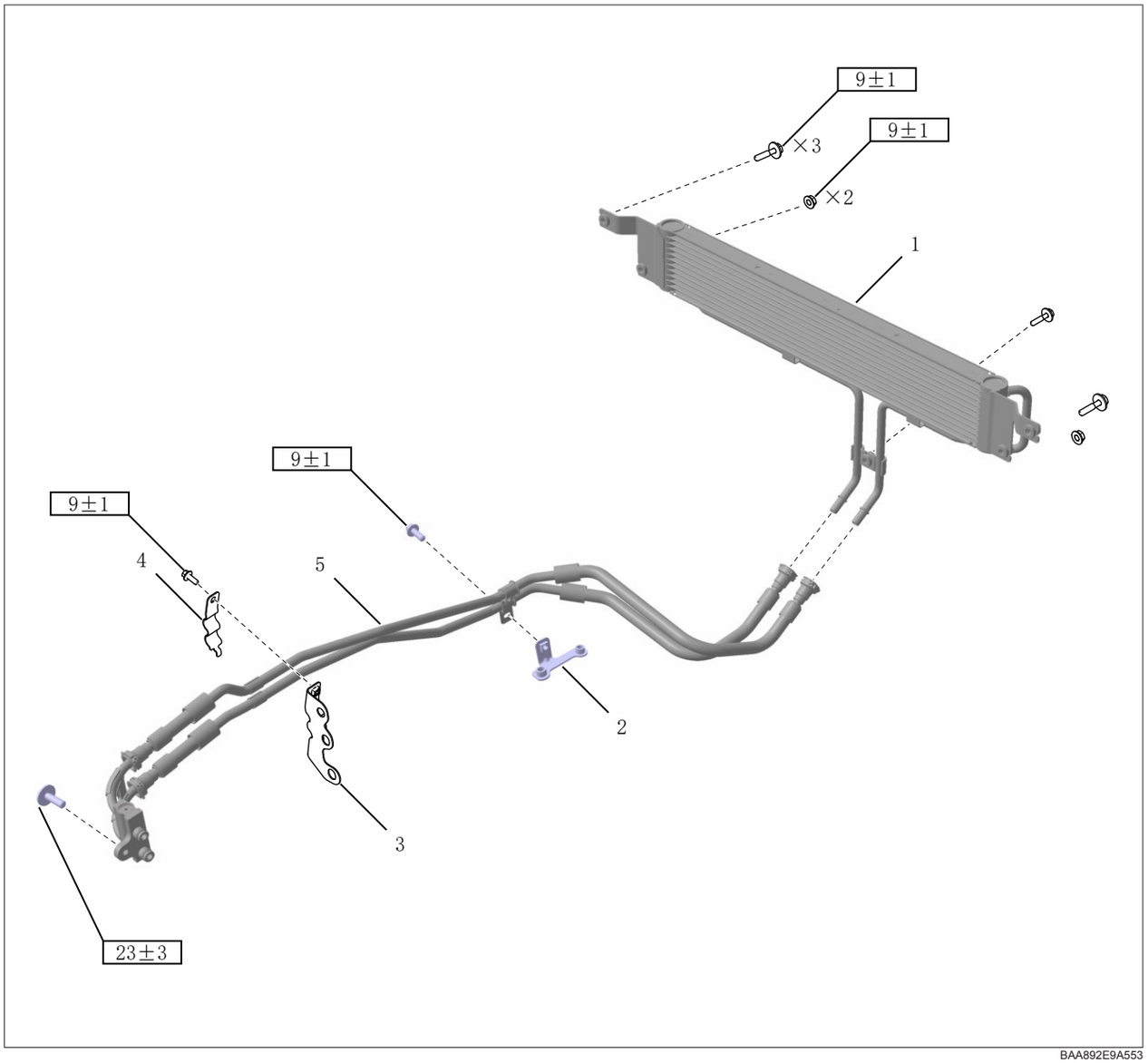
1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Transmission oil cooler assembly

Structural diagram



BAA892E9A553

1. Transmission oil cooler assembly
2. Engine oil cooler pipe bracket assembly
3. Engine oil cooler pipe bracket assembly
4. Engine oil cooler pipe bracket assembly
5. Engine oil cooler inlet and outlet pipe assembly

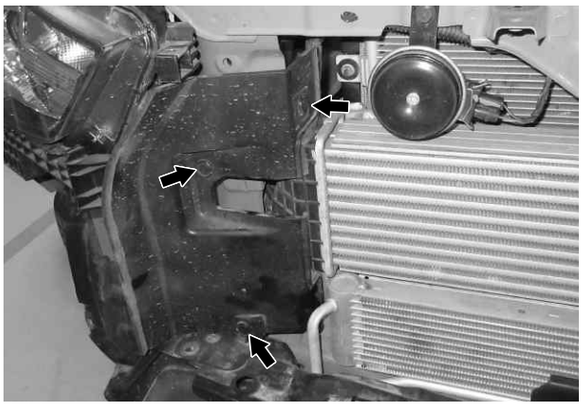
Specified Torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Engine oil cooler assembly × vehicle body	9±1	3	—
Nut		9±1	2	—
Bolt	Engine oil cooler pipe bracket assembly x oil cooler pipe bracket assembly	9±1	1	—
Bolt	Engine oil cooler pipe bracket assembly x oil cooler inlet and outlet pipe assembly	9±1	1	—
Bolt	Engine oil cooler inlet and outlet pipe assembly × transmission	23±3	1	—

Removal/installation

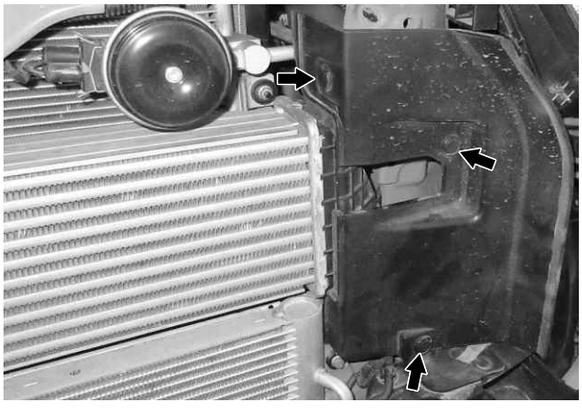
Removal

1. Disconnect the negative terminal of the battery.
2. Drain the transmission lubricant
3. Remove engine compartment side seal strip
4. Remove engine compartment front cover plate assembly
5. Remove front bumper
6. Remove the left radiator deflector



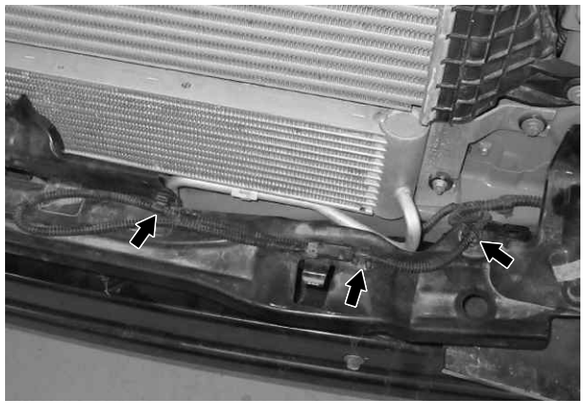
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7. Remove the right radiator deflector



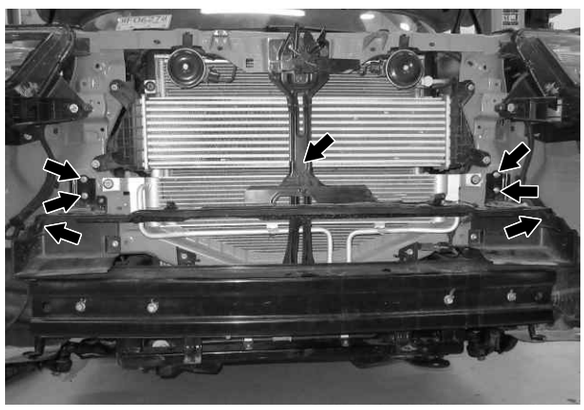
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8. Separate harness clip from front bumper center support plate



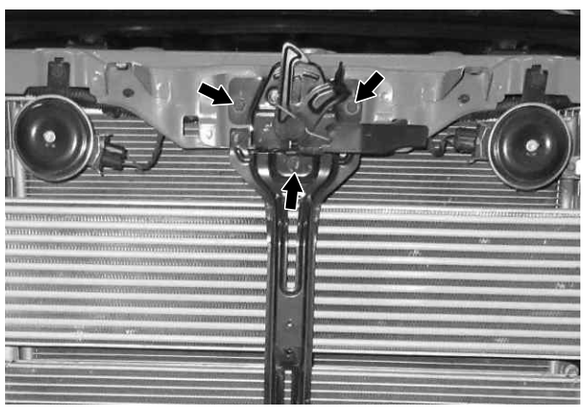
A85D9B8827F0

9. Remove front bumper center support plate assembly



20FE4AD14D05

10. Separate engine hood lock from radiator frame assembly



6ABEB1B1B10A

11. Remove engine hood lock mounting bracket



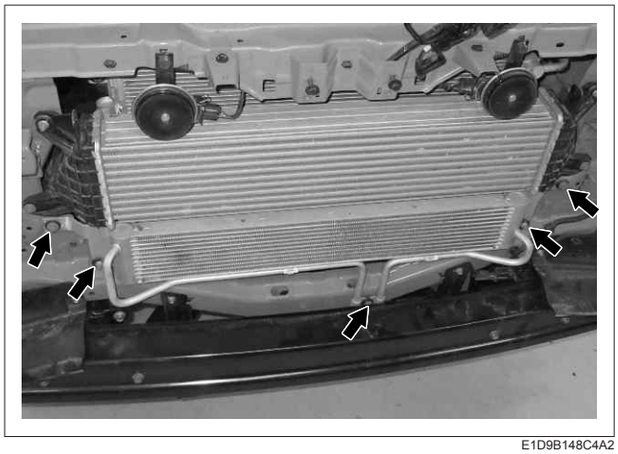
A9447560F64D

12. Lift vehicle to proper position
13. Remove engine lower guard
14. Disconnect oil cooler inlet and outlet oil pipes and transmission oil cooler



ABA3BE8ABD64

15. Remove 2 nuts and 3 bolts



E1D9B148C4A2

16. Remove transmission oil cooler assembly

Installation

1. Perform installation work in reverse order of removal

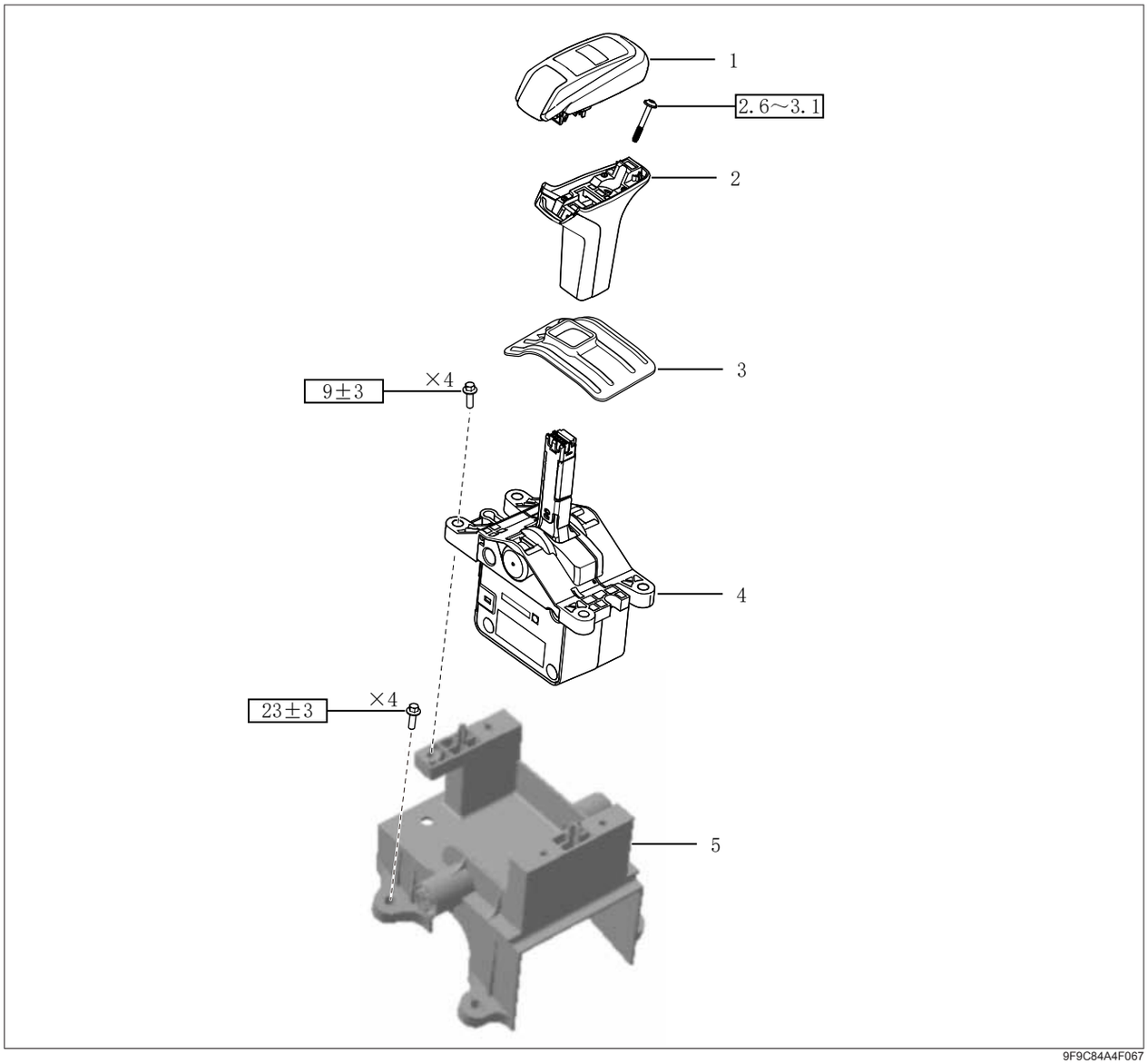
⚠ Caution

› Tighten the fastener according to the specified torque value.

› Fill transmission with lubricant and adjust the transmission lubricant level after installation.

Shifter assembly

Structural diagram



9F9C84A4F067

1. Upper part of gear shift lever
2. Lower part of gear shift lever
3. Shifter dust boot
4. Shifter body
5. shifter bracket

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Gear shift lever mounting bolt	Lower part of gear shift lever x shifter body	2.6~3.1	1	—
Bolt	Shifter x shifter bracket	9±3	4	—
Bolt	Shifter bracket x floor	23±3	4	—

DTC checklist

Serial No.	DTC	Problem description
1	P17E044	Circular memory detection failure
2	P17E145	Circular read-only storage detection failure
3	P17E448	Failure detection in the program flow control
4	P17E548	Function detection
5	P17E646	Category division code failure
6	P17E749	Lighting voltage is on
7	P17E849	Lighting voltage is off
8	P17E949	LED "P" is on
9	P17EA49	LED "P" is off
10	P17EB49	LED "R" is on
11	P17EC49	LED "R" is off
12	P17ED49	LED "N" is on
13	P17EE49	LED "N" is off
14	P17EF49	LED "D" is on
15	P17F049	LED "D" is off
16	P17F149	Hall sensor failure detection (a sensor failure) (note: there are two sensors per position)
17	P17F249	Hall sensor failure detection (2 sensor failures) (note: there are two sensors per position)
18	P17F349	Unlock button ground short circuited
19	P17F449	Unlock button power supply voltage short or open circuited
20	P17F507	Unlock button always pressed
21	P17F649	P key ground short circuited
22	P17F749	P key power supply voltage short or open circuited
23	P17F807	P key always pressed
24	P17F808	TCU count error
25	P17F809	TCU check sum error
26	U110017	Communication voltage too high
27	U110116	Communication voltage too low
28	U000188	Bus off
29	U010187	Lose communication
30	U014687	Communication with GW lost
31	P17F964	ADC self-test failure
32	P17F947	Watchdog self-test failure

DTC troubleshooting method

P17E044, P17E145, P17E448, P17E548, P17E749, P17E849, P17F964, P17F947

Possible causes:

› Microcontroller internal error.

Troubleshooting:
1. Replace the shifter.

P17E646

Possible causes:

› Shifter not coded.

› Shifter code error.

Troubleshooting:
1. Code correct.

P17E949, P17EA49, P17EB49, P17EC49, P17ED49, P17EE49, P17EF49, P17F049, P17F349, P17F449, P17F507, P17F649, P17F749, P17F807

Possible causes:

› The shifter handball malfunctions or the shifter body malfunctions.

Troubleshooting:
1. Replace the handball of the shifter or the shifter body.

P17F149

Possible causes:

› Mechanical abuse.

› Dust problem.

› The internal fault of the shifter microcontroller.

Troubleshooting:
1. Stop the abuse.
2. Clean the dust.
3. Replace the shifter.

P17F249

Possible causes:

› More mechanical abuse.

› Dust problem.

› The internal fault of the shifter microcontroller.

Troubleshooting:
1. Stop the abuse.
2. Clean the dust.
3. Replace the shifter.

P17F808, P17F809, U010187

Possible causes:

› Failed to properly receive the corresponding transmission signal.

Troubleshooting:
1. Check the electronic control unit of the transmission.
2. Check the entire CAN network.
3. Replace the shifter.

U110017

Possible causes:

› On-board power source overvoltage.

Troubleshooting:
1. Check the on-board power source, etc..
2. Replace the shifter.

U110116

Possible causes:

› Low voltage of on-board power source.

Troubleshooting:
1. Check the on-board power source, etc..
2. Replace the shifter.

U000188

Possible causes:

› There is an electrical problem with the vehicle's CAN network or there is an electrical problem with the CAN interface of the shifter.

Troubleshooting:
1. Check the electronic control unit of the transmission.
2. Check the entire CAN network.
3. Replace the shifter.

U014687

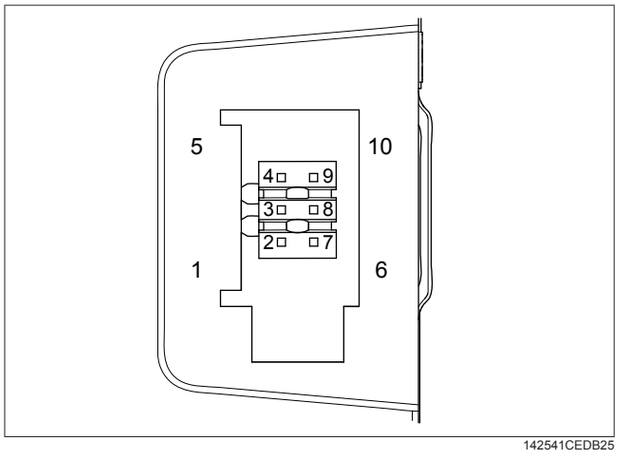
Possible causes:

› Failed to properly receive the corresponding gateway signal or vehicle body control unit signal.

Troubleshooting:
1. Check the electronic control unit concerned.
2. Check the entire CAN network.
3. Replace the shifter.

Pin definition

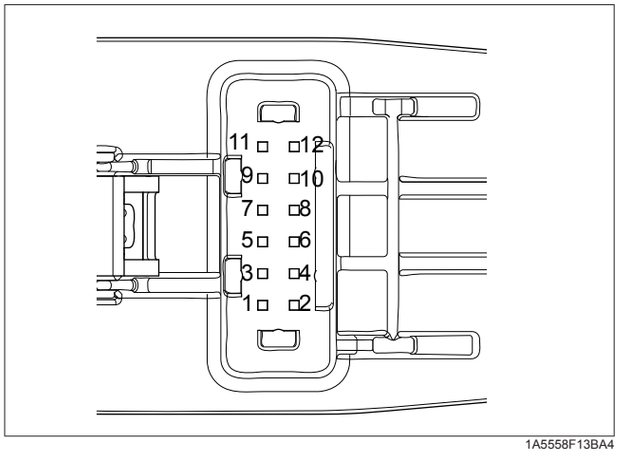
Shifter body



142541CEDB25

Pin No.	Function
1	—
2	Reserved
3	Ground
4	CAN high
5	—
6	—
7	Battery power supply
8	Ignition power supply
9	CAN low
10	—

Upper parts of gear shift lever



1A5558F13BA4

Pin No.	Function
1	Ground
2	Key signal 2 of position P
3	LED indicator of position R
4	LED indicator of position N
5	LED indicator of position D/M
6	LED indicator of position P
7	Ground
8	Background LED indicator
9	Signal for distinguishing left/right-hand drive
10	Key signal of unlock key
11	Key signal 1 of position P
12	Ground

Removal/Installation of

Removal

⚠ Warning

› You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply the electronic parking and engage the P gear.
2. Disconnect the negative terminal of the battery.
3. Remove upper part of gear shift lever



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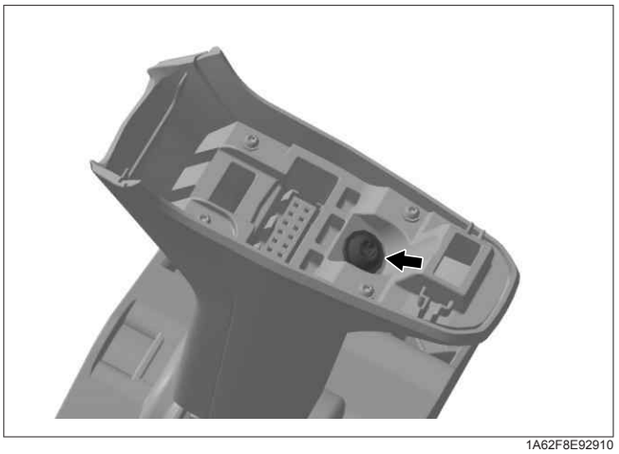
⚠ Caution

› In removing upper component of gear shift lever, support upper component of gear shift lever with two hands and pull it out in vertical direction (about 95 N pulling force).

› Prying out or pulling out in inclined direction using other tool is forbidden, otherwise damage to the component will be caused.

› Do not disassemble upper component of gear shift lever, otherwise the component will be damaged.

4. Remove 1 gear shift lever mounting bolt



1A62F8E92910

5. Remove lower part of gear shift lever

⚠ Caution

› Do not disassemble lower component of gear shift lever, otherwise the component will be damaged.

6. Open the auxiliary instrument panel elbow pillow assembly
7. Remove the console panel assembly of the auxiliary instrument panel
8. Disconnect the harness connector of the console panel of the auxiliary instrument panel
9. Remove shifter dust boot



9453D84672BA

10. Remove 4 bolts



DFBB37C229EA

11. Disconnect shifter connector



73B9322CFE07

12. Remove shifter body

⚠ Caution

› Do not disassemble gear shifter body; otherwise the component will be damaged.

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Before installing upper component of gear shift lever, check parts and components for breakage and pin deflection and iron clip falling off, and repair or replace the parts and components as appropriate.

› In installing upper component of gear shift lever, ensure alignment of upper and lower components of gear shift lever, and then press on the middle of the upper component of gear shift lever and press it in vertical direction (about 100 N mounting force) until clap is heard, and installation of upper component of gear shift lever is completed.

› Tighten the fastener according to the specified torque value.

› After replacing the shifter assembly, the configuration words must be flashed using the scanner.

Paddle shifter assembly

Removal/installation

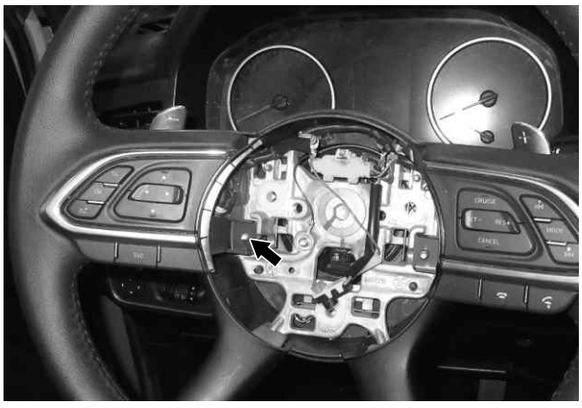
Removal

1. Open the door on driver's side
2. Disconnect the negative terminal of the battery.

⚠ Caution

› Wait 90 seconds before continuing.

3. Remove driver airbag assembly
4. Remove 1 screw



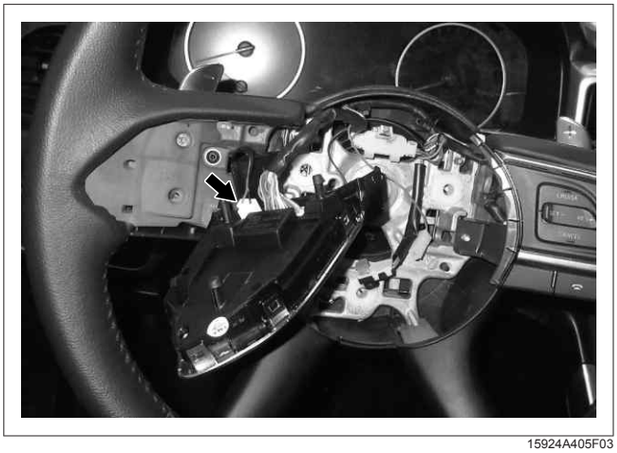
40784CC5CAD4

5. Separate 3 clamping holders



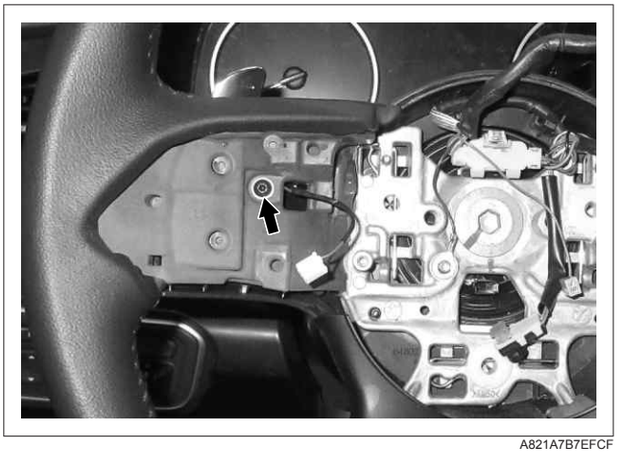
AF7C0F7914C6

6. Separate multifunction switch assembly on steering wheel
7. Disconnect paddle shifter connector



15924A405F03

8. Remove 1 screw



A821A7B7EFCF

9. Separate 4 dogs



FF10049D9A0F

10. Remove paddle shifter assembly

ℹ Notice

› Remove paddle shifter on the other side in the same way.

Installation

1. Perform installation work in reverse order of removal

Transfer case (47-80)

Transfer case system (6MT).....17－1
System description .....17－1
System diagram.....17－2
location diagram .....17－3
Specified torque.....17－4
DTC checklist.....17－5
DTC troubleshooting method.....17－6
Transfer case system (8AT).....17－22
System description .....17－22
System diagram.....17－23
location diagram .....17－24
Specified torque.....17－25
DTC checklist.....17－26
DTC troubleshooting method.....17－27
Transfer case lubricant .....17－42
Specifications.....17－42
check .....17－43
replacement .....17－44
Transfer case assembly (6MT).....17－45
Specified torque.....17－45
Removal/installation.....17－46
Transfer case assembly (8AT).....17－47
Specified torque.....17－47
Removal/installation.....17－48
Shift motor assembly.....17－50
Removal/installation.....17－50
Front flange plate assembly (including the front flange and the dust boot). 17－51
Removal/installation.....17－51
Rear flange plate assembly (including the rear flange and the dust boot) .. 17－52
Removal/installation.....17－52
Front output oil seal .....17－53
Removal/installation.....17－53
Rear output oil seal .....17－55
Removal/installation.....17－55
Spacing sleeve .....17－57
Removal/installation.....17－57
Rotor/armature (6MT).....17－60
Removal/installation.....17－60
Rotor/armature (8AT).....17－63
Removal/installation.....17－63

Electronic control unit of transfer case - without all terrain .....17－67
Specified torque .....17－67
Pin definition .....17－68
Removal/installation .....17－69
Electronic control unit of transfer case - with all terrain .....17－70
Specified torque .....17－70
Pin definition .....17－71
Removal/installation .....17－72
Drive mode switch assembly (6MT) .....17－73
Location diagram .....17－73
Pin definition .....17－74
Removal/installation .....17－74

Transfer case system (6MT)

System description

The 47-80 two-speed TOD transfer case is a 4WD transfer case of intelligent torque-managed type. Power can be transmitted to front drive shaft through a high-precision silent chain. Functions of deceleration and torque increase can be realized due to a set of planetary gear mechanism. The planetary gear pair and the rear output shaft components of the transfer case are actively lubricated by an oil bath and oil pump.

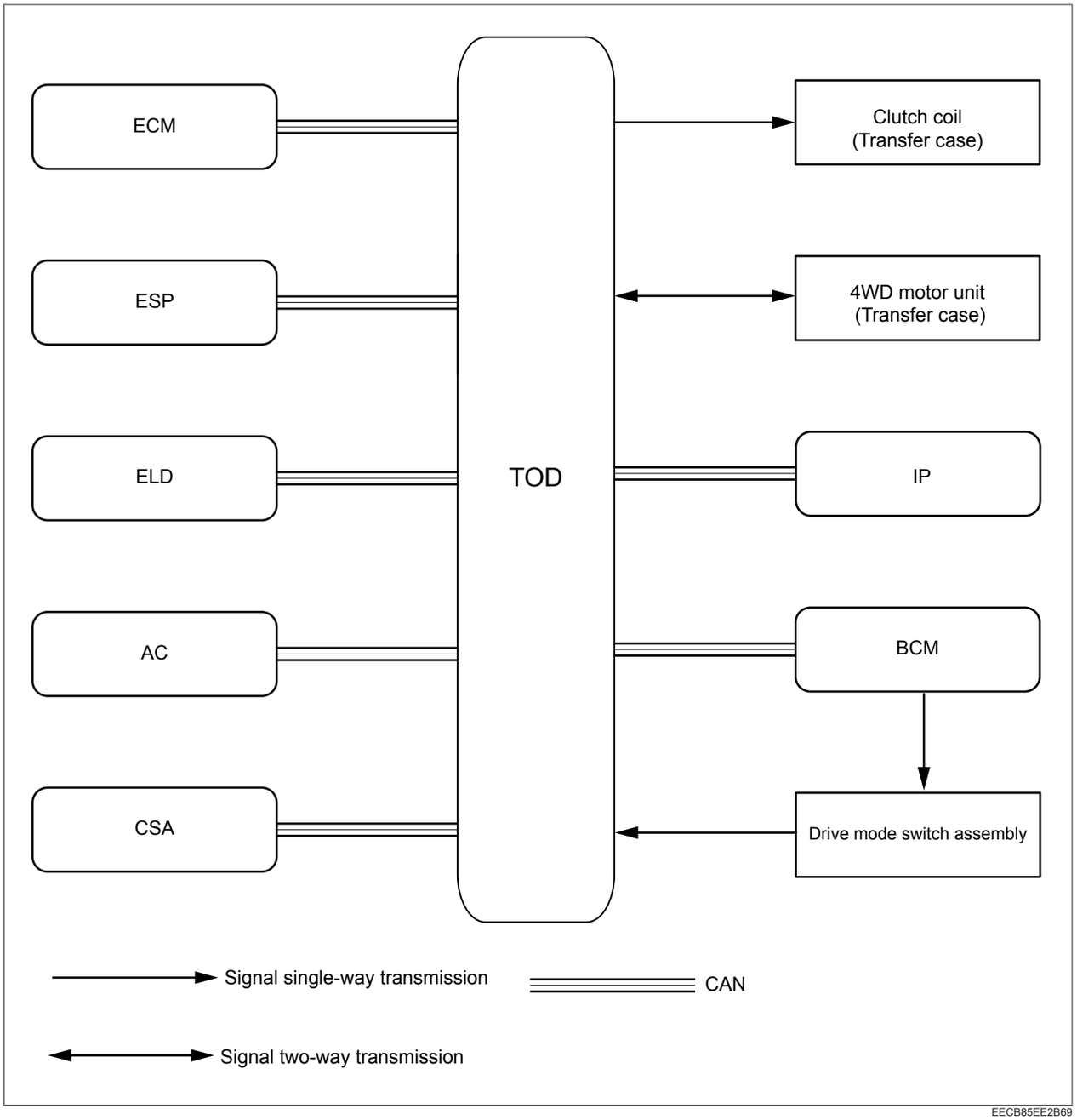
This transfer case is usually provided with three gears of 2H, Auto and 4L Lock gears, and some even with 4H Lock gear.

- 2H - 2WD high gear. Power is directly transmitted to rear axle through the transfer case only for rear-wheel drive. The transmission ratio of transfer case is 1: 1.
- Auto (AWD) - Intelligent 4WD gear. The transmission ratio of transfer case is 1: 1. With intelligent torque management involved, the transfer case transmits some of the power (depending on the judgment of operating conditions) to the front axle through friction components.
- 4H Lock - High gear lock. The transmission ratio of transfer case is 1: 1. The transfer case strengthens active loading of friction components within a certain range of vehicle speed and steering angle to simulate a rigid 4WD state.
- 4L Lock - Low gear lock. The transmission ratio of transfer case is 2.48: 1. Similar to 4H Lock, active loading is usually more aggressive.

The logic of intelligent torque management is implemented through software integrated in electronic control unit.

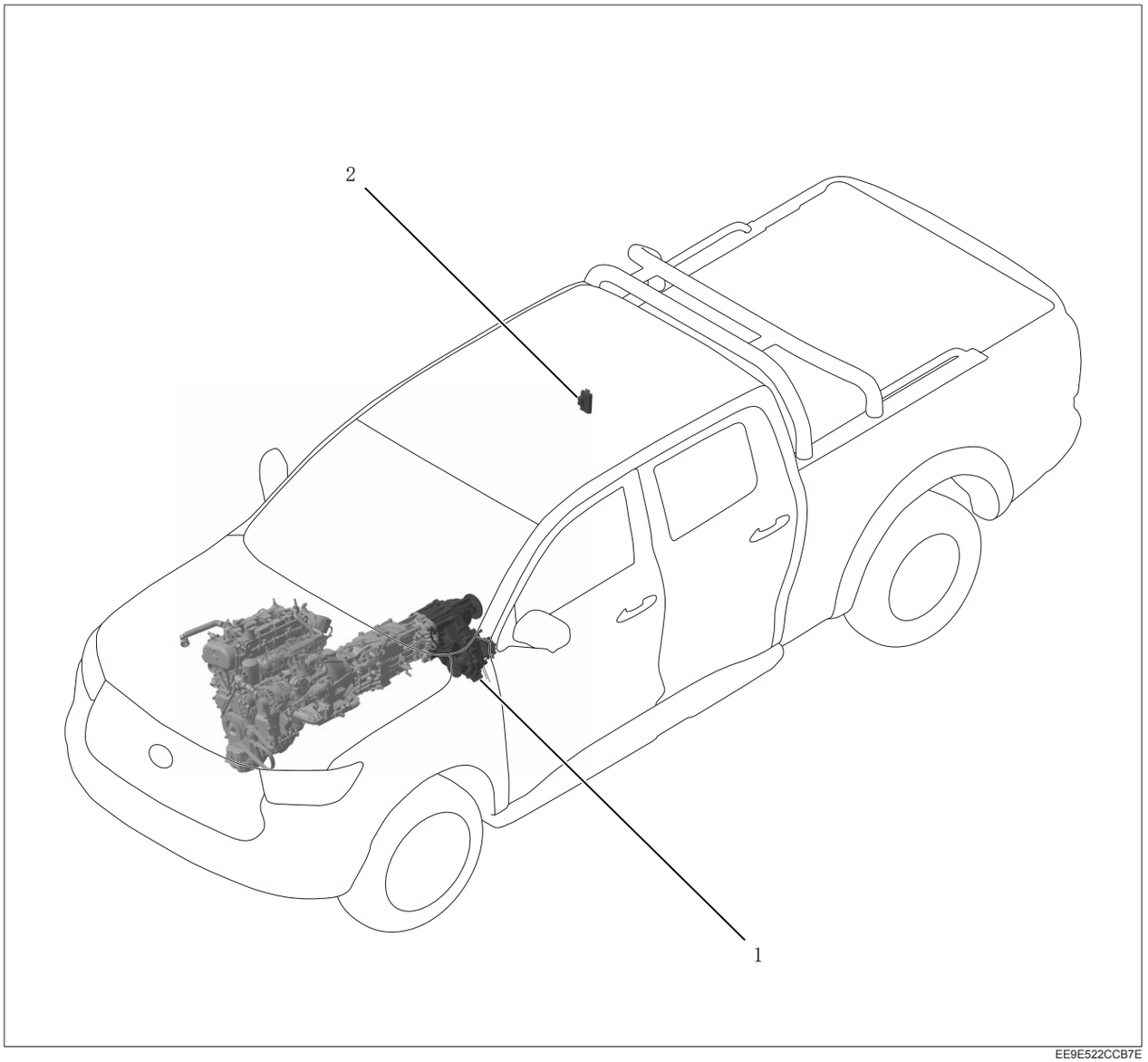
Nameplate: fixed at the bolt on the joint surface of transfer case, with manufacturer's S/N, date of assembly, and assembly S/N marked on it.

System diagram



EECB85EE2B69

location diagram



EE9E522CCB7E

1. Transfer case assembly
2. Transfer case electronic control unit (rear wall)

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Oil filler plug	Oil filler plug x transfer case housing	19~30	1	—
Drain plug	Drain plug x transfer case housing	19~30	1	—
Nut	Front flange x front output shaft	203~241	1	—
Nut	Rear flange x rear output shaft	305~332	1	—
Nut	Shift motor assembly x motor bracket	2.8~4.0	2	—
Bolt	Shift motor assembly x transfer case housing	8~11	3	—
Bolt	Motor bracket x transfer case housing	8~11	1	—
Bolt	Front transfer case housing × rear transfer case housing	27~40	17	—

DTC checklist

No.	DTC	DTC description
1	U007300	Bus off
2	U110017	Voltage too high
3	U110116	Voltage too low
4	U016487	Communication with AC lost
5	U014687	Communication with GW lost
6	U010087	Communication with ECM lost
7	U010187	Communication with TCU (DTC) lost
8	U012287	Communication with ABS_ESP lost
9	U012687	Communication with SAS/CSA2 lost
10	U010081	Invalid ECM signal
11	U010181	Invalid TCU/DCT signal
12	U012281	Invalid ESP/ABS signal
13	U012681	SAS signal invalid
14	U016481	AC signal invalid
15	U014681	GW signal invalid
16	P172813	Coil open circuit
17	P172912	Coil short-circuited to power
18	P173011	Coil short-circuited to ground
19	P173801	Invalid mode switch
20	P178013	Shift motor open circuit
21	P178012	Shift motor short-circuited to power
22	P178011	Shift motor short-circuited to ground
23	P178711	Motor position encoder short-circuited to ground
24	P178801	Motor position encoder invalid or out of valid range
25	P179163	Shift timeout
26	P177198	Overheating protection

DTC troubleshooting method

U007300

DTC definition: bus off

DTC occurring condition: still unavailable after rapid recovery of communication three times consecutively

Possible causes:

- CAN H short-circuited to ground
- CAN L short-circuited to power
- CAN H and CAN L short-circuited to each other
- CAN H and CAN L open-circuited

DTC removal condition: CAN bus ON

Troubleshooting:

Step	Operation	Yes	No
1	Connect scanner, set the ignition switch to "ON", and read the TOD message. Found this DTC?	Next step	Check for other faults
2	Use a multimeter to check if TOD bus is short-circuited to ground or short-circuited to power	Repair or replace the harness	Next step
3	Check for loose TOD connector	Reconnect or replace connector	Completed

U110017

DTC definition: voltage of 4WD power too high

DTC occurring condition: voltage value above 16 V for more than 20 s

Possible causes:

- High voltage of battery

DTC removal condition: system voltage in functional voltage range within 1000 ms

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to “ON” and use a multimeter to check if battery voltage is higher than 16 V	Next step	Check for other faults
2	Check for short-circuited power harness	Repair or replace the harness	Next step
3	Repair or replace battery	Repair or replace battery	Completed

U110116

DTC definition: voltage of 4WD power too low

DTC occurring condition: voltage value below 9V for more than 20 s

Possible causes:

› Low voltage of battery

DTC removal condition: system voltage in functional voltage range within 1000 ms

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to “ON” and use a multimeter to check if battery voltage is lower than 9 V	Next step	Check for other faults
2	Check for open-circuited power harness	Repair or replace the harness	Next step
3	Repair or replace battery	Repair or replace battery	Completed

U016487

DTC definition: communication with AC lost

DTC occurring condition: any of AC CAN signals loses 10 frames continuously (or max.5 s)

Possible causes:

› AC connector not securely connected or disconnected.

› Transmission line between AC and TOD broken or interrupted.

› AC damaged and cannot transmit signals to TOD normally.

DTC removal condition: CAN signal of AC node received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if AC connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between AC and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if AC is damaged and cannot transmit signals to TOD normally	Replace AC	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U014687

DTC definition: communication with GW lost

DTC occurring condition: any of GW CAN signals loses 10 frames continuously (or max.5 s)

Possible causes:

- Loosened or disconnected GW connectors.
- Transmission line between GW and TOD broken or interrupted.
- GW damaged and cannot transmit signals to TOD normally.

DTC removal condition: CAN signal of GW node received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if GW connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between GW and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if GW is damaged and cannot transmit signals to TOD normally	Replace GW	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010087

DTC definition: communication with ECM lost

DTC occurring condition: any of ECM CAN signals loses 10 frames continuously (or min. 250 ms, max. 5 s)

Possible causes:

- ECM connector not securely connected or disconnected.
- Transmission line between ECM and TOD broken or interrupted.
- ECM damaged and cannot transmit signals to TOD normally.

DTC removal condition: all ECM CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ECM connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ECM and TOD is broken or interrupted	Repair harness	Go to step 6

Step	Operation	Yes	No
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ECM is damaged and cannot transmit signals to TOD normally	Replace ECM	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010187

DTC definition: communication with TCU (AT) lost

DTC occurring condition: any TCU CAN signal lost successively for 250 ms

Possible causes:

- Loosened or disconnected TCU connectors.
- Transmission line between TCU and TOD broken or interrupted.
- TCU damaged and cannot transmit signals to TOD normally.

DTC removal condition: all TCU CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if TCU connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between TCU and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if TCU is damaged and cannot transmit signals to TOD normally	Replace TCU	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012287

DTC definition: communication with ABS_ESP lost

DTC occurring condition: any of ABS-ESP CAN signals loses 10 frames continuously (or min. 250 ms, max. 5 s)

Possible causes:

- ABS_ESP connector not securely connected or disconnected.
- Transmission line between ABS_ESP and TOD broken or interrupted.

› ABS_ESP damaged and cannot transmit signals to TOD normally.

DTC removal condition: all ABS_ESP CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ABS_ESP connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ABS_ESP and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ABS_ESP is damaged and cannot transmit signals to TOD normally	Replace ABS_ESP	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012687

DTC definition: communication with SAS/CSA2 lost

DTC occurring condition: any of SAS CAN signals loses 10 frames continuously (or min. 250 ms, max. 5 s)

Possible causes:

› SAS connector not securely connected or disconnected.

› Transmission line between SAS and TOD broken or interrupted.

› SAS damaged and cannot transmit signals to TOD normally.

DTC removal condition: all SAS CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if SAS connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between SAS and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if SAS is damaged and cannot transmit signals to TOD normally	Replace SAS	Go to step 8

Step	Operation	Yes	No
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010081

DTC definition: invalid ECM signal

DTC occurring condition: 1 invalid frame of ECM detected

Possible causes:

- ECM connector not securely connected or disconnected.
- Transmission line between ECM and TOD broken or interrupted.
- ECM damaged and cannot transmit signals to TOD normally.

DTC removal condition: recovery of valid ECM signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ECM connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ECM and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ECM is damaged and cannot transmit signals to TOD normally	Replace ECM	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010181

DTC definition: invalid TCU/DCT signals

DTC occurring condition: 1 invalid frame of TCU detected

Possible causes:

- Loosened or disconnected TCU connectors.
- Transmission line between TCU and TOD broken or interrupted.
- TCU damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid TCU signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if TCU connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between TCU and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if TCU is damaged and cannot transmit signals to TOD normally	Replace TCU	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012281

DTC definition: invalid ESP/ABS signal

DTC occurring condition: 250 ms invalid ABS/ESP/EPB detected

Possible causes:

- ABS_ESP connector not securely connected or disconnected.
- Transmission line between ABS_ESP and TOD broken or interrupted.
- ABS_ESP damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid ABS/ESP/EPB signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ABS_ESP connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ABS_ESP and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ABS_ESP is damaged and cannot transmit signals to TOD normally	Replace ABS_ESP	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012681

DTC definition: invalid SAS signal

DTC occurring condition: 1 invalid frame of SAS detected

Possible causes:

- SAS connector not securely connected or disconnected.
- Transmission line between SAS and TOD broken or interrupted.
- SAS damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid SAS signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if SAS connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between SAS and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if SAS is damaged and cannot transmit signals to TOD normally	Replace SAS	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U016481

DTC definition: invalid AC signal

DTC occurring condition: 1 invalid frame of AC signal detected

Possible causes:

- AC connector not securely connected or disconnected.
- Transmission line between AC and TOD broken or interrupted.
- AC damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid AC2 signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if AC connector is not securely connected or disconnected	Reconnect	Go to step 4

Step	Operation	Yes	No
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between AC and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if AC is damaged and cannot transmit signals to TOD normally	Replace AC	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U014681

DTC definition: invalid GW signal

DTC occurring condition: 1 invalid frame of GW signal detected

Possible causes:

- Loosened or disconnected GW connectors.
- Transmission line between GW and TOD broken or interrupted.
- GW damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid GW signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if GW connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between GW and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if GW is damaged and cannot transmit signals to TOD normally	Replace GW	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

P172813

DTC definition: coil open-circuited

DTC occurring condition: diagnostic voltage of coil drive circuit > = 0.7 V and <= 0.95 V

Possible causes:

› Coil connector not securely connected or disconnected.

› Harness between coil and TOD damaged or disconnected.

› 4WD coil failed or damaged.

DTC removal condition: IG powered on and off, and diagnosis voltage of coil drive circuit restored to normal range.

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the pins of 4WD coil according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Record that diagnostic voltage of 4WD coil meets> = 0.7V and <= 0.95V	Check 4WD coil harness, replug the connector or replace 4WD coil	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check 4WD coil harness, replug the connector or replace 4WD coil	Completed

P172912

DTC definition: coil short-circuited to power

DTC occurring condition: diagnostic voltage of coil drive circuit > = 1.15V and <= 5V

Possible causes:

› Coil connector not securely connected or disconnected.

› Harness between coil and TOD damaged or disconnected.

› 4WD coil failed or damaged.

DTC removal condition: IG powered on and off, and diagnosis voltage of coil drive circuit restored to normal range.

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the pins of 4WD coil according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Is diagnostic voltage of coil drive circuit > = 1.15V and <= 5V	Check 4WD coil harness, replug the connector or replace 4WD coil	Next step

Step	Operation	Yes	No
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check 4WD coil harness, replug the connector or replace 4WD coil	Completed

P173011

DTC definition: coil short-circuited to ground

DTC occurring condition: diagnostic voltage of coil drive circuit > = 0V and <= 0.8V

Possible causes:

- Coil connector not securely connected or disconnected.
- Harness between coil and TOD damaged or disconnected.
- 4WD coil failed or damaged.

DTC removal condition: IG powered on and off, and diagnosis voltage of coil drive circuit restored to normal range.

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the pins of 4WD coil according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode to 4L	Next step	—
3	Is diagnostic voltage of coil drive circuit > = 0V and <= 0.8V	Check 4WD coil harness, replug the connector or replace 4WD coil	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check 4WD coil harness, replug the connector or replace 4WD coil	Completed

P178013

DTC definition: shift motor open-circuited

DTC occurring condition: diagnostic voltage of shift motor drive circuit indicates open-circuited (high to low diagnostic voltage is> = 0.7V AND <= 0.93V) AND (low to high diagnostic voltage is> = 0V AND <= 0.02V)

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor failed or damaged.

DTC removal condition: diagnostic voltage of shift motor drive circuit indicates normal

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the drive pins of 4WD shift motor according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Does diagnostic voltage of shift motor drive circuit indicate open-circuited (high to low diagnostic voltage is> = 0.7V AND <= 0.93V) AND (low to high diagnostic voltage is> = 0V AND <= 0.02V)	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178012

DTC definition: shift motor short-circuited to power

DTC occurring condition: diagnostic voltage of shift motor drive circuit indicates short-circuited to power (driver circuit diagnostic voltage is >= 2.18V AND <= 5V)

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor failed or damaged.

DTC removal condition: diagnostic voltage of shift motor drive circuit indicates normal

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the drive pins of 4WD shift motor according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Does diagnostic voltage of shift motor drive circuit indicate open-circuited to meet (driver circuit diagnostic voltage is >= 2.18V AND <= 5V)	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178011

DTC definition: shift motor short-circuited to ground

DTC occurring condition: diagnostic voltage of shift motor drive circuit indicates short-circuited to ground (driver circuit diagnostic voltage is >= 0V AND <= 0.02V)

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor failed or damaged.

DTC removal condition: diagnostic voltage of shift motor drive circuit indicates normal

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the drive pins of 4WD shift motor according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Does diagnostic voltage of shift motor drive circuit indicate open-circuited to meet (driver circuit diagnostic voltage is >= 0V AND <= 0.02V)	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178711

DTC definition: motor position encoder short-circuited to ground

DTC occurring condition: motor position encoder indicates abnormal state

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor position encoder failed or damaged.

DTC removal condition: motor position encoder indicates normal state

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—
2	Switch TOD mode	Next step	—

Step	Operation	Yes	No
3	Connect scanner to read TOD motor encoder signal (Shift Motor position): motor position encoder indicates abnormal state	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178801

DTC definition: motor position encoder invalid or out of valid range

DTC occurring condition: the motor is not moving and the encoder indicates an invalid position; the motor is moving and the encoder indicates an invalid sequence

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor position encoder failed or damaged.

DTC removal condition: encoder indicates a valid position

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—
2	Switch TOD mode	Next step	—
3	Read TOD motor encoder signals: the motor is not moving and the encoder indicates an invalid position, or the motor is moving and the encoder indicates an invalid sequence	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P179163

DTC definition: shift timeout

DTC occurring condition: motor failed to reach specified position within specified time

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor jamming.

› Shift motor failed or damaged.

DTC removal condition: motor reaches specified position within specified time

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—
2	Switch TOD mode to enter or exit 4L gear	Next step	—
3	Motor failed to reach specified position within specified time, and instrument reports “4WD system fault”	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P177198

DTC definition: overheating protection

DTC occurring condition: friction pad and engine oil exceed set value

Possible causes:

› Frequent skids lead to overheated friction pad or oil

DTC removal condition: 30 s after friction pad and engine oil return to the setting value below

Troubleshooting:

Step	Operation	Yes	No
1	Stop the vehicle immediately and wait for friction pad and oil to cool	Next step	—
2	Check if transfer case lubricant is dirty and the oil level is normal	Change transfer case lubricant or add lubricant to correct oil level	Next step
3	Start the engine and drive the vehicle	Next step	—
4	Observe if the instrument indicates overheating alarm again	Replace transfer case	Completed

P173801

DTC definition: mode switch invalid

DTC occurring condition: input state of mode switch is invalid position

Possible causes:

› Mode switch connector not securely connected, disconnected or damaged.

› Harness between mode switch and BCM damaged or disconnected.

› Mode switch malfunctioned, failed or damaged.

DTC removal condition: input state of mode switch is valid position

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—

Step	Operation	Yes	No
2	Switch TOD mode	Next step	—
3	Check that TOD switches modes successfully	Next step	Check mode switch harness, reconnect mode switch connector or replace mode switch
4	Power on and off again, try to switch TOD mode again, and check that it switches successfully.	Completed	Check mode switch harness, reconnect mode switch connector or replace mode switch

Transfer case system (8AT)

System description

The 47-80 two-speed TOD transfer case is a 4WD transfer case of intelligent torque-managed type. Power can be transmitted to front drive shaft through a high-precision silent chain. Functions of deceleration and torque increase can be realized due to a set of planetary gear mechanism. The planetary gear pair and the rear output shaft components of the transfer case are actively lubricated by an oil bath and oil pump.

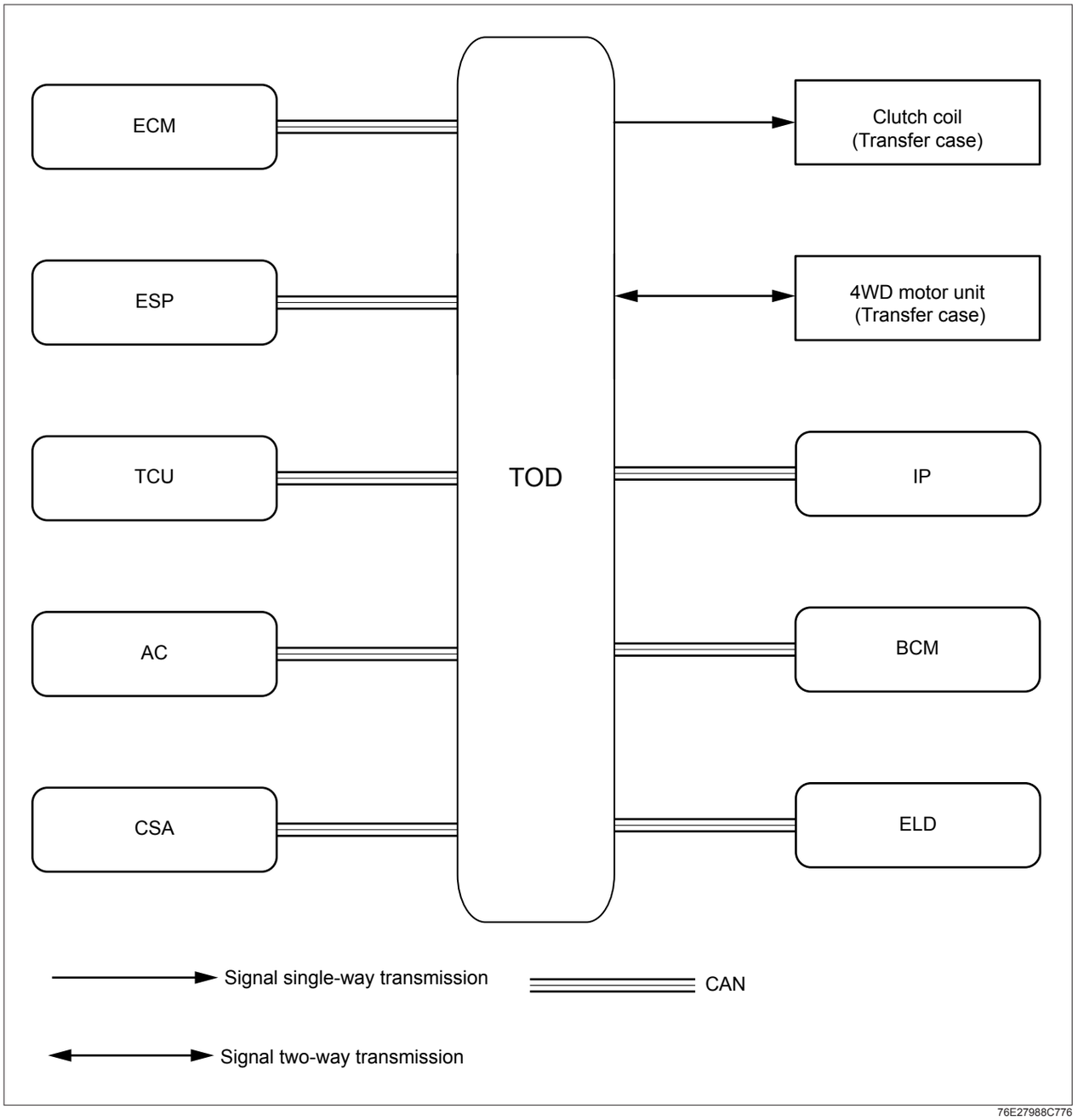
This transfer case is usually provided with three gears of 2H, Auto and 4L Lock gears, and some even with 4H Lock gear.

- 2H - 2WD high gear. Power is directly transmitted to rear axle through the transfer case only for rear-wheel drive. The transmission ratio of transfer case is 1: 1.
- Auto (AWD) - Intelligent 4WD gear. The transmission ratio of transfer case is 1: 1. With intelligent torque management involved, the transfer case transmits some of the power (depending on the judgment of operating conditions) to the front axle through friction components.
- 4H Lock - High gear lock. The transmission ratio of transfer case is 1: 1. The transfer case strengthens active loading of friction components within a certain range of vehicle speed and steering angle to simulate a rigid 4WD state.
- 4L Lock - Low gear lock. The transmission ratio of transfer case is 2.48: 1. Similar to 4H Lock, active loading is usually more aggressive.

The logic of intelligent torque management is implemented through software integrated in electronic control unit.

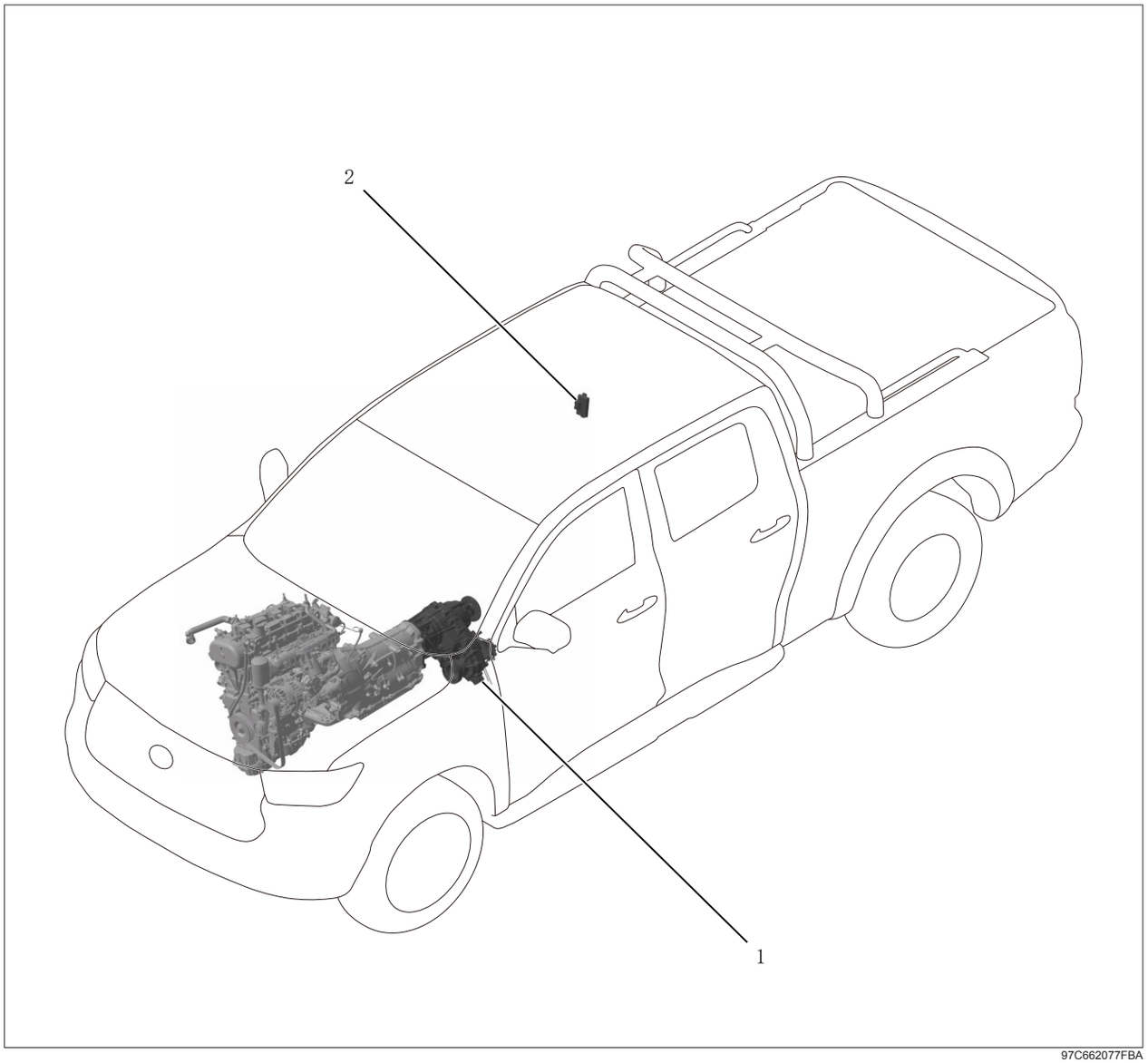
Nameplate: fixed at the bolt on the joint surface of transfer case, with manufacturer's S/N, date of assembly, and assembly S/N marked on it.

System diagram



76E27988C776

location diagram



97C662077FBA

1. Transfer case assembly
2. Transfer case electronic control unit (rear wall)

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Oil filler plug	Oil filler plug x transfer case housing	19~30	1	—
Drain plug	Drain plug x transfer case housing	19~30	1	—
Nut	Front flange x front output shaft	203~241	1	—
Nut	Rear flange x rear output shaft	305~332	1	—
Nut	Shift motor assembly x motor bracket	2.8~4.0	2	—
Bolt	Shift motor assembly x transfer case housing	8~11	3	—
Bolt	Motor bracket x transfer case housing	8~11	1	—
Bolt	Front transfer case housing × rear transfer case housing	27~40	17	—

DTC checklist

No.	DTC	DTC description
1	U007300	Bus off
2	U110017	Voltage too high
3	U110116	Voltage too low
4	U016487	Communication with AC lost
5	U014687	Communication with GW lost
6	U010087	Communication with ECM lost
7	U010187	Communication with TCU (DTC) lost
8	U012287	Communication with ABS_ESP lost
9	U012687	Communication with SAS/CSA2 lost
10	U010081	Invalid ECM signal
11	U010181	Invalid TCU/DCT signal
12	U012281	Invalid ESP/ABS signal
13	U012681	SAS signal invalid
14	U016481	AC signal invalid
15	U014681	GW signal invalid
16	P172813	Coil open circuit
17	P172912	Coil short-circuited to power
18	P173011	Coil short-circuited to ground
19	P178013	Shift motor open circuit
20	P178012	Shift motor short-circuited to power
21	P178011	Shift motor short-circuited to ground
22	P178711	Motor position encoder short-circuited to ground
23	P178801	Motor position encoder invalid or out of valid range
24	P179163	Shift timeout
25	P177198	Overheating protection

DTC troubleshooting method

U007300

DTC definition: bus off

DTC occurring condition: still unavailable after rapid recovery of communication three times consecutively

Possible causes:

- CAN H short-circuited to ground
- CAN L short-circuited to power
- CAN H and CAN L short-circuited to each other
- CAN H and CAN L open-circuited

DTC removal condition: CAN bus ON

Troubleshooting:

Step	Operation	Yes	No
1	Connect scanner, set the ignition switch to "ON", and read the TOD message. Found this DTC?	Next step	Check for other faults
2	Use a multimeter to check if TOD bus is short-circuited to ground or short-circuited to power	Repair or replace the harness	Next step
3	Check for loose TOD connector	Reconnect or replace connector	Completed

U110017

DTC definition: voltage of 4WD power too high

DTC occurring condition: voltage value above 16 V for more than 20 s

Possible causes:

- High voltage of battery

DTC removal condition: system voltage in functional voltage range within 1000 ms

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to “ON” and use a multimeter to check if battery voltage is higher than 16 V	Next step	Check for other faults
2	Check for short-circuited power harness	Repair or replace the harness	Next step
3	Repair or replace battery	Repair or replace battery	Completed

U110116

DTC definition: voltage of 4WD power too low

DTC occurring condition: voltage value below 9V for more than 20 s

Possible causes:

› Low voltage of battery

DTC removal condition: system voltage in functional voltage range within 1000 ms

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to “ON” and use a multimeter to check if battery voltage is lower than 9 V	Next step	Check for other faults
2	Check for open-circuited power harness	Repair or replace the harness	Next step
3	Repair or replace battery	Repair or replace battery	Completed

U016487

DTC definition: communication with AC lost

DTC occurring condition: any of AC CAN signals loses 10 frames continuously (or max.5 s)

Possible causes:

› AC connector not securely connected or disconnected.

› Transmission line between AC and TOD broken or interrupted.

› AC damaged and cannot transmit signals to TOD normally.

DTC removal condition: CAN signal of AC node received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if AC connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between AC and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if AC is damaged and cannot transmit signals to TOD normally	Replace AC	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U014687

DTC definition: communication with GW lost

DTC occurring condition: any of GW CAN signals loses 10 frames continuously (or max.5 s)

Possible causes:

› Loosened or disconnected GW connectors.

› Transmission line between GW and TOD broken or interrupted.

› GW damaged and cannot transmit signals to TOD normally.

DTC removal condition: CAN signal of GW node received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if GW connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between GW and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if GW is damaged and cannot transmit signals to TOD normally	Replace GW	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010087

DTC definition: communication with ECM lost

DTC occurring condition: any of ECM CAN signals loses 10 frames continuously (or min. 250 ms, max. 5 s)

Possible causes:

› ECM connector not securely connected or disconnected.

› Transmission line between ECM and TOD broken or interrupted.

› ECM damaged and cannot transmit signals to TOD normally.

DTC removal condition: all ECM CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ECM connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ECM and TOD is broken or interrupted	Repair harness	Go to step 6

Step	Operation	Yes	No
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ECM is damaged and cannot transmit signals to TOD normally	Replace ECM	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010187

DTC definition: communication with TCU (AT) lost

DTC occurring condition: any TCU CAN signal lost successively for 250 ms

Possible causes:

- Loosened or disconnected TCU connectors.
- Transmission line between TCU and TOD broken or interrupted.
- TCU damaged and cannot transmit signals to TOD normally.

DTC removal condition: all TCU CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if TCU connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between TCU and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if TCU is damaged and cannot transmit signals to TOD normally	Replace TCU	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012287

DTC definition: communication with ABS_ESP lost

DTC occurring condition: any of ABS-ESP CAN signals loses 10 frames continuously (or min. 250 ms, max. 5 s)

Possible causes:

- ABS_ESP connector not securely connected or disconnected.
- Transmission line between ABS_ESP and TOD broken or interrupted.

› ABS_ESP damaged and cannot transmit signals to TOD normally.

DTC removal condition: all ABS_ESP CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ABS_ESP connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ABS_ESP and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ABS_ESP is damaged and cannot transmit signals to TOD normally	Replace ABS_ESP	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012687

DTC definition: communication with SAS/CSA2 lost

DTC occurring condition: any of SAS CAN signals loses 10 frames continuously (or min. 250 ms, max. 5 s)

Possible causes:

› SAS connector not securely connected or disconnected.

› Transmission line between SAS and TOD broken or interrupted.

› SAS damaged and cannot transmit signals to TOD normally.

DTC removal condition: all SAS CAN signals received once at least

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if SAS connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between SAS and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if SAS is damaged and cannot transmit signals to TOD normally	Replace SAS	Go to step 8

Step	Operation	Yes	No
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010081

DTC definition: invalid ECM signal

DTC occurring condition: 1 invalid frame of ECM detected

Possible causes:

- ECM connector not securely connected or disconnected.
- Transmission line between ECM and TOD broken or interrupted.
- ECM damaged and cannot transmit signals to TOD normally.

DTC removal condition: recovery of valid ECM signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ECM connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ECM and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ECM is damaged and cannot transmit signals to TOD normally	Replace ECM	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U010181

DTC definition: invalid TCU/DCT signals

DTC occurring condition: 1 invalid frame of TCU detected

Possible causes:

- Loosened or disconnected TCU connectors.
- Transmission line between TCU and TOD broken or interrupted.
- TCU damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid TCU signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if TCU connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between TCU and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if TCU is damaged and cannot transmit signals to TOD normally	Replace TCU	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012281

DTC definition: invalid ESP/ABS signal

DTC occurring condition: 250 ms invalid ABS/ESP/EPB detected

Possible causes:

- ABS_ESP connector not securely connected or disconnected.
- Transmission line between ABS_ESP and TOD broken or interrupted.
- ABS_ESP damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid ABS/ESP/EPB signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if ABS_ESP connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between ABS_ESP and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if ABS_ESP is damaged and cannot transmit signals to TOD normally	Replace ABS_ESP	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U012681

DTC definition: invalid SAS signal

DTC occurring condition: 1 invalid frame of SAS detected

Possible causes:

- SAS connector not securely connected or disconnected.
- Transmission line between SAS and TOD broken or interrupted.
- SAS damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid SAS signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if SAS connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between SAS and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if SAS is damaged and cannot transmit signals to TOD normally	Replace SAS	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U016481

DTC definition: invalid AC signal

DTC occurring condition: 1 invalid frame of AC signal detected

Possible causes:

- AC connector not securely connected or disconnected.
- Transmission line between AC and TOD broken or interrupted.
- AC damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid AC2 signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if AC connector is not securely connected or disconnected	Reconnect	Go to step 4

Step	Operation	Yes	No
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between AC and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if AC is damaged and cannot transmit signals to TOD normally	Replace AC	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

U014681

DTC definition: invalid GW signal

DTC occurring condition: 1 invalid frame of GW signal detected

Possible causes:

- Loosened or disconnected GW connectors.
- Transmission line between GW and TOD broken or interrupted.
- GW damaged and cannot transmit signals to TOD normally.

DTC removal condition: valid GW signal detected

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Go to step 2	—
2	Use a scanner to check TOD for this DTC	Go to step 3	Check for other DTCs
3	Check if GW connector is not securely connected or disconnected	Reconnect	Go to step 4
4	Check for interference of harness signal	Shield harness	Go to step 5
5	Check if transmission line between GW and TOD is broken or interrupted	Repair harness	Go to step 6
6	Check for CAN hardware circuit failure	Repair as necessary	Go to step 7
7	Check if GW is damaged and cannot transmit signals to TOD normally	Replace GW	Go to step 8
8	Set ignition switch to "ON", connect the scanner to send DTC clear command, start the engine to reach conditions for start testing, and observe if the DTC occurs again.	Check it again according to the steps above	The system is normal

P172813

DTC definition: coil open-circuited

DTC occurring condition: diagnostic voltage of coil drive circuit > = 0.7 V and <= 0.95 V

Possible causes:

› Coil connector not securely connected or disconnected.

› Harness between coil and TOD damaged or disconnected.

› 4WD coil failed or damaged.

DTC removal condition: IG powered on and off, and diagnosis voltage of coil drive circuit restored to normal range.

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the pins of 4WD coil according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Record that diagnostic voltage of 4WD coil meets> = 0.7V and <= 0.95V	Check 4WD coil harness, replug the connector or replace 4WD coil	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check 4WD coil harness, replug the connector or replace 4WD coil	Completed

P172912

DTC definition: coil short-circuited to power

DTC occurring condition: diagnostic voltage of coil drive circuit > = 1.15V and <= 5V

Possible causes:

› Coil connector not securely connected or disconnected.

› Harness between coil and TOD damaged or disconnected.

› 4WD coil failed or damaged.

DTC removal condition: IG powered on and off, and diagnosis voltage of coil drive circuit restored to normal range.

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the pins of 4WD coil according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Is diagnostic voltage of coil drive circuit > = 1.15V and <= 5V	Check 4WD coil harness, replug the connector or replace 4WD coil	Next step

Step	Operation	Yes	No
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check 4WD coil harness, replug the connector or replace 4WD coil	Completed

P173011

DTC definition: coil short-circuited to ground

DTC occurring condition: diagnostic voltage of coil drive circuit > = 0V and <= 0.8V

Possible causes:

› Coil connector not securely connected or disconnected.

› Harness between coil and TOD damaged or disconnected.

› 4WD coil failed or damaged.

DTC removal condition: IG powered on and off, and diagnosis voltage of coil drive circuit restored to normal range.

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the pins of 4WD coil according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode to 4L	Next step	—
3	Is diagnostic voltage of coil drive circuit > = 0V and <= 0.8V	Check 4WD coil harness, replug the connector or replace 4WD coil	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check 4WD coil harness, replug the connector or replace 4WD coil	Completed

P178013

DTC definition: shift motor open-circuited

DTC occurring condition: diagnostic voltage of shift motor drive circuit indicates open-circuited (high to low diagnostic voltage is> = 0.7V AND <= 0.93V) AND (low to high diagnostic voltage is> = 0V AND <= 0.02V)

Possible causes:

› Shift motor connector not securely connected, disconnected or damaged.

› Harness between shift motor and TOD damaged or disconnected.

› Shift motor failed or damaged.

DTC removal condition: diagnostic voltage of shift motor drive circuit indicates normal

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the drive pins of 4WD shift motor according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Does diagnostic voltage of shift motor drive circuit indicate open-circuited (high to low diagnostic voltage is> = 0.7V AND <= 0.93V) AND (low to high diagnostic voltage is> = 0V AND <= 0.02V)	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178012

DTC definition: shift motor short-circuited to power

DTC occurring condition: diagnostic voltage of shift motor drive circuit indicates short-circuited to power (driver circuit diagnostic voltage is >= 2.18V AND <= 5V)

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor failed or damaged.

DTC removal condition: diagnostic voltage of shift motor drive circuit indicates normal

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the drive pins of 4WD shift motor according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Does diagnostic voltage of shift motor drive circuit indicate open-circuited to meet (driver circuit diagnostic voltage is >= 2.18V AND <= 5V)	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178011

DTC definition: shift motor short-circuited to ground

DTC occurring condition: diagnostic voltage of shift motor drive circuit indicates short-circuited to ground (driver circuit diagnostic voltage is >= 0V AND <= 0.02V)

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor failed or damaged.

DTC removal condition: diagnostic voltage of shift motor drive circuit indicates normal

Troubleshooting:

Step	Operation	Yes	No
1	Connect multimeter or oscilloscope to the drive pins of 4WD shift motor according to electrical schematic diagram, and set the ignition switch to "ON"	Next step	—
2	Switch TOD mode	Next step	—
3	Does diagnostic voltage of shift motor drive circuit indicate open-circuited to meet (driver circuit diagnostic voltage is >= 0V AND <= 0.02V)	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178711

DTC definition: motor position encoder short-circuited to ground

DTC occurring condition: motor position encoder indicates abnormal state

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor position encoder failed or damaged.

DTC removal condition: motor position encoder indicates normal state

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—
2	Switch TOD mode	Next step	—

Step	Operation	Yes	No
3	Connect scanner to read TOD motor encoder signal (Shift Motor position): motor position encoder indicates abnormal state	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P178801

DTC definition: motor position encoder invalid or out of valid range

DTC occurring condition: the motor is not moving and the encoder indicates an invalid position; the motor is moving and the encoder indicates an invalid sequence

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor position encoder failed or damaged.

DTC removal condition: encoder indicates a valid position

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—
2	Switch TOD mode	Next step	—
3	Read TOD motor encoder signals: the motor is not moving and the encoder indicates an invalid position, or the motor is moving and the encoder indicates an invalid sequence	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Next step
4	Connect scanner to send fault clearing command, then read DTC. If not, turn IG off, then IG on, use the scanner to read DTC again and observe if it occurs again.	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P179163

DTC definition: shift timeout

DTC occurring condition: motor failed to reach specified position within specified time

Possible causes:

- Shift motor connector not securely connected, disconnected or damaged.
- Harness between shift motor and TOD damaged or disconnected.
- Shift motor jamming.

› Shift motor failed or damaged.

DTC removal condition: motor reaches specified position within specified time

Troubleshooting:

Step	Operation	Yes	No
1	Set ignition switch to ON	Next step	—
2	Switch TOD mode to enter or exit 4L gear	Next step	—
3	Motor failed to reach specified position within specified time, and instrument reports “4WD system fault”	Check shift motor harness, replug shift motor connector or replace 4WD shift motor	Completed

P177198

DTC definition: overheating protection

DTC occurring condition: friction pad and engine oil exceed set value

Possible causes:

› Frequent skids lead to overheated friction pad or oil

DTC removal condition: 30 s after friction pad and engine oil return to the setting value below

Troubleshooting:

Step	Operation	Yes	No
1	Stop the vehicle immediately and wait for friction pad and oil to cool	Next step	—
2	Check if transfer case lubricant is dirty and the oil level is normal	Change transfer case lubricant or add lubricant to correct oil level	Next step
3	Start the engine and drive the vehicle	Next step	—
4	Observe if the instrument indicates overheating alarm again	Replace transfer case	Completed

Transfer case lubricant

Specifications

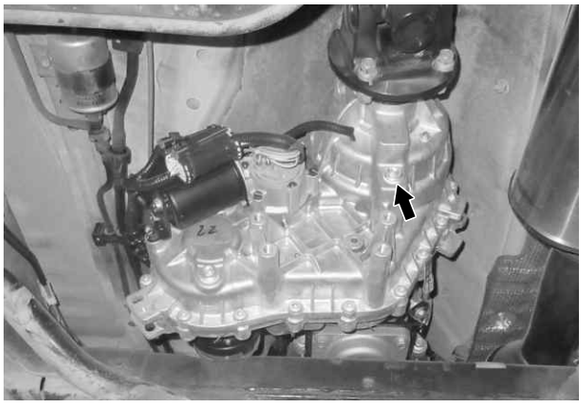
Item	Parameter
Lubricant capacity (L)	1.5±0.05
Lubricant type	Mobil LT

check

⚠ Caution

- Properly handle the waste.
- Before checking lubricant level, make sure the vehicle stays horizontal.
- Before adding lubricant, make sure the vehicle stays horizontal.
- Too much or too little lubricant can cause malfunctions.
- After changing lubricant, drive the vehicle and check the lubricant level.

1. Lift the vehicle to a proper position
2. Unscrew the fuel filler screw plug



02A1C0913247

3. Check oil level of transfer case. The oil level should be flush with the lowest position end of the lower end face of filler at filler screw plug. If necessary, add lubricant in transfer case.
4. If lubricant level is low, check if there is oil leakage
5. Check the quality of transfer case lubricant. If it does not meet the requirements for use, or if dilution, gelling, dirt or deterioration, etc. is found, change the transfer case lubricant.
6. Install oil filler screw plug



02A1C0913247

Tightening torque: (19~30) N·m

replacement

⚠ Caution

› Properly handle the waste.

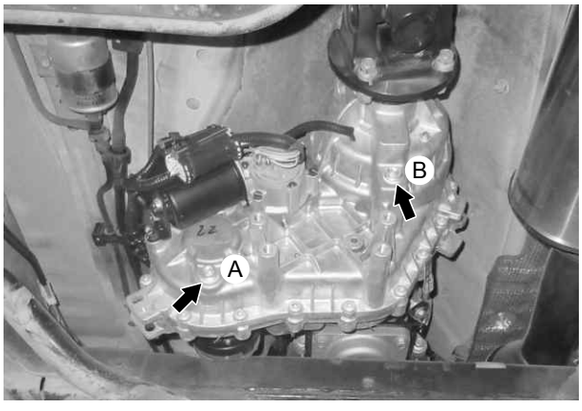
› Before checking lubricant level, make sure the vehicle stays horizontal.

› Before adding lubricant, make sure the vehicle stays horizontal.

› Too much or too little lubricant can cause malfunctions.

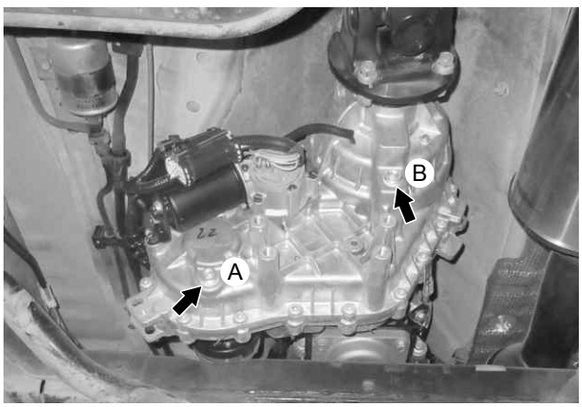
› After changing lubricant, drive the vehicle and check the lubricant level.

1. Lift the vehicle to a proper position
2. Unscrew filler screw plug (B)



2944F1A7B2D8

3. Unscrew drain screw plug (A), and empty transfer case lubricant



2944F1A7B2D8

⚠ Caution

› Properly handle the waste.

4. Install drain screw plug after cleaning drain screw plug

   Tightening torque: (19~30) N·m

5. Fill transfer case lubricant from fuel filler until the lubricant flows out of the fuel filler

   Filling amount: (1.5 ± 0.05) L

6. Install filler screw plug after it is cleaned

   Tightening torque: (19~30) N·m

Transfer case assembly (6MT)

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Transfer case x transmission	45±5	5	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transfer case lubricant
4. Remove front axle propeller shaft assembly

⚠ Caution

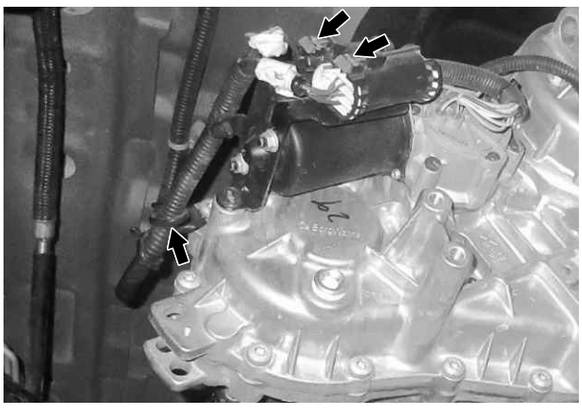
› Make assembly marks before disassembly.

5. Remove rear axle propeller shaft assembly

⚠ Caution

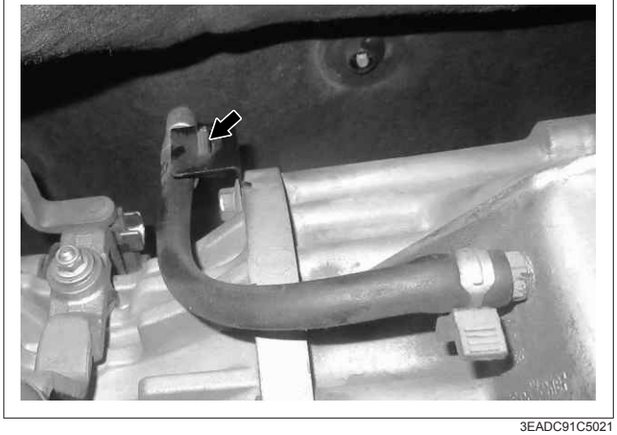
› Make assembly marks before disassembly.

6. Disconnect harness connector of transfer case and separate harness clip



74C4F9687630

7. Disconnect vent pipe assembly of transfer case and vent pipe bracket of transfer case



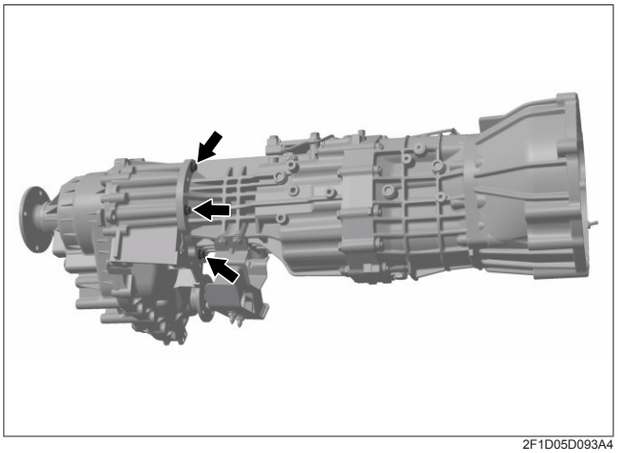
3EADC91C5021

8. Support the transfer case properly

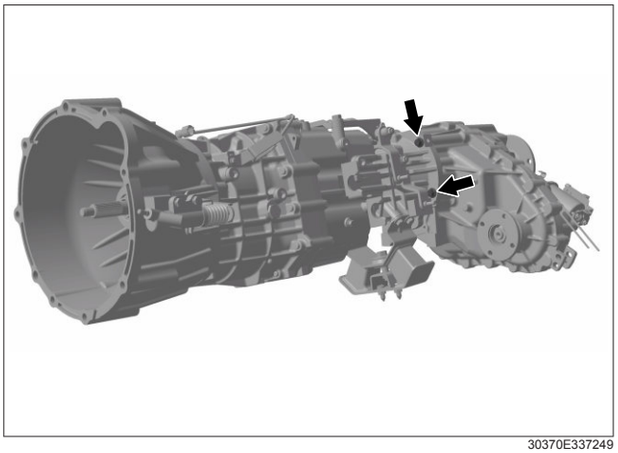
⚠ Caution

› Before removing transfer case and transmission nut, make sure that the transfer case is adequately supported by the lifter. It is not allowed to hang transfer case directly on transmission through spline shaft, or it may result in damage to transfer case parts.

9. Remove 5 bolts



2F1D05D093A4



30370E337249

10. Remove transfer case assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

› Add transfer case lubricant, and check the level of transfer case lubricant.

Transfer case assembly (8AT)

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Transfer case x transmission	45±5	7	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transfer case lubricant
4. Remove front axle propeller shaft assembly

⚠ Caution

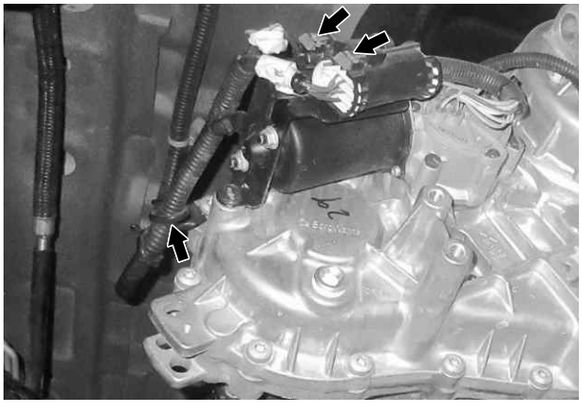
› Make assembly marks before disassembly.

5. Remove rear axle propeller shaft assembly

⚠ Caution

› Make assembly marks before disassembly.

6. Disconnect harness connector of transfer case and separate harness clip



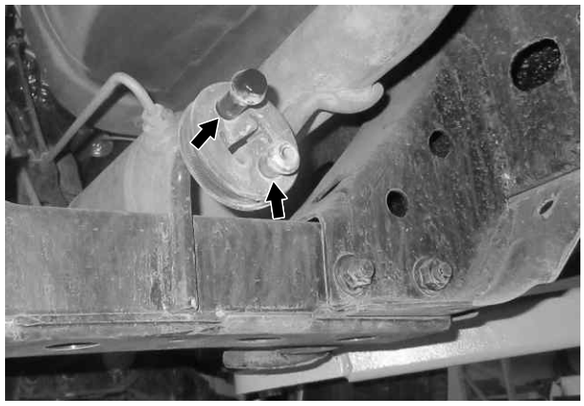
74C4F9687630

7. Separate clip for transfer case vent pipe, and disconnect vent pipe and transfer case housing



0EB4B6B116BC

8. Remove rubber hanger of exhaust pipe



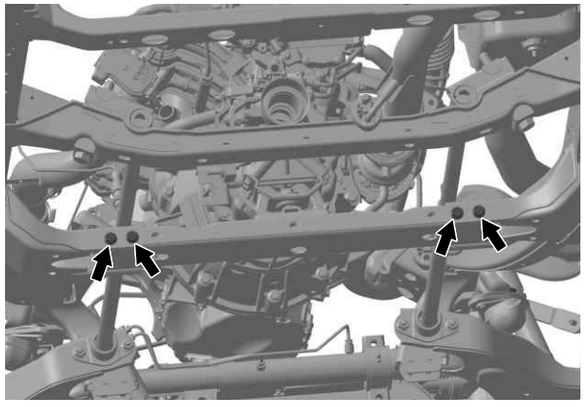
C0DF3C366622

9. Support transmission and transfer case properly
10. Disconnect transmission mount and the fourth beam subassembly of the frame



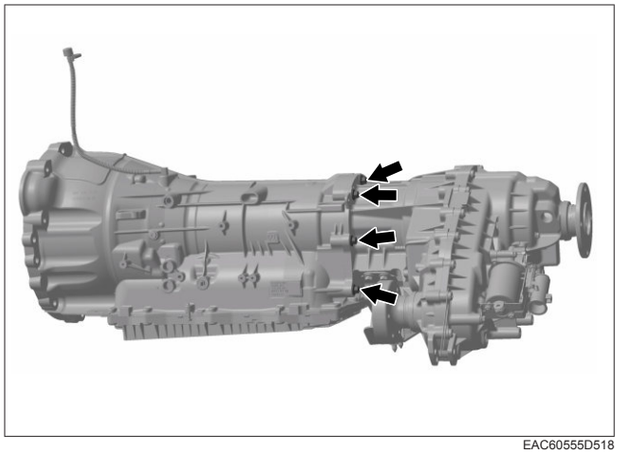
1808BABE740A

11. Remove fourth beam subassembly of the frame

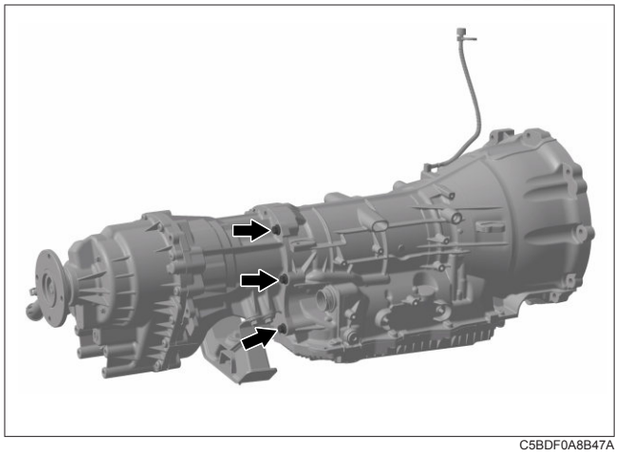


B1D115D1B7EA

12. Remove 7 bolts, and remove transfer case with transmission mount

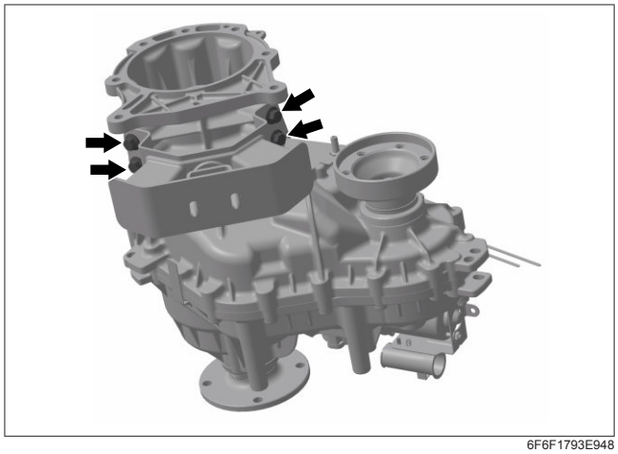


EAC60555D518



C5BDF0A8B47A

13. Remove 4 bolts, and separate transmission mount



6F6F1793E948

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

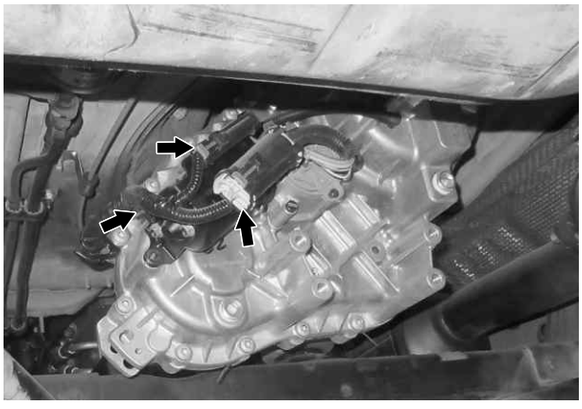
› Add transfer case lubricant, and check the level of transfer case lubricant.

Shift motor assembly

Removal/installation

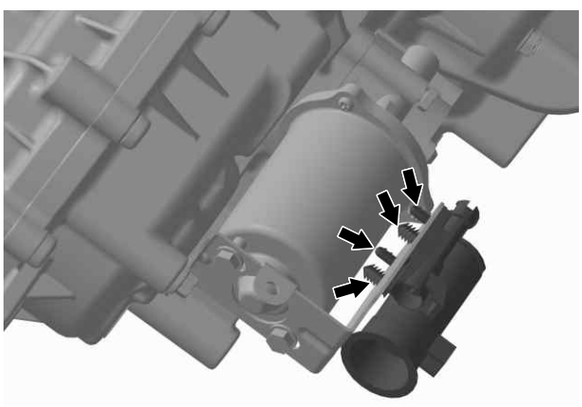
Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Disconnect connector of transfer case, and separate 1 harness clip



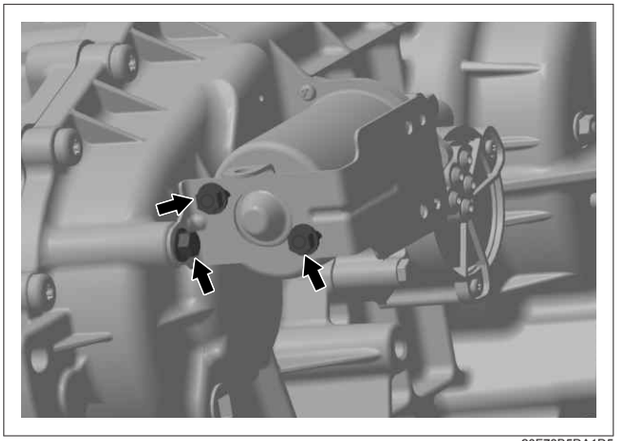
FE38DBA489C1

4. Separate 4 clips for connector on the side transfer case, and disconnect connector on the side of transfer case and motor bracket



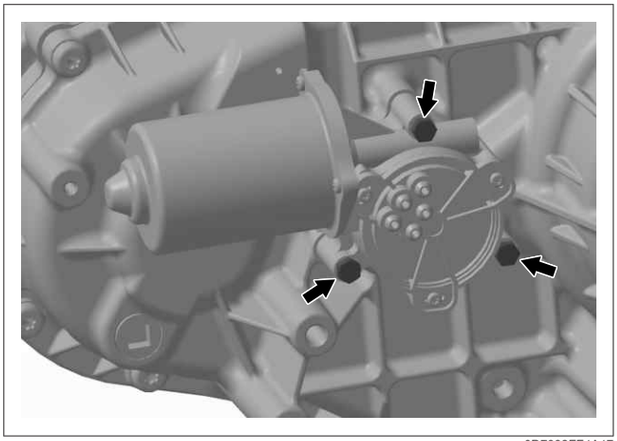
2CD8BB06D636

5. Remove 2 nuts and 1 bolt



20F78B5DA1D5

6. Remove motor bracket
7. Remove 3 bolts



0D7882FF4A47

8. Shift motor assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

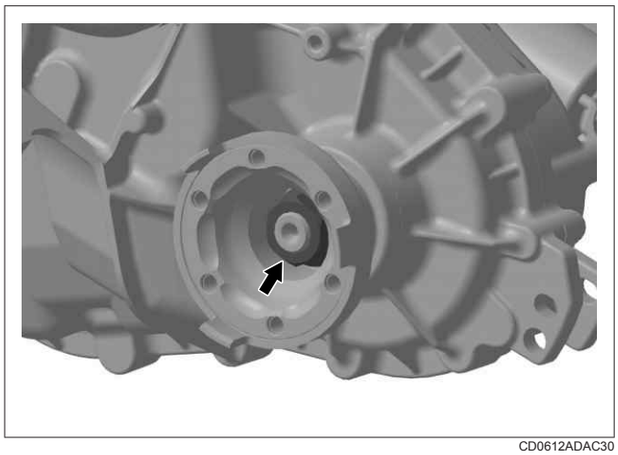
› Tighten the fastener according to the specified torque value.

Front flange plate assembly (including the front flange and the dust boot)

Removal/installation

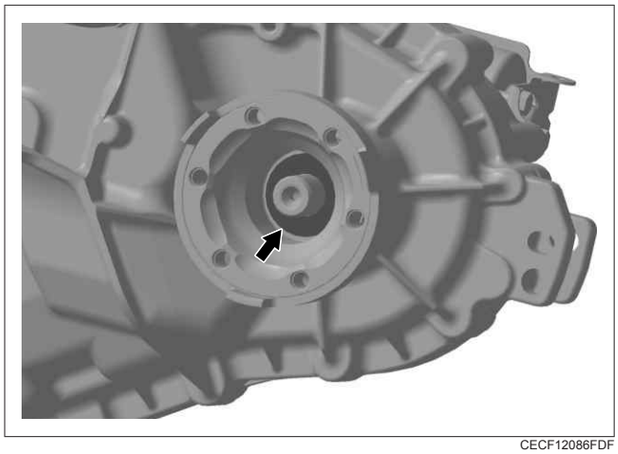
Removal

1. Lift the vehicle to a proper position
2. Remove front axle propeller shaft assembly
3. Remove 1 nut



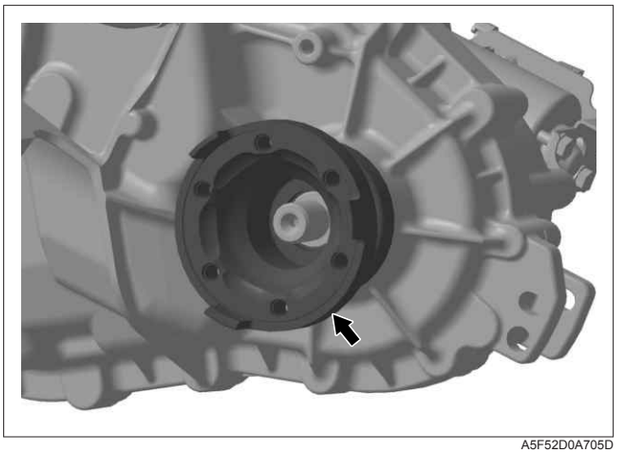
CD0612ADAC30

4. Remove gasket



CECF12086FDF

5. Remove O-ring
6. Remove front flange plate assembly



A5F52D0A705D

Notice

› Flange plate can be removed using a puller.

Installation

1. Perform installation work in reverse order of removal

Caution

› Replace with new O-ring.

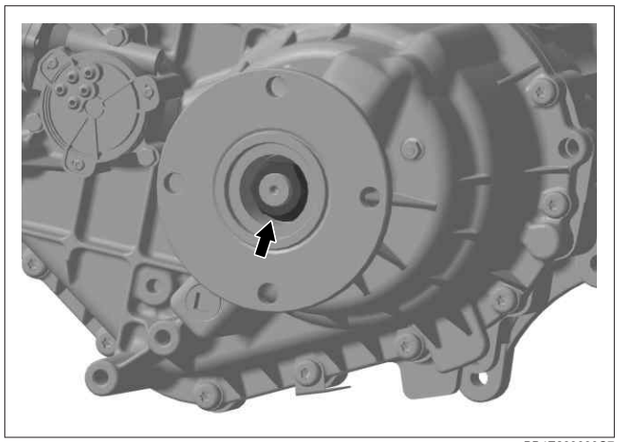
› Tighten the fastener according to the specified torque value.

Rear flange plate assembly (including the rear flange and the dust boot)

Removal/installation

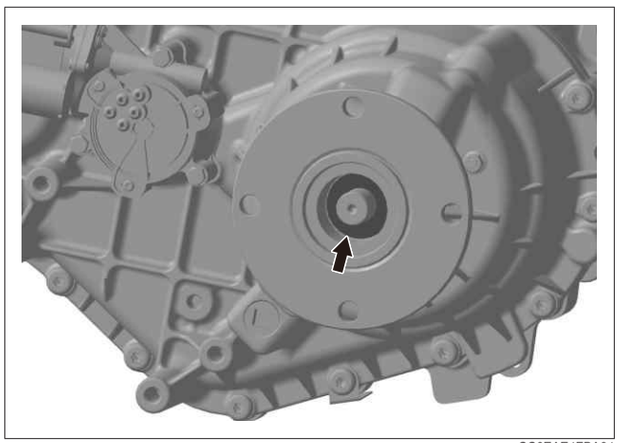
Removal

1. Lift the vehicle to a proper position
2. Remove rear axle propeller shaft assembly
3. Remove 1 nut



BB4E289390C7

4. Remove gasket



CC6EAE4FBA34



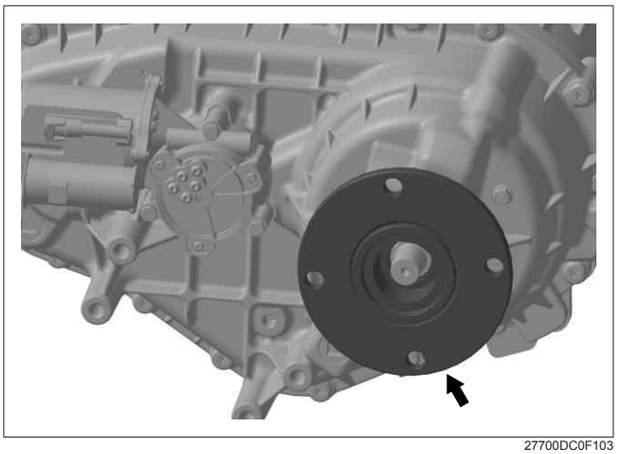
AFA315B161EB

5. Remove O-ring



09CD5858FA43

6. Remove rear flange plate assembly



27700DC0F103

Notice

› Flange plate can be removed using a puller.

Installation

1. Perform installation work in reverse order of removal

Caution

› Replace with new O-ring.

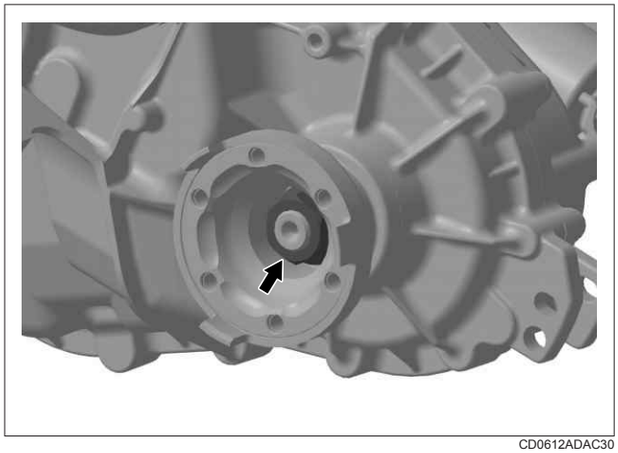
› Tighten the fastener according to the specified torque value.

Front output oil seal

Removal/installation

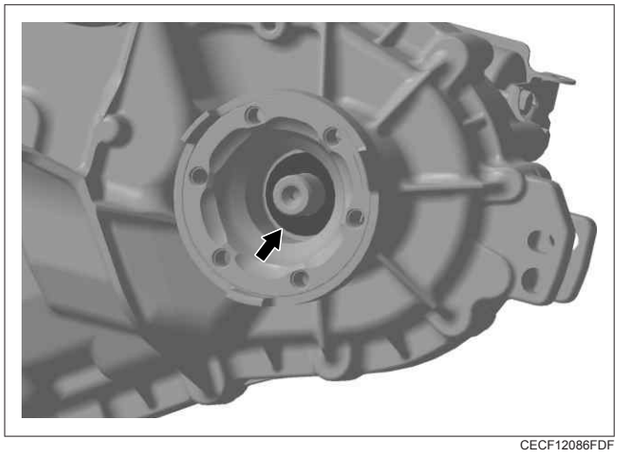
Removal

1. Lift the vehicle to a proper position
2. Drain transfer case lubricant
3. Remove front axle propeller shaft assembly
4. Remove 1 nut



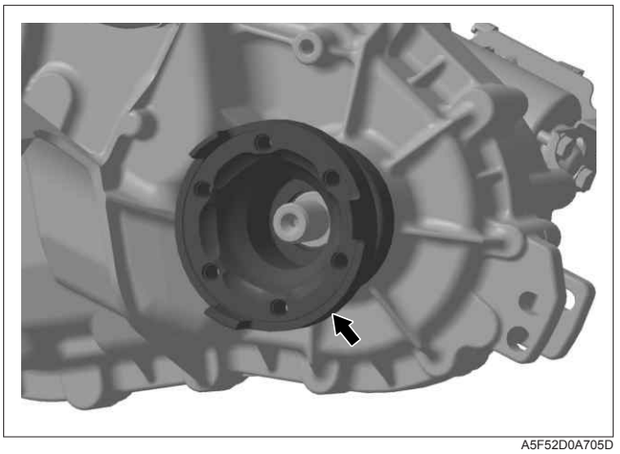
CD0612ADAC30

5. Remove gasket



CECF12086FDF

6. Remove O-ring
7. Remove front flange plate assembly

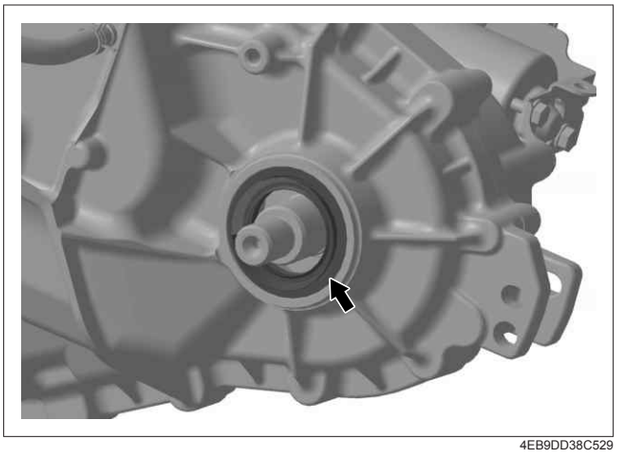


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Notice

› Flange plate can be removed using a puller.

8. Remove front output oil seal



4EB9DD38C529

Caution

› Be careful not to scratch the parts during disassembly.

Installation

1. Perform installation work in reverse order of removal

Caution

› Use reasonable tools when pressing in the oil seal, to avoid uneven installation or local impact of the oil seal.

› Pay attention to the protection of the seal lip, and carefully avoid its scratch.

› Prevent oil seal rubber from being scratched or peeled off in pressing process, and ensure specified pressing depth.

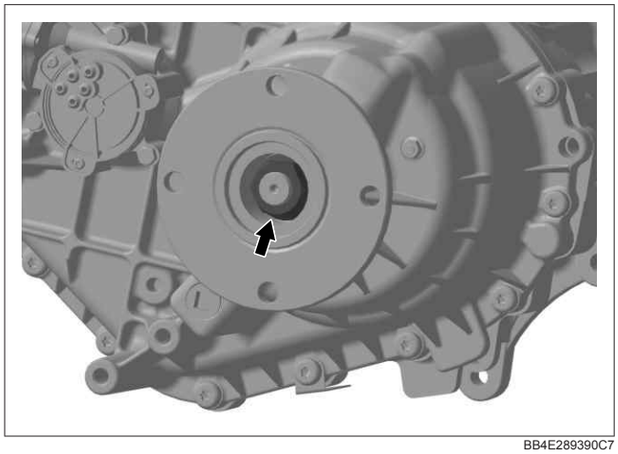
- Pressing depth of front output oil seal: (0.6~1.6) mm lower than the plane of housing end
- Replace with new O-ring.
- Align the assembly markings.
- Tighten the fastener according to the specified torque value.
- Add transfer case lubricant and check transfer case lubricant level.

Rear output oil seal

Removal/installation

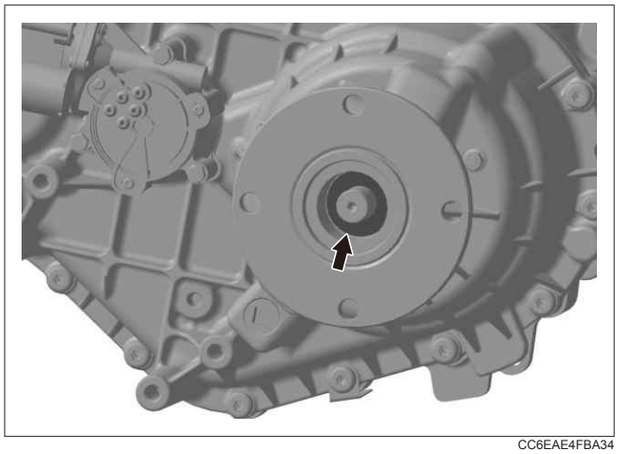
Removal

1. Lift the vehicle to a proper position
2. Remove rear axle propeller shaft assembly
3. Remove 1 nut



BB4E289390C7

4. Remove gasket



CC6EAE4FBA34



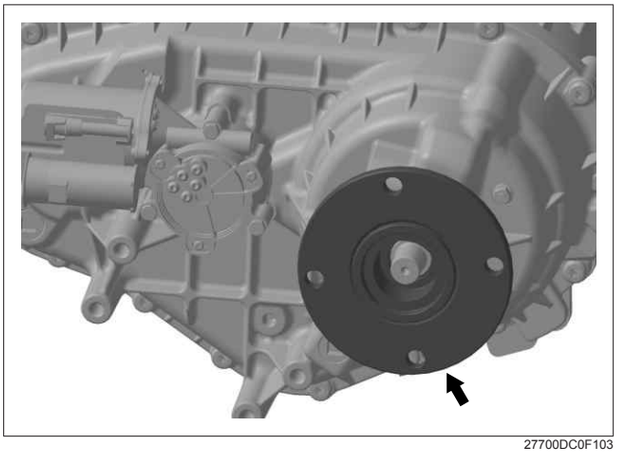
AFA315B161EB

5. Remove O-ring



09CD5858FA43

6. Remove rear flange plate assembly

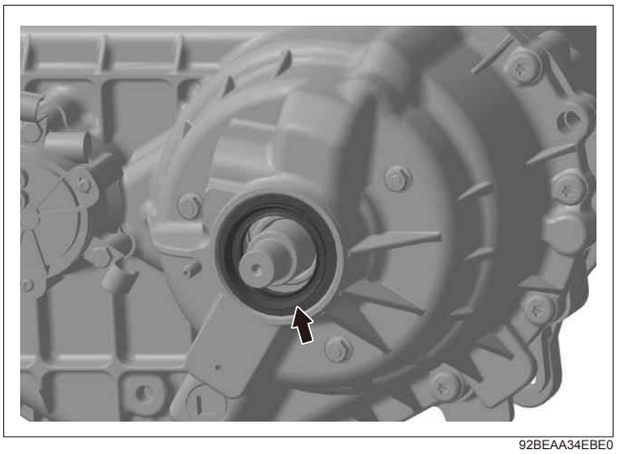


27700DC0F103

Notice

› Flange plate can be removed using a puller.

7. Remove rear output oil seal



92BEAA34EBE0

Caution

› Be careful not to scratch the parts during disassembly.

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Use reasonable tools when pressing in the oil seal, to avoid uneven installation or local impact of the oil seal.

› Pay attention to the protection of the seal lip, and carefully avoid its scratch.

› Prevent oil seal rubber from being scratched or peeled off in pressing process, and ensure specified pressing depth.

› Pressing depth of rear output oil seal: (1.5~2.5) mm lower than the plane of housing end

› Replace with new O-ring.

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

Spacing sleeve

Removal/installation

Removal

⚠ Caution

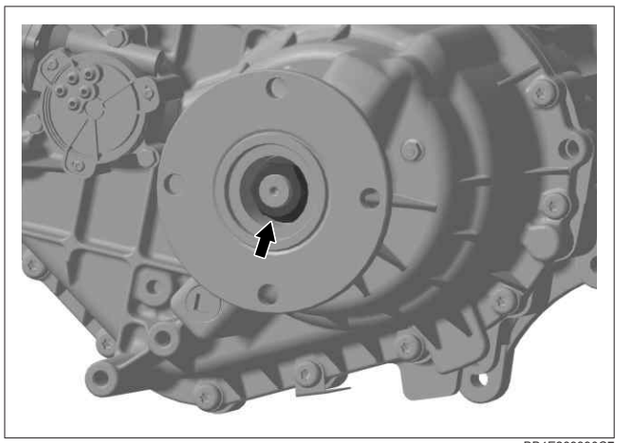
› Make necessary cleaning before removing the parts on the transfer case to prevent foreign matter from contaminating the oil seal lip.

1. Lift the vehicle to a proper position
2. Remove rear axle propeller shaft assembly

⚠ Caution

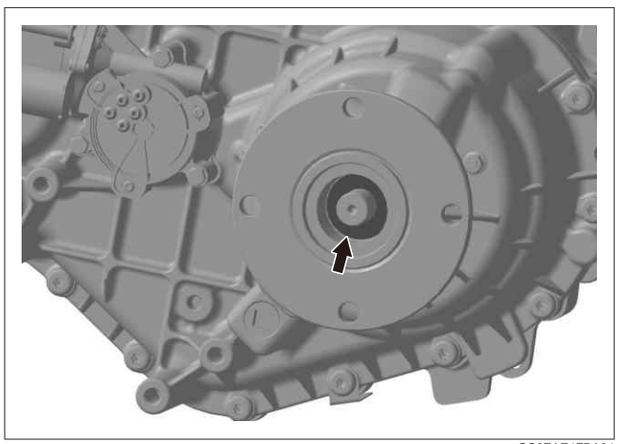
› Make the assembly marking before removing.

3. Remove 1 nut



BB4E289390C7

4. Remove gasket



CC6EAE4FBA34



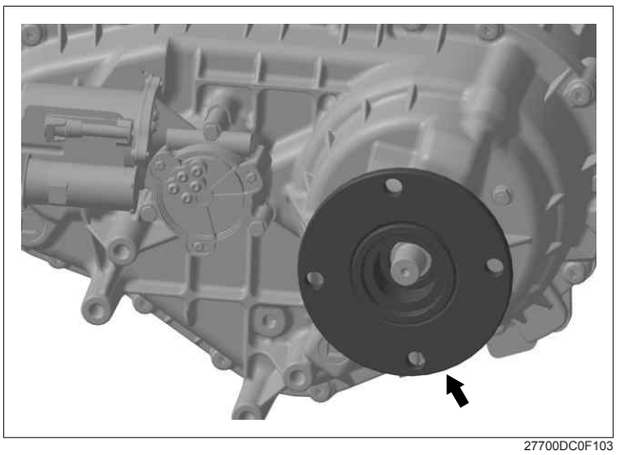
AFA315B161EB

5. Remove O-ring



09CD5858FA43

6. Remove rear flange plate assembly



27700DC0F103

⚠ Caution

› Flange plate can be removed using a puller.

› Do not pull out the flange too violently with a puller, to prevent the flange from falling and hurting the fitting surface of the oil seal.

7. Take out the spacing sleeve



3488FCE68896

⚠ Caution

› Take out the spacing sleeve with two small screwdrivers or a strong magnet pickup.

› Do not damage or pollute the oil seal lip in the process of taking out the spacing sleeve.

Installation

1. Install a new spacing sleeve

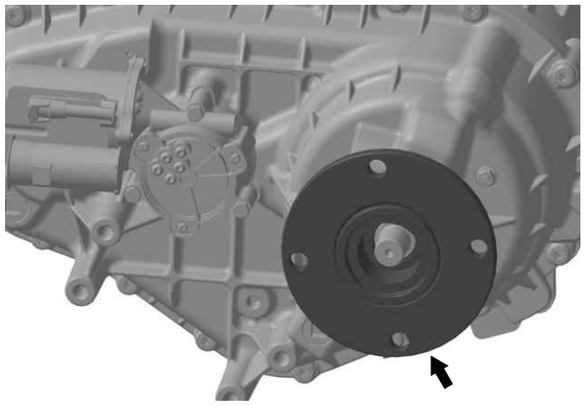


508DEE30AEE5

⚠ Caution

› When installing a new spacing sleeve, keep the gloves clean, and do not damage or pollute the oil seal lip.

2. Install the rear flange assembly



27700DC0F103

⚠ Caution

› Wipe up the surface gently with clean oil absorbing paper before installing the flange, to avoid impurities damaging the oil seal.

› During installation of flange, the flange spline shall be aligned with the shaft spline, and gently knocked in with a leather hammer (note: the flange is just knocked in and it can be pressed in with a big nut at last).

3. Install a new O-ring

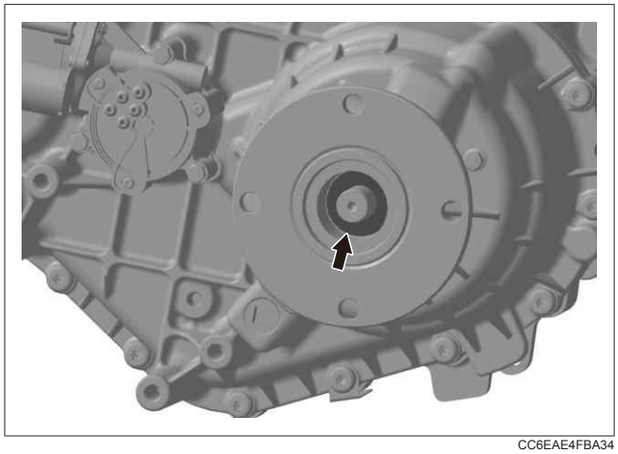


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4. Install a new gasket

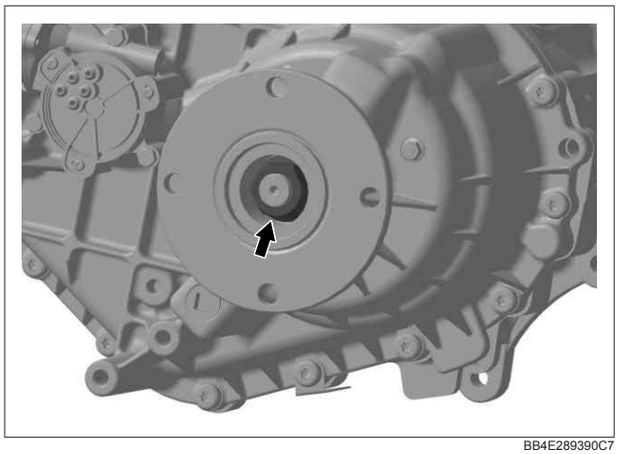


AFA315B161EB



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5. Install 1 nut



BB4E289390C7

⚠ Caution

› Tighten the fastener according to the specified torque value.

6. Install rear axle propeller shaft assembly

⚠ Caution

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

7. Lower the vehicle

Rotor/armature (6MT)

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transfer case lubricant
4. Remove front axle propeller shaft assembly

⚠ Caution

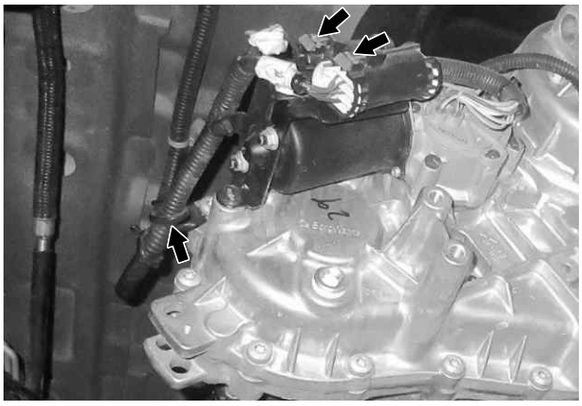
› Make assembly marks before disassembly.

5. Remove rear axle propeller shaft assembly

⚠ Caution

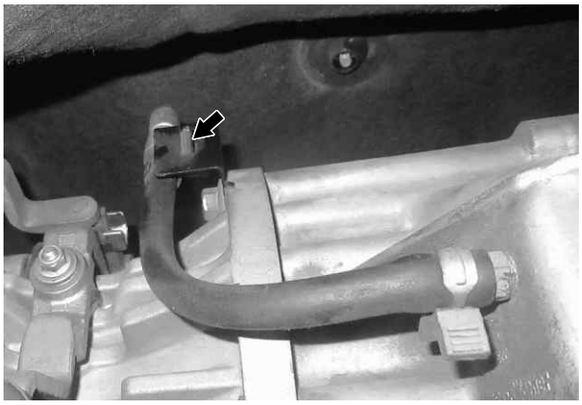
› Make assembly marks before disassembly.

6. Disconnect harness connector of transfer case and separate harness clip



74C4F9687630

7. Disconnect vent pipe assembly of transfer case and vent pipe bracket of transfer case



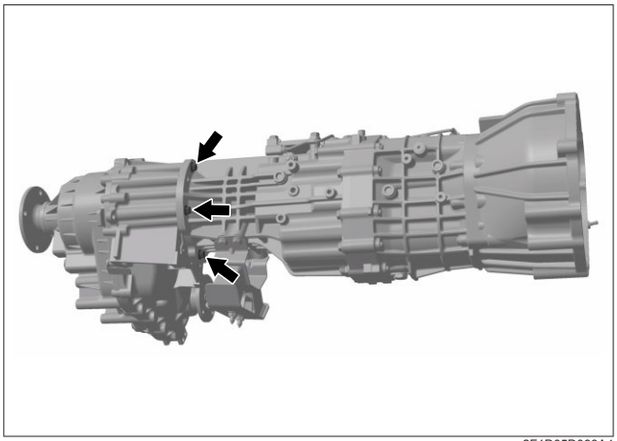
3EADC91C5021

8. Support the transfer case properly

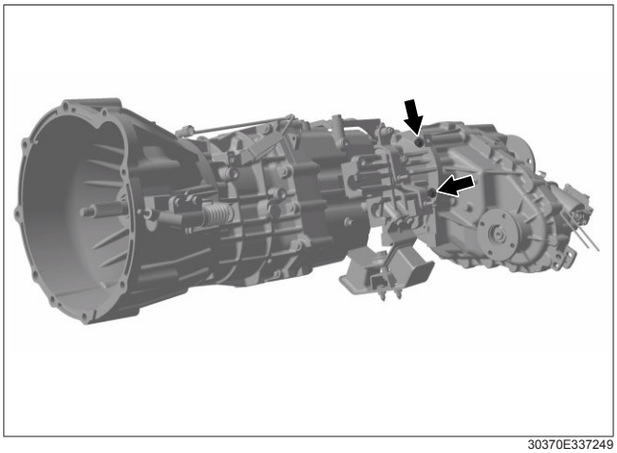
⚠ Caution

› Before removing transfer case and transmission nut, make sure that the transfer case is adequately supported by the lifter. It is not allowed to hang transfer case directly on transmission through spline shaft, or it may result in damage to transfer case parts.

9. Remove 5 bolts



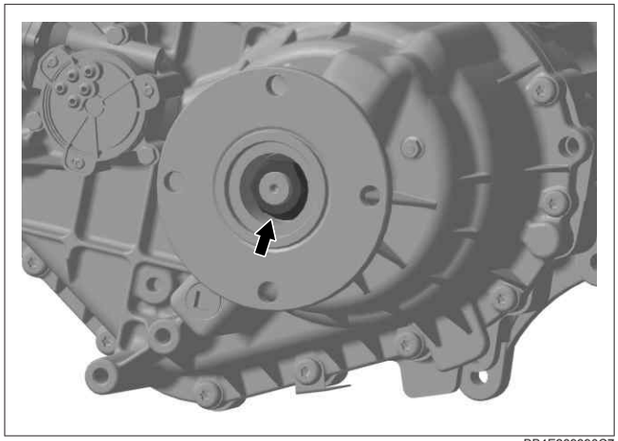
2F1D05D093A4



30370E337249

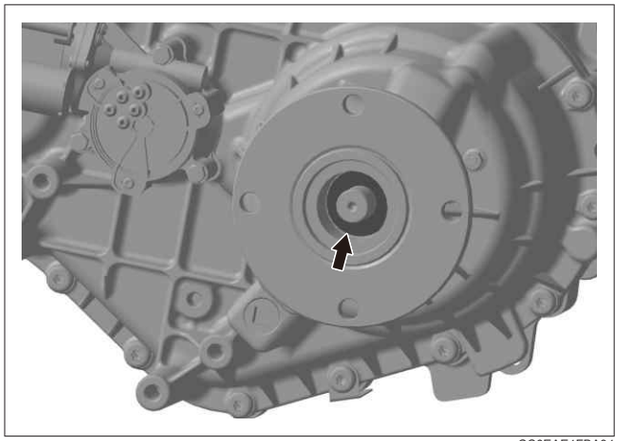
10. Remove transfer case assembly

11. Remove 1 nut



BB4E289390C7

12. Remove gasket



CC6EAE4FBA34



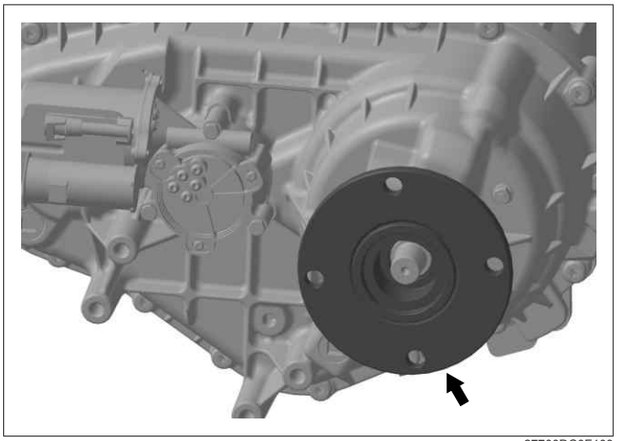
AFA315B161EB

13. Remove O-ring



09CD5858FA43

14. Remove rear flange plate assembly

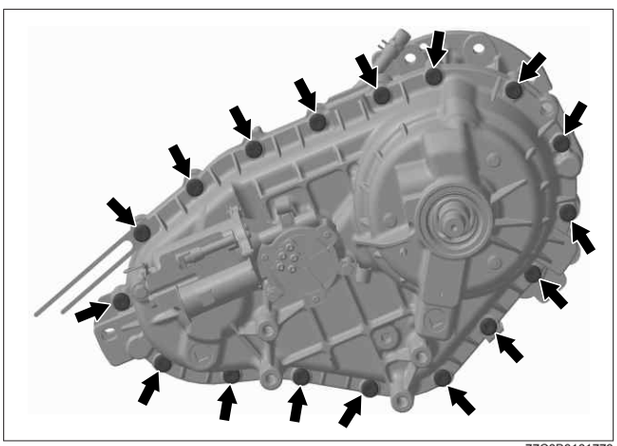


27700DC0F103

Notice

- Flange plate can be removed using a puller.

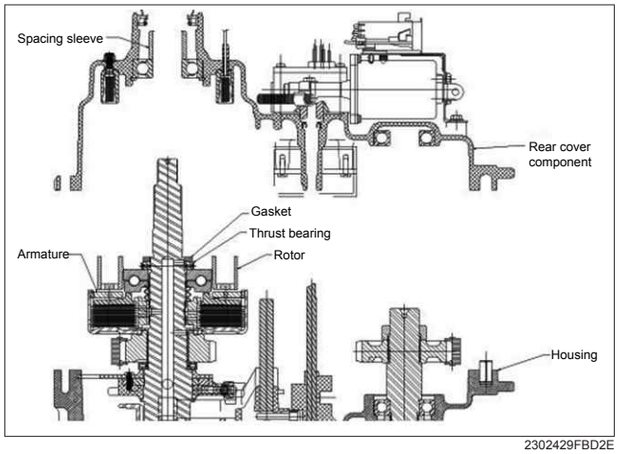
15. Remove 17 bolts



77C8B3161773

16. Remove rear cover component of transfer case, harness clips and nameplate of transfer case

17. Remove gasket, thrust bearing, rotor and armature



2302429FBD2E

⚠ Caution

› Do not drop the steel balls when removing the rotor.

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› When removing the sealant on the housing and surface of the rear cover and case, wipe the sealant outward, preventing residual sealant from entering the case.

› Re-apply RTV glue on the housing, keep the glue line continuous, and do not break the line.

› When reinstalling the rear cover component, insert the spacing sleeve into the shaft with the triangular spindle nose of shift shaft aligned with the triangular groove at the coding disk of the motor. If it can't be fitted, adjust the angle of the shift shaft slightly and try again. Do not shake violently to prevent steel balls from falling.

› Before assembly of the rear flange plate, wipe the surface gently with clean oil-absorbing sheet to prevent impurities from damaging the oil seal. Align the flange plate spline with the shaft spline, use a rawhide hammer to knock it into place, then install new O-rings and gaskets, tighten the joint surface bolts, and tighten the flange locking nuts.

› Align the assembly markings.

› Add transfer case lubricant and check transfer case lubricant level.

Rotor/armature (8AT)

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Empty transfer case lubricant
4. Remove front axle propeller shaft assembly

⚠ Caution

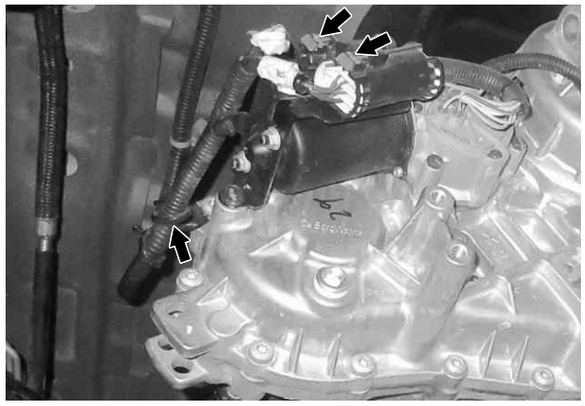
› Make assembly marks before disassembly.

5. Remove rear axle propeller shaft assembly

⚠ Caution

› Make assembly marks before disassembly.

6. Disconnect harness connector of transfer case and separate harness clip



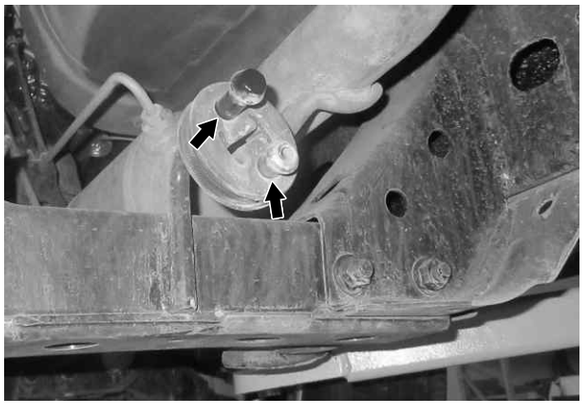
74C4F9687630

7. Separate clip for transfer case vent pipe, and disconnect vent pipe and transfer case housing



0EB4B6B116BC

8. Remove rubber hanger of exhaust pipe



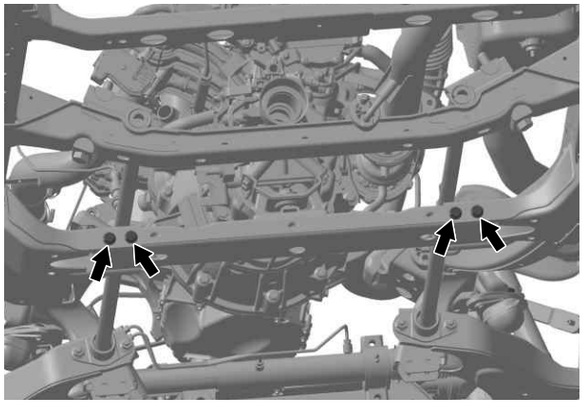
C0DF3C366622

9. Support transmission and transfer case properly
10. Disconnect transmission mount and the fourth beam subassembly of the frame



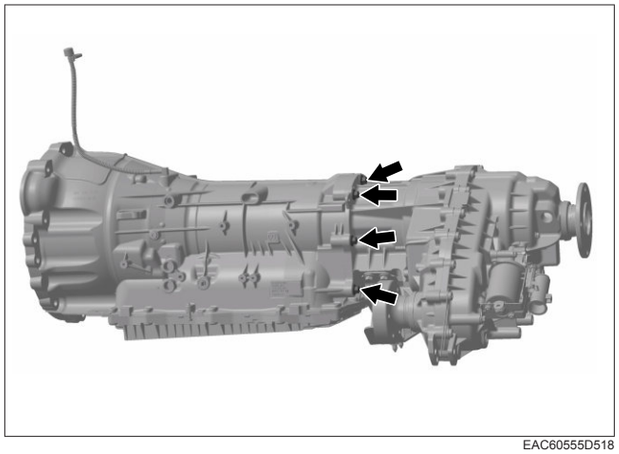
1808BABE740A

11. Remove fourth beam subassembly of the frame

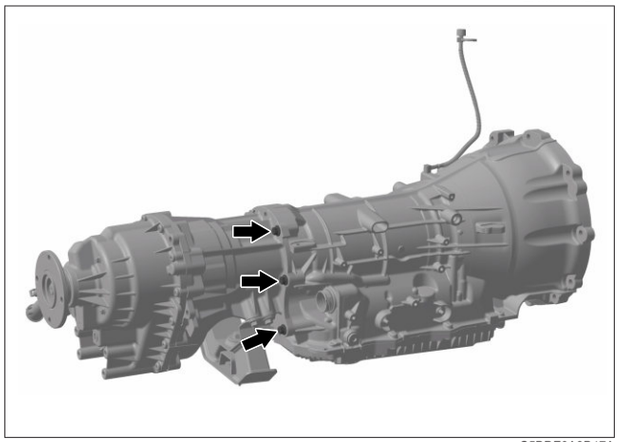


B1D115D1B7EA

12. Remove 7 bolts, and remove transfer case with transmission mount

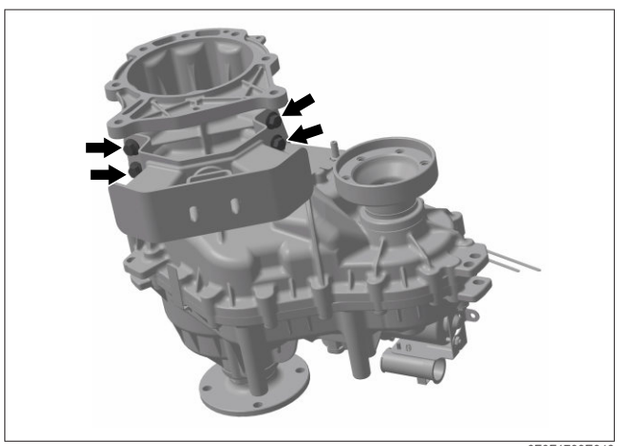


EAC60555D518



C5BDF0A8B47A

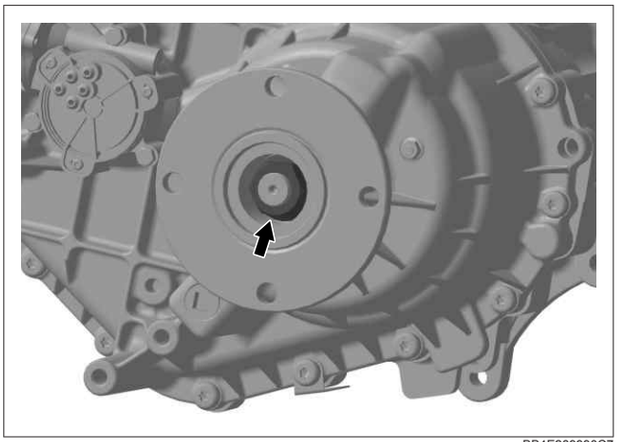
13. Remove 4 bolts, and separate transmission mount



6F6F1793E948

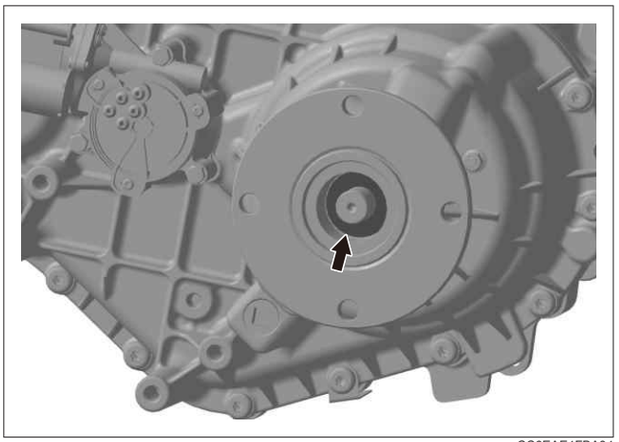
14. Remove transfer case assembly

15. Remove 1 nut



BB4E289390C7

16. Remove gasket



CC6EAE4FBA34



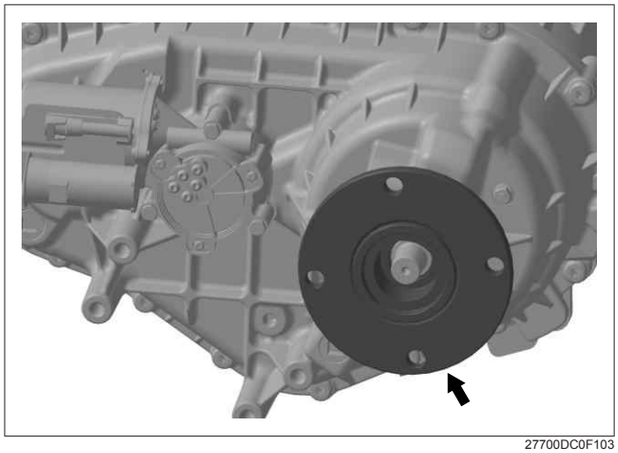
AFA315B161EB

17. Remove O-ring



09CD5858FA43

18. Remove rear flange plate assembly

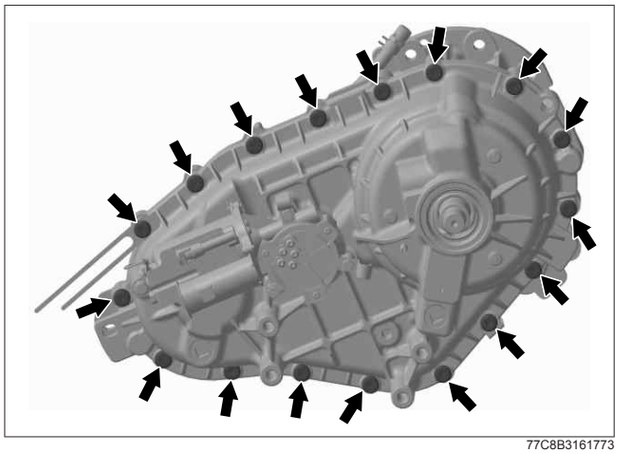


27700DC0F103

Notice

› Flange plate can be removed using a puller.

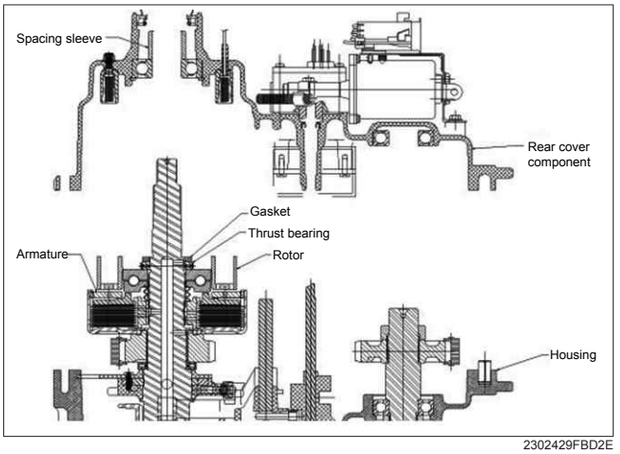
19. Remove 17 bolts



77C8B3161773

20. Remove rear cover component of transfer case, harness clips and nameplate of transfer case

21. Remove gasket, thrust bearing, rotor and armature



2302429FBD2E

Caution

› Do not drop the steel balls when removing the rotor.

Installation

1. Perform installation work in reverse order of removal

Caution

› When removing the sealant on the housing and surface of the rear cover and case, wipe the sealant outward, preventing residual sealant from entering the case.

› Reapply RTV sealant on the case, ensuring continuity of the sealant line without any break.

› When reinstalling the rear cover component, insert the spacing sleeve into the shaft with the triangular spindle nose of shift shaft aligned with the triangular groove at the coding disk of the motor. If it can't be fitted, adjust the angle of the shift shaft slightly and try again. Do not shake violently to prevent steel balls from falling.

› Before assembly of the rear flange plate, wipe the surface gently with clean oil-absorbing sheet to prevent impurities from damaging the oil seal. Align the flange plate spline with the shaft spline, use a rawhide hammer to knock it into place, then install new O-rings and gaskets, tighten the joint surface bolts, and tighten the flange locking nuts.

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

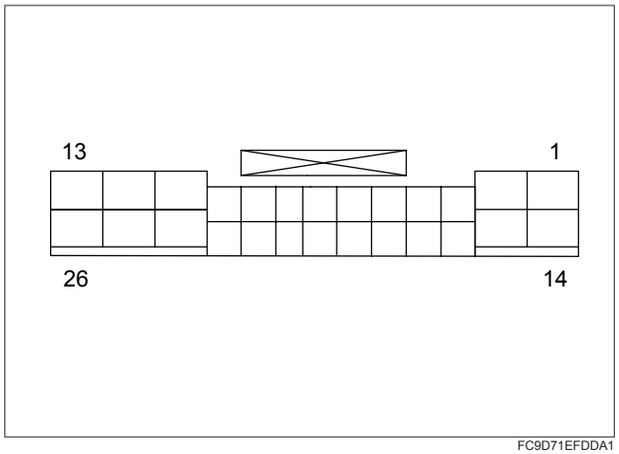
› Add transfer case lubricant, and check the level of transfer case lubricant.

Electronic control unit of transfer case - without all terrain

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Transfer case control unit x vehicle body	9±2	2	—

Pin definition



FC9D71EFDDA1

Pin No.	Function
1	Motor power 1
2	Motor power 2
3	—
4	2WD/AUTO mode switch input
5	Motor position 2
6	—
7	—
8	CAN high
9	CAN low
10	—
11	Solenoid coil
12	Negative terminal of the battery
13	Positive terminal of the battery
14	Motor power 1
15	Motor power 2
16	AUTO/4L mode switch input
17	Motor position 4
18	Motor position 1
19	Motor position 3
20	Motor position circuit
21	—
22	—
23	Ignition power supply
24	—
25	Negative terminal of the battery

Pin No.	Function
26	Positive terminal of the battery

Removal/installation

Removal

1. Open rear right door
2. Disconnect the negative terminal of the battery.
3. Lay down rear right seat backrest



23536E15AD29

4. Remove 1 snap fastener



51B43FBEC2AB

5. Remove rear wall cover plate



6E9EA04226CC

6. Disconnect connector of transfer case control unit



8AFD23629F35

7. Remove 2 nuts



1CDD18519F40

8. Remove transfer case control unit

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

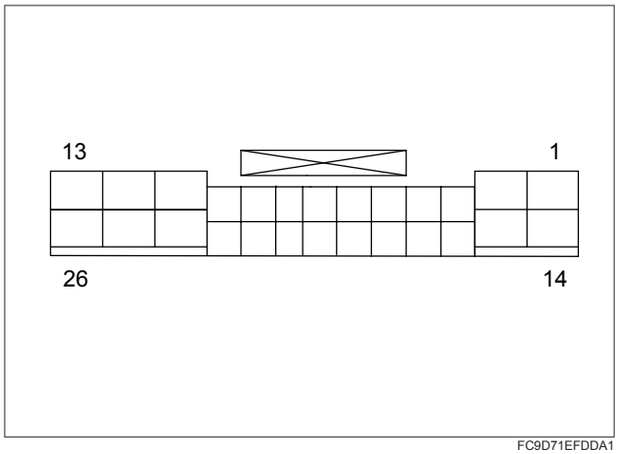
› Tighten the fastener according to the specified torque value.

Electronic control unit of transfer case - with all terrain

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Transfer case control unit x vehicle body	9±2	2	—

Pin definition



FC9D71EFDDA1

Pin No.	Function
1	Motor power 1
2	Motor power 2
3	—
4	—
5	Motor position 2
6	—
7	—
8	CAN high
9	CAN low
10	—
11	Solenoid coil
12	Negative terminal of the battery
13	Positive terminal of the battery
14	Motor power 1
15	Motor power 2
16	—
17	Motor position 4
18	Motor position 1
19	Motor position 3
20	Motor position circuit
21	—
22	—
23	Ignition power supply
24	—
25	Negative terminal of the battery

Pin No.	Function
26	Positive terminal of the battery

Removal/installation

Removal

1. Open rear right door
2. Disconnect the negative terminal of the battery.
3. Lay down rear right seat backrest



23536E15AD29

4. Remove 1 snap fastener



51B43FBEC2AB

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6E9EA04226CC

6. Disconnect connector of transfer case control unit



8AFD23629F35

7. Remove 2 nuts



1CDD18519F40

8. Remove transfer case control unit

Installation

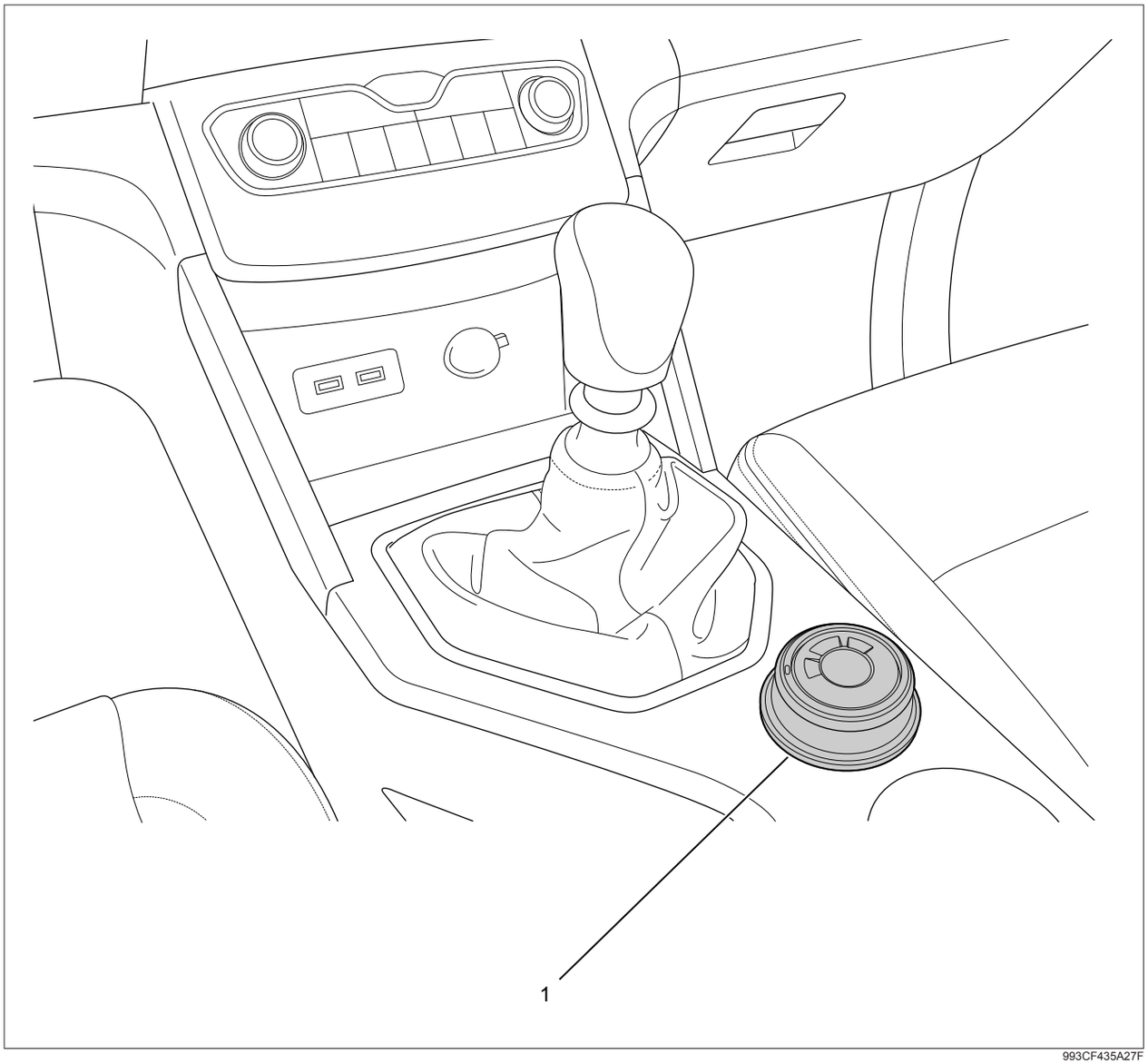
1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Drive mode switch assembly (6MT)

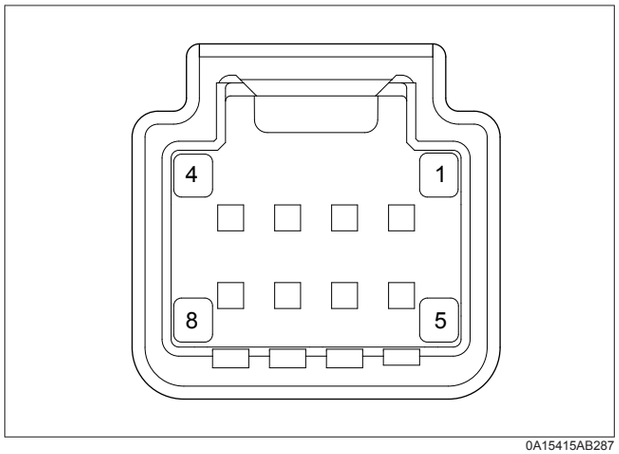
Location diagram



993CF435A27F

1. Drive mode switch assembly

Pin definition



0A15415AB287

Pin No.	Function
1	Backlight power supply
2	—
3	GND
4	—
5	4L
6	GND
7	AUTO
8	Ignition power supply

Removal/installation

Removal

⚠ Warning

› You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply parking brake, and put shift lever in N gear
2. Disconnect the negative terminal of the battery.
3. Remove the gear shift lever



7B484CA2CCD6

i Notice

› Turn gear shift lever counterclockwise to unscrew it.

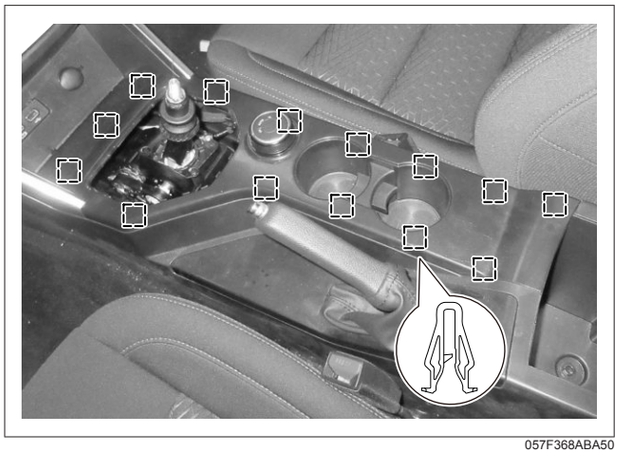
4. Remove shifter dust boot assembly



E69D028111A0

5. Open auxiliary instrument panel elbow pillow assembly

6. Separate 14 clips



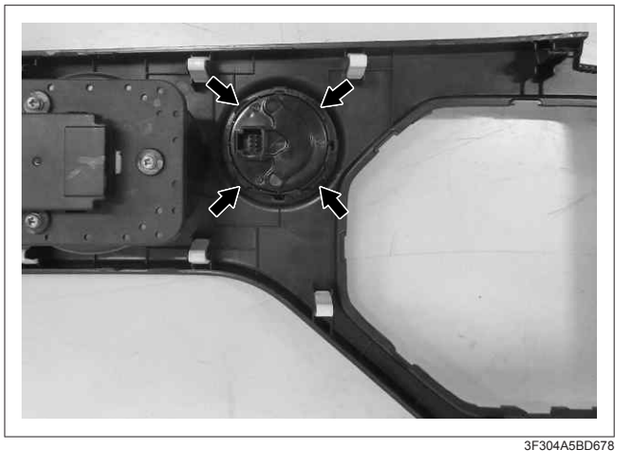
057F368ABA50

7. Disconnect harness connector



765F2AEADDA3

8. Remove console panel of auxiliary instrument panel
9. Separate 4 dogs



3F304A5BD678

10. Remove drive mode switch assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

All terrain control system

All-terrain control system ..... 18－1
System description ..... 18－1
System diagram ..... 18－2
List of DTC ..... 18－3
DTC troubleshooting method ..... 18－4
Drive mode switch assembly (8AT) ..... 18－5
Location diagram ..... 18－5
Pin definition ..... 18－6
Removal/installation ..... 18－6
Auxiliary instrument panel left control switch (8AT) ..... 18－8
Location diagram ..... 18－8
Pin definition ..... 18－9
Removal/installation ..... 18－9

All-terrain control system

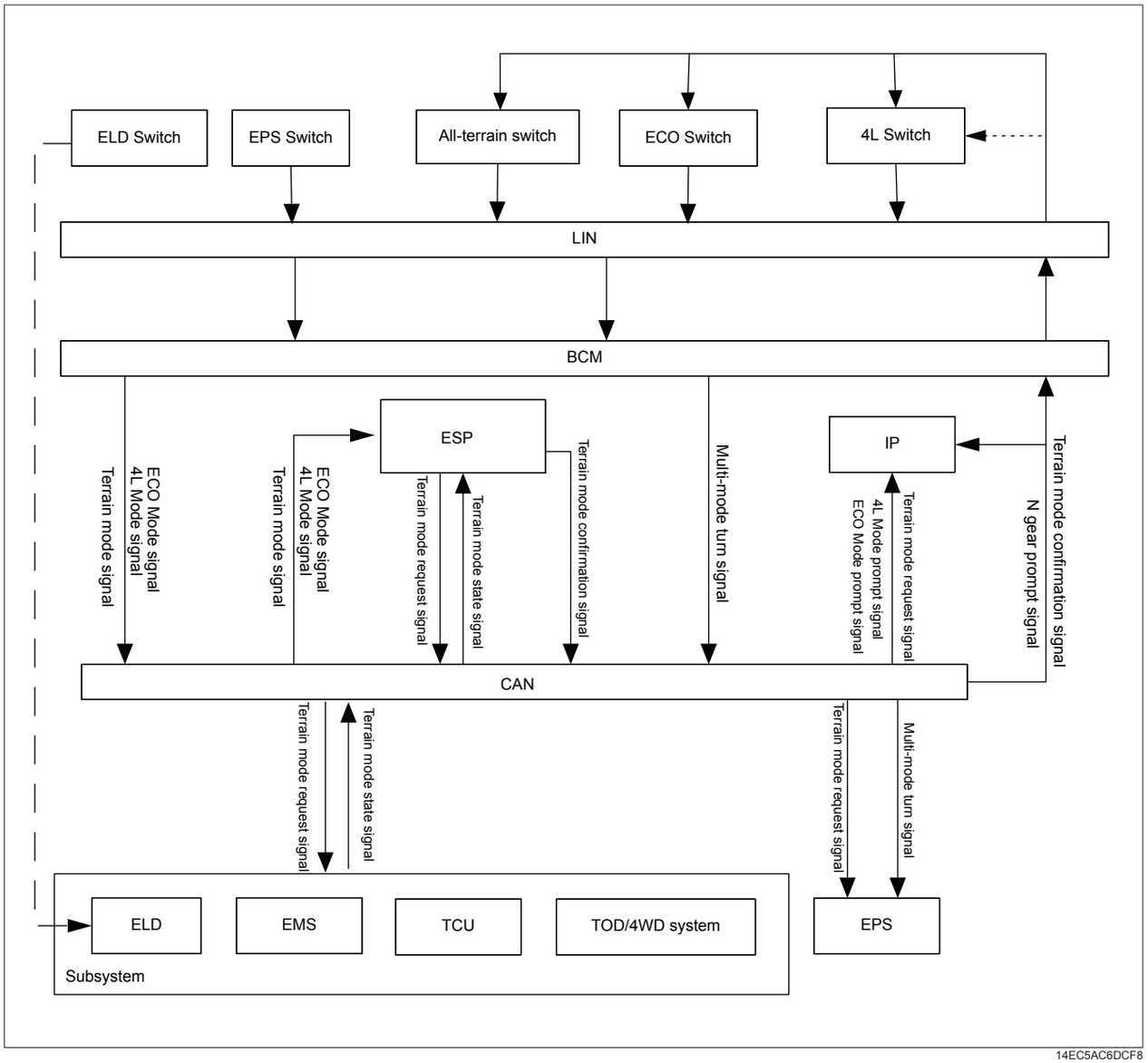
System description

All-terrain control system gives an instruction of terrain mode request through the all-terrain switch. The signal is transmitted to BCM through LIN, and BCM sends all-terrain-related signals to ESP through CAN bus. After receiving all-terrain-related signals, ESP sends terrain mode request signals to EMS, TCU, 4WD system, ELD, EPS, and each IP subsystem in combination with road identification information. After receiving terrain mode request signal, each subsystem enters corresponding operating mode according to all-terrain control strategy. At the same time, each system feedbacks its terrain mode state signal to ESP through CAN bus and makes a final judgment. After successful judgment, ESP sends terrain mode confirmation signal to switch and IP for display.

Power steering EPS system applies open-loop control. The switch of electronic differential lock ELD is connected to ELD system through hard wires. Starting and shutting down of these two systems has no effect on all-terrain system. All-terrain system makes judgment according to its own logic.

The main strategy is stored in ESP system. The entire all-terrain control system is made of ESP, 4WD system, EMS, TCU, ELD, EPS, and IP system, which jointly complete seven terrain modes of AUTO, sports, ECO, snow, mud, sand and 4L.

System diagram



14EC5AC6DCF8

List of DTC

No.	DTC	DTC description
1	U050005	ATM_EMSNegResp signal invalid
2	U050006	ATM_TCUNegResp signal invalid
3	U050007	ATM_TODNegResp signal invalid
4	U050008	ATM_EGDNegResp signal invalid
5	U05000A	ATMNet signal invalid

DTC troubleshooting method

U050005，U050006，U050007，U050008，U05000A

CAN bus node fault

Possible causes:

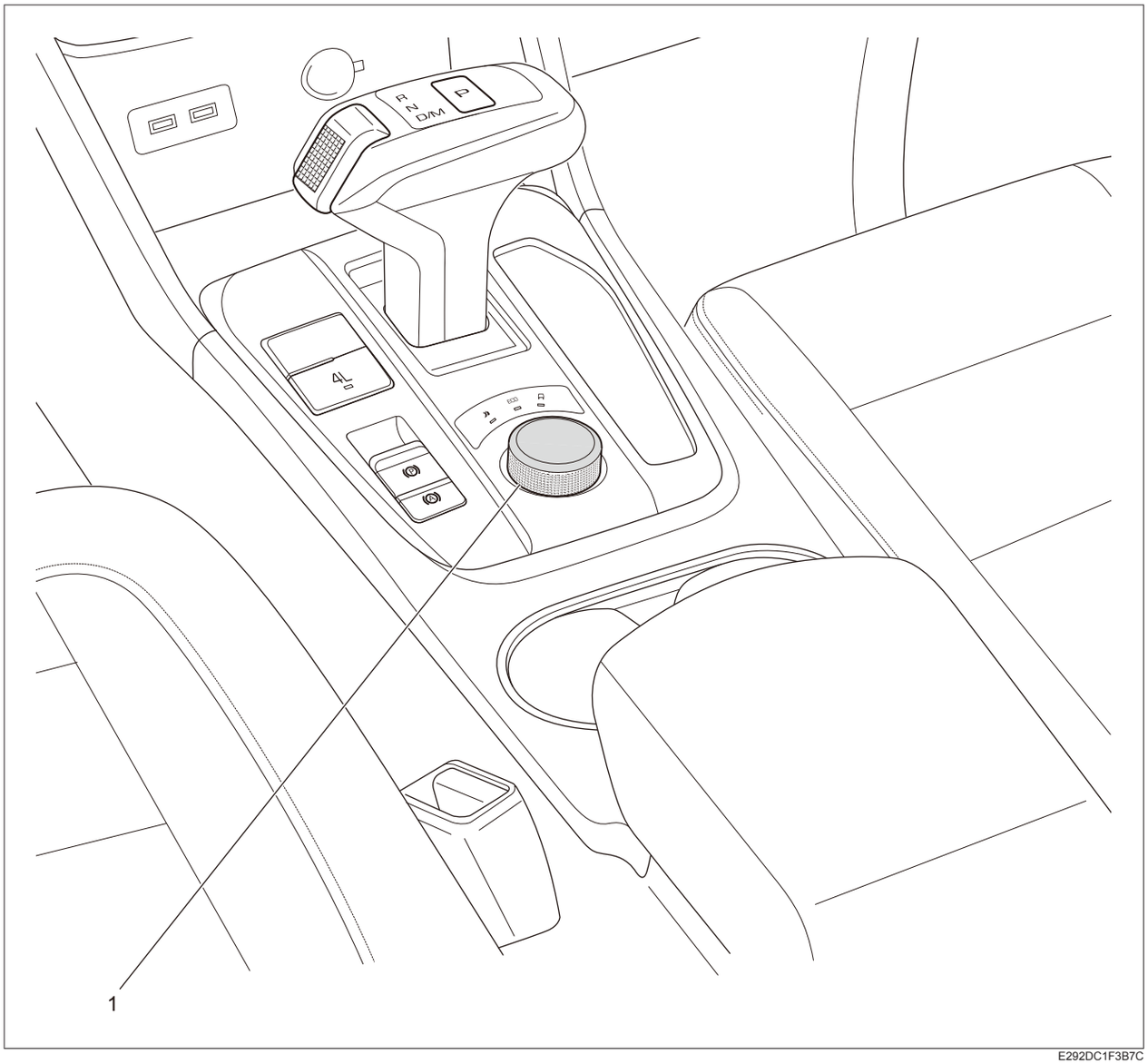
- CAN bus communication interrupted.
- Poor power supply for CAN bus nodes (EMS/TCU/BCM/Gateway/AWDNET).
- There is something wrong with nodes of the CAN bus (EMS/TCU/BCM/Gateway/AWDNET) (it has left the CAN bus or the ECU has a problem).

Diagnostic and repair method:

- Check if CAN bus communication is normal.
- Turn off the ignition switch, and measure the resistance of CAN-H and CAN-L ranging from various CAN bus nodes to the ESP (standard value: less than 5 Ω).
- Measure CAN-H and CAN-L resistance from various CAN bus node connectors (with connectors in place), (standard value: 60 Ω).
- Check power supply of various CAN bus nodes.
- Obtain CAN bus node DTCs and check based on specific codes obtained.

Drive mode switch assembly (8AT)

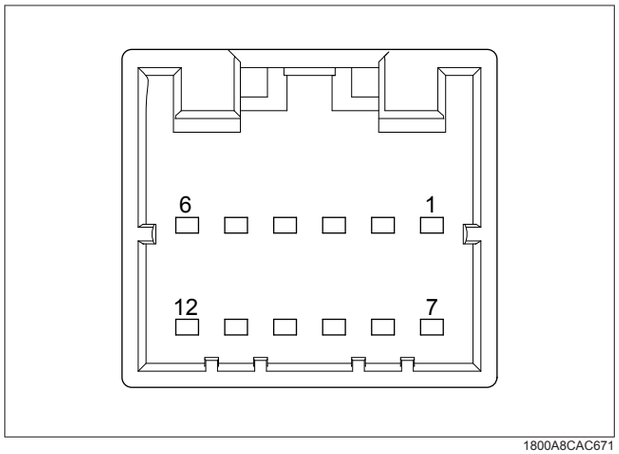
Location diagram



E292DC1F3B7C

1. Drive mode switch assembly

Pin definition



1800A8CAC671

Pin No.	Function
1	—
2	—
3	—
4	—
5	—
6	—
7	Backlight power supply
8	—
9	Ignition power supply
10	—
11	LIN
12	Ground

Removal/installation

Removal

⚠ Warning

› You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply the electronic parking and engage the P gear.
2. Disconnect the negative terminal of the battery.
3. Remove upper part of gear shift lever



61B008865104

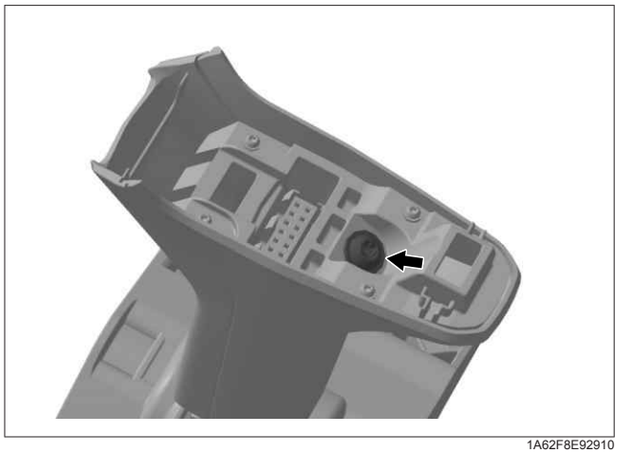
⚠ Caution

› In removing upper component of gear shift lever, support upper component of gear shift lever with two hands and pull it out in vertical direction (about 95 N pulling force).

› Prying out or pulling out in inclined direction using other tool is forbidden, otherwise damage to the component will be caused.

› Do not disassemble upper component of gear shift lever, otherwise the component will be damaged.

4. Remove 1 gear shift lever mounting bolt



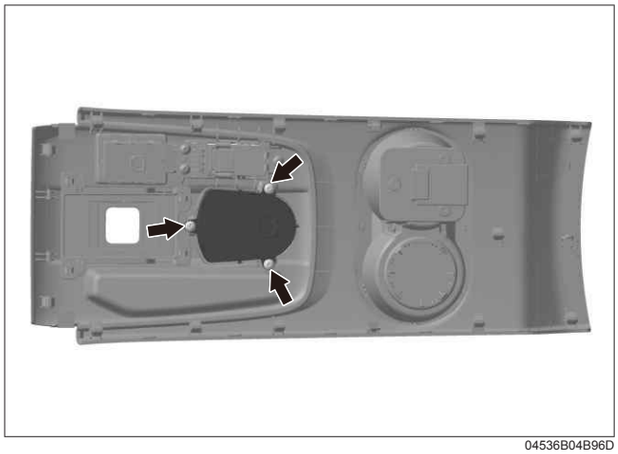
1A62F8E92910

5. Remove lower part of gear shift lever

⚠ Caution

› Do not disassemble lower component of gear shift lever, otherwise the component will be damaged.

6. Open the auxiliary instrument panel elbow pillow assembly
7. Remove the console panel assembly of the auxiliary instrument panel
8. Disconnect the harness connector of the console panel of the auxiliary instrument panel
9. Remove the 3 screws



04536B04B96D

10. Remove drive mode switch assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

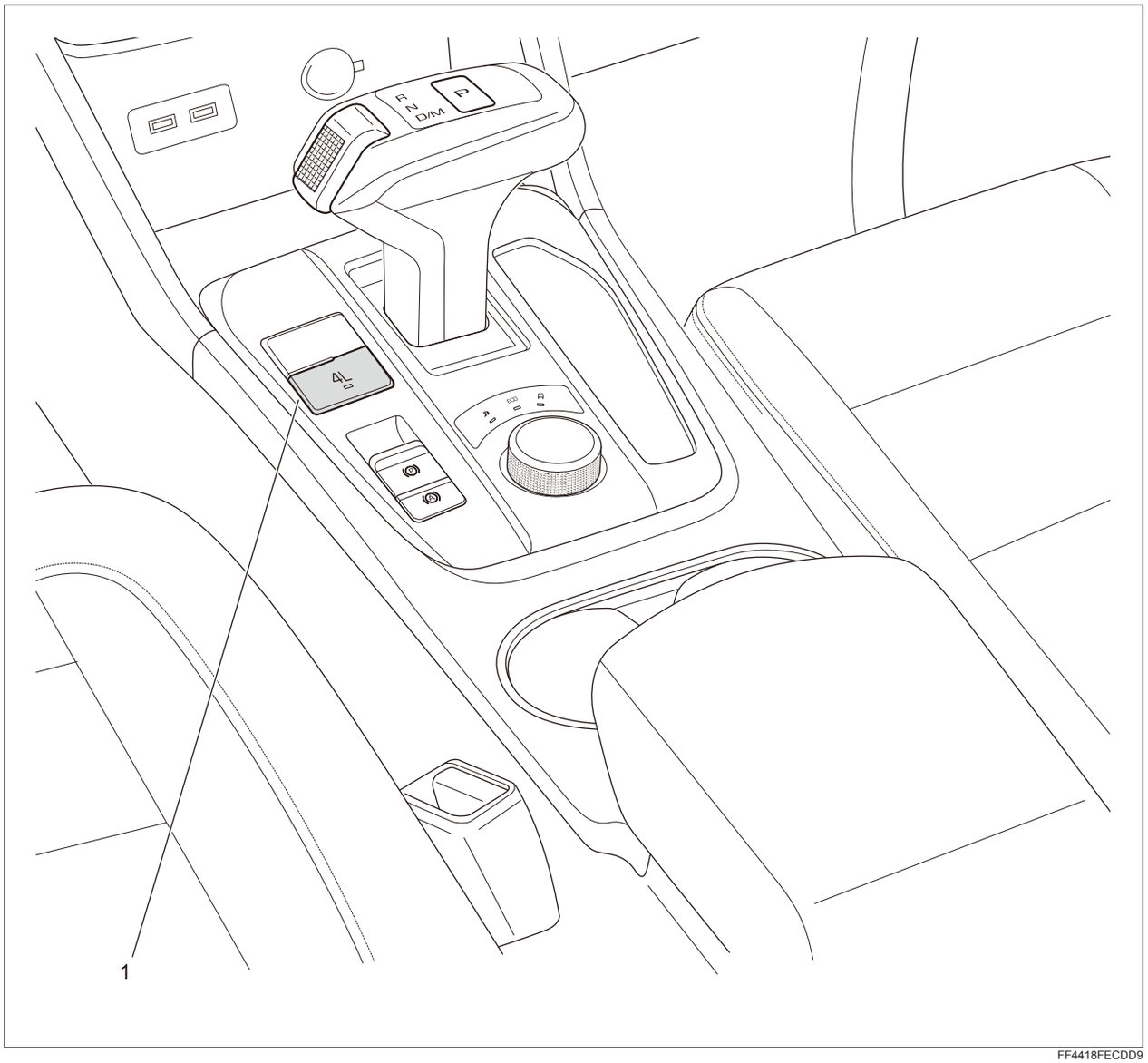
› Before installing upper component of gear shift lever, check parts and components for breakage and pin deflection and iron clip falling off, and repair or replace the parts and components as appropriate.

› In installing upper component of gear shift lever, ensure alignment of upper and lower components of gear shift lever, and then press on the middle of the upper component of gear shift lever and press it in vertical direction (about 100 N mounting force) until clap is heard, and installation of upper component of gear shift lever is completed.

› Tighten the fastener according to the specified torque value.

Auxiliary instrument panel left control switch (8AT)

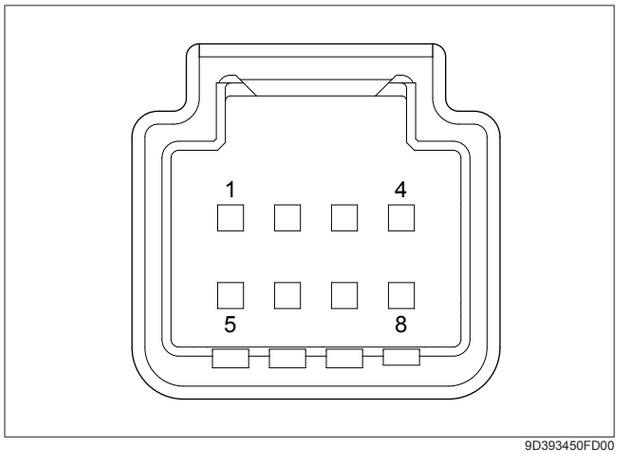
Location diagram



FF4418FECDD9

1. Auxiliary instrument panel left control switch assembly

Pin definition



9D393450FD00

Pin No.	Function
1	LIN
2	Ignition power supply
3	Ground
4	Backlight input
5	—
6	—
7	—
8	—

Removal/installation

Removal

⚠ Warning

› You must turn off the engine before dismantling any shift mechanism components to prevent body injury caused a sudden move of the vehicle.

1. Apply the electronic parking and engage the P gear.
2. Disconnect the negative terminal of the battery.
3. Remove upper part of gear shift lever



61B008865104

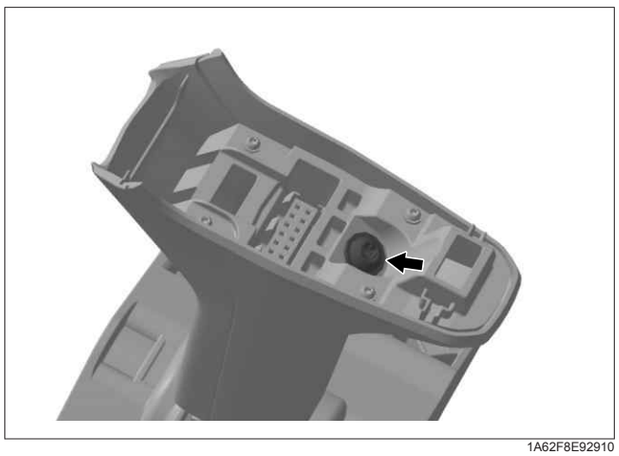
⚠ Caution

› In removing upper component of gear shift lever, support upper component of gear shift lever with two hands and pull it out in vertical direction (about 95 N pulling force).

› Prying out or pulling out in inclined direction using other tool is forbidden, otherwise damage to the component will be caused.

› Do not disassemble upper component of gear shift lever, otherwise the component will be damaged.

4. Remove 1 gear shift lever mounting bolt



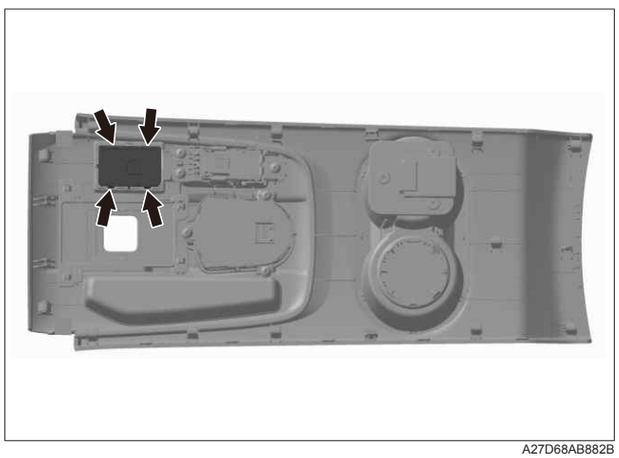
1A62F8E92910

5. Remove lower part of gear shift lever

⚠ Caution

› Do not disassemble lower component of gear shift lever, otherwise the component will be damaged.

6. Open the auxiliary instrument panel elbow pillow assembly
7. Remove the console panel assembly of the auxiliary instrument panel
8. Disconnect the harness connector of the console panel of the auxiliary instrument panel
9. Separate 4 dogs



A27D68AB882B

10. Remove auxiliary instrument panel left control switch assembly

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Before installing upper component of gear shift lever, check parts and components for breakage and pin deflection and iron clip falling off, and repair or replace the parts and components as appropriate.

› In installing upper component of gear shift lever, ensure alignment of upper and lower components of gear shift lever, and then press on the middle of the upper component of gear shift lever and press it in vertical direction (about 100 N mounting force) until clap is heard, and installation of upper component of gear shift lever is completed.

› Tighten the fastener according to the specified torque value.

Electronic differential lock system

Electronic differential lock system .....19－1
System description .....19－1
System diagram.....19－2
DTC checklist.....19－3
DTC troubleshooting method.....19－4
Electronic differential lock control unit .....19－11
Location diagram .....19－11
Pin definition .....19－12
Specified torque.....19－13
Removal/installation.....19－14
Console panel switch assembly .....19－15
Location diagram .....19－15
Pin definition .....19－16
Removal/installation.....19－16

Electronic differential lock system

System description

ELD function

The electronic control differential lock is provided with an additional set of locking mechanism on the basis of the traditional open differential, which controls the mechanism through electronic switch to complete locking and disconnection operations to assist the vehicle to get out of trouble.

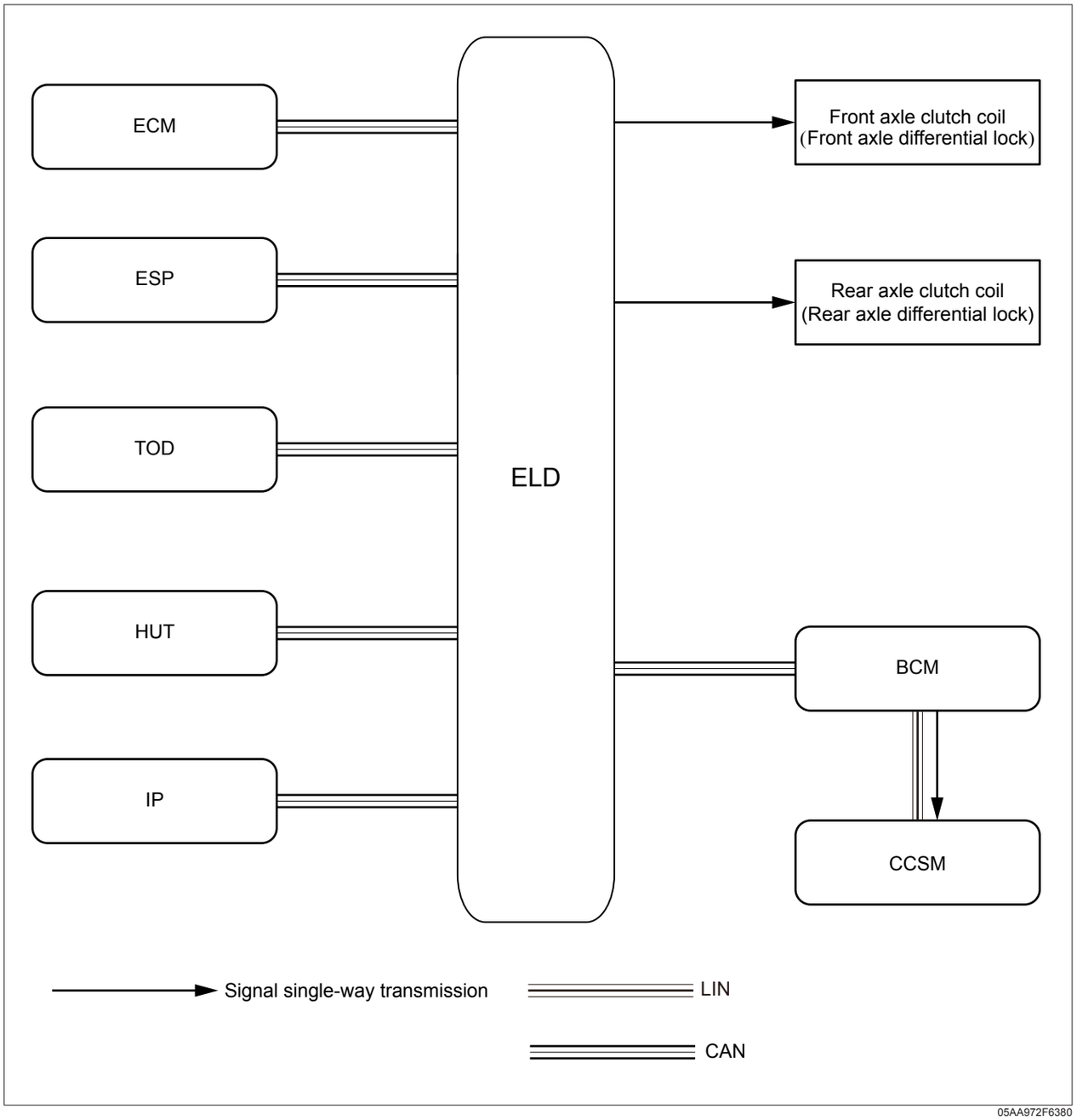
- Lockup of differential lock: When wheels on one side slip or the vehicle is about to travel on a harsh road, the driver can lock the left and right axles completely through electronic switch control as necessary, thus to achieve the same speed of the left and right wheels and transmit 100% of traction to effective wheels, avoiding wheel slipping or sinking.
- Unlocking of differential lock: The driver releases the differential lock through an electronic switch as necessary to achieve differential speeds of left and right wheels, ensuring stability and safety of the vehicle. It can also be unlocked automatically at high speeds to ensure safety (ECU control).

Operating principle

When locked, ECU inputs a working current to solenoid coil to activate it. The solenoid coil makes the cam disc rotate at a speed lower than the differential housing by magnetic force so that the push rod driven by the differential housing slides out of the groove of the cam disc and moves to the left to press the locking ring into the lock gear position. The locking ring locks the left axle shaft gear with the differential housing, thus to lock the entire differential.

To unlock it, ECU cuts off the current input, the locking ring and the push rod return to disconnected positions under the action of return spring, and the differential is unlocked.

System diagram



DTC checklist

No.	DTC	DTC description
1	U110017	Voltage too high
2	U110116	Voltage too low
3	U000188	PT-CAN bus off
4	U012287	Communication with ESP lost
5	U011487	Communication with Nextrac (TOD) lost
6	U014087	BCM6 message lost
7	P1B0001	Rear axle coil fault
8	P1B0101	Front coil fault
9	P1B0274	Rear axle differential malfunction
10	P1B0374	Front axle differential lock malfunction
11	P1B0408	Signal fault of front left or front right wheel speed
12	P1B0608	Signal fault of rear left or rear right wheel speed
13	P1B0808	Speed fault
14	P1B0908	TOD mode signal fault
15	P1B0A08	Rear differential request signal fault
16	P1B0B08	Front differential request signal fault
17	P1B0C56	Invalid vehicle configuration
18	P1B0D04	Reset ECU
19	P1B0E4B	Temperature fault

DTC troubleshooting method

U110017

DTC definition: voltage too high

Possible causes:

› Input voltage is higher than the design voltage of ELD ECU.

Troubleshooting:

1. Check the battery voltage of ELD ECU through VBATT (pin X1-2) and VBATT_GND (pin X2-2).
   - › If the voltage is higher than 16 V, correct the battery voltage and check the voltage regulator/ alternator.
   - › If the voltage is lower than 16V, replace ELD ECU.

U110116

DTC definition: voltage too low

Possible causes:

› Input voltage is lower than the design voltage.

Troubleshooting:

1. Check the battery voltage of ELD ECU through VBATT (pin X1-2) and VBATT_GND (pin X2-2).
   - › If the voltage is lower than 9 V, correct the battery voltage, and check the voltage regulator/ alternator and power connections.
   - › If the voltage is higher than 9 V, replace ELD ECU.

U000188

DTC definition: PT-CAN bus off

Possible causes:

› Communication with vehicle CAN bus failed.

Troubleshooting:

1. Check connections between high and low sides.
   - › If any connection is disconnected, short-circuited to VBATT or GND, no termination resistance for bus (60 ohms between CAN high and CAN low), bus voltage is out of range, or excessive noise is detected, then correct CAN bus connections.
   - › If CAN line is normal, replace ELD ECU.

U012287

DTC definition: communication with ESP lost

Possible causes:

› ELD ECU cannot receive regular communication messages from ESP system.

Troubleshooting:

1. Check connections of CAN high and CAN low with ESP controller.
   - › If any connection with ESP fails, correct CAN bus connection with ESP controller.
1. Determine if ESP is sending correct messages using bus analyzer.
   - › If messages are not sent correctly (ABS1, ABS2 or ABS3), replace ESP controller or correct the CAN bus connection with ESP controller.

U011487

DTC definition: communication with Nextrac (TOD) lost

Possible causes:

› ELD ECU failed to receive regular communication messages from TOD system.

Troubleshooting:

1. Check connections of CAN high and CAN low with TOD controller.
   › If any connection with TOD fails, correct CAN bus connection with TOD controller.
2. Determine if TOD controller is sending correct messages using bus analyzer.
   › If TOD1 messages are not sent correctly, replace TOD controller or correct the CAN bus connection with TOD controller.

U014087

DTC definition: BCM6 messages lost

Possible causes:

› ELD ECU failed to receive regular communication messages from BCM system.

Troubleshooting:

1. Check connections of CAN high and CAN low with BCM.
   › If any connection with BCM fails, correct CAN bus connection with BCM controller.
2. Determine if BCM is sending correct messages using bus analyzer.
   › If BCM6 messages are not sent correctly, replace BCM controller or correct the CAN bus connection BCM controller.

P1B0001

DTC definition: rear axle coil fault

Possible causes:

› Faulty connection between ELD controller and stator coil of rear axle differential.

Troubleshooting:

1. Check physical connections between ELD ECU, vehicle harness and rear axle differential.
   › If any line is open-circuited, loose, damaged or corroded, repair the connections or replace the components.
2. Disconnect connector from ELD ECU, and measure the mated vehicle harness connector pins below

Measuring point 1	Measuring point 2	Check items	Standard value
X1-4	Vehicle body GND	Resistance	Infinity
X2-4	Vehicle body GND	Resistance	Infinity
X1-4	Vehicle body GND	Voltage	<1V
X2-4	Vehicle body GND	Voltage	<1V
X1-4	X2-4	Resistance	(3 ±1)Ω

   › If any problem is found by checking according to the table above, check the line again to determine the location of the fault, and replace the component.
   › If no problem is found when measuring the connector on the differential, replace the

vehicle harness.

› If negative result is found when measuring the connector on the differential, replace the rear axle differential.

› If the check result is good according to the table above, repeat the measurement at ELD ECU connector.

› If the result remains good when ELD ECU connector is retested, replace ELD ECU.

› If the problem is not solved by replacing the parts, or if all the check results are good, drive on a rough road and check for intermittent connection problems by means of vibration. If any, replace the component in which connection problem is found.

P1B0101

DTC definition: front axle coil fault

Possible causes:

› Faulty connection between ELD controller and stator coil of front axle differential.

Troubleshooting:

1. Check physical connections between ELD ECU, vehicle harness and front axle differential.

› If any line is open-circuited, loose, damaged or corroded, repair the connections or replace the components.

2. Disconnect connector from ELD ECU, and measure the mated vehicle harness connector pins below.

Measuring point 1	Measuring point 2	Check items	Standard value
X1-1	Vehicle body GND	Resistance	Infinity
X2-3	Vehicle body GND	Resistance	Infinity
X1-1	Vehicle body GND	Voltage	<1V
X2-3	Vehicle body GND	Voltage	<1V
X1-1	X2-3	Resistance	(3 ±1)Ω

› If any problem is found by checking according to the table above, check the line again to determine the location of the fault, and replace the component.

› If no problem is found when measuring the connector on the differential, replace the vehicle harness.

› If negative result is found when measuring the connector on the differential, replace the front axle differential.

› If the check result is good according to the table above, repeat the measurement at ELD ECU connector.

› If the result remains good when ELD ECU connector is retested, replace ELD ECU.

› If the problem is not solved by replacing the parts, or if all the check results are good, drive on a rough road and check for intermittent connection problems by means of vibration. If any, replace the component in which connection problem is found.

P1B0274

DTC definition: rear axle differential lock malfunction

Possible causes:

› When instructed to lock, the rear axle differential cannot not be locked, and the rear wheels keeps sliding for 5 s when the accelerator is applied.

⚠ Caution

› With mechanical lock mechanism provided in ELocker differential, partial engagement of the lock gear or engaging in case of slipping wheels may cause lock failure, especially when the accelerator is applied during lockup of the differential. Be aware that this differential will not complete physical lockup when ELD ECU supplies power to stator coil. When ELD ECU stator supplies power to the coil, the differential will only be mechanically rotated when the vehicle is moving or the wheels are turning, and then the physical lockup will be achieved. If ELocker fails to lock for the first time, it is suggested that the driver reduce the accelerator so that the vehicle stops, or stop the turning of wheels and try again to request locking. If the differential is successfully locked for the second time and no locking failure occurs any longer after that, there is no need to repair the vehicle.

Troubleshooting:

1. Have both rear wheels of the vehicle on the same road, then request lockup and drive slowly forward to allow the differential to lock.
2. After driving a few meters to allow the mechanical mechanism to lock up and engage, try to make a turn. If lockup actually occurs at this time, you will feel the tires bouncing on the ground. If the differential is not locked, proceed as follows:

   › When ELD ECU accepts the lock request, check that the output voltage of the differential stator coil is within the 6 V range of the battery or alternator voltage. If the voltage is below this threshold, replace ELD ECU, or replace the differential.

P1B0374

DTC definition: front axle differential lock malfunction

Possible causes:

› When instructed to lock, the front axle differential cannot not be locked, and the rear wheels keeps sliding for 5 s when the accelerator is applied.

⚠ Caution

› With mechanical lock mechanism provided in ELocker differential, partial engagement of the lock gear or engaging in case of slipping wheels may cause lock failure, especially when the accelerator is applied during lockup of the differential. Be aware that this differential will not complete physical lockup when ELD ECU supplies power to stator coil. When ELD ECU stator supplies power to the coil, the differential will only be mechanically rotated when the vehicle is moving or the wheels are turning, and then the physical lockup will be achieved. If ELocker fails to lock for the first time, it is suggested that the driver reduce the accelerator so that the vehicle stops, or stop the turning of wheels and try again to request locking. If the differential is successfully locked for the second time and no locking failure occurs any longer after that, there is no need to repair the vehicle.

Troubleshooting:

1. Have both front wheels of the vehicle on the same road, then request lockup and drive slowly forward to allow the differential to lock.
2. After driving a few meters to allow the mechanical mechanism to lock up and engage, try to make a turn. If lockup actually occurs at this time, you will feel the tires bouncing on the ground. If the differential is not locked, proceed as follows:

› When ELD ECU accepts the lock request, check that the output voltage of the differential stator coil is within the 6 V range of the battery or alternator voltage. If the voltage is below this threshold, replace ELD ECU, or replace the differential.

P1B0408

DTC definition: signal fault of front left or front right wheel speed

Possible causes:

› Signal fault of front left or front right wheel speed: the matched diagnostic signal in the message from ESP module is reported as "invalid", out of range or due to an incorrect DLC length.

Troubleshooting:

› Check the signal of front left or front right wheel speed of ESP module.

P1B0608

DTC definition: signal fault of rear left or rear right wheel speed

Possible causes:

› Signal fault of rear left or rear right wheel speed: the matched diagnostic signal in the message from ESP module is reported as "invalid", out of range or due to an incorrect DLC length.

Troubleshooting:

› Check the signal of rear left or rear right wheel speed of ESP module.

P1B0808

DTC definition: speed signal fault

Possible causes:

› Speed signal fault: the matched diagnostic signal in the message from ESP module is reported as "invalid", out of range or due to an incorrect DLC length.

Troubleshooting:

› Check the speed signal of ESP module.

P1B0908

DTC definition: TOD mode signal fault

Possible causes:

› TOD system operation mode signal fault in TOD1 message: the matched diagnostic signal in the message from TOD module is reported as "invalid", out of range or due to an incorrect DLC length.

Troubleshooting:

› Check TOD system operation mode signal from TOD module.

P1B0A08

DTC definition: request signal fault of rear axle lock

Possible causes:

› Rear lockup request signal fault: the matched diagnostic signal is reported as "invalid" in the message of BCM module (through the gateway), or due to an incorrect DLC length.

Troubleshooting:

› Check the rear lockup request signal from BCM module (through the gateway)

P1B0B08

DTC definition: request signal fault of front axle lock

Possible causes:

› Front lockup request signal fault: the matched diagnostic signal is reported as "invalid" in the message of BCM module (through the gateway), or due to an incorrect DLC length.

Troubleshooting:

› Check the front lockup request signal from BCM module (through the gateway)

P1B0C56

DTC definition: Invalid vehicle configuration

Possible causes:

› Incorrect vehicle configuration value written at 0xF1B1.

Troubleshooting:

1. Read 0xF1B1 value through scanner
   - › If it is zero, set the correct value for the installed vehicle.
   - › If the setting is not a valid value in the following table, clear the original value of this vehicle and set it to a valid nonzero value according to the table below.

Configuration table:

Configuration	Byte 1 Bit 7 – Bit 4 Differential	Byte 1 Bit 3 – Bit 0 Transfer case
4WD, dual differential locks on front and rear axles	0100	0011
4WD, rear axle differential lock only	0011	0011
2WD, rear axle differential lock only	0011	0000

   - › If, according to the table above, the configuration shows that the front and rear axle differentials are installed, but no TOD is available, this configuration will not be allowed. Correct the configuration according to the table above.
   - › If ELD controller does not allow the written values to be retained correctly, replace the ELD controller.

P1B0D04

DTC definition: controller reset

Possible causes:

› ELD controller resets unexpectedly, or is stuck in startup mode, and cannot start the application software.

Troubleshooting:

1. Attempt to remove fault by cycling ignition (by turning off ignition switch and then turn it on again). If fault can be removed in this way, ELD ECU may be powered off unexpectedly, causing a reset, but it works normally, so no replacement is required.

2. If fault is not removed by cycling ignition:
   - Connect scanner to ELD ECU and read DTC.
     - If ELD ECU does not respond, replace ELD ECU.
     - If the ELD ECU responds, use the bus analyzer to check that the ELD1 message of the ELD controller is sent at the time when ignition is turned on. Otherwise, ELD ECU may have damaged the application software. Try to update the application software through software downloader. If the problem still exists, replace the ELD controller.

P1B0E4B

DTC definition: temperature fault

Possible causes:

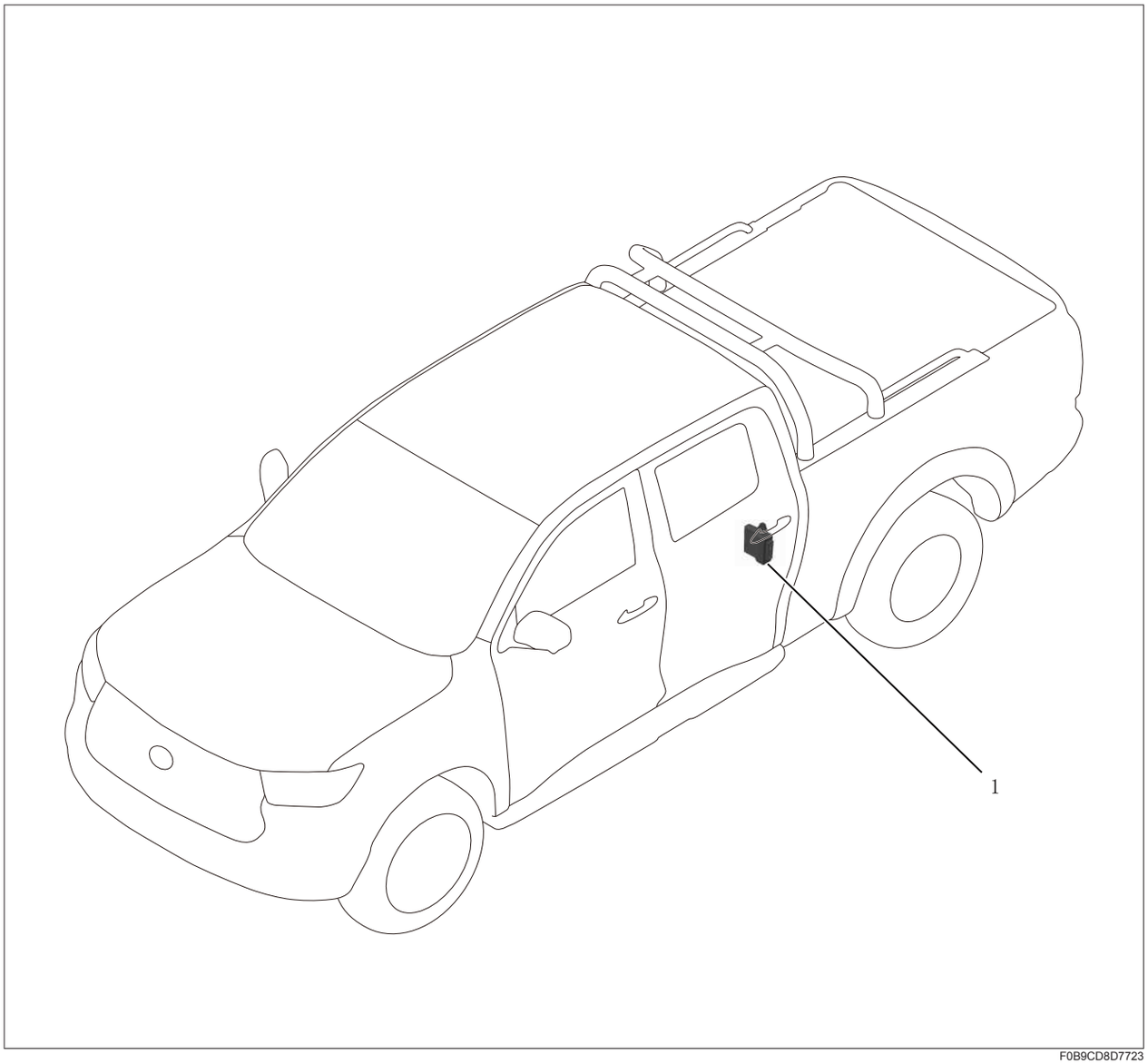
- ELD controller overheated.

Troubleshooting:

- Internal circuit failed and overheated. Replace the ELD controller.

Electronic differential lock control unit

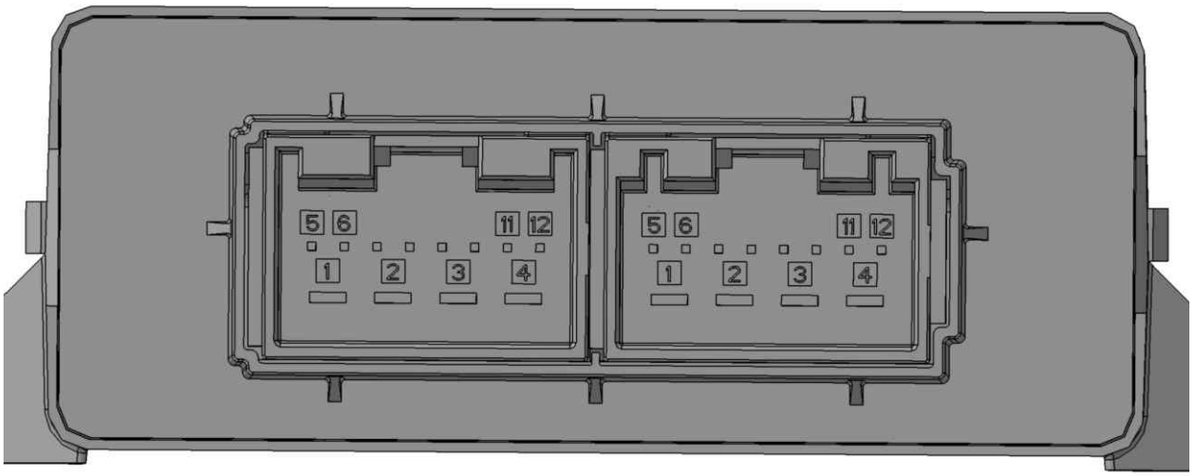
Location diagram



F0B9CD8D7723

1. Control unit of electronic control differential lock (Rear wall)

Pin definition



X1 X2

2009D843F768

Pin No.	Function	Pin No.	Function
X1-1	FRNT ELD COIL high-side drive	X1-2	Power
X1-3	—	X1-4	REAR ELD COIL high-side drive
X1-5	CAN0H	X1-6	CAN0L
X1-7	Ignition switch collection	X1-8	—
X1-9	—	X1-10	—
X1-11	—	X1-12	—
X2-1	—	X2-2	Ground
X2-3	FRNT ELD COIL low-side drive	X2-4	REAR ELD COIL low-side drive
X2-5	—	X2-6	—
X2-7	—	X2-8	—
X2-9	—	X2-10	—
X2-11	—	X2-12	—

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Control unit of differential lock × vehicle body	3±1	2	—

Removal/installation

Removal

1. Open the rear left door
2. Disconnect the negative terminal of the battery.
3. Put down rear left seat backrest



3B78132DDAFC

4. Remove 2 snap fasteners



1C7BFF1DE557

5. Remove rear wall cover plate



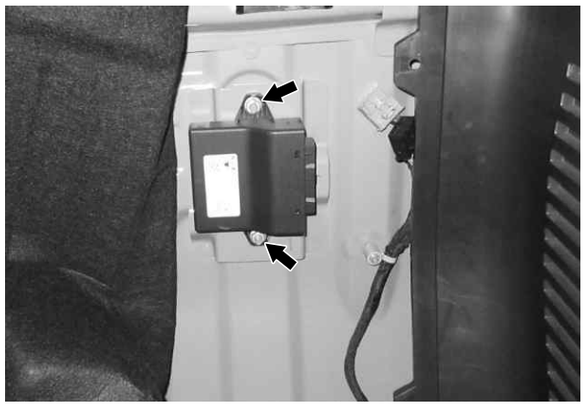
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6. Disconnect the connector of control unit of electronic control differential lock



57A6ADE544CC

7. Remove 2 nuts



0ECDCEFD47AF

8. Remove control unit of electronic control differential lock

Installation

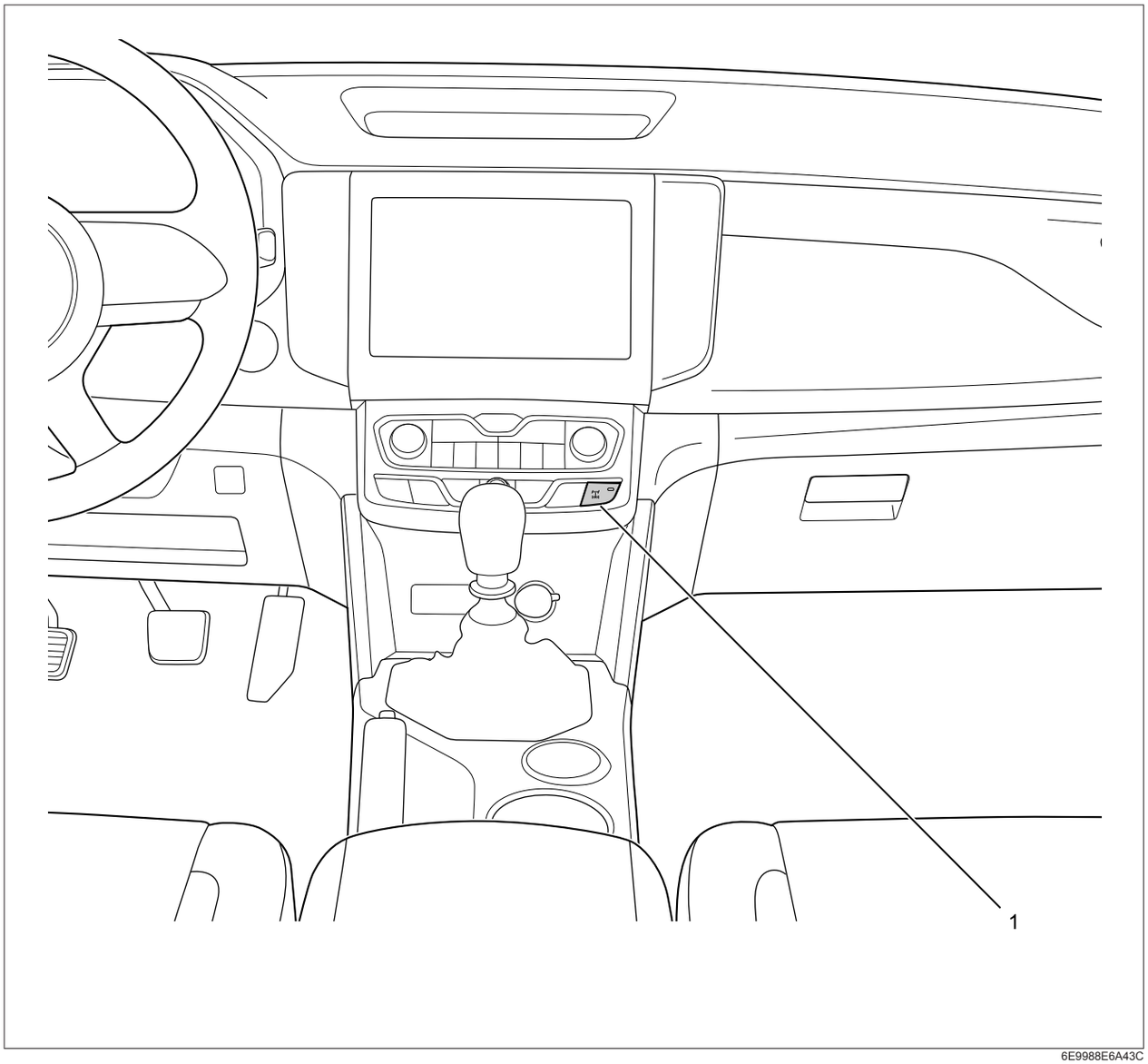
1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Console panel switch assembly

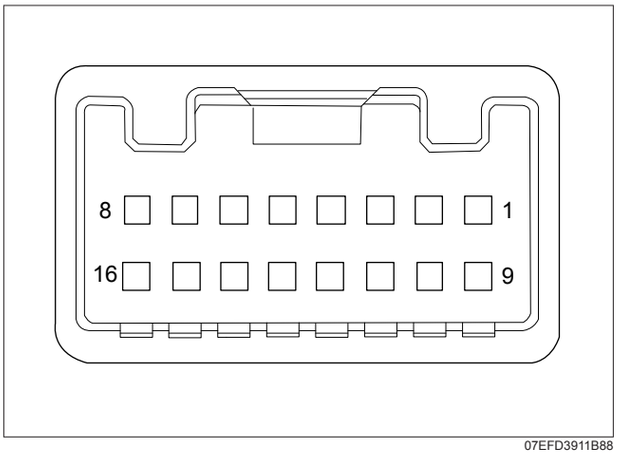
Location diagram



6E9988E6A43C

1. Console panel switch assembly (integrated differential lock switch)

Pin definition



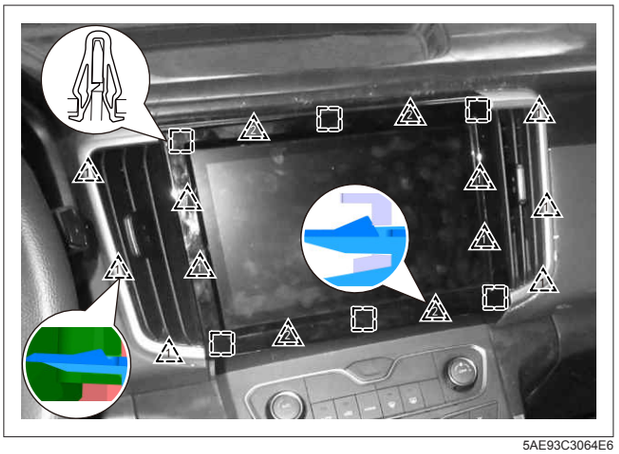
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Pin No.	Function
1	Airbag OFF indicator
2	—
3	Danger warning indicator
4	Hazard warning lamp switch
5	LIN
6	—
7	Airbag ON indicator
8	Power
9	Backlight
10	—
11	—
12	HDC switch
13	ESP switch
14	—
15	—
16	Ground

Removal/installation

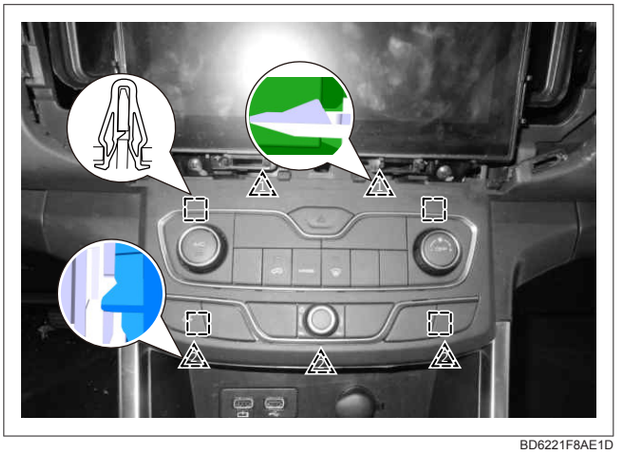
Removal

1. Disconnect the negative terminal of the battery.
2. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

3. Separate 4 clips and 5 joints



BD6221F8AE1D

4. Disconnect connectors of the console panel switch



FB5BA43E2F1B

5. Remove console panel switch

Installation

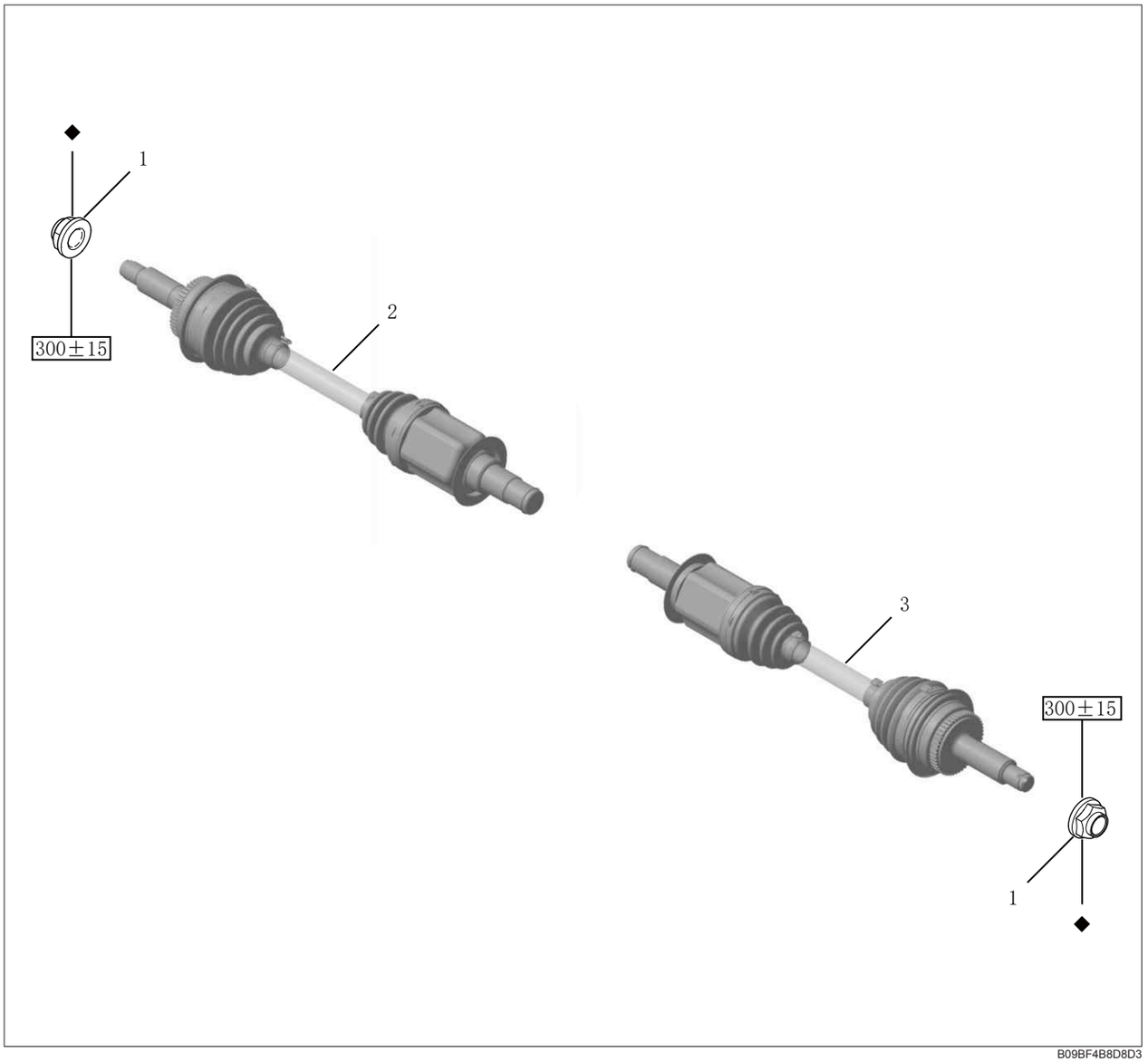
1. Perform installation work in reverse order of removal

Drive shaft

Front drive shaft .....20－1
Structural diagram .....20－1
Specified torque.....20－2
Fault symptom checklist .....20－3
Removal/installation.....20－4
Check.....20－6
Rear drive shaft/axle shaft.....20－7
Structural diagram .....20－7
Specified torque.....20－8
Special Tool .....20－9
Removal/installation.....20－10

Front drive shaft

Structural diagram



B09BF4B8D8D3

1. Front drive shaft nut
2. Front right drive shaft assembly
3. Front left drive shaft assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Front drive shaft nut	Front drive shaft × Front wheel hub flange plate assembly	300±15	2	—

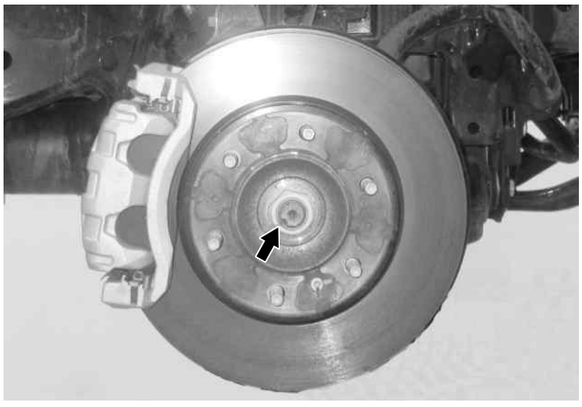
Fault symptom checklist

Fault description	Possible causes	Solution
Noise	Inner or outer joint worn	Replace drive shaft
Oil leakage	Internal and external dust boot damaged	Replace drive shaft
	Internal and external dust boot clamps are damaged.	Replace drive shaft
Resonance	Drive shaft twisted or damaged	Replace drive shaft

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove lower guard of front main reducer
4. Discharge lubricant for front axle main reducer
5. Remove front wheels
6. Remove front drive shaft nut

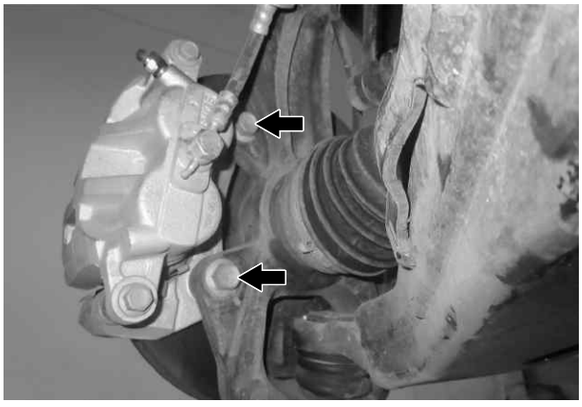


3C5FED6E3A64

⚠ Caution

› Completely loosen the locking part of the nut to avoid damage to drive shaft thread.

7. Remove two bolts and separate front brake caliper assembly

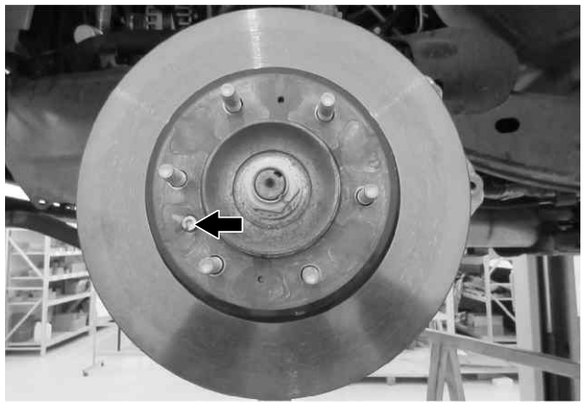


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ℹ Notice

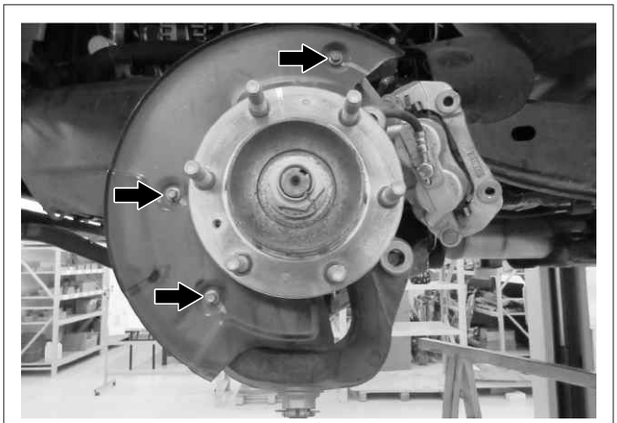
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

8. Remove 1 screw and front brake disc



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9. Remove 3 bolts and front brake disc cover



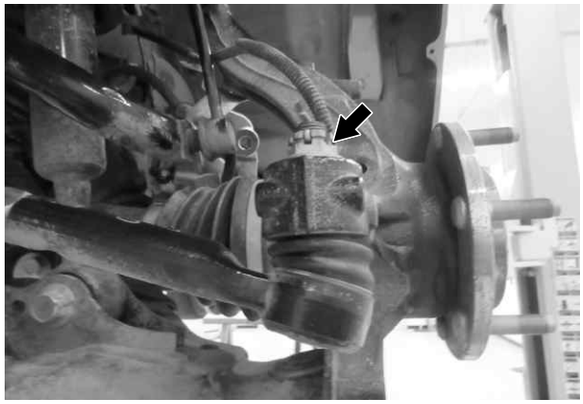
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10. Separate front wheel speed sensor and harness
11. Separate front wheel speed sensor harness bracket
12. Separate front brake hose bracket
13. Separate front stabilizer bar and link assembly



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14. Remove one locking pin and one nut, and separate steering gear outer ball assembly



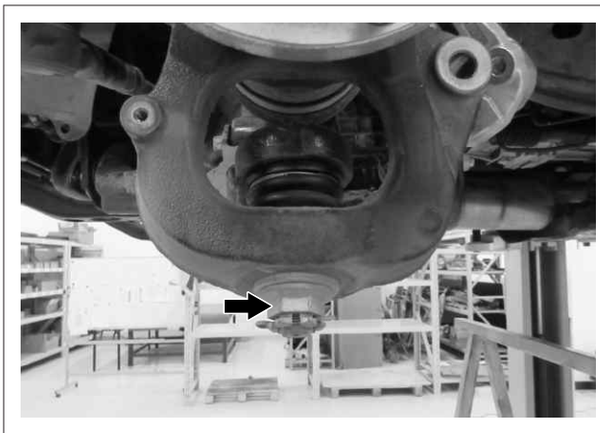
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15. Remove 1 locking pin and 1 nut, and separate front upper arm assembly



8A261A317AC3

16. Remove one locking pin and one nut, and separate front lower arm assembly



8B8E3E75F6D1

17. Remove front steering knuckle and wheel hub flange plate assembly

18. Remove front drive shaft assembly



C320928C6253

Caution

- Do not drag drive shaft lever, otherwise interior connection may fall off.
- Do not damage drive shaft dust boot and drive shaft oil seal.
- Do not drop drive shaft assembly.

Installation

1. Perform installation work in reverse order of removal

Caution

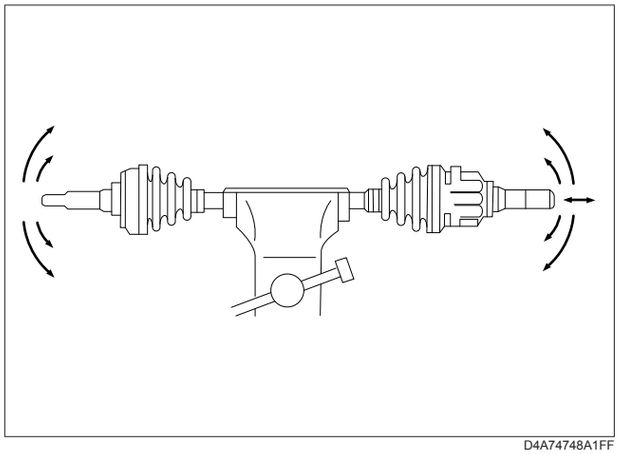
- Do not damage drive shaft dust boot and drive shaft oil seal.
- Do not distort wheel speed sensor harness.

Notice

- In drive shaft installation, have the open end of drive shaft snap ring face upward.
- Move drive shaft assembly horizontally.
- Tighten the fastener according to the specified torque value.
- Add lubricant for front axle main reducer. Check and adjust the level of lubricant for front axle main reducer.
- Check the wheel alignment and make adjustments when necessary.

Check

1. Place drive shaft assembly horizontally
2. Check the drive shaft assembly



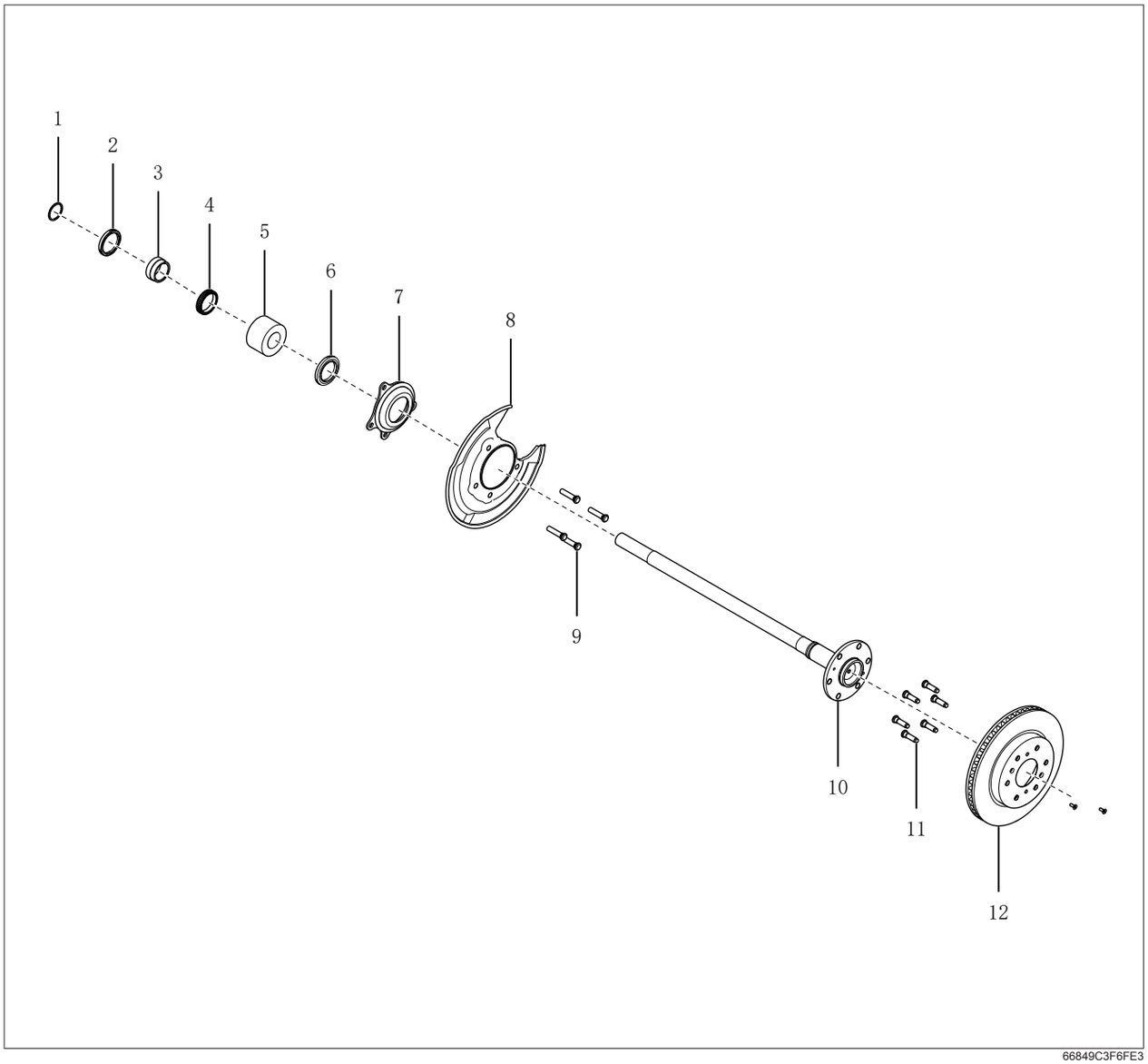
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Check the drive shaft assembly, and replace it if one of the following occurs:

- Swinging of outer cardan joint is not flexible.
- There is an excessive gap in outer cardan joint.
- Swinging of inner cardan joint is not flexible.
- The inner cardan joint does not slide smoothly in thrust direction.
- The inner cardan joint has an excessive gap in radial direction.
- Dust boot damaged.
- The dust boot clamp is damaged.

Rear drive shaft/axle shaft

Structural diagram



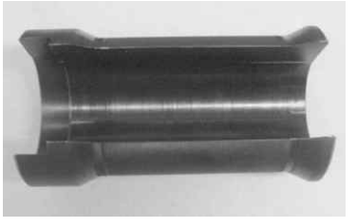
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1. Flat wire stopper ring for shafts
2. Rear bearing inner oil seal assembly
3. Rear axle bearing inner oil seal seat
4. Rear axle ABS gear ring
5. Double row tapered roller bearing
6. Rear bearing outer oil seal assembly
7. Rear axle oil seal compressing seat
8. Rear brake disc cover
9. Oil seal seat mounting bolt
10. Axle shaft
11. Wheel bolts
12. Rear brake disc

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Rear axle x oil seal compressing seat x rear brake backing plate	145±10	4	—
Bolt			4	Apply 1271 thread locking sealant to the threads. Rotate the bolt while applying sealant, covering the circumference of the screwed part, (4~6) threads in axial direction

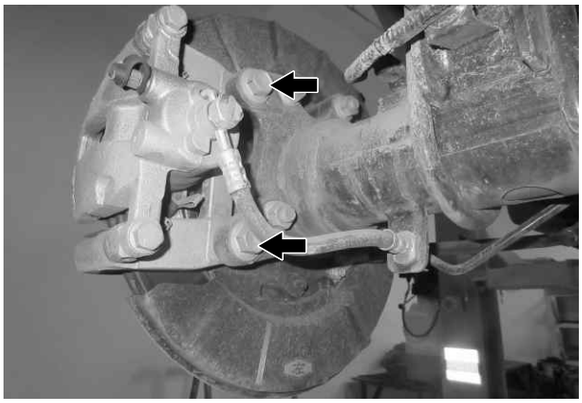
Special Tool

Code	Name	Purpose	Schematic diagram
3916028	Half shaft bearing and oil seal seat press tool	Install half shaft bearing and oil seal seat	
3916031	Rear axle half shaft bearing removal tool	Disassemble rear axle half shaft bearing	
3916032	Rear axle shaft assembly removal tool	Disassemble rear axle half shaft assembly	

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove rear wheels
4. Separate rear brake caliper with brake hose

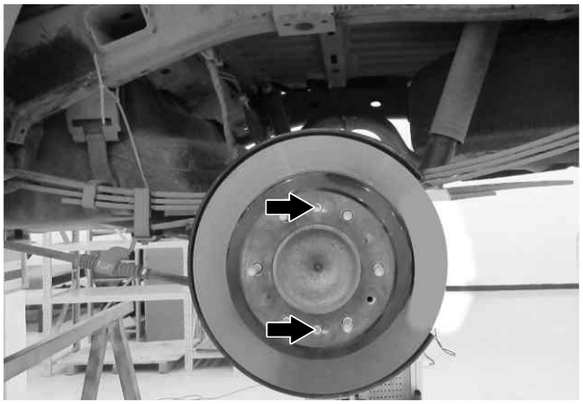


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⚠ Caution

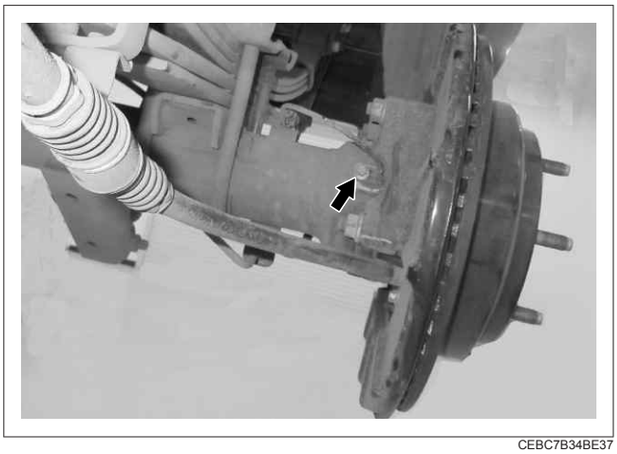
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

5. Remove rear brake disc



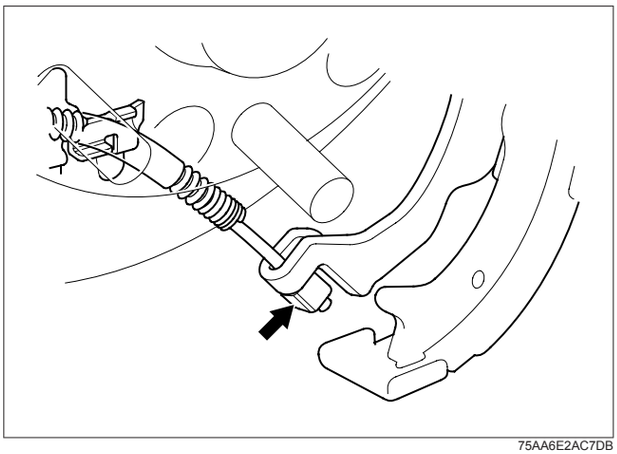
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6. Separate rear wheel speed sensor



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7. Disconnect parking brake cable assembly and rear brake



75AA6E2AC7DB



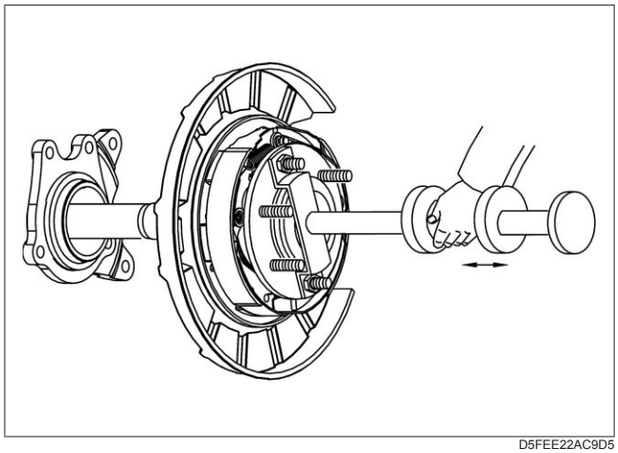
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8. Remove 4 nuts, and disconnect rear axle and rear brake



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9. Remove rear axle shaft with rear brake

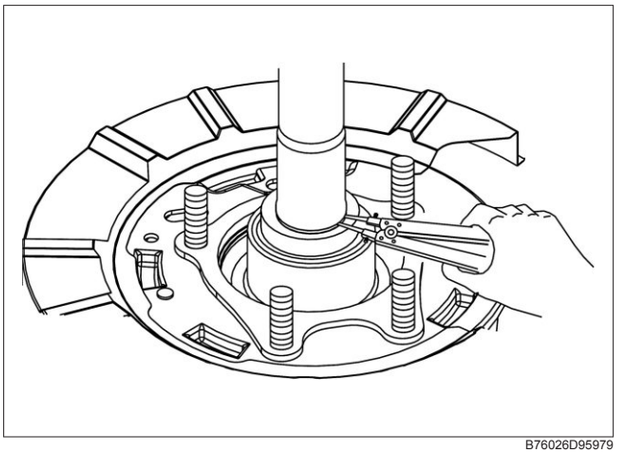


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Notice

- Connect special tool and axle shaft flange surface using the wheel nut.
- Hold the free hammer of the special tool with hand and hit repeatedly Removal the rear axle shaft.

10. Remove 1 clip, and separate rear brake



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Installation

1. Perform installation work in reverse order of removal

Caution

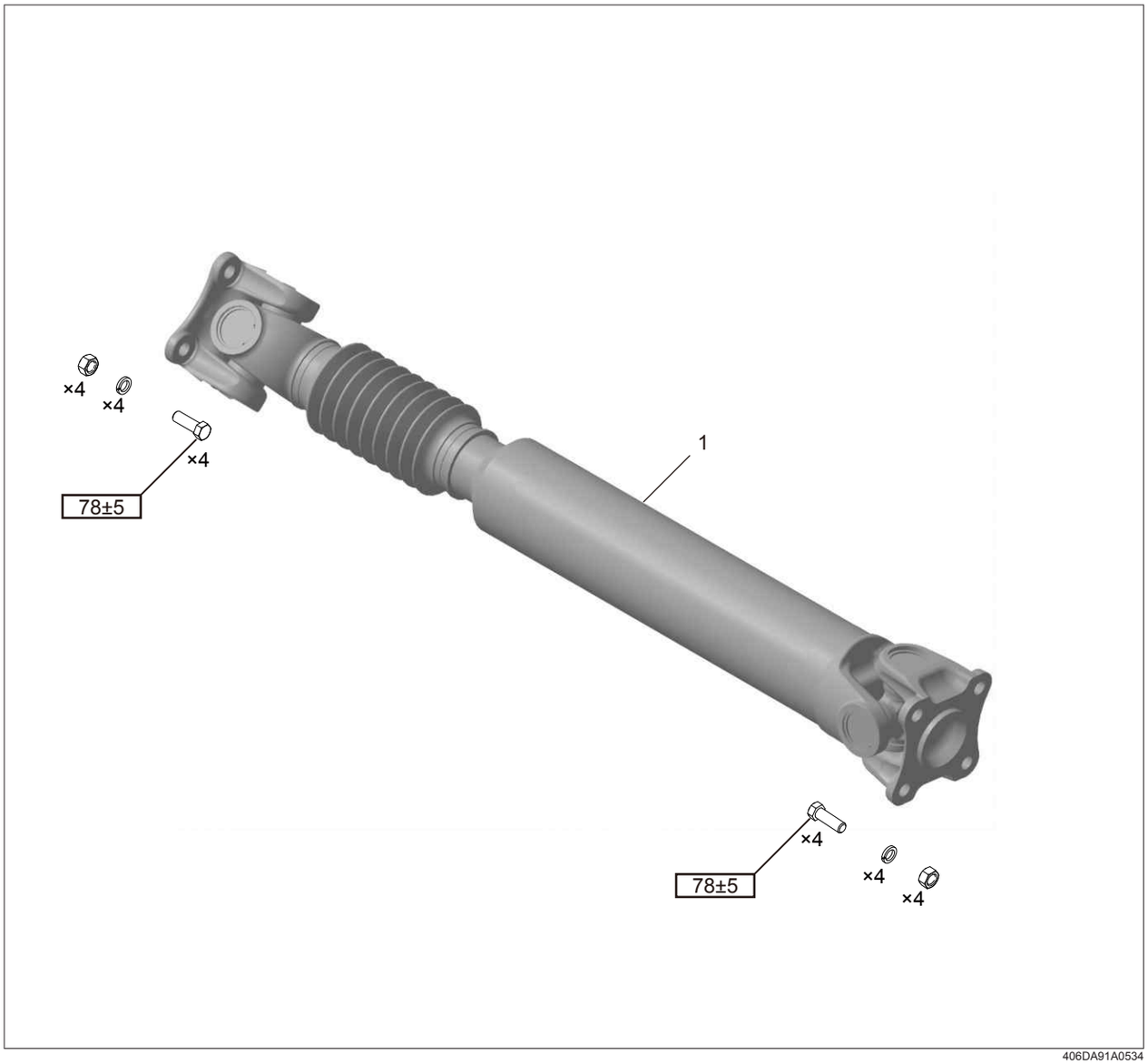
- Before installation, wipe axle shaft and inner oil seal seat clean using kerosene.
- Before installation, fit axle shaft spline with axle shaft gear spline and then drive the axle shaft assembly into axle housing using a copper rod.
- During installation, protect inner/outer oil seal lips and cable assembly and align brake bolt with rear axle lug bolt hole.
- Tighten the fastener according to the specified torque value.

Propeller shaft

Front axle propeller shaft (6MT) ..... 21－1
Structural diagram ..... 21－1
Specified torque ..... 21－2
Fault symptom checklist ..... 21－3
Removal/installation ..... 21－4
Check ..... 21－5
Front axle propeller shaft (8AT) ..... 21－6
Structural diagram ..... 21－6
Specified torque ..... 21－7
Fault symptom checklist ..... 21－8
Removal/installation ..... 21－9
Check ..... 21－10
Rear axle propeller shaft ..... 21－11
Structural diagram ..... 21－11
Specified torque ..... 21－12
Fault symptom checklist ..... 21－13
Removal/installation ..... 21－14
Check ..... 21－15

Front axle propeller shaft (6MT)

Structural diagram



406DA91A0534

1. Front axle propeller shaft assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front axle propeller shaft x front axle	78±5	4	—
Nut			4	—
Bolt	Front axle propeller shaft x transfer case	78±5	4	—
Nut			4	—

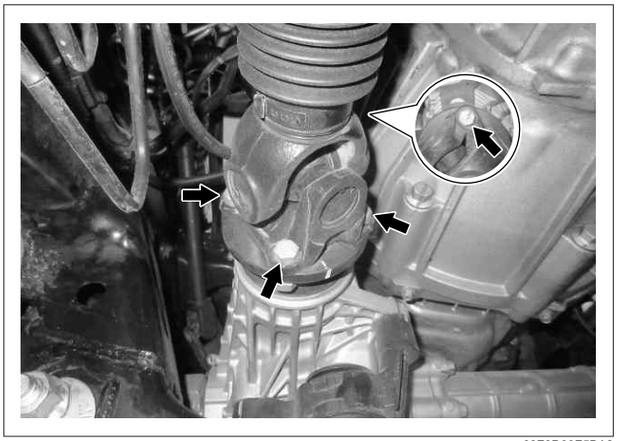
Fault symptom checklist

Fault description	Possible cause	Solution
Noise	Universal joint fork spline worn	Replace front axle propeller shaft assembly
	Cross shaft bearing worn or seized	Replace front axle propeller shaft assembly
Vibration	Propeller shaft run-out	Replace front axle propeller shaft assembly
	Propeller shaft imbalance	Replace front axle propeller shaft assembly
	Universal joint fork spline seized	Replace front axle propeller shaft assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove lower guard of transmission
3. Make assembly marks on flange plate of front axle main reducer and flange plate of front axle propeller shaft
4. Remove 4 nuts, bolts and washers, and disconnect flange plate of front axle main reducer and flange plate of front axle propeller shaft

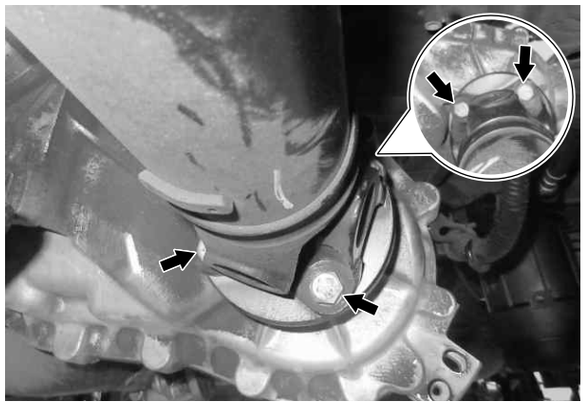


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Notice

› If flange plate joint is nondetachable, install 1 nut for the time being, and evenly knock flange plate using copper rod and hammer and remove front axle main reducer flange plate from front axle propeller shaft assembly.

5. Make assembly marks on flange plate of transfer case and flange plate of front axle propeller shaft
6. Remove 4 nuts, bolts and washers, and disconnect flange plate of transfer case and flange plate of front axle propeller shaft



F0711B992317

7. Remove front axle propeller shaft assembly

Installation

1. Perform installation work in reverse order of removal

Caution

› Align the assembly markings.

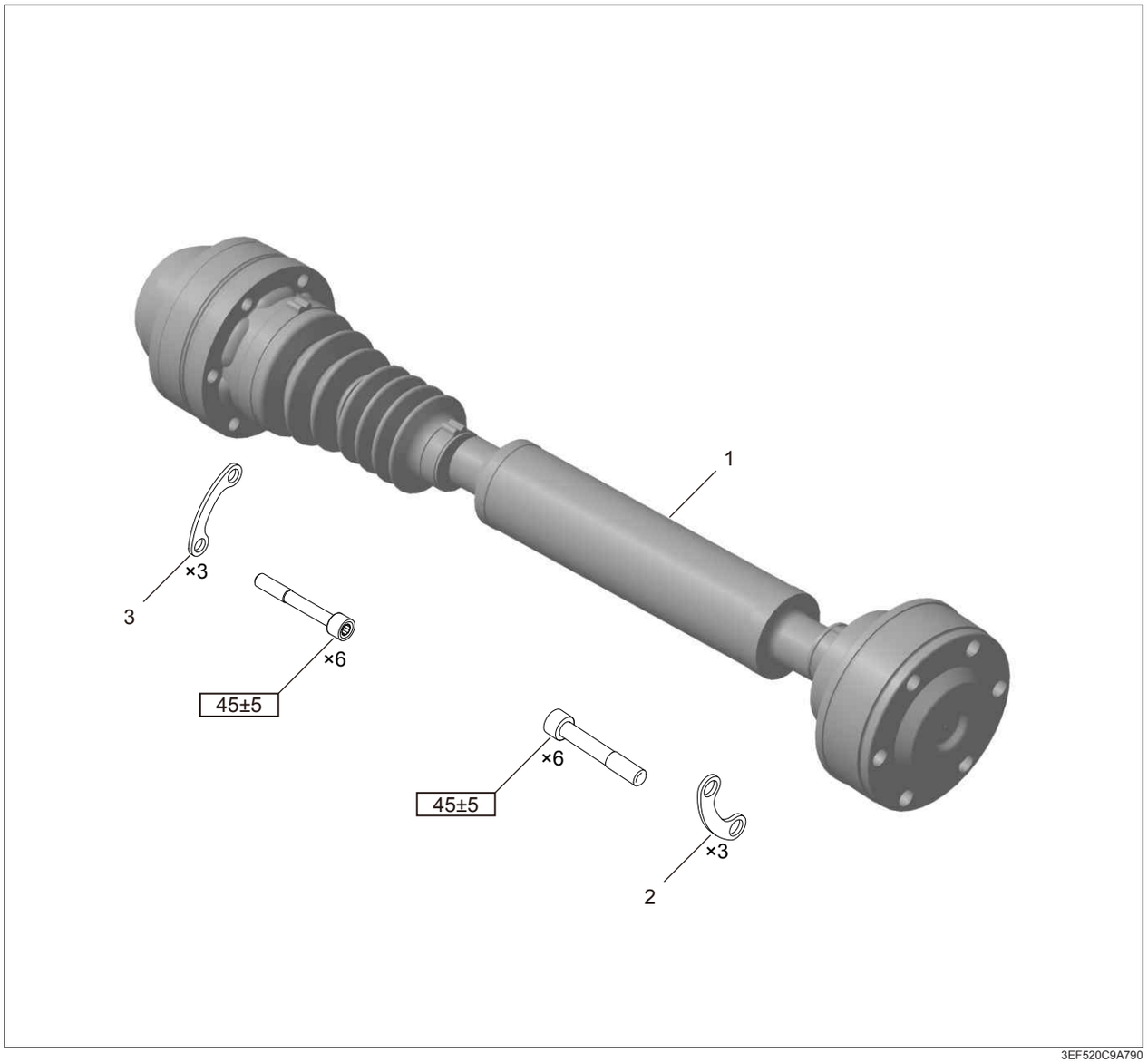
› Tighten the fastener according to the specified torque value.

Check

1. Check dust boot of propeller shaft for loose, twisted or damaged clips
2. Repair depending on conditions, and replace front axle propeller shaft assembly if necessary.
3. Check propeller shaft for damage, rust and presence of joint surface blow hole as a result of collision
4. Check cross shaft bearing for wear or damage and make sure that cross shaft bearing can rotate smoothly
5. Check and confirm that there is no clearance in cross shaft bearing
6. Replace front axle propeller shaft assembly when necessary

Front axle propeller shaft (8AT)

Structural diagram



3EF520C9A790

1. Front axle propeller shaft assembly
2. Propeller shaft gasket
3. Propeller shaft gasket

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw	Front axle propeller shaft x front axle	45±5	6	Pre-apply screw thread glue
Screw	Front axle propeller shaft x transfer case	45±5	6	Pre-apply screw thread glue

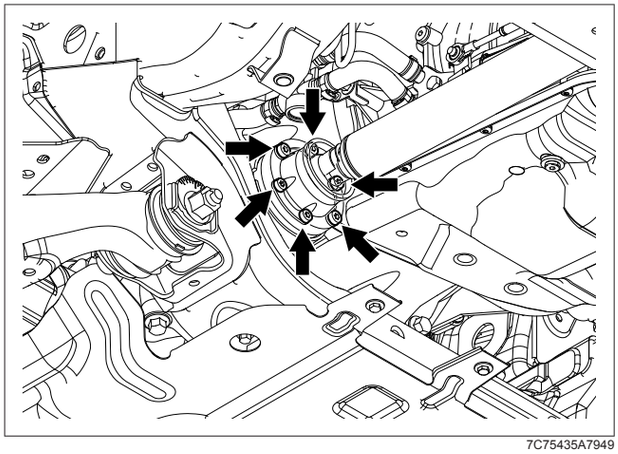
Fault symptom checklist

Fault description	Possible cause	Solution
Noise	Wear of constant velocity joint ball-way	Replace front axle propeller shaft assembly
	Wear of constant velocity joint ball	Replace front axle propeller shaft assembly
Vibration	Propeller shaft run-out	Replace front axle propeller shaft assembly
	Propeller shaft imbalance	Replace front axle propeller shaft assembly
	Propeller shaft damaged	Replace front axle propeller shaft assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Make assembly marks on flange plate of front axle main reducer and flange plate of front axle propeller shaft
3. Remove 6 screws and 3 gaskets, disconnect main reducer flange plate of front axle and flange plate of front axle propeller shaft



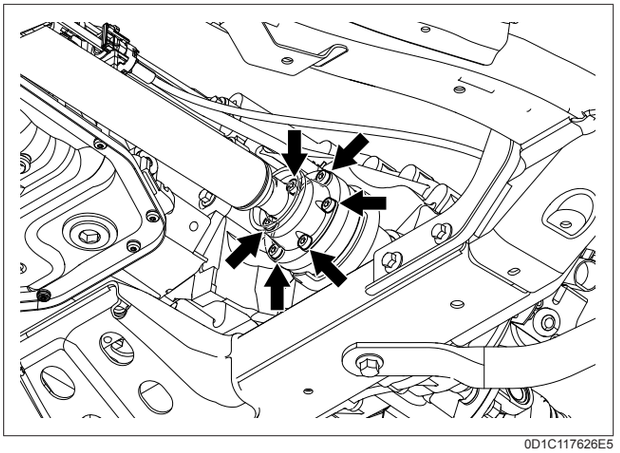
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Notice

› Remove screws according to the principle of diagonal removal.

› If flange plate joint is nondetachable, install 1 nut for the time being, and evenly knock flange plate using copper rod and hammer and remove front axle main reducer flange plate from front axle propeller shaft assembly.

4. Make assembly marks on flange plate of transfer case and flange plate of front axle propeller shaft
5. Remove 6 screws and 3 gaskets, disconnect transfer case flange plate and flange plate of front axle propeller shaft



0D1C117626E5

Notice

› Remove screws according to the principle of diagonal removal.

6. Remove front axle propeller shaft assembly

Installation

1. Perform installation work in reverse order of removal

Caution

› Align the assembly markings.

› Install screws according to the principle of diagonal tightening.

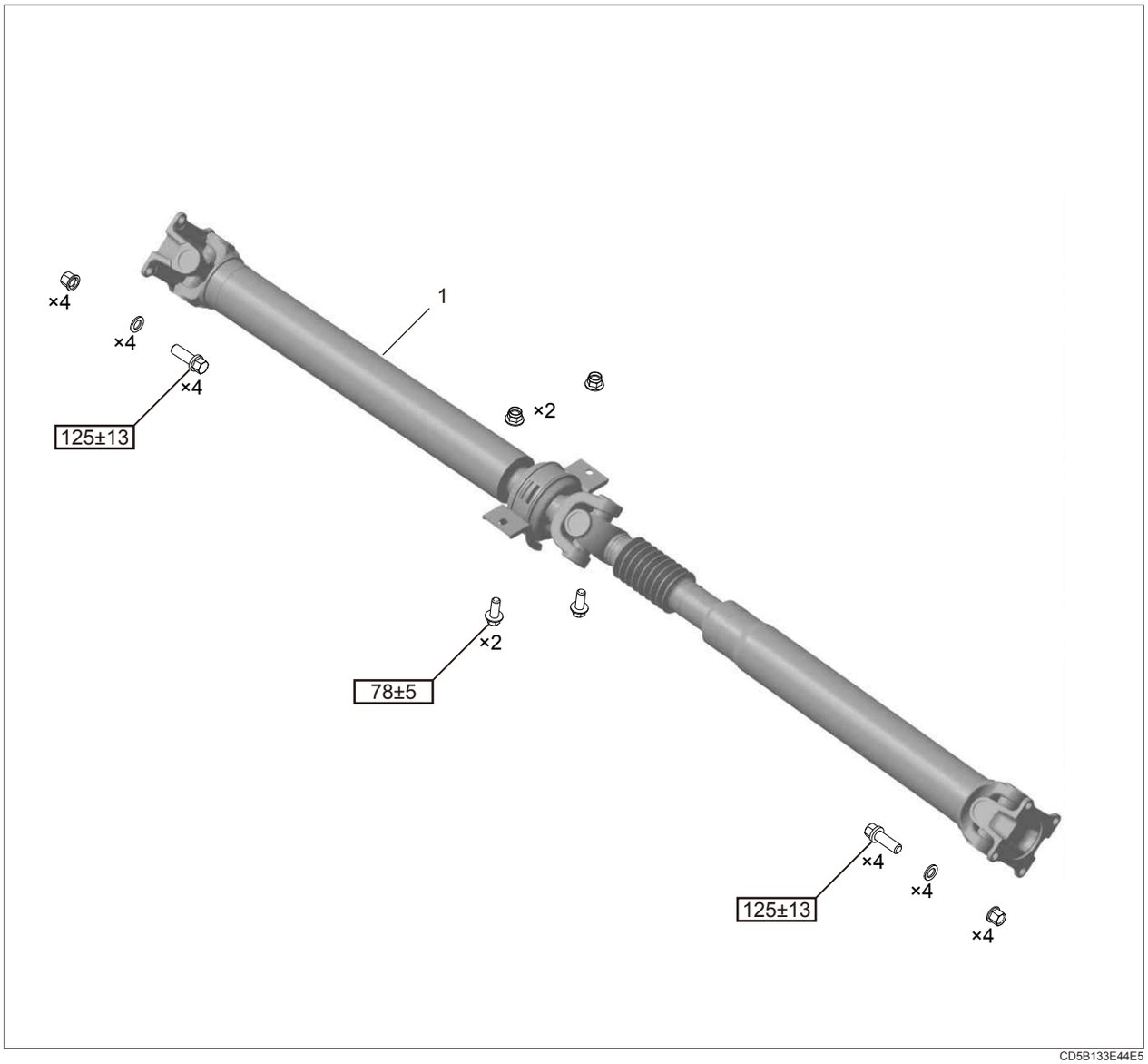
› Tighten the fastener according to the specified torque value.

Check

1. Check dust boot of propeller shaft for loose, twisted or damaged clips
2. Repair depending on conditions, and replace front axle propeller shaft assembly if necessary.
3. Check propeller shaft for damage, rust and presence of joint surface blow hole as a result of collision
4. Check constant velocity joint for wear or damage, and make sure that the constant velocity joint rotates smoothly without jamming
5. Replace front axle propeller shaft assembly when necessary

Rear axle propeller shaft

Structural diagram



CD5B133E44E5

1. Rear axle propeller shaft assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Rear axle propeller shaft x rear axle	125±13	4	—
Bolt			4	Apply screw thread glue
Nut	Rear axle propeller shaft x transfer case	125±13	4	—
Bolt			4	Apply screw thread glue
Nut	Center support of rear axle propeller shaft x frame	78±5	2	—
Bolt			2	—

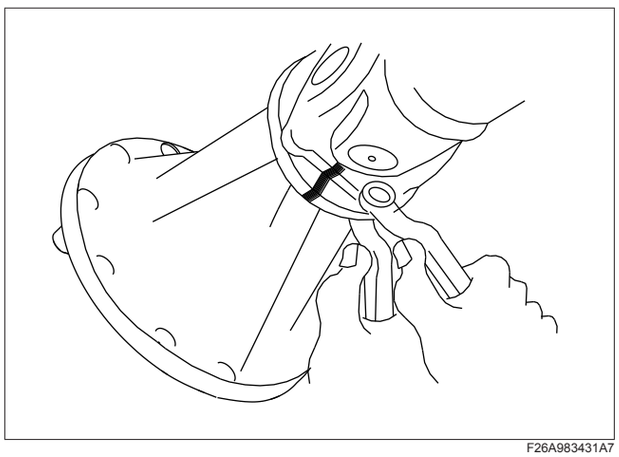
Fault symptom checklist

Fault description	Possible cause	Solution
Noise	Universal joint fork spline worn	Replace rear axle propeller shaft assembly
	Intermediate bearing worn	Replace rear axle propeller shaft assembly
	Cross shaft bearing worn or seized	Replace rear axle propeller shaft assembly
Vibration	Propeller shaft run-out	Replace rear axle propeller shaft assembly
	Propeller shaft imbalance	Replace rear axle propeller shaft assembly
	Universal joint fork spline seized	Replace rear axle propeller shaft assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Make assembly marks on flange plate of rear axle main reducer and flange plate of rear axle propeller shaft
3. Remove 4 nuts, bolts and washers, and disconnect flange plate of rear axle main reducer and flange plate of rear axle propeller shaft

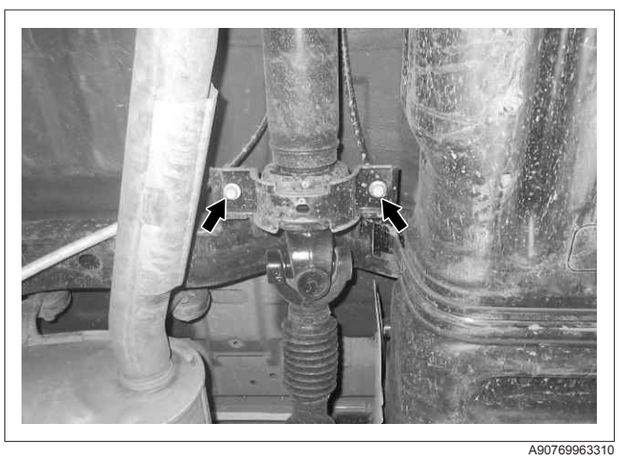


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Notice

› If flange plate joint is nondetachable, install 1 nut for the time being, and evenly knock flange plate using copper rod and hammer and remove flange plate of rear axle main reducer from rear axle propeller shaft assembly.

4. Remove 2 bolts and nuts, and disconnect intermediate support assembly of the rear axle propeller shaft and frame



A90769963310

5. Make assembly marks on flange plate of transfer case and flange plate of rear axle propeller shaft
6. Remove 4 nuts, bolts and washers, and disconnect flange plate of transfer case and flange plate of rear axle propeller shaft



B246B1BAC0DC

7. Remove rear axle propeller shaft assembly

Installation

1. Perform installation work in reverse order of removal

Caution

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

Check

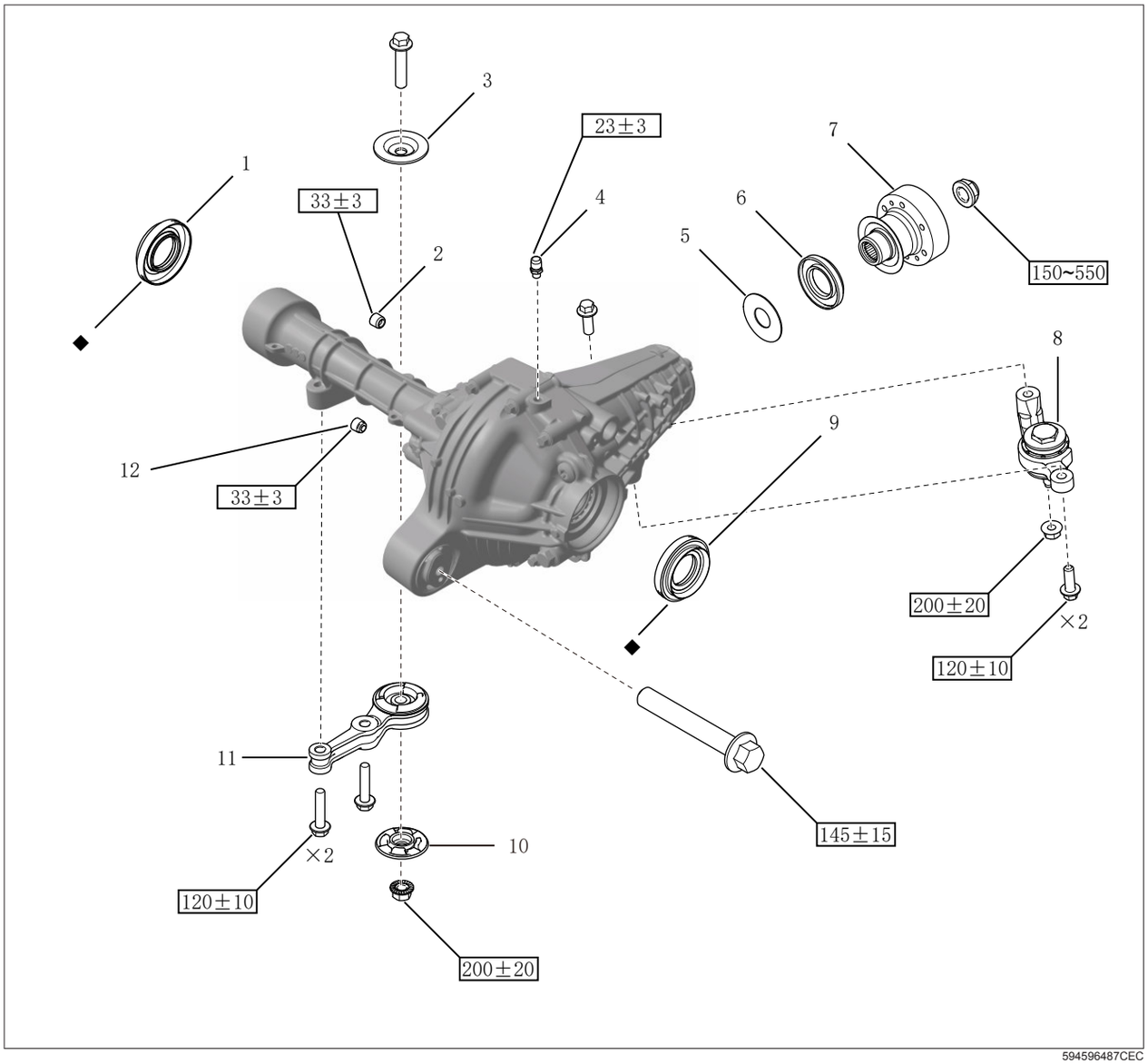
1. Check propeller shaft for damage, rust and presence of joint surface blow hole as a result of collision
2. Check cross shaft bearing for wear or damage and make sure that cross shaft bearing can rotate smoothly
3. Check and confirm that there is no clearance in cross shaft bearing
4. Check and confirm that intermediate support bracket of intermediate support bearing is free of damage or deformation
5. Check and confirm that intermediate support assembly is not broken or damaged
6. Check intermediate support bearing for damage and wear
7. Replace rear axle propeller shaft assembly when necessary

Main reducer

Front axle main reducer - without differential lock ..... 22－1
Structural diagram ..... 22－1
Specified torque ..... 22－2
Special tools ..... 22－4
Fault symptom checklist ..... 22－5
Removal/installation ..... 22－6
Disassembly/assembly ..... 22－8
Front axle main reducer - with differential lock ..... 22－15
Structural diagram ..... 22－15
Specified torque ..... 22－16
Special tools ..... 22－18
Fault symptom checklist ..... 22－19
Removal/installation ..... 22－20
Disassembly/assembly ..... 22－22
Front main reducer lubricant ..... 22－29
Specifications ..... 22－29
Check ..... 22－30
Replacement ..... 22－30
Rear axle main reducer - without differential lock ..... 22－32
Structural diagram ..... 22－32
Specified torque ..... 22－34
Special tool ..... 22－36
fault symptom checklist ..... 22－37
Removal/installation ..... 22－38
Disassembly/assembly ..... 22－40
Rear axle main reducer - with differential lock ..... 22－45
Structural diagram ..... 22－45
Specified torque ..... 22－47
Special tool ..... 22－49
fault symptom checklist ..... 22－50
Removal/installation ..... 22－51
Disassembly/assembly ..... 22－53
Rear main reducer lubricant ..... 22－58
Specifications ..... 22－58
Specifications ..... 22－59
Replacement ..... 22－59

Front axle main reducer - without differential lock

Structural diagram



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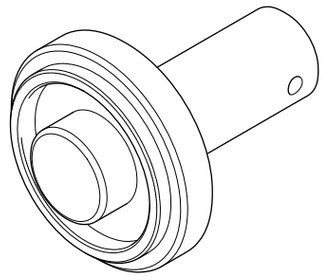
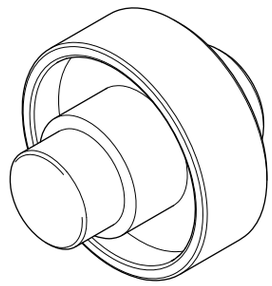
1. Long axle shaft oil seal assembly
2. Oil filler plug
3. Lower pad of axle shaft sleeve bush
4. Ventilation valve assembly
5. Oil-slinger ring - driving bevel gear oil seal
6. Oil seal - front driving bevel gear
7. Lug and dust cover assembly
8. Rear bush assembly of front reducer assembly
9. Left half-axle oil seal
10. Upper pad assembly of axle shaft sleeve bush
11. Mount bracket 2 assembly of front main reducer
12. Drain plug

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Axle shaft sleeve bush of front reducer assembly x frame	200±20	1	Apply screw thread glue
Nut			1	Apply screw thread glue
Bolt	Axle shaft sleeve bush of front reducer assembly x main reducer housing of front axle	120±10	2	Apply 1271 thread locking sealant to threaded part with (6~8) pitches applied around
Bolt	Front bush assembly of front reducer assembly x frame	145±15	1	Apply screw thread glue
Nut	Rear bush assembly of front reducer assembly x frame	200±20	1	Apply screw thread glue
Bolt	Rear bush assembly of front reducer assembly x main reducer housing of front axle	120±10	2	Apply 1271 thread locking sealant to threaded part with (6~8) pitches applied around
Oil filler plug	Oil filler plug x main reducer housing of front axle	33±3	1	Wipe it clean before installation, and re-apply 1271 thread locking sealant with (3~5) threads applied around

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Drain plug	Drain plug x main reducer housing of front axle	33±3	1	Wipe it clean before installation, and re-apply 1271 thread locking sealant with (3~5) threads applied around
Nut	Driving bevel gear x lug and dust cover assembly	160±20	1	Apply 1271 thread lock sealant to thread part, and evenly apply 1596 silicone rubber plane sealant to the end face of nut
Ventilation valve assembly	Ventilation valve assembly x main reducer housing of front axle	23±3	1	Apply 1596 silicon rubber plane sealant to threaded part (with (3~4) pitches applied around)

Special tools

Code	Name	Purpose	Schematic diagram
ZEZF068640	Crimping tool for left axle shaft oil seal of front-mounted main reducer	Press fit left axle shaft oil seal of front-mounted main reducer	
ZEZF068641	Crimping tool for long axle shaft oil seal of front-mounted main reducer	Press fit long axle shaft oil seal of front-mounted main reducer	

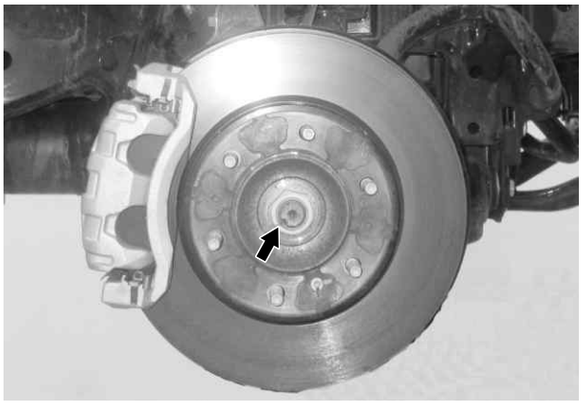
Fault symptom checklist

Fault description	Possible cause	Solution
Differential and reducer assembly oil leakage	High oil level or incorrect grade of oil	Discharge the oil to specified level or replace the oil
	Oil seal worn or damaged	Replace oil seal
	Matching flange loose or damaged	Tighten or replace the flange
Noisy axle	Low oil level or incorrect grade of oil	Fill lubricant as required or replace it
	Excessive clearance between planetary gear and driven bevel gear or axle shaft gear	Inspect the clearance
	Driven bevel gear, planetary gear or axle shaft gear worn or cracked	Check each gear
	Small gear bearing worn	Replace small gear bearing
	Differential bearing loose or worn	Tighten or replace differential shaft bearing

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove lower guard of front main reducer
4. Discharge lubricant for front axle main reducer
5. Remove front wheels
6. Remove front drive shaft nut

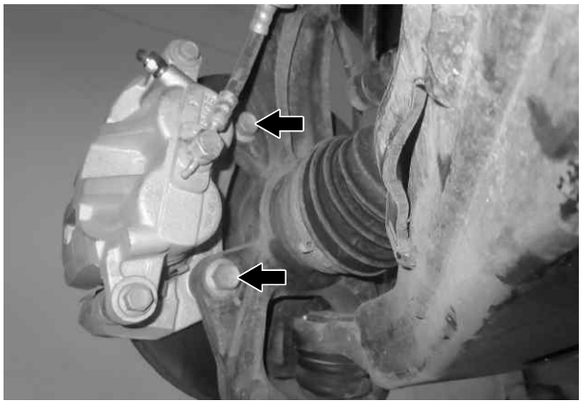


3C5FED6E3A64

⚠ Caution

› Completely loosen the locking part of the nut to avoid damage to drive shaft thread.

7. Remove two bolts and separate front brake caliper assembly

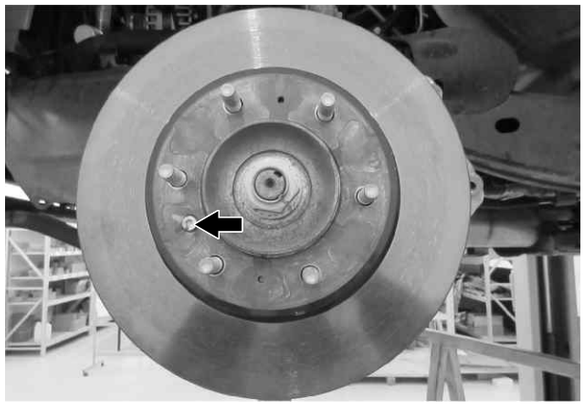


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ℹ Notice

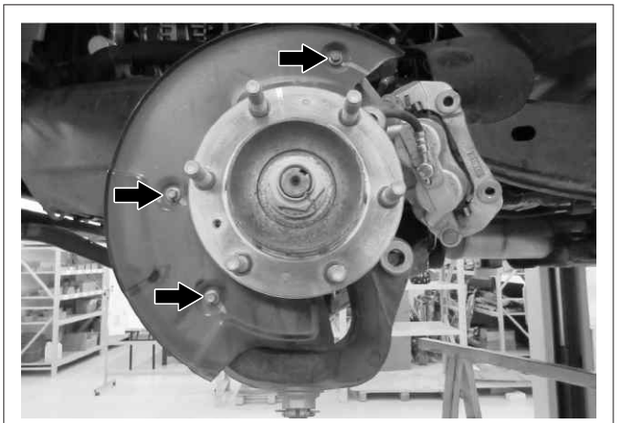
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

8. Remove 1 screw and front brake disc



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9. Remove 3 bolts and front brake disc cover



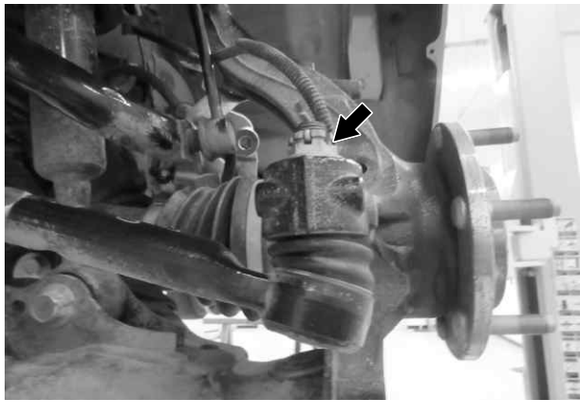
64A82BDFE69C

10. Separate front wheel speed sensor and harness
11. Separate front wheel speed sensor harness bracket
12. Separate front brake hose bracket
13. Separate front stabilizer bar and link assembly



318ED67B702E

14. Remove one locking pin and one nut, and separate steering gear outer ball assembly



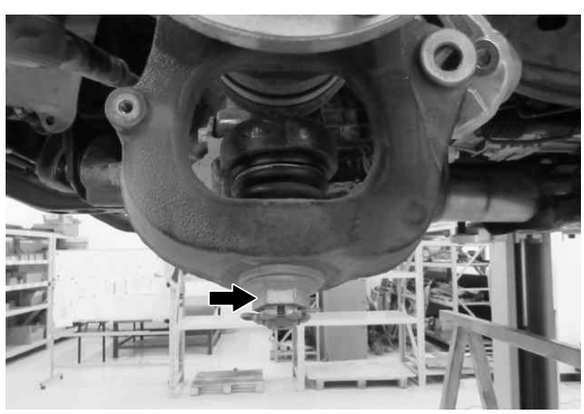
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15. Remove 1 locking pin and 1 nut, and separate front upper arm assembly



8A261A317AC3

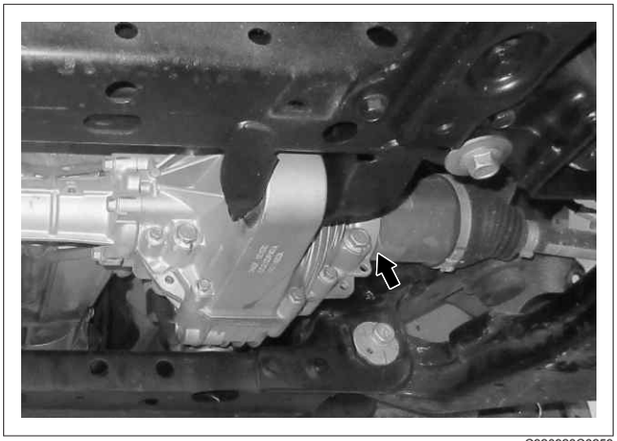
16. Remove one locking pin and one nut, and separate front lower arm assembly



8B8E3E75F6D1

17. Remove front steering knuckle and wheel hub flange plate assembly

18. Remove front drive shaft assembly



C320928C6253

⚠ Caution

› Do not drag drive shaft lever, otherwise interior connection may fall off.

› Do not damage drive shaft dust boot and drive shaft oil seal.

› Do not drop drive shaft assembly.

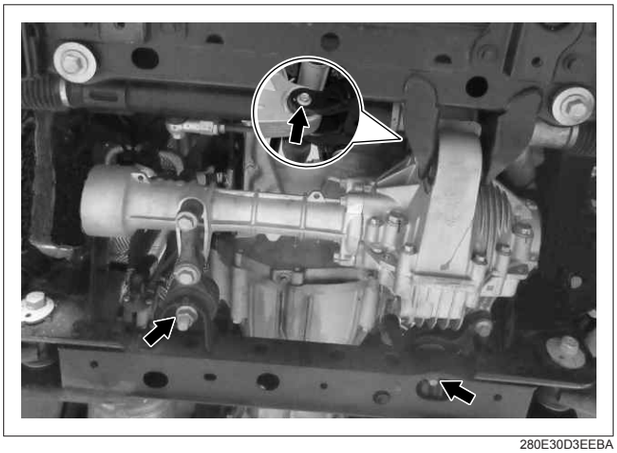
19. Remove lower guard of transmission

20. Remove front axle propeller shaft assembly

ℹ Notice

› Make assembly marks before removal.

21. Remove 2 nuts and 1 bolt



280E30D3EEBA

22. Remove main reducer assembly of front axle

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Do not damage drive shaft dust boot and

drive shaft oil seal.

› Do not distort wheel speed sensor harness.

Notice

› In drive shaft installation, have the open end of drive shaft snap ring face upward.

› Move drive shaft assembly horizontally.

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

› Add lubricant for front axle main reducer. Check and adjust the level of lubricant for front axle main reducer.

› Check the wheel alignment and make adjustments when necessary.

Disassembly/assembly

Disassembly

Caution

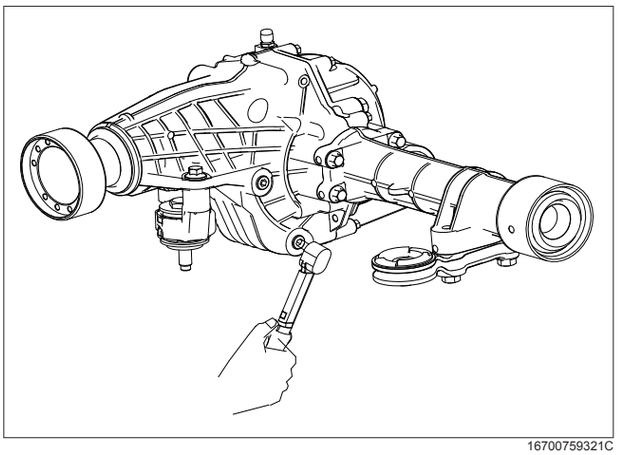
› Before disassembly, clean the outside of front reducer and differential assembly to avoid dirt, dust and other impurities on the assembly from entering the front reducer and differential assembly during removal.

› Prepare clean containers to place removed parts in.

› Replace specified parts only. When other parts are damaged, replace front reducer and differential assembly.

› Oil seal, nut - fastening driving bevel gear and shaft bushing are disposable parts and cannot be reused.

1. Remove oil drain plug and oil filler plug



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Notice

› Unscrew the oil filler plug first, then unscrew the drain plug to drain all gear oil.

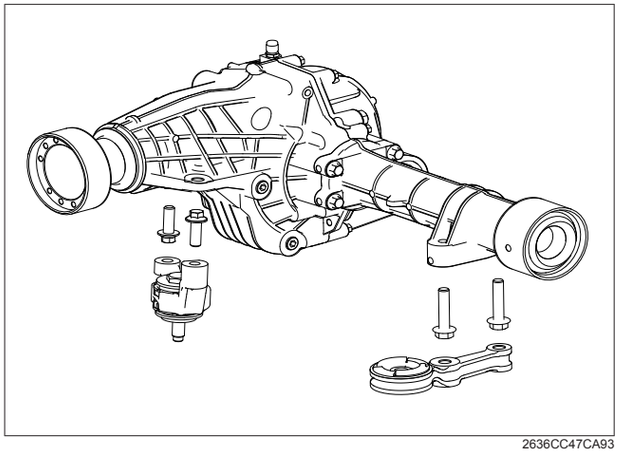
› Place oil filler plug and drain plug in designated container.

Caution

› During the oil discharge process, prevent gear oil from flowing too fast, causing oil stain on the ground.

› Gear oil cannot be reused after it is discharged, and new gear oil must be replaced after repair of main reducer is completed.

2. Remove mount bracket 2 assembly of front main reducer and rear bush assembly of front main reducer

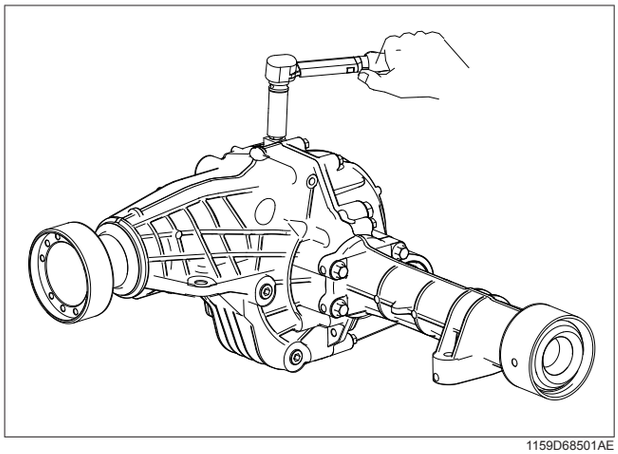


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Notice

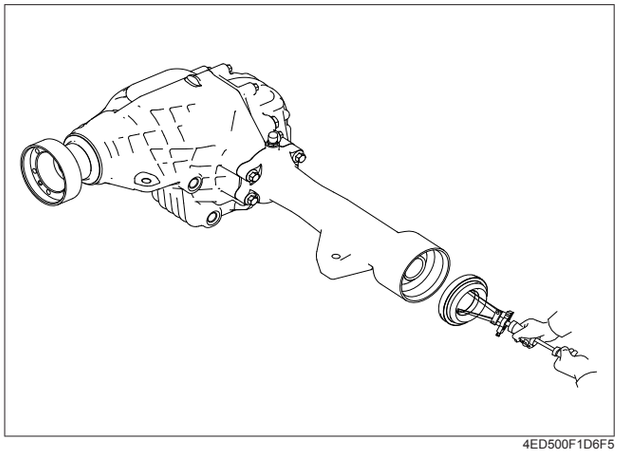
› Fix the front reducer and differential assembly on operation table for disassembly.

3. Remove ventilation valve assembly



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4. Remove oil seal assembly of long axle shaft

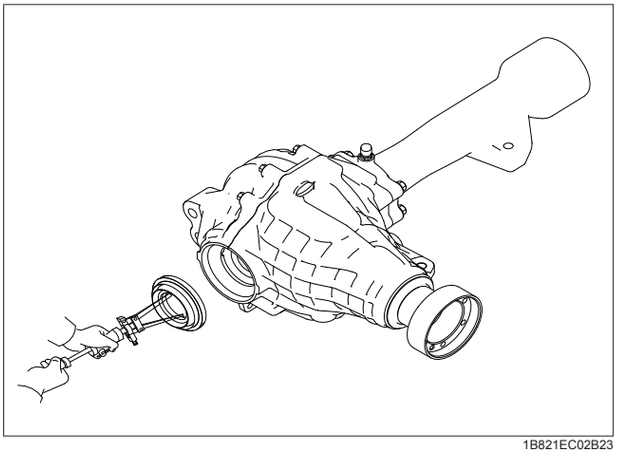


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Caution

› Oil seals are disposable parts.

5. Remove left half-axle oil seal

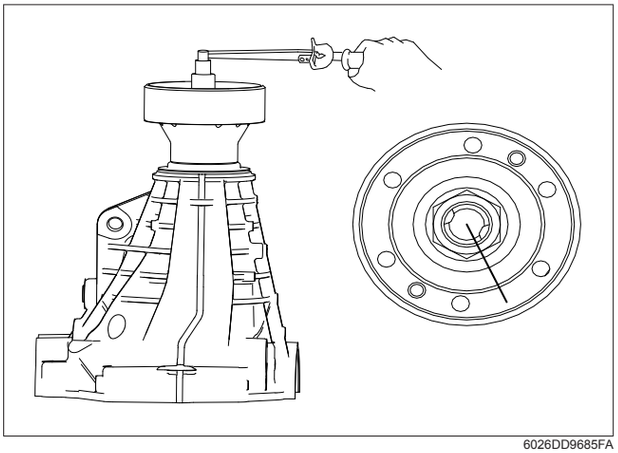


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Caution

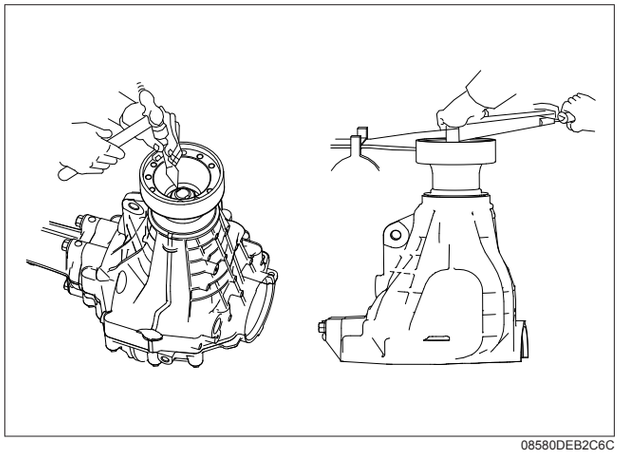
› Oil seals are disposable parts.

6. Measure the starting torque of driving bevel gear nut, and draw an alignment line on the lug and dust cover assembly, the nut-fastening driving bevel gear, and the driving gear



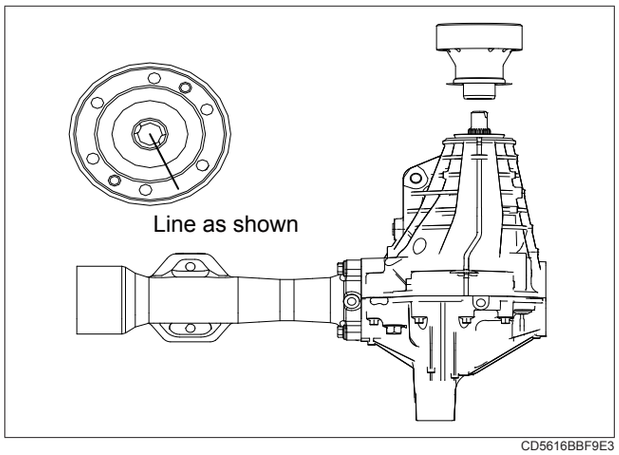
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7. Knock open the punching rivet of the driving bevel gear nut, fix the lug with a tool to prevent rotation, and use a wrench to remove fastening nut of driving bevel gear



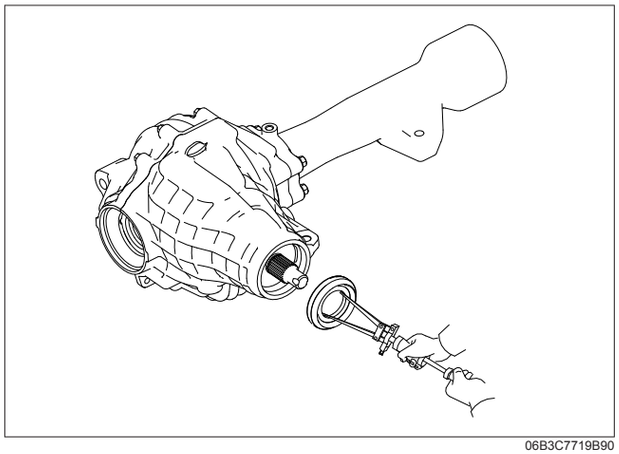
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8. Remove lug and dust cover assembly



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9. Remove oil seal - front driving bevel gear

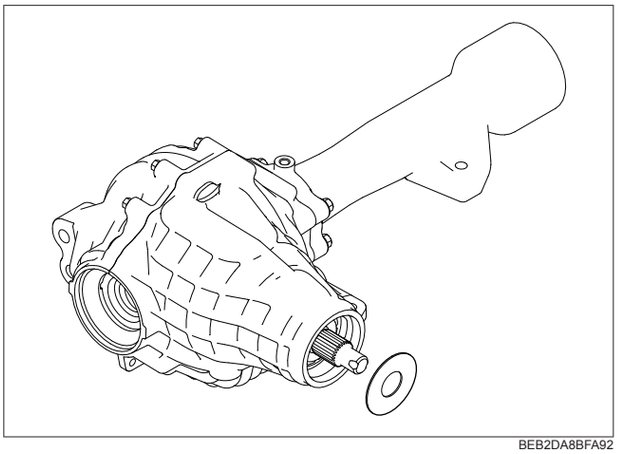


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⚠ Caution

› Oil seals are disposable parts.

10. Remove oil-slinger ring - driving bevel gear



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Assembly

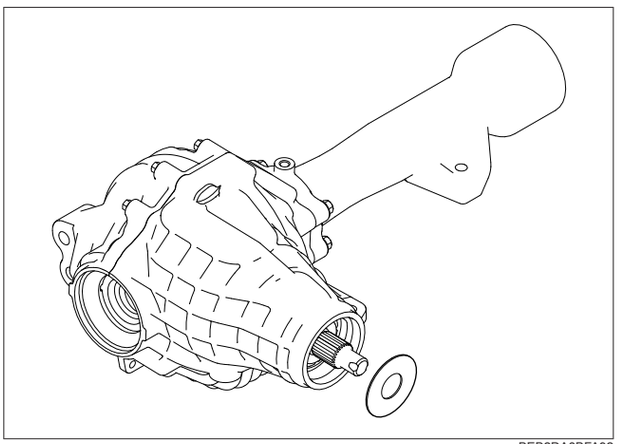
⚠ Caution

› Check integrity of the parts before installation. No defects are allowed in the fitting position of the parts, such as bumps, or scratches, etc.

› Make sure that various tools for installation are in place. For precision testing instruments, it is required to test the instruments to reduce installation errors caused by the tools.

› Clean various parts and prepare for assembly.

1. Install oil-slinger ring - driving bevel gear

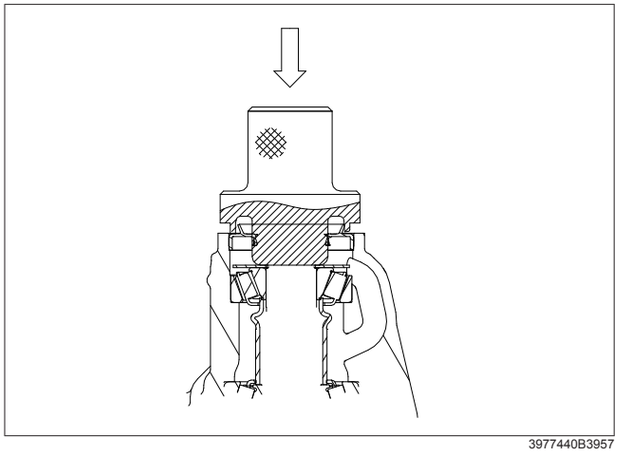


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ℹ Notice

› Place oil-slinger ring - driving bevel gear horizontally on small bearing of driving gear.

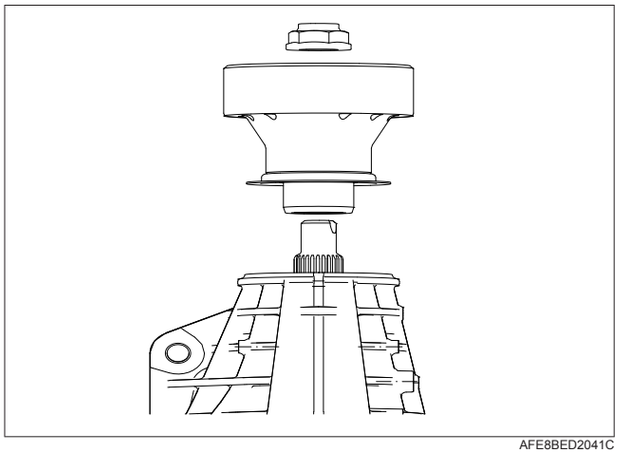
2. Install oil seal - front driving bevel gear, and press the oil seal - front driving bevel gear to the position shown in the figure



3977440B3957

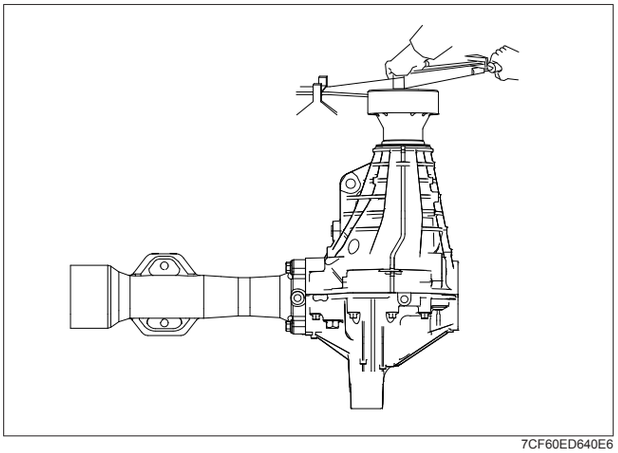
Pressing depth: (19±0.3) mm

3. To install driving gear lug and dust boot assembly (1), first, install the lug and dust boot assembly into the driving gear spline, adjust it to the alignment line, and then install the lug into the oil seal until threads of driving gear shaft are exposed, and finally screw the locking nut of driving gear into (3~4) pitches



AFE8BED2041C

4. To install lug and dust cover assembly (2), first, fix the lug with a tool, apply 1271 thread locking sealant evenly on the nut threads, apply 1596 silicone rubber plane sealant evenly on the end face of nut, then tighten the nut with a torque wrench according to specified torque until the nut is aligned with the alignment line of the driving gear shaft, and finally, measure the starting torque of the main reducer assembly after assembly, and compare the torque after assembly with the torque during disassembly.



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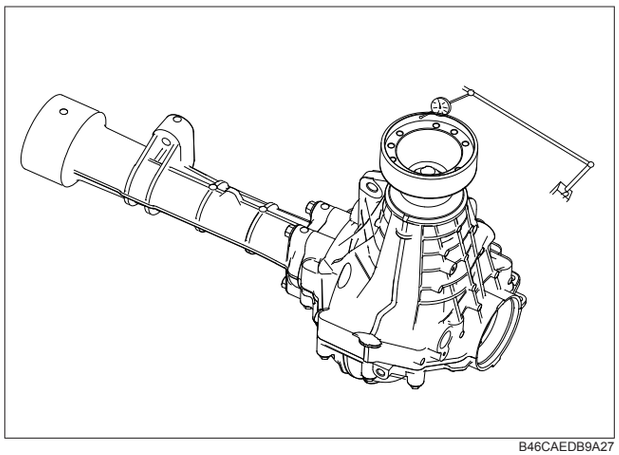
Difference between two torques: < (0 ± 0.2) N·m

⚠ Caution

› If the alignment line of nut exceeds the alignment line of driving gear shaft, this main reducer shall be discarded; if the alignment line of nut does not reach the alignment line of driving gear shaft, problems such as noise vibration or noise vibration harshness (NVH) may occur.

› If this difference exceeds (0 ± 0.2) N·m, replace with new main reducer.

5. Use a dial indicator to check run-out of lug spigot. First, attach the dial indicator seat to the iron piece, fix the dial indicator as well as the front reducer and the differential assembly, and then touch the probe of dial indicator on the cylindrical surface of lug, turn the lug, and carefully observe the deviation range of the meter hand

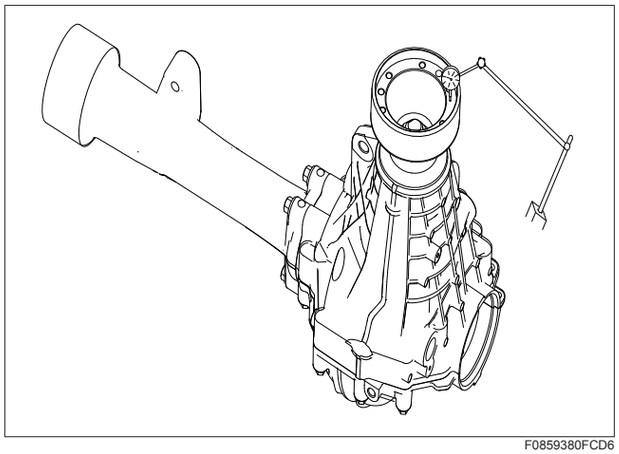


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Radial run-out tolerance of CVJ lug: ≤ 0.13 mm

Radial run-out tolerance of cross shaft lug: ≤ 0.10 mm

6. Check and adjust run-out of lug. First, attach the dial indicator seat to the iron piece, fix the dial indicator as well as the front reducer and the differential assembly, and then touch the probe of dial indicator on the end face of lug, turn the lug, and carefully observe the deviation range of the meter hand

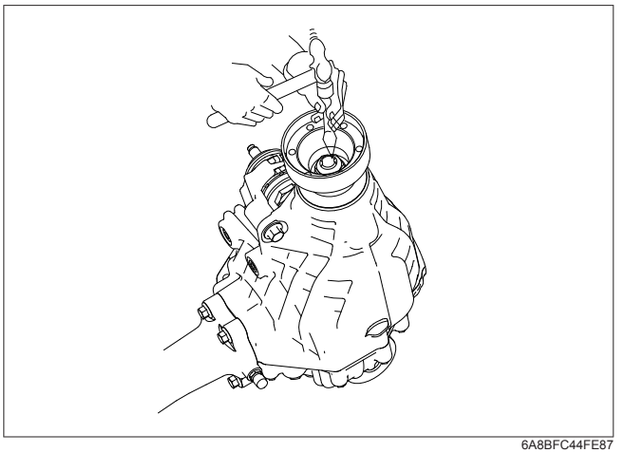


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End face run-out tolerance of CVJ lug: ≤ 0.13 mm

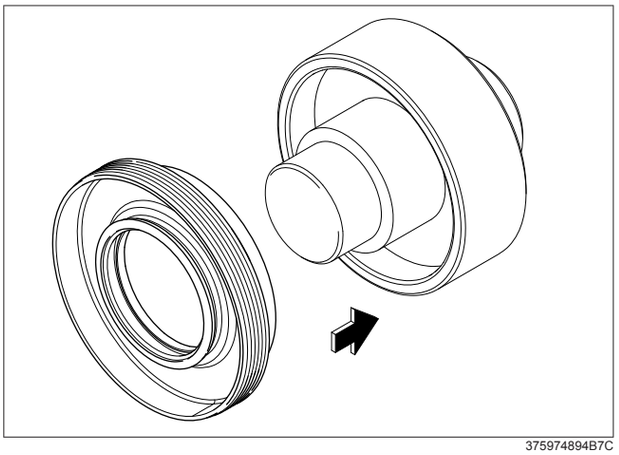
End face run-out tolerance of cross shaft lug: ≤ 0.10 mm

7. Rivet the main gear locking nut diagonally

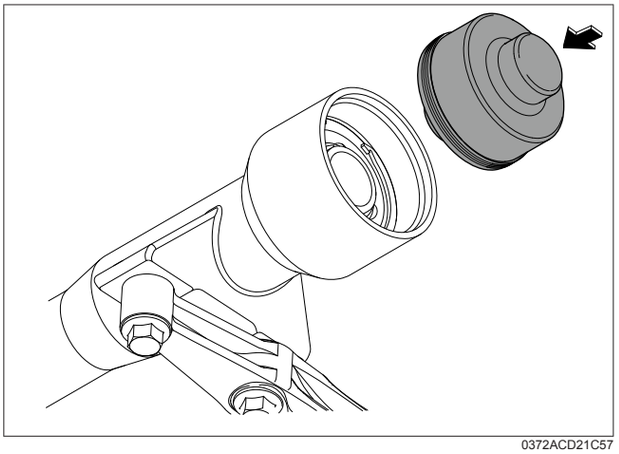


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8. To install long axle shaft oil seal assembly, use the special tool to press the long axle oil seal to the position shown in the figure



375974894B7C



0372ACD21C57

Pressing depth: (12.1±0.3) mm

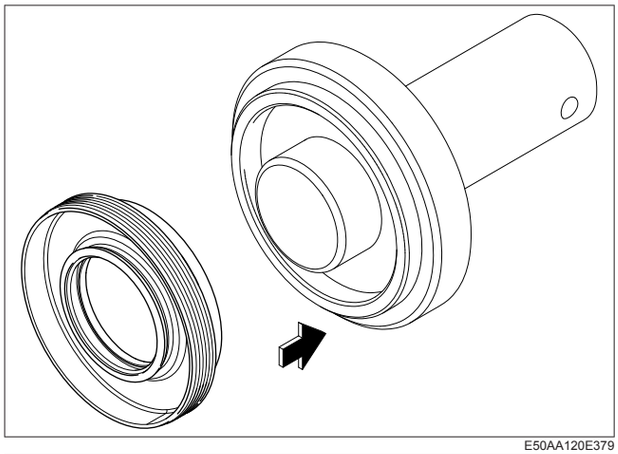
Notice

- Install oil seal to the tool ZEZF068641.
- Position the components on the corresponding seat hole in front main reducer housing.

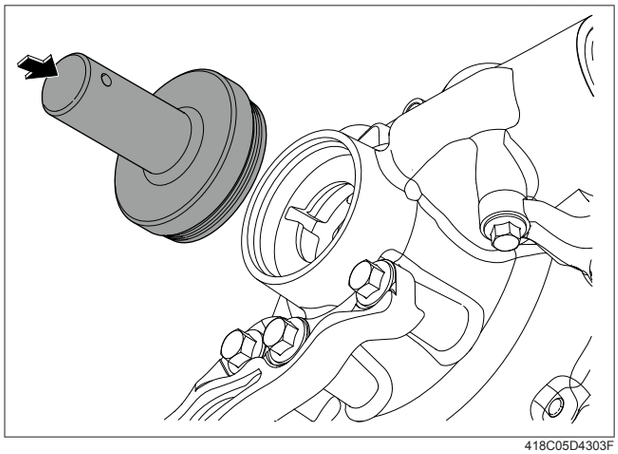
› Use a soft-faced hammer to knock the oil seal lightly and install it in place.

› Remove special tool after the oil seal is installed in place.

9. To install left half-axle oil seal, use the special tool to press the left half-axle oil seal to the position shown in the figure



E50AA120E379



418C05D4303F

Pressing depth: (20.3±0.3) mm

Notice

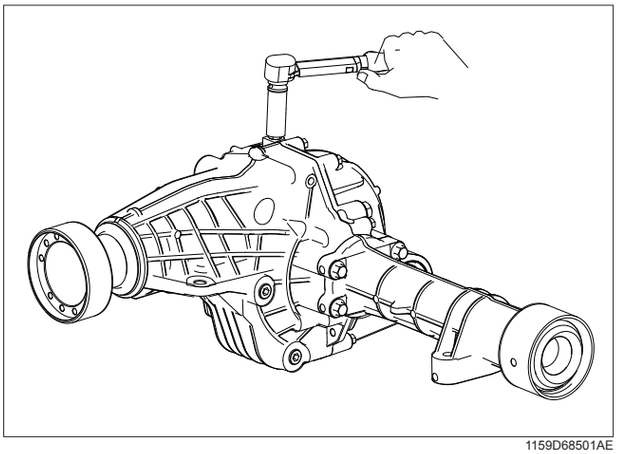
› Install oil seal to the tool ZEZF068640.

› Position the components on the corresponding seat hole in front main reducer housing.

› Use a soft-faced hammer to knock the oil seal lightly and install it in place.

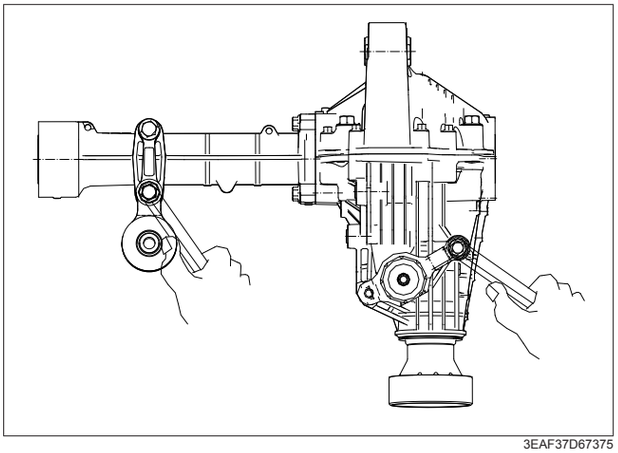
› Remove special tool after the oil seal is installed in place.

10. To install the ventilation valve assembly, first, apply 1596 silicon rubber plane sealant to threaded part of ventilation valve assembly with (3~4) pitches applied around, and tighten it according to specified torque



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11. Install mount bracket 2 assembly of front main reducer and rear bush assembly of front main reducer



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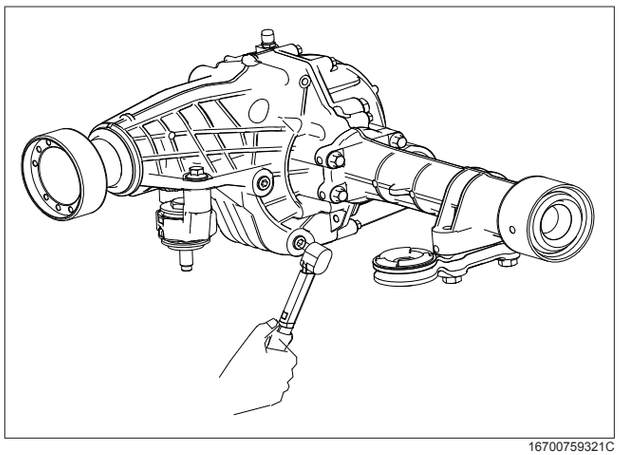
Notice

› Fix the front reducer and differential assembly on operation table for disassembly.

› Apply 1271 thread locking sealant to threaded part of bolt with (6~8) pitches applied around.

› Tighten the fastener according to the specified torque value.

12. To install filler plug and drain plug, first install the drain plug and tighten it according to specified torque value. After front reducer and differential assembly is installed on the frame, add gear oil to the level flush with the bottom surface of filler port, then install the filler plug and tighten it according to specified torque value



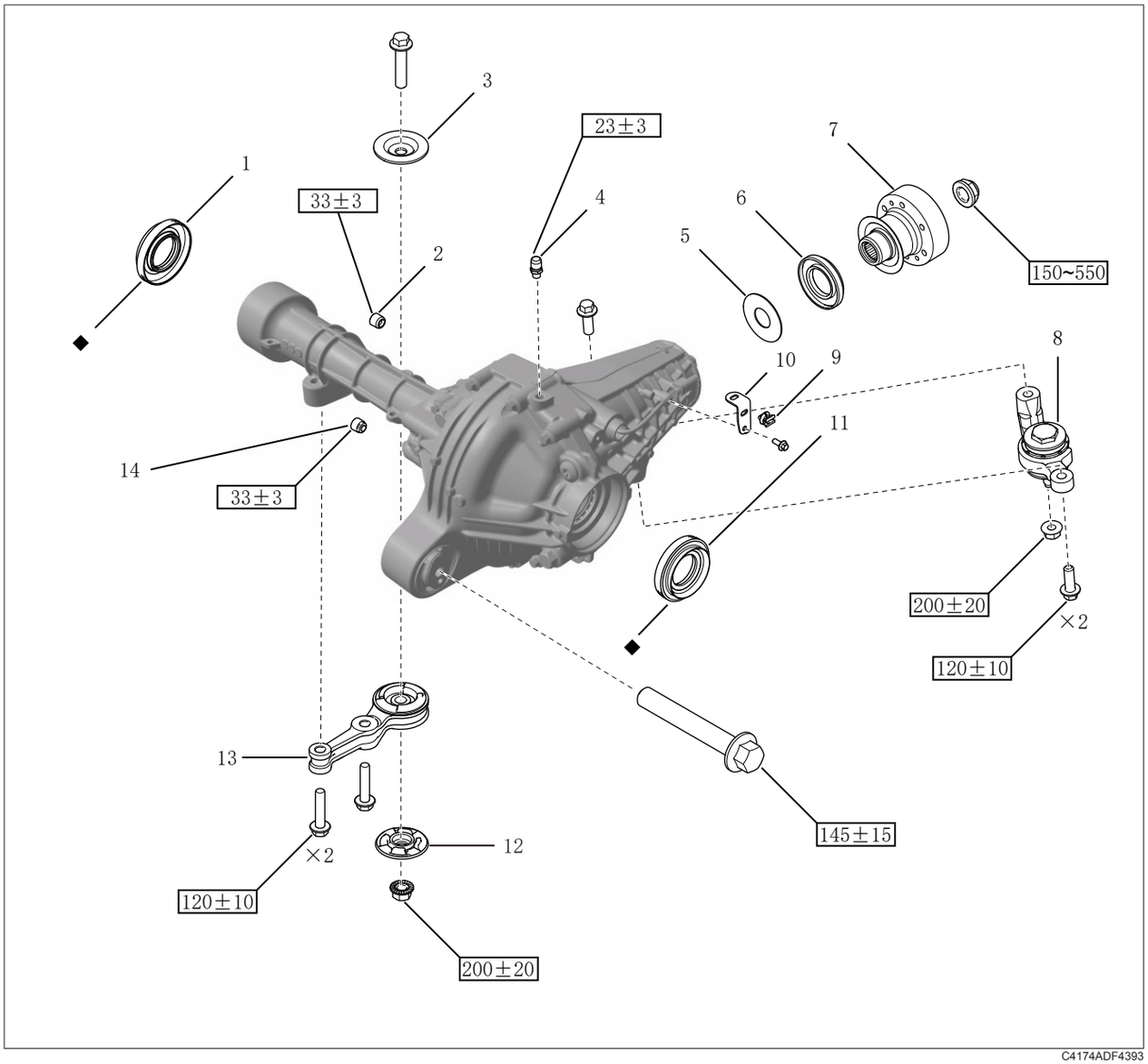
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Notice

› Wipe the plugs clean before installing drain screw plug and filler plug, and re-apply 1271 thread locking sealant with (3~5) threads applied around.

Front axle main reducer - with differential lock

Structural diagram



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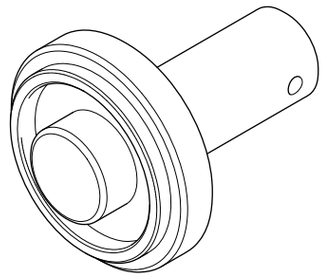
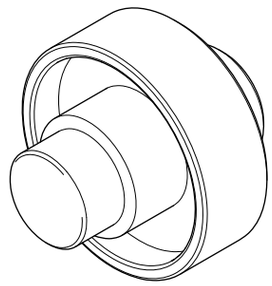
1. Long axle shaft oil seal assembly
2. Oil filler plug
3. Lower pad of axle shaft sleeve bush
4. Ventilation valve assembly
5. Oil-slinger ring - driving bevel gear oil seal
6. Oil seal - front driving bevel gear
7. Lug and dust cover assembly
8. Rear bush assembly of front reducer assembly
9. Harness clamp
10. Harness bracket
11. Left half-axle oil seal
12. Upper pad assembly of axle shaft sleeve bush
13. Mount bracket 2 assembly of front main reducer
14. Drain plug

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Axle shaft sleeve bush of front reducer assembly x frame	200±20	1	Apply screw thread glue
Nut			1	Apply screw thread glue
Bolt	Axle shaft sleeve bush of front reducer assembly x main reducer housing of front axle	120±10	2	Apply 1271 thread locking sealant to threaded part with (6~8) pitches applied around
Bolt	Front bush assembly of front reducer assembly x frame	145±15	1	Apply screw thread glue
Nut	Rear bush assembly of front reducer assembly x frame	200±20	1	Apply screw thread glue
Bolt	Rear bush assembly of front reducer assembly x main reducer housing of front axle	120±10	2	Apply 1271 thread locking sealant to threaded part with (6~8) pitches applied around
Oil filler plug	Oil filler plug x main reducer housing of front axle	33±3	1	Wipe it clean before installation, and re-apply 1271 thread locking sealant with (3~5) threads applied around

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Drain plug	Drain plug x main reducer housing of front axle	33±3	1	Wipe it clean before installation, and re-apply 1271 thread locking sealant with (3~5) threads applied around
Nut	Driving bevel gear x lug and dust cover assembly	160±20	1	Apply 1271 thread lock sealant to thread part, and evenly apply 1596 silicone rubber plane sealant to the end face of nut
Ventilation valve assembly	Ventilation valve assembly x main reducer housing of front axle	23±3	1	Apply 1596 silicon rubber plane sealant to threaded part (with (3~4) pitches applied around)
Bolt	Harness connector harness x main reducer housing of front axle	9±2	1	—

Special tools

Code	Name	Purpose	Schematic diagram
ZEZF068640	Crimping tool for left axle shaft oil seal of front-mounted main reducer	Press fit left axle shaft oil seal of front-mounted main reducer	
ZEZF068641	Crimping tool for long axle shaft oil seal of front-mounted main reducer	Press fit long axle shaft oil seal of front-mounted main reducer	

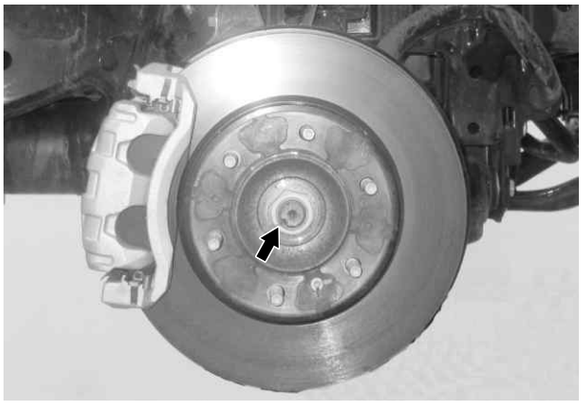
Fault symptom checklist

Fault description	Possible cause	Solution
Differential and reducer assembly oil leakage	High oil level or incorrect grade of oil	Discharge the oil to specified level or replace the oil
	Oil seal worn or damaged	Replace oil seal
	Matching flange loose or damaged	Tighten or replace the flange
Noisy axle	Low oil level or incorrect grade of oil	Fill lubricant as required or replace it
	Excessive clearance between planetary gear and driven bevel gear or axle shaft gear	Inspect the clearance
	Driven bevel gear, planetary gear or axle shaft gear worn or cracked	Check each gear
	Small gear bearing worn	Replace small gear bearing
	Differential bearing loose or worn	Tighten or replace differential shaft bearing

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove lower guard of front main reducer
4. Discharge lubricant for front axle main reducer
5. Remove front wheels
6. Remove front drive shaft nut

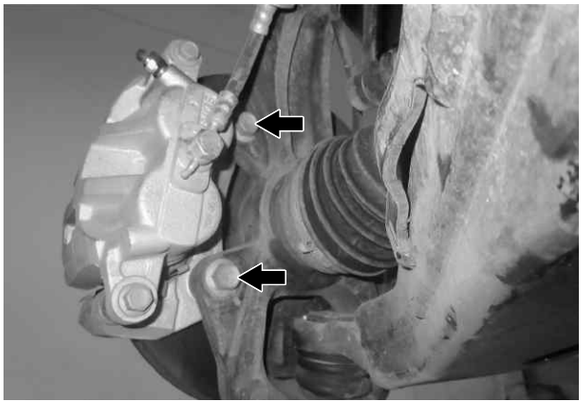


3C5FED6E3A64

⚠ Caution

› Completely loosen the locking part of the nut to avoid damage to drive shaft thread.

7. Remove two bolts and separate front brake caliper assembly

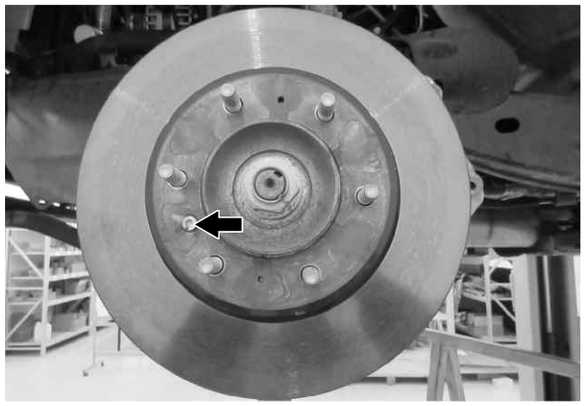


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ℹ Notice

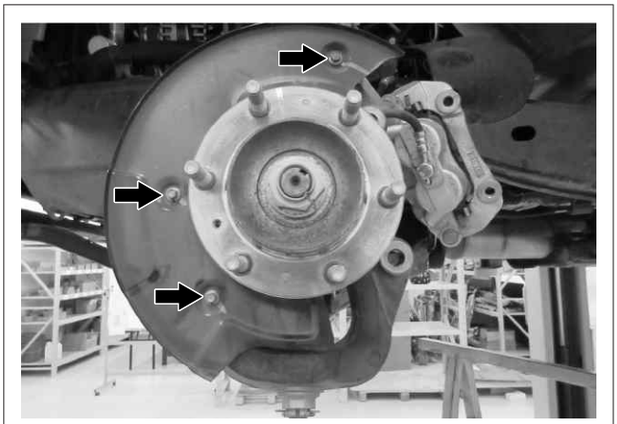
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

8. Remove 1 screw and front brake disc



9E634540A2CC

9. Remove 3 bolts and front brake disc cover



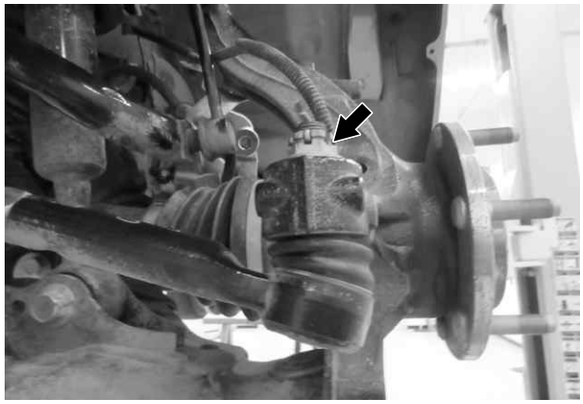
64A82BDFE69C

10. Separate front wheel speed sensor and harness
11. Separate front wheel speed sensor harness bracket
12. Separate front brake hose bracket
13. Separate front stabilizer bar and link assembly



318ED67B702E

14. Remove one locking pin and one nut, and separate steering gear outer ball assembly



948AA561841B

15. Remove 1 locking pin and 1 nut, and separate front upper arm assembly



8A261A317AC3

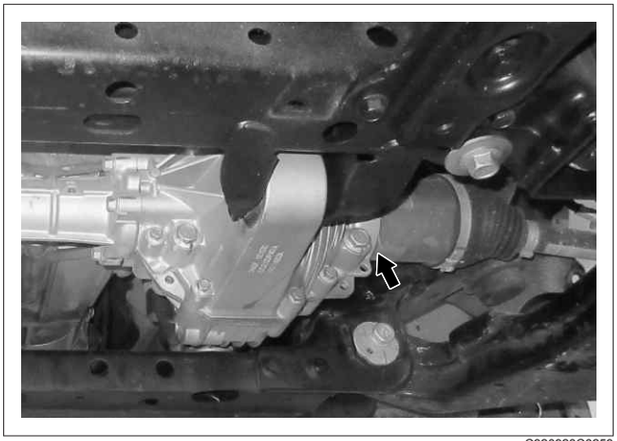
16. Remove one locking pin and one nut, and separate front lower arm assembly



8B8E3E75F6D1

17. Remove front steering knuckle and wheel hub flange plate assembly

18. Remove front drive shaft assembly



C320928C6253

Caution

- Do not drag drive shaft lever, otherwise interior connection may fall off.
- Do not damage drive shaft dust boot and drive shaft oil seal.
- Do not drop drive shaft assembly.

19. Remove lower guard of transmission

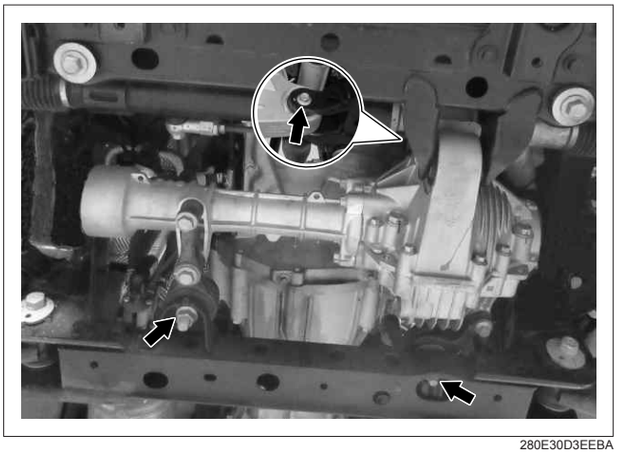
20. Remove front axle propeller shaft assembly

Notice

- Make assembly marks before removal.

21. Disconnect electronic differential lock of front axle

22. Remove 2 nuts and 1 bolt



280E30D3EEBA

23. Remove main reducer assembly of front axle

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Do not damage drive shaft dust boot and drive shaft oil seal.

› Do not distort wheel speed sensor harness.

ℹ Notice

› In drive shaft installation, have the open end of drive shaft snap ring face upward.

› Move drive shaft assembly horizontally.

› Align the assembly markings.

› Tighten the fastener according to the specified torque value.

› Add lubricant for front axle main reducer. Check and adjust the level of lubricant for front axle main reducer.

› Check the wheel alignment and make adjustments when necessary.

Disassembly/assembly

Disassembly

⚠ Caution

› Before disassembly, clean the outside of front reducer and differential assembly to avoid dirt, dust and other impurities on the assembly from entering the front reducer and differential assembly during removal.

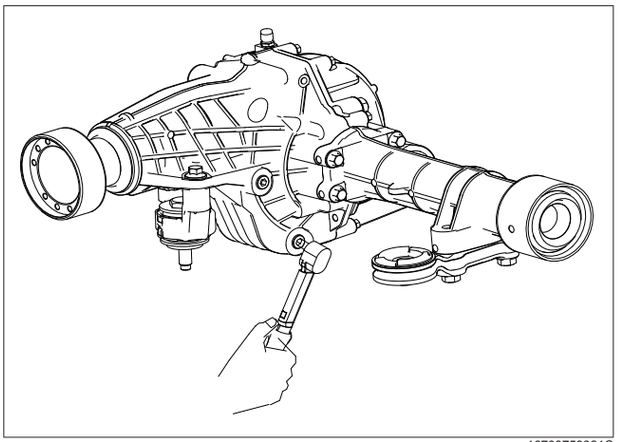
› Prepare clean containers to place removed parts in.

› Replace specified parts only. When other parts are damaged, replace front reducer and differential assembly.

› Electronic controlled differential lock is provided for front reducer and differential assembly, and harness is fixed to harness connector bracket through connector snaps. When a connector snap is damaged and cannot be used, slide the harness connector to remove it from the connector snap. Connector snap can be removed from the bracket by breaking the harness connector.

› Oil seal, nut - fastening driving bevel gear and shaft bushing are disposable parts and cannot be reused.

1. Remove oil drain plug and oil filler plug



16700759321C

ℹ Notice

› Unscrew the oil filler plug first, then unscrew the drain plug to drain all gear oil.

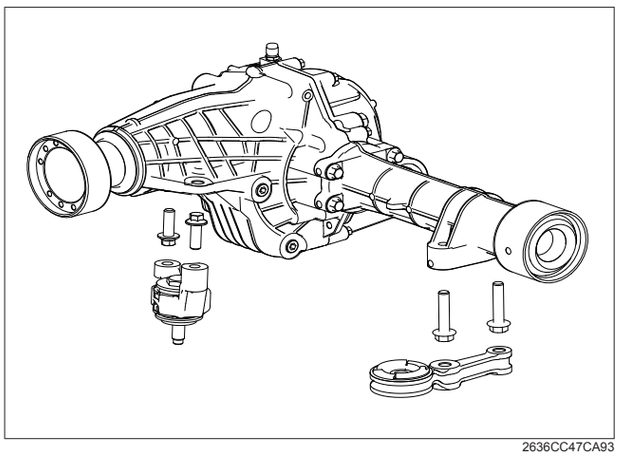
› Place oil filler plug and drain plug in designated container.

⚠ Caution

› During the oil discharge process, prevent gear oil from flowing too fast, causing oil stain on the ground.

› Gear oil cannot be reused after it is discharged, and new gear oil must be replaced after repair of main reducer is completed.

2. Remove mount bracket 2 assembly of front main reducer and rear bush assembly of front main reducer

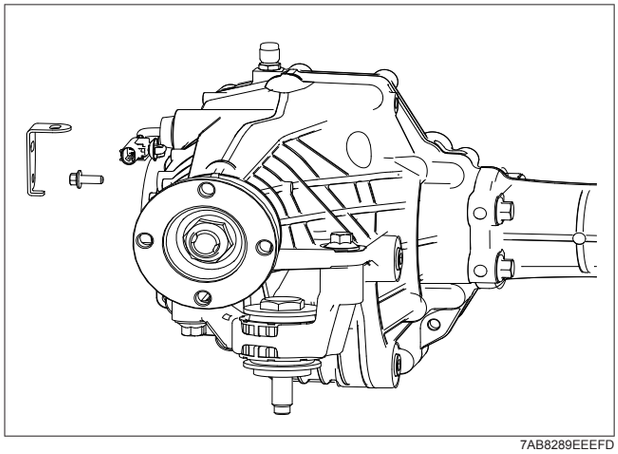


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ℹ Notice

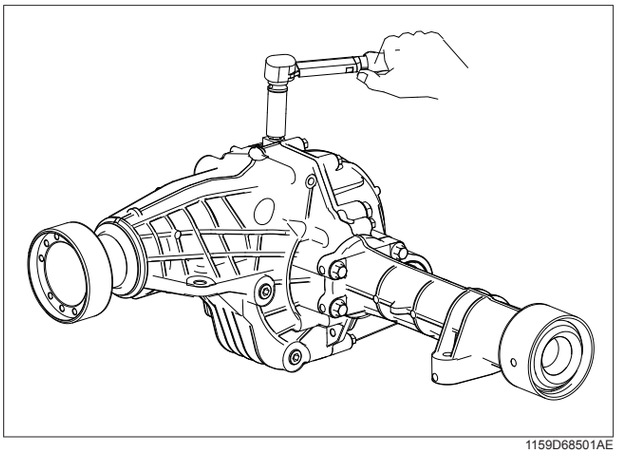
› Fix the front reducer and differential assembly on operation table for disassembly.

3. Separate harness connector snaps
4. Remove 1 bolt, and remove harness connector bracket



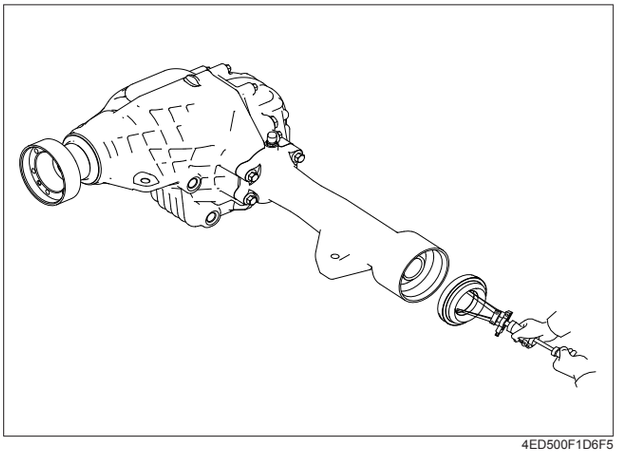
7AB8289EEEFD

5. Remove ventilation valve assembly



1159D68501AE

6. Remove oil seal assembly of long axle shaft

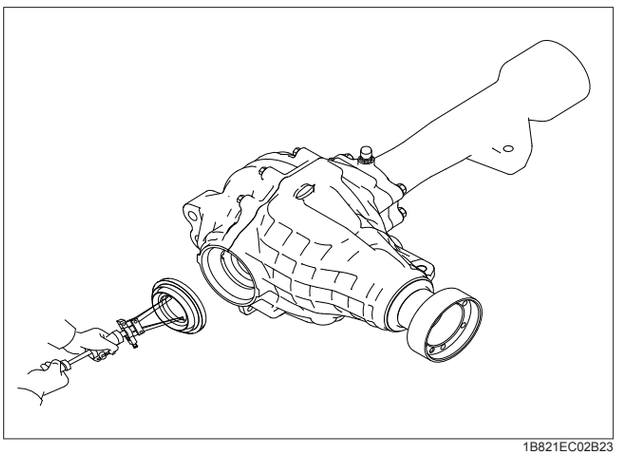


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⚠ Caution

› Oil seals are disposable parts.

7. Remove left half-axle oil seal

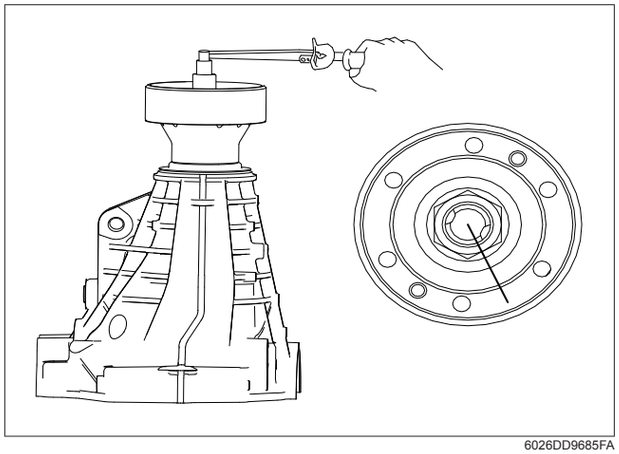


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⚠ Caution

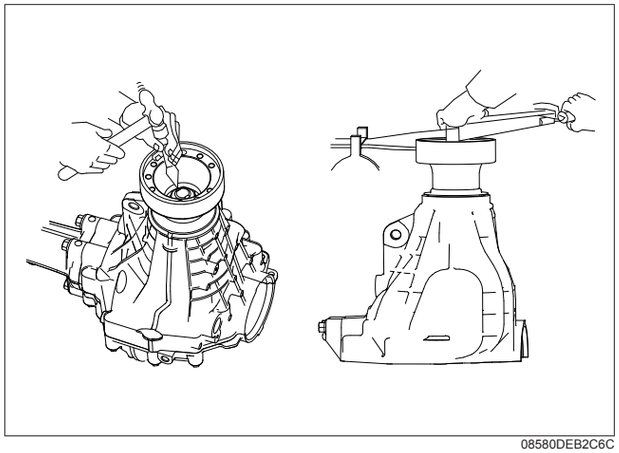
› Oil seals are disposable parts.

8. Measure the starting torque of driving bevel gear nut, and draw an alignment line on the lug and dust cover assembly, the nut-fastening driving bevel gear, and the driving gear



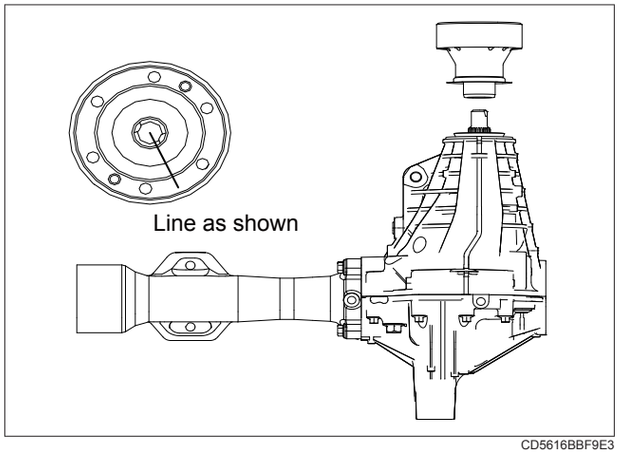
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9. Knock open the punching rivet of the driving bevel gear nut, fix the lug with a tool to prevent rotation, and use a wrench to remove fastening nut of driving bevel gear



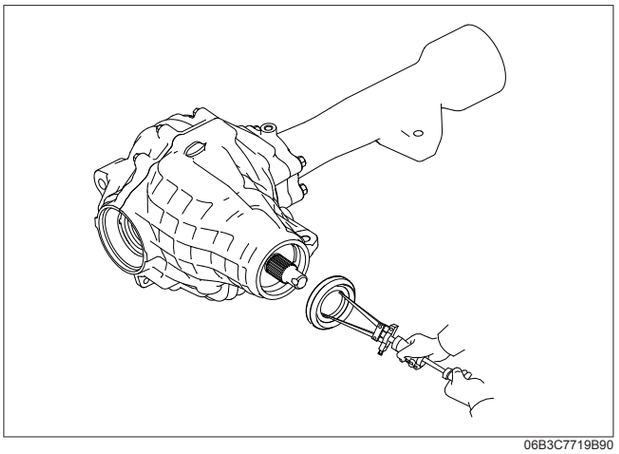
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10. Remove lug and dust cover assembly



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11. Remove oil seal - front driving bevel gear

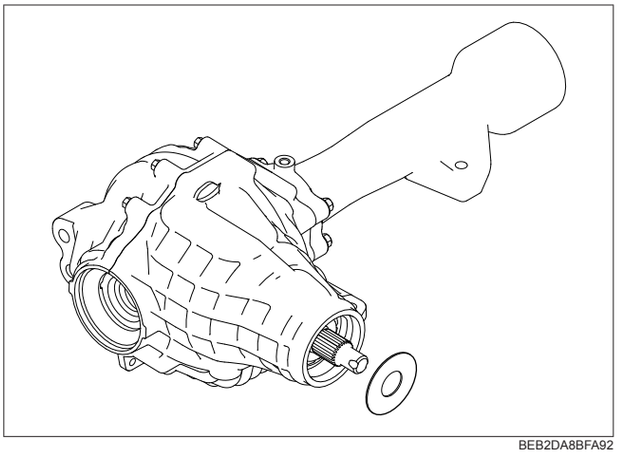


06B3C7719B90

⚠ Caution

› Oil seals are disposable parts.

12. Remove oil-slinger ring - driving bevel gear



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Assembly

⚠ Caution

› Check integrity of the parts before installation. No defects are allowed in the fitting position of the parts, such as bumps, or scratches, etc.

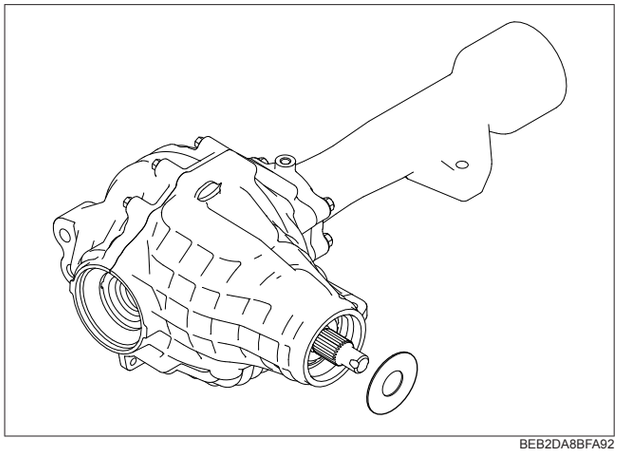
› Make sure that various tools for installation are in place. For precision testing instruments, it is required to test the instruments to reduce installation errors caused by the tools.

› Clean various parts and prepare for assembly.

› When electronic controlled differential lock is

provided for front reducer and differential assembly, the harness is fixed to harness connector bracket through connector snaps. Replace new connector snap, and make sure that the connector snap is installed in place. After assembly, slide the harness chute to fix the harness connector to the connector snap.

1. Install oil-slinger ring - driving bevel gear

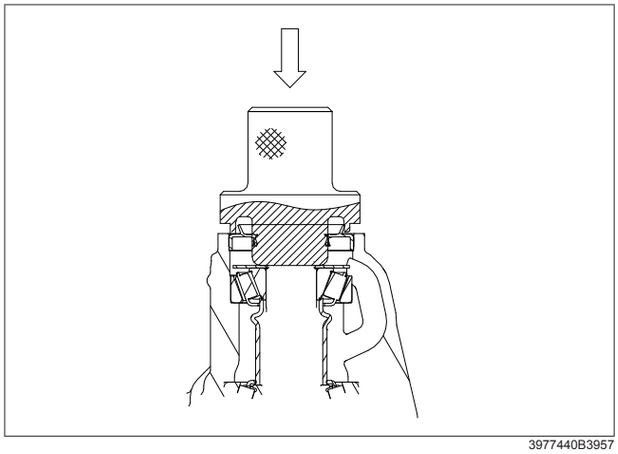


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Notice

- Place oil-slinger ring - driving bevel gear horizontally on small bearing of driving gear.

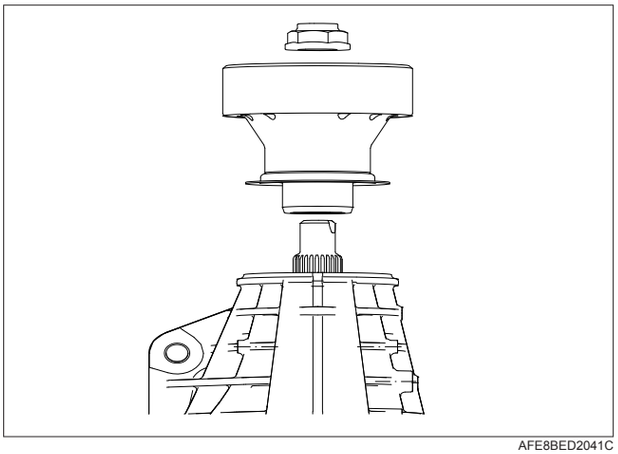
2. Install oil seal - front driving bevel gear, and press the oil seal - front driving bevel gear to the position shown in the figure



3977440B3957

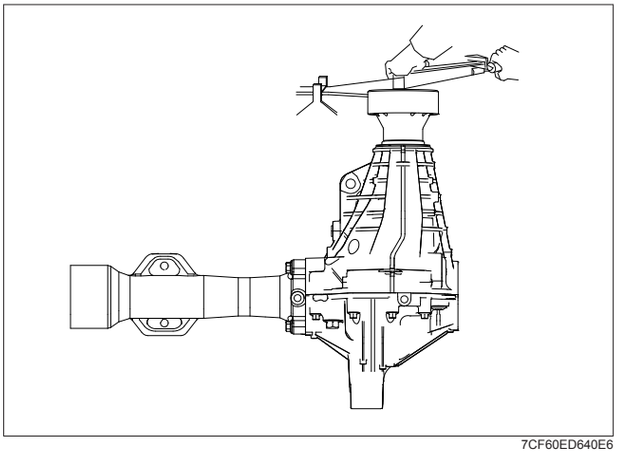
Pressing depth: (19±0.3) mm

3. To install driving gear lug and dust boot assembly (1), first, install the lug and dust boot assembly into the driving gear spline, adjust it to the alignment line, and then install the lug into the oil seal until threads of driving gear shaft are exposed, and finally screw the locking nut of driving gear into (3~4) pitches



AFE8BED2041C

4. To install lug and dust cover assembly (2), first, fix the lug with a tool, apply 1271 thread locking sealant evenly on the nut threads, apply 1596 silicone rubber plane sealant evenly on the end face of nut, then tighten the nut with a torque wrench according to specified torque until the nut is aligned with the alignment line of the driving gear shaft, and finally, measure the starting torque of the main reducer assembly after assembly, and compare the torque after assembly with the torque during disassembly.



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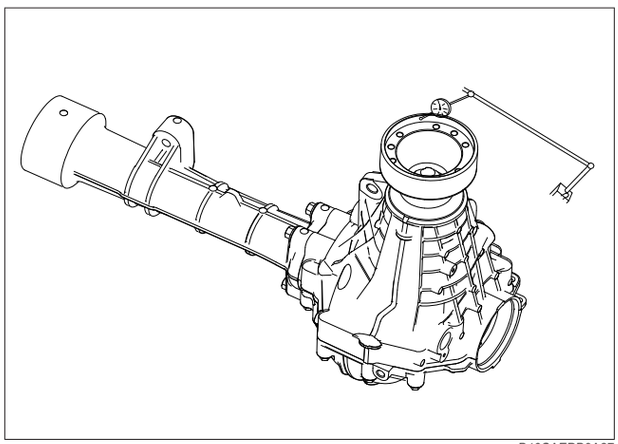
Difference between two torques: < (0 ± 0.2) N·m

⚠ Caution

› If the alignment line of nut exceeds the alignment line of driving gear shaft, this main reducer shall be discarded; if the alignment line of nut does not reach the alignment line of driving gear shaft, problems such as noise vibration or noise vibration harshness (NVH) may occur.

› If this difference exceeds (0 ± 0.2) N·m, replace with new main reducer.

5. Use a dial indicator to check run-out of lug spigot. First, attach the dial indicator seat to the iron piece, fix the dial indicator as well as the front reducer and the differential assembly, and then touch the probe of dial indicator on the cylindrical surface of lug, turn the lug, and carefully observe the deviation range of the meter hand

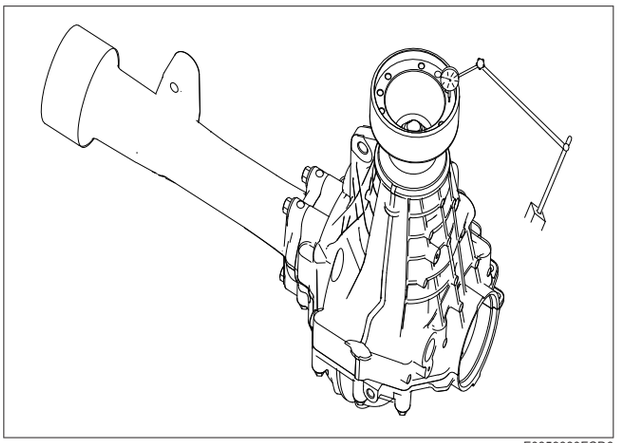


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Radial run-out tolerance of CVJ lug: ≤ 0.13 mm

Radial run-out tolerance of cross shaft lug: ≤ 0.10 mm

6. Check and adjust run-out of lug. First, attach the dial indicator seat to the iron piece, fix the dial indicator as well as the front reducer and the differential assembly, and then touch the probe of dial indicator on the end face of lug, turn the lug, and carefully observe the deviation range of the meter hand

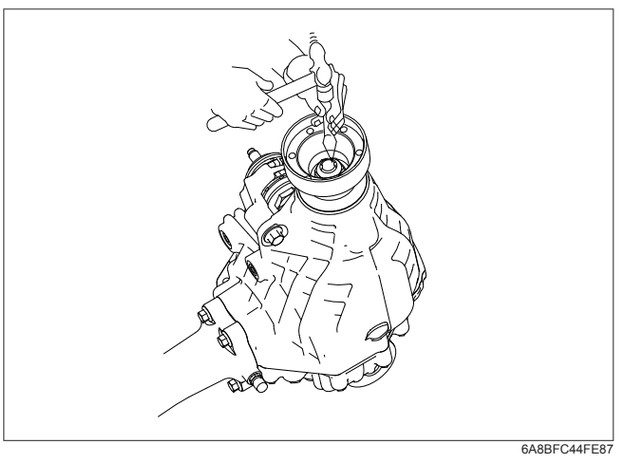


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End face run-out tolerance of CVJ lug: ≤ 0.13 mm

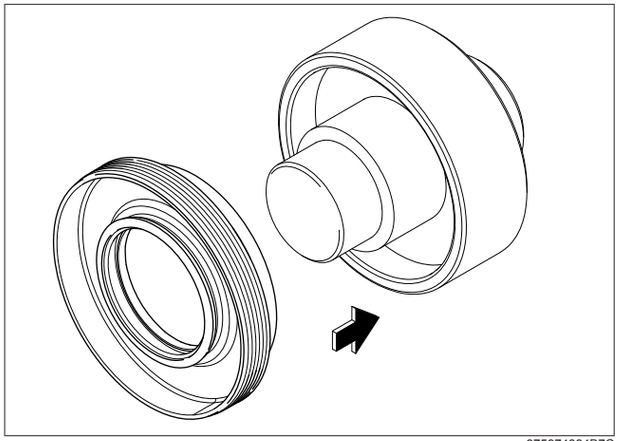
End face run-out tolerance of cross shaft lug: ≤ 0.10 mm

7. Rivet the main gear locking nut diagonally

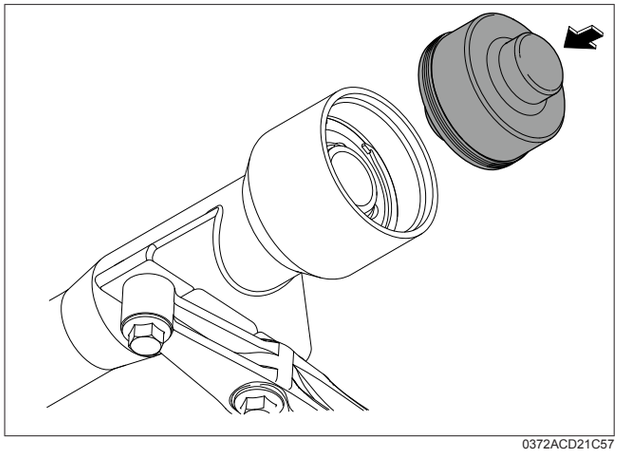


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8. To install long axle shaft oil seal assembly, use the special tool to press the long axle oil seal to the position shown in the figure



375974894B7C



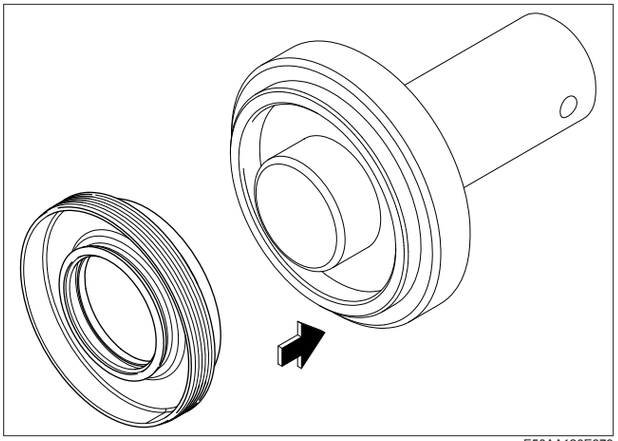
0372ACD21C57

Pressing depth: (12.1±0.3) mm

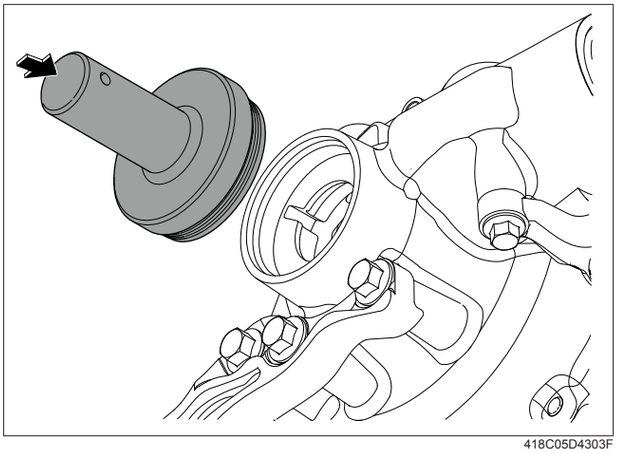
Notice

- Install oil seal to the tool ZEZF068641.
- Position the components on the corresponding seat hole in front main reducer housing.
- Use a soft-faced hammer to knock the oil seal lightly and install it in place.
- Remove special tool after the oil seal is installed in place.

9. To install left half-axle oil seal, use the special tool to press the left half-axle oil seal to the position shown in the figure



E50AA120E379



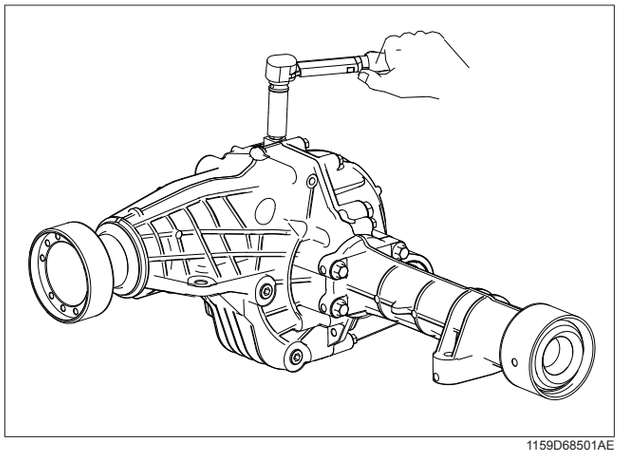
418C05D4303F

Pressing depth: (20.3±0.3) mm

Notice

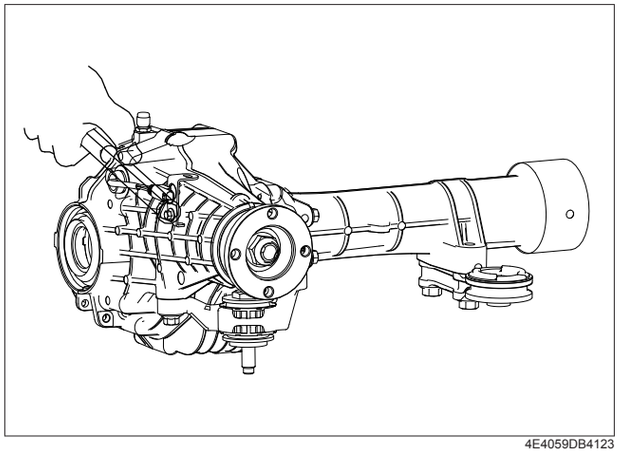
- Install oil seal to the tool ZEZF068640.
- Position the components on the corresponding seat hole in front main reducer housing.
- Use a soft-faced hammer to knock the oil seal lightly and install it in place.
- Remove special tool after the oil seal is installed in place.

10. To install the ventilation valve assembly, first, apply 1596 silicon rubber plane sealant to threaded part of ventilation valve assembly with (3~4) pitches applied around, and tighten it according to specified torque



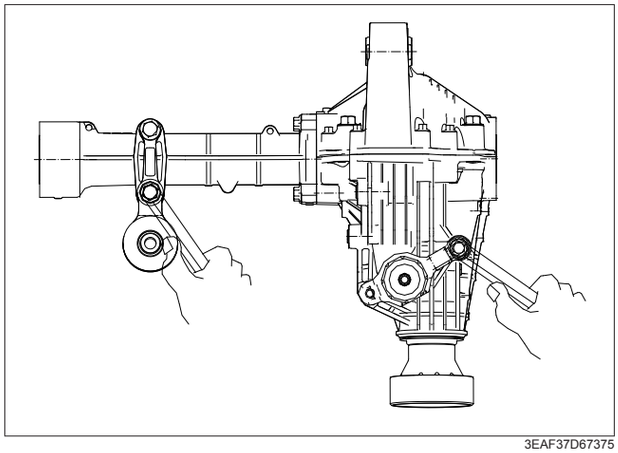
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11. Install harness connector bracket



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12. Install harness connector snaps
13. Install mount bracket 2 assembly of front main reducer and rear bush assembly of front main reducer

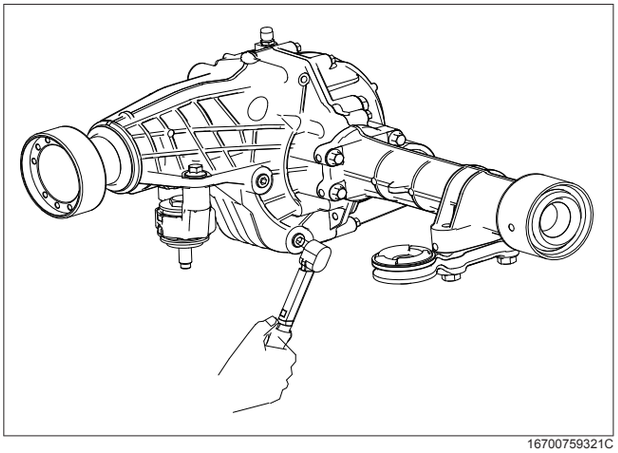


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Notice

- Fix the front reducer and differential assembly on operation table for disassembly.
- Apply 1271 thread locking sealant to threaded part of bolt with (6~8) pitches applied around.
- Tighten the fastener according to the specified torque value.

14. To install filler plug and drain plug, first install the drain plug and tighten it according to specified torque value. After front reducer and differential assembly is installed on the frame, add gear oil to the level flush with the bottom surface of filler port, then install the filler plug and tighten it according to specified torque value



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Notice

- Wipe the plugs clean before installing drain screw plug and filler plug, and re-apply 1271 thread locking sealant with (3~5) threads applied around.

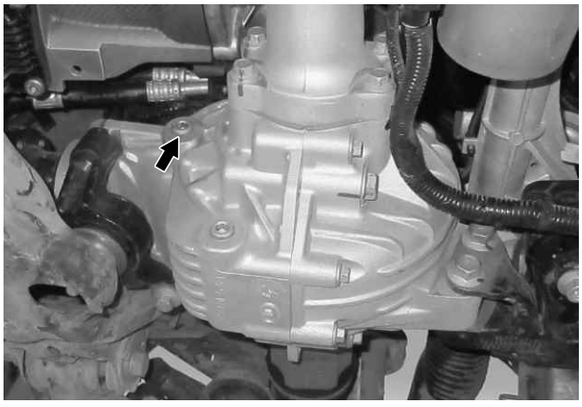
Front main reducer lubricant

Specifications

Item	Parameter
Lubricant capacity (L)	1.05±0.05
Lubricant type	TRANSMISSION DUAL9 FE 75W-90

Check

1. Lift the vehicle to a proper position
2. Unscrew oil filler plug



59BE76111AD9

3. Check lubricant for front axle main reducer. Lubricant level shall be flush with the lowest position of the lower end face of filler port

Notice

› Add lubricant for front axle main reducer if necessary.

4. Check quality of lubricant. If any defect is found, such as dilution, gelling, dirt, deterioration, etc., replace lubricant for front axle main reducer

Replacement

Notice

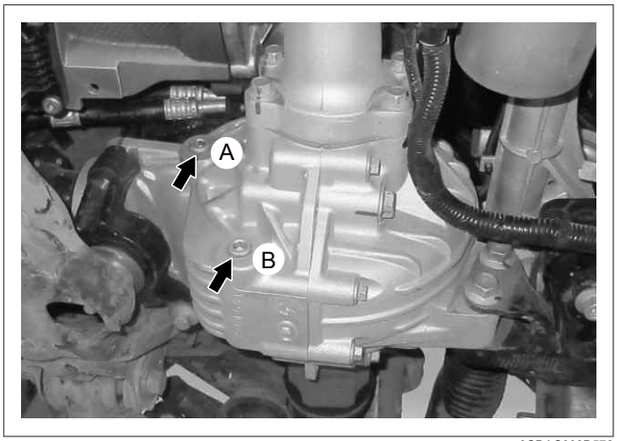
› When adding lubricant for front axle main reducer, make sure that the vehicle is in a horizontal state.

› Excessive or insufficient lubricant for front axle main reducer may result in fault.

› After replacing lubricant for front axle main reducer, drive the vehicle and check the oil level.

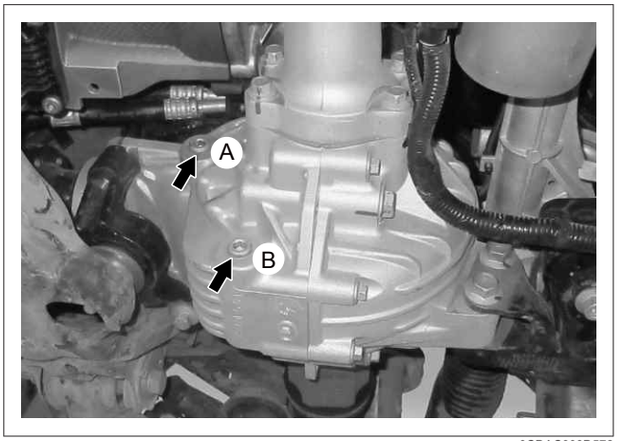
› Lubricant for front axle main reducer shall be in a hot state in replacement of lubricant.

1. Lift the vehicle to a proper position
2. Unscrew oil filler plug A



0CDAC908D572

3. Unscrew drain plug B, and discharge lubricant for front axle main reducer



0CDAC908D572

Caution

› Properly handle the waste.

4. Install drain plug after cleaning drain plug

   Tightening torque: (33±3) N·m

5. Add lubricant for front axle main reducer until lubricant flows out of filling port

   Filling amount: (1.05 ± 0.05) L

   Lubricant type: TRANSMISSION DUAL9 FE 75W-90

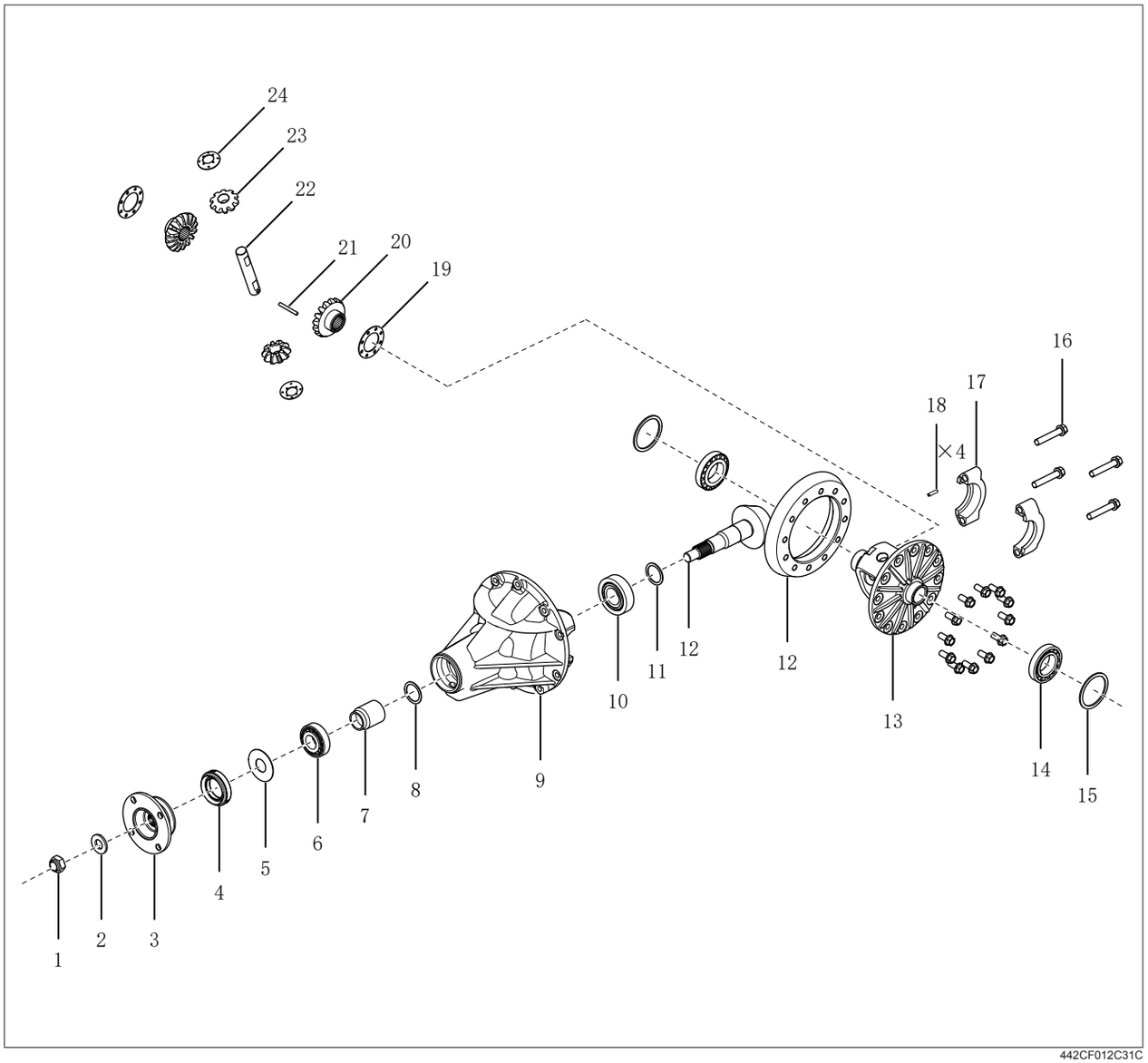
6. Install oil filler plug after cleaning it

   Tightening torque: (33±3) N·m

7. Lower the vehicle

Rear axle main reducer - without differential lock

Structural diagram



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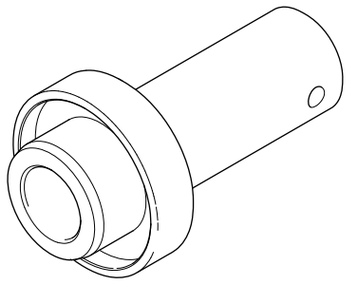
1. Nut of driving bevel gear lug
2. Flat washer - nut of driving bevel gear lug
3. Driving bevel gear lug and dust cover assembly
4. Oil seal assembly-driving bevel gear
5. Flat washer - nut of driving bevel gear lug
6. Tapered roller bearing
7. Spacing sleeve-driving bevel gear bearing
8. Adjusting washer - driving bevel gear
9. Reducer housing
10. Tapered roller bearing
11. Adjusting washer - driving bevel gear
12. Driving/driven bevel gear assembly
13. Differential housing
14. Tapered roller bearing
15. Differential bearing adjusting washer
16. Bolt-for tightening differential bearing gland
17. Differential bearing gland
18. Locating pin
19. Axle shaft gear thrust gasket
20. Axle shaft gear
21. Pin
22. Planetary gear shaft
23. Planetary gear
24. Planetary gear retaining gasket

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Oil filler plug	Oil filler plug x rear axle housing	150±10	1	—
Drain plug	Drain plug x rear axle housing	150±10	1	—
Nut	Driving bevel gear lug x driving bevel gear	120~180	1	Nut: apply 1271 thread locking sealant is applied to the fitting part of thread with an amount of sealant for (6~8) threads. Rotate it while applying sealant. Flat washer: apply 1596 silicone rubber plane sealant evenly on the upper and lower sides.
Bolt	Driven bevel gear x differential housing	110±5	12	Apply 1271 thread locking sealant to the threaded area for about 4 threads

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Differential bearing gland × reducer housing	78~115	4	Apply 1271 thread locking sealant is applied to the fitting part of bolt thread with an amount of sealant for (6~8) threads.
Long stud	Reducer housing × rear axle housing	58±5	6	For double-end studs, pre-apply Loctite 516 thread sealant at one end. The length of sealant applied extends to the end of thread with (2~3) threads exposed
Short stud			4	
Nut			10	First set the heavy-duty spring washer on the double-end stud, then screw the nut onto the double-end stud (3~5) threads
Ventilation valve assembly	Ventilation valve assembly × rear axle housing	23±3	1	—

Special tool

Code	Name	Purpose	Schematic diagram
ZEZF068642	Crimping tool for large oil seal of driving gear of rear axle	Press fit large oil seal of driving gear of rear axle	

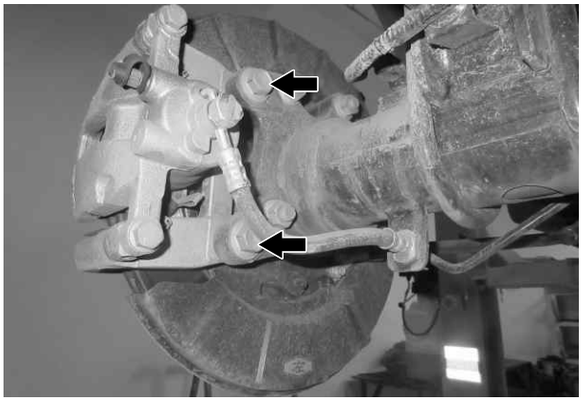
fault symptom checklist

Fault description	Possible cause	Solution
Differential and reducer assembly oil leakage	High oil level or incorrect grade of oil	Discharge the oil to specified level or replace the oil
	Oil seal worn or damaged	Replace oil seal
	Matching flange loose or damaged	Tighten or replace the flange
Noisy axle	Low oil level or incorrect grade of oil	Fill lubricant as required or replace it
	Excessive clearance between planetary gear and driven bevel gear or axle shaft gear	Inspect the clearance
	Driven bevel gear, planetary gear or axle shaft gear worn or cracked	Check each gear
	Small gear bearing worn	Replace small gear bearing
	Rear axle shaft bearing worn	Replace rear axle shaft bearing
	Differential bearing loose or worn	Tighten or replace differential shaft bearing

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Discharge rear axle lubricant
4. Remove rear wheels
5. Separate rear brake caliper with brake hose

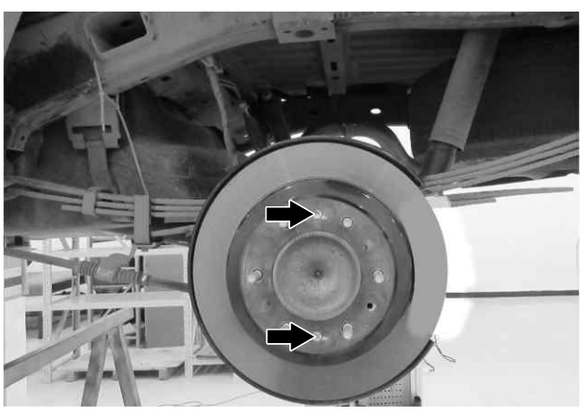


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⚠ Caution

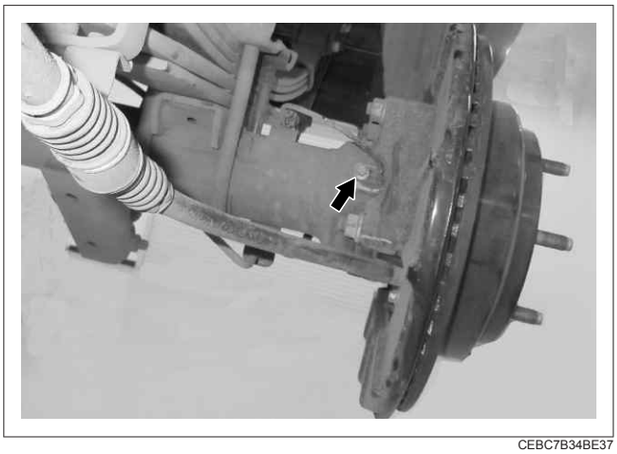
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

6. Remove rear brake disc



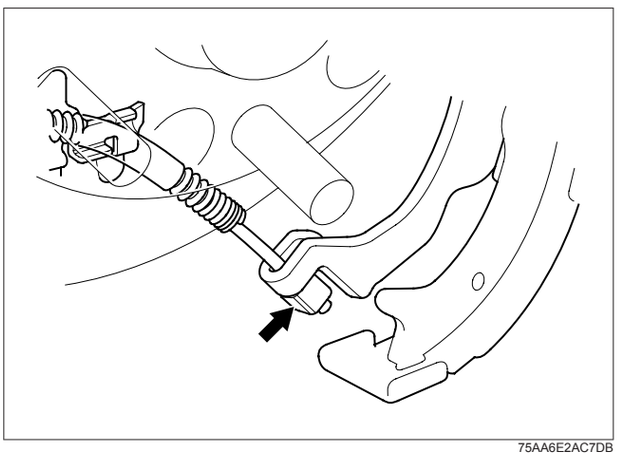
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7. Separate rear wheel speed sensor



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8. Disconnect parking brake cable assembly and rear brake



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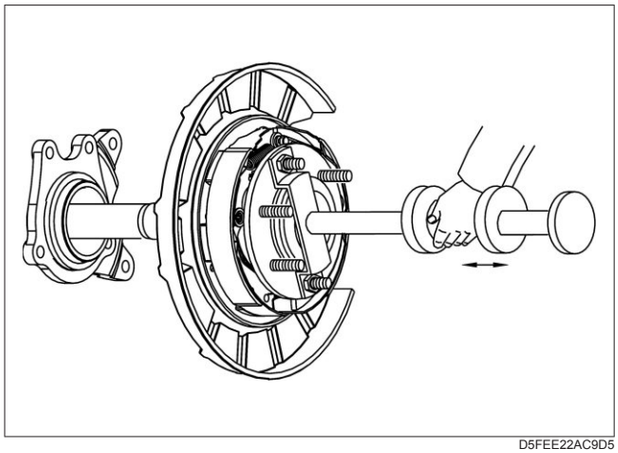
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9. Remove 4 nuts, and disconnect rear axle and rear brake



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10. Remove rear axle shaft with rear brake

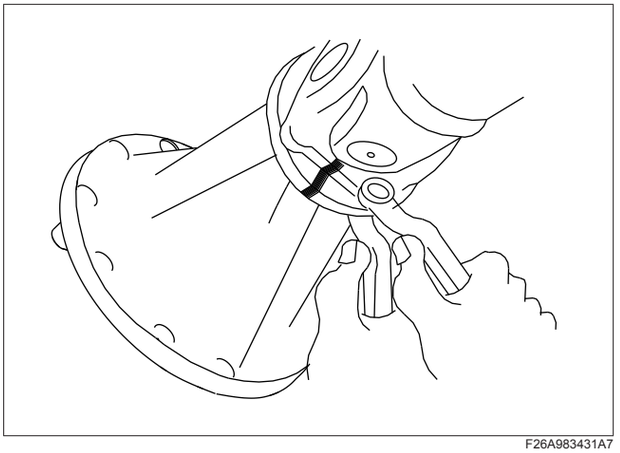


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Notice

- Connect special tool and axle shaft flange surface using the wheel nut.
- Hold the free hammer of the special tool with hand and hit repeatedly Removal the rear axle shaft.

11. Remove 4 nuts, bolts and washers, and disconnect rear axle main reducer and rear axle propeller shaft assembly

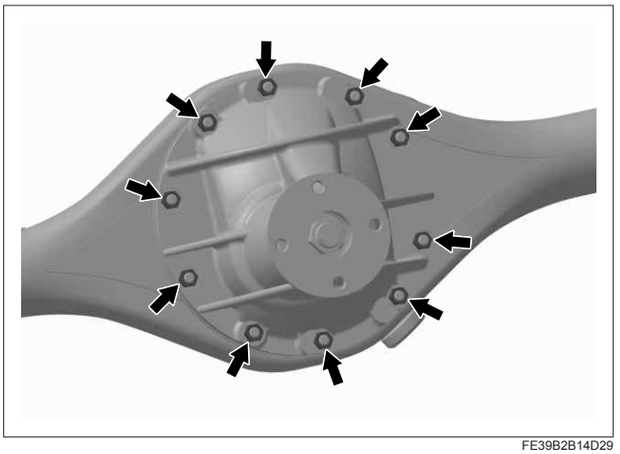


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Notice

- Make assembly marks before disassembly.

12. Remove 10 nuts, and remove rear axle main reducer and rear axle differential



FE39B2B14D29

13. Separate rear axle differential

Installation

1. Perform installation work in reverse order of removal

Caution

- Wipe the mounting facing of the axle housing clean and evenly apply silicon rubber plane sealant on it.
- Align the assembly markings.
- Tighten the fastener according to the specified torque value.
- Add the rear axle lubricant and check rear

axle lubricant level.

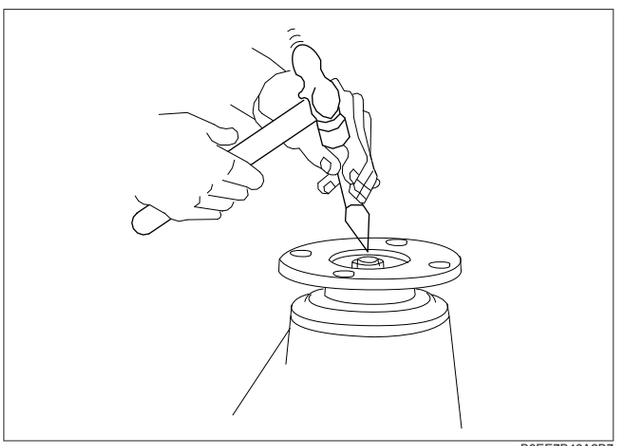
Disassembly/assembly

Disassembly

⚠ Caution

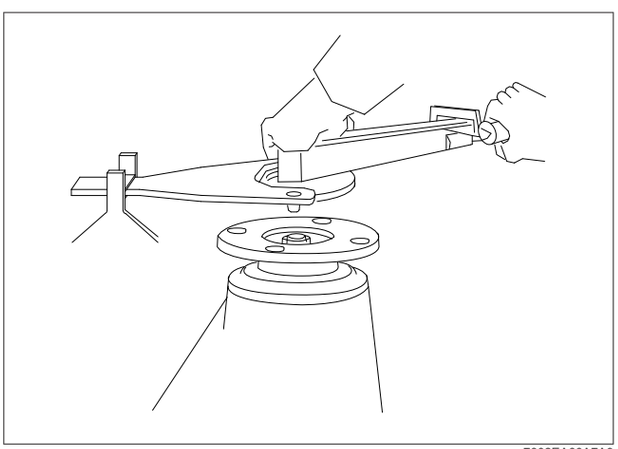
- When removing and repairing rear reducer and differential assembly, arrange the internal parts in order for easy reinstallation.
- When replacing with new parts, make sure that no dust, foreign objects or iron filings are found.
- The meshing clearance between the gears and the pre-tightening force of each bearing are precisely adjusted with strict guaranty. When repairing or replacing the parts of differential assembly, try to avoid unnecessary removal of parts.

1. Pry up the riveting between the nut of driving bevel gear lug and driving bevel gear with punch



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2. Use a tool to fix driving bevel gear lug and dust cover assembly, and then remove nut of driving bevel gear lug

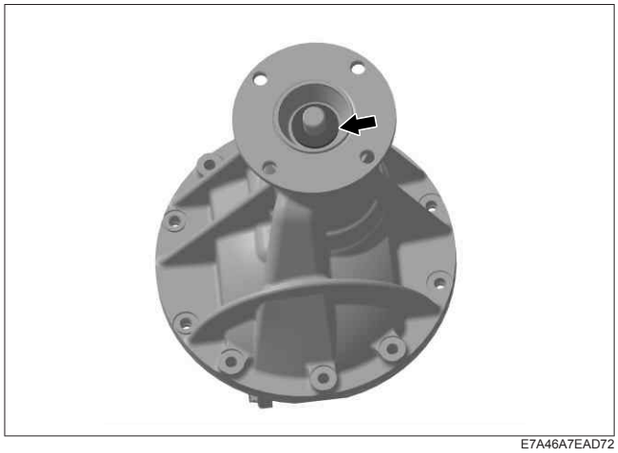


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⚠ Caution

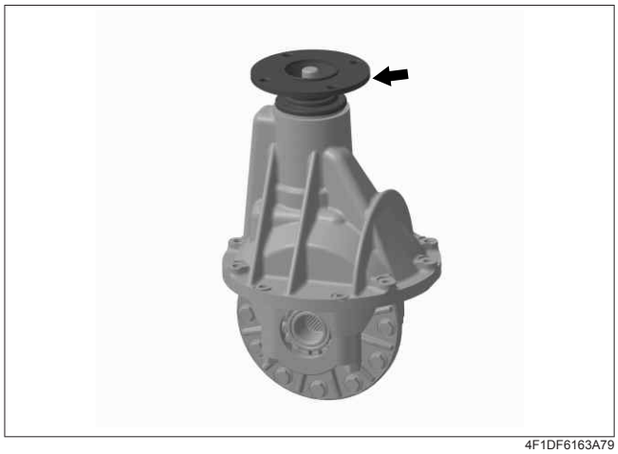
› The removed nut of driving bevel gear lug cannot be reused.

3. Remove flat washer - nut of driving bevel gear lug



E7A46A7EAD72

4. Remove driving bevel gear lug and dust cover assembly



4F1DF6163A79

5. Remove oil seal assembly - driving bevel gear



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⚠ Caution

› Oil seals are disposable parts.

Assembly

⚠ Caution

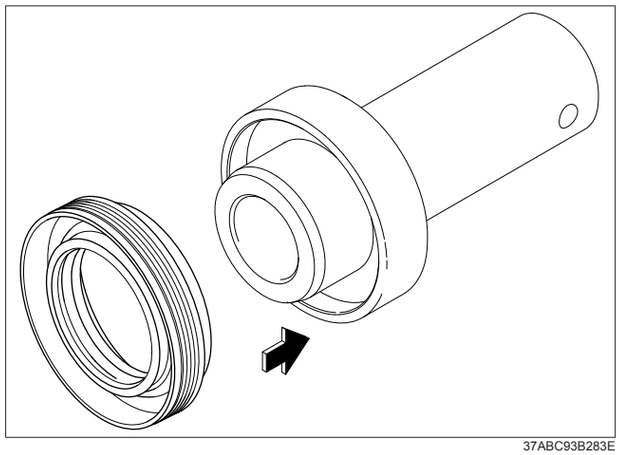
› Before the installation, inspect the integrity of parts and make sure that no part is dented.

› Check that various tools for related installation are in place. For precision testing instruments, it is required to test the instruments to reduce installation errors caused by the tools.

› Perform leak test for main reducer housing to ensure that the product is acceptable.

› Clean various parts (except bearings and oil seals) and prepare for assembly.

1. Apply lithium-based grease evenly to the oil seal of reducer housing
2. Install oil seal on tool ZEZF068642



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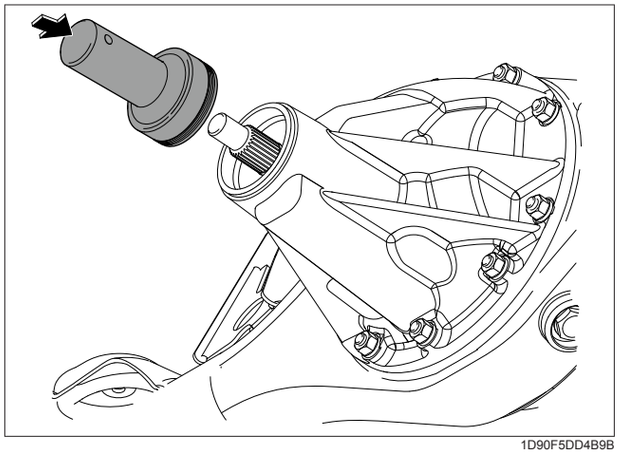
⚠ Caution

› Clean special maintenance tools before installation.

› Lay oil seal flat.

› Before installation, make sure that the working surface coming into contact with oil seal is smooth.

3. Position the component on the corresponding seat hole of rear axle housing



1D90F5DD4B9B

4. Gently knock the oil seal with a hammer to force it into place

⚠ Caution

› Apply force uniformly.

⚠ Warning

› Knocking with metal hammer will damage the tools.

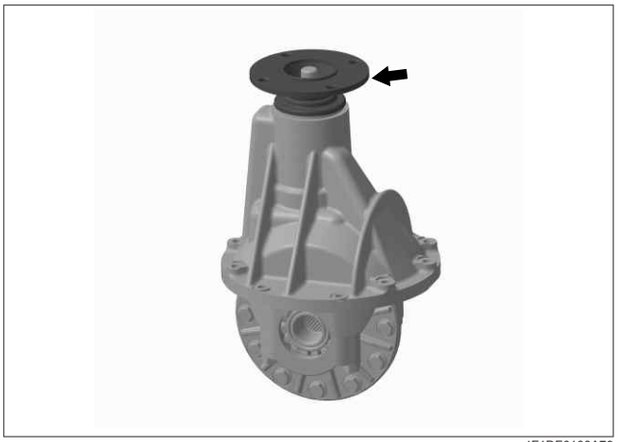
5. Remove special tool after the oil seal is installed in place

⚠ Caution

› Make sure that oil seal is installed in place.

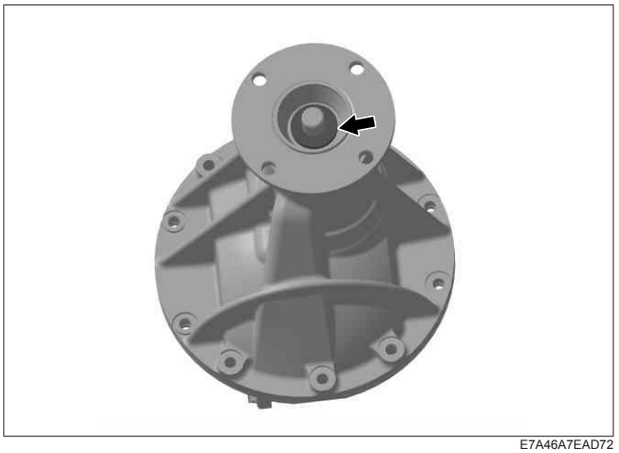
› The upper end face of oil seal is flush with the upper end face of reducer housing.

6. To install driving bevel gear lug and dust cover assembly, put the driving bevel gear lug and dust cover assembly to the position of oil seal lip, align its spline with the spline part of driving bevel gear, and press and flatten the driving bevel gear lug and dust cover assembly by hand



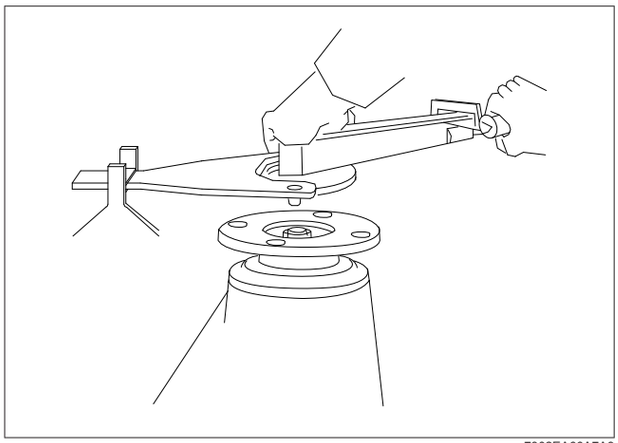
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7. To install flat washer, first apply 1596 silicon rubber plane sealant evenly on the top and bottom sides of the flat washer, and then install the flat washer



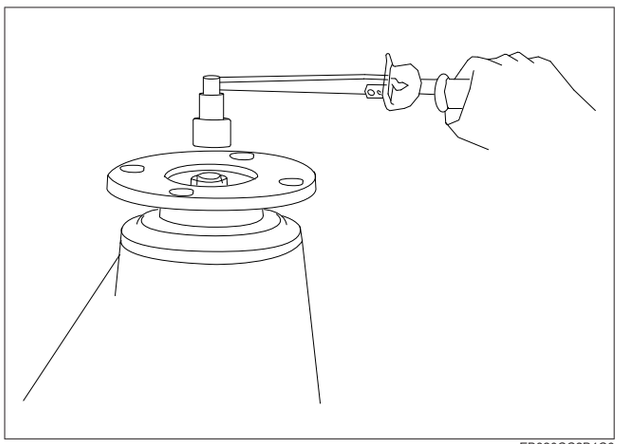
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8. To install driving gear nut, first apply 1271 thread locking sealant is applied to the fitting part of thread with an amount of sealant for (6~8) threads. Rotate the it while applying sealant, and then tighten the nut of driving bevel gear lug according to specified torque value



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9. Measuring pre-tightening force of the rotation of two tapered roller bearings with a torsion-meter



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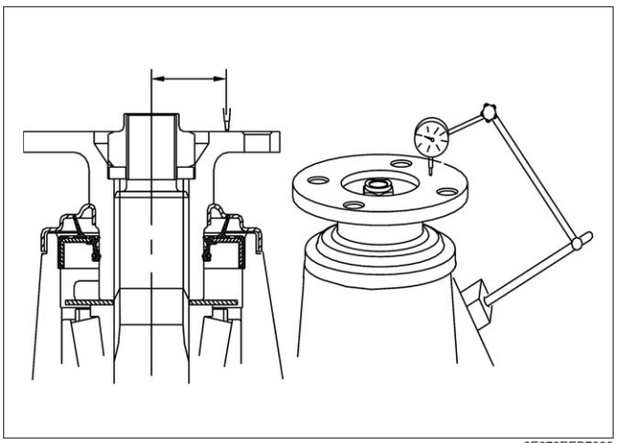
New bearing: (1.2~1.7) N·m

Used bearing: (0.9~1.3) N·m

Notice

› If they do not meet the requirements, replace them with a new rear reducer and differential assembly

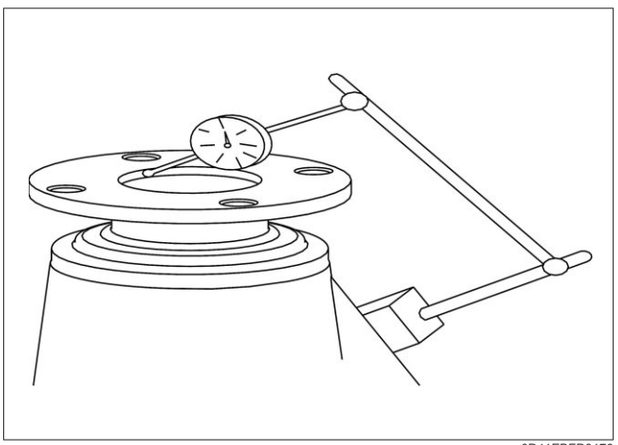
10. Check and adjust run-out of lug. First, attach the dial indicator seat to the reducer housing, and then touch the probe of dial indicator on the end face of lug, turn the lug, and carefully observe the deviation range of the meter hand



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Runout of end face: ≤0.10

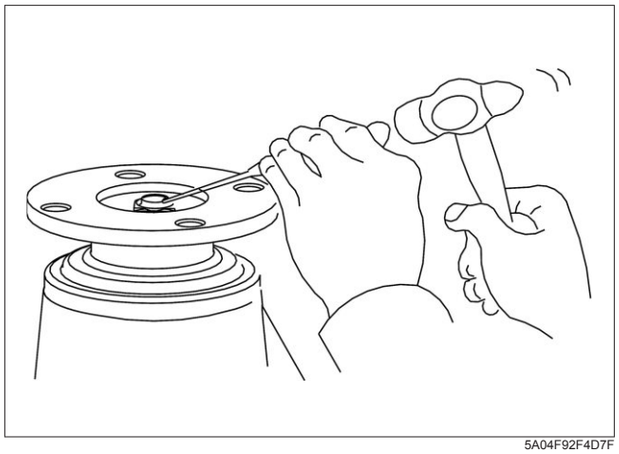
11. Check the lug spigot and run-out spigot with a dial indicator



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Run-out: ≤ 0.10

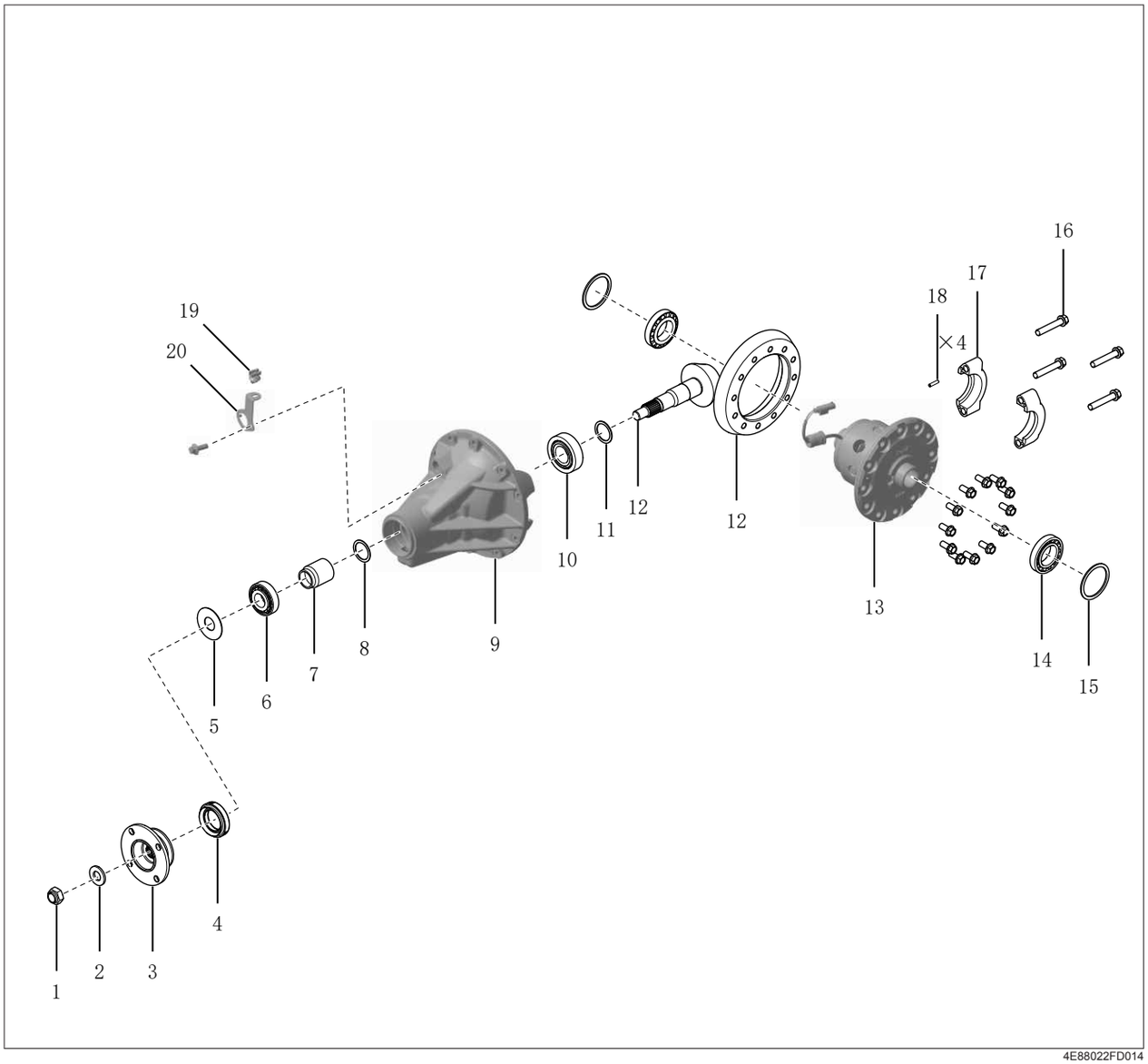
12. Rivet the main gear locking nut diagonally



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Rear axle main reducer - with differential lock

Structural diagram



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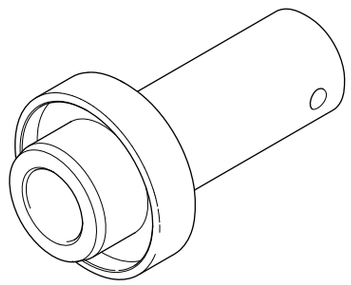
1. Nut of driving bevel gear lug
2. Flat washer - nut of driving bevel gear lug
3. Driving bevel gear lug and dust cover assembly
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7. Spacing sleeve-driving bevel gear bearing
8. Adjusting washer - driving bevel gear
9. Reducer housing
10. Tapered roller bearing
11. Adjusting washer - driving bevel gear
12. Driving/driven bevel gear assembly
13. Electronic differential
14. Tapered roller bearing
15. Differential bearing adjusting washer
16. Bolt-for tightening differential bearing gland
17. Differential bearing gland
18. Locating pin
19. Harness clamp
20. Harness bracket

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Oil filler plug	Oil filler plug x rear axle housing	150±10	1	—
Drain plug	Drain plug x rear axle housing	150±10	1	—
Nut	Driving bevel gear lug x driving bevel gear	120~180	1	Nut: apply 1271 thread locking sealant is applied to the fitting part of thread with an amount of sealant for (6~8) threads. Rotate it while applying sealant. Flat washer: apply 1596 silicone rubber plane sealant evenly on the upper and lower sides.
Bolt	Driven bevel gear x differential housing	110±5	12	Apply 1271 thread locking sealant to the threaded area for about 4 threads

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Differential bearing gland × reducer housing	78~115	4	Apply 1271 thread locking sealant is applied to the fitting part of bolt thread with an amount of sealant for (6~8) threads.
Long stud	Reducer housing × rear axle housing	58±5	6	For double-end studs, pre-apply Loctite 516 thread sealant at one end. The length of sealant applied extends to the end of thread with (2~3) threads exposed
Short stud			4	
Nut			10	First set the heavy-duty spring washer on the double-end stud, then screw the nut onto the double-end stud (3~5) threads
Ventilation valve assembly	Ventilation valve assembly × rear axle housing	23±3	1	—

Special tool

Code	Name	Purpose	Schematic diagram
ZEZF068642	Crimping tool for large oil seal of driving gear of rear axle	Press fit large oil seal of driving gear of rear axle	

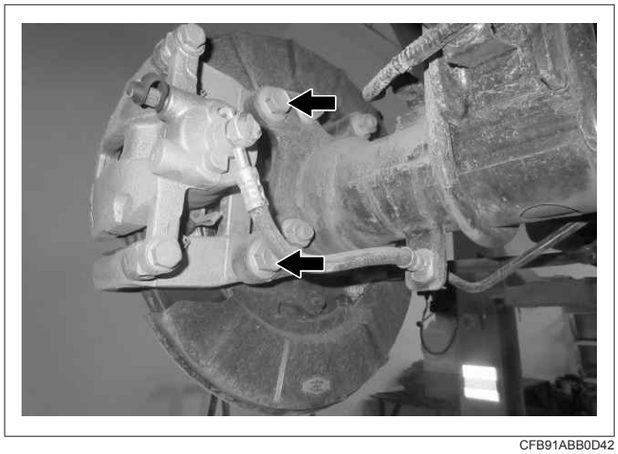
fault symptom checklist

Fault description	Possible cause	Solution
Differential and reducer assembly oil leakage	High oil level or incorrect grade of oil	Discharge the oil to specified level or replace the oil
	Oil seal worn or damaged	Replace oil seal
	Matching flange loose or damaged	Tighten or replace the flange
Noisy axle	Low oil level or incorrect grade of oil	Fill lubricant as required or replace it
	Excessive clearance between planetary gear and driven bevel gear or axle shaft gear	Inspect the clearance
	Driven bevel gear, planetary gear or axle shaft gear worn or cracked	Check each gear
	Small gear bearing worn	Replace small gear bearing
	Rear axle shaft bearing worn	Replace rear axle shaft bearing
	Differential bearing loose or worn	Tighten or replace differential shaft bearing

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Discharge rear axle lubricant
4. Remove rear wheels
5. Separate rear brake caliper with brake hose

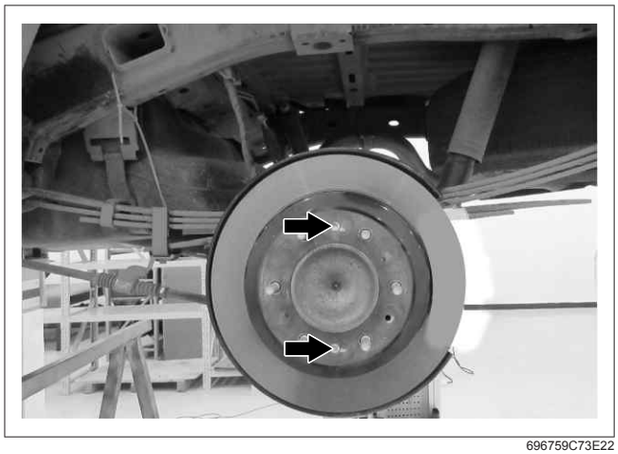


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⚠ Caution

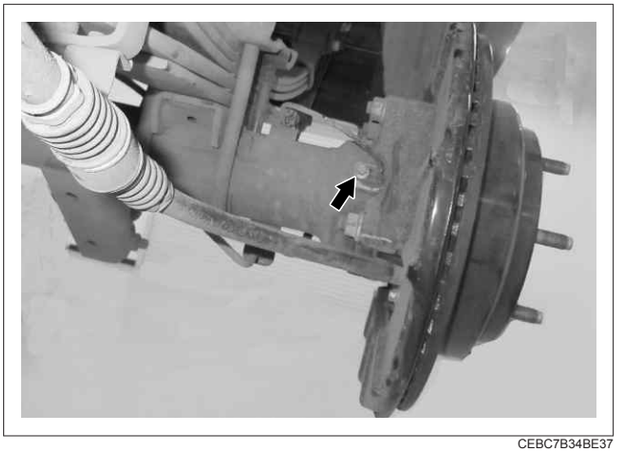
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

6. Remove rear brake disc



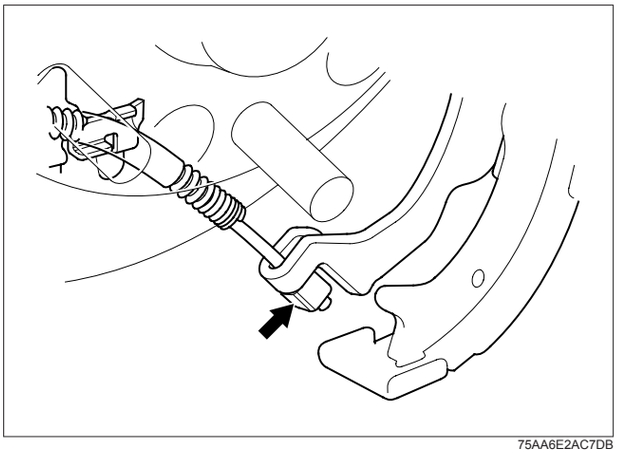
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7. Separate rear wheel speed sensor



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8. Disconnect parking brake cable assembly and rear brake



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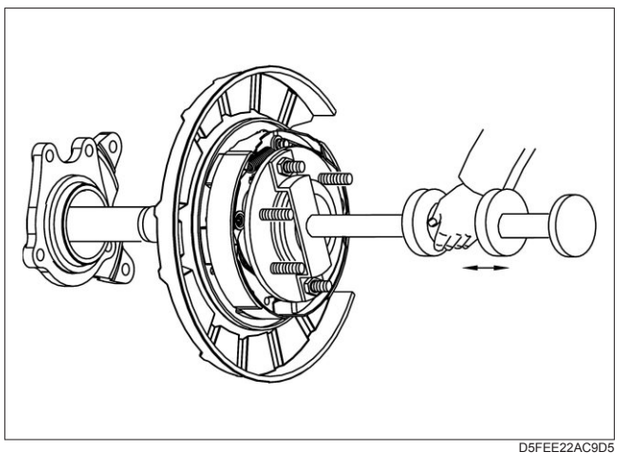
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9. Remove 4 nuts, and disconnect rear axle and rear brake



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10. Remove rear axle shaft with rear brake

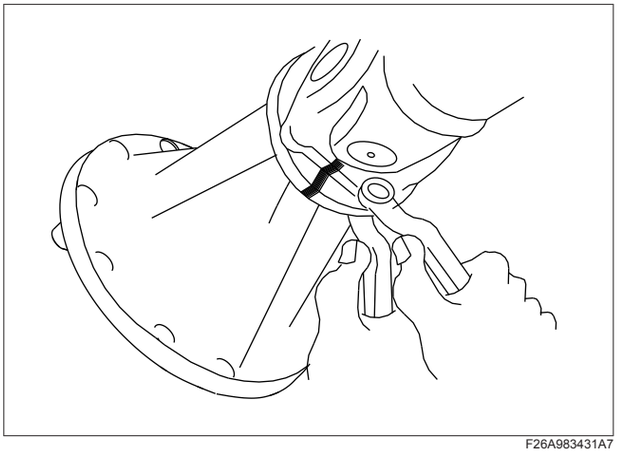


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Notice

- Connect special tool and axle shaft flange surface using the wheel nut.
- Hold the free hammer of the special tool with hand and hit repeatedly Removal the rear axle shaft.

11. Remove 4 nuts, bolts and washers, and disconnect rear axle main reducer and rear axle propeller shaft assembly

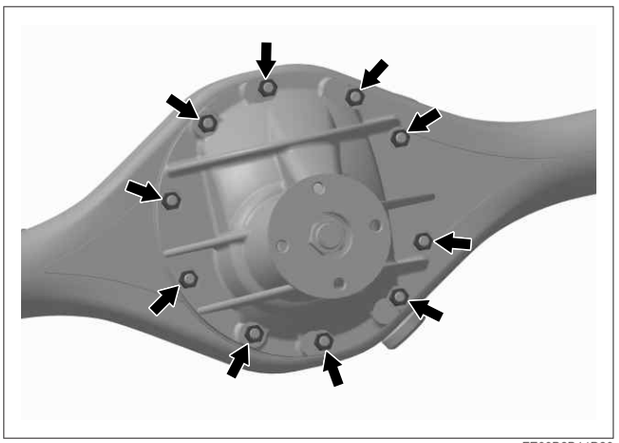


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Notice

- Make assembly marks before disassembly.

12. Disconnect electronic differential lock of rear axle
13. Remove 10 nuts, and remove rear axle main reducer and rear axle differential



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14. Separate rear axle differential

Installation

1. Perform installation work in reverse order of removal

Caution

- Wipe the mounting facing of the axle housing clean and evenly apply silicon rubber plane sealant on it.
- Align the assembly markings.
- Tighten the fastener according to the specified torque value.

› Add the rear axle lubricant and check rear axle lubricant level.

Disassembly/assembly

Disassembly

⚠ Caution

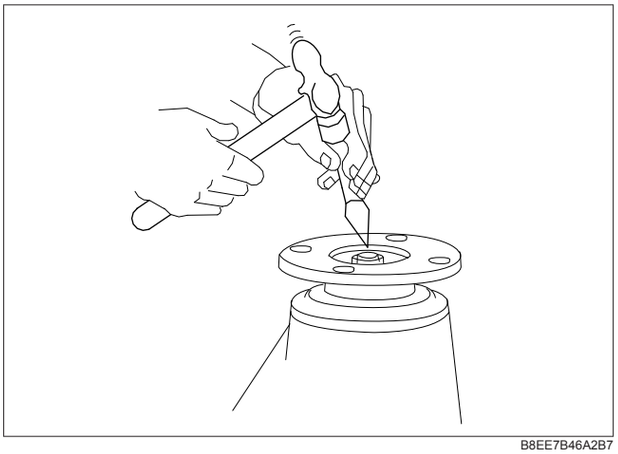
› When removing and repairing rear reducer and differential assembly, arrange the internal parts in order for easy reinstallation.

› When replacing with new parts, make sure that no dust, foreign objects or iron filings are found.

› The meshing clearance between the gears and the pre-tightening force of each bearing are precisely adjusted with strict guaranty. When repairing or replacing the parts of differential assembly, try to avoid unnecessary removal of parts.

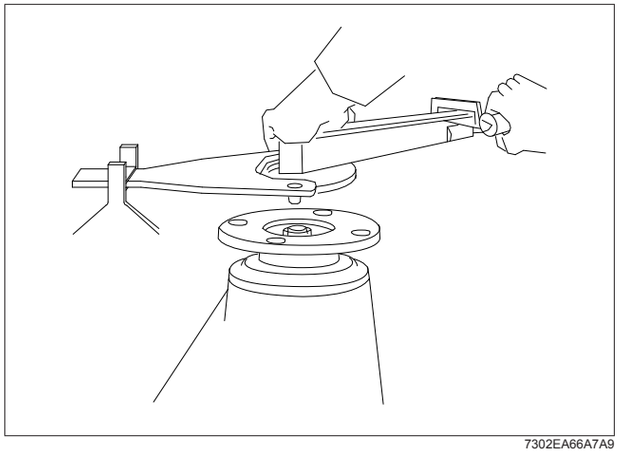
› When electronic controlled differential lock is provided for rear reducer and differential assembly, the harness is fixed to harness connector bracket through connector snaps. When a connector snap is damaged and cannot be used, slide the harness connector to remove it from the connector snap. Connector snap can be removed from the bracket by breaking the harness connector.

1. Pry up the riveting between the nut of driving bevel gear lug and driving bevel gear with punch



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2. Use a tool to fix driving bevel gear lug and dust cover assembly, and then remove nut of driving bevel gear lug

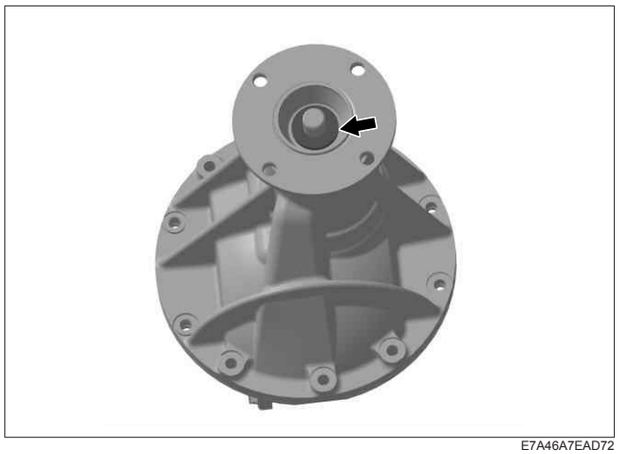


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⚠ Caution

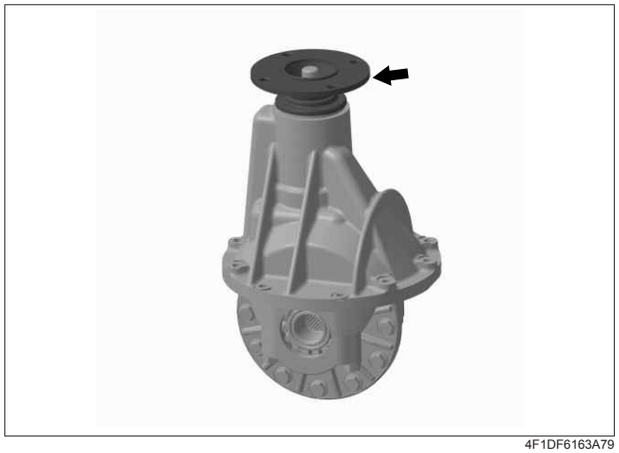
› The removed nut of driving bevel gear lug cannot be reused.

3. Remove flat washer - nut of driving bevel gear lug



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4. Remove driving bevel gear lug and dust cover assembly



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5. Remove oil seal assembly - driving bevel gear



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⚠ Caution

› Oil seals are disposable parts.

Assembly

⚠ Caution

› Before the installation, inspect the integrity of parts and make sure that no part is dented.

› Check that various tools for related installation are in place. For precision testing instruments, it is required to test the instruments to reduce installation errors caused by the tools.

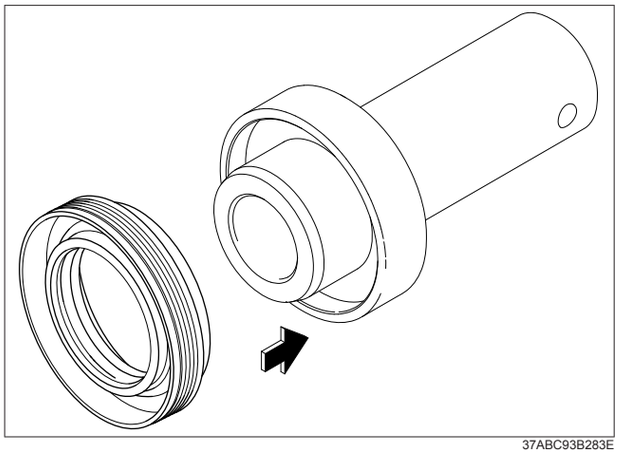
› Perform leak test for main reducer housing to ensure that the product is acceptable.

› Clean various parts (except bearings and oil seals) and prepare for assembly.

› When electronic controlled differential lock is provided for rear reducer assembly, the harness is fixed to harness connector bracket through connector snaps. Replace new connector snap, and make sure that the connector snap is installed in place. After assembly, slide the harness chute to fix the harness connector to the connector snap.

1. Apply lithium-based grease evenly to the oil seal of reducer housing

2. Install oil seal on tool ZEZF068642



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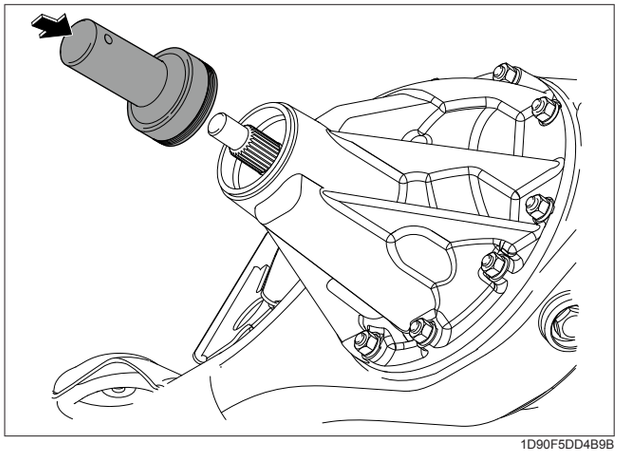
⚠ Caution

› Clean special maintenance tools before installation.

› Lay oil seal flat.

› Before installation, make sure that the working surface coming into contact with oil seal is smooth.

3. Position the component on the corresponding seat hole of rear axle housing



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4. Gently knock the oil seal with a hammer to force it into place

⚠ Caution

› Apply force uniformly.

⚠ Warning

› Knocking with metal hammer will damage the tools.

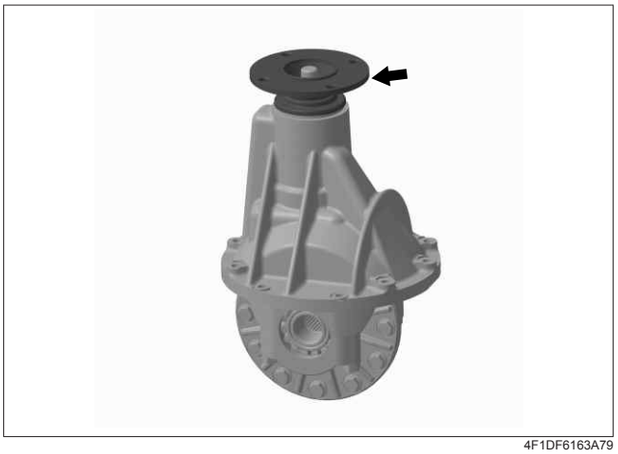
5. Remove special tool after the oil seal is installed in place

⚠ Caution

› Make sure that oil seal is installed in place.

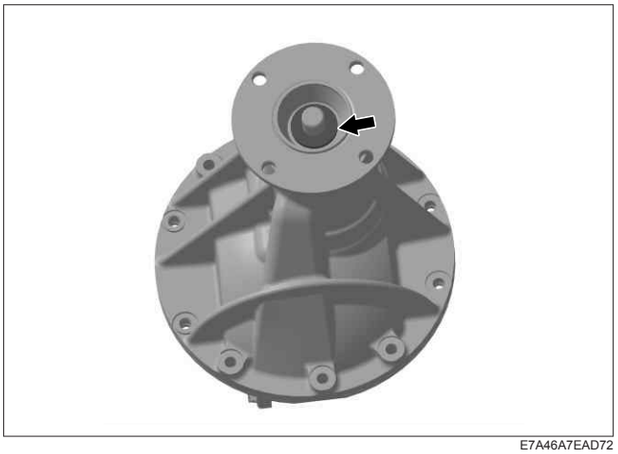
› The upper end face of oil seal is flush with the upper end face of reducer housing.

6. To install driving bevel gear lug and dust cover assembly, put the driving bevel gear lug and dust cover assembly to the position of oil seal lip, align its spline with the spline part of driving bevel gear, and press and flatten the driving bevel gear lug and dust cover assembly by hand



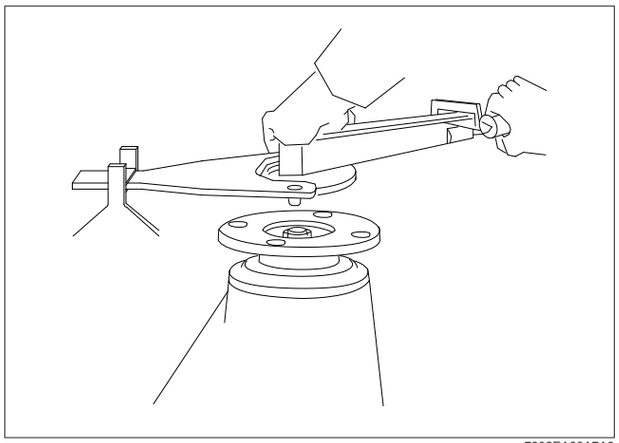
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7. To install flat washer, first apply 1596 silicon rubber plane sealant evenly on the top and bottom sides of the flat washer, and then install the flat washer



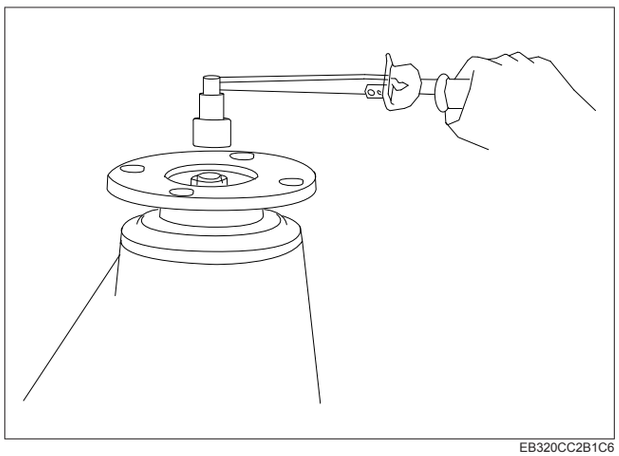
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8. To install driving gear nut, first apply 1271 thread locking sealant is applied to the fitting part of thread with an amount of sealant for (6~8) threads. Rotate the it while applying sealant, and then tighten the nut of driving bevel gear lug according to specified torque value



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9. Measuring pre-tightening force of the rotation of two tapered roller bearings with a torsion-meter



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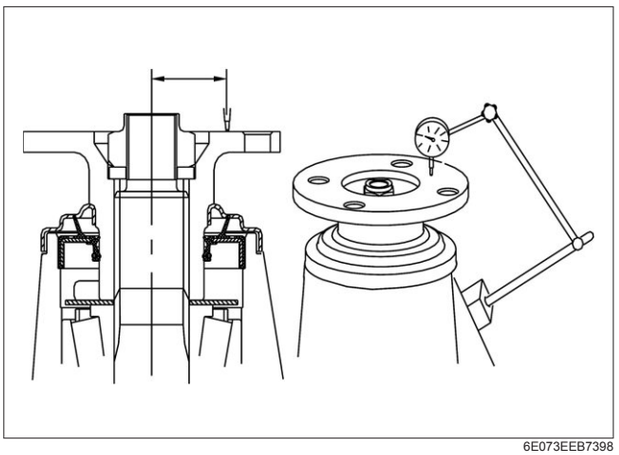
New bearing: (1.2~1.7) N·m

Used bearing: (0.9~1.3) N·m

Notice

› If they do not meet the requirements, replace them with a new rear reducer and differential assembly

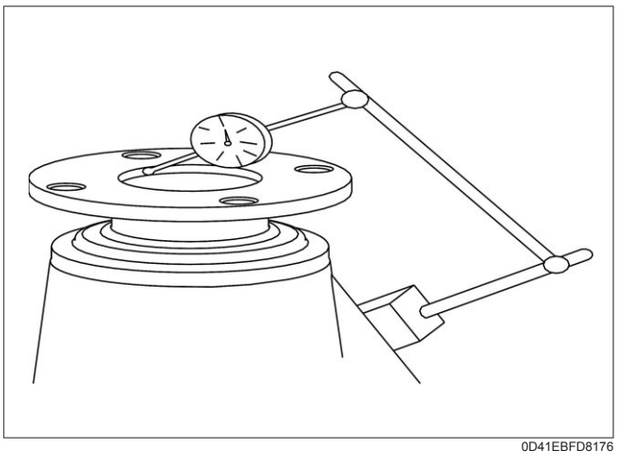
10. Check and adjust run-out of lug. First, attach the dial indicator seat to the reducer housing, and then touch the probe of dial indicator on the end face of lug, turn the lug, and carefully observe the deviation range of the meter hand



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Runout of end face: ≤0.10

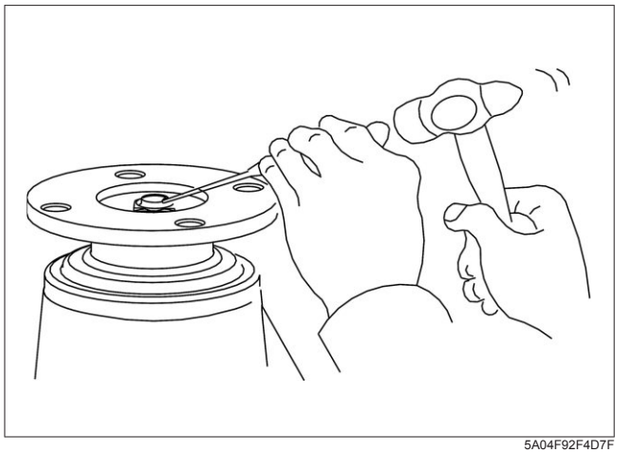
11. Check the lug spigot and run-out spigot with a dial indicator



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Run-out: ≤ 0.10

12. Rivet the main gear locking nut diagonally



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Rear main reducer lubricant

Specifications

Item	Parameter
Lubricant capacity (L)	2.4±0.1
Lubricant type	TRANSMISSION DUAL9 FE 75W-90

Specifications

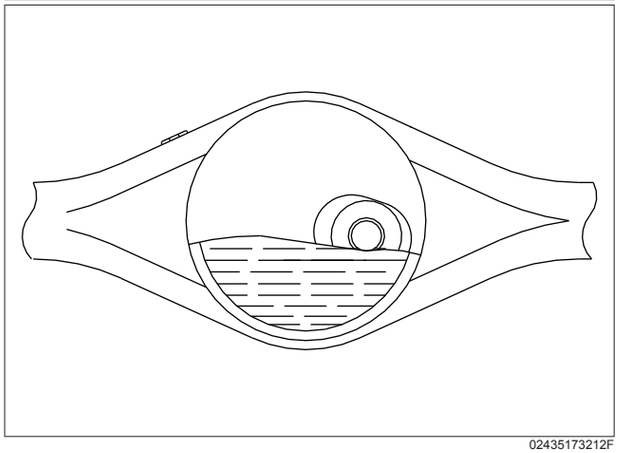
1. Lift the vehicle to a proper position
2. Unscrew oil filler plug



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3. Check rear axle main reducer lubricant. Lubricant level shall be flush with the lowest position of the lower end face of filler port

Notice



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› Add rear axle main reducer lubricant if necessary.

4. Check quality of lubricant. If any defect is found, such as dilution, gelling, dirt, deterioration, etc., change rear axle main reducer lubricant

Replacement

Notice

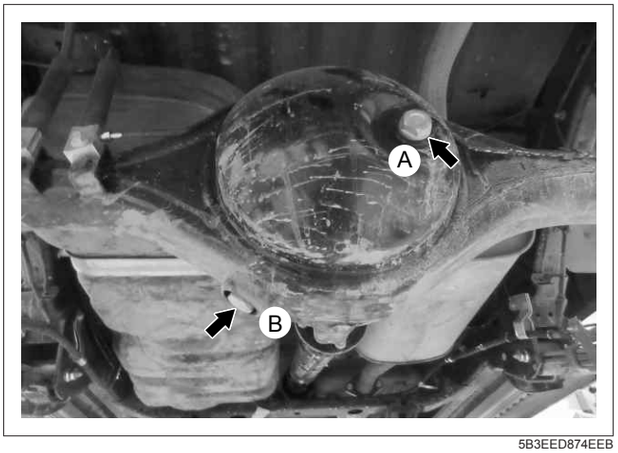
› When adding rear axle main reducer lubricant, make sure that the vehicle is in a horizontal state.

› Excessive or insufficient lubrication of rear axle main reducer may result in fault.

› After replacing rear axle main reducer lubricant, drive the vehicle and check the oil level.

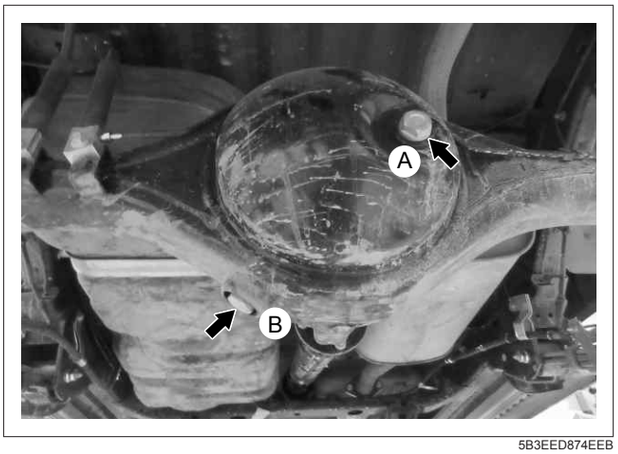
› Rear axle main reducer lubricant shall be in a hot state in replacement of lubricant.

1. Lift the vehicle to a proper position
2. Unscrew oil filler plug A



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3. Unscrew drain plug B and discharge rear axle main reducer lubricant



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Caution

› Properly handle the waste.

4. Install drain plug after cleaning drain plug

   Tightening torque: (150±10) N·m

5. Add rear axle main reducer lubricant until lubricant flows out of filling port

   Filling amount: (2.4 ± 0.1) L

   Lubricant type: TRANSMISSION DUAL9 FE 75W-90

6. Install oil filler plug after cleaning it

   Tightening torque: (150±10) N·m

7. Lower the vehicle

Wheel alignment

Wheel alignment.....23－1
System description .....23－1
Alignment parameters description .....23－2
Specification .....23－4
Front wheel alignment .....23－5
Adjustment.....23－5

Wheel alignment

System description

Wheel alignment is an index parameter for maintaining accurate moving direction relationship between tire and vehicle body. Wheel alignment includes front and rear wheels alignment, which are collectively referred to as four-wheel alignment.

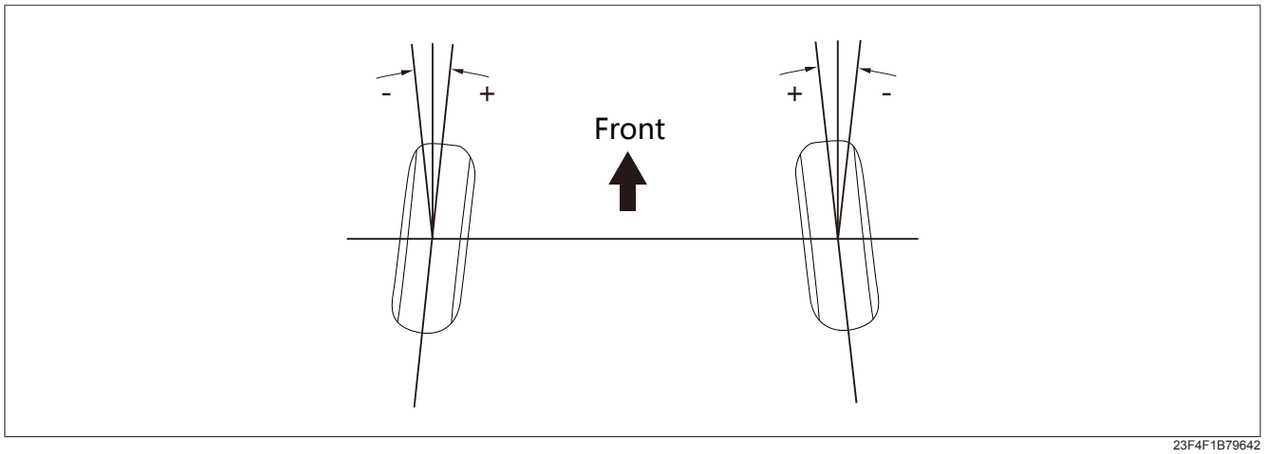
Front wheels alignment parameters include: kingpin caster, kingpin inclination angle, front-wheel camber and front wheel toe-in.

Rear wheel alignment parameters include: Thrust angle.

The main purpose of wheel alignment is to maintain drive stability and 'road feel' so as to ensure easy vehicle operations. Also, the process ensures automatic steering return to reduce tire wear, keep the vehicle running straight and ultimately ensure driving safety.

Alignment parameters description

Toe-in



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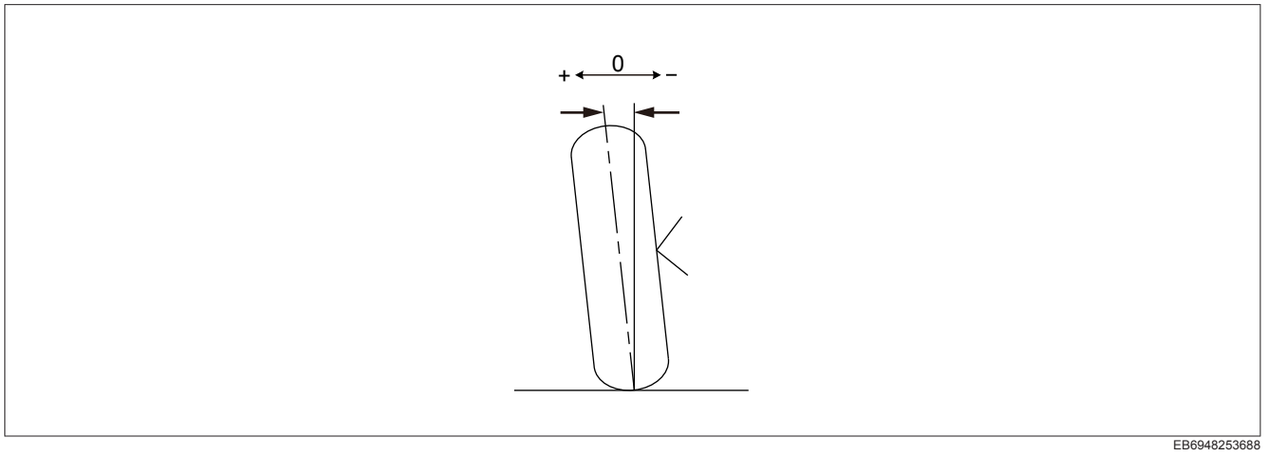
The toe-in refers to the measurement of the inward or outward tilt of the front or rear wheel from the forward position. The role of the toe-in is to ensure that the wheels on both sides roll in parallel. The toe-in can also compensate for a small amount of deflection of the wheel support system as the wheel rolls forward. In other words, if the vehicle is set to front toe-in when the vehicle is stationary, the wheel will roll in parallel when the vehicle is moving.

Improper toe-in adjustment can lead to premature tire wear and unstable steering.

When the wheel is inward, the toe-in is positive (+).

When the wheel is outward, the toe-in is negative (-).

Camber



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The camber angle refers to the angle at which the wheel deviates from the vertical direction when viewed from the front of the vehicle. The inclination value is the number of angles that deviate from the vertical direction. Camber setting value affects the directional control and tire wear.

A large positive camber angle will cause premature wear on the outside of the tire and excessive wear on the suspension components. A large negative camber angle will cause premature wear on the inside of the tire and excessive wear on the suspension components.

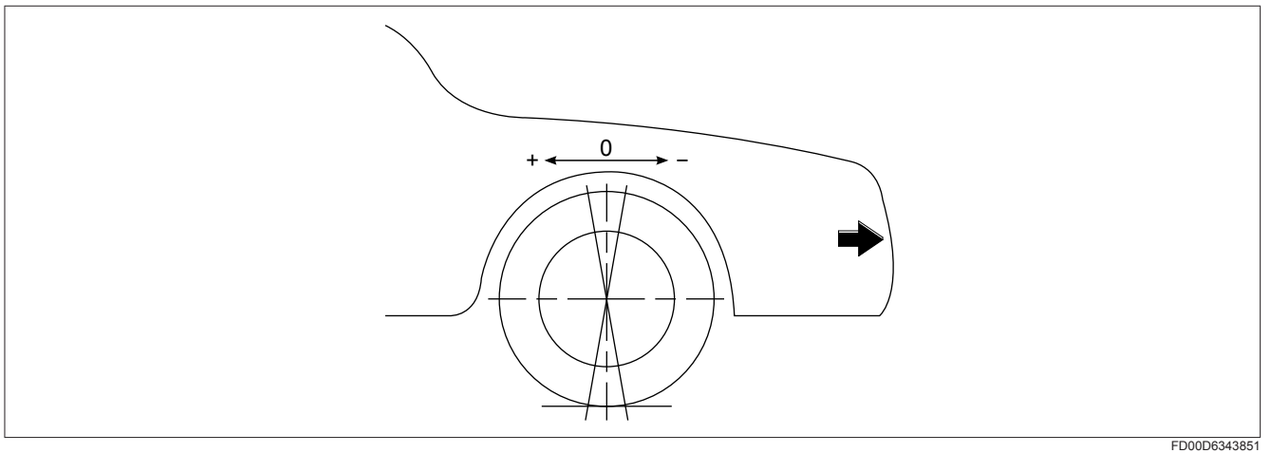
If the difference in the camber angle at both sides is equal to or greater than 1°, the vehicle will deviate towards the side with a larger camber angle.

The adjustment of camber is available on the front and rear wheels of the vehicle (depending on the suspension structure).

When the top of the wheel is tilted outwards, the camber angle is positive (+).

When the top of the wheel is tilted inwards, the camber angle is negative (-).

Kingpin caster



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The kingpin caster is the front and rear inclination of the top at the vertical direction of the steering shaft when looking at the vehicle from the side. The kingpin caster affects the directional control of the steering mechanism, but does not affect tire wear. If the trim of the positive kingpin of one wheel is greater than the other wheels, it will cause the wheel to deflect toward the center of the vehicle. When the positive kingpin trim angle is too small, the steering is difficult at high speeds, and the positive wheel return performance is reduced at the end of the turn. The vehicle will move or deflect towards the side with the smallest amount of positive kingpin trim.

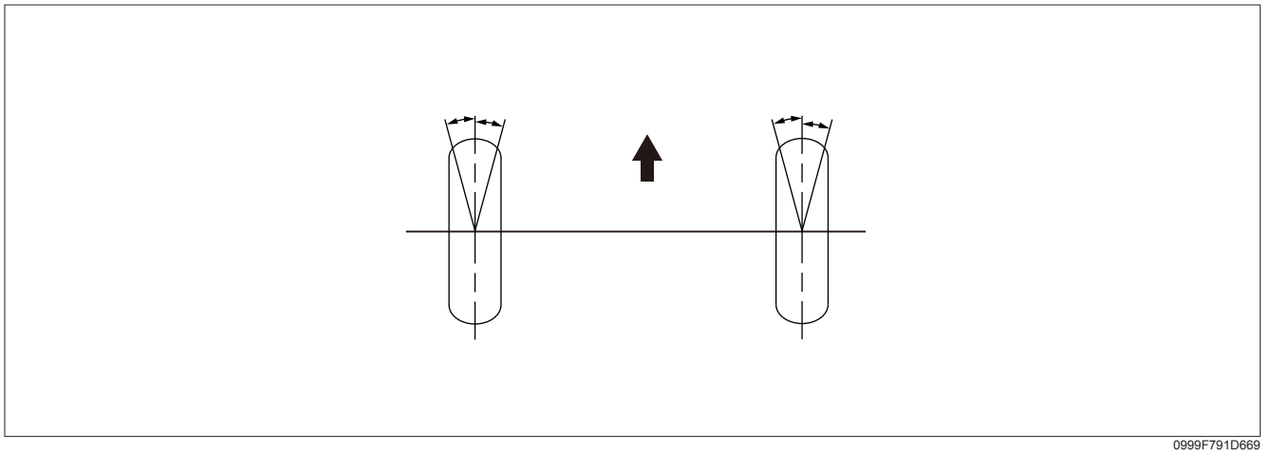
The top inclination backwards is positive (+).

The top inclination forwards is negative (-).

Kingpin inclination

The kingpin inclination is the front and rear inclination of the top at the vertical direction of the steering shaft when looking at the vehicle from the horizontal. The role of the kingpin inclination is to make the wheels return to the positive direction after being steered, and the steering operation is convenient. The larger the kingpin inclination angle or the larger the deflection angle of the steering wheel, the higher the front of the car is lifted, and the greater the effect of the steering wheel's automatic return.

Steering angle



0999F791D669

The steering angle is the angle between the center line of the wheel and the running direction.

Specification

Front wheels alignment parameters (without vehicle load)

Item	Range	Left/right wheel deviation
Kingpin inclination angle	12.2°±30′	≤30′
Kingpin caster angle	3.5°±0.5°	≤30′
Front-wheel camber angle	11′±30′	≤30′
Front-wheel toe-in angle (one side)	0°±5′	≤2′

Rear wheel alignment parameters (without vehicle load)

Item	Range	Left/right wheel deviation
Rear wheel thrust angle	0°±15′	—

Front wheel alignment

Adjustment

1. Check the tires
2. Check front suspension

Notice

› Check the suspension for wear, looseness, deformation and damage, and it should be adjusted, tightened or replaced if there is any such sign.

3. Measure the vehicle height

   Ground clearance of center of front shaft bolt of lower arm: 293.0 mm

   Ground clearance of center of front mounting bolt of long drag rod assembly: 318.6 mm

4. Check wheel steering angle

   Max. inner turning angle 37.1° ± 2.5°

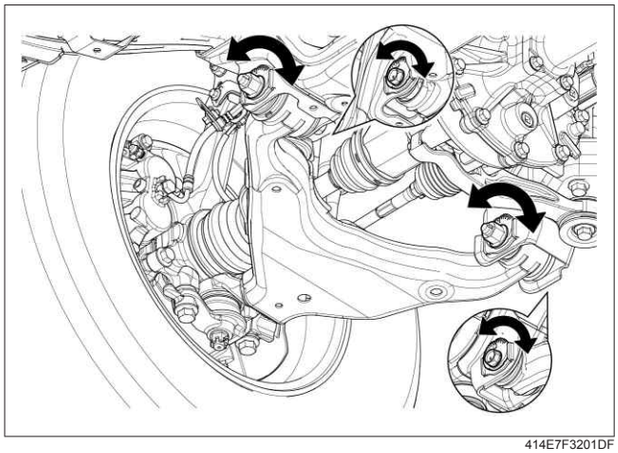
   Max. outer turning angle 33° ± 2.5°

5. Check front-wheel camber, kingpin caster and kingpin inclination

Notice

› If measurements are not within specified values, adjustment is necessary.

6. Adjust kingpin caster angle
7. Loosen nuts of lower arm front/rear shaft bolt with adjusting gasket component separately



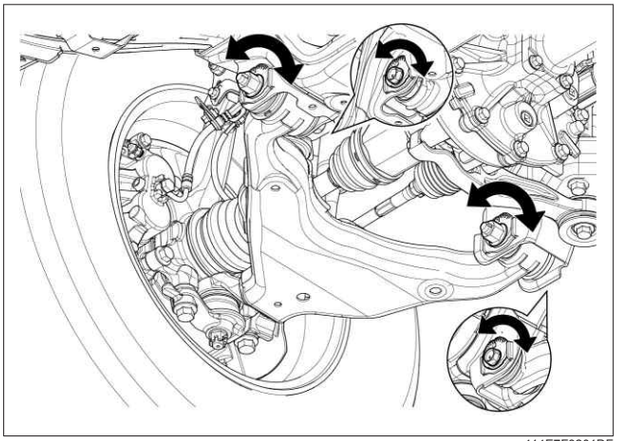
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8. Turn lower arm front/rear shaft bolt with adjusting gasket component of one side in opposite direction at the same angle to adjust caster angle of one side
9. Adjust both sides to standard values

Notice

› Give consideration to the data variation of kingpin inclination angle and front-wheel camber! Give consideration to the adjusting range of kingpin inclination angle and front-wheel camber.

10. Tighten nuts of lower arm front/rear shaft bolt with adjusting gasket component
11. Adjust front wheel camber and kingpin inclination angle
12. Loosen nuts of lower arm front/rear shaft bolt with adjusting gasket component separately



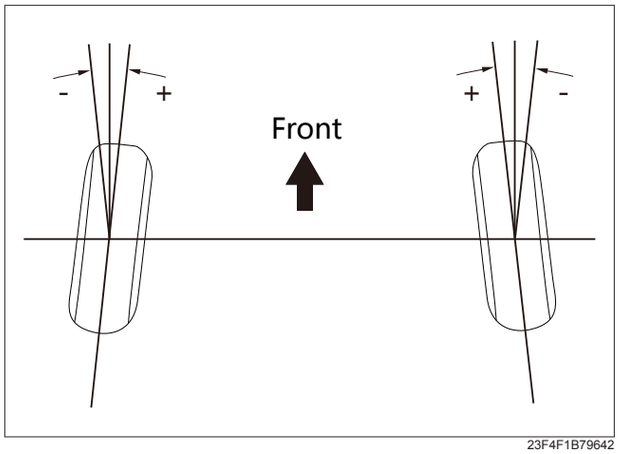
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13. Turn lower arm front/rear shaft bolt with adjusting gasket component inward or outward in the same direction and at the same angle

Notice

› Adjust front-wheel camber and kingpin inclination angle together. Give consideration to the adjusting range of kingpin inclination angle and the data variation of kingpin inclination angle and caster angle.

14. Check the front wheel toe-in

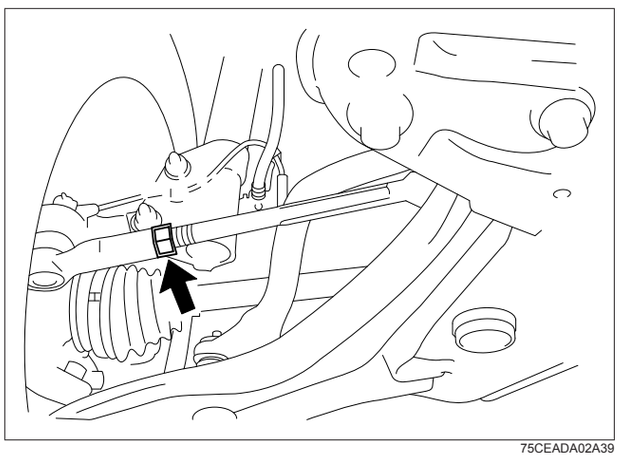


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Notice

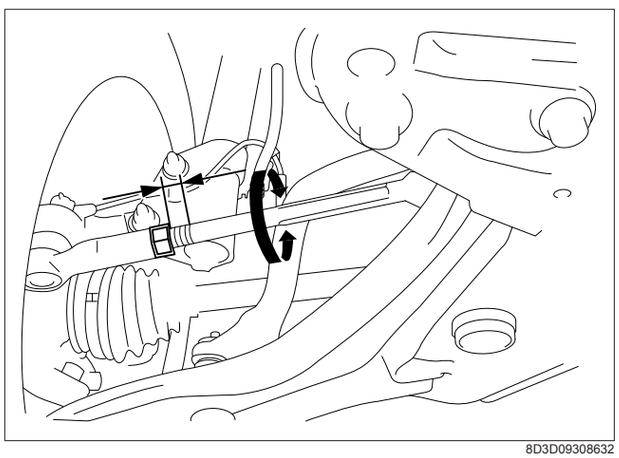
› If the front wheel toe-in is not within specified values, adjustment is necessary.

15. Loosen tie rod joint lock nut



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16. Individually turn the left and right outer steering tie rod to adjust the toe-in



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Caution

› Adjust the left and right outer tie rods to be the same length, otherwise it will cause uneven wear of the tire.

17. Tighten tie rod joint lock nut

Front suspension

Front suspension ..... 24－1
System description ..... 24－1
Structural diagram ..... 24－2
Specified torque ..... 24－3
Front shock absorber with coil spring assembly ..... 24－4
Structural diagram ..... 24－4
Removal/installation ..... 24－5
Disassembly/assembly ..... 24－6
Front upper arm assembly ..... 24－7
Removal/installation ..... 24－7
Front lower arm assembly (4WD) ..... 24－8
Removal/installation ..... 24－8
Front stabilizer bar assembly ..... 24－9
Removal/installation ..... 24－9
Front steering knuckle and wheel hub flange plate assembly (4WD) ..... 24－10
Structural diagram ..... 24－10
Removal/installation ..... 24－11
Disassembly/assembly ..... 24－12

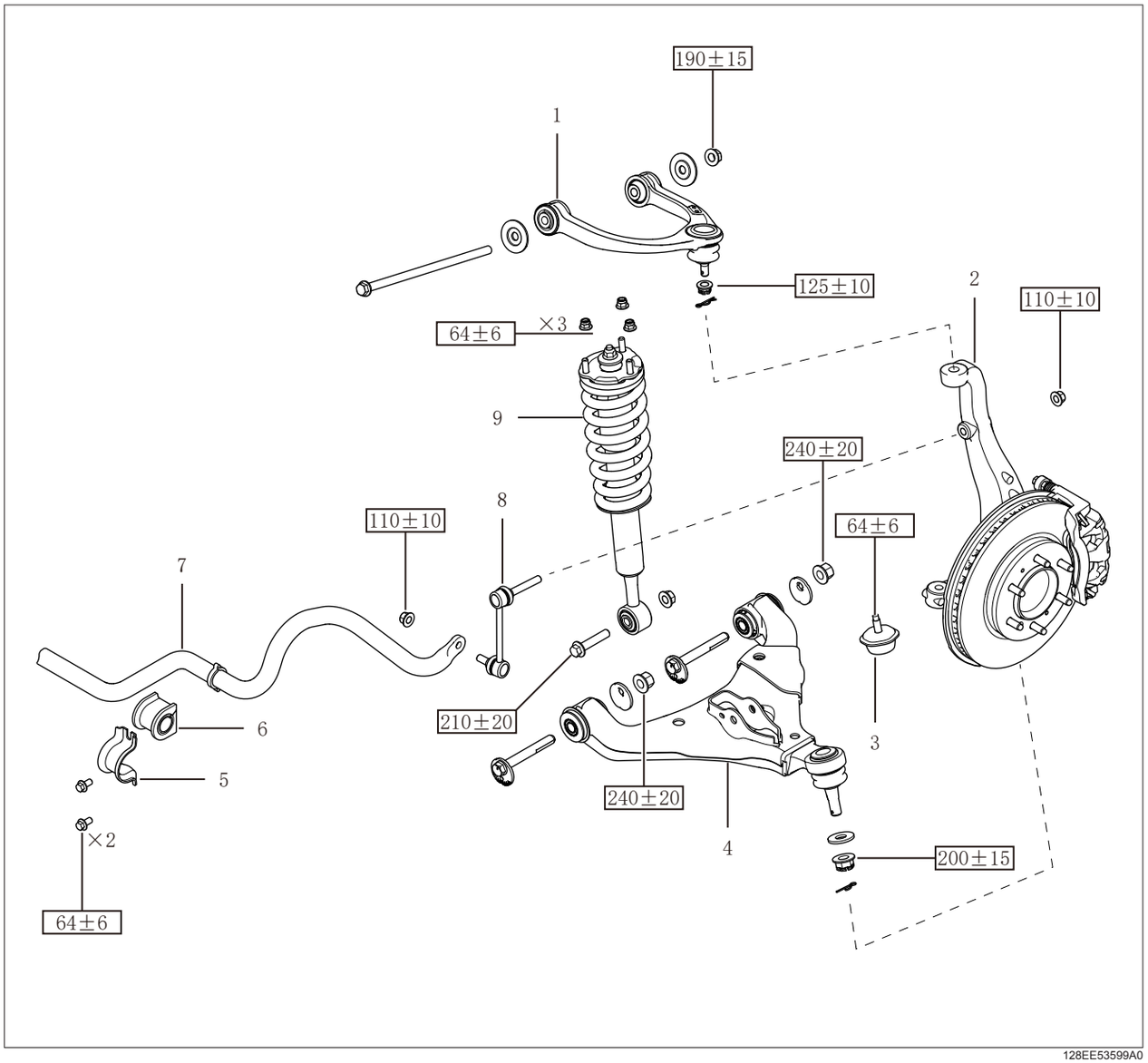
Front suspension

System description

Front suspension is a double-wishbone independent suspension, which is composed of a coil spring, a hydraulic telescopic shock absorber, a hydraulic telescopic shock absorber, stabilizer bar, and upper and lower arms.

It provides good maneuverability and stability when driving on uneven roads, allows vibrating isolation for the driver, and ensures passenger comfort.

Structural diagram



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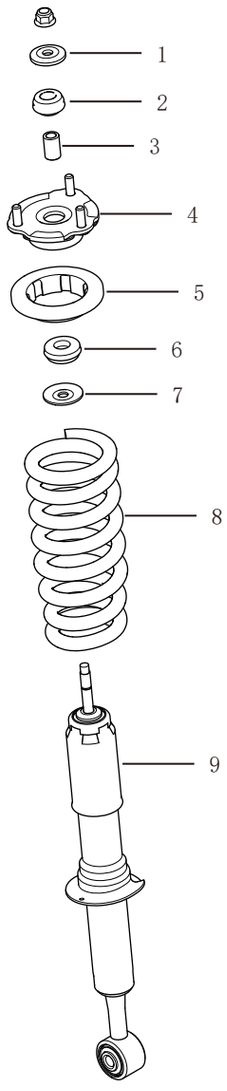
1. Upper arm assembly
2. Front steering knuckle with brake assembly
3. Front suspension bumper block assembly
4. Lower arm assembly
5. Front stabilizer bar clamp
6. Front stabilizer bar sleeve
7. Front stabilizer bar
8. Front stabilizer bar and connecting rod
9. Front shock absorber with coil spring assembly

Specified torque

Name	State	Tightening torque (N·m)	Quantity	Surface coating
Nut	Upper arm of front suspension × steering knuckle	125±10	2	—
Nut	Upper arm of front suspension × frame	190±15	2	—
Bolt			2	Apply the screw thread glue.
Nut	Front shock absorber x frame	64±6	6	—
Nut	Lower arm of front suspension × steering knuckle	200±15	2	—
Nut	Lower arm front shaft of front suspension × frame	240±20	2	—
Front shaft bolt			2	—
Nut	Lower arm rear shaft of front suspension × frame	240±20	2	—
Rear shaft bolt			2	—
Nut	Lower arm of front suspension × front shock absorber	210±20	2	—
Bolt			2	Apply the screw thread glue.
Bolt	Front stabilizer bar clamp x frame	64±6	4	Apply the screw thread glue.
Nut	Front stabilizer bar and connecting rod x front steering knuckle	110±10	2	—
Nut	Front stabilizer link × front stabilizer bar	110±10	2	—
Front suspension bumper block assembly	Front suspension bumper block assembly x frame	64±6	2	—

Front shock absorber with coil spring assembly

Structural diagram



67B0B113B3A1

1. Upper gasket of front shock absorber
2. Upper liner of front shock absorber
3. Mounting sleeve of front shock absorber
4. Upper mounting bracket of front shock absorber
5. Upper mounting pad of front coil spring
6. Lower liner of front shock absorber
7. Lower gasket of front shock absorber
8. Front coil spring
9. Front shock absorber strut assembly

Removal/installation

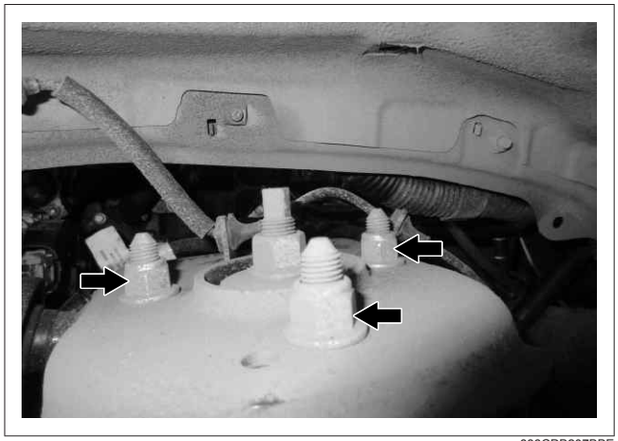
Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Separate front stabilizer bar and link assembly



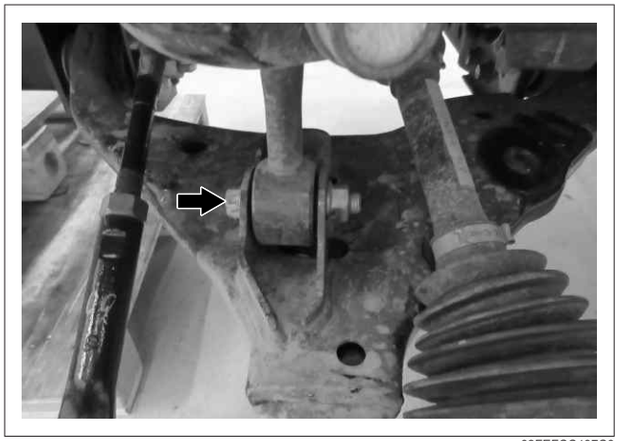
7CDA0099D3F3

4. Remove 3 nuts



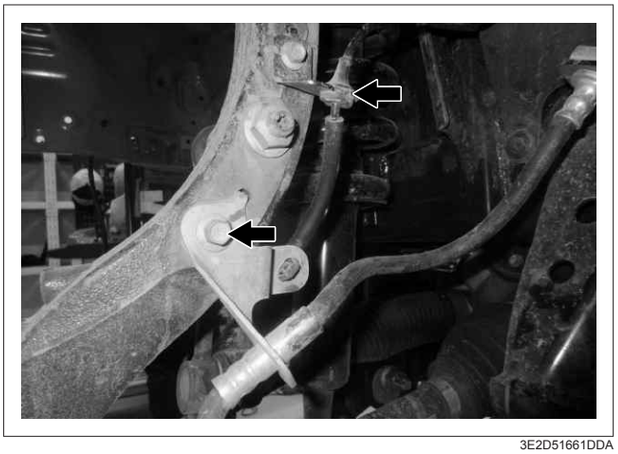
886CDB207BBE

5. Remove 1 bolt



62FEFCC487C8

6. Separate front wheel speed sensor assembly, and remove bolt



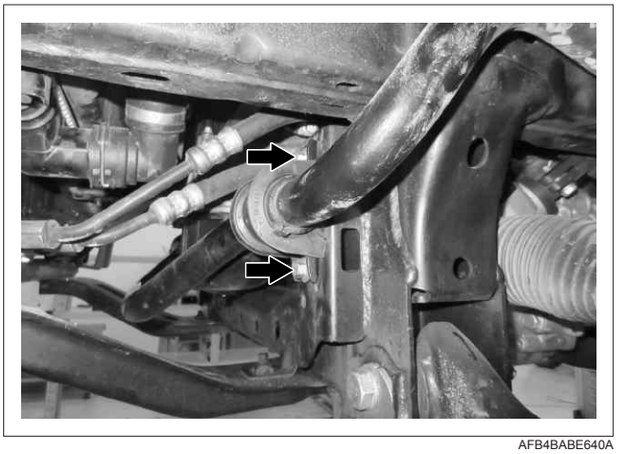
3E2D51661DDA

7. Separate upper control arm assembly



8A261A317AC3

8. Remove engine lower guard
9. Remove 2 bolts and move front stabilizer bar 3 cm to the front of vehicle



AFB4BABE640A

10. Remove front shock absorber and coil spring assembly

Installation

1. Perform installation work in reverse order of removal

Notice

› Check the front wheels alignment and make adjustments when necessary.

Disassembly/assembly

Disassembly

1. Use tools to fix front shock absorber with coil spring assembly
2. Press the coil spring
3. Remove locking nut
4. Remove each part in sequence

Assembly

1. Assembly follows the reverse order of disassembly

Front upper arm assembly

Removal/installation

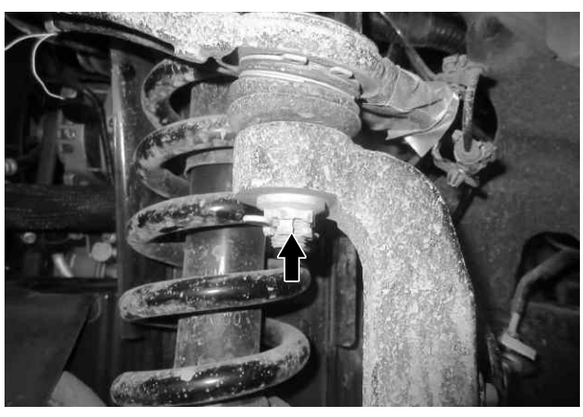
Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Separate front wheel speed sensor bracket



629C5915AA87

4. Remove split pin and nut, and separate ball pin of upper arm



8A261A317AC3

5. Remove nut and gasket, and remove fixing bolt for upper arm from engine compartment



15ED5A1FC310

6. Remove front upper arm assembly

Installation

1. Perform installation work in reverse order of removal

Notice

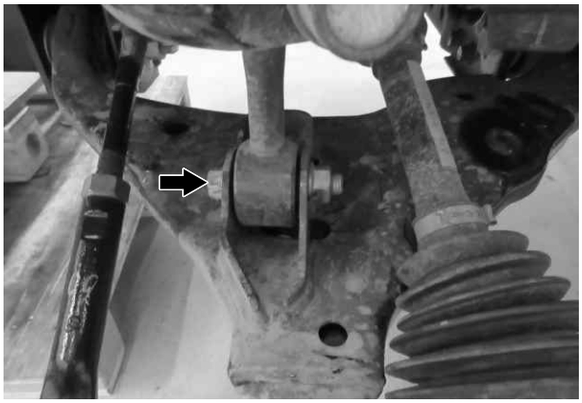
› Tighten the fastener according to the specified torque value.

Front lower arm assembly (4WD)

Removal/installation

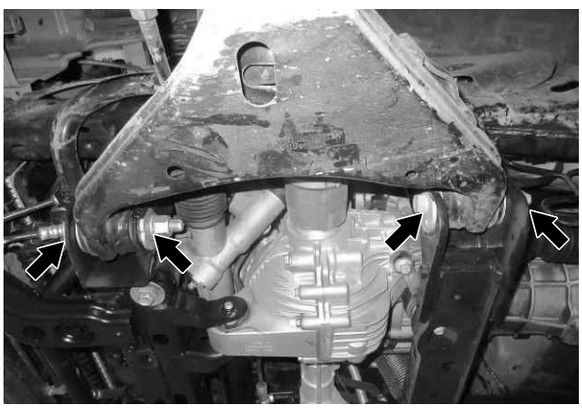
Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Remove front steering knuckle and wheel hub flange plate assembly
4. Separate front shock absorber and coil spring assembly



62FEFCC487C8

5. Remove 2 nuts, 2 eccentric gaskets and 2 eccentric bolts



6F94D3215523

6. Remove front lower arm assembly

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

› Tighten the fastener according to the specified torque value.

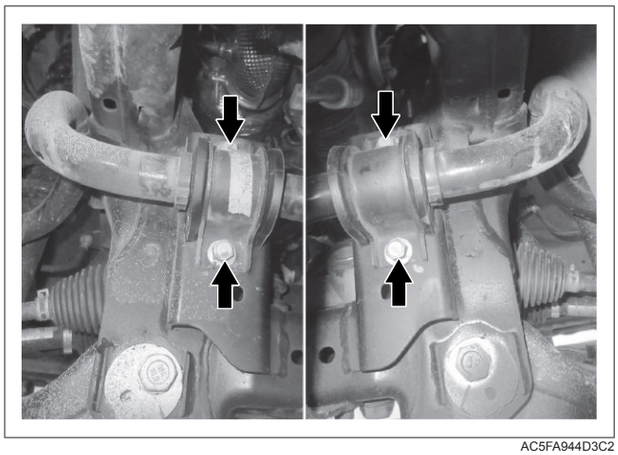
› Check the front wheels alignment and make adjustments when necessary.

Front stabilizer bar assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Disconnect front stabilizer bar and link assembly
4. Remove engine lower guard
5. Remove the first/second beam and connect beam assembly
6. Remove front stabilizer bar assembly



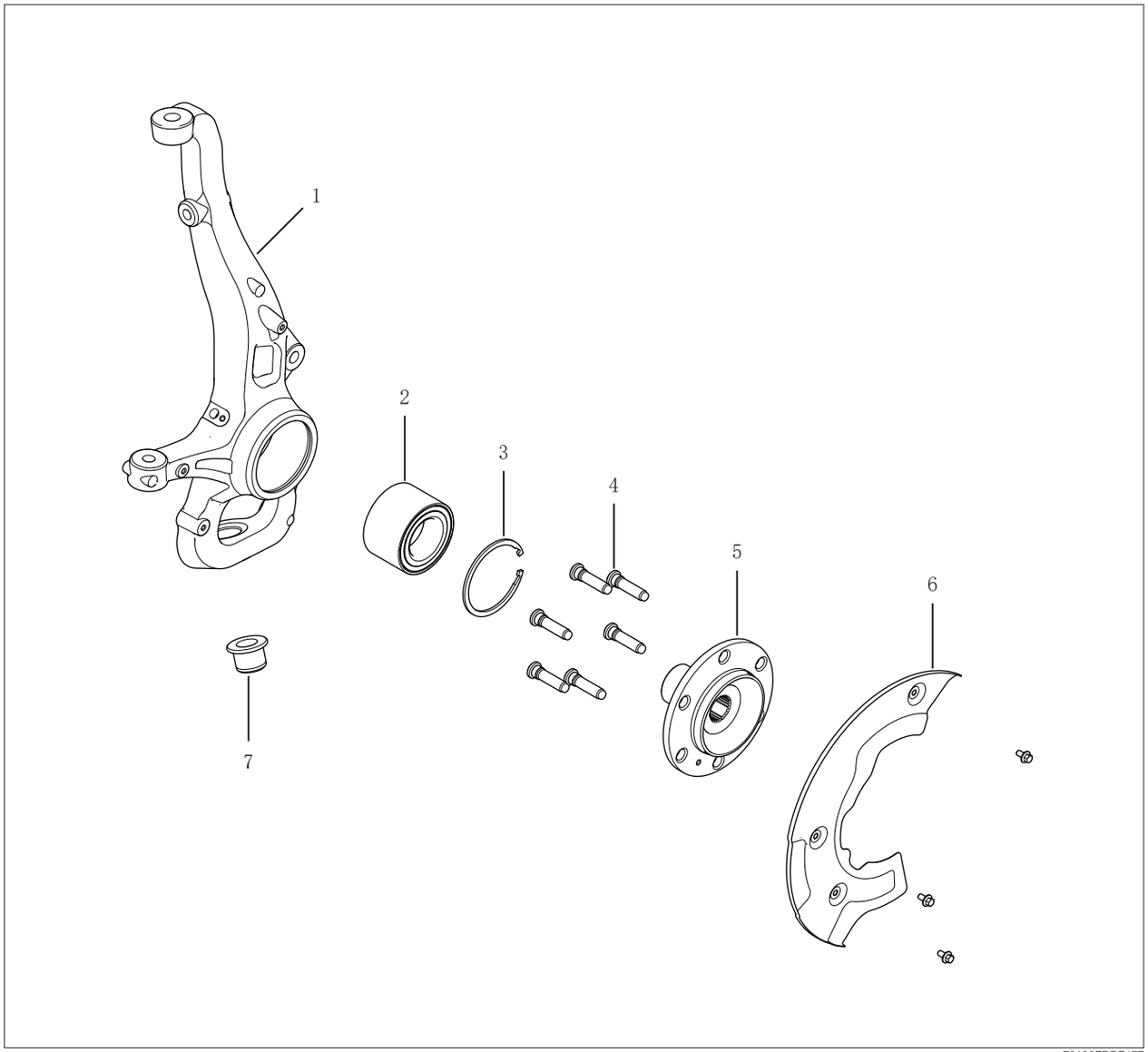
AC5FA944D3C2

Installation

1. Perform installation work in reverse order of removal

Front steering knuckle and wheel hub flange plate assembly (4WD)

Structural diagram



70138FDBF477

1. Front steering knuckle
2. Front wheel hub bearing
3. Internal circlip
4. Wheel bolts
5. Front wheel hub flange plate
6. Front brake disc cover
7. Taper sleeve of steering knuckle

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove front wheels
4. Remove front drive shaft nut

⚠ Caution

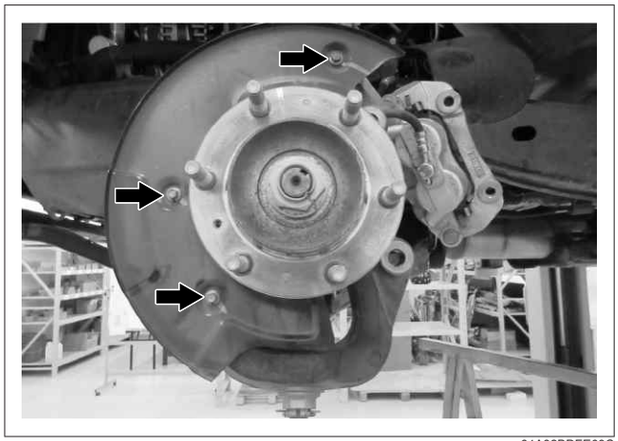
› Completely loosen the locking part of the nut to avoid damage to drive shaft thread.

5. Remove two bolts and separate front brake caliper assembly

ℹ Notice

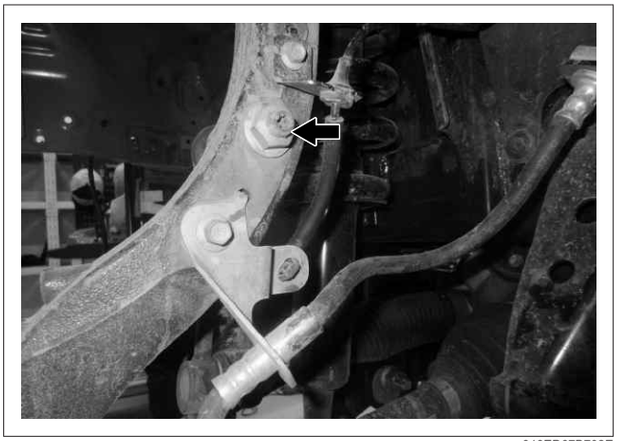
› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

6. Remove 1 screw and front brake disc
7. Remove 3 bolts and front brake disc cover



64A82BDFE69C

8. Separate front wheel speed sensor harness
9. Separate front wheel speed sensor harness bracket
10. Separate front brake hose bracket
11. Separate front stabilizer bar and link assembly



318ED67B702E

12. Remove one locking pin and one nut, and separate steering gear outer ball assembly



948AA561841B

13. Remove 1 locking pin and 1 nut, and separate front upper arm assembly



8A261A317AC3

14. Remove one locking pin and one nut, and separate front lower arm assembly



8B8E3E75F6D1

15. Remove front steering knuckle and wheel hub flange plate assembly

Installation

1. Perform installation work in reverse order of removal

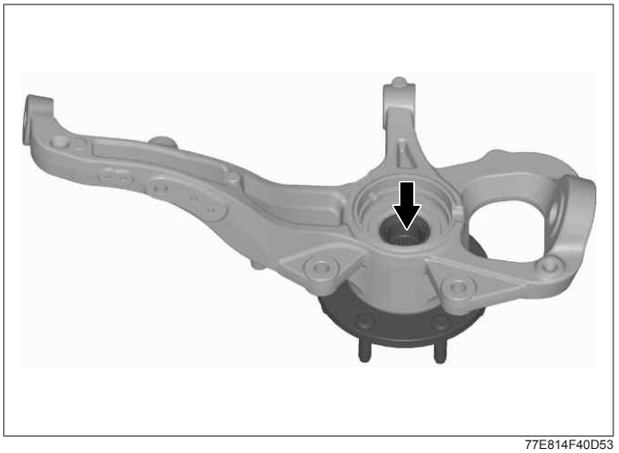
Notice

› Tighten the fastener according to the specified torque value.

Disassembly/assembly

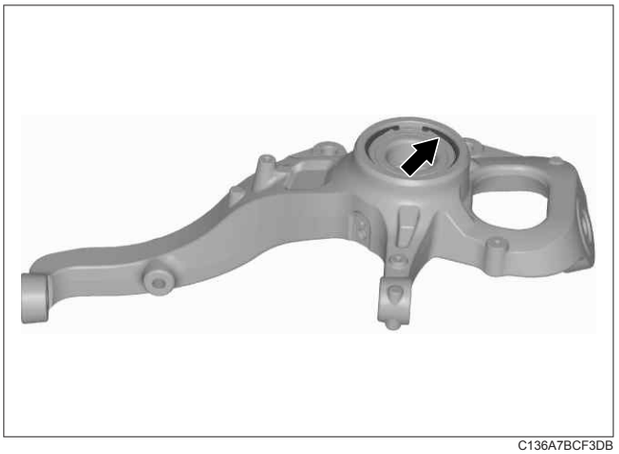
Disassembly

1. Use tool to remove front wheel hub flange plate from steering knuckle



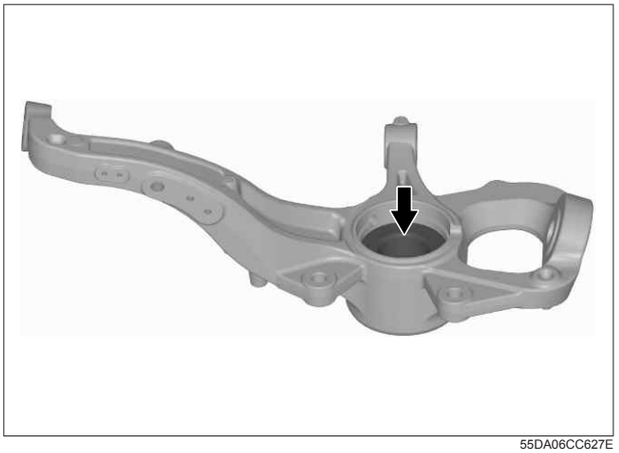
77E814F40D53

2. Remove spring retaining ring with retaining ring caliper



C136A7BCF3DB

3. Use a tool to hold steering knuckle on the press, and press out front wheel hub bearing assembly as a whole



55DA06CC627E

⚠ Caution

› The front wheel hub bearing assembly is a single-use part, so use a new part.

Assembly

1. Assembly follows the reverse order of disassembly

Rear suspension

Rear suspension .....25－1
System description .....25－1
Structural diagram .....25－2
Specified torque.....25－3
Rear shock absorber assembly.....25－4
Removal/installation.....25－4
Rear steel plate spring assembly .....25－5
Removal/installation.....25－5

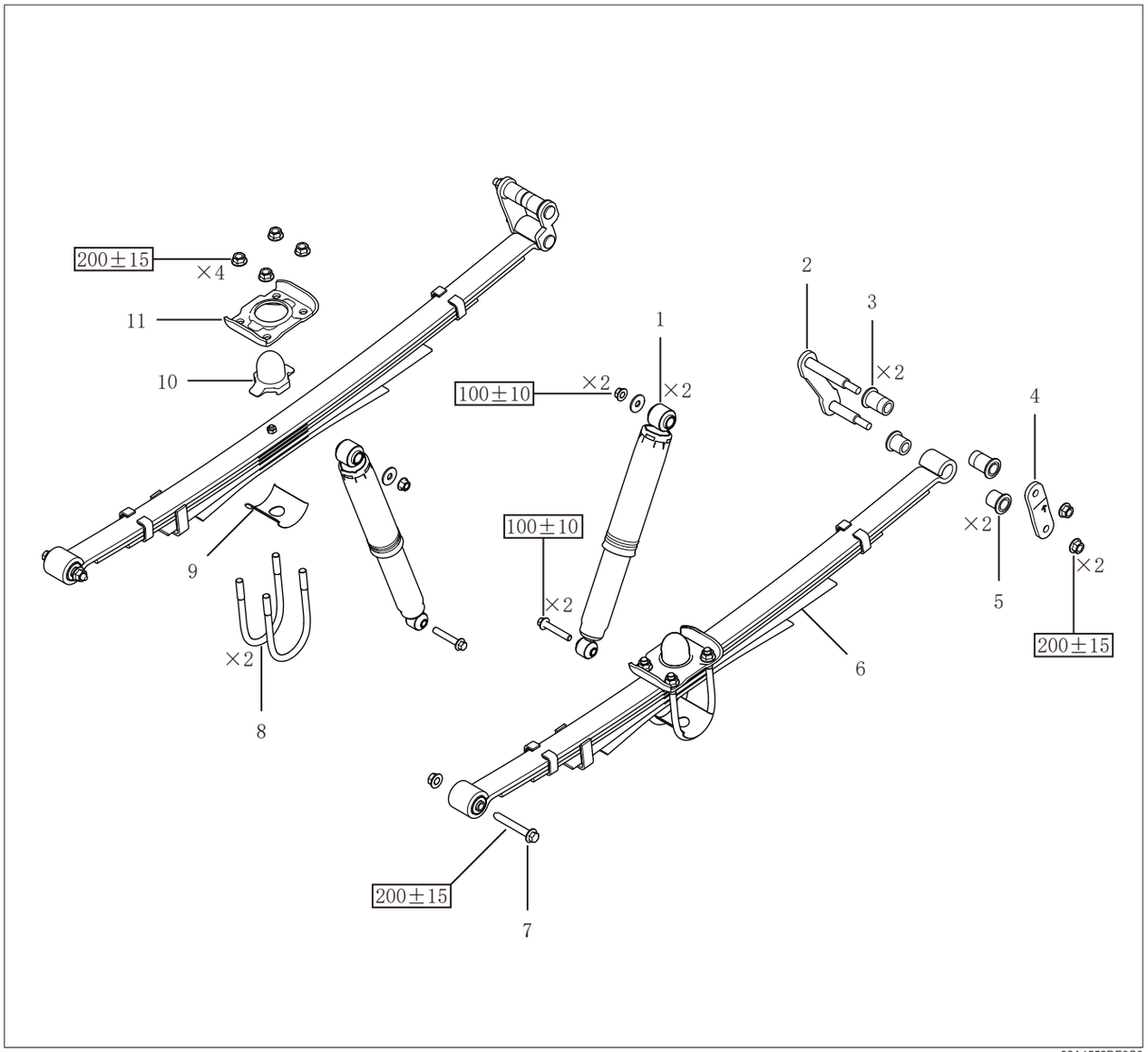
Rear suspension

System description

The rear suspension is a non-independent suspension of steel plate spring, which consists of steel plate spring and hydraulic telescopic shock absorber.

It ensures good maneuverability and stability when driving on uneven roads, provides vibration isolation to the driver and ensures comfort of passengers.

Structural diagram



32A4552DF6C3

1. Rear shock absorber assembly
2. Rear lifting lug assembly of steel plate spring
3. Bush for steel plate spring
4. Rear lifting lug guard of steel plate spring
5. Bush for steel plate spring
6. Rear steel plate spring assembly
7. Front pin shaft of steel plate spring
8. U-bolt
9. U-bolt guard plate
10. Bumper block of rear suspension
11. Bearing bush assembly

Specified torque

Name	Fasteners	Tightening torque (N.m)	Quantity	Remarks
Bolt	Rear steel plate spring x frame	200±15	2	Apply red gum
Nut	U-bolt of steel plate spring x bearing bush of steel plate spring	200±15	8	Apply red gum
Nut	Rear lifting lug assembly x frame	200±15	2	Apply red gum
Nut	Rear steel plate spring x rear lifting lug assembly	200±15	2	Apply red gum
Nut	Lower mounting point of rear shock absorber x rear axle assembly	100±10	2	Apply red gum
Nut	Upper mounting point of rear shock absorber x frame	100±10	2	Apply red gum

Rear shock absorber assembly

Removal/installation

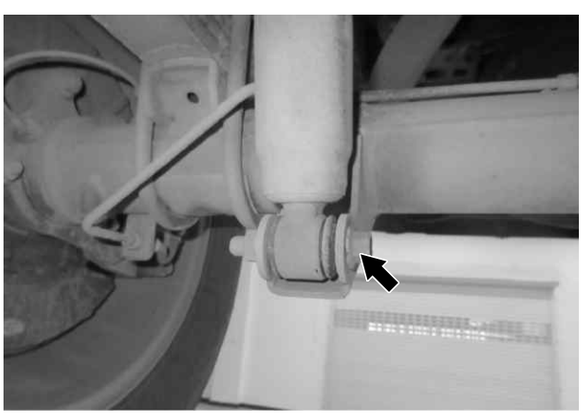
Removal

1. Raise the vehicle to an appropriate position
2. Support rear axle assembly with a bracket till rear axle starts to compression
3. Remove upper fixing point of rear shock absorber assembly



E3753FE724EE

4. Remove lower fixing point of rear shock absorber assembly



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5. Remove rear shock absorber assembly

Installation

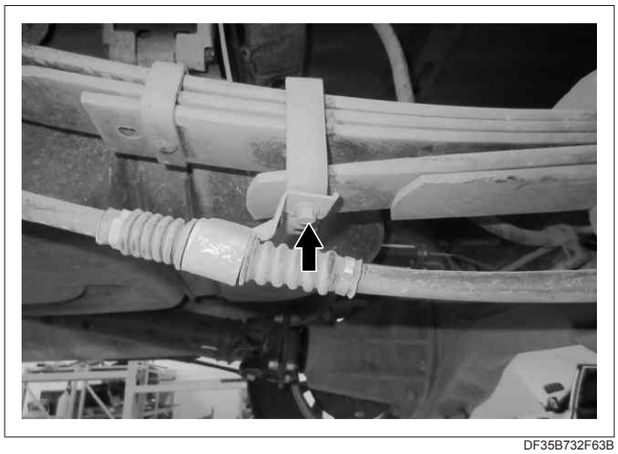
1. Perform installation work in reverse order of removal

Rear steel plate spring assembly

Removal/installation

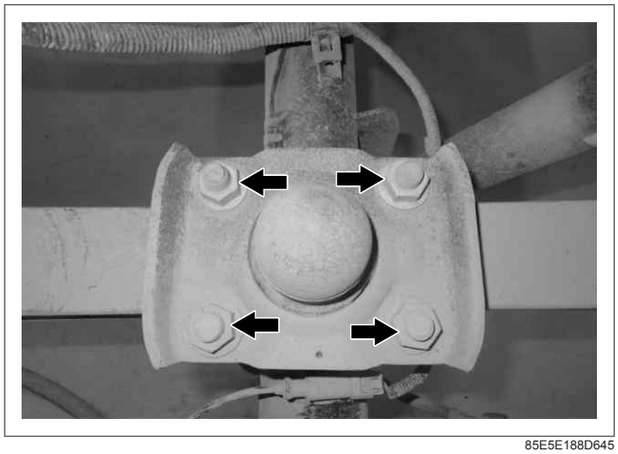
Removal

1. Raise the vehicle to an appropriate position
2. Remove rear wheel
3. Support rear axle assembly with a bracket till rear axle starts to compression
4. Separate parking cable bracket



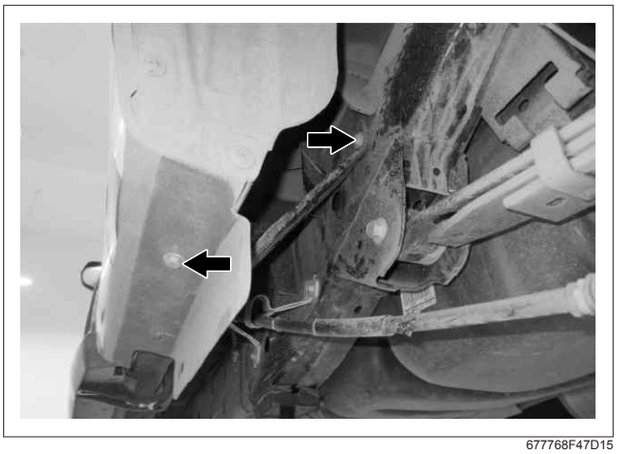
DF35B732F63B

5. Remove 4 nuts, and remove bearing bush assembly, bumper block of rear suspension, U-bolt, U cover plate



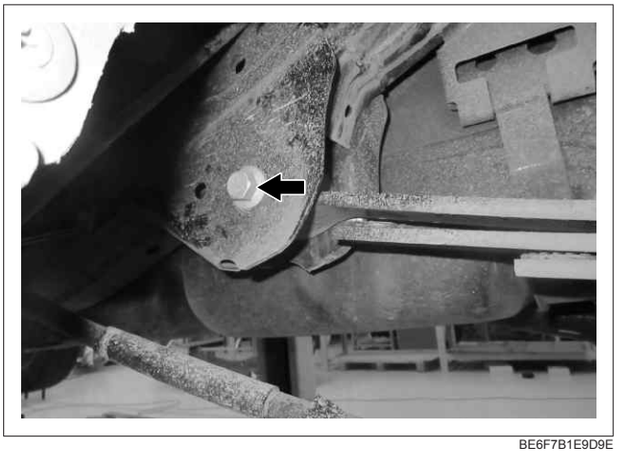
85E5E188D645

6. Remove trunk bracket



677768F47D15

7. Loosen pin shaft, and remove nut



BE6F7B1E9D9E

8. Remove 2 nuts and rear lifting lug guard of steel plate spring

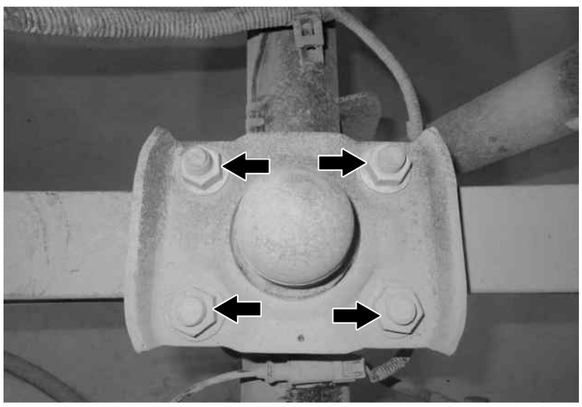


839E195785C2

9. Remove front pin shaft and rear lifting lug assembly of steel plate spring
10. Remove steel plate spring assembly

Installation

1. Fix front end of rear steel plate spring assembly using steel plate spring pin shaft, pretighten the nut.
2. Fix rear end of rear steel plate spring assembly using rear lifting lug assembly and rear lifting lug guard, pretighten the nut.
3. Install U-bolt and nut



85E5E188D645

Notice

- Mount the U-bolt into the hole of upper bearing bush, and tighten the nut after the U-bolt is fitted with the U-bolt guard.
- Tighten U-bolts and nuts alternatively until all U-bolts protrude from bearing bush by substantially equal length.
- Apply the nut with thread locking adhesive before installation.
- Check the tightening of U-bolts and nuts regularly in strict accordance with relevant requirements.

4. Tighten the front bolt of rear steel plate spring assembly
5. Tighten the nut at rear lifting lug guard of the rear end of rear steel plate spring
6. Install trunk bracket
7. Fix parking brake cable

Wheels and tires

Wheels and tires.....26－1
Specification .....26－1
Check.....26－2
Diagnosis flowchart.....26－3
Wheel assembly .....26－4
Removal/installation.....26－4
Spare tire lifter .....26－5
Removal/installation.....26－5

Wheels and tires

Specification

Tire specifications

Item	Parameter
Wheel rim specification	18×7.5J
Tire specifications	265/60 R18 110H
Tire pressure (kPa)	See the tire pressure sticker

Meaning of tire sidewall markings

For example: 265/60 R18 110H

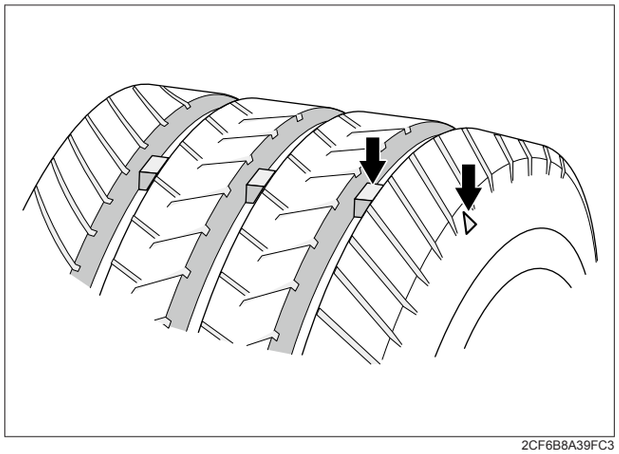
Parameter	Meaning
265	Nominal section width (unit: mm)
60	Flat rate (aspect ratio: %)
R	Meridian structure
18	Nominal diameter of wheel rim (unit: in)
110	Load index
H	Speed rate (210 km/h)

Common speed rate corresponding list

Speed rate	Max. speed (km/h)
R	170
S	180
T	190
U	200
H	210
V	240
W	270
Y	300
ZR	Greater than 240

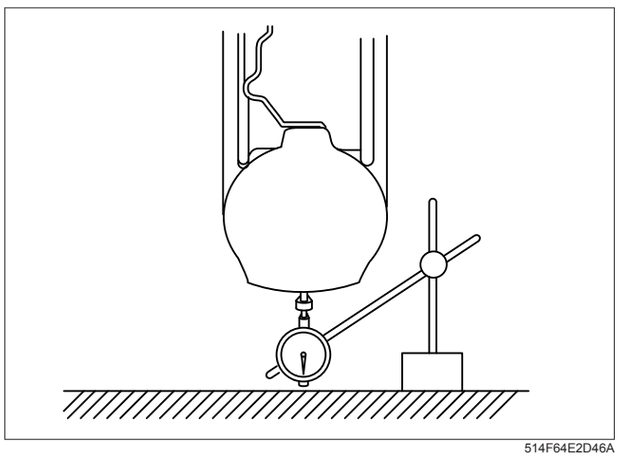
Check

1. Check the tire inflation pressure
2. Check the wear and tear of the tires



2CF6B8A39FC3

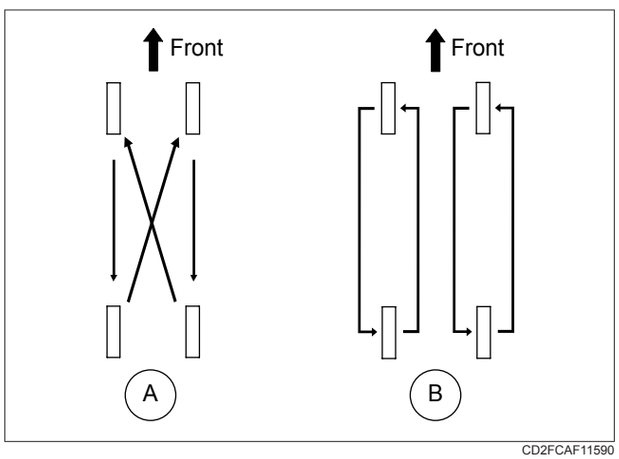
3. Measure tire lateral run-out using a dial indicator



514F64E2D46A

Max. tire radial run-out: 1.5 mm

4. Make tire rotation as shown in the figure

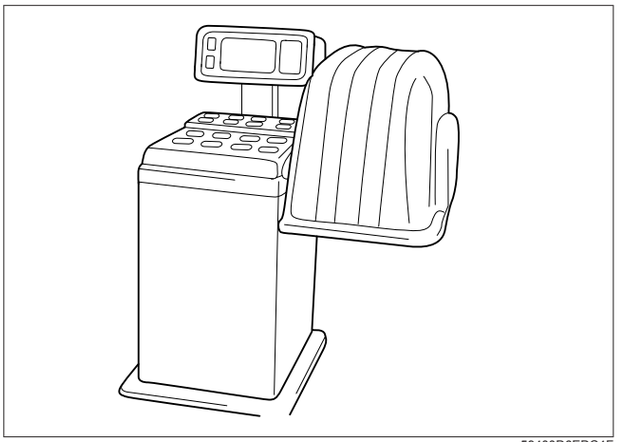


CD2FCAF11590

⚠ Caution

- A: Non-directional tires and wheels
- B: Directional tires and wheels

5. Check the wheel balance



59400D6EDC4F

Max. imbalance permissible following adjustment: Single ≤ 8 g; double ≤ 15 g

6. Check for slackness in front wheel hub bearing assembly
7. Check for slackness in rear wheel hub bearing assembly
8. Check front wheel hub axial run-out
9. Check rear wheel hub axial run-out

Diagnosis flowchart

Tire vibrating

1. Tighten the wheel nuts
   - › Go to Step 2
2. Check tires
   - › Abnormal; go to Step 3
   - › Normal; go to Step 4
3. Repair or replace the tire
   - › Go to Step 4
4. Check and/or adjust the wheel balance
   - › Go to Step 5
5. Check the slackness of front wheel hub bearing assembly and the axial runout of front wheel hub
   - › Abnormal; go to Step 6
   - › Normal; go to Step 7
6. Repair the looseness of the front wheel hub bearing assembly and the axial run-out of the front wheel hub
   - › Go to Step 7
7. Check the looseness of the rear wheel hub bearing assembly and the axial run-out of the rear wheel hub
   - › Abnormal; go to Step 8
   - › Normal; go to Step 9
8. Repair the slackness of rear wheel hub bearing assembly and the axial runout of rear wheel hub
   - › Go to Step 9
9. Carry out the road test

Uneven tire wear

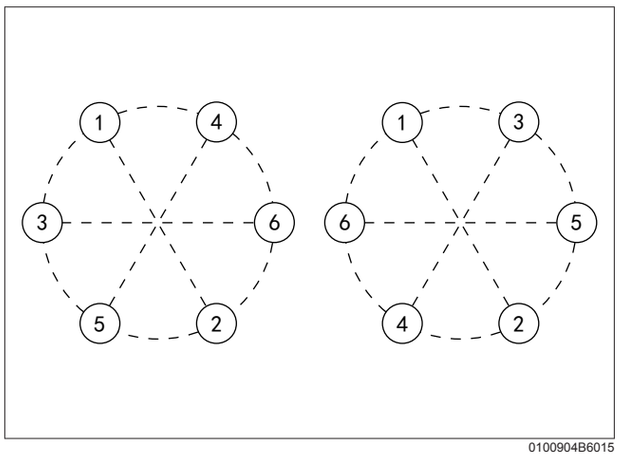
1. Check tires
   - › Go to Step 2
2. Repair or replace the tire
   - › Go to Step 3
3. Check and/or adjust the front wheel alignment
   - › Go to Step 4
4. Check and/or adjust the rear wheel alignment
   - › Go to Step 5
5. Carry out the road test

Wheel assembly

Removal/installation

Removal

1. Loosen the wheel nuts 1 to 2 turns in order



0100904B6015

2. Raise the vehicle to an appropriate position
3. Remove the nuts
4. Remove the wheels

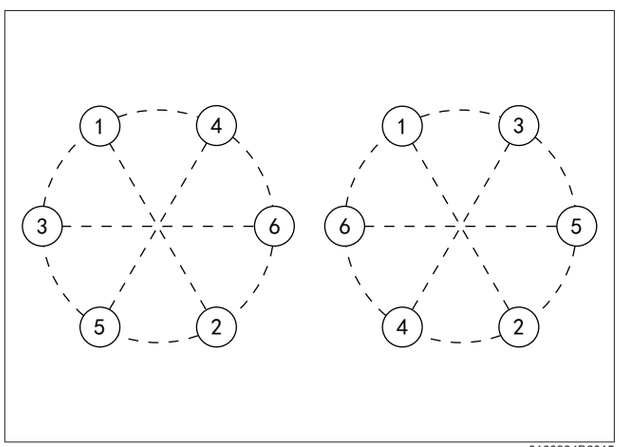
Installation

1. Install wheels

⚠ Caution

› Wipe off dirt from the wheel mounting surface and the brake disc mounting surface to ensure good contact between the wheel mounting surface and the brake disc.

2. Screw the nuts vertically in order to ensure a smooth tightening process



0100904B6015

ℹ Notice

› Screw up wheel nut by at least three threads.

3. Lower vehicle
4. Tighten the nuts in order

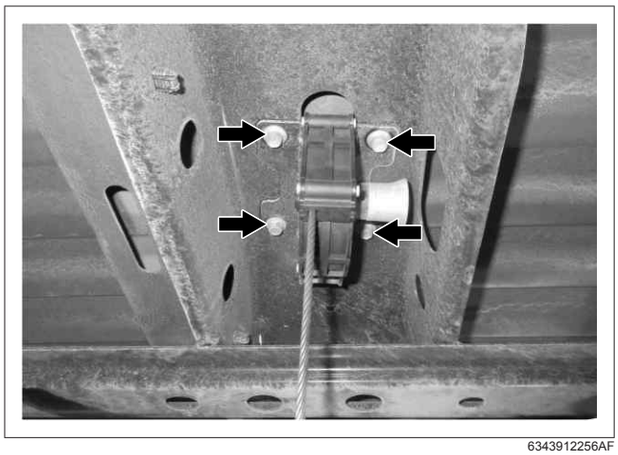
   Tightening torque: (110±10) N·m

Spare tire lifter

Removal/installation

Removal

1. Lower the spare tire assembly
2. Remove spare tire assembly
3. Remove 4 bolts and remove spare tire lifter assembly



6343912256AF

Installation

1. Perform installation work in reverse order of removal

Tire pressure monitoring system

Tire pressure monitoring system .....27－1
Description .....27－1
Location diagram .....27－2
System diagram .....27－3
tire pressure setter .....27－4
DTC checklist .....27－5
DTC troubleshooting method .....27－6
Tire pressure monitor sensor .....27－24
Structural diagram .....27－24
Removal/installation .....27－25
initialization .....27－26
Tire pressure monitoring receiver .....27－27
Pin definition .....27－27
Removal/installation .....27－27

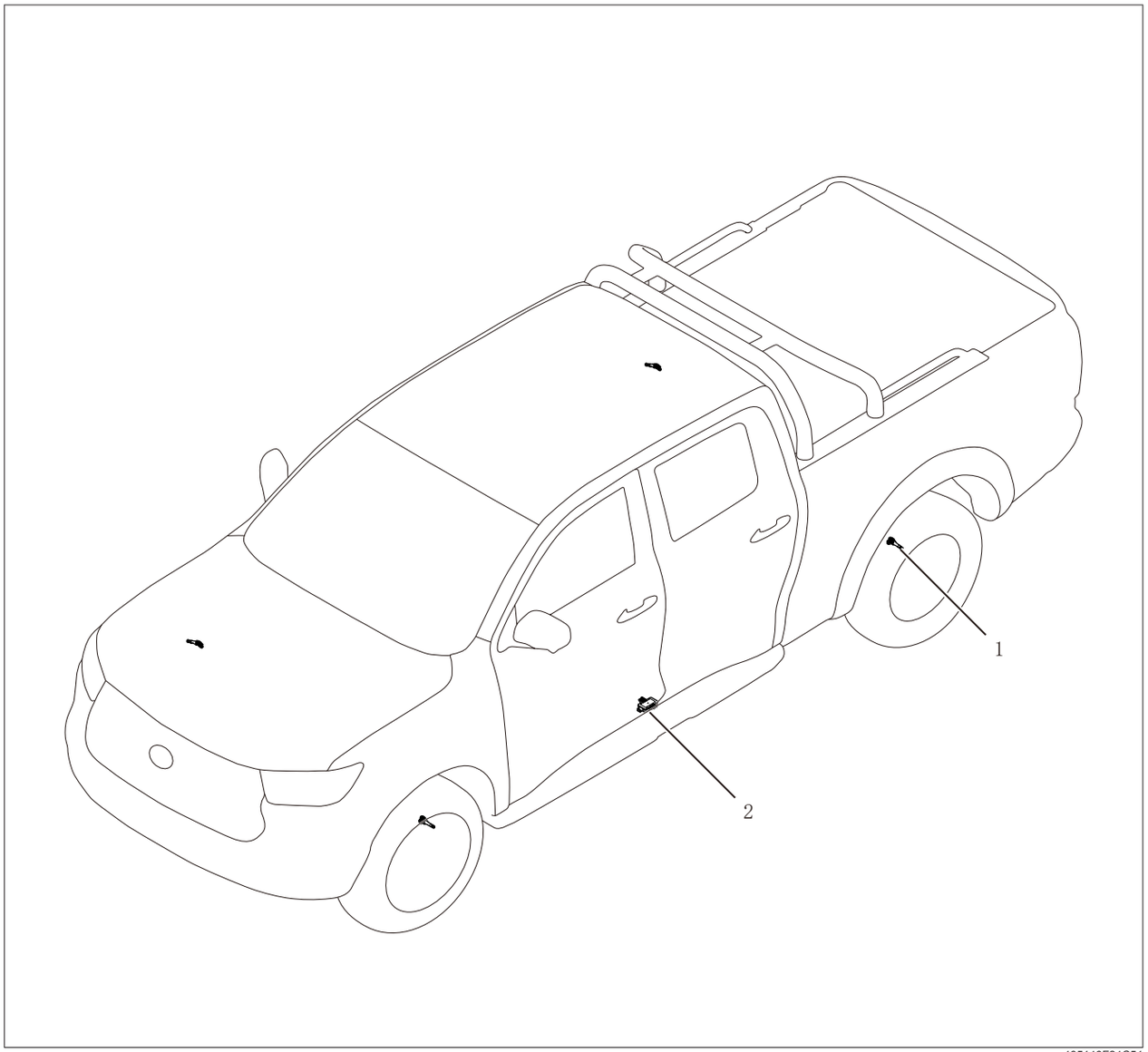
Tire pressure monitoring system

Description

On this vehicle, the tire pressure monitoring system is composed of 4 tire pressure monitor sensors (none for spare tire), 1 tire pressure monitoring receiver and 1 combination instrument. When one or more tires are at low pressure or high temperature, relevant data signal will be transmitted to combination instrument and displayed on TPMS lamp and LCD screen on the combination instrument to Improve driving safety and vehicle reliability.

Tire pressure monitoring system (TPMS) is a new technology for improving the active safety of vehicles. It applies automobile electronic technologies, sensor technologies, wireless emission and receiving technologies.

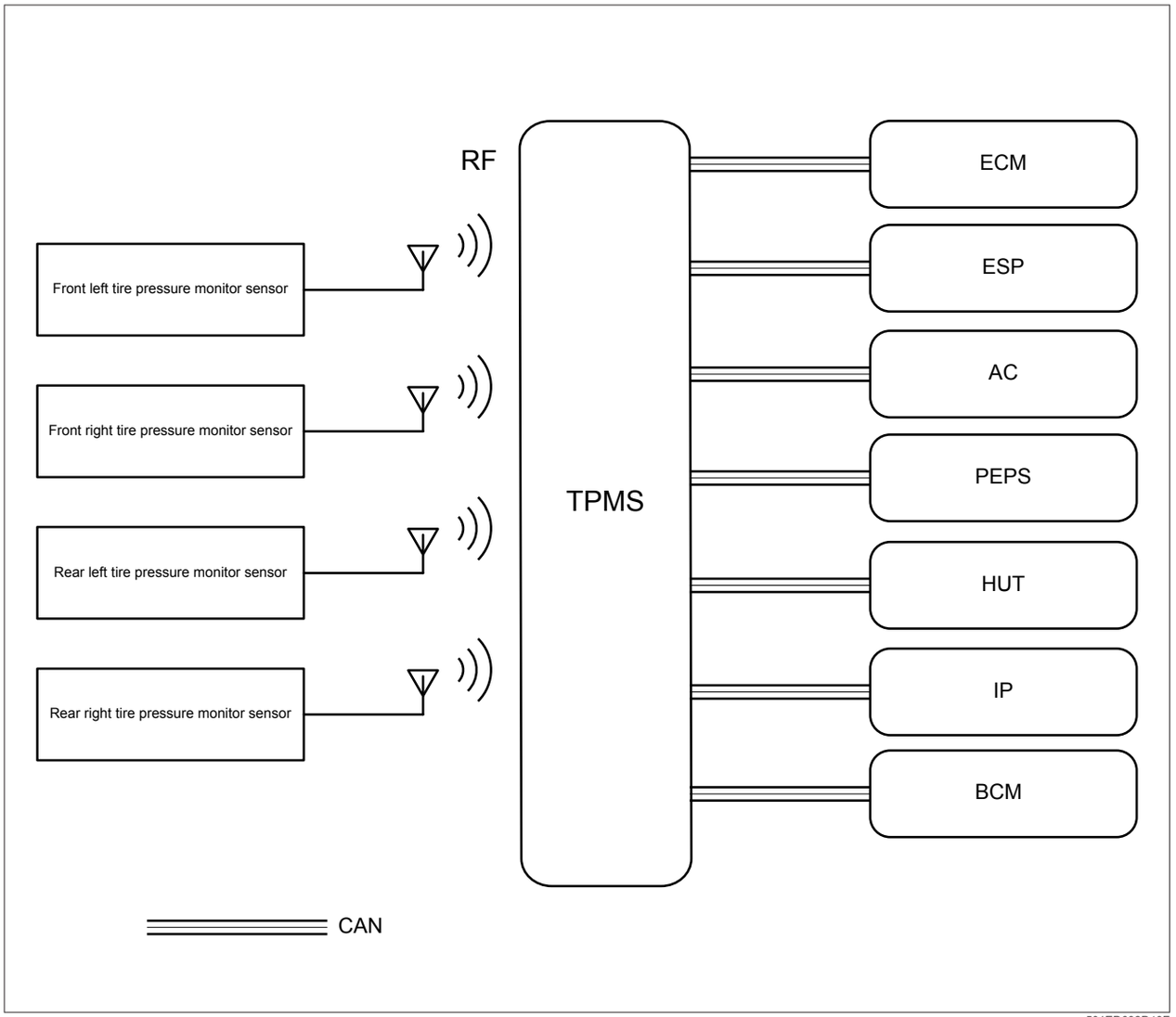
Location diagram



465146F24C51

1. Tire pressure monitor sensor
2. Tire pressure monitoring receiver

System diagram



501ED692D49F

tire pressure setter

THA13 setter

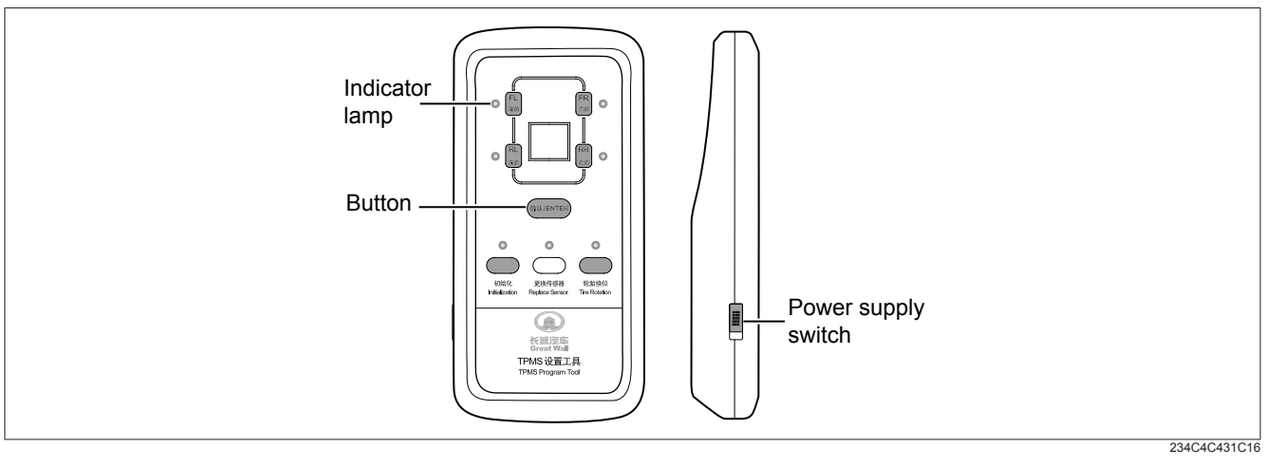
The THA13 setter is a tool that complements the TPMS. Using the THA13 setter, you can perform tire pressure monitor sensor initialization, replace the monitor sensors, and perform tire rotation; this helps you to repair and maintain the TPMS more quickly and efficiently.

⚠ Caution

› In the course of operations, if the indicator becomes dimmer or if all indicator lights flash when the power supply switch is turned on, it means that setter battery levels are low and you should replace the battery.

› The trigger distance becomes shorter when battery levels are low. At this juncture, please try to get as close as possible to the tire valve in order to trigger it and open vehicle door at the set time to access the OK button inside the cab as part of the settings procedure.

Function diagram



234C4C431C16

Technical parameters

Operating voltage: DC 9 V square battery

LF trigger distance: 0.1m ＜ L ＜ 0.2m

RF transmission distance: 1.5 m ＜ L ＜ 3 m

DTC checklist

No.	DTC	DTC description
1	U110017	Communication voltage too high
2	U110116	Communication voltage too low
3	U001088	AD-CAN bus off
4	U010087	Communication with ECM lost
5	U029387	Communication with VCU5 lost
6	U012287	Communication with ESP (ABS) lost
7	U014087	Communication with BCM lost
8	U100287	Lose communication with PEPS
9	U016487	Communication with AC (AC-FCP) lost
10	U3FFFF3	HUT, AC, ABS, BCM and PEPS all lost communication
11	C008351	Front left sensor ID is not configured
12	C008352	Front right sensor ID is not configured
13	C008353	Rear right sensor ID is not configured
14	C008354	Rear left sensor ID is not configured
15	C008311	Front left sensor battery power is low
16	C008312	Front right sensor battery power is low
17	C008313	Rear right sensor battery power is low
18	C008314	Rear left sensor battery power is low
19	C008301	Front left sensor lost
20	C008302	Front right sensor lost
21	C008303	Rear right sensor lost
22	C008304	Rear left sensor lost
23	C007701	Front left tire pressure low alarm
24	C007702	Front right tire pressure low alarm
25	C007703	Rear right tire pressure low alarm
26	C007704	Rear left tire pressure low alarm
27	C007711	Front left tire high temperature alarm
28	C007712	Front right tire high temperature alarm
29	C007713	Rear right tire high temperature alarm
30	C007714	Rear left tire high temperature alarm

DTC troubleshooting method

U110017

DTC definition: voltage too high

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU supply voltage over 16 V

DTC removal condition: CAN bus test voltage within 9 V~15 V, more than 1 s

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	Check for other DTCs
3	Measure if battery voltage is too high	Replace the battery	Go to step 4
4	Measure if pin voltage of TPMS ECU is too high	Replace TPMS ECU	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U110116

DTC definition: voltage too low

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU supply voltage below 9 V

DTC removal condition: CAN bus test voltage within 10V~16V, more than 1 s

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	Check for other DTCs
3	Measure if battery voltage is too low	Replace the battery	Go to step 4
4	Measure if pin voltage of TPMS ECU is too low	Replace TPMS ECU	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U001088

DTC definition: AD-CAN bus off

DTC occurring condition: CAN communication is enabled, CAN communication related diagnosis is turned on, and the bus is not in sleep mode

DTC removal condition: bus network management of TPMS ECU software clears the “bus off flag” and keeps clearing state for 0.1 s

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	Check for other DTCs
3	Check for poor connection or short circuit of AD-CAN circuit	Replace harness	Go to step 5
4	Check if AD-CAN line adapter is disconnected or in false contact	Replace converter	Go to step 6
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U3FFFF3

DTC definition: HUT, AC, ABS, BCM and PEPS all lost communication

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, HUT, AC, ABS, BCM and PEPS all lost communication

DTC removal condition: TPMS ECU receives messages sent from one ECU at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	—
3	Check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	Replace TPMS ECU
4	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 5
5	Check that TPMS ECU state is normal	Go to step 6	Repair connectors
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U010087

DTC definition: communication with ECM lost

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU cannot receive ECM messages

DTC removal condition: TPMS ECU received ECM messages at least ten times successively

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	—
3	Check if there are DTCs missing from other nodes in TPMS ECU, check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	—
4	Read DTCs in ECM to see if DTCs for missing TPMS ECU nodes/lost communication with TPMS ECU exist	Go to step 5	—
5	Read DTCs of other control nodes on network to see if DTC for lost communication with ECM also exists	Go to step 6	—
6	Check for normal functions related to ECM	Go to step 7	Replace ECM
7	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 8
8	Check that TPMS ECU state is normal	Go to step 9	Repair connectors
9	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU cannot receive ESP (ABS) messages

DTC removal condition: TPMS ECU received ESP (ABS) messages at least ten times successively

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	——

Step	Operation	Yes	No
3	Check if there are DTCs missing from other nodes in TPMS ECU, check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	——
4	Read DTCs in ESP (ABS) to see if DTCs for missing TPMS ECU nodes/lost communication with TPMS ECU exist	Go to step 5	——
5	Read DTCs of other control nodes on network to see if DTC for lost communication with ESP (ABS) also exists	Go to step 6	——
6	Check for normal functions related to ESP (ABS)	Go to step 7	Replace ESP (ABS)
7	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 8
8	Check that TPMS ECU state is normal	Go to step 9	Repair connectors
9	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U014087

DTC definition: communication with BCM lost

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU cannot receive BCM messages

DTC removal condition: TPMS ECU received BCM messages at least ten times successively

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	——
3	Check if there are DTCs missing from other nodes in TPMS ECU, check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	——
4	Read DTCs in BCM to see if DTCs for missing TPMS ECU nodes/lost communication with TPMS ECU exist	Go to step 5	——

Step	Operation	Yes	No
5	Read DTCs of other control nodes on network to see if DTC for lost communication with BCM also exists	Go to step 6	——
6	Check for normal functions related to BCM	Go to step 7	Replace BCM
7	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 8
8	Check that TPMS ECU state is normal	Go to step 9	Repair connectors
9	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Recheck if current fault has been eliminated, if not, then check for other possible causes

U016487

DTC definition: communication with AC (AC-FCP) lost

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU cannot receive AC (AC-FCP) messages

DTC removal condition: TPMS ECU received AC (AC-FCP) messages at least ten times successively

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	——
3	Check if there are DTCs missing from other nodes in TPMS ECU, check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	——
4	Read DTCs in AC (AC-FCP) to see if DTCs for missing TPMS ECU nodes/lost communication with TPMS ECU exist	Go to step 5	——
5	Read DTCs of other control nodes on network to see if DTC for lost communication with AC (AC-FCP) also exists	Go to step 6	——
6	Check for normal functions related to AC (AC-FCP)	Go to step 7	Replace AC (AC-FCP)
7	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 8
8	Check that TPMS ECU state is normal	Go to step 9	Repair connectors

Step	Operation	Yes	No
9	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Recheck if current fault has been eliminated, if not, then check for other possible causes

U029387

DTC definition: communication with VCU lost

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU cannot receive VCU5 messages

DTC removal condition: TPMS ECU received VCU5 messages at least ten times successively

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	——
3	Check if there are DTCs missing from other nodes in TPMS ECU, check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	——
4	Read DTCs in VCU to see if DTCs for missing TPMS ECU nodes/lost communication with TPMS ECU exist	Go to step 5	——
5	Read DTCs of other control nodes on network to see if DTC for lost communication with VCU also exists	Go to step 6	——
6	Check for normal functions related to VCU	Go to step 7	Replace VCU
7	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 8
8	Check that TPMS ECU state is normal	Go to step 9	Repair connectors
9	Remove DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Recheck if current fault has been eliminated, if not, then check for other possible causes

U100287

DTC definition: communication with PEPS lost

DTC occurring condition: CAN communication turned on, diagnostics related to CAN communication turned on, TPMS ECU cannot receive PEPS messages

DTC removal condition: TPMS ECU received PEPS messages at least ten times successively

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for starting
2	Use scanner to check TPMS ECU for DTC	Go to step 3	——
3	Check if there are DTCs missing from other nodes in TPMS ECU, check for unstable CAN communication of TPMS ECU itself, and try to clear this DTC with scanner to see if it can be cleared.	Go to step 4	——
4	Read DTCs in PEPS to see if DTCs for missing TPMS ECU nodes/lost communication with TPMS ECU exist	Go to step 5	——
5	Read DTCs of other control nodes on network to see if DTC for lost communication with PEPS also exists	Go to step 6	——
6	Check for normal functions related to PEPS	Go to step 7	Replace the PEPS
7	Check if CAN is short-circuited or open-circuited	End of repair	Go to step 8
8	Check that TPMS ECU state is normal	Go to step 9	Repair connectors
9	Remove DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Recheck if current fault has been eliminated, if not, then check for other possible causes

C008351

DTC definition: front left sensor ID is not configured

DTC occurring condition: front left TPMS sensor ID is not configured (learned) by TPMS ECU

Possible causes:

› Front left sensor ID learning by TPMS ECU is not performed or the learning failed or DTC recorded by gateway in a wrong way.

DTC removal condition: front left TPMS sensor ID is not configured (learned) by TPMS ECU

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Check if the CAN bus of TPMS ECU is connected normally	Reconnect	Go to step 3
3	Perform front left sensor ID learning using diagnostic tool and LF trigger tool	Go to step 4	—
4	Check the TPMS ECU for message sending	Go to step 5	Replace the TPMS ECU unit and relearn 4 sensor IDs

Step	Operation	Yes	No
5	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 6	—
6	The gateway may be faulty, and the gateway is to be replaced	—	—

C008352

DTC definition: front right sensor ID is not configured

DTC occurring condition: front right TPMS sensor ID is not configured (learned) by TPMS ECU

Possible causes:

› Front right sensor ID learning by TPMS ECU is not performed or the learning failed or DTC recorded by gateway in a wrong way.

DTC removal condition: front right TPMS sensor ID is not configured (learned) by TPMS ECU

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Check if the CAN bus of TPMS ECU is connected normally	Reconnect	Go to step 3
3	Perform front right sensor ID learning using diagnostic tool and LF trigger tool	Go to step 4	—
4	Check the TPMS ECU for message sending	Go to step 5	Replace the TPMS ECU unit and relearn 4 sensor IDs
5	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 6	—
6	The gateway may be faulty, and the gateway is to be replaced	—	—

C008353

DTC definition: rear right sensor ID is not configured

DTC occurring condition: rear right TPMS sensor ID is not configured (learned) by TPMS ECU

Possible causes:

› Rear right sensor ID learning by TPMS ECU is not performed or the learning failed or DTC recorded by gateway in a wrong way.

DTC removal condition: rear right TPMS sensor ID is not configured (learned) by TPMS ECU

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2

Step	Operation	Yes	No
2	Check if the CAN bus of TPMS ECU is connected normally	Reconnect	Go to step 3
3	Perform rear right sensor ID learning using diagnostic tool and LF trigger tool	Go to step 4	—
4	Check the TPMS ECU for message sending	Go to step 5	Replace the TPMS ECU unit and relearn 4 sensor IDs
5	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 6	—
6	The gateway may be faulty, and the gateway is to be replaced	—	—

C008354

DTC definition: rear left sensor ID is not configured

DTC occurring condition: rear left TPMS sensor ID is not configured (learned) by TPMS ECU

Possible causes:

› Rear left sensor ID learning by TPMS ECU is not performed or the learning failed or DTC recorded by gateway in a wrong way.

DTC removal condition: rear left TPMS sensor ID is not configured (learned) by TPMS ECU

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Check if the CAN bus of TPMS ECU is connected normally	Reconnect	Go to step 3
3	Perform rear left sensor ID learning using diagnostic tool and LF trigger tool	Go to step 4	—
4	Check the TPMS ECU for message sending	Go to step 5	Replace the TPMS ECU unit and relearn 4 sensor IDs
5	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 6	—
6	The gateway may be faulty, and the gateway is to be replaced	—	—

C008311

DTC definition: low battery power of front left sensor

DTC occurring condition: front left TPMS sensor battery power marking position is 1

Possible causes:

› Two battery checks at static mode (battery is to be checked at interval of 6 hours): front left TPMS

sensor battery power is less than 2.6 V.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace front left TPMS sensor unit, and TPMS ECU needs to re-learn front left sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008312

DTC definition: low battery power of front right sensor

DTC occurring condition: front right TPMS sensor battery power marking position is 1

Possible causes:

› Two battery checks at static mode (battery is to be checked at interval of 6 hours): front right TPMS sensor battery power is less than 2.6 V.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace front right TPMS sensor unit, and TPMS ECU needs to re-learn front right sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008313

DTC definition: low battery power of rear right sensor

DTC occurring condition: rear right TPMS sensor battery power marking position is 1

Possible causes:

› Two battery checks at static mode (battery is to be checked at interval of 6 hours): rear right TPMS sensor battery power is less than 2.6 V.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace the rear right TPMS sensor unit, and TPMS ECU needs to re-learn rear right sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008314

DTC definition: low battery power of rear left sensor

DTC occurring condition: rear left TPMS sensor battery power marking position is 1

Possible causes:

› Two battery checks at static mode (battery is to be checked at interval of 6 hours): rear left TPMS sensor battery power is less than 2.6 V.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace the rear left TPMS sensor unit, and TPMS ECU needs to re-learn rear left sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008301

DTC definition: front left sensor missing

DTC occurring condition: front left TPMS sensor missing

Possible causes:

› At motion status when speed is over 30 km/h, TPMS ECU fails to receive RF data packet from front left TPMS sensor for 10 minutes.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace front left TPMS sensor unit, and TPMS ECU needs to re-learn front left sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008302

DTC definition: front right sensor missing

DTC occurring condition: front right TPMS sensor missing

Possible causes:

› At motion status when speed is over 30 km/h, TPMS ECU fails to receive RF data packet from front right TPMS sensor for 10 minutes.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace front right TPMS sensor unit, and TPMS ECU needs to re-learn front right sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008303

DTC definition: rear right sensor missing

DTC occurring condition: rear right TPMS sensor missing

Possible causes:

› At motion status when speed is over 30 km/h, TPMS ECU fails to receive RF data packet from rear right TPMS sensor for 10 minutes.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace the rear right TPMS sensor unit, and TPMS ECU needs to re-learn rear right sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C008304

DTC definition: rear left sensor missing

DTC occurring condition: rear left TPMS sensor missing

Possible causes:

› At motion status when speed is over 30 km/h, TPMS ECU fails to receive RF data packet from rear left TPMS sensor for 10 minutes.

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Replace the rear left TPMS sensor unit, and TPMS ECU needs to re-learn rear left sensor ID	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	The gateway may be faulty, and the gateway is to be replaced	—	—

C007701

DTC definition: front left tire low pressure alarm

DTC occurring condition: front left sensor low-pressure alarm value is 1

Possible causes:

› TPMS ECU detects front left wheel tire pressure below low pressure alarm threshold reported by front left sensor (nominal tire pressure *80%).

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Inflate front left tire until nominal tire pressure is obtained	Go to step 3	—
3	Drive the vehicle for 5 minutes in normal conditions, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger front left sensor using LF tool	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007702

DTC definition: front right tire low pressure alarm

DTC occurring condition: front right sensor low-pressure alarm value is 1

Possible causes:

- TPMS ECU detects front right wheel tire pressure below low pressure alarm threshold reported by front right sensor (nominal tire pressure *80%).
- Gateway wrongly records DTC.

DTC removal condition:

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Inflate front right tire until nominal tire pressure is obtained	Go to step 3	—
3	Drive the vehicle for 5 minutes in normal conditions, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger front right sensor using LF tool	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007703

DTC definition: rear right tire low pressure alarm

DTC occurring condition: rear right sensor low-pressure alarm value is 1

Possible causes:

› TPMS ECU detects rear right wheel tire pressure below low pressure alarm threshold reported by rear right sensor (nominal tire pressure *80%).

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Inflate rear right tire until nominal tire pressure is obtained	Go to step 3	—
3	Drive the vehicle for 5 minutes in normal conditions, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger rear right sensor using LF tool	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007704

DTC definition: rear left tire low pressure alarm

DTC occurring condition: rear left sensor low-pressure alarm value is 1

Possible causes:

› TPMS ECU detects rear left wheel tire pressure below low pressure alarm threshold reported by rear left sensor (nominal tire pressure *80%).

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Inflate rear left tire until nominal tire pressure is obtained	Go to step 3	—
3	Drive the vehicle for 5 minutes in normal conditions, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger rear left sensor using LF tool	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007711

DTC definition: front left tire high temperature alarm

DTC occurring condition: front left sensor high temperature alarm value is 1

Possible causes:

› TPMS ECU detects front left wheel tire temperature over high temperature alarm threshold reported by front left sensor (75°C).

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Park the vehicle in the shade and wait for a period of time	Go to step 3	—
3	Drive the vehicle for 10 minutes in normal conditions after tire temperature drops significantly, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger front left sensor using LF tool (for over six times)	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007712

DTC definition: front right tire high temperature alarm

DTC occurring condition: front right sensor high temperature alarm value is 1

Possible causes:

› TPMS ECU detects front right wheel tire temperature over high temperature alarm threshold reported by front right sensor (75°C).

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Park the vehicle in the shade and wait for a period of time	Go to step 3	—

Step	Operation	Yes	No
3	Drive the vehicle for 10 minutes in normal conditions after tire temperature drops significantly, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger front right sensor using LF tool (for over six times)	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007713

DTC definition: rear right tire high temperature alarm

DTC occurring condition: rear right sensor high temperature alarm value is 1

Possible causes:

› TPMS ECU detects rear right wheel tire temperature over high temperature alarm threshold reported by rear right sensor (75°C).

› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Park the vehicle in the shade and wait for a period of time	Go to step 3	—
3	Drive the vehicle for 10 minutes in normal conditions after tire temperature drops significantly, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger rear right sensor using LF tool (for over six times)	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

C007714

DTC definition: rear left tire high temperature alarm

DTC occurring condition: rear left sensor high temperature alarm value is 1

Possible causes:

› TPMS ECU detects rear left wheel tire temperature over high temperature alarm threshold reported by rear left sensor (75°C).

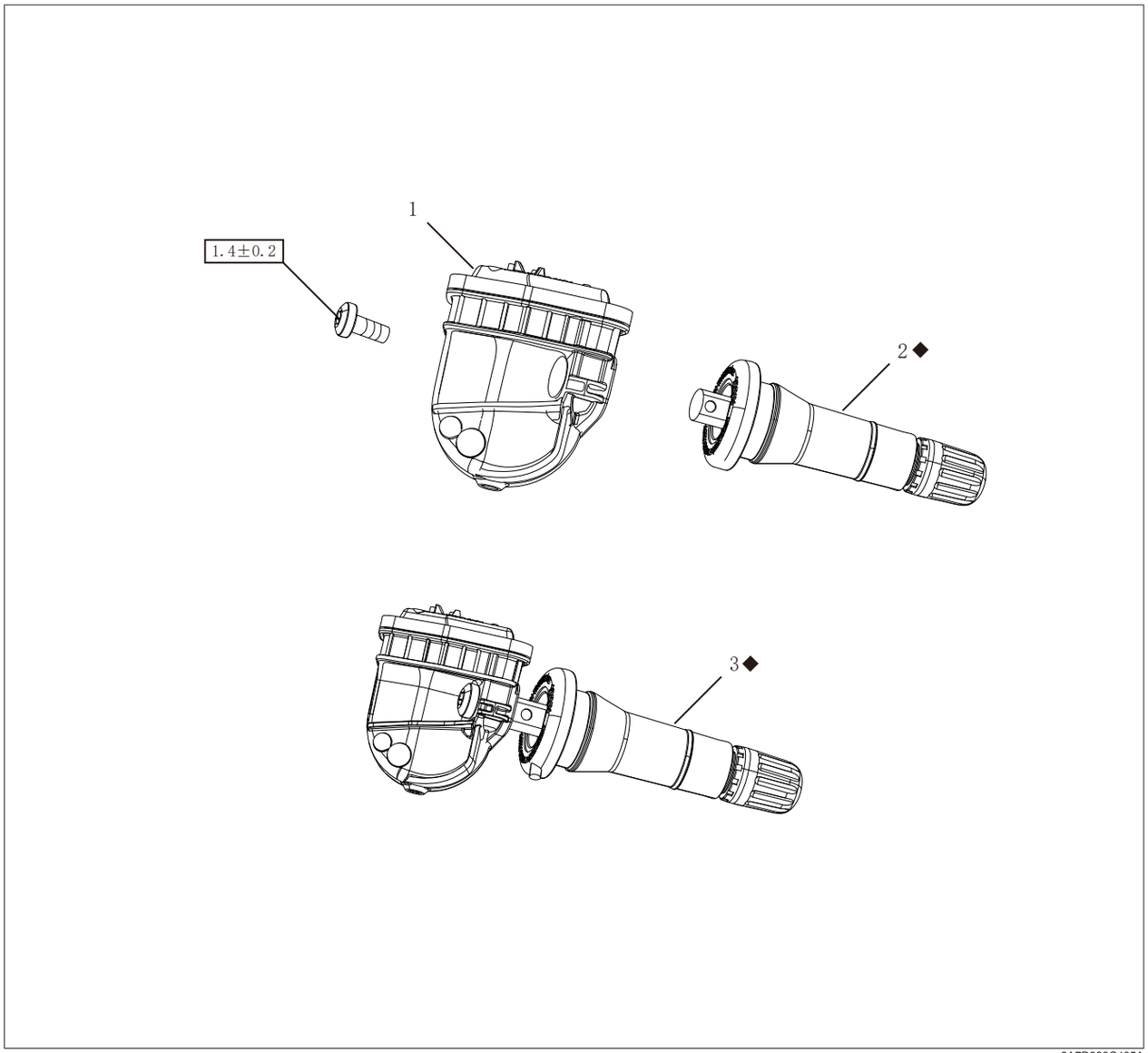
› Gateway wrongly records DTC.

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible running scenes or operation	Troubleshoot abnormalities	Go to step 2
2	Park the vehicle in the shade and wait for a period of time	Go to step 3	—
3	Drive the vehicle for 10 minutes in normal conditions after tire temperature drops significantly, and vehicle speed shall be over 30 km/h; or when the vehicle is at ON gear, trigger rear left sensor using LF tool (for over six times)	Go to step 4	—
4	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 5	—
5	The gateway may be faulty, and the gateway is to be replaced	—	—

Tire pressure monitor sensor

Structural diagram



8A7D996C435A

1. Sensor module
2. Valve
3. Tire pressure monitor sensor

Removal/installation

Removal

1. Lift the vehicle to a proper position
2. Remove wheel assembly
3. Remove the tire from wheel assembly

⚠ Caution

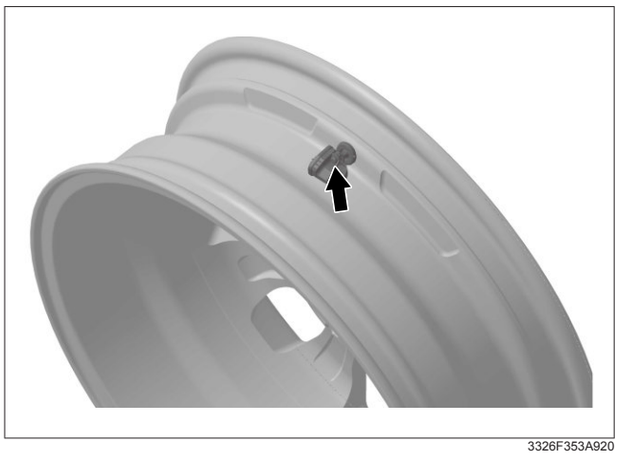
› When removing the tire, make sure that the tire pressure monitor sensor is under the insulation displacement connector.

› Pay attention to the rotation direction of the wheel when removing the upper tire bead.

› When removing the lower tire bead, make sure that the tire pressure monitor sensor is under the insulation displacement connector.

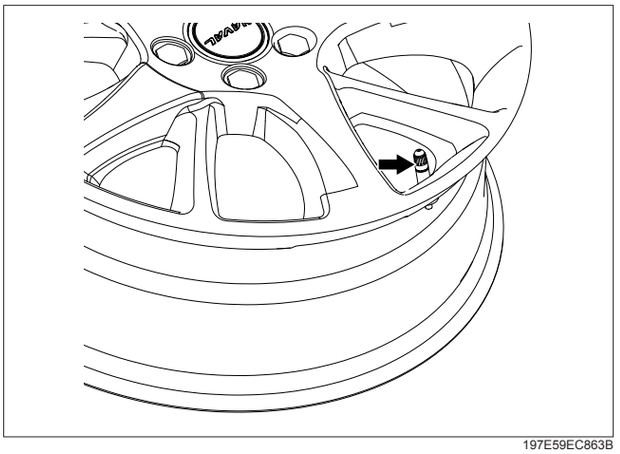
› Do not press the lower tire bead near the tire pressure sensor.

4. Remove 1 screw and separate tire pressure monitoring sensor body



3326F353A920

5. Remove the valve cap
6. Remove the valve using the valve puller



197E59EC863B

⚠ Caution

› When using the puller, protect the corresponding parts of the wheel rim to avoid damages.

› Removed valve is non-reusable.

Installation

ℹ Notice

1. Clear all dirt or debris from seal ring seal position.
2. Lubricate the new valve with lubricant.

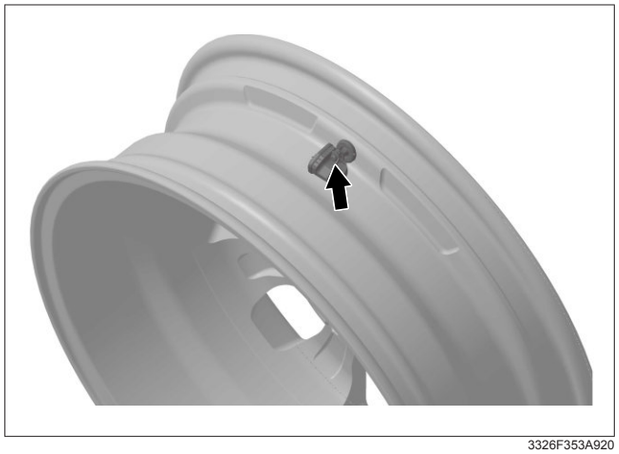
1. Lead valve tip through wheel hub valve hole
2. Install valve using valve puller

⚠ Caution

› Do not reuse the old valve.

› Protect the wheel rim when using the valve puller.

3. Install the tire pressure monitoring sensor body



3326F353A920

Tightening torque: (1.4±0.2) N·m

4. Install tire bead

Notice

› Avoid damaging the sensor.

5. Pressurize tire to standard pressure level, then check valve core and locking nuts using soapy water for signs of air leakage
6. Close valve cap and complete sensor installation
7. Install tire and adjust dynamic balance of the tire

Caution

› Tire dynamic balance check and adjustment are required after installing the tire pressure monitor sensor.

8. Initialize the newly installed tire pressure monitor sensor

initialization

Notice

› After replacing a tire pressure monitor sensor or performing tire rotation, re-learning of tire pressure monitor sensor is required.

1. Connect the scanner to the vehicle through OBD
2. Operate scanner and enter into tire pressure monitoring receiver learning interface
3. Place front left tire pressure monitor sensor into learning mode

Notice

› Take front left tire pressure monitor sensor as example.

4. Trigger front left tire pressure monitor sensor using a setter
5. After tire pressure monitoring receiver receives the high-frequency signal from tire pressure monitor sensor, scanner will display successful front left tire pressure monitor sensor learning

Notice

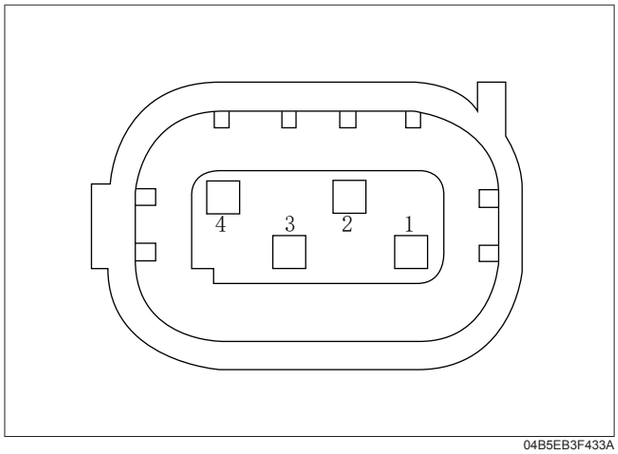
› If the scanner shows failure of learning when the tire pressure sensor is first triggered by the setter, try to trigger it several times during scanner countdown.

› If the learning failed again after scanner countdown is over, exit the scanner system and then re-enter it for another test.

6. Proceed to the next tire pressure monitor sensor learning

Tire pressure monitoring receiver

Pin definition



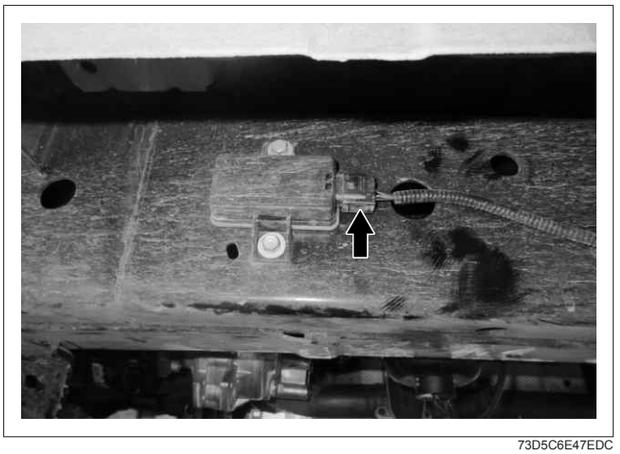
04B5EB3F433A

Pin No.	function
1	Battery power supply
2	GND
3	CAN high
4	CAN low

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connectors



73D5C6E47EDC

3. Remove 2 bolts and tire pressure monitoring receiver

Installation

1. Perform installation work in reverse order of removal

Hydraulic power steering system

Steering system (4D20M) ..... 28－1
System description ..... 28－1
Structural diagram ..... 28－2
Specified torque ..... 28－4
Steering wheel ..... 28－5
Check ..... 28－5
Removal/installation ..... 28－5
Steering column assembly ..... 28－7
Removal/installation ..... 28－7
Steering propeller shaft assembly ..... 28－8
Removal/installation ..... 28－8
Lower steering propeller shaft assembly ..... 28－9
Removal/installation ..... 28－9
Power steering fluid ..... 28－10
check ..... 28－10
Replacement of ..... 28－10
Power steering oil tank (4D20M) ..... 28－11
Removal/installation ..... 28－11
Power steering oil pump (4D20M) ..... 28－12
Removal/installation ..... 28－12
Steering oil pipe (4D20M) ..... 28－13
Removal/installation ..... 28－13
Steering gear assembly (4WD) ..... 28－15
Removal/installation ..... 28－15
Outer tie bar assembly ..... 28－16
Removal/installation ..... 28－16

Steering system (4D20M)

System description

Power steering system consists of steering column with propeller shaft assembly, power-steering oil pump, power steering oil tank, power steering gear with tie rod assembly, oil pipe components, etc.

Through belt drive, the engine drives power-steering oil pump to generate hydraulic pressure which acts on power steering gear piston, and the piston drives steering gear rack and impose auxiliary force on the rack. Amplitude of the auxiliary force is in relation to pressure on the piston. Pressure is changed with the control valve in the steering gear.

Steering process

When steering wheel is turned, the torsion bar in the control valve is twisted and deformed, and control valve core connected to the torsion bar also rotates and hydraulic oil passage on one side is opened and that on the other side is closed, hydraulic oil is delivered to one side of cylinder piston, pushing the piston and the gear rack and achieve front wheel steering.

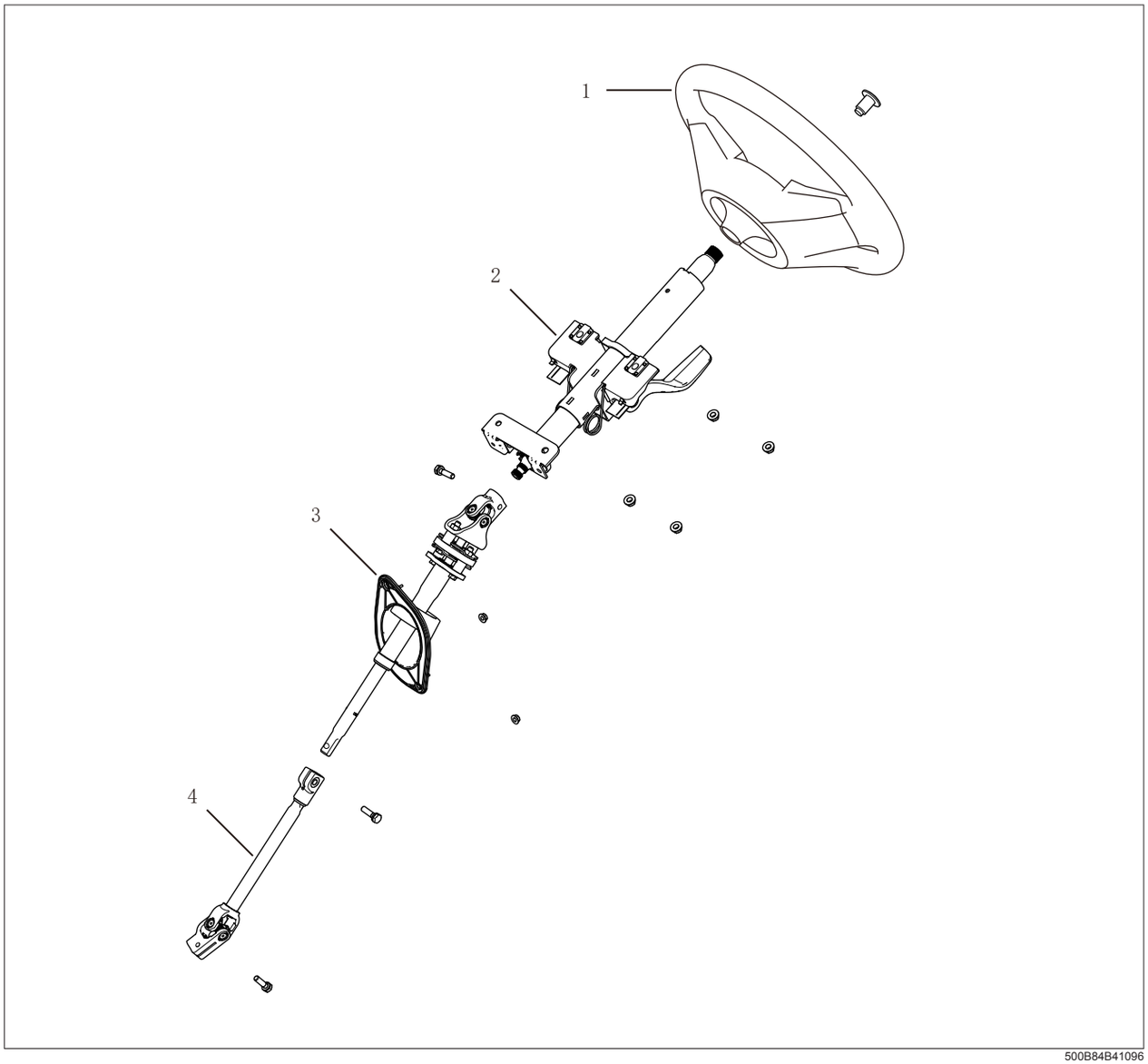
Return-to-center process

After steering operation, force on steering wheel disappears, torsion bar deformation is corrected and control valve core returns to center position. Hydraulic oil supplied from power-steering oil pump does not flow into cylinder and instead flows from control valve back into power steering oil tank through the loop. In such cases, power steering gear piston has equal pressure on both sides. The vehicle resumes straight-line running state by the action of front wheels alignment parameters. In restoring straight-line running state, the piston moves and oil on one side of the piston flows to the other side through the control valve.

Straight-line running state

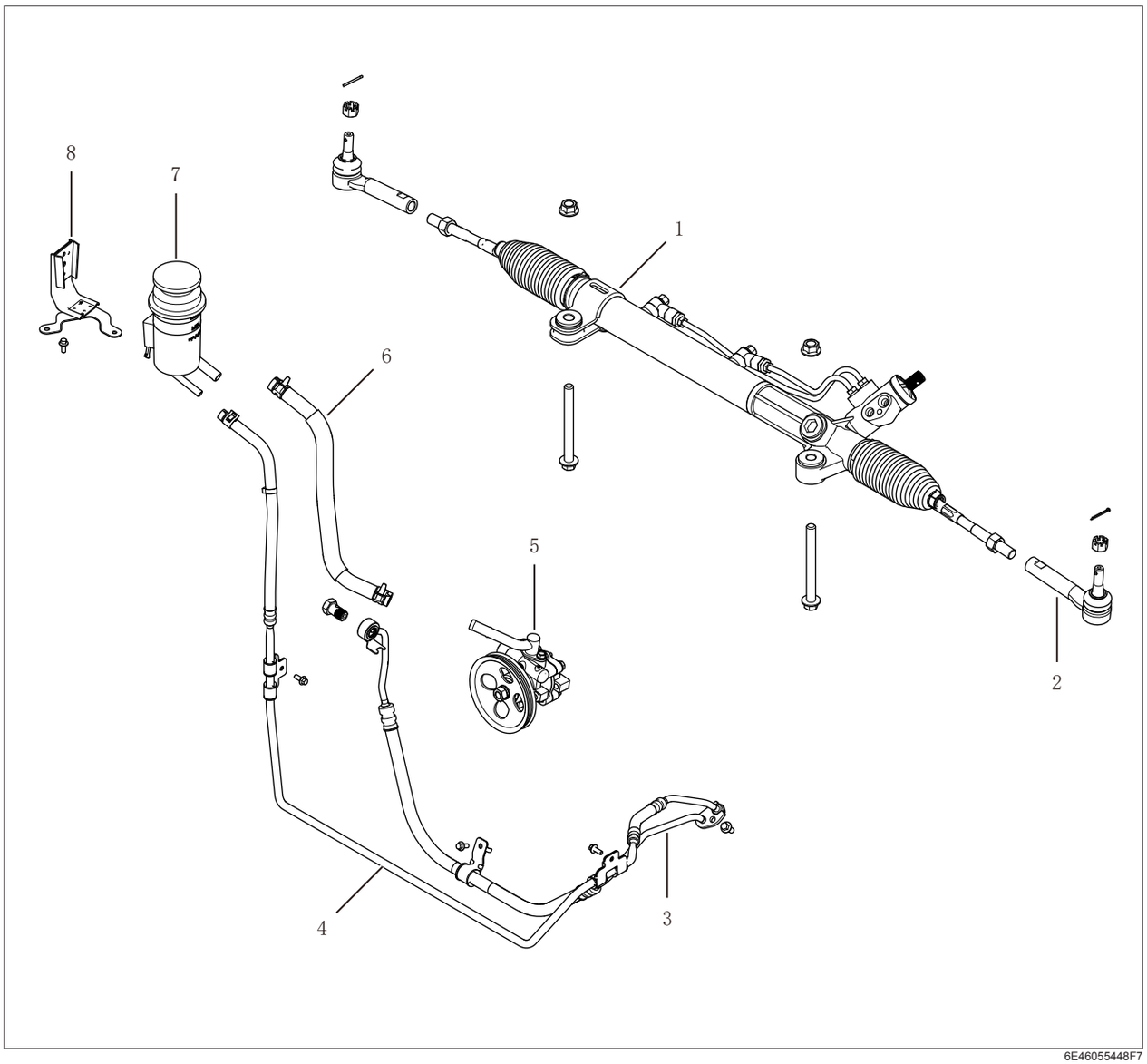
In such case, the control valve core in the power steering gear do not actuate and is at middle position. Hydraulic oil supplied from power-steering oil pump does not flow into cylinder and instead flows from control valve back into power steering oil tank through the loop. In such cases, power steering gear piston has equal pressure on both sides and the piston does not move.

Structural diagram



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1. Steering wheel
2. Steering column assembly
3. Steering propeller shaft assembly
4. Lower steering propeller shaft assembly



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1. Steering gear assembly
2. Outer tie bar assembly
3. Steering high-pressure oil pipe assembly
4. Steering low-pressure oil pipe assembly
5. Steering oil pump assembly
6. Oil inlet hose assembly of steering oil pump
7. Steering oil tank assembly
8. Steering oil tank bracket

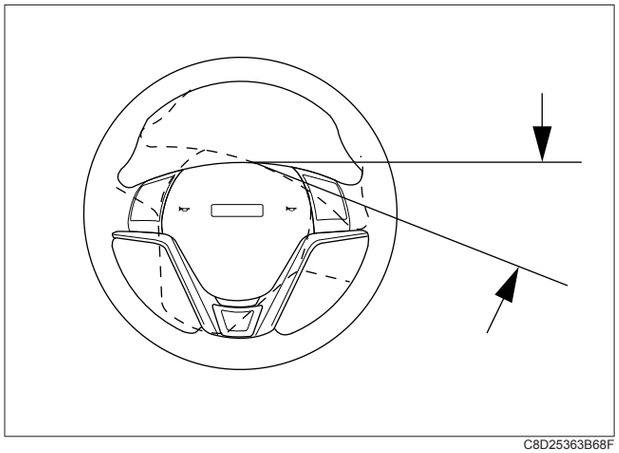
Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Steering wheel assembly × steering column assembly	50±5	1	—
Bolt	Steering column assembly × instrument reinforcing beam	25±3	4	—
Bolt	Steering column assembly × steering propeller shaft assembly	30±3	1	—
Bolt	Steering propeller shaft assembly and lower steering propeller shaft assembly	30±3	1	—
Nut	Steering propeller shaft assembly × vehicle body front wall	9±5	2	—
Bolt	Lower steering propeller shaft assembly × power steering gear assembly	30±3	1	—
Nut	Steering gear assembly x frame	160±16	2	Apply red gum
Bolt	Steering gear assembly x frame	160±16	2	Apply red gum
Nut	Steering gear exterior rod and ball × steering knuckle	100±10	2	—
Nut	Adjusting nut on inner pull rod	63±5	2	—
Bolt	Steering high-pressure oil pipe assembly x steering oil pump	50±5	1	—
Bolt	Steering high-pressure oil pipe assembly x steering gear	18±3	1	Apply red gum
Bolt	Steering high-pressure oil pipe assembly x frame	9±3	1	—
Bolt	Steering low-pressure oil pipe assembly x frame	9±3	2	—
Bolt	Steering oil tank bracket x vehicle body	9±3	1	—
Bolt	Steering oil pump x oil pump bracket	24±2	2	—

Steering wheel

Check

1. Park the vehicle and have the wheels face forward
2. Turn steering wheel clockwise or counterclockwise from the middle until resistance increases and check free stroke of steering wheel



C8D25363B68F

Maximum free stroke: left or right steering angle is not greater than 7.5°

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Turn off the ignition switch.
3. Disconnect negative terminal of the battery and then wait for 90 s
4. Remove the airbag from the steering wheel, and disconnect the horn and airbag connector.
5. Disconnect steering wheel push-button type connector
6. Unscrew steering wheel locking bolts



40FB0C9DB36E

7. Hold steering wheel and shake it from side to side for a few times, and then pull out steering wheel
8. Remove locking bolts
9. Remove steering wheel

i Notice

› After removing the steering wheel, you need to secure the clock spring (with tape etc.) to prevent misalignment of the clock spring (tape is to be peeled off during installation of the steering wheel).

Installation

1. Install the steering wheel assembly

i Notice

› The center of clock spring is aligned.

› Tighten the fastener according to the specified torque value.

2. Install horn, airbag connectors and airbag
3. Install negative terminal of the battery

Steering column assembly

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Make sure the ignition switch is set to OFF, then disconnect negative terminal of the battery.

⚠ Caution

› Disconnect the negative terminal for 90 s or longer.

3. Remove airbag from steering wheel, and disconnect connectors of horn and airbag.
4. Remove steering wheel assembly
5. Remove the driver knee trim plate
6. Separate the steering column upper cover.
7. Remove the steering column lower cover.
8. Disconnect the connector.
9. Loosen the bolt and remove the combination switch assembly.

ℹ Notice

› The combination switch assembly consists of lamp combination switch assembly, wiper combination switch assembly, combination switch matrix assembly, steering angle sensor assembly, and clock spring assembly.

› Fix the clock spring (tape can be used) and make sure that the clock spring is in the zero position.

10. Disconnect the electronic steering lock connector.
11. Separate harness clips
12. Separate steering propeller shaft assembly

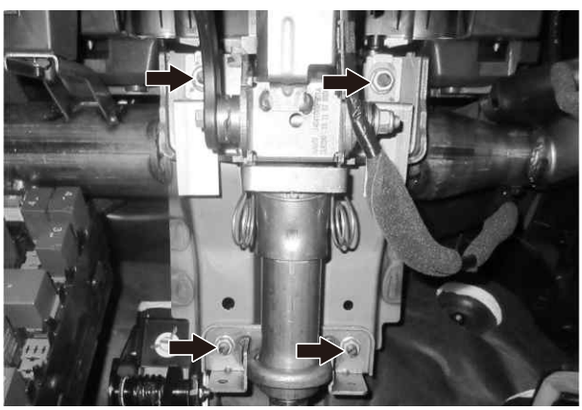


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ℹ Notice

› Make assembly markings.

13. Remove 4 nuts, and remove steering column assembly



AF2AB11C65DA

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Align assembly marks.

› Tighten the fastener according to the specified torque value.

Steering propeller shaft assembly

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Remove 2 snaps on the top of rubber
3. Separate lower propeller shaft assembly



B8021FCB47C2

Notice

› Make assembly markings.

4. Remove 1 bolt, move downwards along axis, and separate steering propeller shaft

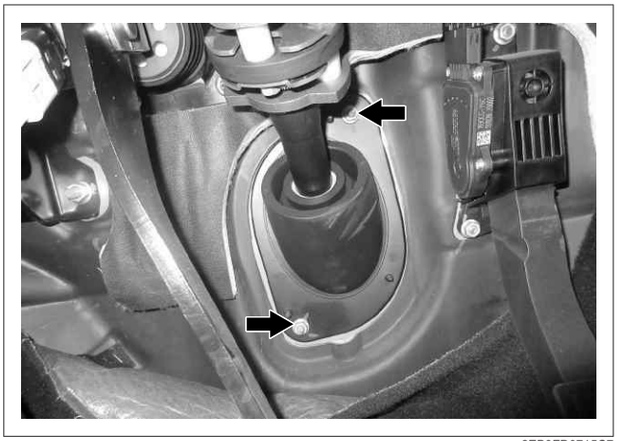


73FAC124B22C

Notice

› Make assembly markings.

5. Remove 2 nuts, and remove steering propeller shaft assembly



2EB3FD0715C7

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

Lower steering propeller shaft assembly

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Remove 2 snaps on the top of rubber
3. Separate steering propeller shaft assembly

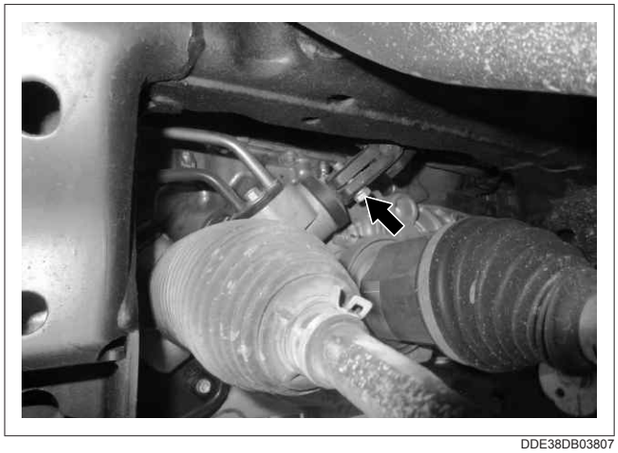


B8021FCB47C2

Notice

› Make assembly markings.

4. Separate steering gear assembly



DDE38DB03807

Notice

› Make assembly markings.

5. Remove lower steering propeller shaft assembly

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

› Tighten the fastener according to the specified torque value.

Power steering fluid check

1. Check the power steering fluid level

Notice

› Check and make sure that power steering fluid level is between the MAX scale mark and MIN scale mark.

› Power steering fluid is FLUIDE DA.

Replacement of

1. Open the power steering oil tank cover, remove the oil return hose on the power steering oil tank, and drain the oil into the container.
2. Start the engine to run at the idle speed. Drain the oil and simultaneously turn the steering wheel leftwards and rightwards to the limit position several times until the oil in the steering system is completely drained.

Notice

› In the process of turning or hydraulic oil replacement, time of steering wheel staying at limit position shall be no more than 5 s, otherwise steering system will be damaged.

3. Shut down the engine
4. Connect the oil return hose and fill the power steering oil tank with new steering fluid.

   Filling amount of power steering fluid: 1.1L ±0.1L (GW4D20M)
5. Restart the engine to run at the idle speed, turn the steering wheel leftwards and rightwards to the limit position several times, and fill the power steering oil tank with new hydraulic oil until there is no foam or turbidity in the power steering oil tank. When the engine is stopped, the oil level in the power steering oil tank shall be between the upper and lower scales.

Notice

› In the process of turning or hydraulic oil replacement, time of steering wheel staying at limit position shall be no more than 5 s, otherwise steering system will be damaged.

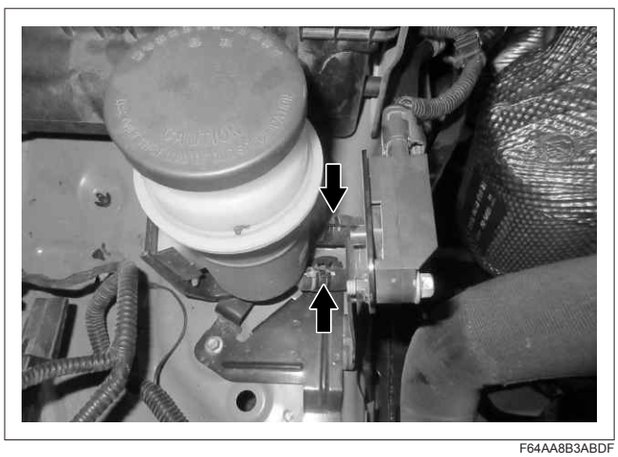
6. Tighten the power steering oil tank cover.

Power steering oil tank (4D20M)

Removal/installation

Removal

1. Discharge power steering fluid
2. Disconnect oil inlet/return hose



F64AA8B3ABDF

3. Pull up the steering oil tank assembly along the centerline of steering oil tank

Installation

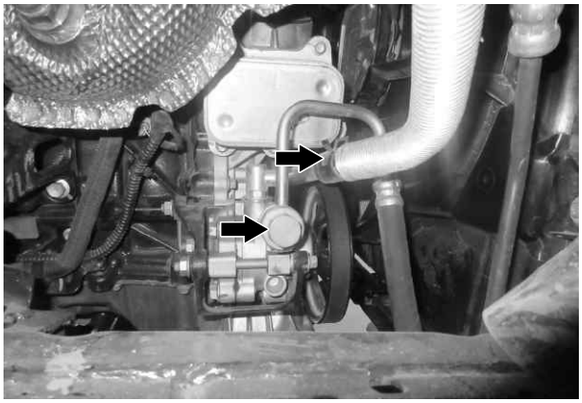
1. Perform installation work in reverse order of removal

Power steering oil pump (4D20M)

Removal/installation

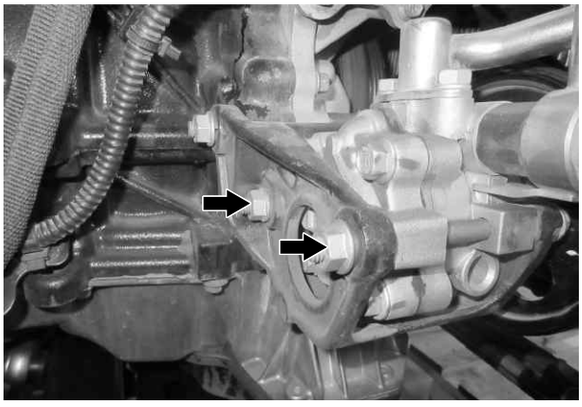
Removal

1. Discharge power steering fluid
2. Lift the vehicle
3. Remove lower guard
4. Disconnect steering fuel inlet and return pipes



389D3551A211

5. Removing belt
6. Remove 2 bolts, and remove steering fuel pump assembly



575125622649

Installation

1. Perform installation work in reverse order of removal

Notice

› Tighten the fastener according to the specified torque value.

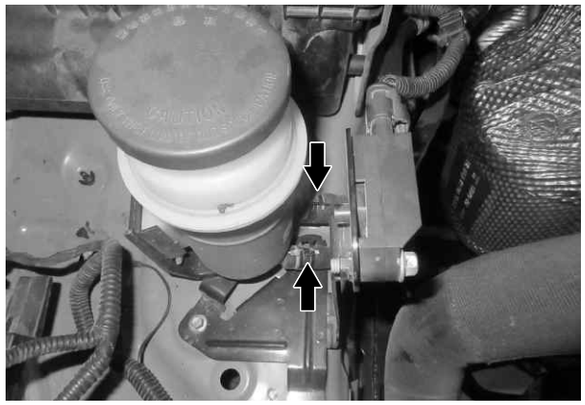
› Exhaust the steering system.

Steering oil pipe (4D20M)

Removal/installation

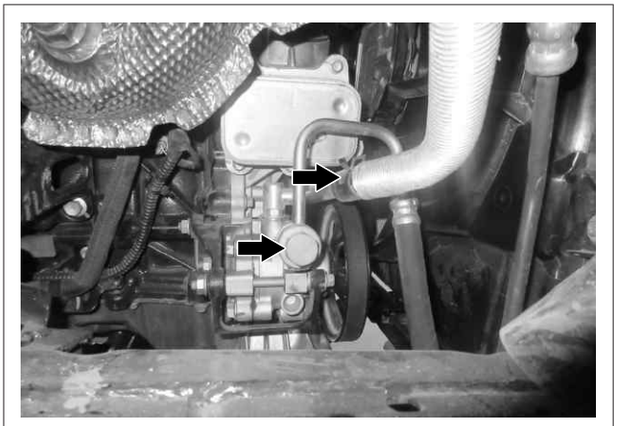
Removal

1. Discharge power steering fluid
2. Disconnect oil inlet/return hose



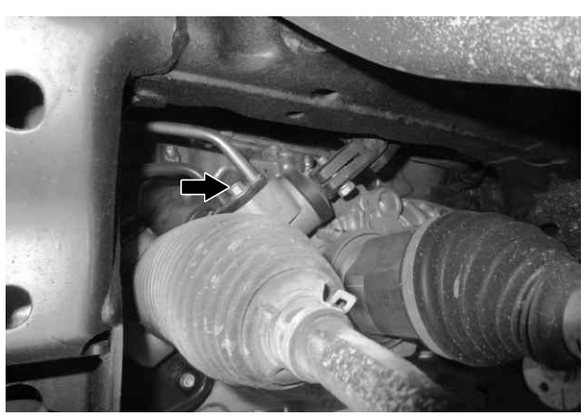
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3. Disconnect steering oil inlet hose and high-pressure oil pipe



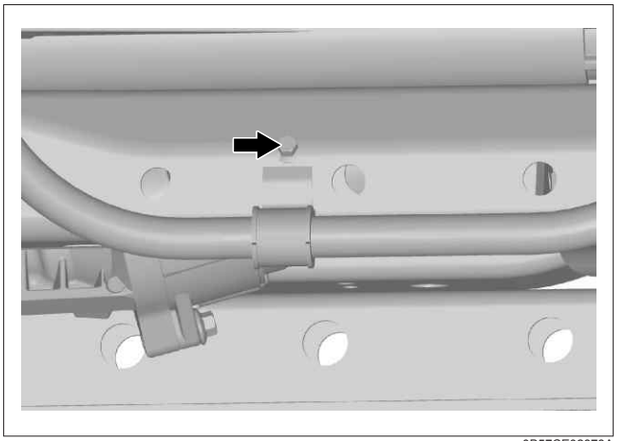
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4. Remove 1 bolt, and disconnect steering high and low pressure oil pipe on steering gear



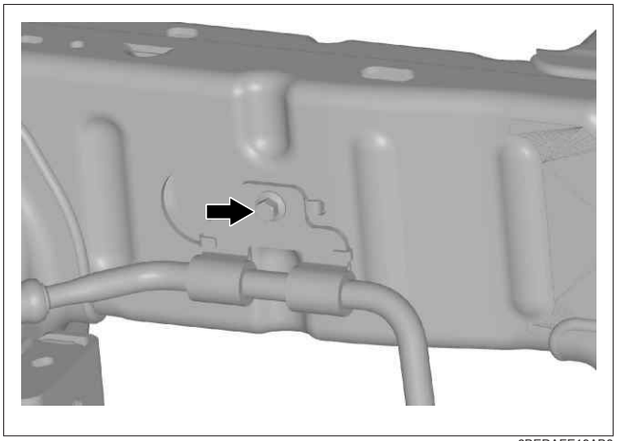
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5. Raise the vehicle to an appropriate position
6. Remove 1 bolt, and remove steering high-pressure oil pipe



0B57CE02878A

7. Remove 2 bolts, and remove steering low-pressure oil pipe



6BEDAFE19AB8



52B7183E8168

Installation

1. Perform installation work in reverse order of removal

Notice

› Exhaust the steering system.

Steering gear assembly (4WD)

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Separate steering tie rod ball assembly
3. Discharge power steering fluid
4. Disconnect steering high and low pressure oil pipe assembly on steering gear



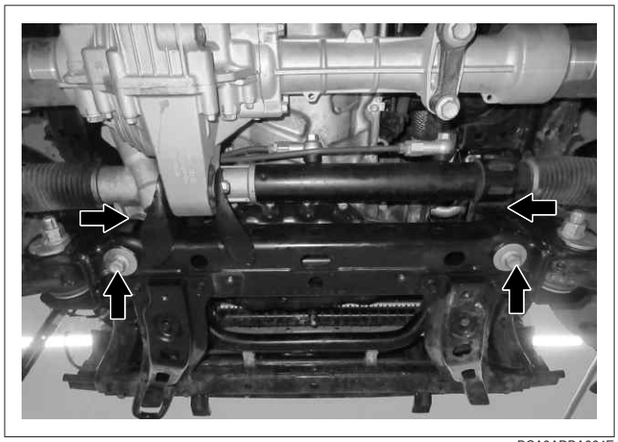
D2A1C70F80F9

5. Separate lower propeller shaft assembly

Notice

› Make assembly markings.

6. Remove front axle main reducer assembly
7. Remove 2 bolts and 2 nuts, and remove power steering gear assembly



BCA3ADBA364E

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

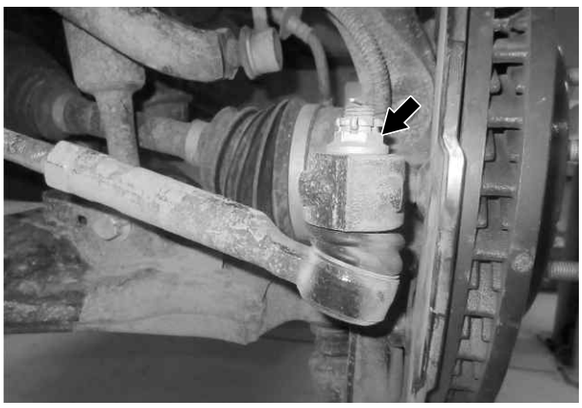
› Check the wheel alignment and make adjustments when necessary.

Outer tie bar assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove split pin and nut, and separate outer tie bar assembly



BCC52A829CD7

3. Loosen locking nut, and remove outer tie bar assembly

Notice

› Make assembly markings.

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

› Check the wheel alignment and make adjustments when necessary.

Electric power steering system

Steering system ..... 29－1
Description ..... 29－1
Structural diagram ..... 29－2
System diagram ..... 29－4
Specified torque ..... 29－5
Fault symptom checklist ..... 29－6
DTC checklist ..... 29－8
DTC troubleshooting method ..... 29－10
Steering wheel ..... 29－15
Check ..... 29－15
Removal/installation ..... 29－15
Steering column assembly ..... 29－17
Removal/installation ..... 29－17
Steering propeller shaft assembly ..... 29－18
Removal/installation ..... 29－18
Lower steering propeller shaft assembly ..... 29－19
Removal/installation ..... 29－19
Electrical steering gear assembly (4WD) ..... 29－20
Pin definition ..... 29－20
Removal/installation ..... 29－21
Steering gear ball assembly ..... 29－22
Removal/installation ..... 29－22

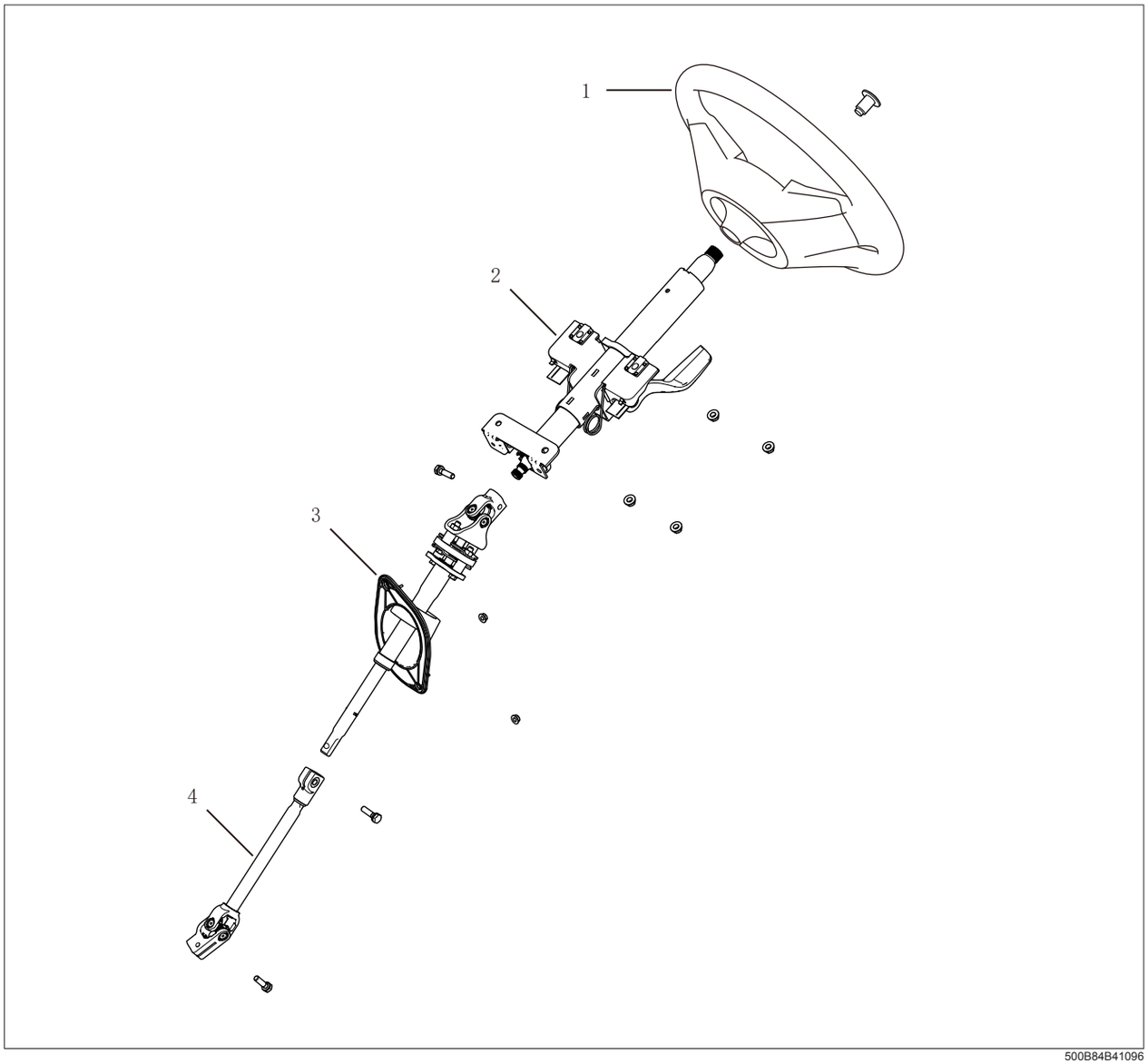
Steering system

Description

Main functions of electric power steering system include EPS power-assisted start/stop function, power-assisted control function, alarm function, rack end protection function, over-temperature protection function, road interference suppression function, active alignment function, damping control function, steering multi-mode function, and abuse protection.

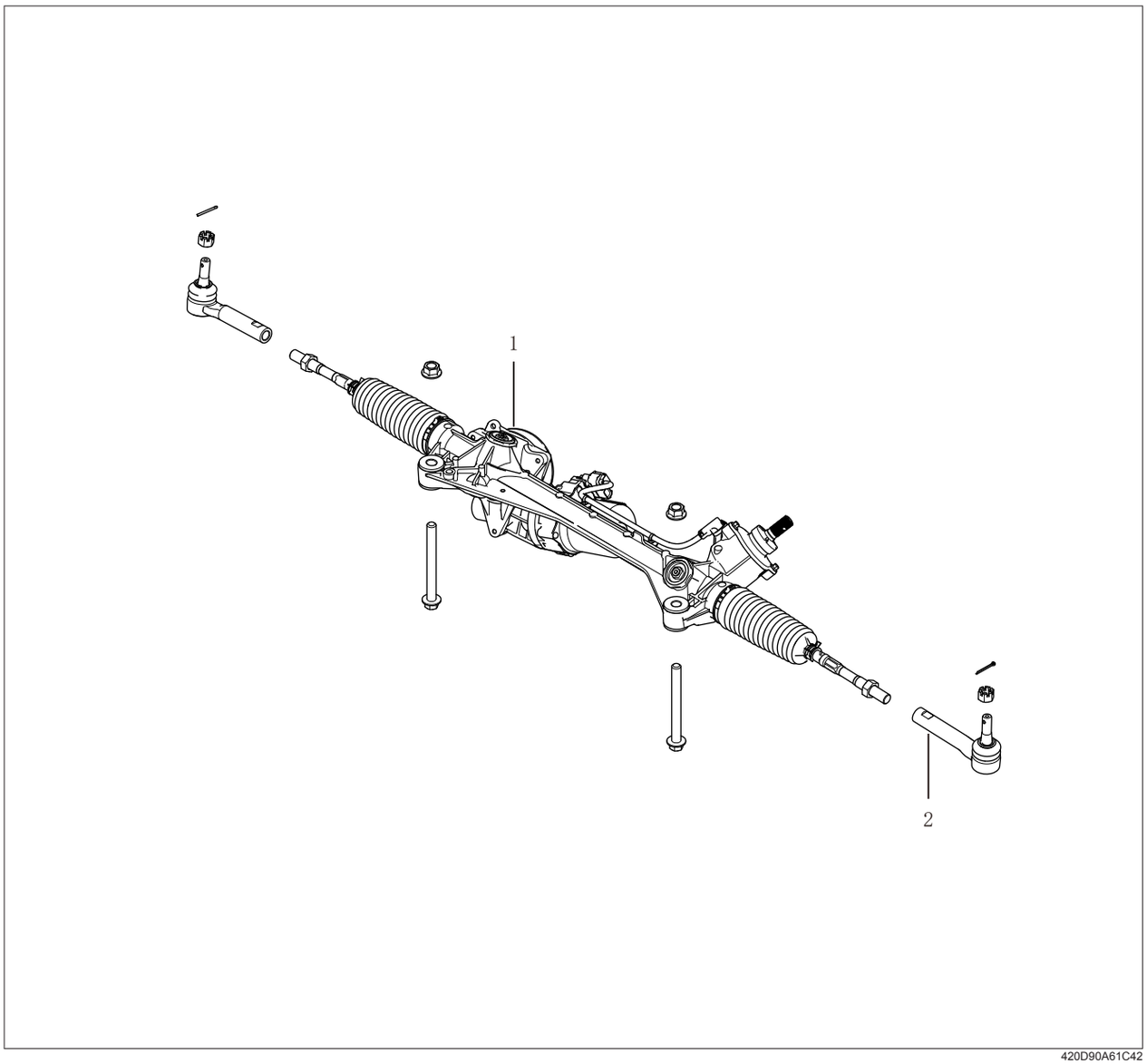
Basic working state of EPS are vehicle speed signal receiving, IGN hardwired signal and engine operating state in ECM module.

Structural diagram



500B84B41096

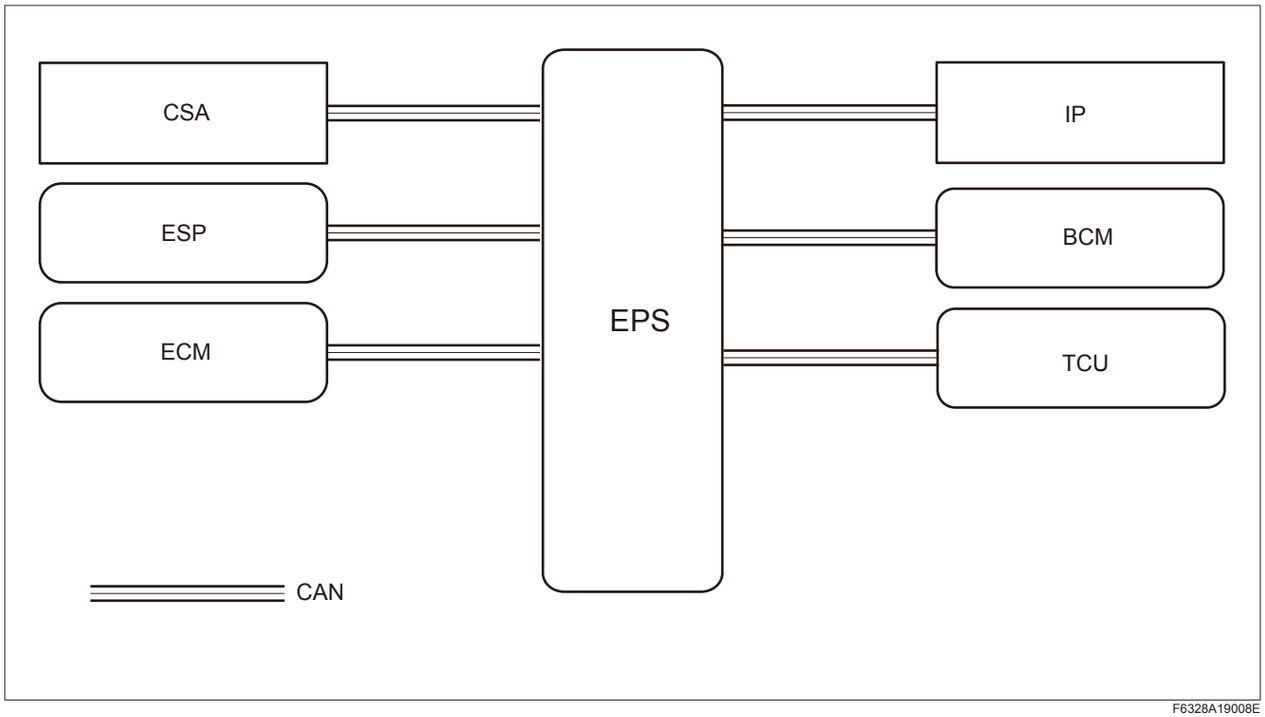
1. Steering wheel
2. Steering column assembly
3. Steering propeller shaft assembly
4. Lower steering propeller shaft assembly



420D90A61C42

1. Steering gear assembly
2. Outer tie bar assembly

System diagram



F6328A19008E

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Steering wheel assembly × steering column assembly	50±5	1	—
Nut	Steering column assembly × instrument reinforcing beam	25±3	4	—
Bolt	Steering column assembly × steering propeller shaft assembly	30±3	1	—
Bolt	Steering propeller shaft assembly x lower steering propeller shaft assembly	30±3	1	—
Bolt	Lower steering propeller shaft assembly x steering gear assembly	30±3	1	—
Bolts and nuts	Steering gear assembly x frame	160±16	2	Apply screw thread glue
Nut	Steering gear exterior rod and ball × steering knuckle	100±10	2	—
Nut	Adjusting nut on inner pull rod	63±5	2	—
Nut	Dust boot x front wall	9±5	2	—

Fault symptom checklist

Fault description	Cause of fault
Excessive steering wheel free stroke, abnormal noise	1. Excessive steering gear wheel and gear rack clearance
	2. Steering rod internal/external ball pin worn down
	3. Steering cardan joint worn down
	4. Connection between steering drive shaft and steering gear loose.
	5. Loose connection between steering wheel and steering column
	6. Steering gear mounting bolt becomes loose
	7. Propeller shaft slide spline worn or loosened
Steering heavy	1. Inadequate tire pressure.
	2. Incorrect front wheels alignment
	3. Clearance of steering gear clamp plate too small
	4. Cross head bearing of steering column damaged
	5. Steering rod ball pin needs greasing or is damaged.
	6. Bearing in upper front damper bracket damaged.
	7. Lower arm ball damaged
	8. Power steering ECU fault.
	9. Motor fault
Left and right steering force are uneven	1.The central position of steering wheel is not correctly recorded
	2. Improper front tire pressure, uneven tire wear.
	3. Check the four-wheel alignment.
	4. Steering rod ball pin needs greasing or is damaged.
	5. Lower arm ball damaged
	6. Internal steering gear assembly fault.
	7. Torque sensor fault
	8. Motor fault
	9. Power steering ECU fault

Fault description	Cause of fault
Steering force does not change along with vehicle speed, or steering wheel positioning failed	1. Lower arm ball damaged
	2. Wheel speed sensor fault
	3. Torque sensor fault
	4. Motor fault
	5. Power steering ECU fault

DTC checklist

S/N	DTC	DTC description
1	U000188	PT-CAN bus off
2	U012287	Communication with ESP (ABS) lost
3	U041500	Invalid ESP node communication signal
4	U041700	EPB signal invalid
5	U010087	Node ECM Missing
6	U024387	Communication with APS lost
7	U054400	APS signal invalid
8	U014387	Communication with IFC lost
9	U012687	SAS loses communication
10	U042100	SAS signal is abnormal
11	U01001C	Torque sensor TS1 is abnormal
12	U01011C	Torque sensor TS2 is abnormal
13	U01021C	Torque sensor out of tolerance
14	U010316	Torque sensor voltage is abnormal
15	U010402	Motor position sensor is abnormal
16	U110017	Diagnostic voltage of CAN communication too high
17	U110116	Diagnostic voltage of CAN communication too low
18	U1102F0	Abnormal voltage
19	U1103F0	Booster voltage too high
20	U1104F0	Booster voltage too low
21	U010501	FET is short-circuited or the detected current is abnormal or the step-up circuit is abnormal.
22	U010601	FET short-circuited
23	U010701	Abnormal current detected
24	U010801	FET fails or FET drive fails or current detection circuit fails
25	U010901	0 V short-circuiting or 5 V short-circuiting of motor terminal
26	U010A01	Motor terminal voltage abnormal
27	U020101	Thermal resistor abnormal
28	U020201	NVM abnormal
29	U020001	ECU internal fault
30	C200068	ECU overheating protection records
31	U210000	Initial EPS vehicle configuration not completed
32	U044400	IFC node signal invalid
33	B110094	LKA function abnormal

S/N	DTC	DTC description
34	U013887	Communication with BCM lost
35	U043900	BCM signal invalid

DTC troubleshooting method

DTC: U01001C

DTC definition: torque sensor TS1 abnormal

Possible cause(s): torque sensor fault, poor harness connection, abnormal sampling circuit of torque sensor

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Check for normal connection between torque sensor harness and MCU	Go to step 3	Reconnect them
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	If parts fault, replace parts	—	—

DTC: U01011C

DTC definition: torque sensor TS2 abnormal

Possible cause(s): torque sensor fault, poor harness connection, abnormal sampling circuit of torque sensor

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Check for normal connection between torque sensor harness and MCU	Go to step 3	Reconnect them
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	If parts fault, replace parts	—	—

DTC: U01021C

DTC definition: torque sensor out of tolerance

Possible cause(s): torque sensor fault, poor harness connection, abnormal sampling circuit of torque sensor

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Check for normal connection between torque sensor harness and MCU	Go to step 3	Reconnect them

Step	Operation	Yes	No
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	If parts fault, replace parts	—	—

DTC: U010316

DTC definition: torque sensor voltage abnormal

Possible cause(s): torque sensor fault, poor harness connection, abnormal sampling circuit of torque sensor

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Check for normal connection between torque sensor harness and MCU	Go to step 3	Reconnect them
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	If parts fault, replace parts	—	—

DTC: U010402

DTC definition: motor position sensor abnormal

Possible cause(s): motor position sensor fault, abnormal sampling circuit of motor position sensor

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U010501

DTC definition: FET short-circuited, abnormal current detected or abnormal boost circuit

Possible causes: FET short-circuited, abnormal current detected or abnormal boost circuit

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2

Step	Operation	Yes	No
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U010601

DTC definition: FET short-circuited

Possible cause(s): FET short-circuited

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U010701

DTC definition: abnormal current detected

Possible cause(s): abnormal current detected

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U010801

DTC definition: FET fault, FET drive fault or abnormal current circuit detected

Possible causes: FET fault, FET drive fault or abnormal current circuit detected

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U010901

DTC definition: 0 V short-circuiting or 5 V short-circuiting of motor terminal

Possible causes: 0 V short-circuiting or 5 V short-circuiting of motor terminal

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U010A01

DTC definition: motor terminal voltage abnormal

Possible cause(s): motor terminal voltage abnormal

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U020101

DTC definition: thermal resistor abnormal

Possible cause(s): thermal resistor abnormal

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U020201

DTC definition: NVM abnormal

Possible cause(s): NVM abnormal

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2

Step	Operation	Yes	No
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U020001

DTC definition: ECU internal failure

Possible cause(s): ECU internal failure

Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 3	—
3	If parts fault, replace parts	—	—

DTC: U210000

DTC definition: EPS initial vehicle configuration not completed

Possible cause(s): configuration words not flashed or NVM fault

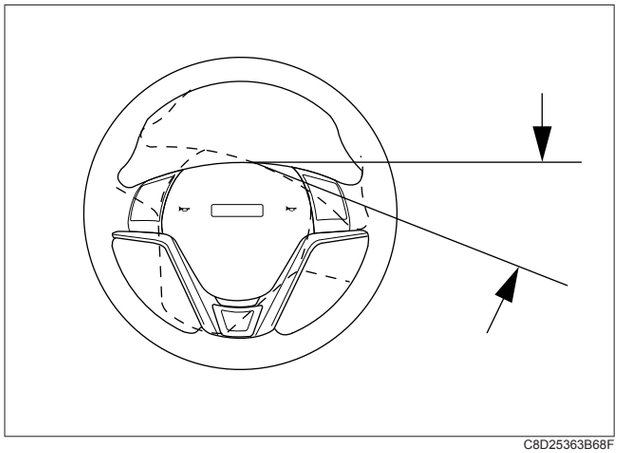
Troubleshooting:

Step	Operation	Yes	No
1	Record the error code and the possible driving conditions or operation	—	Go to step 2
2	Flash configuration words using diagnostic tool	Go to step 3	—
3	Re-power on for startup, and after clearing the previous DTC, read it again and check whether the DTC record still exists	Go to step 4	—
4	If parts fault, replace parts	—	—

Steering wheel

Check

1. Park the vehicle and have the wheels face forward
2. Turn steering wheel clockwise or counterclockwise from the middle until resistance increases and check free stroke of steering wheel



C8D25363B68F

Maximum free stroke: left or right steering angle is not greater than 7.5°

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Turn off the ignition switch.
3. Disconnect negative terminal of the battery and then wait for 90 s
4. Remove the airbag from the steering wheel, and disconnect the horn and airbag connector.
5. Disconnect steering wheel push-button type connector
6. Unscrew steering wheel locking bolts



40FB0C9DB36E

7. Hold steering wheel and shake it from side to side for a few times, and then pull out steering wheel
8. Remove locking bolts
9. Remove steering wheel

Notice

› After removing the steering wheel, you need to secure the clock spring (with tape etc.) to prevent misalignment of the clock spring (tape is to be peeled off during installation of the steering wheel).

Installation

1. Install the steering wheel assembly

Notice

› The center of clock spring is aligned.

› Tighten the fastener according to the specified torque value.

2. Install horn, airbag connectors and airbag
3. Install negative terminal of the battery

Steering column assembly

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Make sure the ignition switch is set to OFF, then disconnect negative terminal of the battery.

⚠ Caution

› Disconnect the negative terminal for 90 s or longer.

3. Remove airbag from steering wheel, and disconnect connectors of horn and airbag.
4. Remove steering wheel assembly
5. Remove the driver knee trim plate
6. Separate the steering column upper cover.
7. Remove the steering column lower cover.
8. Disconnect the connector.
9. Loosen the bolt and remove the combination switch assembly.

ℹ Notice

› The combination switch assembly consists of lamp combination switch assembly, wiper combination switch assembly, combination switch matrix assembly, steering angle sensor assembly, and clock spring assembly.

› Fix the clock spring (tape can be used) and make sure that the clock spring is in the zero position.

10. Disconnect the electronic steering lock connector.
11. Separate harness clips
12. Separate steering propeller shaft assembly

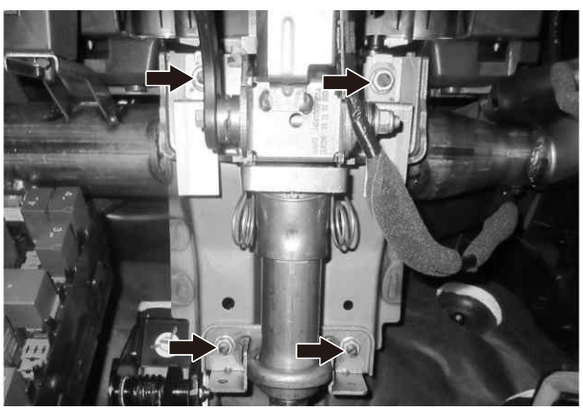


73FAC124B22C

ℹ Notice

› Make assembly markings.

13. Remove 4 nuts, and remove steering column assembly



AF2AB11C65DA

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Align assembly marks.

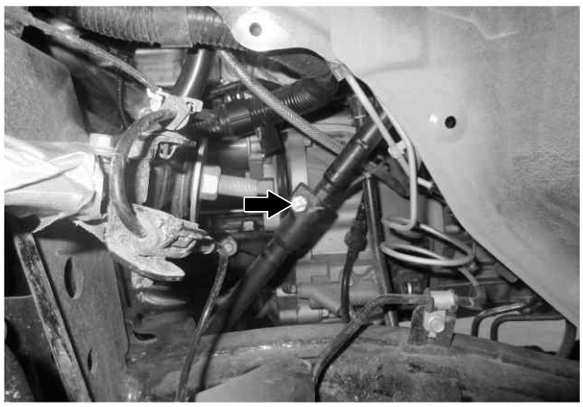
› Tighten the fastener according to the specified torque value.

Steering propeller shaft assembly

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Remove 2 snaps on the top of rubber
3. Separate lower propeller shaft assembly



B8021FCB47C2

Notice

› Make assembly markings.

4. Remove 1 bolt, move downwards along axis, and separate steering propeller shaft

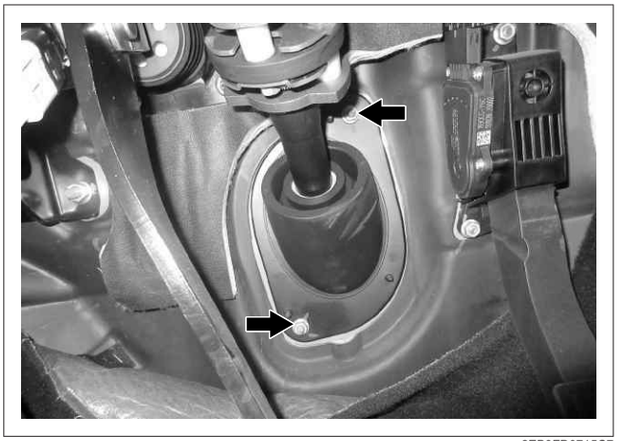


73FAC124B22C

Notice

› Make assembly markings.

5. Remove 2 nuts, and remove steering propeller shaft assembly



2EB3FD0715C7

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

Lower steering propeller shaft assembly

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Remove 2 snaps on the upper end of rubber
3. Separate steering propeller shaft assembly



B8021FCB47C2

Notice

› Make assembly markings.

4. Separate steering gear assembly



F2DC2F2A9042

Notice

› Make assembly markings.

5. Remove steering propeller shaft assembly

Installation

1. Perform installation work in reverse order of removal

Notice

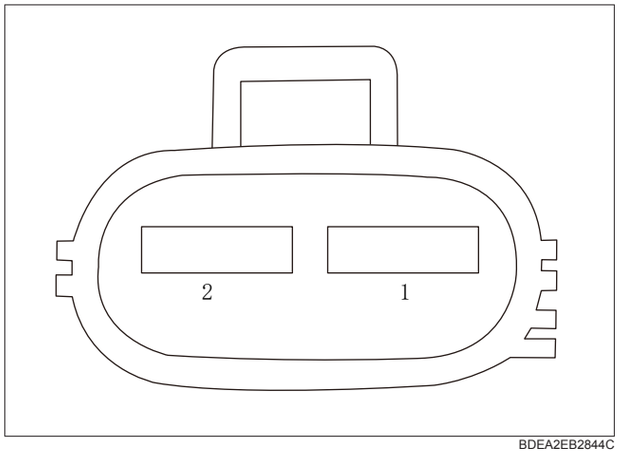
› Align assembly marks.

› Tighten the fastener according to the specified torque value.

Electrical steering gear assembly (4WD)

Pin definition

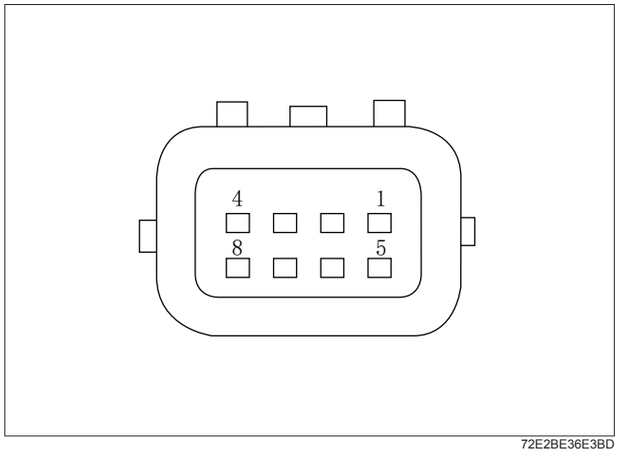
CN1



BDEA2EB2844C

Pin No.	Function
1	Battery power
2	Battery power GND

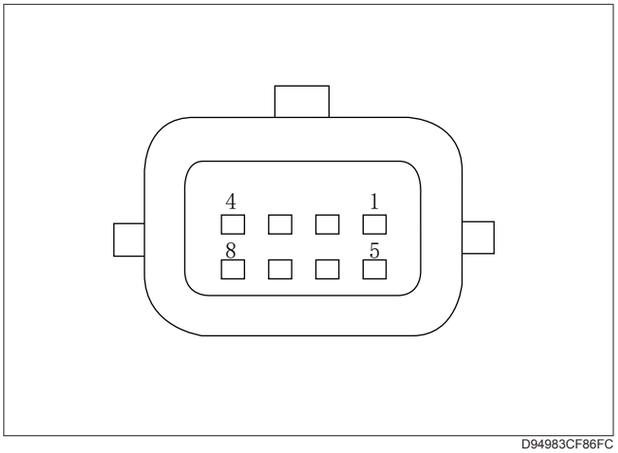
CN2



72E2BE36E3BD

Pin No.	Function
1	—
2	IG
3	—
4	—
5	—
6	CAN_L
7	CAN_H
8	—

CN3



D94983CF86FC

Pin No.	Function
1	VCC
2	GND
3	—
4	—
5	—
6	—
7	PWM-TS1
8	PWM-TS1

Removal/installation

Removal

1. Put the front wheels in the straight-line running position
2. Disconnect the negative terminal of the battery.
3. Raise the vehicle to an appropriate position
4. Remove front wheels
5. Remove engine cover plate
6. Remove front axle main reducer assembly
7. Separate steering tie rod ball assembly
8. Separate lower steering propeller shaft assembly

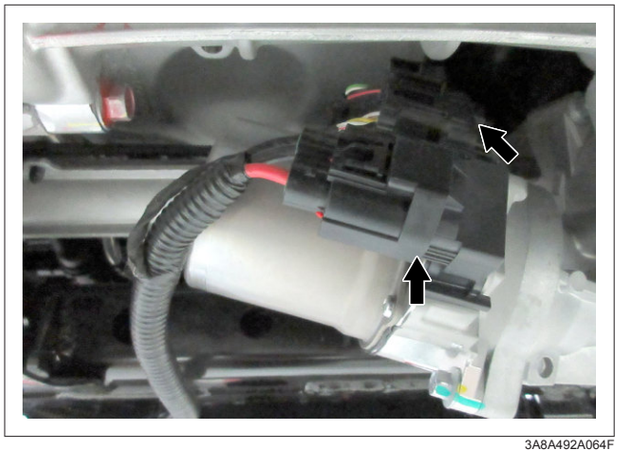


F2DC2F2A9042

Notice

› Make assembly markings.

9. Disconnect the harness connector



3A8A492A064F

10. Remove 2 bolts and 2 nuts, and remove power steering gear assembly



839FABFD6A96

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

› Check the wheel alignment and make adjustments when necessary.

› After replacing the steering gear, adjust four-wheel parameters, calibrate SAS steering angle center and write EPS configuration.

› After adjusting four-wheel parameters in vehicle repair, calibrate SAS steering angle center.

Steering gear ball assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove split pin and nut, and separate outer tie bar assembly



BCC52A829CD7

3. Loosen locking nut, and remove outer tie bar assembly

Notice

› Make assembly markings.

Installation

1. Perform installation work in reverse order of removal

Notice

› Align assembly marks.

› Check the wheel alignment and make adjustments when necessary.

Hydraulic brake

Hydraulic brake .....30－1
Precautions.....30－1
Fault symptom checklist .....30－2
Brake fluid .....30－4
Check.....30－4
Exhaust.....30－4
Brake pipeline.....30－5
Check.....30－5
Structural diagram .....30－6
Front brake hose assembly .....30－8
Removal/installation.....30－8
Rear brake hose assembly.....30－10
Removal/installation.....30－10
Rear axle brake hose assembly .....30－11
Removal/installation.....30－11
Vacuum booster with brake pump assembly (4D20M).....30－12
Structural diagram .....30－12
Brake master cylinder and fluid reservoir assembly (6MT) .....30－13
Removal/installation.....30－13
Brake master cylinder and fluid reservoir assembly (8AT) .....30－14
Removal/installation.....30－14
Vacuum booster assembly .....30－15
Check.....30－15
Removal/installation.....30－16
Brake pedal assembly (6MT) .....30－17
Structural diagram .....30－17
Check.....30－18
Removal/installation.....30－18
Brake pedal assembly (8AT) .....30－20
Structural diagram .....30－20
Check.....30－21
Removal/installation.....30－21
Brake-lamp switch .....30－23
Pin definition .....30－23
Removal/installation.....30－23

Hydraulic brake

Precautions

If the brake fluid level is at or below the half-full position, the brake system should be checked for wear and leakage.

Clean the joint and surrounding areas thoroughly before repairing the brake system.

When repairing the brake system, do not bend or damage the brake pipeline and prevent foreign objects from entering into the pipeline.

Before any repair or maintenance of the hydraulic system; or if the presence of air inside the brake pipelines is suspected, air must be completely discharged from the brake system.

The washer in the brake pipeline and the retaining spring are non-reusable parts and should be replaced after removal.

The replaced or removed brake system parts shall be fixed at the specified torque.

Do not mix brake fluid and mineral oil (engine oil, gasoline and cleaning agent), as mineral oil will damage the seal and gland of the braking device.

The brake fluid is corrosive:

- Once it contacts with skin or eyes, it should be cleaned or treated.
- Once it contacts with any paint surface, it should be cleaned immediately.
- Once it contacts with the electrical connector, wiring or cable, please wipe the brake fluid with a clean rag.

Do not use fibrous rags.

Fault symptom checklist

Symptom	Possible causes
The pedal position is too low or the pedal is soft	1. Brake fluid in the brake system leaks
	2. There is air in the brake system
	3. The piston seal (worn or damaged)
	4. The brake fluid reservoir seriously lacks the fluid
	5. Brake master cylinder (fault)
	6. Booster push rod (imbalance)
	7. Brake pedal free stroke is too large
Brake dragging	1. Brake pedal free stroke is too small
	2. EPB (fault)
	3. Brake pad (rupture or deformation)
	4. Disc brake piston (seizure)
	5. Booster push rod (imbalance)
	6. Booster system vacuum leaks
	7. Brake master cylinder (fault)
Braking deviation	1. Disc brake piston (seizure)
	2. Brake pad (Oil stain)
	3. Front wheel misalignment
	4. Brake disc (Scratch)
	5. Brake pad (rupture or deformation)
Failure of braking	1. Brake fluid in the brake system leaks
	2. There is air in the brake system
	3. Brake pad (Wear)
	4. Brake pad (rupture or deformation)
	5. Brake pad (Oil stain)
	6. Brake pad (Out of use)
	7. Brake disc (Scratch)
	8. Booster push rod (imbalance)
	9. Booster system vacuum leaks

Symptom	Possible causes
Brake noise	1. Brake pad (rupture or deformation)
	2. Mounting bolt (loose)
	3. Brake disc (Scratch)
	4. Brake pad circlip reed (loose)
	5. Brake guide pin (wear)
	6. Brake pad (Dirty)
	7. Brake pad (Out of use)
	8. Brake guide pin (Damaged)
	9. Mute gasket (Damaged)
Brake ineffective	1. Oil leakage of main pump, sub-pump, pipeline or pipe joint
	2. The main pump reservoir room (tank) lacks oil or no oil
	3. The brake fluid deteriorates (thinning or thickening) or the scale on the inner wall of the pipeline is too thick
	4. There is air in the brake fluid
	5. The main pump cup, piston or cylinder is worn excessively
	6. The sub-pump cup, piston or cylinder is worn excessively
	7. The main pump oil inlet hole, compensation hole or reservoir room (tank) vent are blocked
	8. The main pump oil outlet valve and oil return valve can't be sealed or the piston return spring pretension force is too small
	9. The front end cut-through hole of the main pump piston is blocked or the main pump cup is sticky and distensible
	10. The sub-pump cup is sticky and distensible
	11. The supercharger or booster or electronic vacuum pump is ineffective or failure
	12. The oil pipe is hollow or the inner hole of the hose is blocked
	13. Brake pedal free stroke is too large

Brake fluid

Check

1. Open the engine hood
2. Check reservoir brake fluid levels

Notice

› Check if fluid level stays between the lower limit and upper limit marks.

3. Check if brake system is leaking
4. Check the brake fluid quality

Notice

› If it does not meet the requirements of use, or appears dirty, deterioration and dilute etc., the brake fluid needs to be replaced.

Exhaust

1. Unscrew the fluid reservoir cover
2. Fill brake fluid wheel brake fluid is discharged

   Filling amount of brake fluid: 0.9L±0.1L

Notice

› Fluid level in fluid reservoir stays between the lower limit and upper limit marks.

› The spill-over brake fluid must be cleaned up immediately.

› Brake fluid is DOT4 synthetic brake fluid.

3. Connect the transparent plastic pipe to the air-bleeding bolt of the rear right wheel brake, and connect the other end of pipe to the bottle container, and loosen the air-bleeding bolt.
4. Depress the brake pedal repeatedly to discharge air from air-bleeding bolt at rear right wheel

Notice

› Check if there is air bubble in the pipeline. If there is an air bubble, you need to step on the brake pedal repeatedly until no bubble in the pipeline.

5. After new brake fluid is discharged, tighten the air-bleeding bolt when depressing the brake pedal.
6. Follow the same sequence of the rear right wheel brake to discharge fluid the front left wheel brake, front right wheel brake and rear left wheel brake in order
7. Check whether brake fluid leaks.
8. Check brake fluid level in the reservoir

Notice

› Make sure that the brake fluid level is adjusted to MAX line.

Brake pipeline

Check

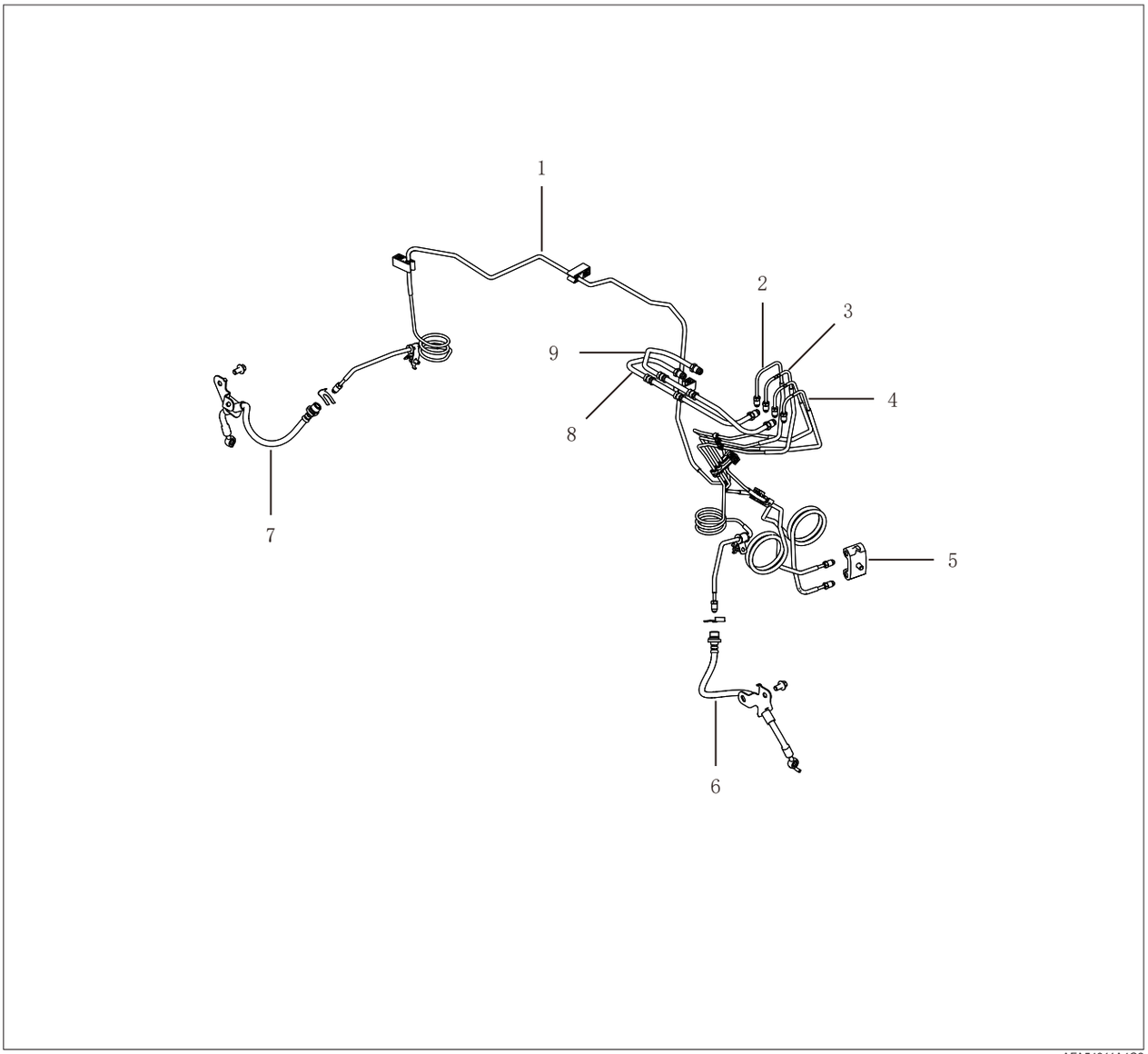
1. Check the brake pipeline

Notice

It is subject to replacement or adjustment under the following conditions.

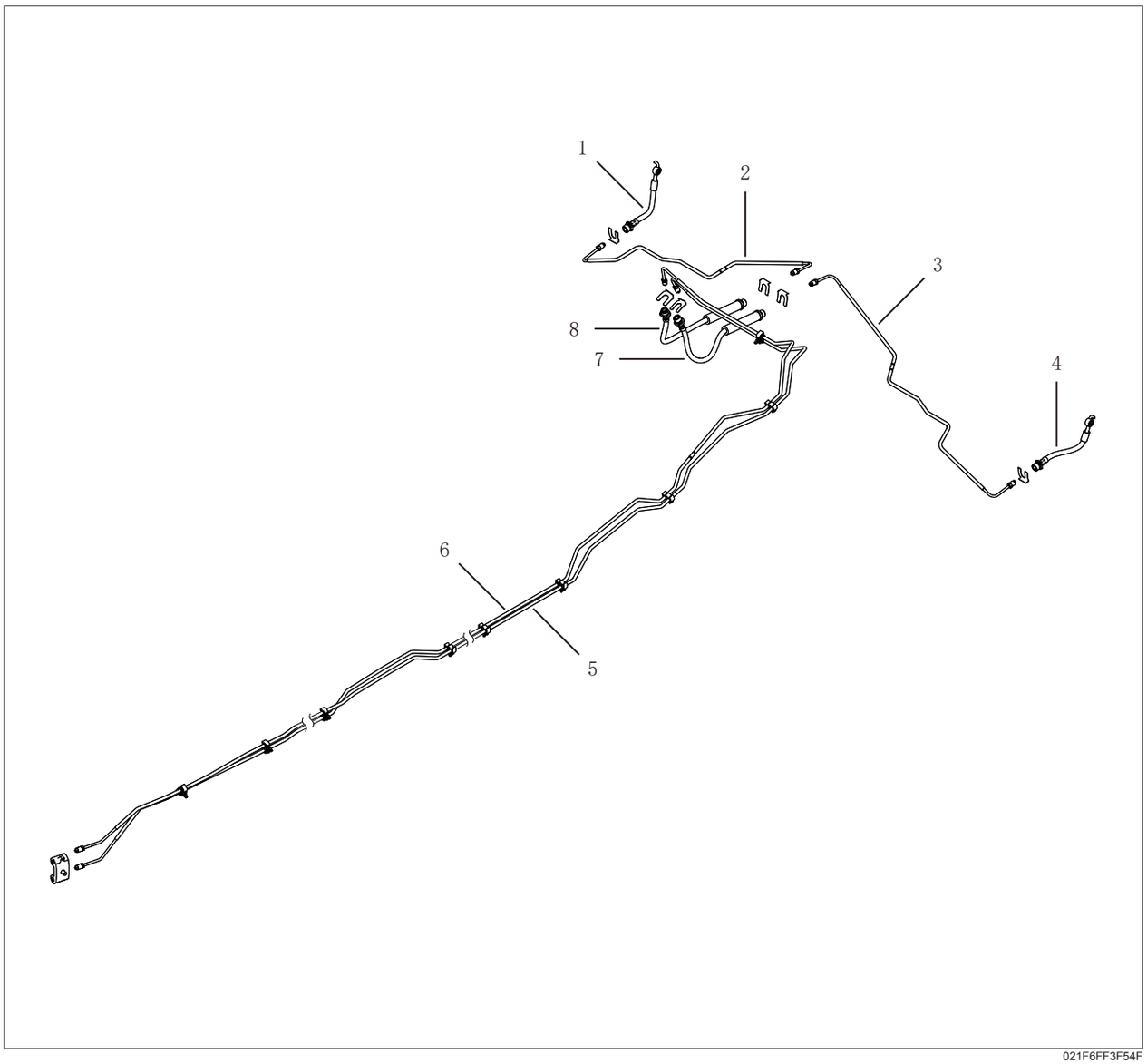
- The brake hose is subject to damaging, aging, rusting, leakage, interference or twisting.
- Leakage is found in the joint or connecting points linking the brake hose and brake pipe.

Structural diagram



AFA54311A4C2

1. Front right brake pipe assembly
2. Rear right pipeline assembly - hydraulic unit to two-way
3. Front left brake pipe assembly
4. Rear left pipeline assembly - hydraulic unit to two-way
5. Combined valve
6. Front left brake hose assembly
7. Front right brake hose assembly
8. Brake master cylinder rear cavity oil pipe assembly
9. Brake master cylinder front cavity oil pipe assembly



021F6FF3F54F

1. Rear right brake hose assembly
2. Rear right brake pipe assembly
3. Rear left brake pipe assembly
4. Rear left brake hose assembly
5. Rear left pipeline assembly - two way to hose
6. Rear right pipeline assembly - two way to hose
7. Rear cross-axle hose assembly
8. Rear cross-axle hose assembly

Front brake hose assembly

Removal/installation

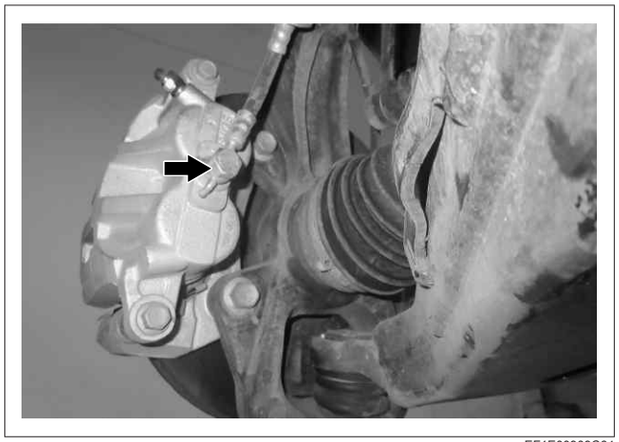
Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Drain the brake fluid

⚠ Caution

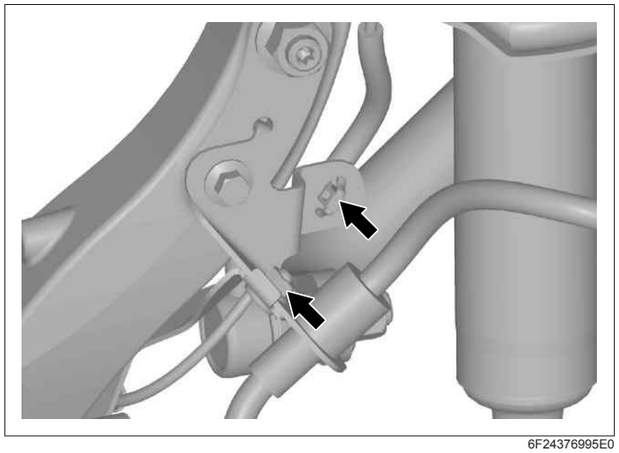
› If the brake fluid contacts with the paint surface, clean it immediately.

4. Remove bolt and washer, and disconnect front brake hose assembly from front brake caliper



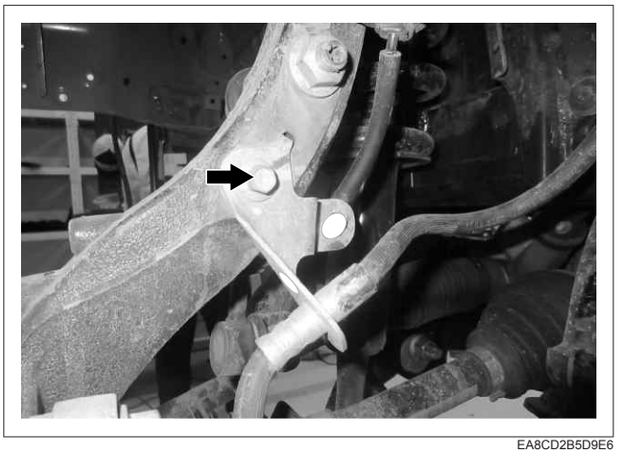
EF1E00909C64

5. Loosen clip, and remove nut



6F24376995E0

6. Remove bolts



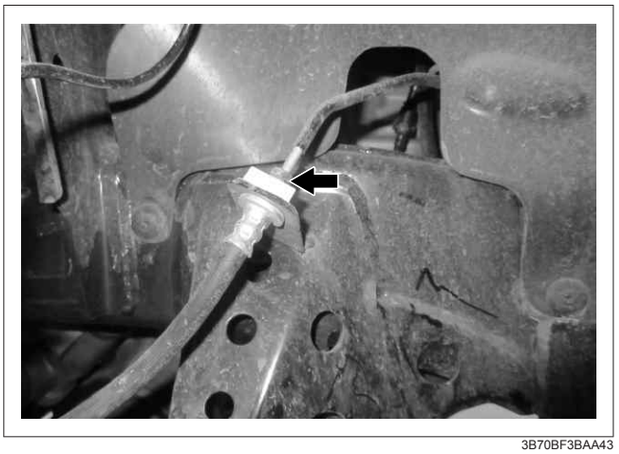
EA8CD2B5D9E6

7. Disconnect brake hose from the pipe

ℹ Notice

› Protect the disconnected pipelines to prevent any foreign object from entering the brake pipeline.

8. Remove retaining spring, and remove front brake hose assembly



3B70BF3BAA43

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Replace with a new retaining spring.

› Replace with a new washer.

› Do not twist or damage the brake hose.

› You shall avoid any foreign matter entering into the brake hose.

› Tighten the fastener according to the specified torque value.

› Exhaust the air from the brake system.

Rear brake hose assembly

Removal/installation

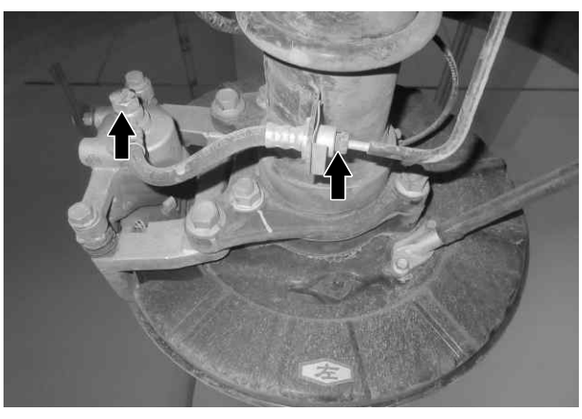
Removal

1. Raise the vehicle to an appropriate position
2. Remove rear wheel
3. Drain the brake fluid

⚠ Caution

› If the brake fluid contacts with the paint surface, clean it immediately.

4. Remove bolts and washers, and disconnect brake pipeline



39C1EDD9147C

5. Remove retaining spring, then remove rear brake hose assembly

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Replace with a new retaining spring.

› Replace with a new washer.

› Do not twist or damage the brake hose.

› You shall avoid any foreign matter entering into the brake hose.

› Tighten the fastener according to the specified torque value.

› Exhaust the air from the brake system.

Rear axle brake hose assembly

Removal/installation

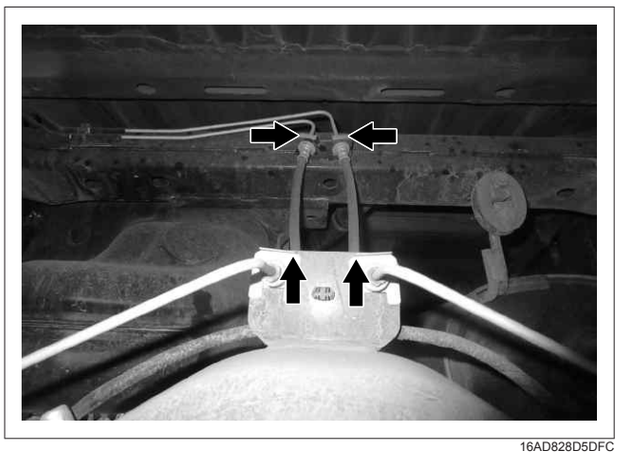
Removal

1. Raise the vehicle to an appropriate position
2. Drain the brake fluid

⚠ Caution

› If the brake fluid contacts with the paint surface, clean it immediately.

3. Disconnect brake oil pipe, remove retaining spring, and remove brake hose assembly of rear axle



16AD828D5DFC

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Replace with a new retaining spring.

› Do not twist or damage the brake hose.

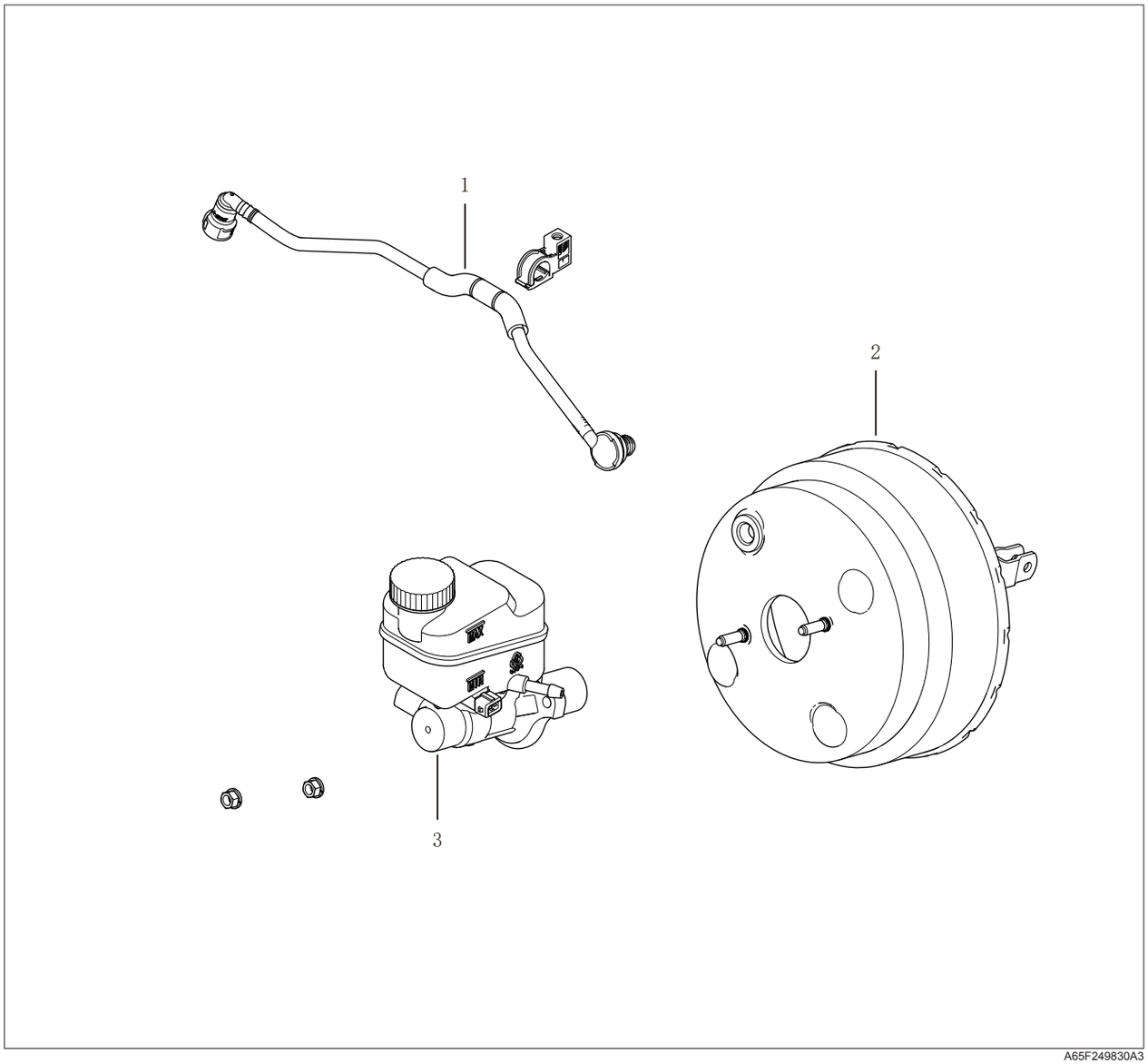
› You shall avoid any foreign matter entering into the brake hose.

› Tighten the fastener according to the specified torque value.

› Exhaust the air from the brake system.

Vacuum booster with brake pump assembly (4D20M)

Structural diagram



A65F249830A3

1. Vacuum booster pipe
2. Vacuum booster
3. Brake master cylinder and fluid reservoir assembly

Brake master cylinder and fluid reservoir assembly (6MT)

Removal/installation

Removal

⚠ Caution

› Be sure to release the vacuum in vacuum booster assembly before removing the brake master cylinder with fluid reservoir assembly from the vacuum booster assembly.

› Push the ignition switch to the LOCK gear and step on the brake pedal several times until there is no vacuum in the vacuum booster.

1. Disconnect the negative terminal of the battery.
2. Drain the brake fluid

⚠ Caution

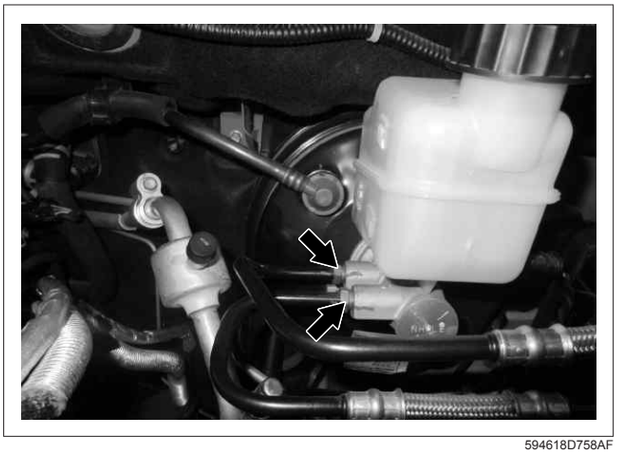
› If the brake fluid contacts with the paint surface, clean it immediately.

3. Separate harness of level sensor



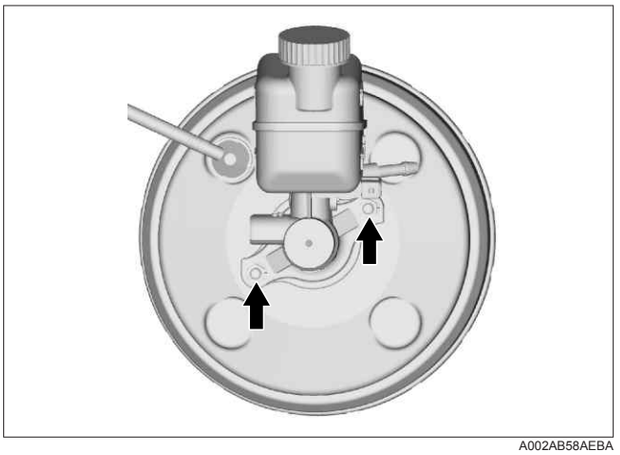
5F5F895168C3

4. Separate oil inlet pipe
5. Remove brake oil pipes on brake master cylinder



594618D758AF

6. Remove 2 nuts, and then remove brake master cylinder and fluid reservoir assembly



A002AB58AEBA

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Tighten the fastener according to the specified torque value.

› Exhaust the air from the brake system.

› When the master cylinder is installed on the booster, you shall make sure the master cylinder remains horizontal or its end faces down (the piston faces up) to prevent the master cylinder piston dropping.

Brake master cylinder and fluid reservoir assembly (8AT)

Removal/installation

Removal

⚠ Caution

› Be sure to release the vacuum in vacuum booster assembly before removing the brake master cylinder with fluid reservoir assembly from the vacuum booster assembly.

› Push the ignition switch to the LOCK gear and step on the brake pedal several times until there is no vacuum in the vacuum booster.

1. Disconnect the negative terminal of the battery.
2. Drain the brake fluid

⚠ Caution

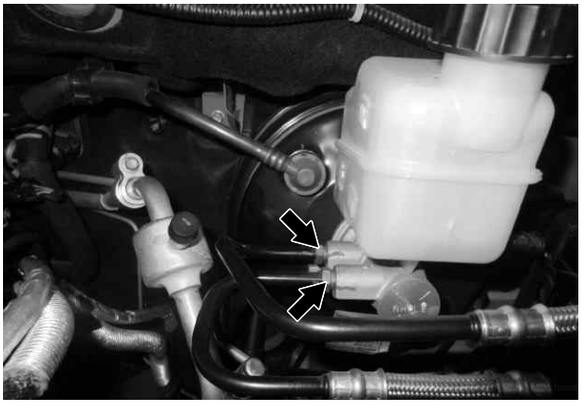
› If the brake fluid contacts with the paint surface, clean it immediately.

3. Separate harness of level sensor



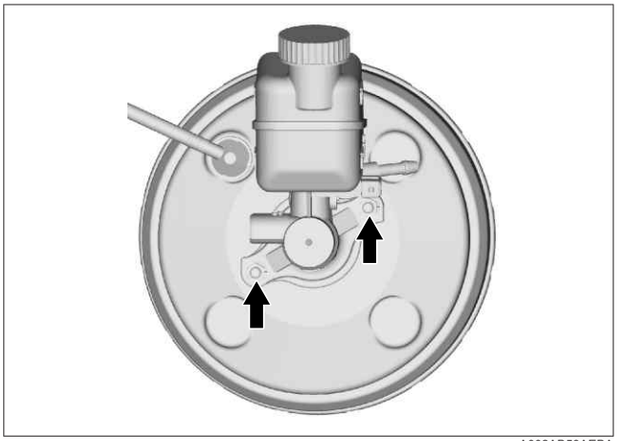
4F289EB78E90

4. Remove brake oil pipes on brake master cylinder



594618D758AF

5. Remove 2 nuts, and then remove brake master cylinder and fluid reservoir assembly



A002AB58AEBA

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

› Tighten the fastener according to the specified torque value.

› Exhaust the air from the brake system.

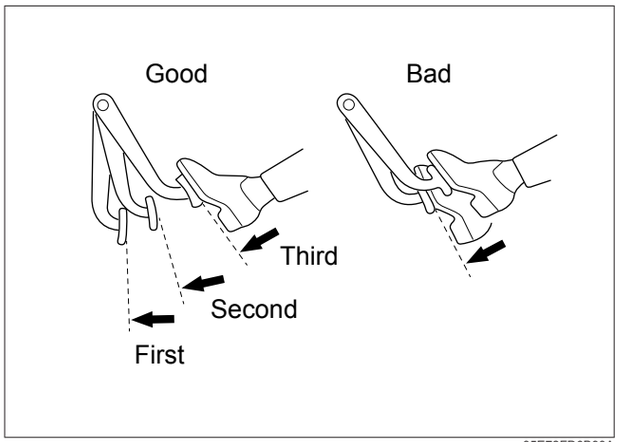
› When the master cylinder is installed on the booster, you shall make sure the master cylinder remains horizontal or its end faces down (the piston faces up) to prevent the master cylinder piston dropping.

Vacuum booster assembly

Check

Air tightness inspection

1. Start the engine and then stop it in 1 or 2 minutes. Depress the brake pedal slowly for a few times



35E72FD6B93A

Notice

› If you are able to step on the pedal all the way on the first instance but you encounter resistance increasingly earlier on the second and third attempts, it means that the booster is well-sealed.

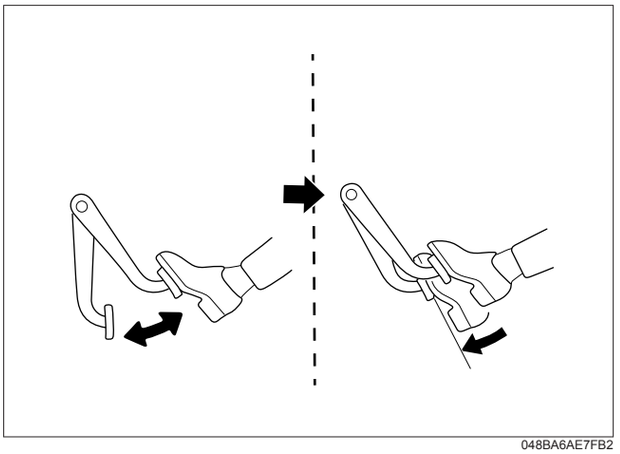
2. Depress the brake pedal when the engine is working and then hold the pedal when shutting down the engine

Notice

› If the pedal stroke margin does not change after the pedal is depressed for 30s, the booster has good air tightness.

Check working conditions

1. After turning off the engine, depress the brake pedal for several times to let air enter into the booster
2. Depress and hold the brake pedal. Check and confirm whether the pedal stroke margin remains the same
3. Step on brake pedal and start the engine



048BA6AE7FB2

Notice

› If the pedal shifts downwards gently, it means that it is working normally.

› If the brake pedal will not go down, then there may be a problem with the vacuum system (including the vacuum hose and vacuum valve), and it must be checked.

Removal/installation

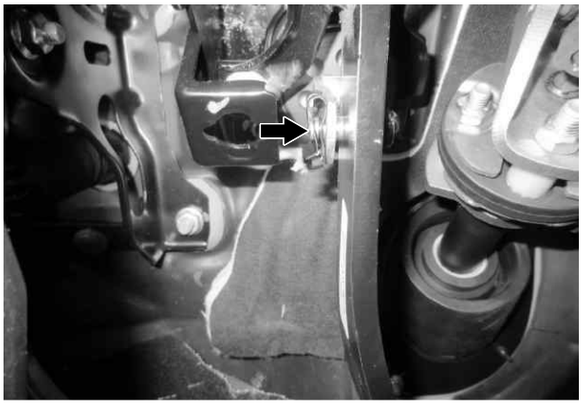
Removal

1. Disconnect the negative terminal of the battery.
2. Drain the brake fluid

⚠ Caution

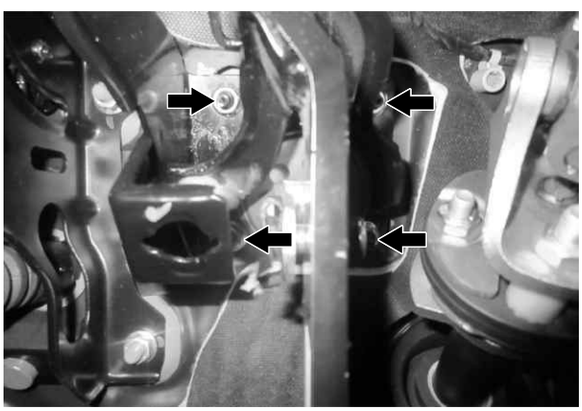
› If the brake fluid contacts with the paint surface, clean it immediately.

3. Remove brake master cylinder and fluid reservoir assembly
4. Separate vacuum booster pipe
5. Remove the driver knee trim plate.
6. Remove the split pin and the pump connecting pin



D3C844983BAA

7. Remove 4 nuts.



20D4ED7294DC

8. Remove the vacuum booster assembly.

Installation

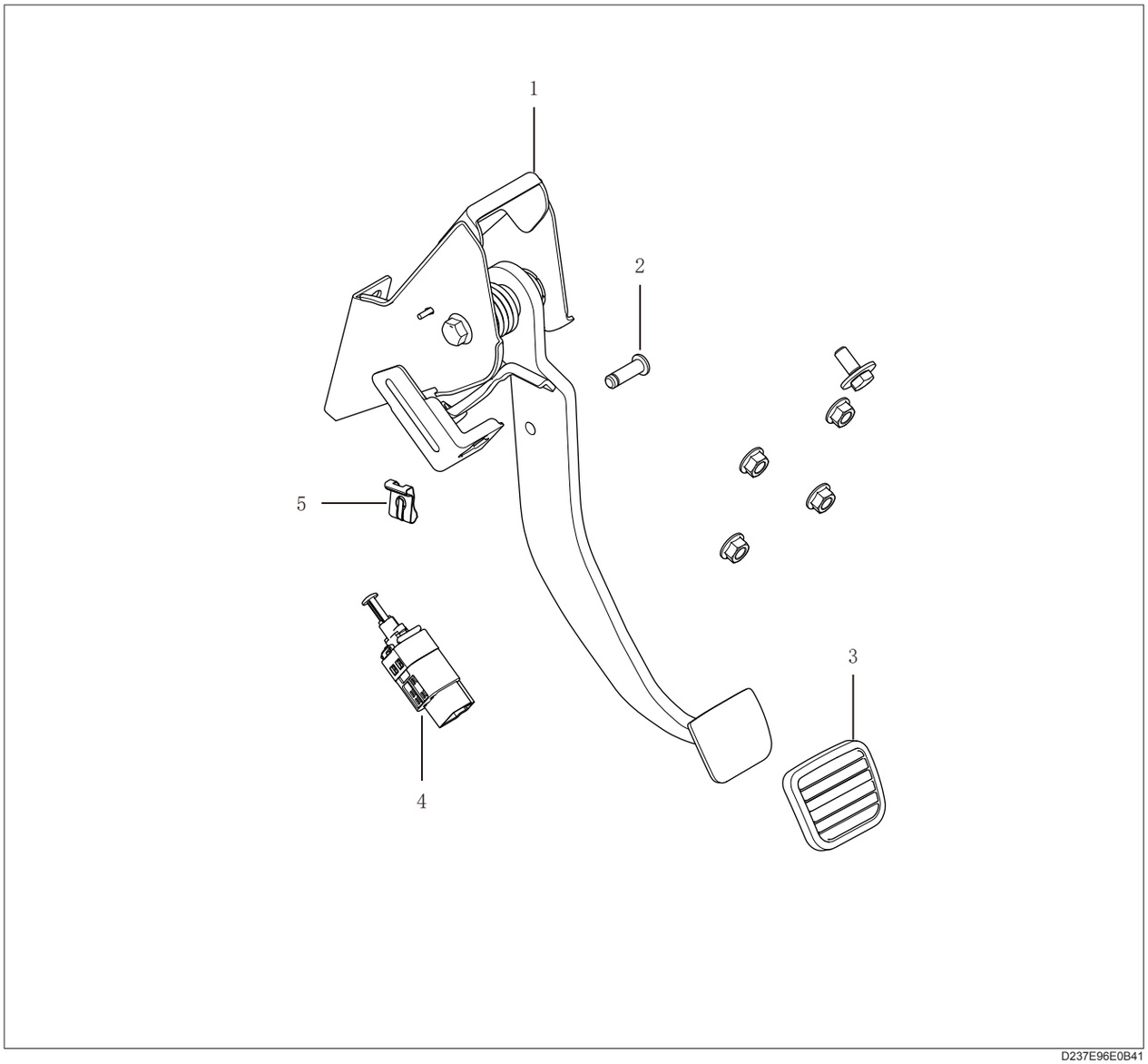
1. Perform installation work in reverse order of removal

ℹ Notice

› Exhaust the air from the brake system.

Brake pedal assembly (6MT)

Structural diagram



D237E96E0B41

1. Brake pedal assembly
2. Pump connecting pin
3. Pedal bushing
4. Brake lamp switch assembly
5. Split pin

Check

1. Check the brake pedal height

Notice

› Release the brake switch until it does not contact the brake pedal any longer. Check the brake pedal height.

Pedal height from front wall: 141 mm

2. Check the pedal free stroke

Notice

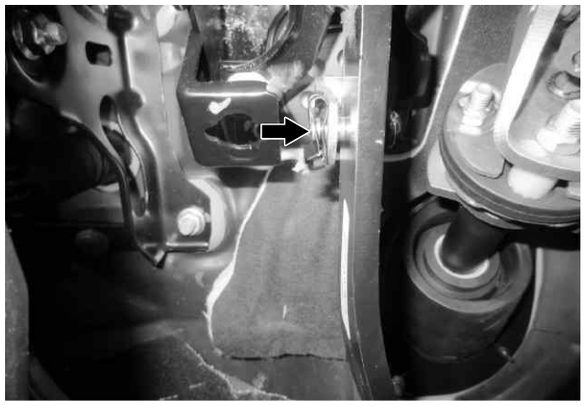
› Shut down the engine and step on the brake pedal a number of times until there is no longer any vacuum in the vacuum booster. Depress the brake pedal until resistance force is felt, then measure the distance traveled.

Pedal free stroke: 10.3±1mm

Removal/installation

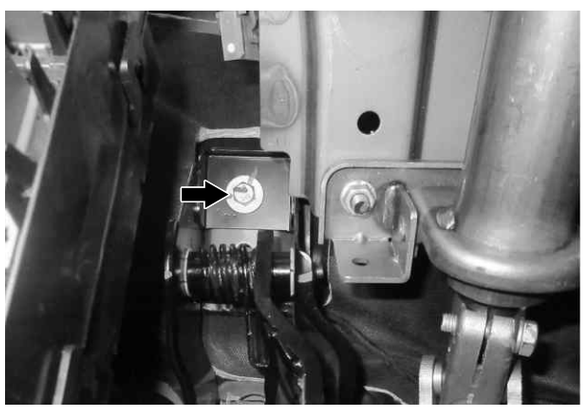
Removal

1. Disconnect the negative terminal of the battery.
2. Remove lower left guard assembly of the instrument panel
3. Remove brake lamp switch assembly
4. Remove split pin and the pump connecting pin



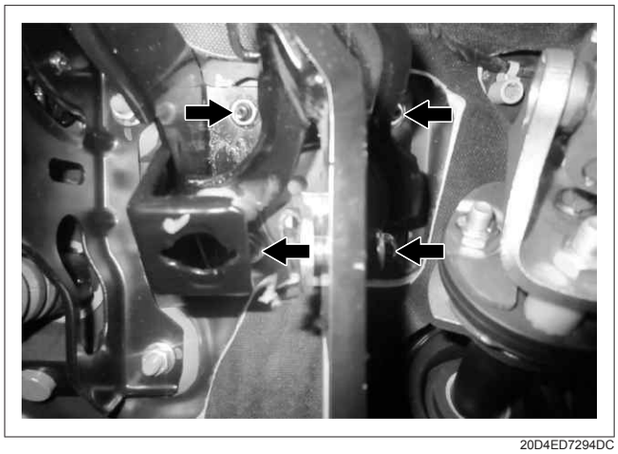
D3C844983BAA

5. Remove 1 bolt



81234785BE08

6. Remove 4 nuts



20D4ED7294DC

7. Remove brake pedal assembly

Installation

1. Perform installation work in reverse order of removal

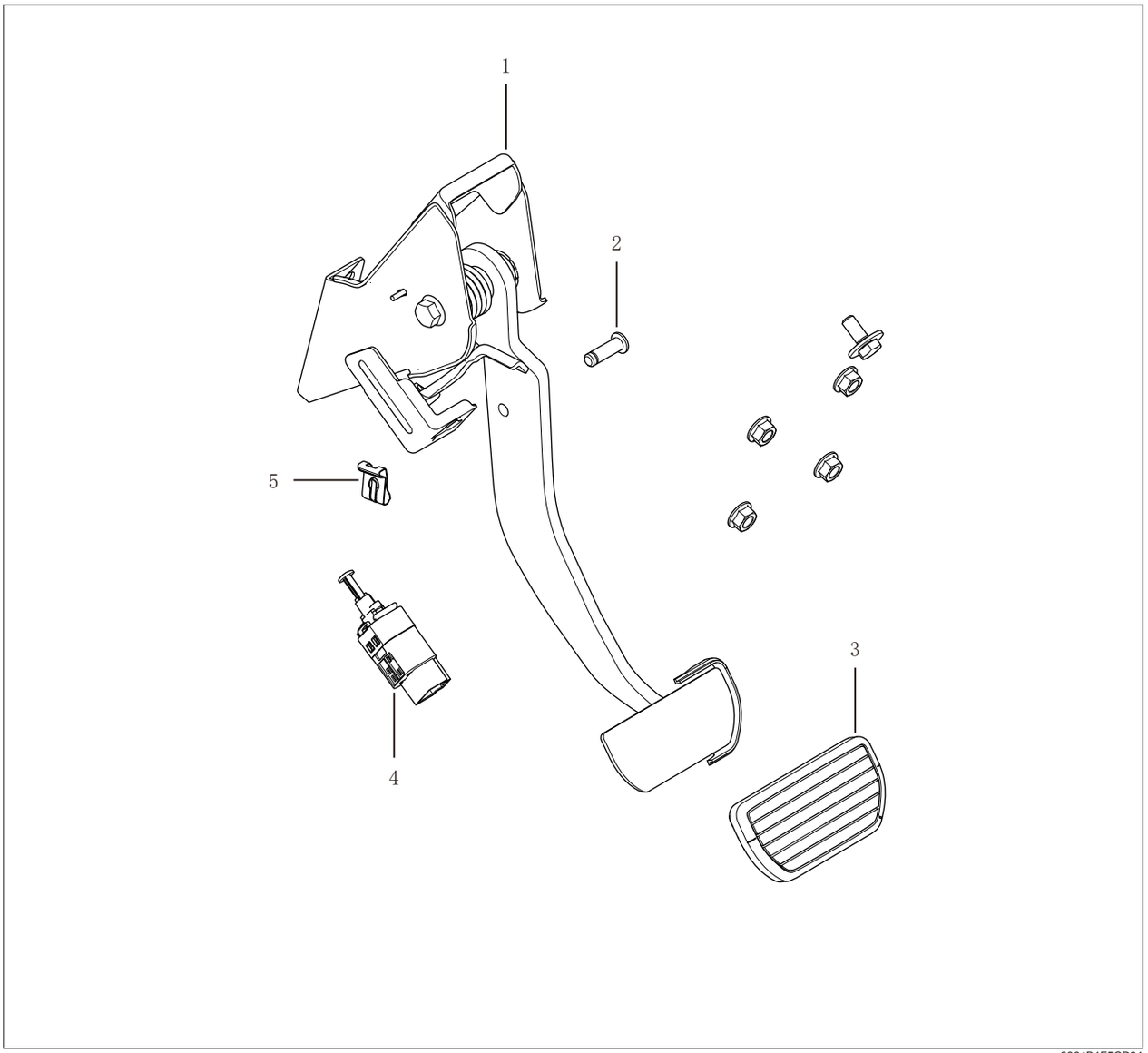
Notice

› Tighten the fastener according to the specified torque value.

› Check and adjust the brake pedal assembly.

Brake pedal assembly (8AT)

Structural diagram



8864B1F5CD31

1. Brake pedal assembly
2. Pump connecting pin
3. Pedal bushing
4. Brake lamp switch assembly
5. Split pin

Check

1. Check the brake pedal height

Notice

› Release the brake switch until it does not contact the brake pedal any longer. Check the brake pedal height.

Pedal height from front wall: 141 mm

2. Check the pedal free stroke

Notice

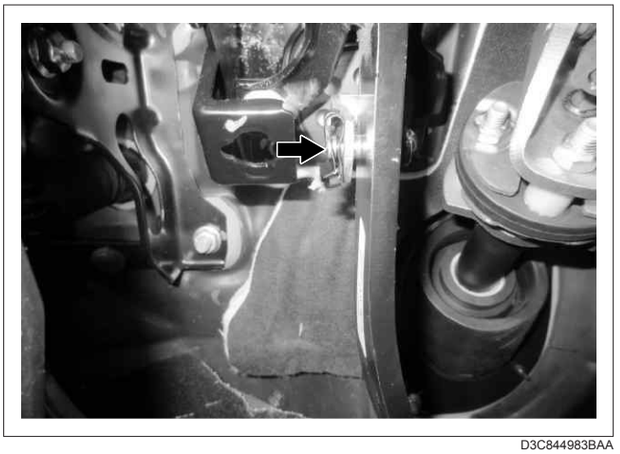
› Shut down the engine and step on the brake pedal a number of times until there is no longer any vacuum in the vacuum booster. Depress the brake pedal until resistance force is felt, then measure the distance traveled.

Pedal free stroke: 10.3±1mm

Removal/installation

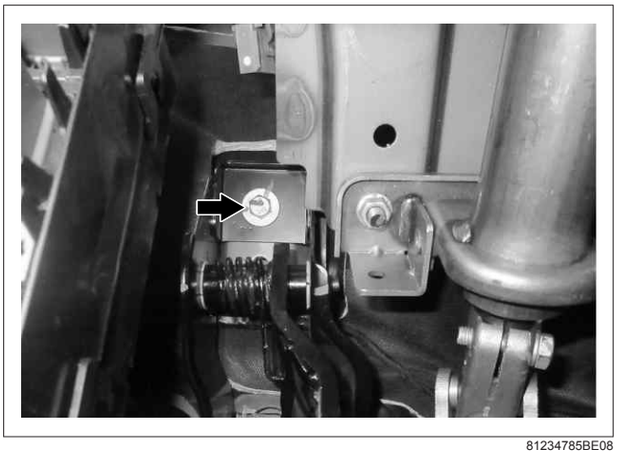
Removal

1. Disconnect the negative terminal of the battery.
2. Remove lower left guard assembly of the instrument panel
3. Remove brake lamp switch assembly
4. Remove split pin and the pump connecting pin



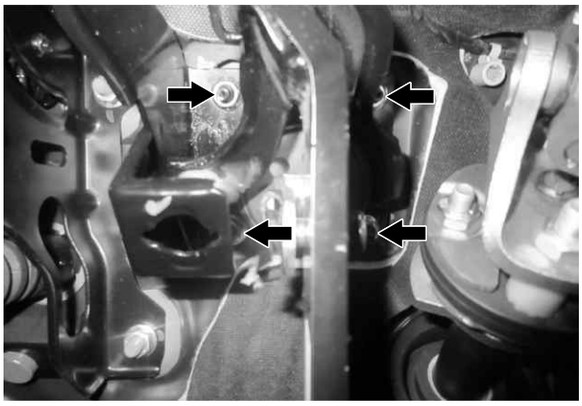
D3C844983BAA

5. Remove 1 bolt



81234785BE08

6. Remove 4 nuts



20D4ED7294DC

7. Remove brake pedal assembly

Installation

1. Perform installation work in reverse order of removal

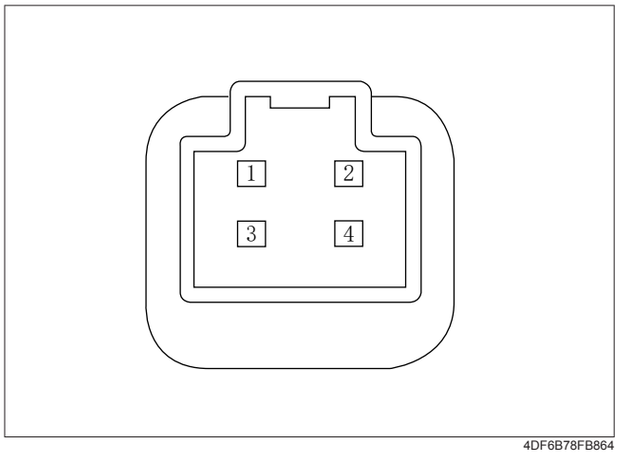
Notice

› Tighten the fastener according to the specified torque value.

› Check and adjust the brake pedal assembly.

Brake-lamp switch

Pin definition



4DF6B78FB864

Pin No.	Function
1	To power
2	To power
3	To signal
4	To signal

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connectors



C289CBE5DAE9

3. Depress brake pedal, turn brake lamp switch 90 ° at the same time, and remove brake lamp switch

⚠ Caution

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

Installation

1. Depress brake pedal, snap brake lamp switch into the long round hole, and turn it 90° to position

ℹ Notice

› Before installation, confirm whether the brake-lamp switch ejector pin is in free state. If not, slowly pull the brake-lamp switch ejector pin outwards to free state.

2. Release brake pedal slowly

3. Connect harness connectors



BC8A237D0F87

⚠ Caution

› Before installing the connector, check that the connector terminals are intact.

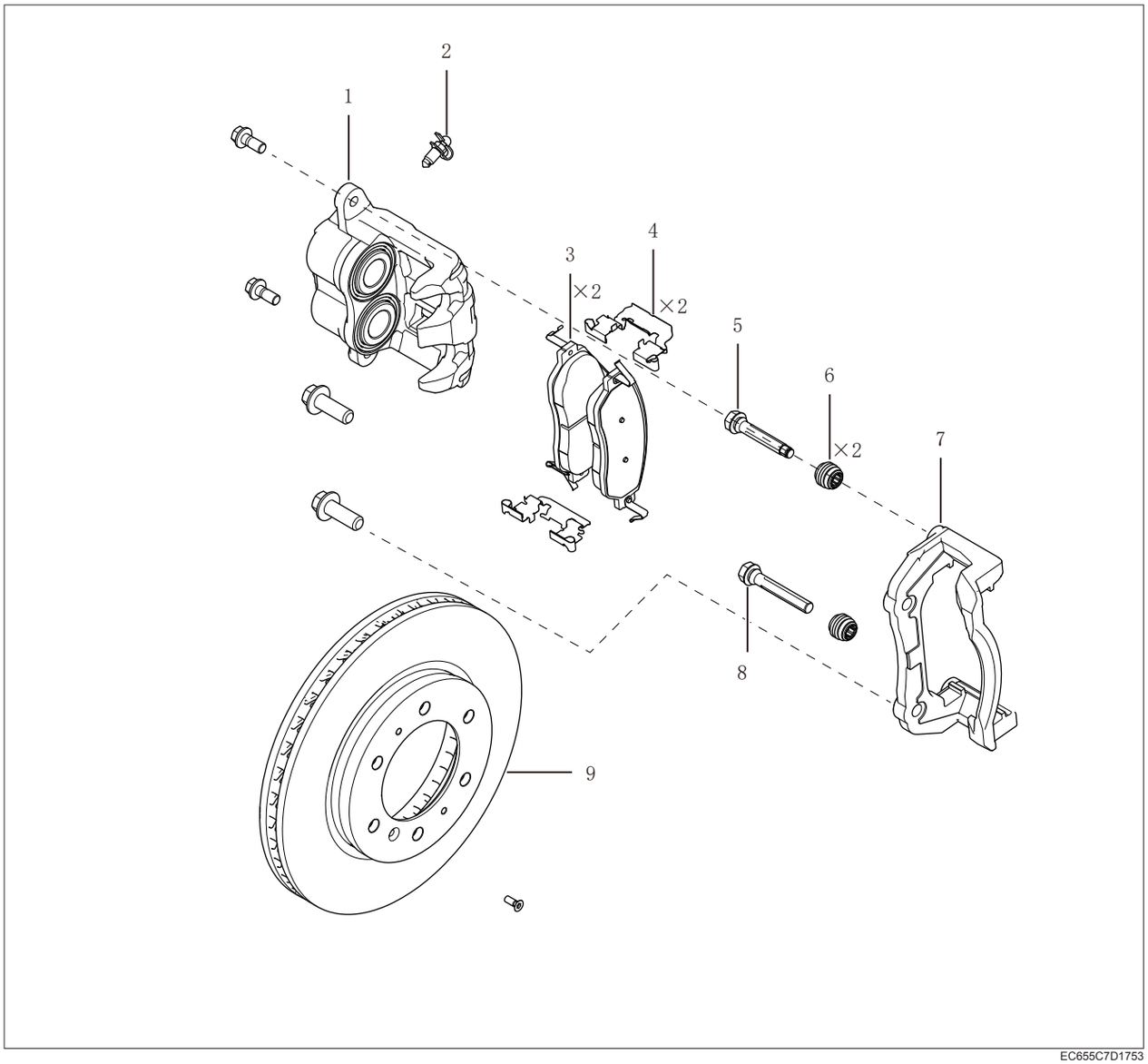
4. Install negative terminal of the battery

Wheel brake - mechanical

Front wheel brake ..... 31－1
Structural diagram ..... 31－1
Specifications ..... 31－2
Specified torque ..... 31－3
Front friction pad assembly ..... 31－4
Removal/installation ..... 31－4
Inspection ..... 31－5
Front brake disc ..... 31－6
Removal/installation ..... 31－6
Check ..... 31－7
Front brake caliper assembly ..... 31－8
Removal/installation ..... 31－8
Rear wheel brake ..... 31－9
Structural diagram ..... 31－9
Specifications ..... 31－10
Specified torque ..... 31－11
Rear friction pad assembly ..... 31－12
Removal/installation ..... 31－12
Inspection ..... 31－13
Rear brake disc ..... 31－14
Removal/installation ..... 31－14
Check ..... 31－15
Rear brake caliper assembly ..... 31－16
Removal/installation ..... 31－16

Front wheel brake

Structural diagram



EC655C7D1753

1. Front brake caliper body
2. Air bleed screw
3. Front friction pad assembly
4. Front friction pad circlip
5. Front guide pin assembly
6. Guide pin sheath
7. Front brake caliper bracket
8. Guide pin assembly
9. Front brake disc

Specifications

Diameter of brake disc (mm)	Standard	316
Brake disc run-out (mm)	Maximum value	0.04
Allowable scratch depth of brake disc (mm)	Maximum value	0.38
Brake disc thickness (mm)	Standard	31
	Minimum	29
Friction pad thickness (mm)	Standard	11.3
	Min. value	2

Specified torque

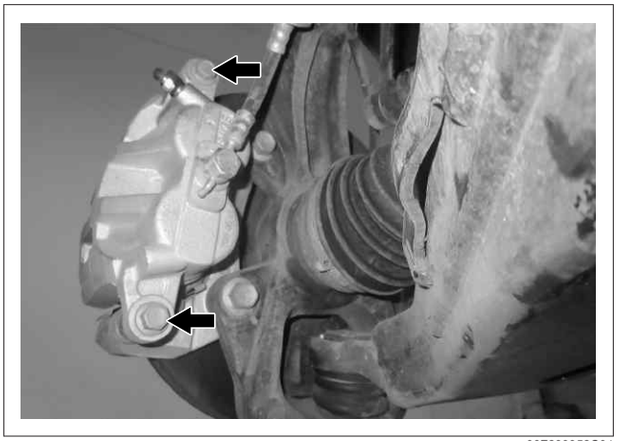
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front brake caliper assembly x front steering knuckle assembly	180±10	4	—
Screw	Front brake disc × wheel hub flange plate	9±3	2	—
Hollow bolt	Front brake hose assembly × snap caliper body	35±4	2	—
Air-discharge bolt	Air-bleeding bolt × caliper body	10±2	2	—
Bolt	Brake caliper body x caliper bracket	45~50	4	—

Front friction pad assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Remove 2 bolts



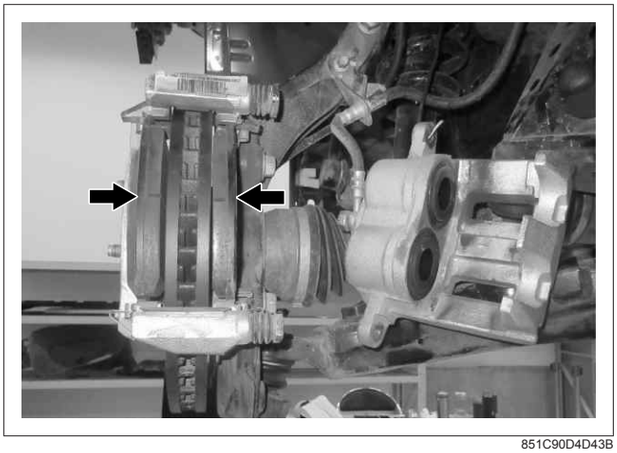
06F293952C04

4. Raise the caliper body assembly

⚠ Caution

› Use the tool to secure the caliper to avoid overhanging from damaging the brake hose.

5. Remove 2 return springs
6. Remove front friction pad assembly



851C90D4D43B

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

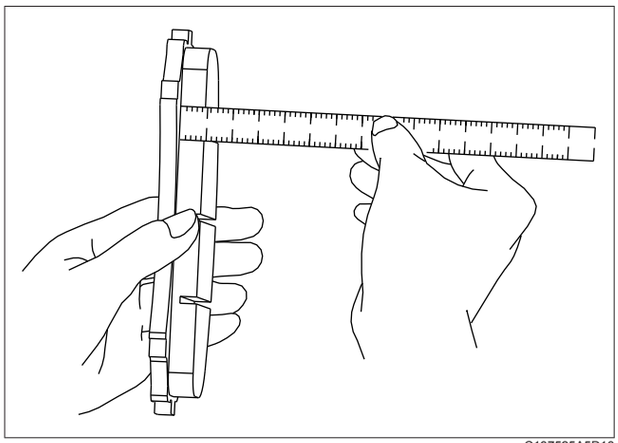
› When replacing with new friction pad, push the brake caliper piston back to its original position, and draw an appropriate amount of brake fluid from the brake fluid reservoir.

› Do not allow any parts of brake system that can cause friction (including the friction surfaces of the brake discs and friction pads) to come into contact with grease, engine oil, brake fluid, other lubricants, or mineral oil-containing cleaners.

› When replacing the friction pads, remove the stains first, and then apply grease evenly to the guide groove of caliper bracket.

Inspection

1. Check the thickness of the front friction pad



C137525A5D18

Minimal thickness of the friction plate 2.0 mm

Notice

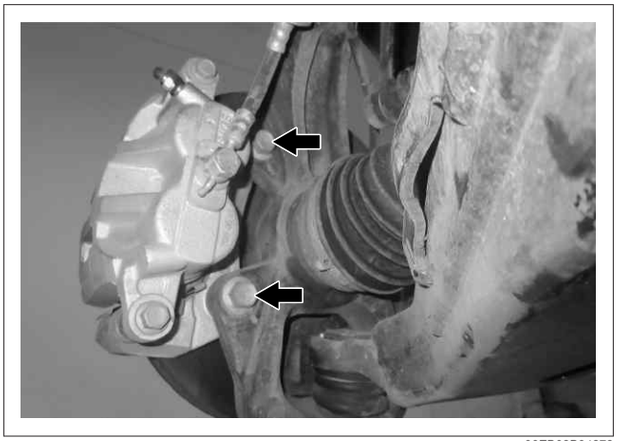
› If the thickness of the internal or external friction plate is less than the minimum thickness specified or the friction plate is cracked, broken or damaged, the friction plate must be replaced.

Front brake disc

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Separate front brake caliper assembly



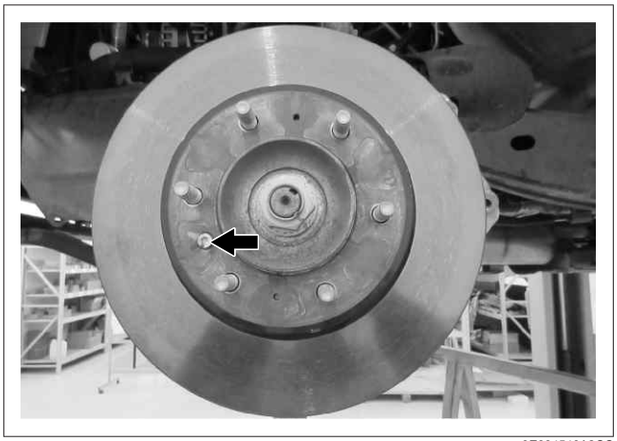
33EB02B84272

Notice

› When replacing with new brake disc, remove the brake caliper body first, and then remove the friction pad and brake caliper bracket.

› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

4. Remove 1 screws



9E634540A2CC

5. Remove front brake disc

Notice

› Jack out the brake disc by screwing in two M8 bolts into the disc repair hole.

Installation

1. Perform installation work in reverse order of removal

Notice

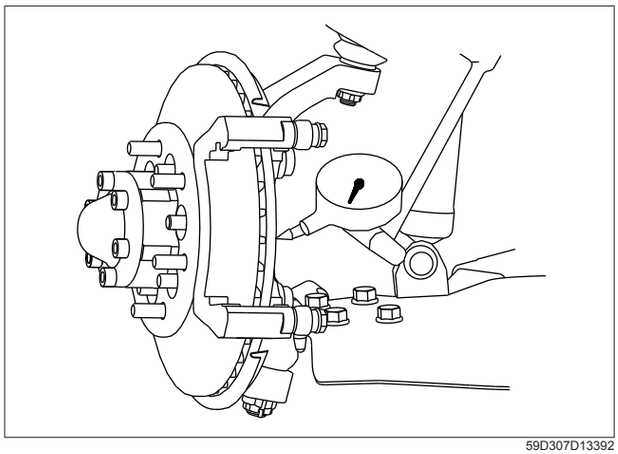
› When replacing with new brake disc, push the brake caliper piston back to its original position.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

› Tighten the fastener according to the specified torque value.

Check

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Check front brake disc run-out



59D307D13392

Maximum end face run-out of brake disc allowable: 0.04 mm

Notice

› When measuring, tighten wheel nuts diagonally. Make the brake disc and wheel hub compactly combined. If the measured value is not correct, repair or replace the brake disc.

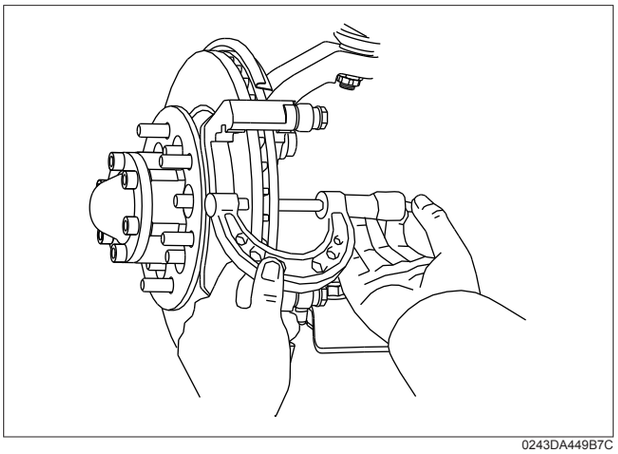
› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

4. Remove front brake caliper assembly

Caution

› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

5. Check front brake disc thickness



0243DA449B7C

Minimal thickness of the brake disc: 29 mm

Maximum single-face wear of brake disc allowable: 1 mm

Notice

› Select 5 points on the same circle within the friction area, and measure and record the thickness of the brake disc (the measurement can be carried out on the brake disc originally attached with brake caliper).

› When measured thickness is less than the minimum thickness, replace the brake disc.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

6. Check the surface of front brake disc

Maximum scratch depth of brake disc allowable: 0.38 mm

Caution

› If the brake disc is obviously scratched, it shall be replaced.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

Front brake caliper assembly

Removal/installation

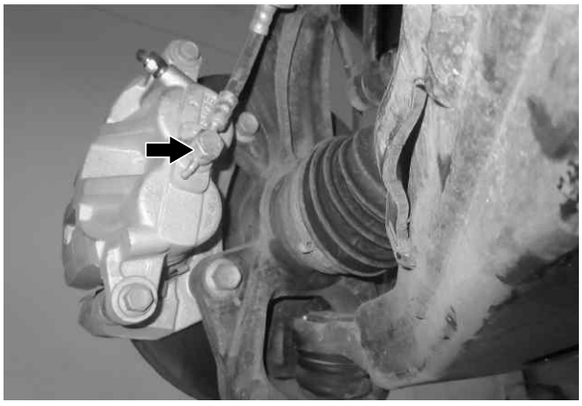
Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Drain the brake fluid

⚠ Caution

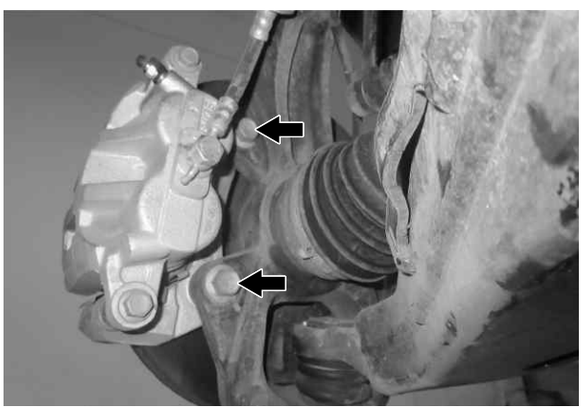
› If the brake fluid contacts with the paint surface, clean it immediately.

4. Remove bolt and the copper washer, and separate front brake hose



EF1E00909C64

5. Remove bolt and front brake caliper assembly



33EB02B84272

Installation

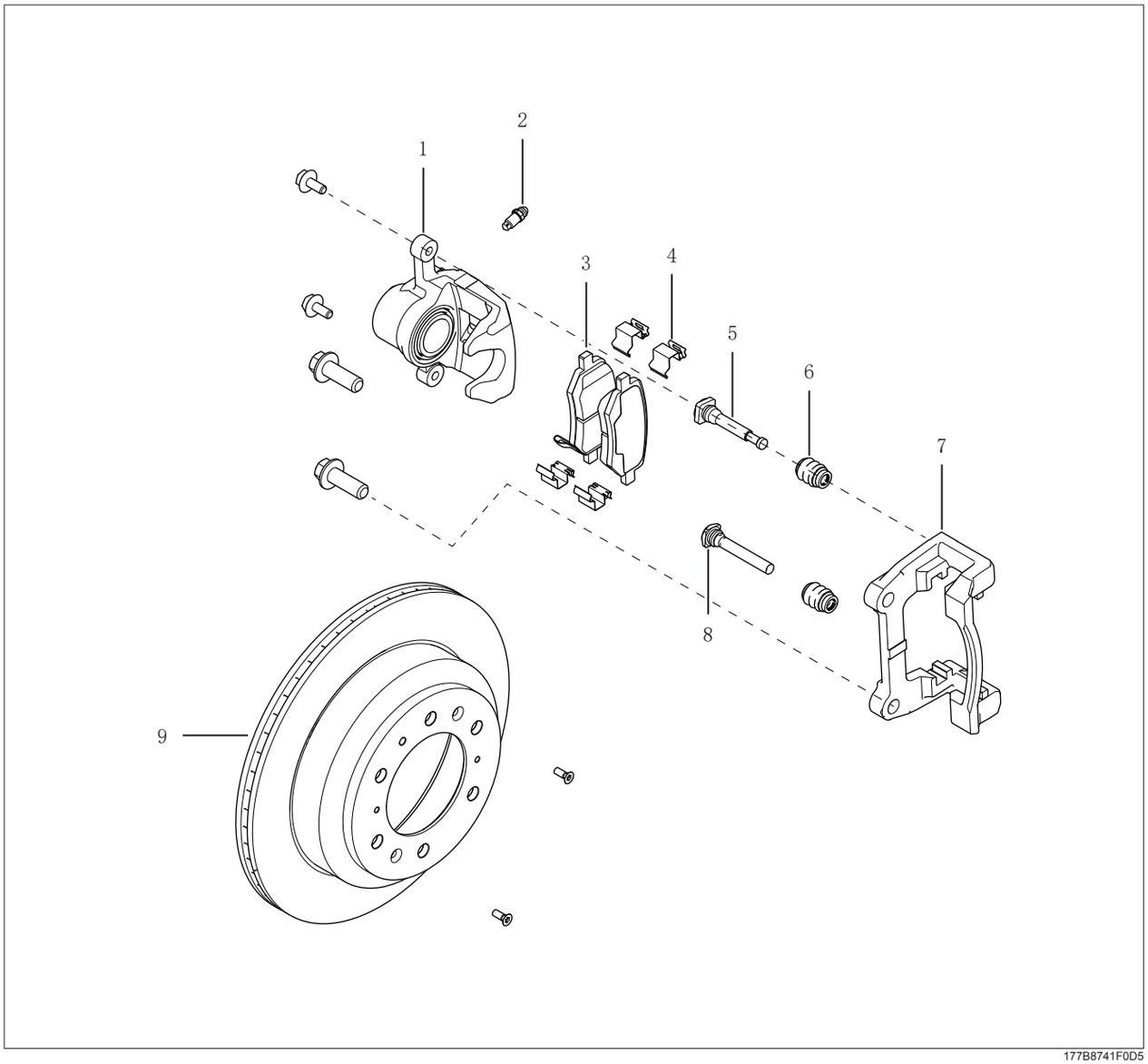
1. Perform installation work in reverse order of removal

ℹ Notice

› Bleed brake system.

Rear wheel brake

Structural diagram



177B8741F0D5

1. Rear brake caliper body
2. Air-bleeding bolt
3. Rear friction pad assembly
4. Rear friction pad circlip
5. Guide pin assembly
6. Guide pin sheath
7. Rear brake caliper bracket
8. Rear locating pin assembly
9. Rear brake disc

Specifications

Diameter of brake disc (mm)	Standard	323
Brake disc run-out (mm)	Maximum value	0.04
Surface scratch depth of brake disc (mm)	Maximum value	0.38
Brake disc thickness (mm)	Standard	22
	Minimum	20
Friction material thickness (mm)	Standard	9
	Min. value	2

Specified torque

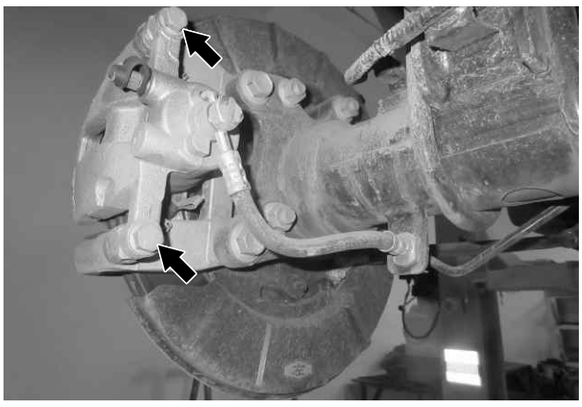
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Rear brake caliper assembly × rear steering knuckle	190±10	4	—
Brake hose bolt	Brake hose assembly x brake caliper assembly	35±3	2	—
Air-bleeding bolt	At brake caliper	10±3	2	—
Bolt	Caliper body x caliper bracket	25~30	4	—

Rear friction pad assembly

Removal/installation

Removal

1. Loosen parking brake
2. Raise the vehicle to an appropriate position
3. Remove rear wheel
4. Remove 2 bolts



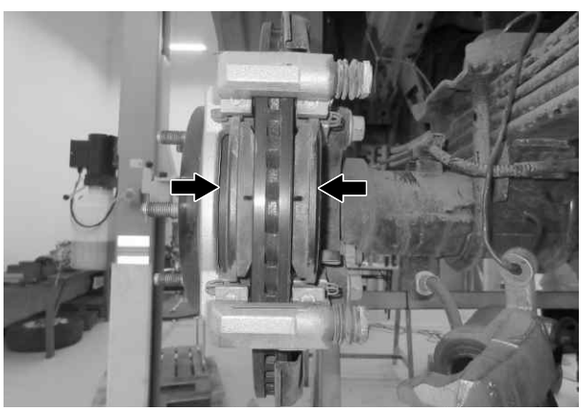
04628BCD93CB

5. Raise the caliper body assembly

⚠ Caution

› Use the tool to secure the caliper to avoid overhanging from damaging the brake hose.

6. Remove rear friction pad assembly



A9D7AD3FF0C7

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

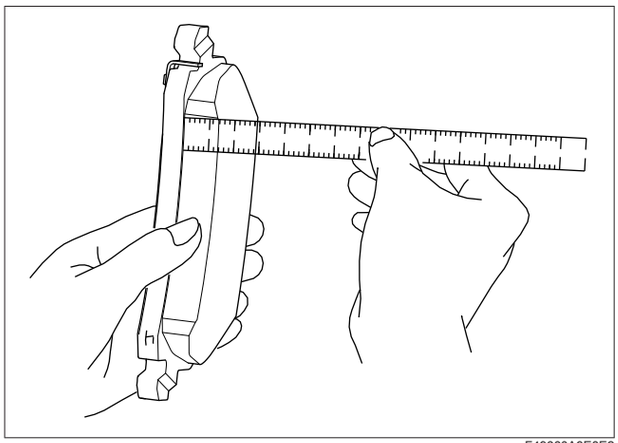
› When replacing with new friction pad, push the brake caliper piston back to its original position, and draw an appropriate amount of brake fluid from the brake fluid reservoir.

› Do not allow any parts of brake system that can cause friction (including the friction surfaces of the brake discs and friction pads) to come into contact with grease, engine oil, brake fluid, other lubricants, or mineral oil-containing cleaners.

› When replacing the friction pads, remove the stains first, and then apply grease evenly to the guide groove of caliper bracket.

Inspection

1. Check the thickness of the rear friction plate



F49660A3E8E2

Minimal thickness of the friction plate 2.0 mm

Notice

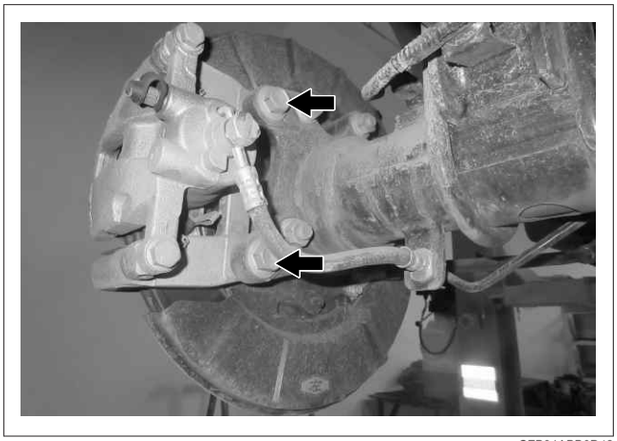
› If the thickness of the internal or external friction plate is less than the minimum thickness specified or the friction plate is cracked, broken or damaged, the friction plate must be replaced.

Rear brake disc

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove rear wheel
3. Separate the rear brake caliper assembly



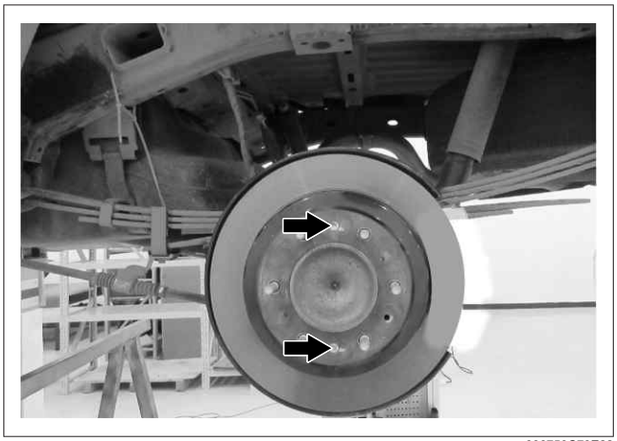
CFB91ABB0D42

⚠ Caution

› When replacing with new brake disc, remove the brake caliper body first, and then remove the friction pad and brake caliper bracket.

› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

4. Remove 2 screws



696759C73E22

5. Remove rear brake disc

ℹ Notice

› Jack out the brake disc by screwing in two M8 bolts into the disc repair hole.

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

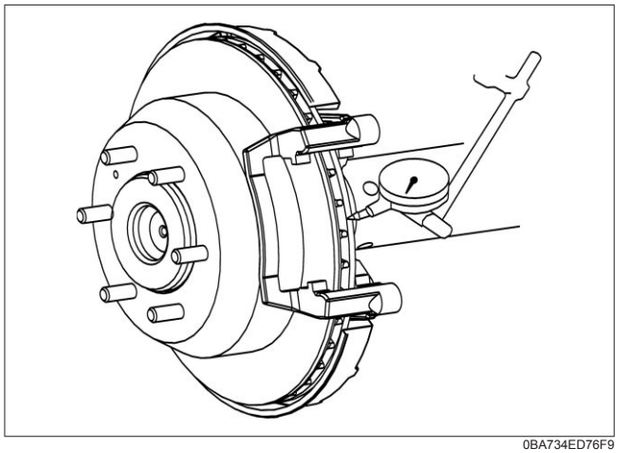
› When replacing with new brake disc, push the brake caliper piston back to its original position.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

› Tighten the fastener according to the specified torque value.

Check

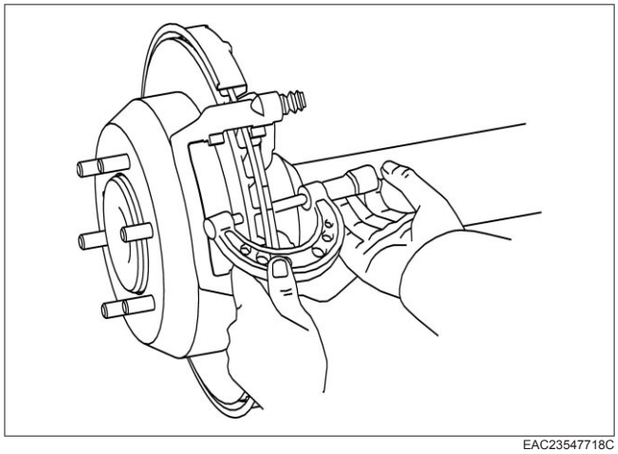
1. Raise the vehicle to an appropriate position
2. Remove rear wheel
3. Check rear brake disc run-out



0BA734ED76F9

Maximum end face run-out of brake disc allowable: 0.04mm

4. Check thickness of rear brake disc



EAC23547718C

Minimal thickness of the brake disc: 20mm

5. Check surface of rear brake disc

Maximum scratch depth of brake disc allowable: 0.38mm

⚠ Caution

› If the brake disc is obviously scratched, it shall be replaced.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

Rear brake caliper assembly

Removal/installation

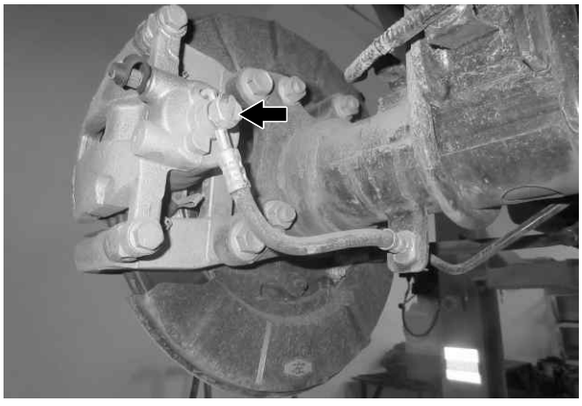
Removal

1. Raise the vehicle to an appropriate position
2. Remove rear wheel
3. Drain the brake fluid

i Notice

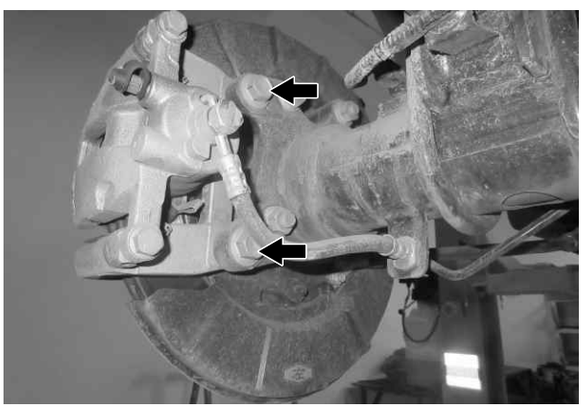
› If the brake fluid contacts with the paint surface, clean it immediately.

4. Remove bolt and copper washer, and separate rear brake hose



D0DE853C12A8

5. Remove bolt and rear brake caliper assembly



CFB91ABB0D42

Installation

1. Perform installation work in reverse order of removal

i Notice

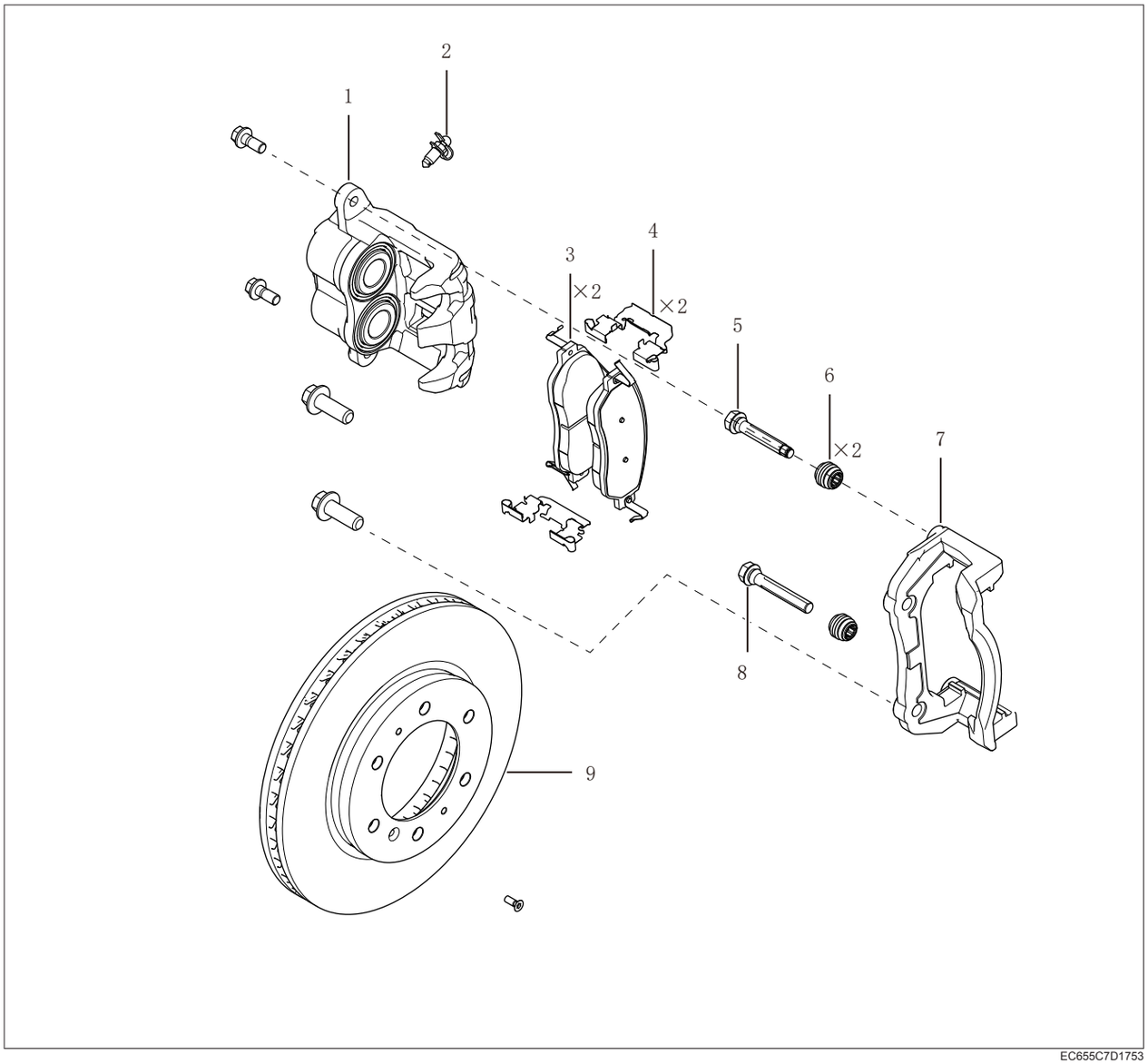
› Bleed brake system.

Wheel brake - electronic

Front wheel brake ..... 32－1
Structural diagram ..... 32－1
Specifications ..... 32－2
Specified torque ..... 32－3
Front friction pad assembly ..... 32－4
Removal/installation ..... 32－4
Inspection ..... 32－5
Front brake disc ..... 32－6
Removal/installation ..... 32－6
Check ..... 32－7
Front brake caliper assembly ..... 32－8
Removal/installation ..... 32－8
Rear wheel brake ..... 32－9
Structural diagram ..... 32－9
Specifications ..... 32－10
Specified torque ..... 32－11
Rear friction pad assembly ..... 32－12
Removal/installation ..... 32－12
Inspection ..... 32－13
Rear brake disc ..... 32－14
Removal/installation ..... 32－14
Check ..... 32－15
Rear brake caliper assembly ..... 32－16
Removal/installation ..... 32－16

Front wheel brake

Structural diagram



EC655C7D1753

1. Front brake caliper body
2. Air bleed screw
3. Front friction pad assembly
4. Front friction pad circlip
5. Front guide pin assembly
6. Guide pin sheath
7. Front brake caliper bracket
8. Guide pin assembly
9. Front brake disc

Specifications

Diameter of brake disc (mm)	Standard	316
Brake disc run-out (mm)	Maximum value	0.04
Allowable scratch depth of brake disc (mm)	Maximum value	0.38
Brake disc thickness (mm)	Standard	31
	Minimum	29
Friction pad thickness (mm)	Standard	11.3
	Min. value	2

Specified torque

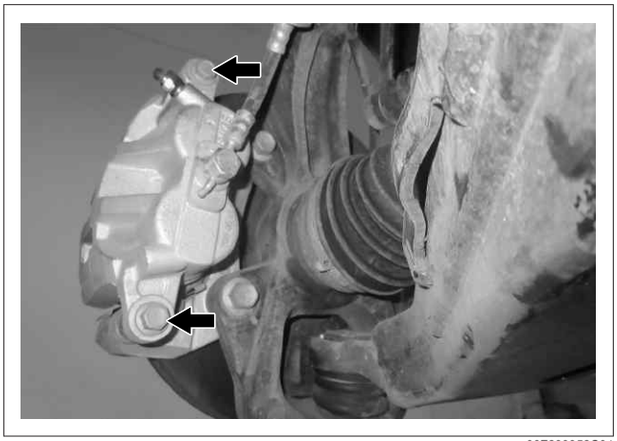
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front brake caliper assembly x front steering knuckle assembly	180±10	4	—
Screw	Front brake disc × wheel hub flange plate	9±3	2	—
Hollow bolt	Front brake hose assembly × snap caliper body	35±4	2	—
Air-discharge bolt	Air-bleeding bolt × caliper body	10±2	2	—
Bolt	Brake caliper body x caliper bracket	45~50	4	—

Front friction pad assembly

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Remove 2 bolts



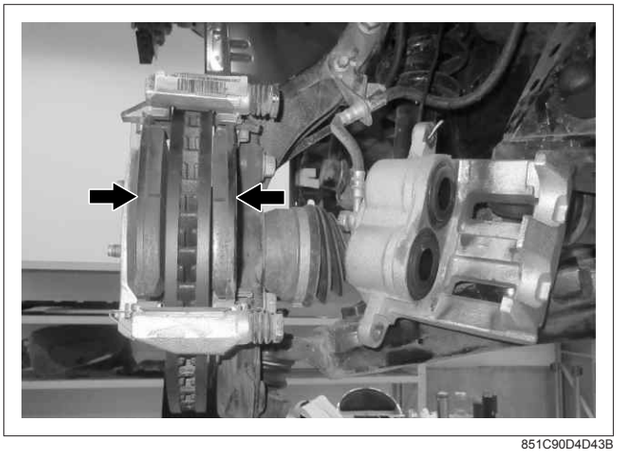
06F293952C04

4. Raise the caliper body assembly

⚠ Caution

› Use the tool to secure the caliper to avoid overhanging from damaging the brake hose.

5. Remove 2 return springs
6. Remove front friction pad assembly



851C90D4D43B

Installation

1. Perform installation work in reverse order of removal

ℹ Notice

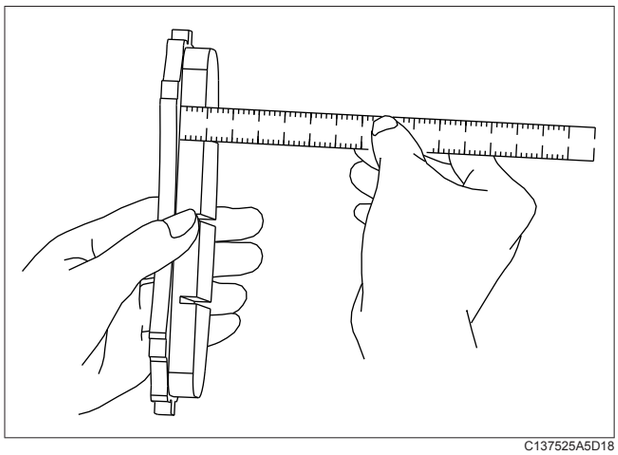
› When replacing with new friction pad, push the brake caliper piston back to its original position, and draw an appropriate amount of brake fluid from the brake fluid reservoir.

› Do not allow any parts of brake system that can cause friction (including the friction surfaces of the brake discs and friction pads) to come into contact with grease, engine oil, brake fluid, other lubricants, or mineral oil-containing cleaners.

› When replacing the friction pads, remove the stains first, and then apply grease evenly to the guide groove of caliper bracket.

Inspection

1. Check the thickness of the front friction pad



C137525A5D18

Minimal thickness of the friction plate 2.0 mm

Notice

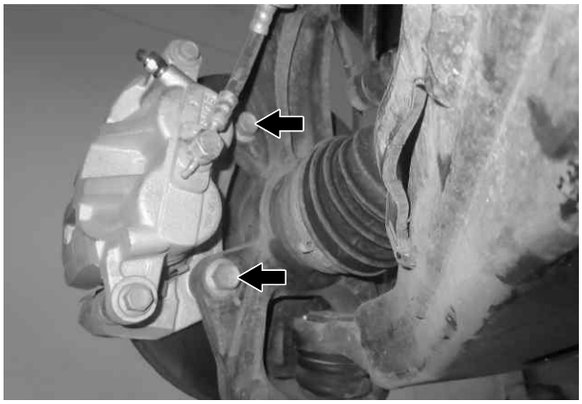
› If the thickness of the internal or external friction plate is less than the minimum thickness specified or the friction plate is cracked, broken or damaged, the friction plate must be replaced.

Front brake disc

Removal/installation

Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Separate front brake caliper assembly



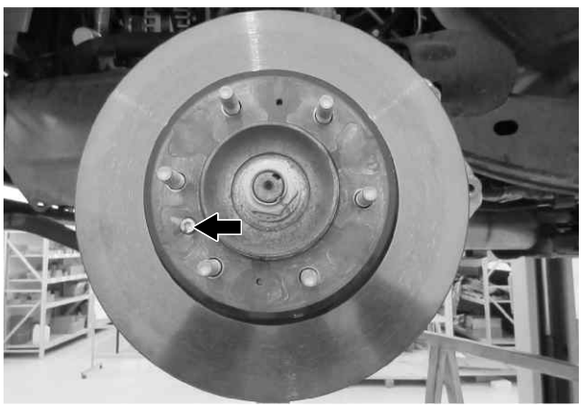
33EB02B84272

Notice

› When replacing with new brake disc, remove the brake caliper body first, and then remove the friction pad and brake caliper bracket.

› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

4. Remove 1 screws



9E634540A2CC

5. Remove front brake disc

Notice

› Jack out the brake disc by screwing in two M8 bolts into the disc repair hole.

Installation

1. Perform installation work in reverse order of removal

Notice

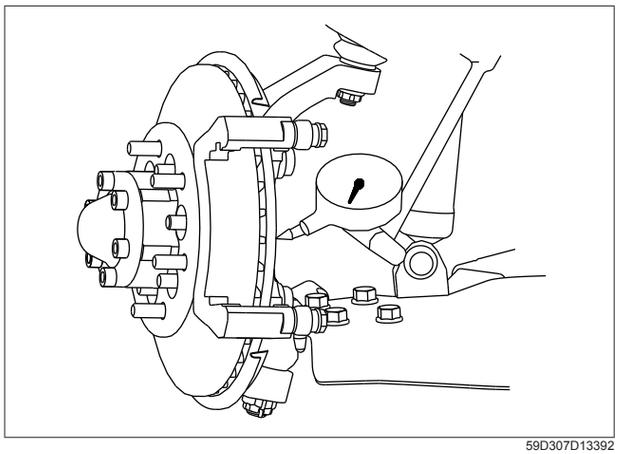
› When replacing with new brake disc, push the brake caliper piston back to its original position.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

› Tighten the fastener according to the specified torque value.

Check

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Check front brake disc run-out



59D307D13392

Maximum end face run-out of brake disc allowable: 0.04 mm

Notice

› When measuring, tighten wheel nuts diagonally. Make the brake disc and wheel hub compactly combined. If the measured value is not correct, repair or replace the brake disc.

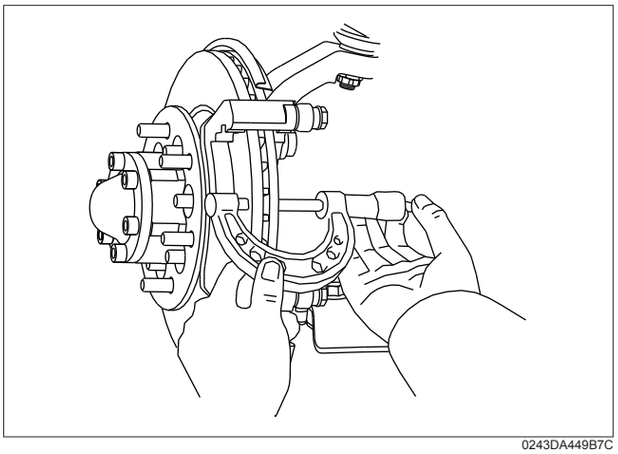
› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

4. Remove front brake caliper assembly

Caution

› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

5. Check front brake disc thickness



0243DA449B7C

Minimal thickness of the brake disc: 29 mm

Maximum single-face wear of brake disc allowable: 1 mm

Notice

› Select 5 points on the same circle within the friction area, and measure and record the thickness of the brake disc (the measurement can be carried out on the brake disc originally attached with brake caliper).

› When measured thickness is less than the minimum thickness, replace the brake disc.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

6. Check the surface of front brake disc

Maximum scratch depth of brake disc allowable: 0.38 mm

Caution

› If the brake disc is obviously scratched, it shall be replaced.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

Front brake caliper assembly

Removal/installation

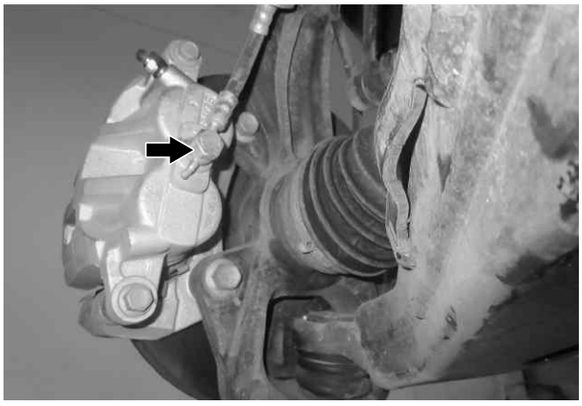
Removal

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Drain the brake fluid

⚠ Caution

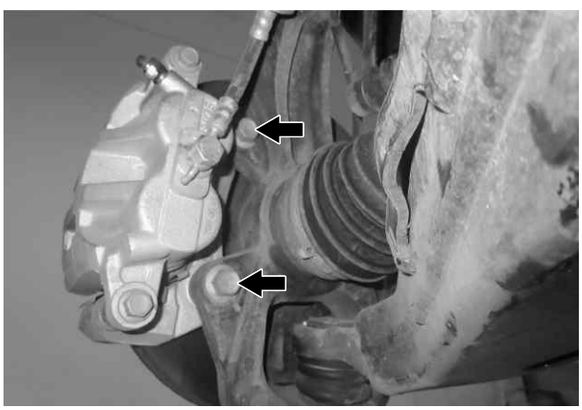
› If the brake fluid contacts with the paint surface, clean it immediately.

4. Remove bolt and the copper washer, and separate front brake hose



EF1E00909C64

5. Remove bolt and front brake caliper assembly



33EB02B84272

Installation

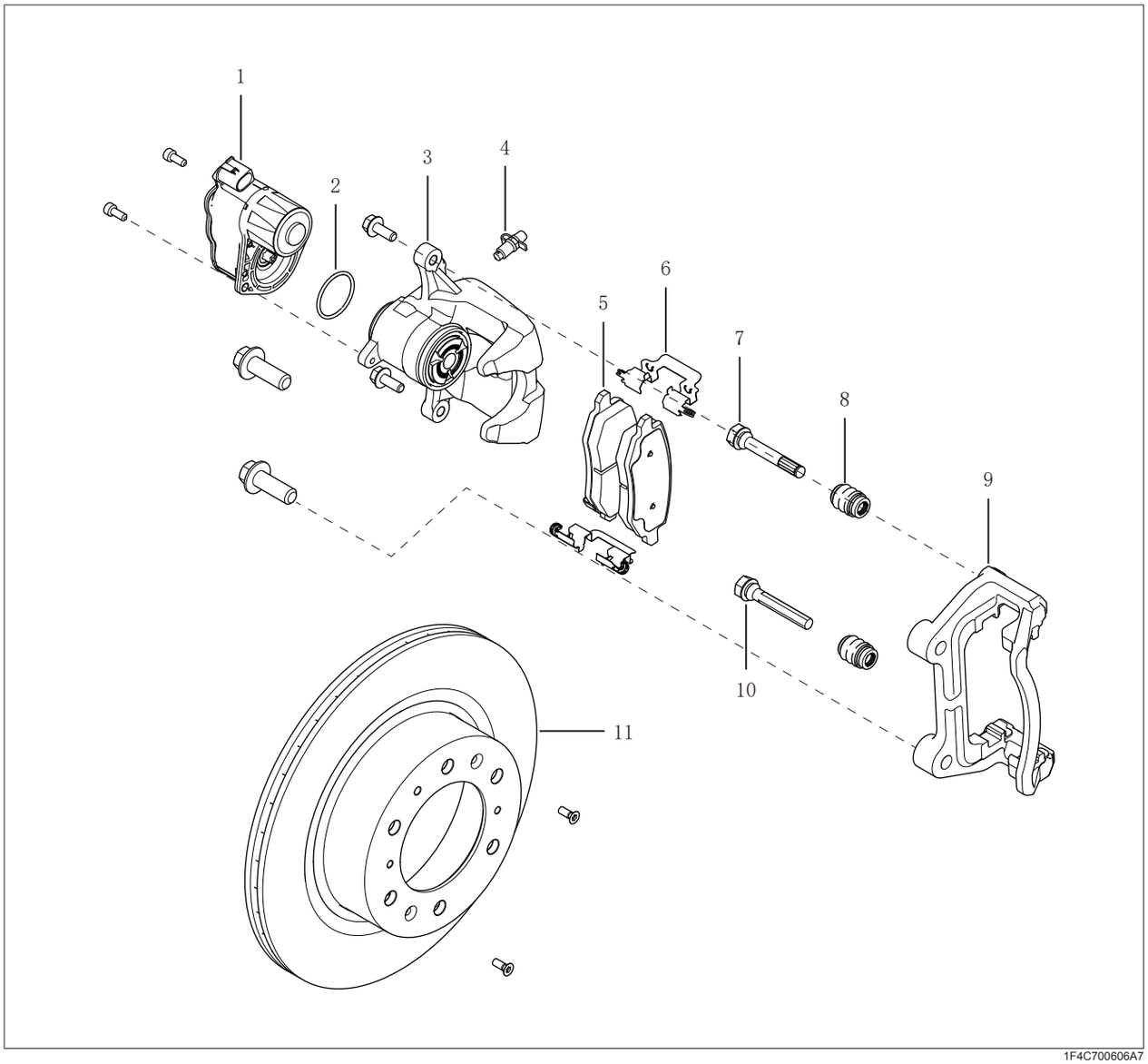
1. Perform installation work in reverse order of removal

ℹ Notice

› Bleed brake system.

Rear wheel brake

Structural diagram



1F4C700606A7

1. Parking motor gear unit
2. O seal ring
3. Rear brake caliper body
4. Air-bleeding bolt
5. Rear friction pad assembly
6. Rear friction pad circlip
7. Guide pin assembly
8. Guide pin sheath
9. Rear brake caliper bracket
10. Rear locating pin assembly
11. Rear brake disc

Specifications

Diameter of brake disc (mm)	Standard	323
Brake disc run-out (mm)	Max. value	0.04
Surface scratch depth of brake disc (mm)	Max. value	0.38
Brake disc thickness (mm)	Standard	22
	Minimum	20
Friction material thickness (mm)	Standard	10.9
	Min. value	2

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw	Rear brake disc x rear wheel hub assembly	9±3	4	—
Bolt	Rear brake caliper assembly × rear steering knuckle	100±5	4	—
Hollow bolt	Brake hose assembly x brake caliper assembly	35±4	2	—
Air-discharge bolt	At brake caliper	10±2	2	—
Bolt	Brake caliper body x caliper bracket	35±5	4	—
Bolt	Motor gear unit	10~13	4	—

Rear friction pad assembly

Removal/installation

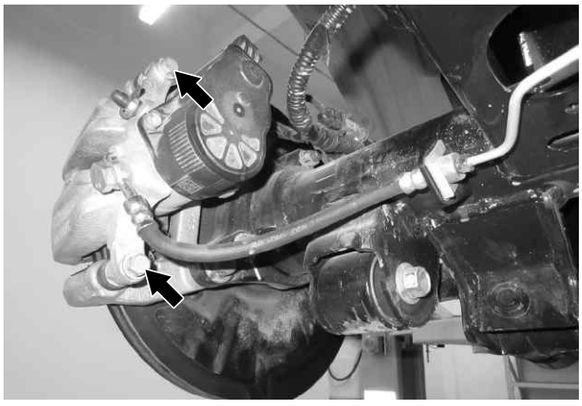
Removal

1. Releasing the parking brake

Notice

› When the ignition switch is in the ON mode or the engine is running, depress the brake pedal, press and hold the EPB switch, release the parking brake, and then turn off the ignition switch. After the engine shuts off, release the EPB switch.

2. Raise the vehicle to an appropriate position
3. Remove rear wheel
4. Remove 2 bolts



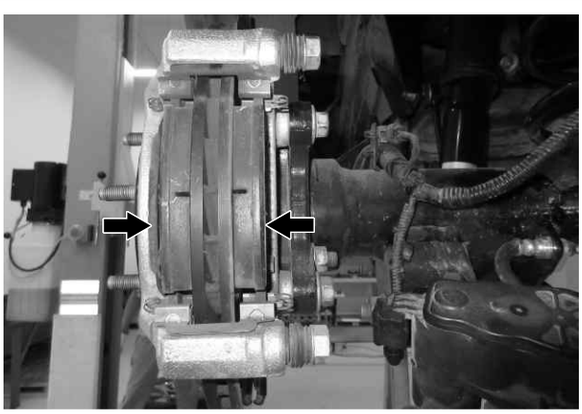
7595C12328A6

5. Raise the caliper body assembly

Caution

› Use the tool to secure the caliper to avoid overhanging from damaging the brake hose.

6. Remove rear friction pad assembly



ED5C2FBFD79A

Installation

1. Perform installation work in reverse order of removal

Notice

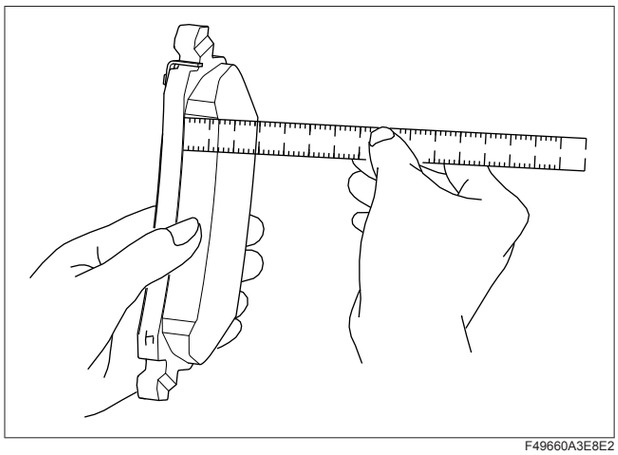
› When replacing with new friction pad, push the brake caliper piston back to its original position, and draw an appropriate amount of brake fluid from the brake fluid reservoir.

› Do not allow any parts of brake system that can cause friction (including the friction surfaces of the brake discs and friction pads) to come into contact with grease, engine oil, brake fluid, other lubricants, or mineral oil-containing cleaners.

› When replacing the friction pads, remove the stains first, and then apply grease evenly to the guide groove of caliper bracket.

Inspection

1. Check the thickness of the rear friction plate



F49660A3E8E2

Minimal thickness of the friction plate 2.0 mm

Notice

› If the thickness of the internal or external friction plate is less than the minimum thickness specified or the friction plate is cracked, broken or damaged, the friction plate must be replaced.

Rear brake disc

Removal/installation

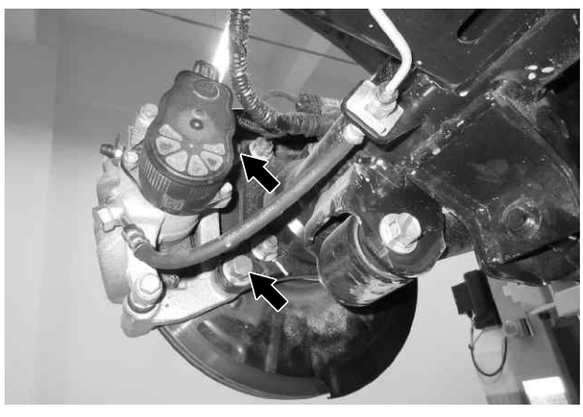
Removal

1. Releasing the parking brake

Notice

› When the ignition switch is in the ON mode or the engine is running, depress the brake pedal, press and hold the EPB switch, release the parking brake, and then turn off the ignition switch. After the engine shuts off, release the EPB switch.

2. Raise the vehicle to an appropriate position
3. Remove rear wheel
4. Separate the rear brake caliper assembly



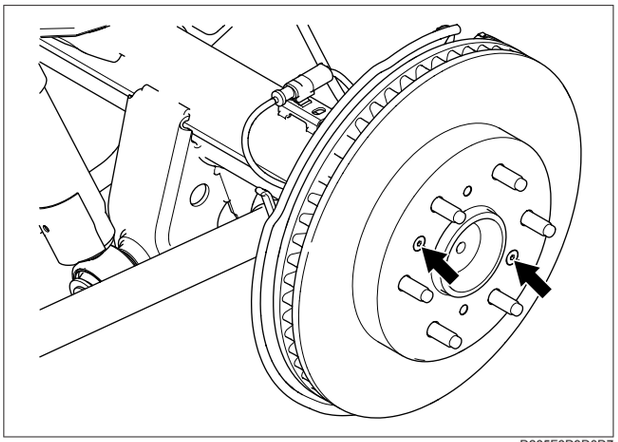
EE271381AFD8

Caution

› When replacing with new brake disc, remove the brake caliper body first, and then remove the friction pad and brake caliper bracket.

› Use the tool to secure the brake caliper assembly to avoid overhanging and damaging brake hose.

5. Remove 2 screws



D265F6D3D0D7

6. Remove rear brake disc

Notice

› Jack out the brake disc by screwing in two M8 bolts into the disc repair hole.

Installation

1. Perform installation work in reverse order of removal

Notice

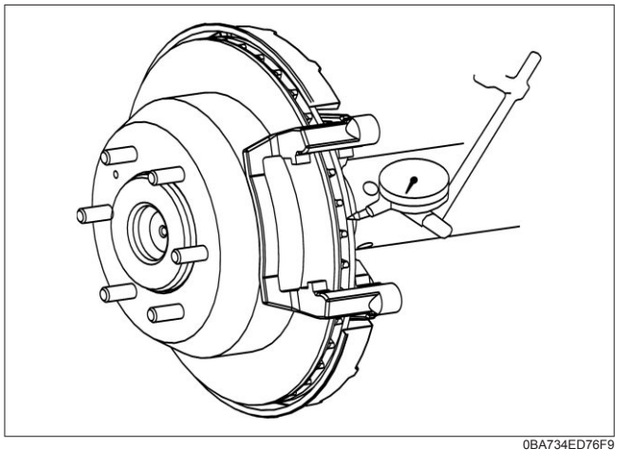
› When replacing with new brake disc, push the brake caliper piston back to its original position.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

› Tighten the fastener according to the specified torque value.

Check

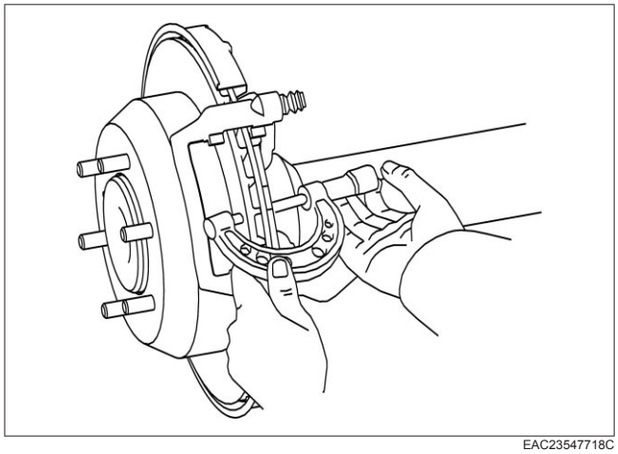
1. Raise the vehicle to an appropriate position
2. Remove rear wheel
3. Check rear brake disc run-out



0BA734ED76F9

Maximum end face run-out of brake disc allowable: 0.04mm

4. Check thickness of rear brake disc



EAC23547718C

Minimal thickness of the brake disc: 20mm

5. Check surface of rear brake disc

Maximum scratch depth of brake disc allowable: 0.38mm

⚠ Caution

› If the brake disc is obviously scratched, it shall be replaced.

› If replacement is required, be sure to replace complete set of the brake disc on axle basis.

Rear brake caliper assembly

Removal/installation

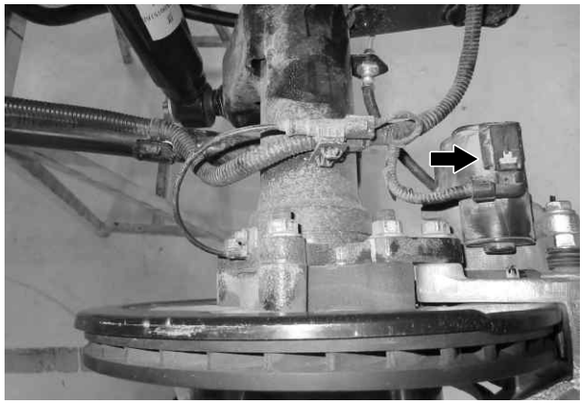
Removal

1. Releasing the parking brake

Notice

› When the ignition switch is in the ON mode or the engine is running, depress the brake pedal, press and hold the EPB switch, release the parking brake, and then turn off the ignition switch. After the engine shuts off, release the EPB switch.

2. Disconnect the negative terminal of the battery.
3. Raise the vehicle to an appropriate position
4. Remove rear wheel
5. Disconnect the motor gear unit connector



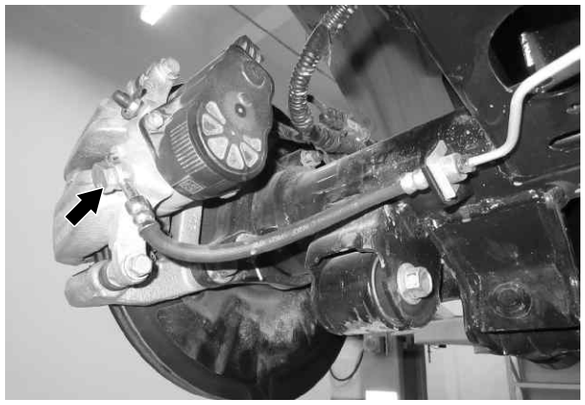
E16FCA7E657F

6. Drain the brake fluid

Notice

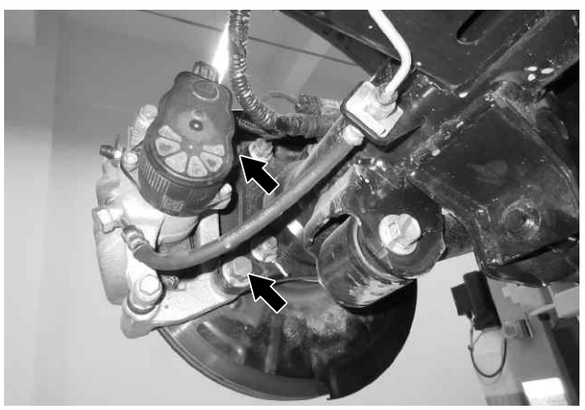
› If the brake fluid contacts with the paint surface, clean it immediately.

7. Remove the bolt and the copper washer, and separate the rear brake hose



6D73F445A2A3

8. Remove the bolt and the rear brake caliper assembly



EE271381AFD8

Installation

1. Perform installation work in reverse order of removal

Notice

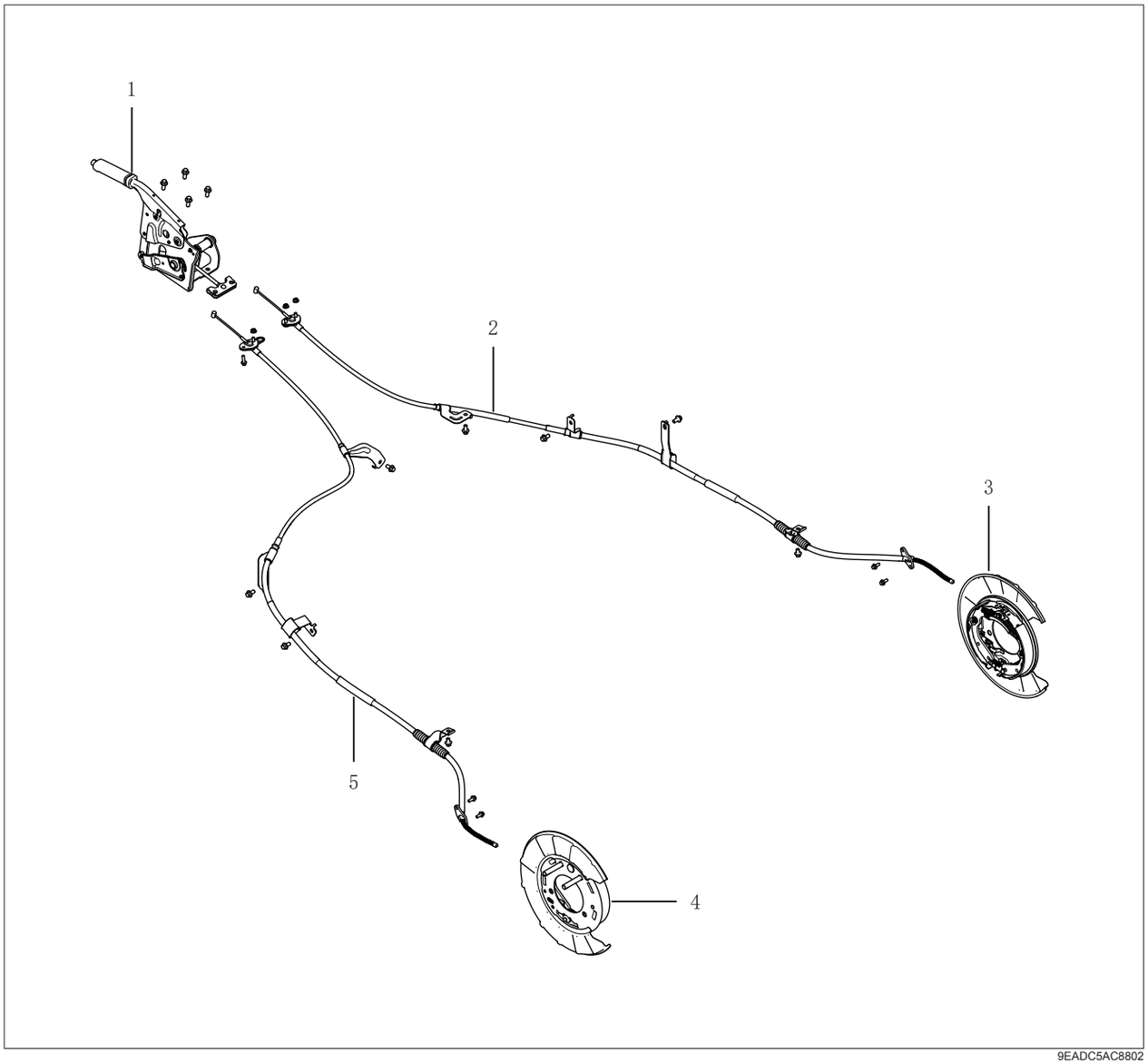
› Bleed brake system.

Parking brake - mechanical

Parking brake - (small double) .....33－1
Structural diagram .....33－1
Specifications.....33－2
Check.....33－3
Adjustment.....33－3
Parking brake control mechanism .....33－5
Removal/installation.....33－5
Parking brake cable assembly (small double).....33－6
Removal/installation.....33－6
Parking brake assembly .....33－7
Removal/installation.....33－7

Parking brake - (small double)

Structural diagram



9EADC5AC8802

1. Parking brake cable handle
2. Right parking brake cable
3. Right parking brake assembly
4. Left parking brake assembly
5. Left parking brake cable

Specifications

Brake-drum inner diameter (mm)	Standard	210
	Max. value	212
Brake-shoe thickness (mm)	Standard	4
	Min. value	1.5

Check

1. Check the stroke of parking brake

   Number of locking teeth: (6~9) teeth

Notice

› Pull up brake lever, apply parking brake; parking brake shall be locked within specified lock teeth count range. If the number of teeth locked does not fall in the specified range, just adjust the parking brake.

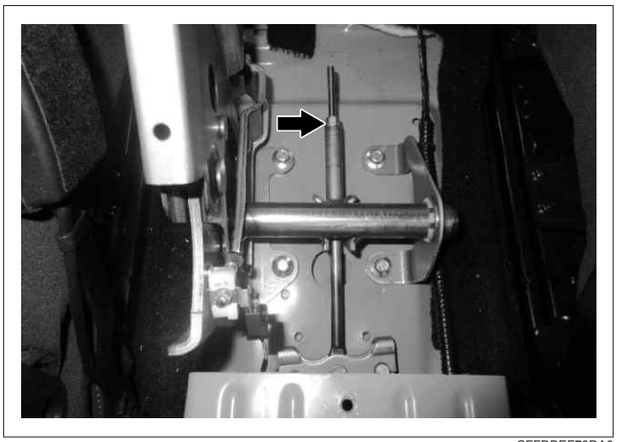
Adjustment

Notice

› Small adjustments to the parking brake (1-2 teeth) can be made with the adjustment nut. If a larger adjustment is necessary, then use the regulator at parking brake drum and follow the procedure of large adjustment.

Minor adjustment

1. Raise the vehicle to an appropriate position
2. Loosen parking brake cable handle completely
3. Remove cover plate assembly of auxiliary instrument panel
4. Pull the parking brake handle by 1-2 gears
5. Turn the adjustment nut until the parking brake jams slightly while the rear wheel is turning



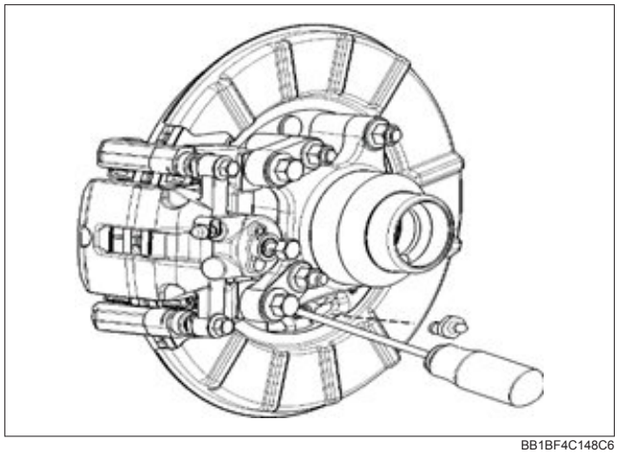
CFFDBEF76DA6

6. Release parking brake handle completely and confirm that the parking brake is not jammed while the rear wheel is turning. If necessary, adjust again
7. Ensure that the parking brake is fully applied when parking brake handle is pulled up

Major adjustment

1. Raise the vehicle to an appropriate position
2. Loosen parking brake cable handle completely
3. Remove rear wheel
4. Remove gunk plug for the regulating port of brake drum

5. Use a slotted screwdriver to rotate the gap-adjuster gear until the brake shoes lock the parking brake drum, and then rotate the gap-adjuster gear in the opposite direction.



BB1BF4C148C6

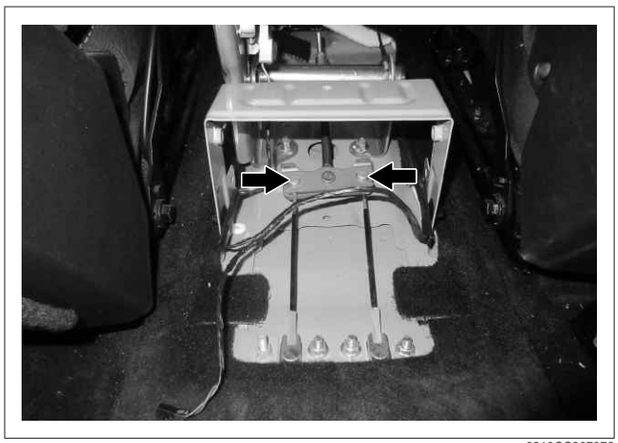
6. Install gunk plug for the regulating port of brake drum
7. Perform fine adjustment procedures

Parking brake control mechanism

Removal/installation

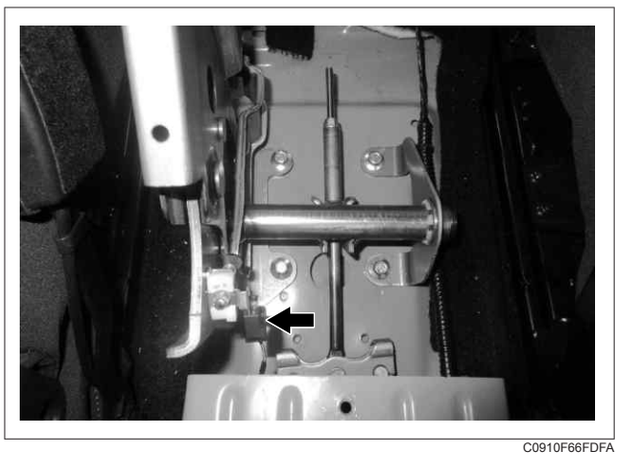
Removal

1. Completely disengage parking brake handle
2. Remove auxiliary instrument panel
3. Loosen adjusting nut and separate parking brake cable



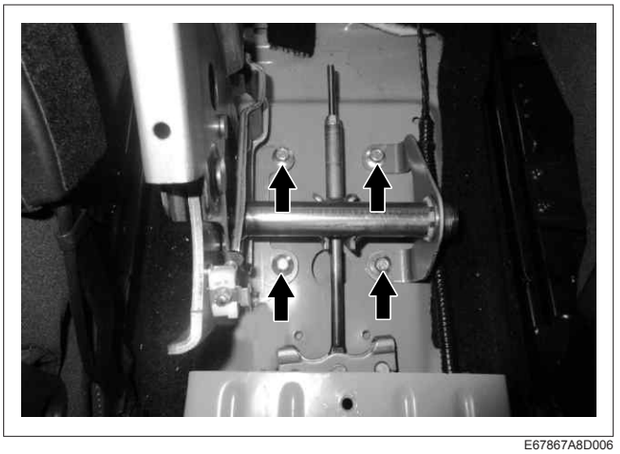
6216CC267972

4. Disconnect connector of parking brake switch



C0910F66FDFA

5. Remove 4 bolts, and remove parking brake control device



E67867A8D006

Installation

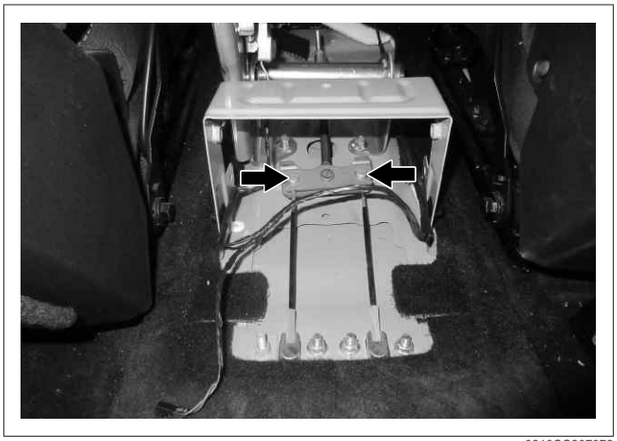
1. Perform installation work in reverse order of removal

Parking brake cable assembly (small double)

Removal/installation

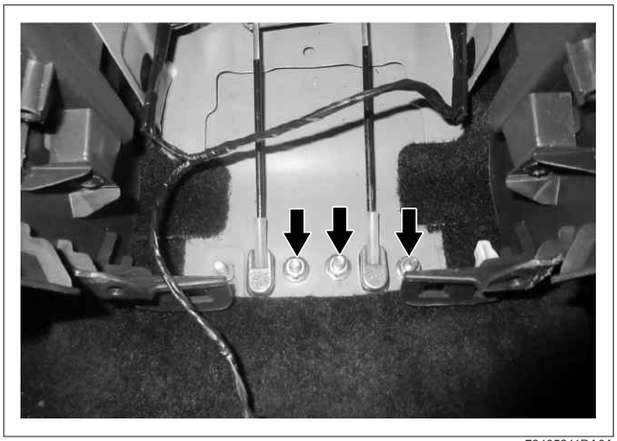
Removal

1. Completely disengage parking brake handle
2. Remove rear trim panel assembly of auxiliary instrument panel
3. Separate parking brake cable



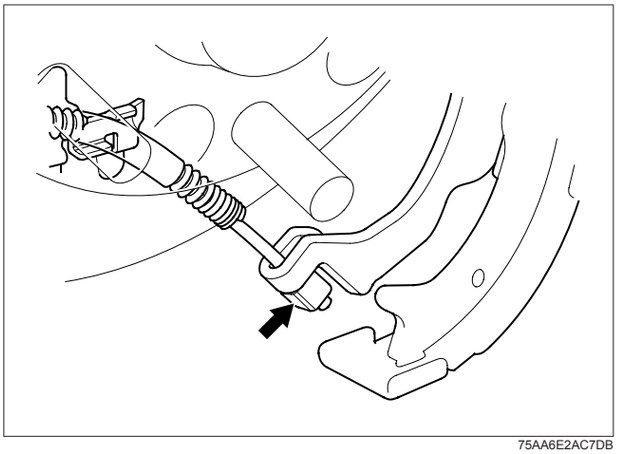
6216CC267972

4. Remove 3 nuts



78405211DA0A

5. Raise the vehicle to an appropriate position
6. Remove rear wheel
7. Separate rear brake caliper assembly
8. Remove rear brake disc
9. Remove parking brake cable from brake shoe lever



75AA6E2AC7DB

10. Remove 2 bolts and remove parking brake cable from rear brake



0737050F43F6

11. Remove 5 bolts and left parking brake cable
12. Remove 4 bolts and right parking brake cable

Installation

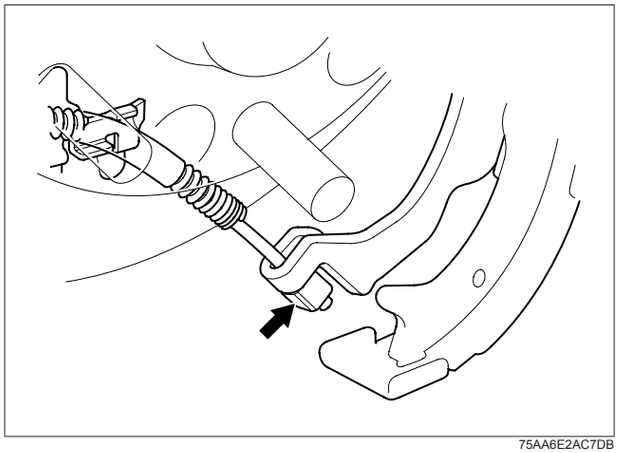
1. Perform installation work in reverse order of removal

Parking brake assembly

Removal/installation

Removal

1. Completely disengage parking brake handle
2. Raise the vehicle to an appropriate position
3. Remove rear wheel
4. Separate rear brake caliper assembly
5. Remove rear brake disc
6. Separate rear wheel speed sensor
7. Disconnect parking brake cable assembly

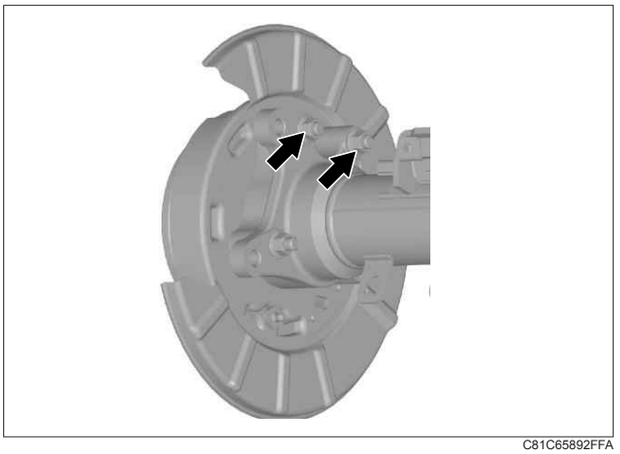


75AA6E2AC7DB



0737050F43F6

8. Remove axle shaft
9. Remove 2 nuts



C81C65892FFA

10. Remove parking brake assembly

Installation

1. Perform installation work in reverse order of removal

Notice

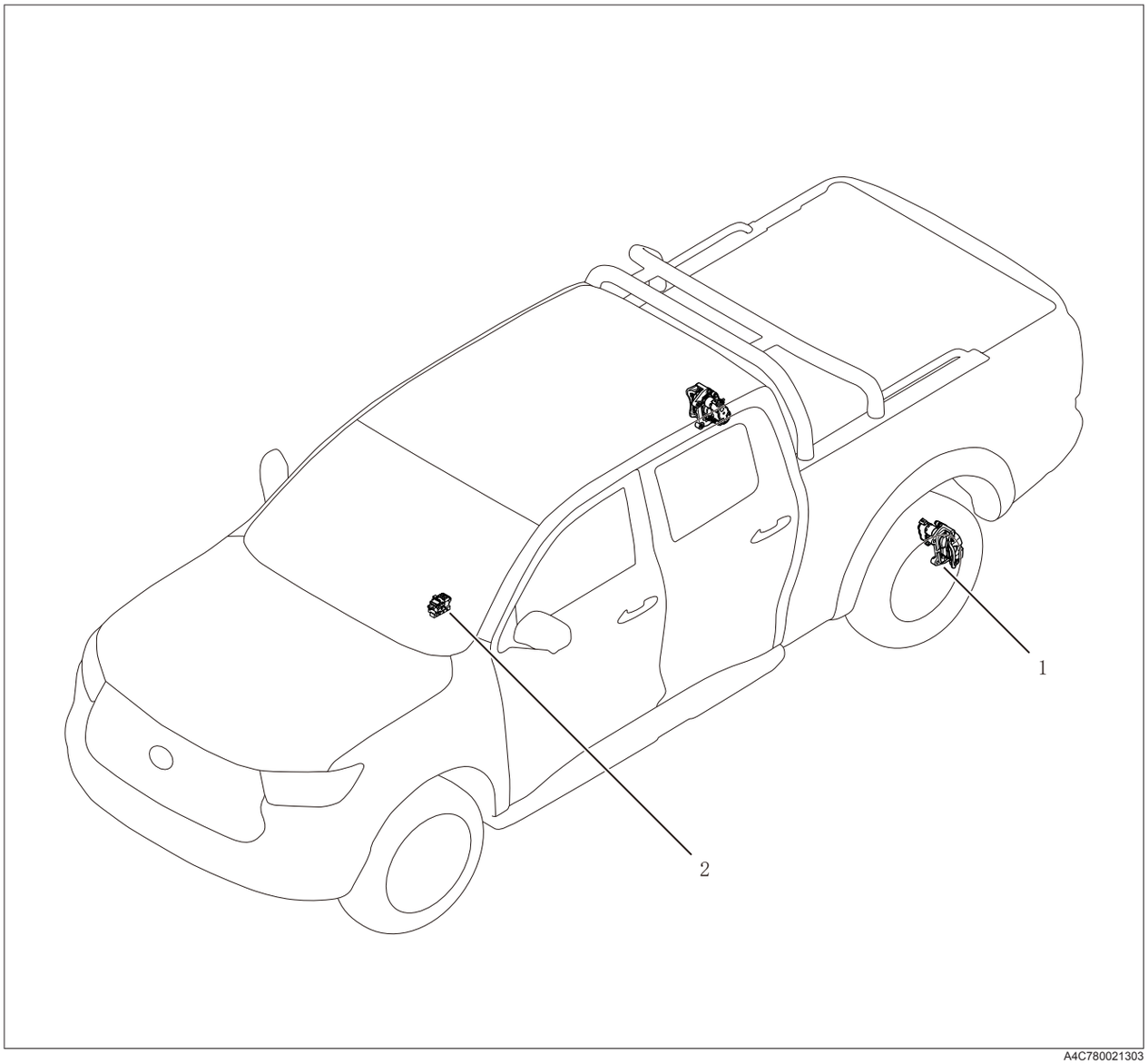
- Do not overstretch spring. Overstretching spring may cause damage.
- Adjust parking brake.

Parking brake - electronic

Parking brake .....34－1
Location diagram .....34－1
Special tool .....34－2
Initialization .....34－3
EPB switch assembly .....34－4
Pin definition .....34－4
Removal/installation.....34－4
Motor gear unit .....34－5
Pin definition .....34－5
Removal/installation.....34－5

Parking brake

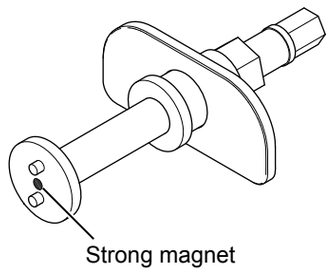
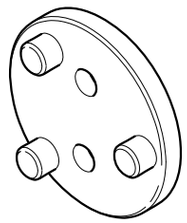
Location diagram



A4C780021303

1. Motor gear unit
2. EPB switch assembly

Special tool

Code	Name	Purpose	Schematic diagram
ZEZF000035	Brake wheel cylinder reset tools	Using with ZEZF000037, reset brake piston	
ZEZF000037	Brake wheel cylinder reset tools	Using with ZEZF000035, reset brake piston	

Initialization

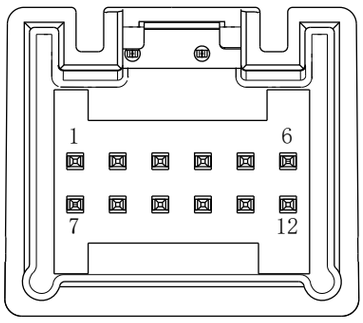
Notice

› If there occurs abnormal power failure of the vehicle, and the parking brake system fault warning indicator lights up after the vehicle is powered on again, the system needs to be initialized in this case.

1. Pull up EPB switch
2. Depress the brake pedal and press the EPB switch to release EPB normally

EPB switch assembly

Pin definition



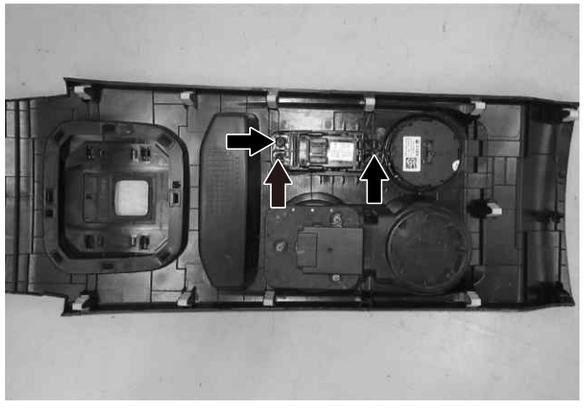
C397D32DE122

Pin	Description of functions
1	Electronic hand brake function
2	Electronic hand brake function
3	Electronic hand brake function
4	Electronic hand brake function
5	—
6	—
7	Backlight-
8	Backlight+
9	—
10	—
11	Automatic parking function
12	Automatic parking function

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove control panel assembly of the auxiliary instrument panel
3. Remove 3 screws and EPB switch assembly



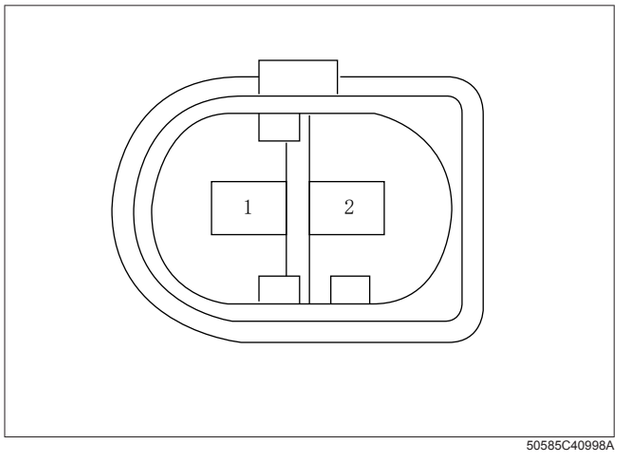
E3F0EBEC747F

Installation

1. Perform installation work in reverse order of removal

Motor gear unit

Pin definition



50585C40998A

Pin	Function	
	Release	Clamp
1	Connect positive terminal	Connect negative terminal
2	Connect negative terminal	Connect positive terminal

Removal/installation

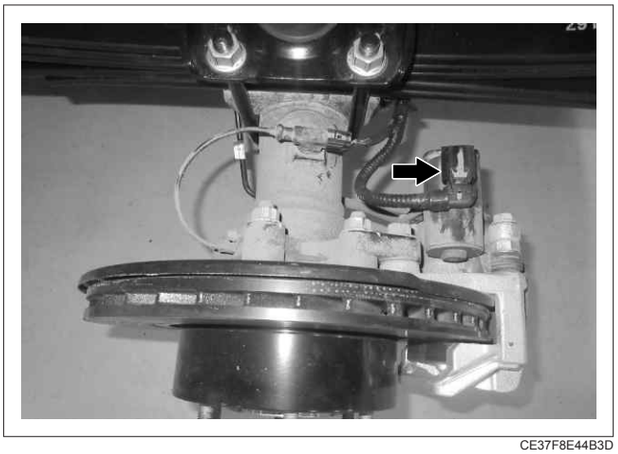
Removal

1. Releasing the parking brake

Notice

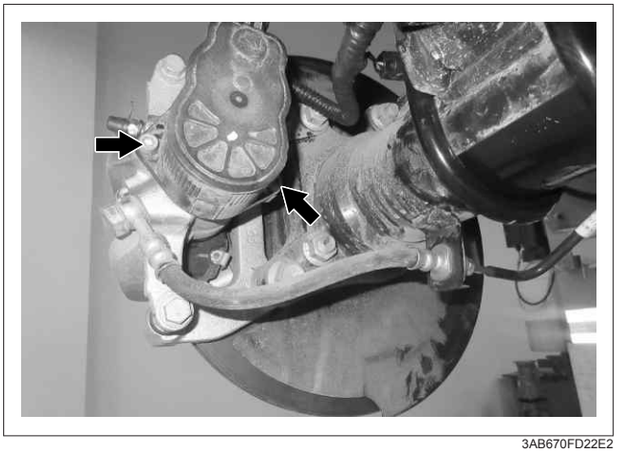
When the ignition switch is in the ON mode or the engine is running, depress the brake pedal, press and hold the EPB switch, release the parking brake, and then turn off the ignition switch. After the engine shuts off, release the EPB switch.

2. Raise the vehicle to an appropriate position
3. Remove rear wheel
4. Pull out plug-in connector locker
5. Disconnect motor gear unit connector



CE37F8E44B3D

6. Remove 2 bolts and remove motor gear unit



3AB670FD22E2

Installation

1. Perform installation work in reverse order of removal

Vehicle stabilization system

ESP control system ..... 35－1
Overview ..... 35－1
Diagram ..... 35－2
Location diagram ..... 35－4
System diagram ..... 35－5
Specified torque ..... 35－6
Precautions ..... 35－7
Preliminary checks ..... 35－8
Diagnosis flowchart ..... 35－9
Repair without DTCs ..... 35－10
Occasional fault repair ..... 35－11
DTC checklist ..... 35－12
DTC troubleshooting method ..... 35－18
ESP hydraulic pressure control unit ..... 35－25
Pin definition ..... 35－25
Removal/installation ..... 35－27
Front wheel speed sensor ..... 35－28
Pin definition ..... 35－28
Removal/installation ..... 35－28
Rear wheel speed sensor ..... 35－30
Pin definition ..... 35－30
Removal/installation ..... 35－30
Steering angle sensor ..... 35－31
Removal/installation ..... 35－31
ESP OFF switch ..... 35－32
Pin definition ..... 35－32
Removal/installation ..... 35－32

ESP control system

Overview

The ESP is an active safety system. Its main function is to use the adhesion between the tires and the road surface to the maximum extent, to maintain the vehicle maneuverability and traveling stability.

Based on basic functions of ABS, TCS and VDC, the ESP system integrates following advanced functions: hydraulic emergent brake assist (HBA), hill-start assist (HHC), rollover prevention (RMI), automatic parking brake (AVH), and deceleration control (CDP), thus further enhancing driving comfort.

Hydraulic brake assist (HBA)

In emergent situations, a driver more often than not cannot apply enough force to the brake pedal. The hydraulic brake assist (HBA) system can identify this fast but insufficient pedal force, and automatically establish a proper braking pressure. The HBA system can greatly reduce the braking distance.

Hill-start assist (HHC)

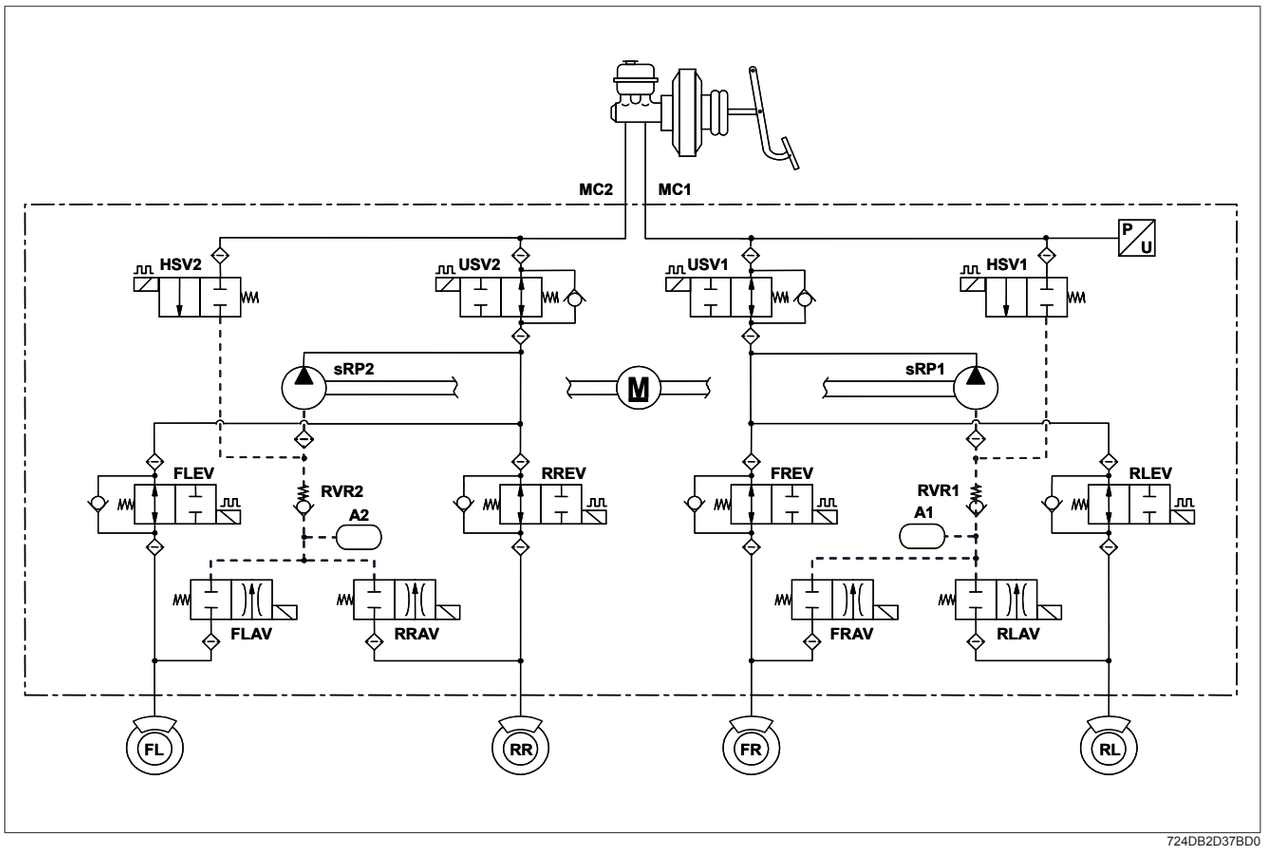
After the brake pedal is released, the HHC function can keep the braking pressure for up to 2 seconds before the vehicle starts, so as to prevent the vehicle from sliding backward.

Rollover prevention function (RMI)

Through the ESP internal sensor to supervise vehicle’s state, it can actively apply braking pressure to prevent vehicle from excessive rolling due to a sudden turn, thus avoiding rolling-over and enhancing driving safety.

Diagram

The brake system adopts a type-X layout (as shown in following diagram). The ESP 9 hydraulic regulator is composed of one motor, two reflux pumps, two accumulators, one pressure sensor and twelve solenoid valves.



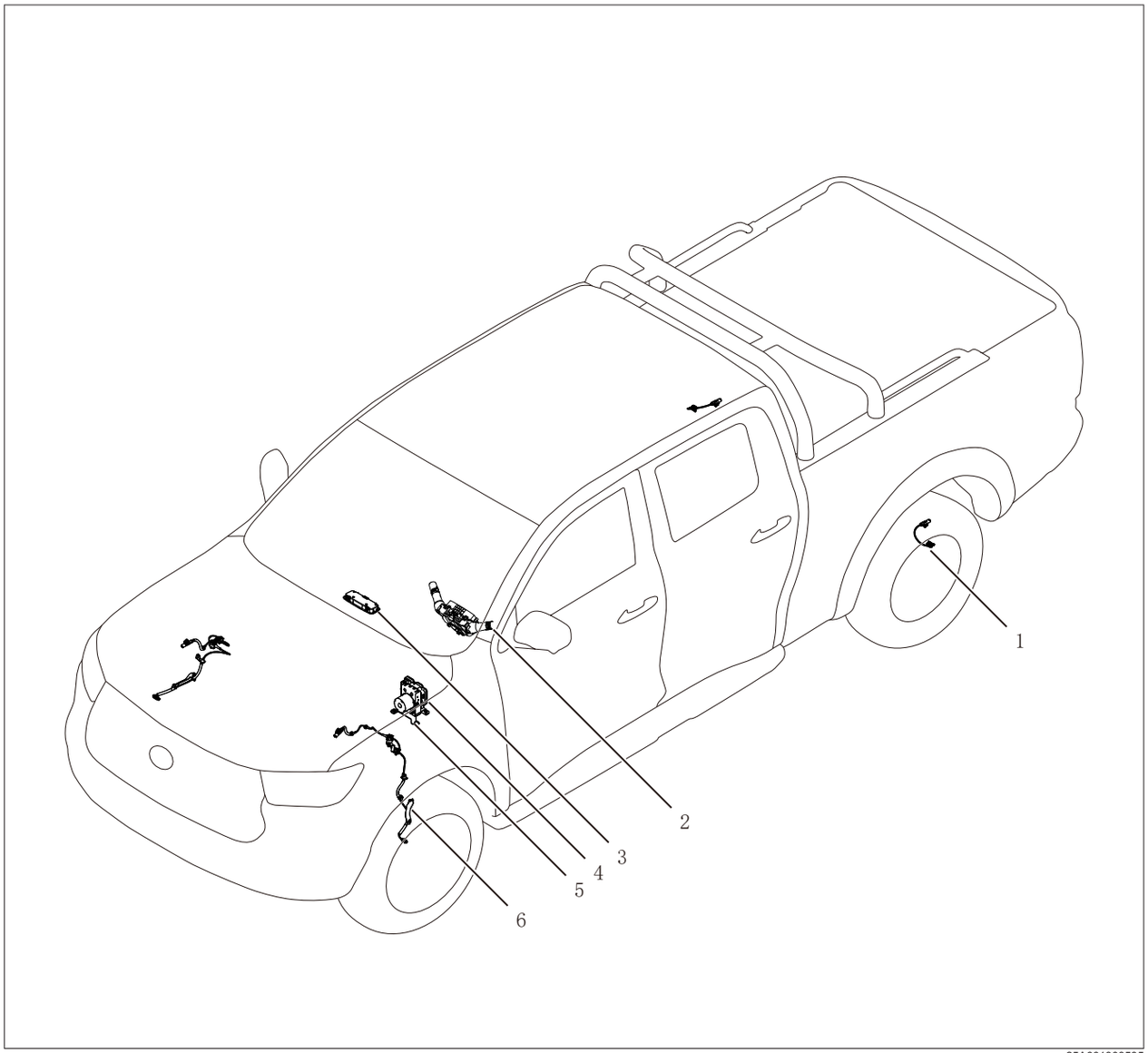
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Abbreviations in English in the figures have following meanings ascribed to them:

MC1	Brake master cylinder loop No.1	FLAV	Front left wheel liquid outlet valve
MC2	Brake master cylinder loop No. 2	FREV	Front right wheel liquid inlet valve
M	Motor	FRAV	Front right wheel liquid outlet valve
RP1	Reflux pump 1	RLEV	Rear left wheel liquid inlet valve
RP2	Reflux pump 2	RLAV	Rear left wheel liquid outlet valve
A1	Accumulator 1	RREV	Rear right wheel liquid inlet valve
A2	Accumulator 2	RRAV	Rear right wheel liquid outlet valve
FL	Front-left wheel	HSV1	High-pressure valve 1
FR	Front-right wheel	HSV2	High-pressure valve 2
RL	Rear-left wheel	USV1	Guide valve 1

RR	Rear-right wheel	USV2	Guide valve 2
FLEV	Front left wheel liquid inlet valve	P/U	Pressure sensor

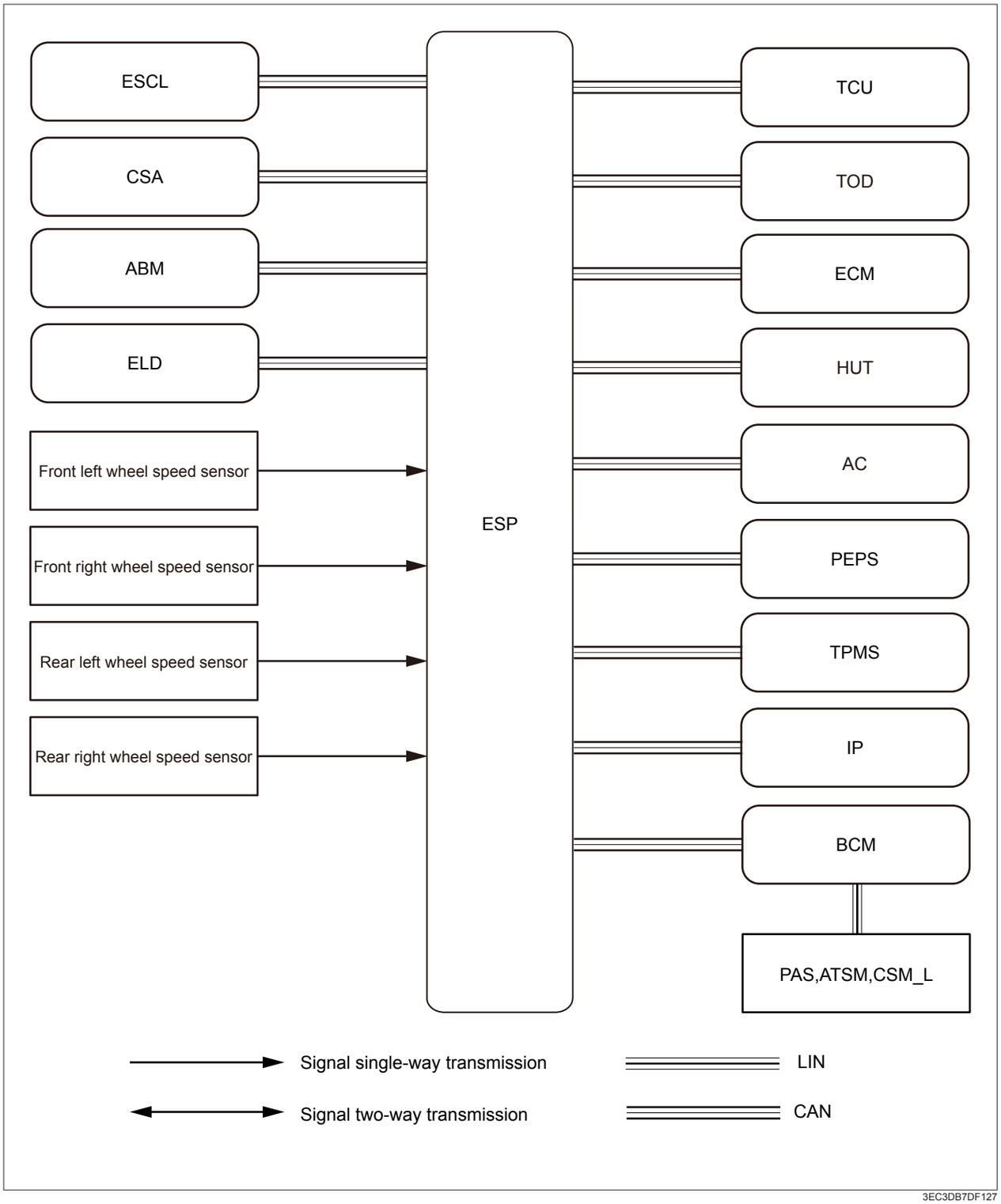
Location diagram



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1. Rear wheel speed sensor assembly
2. Steering angle sensor (integrated in combination switch)
3. ESP (integrated in console panel switch assembly)
4. Hydraulic pressure control unit
5. Hydraulic control unit bracket
6. Front wheel speed sensor assembly

System diagram



3EC3DB7DF127

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Vehicle stabilizer hydraulic control unit × vehicle stabilizer hydraulic control unit bracket assembly	9±3	2	—
Bolt	Vehicle stabilizer hydraulic control unit bracket assembly × vehicle body	9±3	3	—
Bolt	Front wheel speed sensor assembly × steering knuckle assembly	9±3	2	—
Bolt	Rear wheel speed sensor assembly × rear wheel hub assembly	9±3	2	—
All brake pipeline ports M10	Pipe x vehicle stabilizer hydraulic control unit/combined valve	16±2	—	—
All brake pipeline ports M10	Pipe × hose	16±2	—	—
All brake pipeline ports M12	Pipe × vehicle stabilizer hydraulic control unit/booster master cylinder	18±2	—	—

Precautions

Only specified parts can be used in replacing the ESP system components.

Prior to conducting diagnostics on the ESP system, you must first eliminate any faults with the basic brake system, for instance:

- Brake system noise.
- Brake pedal overly stiff.
- Brake pedal or vehicle vibrations with regular braking.
- Braking deviation.
- Parking brake system fault.

The ESP hydraulic control unit can only be replaced as a whole. No dismantling inspection or partial replacement/interchange may be allowed.

Turn on the ignition switch, and the warning indicator will remain lit after system self-check is complete; the warning indicator remains lit all the time during driving. The two situations indicate that the ESP system has detected a fault.

You must turn off the ignition switch before unplugging ESP harness and sensor harness.

Check that the connector is dry and clean to prevent the entry of any foreign matter.

The ESP harness connector must be installed horizontally and vertically into position to prevent any damage to the connector.

Be sure to make a correct connection according to the markings on ESP assembly when connecting the ESP brake pipelines.

- MC1: brake pipeline 1 connected to the brake master cylinder.
- MC2: brake pipeline 2 connected to the brake master cylinder.
- FL: brake pipeline connected to the brake wheel cylinder of front left wheel.
- FR: brake pipeline connected to the brake wheel cylinder of front right wheel.
- RL: brake pipeline connected to the brake wheel cylinder of rear left wheel.
- RR: brake pipeline connected to the brake wheel cylinder of rear right wheel.

After the engine has been started and the vehicle reaches a speed of about 40km/h, a short buzzing sound will be heard. This is the ESP self-check sound and is normal.

Working sound of ESP hydraulic unit motor, solenoid valve and reflux pump; sound caused by brake pedal bounce; sound caused by suspension’s impact on vehicle body due to emergency brake. These are normal working sounds of ESP.

Preliminary checks

Ensure that only tires and wheels of the recommended size are installed on the vehicle, and the pattern and depth of tires must be the same.

Check the ESP hydraulic control unit, brake pipeline and connecting points for leakage.

Check the ESP fuse for signs of burnout and to ensure that the right model is being used.

- Pump motor fuse (40 A)
- Solenoid valve fuse (40 A)
- Electronic control unit fuse (5 A)

Check battery voltage as well as for signs of corrosion or displacement of the battery terminals.

- The normal operating voltage of the ESP ranges from 10 V to 16 V

Check that the ESP grounding point is not loose or if its position has changed.

The ESP ground wire must be well-sealed to prevent any water or moisture from seeping into adapters of ESP ECU due to capillary (siphon) effect via harness pores and thus causing failure of functions.

- Countermeasures: Apply sealant to exposed sections of the harness and then use heat shrink tubing.

Check that the relevant ESP component harness and connectors are connected properly and that they have not been cut or otherwise damaged.

If the ESP is too loud, it may be due to the following causes:

- Loosening of ESP assembly within bracket.
- Loosening of ESP bracket within vehicle body.
- ESP bracket plastic gasket missing or damaged.
- The brake pipeline is deformed, knocking, or interfering.
- The snap for the brake-pipeline bracket is damaged.

Diagnosis flowchart

1. Vehicle enters repair shop
2. Analyze customer’s problem
3. Read DTC
   - DTC indicated, and go to step 4
   - No DTC indicated, and go to step 6
4. Record DTC and then clear it
5. Confirm and reproduce the fault: Accelerate vehicle to a speed of 40 km/h or above to simulate the fault environment and re-read DTC
   - DTC indicated, current DTC, and go to step 7
   - No DTC indicated, historic DTC, and go to step 8
6. Confirm repair without DTC, and then go to step 9
7. Conduct troubleshooting according to list of DTC, and then go to step 9
8. Conduct troubleshooting according to fault symptom checklist, and then go to step 9
9. Confirm that the fault has been eliminated, and carry out the repair completion inspection
10. Prevent recurrence of fault
11. End

Repair without DTCs

If the brake system fails but no DTC is stored in the ESP, such fault is referred to as fault without DTC. Generally, DTC is caused by basic brake system failure. For instance:

- Brake fluid leak (which may lead to soft braking, long brake pedal travel, and even severe braking failure).
- Use of sub-standard brake fluid (which may lead to corrosion of the brake pipeline and ESP hydraulic pressure regulator components and even severe braking failure).
- Air in brake pipeline (which may lead to soft braking and even severe braking failure).
- Brake pipeline blockage (which may lead to 'stiffer' brake, brake deviation or even severe braking failure).
- Excessive wear of brake disc (which may lead to soft braking, long brake pedal travel).
- The booster fault (which may lead to soft or stiff braking, long brake pedal travel, and even severe braking failure).
- Incorrect brake pipeline connections (which may lead to weak ESP performance, drifting, long braking distance, etc.).

Notice

- For the correct installation method, please refer to the markings close to the oil apertures on the ESP hydraulic pressure regulating module: MC1 indicates master cylinder pipeline 1; MC2 indicates master cylinder pipeline No. 2; FL stands for front left wheel cylinder pipeline; FR stands for front right wheel cylinder pipeline; RL stands for rear left wheel cylinder pipeline; RR stands for rear right wheel cylinder pipeline).

Caution

- No power supply available or abnormal suspension of power supply to the ESP may cause that the warning indicators of EBD, ABS and ESP keep lighting up without a DTC recorded.

Notice

- Troubleshooting advice: check the corresponding parts based on fault symptoms to conduct troubleshooting.

Occasional fault repair

Transient bad contact in the electric circuit and input/output signal point of electronic system may lead to occasional fault. It is not easy to identify the cause as sometimes the fault itself may automatically disappear. When encountering an occasional fault, simulate the fault in accordance with following methods to check whether the fault recurs.

No.	Possible causes	Trouble simulation	Remarks
1	Where vibration is suspected as main cause	Slightly shake the ESP ECU connector upwards, downwards, leftwards and rightwards	Replace parts if the harness has been twisted broken or has broken due to tension. When the vehicle is moving, the wheel speed sensor harness may cause momentary open circuits/short circuits as it moves up and down together with the suspension system. Therefore, you must conduct a drive test of the vehicle when checking sensor harness.
		Slightly shake the ESP harness upwards, downwards, leftwards and rightwards	
		Slightly shake the sensor upwards, downwards, leftwards and rightwards	
		Slightly shake the other moving parts (such as wheel bearing)	
2	Where excessive load is suspected as main cause	Turn on all the appliance switches, including the headlamp and wiper switches, etc., making the vehicle power supply under high load.	—

If the trouble does not recur, do not carry out diagnosis and repair until the trouble occurs again. Generally, the occasional trouble will gradually develop to reproducible trouble, and will not disappear automatically.

DTC checklist

No.	DTC	DTC description
1	C002004	Reflux pump error
2	C003108	Front left wheel speed sensor error
3	C003200	Front left wheel speed sensor open-circuited
4	C003208	Front left wheel speed direction error
5	C003408	Front right wheel speed sensor error
6	C003500	Front right wheel speed sensor open-circuited
7	C003508	Front right wheel speed direction error
8	C003708	Rear left wheel speed sensor error
9	C003800	Rear left wheel speed sensor open-circuited
10	C003808	Rear left wheel speed direction error
11	C003A08	Rear right wheel speed sensor error
12	C003B08	Rear right wheel speed sensor open-circuited
13	C004008	Brake signal reliability error
14	C004460	Pressure sensor signal fault
15	C004510	Pressure sensor wiring error
16	C006108	Transverse-speed signal error
17	C006208	Longitudinal-speed signal error
18	C006308	Yaw angle signal error
19	C006B06	Abnormal control
20	C007204	Brake disc overheat
21	C007208	General error of valve
22	C00A000	Front left wheel speed sensor harness short-circuited to ground
23	C00A100	Front left wheel speed sensor harness short-circuited to power supply
24	C00A200	Front right wheel speed sensor harness short-circuited to ground
25	C00A300	Front right wheel speed sensor harness short-circuited to power supply
26	C00A400	Rear left wheel speed sensor harness short-circuited to ground
27	C00A500	Rear left wheel speed sensor harness short-circuited to power supply
28	C00A600	Rear right wheel speed sensor harness short-circuited to ground
29	C00A700	Rear right wheel speed sensor harness short-circuited to power supply
30	C00A800	Inertia sensor calibration failure
31	C00A900	Front left wheel speed sensor wiring error

No.	DTC	DTC description
32	C00AA00	Front right wheel speed sensor wiring error
33	C00AB00	Rear left wheel speed sensor wiring error
34	C00AC00	Rear right wheel speed sensor wiring error
35	C010016	GWM_PBC error 0
36	C010116	GWM_PBC error 1
37	C010217	GWM_PBC error 2
38	C01034B	GWM_PBC error 3
39	C010449	GWM_PBC error 4
40	C010553	GWM_PBC error 5
41	C010653	GWM_PBC error 6
42	C010768	GWM_PBC error 7
43	C010896	GWM_PBC error 8
44	C010949	GWM_PBC error 9
45	C01104B	GWM_PBC error 10
46	C011196	GWM_PBC error 11
47	C011296	GWM_PBC error 12
48	C011349	GWM_PBC error 13
49	C011496	GWM_PBC error 14
50	C011596	GWM_PBC error 15
51	C011696	GWM_PBC error 16
52	C011796	GWM_PBC error 17
53	C011896	GWM_PBC error 18
54	C011996	GWM_PBC error 19
55	C012096	GWM_PBC error 20
56	C012196	GWM_PBC error 21
57	C012296	GWM_PBC error 22
58	C012396	GWM_PBC error 23
59	C012496	GWM_PBC error 24
60	C012596	GWM_PBC error 25
61	C012696	GWM_PBC error 26
62	C012796	GWM_PBC error 27
63	C012896	GWM_PBC error 28
64	C012996	GWM_PBC error 29
65	C013096	GWM_PBC error 30
66	C013196	GWM_PBC error 31

No.	DTC	DTC description
67	C013296	GWM_PBC error 32
68	C013396	GWM_PBC error 33
69	C013496	GWM_PBC error 34
70	C013596	GWM_PBC error 35
71	C013696	GWM_PBC error 36
72	C013796	GWM_PBC error 37
73	C013896	GWM_PBC error 38
74	C013996	GWM_PBC error 39
75	C046004	Steering wheel steering signal offset out of range
76	C046008	Steering wheel steering signal error
77	C046009	Steering wheel steering signal check error
78	C100004	Processor error
79	C100104	Can hardware error
80	C101008	Processor software error
81	C102001	Processor hardware error
82	C104C04	Button error
83	C106600	GWM steering wheel turn-angle calibration
84	C108C08	Reverse gear signal constant error
85	C109904	Wheel speed sensor error
86	C10AD08	Vacuum sensor error
87	C121208	Variant error
88	C154604	EPB power supply failure
89	C154700	Left side EPB hardware error
90	C154800	Right side EPB hardware error
91	C154900	APB right brake error
92	C154A00	APB left brake error
93	C155512	EPB press-button loop error
94	C155C00	PBC command error
95	C155D45	PBC memory error
96	C15611E	EPB brake right-motor H bridge error
97	C156600	EPB circuit error
98	C156601	EPB left caliper passive error
99	C156700	EPB right caliper electronic error
100	C156701	EPB right caliper passive error
101	C156800	EPB left H bridge error

No.	DTC	DTC description
102	C156801	EPB left H bridge CMST
103	C156900	EPB right H bridge error
104	C156901	EPB right H bridge CMST
105	C15691D	EPB left H bridge current expectation
106	C156B00	Drive general error
107	C156C92	APB brake circuit error
108	C156D62	Suspicious EPB action
109	C190004	The processor voltage is too high
110	C190104	The processor voltage is too low
111	C200004	Misuse of hub mode
112	U000188	CAN bus BUSOFF
113	U010008	EMS node message DataCorrupt
114	U010087	EMS node message lost
115	U010108	TCU node message DataCorrupt
116	U010187	TCU node message lost
117	U011008	MCU node message DataCorrupt
118	U011087	MCU node message lost
119	U011487	TOD node message lost
120	U012608	SAS node message DataCorrupt
121	U012682	SASAliveCounter monitoring error
122	U012687	SAS node message lost
123	U013108	EPS node message DataCorrupt
124	U013186	DST function related signal error
125	U013187	EPS node message lost
126	U014008	BCM node message DataCorrupt
127	U014087	EMS node message lost
128	U014608	GW node message DataCorrupt
129	U014687	GW node message lost
130	U015508	IP node message DataCorrupt
131	U015587	IP node message lost
132	U016308	HUT node message DataCorrupt
133	U016387	HUT node message lost
134	U016408	AC-FCP node message DataCorrupt
135	U016487	AC-FCP node message lost
136	U023208	L-RSDS node message DataCorrupt

No.	DTC	DTC description
137	U023286	Invalid RCTBNet signal
138	U023287	L-RSDS node message lost
139	U023587	ACC node message lost
140	U024308	APA node message DataCorrupt
141	U024386	Invalid MEBNet signal
142	U024387	APA node message lost
143	U029387	HCU node message lost
144	U040086	Invalid IPNet signal
145	U040186	Invalid EngineNet signal
146	U040286	Invalid GearNet signal
147	U040586	Invalid ACCNet signal
148	U042086	Invalid Sclutch signal
149	U042100	ACC node message DataCorrupt
150	U045686	Invalid AmbientNet signal
151	U050005	Invalid ATM_EMSNegResp signal
152	U050006	Invalid ATM_TCUNegResp signal
153	U050007	Invalid ATM_TODNegResp signal
154	U050008	Invalid ATM_EGDNegResp signal
155	U05000A	Invalid ATMNet signal
156	U059386	Invalid electric car Motor signal
157	U100086	Invalid ABMNet signal
158	U100087	ABM node message lost
159	U100208	PEPS node message DataCorrupt
160	U100287	PEPS node message lost
161	U101408	ELD node message DataCorrupt
162	U101486	Invalid ELD signal
163	U101487	ELD node message lost
164	U110017	CAN bus overvoltage
165	U110116	CAN bus undervoltage
166	U120104	TOD node message DataCorrupt
167	U140004	ABM node message DataCorrupt
168	U15000B	Invalid CCO signal
169	U160108	Invalid BLS signal
170	U160208	HCU node message DataCorrupt
171	U161408	Invalid RBC signal

No.	DTC	DTC description
172	U162608	Invalid APANet signal

DTC troubleshooting method

C190004, C190104

Power supply voltage high or low

Possible causes:

- Battery voltage too high or too low.
- Vehicle body not grounded properly.

Diagnostic and repair method:

- Measure battery voltage, and recharge battery when necessary (standard voltage value 9V~16V).
- Check the two ESP grounding points, including the ESP electronic control unit and reflux pump motor grounding points.
- Turn on all vehicle appliances that consume significant amounts of power and measure ESP voltage, and power supply may be insufficient at high load.
- Measure the voltage change that occurs when the vehicle is being started up and when all high-power appliances are being turned on. Existing power faults can cause significant voltage changes in the power circuit.

C002004

Pump motor fault

Possible causes:

- System overheating protection.
- Bad power supply to pump motor (low voltage, blown fuse or bad contacts).
- Pump motor not grounded properly.
- Pump motor damaged.

Diagnostic and repair method:

- Cool vehicle for 10 minutes and then read DTC again.
- Check pump motor circuitry, fuse and power source voltage.
- Use a 21 W test light to measure the voltage drop between the ESP connector pump motor power pin and the positive terminal of the battery (standard value: less than 0.2 V).
- Use a 21 W test light to measure the voltage drop between the ESP connector pump motor ground pin and vehicle body grounding point (standard value: less than 0.2 V).
- Accelerate vehicle to speed of 40 km/h and above to activate ESP system dynamic self-check.
- If the fault is still present following dynamic self-check, replace the ESP assembly and discharge air from the brake pipelines.

C004510，C004460

Pressure sensor fault

Possible causes:

- Brake-lamp switch or switch circuitry fault.
- Pressure sensor hardware fault.
- Pressure sensor signal is interrupted and signal is short-circuited to the ground.

Diagnostic and repair method:

› Check that the brake-lamp switch and circuitry are functioning normally.

› Replace ESP assembly and discharge air from brake pipeline.

› Check pressure sensor connecting line.

C007208

Solenoid valve fault

Possible causes:

› System overheating protection.

› ESP electronic control unit damaged.

Diagnostic and repair method:

› Cool vehicle for 10 minutes and then read DTC again.

› Replace ESP assembly and discharge air from brake pipeline.

C003200，C003500，C003800，C003B08，C00A900，C00AA00，C00AB00，C00AC00

Wheel speed sensor line fault

Possible causes:

› Wheel speed sensor circuit disconnected, or connectors loose/broken.

› Wheel speed sensor signal and power cords connected the wrong way round.

› The signal line is shorted to ground and power supply.

Diagnostic and repair method:

› Check wheel speed sensor harness for open circuit or short circuit.

› Check for loose or broken wheel speed sensor cabling connectors.

› Check to see if the wheel speed sensor power cord and signal lines are connected to the right terminals.

› Accelerate vehicle to speed of 40 km/h and above to activate ESP system dynamic self-check.

› If fault is not eliminated following dynamic self-check, replace wheel speed sensor.

C003108， C003208， C003408， C003508， C003708， C003808， C003A08，C00A000，C00A100，C00A200，C00A300，C00A400，C00A500，C00A600，C00A700，C109904

Wheel speed sensor signal fault

Possible causes:

› Wheel speed sensor harness twisted, or connectors loose/broken.

› Wheel speed sensor signal line shorted to power supply.

› Wheel speed sensor power cord shorted to ground.

› Gear ring not installed, missing teeth, foreign matter in gear ring, gear ring demagnetized, gear ring off-center.

› Sensor and gear ring clearance too large.

› Wheel speed sensor under magnetic interference from external sources (wheel or shaft not de-magnetized).

› Wheel speed sensor body fault.

› Gear ring gear number error (wear or loss).

› Tire size incorrect.

Diagnostic and repair method:

› Check for twisting of wheel speed sensor harness.

› Check for loose or broken wheel speed sensor cabling connectors.

› Check for signs of wheel speed sensor harness short-circuited to either power or ground.

› Check that the wheel speed sensor has been fixed correctly.

› Obtain wheel speed sensor data stream using the scanner. Then record all various wheel speeds during travel and make sure that they are consistent with the speed indicator, check that the speed indicator is accurate.

› If the wheel speed taken is inconsistent with the indicator speed, check that the wheel speed sensor signal gear ring is not missing any teeth, dirty, containing foreign matter, demagnetized, or off-center.

› Following replacement/repair/maintenance of wheel speed sensor, you must bring the vehicle to a speed of 40 km/h and above to activate ESP system dynamic self-check.

› If fault is not eliminated following dynamic self-check, replace wheel speed sensor.

i Notice

› With wheel speed sensor signal faults, after remedying the fault you must start the vehicle and bring it to a speed above 40 km/h to turn off the ABS or ESP warning indicator.

› Do not measure the power voltage from the wheel speed sensor to the ECU. So long as the wheel speed sensor return circuit is open somewhere along the line the ECU will automatically cut off power supply and will only resume power supply after conducting a self-check at the next ignition.

C046004，C046008，C046009， C106600

Steering wheel angle sensor fault

Possible causes:

› Steering angle sensor calibrated incorrectly.

› Steering angle sensor wiring fault.

› Steering angle sensor connector loose or broken.

› Steering angle sensor damaged.

Diagnostic and repair method:

› Cancel steering angle sensor calibration and recalibrate.

› Check steering angle sensor harness.

› Check and reconnect steering angle sensor connector.

› Replace steering angle sensor

C00A800，C006108， C006208，C006308

Yaw rate angle sensor faults

Yaw-rate sensor contains three signals: lateral acceleration, longitudinal acceleration and yaw velocity.

Possible causes:

- Yaw rate sensor installation position incorrect or excessive assembly tolerance (make sure that the sensor is on the correct plane within the vehicle body).
- Yaw rate sensor calibrated incorrectly.
- Yaw rate sensor damaged.

Diagnostic and repair method:

- Adjust yaw rate sensor installation position, and check fixed position for signs of twisting and wear-and-tear.
- Re-calibrate yaw-rate sensor.
- Replace yaw-rate sensor.

C004008

Brake lamp switch (BLS) in trouble

Possible causes:

- Brake-lamp switch open-circuited or short-circuited.
- Brake-lamp switch installed incorrectly.
- Brake-lamp switch damaged.

Diagnostic and repair method:

- Check brake-lamp switch and harness.
- Replace brake-lamp switch.

C006B08,C007204

Brake system abnormal (ABS/ESP operating too long or the brake system overheating)

Possible causes:

- Sustained hard driving or braking for long periods of time.
- Inaccurate wheel speed sensor signals.
- Abnormal steering wheel angle sensor, yaw velocity sensor signals.

Diagnostic and repair method:

- Obtain wheel speed sensor data stream using the scanner and observe to see if any wheel in particular is spinning at a higher or lower speed consistently.
- Start the vehicle and drive in an 8-figure loop. During the test, the steering wheel must be turned to full lock both left and right. Then, read the DTC again.
- If there is no DTC related to the steering wheel angle sensor or yaw velocity sensor present, you would need to check that the ESP is installed along the correct position and is secured. The ESP bracket must not be used for installing other devices.

C100004，C101008，C102001

ECU faults

Possible causes:

- ECU damaged (MCU or other hardware fault).
- Software configuration error.

Diagnostic and repair method:

› Reconfigure ECU and clear DTCs.

› If the fault remains, replace the ESP assembly and discharge air from the brake pipeline.

U000188， U110116， U110017，C100104

CAN bus fault

Possible causes:

› Battery voltage too high or too low (standard voltage range: 9 V~16 V).

› CAN bus gateway fault.

› The ECU is damaged.

Diagnostic and repair method:

› Measure battery voltage, and recharge battery when necessary.

› Check CAN bus and bus nodes.

› Replace ESP assembly and discharge air from brake pipeline.

U010008， U010087， U010108， U010187， U011008， U011087， U012608， U012687， U014008， U014087， U015508， U015587， U016408， U016487， U023208， U023287， U023587， U024308， U024387， U029387， U042100， U100087， U100208， U100287， U140004， U160208， U012682， U023286， U024386， U040086， U040186， U040286， U040586， U045686， U059386， U100086， U162608， U011487， U013108， U013187， U014608， U014687， U016308， U016387， U042086， U050005， U050006， U050007， U050008， U05000A， U101408， U101486， U101487， U120104， U15000B， U160108， U161408， U013186

CAN bus node fault

Possible causes:

› CAN bus communication interrupted.

› Poor power supply for CAN bus nodes (EMS/TCU/BCM/Gateway/AWDNET).

› There is something wrong with nodes of the CAN bus (EMS/TCU/BCM/Gateway/AWDNET) (it has left the CAN bus or the ECU has a problem).

Diagnostic and repair method:

› Check if CAN bus communication is normal.

› Turn off the ignition switch, and measure the resistance of CAN-H and CAN-L ranging from various CAN bus nodes to the ESP (standard value: less than 5 Ω).

› Measure CAN-H and CAN-L resistance from various CAN bus node connectors (with connectors in place), (standard value: 60 Ω).

› Check power supply of various CAN bus nodes.

› Obtain CAN bus node DTCs and check based on specific codes obtained.

C104C04

ESP off-switch fault

Possible causes:

› ESP OFF switch depressed by another object.

› ESP OFF switch or circuitry damaged.

Diagnostic and repair method:

› Turn off ESP off-switch manually, then restart ESP function.

› Check ESP OFF switch.

C121208

ESP configuration fault

Possible causes:

› Settings not established.

› Incompatible settings.

Diagnostic and repair method:

› Write in the correct settings using the scanner.

C108C08

Handbrake/clutch/reverse-gear signals are abnormal

Possible causes:

› The handbrake switch signal is abnormal.

› Hand brake switch harness open-circuited or short-circuited.

› There is a problem with the gearbox/clutch.

› Abnormal reverse gear signals.

Diagnostic and repair method:

› Check brake-lamp switch.

› Check brake-lamp switch harness.

› Check the gearbox/clutch.

› Check the TCU and diagnose it with its DTCs.

C200004

Misuse of hub mode

Possible causes:

› Hub mode triggering.

Diagnostic and repair method:

› Check if the hub mode is set via the diagnostic command.

C10AD08

Vacuum signal error

Possible causes:

› Vacuum sensor damaged.

› Vacuum pump pressure release.

Diagnostic and repair method:

› Check vacuum sensor harness and connection.

› Replace vacuum sensor.

› Check vacuum pump state.

C154604，C154700，C154800，C154900，C154A00，C155512，C15611E，C156600，C156601，C156700，C156701，C156800，C156900，C156801，C156901，C15691D，C156B00，C156C92，C156D62

APB/EPB automatic parking brake/electronic hand brake fault

Possible causes:

- APB automatic parking brake actuator harness fault.
- APB automatic parking brake actuating mechanism fault.

C010016，C010116，C010217，C01034B，C010449，C010553，C010653，C010768，C010896，C010949，C01104B，C011196，C011296，C011349，C011496，C011596，C011696，C011796，C011896，C011996，C012096，C012196，C012296，C012396，C012496，C012596，C012696，C012796，C012896，C012996，C013096，C013196，C013296，C013396，C013496，C013596，C013696，C013796，C013896，C013996，C155C00，C155D45

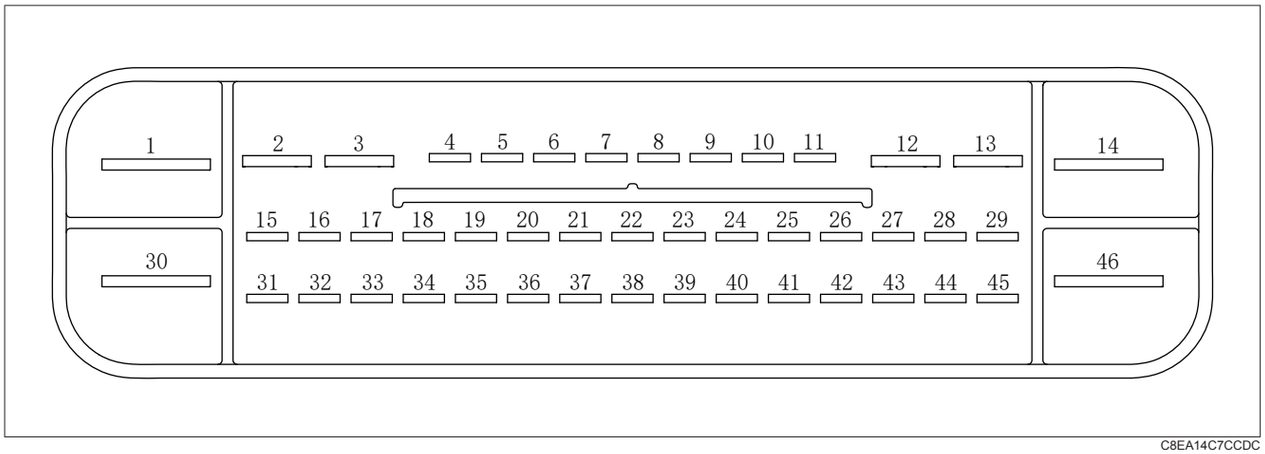
PBC caliper failure

Possible causes:

- Caliper harness related fault.
- Caliper mechanism related failure.

ESP hydraulic pressure control unit

Pin definition



C8EA14C7CCDC

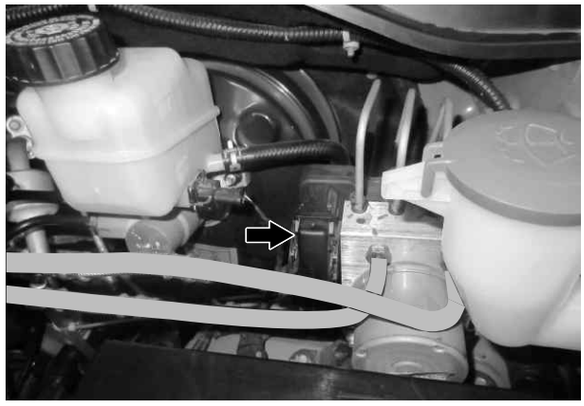
Pin No.	Function	Pin No.	Function
1	Power terminal of motor (positive)	2	Right parking caliper (+)
3	Right parking caliper (-)	4	—
5	CAN bus 1 (High)	6	—
7	Signal terminal of the wheel speed sensor (front left)	8	AVH switch indicator
9	Speed sensor signal	10	—
11	CAN bus 2 (high)	12	Left parking caliper (-)
13	Left parking caliper (+)	14	GND terminal of motor
15	Electronic parking switch 3 (SW3)	16	Electronic parking switch 6 (SW6)
17	HID switch	18	APB switch indicator
19	CAN bus 1 (low)	20	—
21	Power supply terminal of the wheel speed sensor (front right)	22	Power terminal of the wheel speed sensor (rear right)
23	Signal terminal of the wheel speed sensor (rear left)	24	Power supply terminal of the wheel speed sensor (front left)
25	CAN bus 2 (low)	26	Signal terminal of the wheel speed sensor (front right)
27	—	28	—
29	—	30	Valve power supply terminal
31	Electronic parking switch 1 (SW1)	32	Electronic parking switch 4 (SW4)
33	—	34	—
35	—	36	Wake up signal
37	Signal terminal of the wheel speed sensor (rear right)	38	Brake lamp signal

Pin No.	Function	Pin No.	Function
39	Power supply terminal of the wheel speed sensor (rear left)	40	—
41	AVH switch	42	—
43	ESP OFF switch	44	—
45	—	46	GND terminal of ECU

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Drain the brake fluid
3. Disconnect connectors of vehicle stabilizer hydraulic control unit



3BADA7D60067

Notice

› Pull out the connector locker, press the connector, lift the handle to and take off the connector.

4. Disconnect the 6 brake pipes

Notice

› Make assembly marks.

5. Loosen 2 nuts, and remove the vehicle stabilizer hydraulic control unit

Installation

1. Perform installation work in reverse order of removal

Caution

› Align assembly marks.

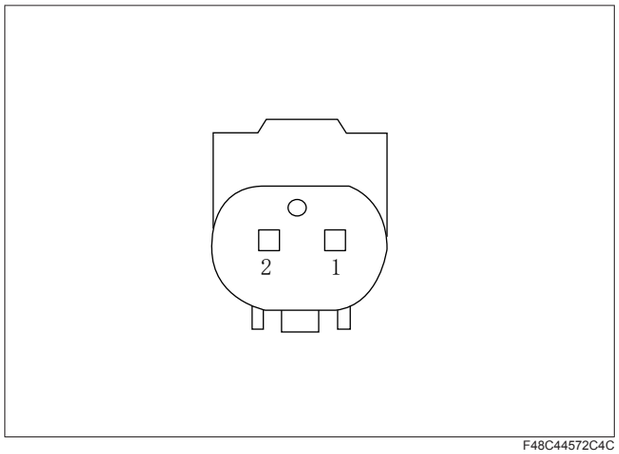
› Tighten the fastener according to the specified torque value.

› Fill brake fluid to MAX line level marked on the reservoir and exhaust the brake system.

› Configuration information must be written in after the replacement of the ESP hydraulic control unit, and the sensor must be calibrated.

Front wheel speed sensor

Pin definition



F48C44572C4C

Pin No.	Function
1	Signal
2	Voltage (+)

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove front wheels
4. Loosen clip and disconnect front wheel speed sensor connector



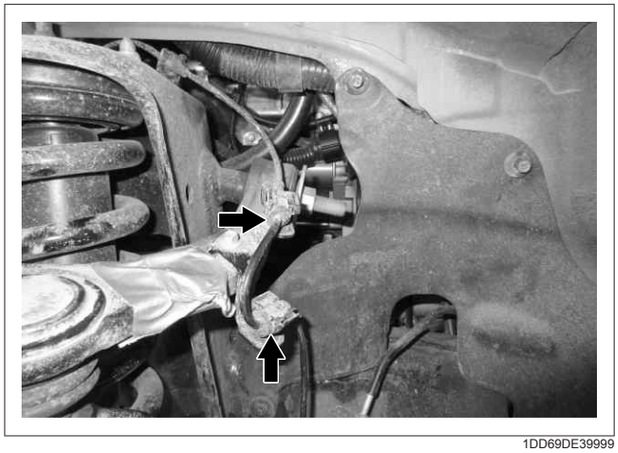
3F0E9AAEF66C

5. Separate front wheel speed sensor harness



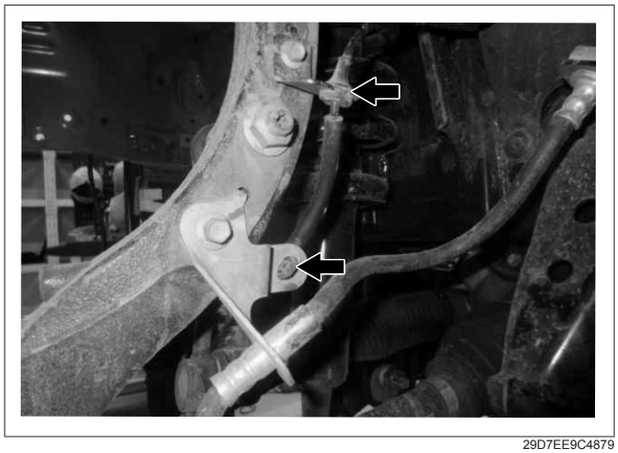
5D9EA978EF85

6. Loosen harness clips



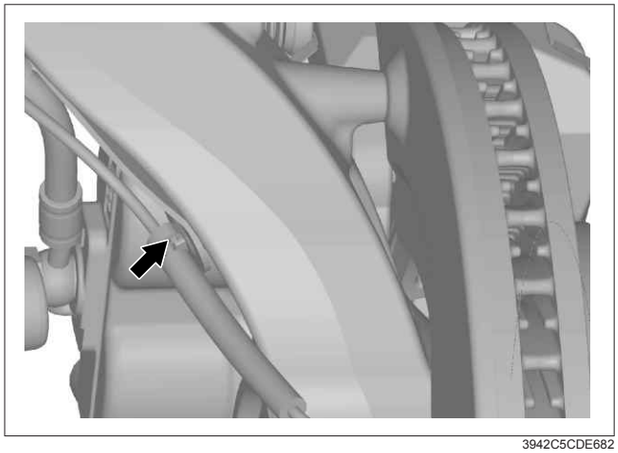
1DD69DE39999

7. Separate front wheel speed sensor harness, and loosen clips



29D7EE9C4879

8. Loosen harness clips



3942C5CDE682

9. Remove 1 bolt, and remove front wheel speed sensor



AE7CCCF929B6

Installation

1. Perform installation work in reverse order of removal

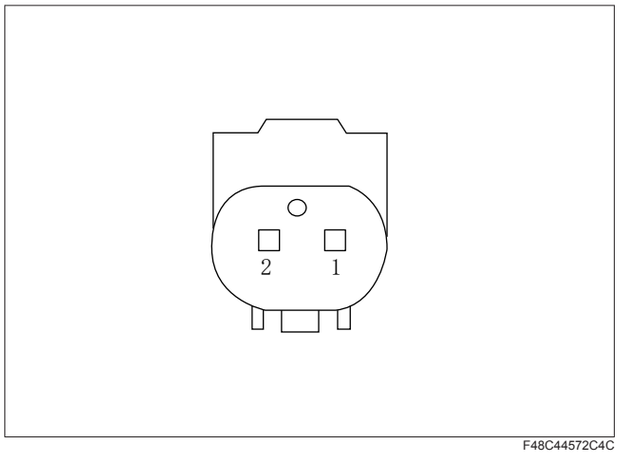
Notice

› Tighten the fastener according to the specified torque value.

› Check the front wheel speed sensor signal.

Rear wheel speed sensor

Pin definition



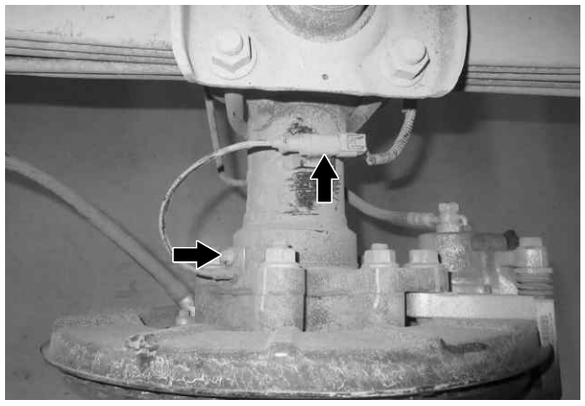
F48C44572C4C

Pin No.	Function
1	Signal
2	Voltage (+)

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Raise the vehicle to an appropriate position
3. Remove rear wheel
4. Disconnect connector of rear wheel speed sensor, loosen snap, remove 1 bolt, and remove rear wheel speed sensor



B7D0E46DFA75

Installation

1. Perform installation work in reverse order of removal

Notice

› When assembling, remove the sealant left in the position of the mounting hole and reapply sealant around the hole.

› Tighten the fastener according to the specified torque value.

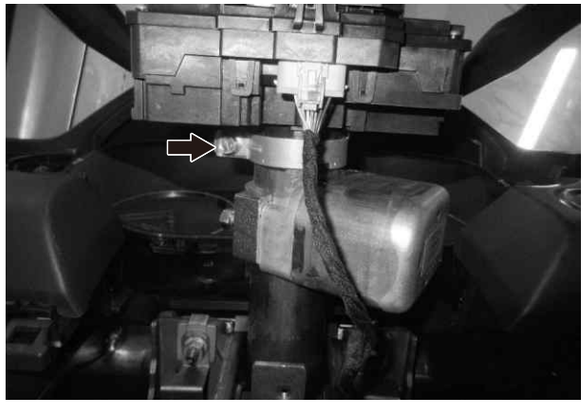
› Check the rear wheel speed sensor signal.

Steering angle sensor

Removal/installation

Removal

1. Turn the steering wheel so that the front wheels are in a straight driving position.
2. Disconnect the negative terminal of the battery.
3. After waiting for 90 s, remove main airbag
4. Remove the steering wheel.
5. Remove upper cover of steering column
6. Remove lower cover of steering column
7. Fix the clock spring at the zero position and loosen 1 bolt.



B150724BBFAD

Notice

› If the clock spring is not in the zero position, adjust it to the zero position.

8. Disconnect connector of combination switch assembly
9. Remove combination switch assembly

Installation

1. Perform installation work in reverse order of removal

Notice

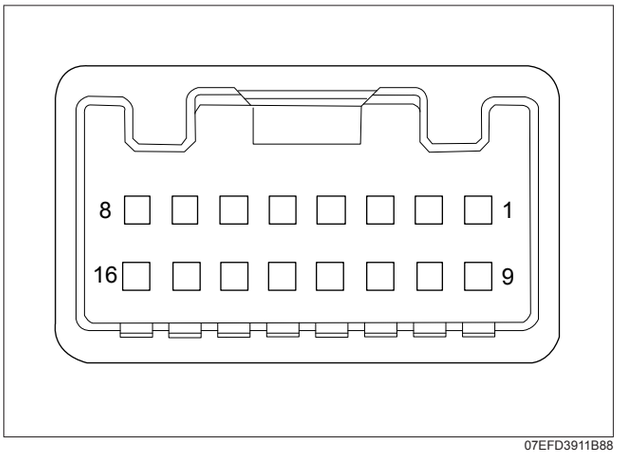
› Make sure that the clock spring is in the zero position before and after installing the combination switch. If the clock spring is fixed with tape, the fixing tape must be removed before reassembly.

› After replacing the combination switch, the scanner shall be connected to flash configuration words.

› After installing the combination switch, the scanner shall be connected to calibrate the SAS.

ESP OFF switch

Pin definition



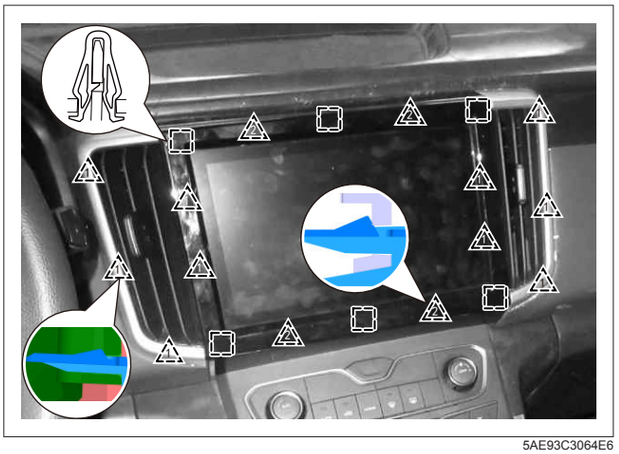
07EFD3911B88

Pin No.	Function
1	Airbag OFF indicator
2	—
3	Danger warning indicator
4	Hazard warning lamp switch
5	LIN
6	—
7	Airbag ON indicator
8	Power
9	Backlight
10	—
11	—
12	HDC switch
13	ESP switch
14	—
15	—
16	Ground

Removal/installation

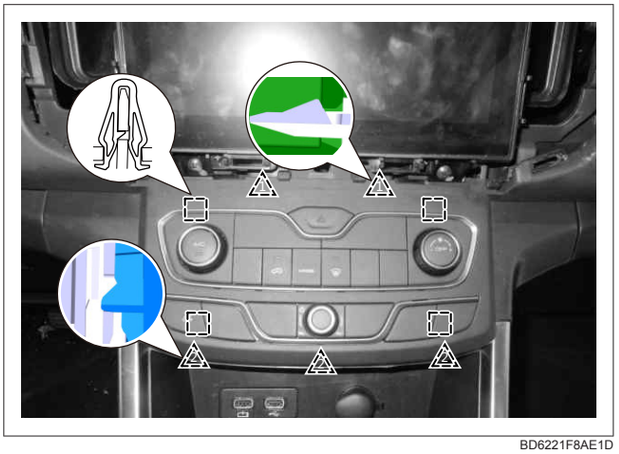
Removal

1. Disconnect the negative terminal of the battery.
2. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

3. Separate 4 clips and 5 joints



BD6221F8AE1D

4. Disconnect connectors of the console panel switch



FB5BA43E2F1B

5. Remove console panel switch

Installation

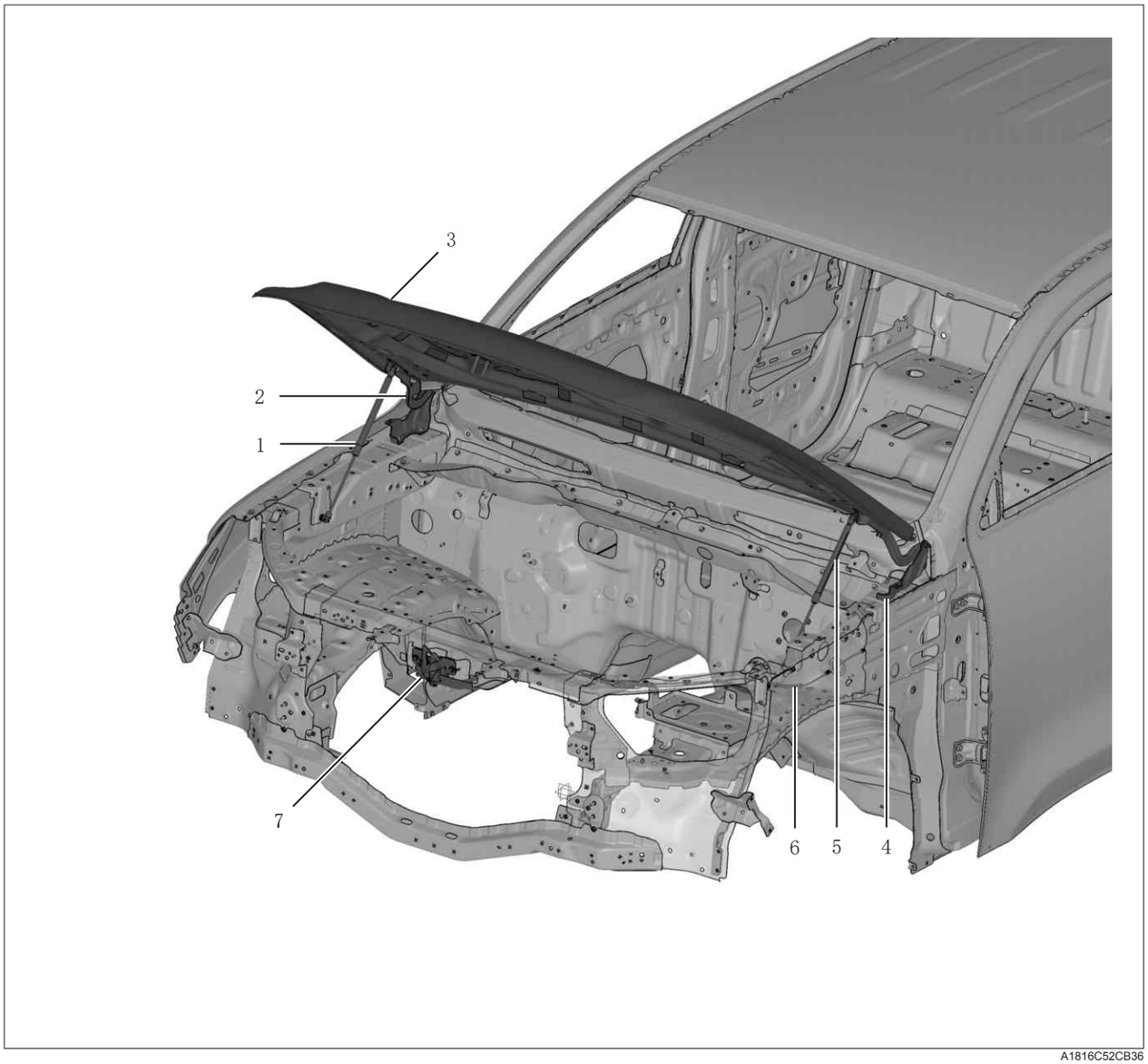
1. Perform installation work in reverse order of removal

Engine hood

Engine hood assembly .....36－1
Structural diagram .....36－1
Removal/installation.....36－2
Adjustment.....36－2
Engine hood lock.....36－4
Structural diagram .....36－4
Removal/installation.....36－5
Engine hood lock cable .....36－6
Removal/installation.....36－6

Engine hood assembly

Structural diagram



A1816C52CB36

1. Right brace strut for engine hood
2. Right hinge assembly of engine hood
3. Engine hood assembly
4. Left hinge assembly of engine hood
5. Left brace strut for engine hood
6. Engine hood cable assembly
7. Engine hood lock assembly

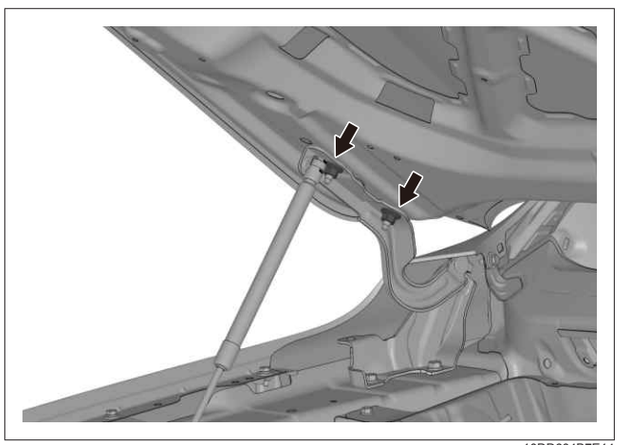
Removal/installation

Removal

⚠ Caution

› Put protective cushions on the fender and windshield glass to avoid damage to the paint, glass and molded parts when removing and installing engine hood.

1. Open the engine hood
2. Remove heat insulating layer of engine hood
3. Remove front washer nozzle assembly
4. Disconnect front washer water pipe from engine hood
5. Mark the position of hinge relative to engine hood for easy positioning in installation
6. Remove 2 locknuts on both sides that connect engine hood and hinge



10DD604B7E14

7. Remove engine hood with assistance of assistant

Installation

1. Perform installation work in reverse order of removal

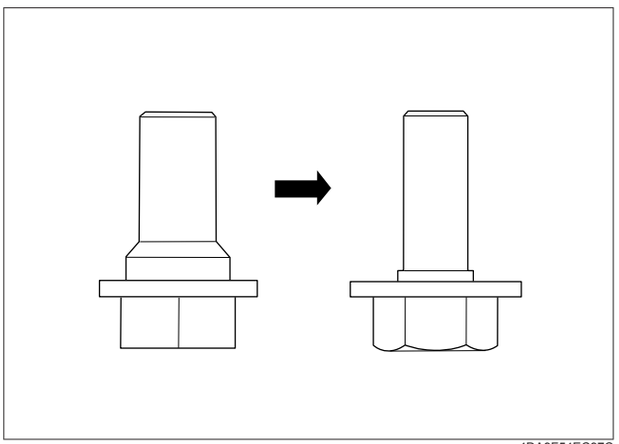
ℹ Notice

› Adjust gap and flush after replacing the engine hood.

Adjustment

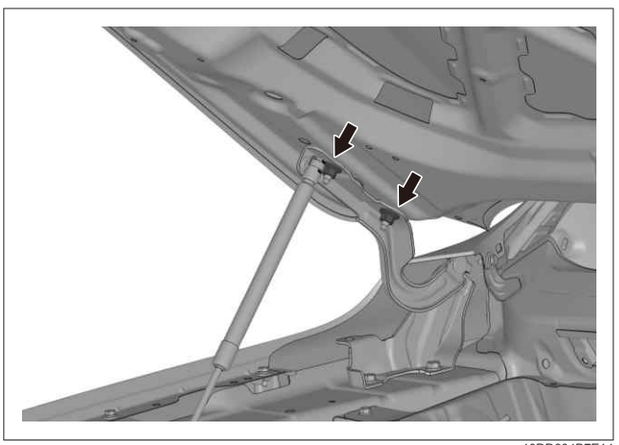
ℹ Notice

› Use centering bolt to mount the engine hood hinge. Adjusting engine hood with centering bolt installed is not allowed. Standard bolt may be used as a substitute for centering bolt in the regulating operation.



4DA9F54EC97C

1. Check the engine hood assembly and verify that clearance measured is within the standard range; adjust the clearance if the measured value is not within the standard range
   › For standard clearance: see the section “Standard clearance”.
2. Open the engine hood
3. Loosen 2 nuts on both side of engine hood



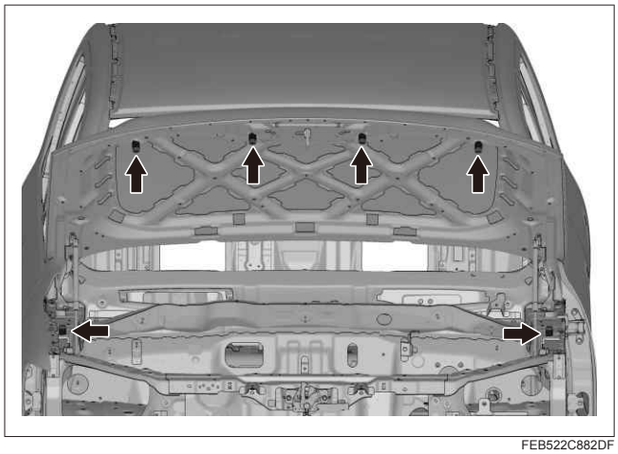
10DD604B7E14

4. Move the engine hood and adjust the clearance to normal range, and tighten 4 nuts on the side of engine hood after adjustment

5. Adjust engine hood front height, turn the adjusting block until the surface difference between engine hood and fender is within standard range

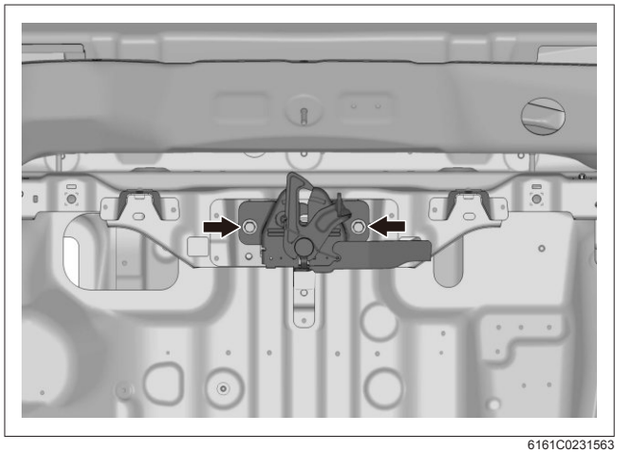
Notice

- For standard clearance: see the section “Standard clearance”.
- It can be adjusted up and down by turning the adjusting block.



FEB522C882DF

6. Loosen 2 bolts, adjust engine hood lock assembly to allow easy entry of lock striker

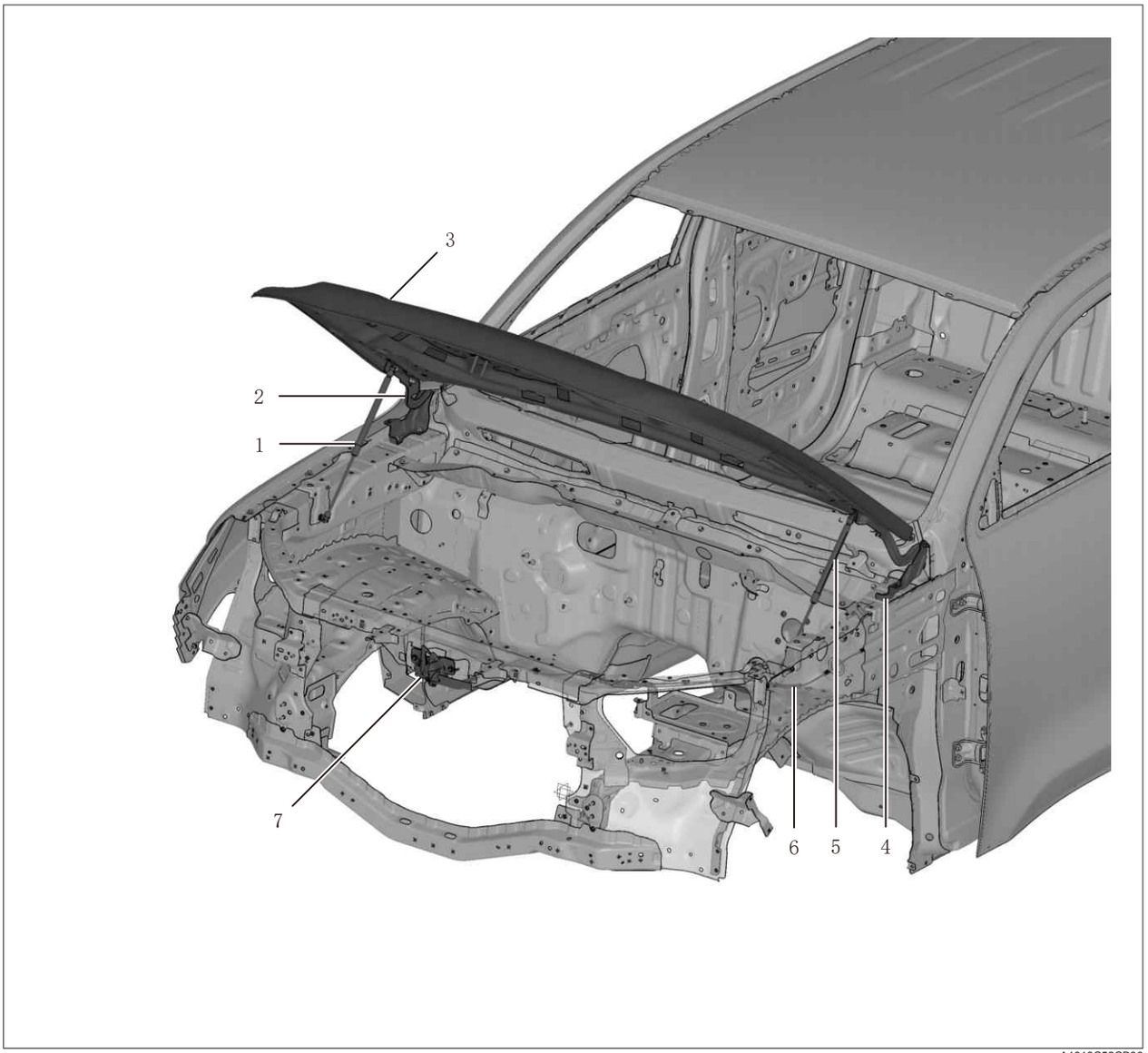


6161C0231563

7. Tighten 2 bolts after adjustment

Engine hood lock

Structural diagram



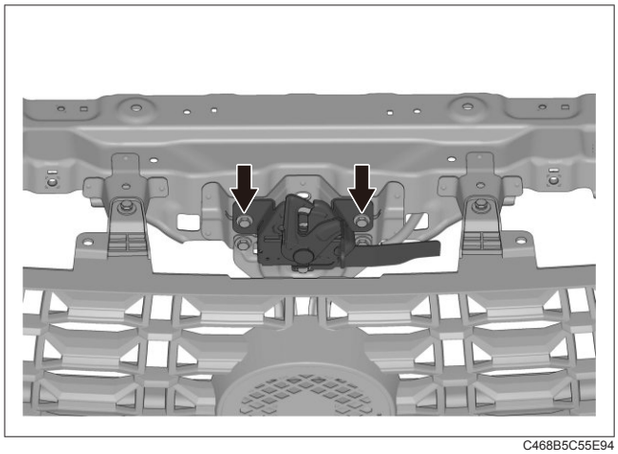
A1816C52CB36

1. Right brace strut for engine hood
2. Right hinge assembly of engine hood
3. Engine hood assembly
4. Left hinge assembly of engine hood
5. Left brace strut for engine hood
6. Engine hood cable assembly
7. Engine hood lock assembly

Removal/installation

Removal

1. Open the engine hood
2. Remove front cover plate assembly of engine compartment
3. Remove 2 fixing bolts of engine hood lock



C468B5C55E94

4. Disconnect engine hood lock cable, and remove engine hood lock

Installation

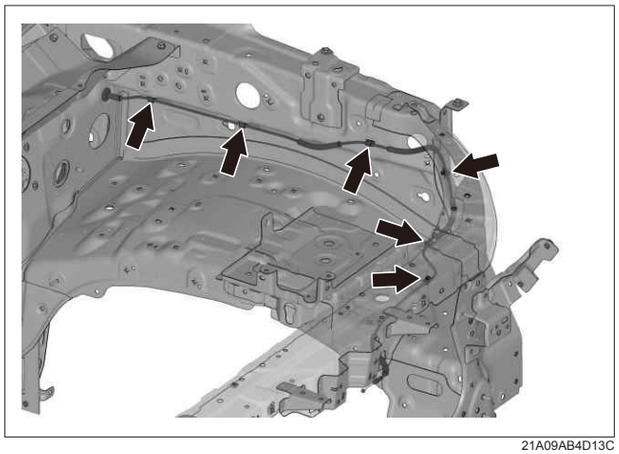
1. Perform installation work in reverse order of removal

Engine hood lock cable

Removal/installation

Removal

1. Remove engine hood lock, and disconnect cable
2. Disconnect handgrip of engine hood lock from cable
3. Disengage cable fixing snap, and pull out engine hood lock cable from engine compartment



21A09AB4D13C

Installation

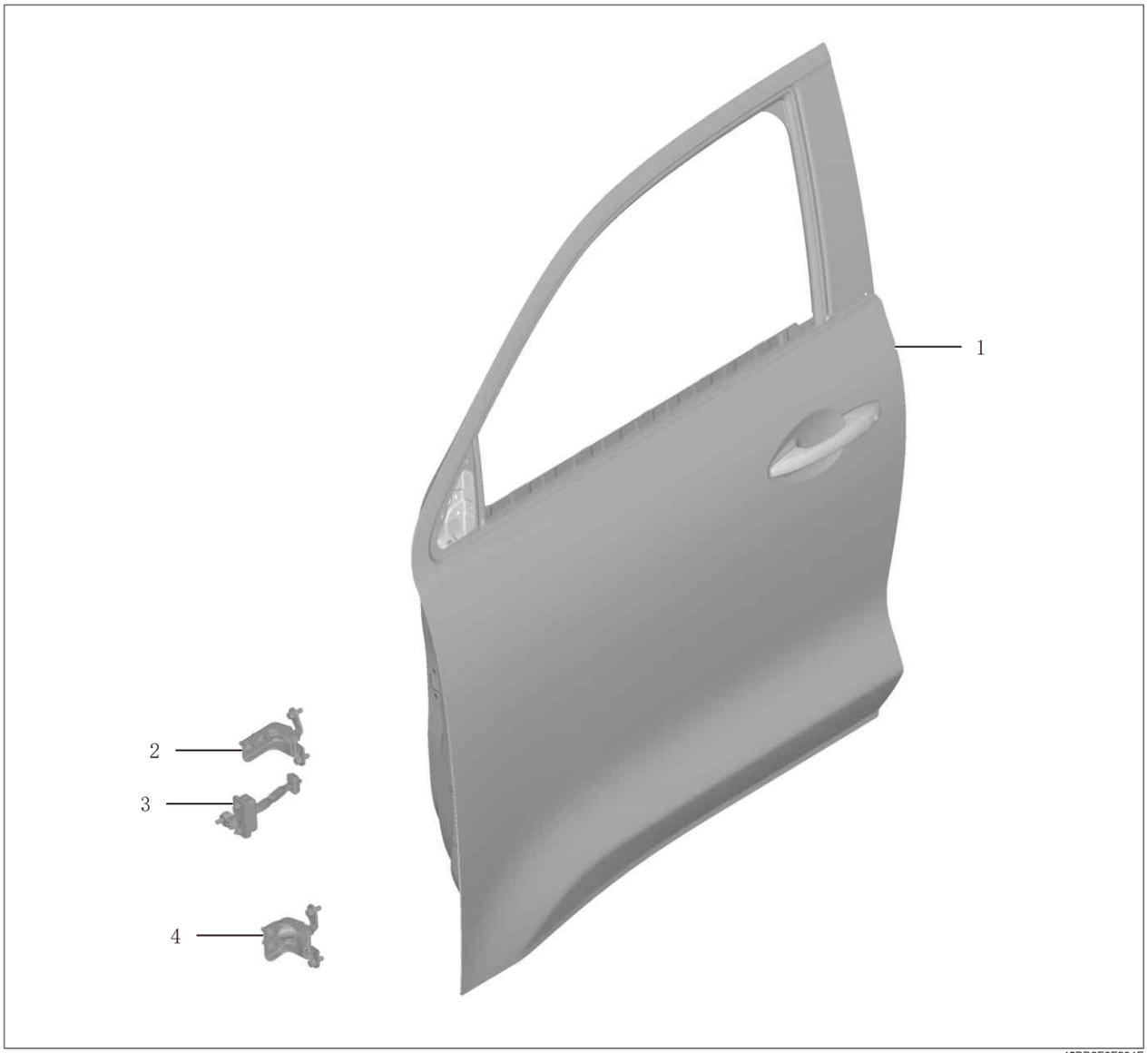
1. Perform installation work in reverse order of removal

Vehicle door

Front door ..... 37－1
Structural diagram ..... 37－1
Specified torque ..... 37－2
Removal/installation ..... 37－3
Adjustment ..... 37－4
Front door inner trim plate ..... 37－5
Structural diagram ..... 37－5
Removal/installation ..... 37－6
Front door check ..... 37－7
Specified torque ..... 37－7
Removal/installation ..... 37－8
Rear door ..... 37－9
Structural diagram ..... 37－9
Specified torque ..... 37－10
Removal/installation ..... 37－11
Adjustment ..... 37－12
Rear door inner trim plate ..... 37－13
Structural diagram ..... 37－13
Removal/installation ..... 37－14
Rear door check ..... 37－15
Specified torque ..... 37－15
Removal/installation ..... 37－16

Front door

Structural diagram



45BB2F8F291F

1. Front door sheet metal assembly
2. Front door upper hinge assembly
3. Front door check assembly
4. Front door lower hinge assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front door hinge x vehicle door connecting terminal	35±5	8	—
Bolt	Front door hinge x vehicle body connecting terminal	35±5	8	—

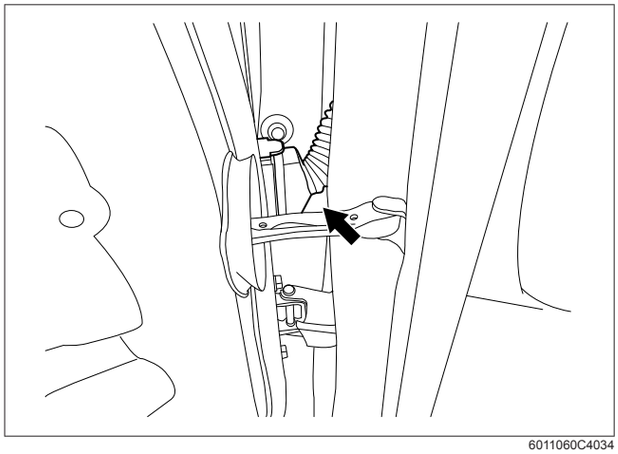
Removal/installation

Removal

⚠ Caution

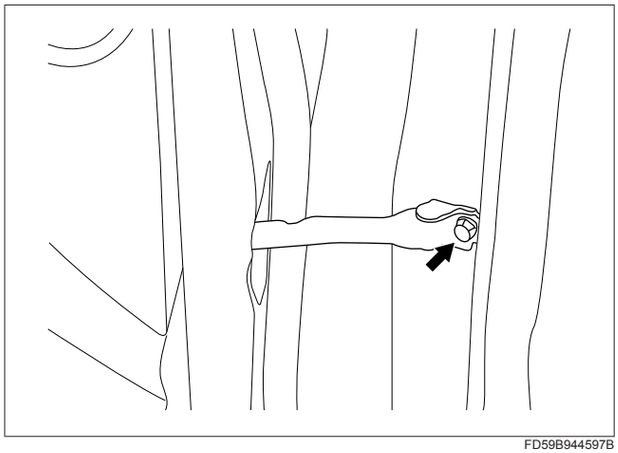
- The removal and installation of vehicle doors need two persons cooperate with each other.
- When mounting doors, be sure to perform the mounting adjustment.
- Check whether the hinge rotating parts are poorly lubricated, and if necessary use vehicle-body lubricating grease.
- Be sure to carry out post-installation check.

1. Disconnect the negative terminal of the battery.
2. Disconnect the vehicle door harness connector



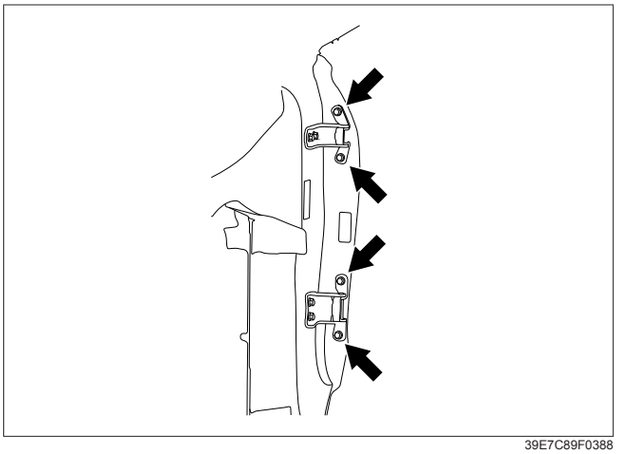
6011060C4034

3. Remove 1 bolt at vehicle body side of check



FD59B944597B

4. Clear up the door hinge mounting surface and mark the hinge position on the door surface
5. Remove the upper and lower hinge bolts (4 in total)



39E7C89F0388

6. Remove the vehicle door

Installation

1. Perform installation work in reverse order of removal

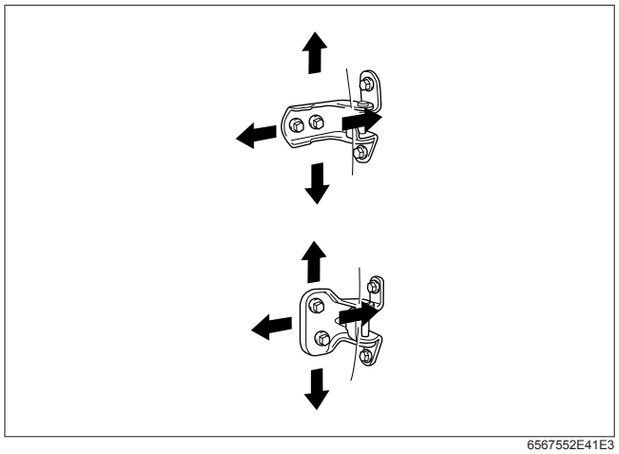
Adjustment

⚠ Caution

› Use centering bolt to mount door hinge. Do not regulate the vehicle door when the centering bolt has not been removed.

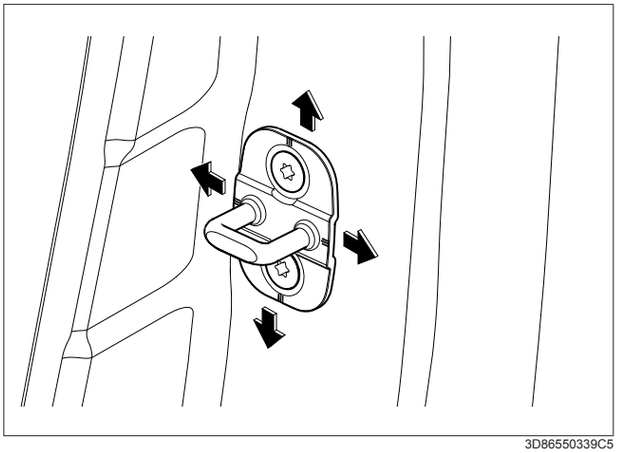
› Standard bolt may be used as a substitute for centering bolt in the regulating operation.

1. Check and confirm that the vehicle door assembly clearance measurement is within the standard range, and adjust if the clearance measurement is not within the standard range
2. Loosen the 4 hinge bolts on the vehicle body to regulate the vehicle door position



6567552E41E3

3. Tighten the 4 hinge bolts on the vehicle body after adjustment
4. Loosen the 4 hinge bolts on the vehicle door to regulate the vehicle door position
5. Tighten the 4 hinge bolts on the vehicle door after adjustment
6. Loosen 2 striker mounting screws gently and hit the striker with a plastic hammer to adjust striker position

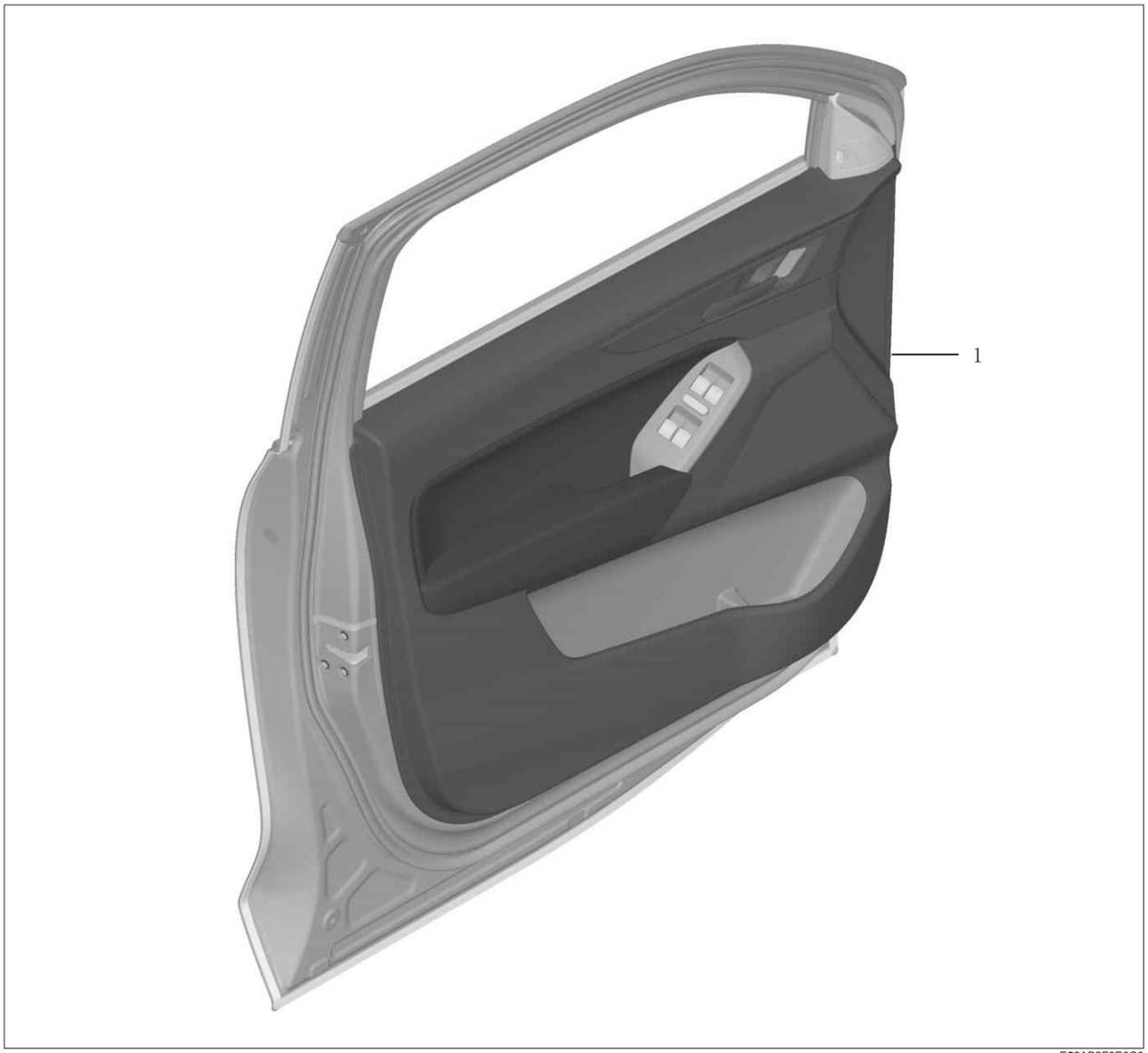


3D86550339C5

7. Tighten striker mounting screws after adjustment

Front door inner trim plate

Structural diagram



E52AB2F9E8C0

1. Front door inner trim plate assembly

Removal/installation

Removal

Notice

› Take the left side as example. The removal of right side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Separate 2 snaps, and remove front door interior triangle plate



6355617693C4

3. Remove screw cover plate of front door interior handle
4. Remove 1 fastening screw on front door interior handle



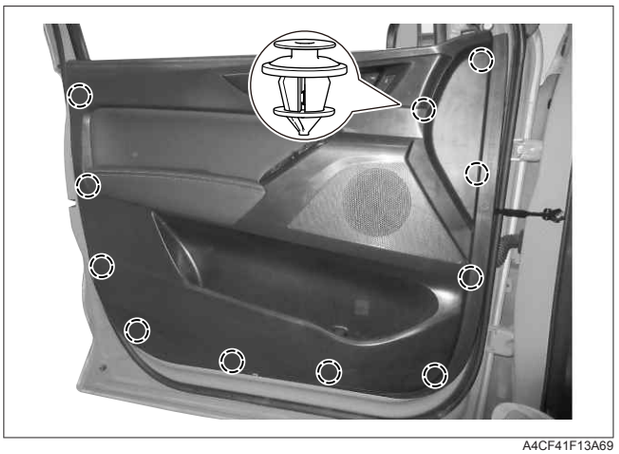
8EBC5BA4F9FC

5. Remove front door handle box rubber mat
6. Remove 1 fastening screw on front door handle box



DD0E5EE2FDAC

7. Separate 11 snaps



A4CF41F13A69

8. Separate inner handgrip cable
9. Disconnect harness connector
10. Remove front door inner trim plate

Installation

1. Perform installation work in reverse order of removal

Front door check

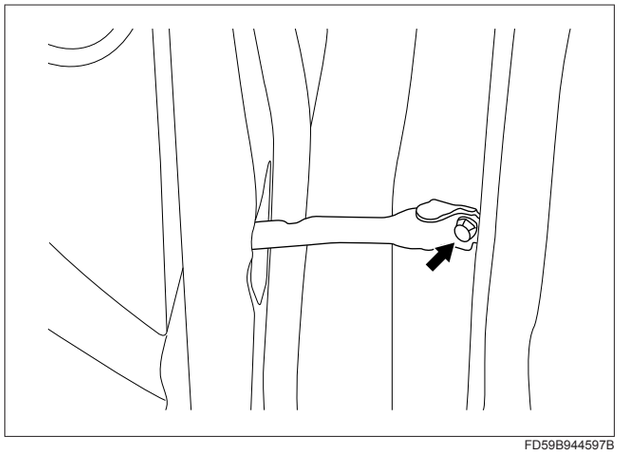
Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front door check × vehicle body connecting terminal	23±3	2	—
Nut	Front door check × vehicle door connecting terminal	9±2	4	—

Removal/installation

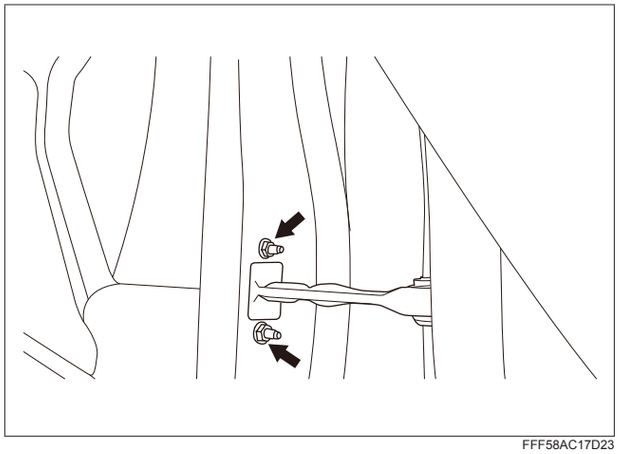
Removal

1. Disconnect the negative terminal of the battery.
2. Remove inner protective surface assembly of door
3. Remove the door water-proof membrane
4. Remove the 1 bolt on the side of the vehicle body



FD59B944597B

5. Remove the 2 nuts from the sides of the vehicle door



FFF58AC17D23

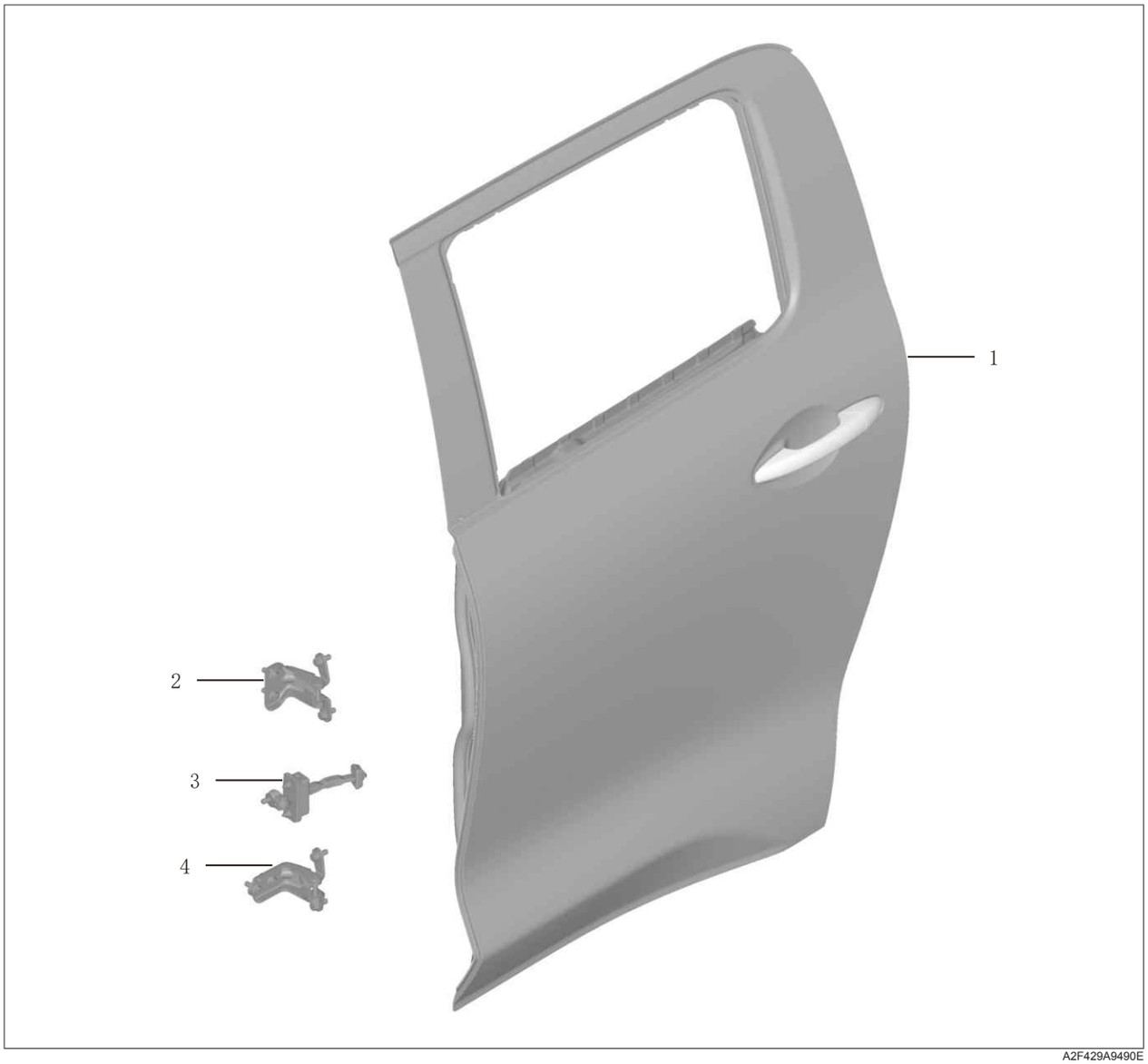
6. Remove the door retainer assembly

Installation

1. Perform installation work in reverse order of removal

Rear door

Structural diagram



A2F429A9490E

1. Rear door sheet metal assembly
2. Rear door upper-hinge assembly
3. Rear door check assembly
4. Rear door lower-hinge assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Rear door hinge x vehicle door connecting terminal	35±5	8	—
Bolt	Rear door hinge x vehicle body connecting terminal	35±5	8	—

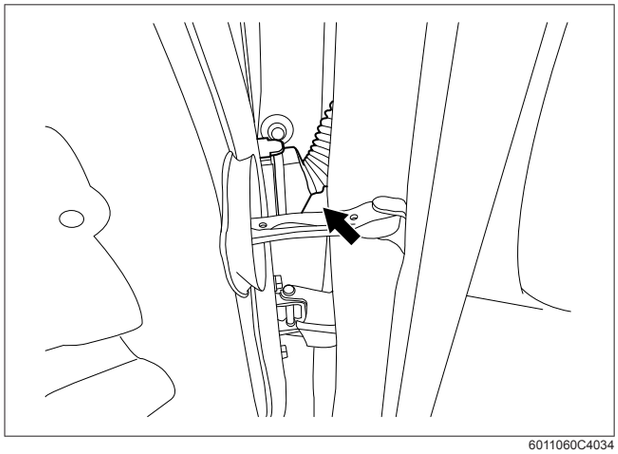
Removal/installation

Removal

⚠ Caution

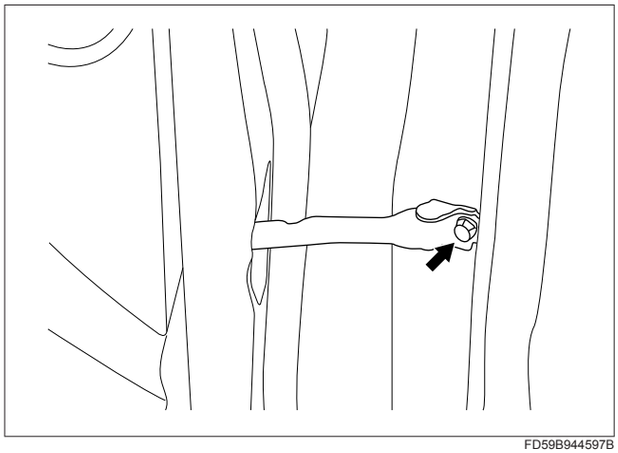
- The removal and installation of vehicle doors need two persons cooperate with each other.
- When mounting doors, be sure to perform the mounting adjustment.
- Check whether the hinge rotating parts are poorly lubricated, and if necessary use vehicle-body lubricating grease.
- Be sure to carry out post-installation check.

1. Disconnect the negative terminal of the battery.
2. Disconnect the vehicle door harness connector



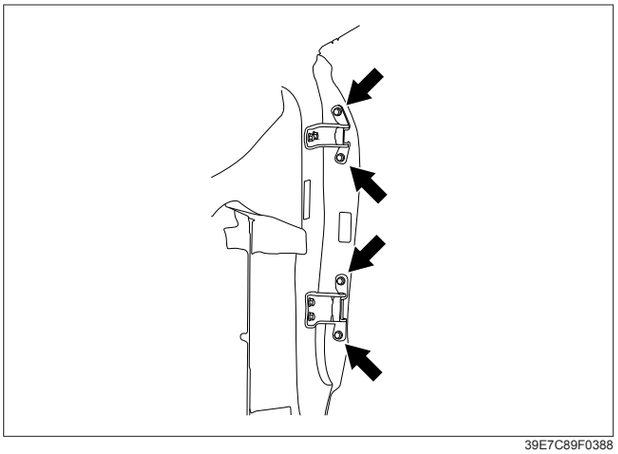
6011060C4034

3. Remove 1 bolt at vehicle body side of check



FD59B944597B

4. Clear up the door hinge mounting surface and mark the hinge position on the door surface
5. Remove the upper and lower hinge bolts (4 in total)



39E7C89F0388

6. Remove the vehicle door

Installation

1. Perform installation work in reverse order of removal

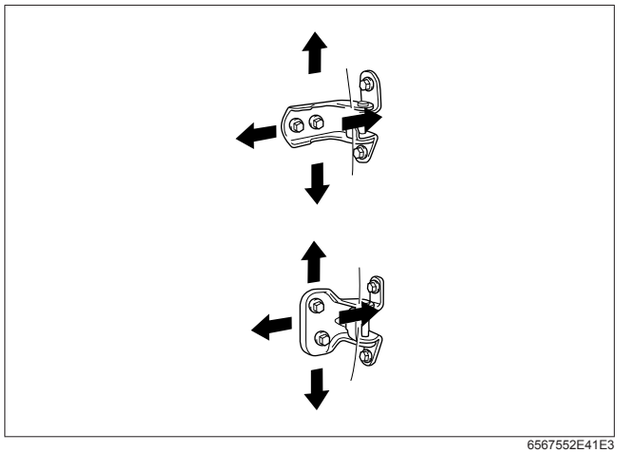
Adjustment

⚠ Caution

› Use centering bolt to mount door hinge. Do not regulate the vehicle door when the centering bolt has not been removed.

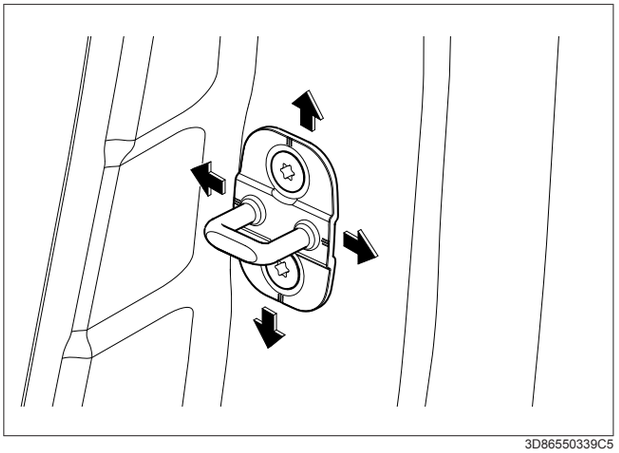
› Standard bolt may be used as a substitute for centering bolt in the regulating operation.

1. Check and confirm that the vehicle door assembly clearance measurement is within the standard range, and adjust if the clearance measurement is not within the standard range
2. Loosen the 4 hinge bolts on the vehicle body to regulate the vehicle door position



6567552E41E3

3. Tighten the 4 hinge bolts on the vehicle body after adjustment
4. Loosen the 4 hinge bolts on the vehicle door to regulate the vehicle door position
5. Tighten the 4 hinge bolts on the vehicle door after adjustment
6. Loosen 2 striker mounting screws gently and hit the striker with a plastic hammer to adjust striker position

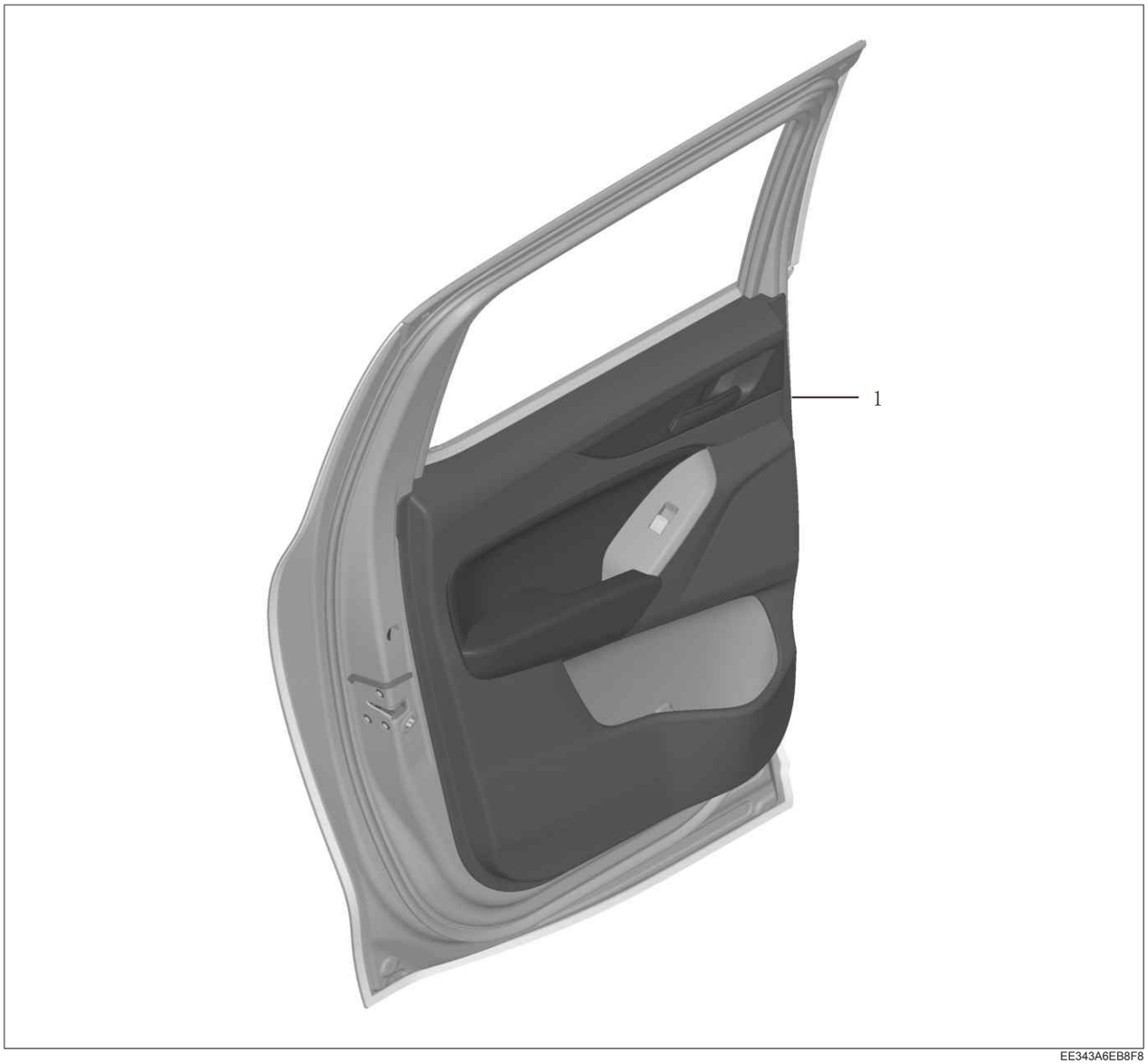


3D86550339C5

7. Tighten striker mounting screws after adjustment

Rear door inner trim plate

Structural diagram



EE343A6EB8F8

1. Rear door inner trim plate assembly

Removal/installation

Removal

Notice

› Take the left side as example. The removal of right side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Remove rear door interior handle screw cover plate
3. Remove 1 rear door interior handle fastening screw



33C3F9D37A3A

4. Remove rear door handle box rubber mat
5. Remove 1 rear door handle box fastening screw



DC3BCF000B91

6. Separate the 9 snaps



BF1C610C82E1

7. Separate inner handgrip cable
8. Disconnect harness connector
9. Remove rear door inner fender

Installation

1. Perform installation work in reverse order of removal

Rear door check

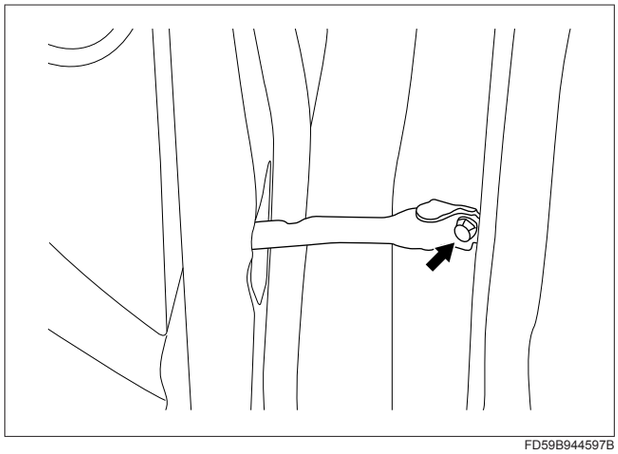
Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Rear door check × vehicle body connecting terminal	23±3	2	—
Nut	Rear door check × vehicle door connecting terminal	9±2	4	—

Removal/installation

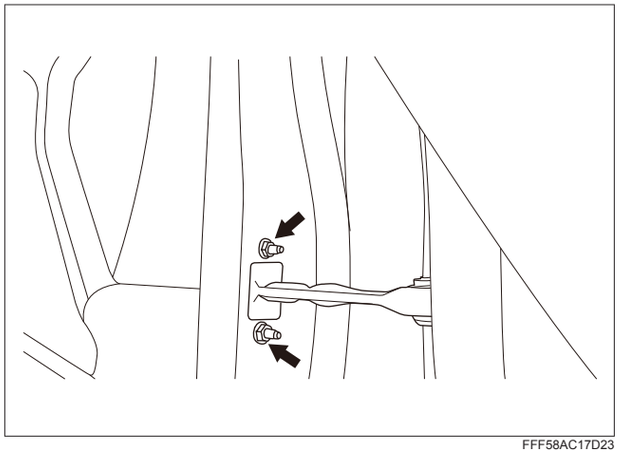
Removal

1. Disconnect the negative terminal of the battery.
2. Remove inner protective surface assembly of door
3. Remove the door water-proof membrane
4. Remove the 1 bolt on the side of the vehicle body



FD59B944597B

5. Remove the 2 nuts from the sides of the vehicle door



FFF58AC17D23

6. Remove the door retainer assembly

Installation

1. Perform installation work in reverse order of removal

Rear trunk plate

Rear trunk plate .....38－1
Specified torque .....38－1
Removal/installation .....38－2
Rear trunk plate hinge .....38－3
Specified torque .....38－3
Removal/installation .....38－4

Rear trunk plate

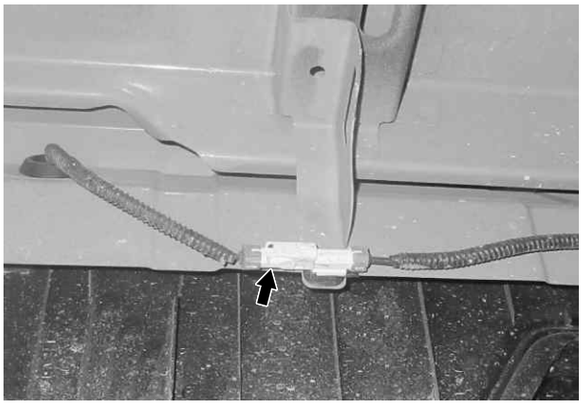
Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw	Rear trunk plate hinge x rear trunk plate	23±3	4	—
Bolt	Rear trunk plate hinge x rear trunk plate	23±3	2	—
Bolt	Rear trunk plate x bracket for trunk check	23±3	2	—
Bolt	Side plate of trunk x trunk check	23±3	1	—

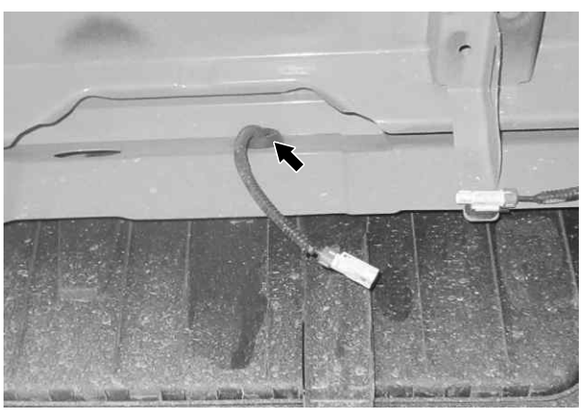
Removal/installation

Removal

1. Open rear trunk plate
2. Lift vehicle to proper position
3. Disconnect harness connector at the bottom of rear trunk plate, and pull out the harness through the mounting hole



72968A33C72A



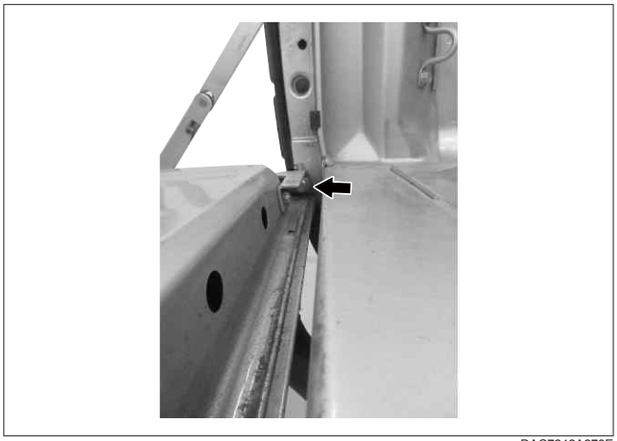
787222CAD78E

4. Lower the vehicle
5. Adjust the lower section of connecting plate of trunk check so that it is perpendicular to the fixing bracket of trunk check, pull the connecting plate of trunk check outward, and disconnect the fixing bracket of trunk check and the connecting plate of trunk check.



B19B3ABC32D7

6. Remove 1 fastening bolt for each of the left and right hinges of the rear trunk plate



DAC7242A278E

7. Remove rear trunk plate

Installation

1. Perform installation work in reverse order of removal

Rear trunk plate hinge

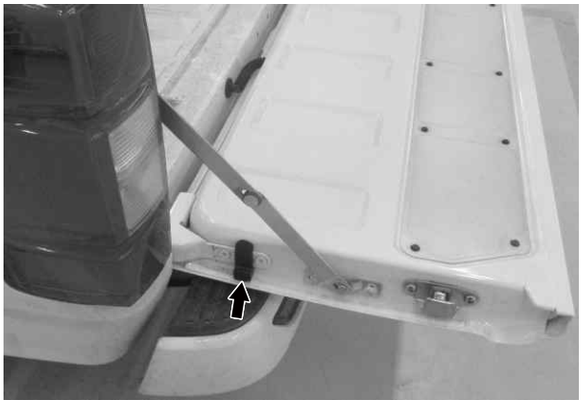
Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw	Rear trunk plate hinge x rear trunk plate	23±3	4	—
Bolt	Rear trunk plate hinge x rear trunk plate	23±3	2	—
Bolt	Rear trunk plate hinge x trunk	40±5	2	—

Removal/installation

Removal

1. Open rear trunk plate
2. Remove anti-collision block of rear trunk plate hinge



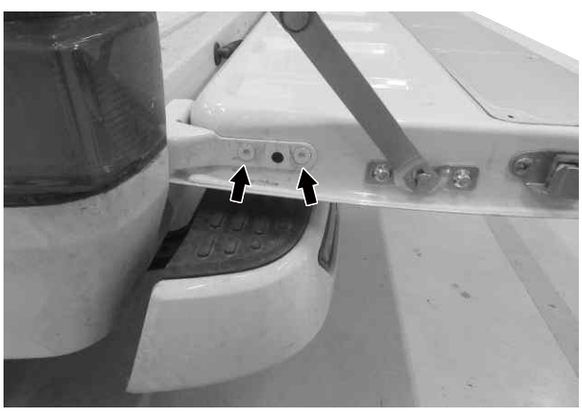
00126E6C6AF1

3. Remove 2 bolts at the interior



26D94D233A05

4. Remove 2 bolts at the exterior of rear trunk plate hinge



21351BBD1D7A

5. Remove rear trunk plate hinge

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy - high cover

Rainproof canopy .....39－1
Specified torque .....39－1
Removal/installation .....39－2
Rainproof canopy rear door .....39－4
Removal/installation .....39－4
Back door lock body .....39－5
Removal/installation .....39－5
Rainproof canopy drawstring .....39－6
Removal/installation .....39－6
Rainproof canopy rear door outer handle .....39－7
Removal/installation .....39－7
Rainproof canopy rear door brace-strut .....39－8
Removal/installation .....39－8
Rainproof canopy buckle .....39－9
Removal/installation .....39－9
Rainproof canopy rear door microswitch .....39－10
Pin Definition of .....39－10
Removal/installation .....39－10
Rainproof canopy mechanical lock .....39－12
Removal/installation .....39－12

Rainproof canopy

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Canopy x front plate of trunk	23±3	6	—

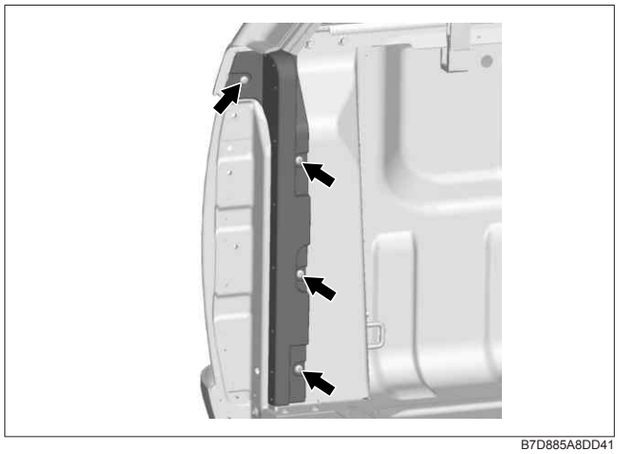
Removal/installation

Removal

⚠ Caution

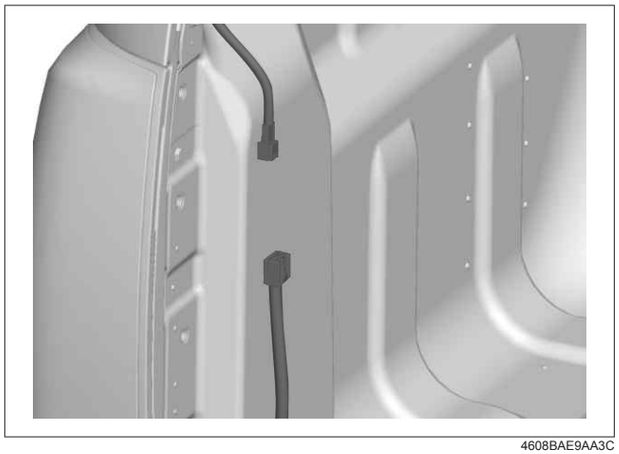
› Wear gloves to protect the hands.

1. Open canopy tailgate and trunk tailgate
2. Disconnect the negative terminal of the battery.
3. Remove mounting plate assembly of left seal strip of trunk door



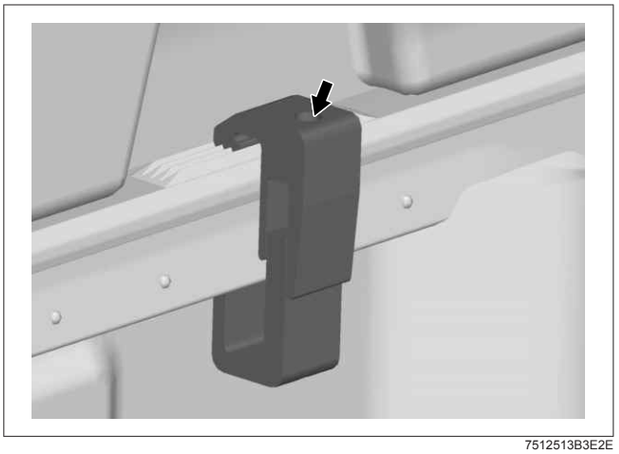
B7D885A8DD41

4. Disconnect canopy harness plug and pull the harness plug from the through hole on mounting plate



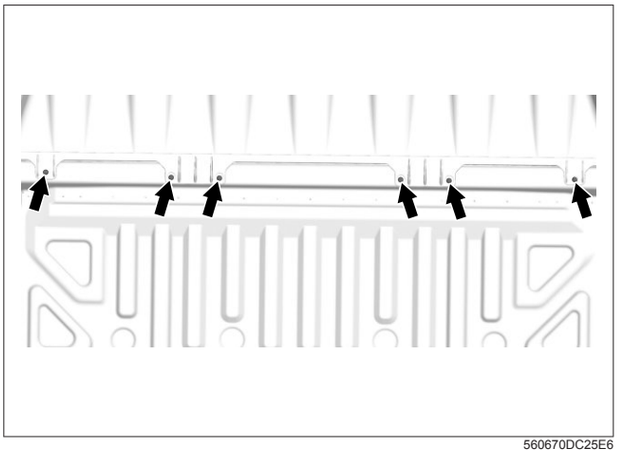
4608BAE9AA3C

5. Loosen bolts in the hole and remove all the C locks of canopy inside the vehicle



7512513B3E2E

6. Remove 6 bolts



560670DC25E6

7. Remove canopy

⚠ Warning

› When performing this operation, assistance from an assistant is needed to prevent parts from falling and causing injury to personnel.

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› When installing a rainproof canopy, first adjust the fitting location between the rainproof canopy and the trunk, and then install the C-shaped buckle of the rainproof canopy and 6 bolts at the front sheet metal part of the trunk.

› When installing the left seal strip mounting plate assembly of the trunk door, first lead

out the canopy harness connector from the wire hole of the mounting plate, and then connect the canopy branch harness connector of the frame harness. Then install the left seal strip mounting plate assembly of the trunk door.

Rainproof canopy rear door

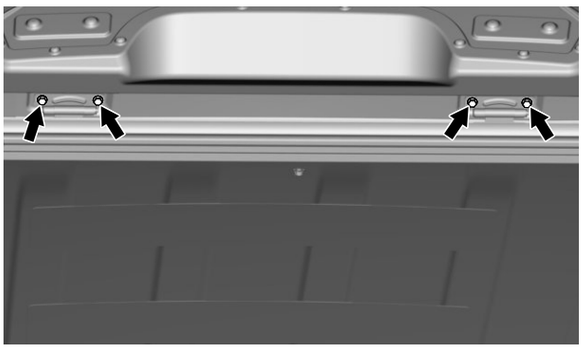
Removal/installation

Removal

⚠ Caution

› Wear gloves to protect the hands.

1. Open canopy tailgate and trunk tailgate
2. Disconnect the negative terminal of the battery.
3. Remove high-position brake lamp of canopy
4. Remove outer handle of canopy tailgate with canopy tailgate microswitch
5. Remove canopy straps
6. Remove back door lock body
7. Disconnect canopy tailgate support rod
8. Separate 5 harness straps of canopy tailgate, and pull out harness of canopy tailgate from canopy tailgate
9. Remove 4 bolts



FF2AF31D17D9

10. Remove canopy tailgate

Installation

1. Perform installation work in reverse order of removal

Back door lock body

Removal/installation

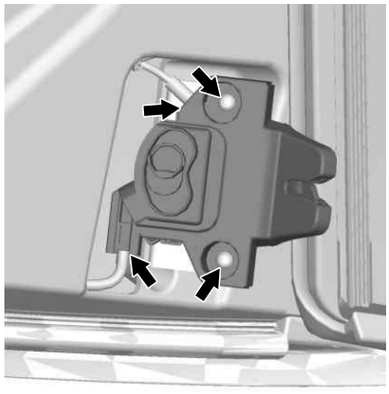
Removal

⚠ Caution

› Wear gloves to protect the hands.

› Take the left side as example. The removal of right side is the same with it.

1. Open canopy tailgate and trunk tailgate
2. Disconnect the negative terminal of the battery.
3. Remove 2 screws and disconnect harness connector and cable



1EF4291DE03B

4. Remove back door lock body

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy drawstring

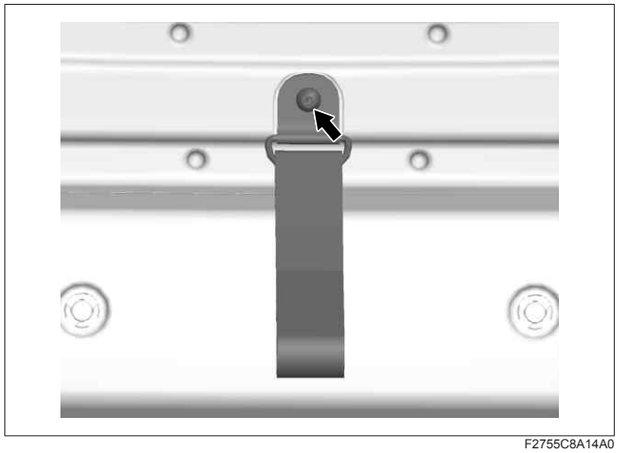
Removal/installation

Removal

⚠ Caution

› Wear gloves to protect the hands.

1. Open canopy tailgate and trunk tailgate
2. Remove 1 screw



F2755C8A14A0

3. Remove canopy straps

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy rear door outer handle

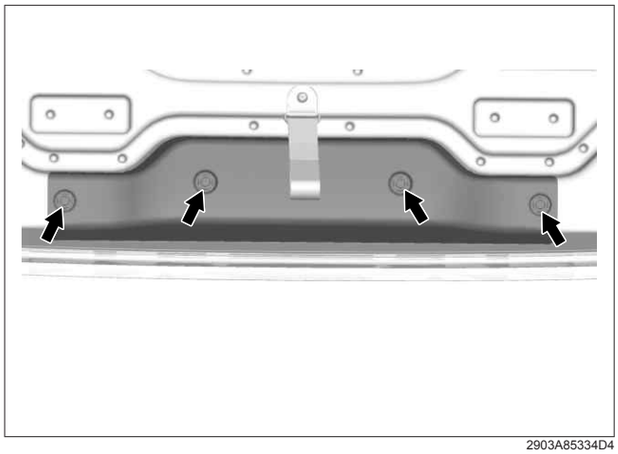
Removal/installation

Removal

⚠ Caution

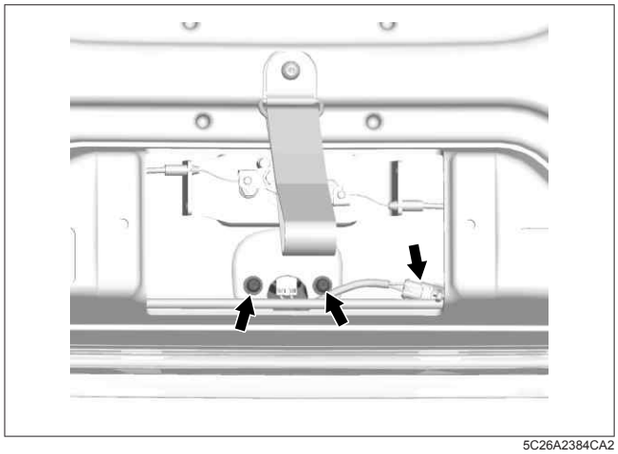
› Wear gloves to protect the hands.

1. Open canopy tailgate and trunk tailgate
2. Disconnect the negative terminal of the battery.
3. Pry open 4 snaps



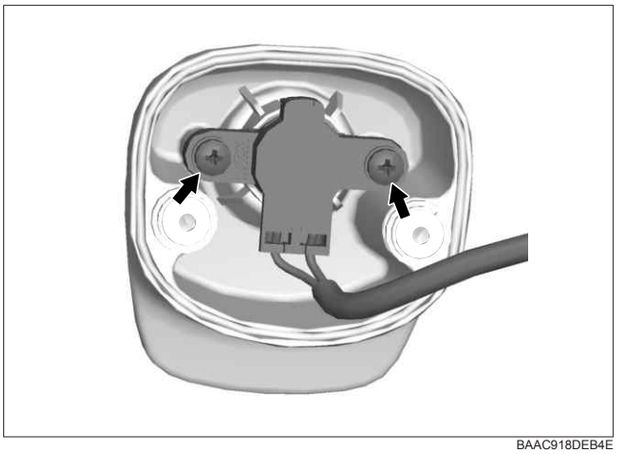
2903A85334D4

4. Remove trim plate of high cover tailgate
5. Remove 2 bolts and disconnect harness connectors



5C26A2384CA2

6. Remove outer handle of canopy tailgate with canopy tailgate microswitch
7. Remove 2 screws



BAAC918DEB4E

8. Separate canopy tailgate microswitch

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy rear door brace-strut

Removal/installation

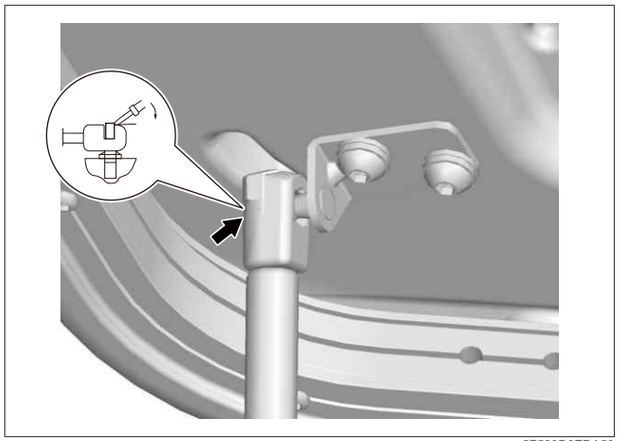
Removal

⚠ Caution

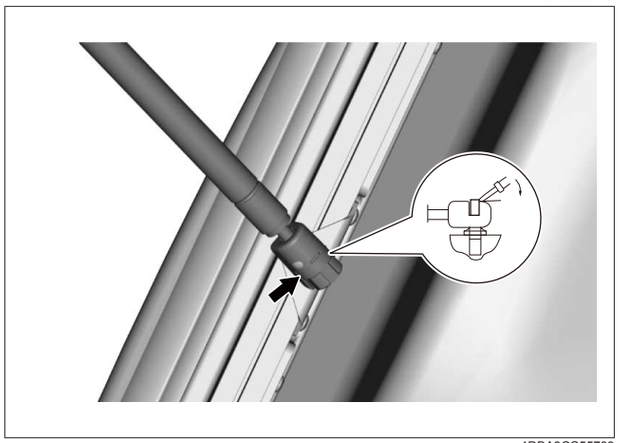
› Wear gloves to protect the hands.

› Take the left side as example. The removal of right side is the same with it.

1. Open canopy tailgate and trunk tailgate
2. Separate 2 connectors



5F529D2EDA53



1DBA3CC55709

3. Remove canopy tailgate support rod

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy buckle

Removal/installation

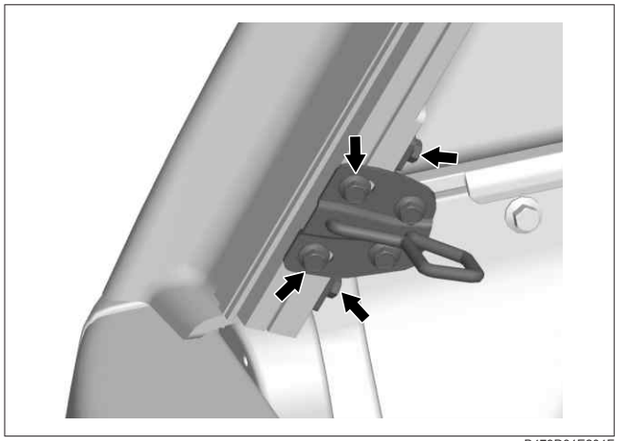
Removal

⚠ Caution

› Wear gloves to protect the hands.

› Take the left side as example. The removal of right side is the same with it.

1. Open canopy tailgate
2. Remove 4 bolts



B479D31E204F

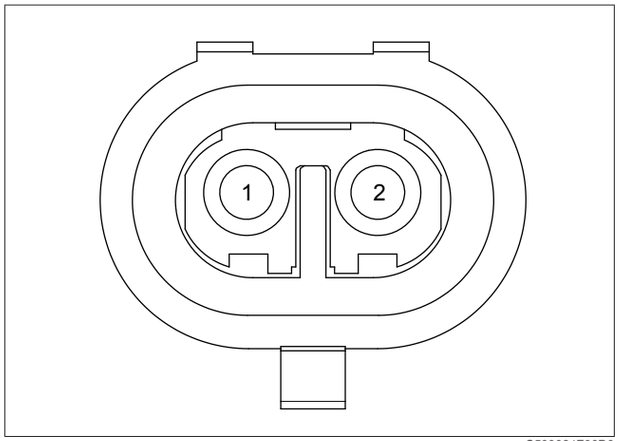
3. Remove canopy striker

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy rear door microswitch

Pin Definition of



C533324F36D9

Pin No.	Function
1	Signal input
2	Signal output

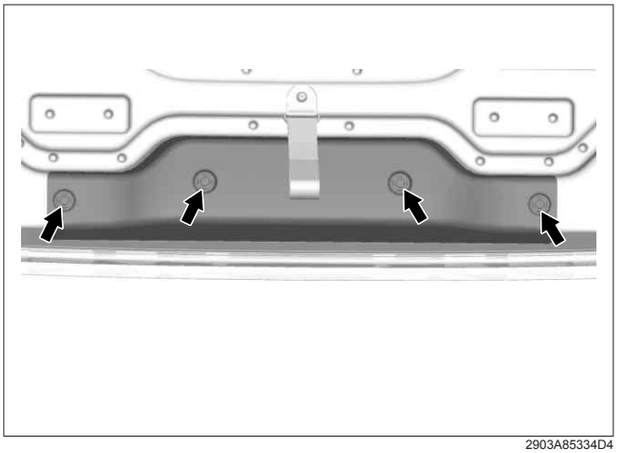
Removal/installation

Removal

⚠ Caution

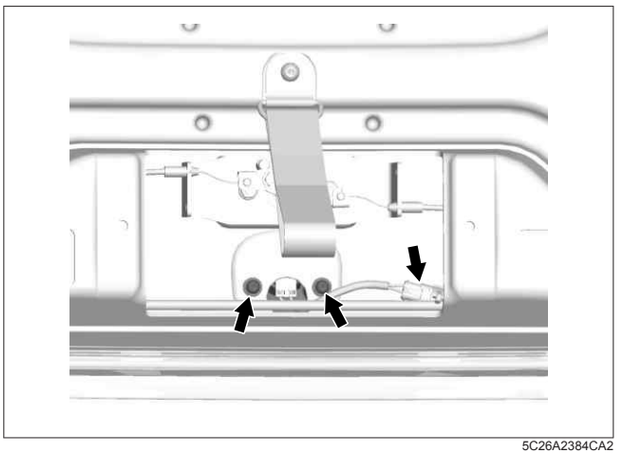
› Wear gloves to protect the hands.

1. Open canopy tailgate and trunk tailgate
2. Disconnect the negative terminal of the battery.
3. Pry open 4 snaps



2903A85334D4

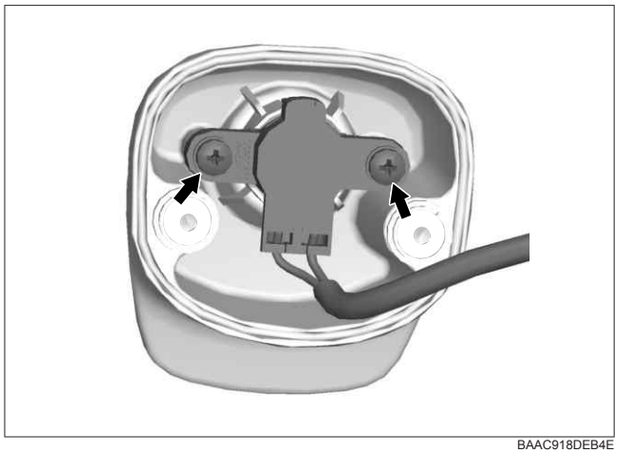
4. Remove trim plate of high cover tailgate
5. Remove 2 bolts and disconnect harness connectors



5C26A2384CA2

6. Remove outer handle of canopy tailgate with canopy tailgate microswitch

7. Remove 2 screws



BAAC918DEB4E

8. Remove canopy tailgate microswitch

Installation

1. Perform installation work in reverse order of removal

Rainproof canopy mechanical lock

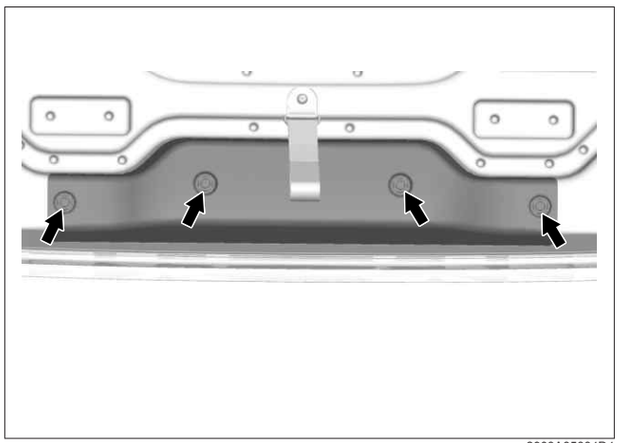
Removal/installation

Removal

⚠ Caution

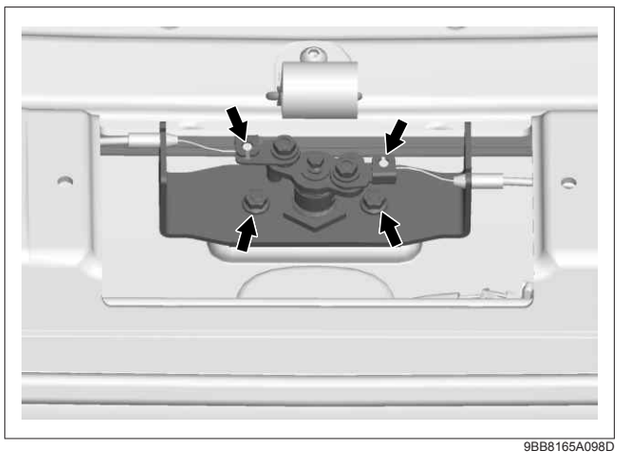
› Wear gloves to protect the hands.

1. Open canopy tailgate and trunk tailgate
2. Pry open 4 snaps



2903A85334D4

3. Remove trim plate of high cover tailgate
4. Remove 2 nuts, and disconnect cable



9BB8165A098D

5. Remove canopy mechanical lock

Installation

1. Perform installation work in reverse order of removal

Fuel filler cap

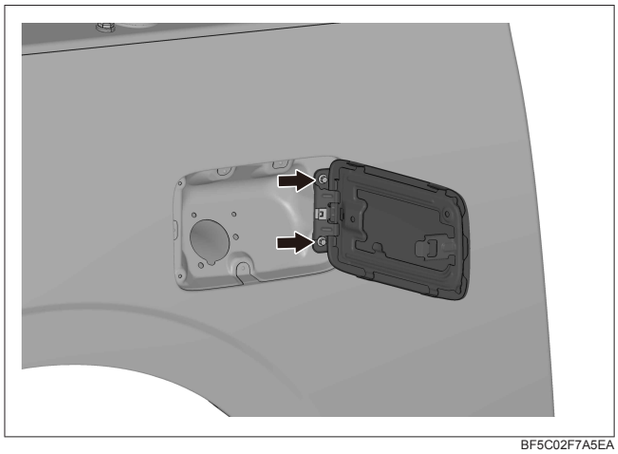
Fuel filler cap .....40－1
Removal/installation.....40－1
Fuel filler cable .....40－2
Removal/installation.....40－2

Fuel filler cap

Removal/installation

Removal

1. Pull the handgrip of fuel tank door and open the fuel filler cap
2. Remove 2 screws and remove fuel filler cap



BF5C02F7A5EA

Installation

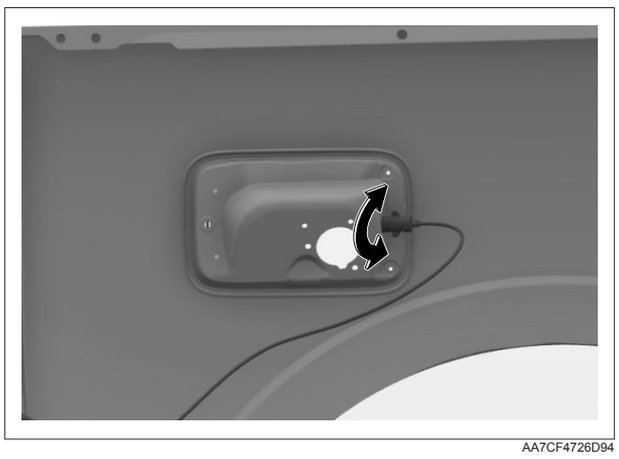
1. Perform installation work in reverse order of removal

Fuel filler cable

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front left door sill trim plate
3. Remove left pillar A lower trim plate
4. Remove rear left door sill trim plate
5. Remove left pillar B lower trim plate
6. Remove rear seat
7. Remove rear wall cover plate
8. Remove right and left pillar C lower trim plate
9. Lift carpet
10. Remove the trunk right wheel arch and mudguard.
11. Rotate the lock head of cable to disconnect fuel filler door cable from the trunk



AA7CF4726D94

12. Disconnect 8 snaps, and remove tank door cable assembly

Installation

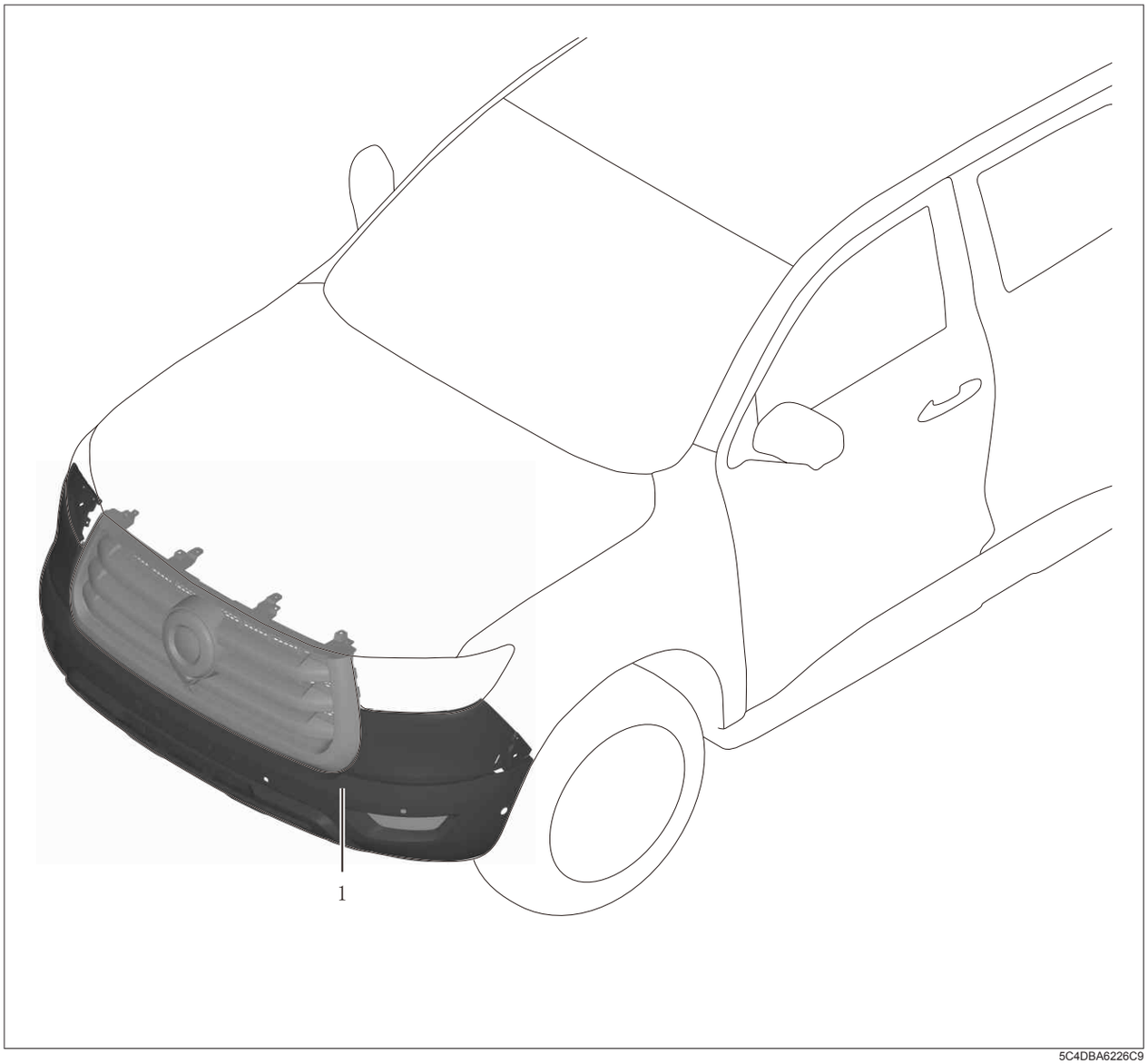
1. Perform installation work in reverse order of removal

Bumper

Front bumper .....41－1
Location Diagram of .....41－1
Removal/installation.....41－2
Ventilation grille .....41－4
Location diagram .....41－4
Removal/installation.....41－5
Rear bumper .....41－6
Location Diagram of .....41－6
Specified torque.....41－7
Removal/installation.....41－8

Front bumper

Location Diagram of



5C4DBA6226C9

1. Front bumper assembly

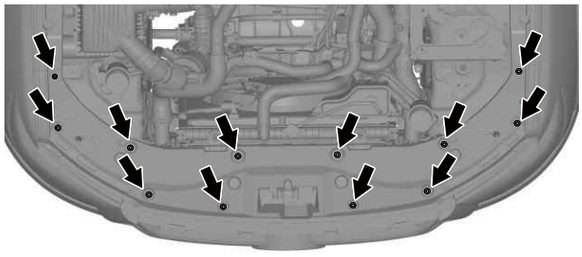
Removal/installation

Removal

⚠ Caution

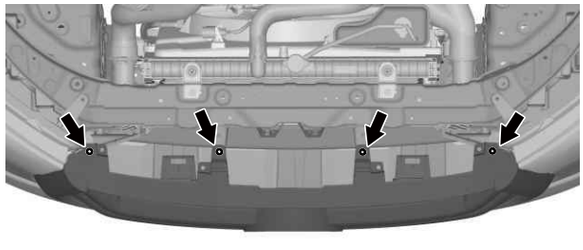
- Wear gloves to protect your hands.
- Be careful not to scratch the bumper and the vehicle body.
- Remove and install the bumper with the help of your assistant.

1. Disconnect the negative terminal of the battery.
2. Remove seal strip for fender trim plate
3. Separate 12 snaps and remove the grille trim plate



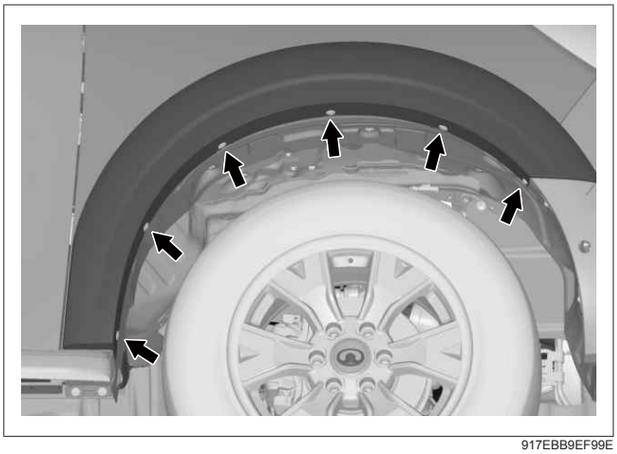
2C1BFFE69E4F

4. Remove 4 bolts



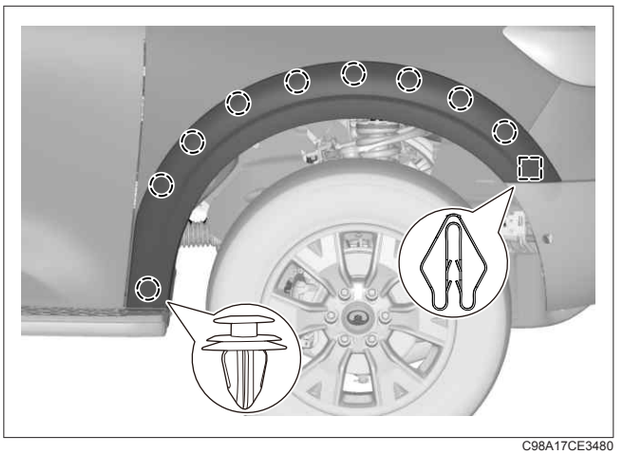
DA3C59FB680B

5. Remove 1 screw and 5 snaps on the left/right sides of the front wheel arch.



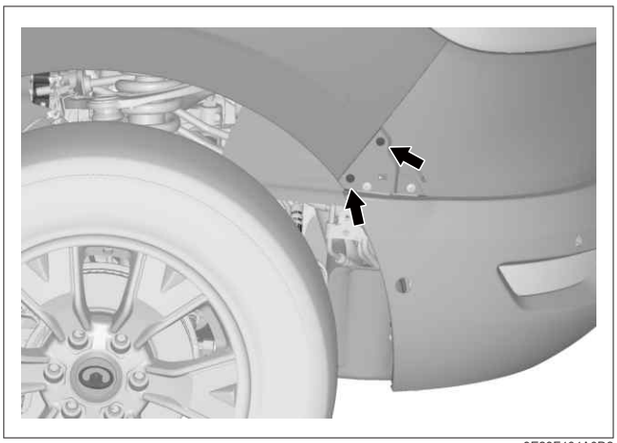
917EBB9EF99E

6. Separate 9 snaps and 1 clip on the left/right sides of the front wheel arch, and remove the front wheel arch.



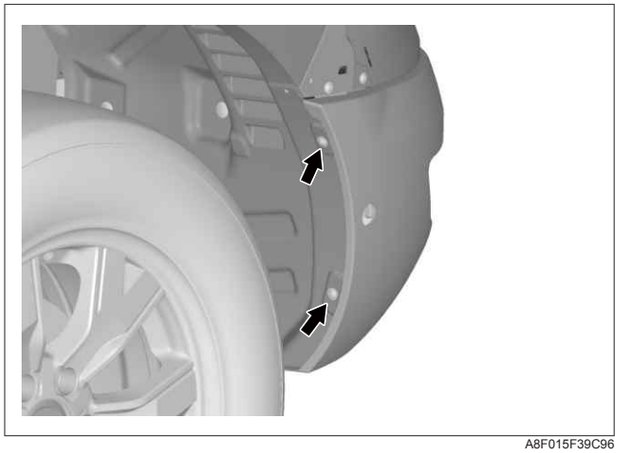
C98A17CE3480

7. Remove 2 screws below the wheel arch



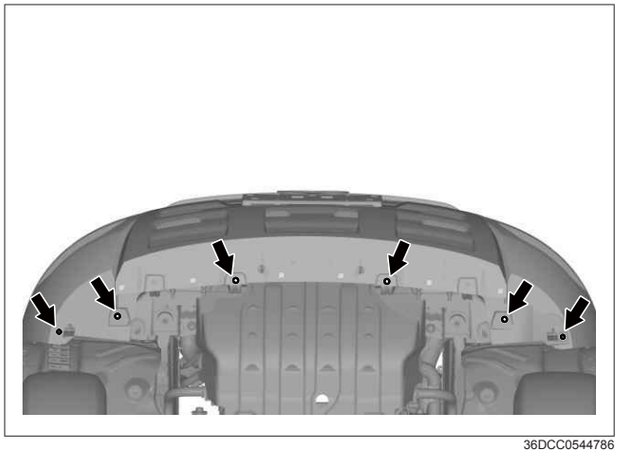
9E28F464A0D2

8. Remove 2 screws respectively on the left and right side, which are connected to front splash guard



A8F015F39C96

9. Remove 2 screws and 4 bolts below



36DCC0544786

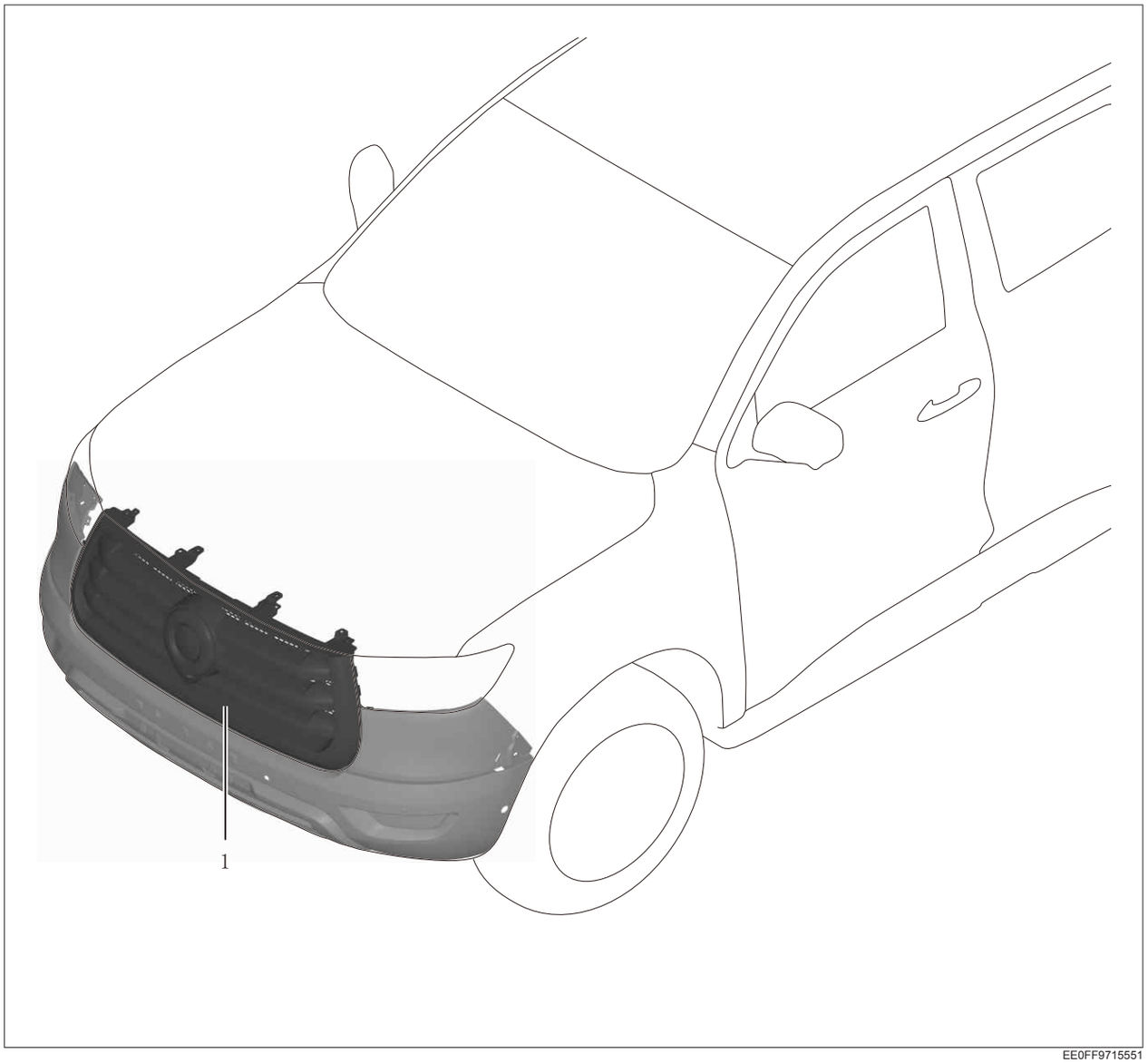
10. Disconnect harness connector
11. Remove front bumper

Installation

1. Perform installation work in reverse order of removal

Ventilation grille

Location diagram



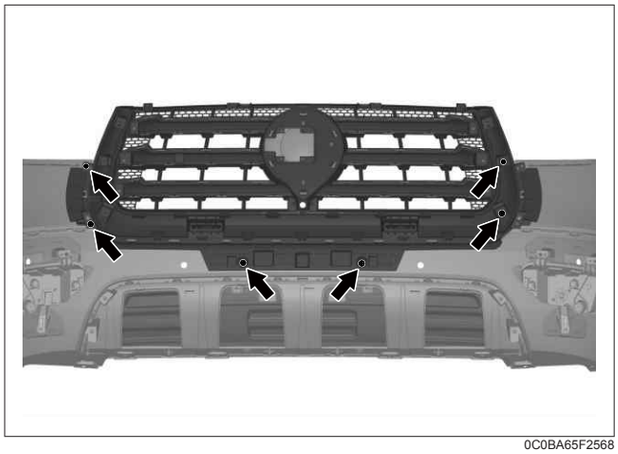
EE0FF9715551

1. Radiator grille assembly

Removal/installation

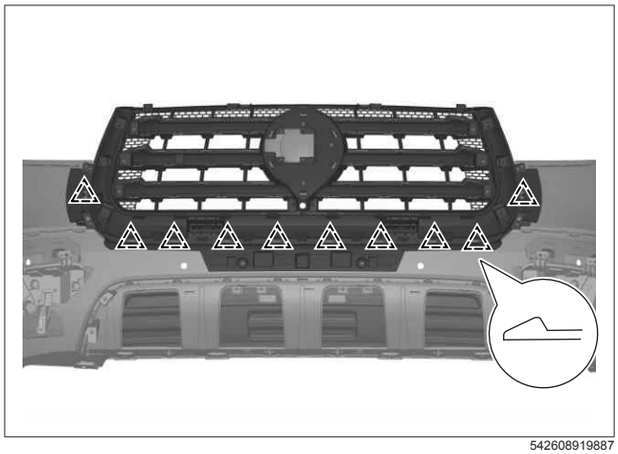
Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front bumper.
3. Disconnect harness connector
4. Remove 6 screws



0C0BA65F2568

5. Separate 10 dogs



542608919887

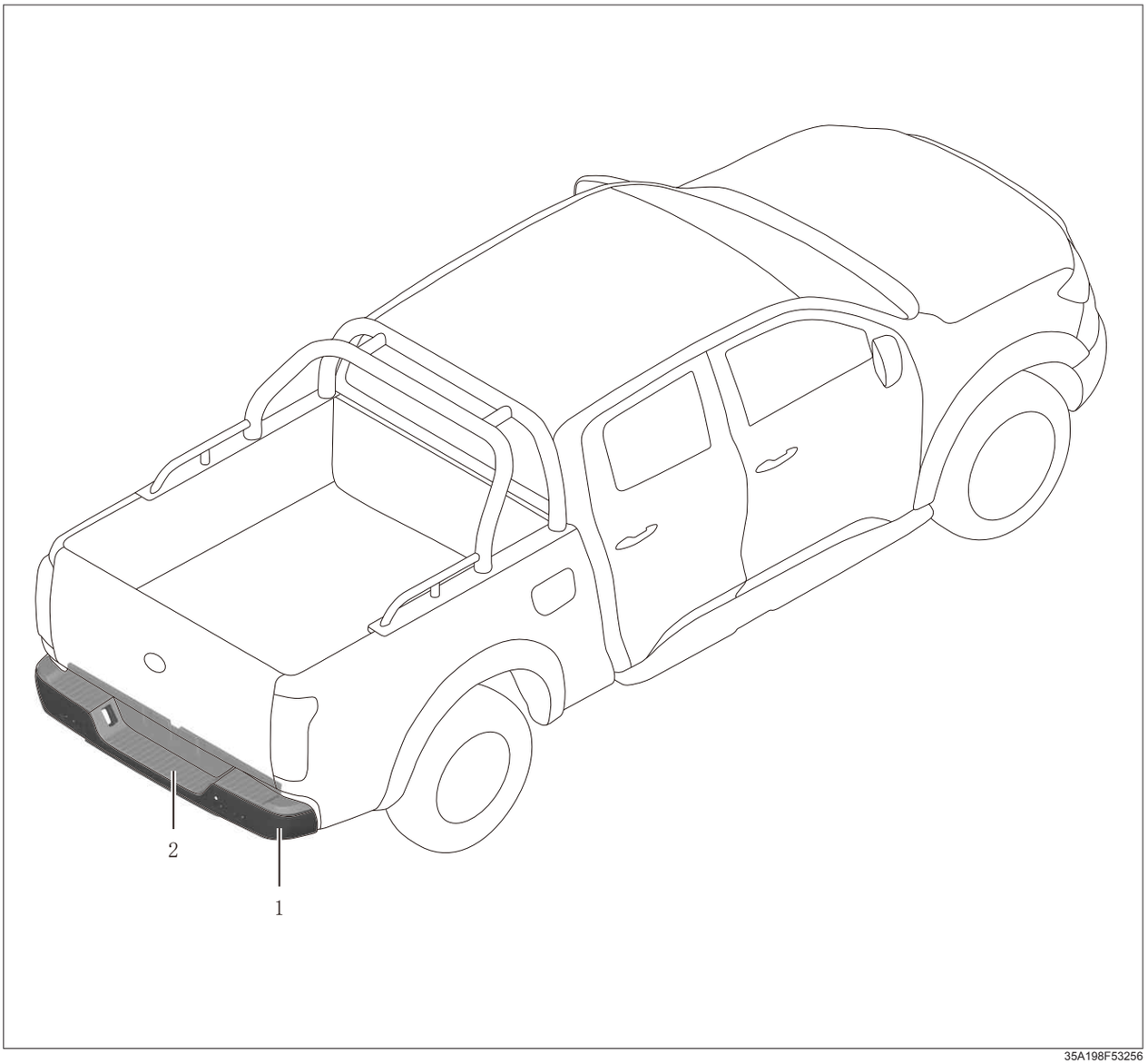
6. Remove the radiator grille

Installation

1. Perform installation work in reverse order of removal

Rear bumper

Location Diagram of



35A198F53256

1. Rear bumper assembly
2. Rear bumper pedal assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Rear bumper x frame	57~110	6	—
Bolt	Rear bumper left/right mounting bracket × rear bumper supporting plate	16.5~31.0	4	—

Removal/installation

Removal

⚠ Caution

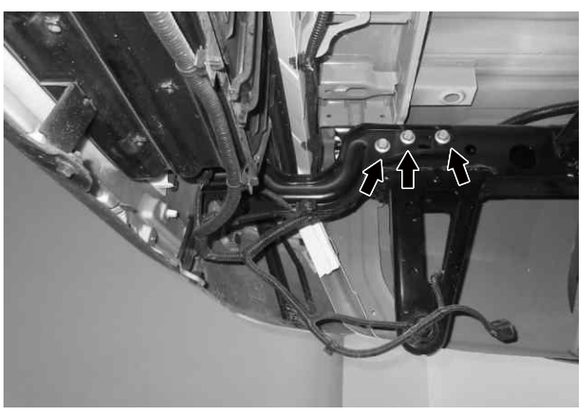
- Remove and install the bumper with the help of your assistant.
- Be careful not to scratch the bumper and the vehicle body.
- Wear gloves to protect your hands.

1. Disconnect the negative terminal of the battery.
2. Disconnect harness connectors
3. Remove 3 bolts connecting rear bumper right mounting bracket and vehicle body



92AC425A82D8

4. Remove 3 bolts connecting rear bumper left mounting bracket and vehicle body



44BD32A70285

5. Remove rear bumper

Installation

1. Perform installation work in reverse order of removal

Glass

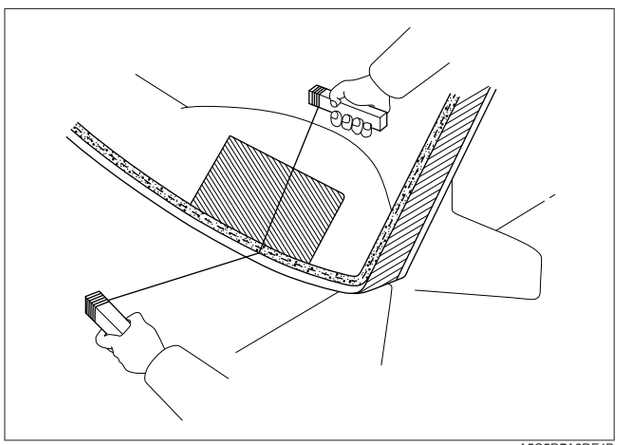
Front windshield .....42－1
Removal/installation.....42－1
Rear windshield glass .....42－3
Removal/installation.....42－3
Front door glass .....42－5
Removal/installation.....42－5
Rear door glass .....42－6
Removal/installation.....42－6

Front windshield

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove inside rearview mirror assembly
3. Remove front wiper arm
4. Remove ventilation cover body
5. Remove left and right trim strips of front windshield
6. To remove front windshield, insert a wire between the vehicle body and the glass from inside
7. Tie objects (such as wood block) capable of functioning as a lever on both ends of the steel wire



A5C5D7A6DF4B

8. Pull the steel wire around the glass to cut the glass
9. Remove glass with suction disc

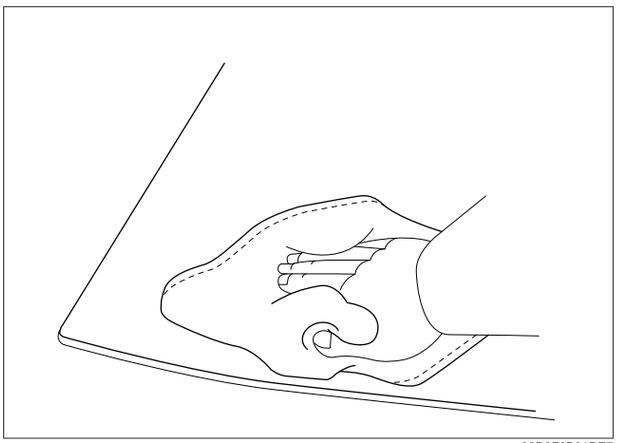
⚠ Caution

› To prevent the exterior surface of the vehicle body from being scratched, apply a layer of protective tape onto the exterior surface.

› Do not to damage the paint or other parts of the vehicle body when separating the glass from the vehicle.

› When removing the glass, in order to prevent the instrument panel from being scratched, place a plastic piece between the steel wire and instrument panel.

10. Remove glass cement on vehicle body and glass surface, then use a cleaning tool to wipe the contact surface between vehicle body and glass



92D8F6B91DE7

⚠ Caution

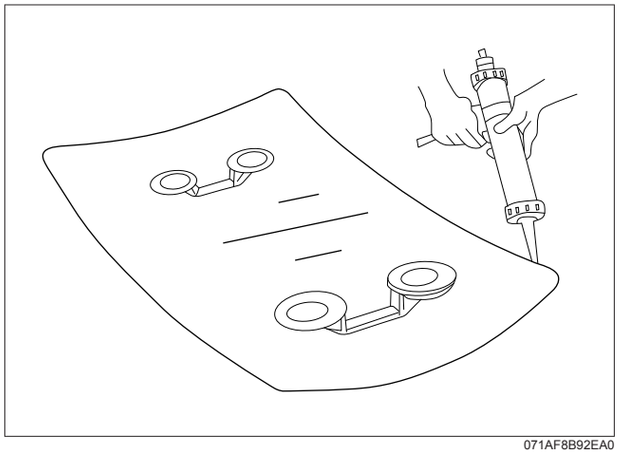
› Do not touch the surface of the glass after cleaning.

› Take care not to damage the glass.

Installation

1. Install front windshield glass upper trimming strip to front windshield
2. Attach two suction discs on the outer surface of front windshield, and turn the glass upside down on the workbench
3. Apply cleaning activator along the inner edge (black glass edge) around the front windshield glass and leave it to dry (usually 10-15 min), then apply primer evenly on cleaning activator and leave it to dry (usually 15-20 min), and finally apply glass adhesive evenly along the periphery of glass
4. Use cotton yarn to wipe windshield spigot of vehicle body, clean it thoroughly with cleaning agent and leave it to dry (usually 10-15 min), apply primer and leave it to dry (usually 15-20 min), and then attach the front windshield to windshield spigot

5. Apply glass adhesive evenly along the periphery of glass

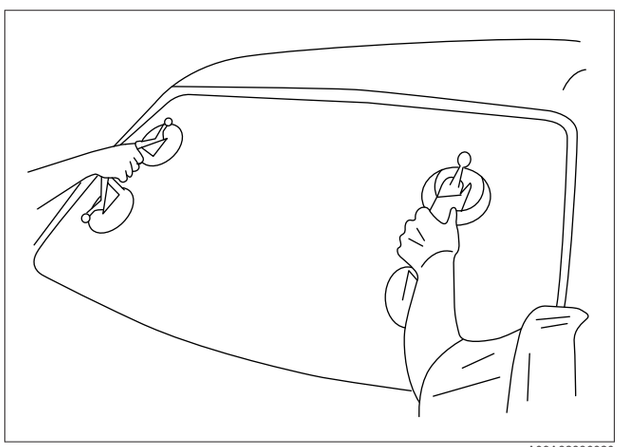


071AF8B92EA0

⚠ Caution

› In applying glass cement, fault at glass cement joint is not allowed.

6. Finally, attach the front windshield to windshield spigot, tap around glass adhesive to make the glass stick firmly and adjust it in place



A09A82886320

7. Adhere upper edge of front windshield to vehicle body with scotch tape to prevent the glass from loosening

⚠ Caution

› Remove excessive cement from vehicle body using cloth with cleaning agent.

› The vehicle must be laid up for 4h in the summer and 8h in the winter before it is used.

8. Perform a leak test before the adhesive material completely hardens, and check for leaks
9. Use vehicle-glass sealant to seal any leaks
10. Install left and right trim strips of front windshield
11. Install ventilation cover body
12. Install front wiper arm
13. Install inside rearview mirror assembly
14. Connect negative terminal of the battery

Rear windshield glass

Removal/installation

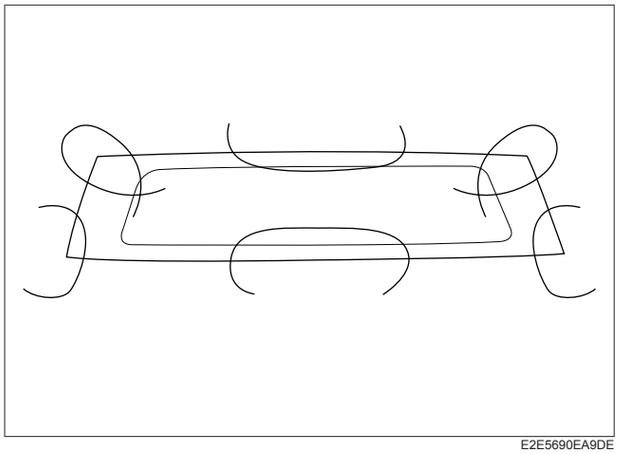
Removal

1. Disconnect harness connectors [if equipped with rear defroster]

⚠ Caution

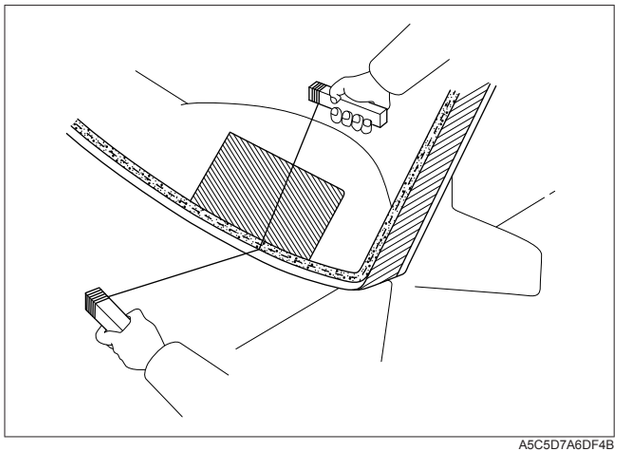
› When removing the glass, take care not to damage plug-in components.

2. To remove rear windshield, insert a wire between the vehicle body and the glass from inside



E2E5690EA9DE

3. Tie objects (such as wood block) capable of functioning as a lever on both ends of the steel wire



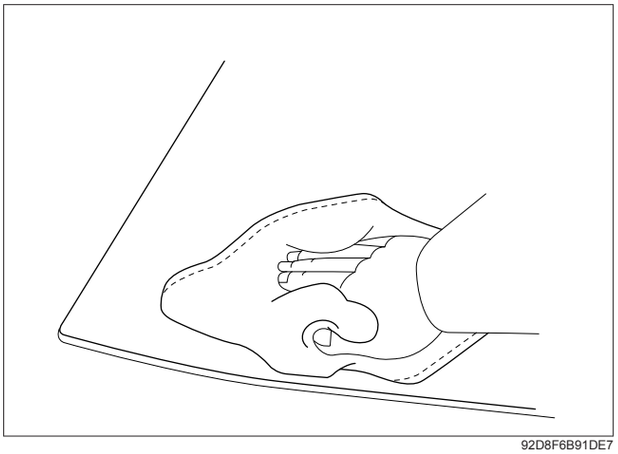
A5C5D7A6DF4B

⚠ Caution

› To prevent the exterior surface of the vehicle body from being scratched, apply a layer of protective tape onto the exterior surface.

› Do not to damage the paint or other parts of the vehicle body when separating the glass from the vehicle.

4. Pull the steel wire along the edge of the glass to cut it
5. Remove rear windshield glass using a suction disc
6. Remove glass cement on vehicle body and glass surface, then use a cleaning tool to wipe the contact surface between vehicle body and glass



92D8F6B91DE7

⚠ Caution

› Do not touch the surface of the glass after cleaning.

› Take care not to damage the glass.

Installation

1. Attach two suction discs on the outer surface of the rear windshield glass, and turn the glass upside down on the workbench
2. Apply cleaning activator along the inner edge (black glass edge) around the rear windshield glass and leave it to dry (usually 10-15 min), then apply primer evenly on cleaning activator and leave it to dry (usually 15-20min), and finally apply glass adhesive evenly along the periphery of glass
3. Use cotton yarn to wipe windshield spigot of vehicle body, clean it thoroughly with cleaning agent and leave it to dry (usually 10-15 min), apply primer and leave it to dry (usually 15-20 min), and then attach the rear windshield to window spigot

4. Then apply glass adhesive evenly along the periphery of glass

⚠ Caution

› In applying glass cement, fault at glass cement joint is not allowed.

5. Finally, attach the rear windshield to windshield spigot, tap around glass adhesive to make the glass stick firmly and adjust it in place
6. Adhere upper edge of rear windshield to vehicle body with scotch tape to prevent the glass from loosening

⚠ Caution

› Remove excessive cement from vehicle body using cloth with cleaning agent.

› The vehicle must be laid up for 4h in the summer and 8h in the winter before it is used.

7. You should perform a leak test after the adhesive material completely hardens, and check for leaks
8. Use vehicle-glass sealant to seal any leaks

Front door glass

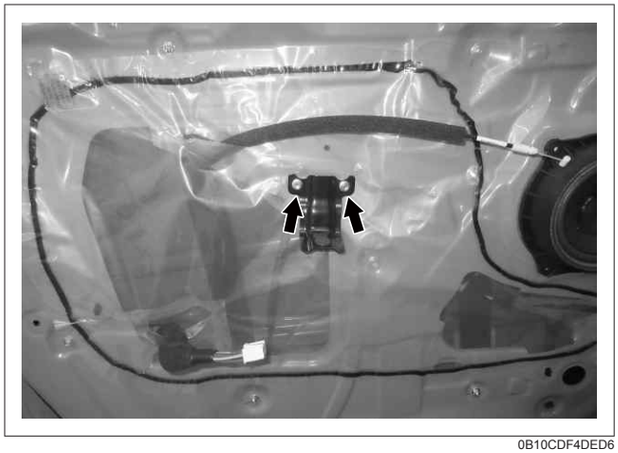
Removal/installation

Removal

Notice

› Take the left side as example. The removal of right side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner trim plate
3. Remove 2 bolts and remove front door handle box mounting bracket



0B10CDF4DED6

4. Remove the waterproof membrane
5. Connect the negative terminal of the battery
6. Adjust the glass to the mounting position
7. Disconnect the glass from 2 dogs



02B8839D6192

8. Tilt up and remove the front door glass

Installation

1. Perform installation work in reverse order of removal

Rear door glass

Removal/installation

Removal

Notice

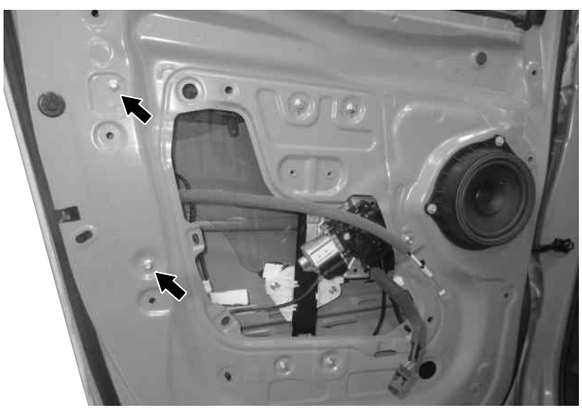
› Take the left side as example. The removal of right side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Remove rear door inner trim plate
3. Remove 2 bolts and remove rear door handle box mounting bracket



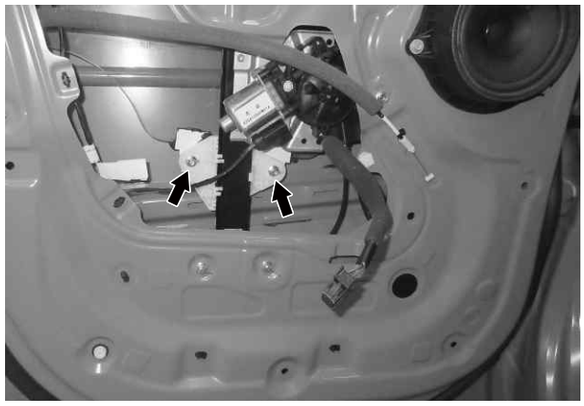
98F1523ACA01

4. Remove the waterproof membrane
5. Remove 2 bolts and remove lower section of rear door glass rear guide



915AE1D94969

6. Connect the negative terminal of the battery
7. Adjust the glass to the mounting position
8. Disconnect the negative terminal of the battery.
9. Remove 2 rear door glass fastening bolts



CCD51FC47867

10. Remove rear door glass

Installation

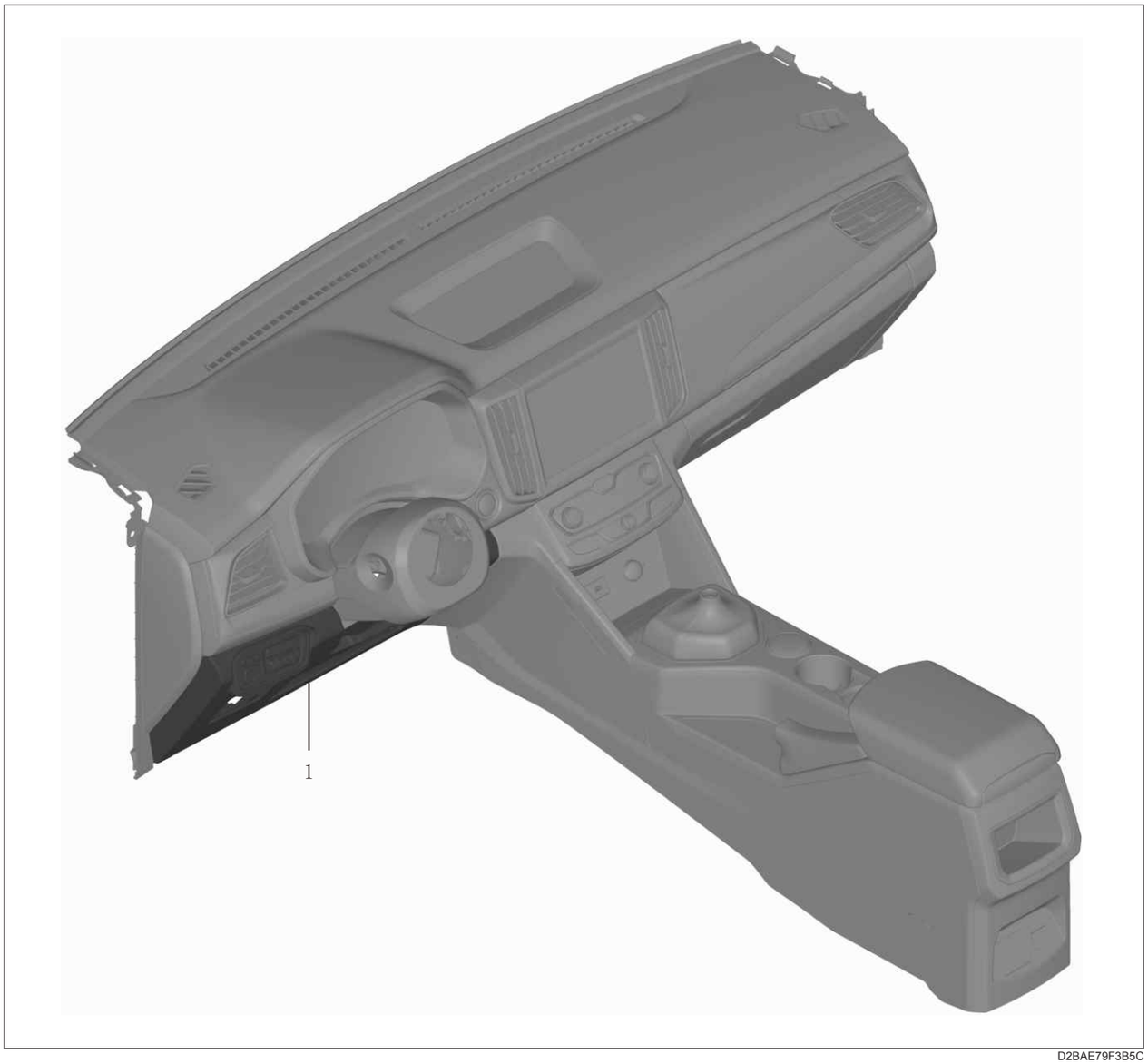
1. Perform installation work in reverse order of removal

Instrument panel

Driver knee trim plate .....43－1
Structural diagram .....43－1
Removal/installation.....43－2
Glove box .....43－3
Structural diagram .....43－3
Removal/installation.....43－4
Main instrument panel .....43－5
Structural diagram .....43－5
Removal/installation.....43－6
Auxiliary instrument panel (6MT).....43－9
Structural Diagram of .....43－9
Removal/installation.....43－10
Auxiliary instrument panel (8AT).....43－13
Structural Diagram of .....43－13
Removal/installation.....43－14

Driver knee trim plate

Structural diagram



D2BAE79F3B5C

1. Driver knee trim plate

Removal/installation

Removal

⚠ Caution

- Be sure to wear gloves to avoid any hand injury.
- Take care not to scratch the trim strips and other parts.

1. Disconnect the negative terminal of the battery.
2. Remove front left door frame seal
3. Separate 4 clips and remove the left end cover of instrument panel



A4B8DF4BF4F8

4. Remove 2 screws



ACC8DCD8D749



6C321C5013D7

5. Separate 8 clips, disconnect harness connector, and remove driver knee trim plate



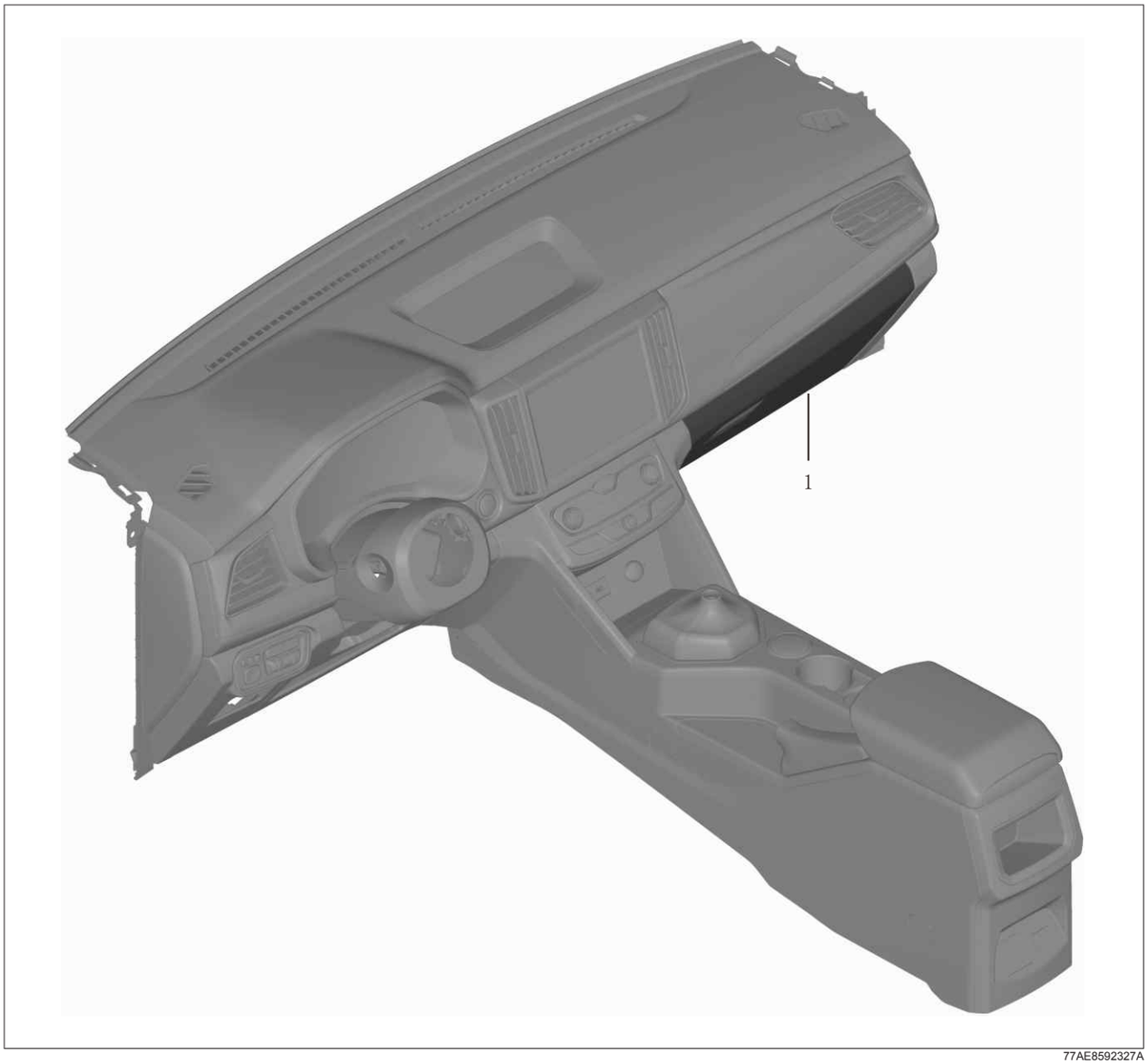
944C13643EB8

Installation

1. Perform installation work in reverse order of removal

Glove box

Structural diagram



77AE8592327A

1. Glove box assembly

Removal/installation

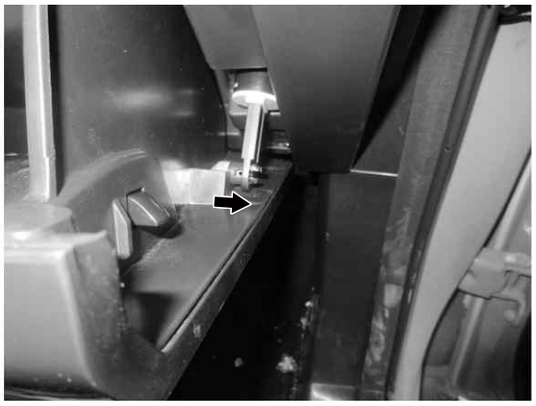
Removal

⚠ Caution

› Be sure to wear gloves to avoid any hand injury.

› Take care not to scratch the trim strips and other parts.

1. Open glove box, and damper can be seen
2. Disconnect damper from the glove box



9F0ED76C5910

ℹ Notice

› At this time, the glove box is still in the assembled state of the vehicle, and the damper pull rod should not come out.

3. After disconnect, slightly push back damper tie bar to separate it from installation surface of glove box, so as to prevent damper tie bar from breaking in removing glove box



138023DFE5D6

4. Push hard inwards, and remove stop structure at the upper and rear sides of glove box



7C272DBEB51B



DA2F70BDFC46

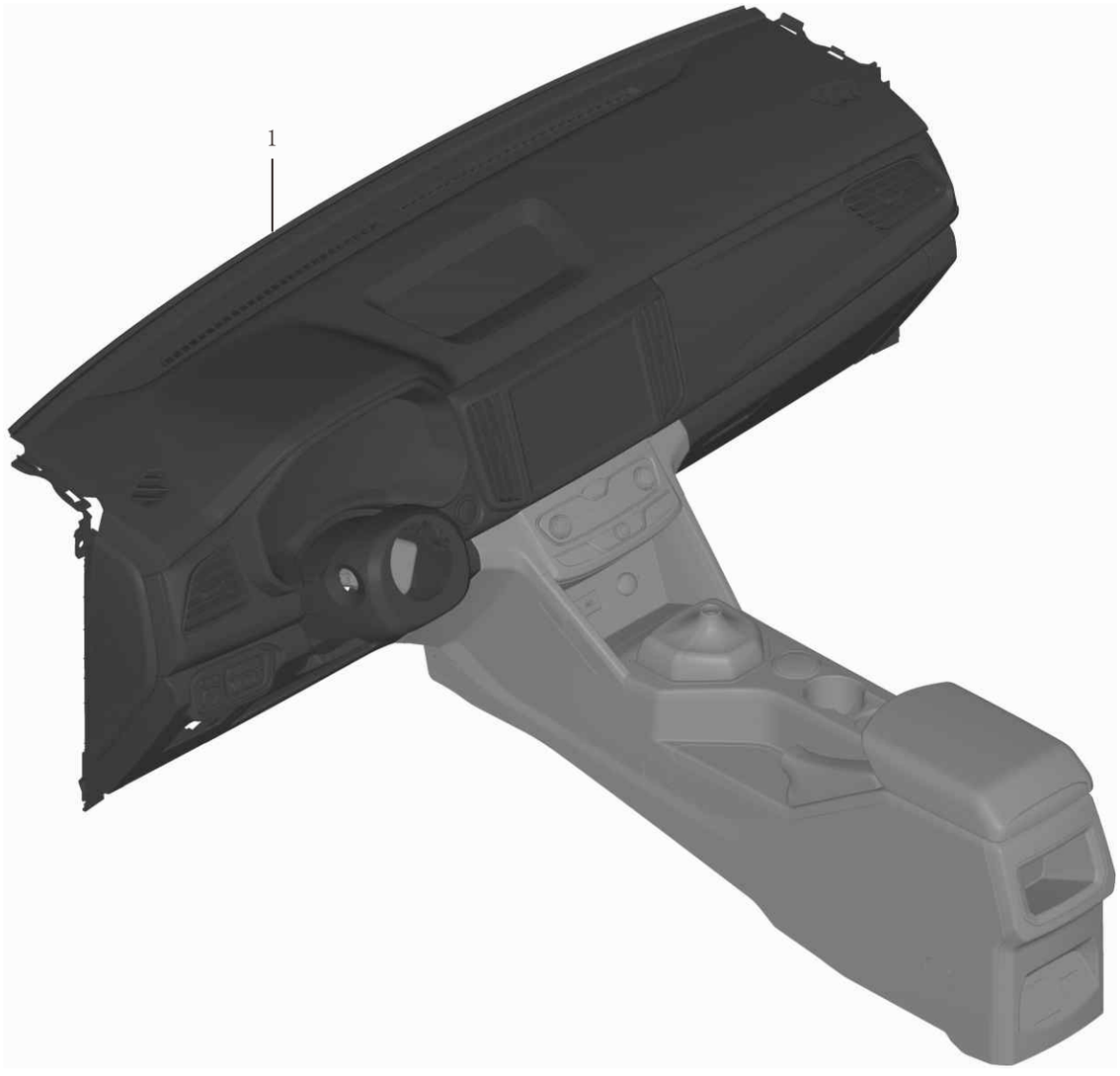
5. Disconnect glove box from glove box shaft, remove glove box

Installation

1. Perform installation work in reverse order of removal

Main instrument panel

Structural diagram



4EFBB8DEDF02

1. Instrument panel assembly

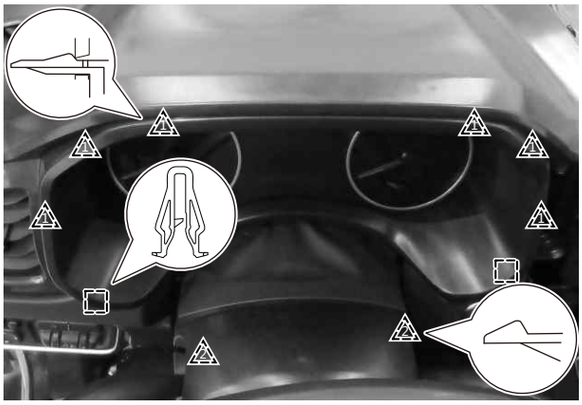
Removal/installation

Removal

⚠ Caution

- Be sure to wear gloves to avoid any hand injury.
- Take care not to scratch the trim strips and other parts.
- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.

1. Disconnect the negative terminal of the battery.
2. Remove the auxiliary instrument panel
3. Separate 2 clips and 6 dogs from the combination instrument cover, and 2 dogs from the steering column upper cover. Remove the combination instrument cover with steering column upper cover.



007CCF40BA5F

4. Remove the combination instrument.
5. Remove 3 screws and remove the steering column lower cover.



B79DB379926C



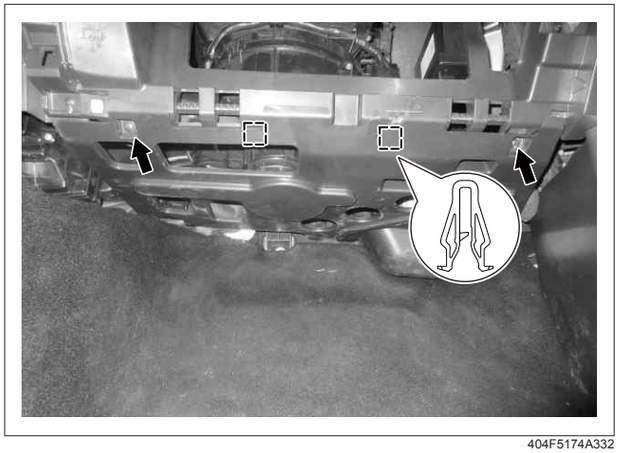
D746C61DD387



C4A6CDB22387

6. Remove airbag
7. Remove steering wheel
8. Remove multimedia player

9. Remove 2 screws, separate 2 clips, disconnect the harness connector, and remove the right foot block of instrument panel.

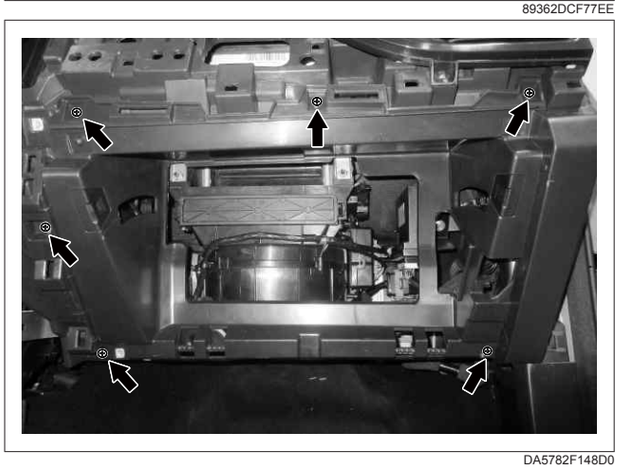


404F5174A332

10. Remove 8 screws and remove the glove box frame.

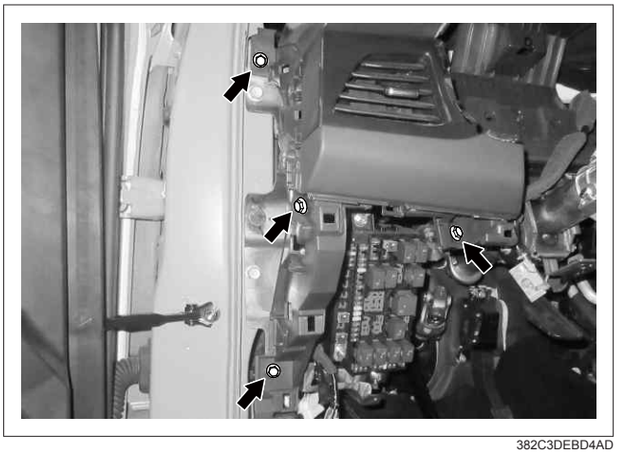


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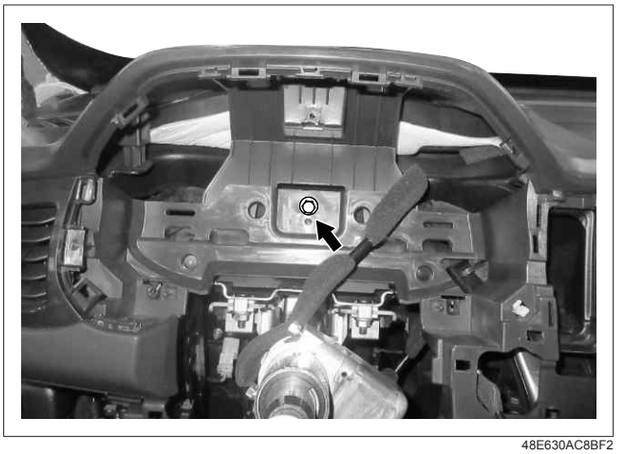


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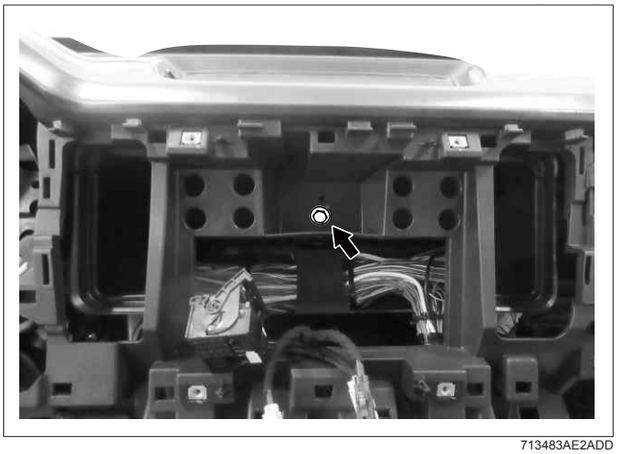
11. Remove the left Pillar A upper guard.
12. Remove the right Pillar A upper guard.
13. Remove 14 bolts and remove the instrument panel body.



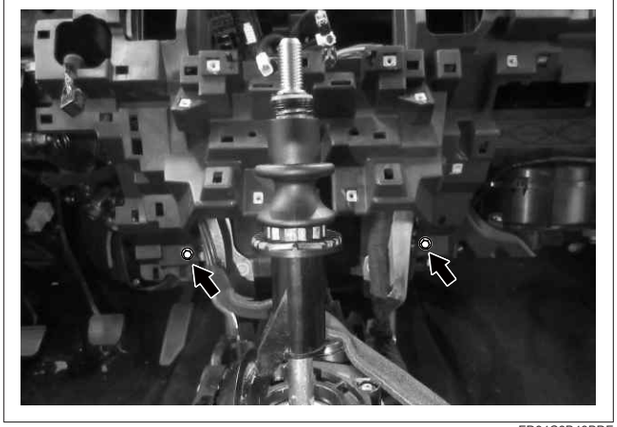
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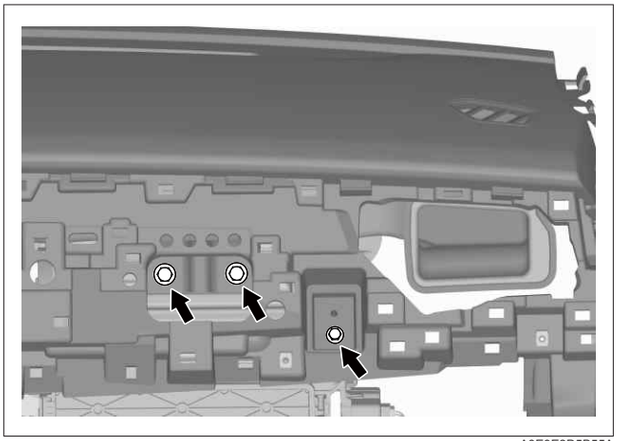
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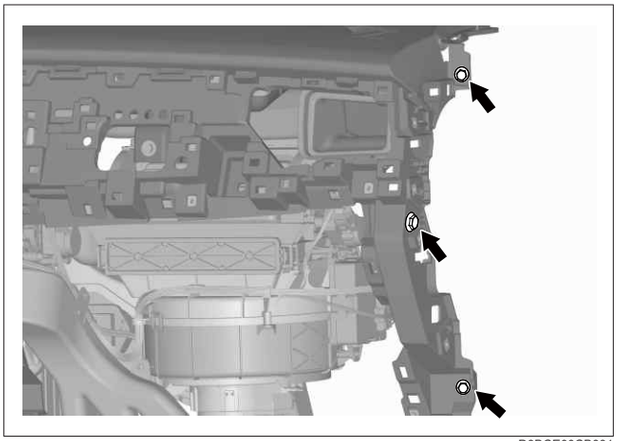
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FD94C8B48BDF



A8E8E2D5B55A



D3BCE00CB331

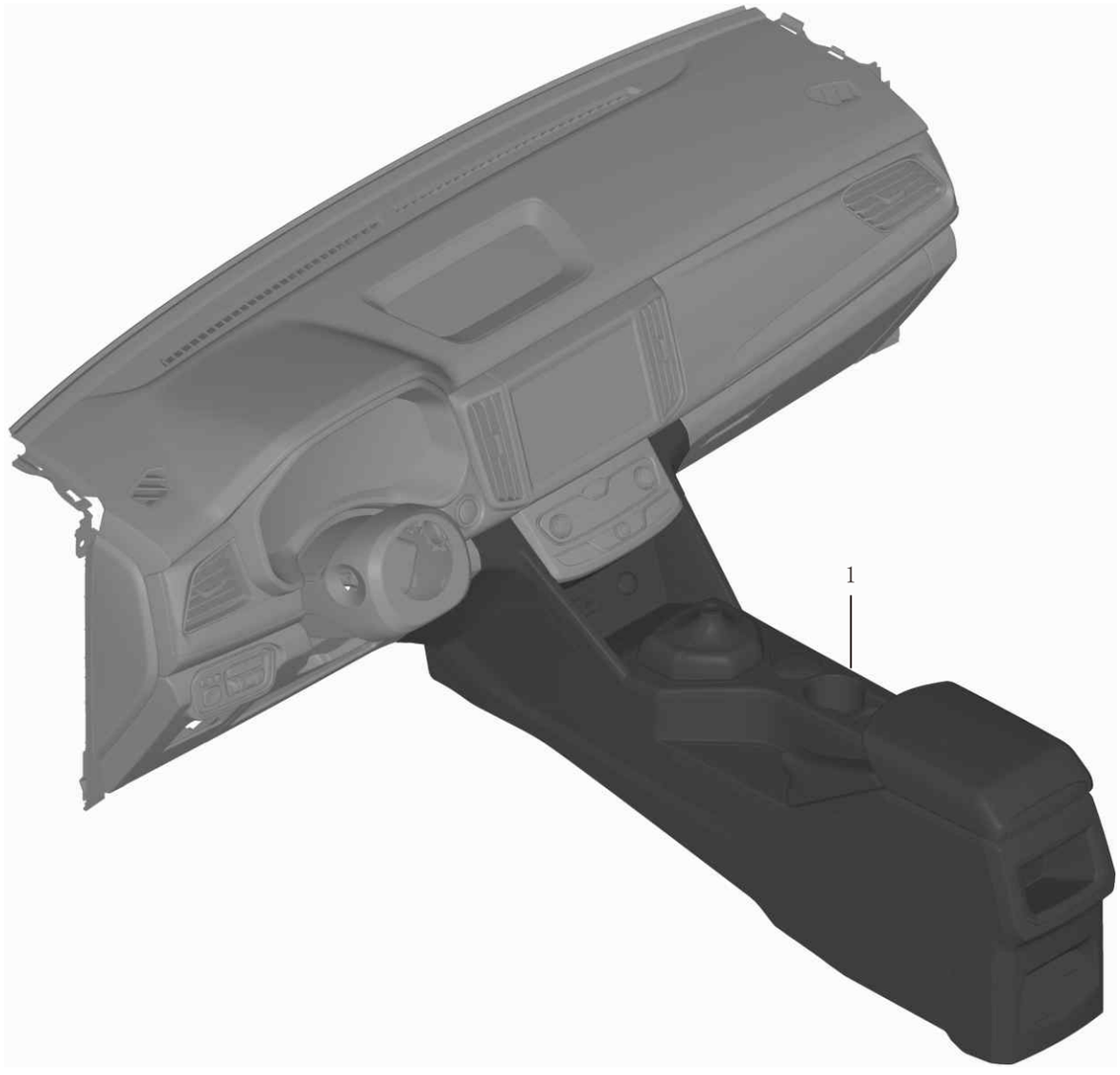
14. Disconnect the harness connector
15. Remove instrument panel body

Installation

1. Perform installation work in reverse order of removal

Auxiliary instrument panel (6MT)

Structural Diagram of



B197313A11D2

1. Auxiliary instrument panel assembly

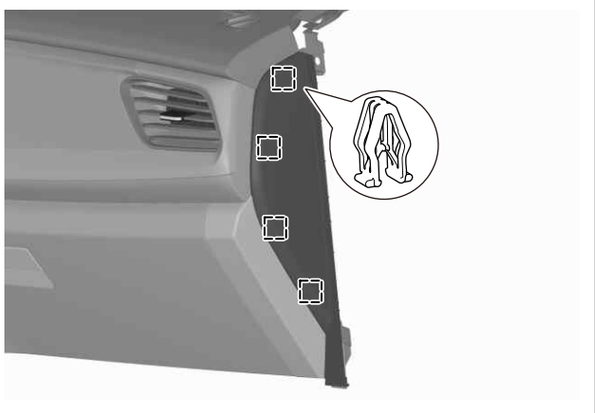
Removal/installation

Removal

⚠ Caution

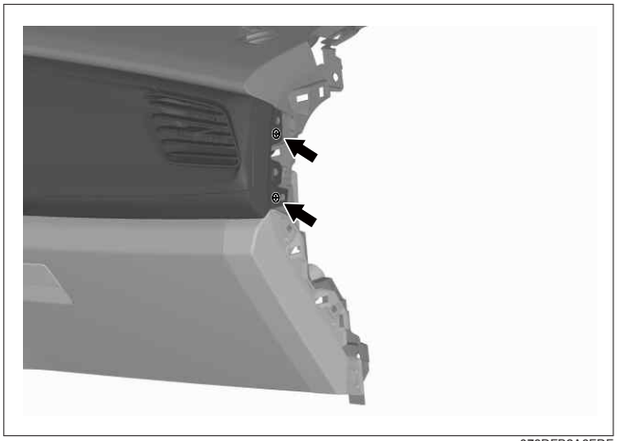
- Be sure to wear gloves to avoid any hand injury.
- Take care not to scratch the trim strips and other parts.
- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.

1. Disconnect the negative terminal of the battery.
2. Remove the driver knee trim plate
3. Remove the left/right air outlet in the center of instrument panel with central control panel
4. Remove the front right door frame seal
5. Separate 4 clips and remove the right side cover plate of the instrument panel.

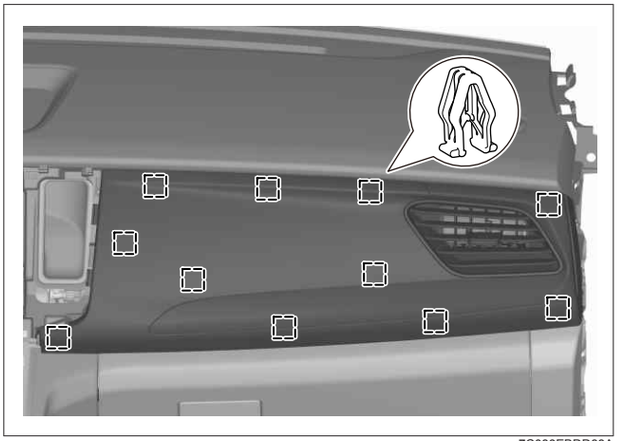


29E2ED6F377E

6. Remove 2 screws, separate 11 clips, and remove the right trim panel assembly of instrument panel.



078DFB2A6FDF



7C086EBDD83A

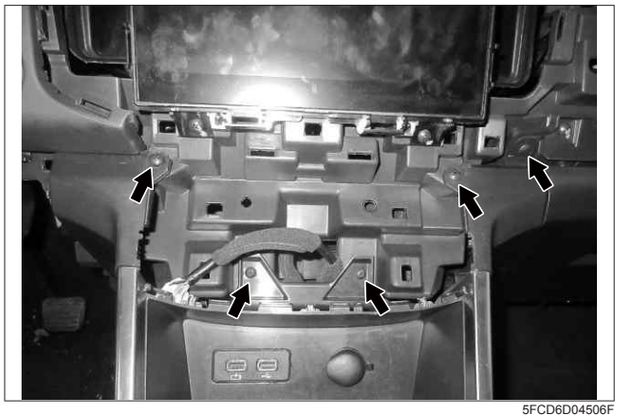
7. Remove glove box
8. Remove 1 screw on the lower left side of glove box.



9061C3084FA7

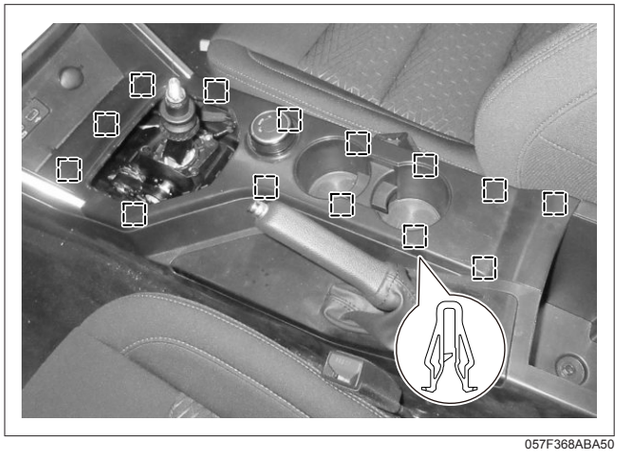
9. Remove the A/C control panel.

10. Remove 5 screw



5FCD6D04506F

11. Remove shift lever ball
12. Remove shifter trim plate
13. Remove front storage box gasket of auxiliary instrument panel
14. Open the elbow pillow
15. Separate 14 clips, disconnect the harness connector, and remove the console panel of the auxiliary instrument panel.



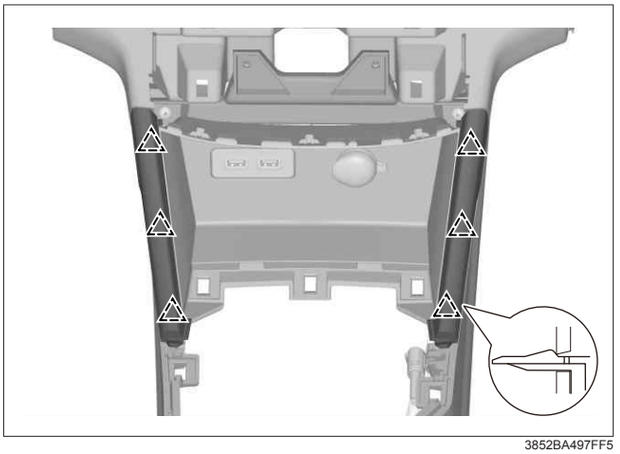
057F368ABA50

16. Remove parking brake handle sheath



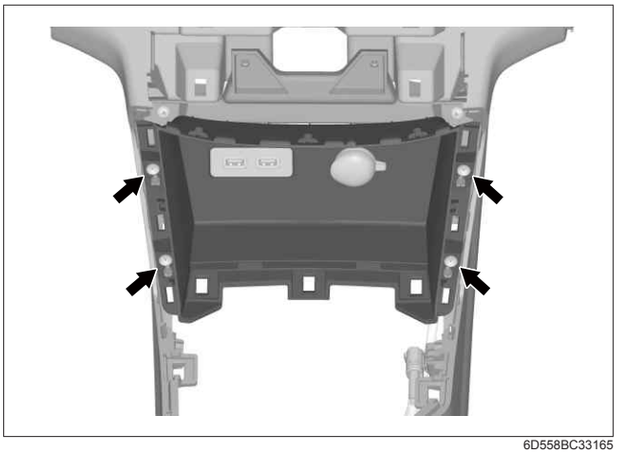
9E767CDF3321

17. Separate 6 dogs and remove the left/right trim strip of the auxiliary instrument panel.



3852BA497FF5

18. Remove 4 screws, disconnect the harness connector, and remove the front storage box of the auxiliary instrument panel.



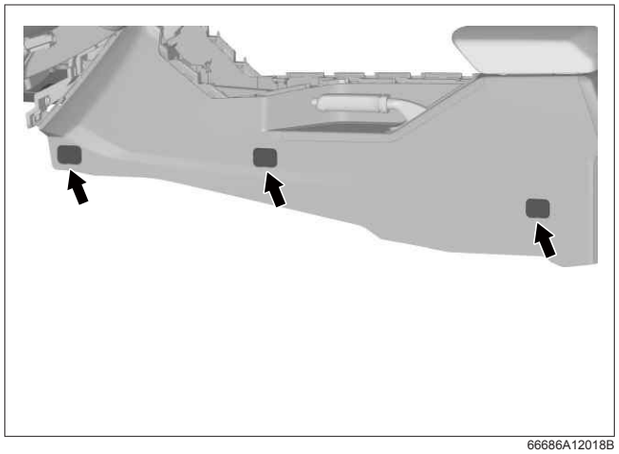
6D558BC33165

19. Remove armrest box rubber mat
20. Remove 1 fastening bolt in the handrail box of the auxiliary instrument panel.



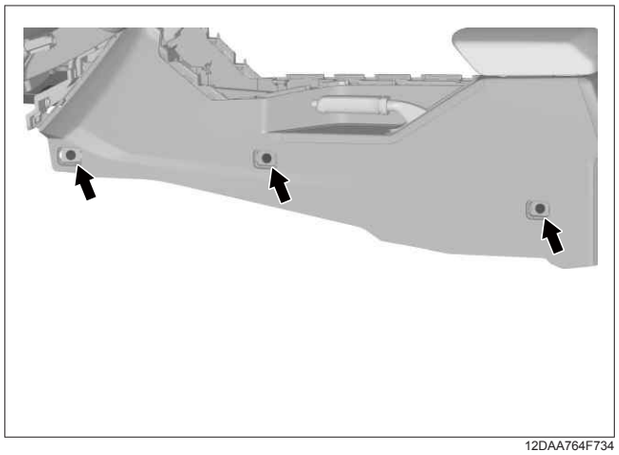
1F318517830A

21. Remove 3 bolt cover plates of the left trim panel of the auxiliary instrument panel.



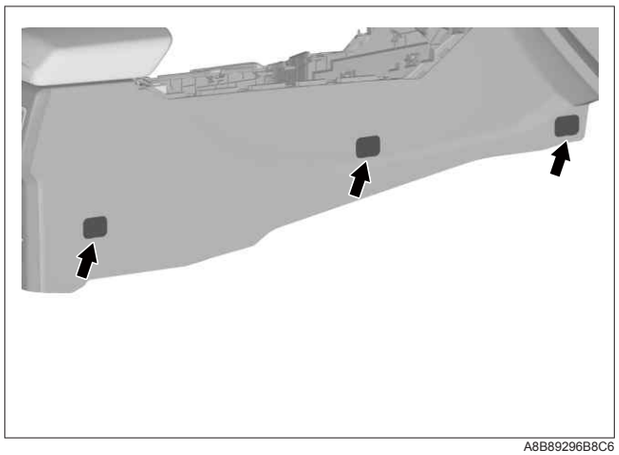
66686A12018B

22. Remove 3 bolts of the left trim panel of the auxiliary instrument panel.



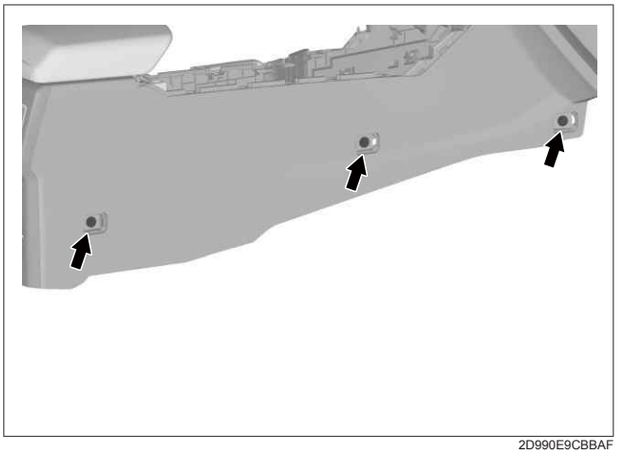
12DAA764F734

23. Remove 3 bolt cover plates of the right trim panel of the auxiliary instrument panel.



A8B89296B8C6

24. Remove 3 bolts of the right trim panel of the auxiliary instrument panel.



2D990E9CBBAF

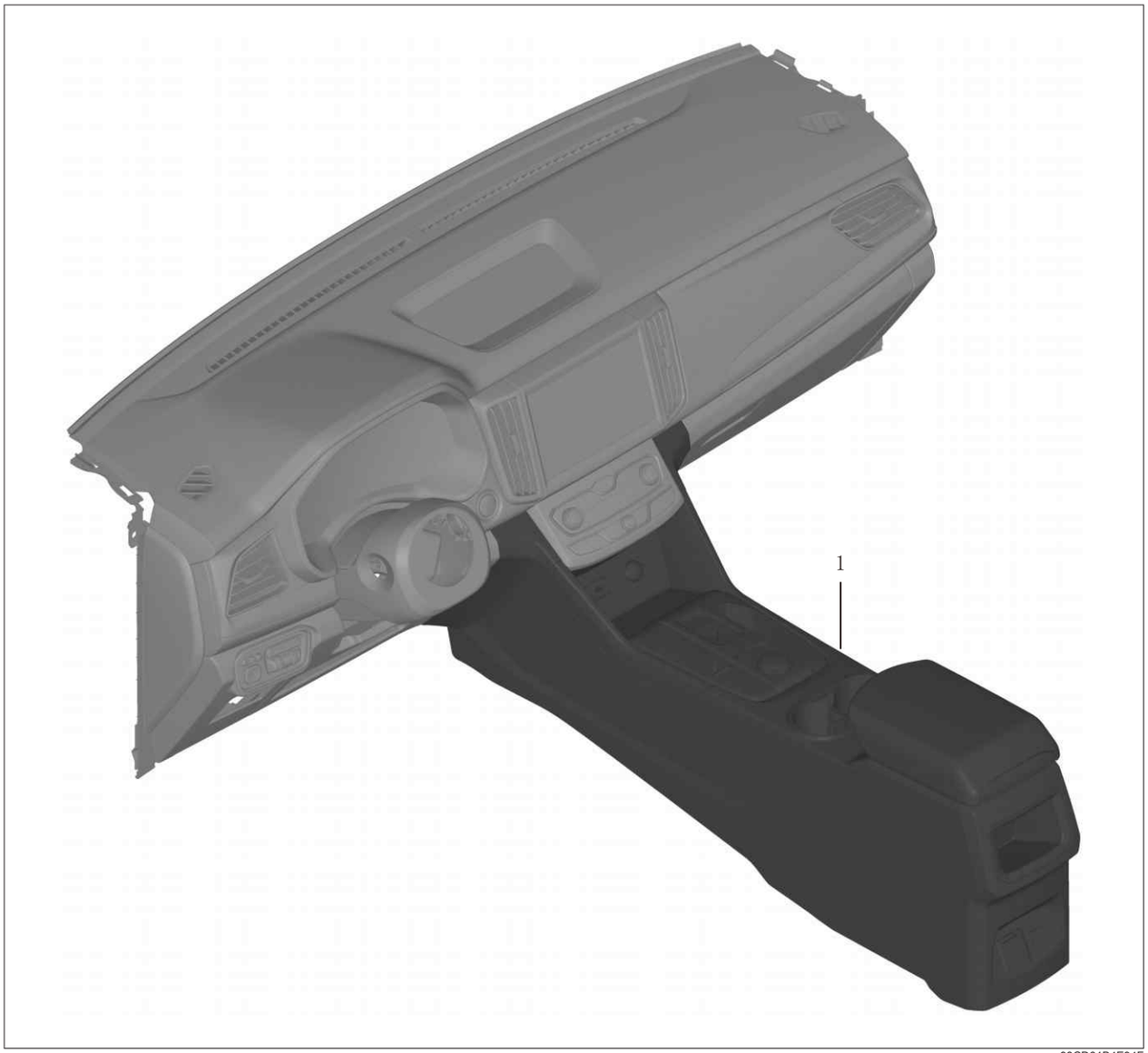
25. Disconnect the harness connector
26. Remove auxiliary instrument panel

Installation

1. Perform installation work in reverse order of removal

Auxiliary instrument panel (8AT)

Structural Diagram of



98CD61B4E94F

1. Auxiliary instrument panel assembly

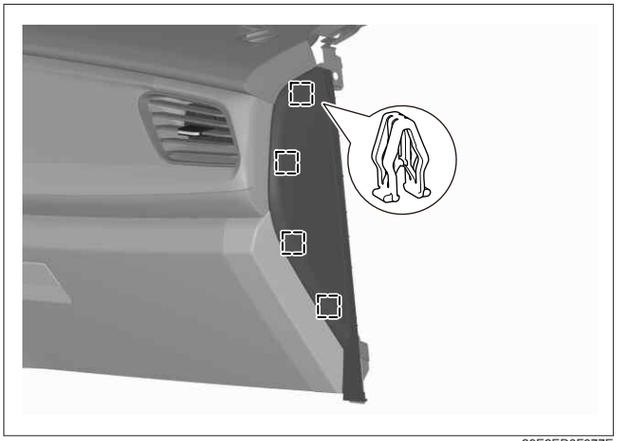
Removal/installation

Removal

⚠ Caution

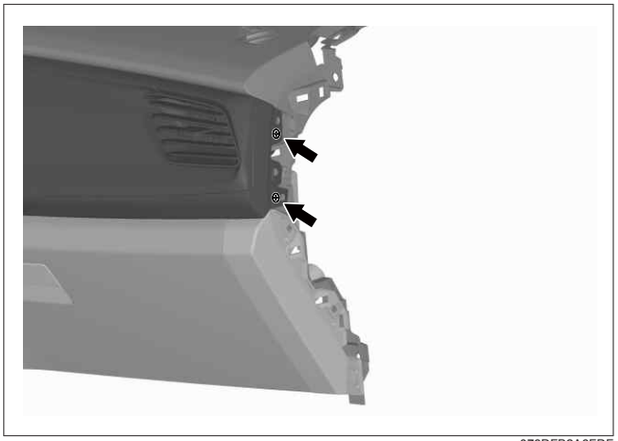
- Be sure to wear gloves to avoid any hand injury.
- Take care not to scratch the trim strips and other parts.
- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.

1. Disconnect the negative terminal of the battery.
2. Remove the driver knee trim plate
3. Remove the left/right air outlet in the center of instrument panel with central control panel
4. Remove the front right door frame seal
5. Separate 4 clips and remove the right side cover plate of the instrument panel.

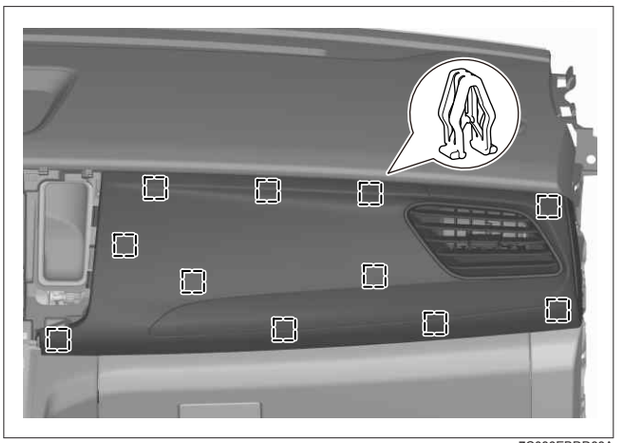


29E2ED6F377E

6. Remove 2 screws, separate 11 clips, and remove the right trim panel assembly of instrument panel.



078DFB2A6FDF



7C086EBDD83A

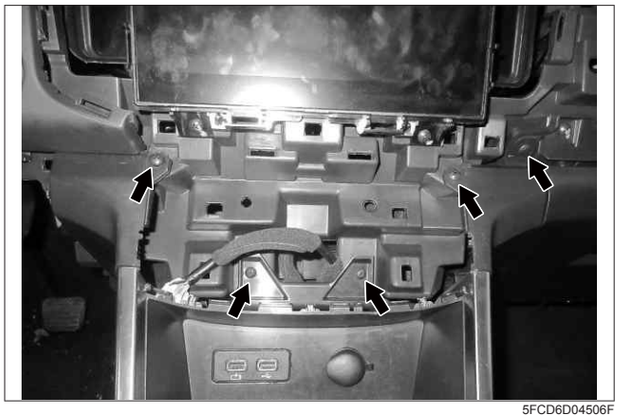
7. Remove glove box
8. Remove 1 screw on the lower left side of glove box.



9061C3084FA7

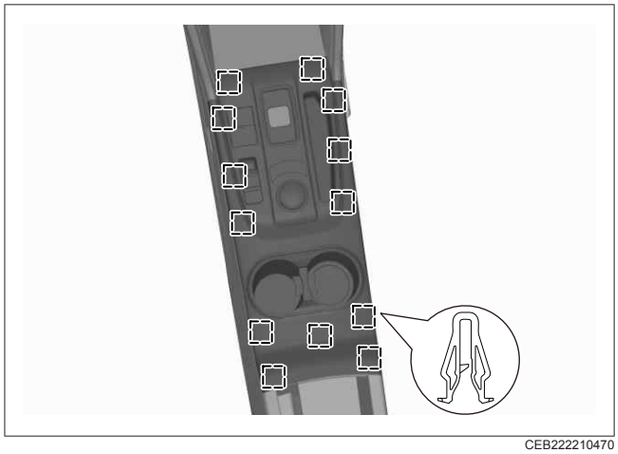
9. Remove the A/C control panel.

10. Remove 5 screw



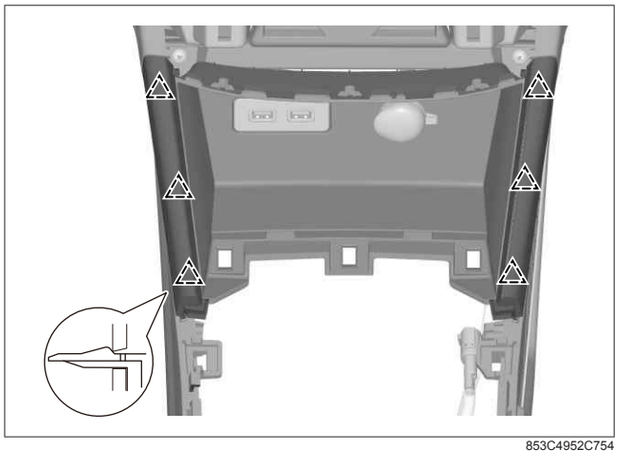
5FCD6D04506F

11. Remove the gear shift lever
12. Remove front storage box gasket of auxiliary instrument panel
13. Open the elbow pillow
14. Separate 13 clips, disconnect the harness connector, and remove the console panel of the auxiliary instrument panel.



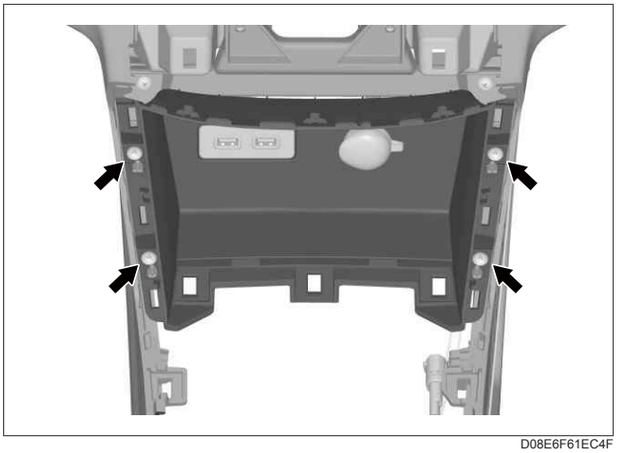
CEB222210470

15. Separate 6 dogs and remove the left/right trim strip of the auxiliary instrument panel.



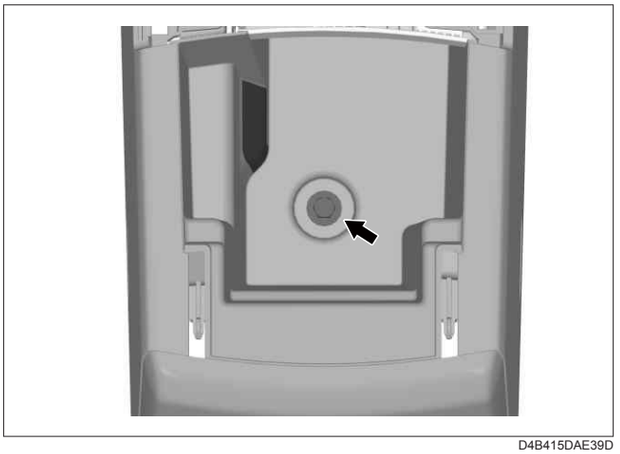
853C4952C754

16. Remove 4 screws, disconnect the harness connector, and remove the front storage box of the auxiliary instrument panel.



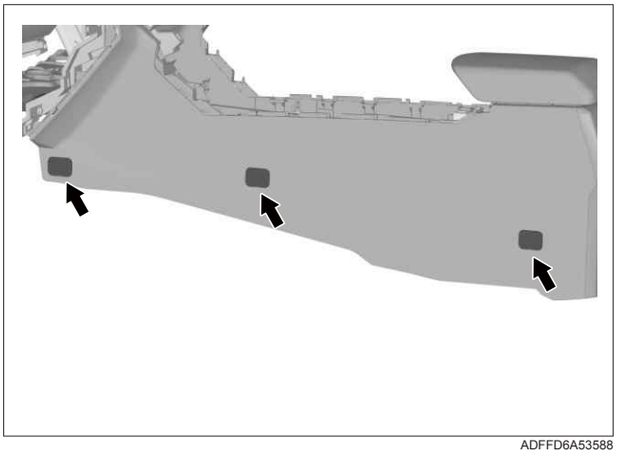
D08E6F61EC4F

17. Remove armrest box rubber mat
18. Remove 1 fastening bolt in the handrail box of the auxiliary instrument panel.



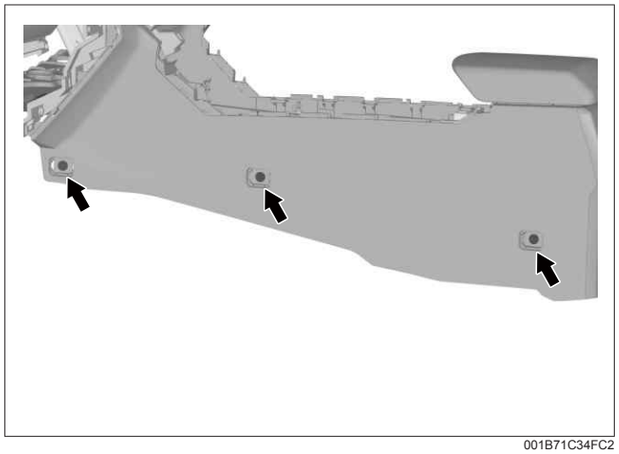
D4B415DAE39D

19. Remove 3 bolt cover plates of the left trim panel of the auxiliary instrument panel.



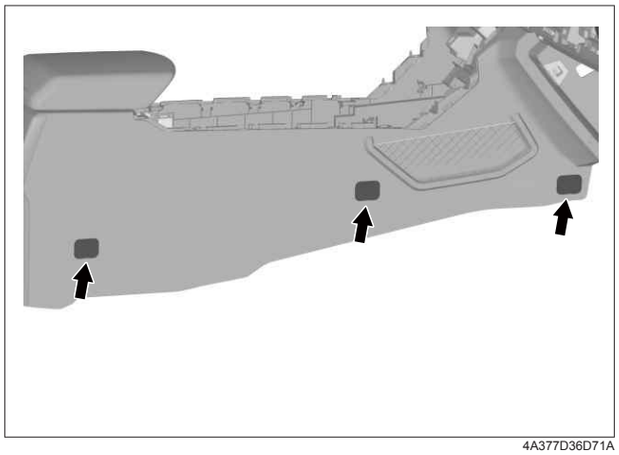
ADFFD6A53588

20. Remove 3 bolts of the left trim panel of the auxiliary instrument panel.



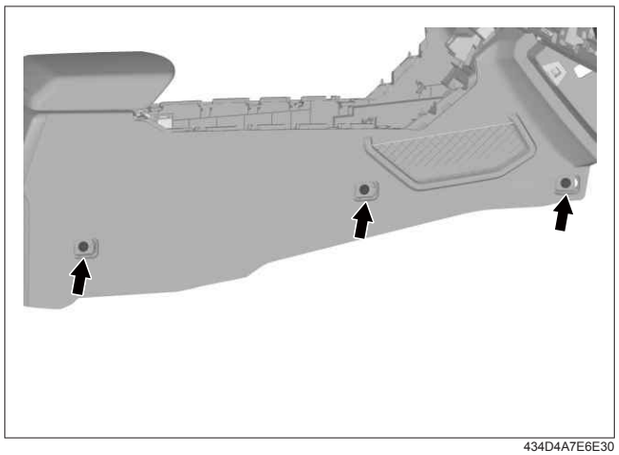
001B71C34FC2

21. Remove 3 bolt cover plates of the right trim panel of the auxiliary instrument panel.



4A377D36D71A

22. Remove 3 bolts of the right trim panel of the auxiliary instrument panel.



434D4A7E6E30

23. Disconnect the harness connector
24. Remove auxiliary instrument panel

Installation

1. Perform installation work in reverse order of removal

Seat

Driver seat - manual six-way + heating .....44－1
Structural diagram .....44－1
Pin definition .....44－2
Specified torque .....44－3
Removal/installation .....44－4
Disassembly/assembly .....44－5
Driver seat - electric six-way + heating .....44－8
Structural diagram .....44－8
Pin definition .....44－9
Specified torque .....44－10
Removal/installation .....44－11
Disassembly/assembly .....44－12
Front passenger seat - manual 4-way + heating + SBR .....44－15
Structural diagram .....44－15
Pin definition .....44－16
Specified torque .....44－17
Removal/installation .....44－18
Disassembly/assembly .....44－19
Front passenger seat - electric four-way + heating + SBR .....44－22
Structural diagram .....44－22
Pin definition .....44－23
Specified torque .....44－24
Removal/installation .....44－25
Disassembly/assembly .....44－26
Rear seat .....44－29
Structural diagram .....44－29
Specified torque .....44－30
Removal/installation .....44－31
Disassembly/assembly .....44－31

Driver seat - manual six-way + heating

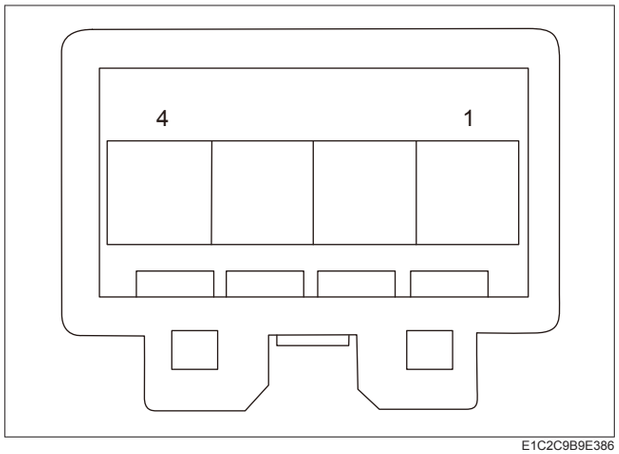
Structural diagram



833F4374D6FF

1. Driver seat cushion assembly
2. Driver seat backrest cushion assembly
3. Driver seat headrest assembly

Pin definition



E1C2C9B9E386

Pin No.	Function
1	NTC ＋
2	NTC －
3	Heating positive terminal of the power supply
4	Negative terminal of the power supply

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Driver seat × floor	45±5	4	—

Removal/installation

Removal

⚠ Caution

- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.
- In the removal, transport and installation of seats, take care not to be scratched or bruised by it.
- Take care to protect the interior trim in the installation and transport operation to prevent scratching the side plates.
- After installation, be sure to check the tightening torque of the mounting bolts.
- Taking the driver seat as an example, the removal method of the front passenger seat is similar to it.

1. Remove seat headrest
2. Adjust seat to the rearmost end
3. Remove 2 bolts at the front end of the seat



F042BE14F2B9

4. Adjust seat to the forefront
5. Remove 2 bolts at the rear end



33B4C3B96CCB

6. Adjust seat to the proper position
7. Stow the seat backrest forwards
8. Disconnect the negative terminal of the battery.
9. Disconnect harness connector
10. Remove seat

Installation

1. Perform installation work in reverse order of removal

Disassembly/assembly

Disassembly

⚠ Caution

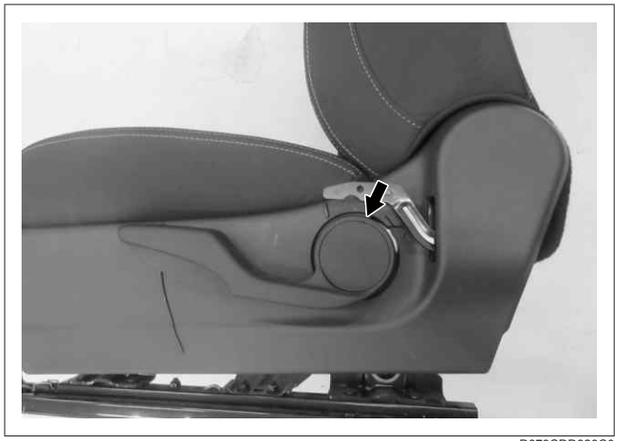
- Any tears or worn points in the seat back cover shall be beyond repair.
- Take care not to tear the seams or damage the seat.

1. Remove the headrest
2. Remove driver seat tilt adjuster lever



33D12E116CB8

3. Remove driver seat adjusting lever cover



D873CDD823C0

4. Remove 2 fastening screws, and remove height adjusting lever assembly



4CDC3C6AB87C

5. Remove 1 screw on the front side of driver seat left outer trim plate



E449C1756AD0

6. Remove 1 screw on the rear side



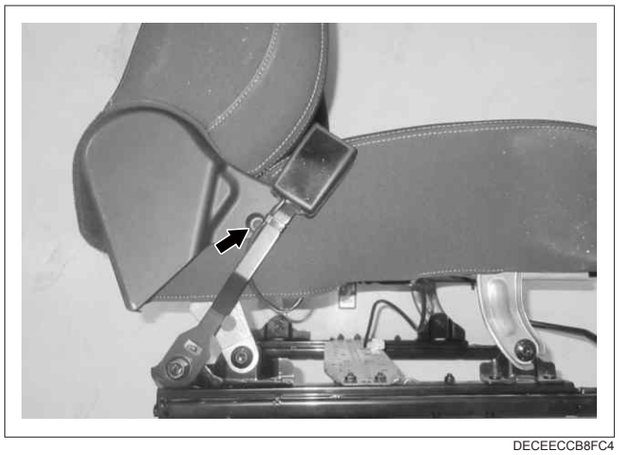
99CF129B7F20

7. Separate 1 clip, and remove driver seat left outer trim plate assembly



1C5D789DBF43

8. Remove 1 screw on the front side of driver seat right inner fender



DECEECCB8FC4

9. Remove 1 screw on the rear side, and remove driver seat right inner fender



B684452E8016

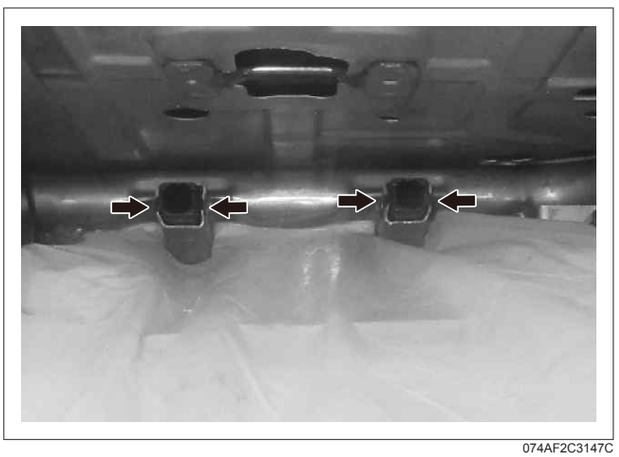
10. Separate backrest buckle

11. Separate 1 snap on the left and 1 snap on the right connecting the internal backrest cushion and the backrest frame



E87AC8C05085

12. Squeeze guide sleeve from both sides to the center, then push it outwards to remove headrest free guide sleeve and lock guide sleeve

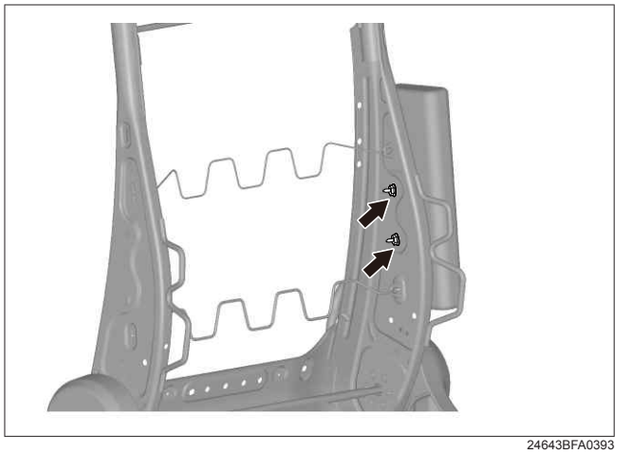


074AF2C3147C

13. Separate airbag harness clamp

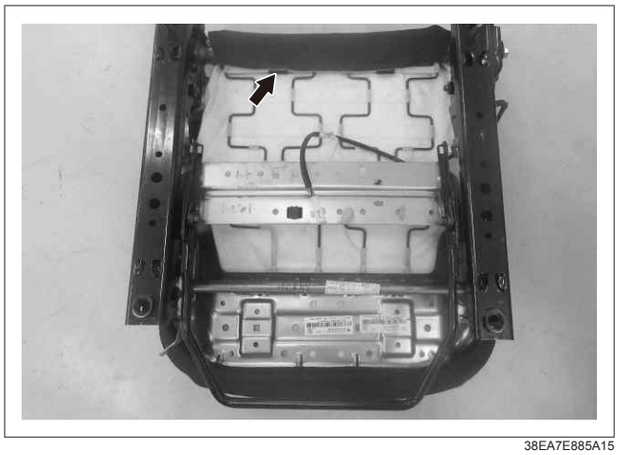
14. Lift up, and remove backrest cushion assembly

15. Remove 2 nuts connecting the backrest frame of the driver and the side airbag



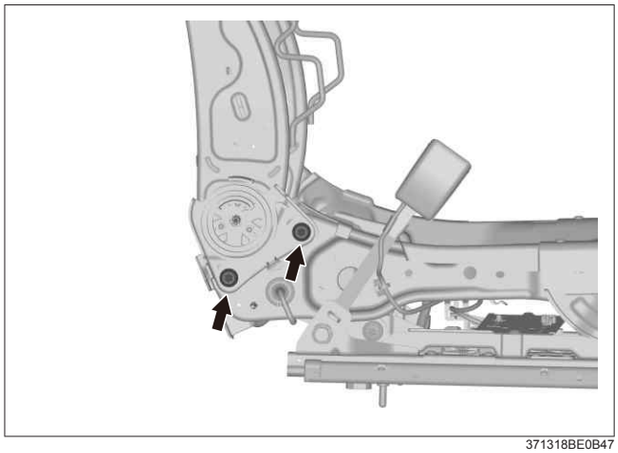
24643BFA0393

16. Separate buckle around seat cushion, and remove seat cushion assembly



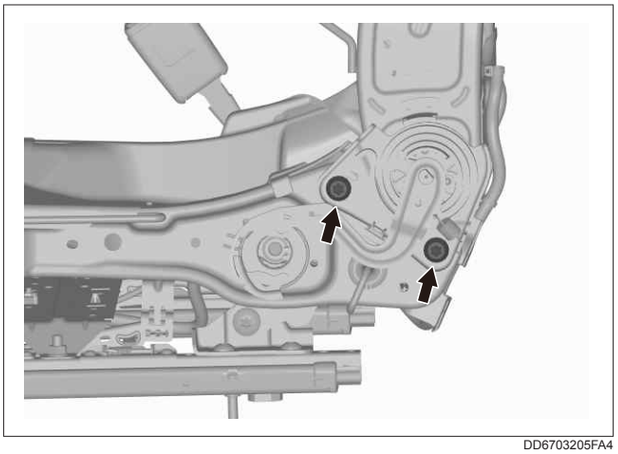
38EA7E885A15

17. Remove 2 bolts on the right side



371318BE0B47

18. Remove 2 bolts on the left side, and separate seat cushion frame from backrest frame



DD6703205FA4

Assembly

1. Perform installation work in reverse order of removal

Driver seat - electric six-way + heating

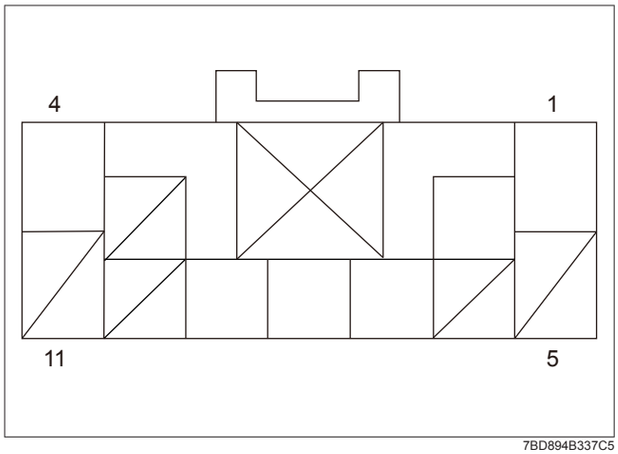
Structural diagram



0534E8051D3F

1. Driver seat cushion assembly
2. Driver seat backrest cushion assembly
3. Driver seat headrest assembly

Pin definition



7BD894B337C5

Pin No.	Function
1	Constant power
2	Positive terminal of the power supply of driver heating pad
3	—
4	Negative terminal of the power supply
5	—
6	—
7	—
8	Driver NTC1 +
9	Driver NTC1-
10	—
11	—

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Driver seat × floor	45±5	4	—

Removal/installation

Removal

⚠ Caution

- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.
- In the removal, transport and installation of seats, take care not to be scratched or bruised by it.
- Take care to protect the interior trim in the installation and transport operation to prevent scratching the side plates.
- After installation, be sure to check the tightening torque of the mounting bolts.
- Taking the driver seat as an example, the removal method of the front passenger seat is similar to it.

1. Remove seat headrest
2. Adjust seat to the rearmost end
3. Remove 2 bolts at the front end of the seat



F042BE14F2B9

4. Adjust seat to the forefront
5. Remove 2 bolts at the rear end



33B4C3B96CCB

6. Adjust seat to the proper position
7. Stow the seat backrest forwards
8. Disconnect the negative terminal of the battery.
9. Disconnect harness connector
10. Remove seat

Installation

1. Perform installation work in reverse order of removal

Disassembly/assembly

Disassembly

⚠ Caution

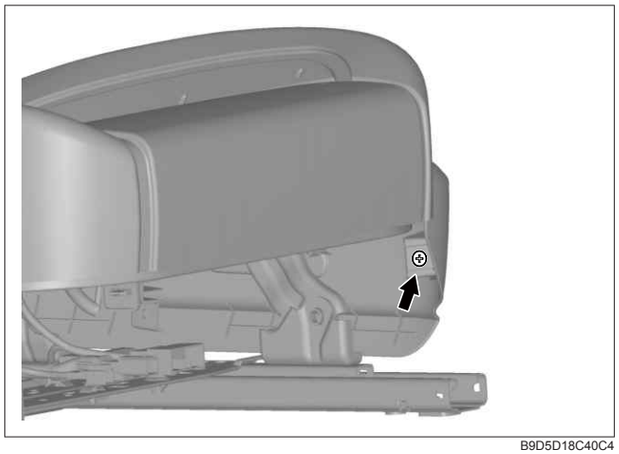
- Any tears or worn points in the seat back cover shall be beyond repair.
- Take care not to tear the seams or damage the seat.

1. Remove the headrest
2. Remove driver seat cushion regulating button and backrest regulating button



DEE863DDC1B8

3. Remove 1 screw on the front side of driver seat left outer trim plate



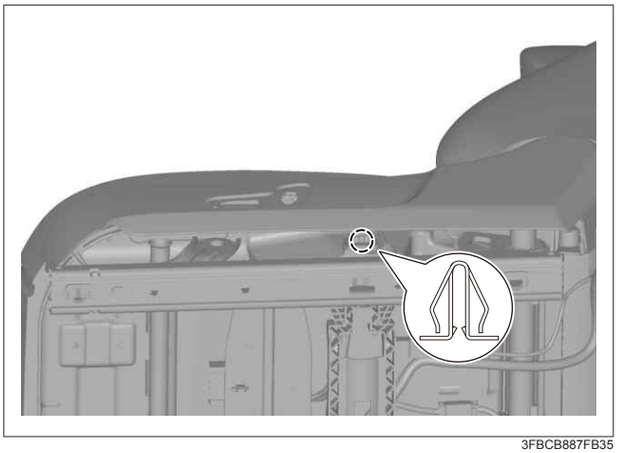
B9D5D18C40C4

4. Remove 1 screw on the rear side



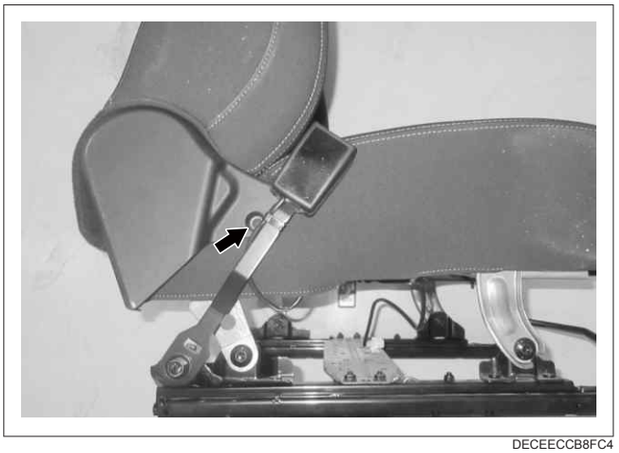
99CF129B7F20

5. Separate 1 clip, and remove driver seat left outer trim plate



3FBCB887FB35

6. Remove 1 screw on the front side of driver seat right inner fender



DECEECCB8FC4

7. Remove 1 screw on the rear side, and remove driver seat right inner fender



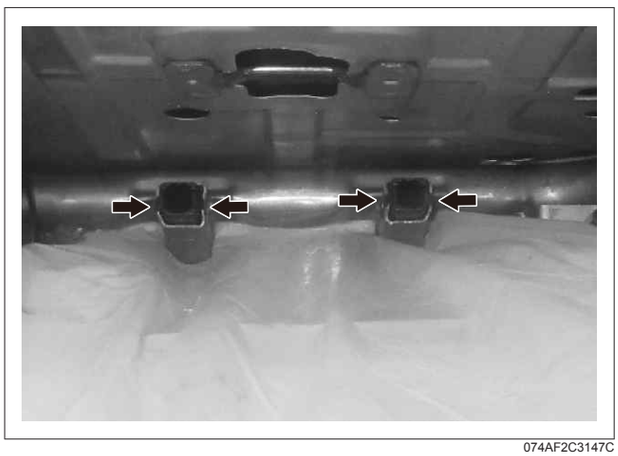
B684452E8016

8. Separate backrest buckle
9. Separate 1 snap on the left and 1 snap on the right connecting the internal backrest cushion and the backrest frame



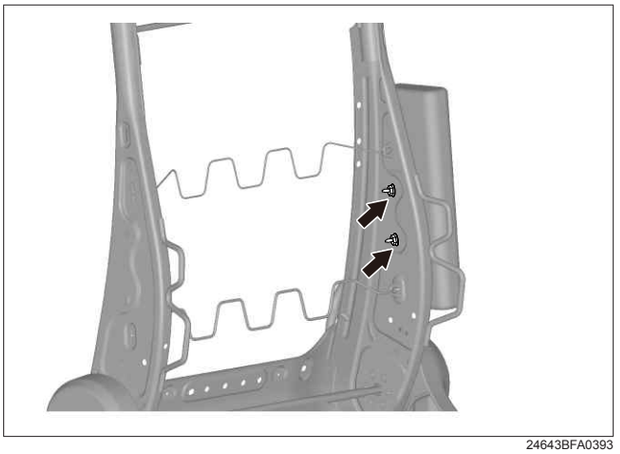
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10. Squeeze guide sleeve from both sides to the center, then push it outwards to remove headrest free guide sleeve and lock guide sleeve



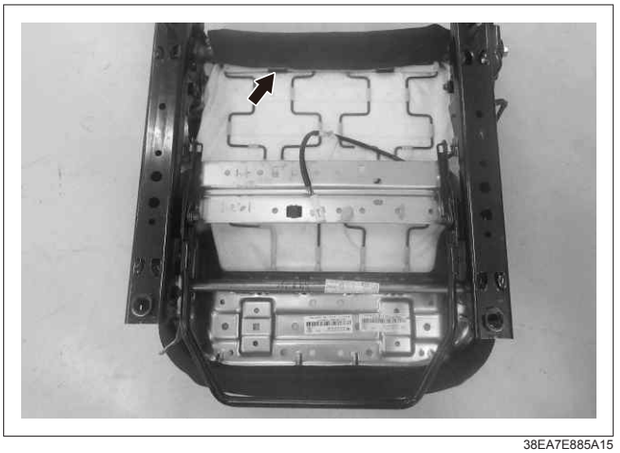
074AF2C3147C

11. Separate airbag harness clamp
12. Lift up, and remove backrest cushion assembly
13. Remove 2 nuts connecting the backrest frame of the driver and the side airbag



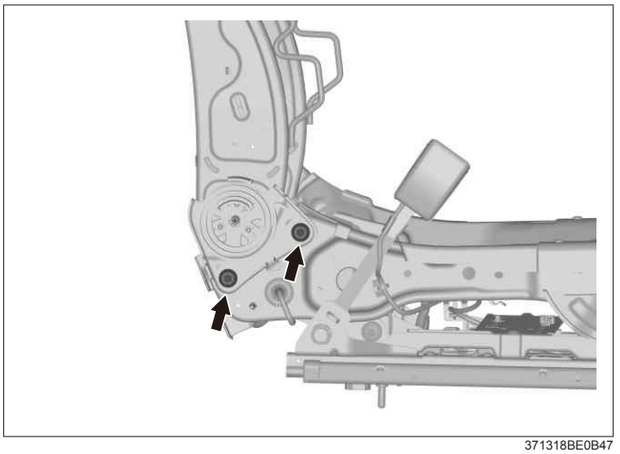
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14. Separate buckle around seat cushion, and remove seat cushion assembly



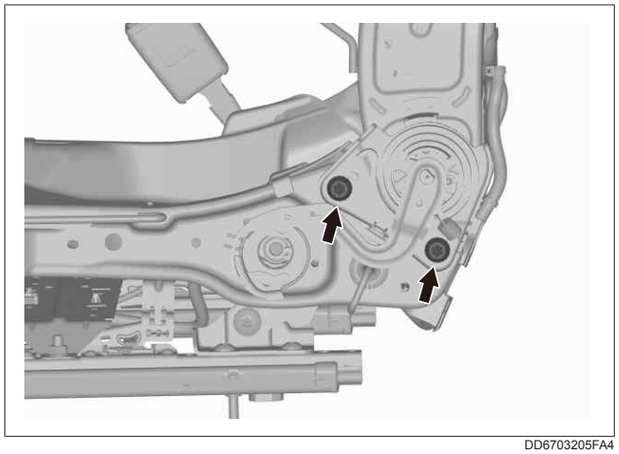
38EA7E885A15

15. Remove 2 bolts on the right side



371318BE0B47

16. Remove 2 bolts on the left side, and separate seat cushion frame from backrest frame



DD6703205FA4

Assembly

1. Perform installation work in reverse order of removal

Front passenger seat - manual 4-way + heating + SBR

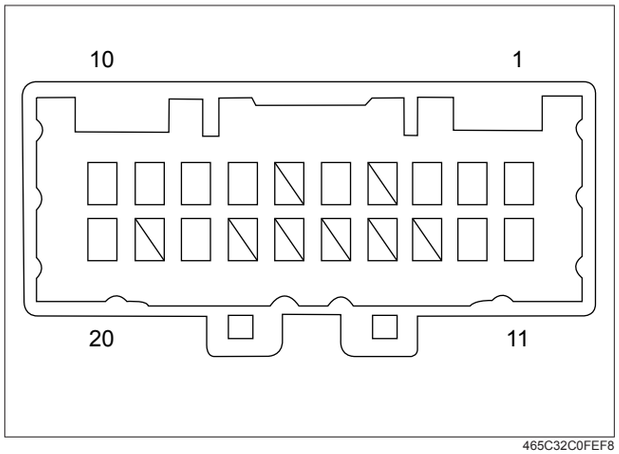
Structural diagram



2868BC9836A5

1. Front passenger seat cushion assembly
2. Front passenger seat backrest cushion assembly
3. Front seat headrest assembly

Pin definition



465C32C0FEF8

Pin No.	Function
1	—
2	Ground
3	IG1 power supply
4	—
5	Constant power (for ventilation and heating)
6	—
7	Driver NTC +
8	Driver NTC-
9	Positive terminal of the power supply of driver heating pad
10	SBR-1
11	Heater module CAN high
12	Heater module CAN low
13	—
14	—
15	—
16	—
17	—
18	—
19	—
20	SBR-2

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front passenger seat × floor	45±5	4	—

Removal/installation

Removal

⚠ Caution

- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.
- In the removal, transport and installation of seats, take care not to be scratched or bruised by it.
- Take care to protect the interior trim in the installation and transport operation to prevent scratching the side plates.
- After installation, be sure to check the tightening torque of the mounting bolts.
- Taking the driver seat as an example, the removal method of the front passenger seat is similar to it.

1. Remove seat headrest
2. Adjust seat to the rearmost end
3. Remove 2 bolts at the front end of the seat



F042BE14F2B9

4. Adjust seat to the forefront
5. Remove 2 bolts at the rear end



33B4C3B96CCB

6. Adjust seat to the proper position
7. Stow the seat backrest forwards
8. Disconnect the negative terminal of the battery.
9. Disconnect harness connector
10. Remove seat

Installation

1. Perform installation work in reverse order of removal

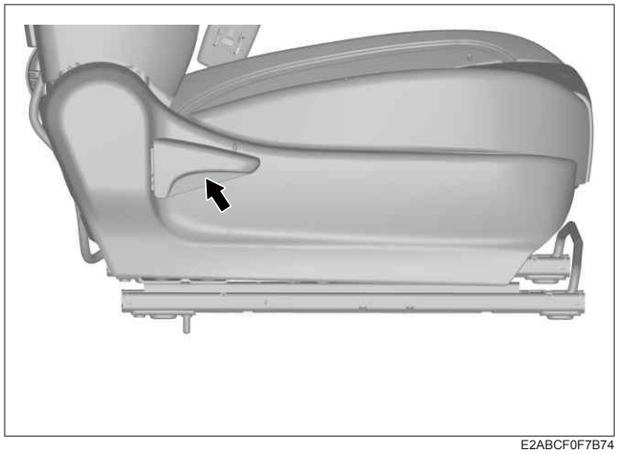
Disassembly/assembly

Disassembly

⚠ Caution

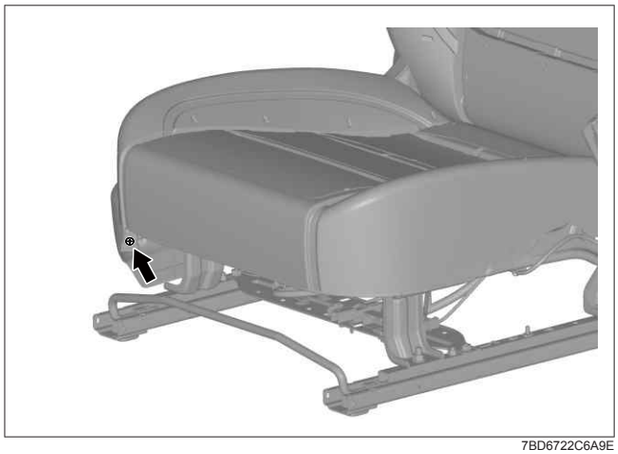
- Any tears or worn points in the seat back cover shall be beyond repair.
- Take care not to tear the seams or damage the seat.

1. Remove the headrest.
2. Remove front passenger seat tilt adjuster lever



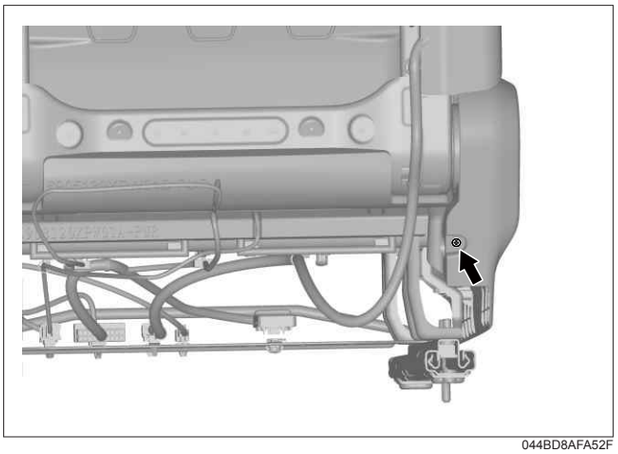
E2ABCF0F7B74

3. Remove 1 screw on the front side of front passenger seat right outer trim plate



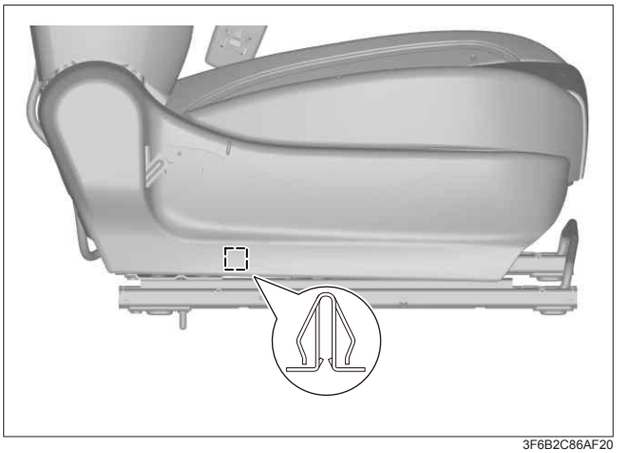
7BD6722C6A9E

4. Remove 1 screw on the rear side.



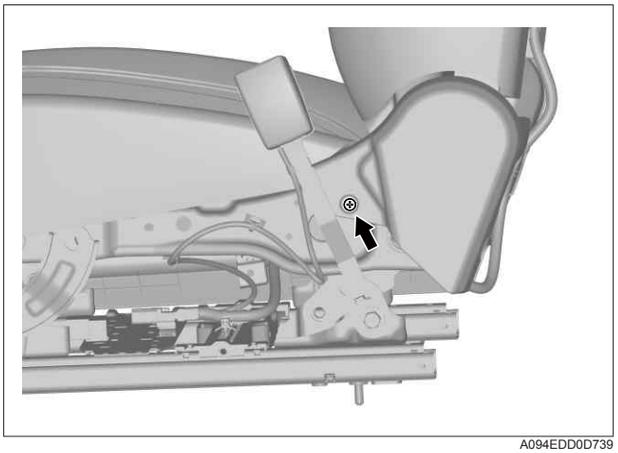
044BD8AFA52F

5. Separate 1 clip, and remove front passenger seat right outer trim plate assembly



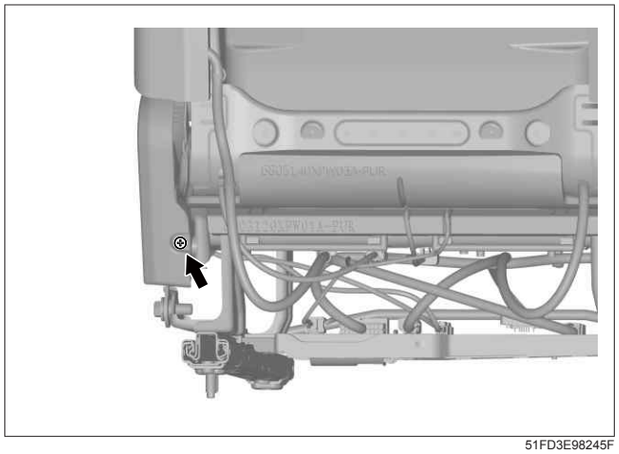
3F6B2C86AF20

6. Remove 1 screw on the front side of front passenger seat left inner fender



A094EDD0D739

7. Remove 1 screw on the rear side, and remove front passenger seat left inner fender



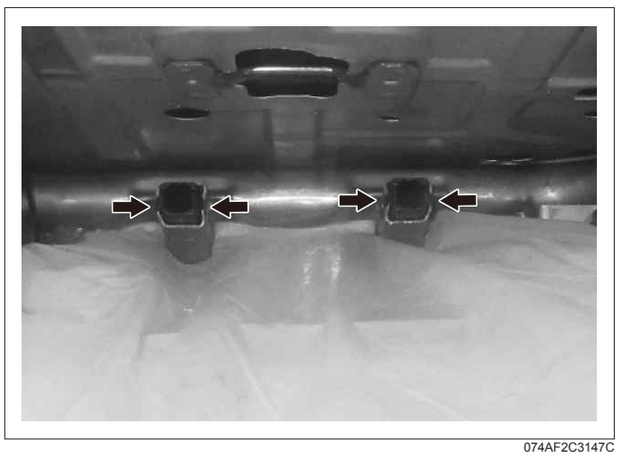
51FD3E98245F

8. Separate backrest batten
9. Separate 1 snap on the left and right respectively that connects the interior of backrest soft-block and the backrest frame



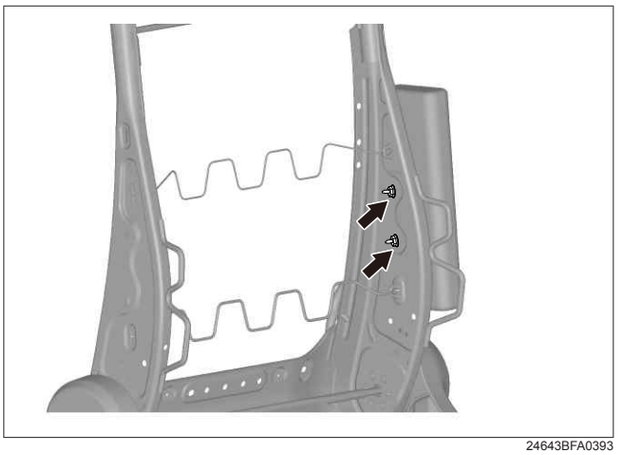
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10. Squeeze guide sleeve from both sides to the center, then push it outwards to remove headrest free guide sleeve and lock guide sleeve



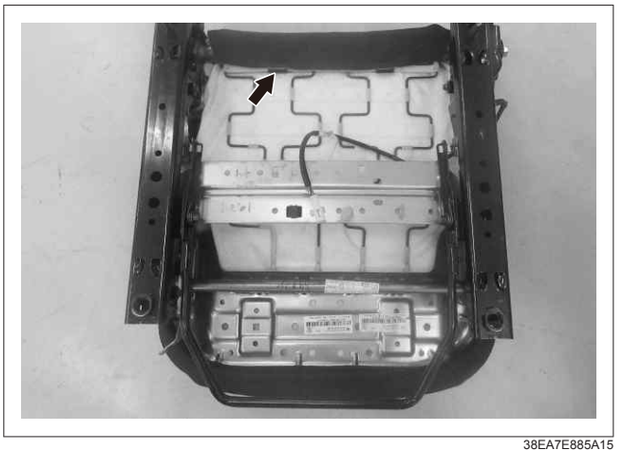
074AF2C3147C

11. Separate harness clamp of airbag
12. Lift up the backrest soft-block assembly and remove it
13. Remove 2 nuts connecting the front passenger backrest frame and the side airbag



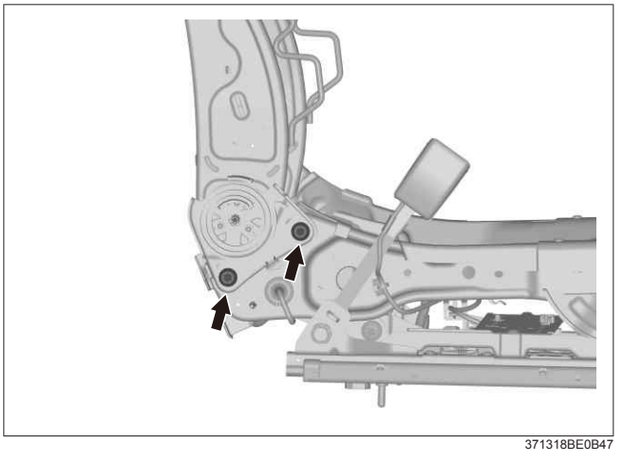
24643BFA0393

14. Separate the clips around the cushion soft-block and remove cushion soft-block assembly



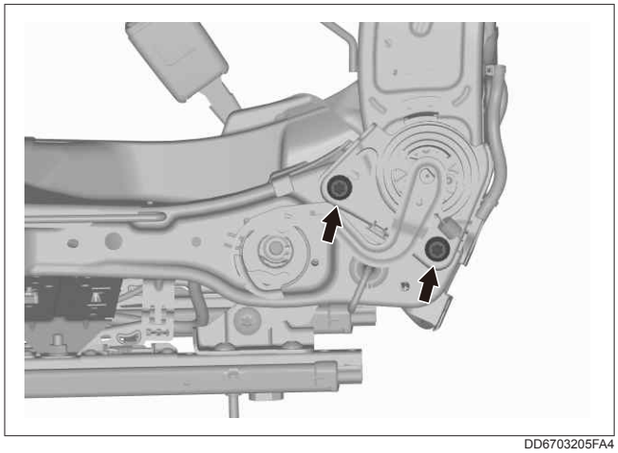
38EA7E885A15

15. Remove 2 bolts on the right side



371318BE0B47

16. Remove 2 bolts on the left side, and separate the seat cushion frame and backrest frame.



DD6703205FA4

Assembly

1. Perform installation work in reverse order of removal

Front passenger seat - electric four-way + heating + SBR

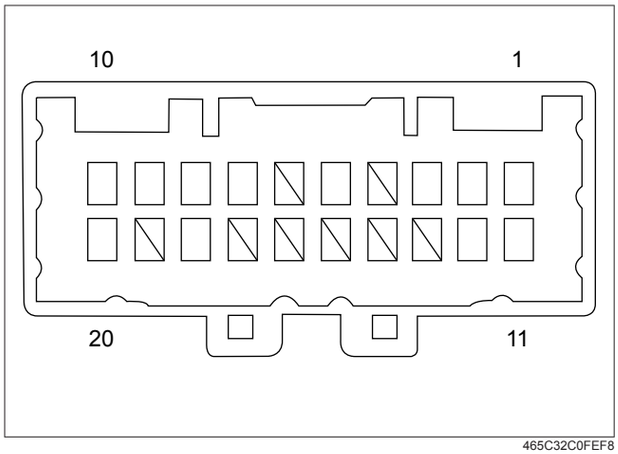
Structural diagram



B1DB9C413F30

1. Front passenger seat cushion assembly
2. Front passenger seat backrest cushion assembly
3. Front seat headrest assembly

Pin definition



465C32C0FEF8

Pin No.	Function
1	Constant power
2	GND
3	IG1 power supply
4	—
5	Constant power (for ventilation and heating)
6	—
7	Driver NTC +
8	Driver NTC-
9	Positive terminal of the power supply of driver heating pad
10	SBR-1
11	Heater module CAN high
12	Heater module CAN low
13	—
14	—
15	—
16	—
17	—
18	—
19	—
20	SBR-2

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front passenger seat × floor	45±5	4	—

Removal/installation

Removal

⚠ Caution

- Set ignition switch to “LOCK” position, disconnect negative terminal of the battery and wait for at least 90 s before starting operation.
- In the removal, transport and installation of seats, take care not to be scratched or bruised by it.
- Take care to protect the interior trim in the installation and transport operation to prevent scratching the side plates.
- After installation, be sure to check the tightening torque of the mounting bolts.
- Taking the driver seat as an example, the removal method of the front passenger seat is similar to it.

1. Remove seat headrest
2. Adjust seat to the rearmost end
3. Remove 2 bolts at the front end of the seat



F042BE14F2B9

4. Adjust seat to the forefront
5. Remove 2 bolts at the rear end



33B4C3B96CCB

6. Adjust seat to the proper position
7. Stow the seat backrest forwards
8. Disconnect the negative terminal of the battery.
9. Disconnect harness connector
10. Remove seat

Installation

1. Perform installation work in reverse order of removal

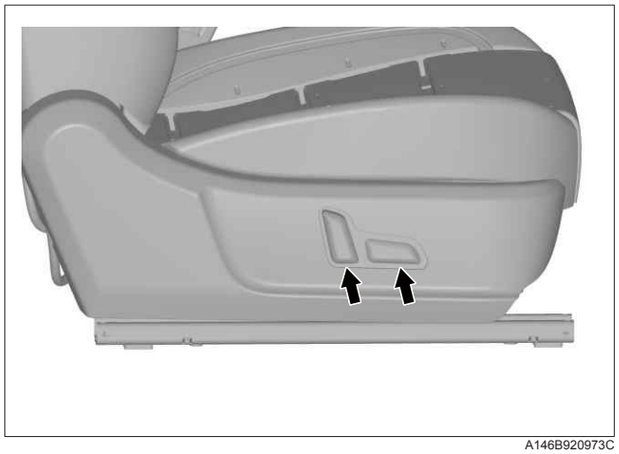
Disassembly/assembly

Disassembly

⚠ Caution

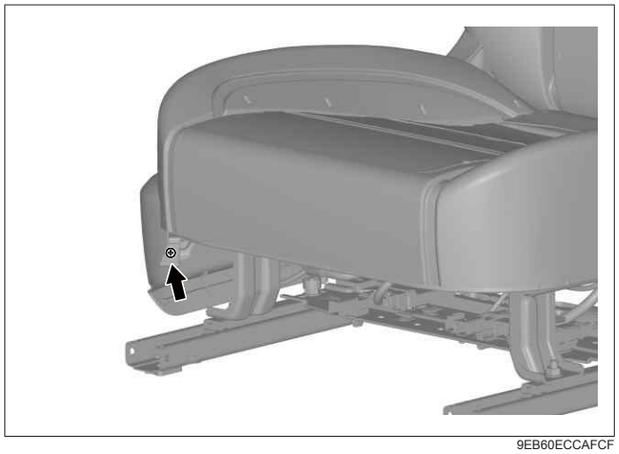
- Any tears or worn points in the seat back cover shall be beyond repair.
- Take care not to tear the seams or damage the seat.

1. Remove the headrest.
2. Remove the seat cushion adjustment button and backrest adjustment button of the front passenger seat.



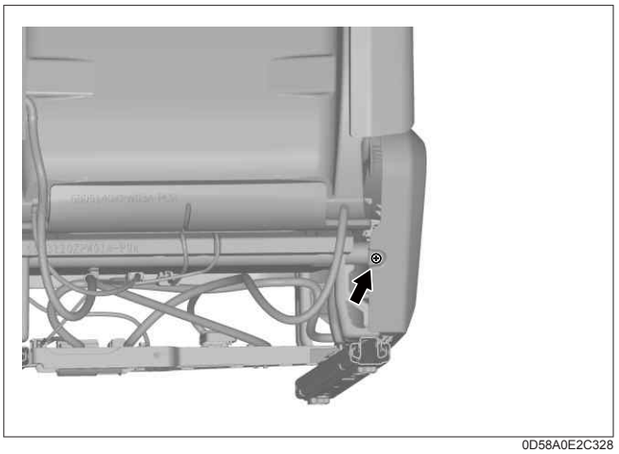
A146B920973C

3. Remove 1 screw on the front side of front passenger seat right outer trim plate



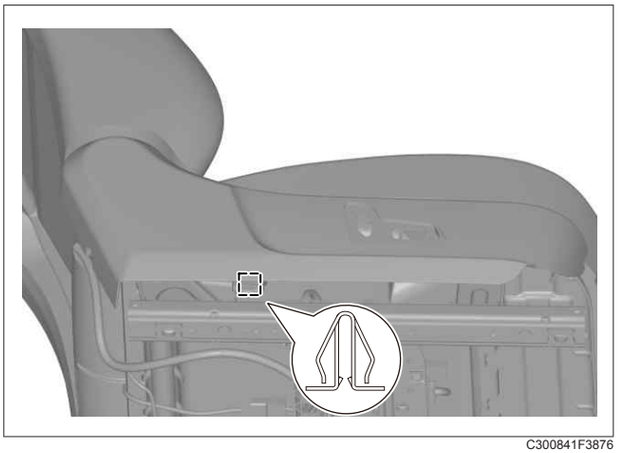
9EB60ECCAFCF

4. Remove 1 screw on the rear side.



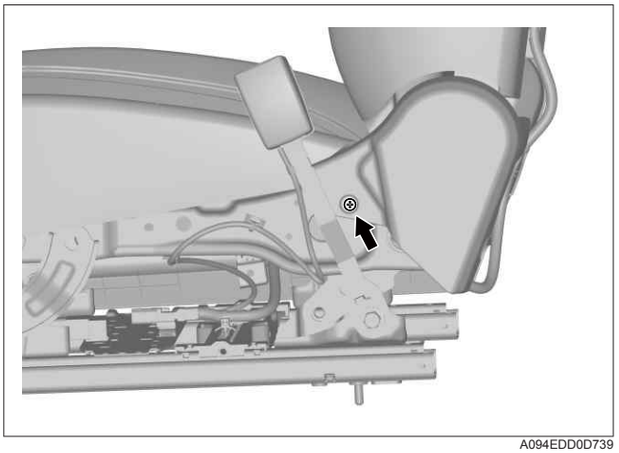
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5. Separate 1 clip, and remove front passenger seat right outer trim plate assembly



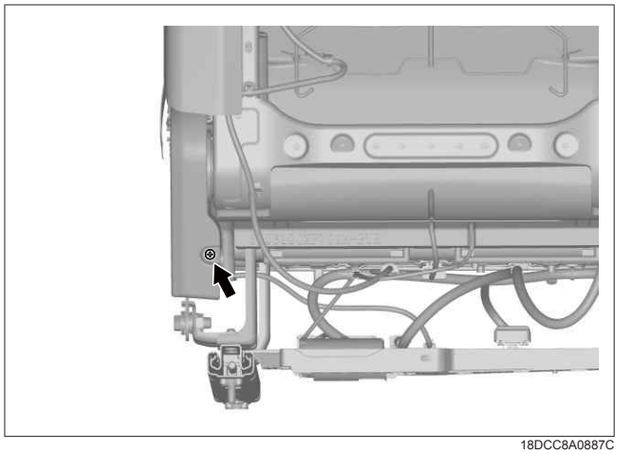
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6. Remove 1 screw on the front side of front passenger seat left inner fender



A094EDD0D739

7. Remove 1 screw on the rear side, and remove front passenger seat left inner fender



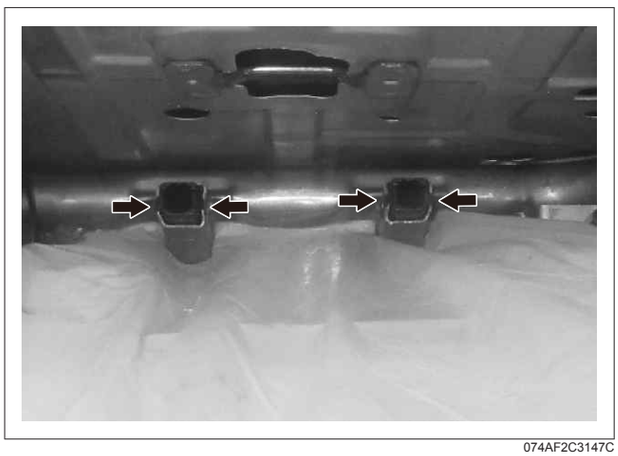
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8. Separate backrest batten
9. Separate 1 snap on the left and right respectively that connects the interior of backrest soft-block and the backrest frame



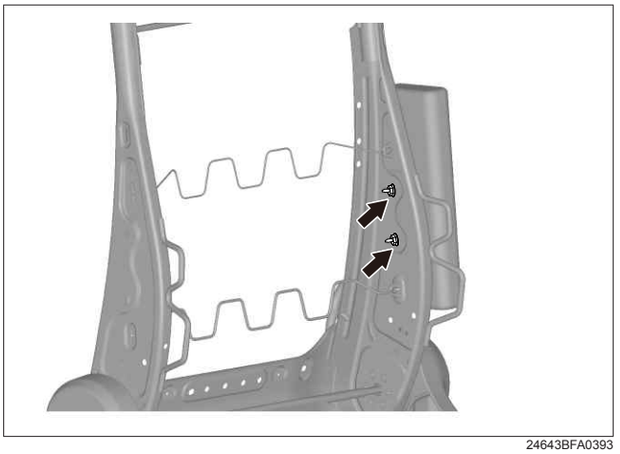
E87AC8C05085

10. Squeeze guide sleeve from both sides to the center, then push it outwards to remove headrest free guide sleeve and lock guide sleeve



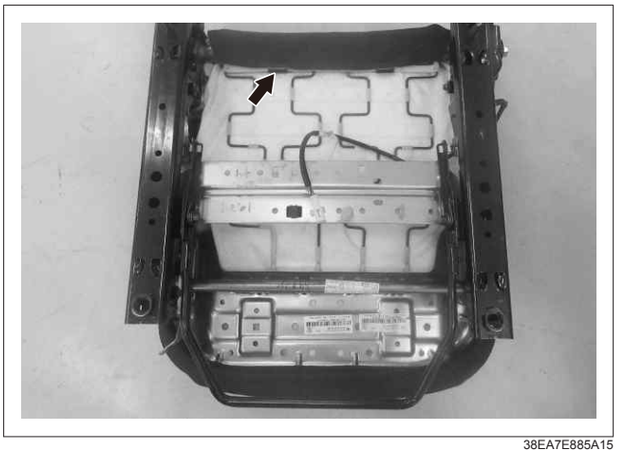
074AF2C3147C

11. Separate harness clamp of airbag
12. Lift up the backrest soft-block assembly and remove it
13. Remove 2 nuts connecting the front passenger backrest frame and the side airbag



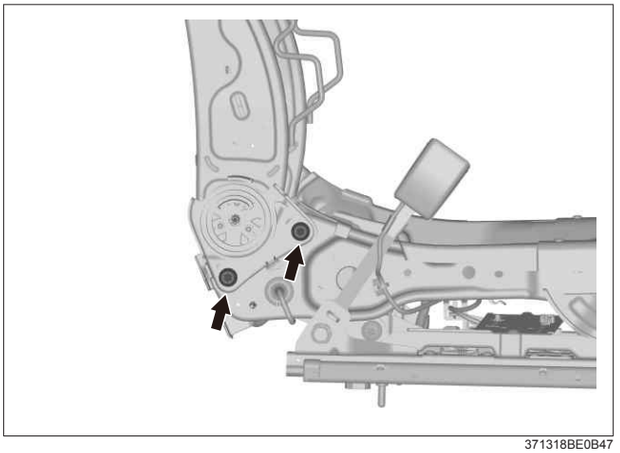
24643BFA0393

14. Separate the clips around the cushion soft-block and remove cushion soft-block assembly



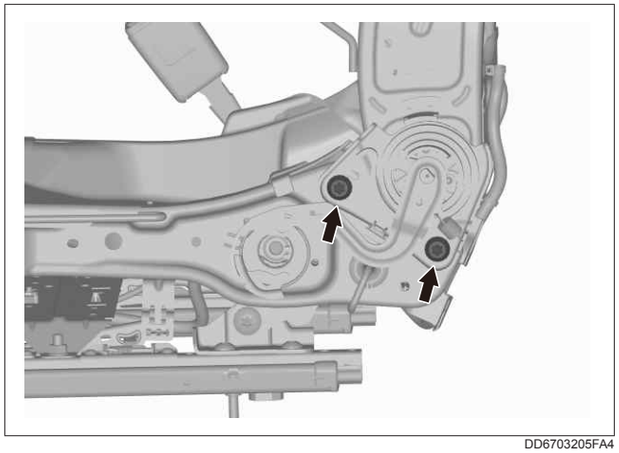
38EA7E885A15

15. Remove 2 bolts on the right side



371318BE0B47

16. Remove 2 bolts on the left side, and separate the seat cushion frame and backrest frame.



DD6703205FA4

Assembly

1. Perform installation work in reverse order of removal

Rear seat

Structural diagram



8C9D5605BF16

1. Rear seat cushion assembly
2. Rear seat backrest assembly
3. Rear seat side headrest assembly

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Rear seat x rear floor assembly	85±5	4	—
Nut	Rear seat x rear floor assembly	85±5	1	—

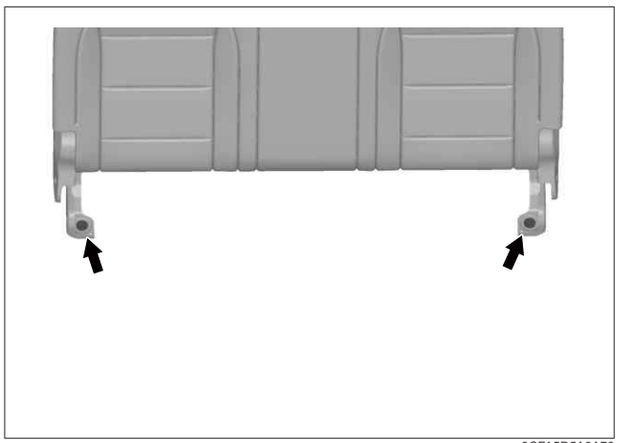
Removal/installation

Removal

⚠ Caution

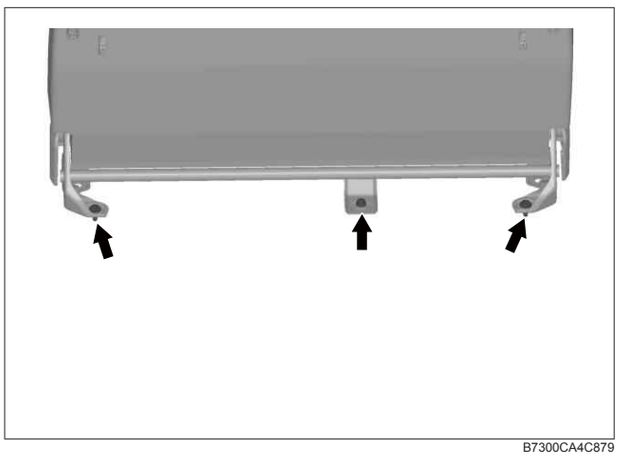
- In the removal, transport and installation of seats, take care not to be scratched or bruised by it.
- Take care to protect the interior trim in the installation and transport operation to prevent scratching the side plates.
- After installation, be sure to check the tightening torque of the mounting bolts.

1. Lift up the seat cushion
2. Remove 2 fastening bolts at the front of rear seat



3CFA5D5A9A78

3. Remove 2 fastening bolts and 1 nut at the back of rear seat



B7300CA4C879

4. Remove rear seat

Installation

1. Perform installation work in reverse order of removal

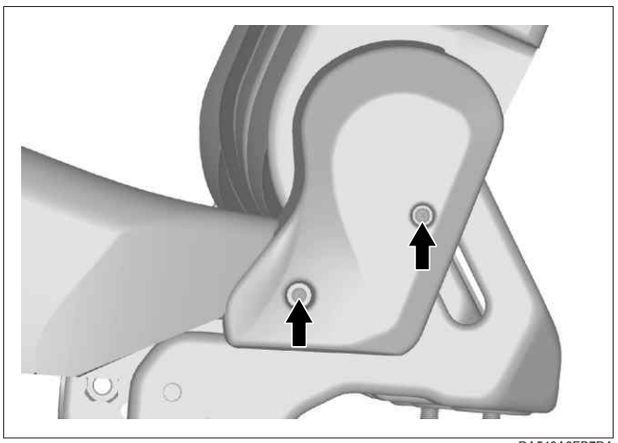
Disassembly/assembly

Removal

⚠ Caution

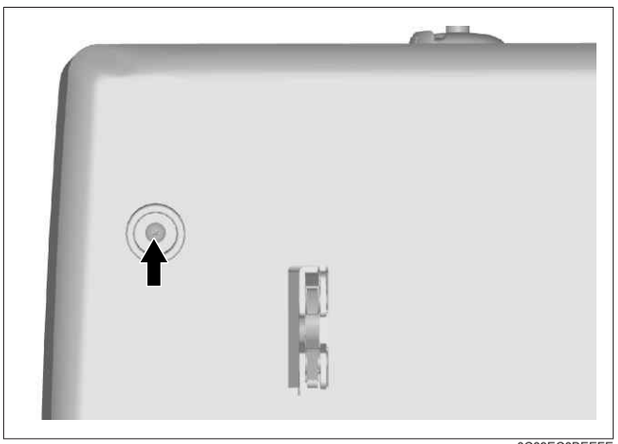
- In the removal, transport and installation of seats, take care not to be scratched or bruised by it.
- Take care to protect the interior trim in the installation and transport operation to prevent scratching the side plates.
- After installation, be sure to check the tightening torque of the mounting bolts.

1. Remove left and right plastic cover plates



DA548A0FB7DA

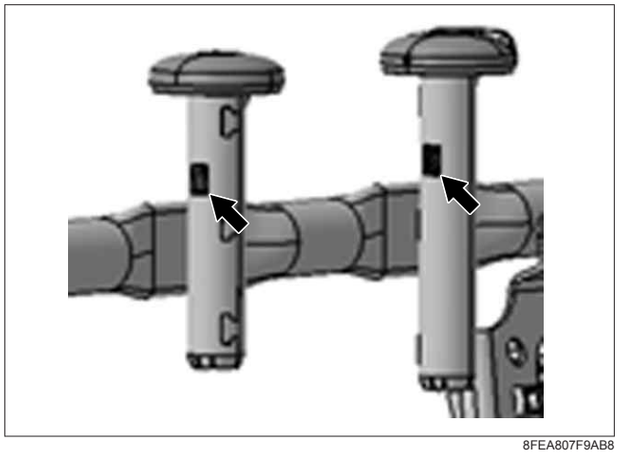
2. Remove rubber pads on both sides of the top of backrest



0C83EC8BEEFE

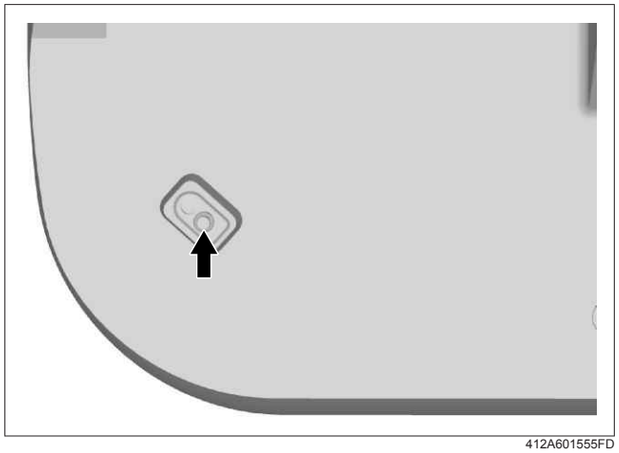
3. Remove snap ring of the bottom trim seal and unzip both sides

4. Press inward on the connecting points on both sides of headrest guide sleeve, pull out the headrest guide sleeve, and remove backrest cushion assembly



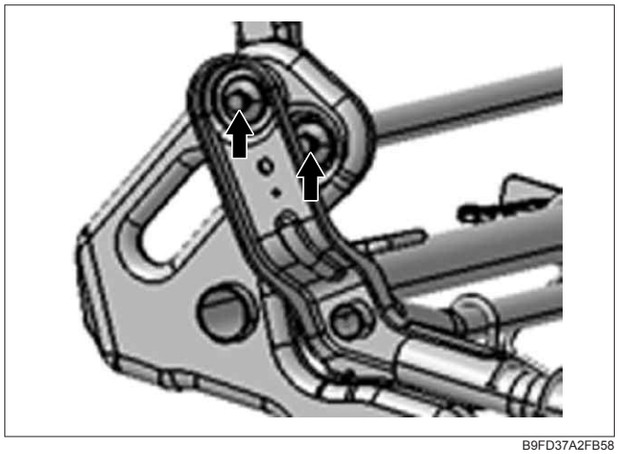
8FEA807F9AB8

5. Remove rubber pad at the bottom of seat cushion



412A601555FD

6. Remove snap ring of the bottom trim seal and unzip both sides, and remove cushion and soft block assembly
7. Remove left and right fastening bolts, and separate frame of backrest and seat cushion



B9FD37A2FB58

Installation

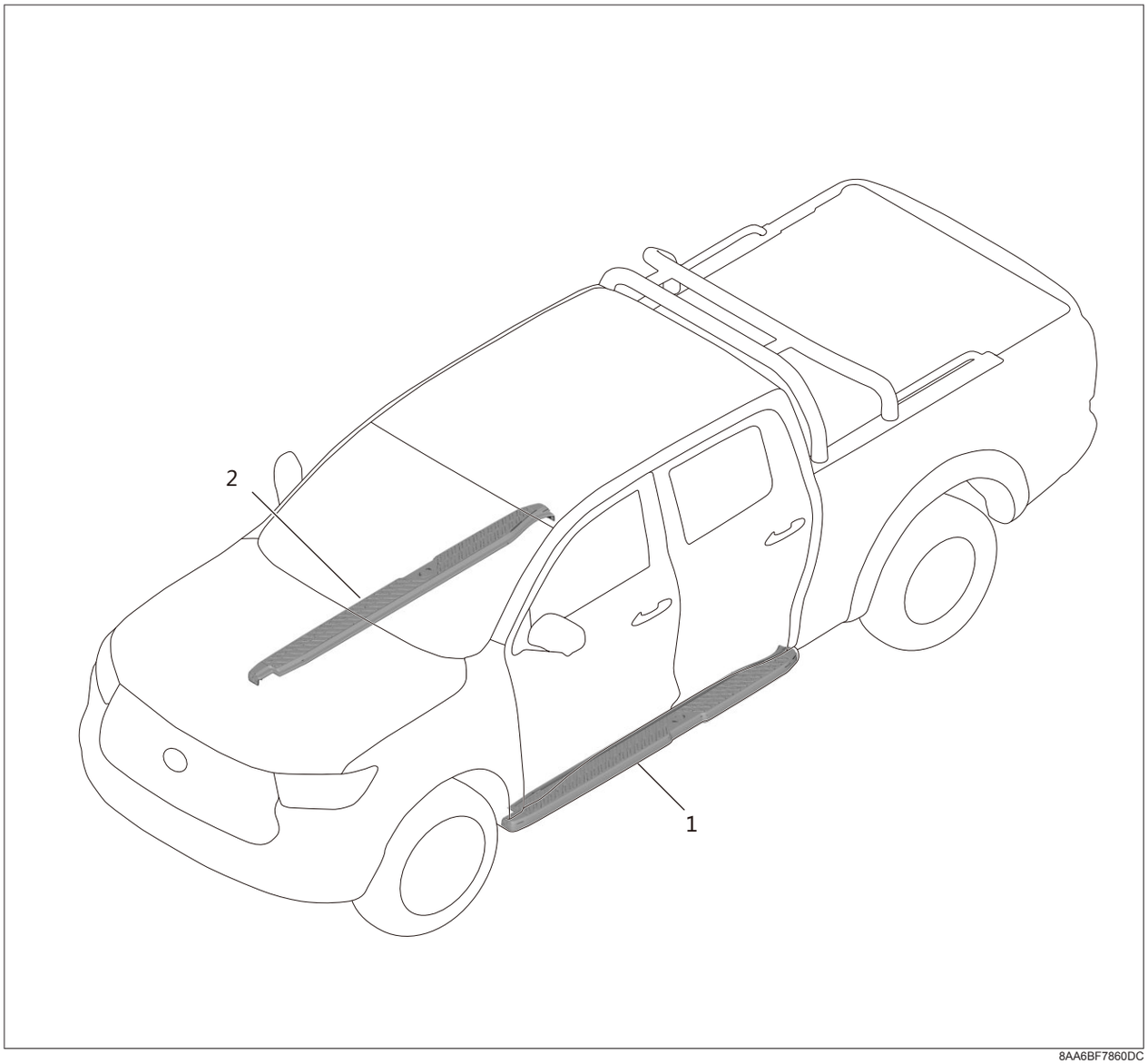
1. Perform installation work in reverse order of removal

Side footboard

Side footboard .....45－1
Location diagram .....45－1
Removal/installation.....45－2

Side footboard

Location diagram



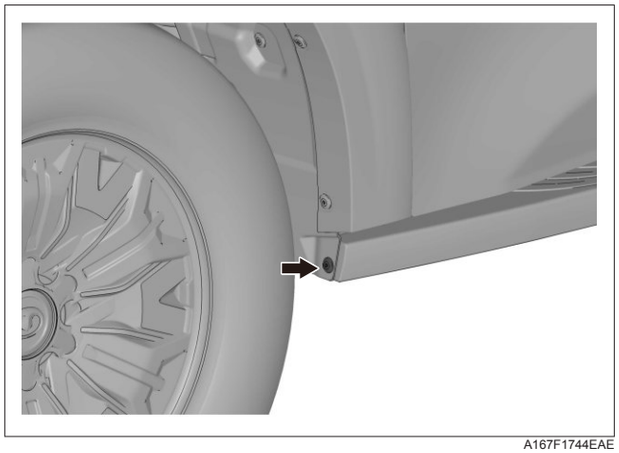
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1. Left side footboard assembly
2. Right side footboard assembly

Removal/installation

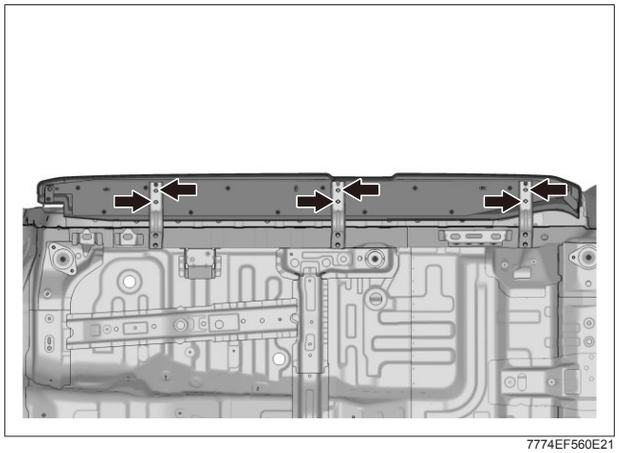
Removal

1. Remove 1 front snaps



A167F1744EAE

2. Remove 6 bolts and remove left side footboard assembly



7774EF560E21

3. Remove 1 snaps
4. Remove 6 bolts and remove right side footboard assembly

Installation

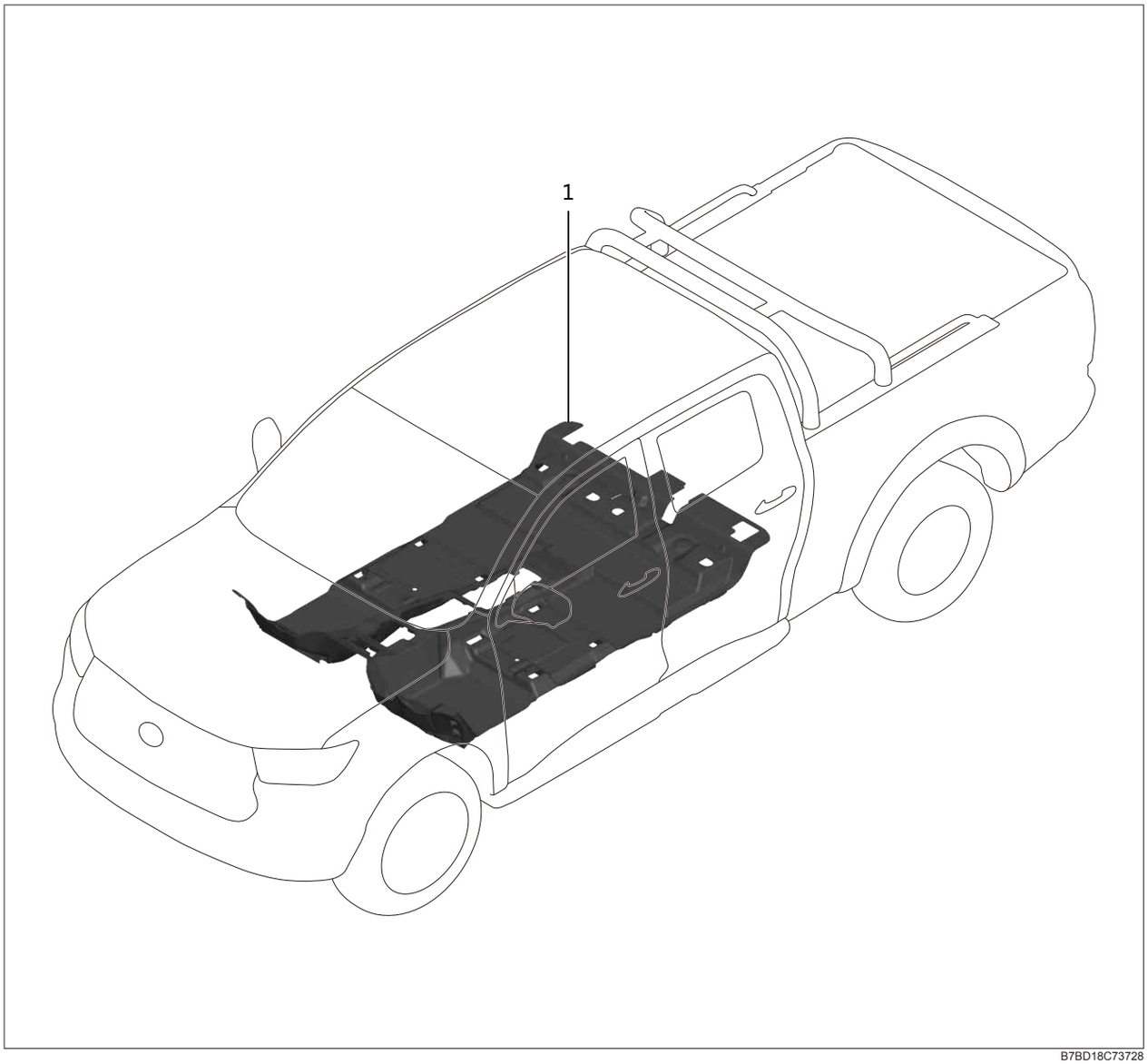
1. Perform installation work in reverse order of removal

Interior trim

Carpet assembly .....46－1
Location diagram .....46－1
Removal/installation.....46－2
Roof inner trimming - without sunroof .....46－5
Location diagram .....46－5
Removal/installation.....46－6
Inner protective surface of roof - with sunroof .....46－8
Location diagram .....46－8
Removal/installation.....46－9
Pillar A guard.....46－11
Location diagram .....46－11
Removal/installation.....46－12
Pillar B guard.....46－14
Location diagram .....46－14
Removal/installation.....46－15
Pillar C guard.....46－17
Location diagram .....46－17
Removal/installation.....46－18

Carpet assembly

Location diagram



B7BD18C73728

1. Carpet assembly

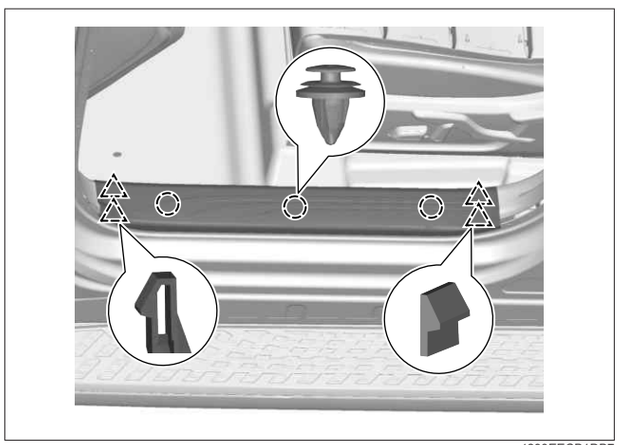
Removal/installation

Removal

⚠ Caution

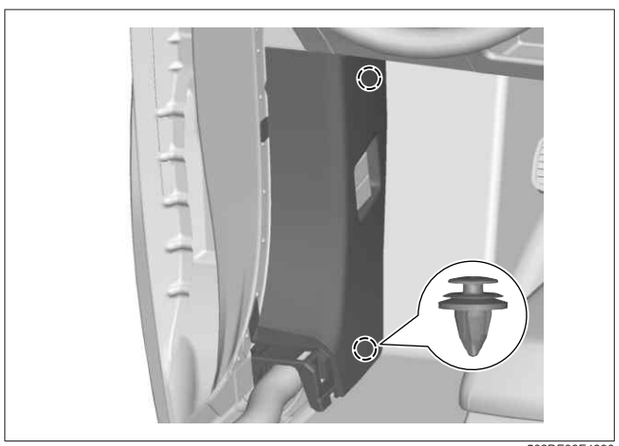
- Wear gloves to protect your hands.
- Do not damage, wrinkle, or warp the carpet.
- Do not damage the instrument panel or other vehicle interior trims.

1. Disconnect the negative terminal of the battery.
2. Remove front seat assembly
3. Remove rear seat assembly
4. Remove auxiliary instrument panel assembly
5. Remove part of front door frame seal strip
6. Pry off 3 snaps and 4 dogs, and remove front sill trim plate assembly



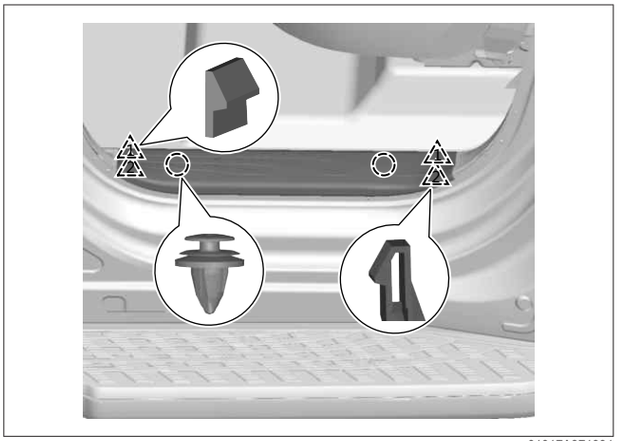
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7. Pry off 2 snaps, remove pillar A lower trim plate assembly



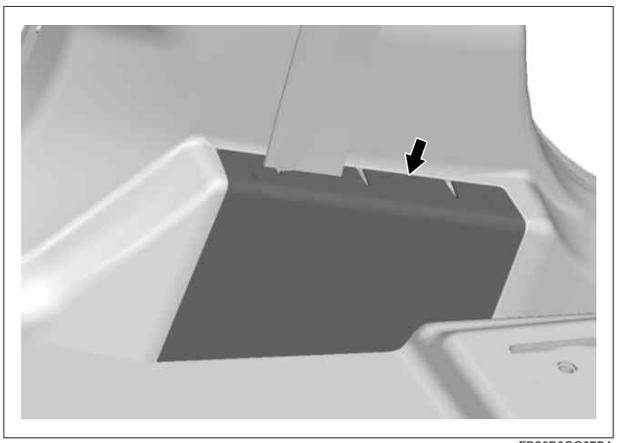
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8. Pry off 2 snaps and 4 dogs, and remove rear door sill trim plate assembly



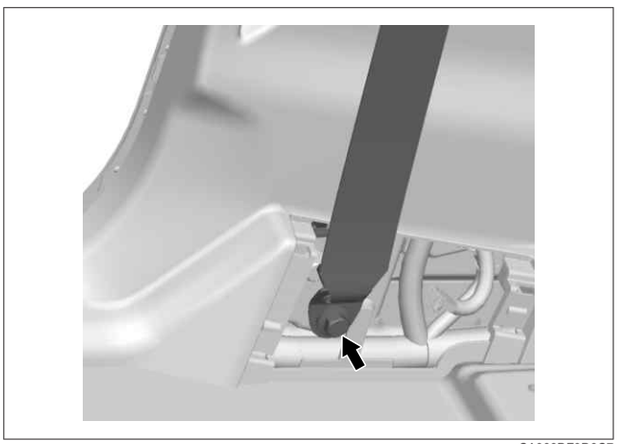
01017A871991

9. Remove some of rear door frame seals
10. Remove the lower fixing point cover plate of the front seat belt



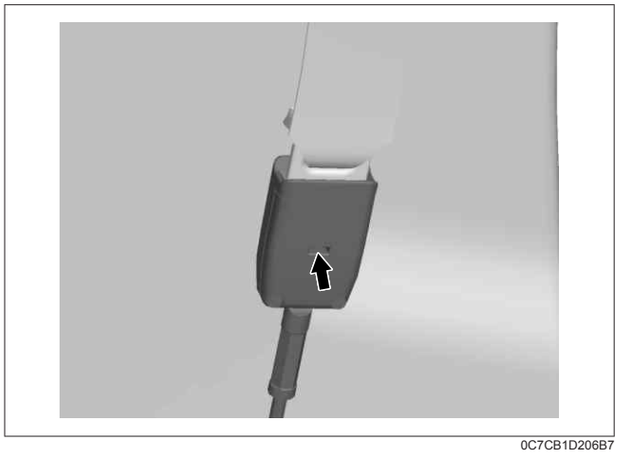
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11. Disconnect the connection between the lower end of front seat belt and the body (configuration I)



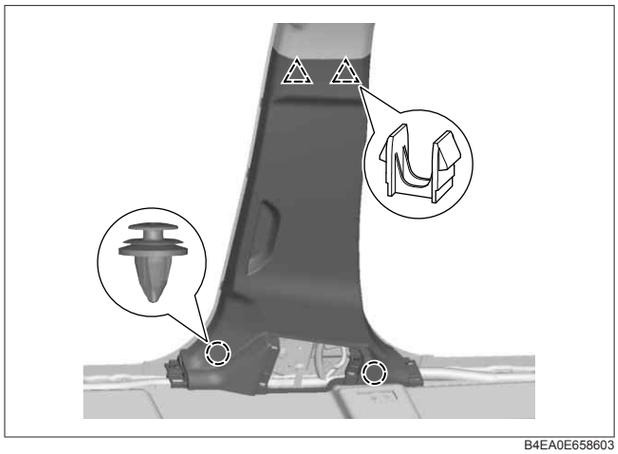
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12. Insert proper tool into the hole, press off circlip and disconnect the connection between seat belt lower end and front seat belt pretensioner end piece (configuration II)



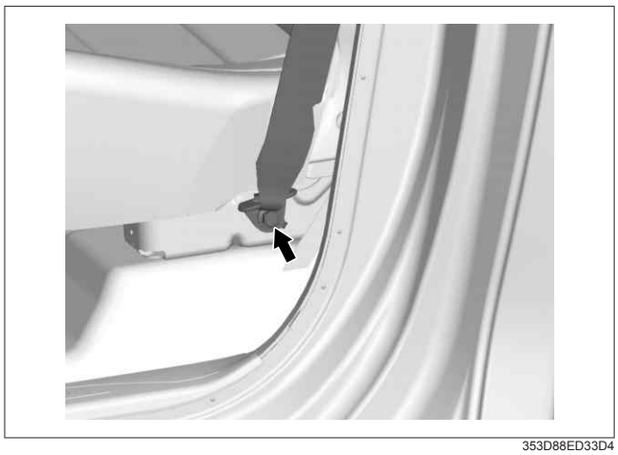
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13. Pry off 2 snaps and 2 dogs, and remove pillar B lower trim plate assembly



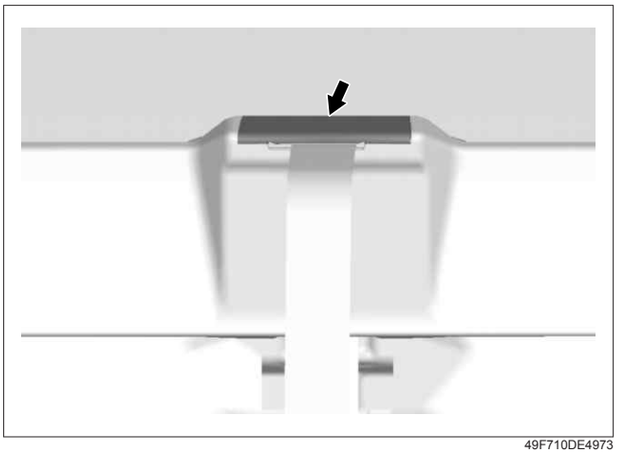
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14. Disconnect the lower fixing point for the rear seat belt



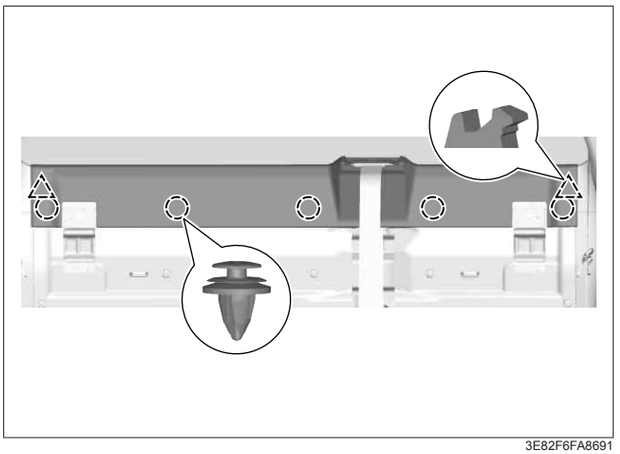
353D88ED33D4

15. Remove seat belt outlet cap



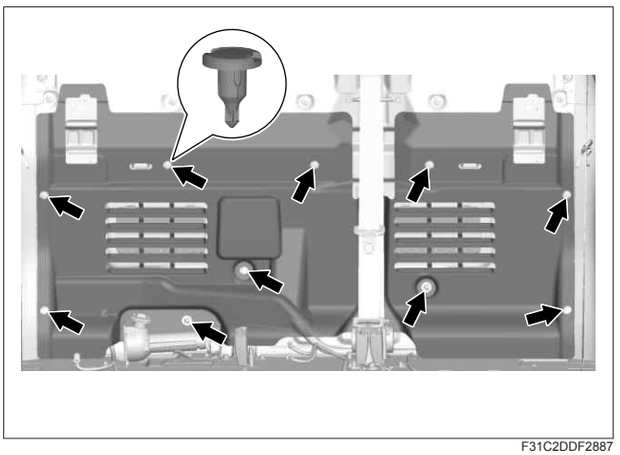
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16. Pry off 5 snaps and 2 dogs, and remove rear wall trim plate body



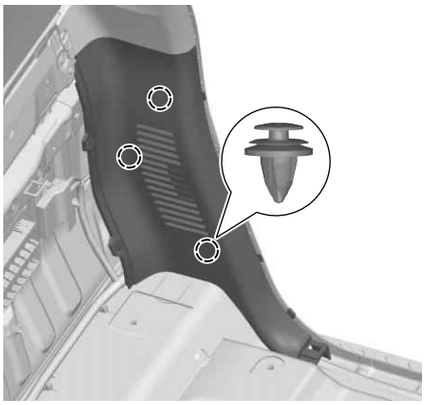
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17. Remove 8 snaps and 2 plastic nuts, and remove rear wall cover plate



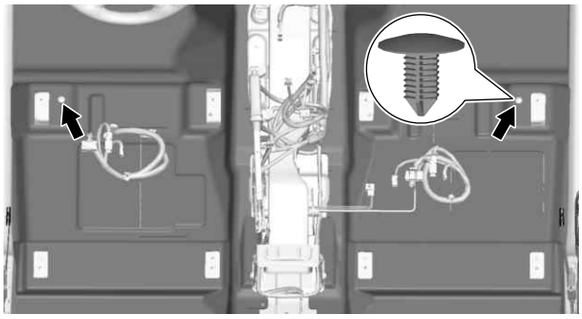
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18. Pry off 3 snaps, and remove rear column lower trim plate assembly



FAF6C96420F7

19. Separate 2 snaps, and remove the rear carpet



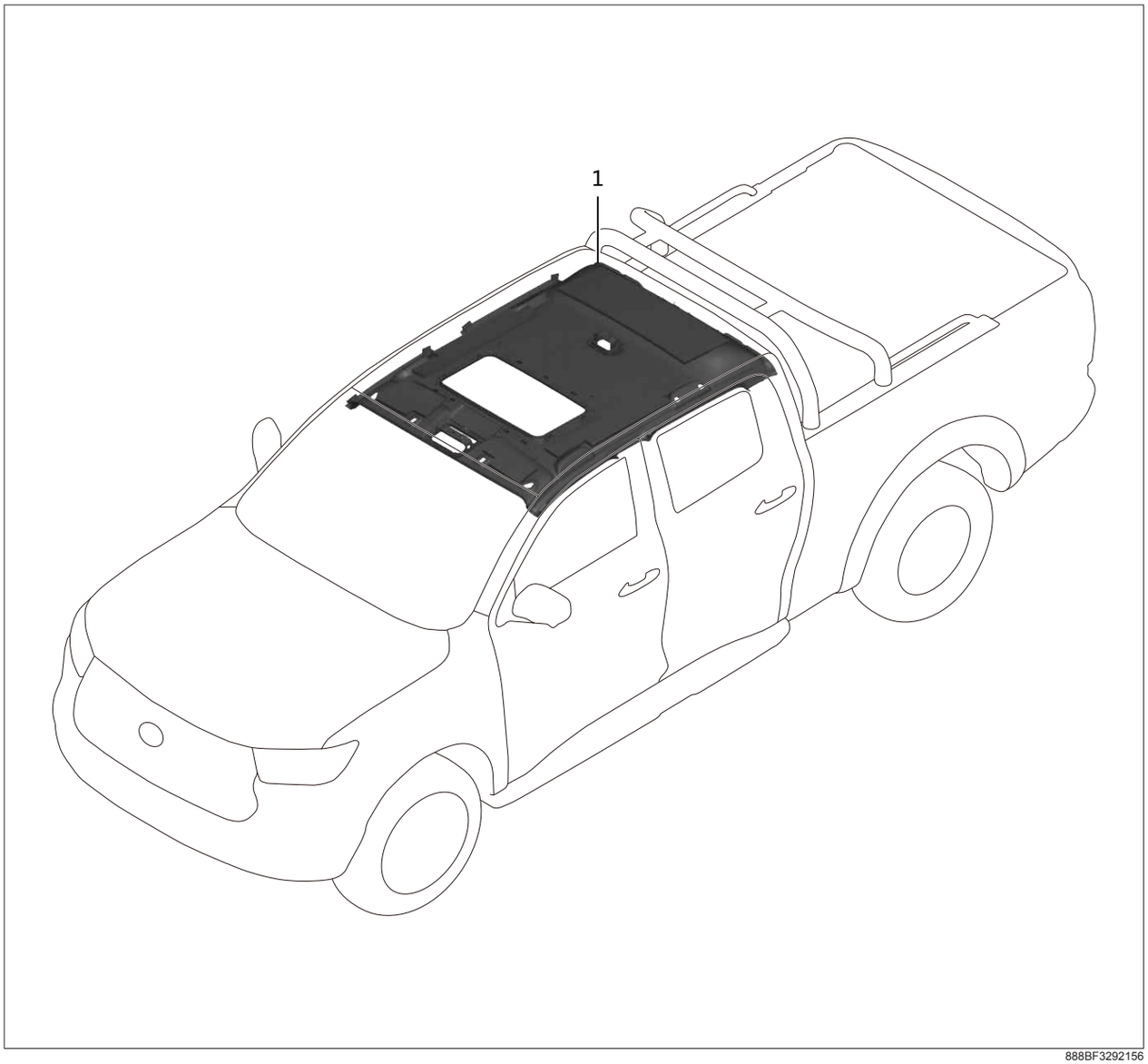
CFF221AB0D6C

Installation

1. Perform installation work in reverse order of removal

Roof inner trimming - without sunroof

Location diagram



888BF3292156

1. Ceiling assembly

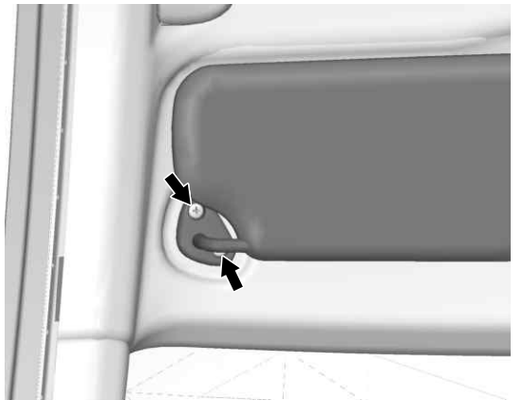
Removal/installation

Removal

⚠ Caution

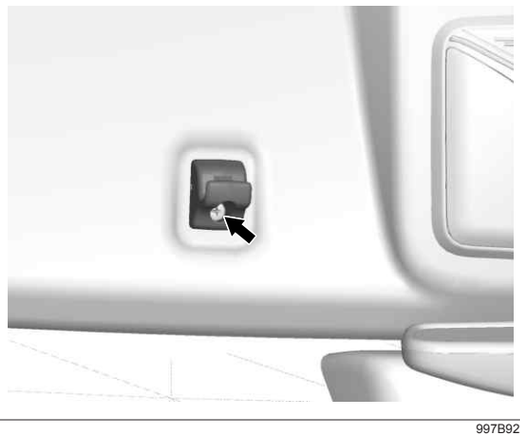
- Wear gloves to protect the hands.
- Do not damage, wrinkle, or warp the ceiling.
- Do not damage the instrument panel or other vehicle interior trims.

1. Disconnect the negative terminal of the battery.
2. Remove the 2 front seats
3. Remove the auxiliary instrument panel
4. Remove pillar A guard
5. Remove pillar B guard
6. Remove pillar C guard
7. Remove 2 screws and remove sun visor assembly



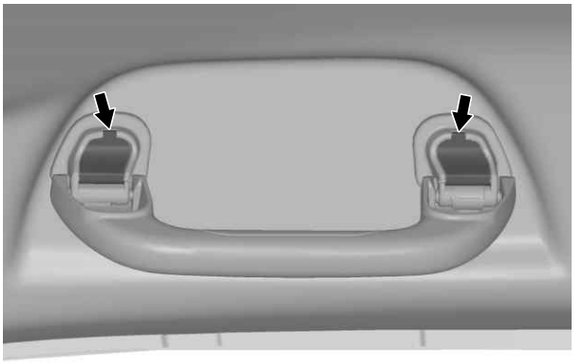
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8. Remove 1 screw, and remove sun visor fixed bracket



997B927D59B9

9. Pry open decorative cover of ceiling handle assembly



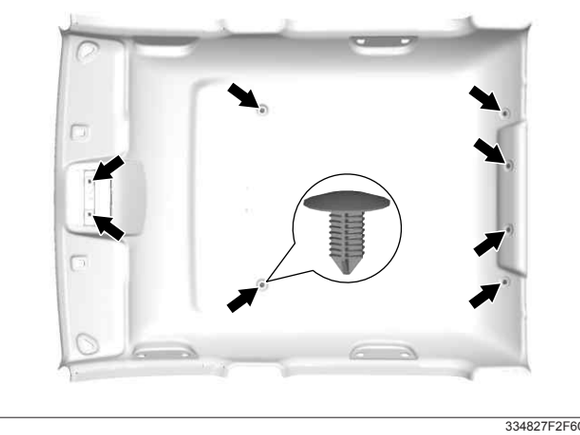
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10. Remove 2 fixing bolts and remove ceiling handle assembly



A88A16D2A090

11. Remove reading lamp assembly
12. Remove ceiling lamp assembly.
13. Remove 2 screws, pry open 6 snaps, and remove ceiling assembly



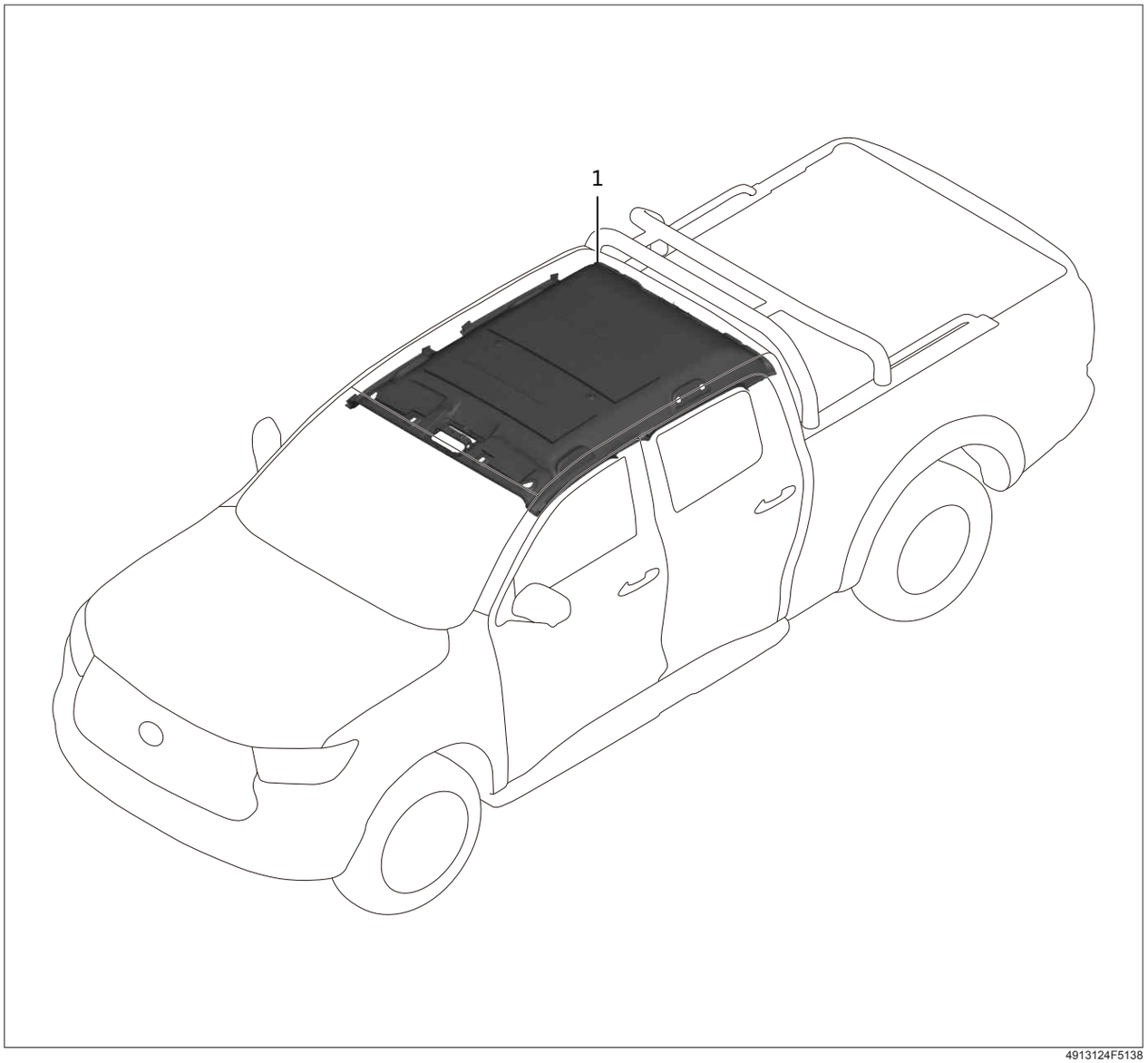
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Installation

1. Perform installation work in reverse order of removal

Inner protective surface of roof - with sunroof

Location diagram



4913124F5138

1. Ceiling assembly

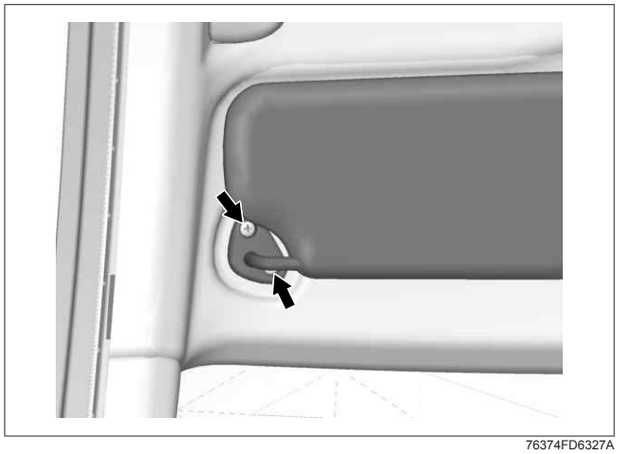
Removal/installation

Removal

⚠ Caution

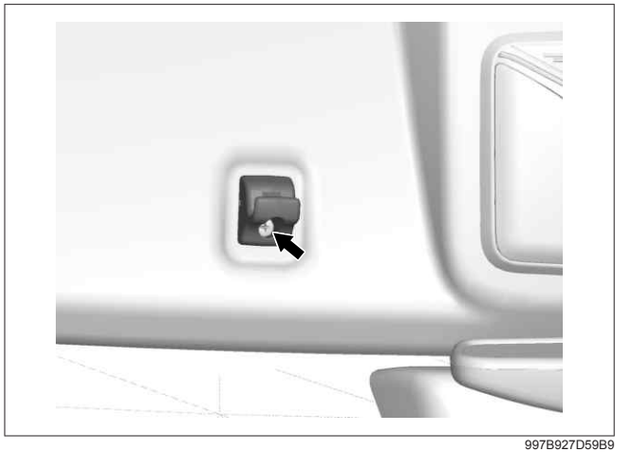
- Wear gloves to protect the hands.
- Do not damage, wrinkle, or warp the ceiling.
- Do not damage the instrument panel or other vehicle interior trims.

1. Disconnect the negative terminal of the battery.
2. Remove the 2 front seats
3. Remove the auxiliary instrument panel
4. Remove pillar A guard
5. Remove pillar B guard
6. Remove pillar C guard
7. Remove 2 screws and remove sun visor assembly



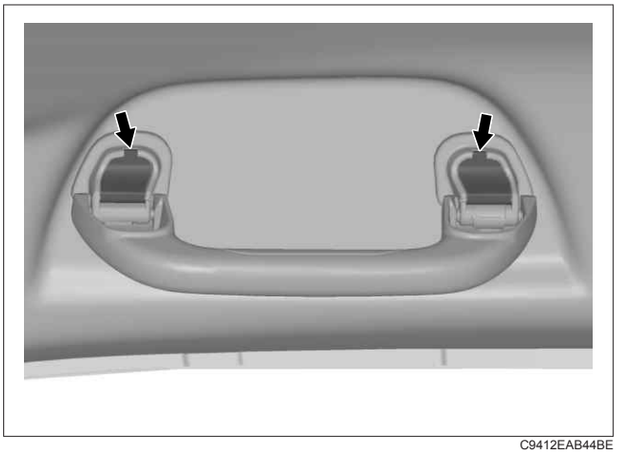
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8. Remove 1 screw, and remove sun visor fixed bracket



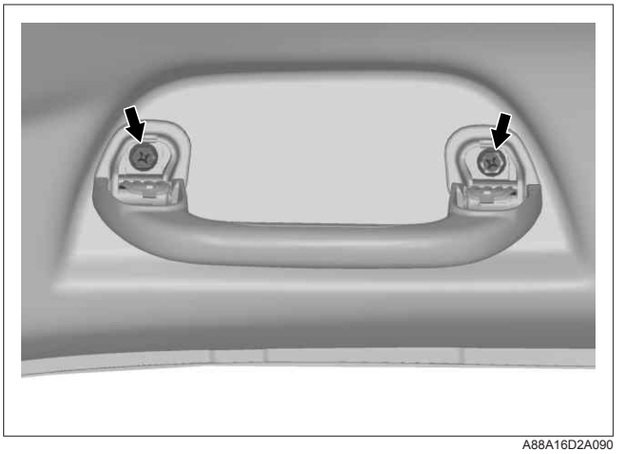
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9. Pry open decorative cover of ceiling handle assembly



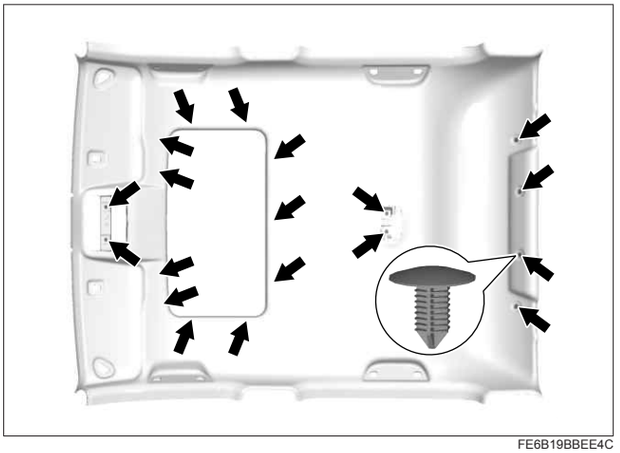
C9412EAB44BE

10. Remove 2 fixing bolts and remove ceiling handle assembly



A88A16D2A090

11. Remove reading lamp assembly
12. Remove ceiling lamp assembly.
13. Remove 4 screws, pry open 4 snaps, pull apart 11 sticking buttons and remove ceiling assembly



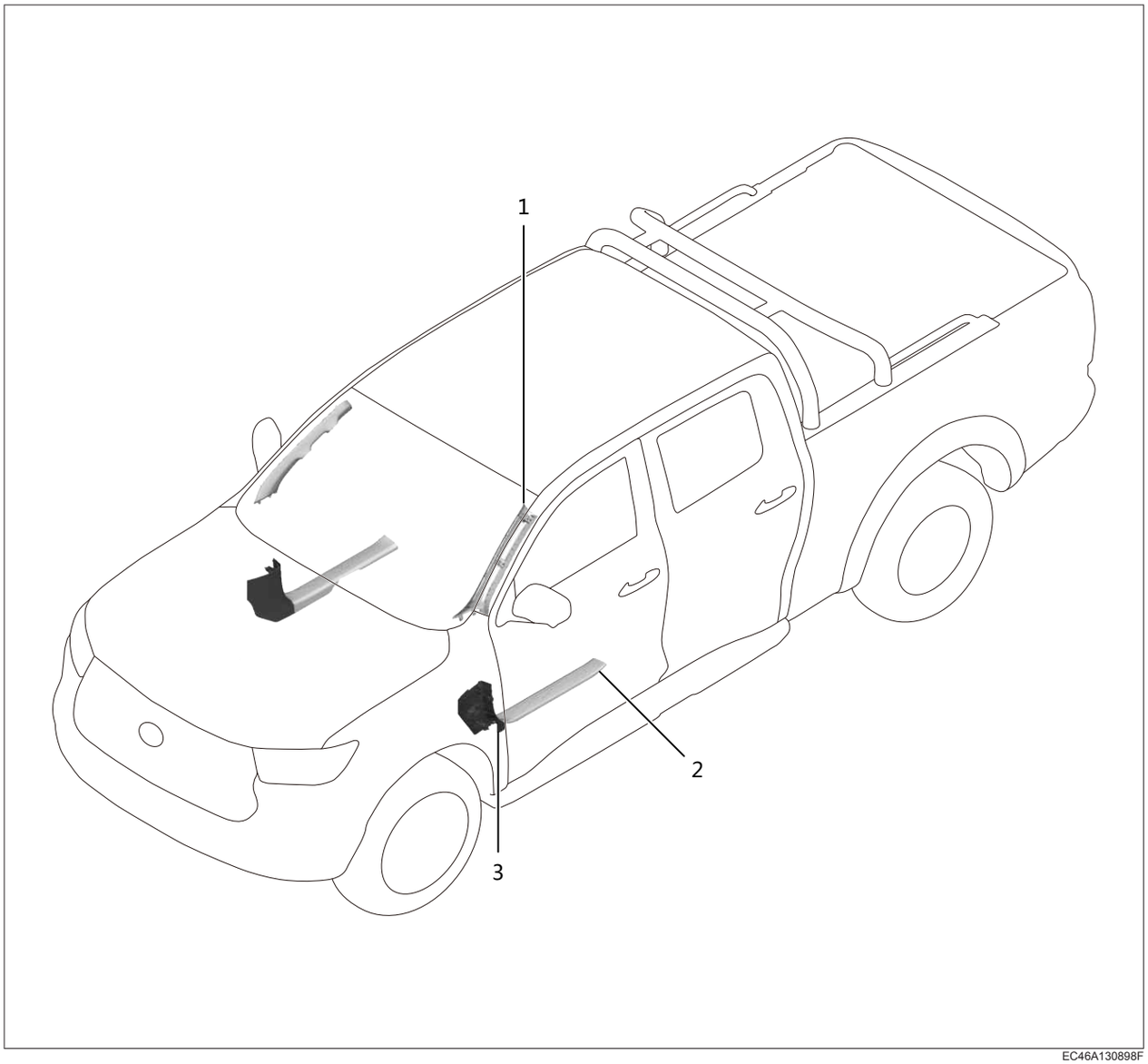
FE6B19BBEE4C

Installation

1. Perform installation work in reverse order of removal

Pillar A guard

Location diagram



EC46A130898F

1. Pillar A upper trim plate assembly
2. Front sill trim plate assembly
3. Pillar A lower trim plate assembly

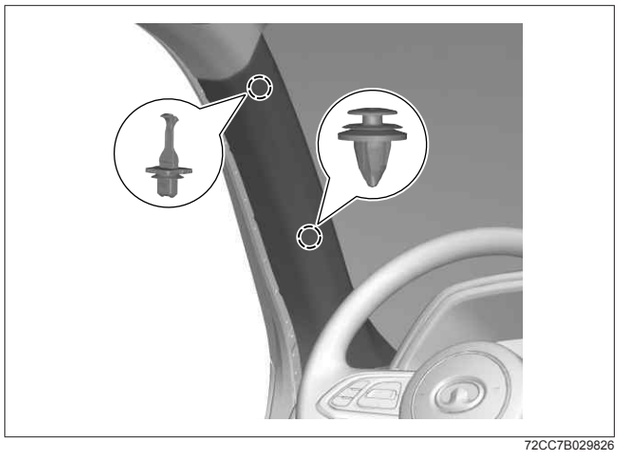
Removal/installation

Removal

Notice

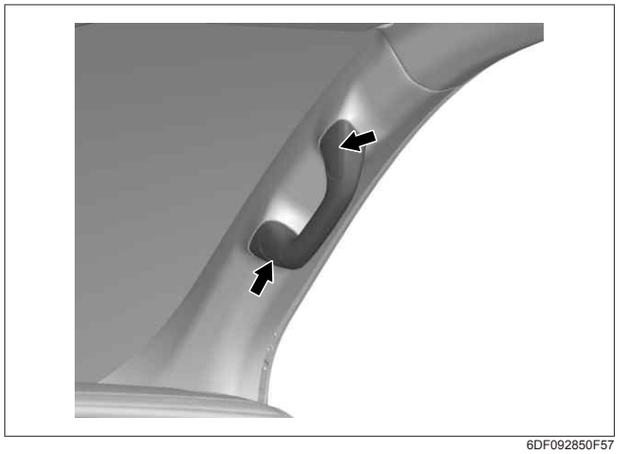
- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Remove part of front door frame seal strip
2. Pry off 2 snaps, pull off left pillar A upper trim plate assembly upward



72CC7B029826

3. Pry off 2 handle bolt cover plates



6DF092850F57

4. Remove 2 bolts, and remove handle assembly

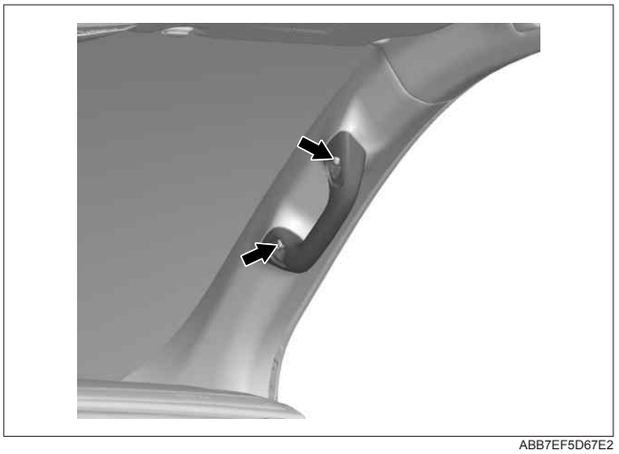
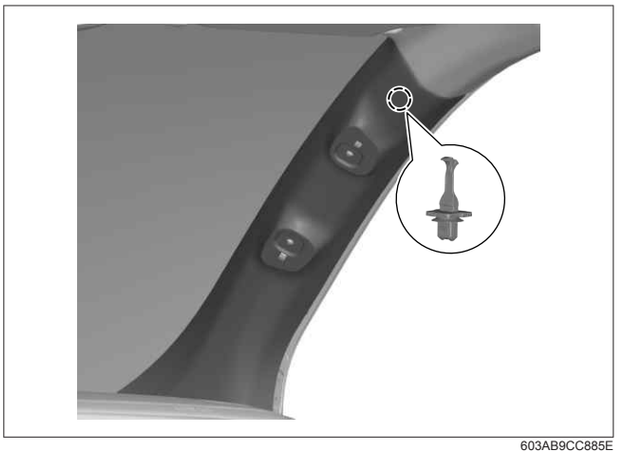


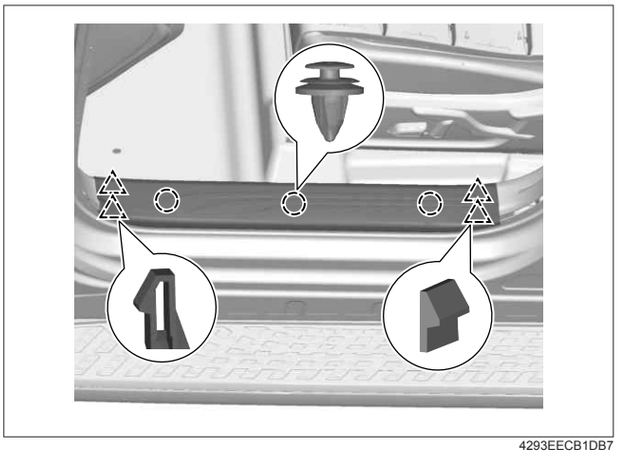
ABB7EF5D67E2

5. Pry off 1 snap, pull off right pillar A upper trim plate assembly upwardl



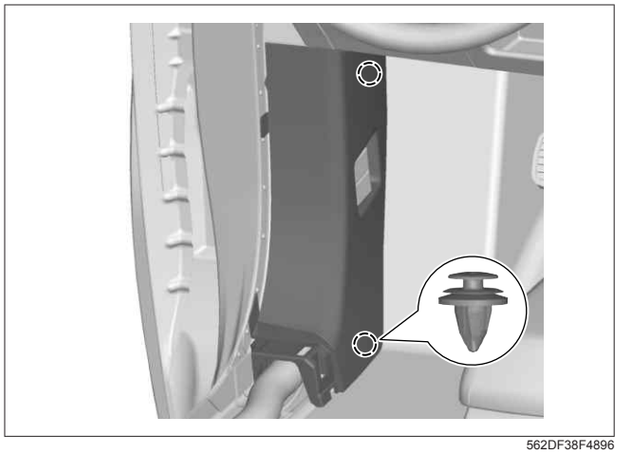
603AB9CC885E

6. Pry off 3 snaps and 4 dogs, and remove front sill trim plate assembly



4293EECB1DB7

7. Pry off 2 snaps, remove pillar A lower trim plate assembly



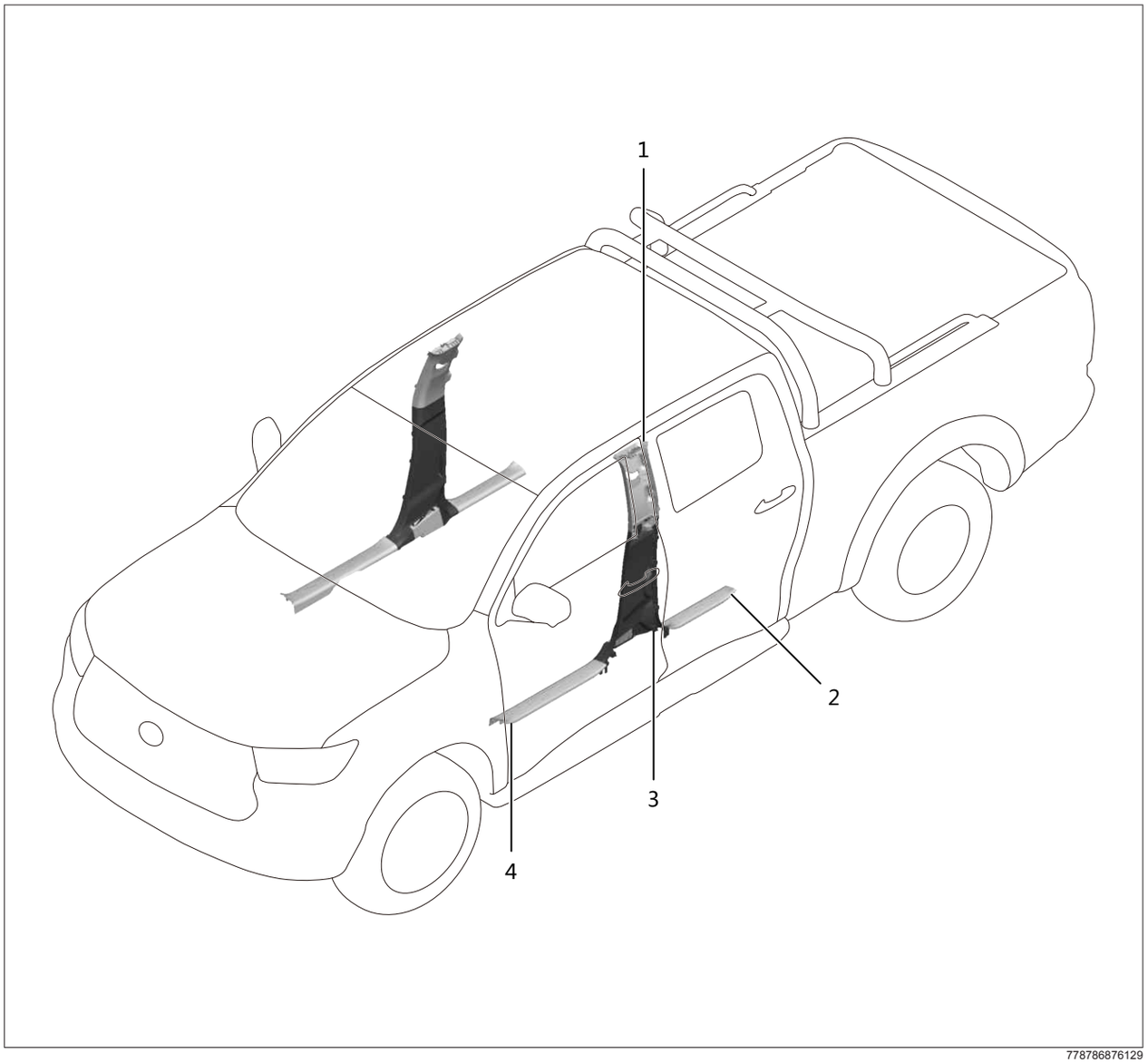
562DF38F4896

Installation

1. Perform installation work in reverse order of removal

Pillar B guard

Location diagram



778786876129

1. Pillar B upper trim plate assembly
2. Rear sill trim plate assembly
3. Pillar B lower trim plate assembly
4. Front sill trim plate assembly

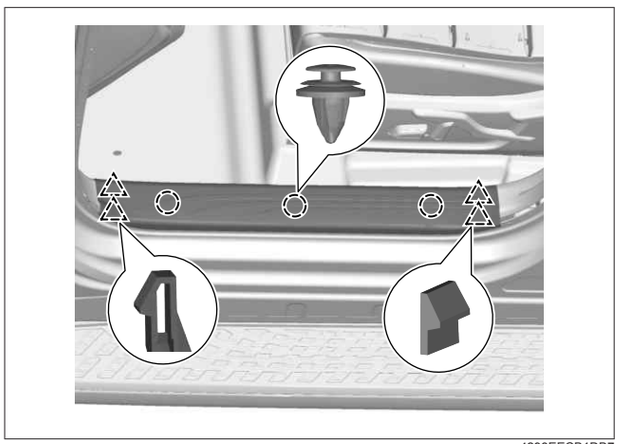
Removal/installation

Removal

Notice

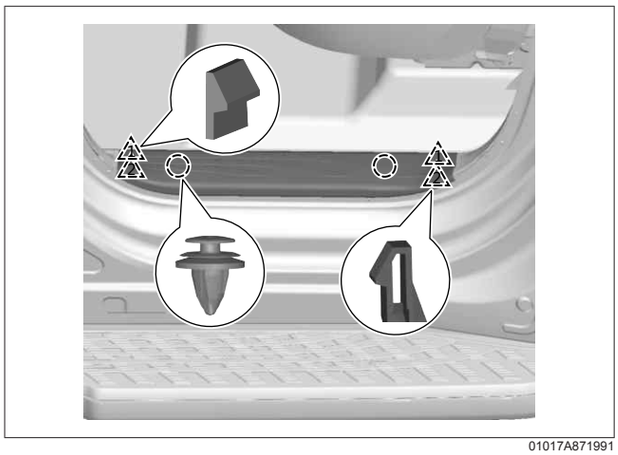
- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Move front seat to front end
2. Pry off 3 snaps and 4 dogs, and remove front sill trim plate assembly



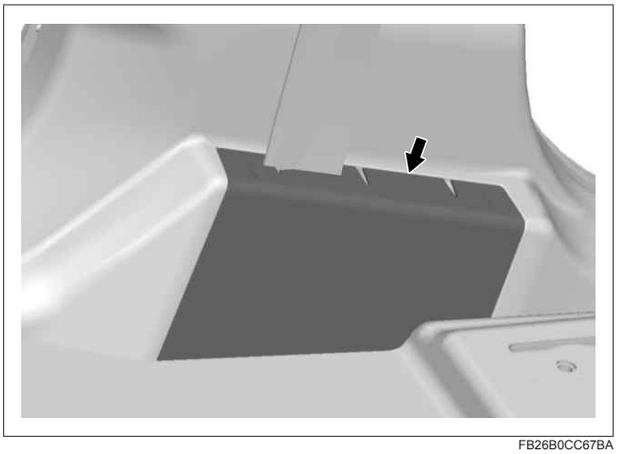
4293EECB1DB7

3. Pry off 2 snaps and 4 dogs, and remove rear door sill trim plate assembly



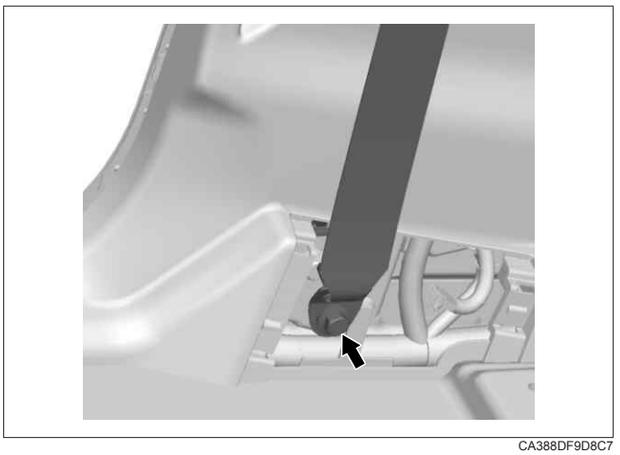
01017A871991

4. Remove some of front/rear door frame seals
5. Remove the lower fixing point cover plate of the front seat belt



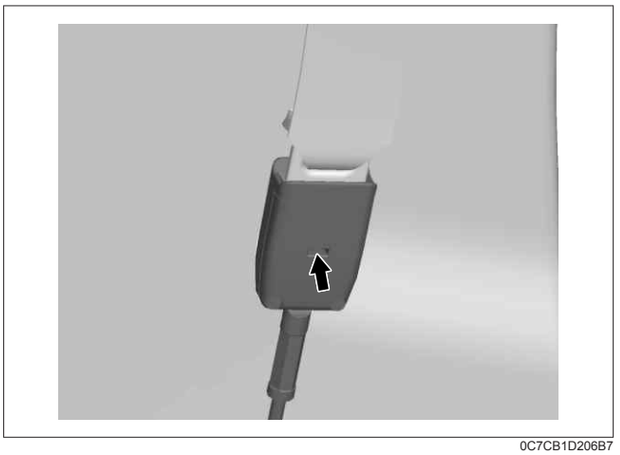
FB26B0CC67BA

6. Disconnect the connection between the lower end of front seat belt and the body (configuration I)



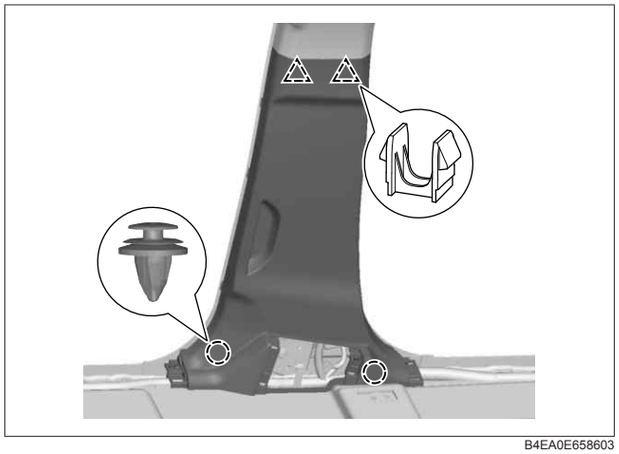
CA388DF9D8C7

7. Insert proper tool into the hole, press off circlip and disconnect the connection between seat belt lower end and front seat belt pretensioner end piece (configuration II)



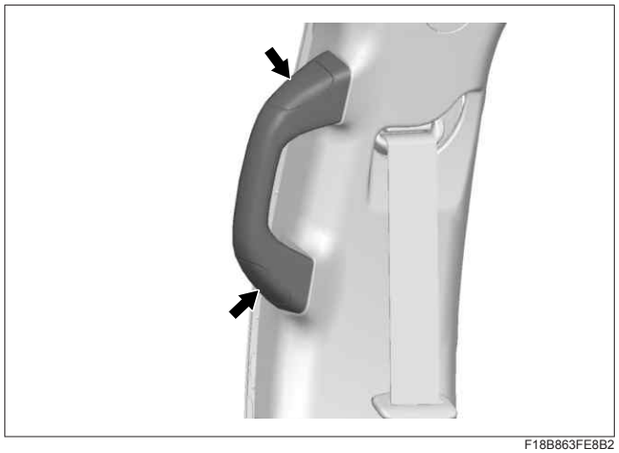
0C7CB1D206B7

8. Pry off 2 snaps and 2 dogs, and remove pillar B lower trim plate assembly



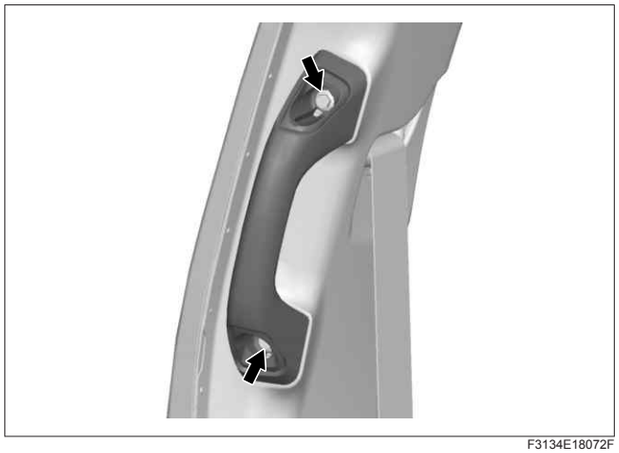
B4EA0E658603

9. Pry off handle bolt cover plate



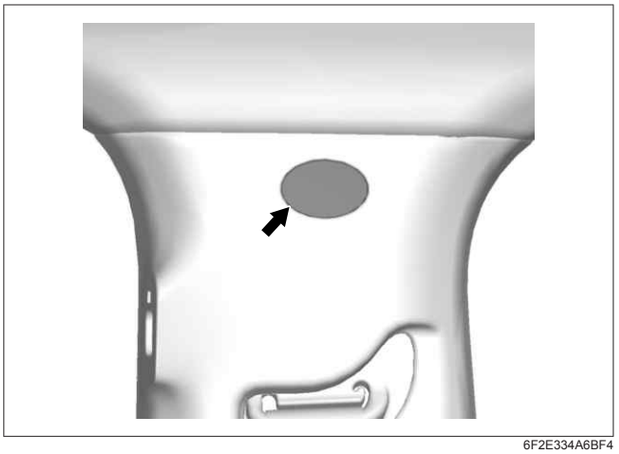
F18B863FE8B2

10. Remove 2 bolts, and remove handle assembly



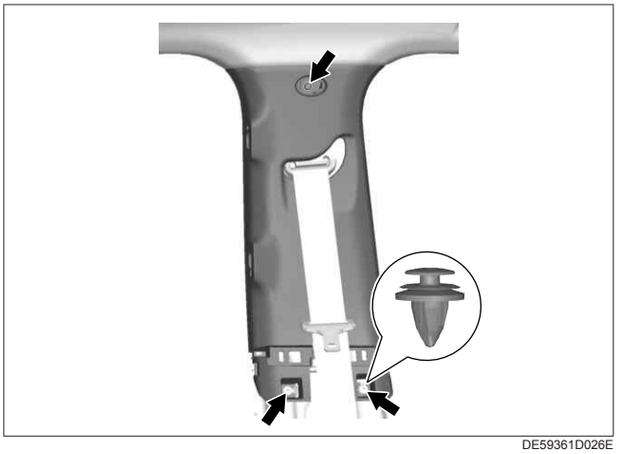
F3134E18072F

11. Pry off pillar B upper guard mounting plug cover



6F2E334A6BF4

12. Remove 1 fixed bolt, pry off 2 snaps, and remove pillar B upper trim plate assembly



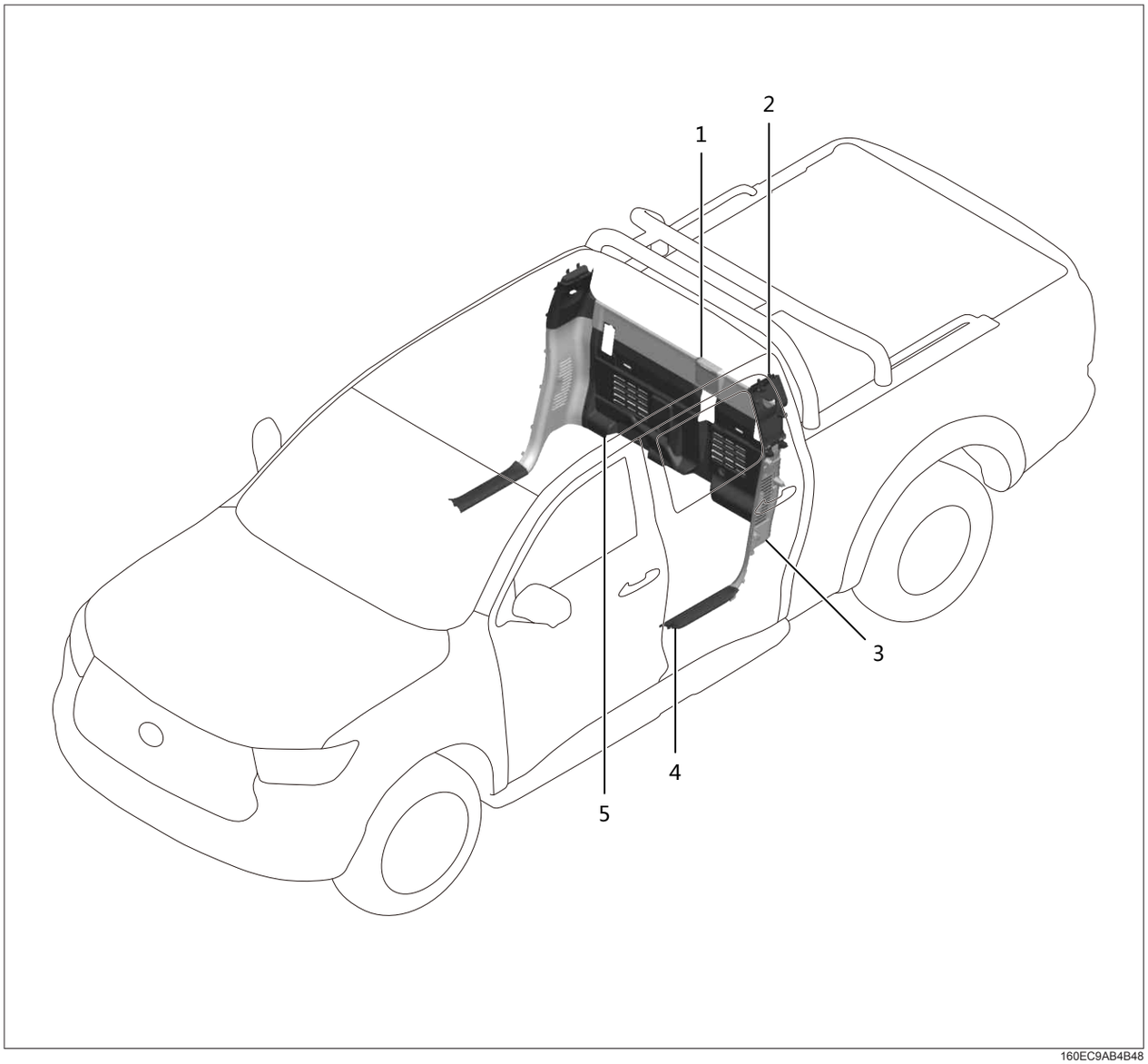
DE59361D026E

Installation

1. Perform installation work in reverse order of removal

Pillar C guard

Location diagram



160EC9AB4B48

1. Rear wall trip plate assembly
2. Pillar C upper trim plate assembly
3. Pillar C lower trim plate assembly
4. Rear sill trim plate assembly
5. Rear wall cover plate

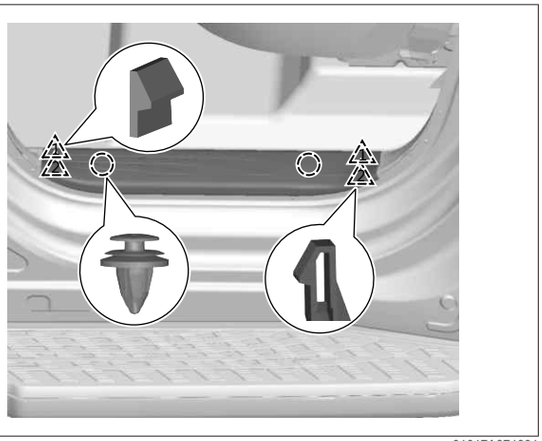
Removal/installation

Removal

Notice

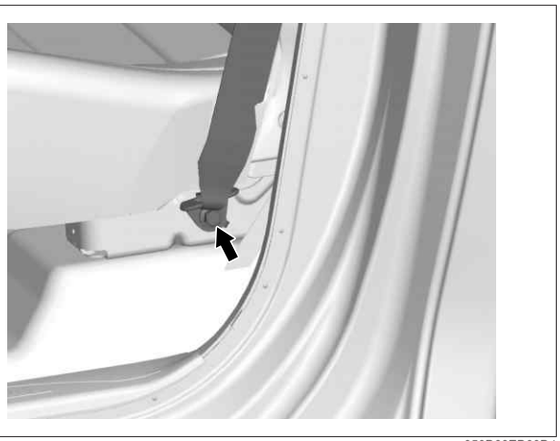
- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Pry off 2 snaps and 4 dogs, and remove rear door sill trim plate assembly



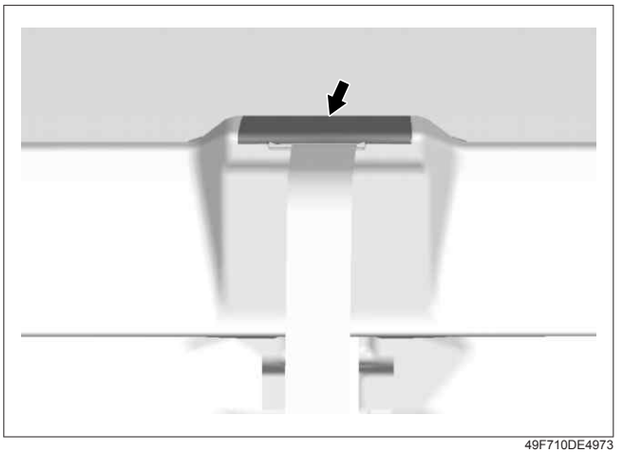
01017A871991

2. Remove some of rear door frame seals
3. Disconnect the lower fixing point for the rear seat belt



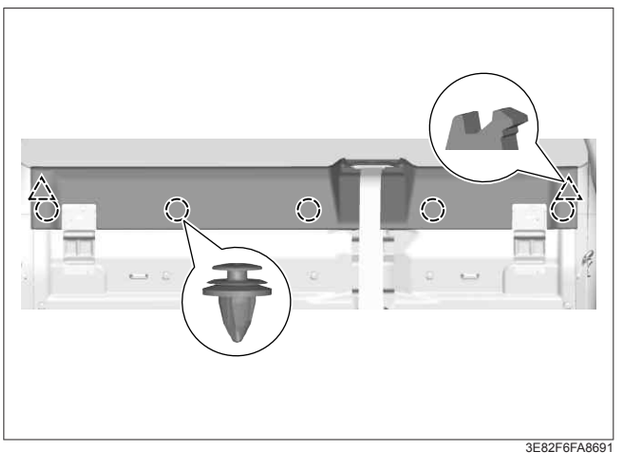
353D88ED33D4

4. Put down rear seat backrest
5. Remove seat belt outlet cap



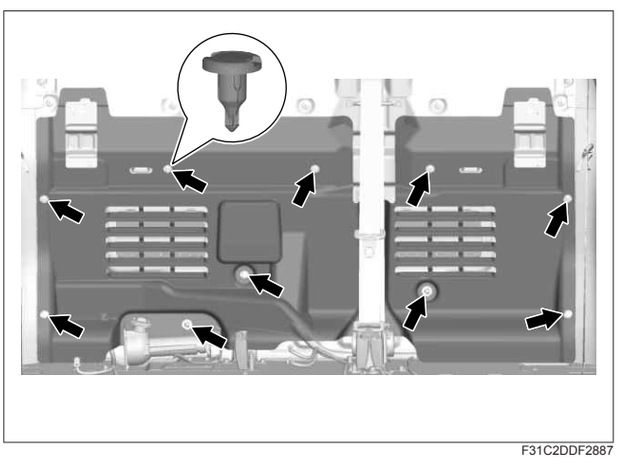
49F710DE4973

6. Pry off 5 snaps and 2 dogs, and remove rear wall trim plate body



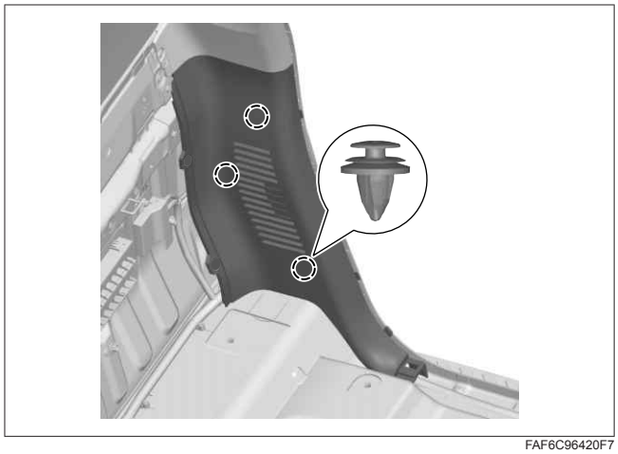
3E82F6FA8691

7. Remove 8 snaps and 2 plastic nuts, and remove rear wall cover plate



F31C2DDF2887

8. Pry off 3 snaps, and remove rear column lower trim plate assembly



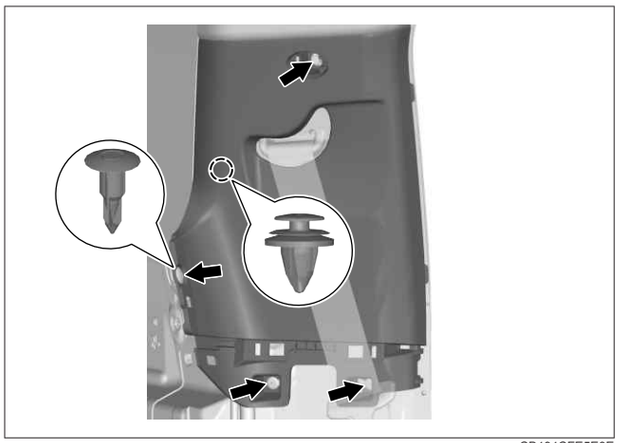
FAF6C96420F7

9. Pry off pillar C upper guard mounting plug cover



E35FE3D034A1

10. Remove 1 bolt, pry off 4 snaps, and remove pillar C upper guard assembly



CB494CFE5E3E

Installation

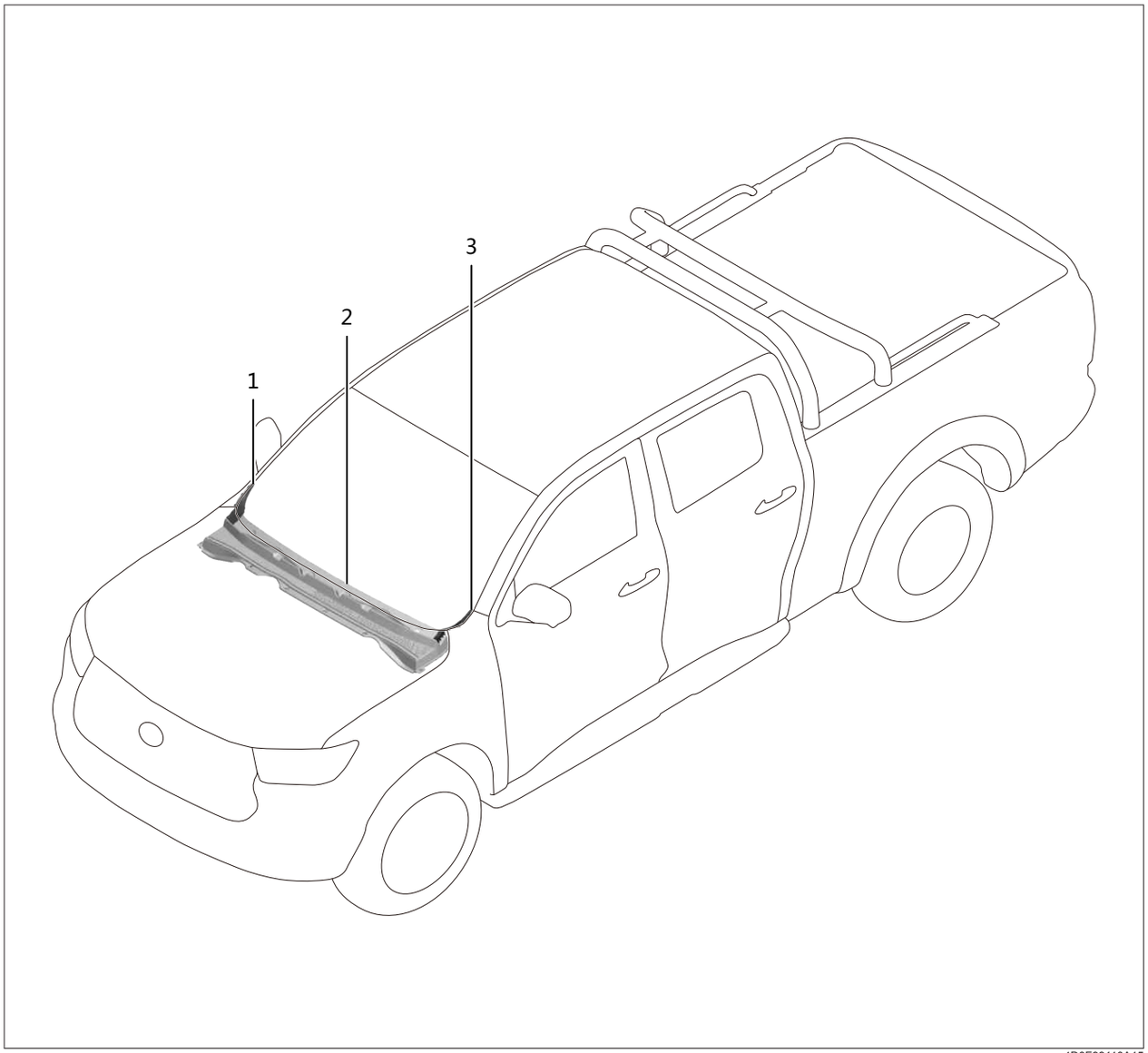
1. Perform installation work in reverse order of removal

Exterior trim

Ventilation cover plate .....47－1
Location diagram .....47－1
Removal/installation.....47－2
Roof panel trim strips .....47－3
Location diagram .....47－3
Removal/installation.....47－4
Splash guard .....47－5
Location diagram .....47－5
Removal/installation.....47－6
Engine lower guard .....47－7
Location diagram .....47－7
Removal/installation.....47－8

Ventilation cover plate

Location diagram



4D0F99110A15

1. Engine hood right hinge shield
2. Ventilation cover plate assembly
3. Left hinge shield of engine hood

Removal/installation

Removal

Notice

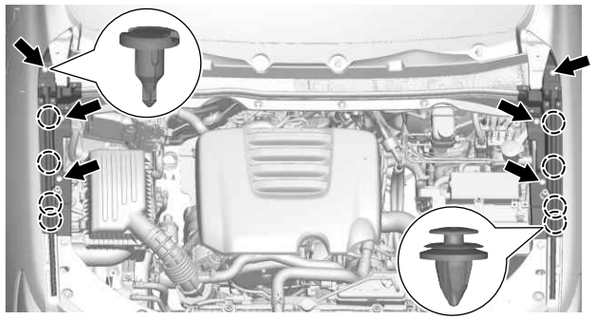
› Wear gloves to protect your hands.

1. Disconnect the negative terminal of the battery.
2. Remove front wiper arm



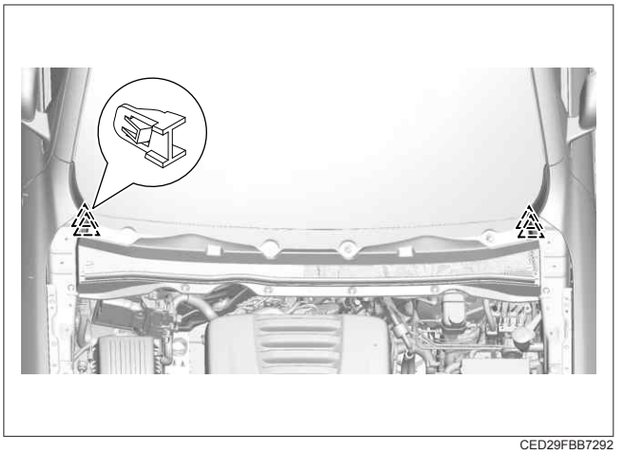
A8FC5179B5B4

3. Remove 14 snaps, and remove left and right cover plates of engine compartment



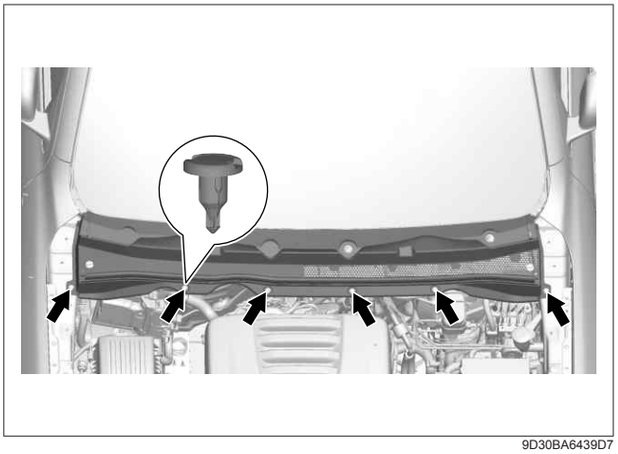
EA6CA201CD8B

4. Remove left and right hinge assembly of engine hood



CED29FBB7292

5. Remove 6 snaps, and remove ventilation cover plate



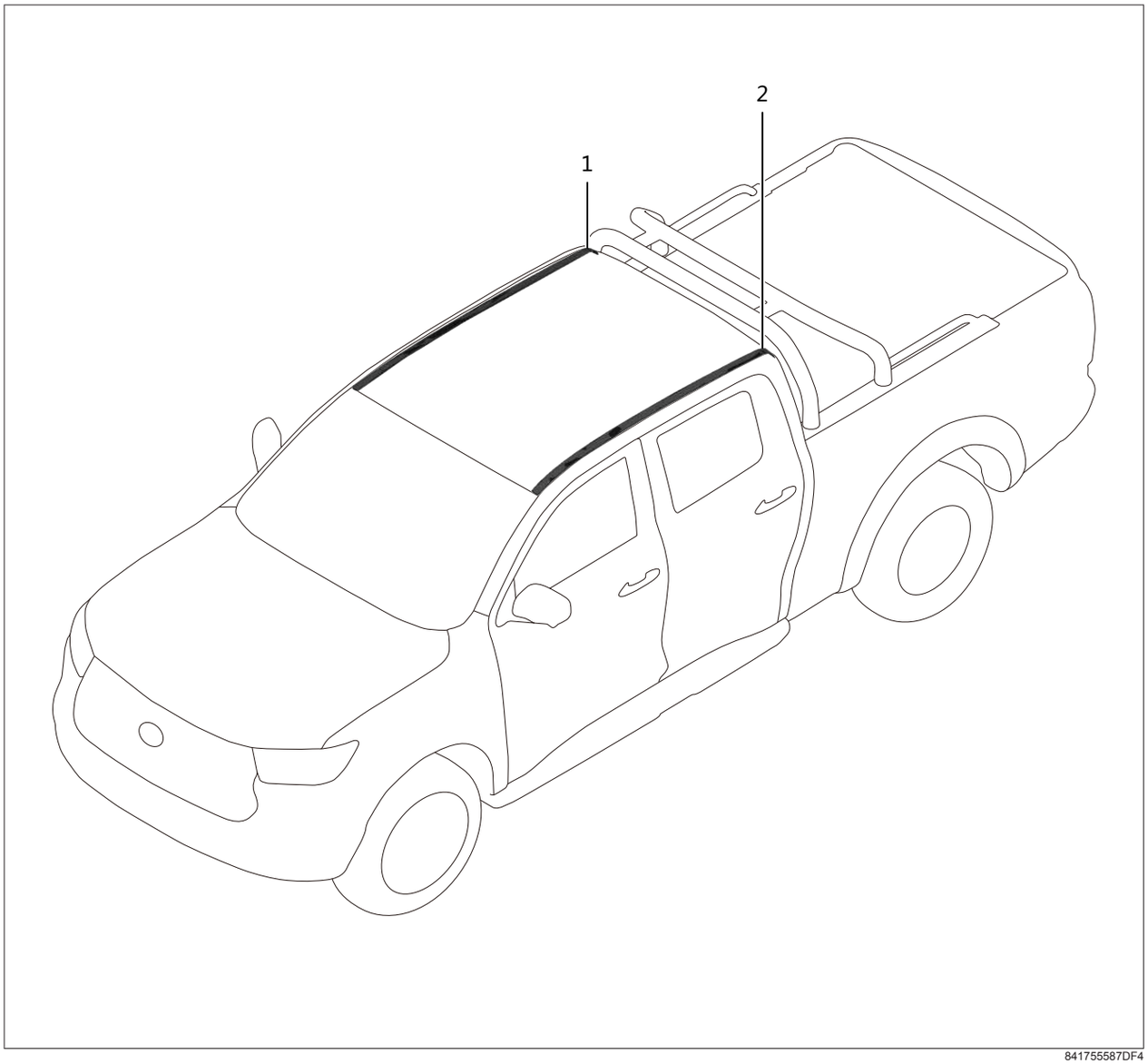
9D30BA6439D7

Installation

1. Perform installation work in reverse order of removal

Roof panel trim strips

Location diagram



841755587DF4

1. Right trim strip of roof
2. Left trim strip of roof

Removal/installation

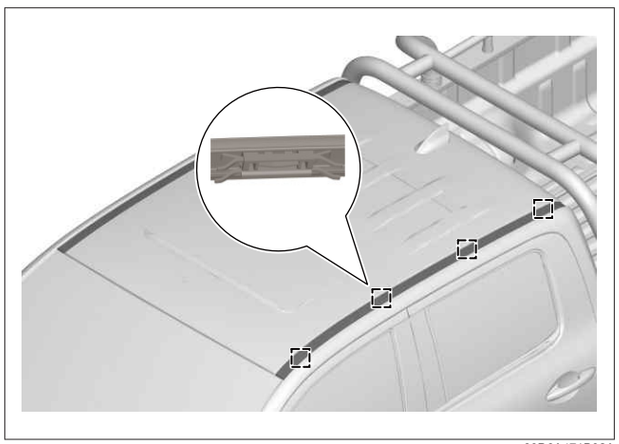
Removal

Notice

› Wear gloves to protect your hands.

› Take the left side as example. The removal of right side is the same with it.

1. Separate 4 dogs, and remove roof trim strip



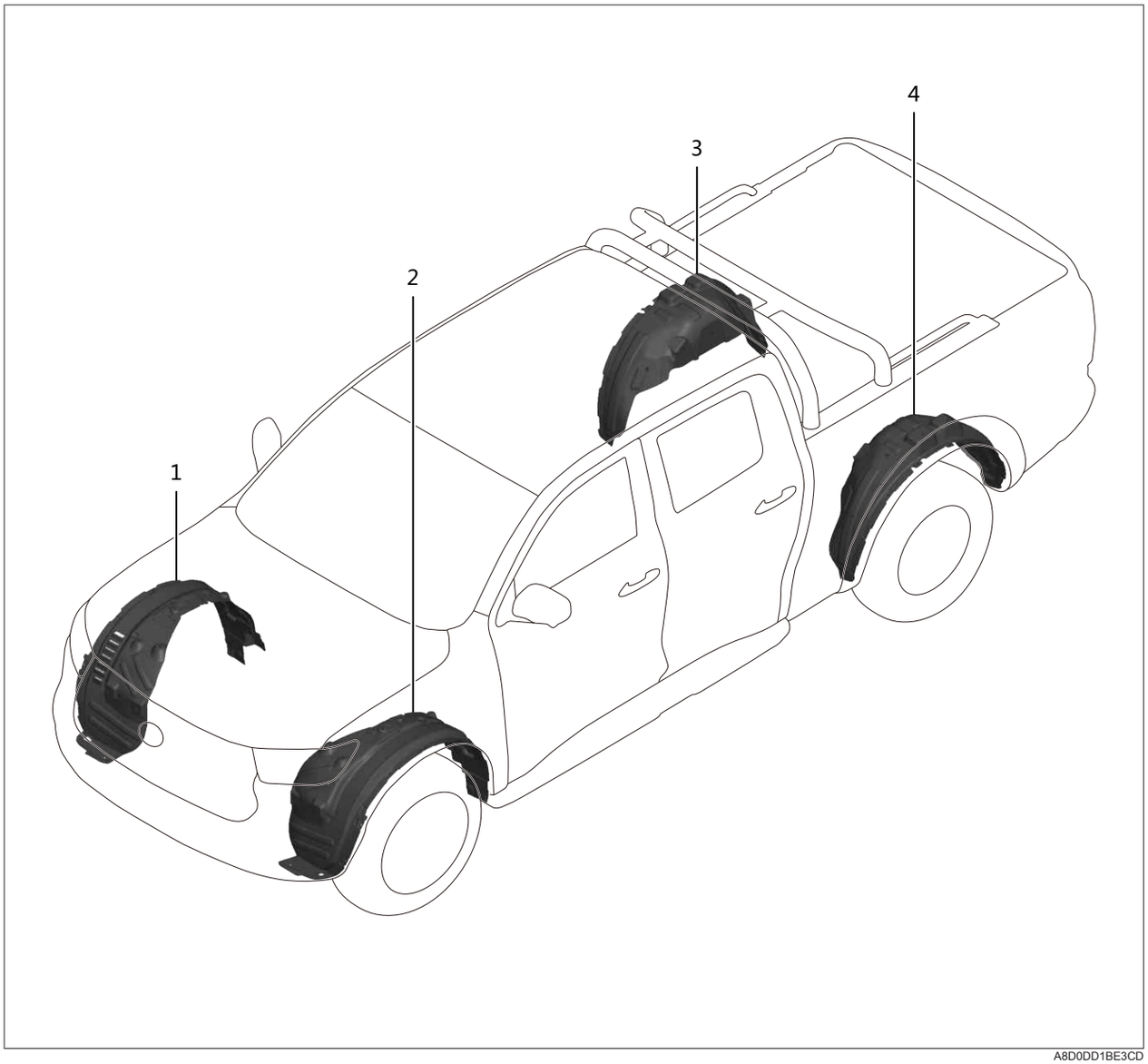
39D6A471B02A

Installation

1. Perform installation work in reverse order of removal

Splash guard

Location diagram



A8D0DD1BE3CD

1. Front right splash guard
2. Front left splash guard
3. Rear right splash guard
4. Rear left splash guard

Removal/installation

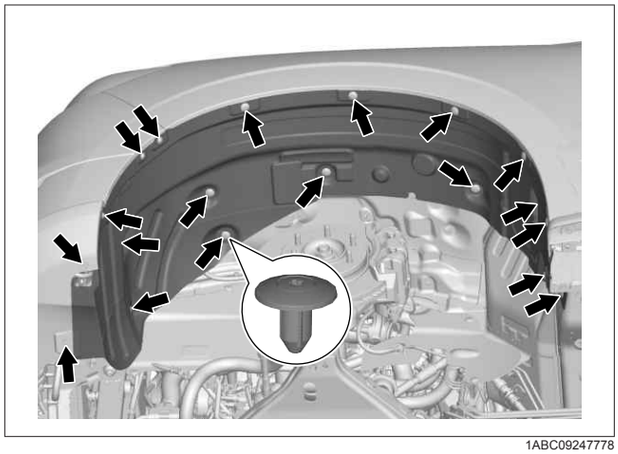
Removal

Notice

› Wear gloves to protect your hands.

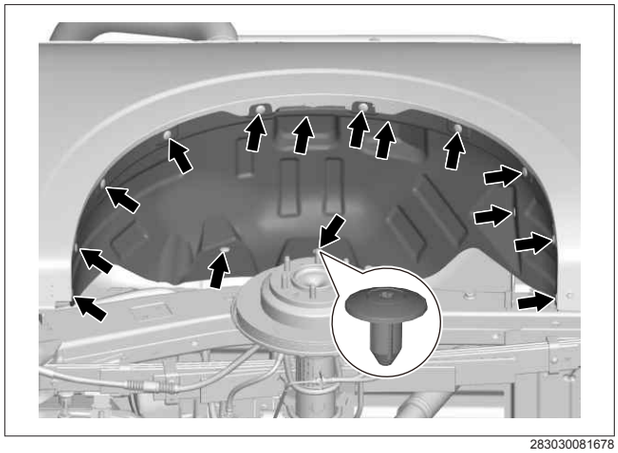
› Take the left side as example. The removal of right side is the same with it.

1. Raise the vehicle to an appropriate position
2. Remove front wheels
3. Remove 2 bolts, 3 screws and 14 snaps, and remove front splash guard



1ABC09247778

4. Remove rear wheel
5. Remove 15 snaps, and remove rear splash guard



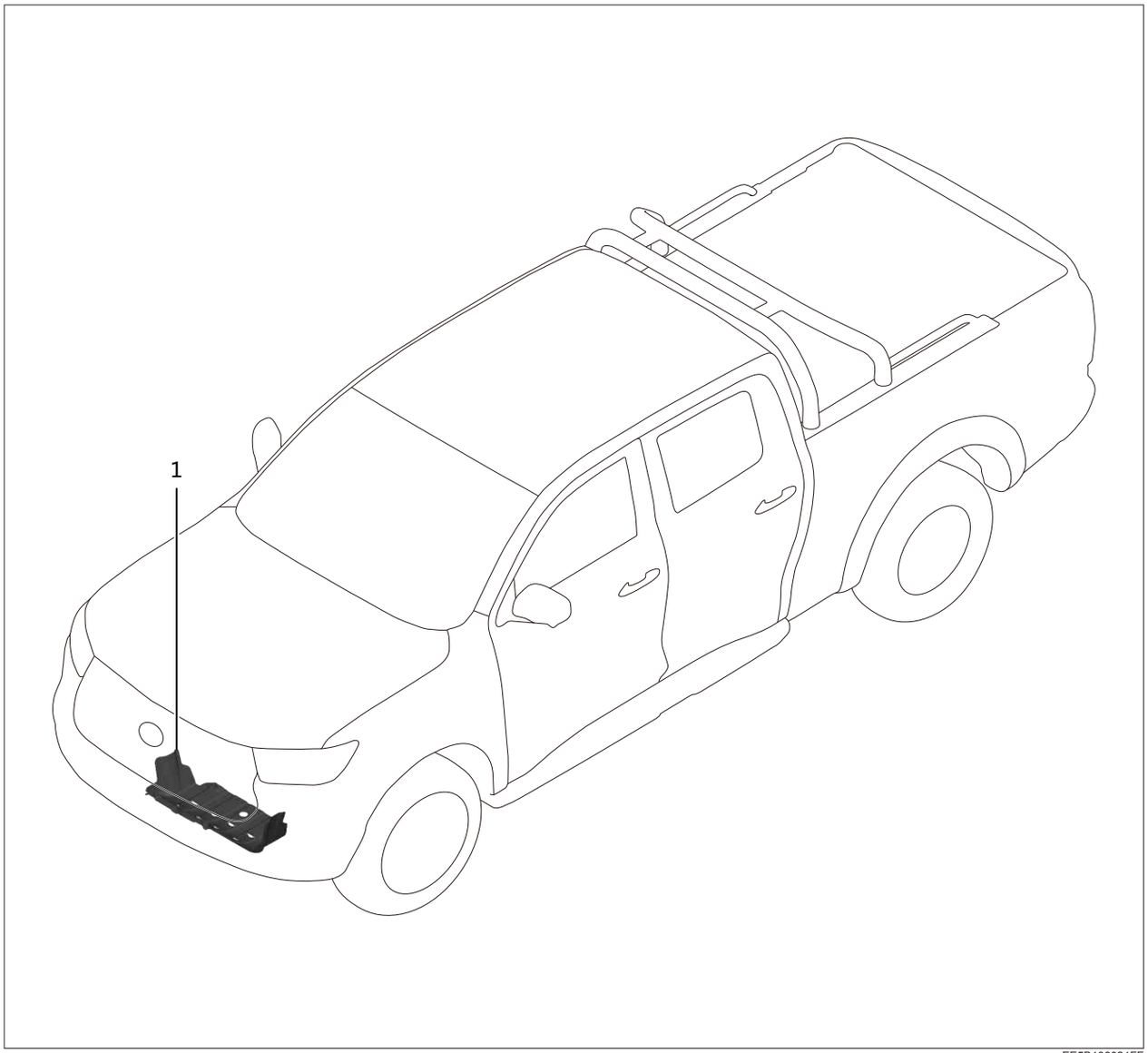
283030081678

Installation

1. Perform installation work in reverse order of removal

Engine lower guard

Location diagram



EE5B108024FF

1. Engine lower guard

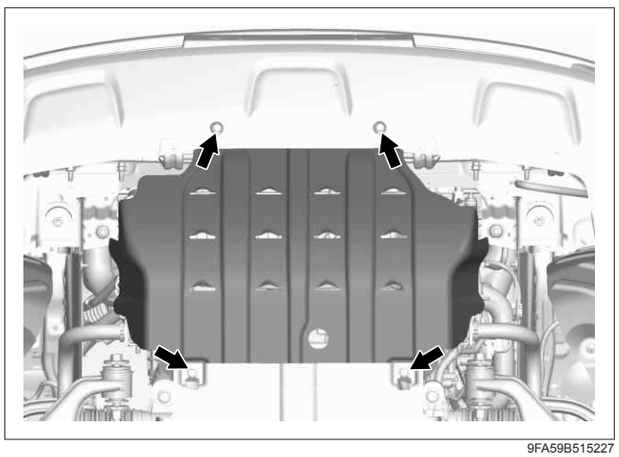
Removal/installation

Removal

Notice

› Wear gloves to protect your hands.

1. Raise the vehicle to an appropriate position
2. Remove 4 bolts, and remove engine lower guard



9FA59B515227

Installation

1. Perform installation work in reverse order of removal

Other parts of vehicle body

Fender .....48－1
Removal/installation.....48－1

Fender

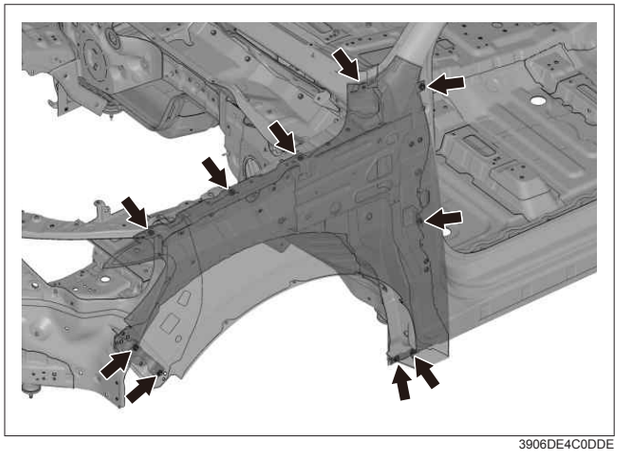
Removal/installation

Removal

⚠ Caution

› Take the left side as example. The removal of right side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Remove front cover plate of engine compartment
3. Remove left cover plate of engine compartment
4. Remove front left splash guard
5. Remove front bumper
6. Remove left headlamp assembly
7. Remove 10 bolts



3906DE4C0DDE

Installation

1. Perform installation work in reverse order of removal

Collision repair

Description and operation .....49－1
Description and operation .....49－1
Materials and parameters .....49－3
Location Diagram of Plastic Parts .....49－3
List of Plastic Parts .....49－4
List of galvanized plates .....49－6
Repair of plastic parts .....49－13
Repairable bumpers .....49－13
Repair procedure of bumpers .....49－14
Explosive view of vehicle body .....49－19
Cargo box .....49－19
Floor .....49－20
Roof .....49－21
Roof (sunroof version) .....49－22
Rear wall .....49－23
Engine compartment .....49－24
Left side wall .....49－25
Standard clearance .....49－26
Front part of vehicle body .....49－26
Sectional view of front body .....49－27
Side face of vehicle body .....49－31
Sectional view of side body .....49－32
Rear part of vehicle body .....49－35
Sectional View of Rear Body .....49－36
Body structure .....49－39
Vehicle body section location diagram .....49－39
Section view of vehicle body .....49－40
Trunk section location diagram .....49－42
Trunk section view .....49－43
Vehicle body reference dimensions .....49－45
Engine compartment .....49－45
Roof .....49－46
Front door .....49－47
Rear door .....49－48
Rear part of vehicle body .....49－49
Body bottom .....49－50
Trunk (small double) .....49－51
Anti-corrosion seal .....49－52
Adhesive for welding .....49－52
Adhesive for coating .....49－64
Adhesive for general assembly .....49－91
Vehicle body welding spot .....49－97

Illustrative example ..... 49－97
Meaning of symbols ..... 49－98
Number of panels drilled ..... 49－99
Drilling hole for plug welding ..... 49－99
Roof ..... 49－100
Left side beam and side wall connecting plate ..... 49－102
Radiator frame assembly ..... 49－103
Front left wheel cover assembly ..... 49－105
Front right wheel cover assembly ..... 49－109
Front windshield lower beam assembly ..... 49－110
Front wall assembly ..... 49－111
Left side wall outer board ..... 49－116
Front floor ..... 49－119
Rear floor ..... 49－123
Rear wall assembly ..... 49－127
Trunk front plate ..... 49－128
Trunk left side plate outer plate ..... 49－129
Trunk left side plate inner plate ..... 49－131
Trunk floor ..... 49－132
Paint/coating repair ..... 49－133
System description ..... 49－133
Paint surface daily maintenance ..... 49－134
Diagnostic information and steps ..... 49－137
Demonstrative example of treating frequently-seen film defects ..... 49－139
Demonstrative example of conventional grinding and polishing treatment processing ..... 49－140
Demonstrative example of in-depth grinding and polishing treatment processing ..... 49－141
Paint-spraying processing for rigid surface ..... 49－142
Paint-spraying procedures for rigid surface after completion of sheet metal repair ..... 49－146
Paint repair procedures for plastic part paint surface ..... 49－146

Description and operation

Description and operation

Safety precautions

- When performing vehicle body sheet metal welding, cutting and grinding operations, you must wear protective clothing, protective goggle, gloves, masks and work shoes.
- The welding area must be well ventilated.
- Before welding, you must disconnect the battery and cover the terminal.
- If any sparks may occur near the battery during operation, the battery must be removed.
- Before dismantling the vehicle components, the vehicle should be fixed to the vehicle lift frame to avoid changes in the center of gravity of the vehicle, which may affect operational safety.
- Connect the grounding wire of the welding device directly to the part to be welded. Make sure there is no conductive part between the grounding point and the welding point during operation.
- Grounding wire or welding electrode must not come into contact with the electronic control unit and the conductor.
- No unprotected car shall be parked in the vehicle body repair area as splashed sparks may give rise to fire and damage paint and glass.
- You shall keep extreme caution when polishing or welding near fuel tanks or other fuel-filled parts, and remove any parts that may be suspected of contributing to safety.
- Be sure not to weld any part of the air conditioning system containing the refrigerant. Similarly, other parts of the vehicle, which may rise the temperature of the air conditioning system part, shall not be welded, otherwise it may explode the air conditioning system.
- If electric welding must be performed near the refrigerant hose, the refrigerant must be recycled as the refrigerant may decay when invisible UV rays penetrate the refrigerant hose during welding.
- When working on the airbag system or performing vehicle body alignment, the ground wire of the battery shall be disconnected; the ambient temperature of the airbag components shall not exceed 100°C.

Status of the parts

1. Before the repaired vehicle or parts are delivered to the paint shop for painting, its surface must be smooth and the joint filled surface must be polished by sandpaper. The preparation process is done by a sheet metal worker.
2. Vehicle body and floor components mainly are formed by cold stamping of steel sheet; therefore, the parts damaged from accident shall be restored to its shape in the same method.
3. If the damaged parts cannot be recovered as they are, the adjacent parts shall be aligned and then the damaged parts shall be disassembled and replaced on the basis of the integrity of the parts.
4. Be sure not to cut a single component. The cut and welded parts may affect the vehicle stiffness, driving safety and maintenance convenience.

Description of welding type

1. Commonly used types of welding are categorized as spot welding, gas shielded welding and brazing.
2. Be sure not to reduce the number of welding spot at the time of spot welding.
3. When the common spot welding device cannot proceed, the gas shielded welding can be used for plug welding after drilling.
4. When using spot welding, if it is the connection of the three-layer plate, only the outer plate is replaced, under this case, the welding spot shall be placed on the original welding spot.
5. Spot welding may produce single-line welds, double-line welds and double-line offset welds.
6. Gas shielded welding may produce lap welds, continuous welds and continuous welds (intermittent).
7. Brazing is commonly used in welding and repairing the area with less tensile strength and less element thickness.

Anti-corrosion treatment

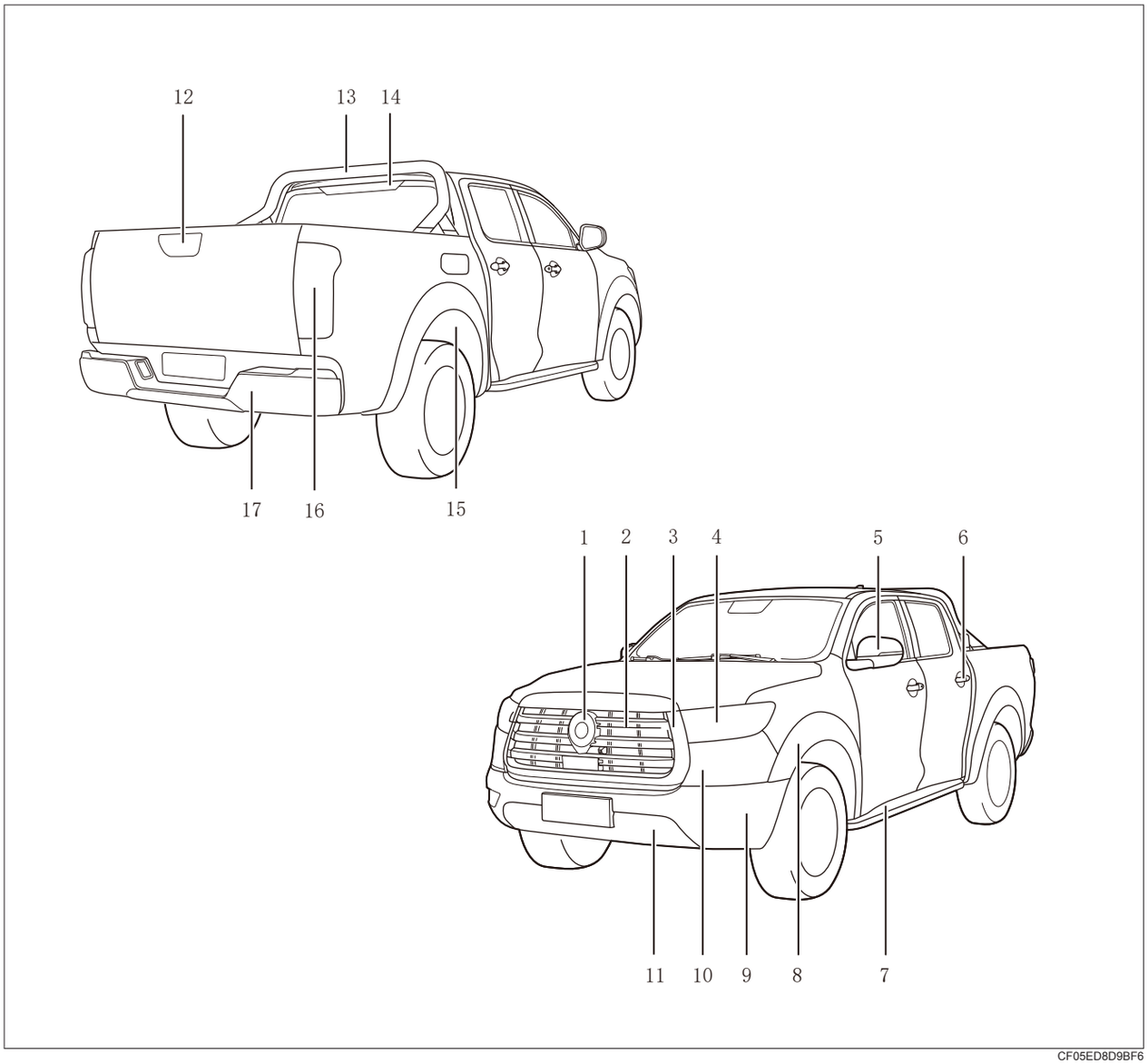
1. After maintenance, the standard anti-corrosion layer must be restored with approved materials.
2. Prior to sealing, primer shall be applied on the inside and outside of all joints.
3. Metal plates applied with primer must be coated with sealant.
4. Overlap plate, metal edge, butt joint and joint must be sealed with sealant.
5. The base plate of the vehicle is coated with a long-acting base plate protector.
6. After applying the finish, the cavity in the repair area must be treated with a cavity protection material.
7. Clean the drain after the cavity protection material is dry.

Environmental protection treatment method for vehicle scrap

1. After maintaining or repairing the vehicle, collecting the discarded materials by type.
2. Sort the discarded materials and check if they are reusable.

Materials and parameters

Location Diagram of Plastic Parts



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1. Front logo
2. Radiator grille
3. Radiator grille decorative frame
4. Combination headlamp
5. Outside rearview mirror
6. Exterior handle
7. Side footboard
8. Front left wheel arch assembly
9. Front bumper
10. Left trim plate of front bumper
11. Front bumper decorative panel
12. Exterior trunk handle assembly
13. Trunk guardrail
14. Brake lamp
15. Rear right splash guard
16. Rear combination lamp
17. Rear bumper body

List of Plastic Parts

Material of Plastic Parts

No.	Part name		Material
1	Front logo		ABS
2	Radiator grille		ASA MP16-02
3	Radiator grille decorative frame		ABS MP03-06
4	Combination headlamp	Lamp cover	PC
		Lamp housing	PP
		Decorative frame	PC
5	Outside rearview mirror	Lamp trim cover	ABS
		Lower cover	ASA
		Support bracket	ASA
6	Exterior handle	Lever housing	PC+PBT
		Lock cylinder cover	PC+PBT
7	Middle pedal	Middle pedal body	6065
		Middle pedal end 1	PP+EPDM-TD20
		Middle pedal end 2	PP+EPDM-TD20
8	Front left wheel arch assembly		PP+EPDM-TD20 MP01-09
9	Front bumper		PP+EPDM-TD20 MP01-06B
10	Left trim plate of front bumper		PP+EPDM-TD20 MP01-06B
11	Front bumper decorative panel		PP+EPDM-TD20 MP01-09
12	Exterior trunk handle assembly		ABS+PC
13	Trunk guardrail		SUS304
14	Brake lamp	Cover	PC
		Rear housing	PC
15	Rear right splash guard		HDPE MP07-04
16	Rear combination lamp	Lamp cover	PMMA
		Lamp housing	PC ＋ ABS
17	Rear bumper body		PP+EPDM-TD20 MP01-06B

List of Plastic Symbols

Symbol	Material name
ABS	Acrylonitrile-butadiene-styrene copolymer
AES	Acrylonitrile-ethylene-propylene-diene monome-styrene copoly-mer
ASA	Acrylonitrile-phenylacetic acid-acrylate copolymer
PVC	Polyvinyl chloride

Symbol	Material name
TPV	Polypropylene+ethylene-propylene-diene monome
PMMA	Polymethyl methacrylate
PP+EPDM-TD20	Polypropylene+ethylene-propylene-diene monome-20% talc powder
PC+ABS	Polycarbonate/acrylonitrile-butadiene-styrene copolymer
PP+HDδ=1.5	High-density polypropylene
PC	Polycarbonate
PP-TD40	Polypropylene-40% lime powder
PBT	Polybutylene terephthalate
PA6-B30S-black	Nylon 6 (with filler)
PA6-B30S	Nylon 6 (without filler)
PBT	Polybutylene terephthalate
PA66/TP8	Nylon 6/linear body
PA66+GF30	Nylon 6+30% glass fiber
PA6-GF30	Nylon 6-20% glass fiber
POM	Polyformaldehyde
TP0	Thermoplastic polypropylene elastomer
TPE	Thermoplastic elastomer
PPS 88G8-BK06	Polyphenylene sulfide
EPDM	Ethylene-propylene-diene monom
HDPE	High-density polyethylene

List of galvanized plates

No.	Part name	Brand of galvanized sheet	Thickness (mm)
1	Right fender	DC53D+Z 50/50-M FD	0.7
2	Left fender	DC53D+Z 50/50-M FD	0.7
3	Reinforcing plate for left fender	DC51D+Z 50/50-M FB	0.7
4	Reinforcing plate for right fender	DC51D+Z 50/50-M FB	0.7
5	Front wall lower reinforcing beam	DC51D+Z 50/50-M FB	0.8
6	Side-beam of front-left wheel cover and front wall connecting plate	HC340LAD+Z 50/50-M	1.2
7	Side-beam of front-right wheel cover and front wall connecting plate	HC340LAD+Z 50/50-M	1.2
8	Front windshield lower beam	HC220YD+Z 50/50-M	0.8
9	Rear right mounting bracket for mounting plate of ventilation cover plate	DC51D+Z 50/50-M FB	1
10	Rear left mounting bracket for mounting plate of ventilation cover plate	DC51D+Z 50/50-M FB	1
11	Bracket of left fender	DC51D+Z 50/50-M FB	1
12	Bracket of right fender	DC51D+Z 50/50-M FB	1
13	Front wiper right mounting plate	DC51D+Z 50/50-M FB	1.4
14	Front wiper left mounting plate	DC51D+Z 50/50-M FB	1.4
15	A/C air inlet water fender	DC51D+Z 50/50-M FB	0.6
16	Front left wheel cover	DC51D+Z 50/50-M	0.8
17	Rear reinforcing plate of front left wheel cover	DC51D+Z 50/50-M	1.6
18	Reinforcing plate of front left wheel cover	DC51D+Z 50/50-M	1.2
19	Battery mounting plate	DC51D+Z 50/50-M	1.2
20	Battery mounting bracket	DC51D+Z 50/50-M	1.4
21	Battery mounting plate front bracket	DC51D+Z 50/50-M	1.4
22	Side beam of front left wheel cover	HC220YD+Z 50/50-M	0.8
23	Side-beam of front-left wheel cover and headlamp mounting plate connecting plate	DC51D+Z 50/50-M	1.6
24	Mounting plate for ventilation cover plate left bracket	DC51D+Z 50/50-M	0.8
25	Left fender upper middle bracket	DC51D+Z 50/50-M	1

No.	Part name	Brand of galvanized sheet	Thickness (mm)
26	Side beam of front right wheel cover	HC220YD+Z 50/50-M	0.8
27	Side-beam of front-right wheel cover and headlamp mounting plate connecting plate	DC51D+Z 50/50-M	1.6
28	Mounting plate for ventilation cover plate right bracket	DC51D+Z 50/50-M	0.8
29	Right fender upper middle bracket	DC51D+Z 50/50-M	1
30	Air filter intake pipe bracket	DC51D+Z 50/50-M	1
31	Front right wheel cover	DC51D+Z 50/50-M	0.8
32	Rear reinforcing plate of front right wheel cover	DC51D+Z 50/50-M	1.6
33	Reinforcing plate of front right wheel cover	DC51D+Z 50/50-M	1.2
34	Left headlamp upper beam	DC51D+Z 50/50-M	1
35	Left headlamp lower mounting plate	HC220YD+Z 50/50-M	0.8
36	Left mounting bracket of radiator	HC260YD+Z 50/50-M	1.6
37	Left headlamp mounting plate and mount mounting plate connecting plate	HC340LAD+Z 50/50-M	1.4
38	Front left wheel cover and mount connecting plate	HC340LAD+Z 50/50-M	1.8
39	Left combination headlamp front bracket	DC51D+Z 50/50-M	1.5
40	Fender upper front bracket	DC51D+Z 50/50-M	1.8
41	Bumper beam left mounting plate	DC51D+Z 50/50-M	1.6
42	Left headlamp mounting plate reinforcing plate	DC51D+Z 50/50-M	1.2
43	Right headlamp lower mounting plate	HC220YD+Z 50/50-M	0.8
44	Right headlamp upper beam	DC51D+Z 50/50-M	1
45	Right mounting bracket of radiator	HC260YD+Z 50/50-M	1.6
46	Right headlamp mounting plate and mount mounting plate connecting plate	HC340LAD+Z 50/50-M	1.4
47	Front right wheel cover and mount connecting plate	HC340LAD+Z 50/50-M	1.8
48	Right combination headlamp front bracket	DC51D+Z 50/50-M	1.5
49	Bumper beam right mounting plate	DC51D+Z 50/50-M	1.6

No.	Part name	Brand of galvanized sheet	Thickness (mm)
50	Right headlamp mounting plate reinforcing plate	DC51D+Z 50/50-M	1.2
51	Lower cross beam of radiator	HC220YD+Z 50/50-M	1.2
52	Oil cooler left bracket	DC51D+Z 50/50-M	1.2
53	Oil cooler right bracket	DC51D+Z 50/50-M	1.2
54	Upper radiator crossbeam	DC51D+Z 50/50-M	1
55	Mounting plate of engine hood lock	HC220YD+Z	1.2
56	Radiator grille mounting bracket	DC51D+Z 50/50-M	1.4
57	Left fender front bracket	DC51D+Z 50/50-M	1.6
58	Right fender front bracket	DC51D+Z 50/50-M	1.6
59	Engine compartment front cover plate left bracket	DC51D+Z 50/50-M	1
60	Engine compartment front cover plate right bracket	DC51D+Z 50/50-M	1
61	Mounting plate for ventilation cover plate	DC51D+Z 50/50-M FB	0.7
62	Front wiper middle mounting plate	DC51D+Z 50/50-M FB	1.4
63	Mounting reinforcing plate for ventilation cover plate	DC51D+Z 50/50-M FB	1
64	Front floor middle passage front left reinforcing plate	HC340LAD+Z 50/50-M FB	1.4
65	Front right reinforcing plate of middle passage	HC340LAD+Z 50/50-M FB	1.4
66	Front right reinforcing plate of front floor	HC340LAD+Z 50/50-M FB	1.6
67	Left mounting plate of 3rd mount of vehicle body	HC220YD+Z 50/50-M FB	1.6
68	Right mounting plate of 3rd mount of vehicle body	HC220YD+Z 50/50-M FB	1.6
69	Front left reinforcing plate of front floor	HC340LAD+Z 50/50-M FB	1.6
70	Rear cross beam of front floor	HC420/780DPD+Z 50/50-M FB	2
71	Front floor and left sill strip connecting plate	HC340LAD+Z 50/50-M FB	1.8
72	Left sill strip and front beam connecting plate	HC340LAD+Z 50/50-M FB	1.6
73	Right sill strip and front beam connecting plate	HC340LAD+Z 50/50-M FB	1.6

No.	Part name	Brand of galvanized sheet	Thickness (mm)
74	Front floor stringer and sill strip connecting plate	DC51D+Z 50/50-M FB	1.2
75	Rear left sill strip	HC340LAD+Z 50/50-M-FB	1.2
76	Left sill strip	HC340/590DPD+Z 50/50-M FB	1.4
77	Right sill strip	HC340/590DPD+Z 50/50-M FB	1.4
78	Rear right sill strip	HC340LAD+Z 50/50-M-FB	1.2
79	Hanger bracket	HC340LAD+Z 50/50-M FB	1.2
80	Rear floor rear beam right reinforc-ing plate	HC340LAD+Z 50/50-M FB	2
81	Rear floor rear beam	HC340LAD+Z 50/50-M FB	1.6
82	Rear floor rear beam left reinforcing plate	HC340LAD+Z 50/50-M FB	2
83	Rear floor front left connecting plate	DC51D+Z 50/50-M FB	1.6
84	Rear floor front right connecting plate	DC51D+Z 50/50-M FB	1.6
85	Rear floor left stringer	HC340LAD+Z 50/50-M FB	1.2
86	Rear floor front right connecting plate	HC220YD+Z 50/50-M	1.2
87	Rear floor front left connecting plate	HC220YD+Z 50/50-M	1.2
88	Rear wall outer plate	DC51D+Z 50/50-M FB	0.7
89	Right side wall outer plate	DC56D+Z 50/50-M FD	0.65
90	Left side wall outer plate	DC56D+Z 50/50-M FD	0.65
91	Rear middle mounting bracket of front fender	DC51D+Z 50/50-M FB	1
92	Left fender rear upper mounting bracket assembly	DC51D+Z 50/50-M FB	0.8
93	Right fender rear upper mounting bracket assembly	DC51D+Z 50/50-M FB	0.8
94	Left sill strip reinforcing plate patch	DC56D+Z 50/50-M FB	0.8
95	Right sill strip reinforcing plate patch	DC56D+Z 50/50-M FB	0.8
96	Right sill strip reinforcing plate rear extension plate	DC51D+Z 50/50-M FB	1.4
97	Left sill strip reinforcing plate rear extension plate	DC51D+Z 50/50-M FB	1.4
98	Ceiling handle bracket	DC51D+Z 50/50-M FB	1.4
99	Mounting bracket for engine hood lock	HC260YD+Z	1.2

No.	Part name	Brand of galvanized sheet	Thickness (mm)
100	Center support plate left lower bracket of front bumper	DC51D+Z 50/50-M FB	1
101	Left bracket of lower front bumper	DC51D+Z 50/50-M FB	1.8
102	Right bracket of lower front bumper	DC51D+Z 50/50-M FB	1.8
103	Pedestrian protection upper beam middle bracket	DC51D+Z 50/50-M	1.2
104	Pedestrian protection upper beam right bracket	DC51D+Z 50/50-M	1.5
105	Pedestrian protection upper beam left bracket	DC51D+Z 50/50-M	1.5
106	Pedestrian protection upper beam	DC51D+Z 50/50-M	0.7
107	Front bumper center support plate right lower bracket	DC51D+Z 50/50-M FB	1
108	Front bumper lower side bracket	DC51D+Z 50/50-M	1.8
109	Front bumper lower middle right bracket	DC51D+Z 50/50-M FB	1.8
110	Front bumper lower middle left bracket	DC51D+Z 50/50-M FB	1.8
111	Front bumper center support plate	DC51D+Z 50/50-M FB	1
112	Front bumper supporting plate middle bracket	DC51D+Z 50/50-M FB	1.5
113	Bumper mounting beam right bracket	DC51D+Z 50/50-M FB	1.8
114	Bumper mounting beam left bracket	DC51D+Z 50/50-M FB	1.8
115	Harness bracket	DC51D+Z 50/50-M FB	1.2
116	Pillar A handle bracket	DC51D+Z 50/50-M FB	1.4
117	Left pillar B handle bracket	HC220YD+Z 50/50-M FB	2
118	Right pillar B handle bracket	HC220YD+Z 50/50-M FB	2
119	Glasses case bracket	DC51D+Z 50/50-M FB	1.4
120	Outer plate of front left door	DC53D+Z 50/50-M FD	0.7
121	Reinforcing plate of front left door lock	DC51D+Z 50/50-M FB	1.2
122	Outer plate of rear left door	DC53D+Z 50/50-M FD	0.7
123	Reinforcing plate of rear left door lock	DC51D+Z 50/50-M FB	1.2
124	Outer plate of front right door	DC53D+Z 50/50-M FD	0.7
125	Reinforcing plate of front right door lock	DC51D+Z 50/50-M FB	1.2

No.	Part name	Brand of galvanized sheet	Thickness (mm)
126	Outer plate of rear right door	DC53D+Z 50/50-M FD	0.7
127	Reinforcing plate of rear right door lock	DC51D+Z 50/50-M FB	1.2
128	Outer plate of engine hood	DC53D+Z 50/50-M FD	0.7
129	Inner plate of engine hood	DC53D+Z 50/50-M FB	0.6
130	Hasp holder for engine hood lock	DC51D+Z 50/50-M FB	1.2
131	The first beam of trunk	HC340LAD+Z 50/50-M FB	1.4
132	Outer plate of left side plate of trunk	DC56D+Z 50/50-M FD	0.8
133	Outer plate of right side plate of trunk	DC56D+Z 50/50-M FD	0.8
134	Connecting plate of outer plate and front plate on the right side of trunk	DC51D+Z 50/50-M FB	1
135	Trunk left side plate outer plate rear lower reinforcing plate	DC51D+Z 50/50-M FB	1.2
136	Trunk right side plate outer plate rear lower reinforcing plate	DC51D+Z 50/50-M FB	1.2
137	Fourth beam of trunk	HC340LAD+Z 50/50-M FB	1.6
138	Trunk left side outer plate and front plate connecting plate	DC51D+Z 50/50-M FB	1
139	Splash guard mounting bracket	DC51D+Z 50/50-M FB	1
140	Trunk tailboard	DC51D+Z 50/50-M FB	1
141	Trunk rear left column rear plate	HC220YD+Z 50/50-M	1.4
142	Trunk front plate upper beam left reinforcing plate	DC51D+Z 50/50-M FB	1.6
143	Trunk front plate upper beam right reinforcing plate	DC51D+Z 50/50-M FB	1.6
144	Trunk front plate upper beam	DC51D+Z 50/50-M	1.2
145	Splash guard mounting bracket	DC51D+Z 50/50-M FB	1
146	Side plate outer plate middle supporting plate reinforcing plate	DC51D+Z 50/50-M FB	2
147	Right side plate outer plate middle supporting plate	DC51D+Z 50/50-M FB	1.4
148	Left side plate outer plate middle supporting plate	DC51D+Z 50/50-M FB	1.4
149	Trunk tailboard supporting plate	DC51D+Z 50/50-M FB	1
150	Fourth beam supporting plate of trunk	DC51D+Z 50/50-M FB	1
151	Trunk right side plate outer plate front lower reinforcing plate	DC51D+Z 50/50-M FB	1.5

No.	Part name	Brand of galvanized sheet	Thickness (mm)
152	Trunk left side plate outer plate front lower reinforcing plate	DC51D+Z 50/50-M FB	1.5
153	Fuel filler fixing seat	DC56D+Z 50/50-M FB	0.8
154	Right side plate outer plate front supporting plate	DC51D+Z 50/50-M FB	1.5
155	Left side plate outer plate front supporting plate	DC51D+Z 50/50-M	1.5
156	Rear splash guard bracket	DC51D+Z 50/50-M FB	1
157	Trunk left side outer plate supporting plate reinforcing plate	DC51D+Z 50/50-M FB	1.6
158	Trunk right side outer plate supporting plate reinforcing plate	DC51D+Z 50/50-M FB	1.6
159	First/second beam connecting plate of trunk	DC51D+Z 50/50-M FB	1.4
160	Trunk front hanger bracket	DC51D+Z 50/50-M FB	1.4
161	Trunk middle hanger bracket	DC51D+Z 50/50-M FB	1.4
162	Trunk rear hanger bracket	DC51D+Z 50/50-M FB	1
163	Second beam connecting plate of trunk	DC51D+Z 50/50-M FB	1.6
164	Fourth beam left reinforcing plate of trunk	DC51D+Z 50/50-M FB	1.6
165	Fourth beam right reinforcing plate of trunk	DC51D+Z 50/50-M FB	1.6
166	Outer plate of rear plate of trunk	DC56D+Z 50/50-M FD	0.8
167	Inner plate of rear plate of trunk	DC56D+Z 50/50-M FB	0.8
168	Upper left connecting plate for inner plate of rear plate of trunk	DC51D+Z 50/50-M FB	1
169	Upper right connecting plate for inner plate of rear plate of trunk	DC51D+Z 50/50-M FB	1
170	Fuel filler connecting plate	DC51D+Z 50/50-M FB	1.2
171	Fuel filler outer plate	DC53D+Z 50/50-M FD	0.8
172	Fuel filler inner plate	HC220YD+Z 50/50-M FB	1.2

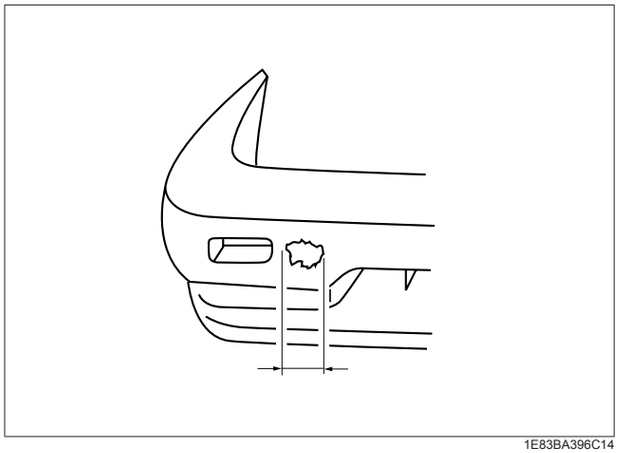
Repair of plastic parts

Repairable bumpers

Repairable bumpers

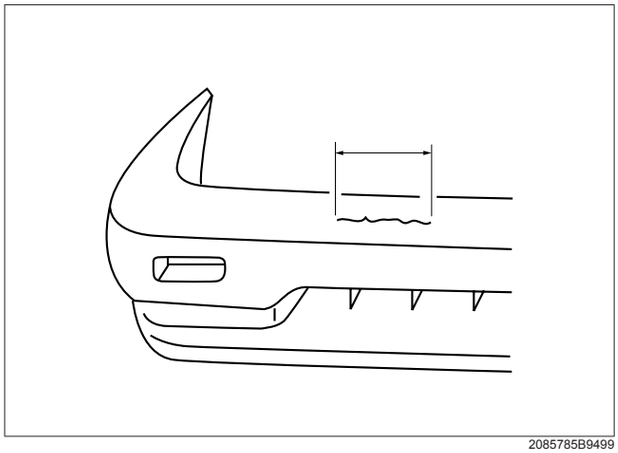
Bumpers of the three damage degrees below are considered as repairable. For the bumper damaged to a larger extent, it should be replaced with a new one because the appearance and quality will be impaired damaged after repair. In addition, such repair is not worthwhile considering maintenance man hours.

1. Bumper with a hole diameter less than 50 mm



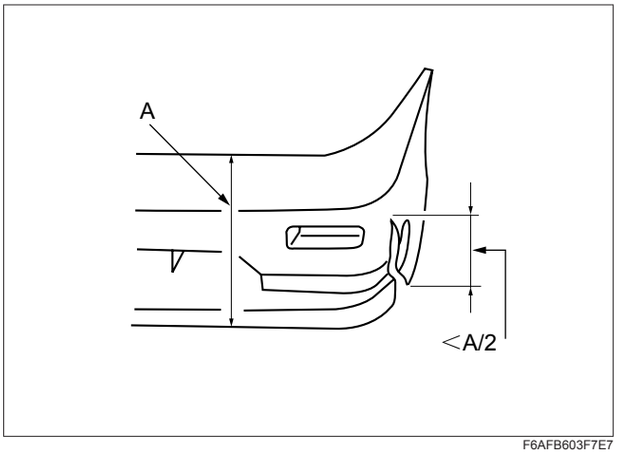
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2. Bumper with a crack length less than 100 mm



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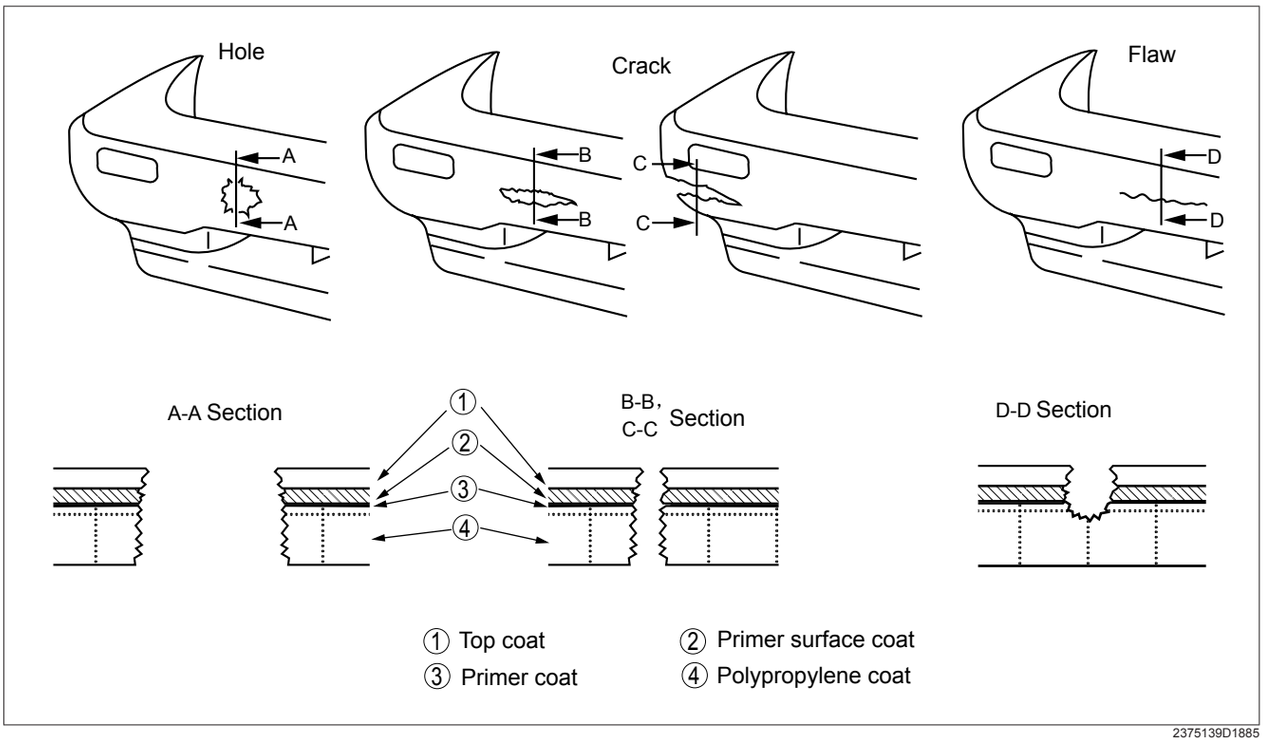
3. Bumper with a crack length less than 100 mm and less than half the bumper width



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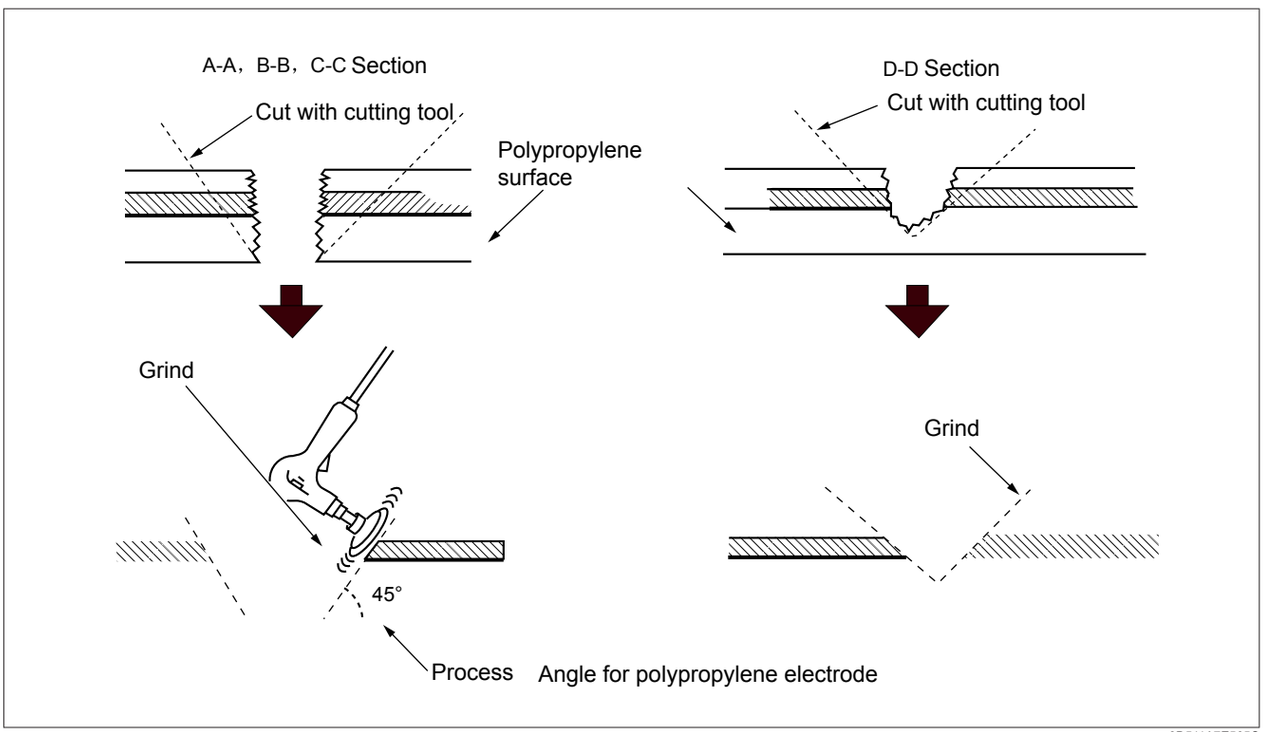
Repair procedure of bumpers

Removal



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1. Use a cutter to remove burrs around the damaged area to make it smooth. Grind the area with a grinder to make an angle of 45° or so.

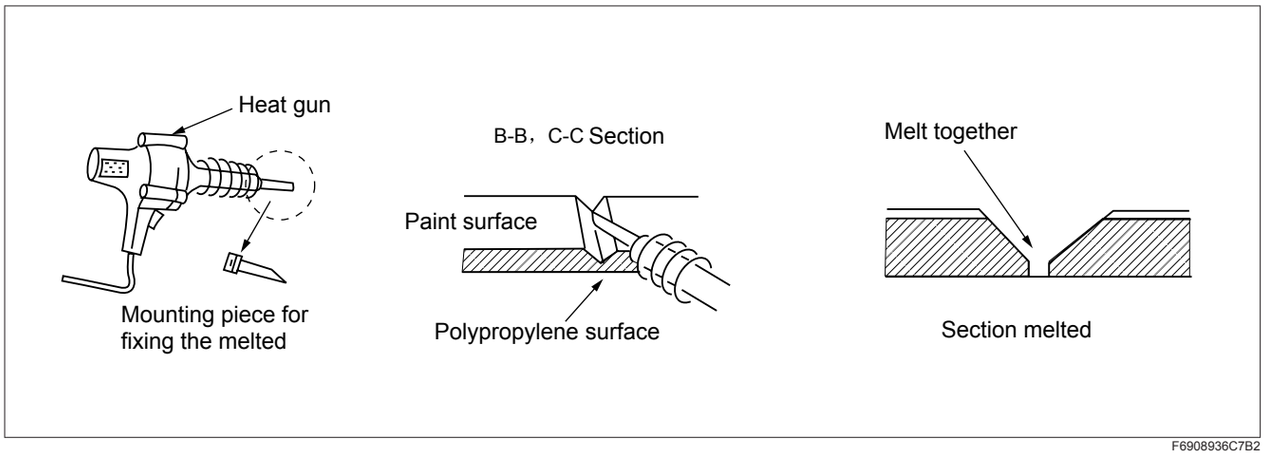


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2. Weld the damaged area

⚠ Caution

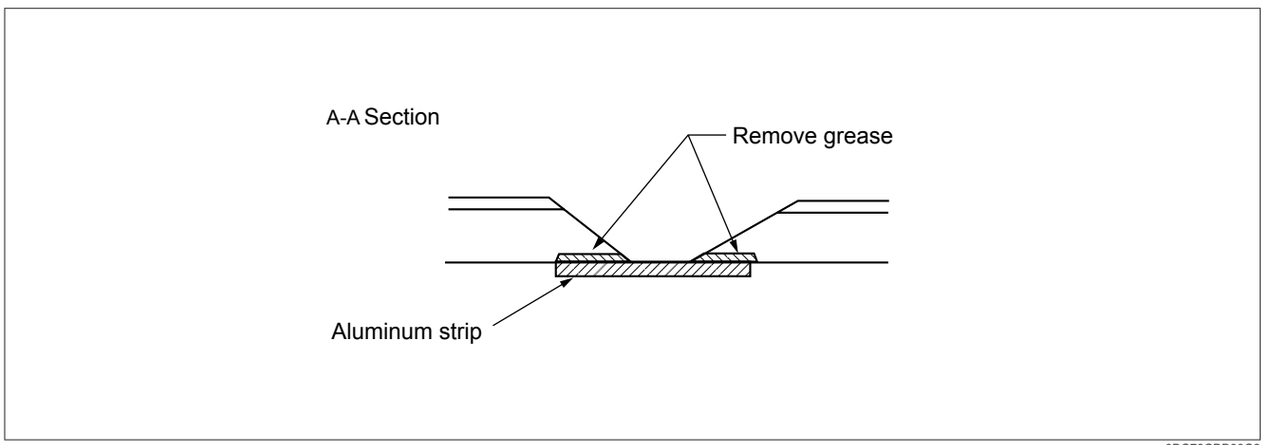
› For repair of the cracked area, fuse the crack together by using a heat gun and a melt.



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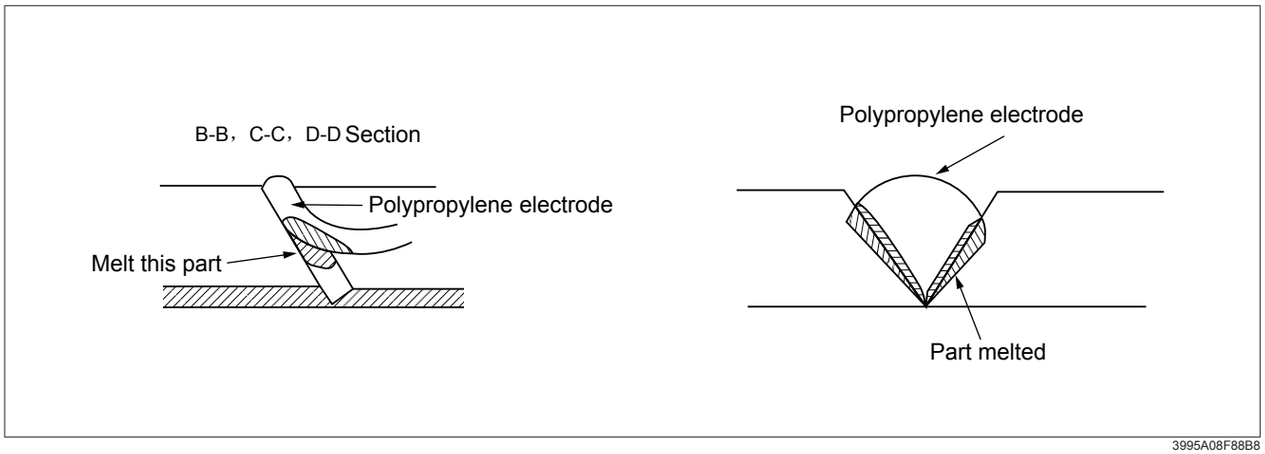
⚠ Caution

› For repair of the hole, Remove grease on both sides of the bumper, and apply an aluminum tape to the back side of the damaged area.



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3. Melt the polypropylene electrode with a heat gun to fill the crack.



3995A08F88B8

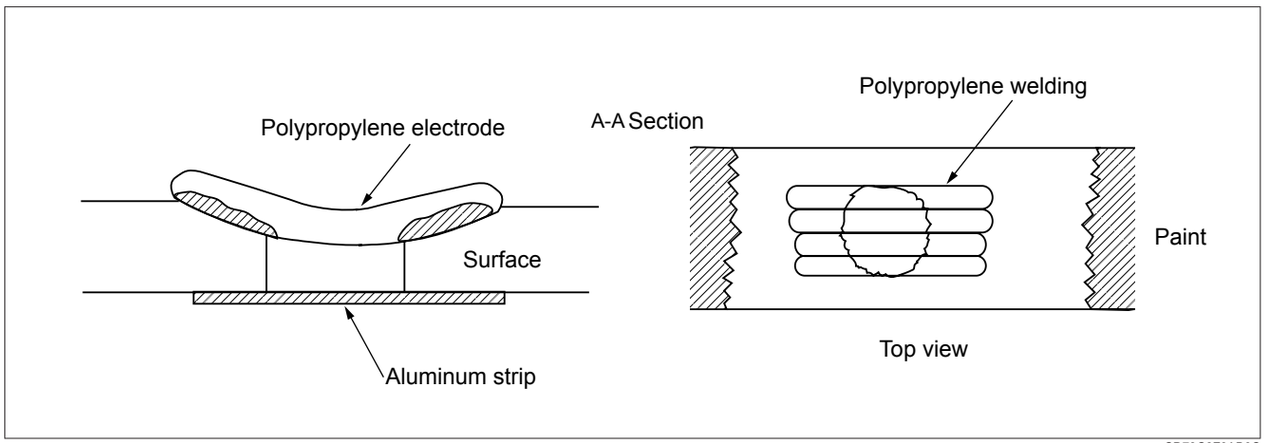
⚠ Caution

› Heat the shadow position to melt it.

› Be careful not to melt the electrode excessively. If the part is welded using a melted gel-like electrode, the weld strength will be decreased.

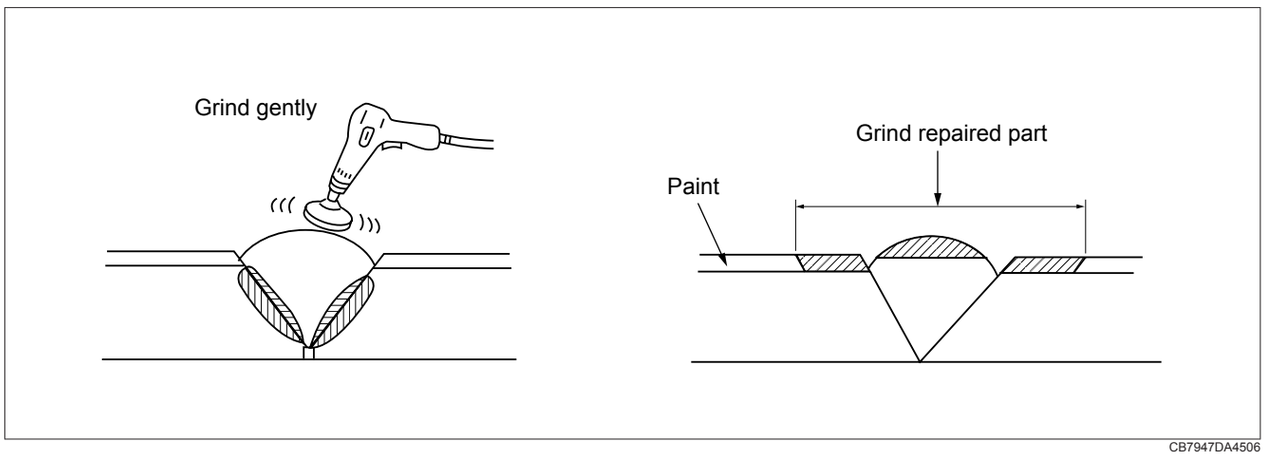
› Keep the heat gun at the position 10~20 mm from the welded part.

› Remove electrode when weldment becomes cool.



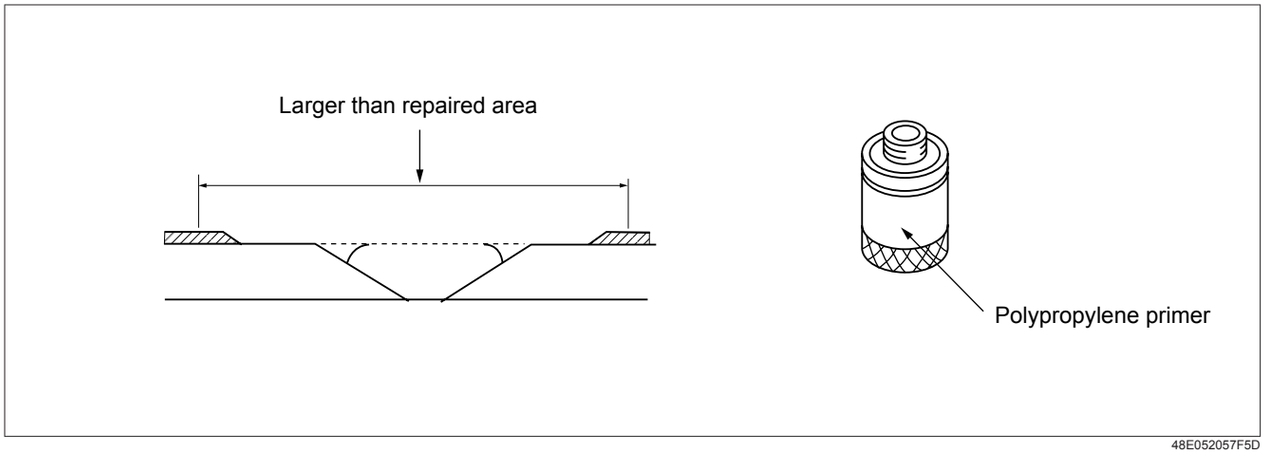
CD73C8F0AB0C

4. Gently polish the surface of the polypropylene, which is easy to melt it due to frictional heat, and polish the area where the repair agent is applied.



CB7947DA4506

5. Evenly apply polypropylene primer with a brush to the area larger than the repair part. Allow it to dry at 20°C for 10 min

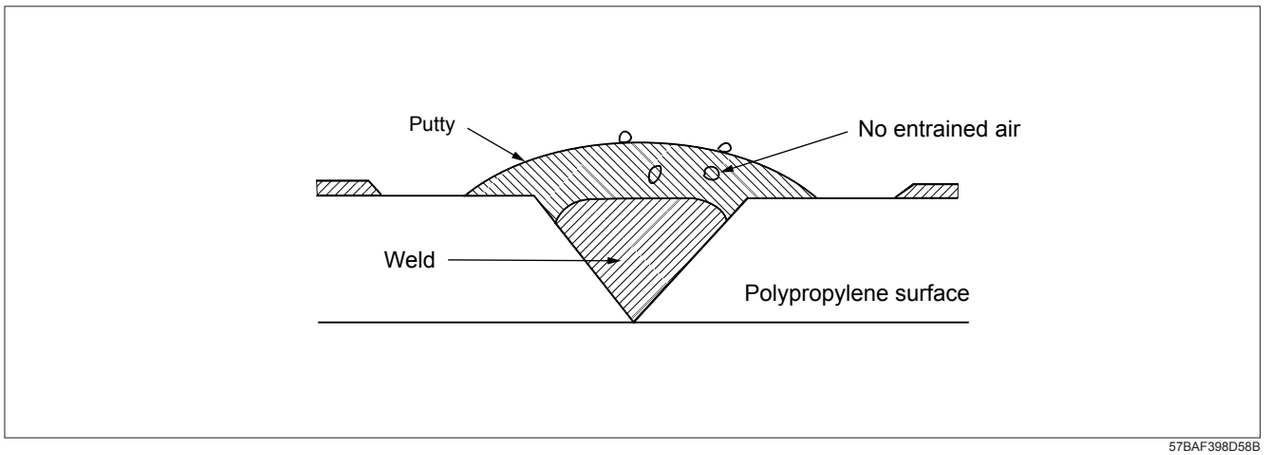


48E052057F5D

6. Brush putty

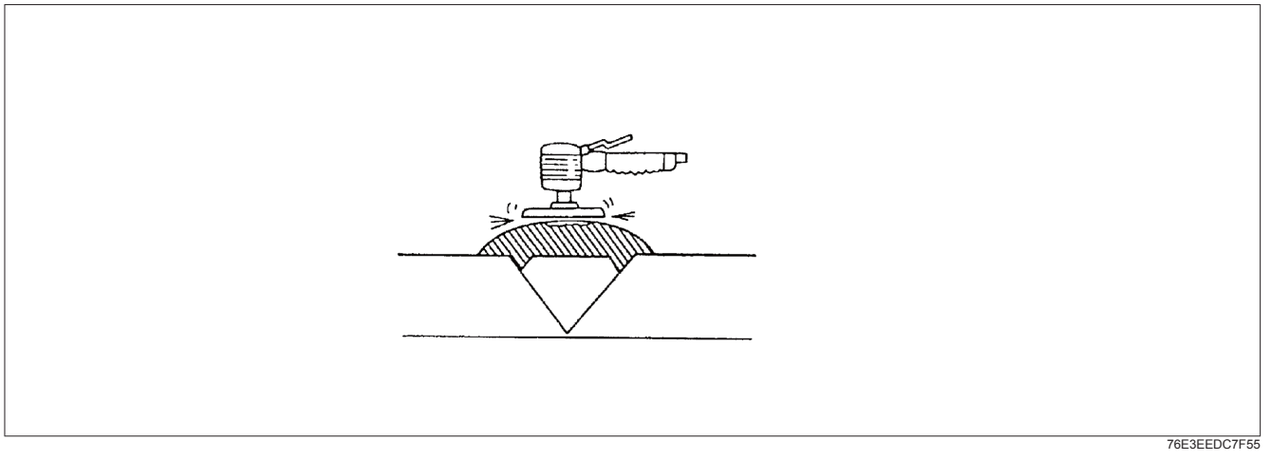
⚠ Caution

- Do not produce bubbles when mixing putty.
- The putty hardens quickly and should be used immediately after mixing.
- Allow it to dry at 20°C for 30 min before grinding.



57BAF398D58B

7. Polish the area with a suitable sandpaper, then blow, degrease and clean it

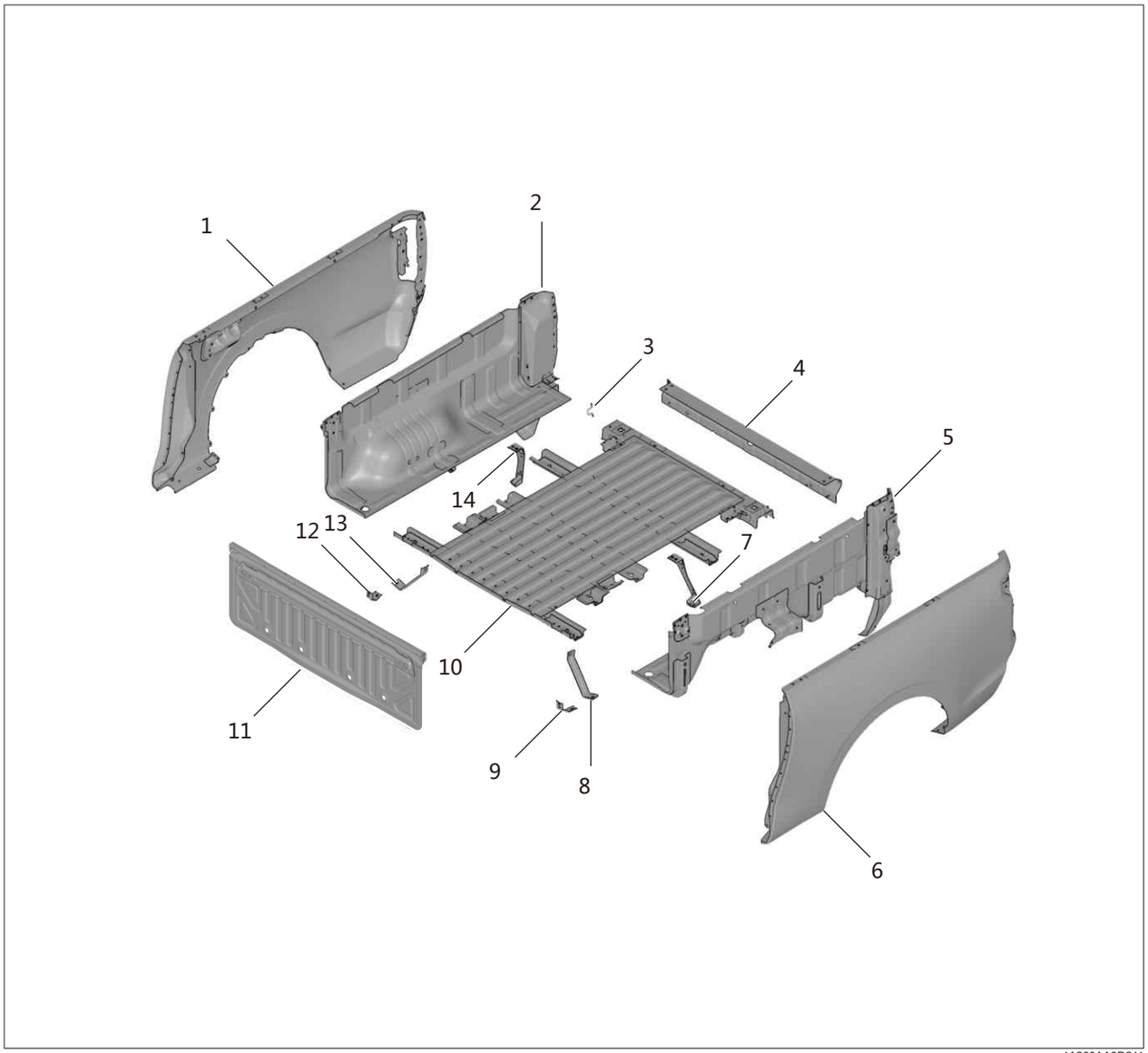


76E3EEDC7F55

8. Apply primer to the repair area and the bumper surface with a brush or spray gun
9. After drying, use sticky gauze to remove dust before spraying lacquer
10. Spray lacquer until the primer area is completely covered by lacquer
11. Air dry it at 20°C for 8 h at least

Explosive view of vehicle body

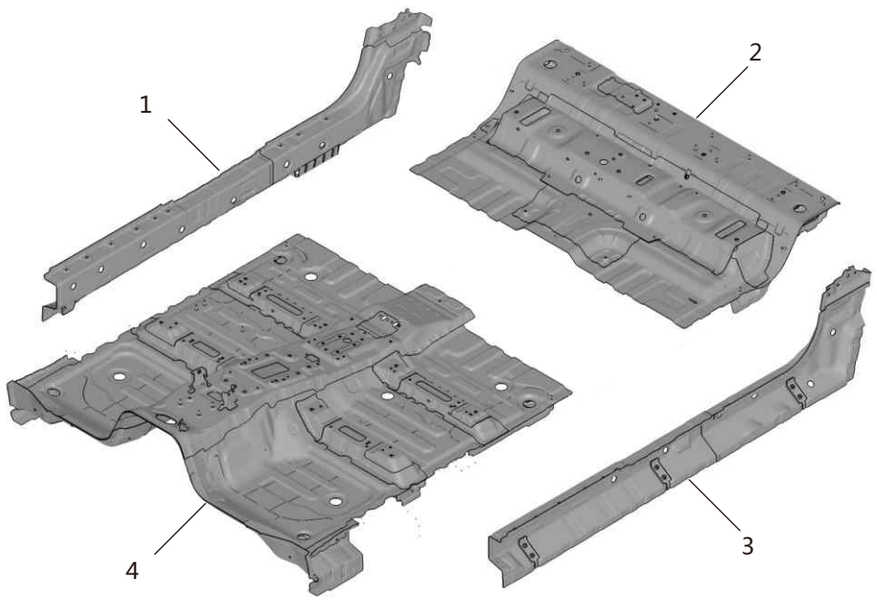
Cargo box



4A260AA3D211

1. Trunk right side plate outer plate assembly
2. Trunk right side plate inner plate assembly
3. Trunk hook
4. Trunk tailboard
5. Trunk left side plate inner plate assembly
6. Trunk left side plate outer plate assembly
7. Left side plate outer plate middle supporting plate assembly
8. Left side plate outer plate front supporting plate welding
9. Trunk left side plate outer plate front lower reinforcing plate welding
10. Trunk floor assembly
11. Trunk front plate assembly
12. Trunk right side plate outer plate front lower reinforcing plate welding
13. Right side plate outer plate front supporting plate welding
14. Right side plate outer plate middle supporting plate assembly

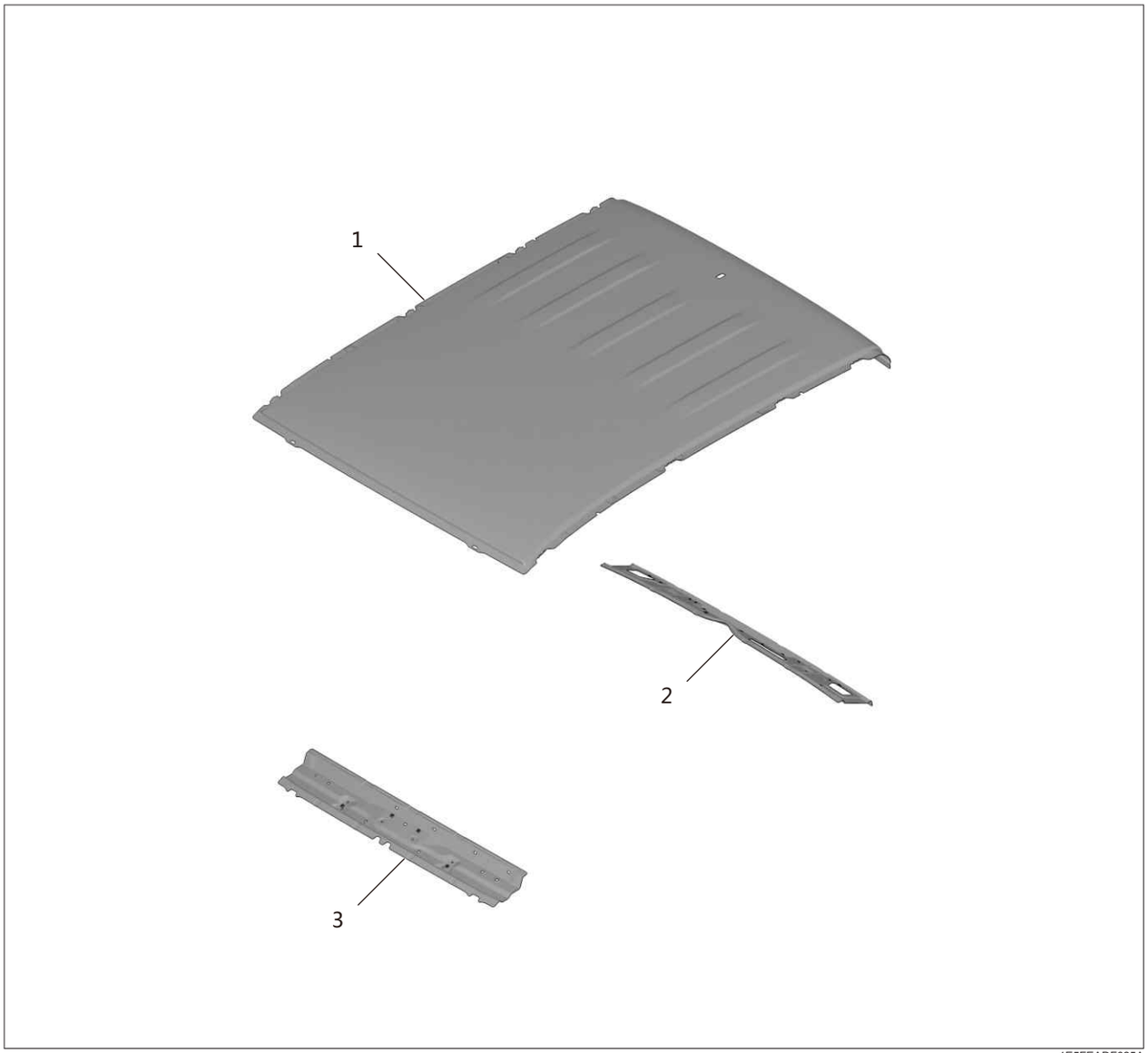
Floor



3632A24509C5

1. Right sill strip assembly
2. Rear floor assembly
3. Left sill strip assembly
4. Front floor assembly

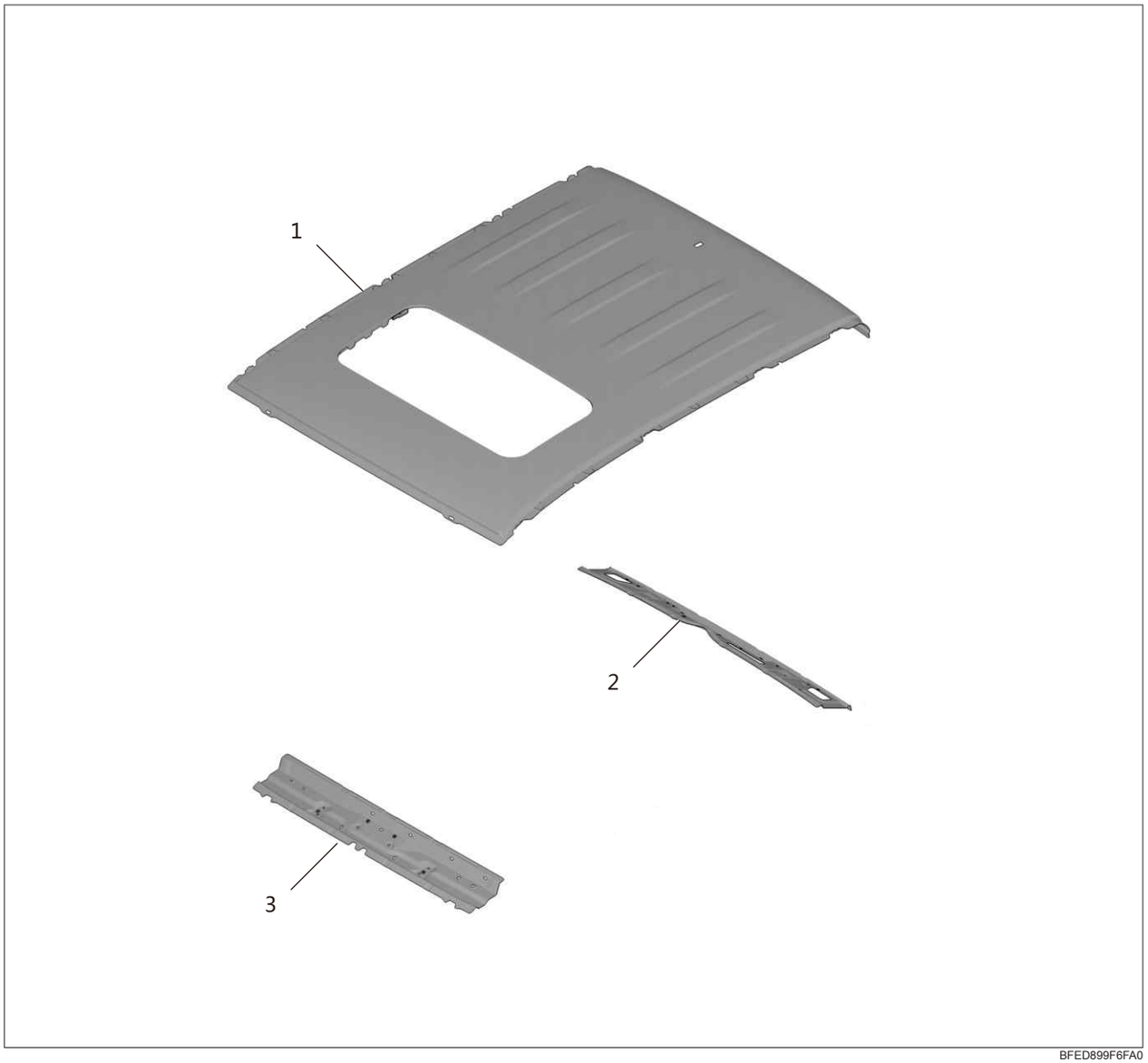
Roof



1E5FEADF625A

1. Roof assembly
2. Roof rear beam assembly
3. Roof front beam assembly

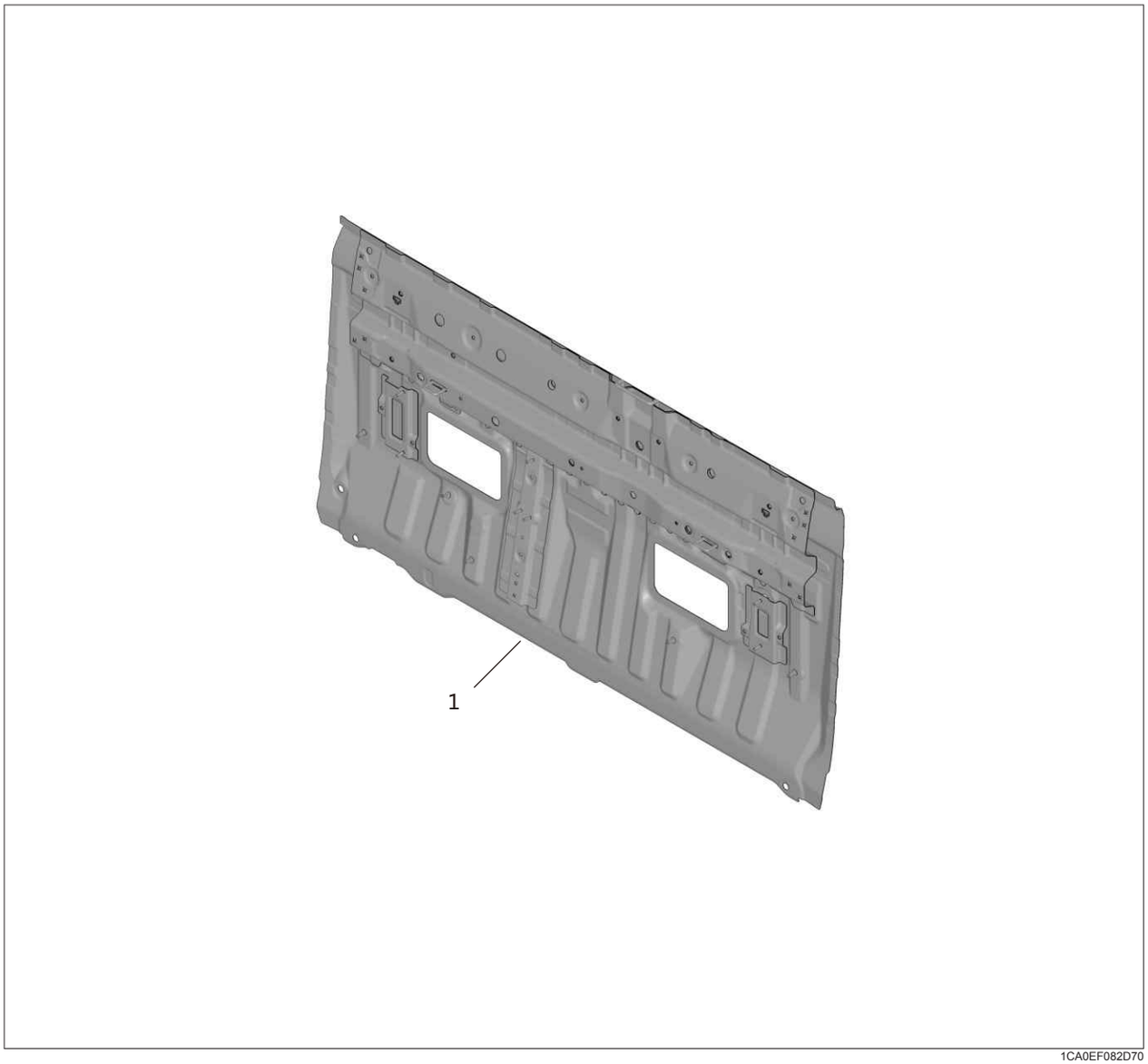
Roof (sunroof version)



BFED899F6FA0

1. Roof assembly
2. Roof rear beam assembly
3. Roof front beam assembly

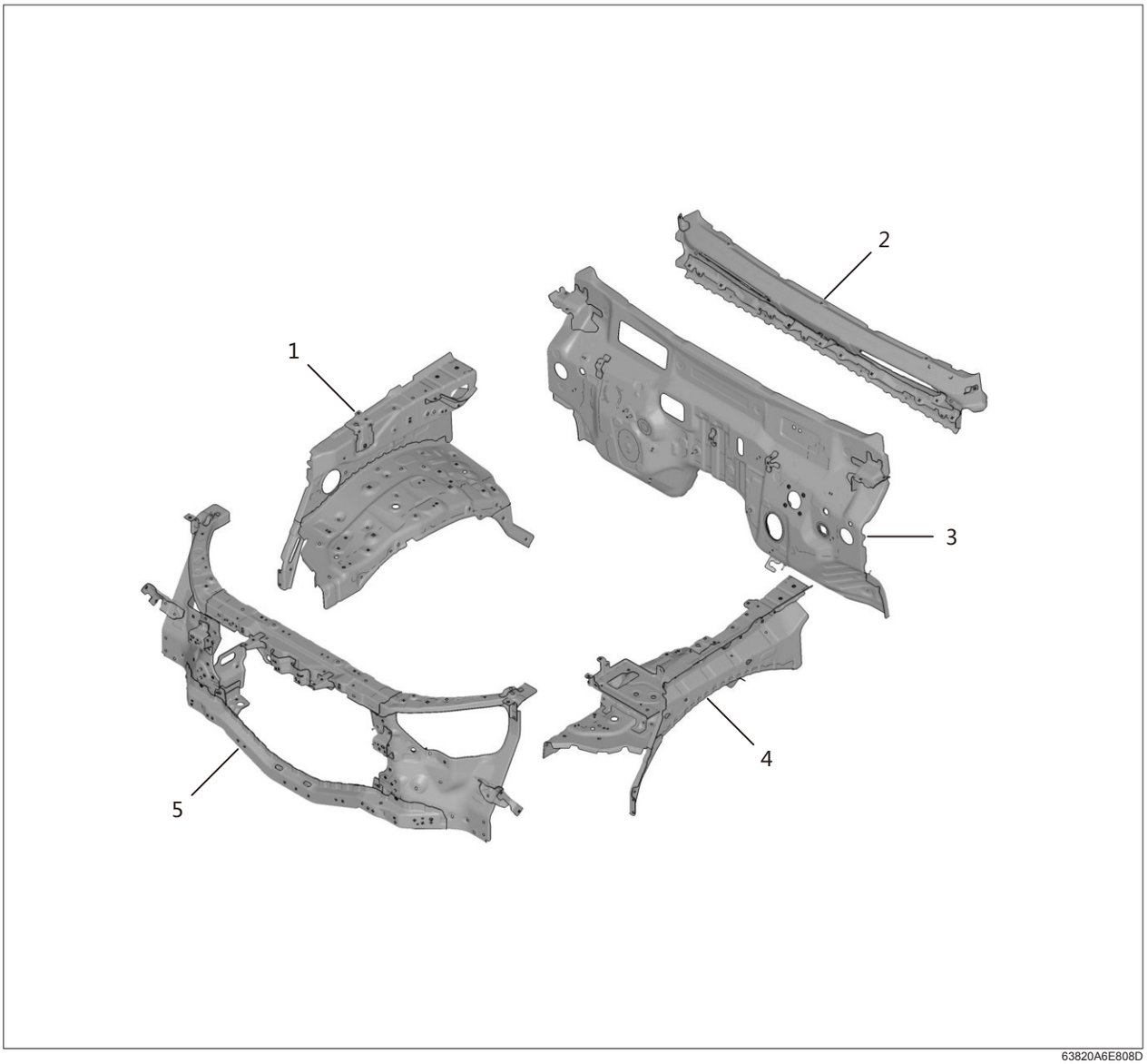
Rear wall



1CA0EF082D70

1. Rear wall assembly

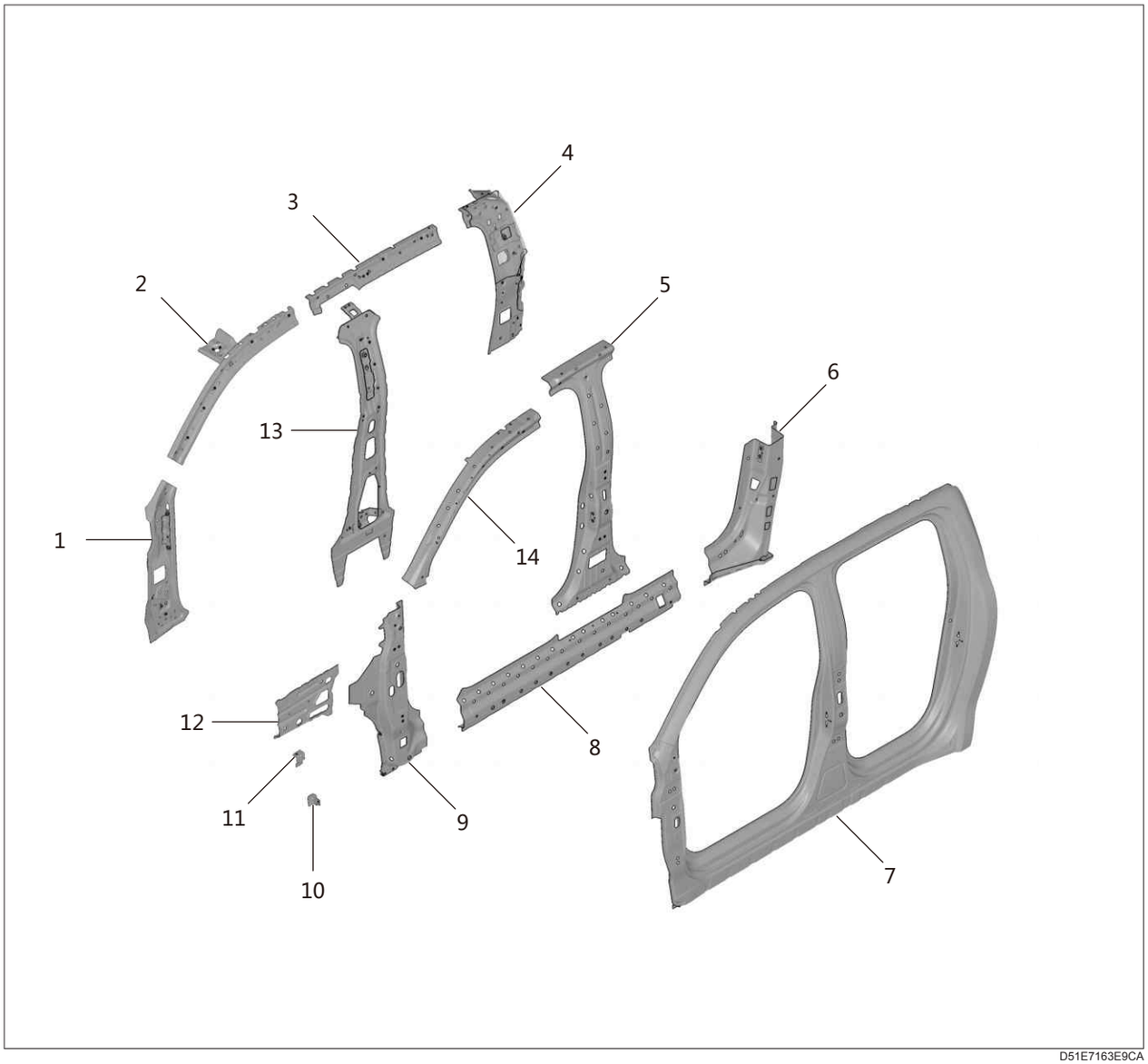
Engine compartment



63820A6E808D

1. Front right wheel cover assembly
2. Front windshield lower beam assembly
3. Front wall assembly
4. Front left wheel cover assembly
5. Radiator frame assembly

Left side wall

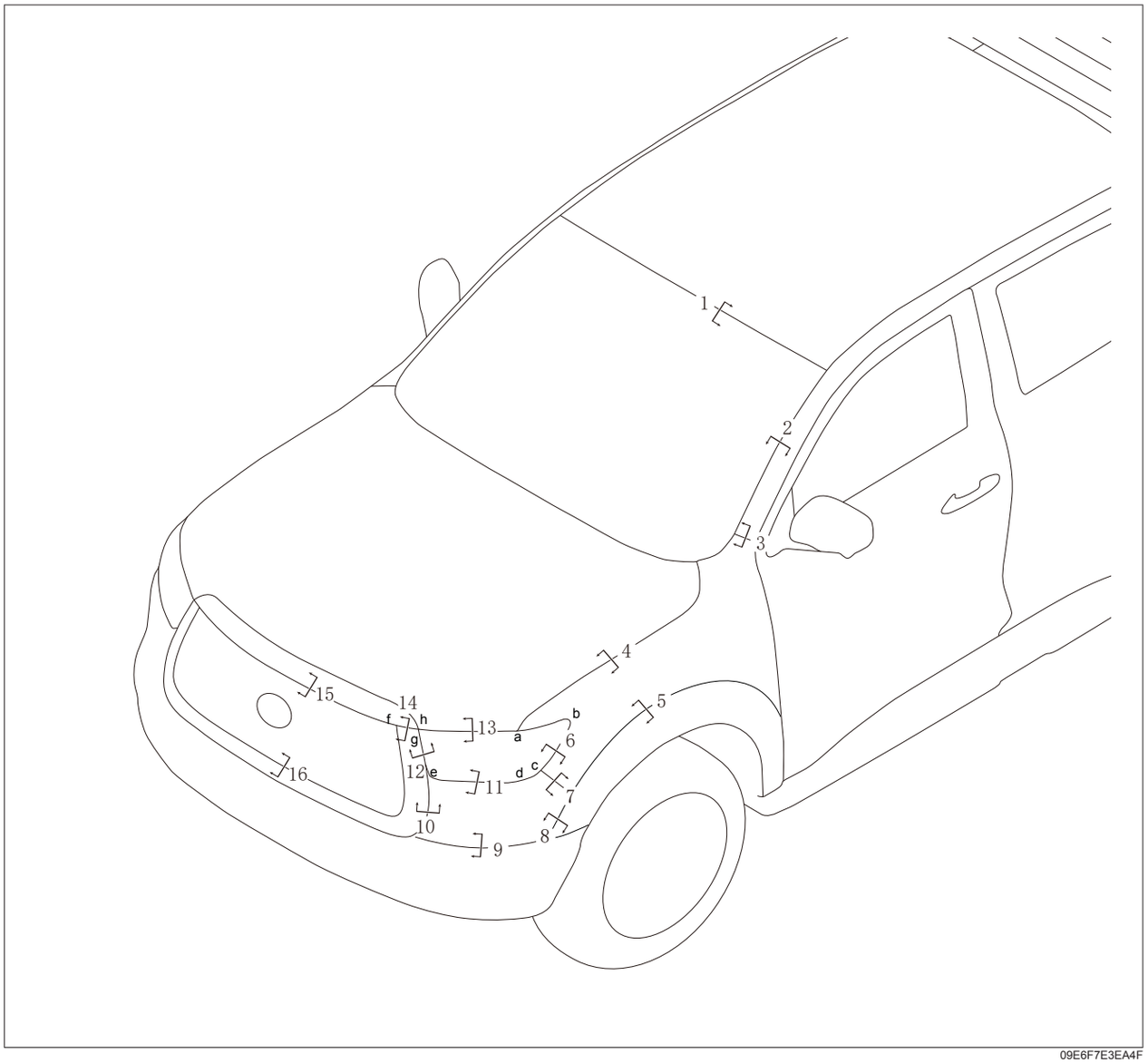


D51E7163E9CA

1. Pillar A lower left section inner plate assembly
2. Pillar A upper left section inner plate assembly
3. Upper left boundary beam inner plate welding
4. Left pillar C inner plate and reinforcing plate assembly
5. Left pillar B reinforcing plate assembly
6. Left pillar C reinforcing plate lower section assembly
7. Left side wall outer board
8. Reinforcing plate of left threshold
9. Reinforcing plate assembly of lower section of left pillar A
10. Left fender rear upper mounting bracket assembly
11. Front fender rear middle mounting bracket welding
12. Left side beam and side wall connecting plate
13. Left B-pillar inner plate assembly
14. Reinforcing plate of upper section of left pillar A

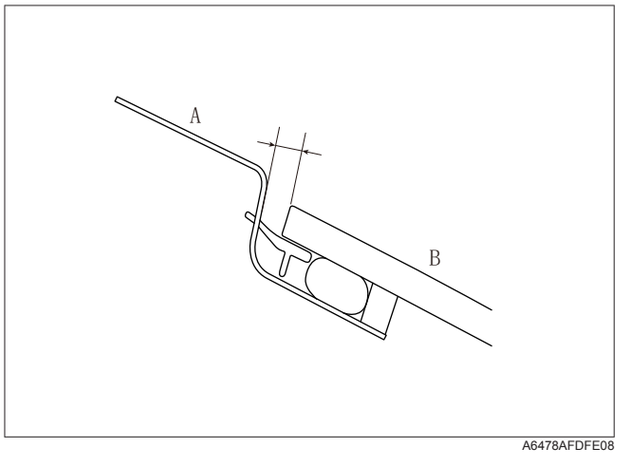
Standard clearance

Front part of vehicle body



09E6F7E3EA4F

Sectional view of front body

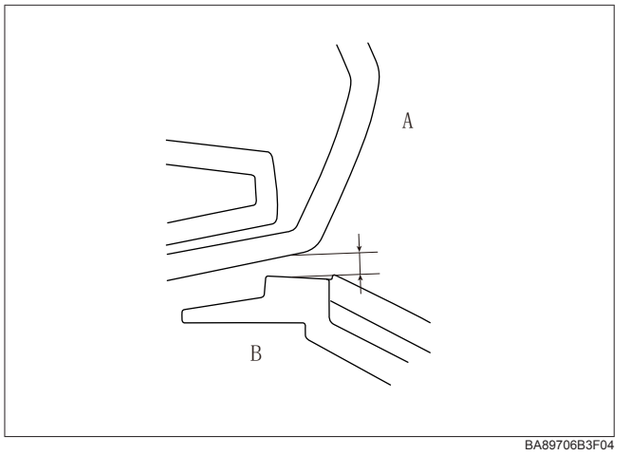


A6478AFDFE08

S/N	Measurements (mm)	Re-marks
1	5.0±1.5	—

› A: top cover

› B: front windshield

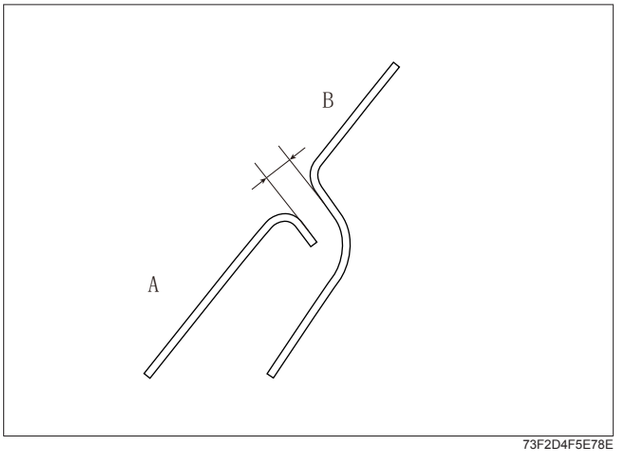


BA89706B3F04

S/N	Measurements (mm)	Re-marks
2	5.0±1.5	—

› A: side wall

› B: front windshield

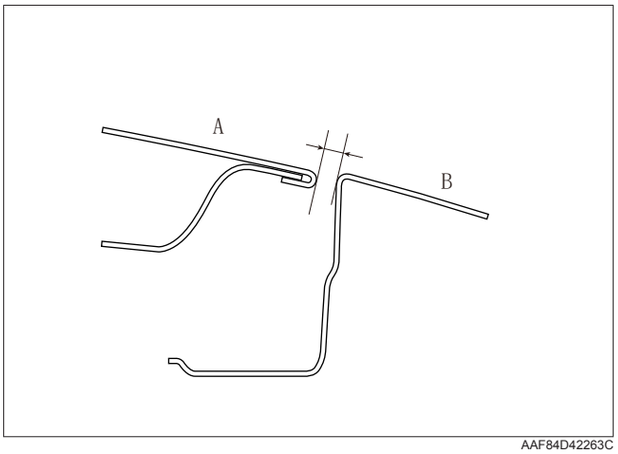


73F2D4F5E78E

S/N	Measurements (mm)	Re-marks
3	2.5±1.0	—

› A: fender

› B: side wall

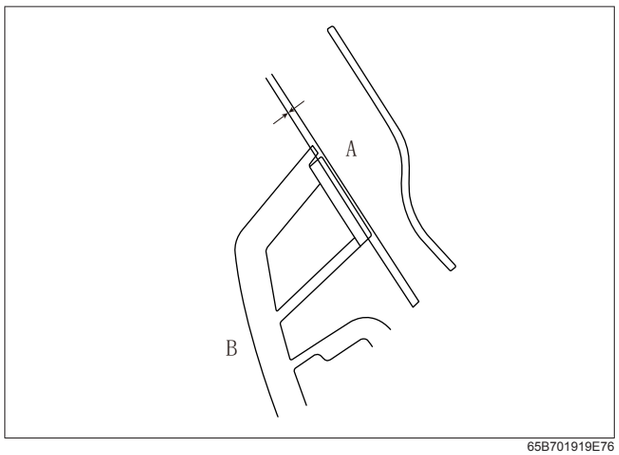


AAF84D42263C

No.	Measurements (mm)	Re-marks
4	(3.3~4.0)±1.0	—

› A: engine hood

› B: fender

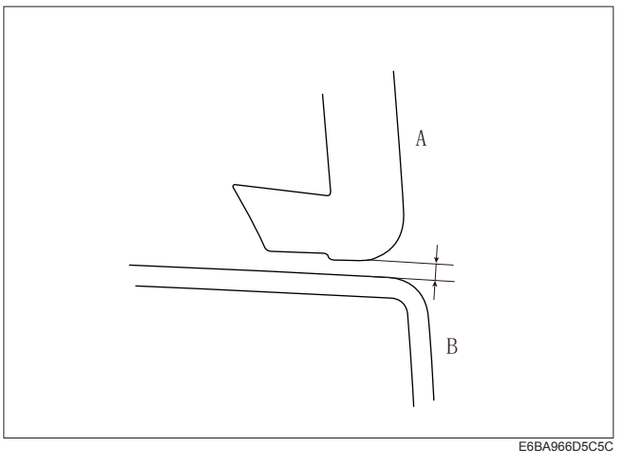


65B701919E76

S/N	Measurements (mm)	Remarks
5	0~0.5	—

› A: fender

› B: front wheel arch

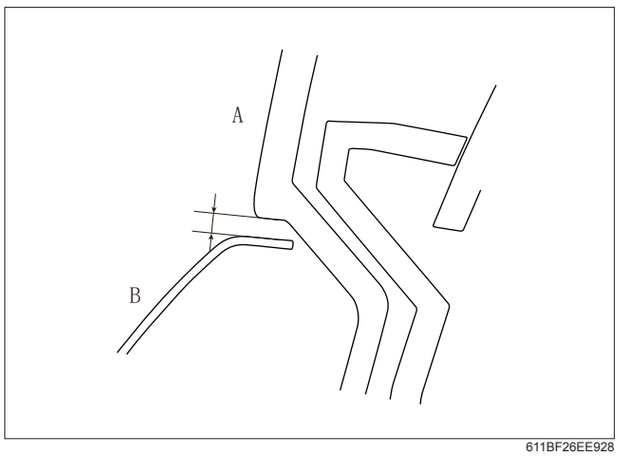


E6BA966D5C5C

S/N	Measurements (mm)	Remarks
7	0~0.7	c-d

› A: upper trim plate of front bumper

› B: fender

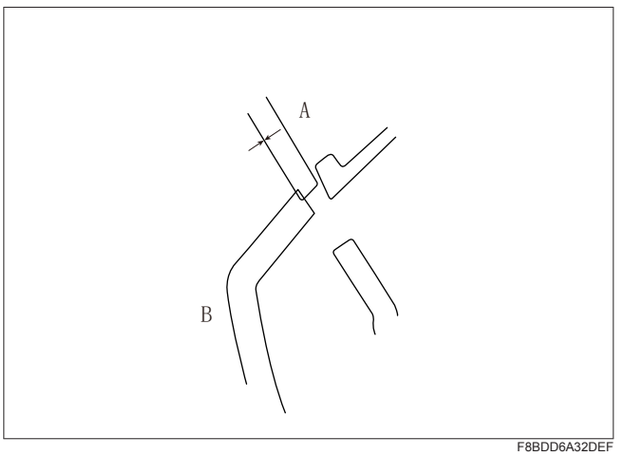


611BF26EE928

S/N	Measurements (mm)	Remarks
6	1.5±1.0	—

› A: front headlamp assembly

› B: fender

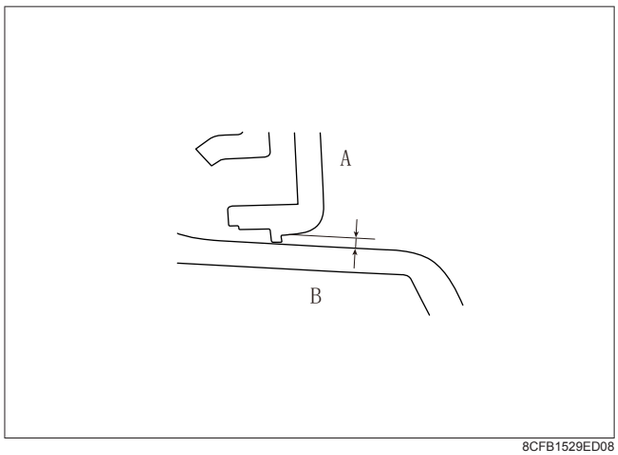


F8BDD6A32DEF

S/N	Measurements (mm)	Remarks
8	0~0.5	—

› A: upper trim plate of front bumper

› B: front wheel arch

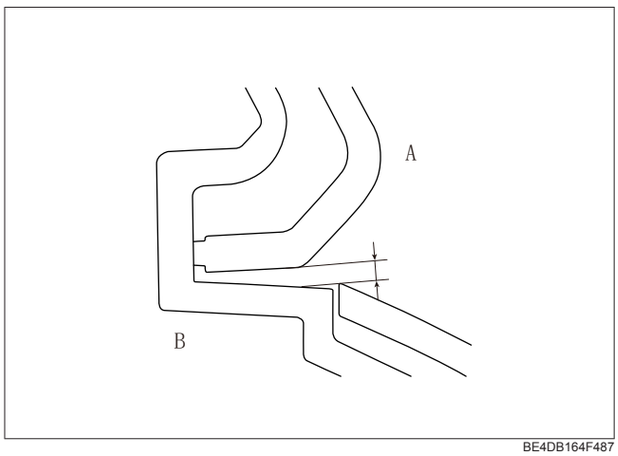


8CFB1529ED08

S/N	Measurements (mm)	Re-marks
9	1.0±0.5	—

› A: upper trim plate of front bumper

› B: front bumper

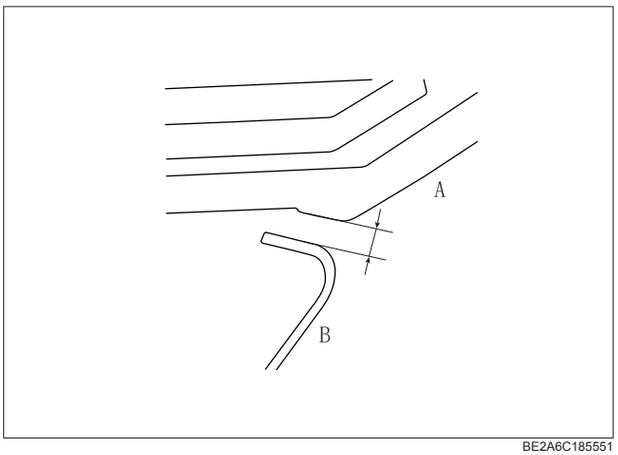


BE4DB164F487

S/N	Measurements (mm)	Re-marks
10	1.5±0.5	—

› A: upper trim plate of front bumper

› B: grille body

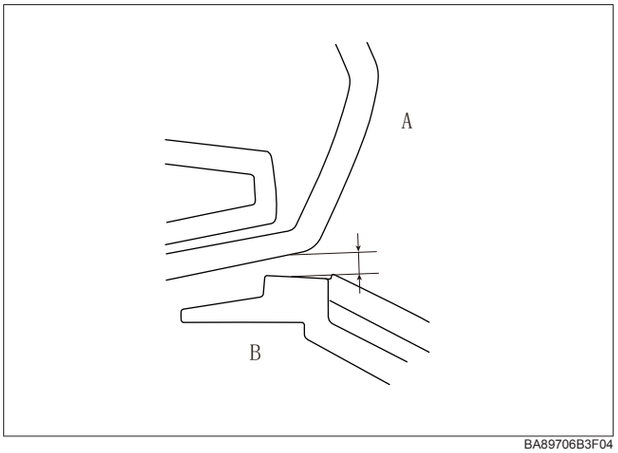


BE2A6C185551

No.	Measurements (mm)	Re-marks
11	2.0±1.0	d-e
	(1.5~2.0)±1.0	c-d

› A: front headlamp assembly

› B: upper trim plate of front bumper

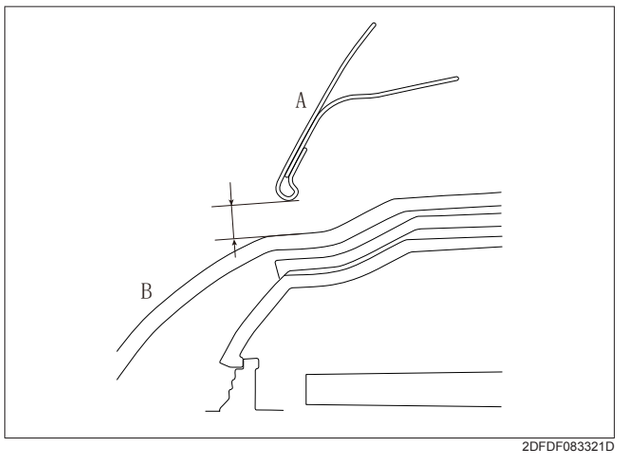


BA89706B3F04

No.	Measurements (mm)	Re-marks
12	2.5±1.3	—

› A: front headlamp assembly

› B: grille body

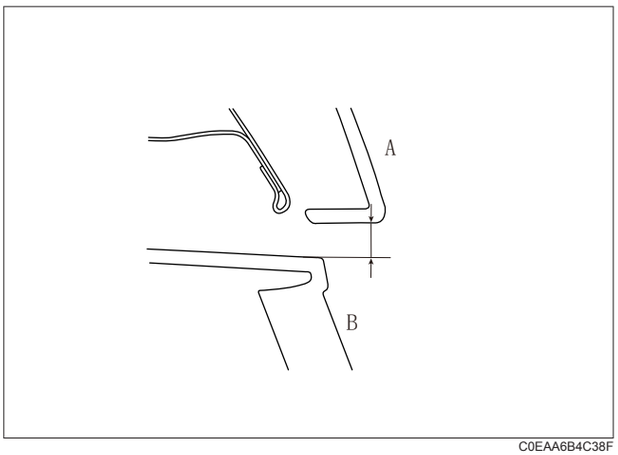


2DFDF083321D

No.	Measurements (mm)	Remarks
13	6.5±1.5	—

› A: engine hood

› B: front headlamp assembly

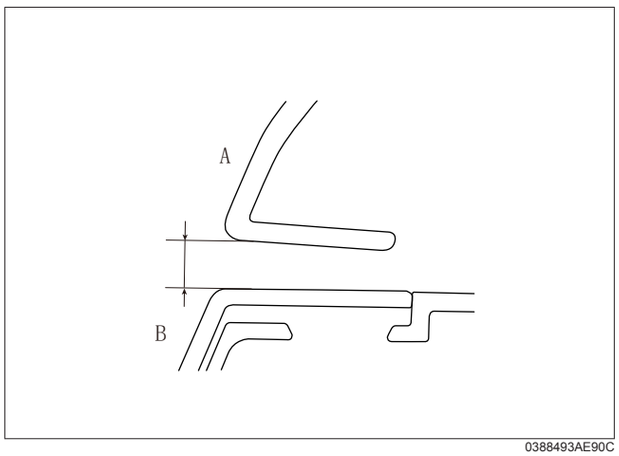


C0EAA6B4C38F

No.	Measurements (mm)	Remarks
15	7.1±2.0	—

› A: bright strip of engine hood

› B: grille body

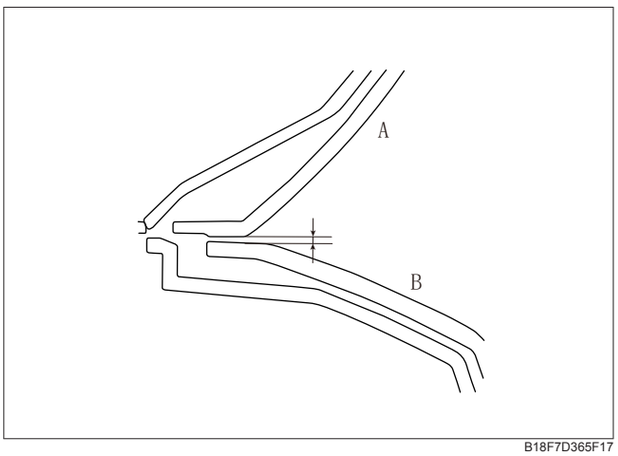


0388493AE90C

S/N	Measurements (mm)	Remarks
14	7.5±2.0	—

› A: bright strip of engine hood

› B: decorative frame of grille



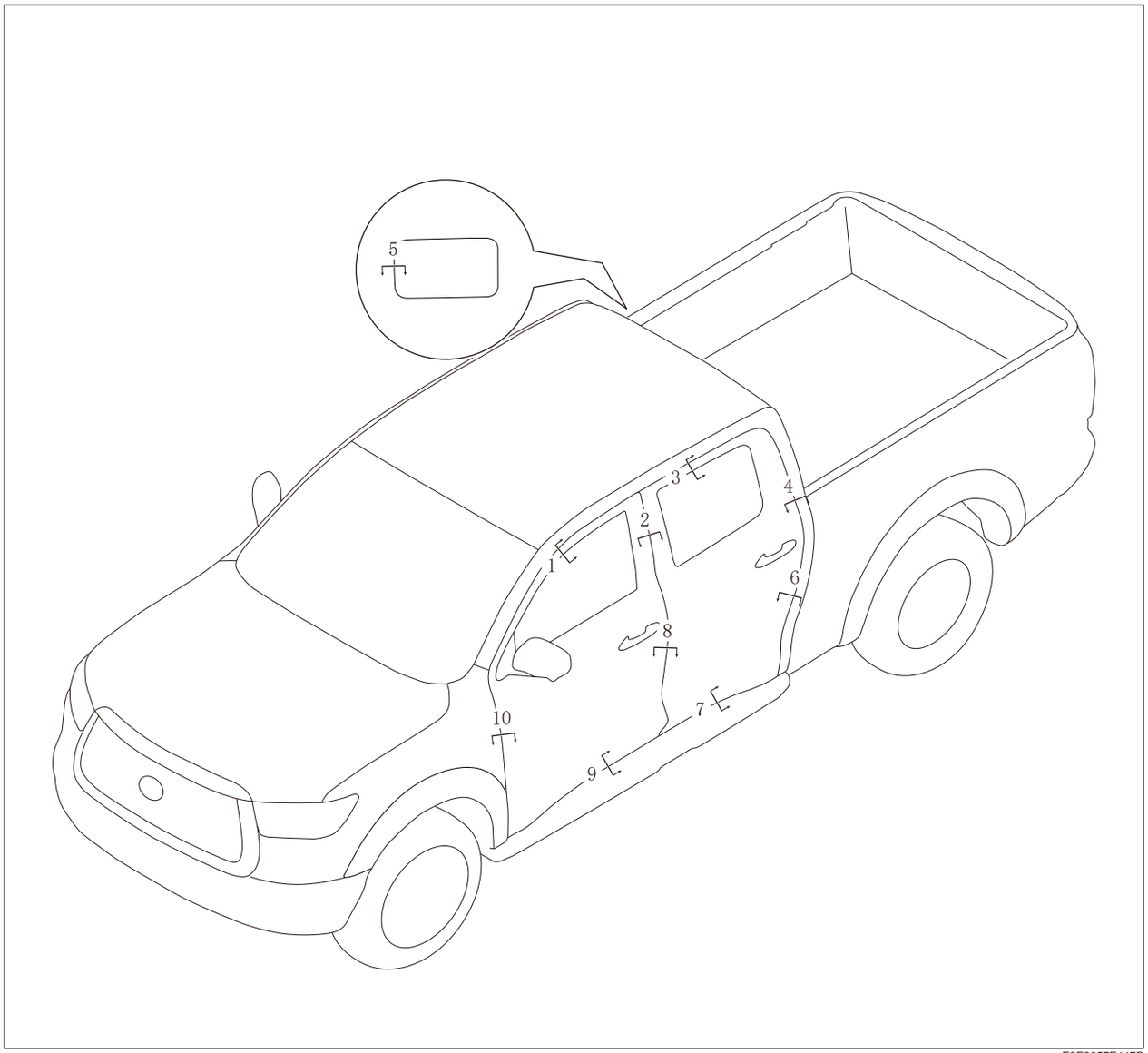
B18F7D365F17

No.	Measurements (mm)	Remarks
16	1.0±0.5	—

› A: decorative frame of grille

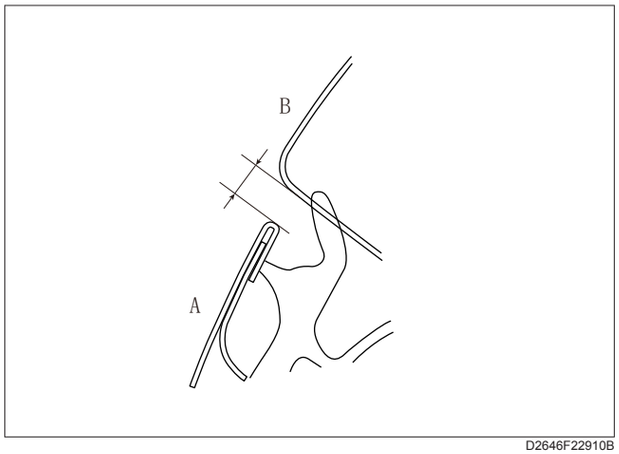
› B: front bumper

Side face of vehicle body



E3E0057E447B

Sectional view of side body

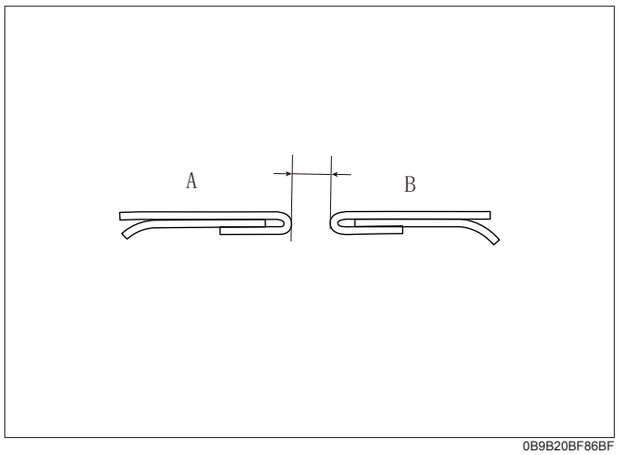


D2646F22910B

S/N	Measurements (mm)	Re-marks
1	4.0±1.0	—

› A: upper window frame of front door

› B: side wall outer plate

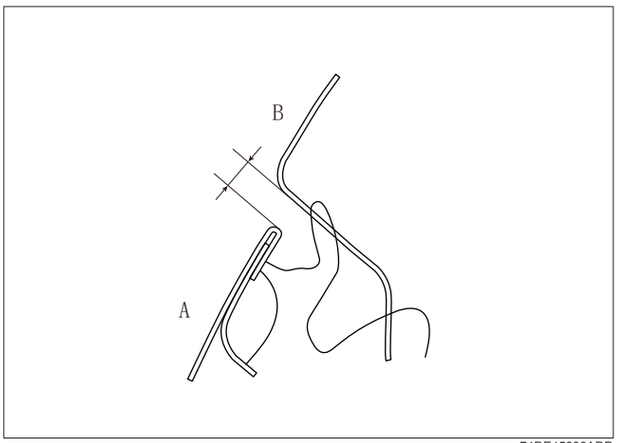


0B9B20BF86BF

S/N	Measurements (mm)	Re-marks
2	4.0±1.0	—

› A: front door rear window frame

› B: rear door front window frame

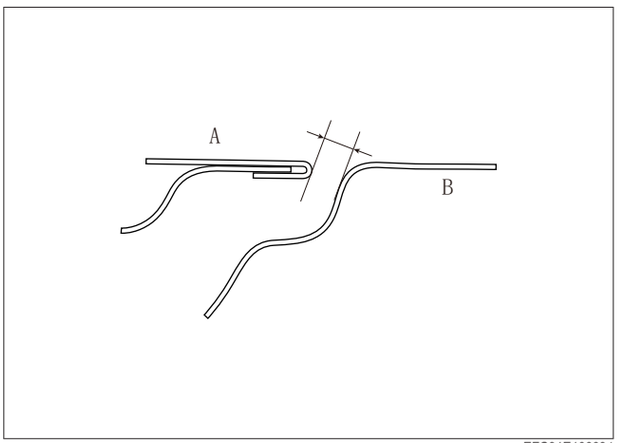


74DE45836ADD

No.	Measurements (mm)	Re-marks
3	4.0±1.0	—

› A: upper window frame of rear door

› B: side wall outer plate

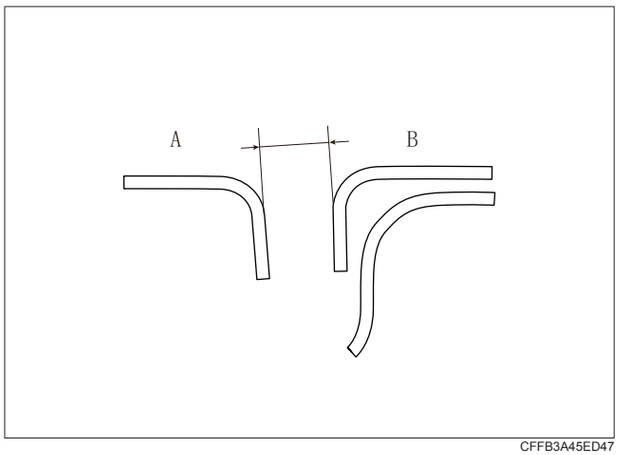


EFC91E106694

S/N	Measurements (mm)	Re-marks
4	4.0±1.0	—

› A: outer plate of rear door

› B: side wall outer plate

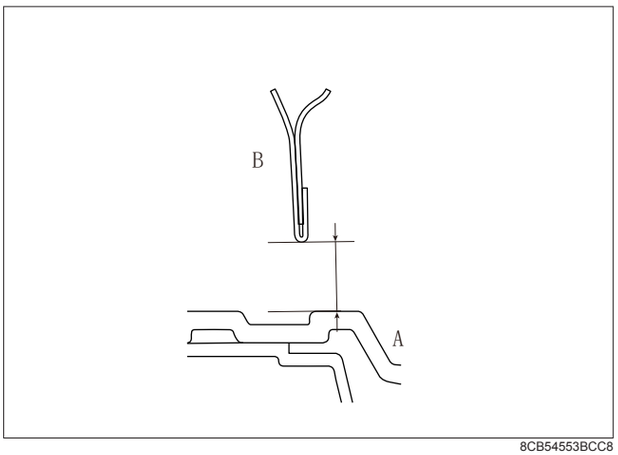


CFFB3A45ED47

S/N	Measurements (mm)	Re-marks
5	3.0±0.5	—

› A: fuel filler cap

› B: outer plate of side plate of trunk

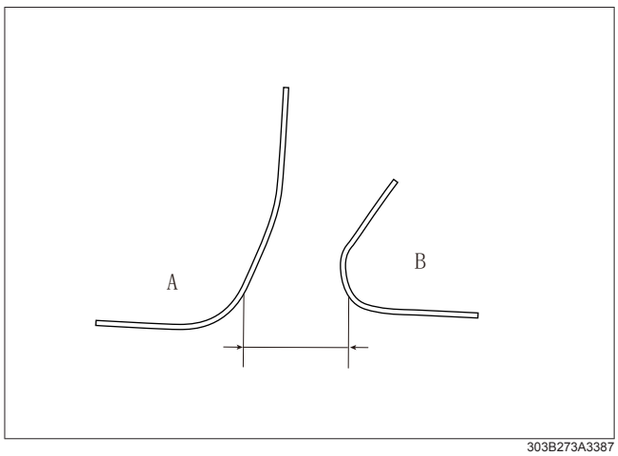


8CB54553BCC8

No.	Measurements (mm)	Re-marks
7	10±2.5	—

› A: side footboard

› B: outer plate of rear door

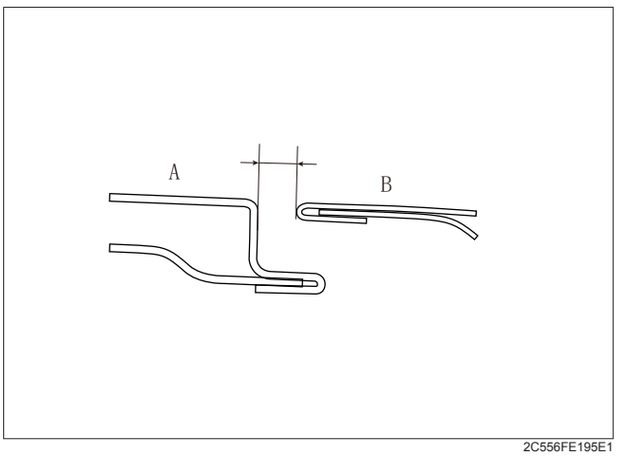


303B273A3387

No.	Measurements (mm)	Re-marks
6	(19.4~17.5)±5	s-t
	17.5±5	t-u

› A: side wall outer plate

› B: outer plate of side plate of trunk

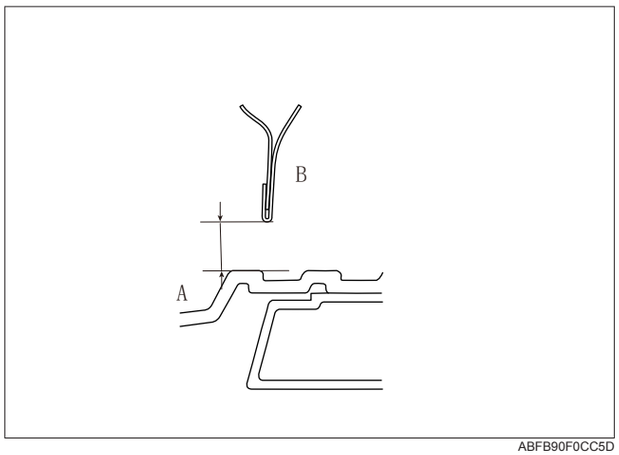


2C556FE195E1

S/N	Measurements (mm)	Re-marks
8	4.0±1.0	—

› A: outer plate of rear door

› B: outer plate of front door

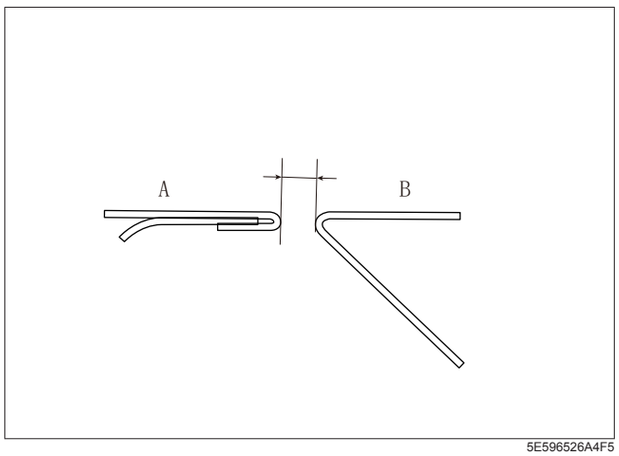


ABFB90F0CC5D

S/N	Measurements (mm)	Remarks
9	10±2.5	—

› A: side footboard

› B: outer plate of front door



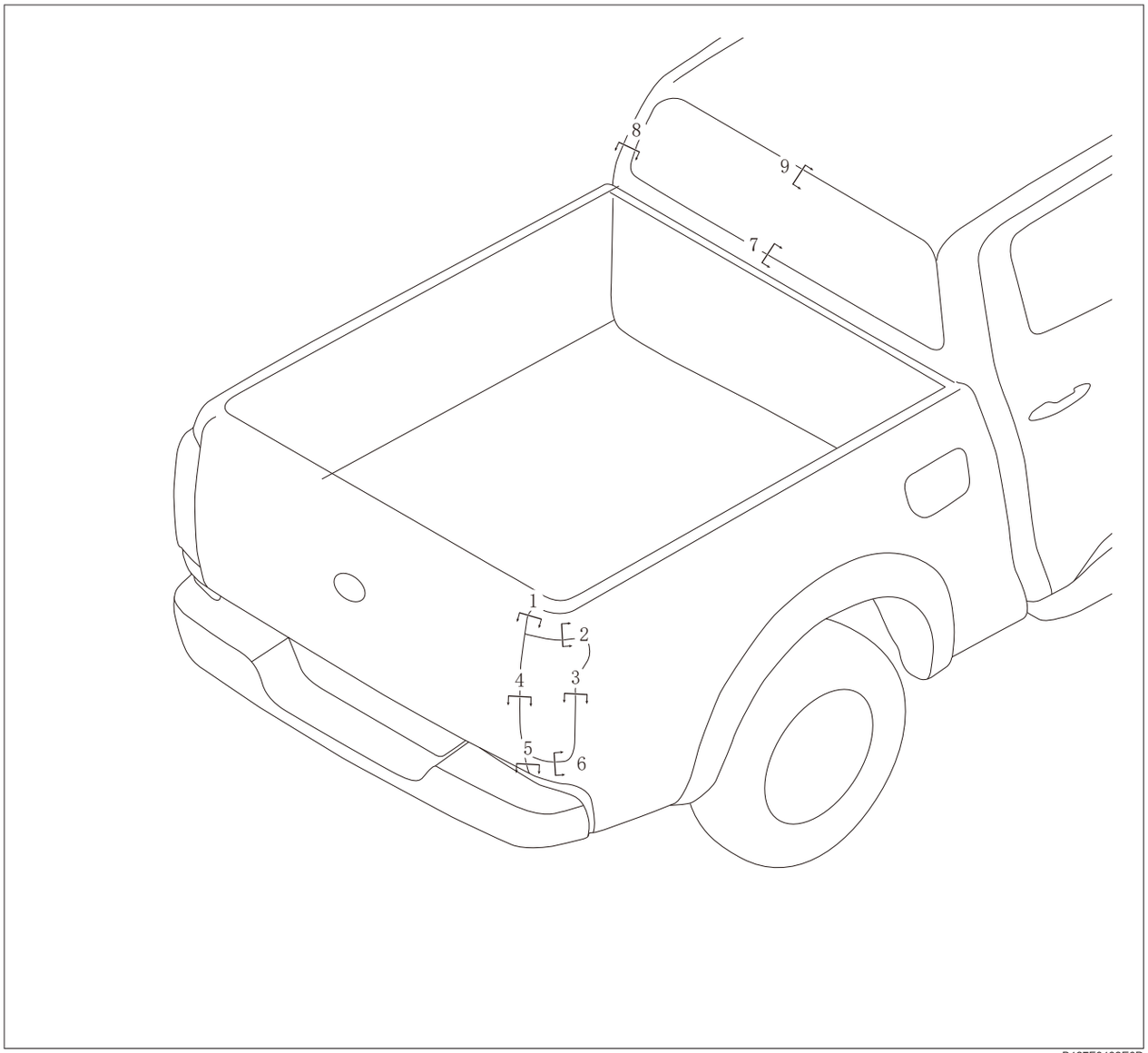
5E596526A4F5

S/N	Measurements (mm)	Remarks
10	4.0±1.0	—

› A: outer plate of front door

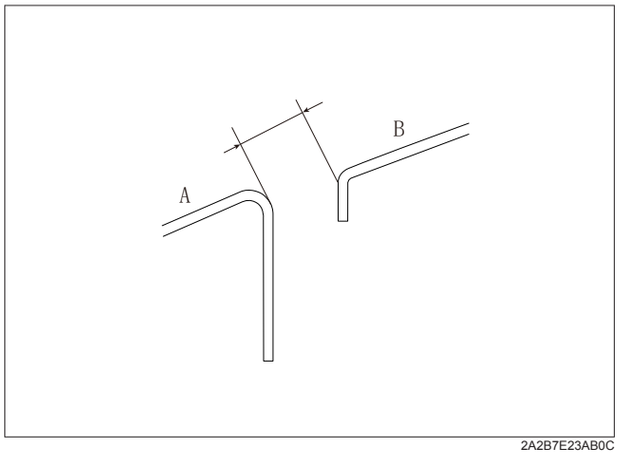
› B: fender

Rear part of vehicle body



B427F8482E6D

Sectional View of Rear Body

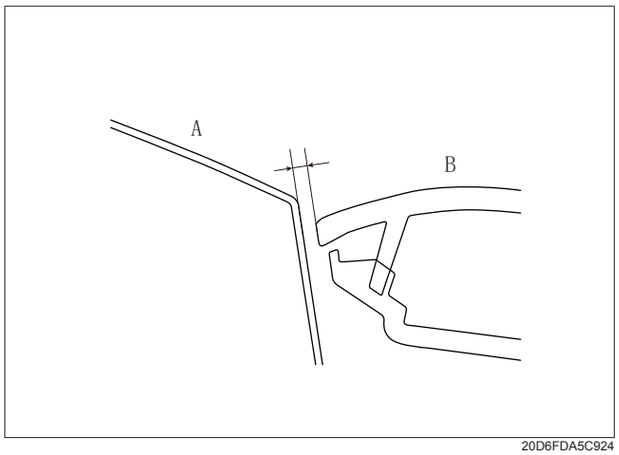


2A2B7E23AB0C

S/N	Measurements (mm)	Re-marks
1	5±1.0	—

› A: outer plate of trunk side plate

› B: outer plate of rear plate of trunk

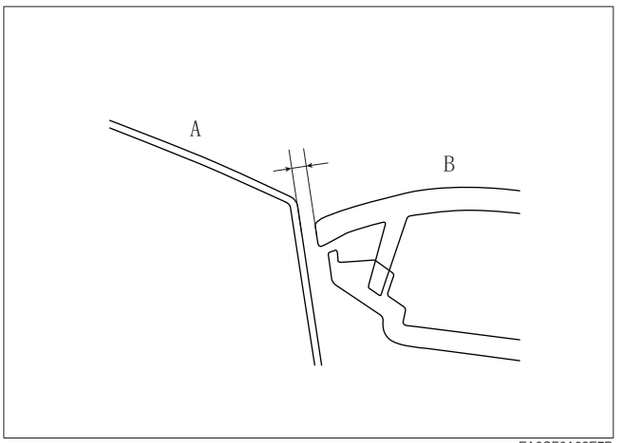


20D6FDA5C924

No.	Measurements (mm)	Re-marks
2	1.5±1.0	—

› A: outer plate of trunk side plate

› B: tail lamp

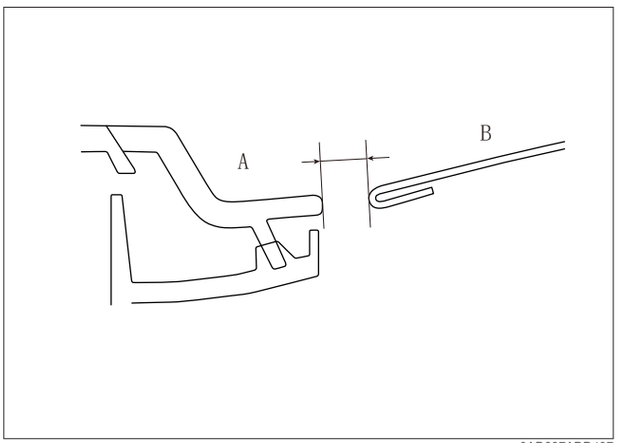


EA6CF0A32E7D

No.	Measurements (mm)	Re-marks
3	1.5±1.0	—

› A: outer plate of trunk side plate

› B: tail lamp

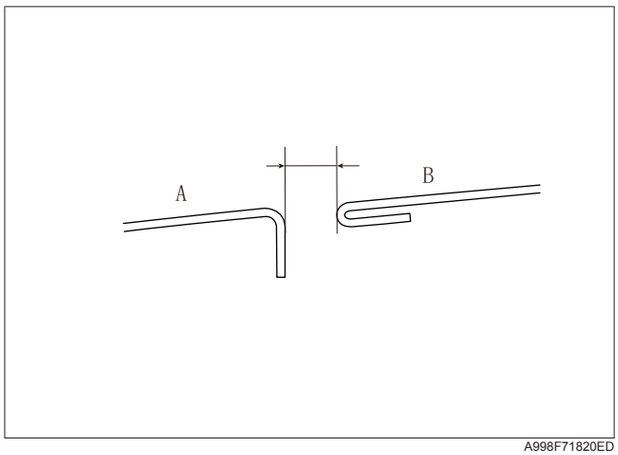


9AD287ADD497

No.	Measurements (mm)	Re-marks
4	5.0±1.0	—

› A: tail lamp

› B: outer plate of rear plate of trunk

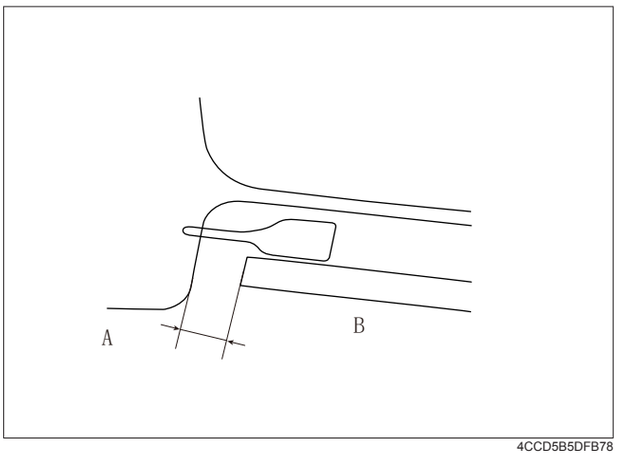


A998F71820ED

No.	Measurements (mm)	Re-marks
5	4.8±1.0	—

› A: outer plate of trunk side plate

› B: outer plate of rear plate of trunk

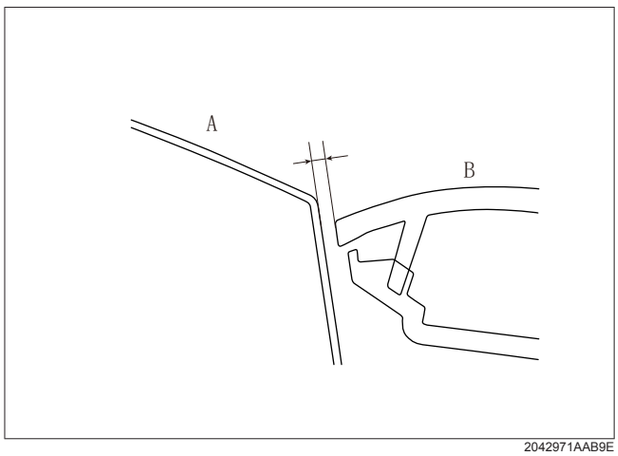


4CCD5B5DFB78

No.	Measurements (mm)	Re-marks
7	4.0±1.5	—

› A: rear end panel

› B: rear windshield glass

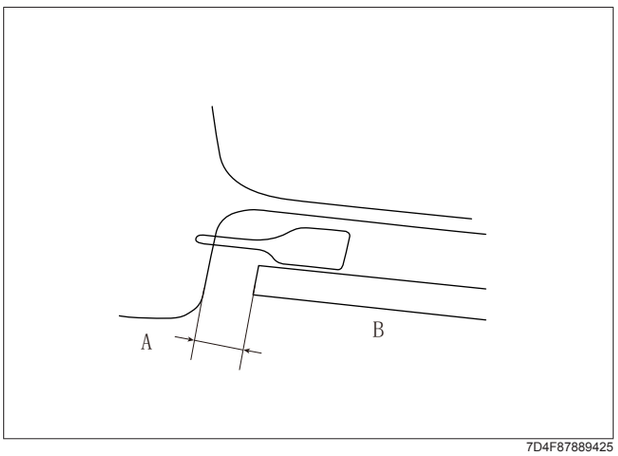


2042971AAB9E

No.	Measurements (mm)	Re-marks
6	1.5±1.0	—

› A: outer plate of trunk side plate

› B: tail lamp

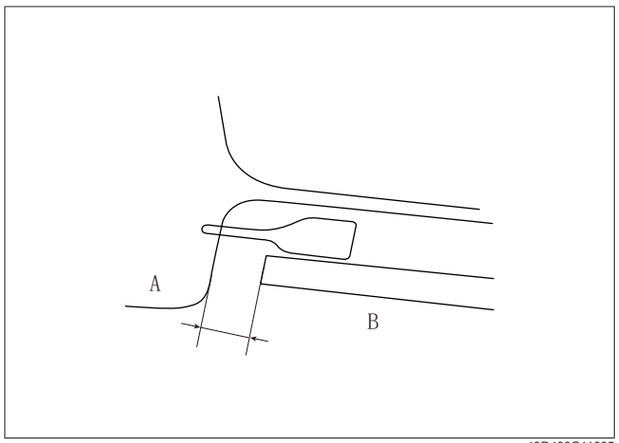


7D4F87889425

No.	Measurements (mm)	Re-marks
8	4.0±1.5	—

› A: side wall outer plate

› B: rear windshield glass



49D499C11605

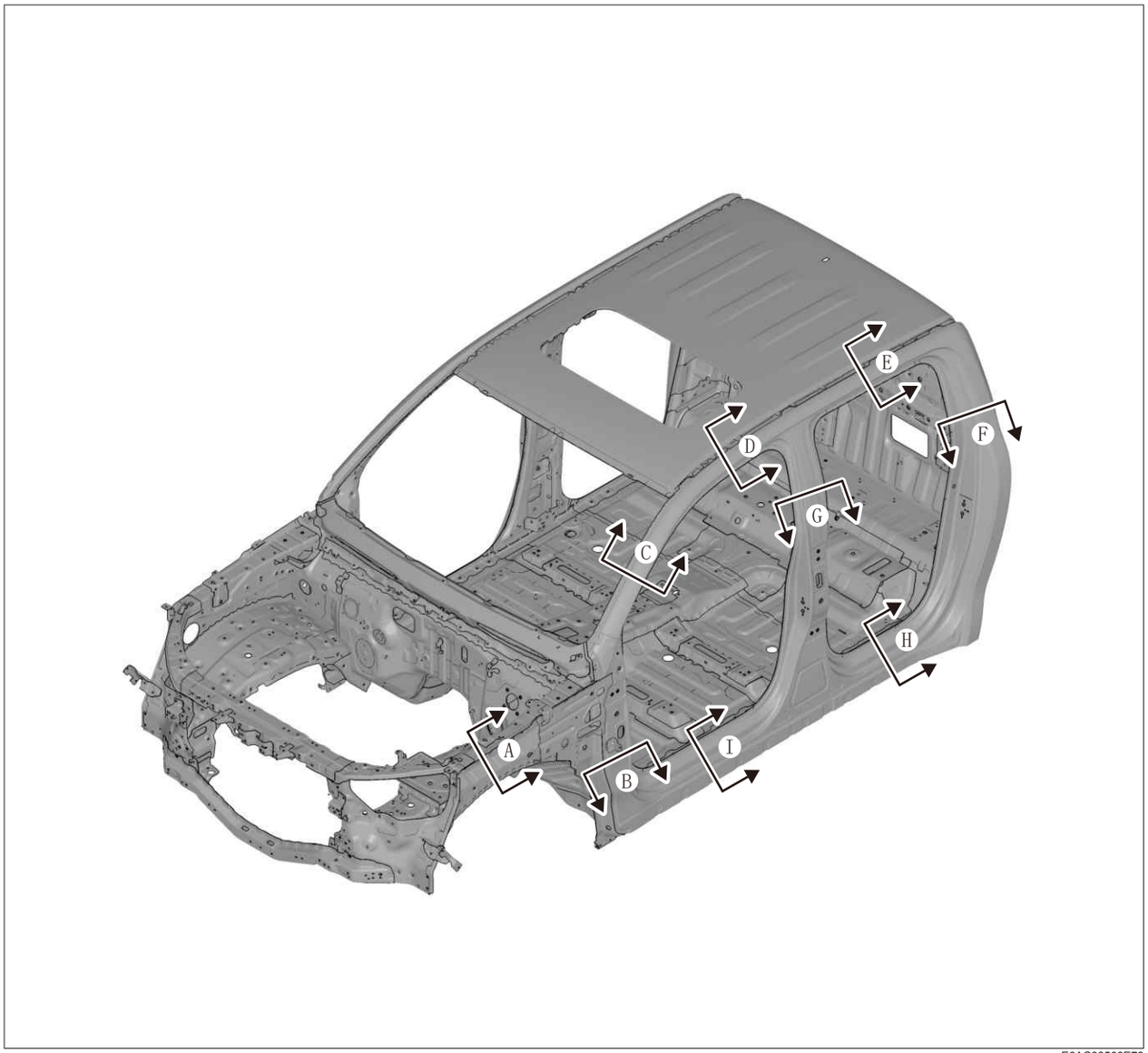
No.	Measurements (mm)	Re-marks
9	4.0±1.5	—

› A: roof outer plate

› B: rear windshield glass

Body structure

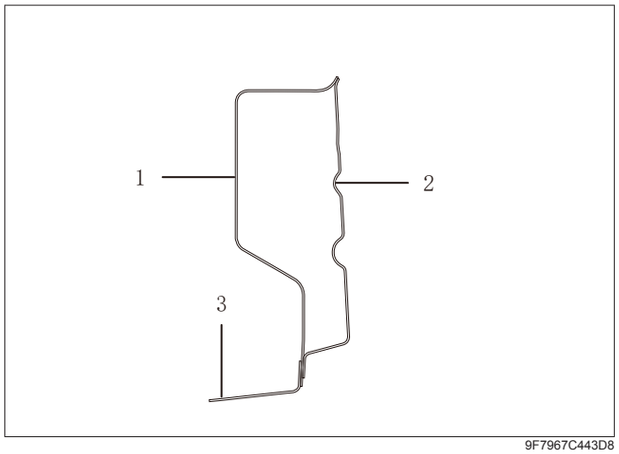
Vehicle body section location diagram



E6AC38566E78

Section view of vehicle body

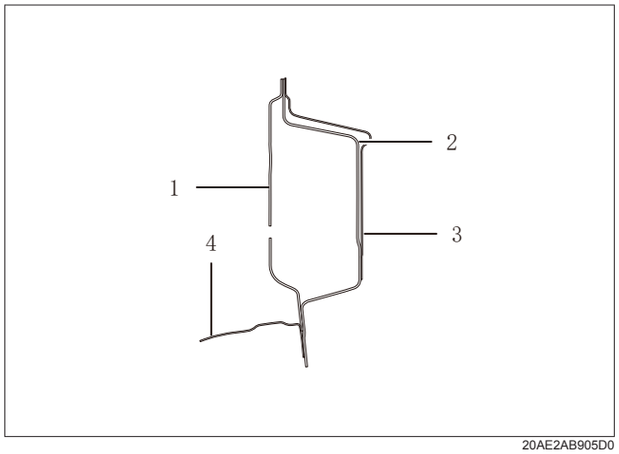
Section A-A



9F7967C443D8

1. Side beam of front left wheel cover
2. Left side beam and side wall connecting plate
3. Front left wheel cover

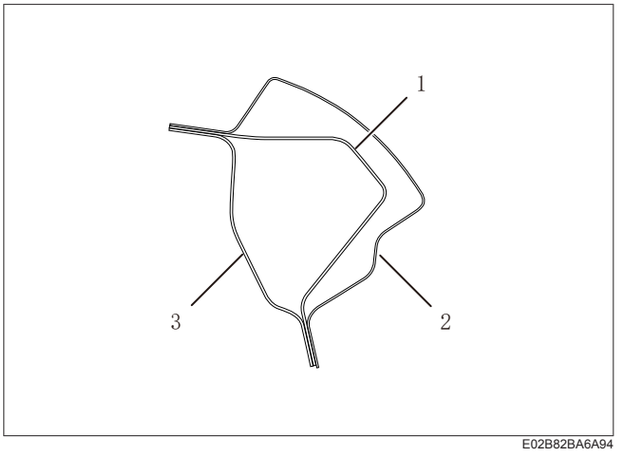
Cross-section B-B



20AE2AB905D0

1. Inner plate of lower section of left pillar A
2. Reinforcing plate of lower section of left pillar A
3. Left side wall outer board
4. Front wall

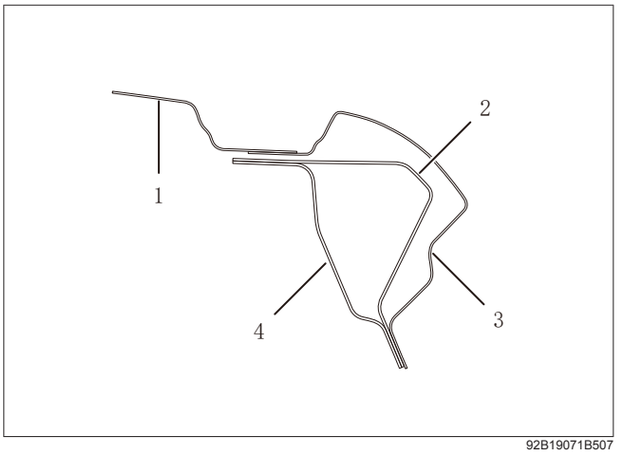
Section C-C



E02B82BA6A94

1. Reinforcing plate of upper section of left pillar A
2. Left side wall outer board
3. Inner plate of upper section of left pillar A

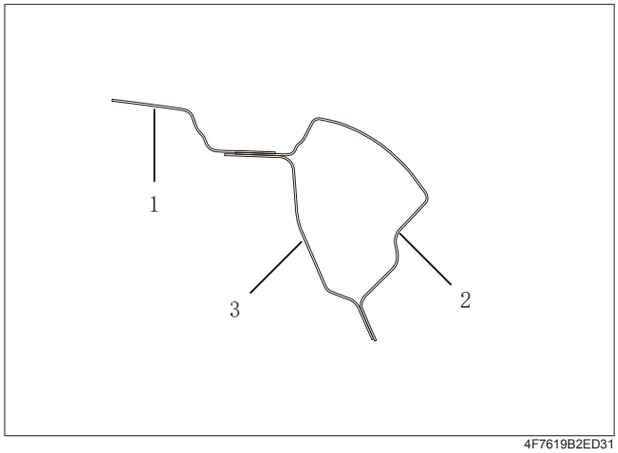
Section D-D



92B19071B507

1. Sunroof head cover exterior board
2. Reinforcing plate of upper section of left pillar A
3. Left side wall outer board
4. Inner plate of upper section of left pillar A

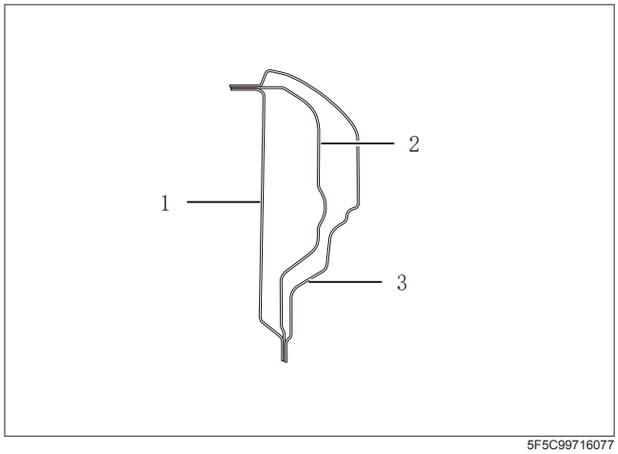
Section E-E



4F7619B2ED31

1. Sunroof head cover exterior board
2. Left side wall outer board
3. Upper left side beam inner plate

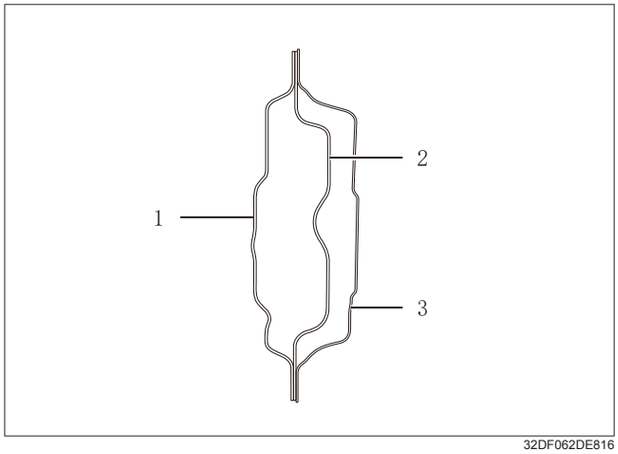
Section F-F



5F5C99716077

1. Inner plate of left pillar C
2. Connecting plate for left pillar C and upper side beam
3. Left side wall outer board

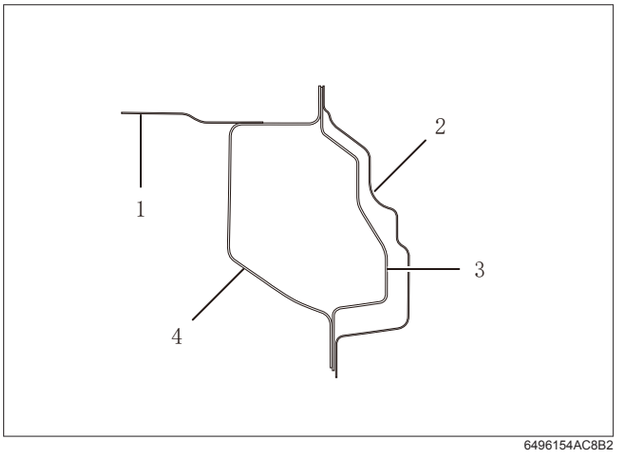
Section G-G



32DF062DE816

1. Inner plate of left pillar B
2. Reinforcing plate of left pillar B
3. Left side wall outer board

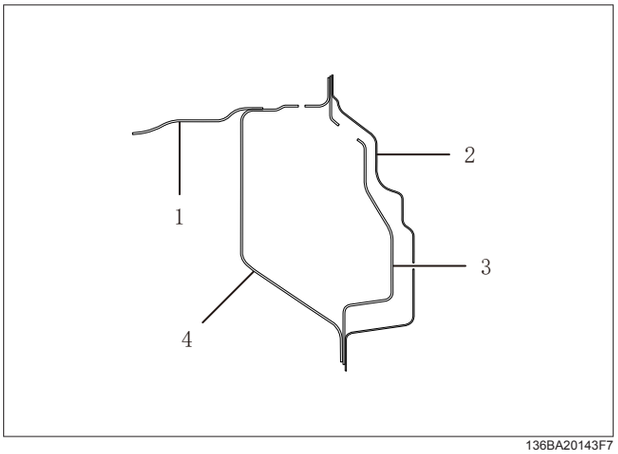
Section H-H



6496154AC8B2

1. Rear floor
2. Left side wall outer board
3. Reinforcing plate of left threshold
4. Rear left sill strip

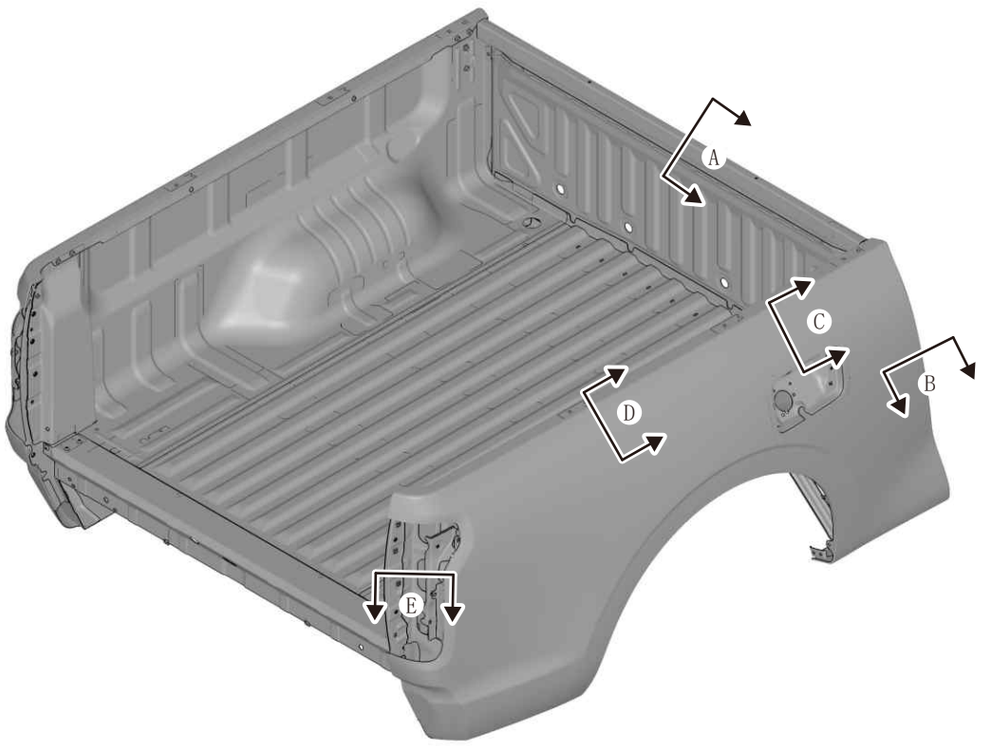
Section I-I



136BA20143F7

1. Front floor
2. Left side wall outer board
3. Reinforcing plate of left threshold
4. Left sill strip

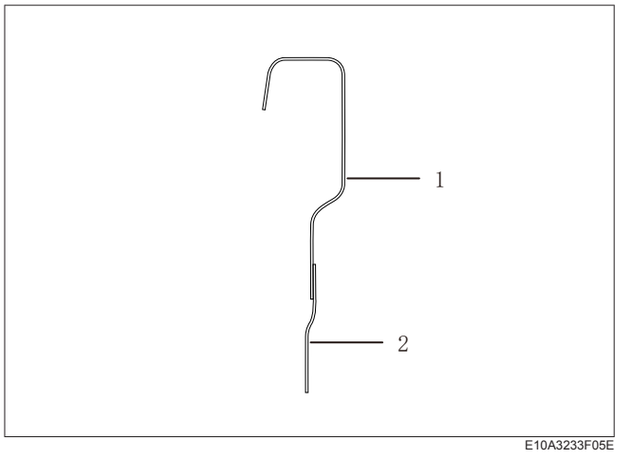
Trunk section location diagram



1383C9B3AC68

Trunk section view

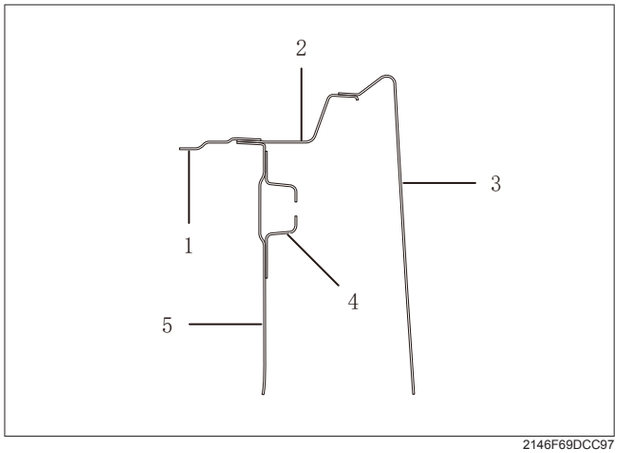
Section A-A



E10A3233F05E

1. Trunk front plate upper beam
2. Front plate of trunk

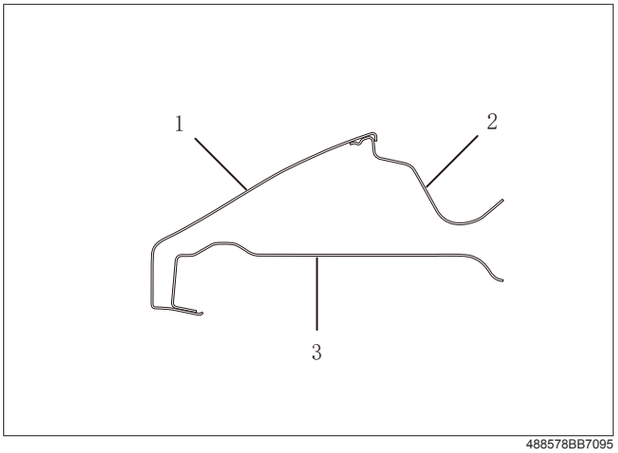
Cross-section B-B



2146F69DCC97

1. Front plate of trunk
2. Connecting plate of outer plate and front plate on the right side of trunk
3. Outer plate of right side plate of trunk
4. First beam right reinforcing plate of trunk
5. Inner plate of right side plate of trunk

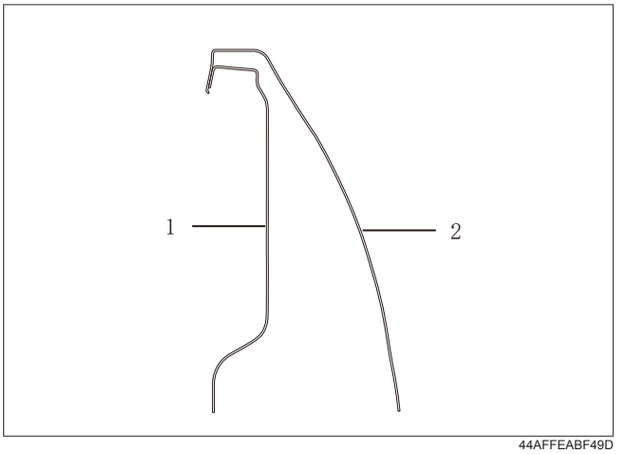
Section C-C



488578BB7095

1. Outer plate of right side plate of trunk
2. Fuel filler fixing seat
3. Inner plate of right side plate of trunk

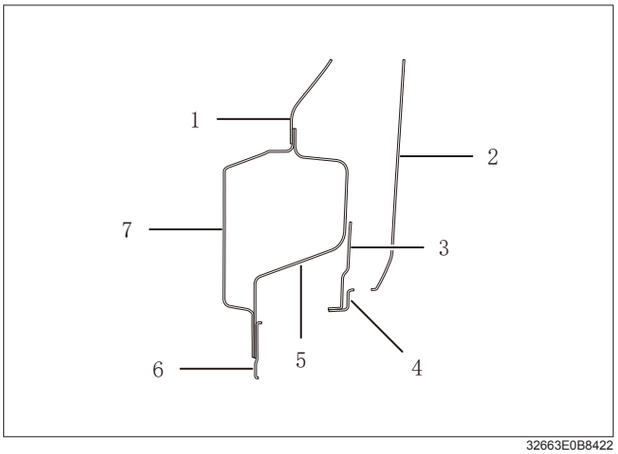
Section D-D



44AFFEABF49D

1. Inner plate of right side plate of trunk
2. Outer plate of right side plate of trunk

Section E-E



32663E0B8422

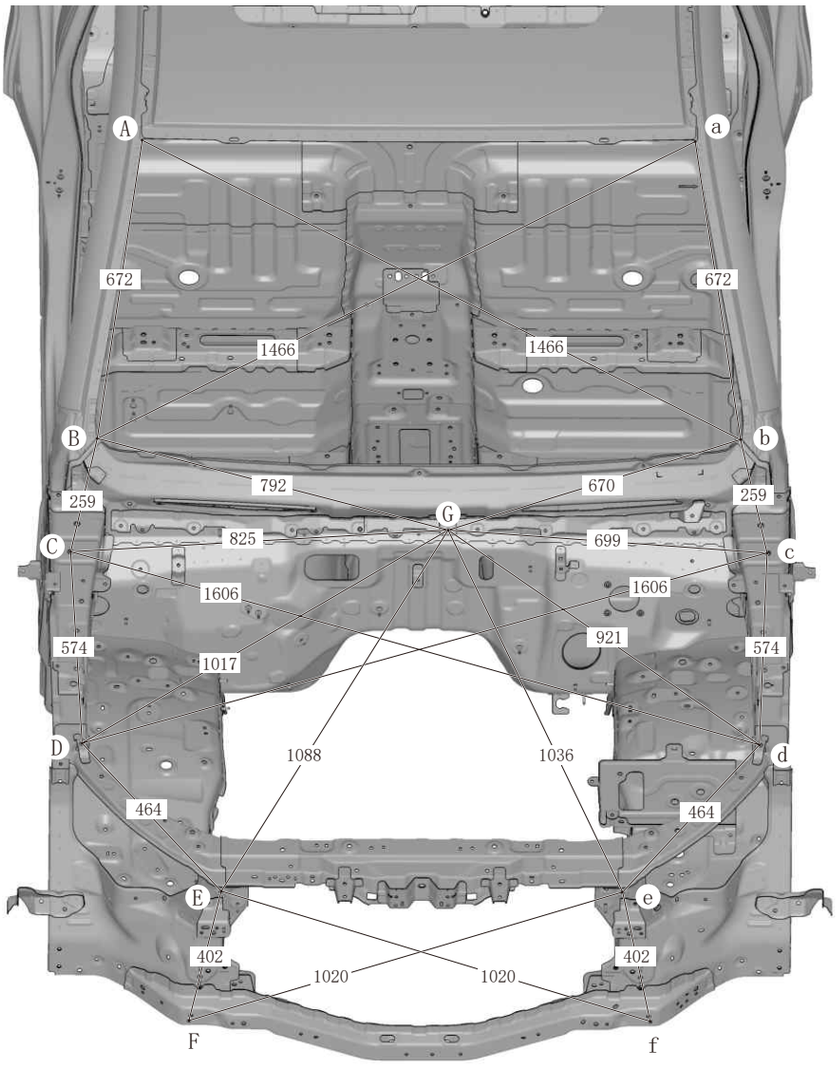
1. Inner plate of right side plate of trunk
2. Outer plate of right side plate of trunk

3. Trunk rear right column and outer plate connecting plate
4. Outer plate complementary plate of right side plate of trunk
5. Trunk rear right column outer plate
6. Trunk rear right column rear plate
7. Trunk rear right column inner plate

Vehicle body reference dimensions

Engine compartment

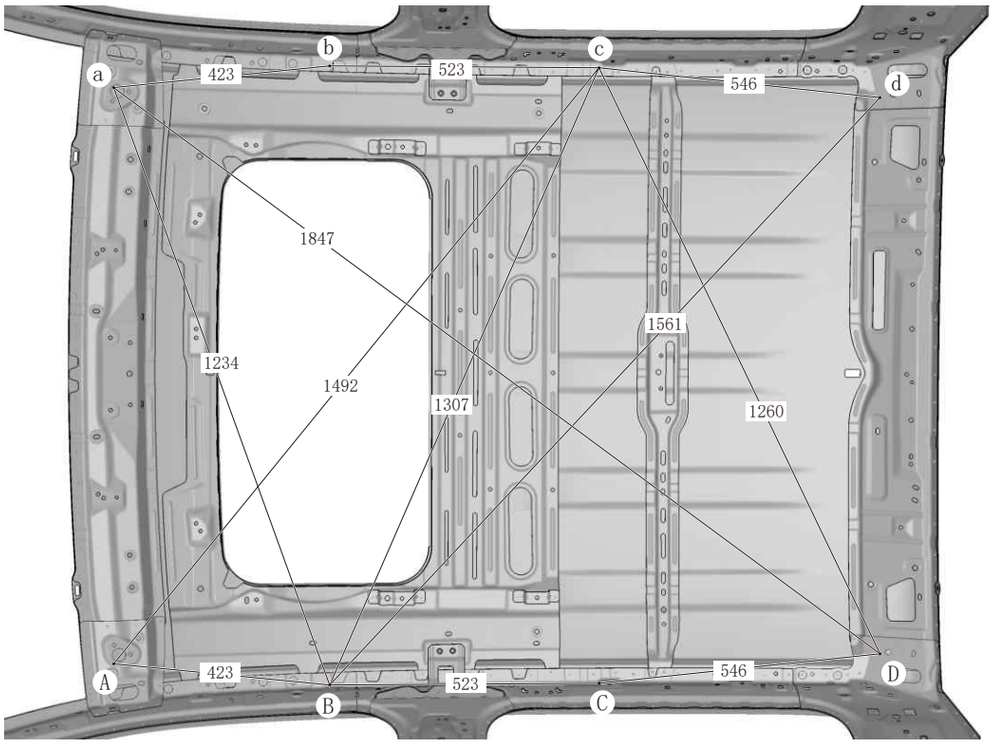
A-a:	1208
B-b:	1405
C-c:	1520
D-d:	1479
E-e:	874
F-f:	1006



0F5803F4C0EF

Roof

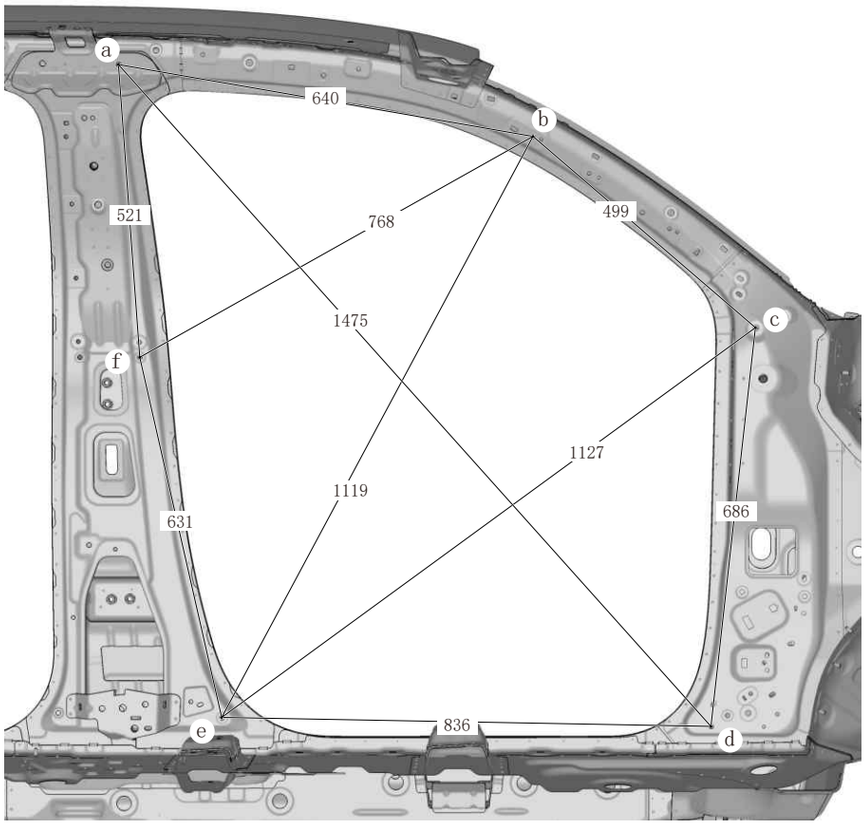
A-a:	1118
B-b:	1202
C-c:	1195
D-d:	1080



04B7CC83923A

Front door

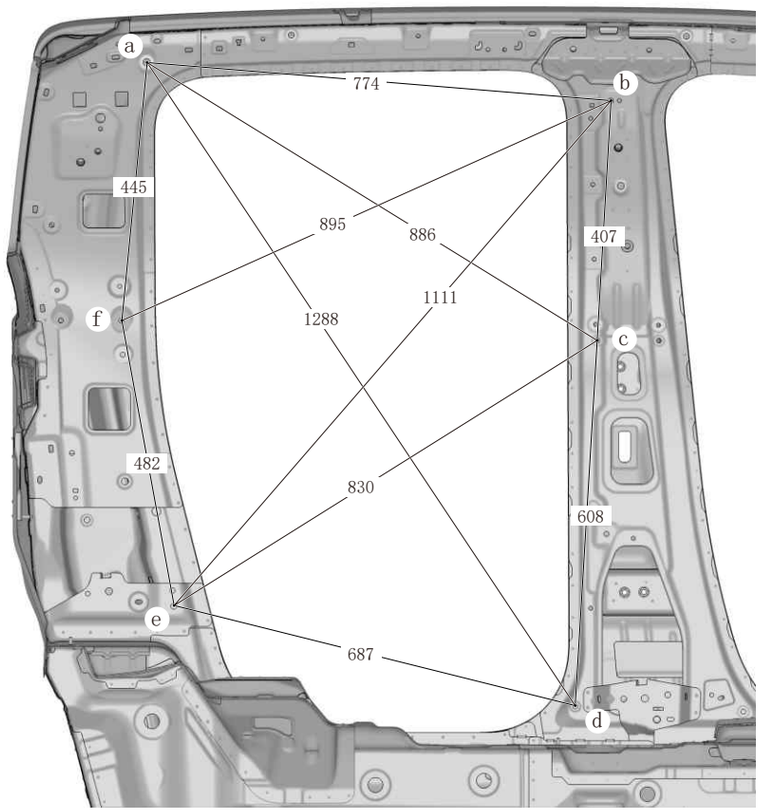
A-a:	1204
B-b:	1288
C-c:	1410
D-d:	1461
E-e:	1449
F-f:	1450



C4767ECD9A95

Rear door

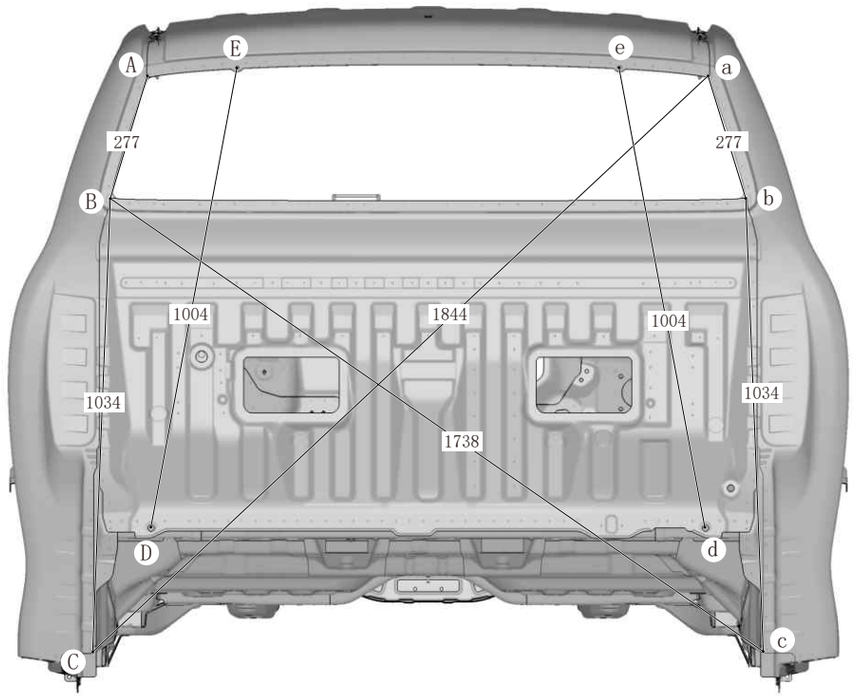
A-a:	1234
B-b:	1283
C-c:	1450
D-d:	1447
E-e:	1436
F-f:	1461



3402B06C6A88

Rear part of vehicle body

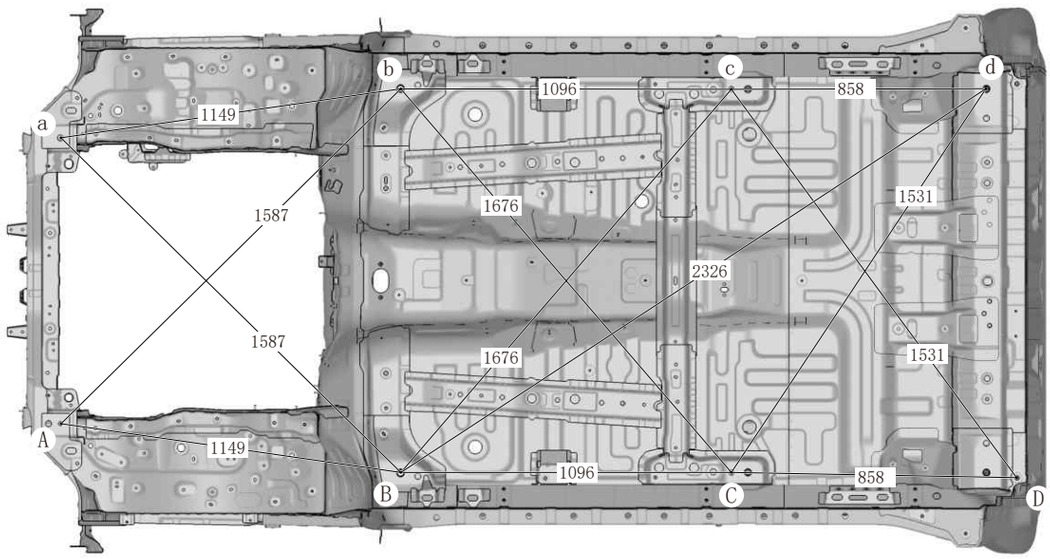
A-a:	1203
B-b:	1366
C-c:	1429
D-d:	1190
E-e:	822



6DC8D9FF8CC6

Body bottom

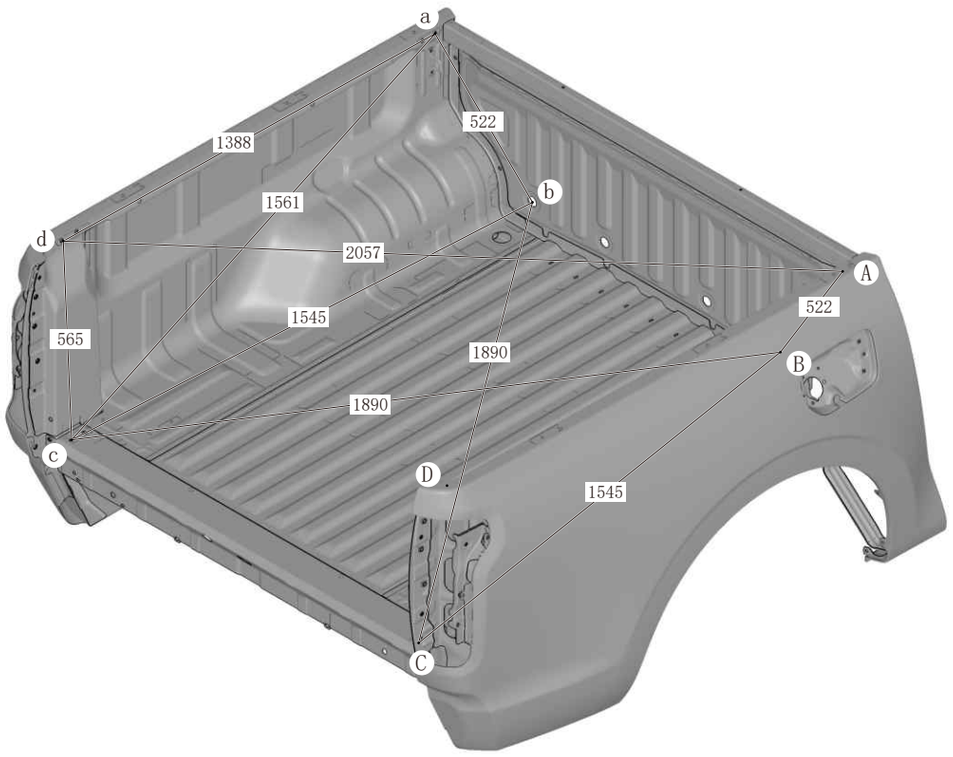
A-a:	944
B-b:	1270
C-c:	1267
D-d:	1268



9926435DF20A

Trunk (small double)

A-a:	1518
B-b:	920
C-c:	1289
D-d:	1518



693D4E0B67F3

Anti-corrosion seal

Adhesive for welding

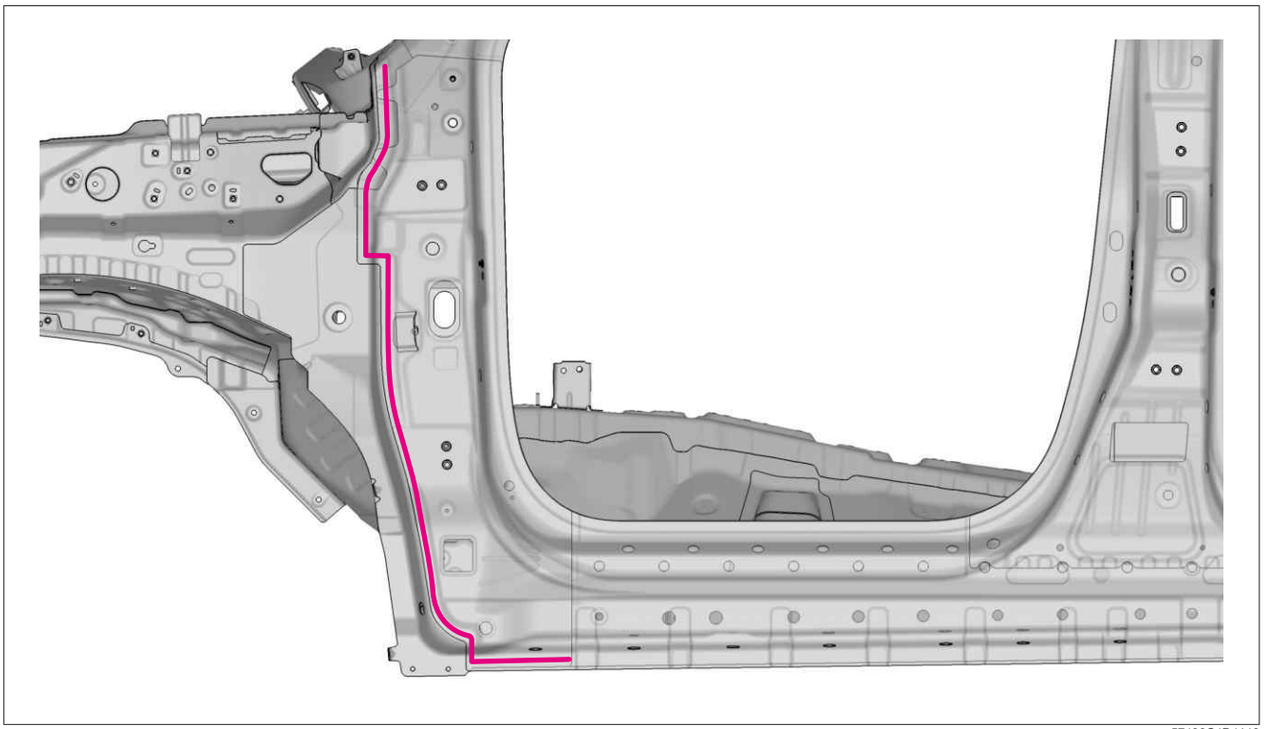
Spot welding sealant

Base material of spot welding sealant: synthetic rubber.

Main performance index: hardness: (Shore A) 10~50, shearing strength: ≥ 0.4 MPa, failure state: ≥ 90% CF.

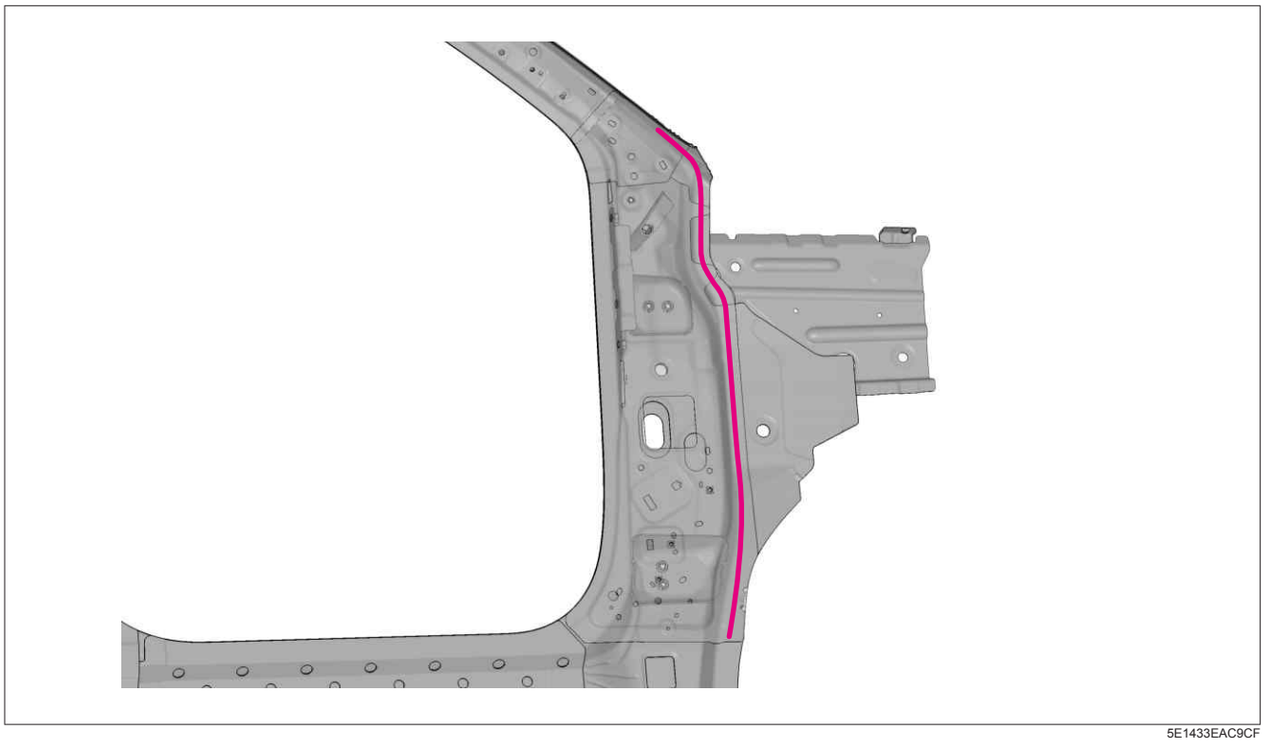
Section size of spot welding sealant: a circle with a diameter of φ (3 ± 1) mm (except for those specified), distance from the center of circle to the boundary (7 ± 2) mm. A small amount of sealant overflow is allowed with a range ≤ 5mm. Sealant is not allowed to flow for areas of roof outer plate and the side wall for non-sunroof version, while a small amount of sealant overflow is allowed for other areas.

Overlap area of left side wall outer board and reinforcing plate of left pillar A (bilateral symmetry)



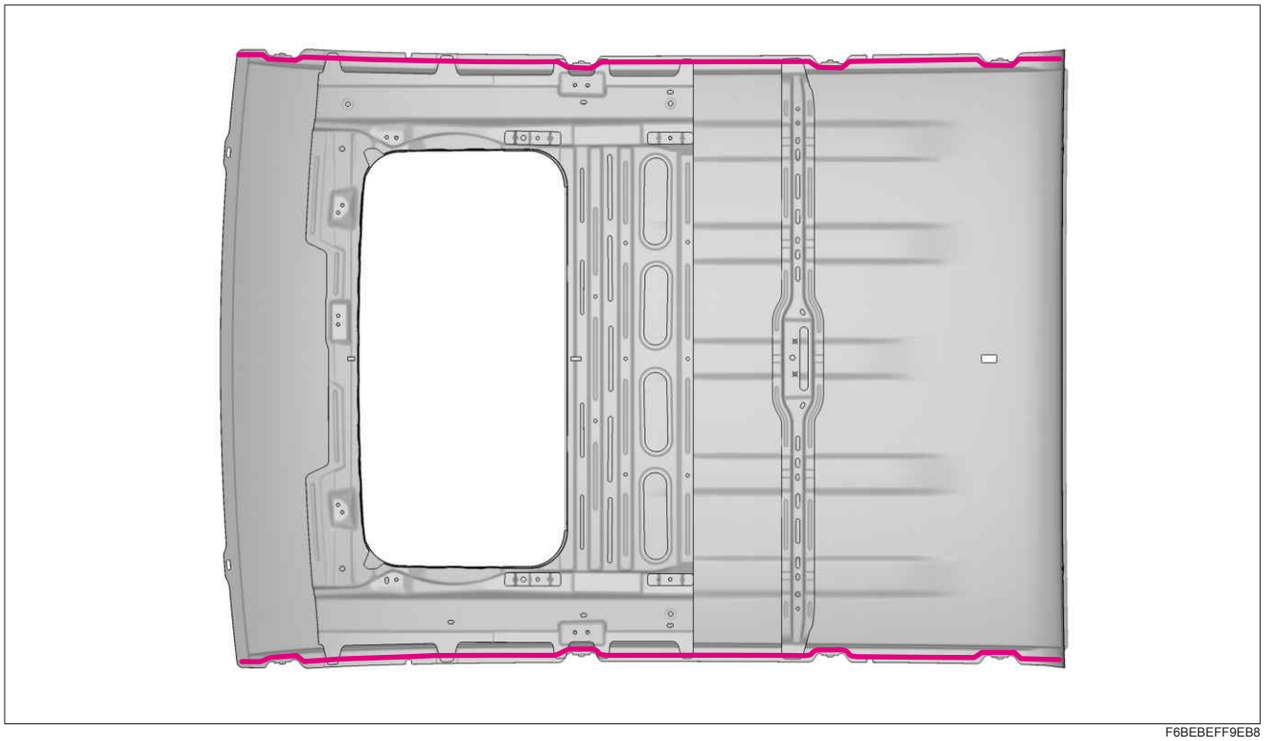
57490C4D4140

Area of left side wall inner plate and reinforcing plate of left pillar A (bilateral symmetry)



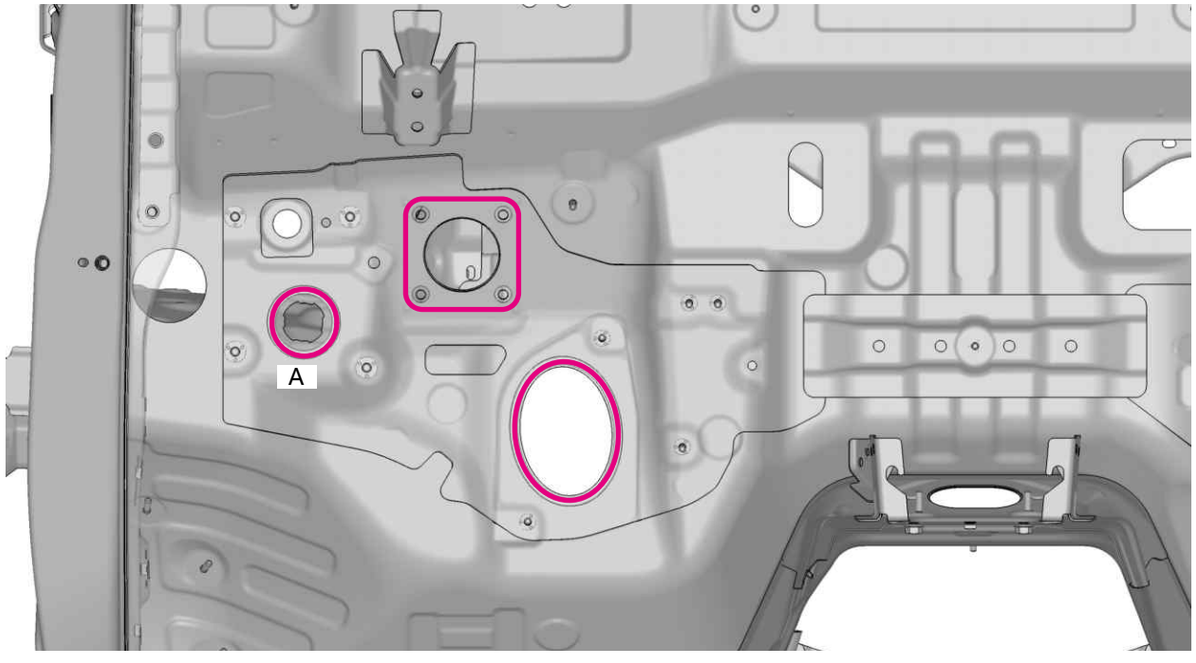
5E1433EAC9CF

Overlap area of roof assembly and side wall assembly (sealant of overlap area of side wall is same for non-sunroof version and sunroof version)



F6BEBEFF9EB8

Fitting area of front wall and left reinforcing plate of front wall

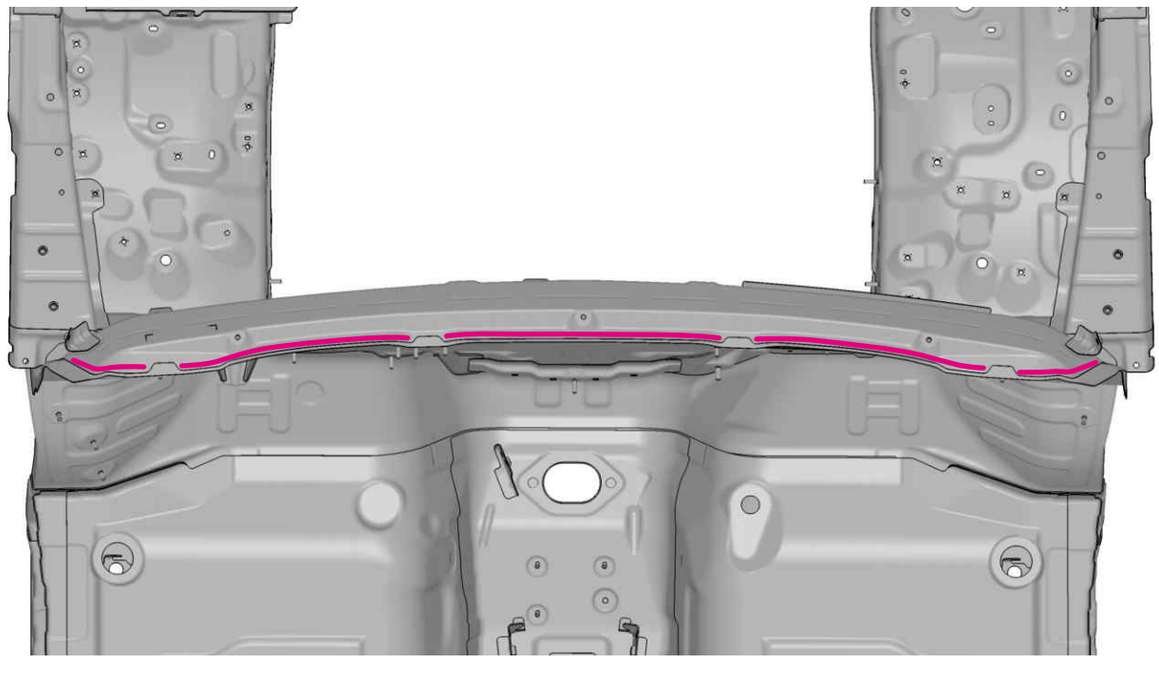


E64A4FD2AFC8

It is required to apply sealant to the entire circle evenly around brake pump, clutch pump and steering guard without interruption.

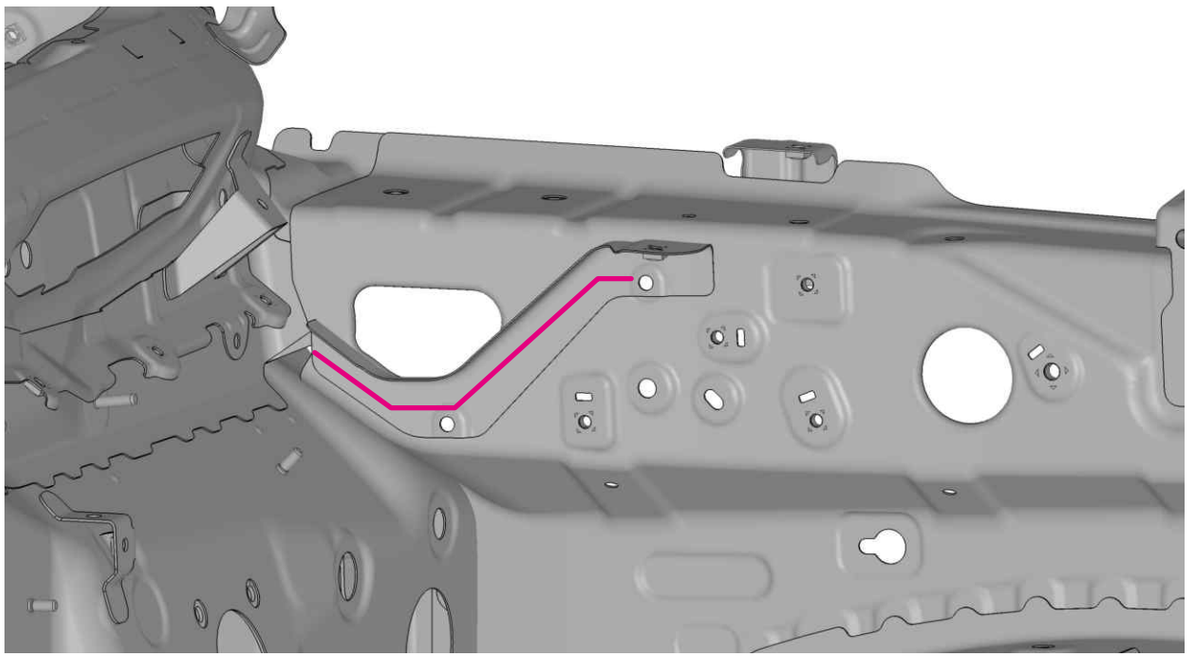
When applying sealant to the welding of left reinforcing plate of front wall, cancel sealant applying to the welding clutch pump area of left reinforcing plate of front wall for 8AT vehicle model to reduce the waste of sealant.

Fitting area of front wall and front windshield lower beam



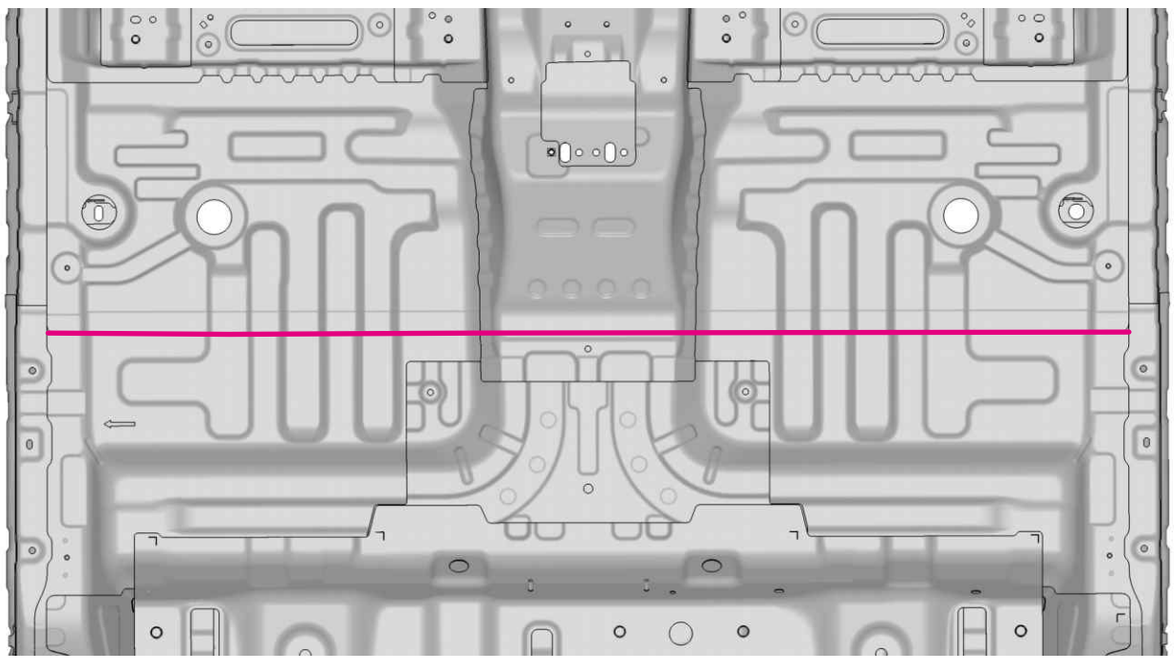
45BD949B1670

Welding area of side-beam of front-left wheel cover and left bracket of mounting plate for ventilation cover plate



3EE3313C27E9

Overlap area of front and rear floor



1DFE6D03E27E

Damping expansible sealant

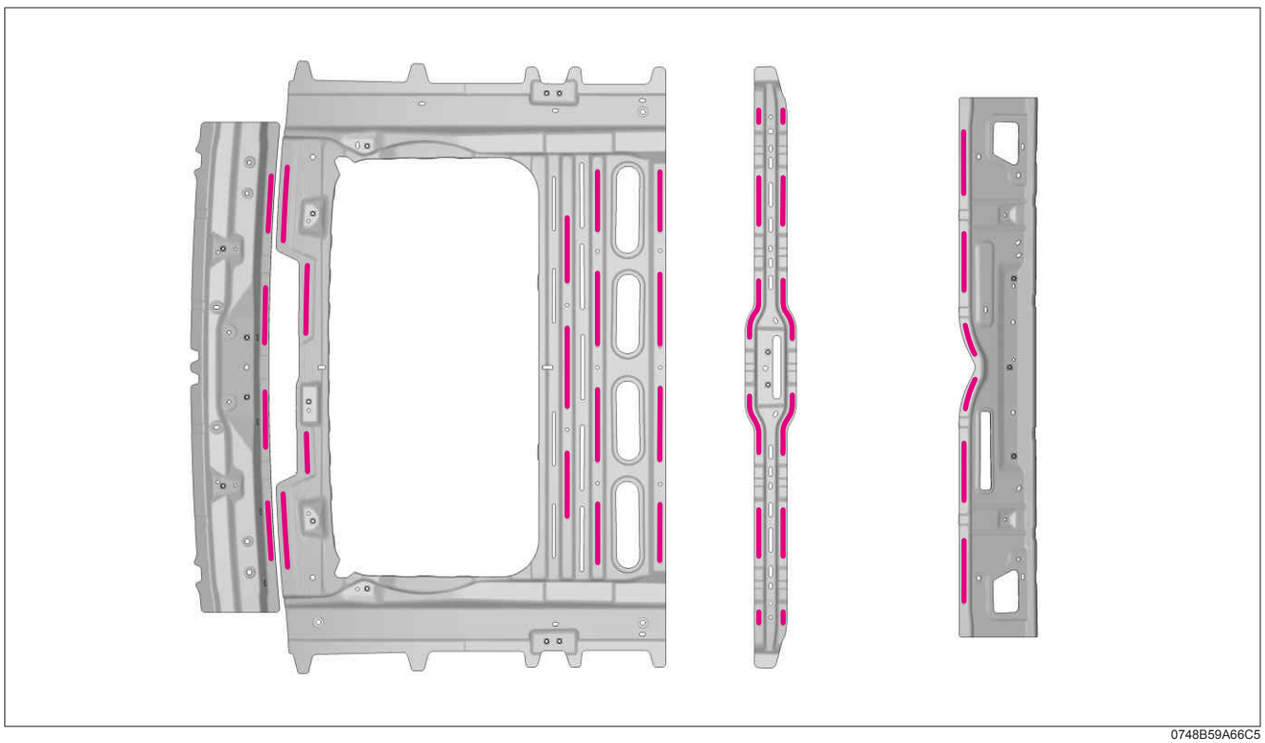
Base material of damping expansible sealant: synthetic rubber.

Main performance index of damping expansible sealant: hardness (Shore A): 10~30, shearing strength: ≥ 0.3 Mpa, failure state: ≥ 90% CF, volume expansion rate: (305)%, rotational viscosity (Pa·s): 8000-12000.

Main performance index of low-expansion damping expansible sealant: hardness (Shore A): 10~30; shearing strength: ≥ 0.4 Mpa, failure state: ≥ 90% CF; volume expansion rate: (5-15)%, rotational viscosity (Pa·s): 8000-12000.

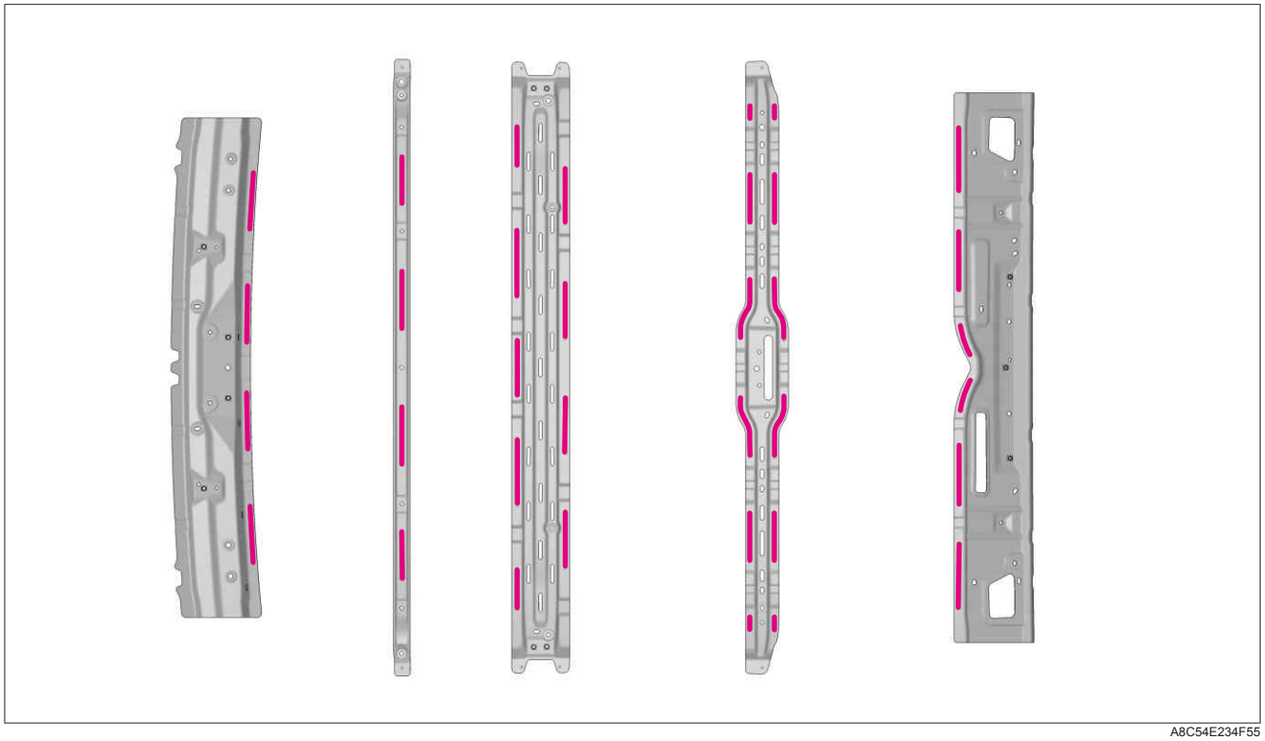
Section size of damping expansible sealant: round circle with a diameter of (8±2) mm and its length dependent on the length of rubberized slot (position as shown in the illustration). Operate according to special requirements for areas with such requirements, and apply damping expansible sealant to all the areas without special requirements.

Roof assembly area of sunroof version



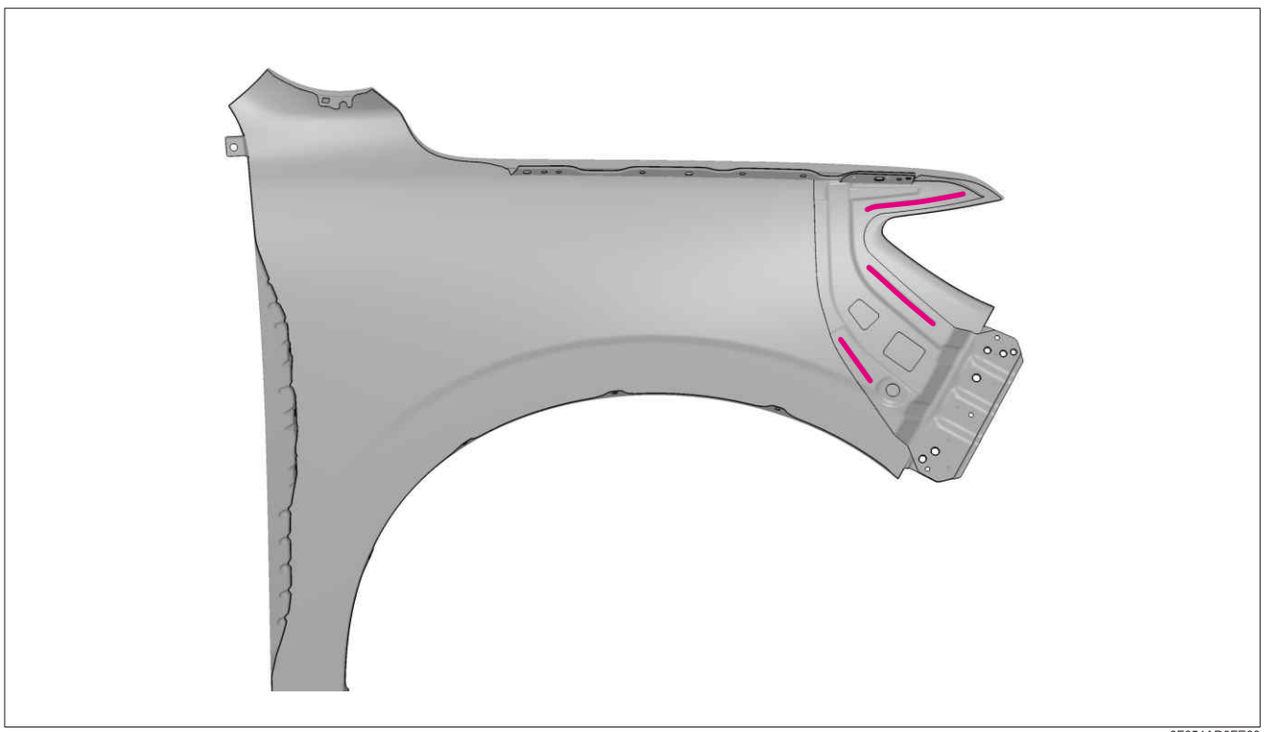
0748B59A66C5

Roof assembly area of non-sunroof version



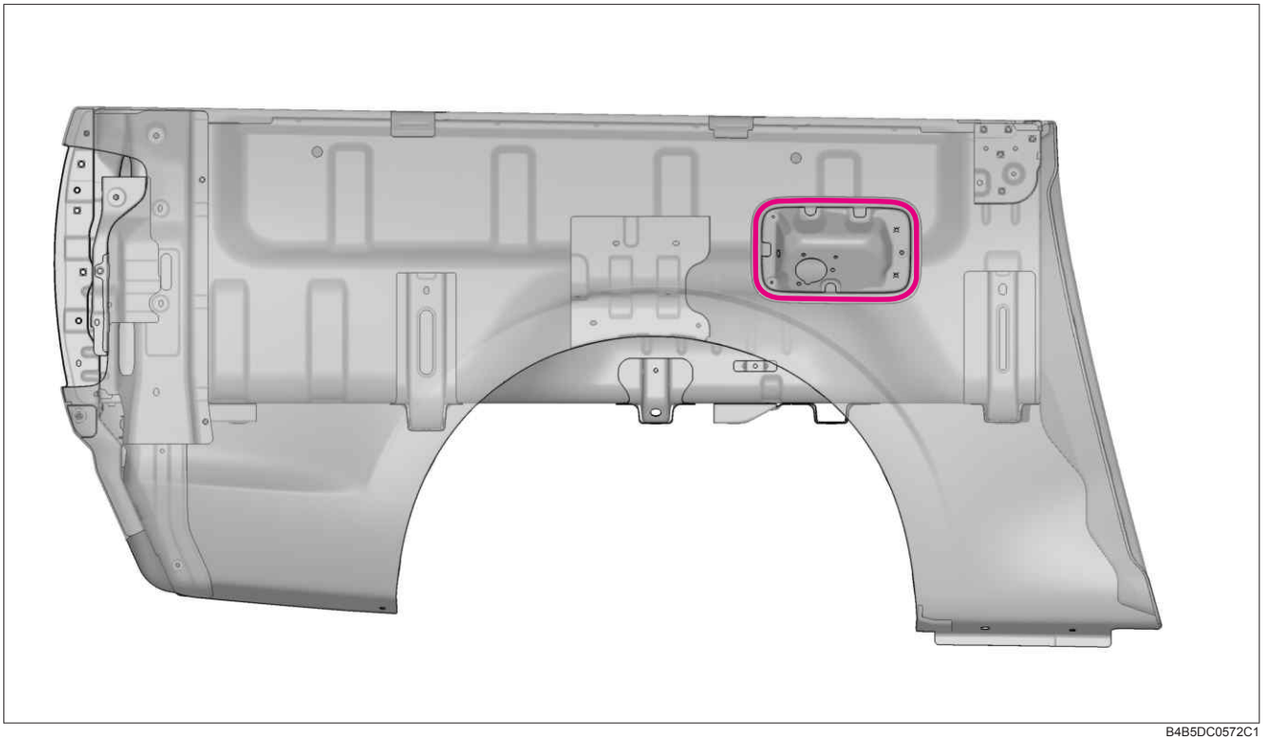
A8C54E234F55

Left/right fender area



8F651AD8FE83

Inner plate area of fuel filler door



B4B5DC0572C1

Structural sealant for spot welding

Base material: epoxy modified resin.

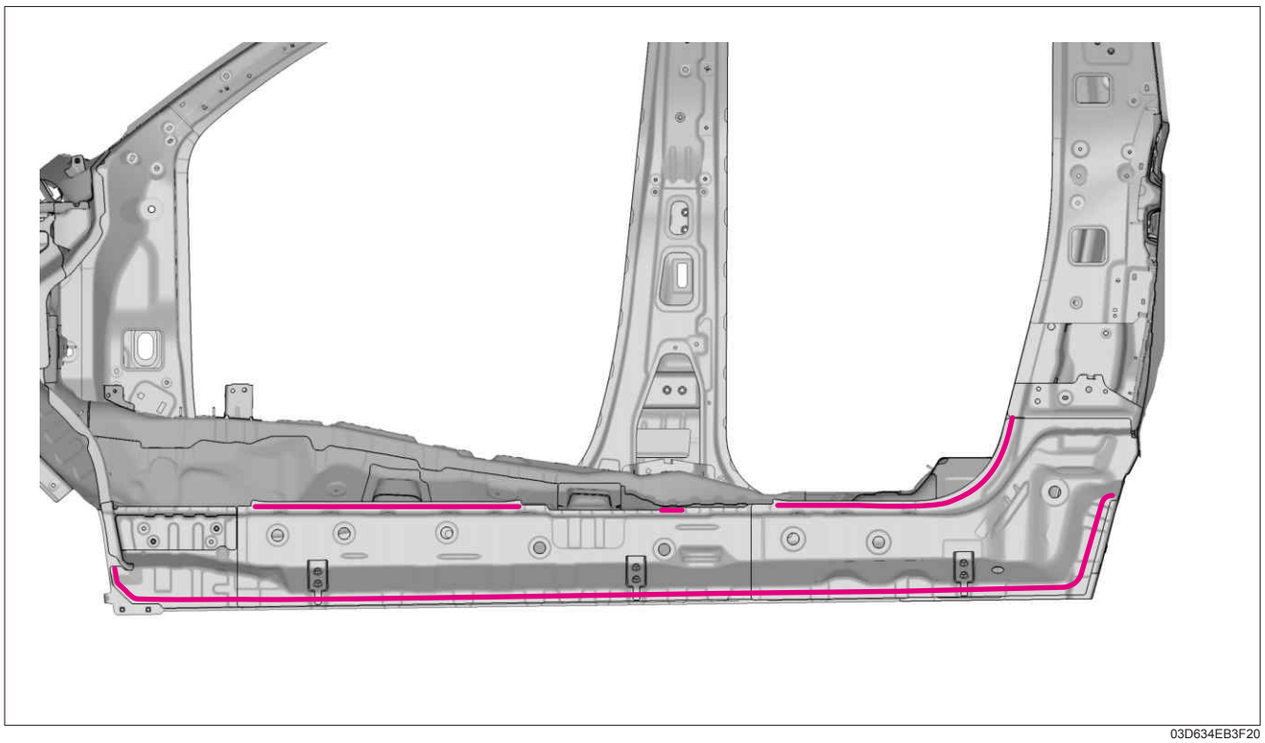
Performance requirements: shearing strength ≥ 20 Mpa, failure state: ≥ 90% CF; T peel strength ≥ 8 N/mm, failure state: ≥ 90% CF.

Section size: a cylinder with a diameter of φ 3 ± 1 mm, distance from the center of circle to the boundary 7 ± 2 mm; a small amount of sealant overflow is allowed with a range ≤ 5mm.

Construction requirements: the operability of this material is subject to the weather to a great extent (viscosity increases with decrease in temperature). At a temperature below 10°C, heating equipment is required for preheating when used on site for easy operation is possible. The temperature of heating equipment shall not exceed 50°C, and the temperature for long-term storage shall not exceed 40°C.

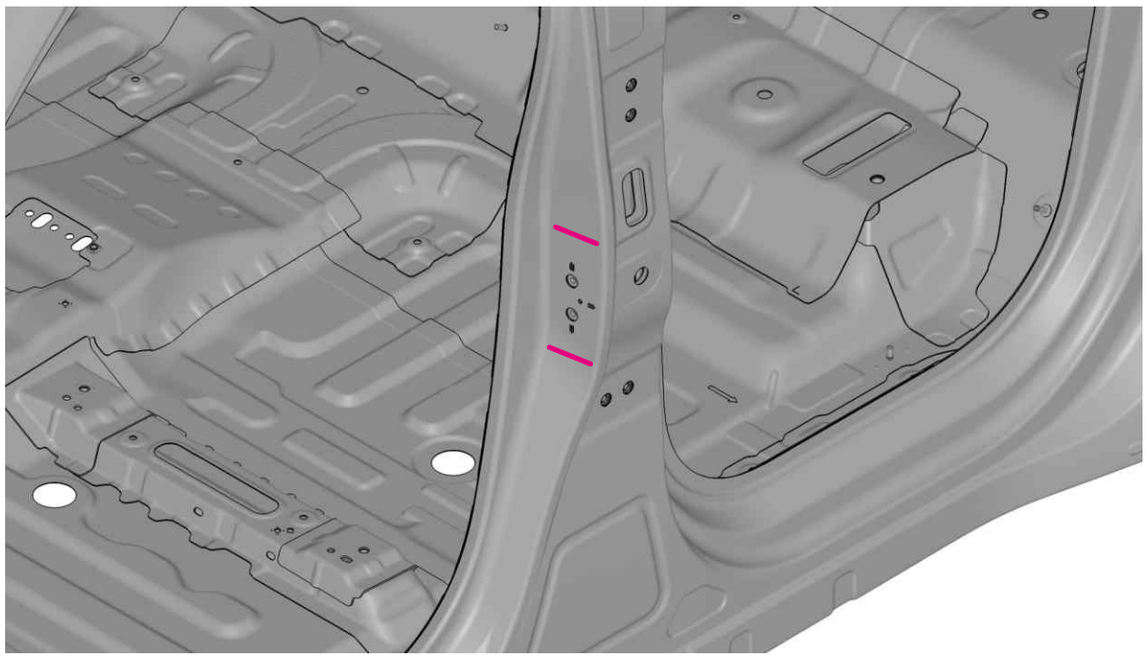
A small amount of sealant overflow is allowed with an overflow range ≤ 5 mm. Flow of sealant is not allowed.

Area of floor assembly and side wall assembly (bilateral symmetry)



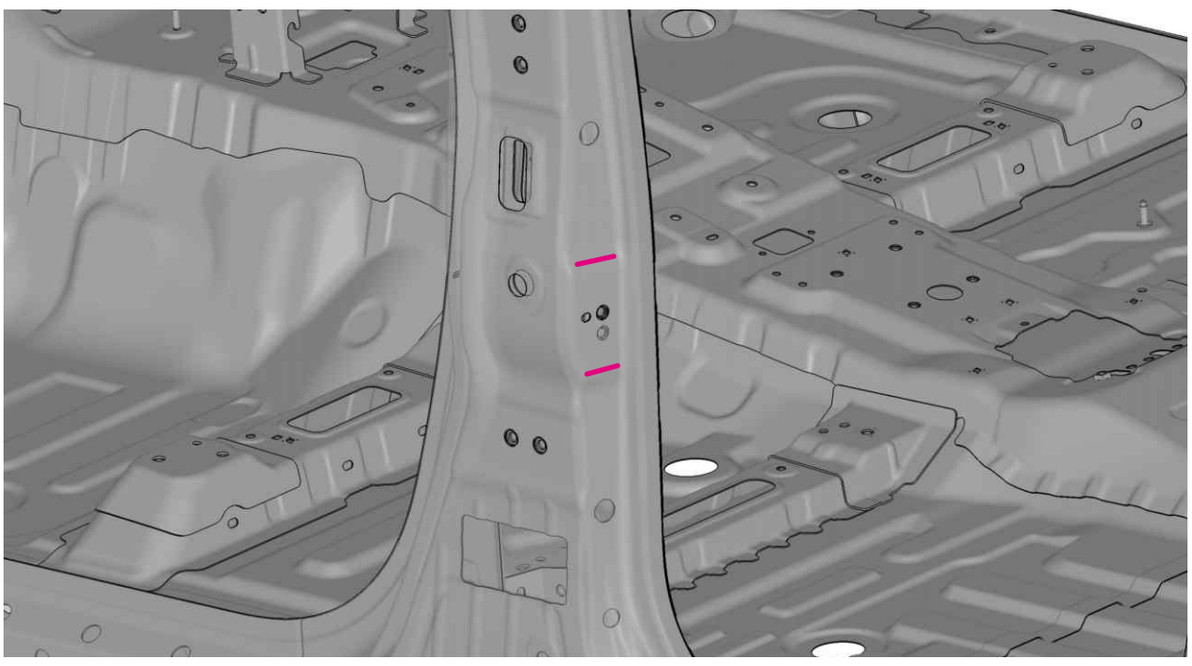
03D634EB3F20

Overlap of pillar B reinforcing plate (installation position of front door striker) and side wall outer plate (bilateral symmetry)



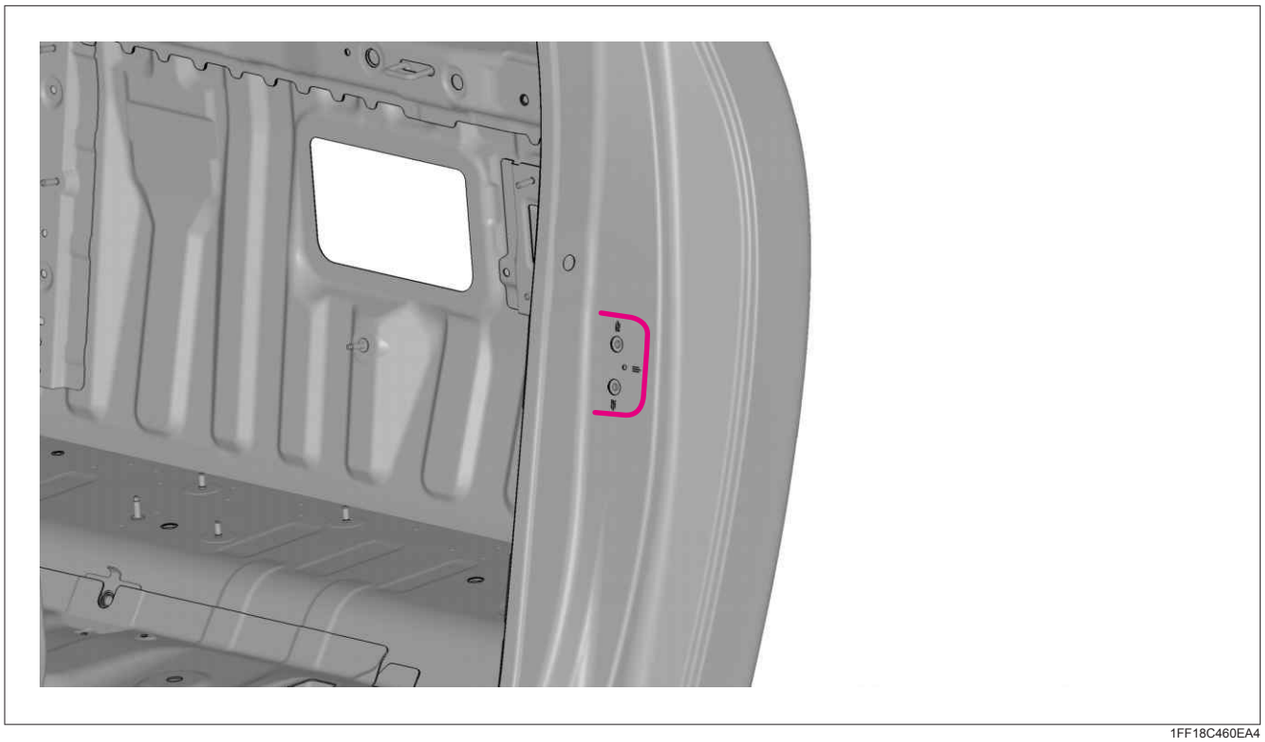
8DBF570D80DA

Overlap of pillar B reinforcing plate (check) and side wall outer plate (bilateral symmetry)



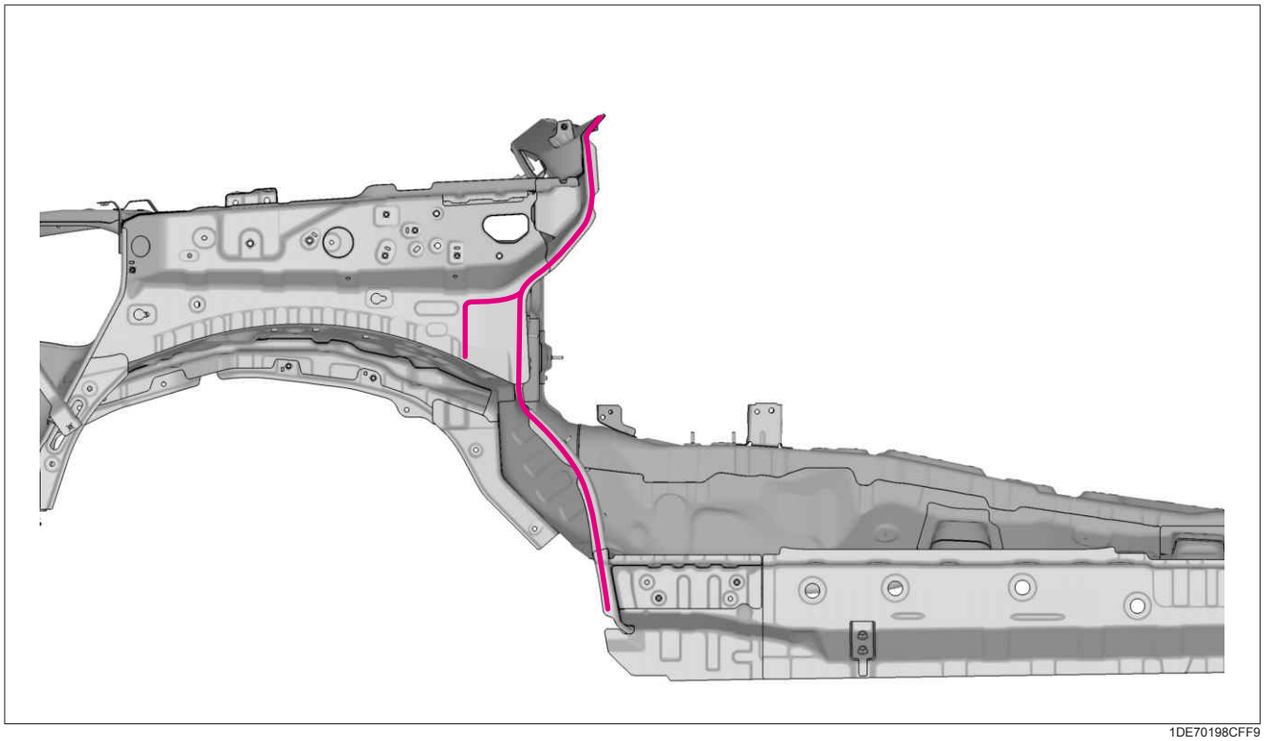
3E984D56AE5A

Overlap area of pillar C reinforcing plate of lower section (installation position of rear door striker) and side wall outer plate (bilateral symmetry)



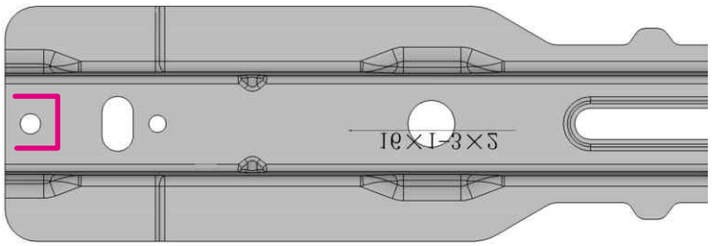
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Welding area of lower vehicle body assembly and side wall assembly (bilateral symmetry)



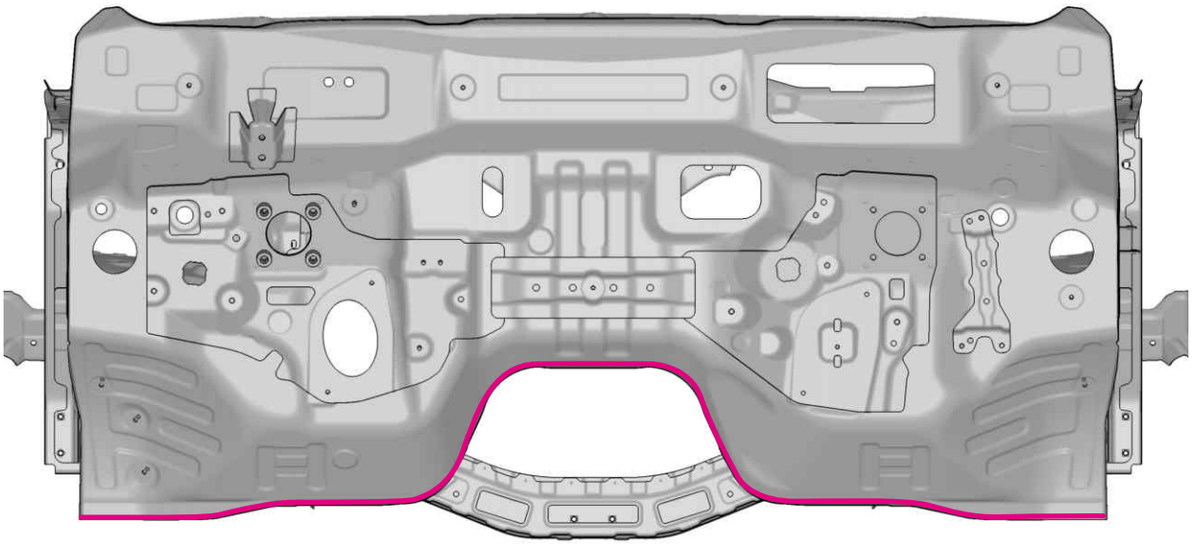
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Area of second beam of trunk



7E40FA40EEEA

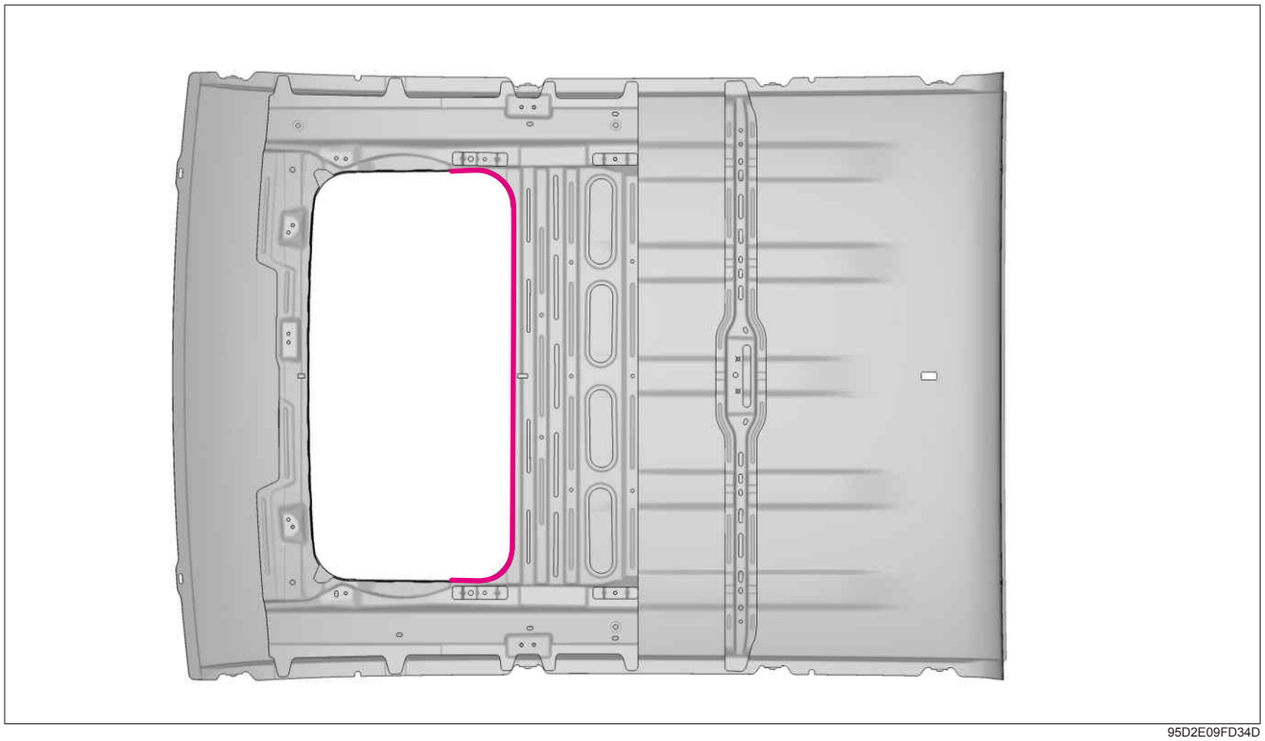
Area of front wall



D0C5A068250D

Structural tape

Roof (with sunroof)



95D2E09FD34D

Adhesive for coating

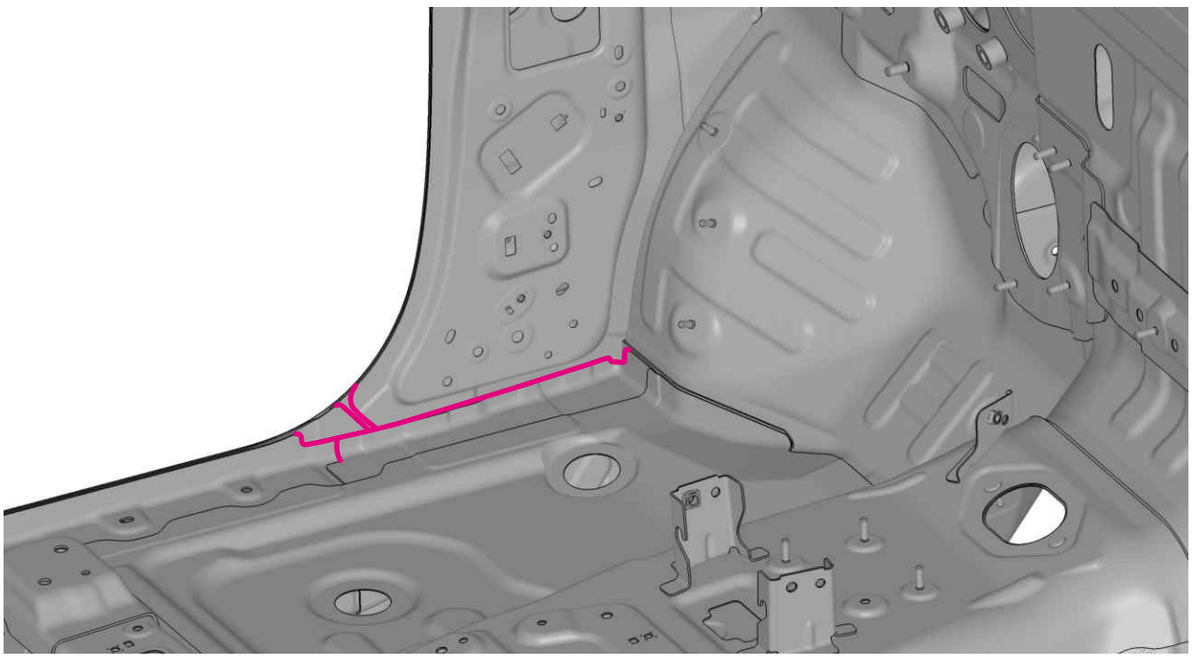
PVC weld sealant

Base material of weld sealant: PVC resin.

Main performance parameters: hardness (Shore A) 40-60, shearing strength ≥ 0.7 MPa, failure state: 100% CF; tensile strength ≥ 0.8 MPa.

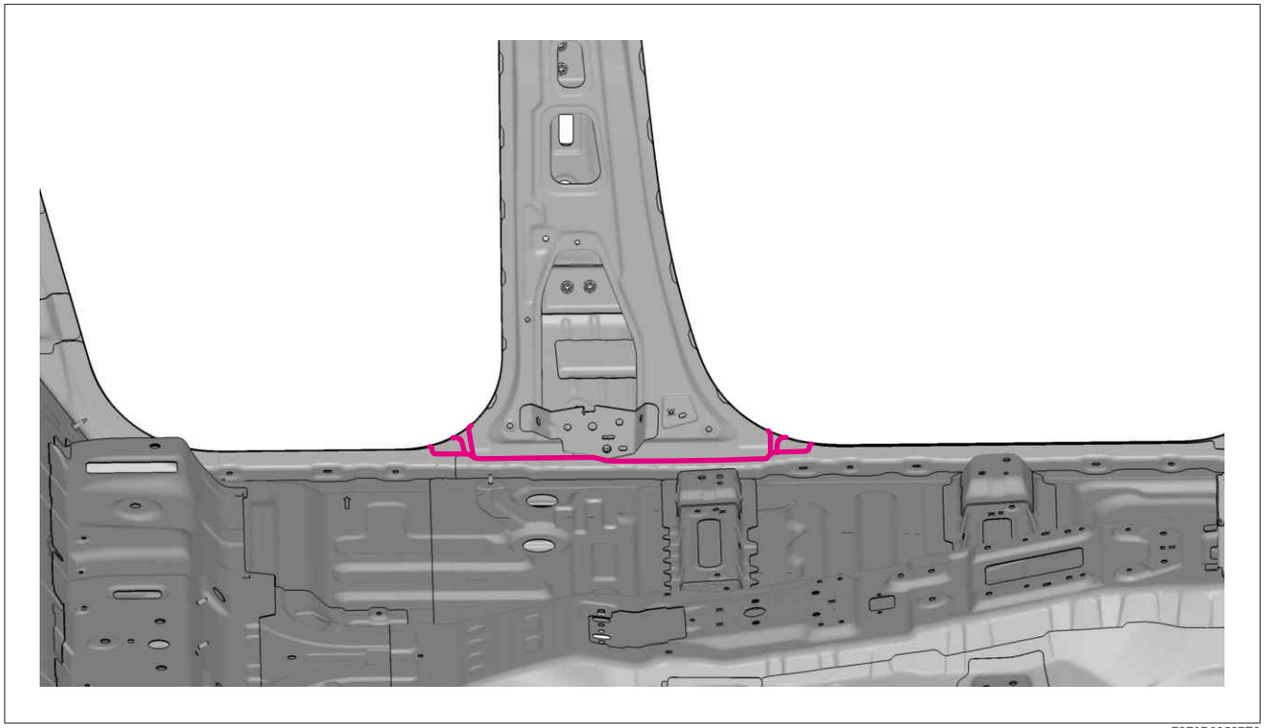
Section size of weld sealant: width of five-door one-cover flat sealant is centered on the weld (8-12) mm, width of round sealant is centered on the weld (2-6) mm, and width of brush coating is centered on the weld (5-40) mm. Try to apply min. width of brush coating in process.

Overlap area of pillar A of side wall and floor assembly (bilateral symmetry)



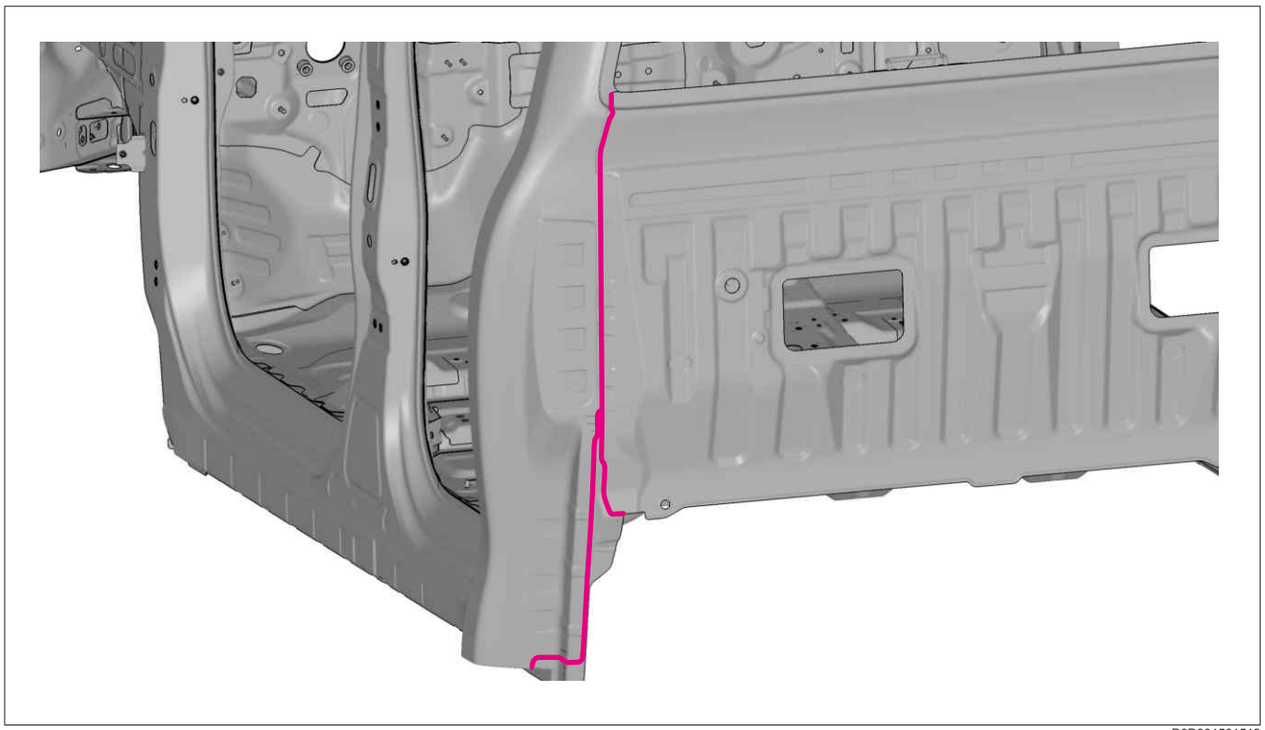
CB8BFB8E74EE

Overlap area of pillar B of side wall and floor assembly (bilateral symmetry)



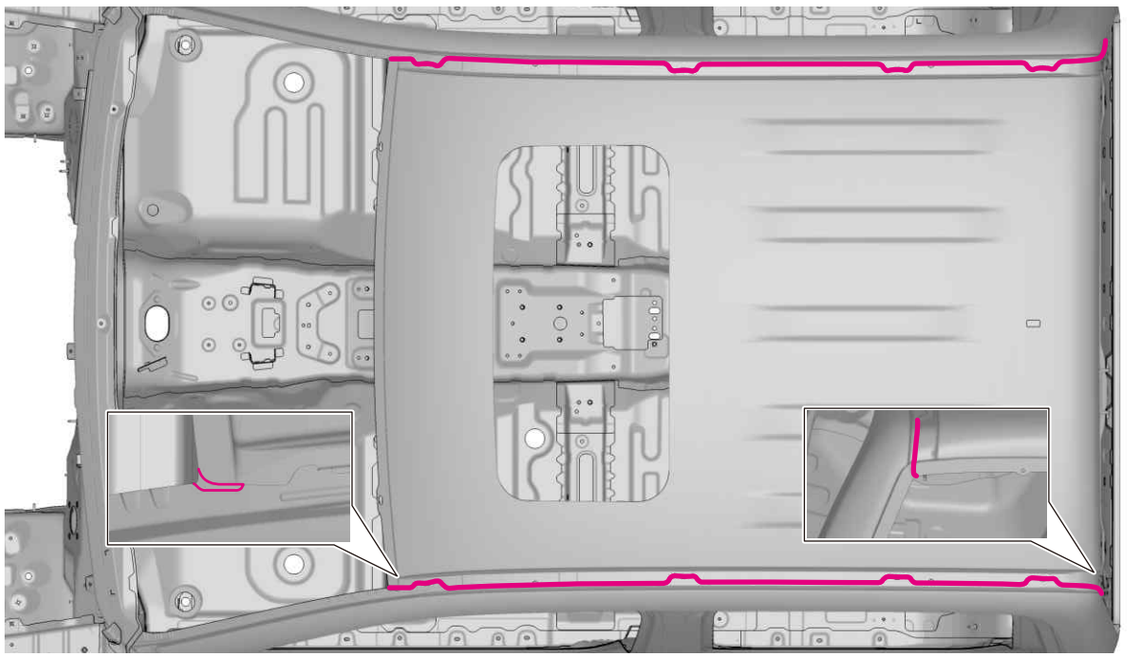
F2F0D03587E9

Overlap area of side wall and rear wall assembly (bilateral symmetry)



D3D901561512

Overlap area of side wall assembly and roof (same overlap position of sunroof version and non-sunroof version in this area)



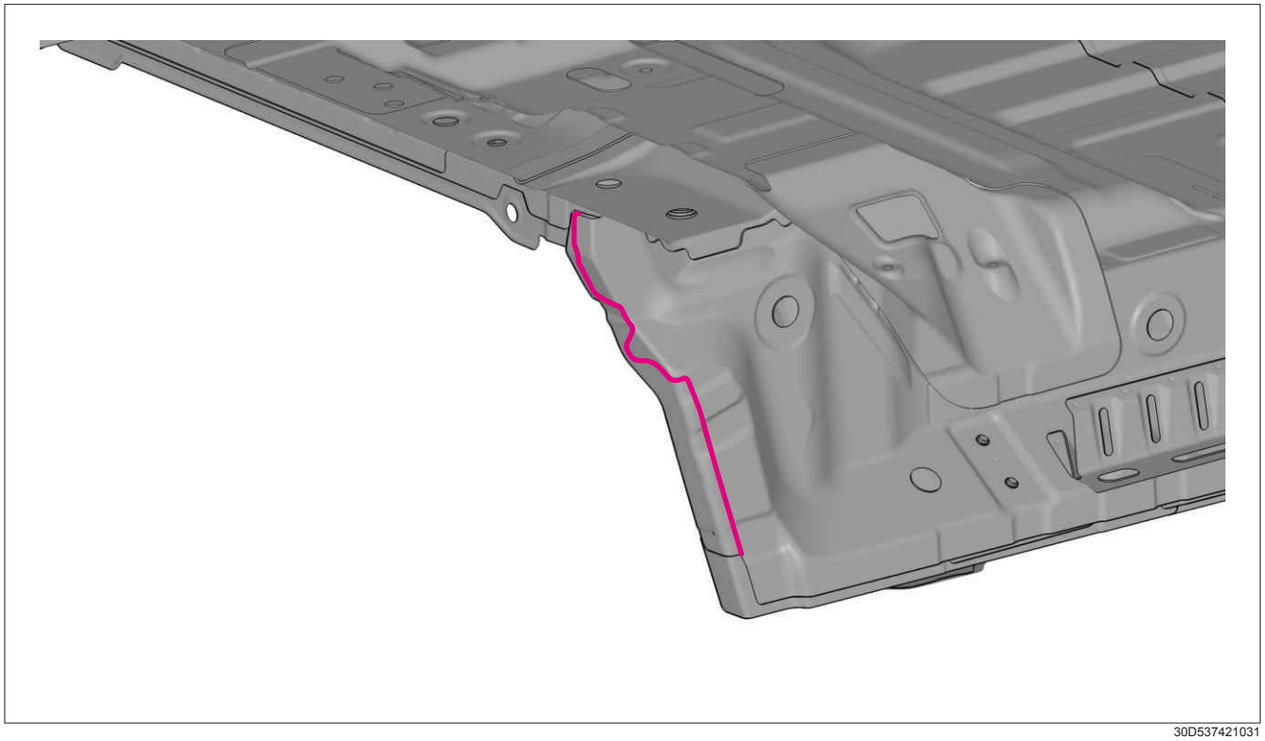
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Overlap area of hinge and side wall outer plate (bilateral symmetry)

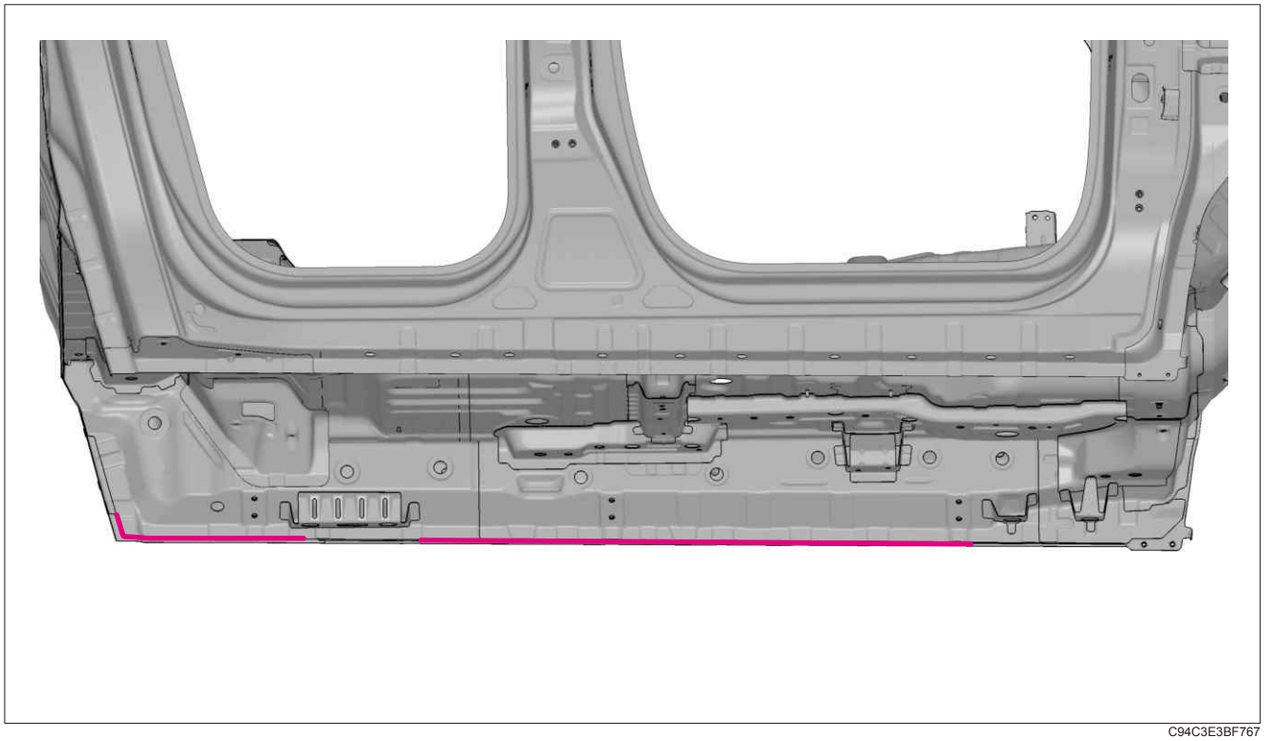


EAD7CCC66AB6

Overlap area of side wall and floor sill strip (bilateral symmetry)

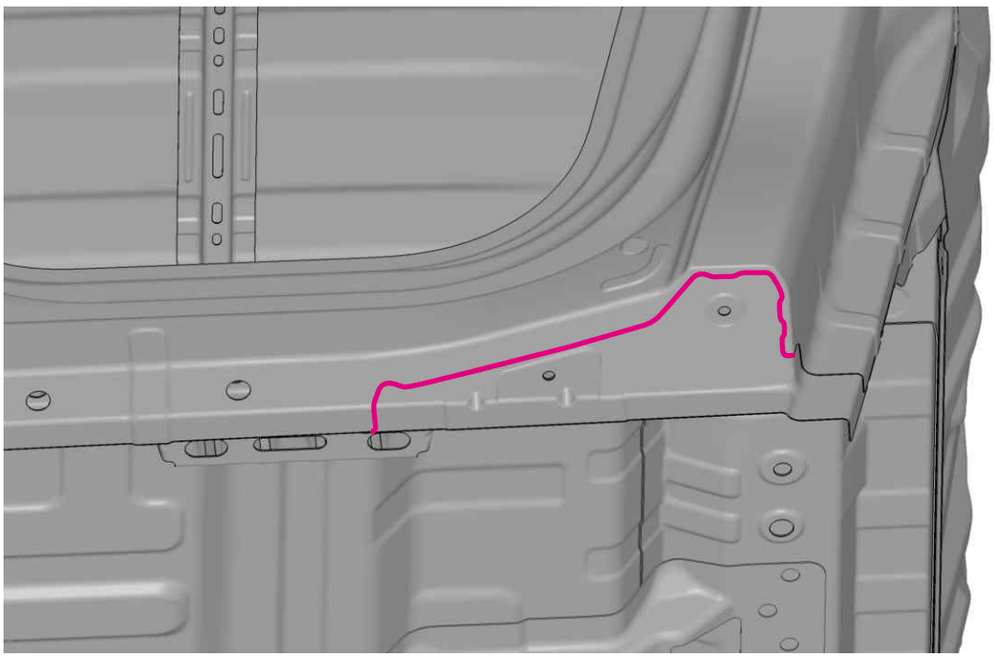


30D537421031



C94C3E3BF767

Overlap area of side wall outer plate and reinforcing plate patch of sill strip (bilateral symmetry)



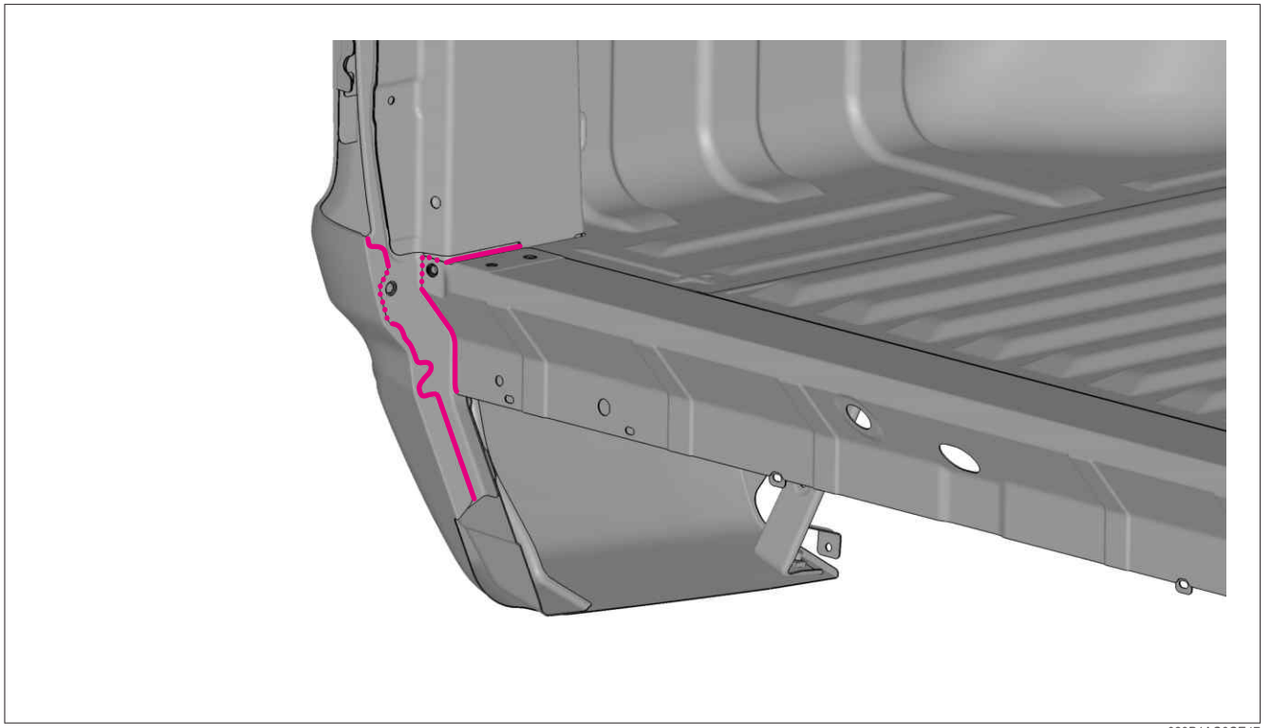
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Area of rear column assembly of trunk



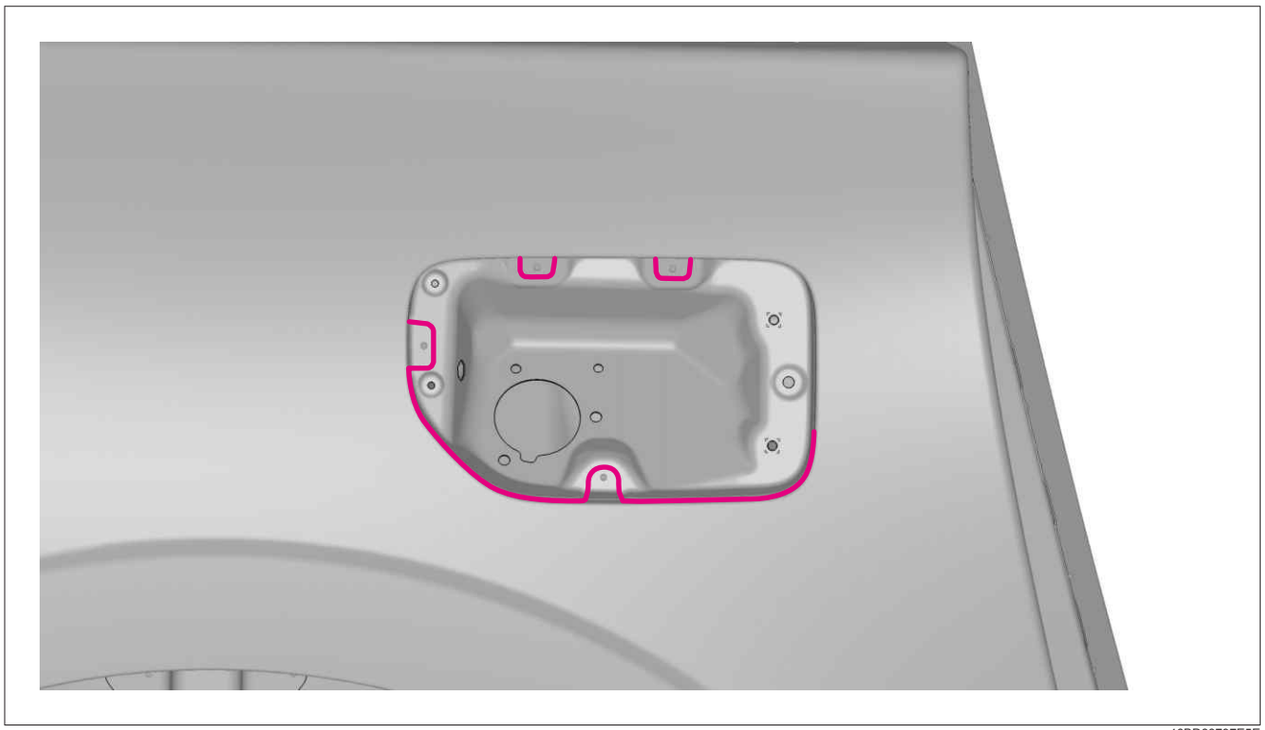
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Overlap area of rear column assembly of trunk and rear beam of trunk

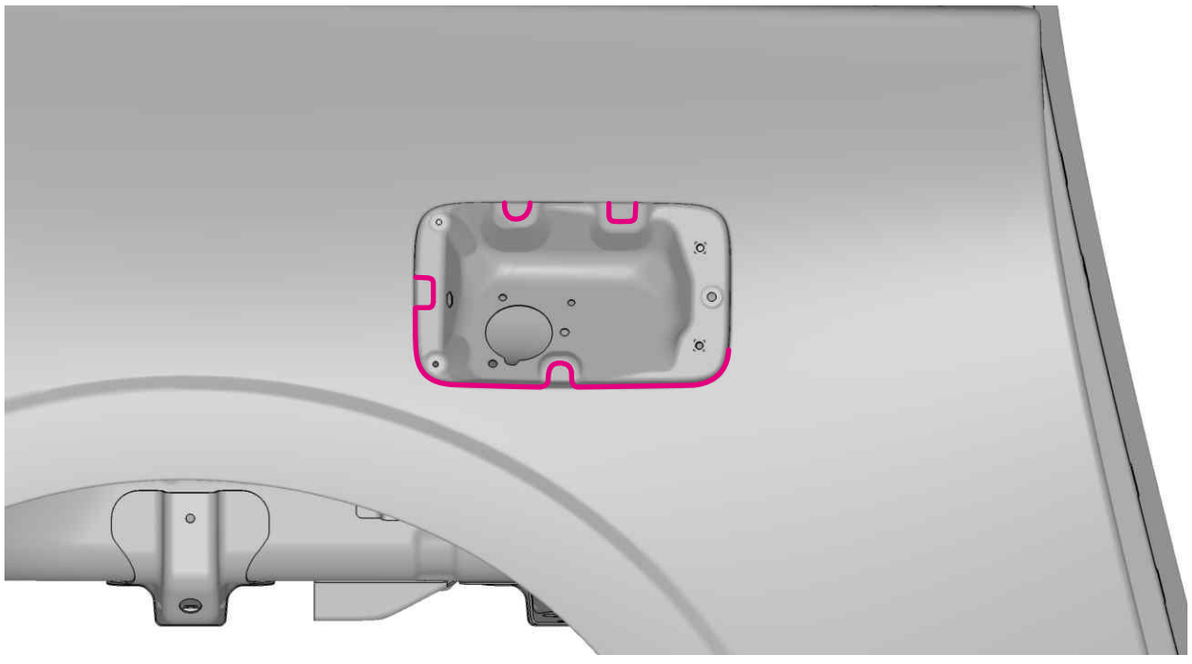


023B1AC6CE47

Overlap area of fixing seat of fuel filler and outer side plate of trunk

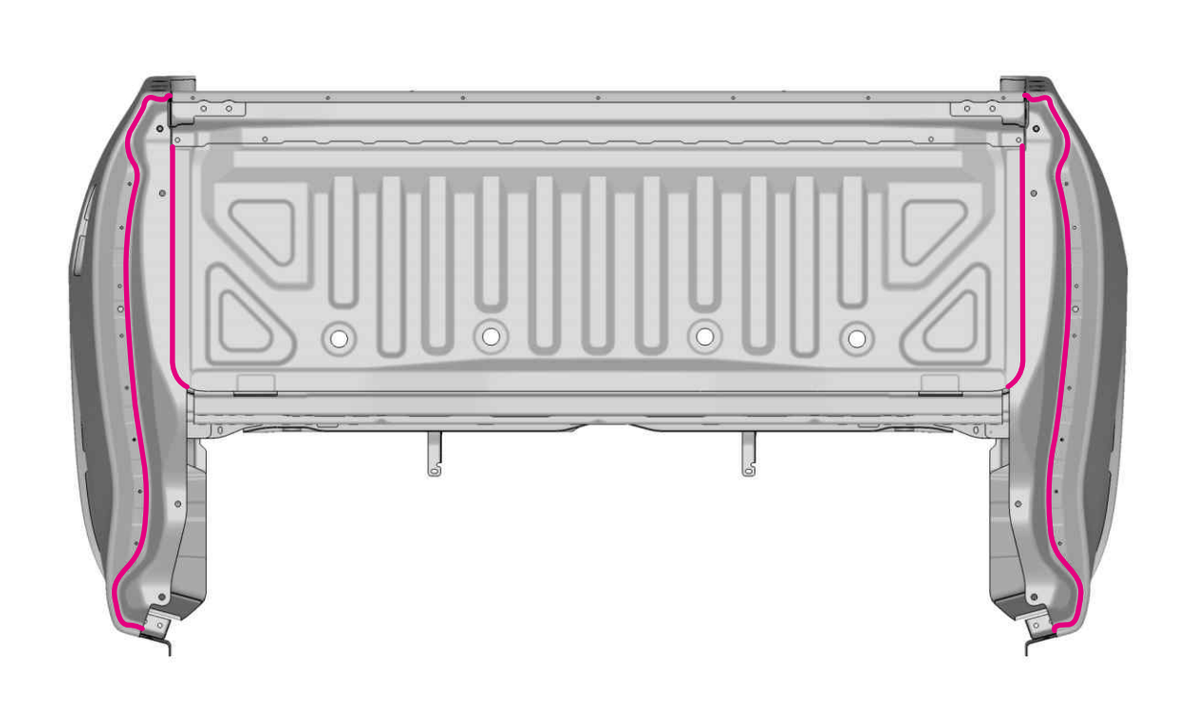


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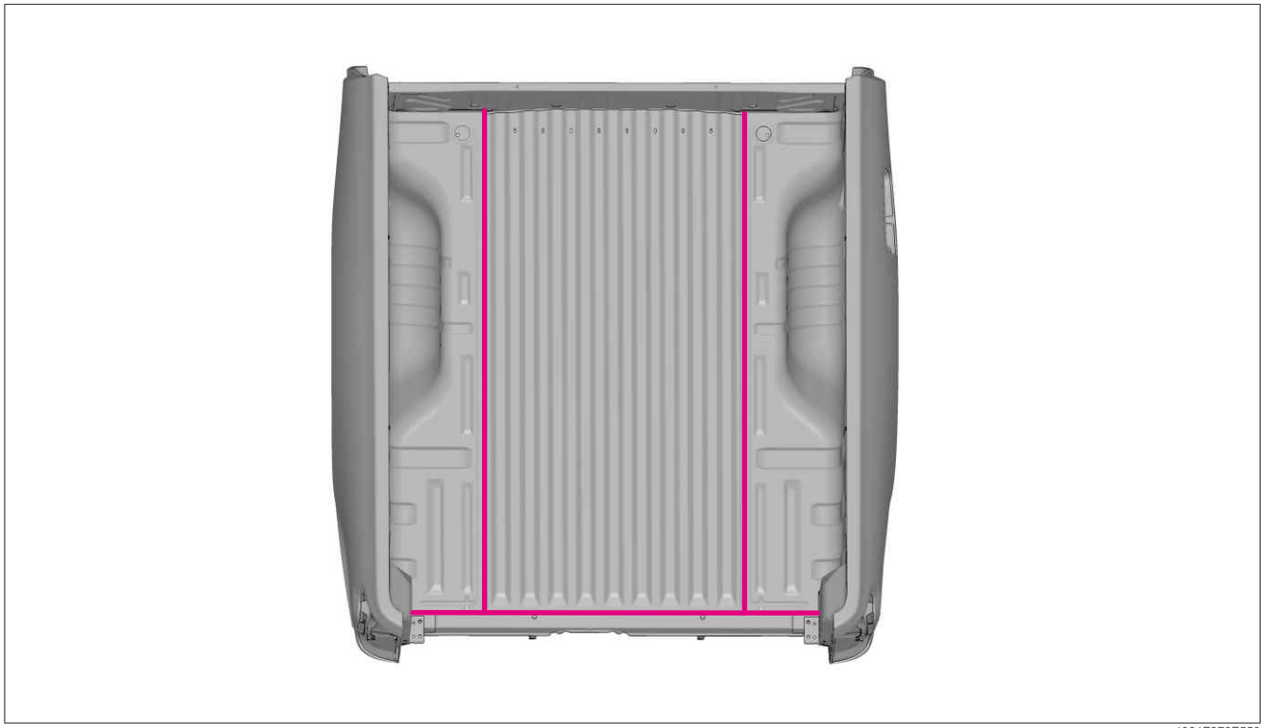
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Overlap area of outer side plate of trunk and front connecting plate



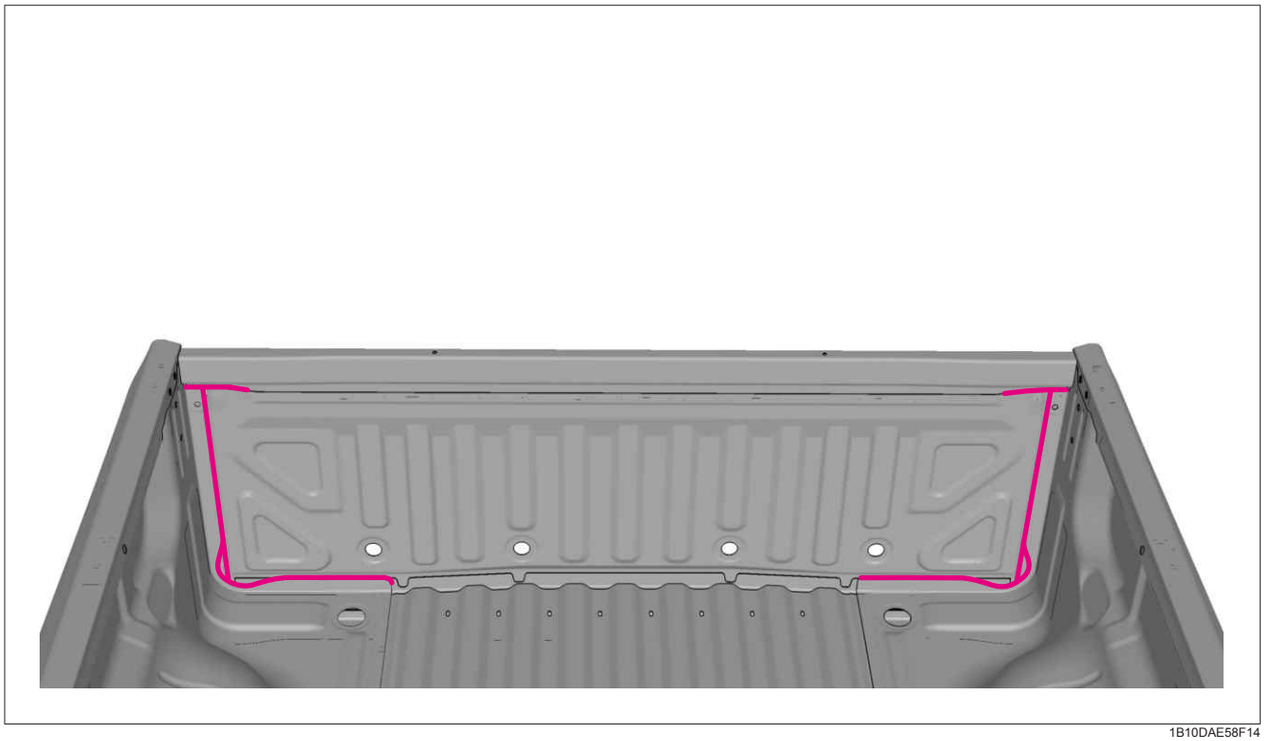
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Floor area of trunk

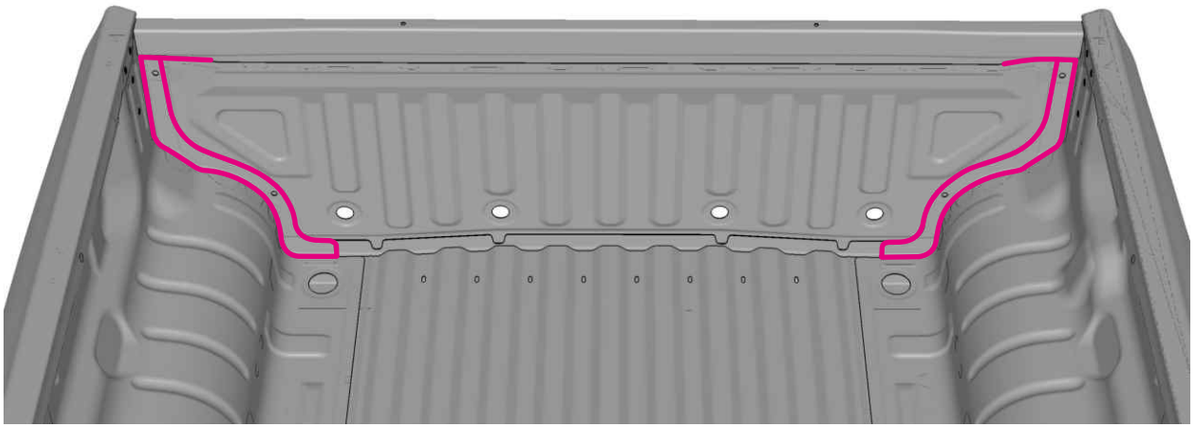


4091F278F553

Front plate area of trunk

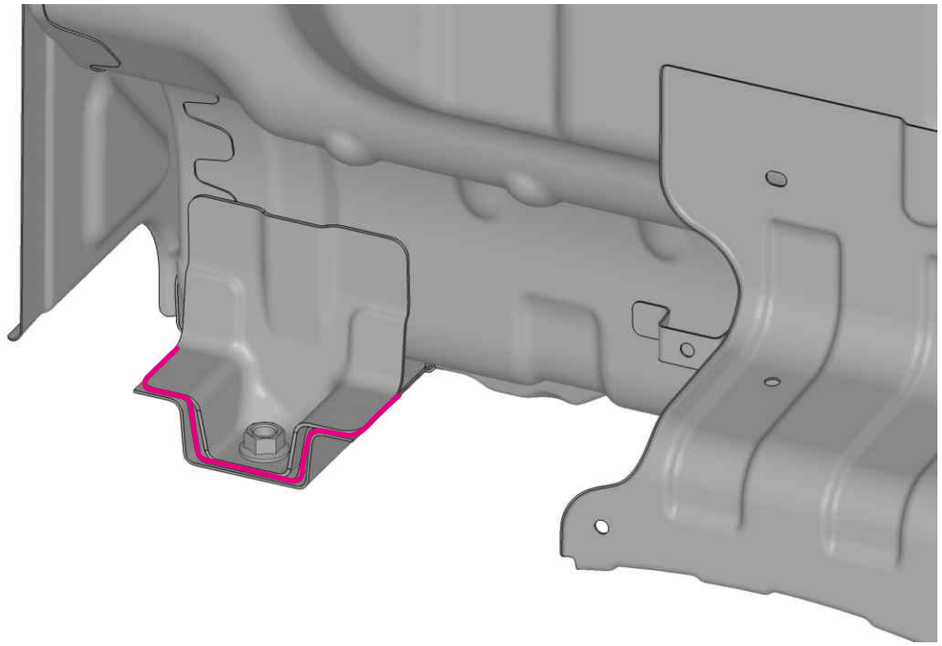


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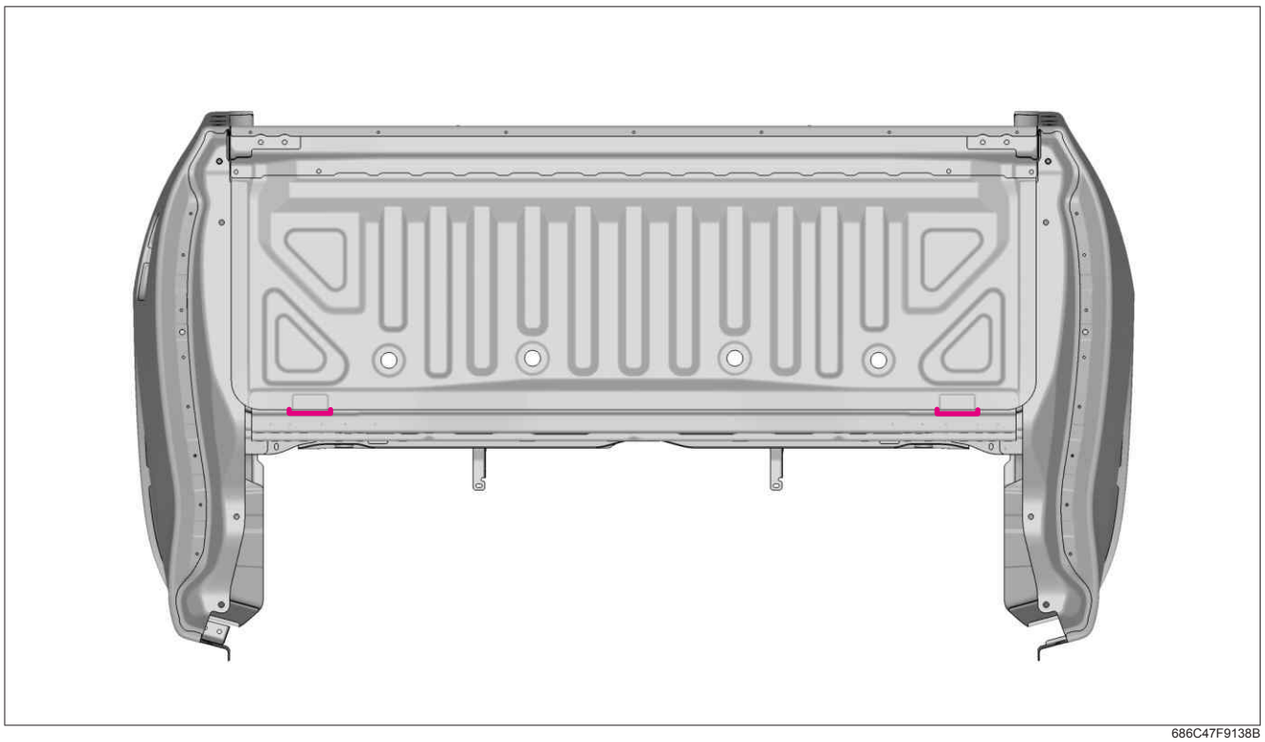


1F10F397E418

Area of first beam of trunk

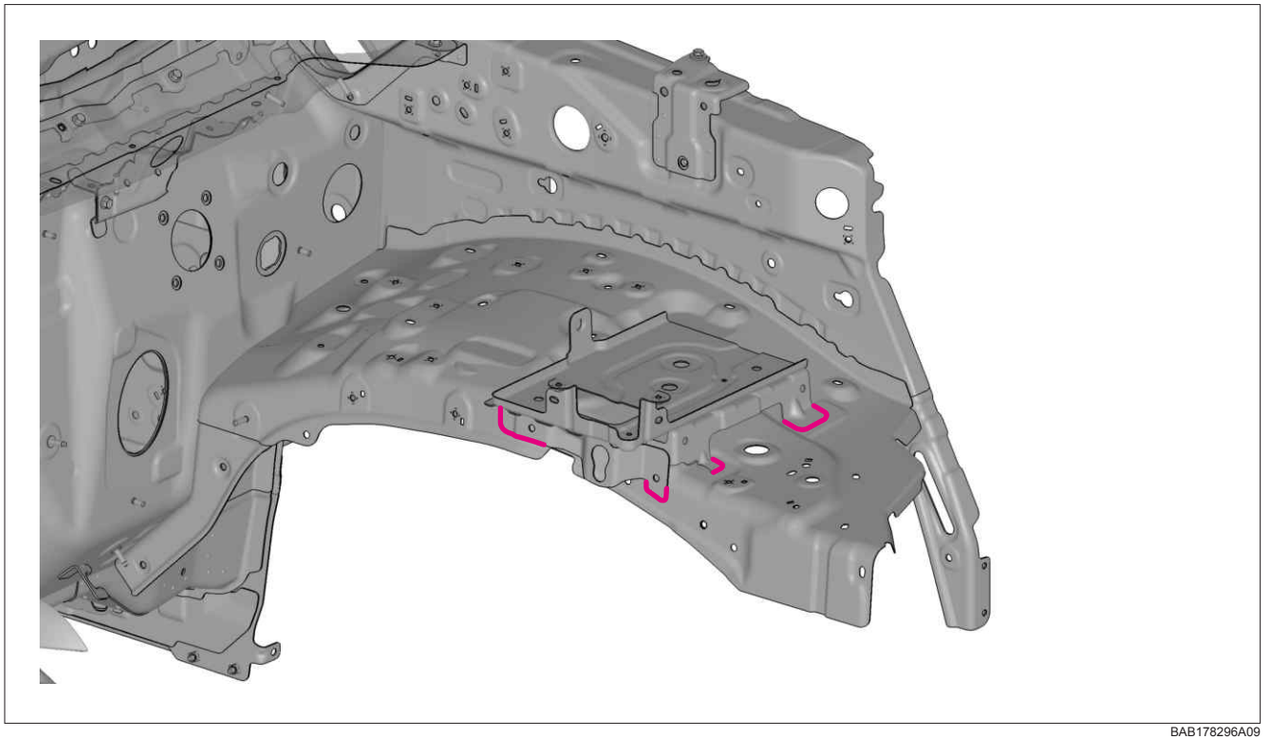


D5D81675C04C



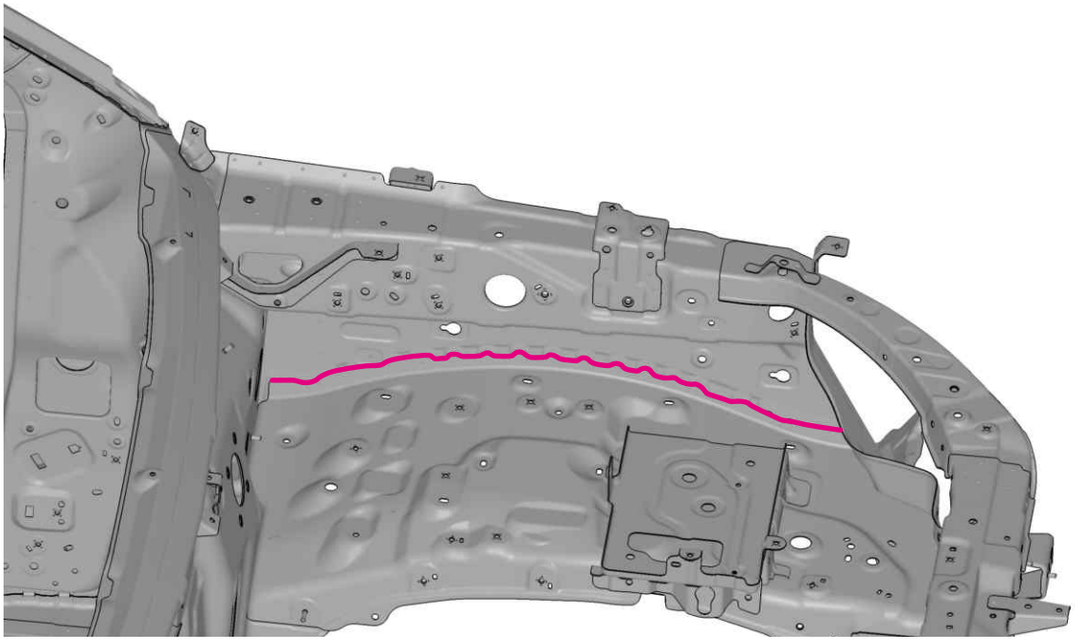
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Welding area of battery mounting bracket and front left wheel cover



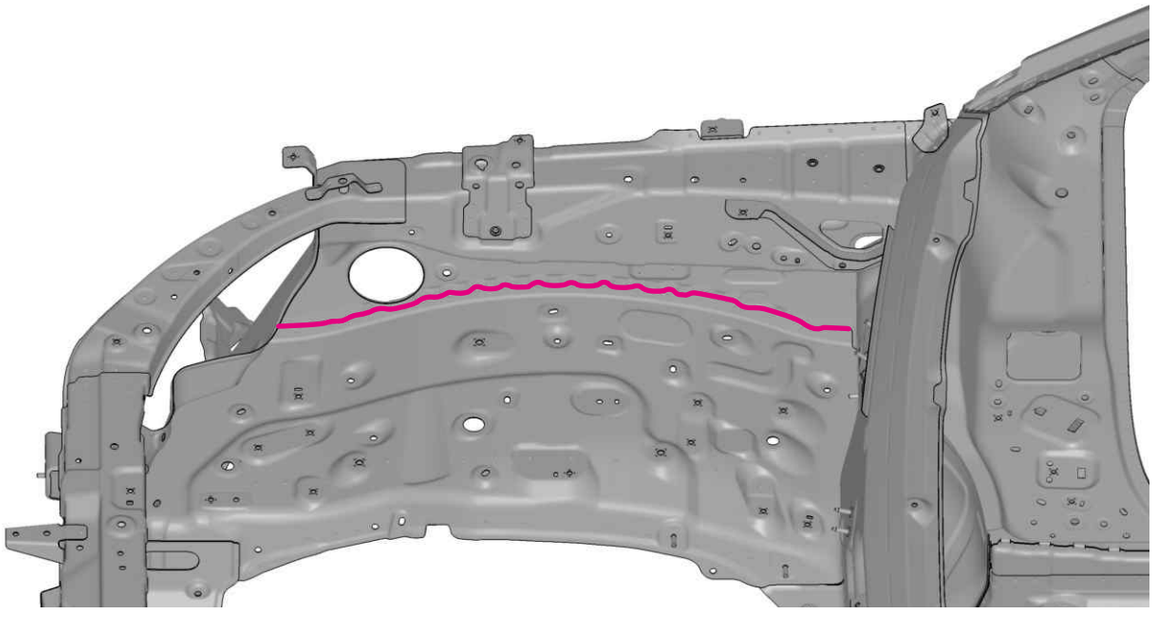
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Welding area of front left wheel cover and side beam of front left wheel cover



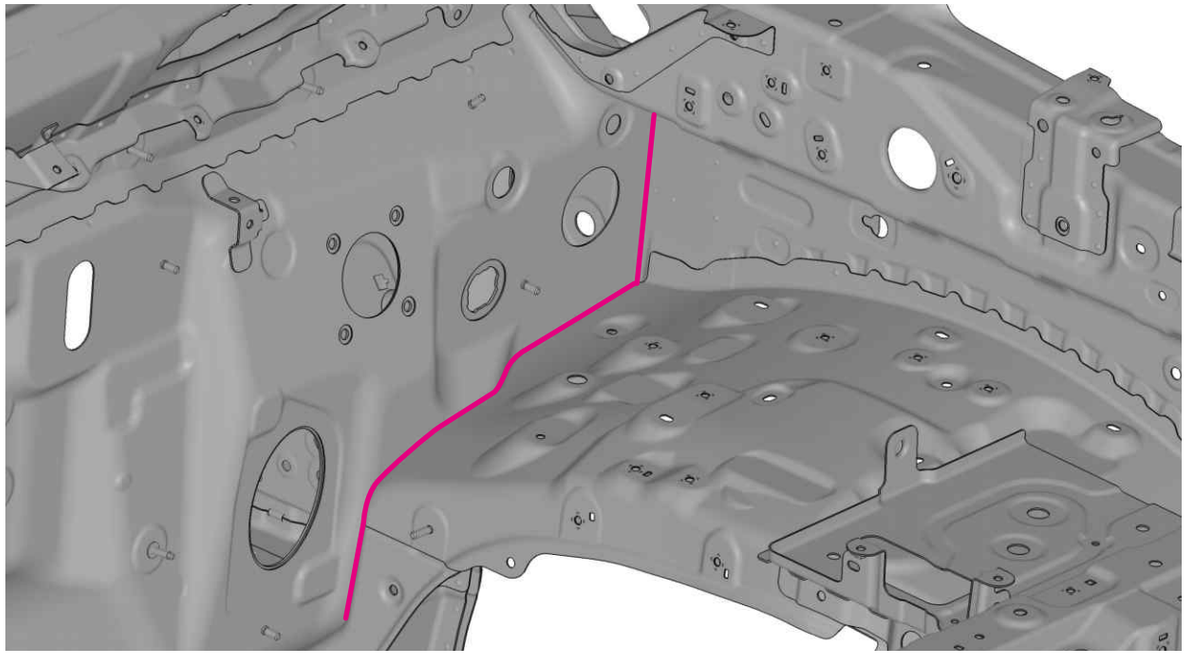
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Welding area of front right wheel cover and side beam of front right wheel cover



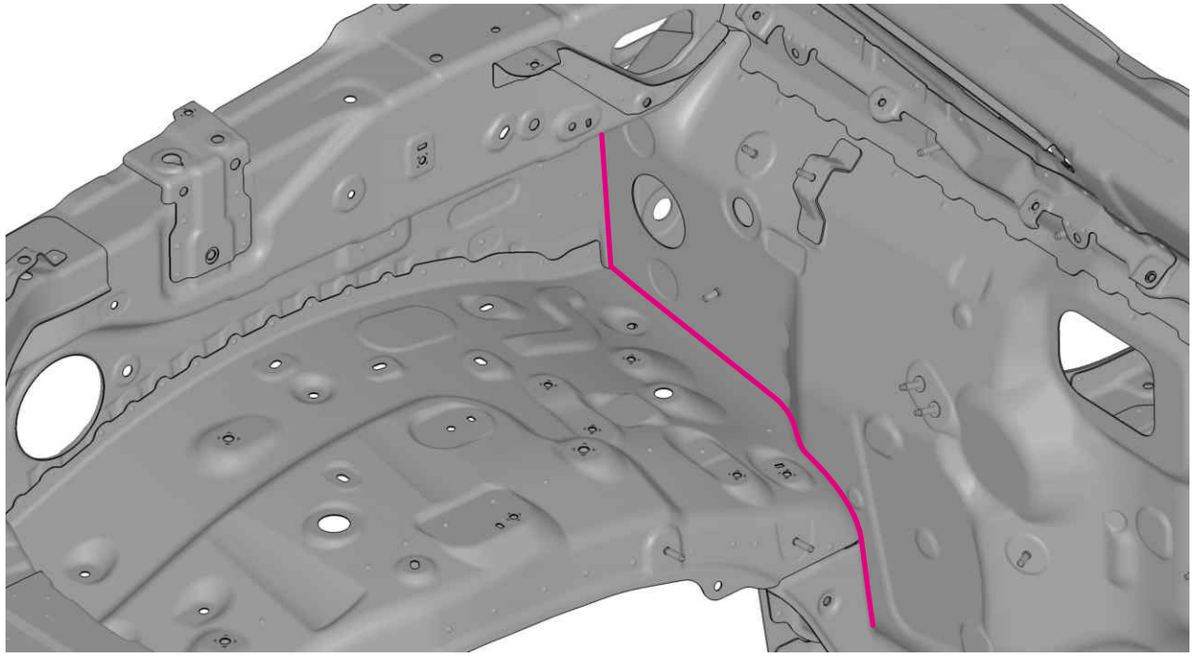
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Welding area of front left wheel cover and front wall



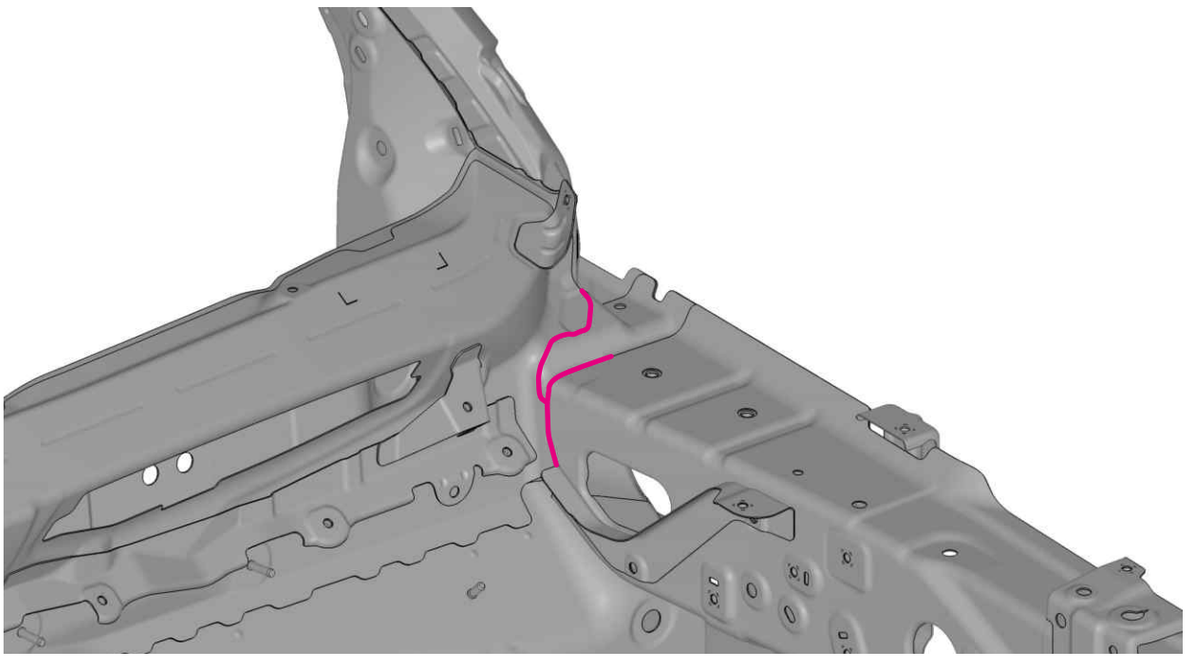
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Welding area of front right wheel cover and front wall



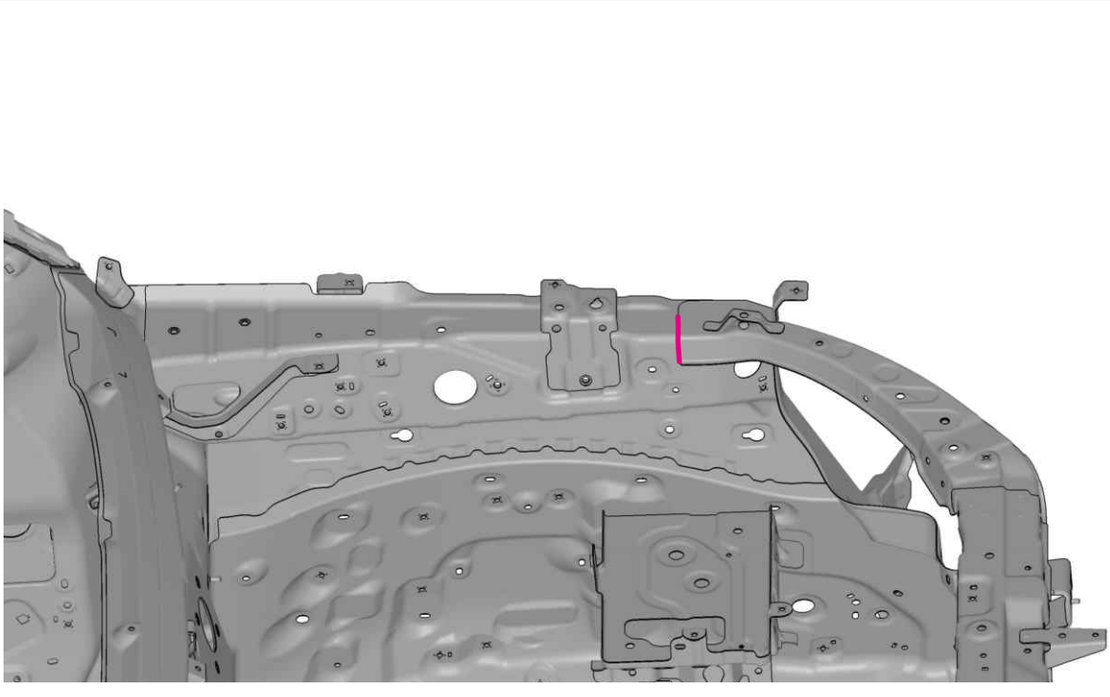
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Welding area of side beam of front left wheel cover and connecting plate of front wall



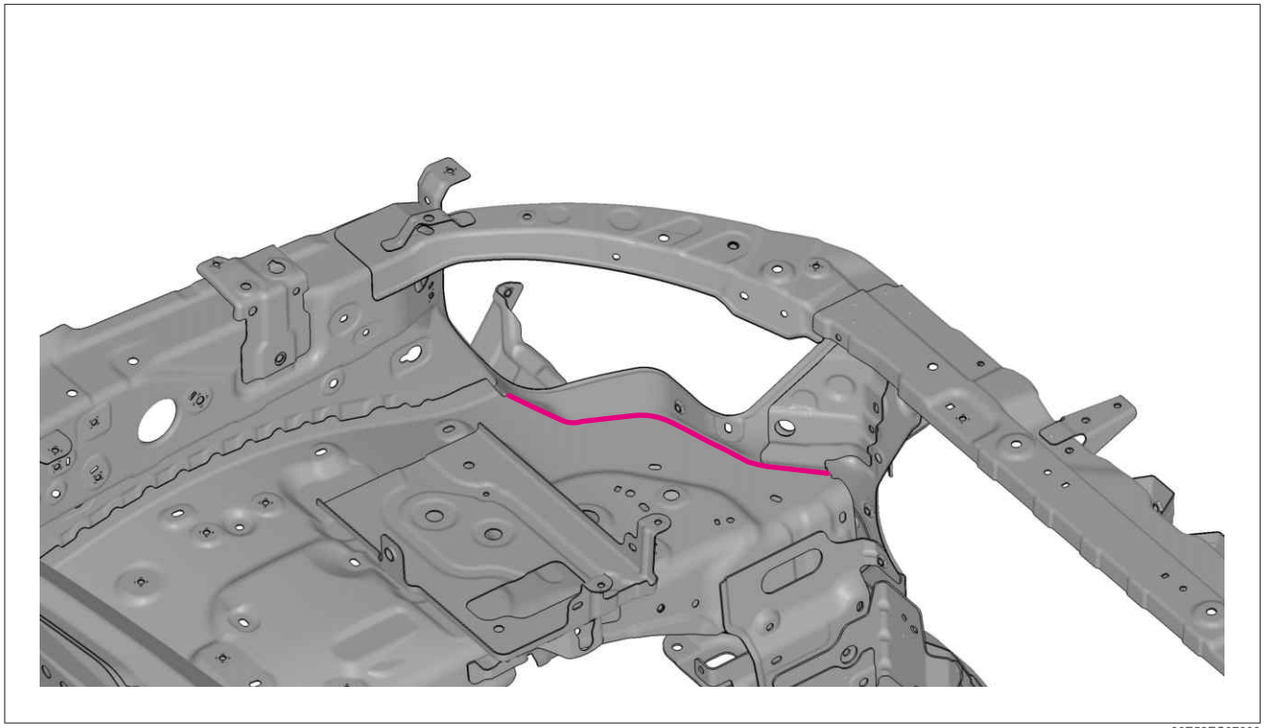
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Welding area of side beam of front left wheel cover and upper beam of left headlamp



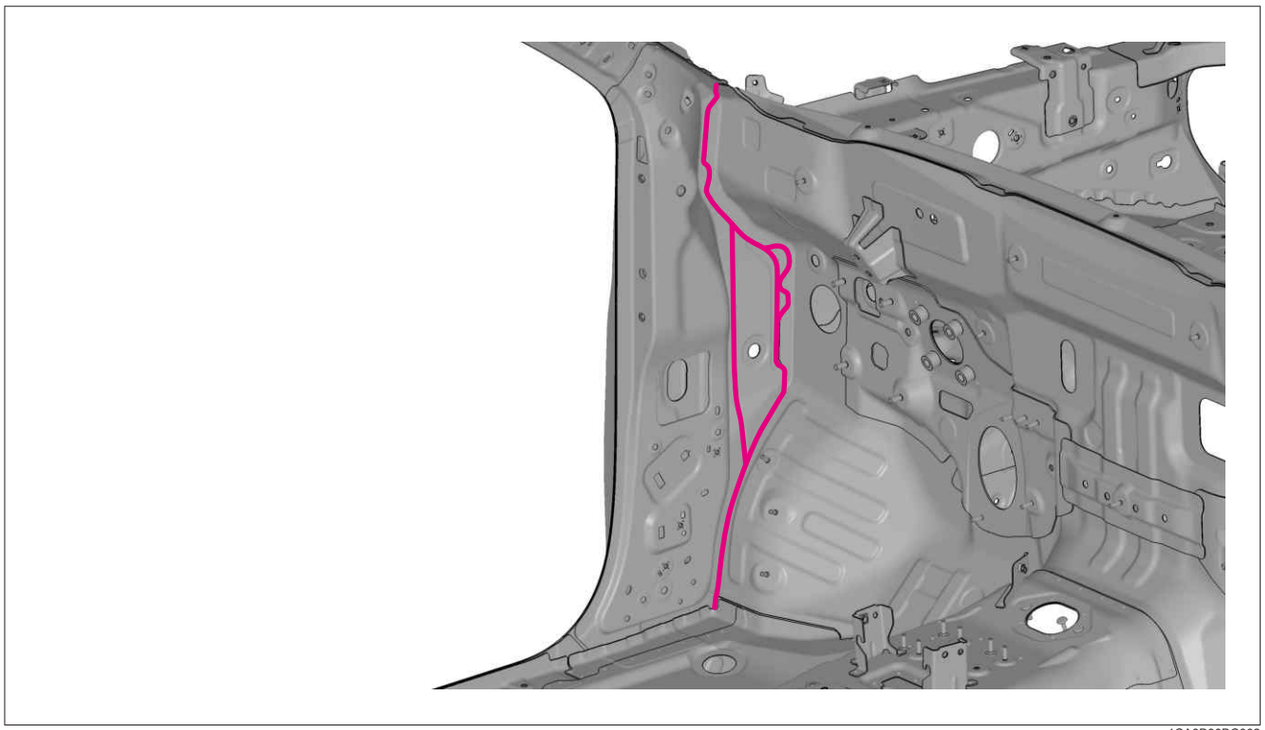
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Welding area of front left wheel cover and lower mounting plate of left headlamp

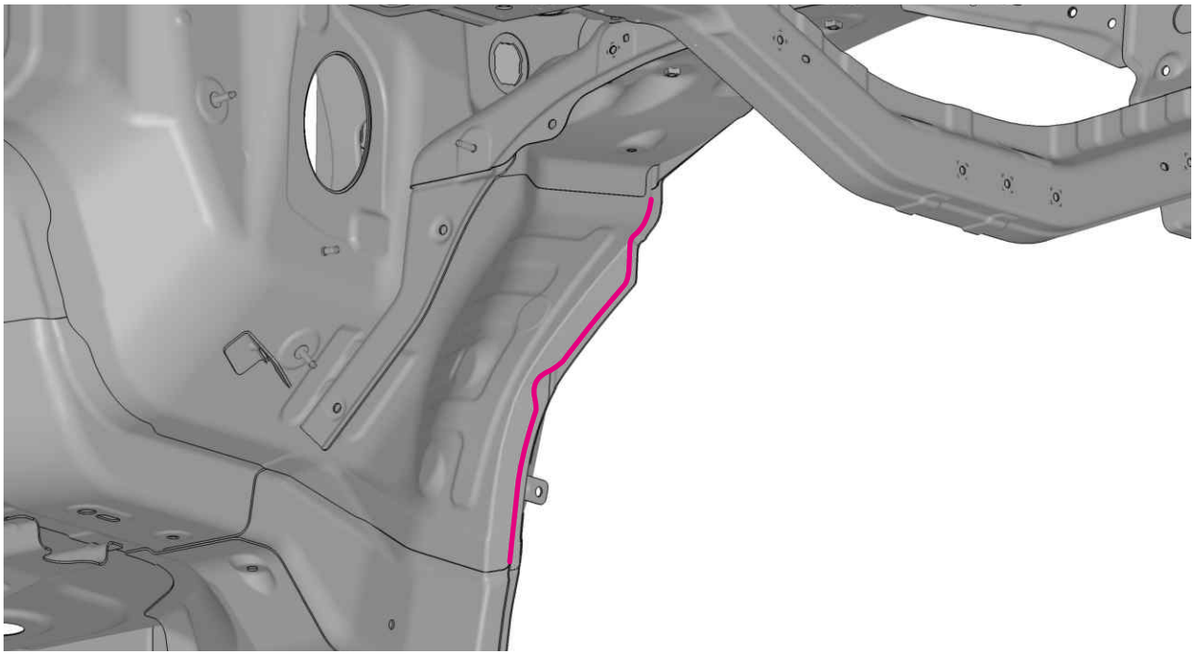


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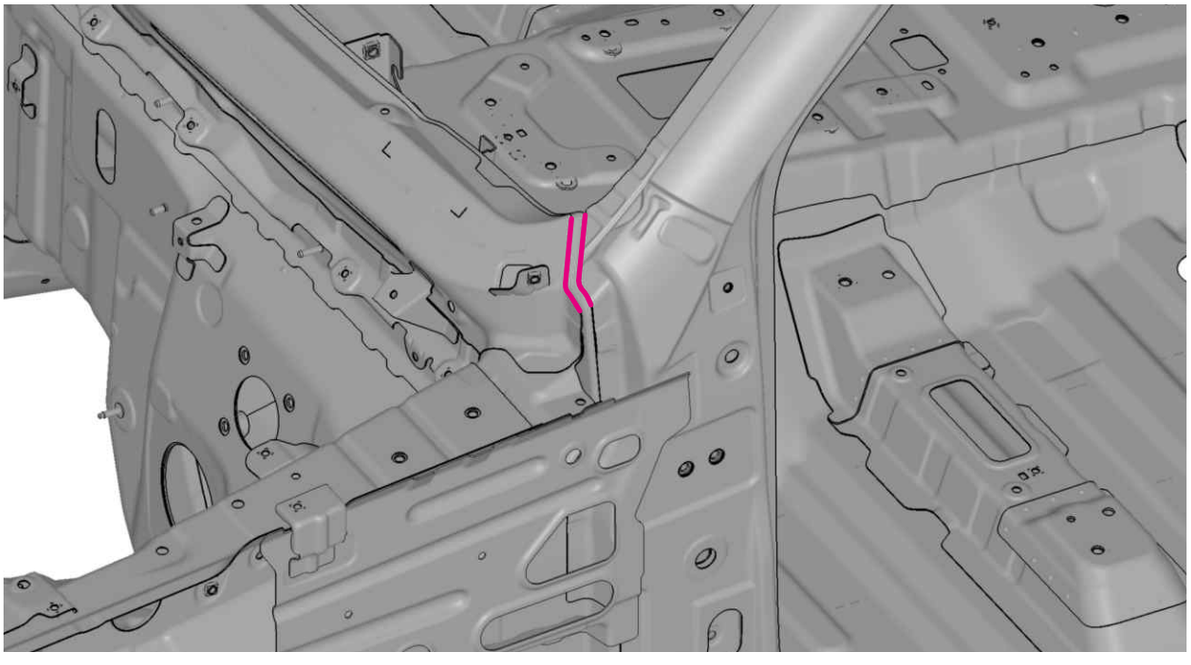
Welding area of front wall and pillar A of side wall



1CA3B30BC062

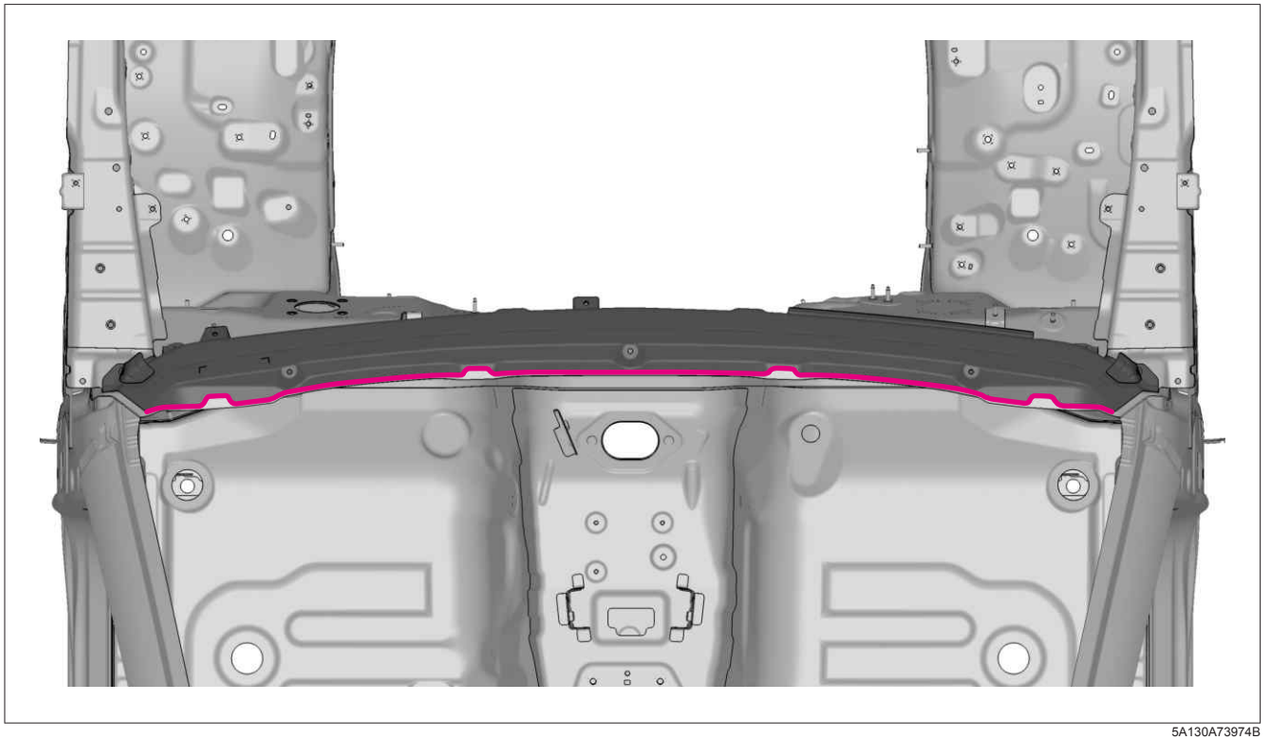


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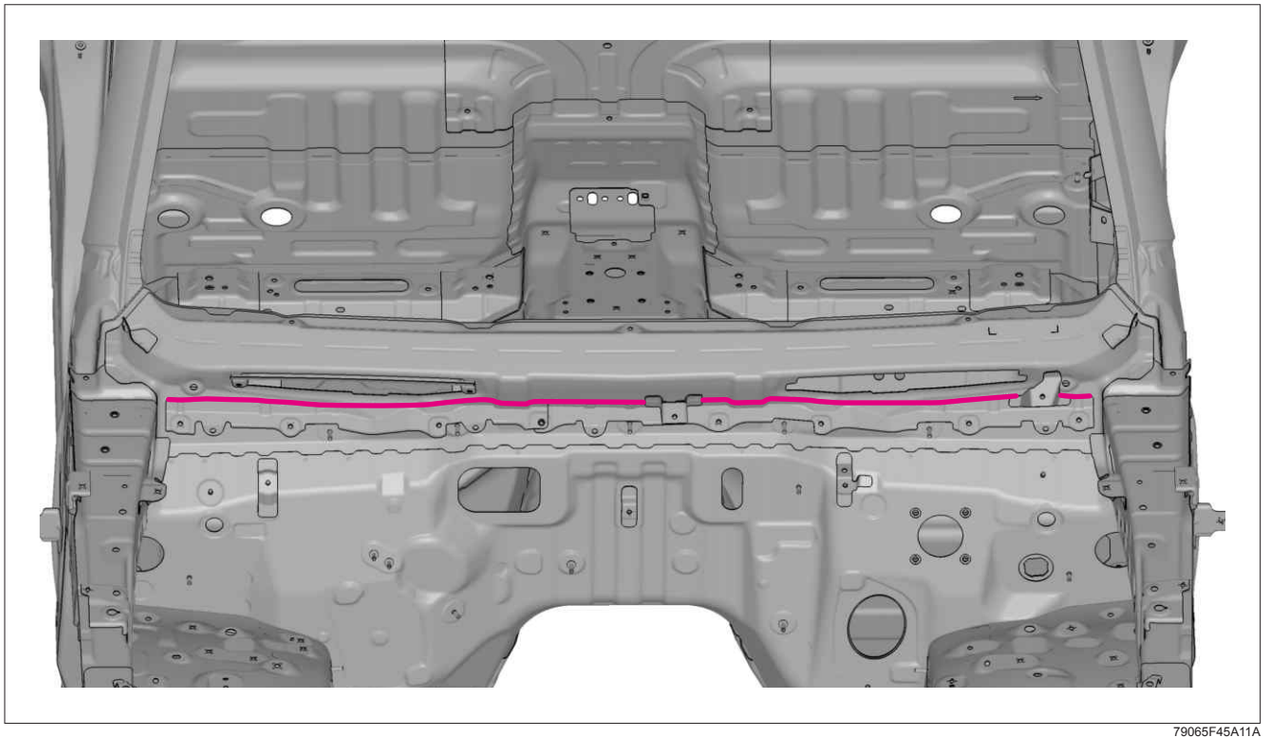


E4E9B66132AE

Welding area of front wall and front windshield lower beam

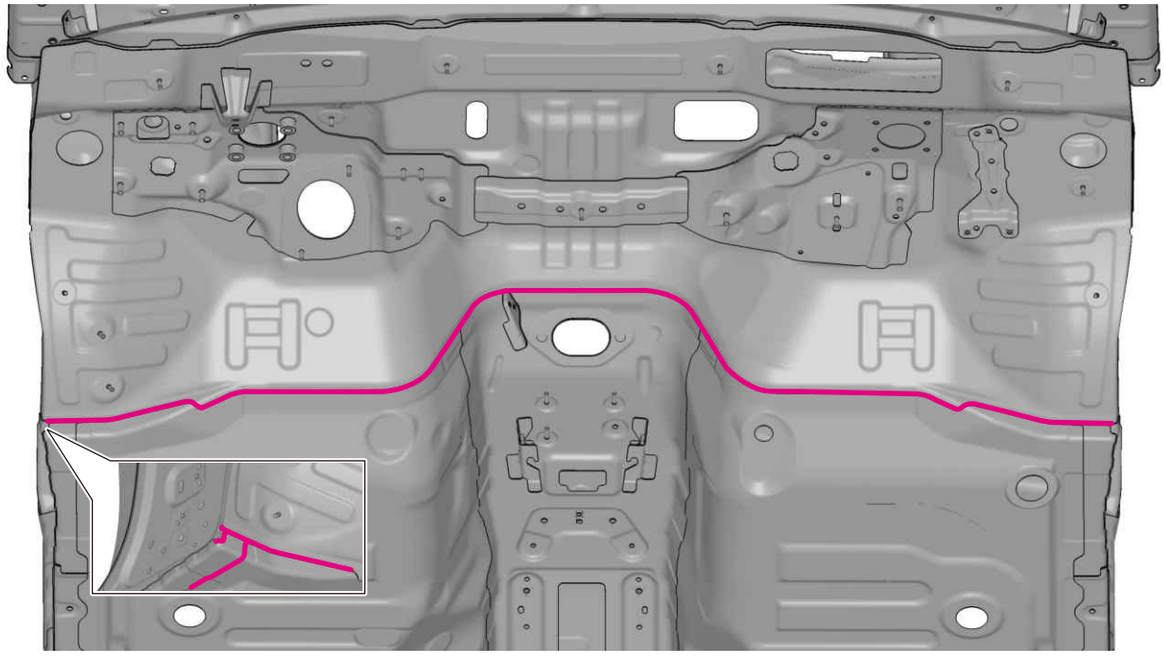


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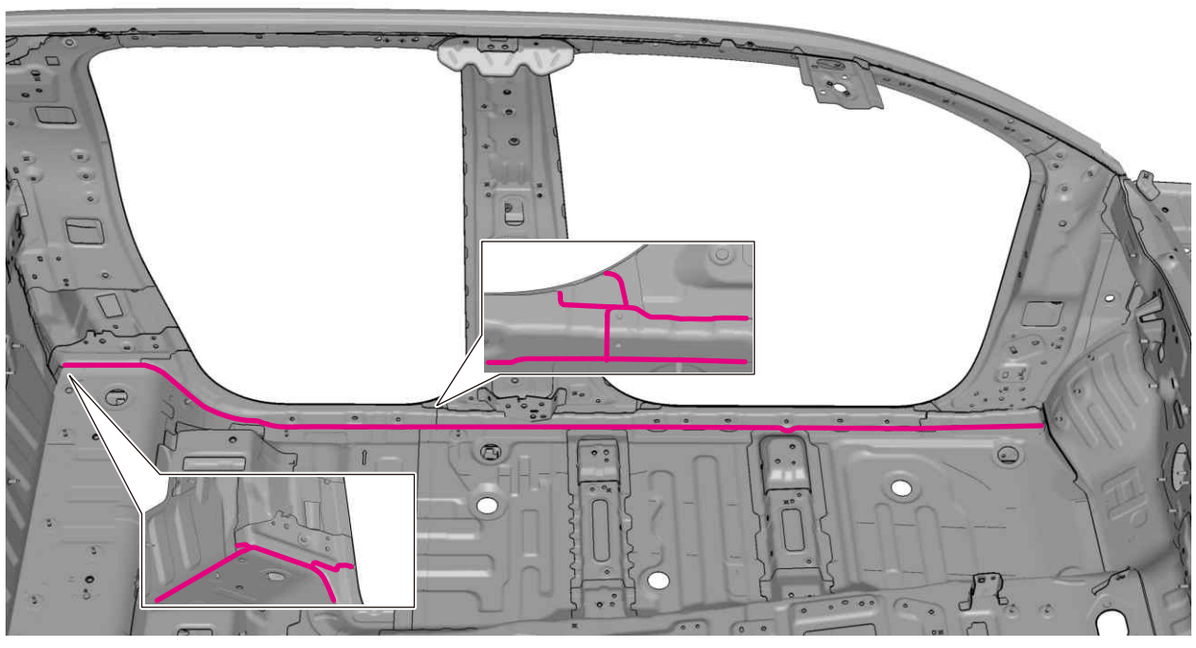


79065F45A11A

Overlap area of front floor assembly, rear floor assembly and sill strip assembly

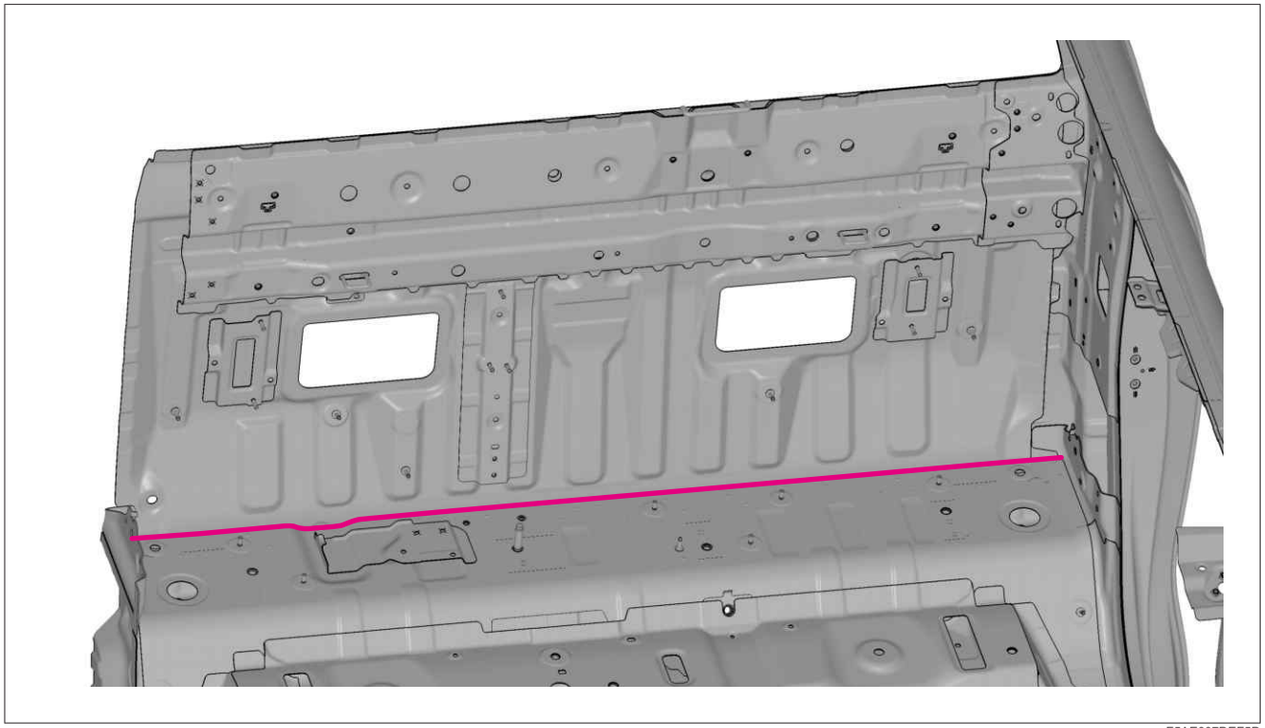


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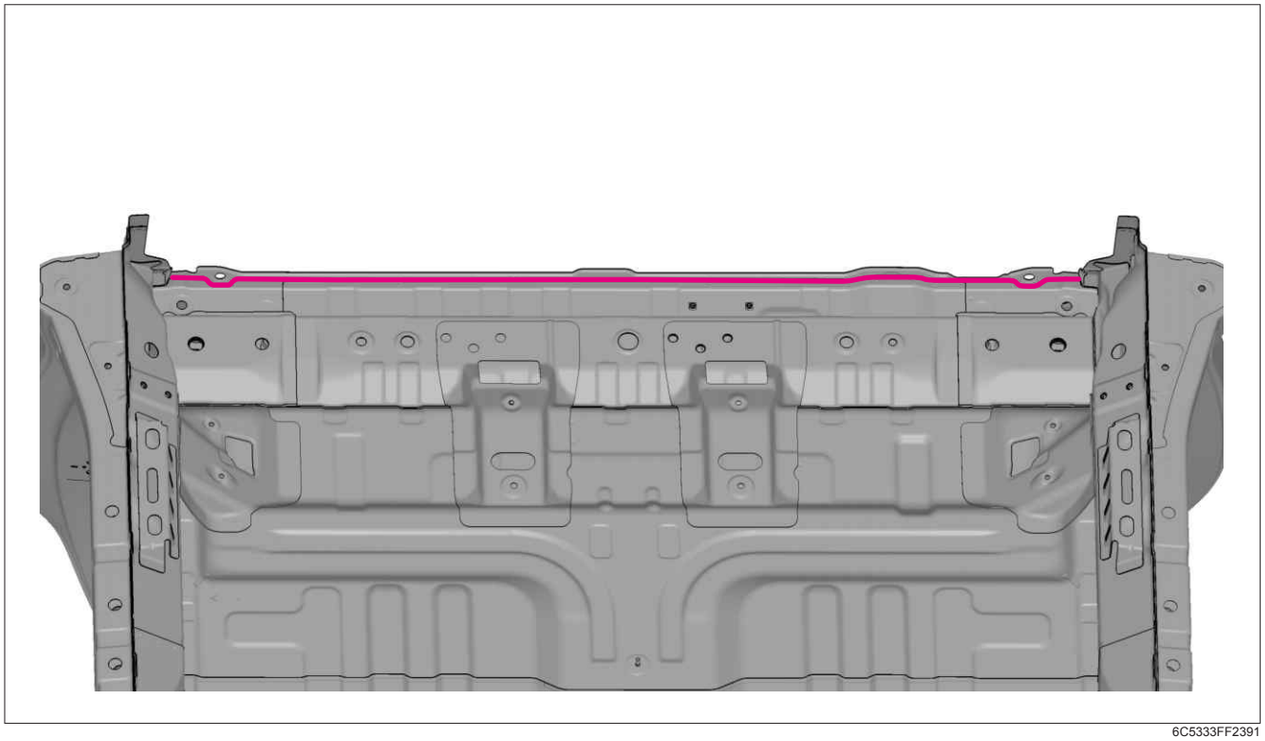


E6D689F3266E

Overlap area of rear floor assembly and rear wall assembly

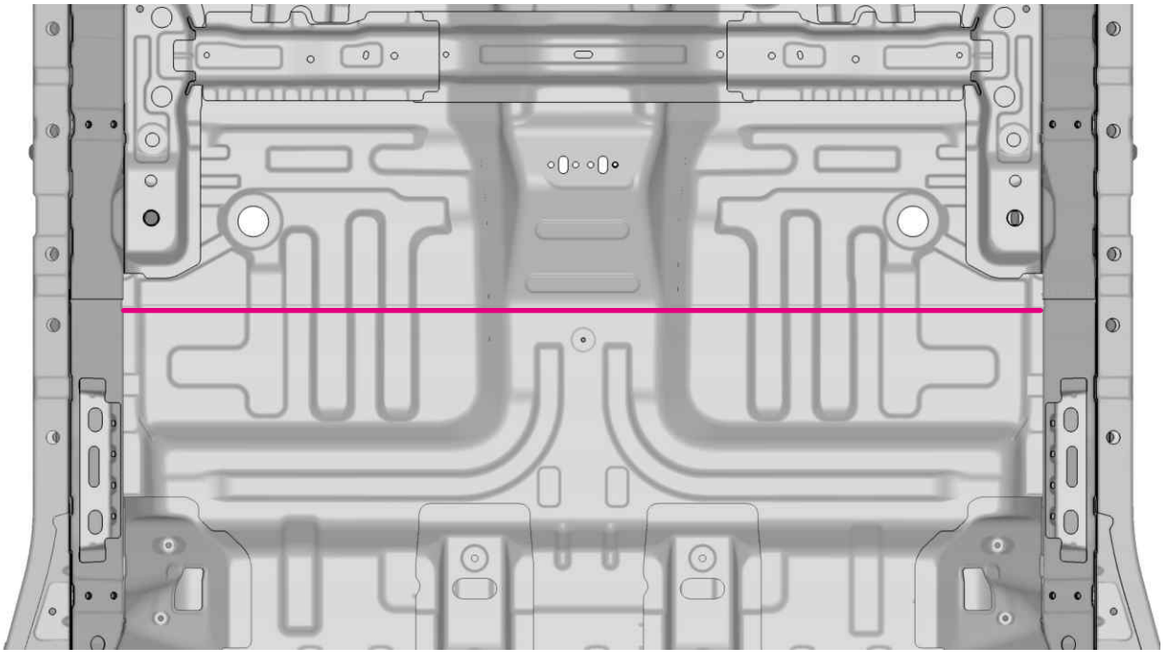


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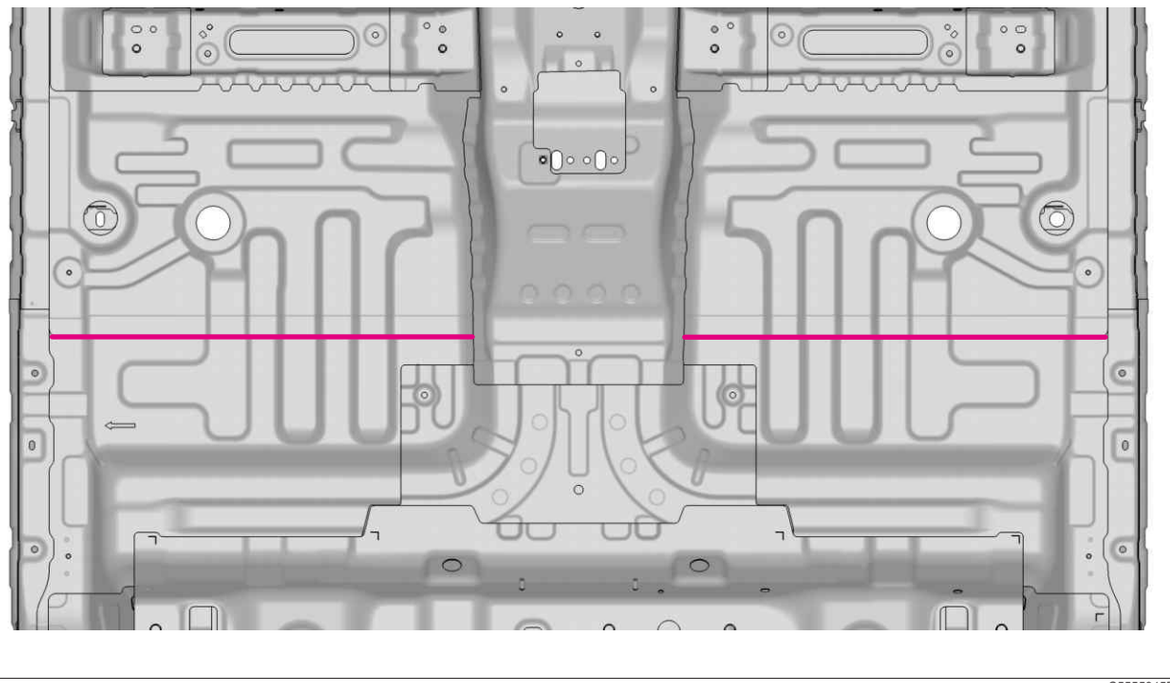


6C5333FF2391

Overlap area of front floor assembly and rear floor assembly



29548DA5BDB9

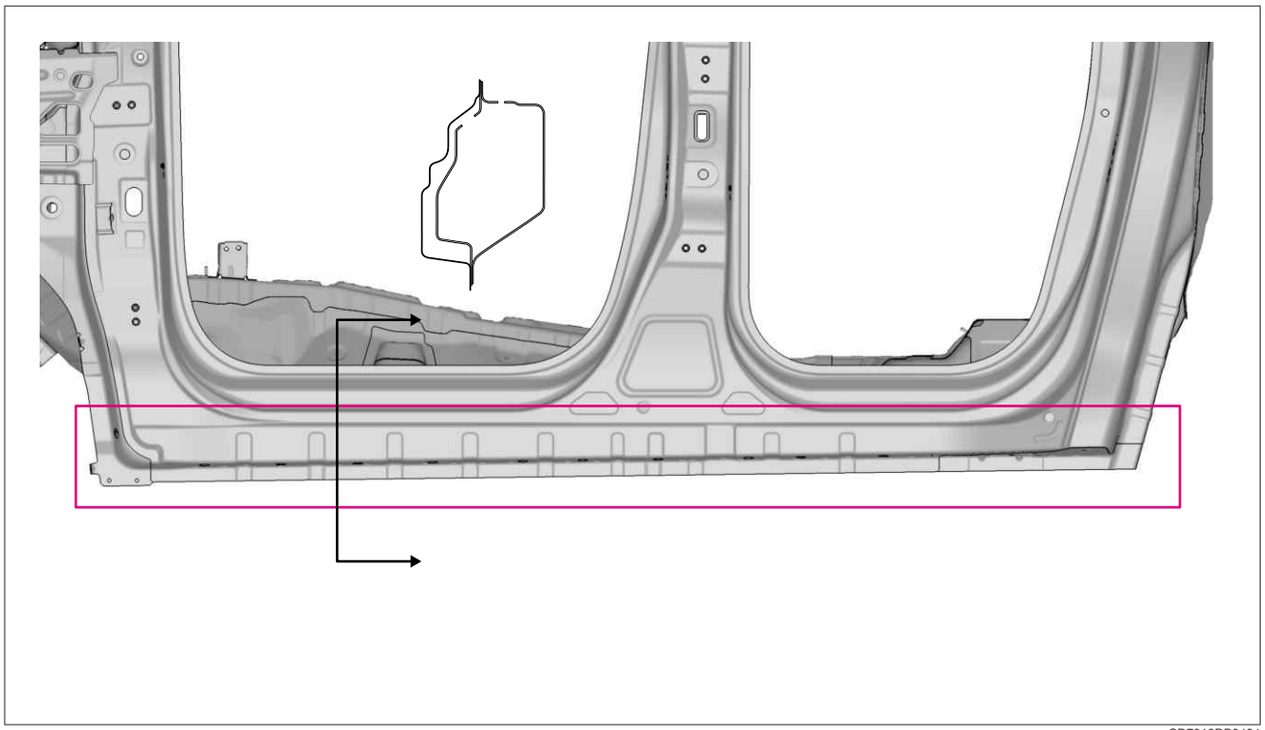


C5555945FBAA

Cavity anti-corrosion wax

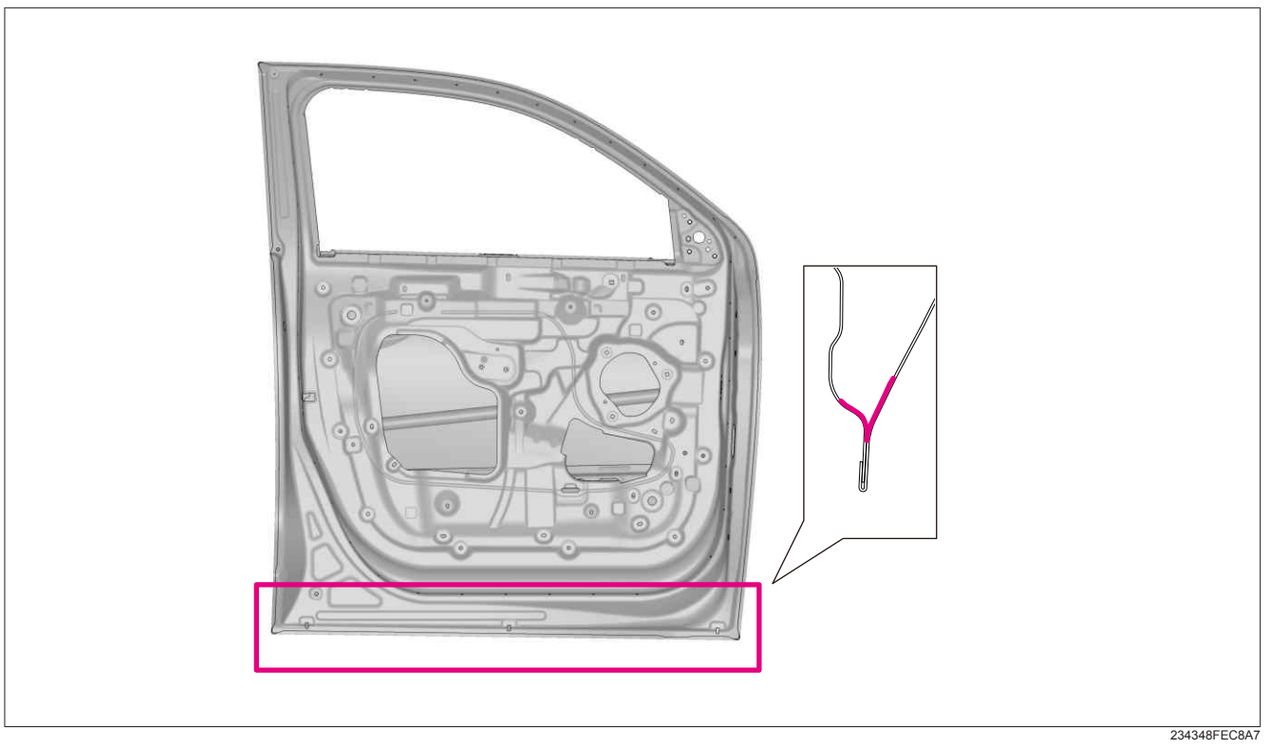
Model: AC 115Q, color: light brown paste, wax-spraying position: inner cavity.

Entire sill beam



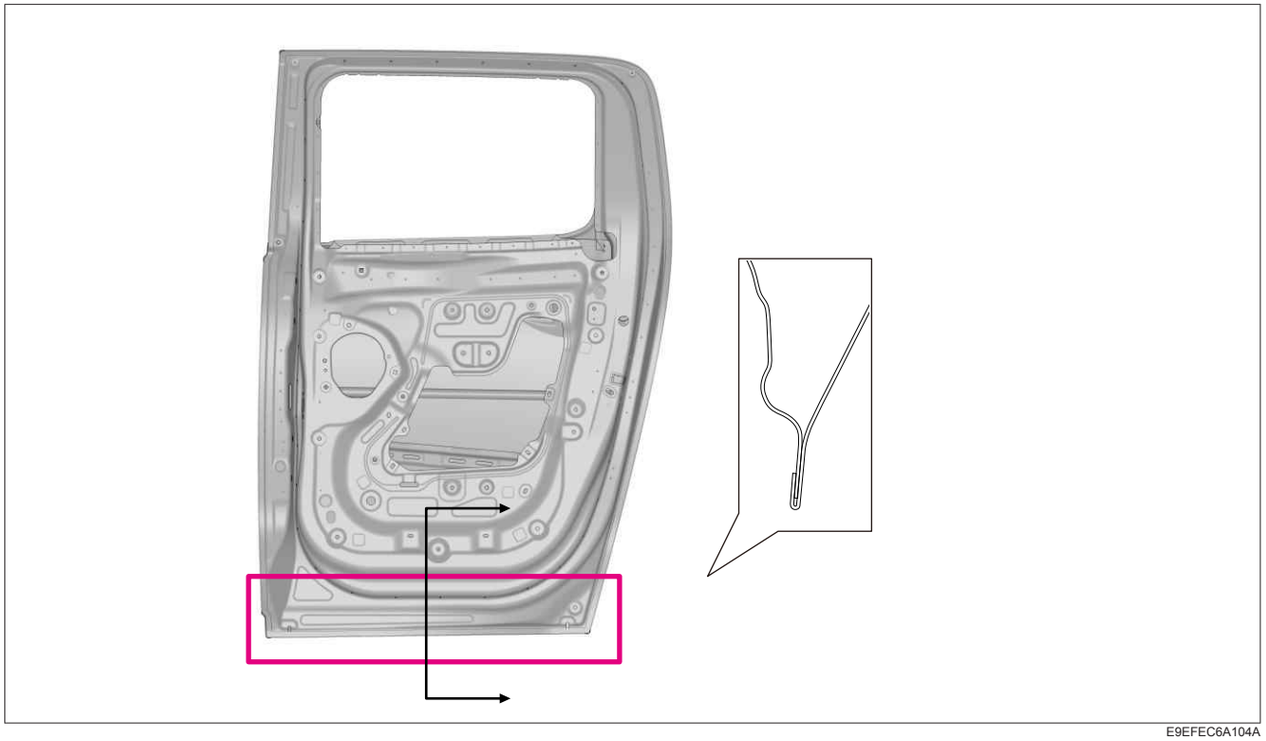
CD7319DB3494

Front left door (bilateral symmetry)



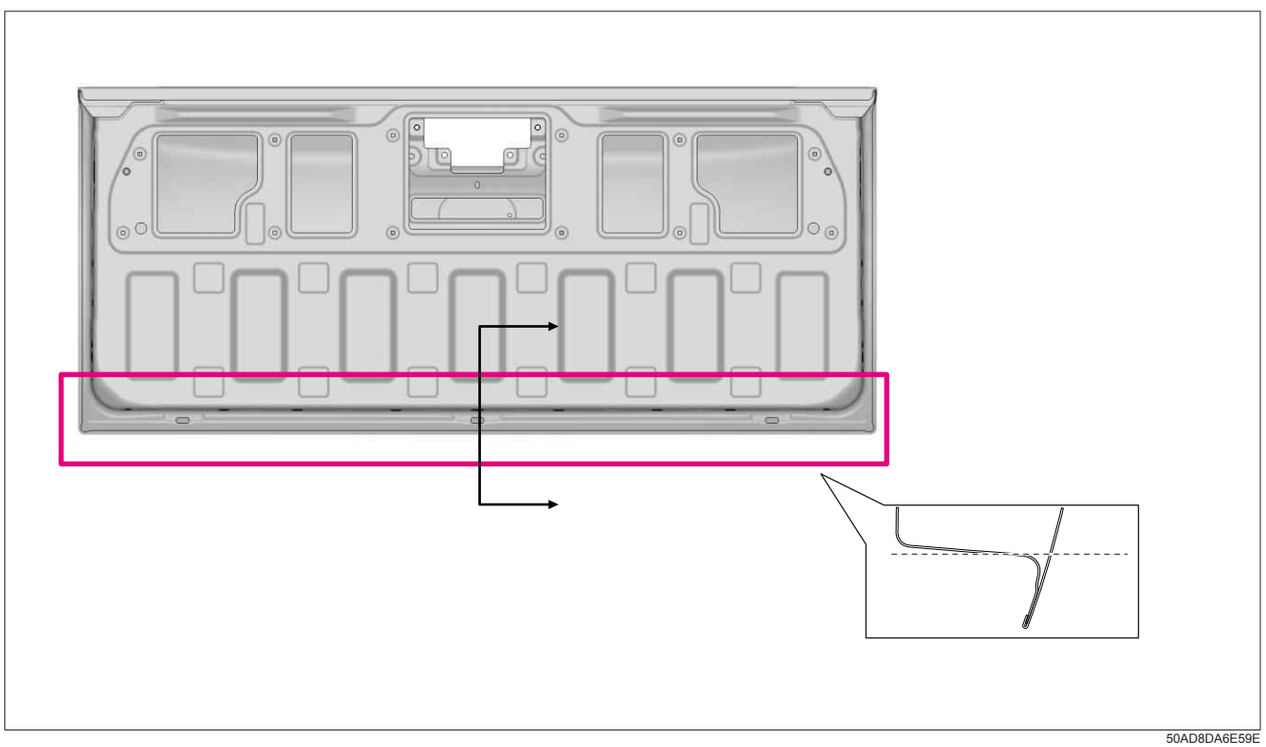
234348FEC8A7

Rear left door (bilateral symmetry)



E9EFEC6A104A

Area of rear trunk plate assembly



50AD8DA6E59E

PVC protective primer

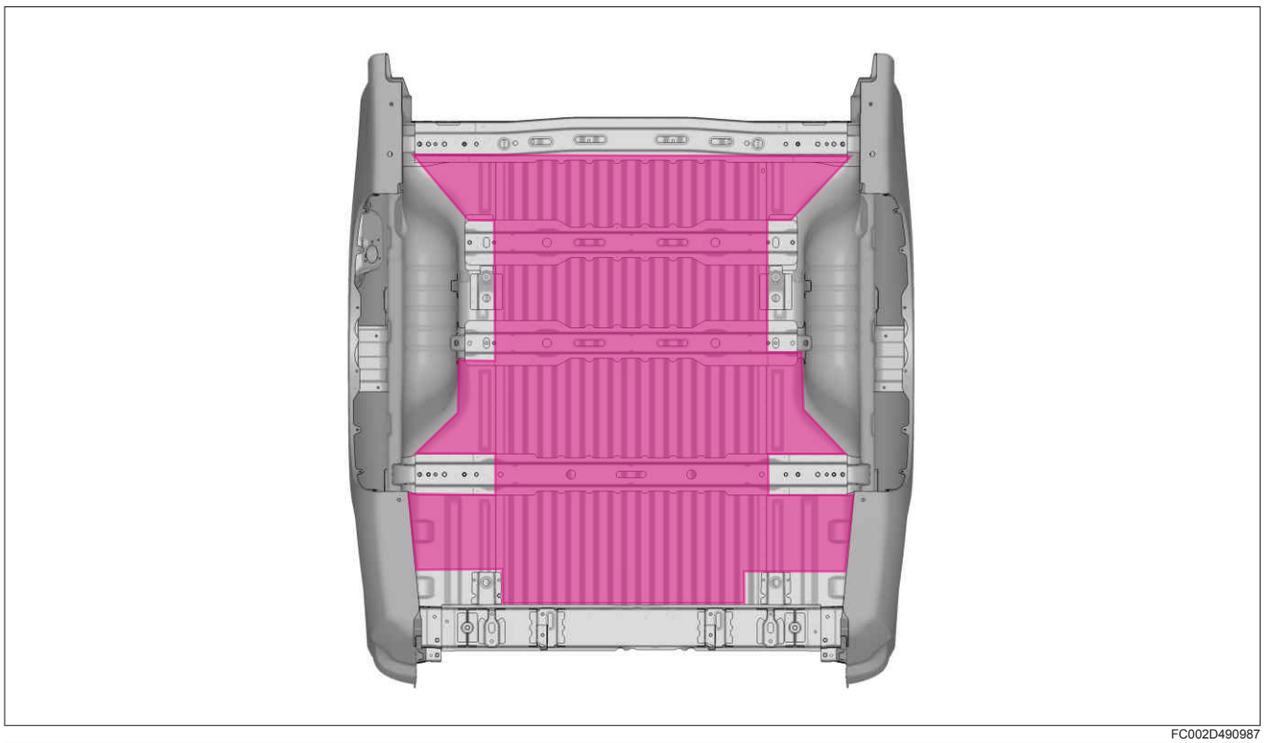
Base material: polyvinyl chloride resin + various additives + filler supplemented with pigment

Density: 1.35 g/cm^3.

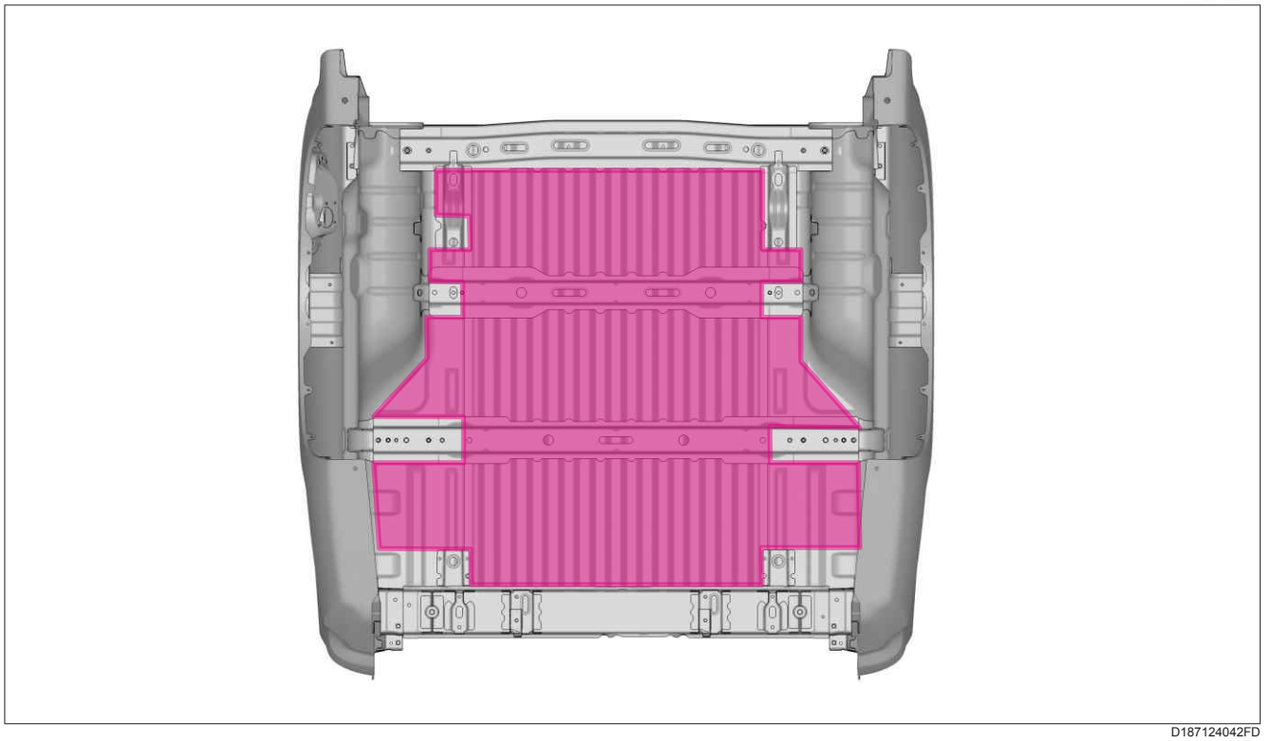
Hardness (Shore A): 40-60.

Shearing strength: ≥ 0.7 Mpa.

Floor area of trunk

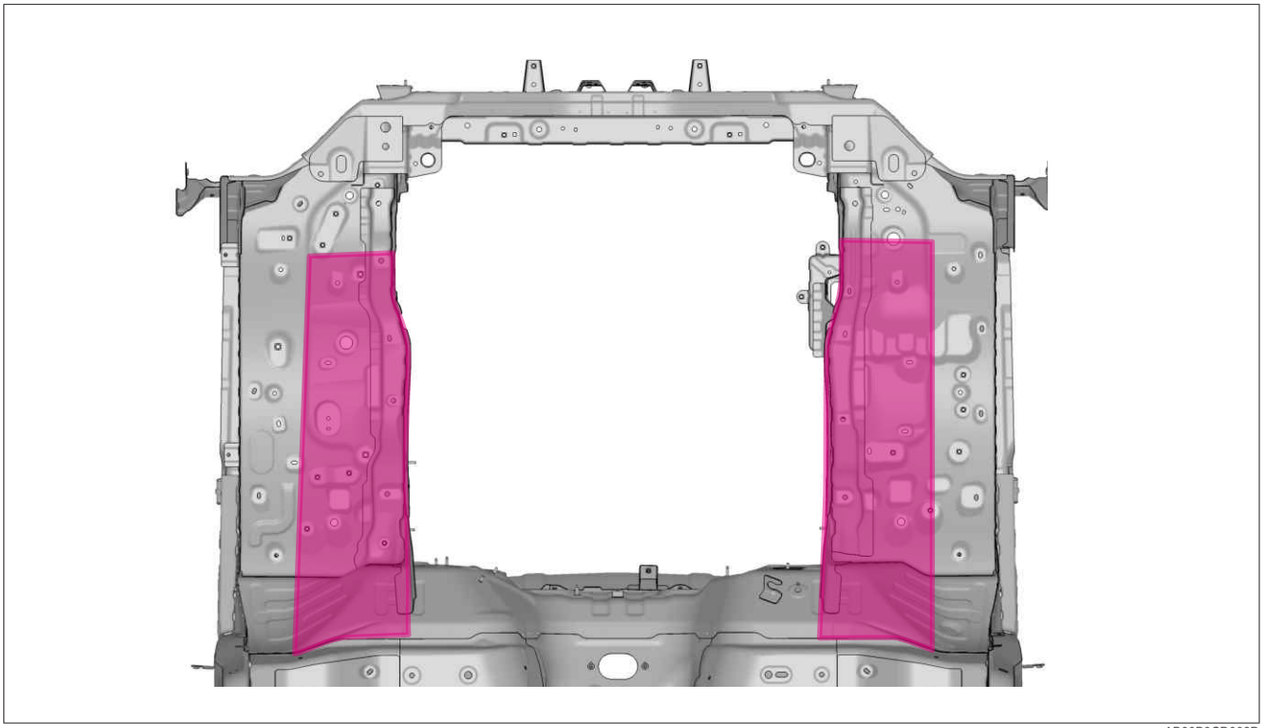


FC002D490987



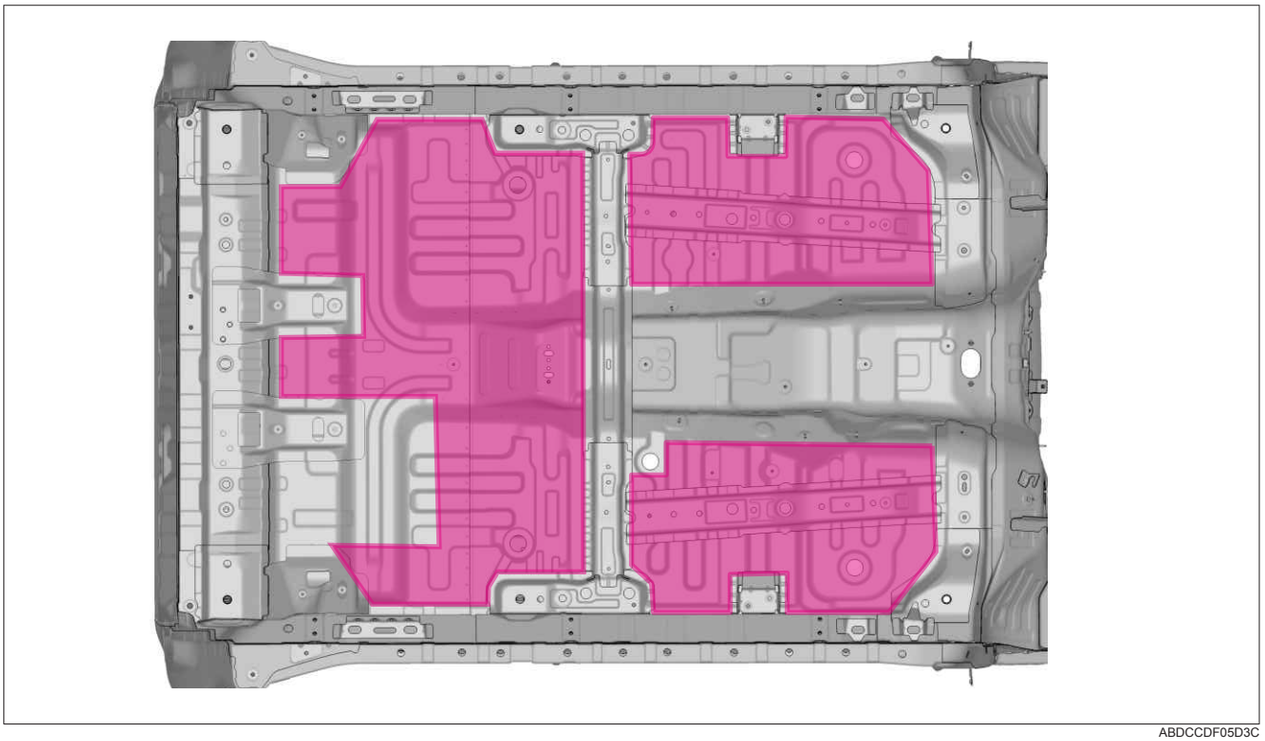
D187124042FD

Area of left and front right wheel cover

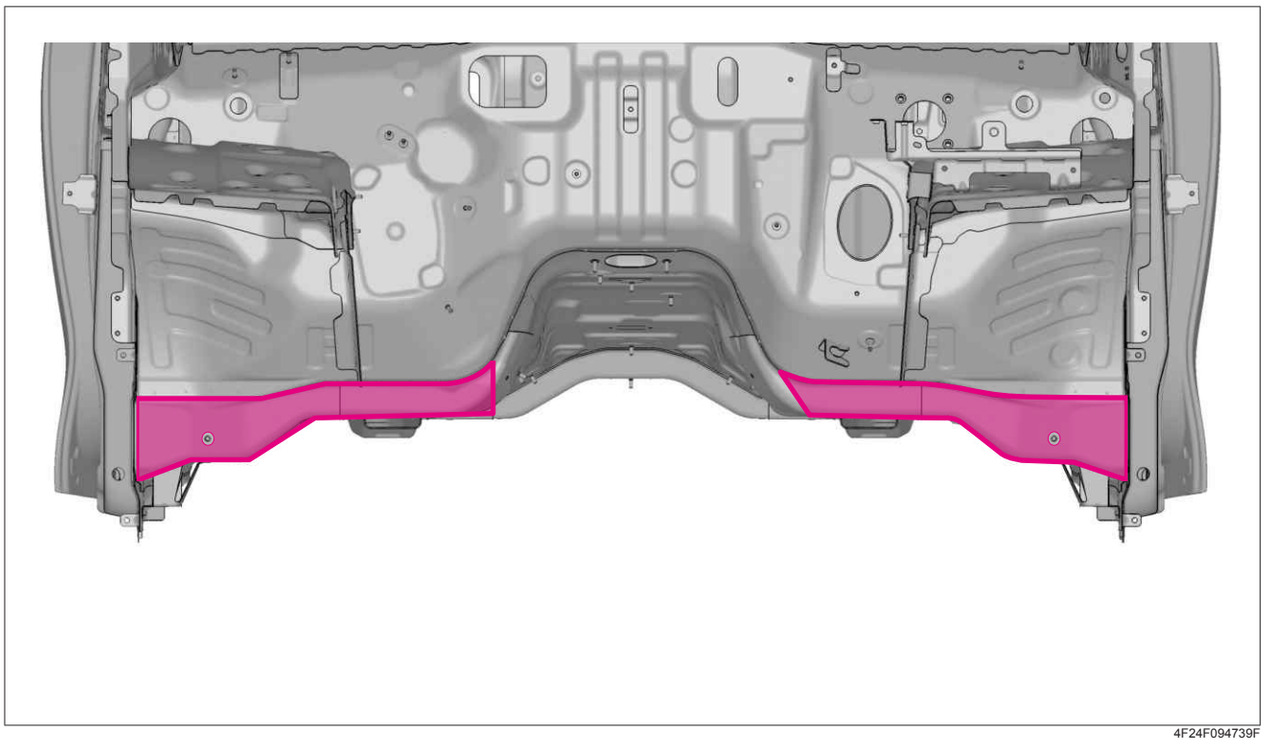


AB86B8CD092D

Floor area



ABDCCDF05D3C



4F24F094739F

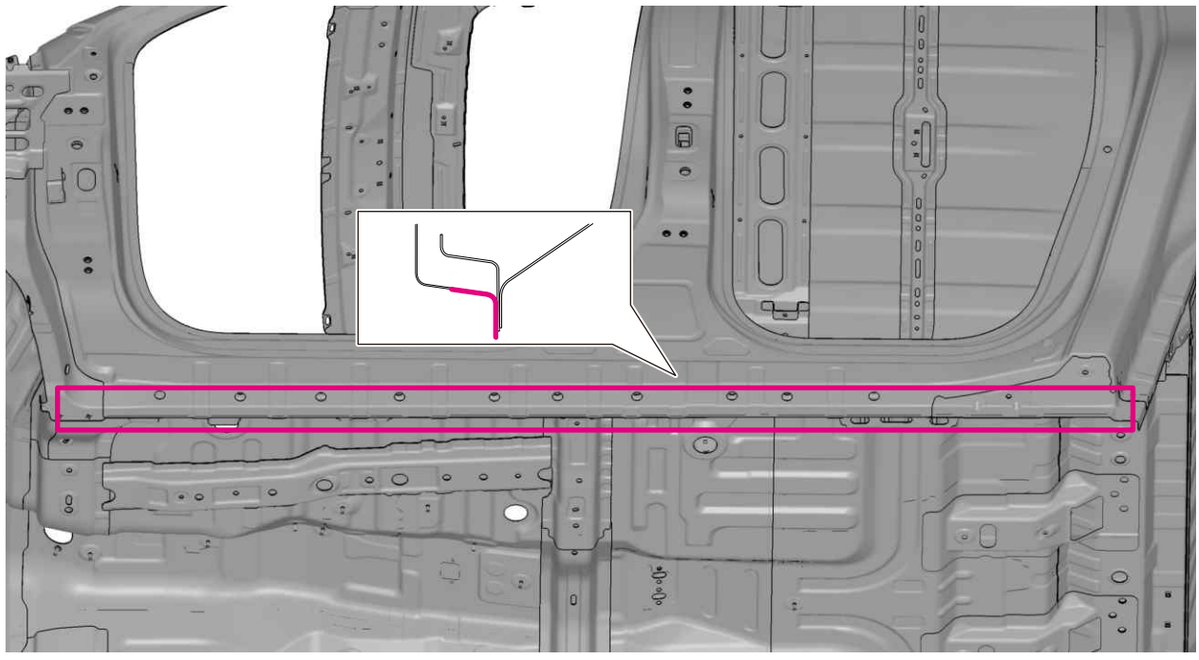
Rocker panel primer

Base material: PVC resin.

Main performance index: hardness (Shore A): 40-60; tensile strength: ≥ 0.7 MPa.

Section size: 250~1000 μm sprayed on rocker panel (including electrophoresis and intermediate coating).

Side wall and door sill section



C345B07CEC14

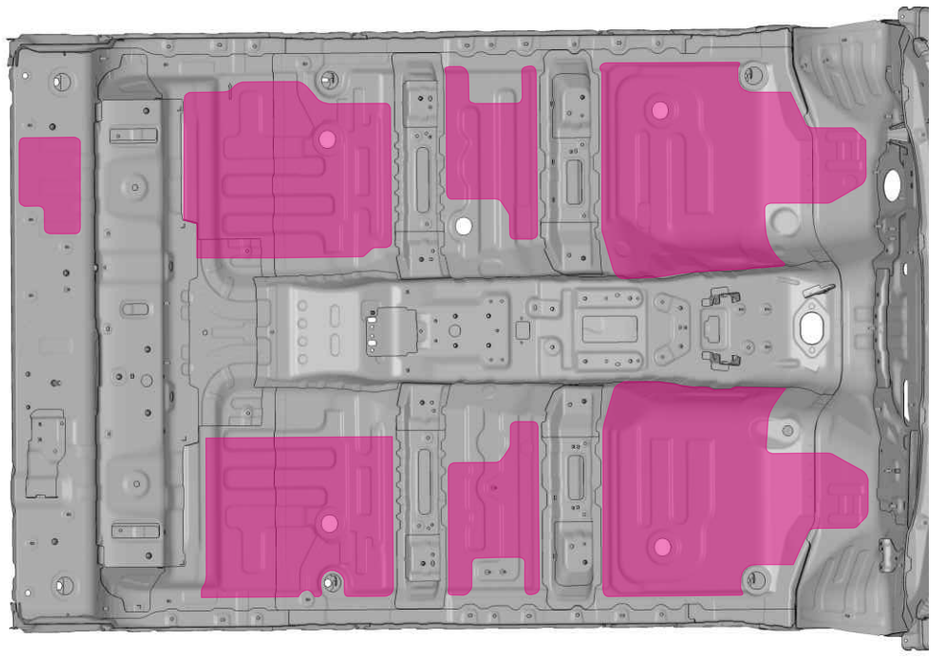
Side plate section of trunk



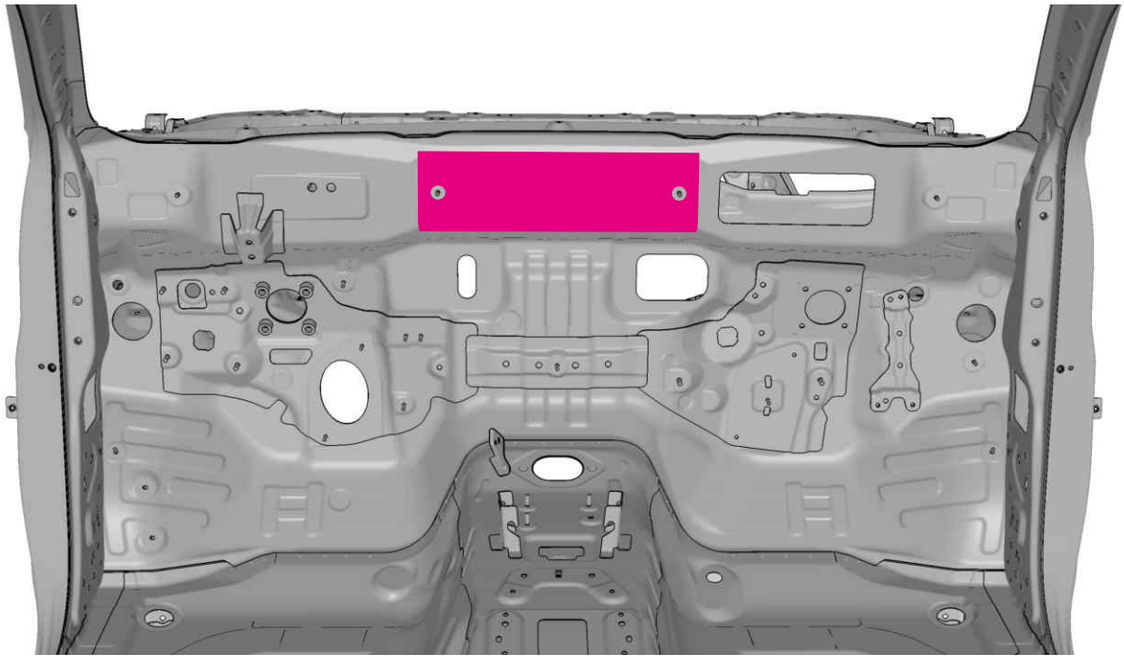
88BEFE376D22

Damping rubber sheet

Pasting area of damping rubber sheet



59B79037145A



095395F067C4

Adhesive for general assembly

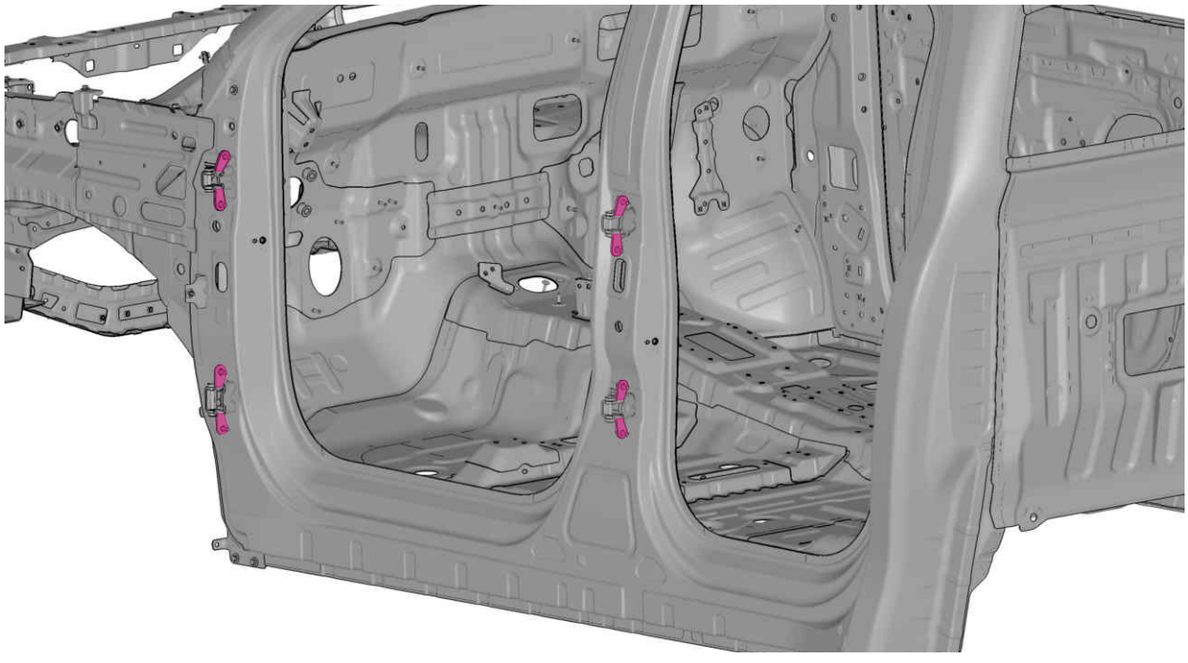
Anti-corrosion wax

Substrate: AC 115Q cavity anti-corrosion wax.

Performance: light brown paste, density (20℃) 0.820~0.880g/cm2, viscosity (40℃) 300~900 MPaS.

Glue position: joint surface of front and rear door hinge.

Door hinge (bilateral symmetry)



11B3561F177E

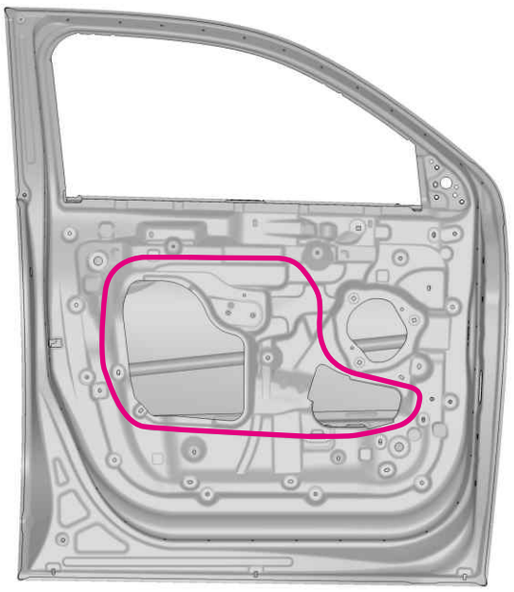
Butyl rubber sealing tape

Substrate of butyl rubber sealing tape: butyl rubber.

Performance requirements: tensile strength ≥0.04 MPa, T-peel strength ≥0.7 kN/m.

Section size of butyl rubber sealing tape: (see the position shown in the figure).

Front door (bilateral symmetry)



4D72781E5E9B

Rear door (bilateral symmetry)



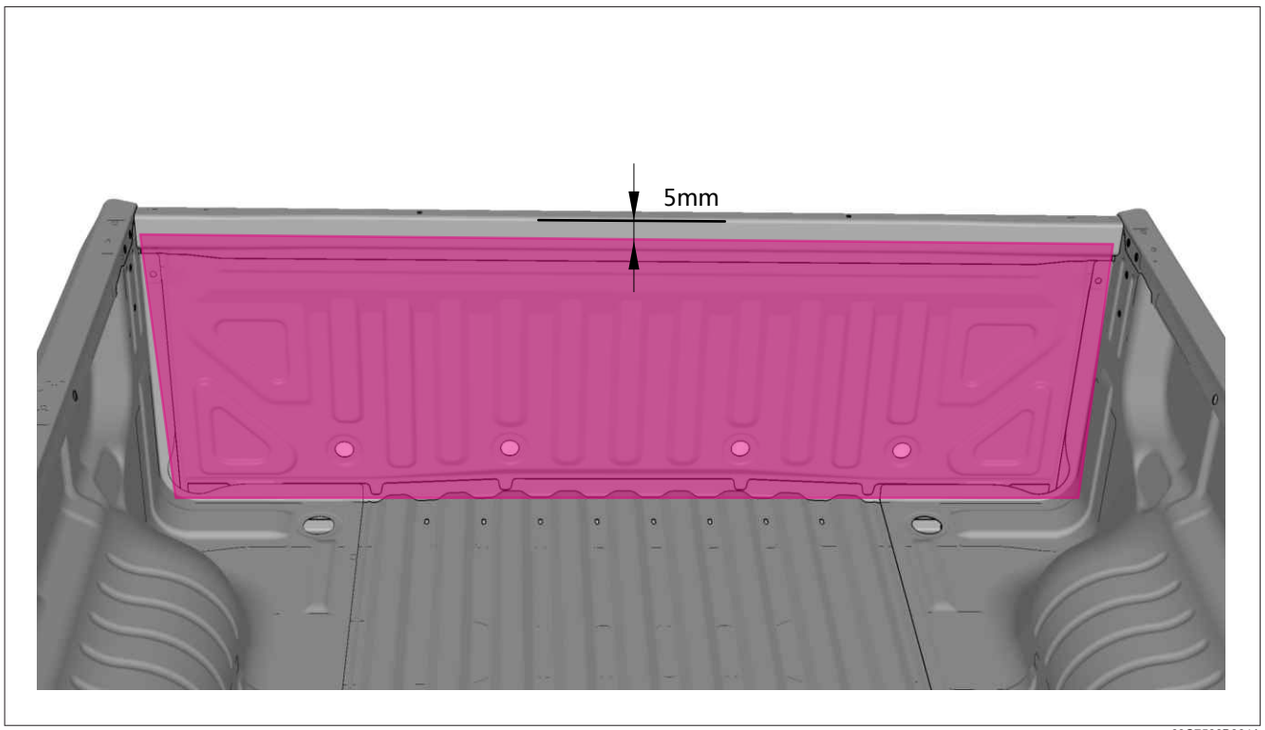
1B52A420BEE4

Trunk protective layer

The boundary deviation of sprayed protective layer is ± 2mm, and the thickness of the protective layer at the boundary position is (1.5 ± 0.5) mm.

Even spraying thickness is required, no spraying defect is allowed, and good appearance shall be ensured.

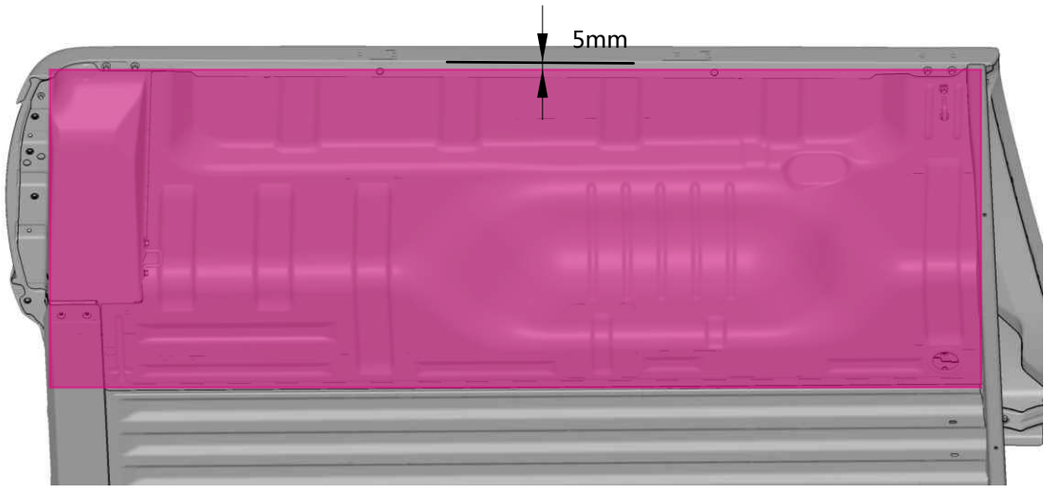
Front plate



69C7586B364A

Take the line 5mm downwards from the top surface of the upper plate of front plate as the boundary line, with all parts sprayed below the boundary line.

Side plate



A8840573C2C7

a: take the line 5mm downwards from the top surface of the outer plate of side plate as the boundary line, with all parts sprayed below the boundary line.

b: the rear end of the side plate is bounded by the mounting surface of the inner plate check of the rear column of the trunk and the R corner root of the side elevation, with the inside of the trunk sprayed and the outside of the trunk not sprayed.

Backing plate

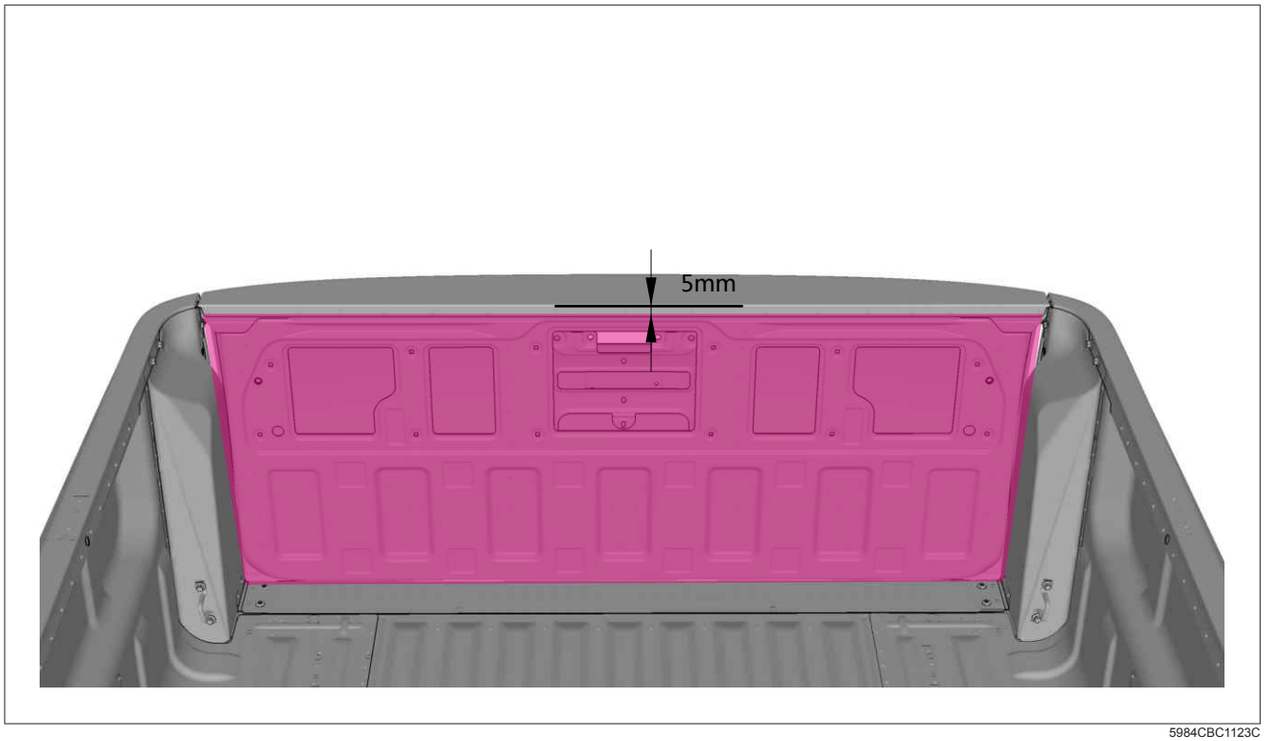


18DFC535DCA4

The spraying position at the rear part of the backing plate is bounded by of the R corner boundary of trunk tailboard and the R corner boundary of the rear plate of the rear column of the trunk.

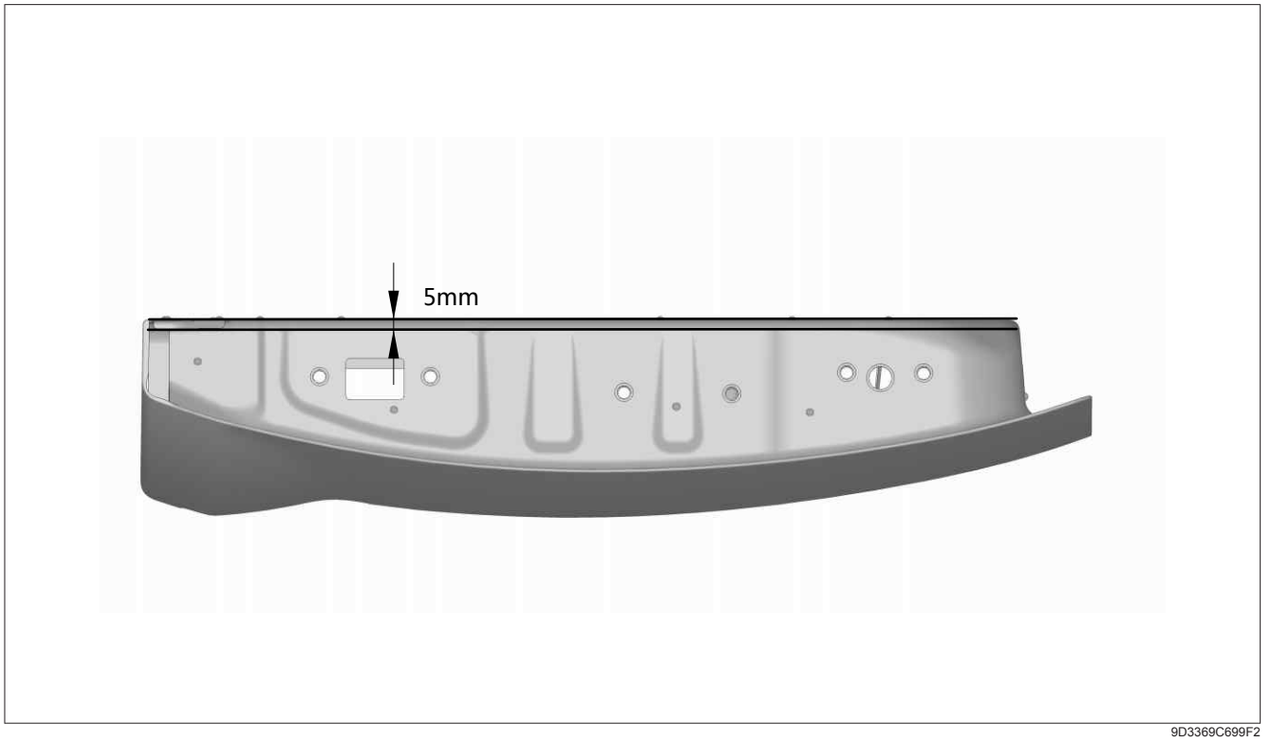
The closed section, composed of front plate, side plate and backing plate boundaries, are painted.

Rear plate



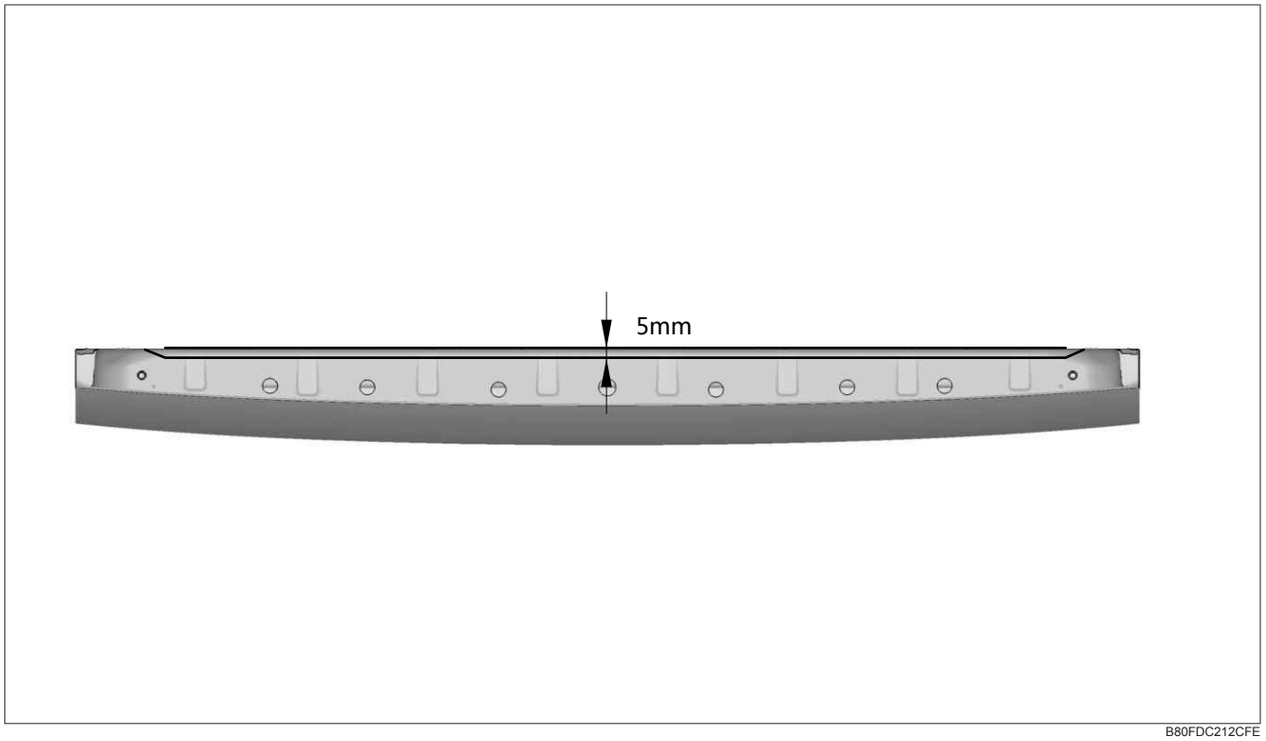
5984CBC1123C

a: the upper part of the rear plate takes 5mm downward from the top surface of the rear plate as the boundary line and the boundary is smoothly transitioned with the boundary of the side plate.



9D3369C699F2

b: the two ends of the rear plate are bounded by the line 5 mm from the side of the inner plate, and the left/right upper connecting plates of the inner plate of the rear trunk plate are bounded by the connecting plate boundary, with bilateral symmetry ensured.

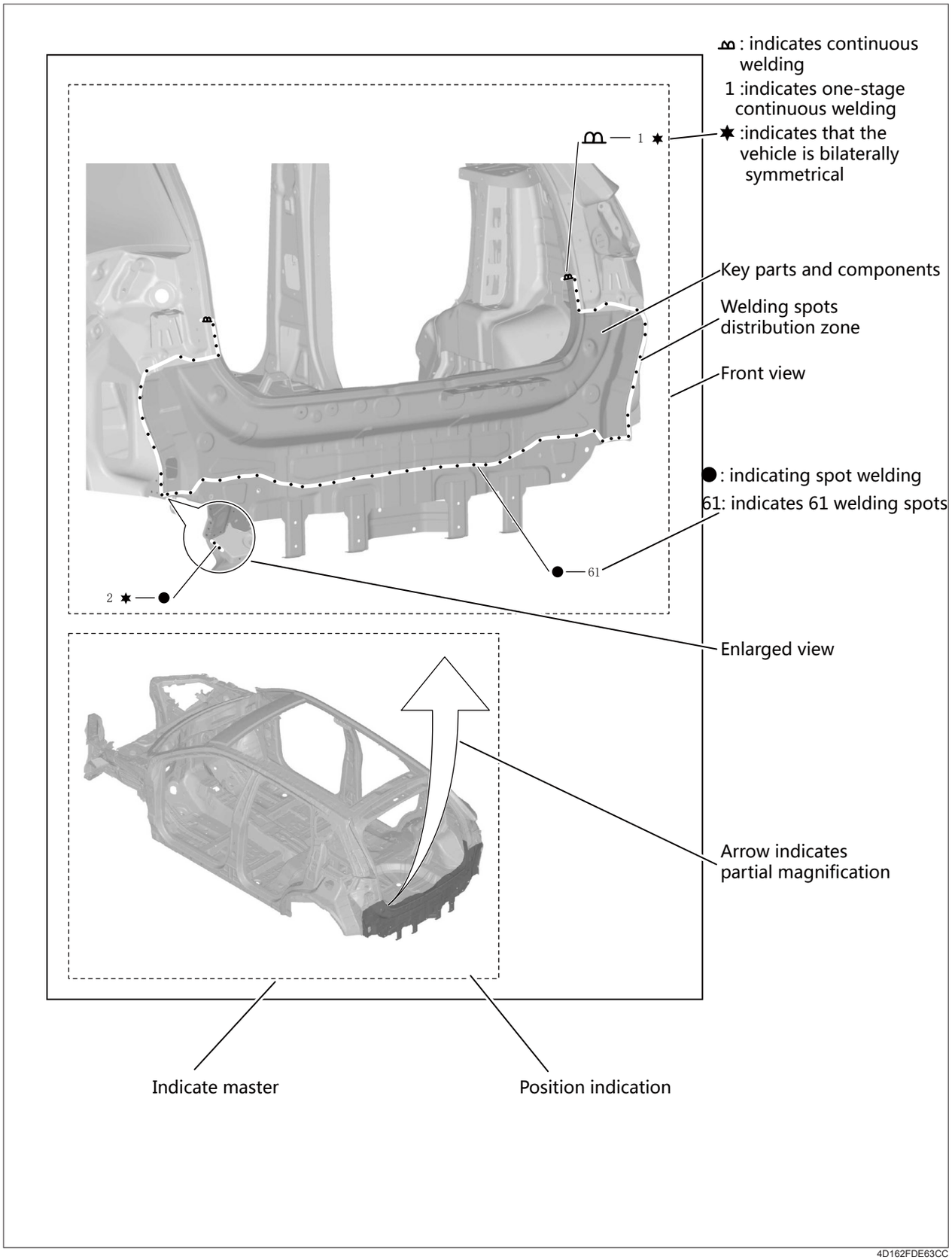


B80FDC212CFE

c: the bottom edge of the rear plate is bounded by the R corner root of the inner plate of rear plate.

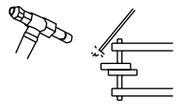
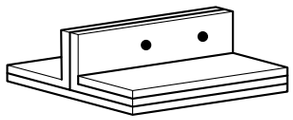
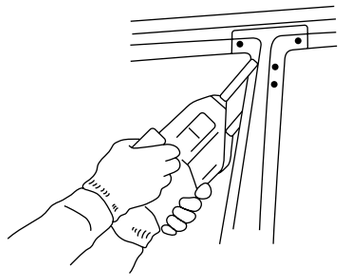
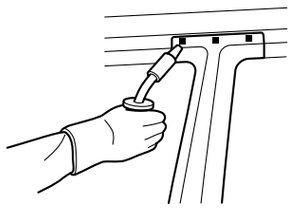
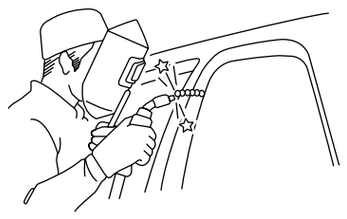
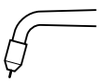
Vehicle body welding spot

Illustrative example



4D162FDE63CC

Meaning of symbols

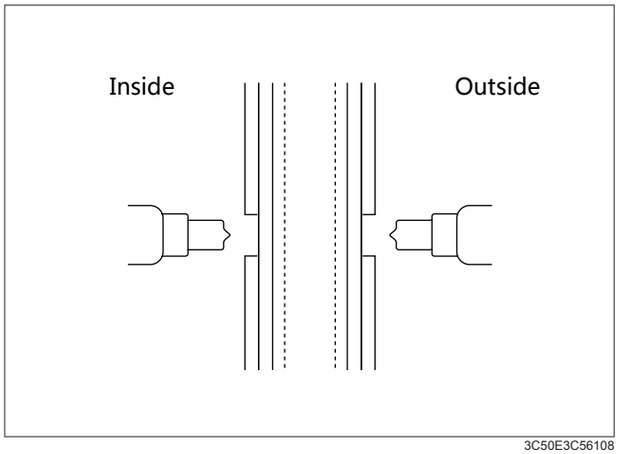
Spot welding	●			
Plug welding	■			
Continu-ous welding	⊐			

Number of panels drilled

Notice

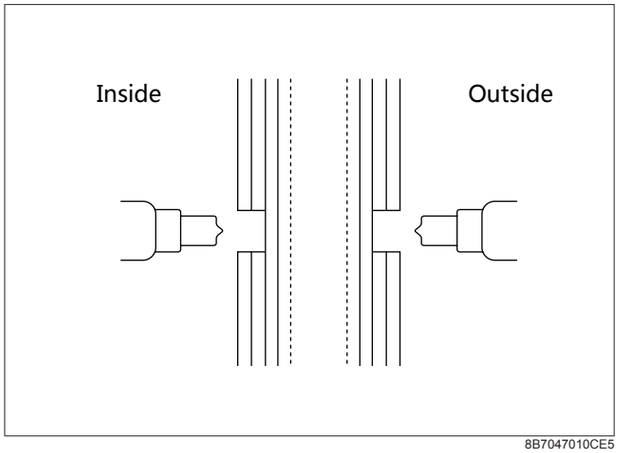
› Based on the number of panels, one or two panels are drilled through, and the number and disassembly direction will be listed together.

1. One panel is drilled through



3C50E3C56108

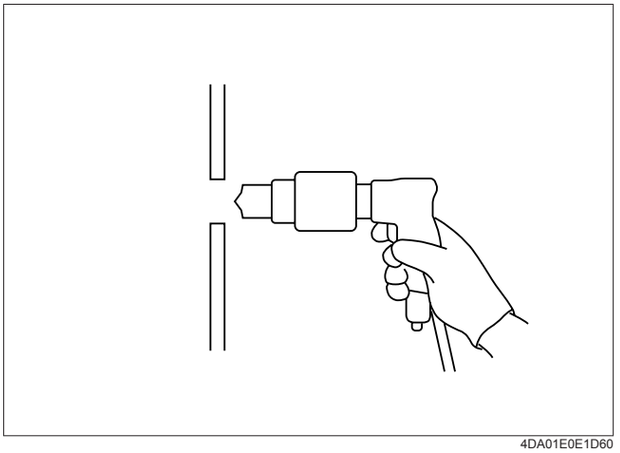
2. Two panels are drilled through



8B7047010CE5

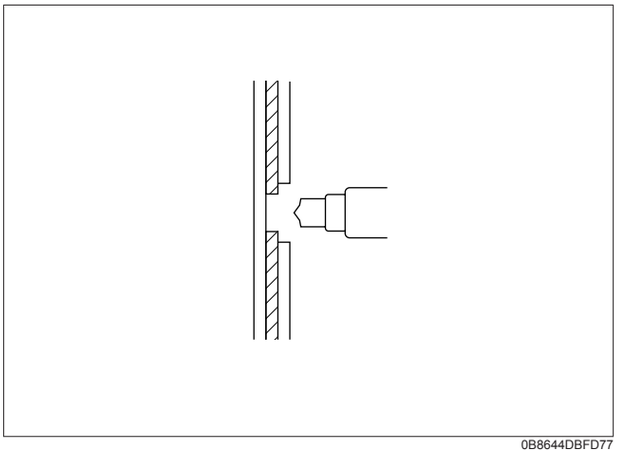
Drilling hole for plug welding

1. Drill hole for plug welding on accessories



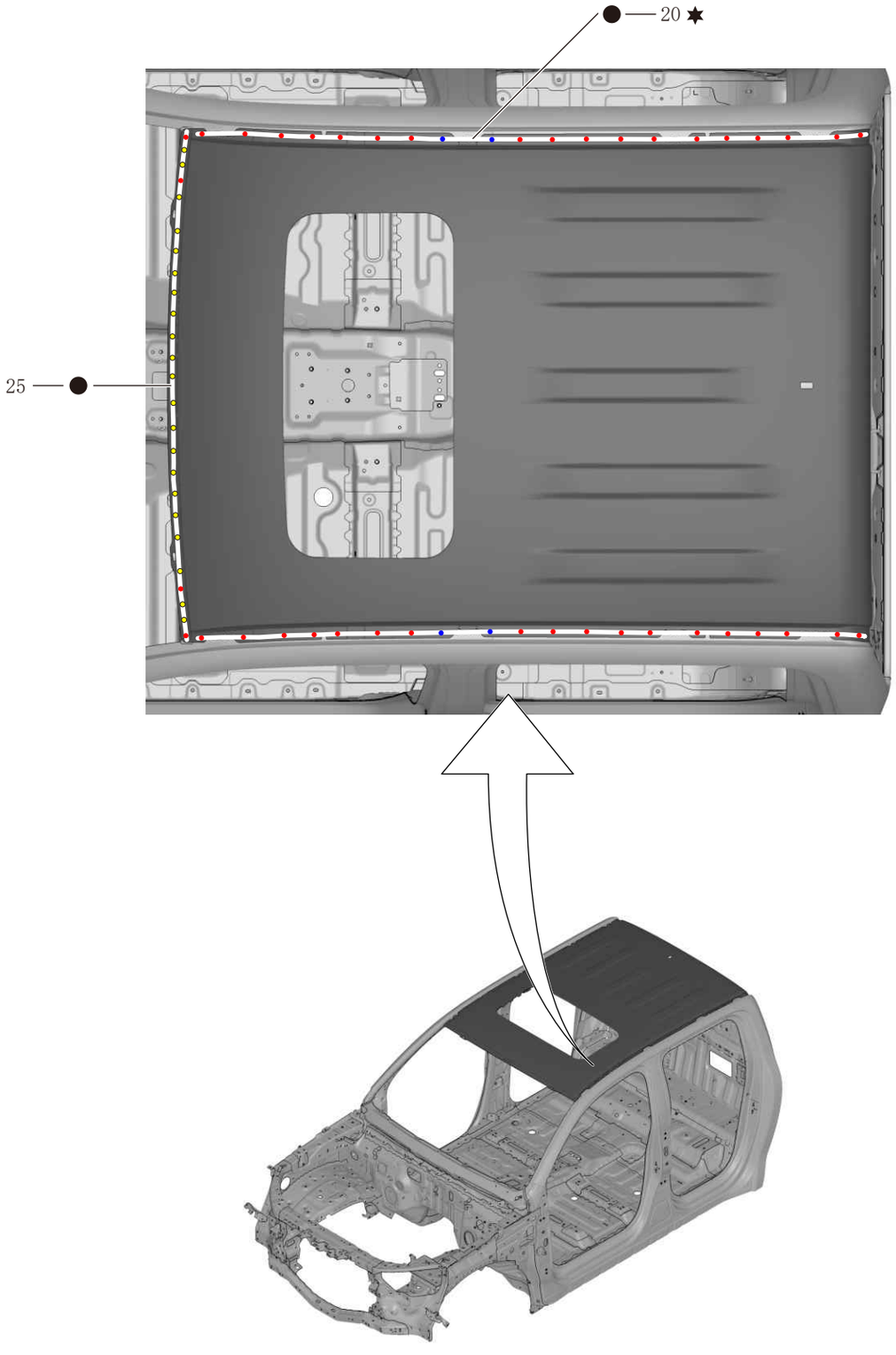
4DA01E0E1D60

2. Drill hole for plug welding on accessories. The hole matches the side hole of the vehicle

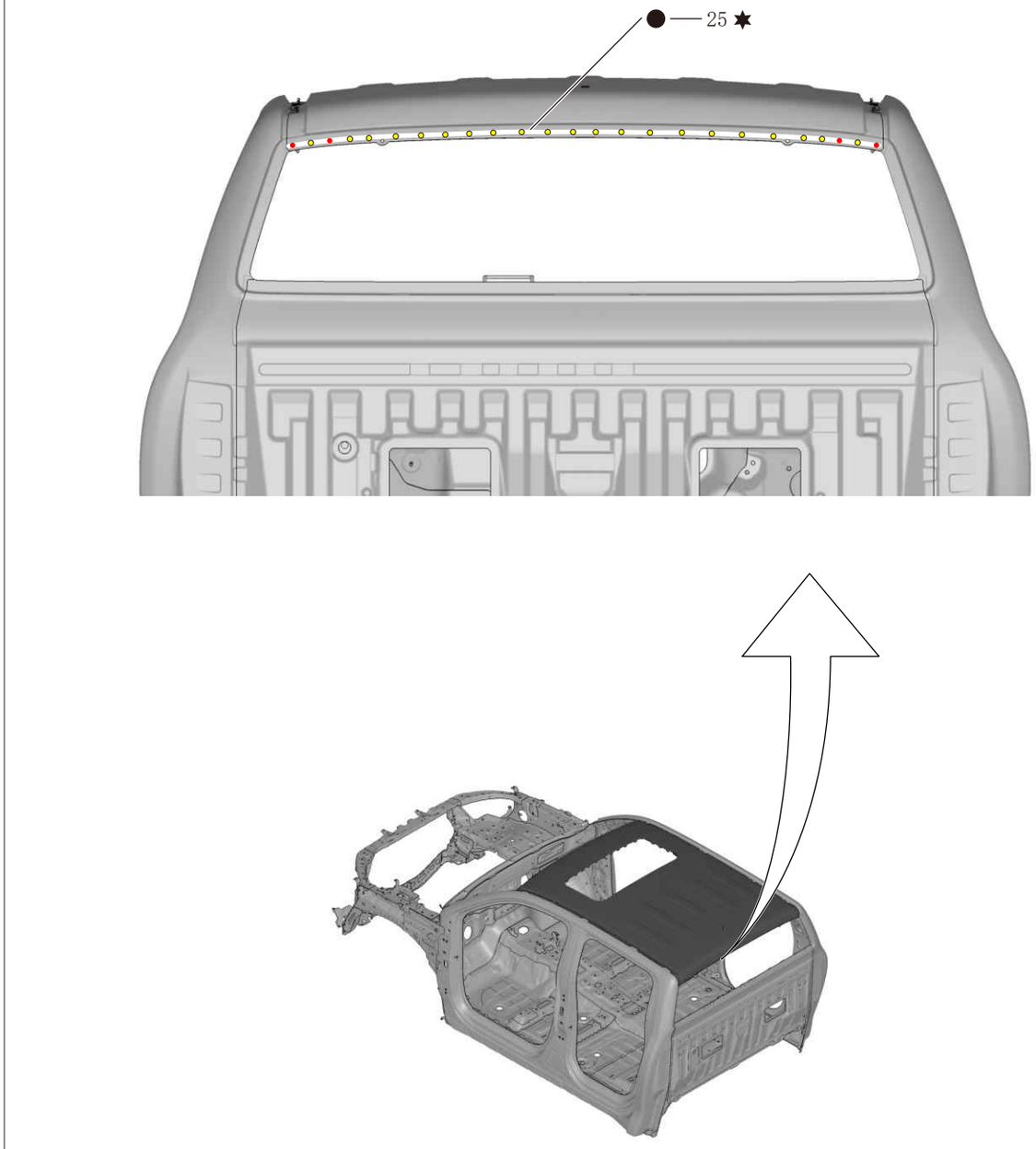


0B8644DBFD77

Roof

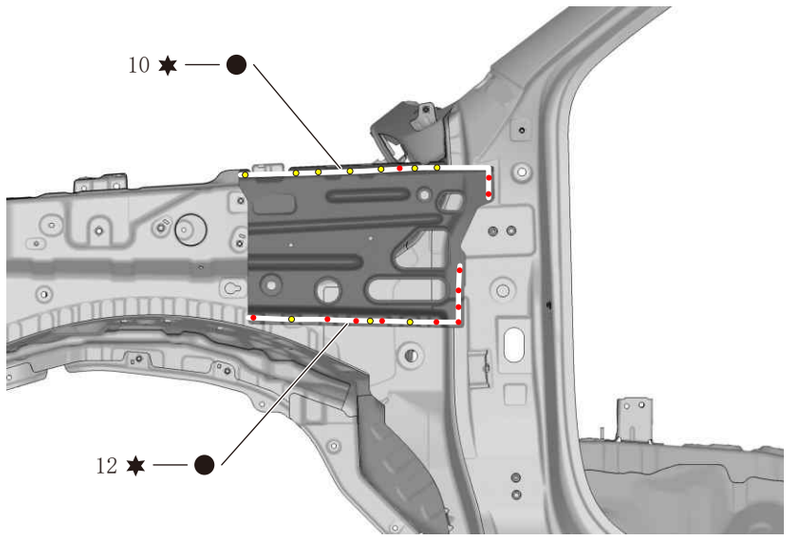


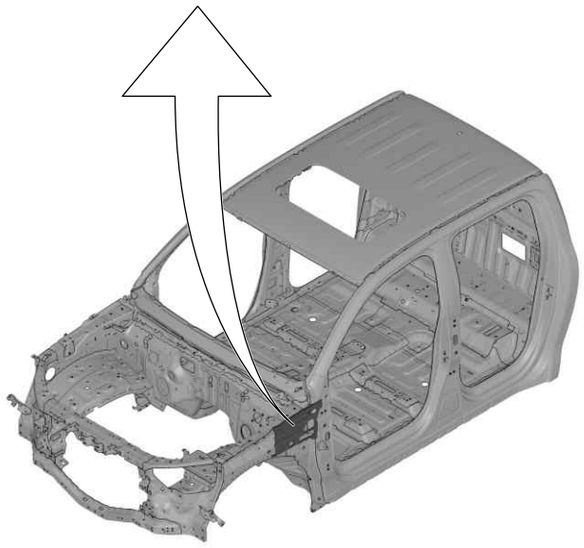
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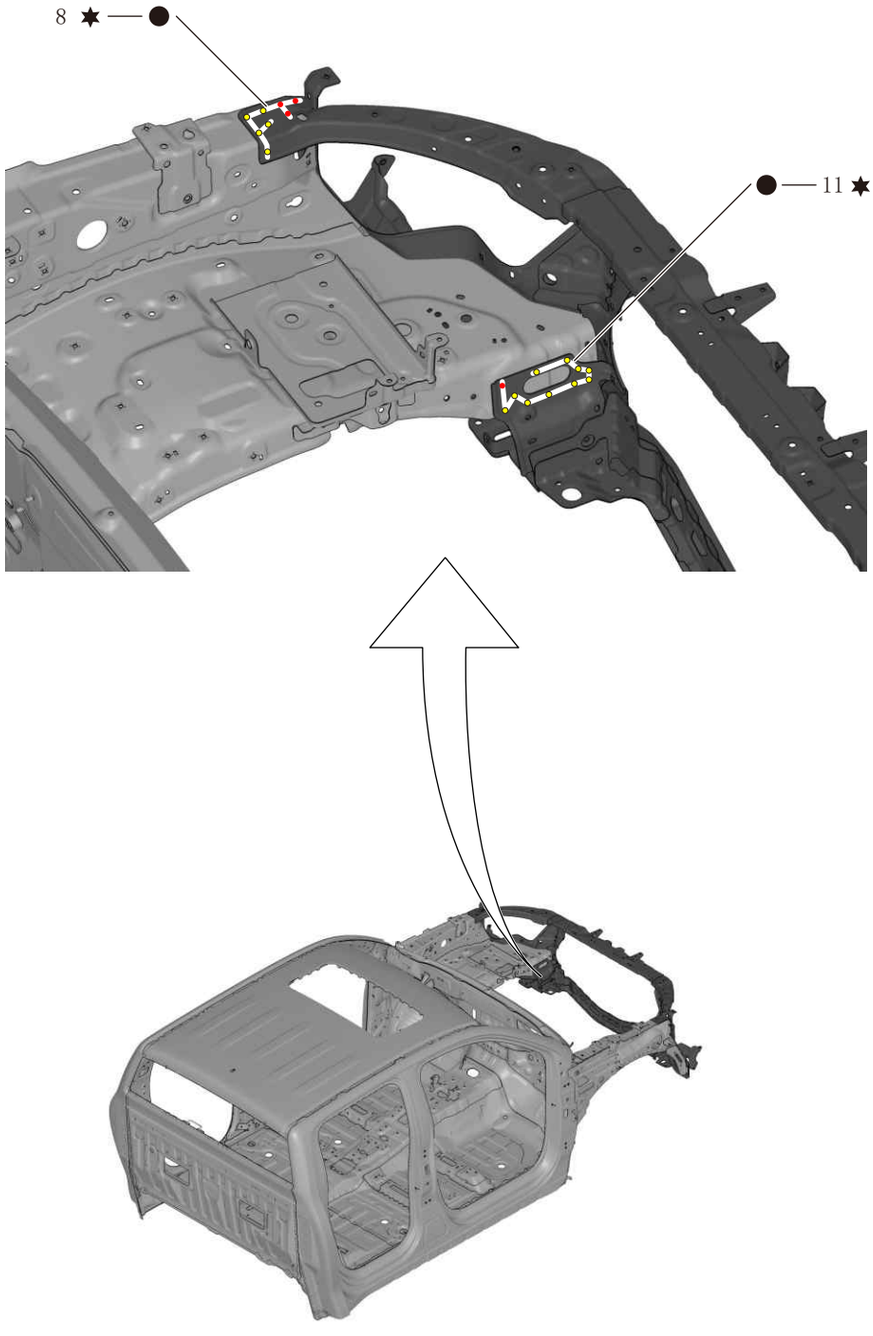
Left side beam and side wall connecting plate



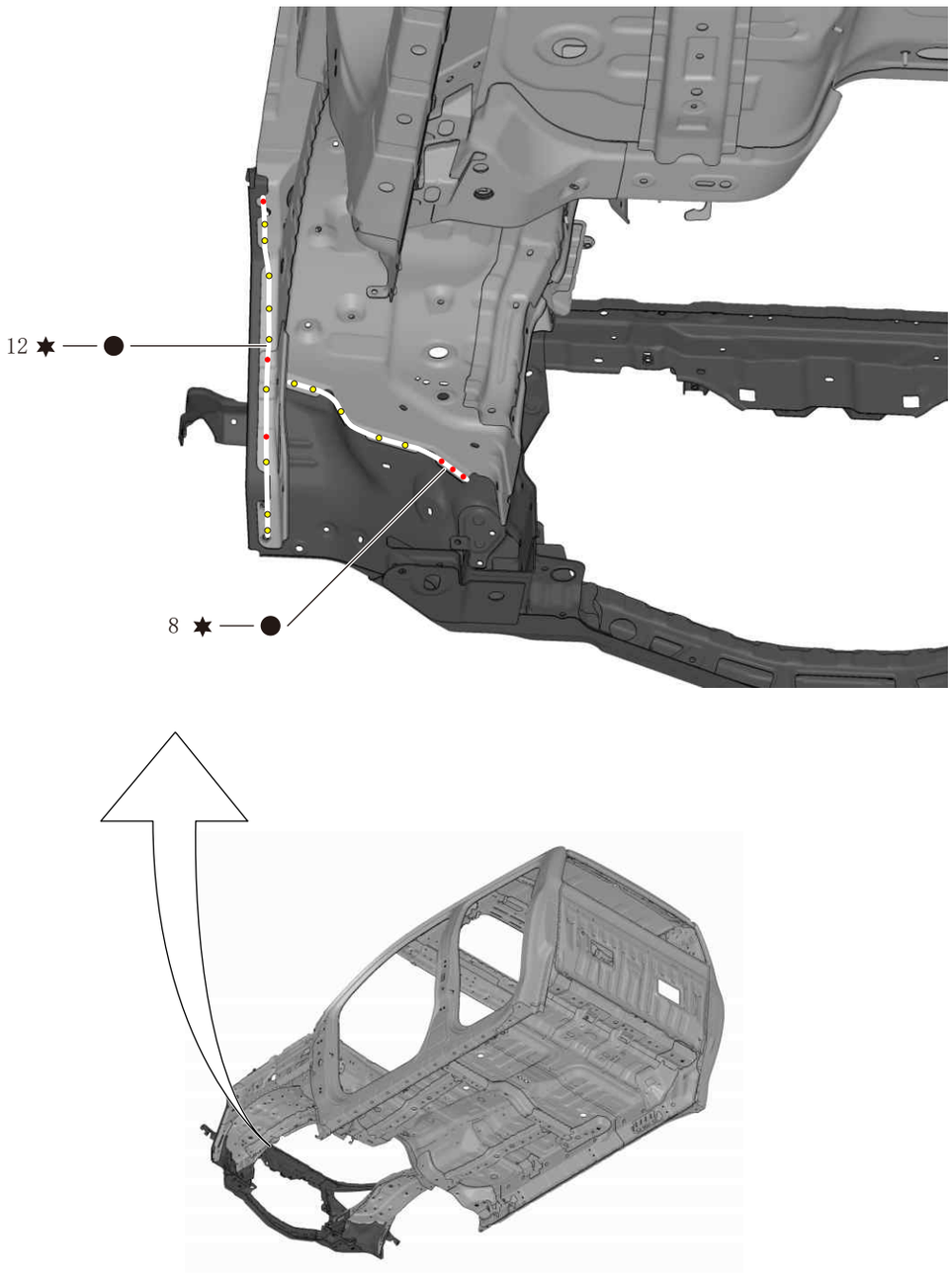


8DE656B4FA27

Radiator frame assembly

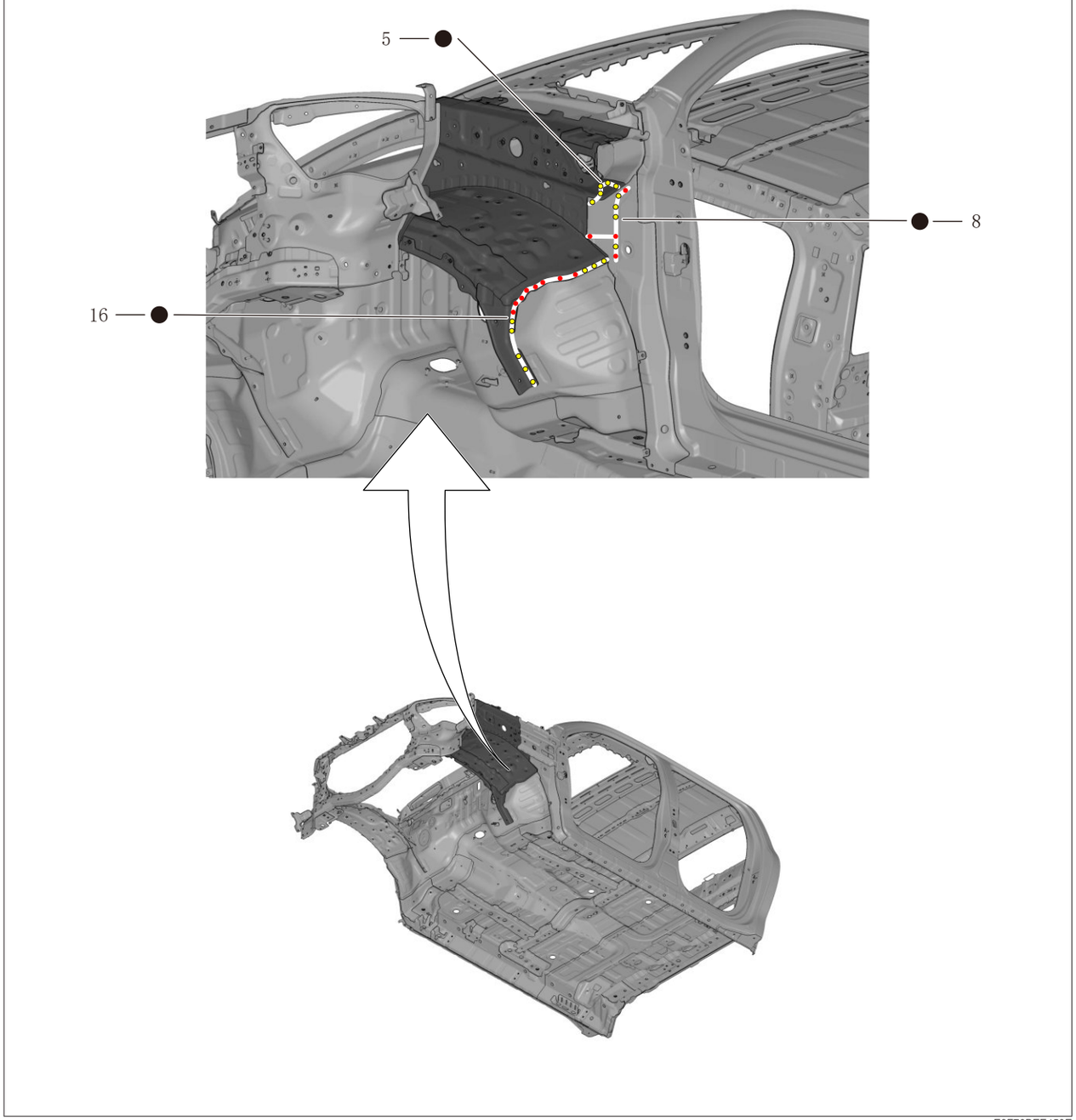


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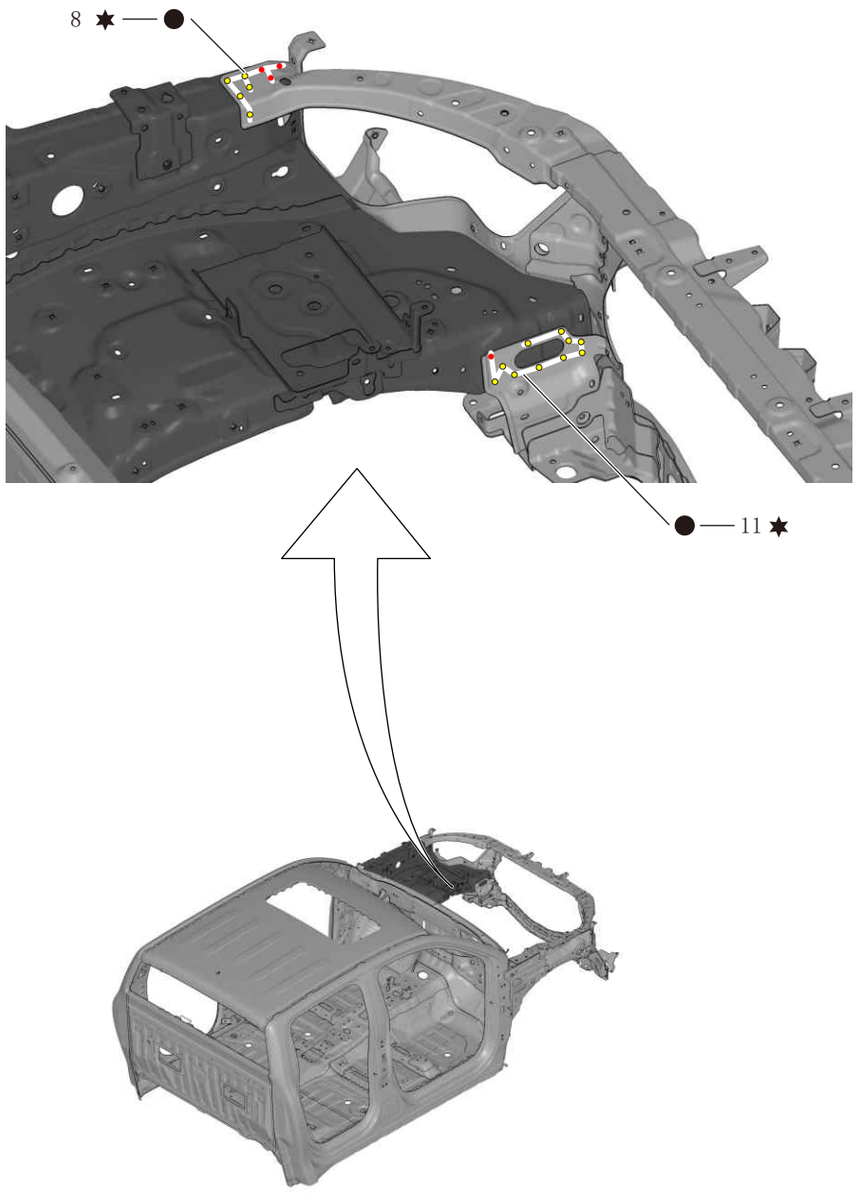


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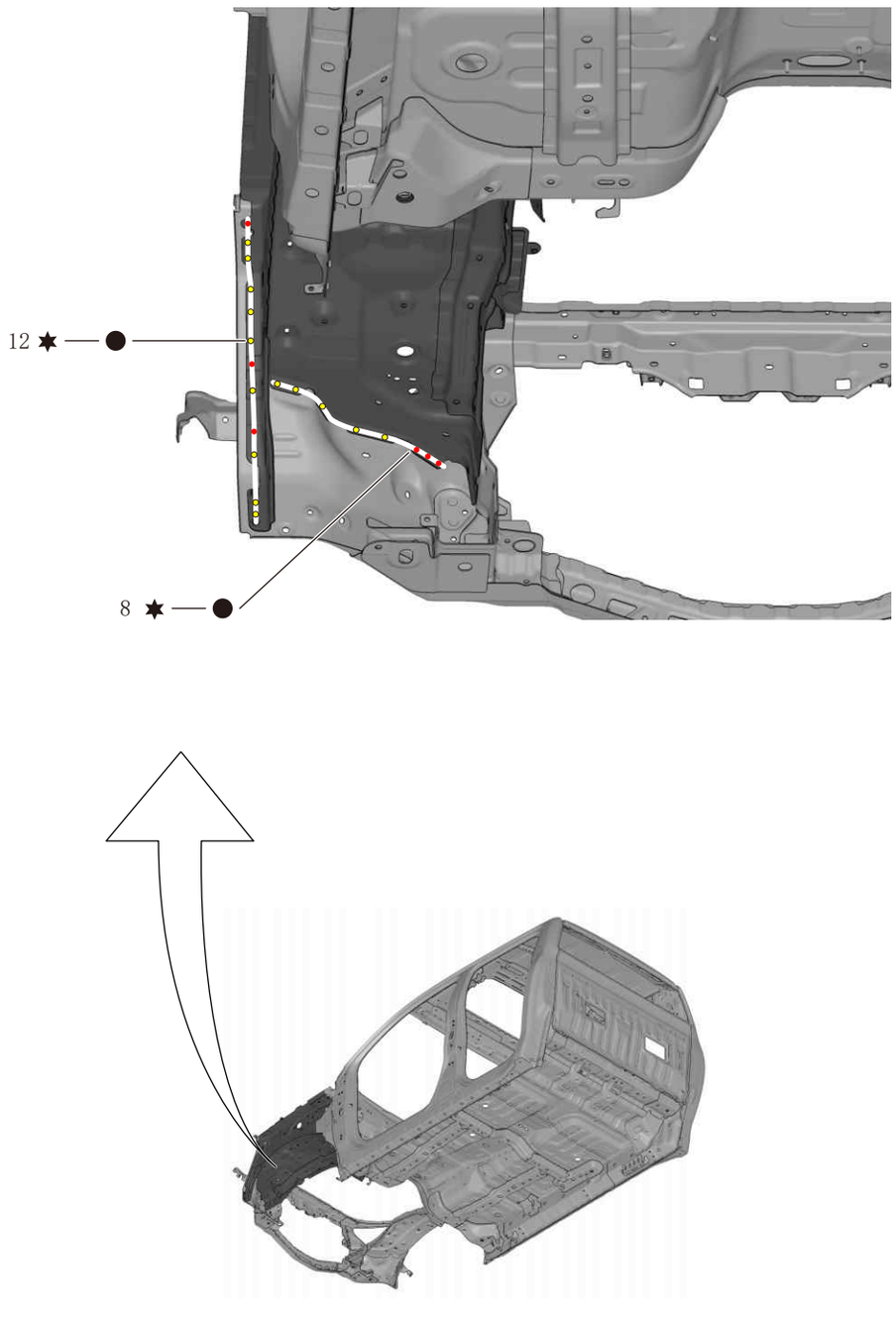
Front left wheel cover assembly



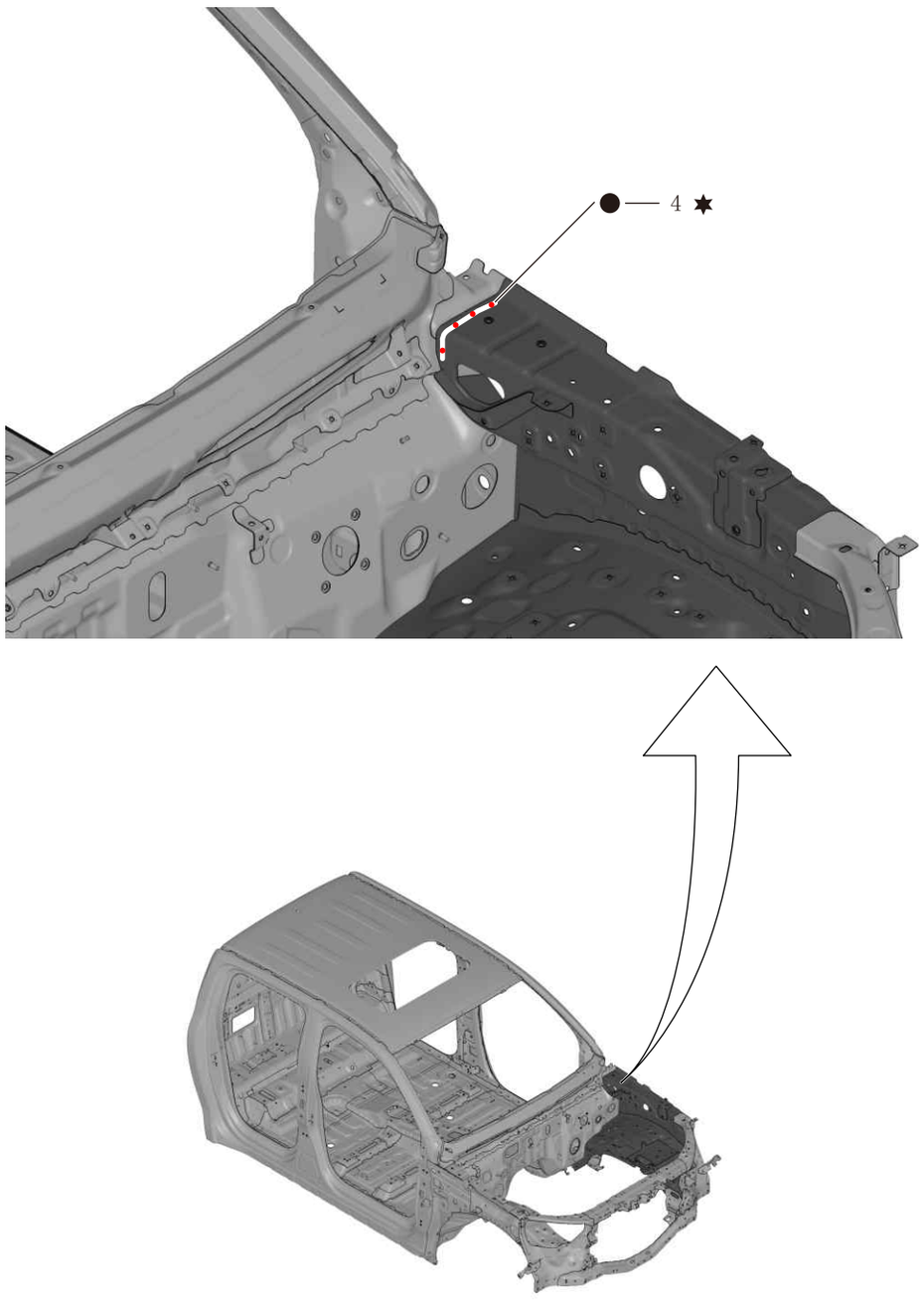
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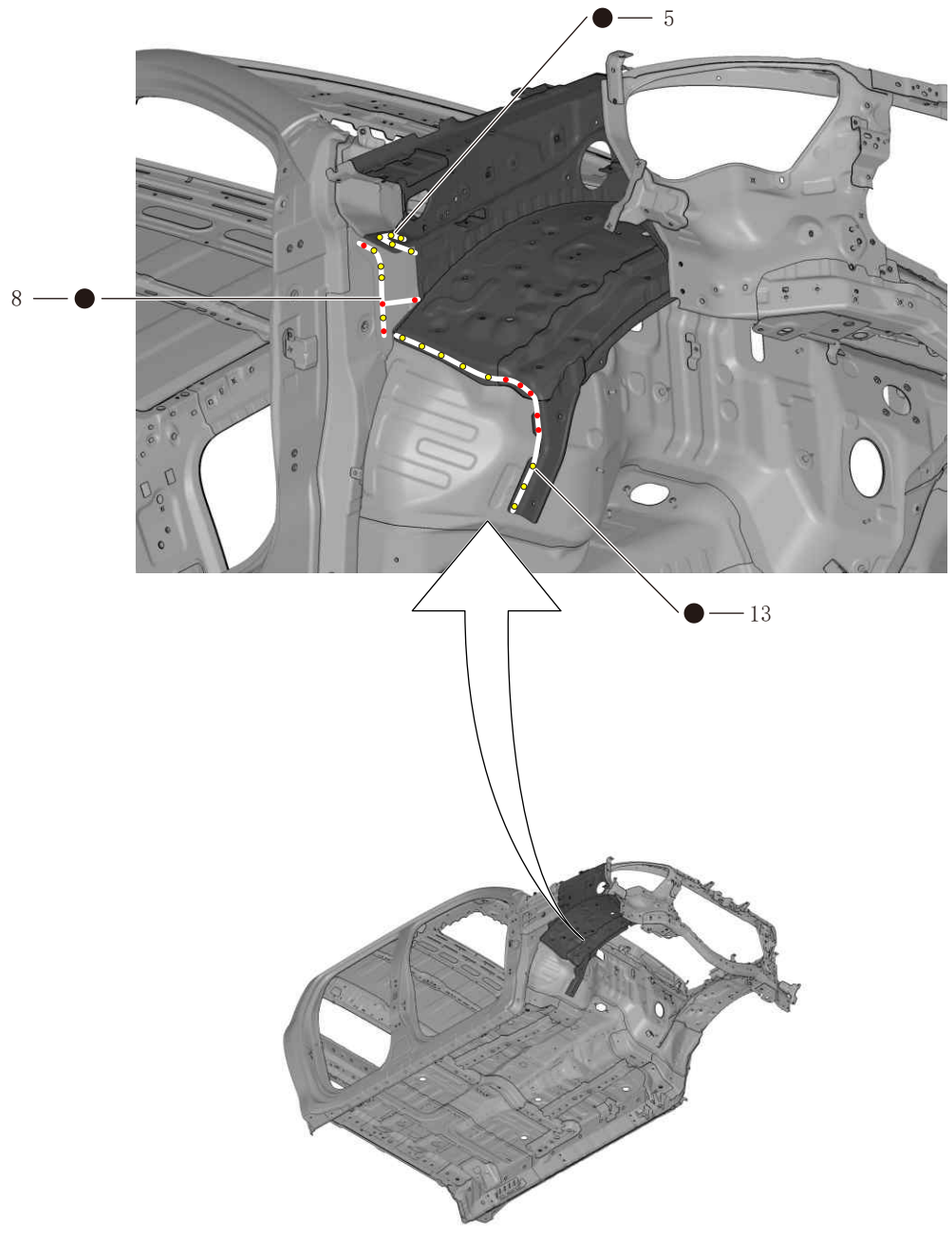


2E0A6FCAB479



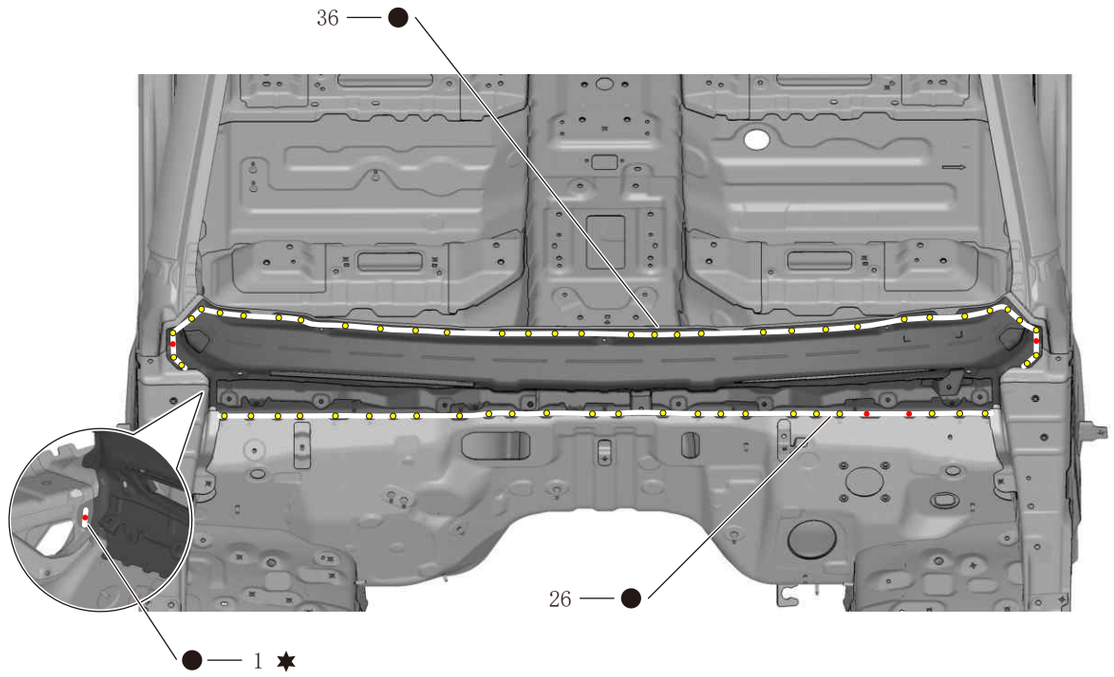
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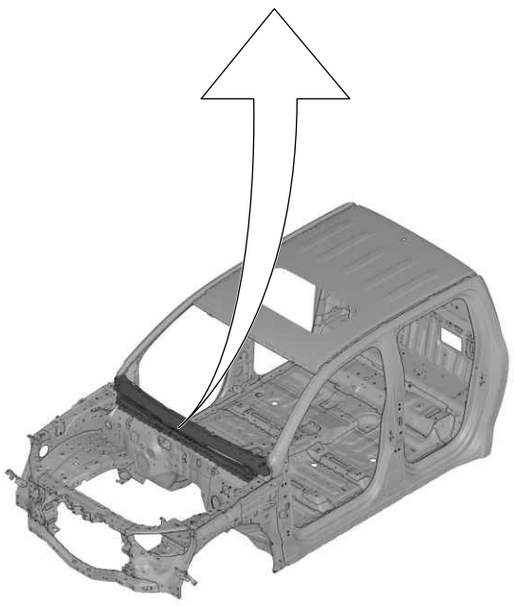
Front right wheel cover assembly



D5F245FDF972

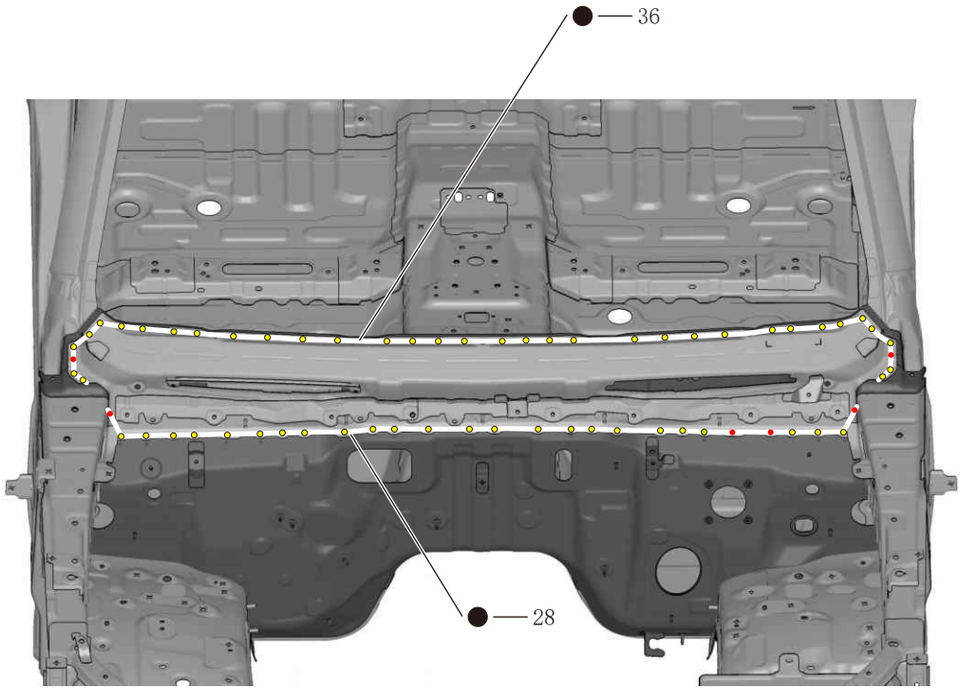
Front windshield lower beam assembly

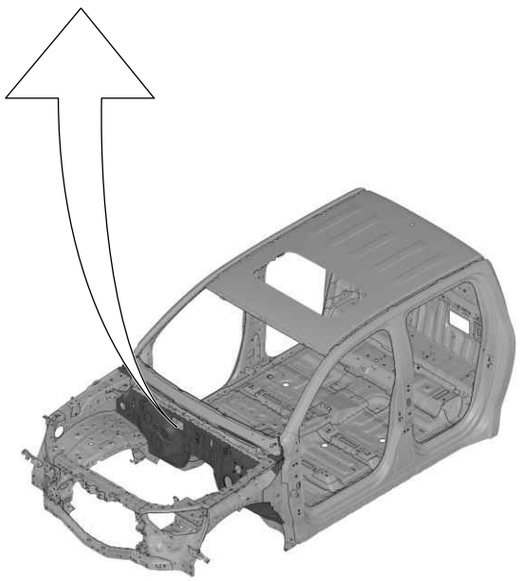




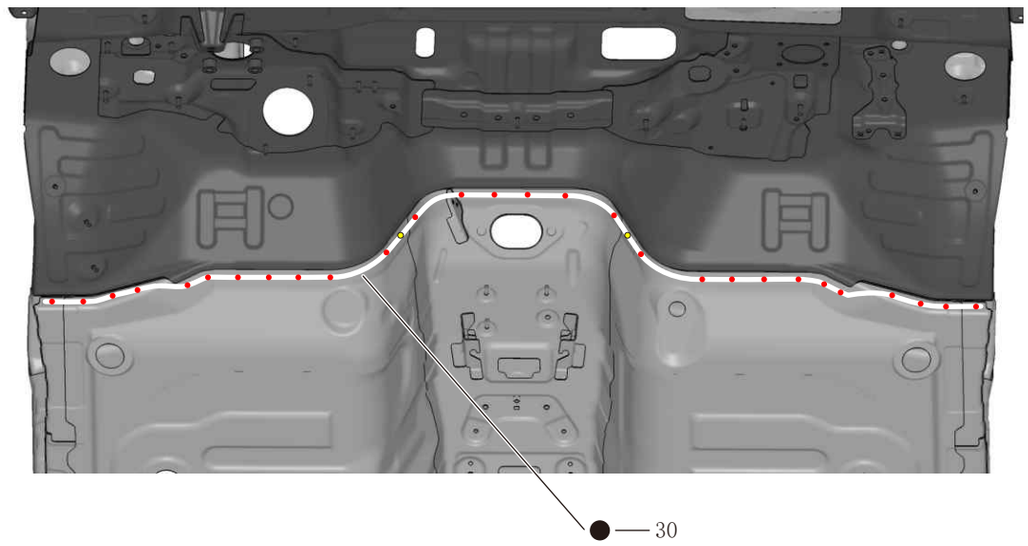
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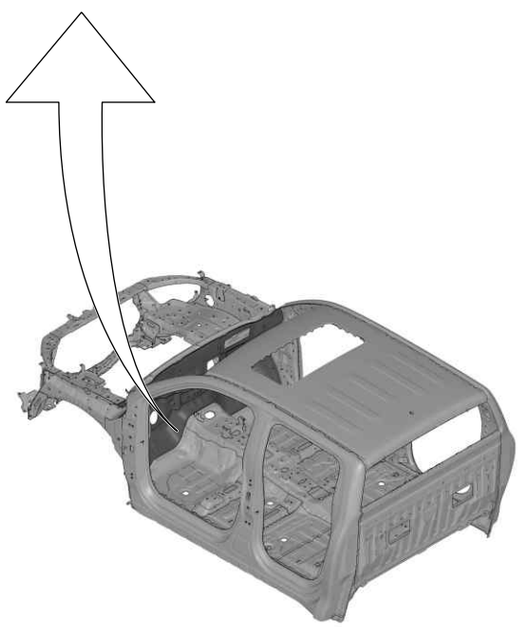
Front wall assembly



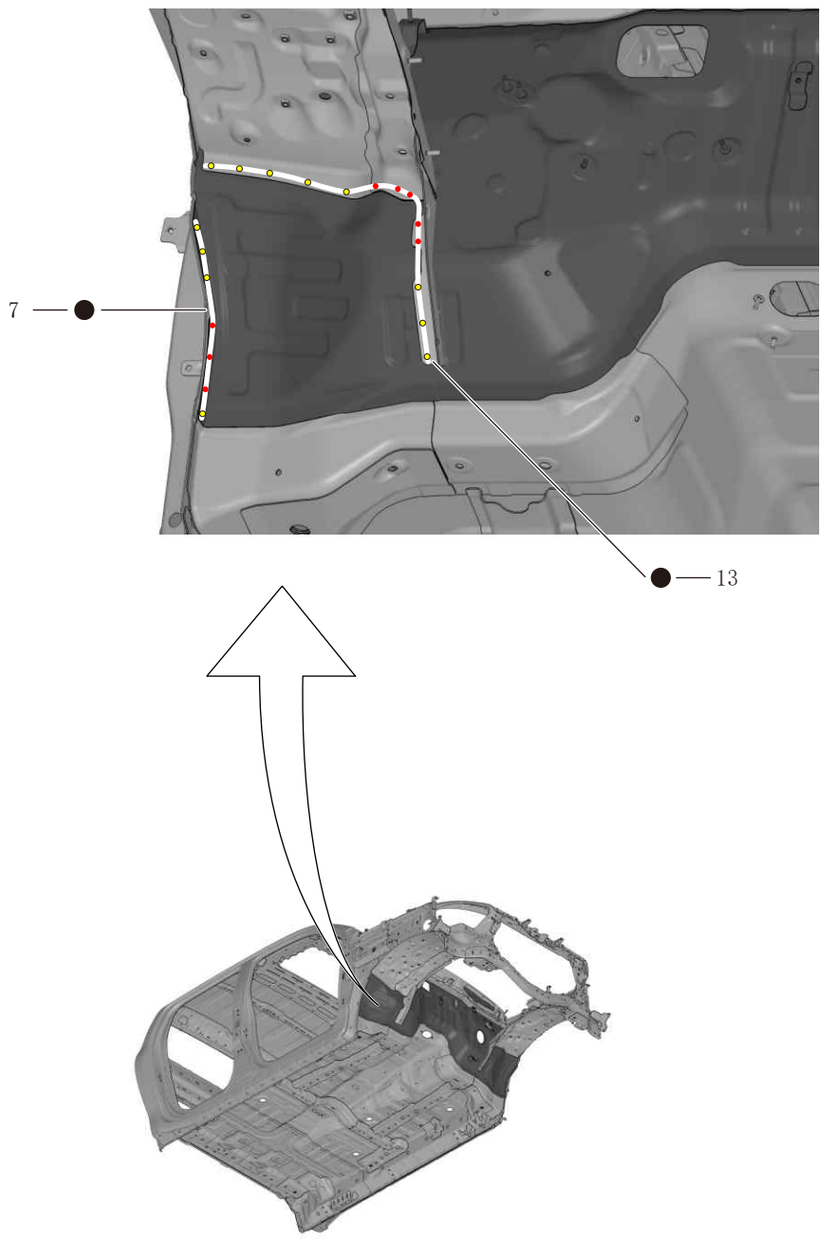


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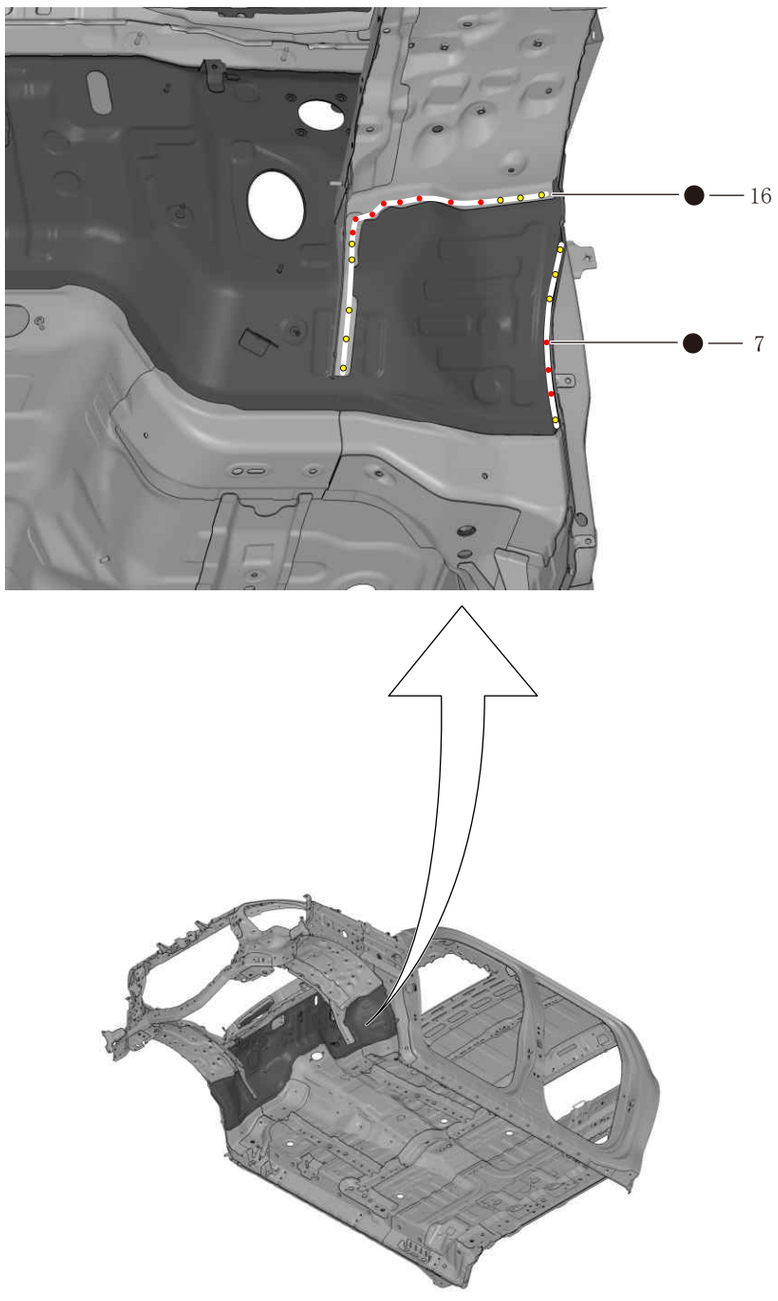




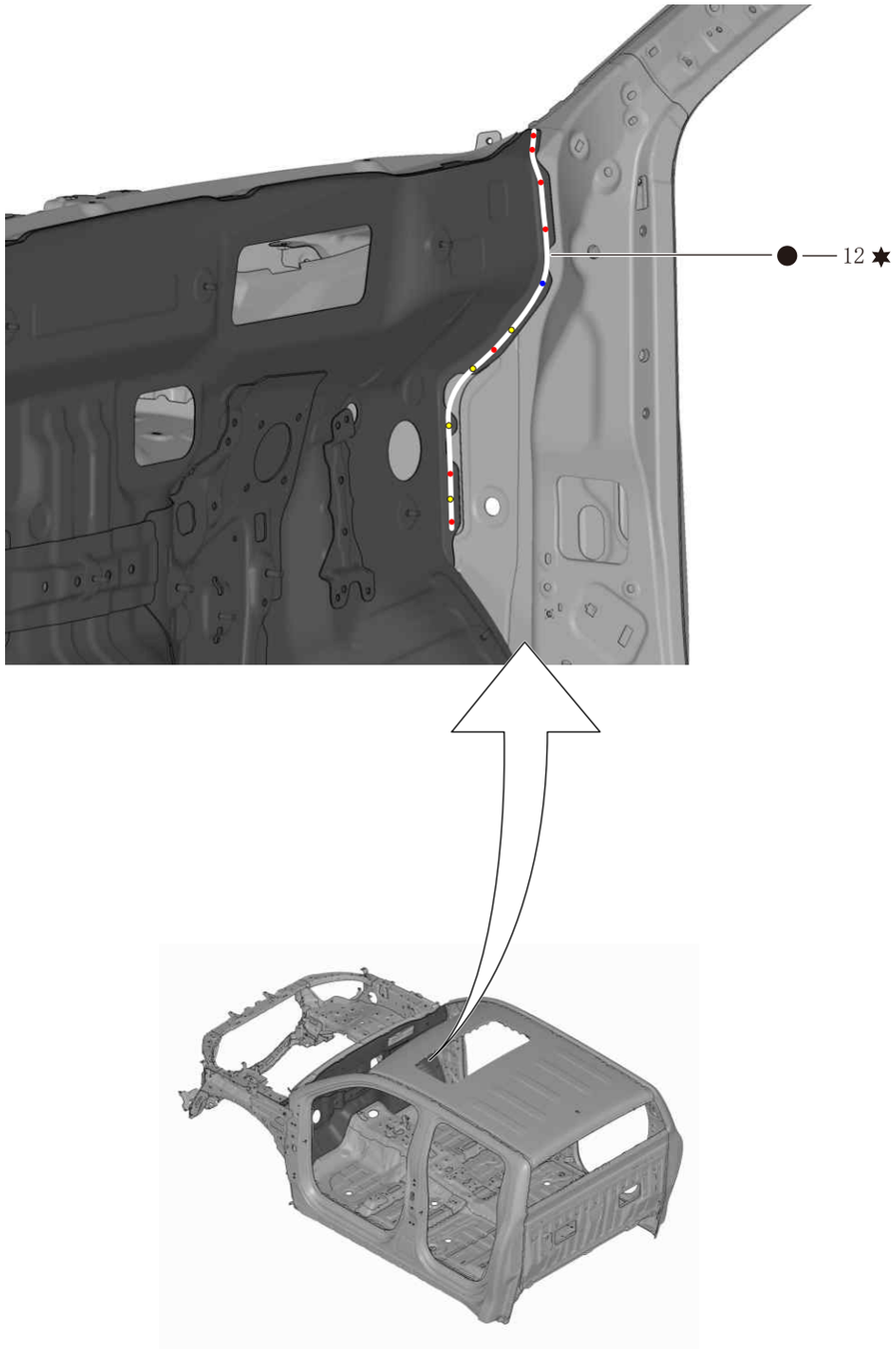
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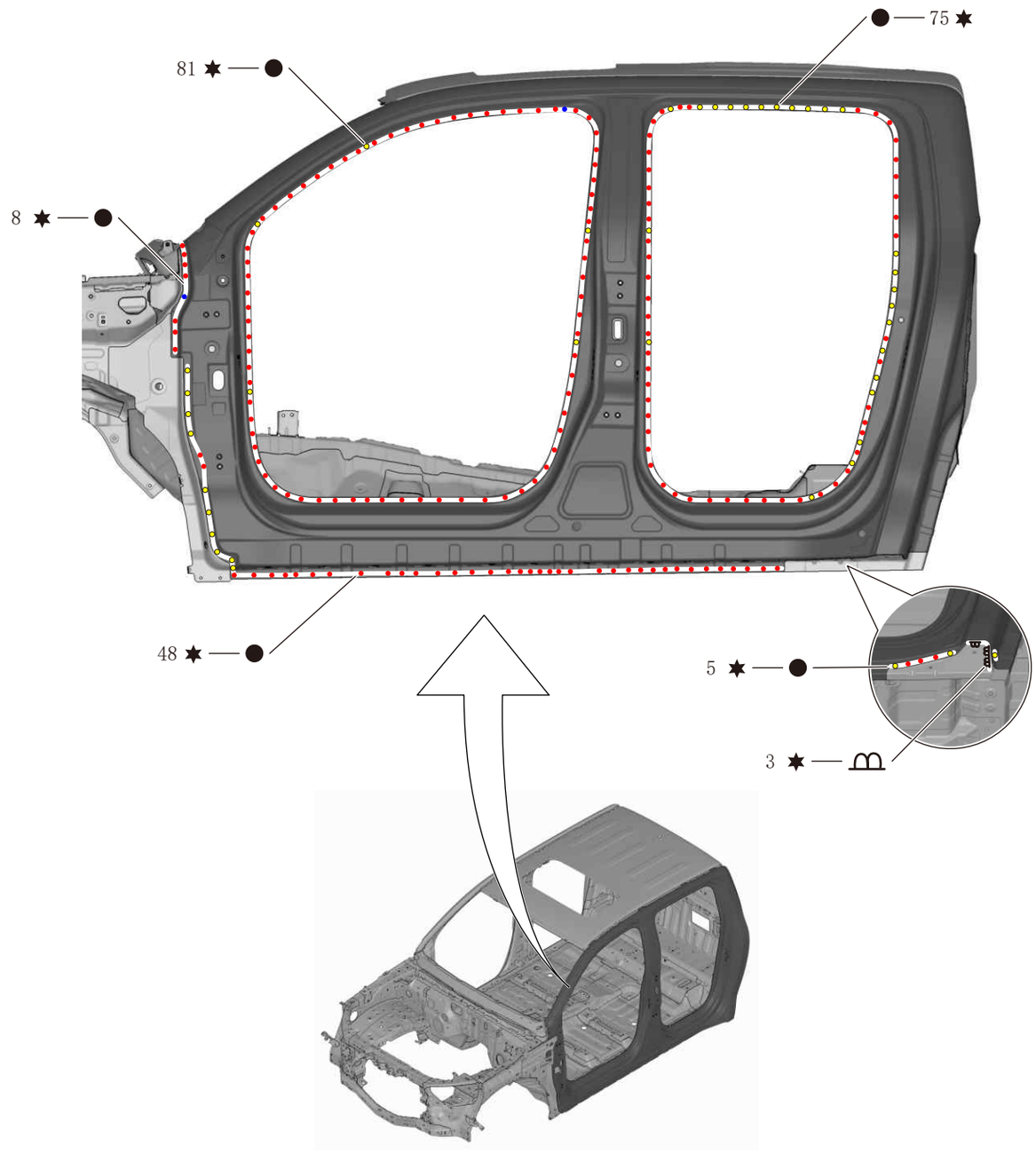


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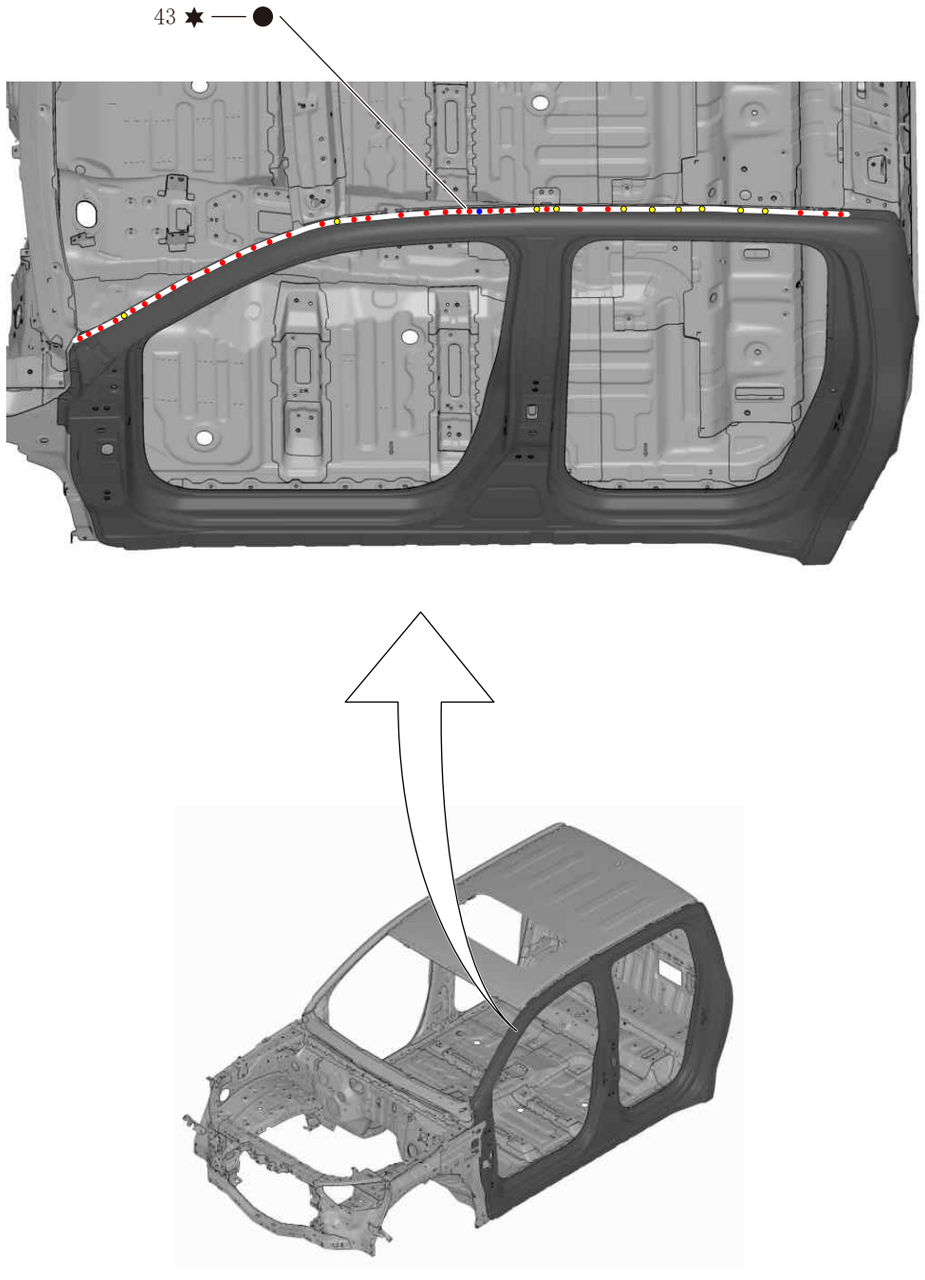


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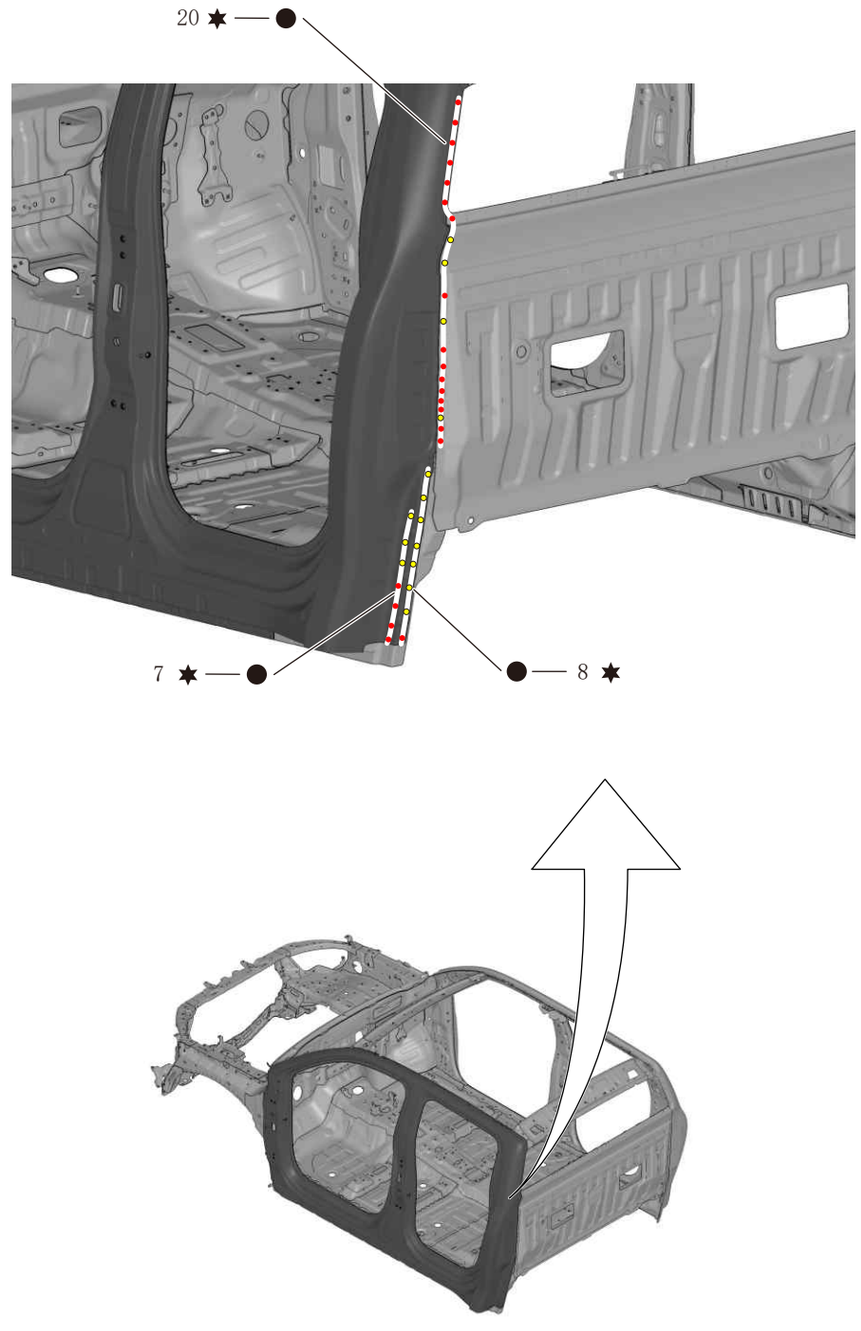
Left side wall outer board



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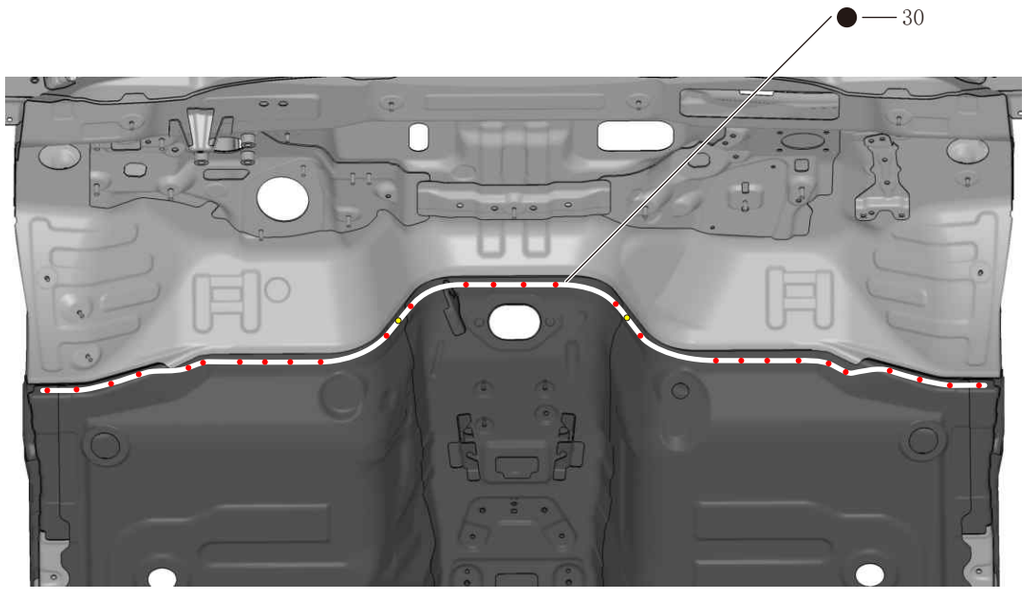


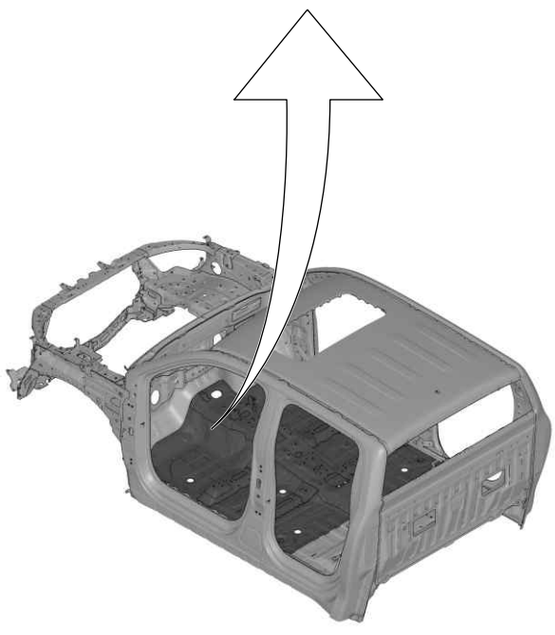
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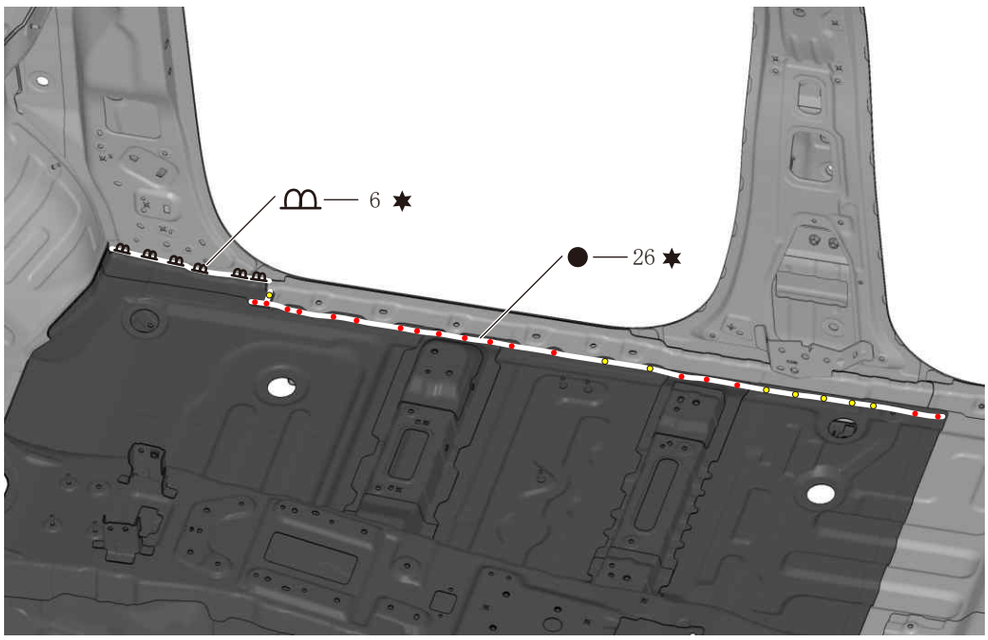
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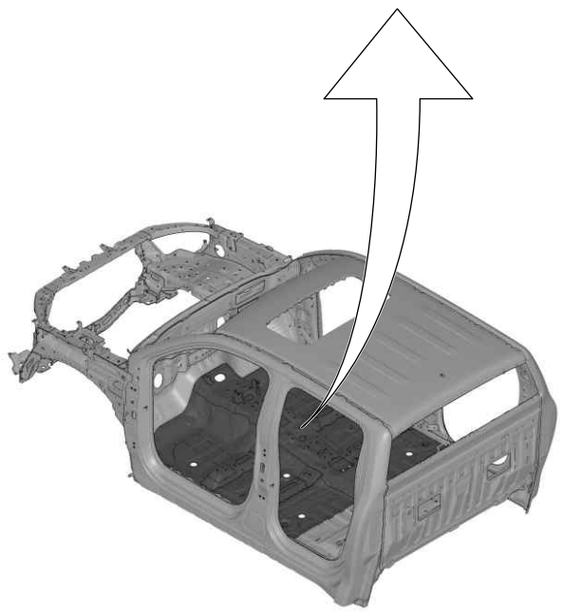
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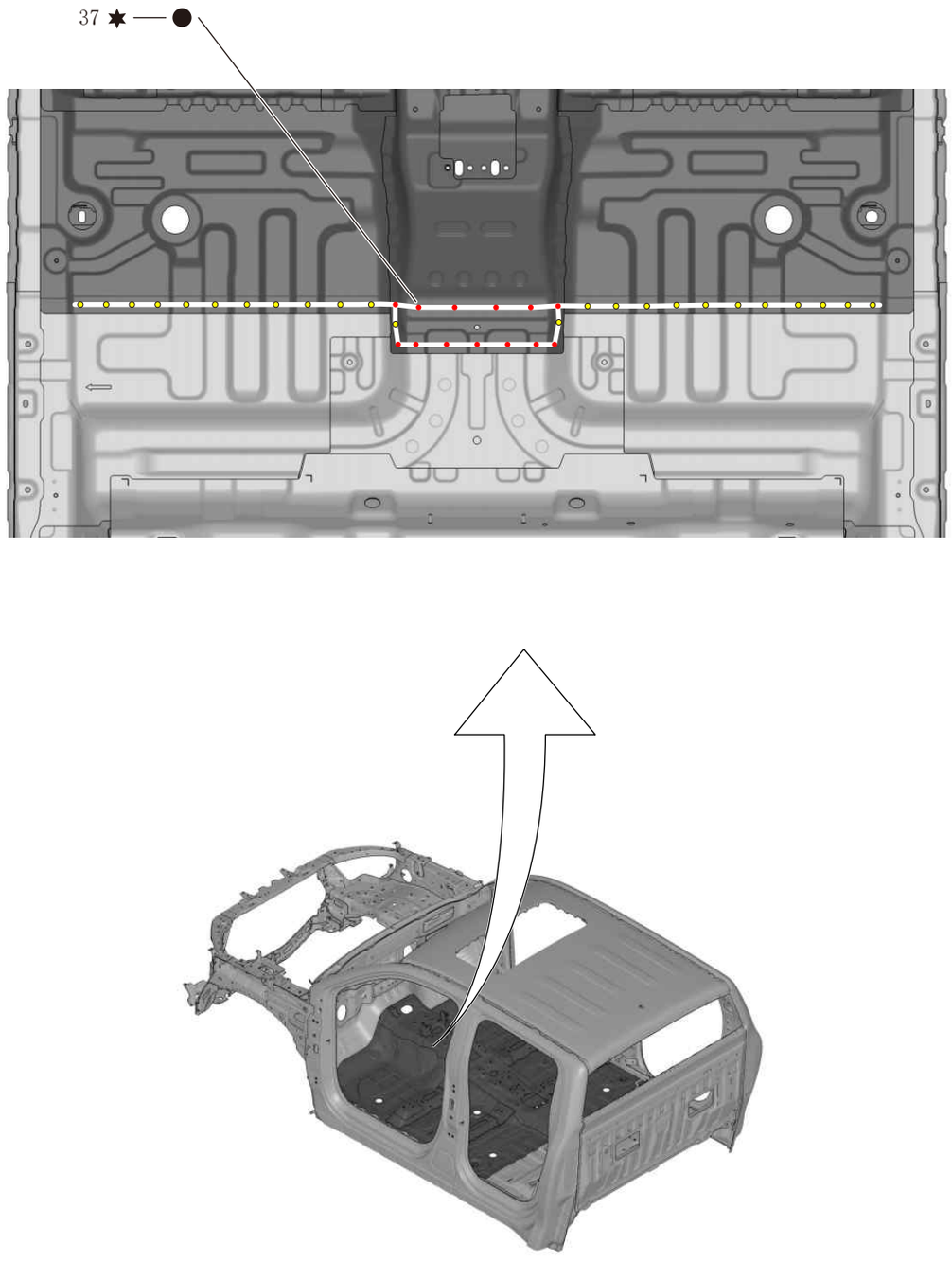


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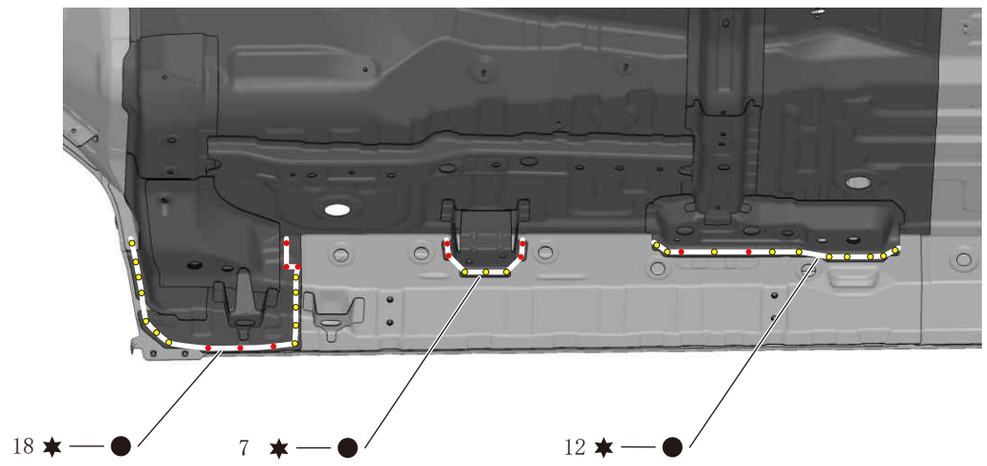


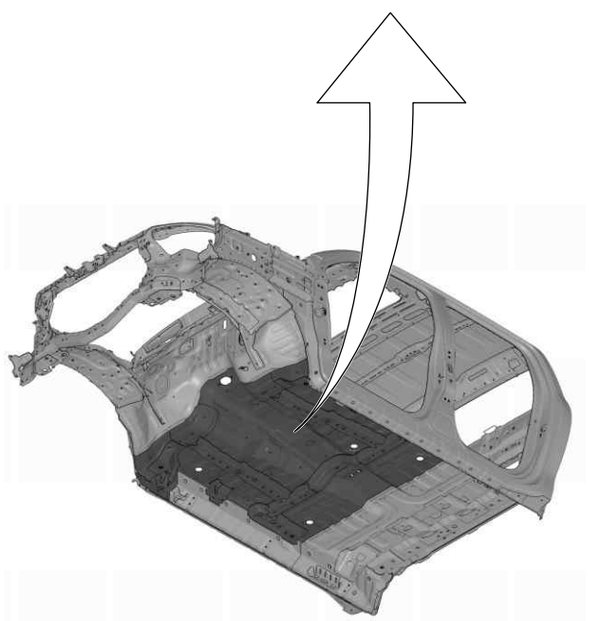


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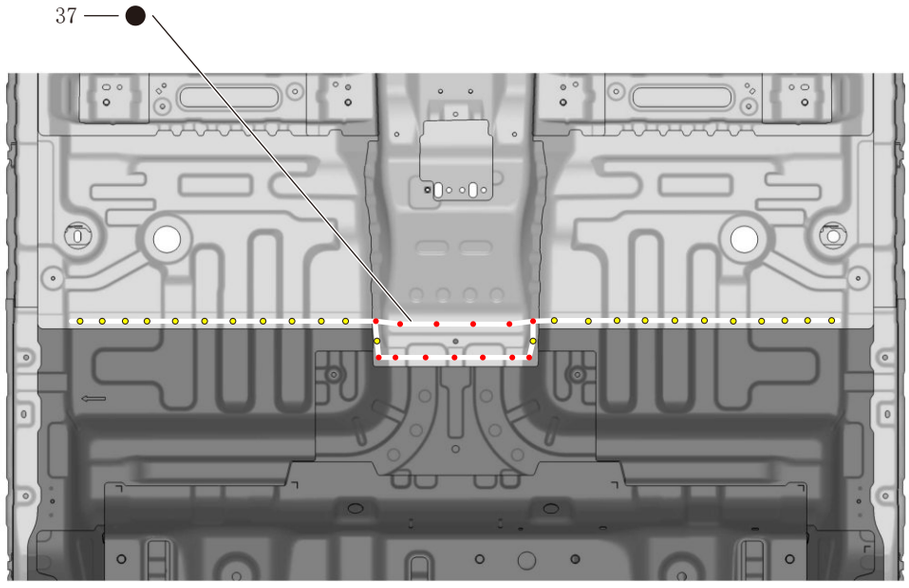
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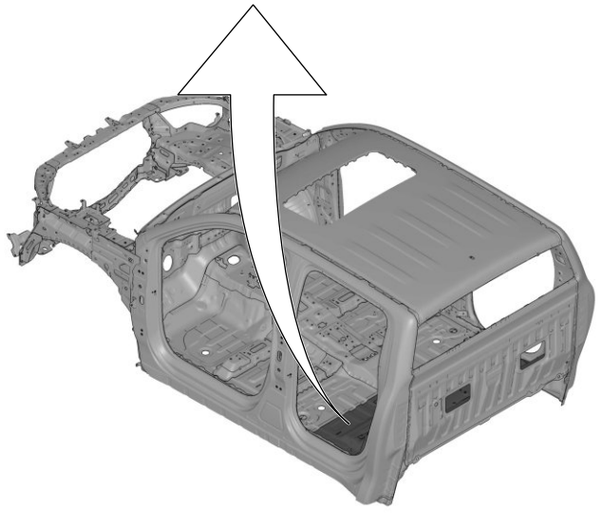




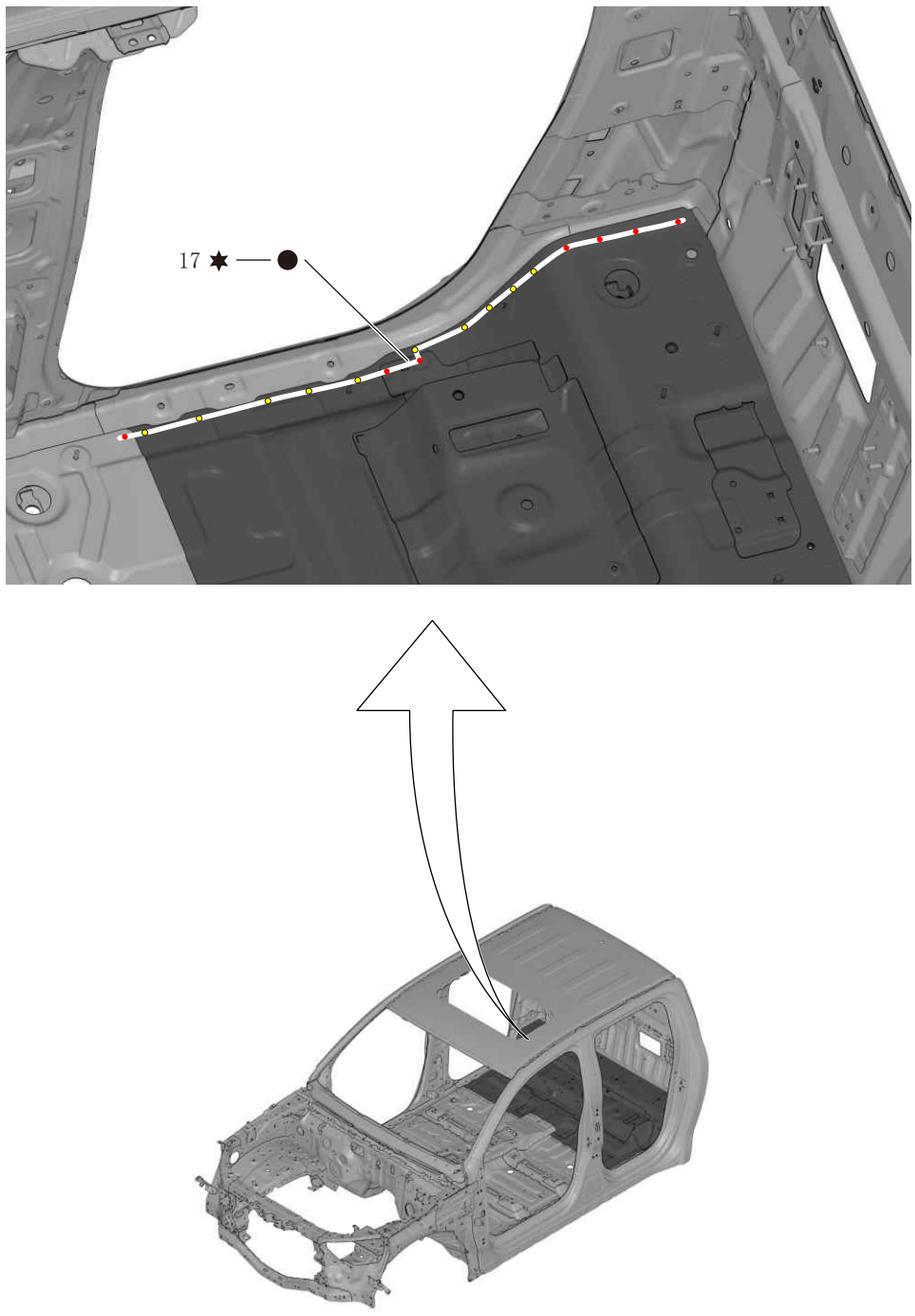
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Rear floor

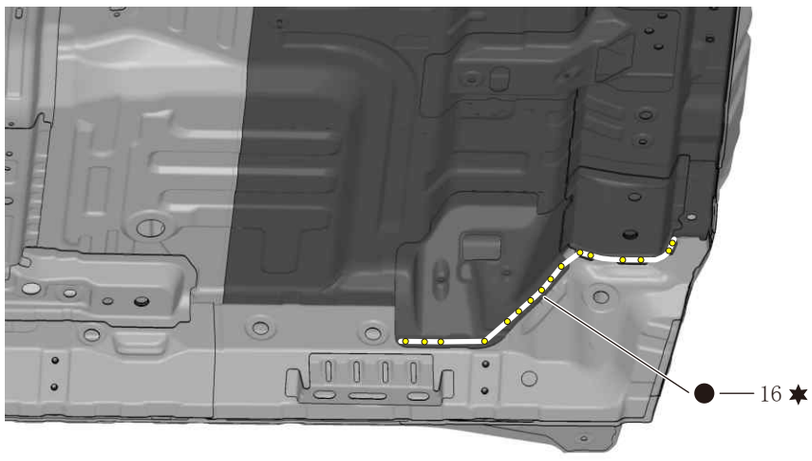


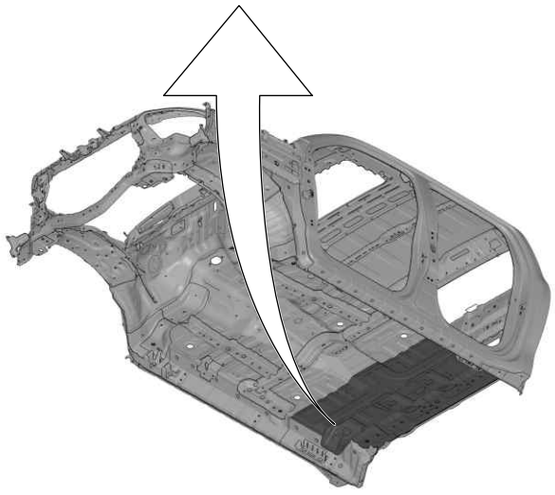


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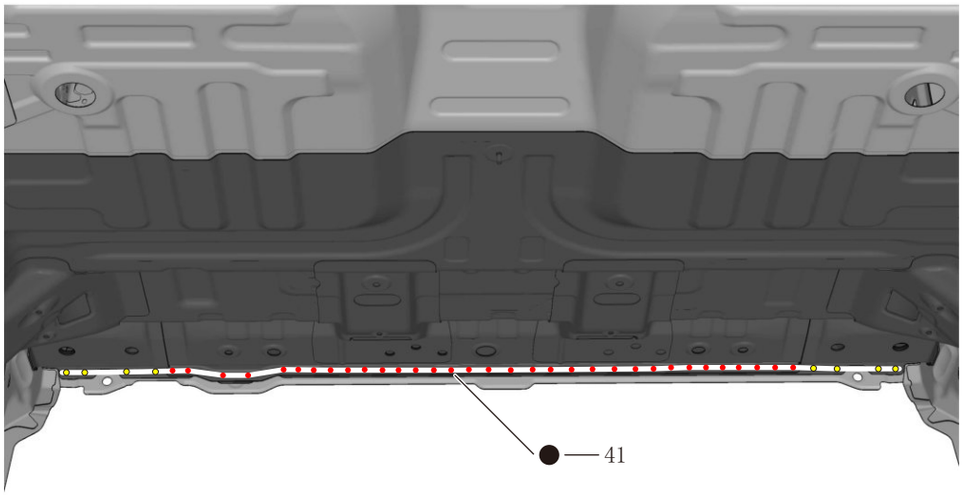


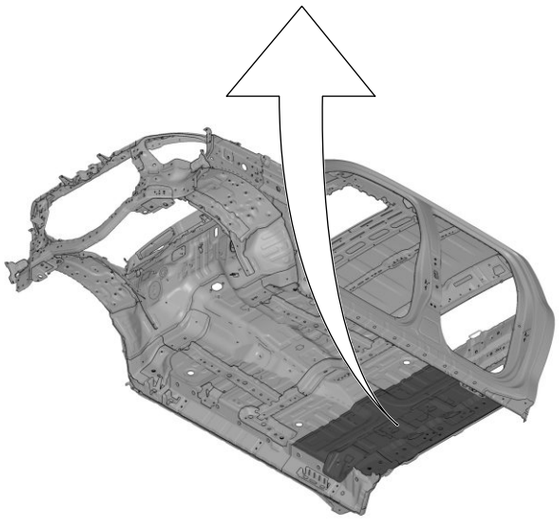
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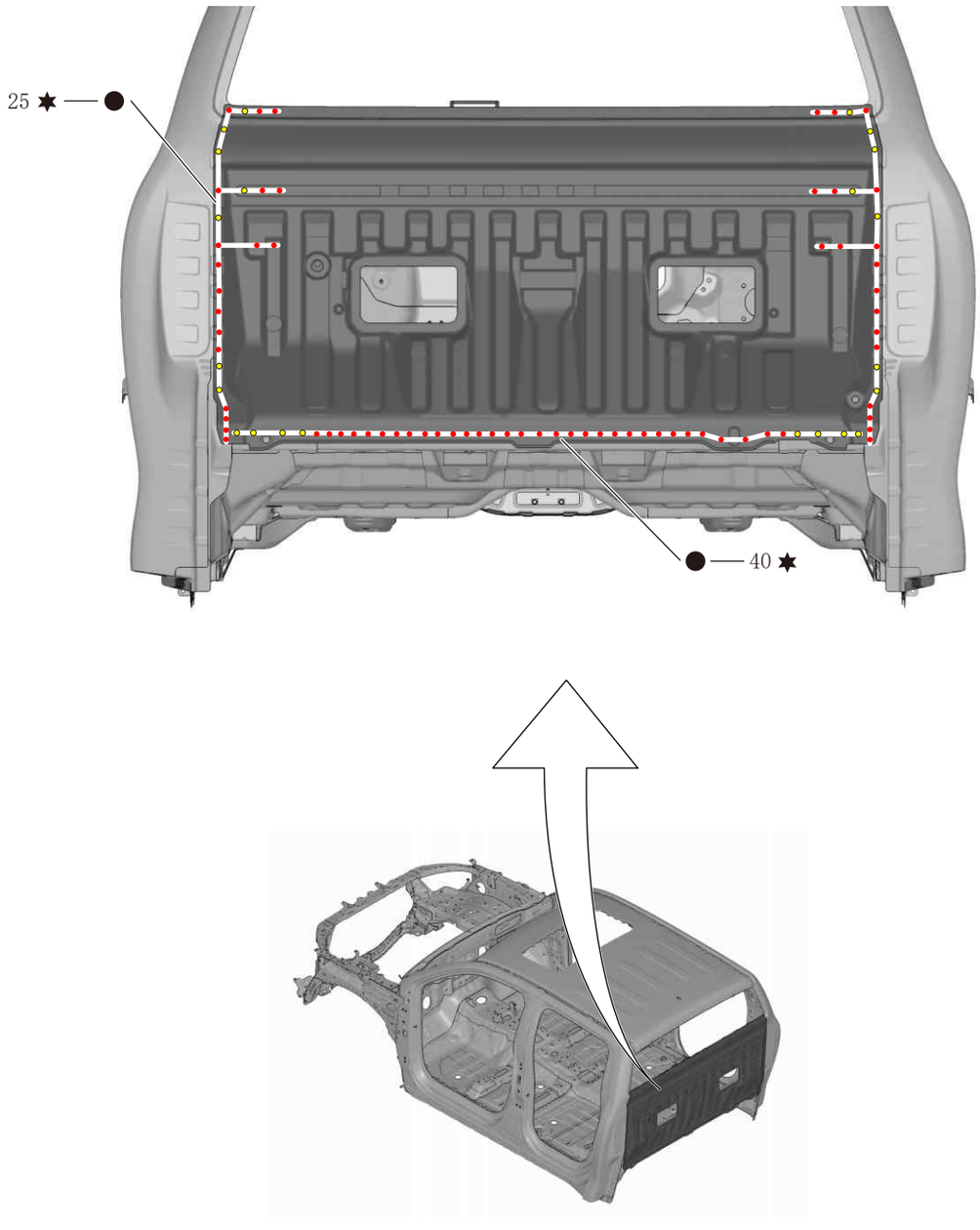
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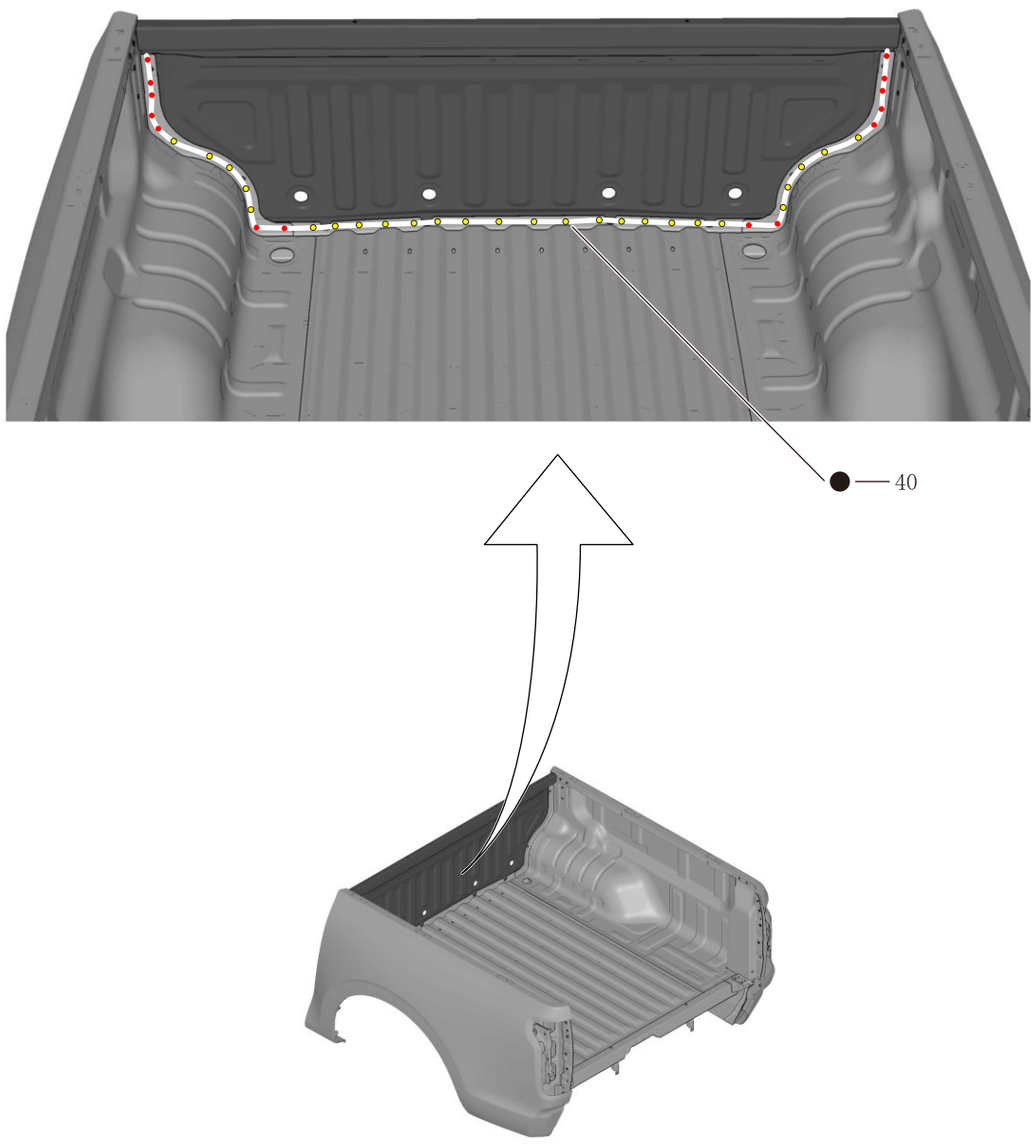
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Rear wall assembly



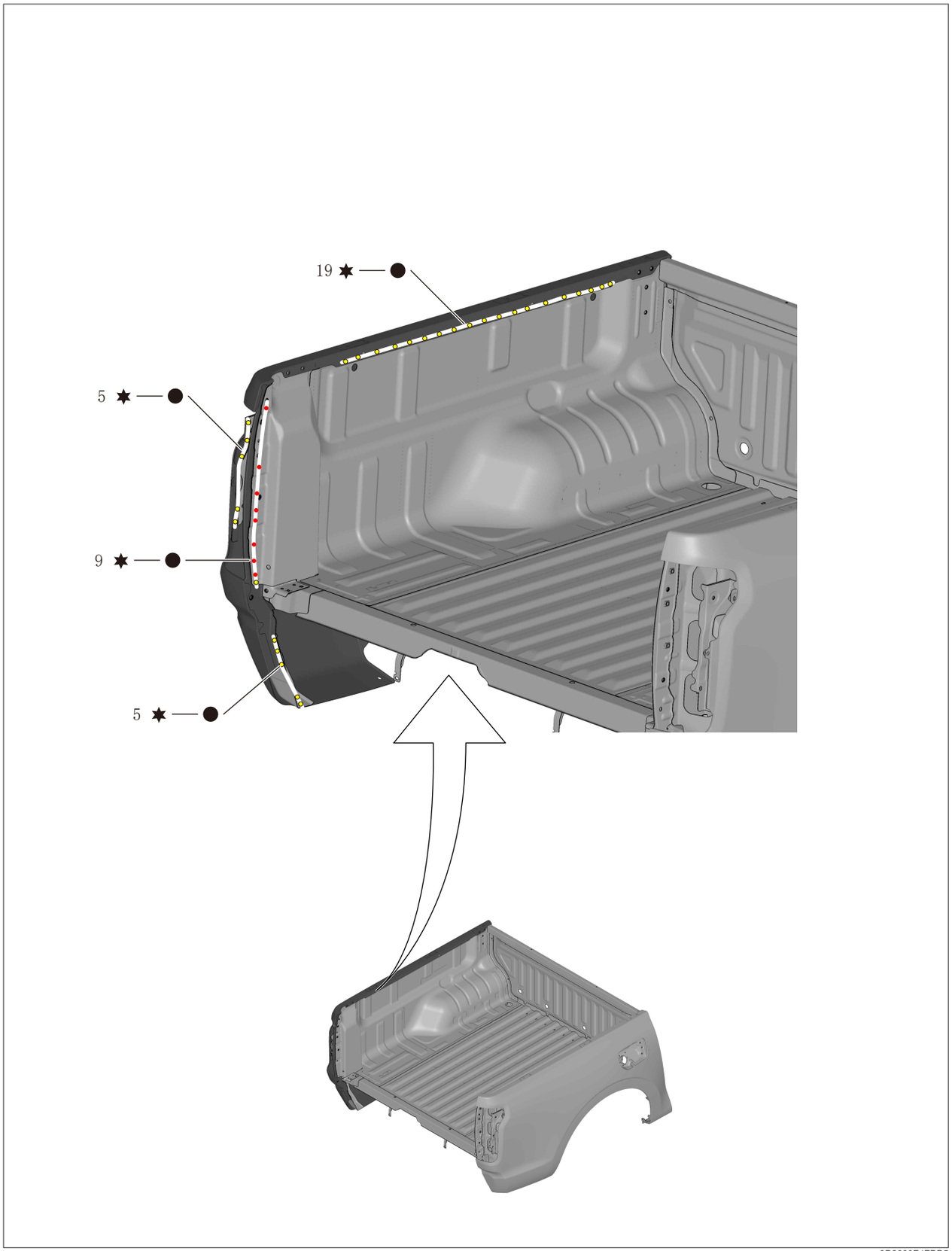
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Trunk front plate

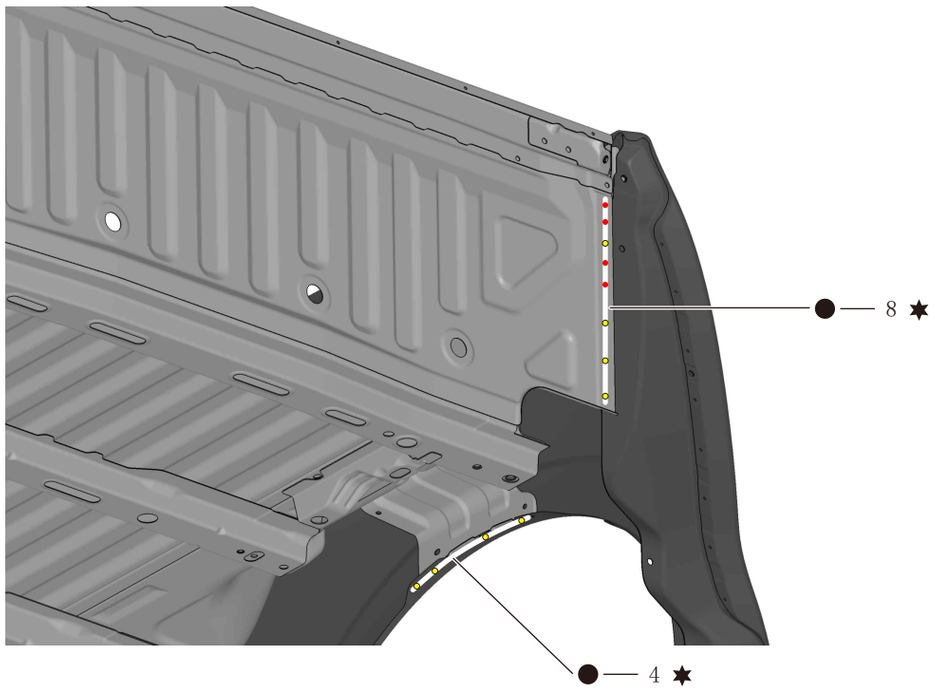


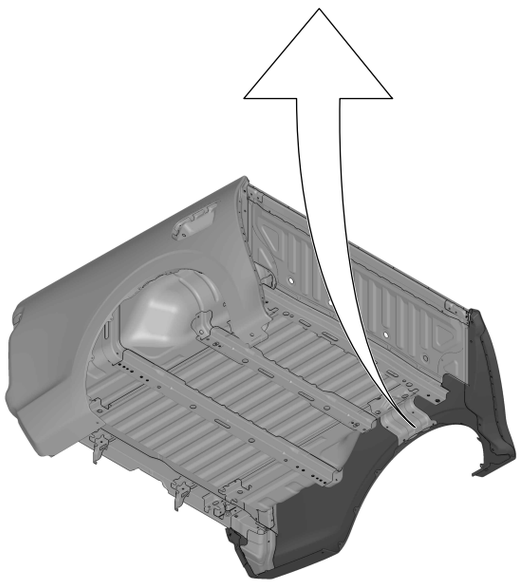
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Trunk left side plate outer plate



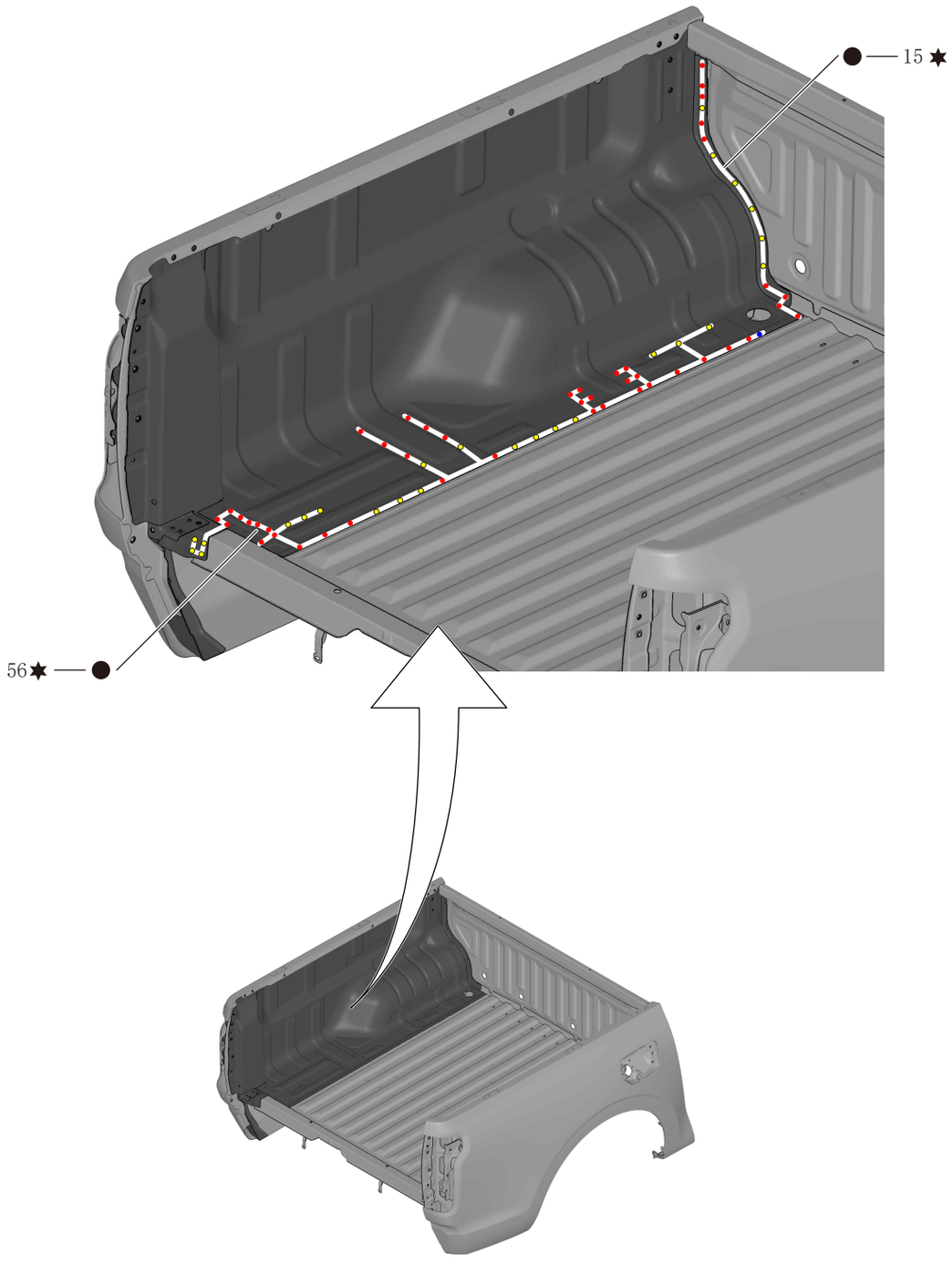
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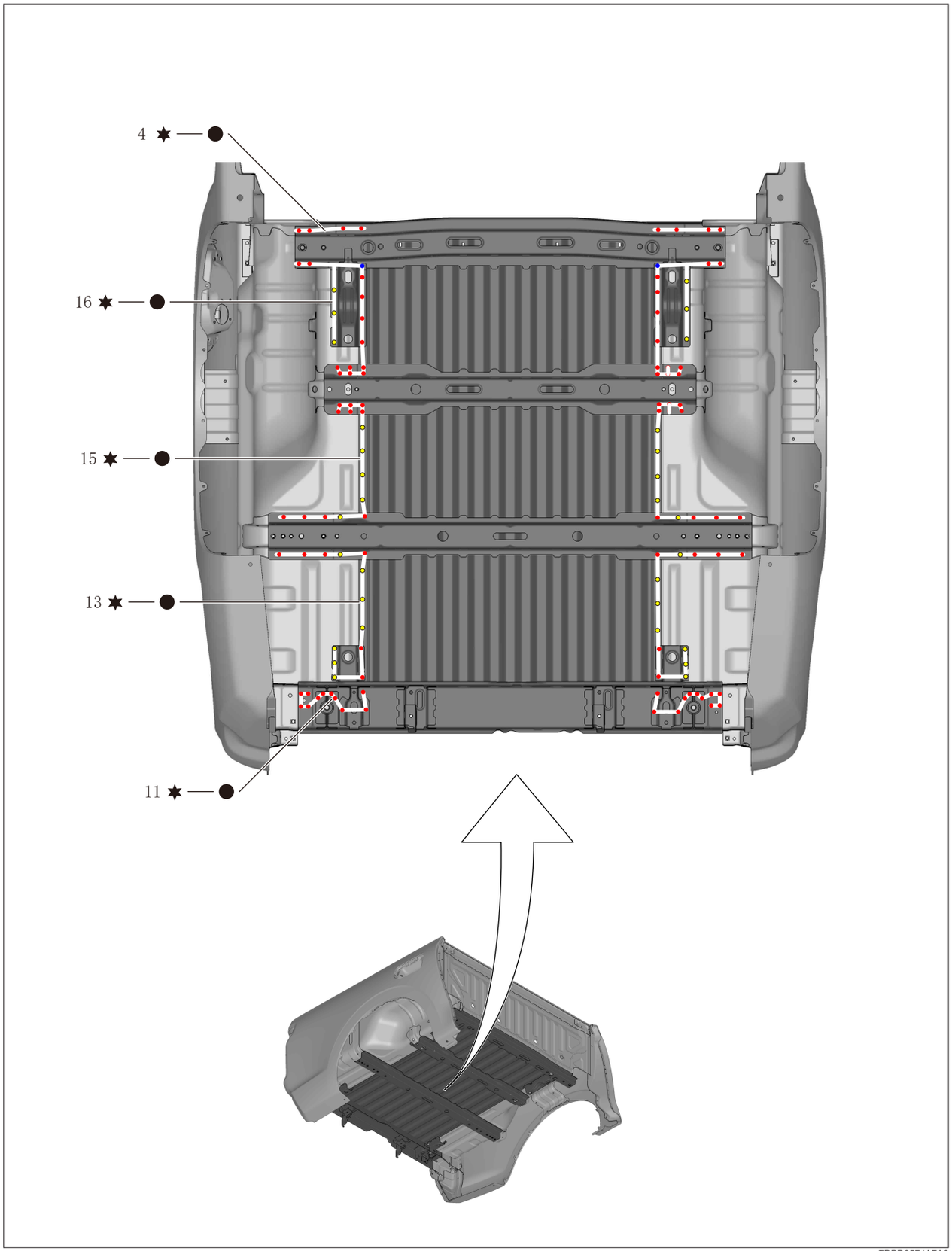
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Trunk left side plate inner plate



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Trunk floor



Paint/coating repair

System description

Paint coating

Paint is a hybrid liquid and can be painted on many kinds of base materials. After drying, it will form a solid film, protecting base material and beautifying outward appearance. The following four coatings spray-painted on vehicle rolling off production line, ensures the vehicle's sound corrosion-resistant performance and brightness.

1. Electrophoretic primer
2. Surfacer
3. Colored paint
4. Lacquer (transparent exterior coat)

Major functions of electrophoretic primer

1. Rust prevention
2. Enhancing adhesive force to parts
3. Limited filling capability

Surfacer function

1. Filling capability
2. Insulating/sealing function
3. Setting off colored paint

Major functions of colored paint

1. Adding color
2. Generating brightness

Lacquer functions

As an outermost coat of paint surface, lacquer has following major functions:

1. UV-resistance material contained enables it to sustain UV in sunlight
2. Resisting environmental dust (acid rain)'s corrosion to paint surface
3. Making paint surface friction-resistant
4. Generating better paint surface brightness

Paint surface daily maintenance

Please observe following rules in the daily maintenance of paint surface:

- In the maintenance and repair of vehicle, take care not to touch the paint surface with dirty hands stained with oil, or carelessly use rag stained with oil to clean the paint surface. Do not place dirty tools smeared with oil contamination or rag containing organic solvent on the vehicle body to prevent the occurrence of chemical reaction.
- If there is no obvious scratch on the paint surface, think again before conducting the second spray-painting to prevent the occurrence of incompatible paint color or bad paint cohesion.
- If vehicle is parking for a long time, park the vehicle in garage or a well-ventilated place and use special vehicle body cover to cover the vehicle body in winter. If vehicle is temporarily parked, park the vehicle in a shady place.
- Be sure to prevent the paint film from strong impact, collision and scratch. If the paint surface is scratched or dented, or the paint has come off, repair it in time. It is suggested sending the vehicle to a Great Wall authorized service shop for repair.
- Use quality detergent to clean vehicle body trim and do not apply excessive force in waxing operation to prevent the paint coating from being penetrated. Clean corrosive stains (such as asphalt, bird-droppings and insect) in time. In such case, be sure to remove such stains with special detergent other than by blade scraping or gasoline cleaning, to prevent damaging the paint surface.
- Wipe off dust from vehicle body before, when or after using the vehicle, to minimize electrostatic dust absorption.
- Clean the vehicle timely after rain. Acid material contained in rainfall will be increasingly concentrated with the gradual shrinking of rain soak after rain on vehicle body. As a result, failure of washing out the rain soak as soon as possible may result in the paint surface damage.
- Use clean and soft rag or sponge (without foreign materials such as metal chips or sands) to clean the vehicle. Be sure not to use dry rag, towel or sponge to clean the vehicle. Otherwise, the vehicle may be scratched. Wipe the vehicle gently along water-flow direction other than in a circle or horizontally.
- Do not wash the vehicle until the engine has cooled off. Do not wash the vehicle under direct sunlight or in high temperature to avoid the detergent drying and thus leaving stains on the vehicle. If you wash your vehicle by yourself, be sure to use special detergent other than high-alkaline detergent, soap suds or dish-washing detergent to avoid accelerated aging of the paint surface as a result of grease contained in the paint surface being washed off. If you get your vehicle washed in a wash-yard, be sure to prevent the car-washing worker from using de-waxing detergent to avoid the paint surface damage. In particular, if you drive your car in coastal or heavily-polluted area, you are advised to wash your car every day.
- Wax the paint surface for protection when needed and get maintenance service for your vehicle from a Great Wall authorized maintenance station regularly to maintain the brightness and glossiness of the paint surface.

Warnings and Precautions for paint proportioning and spraying operation

⚠ Warning

- As the solvent permeated in air in the paint proportioning and spraying operation may cause severe respiratory disease, Be sure to strictly follow the operation manuals of paint, equipment and safety device manufacturers. Be sure to wear protective appliances (such as gas mask, anti-static clothe, safety goggles or gloves) to protect yourself from any injury in the operation.

⚠ Caution

› Mixing paints (or paint alternatives) manufactured by different manufacturers are strictly prohibited. Mixing immersible products from different manufacturers may cause: primer peeling-off, bad paint-coat adhesive bonding, light-tight curing, reduced gloss, ill color precision and coat damage (such as pits, bubble, or orange-peel like tarnishes).

Precautions in maintenance and repair of finish varnish

⚠ Caution

› Avoid washing vehicle under direct sunlight.

› Avoid using strong detergent soap and chemical detergent.

› Use brushless automatic cleaning equipment.

› Avoid using acid or alkali product.

› Do not use brush or broom to clear snow or ice.

› After thorough washing, blot rinse water off immediately. Do not leave rinse water unattended and drying on the paint surface. You are advised to use soft chamois leather to blot off rinse water.

› Polish the vehicle only when surface defects cannot be cured by other means.

› Minimize maintenance area if the surface defects is not serious.

› Avoid using excessive lacquer. Otherwise, the paint may be aging prematurely.

› Use electric polishing equipment in strict compliance with the polishing equipment manufacturer's recommended requirements. Be sure not to use wax or silicone-type product to cover spiral mark (the mark will reemerge causing customer complaint).

› The matte paint surface cannot be polished or waxed, only the whole part can be sprayed.

Precautions for antiseptic treatment

⚠ Caution

› . When spraying sound insulation or antiseptic materials, be sure to take protective measures to prevent the material from being sprayed into part (such as door lock, vehicle window lifting groove, vehicle window regulator and seat belt retractor) as well as any moving or rotating parts (parking brake cable in particular) openings. Be sure to open all the discharge holes of the vehicle after the spraying operation.

› Be sure to remove foaming sound insulation material on the maintenance area before using open flame to repair the vehicle body. When reinstalling sound insulation material, avoid inhalation of harmful dust.

› Be sure to wear goggles or gloves to prevent any hurt or injury.

› All the metal parts of the vehicle body must be treated by electrophoretic coating primer and all the naked metal surface must be treated by rust primer before the vehicle is shipped out of the factory.

› If original film or antiseptic material is damaged in the welding or heating operation, be sure to clean it up and re-conduct antiseptic treatment.

› As metal will be exposed in collision repair, be sure to re-spray special antiseptic material on the metal surface exposed.

› The sealant can prevent water or dust from entry into vehicle and is anti-corrosive. If the sealing

place in original sealing joint (which is easily seen) is damaged, reseal it. The connecting place must be resealed after the replacement of plate. The sealant used must stay flexible after curing and applying paint. For openings sealed by sealant, use sticky filler in the sealing operation. Follow the direction for use of the material selected.

› The insulation material can control general noise level. In case the insulation layer is damaged in the repair operation or in the replacement of plate, be sure to replace it with the same material.

Diagnostic information and steps

Name	Cause	Handling method
Powdering	1. Serious corrosion of paint film, such as corrosion by UV 2. Improper paint proportioning in the construction operation 3. Bad light-stability of film 4. Vehicle not frequently or well cleaned 5. Improper cleaning agent used or polishing wax too coarse	Fixing by partial paint spraying
Plastic part de-painting	1. Too weak adhesive force between coat and substrate, or upper coat too hard as compared with lower coat 2. Film being spray-painted too thick or film corroded by vapor, acid or alkali material 3. Bad recoatability or ill treatment of lower film; or upper coat defects (such as pinhole and grinning defects)	Fixing by partial paint spraying
Cracking	1. Primer not sufficiently stirred before spraying 2. Lacquer coat being sprayed too thick 3. Middle surfacer coat being sprayed too thick	Fixing by partial paint spraying
Corrosion by bird droppings	Bird-dropping corrosion	1. Polishing treatment for slight corrosion 2. Conventional grinding and polishing treatment for moderate corrosion 3. Partial paint-spraying fixing for severe corrosion
Scratching	1. Film low-hardness 2. Scruff by hard object	1. Polishing treatment for slight scratch 2. Conventional grinding and polishing treatment for rough scratch 3. Partial paint-spraying fixing for laceration

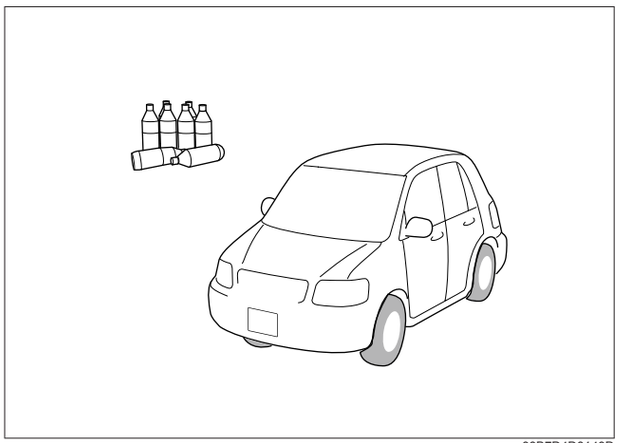
Name	Cause	Handling method
Corrosion	1. Thinner film in fringe place 2. Corrosion as a result of knocking injury 3. Acid or alkali corrosion	Partial paint-spraying fixing (repair the sheet metal before paint-spraying fixing in serious rust circumstances)
Paint peeling-off	1. Too weak adhesive force between coat and substrate, or upper coat too hard as compared with lower coat 2. Film being spray-painted too thick or film corroded by vapor, acid or alkali material 3. Bad recoatability or ill treatment of lower film 4. Upper coat defects (such as pin-hole and grinning defects)	Partial paint-spraying fixing (repair the sheet metal before paint-spraying fixing in serious rust circumstances)
Corrosion by acid rain	Corrosion by acid rain	1. Polishing treatment for slight corrosion 2. Conventional grinding and polishing treatment for moderate corrosion 3. Partial paint-spraying fixing for severe corrosion
Tarnishes	1. Film severely corroded by acid, alkali, electric arc, sea water and salt mist 2. Improper film maintenance in relatively bad conditions 3. Insufficient paint durability 4. Reduced film durability as a result of incorrect paint proportioning in the construction	1. Polishing treatment for slight tarnish 2. Conventional grinding and polishing treatment for moderate tarnish 3. Partial paint-spraying fixing for severe tarnish
Bubbling	1. Vapor penetrating into film and jacking up air bubble with temperature rise as a result of the film exposure in damp environment for too long time 2. Substrate corroded by infiltration material 3. Film corroded by gasoline, acid or alkali material	Partial paint-spraying fixing (repair the sheet metal before paint-spraying fixing in serious rust circumstances)

Demonstrative example of treating frequently-seen film defects

⚠ Caution

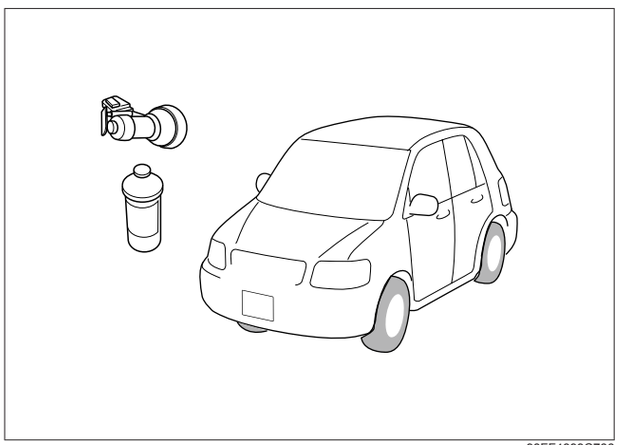
› The matte paint surface cannot be polished or waxed, only the whole part can be sprayed.

1. Clean up the surface to be polished with absorbent material



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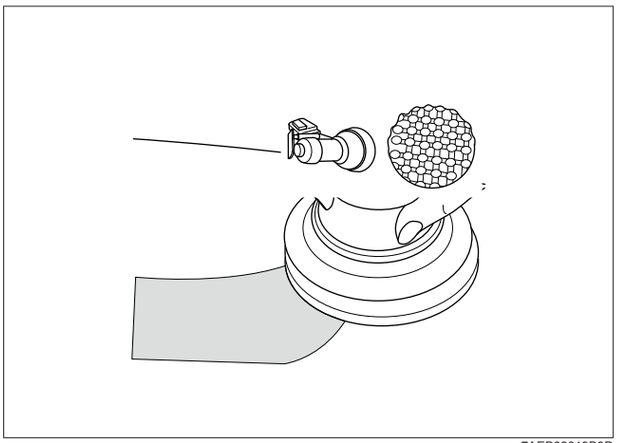
2. Soak a sponge fully with water and then squeeze out excessive water



98FF4399C766

3. Take small amount of wax to grease the surface to be polished and adjust the rotating speed of polisher

4. Place the sponge against the surface before turning on the polisher. Keep the polisher rotating at a speed of (2500~3000)r/min and then press the surface gently with the polisher for (3~5)s to polish the surface



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ℹ Notice

› Keep the polisher stable when moving it gently on the surface. Be sure not to polish the surface for too long time. Otherwise, the surface may be damaged due to overheating.

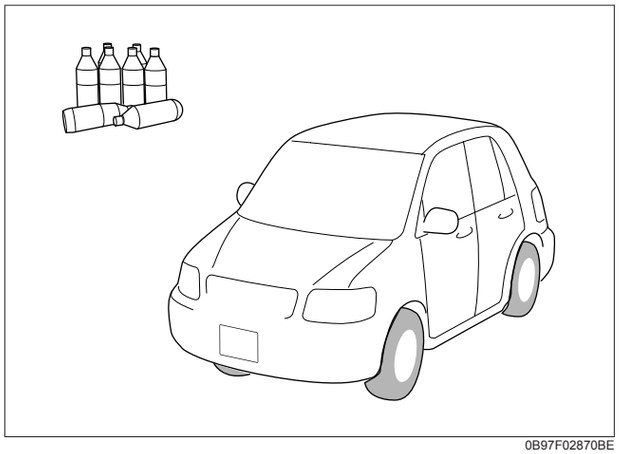
5. Wipe off excessive wax with car-cleaning cloth

Demonstrative example of conventional grinding and polishing treatment processing

⚠ Caution

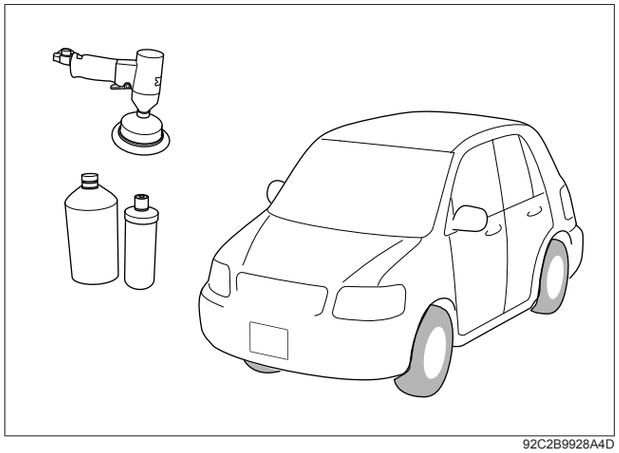
› The matte paint surface cannot be polished or waxed, only the whole part can be sprayed.

1. Clean up the surface to be polished with absorbent material



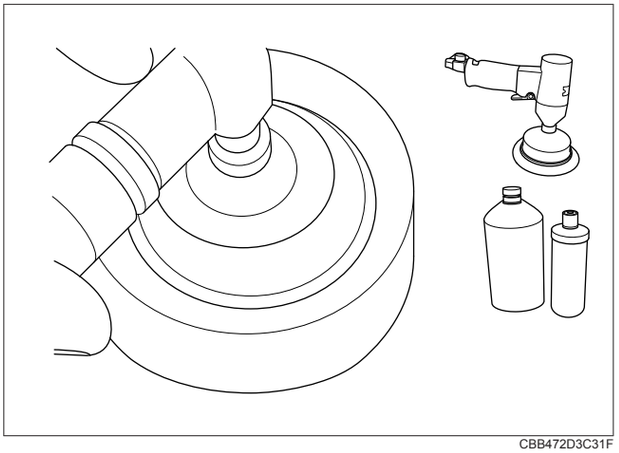
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2. Take appropriate amount of polishing paste and apply it on the surface to be polished and adjust the polisher speed



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3. Place the wool ball against the surface before turning on the polisher. Keep the polisher rotating at a speed of (2500~3000) r/min



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ℹ Notice

› Keep the grinding machine stable when moving it slowly on the surface. Be sure to avoid excessive grinding. Minimize the grinding time and grinding area.

4. Soak a sponge fully with water and then squeeze out excessive water; apply a small amount of polishing wax on the paint to be polished, and attach the sponge to the paint before turning on the polisher; keep the polisher rotating at a speed of (2500~3000) r/min. And then press the surface gently with the polisher for (3~5)s to polish the surface

ℹ Notice

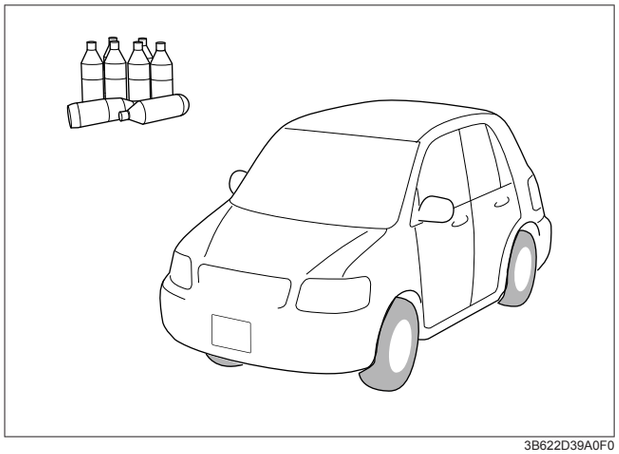
› Keep the polisher stable when moving it gently on the surface. Be sure not to polish the surface for too long time. Otherwise, the surface may be damaged due to overheating.

Demonstrative example of in-depth grinding and polishing treatment processing

⚠ Caution

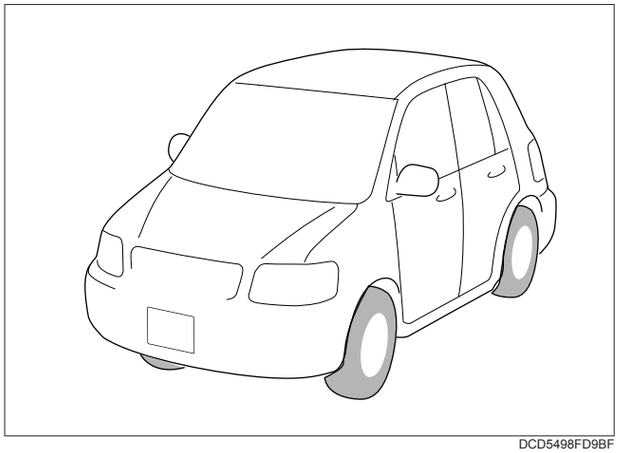
› The matte paint surface cannot be polished or waxed, only the whole part can be sprayed.

1. Use 2000# sandpaper to carry out grinding treatment for the damaged paint surface by keeping the paper clinging to the surface to be polished and grinding in a circle



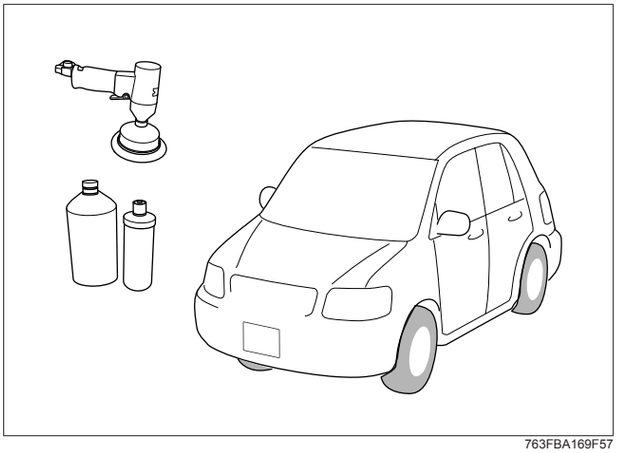
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2. Eliminate the grinding dust



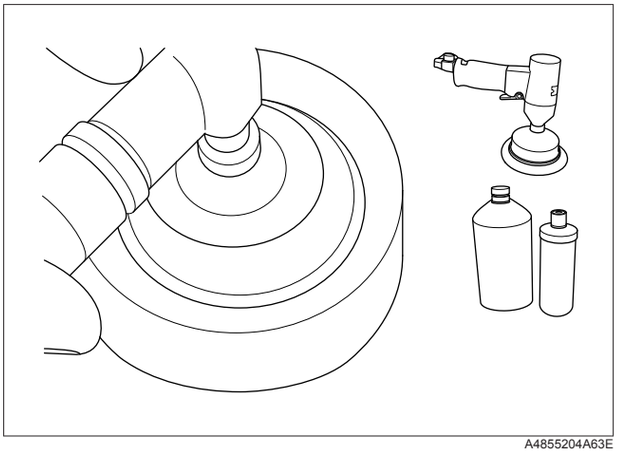
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3. Take appropriate amount of polishing paste and apply it on the surface to be polished and adjust the polisher speed



763FBA169F57

4. Place the wool ball against the surface before turning on the polisher. Keep the polisher rotating at a speed of (2500~3000) r/min



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ℹ Notice

› Keep the grinding machine stable when moving it slowly on the surface. Be sure to avoid excessive grinding. Minimize the grinding time about (3-5s desirable) and grinding area.

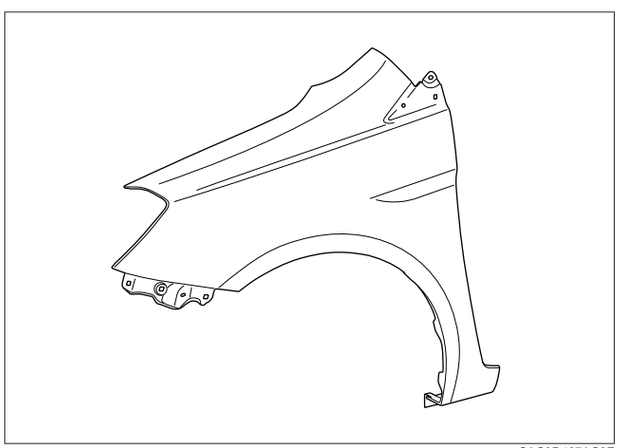
Paint-spraying processing for rigid surface

Taking the fender as example to demonstrate partial paint-spraying (paint repair) processing.

Notice

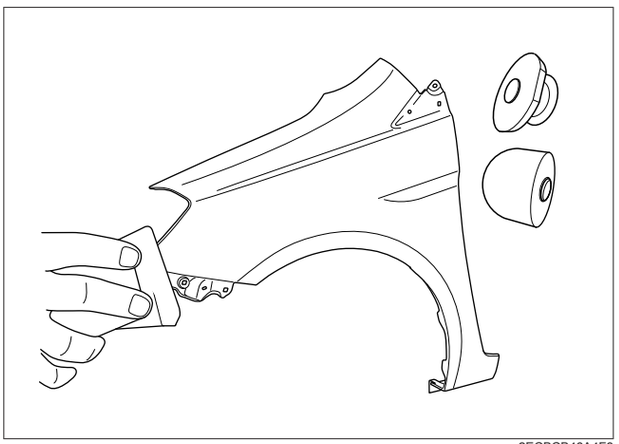
- Any paint repair for rigid surface shall conform to Great Wall standards. Identify repair area and select repair coverage (such as partial repair, the whole-sheet repair or complete-car repair); If it is collision damage, Judging from the damage degree, select to repair the sheet metal first and then the paint surface, or to carry out paint-spraying fixing after the replacement of parts and components.
- The matte paint surface cannot be polished or waxed, only the whole part can be sprayed.

1. Adopt partial spraying (paint repair) processing if the fender is seriously scratched



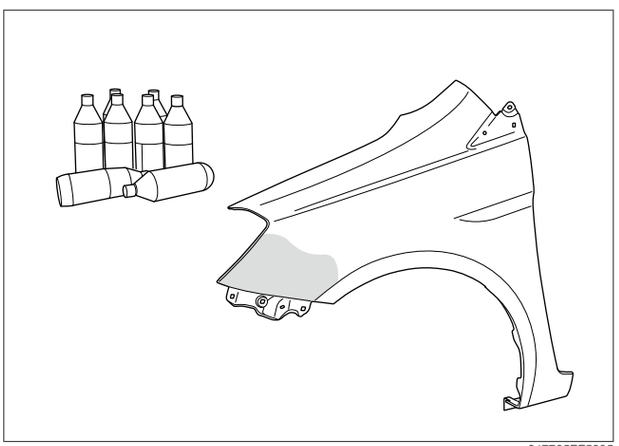
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2. Use P500# wet (water) sandpaper to carry out grinding treatment (grinding in a circle) for damaged paint surface



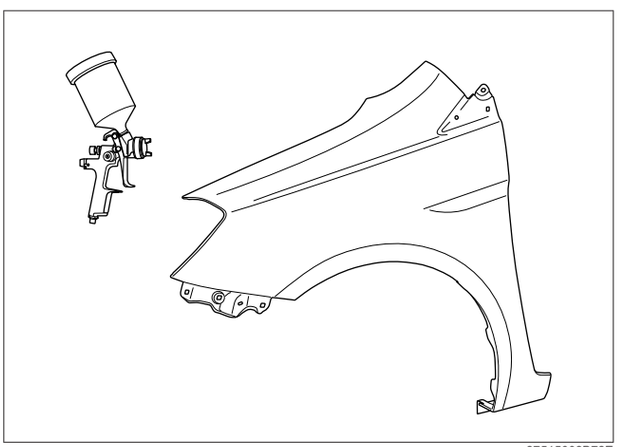
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3. Remove oil and clean up the surface with degreasing agent after grinding



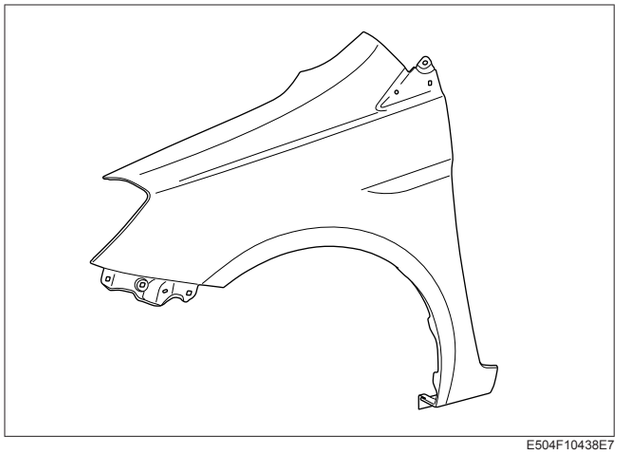
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4. Take as much care as possible to control primer coverage in the spraying operation to ensure progressive (other than gradient) coating in fringe position



27515602B72E

5. Bake dry the surface for (20-30) min after (4-5) min flash drying

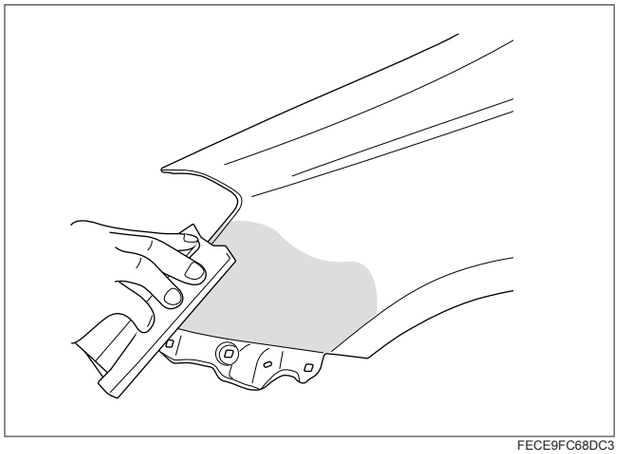


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Notice

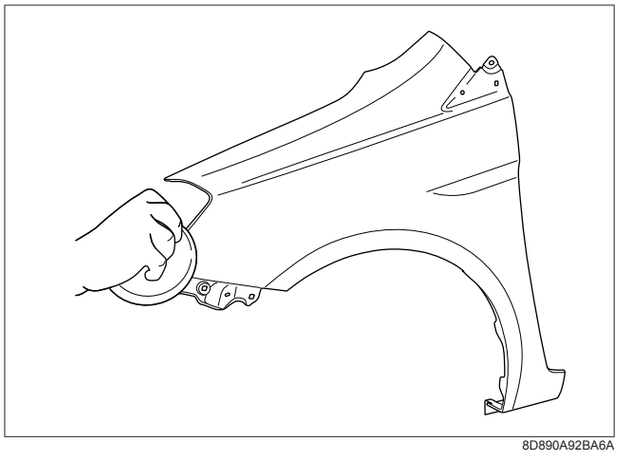
- Baking house temperature (70~80)℃.

6. After baking dry, use wet P(800~1000)# sandpaper to grind the surface



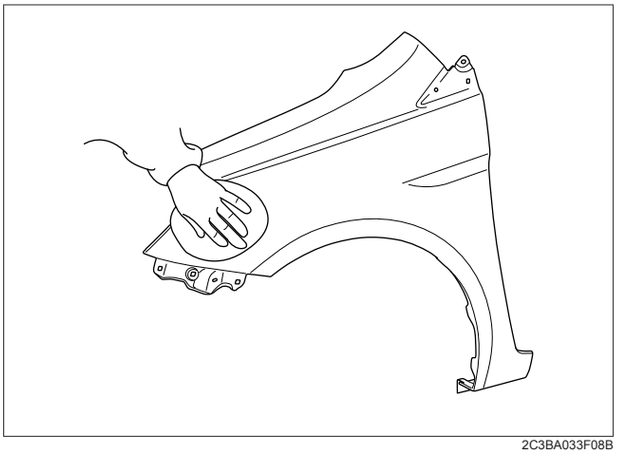
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7. Use 2000# refined sandpaper to grind the surface and gradually expand the grinding range



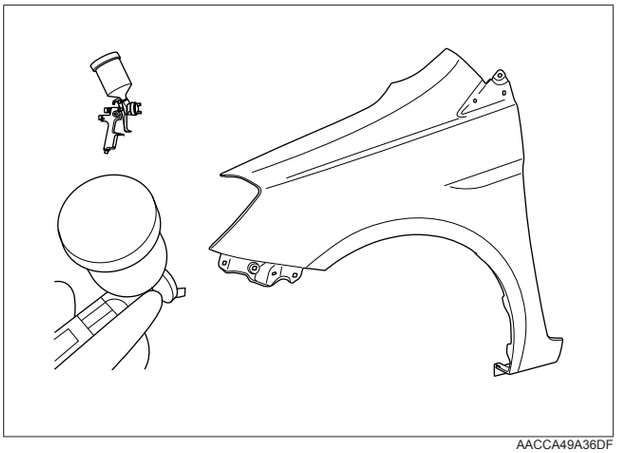
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8. After grinding, use sticky gauze to remove dust before spraying lacquer



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9. Spraying base-coat

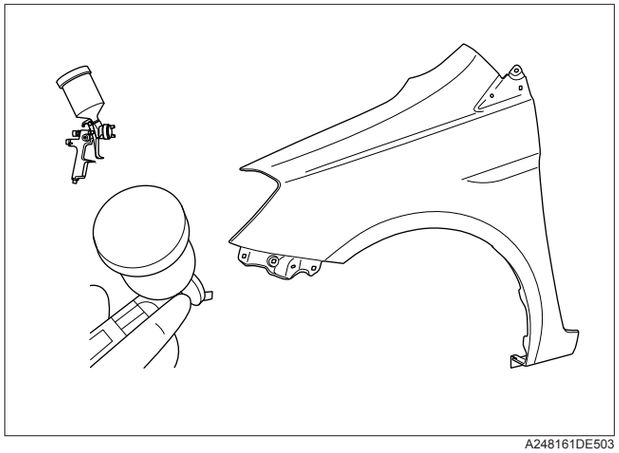


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Notice

- Widen spraying coverage mildly layer by layer.
- Air pressure (150~200) kPa.
- Spraying distance (20~30) cm.

10. After flash drying for (2~3) min, spray the second layer of primer until the interface is not obviously seen

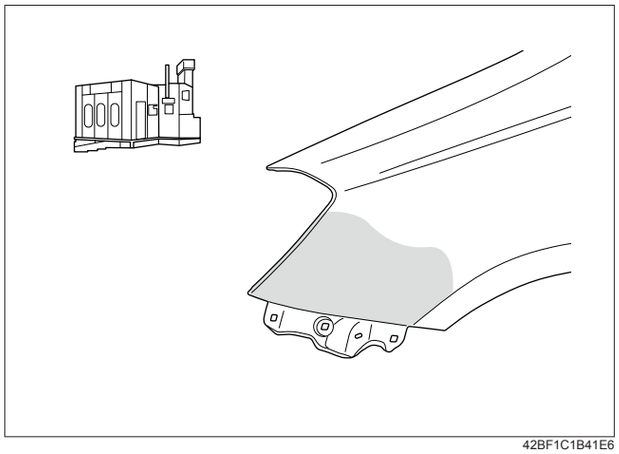


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Notice

- Air pressure (150~200) kPa.
- Spraying distance (20~30) cm.

11. After flash drying for (4-5) minutes, bake dry the surface for (20-30) minutes

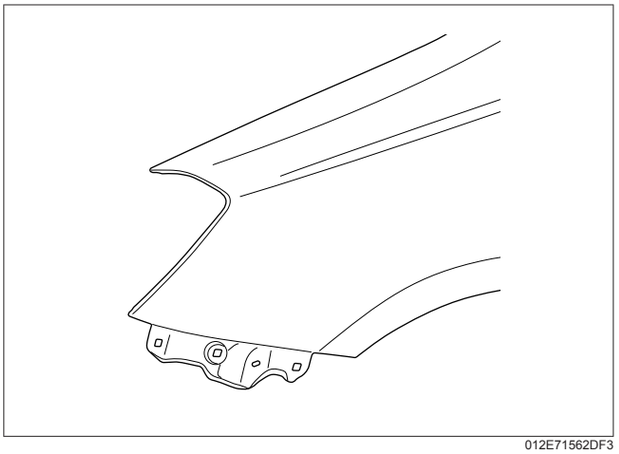


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Notice

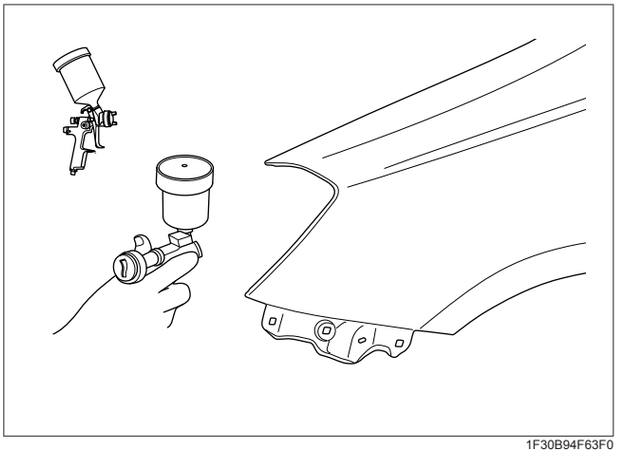
- Baking house temperature (70~80)℃.

12. After drying, use sticky gauze to remove dust before spraying lacquer



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13. Spray lacquer until the primer range is completely covered by lacquer

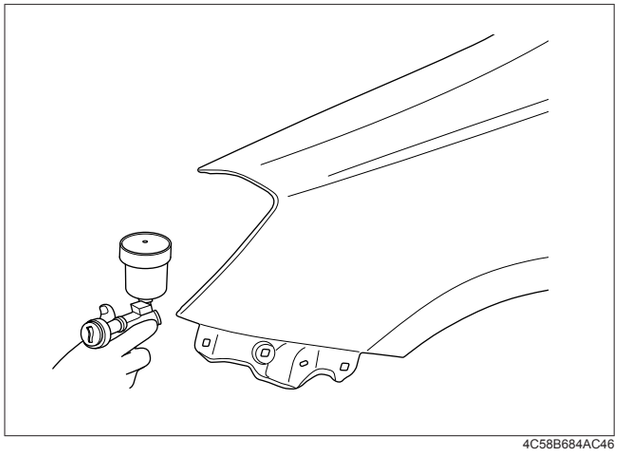


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Notice

- Air pressure (150~200) kPa.
- Spraying distance (20~30) cm.

14. After flash drying for (2-3) min, spray the second layer coating of lacquer until the second layer fully covers the first one

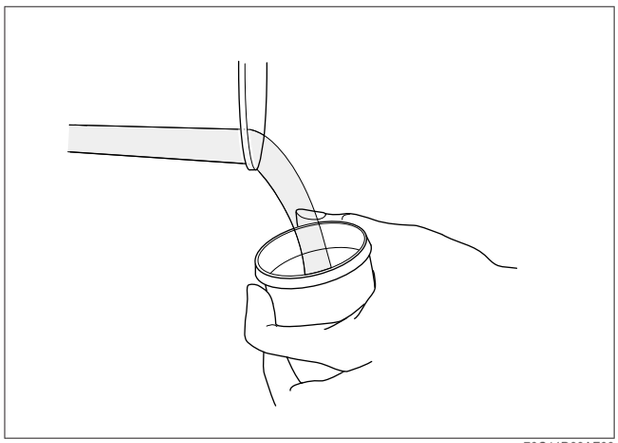


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Notice

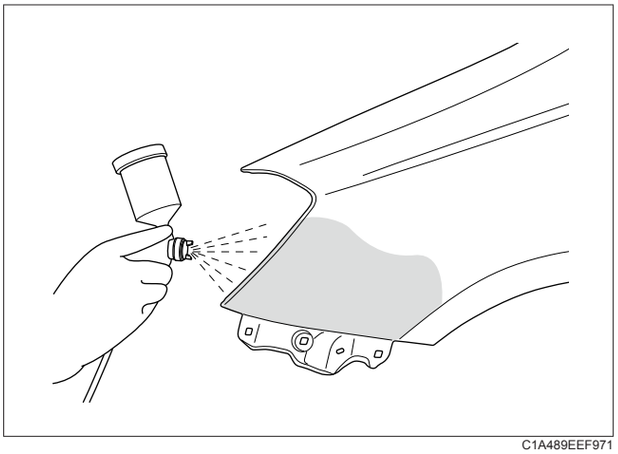
- Air pressure (150~200) kPa.
- Spraying distance (20~30) cm.

15. After lacquer-spraying, change to use base-coat binder immediately or add additive or diluting agent to the original lacquer.



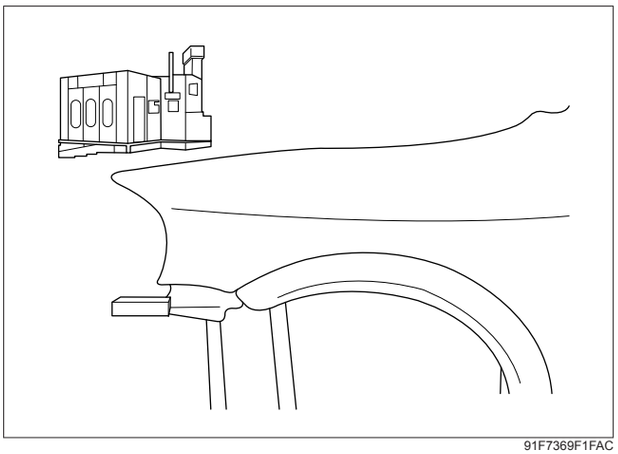
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16. Spray base-coat binder or diluted lacquer for (2-3) times on the interface place



C1A489EEF971

17. Bake dry for (20~30) min in baking house



91F7369F1FAC

Notice

- Baking house temperature (70~80)℃.

Paint-spraying procedures for rigid surface after completion of sheet metal repair

Paint-spraying procedures for rigid surface after completion of sheet metal repair follows procedures similar to those of paint-spraying processing for rigid surface. The only difference is that the following steps are added between primer grinding and base-coat spraying:

1. Brush putty
2. Grind putty
3. Blow off the dust, remove oil and clean the surface
4. Brush lacquer putty
5. Sand old paint surface
6. Clean the surface, remove oil and cover areas not for spray paint

⚠ Caution

› Refer to paint-spraying processing for rigid surface for detailed operation steps.

Paint repair procedures for plastic part paint surface

ℹ Notice

Observe the following three requirements in the repairing of plastic part paint surface:

› A certain adhesive force generated between paint and plastics, will not result in any loss of mechanic force.

› The paint film shall be flexible enough (without cracking) to sustain plastic deformation.

› Original granule and rough texture of certain plastic part surface can be reflected.

Refer to partial spraying processing for plastic primer surface repair and pay attention to low-temperature baking.

ℹ Notice

› Baking conditions: Temperature: (70～80) ℃; Time: (20～30) min.

A/C system

Heater, ventilation and A/C system (GW4D20M) - electric .....50－1
Precautions.....50－1
System description .....50－4
Location diagram .....50－7
System Diagram of .....50－9
Specification Parameters of .....50－11
Specified torque.....50－12
Special tools .....50－13
Fault symptom checklist .....50－14
List of DTC.....50－16
DTC troubleshooting method.....50－17
Heater, ventilation and A/C system (GW4D20M) - auto.....50－29
Precautions.....50－29
System description .....50－32
Location diagram .....50－35
System Diagram of .....50－37
Specification Parameters of .....50－39
Specified torque.....50－40
Special tools .....50－41
Fault symptom checklist .....50－42
DTC checklist.....50－44
DTC troubleshooting method.....50－45
Refrigerant.....50－57
Precautions.....50－57
Fluorescent stain leakage test.....50－59
Air tightness inspection.....50－59
Refrigerant recycle.....50－60
System vacuum pumping .....50－60
Refrigerant filling.....50－61
Refrigerator oil.....50－62
Refrigerator oil balance.....50－62
A/C assembly .....50－63
Removal/installation.....50－63
A/C controller - electric .....50－67
Pin definition .....50－67
Removal/installation.....50－68
A/C controller - auto .....50－69
Pin definition .....50－69
Removal/installation.....50－70
Mode damper motor .....50－71
Pin definition .....50－71
Removal/installation.....50－71

Cooling/heating air damper motor .....50－72
Pin definition .....50－72
Removal/installation.....50－72
Internal and external circulation damper motor .....50－73
Pin definition .....50－73
Removal/installation.....50－73
Speed regulator module .....50－74
Pin definition .....50－74
Removal/installation.....50－74
Blower fan component.....50－75
Pin definition .....50－75
Removal/installation.....50－75
Filtration screen component .....50－76
Removal/installation.....50－76
Indoor temperature sensor - auto .....50－77
Pin definition .....50－77
Check.....50－77
Removal/installation.....50－78
Outside temperature sensor .....50－79
Pin definition .....50－79
Check.....50－79
Removal/installation.....50－80
Pressure sensor .....50－81
Pin definition .....50－81
Check.....50－81
Evaporator temperature sensor.....50－82
Check.....50－82
Removal/installation.....50－83
Evaporator core body .....50－85
Removal/installation.....50－85
Heater core body .....50－87
Removal/installation.....50－87
Console panel switch .....50－88
Pin definition .....50－88
Removal/installation.....50－88
Compressor (GW4D20M).....50－90
Removal/installation.....50－90
Condenser (6MT) .....50－92
Removal/installation.....50－92
Condenser (8AT) .....50－94
Removal/installation.....50－94
Expansion valve element .....50－96
Removal/installation.....50－96

Heater, ventilation and A/C system (GW4D20M) - electric

Precautions

Precautions related to equipment description

- Some of the component functions developed for this system may not be available on some vehicles. Specific equipment depends on the actual vehicle when repairing the vehicle.

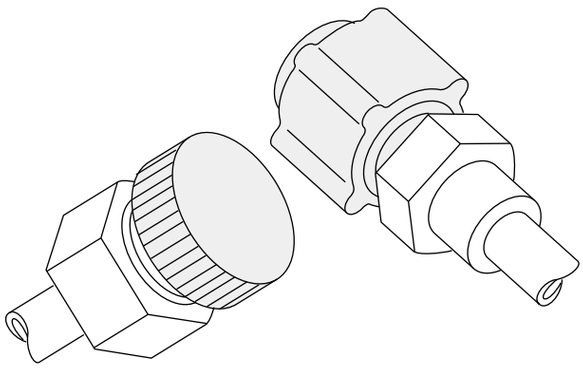
Precautions related to the operation

- Operation shall be conducted outdoors or in a well-ventilated room.
- To prevent fire, it's forbidden to use the open flames and smoking.
- When using the hose, hard pipe, you should be careful to prevent the gas leakage.
- Thoroughly clean the dust at the connecting portion of the hose, hard pipe and inside the pipe to prevent the gas leakage and abnormal operation.
- Before confirming that the A/C stops working, do not touch the belt and fan to prevent injury.
- The compressor is a high-speed rotating part, and any foreign matter, even when small, within the A/C system will damage the compressor. Because of this, you must clean the entire A/C system.
- Immediately plug or cover the pipe nozzle after removing the pipeline. And, before reconnecting the pipeline, do not remove the plug or cap so as to avoid moisture and dust from entering the system.
- When the engine runs, do not open the high-pressure valve of the manifold pressure gauge. Because the backflow high pressure gas will cause unnecessary damage.
- In any of the following cases, keep the engine running at idle speed and the air conditioning system working for at least 3 minutes.
  - The refrigerant gas is refilled.
  - Parts of the A/C system have been replaced.
  - The engine has not been started for a long time.
- Welding or steam cleaning is prohibited on or near vehicles equipped with A/C pipelines or components.
- It is forbidden to clean the A/C system with water, corrosive solutions or flammable/combustible solutions.

Precautions related to O-ring

- O-ring cannot be reused.
- To prevent the refrigerant gas leak due to the O-ring slack, do not wear the gloves when operating, and do not use cloth.
- Apply the refrigerator oil onto the O-ring to prevent it from being stuck, and then carry out the installation.
- Use torque wrench to tighten up the O-ring connector: excessively tightening will get the O-ring and pipe end deformed.
- If the pipeline connection operation is suspended, please re-seal up the pipe and part with plug or

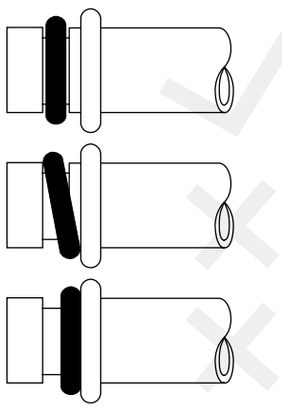
adhesive tape, so as to prevent the entry of contaminants.



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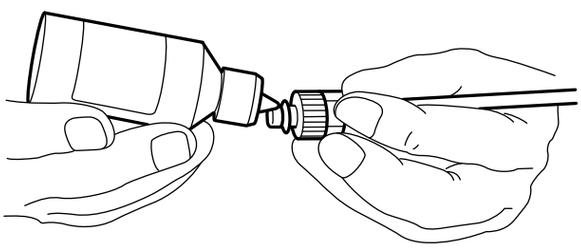
› Visually check the surface and joint surface of the O-ring, thread and connection point. If damaged or deformed, replace the parts.

› Install O-ring to the pipe groove at right angle.



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› Lubricate the O-ring with specified fluid. Before the installation, apply the oil onto the upper surface and inside surface of O-ring.



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› After tightening, use a clean cloth to wipe off the excess oil at joint and other places to prevent contamination of the vehicle body or other parts.

› If the leak is suspected after tightening, disconnect the connector and remove the O-ring, and check the O-ring, threads and connection.

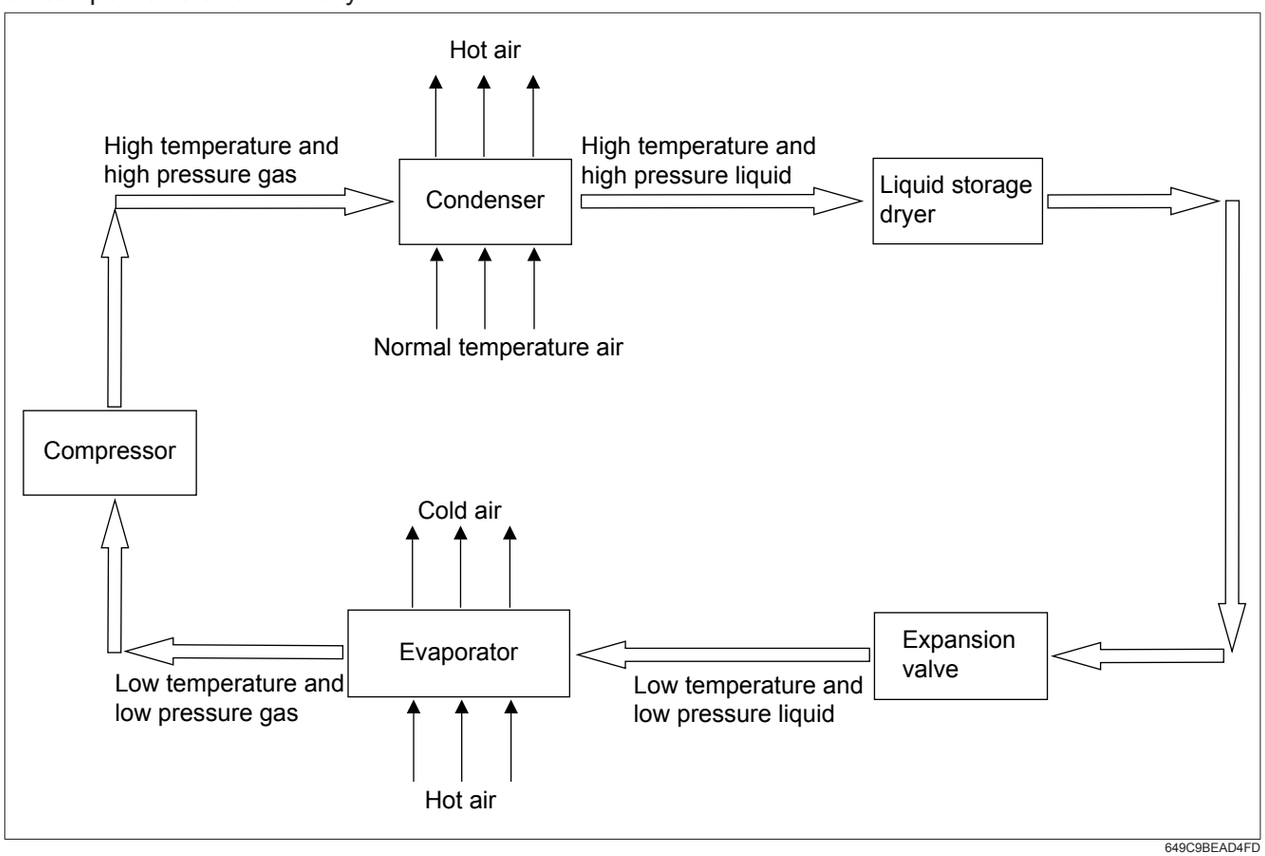
Relevant Precautions of Heating Pipelines

- Before assembling the heating system, clean the old sealant on the hard pipe joint and rubber hose, and then evenly apply new sealant on the hard pipe joint. It is forbidden to remove the sealant with metal or sharp objects, so as to avoid damage to pipe joints and rubber hoses.
- Insert the hose to the bottom or to the limit position during installation.
- Place the clamp at the mark position of the rubber hose when assembling the clamp.

System description

A/C refrigeration principle

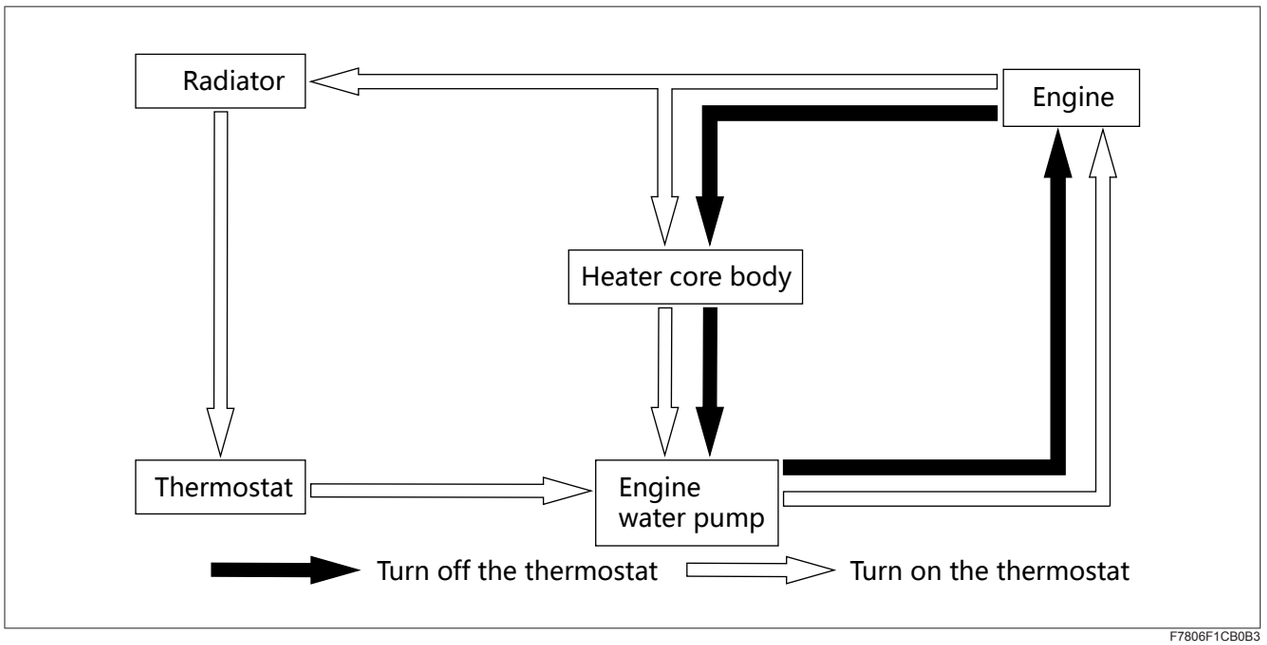
The compressor sucks low-temperature and low-pressure refrigerant gas from evaporator, compressed high-temperature and high-pressure refrigerant gas is sent to condenser through high-pressure hose. The refrigerant that changes into high-temperature and high-pressure liquid after heat release and liquefying in the condenser is sent to liquid dryer, which flows to expansion valve through high-pressure hard pipe after moisture and impurities are removed from the refrigerant. It conducts throttling expansion in the expansion valve, becomes low-temperature low-pressure liquid refrigerant and enters the evaporator. The low-temperature low-pressure liquid refrigerant is vaporized in the evaporator, absorbs the heat flowing through the air on the evaporator outer surface to cool the air, resulting in a cooling effect. The low-temperature low-pressure refrigerant enters the compressor to start the next cycle. Since the temperature of the evaporator surface is below the dew point, the water in the air is condensed into dew which is discharged outside the vehicle, thereby reducing the interior air temperature and humidity.



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A/C heating principle

Engine coolant enters the air conditioning heater core through the water pump, releases the heat to the vehicle under the role of the air conditioning blower.



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Function of each component

Outside temperature sensor

› The outside temperature sensor detects the outside ambient temperature according to the characteristics of the resistance of the thermal resistor changing with the temperature, and sends an electrical signal to the A/C controller.

Evaporator temperature sensor

› The evaporator temperature sensor detects the temperature of the evaporator core body according to the characteristics of the resistance of the thermal resistor changing with the temperature, and sends an electrical signal to the A/C controller.

Mode damper motor

› The mode damper motor adjusts the position of the upper damper, the lower damper, and the defrost damper through the mode control panel, thereby changing the air flow of each outlet.

Cooling/heating air damper motor

› By adjusting the position of the cooling/heating air damper, the cooling/heating air damper motor changes the flow of air flowing through the evaporator core body and the heater core, thereby changing the mixing ratio of the cooling and heating air in the A/C assembly, and finally changing the temperature of the air outlet.

Circulating damper motor

› The circulating damper motor changes the position of the internal and external circulation dampers to switch between the internal and external circulations.

Pressure sensor

› The pressure sensor monitors the pressure on the high pressure side of the A/C cooling pipe in real time and sends the pressure signal to the engine controller.

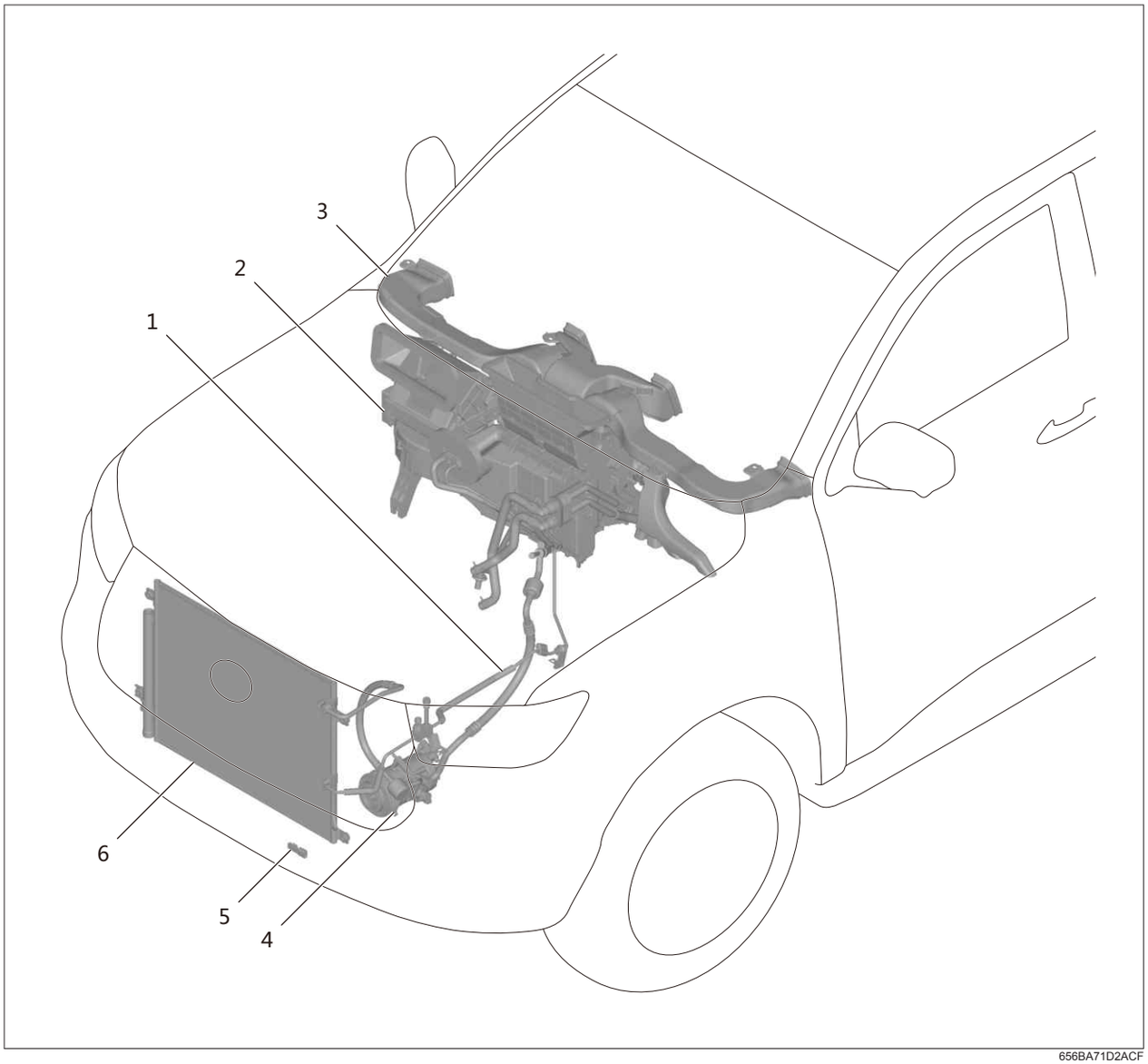
A/C controller

› According to operation instructions, sensor signals, and other system controller signals, the A/C system is controlled to make corresponding actions.

Blower fan component

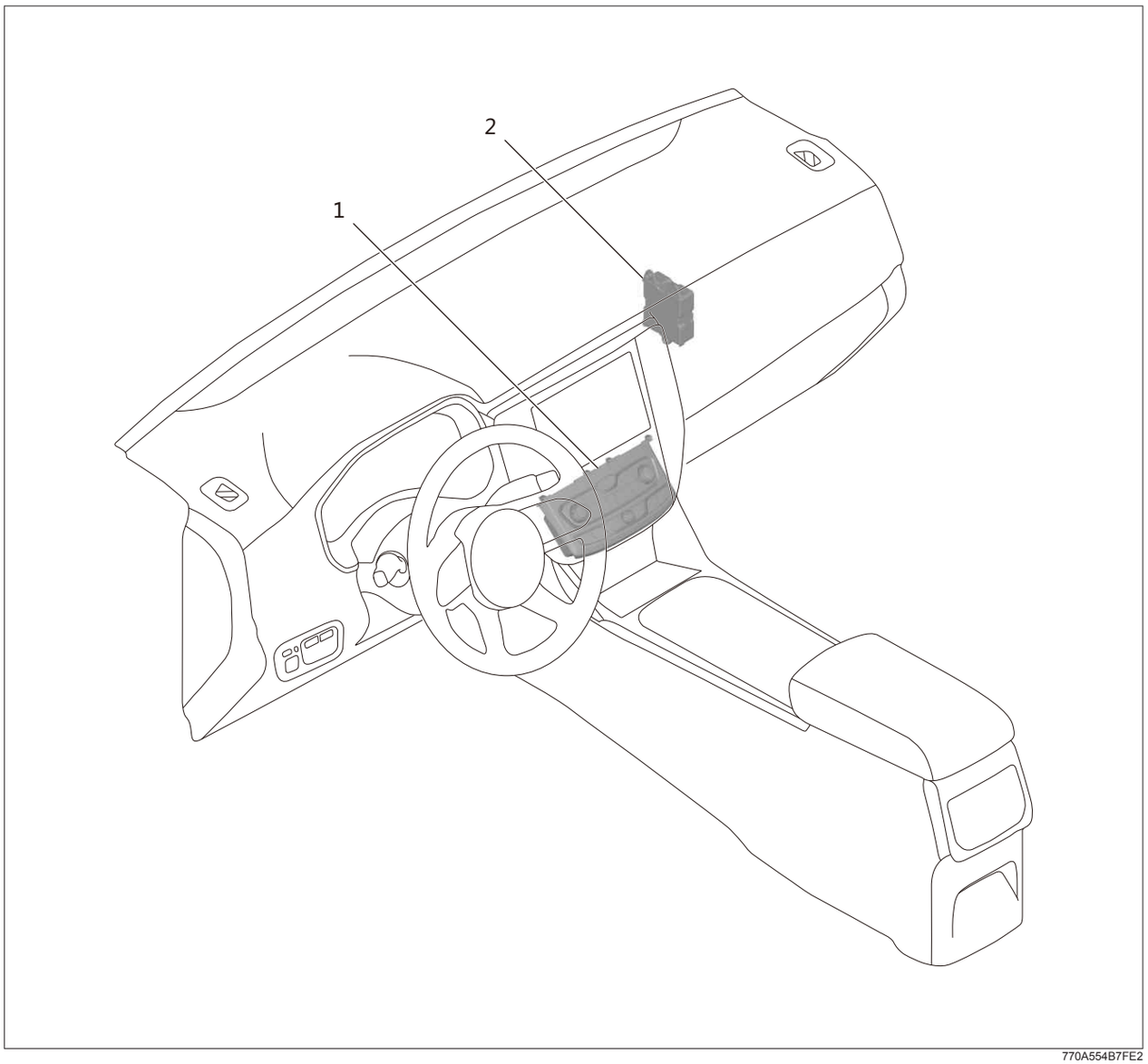
› Voltage at both ends of blower is regulated through linear speed regulator module and hence blower fan speed is controlled.

Location diagram



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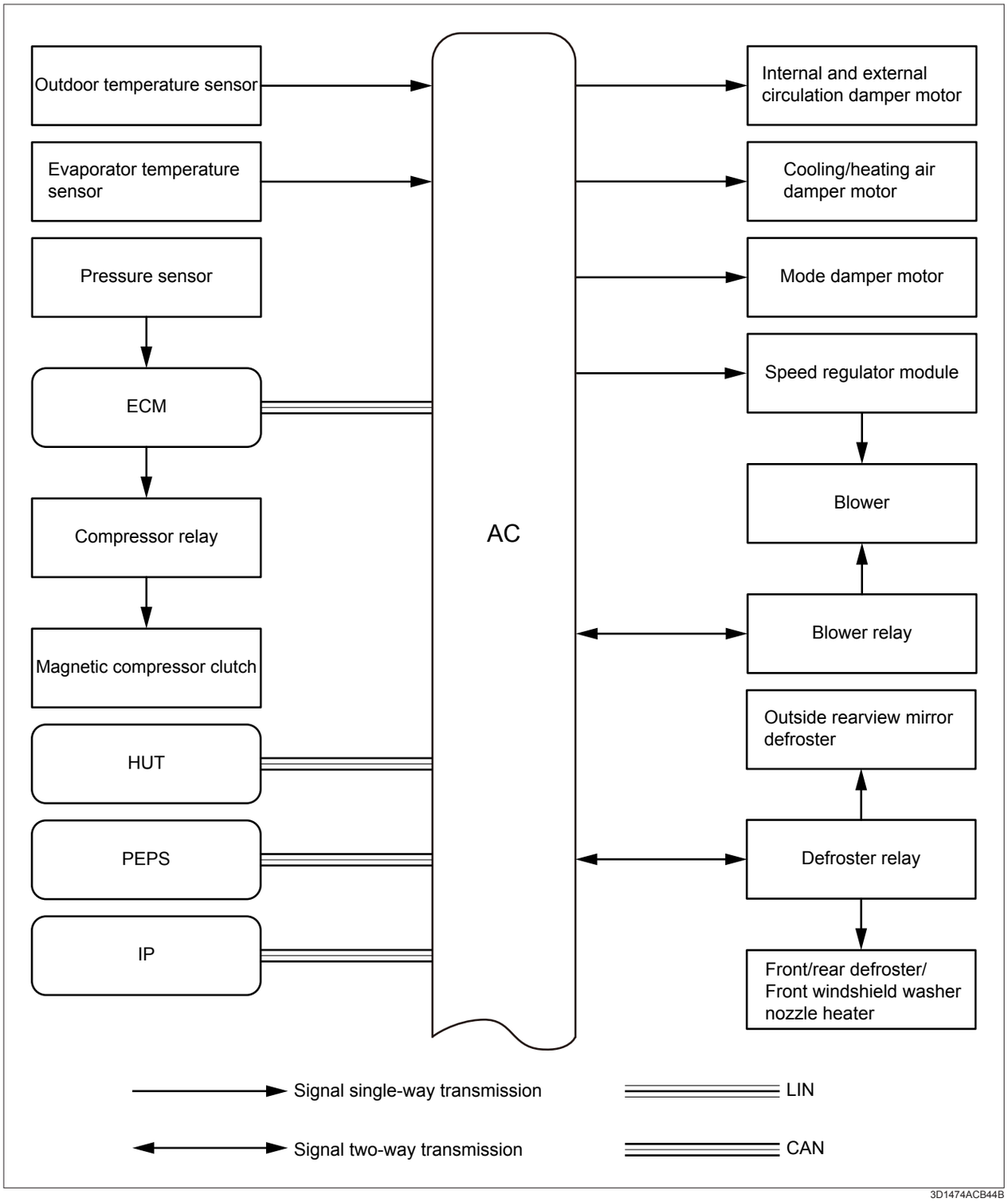
1. A/C pipeline
2. A/C assembly
3. A/C duct
4. Compressor
5. Outside temperature sensor
6. Condenser



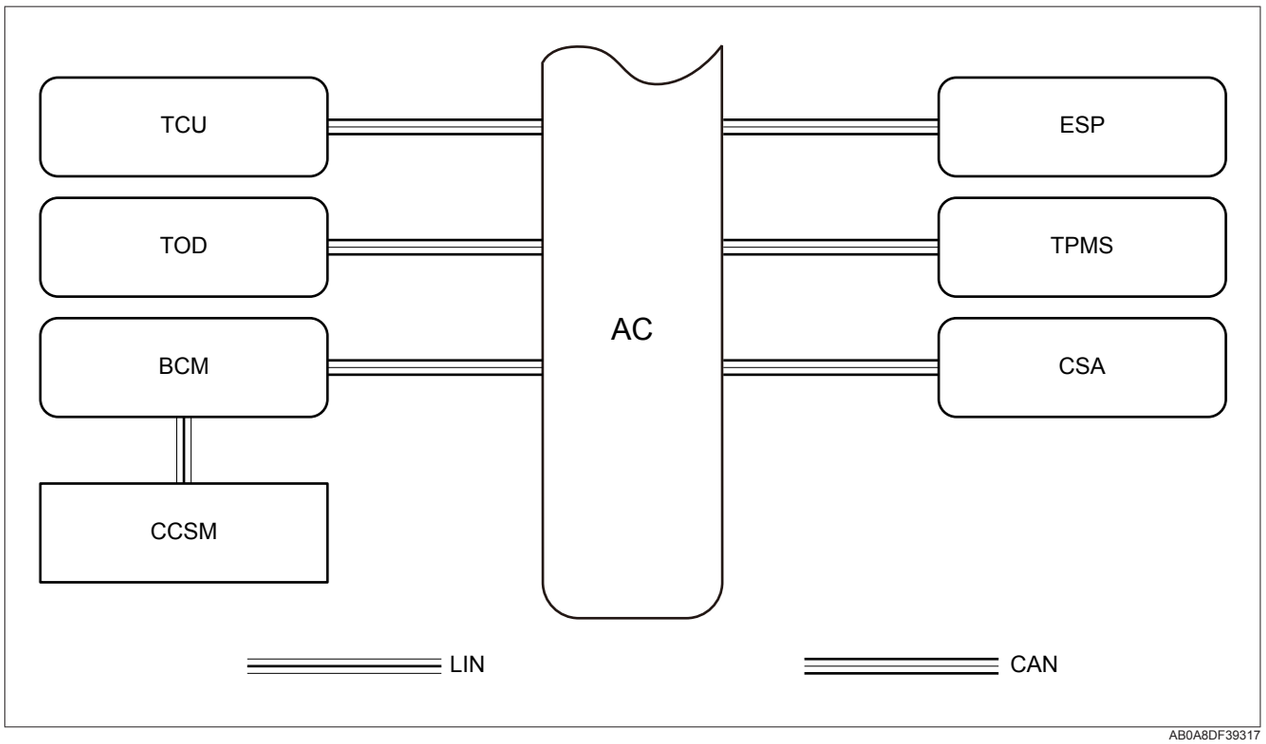
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1. Console panel switch
2. A/C controller

System Diagram of



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Specification Parameters of

A/C system

S/N	Item	Structural parameters
1	A/C performance parameters	› Refrigeration capacity > 4.6 kW › Air flow of blower > 485 m³/h › Heating capacity ＞ 4.5 kW
2	Refrigerant specification	R134a
3	Refrigerant capacity	(480±10)g
4	Refrigerant leakage	≤ 40g/year
5	Refrigerator oil brand	SP10
6	Refrigerator oil capacity	130mL

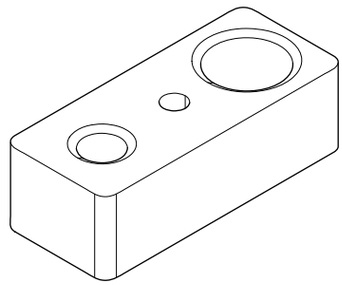
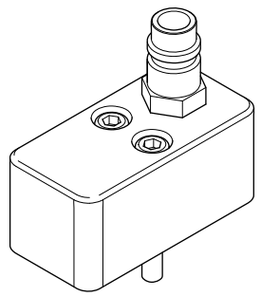
Compressor

S/N	Item	Structural parameters
1	Model	BX13D
2	Type	Piston type
3	Displacement	143cm³/r
4	Maximum rpm	9000r/min
5	Usual rpm range	(800～8000)r/min
6	Rated voltage of clutch	12V(DC)
7	Min. pull-in voltage of clutch	7.5V
8	Belt and wheel shape	6-slot many-wedge type
9	Diameter of belt pulley	φ110mm

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Compressor x engine	24±2	3	—
Bolt	Pipeline bracket x vehicle body	9±2	3	—
Bolt	Mounting bolt of pipeline joint	9±2	7	—
Bolt	Pipeline x pipeline bracket	9±2	1	—
Bolt	A/C assembly x instrument panel reinforcing beam	6±1	2	—
Nut	A/C assembly x instrument panel reinforcing beam	6±1	4	—
Bolt	A/C assembly x vehicle body	9±2	1	—
Nut	A/C assembly x vehicle body	9±2	1	—

Special tools

Code	Name	Purpose	Schematic diagram
ZEZF068738	Sealing tool for A/C pipeline	Seals A/C pipeline	
ZEZF068737	Tester for air tightness of evaporator core	Assists to test air tightness of evaporator core of A/C system	

Fault symptom checklist

The system is operational, but the refrigerating capacity is insufficient (check with a measuring instrument)

Symptom	Possible causes	Countermeasures and Treatment
Both high pressure and low pressure are excessive	1. Fill too much refrigerant, the compressor pressure is high 2. Air enters into the pipe	1. Discharge excess refrigerant until the reading of the measuring instrument returns to normal state 2. Discharge all refrigerant inside, vacuumize again and recharge the system with refrigerant according to the specified amount
The high pressure is slightly lower than the normal one and the low pressure is far higher than the normal one	1. Valve plate of compressor cracked	1. Repair or replace the compressor
The high pressure is slightly lower than the normal one and the low pressure is far lower than the normal one	1. The refrigerant is insufficient, touch the suction joint with the hand, which feels not cold 2. The expansion valve has broken down	1. Add refrigerant 2. Replace the expansion valve.
High/low pressure too low	1. The system has leaks (refrigerant is insufficient) 2. The fluid reservoir dryer is plugged	1. Add the refrigerant after repairing the leaks 2. Replace the condenser
The internal and external circulation dampers are always in external circulation	1. Internal and external circulation damper fails to switch to internal circulation 2. The internal and external circulation dampers fail 3. Internal and external circulation damper motor fault 4. Internal and external circulation key fault	1. Switch internal and external circulation damper to internal circulation 2. Replace internal and external circulation damper 3. Replace interior and exterior circulation vent motor 4. Check internal and external circulation key

The system cannot run normally

Symptom	Possible causes	Countermeasures and Treatment
After the A/C system runs in internal circulation for a certain period, the cold air reduces gradually until no cold air, and returns to normal when turning it on after turning off the A/C for a long time	1. The evaporator is frosted, the evaporator temperature sensor fails	1. Replace the evaporator temperature sensor
After the A/C system runs for a certain period, the cold air gradually becomes warm, and returns to normal when turning it on after turning off the A/C for a long time	1. Too much water in the system, the expansion valve is plugged by ice	1. Perform system vacuum pumping again and fill refrigerant

Other faults

Symptom	Possible causes	Countermeasures and Treatment
The A/C blower works abnormally	1. The speed regulation module is damaged 2. Line, connector malfunctioning	1. Replace the speed regulator module 2. Repair the connector, electrical circuit
A/C blower failure	1. The speed regulation module is damaged 2. Line, connector malfunctioning 3. The blower burns out	1. Replace the speed regulator module 2. Repair the connector, electrical circuit 3. Replace the blower

Faulted warm air system

Symptom	Possible causes	Countermeasures and Treatment
No air blows out from the A/C air outlet	1. Speed module fault 2. Blower is faulty	1. Replace the speed regulator module 2. Replace the blower

Outside temperature indication is abnormal, and A/C does not work

Symptom	Possible causes	Countermeasures and Treatment
The outdoor temperature display is much lower than the actual external temperature	1. A/C controller corrosion and failure 2. Outdoor temperature sensor fault 3. Line, connector malfunctioning	1. Replace the A/C controller 2. Replace the outside temperature sensor. 3. Repair the connector, electrical circuit

List of DTC

No.	DTC	DTC description
1	U110017	System voltage too high
2	U110116	System voltage too low
3	U003788	BD-CAN bus OFF
4	U014087	Communication with BCM lost
5	U015587	Communication with IP lost
6	U014587	Communication with CSA lost
7	U012287	Communication with ESP (ABS) lost
8	U010087	Communication with ECM lost
9	U100287	Communication with PEPS lost
10	B140715	Outside temperature sensor short-circuited to power or open-circuited
11	B140711	Outside temperature sensor short-circuited to ground
12	B140815	Evaporator temperature sensor short-circuited to power or open-circuited
13	B140811	Evaporator temperature sensor short-circuited to ground
14	B142011	Blower control terminal short-circuited to ground or open-circuited
15	B142015	Blower control terminal short-circuited to power or open-circuited
16	B142016	Blower voltage abnormal
17	B142111	Stepper motor 12 V power short-circuited to ground
18	B142314	Internal and external circulation damper motor short-circuited to ground or open-circuited
19	B142312	Internal and external circulation damper motor short-circuited to power
20	B142414	Cooling/heating air damper motor short-circuited to ground or open-circuited
21	B142412	Cooling/heating air damper motor short-circuited to power
22	B142614	Mode damper motor short-circuited to ground or open-circuited
23	B142612	Mode damper motor short-circuited to power
24	B142814	Rear defroster relay short-circuited to ground or open-circuited
25	B142812	Rear defroster relay short-circuited to power

DTC troubleshooting method

U110017

DTC definition: system power is too high

DTC occurring condition: system voltage ＞ 16 V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.
- Controller power module fault.

DTC removal condition: system voltage is 9 V ~ 15 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether generator B+ voltage and battery voltage are higher than 16 V	Repair the generator and discharge the battery and go to step 6	Go to step 4
4	Measure if A/C controller KL30 harness terminal voltage is over 16 V	Harness fails, check harness and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 5	—
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U110116

DTC definition: system voltage is too low

DTC occurring condition: system voltage ＜ 9 V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.
- Controller power module fault.

DTC removal condition: system voltage is 10 V ~ 16 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—

Step	Operation	Yes	No
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether generator B+ voltage and battery voltage are lower than 9 V	Repair the generator, charge the battery and go to step 6	Go to step 4
4	Measure if A/C controller KL30 harness terminal voltage is less than 9 V	Harness fails, check harness and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 6	—
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U003788

DTC definition: high speed CAN bus off

DTC occurring condition: CAN communications is abnormal

Possible causes:

- CAN twisted pair short-circuited or open-circuited.
- A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Use oscilloscope to measure the voltage on controller terminal CAN_H, CAN_L; normal case: CAN_H = CAN_L = 2.5 V or CAN_H = 3.5 V and CAN_L = 1.5 V	Go to step 4	CAN line fault, check if harness is short-circuited or open-circuited, go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014087

DTC definition: communication with BCM lost

DTC occurring condition: controller fails to receive BCM3 message

Possible causes:

› BCM node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, if there are BCM3, BCM6 and BCM8 messages (message ID: 0x345, 0x28C, 0x29F)	Go to step 4	Check BCM node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U015587

DTC definition: communication with IP is lost

DTC occurring condition: IP2 message is lost

Possible causes:

› IP node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, check if there is IP2 message (message ID: 0x27F)	Go to step 4	Check IP node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U014587

DTC definition: communication with CSA is lost

DTC occurring condition: controller fails to receive CSA1 message

Possible causes:

› CSA node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, check if there is CSA1 message (message ID: 0x165)	Go to step 4	Check CSA node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: controller fails to receive ESP_ABS3 message

Possible causes:

› ESP (ABS) node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, check if there is ESP_ABS3 message (message ID: 0x265)	Go to step 4	Check ESP (ABS) node, and go to step 5
4	Replace the A/C controller	Go to step 5	—

Step	Operation	Yes	No
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U010087

DTC definition: communication with ECM lost

DTC occurring condition: controller fails to receive ECM message

Possible causes:

› ECM node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, if there are ECM1, ECM2 and ECM3 messages (message ID: 0x111, 0x271, 0x371)	Go to step 4	Check ECM node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

B140715, B140815

DTC definition: outside temperature sensor is open-circuited or short-circuited to power, evaporator temperature sensor is open-circuited or short-circuited to power

DTC occurring condition: sensor voltage ＞ 4.9 V

Possible causes:

› Sensor fault.

› Controller connector harness failure.

› A/C controller fails.

DTC removal condition: sensor voltage ≤ 4.9 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Measure sensor resistance using multimeter, check if resistance is more than 50 KΩ	Sensor fails, replace sensor and go to step 6	Go to step 4
4	Check if controller connector harness terminal is more than 4.9 V	Connector harness fails, replace connector and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 6	—
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B140711, B140811

DTC definition: outside temperature sensor is short-circuited to ground, evaporator temperature sensor is short-circuited to ground

DTC occurring condition: sensor voltage ＜ 0.1 V

Possible causes:

- Sensor fault.
- Controller connector harness failure.
- A/C controller fails.

DTC removal condition: sensor voltage ≥ 0.1 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Measure sensor resistance using multimeter, check if resistance is less than 0.16 KΩ	Sensor fails, replace sensor and go to step 6	Go to step 4
4	Check if controller connector harness terminal is less than 0.1 V	Connector harness fails, replace connector and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 6	—

Step	Operation	Yes	No
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142016

DTC definition: blower voltage abnormal

DTC occurring condition: voltage difference between blower control terminal and feedback terminal ＞ 1 V

Possible causes:

› Harness fails.

› A/C controller fails.

DTC removal condition: voltage difference between blower control terminal and feedback terminal ＜ 1 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and blower control terminal connection is short-circuited or open-circuited	Harness fails, replace harness and go to step 5	Go to step 4
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142011

DTC definition： Blower control terminal short-circuited to ground or open-circuited

DTC occurring condition: blower control terminal voltage < 0.09 V

Possible causes:

› Harness fails.

› A/C controller fails.

› The blower fails.

DTC removal condition: blower control terminal voltage > 0.09 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if the connection between harness and blower control terminal is short-circuited to ground	Harness fails, replace harness and go to step 6	Go to step 4
4	Replace A/C controller, clear DTC, and read if DTC still exists	Go to step 5	A/C controller fault
5	Replace blower, clear DTC, read if DTC still exists	Troubleshoot other possible causes of fault	Blower failed
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142015

DTC definition： Blower control terminal is short-circuited to power or open-circuited

DTC occurring condition: blower control terminal voltage > 5 V

Possible causes:

- Harness fails.
- A/C controller fails.
- The blower fails.

DTC removal condition: blower control terminal voltage < 5 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if the connection between harness and blower control terminal is short-circuited to power or open-circuited	Harness fails, replace harness and go to step 6	Go to step 4
4	Replace A/C controller, clear DTC, and read if DTC still exists	Go to step 5	A/C controller fault
5	Replace blower, clear DTC, read if DTC still exists	Troubleshoot other possible causes of fault	Blower failed

Step	Operation	Yes	No
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142111

DTC definition： Stepper motor 12 V power is short-circuited to ground

DTC occurring condition: Controller interface J1-15 voltage ＜ 6 V

Possible causes:

› Controller 12 V power supply circuit.

› Harness contact fault.

DTC removal condition: controller interface J1-15 voltage ＞ 6 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness terminal voltage is normal	Go to step 4	Harness fails, check harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142314, B142312

DTC definition: internal and external circulation motor is short-circuited to ground or open-circuited, internal and external circulation damper motor is short-circuited to power

DTC occurring condition: internal and external circulation motor plug line is short-circuited to ground or open-circuited, or short-circuited to power (controller interface J1-11, J1-12, J1-13 and J1-14)

Possible causes:

› Motor fault.

› Harness fails.

› A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and controller connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142414, B142412

DTC definition: cooling/heating air damper motor is short-circuited to ground or open-circuited, cooling/heating air damper motor is short-circuited to power

DTC occurring condition: cooling/heating air damper motor plug line is short-circuited to ground or open-circuited, or short-circuited to power (controller interface J1-5, J1-6, J1-7 and J1-8)

Possible causes:

- Motor fault.
- Harness fails.
- A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and controller connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142614, B142612

DTC definition: mode damper motor is short-circuited to ground or open-circuited, mode damper motor is short-circuited to power

DTC occurring condition: mode damper motor plug line is short-circuited to ground or open-circuited, or short-circuited to power (controller interface J1-1, J1-2, J1-3 and J1-4)

Possible causes:

- Motor fault.
- Harness fails.
- A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and controller connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142814, B142812

DTC definition: rear defroster relay short-circuited to ground or open-circuited, rear defroster relay short-circuited to power

DTC occurring condition: plug line of rear defroster relay and controller fault (controller terminal rear defroster interface J2-17)

Possible causes:

- Harness fails.
- A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs

Step	Operation	Yes	No
3	Check if harness connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

Heater, ventilation and A/C system (GW4D20M) - auto

Precautions

Precautions related to equipment description

- Some of the component functions developed for this system may not be available on some vehicles. Specific equipment depends on the actual vehicle when repairing the vehicle.

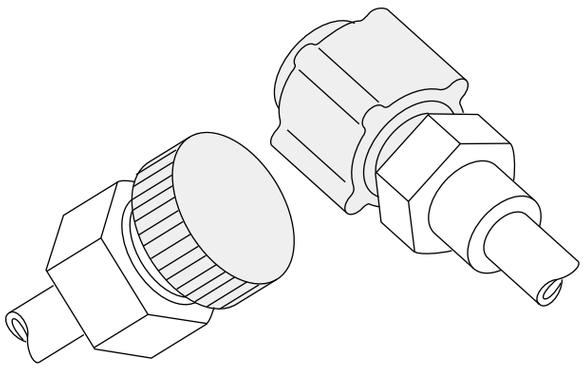
Precautions related to the operation

- Operation shall be conducted outdoors or in a well-ventilated room.
- To prevent fire, it's forbidden to use the open flames and smoking.
- When using the hose, hard pipe, you should be careful to prevent the gas leakage.
- Thoroughly clean the dust at the connecting portion of the hose, hard pipe and inside the pipe to prevent the gas leakage and abnormal operation.
- Before confirming that the A/C stops working, do not touch the belt and fan to prevent injury.
- The compressor is a high-speed rotating part, and any foreign matter, even when small, within the A/C system will damage the compressor. Because of this, you must clean the entire A/C system.
- Immediately plug or cover the pipe nozzle after removing the pipeline. And, before reconnecting the pipeline, do not remove the plug or cap so as to avoid moisture and dust from entering the system.
- When the engine runs, do not open the high-pressure valve of the manifold pressure gauge. Because the backflow high pressure gas will cause unnecessary damage.
- In any of the following cases, keep the engine running at idle speed and the air conditioning system working for at least 3 minutes.
  - The refrigerant gas is refilled.
  - Parts of the A/C system have been replaced.
  - The engine has not been started for a long time.
- Welding or steam cleaning is prohibited on or near vehicles equipped with A/C pipelines or components.
- It is forbidden to clean the A/C system with water, corrosive solutions or flammable/combustible solutions.

Precautions related to O-ring

- O-ring cannot be reused.
- To prevent the refrigerant gas leak due to the O-ring slack, do not wear the gloves when operating, and do not use cloth.
- Apply the refrigerator oil onto the O-ring to prevent it from being stuck, and then carry out the installation.
- Use torque wrench to tighten up the O-ring connector: excessively tightening will get the O-ring and pipe end deformed.
- If the pipeline connection operation is suspended, please re-seal up the pipe and part with plug or

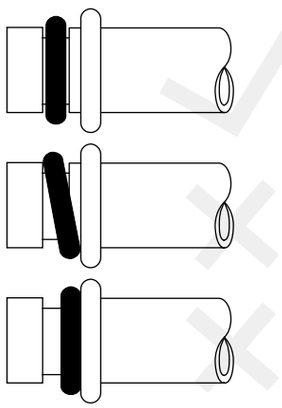
adhesive tape, so as to prevent the entry of contaminants.



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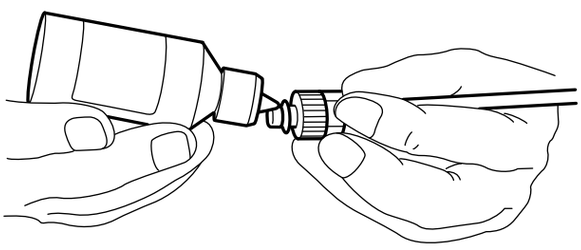
› Visually check the surface and joint surface of the O-ring, thread and connection point. If damaged or deformed, replace the parts.

› Install O-ring to the pipe groove at right angle.



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› Lubricate the O-ring with specified fluid. Before the installation, apply the oil onto the upper surface and inside surface of O-ring.



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› After tightening, use a clean cloth to wipe off the excess oil at joint and other places to prevent contamination of the vehicle body or other parts.

› If the leak is suspected after tightening, disconnect the connector and remove the O-ring, and check the O-ring, threads and connection.

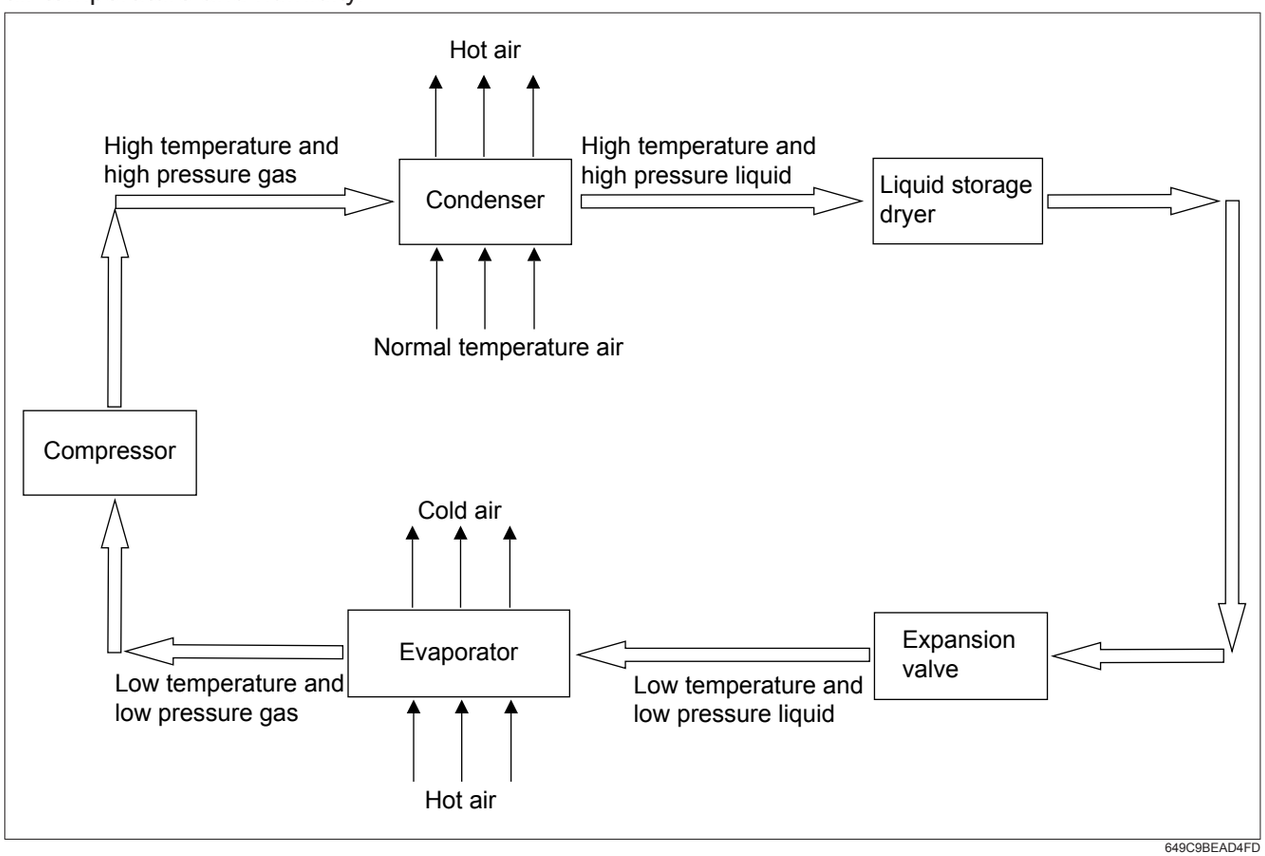
Relevant Precautions of Heating Pipelines

- Before assembling the heating system, clean the old sealant on the hard pipe joint and rubber hose, and then evenly apply new sealant on the hard pipe joint. It is forbidden to remove the sealant with metal or sharp objects, so as to avoid damage to pipe joints and rubber hoses.
- Insert the hose to the bottom or to the limit position during installation.
- Place the clamp at the mark position of the rubber hose when assembling the clamp.

System description

A/C refrigeration principle

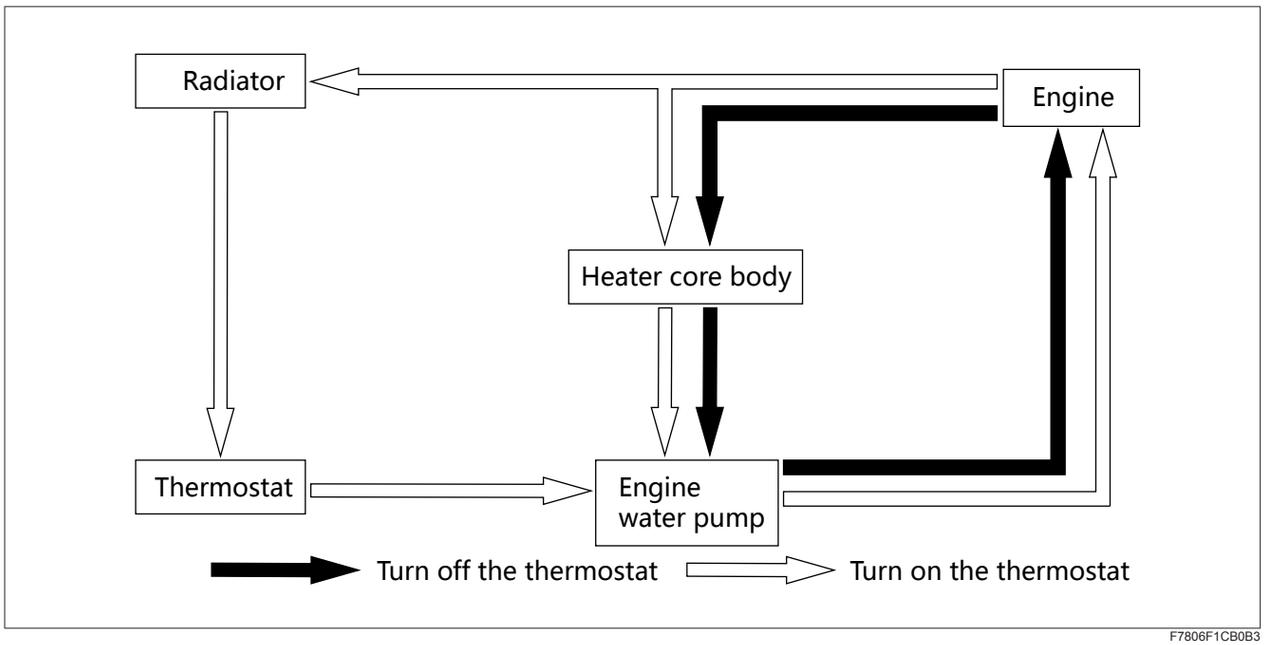
The compressor sucks low-temperature and low-pressure refrigerant gas from evaporator, compressed high-temperature and high-pressure refrigerant gas is sent to condenser through high-pressure hose. The refrigerant that changes into high-temperature and high-pressure liquid after heat release and liquefying in the condenser is sent to liquid dryer, which flows to expansion valve through high-pressure hard pipe after moisture and impurities are removed from the refrigerant. It conducts throttling expansion in the expansion valve, becomes low-temperature low-pressure liquid refrigerant and enters the evaporator. The low-temperature low-pressure liquid refrigerant is vaporized in the evaporator, absorbs the heat flowing through the air on the evaporator outer surface to cool the air, resulting in a cooling effect. The low-temperature low-pressure refrigerant enters the compressor to start the next cycle. Since the temperature of the evaporator surface is below the dew point, the water in the air is condensed into dew which is discharged outside the vehicle, thereby reducing the interior air temperature and humidity.



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A/C heating principle

Engine coolant enters the air conditioning heater core through the water pump, releases the heat to the vehicle under the role of the air conditioning blower.



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Function of each component

Indoor temperature sensor

› The indoor temperature sensor detects the internal temperature of the passenger compartment according to the characteristics of the resistance of the thermal resistor changing with the temperature, and sends an electrical signal to the A/C controller.

Outside temperature sensor

› The outside temperature sensor detects the outside ambient temperature according to the characteristics of the resistance of the thermal resistor changing with the temperature, and sends an electrical signal to the A/C controller.

Evaporator temperature sensor

› The evaporator temperature sensor detects the temperature of the evaporator core body according to the characteristics of the resistance of the thermal resistor changing with the temperature, and sends an electrical signal to the A/C controller.

Mode damper motor

› The mode damper motor adjusts the position of the upper damper, the lower damper, and the defrost damper through the mode control panel, thereby changing the air flow of each outlet.

Cooling/heating air damper motor

› By adjusting the position of the cooling/heating air damper, the cooling/heating air damper motor changes the flow of air flowing through the evaporator core body and the heater core, thereby changing the mixing ratio of the cooling and heating air in the A/C assembly, and finally changing the temperature of the air outlet.

Circulation damper motor

› The circulating damper motor changes the position of the internal and external circulation dampers to switch between the internal and external circulations.

Pressure sensor

› The pressure sensor monitors the pressure on the high pressure side of the A/C cooling pipe in real time and sends the pressure signal to the engine controller.

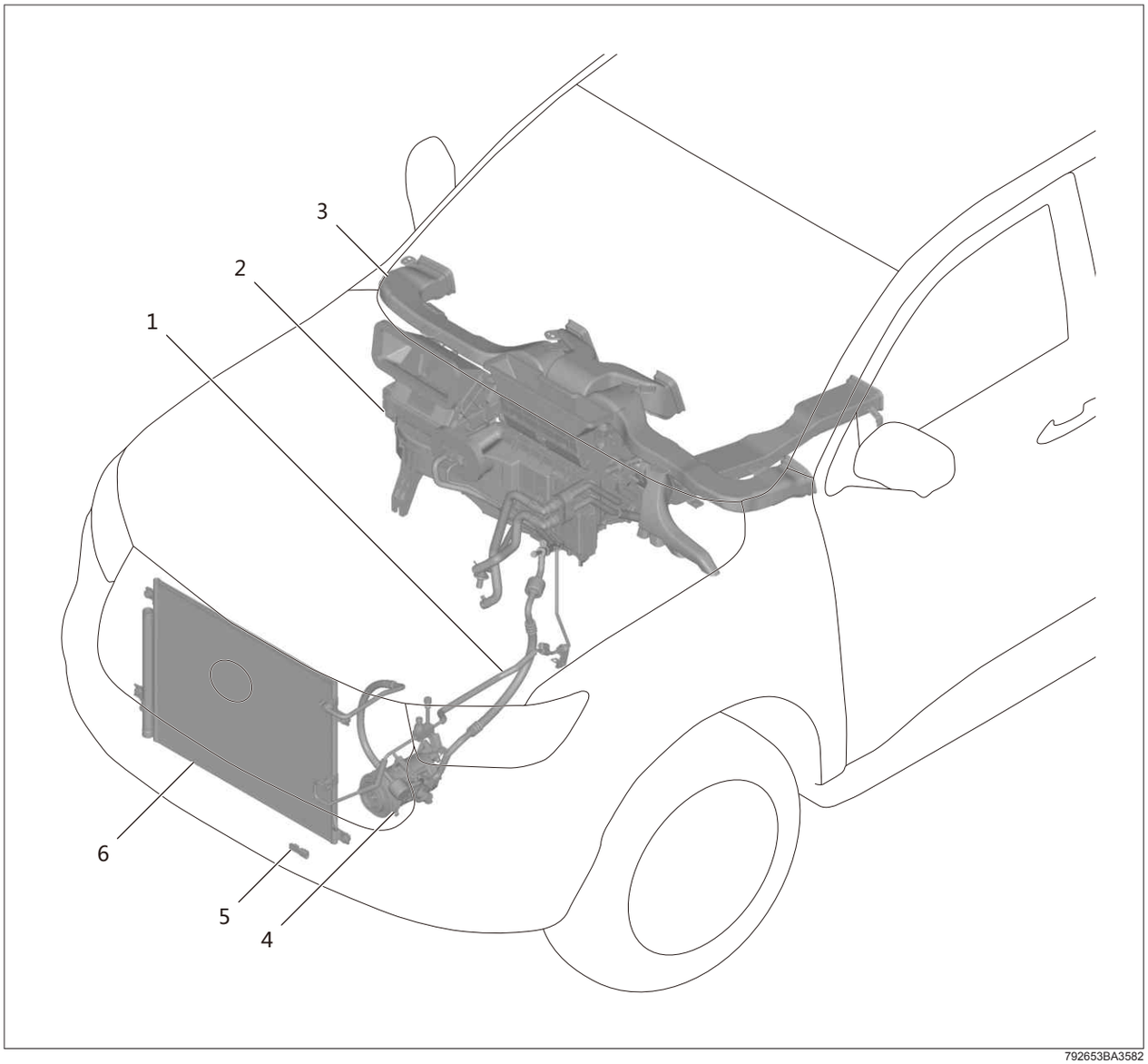
A/C controller

› According to operation instructions, sensor signals, and other system controller signals, the A/C system is controlled to make corresponding actions.

Blower fan component

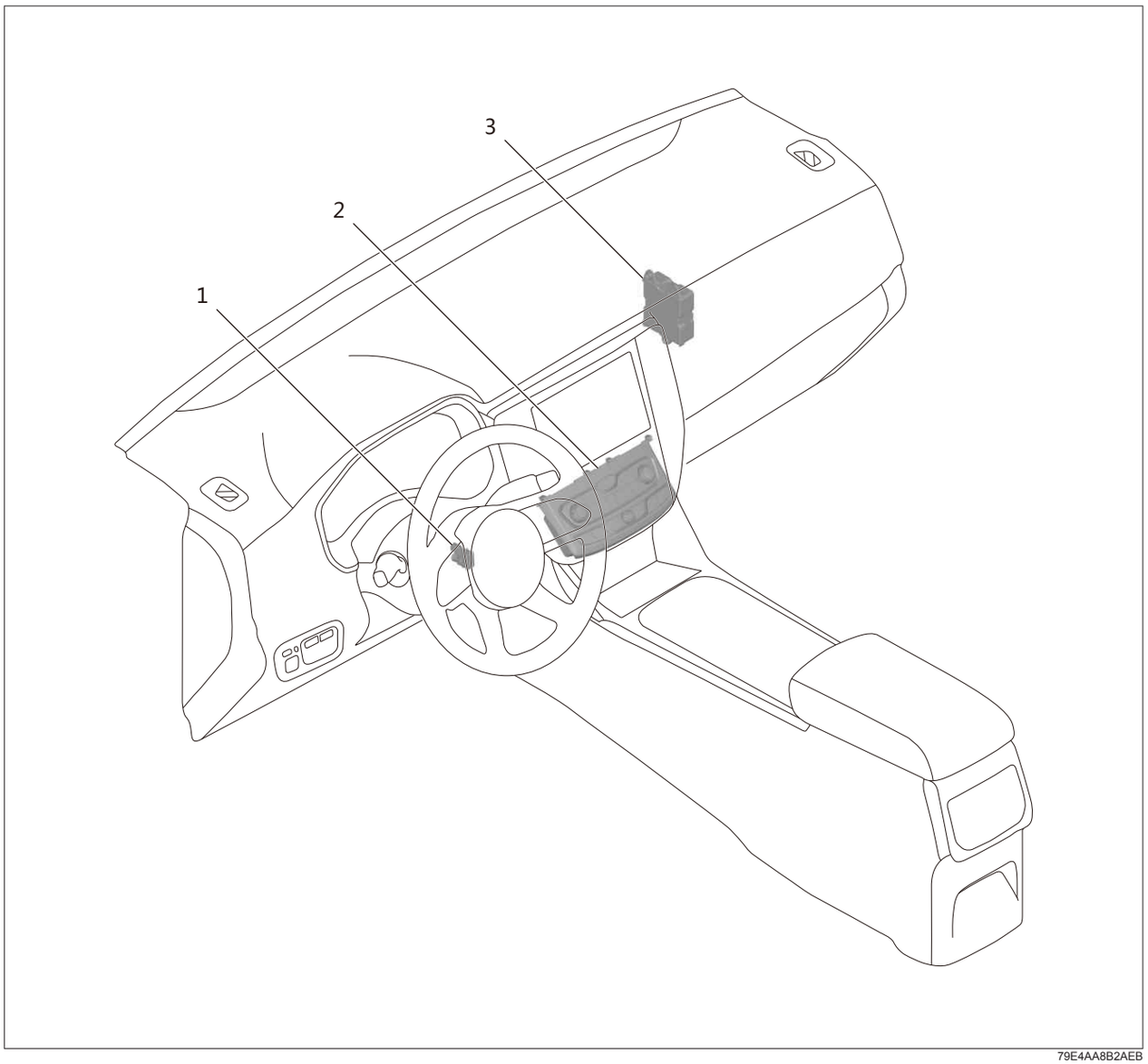
› Voltage at both ends of blower is regulated through linear speed regulator module and hence blower fan speed is controlled.

Location diagram



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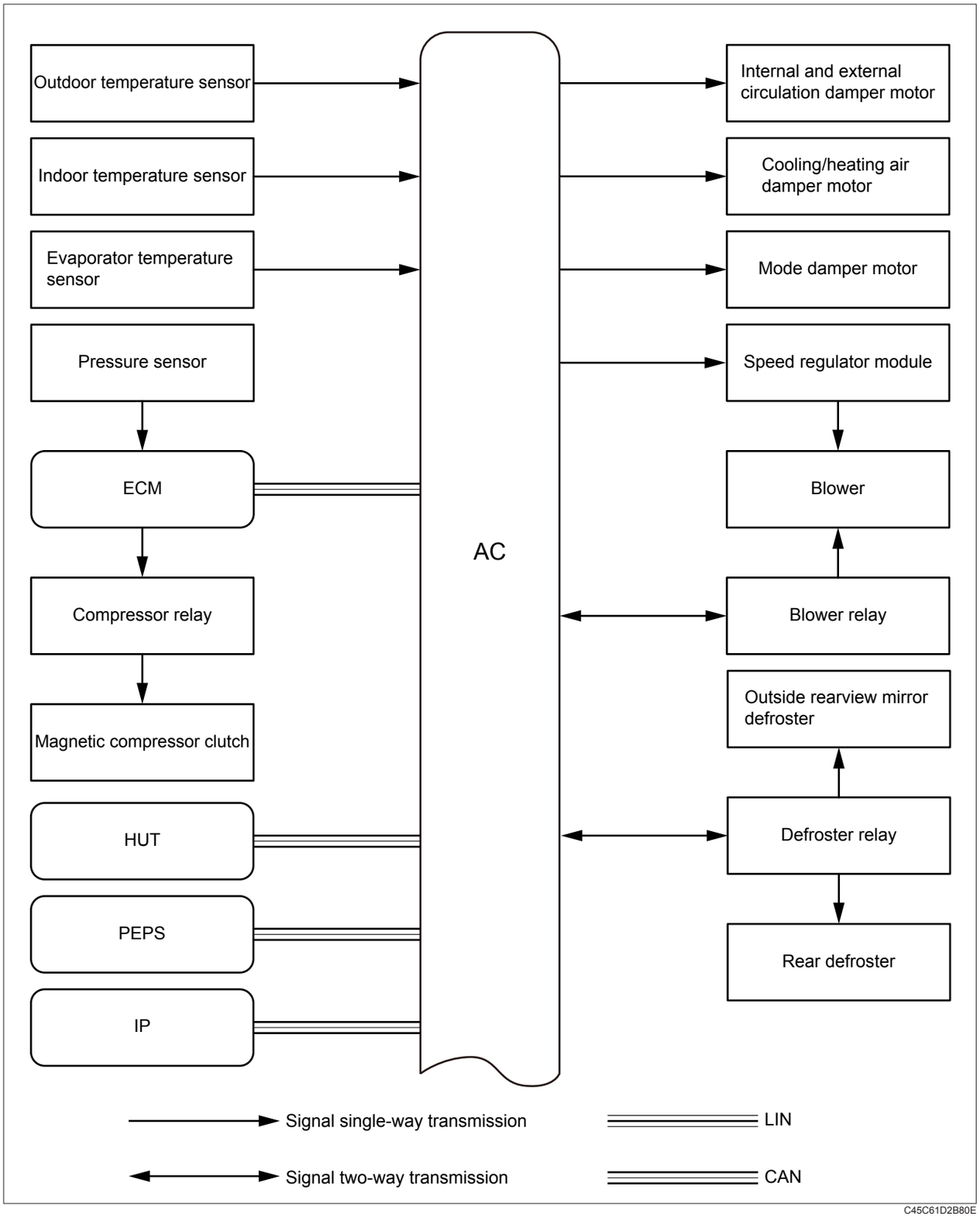
1. A/C pipeline
2. A/C assembly
3. A/C duct
4. Compressor
5. Outdoor temperature sensor
6. Condenser



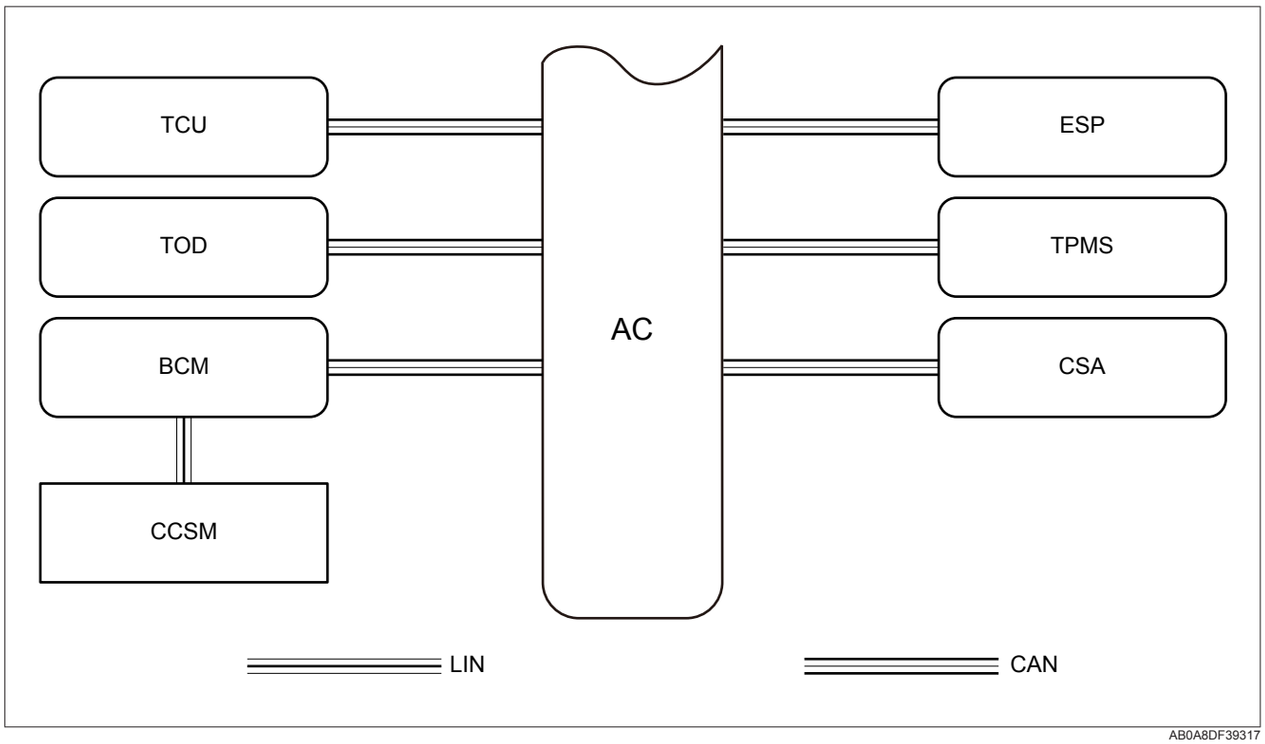
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1. Indoor temperature sensor
2. Console panel switch
3. A/C controller

System Diagram of



C45C61D2B80E



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Specification Parameters of

A/C system

S/N	Item	Structural parameters
1	A/C performance parameters	› Refrigeration capacity > 4.6 kW › Air flow of blower > 485 m³/h › Heating capacity ＞ 4.5 kW
2	Refrigerant specification	R134a
3	Refrigerant capacity	(480±10)g
4	Refrigerant leakage	≤ 40g/year
5	Refrigerator oil brand	SP10
6	Refrigerator oil capacity	130mL

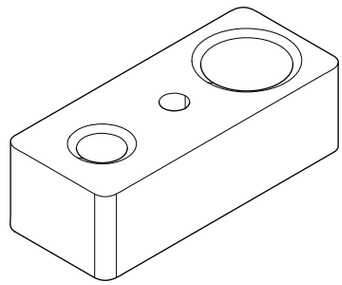
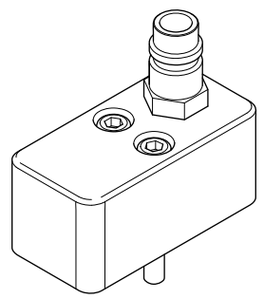
Compressor

S/N	Item	Structural parameters
1	Model	BX13D
2	Type	Piston type
3	Displacement	143cm³/r
4	Maximum rpm	9000r/min
5	Usual rpm range	(800～8000)r/min
6	Rated voltage of clutch	12V(DC)
7	Min. pull-in voltage of clutch	7.5V
8	Belt and wheel shape	6-slot many-wedge type
9	Diameter of belt pulley	φ110mm

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Compressor x engine	24±2	3	—
Bolt	Pipeline bracket x vehicle body	9±2	3	—
Bolt	Mounting bolt of pipeline joint	9±2	7	—
Bolt	Pipeline x pipeline bracket	9±2	1	—
Bolt	A/C assembly x instrument panel reinforcing beam	6±1	2	—
Nut	A/C assembly x instrument panel reinforcing beam	6±1	4	—
Bolt	A/C assembly x vehicle body	9±2	1	—
Nut	A/C assembly x vehicle body	9±2	1	—

Special tools

Code	Name	Purpose	Schematic diagram
ZEZF068738	Sealing tool for A/C pipeline	Seals A/C pipeline	
ZEZF068737	Tester for air tightness of evaporator core	Assists to test air tightness of evaporator core of A/C system	

Fault symptom checklist

The system is operational, but the refrigerating capacity is insufficient (check with a measuring instrument)

Symptom	Possible causes	Countermeasures and Treatment
Both high pressure and low pressure are excessive	1. Fill too much refrigerant, the compressor pressure is high 2. Air enters into the pipe	1. Discharge excess refrigerant until the reading of the measuring instrument returns to normal state 2. Discharge all refrigerant inside, vacuumize again and recharge the system with refrigerant according to the specified amount
The high pressure is slightly lower than the normal one and the low pressure is far higher than the normal one	1. Valve plate of compressor cracked	1. Repair or replace the compressor
The high pressure is slightly lower than the normal one and the low pressure is far lower than the normal one	1. The refrigerant is insufficient, touch the suction joint with the hand, which feels not cold 2. The expansion valve has broken down	1. Add refrigerant 2. Replace the expansion valve.
High/low pressure too low	1. The system has leaks (refrigerant is insufficient) 2. The fluid reservoir dryer is plugged	1. Add the refrigerant after repairing the leaks 2. Replace the condenser
The internal and external circulation dampers are always in external circulation	1. Internal and external circulation damper fails to switch to internal circulation 2. The internal and external circulation dampers fail 3. Internal and external circulation damper motor fault 4. Internal and external circulation key fault	1. Switch internal and external circulation damper to internal circulation 2. Replace internal and external circulation damper 3. Replace interior and exterior circulation vent motor 4. Check internal and external circulation key

The system cannot run normally

Symptom	Possible causes	Countermeasures and Treatment
After the A/C system runs in internal circulation for a certain period, the cold air reduces gradually until no cold air, and returns to normal when turning it on after turning off the A/C for a long time	1. The evaporator is frosted, the evaporator temperature sensor fails	1. Replace the evaporator temperature sensor
After the A/C system runs for a certain period, the cold air gradually becomes warm, and returns to normal when turning it on after turning off the A/C for a long time	1. Too much water in the system, the expansion valve is plugged by ice	1. Perform system vacuum pumping again and fill refrigerant

Other faults

Symptom	Possible causes	Countermeasures and Treatment
The A/C blower works abnormally	1. The speed regulation module is damaged 2. Line, connector malfunctioning	1. Replace the speed regulator module 2. Repair the connector, electrical circuit
A/C blower failure	1. The speed regulation module is damaged 2. Line, connector malfunctioning 3. The blower burns out	1. Replace the speed regulator module 2. Repair the connector, electrical circuit 3. Replace the blower

Faulted warm air system

Symptom	Possible causes	Countermeasures and Treatment
No air blows out from the A/C air outlet	1. Speed module fault 2. Blower is faulty	1. Replace the speed regulator module 2. Replace the blower

Outside temperature indication is abnormal, and A/C does not work

Symptom	Possible causes	Countermeasures and Treatment
The outdoor temperature display is much lower than the actual external temperature	1. A/C controller corrosion and failure 2. Outdoor temperature sensor fault 3. Line, connector malfunctioning	1. Replace the A/C controller 2. Replace the outside temperature sensor. 3. Repair the connector, electrical circuit

DTC checklist

No.	DTC	DTC description
1	U110017	System voltage too high
2	U110116	System voltage too low
3	U003788	BD-CAN bus OFF
4	U014087	Communication with BCM lost
5	U015587	Communication with IP lost
6	U014587	Communication with CSA lost
7	U012287	Communication with ESP (ABS) lost
8	U010087	Communication with ECM lost
9	U100287	Communication with PEPS lost
10	B140715	Outside temperature sensor short-circuited to power or open-circuited
11	B140711	Outside temperature sensor short-circuited to ground
12	B140815	Evaporator temperature sensor short-circuited to power or open-circuited
13	B140811	Evaporator temperature sensor short-circuited to ground
14	B140915	Indoor temperature sensor short-circuited to power or open-circuited
15	B140911	Indoor temperature sensor short-circuited to ground
16	B142011	Blower control terminal short-circuited to ground or open-circuited
17	B142015	Blower control terminal short-circuited to power or open-circuited
18	B142016	Blower voltage abnormal
19	B142111	Stepper motor 12 V power short-circuited to ground
20	B142314	Internal and external circulation damper motor short-circuited to ground or open-circuited
21	B142312	Internal and external circulation damper motor short-circuited to power
22	B142414	Cooling/heating air damper motor short-circuited to ground or open-circuited
23	B142412	Cooling/heating air damper motor short-circuited to power
24	B142614	Mode damper motor short-circuited to ground or open-circuited
25	B142612	Mode damper motor short-circuited to power
26	B142814	Rear defroster relay short-circuited to ground or open-circuited
27	B142812	Rear defroster relay short-circuited to power

DTC troubleshooting method

U110017

DTC definition: system power is too high

DTC occurring condition: system voltage ＞ 16 V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.
- Controller power module fault.

DTC removal condition: system voltage is 9 V ~ 15 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether generator B+ voltage and battery voltage are higher than 16 V	Repair the generator and discharge the battery and go to step 6	Go to step 4
4	Measure if A/C controller KL30 harness terminal voltage is over 16 V	Harness fails, check harness and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 5	—
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U110116

DTC definition: system voltage is too low

DTC occurring condition: system voltage ＜ 9 V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.
- Controller power module fault.

DTC removal condition: system voltage is 10 V ~ 16 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—

Step	Operation	Yes	No
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether generator B+ voltage and battery voltage are lower than 9 V	Repair the generator, charge the battery and go to step 6	Go to step 4
4	Measure if A/C controller KL30 harness terminal voltage is less than 9 V	Harness fails, check harness and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 6	—
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U003788

DTC definition: high speed CAN bus off

DTC occurring condition: CAN communications is abnormal

Possible causes:

- CAN twisted pair short-circuited or open-circuited.
- A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Use oscilloscope to measure the voltage on controller terminal CAN_H, CAN_L; normal case: CAN_H = CAN_L = 2.5 V or CAN_H = 3.5 V and CAN_L = 1.5 V	Go to step 4	CAN line fault, check if harness is short-circuited or open-circuited, go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014087

DTC definition: communication with BCM lost

DTC occurring condition: controller fails to receive BCM3 message

Possible causes:

› BCM node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, if there are BCM3, BCM6 and BCM8 messages (message ID: 0x345, 0x28C, 0x29F)	Go to step 4	Check BCM node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U015587

DTC definition: communication with IP is lost

DTC occurring condition: IP2 message is lost

Possible causes:

› IP node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, check if there is IP2 message (message ID: 0x27F)	Go to step 4	Check IP node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U014587

DTC definition: communication with CSA is lost

DTC occurring condition: controller fails to receive CSA1 message

Possible causes:

› CSA node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, check if there is CSA1 message (message ID: 0x165)	Go to step 4	Check CSA node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: controller fails to receive ESP_ABS3 message

Possible causes:

› ESP (ABS) node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, check if there is ESP_ABS3 message (message ID: 0x265)	Go to step 4	Check ESP (ABS) node, and go to step 5
4	Replace the A/C controller	Go to step 5	—

Step	Operation	Yes	No
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

U010087

DTC definition: communication with ECM lost

DTC occurring condition: controller fails to receive ECM message

Possible causes:

› ECM node is not connected to CAN network.

› A/C controller fails.

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check message on CAN bus, if there are ECM1, ECM2 and ECM3 messages (message ID: 0x111, 0x271, 0x371)	Go to step 4	Check ECM node, and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has not been eliminated, check other possible causes of the fault

B140715, B140815, B140915

DTC definition: outside temperature sensor open-circuited or short-circuited to power, evaporator temperature sensor open-circuited or short-circuited to power, indoor temperature sensor open-circuited or short-circuited to power

DTC occurring condition: sensor voltage ＞ 4.9 V

Possible causes:

› Sensor fault.

› Controller connector harness failure.

› A/C controller fails.

DTC removal condition: sensor voltage ≤ 4.9 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Measure sensor resistance using multimeter, check if resistance is more than 50 KΩ	Sensor fails, replace sensor and go to step 6	Go to step 4
4	Check if controller connector harness terminal is more than 4.9 V	Connector harness fails, replace connector and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 6	—
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B140711, B140811, B140911

DTC definition: outside temperature sensor short-circuited to ground, evaporator temperature sensor short-circuited to ground, indoor temperature sensor short-circuited to ground

DTC occurring condition: sensor voltage ＜ 0.1 V

Possible causes:

- Sensor fault.
- Controller connector harness failure.
- A/C controller fails.

DTC removal condition: sensor voltage ≥ 0.1 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Measure sensor resistance using multimeter, check if resistance is less than 0.16 KΩ	Sensor fails, replace sensor and go to step 6	Go to step 4
4	Check if controller connector harness terminal is less than 0.1 V	Connector harness fails, replace connector and go to step 6	Go to step 5
5	Replace the A/C controller	Go to step 6	—

Step	Operation	Yes	No
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142016

DTC definition: blower voltage abnormal

DTC occurring condition: voltage difference between blower control terminal and feedback terminal ＞ 1 V

Possible causes:

› Harness fails.

› A/C controller fails.

DTC removal condition: voltage difference between blower control terminal and feedback terminal ＜ 1 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and blower control terminal connection is short-circuited or open-circuited	Harness fails, replace harness and go to step 5	Go to step 4
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142011

DTC definition： Blower control terminal short-circuited to ground or open-circuited

DTC occurring condition: blower control terminal voltage < 0.09 V

Possible causes:

› Harness fails.

› A/C controller fails.

› The blower fails.

DTC removal condition: blower control terminal voltage > 0.09 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if the connection between harness and blower control terminal is short-circuited to ground	Harness fails, replace harness and go to step 6	Go to step 4
4	Replace A/C controller, clear DTC, and read if DTC still exists	Go to step 5	A/C controller fault
5	Replace blower, clear DTC, read if DTC still exists	Troubleshoot other possible causes of fault	Blower failed
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142015

DTC definition： Blower control terminal is short-circuited to power or open-circuited

DTC occurring condition: blower control terminal voltage > 5 V

Possible causes:

- Harness fails.
- A/C controller fails.
- The blower fails.

DTC removal condition: blower control terminal voltage < 5 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if the connection between harness and blower control terminal is short-circuited to power or open-circuited	Harness fails, replace harness and go to step 6	Go to step 4
4	Replace A/C controller, clear DTC, and read if DTC still exists	Go to step 5	A/C controller fault
5	Replace blower, clear DTC, read if DTC still exists	Troubleshoot other possible causes of fault	Blower failed

Step	Operation	Yes	No
6	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142111

DTC definition： Stepper motor 12 V power is short-circuited to ground

DTC occurring condition: Controller interface J1-15 voltage ＜ 6 V

Possible causes:

› Controller 12 V power supply circuit.

› Harness contact fault.

DTC removal condition: controller interface J1-15 voltage ＞ 6 V

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for the DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness terminal voltage is normal	Go to step 4	Harness fails, check harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142314, B142312

DTC definition: internal and external circulation motor is short-circuited to ground or open-circuited, internal and external circulation damper motor is short-circuited to power

DTC occurring condition: internal and external circulation motor plug line is short-circuited to ground or open-circuited, or short-circuited to power (controller interface J1-11, J1-12, J1-13 and J1-14)

Possible causes:

› Motor fault.

› Harness fails.

› A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and controller connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142414, B142412

DTC definition: cooling/heating air damper motor is short-circuited to ground or open-circuited, cooling/heating air damper motor is short-circuited to power

DTC occurring condition: cooling/heating air damper motor plug line is short-circuited to ground or open-circuited, or short-circuited to power (controller interface J1-5, J1-6, J1-7 and J1-8)

Possible causes:

- Motor fault.
- Harness fails.
- A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and controller connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142614, B142612

DTC definition: mode damper motor is short-circuited to ground or open-circuited, mode damper motor is short-circuited to power

DTC occurring condition: mode damper motor plug line is short-circuited to ground or open-circuited, or short-circuited to power (controller interface J1-1, J1-2, J1-3 and J1-4)

Possible causes:

- Motor fault.
- Harness fails.
- A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check if harness and controller connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

B142814, B142812

DTC definition: rear defroster relay short-circuited to ground or open-circuited, rear defroster relay short-circuited to power

DTC occurring condition: plug line of rear defroster relay and controller fault (controller terminal rear defroster interface J2-17)

Possible causes:

- Harness fails.
- A/C controller fails.

DTC removal condition: fault is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use the scanner to read the A/C controller for DTC	Go to step 3	Troubleshoot other DTCs

Step	Operation	Yes	No
3	Check if harness connection is intact	Go to step 4	Troubleshoot harness and go to step 5
4	Replace the A/C controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

Refrigerant

Precautions

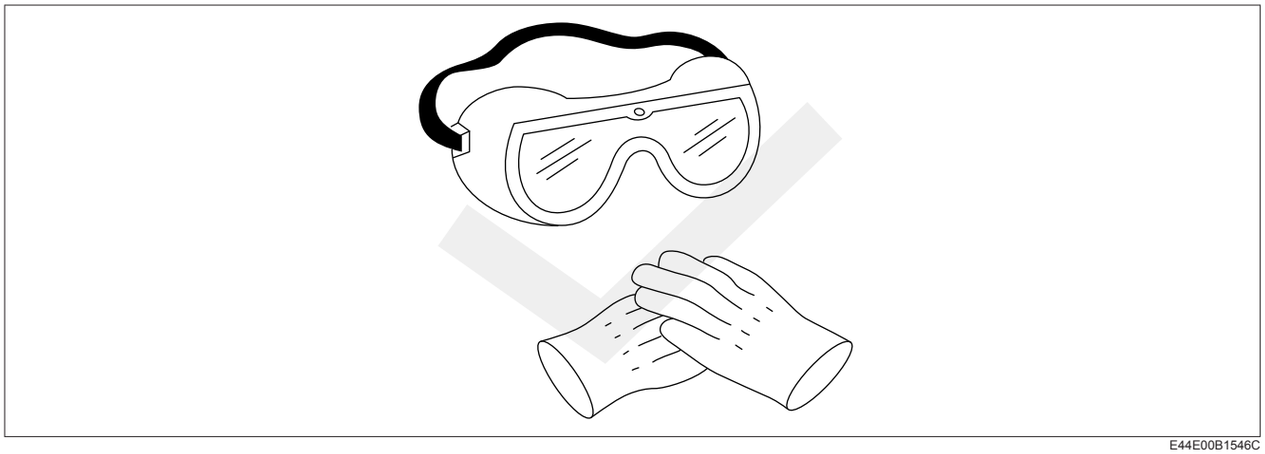
› Refrigerant must be filled according to the model and value on the refrigerant label on the vehicle.

› Do not place the refrigerant tank on the engine or radiator to prevent any serious accident.

› Keep the refrigerant tank out of reach of children or in the place without strong collision with hard object such as other iron, so as to prevent the serious accident.

› Do not handle refrigerant in enclosed spaces or near open flames.

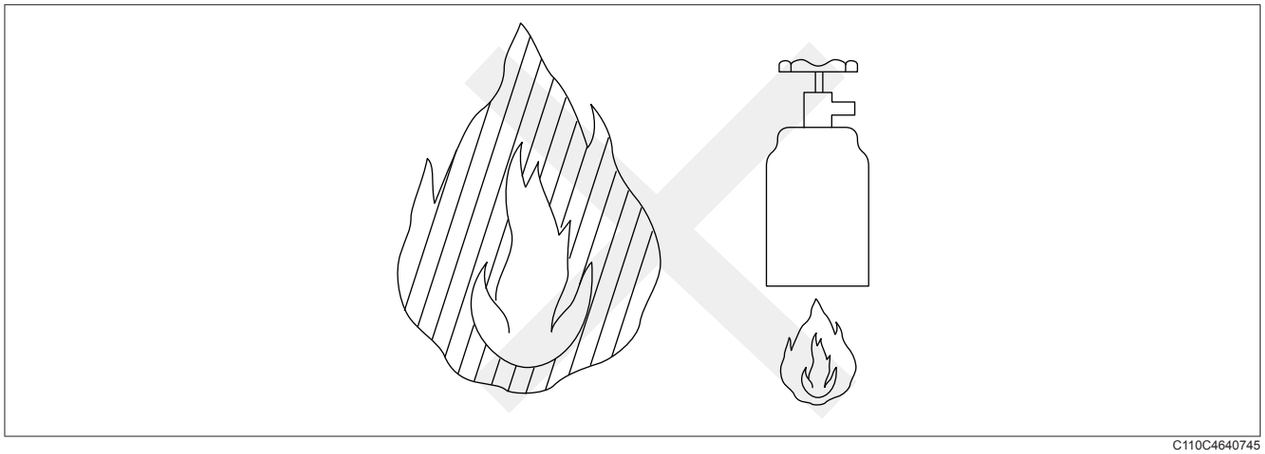
› Refrigerant boiling point is about -30℃. When handling the refrigerant, be sure to wear the goggles and protective gloves. If your skin directly contacts with the refrigerant, it can cause frostbite.



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› If the liquid coolant is splashed into eyes or onto skin, please wash such portions with a lot of cold water; do not rub eyes or skin, but apply the Vaseline onto skin and immediately get professional medical treatment in hospital.

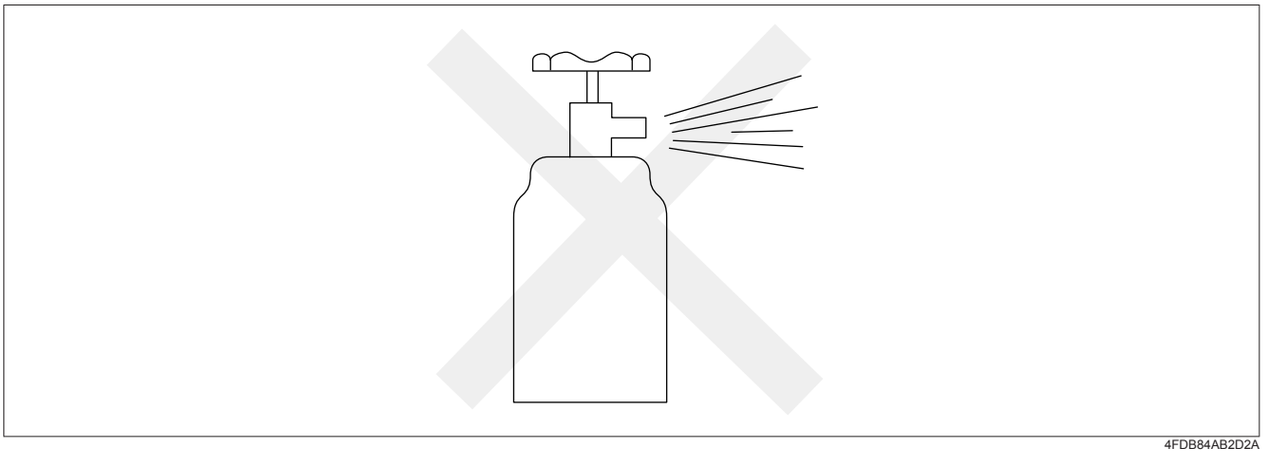
› Do not heat the container for the refrigerant or place it near open flames.



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› Don’t drop the refrigerant reservoir or subject it to physical collision, otherwise the refrigerant may

be released into the atmosphere.



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- If the accidental discharge happens on the system, the working area must be ventilated before repair.
- Dedicated equipment should be used to recover/refill the refrigerant.
- Do not add excessive refrigerant into the system. If too much refrigerant is filled, the troubles such as poor cooling effect, low fuel economy and overheated engine may occur.
- Do not operate the compressor with insufficient refrigerant.
- Do not mix the refrigerant.
- When filling, do not turn the refrigerant bottle upside down, keeping the refrigerant bottle valve facing up.

Fluorescent stain leakage test

⚠ Caution

› Fluorescent stains and refrigerator oil are mixed and flow together through the entire refrigeration system.

› Refrigerator oil is soluble in water, and condensed water on evaporator core or cooling pipeline can wash away refrigerator oil and fluorescent stains from the actual part of the leak. The condensate may also carry away fluorescent stains through drip pipe of A/C system.

› When a leak detection lamp is used, leakage in the A/C system will be indicated in light green or yellow.

1. Remove any remaining stains from the access port thoroughly with a cloth and approved scavenger
2. Add a certain amount of fluorescent stain

ℹ Notice

› For vehicles not added with fluorescent stain.

› Leak detecting fluorescent stain takes some time to take effect. Depending on the leakage rate, leakage may not be observed over a period of 15 min to 7 days.

› Use dark glasses with UV lamps, as this will enhance the color of the stains.

3. All joints or connections using seal washer or O-ring shall be tested by the leak detection lamp
4. All A/C system components shall be tested by the leak detection lamp
5. A/C compressor shaft seal shall be tested by the leak detection lamp
6. Check A/C hose and pressure sensor (pressure switch) using leakage detecting lamp
7. Check A/C system drip pipe using leakage detecting lamp (if there is suspected leakage from evaporator core)
8. The access port seal cap shall be tested by the leak detection lamp

Air tightness inspection

⚠ Caution

› Do not spray soapy water on the molded pin of the pressure sensor/pressure switch.

› To make sure if there is leakage from molded pin of pressure sensor/pressure switch, perform visual inspection. If there is leakage, residual refrigerant may stay at the molded pin. If there is no leakage from pressure sensor/pressure switch, there is no impurity and refrigeration oil stain at the molded pin.

› If the leak is finally confirmed to be caused by the damage of certain component in the A/C system, please carry out leak test after replacing it. Using soap or other alkaline liquid to test electrical parts such as pressure sensor for leak is prohibited, otherwise it will lead to refrigerant leak due to the damage to the sensor caused by its internal corrosion.

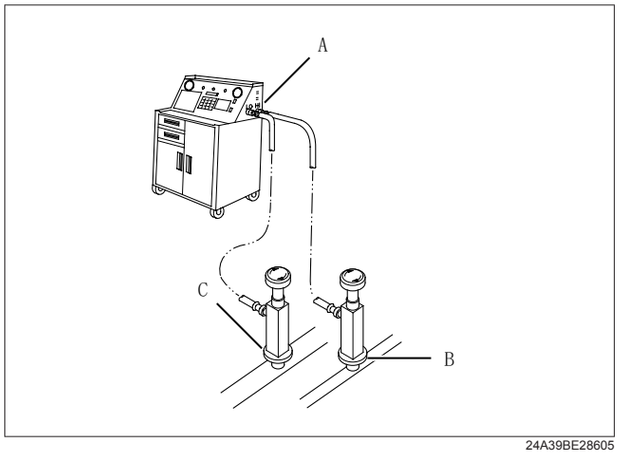
1. Check if system leakage is normal leakage using refrigerant leakage detector with accuracy of 10 g every year or at interval of a shorter period
2. If abnormal leak is detected and the system is to be dismantled (for repairing or replacing hose, fittings, etc.), all refrigerant in the system shall be recovered
3. The system must be evacuated, packed, filled with refrigerant after leak detection and repair are completed

Refrigerant recycle

⚠ Caution

- In actual operation, refrigerant maintaining equipment must be used as specified in the owner's manual provided by equipment manufacturer.
- If accidental discharge happens on the system, the working area must be ventilated before continuing repair.
- For further instructions on health and safety, please refer to the instructions given by refrigerant and lubricant manufacturers.

1. As illustrated, connect refrigerant recovery/ recycling/filling equipment (A) or other equipment with the same functions to high pressure maintenance interface (B) and low-voltage maintenance port (C) according to the equipment manufacturer's instructions



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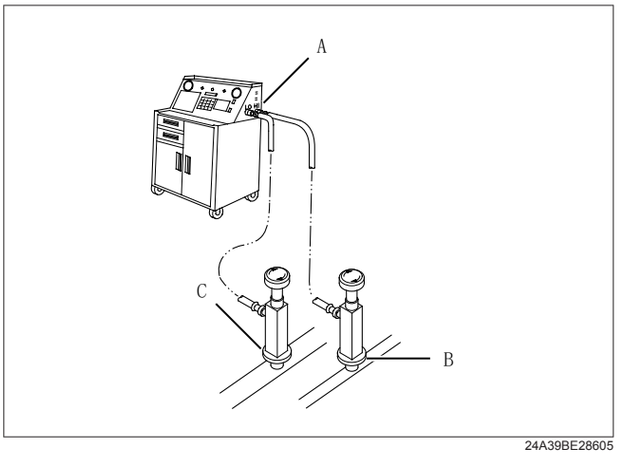
2. After the completion of the recovery procedure, measure the amount of the refrigerator oil discharged from the A/C system. Before filling, ensure that an equal amount of new refrigerator oil is filled back to the A/C system

System vacuum pumping

ℹ Notice

- When the A/C system is exposed in the open air (e.g. during installation and repair), it must be evacuated with the refrigerant recovery/ recycling/filling equipment. However, if the system has been disassembled for several days, please replace the fluid reservoir/ drying agent, and vacuumize the system for several hours.

1. As illustrated, connect refrigerant recovery/ recycling/filling equipment (A) or other equipment with the same functions to high pressure maintenance interface (B) and low-voltage maintenance port (C) according to the equipment manufacturer's instructions



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2. The system is evacuated

ℹ Notice

- 20 minutes later, when the low pressure reaches standard atmospheric pressure or lower pressure, just close the high/low pressure valve and turn off the vacuum pump.
- If the low pressure can’t reach standard atmospheric pressure, then maybe there is leakage in system. Partially fill the system and check for leaks.

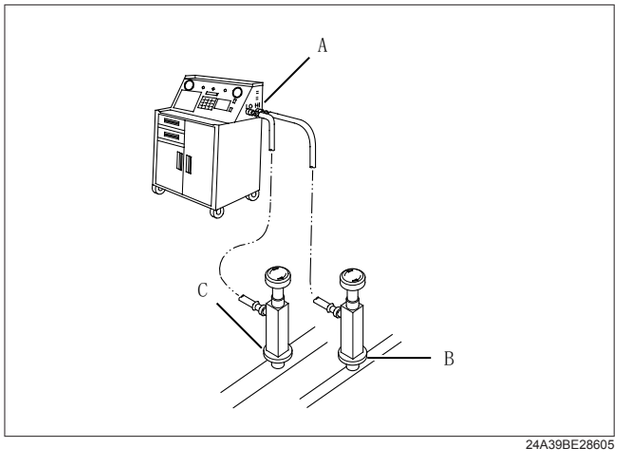
Refrigerant filling

⚠ Caution

› After refrigerant filling, be sure to make the engine preheat for 3 min or longer to prevent its damage when the air conditioning switch is turned on for the first time.

› Make the compressor run-in for 3 min or longer at idle speed after filling the refrigerant.

1. As illustrated, connect refrigerant recovery/recycling/filling equipment (A) or other equipment with the same functions to high pressure maintenance interface (B) and low-voltage maintenance port (C) according to the equipment manufacturer's instructions



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2. The system is evacuated
3. Fill refrigerant of the prescribed amount into the system

⚠ Caution

› Do not overfill, otherwise the compressor will be damaged.

4. Check whether the refrigerant leaks

⚠ Caution

› Do not spray soapy water on the molded pin of the pressure sensor/pressure switch.

› To make sure if there is leakage from molded pin of pressure sensor/pressure switch, perform visual inspection. If there is leakage, residual refrigerant may stay at the molded pin. If there is no leakage from pressure sensor/pressure switch, there is no impurity and refrigeration oil stain at the molded pin.

› If the leak is finally confirmed to be caused by the damage of certain component in the A/C system, please carry out leak test after replacing it. Using soap or other alkaline liquid to test electrical parts such as pressure sensor for leak is prohibited, otherwise it will lead to refrigerant leak due to the damage to the sensor caused by its internal corrosion.

5. Check the system performance

⚠ Caution

› Do not operate the compressor before filling the refrigerant, because the compressor does not work properly without any refrigerant, and overheating will occur.

› Through measurement rather than observation hole, inspect the amount of refrigerant.

› Allow filling refrigerant into the A/C system only when the engine is stopped.

Refrigerator oil

Refrigerator oil balance

Notice

- Replace the condenser, evaporator, pipeline, hose or compressor. Any of the following components require filling refrigerator oil.
- The used refrigerator oil should be discarded as required.
- The different types and brands of refrigerator oil must not be mixed, otherwise it will damage the compressor.
- The refrigerator oil can easily absorb the water, so the time it contacts with the air should be minimized to avoid moisture from entering.
- Do not allow refrigerator oil to splash on the vehicle, as it can damage the paint. If refrigerator oil splashes on a painted surface, you should clean it off immediately.

1. Remove compressor
2. Discharge refrigerator oil from the suction and discharge ports of the compressor to the same container

Caution

- Drain the refrigerator oil into a clean, graduated container.
- When discharging the refrigerator oil, turn the compressor to facilitate the discharge of the oil.

3. Record the amount of refrigerator oil released from the disassembled compressor

Caution

- The measured value will be used when the interchanging compressor is installed.

4. Properly discard used refrigerator oil
5. As the interchanging compressor comes with a certain amount of refrigerator oil, you must drain or add some refrigerator oil before installing the compressor

Notice

- Refer to the amount of refrigerator oil discharged when the compressor is disassembled.
- The amount of refrigerator oil discharged at the time of disassembly is subtracted from the amount of refrigerator oil in the interchanging compressor. The difference is the amount of refrigerator oil to be discharged.
- If the amount of refrigerator oil in the interchanging compressor is small, the difference in the previous step is the amount of refrigerator oil to be added.

6. Discharge or add refrigerator oil in the interchanging compressor based on the calculated values

A/C assembly

Removal/installation

Removal

⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- The vehicle temperature should be lowered to room temperature before operation.
- If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

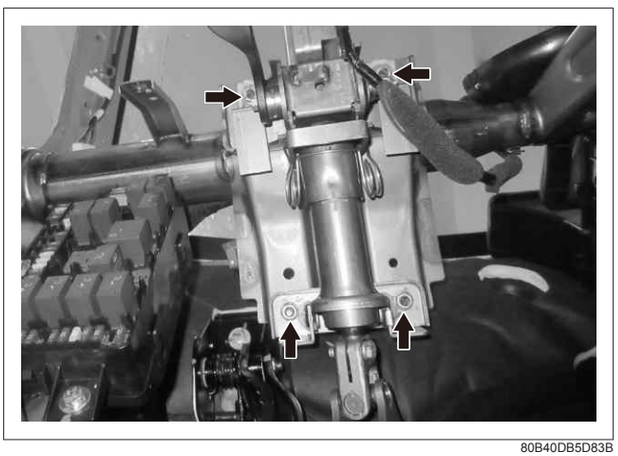
- Do not damage the warning signs on the parts during maintenance.

1. Disconnect the negative terminal of the battery.
2. Drain the engine coolant
3. Recycle the refrigerant and the refrigerator oil
4. Remove auxiliary instrument panel
5. Remove main instrument panel
6. Remove 2 bolts on the left side of instrument panel reinforcing beam



95527865B426

7. Remove 4 nuts connected to steering column



80B40DB5D83B

8. Remove 1 bolt on the left side of the middle of instrument panel reinforcing beam



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9. Remove 2 nuts in the upper and middle of instrument panel reinforcing beam



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10. Remove 2 bolts in the lower and middle of instrument panel reinforcing beam



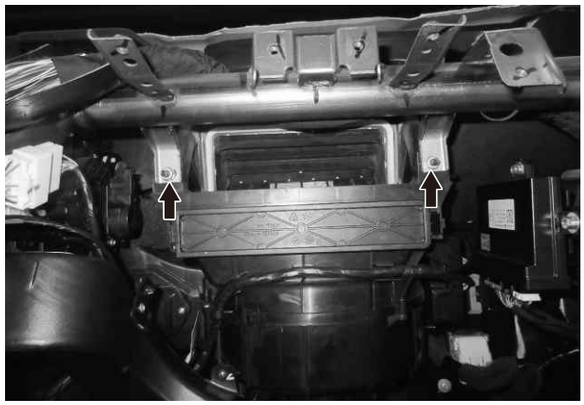
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11. Remove 1 bolt on the right side of the middle of instrument panel reinforcing beam



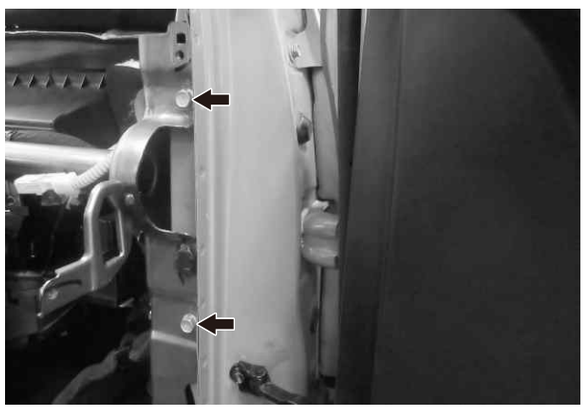
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12. Remove 2 nuts on the right side of the middle of instrument panel reinforcing beam



75202BDB1082

13. Remove 2 bolts on the right side of instrument panel reinforcing beam



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14. Remove 1 bolt plug cover on the front right door side of instrument panel reinforcing beam



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15. Loosen 1 bolt and place bolt head at door open first gear position



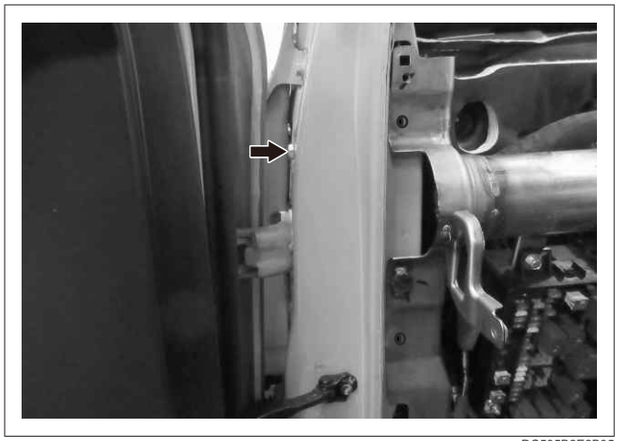
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16. Remove 1 bolt plug cover on the front left door side of instrument panel reinforcing beam



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17. Loosen 1 bolt and place bolt head at door open first gear position



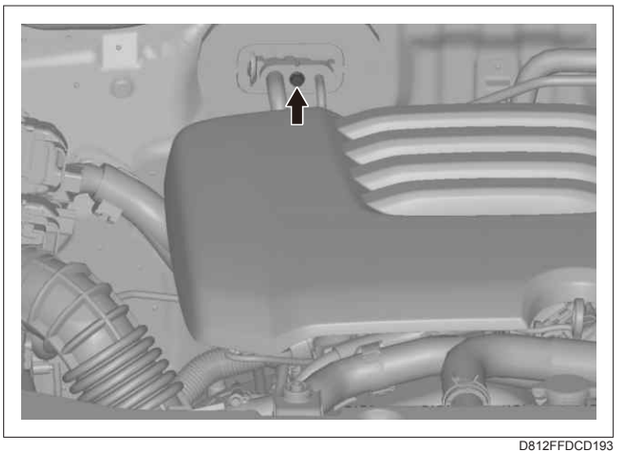
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18. Disconnect water inlet pipe and outlet pipe for hot air

⚠ Caution

- Drain the coolant in the pipeline before disconnecting the pipeline.
- After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

19. Remove 1 bolt, and disconnect A/C refrigeration pipeline connected to expansion valve



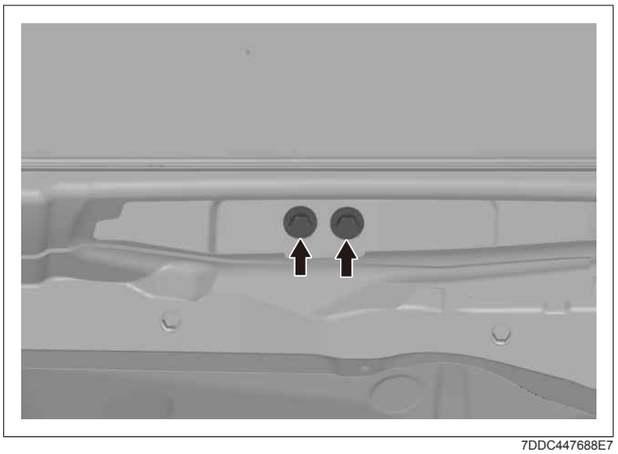
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20. Use a special tool to seal A/C cooling pipeline connected to the expansion valve

ℹ Notice

Special tool: ZEZF068738

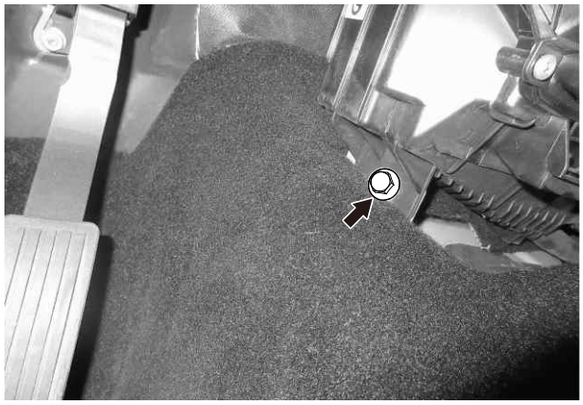
21. Remove ventilation cover plate
22. Remove front wiper motor
23. Remove 2 bolts



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24. Remove harness ground, and disconnect harness connector

25. Separate harness clip, and remove instrument panel reinforcing beam
26. Remove 1 bolt and 1 nut



050D0A36ACF1



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27. Disconnect harness connector
28. Disconnect drip pipe from air duct
29. Remove A/C assembly

Installation

⚠ Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› If the coolant splashes on the skin during operation, rinse it off immediately with water; if it gets into your eyes, rinse immediately with plenty of water and consult a doctor in time.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› Do not damage the warning signs on the parts during maintenance.

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, perform system vacuum pumping and add an appropriate amount of refrigerant, and then check for refrigerant leaks and check for good system performance.

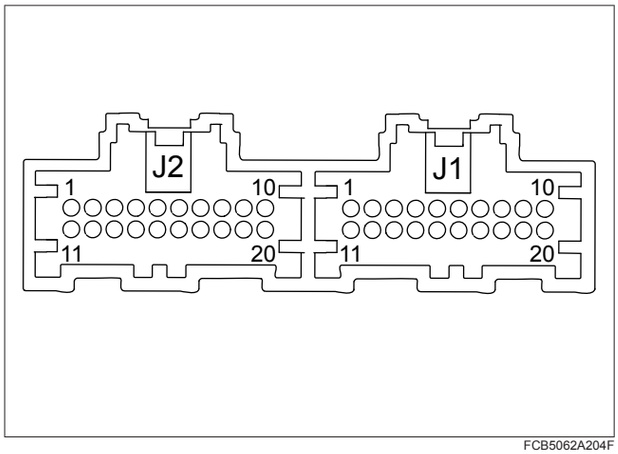
1. Perform installation work in reverse order of removal

ℹ Notice

› Tighten the fastener according to the specified torque value.

A/C controller - electric

Pin definition



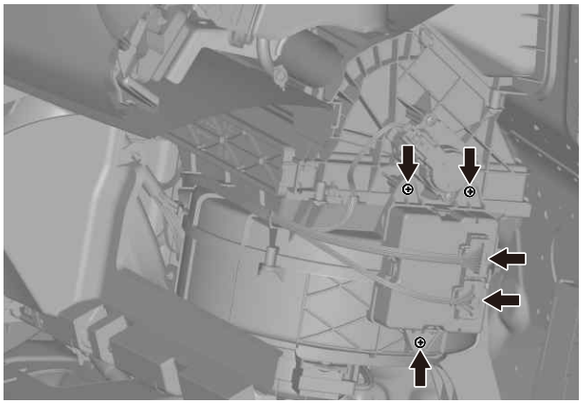
FCB5062A204F

Pin No.	Function
J1-1	Mode air damper stepper motor driver 6
J1-2	Mode air damper stepper motor driver 4
J1-3	Mode air damper stepper motor driver 3
J1-4	Mode air damper stepper motor driver 1
J1-5	Left temperature air damper stepper motor driver 6
J1-6	Left temperature air damper stepper motor driver 4
J1-7	Left temperature air damper stepper motor driver 3
J1-8	Left temperature air damper stepper motor driver 1
J1-9	—
J1-10	—
J1-11	Internal and external circulation damper stepper motor driver 6
J1-12	Internal and external circulation damper stepper motor driver 4
J1-13	Internal and external circulation damper stepper motor driver 3
J1-14	Internal and external circulation damper stepper motor driver 1
J1-15	Stepper motor 12V power 1
J1-16	Front blower LPM feedback negative
J1-17	Front blower LPM feedback positive
J1-18	Front blower LPM
J1-19	Front evaporator temperature sensor
J1-20	—
J2-1	—
J2-2	Outside temperature sensor
J2-3	—
J2-4	—
J2-5	CAN low
J2-6	CAN high
J2-7	—
J2-8	Signal GND
J2-9	Battery negative
J2-10	Battery positive
J2-11	Rear window heater feedback
J2-12	—
J2-13	Ignition power supply
J2-14	—
J2-15	—
J2-16	—
J2-17	Rear air window heater relay
J2-18	—
J2-19	—
J2-20	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove glove box
3. Remove right foot block of instrument panel
4. Remove the PEPS controller
5. Disconnect harness connector and remove the 3 screws



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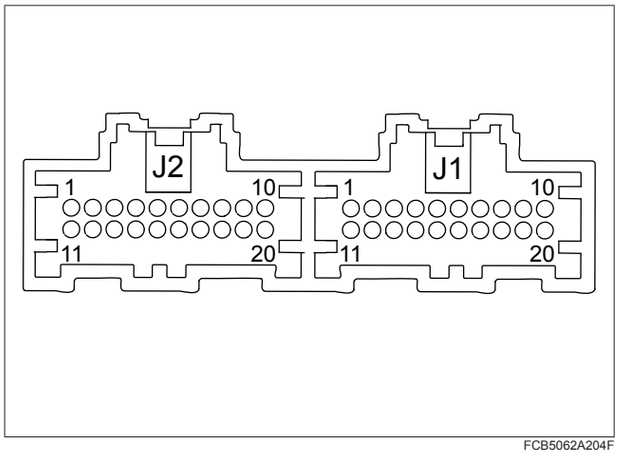
6. Remove A/C controller

Installation

1. Perform installation work in reverse order of removal

A/C controller - auto

Pin definition



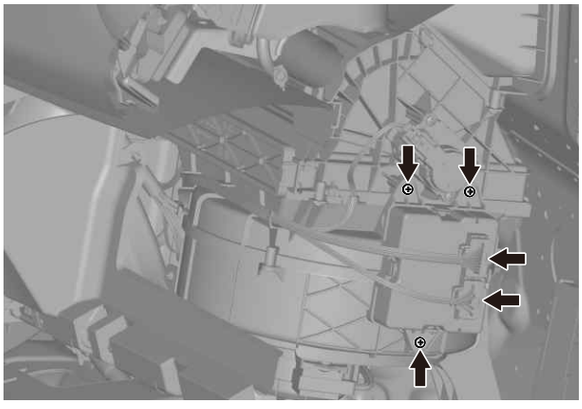
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Pin No.	Function
J1-1	Mode air damper stepper motor driver 6
J1-2	Mode air damper stepper motor driver 4
J1-3	Mode air damper stepper motor driver 3
J1-4	Mode air damper stepper motor driver 1
J1-5	Left temperature air damper stepper motor driver 6
J1-6	Left temperature air damper stepper motor driver 4
J1-7	Left temperature air damper stepper motor driver 3
J1-8	Left temperature air damper stepper motor driver 1
J1-9	—
J1-10	—
J1-11	Internal and external circulation damper stepper motor driver 6
J1-12	Internal and external circulation damper stepper motor driver 4
J1-13	Internal and external circulation damper stepper motor driver 3
J1-14	Internal and external circulation damper stepper motor driver 1
J1-15	Stepper motor 12 V power 1
J1-16	Front blower LPM feedback negative
J1-17	Front blower LPM feedback positive
J1-18	Front blower LPM
J1-19	Front evaporator temperature sensor
J1-20	—
J2-1	—
J2-2	Outside temperature sensor
J2-3	—
J2-4	—
J2-5	CAN low
J2-6	CAN high
J2-7	—
J2-8	Signal GND
J2-9	Negative terminal of battery
J2-10	Battery positive
J2-11	Rear window heater feedback
J2-12	—
J2-13	Ignition power supply
J2-14	Front indoor temperature sensor
J2-15	—
J2-16	—
J2-17	Rear air window heater relay
J2-18	—
J2-19	—
J2-20	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove glove box
3. Remove right foot block of instrument panel
4. Remove the PEPS controller
5. Disconnect harness connector and remove the 3 screws



7FD75B645FD4

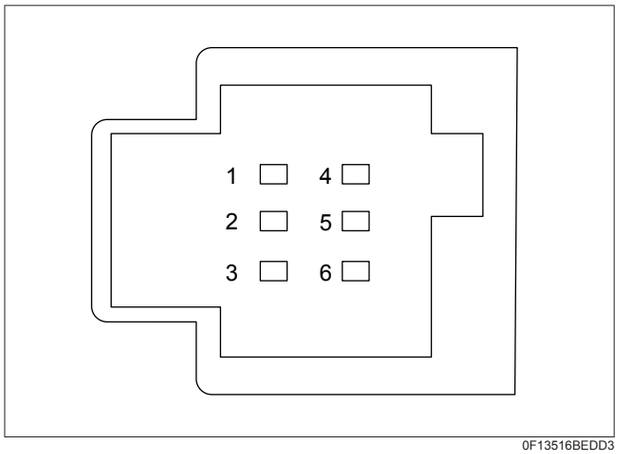
6. Remove A/C controller

Installation

1. Perform installation work in reverse order of removal

Mode damper motor

Pin definition



0F13516BEDD3

Output shaft counterclockwise rotation

Pin No.	Ⅰ	Ⅱ	Ⅲ	Ⅳ
1	Empty	Empty	-	-
3	-	-	Empty	Empty
4	Empty	-	-	Empty
6	-	Empty	Empty	-
(2+5)	+	+	+	+

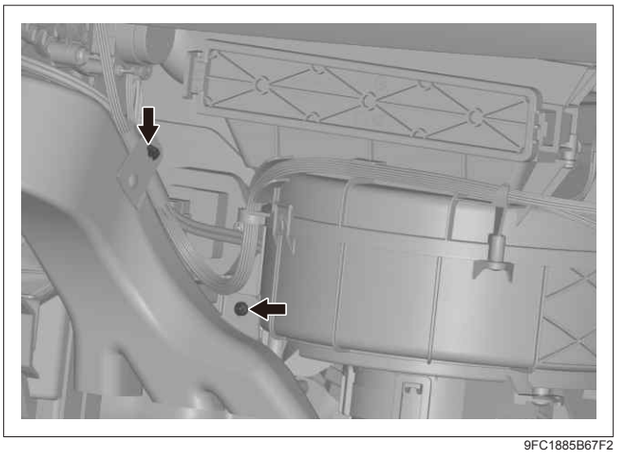
Output shaft clockwise rotation

Pin No.	Ⅰ	Ⅱ	Ⅲ	Ⅳ
1	Empty	-	-	Empty
3	-	Empty	Empty	-
4	Empty	Empty	-	-
6	-	-	Empty	Empty
(2+5)	+	+	+	+

Removal/installation

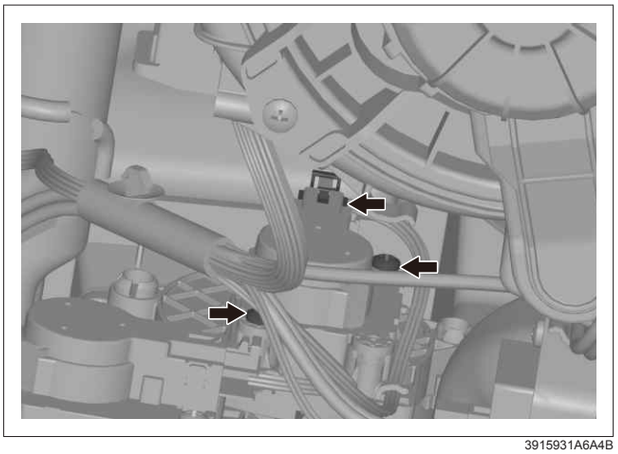
Removal

1. Disconnect the negative terminal of the battery.
2. Remove glove box
3. Remove auxiliary instrument panel
4. Remove the glove box frame
5. Remove 1 screw, disconnect harness clip, and remove front right lower air duct



9FC1885B67F2

6. Remove 2 screws and disconnect the harness connector



3915931A6A4B

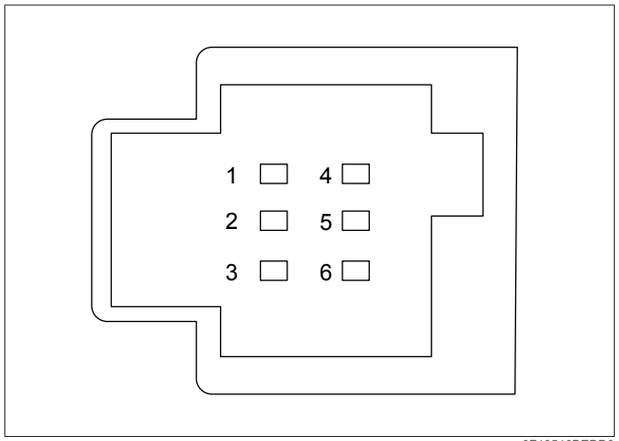
7. Remove mode damper motor

Installation

1. Perform installation work in reverse order of removal

Cooling/heating air damper motor

Pin definition



0F13516BEDD3

Output shaft counterclockwise rotation

Pin No.	Ⅰ	Ⅱ	Ⅲ	Ⅳ
1	Empty	Empty	-	-
3	-	-	Empty	Empty
4	Empty	-	-	Empty
6	-	Empty	Empty	-
(2+5)	+	+	+	+

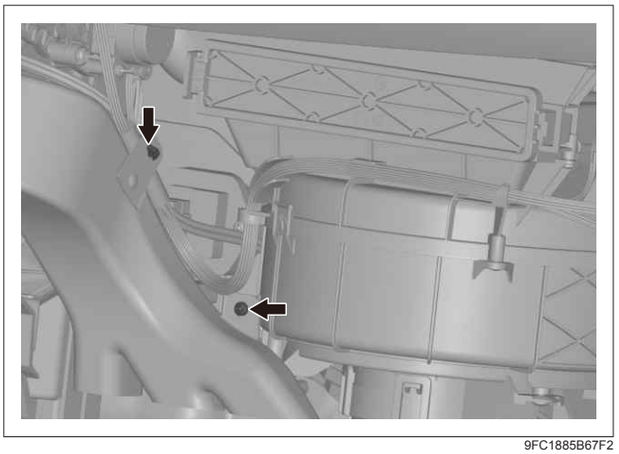
Output shaft clockwise rotation

Pin No.	Ⅰ	Ⅱ	Ⅲ	Ⅳ
1	Empty	-	-	Empty
3	-	Empty	Empty	-
4	Empty	Empty	-	-
6	-	-	Empty	Empty
(2+5)	+	+	+	+

Removal/installation

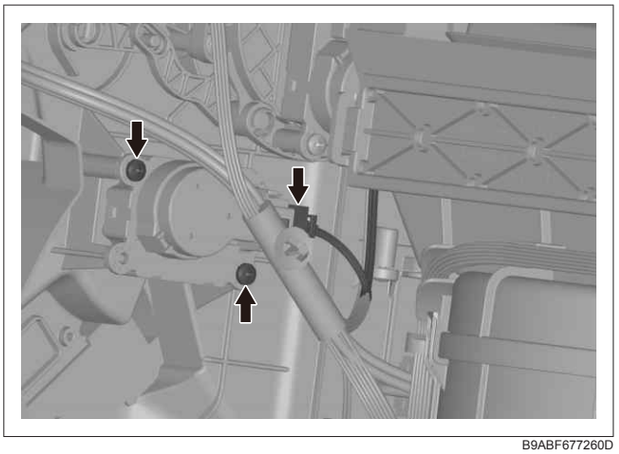
Removal

1. Disconnect the negative terminal of the battery.
2. Remove glove box
3. Remove auxiliary instrument panel
4. Remove the glove box frame
5. Remove 1 screw, disconnect harness clip, and remove front right lower air duct



9FC1885B67F2

6. Remove 2 screws and disconnect the harness connector



B9ABF677260D

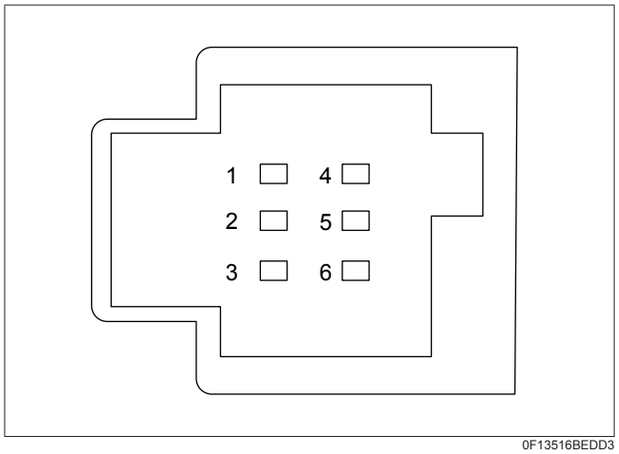
7. Remove cooling/heating air damper motor

Installation

1. Perform installation work in reverse order of removal

Internal and external circulation damper motor

Pin definition



0F13516BEDD3

Output shaft counterclockwise rotation

Pin No.	Ⅰ	Ⅱ	Ⅲ	Ⅳ
1	Empty	Empty	-	-
3	-	-	Empty	Empty
4	Empty	-	-	Empty
6	-	Empty	Empty	-
(2+5)	+	+	+	+

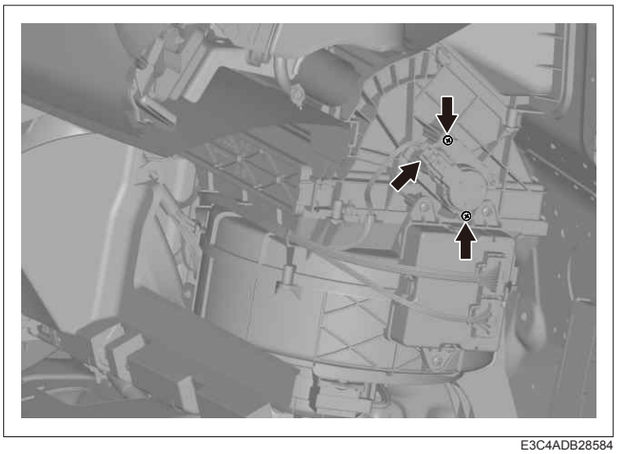
Output shaft clockwise rotation

Pin No.	Ⅰ	Ⅱ	Ⅲ	Ⅳ
1	Empty	-	-	Empty
3	-	Empty	Empty	-
4	Empty	Empty	-	-
6	-	-	Empty	Empty
(2+5)	+	+	+	+

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove glove box
3. Remove right foot block of instrument panel
4. Remove the PEPS controller
5. Disconnect harness connector and remove the 2 screws



E3C4ADB28584

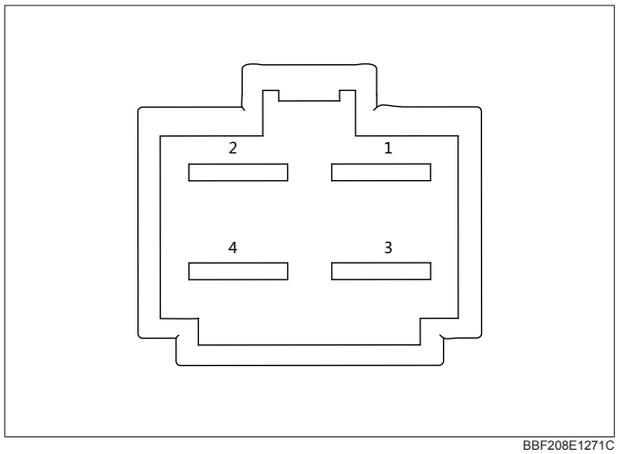
6. Remove internal and external circulation damper motor

Installation

1. Perform installation work in reverse order of removal

Speed regulator module

Pin definition



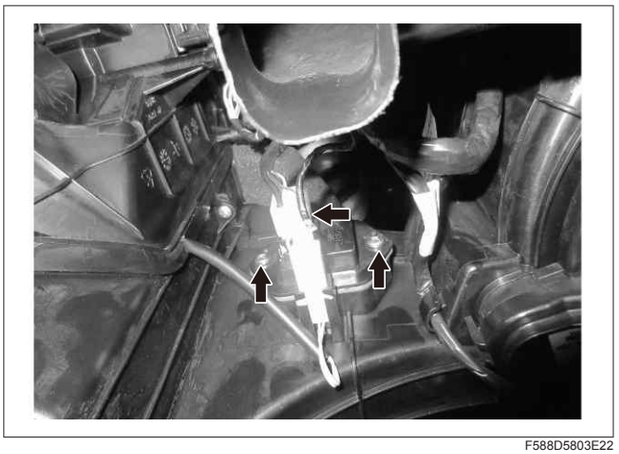
BBF208E1271C

Pin No.	Function
1	—
2	Speed regulator module drive
3	GND
4	Blower output terminal

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove right foot block of instrument panel
3. Remove 2 screws and disconnect the harness connector



F588D5803E22

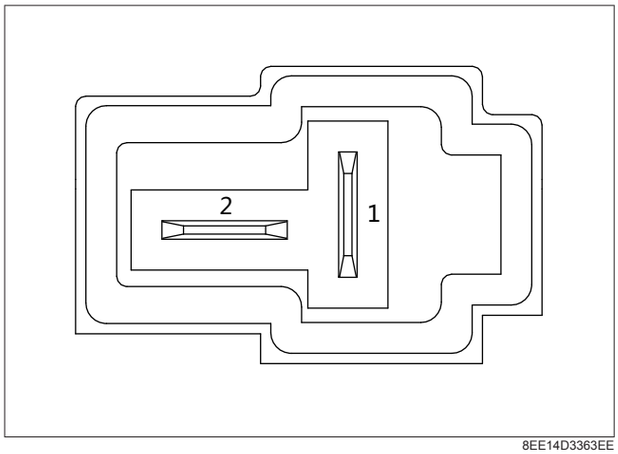
4. Remove speed regulator module

Installation

1. Perform installation work in reverse order of removal

Blower fan component

Pin definition



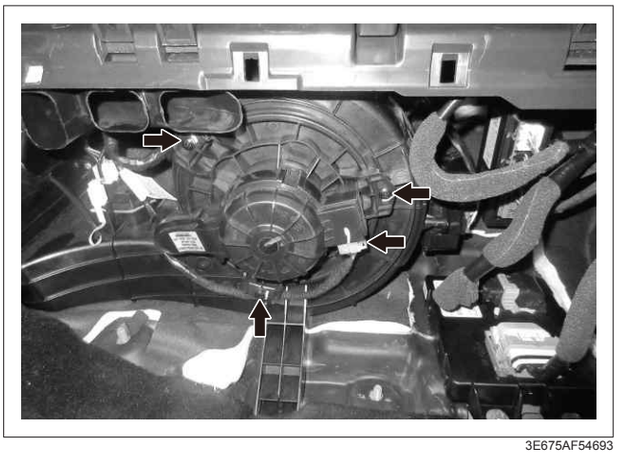
8EE14D3363EE

Pin No.	Function
1	Blower +
2	Blower -

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove right foot block of instrument panel
3. Disconnect harness connector and remove the 3 screws



3E675AF54693

4. Remove blower fan component

Installation

1. Perform installation work in reverse order of removal

Filtration screen component

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove glove box
3. Remove the filtration screen plug cover



5E8E769BB8EE

4. Remove the filtration screen component



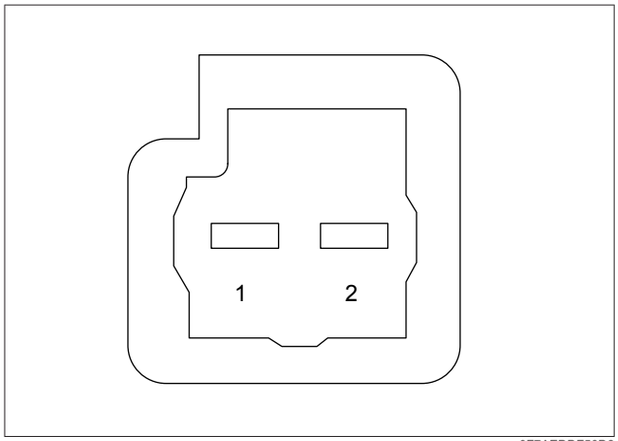
48CC9233AD2A

Installation

1. Perform installation work in reverse order of removal

Indoor temperature sensor - auto

Pin definition



9F7AEDDF58D2

Pin No.	function
1	GND
2	Signal

Check

1. Remove the indoor temperature sensor
2. Place indoor temperature sensor into water of different temperatures and measure resistance value

Notice

- Water temperature shall be identical with the temperature given in indoor temperature R-T table.
- Wetting indoor temperature terminal is forbidden.

3. Compare the measured value to the values given in R-T table, and the resistance value shall be within acceptable range; otherwise, indoor temperature sensor shall be replaced

R-T table

Temperature (℃)	Minimum (kΩ)	Standard (kΩ)	Upper limit (kΩ)
-40	42.12	43.56	45
-35	31.86	32.95	34.04
-30	24.35	25.18	26.01
-25	18.79	19.56	20.07
-20	14.68	15.13	15.58
-15	11.52	11.88	12.24
-10	9.11	9.392	9.674
-5	7.257	7.481	7.705
0	5.82	6	6.18
5	4.699	4.844	4.989
10	3.817	3.935	4.053
15	3.12	3.217	3.314
20	2.565	2.644	2.723
25	2.12	2.186	2.252
30	1.762	1.817	1.872
35	1.472	1.518	1.564
40	1.236	1.274	1.312
45	1.043	1.075	1.107
50	0.8788	0.906	0.9332
55	0.7517	0.7749	0.7981

Temperature (℃)	Minimum (kΩ)	Standard (kΩ)	Upper limit (kΩ)
60	0.6423	0.6622	0.6821
65	0.5513	0.5683	0.5853
70	0.4748	0.4895	0.5042
75	0.4106	0.4233	0.436
80	0.3563	0.3673	0.3783
85	0.3103	0.3199	0.3295
90	0.2712	0.2796	0.288
95	0.2377	0.2451	0.2525
100	0.2091	0.2156	0.2221

Removal/installation

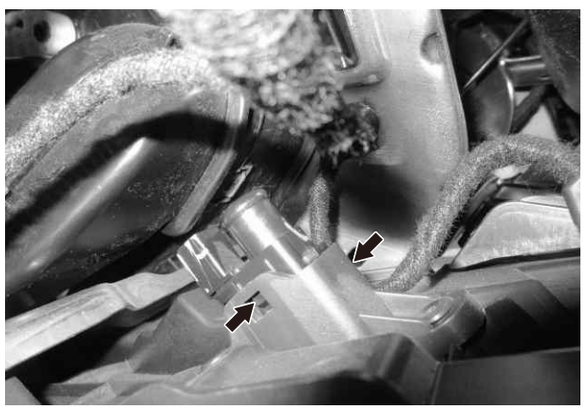
Removal

1. Disconnect the negative terminal of the battery.
2. Remove the driver knee trim plate
3. Disconnect the connection between harness connector and return air duct



EC478EDDF7D6

4. Separate clips at both sides and remove indoor temperature sensor



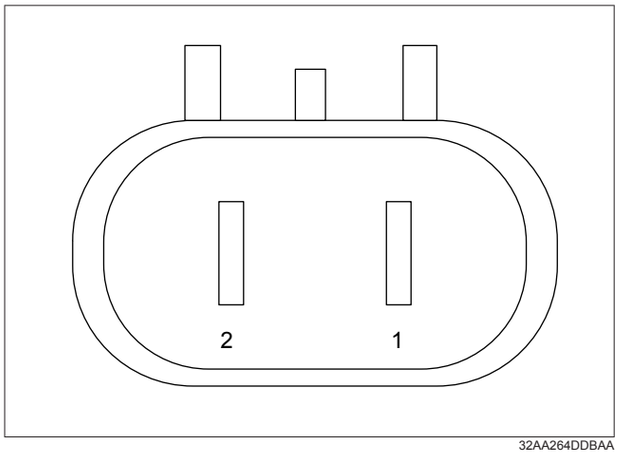
136DDA8AFCB9

Installation

1. Perform installation work in reverse order of removal

Outside temperature sensor

Pin definition



32AA264DDBAA

Pin No.	function
1	GND
2	Signal

Check

1. Remove the outside temperature sensor
2. Place outside temperature sensor into water of different temperatures and measure resistance value

Notice

- Water temperature shall be identical with the temperature given in outside temperature sensor R-T table.
- Wetting outside temperature sensor terminal is forbidden.

3. Compare measured value to the values given in R-T table, and the resistance value shall be within acceptable range; otherwise, outside temperature sensor shall be replaced

R-T table

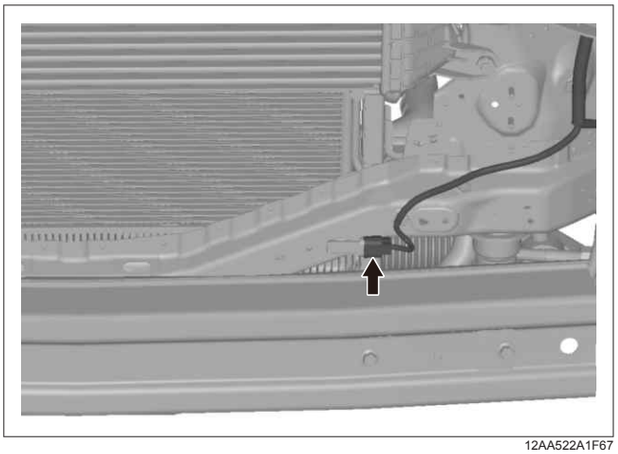
Temperature (℃)	Minimum (kΩ)	Standard (kΩ)	Upper limit (kΩ)
-40	40.94	43.34	45.85
-35	31.15	32.87	34.67
-30	23.91	25.16	26.46
-25	18.52	19.43	20.38
-20	14.46	15.13	15.82
-15	11.38	11.88	12.39
-10	9.021	9.391	9.771
-5	7.203	7.48	7.764
0	5.79	6	6.213
5	4.685	4.844	5.004
10	3.815	3.935	4.057
15	3.125	3.216	3.309
20	2.574	2.644	2.715
25	2.132	2.186	2.24
30	1.769	1.817	1.865
35	1.475	1.518	1.561
40	1.236	1.274	1.313
45	1.041	1.075	1.109
50	0.8802	0.9105	0.9413
55	0.7478	0.7749	0.8024

Temperature (℃)	Minimum (kΩ)	Standard (kΩ)	Upper limit (kΩ)
60	0.6381	0.6622	0.6868
65	0.5467	0.5682	0.5902
70	0.4703	0.4895	0.5092
75	0.4061	0.4233	0.4409
80	0.3519	0.3673	0.3832
85	0.3061	0.3199	0.3342
90	0.2671	0.2796	0.2924

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front bumper
3. Disconnect harness connector



12AA522A1F67

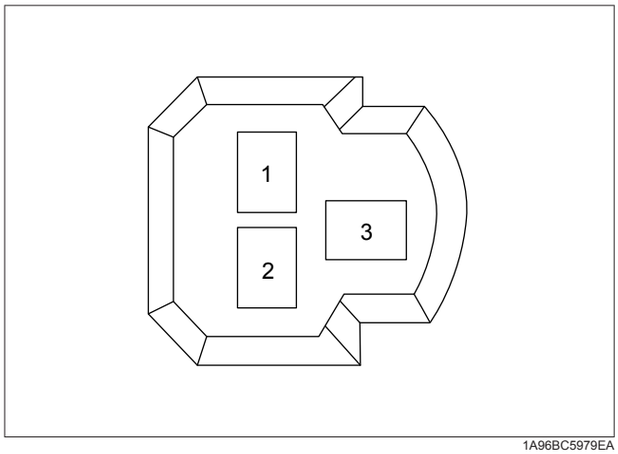
4. Separate clip and remove outside temperature sensor

Installation

1. Perform installation work in reverse order of removal

Pressure sensor

Pin definition



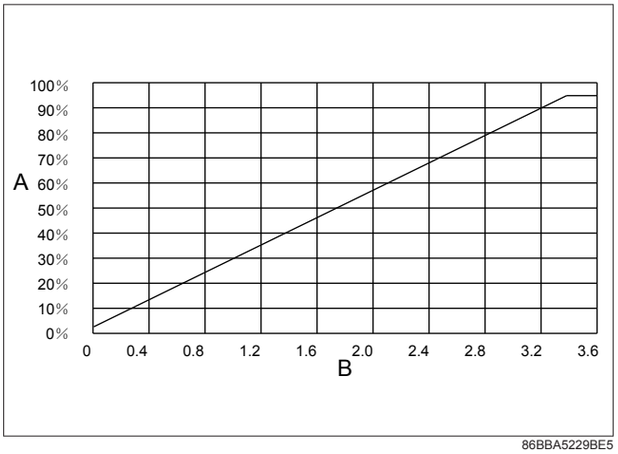
1A96BC5979EA

Pin No.	function
1	Power supply
2	GND
3	Output

Check

1. Install refrigerant pressure gauges on the A/C high and low pressure filling ports respectively, and check the corresponding pressure values.
2. Start the vehicle, turn on the AC switch, and check the voltage value output from the pressure sensor
3. Compare the measured voltage values with those in the refrigerant pressure-output signal table. The voltage value should be within a reasonable range, otherwise, replace the pressure sensor

Refrigerant pressure-output signal table



86BBA5229BE5

A: output signal (a percentage of input voltage)

B: refrigerant pressure (MPa)

Evaporator temperature sensor

Check

1. Remove the evaporator temperature sensor
2. The evaporator temperature sensor is placed in the water at different temperatures and then measures the corresponding resistance value

Notice

› The temperature of the water should be the same as that of the evaporator temperature sensor R-T table.

› Evaporator temperature sensor terminal is forbidden to touch water.

3. Comparing the measured values with those in the R-T table, the resistance value should be within a reasonable range, otherwise, the evaporator temperature sensor should be replaced

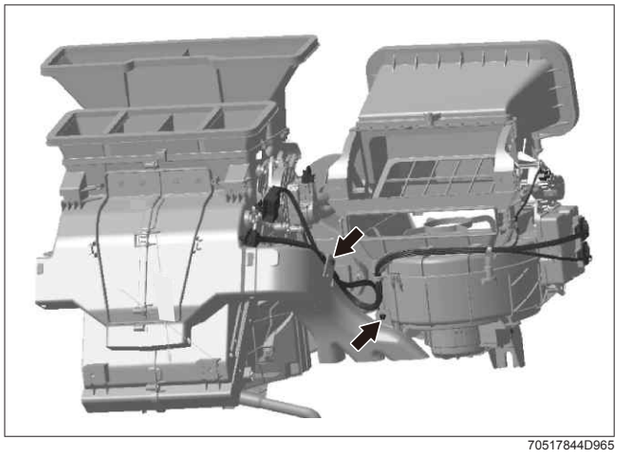
R-T table

Temperature (℃)	Minimum (kΩ)	Standard (kΩ)	Upper limit (kΩ)
-20	14.047	14.278	14.509
-15	10.603	10.761	10.918
-10	8.074	8.182	8.29
-5	6.201	6.275	6.349
0	4.803	4.852	4.901
1	4.564	4.613	4.663
2	4.339	4.387	4.436
2.5	4.231	4.279	4.327
3	4.127	4.174	4.221
4	3.927	3.972	4.018
4.5	3.83	3.876	3.921
5	3.737	3.782	3.826
10	2.931	2.97	3.009
15	2.316	2.349	2.383
20	1.843	1.872	1.901
25	1.476	1.501	1.526
30	1.191	1.212	1.233
35	0.9663	0.9846	1.003
40	0.7889	0.8047	0.8206
45	0.6478	0.6615	0.6752
50	0.535	0.5468	0.5587
55	0.4442	0.4545	0.4647
60	0.3707	0.3796	0.3886
65	0.311	0.3187	0.3265
70	0.2621	0.2689	0.2756

Removal/installation

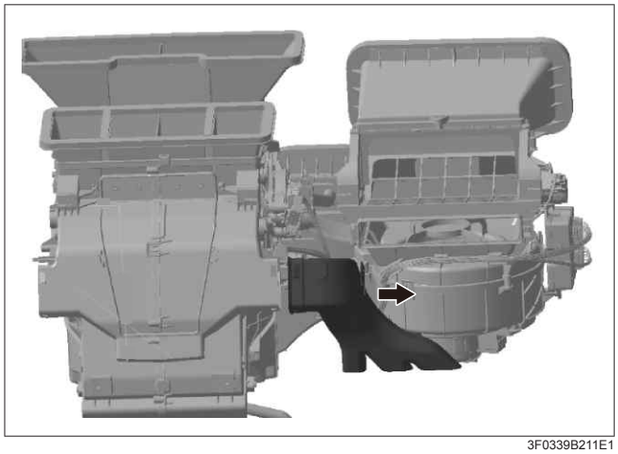
Removal

1. Disconnect the negative terminal of the battery.
2. Drain the engine coolant
3. Recycle the refrigerant and the refrigerator oil
4. Remove auxiliary instrument panel
5. Remove main instrument panel
6. Remove ventilation cover plate
7. Remove front wiper motor
8. Remove front A/C assembly
9. Remove heater core
10. Remove 1 screw, and separate 1 harness clip



70517844D965

11. Remove front right lower air duct along the direction of arrow

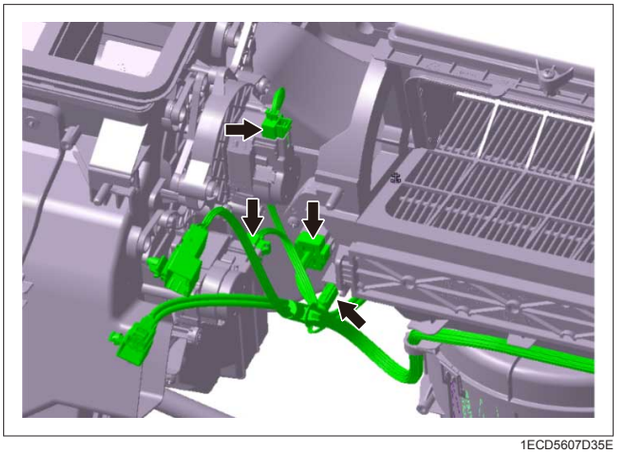


3F0339B211E1

12. Disconnect 8 harnesses clips

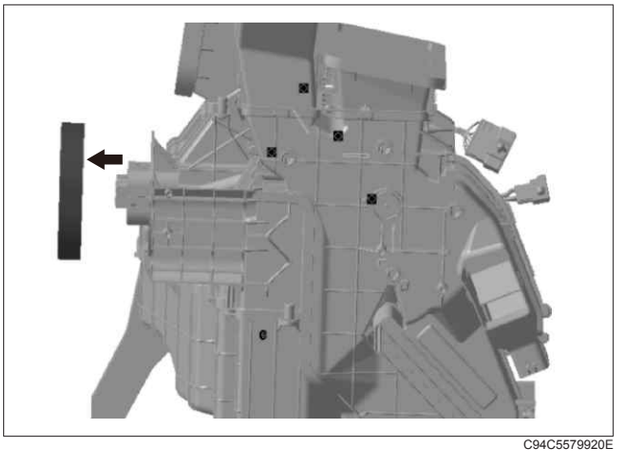


299F4E4E0330



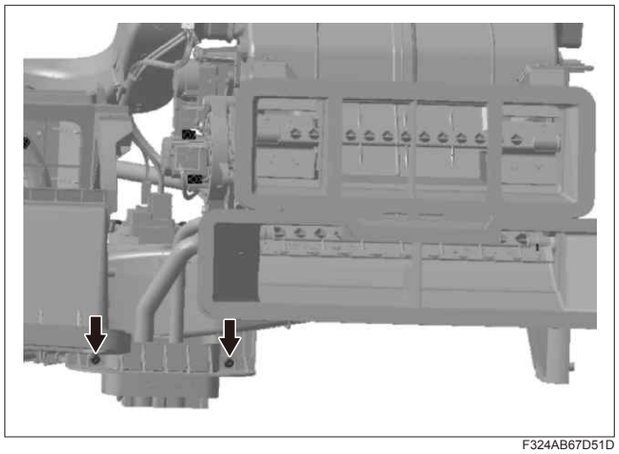
1ECD5607D35E

13. Remove sponge along the direction of arrow



C94C5579920E

14. Remove 2 screws



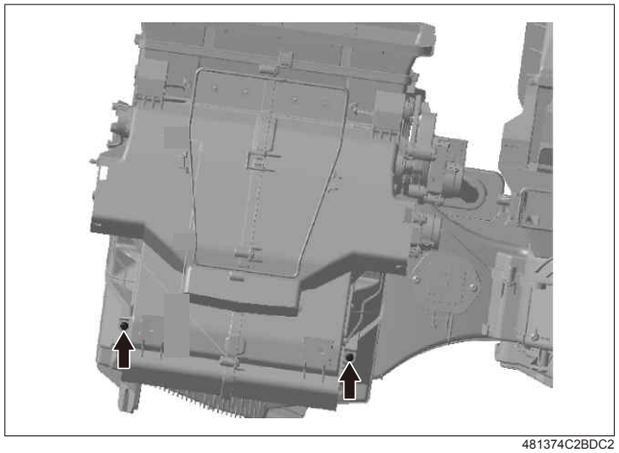
F324AB67D51D

15. Remove expansion valve gland along the direction of arrow

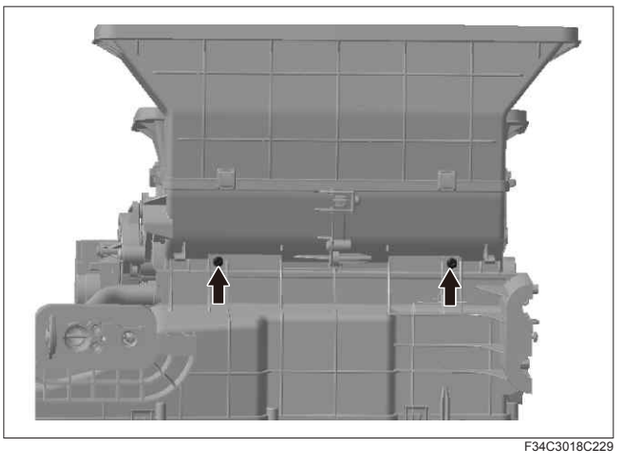


58567F308EA4

16. Remove 4 screws



481374C2BDC2



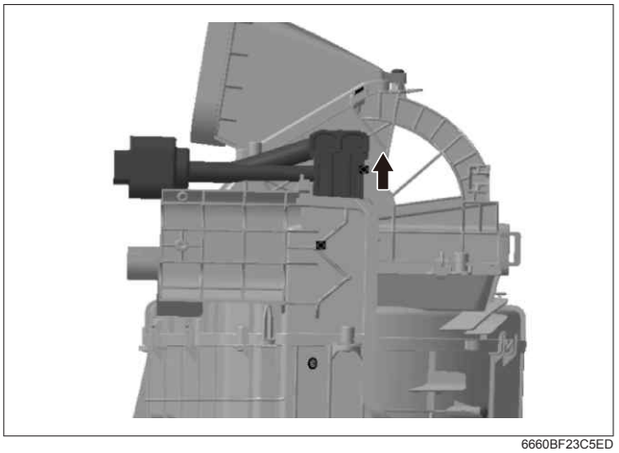
F34C3018C229

17. Remove air regulator along the direction of arrow



F7430477D410

18. Remove evaporator core body with evaporator temperature sensor with expansion valve element along the direction of arrow



6660BF23C5ED

19. Separate evaporator temperature sensor

Installation

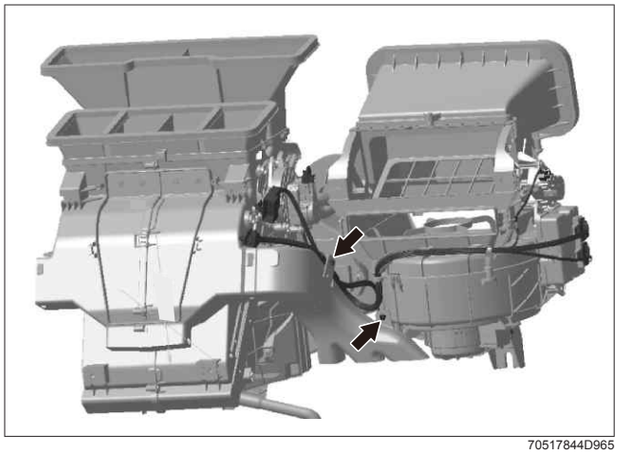
1. Perform installation work in reverse order of removal

Evaporator core body

Removal/installation

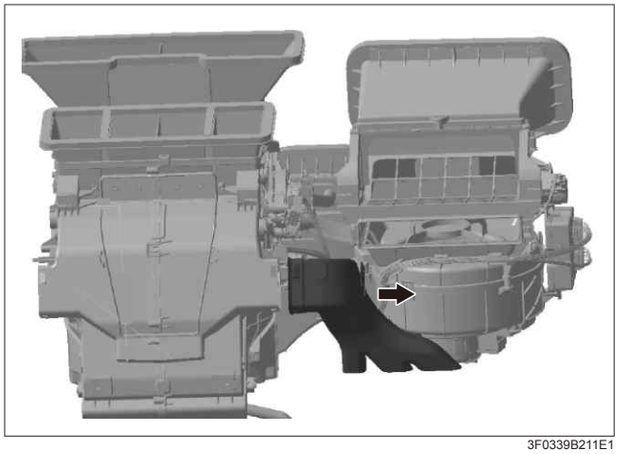
Removal

1. Disconnect the negative terminal of the battery.
2. Drain the engine coolant
3. Recycle the refrigerant and the refrigerator oil
4. Remove auxiliary instrument panel
5. Remove main instrument panel
6. Remove ventilation cover plate
7. Remove front wiper motor
8. Remove front A/C assembly
9. Remove heater core
10. Remove 1 screw, and separate 1 harness clip



70517844D965

11. Remove front right lower air duct along the direction of arrow

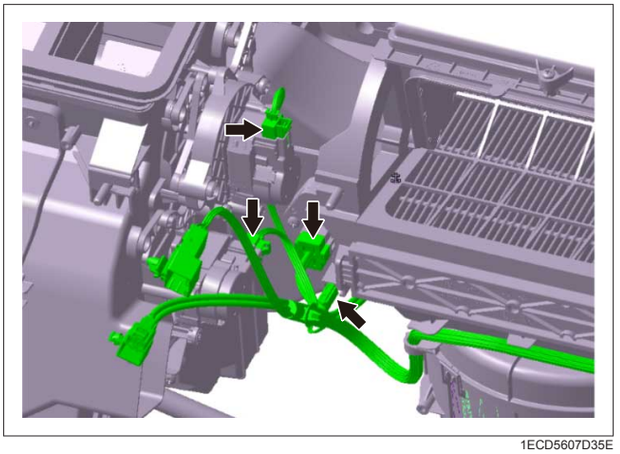


3F0339B211E1

12. Disconnect 8 harnesses clips

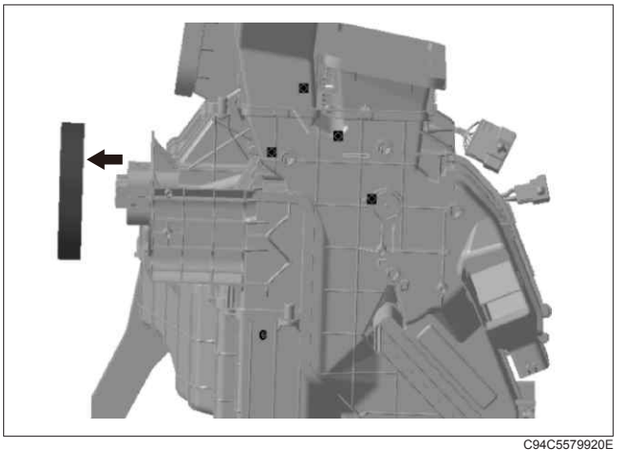


299F4E4E0330



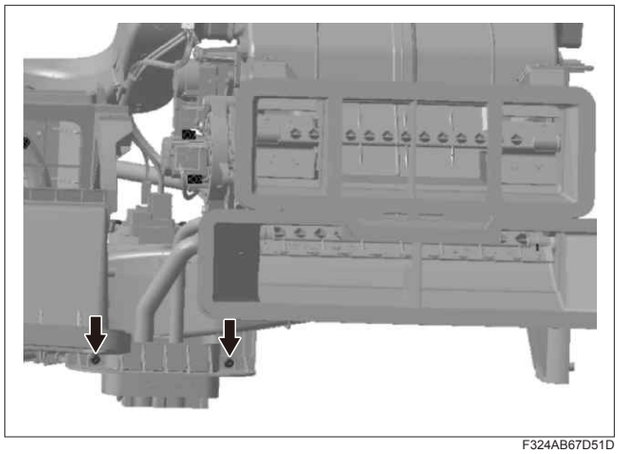
1ECD5607D35E

13. Remove sponge along the direction of arrow



C94C5579920E

14. Remove 2 screws



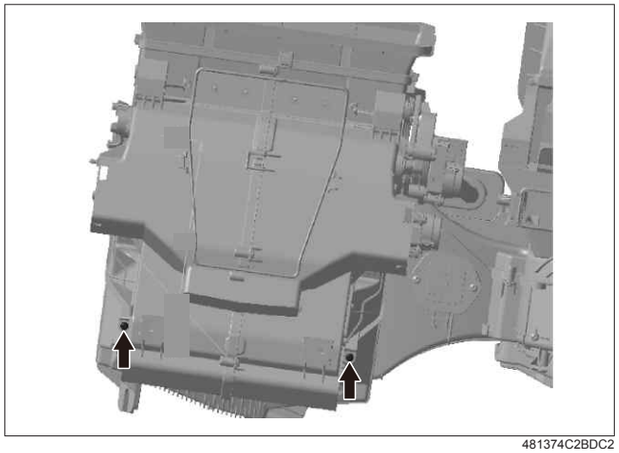
F324AB67D51D

15. Remove expansion valve gland along the direction of arrow

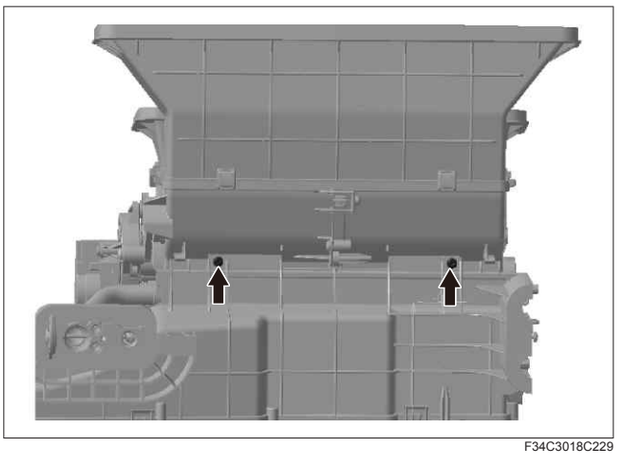


58567F308EA4

16. Remove 4 screws



481374C2BDC2



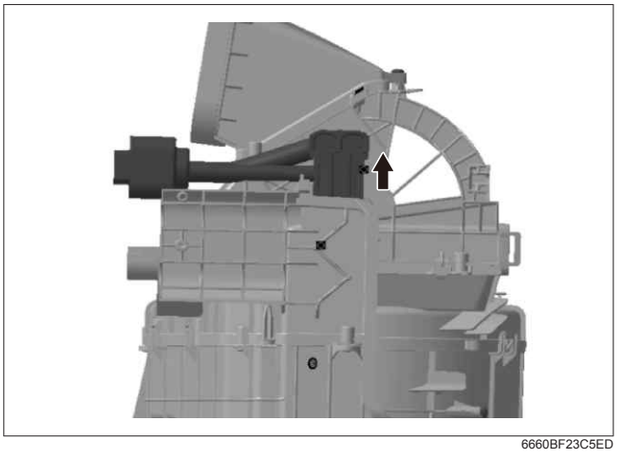
F34C3018C229

17. Remove air regulator along the direction of arrow



F7430477D410

18. Remove evaporator core body with evaporator temperature sensor with expansion valve element along the direction of arrow



6660BF23C5ED

19. Separate evaporator temperature sensor

20. Remove expansion valve element

Installation

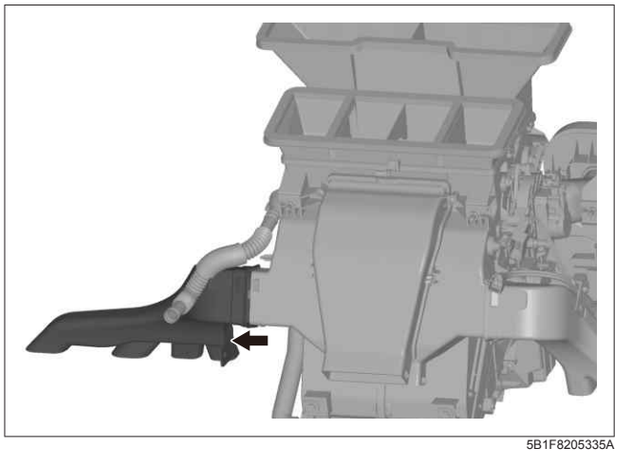
1. Perform installation work in reverse order of removal

Heater core body

Removal/installation

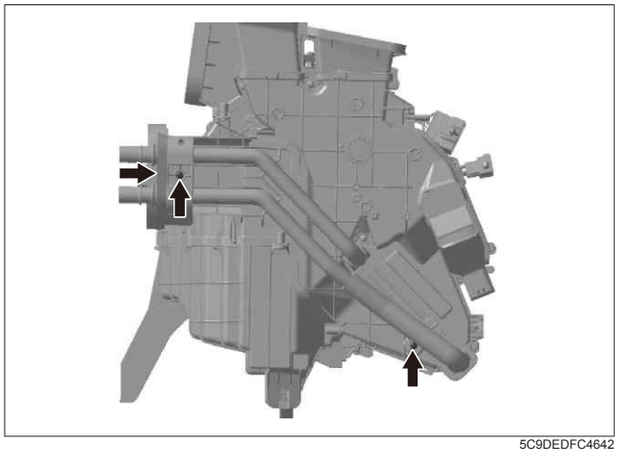
Removal

1. Disconnect the negative terminal of the battery.
2. Drain the engine coolant
3. Recycle the refrigerant and the refrigerator oil
4. Remove auxiliary instrument panel
5. Remove main instrument panel
6. Remove ventilation cover plate
7. Remove front wiper motor
8. Remove front A/C assembly
9. Remove front left lower air duct along the direction of arrow



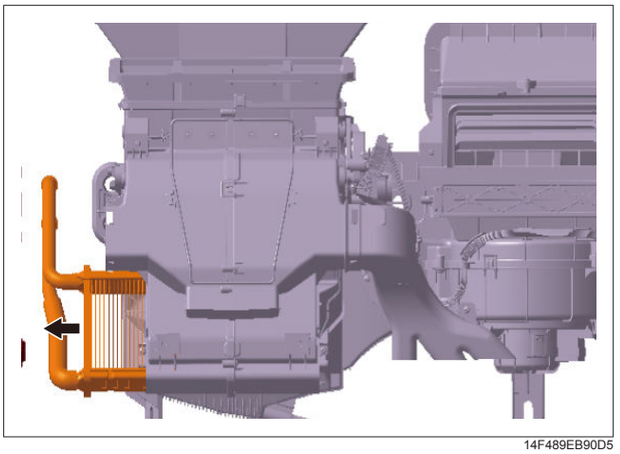
5B1F8205335A

10. Remove protective sleeve of hot water pipe outlet, and remove 2 screws



5C9DEDFC4642

11. Remove heater core



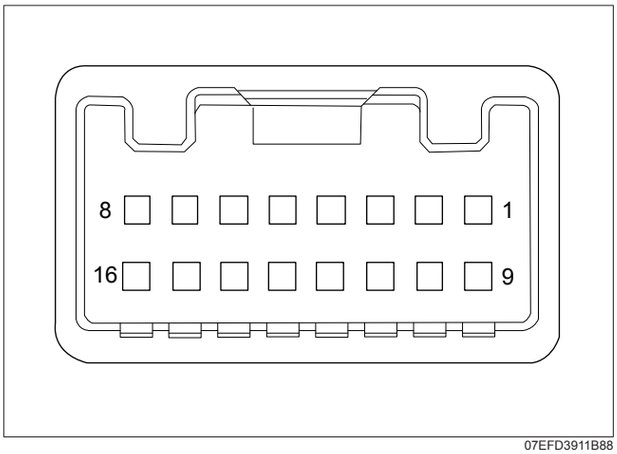
14F489EB90D5

Installation

1. Perform installation work in reverse order of removal

Console panel switch

Pin definition



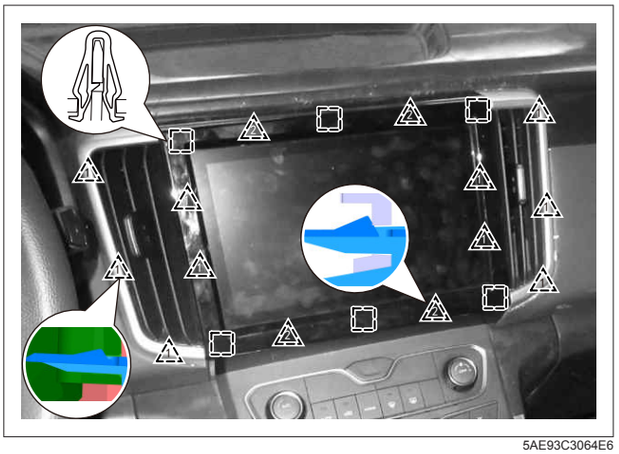
07EFD3911B88

Pin No.	Function
1	Airbag OFF indicator
2	—
3	Danger warning indicator
4	Hazard warning lamp switch
5	LIN
6	—
7	Airbag ON indicator
8	Power
9	Backlight
10	—
11	—
12	HDC switch
13	ESP switch
14	—
15	—
16	Ground

Removal/installation

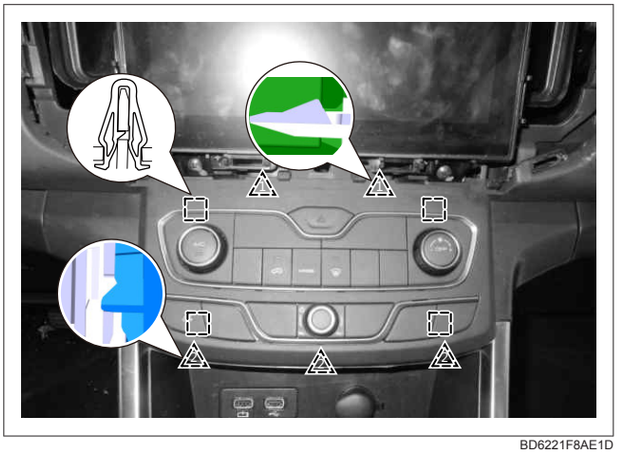
Removal

1. Disconnect the negative terminal of the battery.
2. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

3. Separate 4 clips and 5 joints



BD6221F8AE1D

4. Disconnect connectors of the console panel switch



FB5BA43E2F1B

5. Remove console panel switch

Installation

1. Perform installation work in reverse order of removal

Compressor (GW4D20M)

Removal/installation

Removal

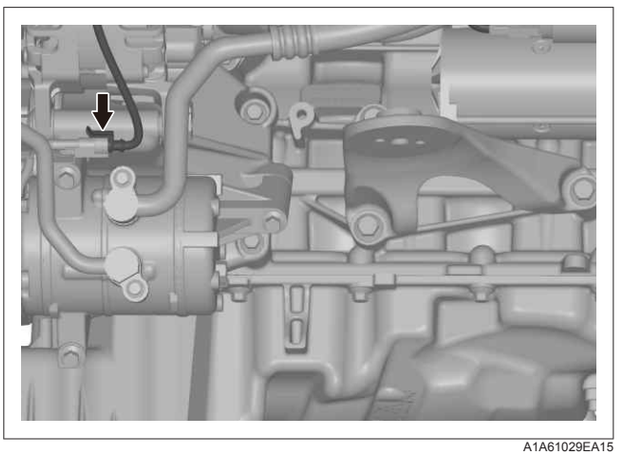
⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- The vehicle temperature should be lowered to room temperature before operation.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

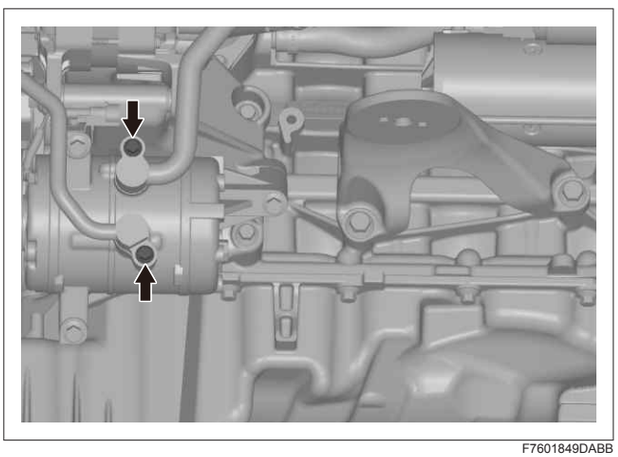
- During maintenance or repair of the vehicle, take care not to allow oil stain to enter the compressor clutch to avoid slipping and ablation of the compressor clutch.
- Do not damage the warning signs on the parts during maintenance.

1. Disconnect the negative terminal of the battery.
2. Recycle the refrigerant and the refrigerator oil
3. Remove front left splash guard
4. Remove rubber fender sheet
5. Raise the vehicle to an appropriate position
6. Remove lower cover plate of the engine
7. Remove ribbed belt
8. Disconnect compressor connector



A1A61029EA15

9. Remove 2 bolts



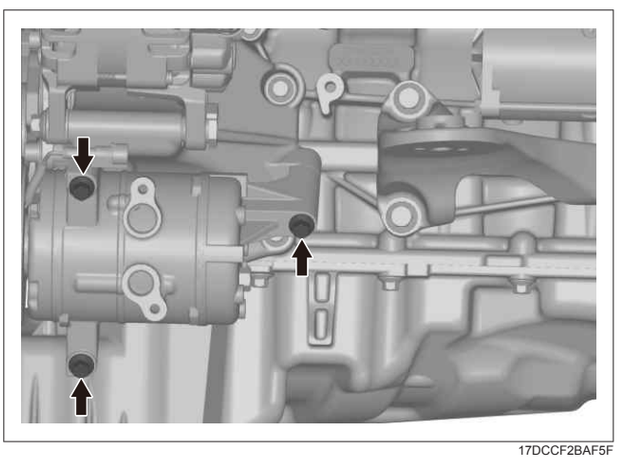
F7601849DABB

10. Disconnect pipeline from the compressor

⚠ Caution

- After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

11. Remove 3 bolts



17DCCF2BAF5F

12. Remove compressor

⚠ Caution

› Under no circumstances should the parts and components be disassembled to avoid irreparable damage.

› Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

⚠ Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› Do not damage the warning signs on the parts during maintenance.

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, perform system vacuum pumping and add an appropriate amount of refrigerant, and then check for refrigerant leaks and check for good system performance.

1. Perform installation work in reverse order of removal

ℹ Notice

› Tighten the fastener according to the specified torque value.

Condenser (6MT)

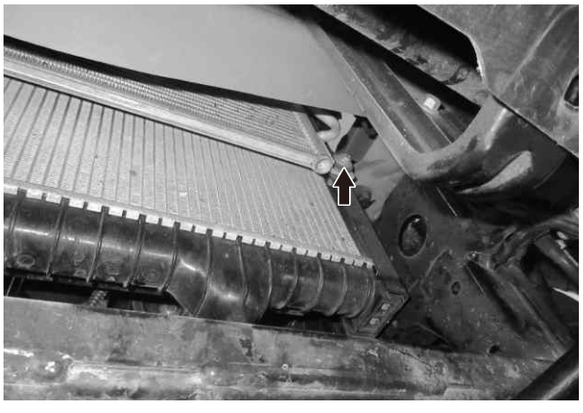
Removal/installation

Removal

⚠ Warning

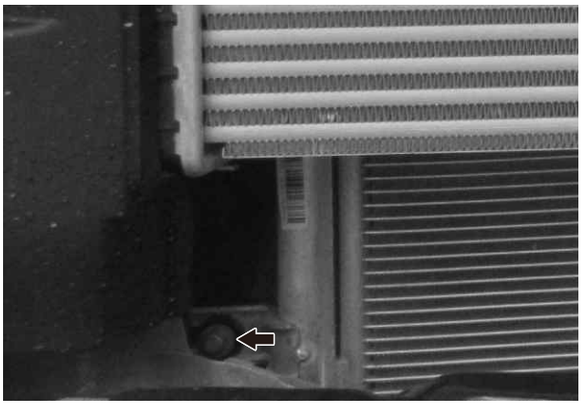
- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- The vehicle temperature should be lowered to room temperature before operation.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Disconnect the negative terminal of the battery.
2. Recycle the refrigerant and the refrigerator oil
3. Remove front bumper
4. Remove lower cover plate of the engine
5. Remove 1 bolt



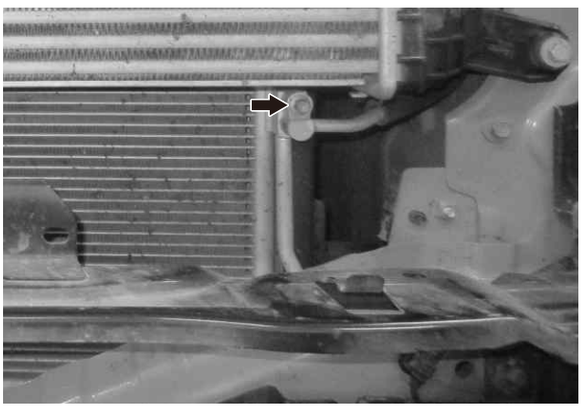
CB1E47EE1259

6. Remove 1 bolt



749CFA53408B

7. Remove 1 bolt, and separate pipeline connecting with the condenser

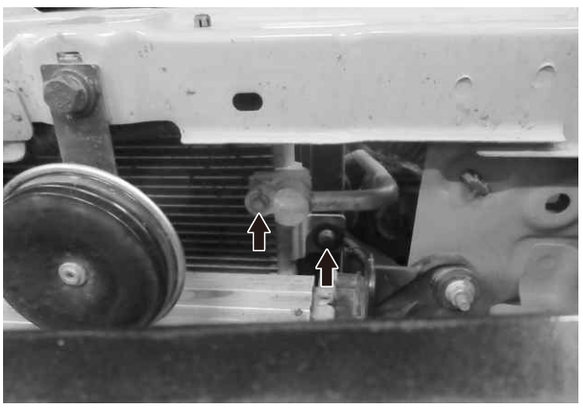


47FD445B63F9

⚠ Caution

- After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

8. Remove 1 bolt and 1 nut, and separate pipeline connecting with the condenser

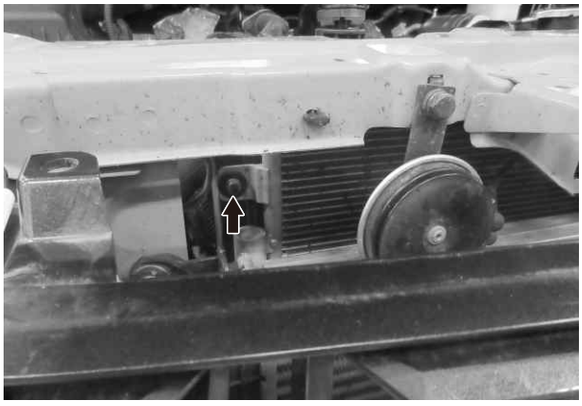


854782DA8C66

⚠ Caution

› After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

9. Remove 1 nut



A52EFF7B010B

10. Remove condenser

Installation

⚠ Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, perform system vacuum pumping and add an appropriate amount of refrigerant, and then check for refrigerant leaks and check for good system performance.

1. Perform installation work in reverse order of removal

Condenser (8AT)

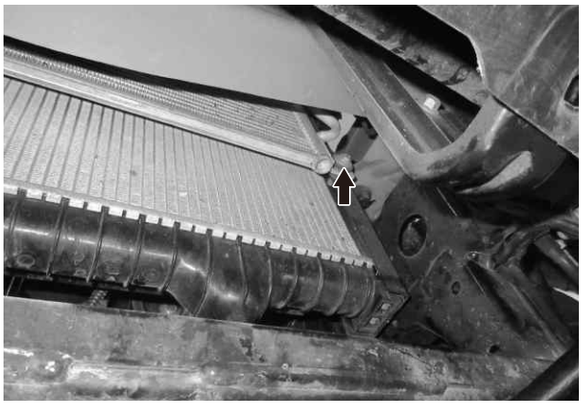
Removal/installation

Removal

⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- The vehicle temperature should be lowered to room temperature before operation.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Disconnect the negative terminal of the battery.
2. Recycle the refrigerant and the refrigerator oil
3. Remove front bumper
4. Remove radar control module
5. Remove intercooler
6. Remove 1 bolt



CB1E47EE1259

7. Remove 1 bolt



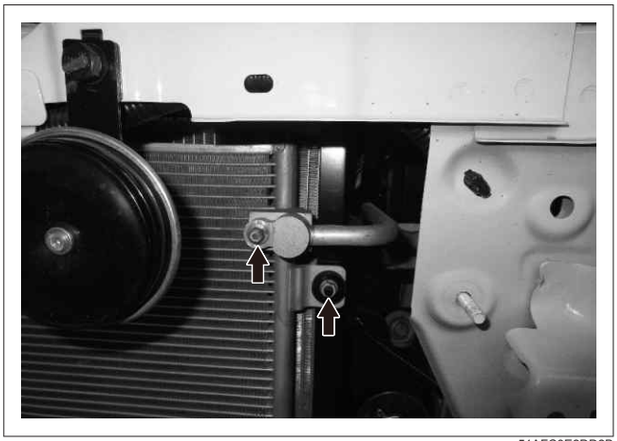
E8FDBD7037AD

8. Remove 1 bolt, and separate pipeline connecting with the condenser



D4108B879E28

9. Remove 1 bolt and 1 nut, and separate pipeline connecting with the condenser



51AFC3E2DD2B

⚠ Caution

- After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

10. Remove 1 nut



14450944D261

⚠ Caution

› After disconnecting the pipeline, the joints at both ends should be completely sealed to prevent debris from entering.

11. Remove condenser

Installation

⚠ Warning

› Prohibit smoking and set up "No Smoking" warning signs in the workplace.

› In the workplace, a dry powder fire extinguisher (Class B) must be available.

› Operation must be performed in a well-ventilated workplace far away from naked flame.

› According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

› Before installing pipeline, make sure no foreign objects are found in pipeline or joint.

› After installation, perform system vacuum pumping and add an appropriate amount of refrigerant, and then check for refrigerant leaks and check for good system performance.

1. Perform installation work in reverse order of removal

Expansion valve element

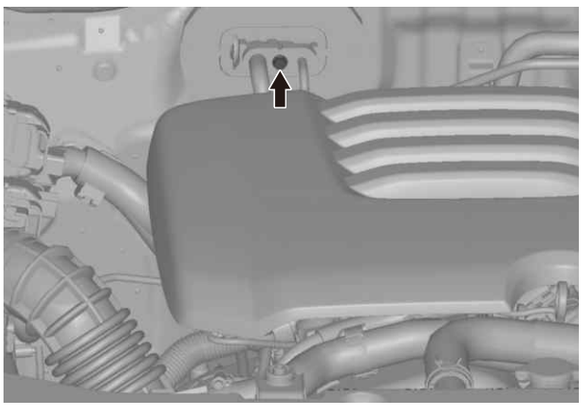
Removal/installation

Removal

⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- The vehicle temperature should be lowered to room temperature before operation.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

1. Disconnect the negative terminal of the battery.
2. Recycle the refrigerant and the refrigerator oil
3. Remove 1 bolt, and disconnect A/C refrigeration pipeline connected to expansion valve



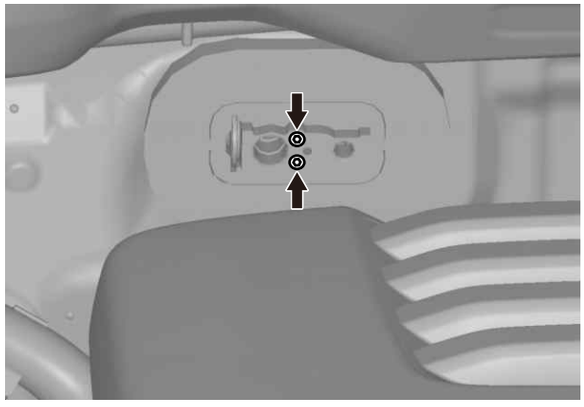
D812FFDCD193

4. Use a special tool to seal A/C cooling pipeline connected to the expansion valve

ℹ Notice

Special tool: ZEZF068738

5. Remove 2 bolts and remove the expansion valve element



B2D7C568579B

⚠ Caution

- Under no circumstances should the parts and components be disassembled to avoid irreparable damage.
- Put the removed parts in a clean and safe place to prevent the parts from colliding.

Installation

⚠ Warning

- Prohibit smoking and set up "No Smoking" warning signs in the workplace.
- In the workplace, a dry powder fire extinguisher (Class B) must be available.
- Operation must be performed in a well-ventilated workplace far away from naked flame.
- According to local regulations, the waste generated during the maintenance process should be properly handled.

⚠ Caution

- Before installing pipeline, make sure no foreign objects are found in pipeline or joint.
- After installation, perform system vacuum pumping and add an appropriate amount of refrigerant, and then check for refrigerant leaks and check for good system performance.

1. Perform installation work in reverse order of removal

Seat belt system

Seat belt system ..... 51－1
Precautions ..... 51－1
System description ..... 51－2
Location diagram ..... 51－3
System diagram ..... 51－4
Specified torque ..... 51－5
Fault symptom checklist ..... 51－6
Diagnosis and inspection ..... 51－7
Front seat belt assembly ..... 51－9
Removal/installation ..... 51－9
Front seat belt buckle ..... 51－12
Removal/installation ..... 51－12
Second-row side seat belts assembly ..... 51－13
Removal/installation ..... 51－13
Second row left seat belt buckle ..... 51－16
Removal/installation ..... 51－16
Second-row right seat belt buckle ..... 51－17
Removal/installation ..... 51－17
Second-row middle seat belt assembly ..... 51－18
Removal/installation ..... 51－18

Seat belt system

Precautions

⚠ Caution

- The seat belt system not used in an accident should still be carefully checked and replaced if damage is discovered or if they operate abnormally.
- Do not bleach or dye the seat belt. Use only neutral liquid soap, soft brush or cloth to clean the seat belt. Avoid the seat belt from contacting with the sharp edge and damaging objects.
- Avoid bending or damaging the seat belt buckle or any part of the lock tongue.
- If there is any cut or damage for the seat belt, please replace it.
- Use only the correct seat belt fixing bolts and screws. When installing the seat belt fixing bolts, first tighten the bolts with hands to ensure the threads alignment.
- Seat belt and retractors must be serviced as part of a complete replacement part, and do not attempt to repair them separately.
- Confirm that the part number of the replacement part applies to the specific vehicle seating position. Do not switch to a seat belt of a different seat.

System description

Seat belt

Seat belt is the main way to protect occupants. The role of the seat belt is to confine the occupant's body to the seat. When the collision accident occurs, a secondary collision shall be prevented because of the occupant's body rushing out of the seat and collision with the steering wheel, the instrument panel and other internal components, thereby minimizing the number of passenger injuries and death. The seat belt not only reduces the risk of secondary collisions with the occupant, but also prevents the occupant from being thrown away from the seat in a dangerous situation such as rolling of the vehicle. Include but not limited to the following:

- Front impact type collision.
- Rear impact type collision.
- Side impact type collision.
- Tumbling collision.

In order to further reduce the damage caused by the occupant's dive phenomenon during the accident and improve the protective effect of the seat belt, the seat belt generally uses additional devices such as pre-tensioner and force limiter. When something happens, the retractor will lock. Include but not limited to the following:

- Seat belt is swiftly pulled out of the retractor.
- Vehicle speed changes abruptly.
- The direction of the vehicle changes abruptly.
- Operate the vehicle to go up on steep slopes.
- Operate the vehicle to go down on steep slopes.

Seat belt warning system

Seat belt warning system consists of airbag electronic control unit, seat belt assembly, seat belt buckle, passenger test sensor, seat belt unfastening warning indicator, seat belt warning buzzer etc. The system prompts passenger and driver to fasten seat belt when driver or passenger seat belt is not fastened when the vehicle is running.

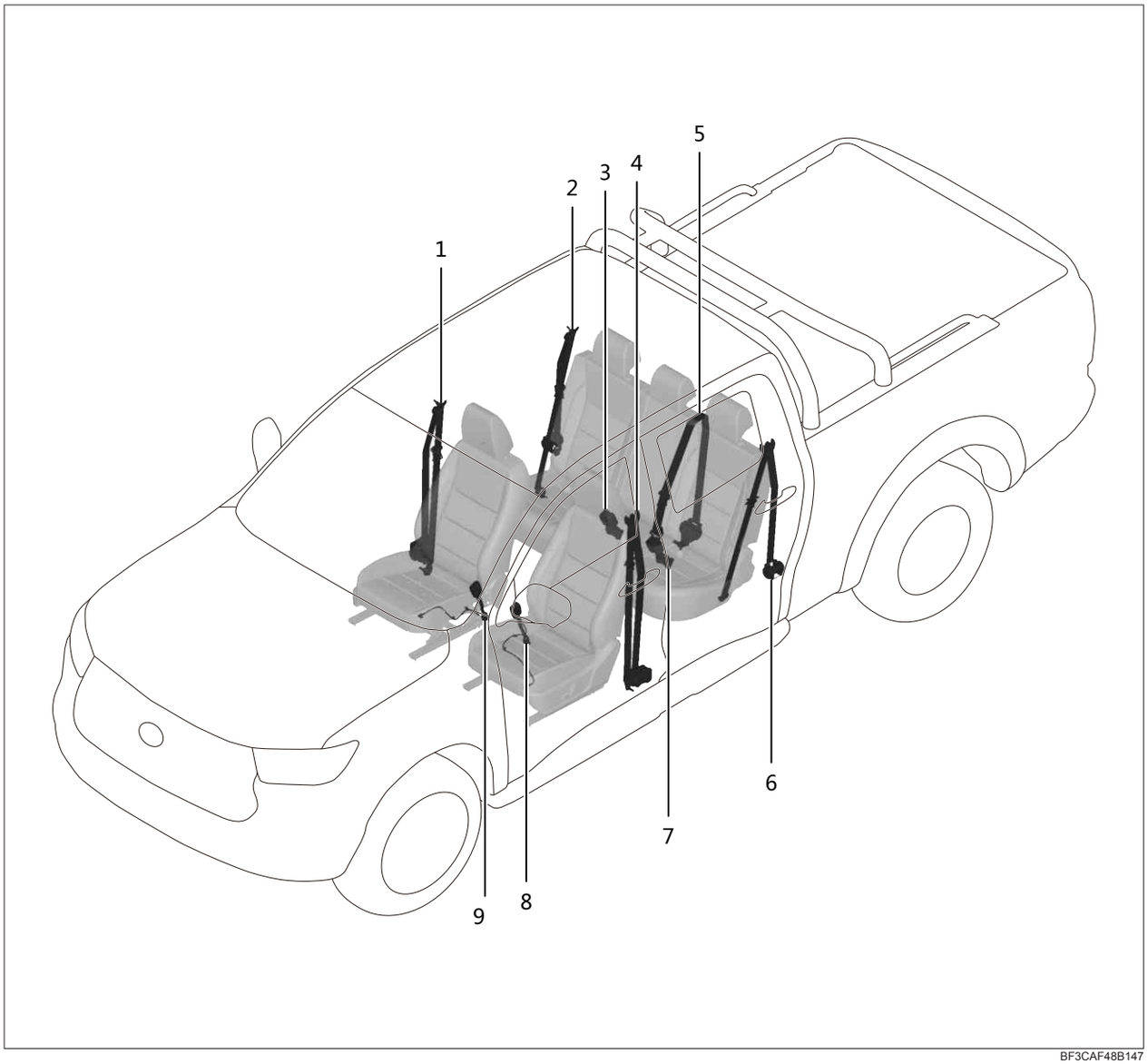
Seat belt unfastened warning indicator:

- If driver seat belt or passenger seat belt is not fastened when ignition switch is at ON position, seat belt unfastening warning indicator is normally on or flashes.

Seat belt warning buzzer:

- If driver or passenger seat belt is not fastened while the vehicle is running at 20 km/h or higher speed, seat belt warning buzzer will give alarm.

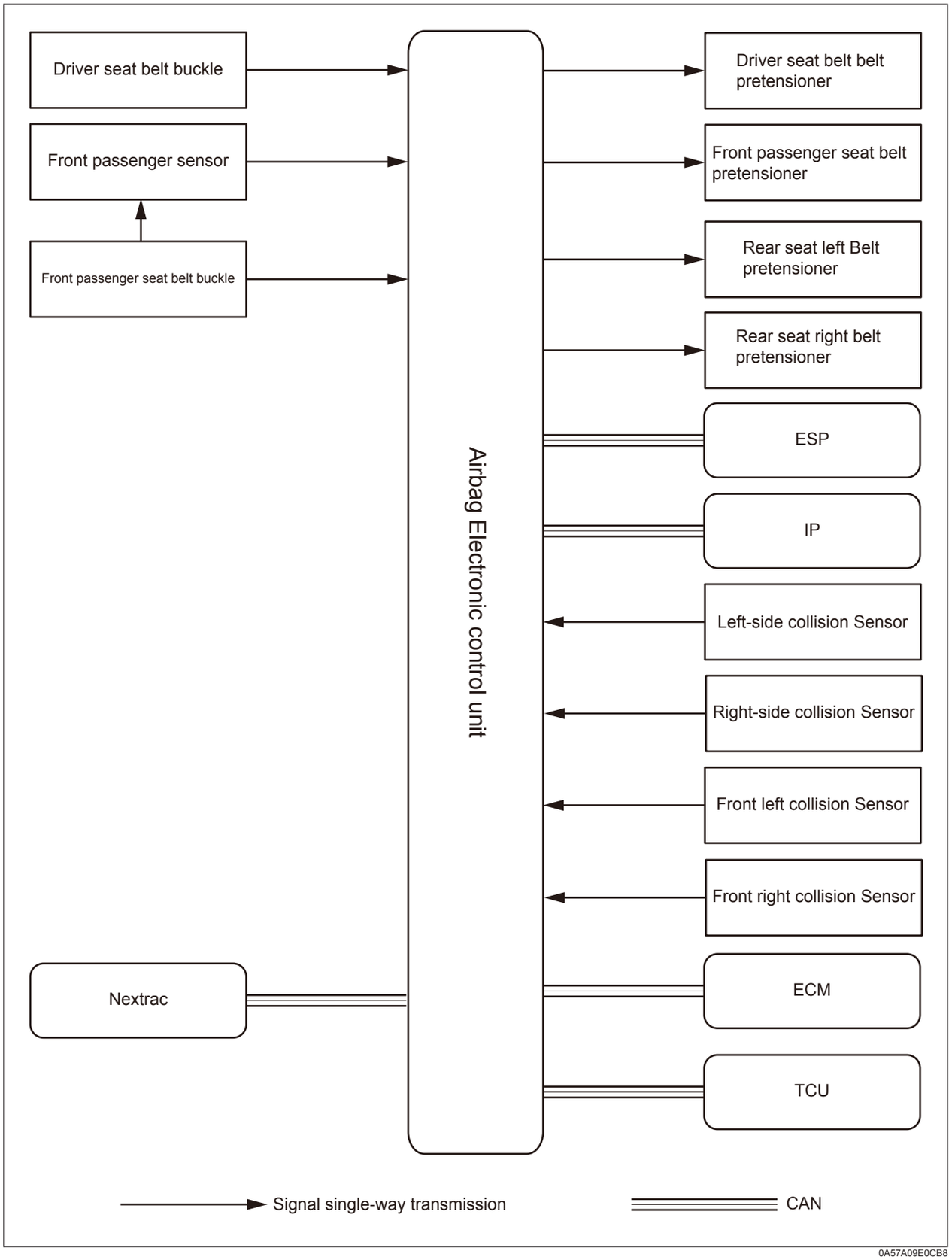
Location diagram



BF3CAF48B147

1. Front right seat belt assembly
2. Second row right seat belt assembly
3. Second row right seat belt buckle assembly
4. Front left seat belt assembly
5. Second row middle seat belt assembly
6. Second row left seat belt assembly
7. Second row left seat belt buckle assembly
8. Front left seat belt buckle assembly
9. Front right seat belt buckle assembly

System diagram



0A57A09E0CB8

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front left/right seat belt assembly × sheet metal of vehicle body	45±5	2	—
Bolt	Front left/right seat belt assembly × sheet metal of vehicle body	45±5	2	—
Bolt	Front left/right seat belt assembly × sheet metal of vehicle body	45±5	2	—
Bolt	Front left/right latch assembly × seat frame	45±5	2	—
Bolt	Rear seat belt assembly (left/right) × sheet metal of vehicle body	45±5	2	—
Bolt	Rear seat belt assembly (left/right) × seat anchor	45±5	2	—
Bolt	Rear seat belt assembly (left/right) × sheet metal of vehicle body	45±5	2	—
Bolt	Rear right latch assembly x sheet metal of vehicle body	45±5	1	—
Bolt	Rear left latch assembly × sheet metal of vehicle body	45±5	1	—
Bolt	Rear seat belt assembly (center) × sheet metal of vehicle body	45±5	1	—

Fault symptom checklist

Symptom	Suspected position of symptom
The front passenger seat belt is fastened, but the driver seat belt is not fastened. If the seat belt is not fastened, no indication function is available	CAN communication system
	Combination instrument
	Main driver seat latch assembly
	Airbag controller
	Harness
The front driver seat belt is fastened, but the front passenger seat belt is not fastened and the seat is occupied by any person. If the seat belt is not fastened, no indication function is available	CAN communication system
	Combination instrument
	Passenger seat latch assembly
	Airbag controller
	Harness
	The front passenger test sensor
The driver seat belt is fastened, but the front passenger seat belt is not fastened. The seat belt is not fastened, the warning indicator is lit	Combination instrument
	Passenger seat latch assembly
	Main driver seat latch assembly
	Airbag controller
	Harness
The front passenger seat belt is fastened, but the driver seat belt is not fastened. The vehicle reaches the theoretical speed (vehicle speed ≥ 20 km/h), the seat belt is not fastened but the buzzer won't sound	CAN communication system
	Combination instrument
	Main driver seat latch assembly
	Airbag controller
	ESP controller
	Harness
The front driver seat belt is fastened, but the front passenger seat belt is not fastened and the seat is occupied by any person. The vehicle reaches the theoretical speed (vehicle speed ≥ 20 km/h), the seat belt is not fastened but the buzzer won't sound	CAN communication system
	Combination instrument
	Passenger seat latch assembly
	Airbag controller
	Harness
	ESP controller
	The front passenger test sensor
The driver seat belt is fastened, but the front passenger seat belt is not fastened. The seat belt is not fastened and the buzzer sounds	Combination instrument
	Airbag controller
	Harness

Diagnosis and inspection

Check the retractor assembly

Notice

› Before repairing or maintaining the front seat belt retractor with pre-tighten function, read carefully SRS assembly position, precautions before operation and operation steps.

› Whatever the reasons, you should not disassemble any seat belt component.

1. Before installing the retractor, check whether the seat belt can be pulled out successfully.
2. Ensure that the seat belt will not be locked when the retractor is slowly tilted to 12°or less angle deviating from the installation position. But the seat belt should be locked when the retractor is tilted to over 27°angle.
3. Replace with the new assembly if there is abnormal condition for the seat belt.

Check the seat belt assembly

1. Check whether the seat belt is wrapped around or hooked on any other components.
2. Check whether the fixed part moves freely on its bolts after mounting it. If necessary, remove its bolts and check whether the washer and other parts are damaged or improperly installed.
3. Check whether the seat belt is damaged or discolored. If necessary, use only soap and water to clean the seat belt. Then use a maintenance cloth to wipe it clean.

Notice

› The dirt deposited on metal ring on upper fixture of seat belt can get the seat belt retracted slowly . At this time, just use the clean cloth soaked with isopropyl alcohol to wipe away the dirt on inner surface of metal ring.

4. Make sure the seat belt will not be locked when it is slowly pulled out. The seat belt will only be locked in a sudden stop or collision.
5. Make sure the seat belt will be automatically shrunk when it is released.
6. Replace with the new seat belt assembly if there is abnormal condition for the seat belt.

Check the seat belt unfastened warning indicator

1. Place the ignition switch in the ON position.
2. When the seat belt at the driver side or the front passenger side (the front passenger seat is occupied) is not fastened, please check and confirm that the seat belt unfastened warning indicator on the combination instrument is lit.
3. When the seat belt at the driver side or the front passenger side (the front passenger seat is occupied) is fastened, please check and confirm that the seat belt unfastened warning indicator on the combination instrument is turned off.

Check seat belt unfastened warning buzzer

1. Lift the vehicle.
2. Place a suitable weight object on the front passenger seat.

Notice

› Gently place the weight object on the seat and it can't touch the seat back.

3. Start the vehicle

4. When the seat belt at the driver side or the front passenger side is loosened and when the vehicle is traveling at a speed of approximately 20 km/h or higher, check and confirm that the seat belt unfastened warning buzzer on the combination instrument sounds 120s at 1Hz frequency.
5. After the buzzer stops sounding, after the seat belt at the driver side or the front passenger side is fastened, when the vehicle is traveling at a speed of about 20 km/h or higher, loosen the seat belt at the driver side or the front passenger side and the buzzer sounds again.

Car trial

1. Wear the front-seat seat belt correctly.
2. Accelerate the car to 16 km/h and then forcefully step on the brake pedal. Carry out inspection and confirm that the seat belt is locked up and can’t be pulled out.

i Notice

› Carry out the test in a safe area. If the seat belt is not locked up, then dismount the seat belt assembly and carry out inspection. In addition, whenever a new seat belt assembly is installed, be sure to verify whether it can work normally before the installation.

Front seat belt assembly

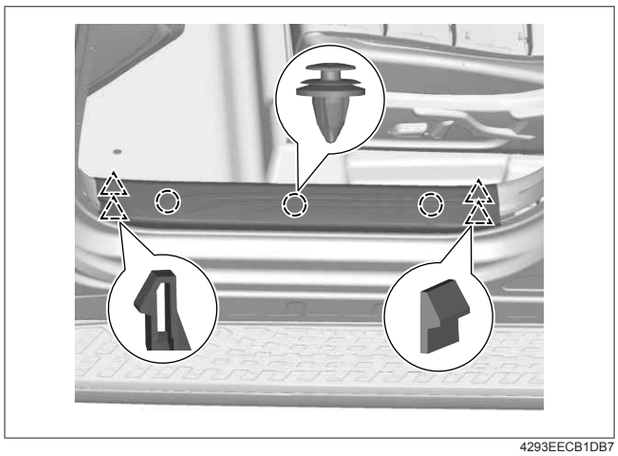
Removal/installation

Removal

Notice

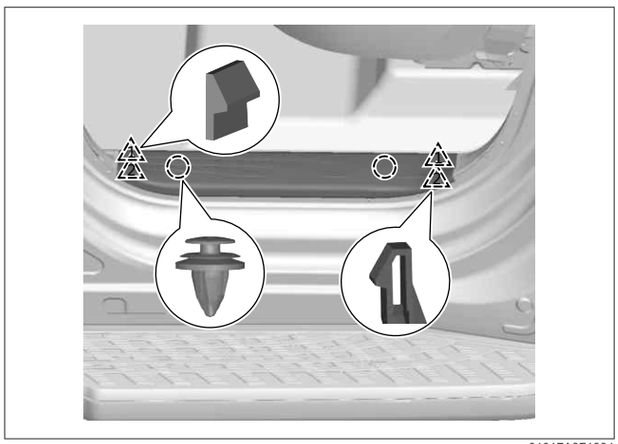
- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Move front seat to front end
2. Turn off the ignition switch.
3. Disconnect negative terminal of the battery and then wait for 90 s
4. Pry off 3 snaps and 4 dogs, and remove front sill trim plate assembly



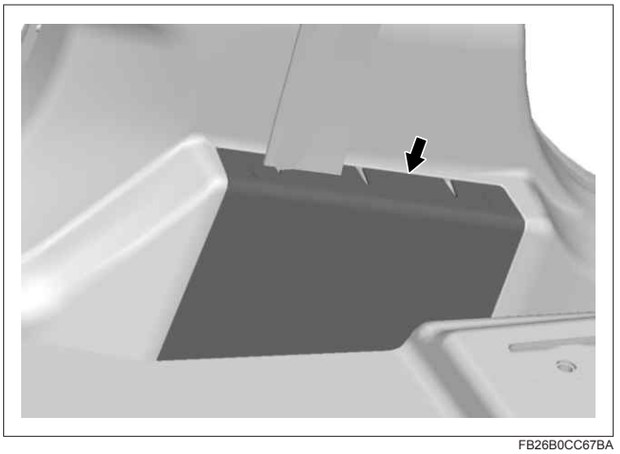
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5. Pry off 2 snaps and 4 dogs, and remove rear door sill trim plate assembly



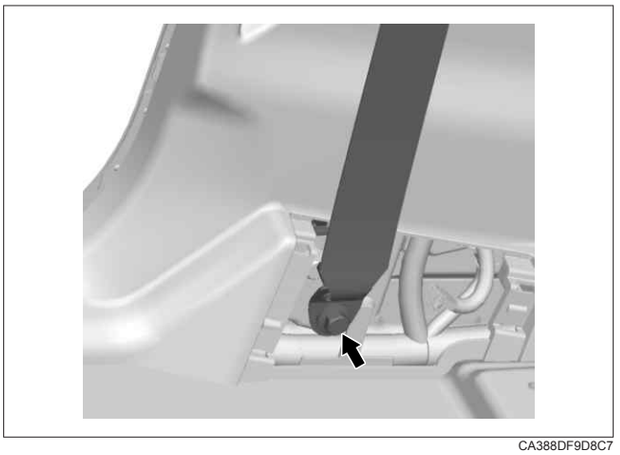
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6. Remove some of front/rear door frame seals
7. Remove the lower fixing point cover plate of the front seat belt



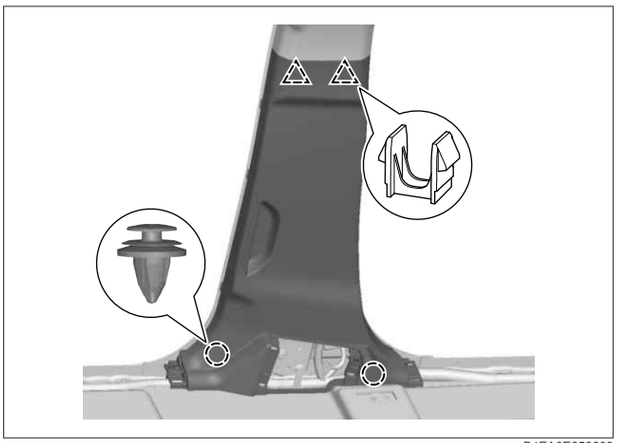
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8. Disconnect the connection between the lower end of front seat belt and the body



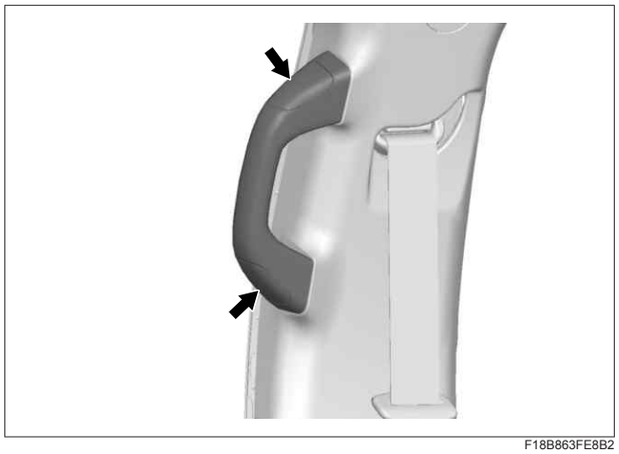
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9. Pry off 2 snaps and 2 dogs, and remove pillar B lower trim plate assembly



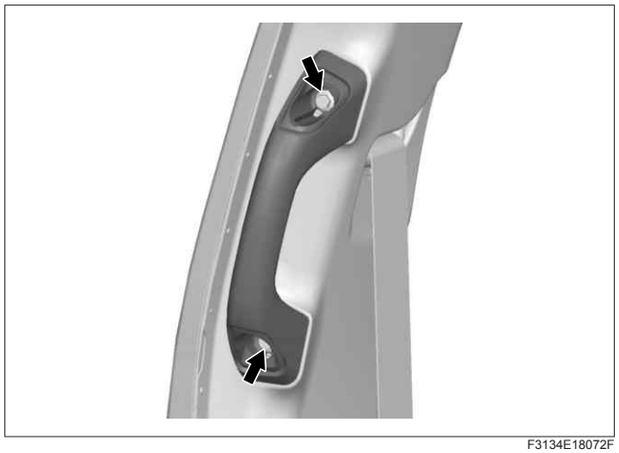
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10. Pry off handle bolt cover plate



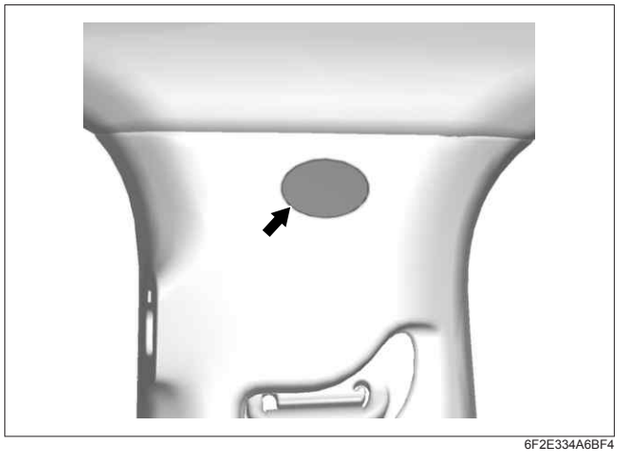
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11. Remove 2 bolts, and remove handle assembly



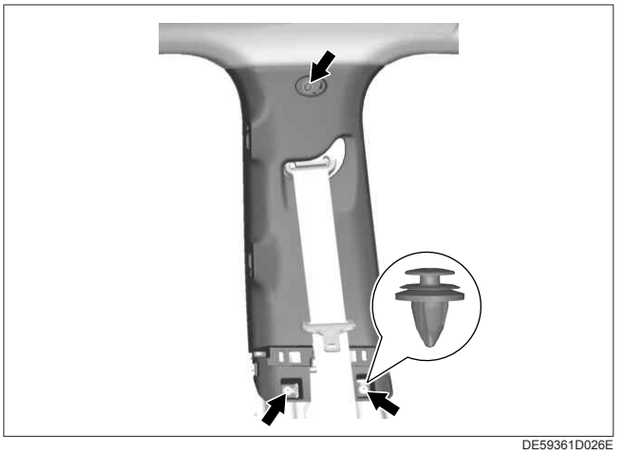
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12. Pry off pillar B upper guard mounting plug cover



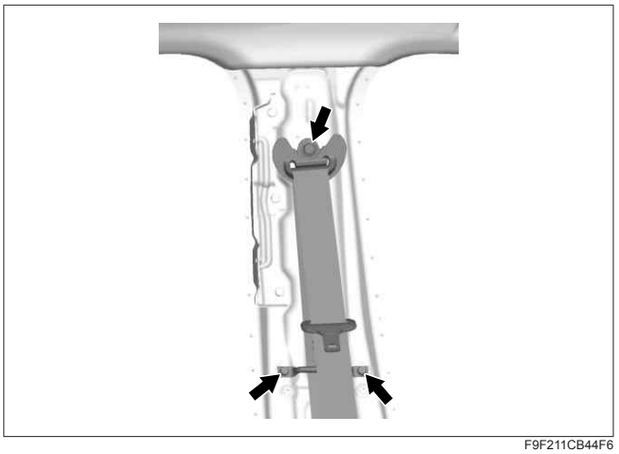
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13. Remove 1 fixed bolt, pry off 2 snaps, and remove pillar B upper trim plate assembly



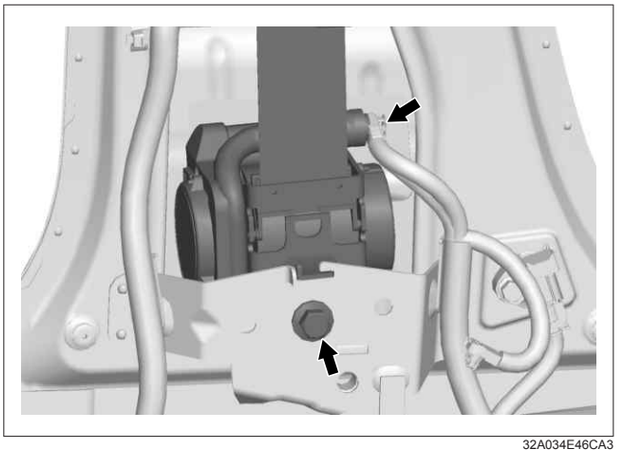
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14. Remove 2 bolts on the front seat belt guide bracket, and disconnect the upper fixing point on both sides of front seat belt



F9F211CB44F6

15. Remove 1 bolt, disconnect harness connector, and remove front seat belt assembly



32A034E46CA3

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Front seat belt buckle

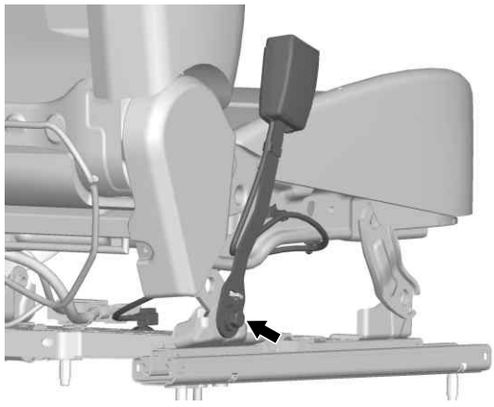
Removal/installation

Removal

Notice

- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Disconnect negative terminal of the battery and then wait for 90 s
2. Remove front seat assembly
3. Remove 1 nut, disconnect harness clamp, and remove front seat belt buckle



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Installation

1. Perform installation work in reverse order of removal

Second-row side seat belts assembly

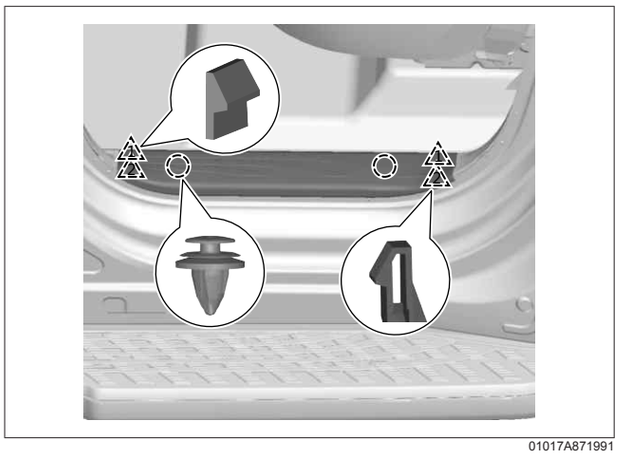
Removal/installation

Removal

Notice

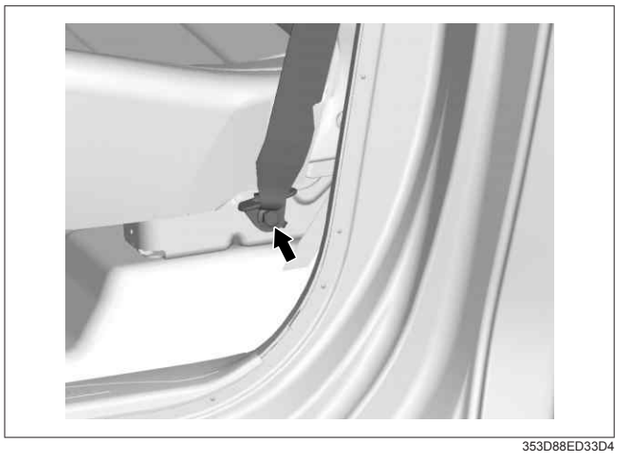
- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Pry off 2 snaps and 4 dogs, and remove rear door sill trim plate assembly



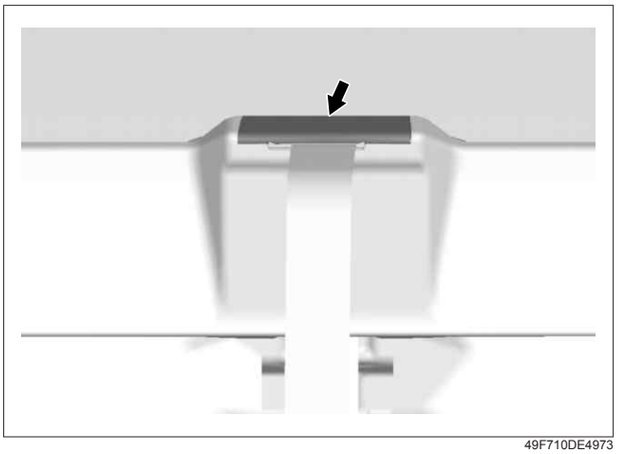
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4. Remove some of rear door frame seals
5. Disconnect the lower fixing point for the rear seat belt



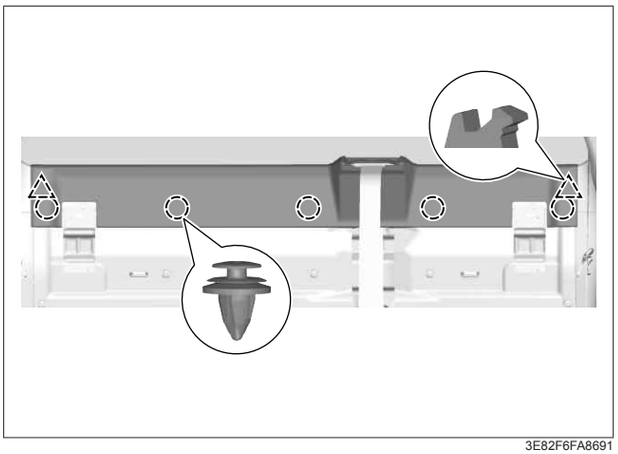
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6. Put down rear seat backrest
7. Remove seat belt outlet cap



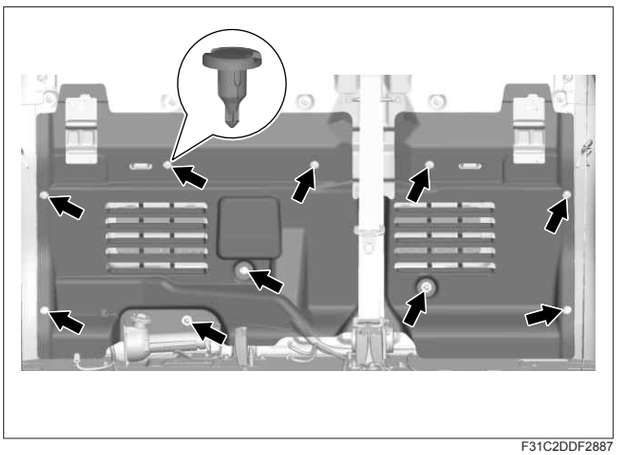
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8. Pry off 5 snaps and 2 dogs, and remove rear wall trim plate body



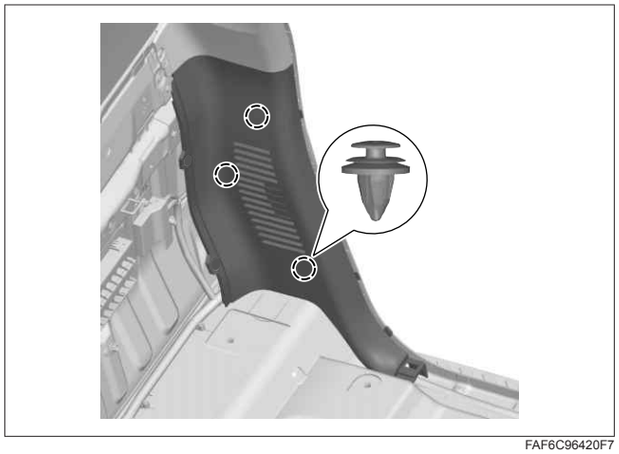
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9. Remove 8 snaps and 2 plastic nuts, and remove rear wall cover plate



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10. Pry off 3 snaps, and remove rear column lower trim plate assembly



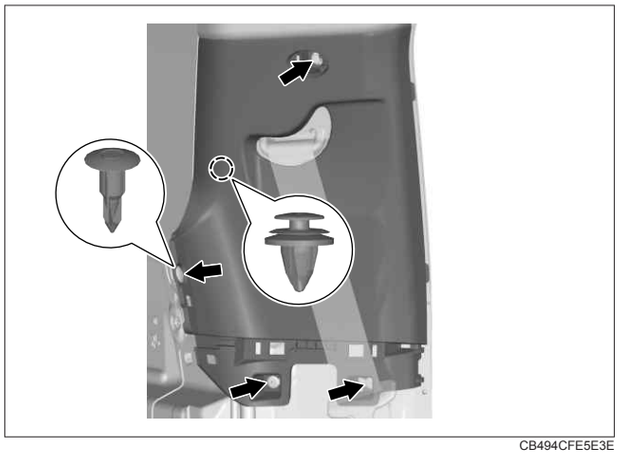
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11. Pry off pillar C upper guard mounting plug cover



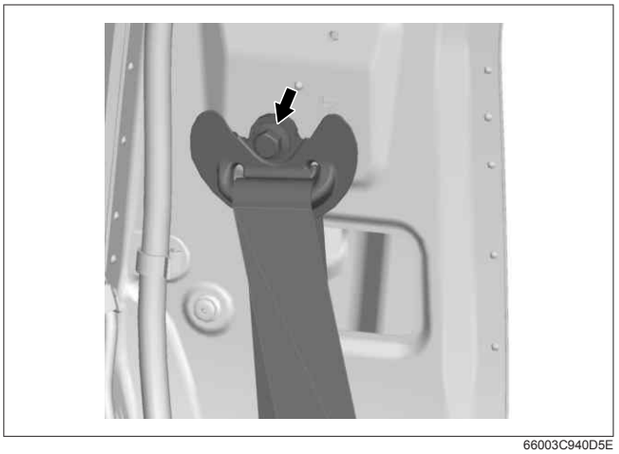
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12. Remove 1 bolt, pry off 4 snaps, and remove pillar C upper guard assembly



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13. Disconnect the upper fixing points of second row side seat belts



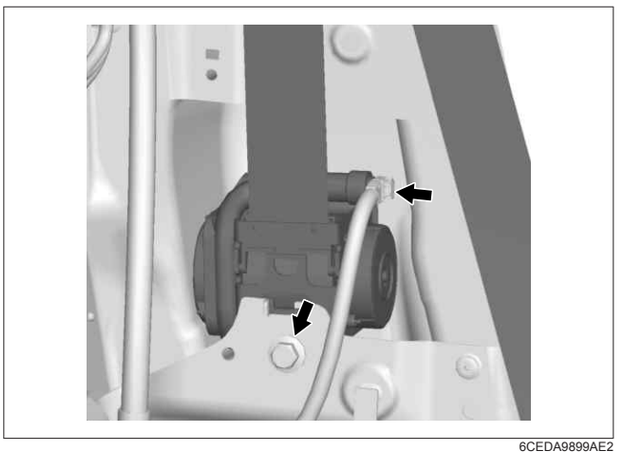
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14. Remove 2 bolts and remove seat belt guide bracket



F5FD0C5EAD26

15. Remove 1 bolt, disconnect harness connector and remove second row side seat belts assembly



6CEDA9899AE2

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Second row left seat belt buckle

Removal/installation

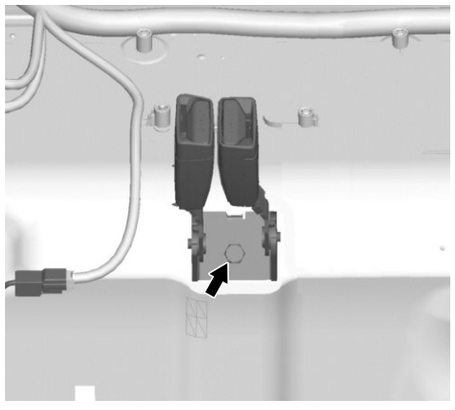
Removal

Notice

› Wear gloves to protect your hands.

› Take care to avoid damaging other interior trims.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Lift second row seat cushion
4. Remove 1 bolt, and remove second row left seat belt buckle



D964F5ED9955

Installation

1. Perform installation work in reverse order of removal

Caution

› Tighten the fastener according to the specified torque value.

Second-row right seat belt buckle

Removal/installation

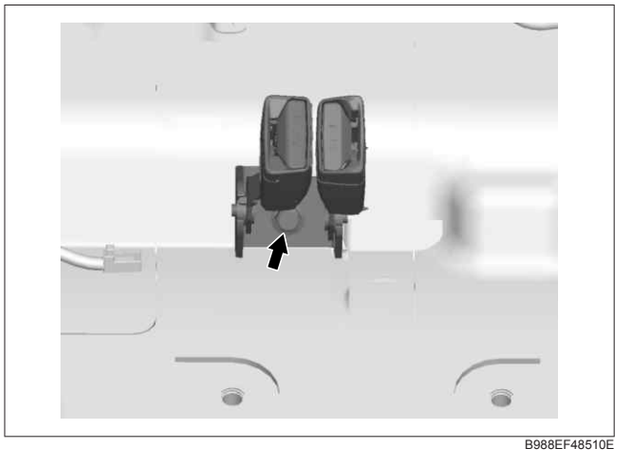
Removal

Notice

› Wear gloves to protect your hands.

› Take care to avoid damaging other interior trims.

1. Disconnect the negative terminal of the battery.
2. Lift second row seat cushion
3. Remove 1 bolt, and remove second row right seat belt buckle



B988EF48510E

Installation

1. Perform installation work in reverse order of removal

Caution

› Tighten the fastener according to the specified torque value.

Second-row middle seat belt assembly

Removal/installation

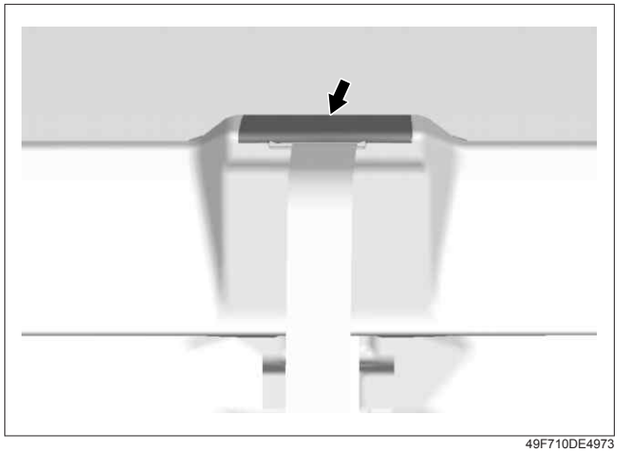
Removal

Notice

› Wear gloves to protect your hands.

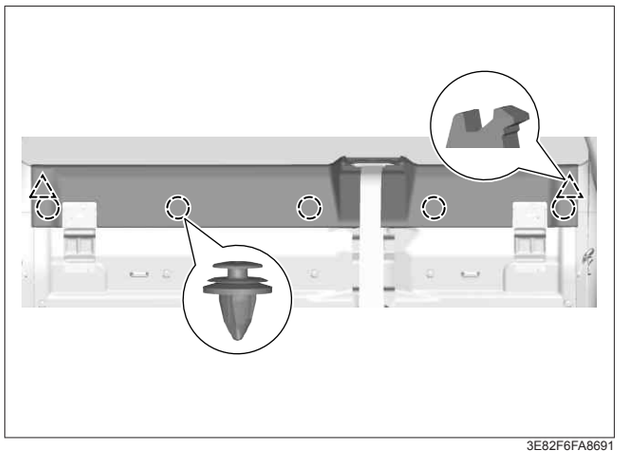
› Take care to avoid damaging other interior trims.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Put down second row seat backrest
4. Remove seat belt outlet cap



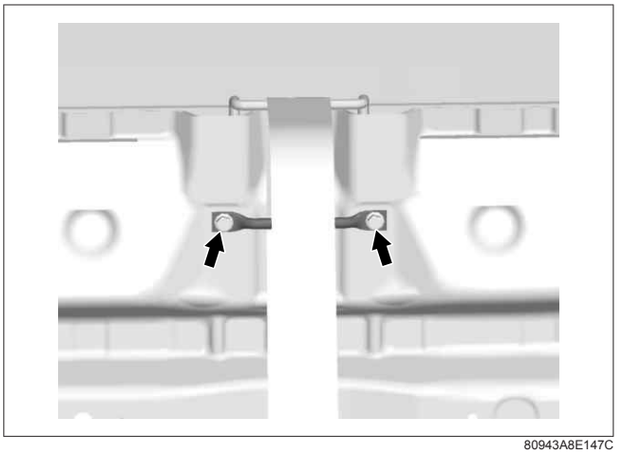
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5. Pry off 5 snaps and 2 dogs, and remove rear wall trim plate body



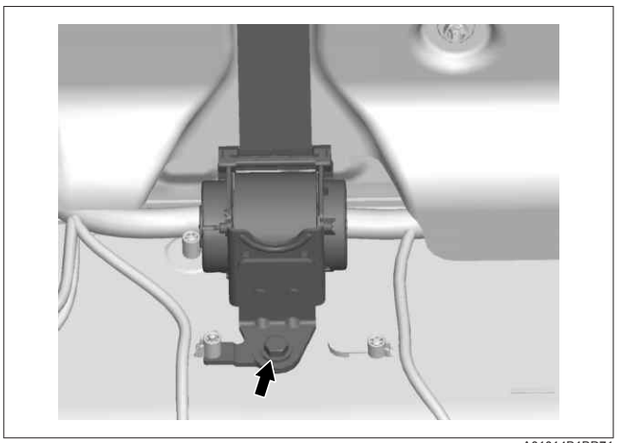
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6. Remove 2 bolts and remove seat belt guide bracket



80943A8E147C

7. Lift rear seat cushion
8. Remove 1 nut, and remove second row middle seat belt assembly



A01014B1BD71

Installation

1. Perform installation work in reverse order of removal

Caution

› Tighten the fastener according to the specified torque value.

Supplemental restraint system

Airbag system ..... 52－1
Brief Introduction to ..... 52－1
Location diagram ..... 52－2
System diagram ..... 52－3
Communication table ..... 52－4
Specified torque ..... 52－6
Diagnosis ..... 52－7
List of DTC ..... 52－8
B100111 ..... 52－12
B100112 ..... 52－13
B100113 ..... 52－14
B100119 ..... 52－15
B10011A ..... 52－16
B100195 ..... 52－17
B100211 ..... 52－18
B100212 ..... 52－19
B100213 ..... 52－20
B100219 ..... 52－21
B10021A ..... 52－22
B100295 ..... 52－23
B100311 ..... 52－24
B100312 ..... 52－25
B100313 ..... 52－26
B100319 ..... 52－27
B10031A ..... 52－28
B100395 ..... 52－29
B100411 ..... 52－30
B100412 ..... 52－31
B100413 ..... 52－32
B100419 ..... 52－33
B10041A ..... 52－34
B100495 ..... 52－35
B100511 ..... 52－36
B100512 ..... 52－37
B100513 ..... 52－38
B100519 ..... 52－39
B10051A ..... 52－40
B100595 ..... 52－41
B100611 ..... 52－42
B100612 ..... 52－43
B100613 ..... 52－44
B100619 ..... 52－45

B10061A.....52－46
B100695.....52－47
B100711.....52－48
B100712.....52－49
B100713.....52－50
B100719.....52－51
B10071A.....52－52
B100795.....52－53
B100811.....52－54
B100812.....52－55
B100813.....52－56
B100819.....52－57
B10081A.....52－58
B100895.....52－59
B100811.....52－60
B101012.....52－61
B101013.....52－62
B101019.....52－63
B10101A.....52－64
B101095.....52－65
B101111.....52－66
B101112.....52－67
B101113.....52－68
B101119.....52－69
B10111A.....52－70
B101195.....52－71
B101211.....52－72
B101212.....52－73
B101213.....52－74
B101219.....52－75
B10121A.....52－76
B101295.....52－77
B101311.....52－78
B101312.....52－79
B101313.....52－80
B101319.....52－81
B10131A.....52－82
B101349.....52－83
B101395.....52－84
B102111.....52－85
B102113.....52－86
B102149.....52－87
B102155.....52－88
B102187.....52－89
B102211.....52－90

B102213 .....52－91
B102249 .....52－92
B102255 .....52－93
B102287 .....52－94
B102311.....52－95
B102313 .....52－96
B102349 .....52－97
B102355 .....52－98
B102387 .....52－99
B102411.....52－100
B102413 .....52－101
B102449 .....52－102
B102455 .....52－103
B102487 .....52－104
B103212 .....52－105
B103312 .....52－106
B104189 .....52－107
B104289 .....52－108
B104389 .....52－109
B105054 .....52－110
B105092 .....52－111
B105595 .....52－112
B105695 .....52－113
B106196 .....52－114
B106396 .....52－115
U007300 .....52－116
U012287 .....52－117
U015587 .....52－118
U110017 .....52－119
U110016 .....52－120
U112017 .....52－121
U112116.....52－122
Airbag electronic control unit .....52－123
Pin definition .....52－123
Removal/installation.....52－125
Driver airbag assembly.....52－126
Removal/installation.....52－126
Discard.....52－127
Front passenger airbag assembly .....52－128
Removal/installation.....52－128
Discard.....52－129
Front side airbag assembly .....52－130
Removal/installation.....52－130
Discard.....52－130
Side curtain airbag assembly .....52－132

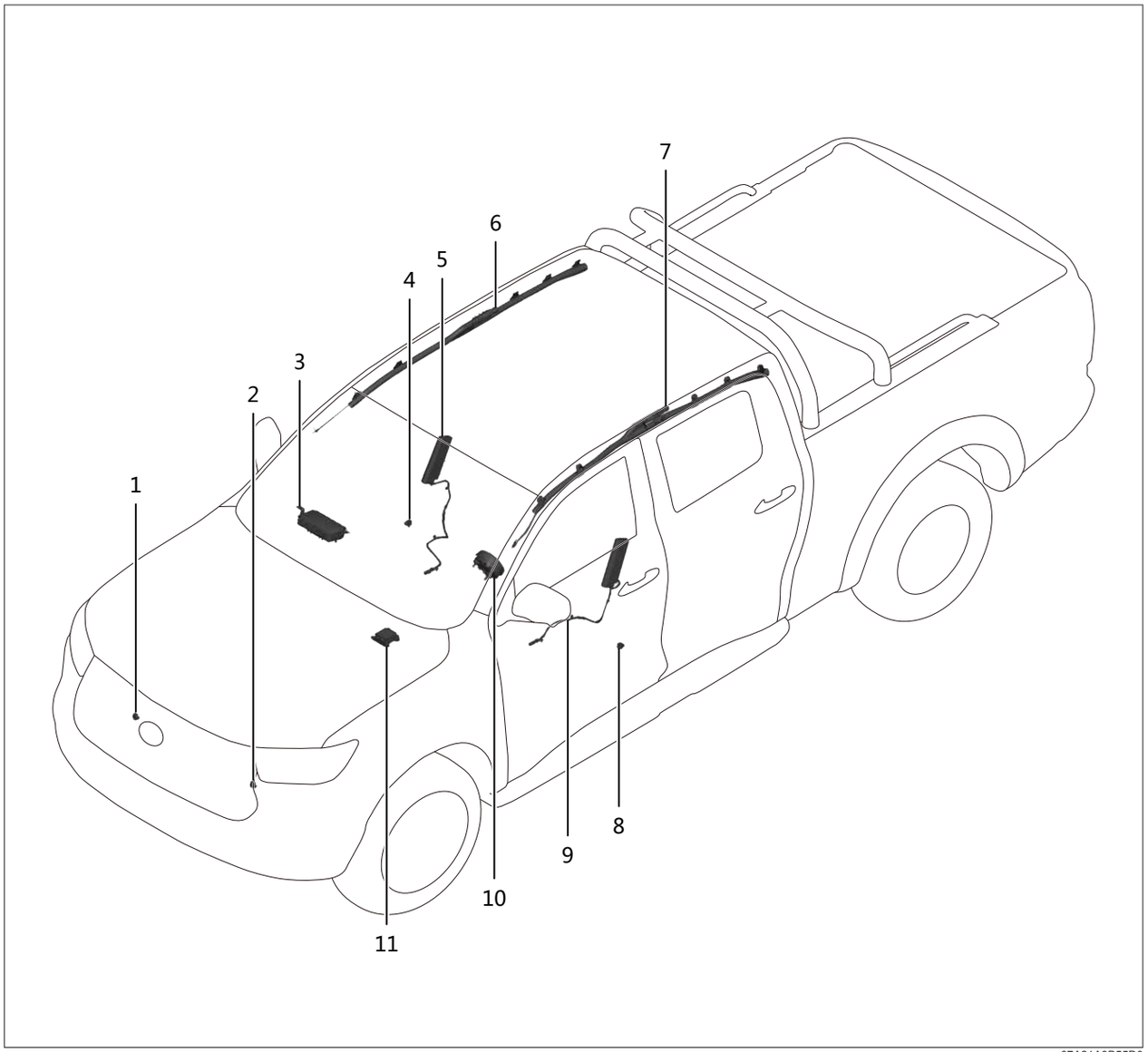
Removal/installation.....52－132
Discard.....52－133
Front collision sensor .....52－134
Removal/installation.....52－134
Side collision sensor.....52－135
Removal/installation.....52－135

Airbag system

Brief Introduction to

The safety restraint system (SRS) is mainly composed of driver airbag assembly, front passenger airbag assembly, left and right curtain airbag assemblies, left and right airbags, front collision sensor, side collision sensor, and airbag controller. If correct procedures are not followed during maintenance, the SRS may be unfolded unexpectedly, resulting in serious personal injury. If mistakes are made while repairing parts of the SRS, the SRS may not operate normally. Thus, before inspecting and repairing the safety restraint system (SRS) (including the removal, installation, checking, and replacement of parts), you must read the precautions in this chapter, and must work carefully.

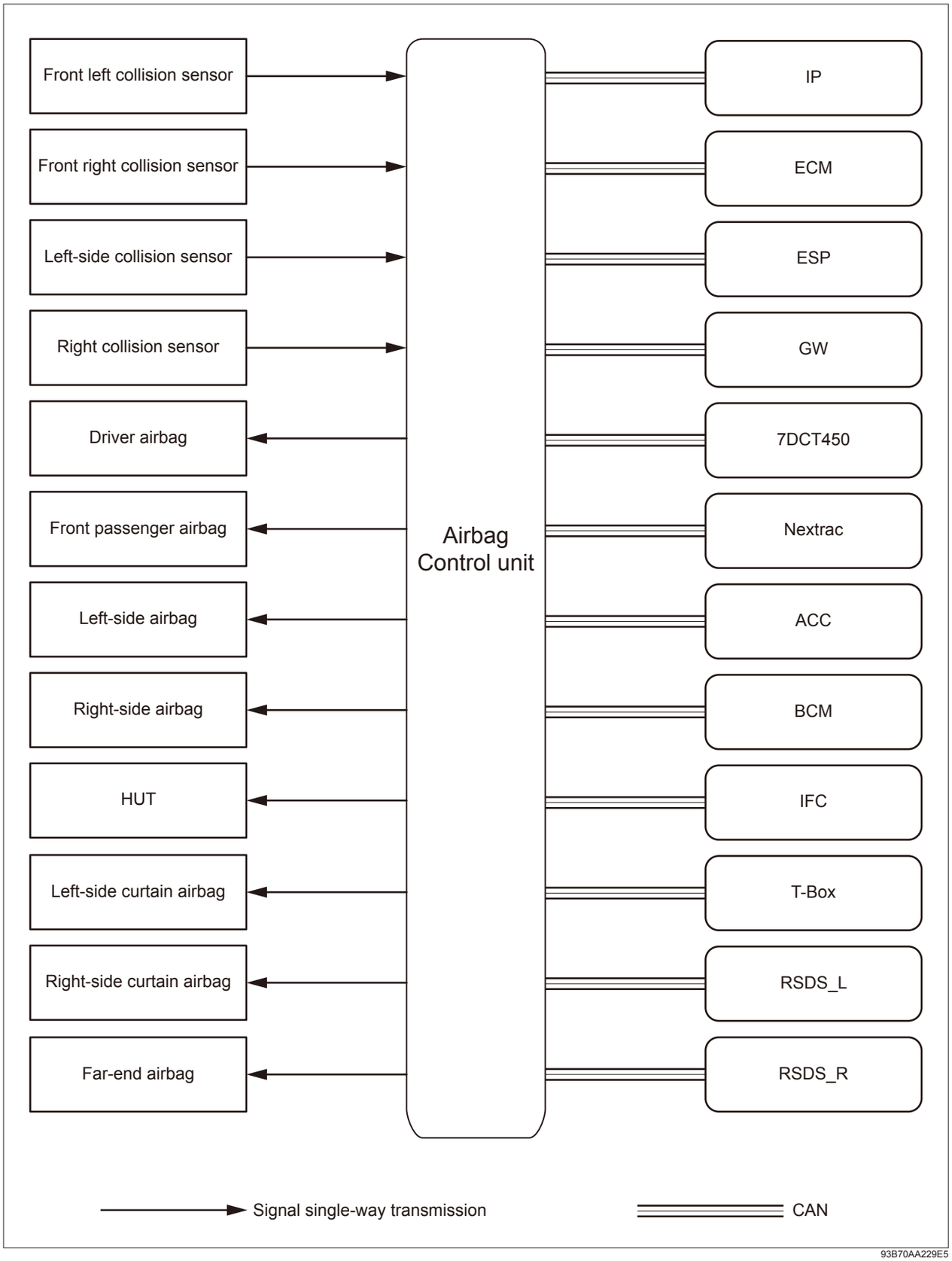
Location diagram



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1. Front right collision sensor assembly
2. Front left collision sensor assembly
3. Front passenger airbag assembly
4. Right side collision acceleration sensor
5. Front right seat side airbag assembly
6. Right side curtain airbag assembly
7. Left side curtain airbag assembly
8. Left side collision acceleration sensor
9. Front left seat side airbag assembly
10. Driver airbag assembly
11. Airbag control unit

System diagram



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Communication table

Transmitter	Receiver	Signal	Communication method
ABM	BCM	Front passenger airbag switch indicator	CAN
ABM	IP T-Box	Airbag control unit fault indicator signal	CAN
ABM	IP ACC T-Box ECM ESP	Driver side seat belt unfastened reminder	CAN
ABM	IP ACC T-Box	Front passenger seat belt unfastened reminder	CAN
ABM	IP	Front passenger seat belt unfastened reminder and display	CAN
ABM	IP	Remind you and display that the front driver's seat belt is not fastened	CAN
ABM	GW ECM	Collision output signal	CAN
ABM	ACC IFC RSDS_L RSDS_R ECM ESP 7DCT450	Longitudinal acceleration	CAN
ABM	IFC RSDS_L RSDS_R ESP 7DCT450	Lateral acceleration	CAN
ABM	IFC ACC RSDS_L RSDS_R ESP	Yaw velocity	CAN
ABM	IFC ACC RSDS_L RSDS_R ECM ESP 7DCT450	Flag bit of longitudinal acceleration	CAN
ABM	IFC ACC RSDS_L RSDS_R ESP 7DCT450	Flag bit of lateral acceleration	CAN
ABM	IFC ACC RSDS_L RSDS_R ESP	Flag bit of yaw velocity	CAN
ECM	GW ESP ABM 7DCT450	Indicate if the brake pedal is depressed or if there is an error	CAN
ECM	GW ESP ABM 7DCT450 Nextrac	Engine speed signal	CAN
ECM	GW ESP ABM 7DCT450 Nextrac	(Virtual) accelerator pedal position signal, which enables adaptive cruise pedal position by default in cruise control and adaptive cruise modes	CAN
ECM	ABM 7DCT450	Air throttle opening signal	CAN
ECM	GW ESP ABM 7DCT450	Physical accelerator pedal position signal	CAN

Transmitter	Receiver	Signal	Communication method
SAS	GW ECM ESP ABM 7DCT450 Nextrac	Steering wheel angle value	CAN
SAS	GW ECM ESP ABM Nextrac	Steering wheel angle symbol	CAN
ESP	GW ECM ABM 7DCT450	Vehicle speed signal	CAN
ESP	GW ABM 7DCT450	ABS or electronic brake force distribution function activated	CAN
ESP	GW ABM	ESP switch off	CAN
ESP	GW ABM 7DCT450	Vehicle dynamic control activated	CAN
ESP	GW ABM 7DCT450	Traction control activated	CAN
ESP	GW ABM 7DCT450	Braking force control activated	CAN
ESP	GW ECM ABM 7DCT450	Main cylinder pressure	CAN
ESP	GW ABM	No clamping force	CAN
DCT	GW ECM ESP ABM Nextrac	Gear lever position	CAN
GW	ABM	The front driver's seat belt indicator fault state	CAN
GW	ABM	The front passenger's seat belt indicator fault state	CAN
GW	ESP ABM 7DCT450	Accumulated mileage	CAN
GW	ABM	Instrument airbag indicator fault state	CAN
GW	ESP ABM	Gear shift state	CAN

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Left/right side curtain airbag × left/ right side wall inner plate sheet metal	9±2	6	—
Bolt	Front passenger airbag × instrument panel pipe beam	9±2	2	—
Nut	Airbag control unit × sheet metal of vehicle body	7～12	3	—
Bolt	Front collision sensor assembly × sheet metal of vehicle body	7～12	2	—
Bolt	Side collision sensor assembly × sheet metal of vehicle body	7～12	2	—

Diagnosis

Diagnosis of vehicles Involved in a collision

Airbag electronic control unit

- Check whether the airbag ECU housing and bracket are dented, cracked or deformed.
- Check whether the connector is damaged and whether the terminals are deformed.
- Check mounting state of the airbag ECU bracket.
- Check whether the cover is dented, cracked, or deformed.
- Check whether the connector is damaged, the terminals are deformed, and the harness is notched.
- Check whether the gas generator housing is dented, cracked, or deformed.
- Check whether the direction of the arrows is the direction of the vehicle.
- Check the installation condition of the airbag module.

Clock spring

- Check whether the connector or protective tube are damaged, and check whether the terminals are deformed.
- Check whether the housing is deformed.

Steering wheel, steering column and lower axle component

- Check the installation state of the driver side airbag module.
- Check whether the steering wheel is making abnormal noises and whether the clearance is normal.

Wiring harness connector

- Check whether the harness is installed securely, the connector is damaged, and the terminals are deformed.

System check

Airbag warning indicator

- Place the ignition switch in the LOCK position. Wait for 2 seconds at least, and then place the ignition switch in the ON position. SRS warning indicator keeps on for about 6 seconds. If after 6 seconds the SRS warning indicator turns off, then the supplemental restraint system (SRS) is operating normally.
- The SRS warning indicator flashes to indicate a problem with the system.
- When the ignition switch is turned from the LOCK position to the ON position, the SRS warning indicator does not light, which indicates a problem with the system.
- The SRS warning indicator illuminates for 6 s and remains lit after 1 s, which indicates a problem with the system.

Passenger detection sensor

- The passenger detection sensor pin does not distinguish between positive and negative.
- The resistance value in the unmanned state should be greater than or equal to 10 kΩ.
- The resistance value in the manned state should be smaller than 400 Ω.

List of DTC

No.	DTC	DTC description
1	B100111	Driver seat belt first level pretension short-circuited to ground
2	B100112	Driver seat belt first level pretension short-circuited to power
3	B100113	The resistance value for the driver seat belt first level pretension too high
4	B100119	Driver seat belt first level pretension connected in series with another circuit
5	B10011A	The resistance value for the driver seat belt first level pretension too low
6	B100195	Driver seat belt first level pretension configuration error
7	B100211	Front passenger seat belt first level pretension short-circuited to ground
8	B100212	Front passenger seat-belt first level pretension short-circuited to power
9	B100213	The resistance value for the front passenger seat belt first level pretension too high
10	B100219	Front passenger seat belt first level pretension connected in series with another circuit
11	B10021A	The resistance value for the front passenger seat belt first level pretension too low
12	B100295	Front passenger seat belt first level pretension configuration error
13	B100311	Driver airbag short-circuited to ground
14	B100312	Driver airbag short-circuited to power
15	B100313	Resistance value of driver airbag too high
16	B100319	Driver airbag connected in series with another circuit
17	B10031A	Resistance value of driver airbag too low
18	B100395	Driver airbag configuration error
19	B100411	Front passenger airbag short-circuited to ground
20	B100412	Front passenger airbag short-circuited to power
21	B100413	Resistance value of front passenger airbag too high
22	B100419	Front passenger airbag connected in series with other circuit
23	B10041A	Resistance value of front passenger airbag too low
24	B100495	Front passenger airbag configuration error
25	B100511	Left side airbag short-circuited to ground
26	B100512	Left side airbag short-circuited to power
27	B100513	Resistance value of left side airbag too high
28	B100519	Left side airbag connected in series with another circuit

No.	DTC	DTC description
29	B10051A	Resistance value of left side airbag too low
30	B100595	Left side airbag configuration error
31	B100611	Right side airbag short-circuited to ground
32	B100612	Right side airbag short-circuited to power
33	B100613	Resistance value of right side airbag too high
34	B100619	Right side airbag connected in series with another circuit
35	B10061A	Resistance value of right side airbag too low
36	B100695	Right side airbag configuration error
37	B100711	Left side curtain airbag short-circuited to ground
38	B100712	Left side curtain airbag short-circuited to power
39	B100713	Resistance value of left side curtain airbag too high
40	B100719	Left side curtain airbag connected in series with another circuit
41	B10071A	Resistance value of left side curtain airbag too low
42	B100795	Left side curtain airbag configuration error
43	B100811	Right side curtain airbag short-circuited to ground
44	B100812	Right side curtain airbag short-circuited to power
45	B100813	Resistance value of right side curtain airbag too high
46	B100819	Right side curtain airbag connected in series with another circuit
47	B10081A	Resistance value of right side curtain airbag too low
48	B100895	Right side curtain airbag configuration error
49	B101011	Driver seat belt double pretensioners are short-circuited to ground
50	B101012	Driver seat belt double-pretensioners are short-circuited to power
51	B101013	Driver seat belt double-pretensioners resistance is too high
52	B101019	Driver seat belt double - pretensioners are connected in series with another circuit
53	B10101A	Driver seat belt double-pretensioners resistance is too low
54	B101095	Driver seat belt double-pretensioners configuration error
55	B101111	Front passenger seat belt double-pretensioners are short-circuited to ground
56	B101112	Front passenger seat belt double-pretensioners are short-circuited to power
57	B101113	Front passenger seat belt double-pretensioners resistance is too high
58	B101119	Front passenger seat belt double - pretensioners are connected in series with another circuit
59	B10111A	Front passenger seat belt double-pretensioners resistance is too low

No.	DTC	DTC description
60	B101195	Front passenger seat belt double-pretensioners configuration error
61	B101211	Rear left seat belt pretensioner is short-circuited to ground
62	B101212	Rear left seat belt pretensioner is short-circuited to power
63	B101213	Rear left seat belt pretensioner resistance is too high
64	B101219	Rear left seat belt pretensioners are connected in series with another circuit
65	B10121A	Rear left seat belt pretensioner resistance is too low
66	B101295	Rear left seat belt pretensioner configuration error
67	B101311	Rear right seat belt pretensioner is short-circuited to ground
68	B101312	Rear right seat belt pretensioner is short-circuited to power
69	B101313	Rear right seat belt pretensioner resistance is too high
70	B101319	Rear right seat belt pretensioners are connected in series with another circuit
71	B10131A	Rear right seat belt pretensioner resistance is too low
72	B101349	Airbag electronic control unit internal error
73	B101395	Rear right seat belt pretensioner configuration error
74	B102111	Pillar B right-side collision sensor is shorted to the ground
75	B102113	Pillar B right-side collision sensor open-circuited
76	B102149	Pillar B right-side collision sensor internal fault
77	B102155	Pillar B right-side collision sensor configuration fault
78	B102187	Pillar B right-side collision sensor communication fault
79	B102211	Front left collision sensor short-circuited to ground
80	B102213	Front left collision sensor open-circuited
81	B102249	Front left collision sensor internal fault
82	B102255	Front left collision sensor configuration fault
83	B102287	Front left collision sensor communication fault
84	B102311	Pillar B left-side collision sensor is shorted to the ground
85	B102313	Pillar B left-side collision sensor open-circuited
86	B102349	Pillar B left-side collision sensor internal fault
87	B102355	Pillar B left-side collision sensor configuration fault
88	B102387	Pillar B left-side collision sensor communication fault
89	B102411	Front right collision sensor short-circuited to ground
90	B102413	Front right collision sensor open-circuited
91	B102449	Front right collision sensor internal fault
92	B102455	Front right collision sensor configuration fault

No.	DTC	DTC description
93	B102487	Front right collision sensor communication fault
94	B103212	Driver buckle switch short-circuited to power
95	B103312	Front passenger buckle placeholder tandem switch short-circuited to power
96	B104189	System warning indicator fault
97	B104289	Driver seat belt indicator fault
98	B104389	Front passenger seat belt indicator fault
99	B105054	Yaw angle sensor calibration missing
100	B105092	Yaw angle sensor calibration failure
101	B105595	EOL parameter configuration error
102	B105695	EOL not configured
103	B106196	Front collision is detected
104	B106396	Side collision is detected
105	U007300	CAN bus shut fault
106	U012287	Communication with ESP lost
107	U015587	Communication with IP lost
108	U110017	Diagnostic voltage too high
109	U110116	Diagnostic voltage too low
110	U112017	Working voltage too high
111	U112116	Working voltage too low

B100111

DTC definition: driver seat belt pretensioner short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of driver seat belt and harness connector of airbag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B100112

DTC definition: primary pretensioner of driver seat belt short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100113

DTC definition: resistance value of driver seat belt pretensioner too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the driver seat belt and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100119

DTC definition: driver seat belt pretensioner connected in series with other loop

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10011A

DTC definition: resistance value of driver seat belt pretensioner too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the driver seat-belt pretensioner connector is in place.	Go to step 4	Go to step 5
4	Disconnect the driver seat belt harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100195

DTC definition: configuration error of driver seat belt pretensioner

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

- This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100211

DTC definition: front passenger seat belt pretensioner short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of front passenger seat belt and harness connector of airbag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B100212

DTC definition: front passenger seat belt pretensioner short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100213

DTC definition: resistance value of front passenger seat belt pretensioner too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the front passenger seat belt and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100219

DTC definition: front passenger seat belt pretensioner connected in series with other loop

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10021A

DTC definition: resistance value of front passenger seat belt pretensioner too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check if the front passenger seat belt pretensioner connector is in place	Go to step 4	Go to step 5
4	Disconnect the front passenger seat belt harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100295

DTC definition: configuration error of front passenger seat belt pretensioner

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

- This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100311

DTC definition: driver airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of driver airbag and harness connector of airbag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B100312

DTC definition: driver airbag short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100313

DTC definition: resistance value of driver airbag too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the driver airbag and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100319

DTC definition: driver airbag connected in serial with other circuit

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10031A

DTC definition: resistance value of driver airbag too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check if the driver airbag connector is in place	Go to step 4	Go to step 5
4	Disconnect the driver airbag harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100395

DTC definition: configuration error of driver airbag

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100411

DTC definition: front passenger airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of front passenger airbag and harness connector of airbag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B100412

DTC definition: auxiliary-airbag short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100413

DTC definition: resistance value of front passenger airbag too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the front passenger airbag and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100419

DTC definition: auxiliary-airbag connected in series with other circuit

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10041A

DTC definition: resistance value of front passenger airbag too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check if the front passenger airbag connector is in place	Go to step 4	Go to step 5
4	Disconnect the front passenger airbag harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 7	Go to step 6
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100495

DTC definition: configuration error of front passenger airbag

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100511

DTC definition: left side airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of left side airbag and harness connector of airbag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B100512

DTC definition: left side airbag short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100513

DTC definition: resistance value of left side airbag too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the left side airbag and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100519

DTC definition: left side airbag connected in series with other circuit

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10051A

DTC definition: resistance value of left side airbag too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the left side airbag connector is in place.	Go to step 4	Go to step 5
4	Disconnect the left side airbag harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100595

DTC definition: configuration error of left side airbag

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100611

DTC definition: right side airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of right side airbag and harness connector of airbag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B100612

DTC definition: right side airbag short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100613

DTC definition: resistance value of right side airbag too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the right side airbag and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100619

DTC definition: right side airbag connected in series with other circuit

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10061A

DTC definition: resistance value of right side airbag too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the right side airbag connector is in place.	Go to step 4	Go to step 5
4	Disconnect the right side airbag harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100695

DTC definition: configuration error of right side airbag

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100711

DTC definition: left side curtain airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of left side curtain airbag and harness connector of air-bag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and trouble-shoot	—	—

B100712

DTC definition: left side curtain airbag short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100713

DTC definition: resistance value of left side curtain airbag too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the left side curtain airbag and the airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100719

DTC definition: left side curtain airbag connected in serial with other circuit

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10071A

DTC definition: resistance value of left side curtain airbag too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the left side curtain airbag connector is in place.	Go to step 4	Go to step 5
4	Disconnect the left side curtain airbag harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100795

DTC definition: configuration error of left side airbag

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100811

DTC definition: right side curtain airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of right side curtain airbag and harness connector of air-bag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and trouble-shoot	—	—

B100812

DTC definition: right side curtain airbag short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the circuit and GND terminal (IG ON state detection) is > 4V.	Go to step 4	Go to step 2
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B100813

DTC definition: resistance value of right side curtain airbag too high

DTC occurring condition: corresponding ignition circuit of airbag control unit open-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the right side curtain airbag and the airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B100819

DTC definition: right side curtain airbag concatenated to other circuit

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate the faulty module from the harness connector (for example, the fault is the concatenation of the driver's airbag, and the faulty module is defined as the driver's airbag)	Go to step 5	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure fault module and controller-side pins until the correct breakover harness is found	Go to step 7	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10081A

DTC definition: resistance value of right side curtain airbag too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the right side air curtain connector is in place.	Go to step 4	Go to step 5
4	Disconnect the right side curtain airbag harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B100895

DTC definition: right side curtain airbag configuration error

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B100811

DTC definition: right side curtain airbag short-circuited to ground

DTC occurring condition: a position in the loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of right side curtain airbag and harness connector of air-bag control unit, short circuit the two terminals of the harness, and check resistance between the circuit and the GND terminal to see if it is close to 0 Ω	Go to step 4	Go to step 2
4	Check the position in the circuit shorted to cathode of the power supply and trouble-shoot	—	—

B101012

DTC definition: driver seat belt end piece pretensioner short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the driver seat belt end piece pretensioner circuit and the GND side (IG ON state detection) is > 4V.	Go to step 4	—
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B101013

DTC definition: resistance value of driver seat belt end piece pretensioner too high

DTC occurring condition: corresponding ignition circuit of airbag control unit short-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the driver seat belt end piece pretensioner and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B101019

DTC definition: driver seat belt end piece pretensioner connected in series with other loop

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	Troubleshoot any other fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	—
4	Separate driver seat belt end piece pretensioner harness connector	—	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure driver seat belt end piece pretensioner and controller end pin until correct breakover harness is found	—	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10101A

DTC definition: resistance value of driver seat belt pretensioner end piece too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check if the driver seat belt pretensioner end piece connector is in place	Go to step 4	Go to step 5
4	Disconnect the driver seat belt end piece pretensioner harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B101095

DTC definition: configuration error of driver seat belt pretensioner end piece

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B101111

DTC definition: front passenger seat belt end piece pretensioner short-circuited to ground

DTC occurring condition: a position in ignition loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check whether front passenger seat belt end piece pretensioner circuit and ground terminal resistance is close to 0Ω	Go to step 4	—
4	Check the position in the circuit shorted to cathode of the power supply and troubleshoot	—	—

B101112

DTC definition: front passenger seat belt end piece pretensioner short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the front passenger seat belt end piece pretensioner circuit and the GND side (IG ON state detection) is > 4V.	Go to step 4	—
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B101113

DTC definition: front passenger seat belt end piece pretensioner resistance value too high

DTC occurring condition: corresponding ignition circuit of airbag control unit short-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the front passenger seat belt end piece pretensioner and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B101119

DTC definition: front passenger seat belt end piece pretensioner connected in series with other loop

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	Go to step 5
4	Separate front passenger seat belt end piece pretensioner harness connector	—	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure front passenger seat belt end piece pretensioner and controller end pin until correct breakover harness is found	—	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10111A

DTC definition: resistance value of front-passenger seat belt pretensioner end piece too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the front passenger seat belt pretensioner end piece is in place.	Go to step 4	Go to step 5
4	Disconnect the front passenger seat belt pretensioner end piece harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B101195

DTC definition: configuration error of pretensioner end piece of front passenger seat belt

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

- This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B101211

DTC definition: pretensioner of rear-row left seat belt retractor short-circuited to ground

DTC occurring condition: a position in ignition loop short-circuited to ground or negative terminal of the power supply

Possible causes:

- A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check resistance of pretensioner circuit of rear-row left seat belt retractor and ground terminal to see if it is close to 0 Ω	Go to step 4	—
4	Check the position in the circuit shorted to cathode of the power supply and trouble-shoot	—	—

B101212

DTC definition: pretensioner of rear-row left seat belt retractor short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the rear left seat belt retractor pretensioner circuit and the GND side (IG ON state detection) is > 4V.	Go to step 4	—
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B101213

DTC definition: pretensioner resistance value of rear-row left side seat belt retractor too high

DTC occurring condition: corresponding ignition circuit of airbag control unit short-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the row left seat belt retractor pretensioner and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B101219

DTC definition: pretensioner of rear-row left seat belt retractor connected in series to other loop

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	Go to step 5
4	Separate pretensioner harness connector of rear-row left seat belt retractor	—	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure rear-row left side seat belt retractor pretensioner and controller end pin until correct breakover harness is found	—	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10121A

DTC definition: pretensioner of rear-row left seat belt retractor has too low resistance value

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the rear left seat belt retractor pretensioner connector is in place.	Go to step 4	Go to step 5
4	Disconnect the rear left seat belt retractor pretensioner harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B101295

DTC definition: configuration error of pretensioner of rear-row left seat belt retractor

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

- This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B101311

DTC definition: pretensioner of rear-row right seat belt retractor short-circuited to ground

DTC occurring condition: a position in ignition loop short-circuited to ground or negative terminal of the power supply

Possible causes:

› A position in the ignition circuit (positive or negative) short-circuited to ground or negative terminal of the power supply.

DTC removal condition: short circuit to ground is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check resistance of pretensioner circuit of rear-row right seat belt retractor and ground terminal to see if it is close to 0 Ω	Go to step 4	—
4	Check the position in the circuit shorted to cathode of the power supply and trouble-shoot	—	—

B101312

DTC definition: pretensioner of rear-row right seat belt retractor short-circuited to power

DTC occurring condition: a position in the loop short-circuited to power

Possible causes:

- In the ignition circuit (positive or negative), a short circuit occurs between a position and the power supply.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the voltage between the rear right seat belt retractor pretensioner circuit and the GND side (IG ON state detection) is > 4V.	Go to step 4	—
4	Check the position short-circuited to power supply in the circuit, and eliminate the fault.	—	—

B101313

DTC definition: resistance value of pretensioner of rear-row right seat belt retractor too high

DTC occurring condition: corresponding ignition circuit of airbag control unit short-circuited or its resistance value higher than the set value

Possible causes:

- Ignition module harness connector is not plugged in properly or the connector in the circuit is disconnected.
- The resistance of the circuit increases due to the change in the contact resistance of the harness or the terminal.

DTC removal condition: restore normal resistance range

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the connector in the circuit is plugged into position	Go to step 4	Go to step 5
4	Disconnect the row right seat belt retractor pretensioner and airbag controller. Measure whether the resistance between the positive and negative harnesses of the corresponding circuit is less than 5.5Ω.	Go to step 7	Go to step 6
5	Correctly install the connector and troubleshoot	Go to step 7	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The fault is cleared, and the system is normal	—

B101319

DTC definition: rear-row right side seat belt retractor pretensioner connected in series to other loop

DTC occurring condition: disturbance in connection between two or more ignition circuits

Possible causes:

- The positive of the circuit is connected to the positive of other circuit.
- The negative of the circuit is connected to the negative of other circuit.

DTC removal condition: restore normal harness connection

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Disconnect harness connector of airbag control unit from the controller	Go to step 4	Go to step 5
4	Separate harness connector of pretensioner of rear-row right seat belt retractor	—	—
5	Use a multimeter to measure whether the two harnesses on the module end are breakover	Go to step 6	Resume electrical connection, and go to step 1
6	Separately measure pretensioner of rear-row right seat belt retractor and controller end pin until correct breakover harness is found	—	—
7	According to the controller pin definition, adjust the corresponding harness to the correct pin	—	—

B10131A

DTC definition: resistance value of pretensioner of rear-row right seat belt retractor too low

DTC occurring condition: short-circuiting of the corresponding 2 pins of the airbag control unit

Possible causes:

- Ignition module harness connector is not in place.
- Short circuit at other positions in the harness loop.

DTC removal condition: short circuit to power is cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Check whether the rear right seat belt retractor pretensioner connector is in place.	Go to step 4	Go to step 5
4	Disconnect the rear right seat belt retractor pretensioner harness connector and airbag control unit end harness connector. Measure whether the resistance between 2 pins corresponding to the harness on one end is less than 1.1Ω.	Go to step 6	Go to step 7
5	Reinstall the connector properly and troubleshoot	Go to step 2	—
6	Troubleshoot harness	Go to step 7	—
7	Remove the DTC, restart the vehicle, and check if the DTC has been removed	The system is normal	Replace the airbag controller

B101349

DTC definition: airbag electronic control unit internal error

DTC occurring condition: any abnormal internal hardware and software failure of airbag electronic control unit

Possible causes:

- External physical parameters (voltage, current, etc.) deviate from internal software settings, circuit board contact problem, soldering problem, detected chip damage problem, etc.

DTC removal condition: recovery of external physical parameters, or unrecoverable faults cannot be eliminated

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Replace airbag control unit	Go to step 2	—
4	It is recommended to replace the controller directly after any internal current or historical fault has occurred	—	—

B101395

DTC definition: configuration error of rear right seat belt retractor pretensioner

DTC occurring condition: the airbag control unit itself does not include this configuration, but the actual vehicle contains this configuration

Possible causes:

› This configuration does not match the vehicle's matched airbag control unit and is higher than the airbag control unit's configuration.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection)

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the vehicle configuration for any extra configuration	Go to step 4	—
4	Disconnect or remove this configuration from the airbag control unit	—	—

B102111

DTC definition: right collision sensor of pillar B short-circuited to ground

DTC occurring condition: short circuit between positive terminal of the sensor and negative terminal of the power supply or GND

Possible causes:

- Positive terminal of the sensor connected to negative terminal of the power supply or GND.
- The pillar B right collision sensor positive is connected to the negative terminal of the power supply or GND.

DTC removal condition: remove the short circuit from the sensor positive and the line returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Measure resistance between positive terminal of right collision sensor and front left collision sensor of pillar B and GND is close to 0 Ω	Go to step 4	Power on again, and go to step 2
4	The harness short-circuited to GND and troubleshoot the harness	Go to step 5	—
5	Troubleshoot, and power on again	Go to step 2	—

B102113

DTC definition: right collision sensor of pillar B is open-circuited

DTC occurring condition: the right-side side collision sensor of pillar B is disconnected from the airbag control unit

Possible causes:

- The connector is not connected.
- Open-circuit in a single harness in the circuit.
- Using the wrong sensor.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection) or replace the correct sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the sensor connector and the connector in the circuit for good connection	Go to step 4	Go to step 5
4	Measure and check if the 2 harnesses connecting the sensor to the airbag control unit pin are breakover	Go to step 2	Go to step 6
5	Restore the breakover and connection of the connector and troubleshoot. Power on again	Go to step 2	—
6	Check the open-circuit position of the harness, and repair the harness. Troubleshot and power on again	Go to step 2	Go to step 7
7	Check to see if the wrong sensor is used	Go to step 8	Go to step 2
8	Replace the sensor with parts used for vehicle setting	Go to step 2	—

B102149

DTC definition: internal fault of right collision sensor of pillar B

DTC occurring condition: sensor's own software or hardware failure

Possible causes:

› External physical conditions and setting parameters do not match or the chip itself fails.

DTC removal condition: replace the sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Replace the faulty sensor after IG LOCK	Go to step 2	—

B102155

DTC definition: configuration fault of right collision sensor of pillar B

DTC occurring condition: configuration redundancy

Possible causes:

› The airbag control unit setting configuration does not include this sensor.

DTC removal condition: remove the redundancy configuration from the airbag control unit

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Remove the sensor from the airbag control unit connection	Go to step 2	—

B102187

DTC definition: communication fault of right collision sensor of pillar B

DTC occurring condition: using the wrong sensor

Possible causes:

› Using the wrong sensor.

DTC removal condition: replace the wrong sensor with a right one

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Is there another sensor open-circuit DTC at the same time?	Go to step 4	Power on again, and go to step 2
4	Open-circuited position sensor uses the wrong part	Go to step 5	—
5	Replace the open-circuited sensor, trouble-shoot, and power on again	Go to step 2	—

B102211

DTC definition: front left collision sensor short-circuited to ground

DTC occurring condition: short circuit between positive terminal of the sensor and negative terminal of the power supply or GND

Possible causes:

- Positive terminal of the sensor connected to negative terminal of the power supply or GND.
- Positive terminal of front left collision sensor connected to negative terminal of the power supply or GND.

DTC removal condition: remove the short circuit from the sensor positive and the line returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Measure resistance between positive terminal of right collision sensor and front left collision sensor of pillar B and GND is close to 0 Ω	Go to step 4	Power on again, and go to step 2
4	The harness short-circuited to GND and troubleshoot the harness	Go to step 5	—
5	Troubleshoot, and power on again	Go to step 2	—

B102213

DTC definition: front left collision sensor open-circuited

DTC occurring condition: the front left collision sensor is disconnected from the airbag control unit

Possible causes:

- The connector is not connected.
- Open-circuit in a single harness in the circuit.
- Using the wrong sensor.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection) or replace the correct sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the sensor connector and the connector in the circuit for good connection	Go to step 4	Go to step 5
4	Measure and check if the 2 harnesses connecting the sensor to the airbag control unit pin are breakover	Go to step 2	Go to step 6
5	Restore the breakover and connection of the connector and troubleshoot. Power on again	Go to step 2	—
6	Check the open-circuit position of the harness, and repair the harness. Troubleshot and power on again	Go to step 2	Go to step 7
7	Check to see if the wrong sensor is used	Go to step 8	Go to step 2
8	Replace the sensor with parts used for vehicle setting	Go to step 2	—

B102249

DTC definition: front left collision sensor internal failure

DTC occurring condition: sensor's own software or hardware failure

Possible causes:

› External physical conditions and setting parameters do not match or the chip itself fails.

DTC removal condition: replace the sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Replace the faulty sensor after IG LOCK	Go to step 2	—

B102255

DTC definition: front left collision sensor configuration failure

DTC occurring condition: configuration redundancy

Possible causes:

› The airbag control unit setting configuration does not include this sensor.

DTC removal condition: remove the redundancy configuration from the airbag control unit

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Remove the sensor from the airbag control unit connection	Go to step 2	—

B102287

DTC definition: front left collision sensor communication failure

DTC occurring condition: using the wrong sensor

Possible causes:

› Using the wrong sensor.

DTC removal condition: replace the wrong sensor with a right one

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Is there another sensor open-circuit DTC at the same time?	Go to step 4	Power on again, and go to step 2
4	Open-circuited position sensor uses the wrong part	Go to step 5	—
5	Replace the open-circuited sensor, trouble-shoot, and power on again	Go to step 2	—

B102311

DTC definition: left-side collision sensor of pillar B short-circuited to ground

DTC occurring condition: short circuit between positive terminal of the sensor and negative terminal of the power supply or GND

Possible causes:

- Positive terminal of the sensor connected to negative terminal of the power supply or GND.
- Positive terminal of front right collision sensor connected to negative terminal of the power supply or GND.

DTC removal condition: remove the short circuit from the sensor positive and the line returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Measure resistance between positive terminal of left collision sensor and front right collision sensor of pillar B and GND to see if it is close to 0 Ω	Go to step 4	Power on again, and go to step 2
4	The harness short-circuited to GND and troubleshoot the harness	Go to step 5	—
5	Troubleshoot, and power on again	Go to step 2	—

B102313

DTC definition: left-side collision sensor of pillar B is open-circuited

DTC occurring condition: the left-side side collision sensor of pillar B is disconnected from the airbag control unit

Possible causes:

- The connector is not connected.
- Open-circuit in a single harness in the circuit.
- Using the wrong sensor.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection) or replace the correct sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the sensor connector and the connector in the circuit for good connection	Go to step 4	Go to step 5
4	Measure and check if the 2 harnesses connecting the sensor to the airbag control unit pin are breakover	Go to step 2	Go to step 6
5	Restore the breakover and connection of the connector and troubleshoot. Power on again	Go to step 2	—
6	Check the open-circuit position of the harness, and repair the harness. Troubleshot and power on again	Go to step 2	Go to step 7
7	Check to see if the wrong sensor is used	Go to step 8	Go to step 2
8	Replace the sensor with parts used for vehicle setting	Go to step 2	—

B102349

DTC definition: internal fault of left-side collision sensor of pillar B

DTC occurring condition: sensor's own software or hardware failure

Possible causes:

› External physical conditions and setting parameters do not match or the chip itself fails.

DTC removal condition: replace the sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Replace the faulty sensor after IG LOCK	Go to step 2	—

B102355

DTC definition: configuration fault of left-side collision sensor of pillar B

DTC occurring condition: configuration redundancy

Possible causes:

› The airbag control unit setting configuration does not include this sensor.

DTC removal condition: remove the redundancy configuration from the airbag control unit

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Remove the sensor from the airbag control unit connection	Go to step 2	—

B102387

DTC definition: communication fault of left-side collision sensor of pillar B

DTC occurring condition: using the wrong sensor

Possible causes:

› Using the wrong sensor.

DTC removal condition: replace the wrong sensor with a right one

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Is there another sensor open-circuit DTC at the same time?	Go to step 4	Power on again, and go to step 2
4	Open-circuited position sensor uses the wrong part	Go to step 5	—
5	Replace the open-circuited sensor, trouble-shoot, and power on again	Go to step 2	—

B102411

DTC definition: front right collision sensor short-circuited to ground

DTC occurring condition: short circuit between positive terminal of the sensor and negative terminal of the power supply or GND

Possible causes:

- Positive terminal of the sensor connected to negative terminal of the power supply or GND.
- Positive terminal of left collision sensor of pillar B connected to negative terminal of the power supply or GND.

DTC removal condition: remove the short circuit from the sensor positive and the line returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Measure resistance between positive terminal of left collision sensor and front right collision sensor of pillar B and GND to see if it is close to 0 Ω	Go to step 4	Power on again, and go to step 2
4	The harness short-circuited to GND and troubleshoot the harness	Go to step 5	—
5	Troubleshoot, and power on again	Go to step 2	—

B102413

DTC definition: front right collision sensor open-circuited

DTC occurring condition: the front right collision sensor is disconnected from the airbag control unit

Possible causes:

- The connector is not connected.
- Open-circuit in a single harness in the circuit.
- Using the wrong sensor.

DTC removal condition: remove the configuration from the airbag control unit (disconnect harness connection) or replace the correct sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Check the sensor connector and the connector in the circuit for good connection	Go to step 4	Go to step 5
4	Measure and check if the 2 harnesses connecting the sensor to the airbag control unit pin are breakover	Go to step 2	Go to step 6
5	Restore the breakover and connection of the connector and troubleshoot. Power on again	Go to step 2	—
6	Check the open-circuit position of the harness, and repair the harness. Troubleshot and power on again	Go to step 2	Go to step 7
7	Check to see if the wrong sensor is used	Go to step 8	Go to step 2
8	Replace the sensor with parts used for vehicle setting	Go to step 2	—

B102449

DTC definition: front right collision sensor internal failure

DTC occurring condition: sensor's own software or hardware failure

Possible causes:

› External physical conditions and setting parameters do not match or the chip itself fails.

DTC removal condition: replace the sensor

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Replace the faulty sensor after IG LOCK	Go to step 2	—

B102455

DTC definition: front right collision sensor configuration failure

DTC occurring condition: configuration redundancy

Possible causes:

› The airbag control unit setting configuration does not include this sensor.

DTC removal condition: remove the redundancy configuration from the airbag control unit

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Remove the sensor from the airbag control unit connection	Go to step 2	—

B102487

DTC definition: front right collision sensor communication failure

DTC occurring condition: using the wrong sensor

Possible causes:

› Using the wrong sensor.

DTC removal condition: replace the wrong sensor with a right one

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Is there another sensor open-circuit DTC at the same time?	Go to step 4	Power on again, and go to step 2
4	Open-circuited position sensor uses the wrong part	Go to step 5	—
5	Replace the open-circuited sensor, trouble-shoot, and power on again	Go to step 2	—

B103212

DTC definition: driver buckle switch short-circuited to power

DTC occurring condition: harness connected to driver buckle pin in airbag control unit is short-circuited to power

Possible causes:

› Harness connected to driver buckle pin in airbag control unit short-circuited to power.

DTC removal condition: remove the power from the harness

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Measure driver's buckle pin voltage of airbag control unit with seat belt buckle inserted and see if it is close to power voltage	Go to step 4	—
4	Find the shorted position in the harness and troubleshoot	—	—

B103312

DTC definition: front passenger buckle occupancy tandem switch short-circuited to power

DTC occurring condition: the harness connected to the front passenger buckle pin in the airbag control unit is shorted to power

Possible causes:

› The harness connected to the front passenger buckle pin in the airbag control unit is short-circuited to the power supply.

DTC removal condition: remove the power from the harness

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Check with a diagnostic apparatus for current fault.	Go to step 3	No current fault
3	Measure whether the voltage of the front passenger buckle pin of the airbag control unit is > 4V when the seat belt is inserted into its buckle.	Go to step 4	—
4	Find the shorted position in the harness and troubleshoot	—	—

B104189

DTC definition: system warning indicator failure

DTC occurring condition: the airbag control unit receives the airbag system indicator failure signal sent by the combination instrument

Possible causes:

- Airbag control unit receives airbag system indicator failure signal.

DTC removal condition: the combination instrument signal returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Read the airbag control unit DTC for airbag system indicator failure	Go to step 3	No current fault
3	Put the vehicle in the power OFF state, wait for more than 3 seconds, turn the power supply to the ON state and observe whether the indicator is on for 6 seconds and off for 1 second	Go to step 4	Go to step 2
4	Replace the combination instrument assembly	—	—

B104289

DTC definition: driver seat belt indicator failure

DTC occurring condition: the airbag control unit receives the driver seat belt indicator failure signal sent by the combination instrument

Possible causes:

› Airbag control unit receives driver seat belt indicator failure signal.

DTC removal condition: the combination instrument signal returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Read the airbag controller for the DTC	Go to step 3	No current fault
3	The seat belts of the driver and the front passenger are inserted into the buckle, and the ignition switch is set to "ON". Observe whether the seat belt indicator lights up for a few seconds and then goes off	Go to step 4	Go to step 4
4	Keep the front passenger seat belt buckle locked and release the driver seat belt buckle. Check if the indicator is on	Go to step 5	Go to step 6
5	Replace the airbag controller assembly	—	—
6	Repair the combination instrument assembly	—	—

B104389

DTC definition: front passenger seat belt indicator failure

DTC occurring condition: the airbag control unit receives the front passenger seat belt indicator failure signal sent by the combination instrument

Possible causes:

› Airbag control unit receives front passenger seat belt indicator failure signal.

DTC removal condition: the combination instrument signal returns to normal

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Read the airbag controller for the DTC	Go to step 3	No current fault
3	The seat belts of the driver and the front passenger are inserted into the buckle, and the ignition switch is set to "ON". Observe whether the seat belt indicator lights up for a few seconds and then goes off	Go to step 4	Go to step 4
4	Keep the driver seat belt buckle locked and release the front passenger seat belt buckle. Check if the indicator is on	Go to step 5	Go to step 6
5	Replace the airbag controller assembly	—	—
6	Repair the combination instrument assembly	—	—

B105054

DTC definition: yaw angle sensor calibration missing

DTC occurring condition: yaw angle sensor not calibrated

Possible causes:

› Yaw angle sensor is not calibrated.

DTC removal condition: yaw angle sensor calibrated successfully

Troubleshooting:

Step	Operation	Yes	No
1	Leave the vehicle stationary and switch power mode to ON	Go to step 2	Switch power to ON
2	Use scanner to check ABM for DTC	Go to step 3	—
3	Check if it shows that yaw angle sensor calibration is missing	Calibrate yaw angle sensor	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Replace ABM

B105092

DTC definition: yaw angle sensor calibration failed

DTC occurring condition: yaw angle sensor calibration failed

Possible causes:

› Yaw angle sensor calibration failed.

DTC removal condition: yaw angle sensor calibrated successfully

Troubleshooting:

Step	Operation	Yes	No
1	Leave the vehicle stationary and switch power mode to ON	Go to step 2	Switch power to ON
2	Use scanner to check ABM for DTC	Go to step 3	—
3	Check if it shows that yaw angle sensor calibration is missing	Calibrate yaw angle sensor	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Replace ABM

B105595

DTC definition: EOL parameter configuration error

DTC occurring condition: bad passive safety configuration Information, does not match actual configuration, unavailable or airbag control unit does not support

Possible causes:

› Writing controller configuration using a non-specified diagnostic device.

DTC removal condition: unable to eliminate the fault, replace with the new airbag control unit, use the device specified by the company to write the configuration

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Functional risk may be existed in the controller, replace the airbag control unit	—	—

B105695

DTC definition: airbag control unit EOL not configured

DTC occurring condition: airbag electronic control unit does not complete the configuration writing

Possible causes:

- The product has not been configured to write on the production line.
- After the faulty product is replaced after sales, the configuration is not written.

DTC removal condition: all tests are not completed, cannot be used, faults cannot be eliminated

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	Ensure that the passive safety system does not have current faults with deploying circuit, collision sensor, etc. Only the driver airbag high resistance fault and the EOL-not-configured fault are allowed	Go to step 5	Go to step 4
4	Exclude current failures	Go to step 5	Go to step 2
5	Use the specified device to configure the airbag control unit to write, and ensure that the written configuration is consistent with the current vehicle configuration	—	—

B106196

DTC definition: front collision is detected

DTC occurring condition: vehicle has a frontal collision and the airbag control unit has issued a deploying command to the seat belt or front airbag

Possible causes:

› Frontal collision of the vehicle to achieve airbag deploying condition.

DTC removal condition: fault cannot be cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	The airbag has been exploded, the controller is locked and the controller needs to be replaced	—	—

B106396

DTC definition: side collision is detected

DTC occurring condition: vehicle has a lateral collision and the airbag control unit has issued a deploying command to the seat belt or lateral airbag

Possible causes:

› Side collision of the vehicle to achieve airbag deploying condition.

DTC removal condition: fault cannot be cleared

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	The scanner reads if there is a current fault	Go to step 3	No current fault
3	The airbag has been exploded, the controller is locked and the controller needs to be replaced	—	—

U007300

DTC definition: CAN offline

DTC occurring condition: network manager detected bus off

Possible causes:

- Network communication is closed, and controller cannot connect to network.
- The airbag electronic control unit fuse is damaged.

DTC removal condition: CAN bus detects battery voltage in the range of 10 V to 16 V

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Use scanner to read DTC and check if it can be read	Go to step 3	Go to step 4
3	The network communication is restored	Troubleshoot	Go to step 4
4	Check if the airbag electronic control unit fuse is normal	Go to step 2	Go to step 5
5	Replace fuse	Go to step 2	—

U012287

DTC definition: communication with ESP lost

DTC occurring condition: unable to receive ESP signal

Possible causes:

› ESP node off bus network

DTC removal condition: ESP node reconnects the network

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Read the airbag controller for the DTC	Go to step 3	No current fault
3	Read combination instrument for DTC that lost communication with ESP	Go to step 6	Go to step 4
4	Use scanner to read ESP current fault and check if it can be read	Go to step 5	Go to step 5
5	Replace the airbag controller or repair the airbag controller harness	—	—
6	ESP node is missing from the network; repair the ESP controller or harness	—	—

U015587

DTC definition: communication with combination instrument is lost

DTC occurring condition: can not receive the combination instrument signal continuously

Possible causes:

- Combination instrument off bus network
- Airbag controller off bus network

DTC removal condition: combination instrument reconnects the network

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Read the airbag controller for the DTC	Go to step 3	No current fault
3	Use the scanner to read ESP for DTC that lost communication with combination instrument	Go to step 4	Go to step 6
4	Is it possible to read combination instrument using scanner?	Go to step 6	Go to step 5
5	Replace the combination instrument or repair the harness	—	—
6	Replace the airbag controller or repair the harness	—	—

U110017

DTC definition: diagnostic voltage high

DTC occurring condition: power voltage is higher than 16 V

Possible causes:

- Supply voltage too high

DTC removal condition: voltage lower than 15 V

Troubleshooting:

Step	Operation	Yes	No
1	Check if the vehicle power supply voltage is greater than 16 V	Go to step 2	Go to step 3
2	Check if the vehicle power supply system is normal	Go to step 3	Repair the vehicle power supply system, and go to step 3
3	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault or replace the airbag controller

U110016

DTC definition: diagnostic voltage low

DTC occurring condition: power voltage is lower than 9 V

Possible causes:

› Supply voltage too low

DTC removal condition: voltage higher than 10 V

Troubleshooting:

Step	Operation	Yes	No
1	Check if the vehicle power supply voltage is lower than 9 V	Go to step 2	Go to step 3
2	Check if the vehicle power supply system is normal	Go to step 3	Repair the vehicle power supply system, and go to step 3
3	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault or replace the airbag controller

U112017

DTC definition: operating voltage too high

DTC occurring condition: power voltage higher than 16 V

Possible causes:

› Power voltage too high.

DTC removal condition: voltage returns to the normal range, which is less than 16 V

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Measure whole vehicle power voltage and check if it is higher than 16 V	Go to step 3	Go to step 4
3	Check if whole vehicle power supply system is normal	Repair the power supply system	Go to step 4
4	Use a scanner to read if the DTC is a current fault	Go to step 3	The voltage returns to normal and the fault disappears

U112116

DTC definition: operating voltage too low

DTC occurring condition: power voltage is lower than 9 V

Possible causes:

› Power voltage too low.

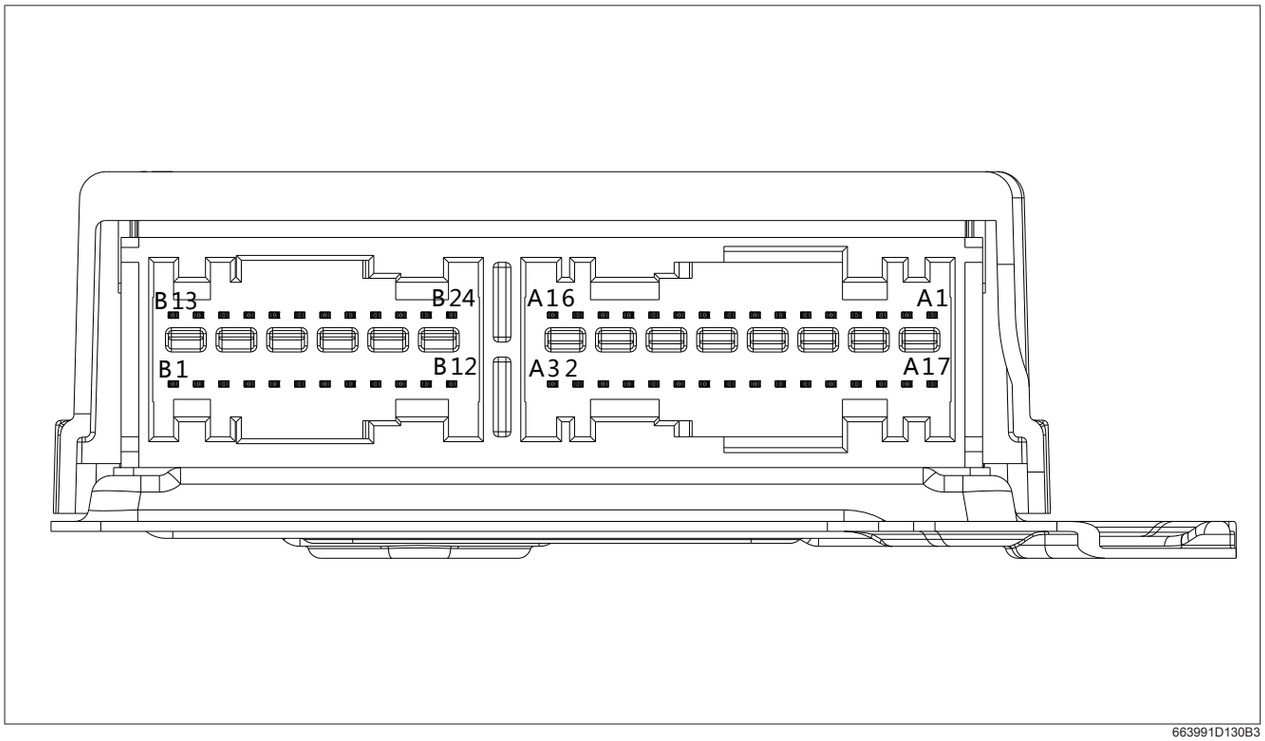
DTC removal condition: voltage returns to the normal range, which is greater than 9V

Troubleshooting:

Step	Operation	Yes	No
1	Make the vehicle static	Go to step 2	—
2	Measure whole vehicle power voltage and check if it is lower than 9 V	Go to step 3	Go to step 4
3	Check if whole vehicle power supply system is normal	Repair the power supply system	Go to step 4
4	Use a scanner to read if the DTC is a current fault	Go to step 3	The voltage returns to normal and the fault disappears

Airbag electronic control unit

Pin definition



663991D130B3

Pin No.	Function	Pin No.	Function
A1	Right-side side airbag (+)	A2	Right-side side airbag (-)
A3	Driver seat belt retractor (-)	A4	Driver seat belt retractor (+)
A5	Front passenger seat belt retractor (+)	A6	Front passenger seat belt retractor (-)
A7	Left-side side airbag (-)	A8	Left-side side airbag (+)
A9	Left-side side curtain airbag(+)	A10	Left-side side curtain airbag(-)
A11	Right-side side curtain airbag(-)	A12	Right-side curtain airbag (+)
A13	Right-side collision sensor (+)	A14	Right-side collision sensor (-)
A15	Left-side collision sensor (-)	A16	Left-side collision sensor (+)
A17	—	A18	—
A19	—	A20	—
A21	—	A22	—
A23	Second-row seat belt buckle (right) +SBR	A24	Second-row seat belt buckle (center) +SBR
A25	Second-row seat belt buckle (left)+SBR	A26	Front passenger seat belt buckle + front passenger SBR
A27	—	A28	—
A29	Front left collision sensor (+)	A30	Front left collision sensor (-)
A31	Front right collision sensor (-)	A32	Front right collision sensor (+)

Pin No.	Function	Pin No.	Function
B1	Power supply (IG)	B2	GND (ECU GND)
B3	GND (external input shared ground)	B4	Collision output
B5	Front passenger airbag switch	B6	Driver seat belt buckle
B7	—	B8	—
B9	—	B10	—
B11	CAN_L	B12	CAN_H
B13	Front passenger airbag (+)	B14	Front passenger airbag (-)
B15	Second-row right seat belt retractor pretension (-)	B16	Second-row right seat belt retractor pretension (+)
B17	Front passenger seat belt end piece pretensioner (+)	B18	Front passenger seat belt end piece pretensioner (-)
B19	Driver airbag (-)	B20	Driver airbag (+)
B21	Second-row left seat belt retractor pretension (+)	B22	Second-row left seat belt retractor pretension (-)
B23	Driver seat belt end piece pretensioner (-)	B24	Driver seat belt end piece pretensioner (+)

Removal/installation

Removal

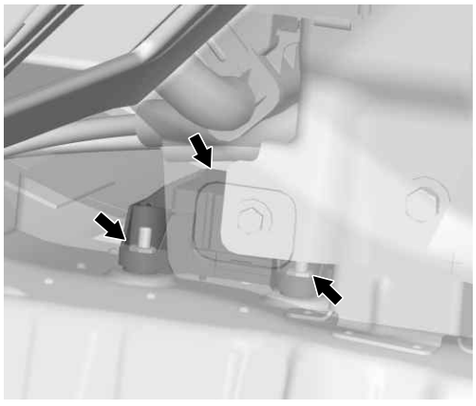
⚠ Warning

- Disassembling or repair an airbag control unit is absolutely forbidden. A faulty airbag control unit must be replaced with a new one.
- Be careful not to make the airbag control unit under shock and vibration. If you discover that it is dented, cracked, or deformed, you must replace the airbag control unit with a new one.
- After an airbag is expanded, be sure to replace the airbag control unit with a new one.

ℹ Notice

- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Remove 3 nuts from the lower part of instrument panel, disconnect harness connector, and remove airbag electronic control unit



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Installation

1. Perform installation work in reverse order of removal

⚠ Caution

- Tighten the fastener according to the specified torque value.

Driver airbag assembly

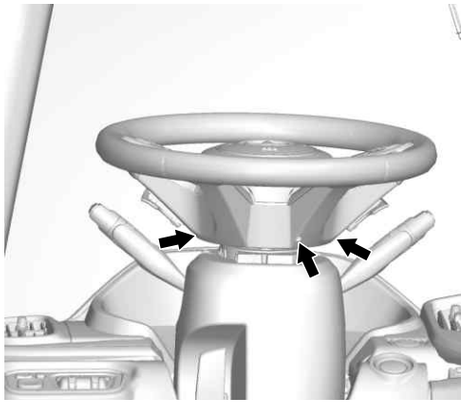
Removal/installation

Removal

Notice

› Ensure that the front wheels are in the straight-line running position.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Use an appropriate tool to insert into the dismantlement hole of lower cover of steering wheel, and push the tool appropriately until the driver airbag pops up

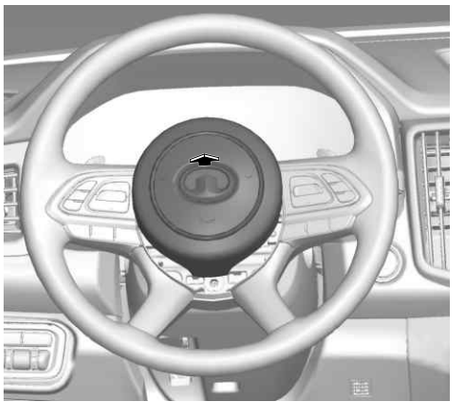


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Notice

› A total of three removable holes, removing respectively at direction of 6 o'clock, 9 o'clock and 3 o'clock according to the order 6-9-3.

4. Gently take the driver airbag assembly and disconnect the driver airbag connector and the horn connector



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5. Remove the driver airbag assembly

Caution

› Place a removed airbag in a clean, dry location with the deployed face up.

Installation

1. Perform installation work in reverse order of removal
2. Connect the connector between the clock spring and the driver airbag assembly and horn connector

Notice

› When installing the steering wheel and driver airbag components, do not catch the clock spring wiring harness.

3. Correctly install the driver airbag assembly. Ensure that the airbag is clamped firmly in place. (Do not strike the airbag module with force when putting it in position)

Caution

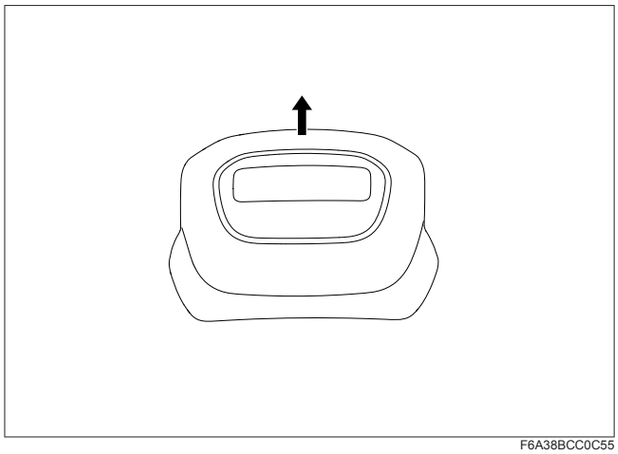
› After installation, put the ignition switch in the ON position. Normally, the airbag warning indicator should turn on for about 6 seconds and then go off.

Discard

⚠ Warning

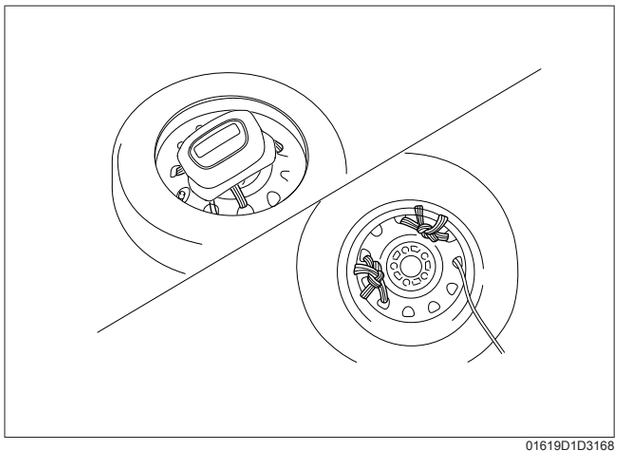
- Before removing, turn off the ignition switch and disconnect negative terminal of the battery. Wait for 90 seconds before carrying out the operation.
- Place a removed airbag in a clean, dry location with the deployed face up.

1. Remove the airbag from the vehicle



F6A38BCC0C55

2. Firmly fix the airbag on the tire with web

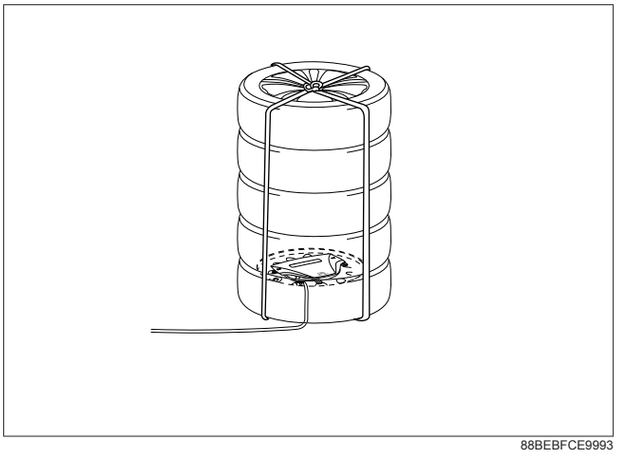


01619D1D3168

⚠ Warning

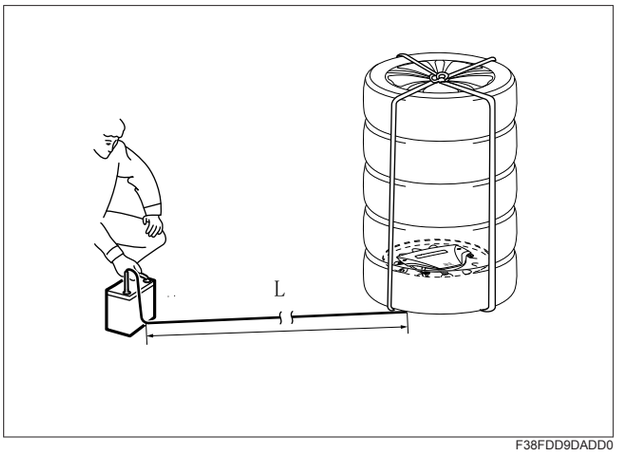
- Make sure it is firmly in place and it won't become loose.
- Deployed face of the airbag faces the inside of the tire.
- Tires may be damaged due to the scrapping of airbags, for this reason, you may use tires that have been discarded.

3. Place at least 3 tires on the tire to which the airbag is fixed, place 1 tire with web at the top and fasten all the tires with a strong rope as shown in the diagram



88BEBFCE9993

4. Unfold the airbag to ensure L ≥ 10 m and regional safety



F38FDD9DADD0

5. Put the deployed airbag in a plastic bag and tighten it before further processing

⚠ Warning

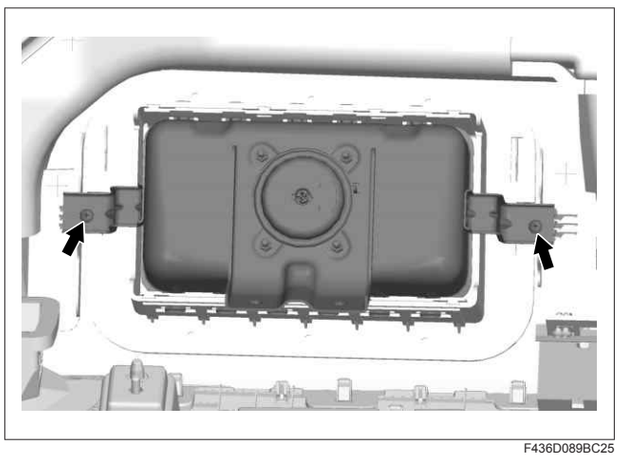
- After the airbag is deployed, it becomes very hot, so do not touch it for at least 30 minutes after deployment.

Front passenger airbag assembly

Removal/installation

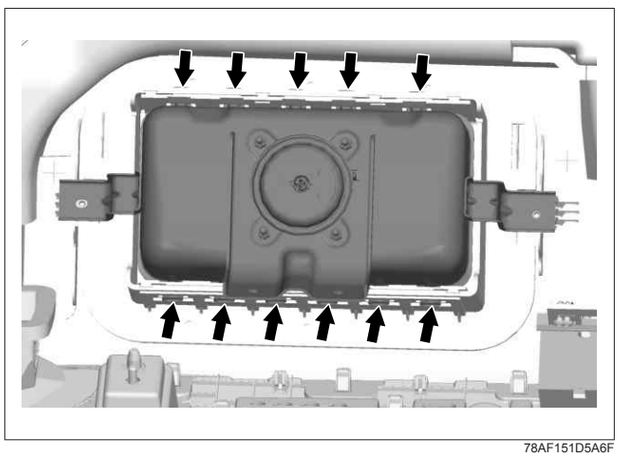
Removal

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Remove main instrument panel assembly
4. Remove 2 fixing screws of front passenger airbag



F436D089BC25

5. Remove front passenger airbag assembly



78AF151D5A6F

⚠ Caution

› Place a removed airbag in a clean, dry location with the deployed face up.

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Even if you are replacing a new airbag module, check that the airbag module is damaged or defective before installation.

› After installation, put the ignition switch in the ON position. Normally, the airbag warning indicator should turn on for about 6 seconds and then go off.

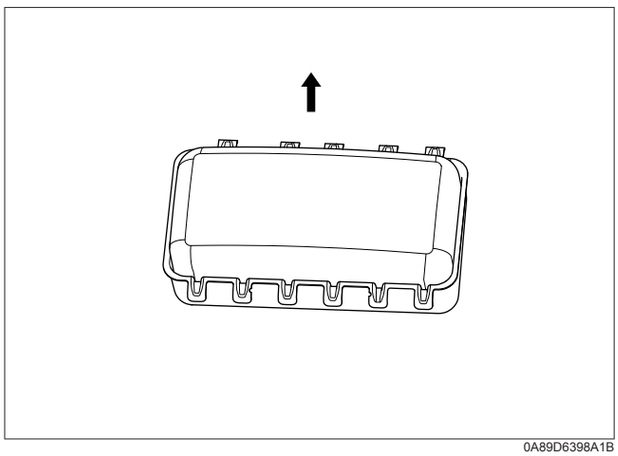
Discard

⚠ Warning

› Before removing, turn off the ignition switch and disconnect negative terminal of the battery. Wait for 90 seconds before carrying out the operation.

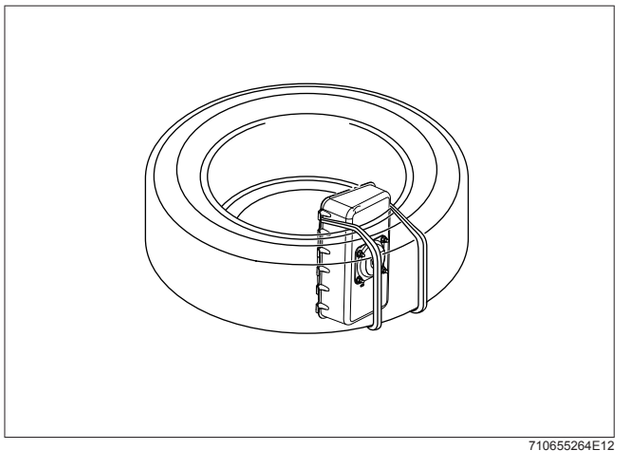
› Place a removed airbag in a clean, dry location with the deployed face up.

1. Remove airbag assembly from the vehicle



0A89D6398A1B

2. Firmly fix airbag assembly on the tire



710655264E12

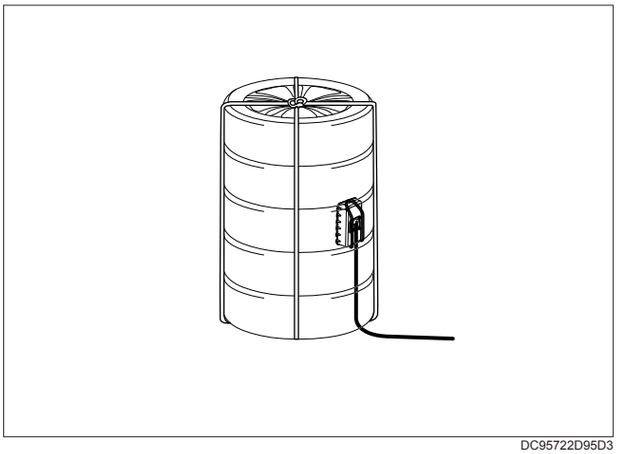
⚠ Warning

› Make sure it is firmly in place and it won't become loose.

› Deployed face of the airbag faces the inside of the tire.

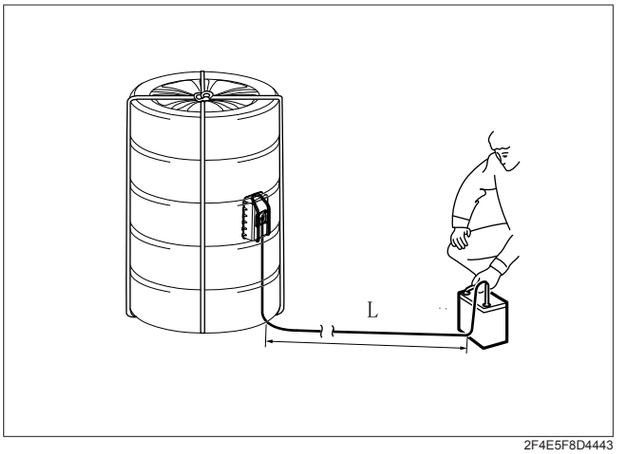
› Tires may be damaged due to the scrapping of airbags, for this reason, you may use tires that have been discarded.

3. Place at least 2 tires on the tire to which the airbag is fixed, place at least one tire on its top, place one tire with web at the top and fasten all the tires with a strong rope as shown in the diagram



DC95722D95D3

4. Unfold the airbag to ensure L ≥ 10 m and regional safety



2F4E5F8D4443

5. Put the deployed airbag in a plastic bag and tighten it before further processing

⚠ Warning

› After the airbag is deployed, it becomes very hot, so do not touch it for at least 30 minutes after deployment.

Front side airbag assembly

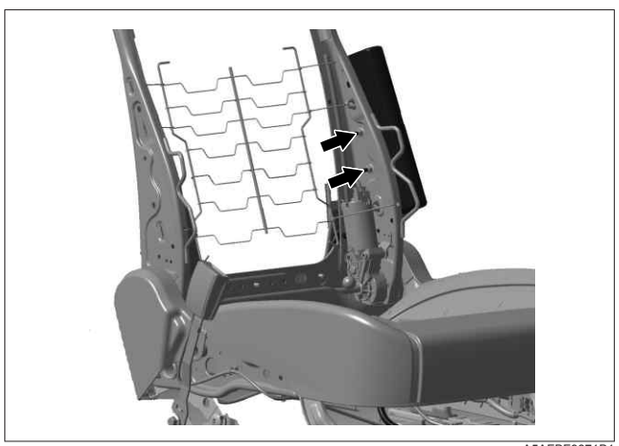
Removal/installation

Removal

Notice

- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Remove front seat assembly
4. Remove seat back cover
5. Remove 2 nuts, disconnect harness from the seat frame, and remove front side airbag assembly



A5AFBF9871B1

Installation

1. Perform installation work in reverse order of removal

Caution

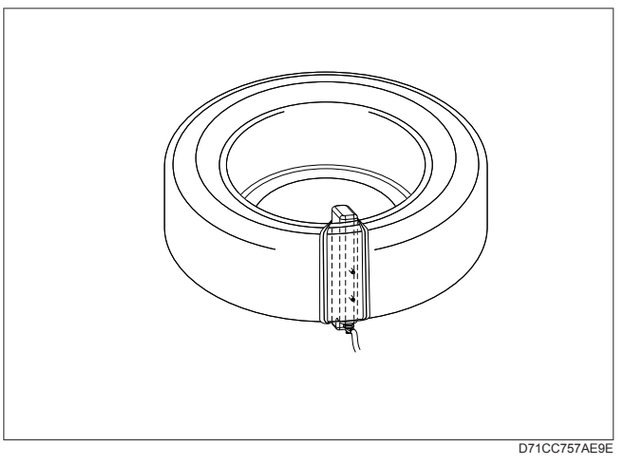
- Tighten the fastener according to the specified torque value.
- Even if you are replacing a new airbag module, check that the airbag module is damaged or defective before installation.
- After installation, put the ignition switch in the ON position. Normally, the airbag warning indicator should turn on for about 6 seconds and then go off.

Discard

Warning

- Before removing, turn off the ignition switch and disconnect negative terminal of the battery. Wait for 90 seconds before carrying out the operation.
- Place a removed airbag in a clean, dry location with the deployed face up.

1. Remove airbag assembly from the vehicle
2. Firmly fix airbag assembly on the tire

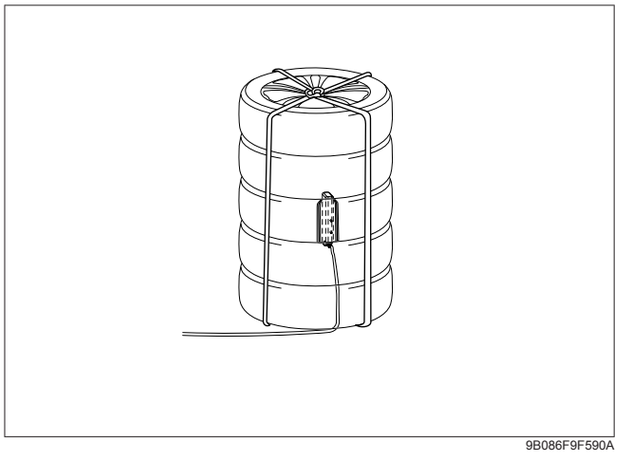


D71CC757AE9E

Warning

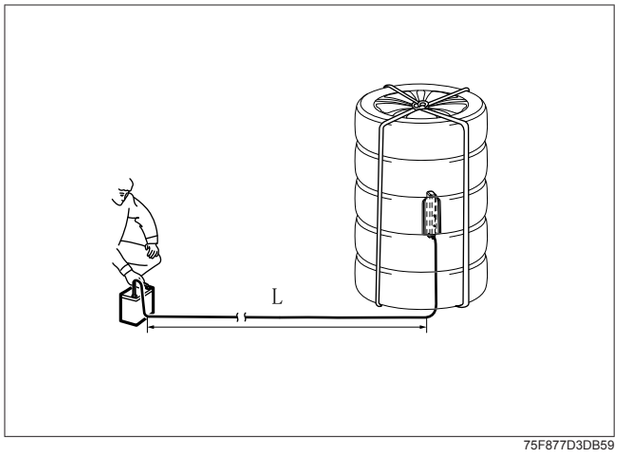
- Make sure it is firmly in place and it won't become loose.
- Deployed face of the airbag faces the inside of the tire.
- Tires may be damaged due to the scrapping of airbags, for this reason, you may use tires that have been discarded.

3. Place at least 2 tires on the tire to which the airbag is fixed, place at least one tire on its top, place one tire with web at the top and fasten all the tires with a strong rope as shown in the diagram



9B086F9F590A

4. Unfold the airbag to ensure L ≥ 10 m and regional safety



75F877D3DB59

5. Put the deployed airbag in a plastic bag and tighten it before further processing

⚠ Warning

- After the airbag is deployed, it becomes very hot, so do not touch it for at least 30 minutes after deployment.

Side curtain airbag assembly

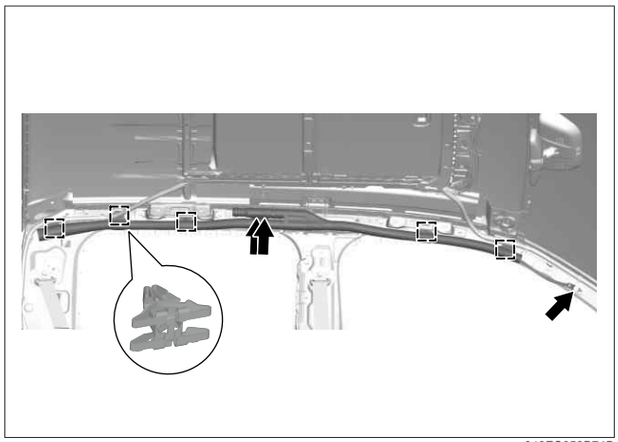
Removal/installation

Removal

Notice

- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Remove the roof cover inner trim plate
4. Disconnect 1 harness connector, and remove 3 fixing bolts and 5 clips from side curtain airbag assembly



348FC658B71B

5. Remove the side curtain airbag assembly

Installation

1. Perform installation work in reverse order of removal

Caution

- Tighten the fastener according to the specified torque value.
- Cable around the curtain airbag and water pipe should pass through the upper part of the curtain airbag and fix, and cannot wind the curtain airbag.
- The curtain airbag should pass below the pillar A's interior trim plate secondary retaining fastener (be careful when installing the pillar A's interior trim plate). Otherwise, the side curtain airbag will not deploy normally, resulting in serious injuries.
- After installation, put the ignition switch in the ON position. Normally, the airbag warning indicator should turn on for about 6 seconds and then go off.

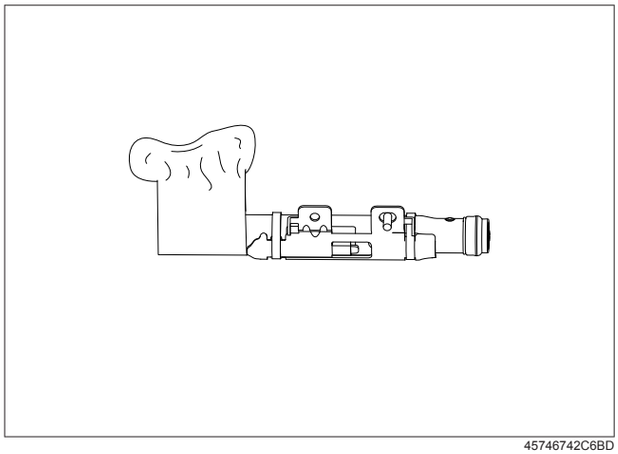
Discard

Warning

› Before removing, turn off the ignition switch and disconnect negative terminal of the battery. Wait for 90 seconds before carrying out the operation.

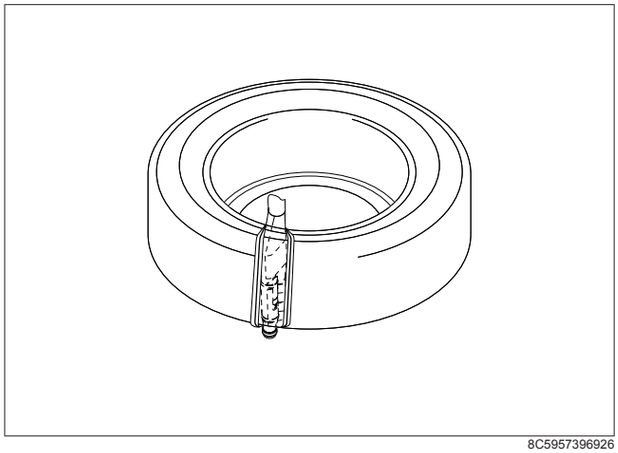
› Place a removed curtain airbag in a clean, dry location with the deployed face up.

1. Remove the side curtain airbag from the vehicle
2. Cut off the unfolding section of the left side curtain airbag



45746742C6BD

3. Fix firmly the side curtain airbag onto the tire



8C5957396926

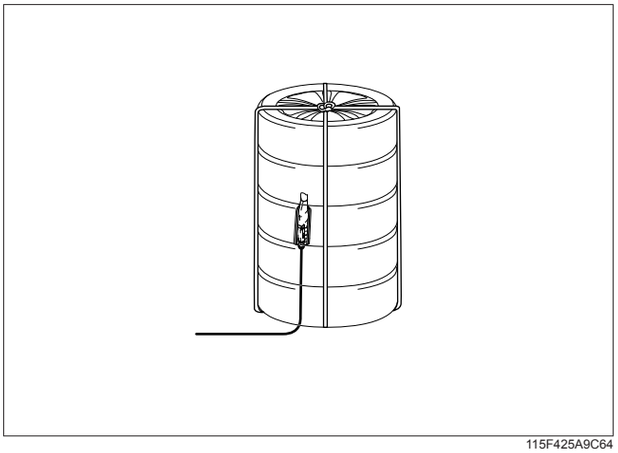
Notice

› Make sure it is firmly in place and it won't become loose.

› Tires may be damaged due to the scrapping of airbags, for this reason, you may use tires that have been discarded.

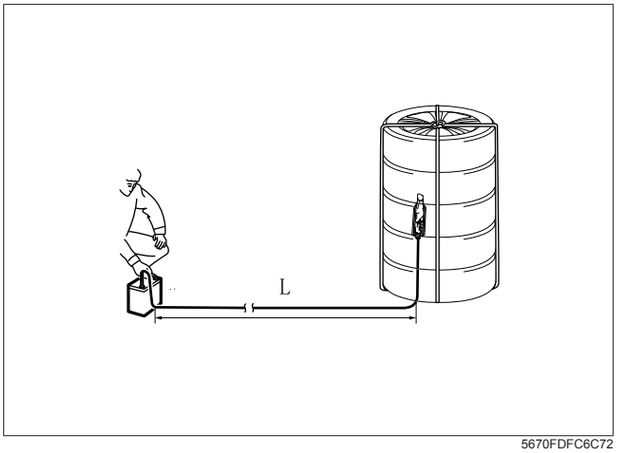
› Deployed face of the curtain airbag faces the inside of the tire.

4. Place at least 2 tires under the side curtain airbag fixed tires, place at least 1 tire on its top, place 1 tire with spokes on the top, and fasten all the tires with a tight rope as shown in the figure



115F425A9C64

5. Expand the airbag to ensure that L ≥ 10 m and regional safety



5670FDFC6C72

6. Put the deployed curtain airbag in a plastic bag and tighten it before further processing

Notice

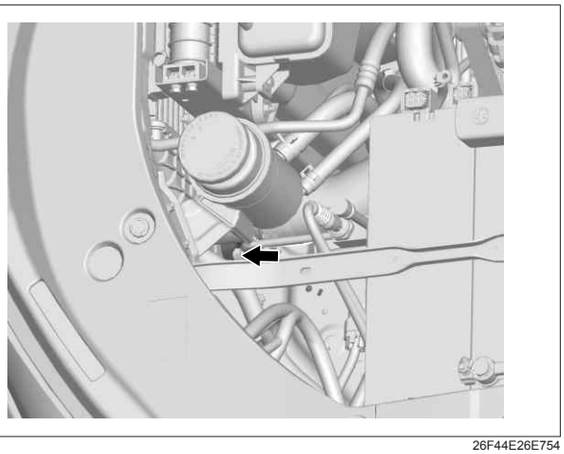
› After the curtain airbag is deployed, it becomes very hot, so do not touch it for at least 30 minutes after deployment.

Front collision sensor

Removal/installation

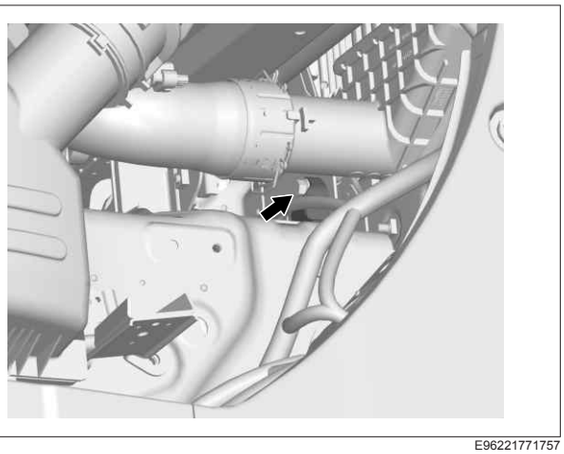
Removal

1. Turn off the ignition switch.
2. Disconnect negative terminal of the battery and then wait for 90 s
3. Remove 1 fixing bolt, disconnect harness connector, and remove front left collision sensor



26F44E26E754

4. Remove 1 fixing bolt, disconnect harness connector, and remove front right collision sensor



E96221771757

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

Notice

› The collision sensor has positive and negative pole. When connecting the plug-in connector, please make sure that the positive and negative poles are connected correctly.

› After installation, put the ignition switch in the ON position. Normally, the airbag warning indicator should turn on for about 6 seconds and then go off.

Side collision sensor

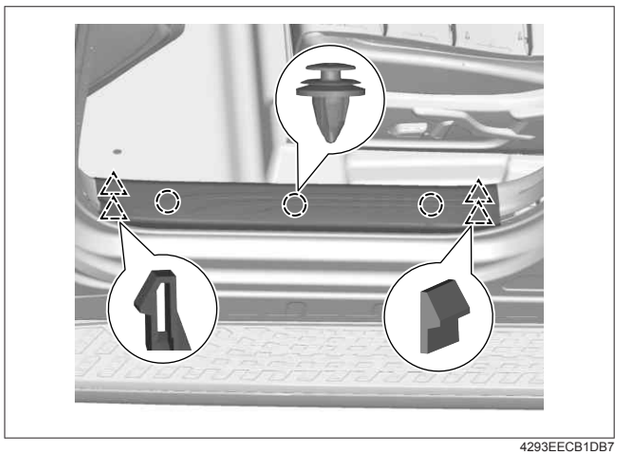
Removal/installation

Removal

Notice

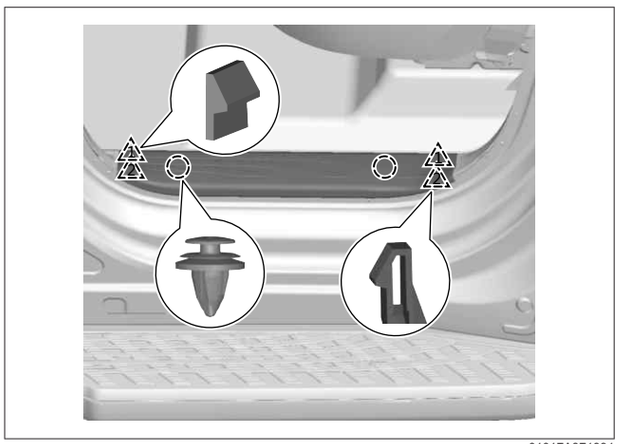
- Wear gloves to protect your hands.
- Take care to avoid damaging other interior trims.
- Take the left side as example. The removal of right side is the same with it.

1. Move front seat to front end
2. Turn off the ignition switch.
3. Disconnect negative terminal of the battery and then wait for 90 s
4. Pry off 3 snaps and 4 dogs, and remove front sill trim plate assembly



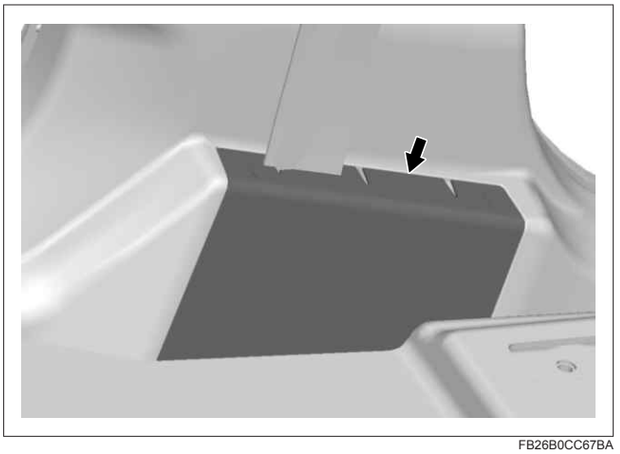
4293EECB1DB7

5. Pry off 2 snaps and 4 dogs, and remove rear door sill trim plate assembly



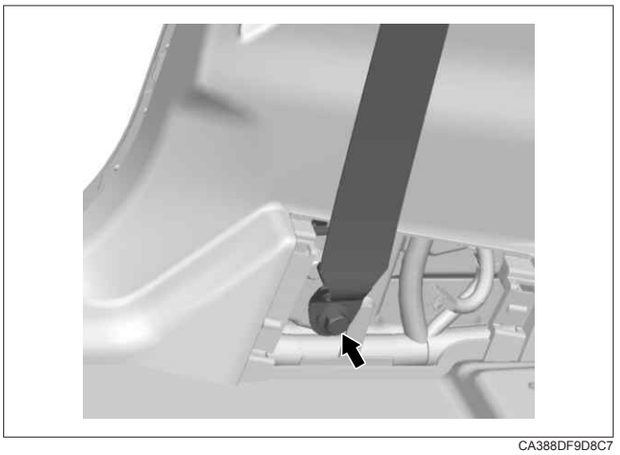
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6. Remove some of front/rear door frame seals
7. Remove the lower fixing point cover plate of the front seat belt



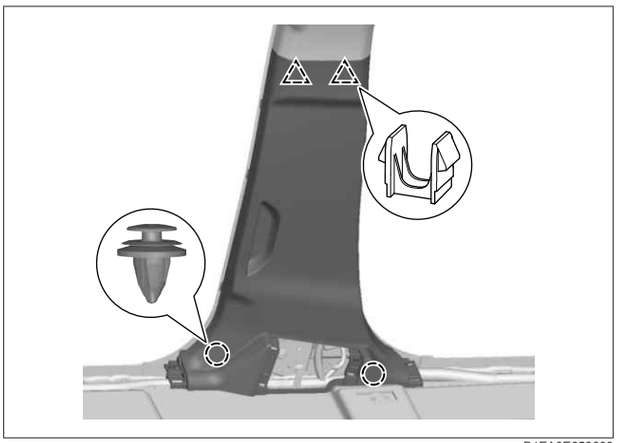
FB26B0CC67BA

8. Disconnect the connection between the lower end of front seat belt and the body



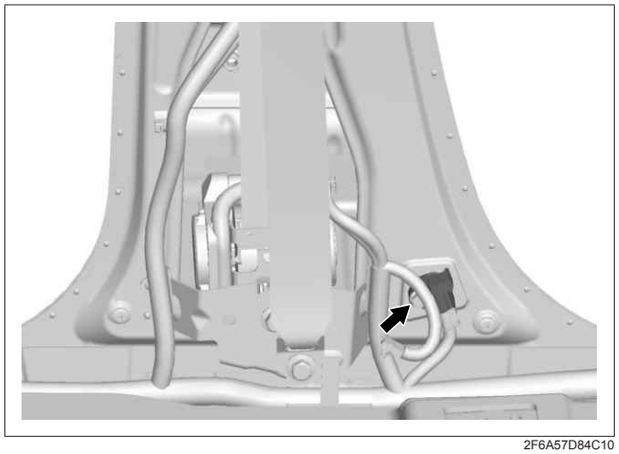
CA388DF9D8C7

9. Pry off 2 snaps and 2 dogs, and remove pillar B lower trim plate assembly



B4EA0E658603

10. Remove 1 bolt, disconnect harness connector, and remove side collision sensor



2F6A57D84C10

Installation

1. Perform installation work in reverse order of removal

⚠ Caution

› Tighten the fastener according to the specified torque value.

ℹ Notice

› The collision sensor has positive and negative pole. When connecting the plug-in connector, please make sure that the positive and negative poles are connected correctly.

› After installation, put the ignition switch in the ON position. Normally, the airbag warning indicator should turn on for about 6 seconds and then go off.

Lighting system

Lighting system .....53－1
System description .....53－1
Location diagram .....53－2
System diagram .....53－3
Specified torque .....53－5
Fault symptom checklist .....53－6
Combination headlamps .....53－11
Pin definition .....53－11
Removal/installation .....53－11
Adjustment .....53－12
Combination headlamp adjustment motor .....53－14
Removal/installation .....53－14
Combination rear lamp .....53－15
Pin definition .....53－15
Removal/installation .....53－15
Front fog lamps .....53－16
Pin definition .....53－16
Removal/installation .....53－16
Front fog lamp bulb .....53－17
Removal/installation .....53－17
High-mounted brake lamp .....53－18
Pin definition .....53－18
Removal/installation .....53－18
License plate lamp .....53－19
Pin definition .....53－19
Removal/installation .....53－19
Reading lamp .....53－20
Pin definition .....53－20
Removal/installation .....53－21
Control switch .....53－22
Pin definition .....53－22
Removal/installation .....53－22
Hazard warning lamp switch .....53－23
Pin definition .....53－23
Removal/installation .....53－23
Light combination switch .....53－25
Pin definition .....53－25
Removal/installation .....53－26
Zero adjustment .....53－27
Rear retro-reflector .....53－28
Removal/installation .....53－28

Lighting system

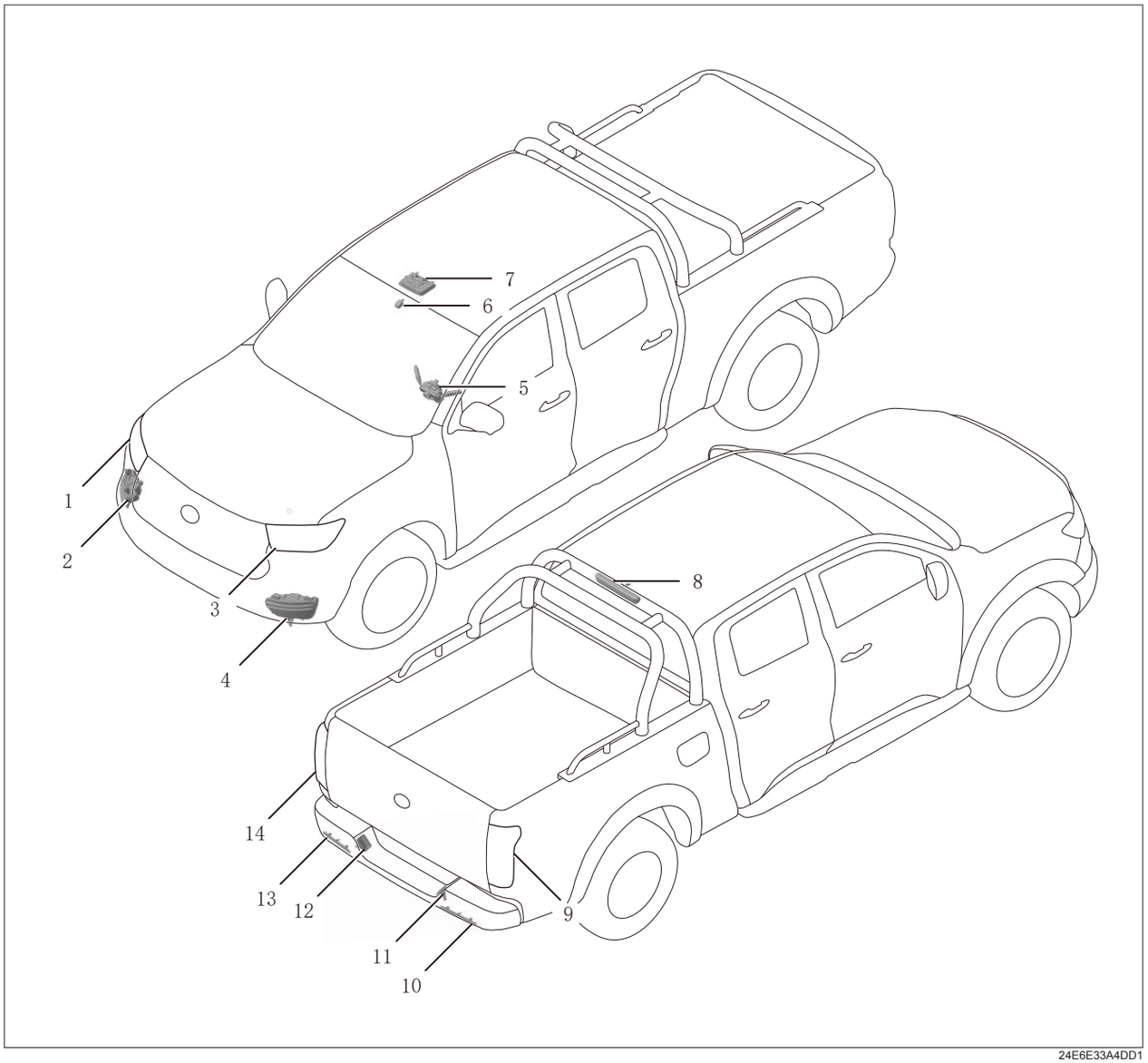
System description

Lighting system provides lighting for vehicle at night. The exterior lighting lamps mainly include front combination lamp, rear combination lamp, license plate lamp, fog lamp, etc. The interior lighting lamps mainly include reading lamp and various background lamps. Various lamps are installed in the respective required lighting positions and equipped with respective control switches, lines and fuses to form a lighting system. Lighting system also has a signal prompt function, which generates optical signals to warn drivers of other vehicles and pedestrians to draw attention, including steering signal, brake signal, danger warning signal and profile signal, reversing signal, etc., so as to ensure the safety of the vehicle.

Rainfall and light sensor

Rainfall and light sensors are installed on the front windshield and the bottom of inside rearview mirror, and transmit rainfall and light information to BCM through LIN line. The BCM controls the automatic wiper and the automatic lighting system based on the information from the rainfall sensor. When the wiper switch is in the AUTO position, the wiper system automatically adjusts the interval time according to the external rainfall. When the light combination switch is in the AUTO position, the lighting system automatically turns on the low beam lamp and the position lamp according to external lighting conditions.

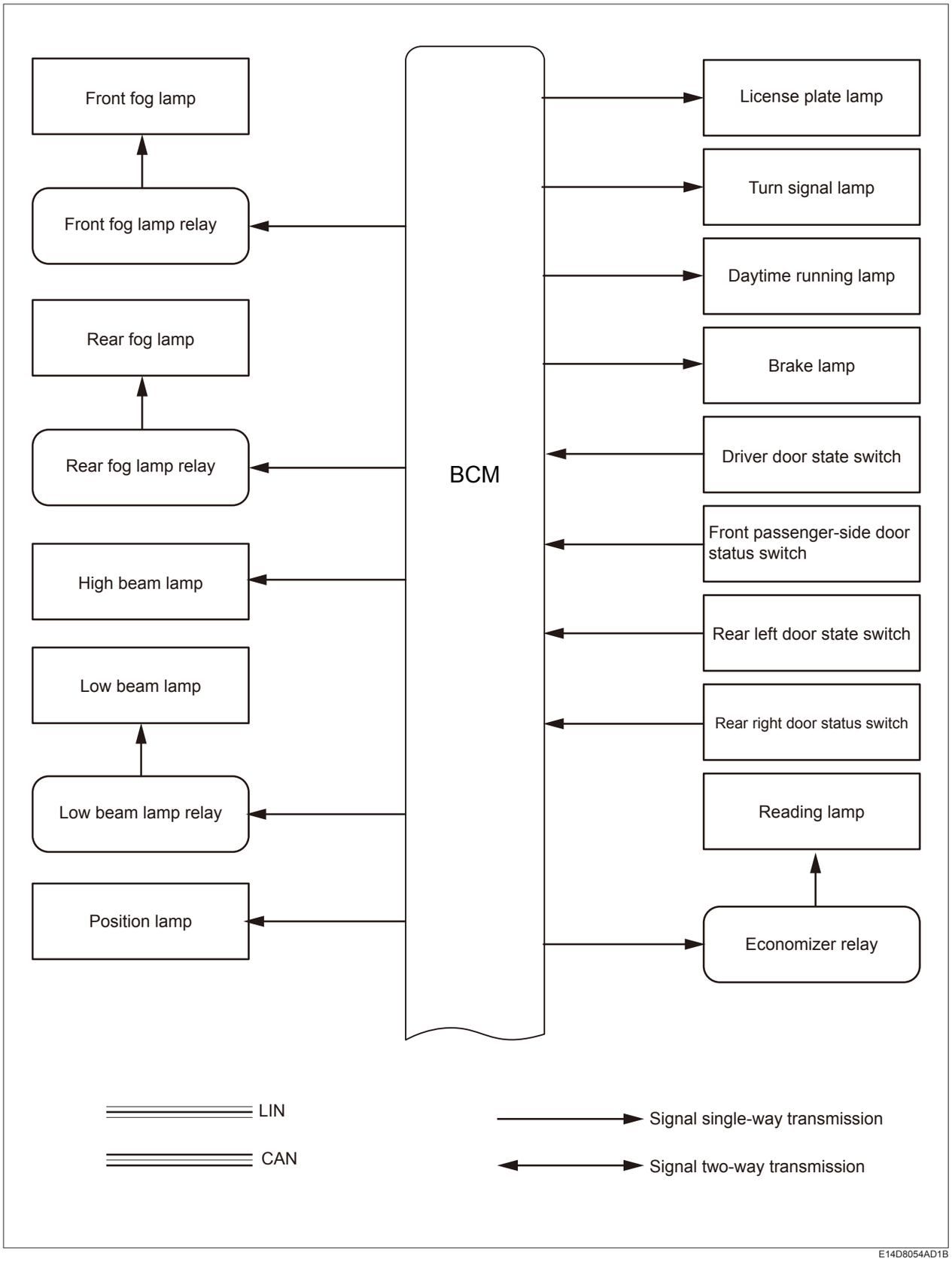
Location diagram

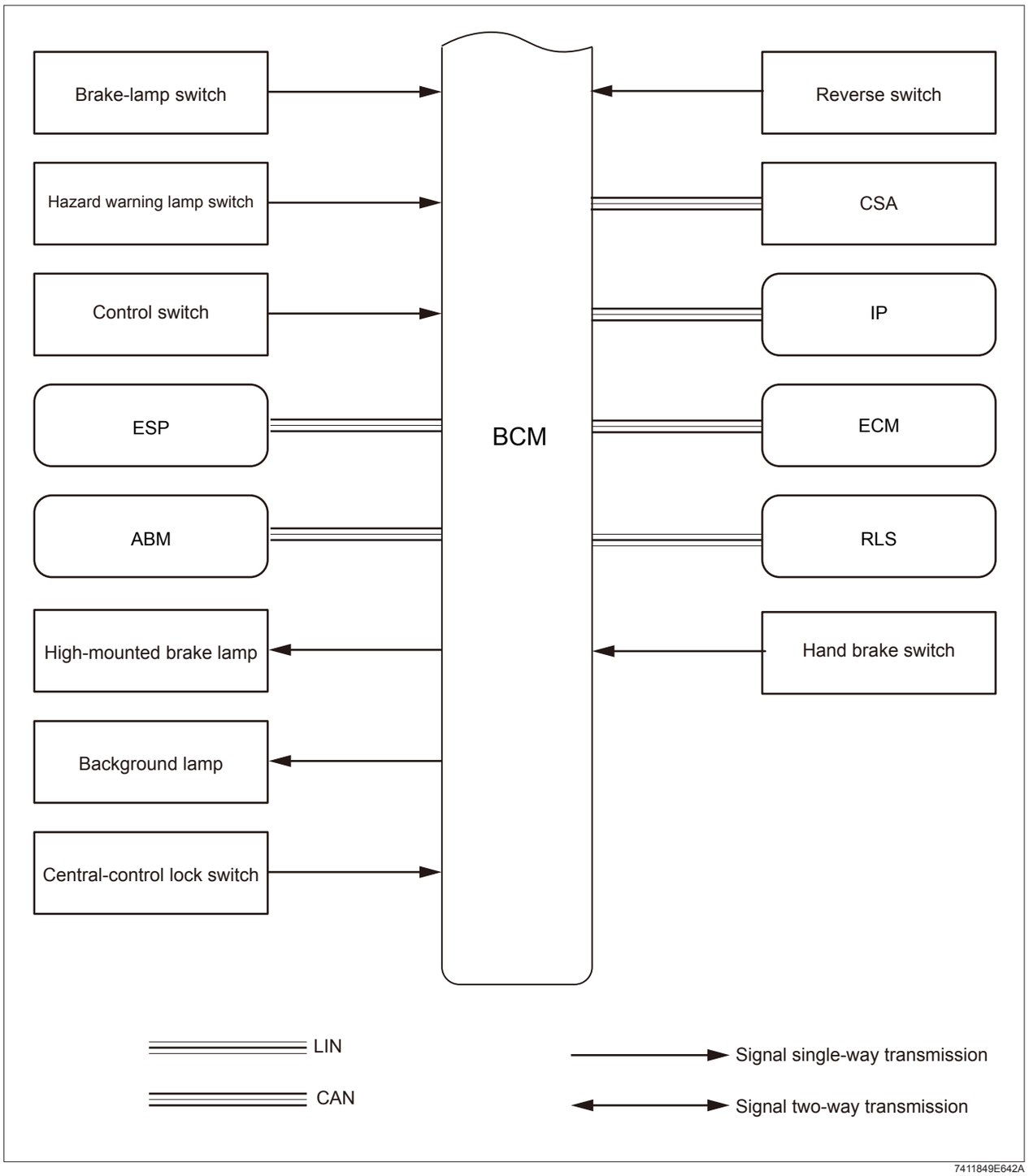


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1. Right combination headlamp
2. Front right fog lamp
3. Left combination headlamp
4. Front left fog lamp
5. Combination switch
6. Rainfall and light sensor
7. Reading lamp
8. High-mounted brake lamp
9. Right combination rear lamp
10. Rear right retro-reflector
11. Right license plate lamp
12. Left license plate lamp
13. Rear left retro-reflector
14. Left combination rear lamp

System diagram





7411849E642A

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Combination headlamp assembly × vehicle body sheet metal	6±3	8	—
Bolt	Combination rear lamp × trunk sheet metal	6±3	4	—

Fault symptom checklist

Symptom	Suspected Portions
The low beam lamp does not light up (one side)	1. LED
	2. Fuse
	3. Harness
Low beam lamps do not light up (all)	1. Fuse
	2. Combination switch
	3. LED
	4. Harness
	6. BCM
Low beam lamps are dim	1. LED
	2. Harness
	3. BCM
Low beam lamp flashes	1. LED
	2. Harness
	3. BCM
Low beam lamps are normally on	1. Harness
	2. Combination switch
High beam lamp does not light up (one side)	1. LED
	2. Harness
	3. Fuse
High beam lamps does not light up (all)	1. Fuse
	2. Combination switch assembly
	3. LED
	4. Harness
	5. BCM
High beam lamps are dim	1. LED
	2. Harness
	3. BCM
High beam flashing	1. LED
	2. Harness
	3. BCM
High beam lamps are normally on	1. Harness
	2. Combination switch assembly
The front left position lamp does not light up	1. LED
	2. Harness

Symptom	Suspected Portions
The front right position lamp does not light up	1. LED
	2. Harness
The rear left position lamp does not light up	1. LED
	2. Harness
The rear right position lamp does not light up	1. LED
	2. Harness
Position lamps do not light up (all)	1. BCM
	2. Harness
	3. Combination switch
	4. Relay
	5. Fuse
Position lamps are normally on (all)	1. Harness
	2. BCM
	3. Combination switch
	4. Relay
The left front fog lamp does not light up	1. Fuse
	2. Relay
	3. Control switch
	4. Bulb
	5. Harness
	6. BCM
The right front fog lamp does not light up	1. Fuse
	2. Relay
	3. Control switch
	4. Bulb
	5. Harness
	6. BCM
Front fog lamp do not light up (all)	1. Control switch
	2. Bulb
	3. Harness
	4. BCM
	5. Fuse

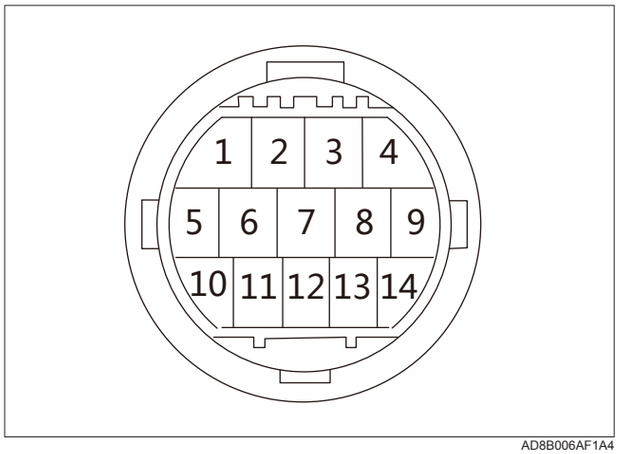
Symptom	Suspected Portions
Front fog lamp is always lit	1. Control switch
	2. Harness
	3. BCM
	4. Relay
Rear fog lamps does not light up (all)	1. Control switch
	2. Harness
	3. BCM
Rear fog lamps are normally on	1. Control switch
	2. Harness
	3. BCM
Rear fog lamp does not light up (one side)	1. LED
	2. Harness
Turn signal lamps do not light up (all)	1. Harness
	2. BCM
	3. LED
	4. Combination switch assembly
Turn signal lamp does not work (on one side)	1. Combination switch assembly
	2. LED
	3. Harness
Turn signal lamp is always on	1. Harness
	2. BCM
	3. Relay
	4. Combination switch
Brake lamps do not light up (all)	1. Brake lamp switch assembly
	2. Harness
	3. LED
	4. BCM
Brake lamps are normally on	1. Brake lamp switch assembly
	2. Harness
	3. BCM
Brake lamp does not light up (one side)	1. LED
	2. Harness
	3. BCM

Symptom	Suspected Portions
High-mount brake lamps do not light up (at the same time, the brake lamp is on)	1. Brake switch assembly
	2. Harness
	3. LED
	4. BCM
High-mount brake lamps do not light up (at the same time, the brake lamp is not on)	1. Brake switch assembly
	2. Harness
	3. BCM
High-mount brake lamps are normally on	1. Brake switch assembly
	2. Harness
	3. BCM
Reverse lamps do not light up	1. LED
	2. Fuse
	3. Reversing lamp switch assembly
	4. Harness
	5. BCM
Reverse lamps are normally on	1. Reversing lamp switch assembly
	2. Harness
	3. BCM
Reading lamp does not light up	1. LED
	2. Harness
	3.BCM
	4. Economizer relay
	5. Economizer relay fuse
The reading lamp does not light up when the doors are opened at the DOOR position	1. Bulb
	2. Relay
	3. Door lamp switch
	4.BCM
Daytime running lamps do not light up	1. Harness
	2. BCM
	3. LED
Automatic lamp control system does not work	1. Light combination switch
	2. BCM
	3. Rainfall and light sensor
	4. Harness
	5. Backup power supply fuse

Symptom	Suspected Portions
Hazard warning indicator does not work	1. Central control switch assembly
	2. Harness
	3. BCM
License-plate lamp does not work (on one side)	1. Bulb
	2. Harness
	3. GND
License plate lamps are normally on (all)	1. Harness
	2. BCM
	3. Light combination switch
	4. Relay
License plate lamps do not light up (all)	1. Bulb
	2. Harness
	3. BCM
	4. Light combination switch
	5. Relay
	6. Fuse

Combination headlamps

Pin definition



AD8B006AF1A4

Pin No.	Function
1	Electric regulating power
2	Daytime running lamp/position lamp GND
3	Front turn signal lamp power
4	Low beam lamp GND
5	Electric regulator signal
6	Daytime running lamp power
7	Front turn signal lamp GND
8	Low beam lamp power
9	Position lamp power
10	Electric regulator GND
11	Switching signal of high beam
12	Diagnostic signal of turn signal lamp
13	Flow-enabled signal of turn signal lamp
14	—

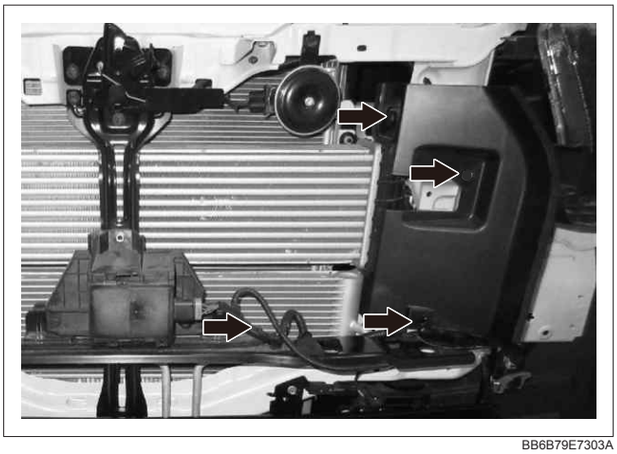
Removal/installation

Removal

⚠ Caution

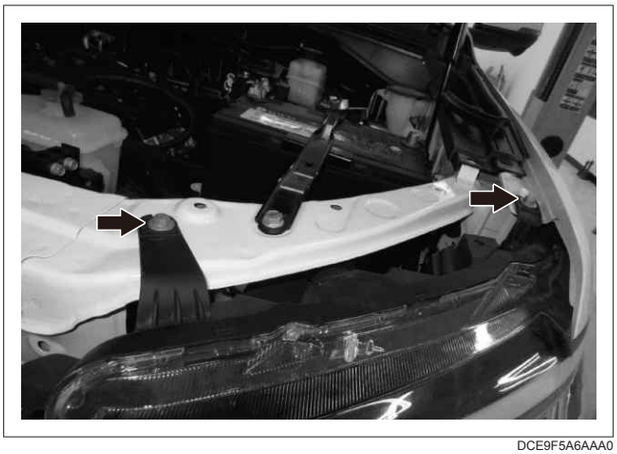
› Do not clean the lamp shade using chemical solvents or aggressive cleaning agents so as to avoid damage to it while replacing or repairing a lamp.

1. Disconnect the negative terminal of the battery.
2. Remove front bumper assembly
3. Separate 3 snaps, and remove deflector



BB6B79E7303A

4. Remove 4 bolts



DCE9F5A6AAA0



09FD5F96C53E



9C0A45BBFC55

5. Disconnect harness connector, and remove combination headlamp assembly

Installation

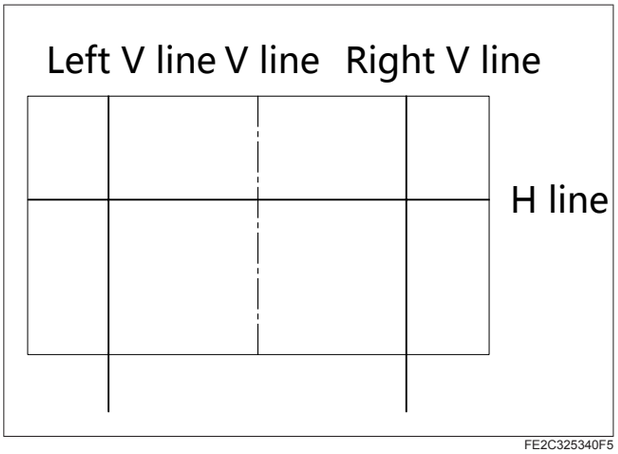
1. Perform installation work in reverse order of removal

Adjustment

Notice

- Check and make sure that there are no signs of damage or deformation in the area around the front combination lamp.
- The vehicle should be on a full fuel tank.
- Tire pressure levels are within specifications.
- Vehicle is parked on a flat horizontal surface.
- A person of ordinary weight is seated in the driver's seat.
- Move the vehicle from top to bottom to stabilize suspension at normal position.

1. Prepare a thick sheet of white paper
2. Lean the piece of paper against the wall vertically
3. Draw a straight line (V-line) down the center of the sheet and align the line with the center of the vehicle
4. Draw a horizontal line equidistant (H-line) between the high beam lamp and vehicle height as measured from the ground on the sheet of paper
5. Draw left and right vertical lines (Left and right V-line) along where the high beam lamp center markings are

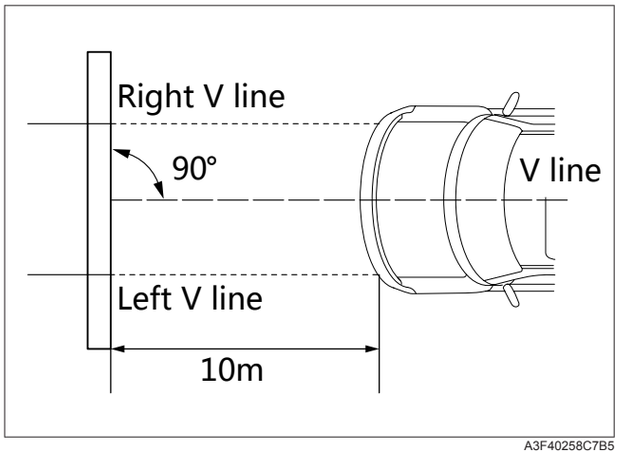


FE2C325340F5

Notice

- The baselines used for inspecting the low beam lamp and high beam lamp are the same.

6. Place the sheet of paper 10 m from the front combination lamp of the vehicle, against the wall, and with H-line at the same height as the center marking
7. Align V-line on the sheet with the center of the vehicle, and make sure that the sheet forms a 90 ° angle against the V-line



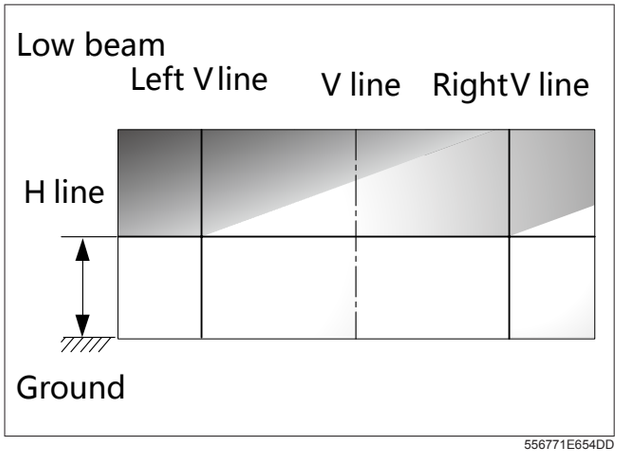
A3F40258C7B5

Notice

› When checking low beam lamp focusing, turn off the high beam lamp or disconnect high beam headlamp connector.

› Adjust the low beam lamp in the same way.

8. Start the engine
9. Open the front combined lamp and turn beam focusing screw using a screwdriver to adjust the front combined lamp low beam focusing to the specified value as shown in the diagram



556771E654DD

Notice

› When turning the screwdriver clockwise, the optical axis downwards; when turning the screwdriver counterclockwise, the optical axis moves axially upwards.

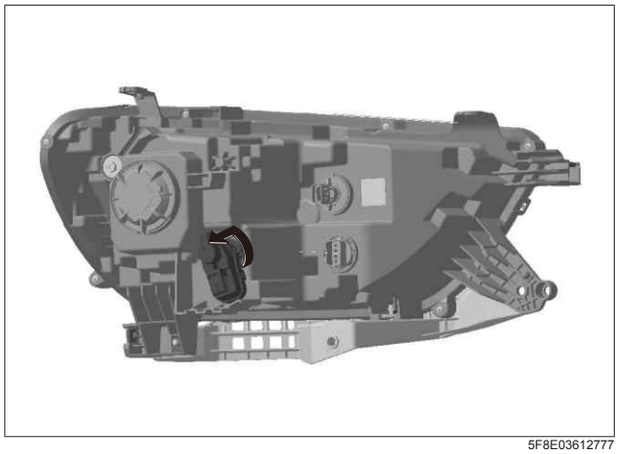
Caution

› When the screw has been overly tightened, loosen the connector and then tighten again to adjust the focusing of the headlamp high beam.

Combination headlamp adjustment motor

Removal/installation

1. Remove combination headlamp assembly
2. Remove dimmer motor for combination headlamp by turning it counterclockwise



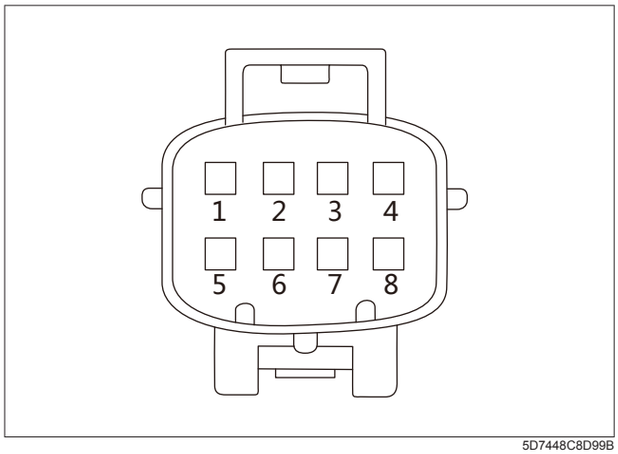
5F8E03612777

Installation

1. Perform installation work in reverse order of removal

Combination rear lamp

Pin definition



5D7448C8D99B

Pin No.	Function
1	Brake lamp power supply
2	Turn signal lamp power
3	Turn signal lamp diagnosis
4	Upper position lamp power
5	GND
6	Rear fog lamp power
7	Reverse lamp power
8	Lower position lamp power

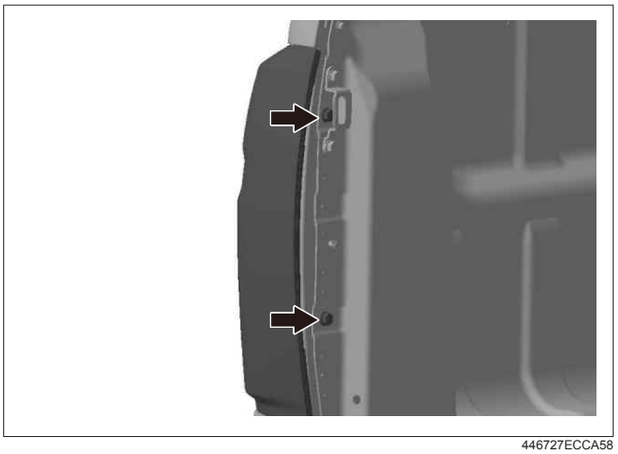
Removal/installation

Removal

Notice

› Do not clean the lamp shade using chemical solvents or aggressive cleaning agents so as to avoid damage to it while replacing or repairing a lamp.

1. Open rear trunk plate
2. Disconnect the negative terminal of the battery.
3. Remove 2 bolts



446727ECCA58

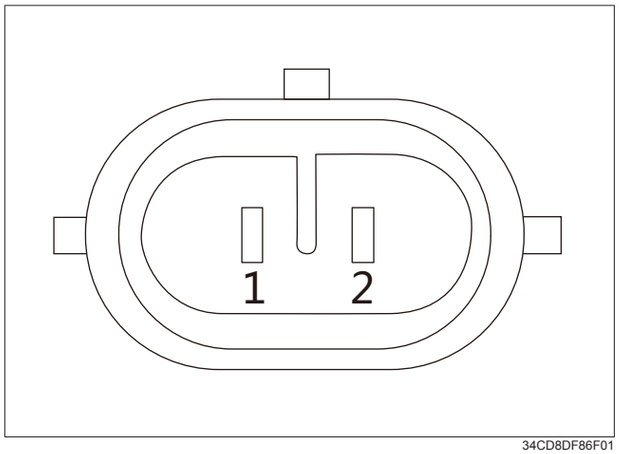
4. Separate the clips to the side of the vehicle and remove combination rear lamp
5. Disconnect harness connector

Installation

1. Perform installation work in reverse order of removal

Front fog lamps

Pin definition



34CD8DF86F01

Pin No.	Function
1	Negative terminal
2	Positive terminal

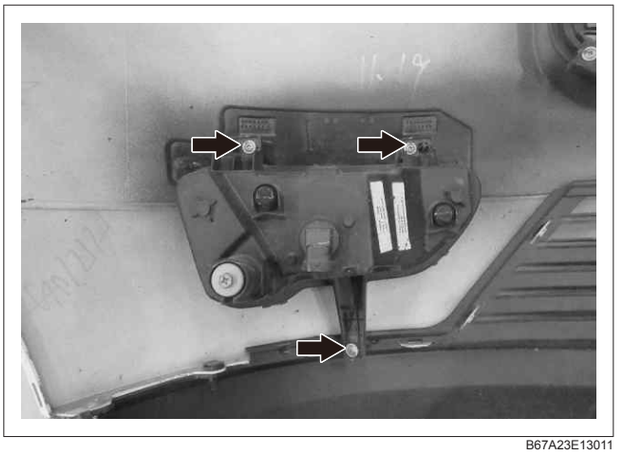
Removal/installation

Removal

Notice

› Do not clean the lamp shade using chemical solvents or aggressive cleaning agents so as to avoid damage to it while replacing or repairing a lamp.

1. Disconnect the negative terminal of the battery.
2. Remove front bumper
3. Remove 3 screws



B67A23E13011

4. Disconnect harness connector

Installation

1. Perform installation work in reverse order of removal

Front fog lamp bulb

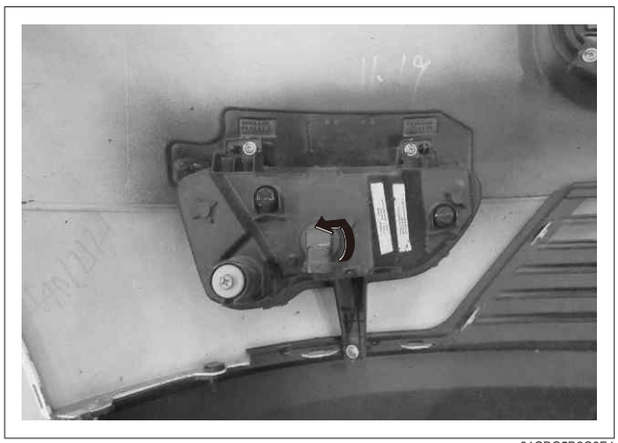
Removal/installation

Removal

Notice

- Do not touch the bulb glass part with your hands when the bulb is replaced. You must wear clean gloves to prevent the glass bulb shell smudgy from affecting the service life of the bulb.
- Always replace a bulb with the same power.

1. Disconnect the negative terminal of the battery.
2. Remove front bumper assembly
3. Rotate counterclockwise to remove front fog lamp bulb



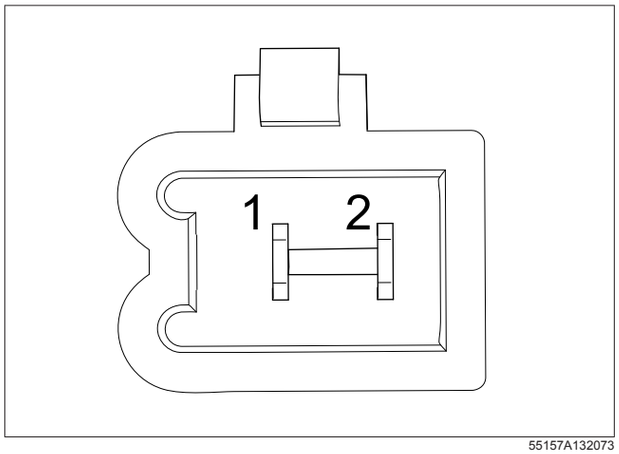
31CBC5B2C8F4

Installation

1. Perform installation work in reverse order of removal

High-mounted brake lamp

Pin definition



55157A132073

Pin No.	Function
1	Ground
2	Power

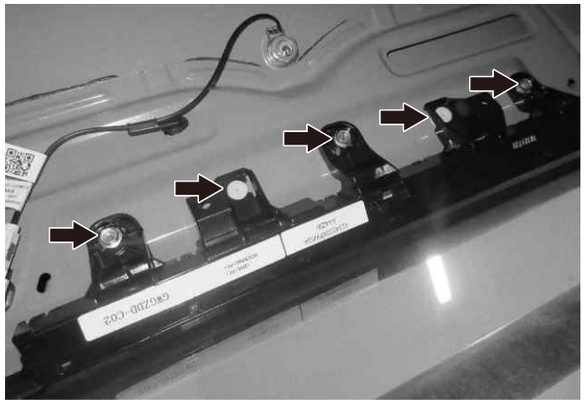
Removal/installation

Removal

Notice

› Do not clean the lamp shade using chemical solvents or aggressive cleaning agents so as to avoid damage to it while replacing or repairing a lamp.

1. Disconnect the negative terminal of the battery.
2. Remove roof inner trim plate
3. Remove 3 bolts, and separate 2 snaps



3571ACD76547

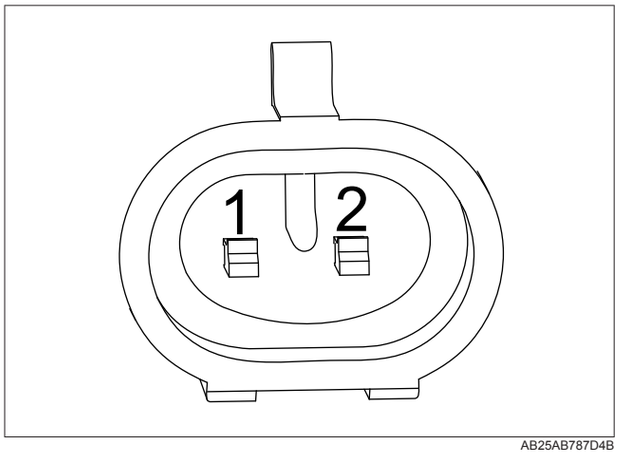
4. Disconnect harness connector, and remove high-mount brake lamp assembly

Installation

1. Perform installation work in reverse order of removal

License plate lamp

Pin definition



AB25AB787D4B

Pin No.	function
1	Power supply
2	GND

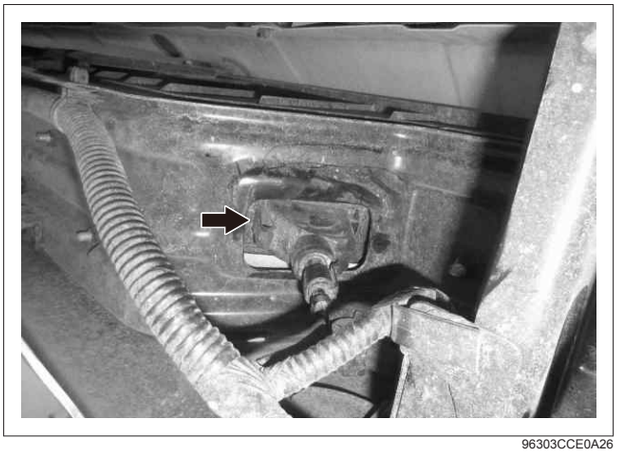
Removal/installation

Removal

Notice

› Do not clean the lamp shade using chemical solvents or aggressive cleaning agents so as to avoid damage to it while replacing or repairing a lamp.

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle properly
3. Separate snaps, and remove license plate lamp assembly



96303CCE0A26

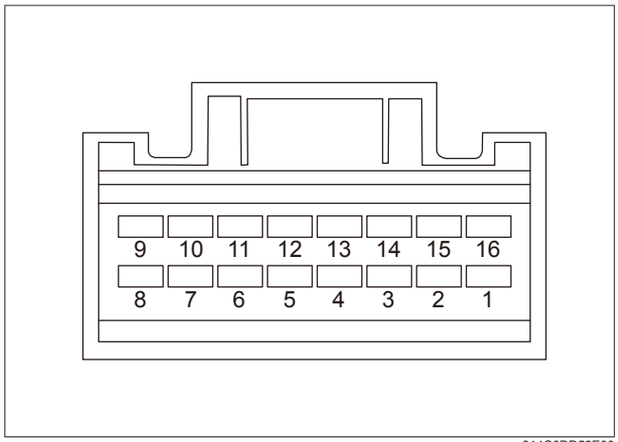
4. Disconnect harness connector

Installation

1. Perform installation work in reverse order of removal

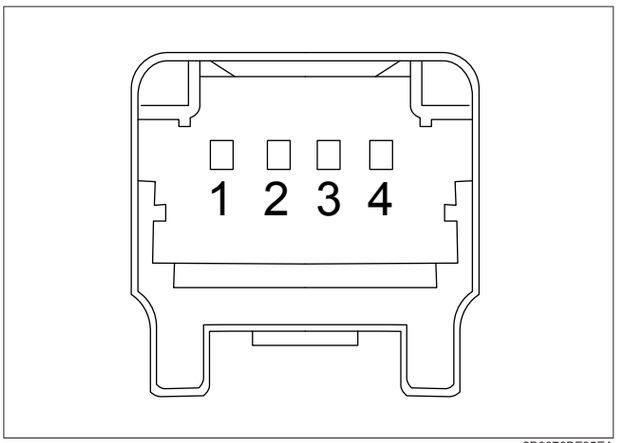
Reading lamp

Pin definition



814C6DD52E80

Pin No.	Function
1	GND
2	Power supply
3	—
4	—
5	—
6	—
7	—
8	—
9	Gated input
10	—
11	—
12	—
13	—
14	—
15	—
16	—



2B3078BF95EA

Pin No.	Function
1	Microphone power supply
2	Microphone GND
3	—
4	—

Removal/installation

Removal

Notice

› Do not clean the lamp shade using chemical solvents or aggressive cleaning agents so as to avoid damage to it while replacing or repairing a lamp.

1. Disconnect the negative terminal of the battery.
2. Pry open the clip, and remove reading lamp assembly from back to front



935CB09B1D2C

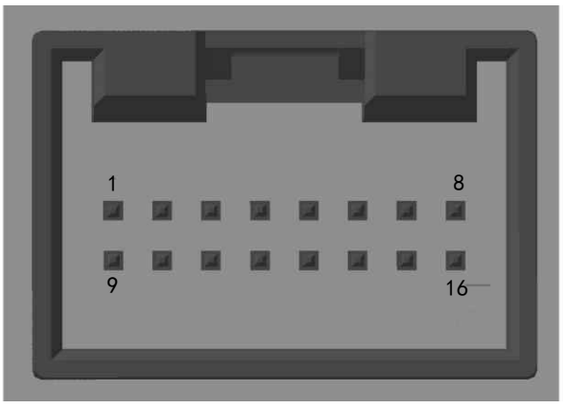
3. Disconnect harness connector

Installation

1. Perform installation work in reverse order of removal

Control switch

Pin definition



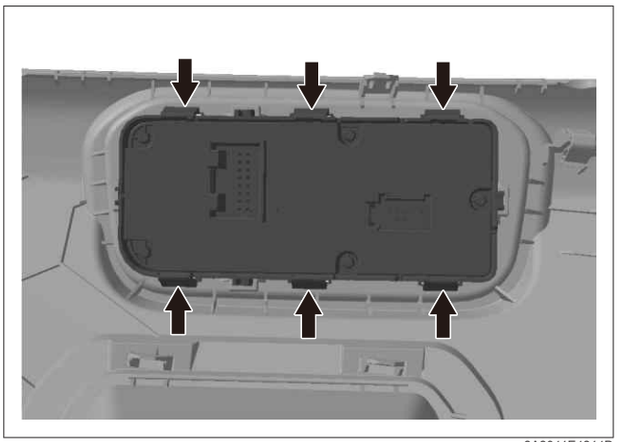
9E6C94CD4A5D

Pin No.	Function
1	Headlamp adjustment input
2	Headlamp adjustment output
3	—
4	DPF input
5	—
6	DPF output
7	—
8	Ground
9	Backlight brightness adjustment +
10	—
11	Backlight brightness adjustment ground
12	—
13	Backlight brightness adjustment -
14	—
15	—
16	Backlight power

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove driver knee trim plate of instrument panel
3. Press the control switch clip, and push out the control switch



2A2341E4214D

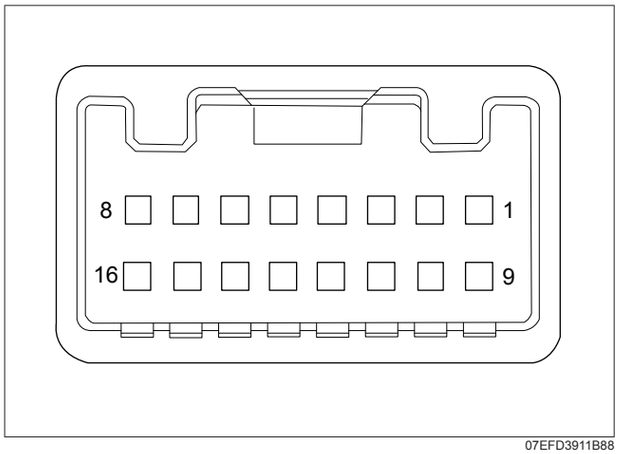
4. Disconnect harness connector of control switch

Installation

1. Perform installation work in reverse order of removal

Hazard warning lamp switch

Pin definition



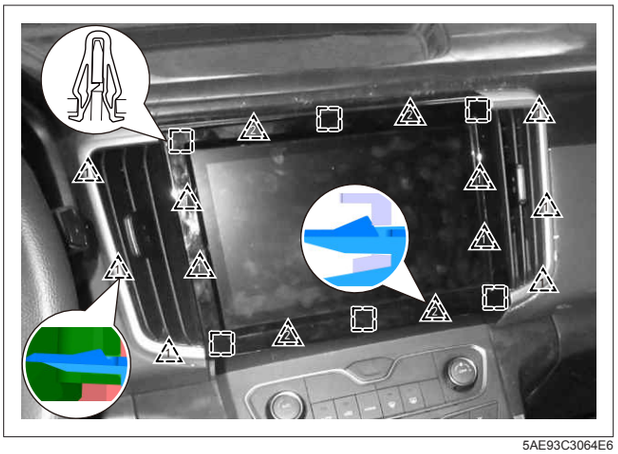
07EFD3911B88

Pin No.	Function
1	Airbag OFF indicator
2	—
3	Danger warning indicator
4	Hazard warning lamp switch
5	LIN
6	—
7	Airbag ON indicator
8	Power
9	Backlight
10	—
11	—
12	HDC switch
13	ESP switch
14	—
15	—
16	Ground

Removal/installation

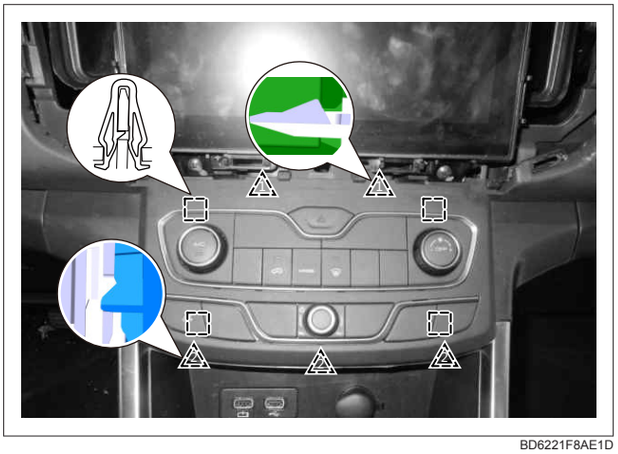
Removal

1. Disconnect the negative terminal of the battery.
2. Separate 6 clips and 14 joints, and remove central air vent assembly of the instrument panel



5AE93C3064E6

3. Separate 4 clips and 5 joints



BD6221F8AE1D

4. Disconnect connectors of the console panel switch



FB5BA43E2F1B

5. Remove console panel switch

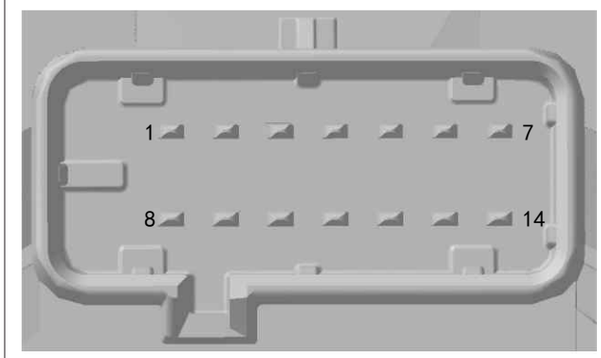
Installation

1. Perform installation work in reverse order of removal

Light combination switch

Pin definition

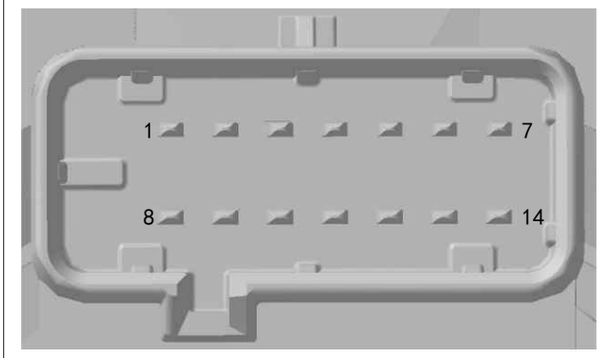
Combination switch



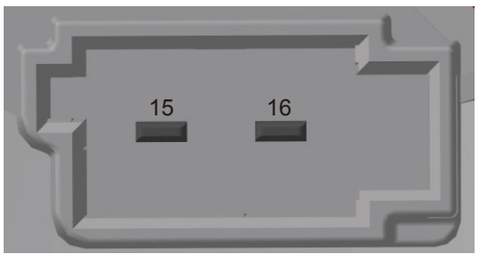
35E36E8B82DC

Pin No.	Function
1	Airbag-
2	Airbag+
3	KL30
4	KL15
5	CAN-H(R/D)
6	CAN-L(R/D)
7	GND
8	—
9	—
10	—
11	—
12	Steering wheel heating+
13	—
14	Steering wheel heating-

Clock spring



35E36E8B82DC



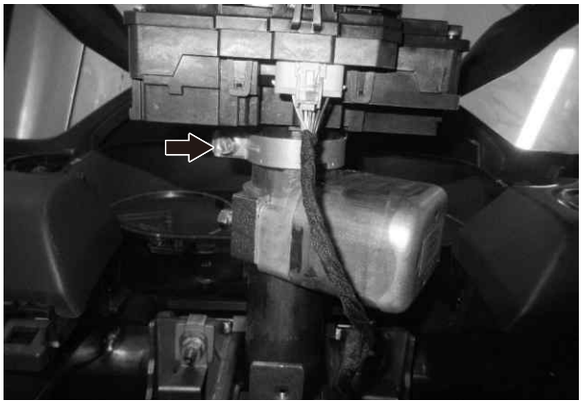
9D628467BE24

Pin No.	Function
1	Airbag+
2	Airbag-
3	KL30
4	LIN (SWC0)
5	Cruise +
6	GND
7	Cruise -
8	—
9	Ground wire of paddle shifter
10	Paddle shifter
11	—
12	—
13	—
14	—
15	Steering wheel heating+
16	Steering wheel heating-

Removal/installation

Removal

1. Turn the steering wheel so that the front wheels are in a straight driving position.
2. Disconnect the negative terminal of the battery.
3. After waiting for 90 s, remove main airbag
4. Remove the steering wheel.
5. Remove upper cover of steering column
6. Remove lower cover of steering column
7. Fix the clock spring at the zero position and loosen 1 bolt.



B150724BBFAD

Notice

› If the clock spring is not in the zero position, adjust it to the zero position.

8. Disconnect connector of combination switch assembly
9. Remove combination switch assembly

Installation

1. Perform installation work in reverse order of removal

Notice

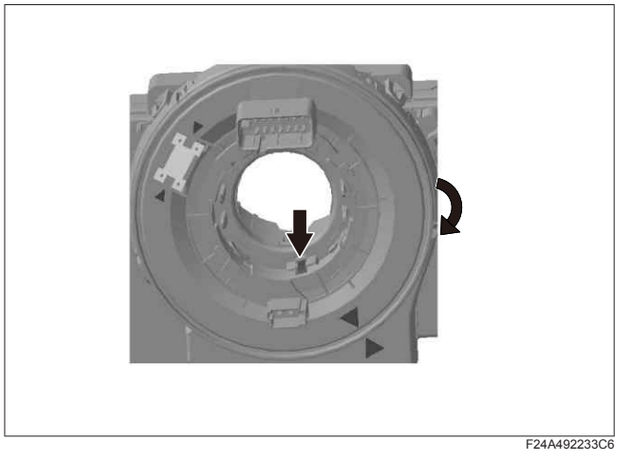
› Make sure that the clock spring is in the zero position before and after installing the combination switch. If the clock spring is fixed with tape, the fixing tape must be removed before reassembly.

› After replacing the combination switch, the scanner shall be connected to flash configuration words.

› After installing the combination switch, the scanner shall be connected to calibrate the SAS.

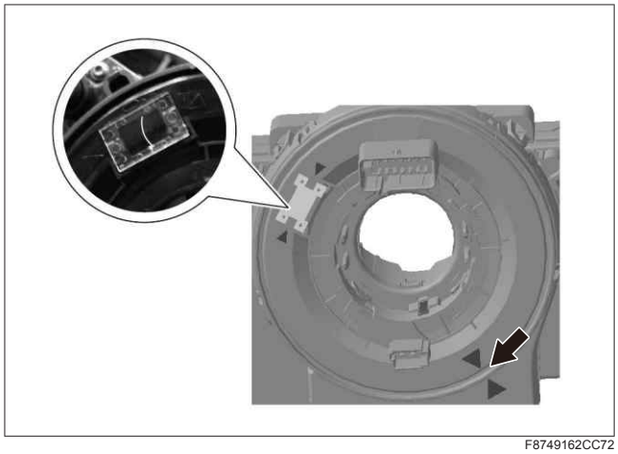
Zero adjustment

1. Press and rotate the self-locking lock pin clockwise to the end (lightly), and when resistance can be felt, it means that the pin is rotated to the end.



F24A492233C6

2. Press and rotate the self-locking lock pin counterclockwise for 3.5 circles.
3. At this time, the two triangle symbols on the clock spring correspond with each other, and a white cable can be seen on the window. This is the zero position of the clock spring.



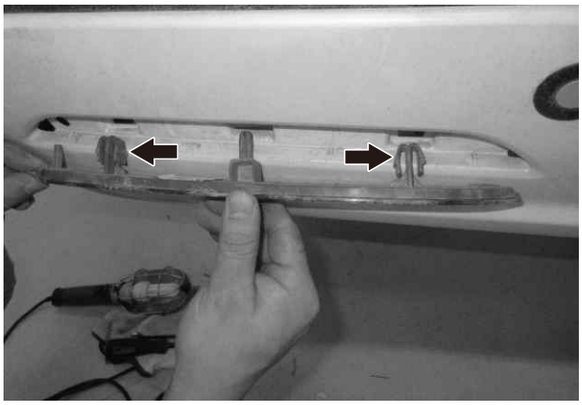
F8749162CC72

Rear retro-reflector

Removal/installation

Removal

1. Lift the vehicle properly
2. Separate clip connector



819B28217A53

3. Remove rear retro-reflector

Installation

1. Perform installation work in reverse order of removal

Wiper & washer

Wipe and wash system .....54－1
System description .....54－1
Location diagram .....54－2
System diagram .....54－3
Specified torque .....54－4
Rainfall and light sensor .....54－5
Pin definition .....54－5
Removal/installation .....54－5
Initialization .....54－6
Front wiper motor .....54－8
Pin definition .....54－8
Removal/installation .....54－8
Front wiper blade - type 1 .....54－10
Removal/installation .....54－10
Inspection .....54－10
Front wiper blade - type 2 .....54－11
Removal/installation .....54－11
Inspection .....54－11
Windshield washer motor .....54－12
Pin definition .....54－12
Removal/installation .....54－12
Washer fluid tank .....54－13
Removal/installation .....54－13
Front washer nozzle .....54－14
Pin definition .....54－14
Removal/installation .....54－14
Adjustment .....54－15
Wiper combination switch .....54－16
Pin definition .....54－16
Removal/installation .....54－17
Zero adjustment .....54－18

Wipe and wash system

System description

Wiper system

The wiper system is mainly composed of wiper arm assembly, wiper blades, front wiper, link and motor assembly. Lever position of combination switch is determined through BCM acquisition, which connects each gear of the front wiper motor respectively. After the motor is energized, the rotary motion of the motor is converted into the swinging motion of the output shaft at the installation position of wiper arm through link mechanism, thus to realize different wiper functions such as jog wiper, intermittent wiper, slow wiper, and fast wiper, etc.

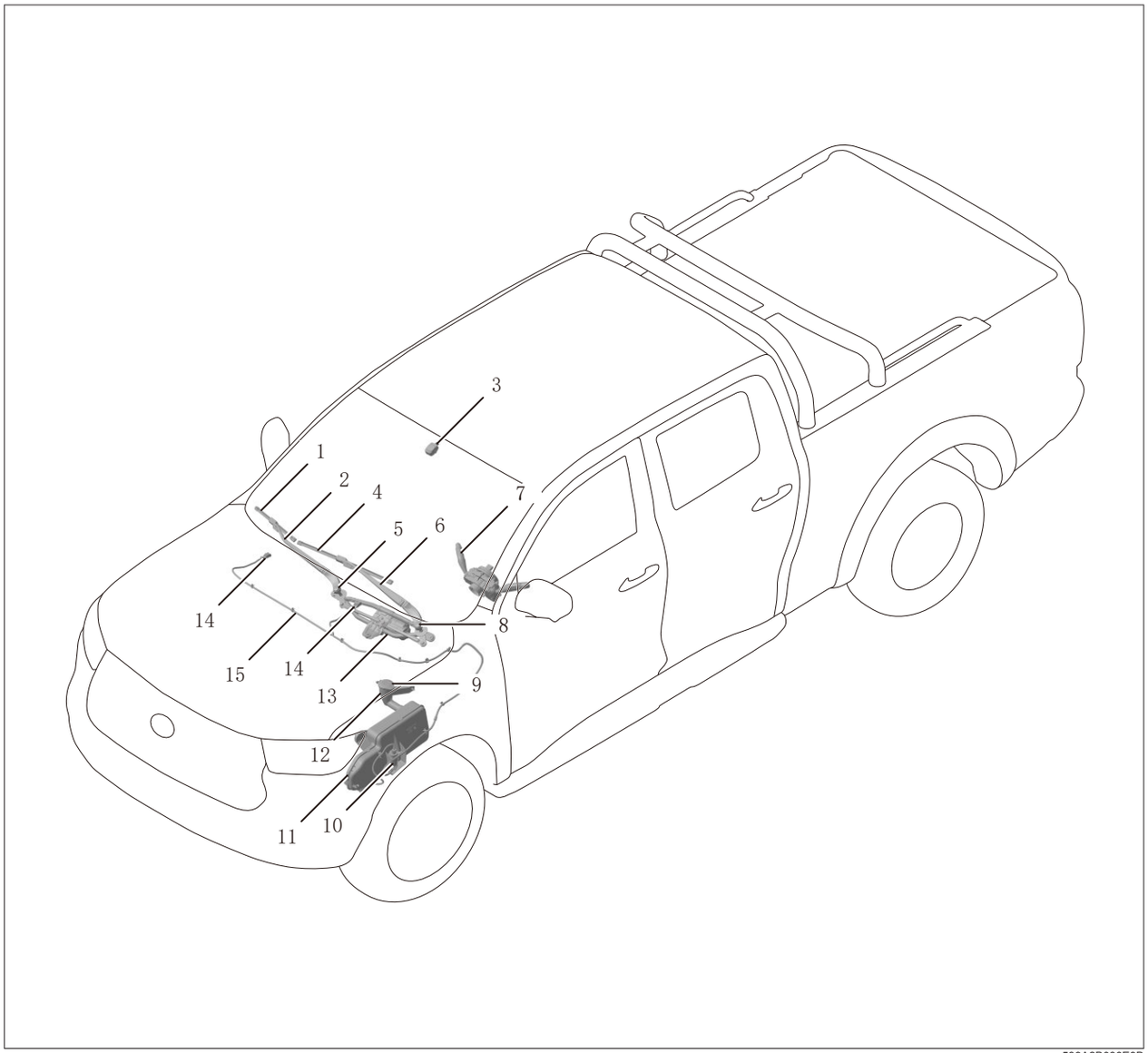
Washer system

The washer system is mainly composed of a washing motor assembly, a washing liquid pot assembly, a washing tube and a nozzle, etc., which judges the lever position of combination switch by BCM acquisition, and powers on windshield washer motor. Washing liquid is delivered by windshield washer motor to the nozzle through washer water pipe and sprayed from the nozzle, combined with the operation of the wiper, thus making the windshield cleaned.

Rainfall and light sensor

The rainfall and light sensor is installed at the bottom of inside rearview mirror on the front windshield, and rainfall and light information is transmitted to BCM through LIN line. The BCM controls the automatic wiper and the automatic lighting system based on the information from the rainfall sensor. When the wiper switch is in the AUTO position, the wiper system automatically adjusts the interval time according to the external rainfall. When the light combination switch is in the AUTO position, the lighting system automatically turns on the low beam lamp and the position lamp according to external lighting conditions.

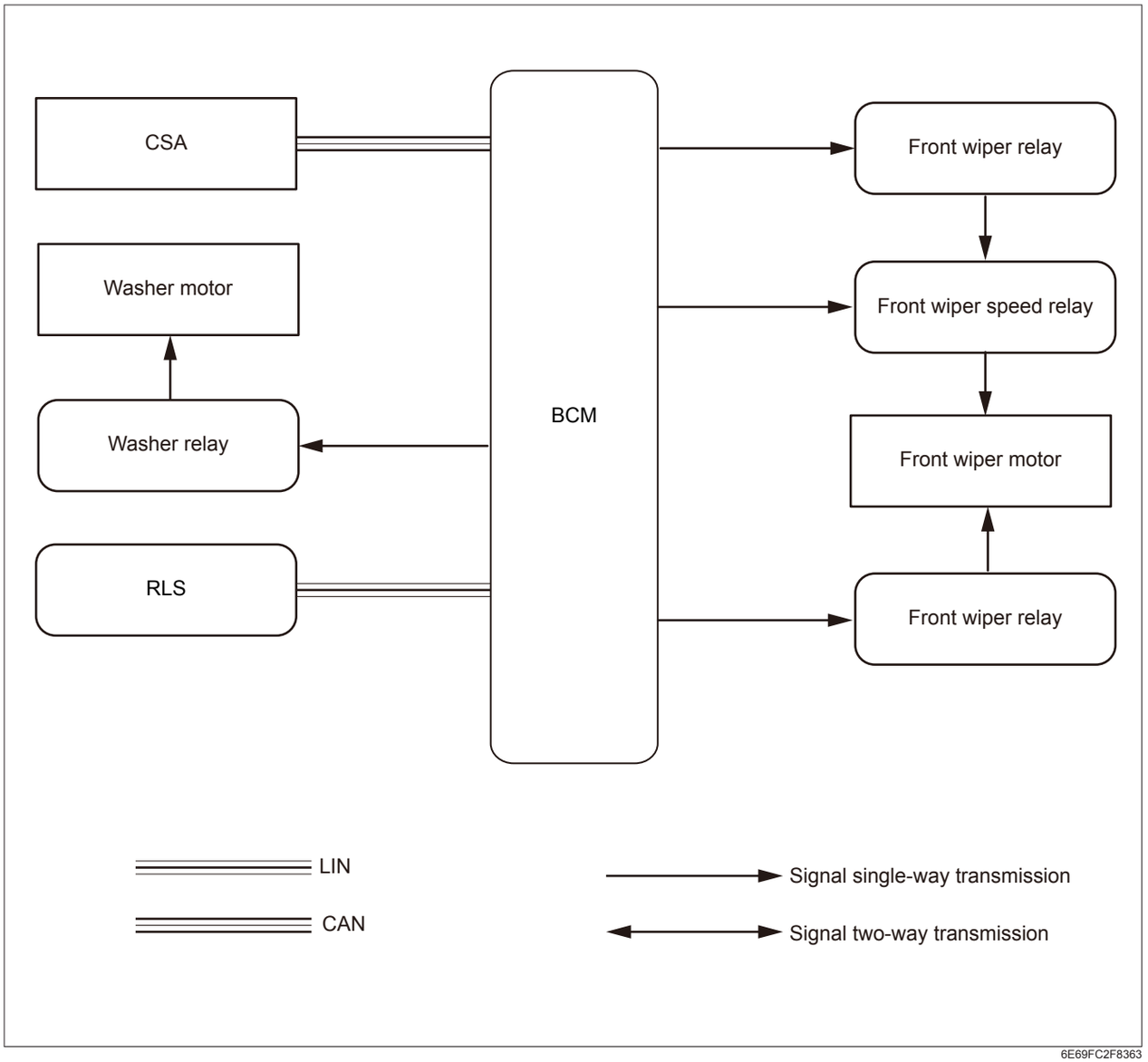
Location diagram



539A2B036E9B

1. Front right wiper blade
2. Front right wiper arm
3. Rainfall and light sensor
4. Front left wiper blade
5. Front wiper decorative cover
6. Front left wiper arm
7. Wiper combination switch
8. Front wiper decorative cover
9. Front windshield cleaning fluid filling cap
10. Front windshield washer motor assembly
11. Front windshield washer assembly
12. Front windshield cleaning fluid filling hole
13. Front wiper link and motor assembly
14. Front windshield washer nozzle assembly
15. Front windshield washer water pipe assembly

System diagram



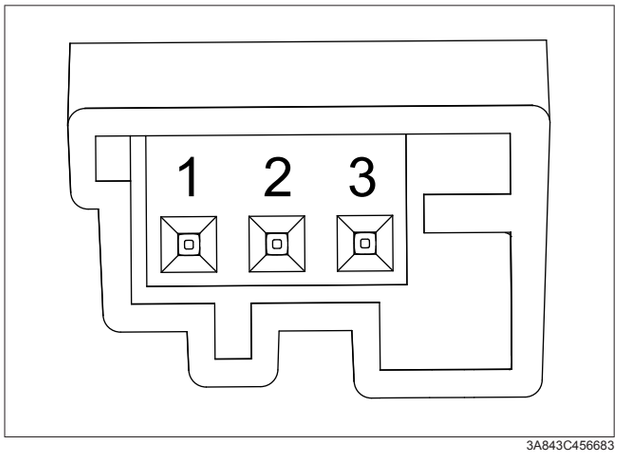
6E69FC2F8363

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	Front wiper, link and motor assembly x front wall sheet metal	9±2	3	—
Nut	Front wiper arm assembly x front wiper, link and motor	30±2	2	—
Nut	Washer fluid reservoir assembly x sheet metal of vehicle body	6±2	3	—
Bolt	Filler of washing liquid x sheet metal of vehicle body	6±2	1	—

Rainfall and light sensor

Pin definition



3A843C456683

Pin No.	function
1	GND
2	LIN
3	Power supply

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Pry out rainfall and light sensor small cover



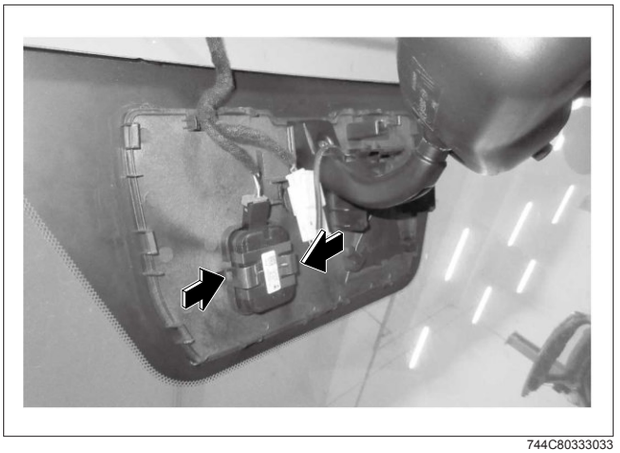
A377E188F744

3. Pry out rainfall and light sensor big cover



EA0B50D01739

4. You can hold the hand against a foot of the shrapnel and pry out the foot out of the buckle



744C80333033

5. Disconnect the harness connector and slightly take off the rainfall and light sensor

Installation

1. Perform installation work in reverse order of removal

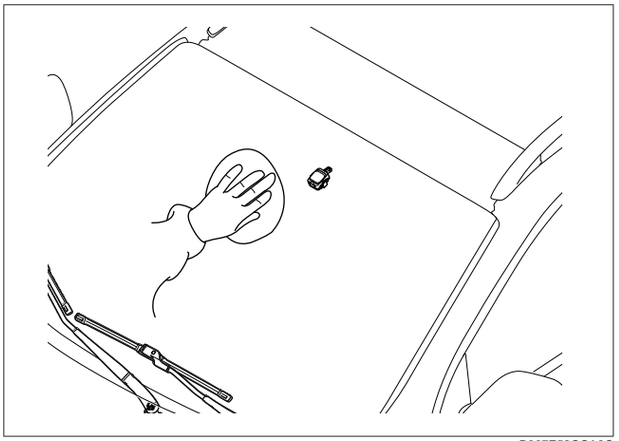
Notice

- Before installation, make sure that the bracket glass is clean and the protective cover of the rainfall and light sensor is intact.
- After the sensor is removed from the bracket, the metal shrapnel deformation may result in malfunction. The sensor, suffering from the metal shrapnel deformation, must be discarded.
- At the time of installation, both hands vertically press into both sides of the snap. You shall hear the two "clicks" when pressing in order to ensure that the two snaps are fully pressed in place.
- After the installation is complete, check the snap is in place and the glass surface is complete without air bubbles. Wait for 15 minutes and then carry out the power-on initialization.
- After the installation is complete, it is not allowed to remove initialized rainfall and light sensor and install it onto another vehicle, otherwise functional fault is likely to occur.

Initialization

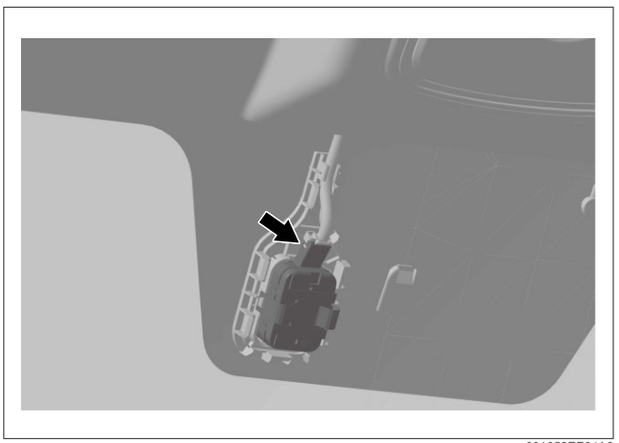
Initialization

1. Place the ignition switch in the LOCK position.
2. Clean the glass in the front of the rainfall and light sensor



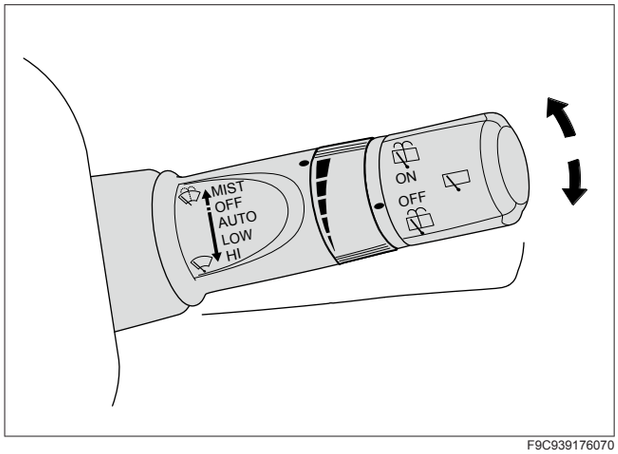
B967F52CCA8C

3. Pull up the wiper to remove it from the glass
4. Turn the ignition switch to ON position, the light switch to AUTO position and the wiper switch to OFF position
5. Disconnect the connector of the rainfall and light sensor and wait for more than 10s



601652EF64A6

6. Connect the connector and switch the wiper switch from OFF to AUTO gear for more than 5 times within10s and finally stop at AUTO gear

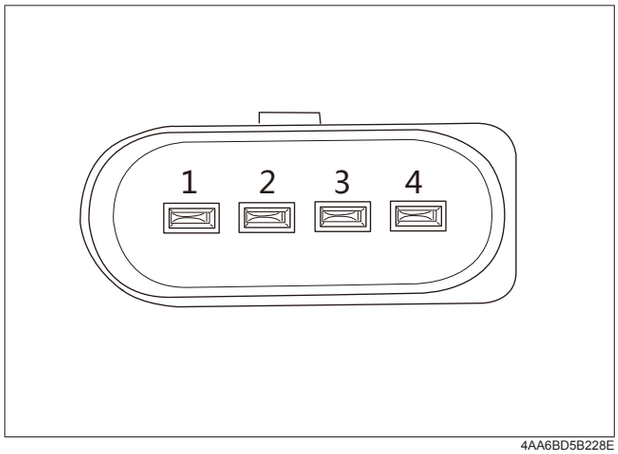


F9C939176070

7. Wait for a period of time (10s) and the wiper will automatically scrape once, indicating the success of the rematching

Front wiper motor

Pin definition



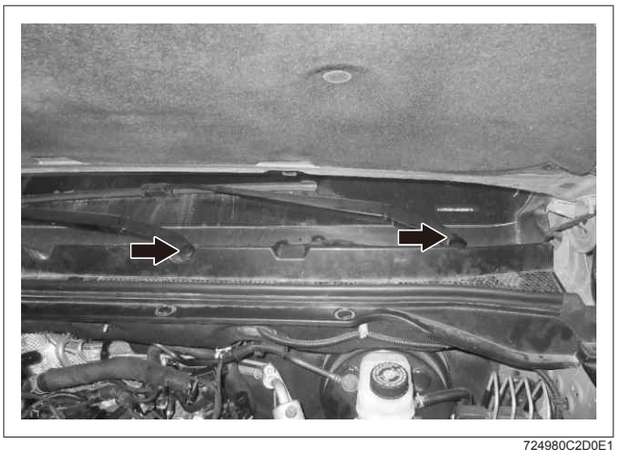
4AA6BD5B228E

Pin No.	Function
1	Ground
2	Parking
3	Low speed
4	High speed

Removal/installation

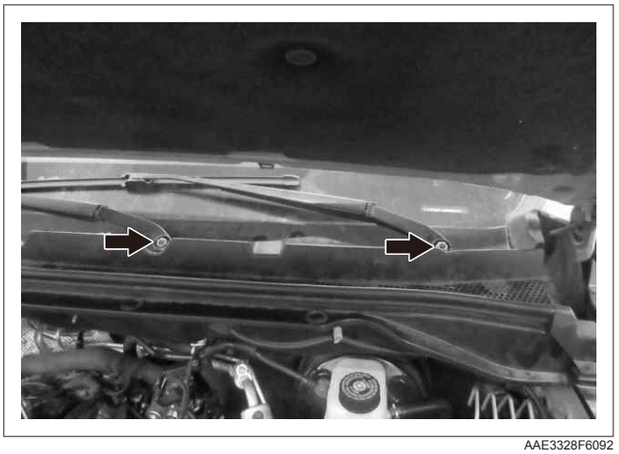
Removal

1. Open the engine compartment cover
2. Disconnect the negative terminal of the battery.
3. Pry decorative cover of front wiper to remove it



724980C2D0E1

4. Remove front wiper arm locknut



AAE3328F6092

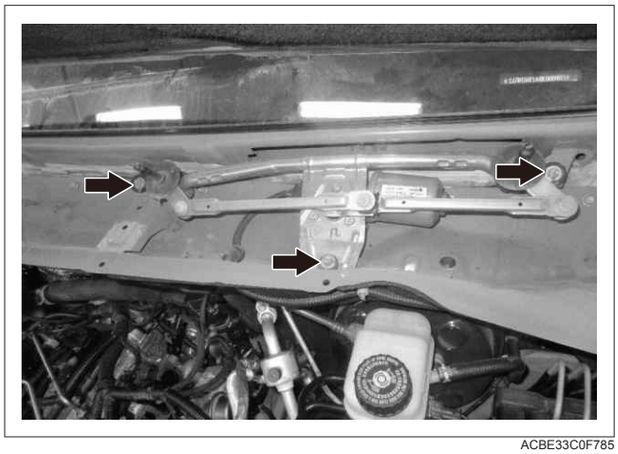
5. Close engine hood, raise wiper arm first, and then remove front wiper assembly

Notice

- Clean the tooth surface of wiper arm and the tooth surface of wiper motor output shaft with a wire brush after removal.

6. Remove ventilation cover plate assembly

7. Remove 3 bolts



ACBE33C0F785

8. Disconnect harness connector of wiper motor, and remove front wiper link with motor assembly

Installation

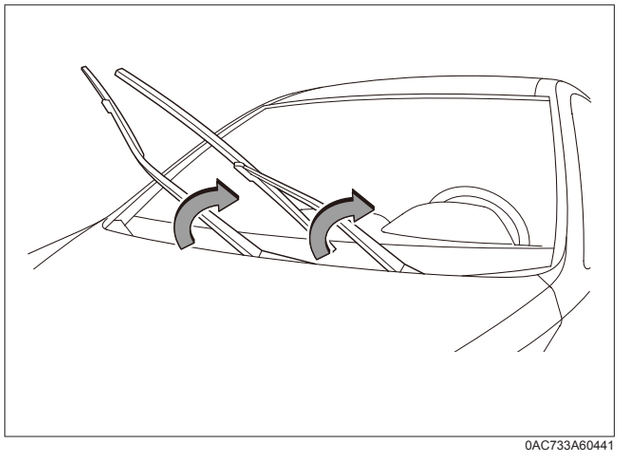
1. Perform installation work in reverse order of removal

Front wiper blade - type 1

Removal/installation

Removal

1. Raise wiper arms from windshield glass

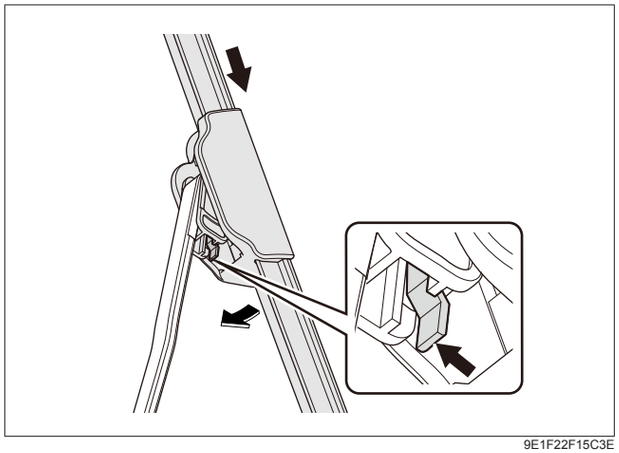


0AC733A60441

⚠ Caution

- Lift to the limited position to prevent the rebound from breaking the windshield.
- Before switching ON the power mode, the wiper must be pulled back to the windshield, otherwise it may be damaged.

2. Raise the elastic plate, and pull out front wiper blade in the direction of arrow while rotating it in the direction of arrow



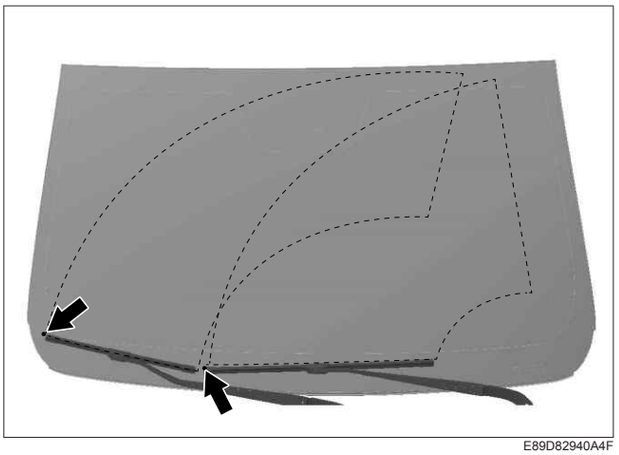
9E1F22F15C3E

Installation

1. Perform installation work in reverse order of removal

Inspection

1. Operate front wipers and run them twice
2. Stop operating front wipers
3. Check the stop position of front wiper blade. It is correct if at the position shown in the figure below



E89D82940A4F

4. If the stop position does not meet the requirements, remove and reinstall the wiper arm and wiper blade assembly, and perform the above on-board inspection again.
5. If the result still does not meet the specification, inspect the front wiper motor assembly.

Front wiper blade - type 2

Removal/installation

Removal

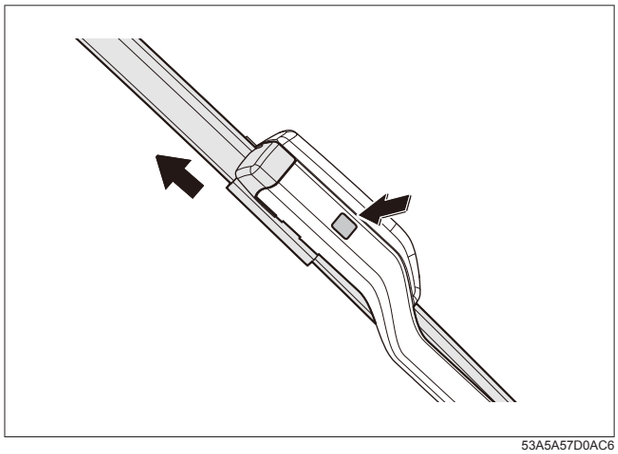
1. Lift the wiper arm off of the windshield

⚠ Caution

› Lift to the limited position to prevent the rebound from breaking the windshield.

› Before switching ON the power mode, the wiper must be pulled back to the windshield, otherwise it may be damaged.

2. Press down the plastic boss, and remove front wiper blade along the direction indicated in the arrow



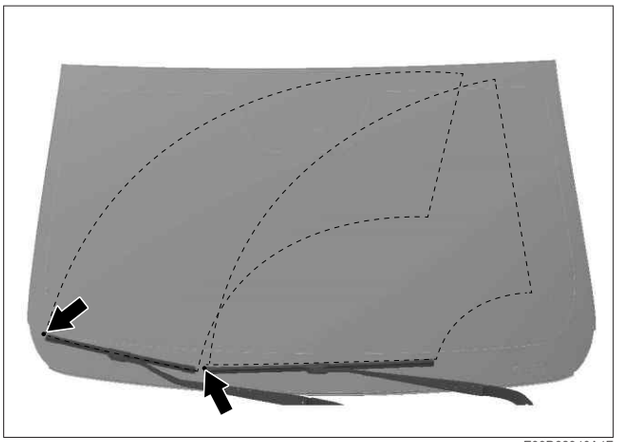
53A5A57D0AC6

Installation

1. Perform installation work in reverse order of removal

Inspection

1. Operate front wipers and run them twice
2. Stop operating front wipers
3. Check the stop position of front wiper blade. It is correct if at the position shown in the figure below

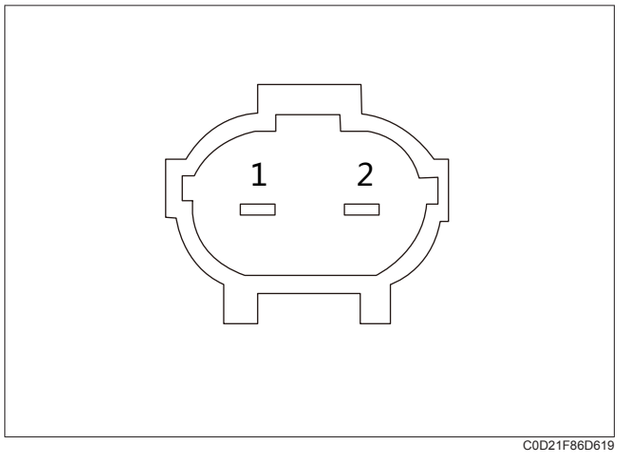


E89D82940A4F

4. If the stop position does not meet the requirements, remove and reinstall the wiper arm and wiper blade assembly, and perform the above on-board inspection again.
5. If the result still does not meet the specification, inspect the front wiper motor assembly.

Windshield washer motor

Pin definition



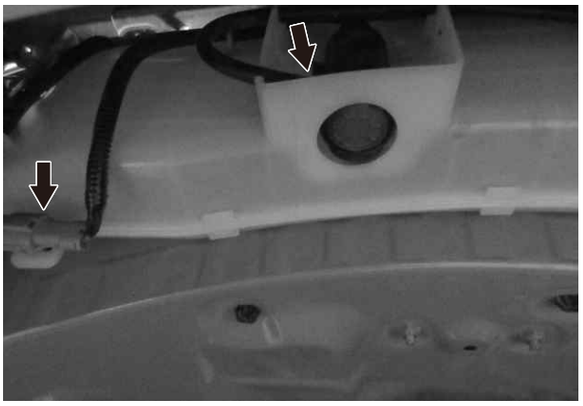
C0D21F86D619

Pin No.	Function
1	Negative terminal
2	Positive terminal

Removal/installation

Removal

1. Drain the washing liquid in the windshield washer
2. Disconnect the negative terminal of the battery.
3. Remove splash guard for front left wheel
4. Disconnect motor harness and washer water pipe, and remove washer motor



49E52D77ECBE

Notice

› During removal, place a container under the washer fluid tank assembly to avoid the remaining washer fluid from falling into the vehicle or on the ground.

Installation

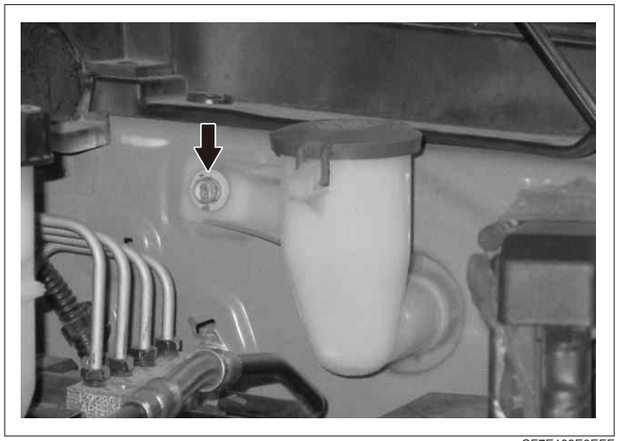
1. Perform installation work in reverse order of removal

Washer fluid tank

Removal/installation

Removal

1. Drain washing liquid
2. Disconnect the negative terminal of the battery.
3. Remove splash guard
4. Disconnect washer motor harness connector
5. Disconnect washer water pipe connection
6. Remove 1 bolt at the filler



CF7E109E3EFF

7. Remove filler
8. Remove 1 nut



CA16B72C2F24

9. Loosen 2 nuts



E186725F1229



0329224EBDB2

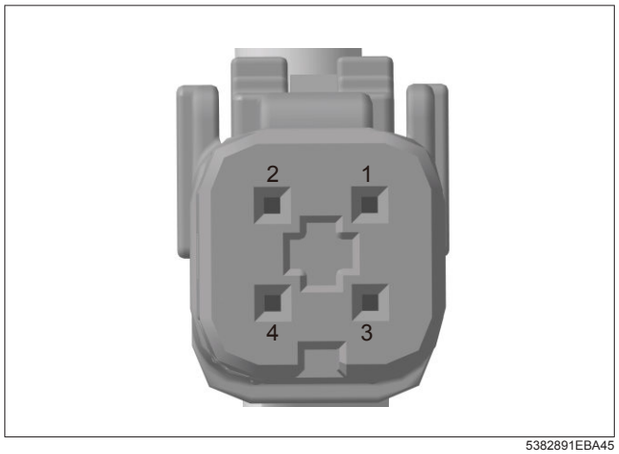
10. Move washing can toward the front of vehicle
11. Remove washing fluid reservoir from splash guard

Installation

1. Perform installation work in reverse order of removal

Front washer nozzle

Pin definition



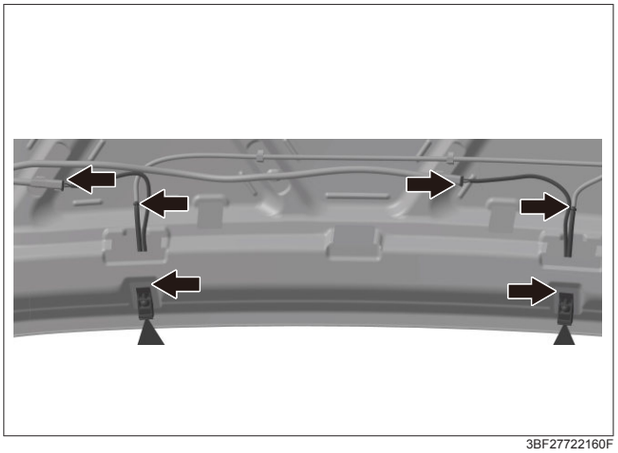
5382891EBA45

Pin No.	Function
1	Power supply
2	—
3	—
4	GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Open the engine hood
3. Remove some thermal blankets of engine hood
4. Disconnect the connection and connector between washer nozzle and water pipe, and remove the front washer nozzle assembly.



3BF27722160F

⚠ Caution

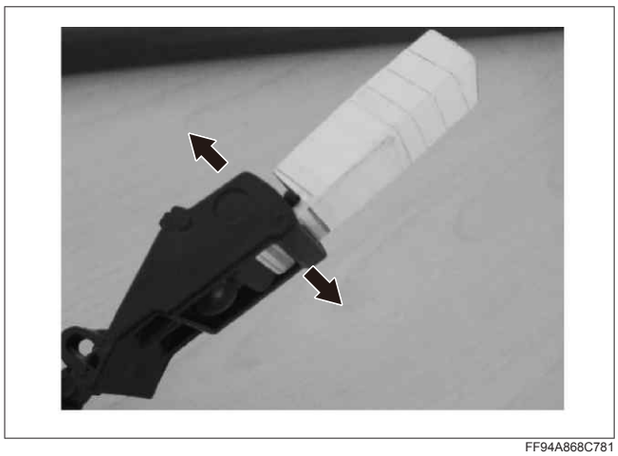
› Do not reuse the washer nozzle.

Installation

1. Perform installation work in reverse order of removal

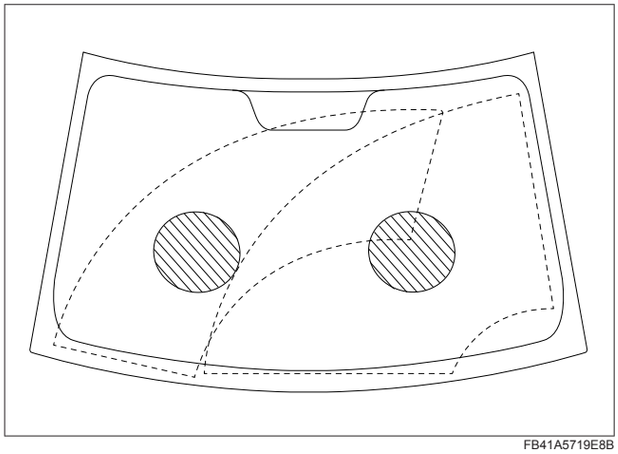
Adjustment

1. Adjust orientation of the washer nozzle with special tool



FF94A868C781

2. Adjust front nozzle to make it spray to the right position

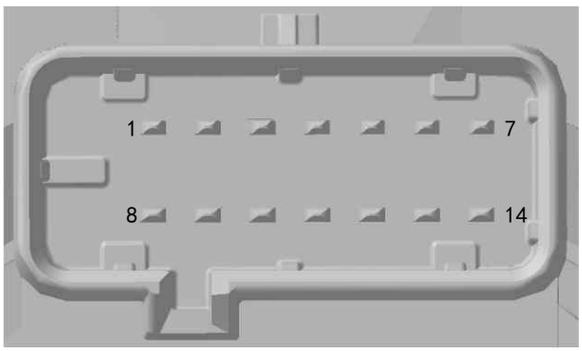


FB41A5719E8B

Wiper combination switch

Pin definition

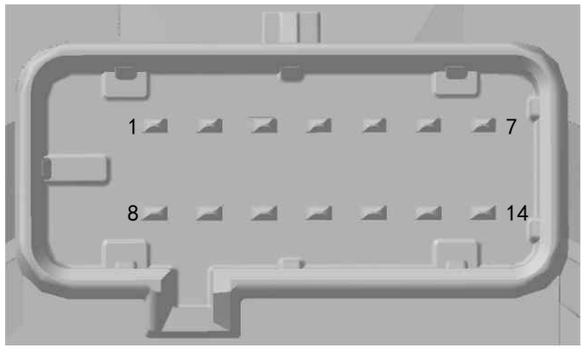
Combination switch



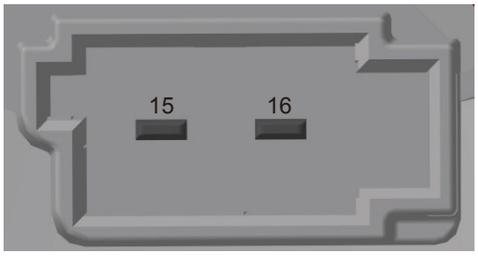
35E36E8B82DC

Pin No.	Function
1	Airbag-
2	Airbag+
3	KL30
4	KL15
5	CAN-H(R/D)
6	CAN-L(R/D)
7	GND
8	—
9	—
10	—
11	—
12	Steering wheel heating+
13	—
14	Steering wheel heating-

Clock spring



35E36E8B82DC



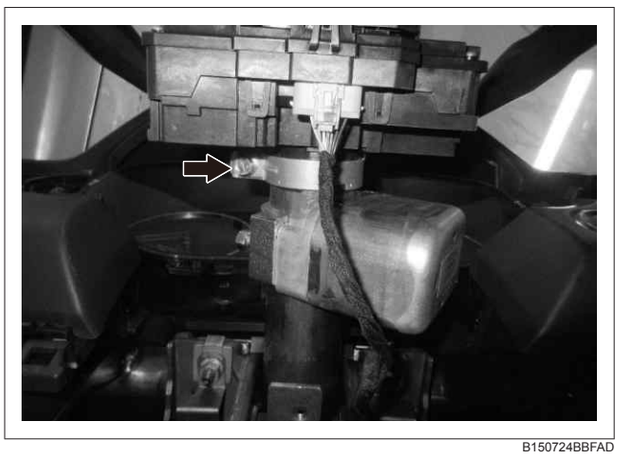
9D628467BE24

Pin No.	Function
1	Airbag+
2	Airbag-
3	KL30
4	LIN (SWC0)
5	Cruise +
6	GND
7	Cruise -
8	—
9	Ground wire of paddle shifter
10	Paddle shifter
11	—
12	—
13	—
14	—
15	Steering wheel heating+
16	Steering wheel heating-

Removal/installation

Removal

1. Turn the steering wheel so that the front wheels are in a straight driving position.
2. Disconnect the negative terminal of the battery.
3. After waiting for 90 s, remove main airbag
4. Remove the steering wheel.
5. Remove upper cover of steering column
6. Remove lower cover of steering column
7. Fix the clock spring at the zero position and loosen 1 bolt.



B150724BBFAD

Notice

› If the clock spring is not in the zero position, adjust it to the zero position.

8. Disconnect connector of combination switch assembly
9. Remove combination switch assembly

Installation

1. Perform installation work in reverse order of removal

Notice

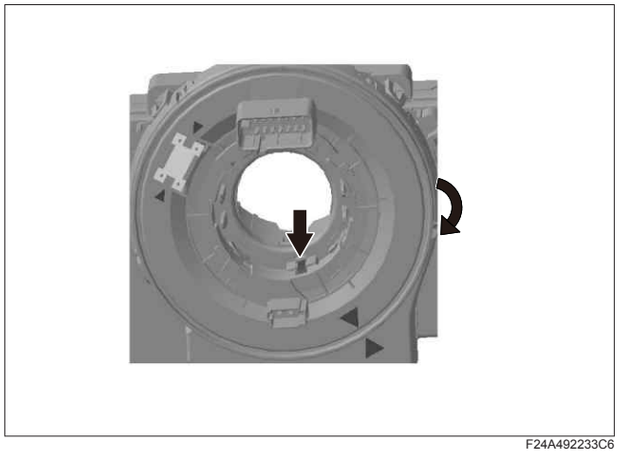
› Make sure that the clock spring is in the zero position before and after installing the combination switch. If the clock spring is fixed with tape, the fixing tape must be removed before reassembly.

› After replacing the combination switch, the scanner shall be connected to flash configuration words.

› After installing the combination switch, the scanner shall be connected to calibrate the SAS.

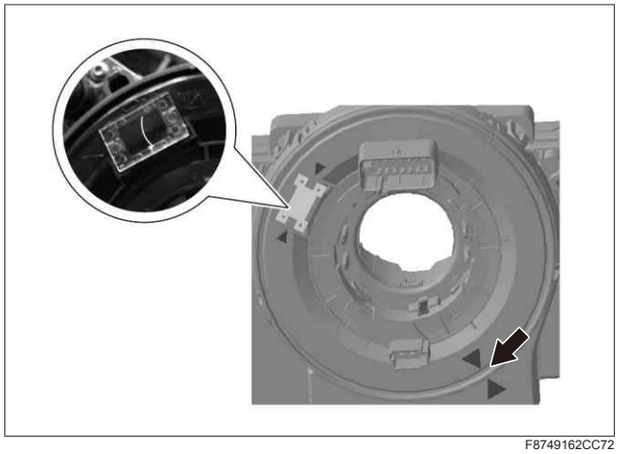
Zero adjustment

1. Press and rotate the self-locking lock pin clockwise to the end (lightly), and when resistance can be felt, it means that the pin is rotated to the end.



F24A492233C6

2. Press and rotate the self-locking lock pin counterclockwise for 3.5 circles.
3. At this time, the two triangle symbols on the clock spring correspond with each other, and a white cable can be seen on the window. This is the zero position of the clock spring.



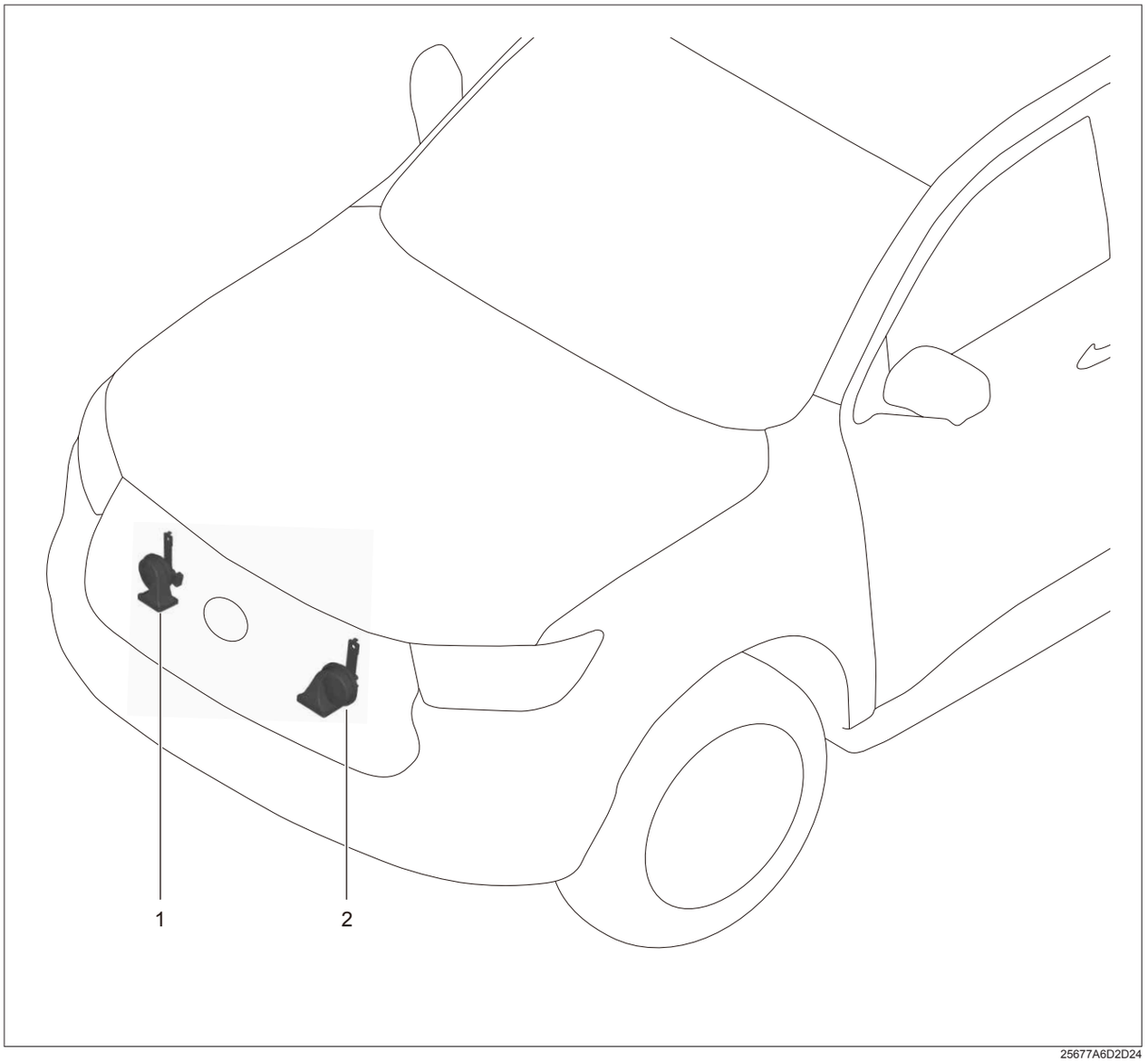
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Horn

Horn system .....55－1
Location diagram .....55－1
Fault symptom checklist .....55－2
Horn assembly .....55－3
Pin definition .....55－3
Check.....55－3
Removal/installation.....55－4

Horn system

Location diagram



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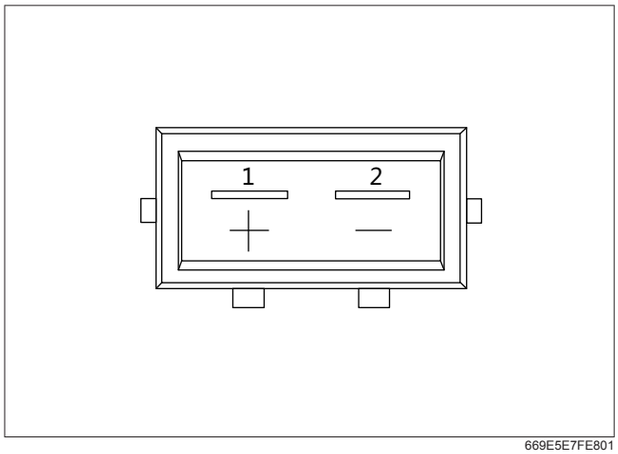
1. Low-tune electric horn
2. High-tune electric horn

Fault symptom checklist

Symptom	Suspected position of symptom
The horn does not sound.	1. Horn button switch
	2. Tweeter assembly
	3. Woofer assembly
	4. Fuse
	5. Horn relay
	6. Clock spring
	7.Harness
The horn keeps honking	1. Horn relay
	2. Horn button switch
	3. Clock spring
	4. BCM fault
	5.Harness
Horn tone is not normal	1. Tweeter assembly
	2. Woofer assembly
	3.Harness

Horn assembly

Pin definition



669E5E7FE801

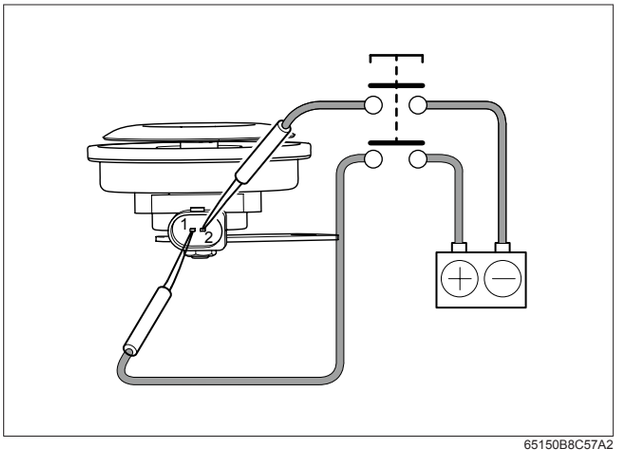
Pin No.	Function
1	Power supply
2	GND

Check

Notice

- The check sequence of the bass horn is the same as that of the tweeter.

1. Apply the battery voltage to the tweeter (positive terminal of the battery (+) → terminal 1, negative terminal of the battery (-) → terminal 2), standard: horn sounds



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2. If the horn does not sound, replace the tweeter assembly

Removal/installation

Removal

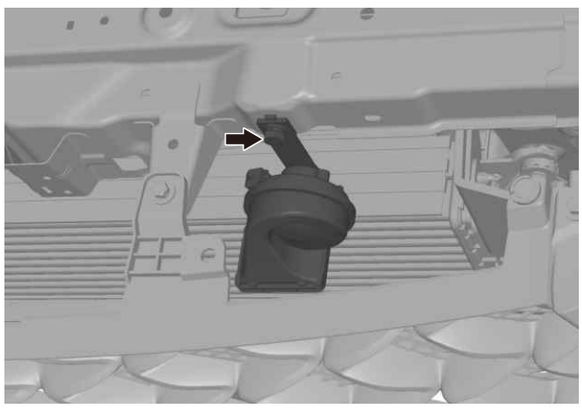
⚠ Caution

› Make sure that you have turned off the ignition switch when disconnecting the battery.

ℹ Notice

› Take the high-tune horn as example, the low-tune horn removal is similar with it.

1. Disconnect the negative terminal of the battery.
2. Remove the grille trim plate
3. Disconnect horn connector
4. Remove 1 bolt



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5. Remove the horn

Installation

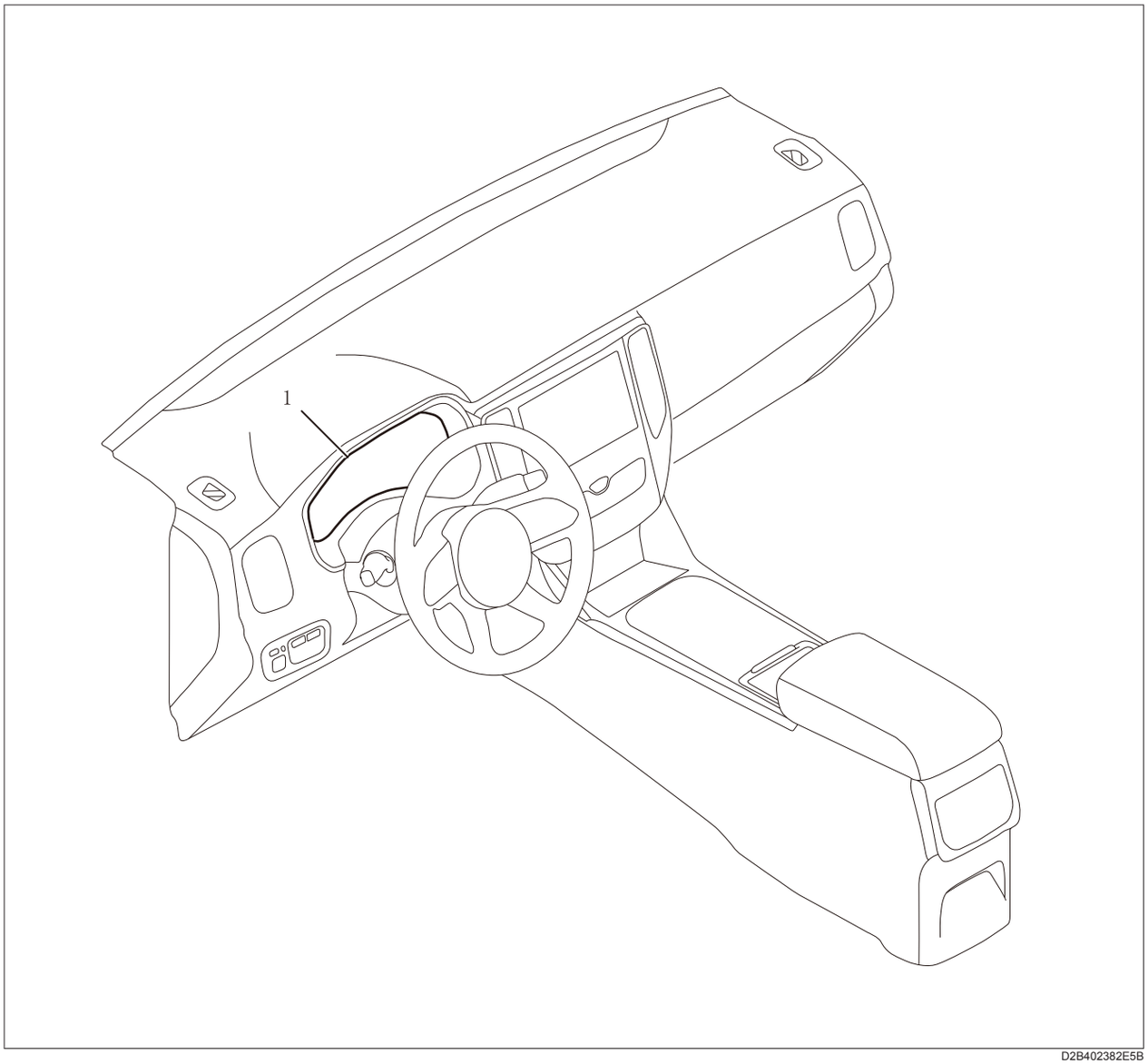
1. Perform installation work in reverse order of removal

Combination instrument

Combination instrument system .....56－1
Location diagram .....56－1
System diagram .....56－2
List of DTC .....56－3
DTC troubleshooting method .....56－4
Combination instrument .....56－21
Pin definition .....56－21
Removal/installation .....56－22

Combination instrument system

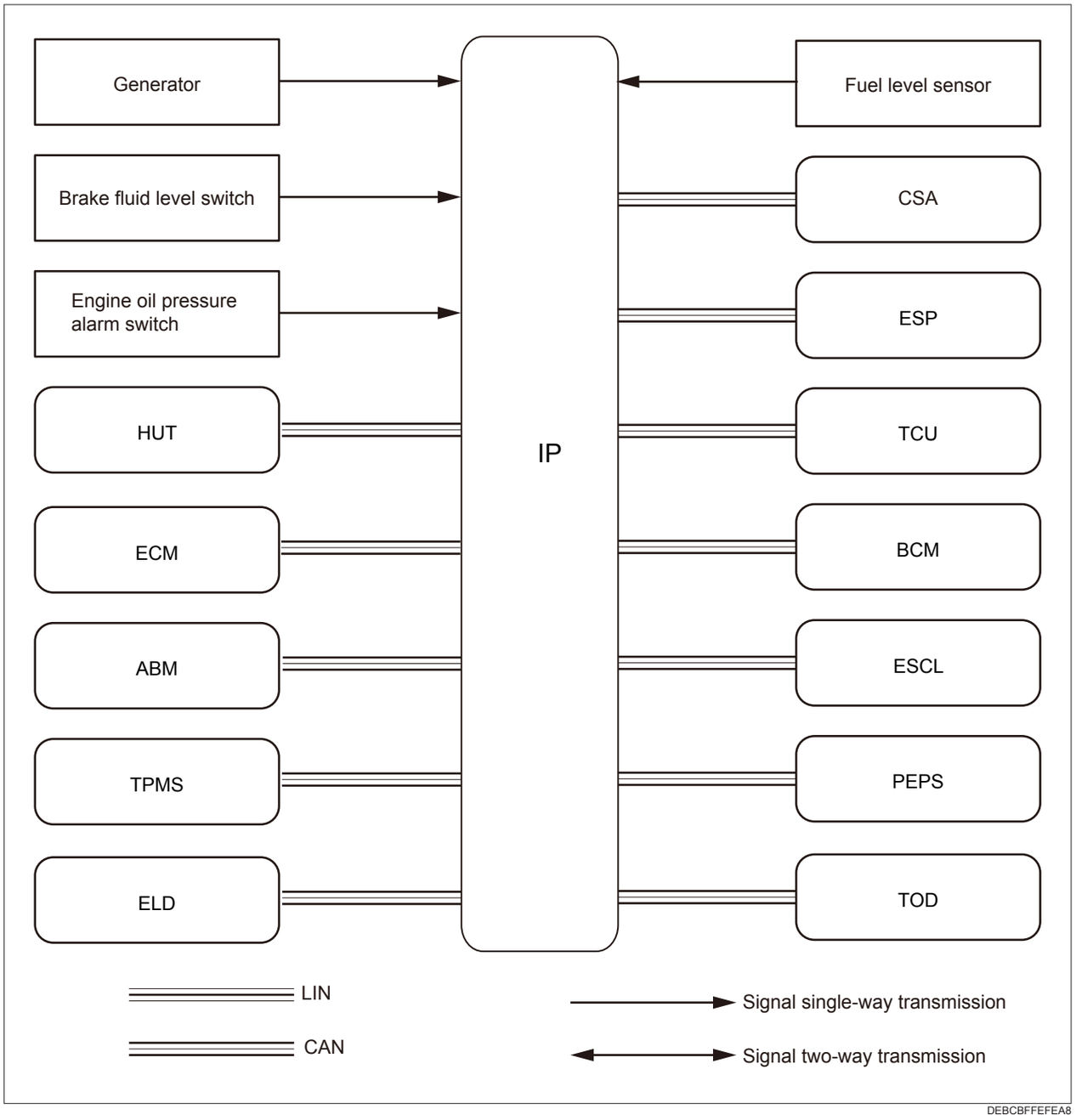
Location diagram



D2B402382E5B

1. Combination instrument

System diagram



List of DTC

S/N	DTC	DTC description
1	U110017	Communication voltage too high
2	U110116	Communication voltage too low
3	U007300	CAN bus-off
4	U023587	Communication with ACC lost
5	U013187	Communication with EPS lost
6	U100287	Communication with PEPS lost
7	U014087	Loss of communication with BCM
8	U019887	Communication with T-Box lost
9	U025487	Communication with ESCL lost
10	U012287	Communication with ESP (ABS) lost
11	U010187	Communication with TCU lost
12	U100087	Communication with ABM lost
13	U010087	Communication with ECM lost
14	U023287	Communication with RSDS_L lost
15	U023387	Communication with RSDS_R lost
16	U012787	Communication with TPMS lost
17	U014387	Communication with IFV (LDW/IFC) lost
18	U016387	Communication with HUT lost
19	U040583	ACC checksum error
20	U040582	ACC rolling counter error
21	B120096	Airbag fault indicator failed
22	B120196	Driver/front passenger seat belt unfastening indicator failed
23	B120296	Brake system fault indicator failed
24	B120396	ABS fault indicator failed
25	B120496	ESP indicator failed
26	B120596	ESP off indicator fails
27	B120696	Tire pressure fault indicator failed
28	B121011	Main fuel tank fuel sensor short-circuited
29	B121013	Main fuel tank fuel sensor open-circuited
30	U011487	Communication with TOD lost
31	U012887	Communication with EPB lost
32	U014587	Communication with CSA lost
33	U014187	Lose communication with Trailer
34	U101487	Communication with ELD lost

DTC troubleshooting method

U110017

DTC definition: communication voltage too high

DTC occurring condition: power supply voltage stays 16V above for 20s

Possible causes:

› Power supply voltage exceeds 16V.

DTC removal condition: 9 V ≤ power supply voltage ≤ 15 V for 1 s

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	–
3	Check if the power supply voltage exceeds 16V	Detect the working state of the power supply system and replace it	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the battery

U110116

DTC definition: communication voltage too low

DTC occurring condition: power supply voltage stays 9V below for 20s

Possible causes:

› Power supply voltage is lower than 9V.

DTC removal condition: 10V ≤ power supply voltage ≤ 16V for 1 s

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	–
3	Check if the power supply voltage is lower than 9V	Detect the working state of the power supply system and replace it	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the battery

U007300

DTC definition: CAN bus off

DTC occurring condition: CAN bus is disturbed by the surrounding environment, and normal communication is impossible. Communication cannot be restored by trying fast recovery three times

Possible causes:

› CAN bus is disturbed by the surrounding environment, leading to the following errors: Bit error, stuffing error, ACK error, format error, CRC error, and communication cannot be restored.

DTC removal condition: CAN bus is not in offline state and normal communication is possible

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	–
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Test whether CAN high line or CAN low line voltages are normal	The fault is cleared, and the system is normal	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U012787

DTC definition: communication with TPMS lost

DTC occurring condition: the signal, sent from TPMS, has not been received for more than 10 cycles

Possible causes:

› Harness connection is abnormal.

› TPMS unit is abnormal.

DTC removal condition: the effective signal, sent from TPMS, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if TPMS is abnormal	Replace TPMS	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U013187

DTC definition: communication with EPS lost

DTC occurring condition: no signal received from EPS for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- EPS unit is abnormal.

DTC removal condition: the effective signal, sent from EPS, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if EPS is abnormal	Replace EPS	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U011487

DTC definition: communication with TOD lost

DTC occurring condition: no signal received from TOD for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- Abnormal TOD unit.

DTC removal condition: 10 cycles of effective signals received from TOD

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check TOD for abnormality	Replace TOD	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U012287

DTC definition: communication with EPB lost

DTC occurring condition: no signal received from EP**S** for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- Abnormal EPB unit.

DTC removal condition: effective signal is received from EPB for more than 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if EPB is abnormal	Replace the EPB	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U014587

DTC definition: communication with CSA lost

DTC occurring condition: no signal received from CSA for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- Abnormal CSA unit.

DTC removal condition: 10 cycles of effective signals received from CSA

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check CSA for abnormality	Replace CSA	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U014187

DTC definition: communication with Trailer lost

DTC occurring condition: no signal received from Trailer for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- Abnormal Trailer unit.

DTC removal condition: 10 cycles of effective signals received from Trailer

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check Trailer for abnormality	Replace Trailer	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U101487

DTC definition: communication with ELD lost

DTC occurring condition: no signal received from ELD for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- Abnormal ELD unit.

DTC removal condition: 10 cycles of effective signals received from ELD

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check ELD for abnormality	Replace ELD	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B121013

DTC definition: open-circuit fault of the fuel sensor of main fuel tank

DTC occurring condition: Main fuel tank resistance detected for 10s consecutively ＞ 1000Ω

Possible causes:

› Harness connection is abnormal.

› Fuel sensor open-circuited.

DTC removal condition: 10 ohms ≤ main tank resistance ≤ 1000 ohms

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if the fuel sensor connector is abnormally connected	Reconnect the connector	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the fuel sensor

B121011

DTC definition: short-circuit fault of the fuel sensor of main fuel tank

DTC occurring condition: main fuel tank resistance detected for 10s consecutively ＜ 10Ω

Possible causes:

› Harness connection is abnormal.

› Fuel sensor is short-circuited.

DTC removal condition: resistance of fuel sensor of main fuel tank 10Ω ≤ resistance of fuel sensor ≤1000Ω

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs

Step	Operation	Yes	No
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if the fuel sensor connector is abnormally connected	Reconnect the connector	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the fuel sensor

U023287

DTC definition: communication with L-RSDS lost

DTC occurring condition: the signal, sent from L-RSDS, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- L-RSDS node is abnormal.

DTC removal condition: the effective signal, sent from L-RSDS, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if L-RSDS node is abnormal	Replace L-RSDS	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U023387

DTC definition: communication with R-RSDS lost

DTC occurring condition: the signal, sent from R-RSDS, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- R-RSDS node is abnormal.

DTC removal condition: the effective signal, sent from R-RSDS, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if R-RSDS node is abnormal	Replace R-RSDS	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U023587

DTC definition: communication with ACC lost

DTC occurring condition: the signal, sent from ACC, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- ACC node is abnormal.

DTC removal condition: the effective signal, sent from ACC, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if ACC node is abnormal	Replace ACC	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: the signal, sent from ESP (ABS), has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- ESP (ABS) node is abnormal.

DTC removal condition: the effective signal, sent from ESP (ABS), has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if ESP (ABS) is abnormal	Replace ESP (ABS)	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U100087

DTC definition: communication with ABM lost

DTC occurring condition: the signal, sent from ABM, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- ABM node is abnormal.

DTC removal condition: the effective signal, sent from ABM, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if ABM is abnormal	Replace ABM	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U014087

DTC definition: communication with BCM lost

DTC occurring condition: the signal, sent from BCM, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- BCM node is abnormal.

DTC removal condition: effective signal is received from BCM for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if BCM node is abnormal	Replace BCM	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U010187

DTC definition: communication with TCU lost

DTC occurring condition: failure to receive signal from TCU for over 10 cycles

Possible causes:

- Harness connection is abnormal.
- Abnormal TCU node.

DTC removal condition: 10 cycles of effective signals received from TCU

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if TCU node is abnormal	Replace TCU	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U010087

DTC definition: communication with ECM lost

DTC occurring condition: the signal, sent from ECM, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- ECM node is abnormal.

DTC removal condition: the effective signal, sent from ECM, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if ECM node is abnormal	Replace ECM	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U025487

DTC definition: communication with ESCL lost

DTC occurring condition: the signal, sent from ESCL, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- ESCL node is abnormal.

DTC removal condition: the effective signal, sent from ESCL, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if ESCL node is abnormal	Replace the ESCL	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U014387

DTC definition: communication with IFV (LDW/IFC) lost

DTC occurring condition: the signal, sent from IFV (LDW/IFC), has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- IFV (LDW/IFC) node is abnormal.

DTC removal condition: the effective signal, sent from IFV (LDW/IFC), has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if IFV (LDW/IFC) node is abnormal	Replace IFV (LDW/IFC)	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U100287

DTC definition: communication with PEPS lost

DTC occurring condition: the signal, sent from PEPS, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- PEPS node is abnormal.

DTC removal condition: the effective signal, sent from PEPS, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if PEPS node is abnormal	Replace the PEPS	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U019887

DTC definition: communication with T-BOX lost

DTC occurring condition: the signal, sent from T-BOX, has not been received for more than 10 cycles

Possible causes:

- Harness connection is abnormal.
- T-BOX node is abnormal.

DTC removal condition: the effective signal, sent from T-BOX, has been received for 10 cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if T-BOX node is abnormal	Replace T-BOX	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U016387

DTC definition: communication with HUT lost

DTC occurring condition: the signal, sent from HUT, has not been received for more than 10 cycles

Possible causes:

› Harness connection is abnormal.

› HUT node is abnormal.

DTC removal condition: effective signal is received from HUT for 10 consecutive cycles

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open circuit and short circuit	Replace the harness	Go to step 4
4	Check if HUT node is normal	Replace HUT and go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120196

DTC definition: driver/front passenger seat belt unfastening indicator failed

DTC occurring condition: Abnormal ADC value of driver/front passenger seat belt unfastening indicator detected for 5s consecutively

Possible causes:

› Driver/front passenger seat belt unfastening indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of driver/front passenger seat belt unfastening indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the seat belt indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120296

DTC definition: brake system fault indicator damaged

DTC occurring condition: Abnormal ADC value of brake system fault indicator detected for 5s consecutively

Possible causes:

› Brake system fault indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of brake system fault indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the brake system fault indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120396

DTC definition: ABS fault indicator damaged

DTC occurring condition: Abnormal ADC value of ABS fault indicator detected for 5s consecutively

Possible causes:

› ABS fault indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of ABS fault indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the ABS fault indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120496

DTC definition: ESP fault indicator damaged

DTC occurring condition: Abnormal ADC value of ESP indicator detected for 5s consecutively

Possible causes:

› ESP indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of ESP indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the ESP indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120596

DTC definition: ESP Off indicator damaged

DTC occurring condition: Abnormal ADC value of ESP Off indicator detected for 5s consecutively

Possible causes:

› ESP Off indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of ESP Off indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the ESP Off indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120696

DTC definition: tire pressure fault indicator damaged

DTC occurring condition: Abnormal ADC value of tire pressure fault indicator detected for 5s consecutively

Possible causes:

› Tire pressure fault indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of tire pressure fault indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the tire pressure fault indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

B120096

DTC definition: airbag fault indicator damaged

DTC occurring condition: Abnormal ADC value of airbag fault indicator detected for 5s consecutively

Possible causes:

› Airbag fault indicator damaged, or short-circuited/open-circuited.

DTC removal condition: Normal ADC value of airbag fault indicator detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Clear the DTC, restart the vehicle and test, turn on the airbag fault indicator, and check if the fault is eliminated	The fault is cleared, and the system is normal	Replace the combination instrument

U040583

DTC definition: ACC checksum error

DTC occurring condition: ACC checksum error detected 3 times consecutively

Possible causes:

› ACC checksum error.

DTC removal condition: Correct ACC checksum value detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open or short circuit	Replace the harness	Go to step 4
4	Check if ACC is abnormal	Replace ACC and go to step 5	Go to step 5

Step	Operation	Yes	No
3	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ACC

U040582

DTC definition: ACC rolling counter error

DTC occurring condition: ACC rolling counter detected 3 times consecutively

Possible causes:

› ACC rolling counter error.

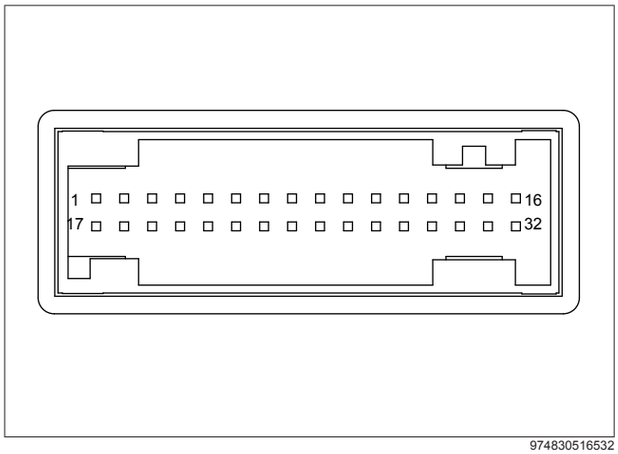
DTC removal condition: Correct ACC rolling counter value detected

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle stalled for 10 min	Go to step 2	Leave vehicle stalled for 10 min
2	Use the scanner to check the body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open or short circuit	Replace the harness	Go to step 4
4	Check if ACC is abnormal	Replace ACC and go to step 5	Go to step 5
3	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ACC

Combination instrument

Pin definition



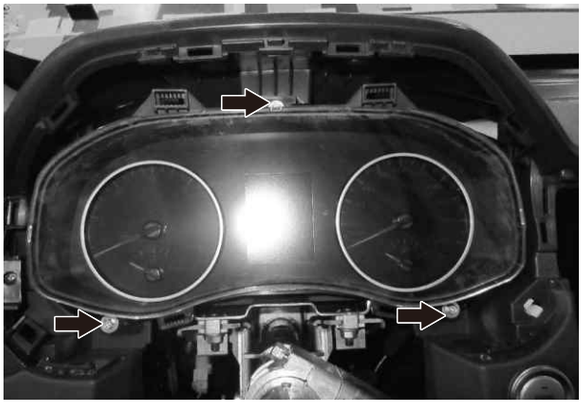
974830516532

Pin No.	Function
1.	—
2	—
3	Engine oil pressure low
4	Battery charging indicator
5	Engine immobilizer
6	Brake system fault indicator
7	—
8	—
9	—
10	—
11	Fuel sensor ground
12	Fuel sensor - main pump
13	Fuel sensor input-auxiliary pump
14	Vehicle body GND
15	—
16	—
17	—
18	—
19	—
20	Body ground
21	—
22	—
23	—
24	—
25	—
26	—
27	Body ground
28	CAN HS high
29	CAN HS low
30	Body ground
31	Ignition power supply
32	Battery power supply

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove central air vent assembly
3. Remove cover of combination instrument
4. Remove 3 screws



6A56B3D25FF0

5. Disconnect harness connector

Installation

1. Perform installation work in reverse order of removal

Power window

Power window system - no anti-pinch for four doors ..... 57－1
System description ..... 57－1
Location diagram ..... 57－2
System diagram ..... 57－3
Specified torque ..... 57－4
Fault symptom checklist ..... 57－5
Front door window lifter - no anti-pinch for four doors ..... 57－6
Pin definition ..... 57－6
Removal/installation ..... 57－6
Rear door window lifter ..... 57－8
Pin definition ..... 57－8
Removal/installation ..... 57－8
Driver side window switch ..... 57－10
Pin definition ..... 57－10
Removal/installation ..... 57－11
Passenger-side door window switch ..... 57－12
Pin definition ..... 57－12
Removal/installation ..... 57－12

Power window system - no anti-pinch for four doors

System description

Power window consists of front left window switch, front right window switch, rear left window switch, rear right window switch, window lifter motor in the doors and control circuit.

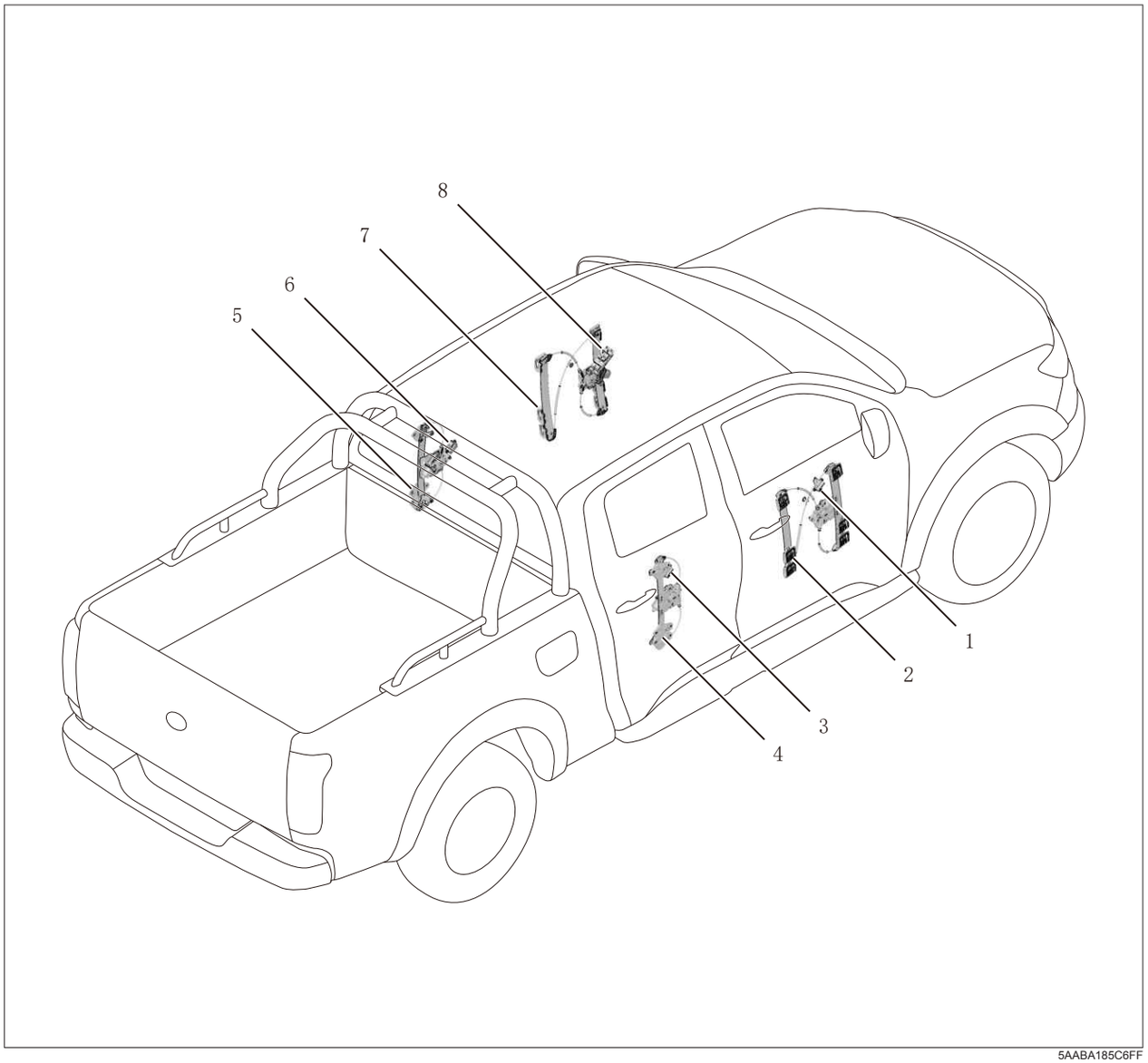
Power window function

Driver side power window switch assembly has four switches and front passenger side door and the two rear doors have their own separate window switch. When you operate each window switch gear position at driver side, the power window switch drives the window lifter through logic circuit to change the rotation direction of the motor, thus to raise or lower the window glass. When you operate the power window switch gear position independently on front passenger side and two rear doors, the power window switch achieves rise and winding down the window glass by using the logic circuit to drive the window lifter to change the rotation direction of the motor. When the switch switches the window to rise or fall, it is necessary to pause for (200 ± 20) ms between rising and falling.

Vehicle window lock function

Press the vehicle window lock switch to turn the window lock function on or off. When the vehicle window lock function is activated, the window switch on the rear door cannot be used. Only the window switch on the front door can be used to control the corresponding vehicle window.

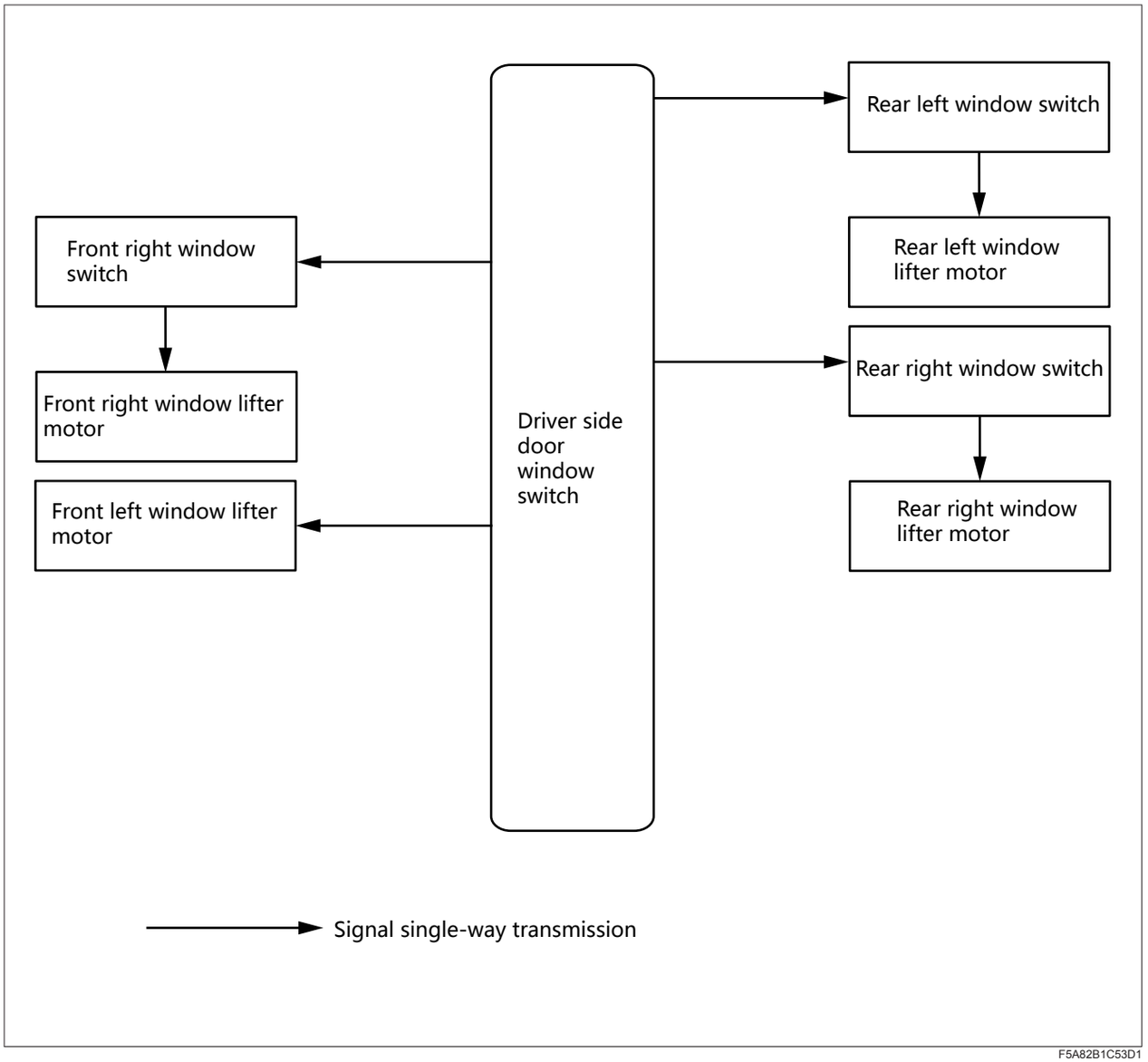
Location diagram



5AABA185C6FF

1. Front right door window switch assembly
2. Front right door window lifter assembly
3. Rear right door window switch assembly
4. Rear right door window lifter assembly
5. Rear left door window lifter assembly
6. Rear left door window switch assembly
7. Front left door window lifter assembly
8. Front left door window switch assembly

System diagram



F5A82B1C53D1

Specified torque

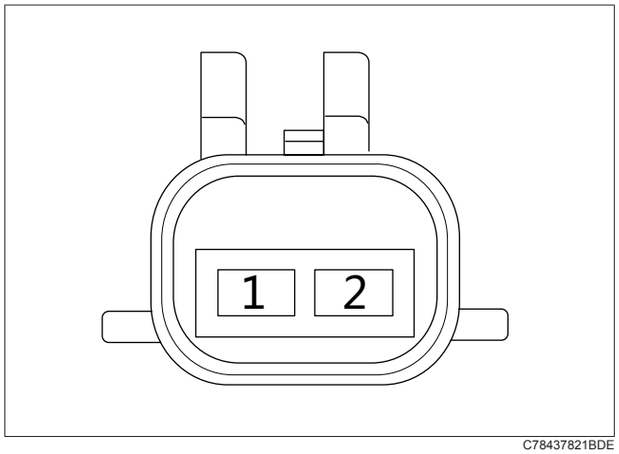
No.	Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
1	Nut	Front door window lifter × front door inner plate	9±1	8	—
2	Bolt	Front door window lifter × front door inner plate	9±1	2	—
3	Nut	Rear door window lifter × rear door inner plate	9±1	8	—
4	Bolt	Rear door window lifter × rear door inner plate	9±1	2	—

Fault symptom checklist

Symptom	Suspected position of symptom
Window lifting does not work	Harness or connector
	Fuse
	Window switch
	Power window motor
Lifting is jammed	First check glass groove and glass guide
Abnormal noise during lifting	First check glass groove and glass guide

Front door window lifter - no anti-pinch for four doors

Pin definition



C78437821BDE

Glass raising

Pin No.	Function
1	Positive terminal
2	Negative terminal

Glass lowering

Pin No.	Function
1	Negative terminal
2	Positive terminal

Removal/installation

Removal

Notice

› Take the driver side as example. The removal of front passenger side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner trim plate
3. Remove 2 bolts and remove front door handle box mounting bracket



0B10CDF4DED6

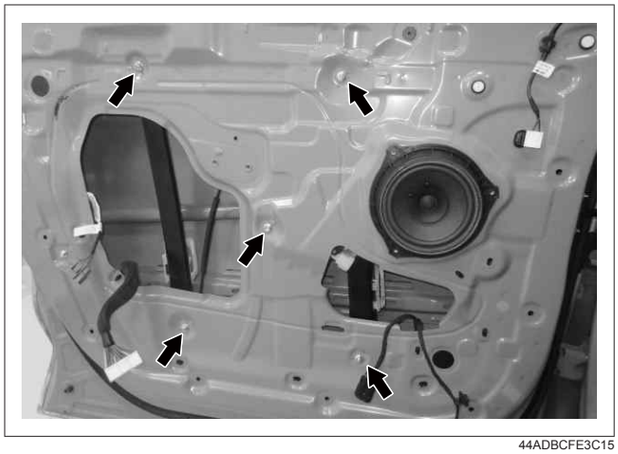
4. Remove the waterproof membrane
5. Connect the negative terminal of the battery
6. Adjust the glass to the mounting position
7. Disconnect the glass from 2 dogs



02B8839D6192

8. Tilt up and remove the front door glass
9. Disconnect the negative terminal of the battery.
10. Disconnect harness connector

11. Remove 4 nuts and 1 bolt, and remove front door window lifter



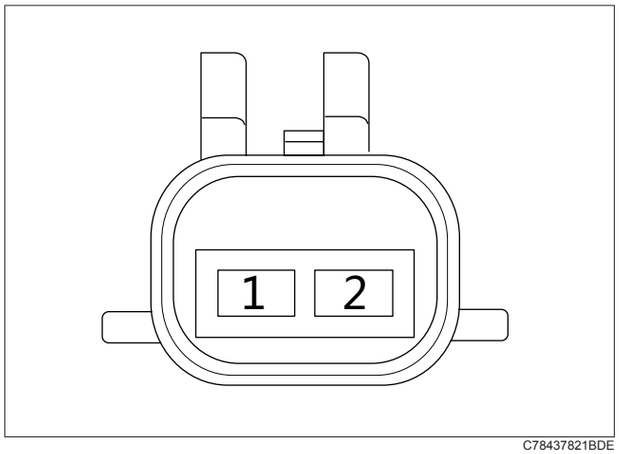
44ADBCFE3C15

Installation

1. Perform installation work in reverse order of removal

Rear door window lifter

Pin definition



C78437821BDE

Glass raising

Pin No.	Function
1	Positive terminal
2	Negative terminal

Glass lowering

Pin No.	Function
1	Negative terminal
2	Positive terminal

Removal/installation

Removal

Notice

› Take the left side as example. The removal of right side is the same with it.

1. Disconnect the negative terminal of the battery.
2. Remove rear door inner trim plate
3. Remove 2 bolts and remove rear door handle box mounting bracket



98F1523ACA01

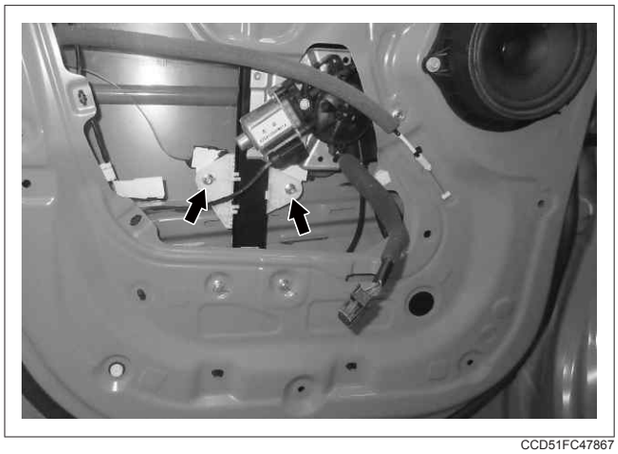
4. Remove the waterproof membrane
5. Remove 2 bolts and remove lower section of rear door glass rear guide



915AE1D94969

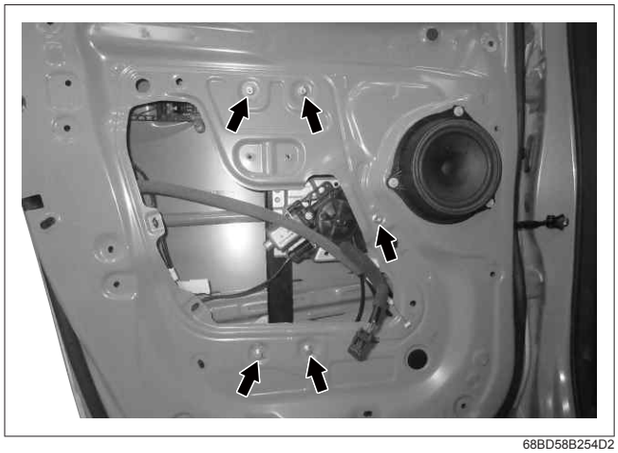
6. Connect the negative terminal of the battery
7. Adjust the glass to the mounting position
8. Disconnect the negative terminal of the battery.

9. Remove 2 rear door glass fastening bolts



CCD51FC47867

10. Remove rear door glass
11. Disconnect harness connector
12. Remove 4 nuts and 1 bolt, and remove rear door window lifter



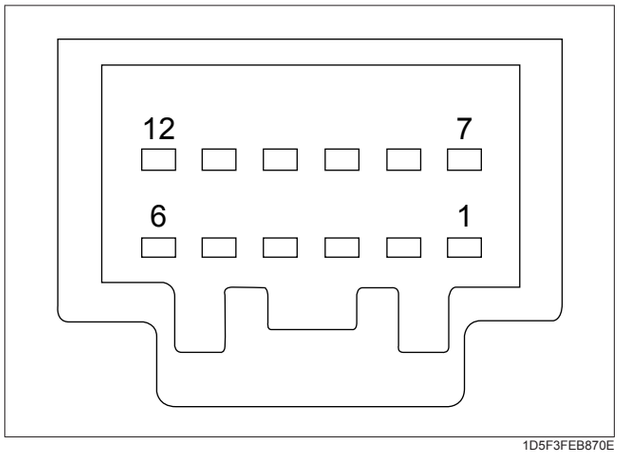
68BD58B254D2

Installation

1. Perform installation work in reverse order of removal

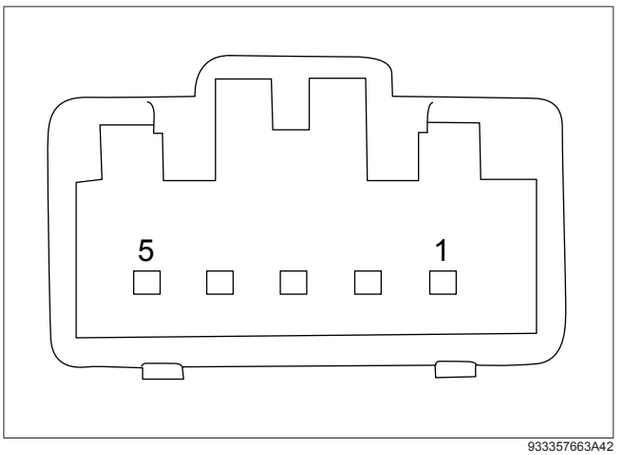
Driver side window switch

Pin definition



1D5F3FEB870E

Pin No.	Function
1	Lower front passenger power window using power window system
2	Raise front passenger power window using power window system
3	Power supply for the child safety lock
4	—
5	Raise driver window using power window system
6	Lower driver window using power window system
7	Lower rear right window using power window system
8	Raise rear right window using power window system
9	GND
10	Ignition power supply
11	Raise rear left power window using power window system
12	Lower rear left power window using power window system



933357663A42

Pin No.	Function
1	—
2	—
3	—
4	—
5	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front left door inner fender
3. Disconnect door window switch harness connector
4. Remove 3 screws, and remove driver side door window switch



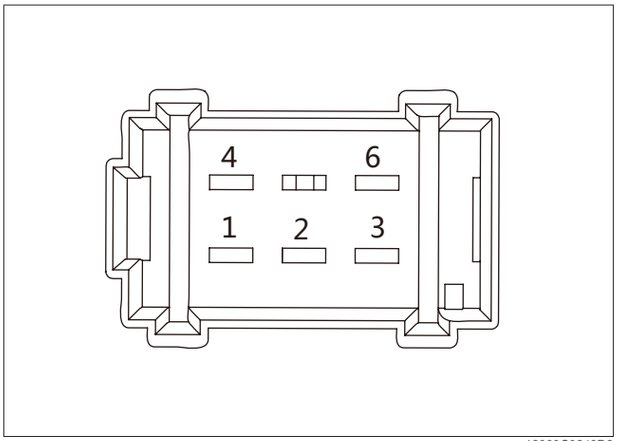
00550665BF2F

Installation

1. Perform installation work in reverse order of removal

Passenger-side door window switch

Pin definition



12369C0243D2

Pin No.	Function
1	Ground (front left output)
2	Power
3	Ground (front left output)
4	Manual downshift output
5	—
6	Manual raise output

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the passenger side inner fender
3. Disconnect harness connector of door window switch
4. Remove 2 screws



A3E038D52484

5. Remove passenger-side door window switch

Installation

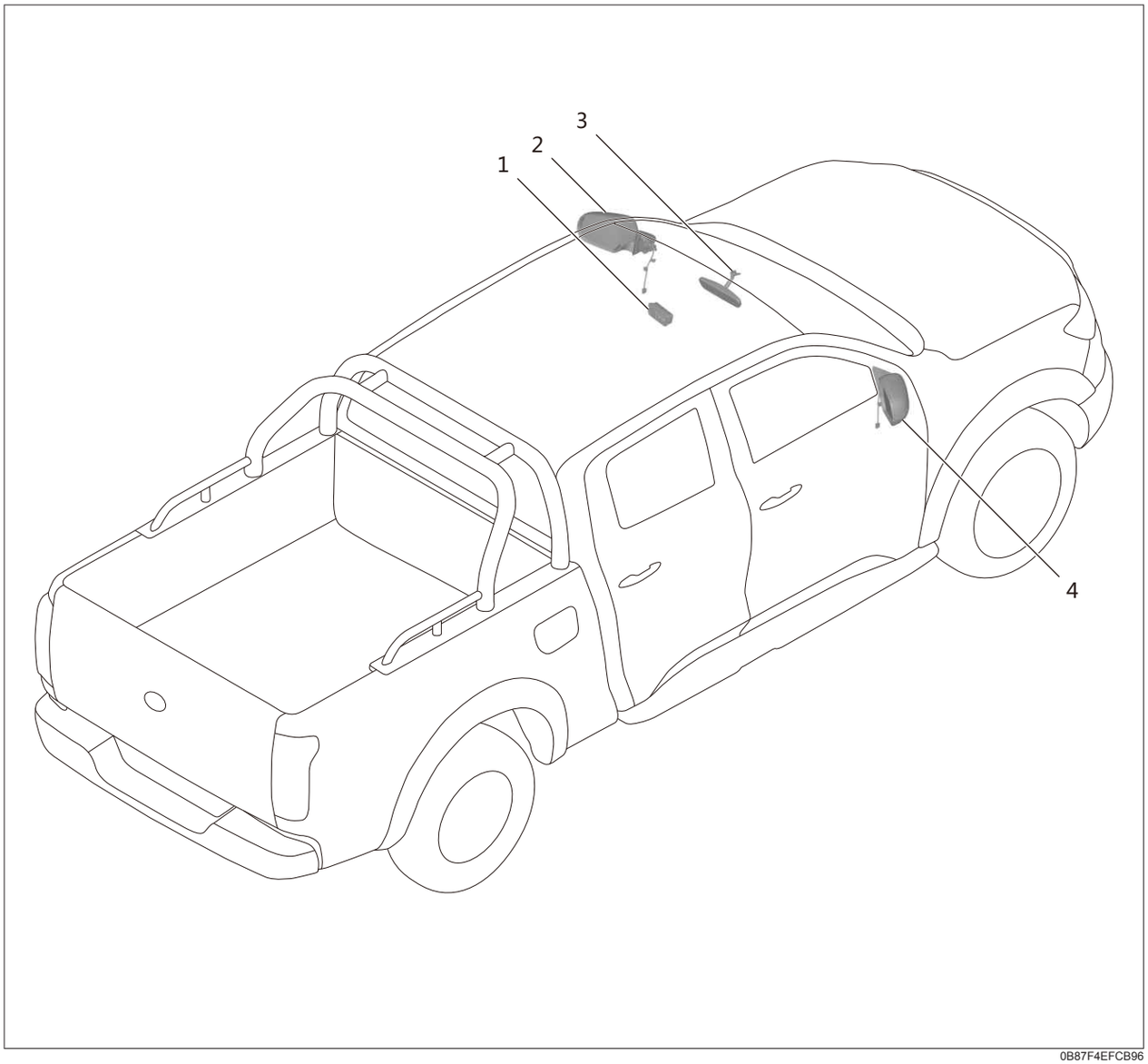
1. Perform installation work in reverse order of removal

Rearview mirror

Rearview mirror control system ..... 58－1
Location diagram ..... 58－1
System description ..... 58－2
Specified torque ..... 58－3
Fault symptom checklist ..... 58－4
Rearview mirror switch - manual stow ..... 58－5
Pin definition ..... 58－5
Removal/installation ..... 58－5
Rearview mirror switch - power stow ..... 58－6
Pin definition ..... 58－6
Removal/installation ..... 58－6
Outside rearview mirror - manual stow + electric adjustment + defroster+ turn signal lamp + visual front blind spot ..... 58－7
Pin definition ..... 58－7
Removal/installation ..... 58－8
Outside rearview mirror - power stow + electric adjustment + defroster + turn signal lamp + 360 surround view ..... 58－9
Pin definition ..... 58－9
Removal/installation ..... 58－10
Inside rearview mirror - manual anti-dazzle ..... 58－11
Removal/installation ..... 58－11
Inside rearview mirror - electric anti-dazzle ..... 58－12
Pin definition ..... 58－12
Removal/installation ..... 58－12

Rearview mirror control system

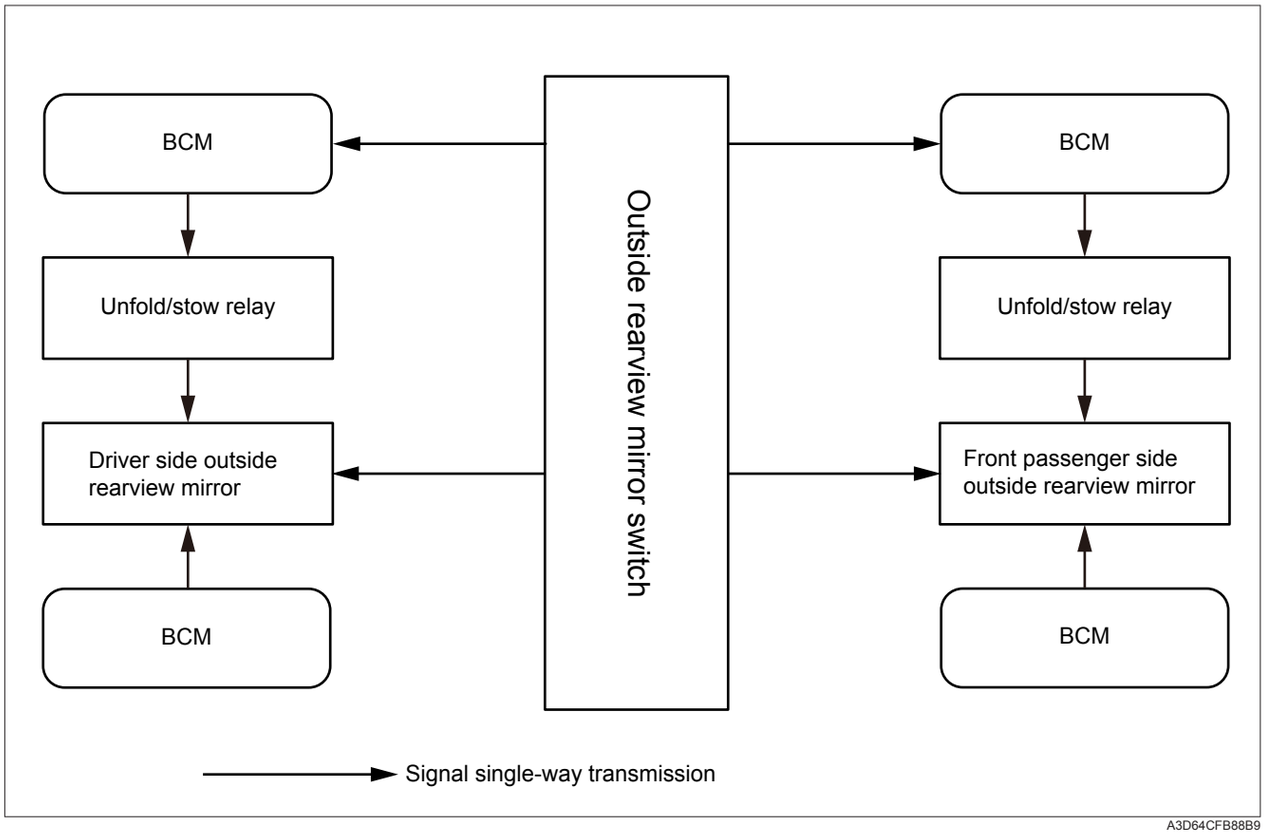
Location diagram



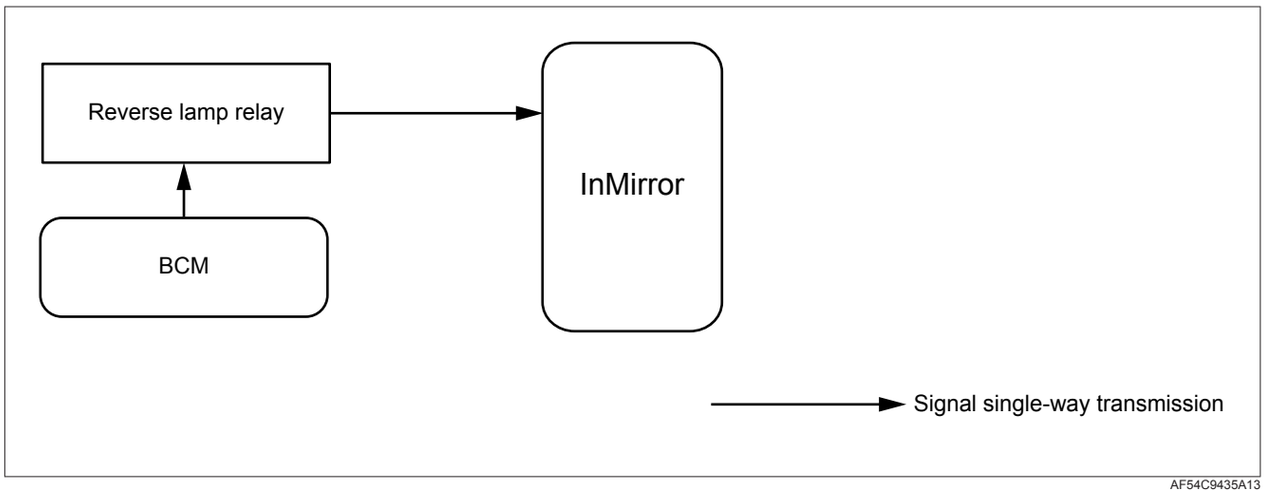
0B87F4EFCB96

1. Outside rearview mirror switch
2. Driver side outside rearview mirror
3. Inside rearview mirror
4. Front passenger side outside rearview mirror

System description



A3D64CFB88B9



AF54C9435A13

Specified torque

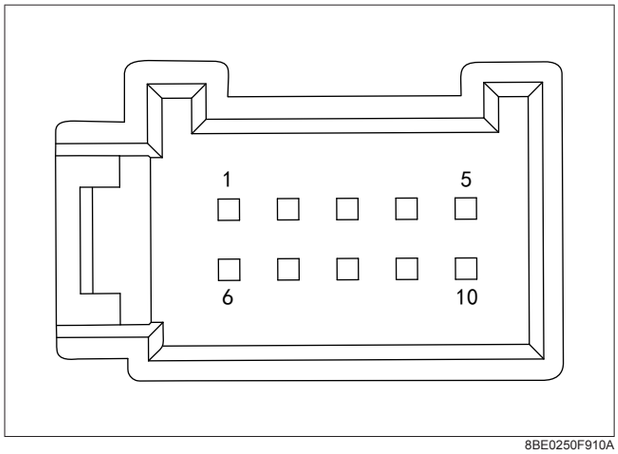
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Exterior rearview mirror × front door inner plate	4–12	6	—

Fault symptom checklist

Symptom	Possible causes
The power side mirror switch cannot operate the driver side rearview mirror surface adjustment	› Driver side outside rearview mirror › Power side mirror switch › Harness or connector
The power side mirror switch cannot operate the front passenger side rearview mirror surface adjustment	› Front passenger side outside rearview mirror › Power side mirror switch › Harness or connector
Impossible to adjust outside rearview mirror by operating power side mirror switch	› Fuse › Power side mirror switch › Outside rearview mirror › Harness or connector
The power outside mirror cannot be stowed or deployed through the power outside mirror switch.	› Fuse › Power side mirror switch › Outside rearview mirror › Harness or connector › BCM(KBCM)
Electronic anti-dazzle inside rearview mirror not working	› Fuse › Electronic anti-dazzle inside rearview mirror › harness or connector

Rearview mirror switch - manual stow

Pin definition



8BE0250F910A

Pin No.	Function
1	—
2	—
3	Power supply
4	GND
5	Outside rearview mirror _ mirror adjustment common end
6	Left outside rearview mirror _ mirror left+/right-
7	Left outside rearview mirror _ mirror up+/down-
8	Right outside rearview mirror _ mirror up+/down-
9	Right outside rearview mirror _ mirror left+/right-
10	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove control switch

Notice

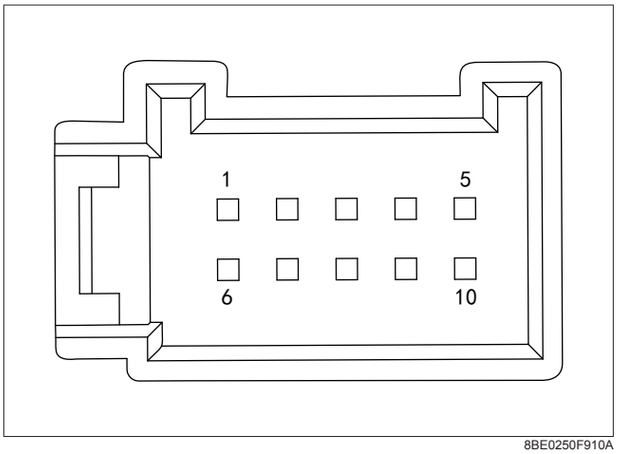
› Outside rearview mirror switch is integrated in control switch on driver side. For removal method, refer to control switch.

Installation

1. Perform installation work in reverse order of removal

Rearview mirror switch - power stow

Pin definition



8BE0250F910A

Pin No.	Function
1	—
2	Automatic stowing signal of outside rearview mirror
3	Power supply
4	GND
5	Outside rearview mirror _ mirror adjustment common end
6	Left outside rearview mirror _ mirror left+/right-
7	Left outside rearview mirror _ mirror up+/down-
8	Right outside rearview mirror _ mirror up+/down-
9	Right outside rearview mirror _ mirror left+/right-
10	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove control switch

Notice

› Outside rearview mirror switch is integrated in control switch on driver side. For removal method, refer to control switch.

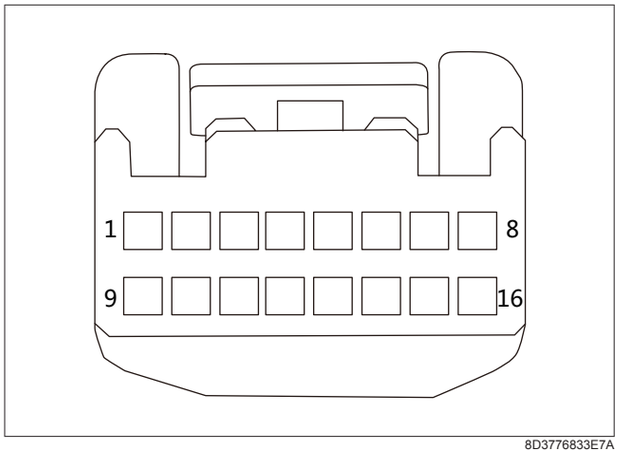
Installation

1. Perform installation work in reverse order of removal

Outside rearview mirror - manual stow + electric adjustment + defroster+ turn signal lamp + visual front blind spot

Pin definition

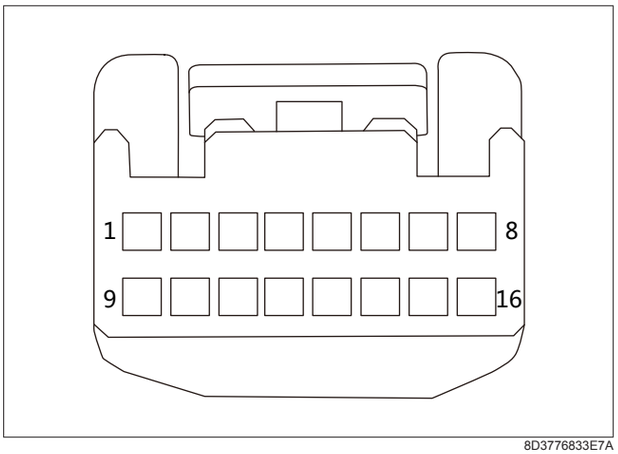
Driver side outside rearview mirror



8D3776833E7A

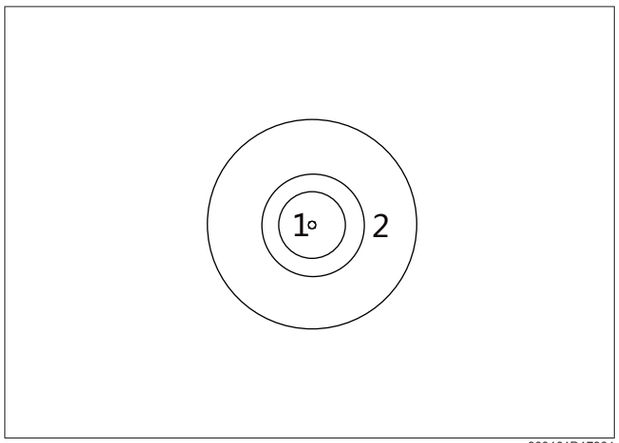
Pin No.	Function
1	Turn signal lamp+
2	Heating-
3	Heating+
4	—
5	—
6	Mirror adjustment left+/right-
7	Mirror adjustment left-/right+/down-/up+
8	Mirror adjustment down+/up-
9	—
10	—
11	Turn signal lamp-
12	—
13	—
14	—
15	—
16	—

Front passenger side outside rearview mirror



8D3776833E7A

Pin No.	Function
1	Turn signal lamp+
2	Heating-
3	Heating+
4	—
5	—
6	Mirror adjustment left+/right-
7	Mirror adjustment left-/right+/down-/up+
8	Mirror adjustment down+/up-
9	—
10	—
11	Turn signal lamp-
12	—
13	—
14	—
15	—
16	—



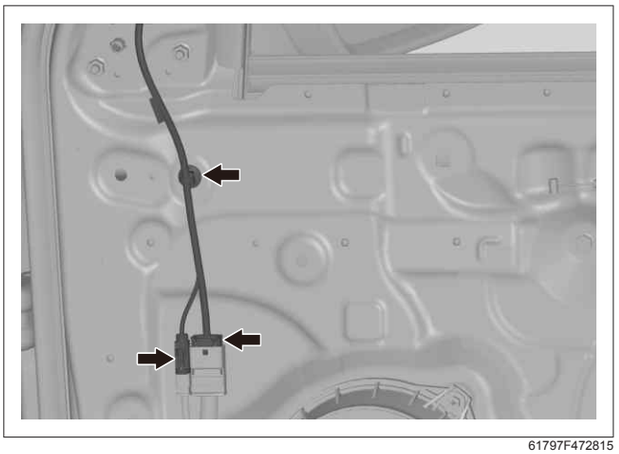
903161D17964

Pin No.	Function
1	Signal x power
2	Ground

Removal/installation

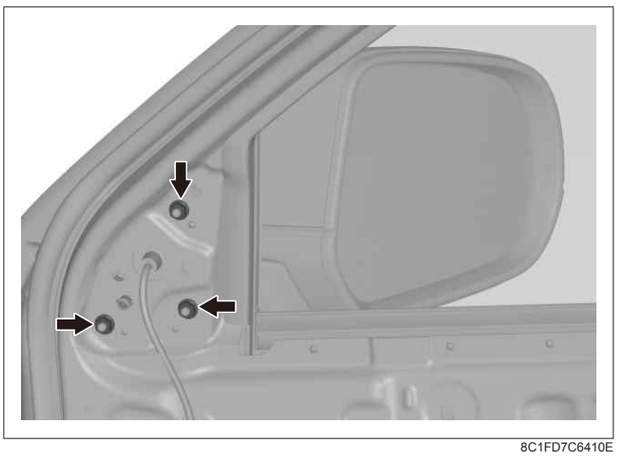
Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner trim plate
3. Disconnect harness connector and separate harness clip



61797F472815

4. Remove 3 nuts



8C1FD7C6410E

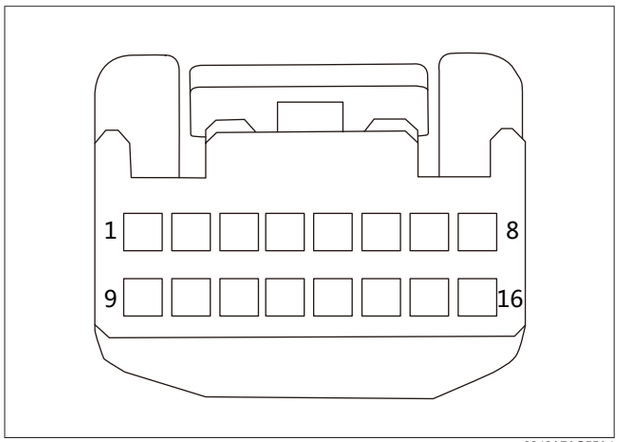
5. Remove the outside rearview mirror

Installation

1. Perform installation work in reverse order of removal

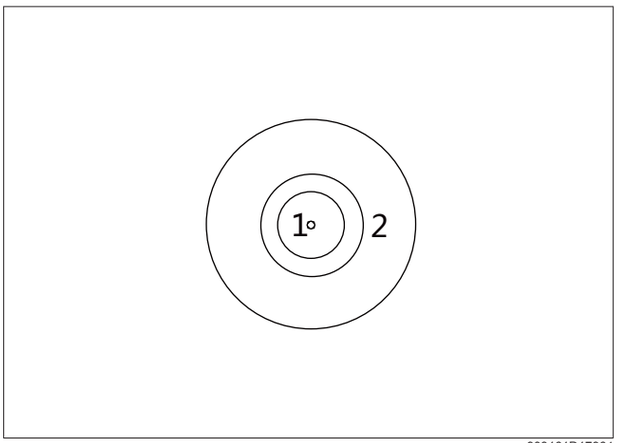
Outside rearview mirror - power stow + electric adjustment + defroster + turn signal lamp + 360 surround view

Pin definition



0048A7AC55A4

Pin No.	Function
1	Turn signal lamp +
2	Heating -
3	Heating +
4	Power initialization- / stow+
5	Power initialization+ / stow-
6	Mirror adjustment leftward +/rightward -
7	Mirror adjustment leftward -/rightward +/downward -/upward +
8	Mirror adjustment downward +/ upward -
9	—
10	—
11	Turn signal lamp -
12	—
13	—
14	—
15	—
16	—



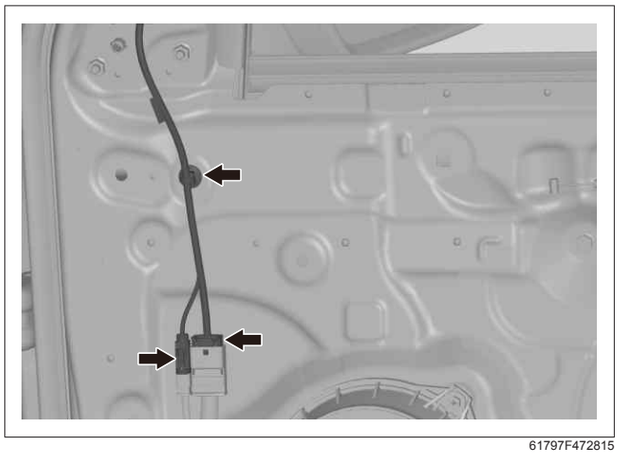
903161D17964

Pin No.	Function
1	Camera video output
2	GND

Removal/installation

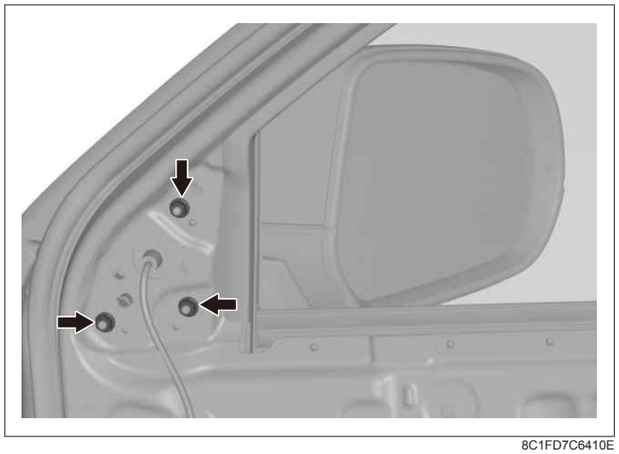
Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner trim plate
3. Disconnect harness connector and separate harness clip



61797F472815

4. Remove 3 nuts



8C1FD7C6410E

5. Remove the outside rearview mirror

Installation

1. Perform installation work in reverse order of removal

Inside rearview mirror - manual anti-dazzle

Removal/installation

Removal

1. Remove 1 screw, and remove inside rearview mirror upward along the rail



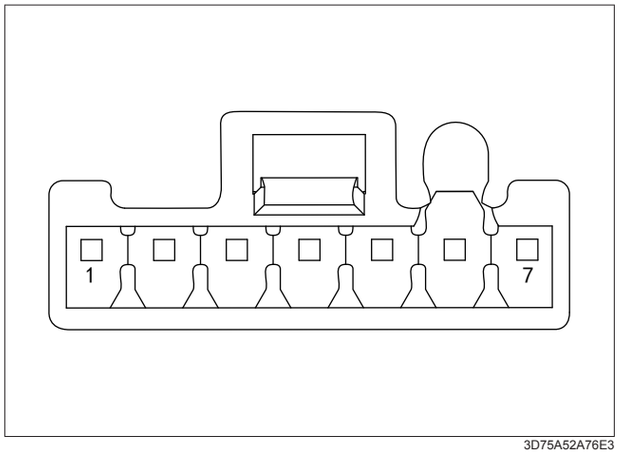
DB5C3ACEE285

Installation

1. Perform installation work in reverse order of removal

Inside rearview mirror - electric anti-dazzle

Pin definition



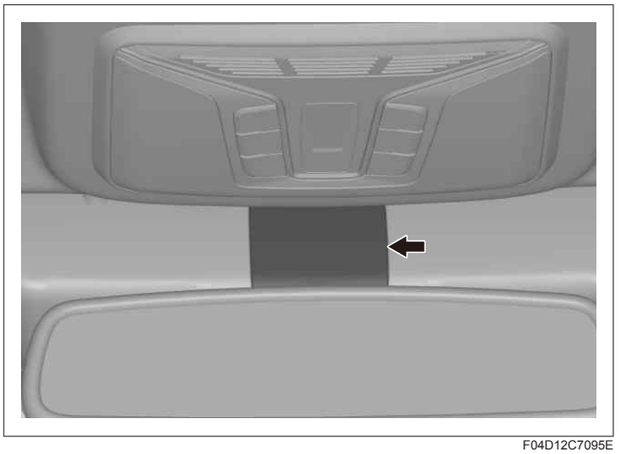
3D75A52A76E3

Pin No.	Function
1	Power
2	Ground
3	Reverse signal
4	—
5	—
6	—
7	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove upper cover of inside rearview mirror



F04D12C7095E

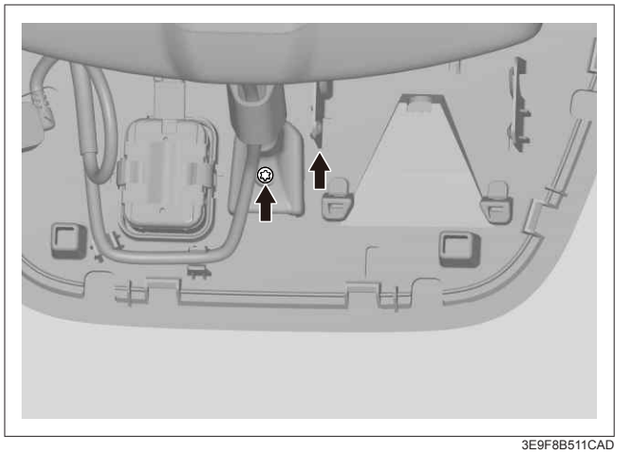
3. Remove lower cover of inside rearview mirror with drive recorder power outlet



0974013D5324

4. Disconnect harness connector

5. Remove 1 screw, and remove inside rear-view mirror upward along the rail



3E9F8B511CAD

Installation

1. Perform installation work in reverse order of removal

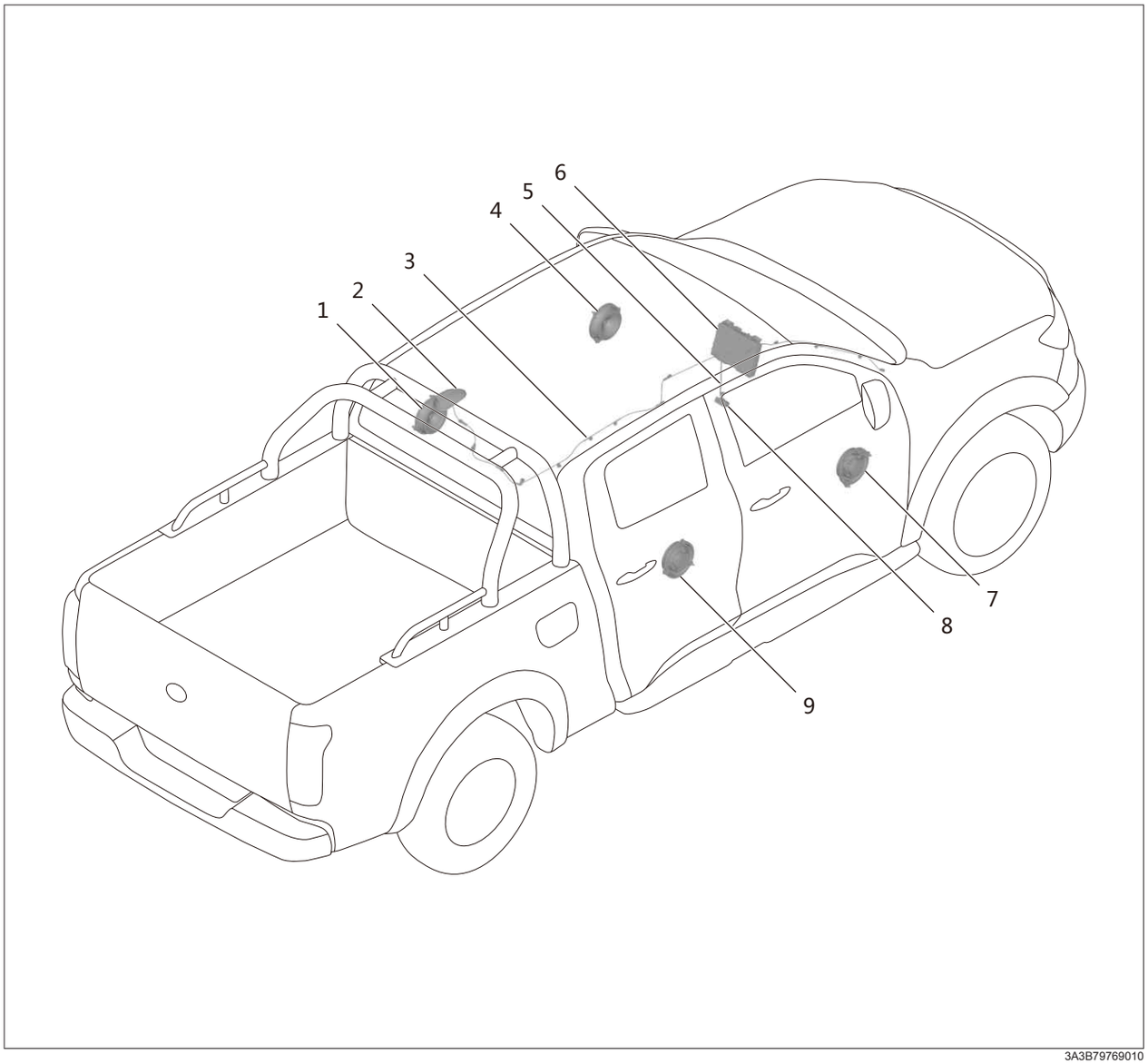
Audio and video system

Audio and video system - 4 woofer .....59－1
Location diagram .....59－1
System diagram .....59－2
Specified torque .....59－3
List of DTC .....59－4
DTC troubleshooting method .....59－5
Audio and video system - (2 treble + +4 woofer) .....59－11
Location diagram .....59－11
System diagram .....59－12
Specified torque .....59－13
List of DTC .....59－14
DTC troubleshooting method .....59－15
Multimedia player - with (FM/AM + RVC + SVC) .....59－21
Pin definition .....59－21
Removal/installation .....59－23
Multimedia player - with (FM/AM + AVM) .....59－24
Pin definition .....59－24
Removal/installation .....59－26
Front door tweeter .....59－27
Pin definition .....59－27
Check .....59－27
Removal/installation .....59－28
Front door woofer .....59－29
Pin definition .....59－29
Check .....59－29
Removal/installation .....59－30
Rear door woofer .....59－31
Pin definition .....59－31
Check .....59－31
Removal/installation .....59－32
Antenna .....59－33
Pin definition .....59－33
Removal/installation .....59－33
Microphone .....59－34
Pin definition .....59－34
Removal/installation .....59－34
USB panel .....59－35
Removal/installation .....59－35
Steering wheel AV switch .....59－36
Pin definition .....59－36
Removal/installation .....59－36
Console panel audio video switch .....59－37

Pin definition .....59－37
Removal/installation.....59－37

Audio and video system - 4 woofer

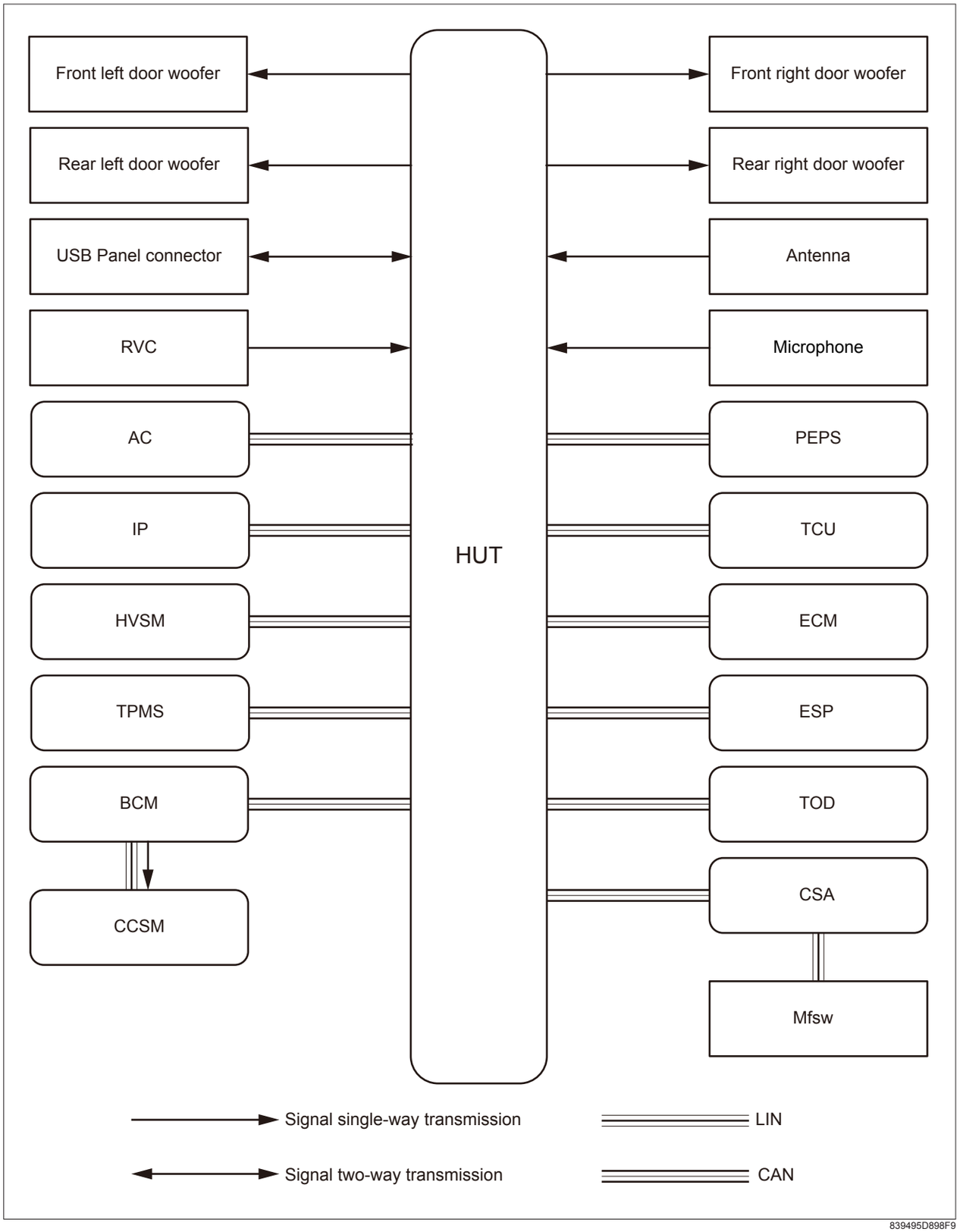
Location diagram



3A3B79769010

1. Rear left door woofer
2. Antenna
3. Antenna wiring harness
4. Front left door woofer
5. USB harness
6. Multimedia player
7. Front right door woofer
8. USB panel
9. Rear right door woofer

System diagram



839495D898F9

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Antenna x roof sheet metal	8±1	1	—

List of DTC

No.	DTC	DTC description
1	U110017	Communication voltage too high
2	U110116	Communication voltage too low
3	U007488	SC-CAN bus off
4	U014687	Communication with GW lost
5	U014087	Communication with BCM lost
6	U015587	Communication with IP lost
7	U014587	Communication with CSA lost
8	U010087	Communication with ECM lost
9	U012287	Communication with ESP (ABS) lost
10	U016487	Communication with AC (AC-FCP) lost

DTC troubleshooting method

U110017

DTC definition: communication voltage too high

DTC occurring condition: The CAN bus diagnostic voltage is greater than 16 V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.

DTC removal condition: CAN bus detection voltage in the range of 9V~15V

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if the voltage at the generator B+ is higher than 14.9 V when the engine speed is 2000 r	After repairing the generator, go to step 5	Go to step 4
4	Check the voltage across the power cord of the multimedia host connector, and check if the voltage is too high	After replacing the harness, go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U110116

DTC definition: communication voltage too low

DTC occurring condition: diagnostic voltage of CAN bus less than 9V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.

DTC removal condition: the CAN bus diagnostic voltage is in the range of 10 V~16 V

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs

Step	Operation	Yes	No
3	Check if the voltage at the generator B+ is lower than 9V when the engine speed is 2000 r	After repairing the generator, go to step 5	Go to step 4
4	Check the voltage across the power cord of the multimedia host connector, and check if the voltage is too low	After replacing the harness, go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U007488

DTC definition: SC-CAN bus off

DTC occurring condition: network management indicates that the bus is off

Possible causes:

› Harness contact abnormal.

DTC removal condition: network management indicates that the bus is not off

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check the harness, reconnect or replace the harness	Go to step 4	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014687

DTC definition: communication with GW lost

DTC occurring condition: no message received on the bus

Possible causes:

› GW node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if GW is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014087

DTC definition: communication with BCM lost

DTC occurring condition: no message received on the bus

Possible causes:

- BCM node is abnormal.
- Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if BCM is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U015587

DTC definition: communication with IP is lost

DTC occurring condition: no message received on the bus

Possible causes:

› IP node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if IP is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014587

DTC definition: communication with CSA lost

DTC occurring condition: no message received on the bus

Possible causes:

› Abnormal CSA node.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if CSA is damaged	Go to step 5	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U010087

DTC definition: communication with ECM lost

DTC occurring condition: no message received on the bus

Possible causes:

› ECM node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if ECM is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: no message received on the bus

Possible causes:

› ESP (ABS) node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if ESP (ABS) is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U016487

DTC definition: communication with AC(AC-FCP) lost

DTC occurring condition: no message received on the bus

Possible causes:

- Abnormal AC (AC-FCP) node.
- Harness contact abnormal.

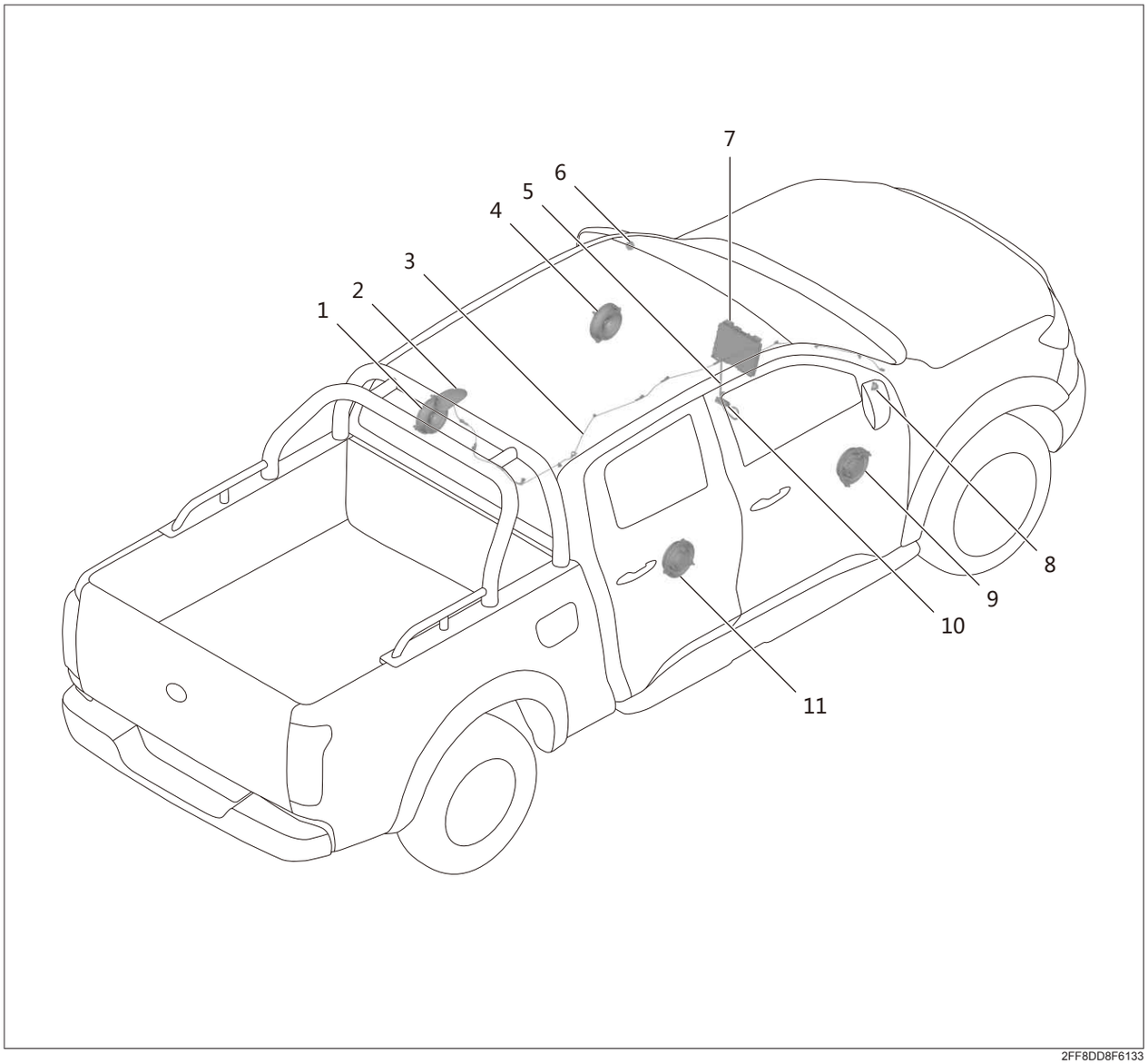
DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if AC(AC-FCP) is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

Audio and video system - (2 treble + +4 woofer)

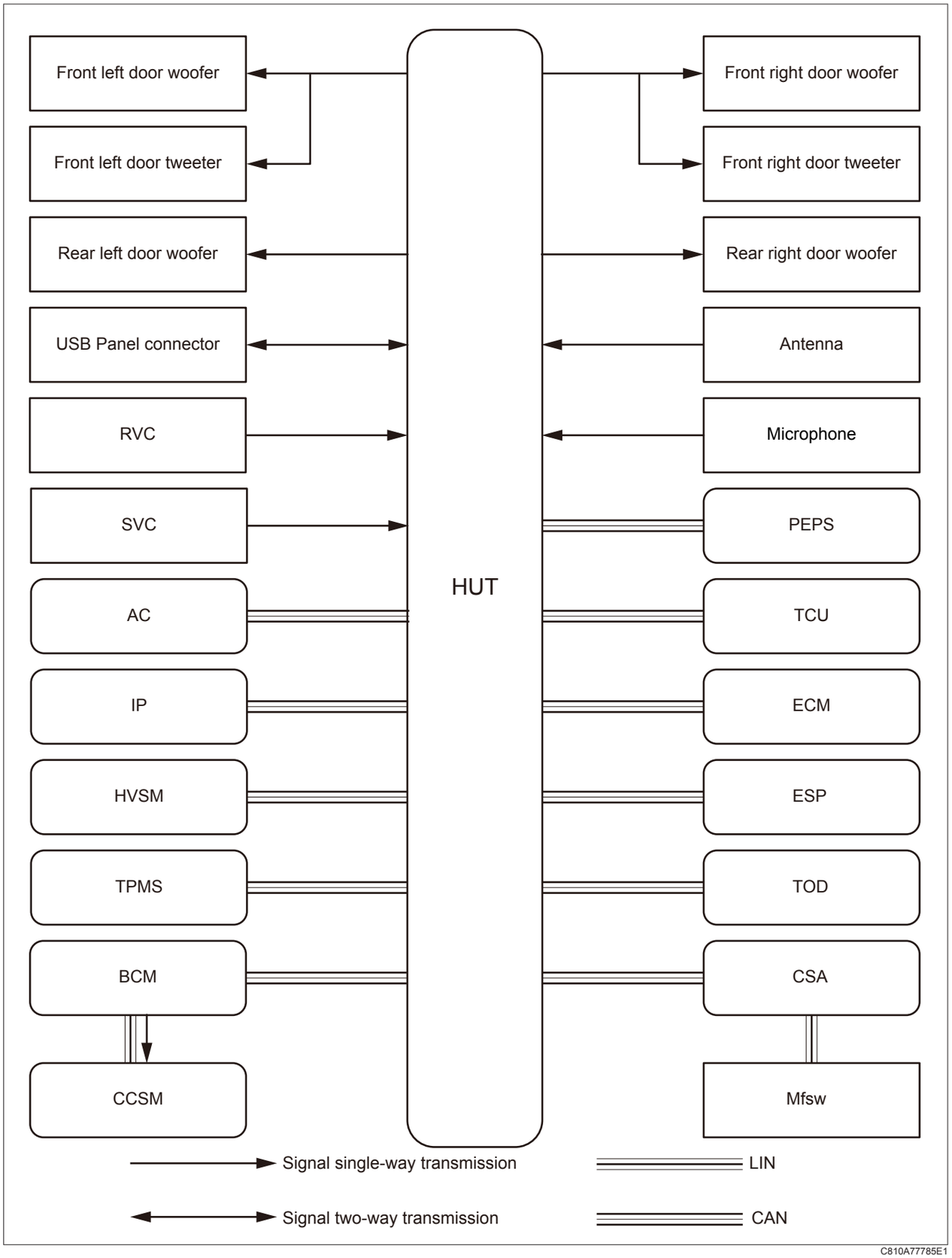
Location diagram



2FF8DD8F6133

1. Rear left door woofer
2. Antenna
3. Antenna wiring harness
4. Front left door woofer
5. USB harness
6. Front left door tweeter
7. Multimedia player
8. Front right door tweeter
9. Front right door woofer
10. USB panel
11. Rear right door woofer

System diagram



C810A77785E1

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Antenna x roof sheet metal	8±1	1	—

List of DTC

No.	DTC	DTC description
1	U110017	Communication voltage too high
2	U110116	Communication voltage too low
3	U007488	SC-CAN bus off
4	U014687	Communication with GW lost
5	U014087	Communication with BCM lost
6	U015587	Communication with IP lost
7	U014587	Communication with CSA lost
8	U010087	Communication with ECM lost
9	U012287	Communication with ESP (ABS) lost
10	U016487	Communication with AC (AC-FCP) lost

DTC troubleshooting method

U110017

DTC definition: communication voltage too high

DTC occurring condition: The CAN bus diagnostic voltage is greater than 16 V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.

DTC removal condition: CAN bus detection voltage in the range of 9V~15V

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if the voltage at the generator B+ is higher than 14.9 V when the engine speed is 2000 r	After repairing the generator, go to step 5	Go to step 4
4	Check the voltage across the power cord of the multimedia host connector, and check if the voltage is too high	After replacing the harness, go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U110116

DTC definition: communication voltage too low

DTC occurring condition: diagnostic voltage of CAN bus less than 9V

Possible causes:

- The generator does not work normally.
- Harness contact abnormal.

DTC removal condition: the CAN bus diagnostic voltage is in the range of 10 V~16 V

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs

Step	Operation	Yes	No
3	Check if the voltage at the generator B+ is lower than 9V when the engine speed is 2000 r	After repairing the generator, go to step 5	Go to step 4
4	Check the voltage across the power cord of the multimedia host connector, and check if the voltage is too low	After replacing the harness, go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U007488

DTC definition: SC-CAN bus off

DTC occurring condition: network management indicates that the bus is off

Possible causes:

› Harness contact abnormal.

DTC removal condition: network management indicates that the bus is not off

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check the harness, reconnect or replace the harness	Go to step 4	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014687

DTC definition: communication with GW lost

DTC occurring condition: no message received on the bus

Possible causes:

› GW node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if GW is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014087

DTC definition: communication with BCM lost

DTC occurring condition: no message received on the bus

Possible causes:

- BCM node is abnormal.
- Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if BCM is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U015587

DTC definition: communication with IP is lost

DTC occurring condition: no message received on the bus

Possible causes:

› IP node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if IP is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U014587

DTC definition: communication with CSA lost

DTC occurring condition: no message received on the bus

Possible causes:

› Abnormal CSA node.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if CSA is damaged	Go to step 5	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U010087

DTC definition: communication with ECM lost

DTC occurring condition: no message received on the bus

Possible causes:

› ECM node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if ECM is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: no message received on the bus

Possible causes:

› ESP (ABS) node is abnormal.

› Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if ESP (ABS) is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

U016487

DTC definition: communication with AC(AC-FCP) lost

DTC occurring condition: no message received on the bus

Possible causes:

- Abnormal AC (AC-FCP) node.
- Harness contact abnormal.

DTC removal condition: all messages received successively on the bus at least 10 times

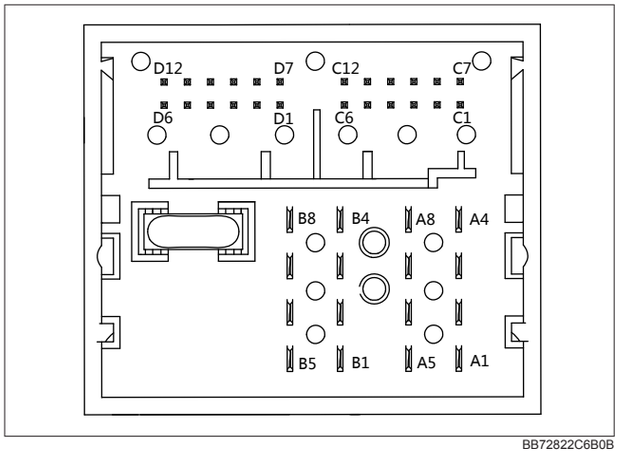
Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Waiting 1 min for start
2	Use scanner to check multimedia host for DTC	Go to step 3	Check for other DTCs
3	Check if harness contact is good or damaged	After reconnecting or replacing the harness, go to step 5	Go to step 4
4	Check if AC(AC-FCP) is damaged	Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

Multimedia player - with (FM/AM + RVC + SVC)

Pin definition

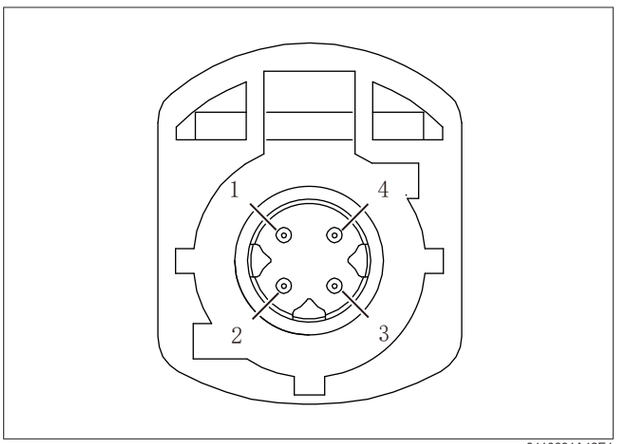
Main connector



BB72822C6B0B

Pin No.	Function
A1	Front right speaker +
A2	Rear right speaker +
A3	Front left speaker -
A4	Rear left speaker -
A5	Front right speaker -
A6	Rear right speaker -
A7	Front left speaker +
A8	Rear left speaker +
B1	—
B2	—
B3	—
B4	—
B5	—
B6	—
B7	Power
B8	Ground
C1	—
C2	—
C3	—
C4	Left microphone audio input+
C5	Left microphone shield GND
C6	—
C7	—
C8	—
C9	—
C10	Left microphone audio input -
C11	—
C12	—
D1	—
D2	CAN high
D3	CAN low
D4	—
D5	—
D6	—
D7	—
D8	—
D9	—
D10	—
D11	—
D12	—

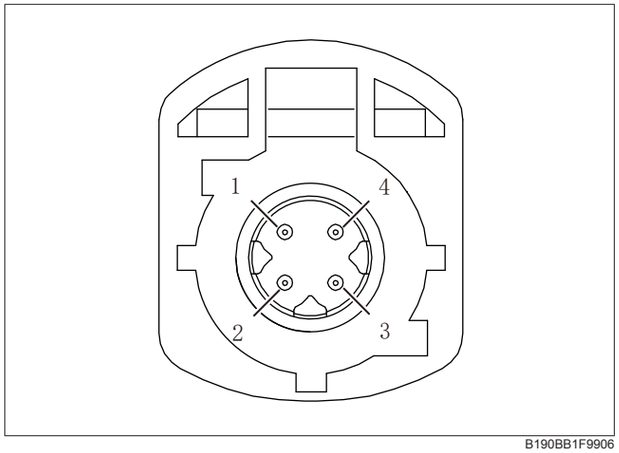
USB1 connector



8416691A42E1

Pin No.	Function
1	Data signal +
2	Power
3	Data signal -
4	Ground

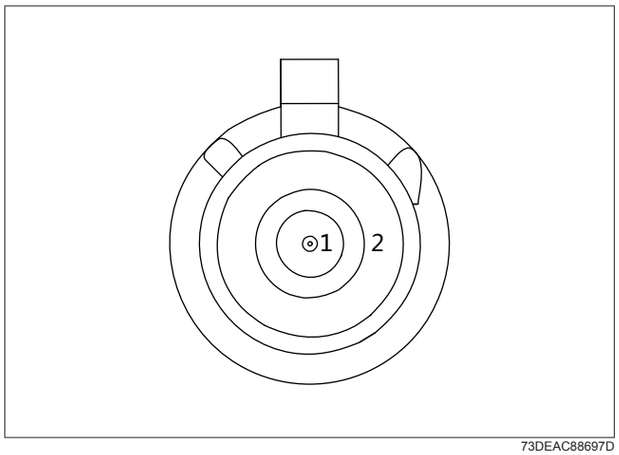
USB2 connector



B190BB1F9906

Pin No.	Function
1	Data signal +
2	Power
3	Data signal -
4	Ground

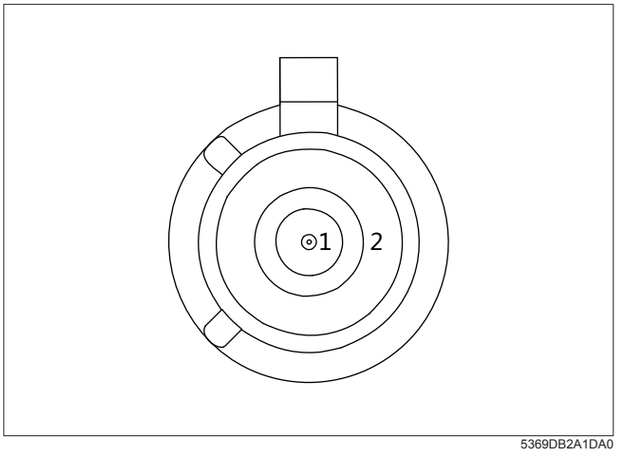
FM/AM connector



73DEAC88697D

Pin No.	Function
1	FM/AM signal input
2	Ground

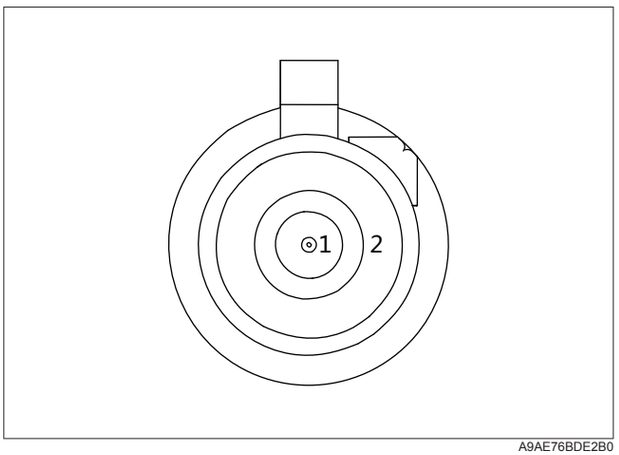
RVC connector



5369DB2A1DA0

Pin No.	Function
1	LVDS signal input
2	Ground

SVC connector



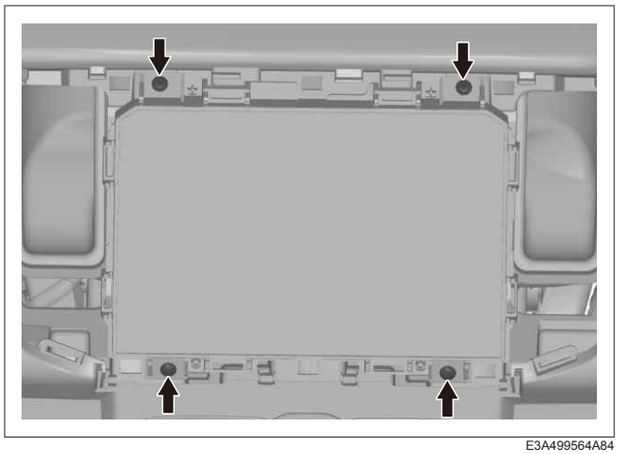
A9AE76BDE2B0

Pin No.	Function
1	LVDS signal input
2	Ground

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove central air vent assembly of instrument panel
3. Remove 4 screws



E3A499564A84

4. Disconnect harness connector
5. Remove multimedia player

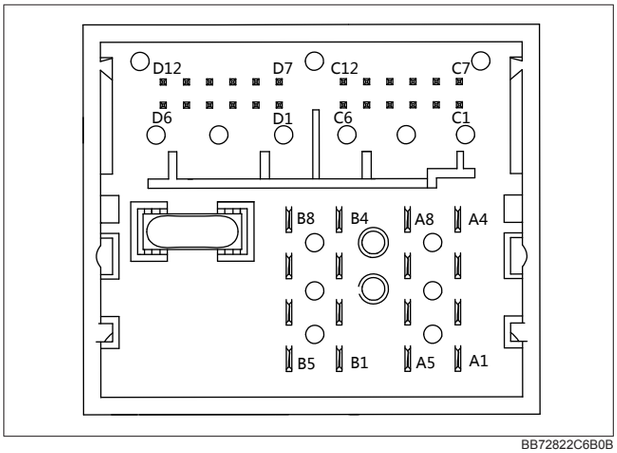
Installation

1. Perform installation work in reverse order of removal

Multimedia player - with (FM/AM + AVM)

Pin definition

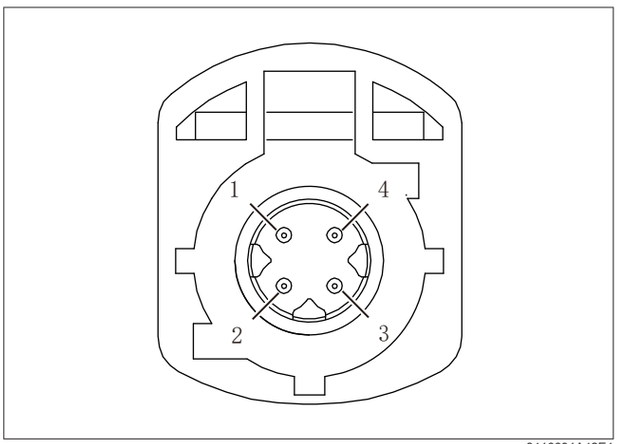
Main connector



BB72822C6B0B

Pin No.	Function
A1	Front right speaker +
A2	Rear right speaker +
A3	Front left speaker -
A4	Rear left speaker -
A5	Front right speaker -
A6	Rear right speaker -
A7	Front left speaker +
A8	Rear left speaker +
B1	—
B2	—
B3	—
B4	—
B5	—
B6	—
B7	Power
B8	GND
C1	—
C2	—
C3	—
C4	Left microphone audio input+
C5	Left microphone shield GND
C6	—
C7	—
C8	—
C9	—
C10	Left microphone audio input -
C11	—
C12	—
D1	—
D2	CAN_H
D3	CAN_L
D4	—
D5	—
D6	—
D7	—
D8	—
D9	—
D10	—
D11	—
D12	—

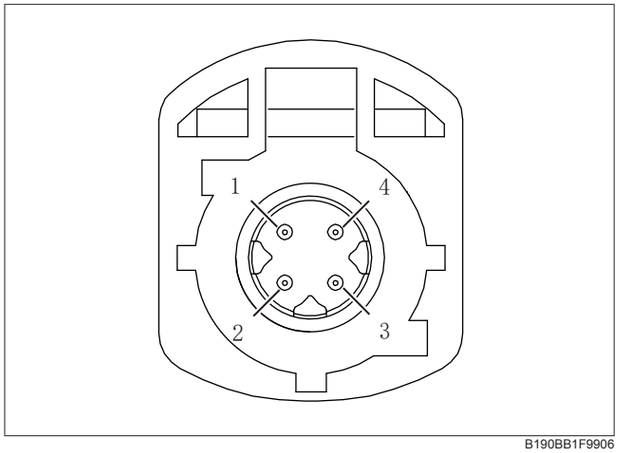
USB1 connector



8416691A42E1

Pin No.	Function
1	Data signal +
2	Power
3	Data signal -
4	GND

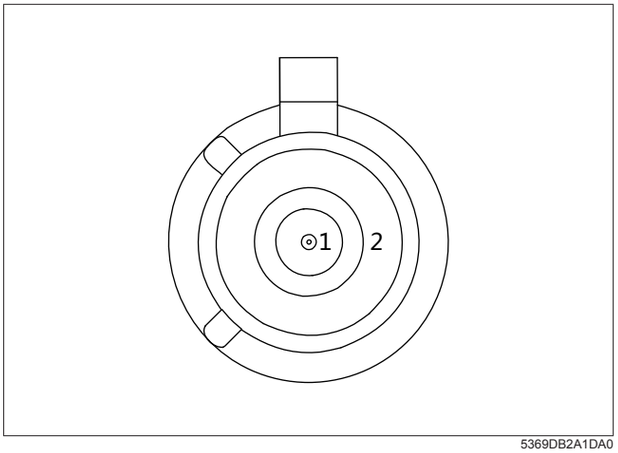
USB2 connector



B190BB1F9906

Pin No.	Function
1	Data signal +
2	Power
3	Data signal -
4	GND

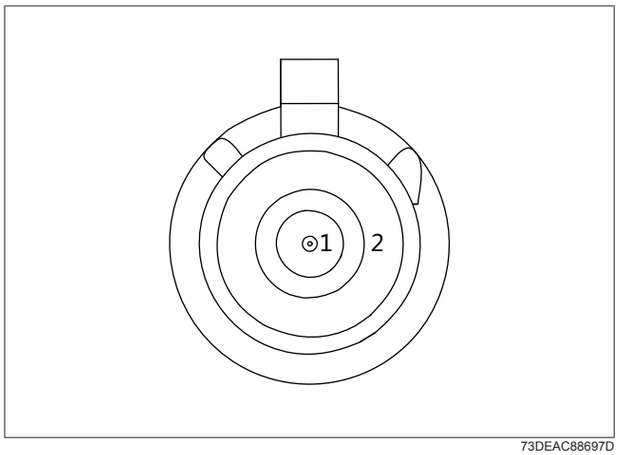
AVM connector



5369DB2A1DA0

Pin No.	Function
1	LVDS signal input
2	GND

FM/AM connector



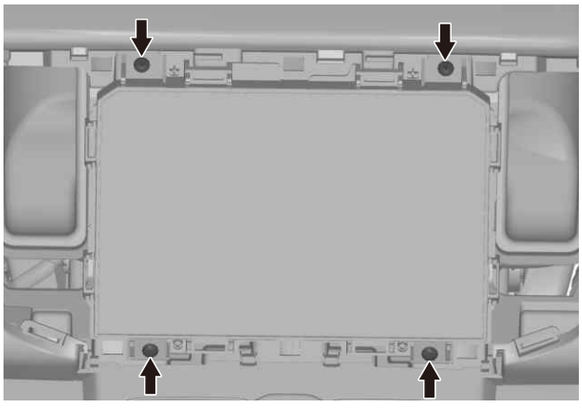
73DEAC88697D

Pin No.	Function
1	FM/AM signal input
2	GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove central air vent assembly of instrument panel
3. Remove 4 screws



E3A499564A84

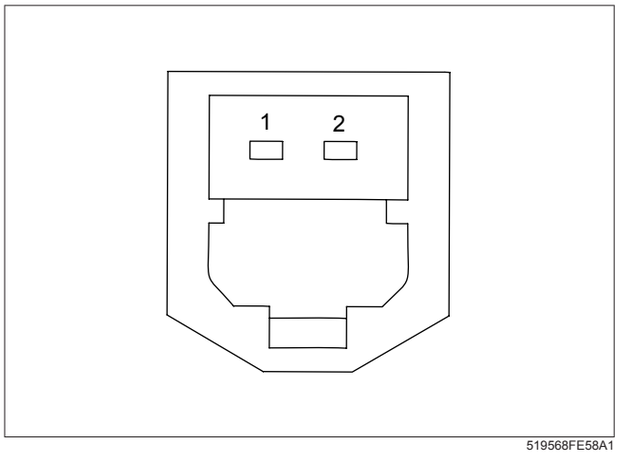
4. Disconnect harness connector
5. Remove multimedia player

Installation

1. Perform installation work in reverse order of removal

Front door tweeter

Pin definition



519568FE58A1

Pin No.	function
1	Positive terminal
2	Negative terminal

Check

Notice

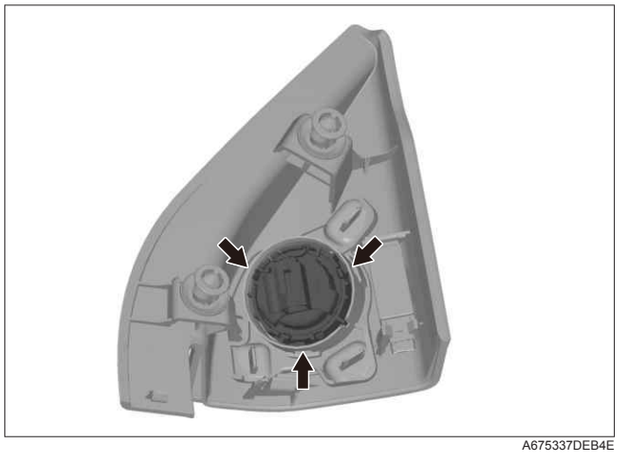
› If a tweeter noise occurs, replace the other door tweeter to check it.

1. If the noise disappears after the other door tweeter is replaced, and no noise appears when it is replaced with the original tweeter, it suggests poor wiring of the harness.
2. If the noise disappears after the other door tweeter is replaced, but the noise still exists when it is replaced with the original tweeter, it suggests the tweeter fault.
3. If the noise still exists after the other door tweeter is replaced, it is not the tweeter fault.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Inner triangle plate of front door
3. Separate 3 snap connections



A675337DEB4E

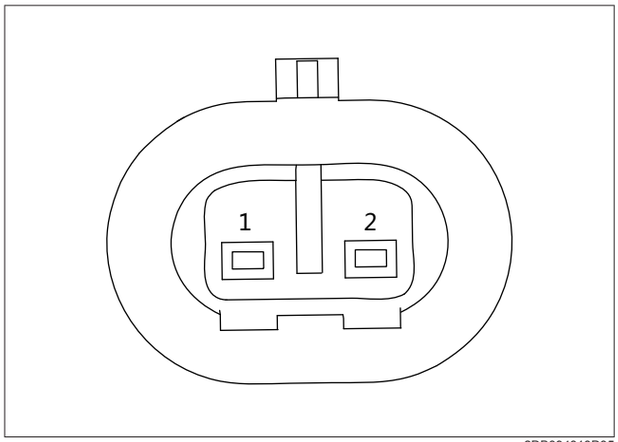
4. Remove front door tweeter

Installation

1. Perform installation work in reverse order of removal

Front door woofer

Pin definition



2DB394318D35

Pin No.	Function
1	Negative terminal
2	Positive terminal

Check

Notice

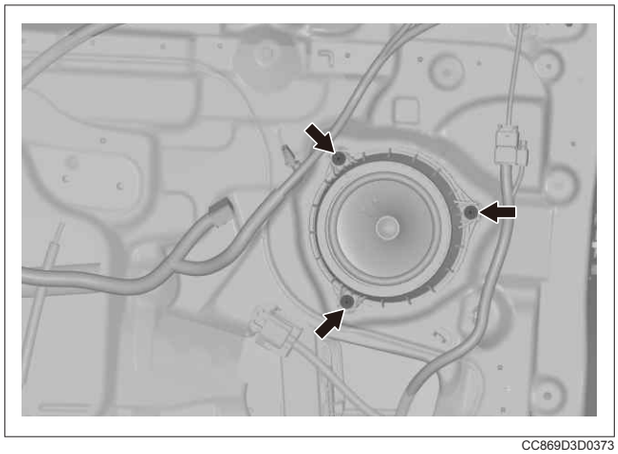
› If a woofer noise occurs, replace the other door woofer to check it.

1. If the noise disappears after the other door woofer is replaced, and no noise appears when it is replaced with the original woofer, it suggests poor wiring of the harness.
2. If the noise disappears after the other door woofer is replaced, but the noise still exists when it is replaced with the original woofer, it suggests the woofer fault.
3. If the noise still exists after the other door woofer is replaced, it is not the woofer fault.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front door inner trim plate
3. Remove 3 screws



CC869D3D0373

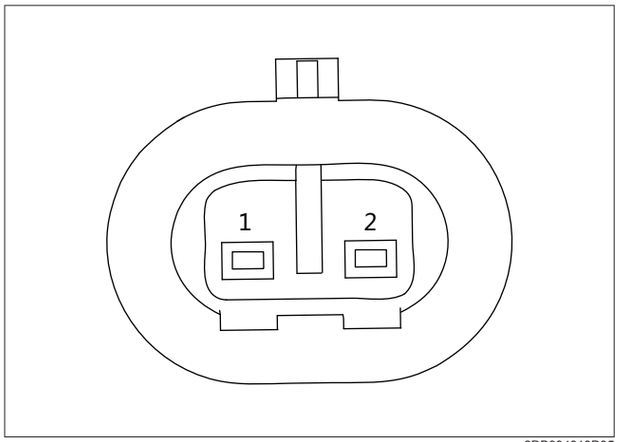
4. Disconnect harness connector
5. Remove front door woofer

Installation

1. Perform installation work in reverse order of removal

Rear door woofer

Pin definition



2DB394318D35

Pin No.	Function
1	Negative terminal
2	Positive terminal

Check

Notice

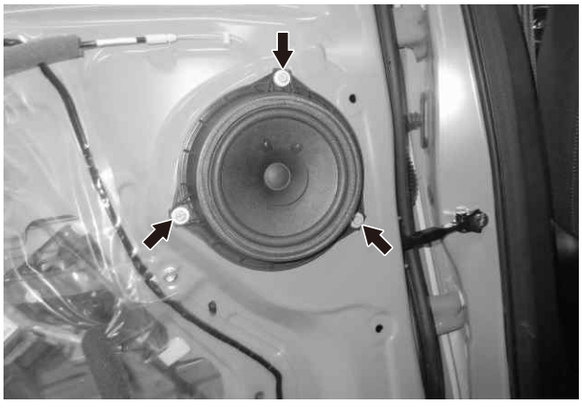
› If a woofer noise occurs, replace the other door woofer to check it.

1. If the noise disappears after the other door woofer is replaced, and no noise appears when it is replaced with the original woofer, it suggests poor wiring of the harness.
2. If the noise disappears after the other door woofer is replaced, but the noise still exists when it is replaced with the original woofer, it suggests the woofer fault.
3. If the noise still exists after the other door woofer is replaced, it is not the woofer fault.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove rear door inner trim plate
3. Remove 3 screws



8C7A00B228C1

4. Disconnect harness connector
5. Remove rear door woofer

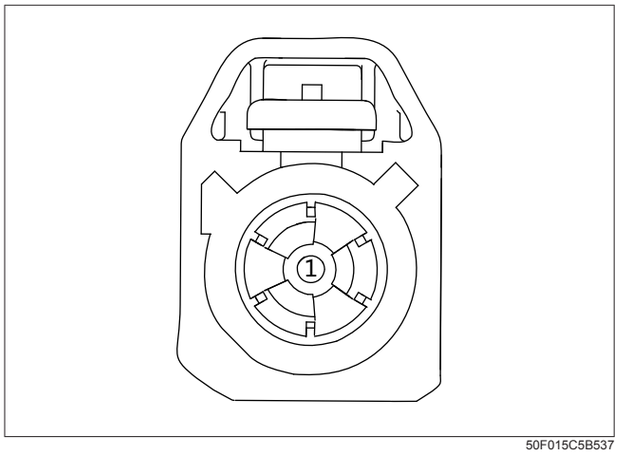
Installation

1. Perform installation work in reverse order of removal

Antenna

Pin definition

FM/AM connector



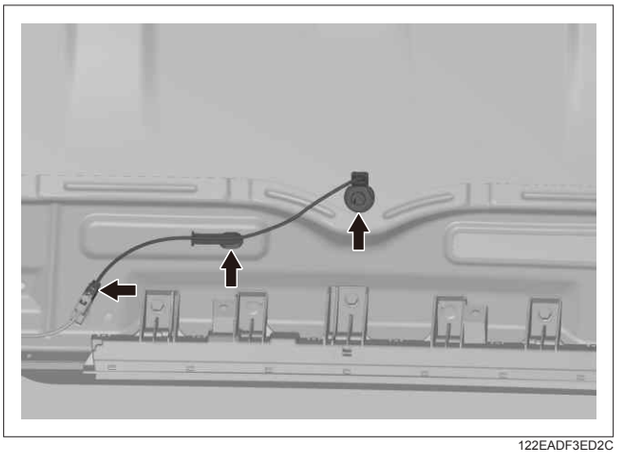
50F015C5B537

Pin No.	Function
1	FM/AM

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove pillar A upper guard
3. Remove pillar B guard
4. Remove pillar C guard
5. Remove the reading lamp.
6. Remove celling lamp
7. Remove the roof inner trimming (Not necessary to take out)
8. Disconnect harness connector, separate harness clips, and remove 1 nut



122EADF3ED2C

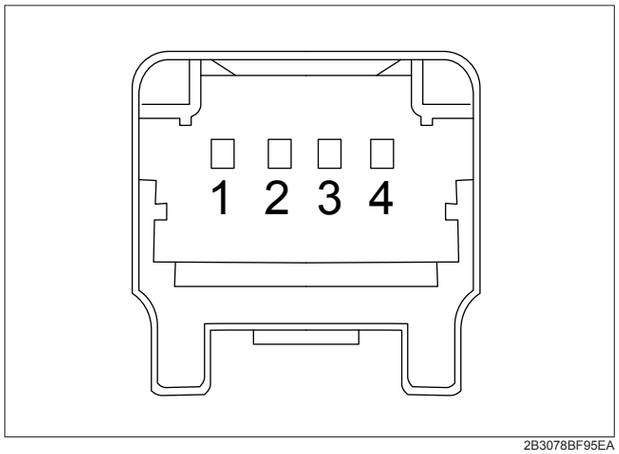
9. Remove antenna

Installation

1. Perform installation work in reverse order of removal

Microphone

Pin definition



2B3078BF95EA

Pin No.	function
1	-
2	-
3	Microphone power supply
4	Microphone GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the reading light.

Notice

› The microphone is integrated in the reading lamp. For the removal method, see the reading lamp.

Installation

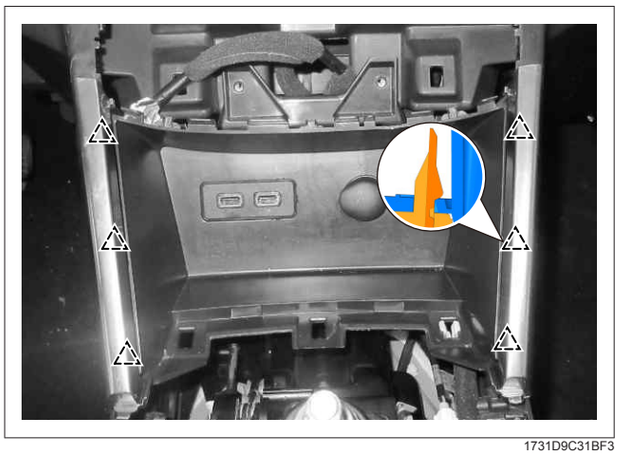
1. Perform installation work in reverse order of removal

USB panel

Removal/installation

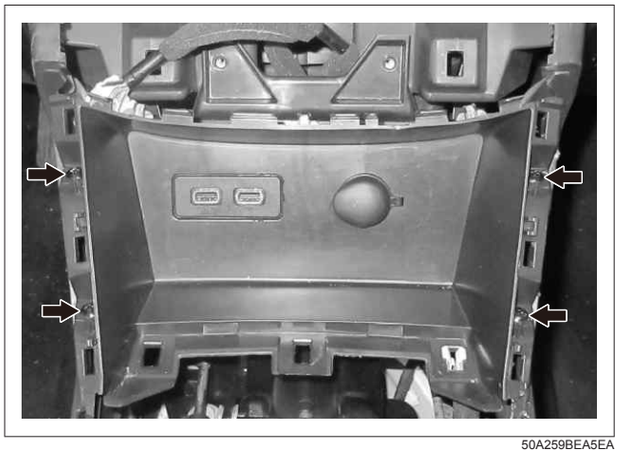
Removal

1. Disconnect the negative terminal of the battery.
2. Remove console panel switch
3. Remove the console panel of the auxiliary instrument panel
4. Separate 3 clips on the left side and 3 clips on the right side, and remove the left and right trim strips on auxiliary instrument panel



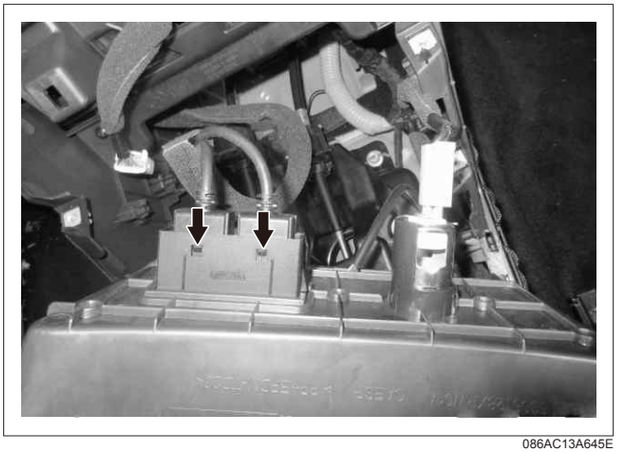
1731D9C31BF3

5. Remove 4 screws, and remove front storage box of auxiliary instrument panel



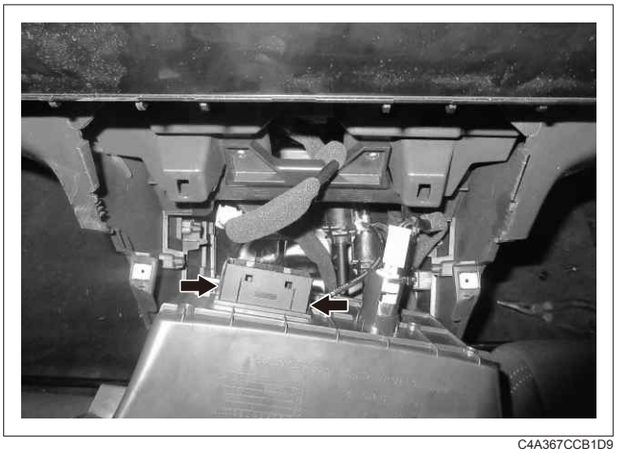
50A259BEA5EA

6. Separate USB harness from USB panel clip



086AC13A645E

7. Separate clips at 2 sides



C4A367CCB1D9

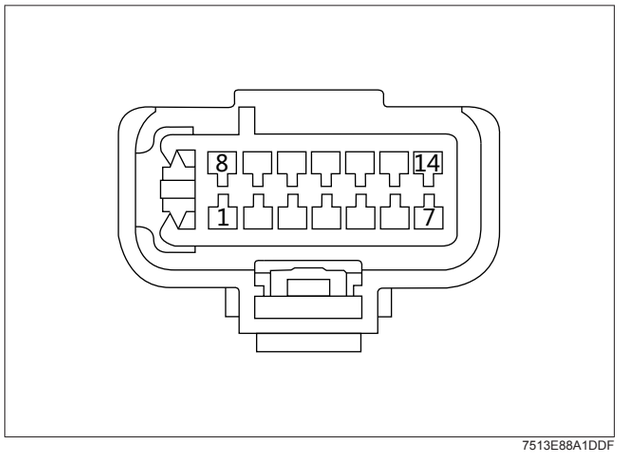
8. Remove USB panel

Installation

1. Perform installation work in reverse order of removal

Steering wheel AV switch

Pin definition



7513E88A1DDF

Pin No.	Function
1	Airbag+
2	Airbag-
3	Battery
4	LIN
5	Cruising
6	Ground
7	Cruise GND
8	—
9	Paddle shifter GND
10	Paddle shifter
11	—
12	—
13	—
14	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the multi-function steering wheel switch

Notice

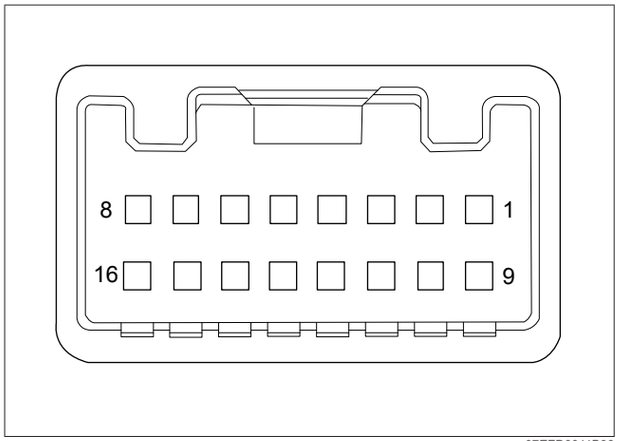
› Steering wheel AV switch is integrated to multi-function steering wheel switch. See multi-function steering wheel switch for method of removal.

Installation

1. Perform installation work in reverse order of removal

Console panel audio video switch

Pin definition



07EFD3911B88

Pin No.	Function
1	Airbag OFF indicator
2	—
3	Danger warning indicator
4	Hazard warning lamp switch
5	LIN
6	—
7	Airbag ON indicator
8	Power
9	Backlight
10	—
11	—
12	HDC switch
13	ESP switch
14	—
15	—
16	Ground

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove console panel switch

Notice

› Console panel AV switch is integrated to console panel switch. See console panel switch for method of removal.

Installation

1. Perform installation work in reverse order of removal

Passive entry & passive start system

Passive entry & passive start system ..... 60－1
System description ..... 60－1
Location diagram ..... 60－2
System diagram ..... 60－3
Specified torque ..... 60－4
List of DTC ..... 60－5
DTC troubleshooting method ..... 60－7
PEPS controller assembly ..... 60－26
Pin definition ..... 60－26
Removal/installation ..... 60－28
Engine start-stop switch ..... 60－29
Pin definition ..... 60－29
Removal/installation ..... 60－29
Door handle electronic module ..... 60－30
Pin definition ..... 60－30
Removal/installation ..... 60－30
Low-frequency antenna assembly - front door ..... 60－31
Pin definition ..... 60－31
Removal/installation ..... 60－31
Low-frequency antenna assembly 4 - in front of auxiliary instrument panel 60－32
Pin definition ..... 60－32
Removal/installation ..... 60－32
Low-frequency antenna assembly 2 - rear floor ..... 60－33
Pin definition ..... 60－33
Removal/installation ..... 60－33
Electronic steering lock ..... 60－34
Pin definition ..... 60－34
Removal/installation ..... 60－34
Immobilizer coil (6MT) ..... 60－35
Pin definition ..... 60－35
Removal/installation ..... 60－35
Immobilizer coil (8AT) ..... 60－36
Pin definition ..... 60－36
Removal/installation ..... 60－36

Passive entry & passive start system

System description

The PEPS (Passive Entry & Passive Start) system uses an advanced radio frequency recognition technique, and it uses the PEPS controller to drive the LF antenna to find and authenticate the intelligent key. After the PEPS controller has authenticated the intelligent key, the doors can be unlocked and the engine can be started.

Passive keyless entry and leave

This system can realize function of passive keyless entry and exit on driver or front passenger side. Touch switch trigger method is applicable to keyless entry on driver side, and microswitch trigger method is applicable to keyless exit.

Engine startup and shutdown

Normal startup: the system engine has a start-stop switch. When the brake/clutch pedal is stepped on and is at P/N gear, the engine can be started by pressing the switch button so long as there is legal intelligent key in the vehicle.

Emergency startup: in emergency mode (intelligent key battery has run down or there is same frequency interference), place intelligent key into designated position and press the switch button in a normal startup manner, and PEPS ECU will authenticate legality of the intelligent key by means of IMMO; and the engine can be started when the intelligent key passes the authentication.

Remote control functions

This system can realize functions of vehicle locking, unlocking and searching through buttons on intelligent key.

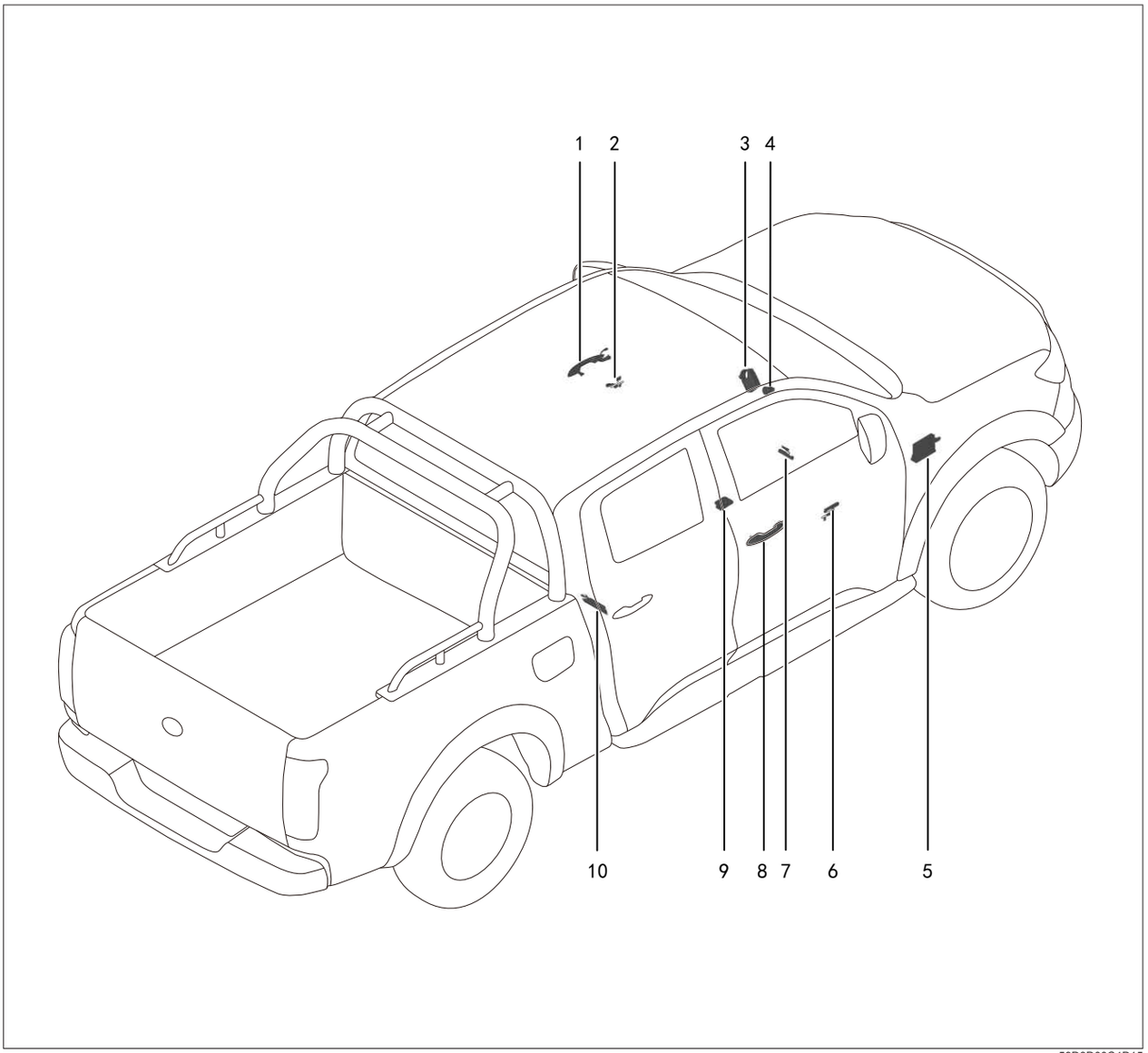
Electronic steering lock

ESCL judges various conditions to control unlocking/locking of steering wheel based CAN bus program.

Alarm function

This system provides a variety of alarm functions, including alarm that the key is not in the car, and the key is left in the car, etc.

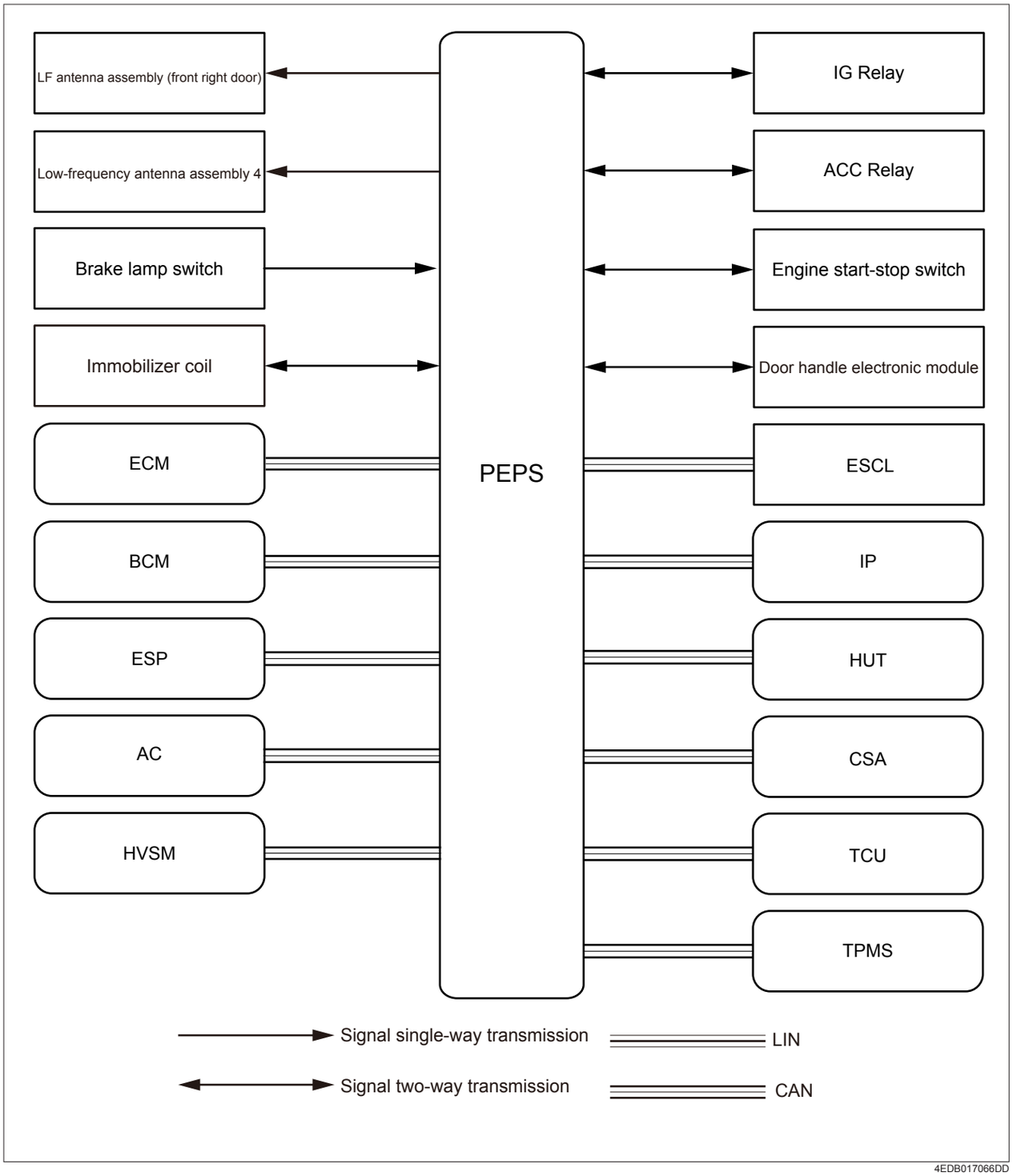
Location diagram



59D3D00C4D15

1. Front left door exterior handle (integrated door handle electronic module)
2. LF antenna assembly - front left door
3. Electronic steering lock
4. Engine start-stop switch
5. PEPS controller
6. LF antenna assembly - front right door
7. Low-frequency antenna assembly 4 - in front of the auxiliary instrument panel
8. Front right door exterior handle (integrated door handle electronic module)
9. Immobilizer coil
10. Low-frequency antenna assembly 2 - rear floor

System diagram



4EDB017066DD

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Bolt	PEPS controller assembly × PEPS controller bracket	8±1	3	—
Bolt	PEPS controller bracket × pipe beam	8±1	2	—

List of DTC

No.	DTC	DTC description
1	U110017	PEPS overvoltage
2	U110116	PEPS undervoltage
3	U001988	CF-CAN bus off
4	U014087	Communication with BCM lost
5	U025487	Lose communication with ESCL
6	U012287	Communication with ESP lost
7	U010187	Communication with TCU lost
8	U010087	Communication with ECM lost
9	U111087	Limphome failure
10	B180300	Unlocking capacitive sensor switch stuck on driver side
11	B180400	Unlocking capacitive sensor switch stuck on front passenger side
12	B180500	Locking capacitive sensor switch stuck on driver side
13	B180600	Locking capacitive sensor switch stuck on front passenger side
14	B185300	Stuck microswitch on driver side
15	B180700	Engine start-stop switch 1 sticky
16	B185200	Engine start-stop switch 2 sticky
17	B180800	Engine start-stop switch out of sync
18	B181900	LF drive end overtemperature
19	B181E13	Antenna 1 open-circuit fault
20	B181E12	Antenna 1 or antenna 2 short-circuited to power supply
21	B181E11	Antenna 1 or antenna 2 short-circuited to ground
22	B181F13	Antenna 2 open-circuit fault
23	B182113	Antenna 4 open-circuit fault
24	B182112	Antenna 4 or antenna 5 short-circuited to power supply
25	B182111	Antenna 4 or antenna 5 short-circuited to ground
26	B182213	Antenna 5 open-circuit fault
27	B182400	IMMO initialization error
28	B182500	IMMO coil fault
29	B182700	IMMO authentication failure
30	B182800	EMS authentication failure
31	B183B00	PDU drive circuit fault
32	B183C00	PDU feedback and expected output are inconsistent
33	B184000	T-BOX authentication failure
34	B184300	ESCL authentication failed

No.	DTC	DTC description
35	B184600	RF drive chip fault
36	B185000	RF chip configuration fault
37	B185100	Key battery low
38	B184700	LF drive chip fault

DTC troubleshooting method

U110017

DTC definition: PEPS overvoltage

DTC occurring condition: battery voltage stays 16V above for 20s

Possible causes:

- High voltage of battery.
- PEPS voltage acquisition circuit fault.

DTC removal condition: battery voltage stays 9V above and 15V below for 1s

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Use special battery testing equipment to check if the voltage is higher than 16V	Go to step 4	Go to step 5
4	Replace the battery	Go to step 1	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U110116

DTC definition: PEPS undervoltage

DTC occurring condition: battery voltage stays 9V below for 20s

Possible causes:

- Low voltage of battery.
- PEPS voltage acquisition circuit fault.

DTC removal condition: battery voltage stays 10V above and 16V below for 1s

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Use special battery testing equipment to check if the voltage is lower than 9V	Go to step 4	Go to step 5
4	Replace the battery	Go to step 1	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U001988

DTC definition: CF-CAN bus off

DTC occurring condition: PEPS enters CANbus-off 3 times successively

Possible causes:

- Whether CAN-H is short-circuited to CAN-L.
- Whether CAN-H is short-circuited to ground.
- Whether CAN-L is short-circuited to power.
- External signal interferes with normal PEPS message, and error frame information is reported all the time.

DTC removal condition: no bus-off prompt for 100 ms in network management

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check if CAN-H is short-circuited to CAN-L	Find fault point of short circuit and fix it, then go to step 1	Go to step 4
4	Check whether CAN-H is short-circuited to ground	Find fault point of short circuit and fix it, then go to step 1	Go to step 5
5	Check if CAN-L is short-circuited to power	Find fault point of short circuit and fix it, then go to step 1	Go to step 6
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U014087

DTC definition: communication with BCM lost

DTC occurring condition: no normal periodic messages sent from BCM

Possible causes:

- CAN communication fault.
- BCM module function fault.
- BCM harness fault.

DTC removal condition: all specified messages can be received from the bus

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN bus communication is normal	Go to step 4	Replace the gateway and go to step 1
4	Check whether BCM harness is at breakover state	Go to step 5	Repair harness, and go to step 1

Step	Operation	Yes	No
5	Check that BCM module functions are normal	Go to step 6	Replace BCM and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U025487

DTC definition: communication with ESCL lost

DTC occurring condition: no normal periodic messages sent from ESCL

Possible causes:

- CAN communication fault.
- ESCL module function fault.
- ESCL harness fault.

DTC removal condition: all specified messages can be received from the bus

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN bus communication is normal	Go to step 4	Replace the gateway and go to step 1
4	Check for breakover of ESCL harness	Go to step 5	Repair harness, and go to step 1
5	Check that ESCL module functions are normal	Go to step 6	Replace ESCL and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U012287

DTC definition: communication with ESP lost

DTC occurring condition: no normal periodic messages sent from ESP

Possible causes:

- CAN communication fault.
- ESP module function fault.
- ESP harness fault.

DTC removal condition: all specified messages can be received from the bus

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs

Step	Operation	Yes	No
2	Clear DTC	Go to step 3	—
3	Check that CAN bus communication is normal	Go to step 4	Replace the gateway and go to step 1
4	Check for breakover of ESP harness	Go to step 5	Repair harness, and go to step 1
5	Check that ESP module functions are normal	Go to step 6	Replace ESP, and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U010187

DTC definition: communication with TCU lost

DTC occurring condition: no normal periodic messages sent from TCU

Possible causes:

- CAN communication fault.
- TCU module function fault.
- TCU harness fault.

DTC removal condition: all specified messages can be received from the bus

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN bus communication is normal	Go to step 4	Replace the gateway and go to step 1
4	Check for breakover of TCU harness	Go to step 5	Repair harness, and go to step 1
5	Check that TCU module functions are normal	Go to step 6	Replace TCU and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U010087

DTC definition: communication with ECM lost

DTC occurring condition: ECM fails to send normal periodic message

Possible causes:

- CAN communication fault.
- ECM module function fault.
- ECM harness fault.

DTC removal condition: all specified messages can be received from the bus

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN bus communication is normal	Go to step 4	Replace the gateway and go to step 1
4	Check for breakover of ECM harness	Go to step 5	Repair harness, and go to step 1
5	Check that ECM module functions are normal	Go to step 6	Replace ECM and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

U111087

DTC definition: Limphome becomes invalid

DTC occurring condition: in Limphome state for 2 s

Possible causes:

- CAN communication fault.
- Network and network management function fault.
- Other node faults.
- PEPS disconnected.

DTC removal condition: leave Limphome state

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN bus communication is normal	Go to step 4	Replace the gateway and go to step 1
4	Check that the network and network management functions are normal	Go to step 5	Repair CAN harness, and go to step 1
5	Check whether other nodes are normal	Go to step 6	Replace fault node, and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B180300

DTC definition: unlocking capacitive sensor switch stuck on driver side

DTC occurring condition: effective signal of unlocking capacitive sensor switch on driver side lasts

more than 15 s

Possible causes:

› Driver side door handle touch switch is continuously triggered.

DTC removal condition: effective signal from driver side door handle touch switch is inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Clean door handle touch area	Go to step 4	—
4	Use scanner to check if DTC still exists	Go to step 5	The fault is cleared, and the system is normal
5	Replace door handle	Go to step 6	—
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B180400

DTC definition: unlocking capacitive sensor switch stuck on front passenger side

DTC occurring condition: effective signal of unlocking capacitive sensor switch on front passenger side lasts more than 15 s

Possible causes:

› Front passenger side door handle touch switch is continuously triggered.

DTC removal condition: effective signal from front passenger side door handle touch switch is inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Clean door handle touch area	Go to step 4	—
4	Use scanner to check if DTC still exists	Go to step 5	The fault is cleared, and the system is normal
5	Replace door handle	Go to step 6	—
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B180500

DTC definition: locking capacitive sensor switch stuck on driver side

DTC occurring condition: effective signal of locking capacitive sensor switch last more than 15 s on driver side

Possible causes:

› Driver side door handle touch switch is continuously triggered.

DTC removal condition: effective signal from driver side door handle touch switch is inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Clean door handle touch area	Go to step 4	—
4	Use scanner to check if DTC still exists	Go to step 5	The fault is cleared, and the system is normal
5	Replace door handle	Go to step 6	—
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B180600

DTC definition: locking capacitive sensor switch stuck on front passenger side

DTC occurring condition: effective signal of locking capacitive sensor switch on front passenger side lasts more than 15 s

Possible causes:

› Front passenger side door handle touch switch is continuously triggered.

DTC removal condition: effective signal from front passenger side door handle touch switch is inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Clean door handle touch area	Go to step 4	—
4	Use scanner to check if DTC still exists	Go to step 5	The fault is cleared, and the system is normal
5	Replace door handle	Go to step 6	—
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B185300

DTC definition: stuck microswitch on driver side

DTC occurring condition: effective signal of microswitch on driver side lasts more than 15 s

Possible causes:

› Microswitch on driver side short-circuited to ground.

DTC removal condition: effective signal of microswitch on driver side inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Check for normal breakover and disconnection of microswitch on diver side	Go to step 4	Replace microswitch, and go to step 1
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B180700

DTC definition: engine start-stop switch 1 stuck

DTC occurring condition: effective signal of engine start-stop switch 1 lasts more than 30 s

Possible causes:

› Engine start-stop switch 1 hardwire circuit remains effective.

DTC removal condition: effective signal of engine start-stop switch 1 hardwire circuit inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Check for normal breakover and disconnection of engine start-stop switch 1 hardwire circuit	Go to step 4	Replace engine start-stop switch, and go to step 1
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B185200

DTC definition: engine start-stop switch 2 stuck

DTC occurring condition: effective signal of engine start-stop switch 2 lasts more than 30 s

Possible causes:

› Engine start-stop switch 2 hardwire circuit remains effective.

DTC removal condition: effective signal of engine start-stop switch 2 hardwire circuit inactive

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC, and power on the vehicle again	Go to step 3	—
3	Check for normal breakover and disconnection of engine start-stop switch 2 hardwire circuit	Go to step 4	Replace engine start-stop switch, and go to step 1

Step	Operation	Yes	No
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B180800

DTC definition: engine start-stop switch out of sync

DTC occurring condition: engine start-stop switch not synchronized more than 3 times

Possible causes:

› Signals from two hardwires of engine start-stop switch are inconsistent.

DTC removal condition: effective signal of engine start-stop switch restores synchronization state

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check for normal harness breakover of engine start-stop switch	Go to step 4	Repair faulty harness, and go to step 1
4	Check for normal two-way hardwire breakover of engine start-stop switch	Go to step 5	Replace engine start-stop switch, and go to step 1
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B181900

DTC definition: LF drive end overtemperature

DTC occurring condition: temperature of LF drive end too high

Possible causes:

› Temperature of LF driver chip too high.

DTC removal condition: LF drive chip temperature is normal

Troubleshooting:

Step	Operation	Yes	No
1	Leave vehicle powered off for 5 minutes, and then power it on again	Go to step 2	—
2	Clear DTC	Go to step 3	—
3	With vehicle power mode OFF, press lock button on intelligent key	Go to step 4	—
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B181E13

DTC definition: antenna 1 open-circuit fault

DTC occurring condition: open circuit detected when PEPS drives antenna 1

Possible causes:

› Antenna 1 open-circuit.

DTC removal condition: normal antenna is detected when PEPS drives antenna 1

Troubleshooting:

Step	Operation	Yes	No
1	Check if harness related to antenna 1 circuit is damaged or incorrectly installed	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 1	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B181E12

DTC definition: antenna 1 or 2 short-circuited to power

DTC occurring condition: LF channel 1 or channel 2 short-circuited to power supply

Possible causes:

› Antenna 1 or antenna 2 circuit short-circuited to power.

DTC removal condition: normal antenna is detected when PEPS drives antenna 1 or antenna 2

Troubleshooting:

Step	Operation	Yes	No
1	Check if related harnesses of antenna 1 and 2 circuit are damaged or installed incorrectly	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 1 and 2 (1 antenna replaced in one test cycle)	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B181E11

DTC definition: antenna 1 or antenna 2 short-circuited to ground

DTC occurring condition: LF channel 1 or channel 2 short-circuited to ground

Possible causes:

› Antenna 1 or antenna 2 loop short-circuited to ground.

DTC removal condition: normal antenna is detected when PEPS drives antenna 1 or antenna 2

Troubleshooting:

Step	Operation	Yes	No
1	Check if related harnesses of antenna 1 and 2 circuit are damaged or installed incorrectly	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 1 and 2 (1 antenna replaced in one test cycle)	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B181F13

DTC definition: antenna 2 open-circuit fault

DTC occurring condition: open circuit detected when PEPS drives antenna 2

Possible causes:

› Antenna 2 loop open-circuit.

DTC removal condition: normal antenna is detected when PEPS drives antenna 2

Troubleshooting:

Step	Operation	Yes	No
1	Check if harness related to antenna 2 circuit is damaged or incorrectly installed	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 2	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182113

DTC definition: antenna 4 open-circuit fault

DTC occurring condition: open circuit detected when PEPS drives antenna 4

Possible causes:

› Antenna 4 loop open-circuit.

DTC removal condition: normal antenna is detected when PEPS drives antenna 4

Troubleshooting:

Step	Operation	Yes	No
1	Check if harness related to antenna 4 circuit is damaged or incorrectly installed	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 4	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182112

DTC definition: antenna 4 or 5 short-circuited to power

DTC occurring condition: LF channel 4 or channel 5 short-circuited to power supply

Possible causes:

› Antenna 4 or 5 circuit short-circuited to power.

DTC removal condition: normal antenna is detected when PEPS drives antenna 4 or antenna 5

Troubleshooting:

Step	Operation	Yes	No
1	Check if harness related to antenna 4 and 5 circuit is damaged or incorrectly installed	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 4 and 5 (1 antenna replaced in one test cycle)	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182111

DTC definition: antenna 4 or antenna 5 short-circuited to ground

DTC occurring condition: LF channel 4 or channel 5 short-circuited to ground

Possible causes:

› Antenna 4 or antenna 5 loop short-circuited to ground.

DTC removal condition: normal antenna is detected when PEPS drives antenna 4 or antenna 5

Troubleshooting:

Step	Operation	Yes	No
1	Check if harness related to antenna 4 and 5 circuit is damaged or incorrectly installed	Repair the harness and go to step 3	Go to step 2

Step	Operation	Yes	No
2	Replace antenna 4 and 5 (1 antenna replaced in one test cycle)	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182213

DTC definition: antenna 5 open-circuit fault

DTC occurring condition: open circuit detected when PEPS drives antenna 5

Possible causes:

› Antenna 5 loop open-circuit.

DTC removal condition: normal antenna is detected when PEPS drives antenna 5

Troubleshooting:

Step	Operation	Yes	No
1	Check if harness related to antenna 5 circuit is damaged or incorrectly installed	Repair the harness and go to step 3	Go to step 2
2	Replace antenna 5	Go to step 3	—
3	Clear DTC	Go to step 4	—
4	With vehicle power mode OFF, press lock button on intelligent key	Go to step 5	—
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182400

DTC definition: IMMO initialization error

DTC occurring condition: initialization of IMMO module failed at power-on, learning or certification start

Possible causes:

› LIN communication failure.

› IMMO chip fault (e.g., configuration error).

DTC removal condition: IMMO initialization succeeds

Troubleshooting:

Step	Operation	Yes	No
1	Clear DTC, and power on the vehicle again	Go to step 2	—
2	Use scanner to check PEPS for DTC	Go to step 3	Check for other DTCs

Step	Operation	Yes	No
3	Check for normal breakover of IMMO harness	Go to step 4	Repair faulty harness, and go to step 1
4	Replace IMMO	Go to step 5	—
5	Clear DTC, and power on the vehicle again	Go to step 6	—
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182500

DTC definition: IMMO coil fault

DTC occurring condition: IMMO coil open-circuited, short-circuited to power or ground

Possible causes:

› IMMO coil open-circuited or short-circuited.

DTC removal condition: IMMO coil drive is normal

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	If no legal key in the car, press engine start-stop switch more than 5 times	Go to step 4	—
4	Use scanner to check PEPS for DTC	Go to step 5	The fault is cleared, and the system is normal
5	Replace IMMO	Go to step 6	—
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B182700

DTC definition: IMMO authentication failed

DTC occurring condition: IMMO authentication failed

Possible causes:

› LIN communication failure.

› IMMO module harness fault.

› IMMO coil fault.

› Illegal key.

› No legal key is detected nearby IMMO coil.

DTC removal condition: EMS authentication succeeds

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Place legal intelligent key in effective area of IMMO coil, start the vehicle and check whether the vehicle can be started successfully	The fault is cleared, and the system is normal	Go to step 1 of B182400 and B182500 for troubleshooting

B182800

DTC definition: EMS authentication failed

DTC occurring condition: EMS authentication failed due to mismatched key or failure to receive a valid response

Possible causes:

- PEPS and EMS anti-theft secrete keys are unmatched.
- Anti-theft authentication message receiving/sending failed.
- Anti-theft authentication message error.

DTC removal condition: EMS authentication succeeds

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN communication and CAN harness breakover is normal	Go to step 4	Replace gateway or repair faulty harness, and go to step 1
4	Check that EMS and PEPS learning is successful	Go to step 5	Restart learning and go to step 1
5	Check that EMS module functions are normal	Go to step 6	Replace EMS and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B183B00

DTC definition: PDU drive circuit fault

DTC occurring condition: incorrect feedback detected by PDU drive lasts more than 100 ms

Possible causes:

- Relay open-circuited.
- Relay short-circuited.
- Drive chip fault.

DTC removal condition: correct feedback detected by PDU drive lasts more than 200 ms

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check for normal harness breakover of relay	Go to step 4	Repair faulty harness, and go to step 1
4	Check for normal relay fuse	Go to step 5	Replace fuse, and go to step 1
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B183C00

DTC definition: PDU feedback and expected output are inconsistent

DTC occurring condition: inconsistence of PDU relay feedback and PDU output lasts more than 2 s

Possible causes:

› Relay feedback and current logic value are inconsistent.

DTC removal condition: consistence of PDU relay feedback and PDU output lasts more than 1 s

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check for normal harness breakover of relay control circuit	Go to step 4	Repair faulty harness, and go to step 1
4	Check for normal relay feedback circuit (short-circuited to power or ground, or current flow backward)	Go to step 5	Repair feedback circuit of relay module, and go to step 1
5	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B184000

DTC definition: T-BOX authentication failed

DTC occurring condition: T-BOX authentication failed due to mismatched key or failure to receive a valid response

Possible causes:

› T-BOX module does not response in time.

› PEPS and T-BOX are unmatched.

› T-BOX module response error.

DTC removal condition: T-BOX authentication succeeds

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN communication and CAN harness breakover is normal	Go to step 4	Replace gateway or repair faulty harness, and go to step 1
4	Check that T-BOX and PEPS learning is successful	Go to step 5	Restart learning and go to step 1
5	Check for normal T-BOX functions	Go to step 6	Replace T-BOX and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B184300

DTC definition: ESCL authentication failed

DTC occurring condition: ESCL authentication failed due to mismatched key or failure to receive a valid response

Possible causes:

- PEPS and ESCL anti-theft secrete keys are unmatched.
- Anti-theft authentication message receiving/sending failed.
- Anti-theft authentication message error.

DTC removal condition: ESCL authentication succeeds

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Check that CAN communication and CAN harness breakover is normal	Go to step 4	Replace gateway or repair faulty harness, and go to step 1
4	Check that ESCL and PEPS learning is successful	Go to step 5	Restart learning and go to step 1
5	Check that ESCL functions properly	Go to step 6	Replace ESCL, and go to step 1
6	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B184600, B185000

DTC definition: RF drive chip fault, RF chip configuration fault

DTC occurring condition: abnormal RF drive feedback occurred 3 times successively

Possible causes:

› RF drive chip fault.

DTC removal condition: normal RF drive feedback is restored

Troubleshooting:

Step	Operation	Yes	No
1	Clear DTC	Go to step 2	—
2	Use scanner to check PEPS for DTC	Go to step 3	Check for other DTCs
3	Power on the vehicle again	Go to step 4	—
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B185100

DTC Definition: low key power

DTC occurring condition: RF signal with low battery flag received

Possible causes:

› Key power is too low (voltage is less than 2.8V).

DTC removal condition: RF signal with normal power level mark bit is received

Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—
3	Replace intelligent key battery. With vehicle power mode OFF, press any button on intelligent key	Go to step 4	—
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

B184700

DTC definition: LF drive chip fault

DTC occurring condition: LF chip feedback error

Possible causes:

› LF drive chip fault.

DTC removal condition: LF chip feedback is normal

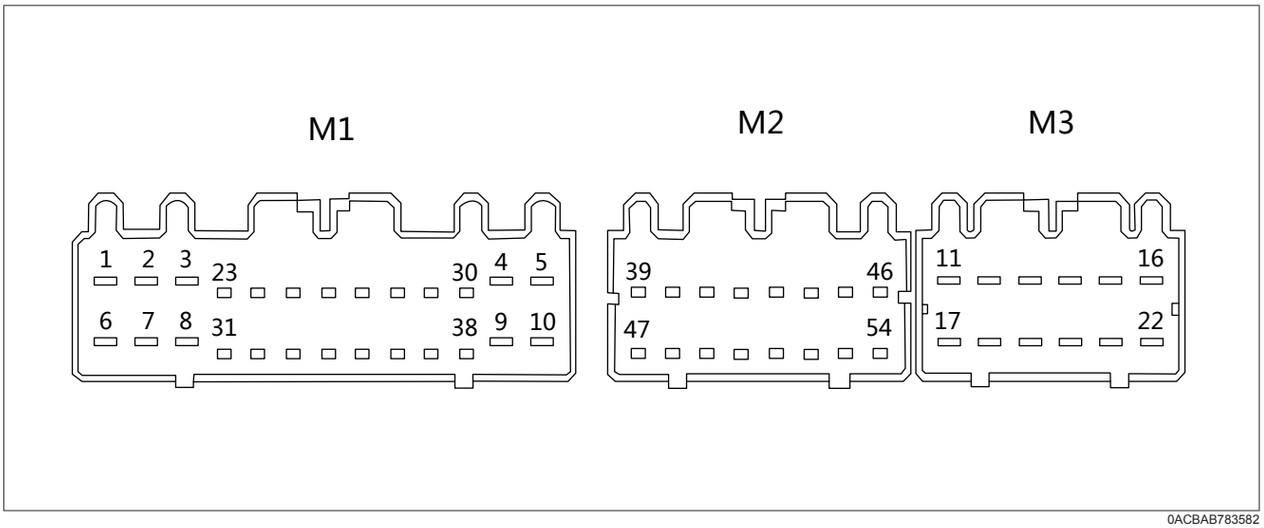
Troubleshooting:

Step	Operation	Yes	No
1	Use scanner to check PEPS for DTC	Go to step 2	Check for other DTCs
2	Clear DTC	Go to step 3	—

Step	Operation	Yes	No
3	Replace intelligent key battery. With vehicle power mode OFF, press any button on intelligent key	Go to step 4	—
4	Use scanner to check if DTC still exists	Replace PEPS and go to step 1	The fault is cleared, and the system is normal

PEPS controller assembly

Pin definition



0ACBAB783582

Pin No.	Function	Pin No.	Function
M1.1	—	M1.2	ACC relay output
M1.3	IGN1 relay output	M1.4	Power supply 1
M1.5	Power supply 2	M1.6	—
M1.7	—	M1.8	IGN2 relay output
M1.9	Power supply GND 1	M1.10	Power supply GND 2
M1.23	—	M1.24	CAN high
M1.25	CAN low	M1.26	—
M1.27	IGN2 power supply relay feedback	M1.28	—
M1.29	ACC power supply relay feedback	M1.30	—
M1.31	Front passenger capacitive sensor touch signal	M1.32	Engine start-stop switch 1
M1.33	—	M1.34	Start relay feedback
M1.35	IGN1 power supply relay feedback	M1.36	Driver capacitive sensor touch signal
M1.37	Clutch pedal input	M1.38	Brake pedal input
M2.39	Engine start-stop switch 2	M2.40	Driver side door microswitch
M2.41	Engine start-stop switch LED (yellow)	M2.42	Engine start-stop switch LED (green)
M2.43	—	M2.44	—
M2.45	Driver-side low-frequency antenna +	M2.46	Driver-side low-frequency antenna -
M2.47	Front passenger side door microswitch	M2.48	—
M2.49	LIN (IMMO)	M2.50	Engine start-stop switch GND 1
M2.51	—	M2.52	—
M2.53	—	M2.54	—

Pin No.	Function	Pin No.	Function
M3.11	—	M3.12	Rear seat LF antenna low
M3.13	Rear seat LF antenna high	M3.14	Auxiliary instrument panel LF antenna high
M3.15	Auxiliary instrument panel LF antenna low	M3.16	—
M3.17	—	M3.18	—
M3.19	—	M3.20	Front passenger LF antenna high
M3.21	Front passenger LF antenna low	M3.22	—

Removal/installation

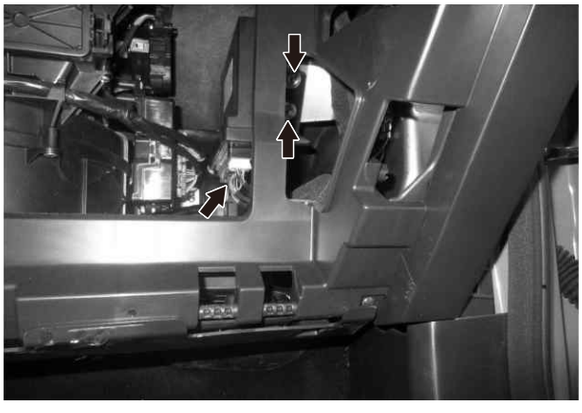
Removal

⚠ Caution

› The vehicle will issue an alarm when the negative terminal of the battery is disconnected and the vehicle is locked, and the door is opened with the mechanical key and the negative electrode of the battery is turned on. When this happens, press the intelligent key unlock button to release the warning.

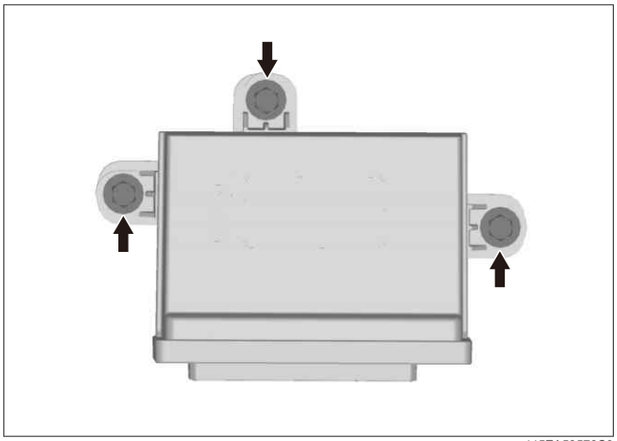
› Make sure that you have turned off the ignition switch when disconnecting the battery.

1. Disconnect the negative terminal of the battery.
2. Remove the glove box assembly
3. Remove front passenger side foot block
4. Remove 2 bolts, disconnect harness connector, and remove PEPS controller with bracket assembly



61AF8C898B26

5. Remove 3 bolts



445EA53576C9

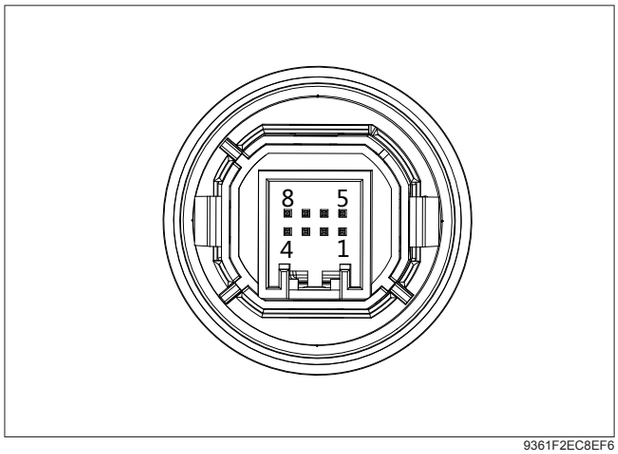
6. Remove the PEPS controller assembly

Installation

1. Perform installation work in reverse order of removal

Engine start-stop switch

Pin definition



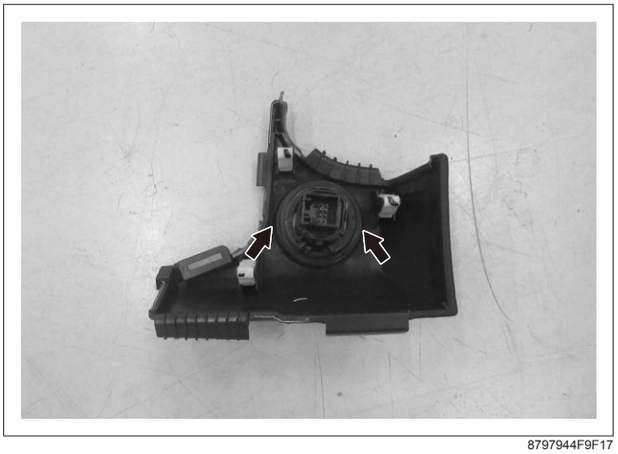
9361F2EC8EF6

Pin No.	Function
1	Switch signal, to PEPS switch 2
2	Power indicator LED green (Base drive)
3	Switch GND 2
4	Switch GND 1
5	Backlight LED (BCM drive)
6	Power indicator LED amber (Base drive)
7	—
8	Switch signal, to PEPS switch 1

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove middle left trim plate of instrument panel
3. Disconnect harness connector
4. Remove engine start-stop switch



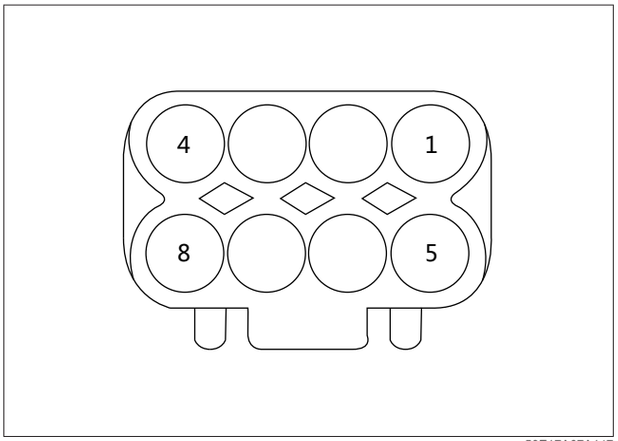
8797944F9F17

Installation

1. Perform installation work in reverse order of removal

Door handle electronic module

Pin definition



59E17A67A147

Pin No.	Function
1	Power
2	Driver side door handle switch
3	Ground
4	Input of driver side door-handle microswitch
5	Output of driver side door-handle microswitch
6	—
7	—
8	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front door exterior handle

Notice

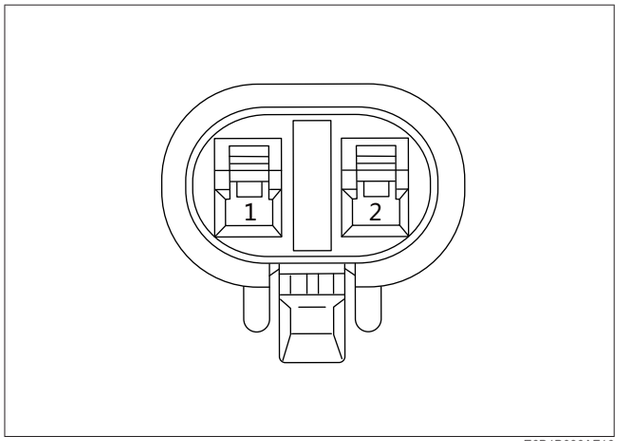
› Door handle electronic module is integrated in front door exterior handle.

Installation

1. Perform installation work in reverse order of removal

Low-frequency antenna assembly - front door

Pin definition



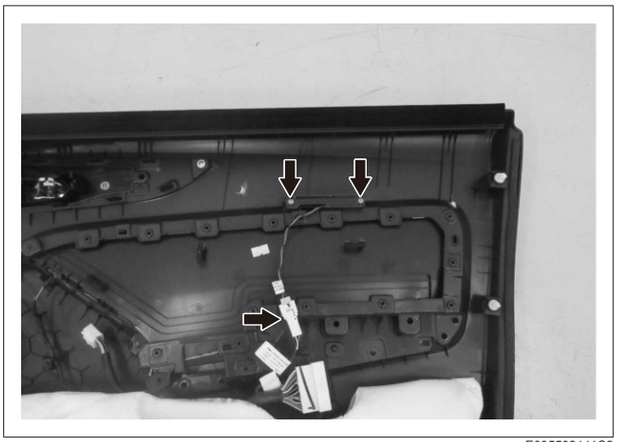
E6B1B036AF16

Pin No.	Function
1	LF antenna －
2	LF antenna +

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner fender
3. Disconnect the harness connector and remove the 2 screws



E035502441C2

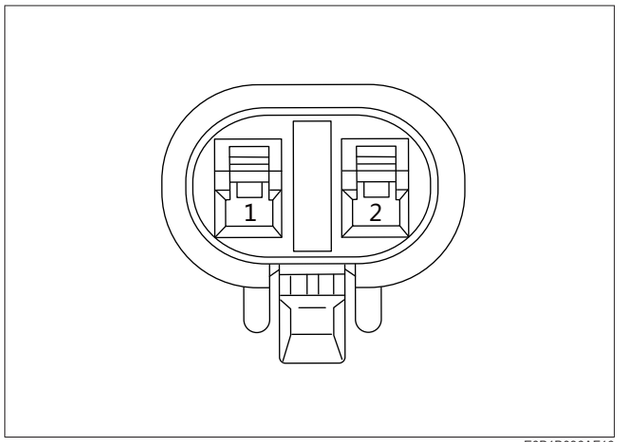
4. Remove the low-frequency antenna assembly

Installation

1. Perform installation work in reverse order of removal

Low-frequency antenna assembly 4 - in front of auxiliary instrument panel

Pin definition



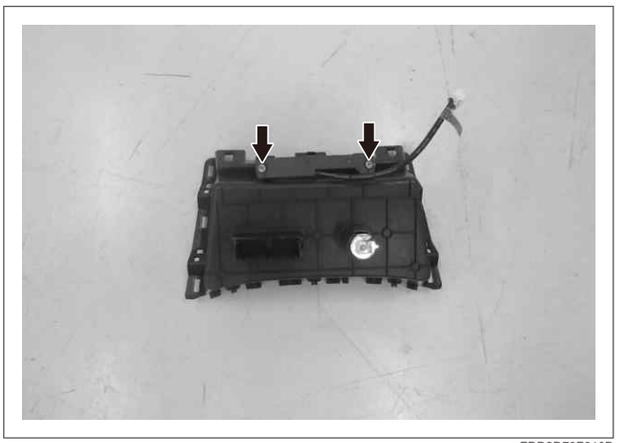
E6B1B036AF16

Pin No.	Function
1	LF antenna －
2	LF antenna +

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front storage box of auxiliary instrument panel
3. Disconnect harness connector
4. Remove 2 screws



FDD2D73F016B

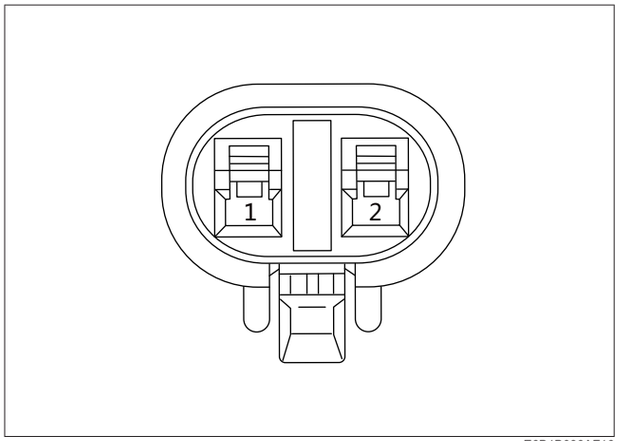
5. Remove the low-frequency antenna assembly 4

Installation

1. Perform installation work in reverse order of removal

Low-frequency antenna assembly 2 - rear floor

Pin definition



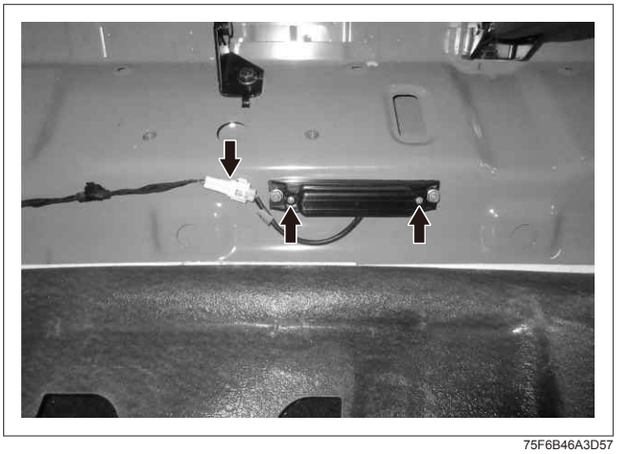
E6B1B036AF16

Pin No.	Function
1	LF antenna －
2	LF antenna +

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove second row seat assembly
3. Lift rear carpet
4. Disconnect the harness connector and remove the 2 screws



75F6B46A3D57

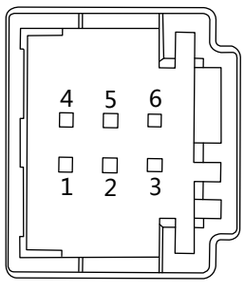
5. Remove the low-frequency antenna assembly 2

Installation

1. Perform installation work in reverse order of removal

Electronic steering lock

Pin definition



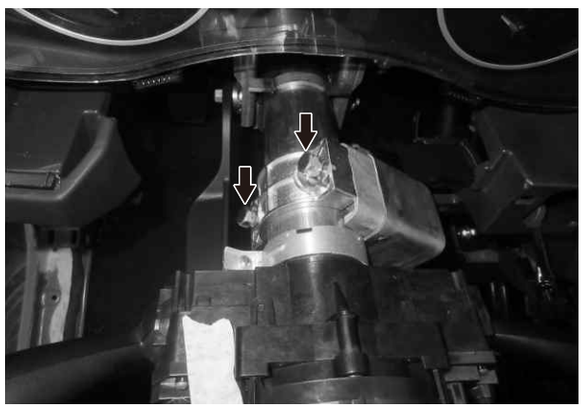
25655E1A6480

Pin No.	Function
1.	CAN low
2	—
3	Ground
4	CAN high
5	—
6	Battery

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove steering column top shield
3. Driver knee trim plate
4. Remove steering column lower shield
5. Disconnect the wiring harness connector of the electric steering lock.
6. Use a drill with a diameter of (3~4)mm to drill a hole on the anti-theft bolt.
7. Use the screw extractor to remove 2 anti-theft bolts.



B7A2B787A9EF

8. Remove the electronic steering lock

Installation

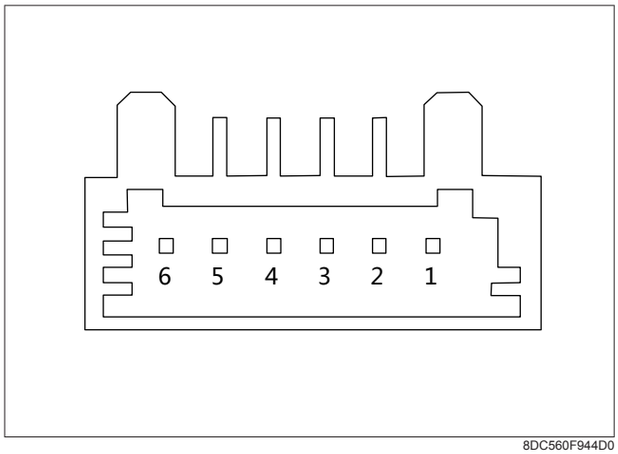
1. Perform installation work in reverse order of removal

Notice

- Anti-theft bolt is a non-reusable part and shall not be reused.
- For reinstalling electronic steering lock, new anti-theft bolt is to be used, and the upper portion of the anti-theft bolt must be twisted off during installation.

Immobilizer coil (6MT)

Pin definition



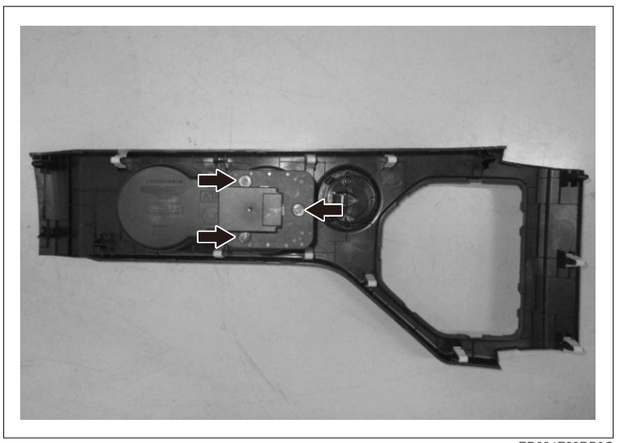
8DC560F944D0

Pin No.	Function
1	IMMO power supply
2	IMMO LIN communication
3	GND
4	—
5	—
6	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove console panel of the auxiliary instrument panel
3. Disconnect harness connector
4. Remove 3 screws



ED934E28DB0C

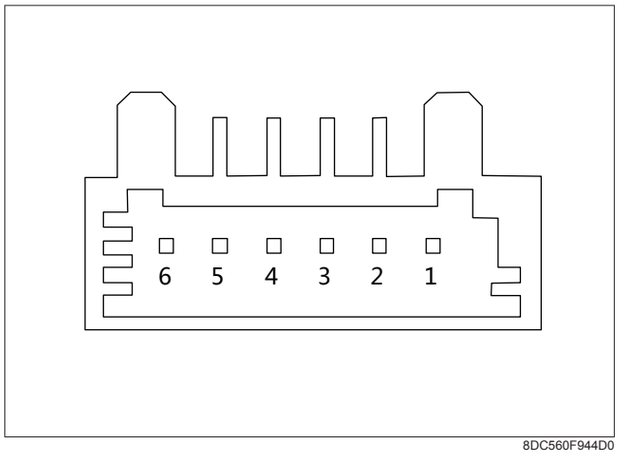
5. Remove immobilizer coil

Installation

1. Perform installation work in reverse order of removal

Immobilizer coil (8AT)

Pin definition



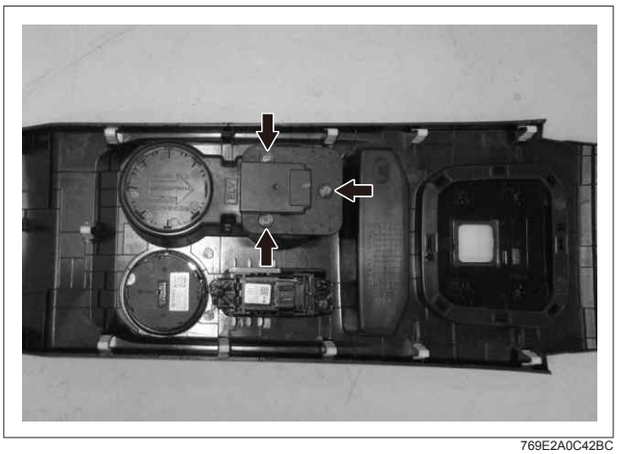
8DC560F944D0

Pin No.	Function
1	IMMO power supply
2	IMMO LIN communication
3	GND
4	—
5	—
6	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove auxiliary instrument panel control panel
3. Disconnect harness connector and remove 3 screws



769E2A0C42BC

4. Remove immobilizer coil

Installation

1. Perform installation work in reverse order of removal

Vehicle door lock

Door lock system ..... 61－1
System description ..... 61－1
Location diagram ..... 61－2
Specified torque ..... 61－3
Fault symptom checklist ..... 61－4
Central-control lock switch ..... 61－5
Pin definition ..... 61－5
Removal/installation ..... 61－5
Front door lock ..... 61－6
Pin definition ..... 61－6
Removal/installation ..... 61－7
Front door lock cylinder ..... 61－8
Removal/installation ..... 61－8
Front door exterior handle ..... 61－9
Removal/installation ..... 61－9
Front door inside handle ..... 61－10
Removal/installation ..... 61－10
Rear door lock ..... 61－11
Pin definition ..... 61－11
Removal/installation ..... 61－12
Rear door exterior handle ..... 61－13
Removal/installation ..... 61－13
Rear door inside handle ..... 61－14
Removal/installation ..... 61－14
Exterior trunk handle ..... 61－15
Removal/installation ..... 61－15
Trunk lock ..... 61－16
Removal/installation ..... 61－16

Door lock system

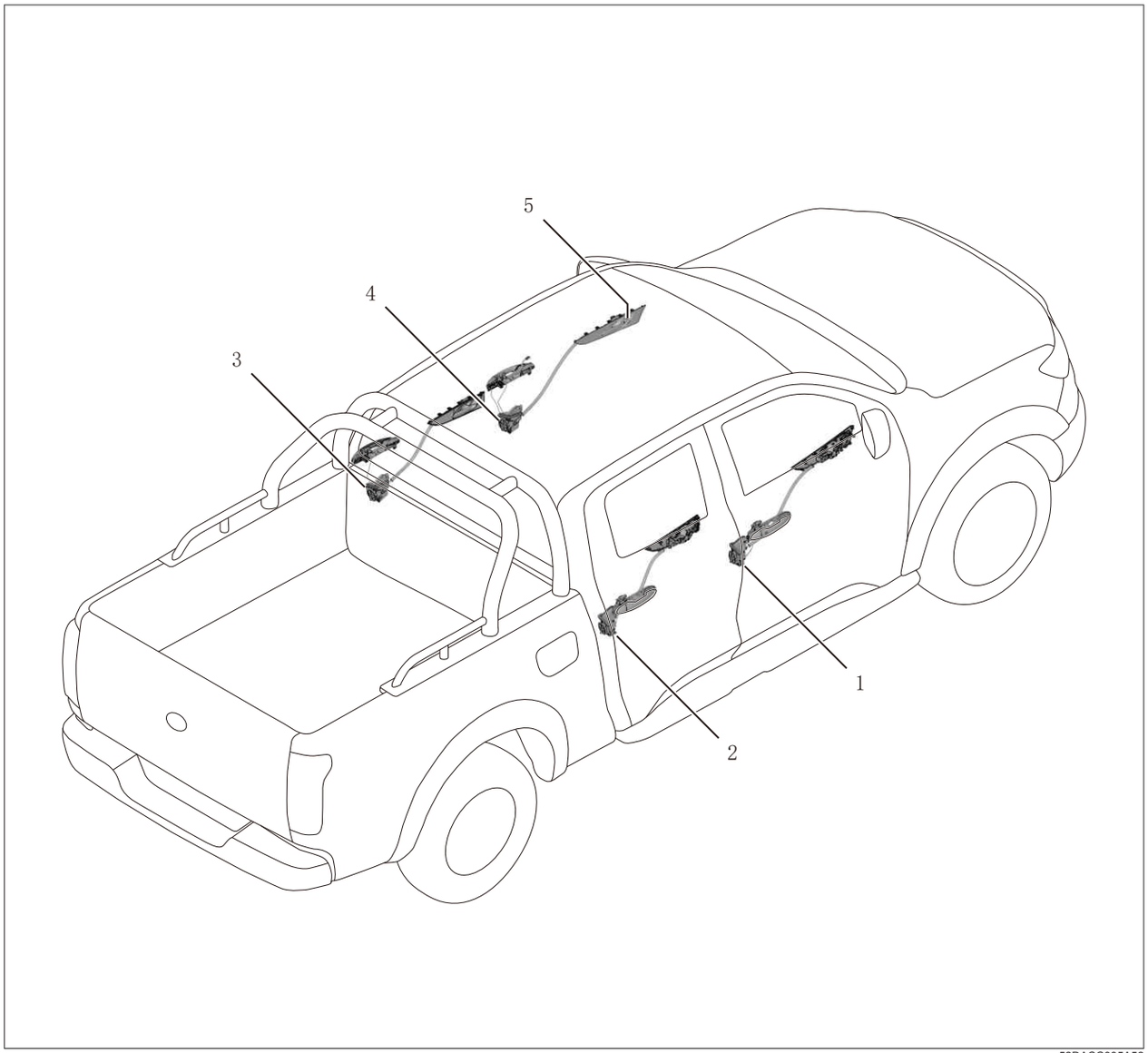
System description

Door lock system consists of front left door lock, front right door lock, rear left door lock, rear right door lock, BCM, central-control lock switch and control circuit. With four doors at closed state, operate the central-control lock switch to send lock/unlock signal to BCM. BCM responds to the input signal and sends a request signal to each door lock motor to lock/unlock all doors.

Description of functions

- In the unlocking status, the door can be normally opened by operating the inner opening lever once.
- At locked state, door can be normally opened by operating front left door interior opening lever; the remaining three doors can be normally opened by operating outer opening lever for twice.
- At unlocked status, the door can be normally opened by operating the outer opening lever.
- In accordance with the operating tips, the door lock inner opening will be disabled, but the outer opening function will be normal after the child safety lock is locked; and both the inner and outer opening functions will be normal after the child safety lock is opened.
- Before closing the doors, you can achieve mechanical lock for the door lock (except the driver's side) by operating the lock body emergency lock structure.
- Driver side door is unlocked, four doors are closed, the speed reaches 15 km/h, and the four doors are locked.
- When the ignition switch is in the ON mode and the system detects a collision, all doors automatically perform an unlock operation.
- After the engine is turned off, all doors perform an unlock operation.

Location diagram



52DACC385A52

1. Front right door lock assembly
2. Rear right door lock assembly
3. Rear left door lock assembly
4. Front left door lock assembly
5. Central-control lock switch assembly

Specified torque

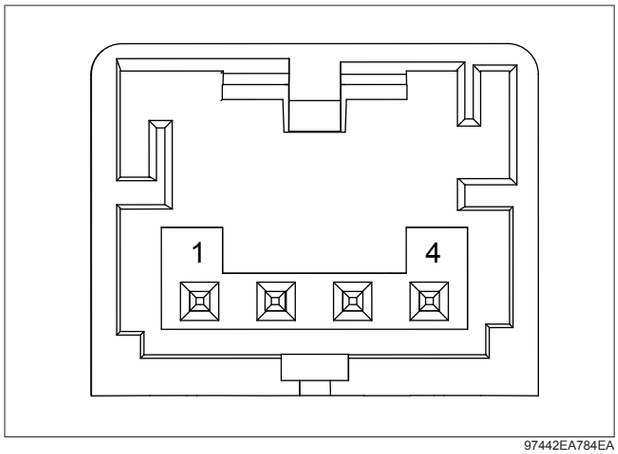
Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Screw	Front door lock assembly x vehicle door sheet metal	5±1	6	—
Screw	Outside handle frame of front door x vehicle door sheet metal	5±2	2	—
Screw	Front door locks x side wall sheet metal	23±3	4	—
Screw	Rear door lock assembly x vehicle door sheet metal	5±1	6	—
Screw	Outside handle frame of rear door x vehicle door sheet metal	5±2	2	—
Screw	Rear door locks x side wall sheet metal	23±3	4	—

Fault symptom checklist

Fault symptom	Suspected location
The lock/unlock function of all the doors cannot work	BCM
	Harness or connector
	Central-control lock switch
Only the lock/unlock function of the front left door cannot work	Harness or connector
	Front left door lock
Only the lock/unlock function of the rear left door cannot work	Harness or connector
	Rear left door lock
Only the lock/unlock function of the front right door cannot work	Harness or connector
	Front right door lock
Only the lock/unlock function of the rear right door cannot work	Harness or connector
	Rear right door lock

Central-control lock switch

Pin definition



97442EA784EA

Pin No.	function
1	GND
2	Backlight illumination
3	—
4	ON/OFF lock function

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner trim plate.
3. Disconnect harness connector
4. Remove the central-control lock switch



0269D54CECA2

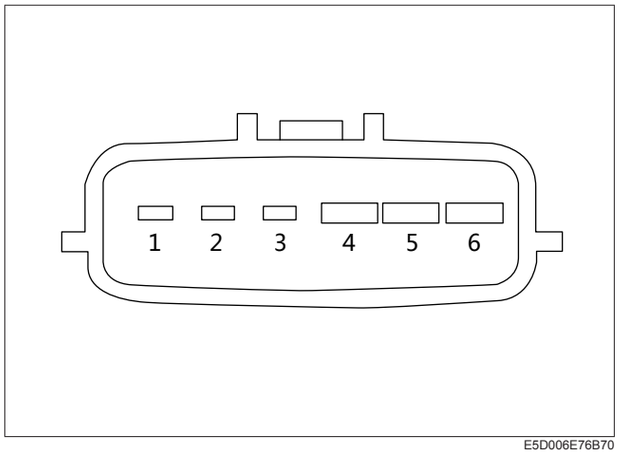
Installation

1. Perform installation work in reverse order of removal

Front door lock

Pin definition

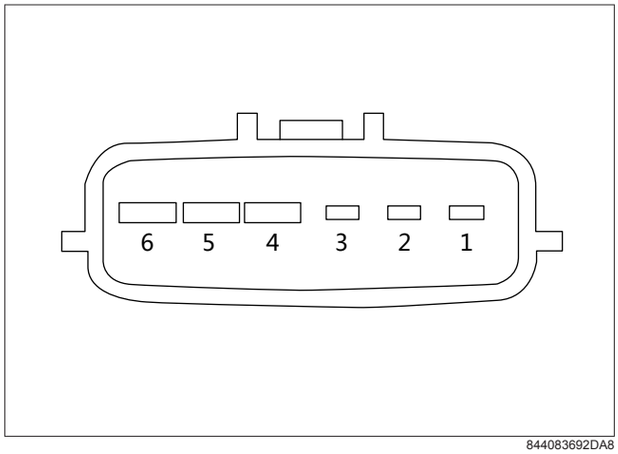
Driver side door lock



E5D006E76B70

Pin No.	Function
1	Central-control motor
2	Central-control motor
3	—
4	Door state switch
5	Common terminal of switch
6	Locking state switch

Front passenger side door lock



844083692DA8

Pin No.	Function
1	Central-control motor
2	Central-control motor
3	—
4	Door state switch
5	Common terminal of switch
6	—

Removal/installation

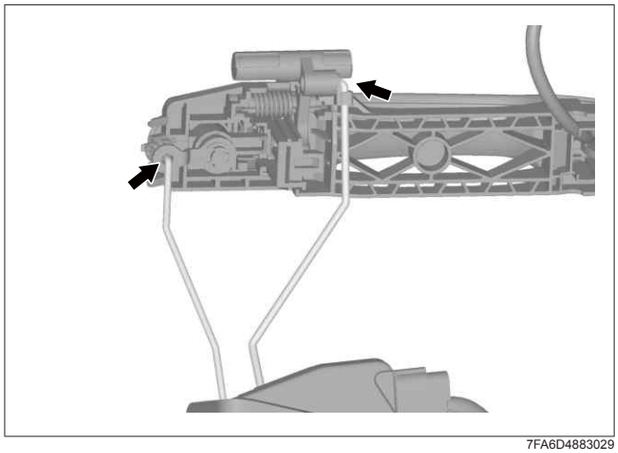
Removal

1. Raise front door window to the top
2. Disconnect the negative terminal of the battery.
3. Remove the front door inner trim plate
4. Remove mounting bracket for front door handle box
5. Remove the front door waterproof membrane
6. Remove 3 screws



804FE72D3DA5

7. disconnect lock cylinder link and outward-opening lever



7FA6D4883029

Notice

- Only the drive-side door lock needs to separate the lock cylinder link.

8. Disconnect harness connector
9. Remove front door lock and front-door interior lock cylinder cable
10. Separate front door lock and front-door interior lock cylinder cable

Installation

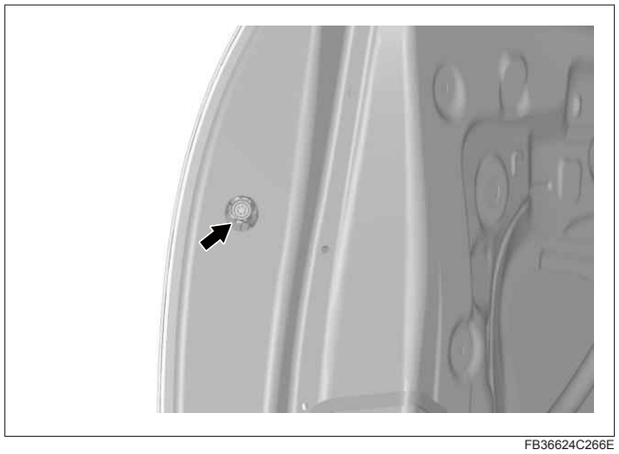
1. Perform installation work in reverse order of removal

Front door lock cylinder

Removal/installation

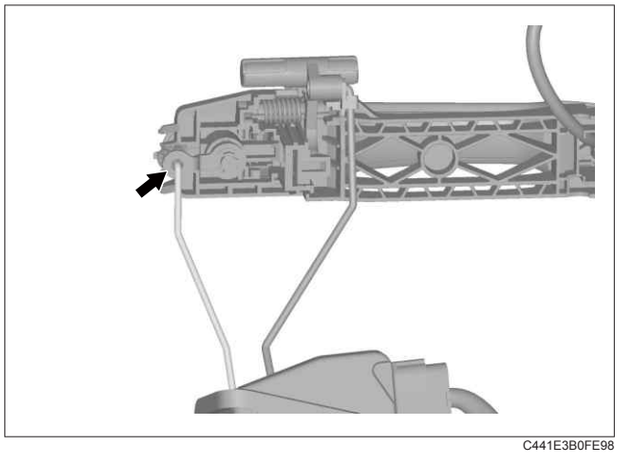
Removal

1. Raise the glass to the top
2. Disconnect the negative terminal of the battery.
3. Remove the front door inner trim plate
4. Remove mounting bracket for front door handle box
5. Remove the front door waterproof membrane
6. Remove lock cylinder mounting plug cover
7. Loosen 1 fastening bolt on the lock cylinder



FB36624C266E

8. Disconnect the front door lock cylinder link

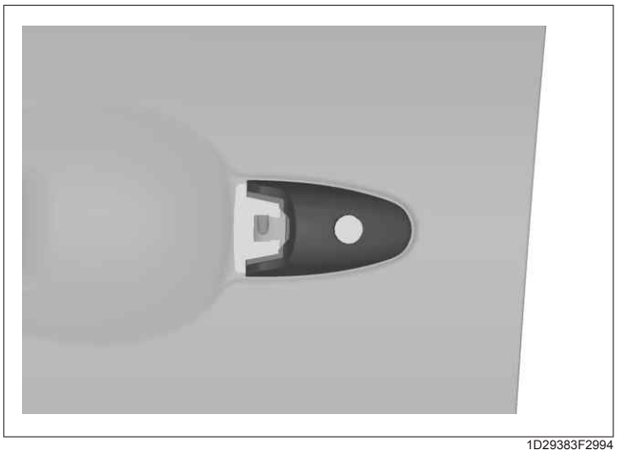


C441E3B0FE98

Notice

› Only the drive-side door lock needs to separate the lock cylinder link.

9. Pull front door exterior handle forward
10. Remove the front door lock cylinder



1D29383F2994

Installation

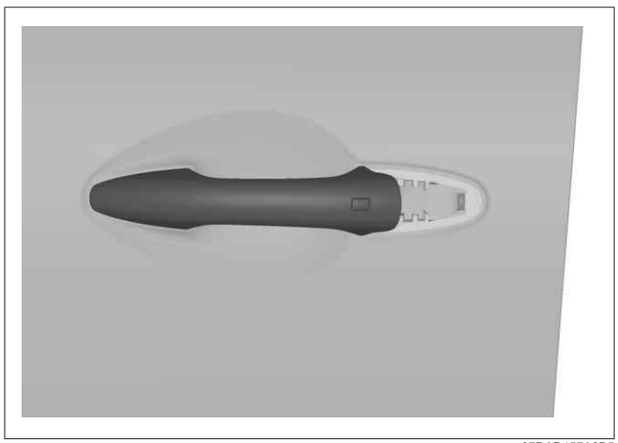
1. Perform installation work in reverse order of removal

Front door exterior handle

Removal/installation

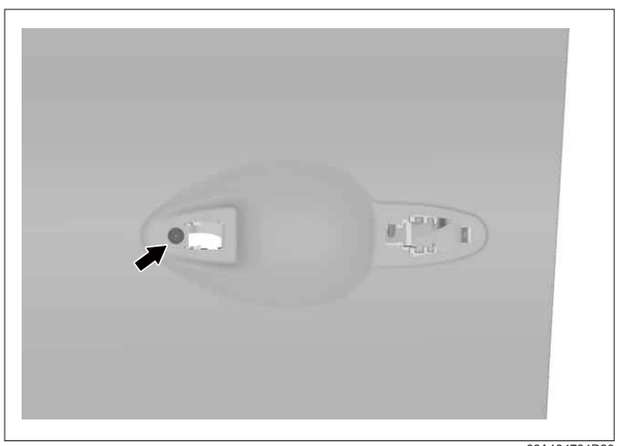
Removal

1. Raise front door glass to the top
2. Disconnect the negative terminal of the battery.
3. Remove the front door inner trim plate
4. Remove mounting bracket for front door handle box
5. Remove the front door waterproof membrane
6. Remove front door lock cylinder
7. Disconnect harness connector
8. Move in parallel, then pull outward to remove front door exterior handle



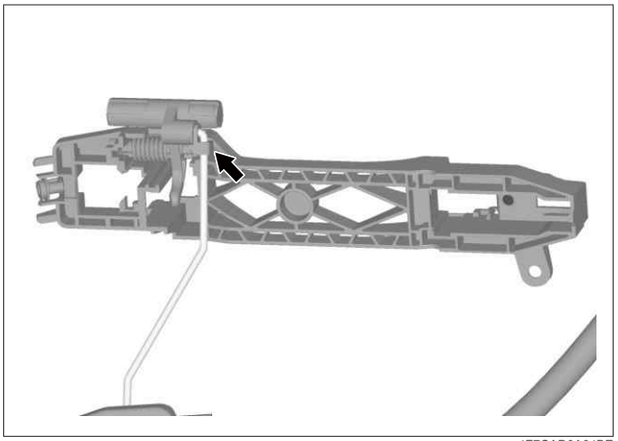
27DAD457A2B5

9. Remove exterior handle front/rear gasket
10. Remove 1 screw



08A134734D23

11. Separate outward-opening lever, and remove front door exterior handle frame



4F7CAD0A84BE

Installation

1. Perform installation work in reverse order of removal

Front door inside handle

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front door inner trim plate
3. Disconnect harness connector
4. Remove 3 screws



8EAA074EFD11

5. Remove front door interior handle

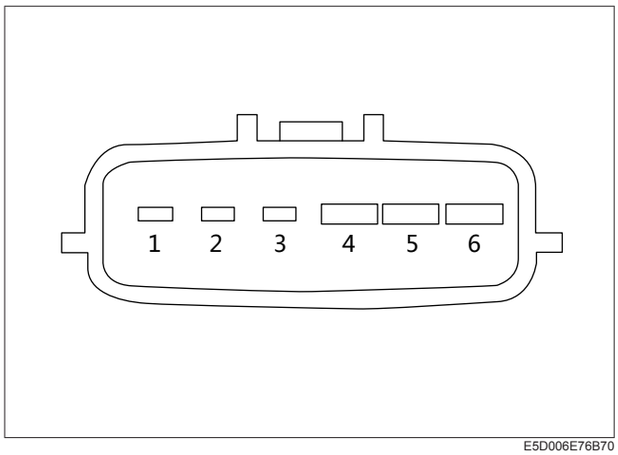
Installation

1. Perform installation work in reverse order of removal

Rear door lock

Pin definition

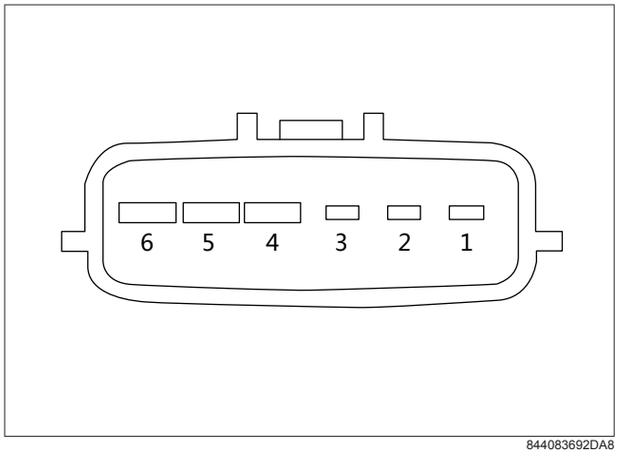
Rear left door lock



E5D006E76B70

Pin No.	Function
1	Central-control motor
2	Central-control motor
3	—
4	Door state switch
5	Common terminal of switch
6	—

Rear right door lock



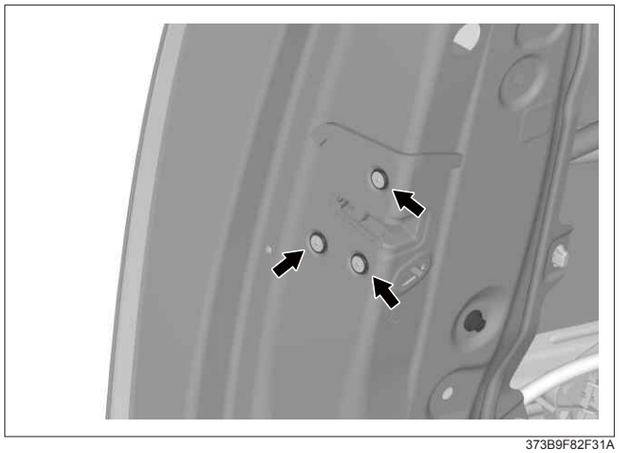
844083692DA8

Pin No.	Function
1	Central-control motor
2	Central-control motor
3	—
4	Door state switch
5	Common terminal of switch
6	—

Removal/installation

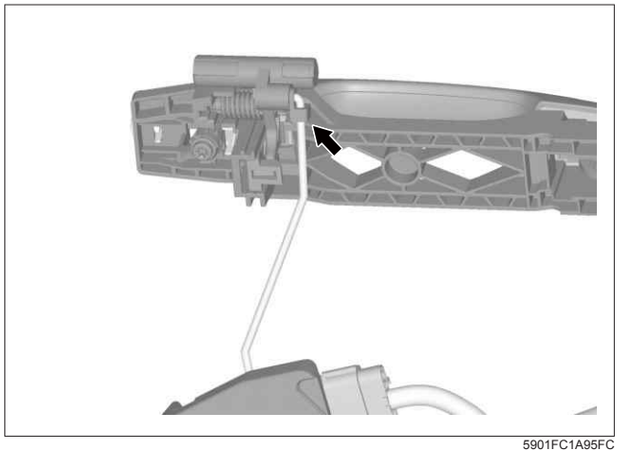
Removal

1. Raise rear door window to the top
2. Disconnect the negative terminal of the battery.
3. Remove rear door inner fender
4. Remove rear door handle box mounting bracket
5. Uncover the rear door waterproof membrane
6. Remove 3 screws



373B9F82F31A

7. Disconnect harness connector
8. Disconnect rear door lock and outward-opening lever



5901FC1A95FC

9. Separate rear door lock and inward-opening cable

Installation

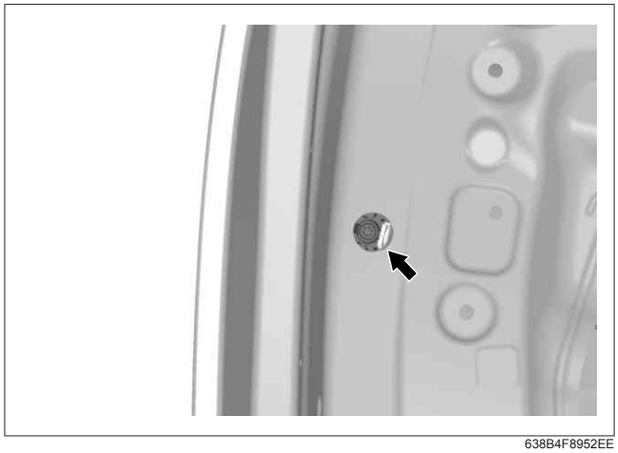
1. Perform installation work in reverse order of removal

Rear door exterior handle

Removal/installation

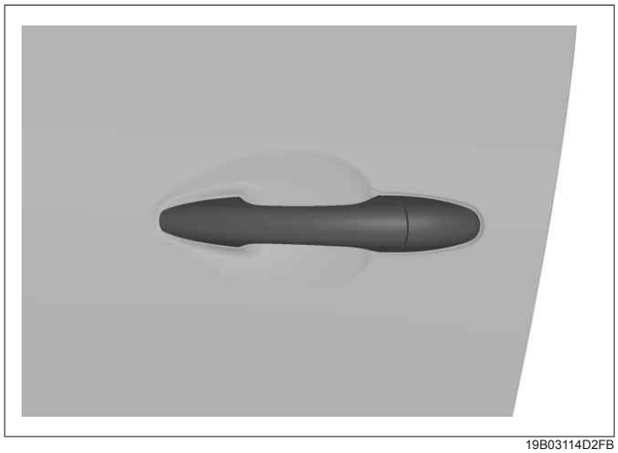
Removal

1. Raise rear door glass to the top
2. Disconnect the negative terminal of the battery.
3. Remove rear door inner trim plate
4. Remove rear door handle box mounting bracket
5. Uncover the rear door waterproof membrane
6. Remove rear door exterior handle lamp trim cover plug cover
7. Loosen 1 bolt



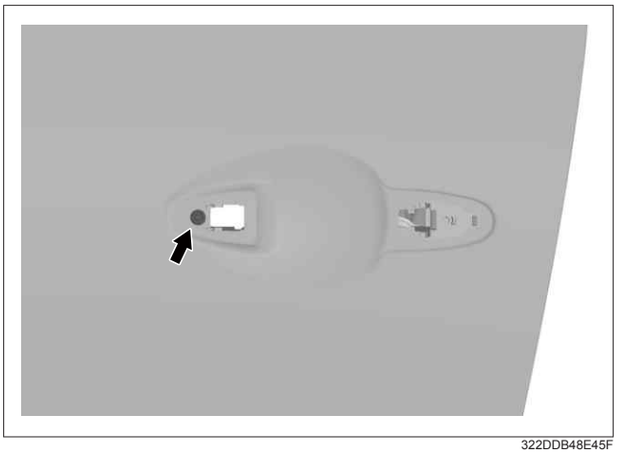
638B4F8952EE

8. Remove rear door exterior handle lamp trim cover and rear door exterior handle



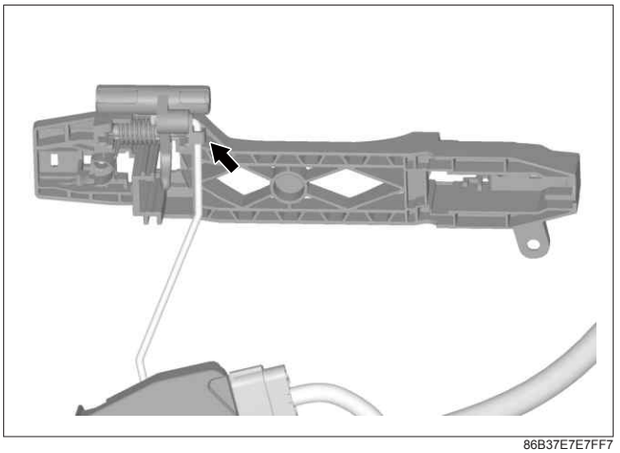
19B03114D2FB

9. Remove exterior handle front/rear gasket
10. Remove 1 screw



322DDB48E45F

11. Disconnect rear door handle frame from outward-opening lever



86B37E7E7FF7

12. Remove the rear door handle frame

Installation

1. Perform installation work in reverse order of removal

Rear door inside handle

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove rear door inner trim plate
3. Remove 3 screws



67D56595912E

4. Remove rear door interior handle

Installation

1. Perform installation work in reverse order of removal

Exterior trunk handle

Removal/installation

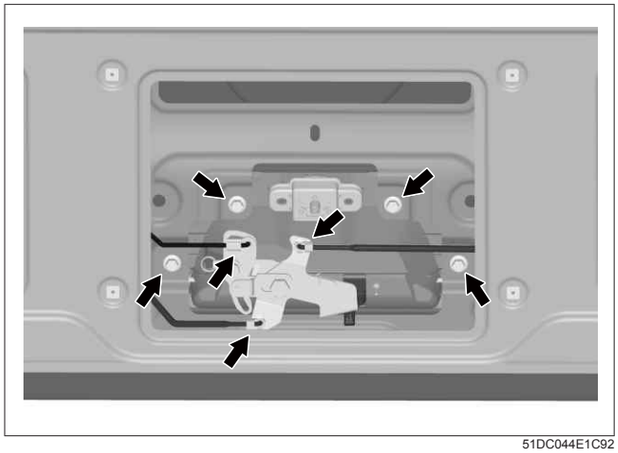
Removal

1. Disconnect the negative terminal of the battery.
2. Open rear trunk plate
3. Remove 12 screws, and remove rear trunk plate cover



D32C80317BEE

4. Disconnect it from the left and right lock levers of the trunk, and remove 4 bolts



51DC044E1C92

5. Disconnect harness connectors, and remove rear view camera
6. Remove exterior trunk handle

Installation

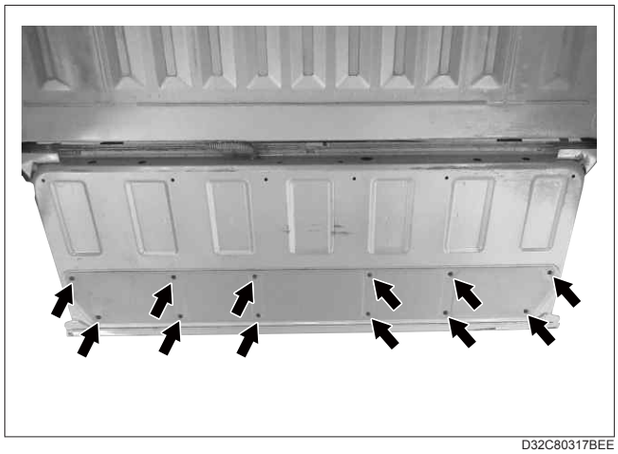
1. Perform installation work in reverse order of removal

Trunk lock

Removal/installation

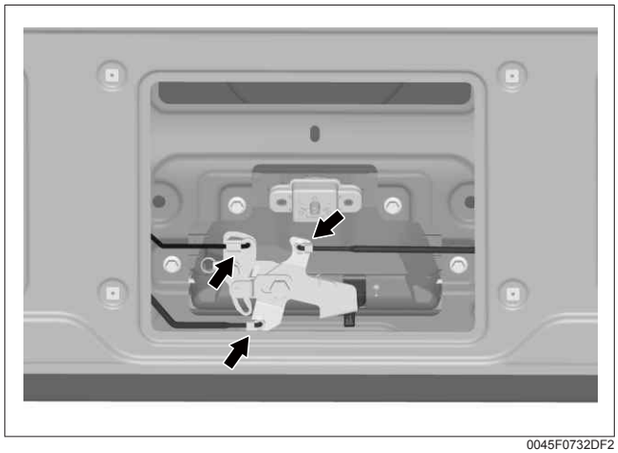
Removal

1. Open rear trunk plate
2. Remove 12 screws, and remove rear trunk plate cover



D32C80317BEE

3. Disconnect exterior trunk handle from the left and right lock levers of the trunk



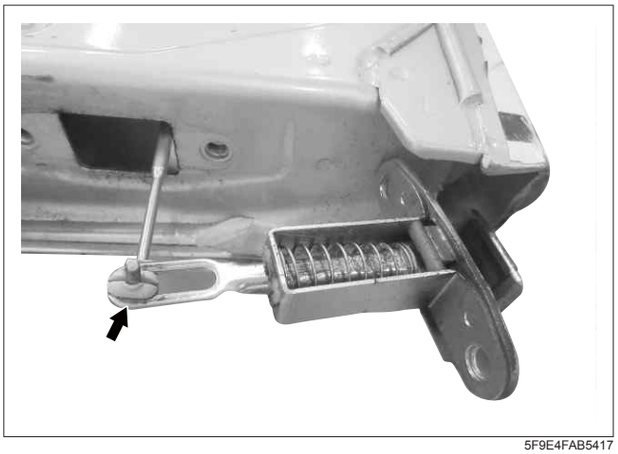
0045F0732DF2

4. Remove 2 fastening bolts



F515249E8652

5. Stretch the lock body outward
6. Disconnect the lock body from the lock lever



5F9E4FAB5417

7. Remove the lock body

Installation

1. Perform installation work in reverse order of removal

Battery & power interface

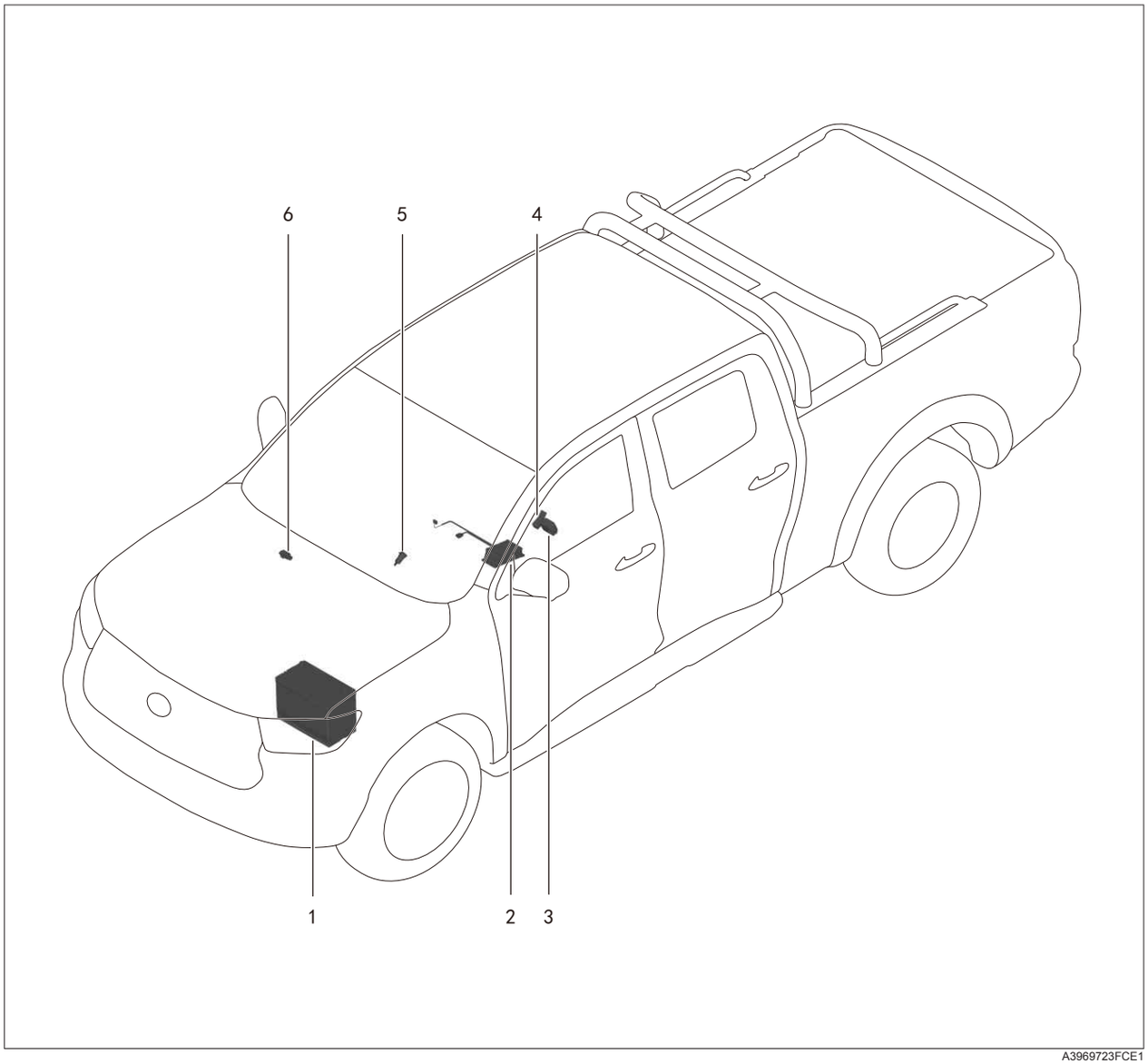
Power supply system .....62－1
Description .....62－1
Location diagram .....62－2
Specified torque .....62－3
Battery .....62－4
Check .....62－4
Removal/installation .....62－5
charging method .....62－6
Spare power supply .....62－8
pin definition .....62－8
Removal/Installation of .....62－8
USB power socket .....62－9
pin definition .....62－9
Removal/installation .....62－9
USB power supply adapter .....62－10
pin definition .....62－10
Removal/installation .....62－10
220 V inverter .....62－11
Pin definition .....62－11
Removal/installation .....62－11
220V inverter socket .....62－13
Pin Definition of .....62－13
Removal/Installation of .....62－13

Power supply system

Description

Power supply system is composed of generator, battery, spare power supply, etc.. It provides electric power for whole-vehicle electrical system and regulates generating capacity of generator and maintains battery capacity within certain range.

Location diagram



A3969723FCE1

1. Battery
2. 220 V inverter
3. 220 V inverter socket
4. USB power socket
5. Standby power supply
6. USB power supply adapter

Specified torque

Name	Fasteners	Tightening torque (N·m)	Quantity	Remarks
Nut	Battery hook × battery pressing plate	6±1	1	—
Bolt	Vehicle body × battery pressure plate	23±3	1	—
Nut	Positive terminal of the battery × battery	6±1	1	—
Nut	Negative terminal of the battery × battery	6±1	1	—
Bolt	Battery ground cable harness x vehicle body	23±3	2	—

Battery

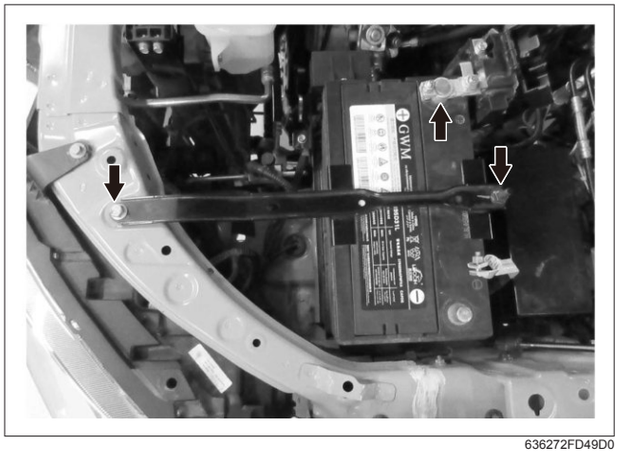
Check

Cause		Reason	Handling method
Casing	Damage	1. The battery case is damaged	Replacement
		2. Improper installation	
	Burnout	1. Loose or bad connection of end post wire terminal	Replacement
		2. External short circuit	
	Burst	1. Internal short-circuit	Replacement
		2. Excessively low electrolyte level, internal spark	
		3. Vent obstruction	
	Deformation	1. Overcharging	Replacement
		2. Excessive current charge	
		3. Vent obstruction	
Battery acid leakage		1. Plastic case is damaged due to collision by external force	Replacement
		2. The battery is inverted or inclined too much	
		3. Thermal sealing is poor	
The column is melted and damaged		1. External short circuit	Refit or replacement
		2. Poor contact	
		3. Poor welding	
Voltage	0V-11.6V	1. Over discharge	Discard
		2. Short circuit	
	11.6V-12.2V	Under charge	Start charging immediately, use battery tester to check battery state after charging
	12.2V-12.5V		Fully charged
	Above 12.5 V	Normal	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove grille trim plate
3. Disconnect positive terminal of battery, and remove 1 nut and 1 bolt



636272FD49D0

4. Remove pressing plate and hook
5. Remove battery

Installation

1. Perform installation work in reverse order of removal

charging method

Precautions before charging

- In assembling battery using metal tools or in troubleshooting using metal conductor, avoid direct short circuit of positive and negative terminals of the battery.
- Place the battery straight up.
- Sequence of battery harness disconnection: disconnect harness for the negative terminal of the battery at first and then disconnect battery positive cable.
- Battery harness connection sequence: connect positive cable at first and then connect negative cable.
- Charging a battery with bulge on housing, a broken battery or a battery leaking acid is not allowed.
- Charging a battery with broken end post is not allowed.
- Before charging, clean the end post and remove oxide skin on the surface.
- Check appearance of charger, power cord and bipolar charging cable for damage. If there is damage, replacement or repair is required.
- Charging a battery with voltage less than 10.5 V at a temperature below 0℃ is forbidden. If charging is required, move the battery to the environment at room temperature (25℃) and place it in the environment for 24 h before recharging.

Selection of charging method

- If battery terminal voltage is ≥12 V, charging at constant voltage is advised.
- If battery terminal voltage is ＜ 12 V, charging at constant current is advised.
- For a battery in serious lack of electricity, charging at constant current can more effectively activate chemical substances in the battery and restore battery capacity.

Method of maintenance free battery/enhanced flooded battery (EFB) charging

- Charging at constant voltage (to be applied when no-load voltage ≥12 V): charge the battery at 16 V constant voltage and 5*I20 (A) limit current until charging current drops down to 0.5*I20 (A) (when charging current is close to "0" and remains unchanged for 2-3 hours).
- Charging at constant current (to be applied when no-load voltage ＜ 12 V): start charging at 1*I20 (A) constant current and 16 V limit voltage, charging time is as stated in Table 1. Charging at 1*I20 (A) constant current is for charging and repairing a battery in extreme lack of electricity. If insufficient voltage is up to over 11.6 V, charging at 2*I20 (A) is advised.

⚠ Caution

- I20:20 h discharge current, C20/20 value, in ampere (A).
- For example: 6-QW-60 model is to be charged at 1*I20 (A) constant current, i.e., charging at 60×0.05=3 A current.

Glass fiber cross wall (AGM) battery charging method

- Charging at constant voltage and limit current (to be applied when open-circuit voltage ≥12 V): charge the battery at 14.4 V (no more than 14.8 V) constant voltage and 5*I20 (A) limit current until charging current drops down to 0.5 A or remains unchanged for three hours.
- Charging at constant current and limit voltage (to be applied when open-circuit voltage ＜ 12 V): start charging at 1*I20 (A) constant current and 14.8 V limit voltage, charging time is as stated in Table 1.

⚠ Caution

› Charging at 1*I20 (A) current is for charging and repairing a battery in extreme lack of electricity (open-circuit voltage is below 11.6 V). If open-circuit voltage is (11-12) V, charging at 2*I20 (A) is advised.

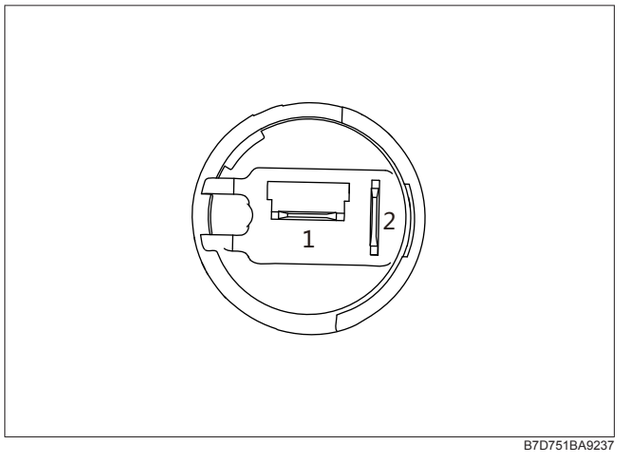
› I20:20 h discharge current, C20/20 value, in ampere (A).

› For example: H5 (LN2) model is to be charged at 1*I20 (A) current, i.e., charging at 60×0.05=3 A current.

Table 1 Relation between Time of Battery Charging at Constant Current and Voltage [For Charging at Constant Current Only]

	12.50-12.45V	12.45-12.35V	12.35-12.20V	12.20-12.05V	12.05-11.95V	11.95-11.80V	11.80-11.65V	11.65-11.50V	11.50-11.30V	11.30-11.00V	Below 11.00 V
2*I20	2h	3h	4h	5h	6h	7h	8h	9h	10h	12h	Over 14 h
1*I20	4h	6h	8h	10h	12h	14h	16h	18h	20h	24h	Over 26 h

Spare power supply
pin definition



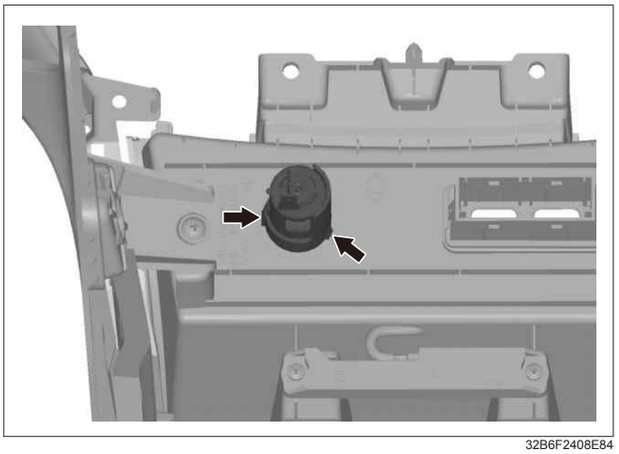
B7D751BA9237

Pin No.	Function
1	Positive terminal
2	Negative terminal

Removal/Installation of

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the auxiliary instrument panel
3. Disconnect the harness connector
4. Remove the spare power supply



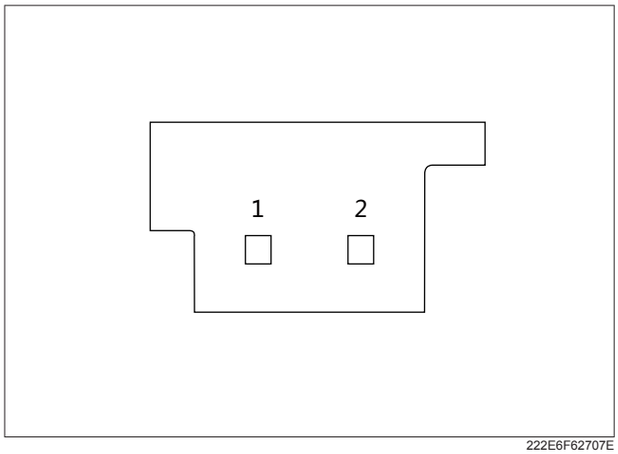
32B6F2408E84

Installation

1. Perform installation work in reverse order of removal

USB power socket

pin definition



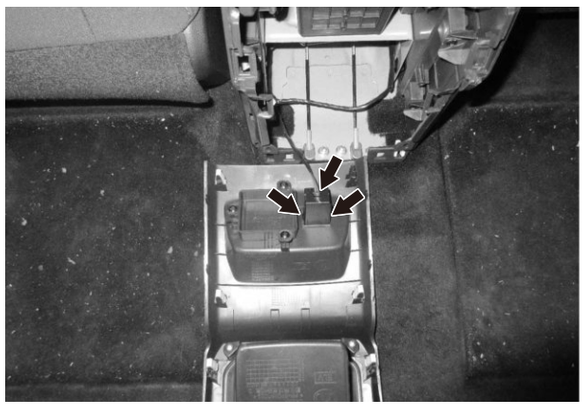
222E6F62707E

Pin No.	Function
1	12 V
2	GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove auxiliary instrument panel rear trim plate
3. Disconnect the harness connector
4. Remove USB power socket



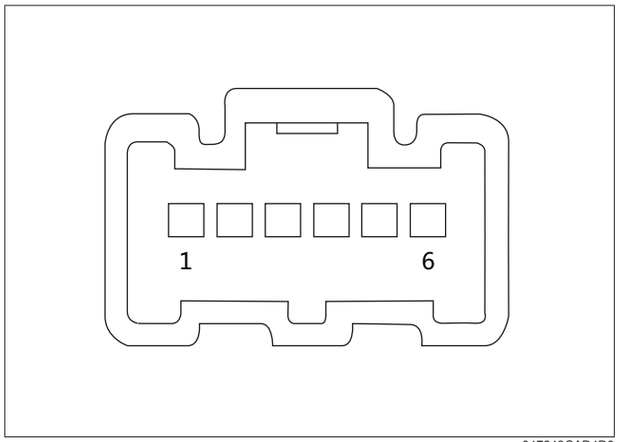
E64D3BABA5FE

Installation

1. Perform installation work in reverse order of removal

USB power supply adapter

pin definition



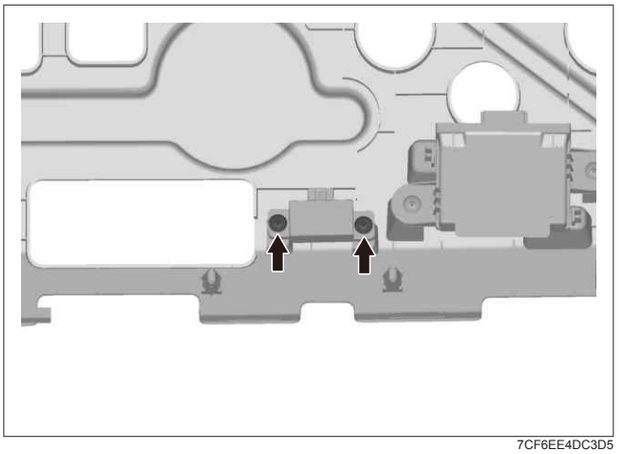
347243CAD4D9

Pin No.	Function
1	Input power (12V)
2	Input ground
3	Output ground
4	Data signal (two-strand wire)
5	Data signal (two-strand wire)
6	Output power (5V)

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front passenger side foot block
3. Disconnect harness connector
4. Remove 2 screws



7CF6EE4DC3D5

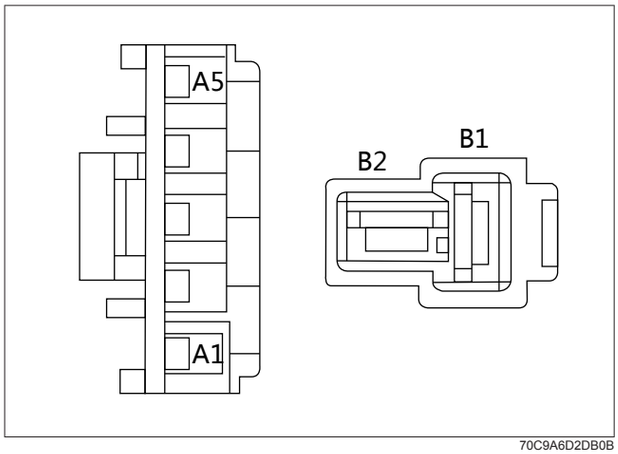
5. Remove USB power supply adapter

Installation

1. Perform installation work in reverse order of removal

220 V inverter

Pin definition



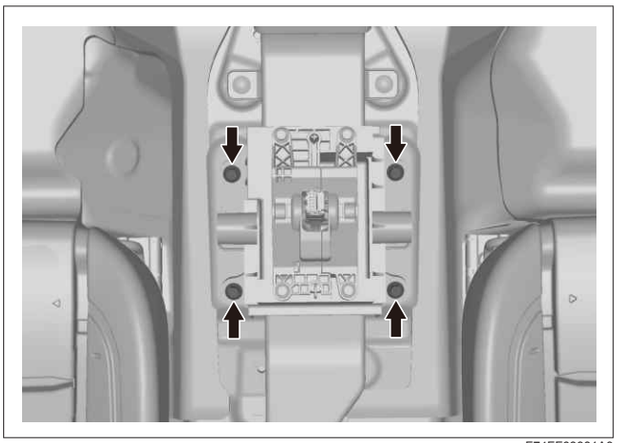
70C9A6D2DB0B

Pin No.	Function
(A1,	AC(220V)
A2	AC(220V)
A3	—
A4	Switch (12 V)
A5	Switch (12 V)
B1	+DC(12V)
B2	-DC(12V)

Removal/installation

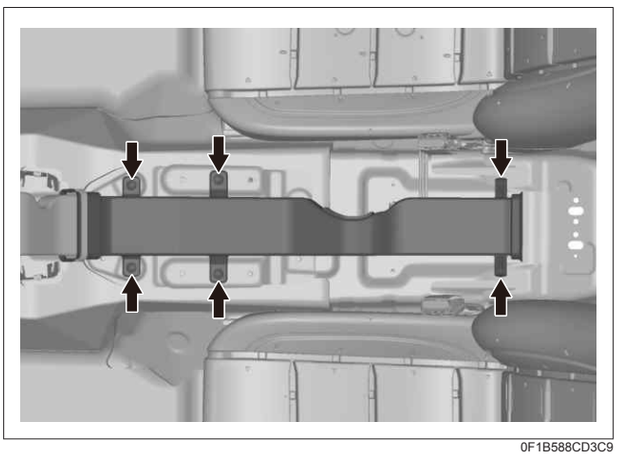
Removal

1. Disconnect the negative terminal of the battery.
2. Remove the auxiliary instrument panel
3. Remove the shifter bracket with shifter



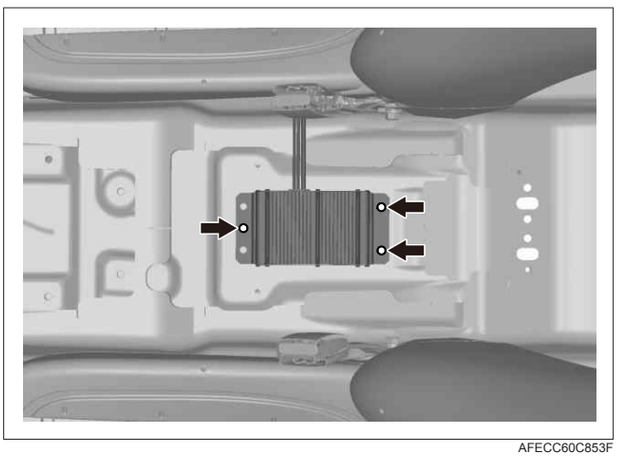
F74FF68381A3

4. Remove the rear upper transition air duct



0F1B588CD3C9

5. Remove 3 bolts



AFECC60C853F

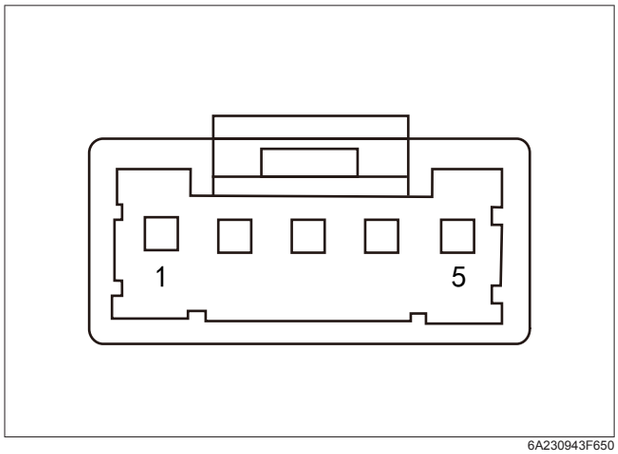
6. Disconnect the harness connector and remove the 220V inverter

Installation

1. Perform installation work in reverse order of removal

220V inverter socket

Pin Definition of



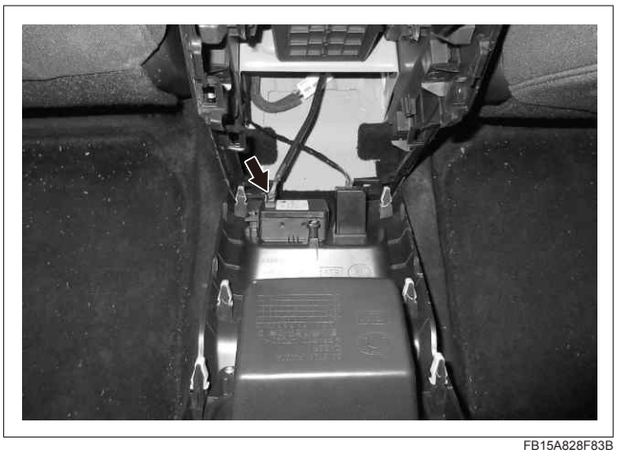
6A230943F650

Pin No.	Function
1	AC (220V)
2	AC (220V)
3	—
4	Switch (12 V)
5	Switch (12 V)

Removal/Installation of

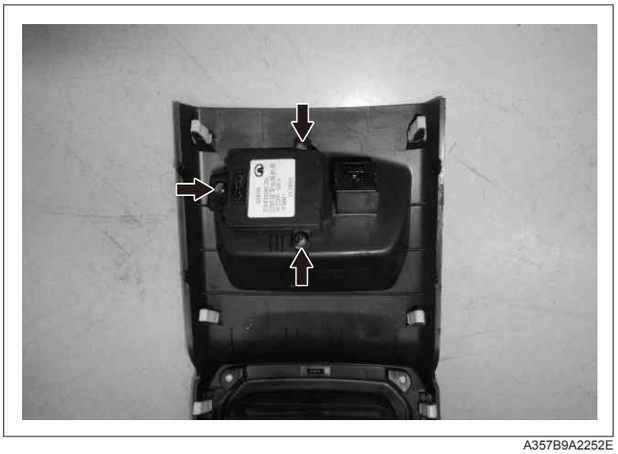
Removal

1. Disconnect the negative terminal of the battery.
2. Remove auxiliary instrument panel rear trim plate
3. Disconnect the harness connector



FB15A828F83B

4. Remove the 3 screws



A357B9A2252E

5. Remove the 220V inverter socket

Installation

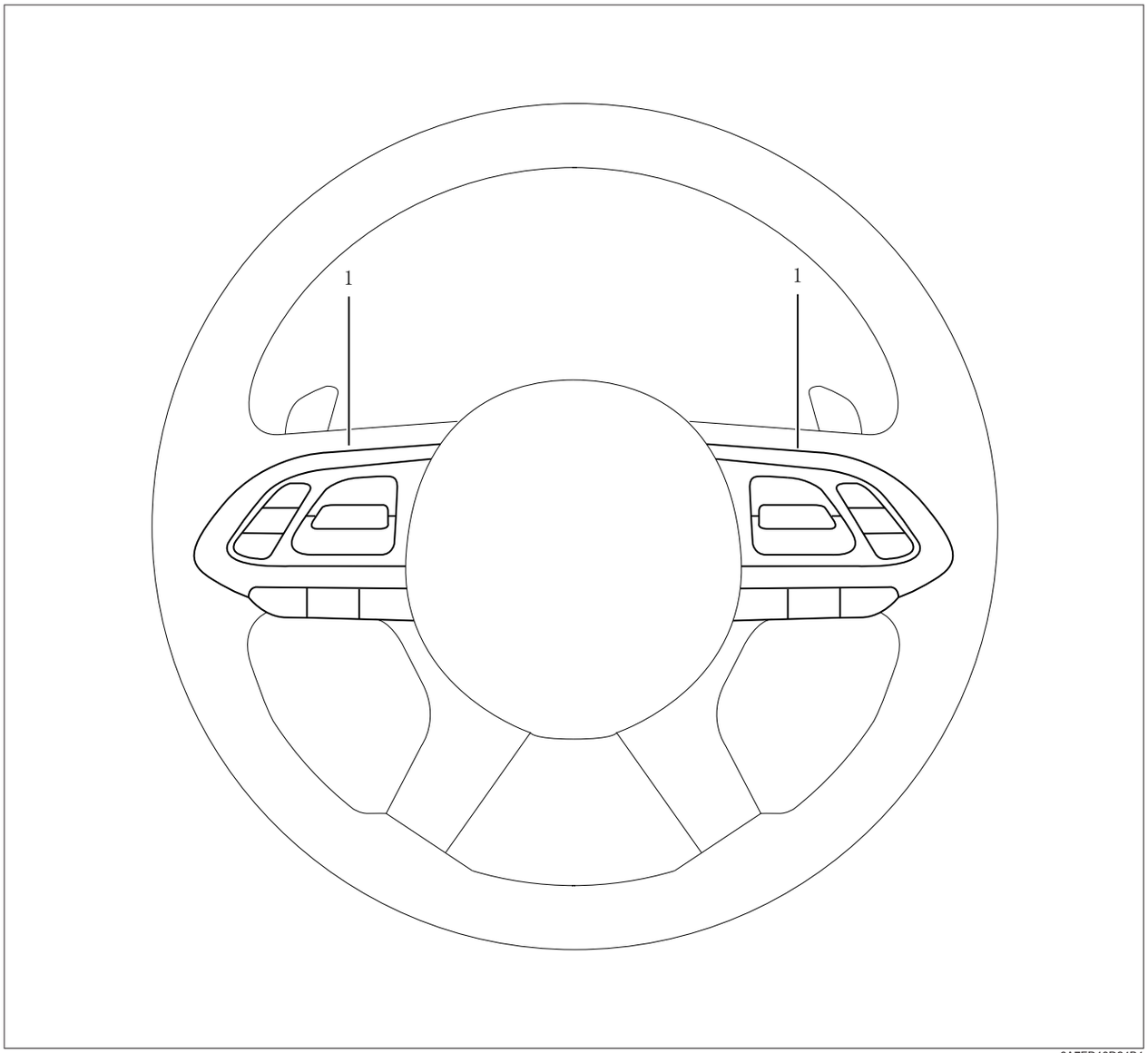
1. Perform installation work in reverse order of removal

Switch

Multi-functional switch on steering wheel .....63－1
Location diagram .....63－1
Pin definition .....63－2
Removal/installation.....63－2
Right control switch .....63－3
Location Diagram of .....63－3
Pin definition .....63－4
Removal/installation.....63－4

Multi-functional switch on steering wheel

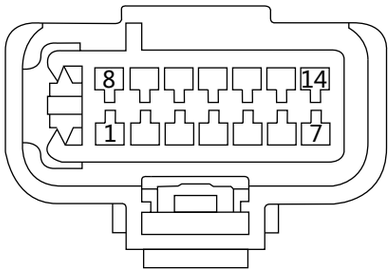
Location diagram



6A7FD13D24B1

1. Multifunction switch on steering wheel

Pin definition



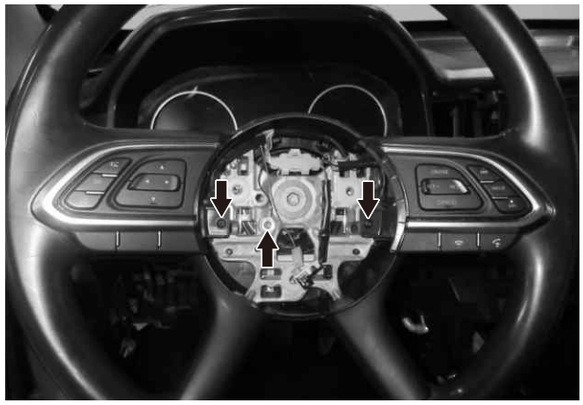
7513E88A1DDF

Pin No.	Function
1	Airbag+
2	Airbag-
3	Battery
4	LIN
5	Cruising
6	Ground
7	Cruise GND
8	—
9	Paddle shifter GND
10	Paddle shifter
11	—
12	—
13	—
14	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove driver airbag assembly
3. Remove 3 screws



4BAB590F07C7

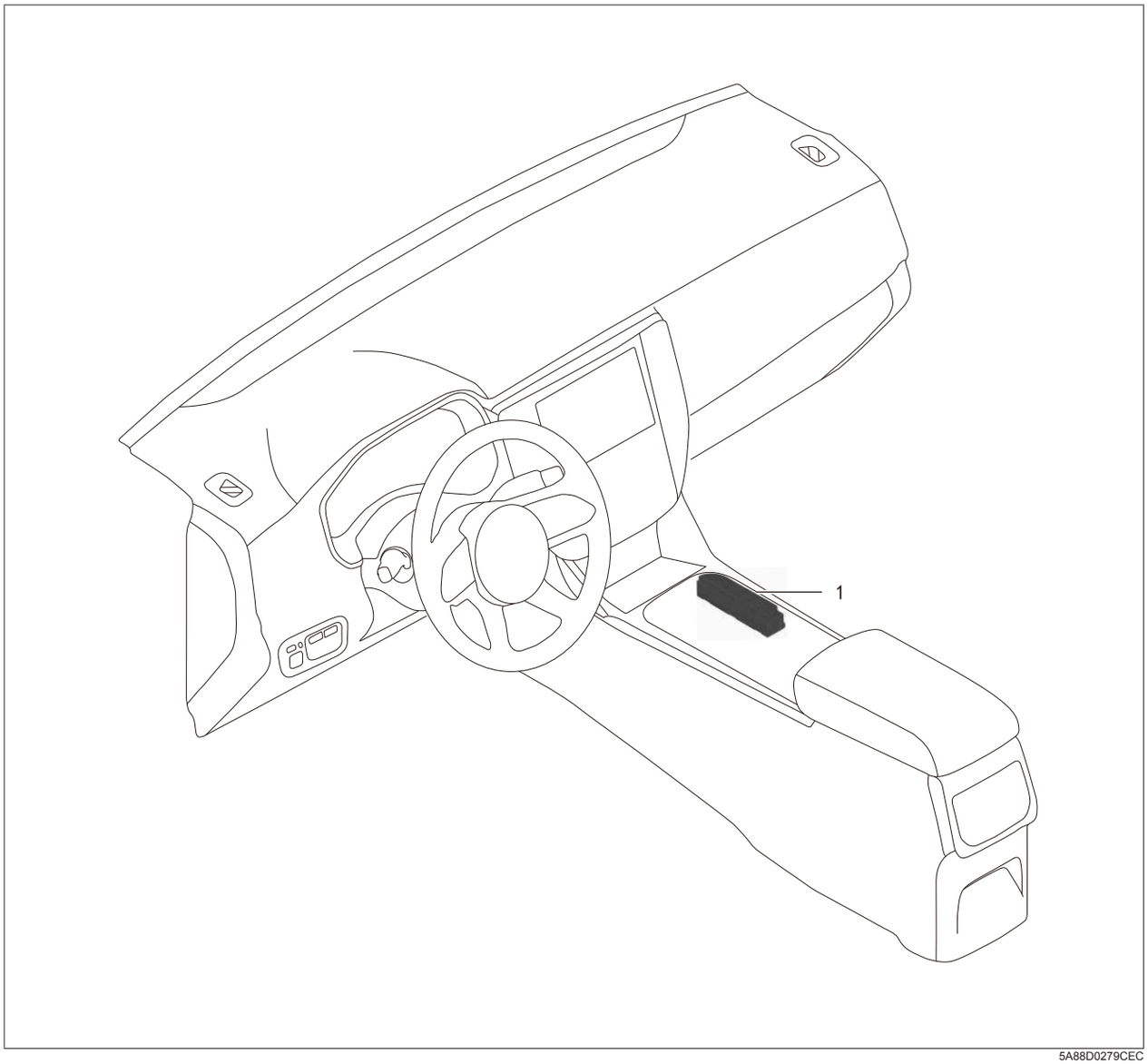
4. Pry multi-function switch on steering wheel to remove it

Installation

1. Perform installation work in reverse order of removal

Right control switch

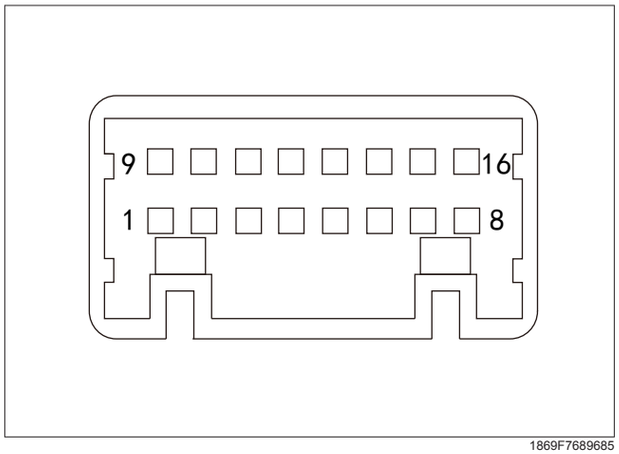
Location Diagram of



5A88D0279CEC

1. Right control switch

Pin definition



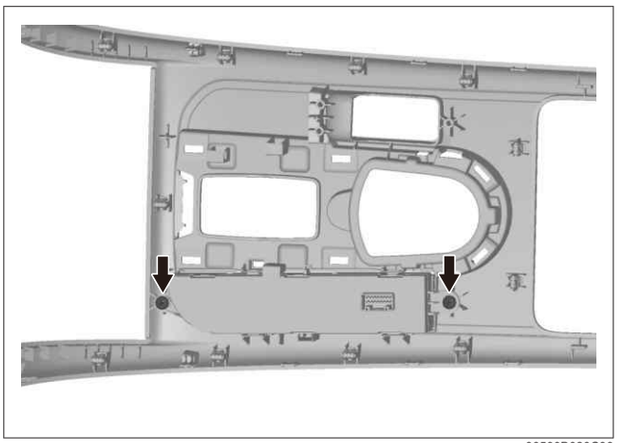
1869F7689685

Pin No.	Function
1	Ignition power supply (IGN)
2	Background lighting input
3	GND
4	—
5	—
6	—
7	—
8	—
9	LIN
10	—
11	—
12	—
13	—
14	—
15	—
16	—

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove auxiliary instrument panel control panel
3. Disconnect the harness connector
4. Remove 2 screws



36590B026C98

5. Remove the right control switch

Installation

1. Perform installation work in reverse order of removal

Cruise system

Cruise control system ..... 64－1
System description ..... 64－1
System diagram ..... 64－2
Cruise control switch ..... 64－3
Pin definition ..... 64－3
Removal/installation ..... 64－3

Cruise control system

System description

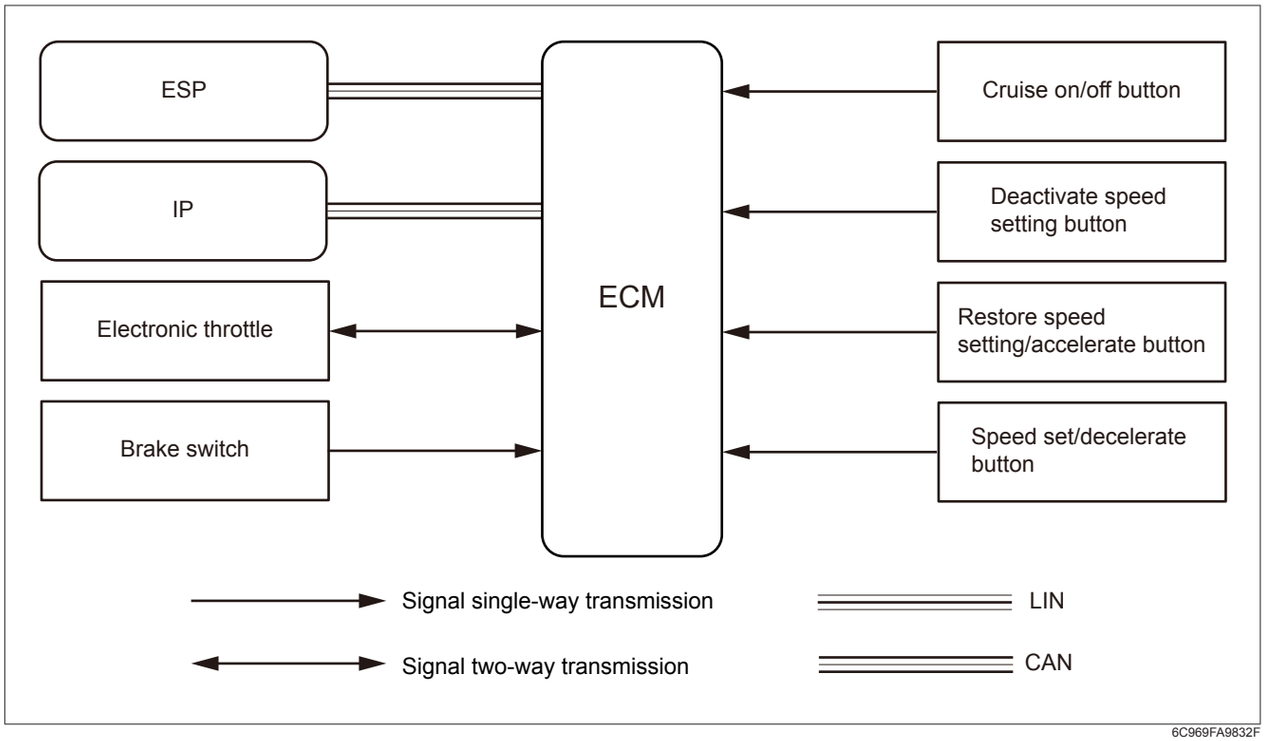
Cruise control is a device capable of automatic control of vehicle speed. During the drive, the driver can start cruise control and set a speed. Afterwards, the vehicle will maintain the set speed without any need to step on the accelerator pedal.

The cruise control system is made up of parts including the operation switch, sensor, cruise control ECU (integrated into the engine's control unit ECU), and the actuator.

Precautions

- Do not use the cruise control system in traffic jams, on steep slopes, sharp turns, or on ice-covered, or slippery roads.
- Be careful while driving on a downhill road section at an increased speed with the cruise control system turned on.

System diagram



6C969FA9832F

Cruise control switch

Pin definition

Notice

› Cruise control switch is integrated into multi-function steering wheel switch.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove multi-function steering wheel switch

Notice

› Cruise control switch is integrated into multi-function steering wheel switch.

Installation

1. Perform installation work in reverse order of removal

Parking assist system

Reverse imaging system .....65－1
System description .....65－1
Location diagram .....65－2
Rear view camera .....65－3
Pin definition .....65－3
Removal/installation.....65－3
Visual system for blind spot.....65－4
System Description of .....65－4
Location diagram .....65－5
Blind spot camera.....65－6
Pin definition .....65－6
Removal/installation.....65－6
Visual switch for blind spot .....65－7
Pin definition .....65－7
Removal/installation.....65－7
Panoramic surround-view imaging system.....65－8
System description .....65－8
Location diagram .....65－9
System diagram.....65－10
Special tools .....65－11
Fault symptom checklist .....65－12
List of DTC.....65－13
DTC troubleshooting method.....65－14
Calibration.....65－30
Front surround-view camera .....65－32
Pin definition .....65－32
Removal/installation.....65－32
Left/right surround-view camera .....65－33
Pin definition .....65－33
Removal/installation.....65－33
Rear surround-view camera .....65－34
Pin definition .....65－34
Removal/installation.....65－34
Panoramic surround-view image controller .....65－35
Pin definition .....65－35
Removal/installation.....65－37
Panoramic surround-view image switch .....65－38
Pin definition .....65－38
Removal/installation.....65－38
Reverse radar system .....65－39
System description .....65－39
Location diagram .....65－40

System diagram.....65－41
Anti-collision radar sensor.....65－42
Pin definition.....65－42
Removal/installation.....65－42

Reverse imaging system

System description

The reverse imaging system captures the image behind the vehicle through the rear view camera, and transmits the image signal to the display screen with the dynamic guide line indicating the width of the vehicle body, and calculates the motion track of the vehicle according to the turning angle of the steering wheel to assist the driver to park.

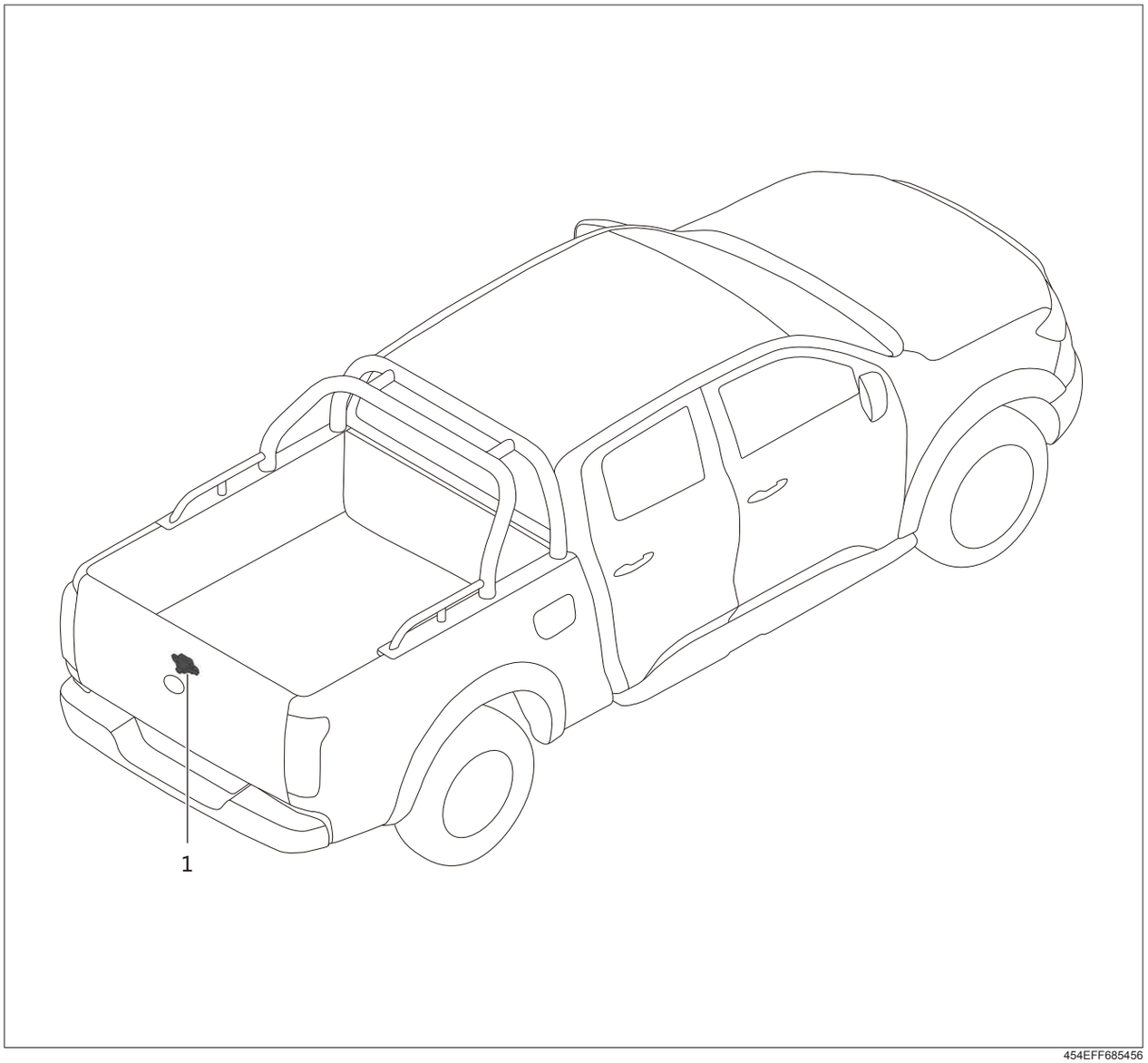
Precautions

- When the camera is partially damaged or collided, the position and angle of the camera may change, which may cause the reversing imaging system to malfunction.
- Do not scrub the camera. Scrubbing the camera may scratch it, affecting the image, and do not allow organic solvents, wax, detackifier, or glass coatings to stick to the camera. If such material sticks to the camera, remove it immediately and rinse it with clean water.
- If there are sudden changes in temperature in the environment of the camera, this may affect its normal operation.
- If the camera is contaminated by snow, mud, etc., a clear image will not be displayed. Please clean the lens with clean water and clean it with a clean soft cloth.

Under the following circumstances, the image may be hard to make out even in normal conditions

- Electronic devices producing interference are being used in the cab.
- If wireless accessories are installed, there may be interference with the image.
- The surroundings of the camera are too bright, for example, bright light such as sunlight and light from headlamps is shining on the camera.
- The surroundings of the camera are too dark (for example, in the night).
- The vehicle is inclined too much.

Location diagram

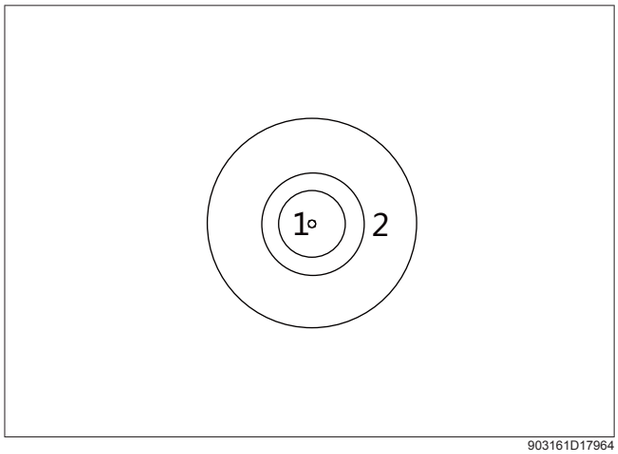


454EFF685456

1. Rear view camera

Rear view camera

Pin definition



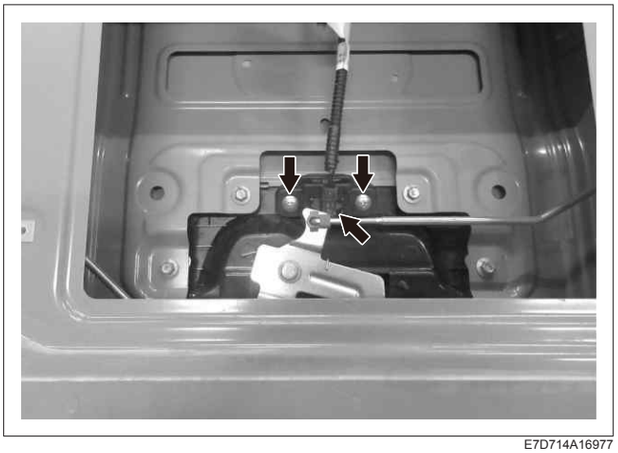
903161D17964

Pin No.	Function
1	Signal x power
2	Ground

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove rear trunk plate cover
3. Disconnect harness connector and remove 2 screws



E7D714A16977

4. Remove rear view camera

Installation

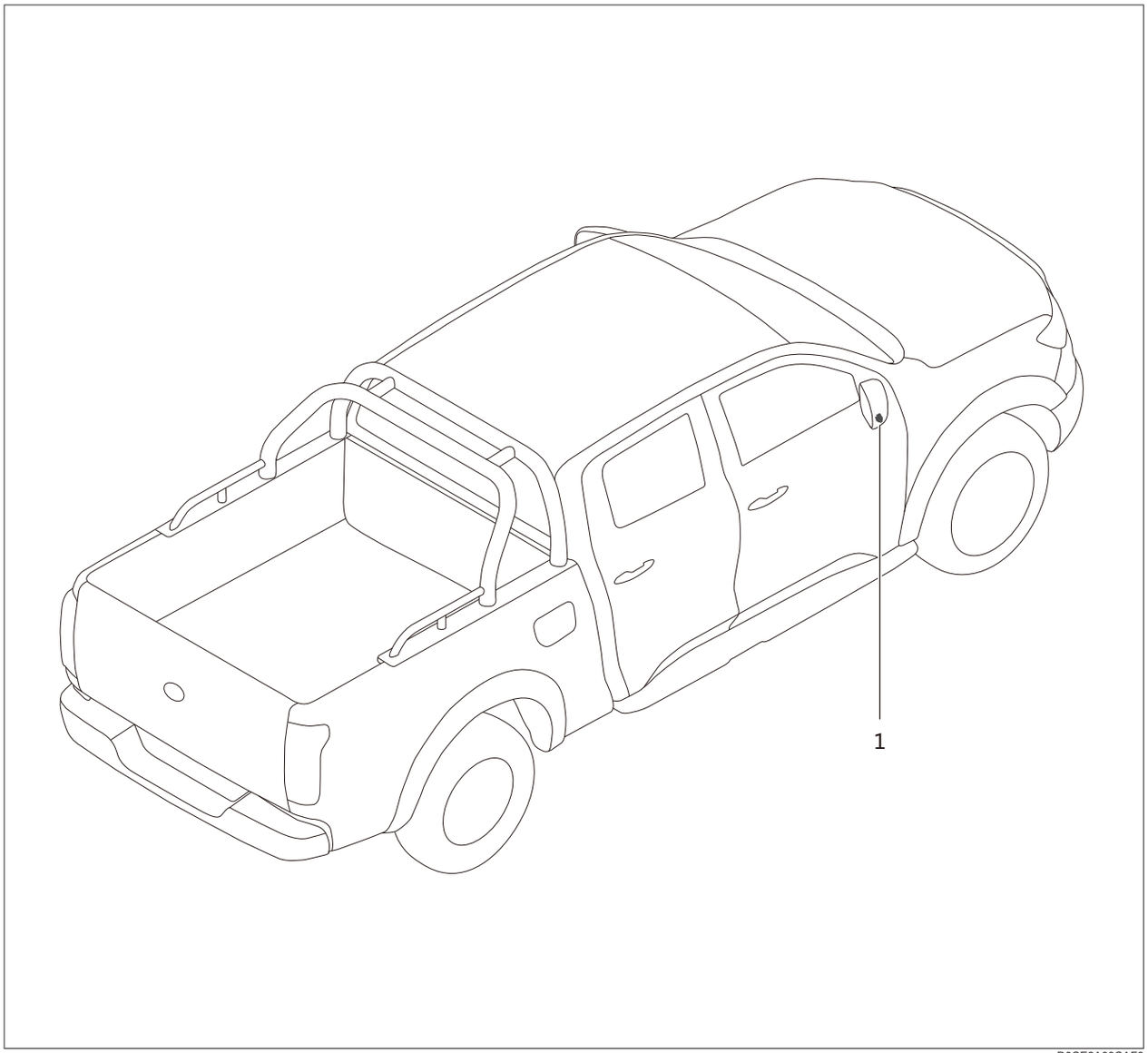
1. Perform installation work in reverse order of removal

Visual system for blind spot

System Description of

The visual system for blind spot captures the peripheral images of the front wheel on the front passenger side of the vehicle via the camera on the bottom of the front passenger side outside rearview mirror, and transmits the image signals to the multimedia display screen for display, to expand the driver's visual field and prevent the vehicle from colliding or dangerous situations in the blind zone.

Location diagram

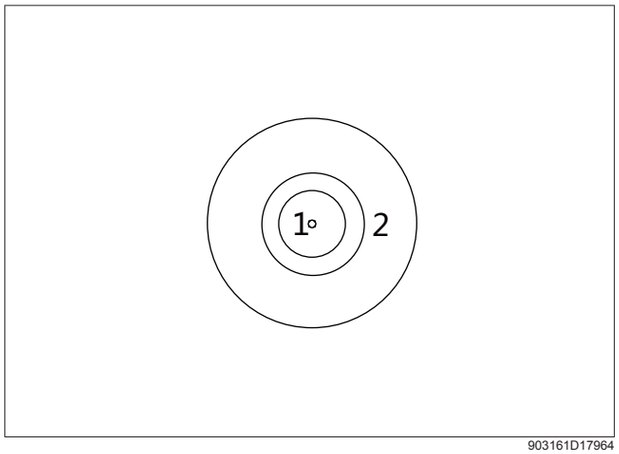


D0CE2A38CAF8

1. Blind spot camera

Blind spot camera

Pin definition



903161D17964

Pin No.	Function
1	Signal x power
2	Ground

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front passenger side outside rearview mirror assembly

Notice

› Blind-spot camera assembly is integrated in front passenger side outside rearview mirror assembly.

Installation

1. Perform installation work in reverse order of removal

Visual switch for blind spot

Pin definition

Notice

› Blind-spot visual switch is integrated in multi-function steering wheel switch.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove multi-function steering wheel switch

Notice

› Blind-spot visual switch is integrated in multi-function steering wheel switch.

Installation

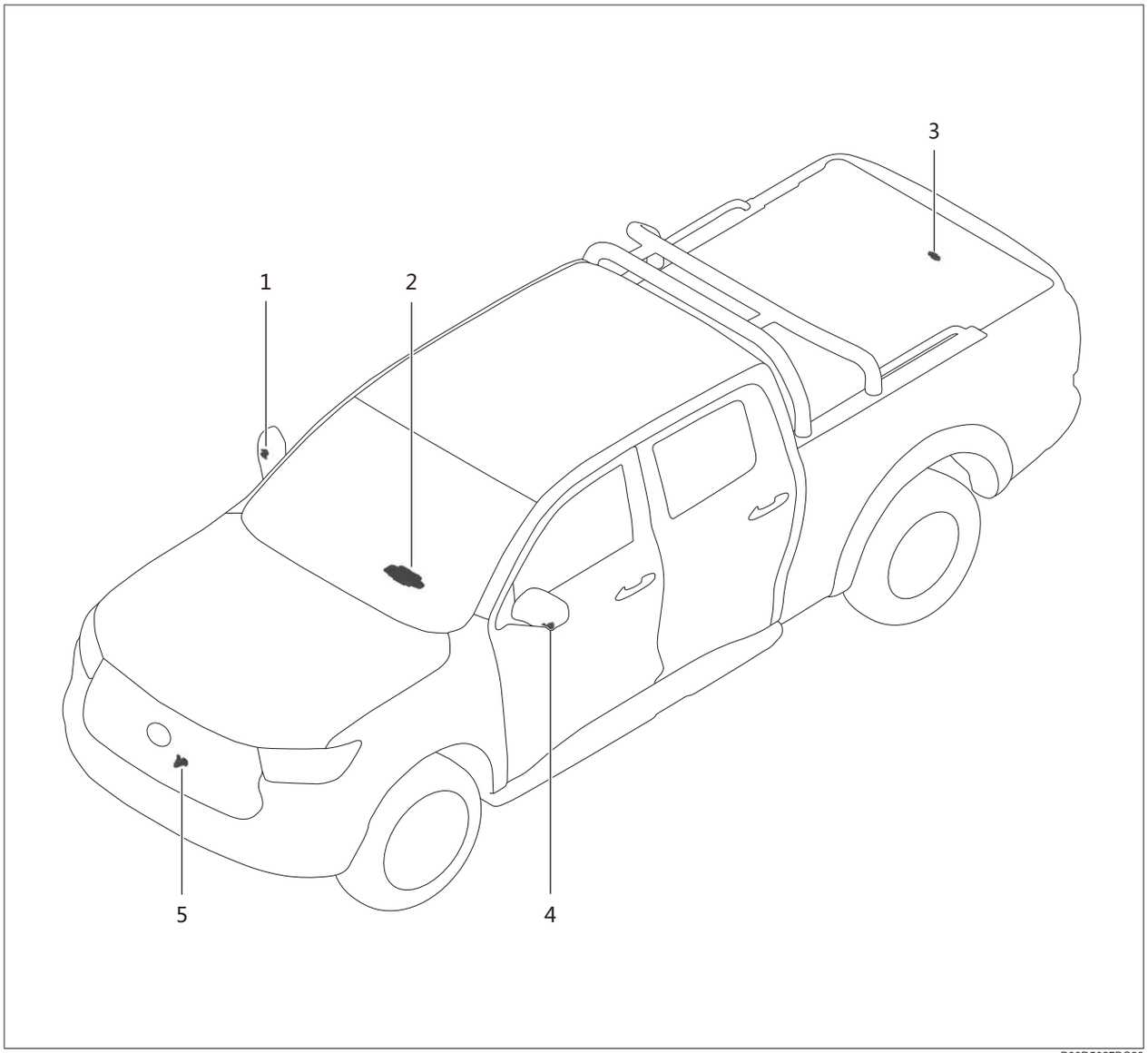
1. Perform installation work in reverse order of removal

Panoramic surround-view imaging system

System description

Panoramic surround-view imaging system intakes the scenery around the vehicle and synthesizes the surrounding scenery into a 360°panoramic image through the controller, with the displaying effect similar to the image taken from the sky over the vehicle. The surround-view image can be displayed simultaneously with the image taken by any of the four cameras. Image processing is to be completed by control host, and processed video signal will be sent to the display screen for display.

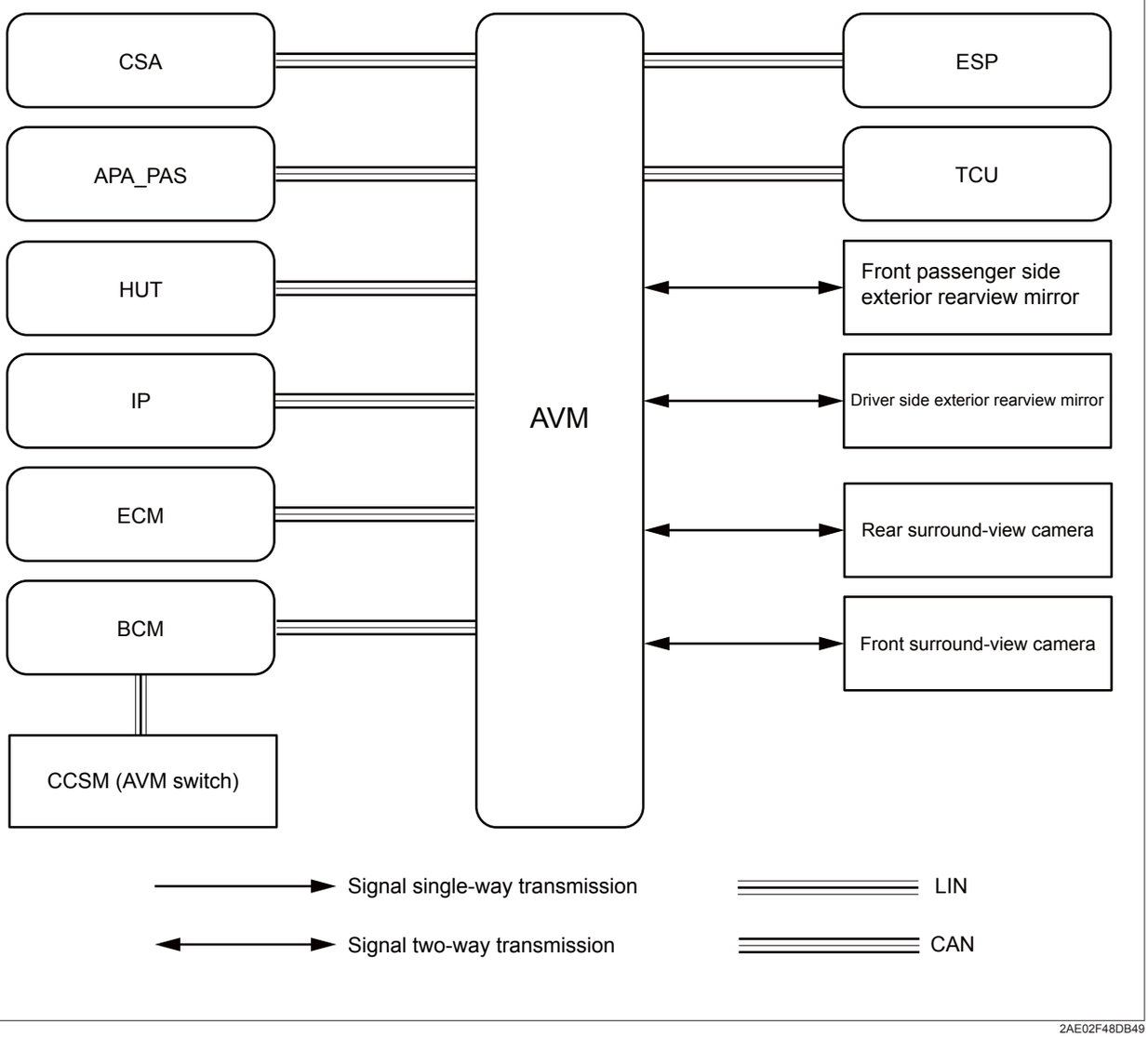
Location diagram



B90D5027BC28

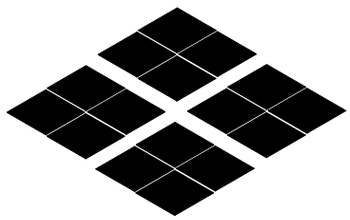
1. Right surround-view camera
2. Panoramic surround-view image controller
3. Rear surround-view camera
4. Left surround-view camera
5. Front surround-view camera

System diagram



2AE02F48DB49

Special tools

Code	Name	Purpose	Schematic diagram
ZEZF068622	360 surround-view calibration tool	During manual calibration process, auxiliary scanner is used for calibration of 360 panoramic surround-view system	

Fault symptom checklist

Symptom	Possible causes
After system startup, HUT does not act	Check if BCM/TCU/VCU and switch are faulty.
	HUT system failure; after replacement of HUT, check whether it is normal
HUT indicates “system failure, surround-view image has been turned off”	Check whether the wiring harness connection is normal
	Check for missing AVM node
	Check for normal battery voltage (9 V~16 V)
	AVM internal fault; after confirmation of replacement of AVM controller, check whether it is normal
	Camera fault
	Connection fault of the wiring harness between the camera and the control module
HUT indicates “No camera video detected”	Check whether the wiring harness connection is normal
	Check if AVM and PAS lost BCM signal
No display of panoramic surround-view single-way screen	Poor contact of panoramic camera connector
	Abnormal function of panoramic camera
	AVM internal fault; after confirmation of replacement of AVM controller, check whether it is normal
Blurry display of panoramic surround-view single screen	Panoramic camera lens wear
Intermittent display of panoramic surround-view screen	Panoramic camera installed improperly
Blurred panoramic surround-view screen	DVD signal processing abnormal
AVM splice image abnormal	Check camera for proper installation
	Calibrate AVM system

List of DTC

Serial No.	DTC	DTC description
1	U110017	Voltage too high
2	U110116	Voltage too low
3	U007388	BD-CAN bus OFF
4	U012287	Communication with ESP (ABS) lost
5	U010187	Communication with TCU lost
6	U014087	Communication with BCM lost
7	U024387	Communication with APA lost
8	U014587	Communication with CSA lost
9	B110117	Voltage of front camera too high
10	B110116	Voltage of front camera too low
11	B110217	Voltage of rear camera too high
12	B110216	Voltage of rear camera too low
13	B110317	Voltage of left camera too high
14	B110316	Voltage of left camera too low
15	B110417	Voltage of right camera too high
16	B110416	Voltage of right camera too low
17	B110517	MAIN_5V voltage too high
18	B110516	MAIN_5V voltage too low
19	B110617	MAIN_3V3 voltage too high
20	B110616	MAIN_3V3 voltage too low
21	B110717	VDDSHV_3V3 voltage too high
22	B110716	VDDSHV_3V3 voltage too low
23	B150151	Surround-view image system is not calibrated

DTC troubleshooting method

U110017

DTC definition: voltage too high

DTC occurring condition: the CAN bus detects a diagnostic voltage greater than 16V

Possible cause(s):

- Battery voltage too high.
- Harness contact abnormal.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: battery voltage detected by AVM controller within the range of 9 V~16 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is higher than 14.9 V	After repairing the generator, go to step 7	Go to step 4
4	Check the voltage across the power cord (yellow is positive, and green is negative) at connection end of AVM controller, and check if the voltage is too high	After replacing the harness, go to step 7	Go to step 5
5	Check for retrofitting	Remove the added device, and go to step 7	Go to step 6
6	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 7	Replace AVM controller
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U110116

DTC definition: voltage too low

DTC occurring condition: CAN bus detects a diagnostic voltage lower than 9 V

Possible cause(s):

- Battery voltage too low.
- Harness contact abnormal.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: battery voltage detected by AVM controller within the range of 9 V~16 V for

500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 10.1 V	When normal battery voltage is restored, go to step 7	Go to step 4
4	Check the voltage across the power cord (yellow is positive, and green is negative) at connection end of AVM controller, and check if the voltage is too low	After replacing the harness, go to step 7	Go to step 5
5	Check for retrofitting	Remove the added device, and go to step 7	Go to step 6
6	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 7	Replace AVM controller
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U007388

DTC definition: BD-CAN bus off

DTC occurring condition: busoff error in CAN communication network

Possible cause(s):

- CAN line open-circuited or short-circuited.
- Abnormal CAN line contact.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: BD-CAN communication restored

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Check for abnormal CAN communication of AVM controller	After replacing the harness, go to step 5	Go to step 3
3	Check for retrofitting	After removing the added device, go to step 5	Go to step 4
4	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 5	Replace AVM controller

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: no network message signals received from ESP (ABS) for more than 10 cycles

Possible cause(s):

- Abnormal CAN line contact.
- Abnormality in ESP (ABS) node CAN information sending.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: network information ESP (ABS) signal is received

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Check for abnormal CAN communication of AVM controller	After replacing the harness, go to step 6	Go to step 3
3	Check for abnormal CAN signal of ESP (ABS) node	After repairing ESP (ABS) node, go to step 6	Go to step 4
4	Check for retrofitting	After removing the added device, go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U010187

DTC definition: communication with TCU lost

DTC occurring condition: no network message signals received from TCU for more than 10 cycles

Possible cause(s):

- Abnormal CAN line contact.
- Sending of CAN message of TCU node abnormal.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: network message signals received from TCU normally

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Check for abnormal CAN communication of AVM controller	After replacing the harness, go to step 6	Go to step 3
3	Check for abnormal CAN signal of TCU node	After repairing TCU node, go to step 6	Go to step 4
4	Check for retrofitting	After removing the added device, go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U014087

DTC definition: communication with BCM lost

DTC occurring condition: no network message BCM is received for over 10 signal cycles

Possible cause(s):

- Abnormal CAN line contact.
- Abnormality in BCM node CAN information sending.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: receive network information BCM signal again

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Check for abnormal CAN communication of AVM controller	After replacing the harness, go to step 6	Go to step 3
3	Check if CAN signal of BCM node is abnormal	After repairing the BCM node, go to step 6	Go to step 4
4	Check for retrofitting	After removing the added device, go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller

Step	Operation	Yes	No
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U024387

DTC definition: communication with APA lost

DTC occurring condition: no network message signals received from APA for more than 10 cycles

Possible cause(s):

- Abnormal CAN line contact.
- Sending of CAN message of APA node abnormal.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: network message signals received from APA normally

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Check for abnormal CAN communication of AVM controller	After replacing the harness, go to step 6	Go to step 3
3	Check for abnormal CAN signal of APA node	After repairing APA node, go to step 6	Go to step 4
4	Check for retrofitting	After removing the added device, go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

U014587

DTC definition: communication with CSA lost

DTC occurring condition: no network message signals received from CSA for more than 10 cycles

Possible cause(s):

- Abnormal CAN line contact.
- Sending of CAN message of CSA node abnormal.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: network message signals received from CSA normally

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Check for abnormal CAN communication of AVM controller	After replacing the harness, go to step 6	Go to step 3
3	Check for abnormal CAN signal of CSA node	After repairing CSA node, go to step 6	Go to step 4
4	Check for retrofitting	After removing the added device, go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110117

DTC definition: voltage of front camera too high

DTC occurring condition: AVM controller detects that voltage of front camera higher than 9 V

Possible cause(s):

- Harness short-circuited to power.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of front camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if harness is short-circuited to power (unplug harness of front camera at AVM end, and check for voltage in harness of front camera)	After replacing the harness, go to step 6	Go to step 4
4	Check for retrofitting	Remove the additional equipment and go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110116

DTC definition: voltage of front camera too low

DTC occurring condition: AVM controller detects that voltage of front camera is lower than 7 V

Possible cause(s):

- Battery voltage too low.
- Harness short-circuited to ground.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of front camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery voltage is restored, go to step 7	Go to step 4
4	Check if harness is short-circuited to power (unplug harness of front camera at AVM end, and check if harness of front camera is short-circuited to ground)	After replacing the harness, go to step 7	Go to step 5
5	Check for retrofitting	Remove the added device, and go to step 7	Go to step 6
6	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 7	Replace AVM controller
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110217

DTC definition: voltage of rear camera too high

DTC occurring condition: AVM controller detects that voltage of rear camera is higher than 9 V

Possible cause(s):

- Harness short-circuited to power.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of front camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if harness is short-circuited to power (unplug harness of rear camera at AVM end, and check for voltage in harness of rear camera)	When normal battery voltage is restored, go to step 6	Go to step 4
4	Check for retrofitting	Remove the additional equipment and go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110216

DTC definition: voltage of rear camera too low

DTC occurring condition: AVM controller detects that voltage of rear camera is lower than 7 V

Possible cause(s):

- Battery voltage too low.
- Harness short-circuited to ground.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of rear camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery voltage is restored, go to step 7	Go to step 4
4	Check if harness is short-circuited to power (unplug harness of rear camera at AVM end, and check if harness of rear camera is short-circuited to ground)	After replacing the harness, go to step 7	Go to step 5
5	Check for retrofitting	Remove the added device, and go to step 7	Go to step 6

Step	Operation	Yes	No
6	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 7	Replace AVM controller
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110317

DTC definition: voltage of left camera too high

DTC occurring condition: AVM controller detects that voltage of left camera higher than 9 V

Possible cause(s):

- Harness short-circuited to power.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of left camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if harness is short-circuited to power (unplug harness of left camera at AVM end, and check for voltage in harness of left camera)	After replacing the harness, go to step 6	Go to step 4
4	Check for retrofitting	Remove the additional equipment and go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110316

DTC definition: voltage of left camera too low

DTC occurring condition: AVM controller detects that voltage of left camera is lower than 7 V

Possible cause(s):

- Battery voltage too low.
- Harness short-circuited to ground.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of left camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery voltage is restored, go to step 7	Go to step 4
4	Check if harness is short-circuited to power (unplug harness of left camera at AVM end, and check if harness of left camera is short-circuited to ground)	After replacing the harness, go to step 7	Go to step 5
5	Check for retrofitting	Remove the added device, and go to step 7	Go to step 6
6	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 7	Replace AVM controller
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110417

DTC definition: voltage of right camera too high

DTC occurring condition: AVM controller detects that voltage of right camera is higher than 9 V

Possible cause(s):

- Harness short-circuited to power.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of right camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if harness is short-circuited to power (unplug harness of right camera at AVM end, and check for voltage in harness of right camera)	After replacing the harness, go to step 6	Go to step 4

Step	Operation	Yes	No
4	Check for retrofitting	Remove the additional equipment and go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110416

DTC definition: voltage of right camera too low

DTC occurring condition: AVM controller detects that voltage of right camera is lower than 7 V

Possible cause(s):

- Battery voltage too low.
- Harness short-circuited to ground.
- Abnormality caused by retrofitting.
- AVM controller trouble.

DTC removal condition: voltage of right camera detected by AVM controller within the range of 7 V~9 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery voltage is restored, go to step 7	Go to step 4
4	Check if harness is short-circuited to power (unplug harness of right camera at AVM end, and check if harness of right camera is short-circuited to ground)	After replacing the harness, go to step 7	Go to step 5
5	Check for retrofitting	Remove the added device, and go to step 7	Go to step 6
6	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 7	Replace AVM controller
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110517

DTC definition: MAIN_5V voltage too high

DTC occurring condition: AVM controller detects that MAIN_5V supply voltage is higher than 5.5 V

Possible cause(s):

› Battery voltage too high.

› AVM controller trouble.

DTC removal condition: MAIN_5V supply voltage detected by AVM controller within the range of 4.5 V~5.5 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is higher than 16V	When normal battery power is restored, go to step 6	Go to step 4
4	Turn on PAS switch and check for AVM image output	Go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110516

DTC definition: MAIN_5V voltage too low

DTC occurring condition: AVM controller detects that MAIN_5V supply voltage is lower than 4.5 V

Possible cause(s):

› Battery voltage too low.

› AVM controller trouble.

DTC removal condition: MAIN_5V supply voltage detected by AVM controller within the range of 4.5 V~5.5 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery power is restored, go to step 6	Go to step 4
4	Turn on PAS switch and check for AVM image output	Go to step 6	Go to step 5

Step	Operation	Yes	No
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110617

DTC definition: MAIN_3V3 voltage too high

DTC occurring condition: AVM controller detects that MAIN_3V3 supply voltage is higher than 3.8 V

Possible cause(s):

- Battery voltage too high.
- AVM controller trouble.

DTC removal condition: MAIN_3V3 supply voltage detected by AVM controller within the range of 2.8 V~3.8 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is higher than 16V	When normal battery power is restored, go to step 6	Go to step 4
4	Turn on PAS switch and check for AVM image output	Go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110616

DTC definition: MAIN_3V3 voltage too low

DTC occurring condition: AVM controller detects that MAIN_3V3 supply voltage is lower than 2.8 V

Possible cause(s):

- Battery voltage too low.
- AVM controller trouble.

DTC removal condition: MAIN_3V3 supply voltage detected by AVM controller within the range of 2.8 V~3.8 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery power is restored, go to step 6	Go to step 4
4	Turn on PAS switch and check for AVM image output	Go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110717

DTC definition: VDDSHV_3V3 voltage too high

DTC occurring condition: AVM controller detects that VDDSHV_3V3 supply voltage is higher than 3.8 V

Possible cause(s):

- Battery voltage too high.
- AVM controller trouble.

DTC removal condition: VDDSHV_3V3 supply voltage detected by AVM controller within the range of 2.8 V~3.8 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery power is restored, go to step 6	Go to step 4
4	Turn on PAS switch and check for AVM image output	Go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B110716

DTC definition: VDDSHV_3V3 voltage too low

DTC occurring condition: AVM controller detects that VDDSHV_3V3 supply voltage is lower than 2.8

V

Possible cause(s):

› Battery voltage too low.

› AVM controller trouble.

DTC removal condition: VDDSHV_3V3 supply voltage detected by AVM controller within the range of 2.8 V~3.8 V for 500 ms at least

Troubleshooting:

Step	Operation	Yes	No
1	Vehicle IGN starts 1 min	Go to step 2	Wait 1 min for start
2	Check AVM controller for DTC with a scanner	Go to step 3	Check for other DTCs
3	Check if battery terminal voltage is lower than 9V	When normal battery power is restored, go to step 6	Go to step 4
4	Turn on PAS switch and check for AVM image output	Go to step 6	Go to step 5
5	Check for DTC when voltage is stable after replacing of AVM controller	Go to step 6	Replace AVM controller
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

B150151

DTC definition: surround-view image system is not calibrated

DTC occurring condition: surround view imaging system not calibrated

Possible cause(s):

› AVM host calibration failed.

› AVM controller trouble.

DTC removal condition: AVM is successfully calibrated

Troubleshooting:

Step	Operation	Yes	No
1	Check AVM controller for DTC with a scanner	Go to step 2	Check for other DTCs
2	Perform automatic calibration of AVM host with a prompt of successful calibration	Go to step 5	Go to step 3
3	Check for abnormal signals sent by AVM controller (ID: 0x199)	Replace AVM controller	Go to step 4
4	As stated in relevant calibration manual, check causes of calibration failure until calibration is successfully completed	After successful calibration, go to step 5	Go to step 4

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Troubleshoot other causes

Calibration

After-sales calibration

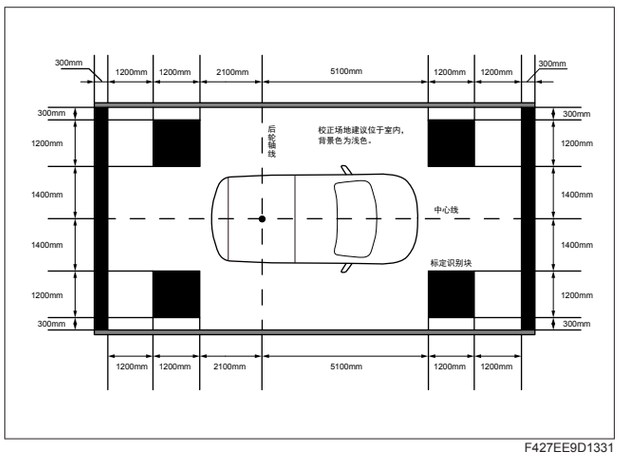
Notice

Condition for calibration:

- If replacement of controller or camera, or change of camera installation position occurs during use of vehicle, calibration of panoramic surround-view system needs to be performed again.
- As chassis modification has impact on vehicle body height, the panoramic surround-view imaging system is to be re-calibrated.
- Before calibration, check that the four camera lenses are clean, free from foreign matter, and not covered with protective film.

Notice

Layout of calibration site:



F427EE9D1331

- Size of the ground: no less than 6.5 m×13.4 m.
- Background color of site: solid white or whitish solid color, non-reflective, not black or dark gray.
- Flatness of site: the ground is flat. The air bubble is always in the center when measurement is performed at any position using a spirit level.
- Cleanliness of site: the site is kept clean and free of water stains, oil stains, tire marks, or debris, etc.
- Size of calibration recognition block: 1.2 m × 1.2 m square block (tolerance ± 5 mm).
- Color of calibration recognition block: black, non-reflective.
- Arrangement of calibration identification block: four square calibration blocks on the same horizontal plane.
- Calibration identification block is optional:
  1) Draw black blocks on flat ground.
  2) Use a black non-woven fabric with a thickness ≤ 10 mm, and affix it flat on the ground before calibration.
  3) Use a laminated board, etc. with the surface painted black or affixed with black non-woven fabric. Total thickness ≤ 10 mm.
- The 50 cm of area around the calibration identification block is the critical area for calibration, which shall meet the following requirements:
  - Keep the critical area clean and tidy, which shall be free from stains (tire marks, footprints, etc.) without light reflection.
  - The color of critical area is solid white or whitish solid color. If it is impossible to meet the requirements, lay a white paper around the calibration block (the paper is flat with no gap between each other) or instead stack black calibration blocks on a white cloth of 2.0 m x 2.2 m.
- Lighting of calibration site shall meet the following conditions:
  - Type of light source: white light, color temperature range 5000 K~ 6500 K.
  - Illuminance: complies with CNS national standard, measured value of ground illuminance is 200 Lux ~ 700 Lux (bright natural light or incandescent light is applicable).
  - The critical area for calibration is uniform in brightness with no obvious shadows.
  - The camera is not subject to direct light on site.

Notice

Precautions:

- During calibration, the vehicle drives straight

in from the rear of calibration site; after calibration, drives straight out from the front of calibration site. Do not turn at low speed on calibration site or identification blocks to avoid damage of calibration site.

› During calibration process, do not move the vehicle and make sure that no unrelated personnel enter calibration site and interfere with calibration.

› During automatic calibration, make sure that no external light sources interfere with calibration, such as direct light from other light sources, or non-uniform illumination in critical areas of calibration.

› To protect calibration station of panoramic surround-view system, it required to set up protective fences on both sides of calibration station and protective mopboards at corners.

1. Everything is ready before calibration
2. Power switched to IGN ON
3. Connect after-sales calibration device to OBD interface of vehicle and establish communication
4. Operate “Auto Calibration” button of after-sales calibration device to trigger automatic calibration
5. AVM host enters auto calibration mode with AVM prompt message as follows

Notice

› Do not move vehicle during auto calibration.

› Checking calibration results (if this screen stays more than 10 s, eliminate site interference and restart vehicle to calibrate again).

› Calibration failed.

› Saving calibration data. Do not shut down engine.

› Calibration successful.

6. Check calibration results after a successful calibration. If calibration results are not satisfactory, repeat calibration several times until satisfactory calibration results are obtained
7. If calibration fails, check the site, make sure that the vehicle meets the requirements, and then perform “Auto Calibration” again. If automatic calibration fails after repeating 3 times, try to perform “Manual Calibration”
8. Operate “Manual Calibration” button of after-sales calibration device to trigger manual calibration
9. Through functions of “View Selection”, “Corner Point Selection” and “Corner Point Move” of after-sales calibration device, make the corner points of four view screens (front, back, left, and right) coincide with the corner points of calibration blocks on calibration site

Notice

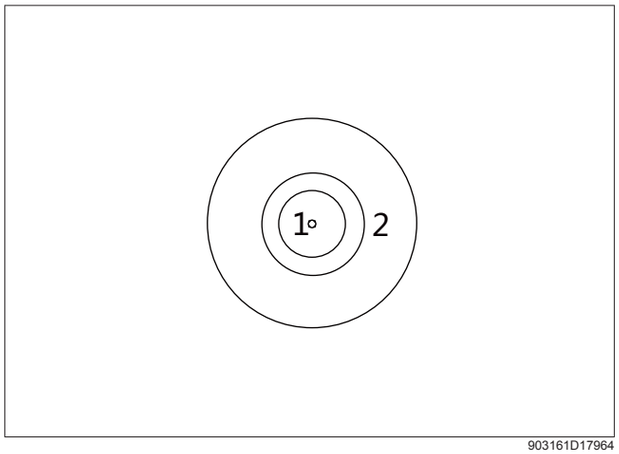
› Switch AVM screen to corresponding camera using “View Selection” function of after-sales calibration device.

› Select the point to be moved through “Corner Point Selection” function of after-sales calibration device. The selected mark is blue. The corner points selected through “corner point movement” function of after-sale calibration device are made to coincide with the corner points of the corresponding calibration block. Corner points can be moved in a manner of moving four points together or moving a single point.

10. Trigger the after-sales calibration device for calibration. If the stitching effect of surround views is not satisfactory after calibration is completed, calibration can be triggered again without re-selecting of corner points. In this case, AVM system performs auto calibration of point selection according to the area with points selected manually. If calibration is successful, the calibration results will be improved
11. If calibration results are still not satisfactory, perform “Manual Calibration” again until satisfactory calibration results are obtained

Front surround-view camera

Pin definition



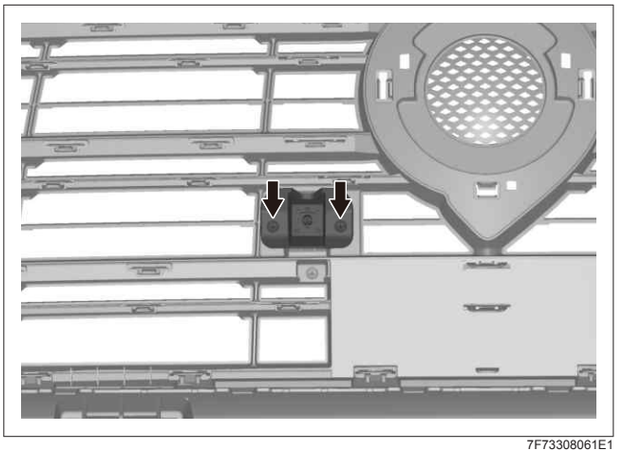
903161D17964

Pin No.	Function
1	Camera video output
2	GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the grille trim plate
3. Disconnect the harness connector
4. Remove 2 screws



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5. Remove the front surround-view camera

Installation

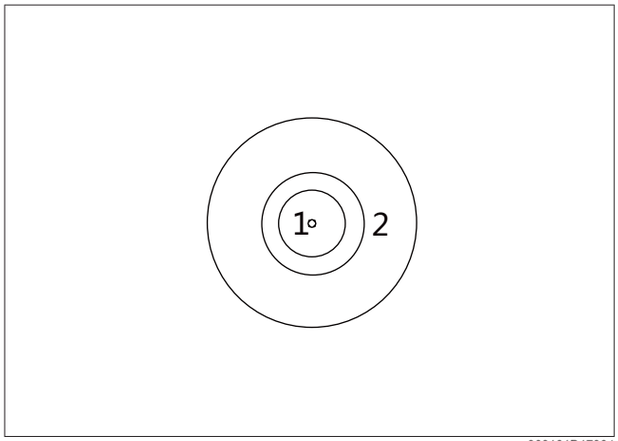
1. Perform installation work in reverse order of removal

Notice

› After removing and installing front surround-view camera, you need to re-calibrate the panoramic surround-view imaging system.

Left/right surround-view camera

Pin definition



903161D17964

Pin No.	Function
1	Camera video output
2	GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the outside rearview mirror assembly

Notice

› The left/right surround-view camera assembly is integrated with the outside rear view mirror assembly.

Installation

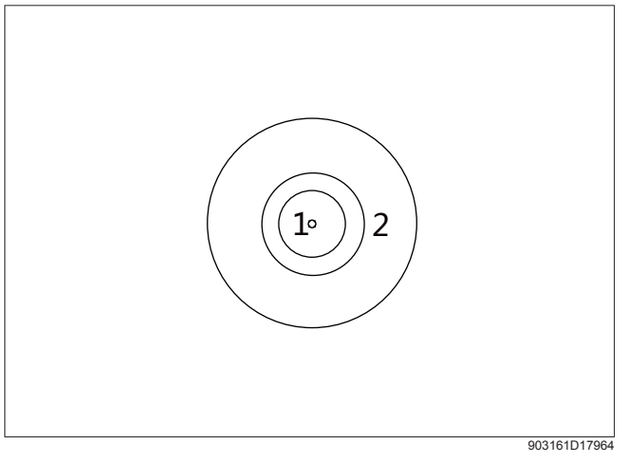
1. Perform installation work in reverse order of removal

Notice

› After removing and installing left/right outside rearview mirror assembly (integrated surround-view camera), you need to re-calibrate panoramic surround-view imaging system.

Rear surround-view camera

Pin definition



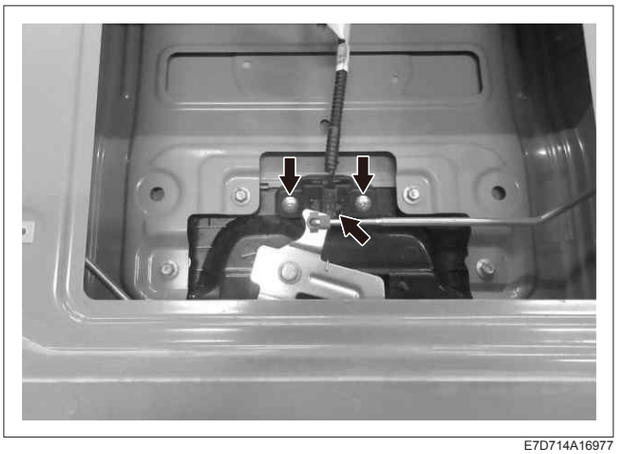
903161D17964

Pin No.	Function
1	Camera video output
2	GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove rear trunk plate cover
3. Disconnect harness connector and remove 2 screws



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4. Remove the rear surround-view camera

Installation

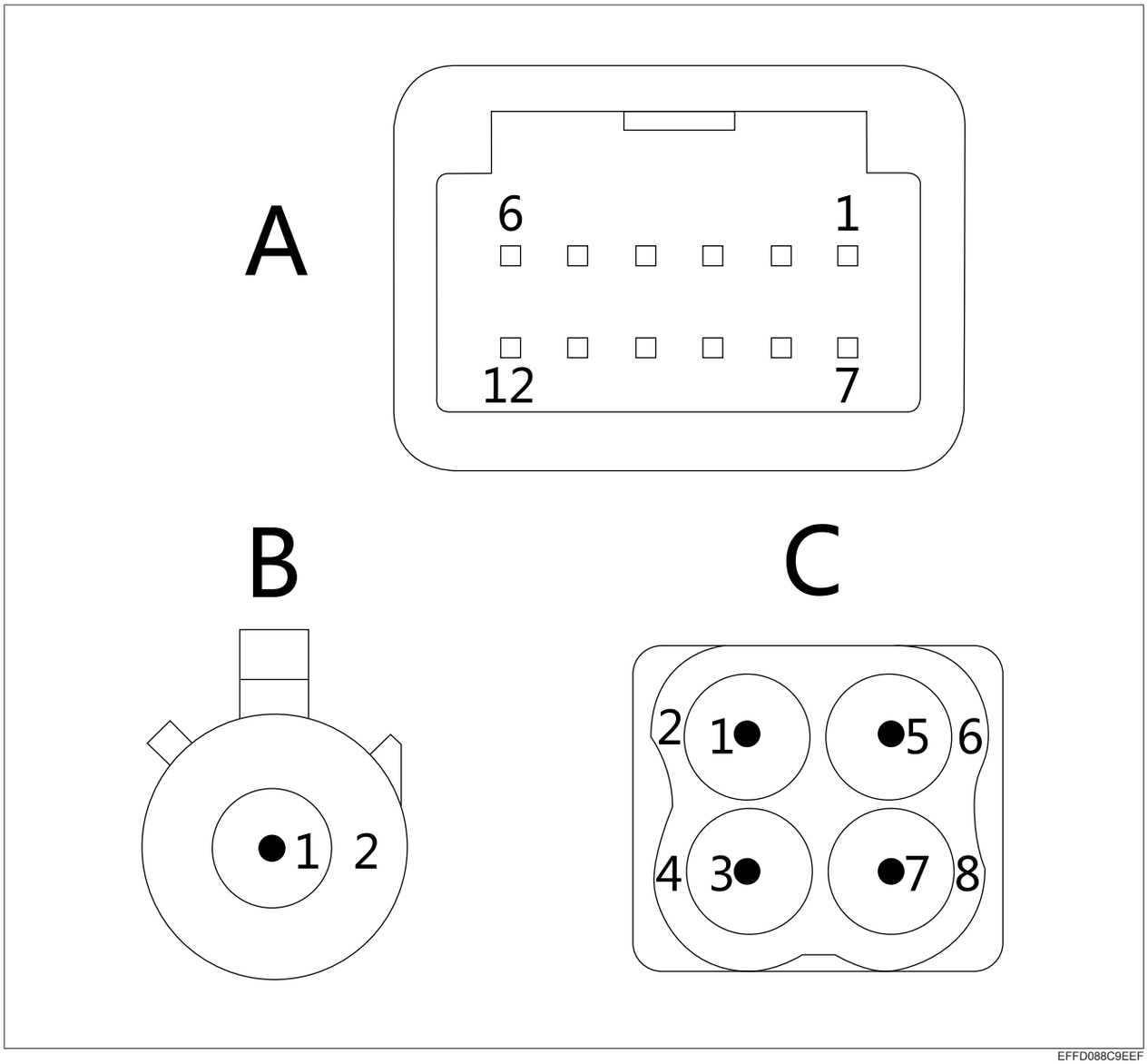
1. Perform installation work in reverse order of removal

Notice

- After removing and installing rear surround-view camera, you need to re-calibrate the panoramic surround-view imaging system.

Panoramic surround-view image controller

Pin definition



EFFD088C9EEF

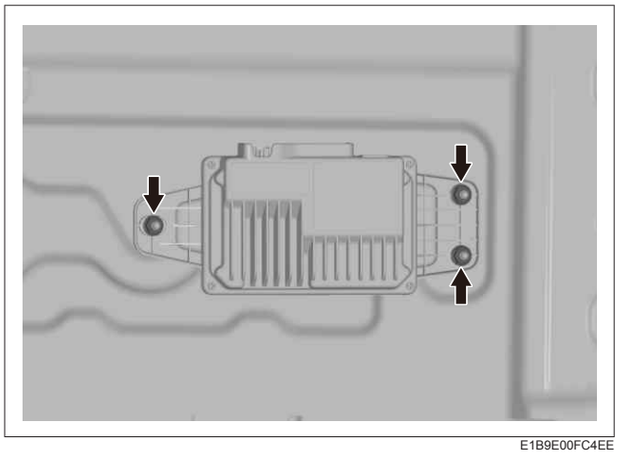
Pin No.	Function	Pin No.	Function
A1	Battery	A2	Panoramic local wake-up signal IGN
A3	—	A4	—
A5	CAN_L	A6	CAN_H
A7	GND	A8	—
A9	—	A10	—
A11	—	A12	—
B1	Outputs video	B2	Video shielded GND
C1	Right-view video	C2	Video shielded GND
C3	Left-view video	C4	Video shielded GND

Pin No.	Function	Pin No.	Function
C5	Front-view video	C6	Video shielded GND
C7	Rear-view video	C8	Video shielded GND

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove the front passenger seat
3. Open dot-cutting access opening of carpet
4. Disconnect harness connector
5. Remove 3 nuts and remove the panoramic surround-view image controller



E1B9E00FC4EE

Installation

1. Perform installation work in reverse order of removal

Notice

› After replacing the panoramic surround-view image controller, the panoramic surround-view imaging system is to be calibrated.

Panoramic surround-view image switch

Pin definition

Notice

› The panoramic surround-view image switch is integrated with the console panel switch.

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove console panel switch

Notice

› The panoramic surround-view image switch is integrated with the console panel switch.

Installation

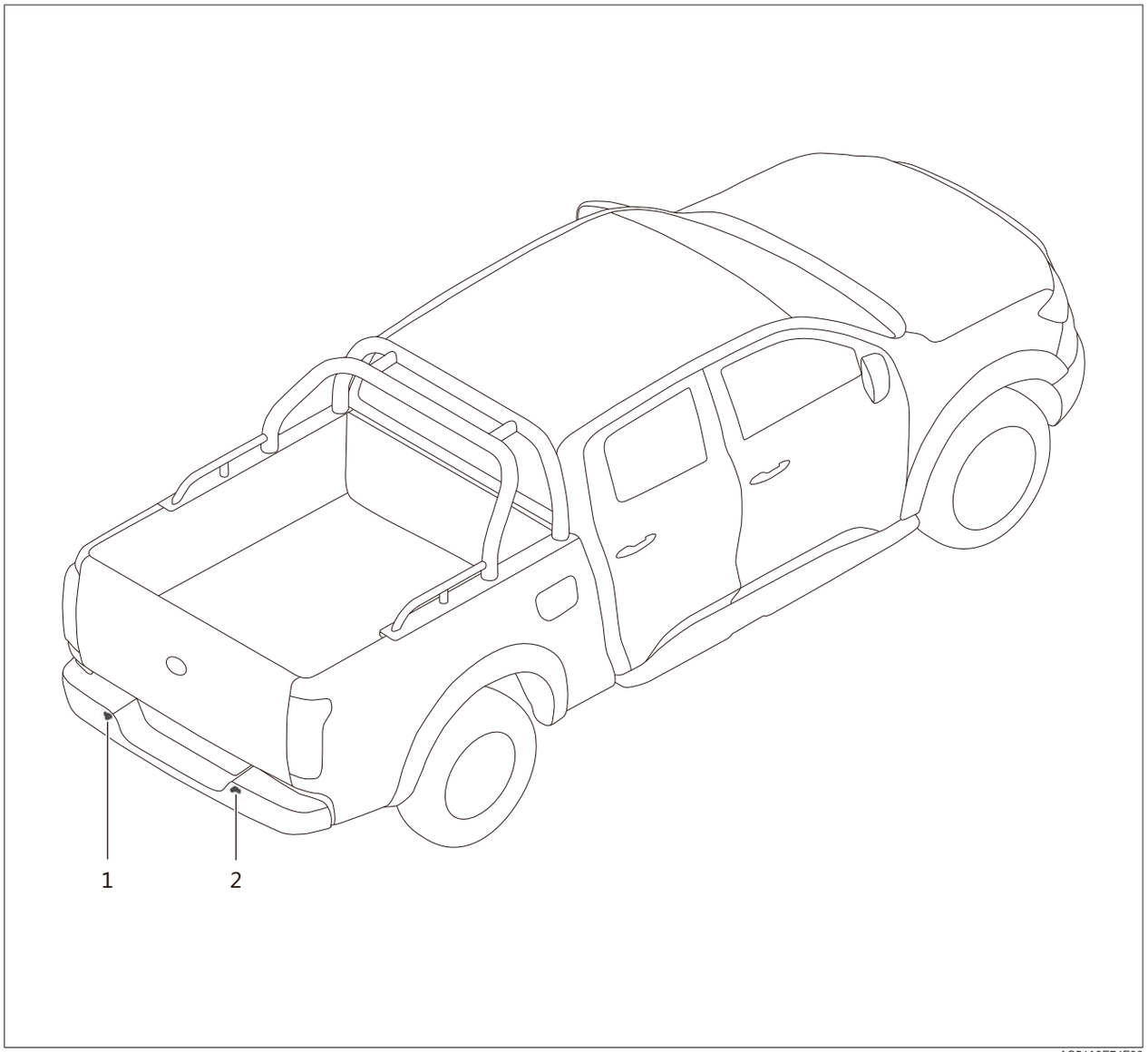
1. Perform installation work in reverse order of removal

Reverse radar system

System description

Reverse radar is a radar detection device. During reversing, it detects whether there are obstacles behind the vehicle and the distance between obstacles via the sensor, and uses voice prompts to assist the driver in safe and easy parking.

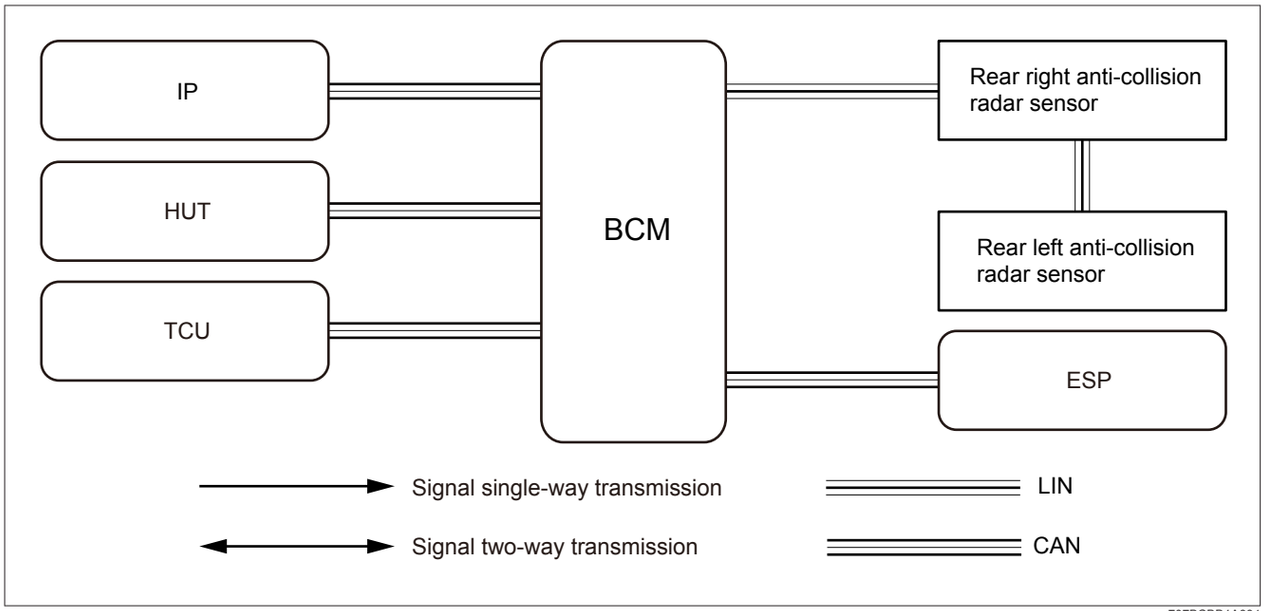
Location diagram



AC54A9E74E98

1. Rear left anti-collision radar sensor
2. Rear right anti-collision radar sensor

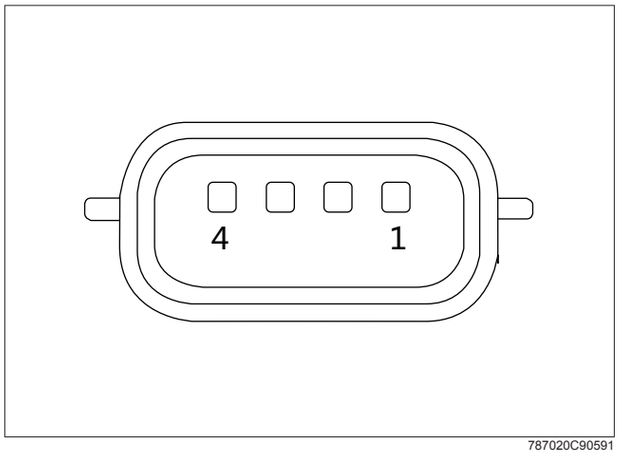
System diagram



707BCBB1A834

Anti-collision radar sensor

Pin definition



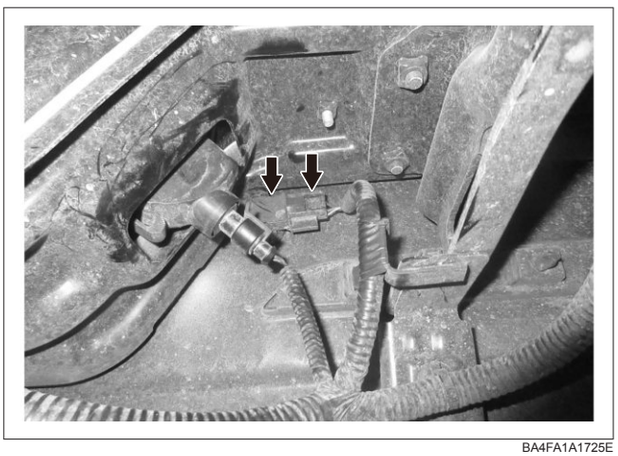
787020C90591

Pin No.	Function
1.	LIN1
2	Power
3	LIN2
4	Ground

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Lift the vehicle to a proper position
3. Disconnect harness connector, and remove anti-collision radar sensor



BA4FA1A1725E

⚠ Caution

› Do not press hard on the surface of the radar probe.

Installation

1. Perform installation work in reverse order of removal

Emergency call system

Emergency call system .....66－1
System description .....66－1
Location diagram .....66－2
System diagram .....66－3
Diagnostic .....66－4
Occasional fault repair .....66－5
List of DTC of .....66－6
DTC troubleshooting method of .....66－8
Emergency call controller .....66－21
Pin Definition of .....66－21
Removal/installation .....66－22
Emergency call switch .....66－23
Pin Definition of .....66－23
Removal/installation .....66－23

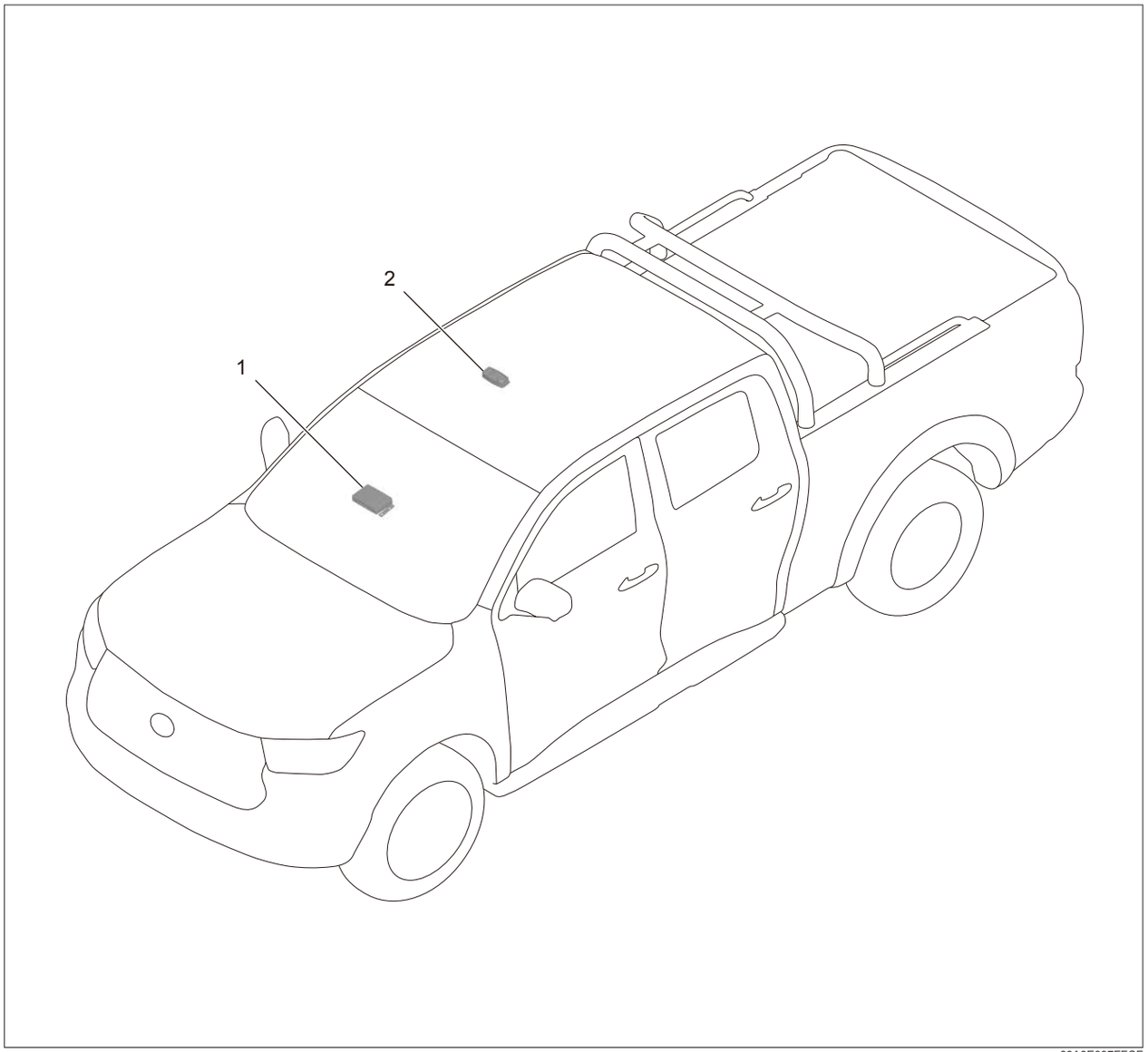
Emergency call system

System description

Emergency call system is the automatic help system used for manually pressing emergency call (SOS) switch for emergency calling and vehicle accident.

Emergency calling system is triggered and tried to communicate with PSAP (public service center) and output mute signal to prevent multimedia player output so as to avoid acoustic disturbance. After the communication is successfully established, emergency calling system will try to send MSD (minimum set of data) to inform the vehicle position, accident occurrence time, vehicle information and so on. After MSD is sent (whether successful or not), the system will establish the voice communication with PSAP. During the communication, PSAP can require to send MSD again. After the communication is finished, the system is in the wait mode to response the call back of PSAP. The wait time is 1h. After 1h, emergency call controller will be in the sleep state to reduce vehicle battery consumption.

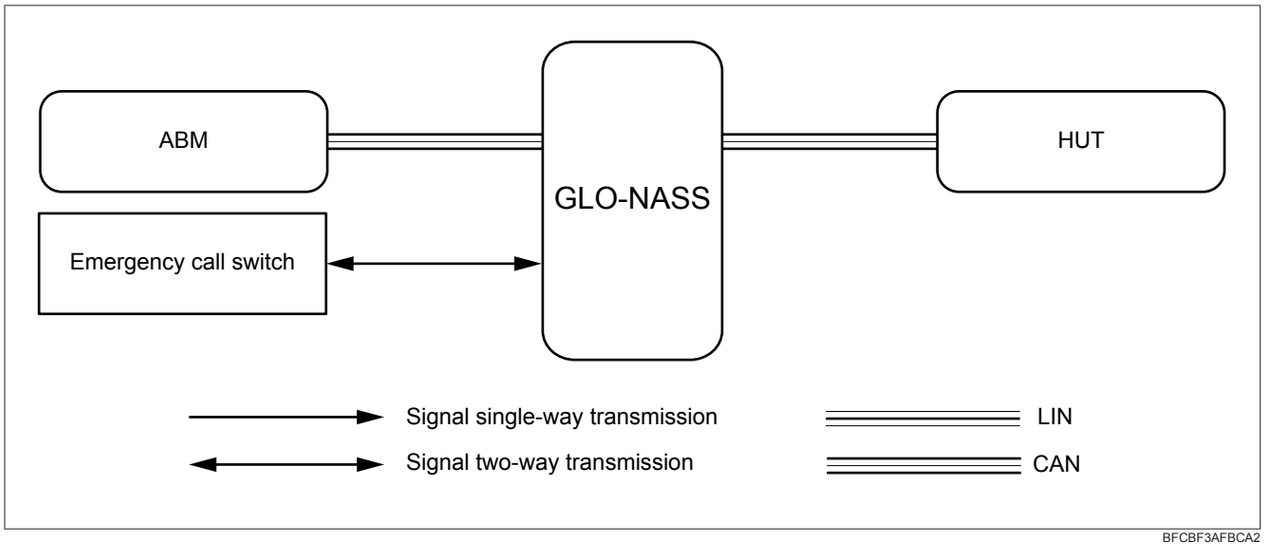
Location diagram



89A9E397FFCF

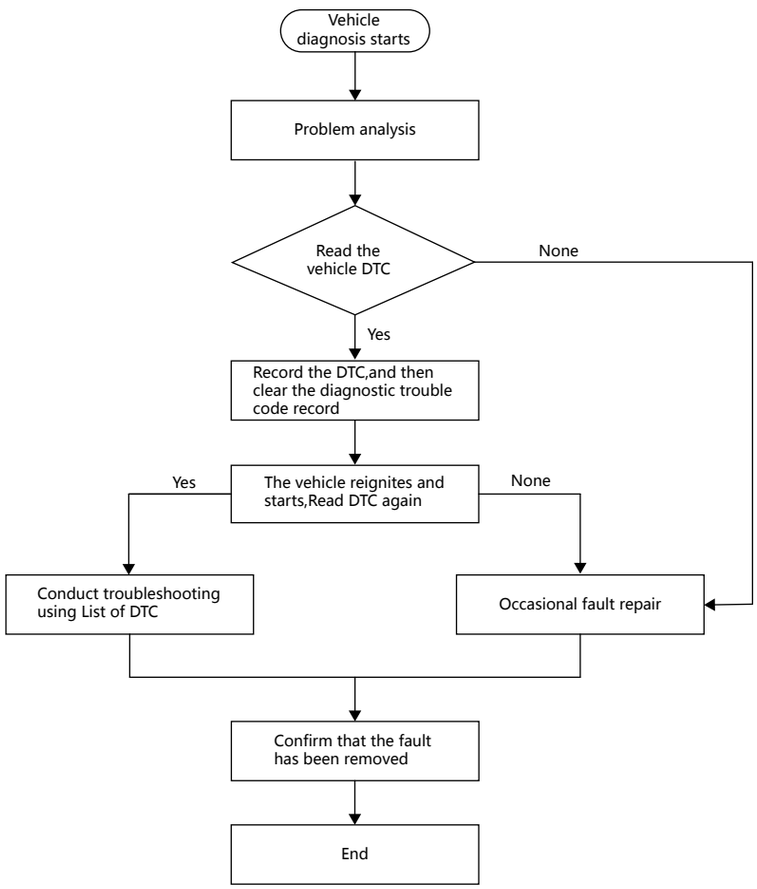
1. Emergency call controller
2. Emergency call switch

System diagram



BFCBF3AFBCA2

Diagnostic



1D94515C041E

Occasional fault repair

When emergency call system is operating in an environment other than that defined in standards, occasional fault may occur; and the fault is cleared automatically once it resumes normal operation or after re-ignition of vehicle. Possible occasional faults are given below:

- Mobile phone network signal is poor around: as part of regions in Russia (such as outskirt) may be out of coverage of network, network connection failure may occur. Drive the vehicle to place of good signal for a test.
- Vehicle positioning failure: emergency call controller receives GPS/GLONASS navigation signal at the same time, and positioning failure may occur in underground garage or buildings enclosed by metal. Drive the vehicle to open place for test (places where there no large-sized metal buildings and forests).

List of DTC of

S/N	DTC	DTC description
1	B101116	Battery error: The power voltage is less than the predefined threshold.
2	B101117	Battery error: The power voltage exceeds the preset threshold.
3	B101113	Battery error: open circuit
4	B102146	GSM/GPRS and UMTS module error: audio file error (missing or incorrect)
5	B102147	GSM/GPRS and UMTS module error: audio coder and decoder error
6	B102148	GSM/GPRS and UMTS module error: invalid GSM module software version
7	B102181	GSM/GPRS and UMTS module error: incorrect data received (incorrect data package or data format)
8	B102187	GSM/GPRS and UMTS module error: message loss (module has no signal)
9	B103181	GPS/GLONASS module error: incorrect data received (incorrect data package or data format)
10	B103187	GPS/GLONASS module error: message loss (module does not send signals)
11	B101291	Backup battery error: parameter (battery capacity is too low)
12	B101292	Backup battery error: performance or fault (battery is out of date)
13	B101297	Backup battery error: the component is locked or inaccessible (the battery cannot be charged)
14	B101298	Backup battery error: overheating (the temperature is too high, and the backup battery has exceeded the heating threshold of 85°C)
15	B101301	Power supply voltage error: electrical error (fault source)
16	U007308	CAN bus disabled: signal or bus error
17	B104109	Microphone error: component fault
18	B104113	Microphone error: open circuit
19	B104209	Speaker error: component cannot work properly
20	B104213	Speaker error: open circuit
21	B106202	VIN error: general error
22	B106304	EOL offline diagnosis error
23	B105113	SOS button error: open circuit (SOS button is not connected)
24	B105123	SOS button error: signal suspension (SOS button gets stuck)
25	B105223	(Service) button error: signal suspension (service button gets stuck)
26	B105302	Accelerometer error: module has no signal
27	B105309	Accelerometer error: initialization error

S/N	DTC	DTC description
28	B105315	Accelerometer error: calibration error
29	B10714A	SIM card error: the component is not installed correctly (does not respond)
30	B101601	Flash error: invalid CRC for saved application

DTC troubleshooting method of

B101116

DTC definition: battery error: power supply voltage is lower than the predetermined threshold.

DTC occurring condition: vehicle electrical system error (voltage is less than 10V)

Possible cause of faults:

› The power supply voltage of the system is too low, lower than 10V.

DTC removal condition: The power supply voltage is higher than 10V.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Clear the DTC and check whether it still exists.	Go to step 3	The fault is cleared, and the system is normal
3	Measure whether the voltage is lower than 10V with a special battery measuring device.	Go to step 4	Go to step 5
4	Charge the battery to its normal voltage, or replace it with a new one, and then check whether the DTC still exists.	Go to step 5	The fault is cleared, and the system is normal
5	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101117

DTC definition: battery error: power supply voltage is higher than the predetermined threshold.

DTC occurring condition: in-vehicle network error (the voltage exceeds 15V)

Possible cause of faults:

› The power supply voltage of the system is too high, higher than 15V.

DTC removal condition: The power supply voltage is lower than 15V.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Clear the DTC and check whether it still exists.	Go to step 3	The fault is cleared, and the system is normal
3	Measure whether the voltage is higher than 15V with a special battery measuring device.	Go to step 4	Go to step 5

Steps	Operation	Yes	No
4	Replace the battery with a new one, and then check whether the DTC still exists.	Go to step 5	The fault is cleared, and the system is normal
5	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101113

DTC definition: battery error: open circuit

DTC occurring condition: in-vehicle network error

Possible cause of faults:

› The device is disconnected or has no power supply.

DTC removal condition: check the equipment connection and power supply voltage.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check the unit connection.	Go to step 3	—
3	Check the voltage.	Go to step 4	—
4	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B102146

DTC definition: GSM/GPRS and UMTS module error: audio file error (missing or incorrect)

DTC occurring condition: audio file error

Possible cause of faults:

› The audio file is missing or incorrect.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B102147

DTC definition: GSM/GPRS and UMTS module error: audio coder and decoder error

DTC occurring condition: audio coder and decoder error

Possible cause of faults:

› Audio coder and decoder error

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B102148

DTC definition: GSM/GPRS and UMTS module error: invalid GSM module software version

DTC occurring condition: invalid GSM module software version

Possible cause of faults:

› Invalid GSM module software version

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B102181

DTC definition: GSM/GPRS and UMTS module error: incorrect data received (incorrect data package or data format)

DTC occurring condition: incorrect data received

Possible cause of faults:

› Incorrect data package or data format

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	It may be necessary to restart GSM/GPRS and UMTS modules, wait for at least 1min and turn on the ignition switch.	Go to step 3	The fault is cleared, and the system is normal

Steps	Operation	Yes	No
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B102187

DTC definition: GSM/GPRS and UMTS module error: message loss (module has no signal)

DTC occurring condition: loss of message

Possible cause of faults:

› Module has no signal.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	It may be necessary to restart GSM/GPRS and UMTS modules, wait for at least 1min and turn on the ignition switch.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B103181

DTC definition: GPS/GLONASS module error: incorrect data received (incorrect data package or data format)

DTC occurring condition: incorrect data received

Possible cause of faults:

› Incorrect data package or data format

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	It may be necessary to restart GSM/GPRS and UMTS modules, wait for at least 1min and turn on the ignition switch.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B103187

DTC definition: GSM/GPRS and UMTS module error: message loss (module has no signal)

DTC occurring condition: loss of message

Possible cause of faults:

› Module has no signal.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	It may be necessary to restart GSM/GPRS and UMTS modules, wait for at least 1min and turn on the ignition switch.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101291

DTC definition: backup battery error: parameter (battery capacity is too low)

DTC occurring condition: low battery capacity

Possible cause of faults:

› The equipment has no external power supply for a long time.

DTC removal condition: Charge the battery and keep the ignition state for at least 30 min.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Keep the ignition state for at least 30 min.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101292

DTC definition: backup battery error: performance or fault (battery is out of date)

DTC occurring conditions: performance or fault

Possible cause of faults:

› The battery is out of date.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101297

DTC definition: backup battery error: it is locked or unavailable.

DTC occurring condition: The component is locked or the battery is unavailable.

Possible cause of faults:

› The battery is unavailable.

DTC removal condition: Use ASKAN-10 tester to check the battery capacity. If the battery capacity increases to 4.1V in a short time (no more than 1h), it can be considered that the battery is fixed, and the error is to reset and restart command block. If necessary, replace the battery.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check the battery capacity with ASKAN-10 tester. If the battery capacity increases to 4.1V in a short time (no more than 1h), it can be considered that the battery is fixed, and the error is to reset and restart command block. If necessary, replace the battery.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101298

DTC definition: backup battery error: overheating (the temperature of the backup battery has exceeded the heating threshold of 85℃)

DTC occurring conditions: overheating

Possible cause of faults:

› The temperature of the backup battery has exceeded the heating threshold of 85°C.

DTC removal condition: cooling block ERA-GLONASS

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Cooling ERA-GLONASS module	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101301

DTC definition: power supply voltage error: electrical error (fault source)

DTC occurring condition: electrical error

Possible cause of faults:

› Electrical error (fault source)

DTC removal condition: Check the connection between ERA-GLONASS unit and in-vehicle network.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check the connection between ERA-GLONASS unit and in-vehicle network.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

U007308

DTC definition: CAN bus disabled: signal or bus error

DTC occurring condition: signal or bus error

Possible cause of faults:

› Data rate mismatch

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B104109

DTC definition: microphone error: it is damaged.

DTC occurring conditions: component error

Possible cause of faults:

› The self-diagnosis procedure may be incomplete.

DTC removal condition: Reset the DTC or run the self-diagnosis program, and operate following the help manual.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Clear the DTC or run the self-diagnosis program, and operate following the help manual.	Go to step 3	The fault is cleared, and the system is normal
3	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B104113

DTC definition: microphone error: open circuit

DTC occurring condition: wrong BIP connection

Possible cause of faults:

› The wire is broken or the connector is not connected.

DTC removal condition: Check the connection between BIP and harness.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check the connection between BIP and harness.	Go to step 3	The fault is cleared, and the system is normal
3	Replace BIP and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B104209

DTC definition: speaker error: it cannot work normally.

DTC occurring condition: it cannot work normally.

Possible cause of faults:

› The self-diagnosis procedure may be incomplete.

DTC removal condition: Reset the DTC or run the self-diagnosis program, and operate following the help manual.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Clear the DTC or run the self-diagnosis program, and operate following the help manual.	Go to step 3	The fault is cleared, and the system is normal
3	Replace the speaker and check whether the DTC still exists.	—	The fault is cleared, and the system is normal

B104213

DTC definition: speaker error: open circuit

Possible cause of faults:

› The wire may be disconnected and the connector is not connected.

DTC removal condition: Check the connection between the speaker and harness.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check the connection between the speaker and harness.	Go to step 3	The fault is cleared, and the system is normal
3	Replace the speaker and check whether the DTC still exists.	—	The fault is cleared, and the system is normal

B106202

DTC definition: VIN error: general error

DTC occurring conditions: lack of VIN

Possible cause of faults:

› VIN is not written in the module.

DTC removal condition: A diagnostic tester is required to initialize and activate the device.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.

Steps	Operation	Yes	No
2	A diagnostic tester is required to initialize and activate the device.	—	The fault is cleared, and the system is normal

B106304

DTC definition: EOL (offline diagnosis) error

DTC occurring condition: Invalid parameters are recorded.

Possible cause of faults:

› Invalid parameters are recorded.

DTC removal condition: A diagnostic tester is required to initialize and activate the device.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	A diagnostic tester is required to initialize and activate the device.	—	The fault is cleared, and the system is normal

B105113

DTC definition: SOS button error: open circuit

DTC occurring condition: SOS button is not connected.

Possible cause of faults:

› The wire is disconnected and the connector is not connected.

DTC removal condition: The wire is disconnected and the connector is not connected.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check the connection between BIP and harness.	Go to step 3	The fault is cleared, and the system is normal
3	Replace BIP and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B105123

DTC definition: SOS button error: signal hang (SOS button is stuck)

DTC occurring condition: signal hang

Possible cause of faults:

› SOS button is stuck.

DTC removal condition: Check whether the BIP button is stuck.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check whether the BIP button is stuck.	Go to step 3	The fault is cleared, and the system is normal
3	Replace BIP and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B105223

DTC definition: SERVICE button error: signal hang (SERVICE button is stuck)

DTC occurring condition: signal hang

Possible cause of faults:

› SERVICE button is stuck.

DTC removal condition: Check whether the BIP button is stuck.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Check whether the BIP button is stuck.	Go to step 3	The fault is cleared, and the system is normal
3	Replace BIP and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B105302

DTC definition: accelerometer error: module has no signal.

DTC occurring conditions: The module has no signal.

Possible cause of faults:

› There is no hanger on IIC bus, the accelerometer is not soldered, and other accelerometers with different addressing modes are used.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.

Steps	Operation	Yes	No
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B105309

DTC definition: accelerometer error: initialization error

DTC occurring condition: initialization error

Possible cause of faults:

› There is no hanger on IIC bus, the accelerometer is not soldered, and other accelerometers with different addressing modes are used.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B105315

DTC definition: accelerometer error: calibration error

DTC occurring condition: calibration error

Possible cause of faults:

› Calibration of the recorded accelerometer is incorrect.

DTC removal condition: A diagnostic tester is required to activate the device.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B10714A

DTC definition: SIM card error: it is not installed correctly (SIM card does not respond).

DTC occurring condition: SIM card does not respond.

Possible cause of faults:

› It is not installed correctly.

DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

B101601

DTC definition: flash error: invalid CRC of saved application

DTC occurring condition: invalid CRC of saved application

Possible cause of faults:

› Invalid CRC for saved application.

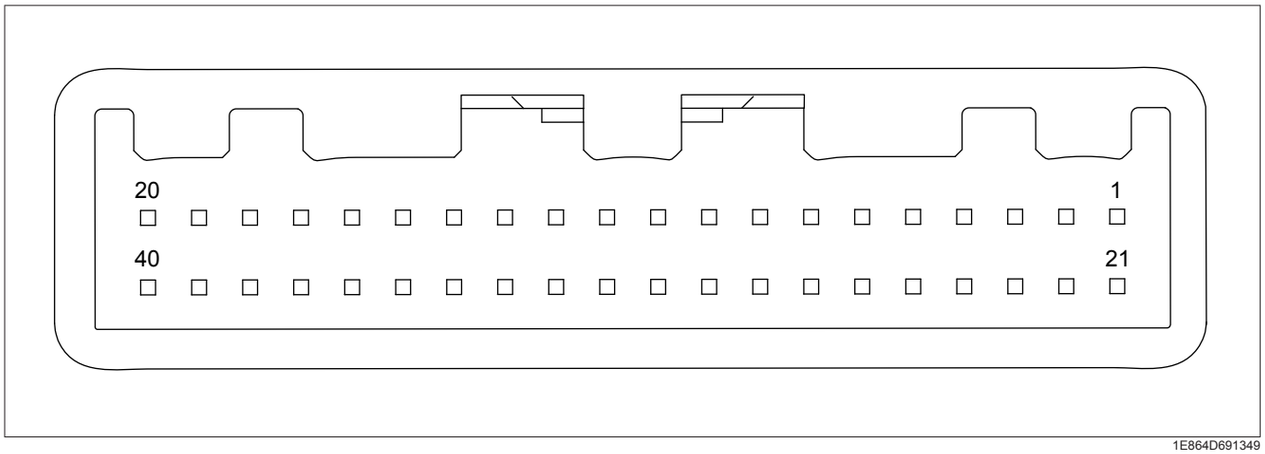
DTC removal condition: Contact the module supplier.

Troubleshooting method:

Steps	Operation	Yes	No
1	Check whether this DTC exists with a diagnostic instrument.	Go to step 2	Check whether other DTC exists with a diagnostic instrument.
2	Replace GLONASS and check whether the DTC exists.	—	The fault is cleared, and the system is normal

Emergency call controller

Pin Definition of



1E864D691349

Pin No.	Function	Pin No.	Function
1	Battery power supply	2	ACC ignition switch power
3	—	4	LED1 (red indicator)
5	LED2 (red indicator)	6	CAN high
7	CAN low	8	—
9	Digital GND	10	Ignition switch ON position - power supply
11	—	12	—
13	Digital GND	14	Speaker output+
15	Speaker output-	16	Microphone input-
17	Microphone input+	18	SOS switch power
19	Analogue GND	20	—
21	—	22	—
23	—	24	—
25	—	26	Button backlight
27	Output of SOS switch backlight	28	Power supply GND
29	Power supply GND	30	—
31	—	32	—
33	—	34	Service button input
35	—	36	Diagnostic line
37	SOS button input	38	—
39	—	40	—

Removal/installation

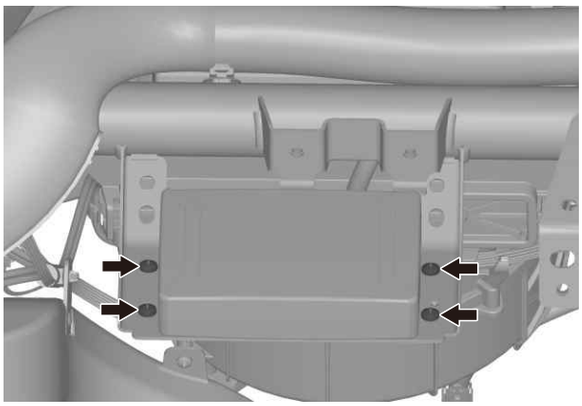
Removal

⚠ Caution

› The emergency call system components can only be removed and/or repaired by specialized personnel in special repair stations.

› Do not open the emergency call system components without authorization.

1. Disconnect the negative terminal of the battery.
2. Remove the auxiliary instrument panel
3. Remove main instrument panel
4. Disconnect the harness connector and remove 4 screws



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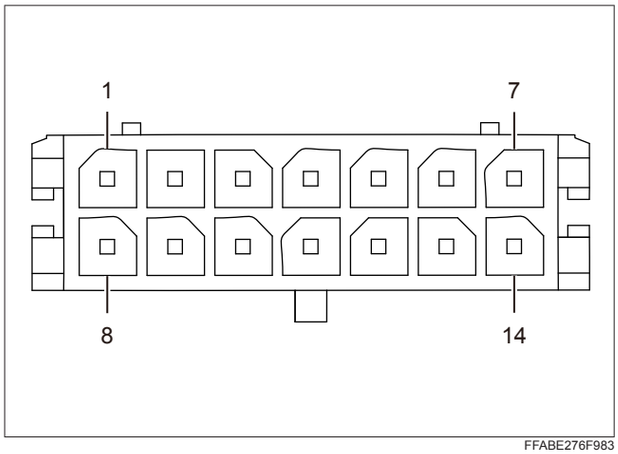
5. Remove emergency call controller

Installation

1. Perform installation work in reverse order of removal

Emergency call switch

Pin Definition of



FFABE276F983

Pin No.	Function
1	—
2	Power supply
3	Microphone output-
4	SOS button signal
5	Diagnostic line
6	LED1 red indicator
7	Microphone output+
8	Service button signal
9	Backlight button power input
10	—
11	GND
12	LED 2 red light
13	Speaker input-
14	Speaker input+

Removal/installation

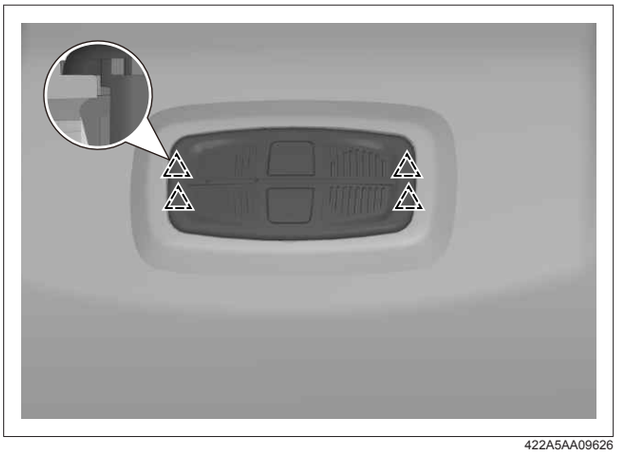
Removal

⚠ Caution

› The emergency call system components can only be removed and/or repaired by specialized personnel in special repair stations.

› Do not open the emergency call system components without authorization.

1. Disconnect the negative terminal of the battery.
2. Separate 4 clips



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ℹ Notice

› Properly take preventive measures to avoid scratching the peripheral parts.

3. Disconnect harness connector, and remove emergency call switch

Installation

1. Perform installation work in reverse order of removal

Vehicle body controller

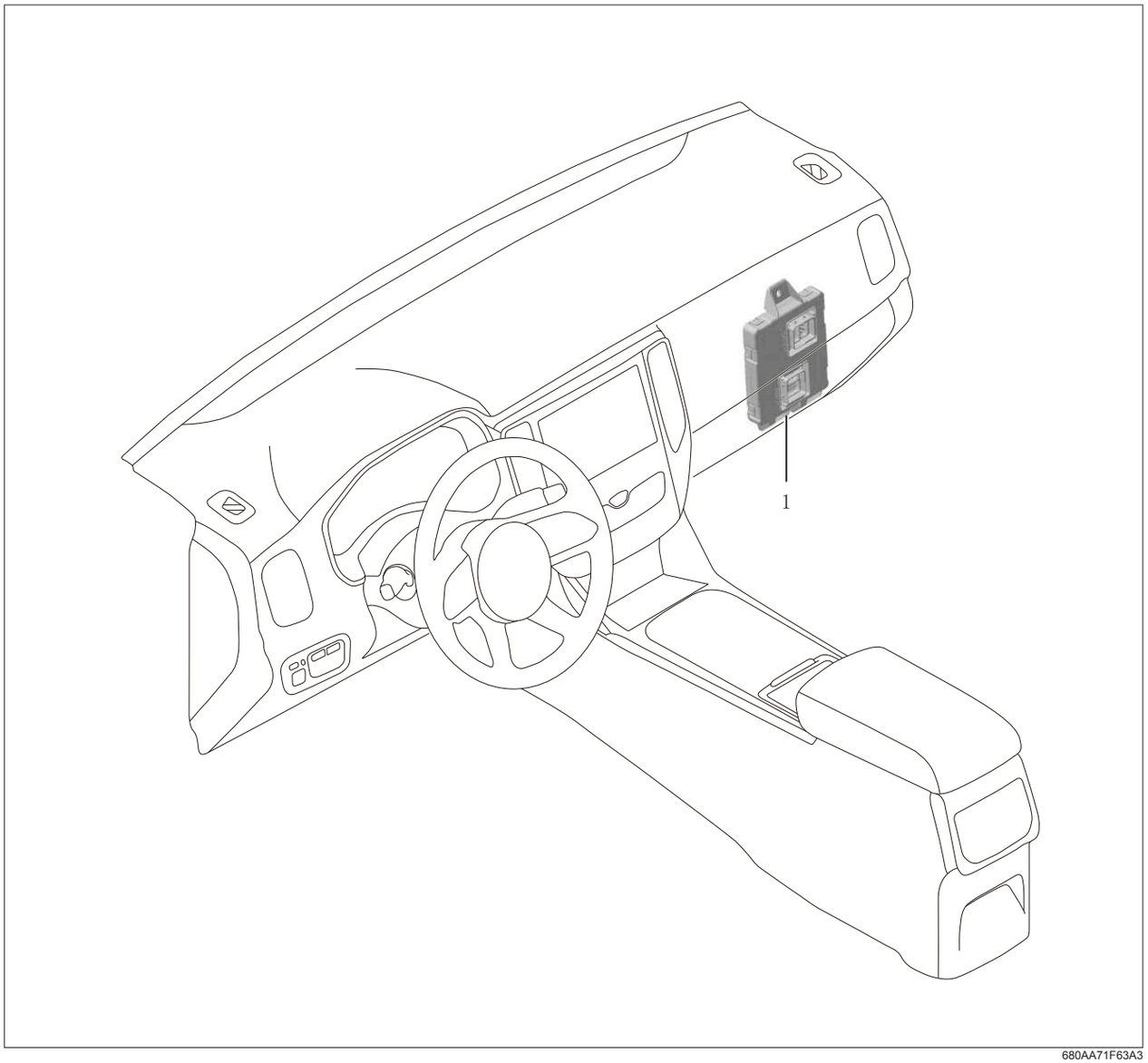
Vehicle body control system .....67－1
System description .....67－1
Location diagram .....67－2
System diagram .....67－3
List of DTC .....67－7
DTC troubleshooting method .....67－9
BCM .....67－40
Pin definition .....67－40
Removal/installation .....67－43

Vehicle body control system

System description

Vehicle body controller is installed at the rear of the glove box of instrument panel, mainly implementing the door lock system control functions, including opening and closing lock, search for vehicle, central control, remote control, anti-error lock, vehicle speed lock, auto arm, engine shutdown unlock, unlock upon collision, and door lock overheating protection; lighting system control functions, including power saving delay, turning on and off internal and external lamps, background lamp, turn signal lamp, lane change lamp, emergency brake lamp, daytime running lamp, etc.; wiper washing functions, including enabling wiper, washing; vehicle body anti-theft control function; and forwarding LIN network signals, network communication and diagnosis. Work voltage is 9 V-16 V.

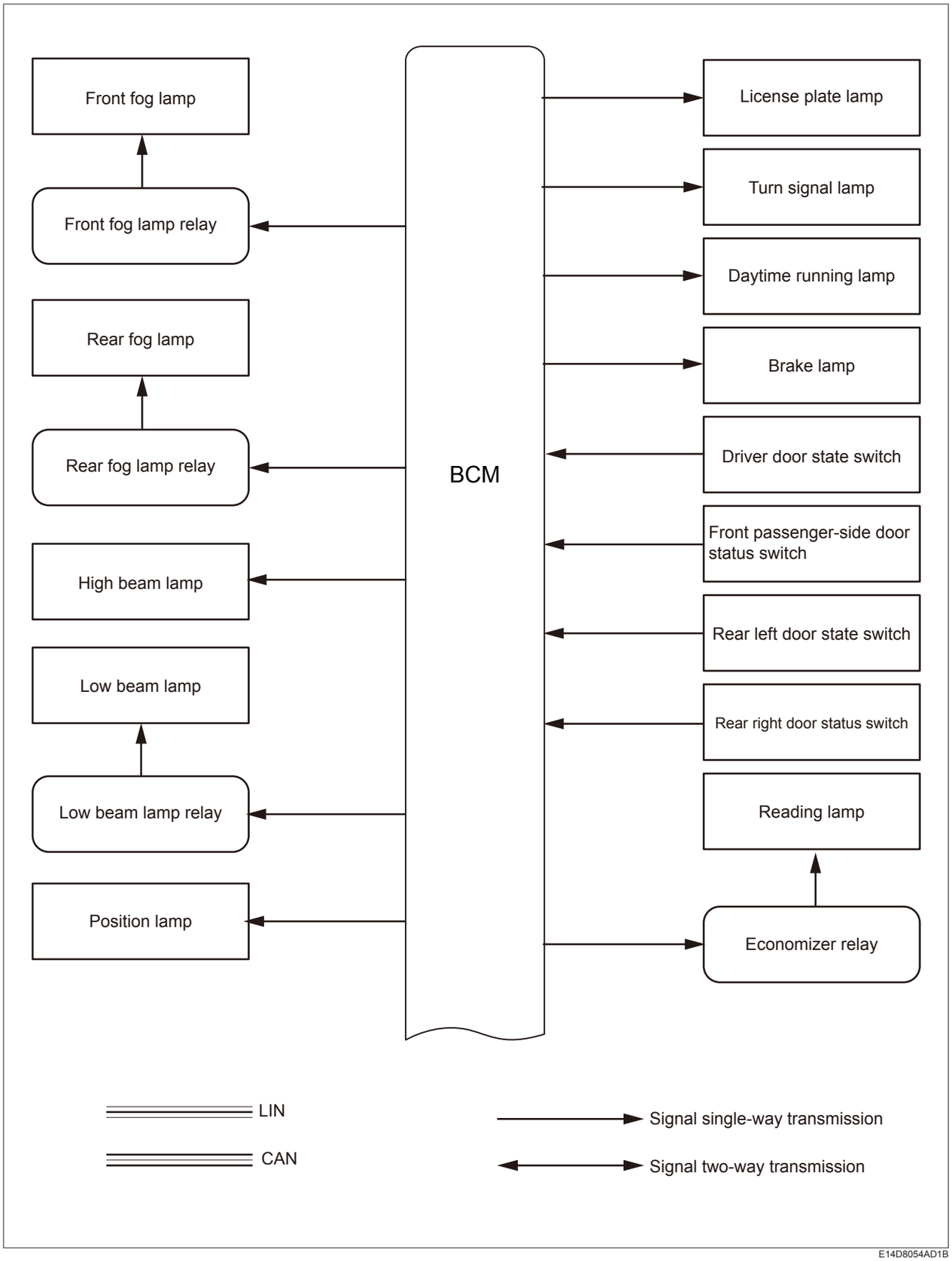
Location diagram

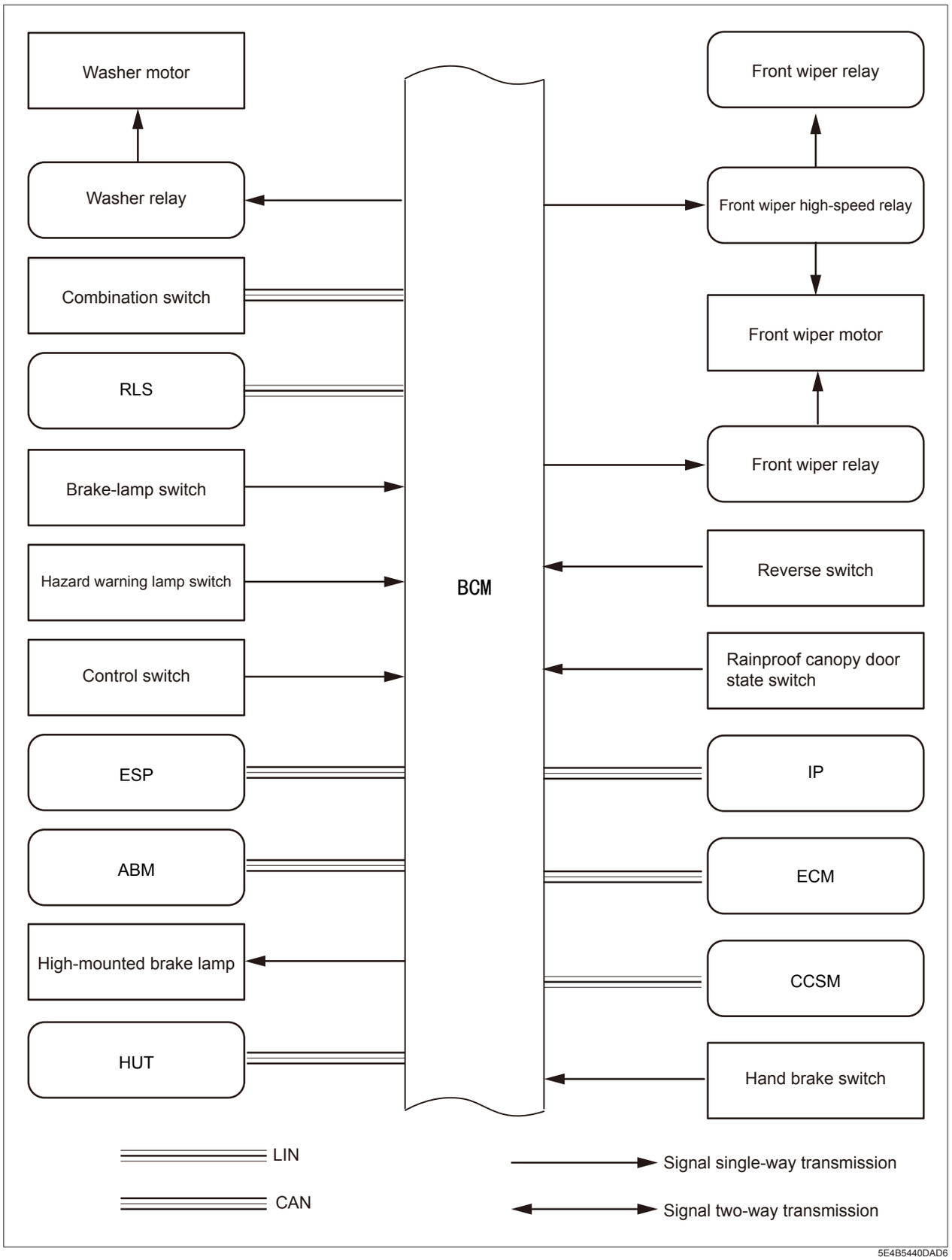


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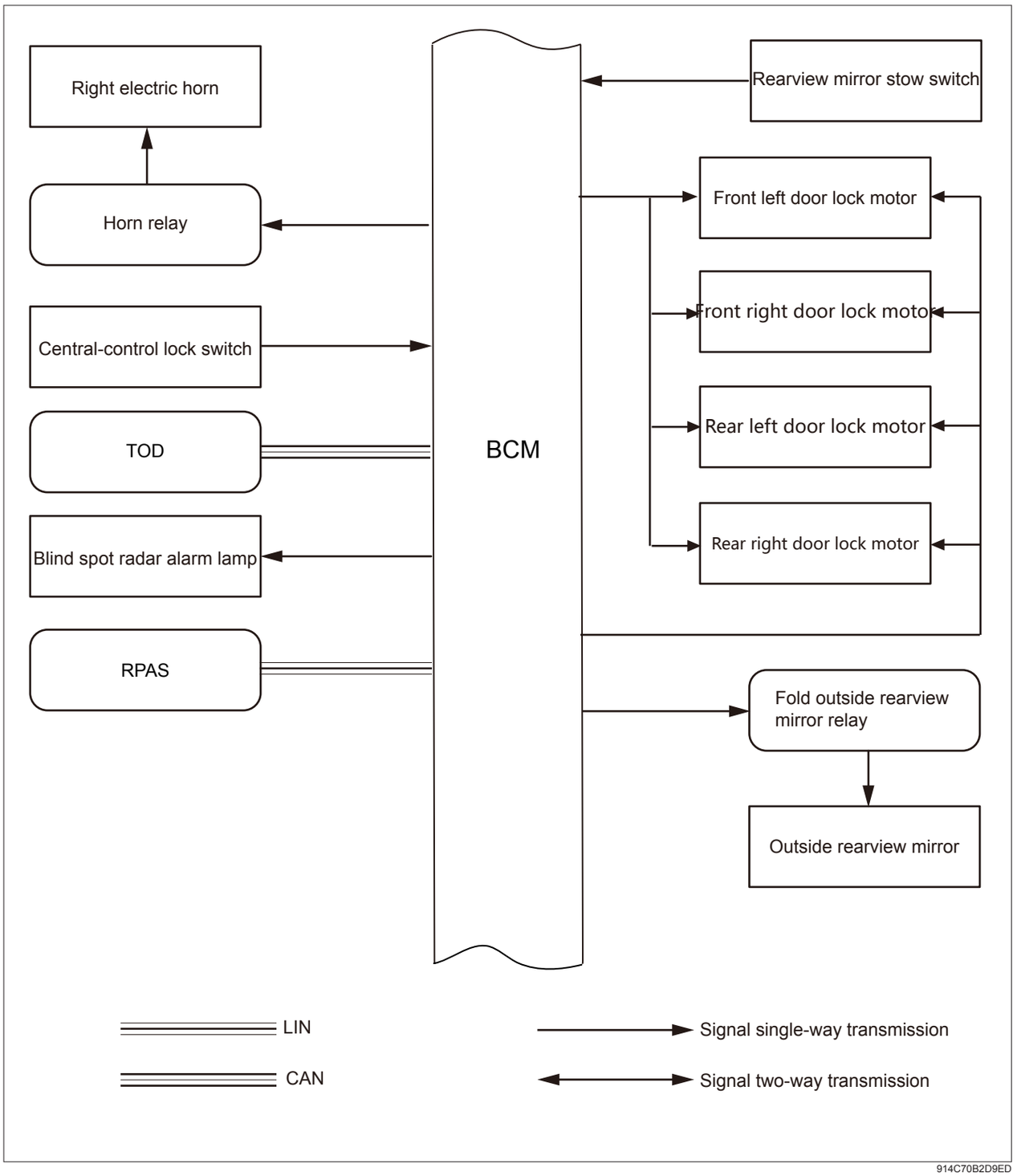
1. Vehicle body controller

System diagram

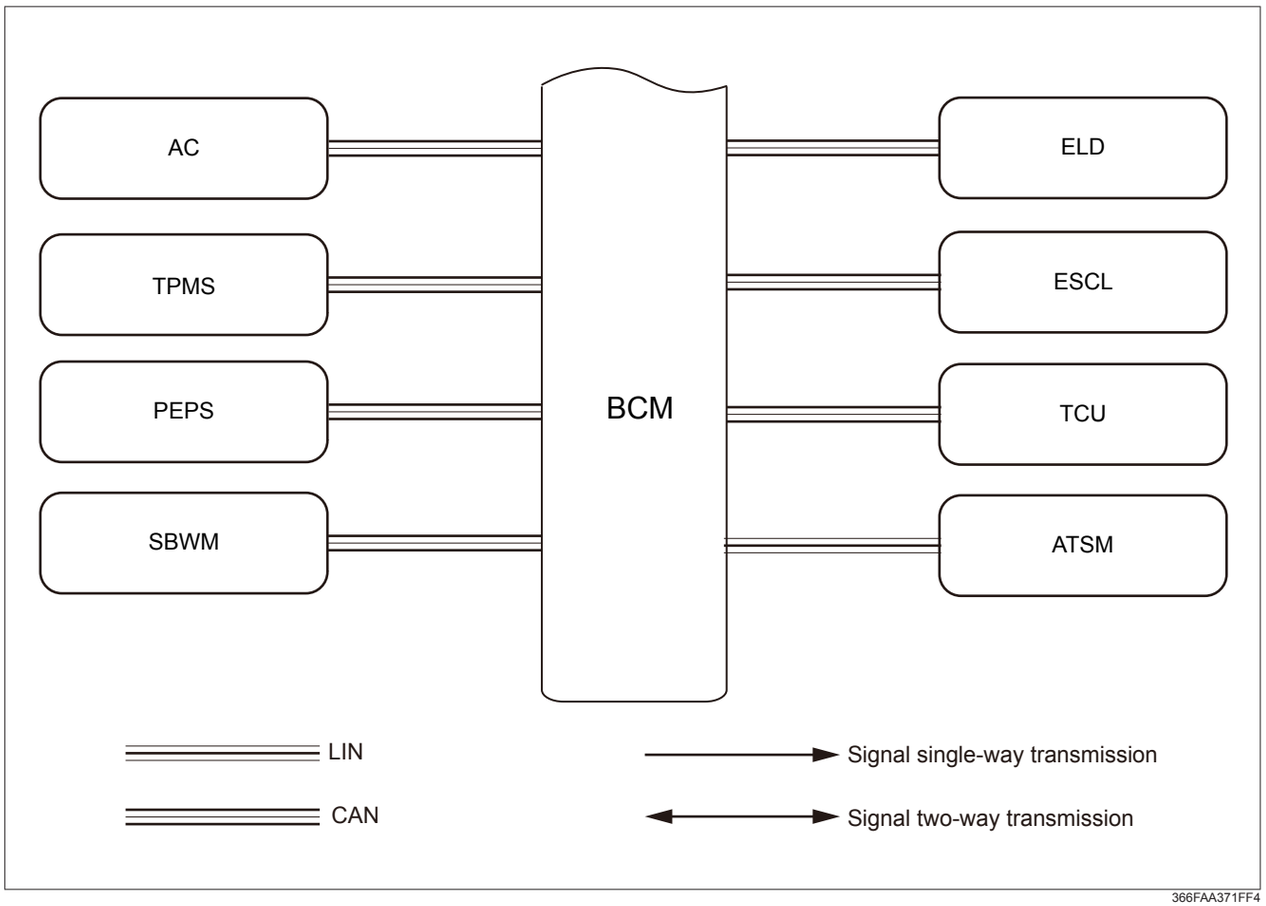




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List of DTC

No.	DTC	DTC description
1	D10017	Power supply voltage is higher than diagnostics required voltage 16 V
2	908117	External lamp power source voltage is higher than required voltage 17 V
3	D10116	Power supply voltage is lower than diagnostics request voltage 9 V
4	908116	Exterior lamp power source voltage is lower than required voltage 9 V
5	D00011	LIN1 short-circuited to ground
6	D00111	LIN2 short-circuited to ground
7	C03788	BD-CAN bus OFF
8	C16487	Communication with AC lost
9	C23587	Communication with ACC lost
10	C14587	Communication with CSA lost
11	D00287	Communication with PEPS lost
12	D00087	Communication with ABM lost
13	C12287	Communication with ESP (ABS) lost
14	C24387	Communication with PAS (APA) is lost
15	C10187	Communication with TCU (DCT) lost
16	D00882	ABM network message counter signal has failed
17	D00983	ABM network message verification and signaling have failed
18	C10087	Communication with ECM lost
19	D50987	Communication with RLS lost
20	D52187	Communication with CCSM lost
21	C10687	Communication with ATSM lost
22	D51587	Communication with RPAS lost
23	D51687	Communication with FPAS lost
24	900511	Background lamp is short-circuited to ground
25	900611	Front position lamp and license-plate lamp are short-circuited to ground
26	900711	Rear position lamp/license plate lamp is overloaded or short-circuited to ground
27	900812	High beam relay output shorted to battery
28	900912	Front left fog lamp relay output shorted to battery
29	908312	Front right fog lamp relay output shorted to battery
30	901012	Front washer relay output shorted to battery

No.	DTC	DTC description
31	901112	Horn relay output shorted to battery
32	901212	Low beam lamp relay output shorted to battery
33	901512	Front wiper speed relay is short-circuited to power
34	901812	Economizer relay output shorted to battery
35	901912	Front wiper low-speed relay shorted to battery
36	902011	The left brake lamp is shorted to ground
37	902013	Left brake lamp is open-circuited (for bulb configuration)
38	902111	The right brake lamp is shorted to ground
39	902113	Right brake lamp is open-circuited (for bulb configuration)
40	902211	Daytime lamp short-circuited to ground
41	902213	Daytime lamp is open-circuited
42	902312	Rear fog lamp relay is short-circuited to power
43	902411	Right turn signal lamp short-circuited to ground
44	902413	Right turn signal lamp open circuit
45	902511	Left turn signal lamp short-circuited to ground
46	902513	Left turn signal lamp open circuit
47	900011	Reverse lamp relay is shorted-circuited to power
48	902611	High-mounted brake lamp is shorted to ground
49	902812	Rearview mirror fold relay is short-circuited to power
50	902912	Rearview mirror unfold relay is short-circuited to power
51	903486	Rainfall and light sensor response error
52	903586	Rainfall and light sensor temperature abnormal
53	903686	Rainfall and light sensor voltage abnormal
54	903786	CCO switch failure
55	903886	TAB switch failure
56	903012	Left blind spot radar alarm lamp is short-circuited to power
57	903112	Right blind spot radar alarm lamp is short-circuited to power

DTC troubleshooting method

D10017

DTC definition: power voltage is higher than diagnostic voltage of 16 V

DTC occurring condition: KL30_ interior lamp power source voltage is higher than 16V

Possible causes:

- Interior lamp voltage of BCM terminal is unstable.
- The vehicle voltage is unstable.

DTC removal condition: the interior lamp voltage of BCM input is in normal range: 9V ~ 16V

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether the interior lamp voltage of BCM is higher than 16V	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check whether the battery voltage of the vehicle is higher than 16 V	Replace the battery, and go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

908117

DTC definition: external lamp voltage high

DTC occurring condition: KL30_ external lamp power source voltage is higher than 17 V

Possible causes:

- Exterior lamp voltage of BCM terminal is unstable.
- The vehicle voltage is unstable.

DTC removal condition: the external lamp voltage of BCM input is in normal range: 9V ~ 17V

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether the external lamp voltage of BCM is higher than 17V	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check whether the battery voltage of the vehicle is higher than 17V	Replace the battery, and go to step 5	Go to step 5

Step	Operation	Yes	No
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

D10116

DTC definition: power voltage is lower than diagnostic voltage of 9 V

DTC occurring condition: KL30_ interior lamp power source voltage is lower than 9V

Possible causes:

- Interior lamp voltage of BCM terminal is unstable.
- The vehicle voltage is unstable.

DTC removal condition: the interior lamp voltage of BCM input is in normal range: 9V ~ 16V

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether the interior lamp voltage of BCM is lower than 9V	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check whether the battery voltage of the vehicle is lower than 9V	Replace the battery, and go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

908116

DTC definition: external lamp voltage low

DTC occurring condition: KL30_ external lamp power source voltage is lower than 9V

Possible causes:

- Exterior lamp voltage of BCM terminal is unstable.
- The vehicle voltage is unstable.

DTC removal condition: the external lamp voltage of BCM input is in normal range: 9V ~ 17V

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check whether the external lamp voltage of BCM is lower than 9V	Check the harness and install it properly. Go to step 5	Go to step 4

Step	Operation	Yes	No
4	Check whether the battery voltage of the vehicle is lower than 9V	Replace the battery, and go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

D00011

DTC definition: LIN1 short-circuited to ground

DTC occurring condition: LIN1 harness short-circuited to ground

Possible causes:

- LIN1 harness failure.
- Ground wire failure.

DTC removal condition: LIN1 circuit harness is normal

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the LIN1 circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the ground wire near LIN1	Check the harness and install it properly. Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

D00111

DTC definition: LIN2 short-circuited to ground

DTC occurring condition: LIN2 harness short-circuited to ground

Possible causes:

- LIN2 harness failure.
- Ground wire failure.

DTC removal condition: LIN2 circuit harness is normal

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs

Step	Operation	Yes	No
3	Check the LIN2 circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the ground wire near LIN2	Check the harness and install it properly. Go to step 5	Go to step 5
5	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

C03788

DTC definition: BD high speed bus failure

DTC occurring condition: CAN_H short-circuited to ground, CAN_L short-circuited to power, CAN_H/CAN_L short-circuited

Possible causes:

- CAN_L/CAN_H harness fault.
- Power or ground wire failure.

DTC removal condition: CAN_H/CAN_L harness is normal

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the power supply and the ground wire near CAN_H or CAN_L	Check the harness and install it properly. Go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

D00287

DTC definition: communication with PEPS lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of PEPS

Possible causes:

- PEPS CAN_H or CAN_L failure.
- PEPS fault.

DTC removal condition: BCM has received the message signal of the corresponding application layer of PEPS

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check PEPS CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of PEPS	Operate according to the corresponding content of PEPS DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

C12287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer ESP (ABS)

Possible causes:

- ESP (ABS) CAN_H or CAN_L failure.
- ESP(ABS) failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer ESP(ABS)

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check ESP(ABS) CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of ESP(ABS)	Operate according to the corresponding content of ESP(ABS), and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1, or replace vehicle body controller

C10087

DTC definition: communication with ECM lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of ECM

Possible causes:

› ECM CAN_H or CAN_L failure.

› ECM failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer of ECM

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the ECM CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of ECM	Operate according to the corresponding content of the ECM DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

C16487

DTC definition: communication with AC lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of AC

Possible causes:

› AC CAN_H or CAN_L failure.

› AC failure.

DTC removal condition: AC has received the message signal of the corresponding application layer of ECM

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check AC CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4

Step	Operation	Yes	No
4	Check the corresponding DTC of AC	Operate according to the corresponding content of AC DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

C23587

DTC definition: communication with ACC lost

DTC occurring condition: ACC fails to receive the message signal of the corresponding application layer of ECM

Possible causes:

- ACC CAN_H or CAN_L failure.
- ACC failure.

DTC removal condition: ACC has received the message signal of the corresponding application layer of ECM

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check ACC CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of ACC	Operate according to the corresponding content of ACC DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

C14587

DTC definition: communication with CSA is lost

DTC occurring condition: CSA fails to receive the message signal of the corresponding application layer of ECM

Possible causes:

- CSA CAN_H or CAN_L failure.
- CSA failure.

DTC removal condition: CSA has received the message signal of the corresponding application layer of ECM

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check CSA CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of CSA	Operate according to the corresponding content of CSA DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

D00087

DTC definition: communication with ABM lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of ABM

Possible causes:

› ABM CAN_H or CAN_L failure.

› ABM failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer of ABM

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the ABM CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of ABM	Operate according to the corresponding content of the ABM DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

C24387

DTC definition: communication with PAS (APA) lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer PAS (APA)

Possible causes:

› PAS(APA) CAN_H or CAN_L failure.

› PAS(APA) failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer PAS(APA)

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check PAS(APA) CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of PAS(APA)	Operate according to the corresponding content of PAS(APA), and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

C10187

DTC definition: communication with TCU (DCT) lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer TCU (DCT)

Possible causes:

› TCU(DCT) CAN_H or CAN_L failure.

› TCU(DCT) failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer TCU(DCT)

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check TCU(DCT) CAN_H or CAN_L circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4

Step	Operation	Yes	No
4	Check the corresponding DTC of TCU(DCT)	Operate according to the corresponding content of TCU(DCT), and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

D00882

DTC definition： ABM network message counter signal has failed

DTC occurring condition: Rolling Counter check error count amounts to 128

Possible causes:

- ABM failure.
- Abnormal communication.

DTC removal condition: Rolling Counter check error count reduces to 0

Troubleshooting:

Step	Operation	Yes	No
1	Let vehicle stand for 10 min	Go to step 2	Let vehicle stand for 10 min
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open or short circuit	Replace the harness	Go to step 4
4	Check if ABM is abnormal	Replace ABM, and go to step 5	Go to step 5
3	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ABM

D00983

DTC definition： ABM network message check and signal has failed

DTC occurring condition: Checksum check error count amounts to 128

Possible causes:

- ABM failure.
- Abnormal communication.

DTC removal condition: Checksum check error count reduces to 0

Troubleshooting:

Step	Operation	Yes	No
1	Let vehicle stand for 10 min	Go to step 2	Let vehicle stand for 10 min

Step	Operation	Yes	No
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the harness for open or short circuit	Replace the harness	Go to step 4
4	Check if ABM is abnormal	Replace ABM, and go to step 5	Go to step 5
3	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ABM

D50987

DTC definition: communication with RLS is lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of RLS

Possible causes:

› RLS LIN2 failure.

› RLS failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer of RLS

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check BCM LIN2 circuit harness	Check the harness and install it properly. Go to step 4	Go to step 4
4	Check the corresponding DTC of RLS	Operate according to the corresponding content of RLS DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

C106887

DTC definition: communication with ATSM is lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of ATSM

Possible causes:

› ATSM LIN failure.

› ATSM failure.

DTC removal condition: ATSM has received the message signal of the corresponding application layer of RLS

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check BCM LIN circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of ATSM	Operate according to the corresponding content of ATSM DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

D52187

DTC definition: communication with CCSM is lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of CCSM

Possible causes:

- CCSM LIN failure.
- CCSM failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer of CCSM

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check BCM LIN circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of CCSM	Operate according to the corresponding content of CCSM DTC, and go to step 5	Go to step 5

Step	Operation	Yes	No
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

900511

DTC definition: background lamp is short-circuited to ground

DTC occurring condition: BCM detects the background lamp load short-circuited to ground or load overcurrent

Possible causes:

- Background lamp load harness is short-circuited to ground.
- Background lamp load overcurrent.

DTC removal condition: the background lamp load is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the backlight load harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the backlight load	Replace the backlight and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

900611

DTC definition: position lamp and license plate lamp are short-circuited to ground

DTC occurring condition: BCM detects the loads of the position lamp and the license plate lamp are short-circuited to ground or load overcurrent

Possible causes:

- The load harnesses of the position lamp and the license plate lamp are short-circuited to ground.
- Load overcurrent of the position lamp and the license plate lamp.

DTC removal condition: the loads of the position lamp and the license plate lamp are normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs

Step	Operation	Yes	No
3	Check the circuit harnesses of the load harness of the position lamp and the license plate lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the position lamp and the license plate lamp	Replace the position lamp and the license plate lamp, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

900812

DTC definition: the high beam lamp relay is short-circuited to power

DTC occurring condition: BCM detects the load of the high beam lamp relay short-circuited to power

Possible causes:

- The load harness of the high beam lamp relay is short-circuited to power.
- The overcurrent of the load of the high beam lamp relay.

DTC removal condition: the load of the high beam lamp relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the high beam lamp relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the high beam lamp relay	Replace the high beam lamp relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

900912

DTC definition: the front left fog lamp relay is short-circuited to power

DTC occurring condition: BCM detects the load of the front left fog lamp relay short-circuited to power or load overcurrent

Possible causes:

- The load harness of the front left fog lamp relay is short-circuited to power.
- The overcurrent of the load of the front left fog lamp relay.

DTC removal condition: the load of the front left fog lamp relay is normal, and the diagnostic current is

lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the front left fog lamp relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front left fog lamp relay	Replace the front left fog lamp relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

908312

DTC definition: the front right fog lamp relay is short-circuited to power

DTC occurring condition: BCM detects the load of the front right fog lamp relay short-circuited to power or load overcurrent

Possible causes:

- The load harness of the front right fog lamp relay is short-circuited to power.
- The overcurrent of the load of the front right fog lamp relay.

DTC removal condition: the load of the front right fog lamp relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the front right fog lamp relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front right fog lamp relay	Replace the front right fog lamp relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

901012

DTC definition: the front washer relay is short-circuited to power

DTC occurring condition: BCM detects the load of the front washer relay short-circuited to power or

load overcurrent

Possible causes:

› The load harness of the front washer relay is short-circuited to power.

› The load overcurrent of the front washer relay.

DTC removal condition: the load of the front washer relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the front washer relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front washer relay	Replace the front washer relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

901112

DTC definition: the horn relay is short-circuited to power

DTC occurring condition: BCM detects the load of the horn relay short-circuited to power or load overcurrent

Possible causes:

› The load harness of the horn relay is short-circuited to power.

› The overcurrent of the load of the horn relay.

DTC removal condition: the load of the horn relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the horn relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the horn relay	Replace the horn relay, and go to step 5	Go to step 5

Step	Operation	Yes	No
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

901212

DTC definition: the low beam lamp relay is short-circuited to power

DTC occurring condition: BCM detects the load of the low beam lamp relay short-circuited to power or load overcurrent

Possible causes:

- The load harness of the low beam lamp relay is short-circuited to power.
- The overcurrent of the load of the low beam lamp relay.

DTC removal condition: the load of the low beam lamp relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the low beam lamp relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the low beam lamp relay	Replace the low beam lamp relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

901512

DTC definition: front wiper speed relay is short-circuited to power

DTC occurring condition: BCM detects the load of the front wiper speed relay short-circuited to power or load overcurrent

Possible causes:

- The load harness of the front wiper speed relay is short-circuited to power.
- The overcurrent of the load of the front wiper speed relay.

DTC removal condition: front wiper speed relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1

Step	Operation	Yes	No
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check load harness and circuit harness of front wiper speed relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front wiper speed relay	Replace the front wiper speed relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

901812

DTC definition: the economizer relay is short-circuited to power

DTC occurring condition: BCM detects the load of the economizer relay short-circuited to power or load overcurrent

Possible causes:

› The load harness of the economizer relay is short-circuited to power.

› The overcurrent of the load of the front left fog lamp relay.

DTC removal condition: the load of the economizer relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the economizer relay	Check the harness and install it properly. Go to step 4	Go to step 4
4	Check the load of the economizer relay	Replace the economizer relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

901912

DTC definition: the front wiper low-speed relay is short-circuited to power

DTC occurring condition: BCM detects the load of the front wiper low-speed relay short-circuited to power or load overcurrent

Possible causes:

› The load harness of the front wiper low-speed relay is short-circuited to power.

› The overcurrent of the load of the front wiper low-speed relay.

DTC removal condition: the load of the front wiper low-speed relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the front wiper low-speed relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front wiper low-speed relay	Replace the front wiper low-speed relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902312

DTC definition: rear fog lamp relay is short-circuited to power

DTC occurring condition: BCM detects the load of rear fog lamp relay short-circuited to power or load overcurrent

Possible causes:

› The load harness of rear fog lamp relay is short-circuited to power.

› The overcurrent of the load of rear fog lamp relay.

DTC removal condition: the load of rear fog lamp relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of rear fog lamp relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of rear fog lamp relay	Replace rear fog lamp relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

900011

DTC definition: Reverse lamp relay is short-circuited to power

DTC occurring condition: BCM detects the load of reverse lamp relay short-circuited to power or load overcurrent

Possible causes:

- The load harness of reverse lamp relay is short-circuited to power.
- The load overcurrent of reverse lamp relay.

DTC removal condition: the load of reverse lamp relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check circuit harness and load harness of reverse lamp relay	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of reverse lamp relay	Replace reverse lamp relay and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902812/900912

DTC definition: rearview mirror stow/turning on relay is short-circuited to power

DTC occurring condition: BCM detects the rearview mirror stow/turning on relay short-circuited to power or load overcurrent

Possible causes:

- The load harness of rearview mirror stow/turning on relay is short-circuited to power.
- Rearview mirror stow/turning on relay is load overcurrent.

DTC removal condition: rearview mirror stow/turning on relay is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check circuit harness and load harness of rearview mirror stow/turning on relay	Check the harness and install it properly. Go to step 5	Go to step 4

Step	Operation	Yes	No
4	Check the load of rearview mirror stow/turning on relay	Replace rearview mirror stow/turning on relay, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902011

DTC definition: the left brake lamp is short-circuited to ground

DTC occurring condition: BCM detects the load of the left brake lamp short-circuited to ground or load overcurrent

Possible causes:

- The load harness of the left brake lamp is short-circuited to ground.
- The overcurrent of the load of the left brake lamp.

DTC removal condition: the load of the left brake lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the left brake lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the left brake lamp	Replace the left brake lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902111

DTC definition: the right brake lamp is short-circuited to ground

DTC occurring condition: BCM detects the load of the right brake lamp short-circuited to ground or load overcurrent

Possible causes:

- The load harness of the right brake lamp is short-circuited to ground.
- The overcurrent of the load of the right brake lamp.

DTC removal condition: the load of the right brake lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the right brake lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the right brake lamp	Replace the right brake lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902211

DTC definition: daytime lamp is short-circuited to ground

DTC occurring condition: BCM detects the load of the daytime lamp is short-circuited to ground or load overcurrent

Possible causes:

› The load harness of the daytime lamp is short-circuited to ground.

› The load overcurrent of the daytime lamp.

DTC removal condition: the load of the daytime lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the daytime lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the daytime lamp	Replace the daytime lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902213

DTC definition: daytime lamp is open-circuited

DTC occurring condition: BCM detects the load of the daytime lamp is open-circuited

Possible causes:

› The load harness of the daytime lamp is open-circuited.

› The load of the daytime lamp is damaged.

DTC removal condition: the load of the daytime lamp is normal, and the diagnostic current is higher than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the daytime lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the daytime lamp	Replace the daytime lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902411

DTC definition: the right turn signal lamp is short-circuited to ground

DTC occurring condition: BCM detects the load of the front/rear right turn signal lamp short-circuited to ground or load overcurrent

Possible causes:

› The load harness of the front/rear right turn signal lamp is short-circuited to ground.

› The load overcurrent of the front/rear right turn signal lamp.

DTC removal condition: the load of the front/rear right turn signal lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check load harness and circuit harness of the front/rear right turn signal lamp	Check the harness and install it properly. Go to step 4	Go to step 4
4	Check the load of the front/rear right turn signal lamp	Replace the front/rear right turn signal lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902413

DTC definition: the right turn signal lamp is open-circuited

DTC occurring condition: BCM detects the load of the front/rear right turn signal lamp is open-circuited

Possible causes:

› Load harness of the front/rear right turn signal lamp is open-circuited.

› The load of the front/rear right turn signal lamp is damaged.

DTC removal condition: the load of the front/rear right turn signal lamp is normal, and the diagnostic current is higher than the open-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check load harness and circuit harness of the front/rear right turn signal lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front/rear right turn signal lamp	Replace the front/rear right turn signal lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902511

DTC definition: the left turn signal lamp is short-circuited to ground

DTC occurring condition: BCM detects the load of the front/rear left turn signal lamp short-circuited to ground or load overcurrent

Possible causes:

› The load harness of the front/rear left turn signal lamp is short-circuited to ground.

› The load overcurrent of the front/rear left turn signal lamp.

DTC removal condition: the load of the front/rear left turn signal lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check load harness and circuit harness of the front/rear left turn signal lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front/rear left turn signal lamp	Replace the front/rear left turn signal lamp and go to step 5	Go to step 5

Step	Operation	Yes	No
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902513

DTC definition: the left turn signal lamp is open-circuited

DTC occurring condition: BCM detects the load of the front/rear left turn signal lamp is open-circuited

Possible causes:

- Load harness of the front/rear left turn signal lamp is open-circuited.
- The load of the front/rear left turn signal lamp is damaged.

DTC removal condition: the load of the front/rear left turn signal lamp is normal, and the diagnostic current is higher than the open-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check load harness and circuit harness of the front/rear left turn signal lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the front/rear left turn signal lamp	Replace the front/rear left turn signal lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902013/902113

DTC definition: left/ right brake lamp is open-circuited (bulb configuration vehicle)

DTC occurring condition: BCM detects the load of the left/right brake lamp is open-circuited

Possible causes:

- The load harness of the left/right brake lamp is open-circuited.
- The load of the left/right brake lamp is damaged.

DTC removal condition: the load of the left/right brake lamp is normal, and the diagnostic current is higher than the open-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs

Step	Operation	Yes	No
3	Check circuit harness and load harness of the left/right brake lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the left/right brake lamp	Replace the left/right brake lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

902611

DTC definition: the high-mounted brake lamp is short-circuited to ground

DTC occurring condition: BCM detects the load of the high-mounted brake lamp short-circuited to ground or load overcurrent

Possible causes:

- The load harness of the high-mounted brake lamp is short-circuited to ground.
- The load overcurrent of the high-mounted brake lamp.

DTC removal condition: the load of the high-mounted brake lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the circuit harness of the load harness of the high-mounted brake lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the high-mounted brake lamp load	Replace the high-mounted brake lamp and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

900711

DTC definition: rear position lamp/license plate lamp are overloaded or short-circuited to ground

DTC occurring condition: BCM detects rear position lamp/license plate lamp are overloaded or short-circuited to ground

Possible causes:

- The load harness is short-circuited to ground.
- Rear position lamp/license plate lamp are damaged due to load failure.

DTC removal condition: the loads of ear position lamp/license plate lamp are normal, and the

diagnostic current is higher than the open-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check circuit harnesses and load harness of the rear position lamp/license plate lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of rear position lamp/license plate lamp	Replace rear position lamp/license plate lamp, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

D51587

DTC definition: communication with RPAS is lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of RPAS

Possible causes:

- RPAS LIN failure.
- RPAS node failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer of RPAS

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check LIN circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of RPAS	Operate according to the corresponding content of RPAS DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

D51687

DTC definition: communication with FPAS is lost

DTC occurring condition: BCM fails to receive the message signal of the corresponding application layer of FPAS

Possible causes:

› FPAS LIN failure.

› FPAS node failure.

DTC removal condition: BCM has received the message signal of the corresponding application layer of FPAS

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check LIN circuit harness	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the corresponding DTC of FPAS	Operate according to the corresponding content of FPAS DTC, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

903486

DTC definition: rainfall and light sensor response error

DTC occurring condition: LIN communication between BCM and RLS is abnormal

Possible causes:

› There is a problem with the rainfall sensor.

› Vehicle body controller fault.

DTC removal condition: the communication fault between BCM and RLS is troubleshot

Troubleshooting:

Step	Operation	Yes	No
1	Wait for the vehicle to sleep and re-power on	Go to step 2	—
2	Use a scanner to read the vehicle body controller for any DTC	Go to step 3	Troubleshoot other DTCs
3	After replacing RLS, use a scanner to read whether there is any DTC	Replace the vehicle body controller	Troubleshooting

903586

DTC definition: rainfall and light sensor temperature is abnormal

DTC occurring condition: the self-temperature of the sensor exceeds 89℃

Possible causes:

- The ambient temperature exceeds 89℃.
- Short circuit of RLS internal circuit.
- Vehicle body controller is damaged.

DTC removal condition: RLS self-temperature is lower than 89℃

Troubleshooting:

Step	Operation	Yes	No
1	Whether the ambient temperature exceeds 89℃	Change ambient temperature	Go to step 2
2	After replacing RLS, whether the abnormal warning is eliminated	Troubleshooting	Go to step 3
3	Use the scanner to read the vehicle body controller for DTC	Troubleshoot other DTCs	Troubleshooting

903686

DTC definition: rainfall and light sensor voltage is abnormal

DTC occurring condition: RLS checks that the battery voltage is more than 16.6V

Possible causes:

- The vehicle power voltage is more than 16.6 V.
- RLS is damaged.
- Vehicle body controller is damaged.

DTC removal condition: the sensor checks that the battery voltage is lower than 16.6 V

Troubleshooting:

Step	Operation	Yes	No
1	Measure whether the vehicle power voltage exceed 16.6 V	The vehicle power voltage recovers to the normal	Go to step 2
2	You can use a scanner to read DTC	Go to step 3	Troubleshooting
3	After replacing RLS, whether the fault is eliminated	Troubleshooting	Go to step 4
4	Use the scanner to read the vehicle body controller for DTC	Troubleshoot other DTCs	Troubleshooting

903012/903112

DTC definition: left/ right blind spot radar alarm lamp is short-circuited to power

DTC occurring condition: BCM detects the load of left/right blind spot radar alarm lamp is short-circuited to power or overcurrent

Possible causes:

› Load harness of the left/right blind spot radar alarm lamp is short-circuited to power.

› Load of the left/right blind spot radar alarm lamp is overcurrent.

DTC removal condition: the left/right blind spot radar alarm lamp is normal, and the diagnostic current is lower than the short-circuited current

Troubleshooting:

Step	Operation	Yes	No
1	Turn off all load appliances	Go to step 2	Repeat 1
2	Use the scanner to read the vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Check the load harness and circuit harness of the left/right blind spot radar alarm lamp	Check the harness and install it properly. Go to step 5	Go to step 4
4	Check the load of the left/right blind spot radar alarm lamp	Replace the left/right blind spot radar alarm lamp, and go to step 5	Go to step 5
5	Clear DTC, restart vehicle and check if the fault is eliminated	The fault is cleared, and the system is normal	Repeat 1

903786

DTC definition: CCO switch fault

DTC occurring condition: CCOSwtErrSts ＝ 1 is detected

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use scanner to check vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Replace CCO switch	Go to step 5	—
4	Replace the vehicle body controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

903886

DTC definition: TAB switch fault

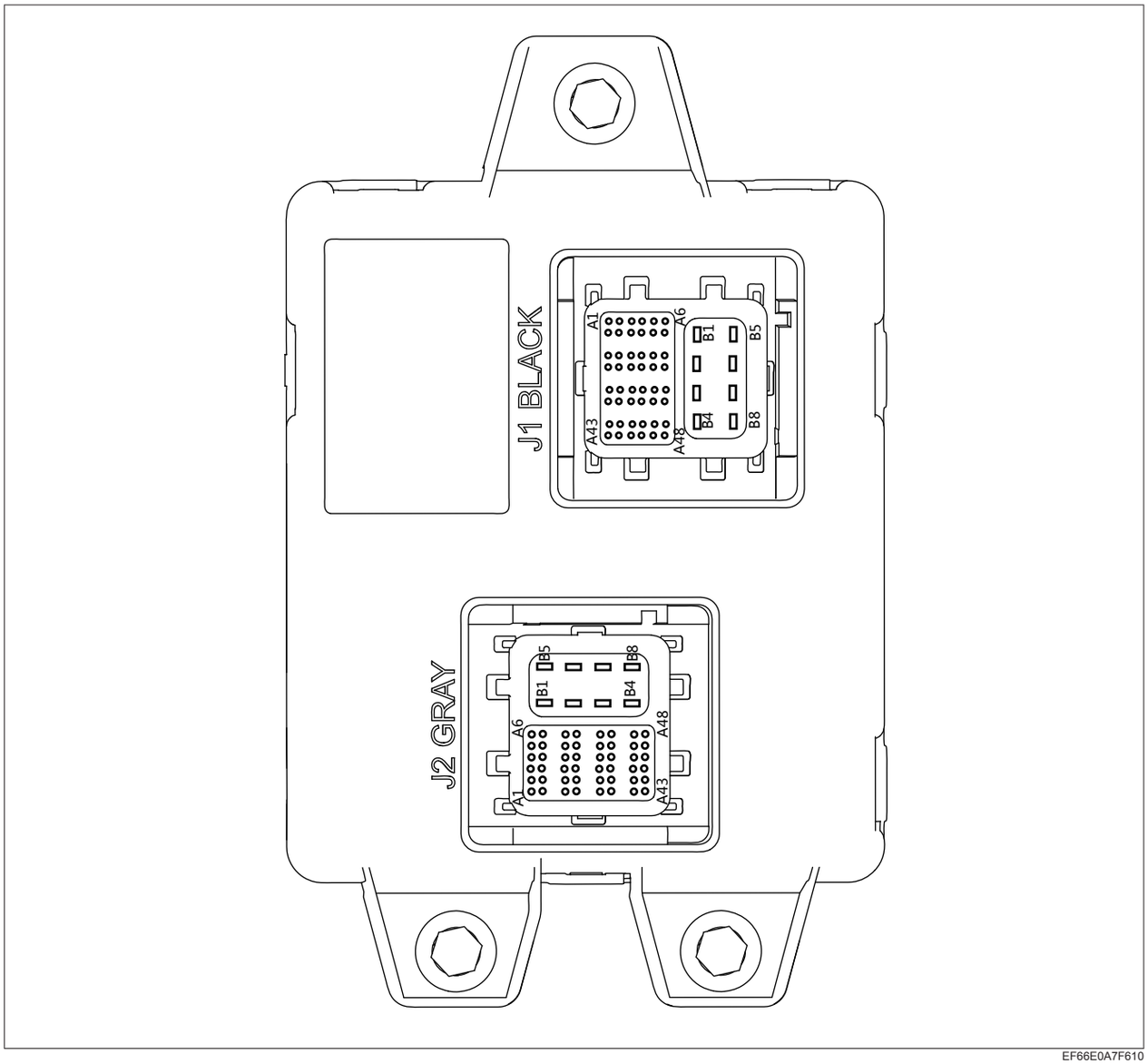
DTC occurring condition: TABSwtErrSts ＝ 1 is detected

Troubleshooting:

Step	Operation	Yes	No
1	Place the ignition switch in the ON position	Go to step 2	—
2	Use scanner to check vehicle body controller for DTC	Go to step 3	Troubleshoot other DTCs
3	Replace TAB switch	Go to step 5	—
4	Replace the vehicle body controller	Go to step 5	—
5	Remove the DTC, restart the vehicle and test to see if the DTC has been removed	The fault is eliminated and the system is normal	Confirm once again whether the current fault has been ruled out. If it has been eliminated, check other possible causes of the fault

BCM

Pin definition



EF66E0A7F610

Pin No.	Function	Pin No.	Function
J1-A1	Left blind spot radar alarm lamp	J1-A2	Hazard backlight
J1-A3	Left turn water flow enable	J1-A4	Console backlight and ambient lamp
J1-A5	Left brake lamp	J1-A6	Right brake lamp
J1-A7	High beam headlamp relay (high configuration link high beam headlamp module)	J1-A8	Front left fog lamp relay
J1-A9	—	J1-A10	Horn relay
J1-A11	Front wiper high-speed relay	J1-A12	Backlight brightness adjustment -
J1-A13	Rear fog lamp	J1-A14	Right blind spot radar alarm lamp

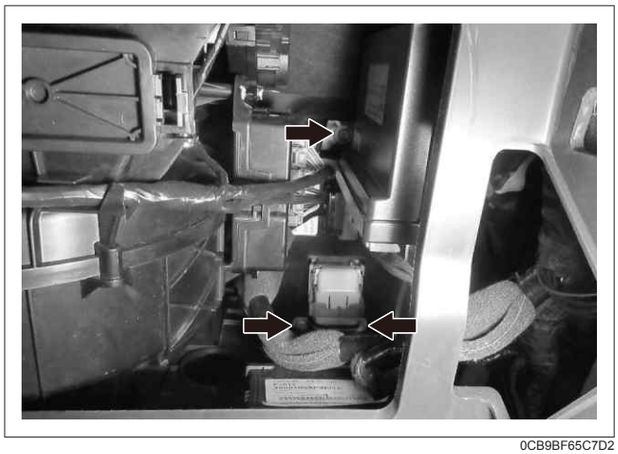
Pin No.	Function	Pin No.	Function
J1-A15	Low beam lamp relay	J1-A16	Rainproof canopy unlock relay (high configuration)
J1-A17	Front washer relay	J1-A18	Reverse lamp (8AT model)
J1-A19	Engine start-stop switch backlight	J1-A20	Front wiper power supply relay
J1-A21	—	J1-A22	—
J1-A23	—	J1-A24	—
J1-A25	Central lock	J1-A26	—
J1-A27	—	J1-A28	—
J1-A29	—	J1-A30	—
J1-A31	Rainproof canopy interior lamp relay (high configuration)	J1-A32	Economizer relay
J1-A33	Central unlocking	J1-A34	—
J1-A35	—	J1-A36	Right front fog lamp relay
J1-A37	LIN1	J1-A38	Right turn water flow enable
J1-A39	CAN—H—1	J1-A40	—
J1-A41	Backlight brightness adjustment +	J1-A42	—
J1-A43	LIN2	J1-A44	—
J1-A45	CAN—L—1	J1-A46	—
J1-A47	—	J1-A48	Hazard warning indicator switch
J1-B1	KL30 - interior lamp power source	J1-B2	High-mounted brake lamp
J1-B3	Daytime running lamp	J1-B4	GND-SIGNAL-1
J1-B5	Front position lamp & license plate lamp	J1-B6	Right turn signal lamp
J1-B7	Left turn signal lamp	J1-B8	KL30 - external lamp power source
J2-A1	Rainproof canopy opening switch	J2-A2	Driver door state switch
J2-A3	Front passenger-side door status switch	J2-A4	Rear left door state switch
J2-A5	Rear right door status switch	J2-A6	Rainproof canopy door state switch
J2-A7	—	J2-A8	Key detection switch (Non-PEPS configuration) engine start-stop switch (PEPS configuration)
J2-A9	—	J2-A10	—
J2-A11	—	J2-A12	—
J2-A13	—	J2-A14	Rearview mirror open/stow switch
J2-A15	—	J2-A16	PBS Handbrake signal
J2-A17	—	J2-A18	—
J2-A19	—	J2-A20	—

Pin No.	Function	Pin No.	Function
J2-A21	—	J2-A22	—
J2-A23	—	J2-A24	—
J2-A25	START signal	J2-A26	ACC signal
J2-A27	IGN1 signal	J2-A28	Diagnostic feedback input for rear left turn signal lamp (high configuration)
J2-A29	IGN2-FB signal	J2-A30	Driver door lock feedback switch
J2-A31	Collision unlocking signal	J2-A32	Console unlock and lock switch
J2-A33	—	J2-A34	—
J2-A35	BPS brake pedal switch	J2-A36	—
J2-A37	—	J2-A38	Reverse lamp signal (6MT model)
J2-A39	Front wiper stop signal	J2-A40	—
J2-A41	—	J2-A42	—
J2-A43	—	J2-A44	Diagnostic feedback input for rear right turn signal lamp (high configuration)
J2-A45	Diagnostic feedback input for front left turn signal lamp (high configuration)	J2-A46	Diagnostic feedback input for front right turn signal lamp (high configuration)
J2-A47	—	J2-A48	—
J2-B1	Rearview mirror unfold relay	J2-B2	KL30 - central-control lock power source
J2-B3	GND—SIGNCL—0	J2-B4	GND-POWER
J2-B5	Rearview mirror fold relay	J2-B6	GND-SIGNCL-2
J2-B7	Rear position lamp	J2-B8	Interior lamp

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove right foot block of instrument panel
3. Remove the 3 bolts and disconnect the 2 connectors



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4. Remove the BCM

Installation

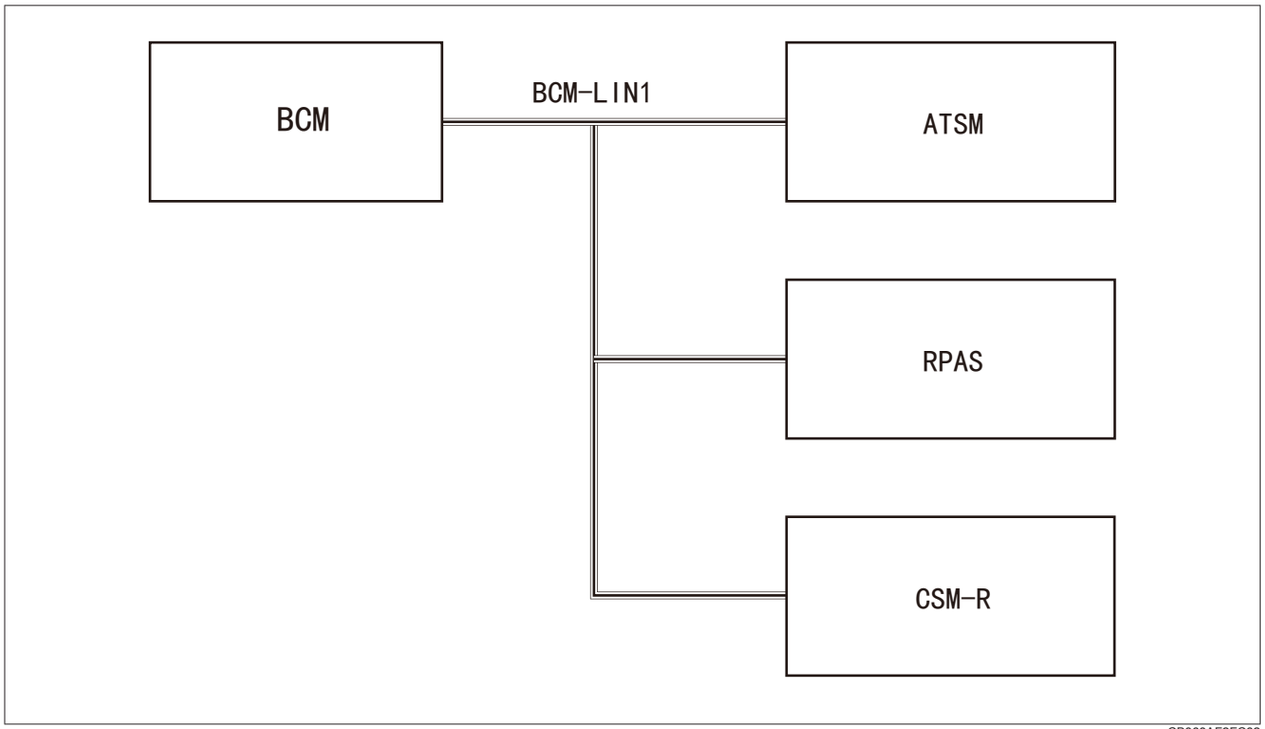
1. Perform installation work in reverse order of removal

Network system

LIN communication.....68－1
System Diagram-LIN1 .....68－1
System diagram - LIN2.....68－2
System diagram - CSA-LIN .....68－3
CAN communication.....68－4
System Diagram-BD-CAN .....68－4
System diagram-PT-CAN .....68－5
System diagram-SC-CANFD .....68－6
System diagram-DG-CAN .....68－7
Gateway .....68－8
System description .....68－8
Location diagram .....68－9
List of DTC.....68－10
DTC troubleshooting method.....68－11
Pin definition .....68－30
Removal/installation.....68－31

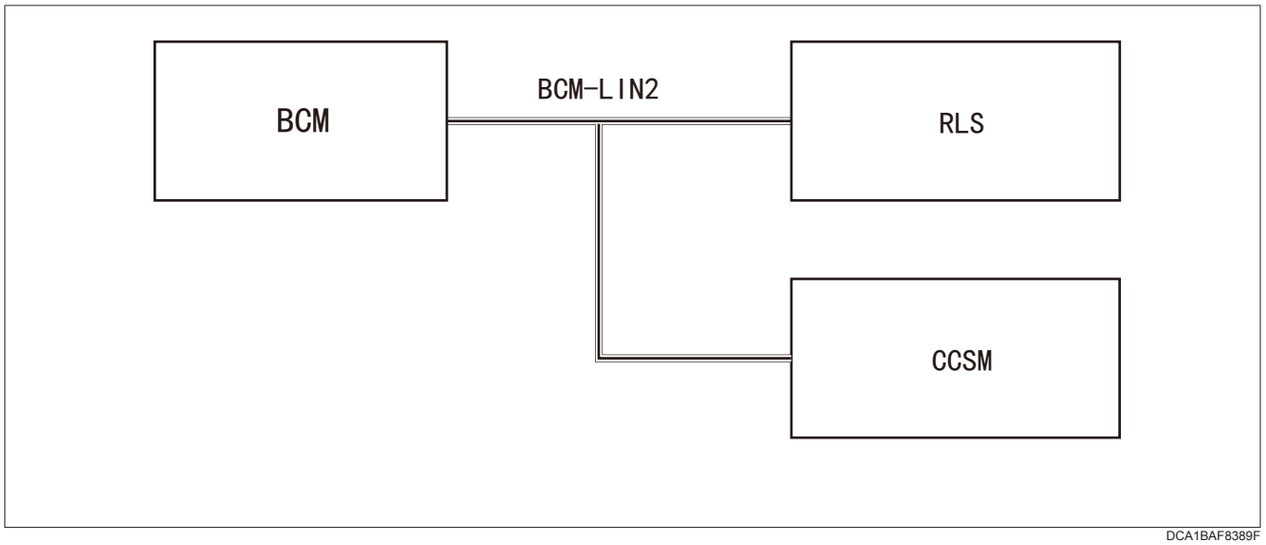
LIN communication

System Diagram-LIN1



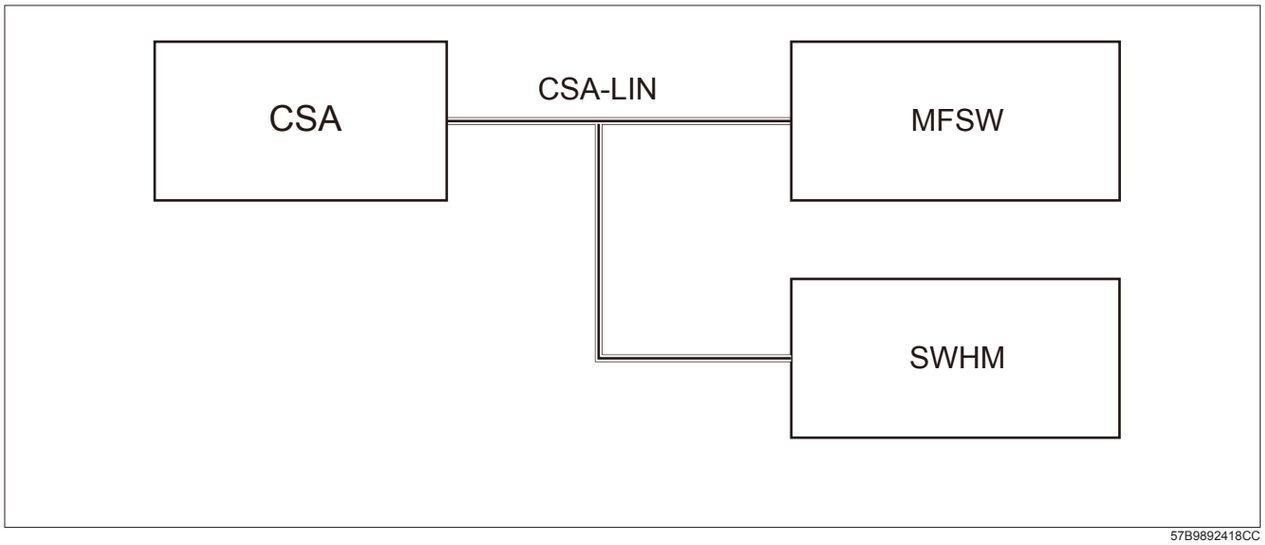
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System diagram - LIN2



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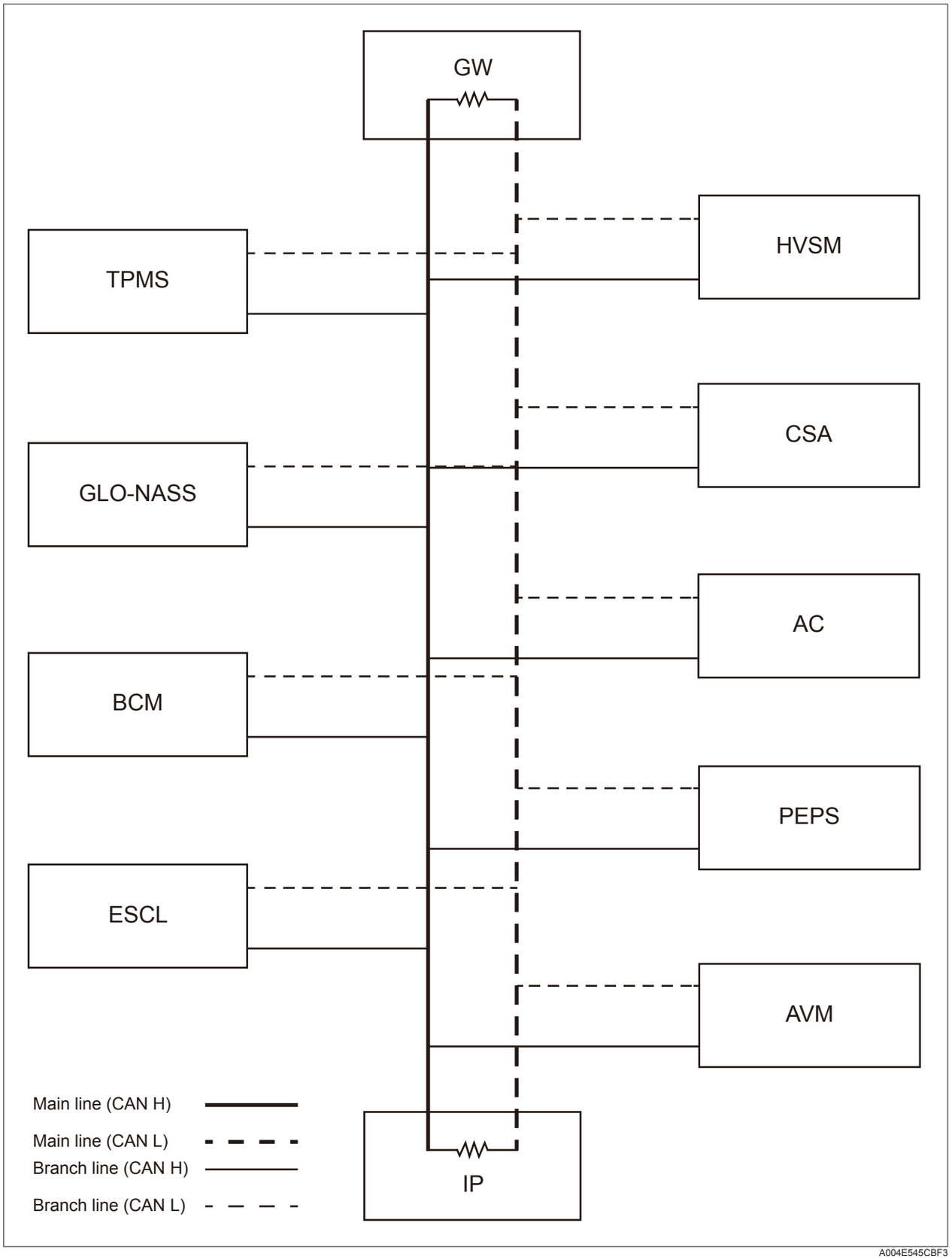
System diagram - CSA-LIN



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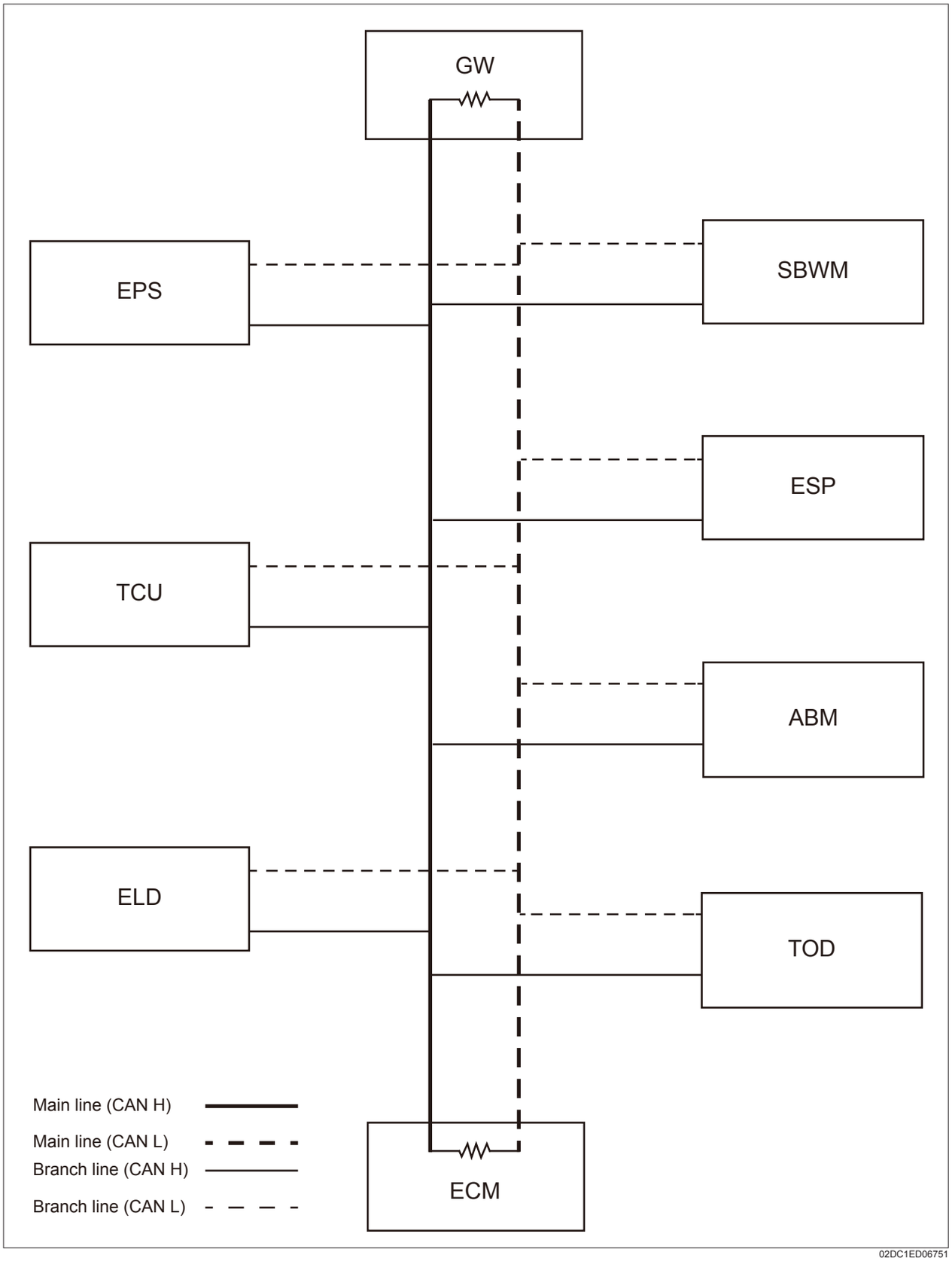
CAN communication

System Diagram-BD-CAN

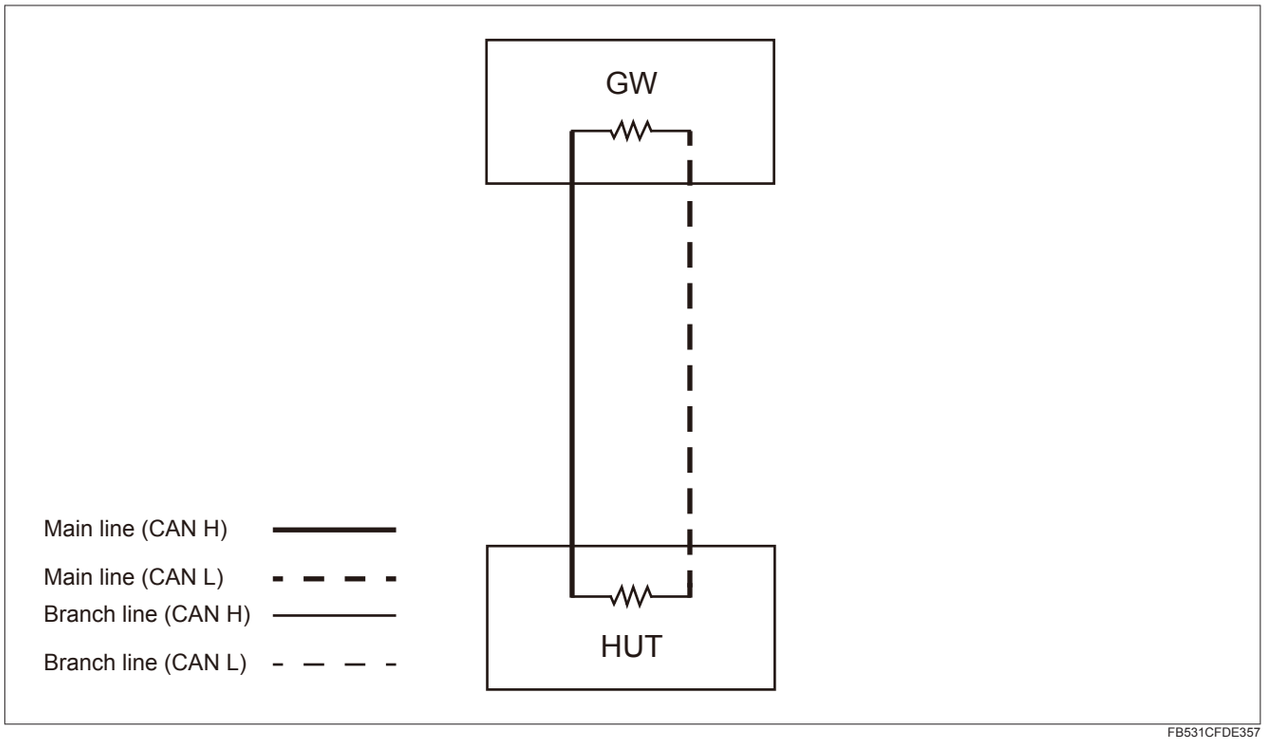


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System diagram-PT-CAN

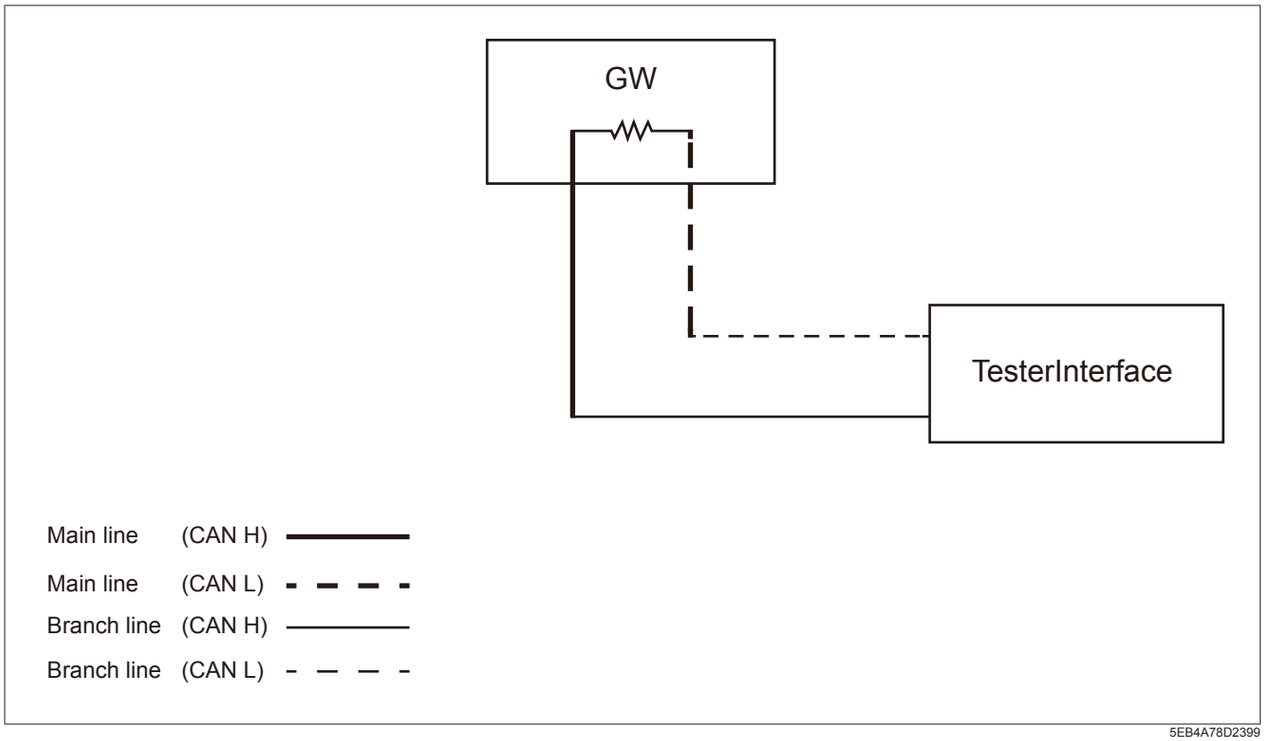


System diagram-SC-CANFD



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System diagram-DG-CAN



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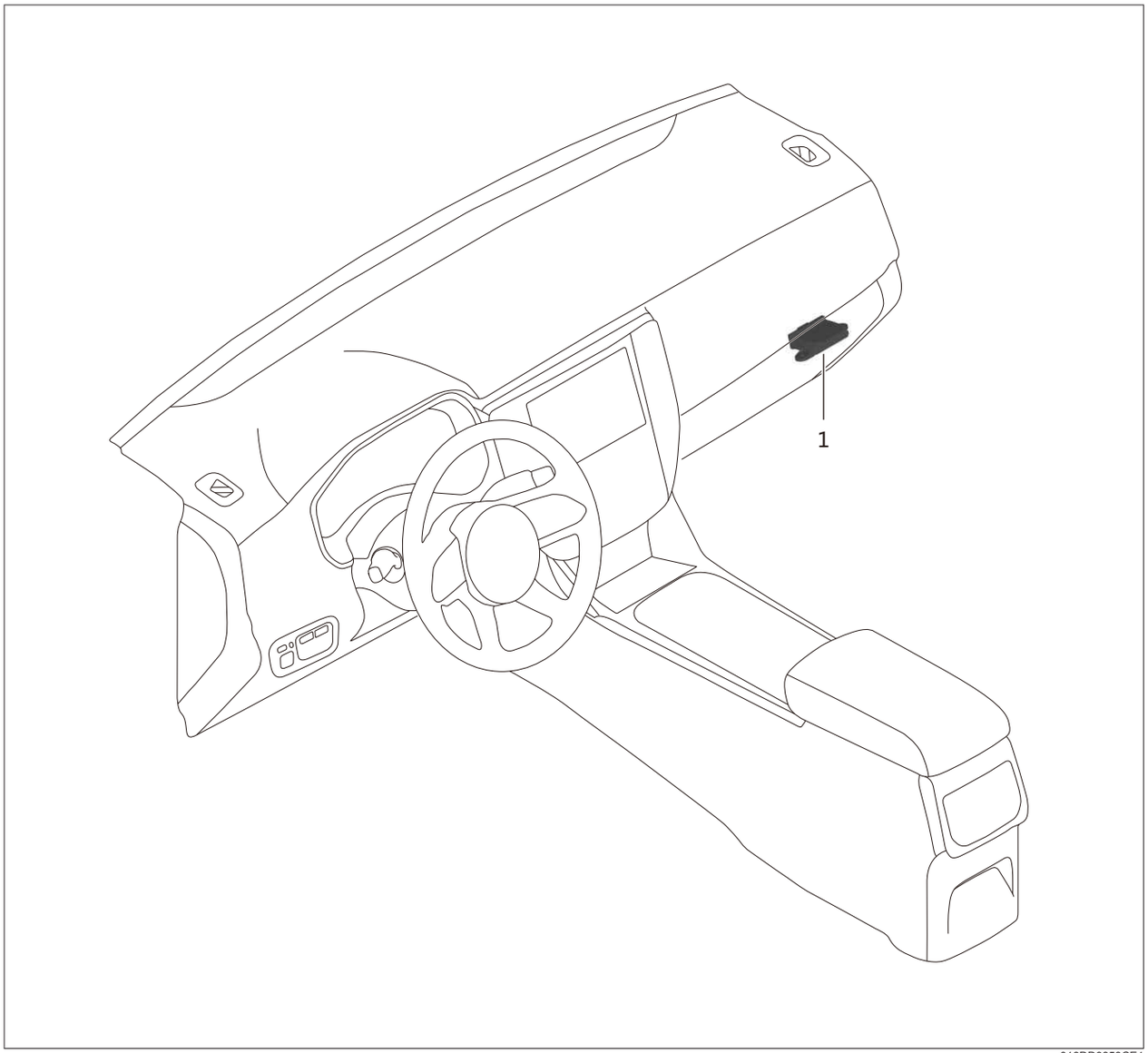
Gateway

System description

The vehicle’s gateway controller is a critical device for information and communications management of various smart electronic products such as ESP, IP and BCM. Its main functions are as follows:

- Real-time reception and transmission of communication signals and messages from various ECUs (electronic control units).
- Management and coordination of wake up, normal operation, and sleep status for the whole-vehicle bus network.
- Monitoring and control of problems with the whole-vehicle bus network and various ECU communication states, as well as recording and storing the related fault codes.

Location diagram



018DD3858CE1

1. Gateway

List of DTC

No.	DTC	DTC description
1	U110116	Voltage too low
2	U110017	Voltage too high
3	U007588	PT-CAN bus off
4	U007888	BD-CAN bus off
5	U007488	SC-CAN bus off
6	U007988	DG-CAN bus off
7	U007508	PT-CAN lost globally
8	U007808	BD-CAN lost globally
9	U007C08	SC-CAN lost globally
10	U010087	Node ECM Missing
11	U012287	Communication with ESP (ABS) lost
12	U014587	Communication with CSA lost
13	U011487	Communication with Nextrac (TOD) lost
14	U100087	Loss of communication with ABM
15	U010187	Node TCU Missing
16	U100287	Communication with PEPS lost
17	U014087	Communication with BCM lost
18	U024387	Loss of communication with PAS (APA)
19	U012787	Communication with TPMS lost
20	U013187	Communication with EPS lost
21	U015587	Communication with IP lost
22	U018787	Communication with HUT lost
23	U016487	Communication with AC lost
24	U023587	Loss of communication with FR/ACC
25	U023287	Communication with RSDS-L lost
26	U023387	Communication with RSDS-R lost
27	U100487	Communication with AVM lost
28	U014387	Communication with IFV (LDW/IFC) lost
29	U101487	Communication with ELD lost
30	U102987	Communication with WPC lost

DTC troubleshooting method

U110017

DTC definition: communication voltage too high

DTC occurring condition: the power supply voltage exceeds 16 V for 20 s

Possible cause of faults:

› Power supply voltage exceeds 16V.

DTC removal condition: 9V ≤ power supply voltage ≤ 15V, lasting for 1s

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	—
3	Check if the power supply voltage exceeds 16 V	Detect the working state of the power supply system and replace it	Go to step 4
4	Clear the DTC, restart the vehicle and test to see if the fault is eliminated.	The fault is cleared, and the system is normal	Replace the battery.

U110116

DTC definition: low communication voltage

DTC occurring condition: The power supply voltage is less than 9V for 20s.

Possible cause of faults:

› Power supply voltage is less than 9V.

DTC removal condition: 10V ≤ power supply voltage ≤ 16V, lasting for 1s

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	—
3	Check if the power supply voltage is lower than 9 V	Detect the working state of the power supply system and replace it	Go to step 4
4	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the battery.

U007588

DTC definition: PT-CAN bus off

DTC occurring condition: node is offline

Possible cause of faults:

- CAN high line is short circuited to the ground.
- CAN high line short-circuited to power.
- CAN low line short-circuited to power.
- CAN low line short-circuited to ground.
- CAN high line and CAN low line short-circuited.

DTC removal condition: node resumes normal communication

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Power off the vehicle, disconnect the battery and measure the CAN high line, CAN low line resistance, and check if the resistance is within the (58 ~ 62) Ω range	Go to step 4, check whether the CAN high line is short circuited to the power supply, and CAN low voltage line is short circuited to the ground.	Go to step 4 and check the CAN high line short-circuited to ground, the CAN low line short-circuited to power, CAN high line and CAN low line short-circuited
4	Check the harness for open circuit, short circuit or be shorted	Replace the harness	Go to step 5
5	Check whether the voltage of CAN HV line and CAN LV line is normal.	The fault is cleared, and the system is normal	Go to step 6
6	Check if ECU is abnormal	Replace ECU and go to step 7	Go to step 7
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ECU

U007888

DTC definition: BD-CAN bus off

DTC occurring condition: node is offline

Possible cause of faults:

- CAN high line is short circuited to the ground.
- CAN high line short-circuited to power.

› CAN low line short-circuited to power.

› CAN low line short-circuited to ground.

› CAN high line and CAN low line short-circuited.

DTC removal condition: node resumes normal communication

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Power off the vehicle, disconnect the battery and measure the CAN high line, CAN low line resistance, and check if the resistance is within the (58 ~ 62) Ω range	Go to step 4, check whether the CAN high line is short circuited to the power supply, and CAN low voltage line is short circuited to the ground.	Go to step 4 and check the CAN high line short-circuited to ground, the CAN low line short-circuited to power, CAN high line and CAN low line short-circuited
4	Check the harness for open circuit, short circuit or be shorted	Replace the harness	Go to step 5
5	Check whether the voltage of CAN HV line and CAN LV line is normal.	The fault is cleared, and the system is normal	Go to step 6
6	Check if ECU is abnormal	Replace ECU and go to step 7	Go to step 7
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ECU

U007488

DTC definition: SC-CAN bus off

DTC occurring condition: node is offline

Possible cause of faults:

› CAN high line is short circuited to the ground.

› CAN high line short-circuited to power.

› CAN low line short-circuited to power.

› CAN low line short-circuited to ground.

› CAN high line and CAN low line short-circuited.

DTC removal condition: node resumes normal communication

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Power off the vehicle, disconnect the battery and measure the CAN high line, CAN low line resistance, and check if the resistance is within the (58 ~ 62) Ω range	Go to step 4, check whether the CAN high line is short circuited to the power supply, and CAN low voltage line is short circuited to the ground.	Go to step 4 and check the CAN high line short-circuited to ground, the CAN low line short-circuited to power, CAN high line and CAN low line short-circuited
4	Check the harness for open circuit, short circuit or be shorted	Replace the harness	Go to step 5
5	Check whether the voltage of CAN HV line and CAN LV line is normal.	The fault is cleared, and the system is normal	Go to step 6
6	Check if ECU is abnormal	Replace ECU and go to step 7	Go to step 7
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ECU

U007988

DTC definition: DG-CAN bus off

DTC occurring condition: node is offline

Possible cause of faults:

- CAN high line is short circuited to the ground.
- CAN high line short-circuited to power.
- CAN low line short-circuited to power.
- CAN low line short-circuited to ground.
- CAN high line and CAN low line short-circuited.

DTC removal condition: node resumes normal communication

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs

Steps	Operation	Yes	No
3	Power off the vehicle, disconnect the battery and measure the CAN high line, CAN low line resistance, and check if the resistance is within the (58 ~ 62) Ω range	Go to step 4, check whether the CAN high line is short circuited to the power supply, and CAN low voltage line is short circuited to the ground.	Go to step 4 and check the CAN high line short-circuited to ground, the CAN low line short-circuited to power, CAN high line and CAN low line short-circuited
4	Check the harness for open circuit, short circuit or be shorted	Replace the harness	Go to step 5
5	Check whether the voltage of CAN HV line and CAN LV line is normal.	The fault is cleared, and the system is normal	Go to step 6
6	Check if ECU is abnormal	Replace ECU and go to step 7	Go to step 7
7	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ECU

U007508

DTC definition: PT-CAN lost globally

DTC occurring condition: GW fails to receive signal from ECU on PT-CAN

Possible cause of faults:

- Harness connection is abnormal.
- GW is abnormal.

DTC removal condition: effective signal is received from ECU for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Check if GW connector PT-CAN line is in false contact or short-circuited	The fault is cleared, and the system is normal	Go to step 4
4	Check if PT-CAN line adapter is disconnected or in false contact	The fault is cleared, and the system is normal	Replace GW

U007808

DTC definition: BD-CAN lost globally

DTC occurring condition: GW receives no signal from ECU on BD-CAN

Possible cause of faults:

- Harness connection is abnormal.
- GW is abnormal.

DTC removal condition: effective signal is received from ECU for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Check GW connectors for false connection or short circuit of BD-CAN line	The fault is cleared, and the system is normal	Go to step 4
4	Check for disconnection or false connection of BD-CAN line adapter	The fault is cleared, and the system is normal	Replace GW

U007C08

DTC definition: SC-CAN lost globally

DTC occurring condition: GW fails to receive signal from ECU on SC-CAN

Possible cause of faults:

- Harness connection is abnormal.
- GW is abnormal.

DTC removal condition: effective signal is received from ECU for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Check if GW connector SC-CAN line is in false connection or short-circuited	The fault is cleared, and the system is normal	Go to step 4
4	Check if SC-CAN line adapter is disconnected or in false connection	The fault is cleared, and the system is normal	Replace GW

U010087

DTC definition: communication loss with ECM

DTC occurring condition: the signal, sent from ECM, has not been received for more than 10 cycles

Possible cause of faults:

› Harness connection is abnormal.

› ECM node is abnormal.

DTC removal condition: the effective signal, sent from ECM, has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter ECM diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if ECM is abnormal	Replace ECM and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ECM

U012287

DTC definition: communication with ESP (ABS) lost

DTC occurring condition: The signal sent by ESP (ABS) has not been received for more than 10 cycles.

Possible cause of faults:

› Harness connection is abnormal.

› ESP (ABS) node is abnormal.

DTC removal condition: the effective signal, sent from ESP (ABS), has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use a scanner to check if ESP (ABS) diagnostics can be entered	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if ESP (ABS) is abnormal	Replace ESP (ABS) and go to step 6	Go to step 6

Steps	Operation	Yes	No
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ESP (ABS)

U014587

DTC definition: communication loss with CSA

DTC occurring condition: the signal, sent from CSA, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- Abnormal CSA node.

DTC removal condition: 10 cycles of effective signals received from CSA

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use scanner to check if entry of CSA diagnosis is possible	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check CSA for abnormality	Replace CSA, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace CSA

U011487

DTC definition: communication with Nextrac (TOD) lost

DTC occurring condition: The signal sent by Nextrac (TOD) has not been received for more than 10 cycles.

Possible cause of faults:

- Harness connection is abnormal.
- Abnormal Nextrac(TOD) node

DTC removal condition: Valid signals sent by Nextrac (TOD) have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use a diagnostic instrument to check whether the Nextrac(TOD) diagnosis is available.	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check for abnormal Nextrac (TOD)	Replace Nextrac (TOD) and go to step 6.	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace Nextrac (TOD).

U100087

DTC definition: communication with ABM is lost

DTC occurring condition: the signal, sent from ABM, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- ABM node is abnormal.

DTC removal condition: the effective signal, sent from ABM, has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter ABM diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if ABM is abnormal	Replace ABM, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ABM

U010187

DTC definition: communication with TCU lost

DTC occurring condition: failure to receive signal from TCU for over 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- Abnormal TCU node.

DTC removal condition: 10 cycles of effective signals received from TCU

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use scanner to check if it is possible to enter TCU diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check for abnormal TCU	Replace TCU, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace TCU

U100287

DTC definition: communication loss with PEPS

DTC occurring condition: failure to receive signal from TCU for over 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- PEPS node is abnormal.

DTC removal condition: the effective signal, sent from PEPS, has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Check if PEPS diagnosis is possible using a scanner	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5

Steps	Operation	Yes	No
5	Check if PEPS is abnormal	Replace PEPS and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace the PEPS

U014087

DTC definition: communication with BCM lost

DTC occurring condition: the signal, sent from BCM, has not been received for more than 10 cycles

Possible cause of faults:

› Harness connection is abnormal.

› BCM node is abnormal.

DTC removal condition: the effective signal, sent from BCM, has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Check of BCM diagnosis is possible user a scanner	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if BCM is abnormal	Replace BCM and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace BCM

U024387

DTC definition: Loss of communication with PAS (APA)

DTC occurring condition: the signal, sent from PAS (APA), has not been received for more than 10 cycles

Possible cause of faults:

› Harness connection is abnormal.

› PAS (APA) node is abnormal.

DTC removal condition: the effective signal, sent from PAS (APA), has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use a scanner to check if PAS (APA) diagnostics can be entered	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if PAS (APA) is abnormal	Replace PAS (APA) and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace PAS (APA)

U012787

DTC definition: communication with TPMS lost

DTC occurring condition: the signal, sent from TPMS, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- Abnormal TPMS node.

DTC removal condition: 10 cycles of effective signals received from TPMS

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter TPMS diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if TPMS is abnormal	Replace TPMS, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace TPMS

U013187

DTC definition: communication with EPS lost

DTC occurring condition: the signal, sent from EPS, has not been received for more than 10 cycles

Possible cause of faults:

› Harness connection is abnormal.

› EPS node is abnormal.

DTC removal condition: Valid signals sent by EPS-R have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Check if EPS diagnosis is possible using a scanner	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Inspect whether EPS is abnormal	Replace EPS, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace EPS

U015587

DTC definition: communication with IP is lost

DTC occurring condition: the signal, sent from IP, has not been received for more than 10 cycles

Possible cause of faults:

› Harness connection is abnormal.

› IP node is abnormal.

DTC removal condition: the effective signal, sent from IP, has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter IP diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if the IP is abnormal	Replace IP, and go to step 6	Go to step 6

Steps	Operation	Yes	No
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace IP

U018787

DTC definition: communication with HUT lost

DTC occurring condition: the signal, sent from HUT, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- HUT node is abnormal.

DTC removal condition: Valid signals sent by AC(HUT) have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter HUT diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if HUT is abnormal	Replace HUT and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace HUT

U016487

DTC definition: communication with AC lost

DTC occurring condition: the signal, sent from AC, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- AC node is abnormal.

DTC removal condition: the effective signal, sent from AC, has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.

Steps	Operation	Yes	No
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter AC diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if AC is abnormal	Replace AC, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace AC

U023587

DTC definition: communication with FR/ACC lost

DTC occurring condition: The signal sent by FR/ACC has not been received for more than 10 cycles.

Possible cause of faults:

› Harness connection is abnormal.

› Abnormal FR/ACC node

DTC removal condition: Valid signals sent by FR/ACC have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use a diagnostic instrument to check whether the FR/ACC diagnosis is available.	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check whether FR/ACC is abnormal.	Replace FR/ACC and go to step 6.	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace FR/ACC.

U023287

DTC definition: communication loss with RSDS-L

DTC occurring condition: The signal sent by RSDS-L has not been received for more than 10 cycles.

Possible cause of faults:

› Harness connection is abnormal.

› Abnormal RSDS-L node

DTC removal condition: Valid signals sent by RSDS-L have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use a diagnostic instrument to check whether the RSDS-L diagnosis is available.	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check whether RSDS-L is abnormal.	Replace RSDS-L and go to step 6.	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace RSDS-L.

U023387

DTC definition: communication loss with RSDS-R

DTC occurring condition: The signal sent by RSDS-R has not been received for more than 10 cycles.

Possible cause of faults:

› Harness connection is abnormal.

› Abnormal RSDS-R node

DTC removal condition: Valid signals sent by RSDS-R have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use a diagnostic instrument to check whether the RSDS-R diagnosis is available.	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check whether RSDS-R is abnormal.	Replace RSDS-R and go to step 6.	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace RSDS-R.

U100487

DTC definition: communication with AVM lost

DTC occurring condition: the signal, sent from AVM, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- AVM node is abnormal.

DTC removal condition: Valid signals sent by AVM-R have been received in 10 continuous cycles.

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter AVM diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Inspect whether AVM is abnormal	Replace AVM, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace AVM

U014387

DTC definition: communication with IFV (LDW/IFC) lost

DTC occurring condition: The signal sent by IFV(LDW/IFC) has not been received for more than 10 cycles.

Possible cause of faults:

- Harness connection is abnormal.
- IFV (LDW/IFC) node is abnormal.

DTC removal condition: the effective signal, sent from IFV (LDW/IFC), has been received for 10 cycles

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs

Steps	Operation	Yes	No
3	Use a diagnostic instrument to check whether the IFV(LDW/IFC) diagnosis is available.	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check if IFV (LDW/IFC) is abnormal	Replace IFV(LDW/IFC) and go to step 6.	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace IFV (LDW/IFC)

U101487

DTC definition: communication with ELD lost

DTC occurring condition: the signal, sent from ELD, has not been received for more than 10 cycles

Possible cause of faults:

- Harness connection is abnormal.
- Abnormal ELD node.

DTC removal condition: 10 cycles of effective signals received from ELD

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter ELD diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Check ELD for abnormality	Replace ELD, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace ELD

U102987

DTC definition: communication with WPC lost

DTC occurring condition: the signal, sent from WPC, has not been received for more than 10 cycles

Possible cause of faults:

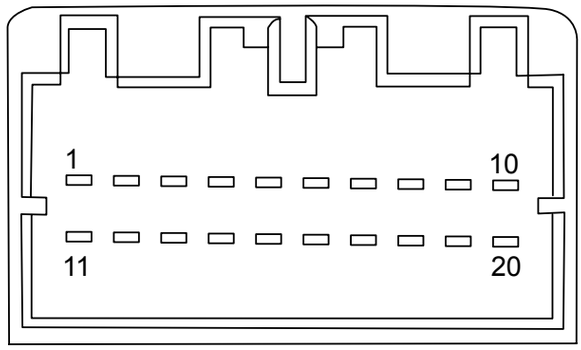
- Harness connection is abnormal.
- Abnormal WPC node.

DTC removal condition: 10 cycles of effective signals received from WPC

Troubleshooting method:

Steps	Operation	Yes	No
1	The vehicle is stationary, and the power mode is switched to the ON position.	Go to step 2	The power mode is switched to the ON position.
2	Read whether GW has fault code with diagnostic instrument	Go to step 3	Troubleshoot other DTCs
3	Use diagnostic instrument to check if it is possible to enter WPC diagnosis	Check for false connection of harness	Go to step 4
4	Check the harness for open circuit or short circuit.	Replace the harness	Go to step 5
5	Inspect whether WPC is abnormal	Replace WPC, and go to step 6	Go to step 6
6	Clear the DTC, restart the vehicle and check to see if the fault is eliminated	The fault is cleared, and the system is normal	Replace WPC

Pin definition



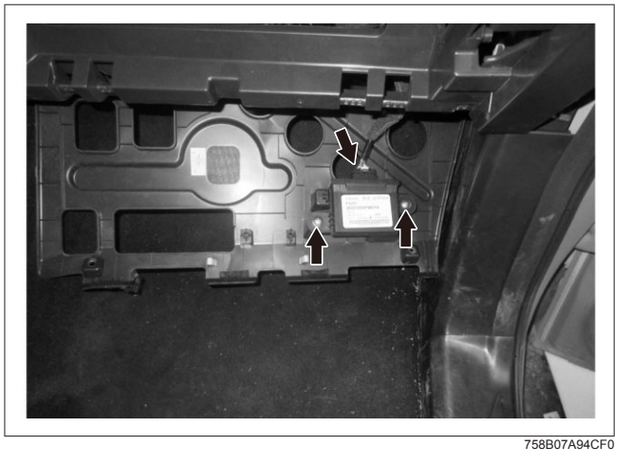
397BDADE74A3

Pin No.	Function	Pin No.	Function
1	BD-CAN high	2	PT-CAN high
3	—	4	SC-CAN high
5	—	6	DG-CAN high
7	—	8	—
9	—	10	—
11	BD-CAN low	12	PT-CAN low
13	—	14	SC-CAN low
15	—	16	DG-CAN low
17	—	18	KL15 (ignition power supply)
19	KL30 (battery power supply)	20	Ground

Removal/installation

Removal

1. Disconnect the negative terminal of the battery.
2. Remove front passenger side foot block
3. Disconnect harness connector and remove the 2 screws



758B07A94CF0

4. Remove the gateway

Installation

1. Perform installation work in reverse order of removal