



EPS system

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KX11 adopts DP-EPS , the structure is as follows:

DP: Double pinion, pinion and reduction gear

The torque provided by the motor is amplified by the reduction gear and then transmitted to the pinion

The torque provided by the driver and the torque provided by the motor are both transmitted to the rack through the pinion, and then rack moves to achieve steering.



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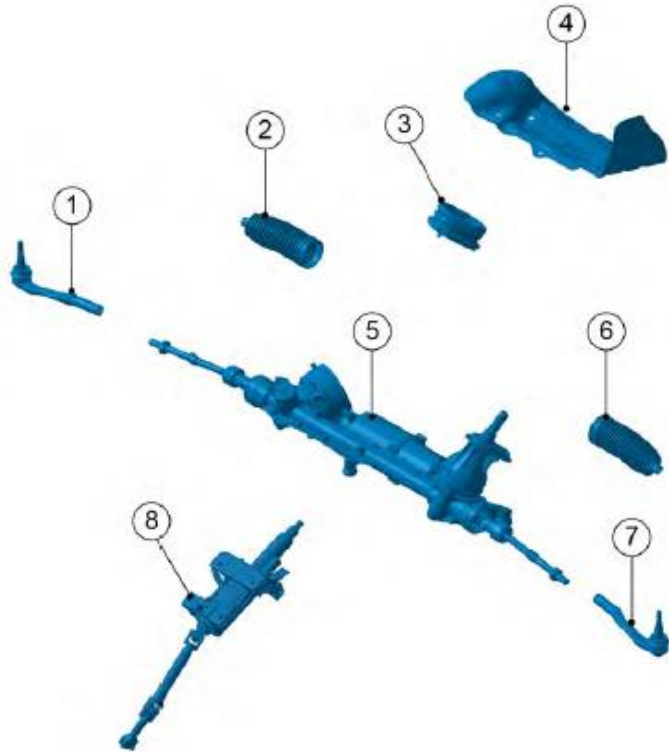
Overview

▶ **Structure and principle**

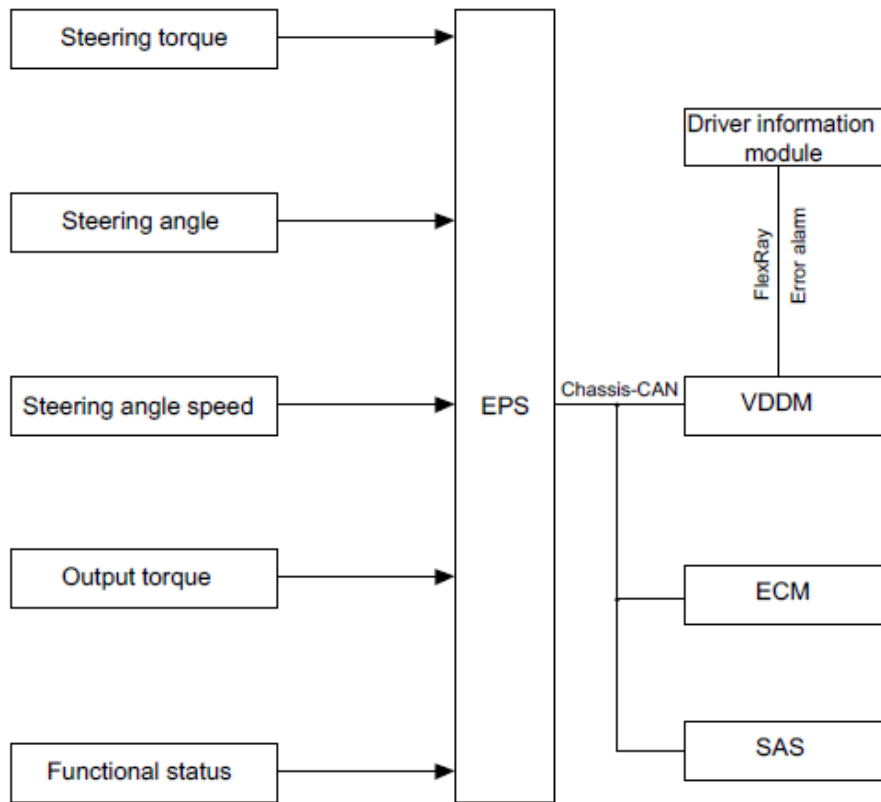
Maintenance and Diagnosis



EPS system structure



1. Steering gear right outer pull rod
2. Corrugated pipes as-steering gear components
3. Steering gear dust cover
4. Steering gear heat shield
5. Electric power steering body
6. Corrugated pipes as-steering gear components
7. Steering gear left outer tie rod
8. Steering column assembly mechanical



Basic control strategy:

1. The driver turns the steering wheel;
2. The torque sensor detects the steering torque, and sends the signal to the ECU control unit (EPS/PSCM);
3. According to the torque signal and vehicle speed signal, the control unit decides how much assisting power the motor provides based on the pre-calibrated assisting power curve. The torque provided by the motor is amplified by the reduction gear and transmitted to the pinion;
4. The torque provided by the driver and the torque provided by the motor are both transmitted to the rack through the pinion, and then rack moves to achieve steering.



➤ Variable assist

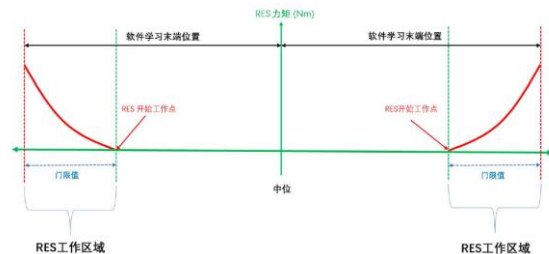
Providing different steering assistance according to different vehicle speeds to achieve high-speed steering stability and low-speed lightness

➤ Active Return

Assisting the driver to turn the driving wheel back to the middle position, makes the driving process more comfortable.

➤ End stop protection

In the steering gear, the rack travel range for steering is limited due to the existence of the mechanical end stop . In order to avoid the noise and the mechanical damage caused by the impact, the function is realized by the software end stop before reaching the mechanical end stop.



Steering Assist Mode



On MMI, click in turn: Vehicle Settings → Shortcuts Control → Steering Force of Steering Wheel

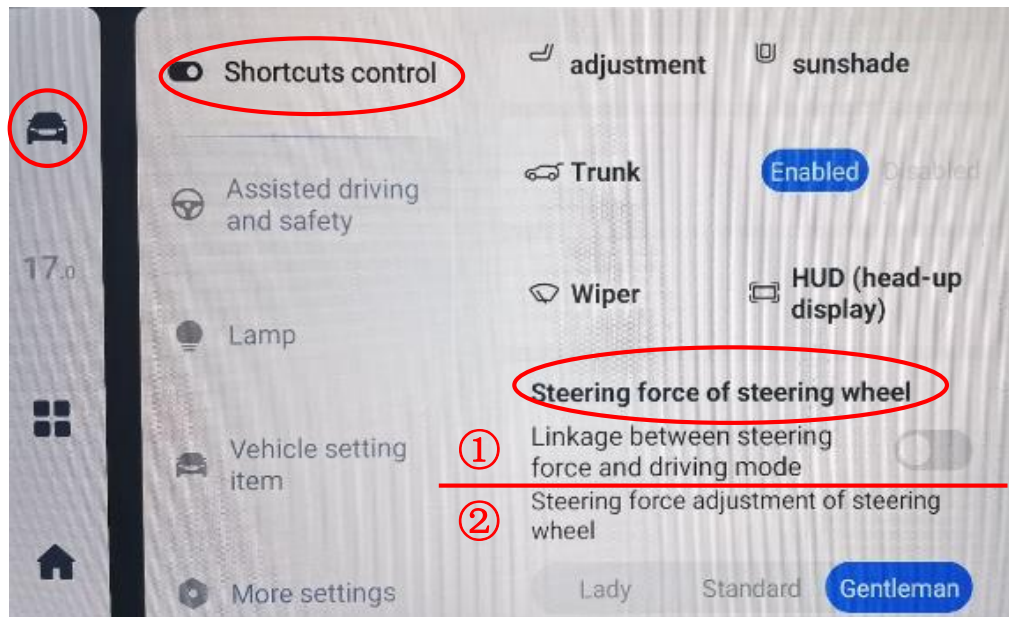
➤ The linkage of steering force and driving mode

After the function is enabled, the steering force of steering wheel will match the selected driving mode.

➤ Steering force adjustment

- Lady: compared with standard mode, the steering assistance increases. It feels gentle and flexible;
- Standard mode: moderate steering assistance, moderate steering feeling;
- Gentleman: compared with standard mode, steering assistance decreases. It feels firmly heavy.

Only when the linkage of steering force and driving mode function is disabled, the steering force adjustment can be set.



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ECUs

Other

ID	Name
	PSCM
6/163	Power Steering Control Module (PSCM)

DTCs Documents Wiring Diagrams Parameters Activations Diagnostic Seq

Confirmed Unconfirmed All DTCs

- DTC
- PSCM-C052A62 Steering Angle Sensor Module Correlation. Algorithm Based Failures. Signal compare failure.
 - PSCM-C102D07 High Friction Inside Power Steering. Mechanical failures.
 - PSCM-C102D74 High Friction Inside Power Steering. Mechanical Failures. Actuator slipping.
 - PSCM-C102D79 High Friction Inside Power Steering. Mechanical Failures. Mechanical linkage failure .
 - PSCM-C105602 Internal Connected Sensor Faults. General signal failure.
 - PSCM-C107279 Freezing Detection. Mechanical Failures. Mechanical linkage failure .
 - PSCM-C200C96 Steering Shaft Torque Sensor 2. Component Failures. Component internal failure.
 - PSCM-P061A62 Internal Control Module Torque Performance. Algorithm Based Failures. Signal compare failure.
 - PSCM-U002888 Chassis CAN. Bus Signal / Message Failures. Bus off.
 - PSCM-U012687 Lost Communication With Steering Angle Sensor Module (SAS). Bus Signal / Message Failures. Missing message.



Network

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ECUs Other

ID	Name
	SAS
4/68	Steering Angle Sensor Module (SAS)

DTCs Documents Wiring Diagrams Parameters Activations Diagnostic Seq

Confirmed Unconfirmed All DTCs

DTC

- SAS-C1B0085 Steering angle sensor. Bus Signal / Message Failures. Signal above allowable range.
- SAS-C1B008F Steering angle sensor. Bus Signal / Message Failures. Erratic.
- SAS-C1B009A Steering angle sensor. Component Failures. Component or system operating conditions.
- SAS-U002800 Chassis CAN.
- SAS-U002888 Chassis CAN. Bus Signal / Message Failures. Bus off.
- SAS-U102294 ECU Quiescent Current Too High, No Network Communication Requested. Component Failures. Unexpected operation.
- SAS-U120100 Intermittent Communication Problem with Chassis CAN Domain Master.
- SAS-U230054 Central Configuration. System Programming Failures. Missing calibration.
- SAS-U230055 Central Configuration. System Programming Failures. Not configured.
- SAS-U230056 Central Configuration. System Programming Failures. Invalid or incompatible configuration.



VIN: LB37852D2MS006189
Model/Year/Chassis: KX11, 2021, 006189

Connection: Virtual #1
12.1 V Active

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ECUs

Other



ID	Name
<input type="text"/>	<input type="text" value="PSCM"/>

6/163 Power Steering Control Module (PSCM)

DTCs Documents Wiring Diagrams Parameters Activations Diagnostic Seq

Parameters Selected

Parameter

- Control module temperature - PSCM
- Steering angle from SAS - PSCM
- Steering shaft, torque - PSCM
- Supply voltage to CEM (reference voltage) - PSCM
- Supply voltage to control module - PSCM
- Temperature, power steering motor - PSCM
- Usage mode - PSCM
- Vehicle speed - PSCM

Control module temperature - PSCM

Parameter usage:

The parameter shows the temperature in the Power Steering Control Module (PSCM).



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ECUs **Other**

ID	Name
	SAS

4/68 Steering Angle Sensor Module (SAS)

Documents

Wiring Diagrams

Parameters

Activations

Diagnostics Sequences

Parameters **Selected**

Parameter

- Steering Angle Sensor Module (SAS) internal errors - SAS
- Steering Angle Sensor Module (SAS) internal errors - SAS
- Steering Angle Sensor Module (SAS) internal errors - SAS
- Steering Angle Sensor Module (SAS) status - SAS
- Steering wheel angle - SAS
- Steering wheel angle speed - SAS
- Supply voltage to CEM (reference voltage) - SAS
- Supply voltage to control module - SAS
- Total distance - SAS
- Total odometer - SAS
- Usage mode - SAS



Steps after replacing EPS

- Reload software →
- End stop protection learning
- Ensure that the four-wheel alignment calibration and the SAS(steering angle sensor) calibration is completed;
- Start the engine;
- Turn the steering wheel to the left end stop position (mechanical stop);
- Turn the steering wheel to the right end stop position (mechanical stop);
- Turn the steering wheel back to the middle position.

The screenshot shows a software management interface with two main panels. The left panel displays a table of software items, and the right panel shows a 'Selected Software' section.

Part Number	Description	Comments	Size (...)	Download Time (min)
8892406575	PSCM reload		1702	1

Buttons: Add Software

Order ID	Order Date	Expiration Date	Order Status
			Initialized

Selected Software

Part Number	Description	Comments	Size (KB)	Download TI...
8892406575	PSCM reload		1702	1

Buttons: Remove, Purchase, Order for Independent Workshop

Caution:

The duration of the steering wheel in the steering limit position should not exceed 5s, otherwise the motor may be damaged.

Calibration of SAS



After replacing SAS/VDDM, do the calibration of SAS on VDDM module.

The screenshot displays the Geely diagnostic software interface. At the top, there is a navigation bar with 'Home', 'KX11, 2021', and '扬毅 陈'. Below this, the 'Diagnostics' and 'Software' tabs are visible. The main interface shows a vehicle profile for a Geely SUV with VIN: LB37852D2MS006189 and Model/Year/Chassis: KX11, 2021, 006189. The connection status is 'Virtual #1' and 'Active' with a voltage of 12.1 V. The 'Diagnostic Sequences' menu is open, showing a list of tests. The test 'Calibration of the Steering Angle Sensor Module (SAS) and sensors in the IMU' is highlighted with a red oval, and a red arrow points to its information panel on the right. The information panel includes details about the sensors being calibrated and the preconditions for the test.

Home KX11, 2021 X 扬毅 陈

吉利汽车 GEELY AUTO Diagnostics Software

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ECUs Other

ID	Name
	VDDM
4/163	Vehicle Dynamics Domain Master (VDDM)

Documents Wiring Diagrams Parameters Activations Diagnostic Sequences

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Diagnostic Sequences

- Bleeding of brakes
- Brake Plate Maintenance Mode Switch
- Calibration of the Steering Angle Sensor Module (SAS) and sensors in the IMU
- EPB Calibration (Left ECU)
- Height Sensors Calibration
- Pump Motor Slow Down Test

Information

The test will calibrate the following sensor in the Vehicle Dynamics Domain Master (VDDM).

- Steering Angle Sensor Module (SAS) (located in the Steering Wheel Module (SWM))

The test will calibrate the following sensors located in the inertial measurement unit (IMU), which is physically located in the Supplemental Restraint System Module (SRS).

- Lateral acceleration sensor
- Longitudinal acceleration sensor
- Yaw rate sensor

Preconditions

Before running this test it is important to check the control module for internal errors. The test cannot be started if any DTCs concerning internal errors are set.

Instructions

- Park the vehicle on a level surface with the wheels pointing straight ahead.
- Release the brake pedal (no braking).
- Turn on the ignition.
- Press "Calibrate".

Steering Angle Sensor Module (SAS) calibration status

Calibrating the inertial measurement unit (IMU)

Calibrate Close



快乐人生 吉利相伴

1760, Jiangling Road, Binjiang District, Hangzhou,
Zhejiang Province, P, R.China, 310051

www.geely.com

No.918,Binhai 4th Rd. Hangzhou Bay New District,

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