



# 2023 KX11 PHEV Power Battery Manual (SVOLT)

The manual provides specifications, diagnostics, and repair service information on 113Ah

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# Warnings

Disassembling the power battery is a specialized and hazardous work. Failure to receive professional training related to servicing may increase the risk of injury, property damage, and failure to perform repair operations properly. The power battery servicing procedures recommended in this manual have been carefully developed by professional Geely technicians. This manual is very helpful to technicians who have not been trained by Geely, and also can reduce the risk taken by technicians who have received our servicing training and experience in performing servicing operations. However, all users of this manual should be aware of the minimum safety precautions.

The "WARNINGS" and "CAUTIONS" contained in this manual will alert technicians of average experience to hazards that are not frequently encountered. These "WARNINGS" and "CAUTIONS" must be strictly adhered to during the servicing of the vehicle to minimize injury or death and to prevent damage to the power battery caused by irregularities in servicing and repair or unsafe conditions that may still exist in the repaired power battery. These "WARNINGS" and "CAUTIONS" are not superfluous, but are very important reminders. Due to the dangerous consequences of failing to follow the servicing procedures, it is not possible to complete this manual with all the "WARNINGS, CAUTIONS".

The recommended procedures described in this manual are very effective for servicing and repair work. Some of the servicing tools have been specially designed for specific servicing procedures. Service personnel must use Geely's recommended servicing procedures and special servicing tools during the repair process. It is necessary to ensure their own safety and the safety of the vehicle.

Replacement parts must be Geely original replacement parts or parts matching the quality of Geely original replacement parts.

Geely is not responsible for any problems that may arise from the use of this manual. Causes of these problems include lack of training related to the servicing, use of incorrect tools, use of parts of inferior quality to Geely original replacement parts, and other causes.

# Contents

This operation manual is for the Geely power battery SVOLT (113Ah) and explains in detail the procedures for its removal and installation.

As changes in the content of the manual will affect the servicing procedures for this power battery SVOLT (113Ah), information about additions to this version is available from Geely dealers and this manual should be kept up-to-date in real time.

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## 1.1 Overview

### 1.1.1 Power battery overhaul warnings

#### 1.1.1.1 Warnings and Cautions

##### Warnings about Disassembling the Power Battery

###### Warning !

###### Servicing Site Requirements:

- Safety isolation measures are required prior to the servicing operation: isolation using guardrails and erection of high-voltage warning signs to warn uninvolved persons to stay away from the area to avoid safety accidents.
- Water-based fire extinguishers must be provided in the designated locations of the servicing site, so that a large amount of water can be used to extinguish the fire when the power battery catches fire.
- Keep the working environment clean and well ventilated, away from liquids and flammable materials.

###### Warning !

Servicing personnel must wear insulating protective equipment before operation:

- Wear the insulating protective clothing.
- Wear the insulating shoes.
- Wear the protective glasses or face shield.
- Wear the insulated gloves (according to the work situation to choose the appropriate insulating gloves or anti-battery electrolyte acid-alkali gloves).

###### Warning !

###### Insulating tools:

- Pad the servicing area with insulating rubber mats.
- Servicing personnel must use the insulating tools when working on energized parts. Before using insulating tools, insulating protective gear must be checked for damage, hole and crack, clean and dry internal and external surfaces, and must not be operated with water to ensure safety.
- The high-voltage output part must be wrapped with a special protective cover or insulating tape immediately after disconnecting the power battery high-voltage connector.
- When disassembling the power battery and the electronic control components, a special workbench with insulating mats must be used.

###### Precautions for Safety during Servicing

###### Caution

When repairing the power battery assembly, a full-time guardian must be set up, and the guardian and the servicing personnel must have the nationally recognized "Special Operation Certificate (Electrician)" and "Junior (or above) Electrician Certificate" (professional qualification certificate).

The guardian's duty is to supervise the whole process of servicing.

1. Check if supervision and servicing personnel for dismantling the power battery assembly, tool use, protective gear wear, spare parts safety protection, servicing safety warning signs, etc. are meeting the requirements.

2. Responsible for the servicing process of the safety servicing operation procedures to check, the guardian should be in accordance with the safety servicing operation procedures to direct the operation, the servicing personnel inform the guardian after completing an operation, the guardian should mark in the operation procedure table.

### Precautions for the Cooling System

#### Caution

After the cooling system is installed, perform an air tightness test.

### Precautions for the Power Battery after Completion of Assembly

#### Caution

After the power battery is assembled, it is necessary to perform an airtightness test.

### 1.1.2 How to use this manual

#### 1.1.2.1 Scope of Topics

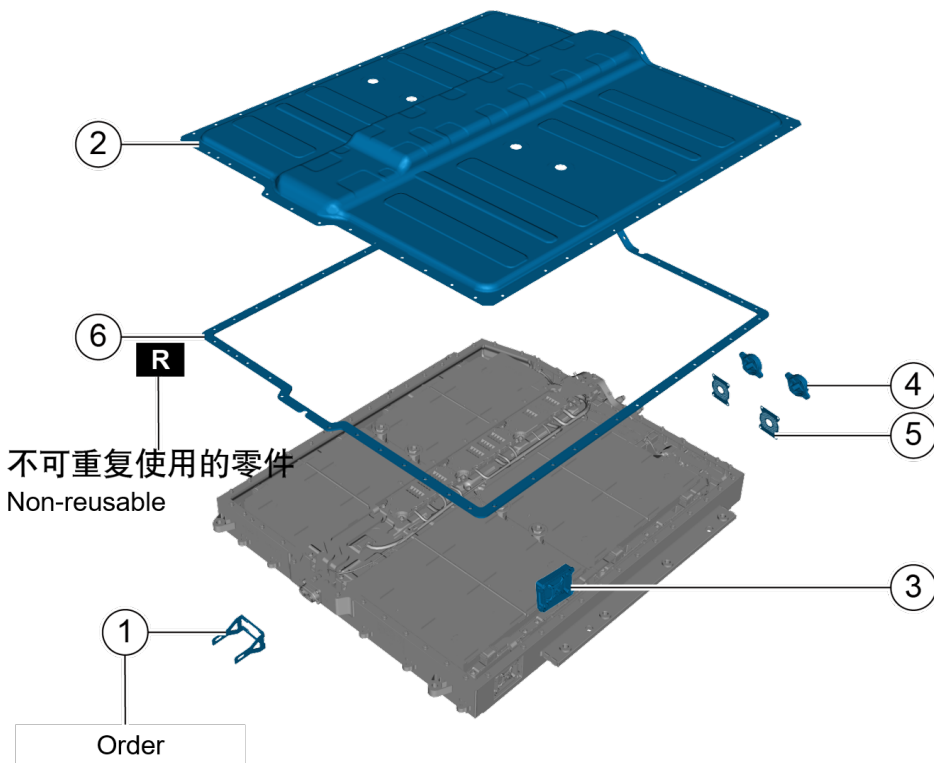
This manual contains procedures for all required overhaul operations, which are divided into the following basic operations:

- a. Removal
- b. Disassembly
- c. Inspection
- d. Installation

#### 1.1.2.2 Repair Procedures

The description of most repair protocols is preceded by a general overview diagram.

- a. State the names of the parts and how they are combined, and describe the visual inspection method. Provides instructions for performing systematic removal and installation procedures.
- b. The overview diagram identifies non-reusable parts.
- c. Main components covered by the servicing procedures are illustrated with corresponding numbered diagrams.



1. Bracket (plug)
2. Battery pack upper housing
3. Explosion-proof valve (1)
4. Explosion-proof valve (2)
5. Fire filter
6. Sealing strip

### 1.1.2.3 Symbols

The following symbols indicate how to use the material or how to use it during servicing.

Symbols	Meaning	Material type
<b>R</b>	Non-reusable, removal requires replacement of new parts	Sealing gasket, cushioning foam, etc.

### 1.1.2.4 Indicative informations

Throughout this manual, you will find several warnings, cautions, and specifications.

#### WARNINGS

A warning indicates that ignoring the caution could result in damage to the vehicle, parts, or serious personal injury or death.

#### CAUTIONS

A caution provides additional information that will assist in accomplishing a particular protocol.

#### SPECIFICATIONS

A specification establishes the permissible extent of an inspection or adjustment operation.

### 1.1.3 Unit

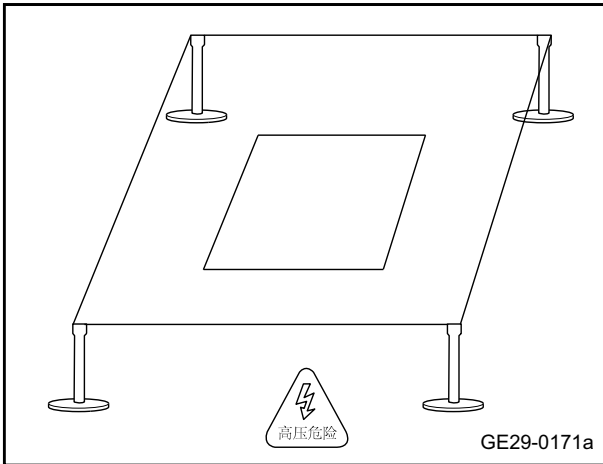
#### 1.1.3.1 Unit

Current	A (Ampere)
Electrical power	W (Watt)
Resistance	$\Omega$ (ohm)
Voltage	V (Volt)
Capacitance	Ah (Ampere-hour)
Length	mm (millimeter)
Torque	N·m (Newton metre)
Weight	g (g), kg (kg)
Electricity	kWh (kilowatt-hour)
Energy density	W·h/kg (watt per kilogram)
Pressure	kPa (kilopascal)

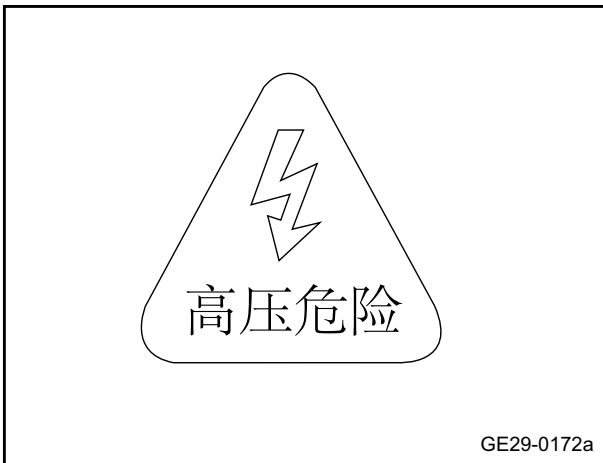
## 1.1.4 Basic procedures

### 1.1.4.1 Preparation

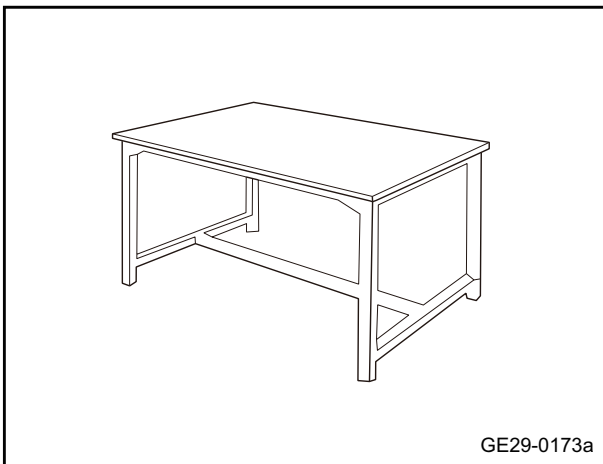
#### Site Preparation



- Servicing of the power battery must be carried out in a dedicated workstation with insulating mats in the servicing area.

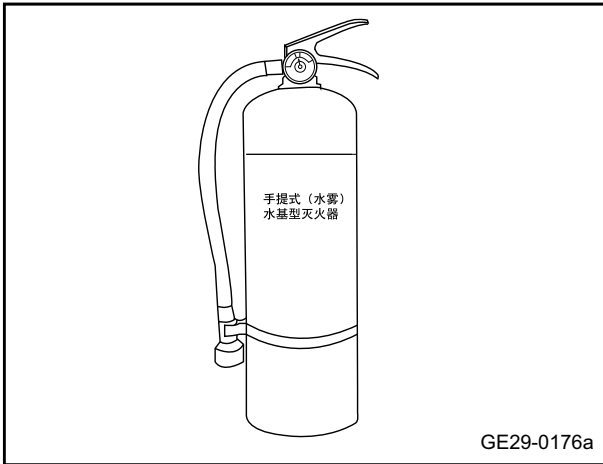


- Protective fencing must be placed around the dedicated work station, and safety warning signs such as "High Voltage Work", "High Voltage Danger", and "Stop/High Voltage Danger" must be provided.



- The site must be equipped with a special insulating workbench.

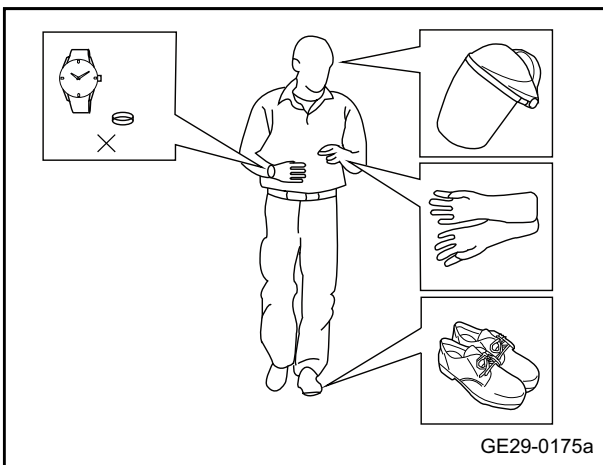




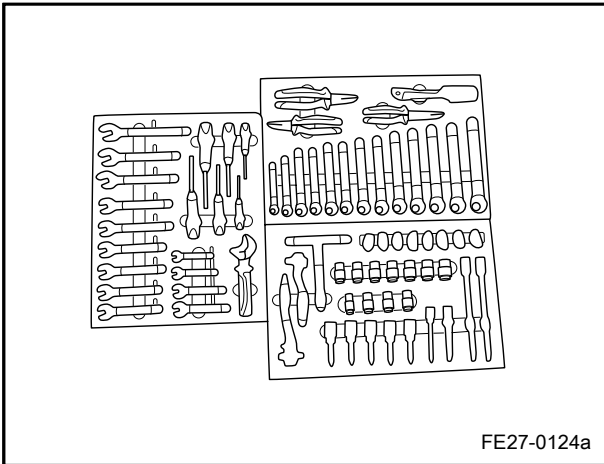
- Water-based fire extinguishers must be provided in the site.

- Keep the working environment clean and well ventilated, away from liquids and flammable materials.

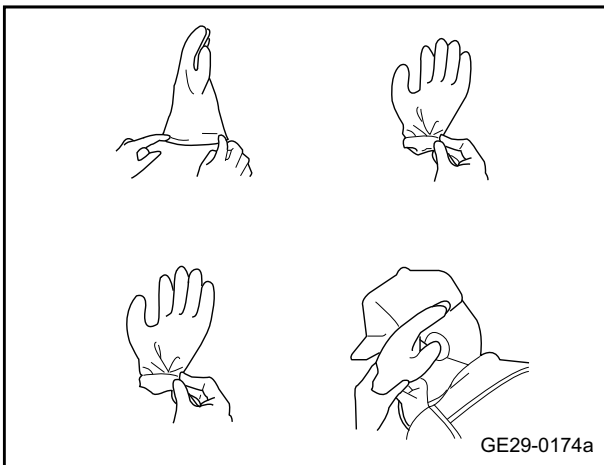
### Preparation of the Protective Equipment and Insulating Tools



- Preparation of protective equipment: insulating protective clothing, insulating shoes, insulating gloves, goggles, protective mask, anti-acid and alkali gloves.
- Please wear protective equipment correctly. For example, helmets must be laced and cuffs should be tied into insulating gloves. It is forbidden to wear watches, bracelets, rings and other metal objects to prevent accidental electric shock.



- Preparation of insulating tools: commonly used insulating tools.

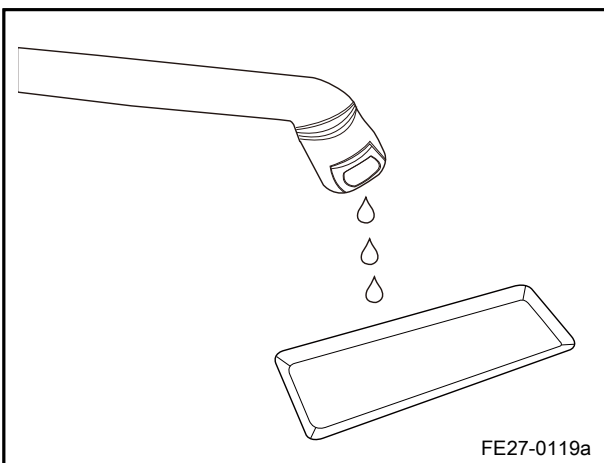


- Inspection of protective equipment: Check whether the insulating gloves are within the validity period and whether they are dirty, broken or leaking. If there are any of the above problems, a new pair of gloves must be replaced and rechecked; check whether the protective clothing, insulating shoes, goggles protective and masks, etc. are damaged.

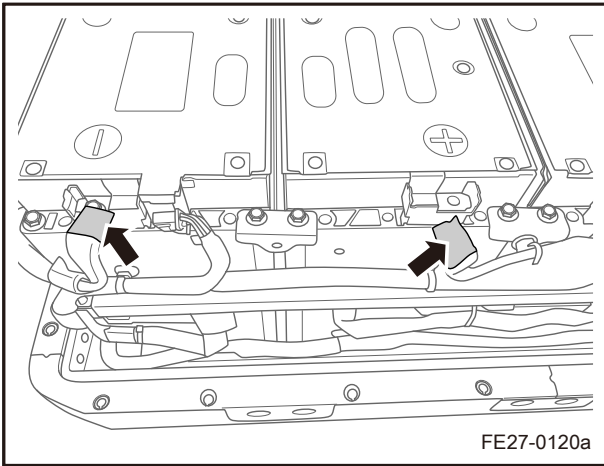
#### 1.1.4.2 Removal

##### Water Tube

When the water tube fitting is pulled out, catch it in a container to avoid spillage of incompletely extracted coolant on the module and electrical equipment.



##### Copper Row



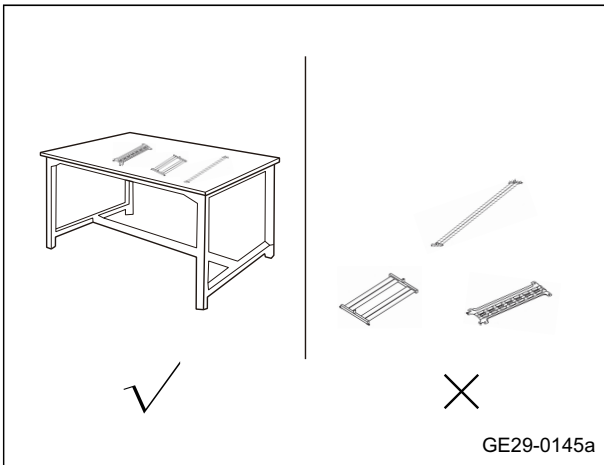
The removed copper rows need to be covered with insulating shields.

**Warning !**

When disconnecting the power battery module harness, follow the order of "low voltage first, then high voltage".

**1.1.4.3 Placement of Parts**

- All removed parts should be sorted and placed in a clean, dust-free environment for reassembly.
- Label and store separately any replacement parts that are needed.

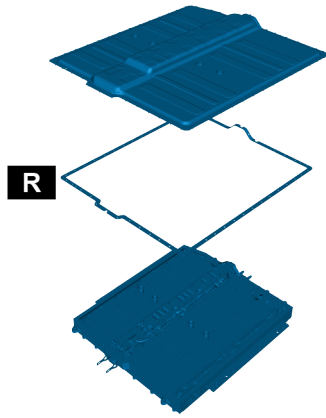


#### 1.1.4.4 Reassembly

When assembling each part, be sure to strictly adhere to the specification data, such as tightening torque.

##### Caution

Sealing trips are not reusable and need to be replaced with new parts after each removal.



## 1.1.5 Electrical system

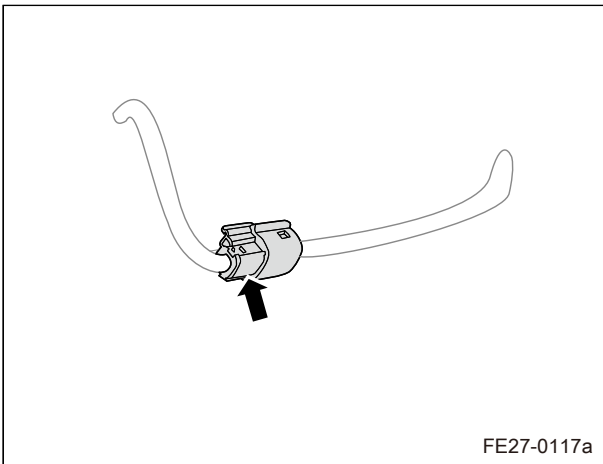
### 1.1.5.1 Connector

#### Disconnecting the connector

When disconnecting the harness connector, operate the harness connector by grasping both ends. Disconnect the harness connector by pressing or pulling up the locking handle as shown in the figure.

#### Warning !

It is prohibited to grasping the harness for disconnecting the connector.

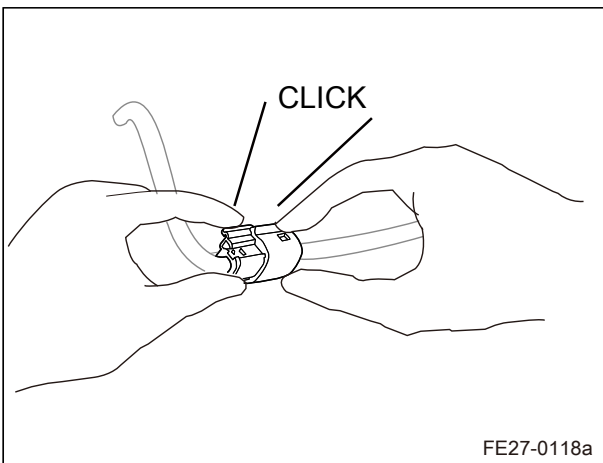


#### Installing the Connector

When locking the harness connector, hear a "click" to indicate that the connector is locked.

#### Caution

To confirm that the harness connector is secure, follow the "one plug, two clicks, three confirms" procedure.



## 1.1.6 Abbreviations

### 1.1.6.1 Abbreviations

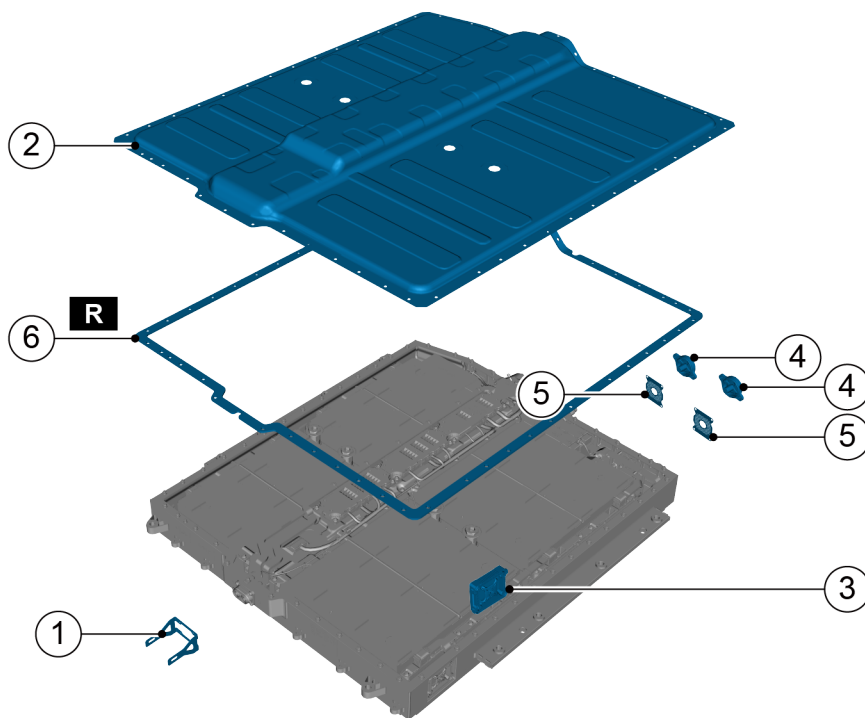
BMS	Battery Management System
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## 2.1 Power battery

### 2.1.1 Removal of the Hybrid Power Battery Assembly Upper Housing

#### 2.1.1.1 Removal of the Battery Pack Upper Housing

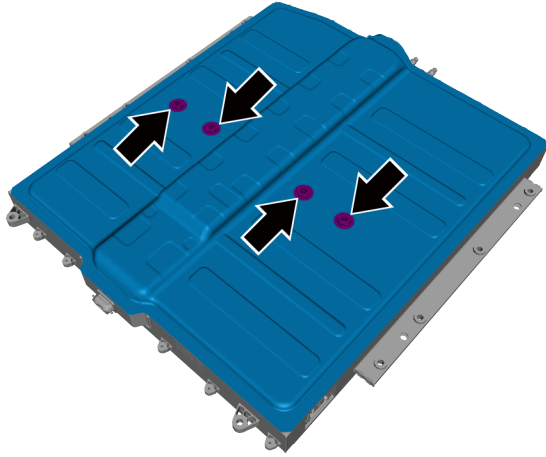
Remove in the order indicated in the diagram.



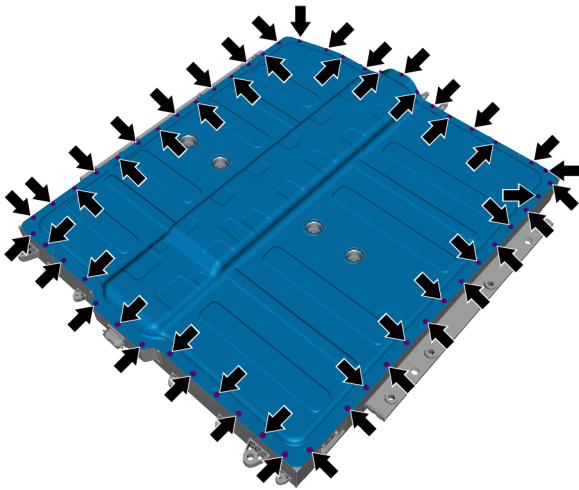
- |                               |                              |
|-------------------------------|------------------------------|
| 1. Bracket (plug)             | 4. Explosion-proof valve (2) |
| 2. Battery pack upper housing | 5. Fire filter               |
| 3. Explosion-proof valve (1)  | 6. Sealing strip             |

### 2.1.1.2 Removal of the Battery Pack Upper Housing

- 1 Remove the 4 fixing nuts connecting the battery pack upper housing and the battery pack lower tray.



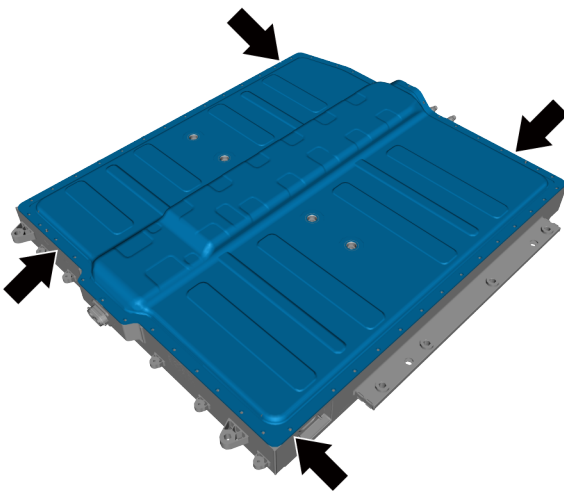




- 2 Remove the 54 fixing bolts connecting the upper housing of the battery pack and the battery pack lower tray.

**Caution**

When removing the fixing bolts of the battery pack upper housing, loosen the bolts firstly and then gradually remove the fixing bolts in several passes.



- 3 Use the plastic pry plate to pry open the battery pack upper housing and remove the battery pack upper housing.

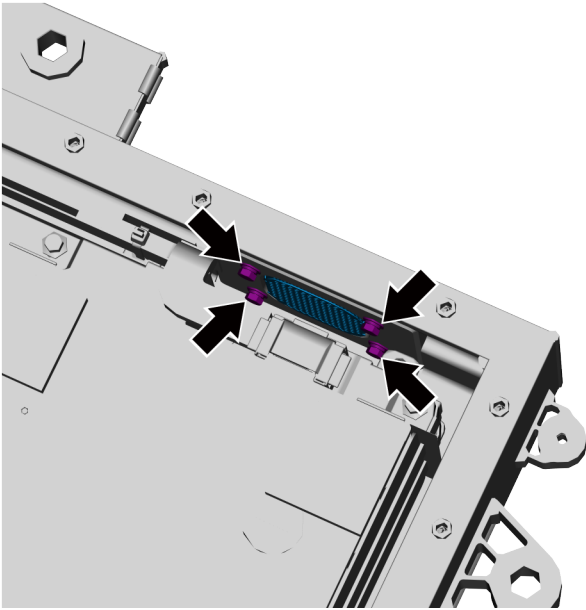
**Caution**

1. 2 people are required to work together to complete it.

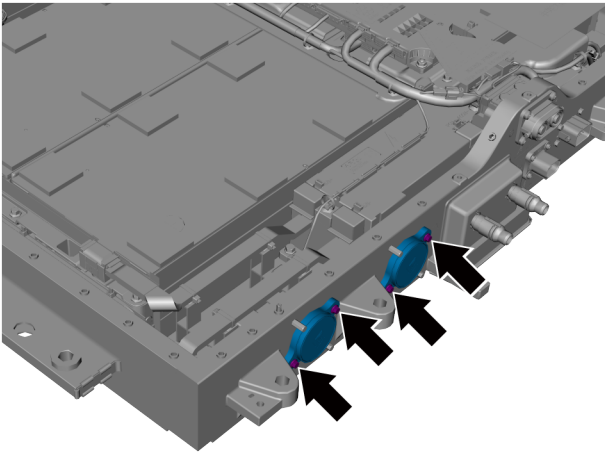
2. When prying open the battery pack upper housing, do not allow the battery pack upper housing to be deformed.

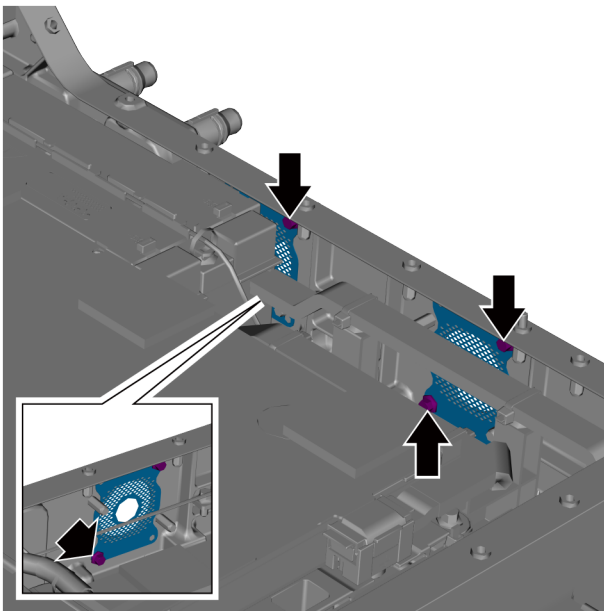
### 2.1.1.3 Removal of the Explosion-proof Valve

- 1 Remove the four fixing bolts connecting the explosion-proof valve (1) and the battery pack lower tray.
- 2 Remove the explosion-proof valve (1).



- 3 Remove the 4 fixing bolts connecting the 2 explosion-proof valves (2) and the battery pack lower tray.
- 4 Remove the 2 explosion-proof valves (2).





#### 2.1.1.4 Removal of the Fire Filter

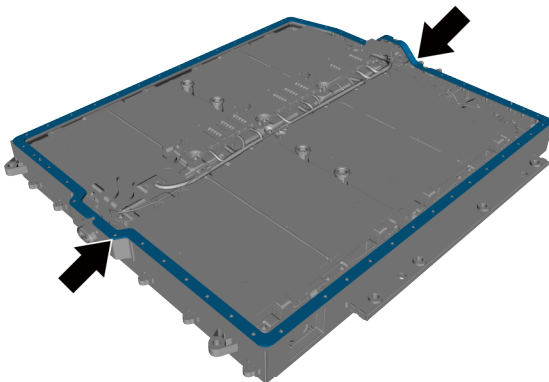
- 1 Remove the 4 fixing bolts connecting the fire filter and the battery pack lower tray.
- 2 Remove the fire filter.

#### 2.1.1.5 Removal of the Sealing Strip

- 1 Remove the sealing strip.

##### Caution

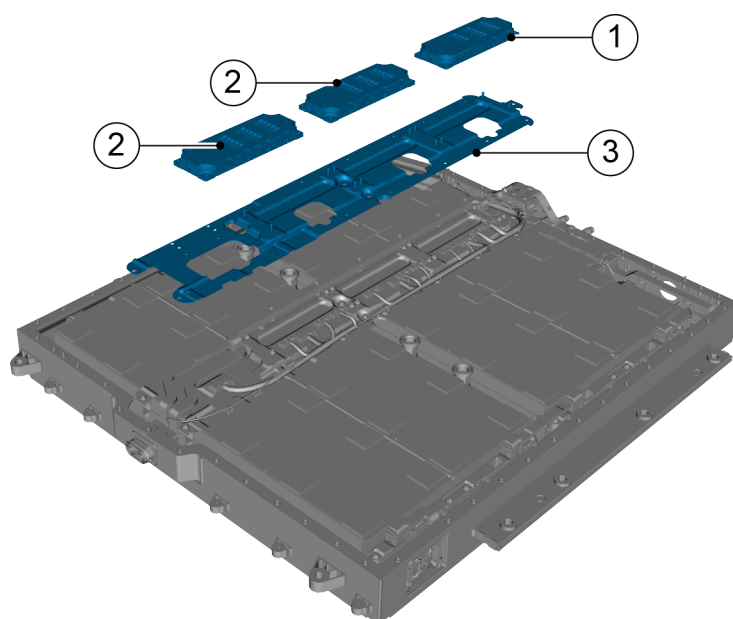
1. Clean the residual gel on the surface of the battery pack lower tray, do not damage the mounting surface.
2. The sealing strip is not reusable and needs to be replaced with a new piece after each removal.



## 2.1.2 Removal of the Battery Management System

### 2.1.2.1 Removal of the Battery Management System

Remove in the order indicated in the diagram.



1. Power battery control module (master board)
2. Power battery control module (slave board)

3. Power battery control module bracket

### 2.1.2.2 Removal of the Power Battery Control Module (main board)

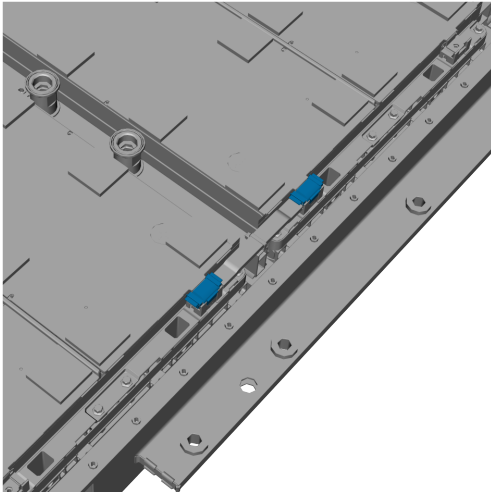
#### Caution

After disconnecting the high-voltage harness connector, the connector protective cover should be installed immediately, and it is strictly prohibited to touch the high-voltage harness connector directly with your fingers; no part of the high-voltage harness can be damaged during the disconnection process, and any metal tools should be prevented from touching the high-voltage harness connector.

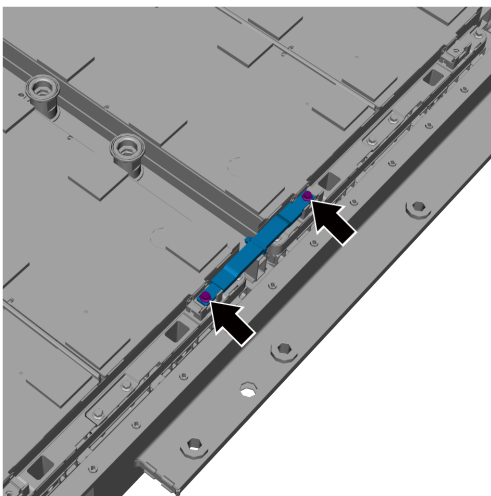
#### Warning !

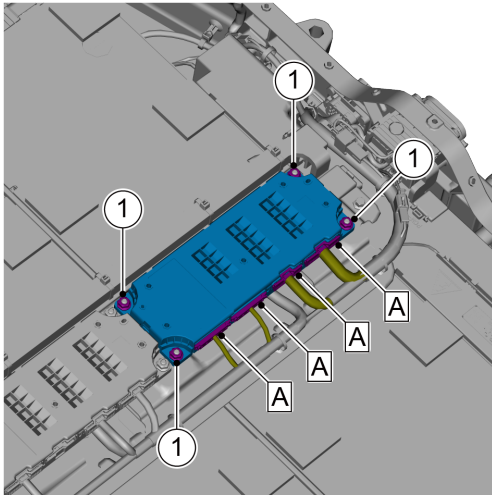
During the removal and installation process, safety glasses should always be worn, high-voltage insulating gloves should be worn, and insulating tools should be used when working.

- 1 Remove the protective cover.



- 2 Remove the 2 fixing bolts connecting the copper row (8) and the battery module.
- 3 Remove the copper row (8).





- 4 Remove the 4 fixing nuts 1 connecting power battery control module (main board) and the power battery control module bracket.
- 5 Disconnect the harness connector A connecting the power battery control module (main board) and the low-voltage harness.
- 6 Remove the power battery control module (main board).

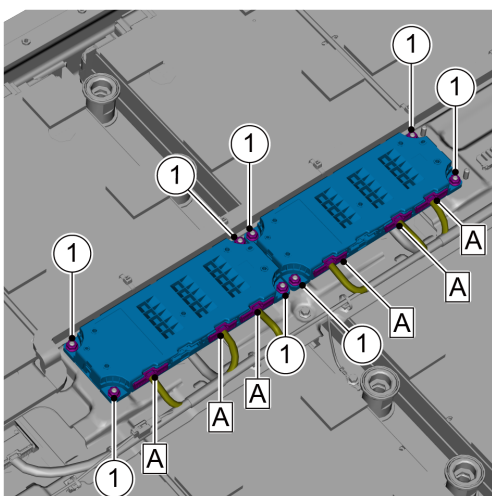
### 2.1.2.3 Removal of the power battery control module (slave board)

#### Caution

Disconnect the high-voltage harness connector, the connector protective cover should be installed immediately, and it is strictly prohibited to touch the high-voltage harness connector directly with your fingers; no part of the high-voltage harness should be damaged during disconnection, and any metal tools should be prevented from touching the high-voltage harness connector.

#### Warning !

During the removal and installation process, safety glasses should always be worn, high-voltage insulating gloves should be worn, and insulating tools should be used when working.



- 1 Remove the 8 fixing nuts 1 connecting the power battery control module (slave plate) and the power battery control module bracket.
- 2 Disconnect the harness connector A connecting the power battery control module (slave board) and the low-voltage harness.
- 3 Remove the power battery control module (slave plate).

### 2.1.2.4 Removal of the Power Battery Control Module Bracket

#### Caution

Disconnect the high-voltage harness connector, the connector protective cover should be installed immediately, and it is strictly prohibited to touch the high-voltage harness connector directly with your fingers; no part of the high-voltage harness can be damaged during the disconnection process, and any metal tool should be prevented from touching the high-voltage harness connector.

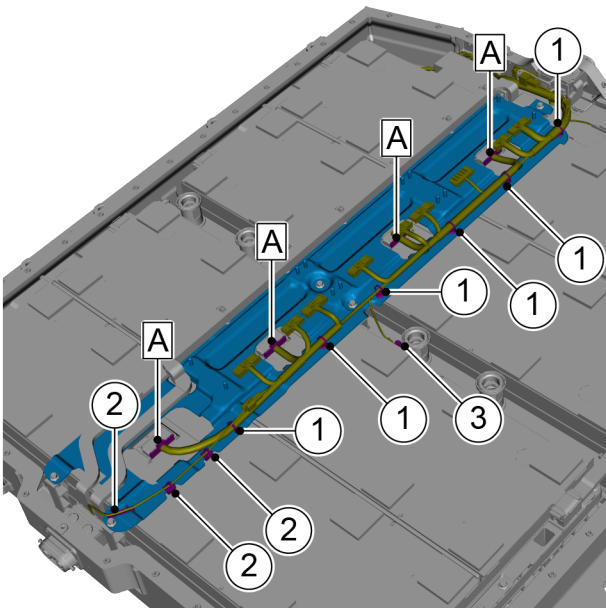
#### Caution

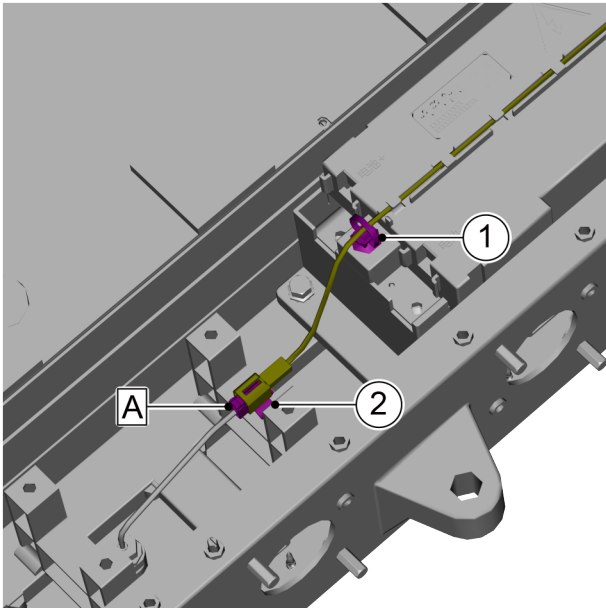
The removed copper rows need to be wrapped with insulating tape.

#### Warning !

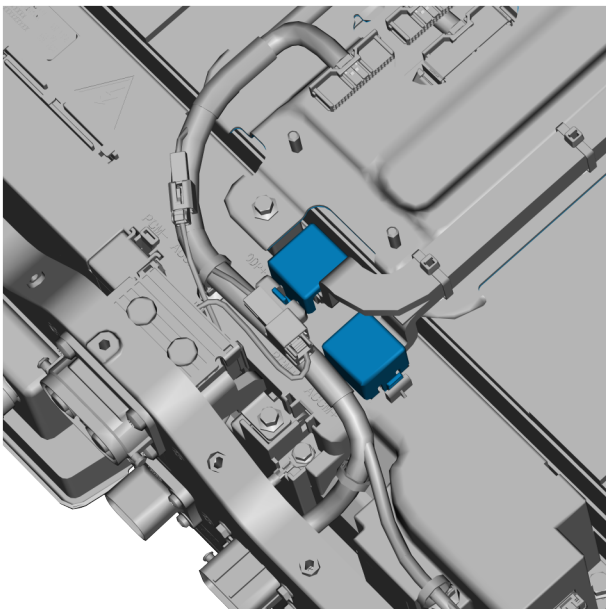
During the removal and installation process, safety glasses should always be worn, high-voltage insulating gloves should be worn, and insulating tools should be used when working.

- 1 Remove the 6 harness clips 1 connecting the low-voltage harness and the power battery control module bracket.
- 2 Remove the 3 harness clips 2 connecting the high-voltage plug (ODP) and the power battery control module bracket.
- 3 Remove the fixing bolt 3 connecting the low-voltage harness and the battery module.
- 4 Disconnect the harness connector A connecting the low-voltage harness and the battery module.

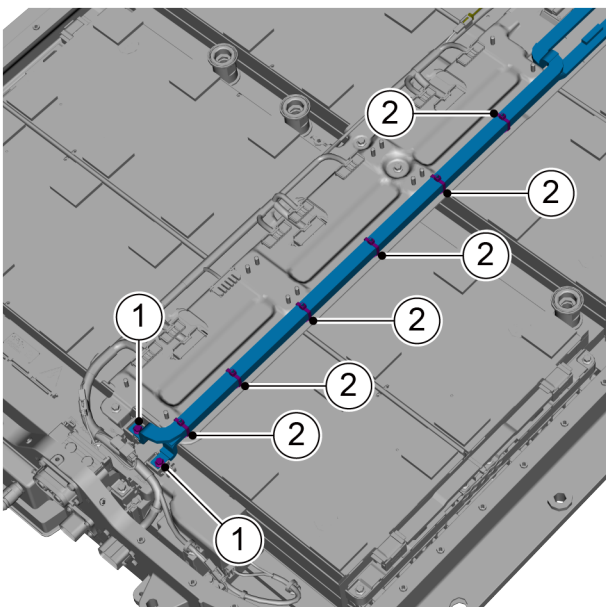




- 5 Remove the harness clip 1 connecting the low-voltage harness and the high-voltage control box.
- 6 Disconnect the harness clip 2 connecting the low-voltage harness and the battery pack lower tray.
- 7 Disconnect the harness connector A connecting the low-voltage harness and the battery pack lower tray.

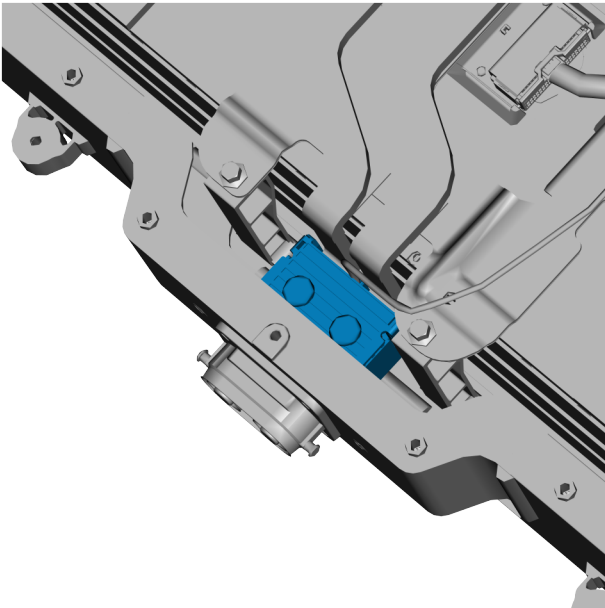


- 8 Remove the protective cover.

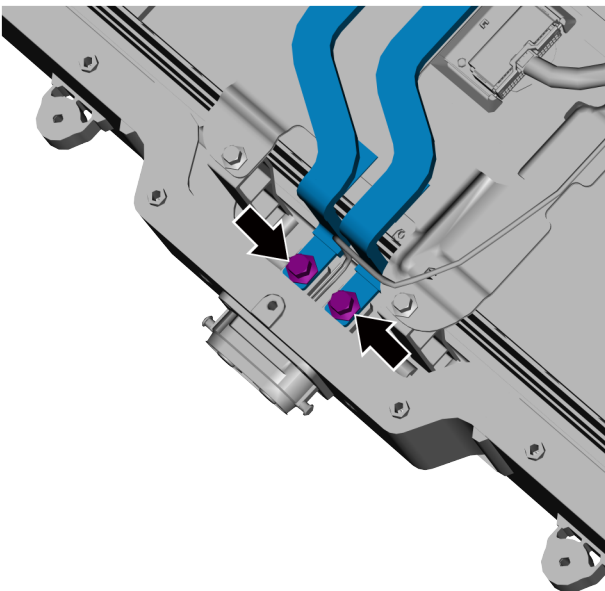


- 9 Remove the 2 fixing bolts 1 connecting the copper row (1) and the high-voltage control box.
- 10 Remove the 6 fixing clips 2 connecting the copper row (1) and the battery module.



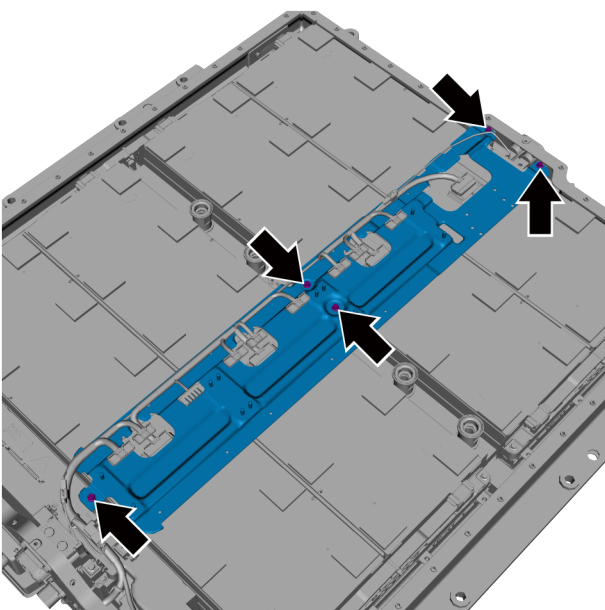


11 Remove the protective cover.



12 Remove the 2 fixing bolts connecting the copper row (1) and the high-voltage plug (ODP).

13 Remove the copper row (1).



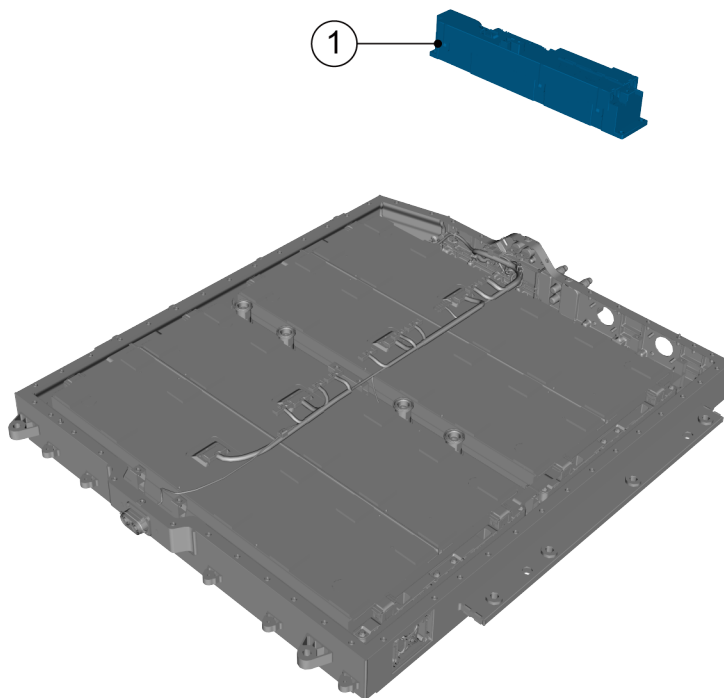
14 Remove the 5 fixing bolts connecting the hybrid power battery assembly bracket and the battery pack lower tray.

15 Remove the hybrid power battery assembly bracket.

## 2.1.3 Removal of the High-voltage Control Box

### 2.1.3.1 Removal of the High-voltage Control Box

Remove in the order indicated in the diagram.



1. High-voltage control box

### 2.1.3.2 Removal of the High-voltage Control Box

#### Caution

The removed copper rows need to be wrapped with insulating tape.

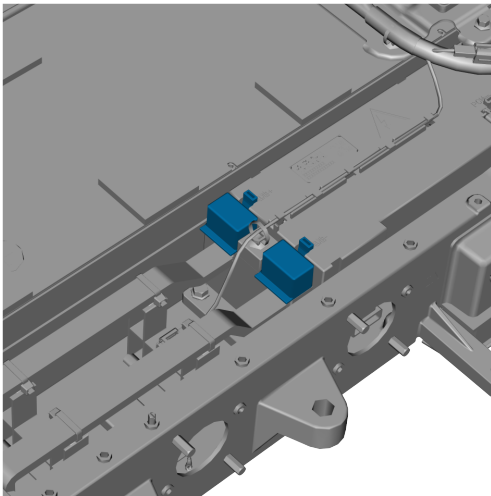
#### Caution

Disconnect the high-voltage harness connector, the connector protective cover should be installed immediately, and it is strictly prohibited to touch the high-voltage harness connector directly with your fingers; no part of the high-voltage harness should be damaged during disconnection, and any metal tools should be prevented from touching the high-voltage harness connector.

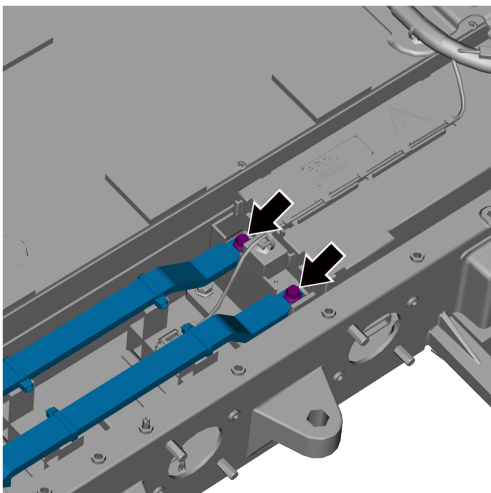
#### Warning !

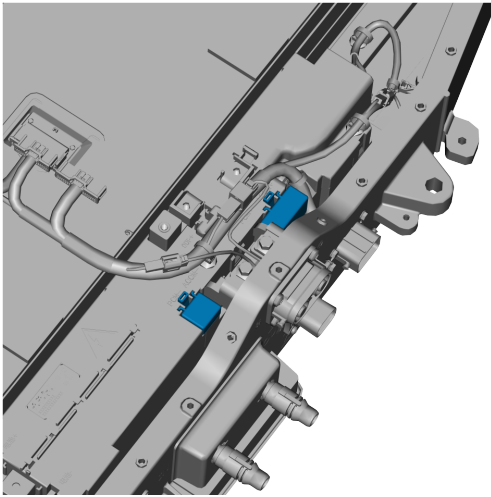
During the removal and installation process, safety glasses should always be worn, high-voltage insulating gloves should be worn, and insulating tools should be used when working.

- 1 Remove the protective cover.

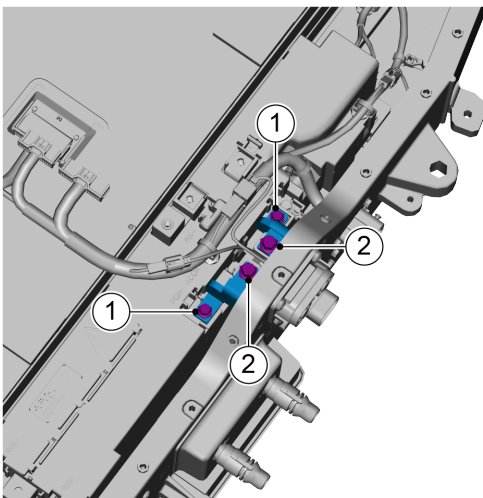


- 2 Remove the 2 fixing bolts connecting the copper rows (4) and (5) to the high-voltage control box, wrap the copper row joints with insulating tape and set aside.





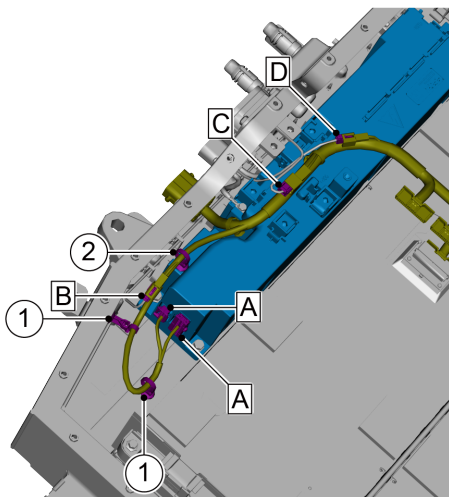
3 Remove the protective cover.



4 Remove the 2 fixing bolts 1 connecting the copper rows (2) and (3) to the high-voltage control box.

5 Remove the 2 fixing bolts 2 connecting the copper rows (2) and (3) to the high-voltage plug (PCM).

6 Remove the copper rows (2) and (3).



7 Remove the 2 harness clips 1 connecting the low-voltage harness and the battery pack lower tray.

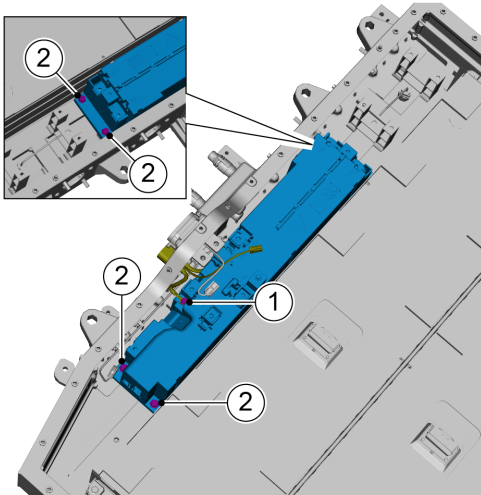
8 Remove the harness clip 2 connecting the low-voltage harness and the high-voltage control box.

9 Disconnect the 2 harness connectors A connecting the low-voltage harness and the high-voltage control box.

10 Disconnect the harness connector B connecting the low-voltage harness and the battery pack lower tray.

11 Disconnect the harness connector C connecting the low-voltage harness and the high-voltage plug (PCM).

12 Disconnect the harness connector D connecting the low-voltage harness and the high-voltage plug (ACCM).

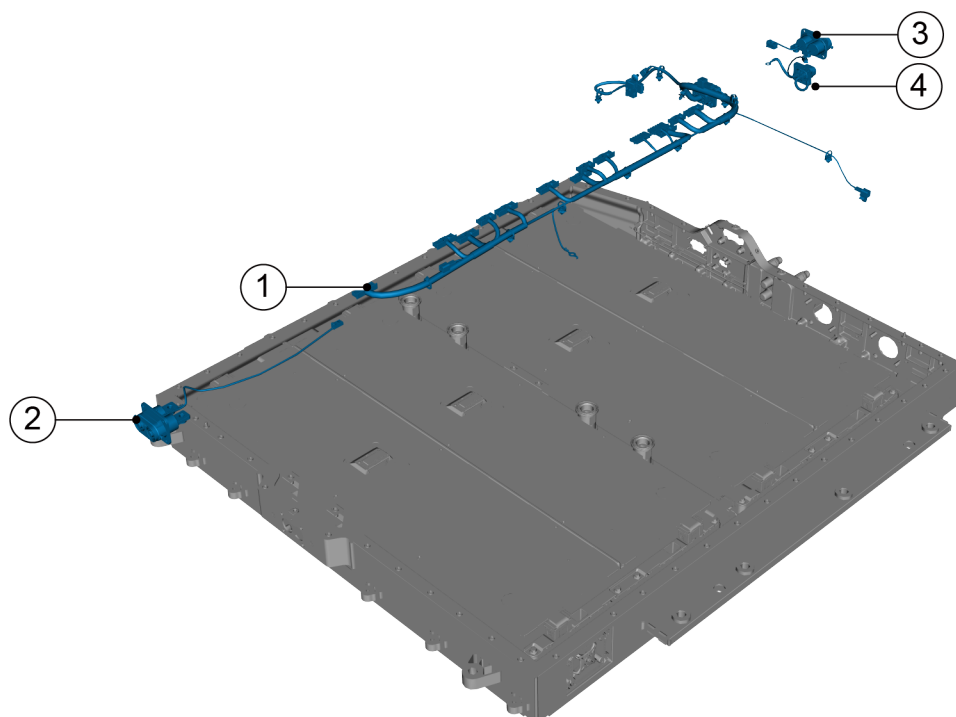


- 13 Remove the fixing bolt 1 connecting the high-voltage control box and the high-voltage plug (ACCM).
- 14 Remove the 4 fixing bolts 2 connecting the high-voltage control box and the battery pack lower tray.
- 15 Remove the high-voltage control box.

## 2.1.4 Removal of the Low-voltage Harness and Accessories

### 2.1.4.1 Removal of the Low-voltage Harness and Accessories

Remove in the order indicated in the diagram.



1. Low-voltage harness
2. High-voltage plug (ODP)

3. High-voltage plug (PCM)
4. High-voltage plug (ACCM)

### 2.1.4.2 Removal of the Low-voltage Harness

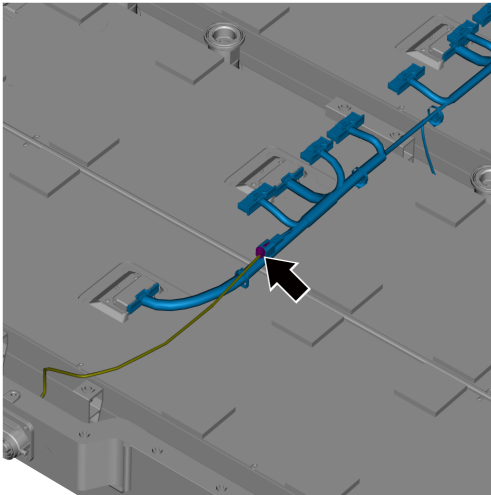
#### Caution

Disconnect the high-voltage harness connector, the connector protective cover should be installed immediately, and it is strictly prohibited to touch the high-voltage harness connector directly with your fingers; no part of the high-voltage harness should be damaged during disconnection, and any metal tools should be prevented from touching the high-voltage harness connector.

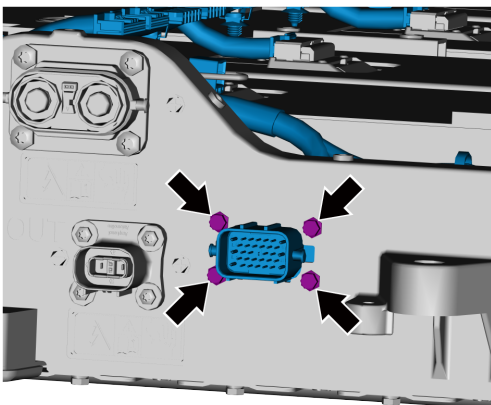
#### Warning !

During the removal and installation process, safety glasses should always be worn, high-voltage insulating gloves should be worn, and insulating tools should be used when working.

- 1 Disconnect the harness connector connecting the low-voltage harness and the high-voltage plug (ODP).



- 2 Remove the 4 fixing bolts connecting the low-voltage harness and the battery pack lower tray.
- 3 Remove the low-voltage harness.



### 2.1.4.3 Removal of the Accessories

#### Caution

Disconnect the high-voltage harness connector, the connector protective cover should be installed immediately, and it is strictly prohibited to touch the high-voltage harness connector directly with your fingers; no part of the high-voltage harness should be damaged during disconnection, and any metal tools should be prevented from touching the high-voltage harness connector.

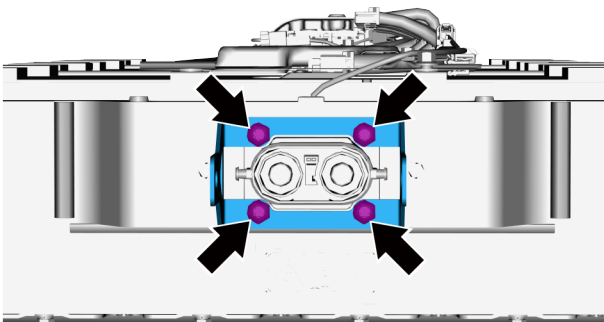
#### Caution

The removed copper rows need to be wrapped with insulating tape.

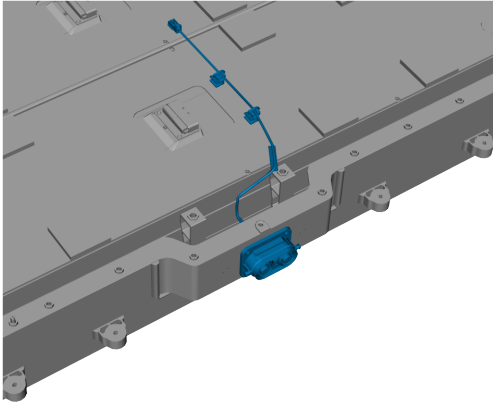
#### Warning !

During the removal and installation process, safety glasses should always be worn, high-voltage insulating gloves should be worn, and insulating tools should be used when working.

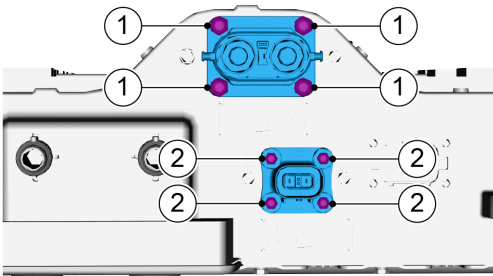
- 1 Remove the 4 set screws connecting the bracket (plug) and the high-voltage plug (ODP).
- 2 Remove the bracket (plug).



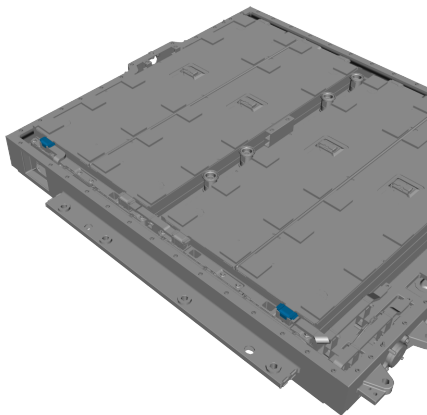




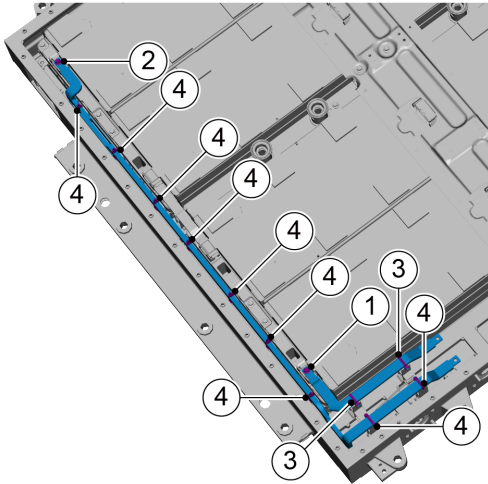
- 3 Remove the high-voltage plug (ODP).



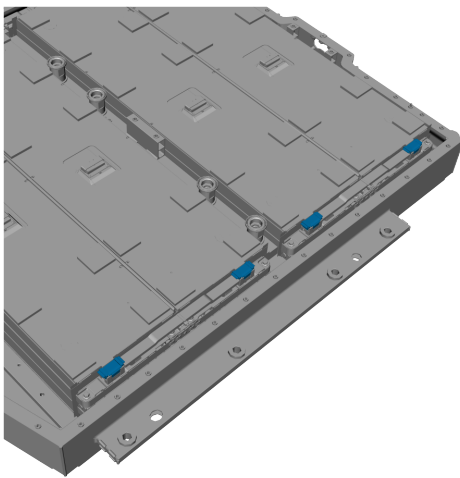
- 4 Remove the 4 fixing screws 1 connecting the high-voltage plug (PCM) and the battery pack lower tray.
- 5 Remove the high-voltage plug (PCM).
- 6 Remove the 4 fixing screws 2 connecting the high-voltage plug (ACCM) and the battery pack lower tray.
- 7 Remove the high-voltage plug (ACCM).



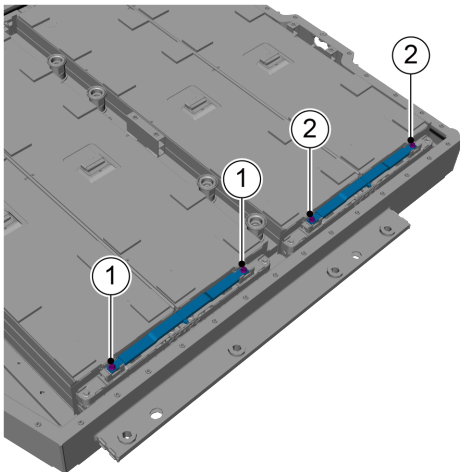
- 8 Remove the protective cover.



- 9 Remove the fixing bolts 1 connecting the copper row (4) and the battery module.
- 10 Remove the fixing bolts 2 connecting the copper row (5) and the battery module.
- 11 Remove the 2 fixing clips 3 connecting the copper row (4) and the battery pack lower tray.
- 12 Remove the 9 fixing clips 4 connecting the copper row (5) and the battery pack lower tray.
- 13 Remove the copper rows (4) and (5).



- 14 Remove the protective cover.

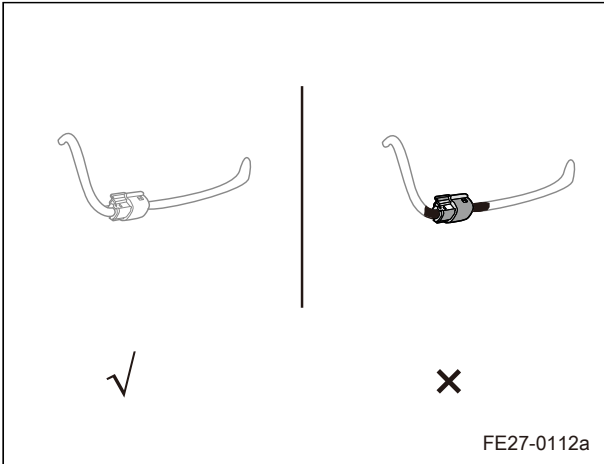


- 15 Remove the 2 fixing bolts 1 connecting the copper row (6) and the battery module.
- 16 Remove the copper row (6).
- 17 Remove the 2 fixing bolts 2 connecting the copper row (7) and the battery module.
- 18 Remove the copper row (7).
- 19 Separate the battery module from the battery pack lower tray.

## 2.1.5 Checking the Harness Connector Joint

### 2.1.5.1 Checking the Harness Connector Joint

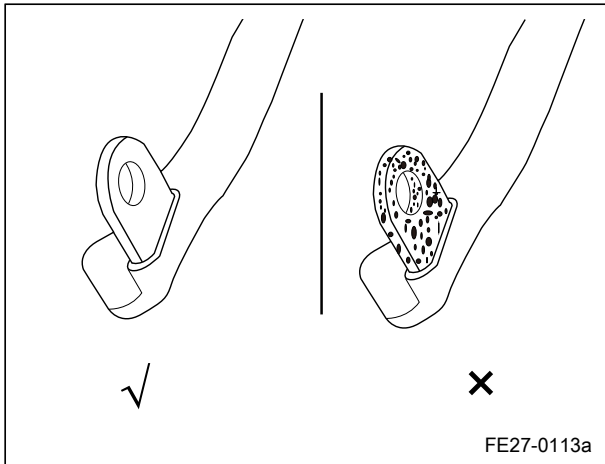
Check the harness connector joint for ablation, the ablated part of the harness connector is black, as shown in the figure. If there is any erosion, the harness needs to be checked for short circuit or broken faults, and the harness needs to be replaced with a new one after troubleshooting.



## 2.1.6 Inspect the copper row

### 2.1.6.1 Checking the Copper Row

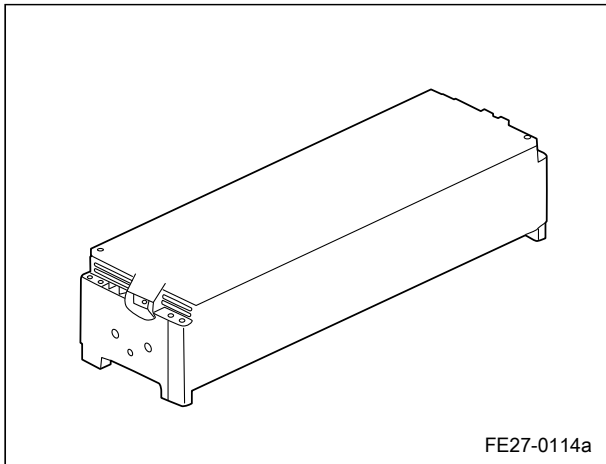
Check the joints of the copper row for signs of ablation; if there is ablation, the condition may appear as shown in the figure. After the copper row appears to be ablated, it is necessary to check whether the copper row bolts are tightened according to the standard torque, whether the surface of the copper row is oxidized by the oxide layer, etc., and to check whether other parts of the internal system of the power battery have the same problem. After troubleshooting the above, replace the copper row with a new one.



## 2.1.7 Check the Battery Module

### 2.1.7.1 Check the Battery Module

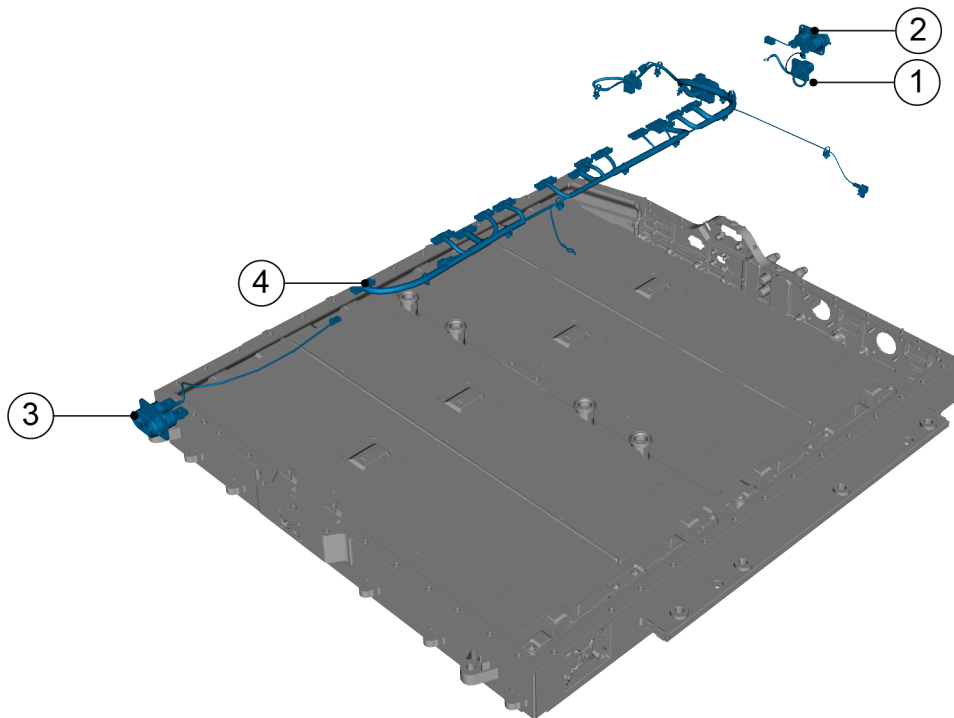
Check the battery module for deformation, protrusion, breakage, etc. If so, the power battery module needs to be replaced.



## 2.1.8 Install the harness, water tube and accessories

### 2.1.8.1 Installation of the Low-voltage Harness and Accessories

Install in the order indicated in the diagram.



1. High-voltage plug (ACCM)

2. High-voltage plug (PCM)

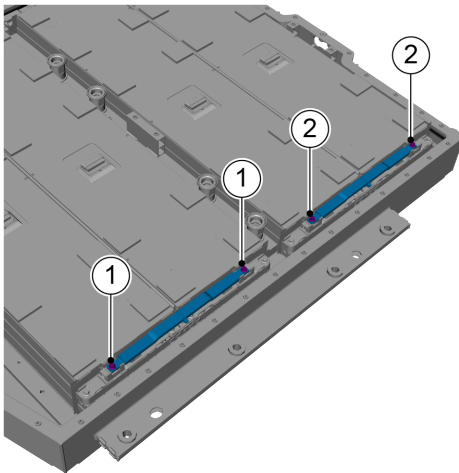
3. High-voltage plug (ODP)

4. Low-voltage harness

### 2.1.8.2 Installation of the Accessories

#### Warning !

During the installation, always wear safety glasses, high-voltage insulating gloves, and use insulating tools when working.

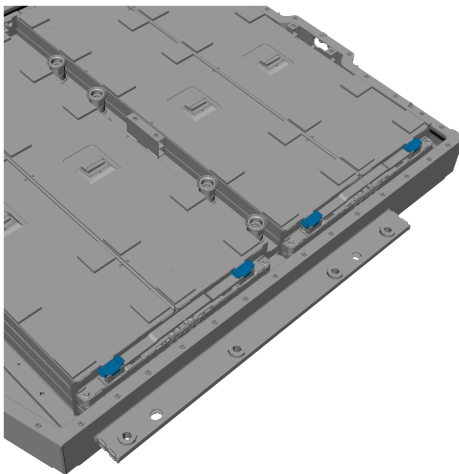


- 1 Install the copper row (7) and copper row (6) to the battery module and the battery pack lower tray.
- 2 Install and tighten the 2 fixing bolts 2 connecting the copper row (7) and the battery module.

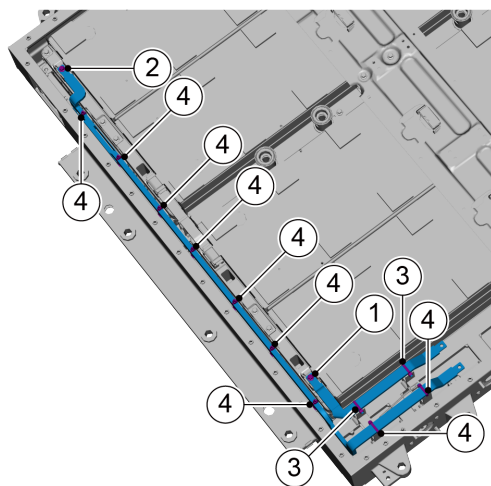
Torque: 9N·m

- 3 Install and tighten the 2 fixing bolts 1 connecting the copper row (6) and the battery module.

Torque: 9N·m



- 4 Install the protective cover.



- 5 Install the copper rows (4) and (5).

- 6 Install the 9 fixing clips 4 connecting the copper row (5) and the battery pack lower tray.

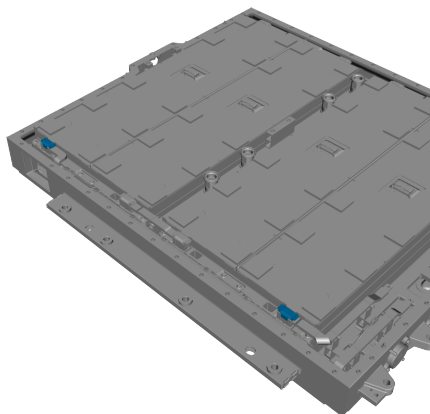
- 7 Install the 2 fixing clips 3 connecting the copper row (4) and the battery pack lower tray.

- 8 Install and tighten the fixing bolt 2 connecting the copper row (5) and the battery module.

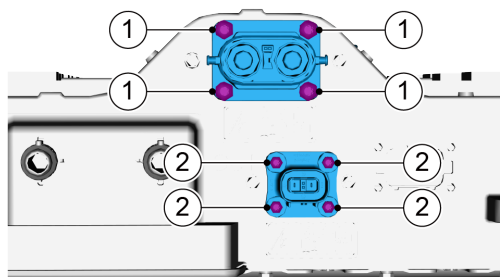
Torque: 9N·m

- 9 Install and tighten the fixing bolt 1 connecting the copper row (4) and the battery module.

Torque: 9N·m



10 Install the protective cover.



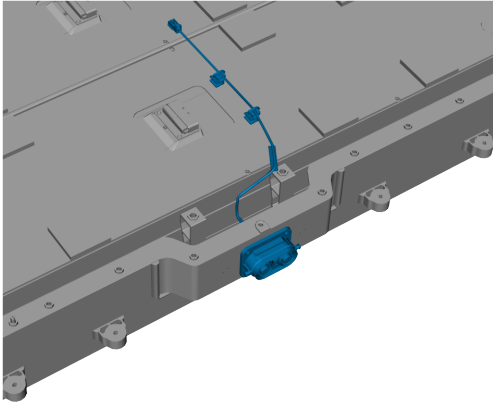
11 Install the high-voltage plug (ACCM) and fasten the 4 fixing screws 2 connecting the high-voltage plug (ACCM) and the battery pack lower tray.

Torque: 3N·m

12 Install the high-voltage plug (PCM) and fasten the 4 fixing screws 1 connecting the high-voltage plug (PCM) and the battery pack lower tray.

Torque: 7N·m

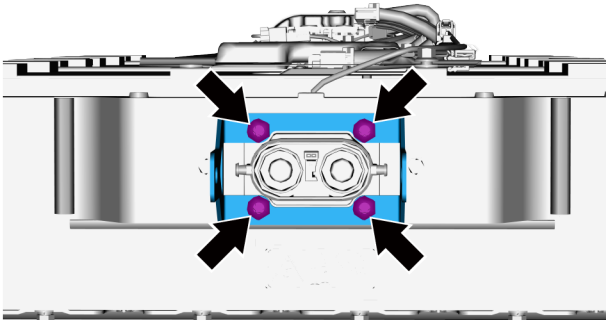




- 13 Install the high-voltage plug (ODP).

- 14 Install the bracket (plug) and tighten the 4 set screws connecting the bracket (plug) and the high-voltage plug (ODP).

Torque: 7N·m



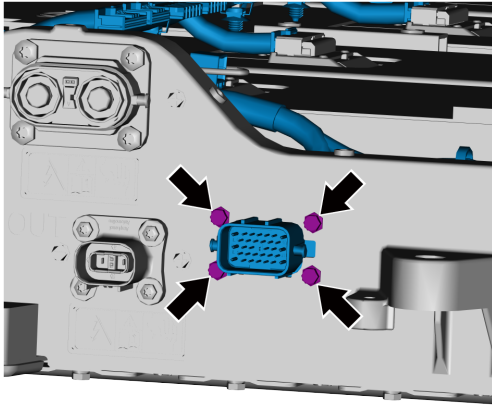
### 2.1.8.3 Installation of the Low-voltage Harness

#### Warning !

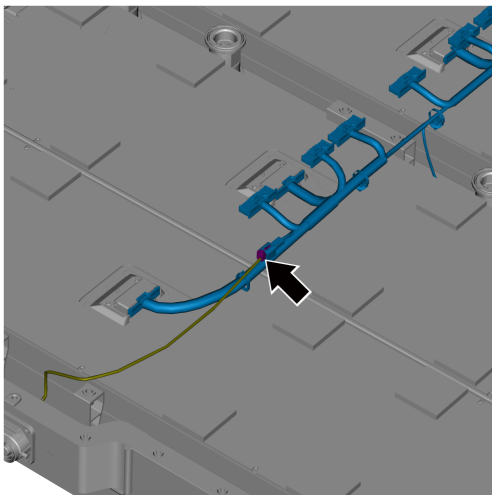
During the installation, always wear safety glasses, high-voltage insulating gloves, and use insulating tools when working.

- 1 Install the low-voltage harness and tighten the 4 fixing bolts connecting the low-voltage harness and the battery pack lower tray.

Torque: 3N·m



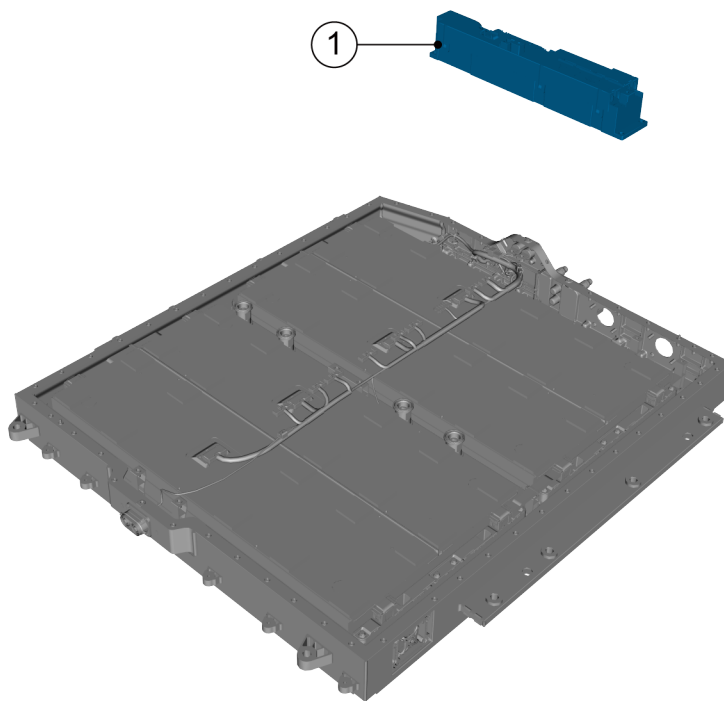
- 2 Connect the harness connector of the low-voltage harness and the high-voltage plug (ODP).



## 2.1.9 Installation of the High-voltage Control Box

### 2.1.9.1 Installation of the High-voltage Control Box

Install in the order indicated in the diagram.

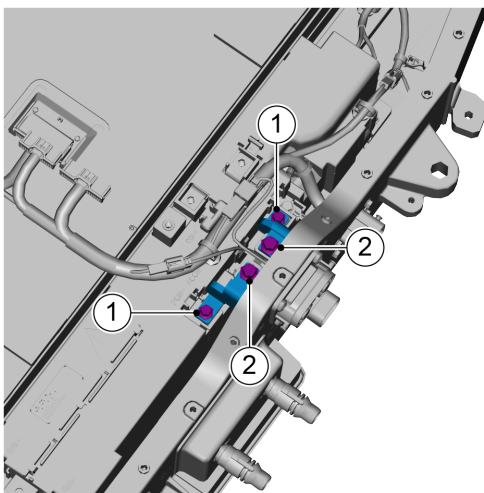
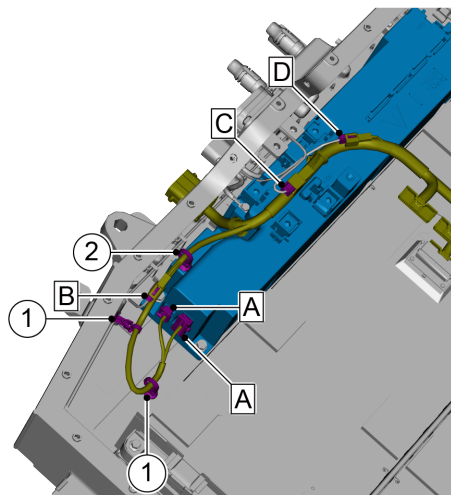
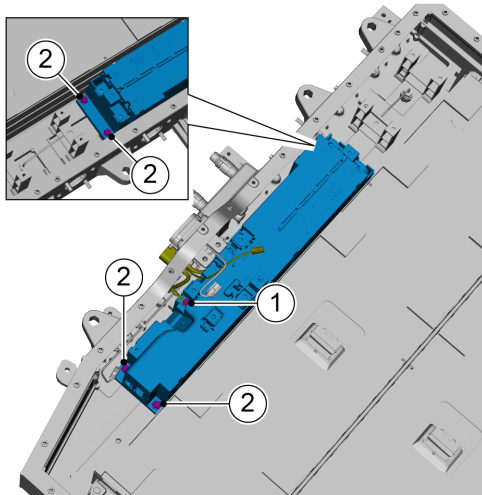


1. High-voltage control box

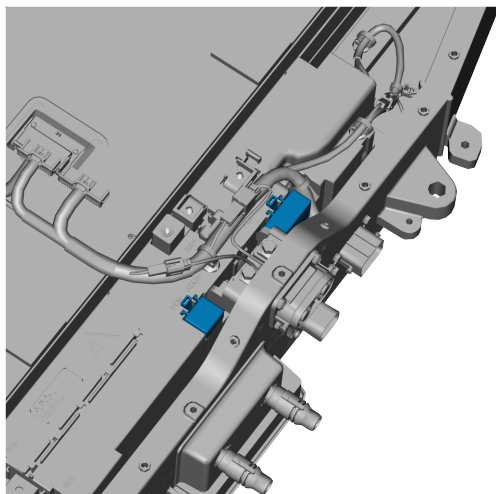
### 2.1.9.2 Installation of the High-voltage Control Box

#### Warning !

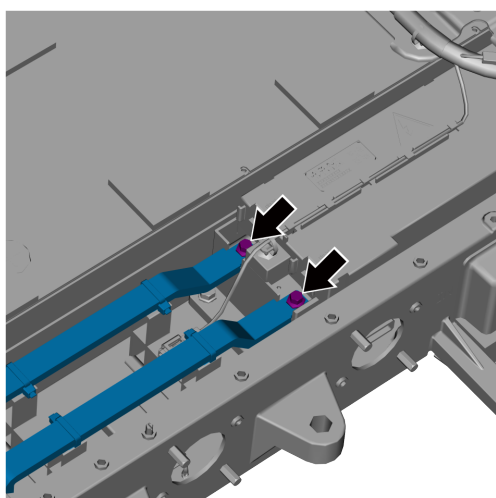
During the installation, always wear safety glasses, high-voltage insulating gloves, and use insulating tools when working.



- 1 Install the high-voltage control box.
- 2 Install and tighten the 4 fixing bolts 2 connecting the high-voltage control box and the battery pack lower tray.  
Torque: 9N·m
- 3 Install and tighten the fixing bolt 1 connecting the high-voltage control box and the high-voltage plug (ACCM).  
Torque: 6N·m
- 4 Connect the harness connector D connecting the low-voltage harness and the high-voltage plug (ACCM).
- 5 Connect the harness connector C connecting the low-voltage harness and the high-voltage plug (PCM).
- 6 Connect the harness connector B connecting the low-voltage harness and the battery pack lower tray.
- 7 Connect the 2 harness connectors A connecting the low-voltage harness and the high-voltage control box.
- 8 Install the harness clip 2 connecting the low-voltage harness and the high-voltage control box.
- 9 Install the 2 harness clips 1 connecting the low-voltage harness and the battery pack lower tray.
- 10 Install the copper rows (2) and (3).
- 11 Install and tighten the 2 fixing bolts 2 connecting the copper rows (2) and (3) to the high-voltage plug (PCM).  
Torque: 15N·m
- 12 Install and tighten the 2 fixing bolts 1 connecting the copper rows (2) and (3) to the high-voltage control box.  
Torque: 9N·m

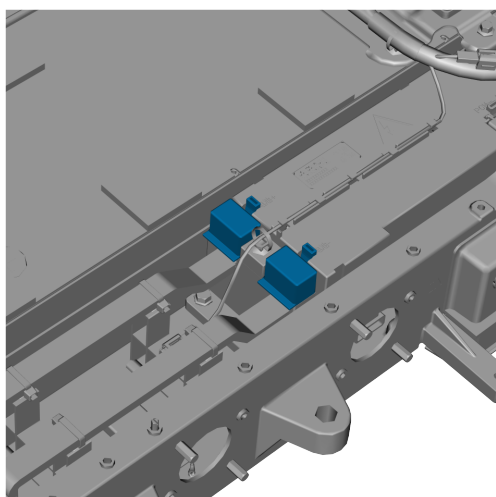


13 Install the protective cover.



14 Install and tighten the 2 fixing bolt connecting the copper row (4) and copper row (5) to the high-voltage control box.

Torque: 9N·m

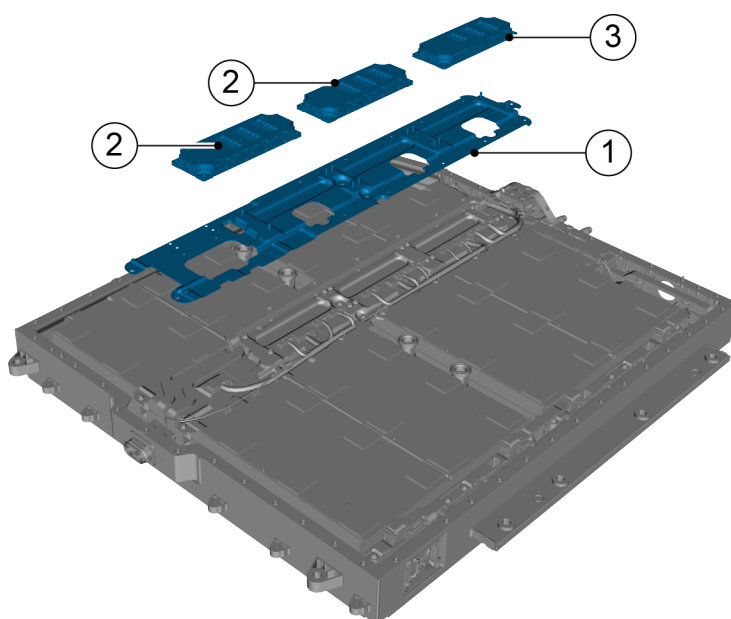


15 Install the protective cover.

## 2.1.10 Installation of the Battery Management System

### 2.1.10.1 Installation of the Battery Management System

Install in the order indicated in the diagram.



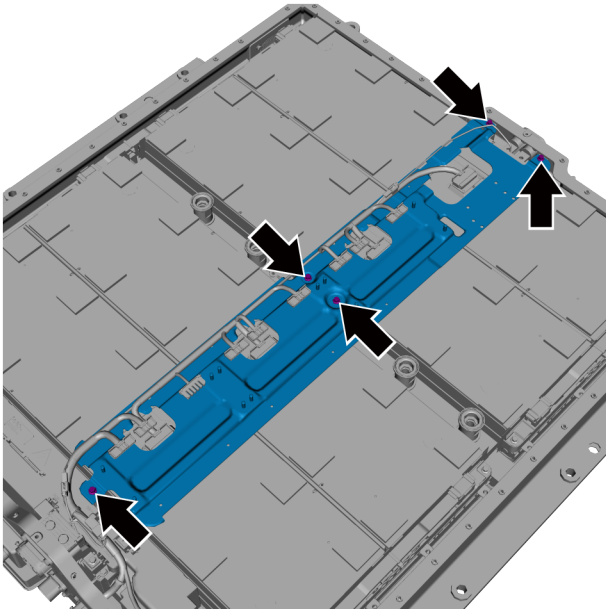
1. Power battery control module bracket
2. Power battery control module (slave board)
3. Power battery control module (master board)

### 2.1.10.2 Installation of the Power Battery Control Module Bracket

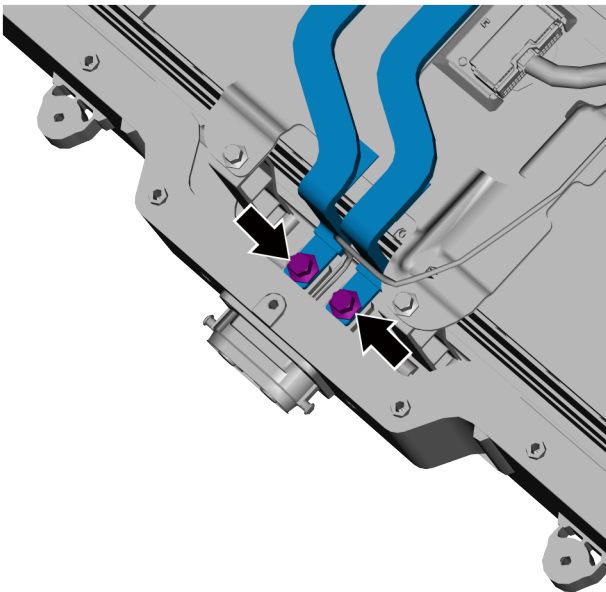
#### Warning !

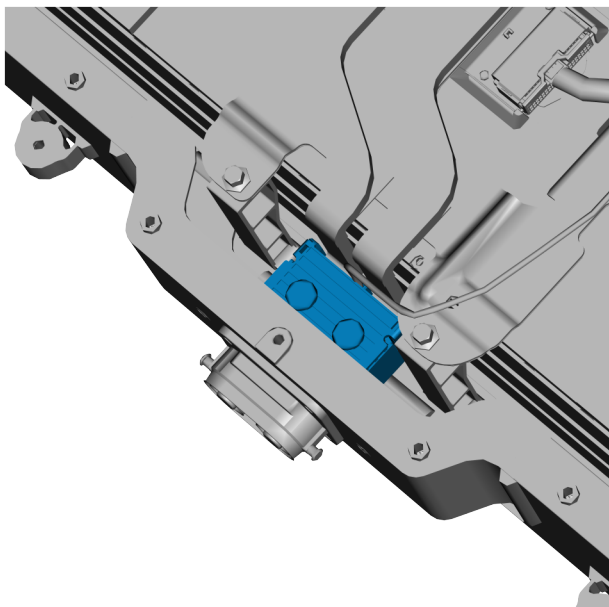
During the installation, always wear safety glasses, high-voltage insulating gloves, and use insulating tools when working.

- 1 Install the hybrid power battery assembly bracket and tighten the 5 fixing bolts connecting the hybrid power battery assembly bracket and the battery pack lower tray.  
Torque: 7N·m

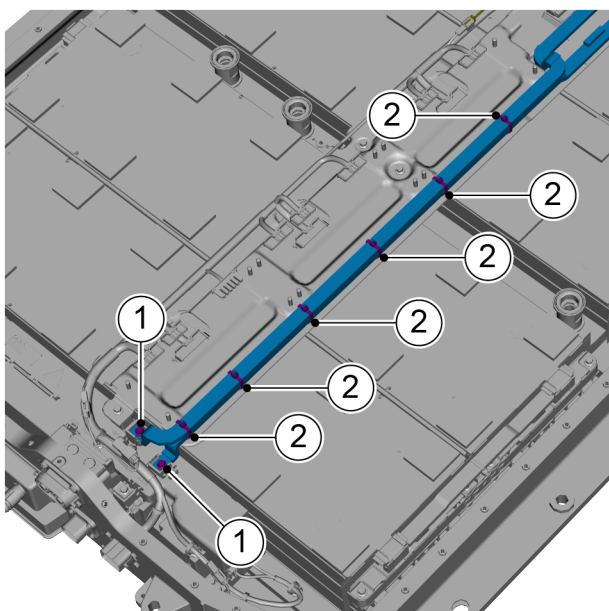


- 2 Install the copper row (1) and tighten the 2 fixing bolts connecting the copper row (1) and the high-voltage connector (ODP).  
Torque: 15N·m





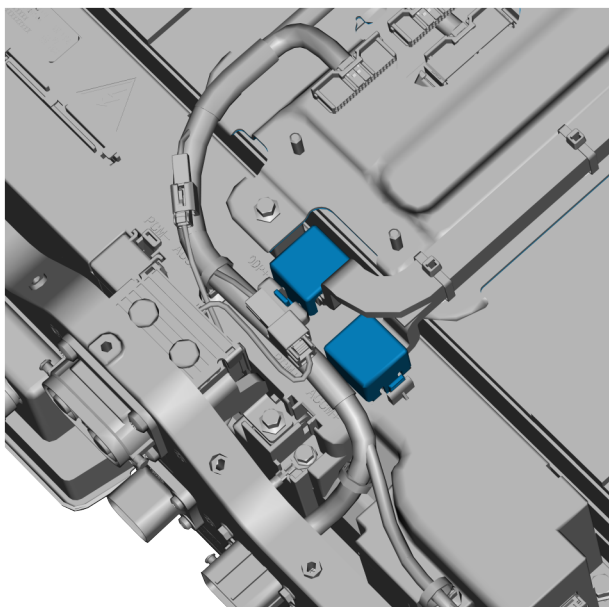
3 Install the protective cover.



4 Install the 6 fixing clips 2 connecting the copper row (1) and the battery module.

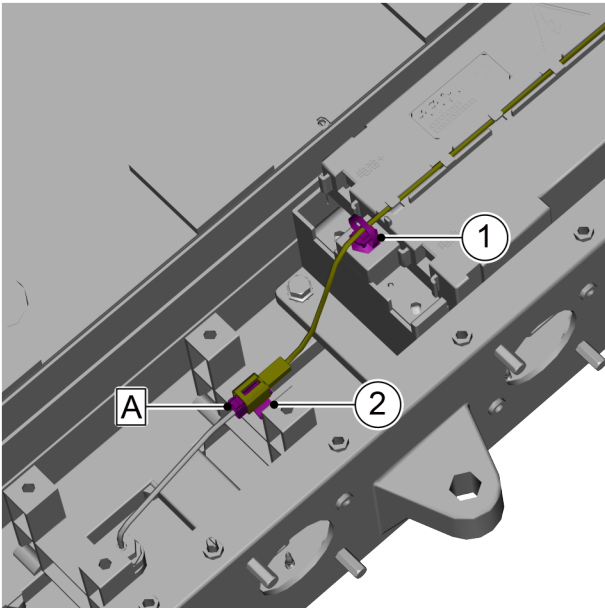
5 Install and tighten the 2 fixing bolts 1 connecting the copper row (1) and the high-voltage control box.

Torque: 9N·m

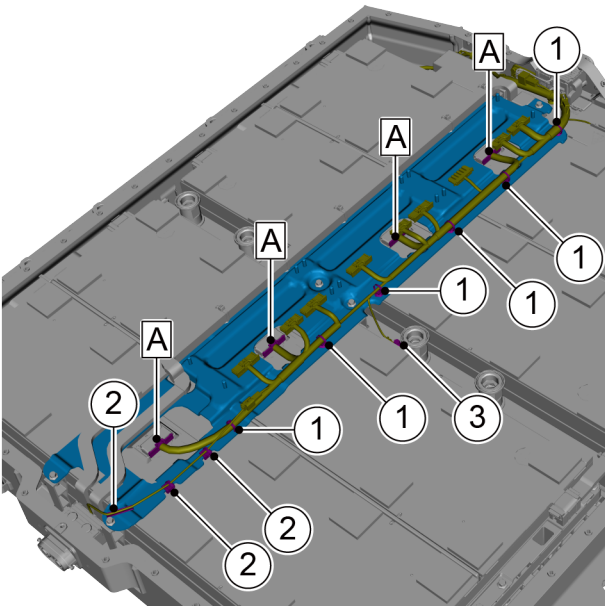


6 Install the protective cover.





- 7 Connect the harness connector A connecting the low-voltage harness and the battery pack lower tray.
- 8 Install the harness clip 2 connecting the low-voltage harness and the battery pack lower tray.
- 9 Install the harness clip 1 connecting the low-voltage harness and the high-voltage control box.



- 10 Connect the harness connector A connecting the low-voltage harness and the battery module.
- 11 Install and tighten the fixing bolt 3 connecting the low-voltage harness and the battery module.  
Torque: 6N·m
- 12 Install the 3 harness clips 2 connecting the high-voltage plug (ODP) and the power battery control module bracket.
- 13 Install the 6 harness clips 1 connecting the low-voltage harness and the power battery control module bracket.

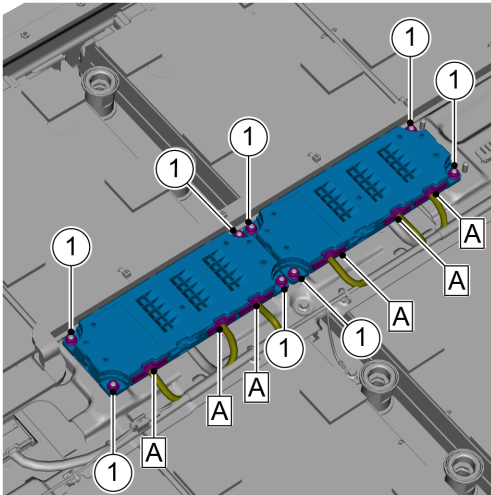
### 2.1.10.3 Installation of Power Battery Control Module (slave plate)

#### Warning !

During the installation, always wear safety glasses, high-voltage insulating gloves, and use insulating tools when working.

- 1 Install the power battery control module (slave board).
- 2 Connect the harness connector A connecting the power battery control module (slave plate) and the low-voltage harness.
- 3 Install and tighten the 8 fixing nuts 1 connecting the power battery control module (slave board) to the power battery control module bracket.

Torque: 7N·m



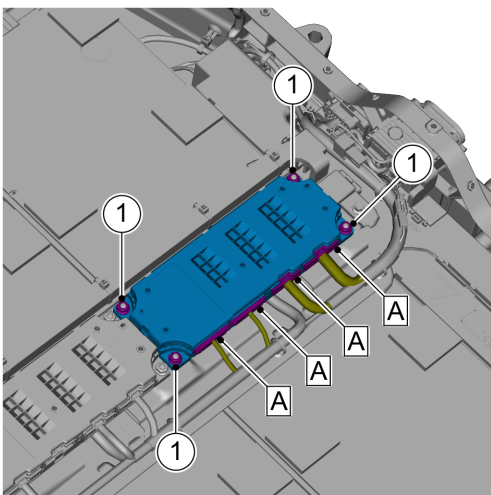
### 2.1.10.4 Installing the Power Battery Control Module (main board)

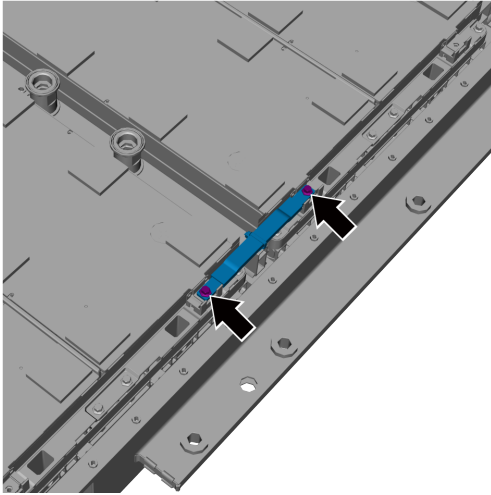
#### Warning !

During the installation, always wear safety glasses, high-voltage insulating gloves, and use insulating tools when working.

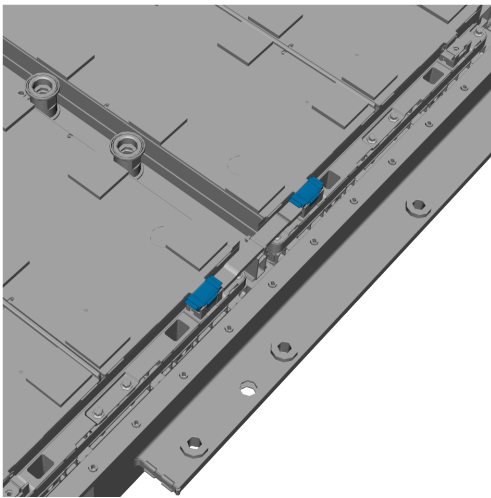
- 1 Install the power battery control module (main board).
- 2 Connect the harness connector A connecting the power battery control module (main board) and the low-voltage harness.
- 3 Install and tighten the 4 fixing nuts 1 connecting the power battery control module (main board) and the power battery control module bracket.

Torque: 7N·m





- 4 Install the copper row (8) and tighten the 2 fixing bolts connecting the copper row (8) and the battery module.  
Torque: 9N·m

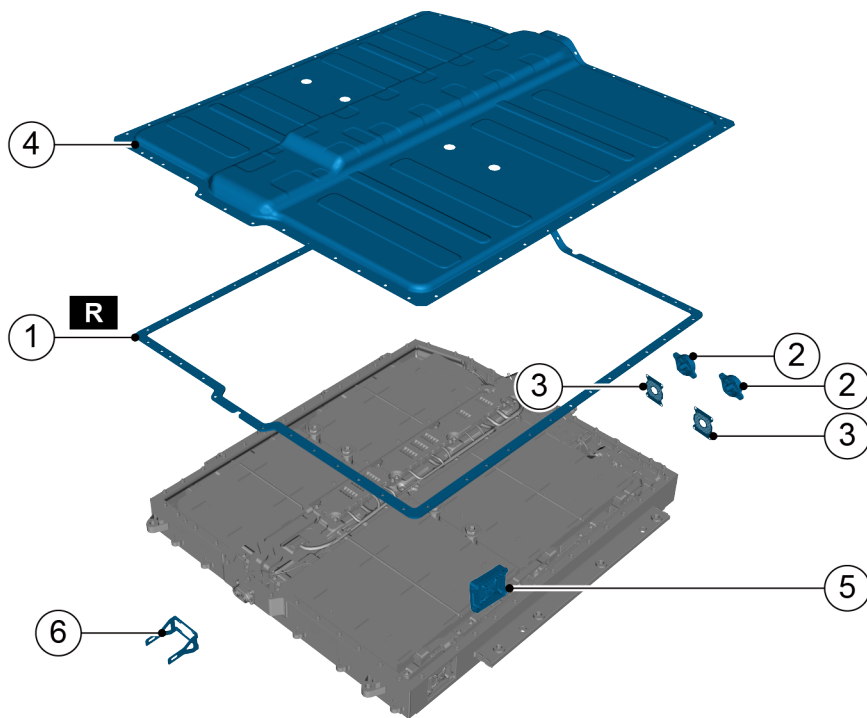


- 5 Install the protective cover.

## 2.1.11 Installation of the hybrid power battery assembly upper housing and peripheral parts

### 2.1.11.1 Installing the Power Battery Upper Housing and Peripheral Parts

Install in the order indicated in the diagram.



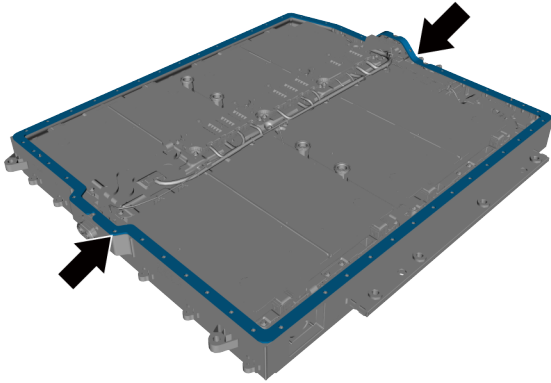
- |                              |                               |
|------------------------------|-------------------------------|
| 1. Sealing strip             | 4. Explosion-proof valve (1)  |
| 2. Fire filter               | 5. Battery pack upper housing |
| 3. Explosion-proof valve (2) | 6. Bracket                    |

### 2.1.11.2 Installation of the Sealing Strip

- 1 Install the sealing strip.

#### Caution

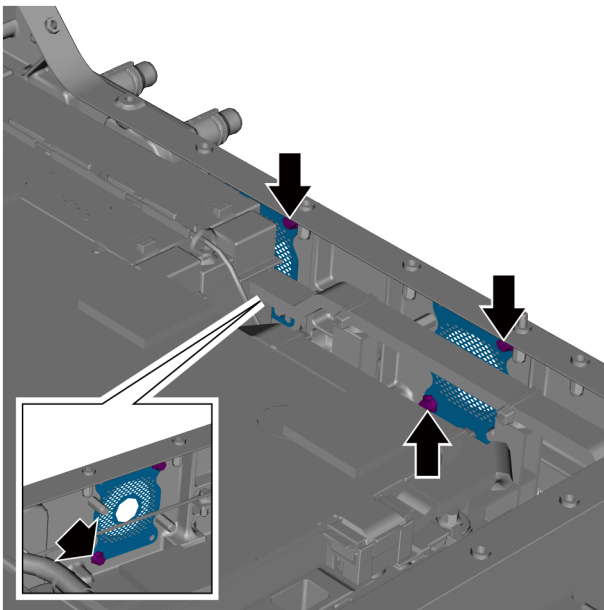
The sealing strip must be installed by attaching it in a circle right down the center of the battery pack lower tray.



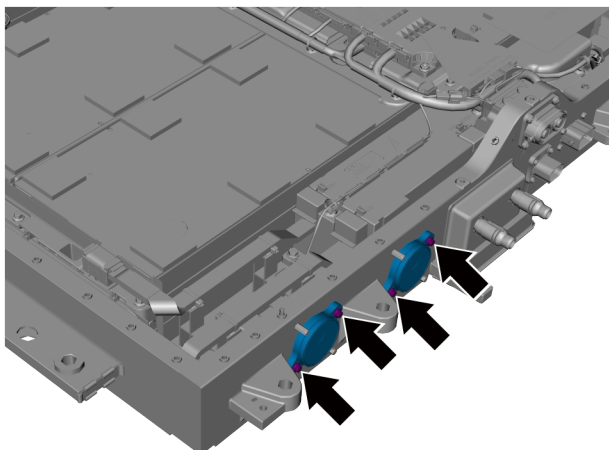
### 2.1.11.3 Installation of the Fire Filter

- 1 Install the fire filter and tighten the 4 fixing bolts connecting the fire filter and the battery pack lower tray.

Torque: 6N·m

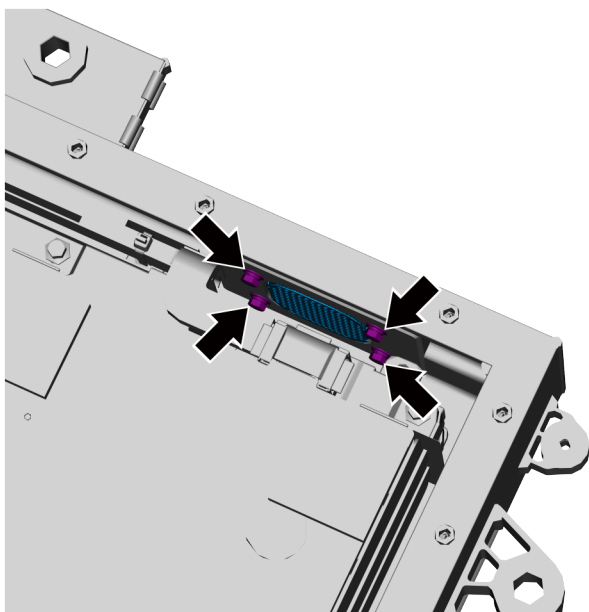


#### 2.1.11.4 Installation of the Explosion-proof Valve



- 1 Install the 2 explosion-proof valves (2) and tighten the 4 fixing bolts connecting the 2 explosion-proof valves (2) and the attery pack lower tray.

Torque: 6N·m



- 2 Install the explosion-proof valve (1) and tighten the 4 fixed bolts connecting the explosion-proof valve (1) and the battery pack lower tray.

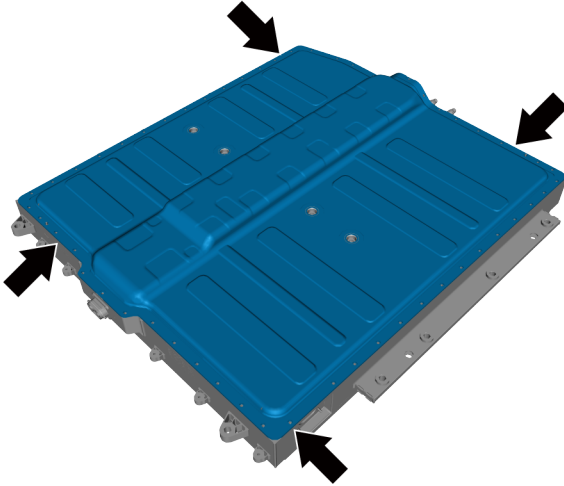
Torque: 6N·m

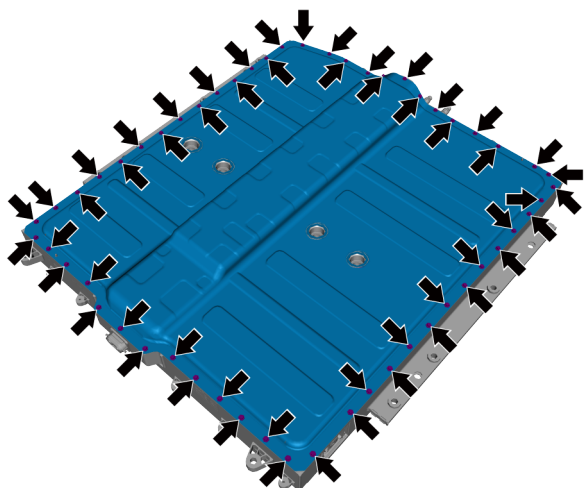
### 2.1.11.5 Installation of the Battery Pack Upper Housing

- 1 Place the battery pack upper housing in the mounting position.

#### Caution

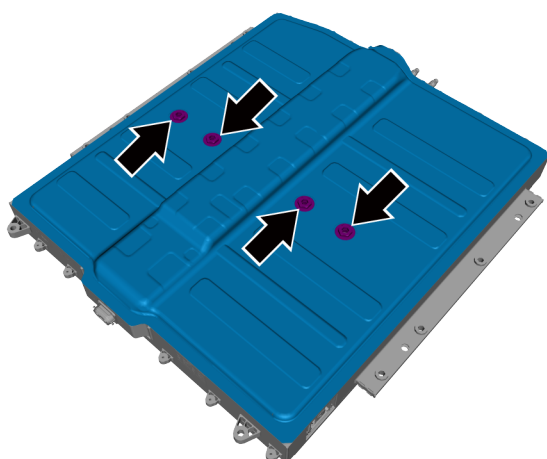
Two people are required to do this work.





- 2 Install and tighten the 54 fixing bolts connecting the battery pack upper housing and the battery pack lower tray.

Torque: 6N·m



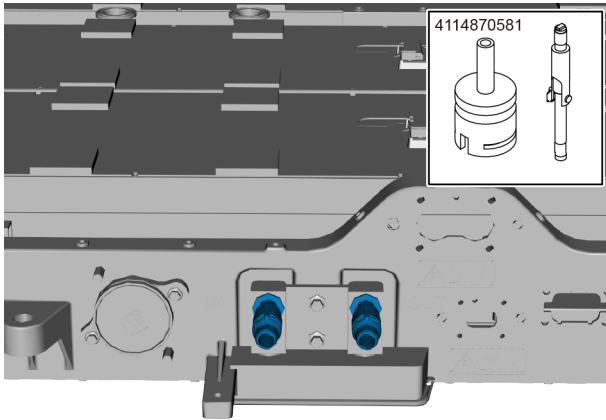
- 3 Install and tighten the 4 fixing nuts connecting the battery pack upper housing and the battery pack lower tray.

Torque: 10N·m



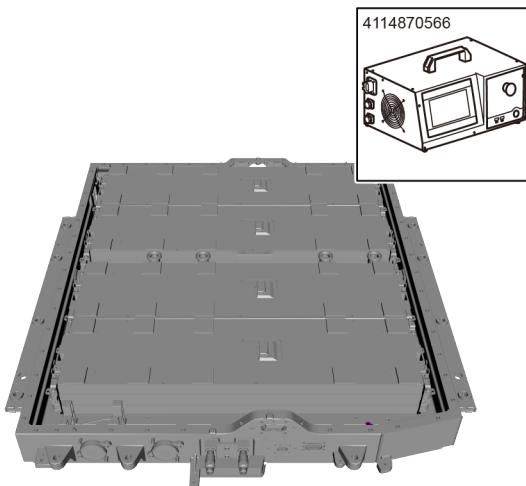
## 2.1.12 Checking the Airtightness of the Water Tube

### 2.1.12.1 Checking the Airtightness of the Water Tube



- 1 Perform the airtightness test of power battery cooling water line.
- 2 Plug the water-cooling pipe ports using the water-cooling pipe tooling.

Specialized tool: 4114870581



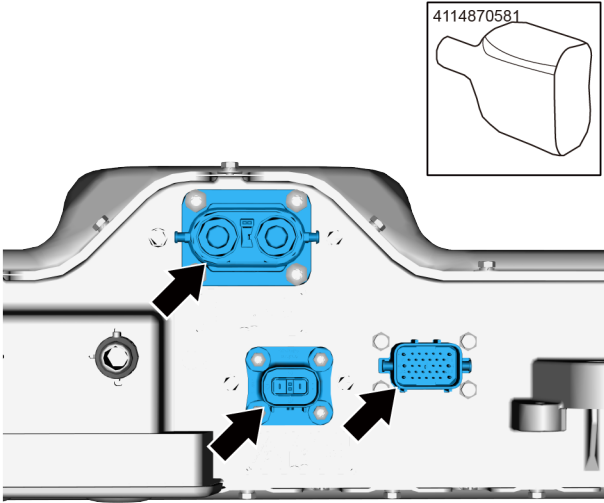
- 3 Use 400kPa air pressure to inflate the water-cooled tube, inflation lasts for 60s, air pressure range is 360-440kPa.  
Specialized tool: 4114870566
- 4 Pressure stabilization lasts for 120s, test water cooling system air pressure, range is 360-440kPa.
- 5 Test time is 60s, range is -75 to 75par.
- 6 Exhaust lasts for 5s.
- 7 Test result leakage rate <math><100\text{Pa}/\text{min}</math> will pass the airtightness test.

### 2.1.13 Check the Power Battery Compartment for Airtightness

#### 2.1.13.1 Check the Power Battery Compartment for Airtightness

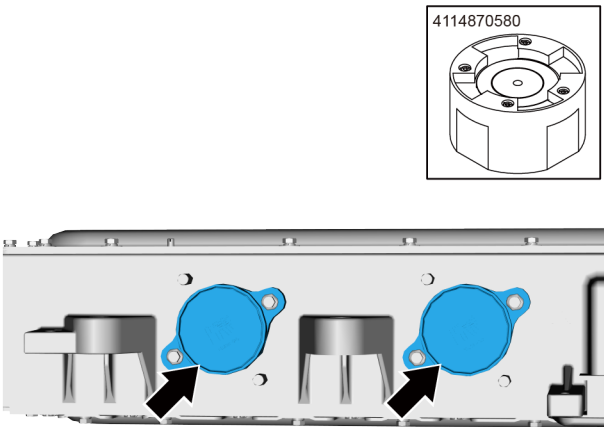
- 1 Plug the high/low-voltage harness connector using the harness connector protector shield.

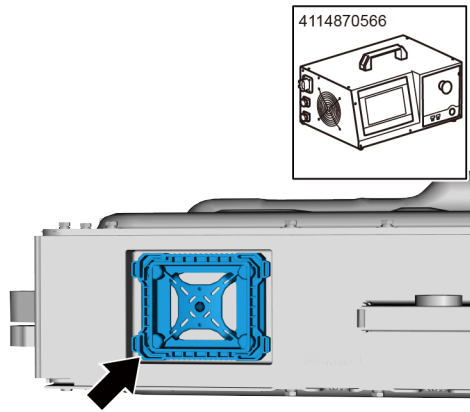
Specialized tool: 4114870581



- 2 Plug the blast valve holes using the blast valve tooling.

Specialized tool: 4114870580



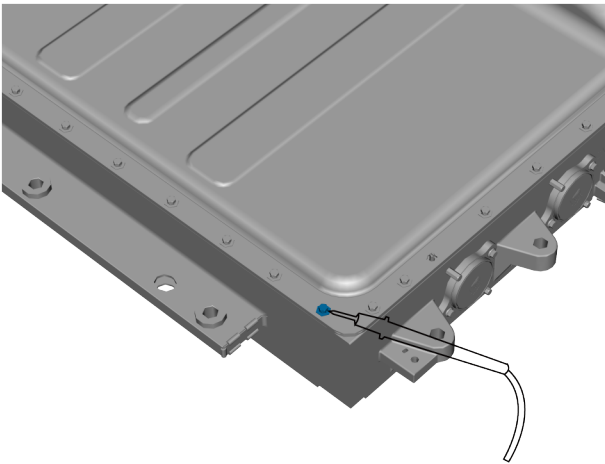


- 3 Use the inflation equipment to inflate the battery compartment with 4kpa, inflation time lasts for 100s, air pressure gets up to 3.6-4.4kap.  
Specialized tool: 4114870566
- 4 Pressure stabilization lasts for 80s.
- 5 Exhaust lasts for 5s.
- 6 Test the leakage rate is <math><100\text{Pa}/\text{min}</math> inside the battery compartment, then the airtightness is qualified.

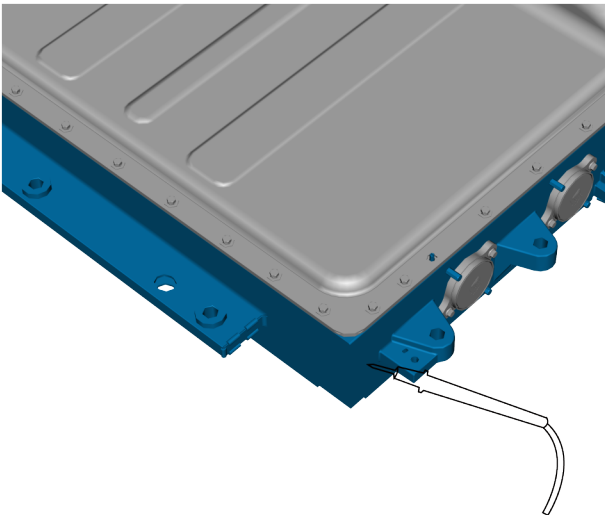
## 2.1.14 Check the Power Battery Equipotential

### 2.1.14.1 Check the Power Battery Equipotential

- 1 Firstly, adjust the testing equipment resistance gear down, and then dock the red and black meter pens, and test whether the resistance is zeroed after the red and black pens are docked.
- 2 Adjust the testing equipment to 20M $\Omega$ . As shown in the figure, connect the black meter pen of the testing equipment to the fixing bolt of the battery pack upper housing.



- 3 Connect the red meter pen of the testing equipment to the battery pack lower tray as shown in the figure.

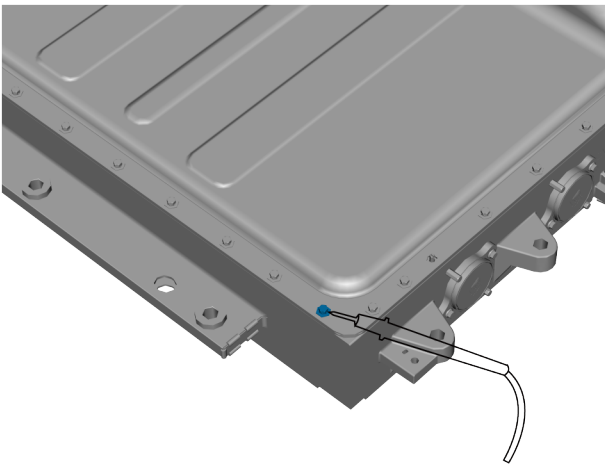
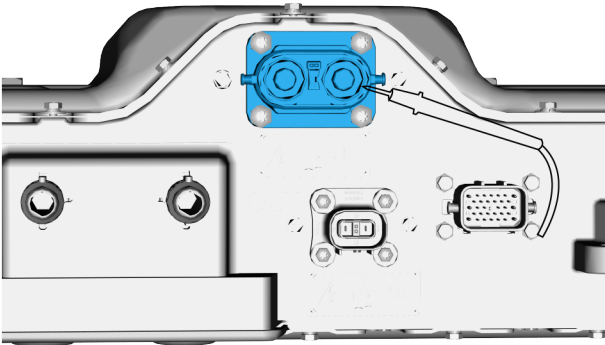


- 4 The measured value is <math><100\text{M}\Omega</math>.

## 2.1.15 Check the Insulation of Power Battery

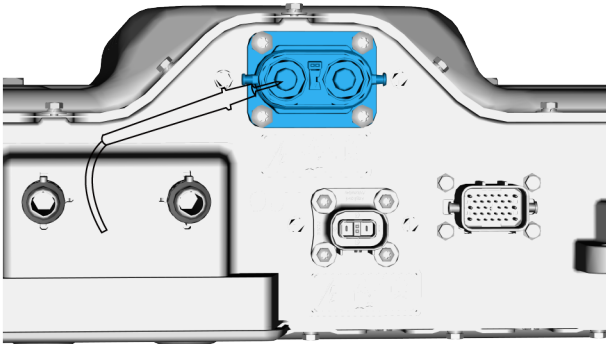
### 2.1.15.1 Check the Insulation of Power Battery

- 1 Set the insulation meter voltage to 500VDC and check the insulation resistance.
- 2 Connect the testing device red meter pen to the positive terminal.

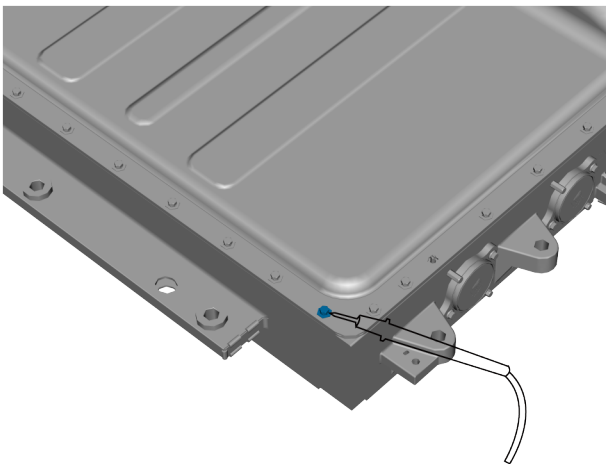


- 3 Connect the testing equipment black meter pen to the fixing bolt on the upper housing of the battery pack and check the data.

- 4 Connect the testing device red meter pen to the negative terminal.



- 5 Connect the testing equipment black meter pen to the fixing bolt on the upper housing of the battery pack and check the data.



- 6 The data measured by the above check should be  $\geq 550\text{M}\Omega$ , otherwise it needs to be recharged and rechecked.

## 2.2 Technical data

### 2.2.1 Power battery technical data

#### 2.2.1.1 Power Battery Specifications

Item	Specification
Rated voltage	352V
Capacity	113Ah
Nominal voltage of energy storage device monobloc	3.67V
Mass of energy storage unit	1.80±0.03kg
Number of energy storage device units	96
Total storage capacity of energy storage device	39.81 kWh
Total mass of energy storage device	255kg
Peak charging power	134 kWh@10s, 35%SOC, 25°C
Peak discharge power	174.8 kWh@10s, 50%SOC, 25°C
Self-discharge rate	322 %/m
Charging temperature	-20 to 55°C
Discharge temperature	-30 to 55°C
Storage temperature	-30 to 55°C
Battery pack charging temperature range	-20 to 55°C
Battery pack discharge temperature range	-30 to 55°C

#### 2.2.1.2 Fastener specification

Fastener name	Model	Torque range
		Metric system (N·m)
Fixing bolt connecting the copper row (8) and the battery module	M6×14	8-10
Fixing bolt connecting the copper row (7) and the battery module	M6×14	8-10
Fixing bolt connecting the copper row (6) and the battery module	M6×14	8-10
Fixing bolt connecting the copper row (5) and the battery module	M6×14	8-10
Fixing bolt connecting the copper row (4) and the battery module	M6×14	8-10
Fixing screw connecting the high-voltage plug (ACCM) and the battery pack lower tray	M4×14	2.5-3.5
Fixing screw connecting the high-voltage plug (PCM) and the battery pack lower tray	M6×14	6.5-7.5

Fastener name	Model	Torque range
		Metric system (N·m)
Fixing bolt connecting the low-voltage harness and the battery pack lower tray	M4×10	2.5-3.5
Fixing bolt connecting the high-voltage control box and the battery pack lower tray	M6×20	8-10
Fixed bolt connecting the high-voltage control box and high-voltage plug (ACCM).	M5×12	5-7
Fixing bolt connecting the copper row (2) and the high-voltage plug (PCM)	M8×16	14-16
Fixing bolt connecting the copper row (3) and the high-voltage plug (PCM)	M8×16	14-16
Fixing bolt connecting the copper row (2) and the high-voltage control box	M6×14	8-10
Fixing bolt connecting the copper row (3) and the high-voltage control box	M6×14	8-10
Fixing bolt connecting the hybrid power battery assembly bracket and the battery pack lower tray	M6×14	6-8
Fixing bolt connecting the copper row (1) and the high-voltage plug (ODP)	M8×16	14-16
Fixing bolt connecting the copper row (1) and the high-voltage control box	M6×14	8-10
Fixing bolt connecting the low-voltage harness and battery module	M6×14	5-7
Fixing nut connecting the power battery control module (slave board) and the power battery control module bracket	M6×16	6-8
Fixing nut connecting the power battery control module (main board) and the power battery control module bracket	M6×16	6-8
Fixing bolt connecting the copper row (4) and the high-voltage control box	M6×14	8-10
Fixing bolt connecting the copper row (5) and the high-voltage control box	M6×14	8-10
Fixing bolt connecting the fire filter and the battery pack lower tray	M5×16	5-7

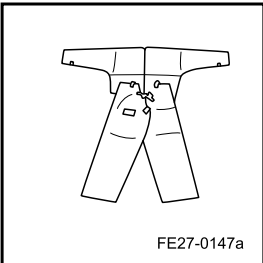
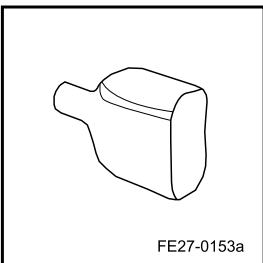


Fastener name	Model	Torque range
		Metric system (N·m)
Fixing bolt connecting the explosion-proof valve (2) and the battery pack lower tray	M5×16	5-7
Fixing bolt connecting the explosion-proof valve (1) and the battery pack lower tray	M5×16	5-7
Fixing bolt connecting the battery pack upper housing and the battery pack lower tray	M5×16	5-7
Fixing nut connecting the battery pack upper housing and the battery pack lower tray	M24×12	9-11
Fixing screw connecting the bracket (plug) and the high-voltage plug (ODP)	M6×14	6-8

## 2.3 Servicing tools

### 2.3.1 Servicing tools

#### 2.3.1.1 Specialized Tools List

<p>Insulation meter</p>  <p>FE27-0142a</p>	<p>Insulating protective cap</p>  <p>FE27-0141a</p>	<p>Insulating gloves</p>  <p>FE27-0143a</p>
<p>Goggles</p>  <p>FE27-0144a</p>	<p>Insulating shoes</p>  <p>FE27-0145a</p>	<p>Protective mask</p>  <p>FE27-0146a</p>
<p>Insulating clothing</p>  <p>FE27-0147a</p>	<p>Insulating servicing tools</p>  <p>FE27-0148a</p>	<p>Safety warning signs</p>  <p>FE27-0149a</p>
<p>Copper row protection cover</p>  <p>FE27-0154a</p>	<p>Water inlet and outlet plugs</p>  <p>FE27-0156a</p>	<p>Protective cover for connectors</p>  <p>FE27-0153a</p>
<p>Airtightness tester</p>  <p>FE27-0152a</p>	<p>Explosion-proof valve tooling</p>  <p>FE27-0150a</p>	

