



# **MITSUBISHI MOTORS**

## **2023 OUTLANDER PHEV**

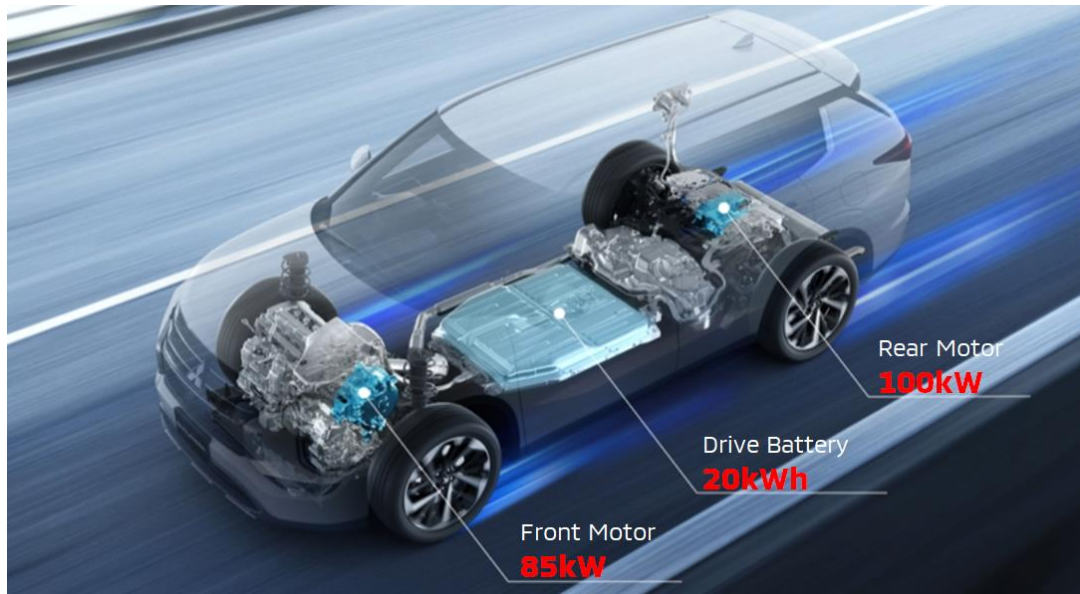
### **Drive Battery Removal Procedure and Dismantling Guide**



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# TABLE OF CONTENTS

<b>1. INTRODUCTION.....</b>	<b>2</b>
<b>2. HOW TO IDENTIFY OUTLANDER PHEV .....</b>	<b>3</b>
<b>3. SAFETY PRECAUTIONS .....</b>	<b>5</b>
<b>4. INSPECTION/TEST OF PROTECTIVE EQUIPMENT, BLOTTER STRAGE .....</b>	<b>6</b>
<b>5. PROTECTIVE EQUIPMENT .....</b>	<b>6</b>
<b>6. TESTER AND SPECIAL TOOL .....</b>	<b>7</b>
<b>7. HIGH-VOLTAGE COMPONENTS .....</b>	<b>8</b>
<b>8. MAIN DRIVE LITHIUM-ION BATTERY REMOVAL PROCEDURE .....</b>	<b>9</b>
<b>9. SERVICE PLUG REMOVAL CHECK SHEET .....</b>	<b>21</b>
<b>10.HIGH VOLTAGE SIGN BOARD.....</b>	<b>22</b>
<b>11. WARNING SIGN .....</b>	<b>23</b>



## 1. INTRODUCTION

The Outlander PHEV (Plug-in Hybrid Electric Vehicle) is a vehicle equipped with a high voltage main drive lithium-ion battery. The battery provides high voltage electricity to power the two electric drive motors. The vehicle also has a gasoline powered engine/generator which recharges the battery and assists the drive motors under certain conditions. Caution must be used when dismantling the vehicle. This guide provides instructions that must be followed when the high voltage main drive battery is to be removed from the Outlander PHEV. Always handle the Outlander PHEV high voltage components by using appropriate Personal Protective Equipment (PPE) and the methods described in this guide. Failure to follow the instructions in this guide, including the warnings and cautions, may result in serious injury by electrical shock due to the high voltage battery installed on the Outlander PHEV. Before dismantling, please read this guide carefully and understand the identified procedures. It may differ according to the sales classification; refer to the sales catalog.

Throughout this guide the words **DANGER**, **WARNING** and **CAUTION** appear.

These serve as reminders to be especially careful. Failure to follow instructions may result in personal injury or damage to the vehicle.



**Indicates a hazardous situation which, if not avoided, will result in death or serious injury.**



**Indicates a strong possibility of severe personal injury or death if instructions are not followed.**



**indicates hazards or unsafe practices that could cause personal injury or damage to your vehicle.**

Mitsubishi Motors reserves the right to make changes in design and specification and/or to make additions to or improvements in this product without obligation to install them on products previously manufactured.

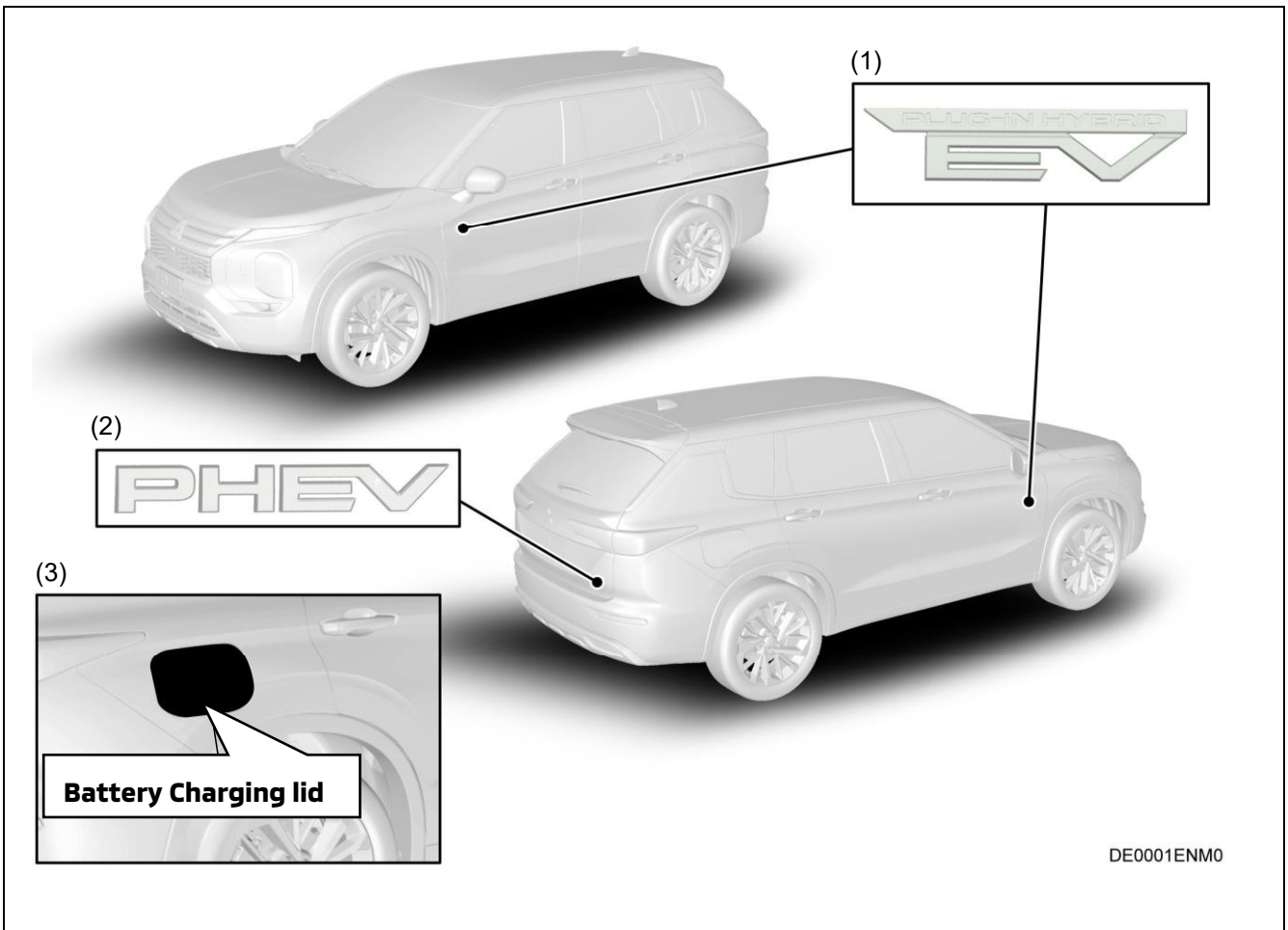
\*NOTE: The contents of this guide may not match exactly with every vehicle due to changes in vehicle specification.

## 2. HOW TO IDENTIFY OUTLANDER PHEV

### 1) Unique features of the Outlander PHEV compared to the gasoline engine Outlander.

- PHEV logo marks
- Charging lid and portal
- Lithium-ion main drive battery (maximum voltage is 650V)
- Twin electric drive motors
- Twin Super all-wheel control motors
- Motors in front and rear axles
- Lack of any engine noises when in EV mode.
- Electric transmission gear selector and parking pawl (12V system).
- 12V Battery is located in the left rear cargo area of the vehicle.
- The A/C compressor and interior heater is powered by the 350V Lithium-ion battery
- Chassis number

### 2) Exterior features that identify an Outlander PHEV from a gasoline engine Outlander.



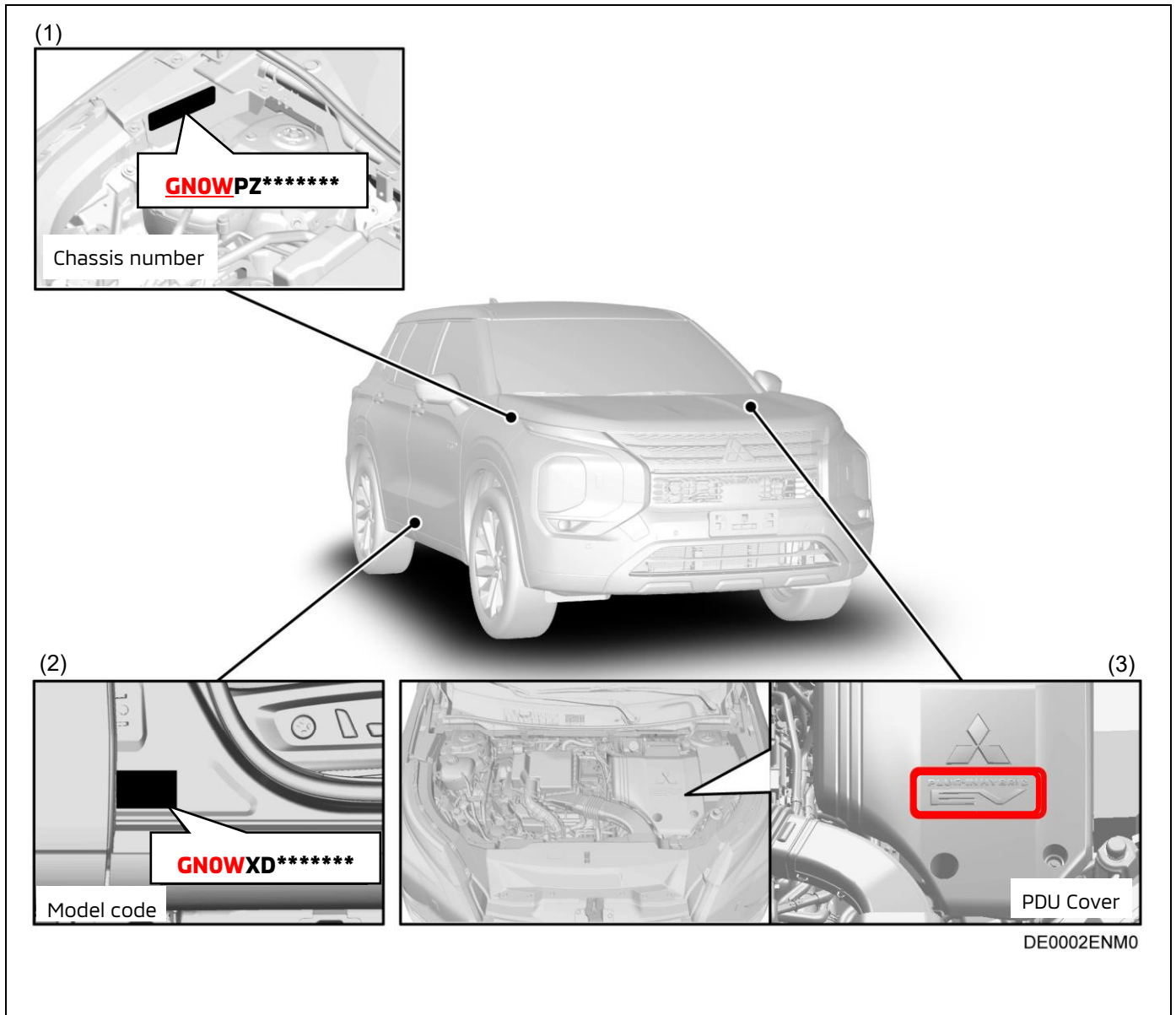
(1) "PLUG-IN HYBRID EV" logo mark on the left and right sides of the door panel

(2) "PHEV" logo mark on the liftgate

(3) "Battery charging lid" on the right rear panel

\*NOTE : The left rear panel is the "Fuel filler lid".

### 3) Chassis Number and Model Code



- (1) "Chassis number" shown in the engine compartment
- (2) "Model code" shown in the Vehicle information code plate
- (3) "PLUG-IN HYBRID EV" logo mark on the "PDU cover" in the engine compartment

### 3. SAFETY PRECAUTIONS



- Always follow instructions described in this guide. Failure to follow these instructions can result in serious injury or death.
- Before dismantling, shut off the high voltage circuits or discharge the Main drive lithium-ion battery in accordance with instructions on the following pages.
- Wear appropriate personal protective equipment where instructed in this guide.
- Do not assume high voltage components have been shut off simply because the vehicle is quiet.
- Never directly touch any exposed high voltage wiring cables, protective covers detached from high voltage components, or high voltage components that might be damaged.
- If fluid leakage is observed under the body, the fluid may be electrolyte leaking from the Main drive lithium-ion battery. This electrolyte is flammable and poisonous acidic gas will evaporate from the electrolyte. Wear a mask for organic gas, solvent-resistant gloves (or heavy-duty rubber gloves), and eye protection. Use an absorption mat or sand to absorb spilled electrolyte. (The electrolyte is clear and colorless and with a slightly sweet odor. It has similar viscosity to water.)
- If the electrolyte comes into contact with your skin, flush with water immediately.
- If the electrolyte gets into your eyes, do not rub your eyes. Immediately flush your eyes with a large quantity of water and seek medical treatment as soon as possible.
- If the vehicle must be left unattended during the dismantling process, display a sign indicating "HIGH VOLTAGE WORK IN PROGRESS!! DANGER! DO NOT TOUCH!" Refer to the signboard example at the end of this guide.
- Advise all dismantlers that an electric vehicle is involved.
- If a charge connector is connected to the vehicle, remove it.

#### **Information on the 12V Auxiliary Battery (located in rear cargo area)**

The 12V auxiliary battery of the Outlander PHEV is located in the left rear of the vehicle. It provides power to multiple ECUs (Electronic control units) in the vehicle and operates all the 12V vehicle accessories. The multiple ECUs that are powered by the 12V battery include the ECUs that operate the High Voltage electric drive components. If the 12V battery state of charge is depleted or has been disconnected, the vehicle will not operate even if the 350V drive battery is fully charged. The unlocking mechanism of the rear tail gate is powered by the 12V battery. This function will be disabled if the 12V battery is dead or disconnected. Refer to the owner's manual for instructions on how to jump start the vehicle from the engine compartment.

#### **Proper Handling of the Main Drive Lithium-ion High Voltage Battery (located under vehicle)**

If the Main drive lithium-ion battery is damaged during the extraction process due to the use of heavy machinery or a procedure not described in this guide, collection/recycling of that battery may be denied due to increased safety concerns in transporting the damaged Main drive lithium-ion battery. Mitsubishi Motors North America Inc. is not responsible for any accident or damage caused by modification of the Main drive lithium-ion battery or mounting/installation of the Main drive lithium-ion battery on any vehicle other than the Outlander PHEV. To prevent accidents, your cooperation in the safe collection/recycling of Main drive lithium-ion batteries is appreciated. For collection/recycling information, please contact: <http://elvsolutions.org/>

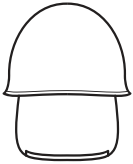

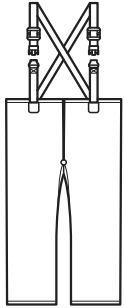
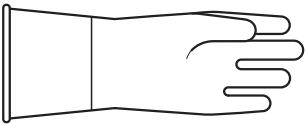
#### 4. **INSPECTION/TEST OF PROTECTIVE EQUIPMENT, BLOTTER STRAGE**

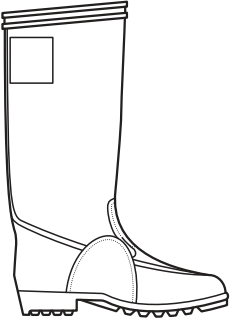
Check and store the protective equipment in accordance with national legal requirements.

#### 5. **PROTECTIVE EQUIPMENT**



- **Use protective equipment that complies with the legal requirements of your country/local area.**
- **Use insulating protective equipment which meets the requirements to withstand DC 650 V and AC 650 V.**

Protective equipment	Name	Use
	Electric insulation helmet (with shield)	<ul style="list-style-type: none"><li>• When you may contact with the exposed live wirings while handling the damaged vehicle</li><li>• Alternatively, when you prevent the electric shock according to need</li></ul>
	Electric insulation jacket	<ul style="list-style-type: none"><li>• When you may contact with the exposed live wirings while handling the damaged vehicle</li><li>• Alternatively, when you prevent the electric shock according to need</li></ul>
	Electric insulation trousers	<ul style="list-style-type: none"><li>• When you may contact with the exposed live wirings while handling the damaged vehicle</li><li>• Alternatively, when you prevent the electric shock according to need</li></ul>
	Electric insulation glove	<ul style="list-style-type: none"><li>• Service plug removal and installation</li><li>• Work on live wirings when there is a problem</li><li>• When you may contact with the exposed live wirings while handling the damaged vehicle</li></ul>

		<ul style="list-style-type: none"> <li>· Alternatively, when you prevent the electric shock according to need</li> </ul>
	<p>Electric insulation boots</p>	<ul style="list-style-type: none"> <li>· When you may contact with the exposed live wirings while handling the damaged vehicle</li> <li>· Alternatively, when you prevent the electric shock according to need</li> </ul>

**6. TESTER AND SPECIAL TOOL**

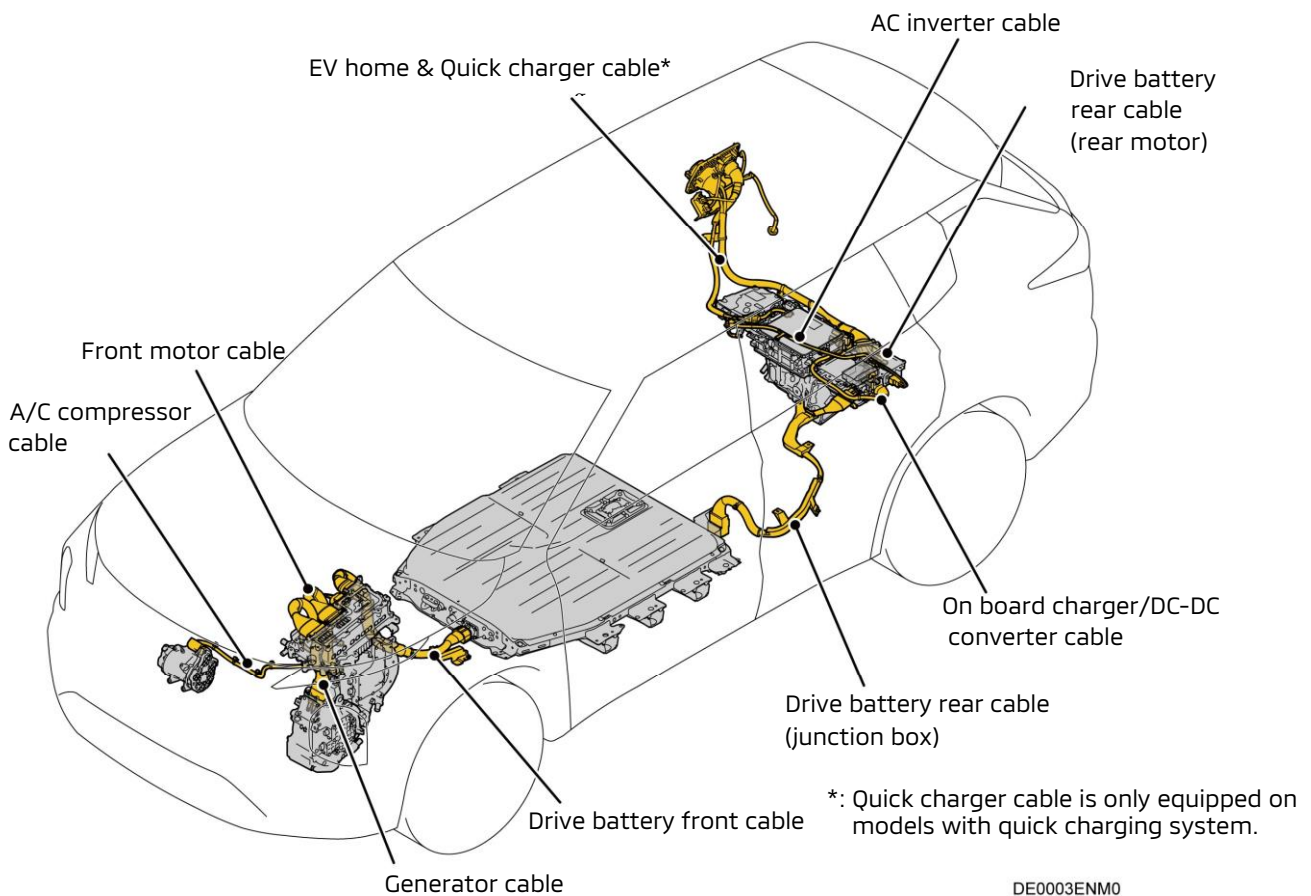
Be sure to use the tester and special tools specified in this manual.



## 7. HIGH-VOLTAGE COMPONENTS

The high-voltage components are described below. Also, wiring harness and connectors of high-voltage circuit are unified with a color of orange.

- Drive battery [with built-in Battery Management Unit (BMU)]
- Power Drive Unit (PDU) [with built-in Front electric motor control unit (FEMCU) and Generator Control Unit (GCU)]
- Front motor
- Rear motor [with built-in Rear Electric Motor Control Unit (REMCU)]
- Generator
- On Board Charger (OBC)/DC-DC converter
- AC inverter <Some models>
- Drive battery cable
- EV home & Quick charger cable\*
- Service plug
- Wiring harness and connector
- A/C compressor
- Junction box
- High voltage sensor (for quick charging)



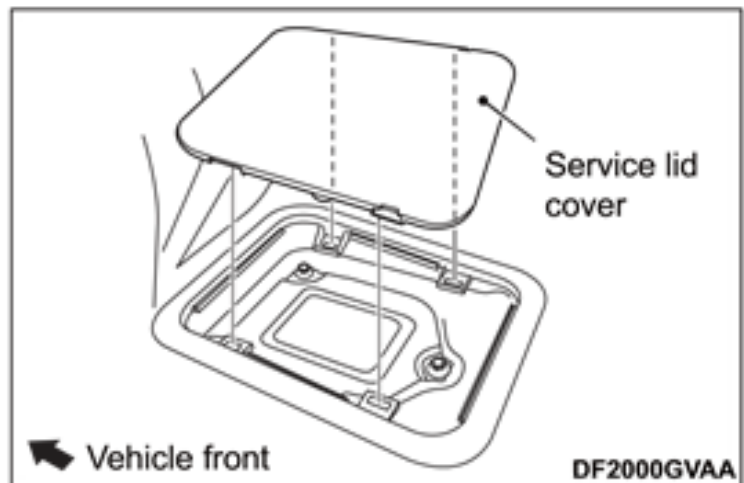
## 8. MAIN DRIVE LITHIUM-ION BATTERY REMOVAL PROCEDURE

1. Drain the refrigerant completely as pre-removal operation.
2. Remove the charging cable if the vehicle is being charged.
3. Turn the power switch to OFF.
4. Open the hood and tail-gate.
5. Turn the ignition ON.
6. Press the power switch for more than 5 seconds.
7. Close the driver side door and wait for more than 5 minutes.
8. Check if illumination of combination meter and "P" indicator of electrical parking brake switch are OFF.
9. Disconnect the negative terminal of 12V battery and wait for more than 5 minutes.

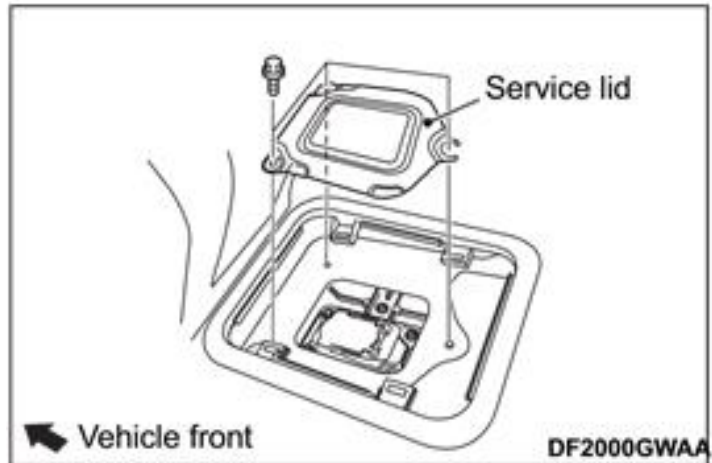
### CAUTION

- **Do not remove the negative terminal of 12V battery for 5 minutes after turning OFF the power switch. It may cause of damage of power unit components.**
- **Do not remove the service plug within 5 minutes after disconnecting negative terminal of 12V battery to decrease voltage of smooth condenser inside of inverter.**

10. Remove service lid cover.



11. Remove 3 bolts and remove the service lid.



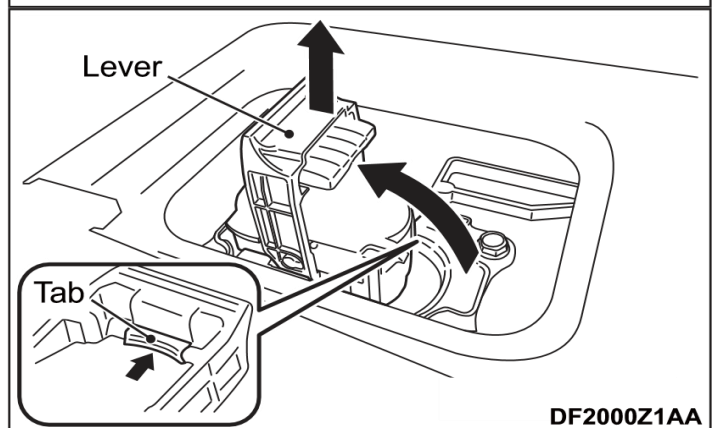
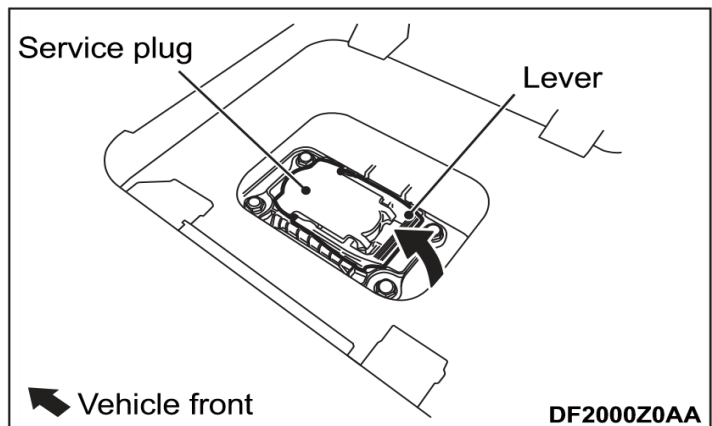
**⚠ DANGER**

- **Wear the electrical insulation gloves when removing the service plug.**
- **Do not pull out the service plug by halves. It is dangerous because the current is supplied during the lifting operation. Be sure to remove the entire service plug at once.**

**⚠ CAUTION**

**The voltage of the smooth condenser in the inverter must be decreased thoroughly. Therefore, do not remove the service plug 5 minutes after the negative terminal of the 12 V battery is disconnected.**

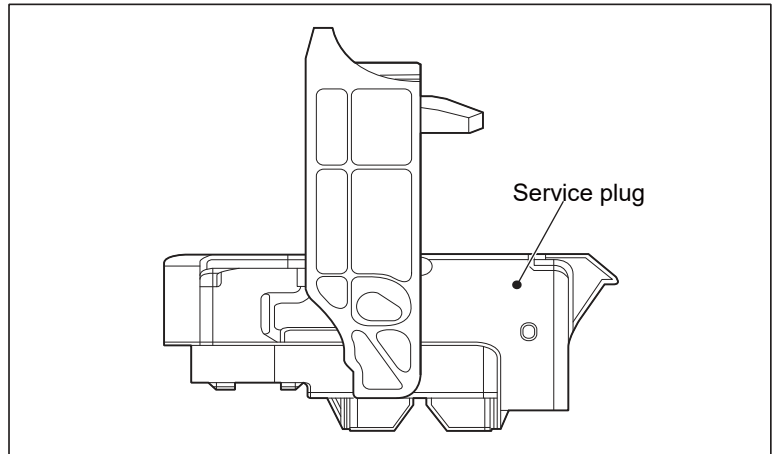
12. Pull up the service plug lever a little, then pull up the lever more while pushing the tab, then pull out the service plug.



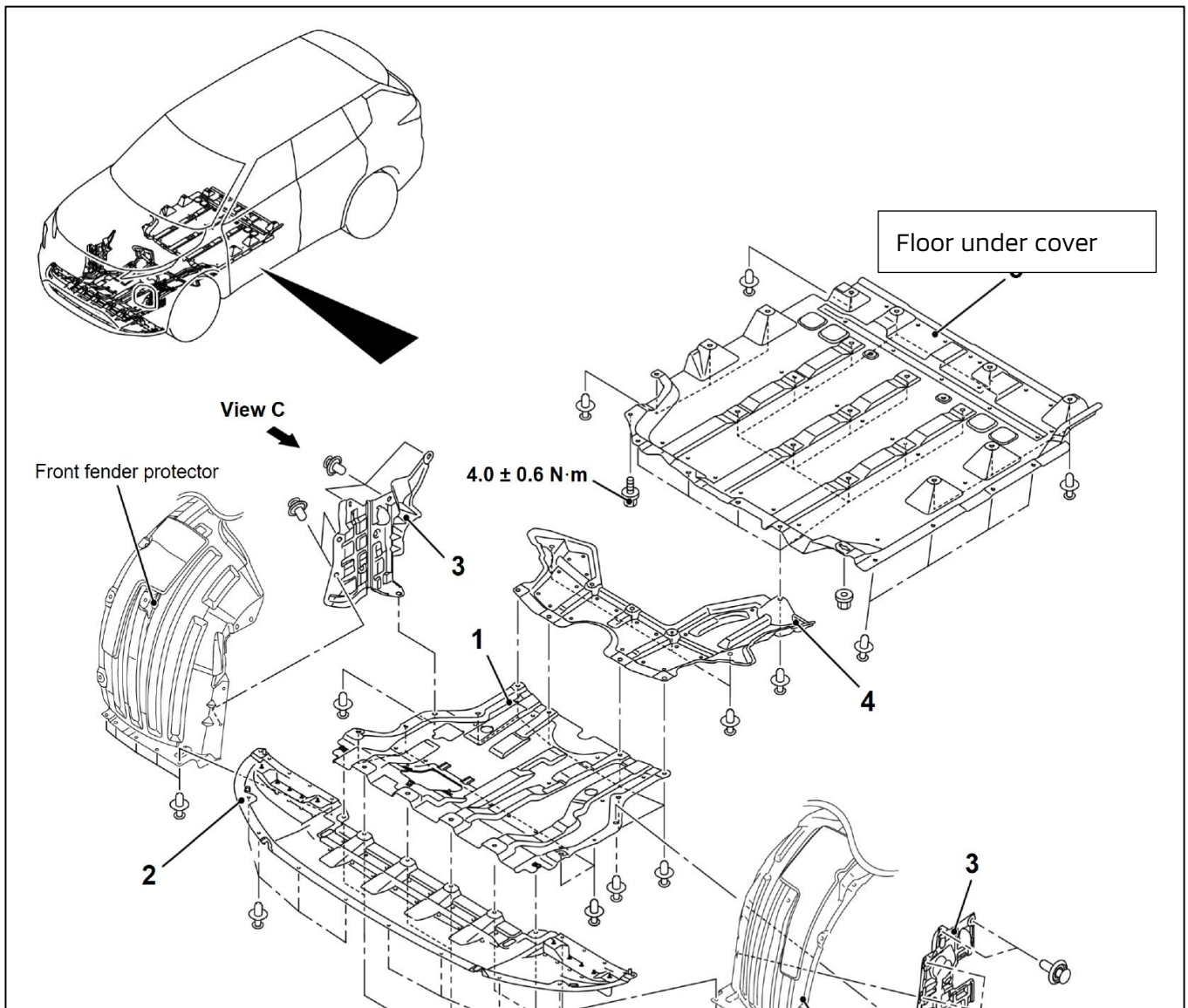
**⚠ DANGER**

**After removing the service plug, insulate the plug installed part of the drive battery side securely.**

13. Remove the service plug.



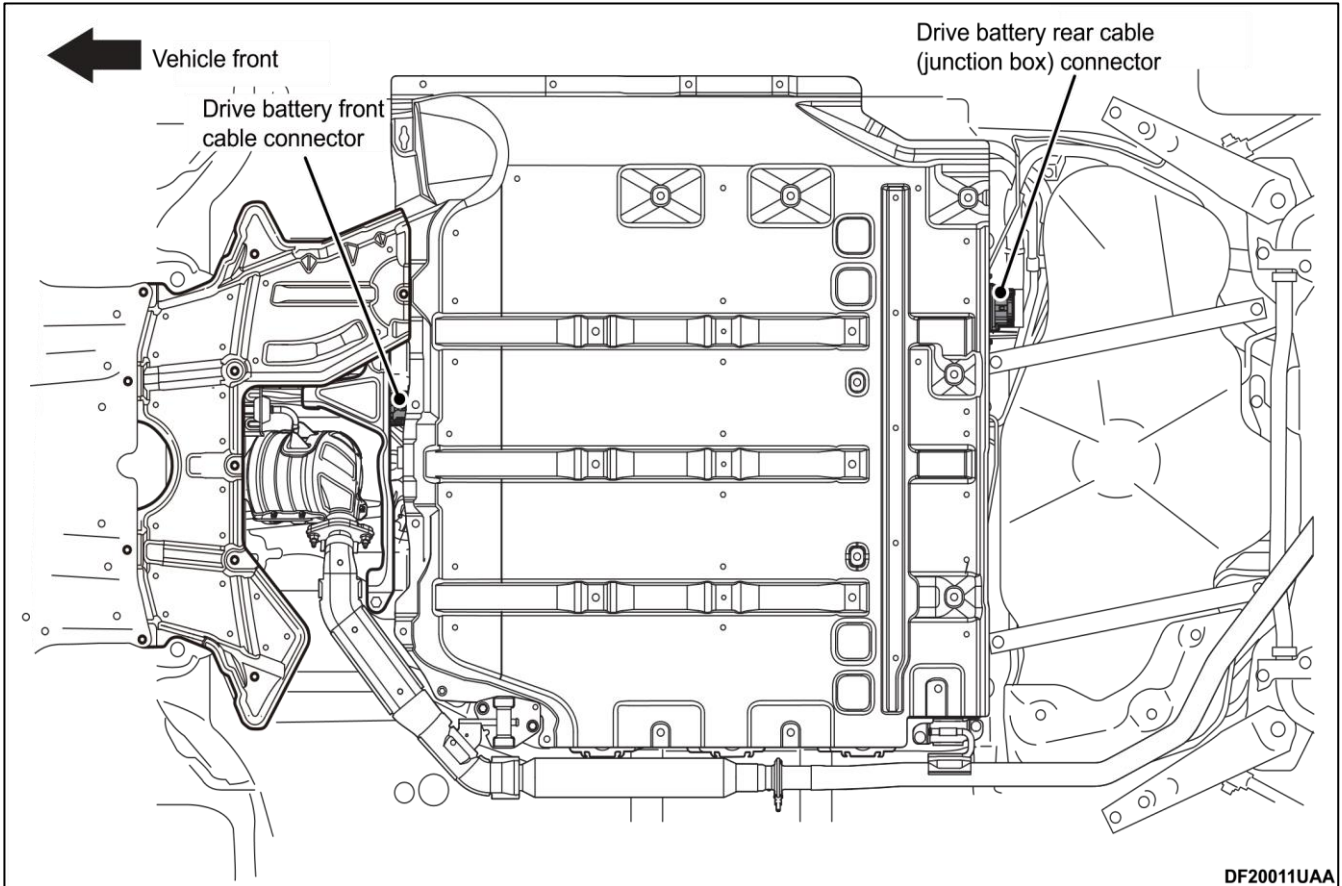
14. Remove the floor under cover.



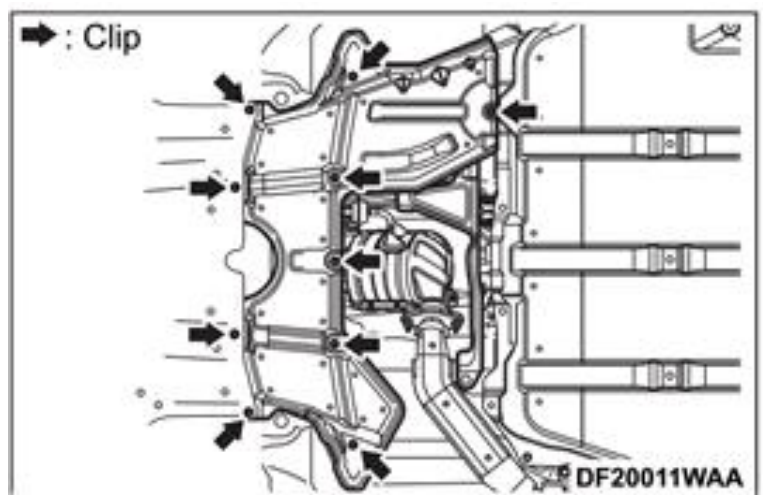
**During inspection, wear the electric insulation gloves.**

15. When removing and installing each high-voltage part, be sure to perform the following inspection beforehand.

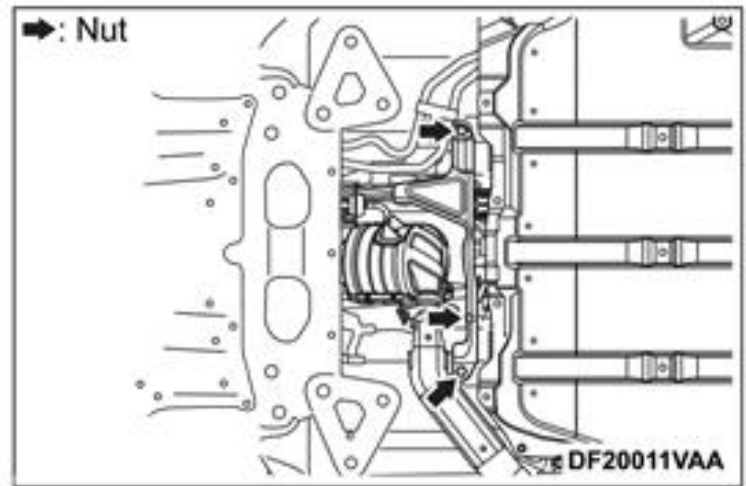
16. Check the drive battery front cable connector and drive battery rear cable (junction box) connector by the following procedure below.



17. Remove the engine room under cover rear.



18. Remove the front floor heat protector (rear).

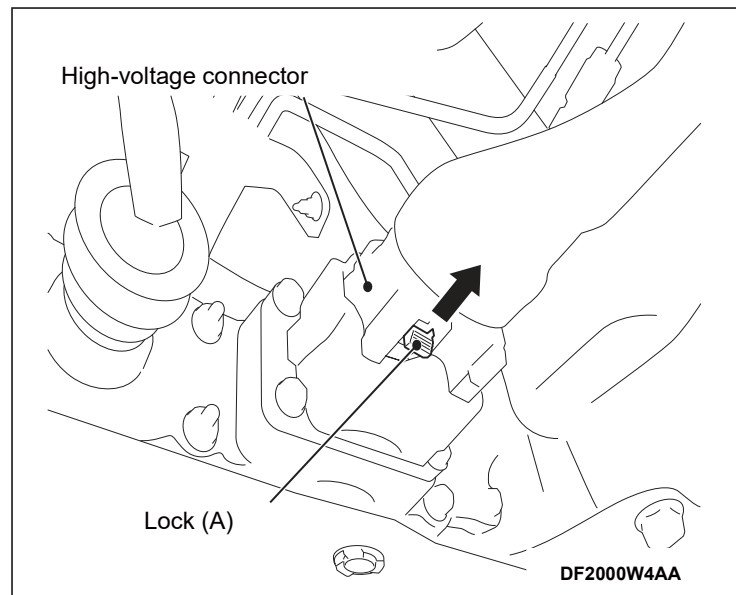


**When servicing the high-voltage components, be sure to disconnect the service plug.**

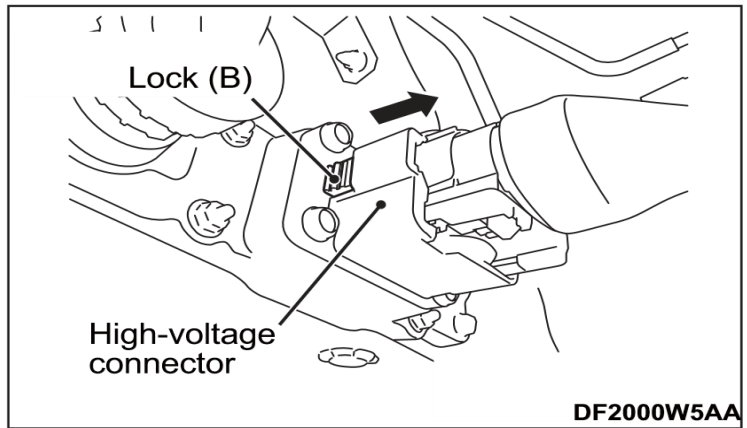


**When unlocking the connector lock, do not use tools etc. otherwise the connector lock may be damaged. Be sure to unlock the connector lock by hand.**

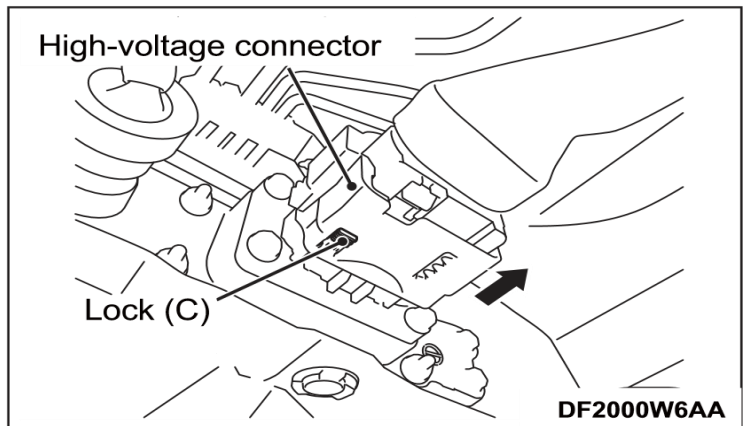
19. Disconnect the drive battery front cable from the drive battery.  
20. Move the lock (A) of the connector to the direction of the arrow.



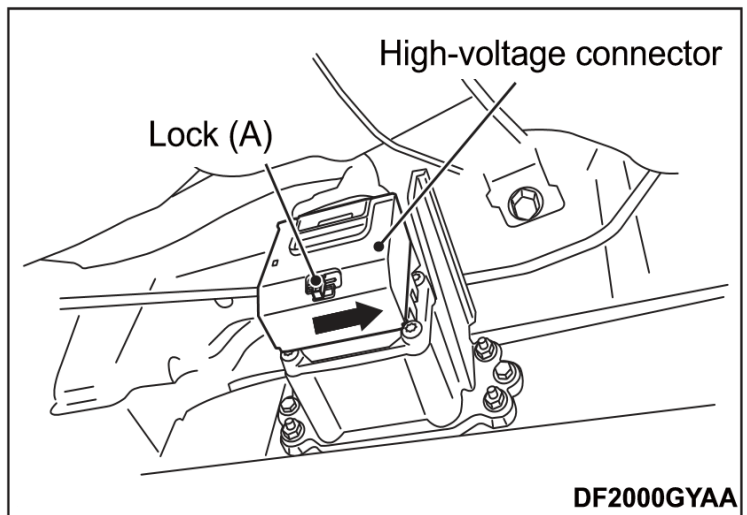
21. Pull the connector to the direction of the arrow until it stops while pushing the lock (B).



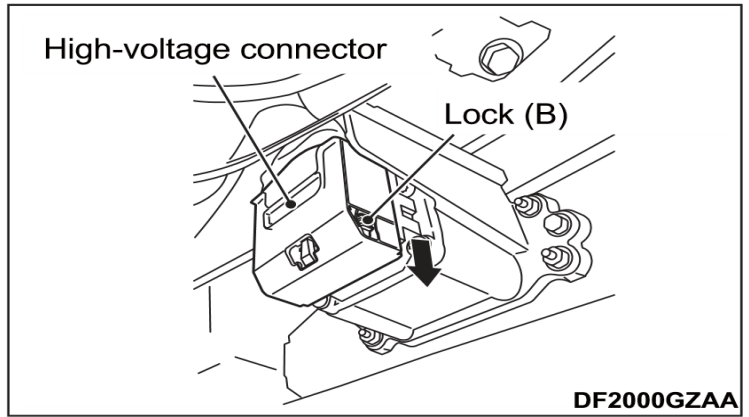
22. Pull the connector to the direction of the arrow while pushing the lock (C) to disconnect the connector.



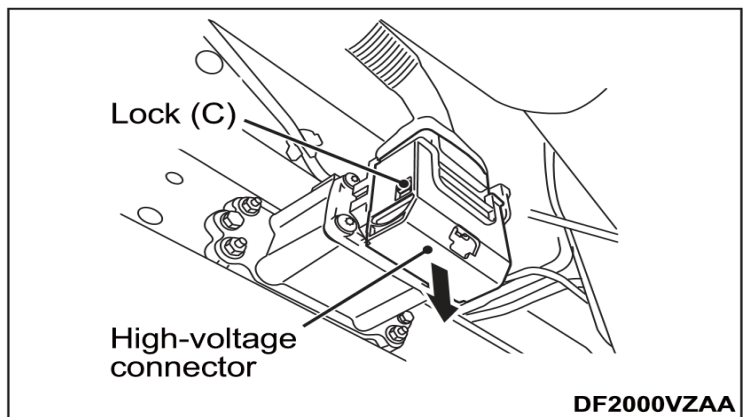
23. Disconnect the drive battery rear cable (junction box) from the drive battery.
24. Move the lock (A) of the connector to the direction of the arrow (UNLOCK position).



25. Pull down the connector to the direction of the arrow until it stops while pushing the lock (B).



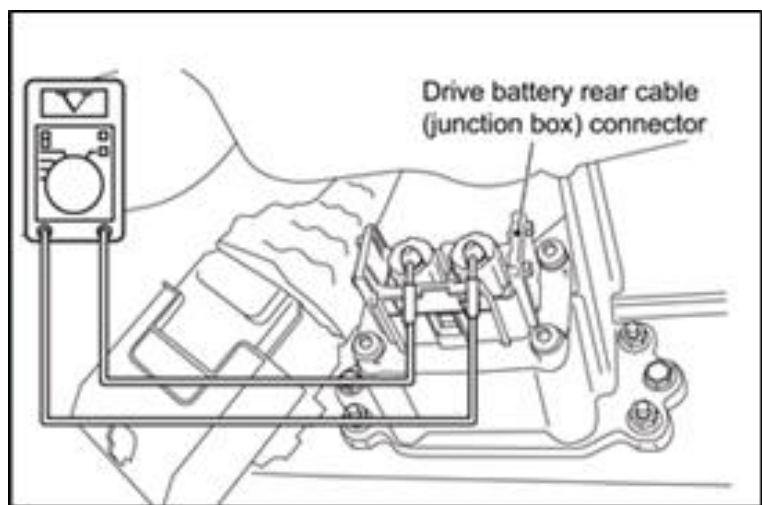
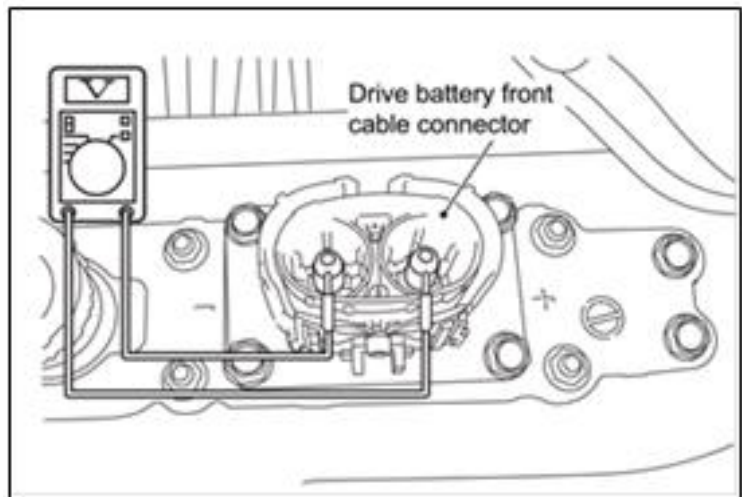
26. Pull the connector to the direction of the arrow while pushing the lock (C) to disconnect the connector.





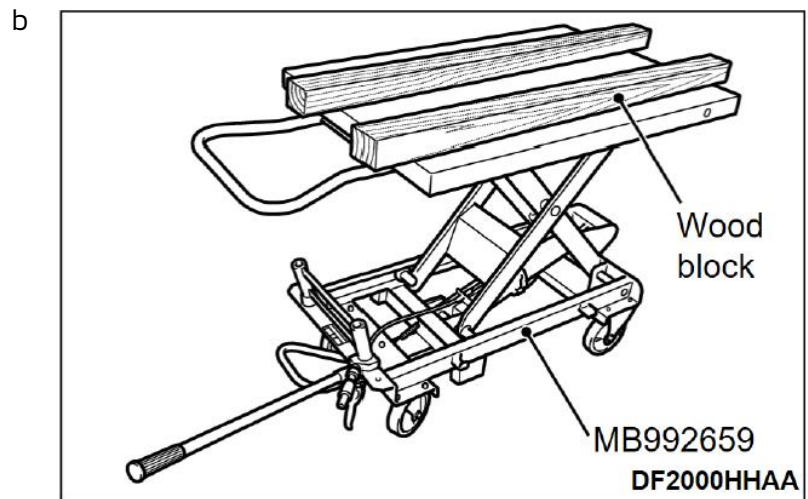
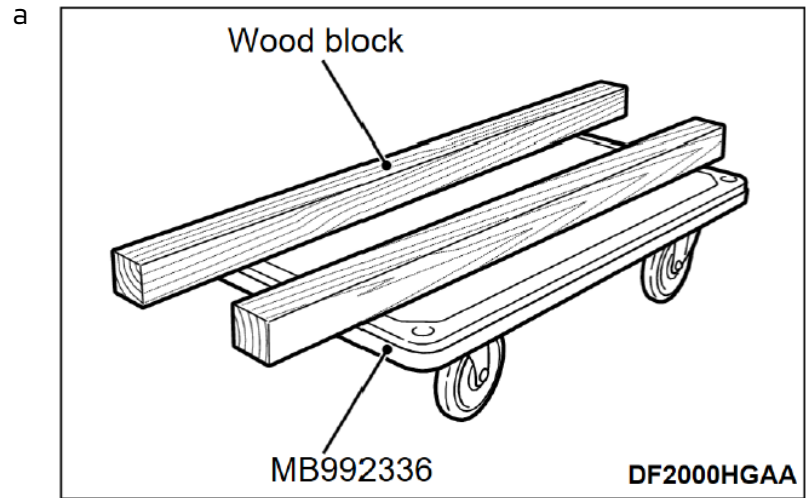
27. Measure the voltages between the terminals as shown in the illustration using a high-voltage multi-meter.

**Normal voltage: Approximately 0 V**



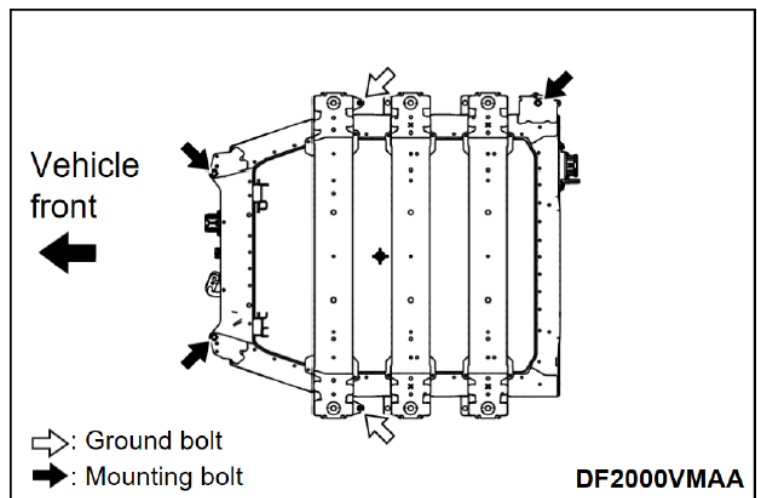
28. Remove the A/C pipes from the drive battery.

29. Use the following special tools and 2 wood blocks (RH: 90 x 90 x 1,500 mm, LH: 90 x 90 x 1,650 mm)



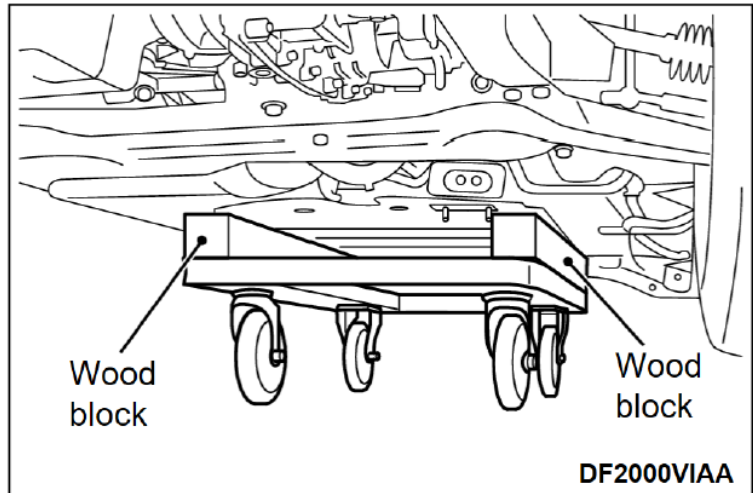
When the vehicle is lowered with the lift using the above special tool (MB992336), if the lower stopper lock does not work, use the EV battery lifting cart (special tool: MB992659) instead.

30. Remove the 2 ground bolts and 3 mounting bolts shown in the illustration with the drive battery mounted.



31. Loosen the remaining mounting bolts (6 locations).

32. Lower the vehicle with the lift until just before the bottom of the drive battery contacts the wood block.



33. Remove all the mounting bolts on the drive battery.



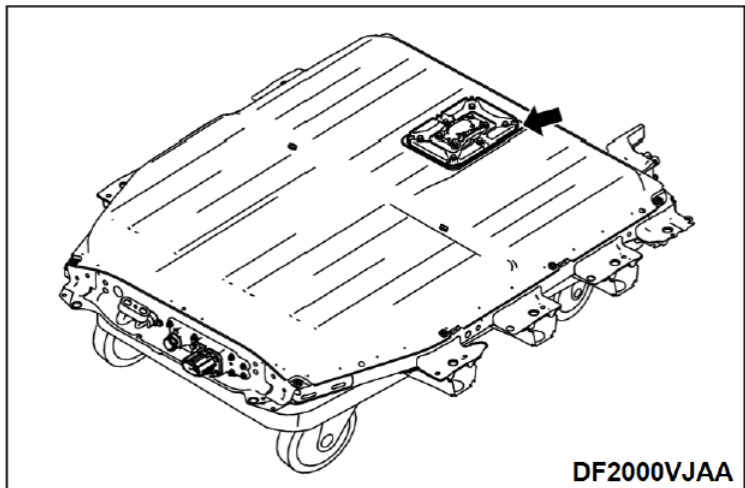
**Be careful of damage due to wiring harness caught or hooked.**

34. Raise the vehicle with the lift and remove the drive battery.



- **Store the drive battery on a place with no risk of wetting.**
- **Do not bring the drive battery close to fire or heat it to 60°C(140°F) or more.**

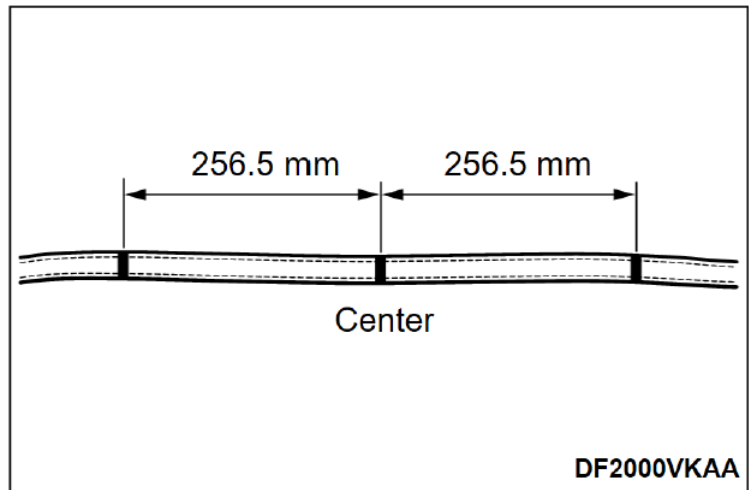
35. Cover around the service plug of the drive battery with a vinyl sheet or others so that no water, foreign material, etc. enter the inside of the drive battery.



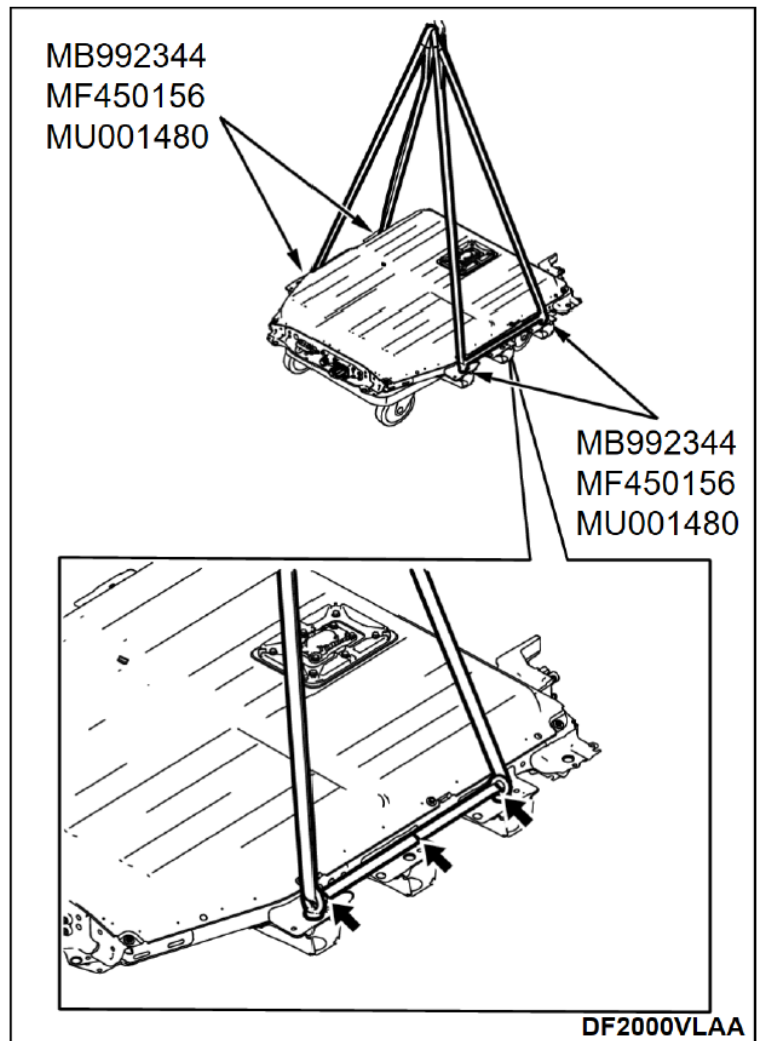
36. When moving the removed drive battery with a crane or others, use the EV battery sling tool kit (special tool: MB992343) to sling it up in accordance with the following procedure.

- EV battery sling tool kit (MB992343)
  - Eye bolts (MB992344 x 4)
  - EV battery sling belts (MB992345 x 2)
  - Washers (MF450156 x 8)
  - Hexagon nuts (MU001480 x 4)

a) Mark the center of the EV battery sling belt (MB992345) and positions 256.5 mm right and left from the center.



b) Install the eye bolts (MB992344), washers (MF450156) and nuts (MU001480) onto the positions (2 each at the right and left) on the drive battery as shown in the figure.



- 
- c) Pass the EV battery sling belt through the eye bolts and align the marks on the EV battery sling belt to the eye bolt positions.
  - d) Bind the 2 EV battery sling belts together and sling up the drive battery with a crane or others.

## 9. SERVICE PLUG REMOVAL CHECK SHEET

Check	#	Procedure	Notes
	1	Disconnect charging cable if it is connected.	
	2	Turn the power switch OFF.	
	3	Open the hood and tail-gate.	
	4	Turn the power switch ON, then press and hold for more than 5 seconds.	
	5	Close driver side door.	
Wait for more than 5 minutes.			
	6	Check if indicator of combination meter and "P" indicator of parking switch turn OFF.	
	7	Disconnect the negative terminal of 12 V battery.	<p><b>⚠ CAUTION</b></p> <ul style="list-style-type: none"> <li>Do not remove the negative terminal of 12V battery for 5 minutes after turning OFF the power switch. It may cause of damage of power unit components.</li> <li>Do not remove the service plug within 5 minutes after disconnecting negative terminal of 12V battery to decrease voltage of smooth condenser inside of inverter.</li> </ul>
Wait for more than 5 minutes.			
	8	Remove service lid cover.	
	9	Remove service lid.	
	10		<b>⚠ DANGER</b>
	11	Remove service plug.	<ul style="list-style-type: none"> <li>Wear the electrical insulation gloves when removing the service plug.</li> <li>Do not pull out the service plug by halves. It is dangerous because the current is supplied during the lifting operation. Be sure to remove the service plug at once.</li> <li>After removing the service plug, insulate the plug installed part of the drive battery side securely.</li> </ul> <p><b>⚠ CAUTION</b></p> <p>Do not remove the service plug within 5 minutes after disconnecting negative terminal of 12V battery to decrease voltage of smooth condenser inside of inverter.</p>
	12	Be sure to carry out preliminary inspection when detaching each high voltage part. (ex. high voltage cable)	<p><b>⚠ DANGER</b></p> <p>During inspection, wear the electric insulation gloves.</p>

**10. HIGH VOLTAGE SIGN BOARD**

**DO NOT TOUCH!  
DANGER!  
IN PROGRESS!!  
HIGH VOLTAGE WORK**

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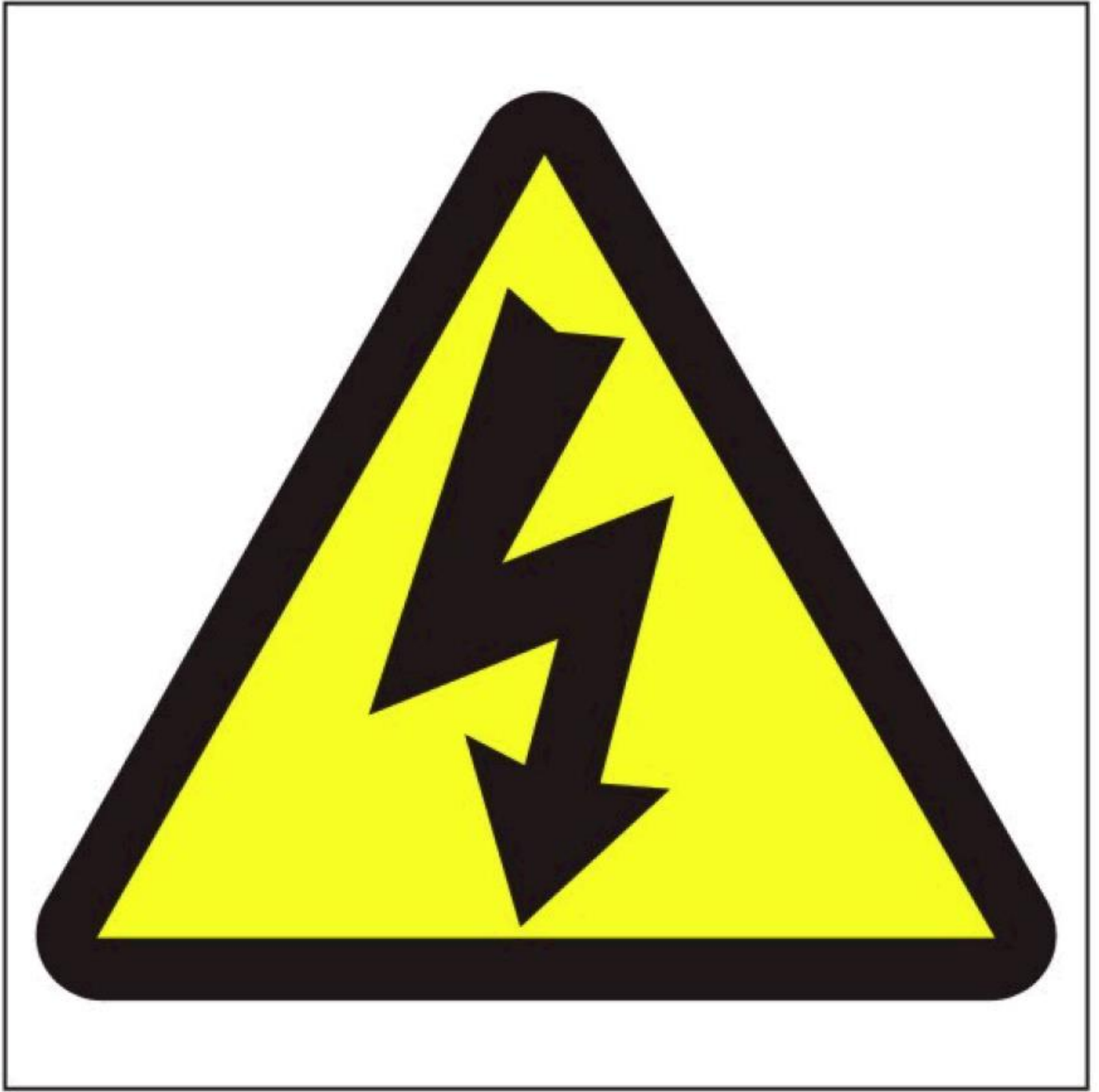
**HIGH VOLTAGE WORK  
IN PROGRESS!!  
DANGER!  
DO NOT TOUCH!**

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\*When doing high-voltage work, please put up this signboard.

Fold along the dotted line and place it on top of the Outlander PHEV's roof.

## 11. WARNING SIGN



It is recommended that a warning sign (example provided above) is fixed to or on the vehicle during any emergency work on the vehicle. A sign that complies with local regulation should be used.