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# MITSUBISHI



## 2014 i-MiEV Dismantling Guide



### Lithium-Ion Battery Electric Vehicle



May 2014

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## Introduction

Since the i-MiEV is an 100% electric vehicle equipped with a high voltage (370V) Main drive lithium-ion battery, caution must be used when dismantling the vehicle. This guide provides instructions that must be followed when the high voltage Main drive lithium-ion battery is to be removed from the i-MiEV. Failure to follow the instructions in this guide, including the warnings and cautions, may result in serious injury or death by electrical shock due to the high voltage battery installed on the i-MiEV. Before dismantling, please read this guide carefully and understand the identified procedures.

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

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

 **WARNING;**

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

 **CAUTION;**

Means hazards or unsafe practices that could cause minor personal injury or damage to your vehicle..

\*: indicates optional equipment.

It may differ according to the sales classification; refer to the sales catalogue.

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.

- Please note that the contents of this guide may not match exactly with every vehicle due to changes in vehicle specification.

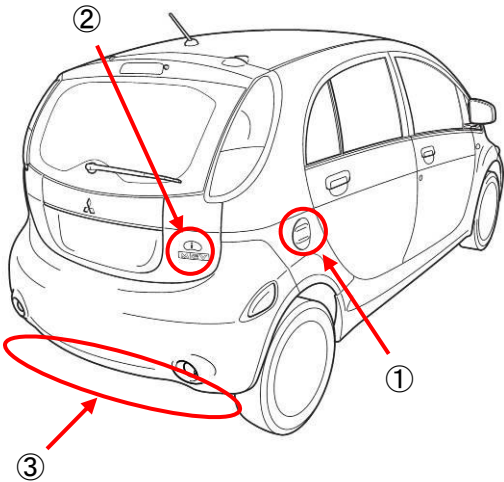


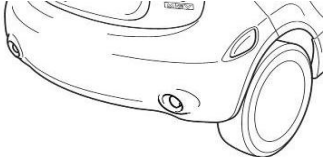
## How to Identify i-MiEV

Always handle i-MiEV using appropriate Personal Protective Equipment (PPE) and the methods described in this guide.

### (1) Unique i-MiEV features

- MiEV logo mark
- Charging lid and port
- No exhaust pipe
- Chassis number

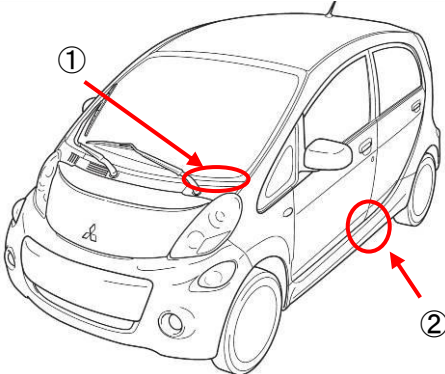
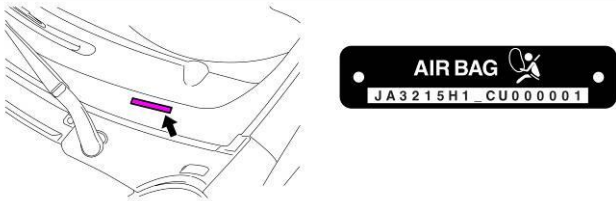
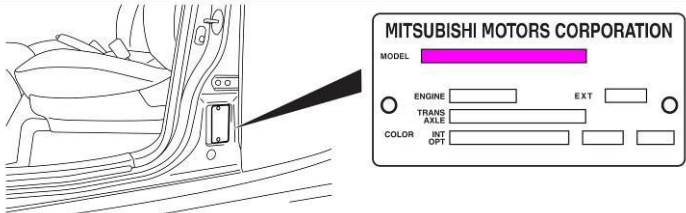
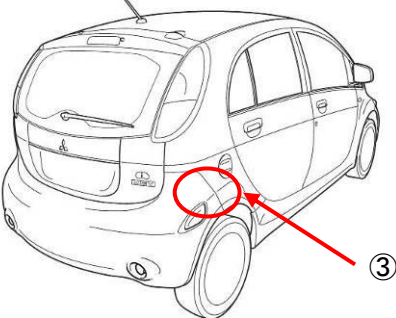
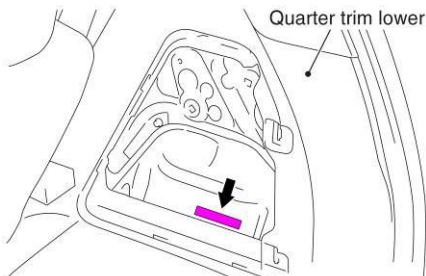
### (2) Exterior

|  |  |
|--|--|
|  | <p>① Charging lid and port on the right side of the vehicle.</p>      |
|  | <p>② MiEV logo mark on right side of tailgate.</p>                   |
|  | <p>③ No exhaust pipe<br/>i-MiEV does not have an exhaust pipe.</p>  |

### (3) Chassis Number and Model Code

The Model code is stamped on the "Vehicle identification number plate" and "Vehicle information code plate".

The Chassis number is stamped on the "Quarter Trim".

|  |  |
|--|--|
|                              | <p>① VEHICLE IDENTIFICATION NUMBER PLATE</p> <p>The vehicle identification number (VIN) plate is located on a plate attached to the left top side of the instrument panel.</p> <p>The first 6 digits are "JA3215" for i-MiEV.</p> <p>Ex) Model code stamp : <b>JA3215H1_CU00001</b></p>  |
|  | <p>② VEHICLE INFORMATION CODE PLATE</p> <p>The vehicle information code plate is riveted to the face of the driver's door sill.</p> <p>i-MiEV includes "HA3W" in the MODEL code.</p> <p>Ex) MODEL code stamp: <b>HA3WGLDDL2M</b></p>   |
|  <p>(inside of vehicle)</p> | <p>③ CHASSIS NUMBER</p> <p>The chassis number is stamped on the body panel, quarter trim lower, inside the vehicle.</p> <p>i-MiEV includes "HA3W" in the Chassis number.</p> <p>Ex) Chassis number stamp: <b>HA3W-0000010</b></p>    |

## **Safety Precautions**

### **WARNING;**

- 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.

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## **Proper Handling of the High Voltage Battery**

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 of that battery may be denied due to increased safety concerns in transporting the damaged Main drive lithium-ion battery.

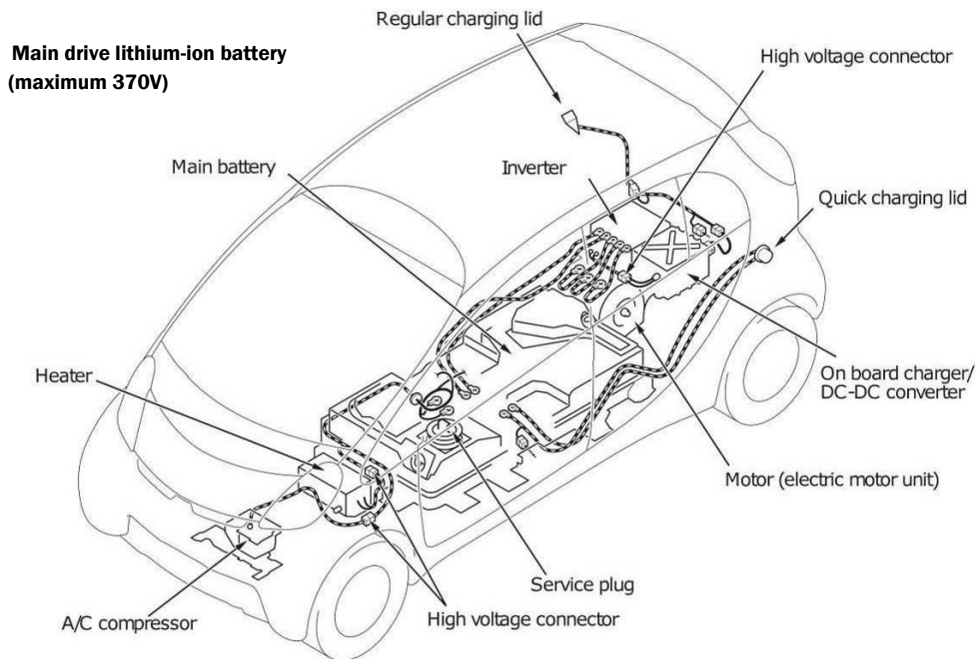
Mitsubishi Motors North America Inc. is not responsible for any accident or damage caused by modification of the Main drive lithium-ion battery or mounting/installation of the Main drive lithium-ion battery on any vehicle other than the Mitsubishi i-MiEV.

To prevent accidents, your cooperation in the safe collection of Main drive lithium-ion batteries is appreciated. For collection information, please contact:

<http://global.ev-life.com/recycle/>

## **High Voltage Components Layout**

High voltage (maximum 370V) components and wiring cables are located as shown in the figure below.



### **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.

- Main drive lithium-ion battery
- Inverter
- On board charger/DC-DC converter
- Motor (electric motor unit)
- Heater
- A/C compressor
- Regular charging lid
- Quick charging lid (if applicable)
- Service plug
- Wiring harness and connector

### **Tester and special tools**

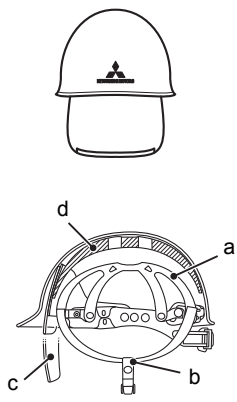

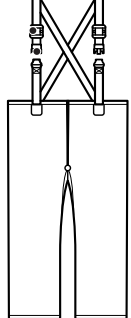
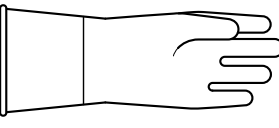
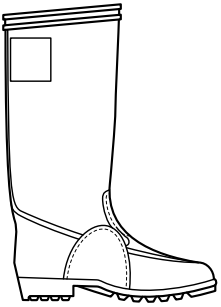
- High-voltage multimeter (minimum Category IV)
- EV battery lifting cart (special tool: MB992659) or equivalent (maximum capacity 1100 lbs.)
- EV battery sling (special tool: MB992345) or equivalent (maximum capacity 1200 lbs.)



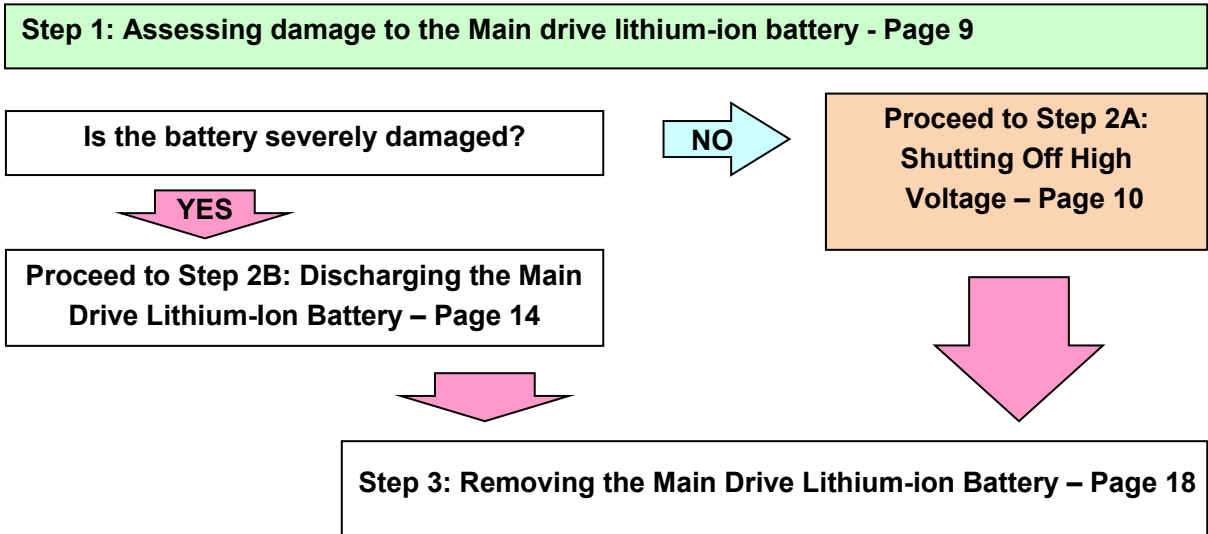
## Personal Protective Equipment (Reference Only)

**⚠ CAUTION;**

Use personal protective equipment that complies with applicable state and local requirements. This equipment should include the following:

| Personal Protective Equipment   | Name  |
|---|---|
|    | Electric insulation helmet (with shield)<br>a. Helmet suspension<br>b. Chin strap<br>c. Visor<br>d. Liner |
|    | Electric insulation jacket  |
|   | Electric insulation trousers  |
|  | Electric insulation glove   |
|  | Electric insulation boots   |

## Dismantling Process Overview



## **Step 1: Assessing Damage to the Main Drive Lithium-ion Battery**

Immediately after receiving the vehicle, and prior to any dismantling work, check for damage to the Main drive lithium-ion battery. If the Main drive lithium-ion battery is severely damaged, the Main drive lithium-ion battery must be discharged by soaking in water prior to any dismantling work in order to reduce the risk of electric shock and/or fire.

If one of the following conditions is observed, the battery is likely severely damaged:

- Organic solvent odor is detected around the vehicle that is unlike gasoline, light oil or oil odors.
- Inner components such as batteries or electric wirings are visible through an opening in the damaged Main drive lithium-ion battery case.
- An object is penetrating into the Main drive lithium-ion battery case.
- Driver's, front passenger's, and/or the rear seat is deformed or tilted due to floor deformation.

### **WARNING;**

- Wear Personal Protection Equipment when checking for damage to the Main drive lithium-ion battery.
- If the Main drive lithium-ion battery is severely damaged, even after the high voltage circuit has been shut off, there is still a risk of electrical shock and/or fire.
- If it is not possible to proceed immediately with the process for discharging the Main drive lithium-ion battery, place the vehicle in an open space away from any structure or vehicle, and continue to monitor the vehicle until the discharging process has been completed and the risk of fire is eliminated.
- If you detect leaking fluids, sparks, smokes, flames, increased temperature, gurgling, popping, or hissing noises from the HV compartment, notify the Fire Department. Ensure area is clear around the vehicle. If possible, open windows to avoid potential gas build-up.

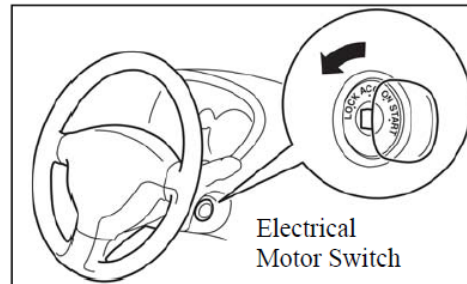
## Step 2A: Shutting Off the High Voltage

### **⚠ WARNING;**

If the Main drive lithium-ion battery is severely damaged, do not carry out the procedures described in this section. Instead, discharge the Main drive lithium-ion battery in accordance with Step 2B.

1) Shut down the vehicle's high voltage system using one of the following two methods. This will disconnect the high voltage electricity current supplied from the Main drive lithium-ion battery.

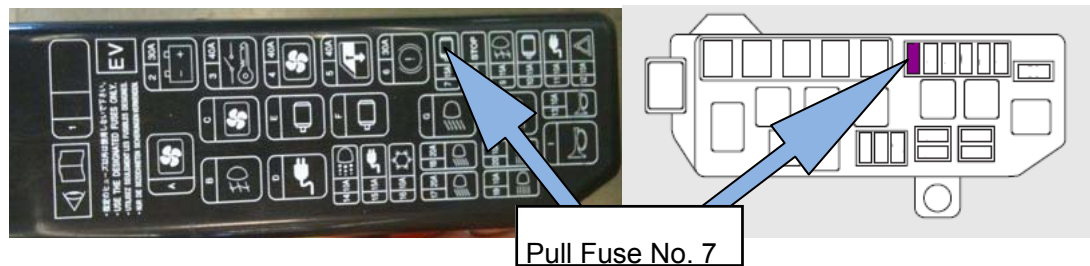
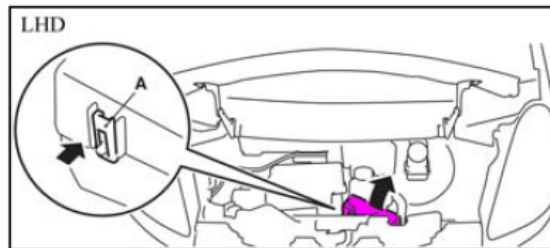
- ① Turn the Electric Motor Switch (Ignition switch) on the steering column to the "LOCK" position.



- ② If it is impossible to turn off the electric motor switch, use needle-nose pliers to remove the Power control unit fuse from the fuse box under the hood. It is the No.7 15A fuse shown in the figure below. If you cannot locate this fuse, remove all fuses and relays in the fuse box.

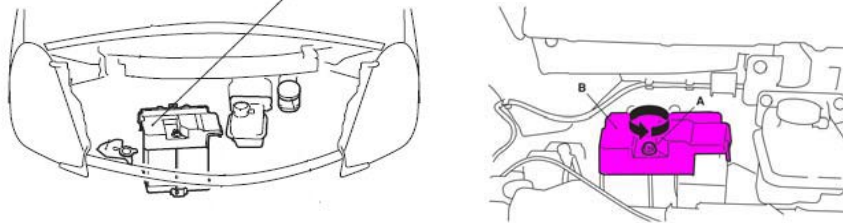


The hood release is under the instrument panel beside the **front passenger's** door.



- 2) Wait at least 1 minute before proceeding to the next step. High voltage system shut down is performed during this waiting time.
- 3) Disconnect the 12V battery negative terminal. This will disconnect the power supply to the SRS airbag system and the EV ECU. Disconnect the 12V battery negative terminal by using a 10mm wrench as follows:

- ① Remove the cover of the 12V battery under the hood. Turn the plastic nut (A) counter clockwise, and then remove the battery upper cover (B).



- ② Disconnect the negative terminal from the 12V battery.
- 4) If necessary, cut the negative 12V battery cable, then wrap electrical tape to insulate the cable ends.

**⚠ WARNING;**

After disconnecting the 12V battery negative terminal, to avoid the risk of inadvertent air bag deployment, wait at least 1 minute. The SRS air bag system is designed to retain enough voltage to deploy the air bag for a short time even after the 12V battery has been disconnected.

- 5) Wait at least 5 minutes before proceeding to the next step. Working with the High voltage circuit in the Main drive lithium-ion battery can be performed about 5 minutes after disconnecting the 12V battery negative terminal.
- 6) Remove the Service Plug by following the procedure below.

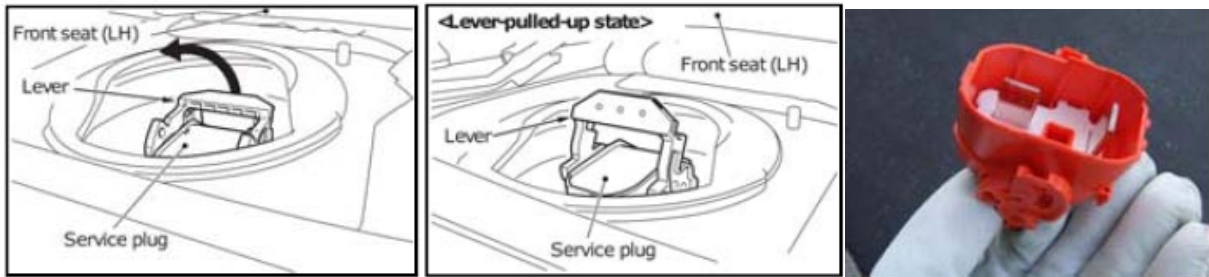
**⚠ WARNING;**

- Always wear Personal Protective Equipment (PPE) when removing the Service Plug.
- If the Service Plug is removed without following the procedure described in this section, a short circuit can occur and melted metal debris may fly from the service plug terminal, resulting in injury to dismantlers.

- ① Adjust the **front left side seat** to its rear most position and roll up the carpet under the seat. Detach the service lid by removing two wing nuts. If it is difficult to move the seat, remove it.



- ② Pull up the lever of the Service Plug and then remove the Service Plug by pulling upward on the lever.



**⚠ WARNING;**

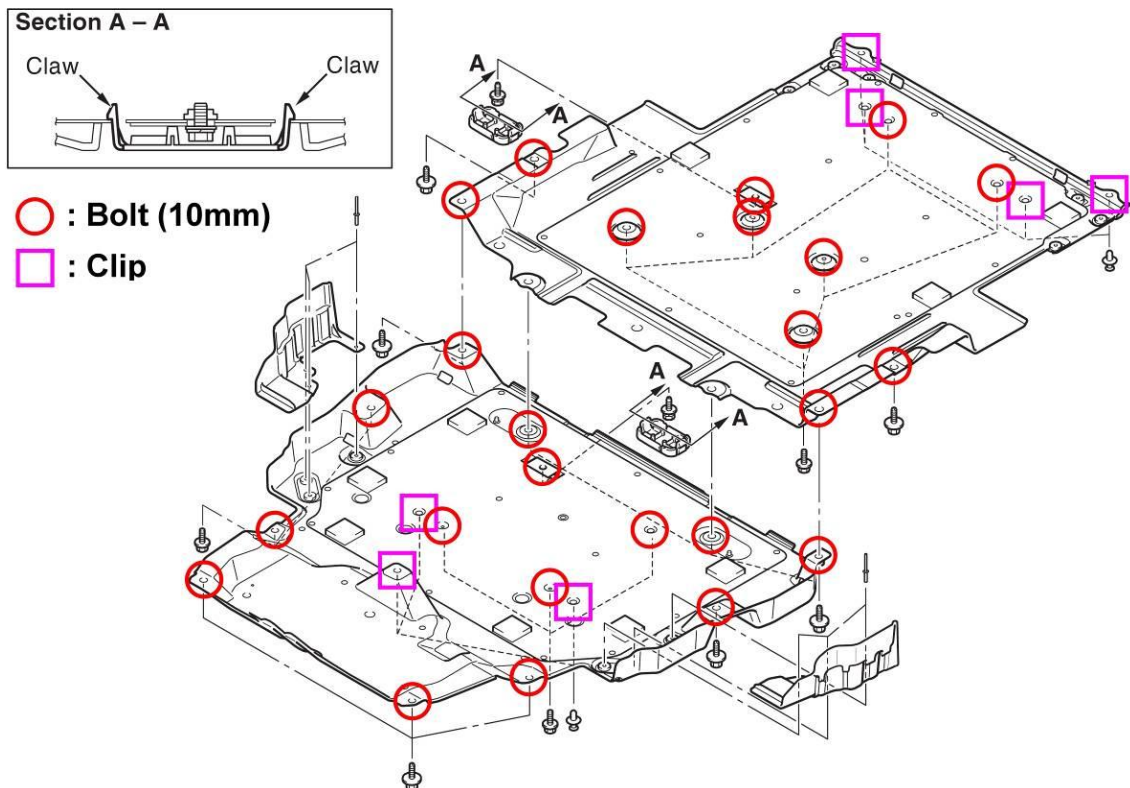
- After removing the Service Plug, keep it in a secure place away from other dismantlers to prevent accidental handling/improper re-installation.
- There are some high voltage components and wiring cables which retain high voltage for 5 minutes after disconnecting the 12V battery. When it is necessary to cut the high voltage components and wiring cables, wait at least 5 minutes after cutting before commencing the next action.

7) Measurement of the Main drive lithium-ion battery's voltage

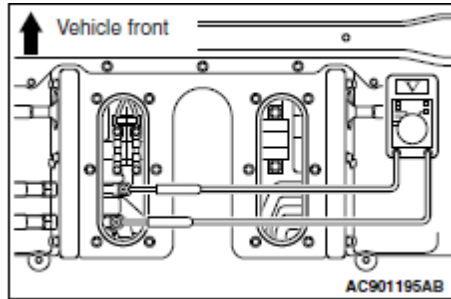
**⚠ WARNING;**

Always wear eye protection (safety glasses) to protect your eyes from flying debris.

- ① Remove the undercover for the Main drive lithium-ion battery



- ② Remove the service hole lids on the bottom of the Main drive lithium-ion battery and carry out the measurement of the battery's voltage as shown below.



If the voltage is not 0V, wait until the voltage shows 0V. When the high voltage circuit is successfully shut down, the voltage shows 0V.

## **Step 2B: Discharging the Main Drive Lithium-ion Battery**



### **WARNING;**

- Do not use salt water to discharge the Main drive lithium-ion battery. Using water containing salt can generate a large volume of flammable hydrogen and increases the risk of fire or explosion.
- Hydrogen gas is generated during the discharging process, even when fresh water is used and proper discharging procedures are followed. To reduce the risk of fire;
  - The discharging must be done in a well-ventilated area located outside.
  - Keep all windows, doors and the tailgate open to prevent hydrogen from accumulating in the passenger compartment.
- Do not remove the vehicle from the water for 72 hours in order to discharge the battery completely.

### 1) Soaking the vehicle in water

Marked ★ items are required. The other items should be available and used as necessary.

Step 1. Set up an easy set pool in the size of approximately 450cm X 200cm X 70cm [approximately 180 inch X 80 inch X 30 inch] (length X width X height).

Step 2. Use a forklift or similar equipment to place the vehicle in the center of the pool.

Step 3. ★Open all windows, doors and the tailgate.

Step 4. ★Make sure to use water that does not contain salt (use tap water, well water or pond water) to prevent an aggressive chemical reaction and the excessive release of flammable hydrogen gas.

#### ★Required water level:

Fill the pool with water until a minimum required depth of 50cm [20 inch] is achieved.

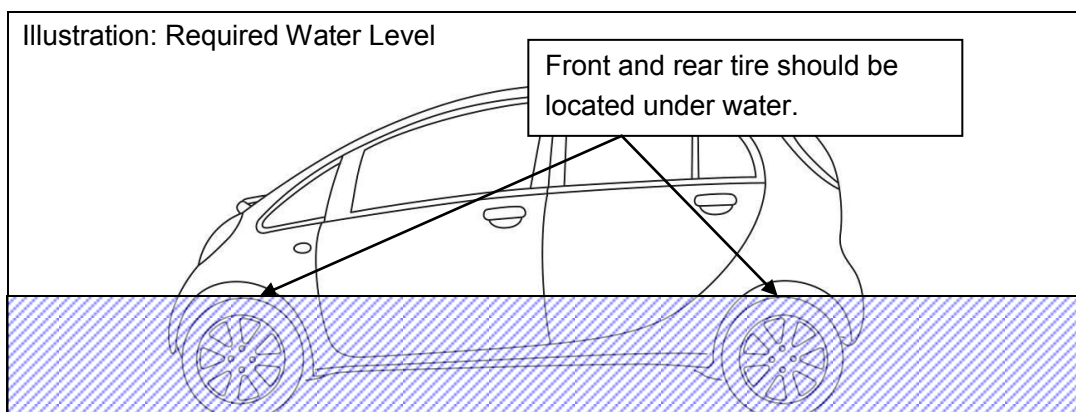
Front and Rear tire height is about 50cm [20 inch]. (See illustration below.)

This water level is considered deep enough for the Main drive lithium-ion battery to be completely submerged in water.

If the vehicle body is significantly deformed due to impact from a crash, make sure that the Main drive lithium-ion battery installed under the floor is completely submerged in water.

Add additional water if necessary.

- ★Maintain this water level for at least 72 hours with the Main drive lithium-ion battery soaking in water.





## 2) Draining the Main drive lithium-ion battery

Step 1. After 72 hours have elapsed, remove the vehicle from the water.

Step 2. Remove the Under cover (2 pieces) from bottom of vehicle. (see illustration below.)

- Use Socket wrench (size 10mm) for removing the fixing bolts.
- Use Flat head screwdriver for removing of the fixing clips.

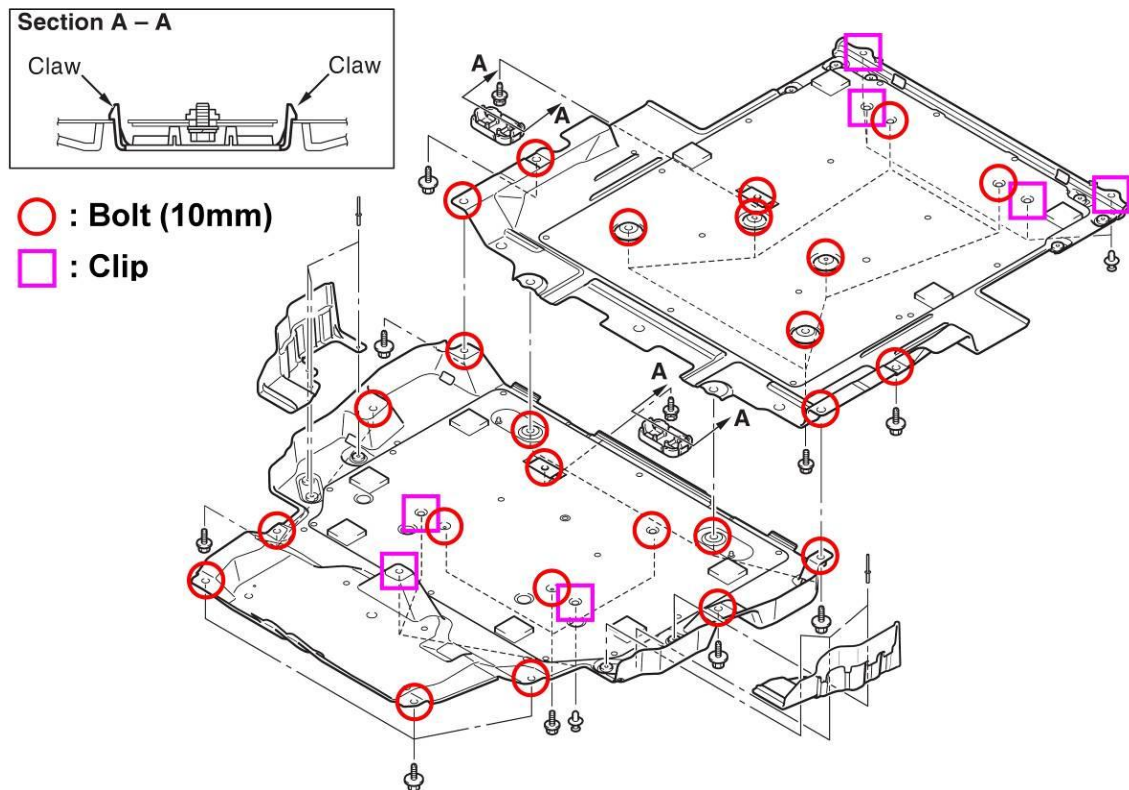
Step 3. Drill drain holes in the marked locations on the bottom of the Main drive lithium-ion battery (see “Drain hole locations on Main drive lithium-ion battery” on next page). Then, drain water from the Main drive lithium-ion battery.

Step 4. Drained water shall be properly disposed of as an industrial waste according to state and/or local regulations.

### **⚠ WARNING;**

Always wear eye protection (safety glasses) to protect your eyes from flying debris and draining water.

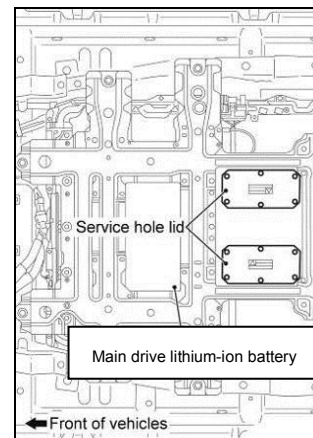
### ➤ Illustration : Fixing point of Under cover



➤ Drain hole locations on Main drive lithium-ion battery

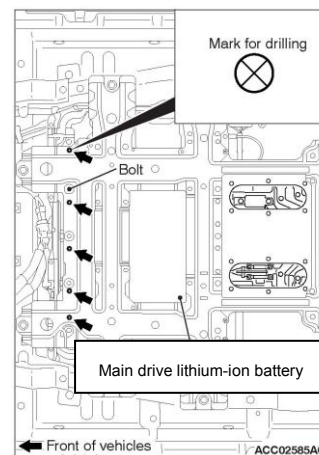
Service hole lid:

Remove the service hole lids on the bottom of the Main drive lithium-ion battery and drain the Main drive lithium-ion battery.



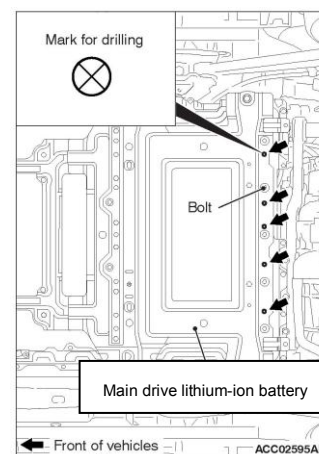
Front end of Main drive lithium-ion battery:

Use a drill (diameter size 6mm or less) to drill drain holes in the five marked locations on the front bottom of the Main drive lithium-ion battery. Then drain the Main drive lithium-ion battery.



Rear end of Main drive lithium-ion battery:

Use a drill (diameter size 6mm or less) to drill drain holes in the five marked locations on the rear bottom of the Main drive lithium-ion battery. Then drain the Main drive lithium-ion battery.



3) Disconnect 12V battery under the front hood.

**⚠ WARNING;**

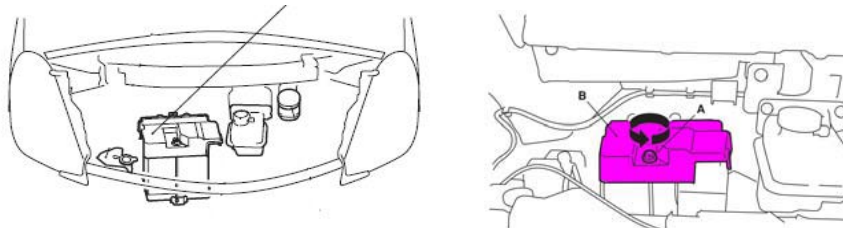
Disconnect 12V battery to avoid inadvertent airbag deployment during the dismantling process, since the 12V battery may not have discharged while the vehicle was soaking for 72 hours in water.

Since the 12V battery will not discharge while the vehicle is soaking in water;



The hood release is under the instrument panel beside the **front passenger's** door.

- ① Remove the cover of the 12V battery under the hood. Turn the plastic nut (A) counter clockwise, and then remove the battery upper cover (B).



- ② Disconnect the negative terminal from the 12V battery.

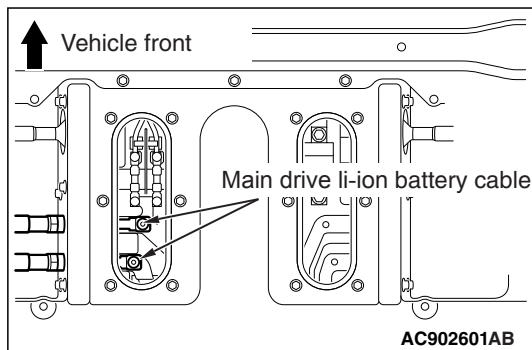
**⚠ WARNING;**

After disconnecting the 12V battery negative terminal, to avoid the risk of inadvertent air bag deployment, wait at least 1 minute before proceeding to the next step.

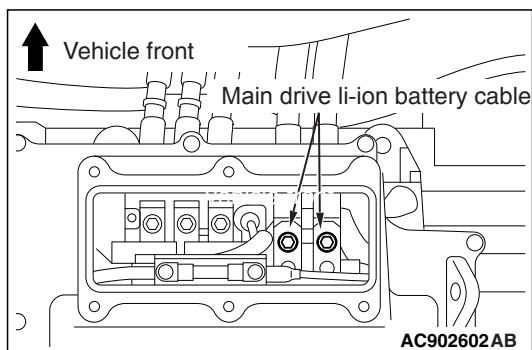
### Step 3: Removing the Main Drive Lithium-ion Battery From the Vehicle

#### **⚠ WARNING;**

- Before removing the Main drive lithium-ion battery, be sure that the procedure for shutting off the high voltage or discharging the Main drive lithium-ion battery has been completed.
- Only use procedures described in this guide to remove the Main drive lithium-ion battery. Using different procedures increase the risk of injury and may cause damage to the battery.
- Always wear appropriate personal protection equipment during this work. High voltage may remain inside of the Main drive lithium-ion battery, even after completion of the high voltage shut down or discharge of the Main drive lithium-ion battery.
- If it is necessary to cut the body in order to remove the Main drive lithium-ion battery due to body deformation, never cut the Main drive lithium-ion battery, high voltage wiring, or other high voltage components.
- The Main drive lithium-ion battery is heavy, approximately 507 lbs. To remove and move the battery, use only equipment with sufficient weight capacity.

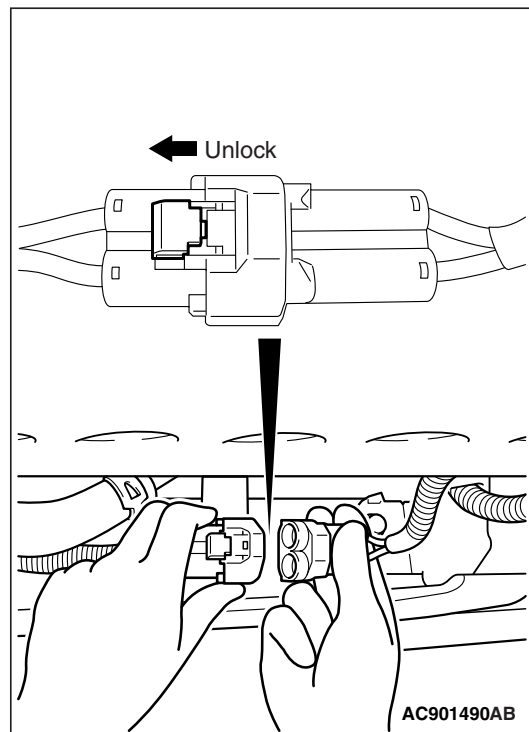


1. Remove the work hole lid at the bottom of the Main drive lithium-ion battery, and then remove the Main drive lithium-ion battery cable.



2. When the work No. 1 is difficult or when the maintenance work of the electric motor unit room must be necessarily performed, remove the Main drive lithium-ion battery cable of the inverter.

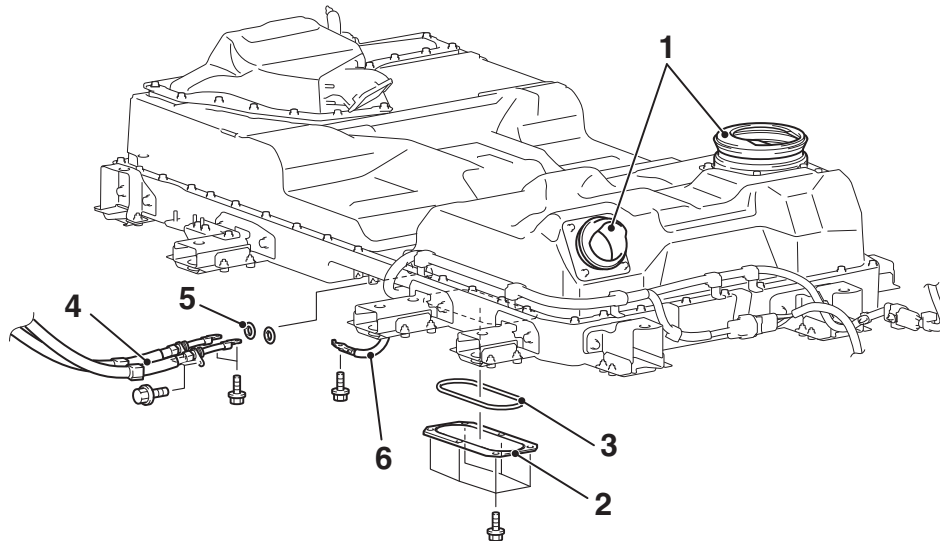
#### **⚠ CAUTION;** Be sure to release the lock on the connector with your hands, using a tool may damage the connector.



3. Unlock the connector by sliding the lock, and then disconnect it.

**\*Pre-removal operation**

- Removal of Under cover A, B (Refer to Pg.12 illustration)
- Floor duct removal if applicable (Refer to GROUP 55 – Duct)
- \*For additional assistance, visit <http://www.mitsubishitechno.com>



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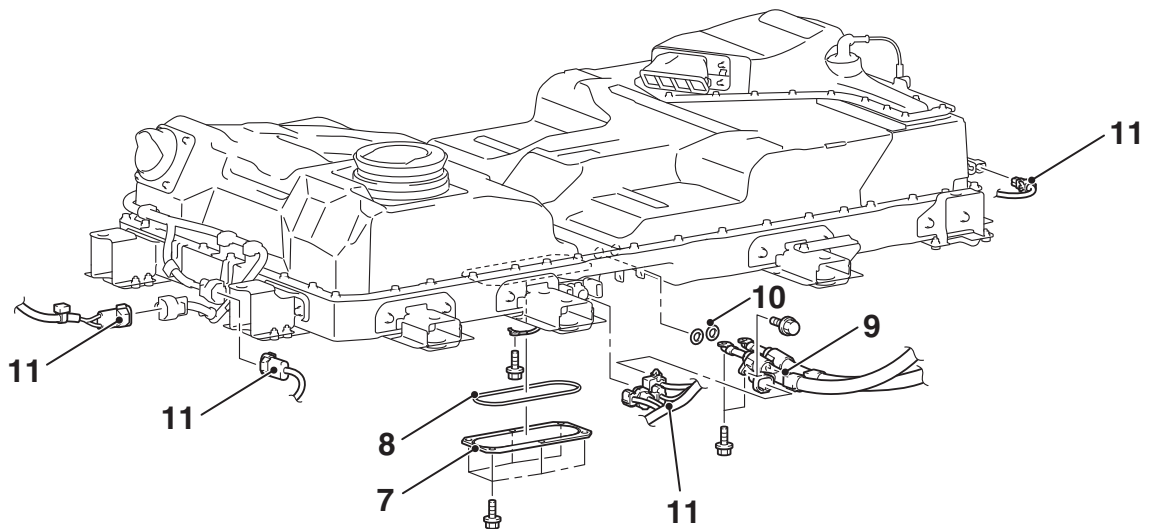
**Removal steps**

1. Rubber boot connection
2. Service hole lid
3. O-ring

<<B>>

**Removal steps (Continued)**

4. Main drive lithium-ion battery cable connection
5. O-ring
6. Ground cable connection



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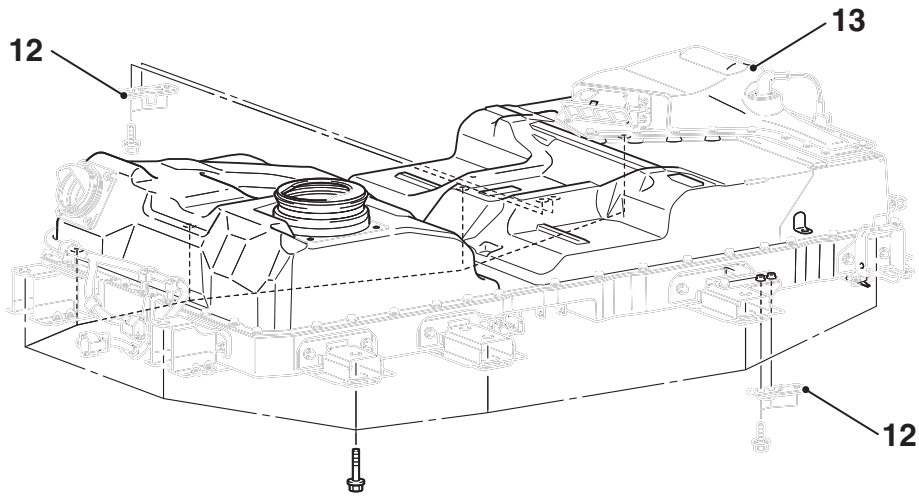
<<C>>

**Removal steps**

7. Service hole lid
8. O-ring
9. Quick charging cable connection (if applicable)

**Removal steps (Continued)**

10. O-ring
11. Connector connection



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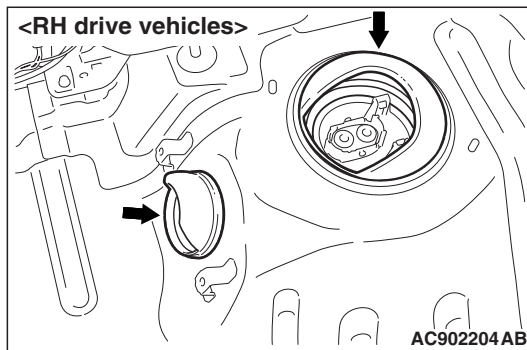
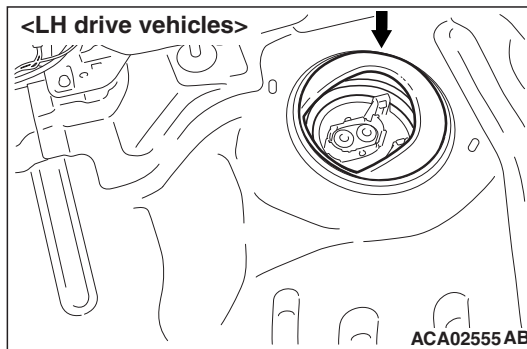
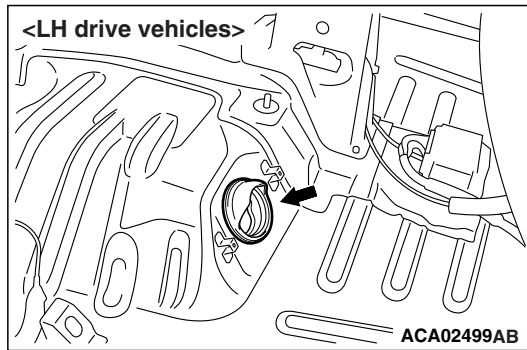
**Removal steps**

- 12. Floor frame plate
- 13. Main drive lithium-ion battery assembly

<<D>>

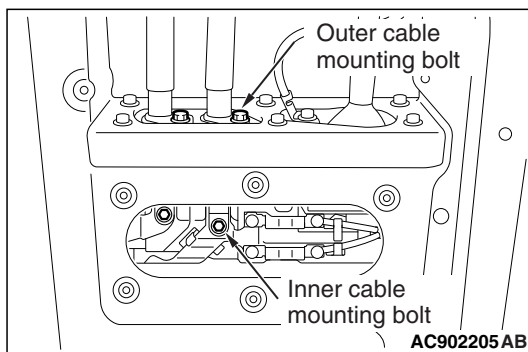
## Removal service points

### <<A>> Rubber boot discussion



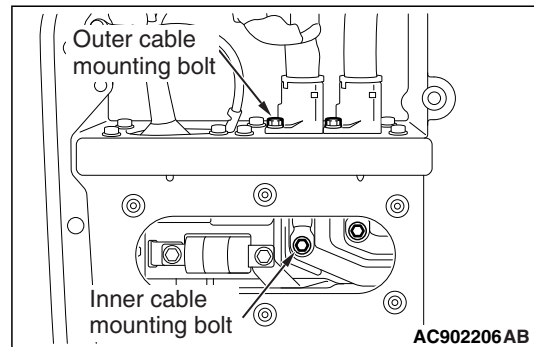
Disengage the hook of the rubber boot and push it out of the vehicle (towards under the vehicle).

### <<B>> Main drive lithium-ion battery cable disconnection



1. Remove the inner cable mounting bolts (2 locations).
2. Remove the outer cable mounting bolts (2 locations).
3. Pull out the cable from the Main drive lithium-ion battery.

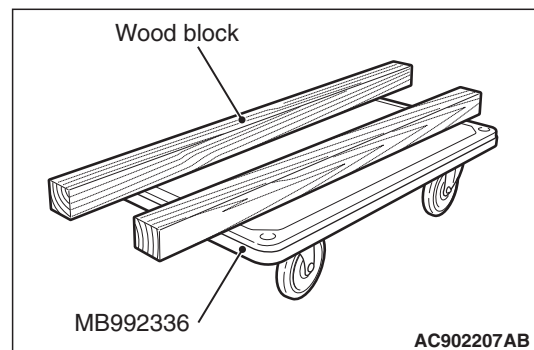
### <<C>> Quick charging cable disconnection (if applicable)



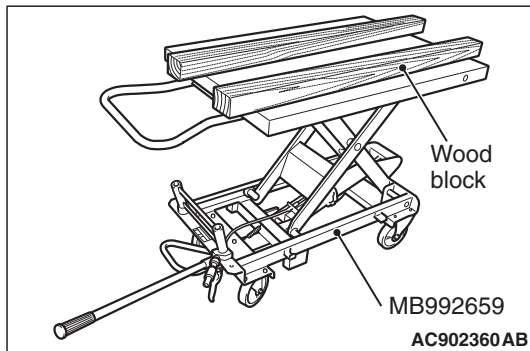
1. Remove the inner cable mounting bolts (2 locations).
2. Remove the outer cable mounting bolts (2 locations).
3. Pull out the cable from the Main drive lithium-ion battery.

### <<D>> Main drive lithium-ion battery assembly removal

1. Attach the removed work hole lid and O-ring to the Main drive li-ion battery so that no water, foreign material, etc. can enter the inside of the Main drive li-ion battery.
2. Use the following special tools and 2 wood blocks (100 x 100 x 1500 mm).



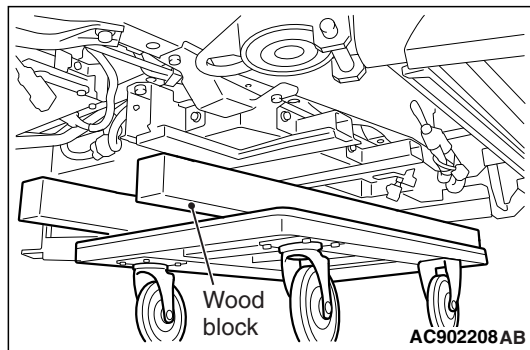
- (1) Remove the handle of the EV battery cart (special tool: MB992336) and set the wood blocks.



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

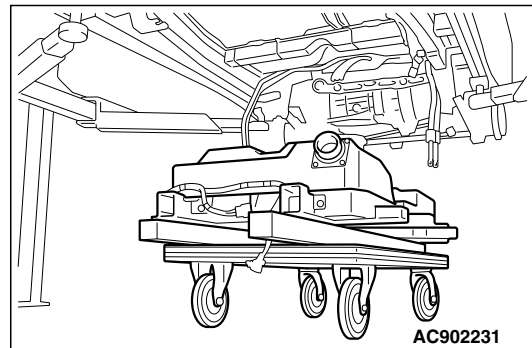
*NOTE: For instructions how to use the EV battery lifting cart, refer to the provided "Operation Manual".*

3. With the Main drive li-ion battery installed on the vehicle, remove the mounting bolts (2 at the front and 2 at the rear of the Main drive li-ion battery).
4. Loosen the remaining mounting bolts (6 locations).



5. Lower the vehicle with the lift until just before the bottom of the Main drive li-ion battery contacts the wood block.
6. Remove all the mounting bolts on the Main drive li-ion battery.

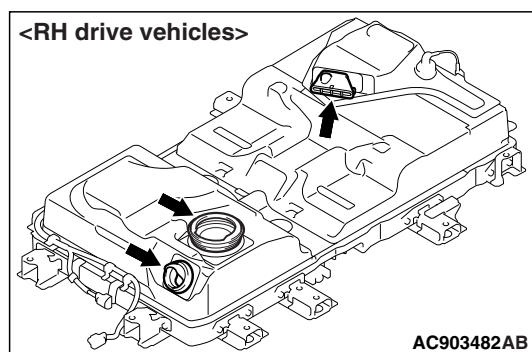
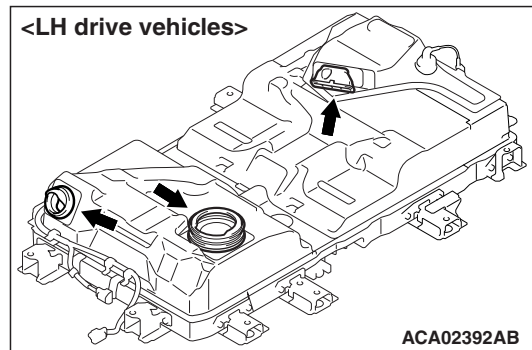
**⚠ CAUTION**  
Be careful not to damage the wiring harness.



7. Raise the vehicle with the lift and remove the Main drive li-ion battery.

**⚠ WARNING**

- **Store the Main drive li-ion battery in a dry location where it will not get wet.**
- **Do not bring the Main drive li-ion battery close to fire or heat 60 °C or above.**



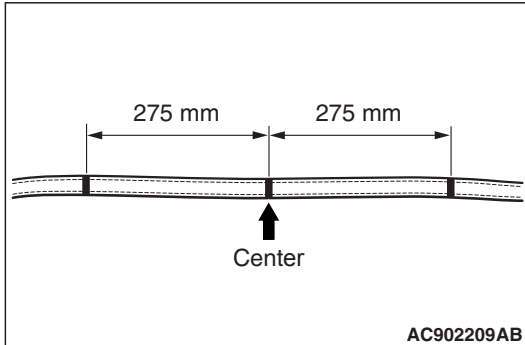
8. Cover around the air outlet of the Main drive li-ion battery (computer unit portion) with a vinyl sheet or other cover so that no water, foreign material, etc. can enter the inside of the Main drive li-ion battery.



9. When moving the removed Main drive li-ion battery with a crane or other machine, use the EV battery sling tool kit (special tool: MB992343) to sling it up in accordance with the following procedure.

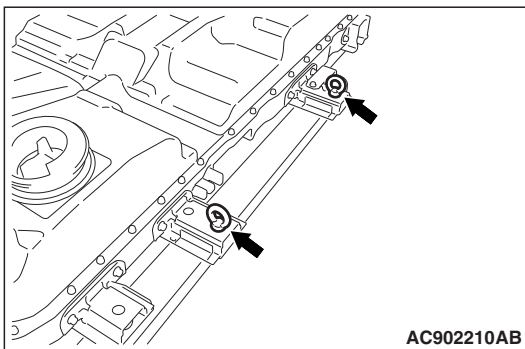
- EV battery sling tool kit (MB992343)
- Eye bolts (MB992344 x 4)
- EV battery sling belts (MB992345 x 2)
- Washers (MF450156 x 8)
- Hexagon nuts (MU001480 x 4)

**NOTE:** For instructions how to use the EV battery sling belt, refer to the provided "Operation Manual".

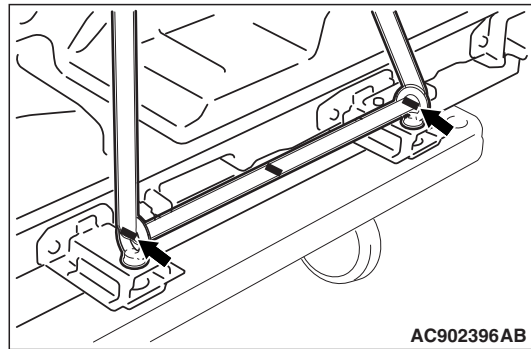


(1) Mark the center of the EV battery sling belt (MB992345) and positions 275 mm right and left from the center.

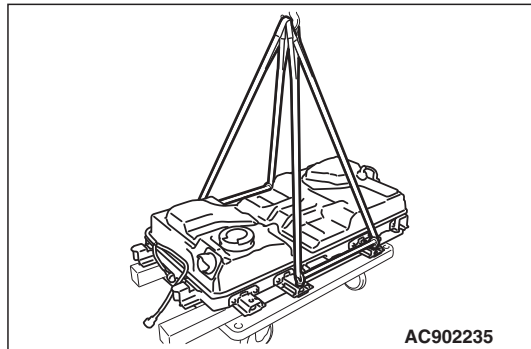
**NOTE:** The marking is intended for alignment of the EV battery sling belt and eye bolt.



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



(3) 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.

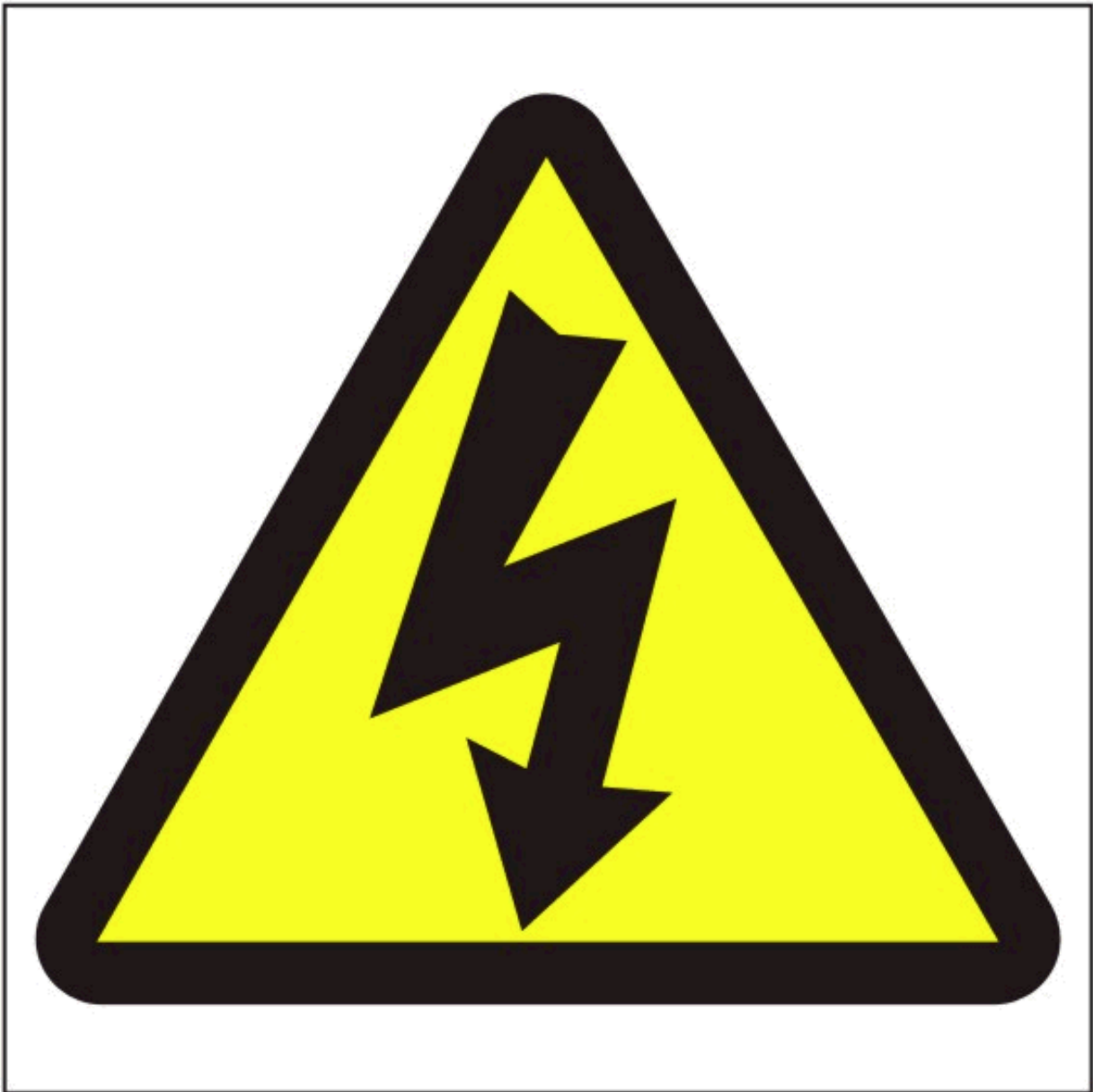


(4) Bind 2 EV battery sling belts together and sling up the Main drive li-ion battery with a crane or other machine.

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

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

\*When doing high-voltage work, please put up this signboard.  
Fold along the dotted line and place it on top of the i-MiEV's roof.



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