For Dismantler

High Voltage Battery Disposal Manual

Target Model

MAZDA CX-60

MAZDA CX-90

Mazda Motor Corporation
Customer Service Div,Recycle Promotion Gr.
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Contents

1. Introduction

Some vehicles manufactured by Mazda Motor Corporation is mounted the high voltage battery.
This manual describes how to remove the battery from the End-of Life Vehicle(ELV).
Read this manual carefully and observe the precautions before handling the battery.

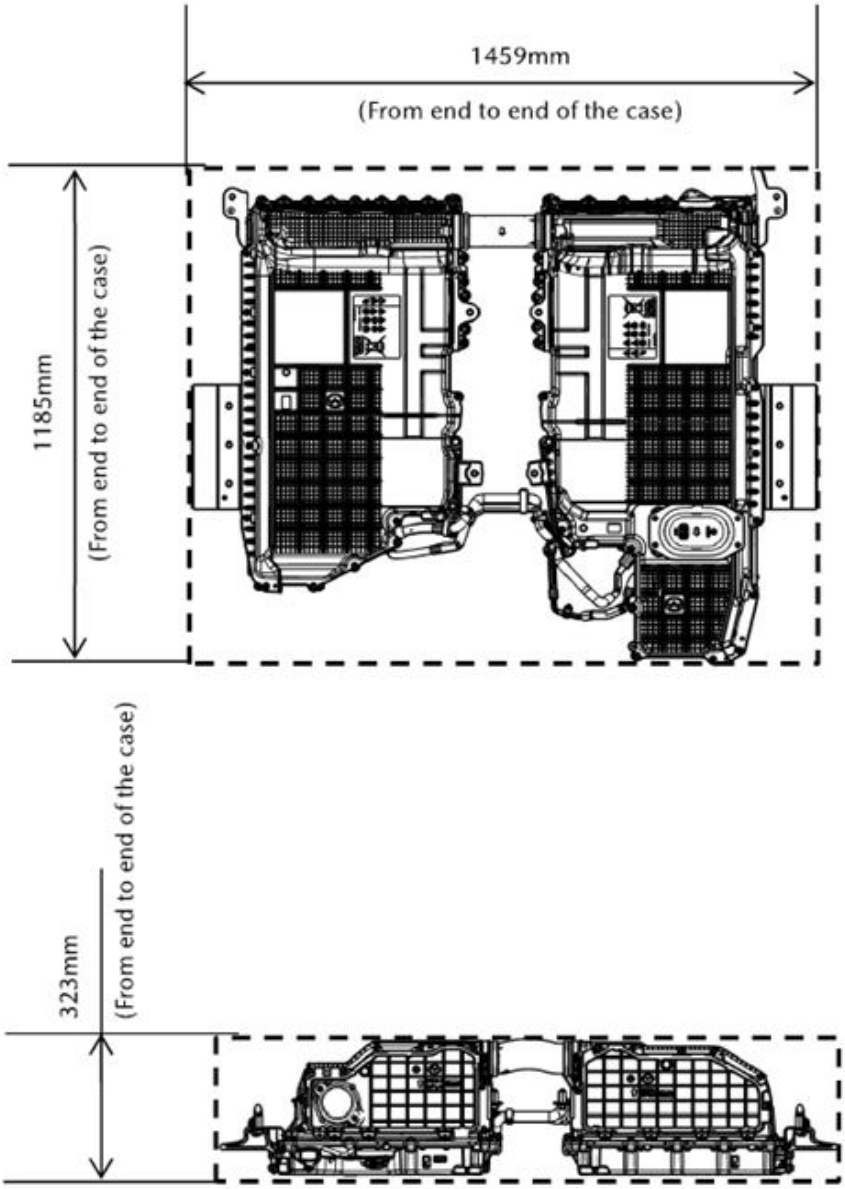
<Warning>
Pressing and shredding the vehicle with high voltage battery attached will generate such as heat, fire, smoke, and rupture from the high voltage battery.

2. Overview of the high voltage battery

- Specification

Item	Specification
Pack composition	Direct series, 96cells
Nominal capacity	50 [Ah]
Nominal voltage	355 [V]
Mass	174.5[kg]
Extremal dimensions	W 1,185×D 1,459×H 323 [mm]
Electrolyte volume	9.6 [L] or less

- Appearance



3. Precautions in Handling the high voltage battery

● Introduction

For this product, chemical materials are stored in a hermetically aluminum case, designed to withstand temperatures and pressure encountered during normal use.
As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials leakage.
However, if exposed to a fire, added mechanical shocks, decomposed, add electric stress by miss-use, gas release valve will be opened, or the product case will be breached at the extreme, hazardous materials may be released.
Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.
Nominal voltage of this product is 355V, therefore in case of electric shock, there is a risk of death.

Most important hazard and effect

- Human Health Effects
  The steam of the electrolyte has an anesthesia action and stimulates eye, respiratory tract and skin.
  The electrolyte eye/ skin contact causes a sore and erosion on eye/ skin.
  Especially, substance that cause a strong inflammation of the eyes is contained.
- Environmental Effects
  Since the product remains in the environment, do not throw out it into the environment.
- Specific Hazards
  If the electrolyte contacts with water, it will generate detrimental hydrogen fluoride.
  Since the leaked electrolyte is flammable liquid, do not bring close to fire.

● First-aid measures

Internal material such as electrolyte leaked from battery

- Inhalation
  Move to the place where is well-ventilated and seek medical attention if necessary.
- Skin contact
  Wash with soap and plenty of water immediately.
- Eye contact
  Do not rub one's eyes. Immediately flush eyes with clean water continuously for 15 minutes at least. Seek medical attention immediately.
- Ingestion
  Wash mouth with water and seek medical attention immediately.
- First aid treatment for electric shock
  - Do not touch he/ her with bare hands, during victim contact to the battery in order to prevent secondary electric shock.
  - Pull victim apart from the battery by using not conductive materials in order to prevent secondary electric shock.
  - Check pulse and breath, or react on stimulus, contact with emergency hospital and seek medical attention. If victim's breath stops, perform the cardiopulmonary resuscitation as needed.

Fire fighting measure

- Suitable extinguish material
  Plenty of water from fire hydrant (avoid using slam amount of water as it may gain force of fire), Carbon dioxide gas, powder fire extinguisher.
- Specific method of fire-fighting
  When the battery burns with other combustibles simultaneously, take fire extinguishing method which correspond to the combustibles. Extinguish from the windward as much as possible.
- Special protective equipment for fire fighters
  See [Exposure controls/ Personal protection].
- Specific hazards
  Corrosive gas may be emitted during firefighting. And when the battery temperature becomes high, its components may scatter.

Accidental release measure

- Precautions for human body
  Prohibit the entry other than related personnel. Remove spilled materials wearing with proper protection described in [Exposure controls/ Personal protection].
  Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.
- Environmental precautions
  Do not throw out into the environment.
- Method of cleaning up
  The spilled solids are put into a container. The leaked place is wiped off with cloth which must be incinerated.
- Prevention of secondary hazards
  Avoid re-scattering. Do not bring the collected materials close to fire.

Handling and Storage

- **Handling**
  - Do not throw into fire or heat.
  - Do not throw into water and soak in water and seawater.
  - Do not expose strong oxidizer.
  - Do not throw and give a strong mechanical shock.
  - Never disassemble, modify or deform.
  - Do not connect positive terminal and negative terminal.
  - In case of charging, charge according to the condition specified.
  - Keep children away from battery.
  - Do not connect connectors and plugged-in service plugs until battery is installed in a vehicle.
  - To avoid electric shock, keep isolation of terminals and ware isolation grove.
- **Storage**
  - Incompatible product
    Conductive materials, water, seawater, strong oxidizers and strong oxidizers and strong acids.
  - Proper store condition
    Dark and cool place (0-35°C, humidity 45-85%), covered from rainwater.
  - Improper store condition
    Avoid direct sunlight, high temperature, high humidity.
  - Recommended packing material
    Not conductive and tear proof materials.

Exposure controls/ Personal protection

In case of scatter due to electrolyte leakage or demolishing, the following protection equipment and/ or protection must be used.

- Protection equipment for reducing exposure
  Operate the local exhaust equipment or improve ventilation.
- Proper personal protection
  Respirator with air cylinder, dust mask, protective gloves (insulating, oil resistance) ,Protective eyewear, protective clothes and shoes.

Disposal considerations

The product (residual waste); The disposal of the battery shall be carried out in compliance with the relevant law and regulations of the country where the batteries are disposed.

Even if it's an used battery, since there should be remaining electric energy in it, it's required to be disposed after having precaution for short-circuit while being careful about electric shock.

Transportation information

The following information is based on the United Nations (UN) recommendations.
However, some regulations are varied depending on shipping mode and country/ area.
Need to consult with the forwarder or shipping company before the shipment of the battery.

Lithium-ion battery is categorized as the following classification of dangerous goods stipulated by UN recommendations the transportation of dangerous goods, model regulations.

- UN number : UN3480
- Class : Class 9
- Watt-hour rating : 17.7 kWh

4. The high voltage battery removal cautions

Warning

- If the necessary measures are not taken before removing the high voltage battery , it could cause electrical shock and result in serious injury or, in the worst case, death. Before removing the high voltage battery, refer to [The high voltage battery removal cautions] in the general information and implement the necessary measures.

- Vehicles damaged in an accident could have electrical leakage due to internal damage of the high voltage battery. If removing is carried out under electrical leakage conditions, it could cause electrical shock and result in serious injury or, in the worst case, death.

- Removal of the high-voltage parts of this vehicle is a dangerous operation defined by the industrial safety and health law. For this reason, removal work on high voltage parts can only be performed by a person who has completed special training for low voltage line work.

- Wear insulating gloves when removing the high voltage parts. Contact with a high voltage part when you are not wearing insulating gloves may result in serious injury or death caused by electric shock.

- Before removing the high voltage parts, remove the service plug and wait until 10 min have elapsed. Servicing without removing the service plug or before 10 min have elapsed after removing the service plug could cause electrical shock and result in serious injury or ,in the worst case, death.

- Do not spin the tires while performing work for removal of high voltage parts. If the tires spin, power generation occurs even if the service plug is removed. If power generation occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.

- Verify that the charging connector is not connected to the vehicle when removing the high voltage parts. If the charging connector is connected to the vehicle, high voltage may be supplied to the vehicle. If this occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.

- Always observe the following thoroughly to ensure safety when removing the high voltage parts. Otherwise, the high voltage circuit may operate on the vehicle regardless of whether or not the main power is switched OFF or ON (READY off or on). If this occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.
  - Do not perform normal charging or quick charging
  - Access connected vehicle maintenance mode (My Mazda App connected vehicle)
  - Cancel climate control timer

- When removing the high voltage parts, place a high voltage work sign on the vehicle to alert other workers.

Caution

- Do not switch the main power ON (READY on) after removing the service plug.
  If the main power is switched ON (READY on) after removing the service plug,
  a malfunction may occur with the vehicle.

- The high voltage parts can be identified as follows.
  — Parts that are connected using orange wiring harnesses
  — Parts with a high voltage warning label attached

● Risk of injury or damage

- When working on a high voltage system, mistaken operation could cause a serious accident such as electrical shock and result in serious injury or, in the worst case, death. Additionally, when handling the high voltage battery, work must be performed by persons who have acquired qualifications specified by laws and regulations.

- Because the high voltage battery is silent even when the EV system is operating, injury could result from getting caught in a cooling fan that operates unexpectedly. Verify that the READY indicator in the instrument cluster and the push button start indicator light are turned off and perform removing while the system is stopped.

- If the main power is switched ON (READY on) and the charge connector is connected to the vehicle, high voltage may be supplied to the vehicle. If removing is performed under this condition, it could cause electrical shock and result in serious injury or, in the worst case, death.

- The high voltage battery uses a lithium-ion battery. The electrolyte used for the high voltage battery is flammable. If the electrolyte is leaking, immediately keep it away from any flames. In addition, verify that the area is sufficiently ventilated, and wear solvent-resistant protective equipment and wipe off the leaked electrolyte using cloth.

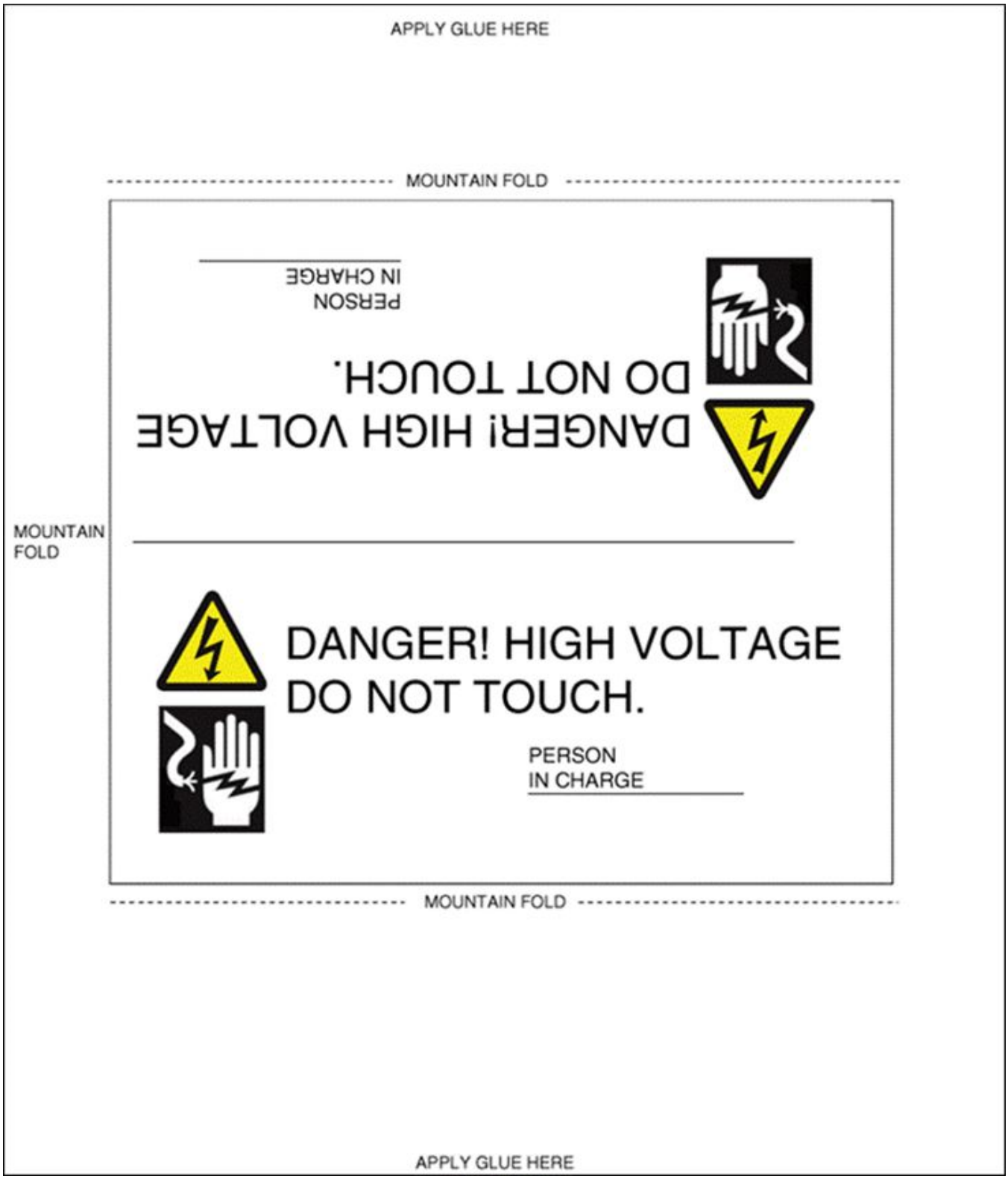
- The leaked electrolyte and its vapor may react with the moisture in the air and produce an acidic substance that irritates the skin and eyes. Therefore, if the electrolyte comes in contact with the skin or eyes, wash off well with plenty of running water and promptly seek medical attention.

- While the EV system is stopped, the cooling fan may suddenly start operating under the following conditions.
  — During charging
  — Air conditioning or charging is reserved using center display or connected functions
  — Accessory power supply is used
  — High voltage battery cooling is operating (after-cooling)
  — Cabin preconditioning is operating
  — Battery heater is operating
  — Main power is switched ON (READY on)
  — After main power is switched ON (READY on) and OFF repeatedly

- Keep hands and tools away from the cooling fan even if the cooling fan is not operating to prevent an accident or damage.

- Dispose of the cloth used to wipe off high voltage battery electrolyte in accordance with regulations.
- The high voltage battery electrolyte is clear and has an aromatic odor.

- High voltage work sign



5. Recommendation for safe collection of the high voltage battery

- In an accident car, submersible car, etc., there is a possibility that the battery pack for may be deformed , cracked, short circuit, leaked, etc., and a short circuit may cause accidents such as smoking, ignition, or electric shock.

- Always disconnect the lead battery before removing high voltage battery.
  - If you work without disconnecting the lead battery, short circuit may cause smoke, fire, electric shock, etc.

- Do not leave/discard/divert/modify/disassemble/resell/transfer the high voltage battery.
  - Touching of the high voltage battery that has been Improperly left or discarded, or diverting, remodeling, or disassembling it for purposes other than its intended use may cause accidents such as electric shock, emitting smoke, firing, heat generation, explosion, or electrolyte leakage.

Mazda cannot be held liable for any accidents / damages caused by diversion / modification / disassembly of the high voltage battery, or any accidents / damages caused after neglect / discard / resale / transfer. The responsibilities of the business operator who performed these actions may be held.

6. Removing the high voltage battery

Warning

- Vehicles damaged in an accident could have electrical leakage due to internal damage of the high voltage battery. If servicing is carried out under electrical leakage conditions, it could cause electrical shock and result in serious injury or, in the worst case, death.

- removal of the high-voltage parts of this vehicle is a dangerous operation defined by the Industrial Safety and Health Law. For this reason, the removal work on high voltage parts can only be performed by a person who has completed special training for low voltage line work.

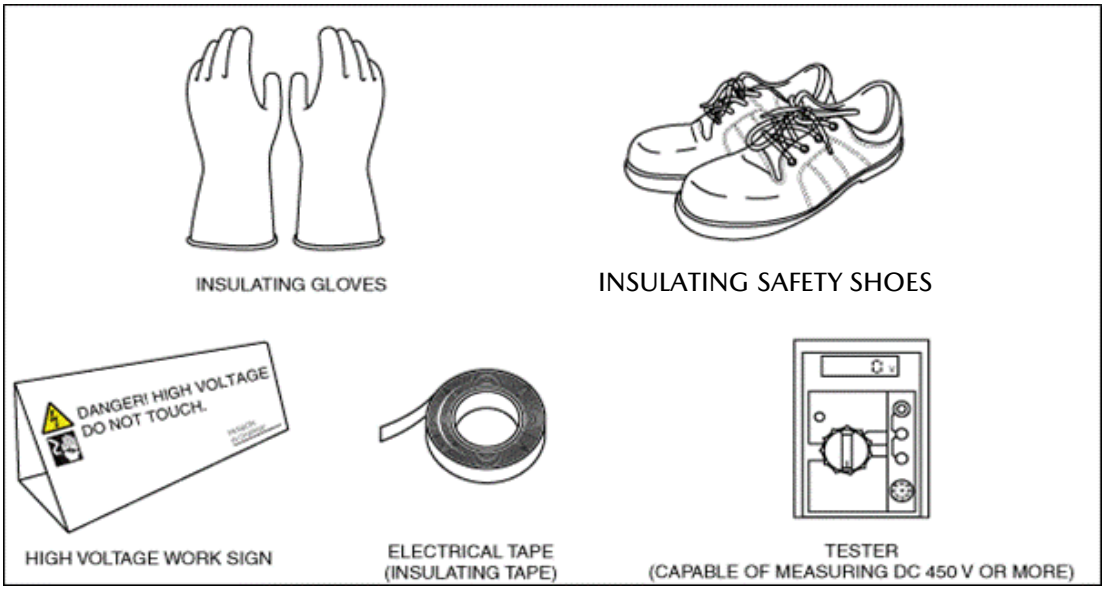
- Wear insulating gloves when removing the high voltage parts.
  Contact with a high voltage part when you are not wearing insulating gloves may result in serious injury or death caused by electric shock.

- Before removing the high voltage parts, remove the service plug and wait until 10 min have elapsed. Servicing without removing the service plug or before 10 min have elapsed after removing the service plug could cause electrical shock and result in serious injury or, in the worst case, death.

- Do not spin the tires while inspecting or removing/installing the high voltage parts.
  If the tires spin, power generation occurs even if the service plug is removed.
  If power generation occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.

- Always observe the following thoroughly to ensure safety when removing the high voltage parts.
  Otherwise, the high voltage circuit may operate on the vehicle regardless of whether or not the main power is switched OFF or ON (READY off or on). If this occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.
  — Do not perform normal charging

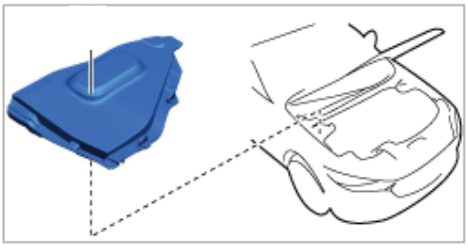
● Items to be prepared



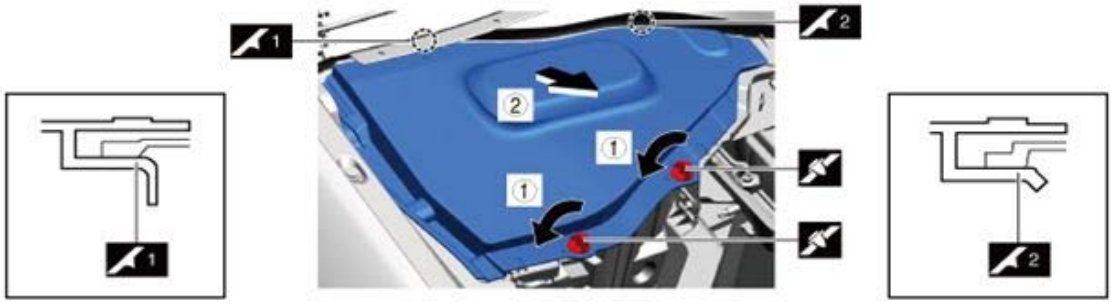
Caution

- Verify that the charge cable is not connected to the charging port.
- If the charge cable is connected to the charging port, remove the charge cable.

1) Remove Cover Assembly
   *Left steering : right side
   Right steering : left side



① Remove the cover assembly as shown in the figure.



2) Keep the driver's door open.

3) Switch the main power ON (READY on) for 3 s or more.
   - Disconnect the negative lead-acid battery terminal within 20 min of operation because the selector lever position will shift to the P position on its own after 20 min have elapsed.

4) Shift the selector lever to the N position.

5) Release the electric parking brake. (Parking brake release is not required for rear brake system)

6) Move the front seat forward.

7) Switch the main power OFF and start measuring the time since the main power was switched OFF using a stopwatch.

Caution

- If the cooling fan does not stop after 5 min have elapsed since the main power was switched OFF, wait until it stops.
- If the [Battery cooling] operation notification is displayed on the center display, do not make a selection and leave it as it is.

7) Switch the main power OFF and wait for 5 min.

Warning

- Before servicing after disconnecting the negative lead-acid battery terminal, wait for 1 min or more.

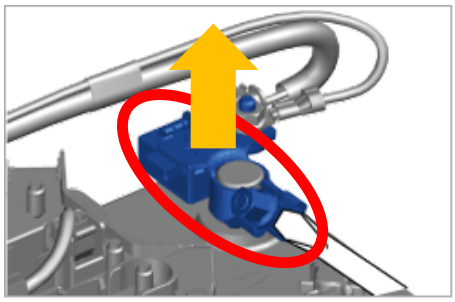
Caution

- If the time since the main power was switched OFF in Step 5 to the disconnection of the negative lead-acid battery terminal exceeds 25 min, perform the procedure from Step 3 again.
- In order to prevent it from falling off, the negative lead-acid battery terminal nut cannot be removed.
- After the negative lead-acid battery is disconnected, there is no restriction on opening/closing the door.

8) Disconnect the negative lead-acid battery terminal within 25 min from switching the main power OFF in Step 5 using the following procedure.

① Disconnect the current sensor connector.
② Disconnect the negative lead-acid battery terminal.

- When disconnecting a negative lead-acid battery terminal with deformed plastic, expand the gap of the negative lead-acid battery terminal using a flathead screwdriver, and remove the terminal.



Warning

- Contact with the positive lead-acid battery terminal could cause electrocution due to a short circuit and result in serious injury or death, or damage to vehicle parts.
  Do not contact the positive lead-acid battery terminal when performing the procedure.

Caution

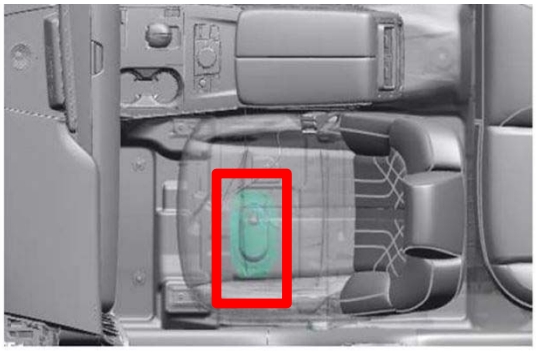
- If the nut for the current sensor is loosened with the negative lead-acid battery terminal connected to the lead-acid battery, excessive torque will be applied to the negative lead-acid battery terminal and the lead-acid battery terminal will be damaged.
  When removing the negative lead-acid battery terminal and current sensor,

9) Close the driver's door.

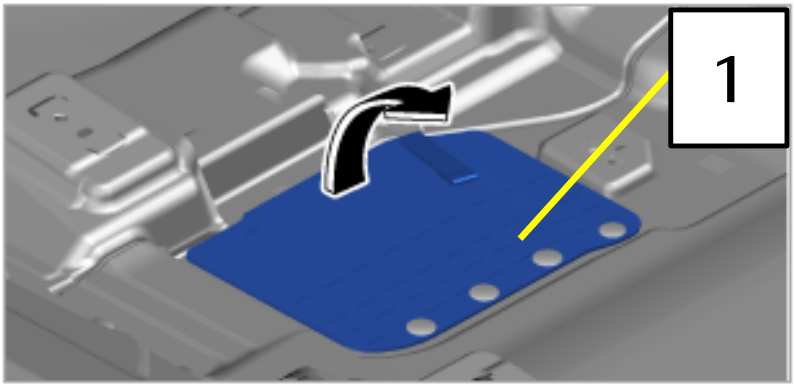
10) Drain Refrigerant

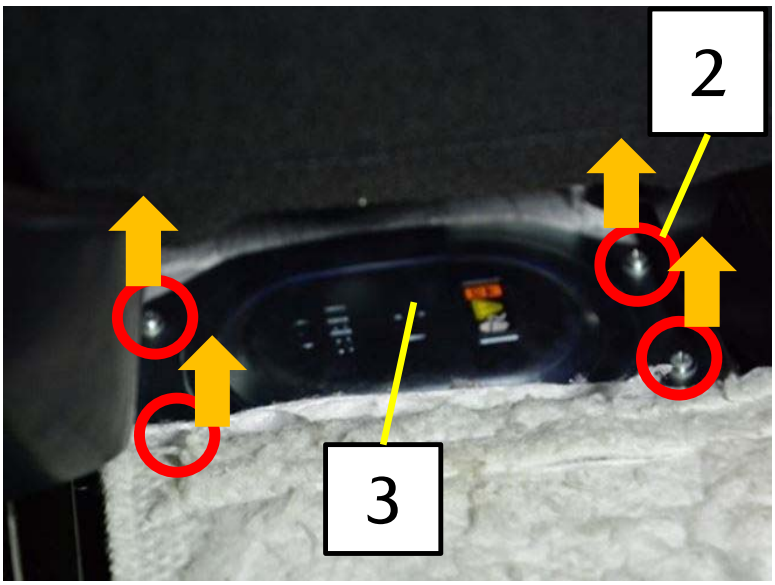
11) Remove Service Hole Cover (High Voltage Battery)

(1) Partially peel back the cover shown in the figure.



- Cover Removal Note
  Remove using the procedure shown in the figure.

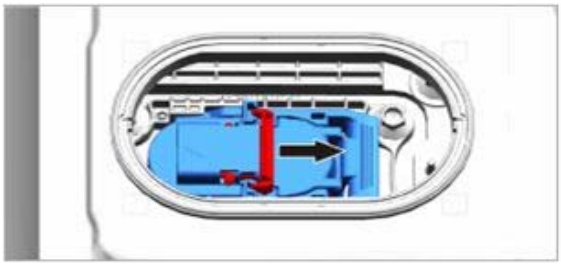




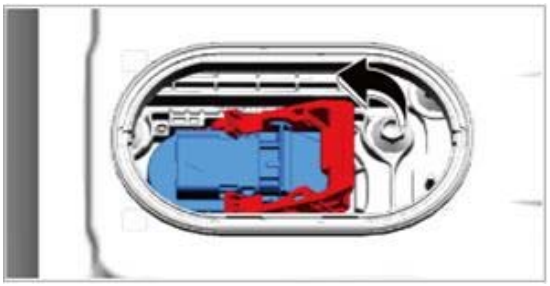
12) Remove Service Plug

- Remove using the procedure shown in the figure.

① Slide the lock in the direction of the arrow shown in the figure.
(It will not be completely pulled out.)

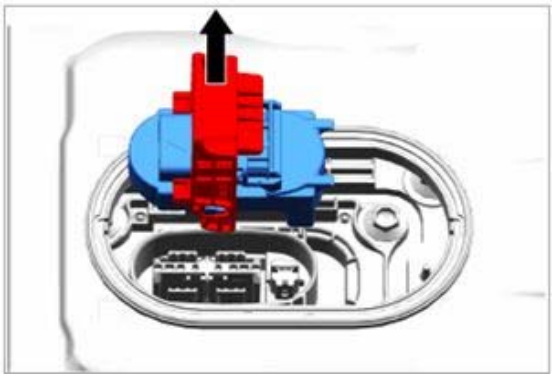


② Raise the lever.

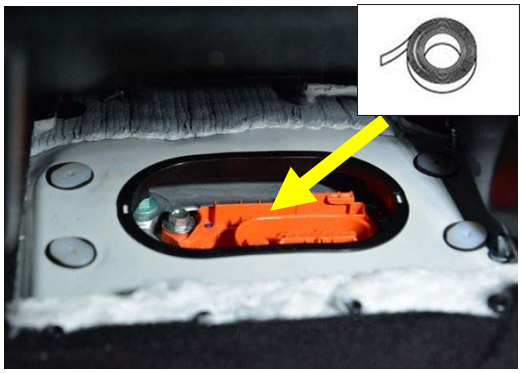


③ Press the area indicated by arrow (1) shown in the figure,
release the tabs, and then raise the lever until it is perpendicular.

④ Hold the lever and pull the service plug out straight up.

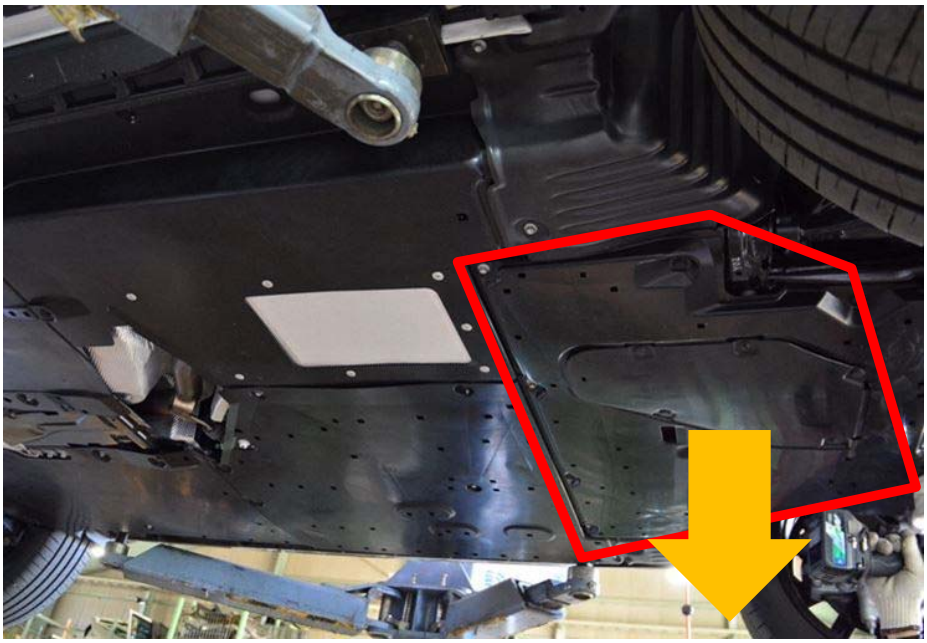


- After disconnecting the service plug, wear insulating gloves and wrap the terminals with electrical tape to insulate them.



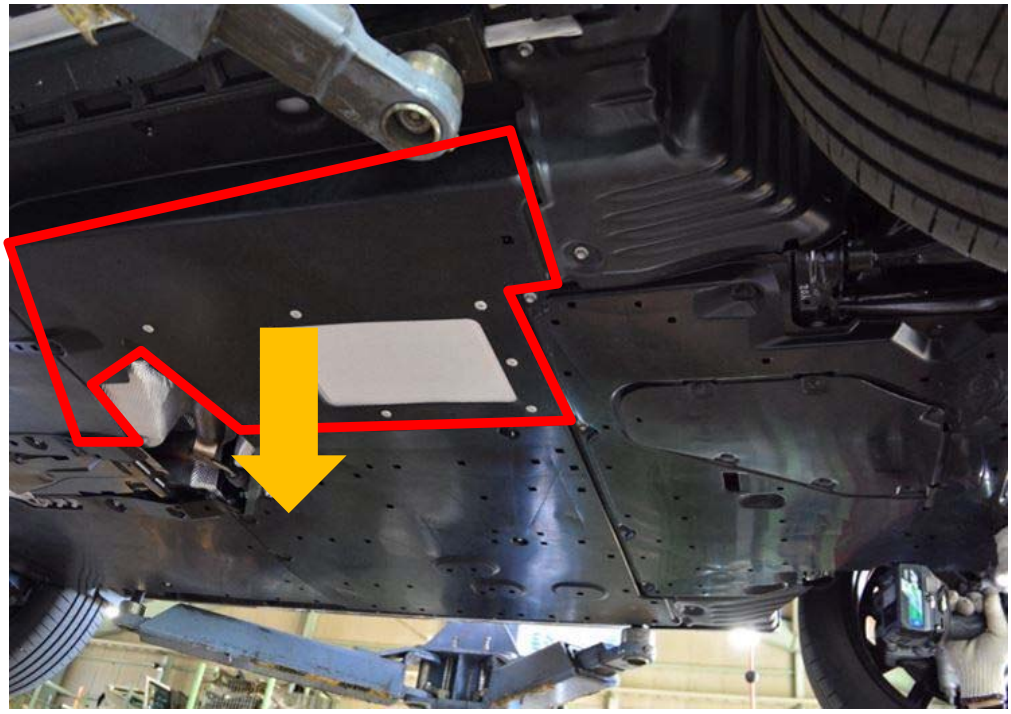
13) After removing the service plug, leave it for 10 min.

14) Remove Front Under Cover

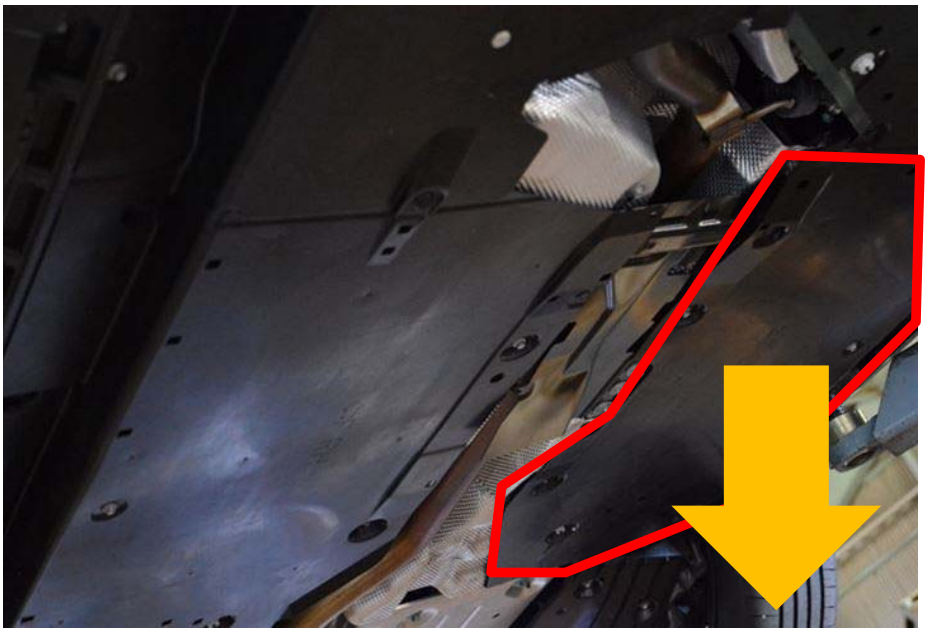


15) Remove Front Floor Under Cover (LH)

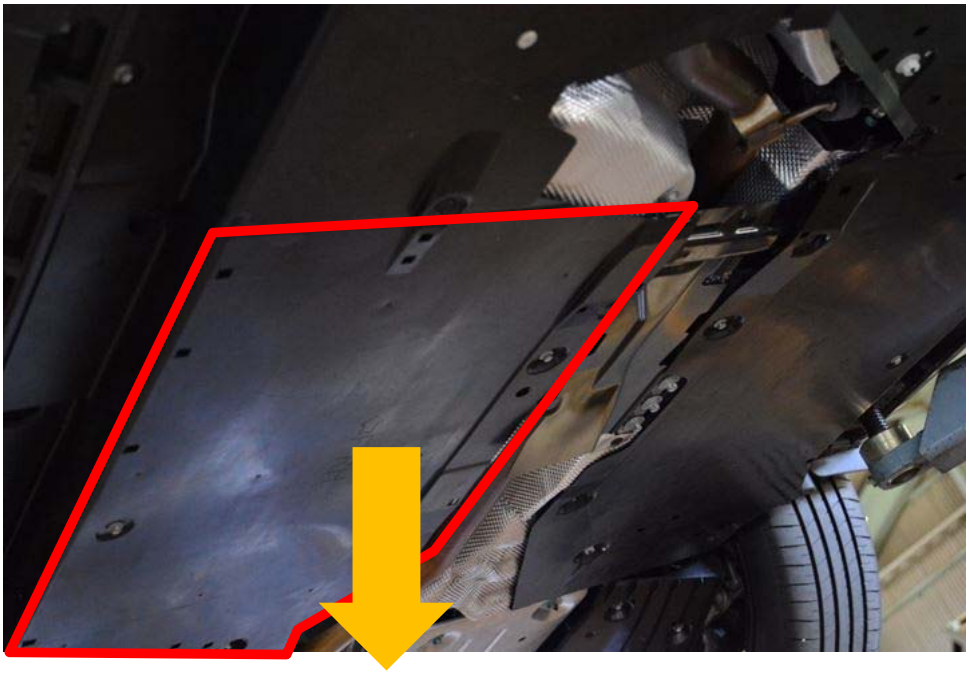
16) Remove Front Floor Under Cover (RH)



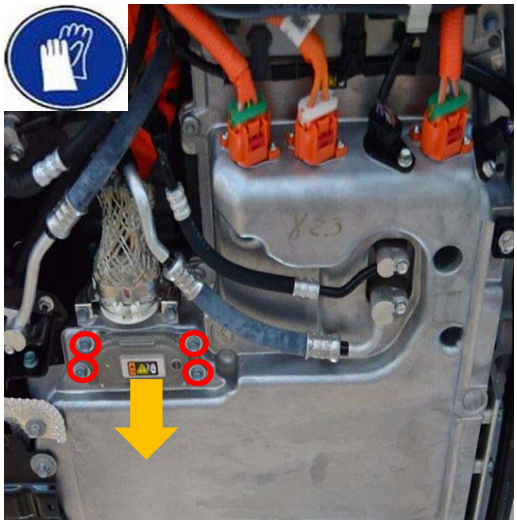
17) Remove Rear Floor Under Cover (LH)

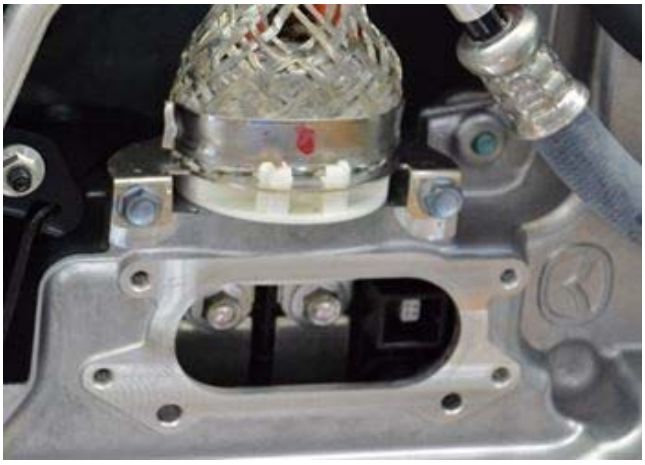


18) Remove Rear Floor Under Cover (RH)

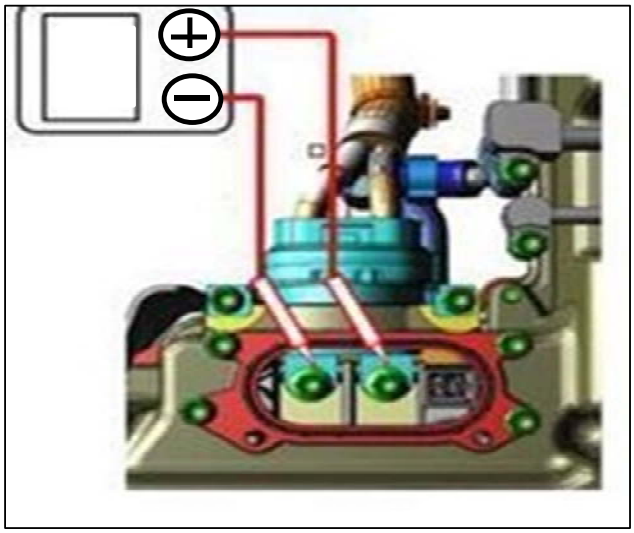


19) Wear insulating gloves disconnect terminal cover (high voltage battery side)

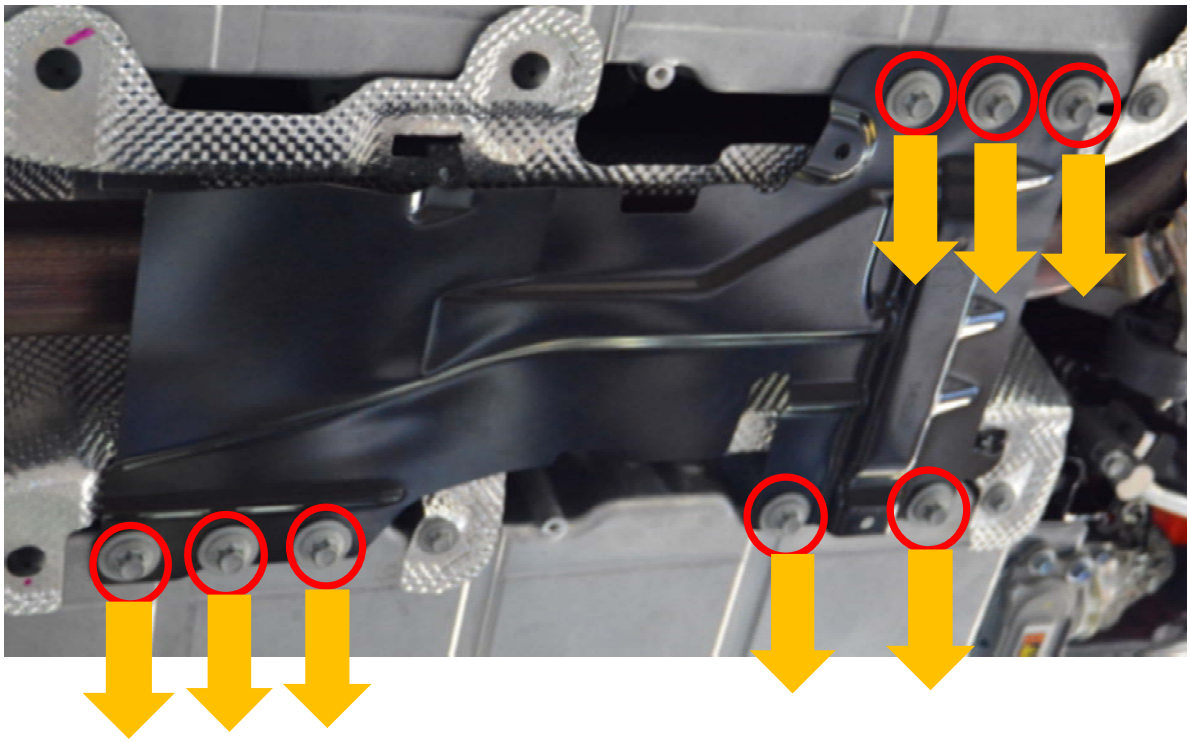




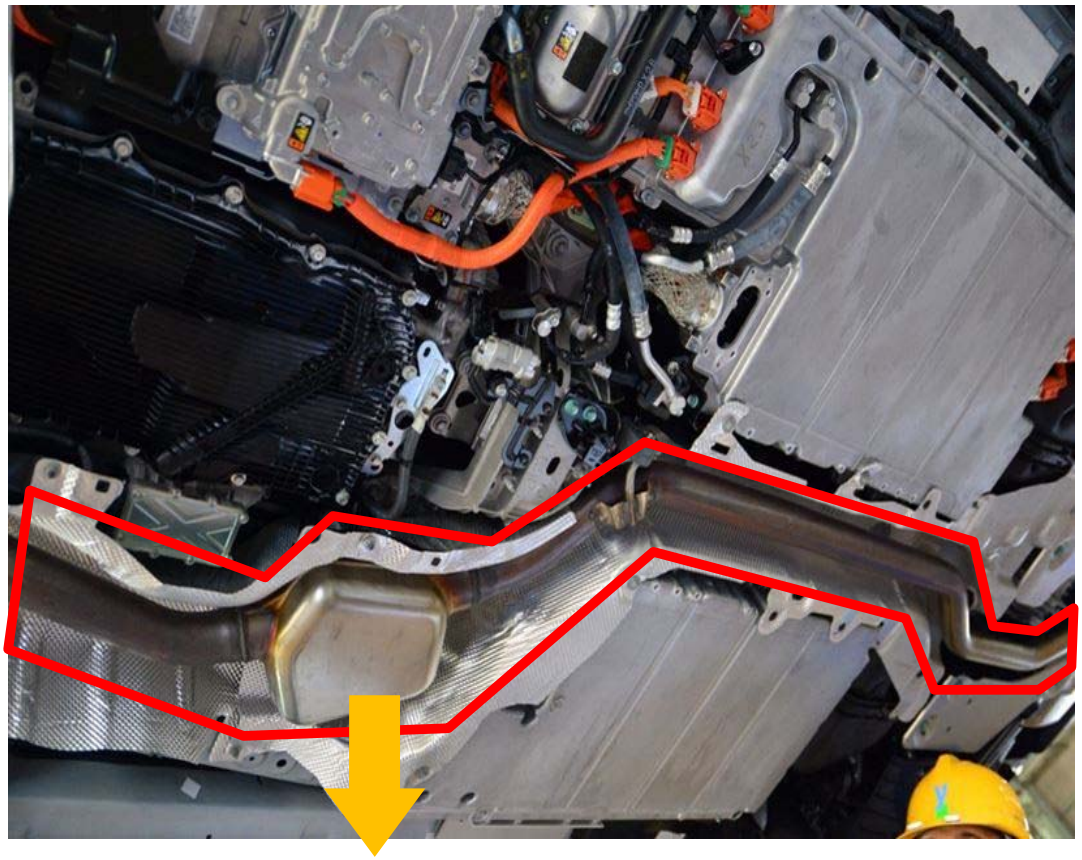
20) Verify that the generation of voltage does not occur using a tester



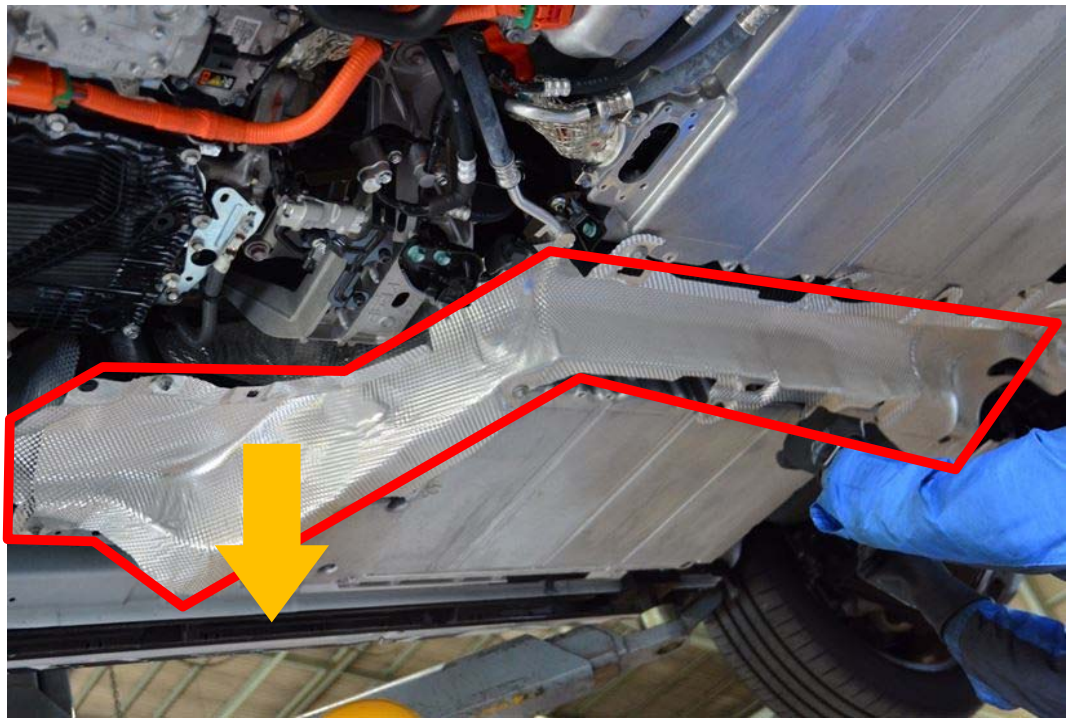
21) Remove Tunnel Member



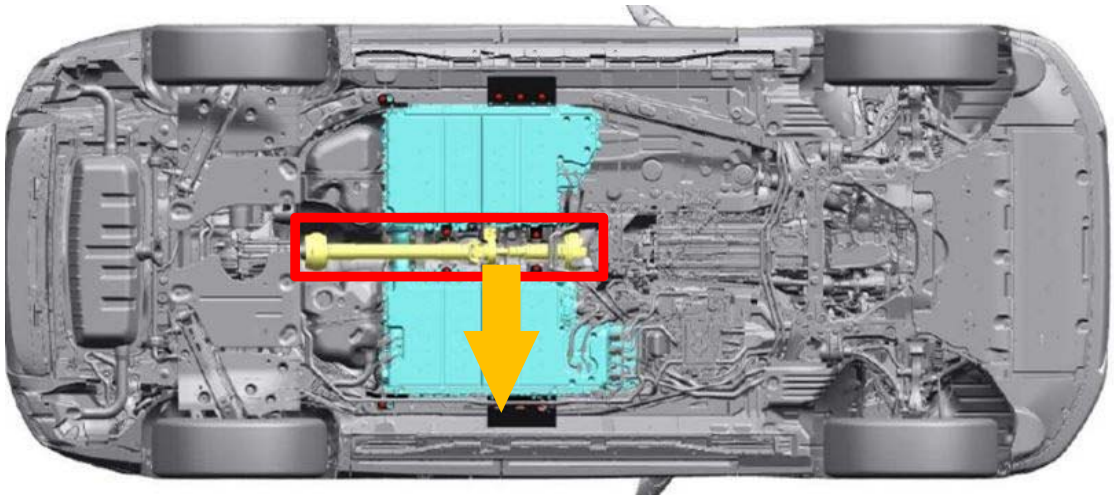
22) Remove Middle Pipe

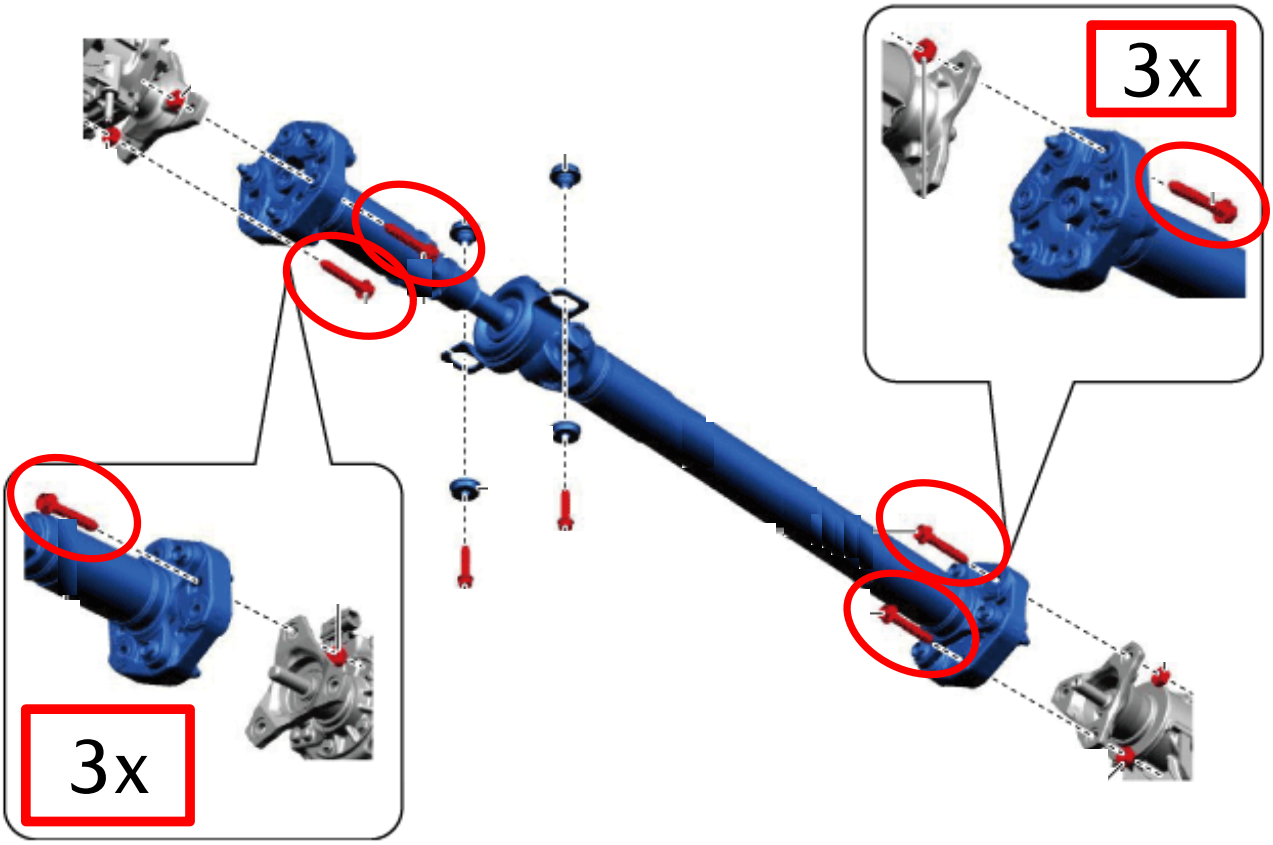


23) Remove Exhaust System Insulator

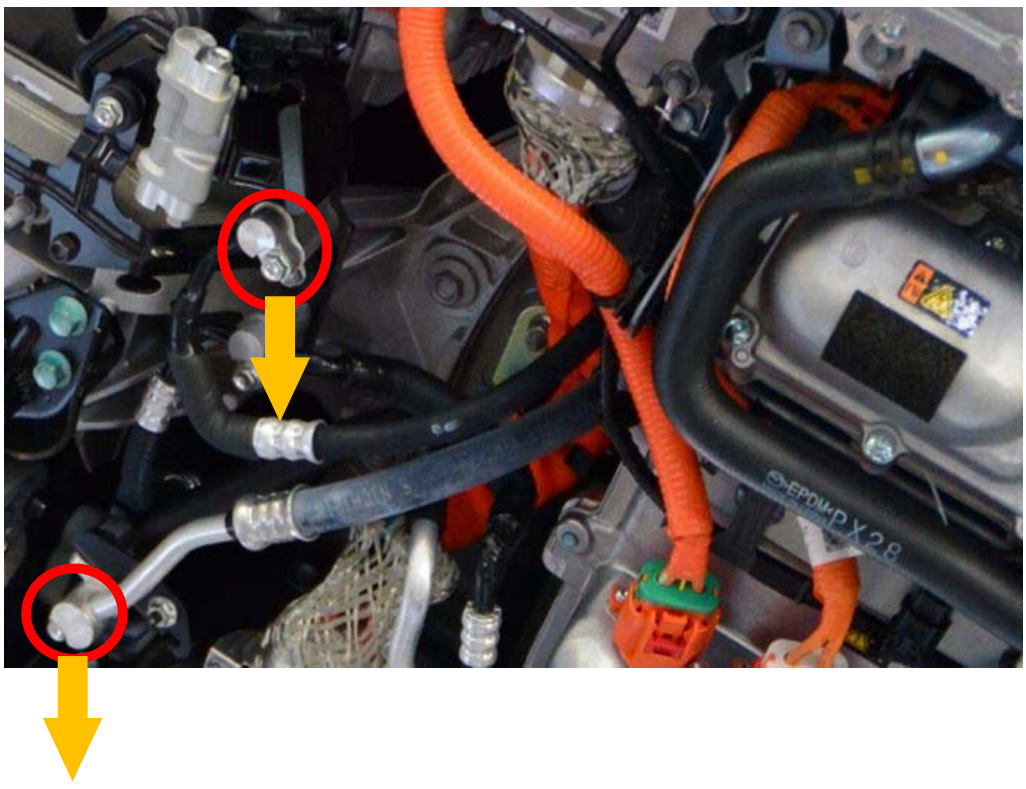


24) Remove Propeller Shaft

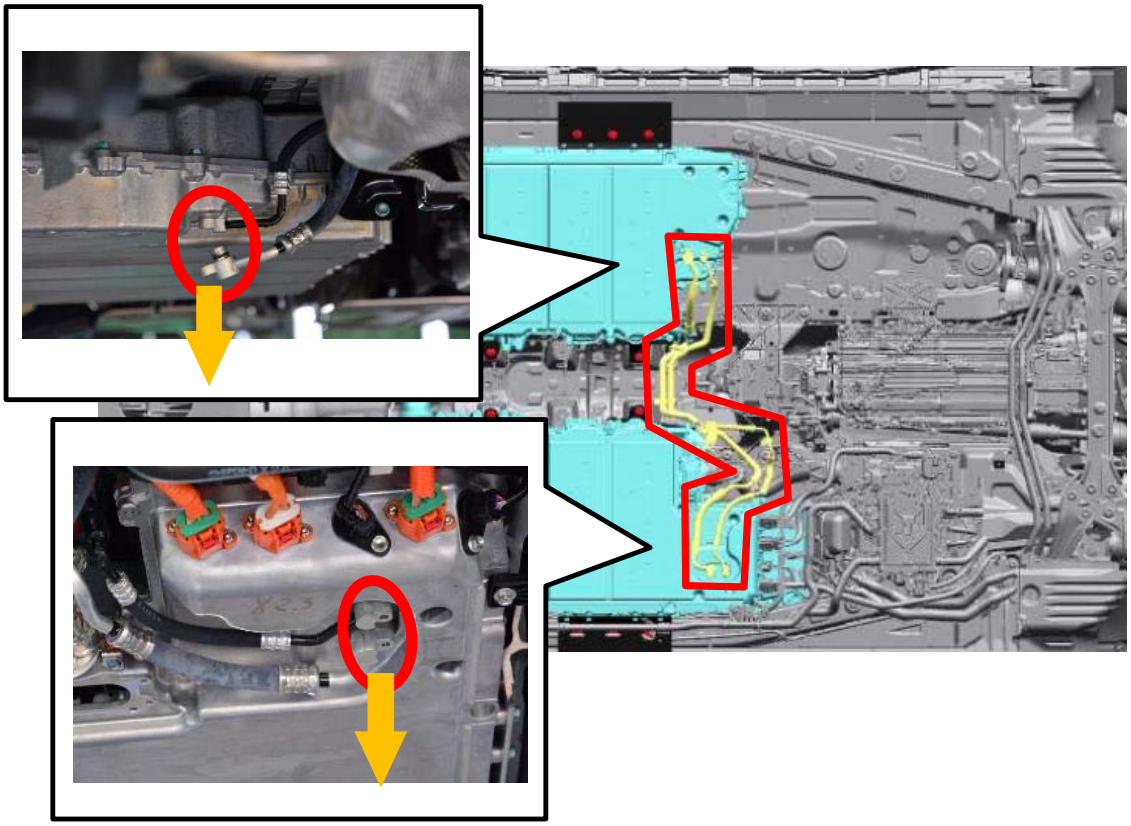




25) Disconnect Refrigerant Piping

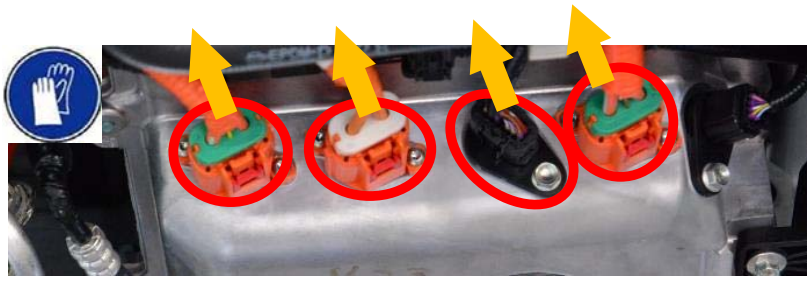


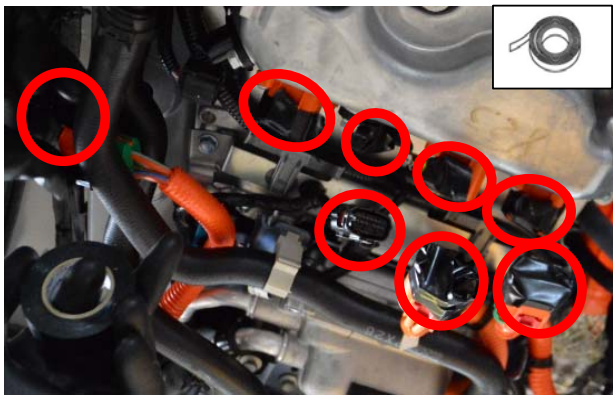
26) Remove Refrigerant Piping



27) Wear insulating gloves and, disconnect the High Voltage Connectors

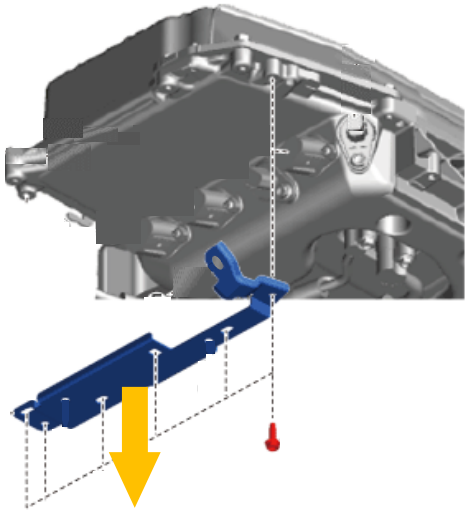
- After disconnecting the high voltage cable connectors, wear insulating gloves and wrap the terminals with electrical tape to insulate them.





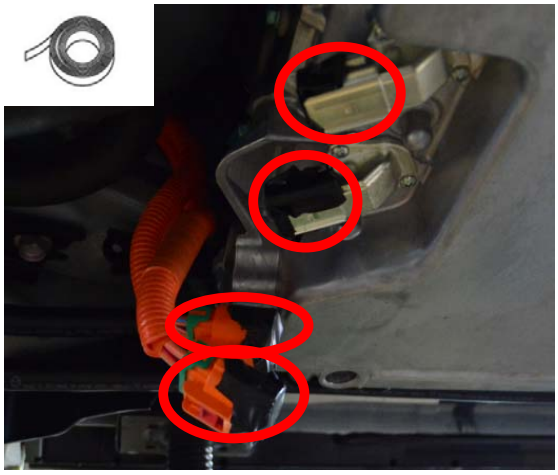
28) Wear insulating gloves and, remove Harness Bracket

- After disconnecting the high voltage cable connectors, wear insulating gloves and wrap the terminals with electrical tape to insulate them.



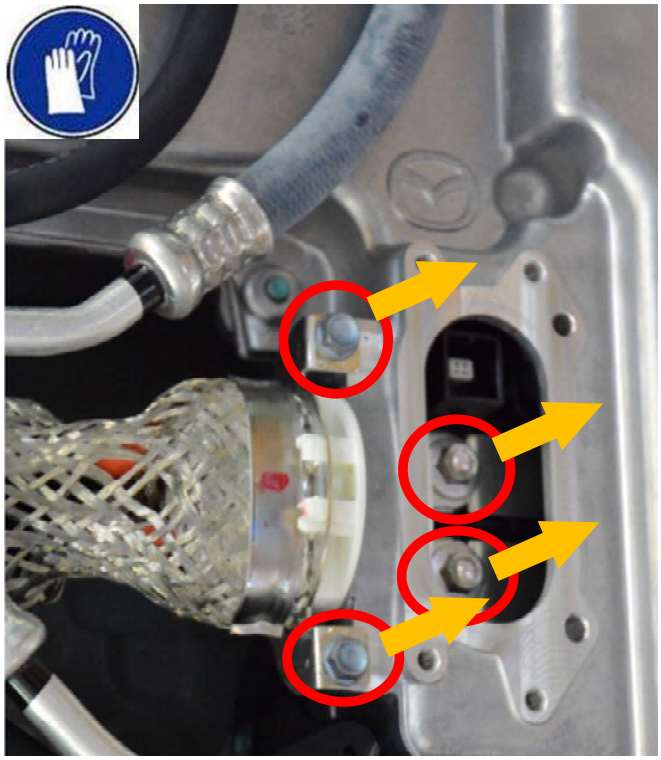
29) Wear insulating gloves and, disconnect Battery Control Connector (Rear Side)

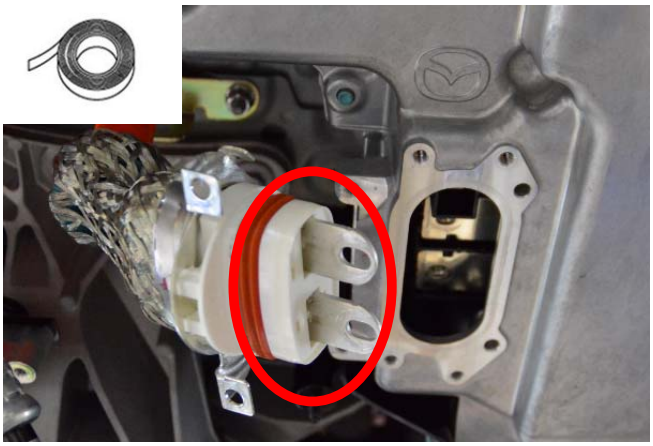
- After disconnecting battery control connector, wear insulating gloves and wrap the terminals with electrical tape to insulate them.



30) Wear insulating gloves and, disconnect High Voltage Cable (High Voltage Battery Side)

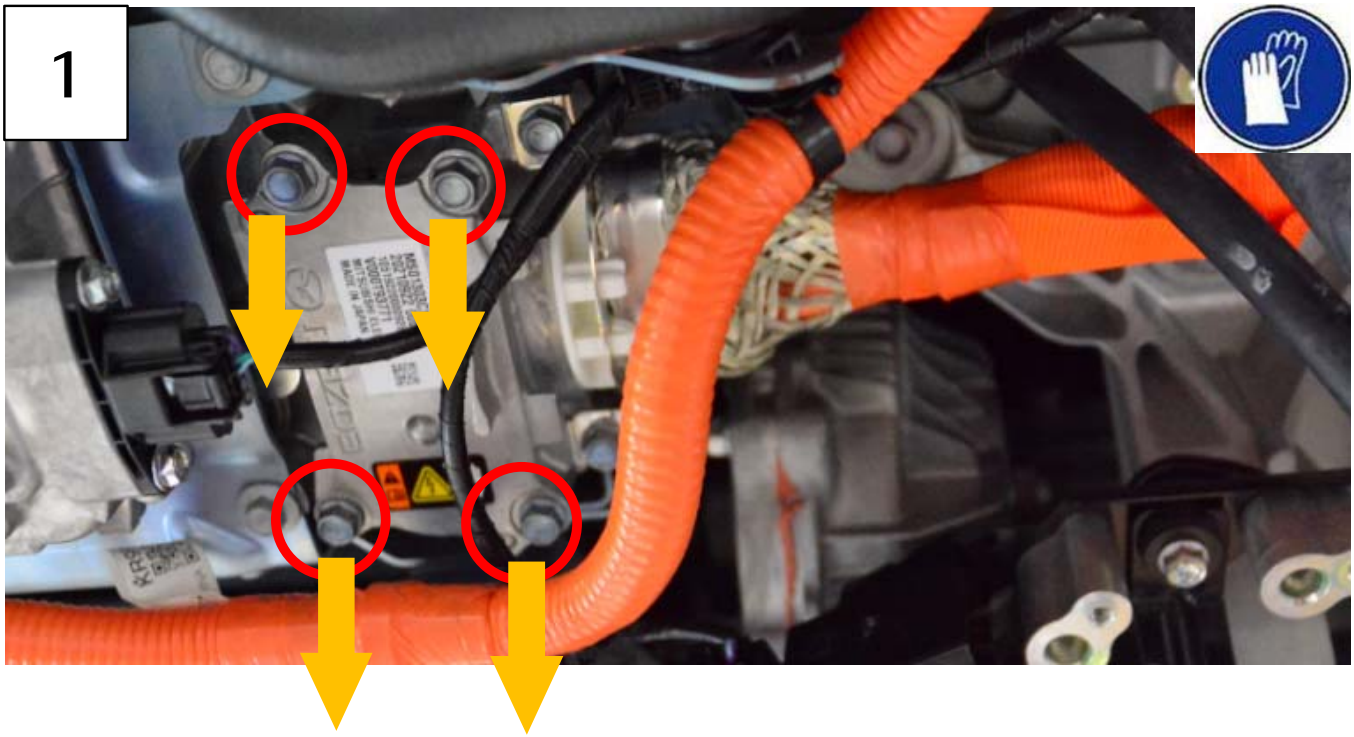
- After disconnecting battery control connector, wear insulating gloves and wrap the terminals with electrical tape to insulate them.

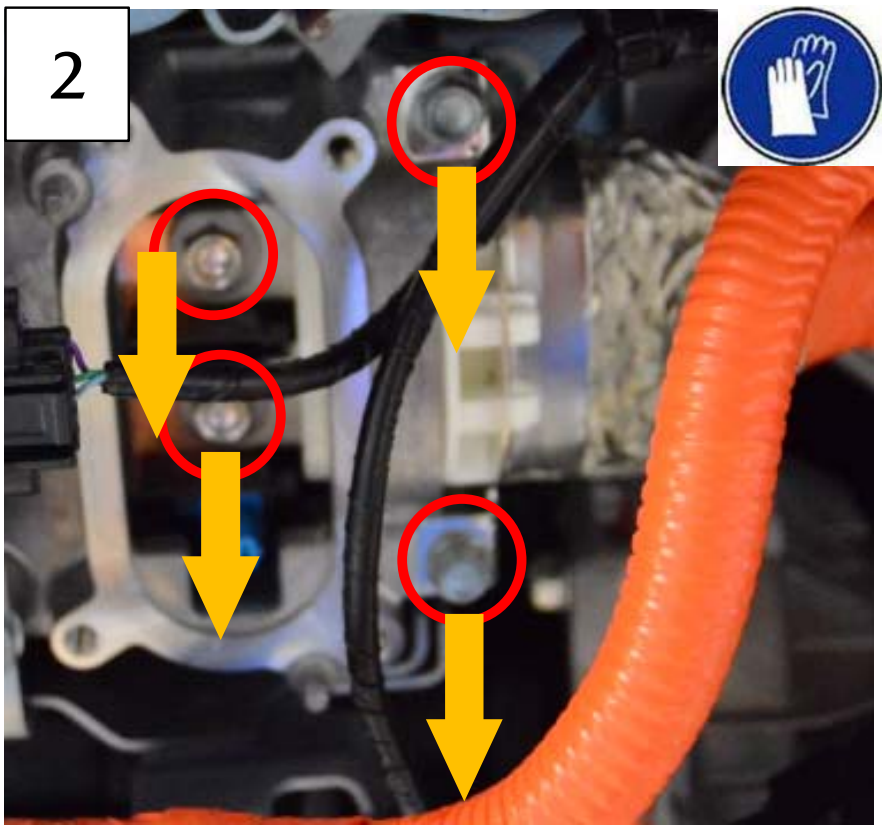


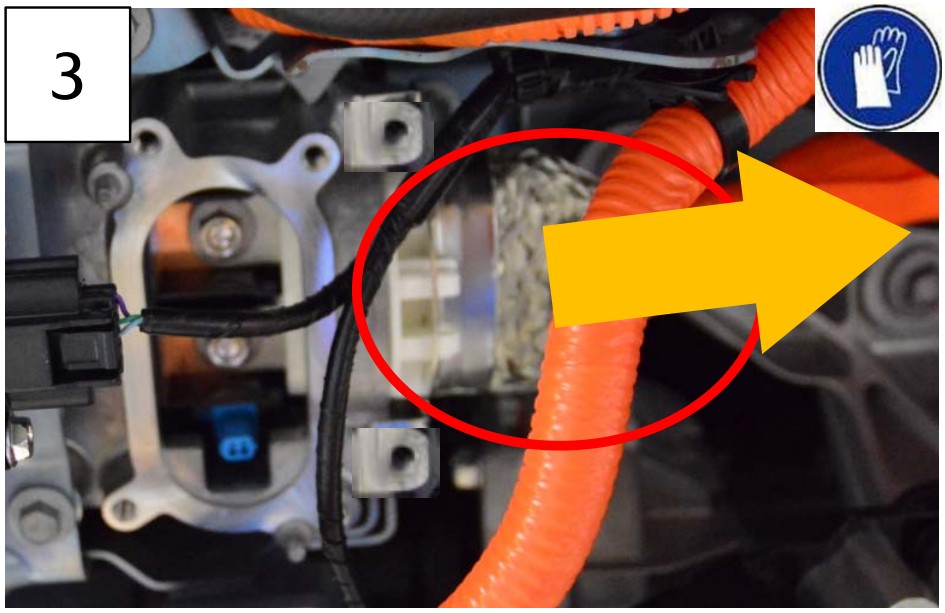


31) Wear insulating gloves and, disconnect High Voltage Cable (Inverter Side)

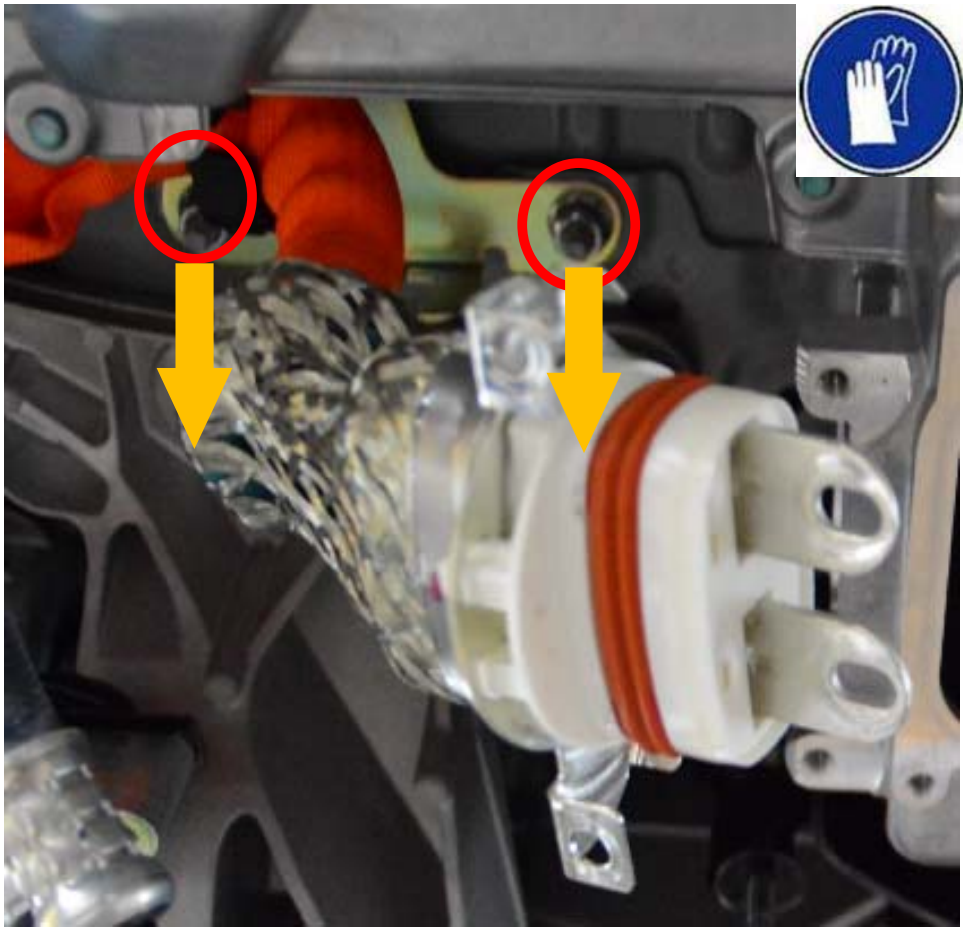
- After disconnecting battery control connector, wear insulating gloves and wrap the terminals with electrical tape to insulate them.



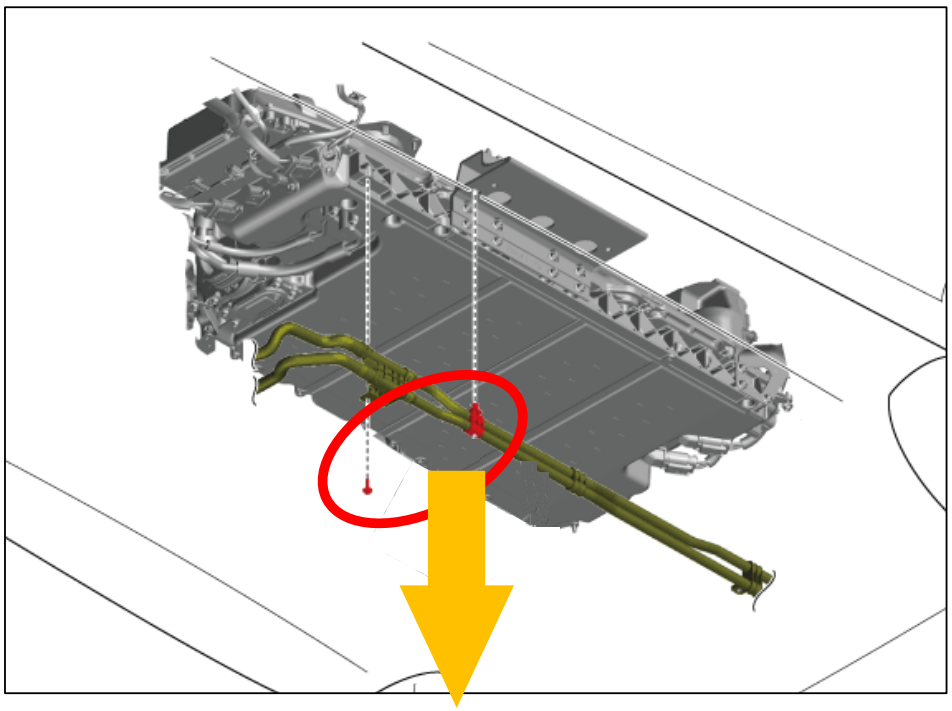

2


3

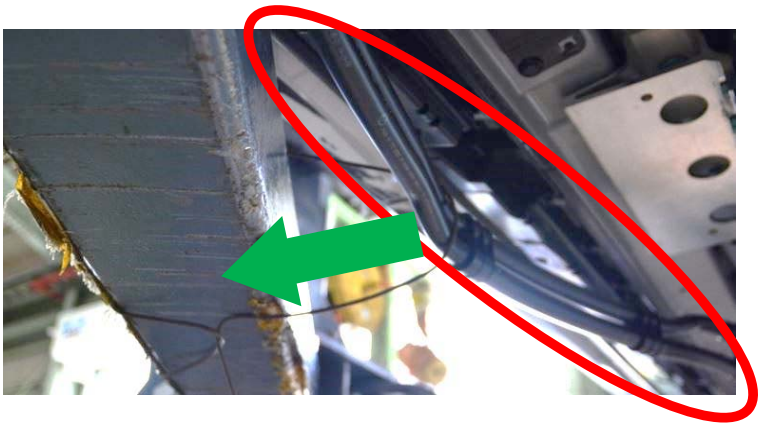
32) Remove High Voltage Cable



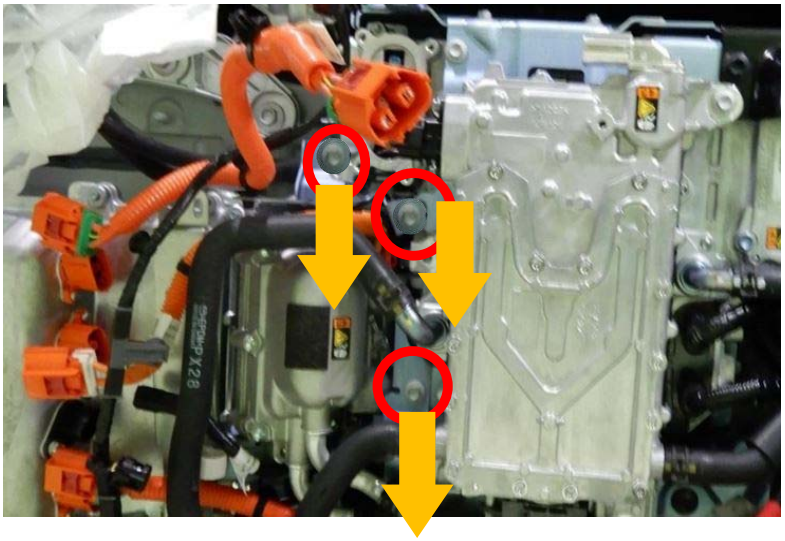
33) Disconnect Water Pipe



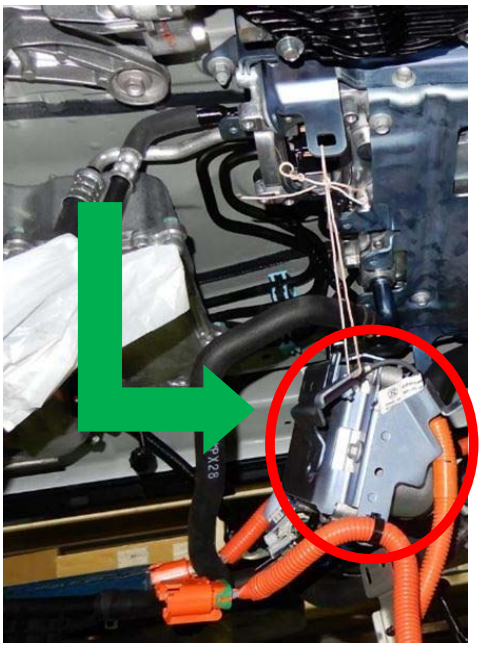
- Suspend the water pipe as shown in the figure.



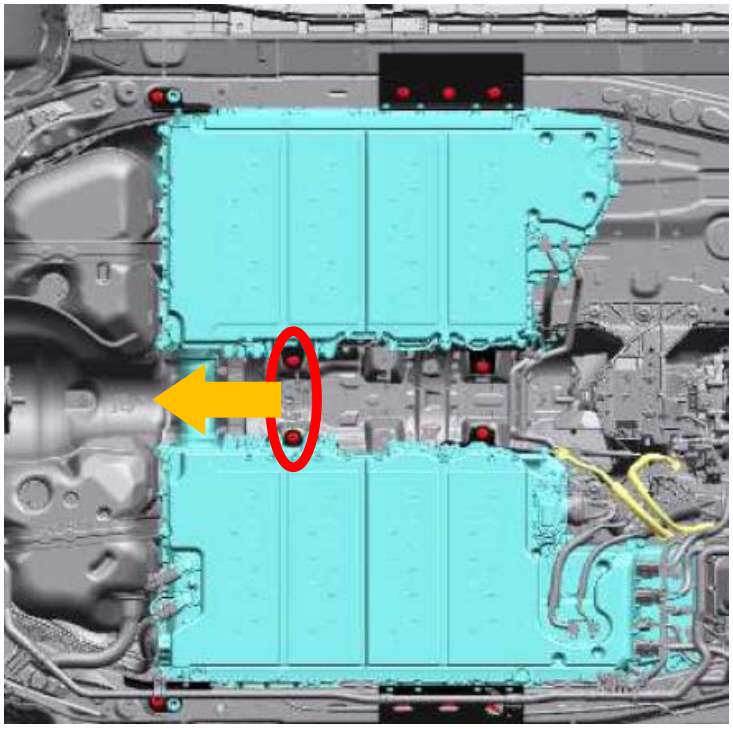
34) Disconnect PTC Heater. (This proceture is applied to MAZDA CX-60 only.)



- Suspend the PTC Heater as shown in the figure.



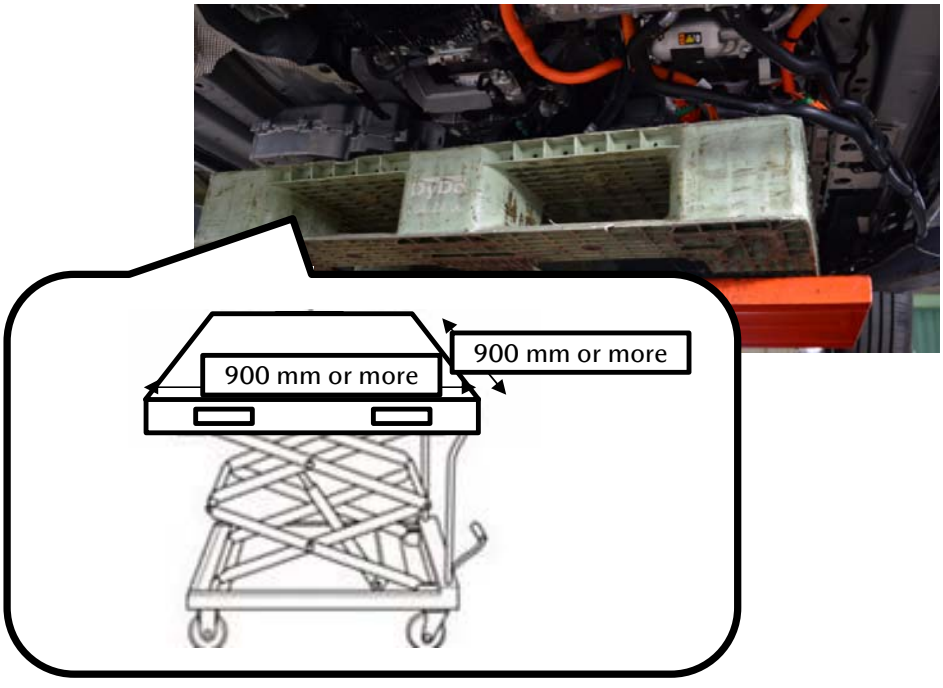
35) Wear insulating gloves and remove the bolts shown in the figure.



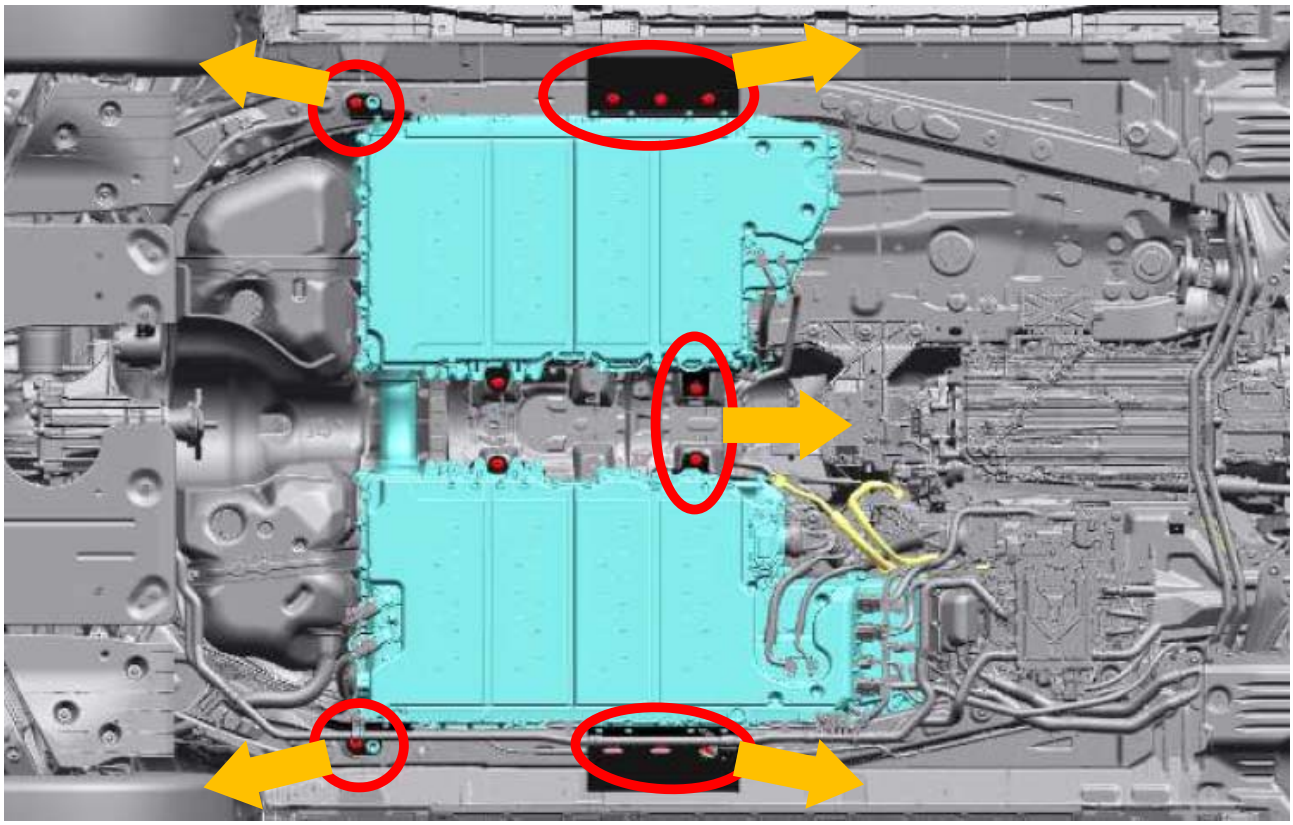
36) wear insulating gloves and support the high voltage battery.

Warning

Use a table lifter and palette of the sizes shown in the picture or larger. If the table lifter or the palette are small, they will not be able to support the high voltage battery (weight approx. 174.5 kg {385 lb.}) and the table lifter will fall, which may cause serious injury or death, and equipment damage. In addition, the high voltage battery may be damaged and the high voltage parts may be exposed, which could cause electrical shock or a fire.



37) Wear insulating gloves and remove the bolts shown in the figure.



38) Wear insulating gloves, and while verifying that the vehicle, high voltage battery, and the table lifter are not tilted and unbalanced, lower the table lifter slowly to remove the high voltage battery.

Warning

- When lowering the table lifter, verify that the vehicle on the auto lift is not tilter or unbalanced. If the vehicle is tilted or unbalanced, it may flat off auto lift and cause a serious injury or death, and equipment damage.

- Example of high voltage battery transportation method

Caution

Make sure that the terminals of the high voltage cable are insulated with insulation tape.
Use two fastening belts to secure the high voltage battery to the pallet.
The weight of the high voltage battery is 174.5 kg {385 lb.}, so do not use a pallet that is severely deteriorated.

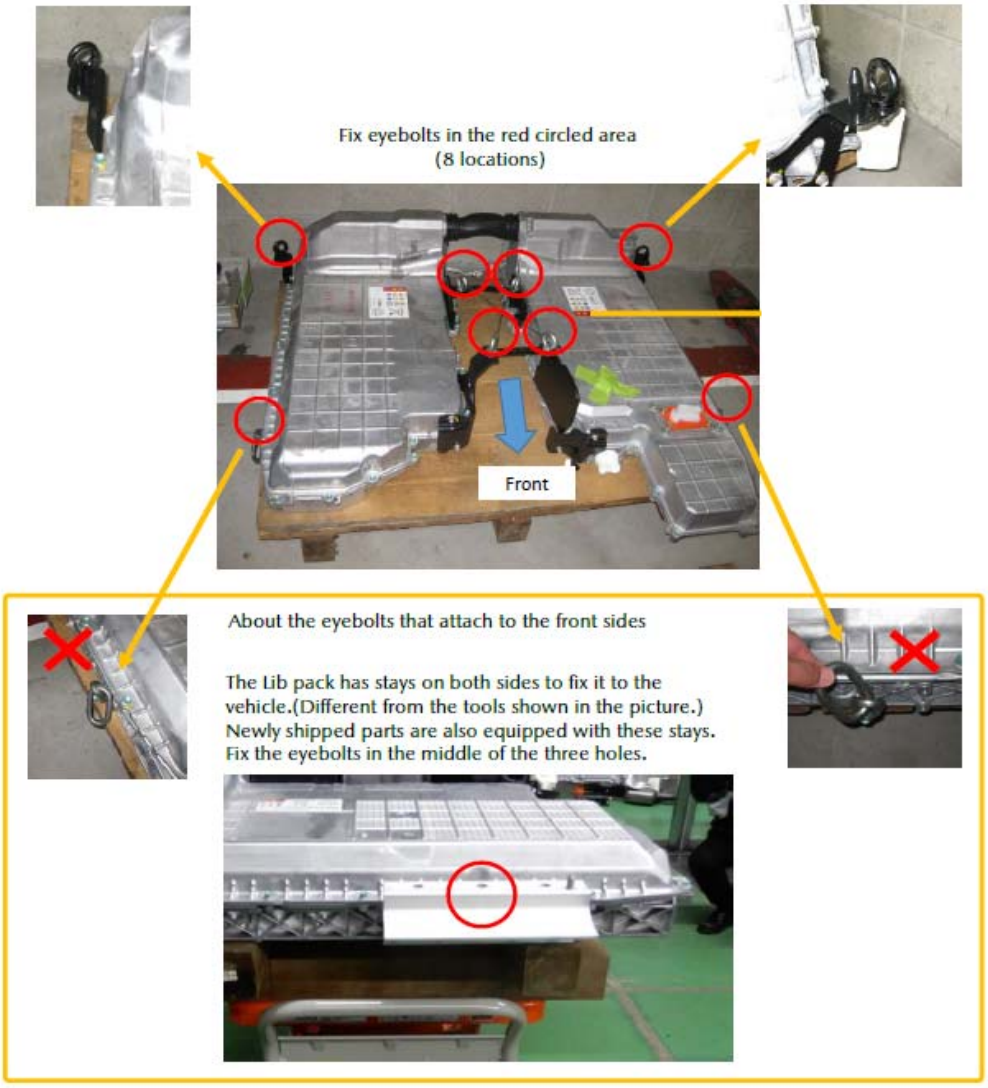
<Carry by a forklift (image)>

- **Reference**

<LiB pack lifting method>

This section tells you how to set up the jig for inserting LiB packs from the container.
Some photos are for illustrative purposes only.

Mounting position



Items to be prepared

When moving LiB Pack after removal from the vehicle, do it with a hoist crane by using eyebolts fixed to the LiB pack, balance bar, and sling belt.

Hoist Crane

Eyebolts & Nuts

Balance bar

Sling belts

Iron plate

Lashing belts

Wire

- Hoist Crane
- 8 pairs of "Eyebolt and nut": M12
- 1 X Balance bar
  Loading capacity: 700kg or more
  Length: approx. 1,000 mm
- 4 X Sling belts
  Loading capacity: 200kg or more
  Size: approx. 25 mm X 1,000 mm or more
- 2 X Lashing belts
  Loading capacity:150kg or more
  Size: approx. 25 mm X 1,500 mm or more
- 2 X Iron plate
  Size: approx. 200 mm X plate thickness 2 mm or more
- wire
  Length: approx. 1,000 mm

Scene of hanging (image)

7. Storage of the Removed high voltage battery

- Take care of the following situations with the removed high voltage battery.

Mixed touch prohibited substances	:	Metal products, water, seawater, strong oxidizers, and strong acids.
Appropriate storage conditions	:	In a cool, dark place (temperature: 0 to 35°C, humidity: 45 to 85%) and, away from rainwater.
Improper storage conditions	:	Direct sunlight, high temperature, and high humidity.