MX-30

DAMAGED VEHICLE HANDLING
**Warning**

<<High voltage>>

- If the high voltage parts of an electric vehicle are damaged due to an accident, improper handling could cause a serious accident such as electrical shock and result in serious injury or, in the worst case, death. When handling a vehicle damaged in an accident, follow the cautions and perform the correct procedures.

**Measures in Case of Accident**

**Caution**

<<High voltage>>

- The high voltage battery electrolyte and its vapor may react with the moisture in the air and produce an acidic substance that irritates the skin and eyes. In addition, if handled incorrectly, it could cause electrical shock and result in serious injury or, in the worst case, death. Follow the cautions and perform the correct procedures.

**Items to be prepared**

<table>
<thead>
<tr>
<th>Items to be prepared</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective equipment</td>
<td></td>
</tr>
<tr>
<td>Protection against high voltage</td>
<td>• Prevent an electrical shock accident of the worker.</td>
</tr>
<tr>
<td>(Insulating gloves, electrical-hazard safety shoes,</td>
<td>• Protect the eyes from an arc flash caused by a short circuit in the high voltage circuit.</td>
</tr>
<tr>
<td>protective eye wear)</td>
<td></td>
</tr>
<tr>
<td>Protection against electrolyte</td>
<td>• Protect the skin and eyes when high voltage battery electrolyte is leaking.</td>
</tr>
<tr>
<td>(Protective rubber gloves, protective eye wear)</td>
<td></td>
</tr>
<tr>
<td>Electrical tape (Insulating tape)</td>
<td>• Used for insulation of damaged wiring harnesses or removed lead-acid battery terminals.</td>
</tr>
<tr>
<td></td>
<td>• Used for insulation of parts such as high voltage wiring harnesses.</td>
</tr>
<tr>
<td>Voltmeter (Capable of measuring DC 450 V or more)</td>
<td>• Used for measuring the voltage of damaged wiring harnesses and locations being serviced.</td>
</tr>
<tr>
<td>Absorbing mat, cloth</td>
<td>• Absorb oils and high voltage battery electrolyte.</td>
</tr>
<tr>
<td>Sealed container</td>
<td>• Used for disposal of cloth that was used to wipe off high voltage battery electrolyte.</td>
</tr>
<tr>
<td>Tools</td>
<td></td>
</tr>
<tr>
<td>Wrenches (size: 10 mm)</td>
<td>• Used to remove the lead-acid battery terminals.</td>
</tr>
<tr>
<td></td>
<td>• Used to remove the service hole cover.</td>
</tr>
<tr>
<td>Fire extinguisher (ABC fire extinguisher)</td>
<td>• Used for early-stage fire extinguishing.</td>
</tr>
</tbody>
</table>
Handling in case of accident

Warning
<<High voltage>>
• Do not touch wiring with broken insulation that may be high voltage wiring harnesses. If they need to be touched or may be touched, use insulating gloves and insulate the wiring harnesses with broken insulation using electrical tape.
• Do not remove the service plug in water. Also, do not touch the high voltage areas and high voltage wiring harnesses. Touching them could cause electrical shock and result in serious injury or, in the worst case, death. If the vehicle is flooded or submerged in water, pull the vehicle completely out of the water and then perform work on the vehicle.
• Only extinguish a fire with water when large amounts of water is available such as from a fire hydrant. Extinguishing a fire with a small amount of water is dangerous. If a large amount of water is not available, do not try to extinguish the fire but evacuate to a safe place and wait for firefighters to arrive.
• When using a fire extinguisher to extinguish a fire, use an ABC fire extinguisher (effective for normal fire, oil fire (fire caused by gasoline and other petroleum oils) and electrical fire (fire caused by electrical wiring and equipment)).

1. If the high voltage parts and wiring harnesses may be damaged, cut off the high voltage using the following procedure.

Note
• If the main power cannot be switched OFF, disconnect main relay No.1 and the negative lead-acid battery terminal in the motor compartment. (See NEGATIVE LEAD-ACID BATTERY TERMINAL DISCONNECTION/CONNECTION.)

(1) Switch the main power OFF.

Caution
<<High voltage>>
• Do not switch the main power ON (READY on) with the service plug removed or a malfunction could occur.

(2) Wear insulating gloves and remove the service plug. (See SERVICE PLUG REMOVAL/INSTALLATION.)

Warning
<<High voltage>>
• The high voltage battery uses 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. Put the used cloth in a sealed container.

- 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 eye, wash off well with plenty of running water and promptly seek medical attention.

**Caution**
<<High voltage>>
- Dispose of the absorbing mat and cloth used to clean the electrolyte leakage according to a method specified by the laws and regulations.

**Note**
- The high voltage battery electrolyte is clear and has an aromatic odor.

2. Verify leakage from the high voltage battery.

**There is no liquid leakage**

1. Perform verification of need for high voltage battery internal inspection. (See Procedure for Determining Need for High Voltage Battery Internal Inspection.)

**There is liquid leakage**

1. Wear protective rubber gloves (protection against electrolyte) and protective eye wear.
2. After soaking up liquid leakage from an absorbent mat and cloth, and disposing of them properly, contact the technical assistance for your market.
3. Perform verification of need for high voltage battery internal inspection. (See Procedure for Determining Need for High Voltage Battery Internal Inspection.)

**Handling High Voltage Battery on Vehicle Damaged in Accident**

**Warning**
<<High voltage>>
- The high voltage battery is covered with a cover and direct verification of damage to internal parts is impossible.
- If the necessary measures are not taken before servicing an electric vehicle, it could cause electrical shock and
result in serious injury or, in the worst case, death. Before servicing the electric vehicle, refer to [HIGH VOLTAGE SERVICE CAUTIONS] in the general information and implement the necessary measures. (See HIGH VOLTAGE SERVICE CAUTIONS.)

High voltage part inspection notes

Warning

<<High voltage>>
• The inspection and removal/installation of the high voltage parts of this vehicle must be performed by persons who have acquired qualifications specified by the laws and regulations.
• The protective equipment indicated in the workshop manual is recommended by Mazda. Use equipment specified by the laws and regulations of each country.
• Wear insulating gloves when inspecting or removing/installing the high voltage parts. Touching the high voltage parts without wearing insulating gloves could cause electrical shock and result in serious injury or, in the worst case, death. (See HIGH VOLTAGE SERVICE CAUTIONS.)
• Before inspecting or removing/installing 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. (See SERVICE PLUG REMOVAL/INSTALLATION.)
• 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.
• Verify that the charge connector is not connected to the vehicle when inspecting or removing/installing the high voltage parts. If the charge 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 inspecting or removing/installing 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 charge or quick charge
  — Do not select high voltage battery cooling on center display after EV system stops
  — Do not open/close doors frequently with main power switched OFF
  — Switch to connected vehicle maintenance mode (MyMazda App connected vehicle)
  — Cancel climate control timer
  — Operate center display and turn off battery heater operation
• When inspecting or removing/installing the high voltage parts, place a high voltage work sign on the vehicle to alert other workers. (See HIGH VOLTAGE SERVICE CAUTIONS.)

Caution

<<High voltage>>
• 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.
Note
• 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

Items to be prepared

<table>
<thead>
<tr>
<th>INSULATING GLOVES</th>
<th>ELECTRICAL-HAZARD SAFETY SHOES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH VOLTAGE WORK SIGN</td>
<td>ELECTRICAL TAPE (INSULATING TAPE)</td>
</tr>
</tbody>
</table>

Procedure for Determining Need for High Voltage Battery Internal Inspection

Warning
<<High voltage>>
• Inspections that require installation/removal of the high voltage battery cover cannot be performed because the high voltage battery cannot be disassembled. Perform troubleshooting for DTCs output by the PCM and the BECM. (See DTC INSPECTION.)
• Do not touch damaged or exposed internal areas of high voltage parts and wiring harnesses. If they need to be touched, always wear insulating protective gear.
• Wear insulating protective gear and then insulate damaged high voltage parts and wiring harnesses with electrical tape.
• The high voltage battery is covered with a cover and direct verification of damage to internal parts is impossible. The high voltage battery is covered by a cover and direct verification of damage to internal parts is impossible. Perform the following [Step 1] to [Step 4] and determine the need for a high voltage battery internal inspection.
• If it is determined that a high voltage battery internal inspection is necessary, contact the technical assistance for your market.

Step 1

<table>
<thead>
<tr>
<th>Condition when malfunction/accident occurred</th>
<th>DTC verification</th>
<th>Determination result</th>
<th>Need for high voltage battery internal inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occurs during quick charging</td>
<td>Cannot verify</td>
<td>Contact the technical assistance for your market.</td>
<td>Yes</td>
</tr>
<tr>
<td>Other than during quick charging</td>
<td>Cannot verify</td>
<td>Verify [Step 2].</td>
<td>No</td>
</tr>
<tr>
<td>Regardless of condition</td>
<td>Can verify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step 2

<table>
<thead>
<tr>
<th>High voltage battery external appearance malfunction</th>
<th>Determination criteria</th>
<th>Measures</th>
<th>Need for high voltage battery internal inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>• Intermittent noise, odor, and smoke occurring from inside the high voltage battery. • The temperature of the high voltage battery does not decrease or increases even if the EV system is disabled.</td>
<td>• Continue to monitor the temperature of the high voltage battery using an IR camera until the difference between the temperature on the bottom of the high voltage battery and the ambient temperature is less than 5 degrees C. • If there is a service plug, remove the service plug if possible. • Contact the technical assistance for your market.</td>
<td>Yes</td>
</tr>
<tr>
<td>Liquid is leaking from inside the high voltage battery.</td>
<td>• A very small amount of liquid is leaking from inside the high voltage battery.</td>
<td>• Soak up leaked liquid with a cloth and dispose of it properly. • Contact the technical assistance for your market.</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>High voltage battery external appearance malfunction</th>
<th>Determination criteria</th>
<th>Measures</th>
<th>Need for high voltage battery internal inspection</th>
</tr>
</thead>
</table>
| 3 Water has penetrated into the high voltage battery. | • There is a sound of splashing water from inside the high voltage battery.  
• Liquid is leaking from the high voltage battery (liquid leaked out). | • Begin monitoring the temperature of the high voltage battery using an IR camera.  
• Soak up leaked liquid with a cloth and dispose of it properly.  
• Contact the technical assistance for your market. | |
| 4 Dent | • Any level of dents. | • Replace the high voltage battery. | |
| 5 The inside of the high voltage battery is exposed. | • The exterior of the high voltage battery is damaged and the inside of the high voltage battery is visible. | • Insulate and seal up the damaged area of the high voltage battery using electrical tape.  
• Replace the high voltage battery. | No |
| 6 If there are none of the above malfunctions, verify [Step 3]. | — | — | — |

**Step 3**

<table>
<thead>
<tr>
<th>Determination criteria</th>
<th>Air bag deployment verification (See Air bag deployment verification.)</th>
<th>Verification of external appearance of high voltage battery and vehicle body dimensions (See Verification of external appearance of high voltage battery and vehicle body dimensions.)</th>
<th>Main power can or cannot be switched ON (READY on)</th>
<th>DTC verification (See DTC verification.)</th>
<th>Determination result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Undeployed</td>
<td>Normal</td>
<td>Possible</td>
<td>DTCs</td>
<td>Implement DTC troubleshooting and take measures according to the diagnostic results.</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Perform an inspection for power</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Can be used continuously.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Determination criteria</th>
<th>Determination result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air bag deployment verification</td>
<td><strong>leakage in the high voltage battery. (See Electrical leakage inspection.)</strong></td>
</tr>
<tr>
<td>(See Air bag deployment verification.)</td>
<td><strong>Verify [Step 4].</strong></td>
</tr>
<tr>
<td>Verification of external appearance of high voltage battery and vehicle body dimensions. (See Verification of external appearance of high voltage battery and vehicle body dimensions.)</td>
<td></td>
</tr>
<tr>
<td>Main power can or cannot be switched ON (READY on)</td>
<td>No matter yes/no</td>
</tr>
<tr>
<td>DTC verification (See DTC verification.)</td>
<td>Replace the high voltage battery.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Determination criteria</td>
<td>Determination result</td>
</tr>
<tr>
<td>Power leakage in high voltage battery</td>
<td>Replace the high voltage battery.</td>
</tr>
<tr>
<td>(See Electrical leakage inspection.)</td>
<td></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td></td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Perform repairs until the main power can be switched ON (READY on) and verify the DTC. (See DTC verification.)</td>
</tr>
</tbody>
</table>

*1: External appearance damage (cracks, deformation) or body frame dimensions are not within specification

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Air bag deployment verification

Verify if any of the air bags equipped on the vehicle is deployed.
Verification of external appearance of high voltage battery and vehicle body dimensions
Warning
<<High voltage>>
• Electrical leakage may occur due to damage related to the high voltage system. When performing the following procedure, wear insulating protective gear. If electrical leakage occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.

1. Remove the gussets connecting the front crossmember to the vehicle body. (See FRONT CROSSMEMBER REMOVAL/INSTALLATION.)

2. Remove the floor under cover (No.1 — No.4) covering the high voltage battery. (See FLOOR UNDER COVER REMOVAL/INSTALLATION.)

3. Visually inspect the exterior appearance of the high voltage battery for cracks and deformation.

4. Visually inspect the high voltage battery for liquid leakage from the inside and exposure.

Note
• For dimension measurements, obtain advice from a sheet metal repair specialist if necessary.

5. Measure the dimensions between each vehicle body point shown in the figure and determine if the body frame is deformed.
DTC verification
• Verify DTCs according to the flow diagram.

— Under the following conditions, perform troubleshooting according to the diagnostic procedure for each DTC.

• The BECM outputs DTCs. (See DTC TABLE [BECM (e-SKYACTIV)].)
• The PCM outputs the following DTCs. (See DTC TABLE [PCM (e-SKYACTIV)].) P0A0C:00, P0A0D:00, P0A0A1:00, P0A0A2:00, P0A0A4:00, P0A0A5:00, P0A0A6:00, P0A0A7:00, P0A0E1:00, P0A0E2:00, P0A0D3:00, P0A0E14:00, P1A022:00, P1A02D:00, U007E:00, U0100:00, U0111:00, U0112:00, U0312:00, U0313:00
• The DC-DC CONVERTER outputs the following DTCs. (See DTC TABLE [DC-DC CONVERTER (e-SKYACTIV)].) P0E56:00, U007E:88
• The DRIVE MOTOR CONTROL MODULE outputs the following DTCs. (See DTC TABLE [DRIVE MOTOR CONTROL MODULE (e-SKYACTIV)].) P0C0C:00, P0D2F:14, U0115:88

DTC verification flow diagram
CONNECT SERVICE PLUG

INSTALL REMOVED RELAY (R3 AND R20) (IN THEY ARE REMOVED)

CONNECT NEGATIVE 12V BATTERY TERMINAL

CONNECT M-MDS

SWITCH THE MAIN POWER ON (READY OFF)

CLEAR DTC (s) AND CHECK IT AGAIN

---

DTC (s) DISPLAY

DISPLAYED

DISPLAYED DTC (s) IS ON THE LIST
SEE THE END OF THIS SECTION *

NOT LISTED

LISTED

NOT DISPLAYED

JUDGE DTC INSPECTION AS "DTC (s) DISPLAYED"

NOT AVAILABLE

JUDGE DTC INSPECTION AS "DTC (s) DISPLAYED"

OPERATE BELOW TO RUN DTC DETECTION
1. SWITCH THE MAIN POWER ON (READY ON)
2. SWITCH THE MAIN POWER OFF (READY OFF)
   AND WAIT 30 SECONDS
3. SWITCH THE MAIN POWER ON (READY OFF)

CHECK IT AGAIN

---

DTC (s) DISPLAY

DISPLAYED

DISPLAYED DTC (s) IS ON THE LIST
SEE THE END OF THIS SECTION *

NOT LISTED

LISTED

NOT DISPLAYED

JUDGE DTC INSPECTION AS "DTC (s) DISPLAYED"

PSMA4, PMAE2, P2D38 ARE STORED AS PAST FAILURE.

JUDGE DTC INSPECTION AS "NO DTC (s) DISPLAYED"

---

*: APPLICABLE DTC (s)

REFER TO [DTC VERIFICATION]
Electrical leakage inspection

**Warning**
*<<High voltage>>*
- For the insulation resistance tester usage, refer to the insulation resistance tester instruction manual. Otherwise, electrocution could result from the voltage generated by the insulation resistance tester.

**Caution**
*<<High voltage>>*
- Use an insulation resistance tester using a testing range of 500 V or less because the high voltage applied by the insulation resistance tester may damage the parts.
- The direction of the voltage applied by the insulation resistance tester when measuring the insulation resistance differs depending on the insulation resistance tester manufacturer. To prevent damage to the parts, confirm the voltage application side and ground side probes using the insulation resistance tester instruction manual, and connect the insulation resistance tester probes to the measuring terminals as follows.

During high voltage (+) side circuit measurement:
- Service plug (+) terminal: Voltage application side probe
- Body ground (bolt): Ground side probe

During high voltage (-) side circuit measurement:
- Service plug (-) terminal: Ground side probe
- Body ground (bolt): Voltage application side probe

*1: To measure the electric potential difference and the insulation resistance, measure both sockets, the (+) side and (-) side, on the high voltage battery side.
Measurement locations for electric potential difference and insulation resistance

- Bolt — High voltage battery (+) side socket
- Bolt — High voltage battery (-) side socket

**Warning**
<<High voltage>>
- Electrical leakage could occur after connecting the service plug for a DTC inspection. After connecting the service plug, do not perform servicing such as part removal/installation. If electrical leakage occurs, it could cause electrical shock and result in serious injury or, in the worst case, death.

**Note**
- If the M-MDS cannot communicate with the vehicle due to vehicle damage from an accident, remove the service plug again and repair the damaged location.

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