Body Repair Tech Note: Disconnecting 12V and High Voltage Power

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.
Disconnect the 12V and high voltage systems to make the vehicle safe to work on before any repair that involves:

- Welding on the vehicle
- Disconnecting or repairing 12V components
- Touching high voltage components
- Touching supplemental restraint system (SRS) components
- Working near exposed high voltage components
- Storing the vehicle for several weeks or more (unless it is plugged in)

⚠️ WARNING: Do not assume that the high voltage system is de-energized after 12V power and the first responder loop have been disconnected. Always check for high voltage at the charger before proceeding with any repairs that involve contact with high voltage components.
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### Location of High Voltage Components and Cables

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<th>What does the high voltage system consist of?</th>
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<td>The high voltage system consists of the High Voltage (HV) Battery and components that contain high voltage circuits, such as the charge port, the drive unit(s), the A/C compressor, and the PTC heater (cabin heater).</td>
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<th>How do you tell which components and cables are high voltage and where they're located?</th>
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<td>All high voltage components have a high voltage warning label on them. Many high voltage components also have the color orange associated with them, but not all do.</td>
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<td>All high voltage cables are orange.</td>
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<td>Before beginning a repair, use the associated diagram to determine whether the repair might involve contact with high voltage components.</td>
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<th>How do you disconnect high voltage power?</th>
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<td>Certain failure modes can allow high voltage power to continue to be present even after the first responder loop has been disconnected. For this reason, always check for the presence of high voltage after disconnecting 12V and high voltage power before starting a repair that might involve contact with a high voltage component or cable.</td>
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</table>

**WARNING:** Do not assume that the high voltage system is de-energized after 12V power and the first responder loop have been disconnected. Always check for high voltage at the charger before proceeding with any repairs that involve contact with high voltage components.

**WARNING:** When checking for the presence of high voltage, if any voltage reading is more than 10V, high voltage might be present. Due to the risk of electrocution, discontinue this procedure and contact a Tesla Service Center.
High Voltage Components and Cables
When and Where to Check for High Voltage

When should you check? Before any repair that involves contact with high voltage components or cables, always check for the presence of high voltage after disconnecting 12V and high voltage power (refer to the "Location of High Voltage Components and Cables" section of this document for more information).

Where should you check? Perform the steps in the "Checking for High Voltage at the Charger" section of this document.

⚠️ WARNING: Do not assume that the high voltage system is de-energized after 12V power and the first responder loop have been disconnected. Always check for high voltage at the charger before proceeding with any repairs that involve contact with high voltage components.

⚠️ WARNING: If any voltage is above 10V, do not proceed with a repair that might involve contact with high voltage components. Contact a Tesla Service Center for further instructions. Failure to follow this instruction could result in exposure to shock hazard.
Disconnecting 12V and High Voltage Power

From the touchscreen, touch **CONTROLS > FRONT TRUNK** to open the front trunk.
Disconnecting 12V and High Voltage Power

2

Make sure that the climate control system is turned off.

**NOTE:** On the touchscreen, the power button above the word "Climate" at the bottom center of the screen is gray if the climate control system is off. If the climate control system is on (the power button is blue), touch the power button above the word "Climate" at the bottom center of the screen to turn the climate control system off.

3

If the repair requires **checking for the presence of high voltage**, open both rear doors and the liftgate, and lower the third row seats (if present).

**NOTE:** Refer to the "When and Where to Check for High Voltage" section of this document for more information.
4

Fully open the driver's window and then close all doors.

**NOTE:** Before disconnecting 12V power, make sure that the driver's window is fully open. Failure to follow this instruction could result in vehicle lockout.

5

Identify the location of the 12V battery.
6

Disconnecting 12V and High Voltage Power

Remove the underhood storage unit and the HEPA filter housing to gain access to the 12V battery.
Disconnecting 12V and High Voltage Power

7
Disconnect the 12V battery ground connection. Cover the terminal with insulating material to prevent accidental electrical contact between the terminal and the post.

WARNING: If the 12V power supply is disconnected, do not attempt to open the front doors with the door glass in closed position. Failure to follow this instruction could result in door glass shatter.

NOTE: Before disconnecting 12V power, make sure that the driver’s door window is fully open. Failure to follow this instruction could result in vehicle lockout.

8
Disconnect the first responder loop and place it in a secure location.

WARNING: Always disconnect the first responder loop to disable the high voltage system. Unless the first responder loop has been disconnected, the vehicle can re-enable high voltage after being idle for a period of time. Failure to follow this instruction could result in serious injury or death due to exposure to high voltage.

CAUTION: Do not cut the first responder loop.
Disconnecting 12V and High Voltage Power

9 Wait at least 2 minutes for all electrical circuits to fully discharge before continuing.

WARNING: Make sure that the first responder loop has been disconnected for at least 2 minutes before continuing. Failure to follow this instruction could result in serious injury or death due to exposure to high voltage.

10 If the repairs involve touching or working around high voltage system components, follow the steps in the “Checking for High Voltage at the Charger” section of this document to check for the presence of high voltage.

WARNING: Do not assume that the high voltage system is de-energized after 12V power and the first responder loop have been disconnected. Always check for high voltage at the charger before proceeding with any repairs that might involve contact with high voltage components.

NOTE: Refer to the Location of High Voltage Components and Cables section of this document for more information on the location of high voltage system components.
After the repair is complete, reconnect 12V and high voltage power.
Checking for High Voltage at the Charger

After disconnecting 12V and high voltage power, use this procedure to check for high voltage.

1. Access the charger.

A. Remove the rear trunk load floor.

NOTE: If the 3rd row seats were not folded down during the Disconnecting 12V and High Voltage Power section of this document, temporarily reconnect 12V power and fold down the 3rd row seats.
Checking for High Voltage at the Charger

Access the charger (continued).

B

Remove the rear trunk side trim panel, and then gently pull back on the upper part of the lower C-pillar trim panel to gain access to the fasteners for the middle C-pillar trim panel. Remove the fasteners (x2) for the middle C-pillar trim panel and then remove the panel.

2 Rear Trunk Side Trim Panel
3 Lower C-Pillar Trim Panel
4 Middle C-Pillar Trim Panel
Checking for High Voltage at the Charger

Access the charger (continued).

Remove the rear trunk floor carpet, the rear trunk sill trim, and the rear trunk rear wall trim, and then remove the left-hand side rear trunk carpet and trim assembly.

**NOTE:** When removing the left-hand side rear trunk carpet and trim assembly, rotate the panel counter-clockwise (up and toward the rear of the vehicle).
Checking for High Voltage at the Charger

Access the charger (continued).

D

Remove the left-hand load floor minion bracket, and then remove the foam HVAC ducting (if equipped).
Checking for High Voltage at the Charger

2

Put on proper personal protective equipment (PPE) and insulating high voltage gloves with a minimum rating of class 00 (500V).

WARNING: Proper personal protective equipment (PPE) and insulating high voltage gloves with a minimum rating of class 00 (500V) must be worn while performing the remainder of this procedure.

WARNING: Before each use, test gloves for leaks using a glove tester and verify that the testing date on the gloves has not expired (high voltage gloves can be used up to 12 months after the testing date printed on the glove, but only 6 months after first use even if the gloves are still within the 12 month period).

3

Remove and discard the warranty label from the charger access panel.

NOTE: Components have been removed in this graphic to aid clarity.
Checking for High Voltage at the Charger

4. Release and discard the fasteners (x11) that attach the charger cover to the charger.

5. Carefully open the front access cover to expose the fasteners that attach the high voltage cables to the High Voltage Battery.
Checking for High Voltage at the Charger

6 Use the charger casing as a chassis ground. Measure the following voltages:
- B+ to chassis ground
- B- to chassis ground
- B+ to B-

**TIP:** Check chassis ground in 2 locations for each measurement that uses chassis ground.

**WARNING:** If any voltage reading is more than 10V, high voltage might be present. Due to the risk of electrocution, discontinue this procedure and contact a Tesla Service Center.

**WARNING:** Use a multimeter that meets CAT III or CAT IV ratings and has test leads that have no more than 3 mm of exposed tip. Both multimeter and test leads must be able to handle at least 500V.

7 Reinstall components that were removed for access.

**NOTE:** Reinstallation is the reverse of removal, except for the following:
- Replace the charger cover fasteners (x11) with Tesla part number 1039097-00-A and torque them to 2 Nm.
- Replace the warranty label with Tesla part number 6001487.
- Clean the adhesive residue on the charger and charger access panel with an alcohol wipe before installing a new warranty label.
- Grind down the plastic welds on the left-hand side rear trunk carpet and trim assembly before reinstalling to avoid scratching the surrounding panels.
Reconnecting is the reverse of disconnecting, except for the following:

- Torque the 12V battery ground connection to 10 Nm.
- Replace any broken clips.
- Torque the bolts that attach the underhood storage unit to the values shown.
- When closing the front trunk, press with both hands on either side of the hood.

⚠️ **CAUTION:** Do not press in the center of the hood. Pressing in the center of the hood can damage the hood.
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Reconnecting 12V and High Voltage Power

7 Nm