


TN-21-16-001 December 15, 2021		Tesla, Inc. Technical Note
Model:	Vehicle System:	Region:
Model S Palladium Model X Palladium	16 - Battery System	All

Inspect the Model S Palladium and Model X Palladium HV Battery for Underside Damage

Tech Notes are announcements that help to communicate and track new information about Tesla Service concerns. Such concerns may or may not be VIN specific. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs and should only be executed by trained professionals. Tesla assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

Whenever the vehicle is raised, or if the customer has indicated possible damage, the underside of the vehicle, including the High Voltage (HV) battery assembly, should be visually inspected for damage. HV battery assembly damage may include:

- Dents, holes, cracks, or tears
- Corrosion or moisture accumulation
- Evidence of a previous thermal event, such as smoke residue, discoloration, deformation, melted seals, metallic platter, or abnormal odor
- Rupture or disassembly
- Coolant or electrolyte leakage



NOTE: If a vehicle is brought into a Body Shop with visible damage to the bottom of the HV battery, the Body Shop should contact Tesla:

- **In Europe, Middle East, and Africa:** Contact EMEABodyRepair@Tesla.com.
- **All other regions:** Contact your local Tesla Service Center.

The Body Shop should not try to repair the HV battery damage. Only Tesla Service Centers should try to repair the damaged HV battery.

⚠ WARNING: If the HV battery is compromised with a **visible open hole, crack, or tear** (Figures 1 and 2), the Service Center should not perform any additional inspections, and recommend the customer replace the HV battery. No further diagnosis is needed as Tesla recommends an HV battery replacement for any visible open hole, crack, or tear to meet Tesla's standards of quality and safety.



Figure 1 – Visible open hole



Figure 2 – Visible open crack

☰ NOTE: If at any point during the inspection the damage requires a HV battery, advise the customer that the HV battery requires replacement to meet Tesla's standards of quality and safety. Tesla does not recommend driving the vehicle until the HV battery is replaced. Since the new HV battery replacement is not covered under the vehicle warranty, the Service Center should recommend that the customer replace the HV battery and provide the customer a price quote for the HV battery replacement. The warranty does not cover the HV battery damage because it was caused by an external impact.

☰ NOTE: If a replacement HV battery is recommended for any out of warranty repair and the customer declines the repair, refer to [Article 6101300](#) for the appropriate next actions.

⚠ WARNING: Failure to follow all High Voltage (HV) safety precautions, including the use of personal protective equipment, when working on or around HV components may result in serious injury or property damage. Only technicians who have completed Tesla's Mechanical, Electrical, and Trim training course should diagnose, repair, or replace HV components. In addition, all repair and operating instructions should be reviewed and understood before working on Tesla vehicles or associated repair equipment.

⚠ WARNING: An HV battery poses a significant high voltage and electrocution risk if the outer enclosure or safety circuits have been compromised or have been significantly damaged. Proper Personal Protective Equipment (PPE) and insulating HV gloves with a minimum rating of class 0 (1000V) must be worn any time a high voltage component is handled. Refer to Technical Note [TN-15-92-003](#), "High Voltage Awareness Care Points" for additional safety information.

⚠ WARNING: If the battery or vehicle displays signs of escaping gases, smoke, flames, excessive heat, sparks, or arcing, contact the local emergency department and refer to the Emergency Response Guide, available at <http://www.tesla.com/firstresponders> and/or [TN-13-16-007](#), "Lithium-Ion Battery Emergency Response Guide, Model S, X, 3, and Y". Gases or smoke exiting a lithium-ion HV battery are likely flammable and could ignite at any time.

⚠ WARNING: Avoid contact with gases escaping from the battery. Vented gases might irritate the eyes, skin, and throat. Vent gas temperatures can exceed 600°C (1,110°F). Contact with hot gases can cause burns.

⚠ WARNING:

- Inspect or repair a vehicle that has an unstable battery outdoors or within easy access to the outdoors.
- If an HV battery has been determined to have a coolant leak, do not pressurize the cooling system.
- Store damaged HV batteries at least 15 m (50 ft) away from flammable materials, structures, other vehicles, and other HV batteries.
- Do not store standalone HV batteries below -20°C (-4°F).
- Do not store standalone HV batteries for over 10 days above 35°C (95°F).
- Do not charge or discharge a standalone HV battery below 0°C (32°F).
- Do not store standalone HV batteries for over 30 days at full state of charge (SOC) or completely discharged.
- Do not charge a damaged or potentially unstable HV battery.
- Do not weld near HV batteries.

HV Battery Underside

The underside of the HV battery has several key components, as shown in Figure 3.

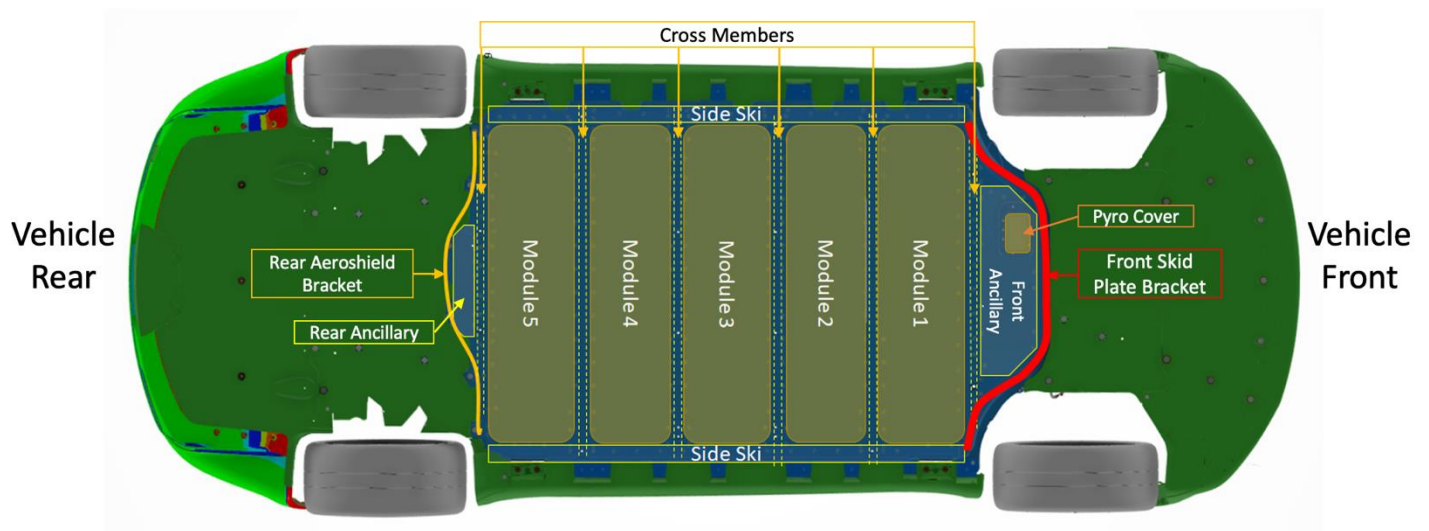


Figure 3 – HV Battery Components

The bottom of the HV battery can be divided into a grid to make it easier to track and report damage (Figures 4, 5 and 6).

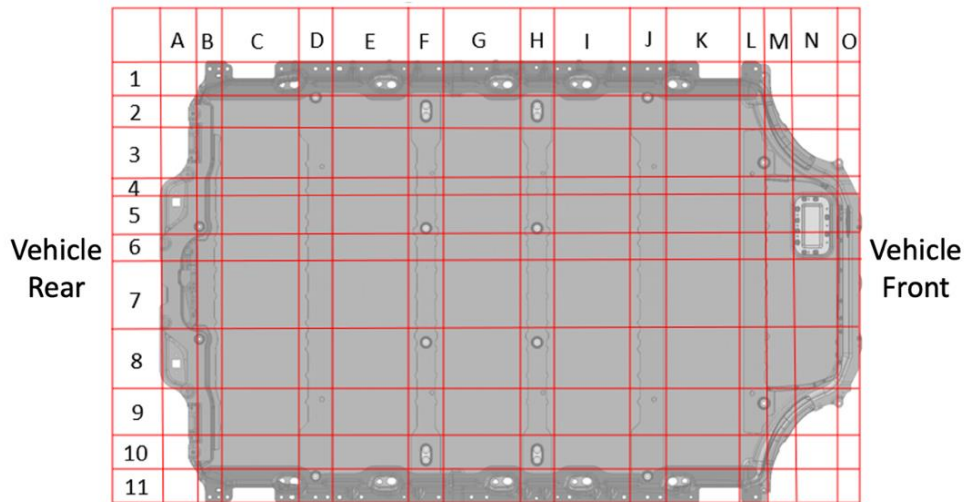
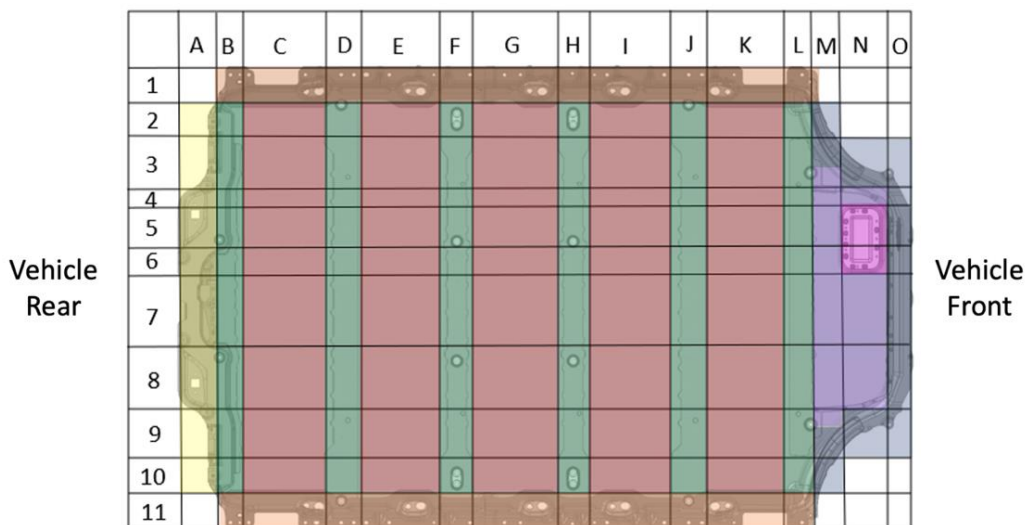


Figure 4 – HV Battery Grid Layout

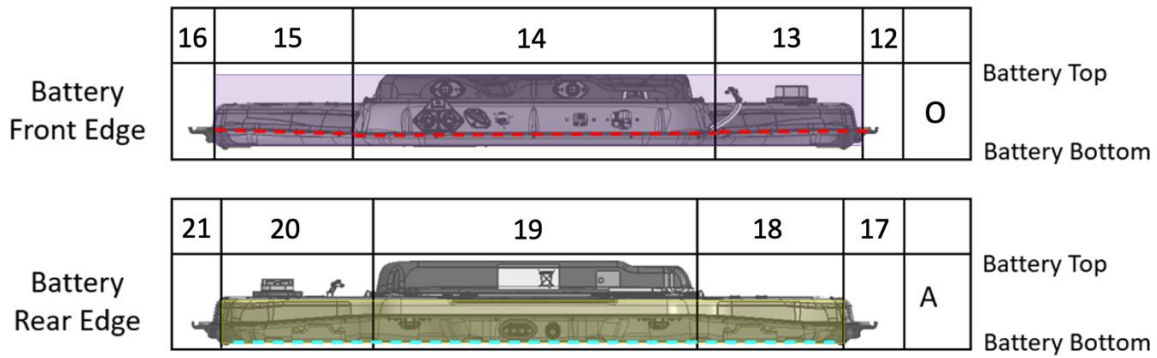
The grid locations for the underside components of the HV battery are shown in Figure 5.



	HV Battery Part	Grid Locations
	Side Ski Zones	B1 – L1, B11 – L11
	Baseplate	C2 – C10, E2 – E10, G2 – G10, I2 – I10, K2 – K10
	Cross Member Zones	B2 - B10, D2 – D10, F2 – F10, H2 – H10, J2 – J10, L2 – L10
	Front Skid Plate Bracket	M2 - M3, M9 - M10, N3, N9, O3 - O9
	Front Ancillary	M3 – M9, N4, N7 - N8
	Pyro Cover	N5 - N6
	Rear Ancillary	A2 - A10

Figure 5 – HV Battery Bottom Grid

The grid locations for the front and rear edges of the HV battery are shown in Figure 6.



	HV Battery Part	Grid Locations
---	Front Skid Plate Bracket	O13 - O15
	Front Ancillary	O13 - O15
---	Rear Aeroshield Bracket	A18 - A20
	Rear Ancillary	A18 - A20

Figure 6 – HV Battery Edge Grid

If there is noticeable damage to the bottom of the HV battery assembly:

1. Create a Toolbox session with [Article 5402800](#) marked as an issue.
2. Add the comment “@NACompromisedBattery”, “@EUCompromisedBattery”, or “@APACCompromisedBattery”, depending on your region, to add HV battery inspection engineers as watchers.
3. Collect the following information and upload it to the session:
 - a. Several pictures of the damage, taken with a high-resolution camera: If there isn't a visible open hole, crack, or tear, measure the depth of the HV battery enclosure damage (Figure 7) **while wearing proper PPE**. If the damage is not obvious, take an overall picture of the HV battery, with pointers to the damaged area or areas.

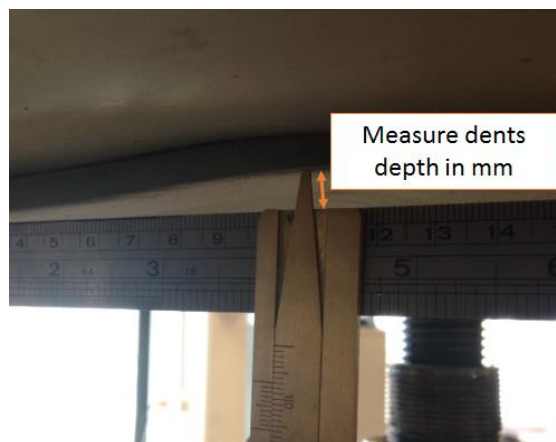


Figure 7 – Measuring the depth of enclosure damage

- b. Information from the customer about the incident that may have caused the damage, if available.
 - c. The location of the damage according to the corresponding zone.
4. Perform the appropriate repair according to the corresponding section below.

Front Skidplate

The front skidplate (Figure 8) is located at the front of the HV battery and sits over the front skidplate bracket (Figure 9):



Figure 8 – Front Skidplate

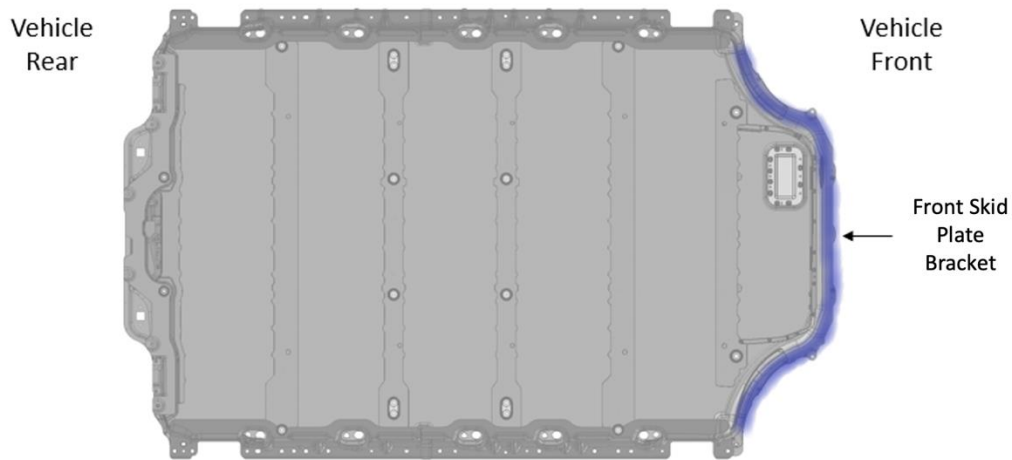


Figure 9 – Front Skidplate Bracket Location

To inspect the front skidplate for damage:

1. Visually inspect the skidplate for tears, dents, or breaches (Figure 10).
2. Remove the front skidplate (refer to Service Manual procedure 30011002; [Model S](#), [Model X](#)).

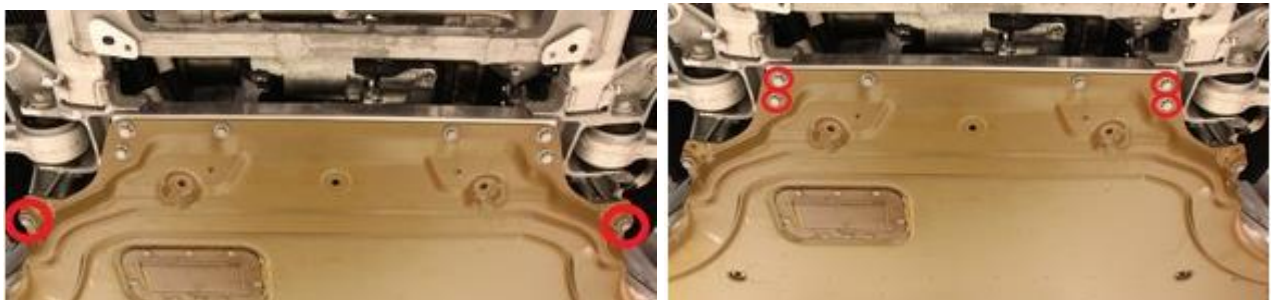


Figure 10 – Front Skidplate Fasteners

3. Inspect the HV cables and passthroughs.
4. If there is damage to the leading edge above the front skidplate, see also “Leading Edge” section.
5. If there is damage to that extends onto the pyro cover, see also “Pyrotechnic Fuse Cover” section.

6. If there is damage that extends onto the front ancillary, see also “Front Ancillary” section.
7. Remove and assess damage to components: HV cables, passthroughs, fasteners, baseplate, etc.

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found.
- Recommend the replacement of the front skidplate if the frontskid plate, or part of the skidplate, is detached.
- Recommend the replacement of the HV cables if the HV cables are damaged above the front skidplate.
- Recommend the replacement of the passthrough if a passthrough is damaged above the front skidplate.
- Recommend the replacement of the fastener if a fastener attaching the front skidplate to the vehicle is damaged or stripped.
- Re-tap the fastener hole if a fastener hole is damaged and the fastener cannot withstand full torque.
- Recommend HV battery replacement if:
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.



NOTE: Do not drill new holes in any part of the HV battery case, front skidplate, rails, or baseplate.

Side Skis

There are two side skis (Figure 11). For each side ski, there is a “side ski zone,” which extends 5 inches (127 mm) inward from the edge of the HV battery.

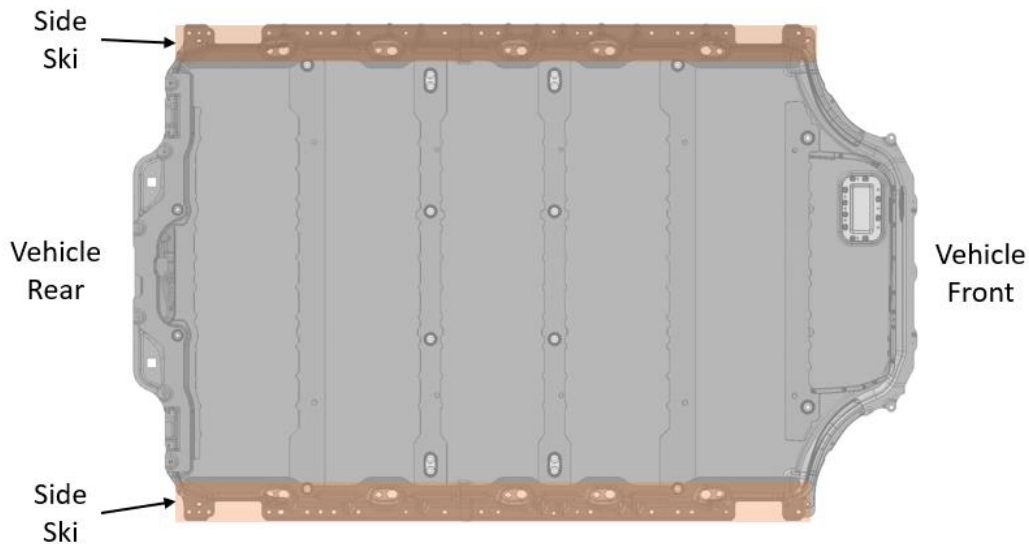


Figure 11 – Side Skis

Suggest repair to customer:

- Recommend HV battery replacement if:
 - The side ski, or part of the ski, is detached from the HV battery.
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.
- Recommend the replacement of the jack pad if a jack pad has extensive damage where it cannot be used to safely lift the vehicle.
- Re-tap fastener hole if a fastener hole is damaged and the fastener cannot withstand full torque.
- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found (Figure 12).



Figure 12 – Deburr the area to remove sharp edges

Baseplate

The baseplate covers the underside of the HV battery. The baseplate is divided into the cross member and module zones (Figure 13):

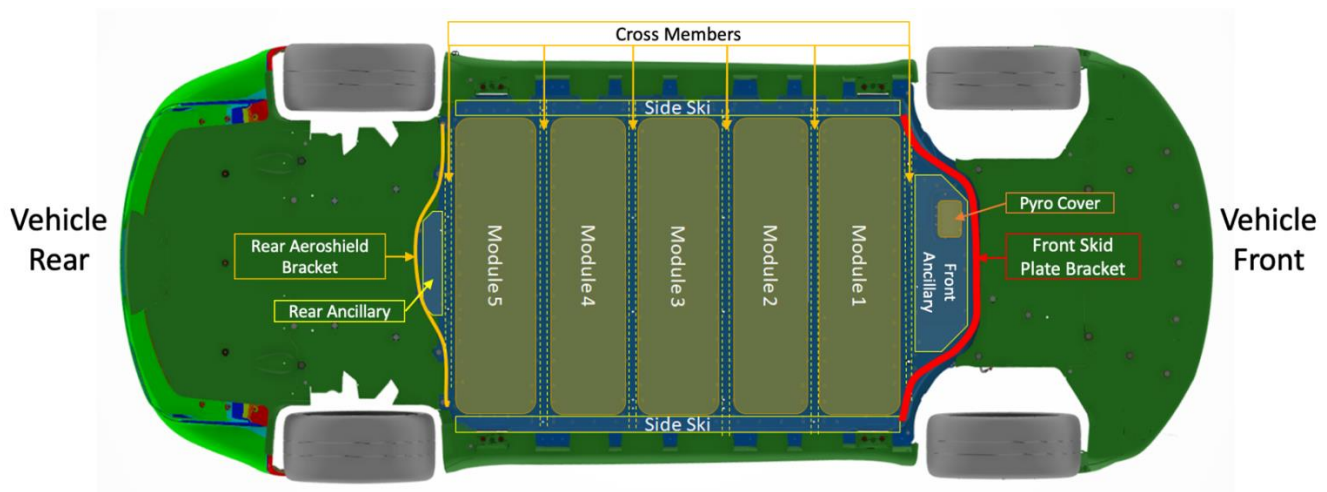


Figure 13 – Baseplate Zones

NOTE: If damages on a module zone extend to the cross member zone, see also “Baseplate – Cross Member Zone” section below.

Baseplate – Module Zone

Baseplate module zones are located between the crossmember zones. When a baseplate module zone is damaged, follow these steps:

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found (Figure 14).
- Recommend HV battery replacement if:
 - A dent is **7 mm** or more in depth (Figure 15).
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.

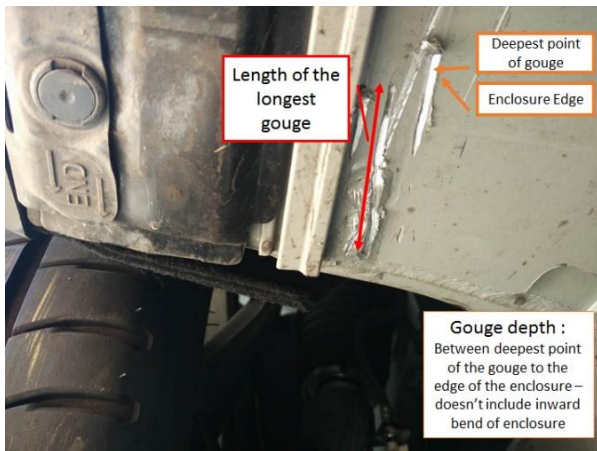


Figure 14 – Debur area to remove sharp edges

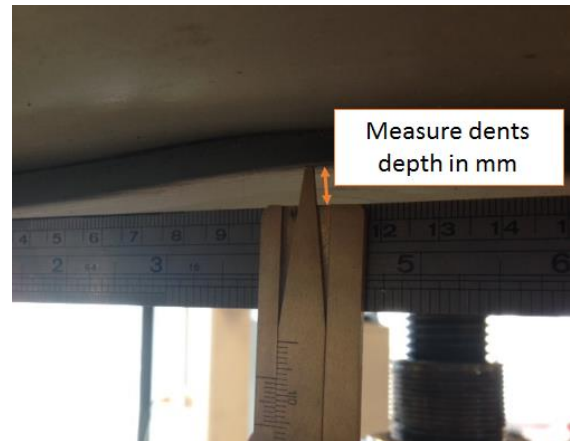


Figure 15 – Dents in the Baseplate

Baseplate – Cross Member Zone

Baseplate cross member zones separate the baseplate module zones. When a baseplate cross member zone is damaged, follow these steps:

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found (Figure 14).
- Recommend HV battery replacement if:
 - A dent is **3 mm** or more in depth (Figure 15).
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.

NOTE: The rear aero shield bracket, rear ancillary, front ancillary, and pyro cover zones are not included in the baseplate area. See those specific sections if they are damaged.

Leading Edge

The leading edge of the HV battery is above the front skidplate bracket, shown as a dashed red line (Figure 16). Anything below the front skidplate bracket is part of the front ancillary or the pyro cover. When the leading edge area is damaged, follow these steps:

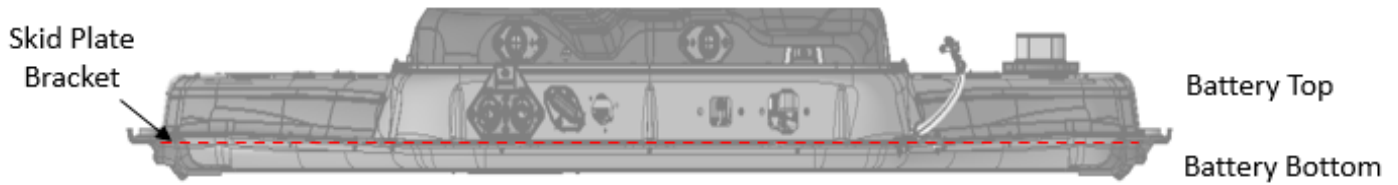


Figure 16 – Leading Edge

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found.
- Recommend the replacement of the HV cables if the HV cables are damaged above the front skidplate.
- Recommend the replacement of the passthrough if a passthrough is damaged above the front skidplate.
- Recommend HV battery replacement if:
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.

Rear Edge

The rear edge of the HV battery enclosure is above the aero shield bracket, shown as a dashed red line (Figure 17). When the rear edge area is damaged, follow these steps:

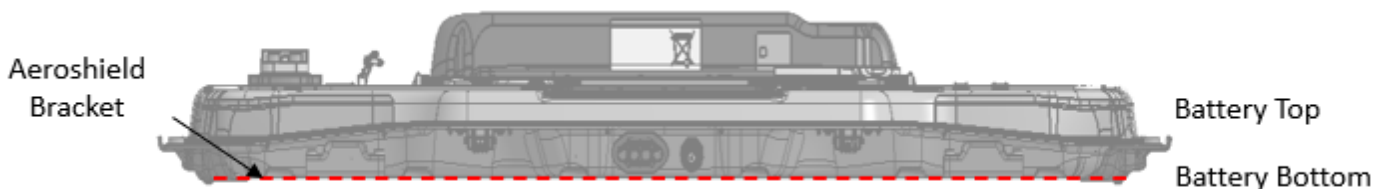


Figure 17 – Rear Edge

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found.
- Recommend the replacement of the HV cables if the HV cables are damaged above the aero shield bracket.
- Recommend HV battery replacement if:
 - A passthrough is damaged above the aero shield bracket.
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.

Pyrotechnic Fuse Cover

The pyrotechnic fuse cover is boxed below in the yellow dashed line (Figure 18). When the pyrotechnic fuse cover area is damaged, follow these steps:

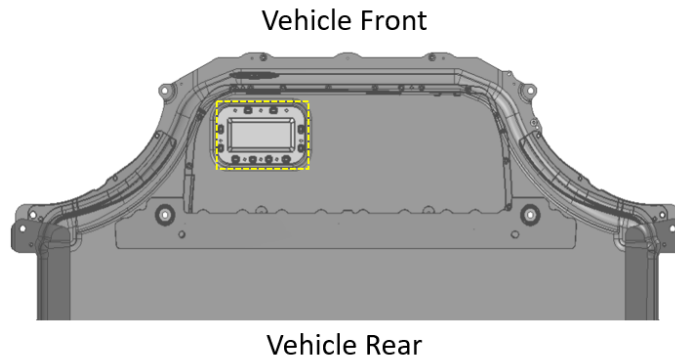



Figure 18 – Pyro Cover

 **NOTE:** If damages on a pyrotechnic fuse cover section extend onto the front ancillary, follow these steps.

Suggest repair to customer:

- Recommend the replacement of the pyrotechnic fuse cover if the pyrotechnic fuse cover is missing, detached, damaged, or something is lodged between the cover and front ancillary.
- Deburr the area with a hand deburring tool to remove the sharp edges if sharp edges are found.

Front Ancillary

The front ancillary is marked in red below (Figure 19). The pyrotechnic fuse cover area, yellow dashed box, is **NOT** part of this area. If damages on the front ancillary area extend onto the pyrotechnic fuse cover area, see also the “Pyrotechnic Fuse Cover” section above. When the front ancillary area is damaged, follow these steps:

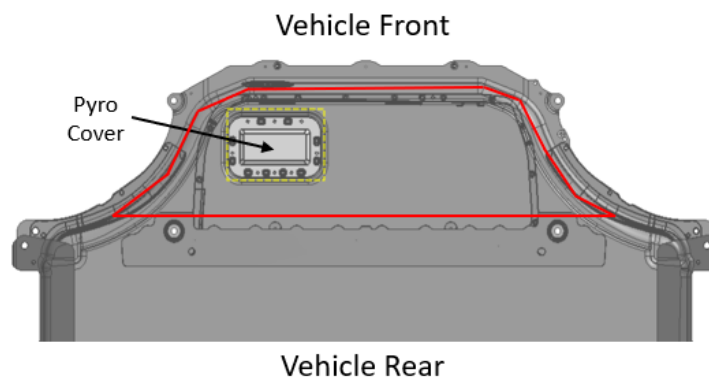


Figure 19 – Front Ancillary

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges If sharp edges are found.
- Recommend HV battery replacement if:
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.

Rear Ancillary

The rear ancillary area is identified with a red box in Figure 20. When the rear ancillary area is damaged, follow the steps below:

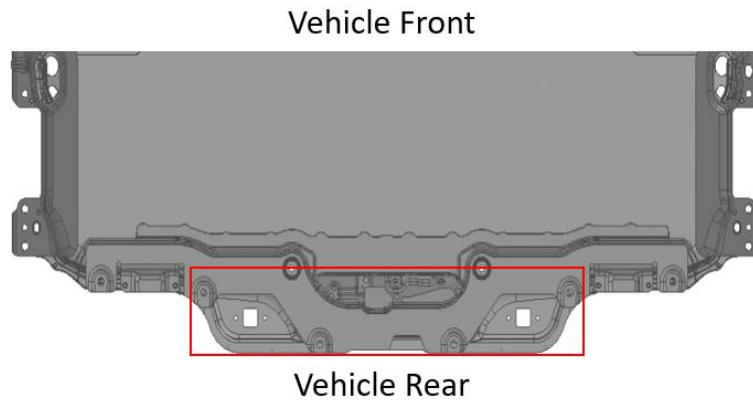


Figure 20 – Rear Ancillary

Suggest repair to customer:

- Deburr the area with a hand deburring tool to remove the sharp edges If sharp edges are found.
- Recommend HV battery replacement if:
 - The HV battery enclosure fails the leak test due to impact.
 - The HV battery enclosure has low isolation due to impact.

For feedback on the accuracy of this document, email ServiceBulletinFeedback@tesla.com.