



Front Frame Rail Outer (Section)





Parts List

Quantity	Part Number	Description	Image / Notes
2	1103447-S0-A (LH) 1103448-S0-A (RH)	Front Frame Rail Outer	 The Front Frame Rail Outer is listed in the Parts Manual as the "Front Rail Outer Assembly". One Front Frame Rail Outer is needed for replacement and one is needed to make a reinforcement plate.
16 rivets needed; order 20 rivets	1454538-00-A	● High Strength Structural Rivet, 6.5 mm	All rivets come in packages of 10; order all rivets in multiples of 10.
8 rivets needed; order 10 rivets	1069327-00-A	○ Structural Countersunk Rivet, 6.5 mm	All rivets come in packages of 10; order all rivets in multiples of 10.
4	2007222-00-B	■ Bolt, hex-head, M6	Front Frame Rail Outer to Front Frame Rail Inner
4	2007207	□ Nut	Front Frame Rail Outer to Front Frame Rail Inner
1	—	Structural Adhesive	⚠ WARNING: Use only Tesla-approved structural adhesive; refer to BR-15-92-008, "Approved Structural Adhesive and Urethane Sealants" for a list of current approved structural adhesives. Refer to BR-17-92-002, "Obtaining Adhesives, Coolant, and Other Chemicals" for information on how to obtain approved structural adhesive.
1	—	Seam Sealer	Source locally; not available from Tesla.

These part numbers were current at the time of publication. Use the revisions listed or later, unless otherwise specified in the [Parts Manual](#).



Repair Information

Repair Information	Warnings and Cautions	Special Tools
This procedure is for the right-hand component; the procedure is identical for the left-hand component. Installation fasteners that replace factory spot welds in steel-to-steel panel interfaces are specified in this procedure where an approved squeeze-type resistance spot welder with the base welding accessories might not be able to reach. If your approved welder can access a factory spot weld location where this procedure specifies a fastener, an installation spot weld is recommended in place of the specified fastener. The items listed in the "Prerequisites" section of this document include only the last structural component that needs to be removed before starting the repair and any other prerequisites that are not obvious. Refer to the estimating system being used for a complete list of the prerequisites that must be performed before starting the repair.	 WARNING: Wear the appropriate personal protective equipment (PPE) when performing this procedure.  CAUTION: This procedure involves only steel components. Use the appropriate tools to avoid cross-contamination.	The special tools listed below are required to perform this procedure: • Microstop Countersink kit • Resistance Spot Welder Use only an approved resistance spot welder. Refer to BR-16-92-007, "Approved Welders" for a list of current approved resistance spot welders. • GMA welder Use only an approved GMA welder. Refer to BR-16-92-007, "Approved Welders" for a list of current approved GMA welders. • Frame bench The vehicle must be properly mounted on an approved frame bench to replace this component. Refer to BR-16-92-006, "Approved Frame Bench Systems" for a list of current approved bench repair systems.



Prerequisites

1

Disconnect 12V and high voltage power (refer to the appropriate section in [BR-17-17-004](#), "Disconnecting 12V and High Voltage Power on Model 3").



WARNING: Before disconnecting the 12V power supply, make sure that all windows are at least slightly open. Attempting to open a door with a fully-closed window when the 12V power supply is disconnected could result in door glass shatter.



NOTE: Before disconnecting the 12V power supply, make sure that the driver's door window is fully open. Failure to lower the driver's door window before disconnecting the 12V power supply could result in vehicle lockout.





Prerequisites

2

Remove the [Shotgun Shear Wall](#).





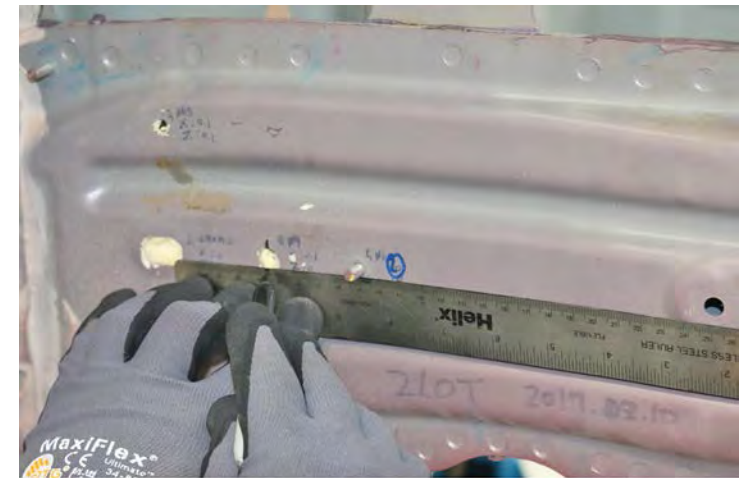
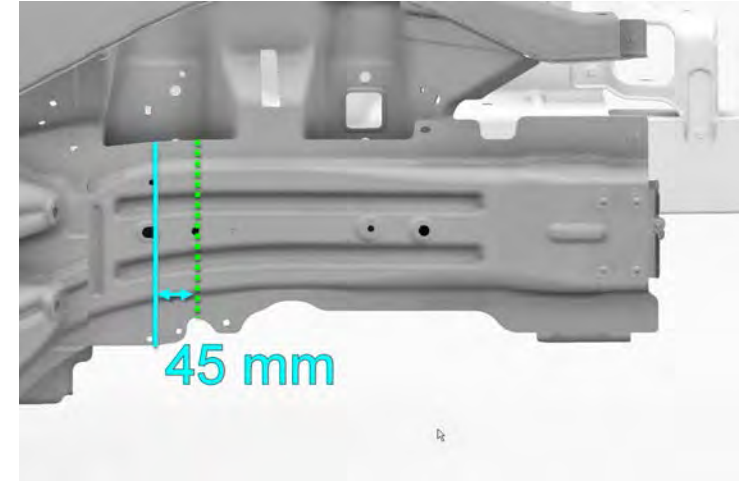
Removal

1 Remove the original component.

A Mark a cut line 45 mm (1-3/4 in) from the end of the alignment hole shown.

 Reference Line/Point

 Cut Line





Removal

1 Remove the original component (continued).

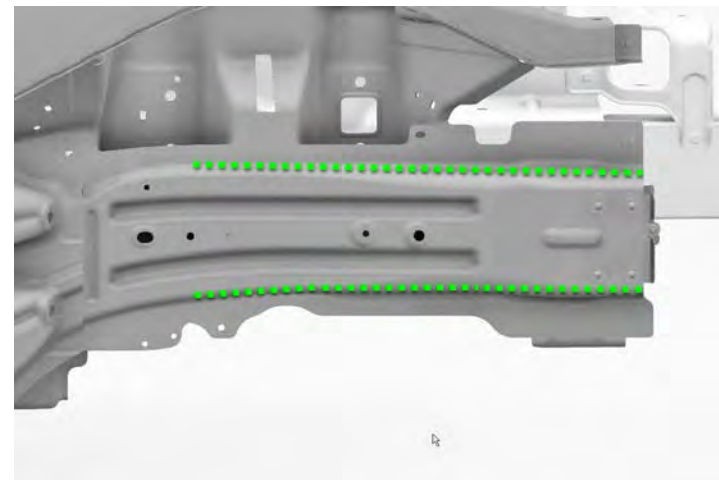
B Mark the cut lines shown.

 Cut Line

C Cut the component on the cut lines marked in the previous substeps.



CAUTION: Do not damage the surrounding components.





Removal

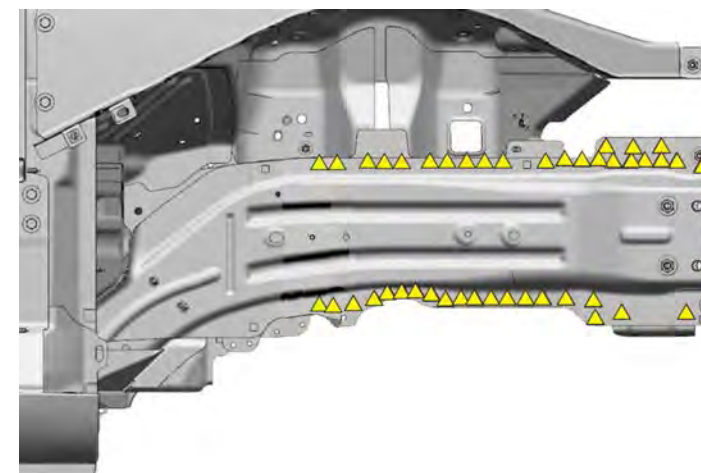
- 1 Remove the original component (continued).
- D Remove the bulk of the original component.



- E Use a drill with a spot weld bit to drill out the factory spot welds.
- ▲ Factory Spot Weld



NOTE: Factory spot weld locations shown are approximate. Exact spot weld locations and number vary from vehicle to vehicle.





Removal

- 1 Remove the original component (continued).
- E Use a drill with a spot weld bit to drill out the factory spot welds (continued).



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- F Use a heat gun to heat the adhesive joints, and then use a hammer and chisel to remove the remaining pieces of the original component.



WARNING: Do not heat any adhesive joints of components that are not being removed. Heating adhesive joints weakens the adhesive bond and could compromise vehicle crash integrity.





Removal

1 Remove the original component (continued).

F Use a heat gun to heat the adhesive joints, and then use a hammer and chisel to remove the remaining pieces of the original component (continued).





Removal

2

Use a disc sander with a medium-abrasive surface conditioning disc to remove any remaining materials from the bond paths. Use a belt sander with a medium-abrasive belt for any areas that cannot be reached with a disc sander. Vacuum any adhesive dust.



WARNING: Remove the epoxy adhesive in a well-ventilated area. Wear suitable personal protective equipment.



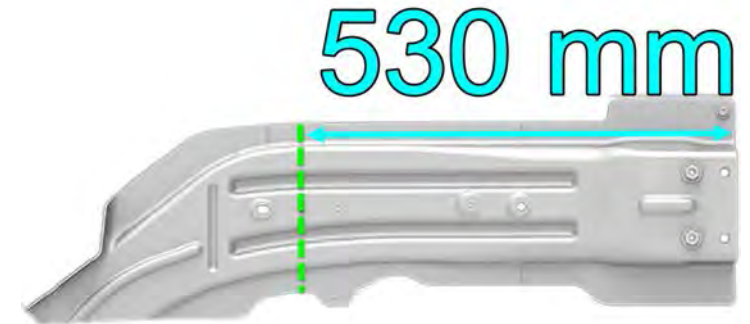


Replacement

- 1 Prepare the new Front Frame Rail Outer section for installation.

A Mark a cut line 530 mm (20-7/8 in) from the front edge of the first new Front Frame Rail Outer.

— — — — — Cut Line





Replacement

1 Prepare the new Front Frame Rail Outer section for installation (continued).

B Cut the new Front Frame Rail Outer on the cut line marked in the previous substep.

C Put the new section into position and align it to the frame bench jig point.

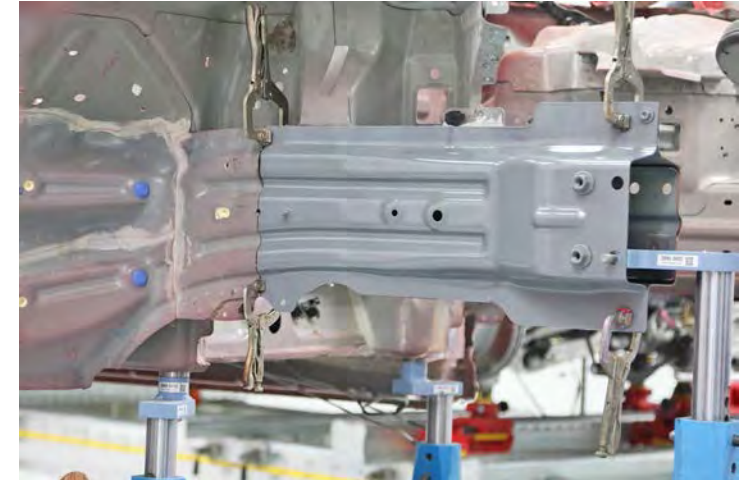




Replacement

1 Prepare the new Front Frame Rail Outer section for installation (continued).

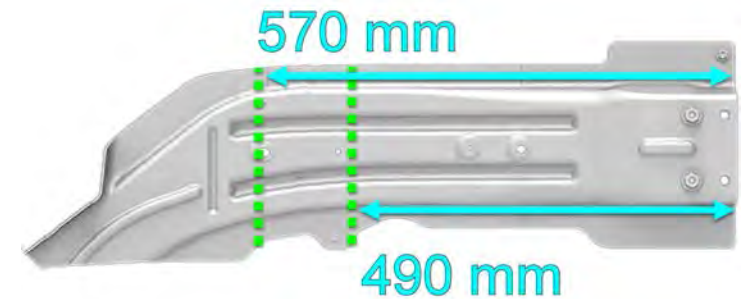
D Clamp the new section into position.



2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer.

A Mark cut lines on the second new Front Frame Rail Outer.

— — — — — Cut Line





Replacement

2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer (continued).

B Cut the second new Front Frame Rail Outer on the cut lines marked in the previous substep.



C Cut the section created in the previous substep in half horizontally to create two sections.

— — — — — Cut Line



NOTE: This allows the sections to fit more closely to the Front Frame Rail Outer sections.





Replacement

2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer (continued).

C Cut the section created in the previous substep in half horizontally to create two sections (continued).

D Clamp the reinforcement plate sections into position. If necessary, trim them to fit.



NOTE: The photos of the reinforcement plate sections were taken during an earlier version of this procedure where the upper and lower flanges were cut off of the reinforcement plate sections. Do not cut off the upper and lower flanges from the reinforcement plate sections.





Replacement

2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer (continued).

E Remove the reinforcement plates.

F Use a disc sander with a medium-abrasive surface conditioning disc to remove the e-coat on the reinforcement plate sections in the areas where the two sections meet.



WARNING: Remove the e-coat in a well-ventilated area. Wear suitable personal protective equipment.



CAUTION: Within two hours of removing the e-coat or paint, cover the abraded aluminum areas in the bond path with a thin primer layer of structural adhesive. If the abraded aluminum areas are not primed within two hours, they must be abraded again to remove any oxidation.





Replacement

2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer (continued).

G Clean the weld areas on the reinforcement plate sections with isopropyl alcohol (IPA).



WARNING: Wipe off the remaining isopropyl alcohol with a clean, dry towel immediately after application. Do not let the remaining isopropyl alcohol air dry. Allowing the remaining isopropyl alcohol to air dry can compromise the adhesive bond.

H Clamp the reinforcement plate sections into position.



Replacement

- 2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer (continued).

I

Tack weld the reinforcement plate sections together.



WARNING: Failure to follow all welding safety precautions, including the use of personal protective equipment, could result in serious injury or property damage. Only technicians who have successfully met Tesla's requirements for welding training are authorized to weld structural components on Tesla vehicles.



CAUTION: Do not weld on a Tesla vehicle with an energized high voltage or 12V system. Welding on a Tesla vehicle with an energized high voltage or 12V system might damage vehicle components.



NOTE: Do not fully weld the reinforcement plate sections together while the plate is on the vehicle.

J

Remove the reinforcement plate.





Replacement

2 Create a reinforcement plate to reinforce the joined sections of the Front Frame Rail Outer (continued).

K

GMA weld the reinforcement plate sections together.



WARNING: Failure to follow all welding safety precautions, including the use of personal protective equipment, could result in serious injury or property damage. Only technicians who have successfully met Tesla's requirements for welding training are authorized to weld structural components on Tesla vehicles.



WARNING: To maintain vehicle crash integrity, use only Bohler Union X96 welding wire and an approved GMA welder to perform steel GMA welding on high-strength steel and ultra high-strength steel components.

L

Use a disc sander to grind down the weld.





Replacement

3 Prepare for installation.

A Clamp the reinforcement plate into position



B Mark the fastener locations.

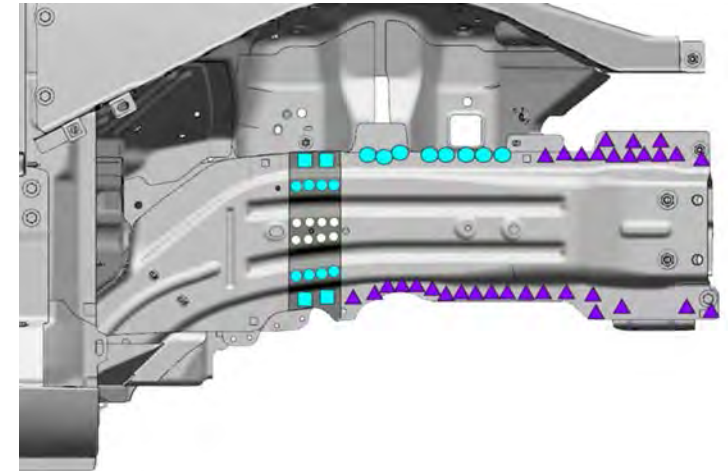
- Structural Countersunk Rivet, 6.5 mm (x8)
- High Strength Structural Rivet, 6.5 mm (x16)
- Bolt, hex-head (x4)
- ▲ Installation Spot Weld (x32)



NOTE: If your approved resistance spot welder can access any of the locations where this procedure specifies a rivet, an installation spot weld is recommended in place of the rivet.



NOTE: Holes for countersunk rivets must be marked far enough away from the corners and any other obstructions to provide enough clearance (approximately 18 mm or 11/16 in) for the Microstop countersink cage assembly.





Replacement

3 Prepare for installation (continued).

C Use a drill with a 6.7 mm (17/64 in) bit to drill holes for structural countersunk rivets, structural bulb rivets, and bolts.



CAUTION: Drill holes for countersunk rivets far enough away from the corners and any other obstructions to provide enough clearance (approximately 18 mm or 11/16 in) for the Microstop countersink cage assembly.



NOTE: Install a grip screw after drilling each hole to keep the panel aligned while drilling the remaining holes.

D Use a drill with the Microstop countersink cage assembly and the appropriate-sized countersink bit to countersink the holes for countersunk rivets (Microstop Countersink Kit, Tesla p/n 1133101-00-A).



NOTE: If the depth adjustment for the Microstop countersink cage assembly has not already been set, do the procedure in the [Microstop Countersink Kit tool instructions](#) to adjust the tool.





Replacement

3

Prepare for installation (continued).

E

Mark the surface preparation boundary lines on the new Front Frame Rail Outer section and the vehicle.

F

Remove the new Front Frame Rail Outer section and the reinforcement plate.



Replacement

3 Prepare for installation (continued).

G Mark the bond path areas on the new Front Frame Rail Outer section, the inside surface of the reinforcement plate, and the vehicle.

 Steel-to-Steel Bond Path





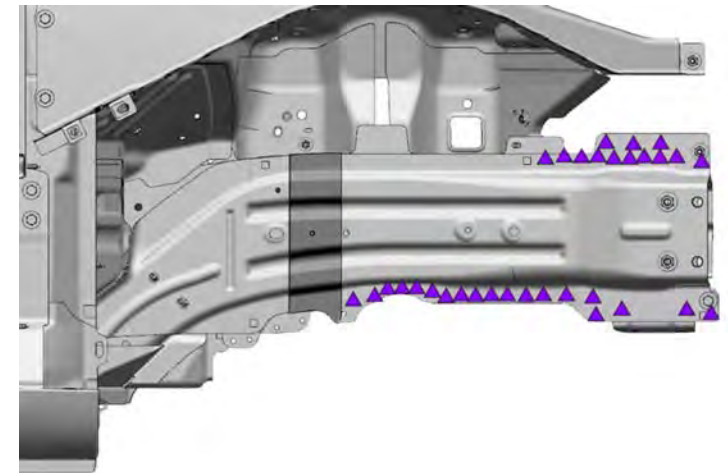
Replacement

4 Prepare the surfaces.

A Use a red Scotch-Brite pad or equivalent to scuff the e-coat on the new section, the reinforcement plate, and the vehicle in the bond path areas.

B Mark the installation spot weld locations on the new section and on the vehicle.

▲ Installation Spot Weld





Replacement

4 Prepare the surfaces (continued).

- C** Use a disc sander with a medium-abrasive surface conditioning disc to remove the e-coat on the vehicle and the new Front Frame Rail Outer section in the weld areas. Use a belt sander with a medium-abrasive belt for any areas that cannot be reached with a disc sander.



WARNING: Remove the e-coat in a well-ventilated area. Wear suitable personal protective equipment.



CAUTION: Within two hours of removing the e-coat or paint, cover the abraded aluminum areas in the bond path with a thin primer layer of structural adhesive. If the abraded aluminum areas are not primed within two hours, they must be abraded again to remove any oxidation.

D

Clean all the bond paths and weld areas on the new section, the reinforcement plate, and the vehicle with isopropyl alcohol (IPA).



WARNING: Wipe off the remaining isopropyl alcohol with a clean, dry towel immediately after application. Do not let the remaining isopropyl alcohol air dry. Allowing the remaining isopropyl alcohol to air dry can compromise the adhesive bond.





Replacement

5 Apply structural adhesive.

A Spread a thin coating of structural adhesive as a primer layer on the bond paths on the vehicle, the reinforcement plate, and the new section.



NOTE: Assembly must be performed while the primer layer is still wet. The drying time of the adhesive varies depending on temperature and humidity.

B While the primer layer is still wet, apply a bead of structural adhesive on top of the primer layer on the vehicle.





Replacement

6 Install the new section.

A Put the new section into position and align it to the frame bench jig points.

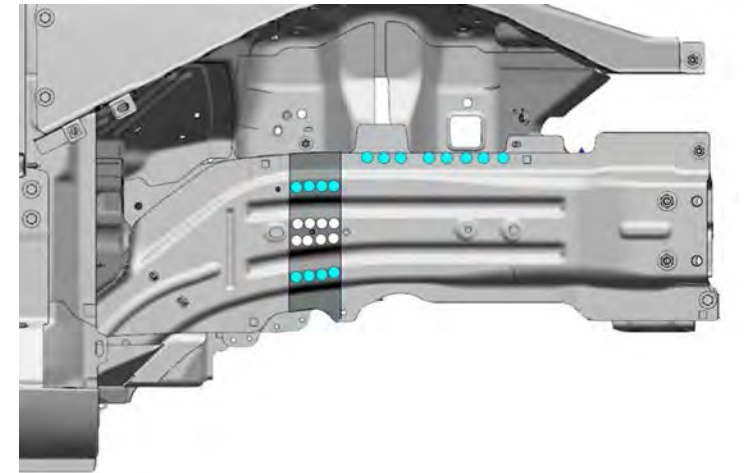
B Clamp the new section into position.





Replacement

- 6 Install the new section (continued).
- C Put the reinforcement plate into position.
- D Insert the structural rivets and the structural countersunk rivets.
- High Strength Structural Rivet, 6.5 mm (x16)
 - Structural Countersunk Rivet, 6.5 mm (x8)





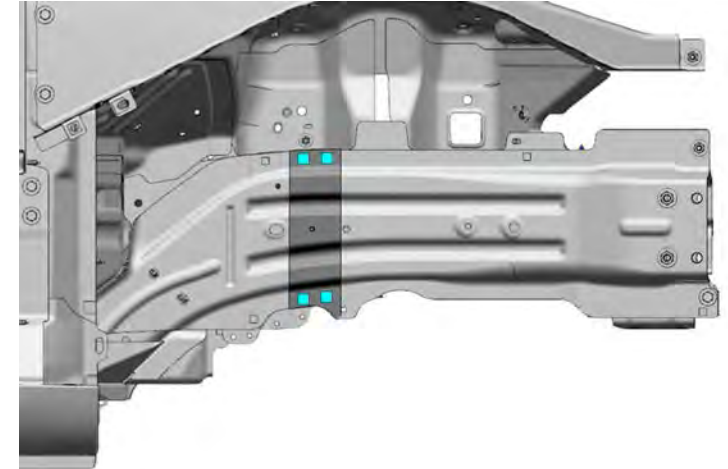
Replacement

6 Install the new section (continued).

E Install the new bolts and nuts, but do not torque them fully at this time.

■ Bolt, hex-head (x4)

F Temporarily insert an M6 bolt through the existing hole on the Front Frame Rail, but do not torque it fully at this time.



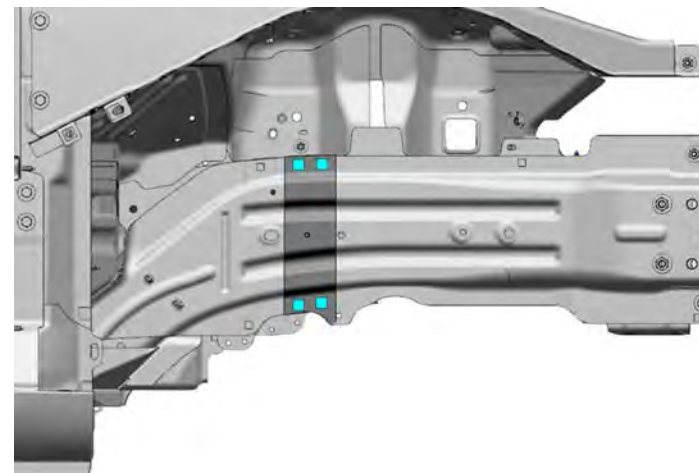


Replacement

- 6 Install the new section (continued).
- G Install the structural rivets and structural countersunk rivets.



- H Torque the new bolts to 13 Nm (10 ft lbs).
- Bolt, hex-head (x4)





Replacement

- 6 Install the new section (continued).
- 1 Wipe off any excess adhesive.





Replacement

6 Install the new section (continued).

J

Perform resistance spot welding.

▲ Installation Spot Weld (x22)



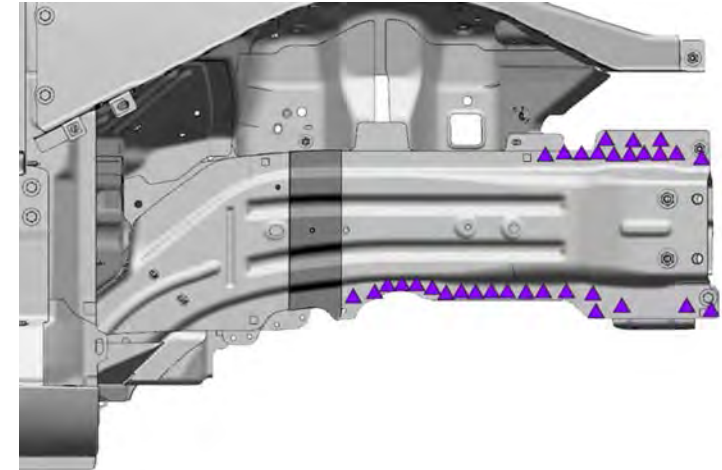
WARNING: Failure to follow all welding safety precautions, including the use of personal protective equipment, could result in serious injury or property damage. Only technicians who have successfully met Tesla's requirements for welding training are authorized to weld structural components on Tesla vehicles.



CAUTION: Do not weld on a Tesla vehicle with an energized high voltage or 12V system. Welding on a Tesla vehicle with an energized high voltage or 12V system might damage vehicle components.



CAUTION: Use only insulated clamps within 200 mm (8 in) of resistance spot weld locations. Do not perform resistance spot welding when there is an uninsulated clamp within 200 mm (8 in) of the spot weld location.





Replacement

- 6 Install the new section (continued).
- J Perform resistance spot welding (continued).



- K Remove any discoloration from the weld areas.



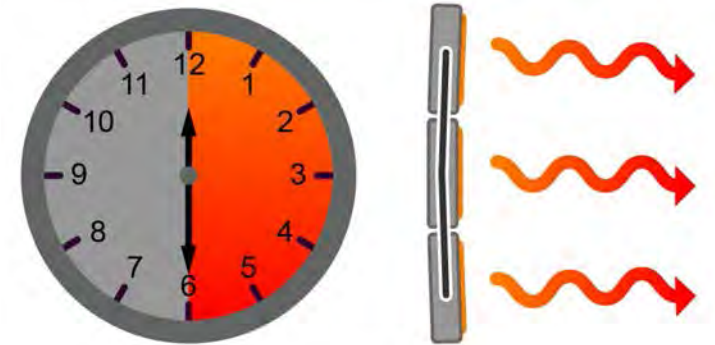
Replacement

6 Install the new section (continued).

L Bake the structural adhesive so that the bonded panels reach a temperature of 60°C–80°C (140°F–176°F) for at least 30 minutes to achieve full strength.



WARNING: Do not allow the High Voltage Battery to reach a temperature above 74°C (165°F). Heating the High Voltage Battery above 74°C (165°F) for an extended period could result in injury to personnel and/or damage to the battery.



00:30:00+

60°C–80°C

7 Install the new [Shotgun Shear Wall](#).





Replacement

8

After refinishing, use a 360-degree spray wand of suitable length to apply corrosion-proofing material on the inside of the enclosed area to prevent corrosion.