

GROUP 3

WELDED PANEL REPLACEMENT

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ULTRA HIGH STRENGTH STEEL PLATE

M4030002800073

ADVANTAGES OF ULTRA HIGH STRENGTH STEEL PLATE

The ultra high strength steel plate has the following advantages as compared with conventional high strength steel plate.

- It has tensile strength approximately 1.7 times higher than the conventional high strength steel sheet.
- It has a higher yielding point and yielding ratio (yielding point/tensile strength).

These advantages allow thinner and lighter plates and better fuel efficiency than the high strength steel plate.

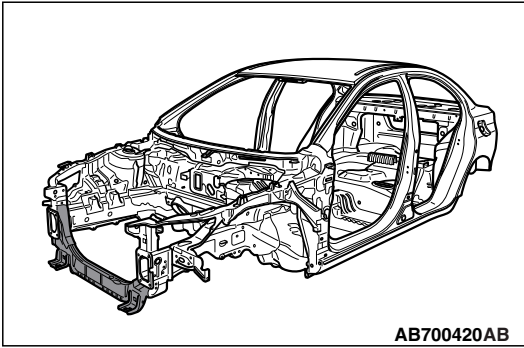
PRECAUTION UPON MAINTENANCE OF ULTRA HIGH STRENGTH STEEL PLATE


- Use a spot cutter for ultra high strength steel plate to ensure that the spot-welded area is cut off.

- For the part in which the ultra high strength steel plate is used, do not repair it by cutting and bonding to avoid the reduction in strength by heat. Instead, replace the whole assembly including the part.
- Be careful with rough extending work, because the ultra high strength steel plate has higher tensile strength and a higher yielding point than high strength steel plate and general steel plate. Careless work will cause symptom such as over-pulling and springback. Do not extend it completely at a time. Do it gradually while removing the distortion by sheet metal processing with a hammer.
- Plug welding of ϕ 8 mm (0.31 inch) diameter plug for repair ensures the strength equivalent to spot welding for 2 steel sheets. For 3 sheets, weld 2 sheets each time instead of welding from one side to give sufficient welding strength.

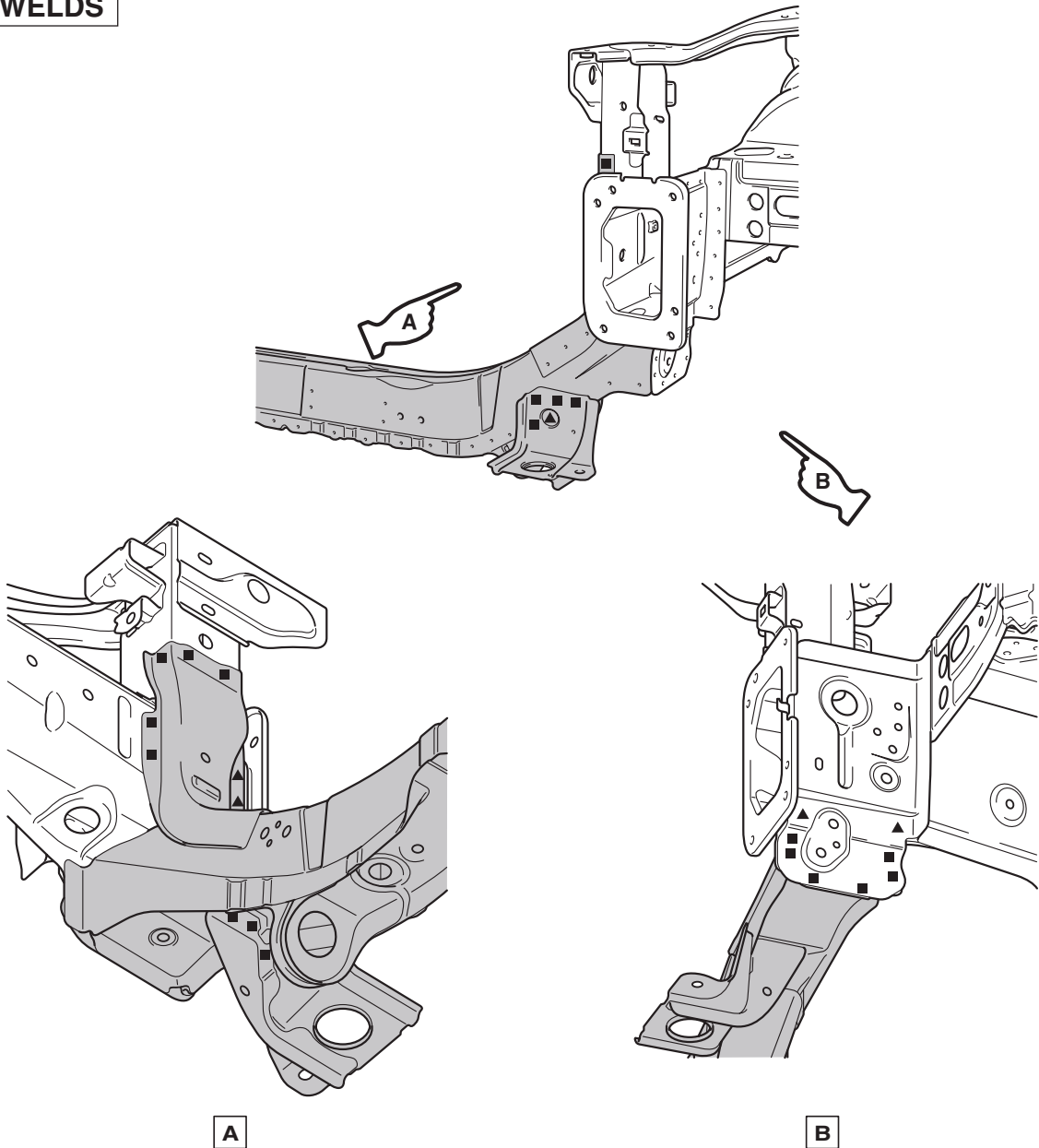
FRONT END CROSSMEMBER

M4030003100237



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

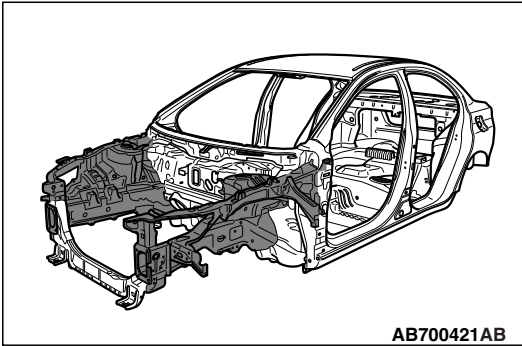
REPAIR WELDS




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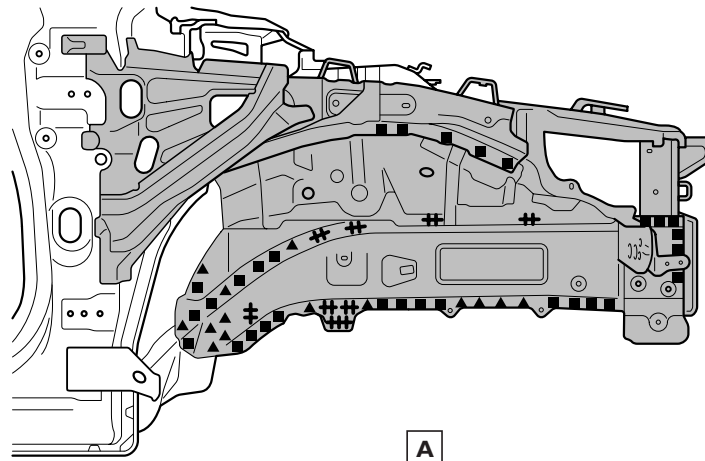
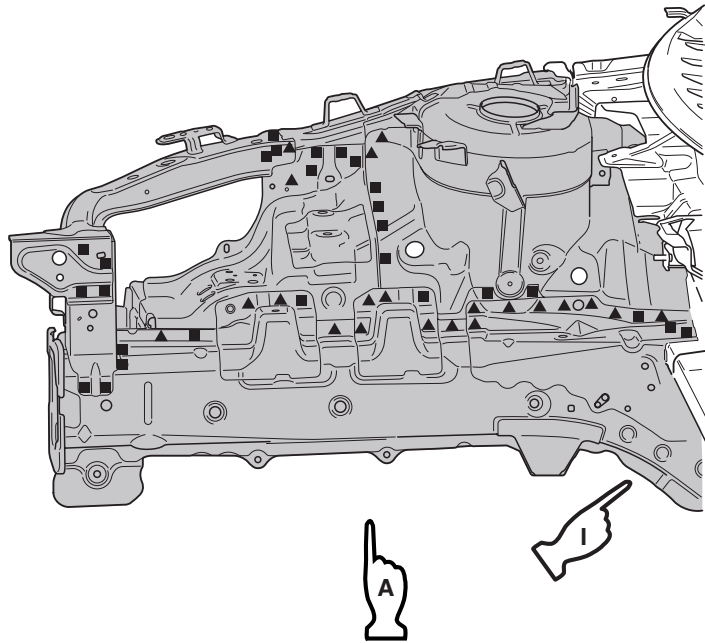
FENDER SHIELD

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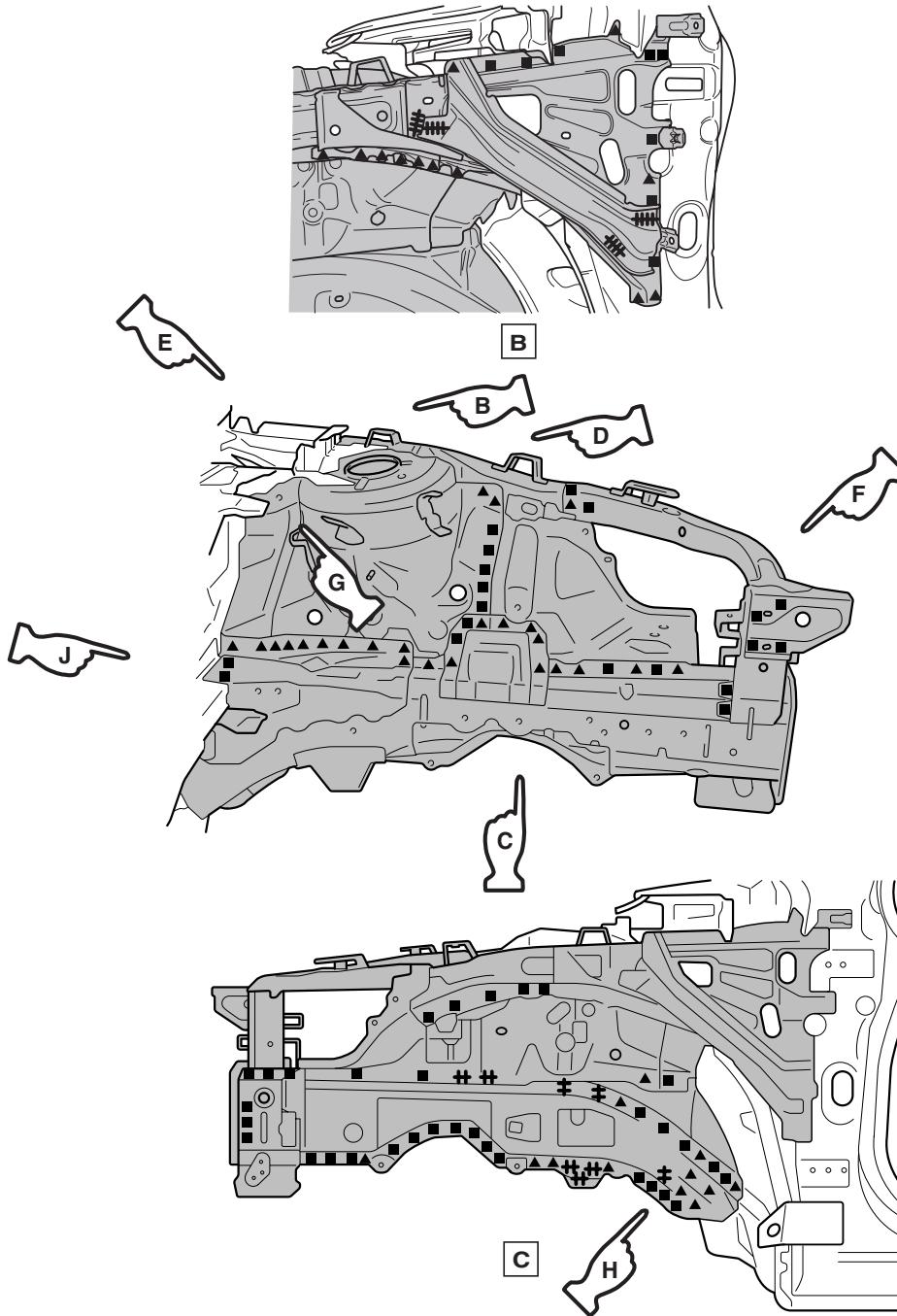
Symbol	Operation description
● ● ● ●	Spot welding
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++++	MIG spot welding
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○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS

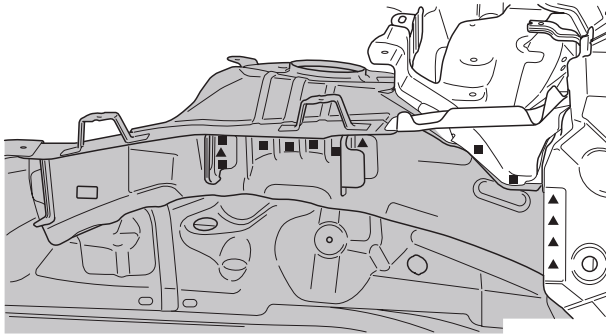


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NOTE: Refer to the Front End Crossmember section on P.3-3 for the welding point with front end crossmember.

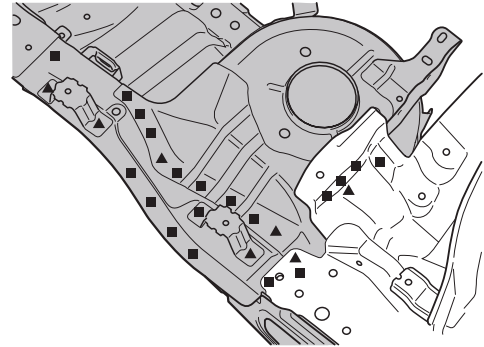


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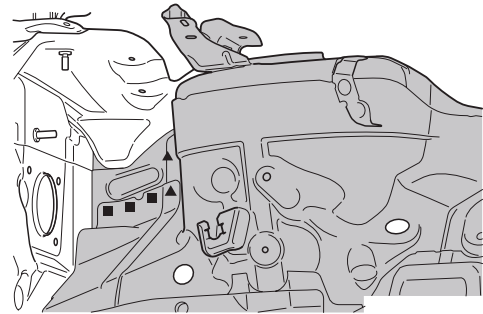


D

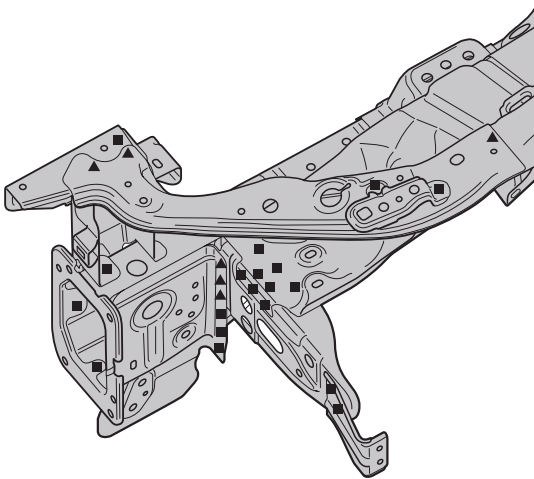
(With the upper frame to front pillar brace,
Fender shield frame upper outer
and front deck frame upper outer removed)



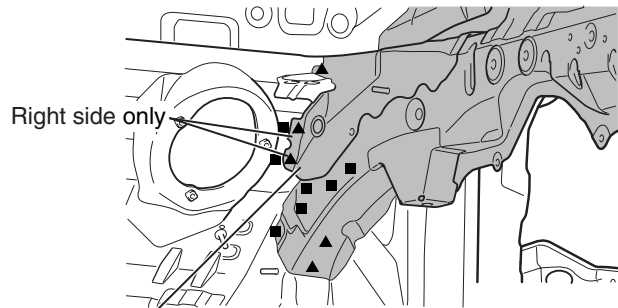
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G



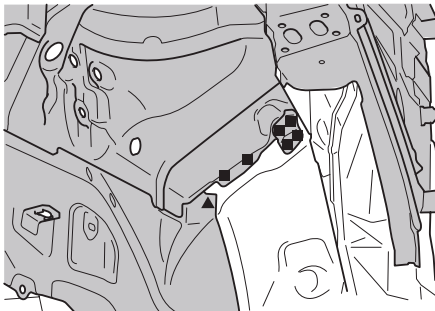
F



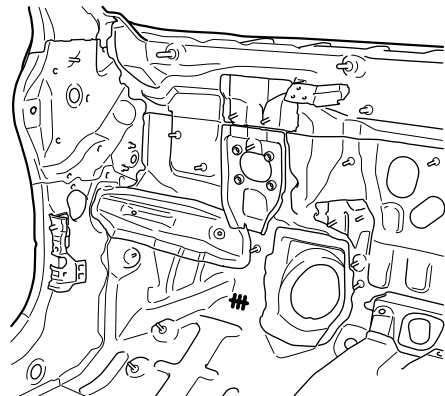
Right side only

▲ Right side

I

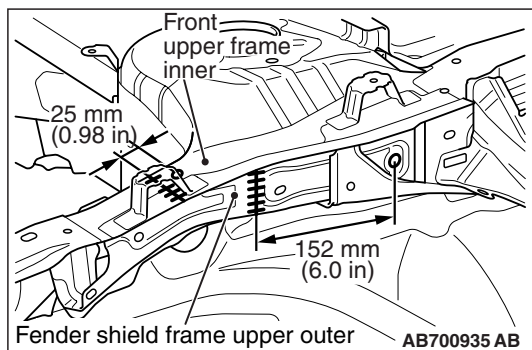


H



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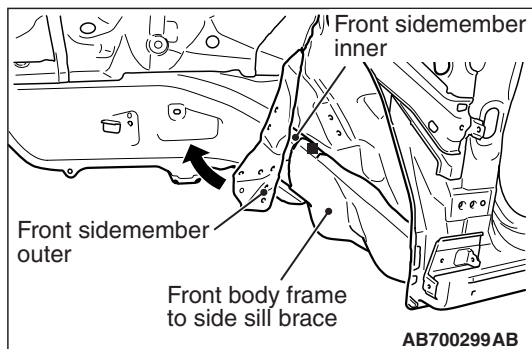
NOTE: Partial replacement of the front upper frame is possible depending on the range of damage. When performing partial replacement, cut the fender shield frame upper outer 152 mm (6.0 inches) forward of the positioning hole center, and cut the front upper frame inner 25 mm (0.98 inches) forward of the positioning hole center.

NOTE ON REPAIR WORK

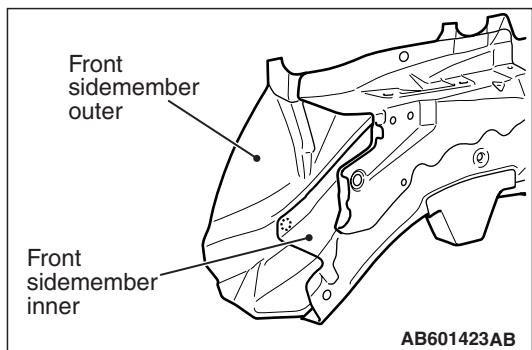
REMOVAL

Turn up the front sidemember outer as shown to cut off the welded point between the front sidemember inner and the front body frame to side sill brace.

INSTALLATION

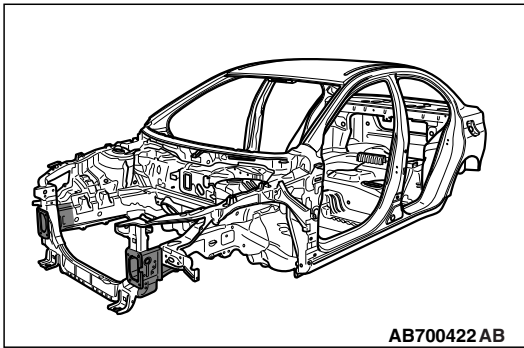


When installing the new front sidemember, align the hole of the front sidemember brace lower with the front sidemember outer to make a hole because the front sidemember outer prevents the front sidemember inner and front sidemember brace lower from being welded. Then, weld the front sidemember outer, front sidemember inner, and front sidemember brace lower.



FRONT SIDEMEMBER (PARTIAL REPLACEMENT)

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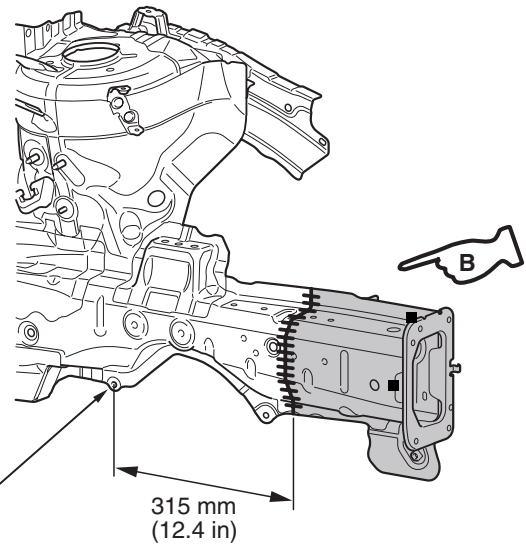
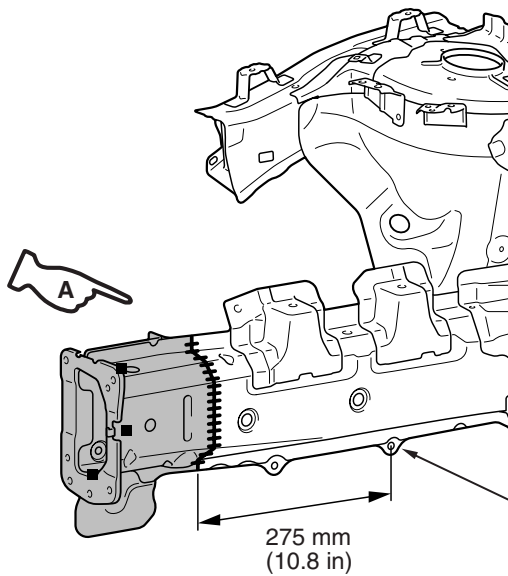


Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

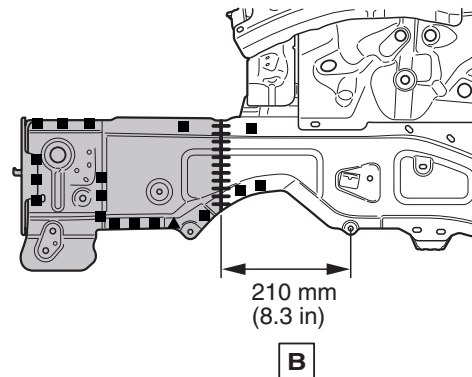
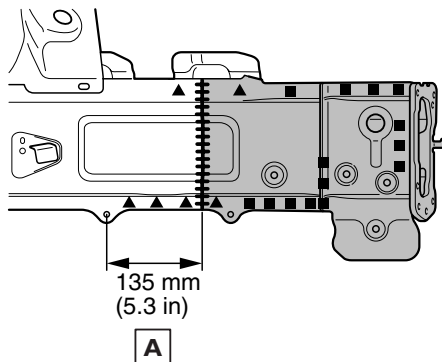
REPAIR WELDS

(Right side)

(Left side)



Engine room side cover
mounting hole



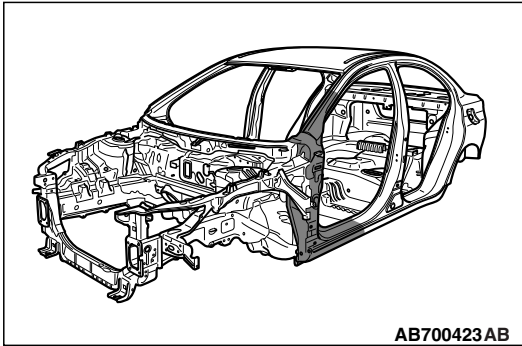
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NOTE:

- Refer to the *Front End Crossmember* section on [P.3-3](#) for the welding point with front end crossmember.
- Refer to the *Fender Shield* section on [P.3-4](#) for the welding points with the front fender Shield front.

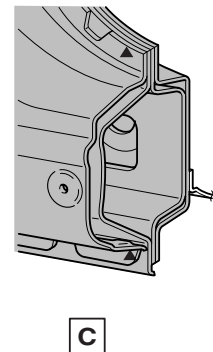
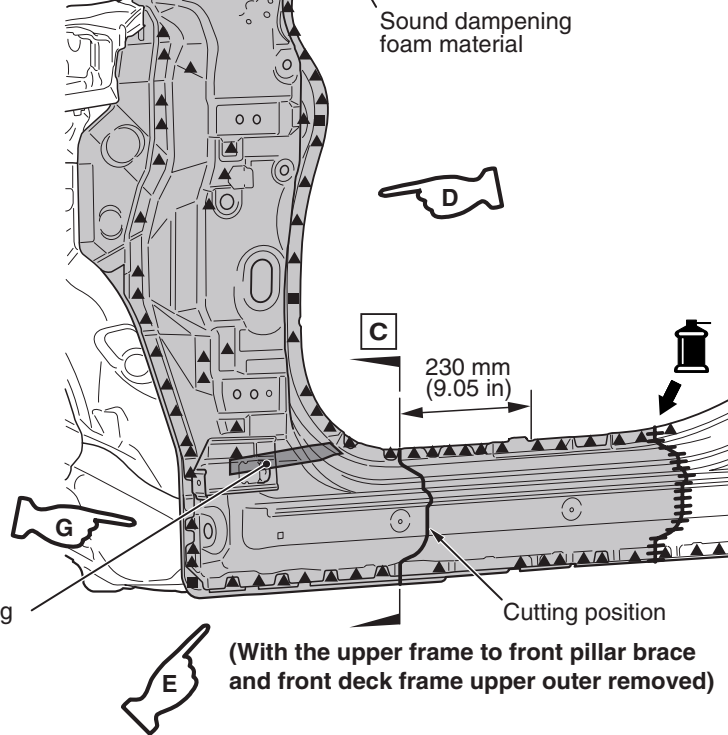
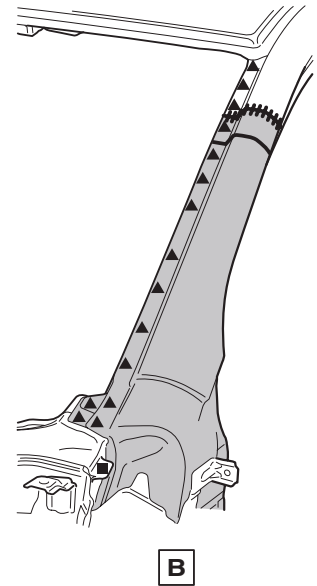
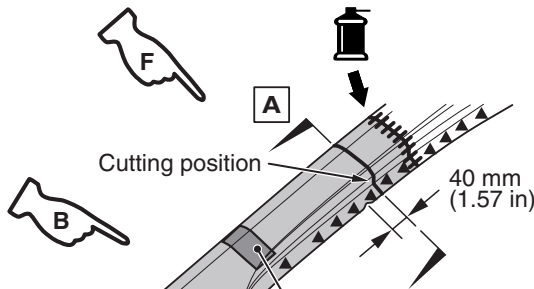
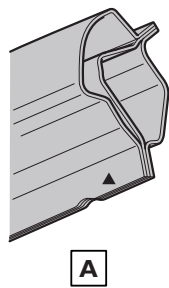
FRONT PILLAR

M4030005001563



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS

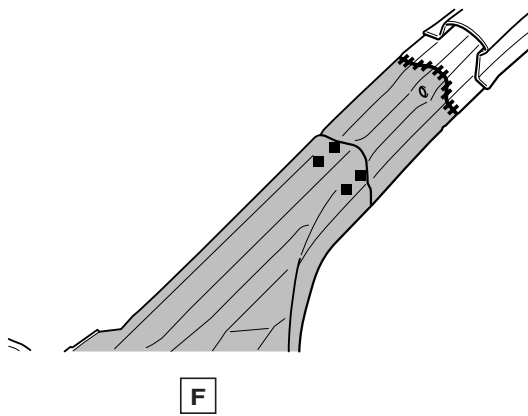
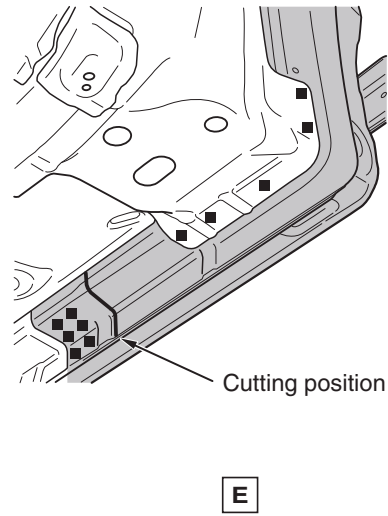
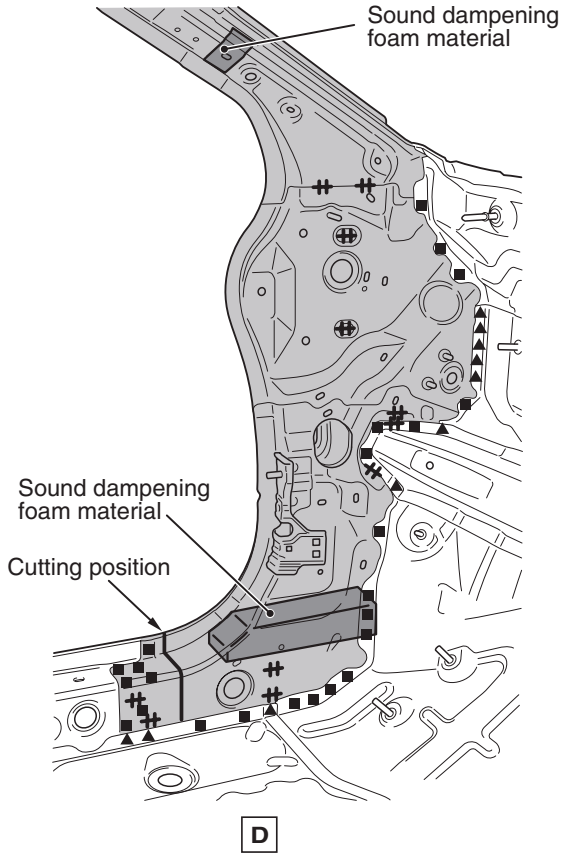


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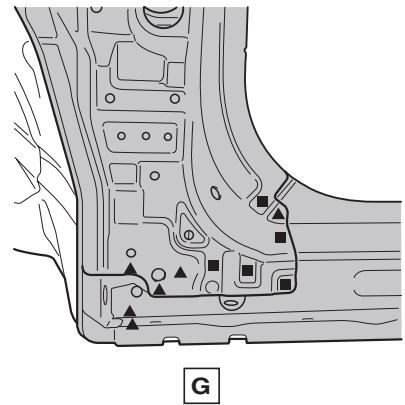
NOTE: Refer to the Fender Shield section on P.3-4 for the welding points with the upper frame to front pillar brace and front deck frame upper outer.

CAUTION

When repairing the area using sound dampening foam material do not use firing tools since the sound dampening foam material may burn.



(With the side outer panel removed)



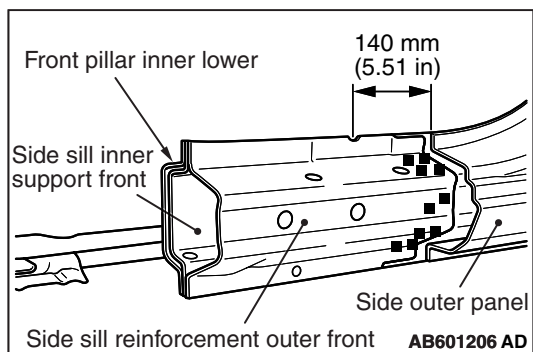
(With the side outer panel removed)

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NOTE ON REPAIR WORK

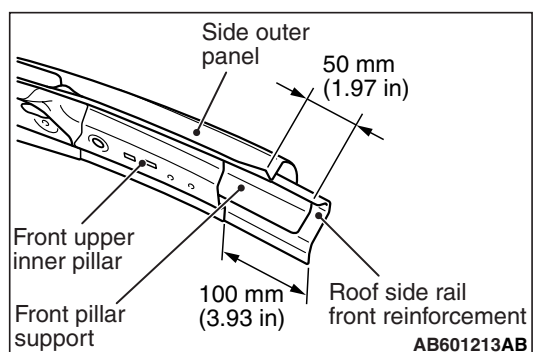
REMOVAL

After removing the front pillar, cut the side outer panel 140 mm (5.5 inches) behind the positioning notch to remove the side sill reinforcement outer front, side sill inner support front, and front pillar inner lower remaining on the body side.

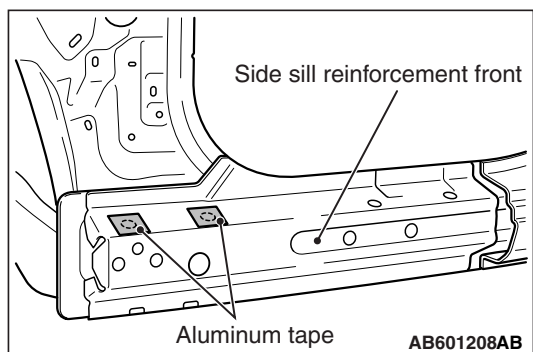


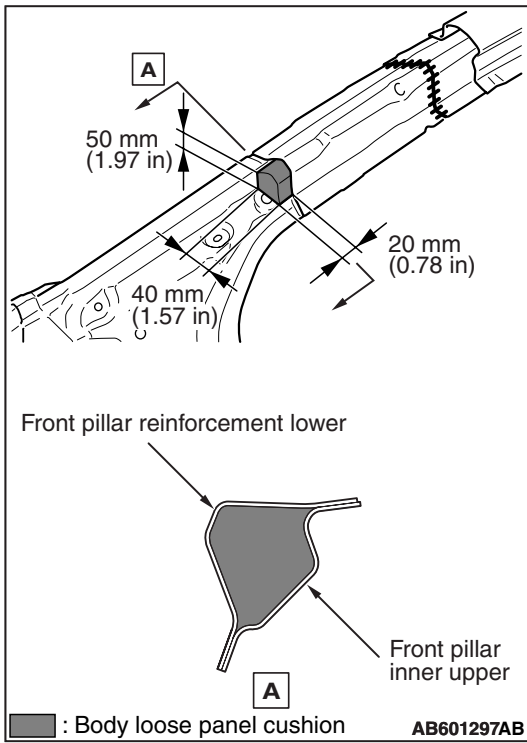
INSTALLATION

1. To reinforce the strength in the front pillar cut area, cut the side outer panel 50 mm (1.97 inches) above the cut area and cut the front upper inner pillar 100 mm (3.9 inches) above the cut area.
2. Assemble the new front pillar inner lower parts.
3. Assemble the new front upper inner pillar part.

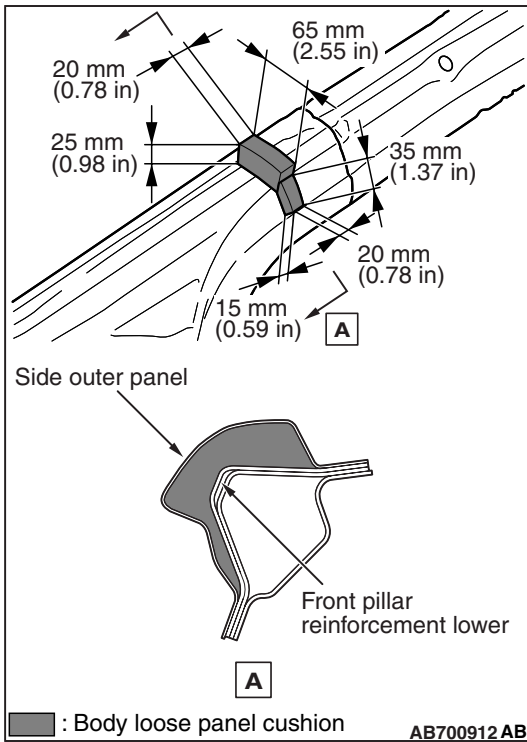


4. Assemble the new side sill reinforcement front parts. After that, cover the hole with aluminum tape to prevent the sound dampening foam material from dropping when the material is filled into the front pillar in the next process.

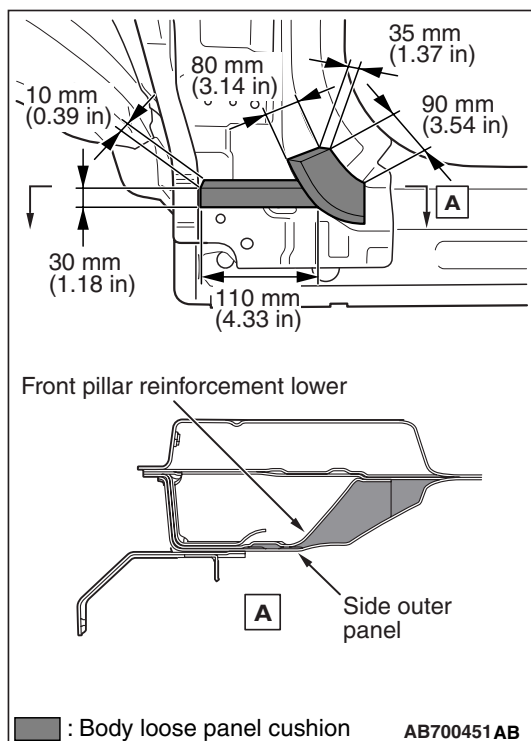




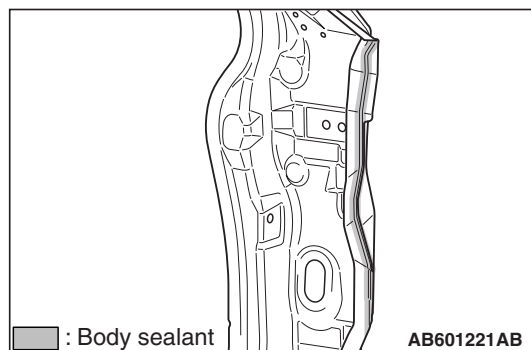
- Align the new roof side rail reinforcement parts to the body side to cut and install. After that, machine the body loose panel cushion (MR535301 or MR435765) as shown and apply it to the body side to prevent the sound dampening foam material from dropping when the material is filled into the front pillar in the next process.
- Assemble the new front pillar reinforcement lower.



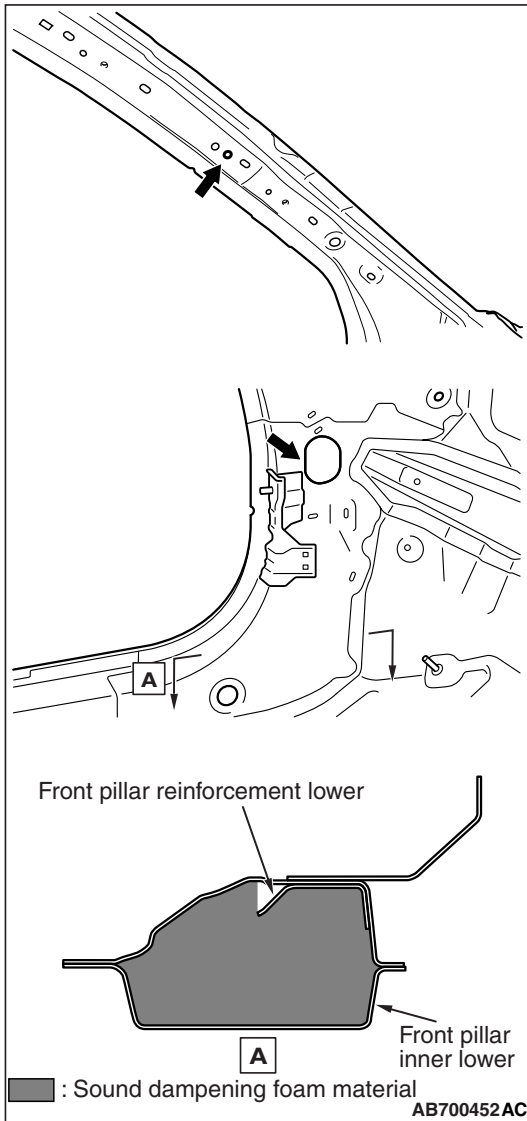
- When installing the new front outer pillar parts, machine the body loose panel cushion (MR535301 or MR435765) as shown and apply it to the body side to prevent the sound dampening foam material from dropping when the material is filled into the front pillar upper in the next process (for front pillar upper).



- When installing the new front outer pillar parts, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material is filled into the front pillar (for front pillar lower).

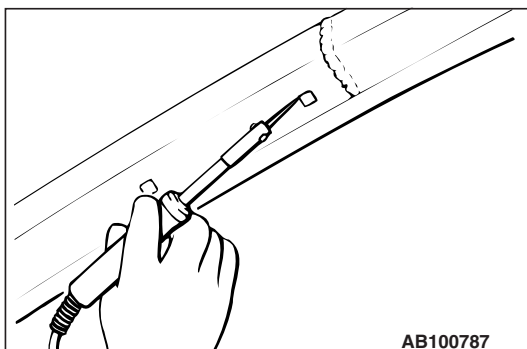


- When installing the new front outer pillar parts, apply the body sealant to the areas as shown in advance.



10. Assemble the front outer pillar, bolt and tape the hole and flange with aluminum tape, then fill the hole with sound dampening foam material as shown in the figure of the instructions.

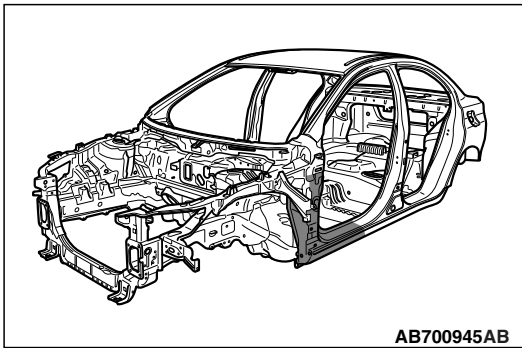
Sound dampening foam material: 3M™ AAD ULTRA-PRO Panel foam-Yellow



11. Wait 2 hours after filling the sound dampening foam material to remove the bolt and aluminum tape, then melt the sound dampening foam material with a soldering gun so a clip, etc. can thoroughly be inserted in the hole filled with sound dampening foam material.

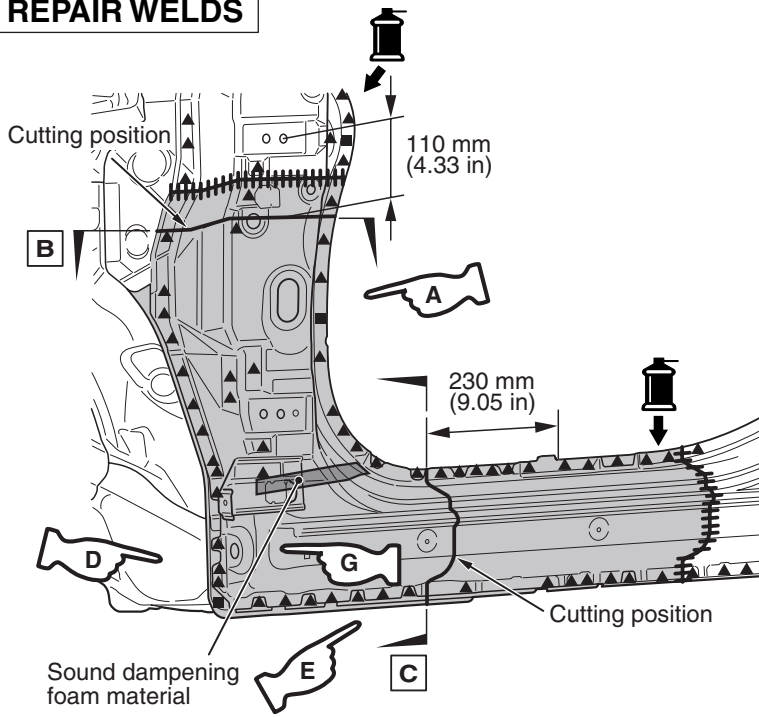
FRONT PILLAR (PARTIAL REPLACEMENT)

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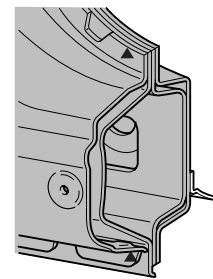
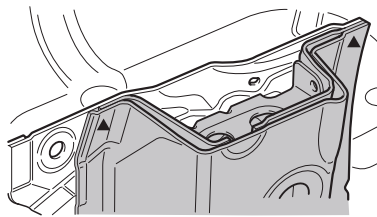
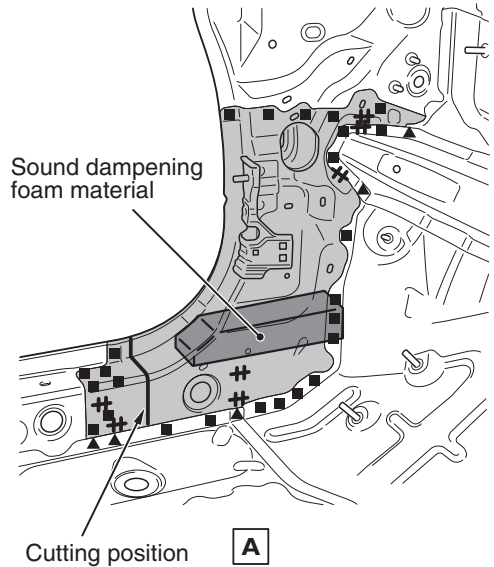


Symbol	Operation description
● ● ● ●	Spot welding
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++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



(With the upper frame to front pillar brace and front deck frame upper outer removed)

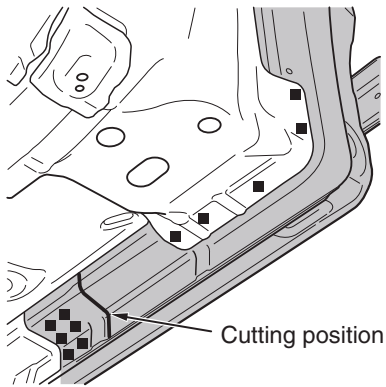


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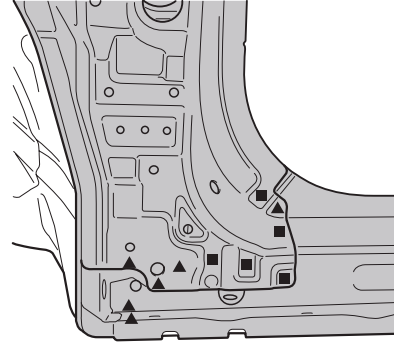
CAUTION

When repairing the area using sound dampening foam material do not use firing tools since the sound dampening foam material may burn.

NOTE: Refer to the Fender Shield section on P.3-4 for the welding points with the upper frame to front pillar brace and front deck frame upper outer.



D



E

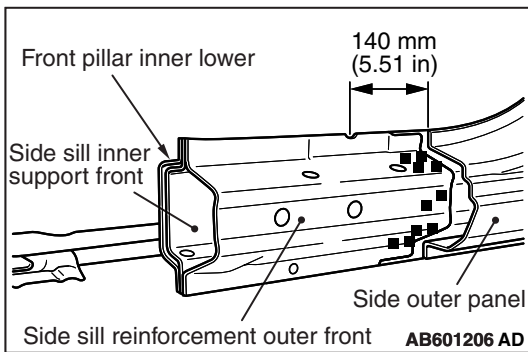
(With the side outer panel removed)

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NOTE ON REPAIR WORK

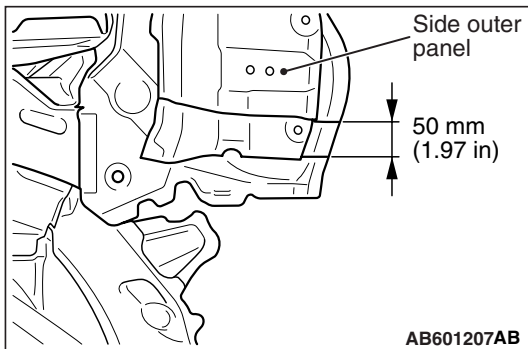
REMOVAL

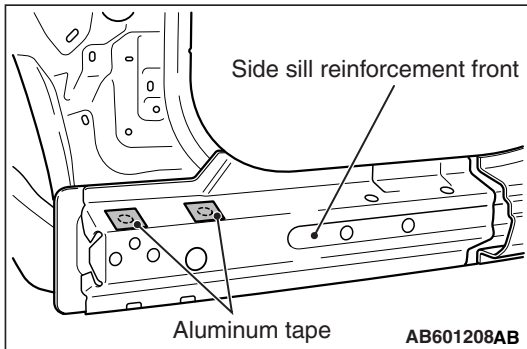
After removing the front pillar, cut the side outer panel 140 mm (5.5 inches) behind the positioning notch to remove the side sill reinforcement outer front, side sill inner support front, and front inner pillar lower remaining on the body side.



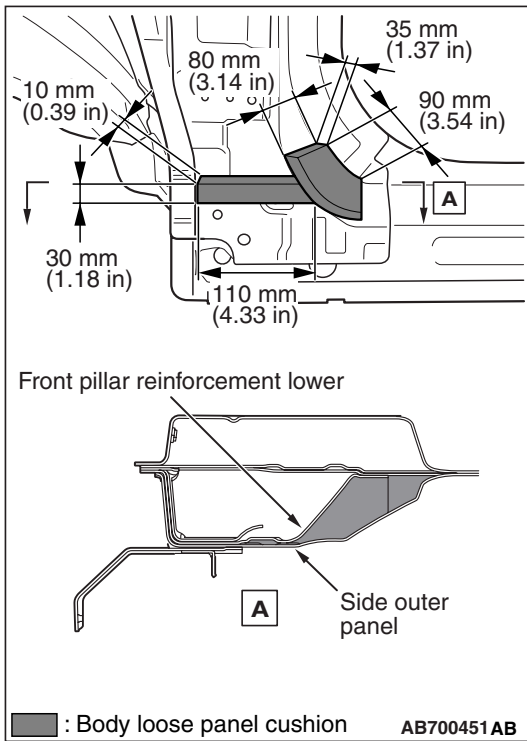
INSTALLATION

1. To reinforce the strength in the front pillar cut area, cut the side outer panel 50 mm (1.97 inches) above the cut area.
2. Assemble the new front lower inner pillar parts.

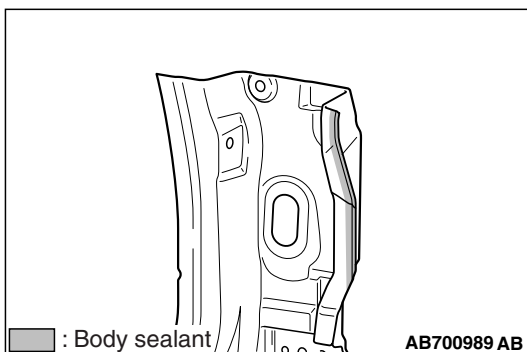




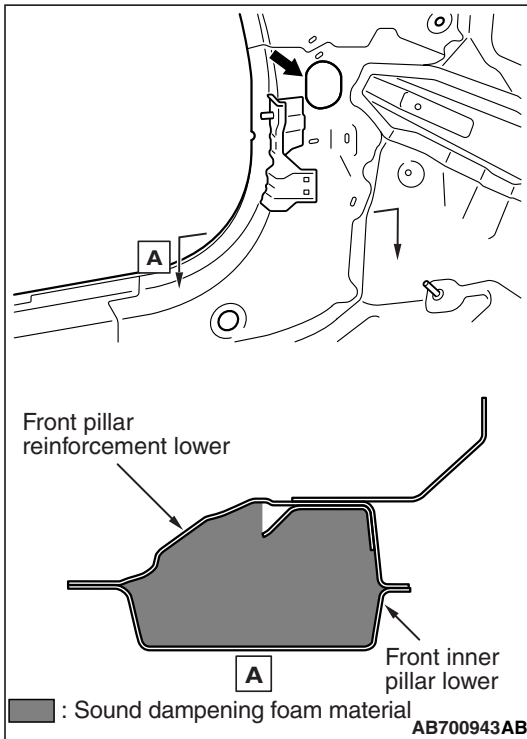
3. Assemble the new side sill reinforcement front parts. After that, cover the hole with aluminum tape to prevent the sound dampening foam material from dropping when the material is filled into the front pillar in the next process.
4. Assemble the new front pillar reinforcement lower.



5. When installing the new front outer pillar, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the front pillar.

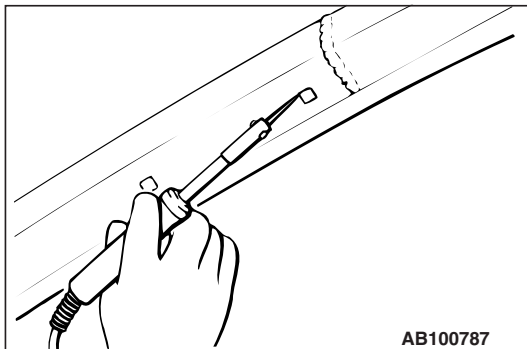


6. When installing the new front outer pillar, apply the body sealant to the areas as shown in advance.



7. Assemble the front outer pillar, bolt and tape the hole and flange with aluminum tape, then fill the hole with sound dampening foam material as shown in the figure of the instructions.

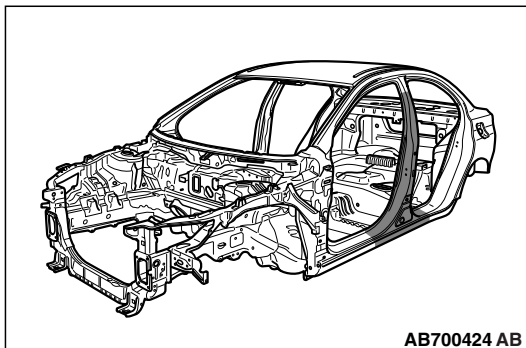
Sound dampening foam material: 3M™ AAD ULTRA-PRO Panel foam-Yellow



8. Wait 2 hours after filling the sound dampening foam material to remove the bolt and aluminum tape, then melt the sound dampening foam material with a soldering gun so a clip, etc. can thoroughly be inserted in the hole filled with sound dampening foam material.

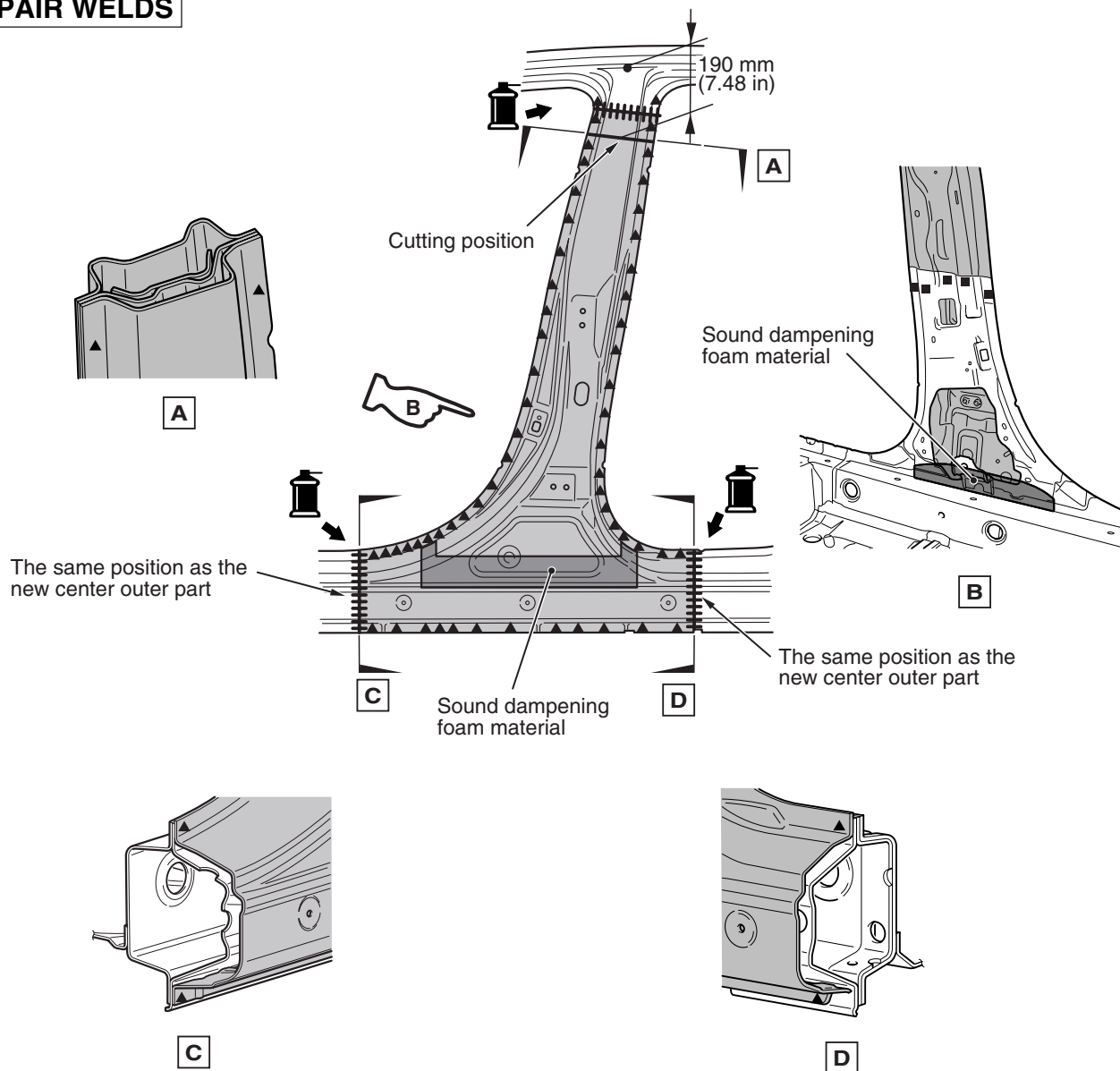
CENTER PILLAR

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Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



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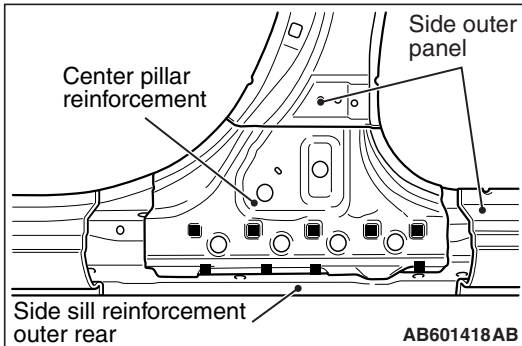
CAUTION

When repairing the area using sound dampening foam material do not use firing tools since the sound dampening foam material may burn.

NOTE ON REPAIR WORK

REMOVAL

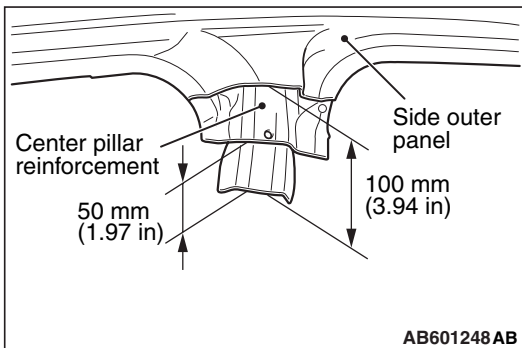
1. To cut the welding points between the center pillar reinforcement and side sill reinforcement outer rear, cut the side outer panel as shown.



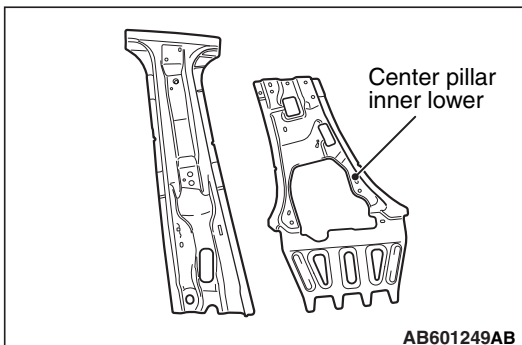
2. After removing the center pillar, remove the center pillar inner upper left on the body side.

INSTALLATION

1. To reinforce the strength in the center pillar cut area, cut the side outer panel 100 mm (3.94 inches) above the cut area and cut the center pillar reinforcement 50 mm (1.97 inches) above the cut area.



2. Remove the center pillar inner lower from the new center inner pillar, and install the center inner pillar to the body.



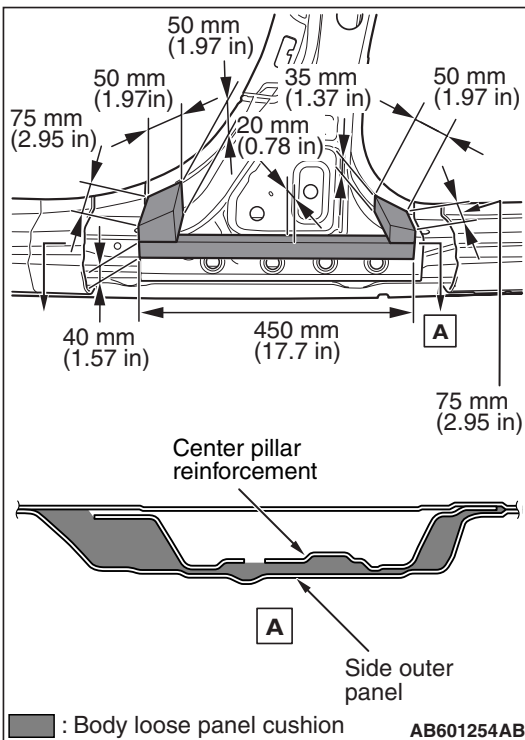
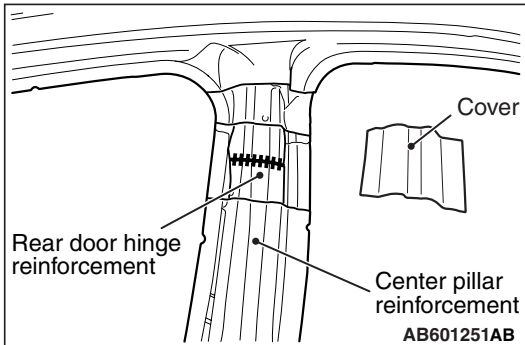
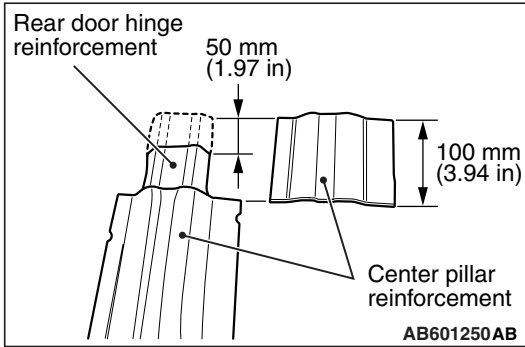
CAUTION

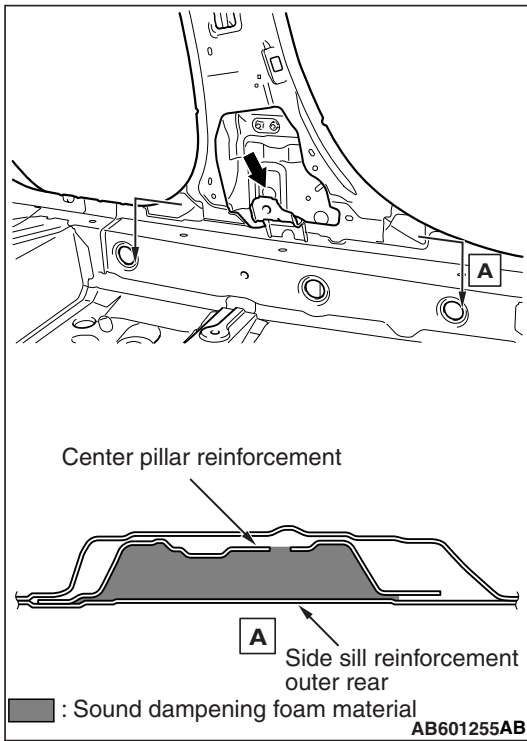
Weld and repair if the rear door hinge reinforcement is damaged.

3. Cut the new center pillar reinforcement parts by aligning them with the cut area of center pillar reinforcement in the body-side. Then, cut only the center pillar reinforcement 100 mm (3.94 inches) below from the cut area to create a cover, and then cut the rear door hinge reinforcement 50 mm (1.97 inches) below from the cut area.

4. Weld the rear door hinge reinforcement then weld the cover of the center pillar reinforcement.

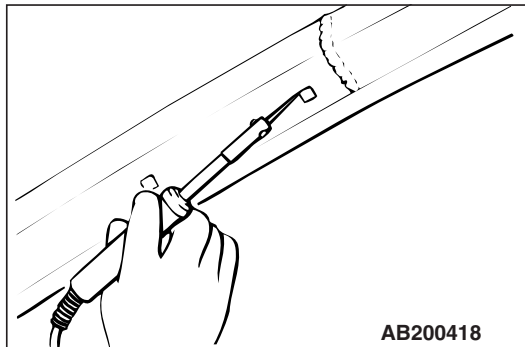
5. When installing the new center outer pillar, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the front pillar.





6. Assemble the center outer pillar, bolt and tape the hole and flange with aluminum tape, then fill the hole with sound dampening foam material as shown in the figure of the instructions.

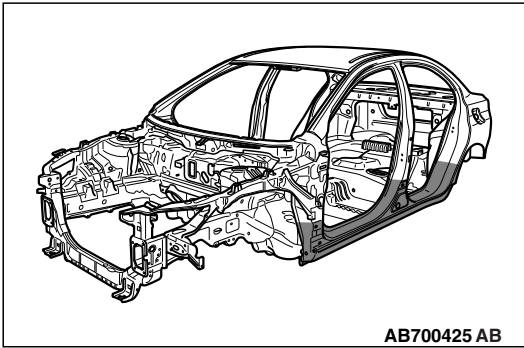
Sound dampening foam material: 3M™ AAD ULTRA-PRO Panel foam-Yellow



7. Wait 2 hours after filling the sound dampening foam material to remove the bolt and aluminum tape, then melt the sound dampening foam material with a soldering gun so a clip, etc. can thoroughly be inserted in the hole filled with sound dampening foam material.

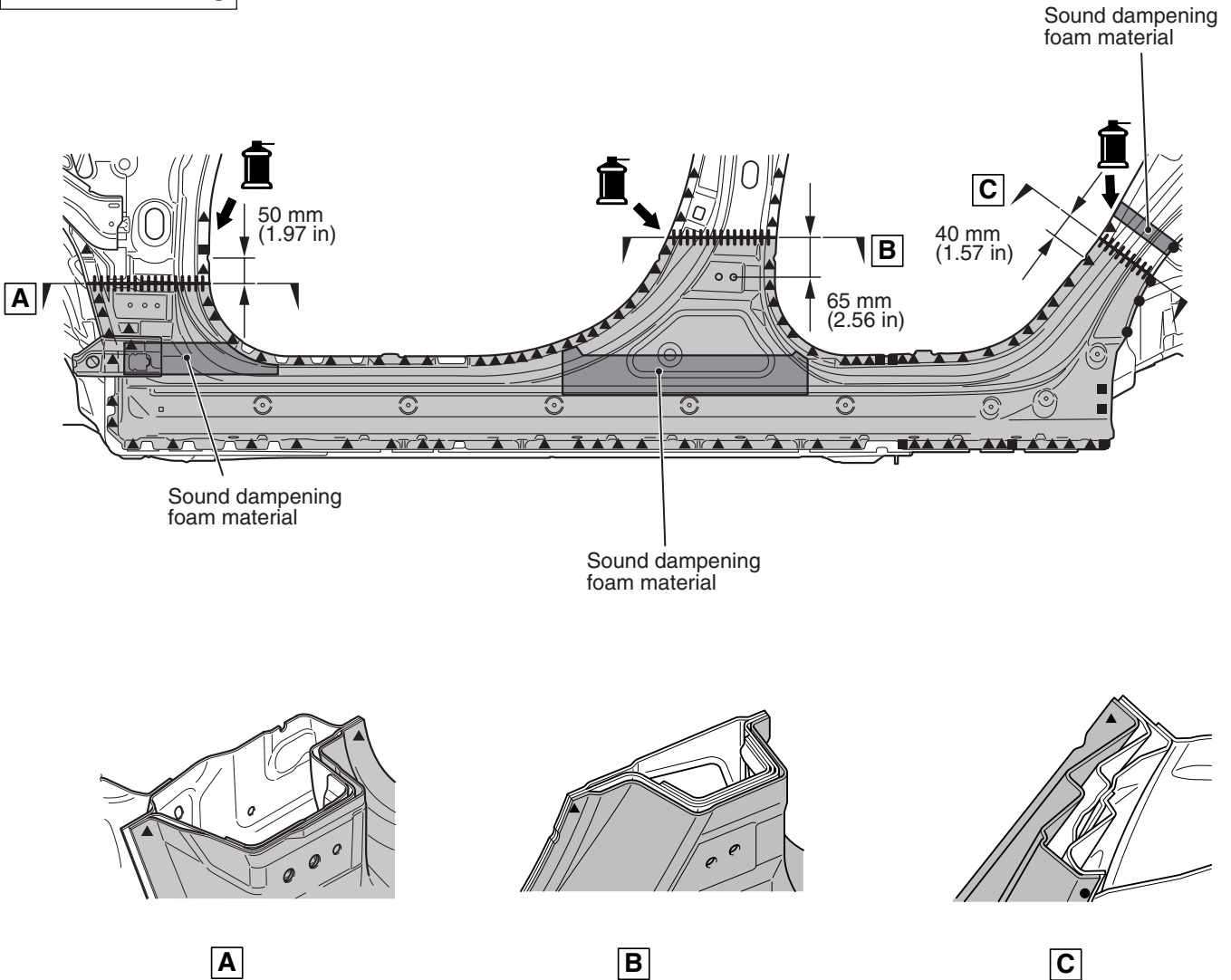
SIDE SILL

M4030007001280



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

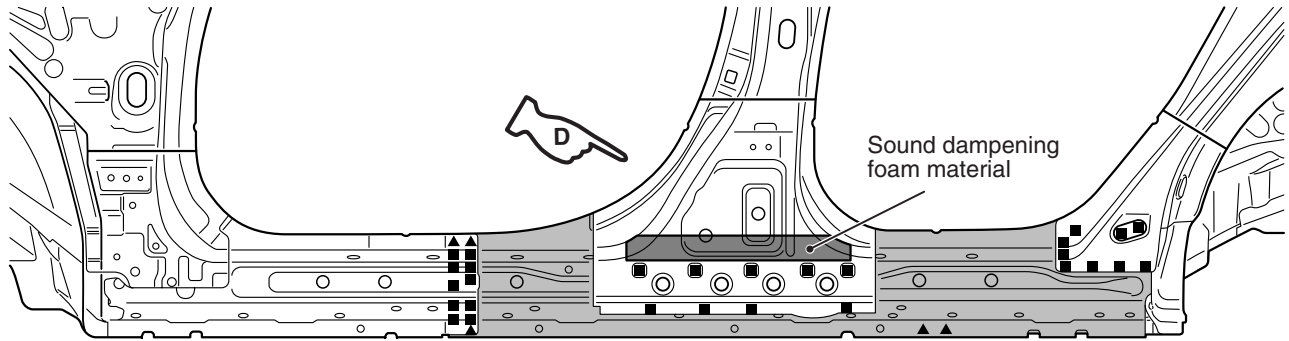
REPAIR WELDS



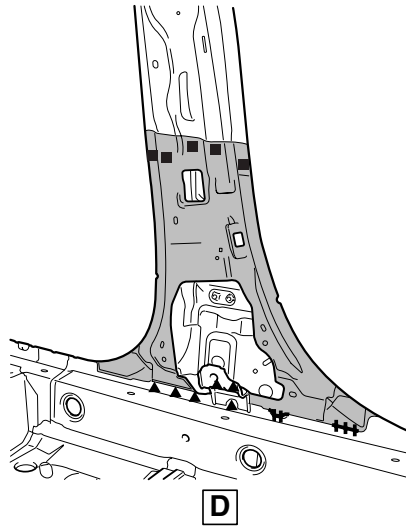
AB700454AC

CAUTION

When repairing the area using sound dampening foam material do not use firing tools since the sound dampening foam material may burn.



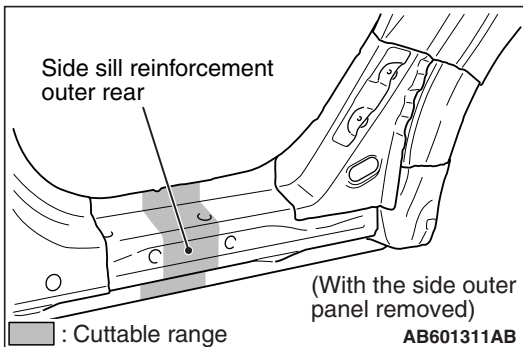
(With the side outer panel removed)



D

AB700455 AB

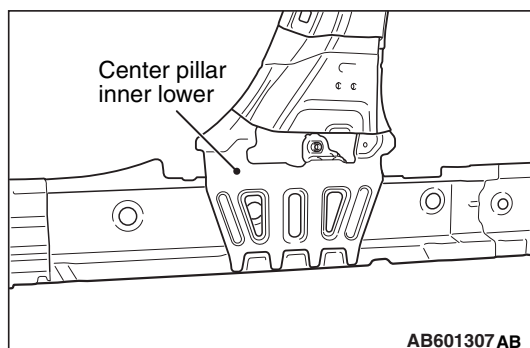
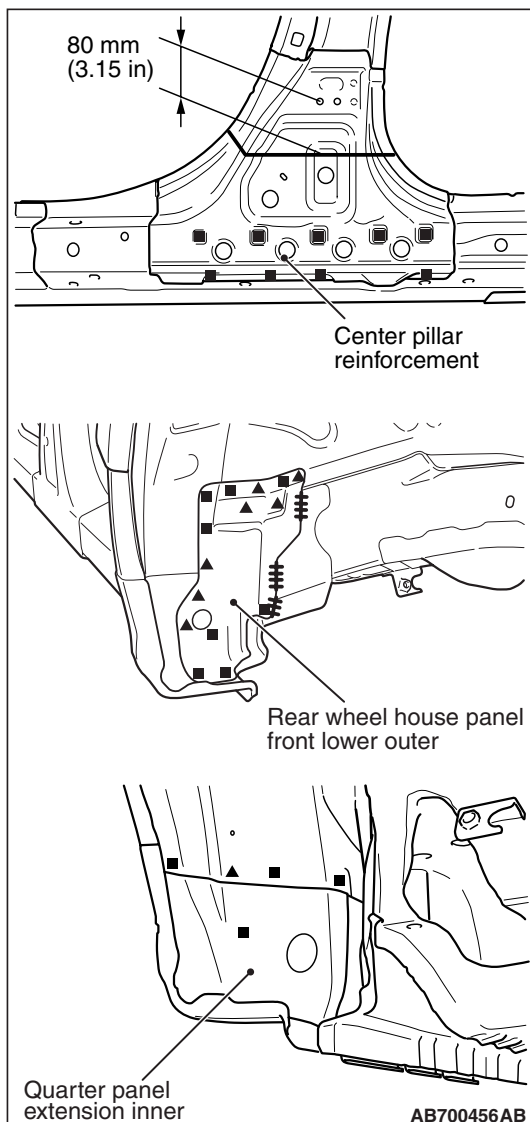
NOTE: Partial replacement is possible depending on the range of damage. Cut the side sill reinforcement outer rear 50 mm (1.97 inches) away from the cut area of the side outer panel.



NOTE ON REPAIR WORK

REMOVAL

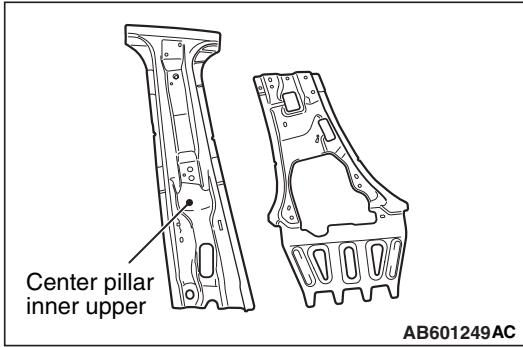
1. When installing the side sill reinforcement outer rear, cut the center pillar reinforcement 80 mm (3.15 inches) downward from the installation hole of the rear door hinge because the center pillar reinforcement interferes with it. For the rear wheel house, remove the rear wheel house panel front lower outer and quarter panel extension inner because the quarter panel extension inner interferes with the rear wheel house panel front lower outer.



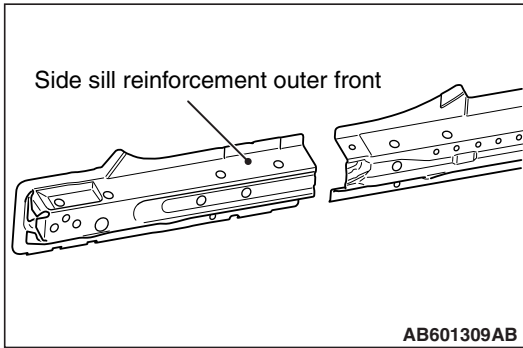
2. After removing the side sill reinforcement outer rear, remove the center pillar inner lower.

INSTALLATION

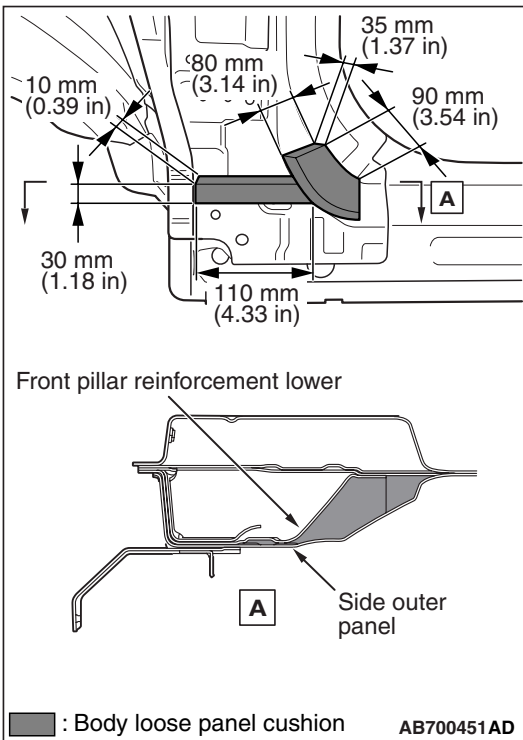
1. Remove the center pillar inner upper from the new center inner pillar, and install the center inner pillar to the body.

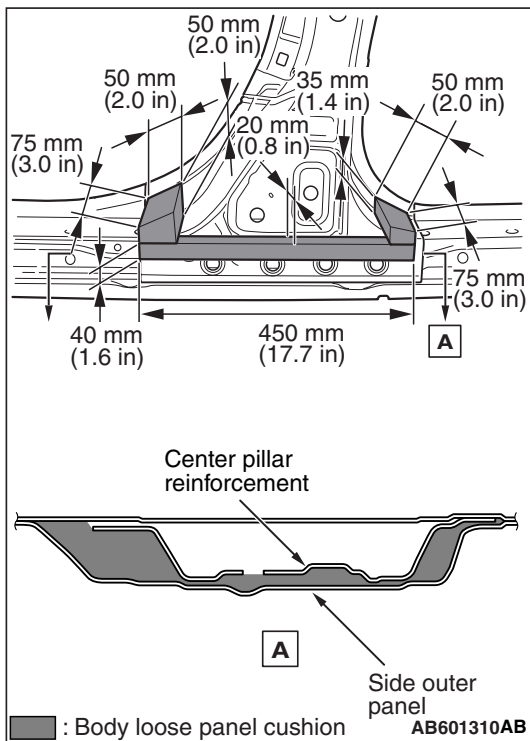


2. Remove the side sill reinforcement outer front from the new side sill reinforcement, and install the side sill reinforcement to the body.

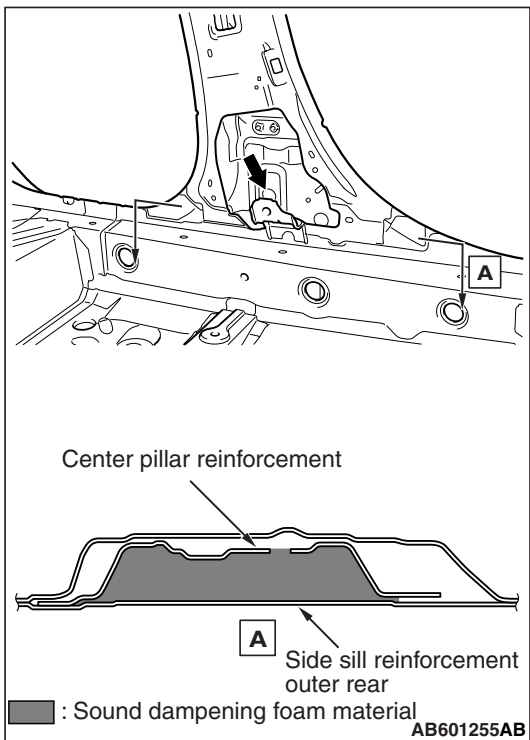


3. When installing the new front floor side sill outer, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the front pillar.



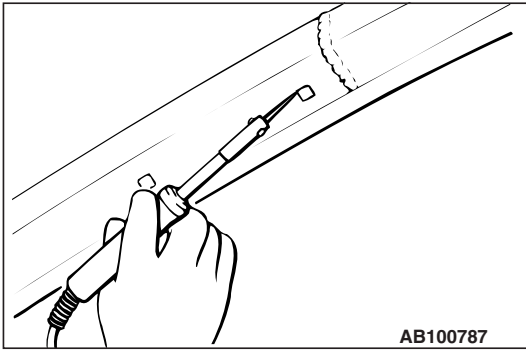


- When installing the new front floor side sill outer, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the center pillar.



- Assemble the front floor side sill outer, bolt and tape the hole and flange with aluminum tape, then fill the hole with sound dampening foam material as shown in the figure of the instructions.

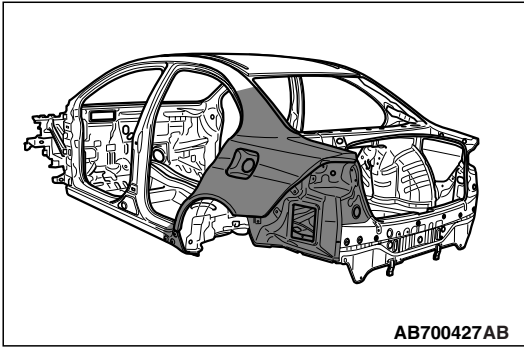
Sound dampening foam material: 3M™ AAD ULTRA-PRO Panel foam-Yellow



6. Wait 2 hours after filling the sound dampening foam material to remove the bolt and aluminum tape, then melt the sound dampening foam material with a soldering gun so a clip, etc. can thoroughly be inserted in the hole filled with sound dampening foam material.

QUARTER OUTER

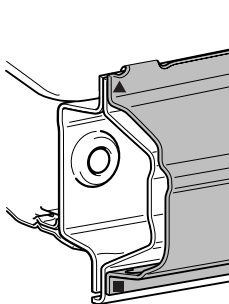
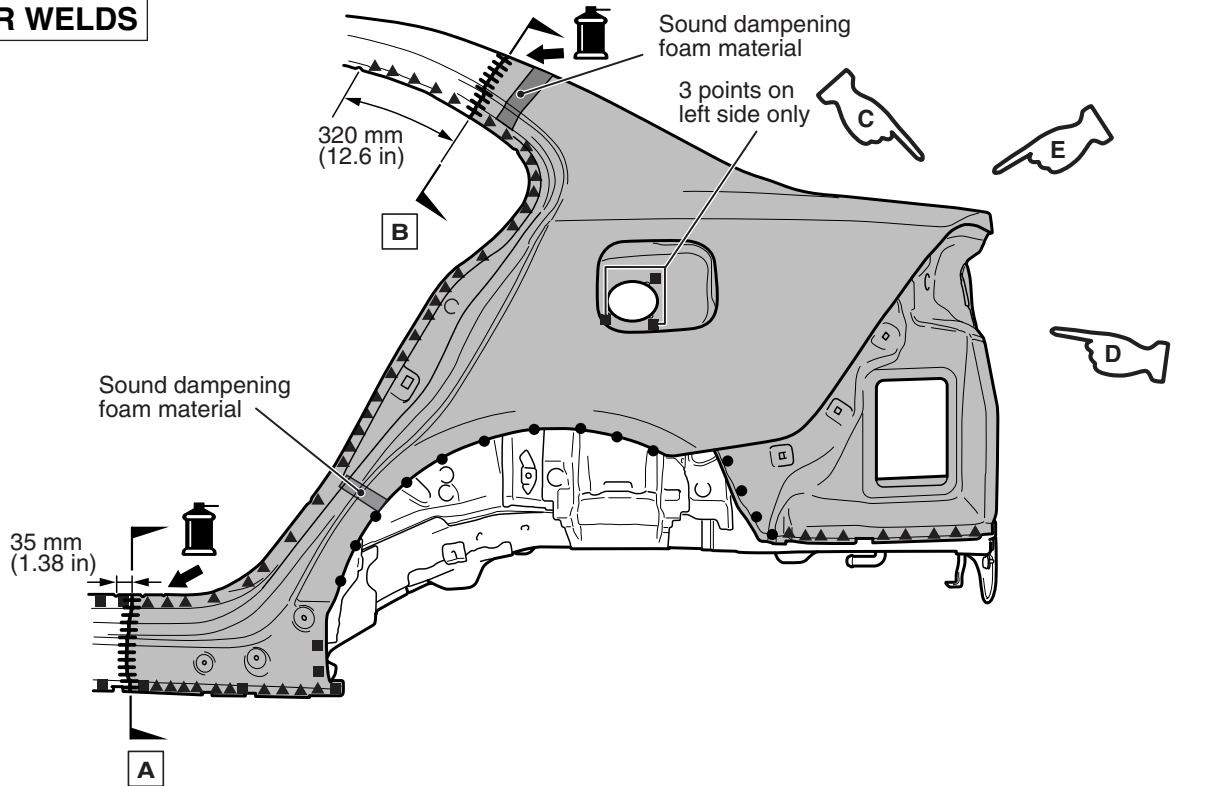
M4030008001090



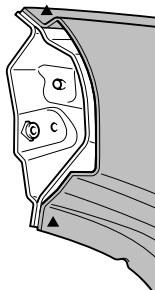
AB700427AB

Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

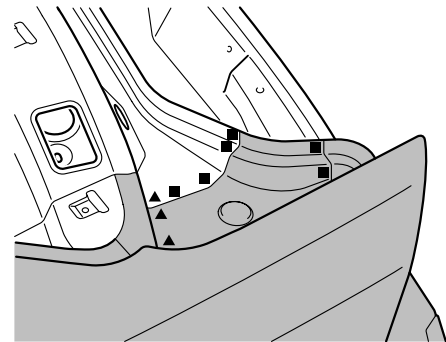
REPAIR WELDS



A



B

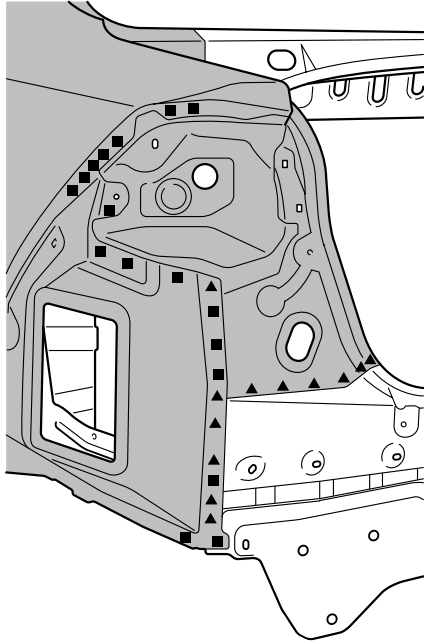


C

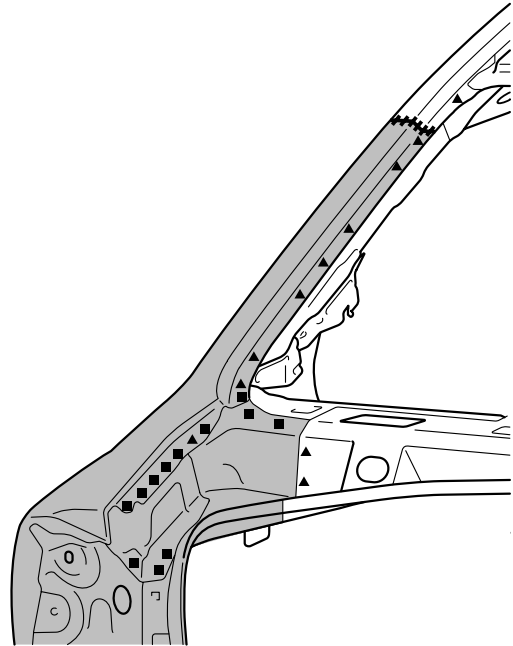
AB700483AB

⚠ CAUTION

When repairing the area using sound dampening foam material do not use firing tools since the sound dampening foam material may burn.



D



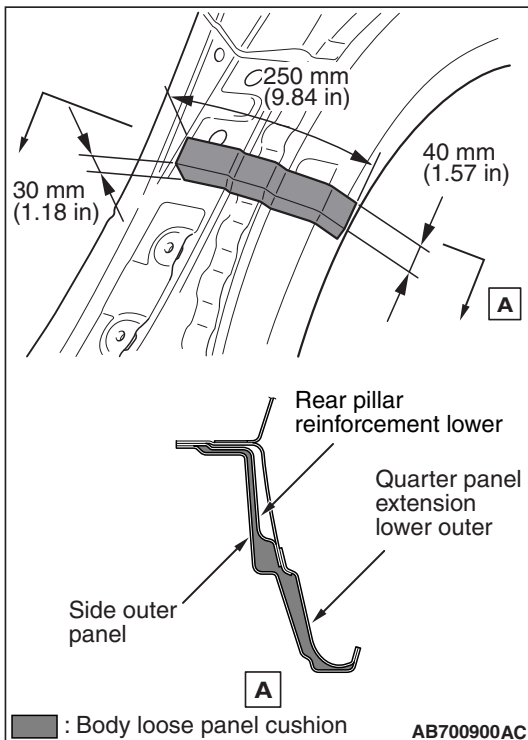
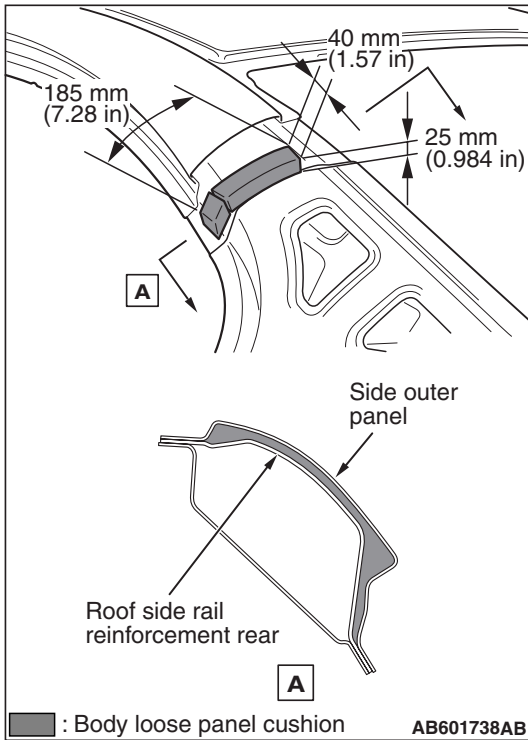
E

AB602342AD

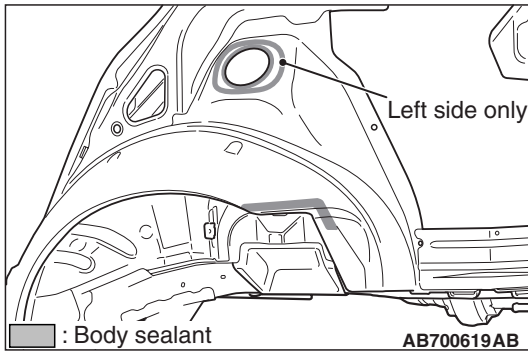
NOTE ON REPAIR WORK

INSTALLATION

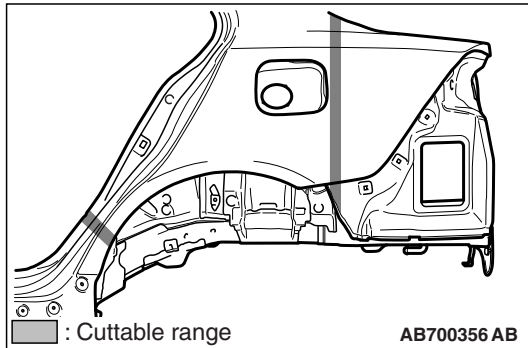
1. When installing the new quarter panel outer, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the rear pillar.



2. When installing the new quarter panel outer, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the wheel arch.



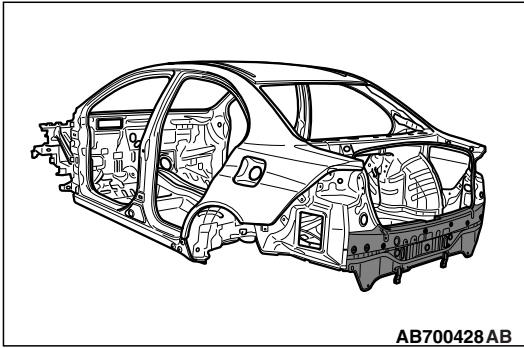
3. When installing the new quarter panel outer, apply the body sealant in advance to the areas as shown.




4. Partial replacement is possible depending on the range of damage.

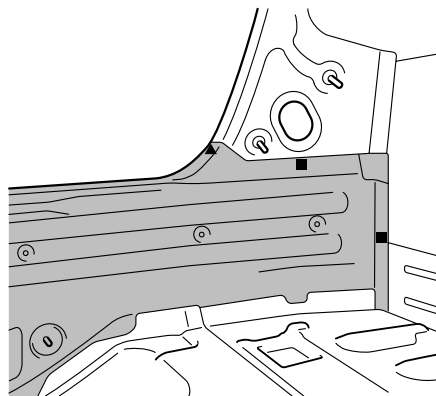
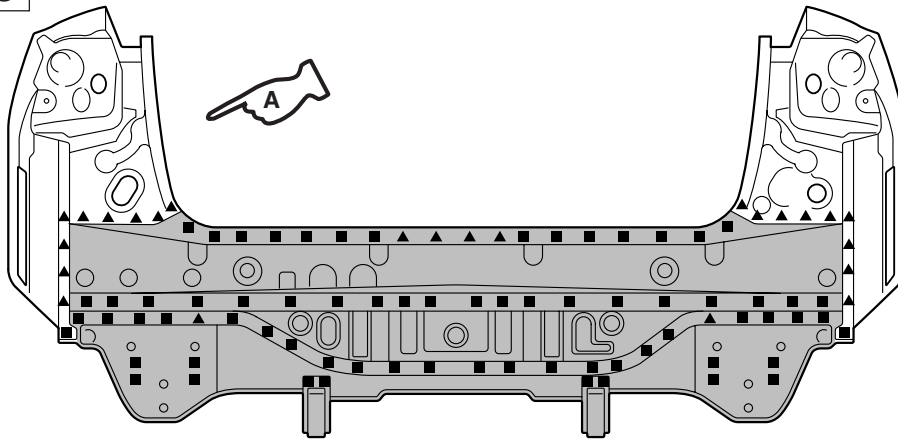
REAR END PANEL

M4030009000409



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■ : indicates two panels to be welded) ▲ : indicates three panels to be welded)
++++	MIG spot welding
	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

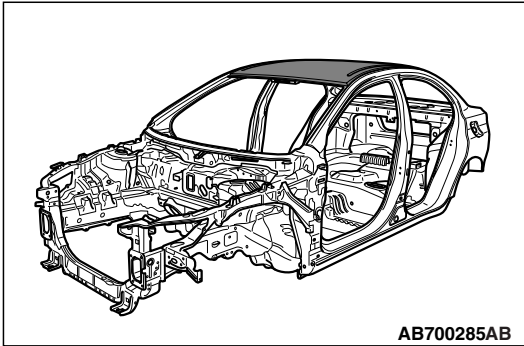
REPAIR WELDS




A

AB601442AB

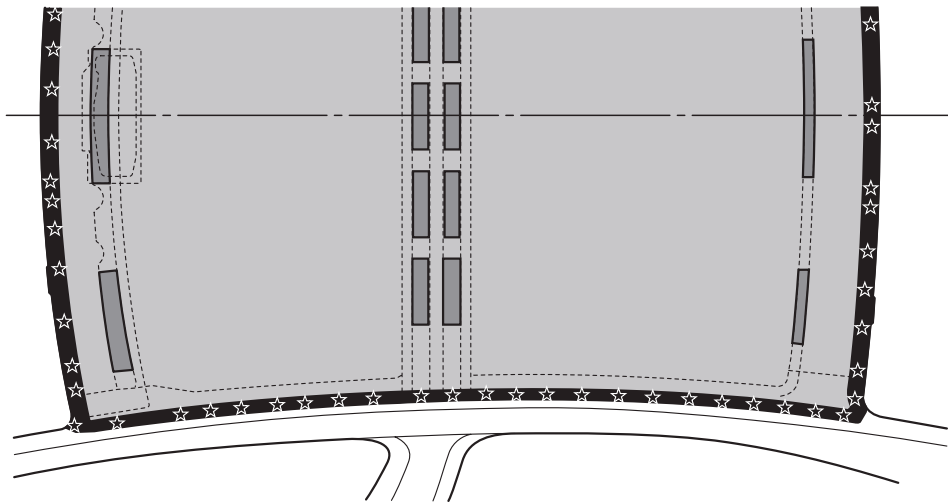
ROOF



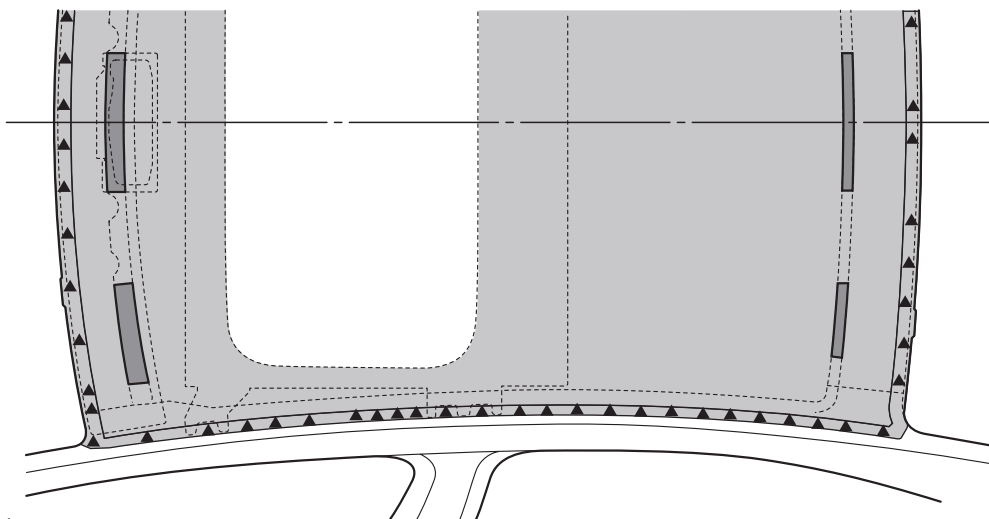
Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
★★★★	Rivet
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)



REPAIR WELDS

<Vehicles without sunroof (aluminum panel)>



<Vehicles with sunroof (steel panel)>



 : Adhesive 1
 : Adhesive 2

AB700919AB

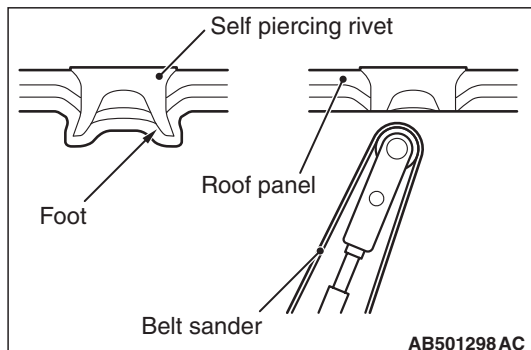
- **Adhesive 1: Urethane body sealer**
Brand: 3M™ AAD Part No.08360 or equivalent

- **Adhesive 2: Epoxyayresin adhesive**
Brand: 3M™ AAD Part No.8115 or equivalent

NOTE ON REPAIR WORK <Vehicles without sunroof (aluminum panel)>

REMOVAL

1. Grind the self piercing rivet foot with a belt sander [belt width of 10 mm (0.39 inch)] or the like.



2. Remove the self piercing rivet by striking it up at the bottom with a punch or the like to disconnect it from the side structure.

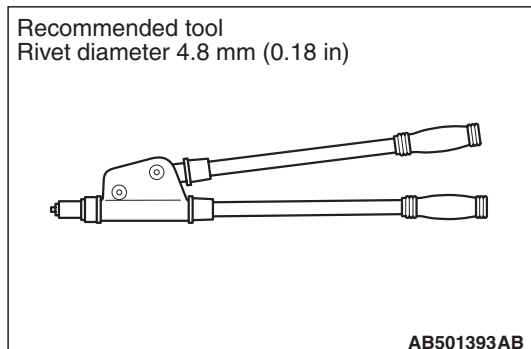
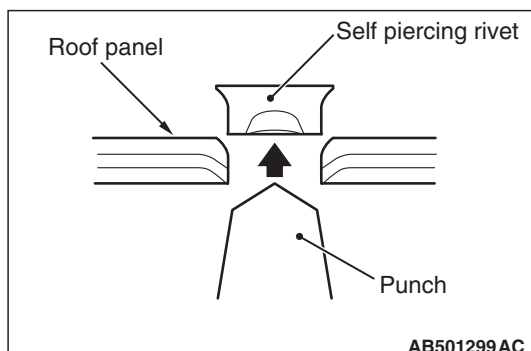
INSTALLATION

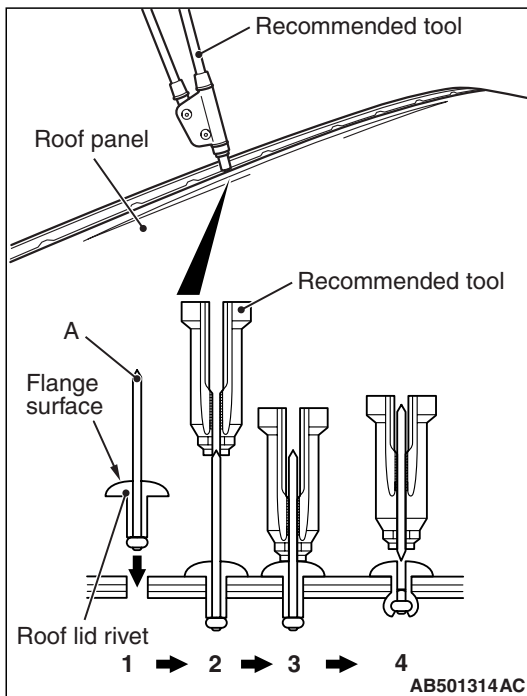
1. Temporarily install the new roof panel to the body and drill holes at riveting positions with a drill [5 mm (0.19 inch) in diameter].
2. Remove the roof, remove burrs at the drilled holes, and clean the body.
3. Apply structural adhesive to the body, and install the roof.

Adhesive: Epoxyayresin adhesive

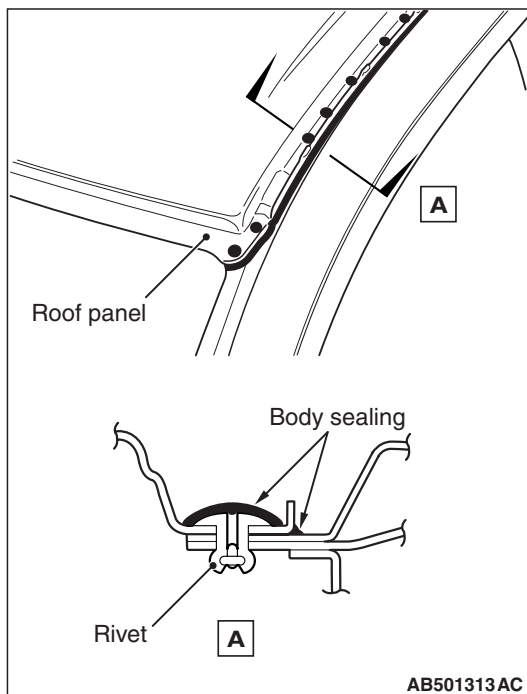
Brand: 3M™ AAD Part No.8115 or equivalent

4. Use the recommended tool to tighten the roof lid rivet by the following procedure.





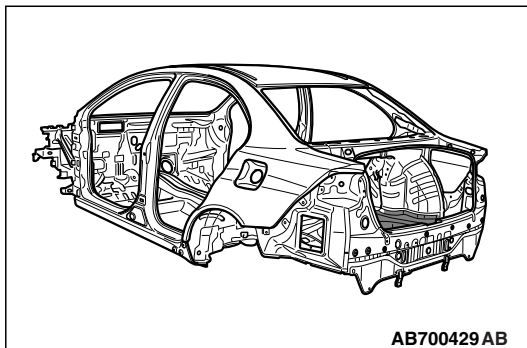
- (1) Insert the rivets into the roof.
- (2) Mount the recommended tool on the A-section of the rivet.
- (3) Operate the tool's handle while pushing the flange surface of the rivet by the recommended tool.
- (4) Part A of the rivet is cut and the rivet is tightened.



5. After the adhesive is dried, remove the excessive residues and apply body sealant to the whole rivets and the roof edge in order to prevent water leakage.

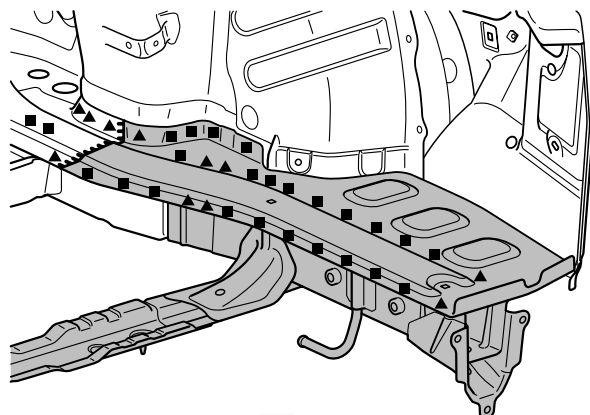
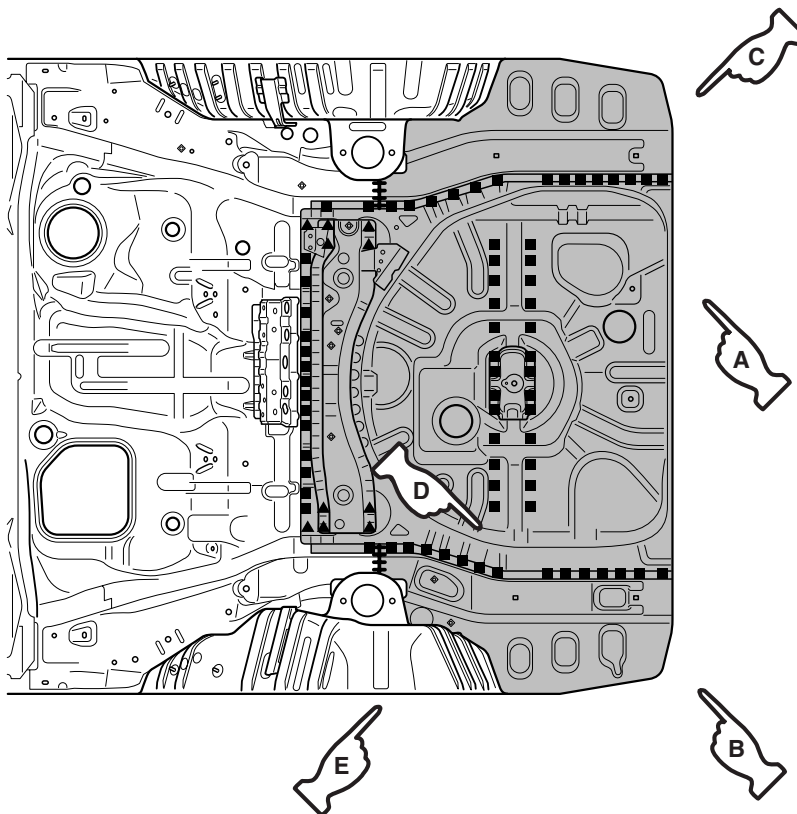
REAR FLOOR

M4030010001053



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■ : indicates two panels to be welded) (▲ : indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS

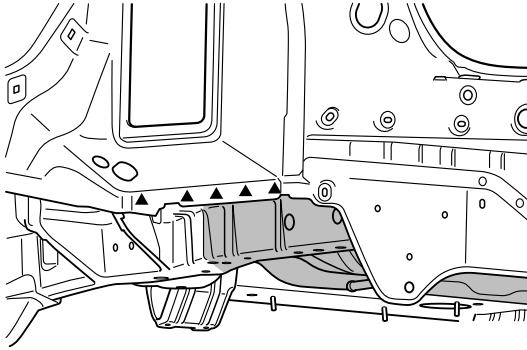


A

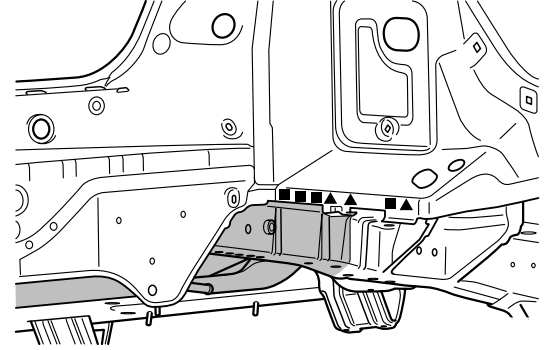
(With the rear floor removed)

AB700939AB

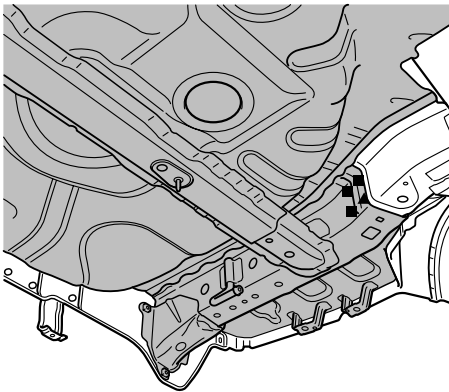
NOTE: Refer to the Rear End Panel section on P.3-33 for the welding points with the rear end panel.



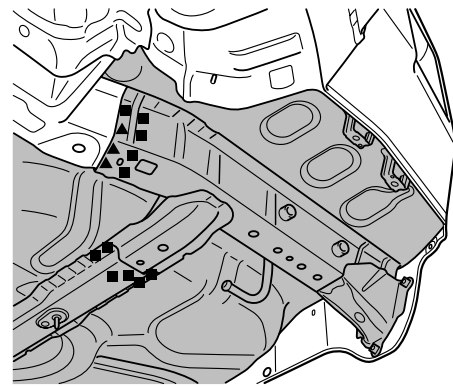
B



C



D



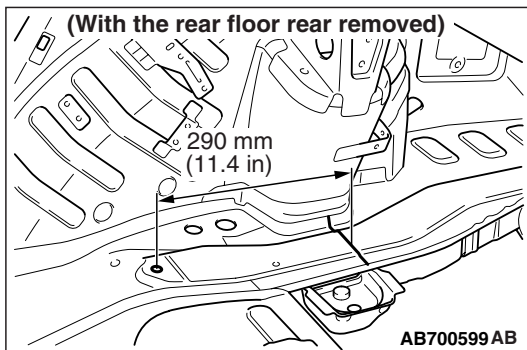
E

AB700940 AB

NOTE ON REPAIR WORK

REMOVAL

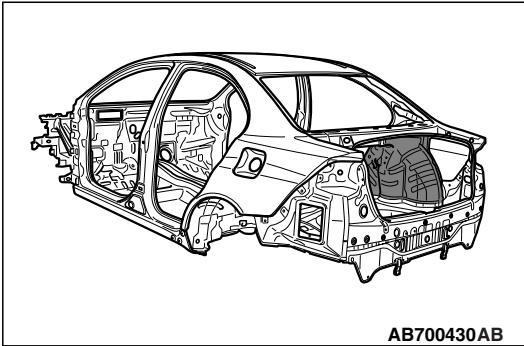
When removing the rear floor side panel, cut it 290 mm (11.4 inches) behind the installation hole of the child restraint bracket.



AB700599 AB

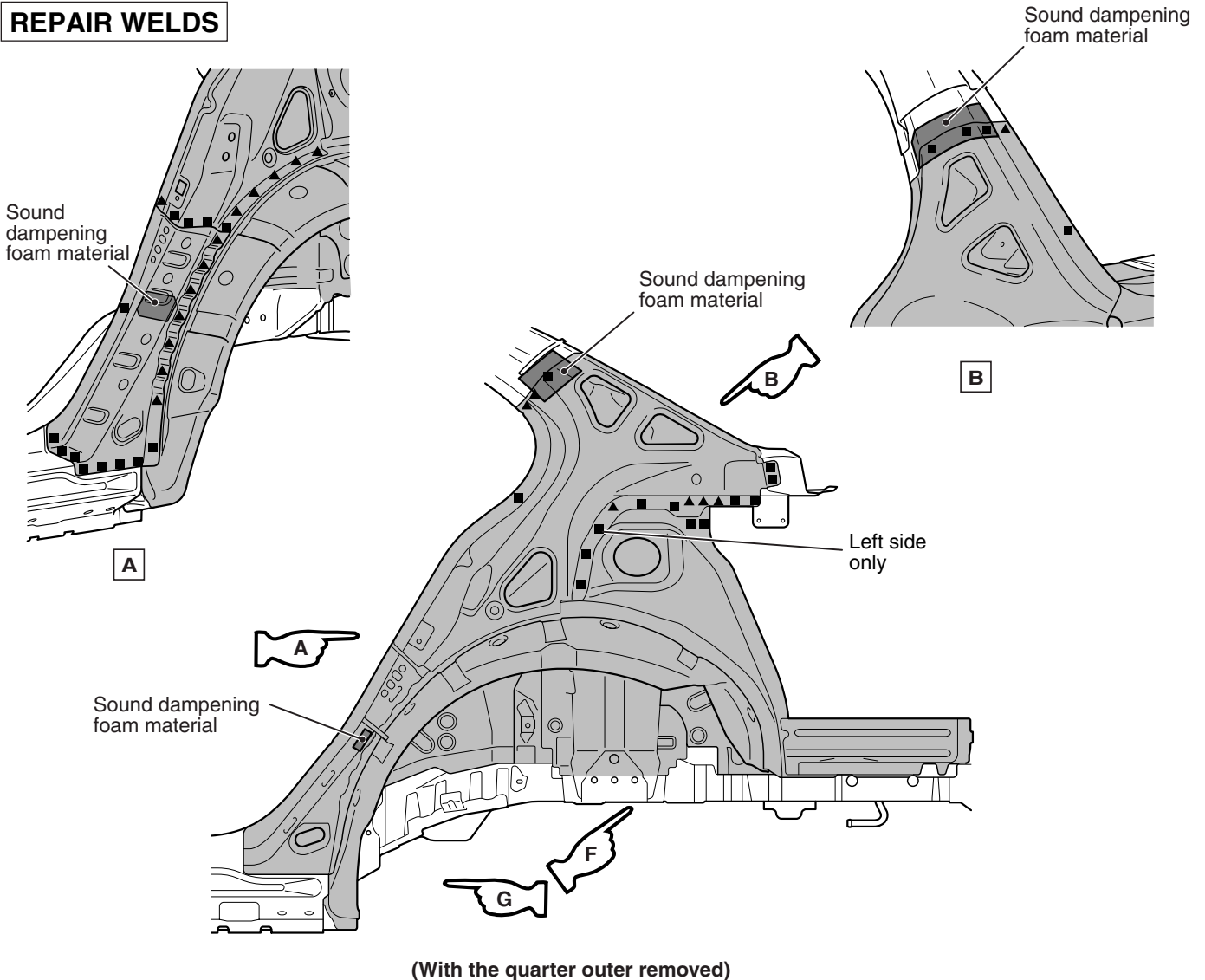
QUARTER INNER

M4030012001093



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS

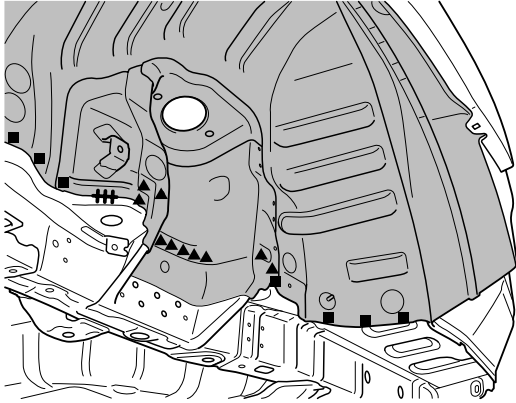


AB700999AB

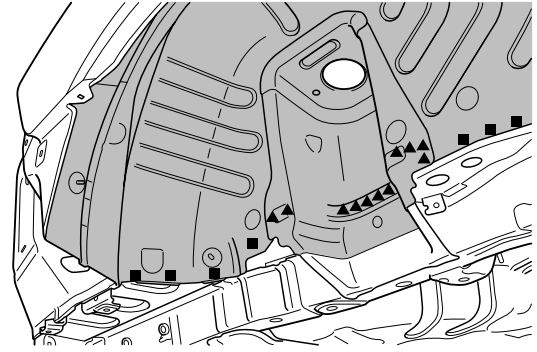
CAUTION

When repairing the area using sound dampening foam material do not use firing tools since the sound dampening foam material may burn.

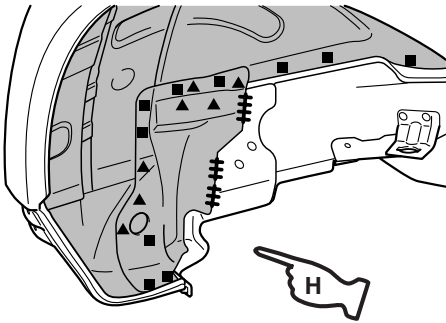
NOTE: Refer to the Quarter Outer section on P.3-29 for the welding points with the quarter outer.



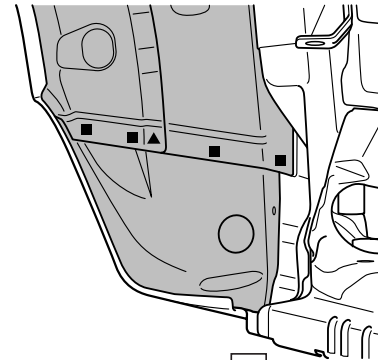
F
(Left side)



F
(Right side)



G



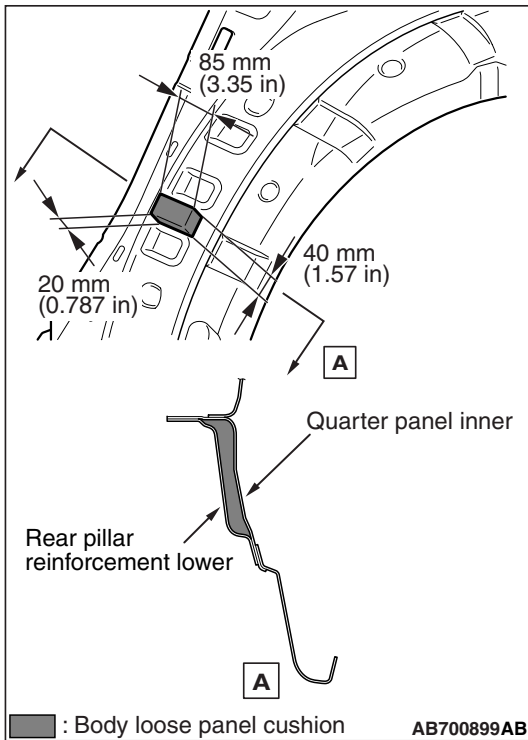
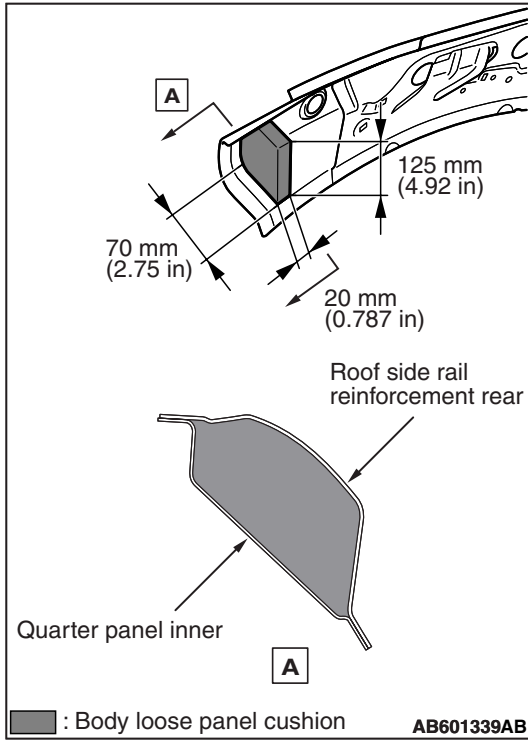
H

(With the rear wheel house
panel front lower outer removed) AB700546 AB

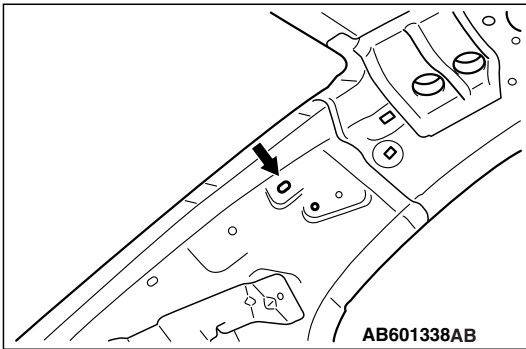
NOTE ON REPAIR WORK

INSTALLATION

1. When installing the new quarter panel inner, machine the body loose panel cushion (MR535301 or MR435765) as shown and apply it to the body side to prevent the sound dampening foam material from dropping when the material is filled into the rear pillar in the next process.

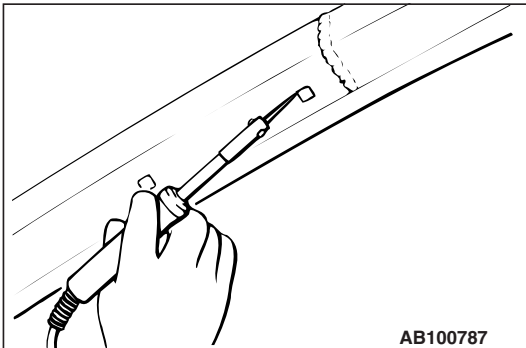


2. When installing the new rear pillar reinforcement lower parts, machine the body loose panel cushion (MR535301 or MR435765) for replacement as shown and apply it to the body side because the sound dampening foam material cannot be filled into the rear pillar reinforcement lower.



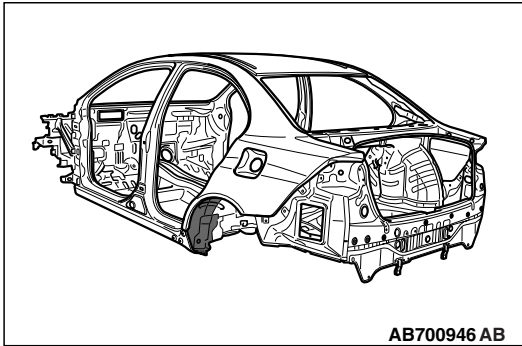
3. Assemble the rear quarter panel inner, bolt and tape the hole and flange with aluminum tape, then fill the hole with sound dampening foam material as shown in the figure of the instructions.

Sound dampening foam material: 3M™ AAD ULTRA-PRO Panel foam-Yellow



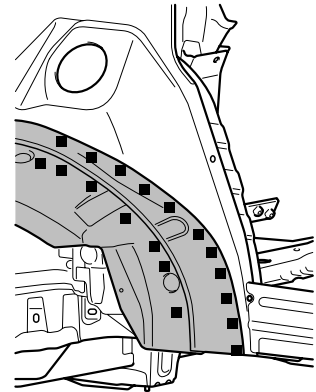
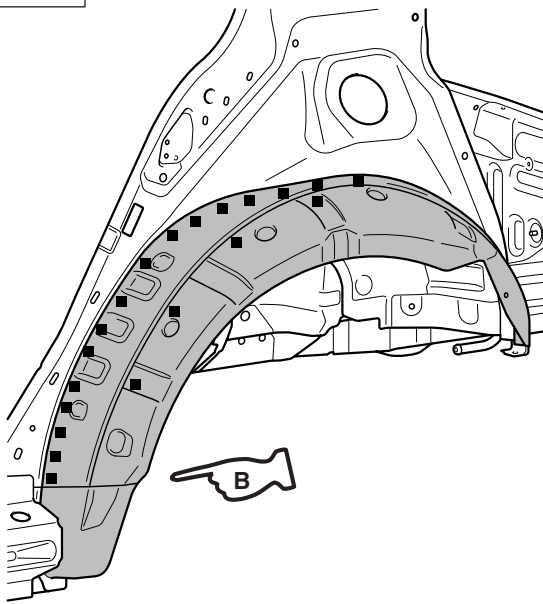
4. Wait 2 hours after filling the sound dampening foam material to remove the bolt and aluminum tape, then melt the sound dampening foam material with a soldering gun so a clip, etc. can thoroughly be inserted in the hole filled with sound dampening foam material.

QUARTER INNER (PARTIAL REPLACEMENT)



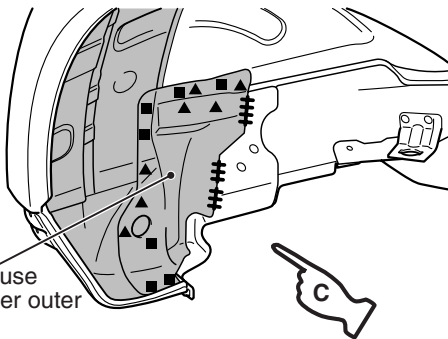
Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded) (▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



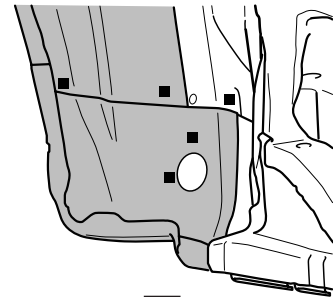
A

(With the rear pillar reinforcement and the rear pillar reinforcement lower removed)



Rear wheel house panel front lower outer

B



C

(With the rear wheel house panel front lower outer removed)

AB700972AB

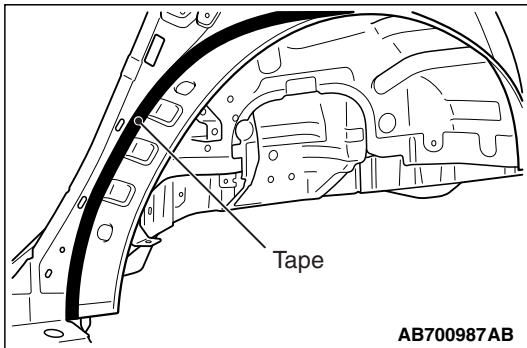
NOTE:

- Refer to the Quarter Outer Section on P.3-29 for the welding points with the quarter outer.
- Refer to the Quarter Inner Section on P.3-39 for the welding points with the rear pillar reinforcement and the rear pillar reinforcement lower.

NOTE ON REPAIR WORK

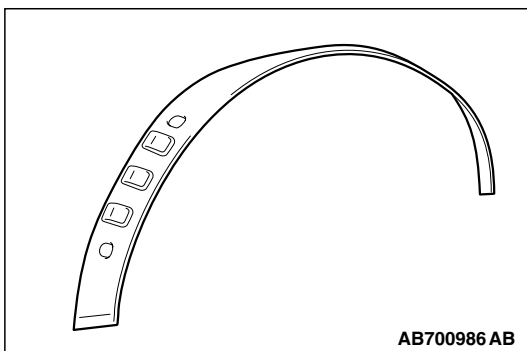
REMOVAL

1. Adhere tape along the wheel arch of the quarter inner panel as shown in the figure of the instructions, use the tape as a guide so about 20 mm (0.79 inch) of the flange remains, then cut and remove.

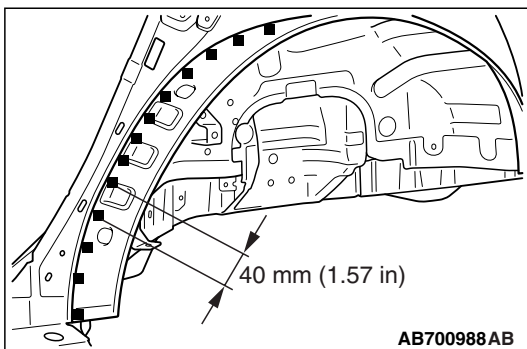


INSTALLATION

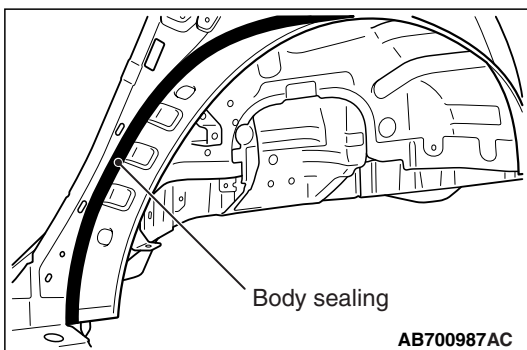
1. For the new quarter panel inner parts, cut the wheel arch end are so that it overlaps with the flange on the body-side.



2. Overlap, assemble and weld the quarter panel inner with the body-side flange. Weld at a pitch of 40 mm (1.57 inches).

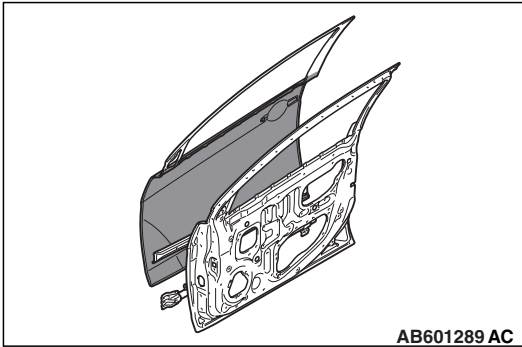



3. Weld the quarter panel inner then apply a body sealing in the area shown in the figure of the instructions.



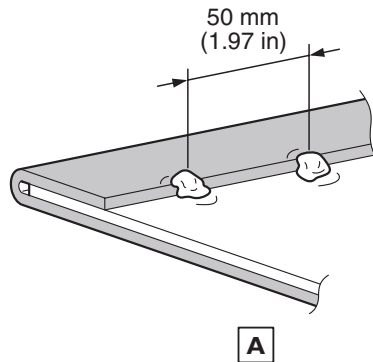
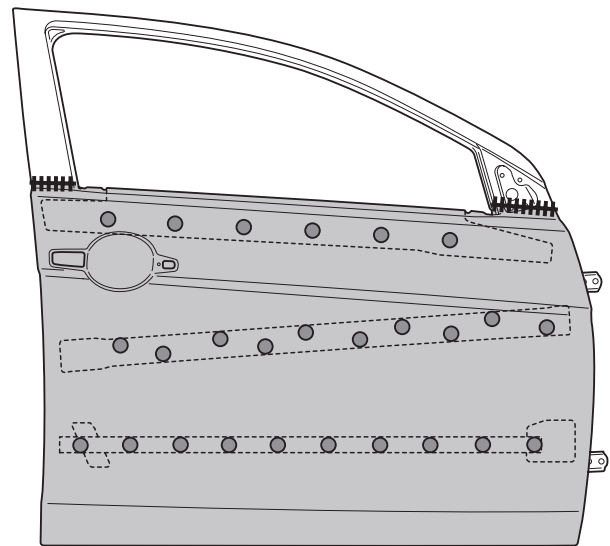
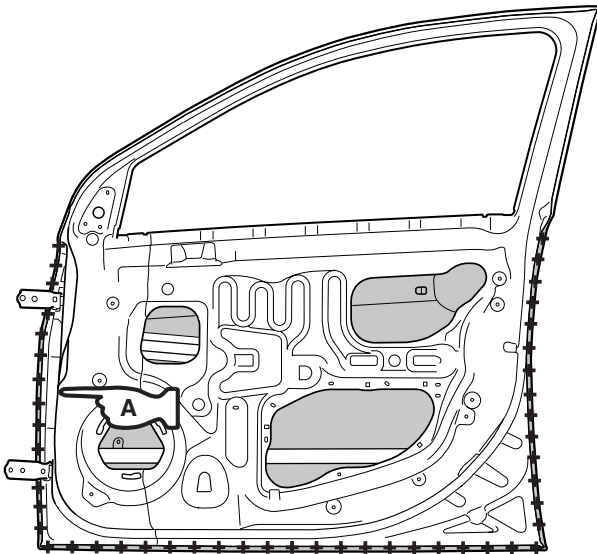
FRONT DOOR OUTER PANEL (WELDED TYPE)

M4030001500671



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■ : indicates two panels to be welded ▲ : indicates three panels to be welded)
++++	MIG spot welding
	MIG arc welding (continuous)
○○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



 : Adhesive

AB700976AB

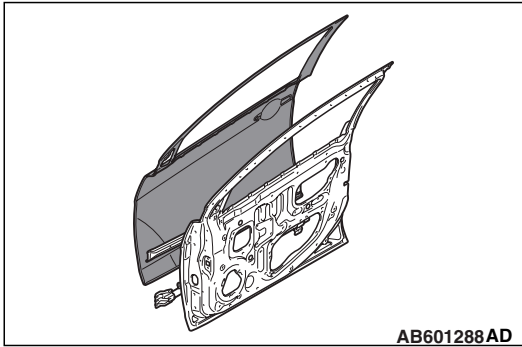
Adhesive: Urethane body sealer


Brand: 3M™ AAD Part No.08360 or equivalent

NOTE: After hemming the front door outer panel, MIG spot weld the flange overlap section at a pitch of 50 mm (1.97 inches).

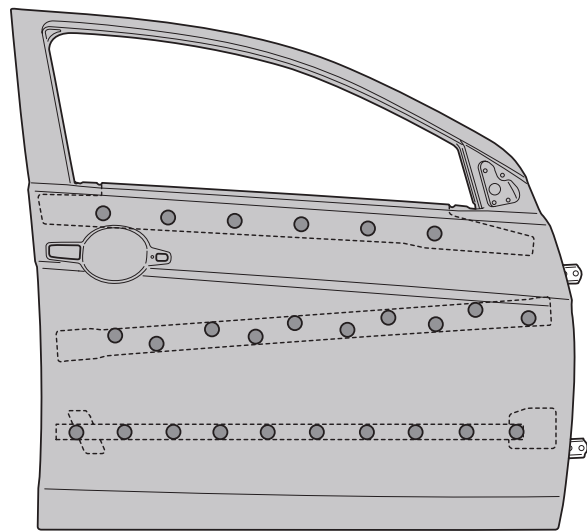
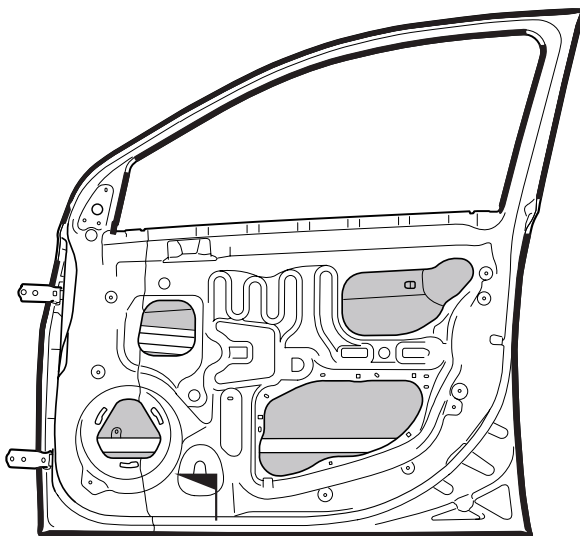
FRONT DOOR OUTER PANEL (ADHESION TYPE)



M4030001700686



Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
oooooooo	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



-  : Adhesive 1
-  : Adhesive 2

- **Adhesive 1: Urethane body sealer**
Brand: 3M™ AAD Part No.08360 or equivalent
- **Adhesive 2: Epoxyayresin adhesive**

Brand: 3M™ AAD Part No.8115 or equivalent

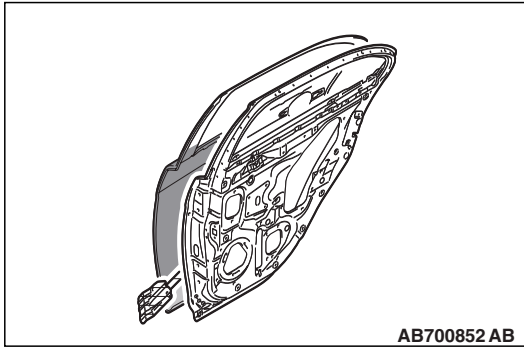
AB700977AB


NOTE ON REPAIR WORK

INSTALLATION

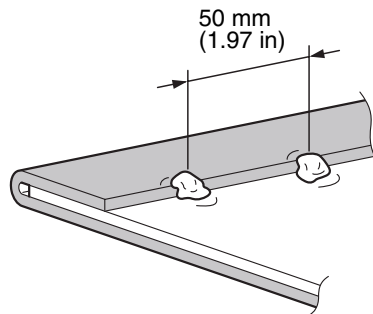
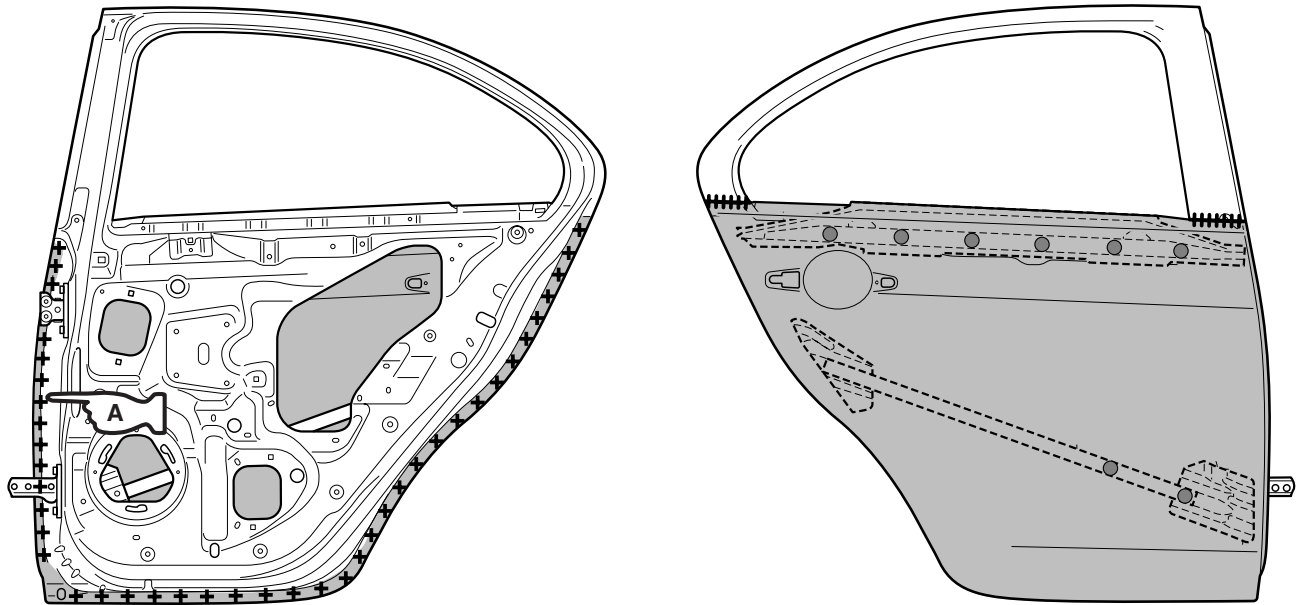
1. When installing the front door outer panel, grind and remove the paint from the bonded surface of the outer panel to ensure the bonding strength. After the removal, degrease it.
2. Install the outer panel and hem it. Wipe off the excessive adhesive and finish it.

REAR DOOR OUTER PANEL (WELDED TYPE)




Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
	MIG arc welding (continuous)
○○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



A

 : Adhesive

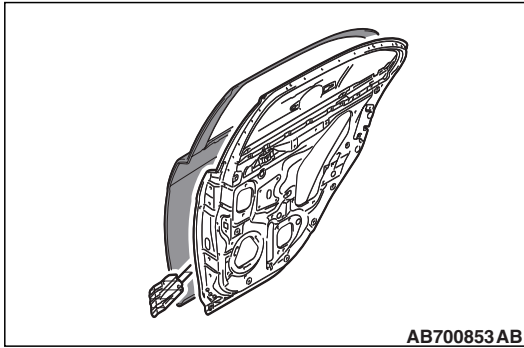
AB700542 AB

Adhesive: Urethane body sealer
Brand: 3M™ AAD Part No.08360 or equivalent


NOTE: After hemming the front door outer panel, MIG spot weld the flange overlap section at a pitch of 50 mm (1.97 inches).

REAR DOOR OUTER PANEL (ADHESION TYPE)

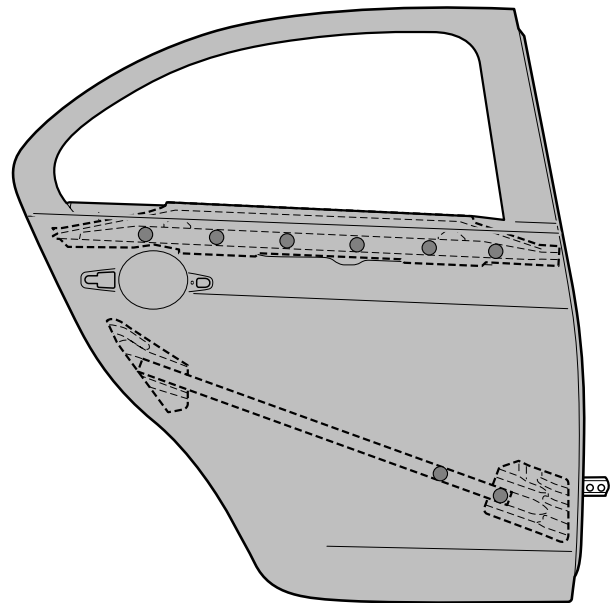
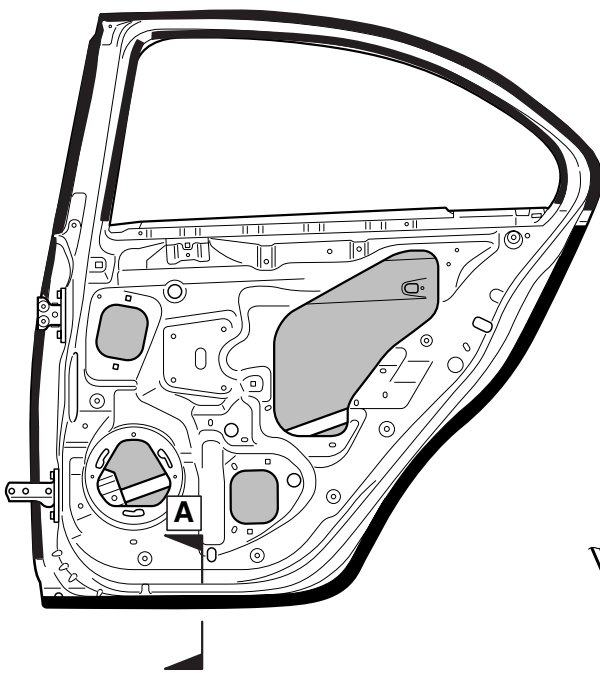
M4030001800520



AB700853 AB

Symbol	Operation description
● ● ● ●	Spot welding
■ ■ ▲ ▲	MIG plug welding (■: indicates two panels to be welded ▲: indicates three panels to be welded)
++++	MIG spot welding
#####	MIG arc welding (continuous)
○○○○○○	Braze welding
	Anti-corrosion agent application locations (Use access holes to apply liberally to butt-welded joints.)

REPAIR WELDS



A

AB700543 AB

■ : Adhesive 1
 ■ : Adhesive 2

- Adhesive 1: Urethane body sealer
 Brand : 3M™ AAD Part No.08360 or equivalent
- Adhesive 2: Epoxyayresin adhesive

Brand : 3M™ AAD Part No.8115 or equivalent

NOTE ON REPAIR WORK

INSTALLATION

1. When installing the rear door outer panel, grind and remove the paint, etc. from the bonded surface of the outer panel to ensure the bonding strength. After the removal, degrease it.
2. Install the outer panel and hem it. Wipe off the excessive adhesive and finish it.

ALUMINUM PANEL

ALUMINUM PANEL CHARACTERISTICS

M4030000500173

Description of aluminum panel

A new aluminum panel with higher strength and better workability has been developed by adding a small amount of metallic elements, including magnesium (Mg), copper (Cu) and silicon (Si), to aluminum. This type of aluminum material has equivalent strength to cold rolled steel sheets.

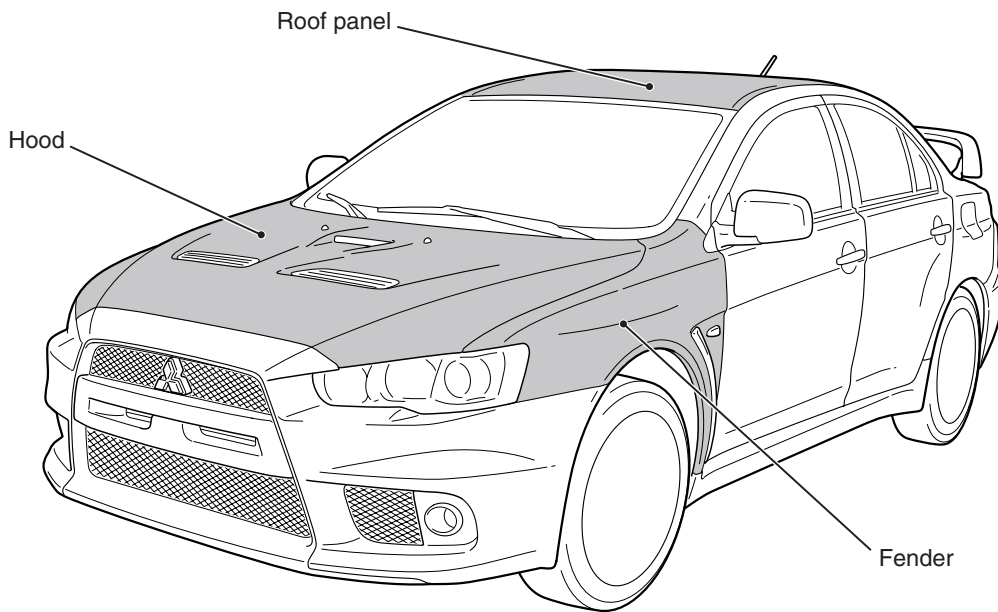
Advantage of aluminum panel

1. Lighter: The specific gravity of aluminum is 2.7, which is only one third of general steel panel (7.9). However, it requires 1.4 times in thickness to obtain the same rigidity as the steel panel, resulting in one half in weight.

- 2. More durable: Aluminum has the property of creating oxide coating on its surface when it contacts with the air. This coating prevents it from being corroded.
- 3. More heat-conductive: The heat conductivity of aluminum is twice as high as that of iron. This means that aluminum absorbs and disperses heat more quickly, which results in prompt change of its temperature.
- 4. More electric-conductive
- 5. Non-magnetic substance

ALUMINUM PANEL LOCATIONS

M4030000600277



AB701121AB

Application	Thickness
Roof panel	1.1 mm (0.043 inch)

Application	Thickness
Hood outer panel	0.9 mm (0.035 inch)
Hood inner panel	0.8mm (0.031 inch)
Fender	1.0 mm (0.039 inch)

ALUMINUM PANEL REPAIR

M4030000700230

Precautions upon sheet metal processing

1. Major difference in processing between sheet metal and steel sheet (On the basis of general body shop)

Work description	Aluminum alloy panel	Steel sheet
Hammering	Mallet or plastic hammer	Sheet metal hammer
Washer welding	Not possible	Possible
Gas welding	Not good workability but possible	Possible
Spot welding	Not possible	Possible
MIG welding	Possible by a welding machine for aluminum and argon gas	Possible by a general welding machine and CO ₂ gas

2. If strong impact is given under low temperature, its strength becomes low and cracking occurs.
3. The springback (returning force to the original condition) is large due to high elastic modules.
4. The thermal effect is large due to high heat conductivity.
5. When excessively heated, its strength will be deteriorated. When heated additionally, it will be melted without discolouration. [The heating temperature is approximately 250°C (482°F)].

Material	Melting point
Aluminum	475 to 660 °C (887 to 1220 °F) <varying with the alloy content>
Steel sheet	1500 to 2500 °C (2732 to 4532 °F)

⚠ CAUTION

Weld and repair it if the side sill reinforcement front is damaged.

6. Because the material is soft, choose an abrasive carefully. Wear a dustproof mask and safety glasses, because ground particle is light and tends to float in the air.
7. If a disk sander is strongly pressed against the aluminum plate, friction heat is generated, resulting in exfoliation of the aluminum alloy and clogging of the disk sander with the exfoliated particles.
8. Because the clogged disk sander will damage the aluminum alloy panel, replace it with a new one as soon as possible.

9. General tools and sanding tools shall not be shared for both aluminum alloy and steel panels. (Iron powder remaining on the surface may cause electric corrosion with a different type of metal).
10. During MIG welding, protect the vicinity because the spatters are hard to see and spread farther than expected.

Correction of uneven surface

Basically, the same as the steel panel. However, give a consideration to the aluminum alloy characteristics.

1. Repair of sheet metal
 - (1) Heat with a burner.

⚠ CAUTION

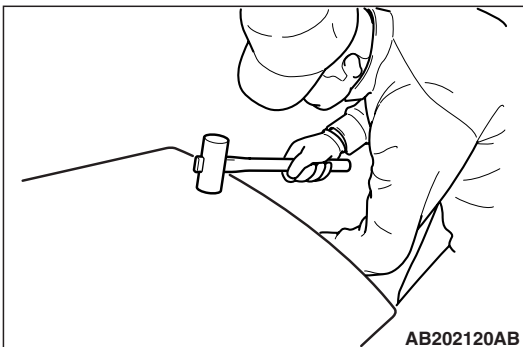
- Heat-up the panel until you feel heat with a keplar work glove on the reverse side of the panel.
- Keep moving the burner evenly to prevent heat from concentrating in one point.



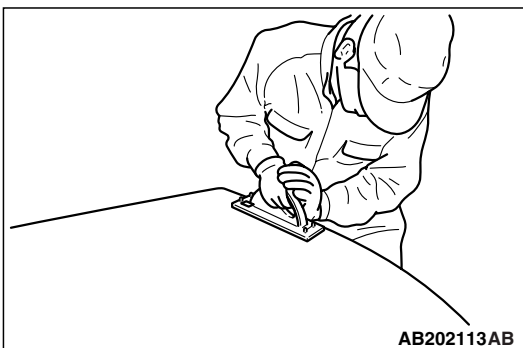
- (2) Because hammering may stretch the panel, use a mallet or plastic hammer.

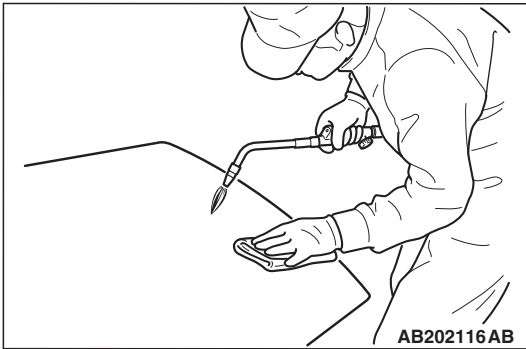
⚠ CAUTION

Minimize the stretch and hardening, and give no hammer dent.



2. Distortion check: Grind the surface with #80 to #120-grit sandpaper and then check for distortion.

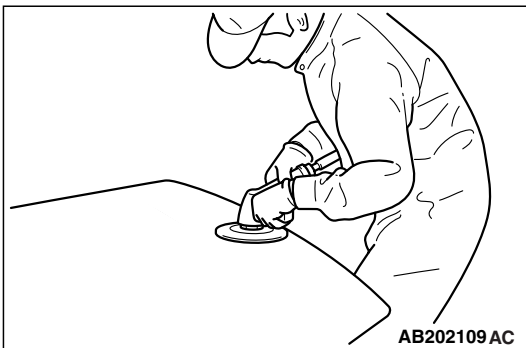




3. Straightening: Remove distortion by the draw correction procedure with a flattening hammer and a burner.

⚠ CAUTION

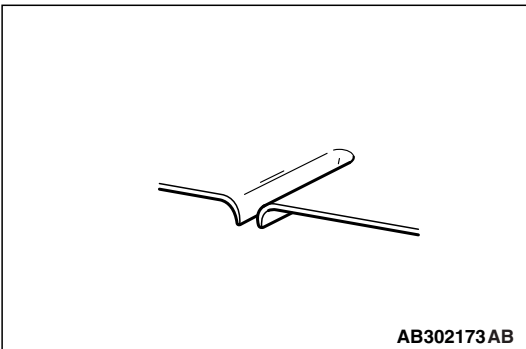
- The heating temperature should be approximately 250°C (482°F).
- Pay particular attention to heating, because it is melted without discolouration by heat.
- Cover the vicinity of the area to be heated with a wet rag or the like to prevent temperature rise and influence of heat (distortion).
- Do not use a draw hammer for steel sheets because it may cause the panel crack.



4. Sanding: Grind the surface with a disk sander or a double-action sander.
 - Disk sander: #100 to #120
 - Double-action sander: #150 to #180

⚠ CAUTION

Aluminum plates are softer than steel sheets, therefore select an appropriate abrasive to prevent the surface from deeply scratched. The heating temperature should be approximately 250°C (482°F).



Correction of cuts and cracks

If cuts, cracks, or holes occur in a steel sheet panel, MIG welding with CO₂ is used for repair. However, for an aluminum panel, use MIG or TIG welding with argon gas (inert gas) as shielding gas for repair.

DEGREE OF DISTORTION CAUSED BY WELDING

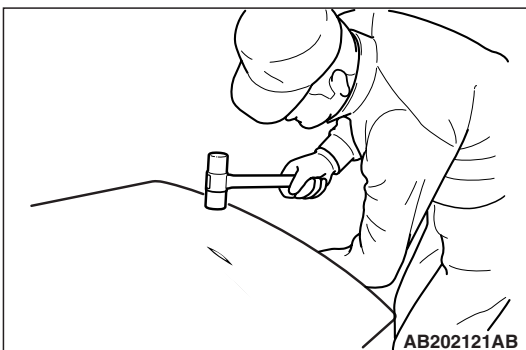
Gas welding (a large amount of distortion) TIG welding MIG welding (a small amount of welding). This manual explains the operation procedure of MIG welding which causes a small amount of distortion by welding heat.

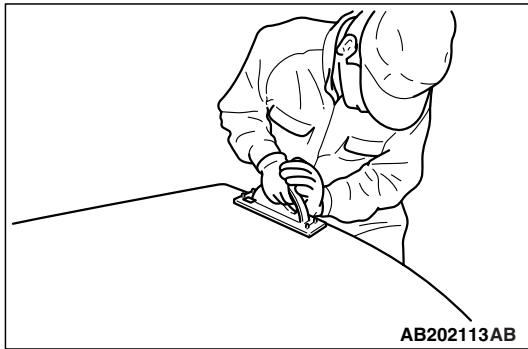
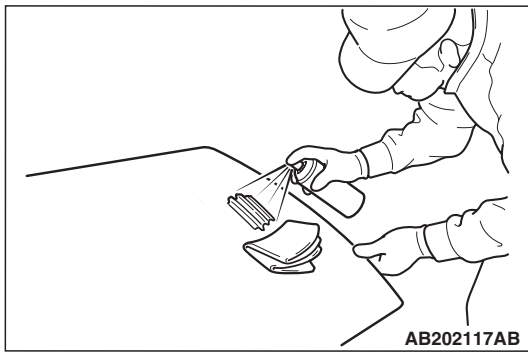
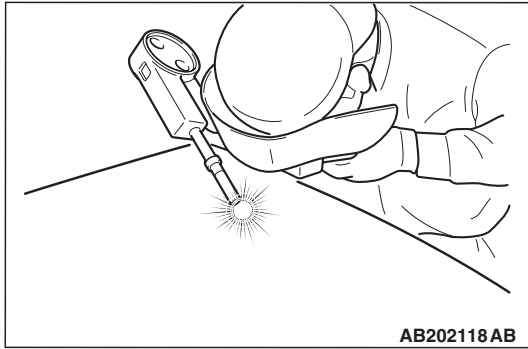
Operation procedure of MIG welding

⚠ CAUTION

- Be careful to avoid excessive stretch of or damage to the panel.
- Minimize the gap of the butt joint.

1. Correct the damaged area by hammering lightly while heating it. If any area is stretched by hammering, grind it off with a pneumatic saw.





⚠ CAUTION

To minimize distortion and meltdown, divide a welding area into several short segments, and weld one segment at a time.

2. Welding: Use an aluminum dedicated welding machine or a shared welding machine for aluminum and steel sheet for the operation.

Wire diameter: 0.8 or 1.0 mm (0.031 or 0.039 inch)

- (1) Degrease the welding area by white gasoline or the like.
- (2) Remove the oxide coat from the welding area, including its back, with a stainless steel wire brush just before welding. Welding shall be started as soon as the oxide coat is removed.

⚠ CAUTION

Do not over-grind the base of the panel.

3. Refinish the welding area by a #100-grit disk sander, and then check for any faulty welding by the visible dye penetrate testing.

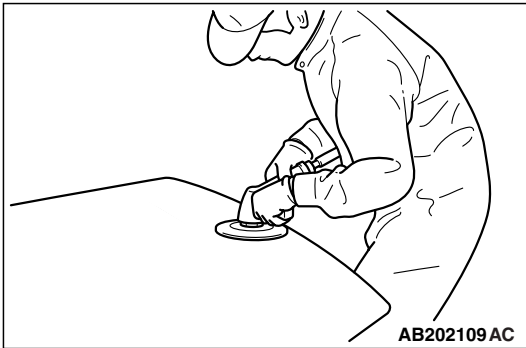
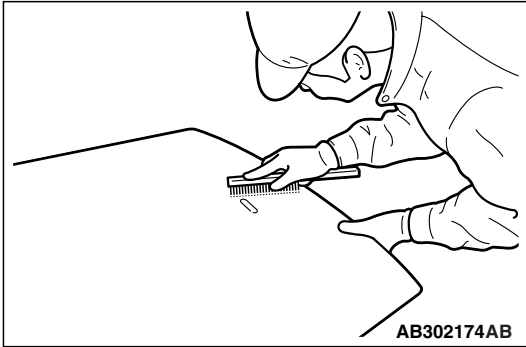
4. Check for distortion: Grind the surface with #80 to #120-grit sandpaper and then check for distortion.

⚠ CAUTION

- **The heating temperature should be approximately 250°C (482°F).**
 - **Pay particular attention to heating, because it is melted without discolouration by heat.**
 - **Cover the vicinity of the area to be heated with a wet rag or the like to prevent temperature rise and influence of heat (distortion).**
 - **Do not use a draw hammer for steel sheets because it may cause the panel crack.**
5. Remove distortion by the draw correction procedure with a flattening hammer and a burner.

⚠ CAUTION

Remove any spark spot or carbon residue on the surface by a stainless steel wire brush, because they will cause improper painting in the following process.



6. Finishing: Finish it with a #100 to #120-grit disc sander.

Other welding

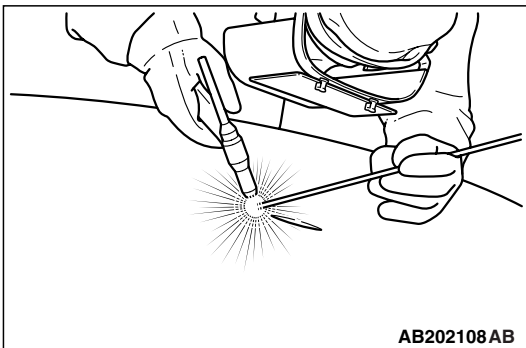
TIG WELDING

1. This welding is conducted by the same arc welding method as for MIG welding, however, it uses a welding rod instead of electrode wire.

Wire diameter: 1.6 mm (0.063 inch).

⚠ CAUTION

- Be careful to avoid excessive stretch of or damage to the panel.
- Minimize the gap of the butt joint.

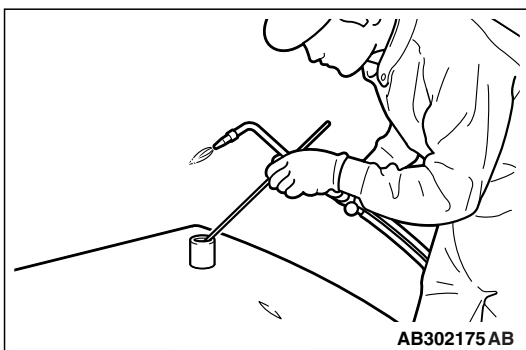


GAS WELDING (OXIDE - ACETYLENE)

If gas welding is allowed, the welding can be conducted using a welding rod and flux (oxide coat remover). However, before the welding work, do sufficient practice to avoid distortion by welding heat or poor welding.

Wire diameter: 1.6 mm (0.063 inch).

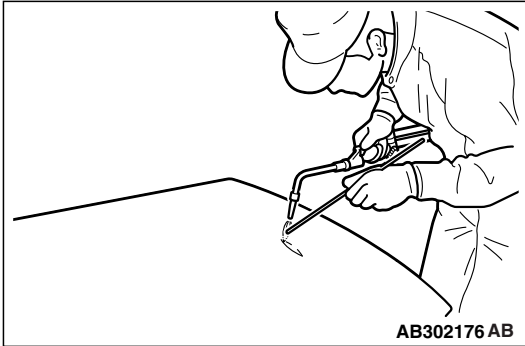
1. Heat the welding rod and bond the flux to it.



⚠ CAUTION

Keep the welding surface as horizontal as possible, because the melted welding rod flows readily.

2. While melting the flux with the burner to remove the oxide coat, conduct the welding.
3. Remove the flux residue from the panel with a stainless steel wire brush.



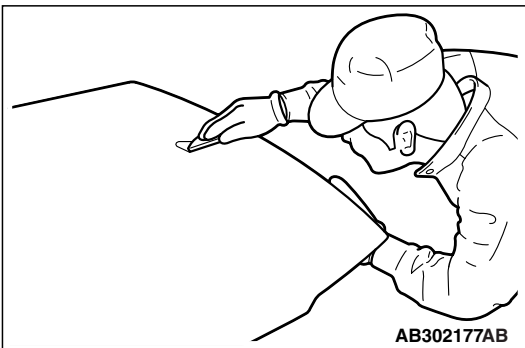
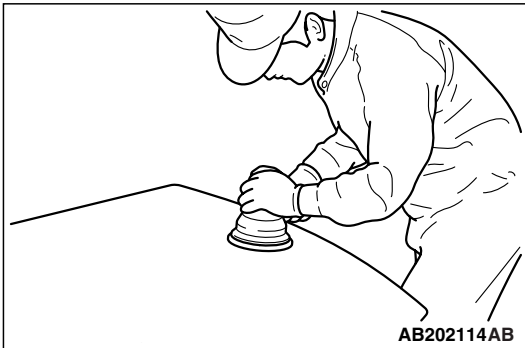
Finish with putty

1. Grind the putty-applied area with a #150 to #180-grit double-action sander.
2. Degrease and clean the putty-applied area.
3. Apply 2-liquid type epoxy primer or a pretreatment agent for aluminum.
4. Grind with a #180-grit double-action sander for cutting action.
5. Degrease and clean the putty-applied area.
6. Apply putty for metal sheets, and dry it naturally.

⚠ CAUTION

Do not dry it forcibly at 60°C (140°F) or higher.

7. Grind with a #180-grit sander.



ALUMINUM PANEL PAINT

M4030000800163

Painting in production line

Same as painting for normal steel sheets.

Precautions upon sheet metal processing

⚠ CAUTION

- **Avoid hasty grinding and minimize grinding heat.**
- **Do not dry it forcibly at higher than 60°C (140°F).**

1. Peel-off of paint film
2. Cleaning and degreasing

⚠ CAUTION

Apply 2-liquid type epoxy primer or a pretreatment agent for aluminum to the aluminum base surface.

3. Application of wash primer
4. Drying <60°C (140°F) or lower>
5. Application of primer surfacer
6. Drying <60°C (140°F) or lower>
7. Grinding
8. Cleaning and degreasing
9. Finish coating
10. Drying <60°C (140°F) or lower>

NOTE:

- *Refer to paint manufacturers' paint specifications for details.*
- *The procedure is almost the same as the repair painting procedure of anti-corrosion steel panel.*

NOTES