KIA MOTORS
The Power to Surprise™

CARNIVAL
SEDONA

Body Shop Manual

FOREWORD

This Body Shop Manual illustrates body structures and service procedures for the CARNIVAL/SEDONA.

This manual illustrates the replacement of major body panels, plastic parts, body dimensions, sealing treatment etc., in a systematic manner which is necessary for effective and lasting body repairs.
You are encouraged to become familiar with this manual and understand each section in order to perform proper repair procedures. Keep this manual in a convenient location so that it is readily available.

All information in this manual including specifications, data and illustrations is made based on the vehicles built at the time the manual was printed.

Information regarding the removal/replacement of components not specifically covered in this manual can be found in the CARNIVAL/SEDONA Service Manual. Information regarding electrical harness routing/ connections, etc. can be found in the CARNIVAL/SEDONA Electrical Troubleshooting Manual.

The descriptions and specifications contained in this manual were in effect at the time this manual was approved for printing. Kia Motors Corporation reserves the right to discontinue models at any time, or change specifications or design without notice and without incurring obligation.

Kia Motors Corporation
SEOUL, KOREA

CAUTION :
Severe engine and transaxle damage may result from the use of poor quality fuels and lubricants that do not meet Kia specifications. You must always use high quality fuels and lubricants that meet the specifications described on the specification section in the relevant group of the Workshop Manual.

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CONTENTS

IMPORTANT SAFETY NOTICE

Proper service methods and repair procedures are essential for safe, reliable operation of all motor vehicles as well as personal safety of the operator. The service procedures and descriptions in this shop manual provide general directions for a service and repair.

Procedure, techniques, tools, and parts for service including the skill of the technician vary.
It is impossible to provide advice or caution as to each case in this manual.
Accordingly, anyone who intends to use a replacement part, service procedure, or tool, which is not recommended by the vehicle manufacturer, must first assure thoroughly that neither their personal safety nor the safe operation of the vehicle will be first jeopardized by the replacement part, service procedure, or tool they select.

IN THIS MANUAL

WARNING : Remind you to be especially careful in those areas where carelessness can cause personal injury.

CAUTION : To prevent you from making errors that could damage the vehicle as well as personal injury.

NOTE : Gives you added information that will help you complete a particular procedure.

The following list contains some general WARNINGS that you should follow while working on a vehicle.

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Make sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle. If you have an automatic transaxle, set in park unless instructed otherwise for a specific operation
- Place supporters against the front and rear surfaces of the tires to help prevent the vehicle from moving
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide poisoning.
- Keep yourself and your clothing away from moving parts when the engine is running, especially the drive belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.
- Do not smoke while working on a vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle.
- When it is necessary to work under the hood, keep hands and other objects clear of the radiator fan blades! Your vehicle may be equipped with a cooling fan that may turn on, even though the ignition switch is in the OFF position. For this reason care should be taken to ensure that the radiator fan electric motor is completely disconnected when working under the hood and the engine is not running.

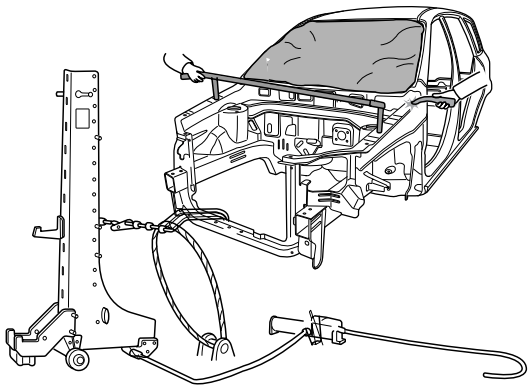
General Information

FUNDAMENTAL PROCEDURES

VEHICLE PROTECTION

1. Cover the seats before performing any procedure to keep them from getting dirty.

2. Cover all glasses, seats and mats with a heat resistant cover when welding.



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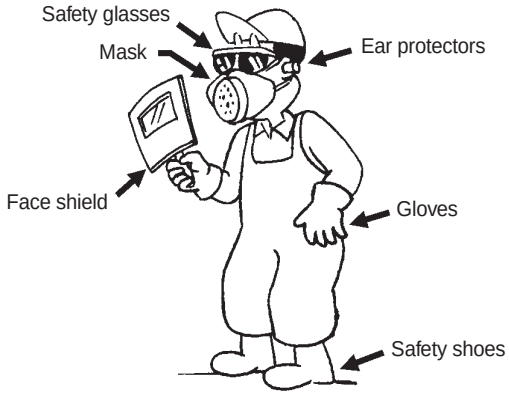
3. Protect moldings, garnishes and ornaments.

A WORD ABOUT SAFETY

1. Wear the appropriate safety equipment that is necessary for the procedure being performed.



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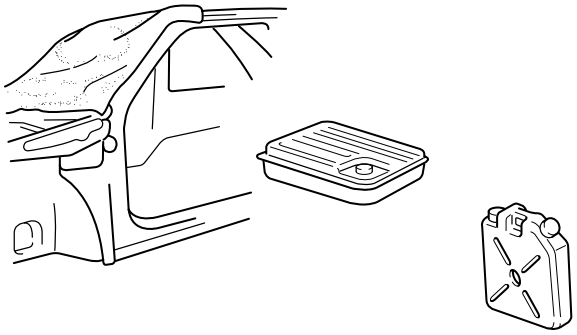
2. When welding or performing other procedures that require the use of an open flame near the fuel tank, disconnect and remove the tank and fuel pipe, and cap the pipe to prevent fuel leakage.



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WELDING PROCEDURES

Observe the following tips when welding.

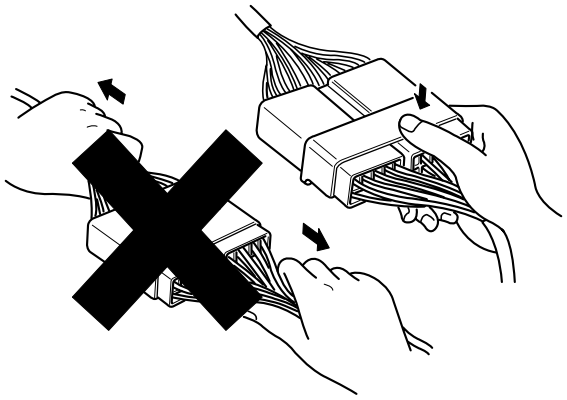
1. Wear appropriate eye protection.
2. Carefully follow the manufacturers operating instructions for the welding machine you are using.
3. Do not weld, smoke or allow open flames around volatile chemicals, cleaners or solvents or in any area where they have just been used.

BODY FRAME STRAIGHTENER

When using a frame straightener, do not enter the area where the body is being straightened by the chain.

ELECTRICAL PROCEDURES

1. Disconnect the negative battery terminal.
2. Do not pull on wires when disconnecting electrical connectors. Be careful to hold the connector itself when disconnecting it.
3. Insert the connector until it "licks" when connecting the connector.
4. Handle all electrical components with care.



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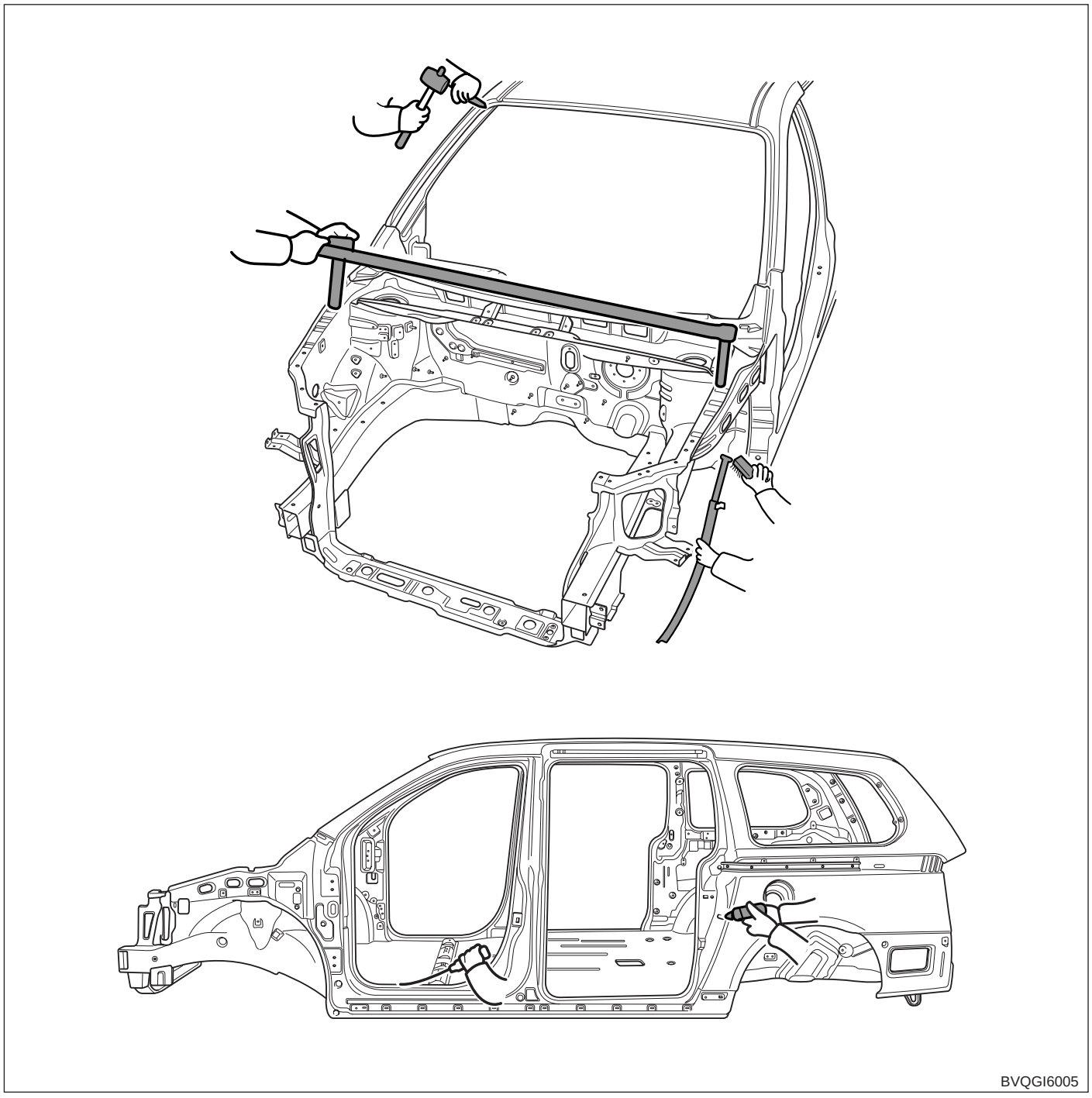
FOR BEST RESULTS

DISASSEMBLY

Measuring dimensions before beginning
Measure the dimensions of the damaged area according to the body dimension drawings before disassembling and repairing. Adjust dimensions with body frame adjuster if deformed.

Selecting cutting area
Select a cutting area that is easily accessible and that is prone to the least amount of distortion when welding.
Select an area that would allow the new part to overlap repair area by 1.2~2.0 in (30~50 mm).

Protecting body from damage
Secure the body with clamps and jacks to prevent damage to the body when working on it.



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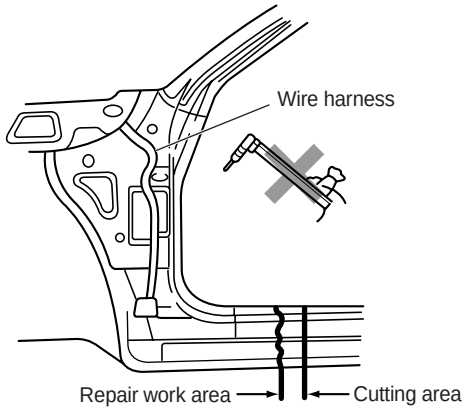
Disassembling related parts

Use caution when removing body molding and trim from the area to be worked.

Apply masking tape where needed to prevent damage to the part being removed or to the vehicle body.

Before starting repairs, check if pipes, hoses or electrical components are present near damaged area.



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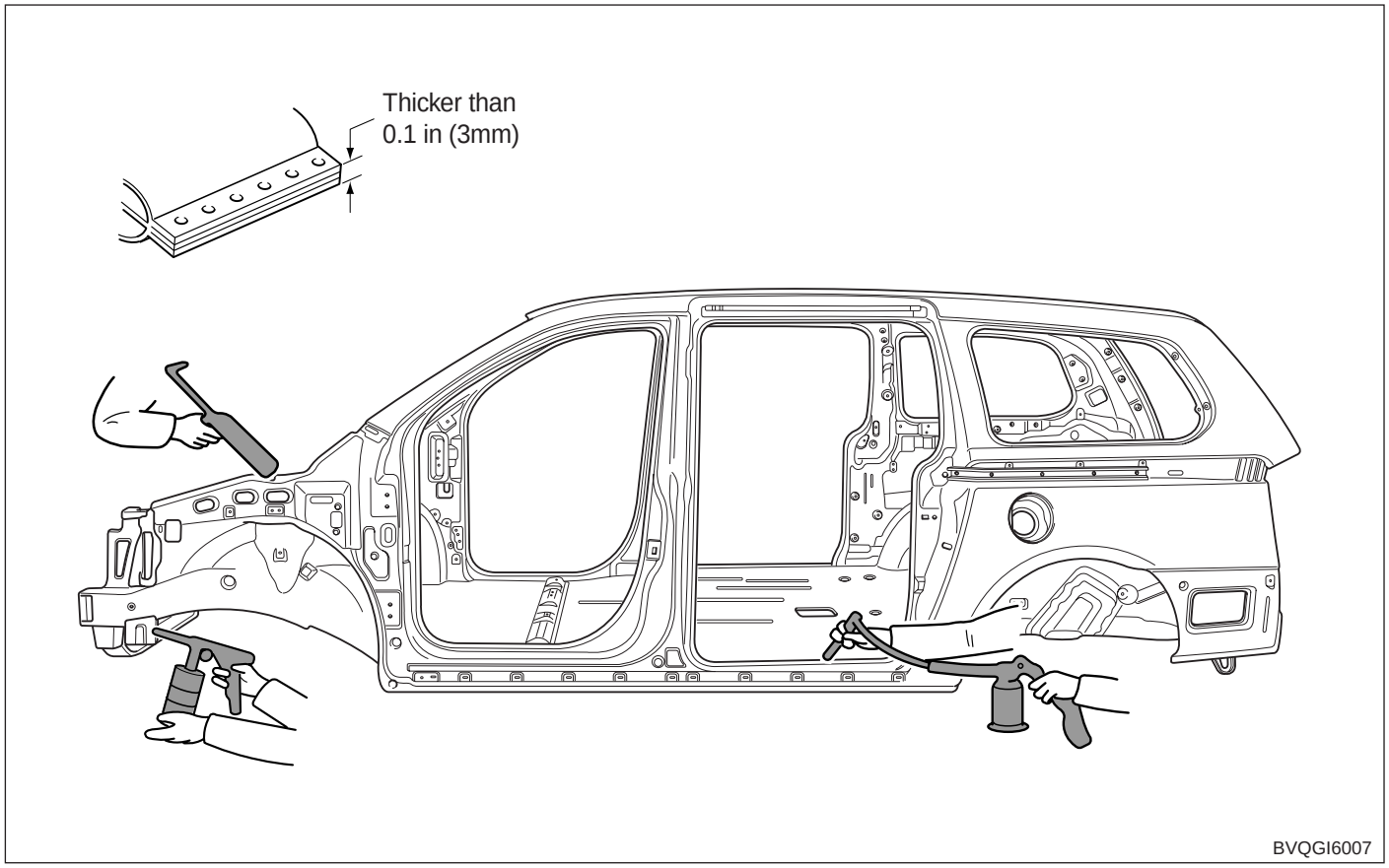
PREPARATION OF ASSEMBLY

Applying spot sealer
Remove paint from the surface of new parts and body to be spot welded, and apply spot sealer for rustproofing.

Selecting a welding method
If the thickness of the area to be welded with the panels overlapped is greater than 0.1 in (3 mm), do plug welding using a carbon arc welding machine.

Protecting body from damage
Secure the body with clamps and jacks to prevent damage to the body when working on it.



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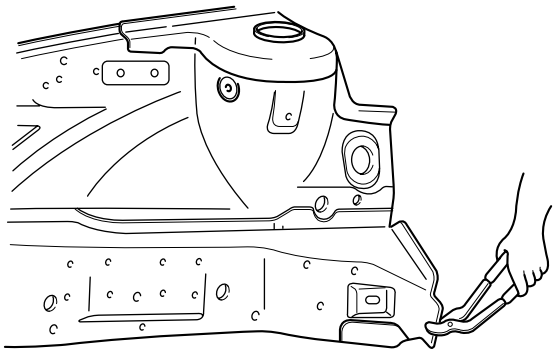
Machining holes for plug welding
Drill a hole of approximately 0.2~0.24 in (5~6 mm) in diameter in those areas which are not suitable for spot welding.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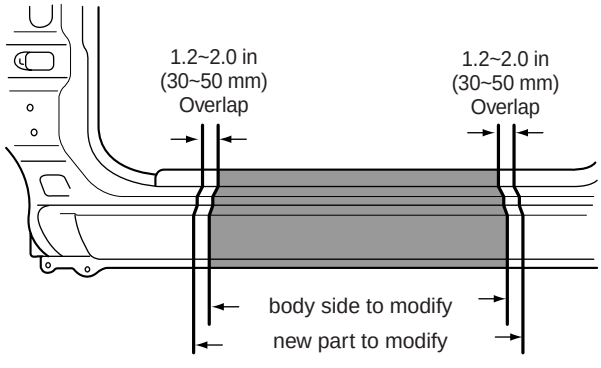
Adjusting a new part
The new part should be cut larger than the repair area, overlapping the repair area by 1.2~2.0 in (30~50 mm).



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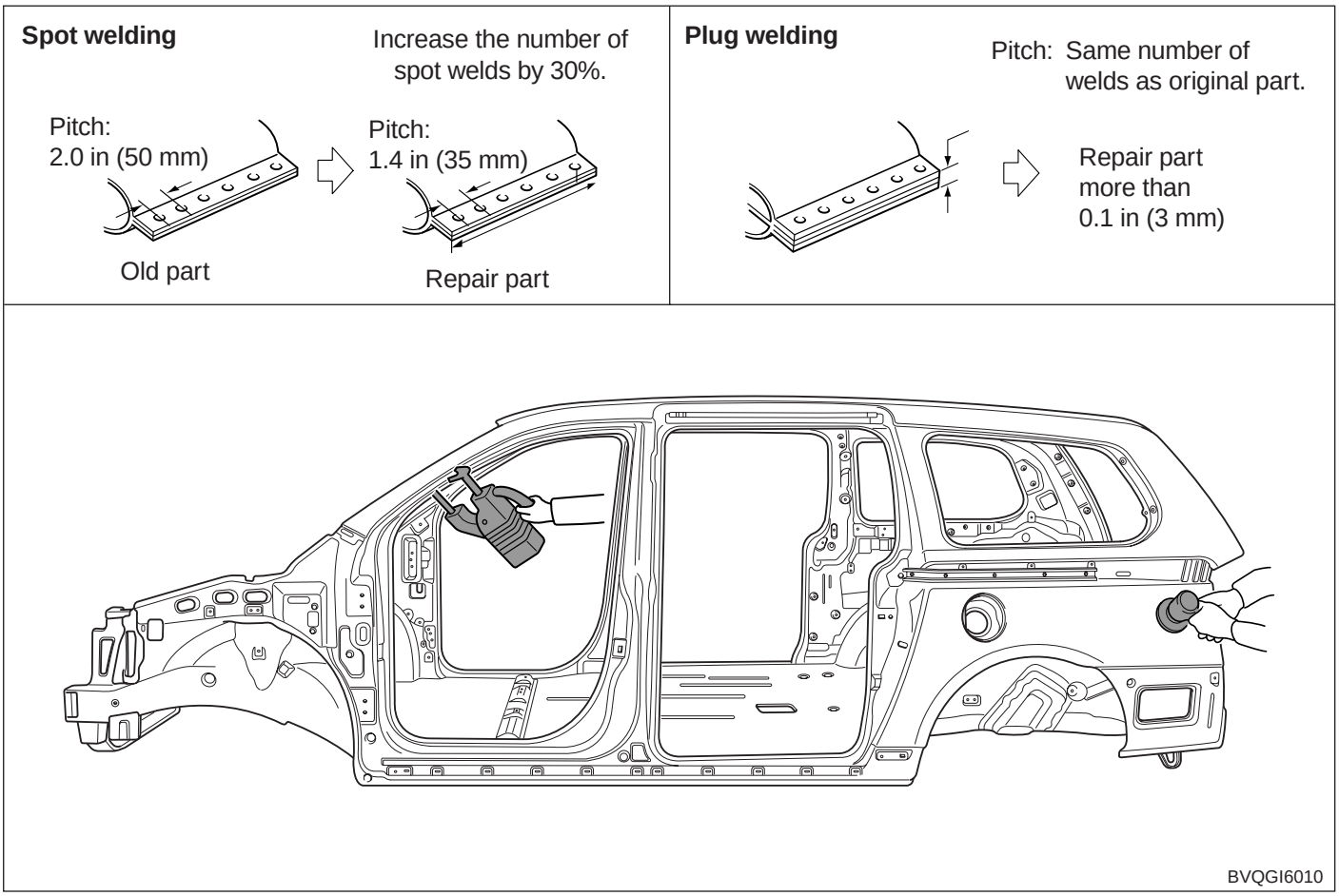
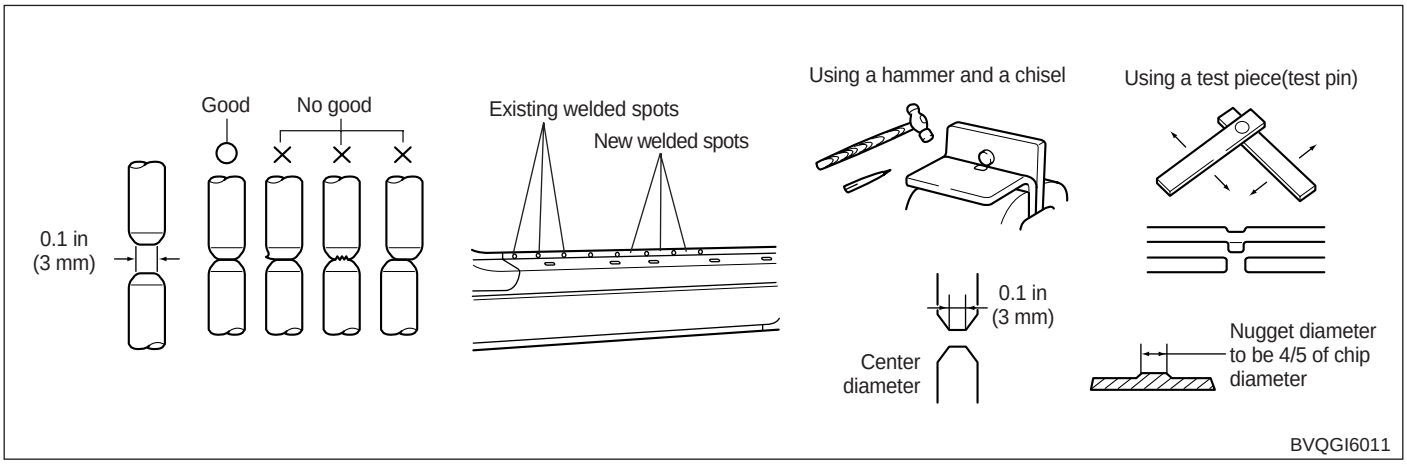
ASSEMBLY

Measuring dimensions before welding
When assembling a new part, assemble it according to the body dimensions given in Section 31, and start welding after checking the gaps with nearby parts.

Caution when welding
The number of welding points should be determined based on the criteria below:



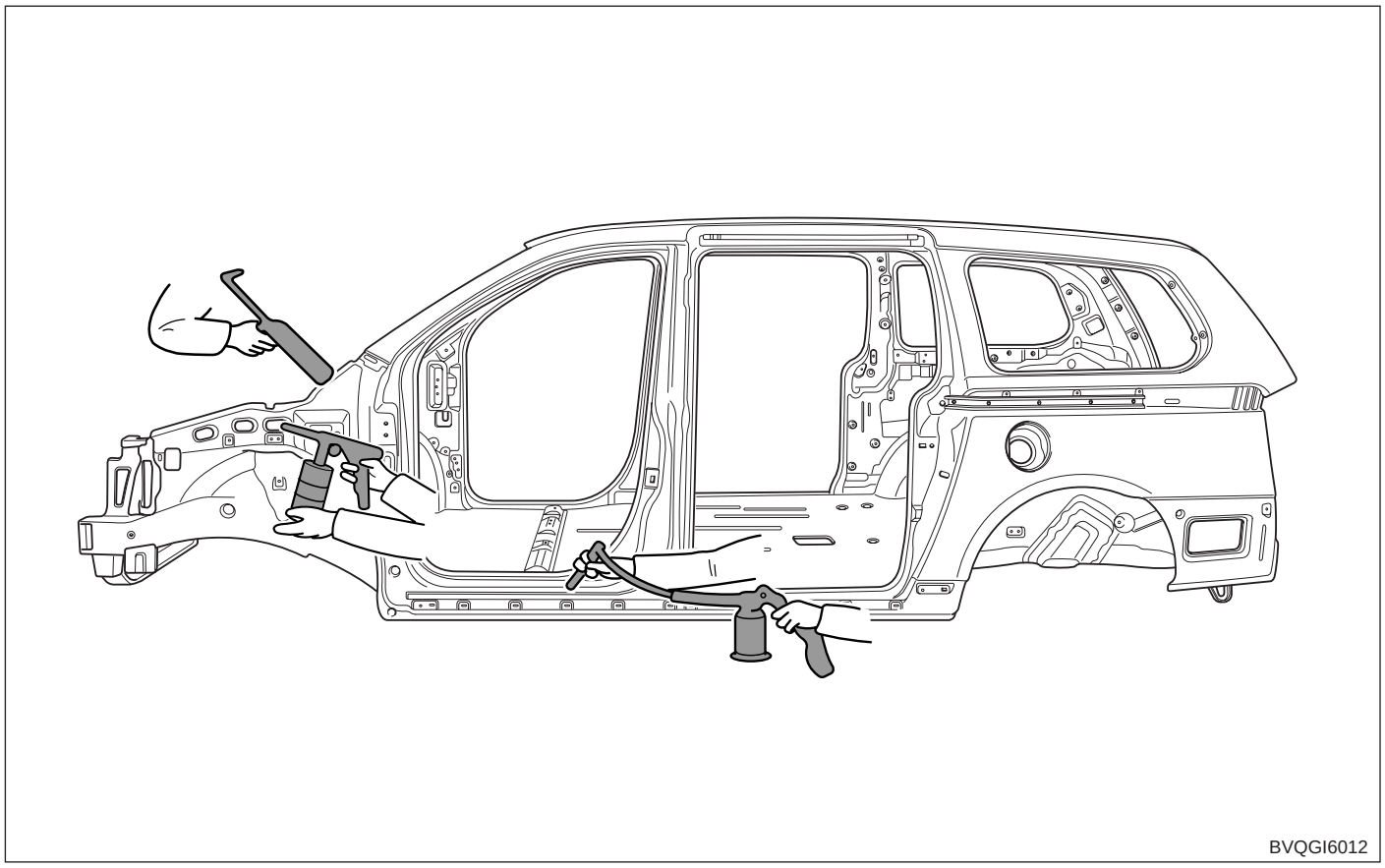
Caution when spot welding
The tip of the spot welding machine should be maintained to a minimum of 0.1 in (3 mm) because it greatly affects welding strength. When possible, spot welding should be done between the existing spot welded points.
Before and after spot welding, weld a test piece(test pin) of the same material as the body panel, and check the welding strength.



RUSTPROOF TREATMENT AFTER ASSEMBLY

Body sealing
Apply body sealer where necessary.

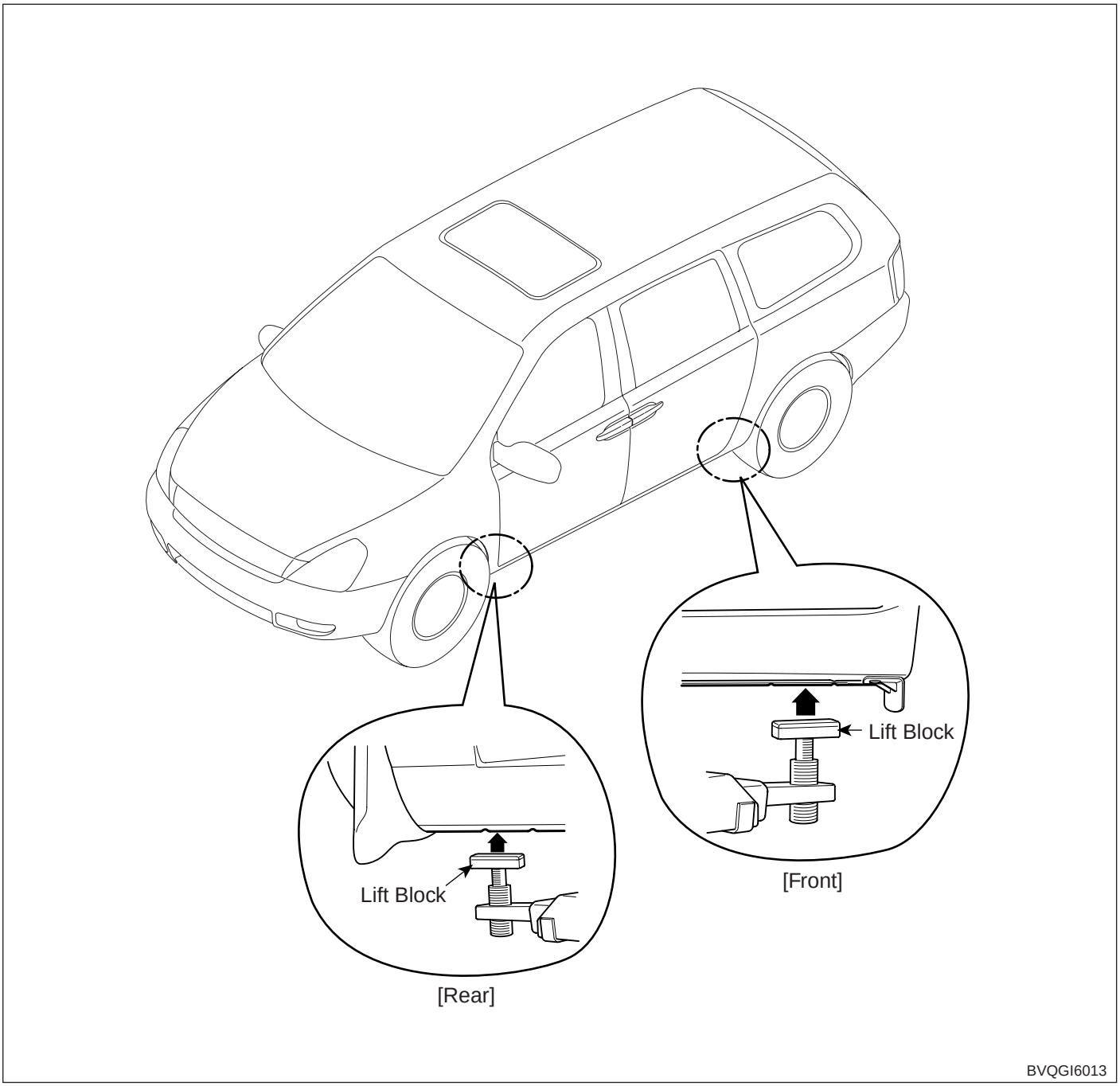
Applying rustproof material
Apply rustproofing material(wax, oil, etc.) behind welded area.



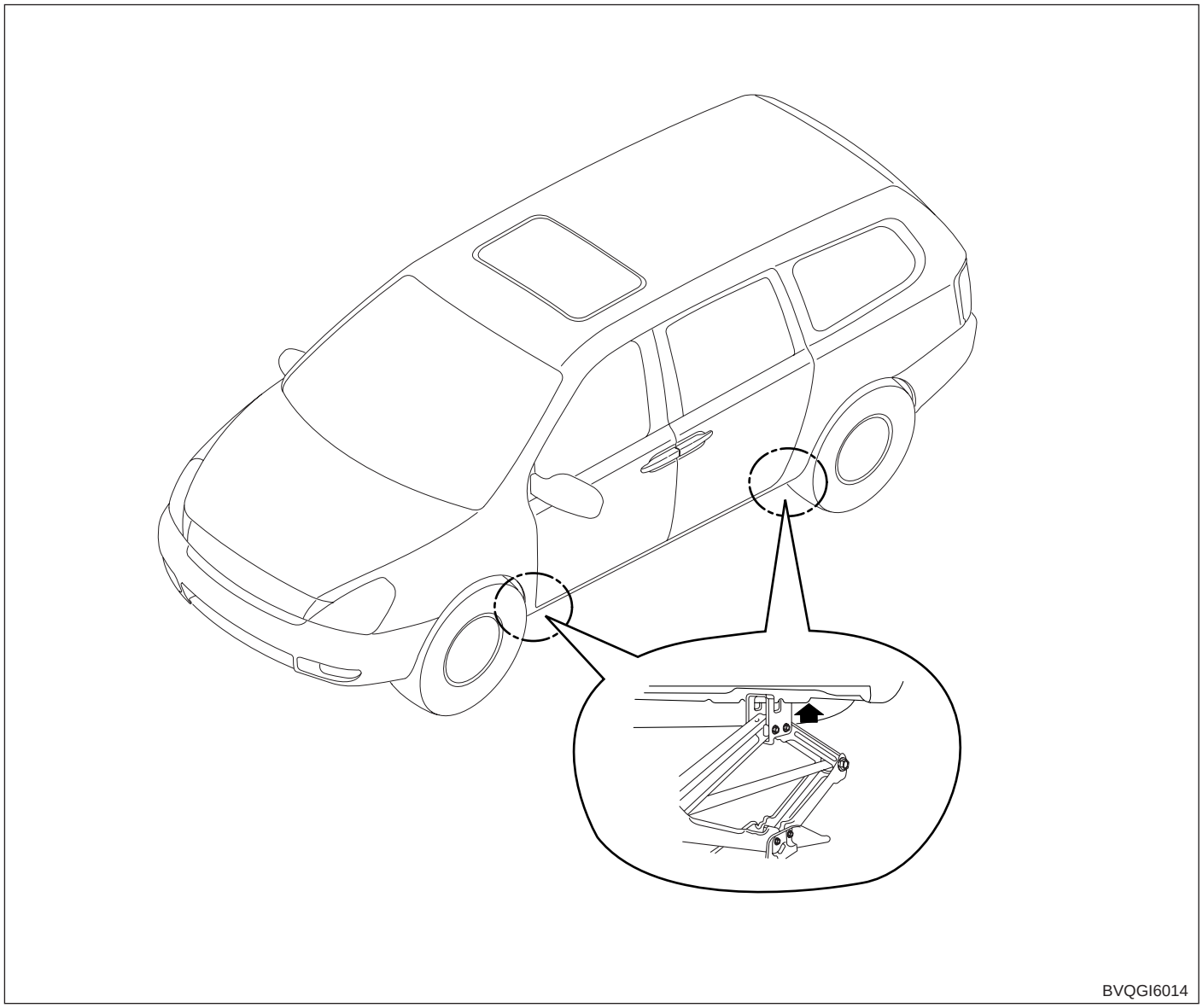
Applying undercoat
Apply undercoat on the body where necessary.

VEHICLE LIFT (2-SUPPORT TYPE) AND SAFETY STAND POSITIONS

1. Place the lift blocks under the support points as shown in the illustration
2. Raise the hoist a few inches and rock the vehicle to be sure it is firmly supported.
3. Raise the hoist to full height to inspect the lift points for secure support.



JACK SUPPORT POSITIONS



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BODY COLORS AND MAJOR SPECIFICATIONS

KIA COLOR CODES

Kia code	Paint color
7P	Cherry Kiss Cocktail
J9	Evening Sailing Gold
K5	Velvet Indigo Blue
K9	Crystal Blue
6C	Clear Silver
7V	Olive Gray
9B	Midnight Black
U4	White Pearl
UD	Clear White

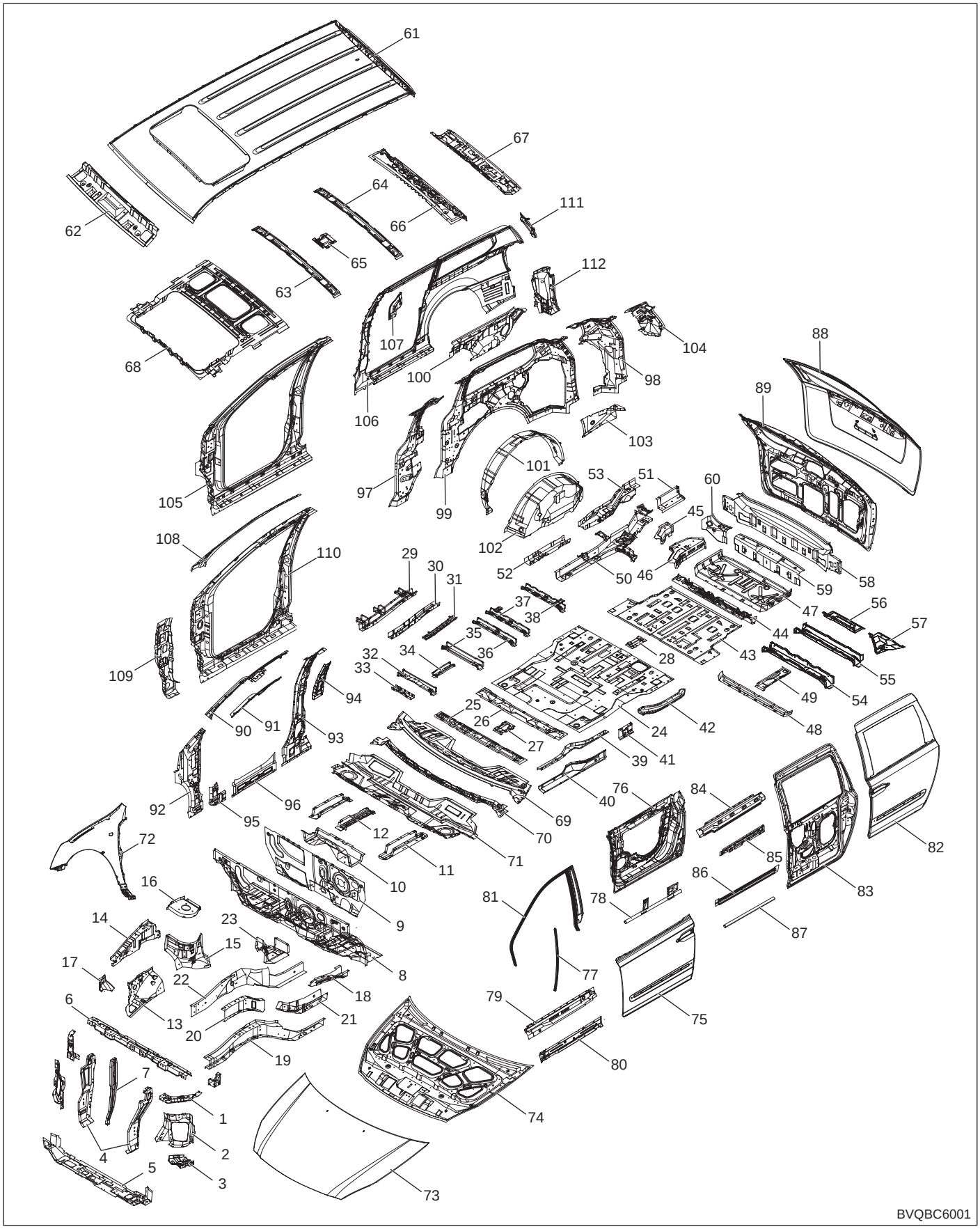
PAINT MANUFACTURE CODES

Kia code	Color name	Dupont	Spies Hecker	Standox	BASF	Akzo Nobel	PPG
7P	Cherry Kiss Cocktail	X3089	769042	7P	7P	KIA9322	7P
J9	Evening Sailing Gold	X3088	769041	J9	J9	KIA9106	J9
K5	Velvet Indigo Blue	X3090	769043	K5	K5	KIA9546	K5
K9	Crystal Blue	X3091	769044	K9	K9	KIA9545	K9
6C	Clear Silver	X1135	746556	6C	6C	KIA9742	6C
7V	Olive Gray	X2188	760711	7V	7V	KIA9741	7V
9B	Midnight Black	M0510	75343	9B	9B	KIA9411	9B
U4	White Pearl	M7817	744249	U4	U4	KIA9405	U4
UD	Clear White	F2756	755719	UD	UD	KIA4004	UD

Body Construction

BODY COMPONENTS

Body construction will sometimes differ depending on specifications and country of destination. Therefore, please keep in mind that the information contained herein is based on vehicles for general destination.

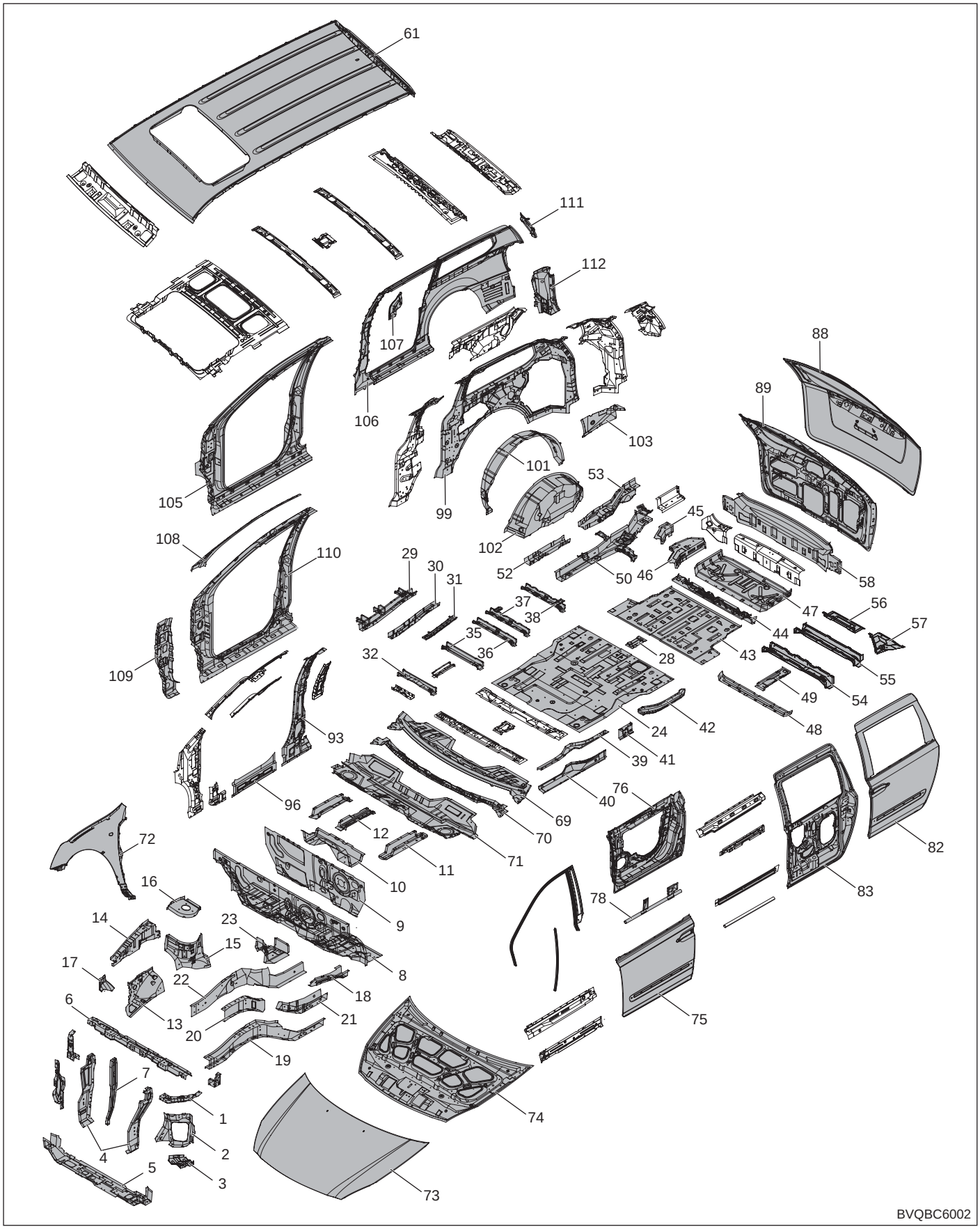


BVQBC6001

1. Radiator support side member assembly
2. Head lamp support panel
3. Fender mounting braket assembly
4. Radiator support side member assembly
5. Radiator support lower outer member assembly
6. Radiator upper center member assembly
7. Radiator center stay member assembly
8. Dash panel assembly
9. Dash rainforcement assembly
10. Dash lower member assembly
11. Dash lower outer member assembly
12. Dash lower outer center member assembly
13. Fender apron inner lower panel assembly
14. Fender apron inner upper panel assembly
15. Front shock absorber housing panel assembly
16. Front shock absorber housing upper panel
17. Fender apron inner front support
18. Engine mounting bracket assembly
19. Front side inner member assembly
20. Front side member inner reinforcement assembly
21. Front side member inner rear reinforcement assembly
22. Front side member outer member assembly
23. Side cross front member
24. Center floor panel
25. Front seat cross front member assembly
26. Front seat cross rear member assembly
27. Console mounting front bracket assembly
28. Console mounting rear bracket assembly
29. Center floor side member
30. Center floor side member reinforcement assembly
31. Center floor side member upper reinforcement
32. No.1 cross member reinforcement
33. No.1 cross member reinforcement
34. No.1 cross member support reinforcement
35. No.1 cross member assembly
36. No.3 cross member assembly
37. No.3 cross member assembly
38. No.3 cross member assembly
39. Side sill inner upper panel
40. Side sill inner lower panel
41. Side sill inner rear panel
42. Rail guide lower panel assembly
43. Rear floor panel
44. Rear floor extension assembly
45. Rear floor side reinforcement
46. Rear floor side panel assembly
47. Rear floor rear panel
48. Rear floor rear cross member assembly
49. Rear towing hook bracket assembly
50. Rear floor side member
51. Rear floor side member extension assembly
52. Rear floor side front reinforcement assembly
53. Rear floor side rear reinforcement assembly
54. No.4 cross member assembly
55. No.5 cross member assembly
56. No.6 cross member
57. No.6 cross gusset
58. Back panel
59. Rear transverse member
60. Rear transverse side member
61. Roof panel
62. Roof front lower rail assembly
63. Roof No.2 rail
64. Roof No.2 rail
65. Room lamp mounting bracket
66. Roof rear upper rail assembly
67 Roof rear lower rail
68. Sun roof rack front bracket assembly
69. Cowl top outer panel
70. Cowl top outer reinforcement
71. Cowl inner lower panel assembly
72. Fender panel
73. Hood outer panel
74. Hood inner panel
75. Front door outer panel
76. Front door inner panel
77. Front door quadrant channel
78. Front door reinforcement beam
79. Front door belt outer rail
80. Front door belt inner rail
81. Front door frame assembly
82. Rear door outer panel
83. Rear door inner panel
84. Rear door belt outer rail
85. Rear door belt inner rail assembly
86. Rear door outer rail
87. Rear door beam
88. Tail gate outer panel
89. Tail gate inner panel
90. Front inner upper pillar assembly
91. Side inner upper reinforcement assembly
92. Front inner lower pillar assembly
93. Center pillar inner panel assembly
94. Front seatbelt upper mounting bracket assembly
95. Front pillar inner lower reinforcement assembly
96. Sill side outer front reinforcement
97. Quarter inner front reinforcement
98. Rear side belt upper mounting reinforcement assembly
99. Quarter inner panel
100. Quarter inner belt reinforcement assembly
101. Wheel house outer panel
102. Rear wheel house inner panel assembly
103. Quarter inner rear lower extension assembly
104. D pillar reinforcement gusset assembly
105. Front side outer panel
106. Front side outer panel
107. Fender rear upper reinforcement
108. Front pillar outer upper reinforcement
109. Front pillar outer lower reinforcement
110. Front side outer panel
111. Quarter outer rear upper extension
112. Rear combination lamp housing panel

ZINC-GALVANIZED STEEL PANELS

Becavanized steel panel has excellent resistance, it tis used in areas which have a high possibility of painting deficiency below.



BVQBC6002

1. Radiator support side member assembly
2. Head lamp support panel
3. Fender mounting braket assembly
4. Radiator support side member assembly
5. Radiator support lower outer member assembly
6. Radiator upper center member assembly
7. Radiator center stay member assembly
8. Dash panel assembly
9. Dash rainforcement assembly
10. Dash lower member assembly
11. Dash lower outer member assembly
12. Dash lower outer center member assembly
13. Fender apron inner lower panel assembly
14. Fender apron inner upper panel assembly
15. Front shock absorber housing panel assembly
16. Front shock absorber housing upper panel
17. Fender apron inner front support
18. Engine mounting bracket assembly
19. Front side inner member assembly
20. Front side member inner reinforcement assembly
21. Front side member inner rear reinforcement assembly
22. Front side member outer member assembly
23. Side cross front member
24. Center floor panel
25. Front seat cross front member assembly
26. Front seat cross rear member assembly
27. Console mounting front bracket assembly
28. Console mounting rear bracket assembly
29. Center floor side member
30. Center floor side member reinforcement assembly
31. Center floor side member upper reinforcement
32. No.1 cross member reinforcement
33. No.1 cross member reinforcement
34. No.1 cross member support reinforcement
35. No.1 cross member assembly
36. No.3 cross member assembly
37. No.3 cross member assembly
38. No.3 cross member assembly
39. Side sill inner upper panel
40. Side sill inner lower panel
41. Side sill inner rear panel
42. Rail guide lower panel assembly
43. Rear floor panel
44. Rear floor extension assembly
45. Rear floor side reinforcement
46. Rear floor side panel assembly
47. Rear floor rear panel
48. Rear floor rear cross member assembly
49. Rear towing hook bracket assembly
50. Rear floor side member
51. Rear floor side member extension assembly
52. Rear floor side front reinforcement assembly
53. Rear floor side rear reinforcement assembly
54. No.4 cross member assembly
55. No.5 cross member assembly
56. No.6 cross member
57. No.6 cross gusset
58. Back panel
59. Rear transverse member
60. Rear transverse side member
61. Roof panel
62. Roof front lower rail assembly
63. Roof No.2 rail
64. Roof No.2 rail
65. Room lamp mounting bracket
66. Roof rear upper rail assembly
67 Roof rear lower rail
68. Sun roof rack front bracket assembly
69. Cowl top outer panel
70. Cowl top outer reinforcement
71. Cowl inner lower panel assembly
72. Fender panel
73. Hood outer panel
74. Hood inner panel
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87. Rear door beam
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91. Side inner upper reinforcement assembly
92. Front inner lower pillar assembly
93. Center pillar inner panel assembly
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95. Front pillar inner lower reinforcement assembly
96. Sill side outer front reinforcement
97. Quarter inner front reinforcement
98. Rear side belt upper mounting reinforcement assembly
99. Quarter inner panel
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102. Rear wheel house inner panel assembly
103. Quarter inner rear lower extension assembly
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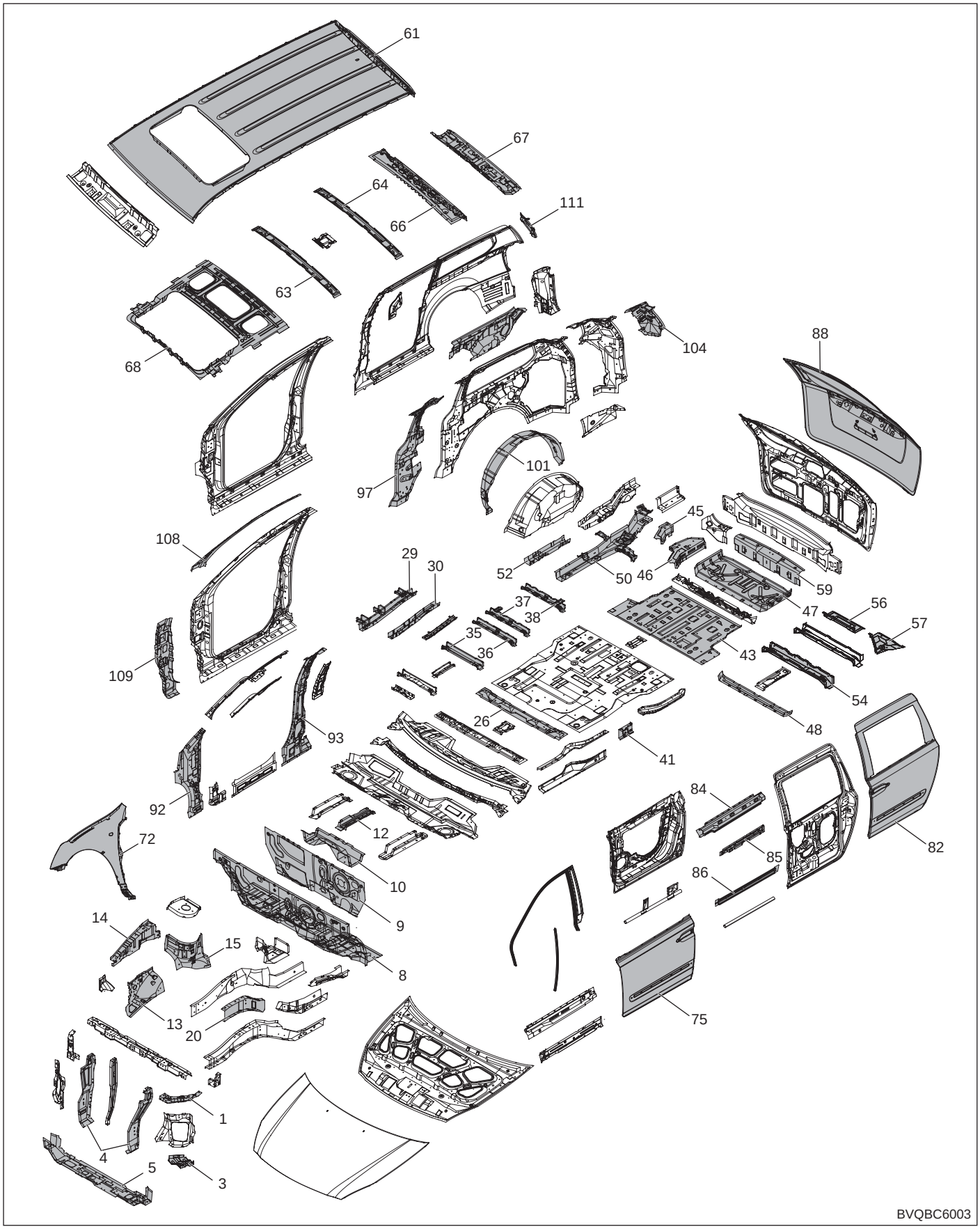
106. Front side outer panel
107. Fender rear upper reinforcement
108. Front pillar outer upper reinforcement
109. Front pillar outer lower reinforcement
110. Front side outer panel
111. Quarter outer rear upper extension
112. Rear combination lamp housing panel

HIGH STRENGTH STEEL PANELS

Because high strength steel panel has excellent resistance, it is used in areas which have a high posibility of painting deficiency below.



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30. Center floor side member reinforcement assembly
31. Center floor side member upper reinforcement
32. No.1 cross member reinforcement
33. No.1 cross member reinforcement
34. No.1 cross member support reinforcement
35. No.1 cross member assembly
36. No.3 cross member assembly
37. No.3 cross member assembly
38. No.3 cross member assembly
39. Side sill inner upper panel
40. Side sill inner lower panel
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106. Front side outer panel
107. Fender rear upper reinforcement
108. Front pillar outer upper reinforcement
109. Front pillar outer lower reinforcement
110. Front side outer panel
111. Quarter outer rear upper extension
112. Rear combination lamp housing panel

Body Dimensions

GENERAL

1. Basically, all measurements in this manual are taken with a tracking gauge.

2. When a measuring tape is used, check to be sure there is no elongation, twisting or bending.

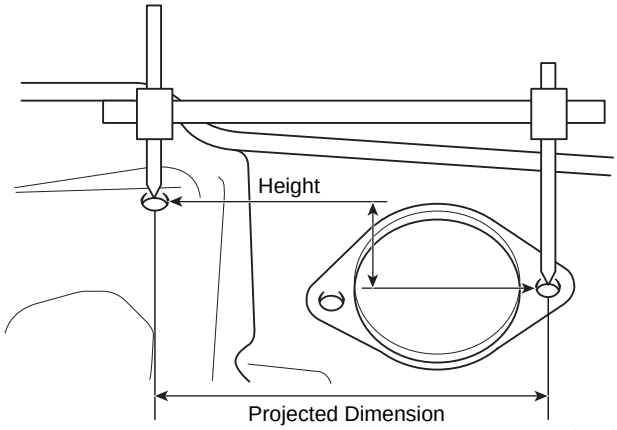
3. For measuring dimensions, both projected dimension and actual-measurement dimension are used in this manual.

MEASUREMENT METHOD

PROJECTED DIMENSIONS

1. These are the dimensions measured when the measurement points are projected into the reference plane, and are the reference dimensions used for body alterations.

2. If the length of the tracking gauge probes are adjustable, make the measurement by lengthening one probe by the amount equivalent to the difference in height of the two surfaces.



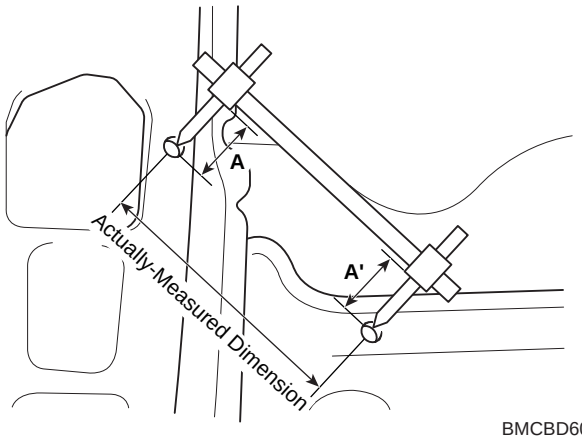
BMCBD6001

ACTUAL-MEASUREMENT DIMENSIONS

1. These dimensions indicate the actual linear distance between measurement points, and are the reference dimensions for use if a tracking gauge is used for measurement.

2. Measure by first adjusting both probes to the same length (A=A')

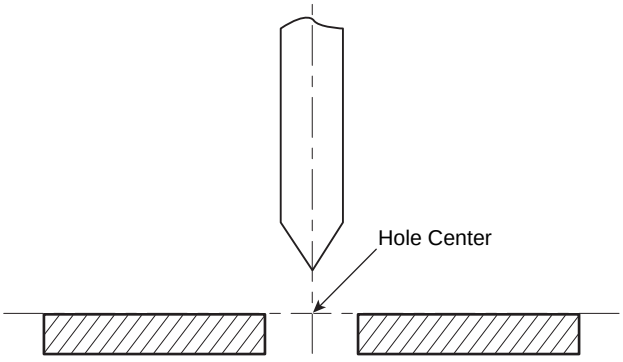
CAUTION
Check the probes and gauge itself to make sure there is no free play.



BMCBD6002

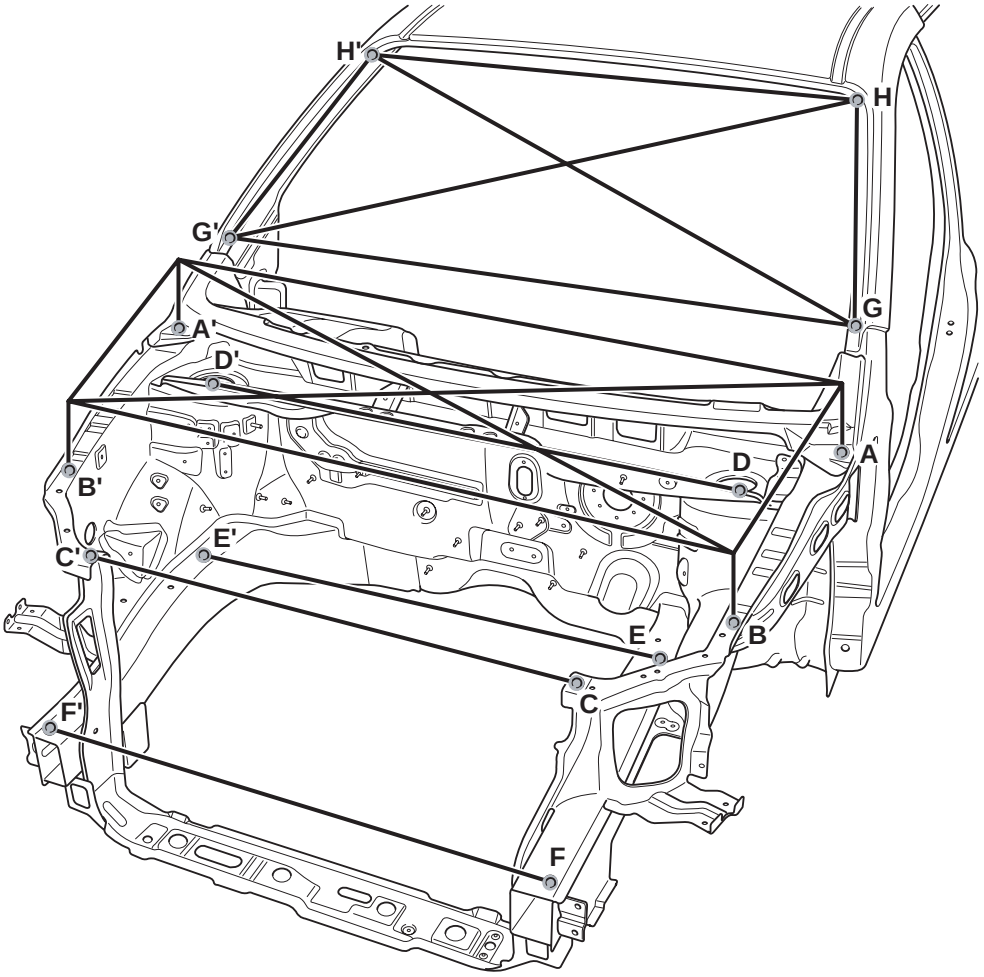
MEASUREMENT POINT

1. Measurements should be taken at the hole center.



BMCBD6003

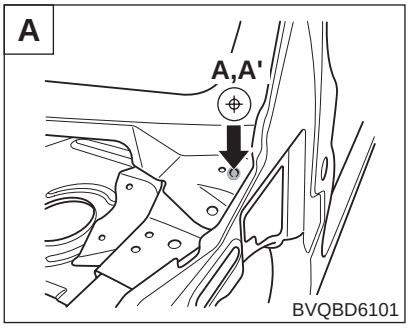
FRONT BODY



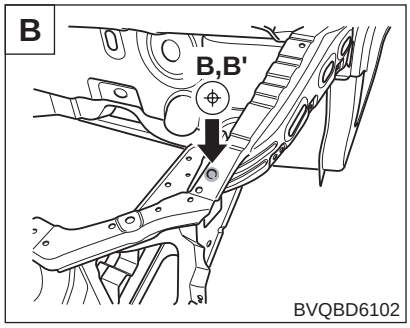
BVQBD6100

* These dimensions indicated in this figure are actual-measurement dimensions.

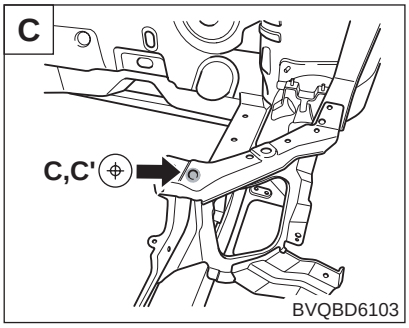
Point symbol	A-A'	A-B	A-B'	B-B'	C-C'	D-D'	E-E'	F-F'
Length(mm)	1660	584.4	584.4	1484.8	1071.1	1310.5	1104.1	1120
Point symbol	**G-G'**	**H-H'**	**H-G**	**H-G'**				
Length(mm)	1552.1	1273	1562.5	1562.5				



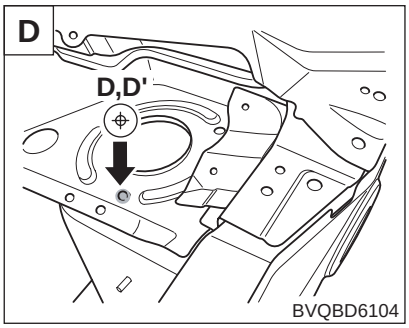
Hood hinge mounting hole (ø12)



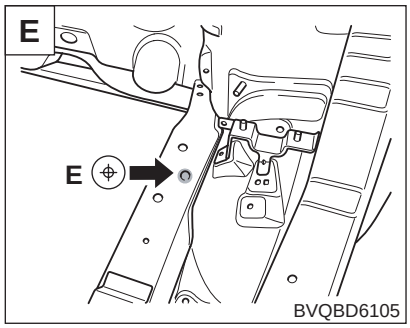
Fender mounting hole (ø8)



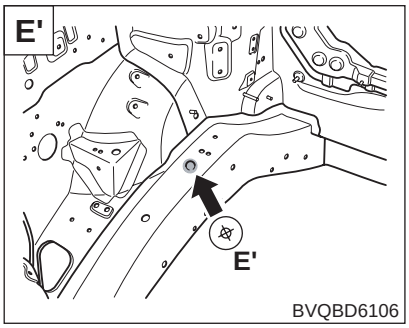
Radiator upper member mounting hole (ø8)



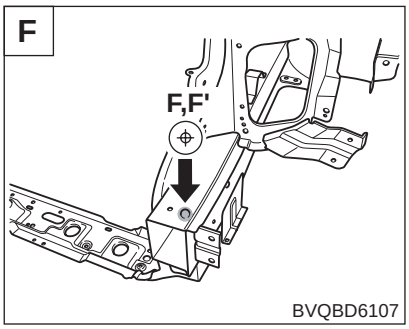
Front strut mounting hole (ø14)



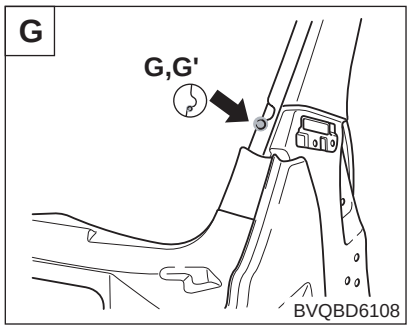
Transaxle bracket mounting hole (ø12)



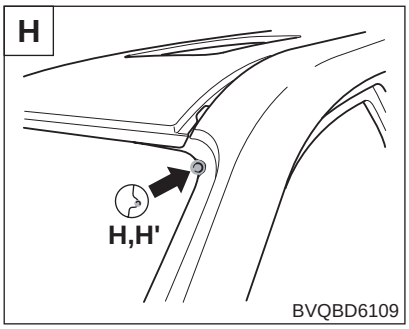
Engine bracket mounting hole (ø18)



Front bumper bracket mounting hole (ø9)

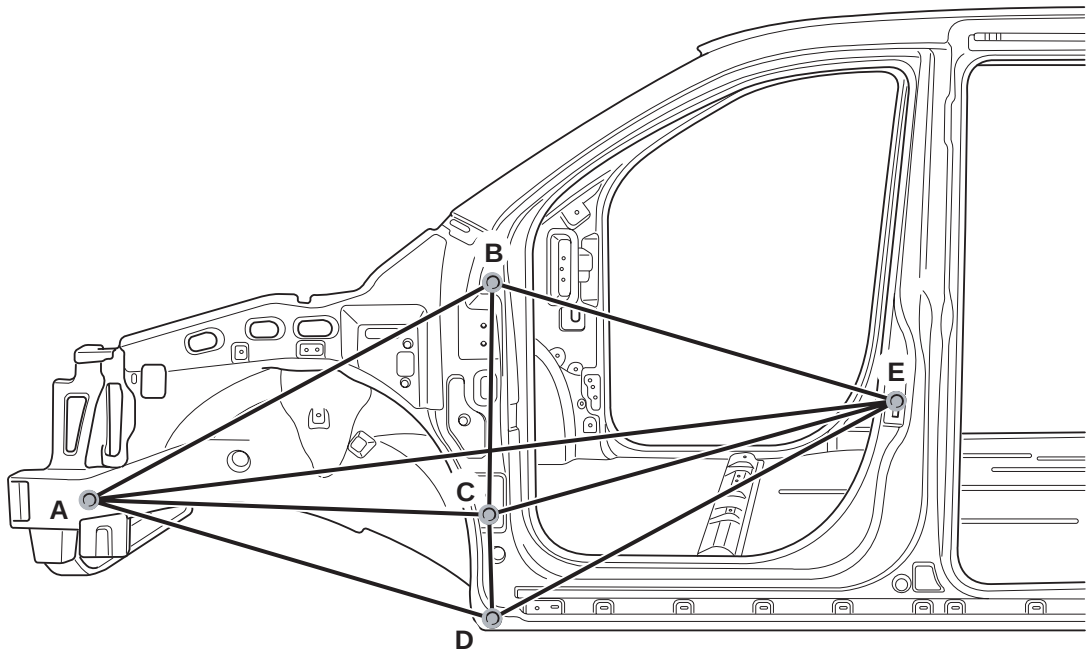


Location notch



Location notch

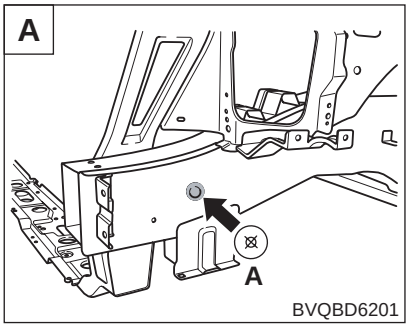
SIDE BODY (FRONT)



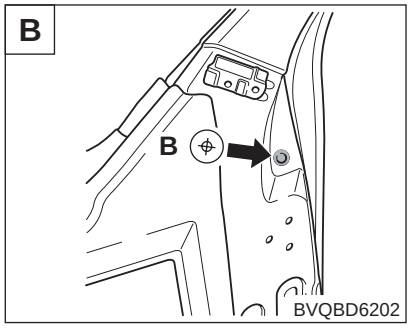
BVQBD6200

* These dimensions indicated in this figure are actual-measurement dimensions.

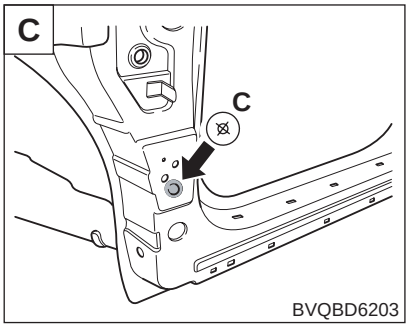
Point symbol	A-B	A-C	A-D	B-C	C-D	B-E	C-E	D-E
Length(mm)	1244.9	1119.4	1119.0	536.4	301.7	1005.8	1005.8	1126.2
Point symbol	A-E							
Length(mm)	2079.4							



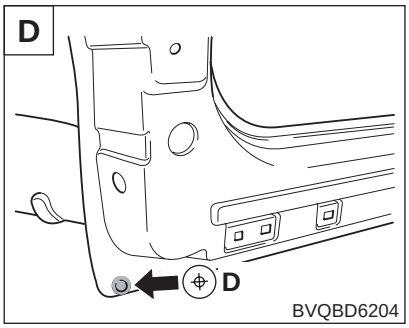
Tooling hole (ø16)



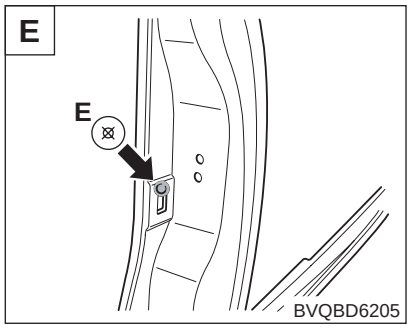
Front fender mounting hole (ø10)



Front door hinge mounting hole (ø13)

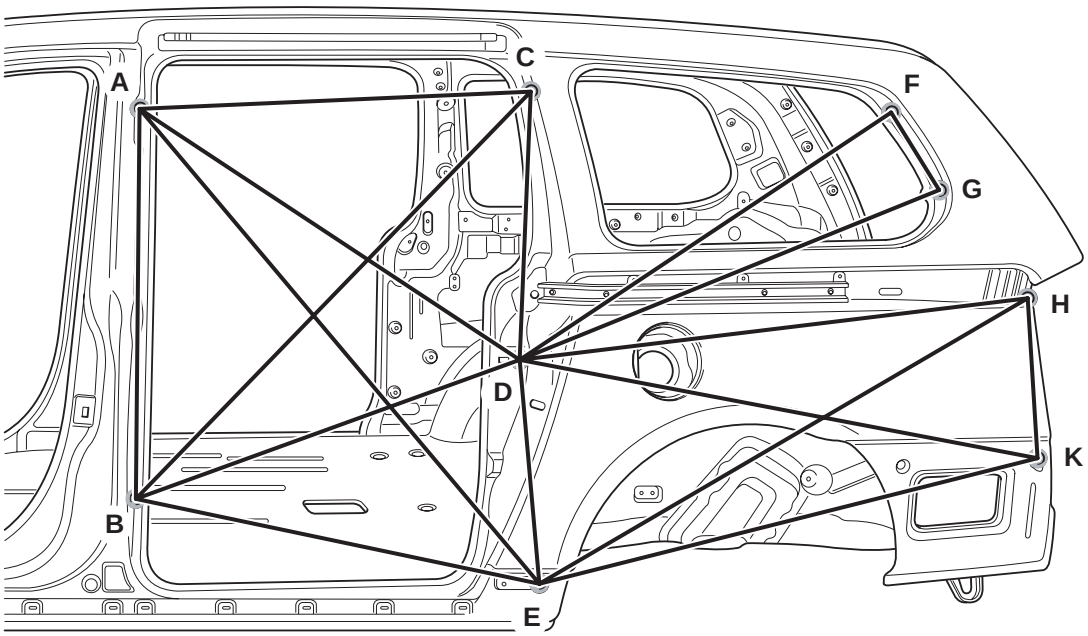


Front fender mounting hole (ø10)



Front door switch mounting hole (R9.2X9.2)

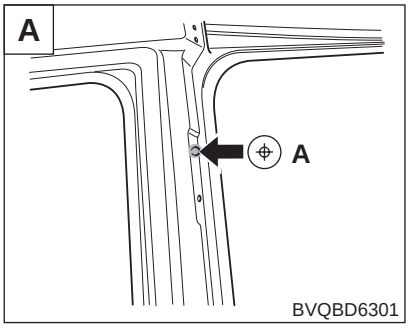
SIDE BODY (REAR)



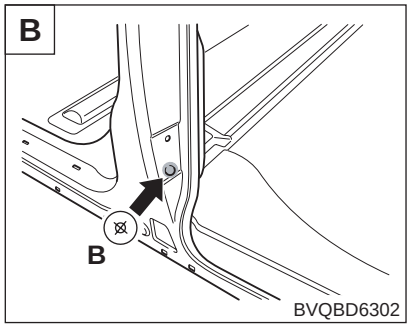
BVQBD6300

* These dimensions indicated in this figure are actual-measurement dimensions.

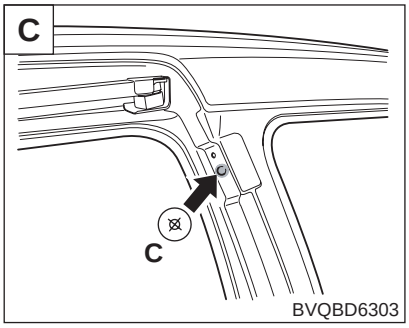
Point symbol	A-B	A-C	A-D	A-E	B-C	B-D	B-E	C-D
Length(mm)	913.6	959.7	1077	1479.8	1377.8	968	1000	658.9
Point symbol	D-E	D-F	D-G	D-H	D-K	E-H	E-K	H-K
Length(mm)	535.3	1151.5	1153.1	1327.6	1353.2	1432	1303.1	398.4
Point symbol	F-G							
Length(mm)	231.0							



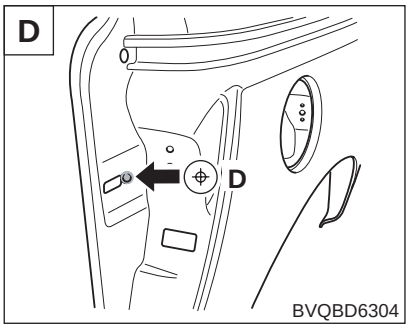
Rear door stopper mounting hole (ø10)



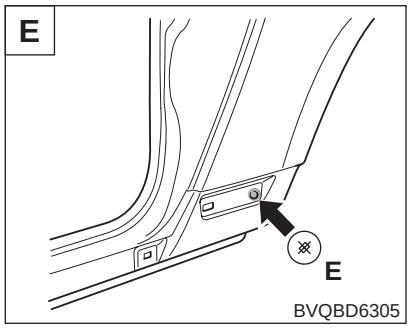
Rear door stopper mounting hole (ø10)



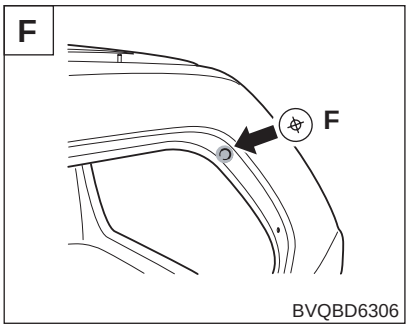
Qurter glass guide mounting hole (S6.2X8)



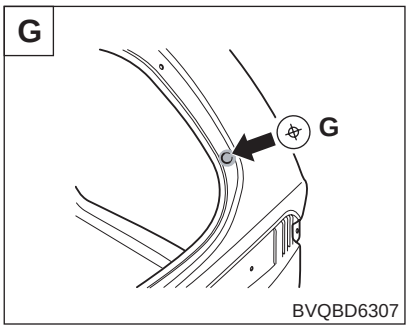
Rear door switch mounting hole (ø8)



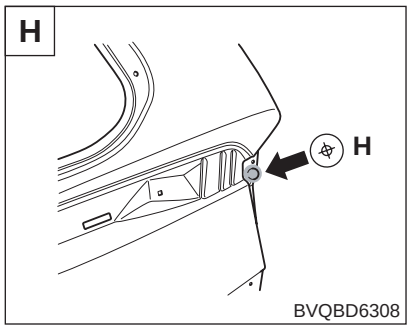
Side garnish mounting hole (R9X12)



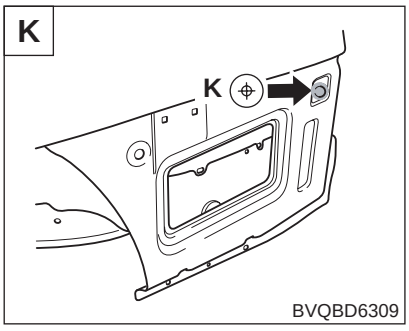
Qurter glass stopper mounting hole (ø8.5)



Qurter glass stopper mounting hole (ø8.5)

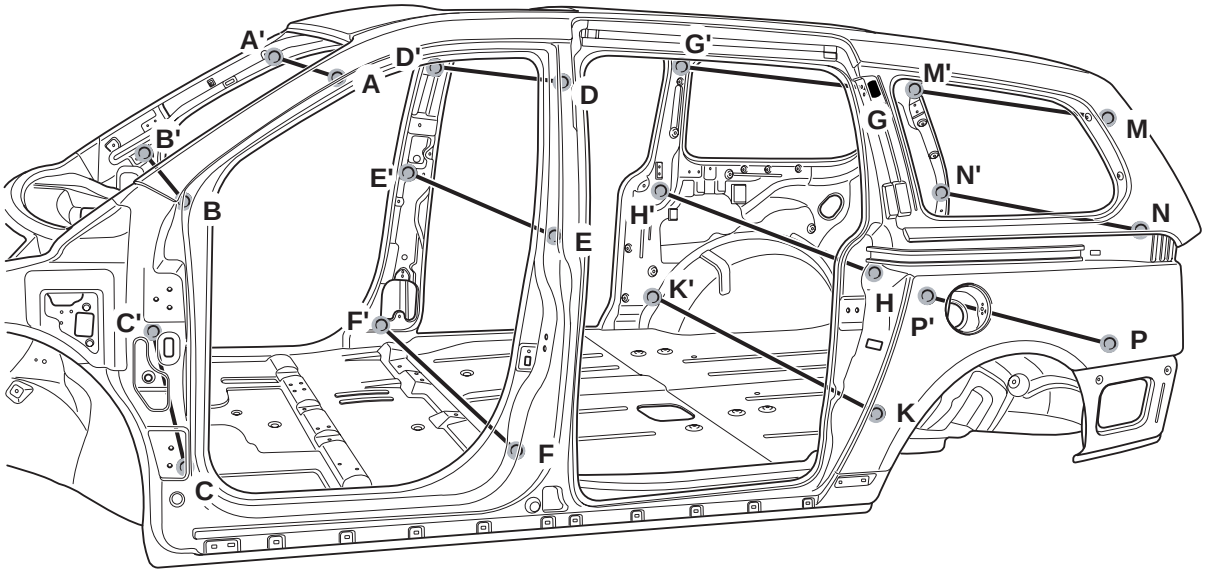


Center rail cover mounting hole (ø10)



Rear bumper mounting hole (ø11)

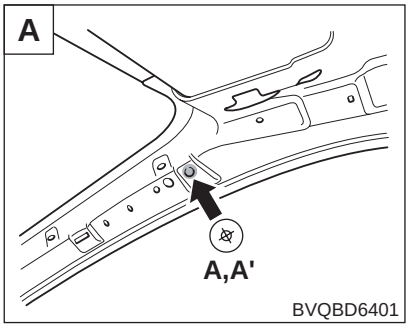
INTERIOR A



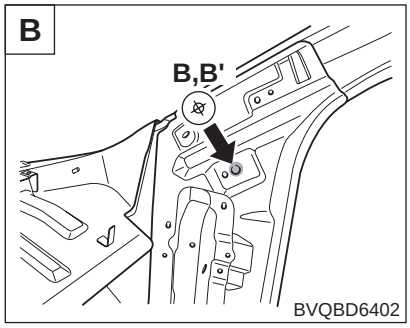
BVQBD6400

* These dimensions indicated in this figure are actual-measurement dimensions.

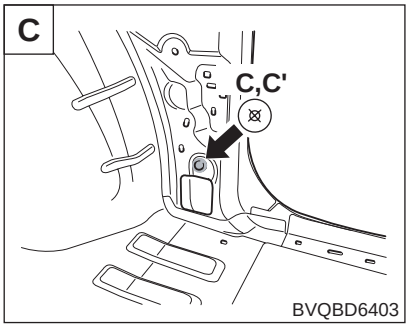
Point symbol	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'	G-G'	H-H'
Length(mm)	1315.9	1525.9	1550.0	1279.7	1572.0	1569.2	1291.2	1593.3
Point symbol	**K-K'**	**M-M'**	**N-N'**	**P-P'**				
Length(mm)	1639.5	1106.0	1293.0	1317.1				



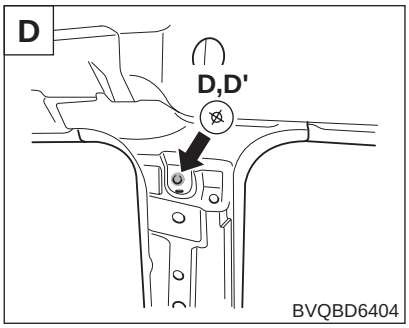
A pillar trim mounting hole (ø8.5)



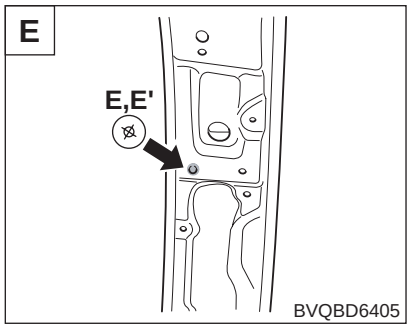
Curtain airbag mounting hole (ø6.6)



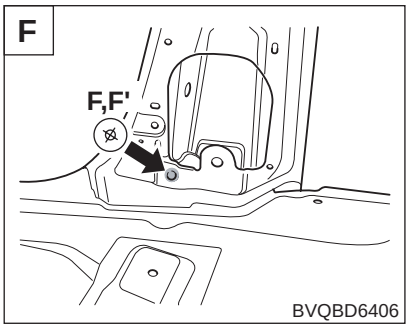
A pillar trim mounting hole (ø8.5)



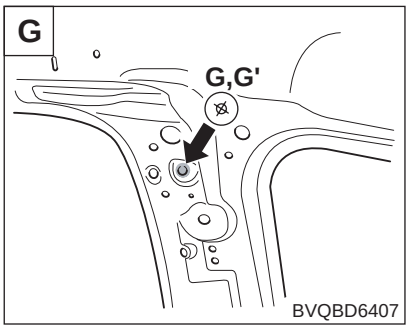
B pillar trim mounting hole (ø6.6)



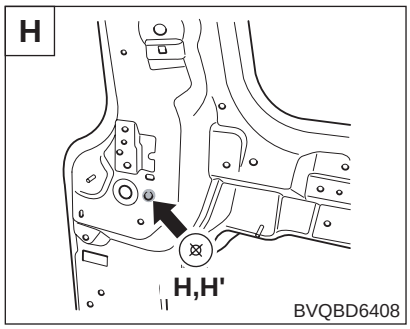
Paint stay mounting hole (ø11)



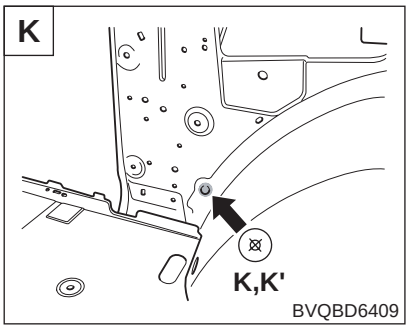
Seat belt mounting hole (ø12.4)



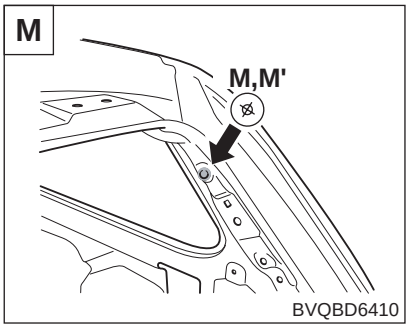
C pillar trim mounting hole (ø9)



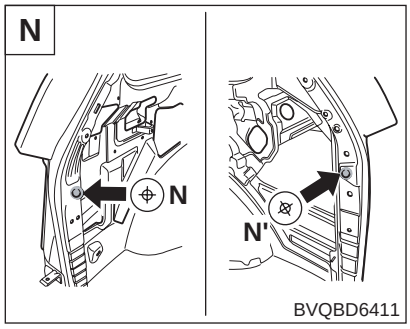
Power sliding door module mounting hole (ø9)



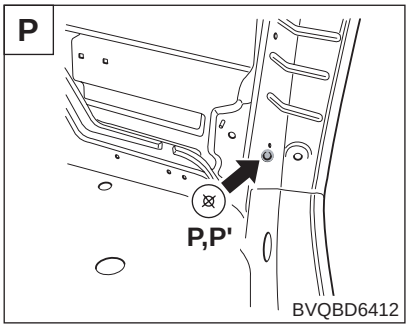
Tooling hole (ø12)



D pillar trim mounting hole (ø8.5)

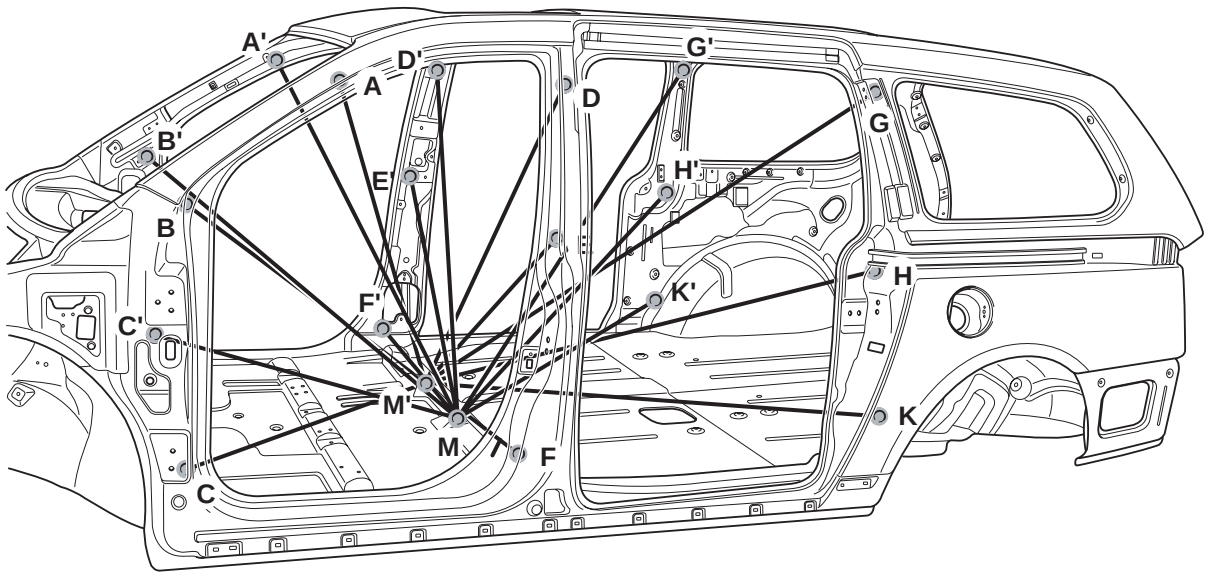


Net hook mounting hole (ø9)



Wire harness earth mounting hole (ø9)

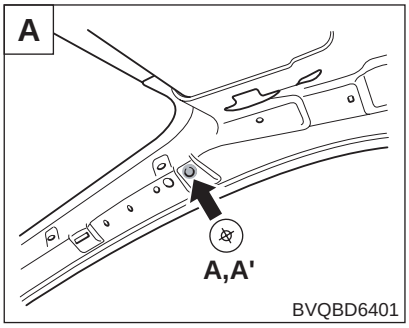
INTERIOR B



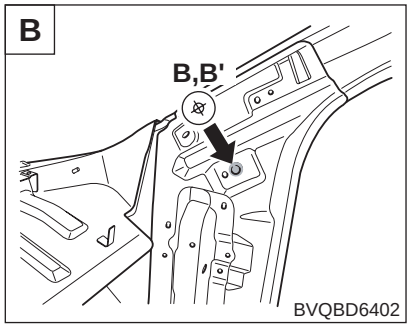
BVQBD6500

* These dimensions indicated in this figure are actual-measurement dimensions.

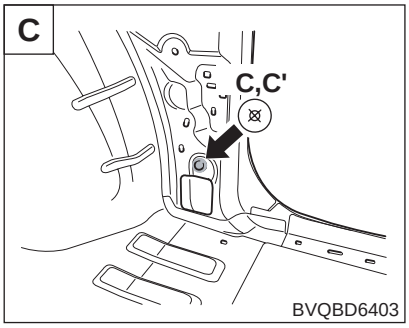
Point symbol	M-A'	M-B'	M-C'	M-D'	M-E'	M-F'	M-G'	M-H'
Length(mm)	1482.6	1539.7	1350.8	1417.6	1207.5	1010.6	1807.2	1649.3
Point symbol	M-K'	M'-A	M'-B	M'-C	M'-D	M'-E	M'-F	M'-G
Length(mm)	1555.2	1482.6	1539.7	1350.8	1417.6	1207.5	1010.6	1807.2
Point symbol	M'-H	M'-K						
Length(mm)	1632.0	1511.7						



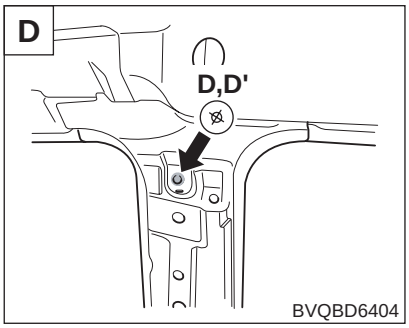
A pillar trim mounting hole (ø8.5)



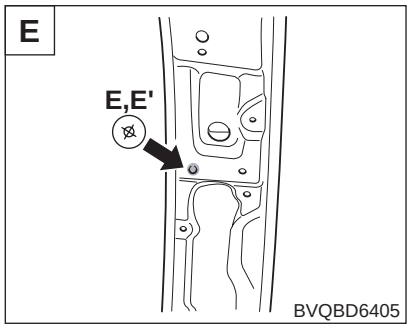
Curtain airbag mounting hole (ø6.6)



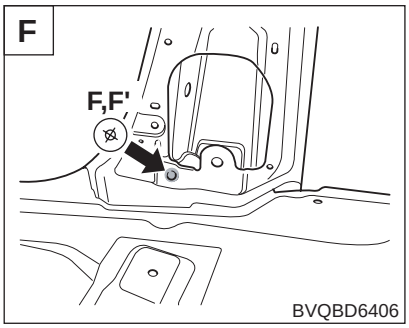
A pillar trim mounting hole (ø8.5)



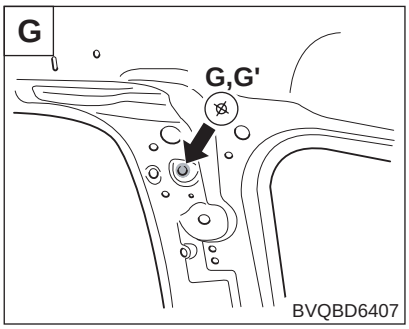
B pillar trim mounting hole (ø6.6)



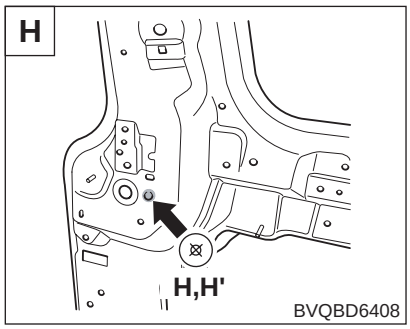
Paint stay mounting hole (ø11)



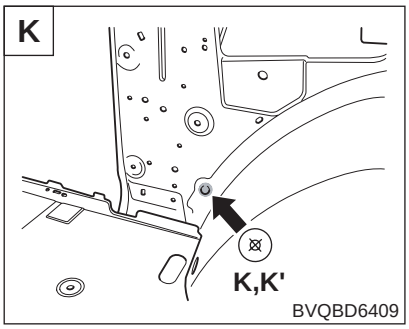
Seat belt mounting hole (ø12.4)



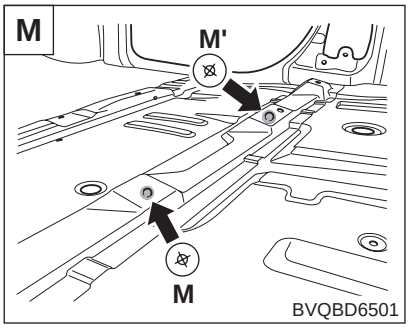
C pillar trim mounting hole (ø9)



Power sliding door module mounting hole (ø9)

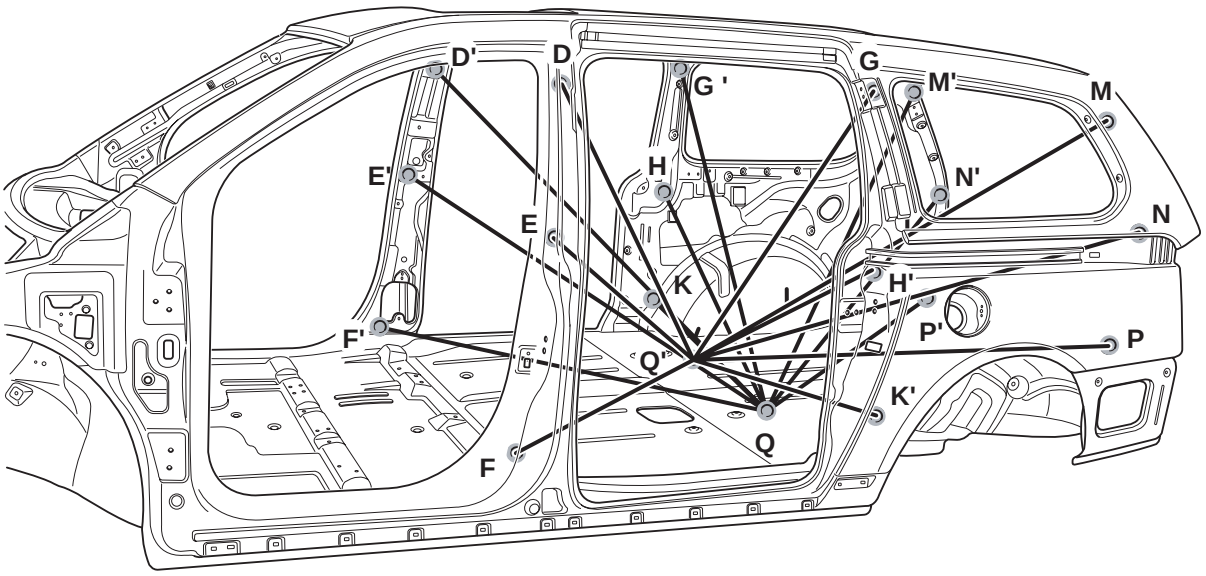


Tooling hole (ø12)



Seat mounting hole (ø14)

INTERIOR C



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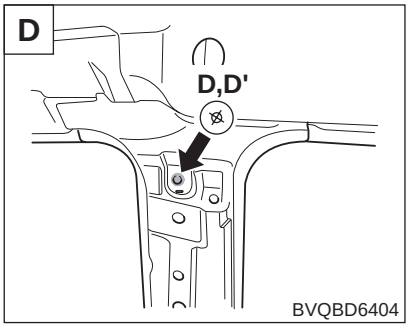
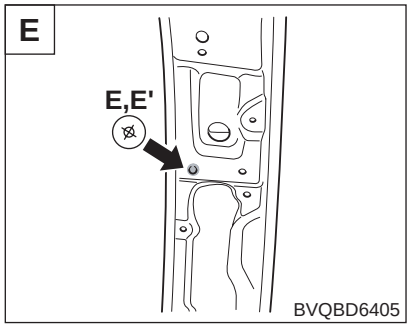
* These dimensions indicated in this figure are actual-measurement dimensions.

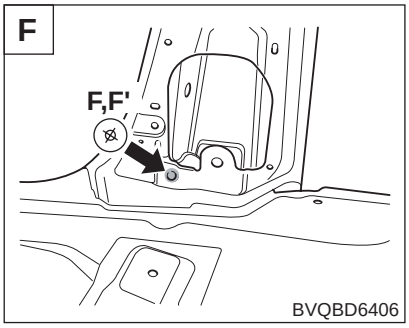
Point symbol	Q-D'	Q-E'	Q-F'	Q-G'	Q-H'	Q-K'	Q-M'	Q-N'
Length(mm)	1695.2	1579.8	1507.8	1412.2	1210.9	1087.3	1720.1	1737.0
Point symbol	Q-P'	Q'-D	Q'-E	Q'-F	Q'-G	Q'-H	Q'-K	Q'-M
Length(mm)	1641.4	1695.2	1579.8	1507.8	1412.2	1192.4	1084.7	1720.1
Point symbol	Q'-N	Q'-P						
Length(mm)	1737.0	1637.9						



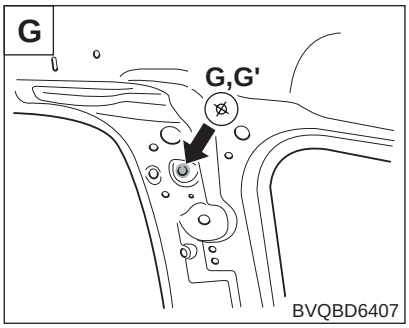
B pillar trim mounting hole (ø6.6)



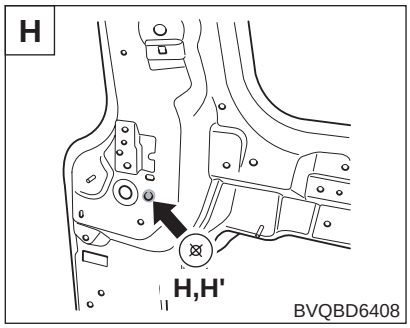
Paint stay mounting hole (ø11)



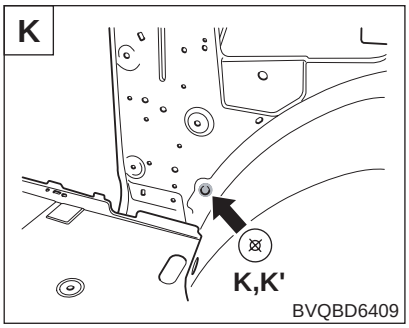
Seat belt mounting hole (ø12.4)



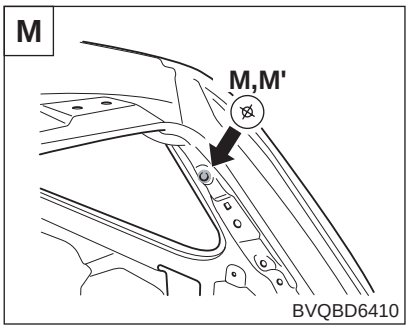
C pillar trim mounting hole (ø9)



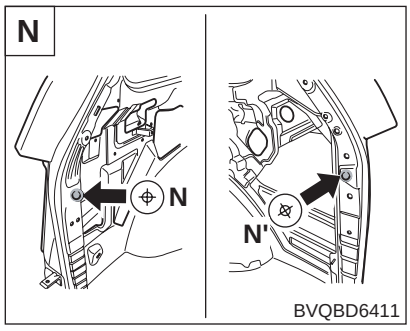
Power sliding door module mounting hole (ø9)



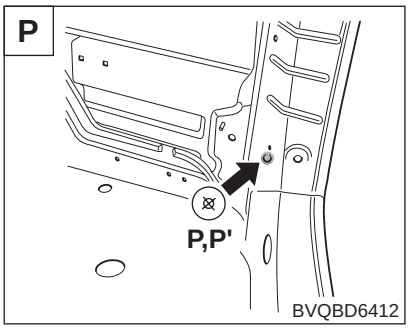
Tooling hole (ø12)



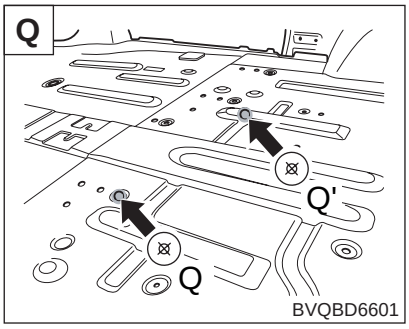
D pillar trim mounting hole (ø8.5)



Net hook mounting hole (ø9)

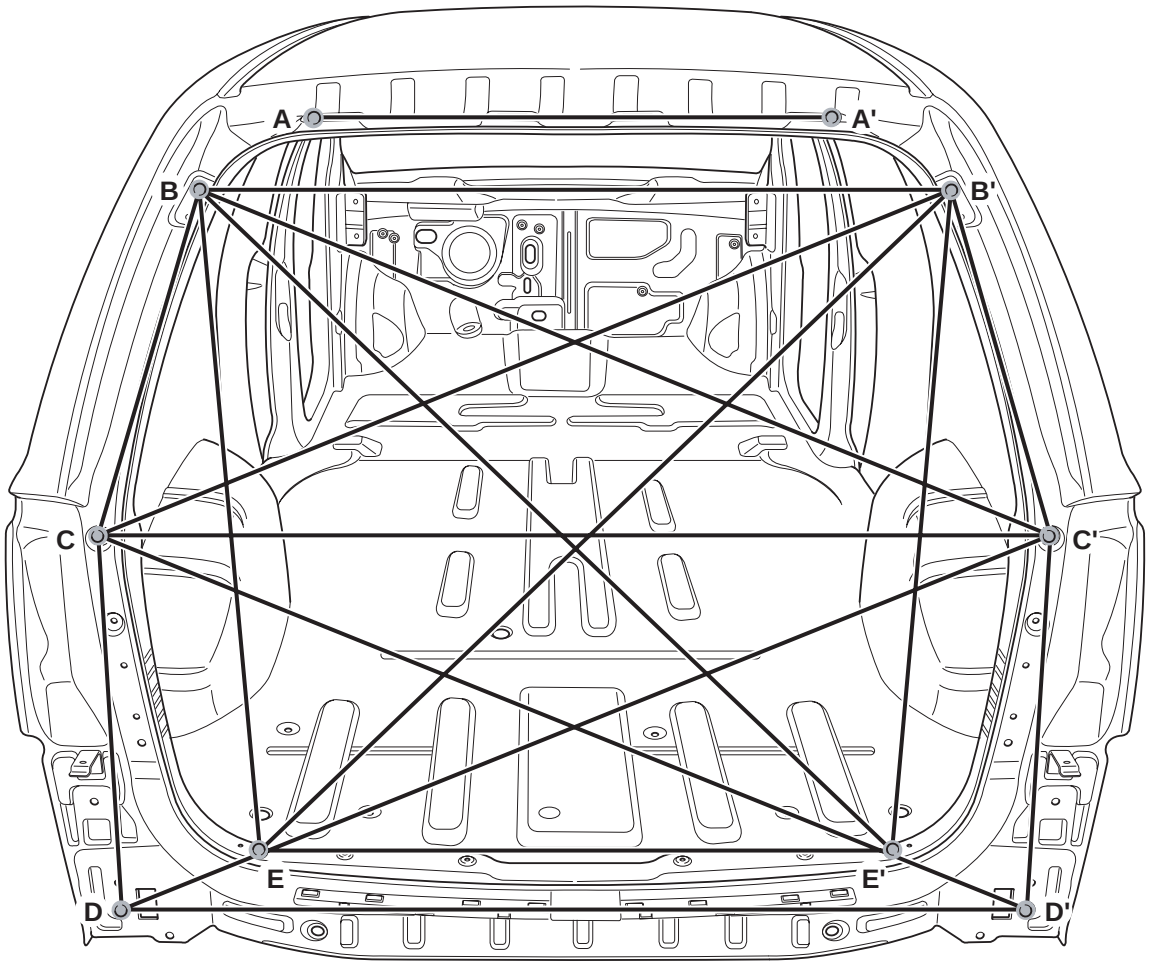


Wire harness earth mounting hole (ø9)



Tooling hole (ø20)

REAR BODY



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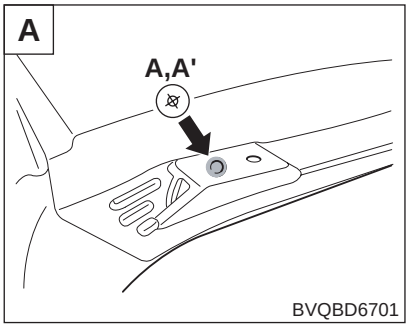
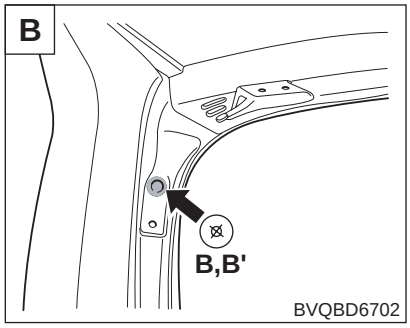
* These dimensions indicated in this figure are actual-measurement dimensions.

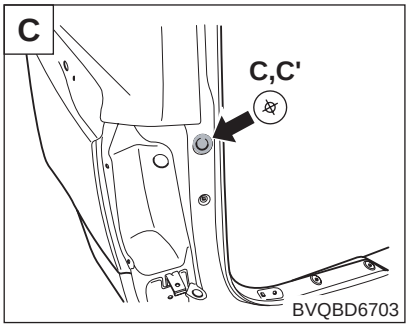
Point symbol	A-A'	B-B'	C-C'	D-D'	E-E'	B-E	B-C'	B-E'
Length(mm)	820.0	1174.7	1394.0	1464.0	976.0	994.4	1391.0	1461.3
Point symbol	C-B'	C-D'						
Length(mm)	1391.0	1565.1						



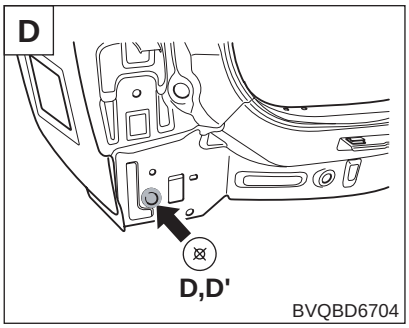
Tail gate hinge mounting hole (ø12)



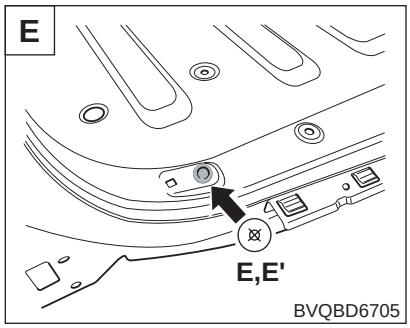
Gas lift mounting hole (ø9)



Rear clamp mounting hole (R8.5X8.5)

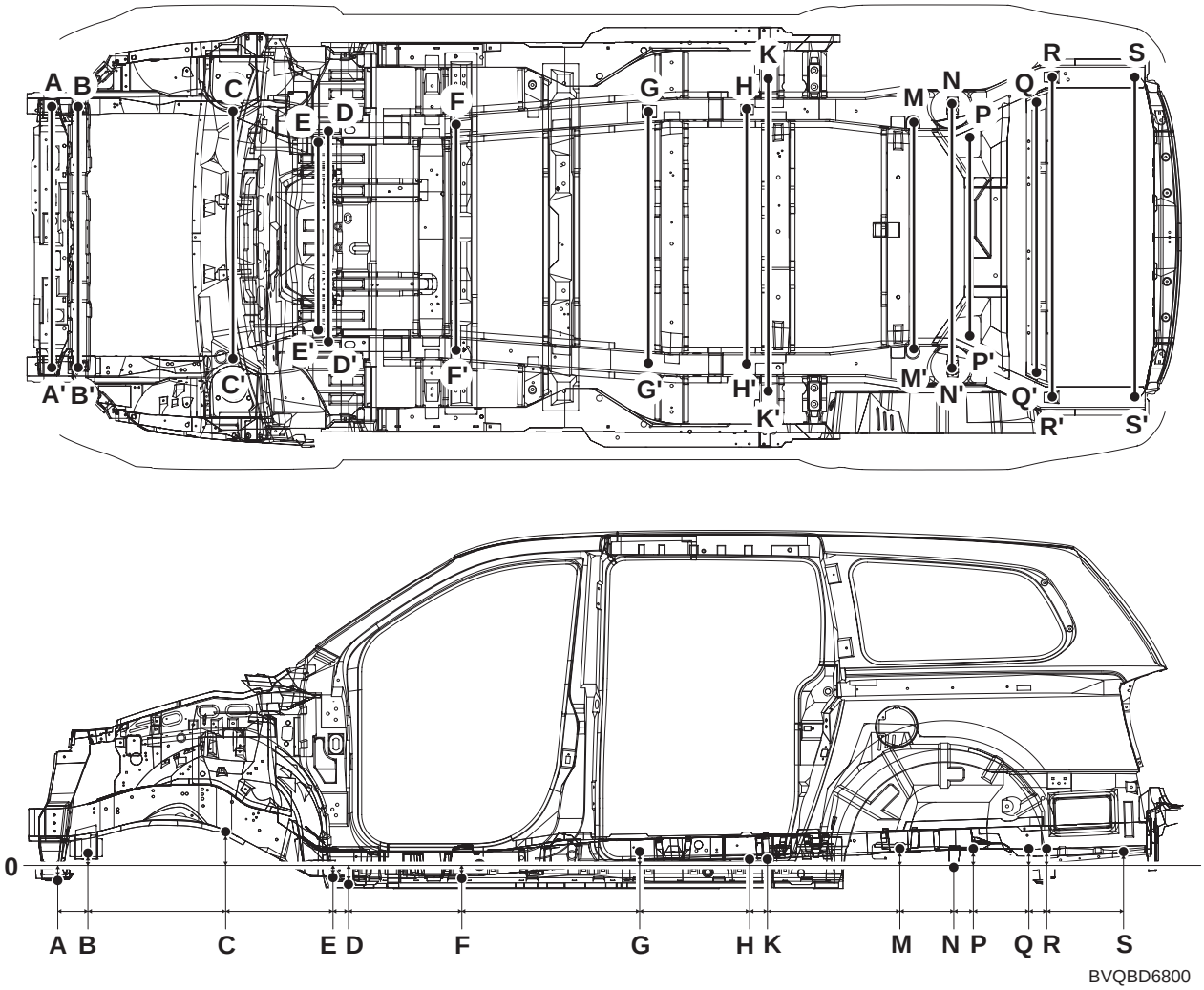


Rear bumper mounting hole (ø14)



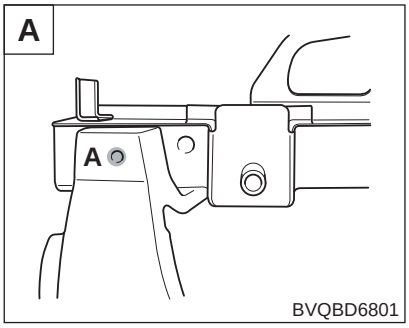
Package trim mounting hole (ø8.5)

UNDER BODY (PROJECTED DIMENSIONS)

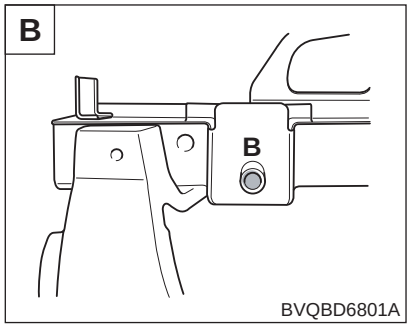


* These dimensions indicated in this figure are projected dimensions.

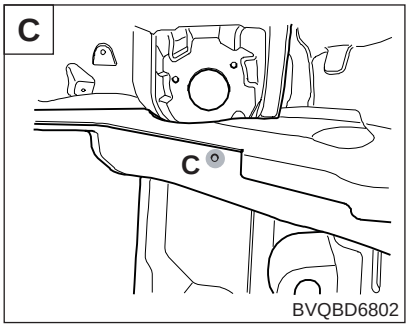
Point symbol	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'	G-G'	H-H'
Length(mm)	1095	1095	1048	696	878	924.8	1050	1066
Point symbol	K-K'	M-M'	N-N'	P-P'	Q-Q'	R-R'	S-S'	O-A
Length(mm)	1325	959	1097.5	840	1060	1338	1338	-33.5
Point symbol	O-B	O-C	O-D	O-E	O-F	O-G	O-H	O-K
Length(mm)	-61.3	78.1	-117.5	-87.6	-85.8	-31(LH)/-14(RH)	-15(LH)/0(RH)	-1.4
Point symbol	O-M	O-N	O-P	O-Q	O-R	O-S	A-B	B-C
Length(mm)	13.5	-54.3	18	81.5	26	39.2	138	631
Point symbol	C-E	E-D	D-F	F-G	G-H	H-K	K-M	M-N
Length(mm)	329.5	55	366.5	972	415	85	605	164.5
Point symbol	N-P	P-Q	Q-R	R-S				
Length(mm)	56	344.5	15	350				



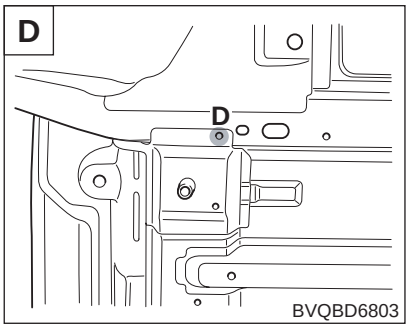
Front stay mounting hole (ø13)



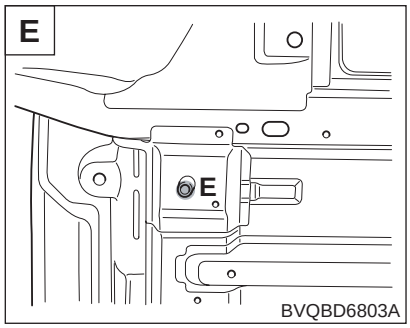
Sub frame front mounting hole (ø16)



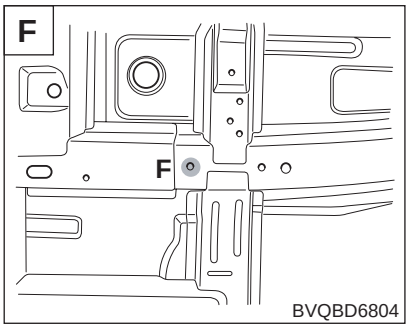
Brake pipe mounting hole (ø7)



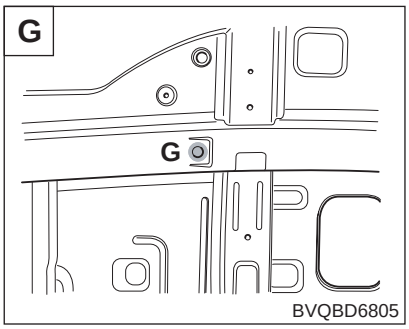
Rear stay mounting hole (ø12)



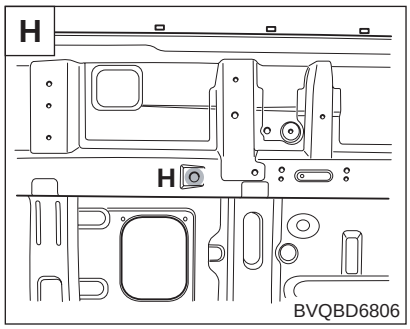
Sub frame rear mounting hole (ø18)



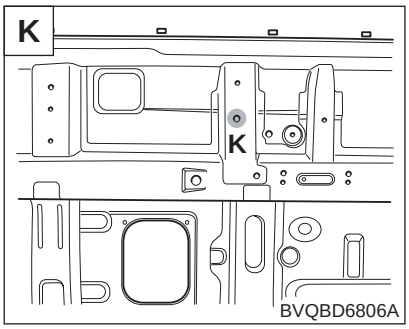
Tooling hole (ø13)



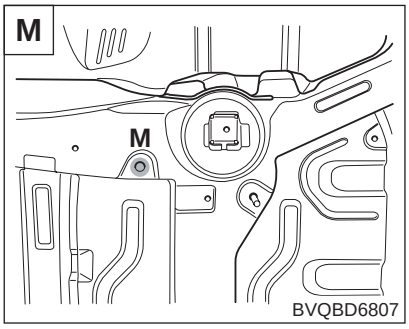
Tooling hole (S22X20)



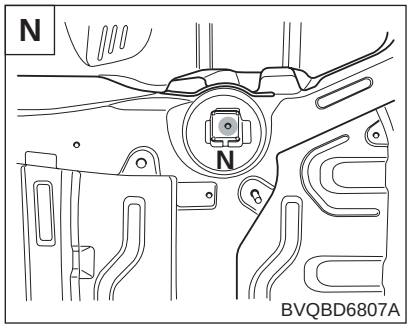
Tooling hole (ø20)



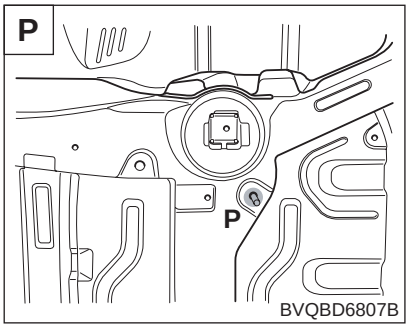
Traling arm mounting front hole (ø14)



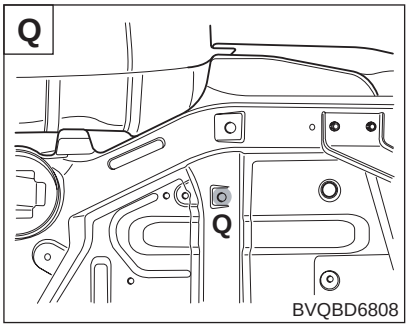
Sub frame mounting hole (ø18)



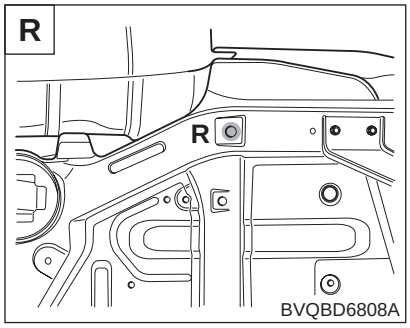
Rear bumper stopper mounting hole (ø11)



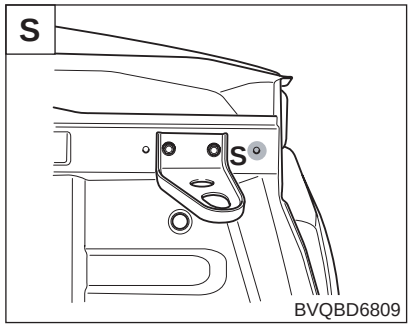
Brake pipe bolt mounting hole (ø16)



Tooling hole (S15X17)

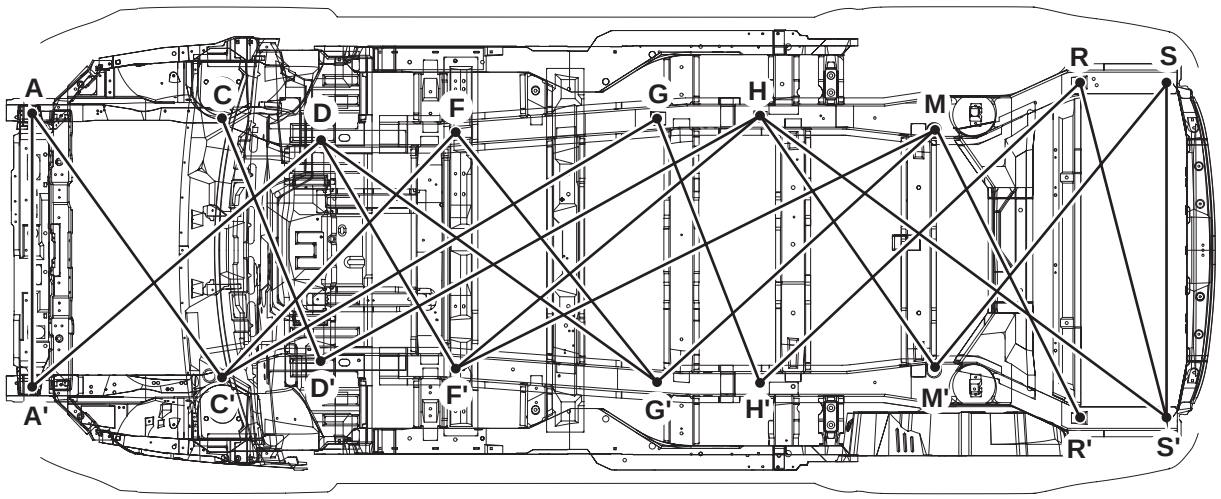


Tooling hole (S20X22)



Tooling hole (ø10)

UNDER BODY (ACTUAL-MEASUREMENT DIMENSIONS)



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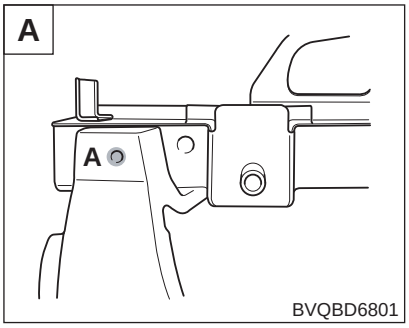
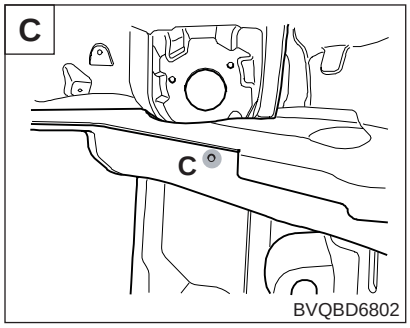
* These dimensions indicated in this figure are actual-measurement dimensions.

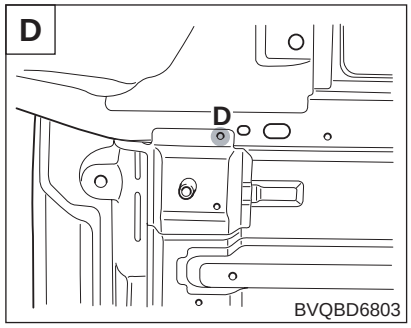
Point symbol	A-A'	A-C'	A'-D	C-D'	C'-F	C'-G	D-F'	D-G'
Length(mm)	1095	1325.2	1518.8	1048.2	1251.1	2020.4	973.1	1650.5
Point symbol	**D'-H**	**F-G'**	**F'-H**	**F'-M**	**G-H'**	**G'-M**	**H'-R**	**H-M'**
Length(mm)	2006.8	1386.6	1709.4	2282.7	1136.5	1494	1749.1	1225.3
Point symbol	**H-S'**	**M-R'**	**M'-S**	**R-S'**	**S-S'**			
Length(mm)	2017.6	1286.7	1478	1383.1	1338			



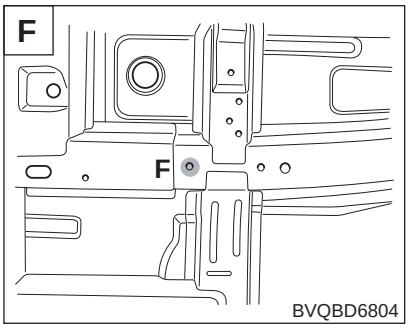
Front stay mounting hole (ø13)



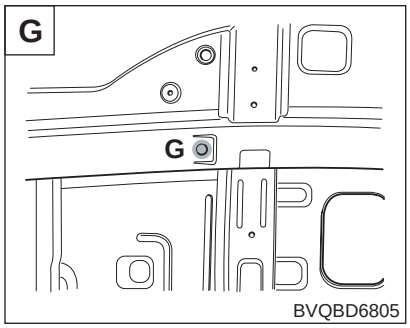
Brake pipe mounting hole (ø7)



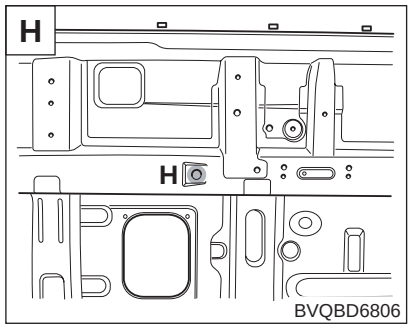
Rear stay mounting hole (ø12)



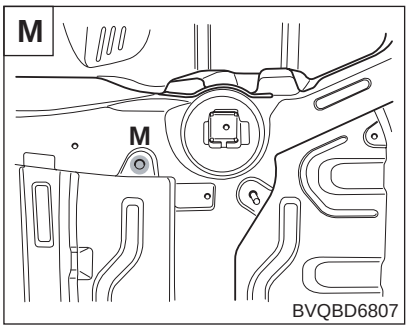
Tooling hole (ø13)



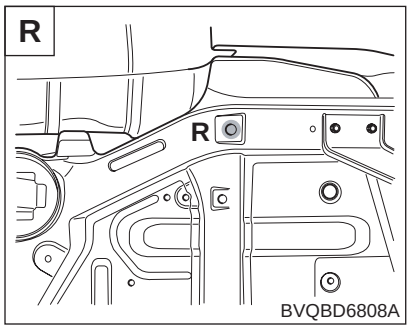
Tooling hole (S22X20)



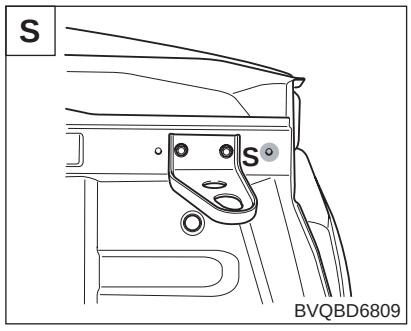
Tooling hole (ø20)



Sub frame mounting hole (ø18)



Tooling hole (S20X22)

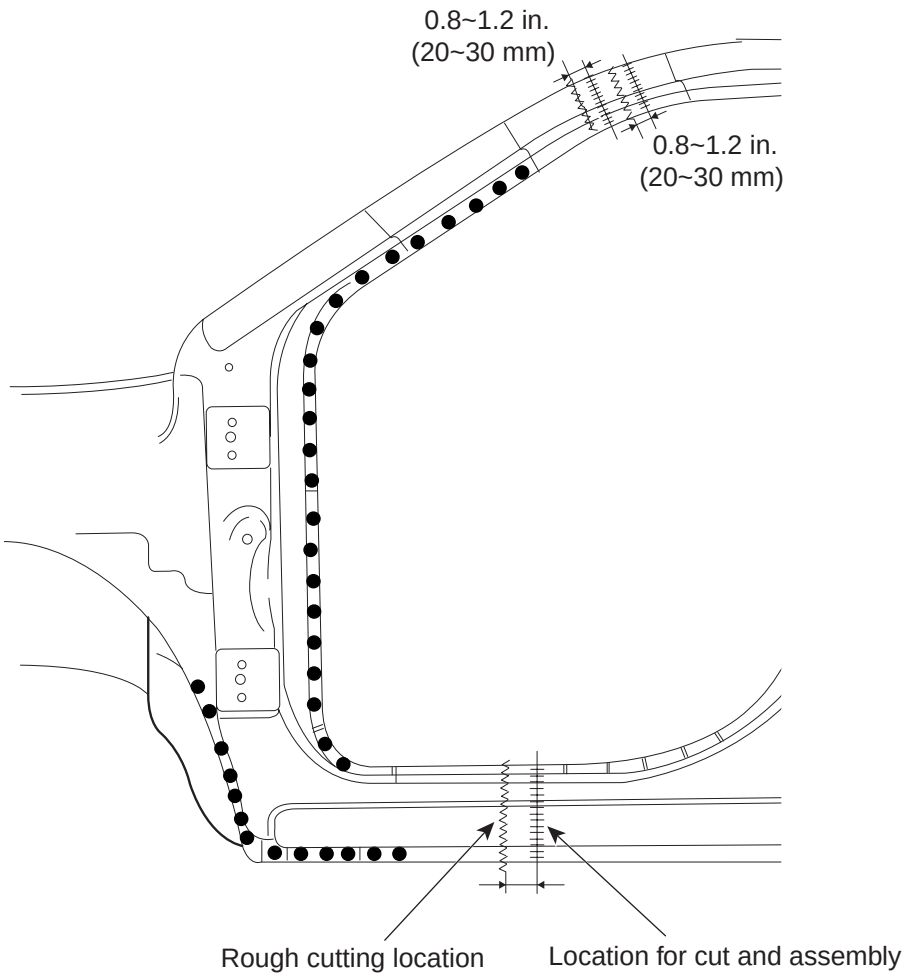


Tooling hole (ø10)

Body Panel Repair Procedure

REPLACING BODY PANELS

CODES FOR REMOVING AND INSTALLING BODY PANELS



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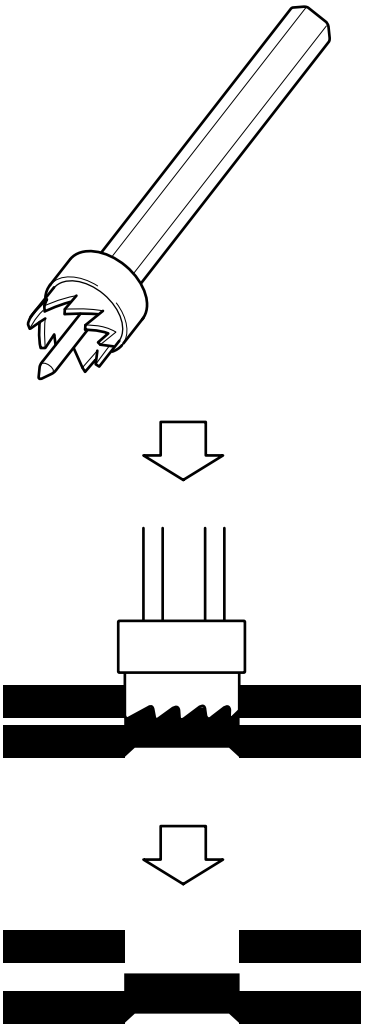
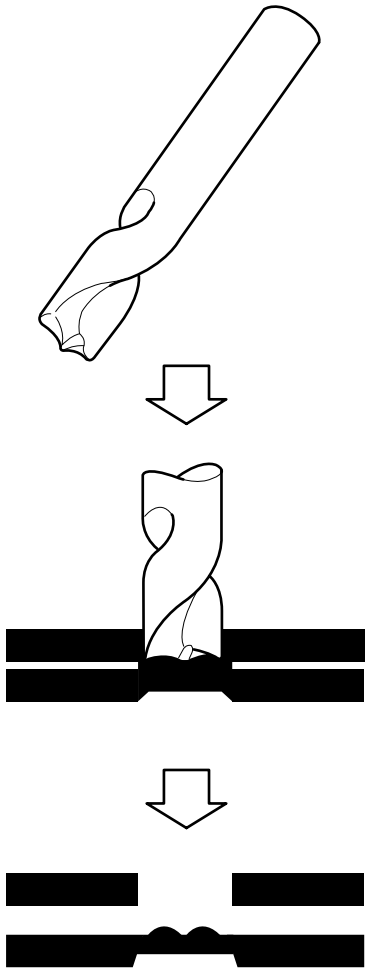
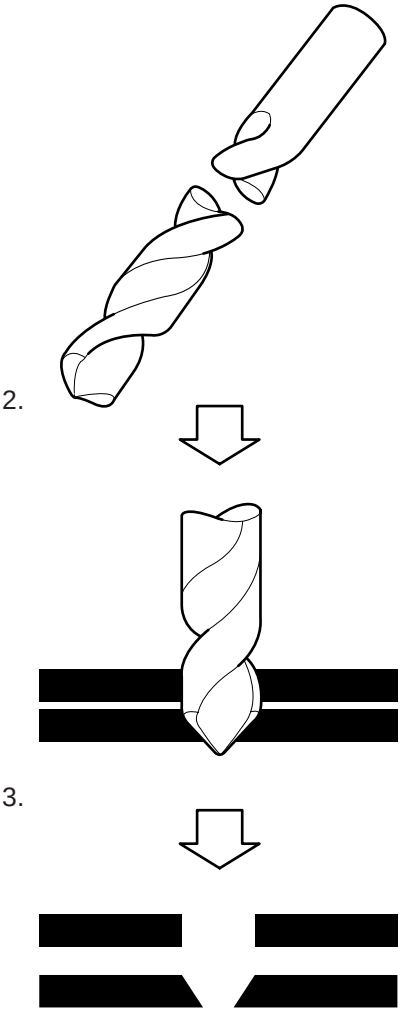
NOTES WHEN WELDING BODY

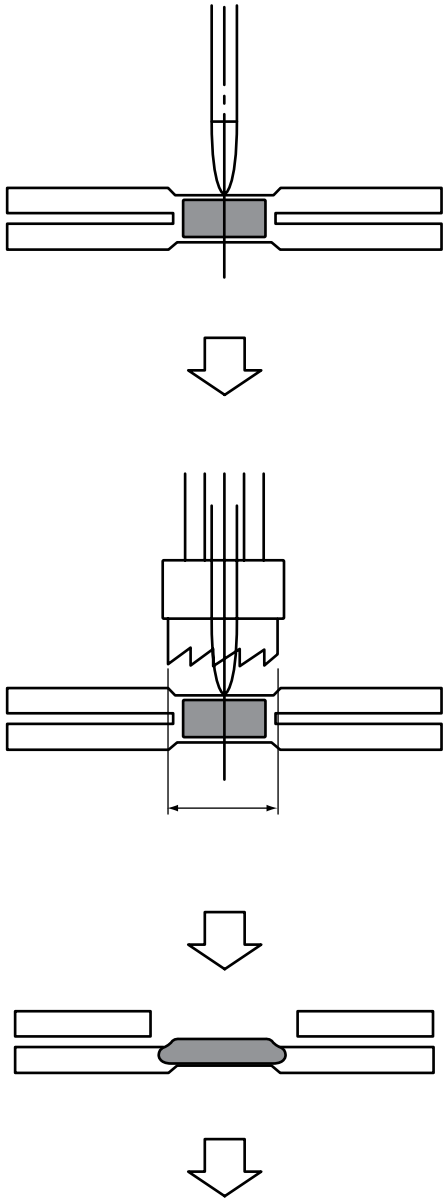
REMOVING SPOT WELDED AREA

Most body parts are spot welded. In order to remove the damaged area, it is best to remove the spot welded area from the body frame using a spot cutter or candle type edge drill bit.
Do not use a drill bit with a tapered edge. Center punch middle of spot weld to insure the entire spot weld will be removed.

1. Spot cutter	1. Drill(candle type edge)	1. Drill(taper edge)
		
Correct	Correct	Not correct

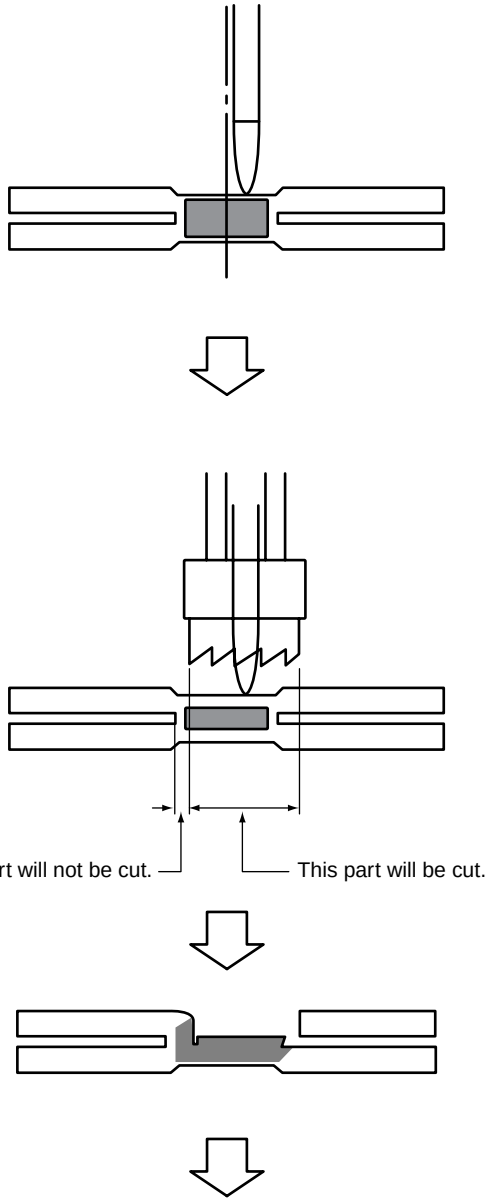
BVQBP6002

Center punch the middle(nugget) of the spot weld.



Spot welded area can be removed from the body frame.

Otherwise,



Spot welded area cannot be removed from the body frame.

BVQBP6003

INSTALLING A NEW BODY FRAME

The efficiency of the transmission and load distribution are determined by many complicated factors such as thickness of plate, shape and size of a cross section, damage of parts, variance of joints, welding method, and/or welding locations. Therefore, a new part should be fitted to the body frame using the proper procedures to avoid reducing the strength of the body.

DETERMINING A WELDING METHOD

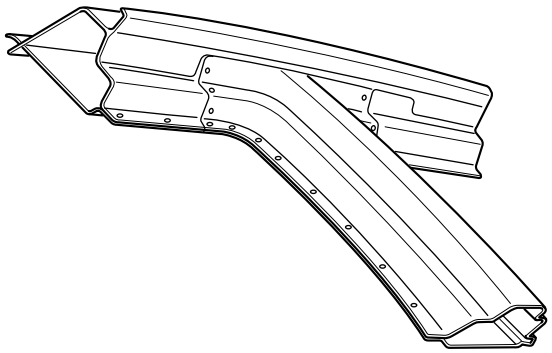
It is extremely important that appropriate welding methods, which don't reduce the original strength and durability of the body be used when making repairs, Try to use either spot welding or carbon arc(plug) welding, Do not braze any body components other than the ones brazed at the factory. Do not use an oxy-acetylene torch for welding.

Welding	Symbol	Details
Spot welding	●	The most reliable welding method (provides high efficiency and quality of assembled part.)
Carbon arc welding (Plug welding)	■	Use when spot welding cannot be done or spot welding is not necessary.
Oxygen-acetylene welding	✖	Not used

BVQBP6004

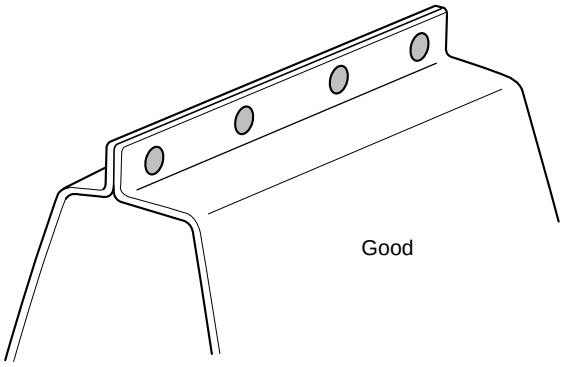
SPOT WELDING

1. Commercial spot welding machines do not perform as well as the machines used in the manufacturing process. When spot welding, increase the number of spot welds by 30% (1.3 times the original number of welds).



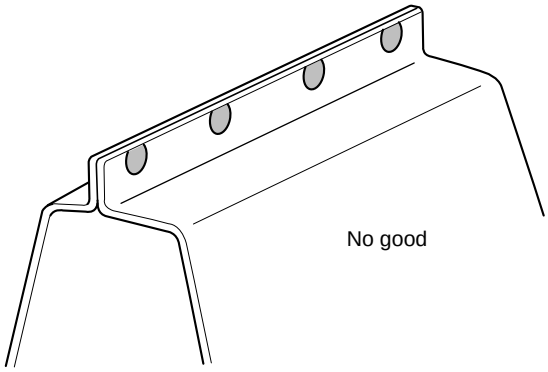
BVQBP6005

2. When spot welding, weld in the middle of the joint.



BVQBP6006

- Spot welding on the edge of the joint will reduce welding strength.

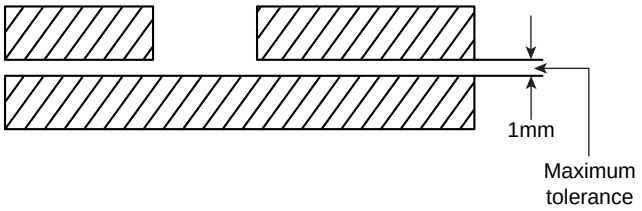


BVQBP6007

CARBON ARC WELDING

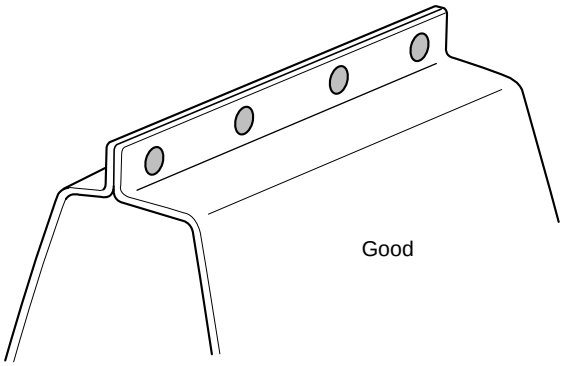
In areas where spot welding is not suitable, do plug welding using a carbon are welding machine.

1. Clamp the parts to be welded together tightly. Do not exceed 1 mm of space between parts. A tolerance greater than 1 mm will reduce the strength of the welded area.



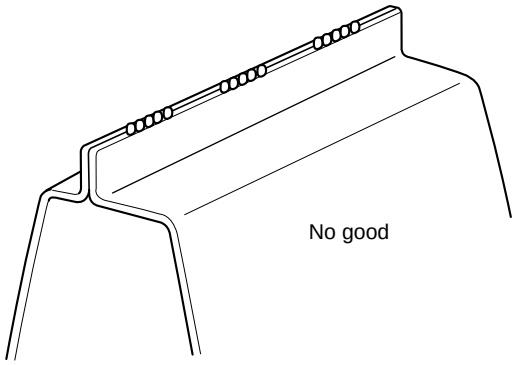
BVQBP6008

2. Weld in the middle of the flange joint.
   a) Drill a hole 5~6 mm on one side of the flange only, and weld within the hole.



BVQBP6006

   b) Do not weld on the edge of the flange joint.



BVQBP6009

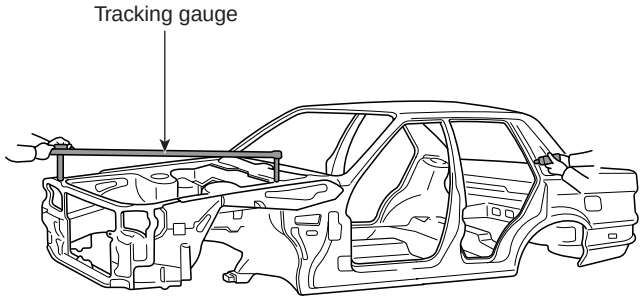
REPLACING BODY PANEL

REMOVAL

1. Body measurement

a) Before removing, measure the damaged area according to the dimensions supplied in Body Dimension, section 31. If deformation is present, use a frame straightener to adjust.

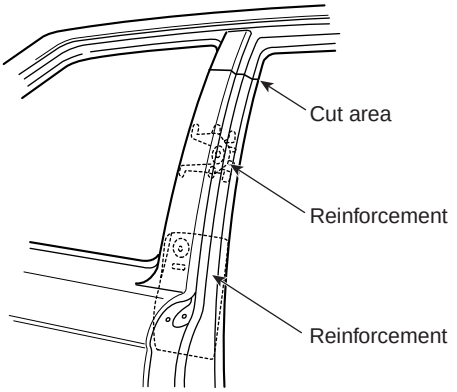
b) When removing a panel, apply clamps to prevent damage of each part, and support the lower end of the frame to prevent deformation during the procedure.



BVQBP6010

2. Cut and welding point selection

Cutting, if necessary, should not be done in a reinforcement area. Select an area which will result in the least amount of deformation after welding.



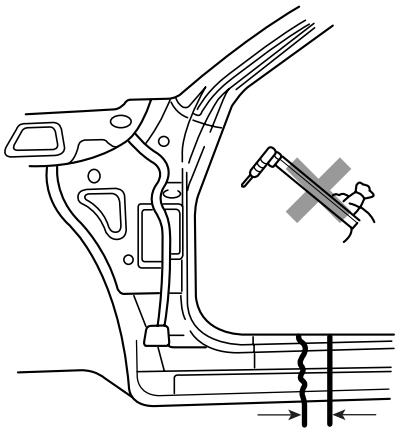
BVQBP6011

3. Cutting rough area for replacement part

Cutting should be done according to the following steps to make removal easy:

a) Use care when cutting an area close to a pipe or wiring harness.

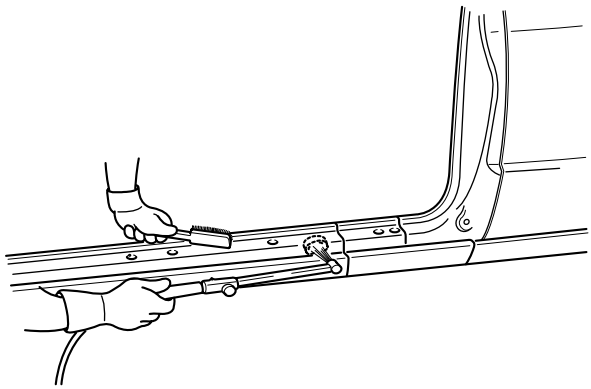
b) Cut an area leaving 30~50 mm of tolerance.



BVQBP6012

4. Removing paint from an area to be spot welded

Using a torch and wire brush, remove paint completely before beginning welding.

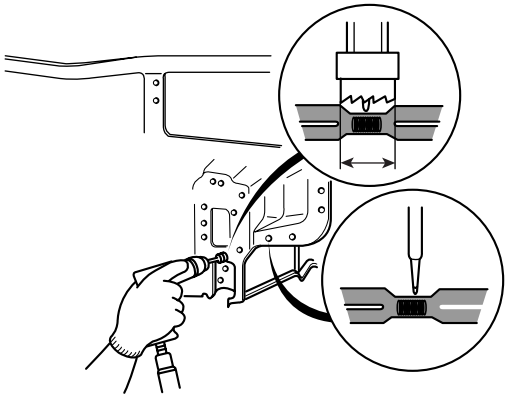


BVQBP6013

5. Determine a cutting method

a) Cutting a spot welded area

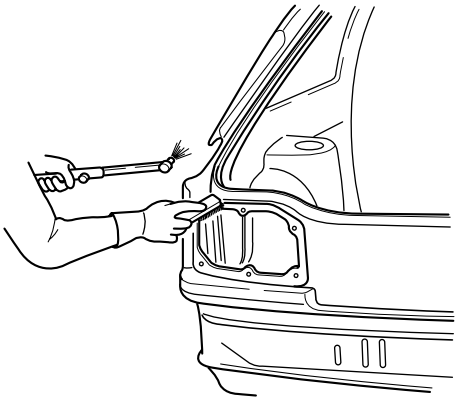
Make a hole in the middle of spot welded area with a punch, remove welded area using a spot cutter and remove using a chisel.



BVQBP6014

b) Removing brazed area

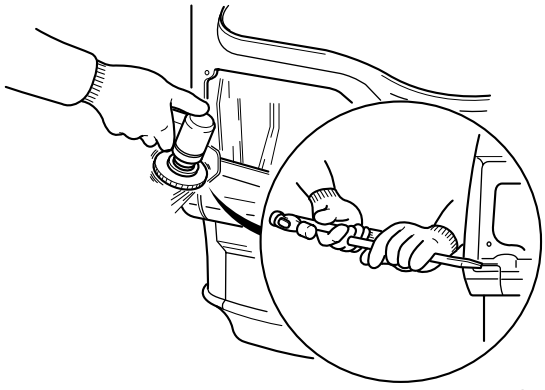
Remove using a torch and wire brush, and chisel.



BVQBP6015

c) Removing arc welded area

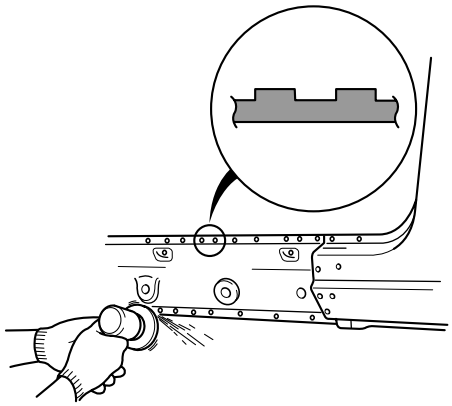
Remove plug welded area using a disk grinder and chisel.



BVQBP6016

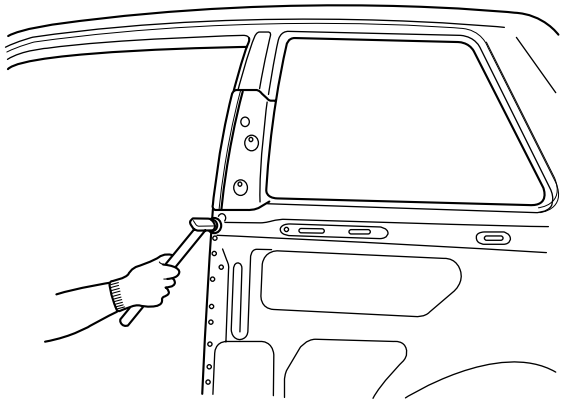
PREPARATION FOR INSTALLATION

1. Spot weld finish
Use a disk grinder or similar tool to finish spot weld mark, Do not grind more than is necessary to smooth surface.



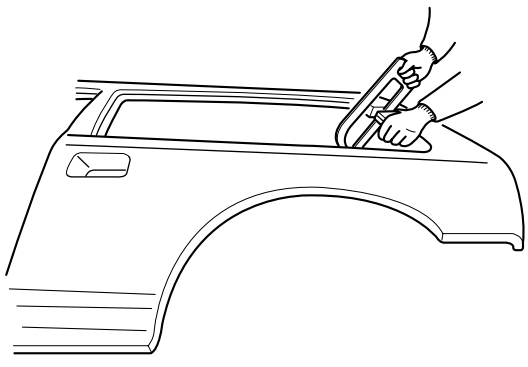
BVQBP6017

2. Panel preparation
Repair any bent or uneven areas with a hammer to improve the installation process.



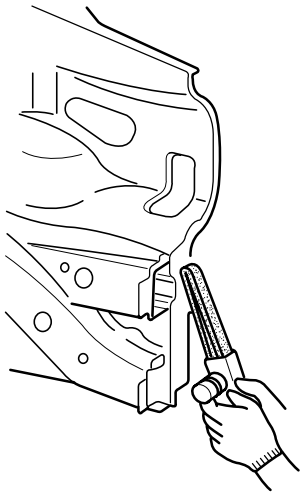
BVQBP6018

3. Cutting a rough area for a new part
When rough cutting an area for a new part, leave a tolerance of 30~50 mm.



BVQBP6019

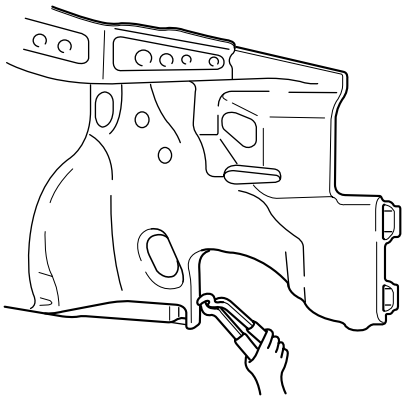
4. Preparation for spot welding
Remove paint on spot welded area and on the area overlapped by the new part using a belt sander or similar tool.



BVQBP6020

5. Drilling a hole for plug welding
If the thickness of the part to be welded is less than 3 mm, drill a 5~6 mm diameter hole. If the thickness of the part to be welded is greater than 3 mm, drill a hole using a 7 mm diameter drill.

NOTE
Do not spot weld where thickness is greater than 3 mm.

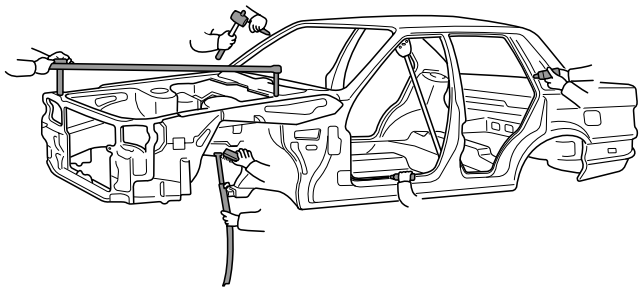


BVQBP6021

INSTALLATION

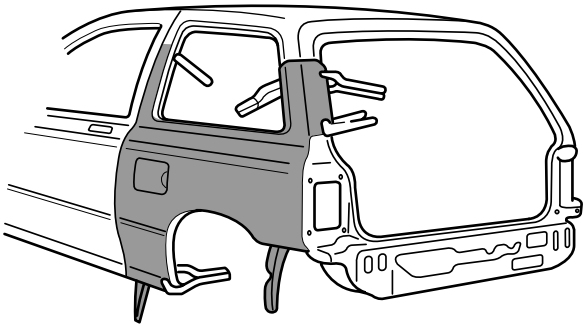
1. Checking welding and fitting in advance

a) When installing a new part, measure the dimensions of each part according to the body dimensions given in Section 31, and set part to the reference dimensions.



BVQBP6022

b) Prior to final welding, check the fit of all related parts.



BVQBP6023

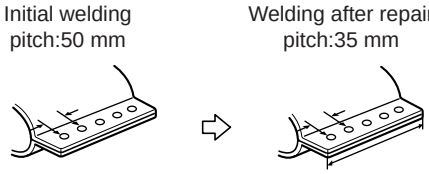
2. Selecting number of welding points

Spot welding : Multiply the original number of factory welds by 1.3 times

Plug welding : Same number as original number of factory welds

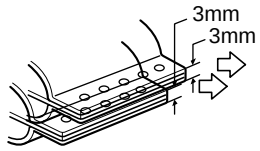
NOTE

- *Plug welding should be done using a carbon arc welding machine.*
- *Brazing should be done only on areas that were originally brazed at the factory.*



Spot welding:initial number of welds x1.3

Welding points-same number as original number of factory welds.



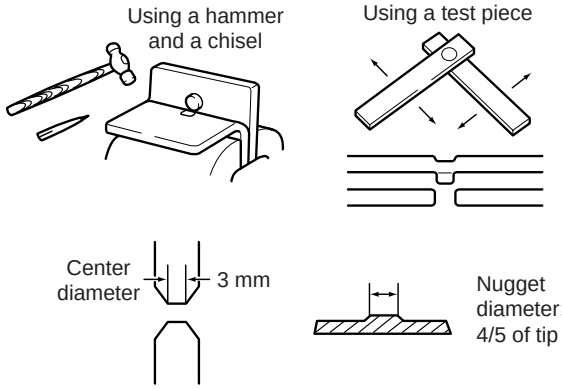
Plug welding-used when spot welding is not feasible or material is thicker than 3 mm

BVQBP6024

3. Caution when spot welding

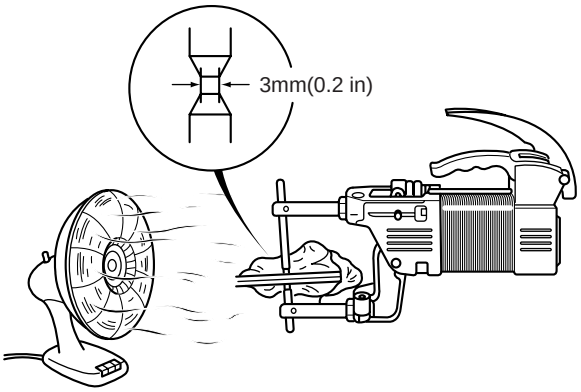
a) Do a test welding on a piece of material of the same type and thickness as the part to be welded and proceed if test weld is good.

b) Before spot welding, check if welding debris, oil or paint is present on the area where surfaces meet.
Clean or sand as necessary.



BVQBP6025

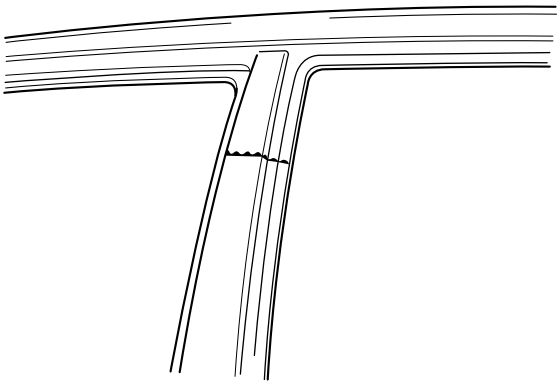
c) The tip of the spot welding machine should be maintained to a minimum tolerance of 3 mm. Also let area cool after 5 or 6 welds to minimize problems caused by excessive heat.



BVQBP6026

4. Cutting and welding an removed area

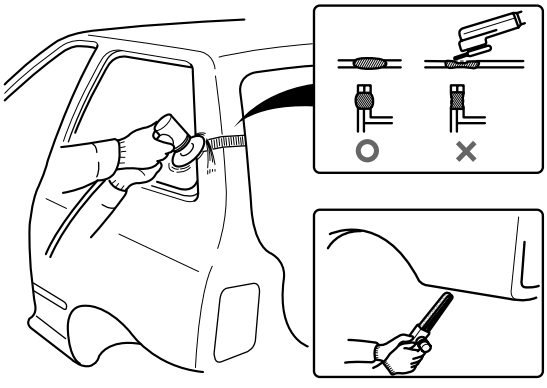
To align a roof panel and a center pillar together for butt welding, temporarily fasten a steel flange to the roof panel and then apply the new center pillar panel. Remove the flange when final welding is done.



BVQBP6027

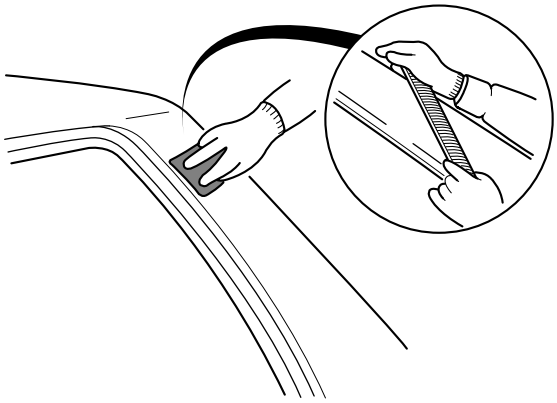
5. Finishing after welding

a) Grind any areas that were plug welded or butt welded using a disk grinder. Grind carefully to avoid removing too much material. This degrades the strength of the weld.



BVQBP6028

b) Finish areas that have been brazed by applying body filler then smooth the area with a flexible file and sander.



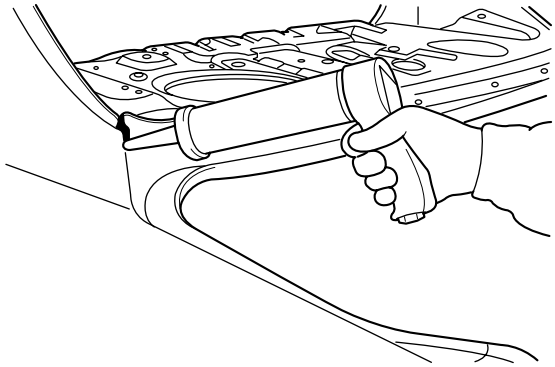
BVQBP6029

6. Applying anti-rust agent and body sealer

After coating the surface with anti-rust agent, apply body sealer where necessary.

NOTE

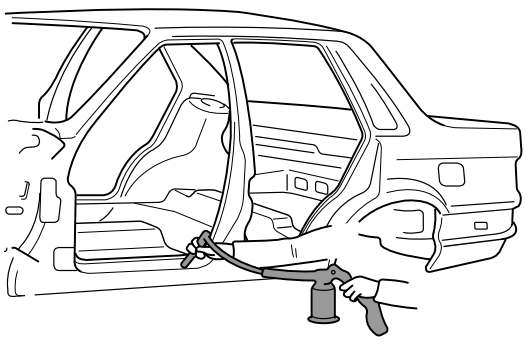
Apply body sealer before assembly.



BVQBP6030

7. Anti-rust treatment

Apply anti-rust agent to inside of doors and sills by spraying through access holes provided.



BVQBP6031

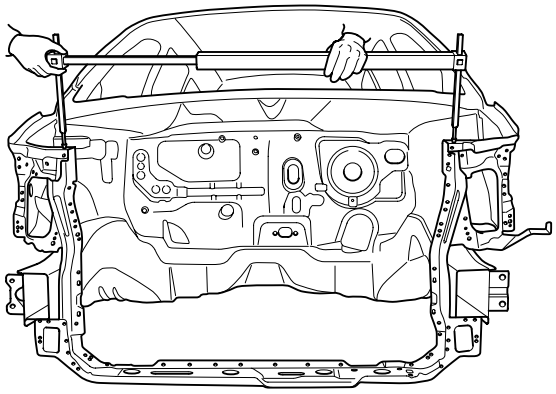
RADIATOR SUPPORT PANEL

ASSEMBLY

NOTE

Before repairing, remove Engine and Suspension Components.

Refer to the body dimension charts and measure the vehicle to determine straightening and alignment requirements. The body must be returned to its original dimension before you begin the repair procedure.



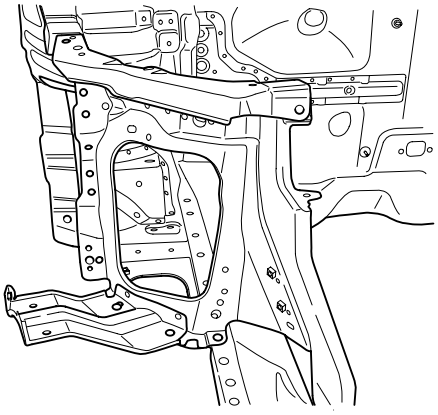
BVQBP6032

REMOVAL

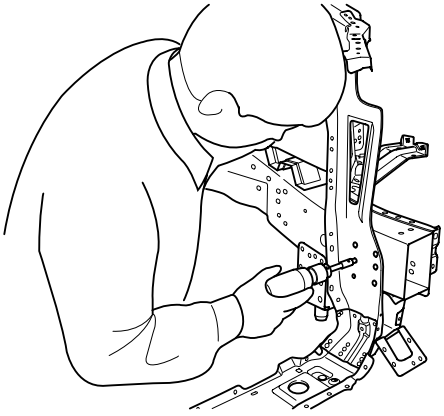
1. Drill out all the spotwelds to separate radiator support panel from front side member(10 points) and fender apron upper outer panel(10 points).

NOTE

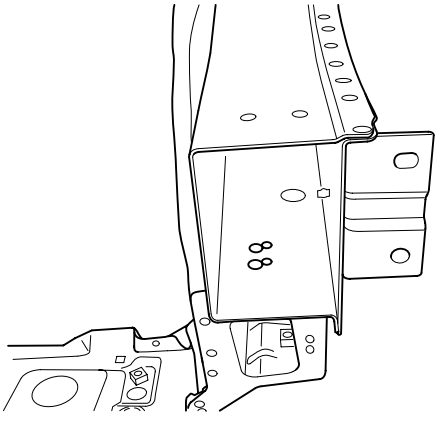
When spotwelded portions are not apparent, remove paint with a rotary wire brush



BVQBP6033

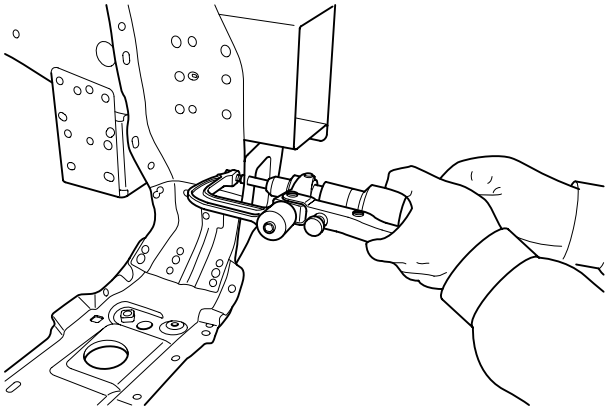


BVQBP6034



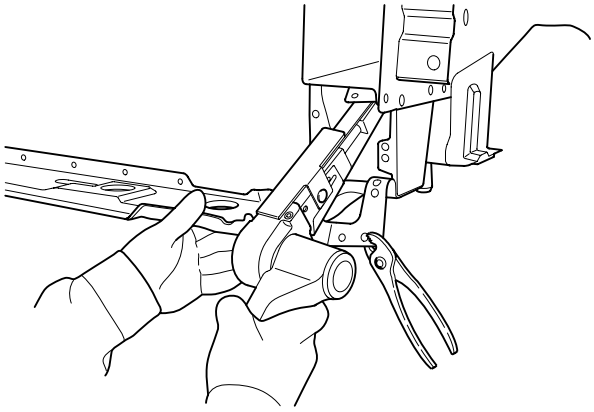
BVQBP6035

2. Drill out all the spotwelds to separate radiator support panel from front side member(7 points).



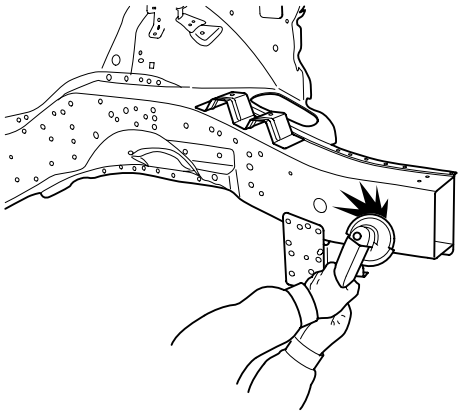
BVQBP6036

3. Using a belt sander, remove the front side member by drilling out the spotwelds(4points).



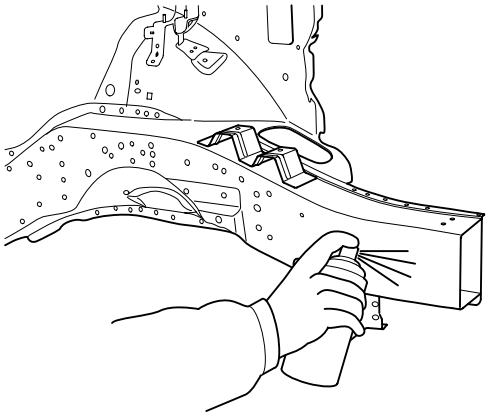
BVQBP6037

4. Clean MIG welds with a disc grinder.



BVQBP6038

5. Before welding the radiator support panel, apply the epoxy primer to the interior of the radiator support panel

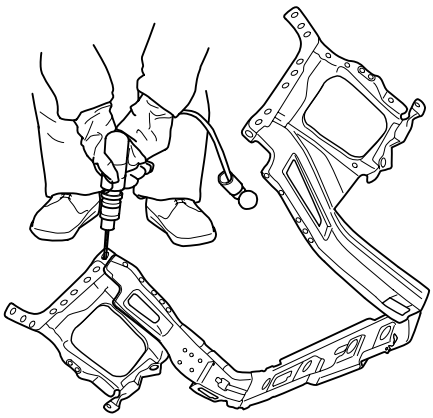


BVQBP6039

INSTALLATION

1. Drill 6mm holes in the new radiator support panel for MIG plug welding.

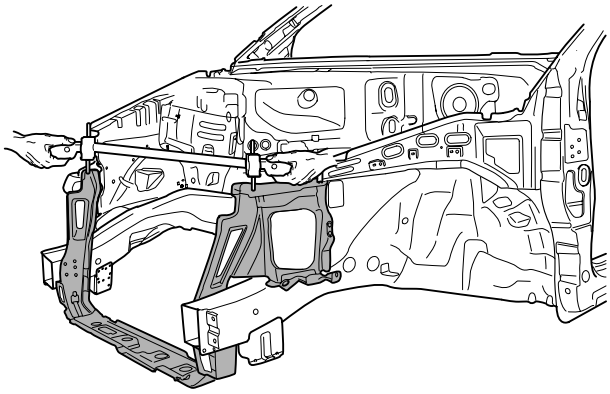
2. Remove paint from both sides of all portions that are to be welded such as peripheries of MIG plug weld holes.



BVQBP6040

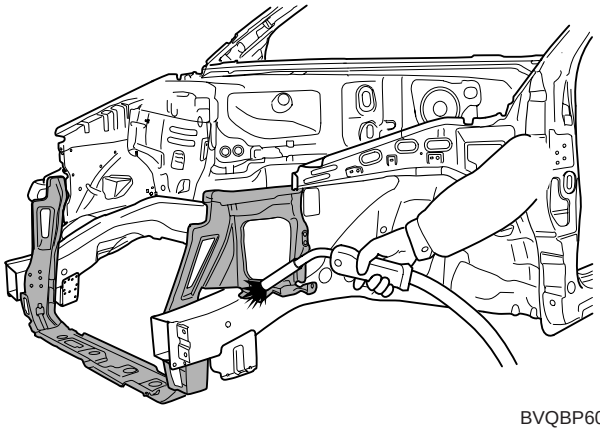
3. Temporarily install new parts in place.

4. Measure each measurement point (Refer to the BODY DIMENSIONS) and correct the installation position



BVQBP6041

5. MIG plug weld all holes.

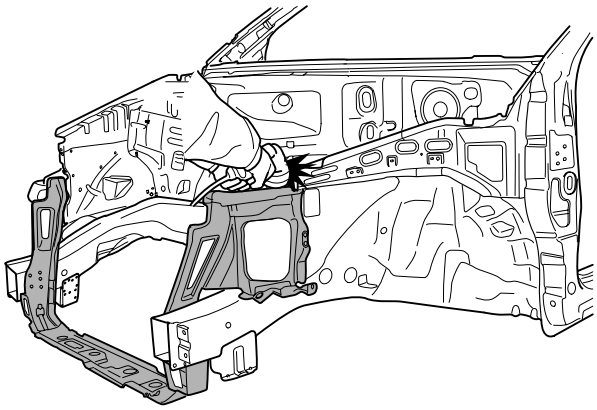


BVQBP6042

6. Clean MIG welds with a disc grinder.

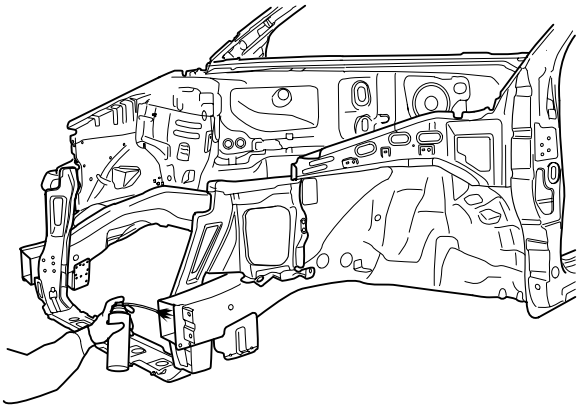
NOTE

- *Be careful not to grind welded portions too much.*
- *The internal parts will be stronger if the weld traces are not ground.*



BVQBP6043

7. After welding the radiator support panel, apply the epoxy primer and anti-corrosion to the radiator support panel

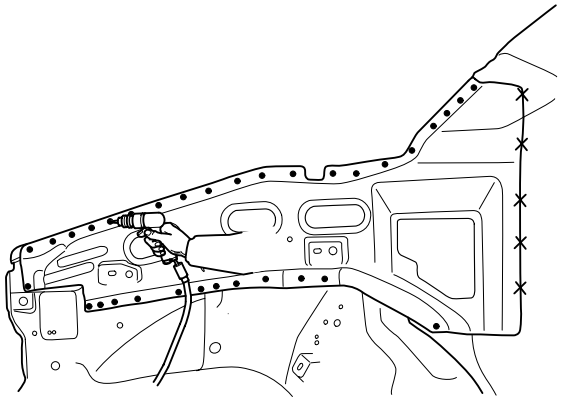


BVQBP6044

COWL SIDE OUTER PANEL

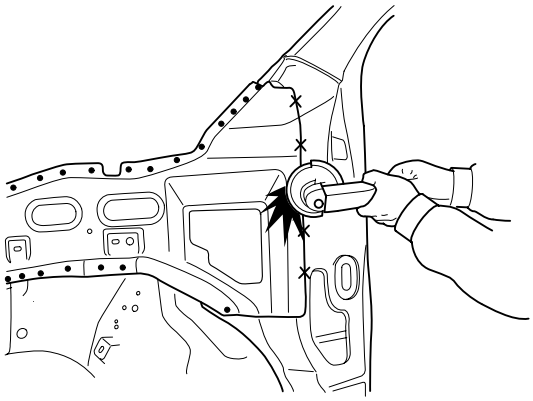
REMOVAL

1. Drill out all spotwelds to separate cowl side outer panel from cowl assembly and fender apron inner panel(33 points).



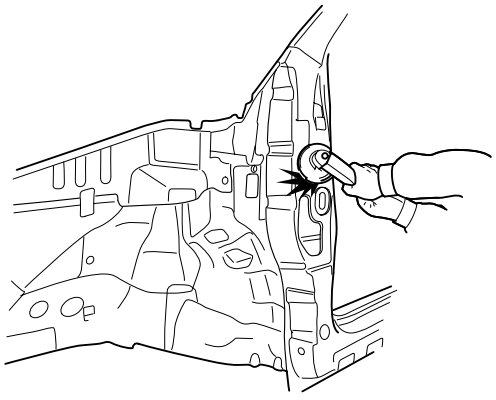
BVQBP6045

2. Using a disc grinder, remove the cowl side outer panel by drilling out the MIG lap welds.(5 points)



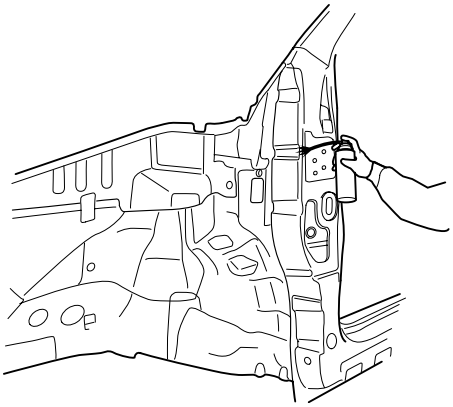
BVQBP6046

3. Clean MIG welds with a disc grinder.



BVQBP6047

4. Before welding the cowl side outer panel, apply the epoxy primer to the interior of the cowl side outer panel.

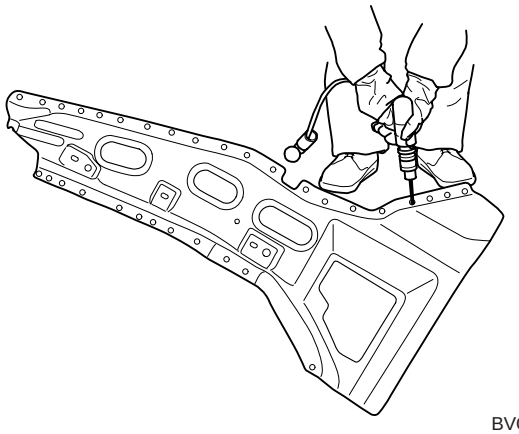


BVQBP6048

INSTALLATION

1. Drill 6mm holes in the new cowl side outer panel for MIG plug welding.

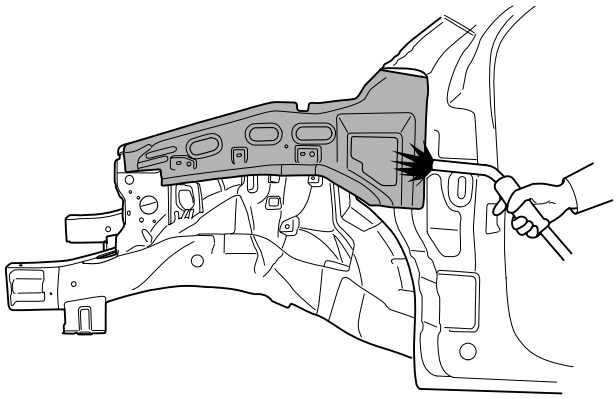
2. Remove paint from both sides of all portion that are to be welded such as peripheries of MIG plug weld holes.



BVQBP6049

3. Temporarily install new parts in place.

4. MIG plug weld all holes.

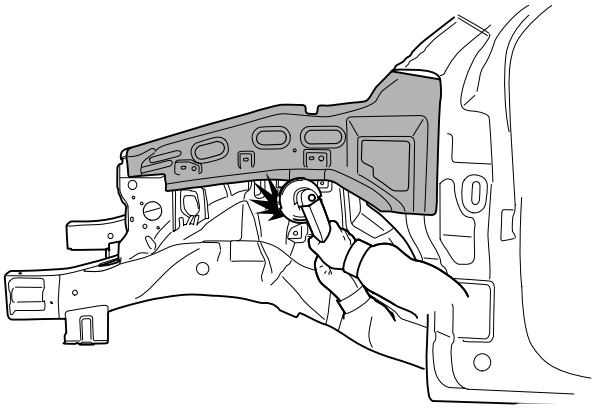


BVQBP6050

5. Clean MIG welds with a disc grinder.

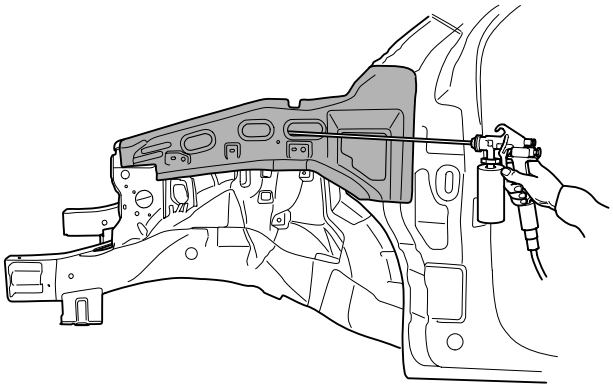
NOTE

Be careful not to grid welded portion too much. The internal parts will be stronger if the weld traces are not ground.



BVQBP6051

6. After welding the cowl side outer panel, apply the epoxy primer and anti corrosion to the cowl side outer panel.

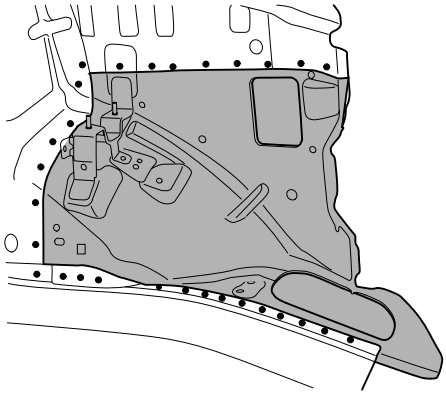


BVQBP6052

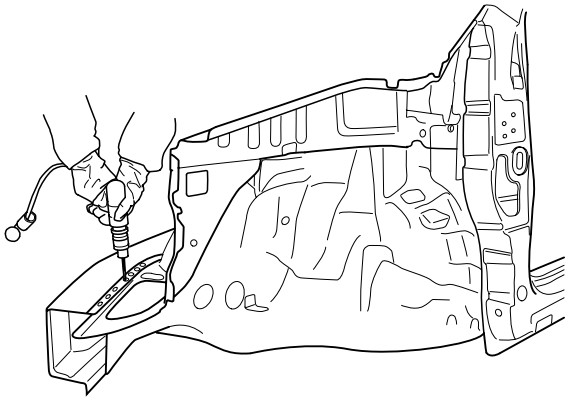
FENDER APRON INNER LOWER PANEL

REMOVAL

1. Drill out all the spotwelds to separate fender apron inner lower panel from fender apron inner upper panel, shock absorber housing panel and front side member.

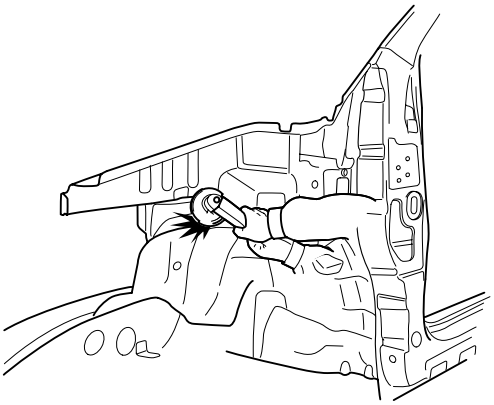


BVQBP6053



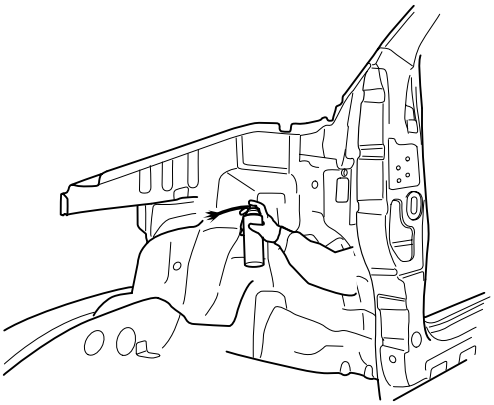
BVQBP6054

2. Clean MIG welds with a disc grinder.



BVQBP6055

3. Before welding the fender apron inner lower panel, apply the epoxy primer to the interior of the fender apron inner lower panel.

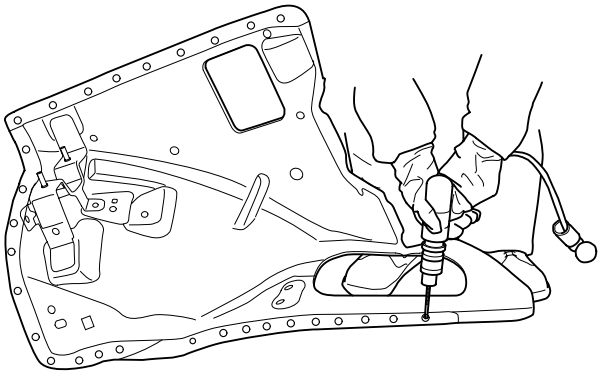


BVQBP6056

INSTALLATION

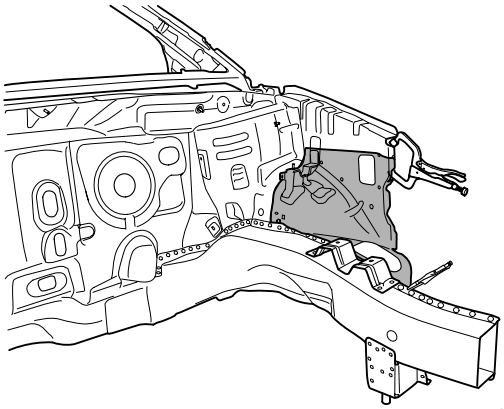
1. Drill 6mm holes in the new fender apron inner lower panel for MIG plug welding.

2. Remove paint from both sides of all portion that are to be welded such as peripheries of MIG plug weld holes.



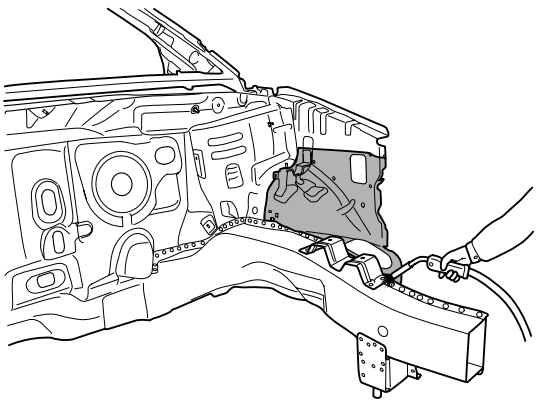
BVQBP6058

3. Temporarily install new parts in place.



BVQBP6059

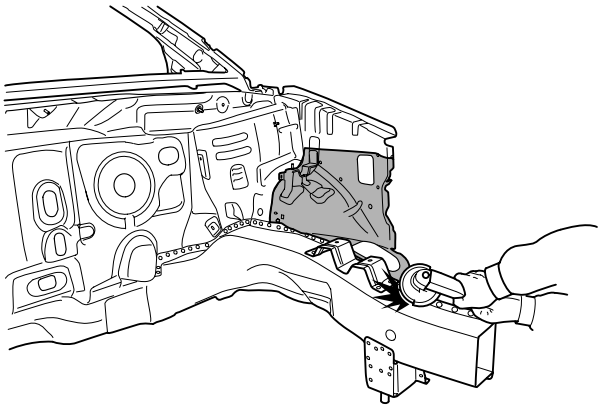
4. MIG plug weld all holes.



BVQBP6060

5. Clean MIG welds with a disc grinder.

NOTE
Be careful not to grid welded portion too much. The internal parts will be stronger if the weld traces are not ground.



BVQBP6061

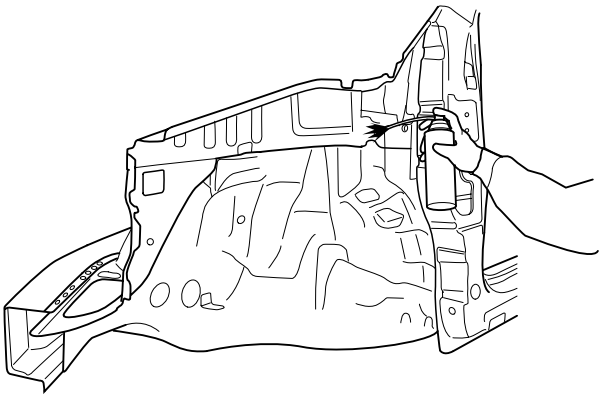
6. After welding the fender apron inner lower panel, apply the epoxy primer and anti corrosion to the cowl side outer panel

7. Prepare the exterior surfaces for priming using wax and grease remover.

8. Apply metal conditioner and water rinse.

9. Apply conversion coating and water rinse.

10. Apply the two-part epoxy primer



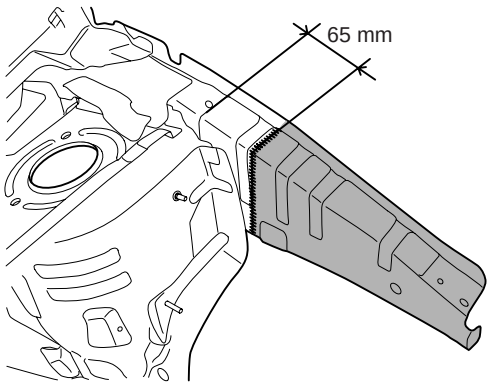
BVQBP6062

FENDER APRON INNER UPPER PANEL

REMOVAL

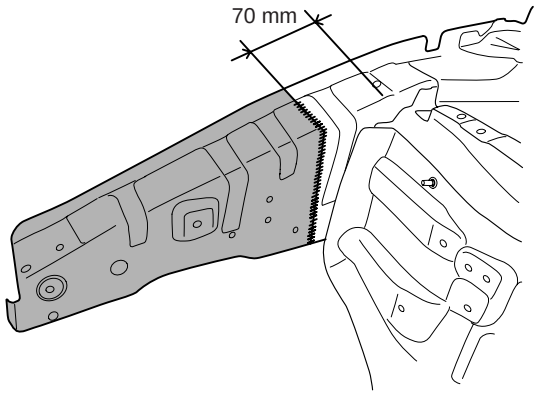
1. Measure and mark the vertical cut lines on fender outer mounting hole edge.

LH



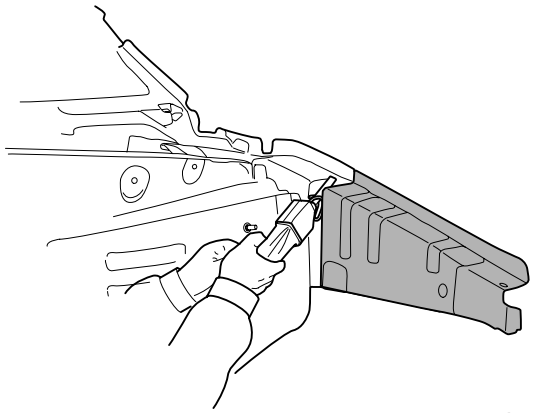
BVQBP6063

RH



BVQBP6064

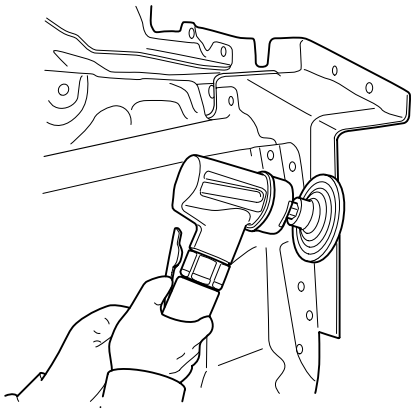
2. Cut through the fender apron inner upper panel cutline.



BVQBP6065

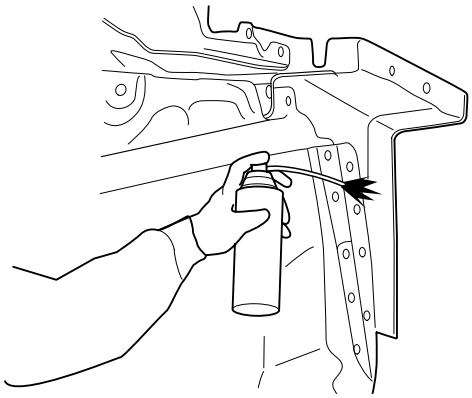
3. Prepare all surfaces to be welded.

4. Clean MIG with a disc sander.



BVQBP6066

5. Apply the epoxy primer to interior of the fender apron inner upper panel.

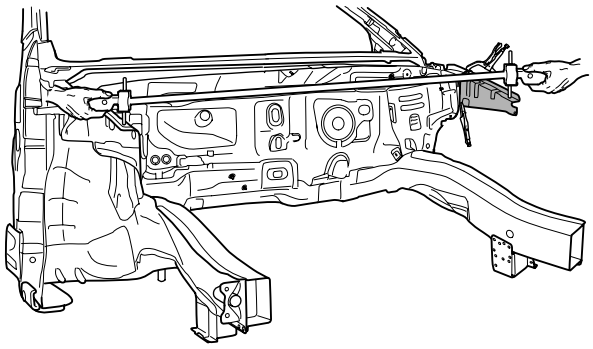


BVQBP6067

INSTALLATION

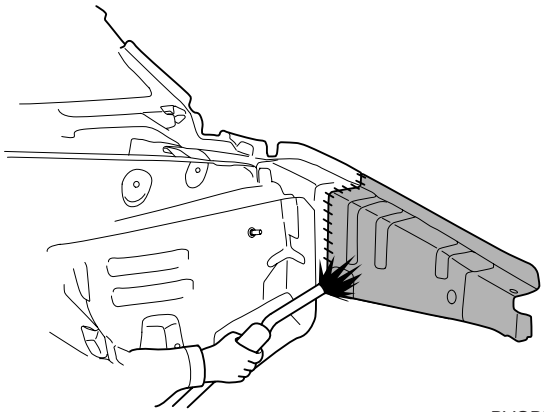
1. Temporarily Fit and clamp the fender inner upper panel in place.

2. Measure each measurement point(refer to the BODY DIMENSIONS) and correct the installation position.



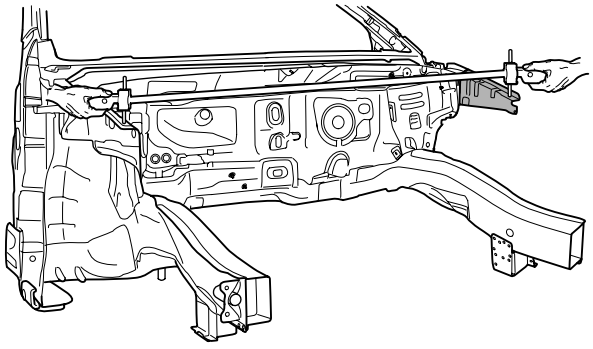
BVQBP6068

3. MIG butt weld all seams.



BVQBP6069

4. After welding the fender apron inner upper panel, measure each measurement point(refer to the BODY DIMENSIONS) and correct the installation position.

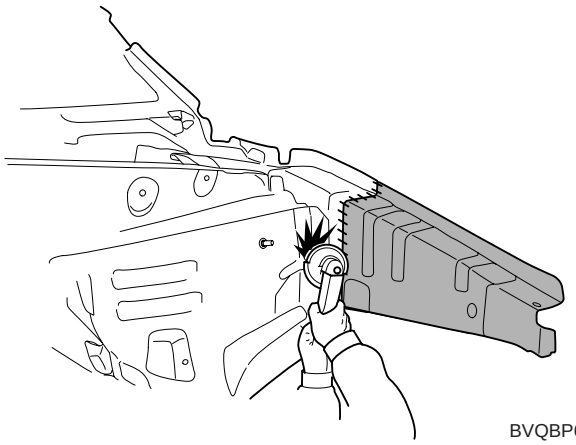


BVQBP6070

5. Clean MIG welds with a disc grinder.

NOTE

Be careful not to grid welded portion too much. The internal parts will be stronger if the weld traces are not ground.



BVQBP6071

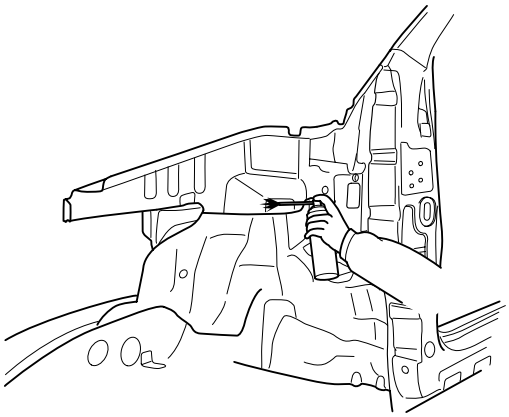
6. Apply the epoxy primer and anti-corrosion to the fender apron inner upper panel.

7. Prepare the exterior surfaces for priming using wax and grease remover.

8. Apply metal conditioner and water rinse.

9. Apply conversion coating and water rinse.

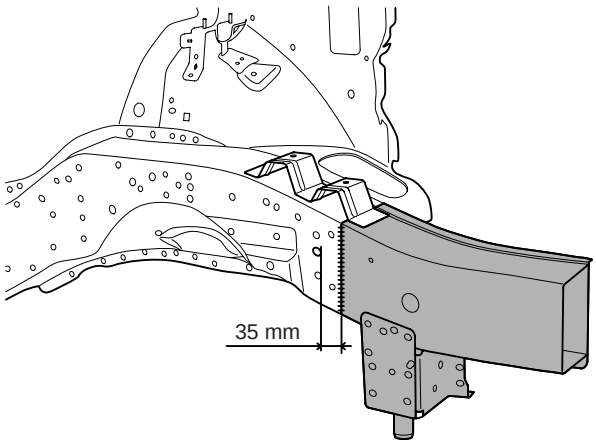
10. Apply the two-part epoxy primer.

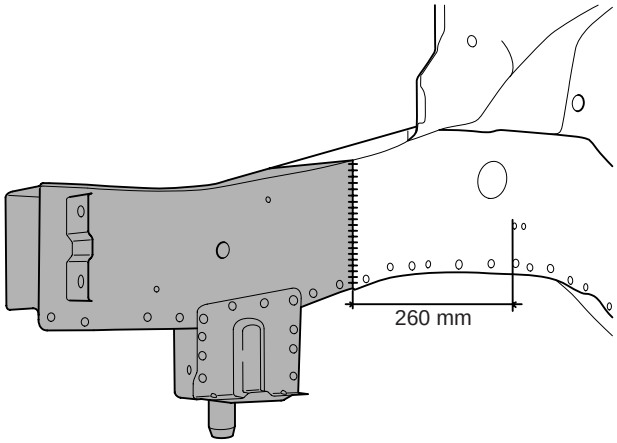


BVQBP6072

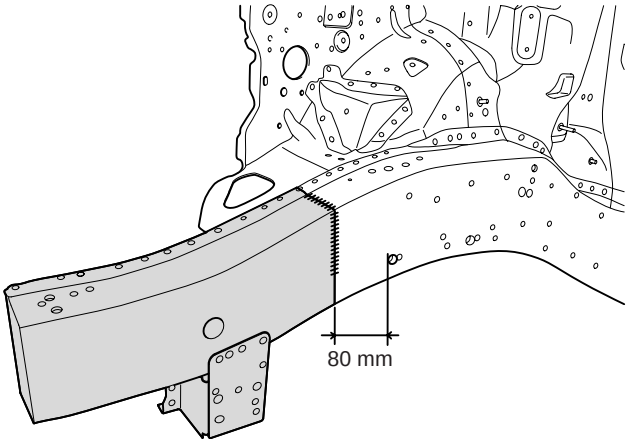
FRONT SIDE MEMBER

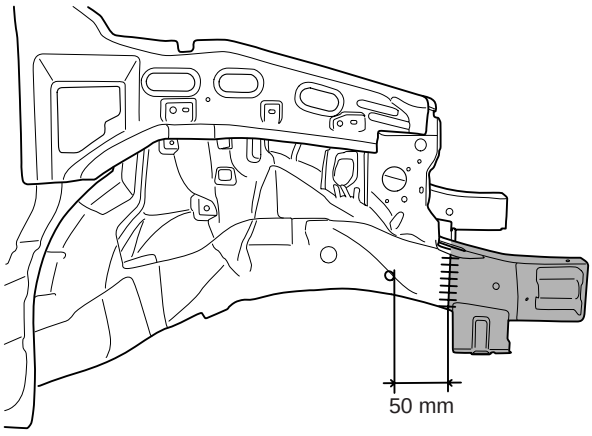
LH





RH





● **MIG plug welding**

MIG butt welding

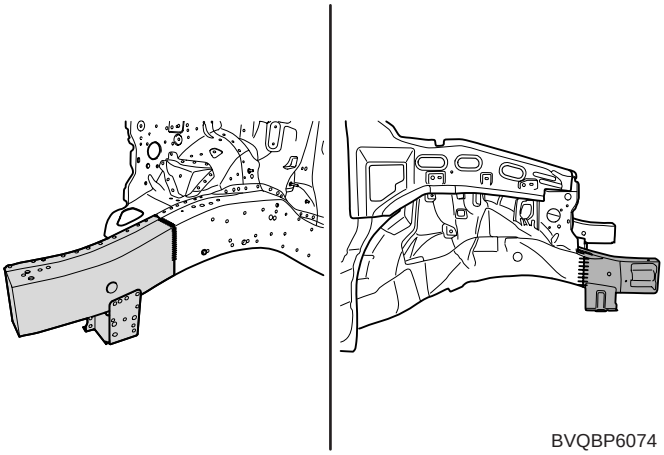
BVQBP6073

REMOVAL

NOTE

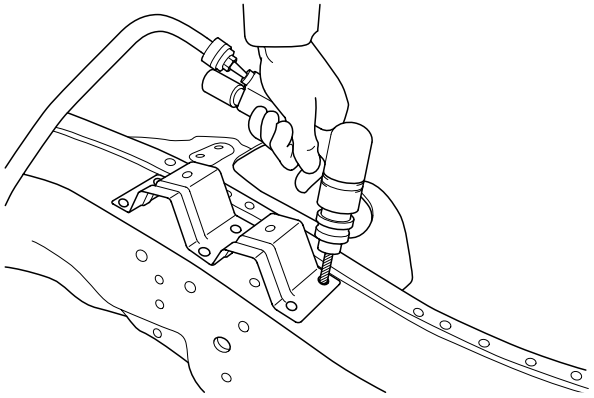
This procedure is to be used only for repair of minor damage to the front side member and when it is impossible to straighten the damaged side member.
The following procedure illustrates a repair for the front left side member.
The procedure may also be applied to the front left side member.

1. Measure and mark the vertical cut lines on front side member inner tooling hole outer side.



BVQBP6074

2. Drill out the spotwelds to separate front side member from engine mounting bracket.(6points)

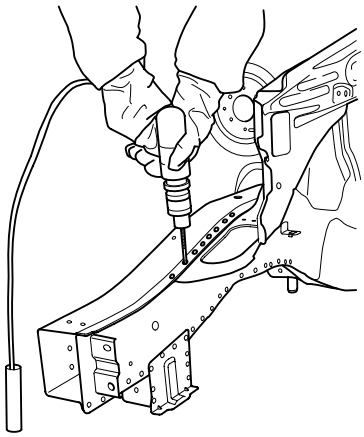


BVQBP6075

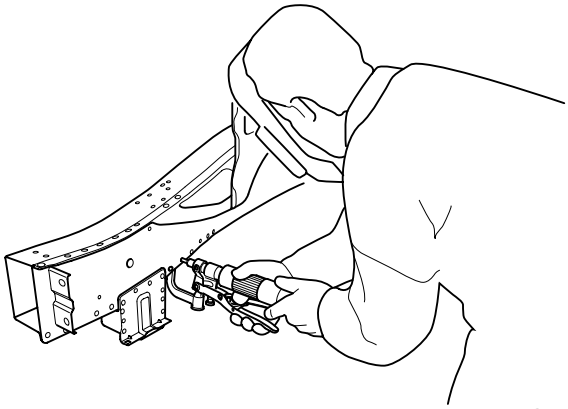
3. Drill out all the spotwelds to separate fender apron inner panel from front side member.

NOTE

- *When spotwelded portions are not apparent, remove paint with a rotary wire brush.*
- *In order to perform cutting and separation of spotwelded points use a spot weld cutter which is larger than the size of the nugget to make a hole only in the panels to be replaced.*



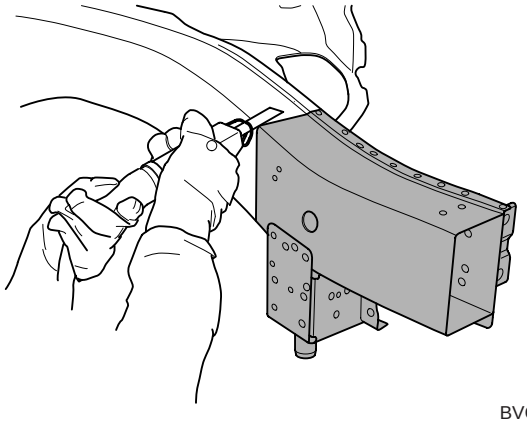
BVQBP6076



BVQBP6077

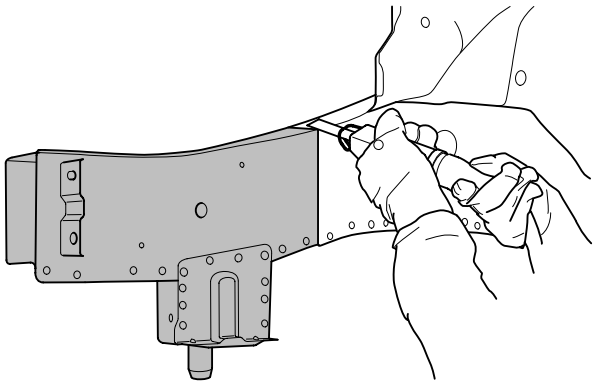
3. Cut through the front side member inner and outer at cutlines.

NOTE
Take care not to cut through front side member inner reinforcement.



BVQBP6078

4. Prepare all surfaces to be welded

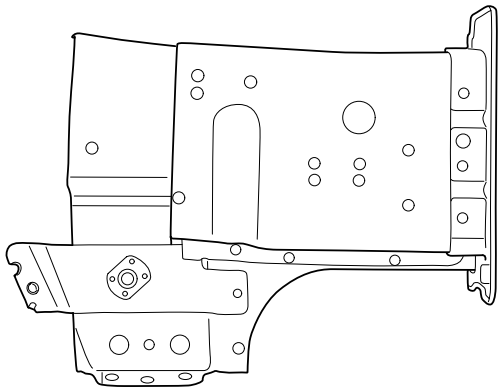


BVQBP6079

INSTALLATION

1. Transcribe the front side member inner and outer cut line to the new front side member, cut to length and chamfer butt end to improve weld surface.

2. Drill 8mm holes in new front side member for MIG plug welding.

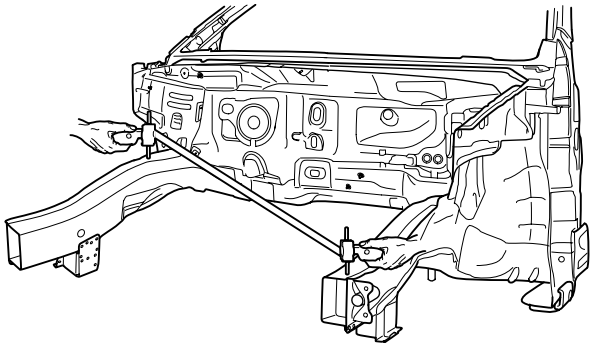


BVQBP6080

3. Fit and clamp the front side member inner and outer in place.

4. MIG plug weld all holes and MIG butt weld all seams.

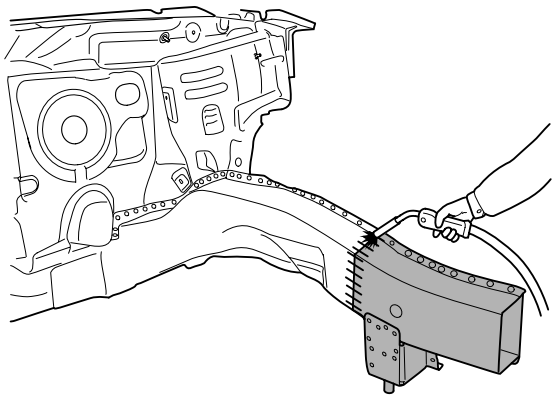
5. Measure each measurement point (Refer to the BODY DIMENSIONS) and correct the installation position.



BVQBP6081

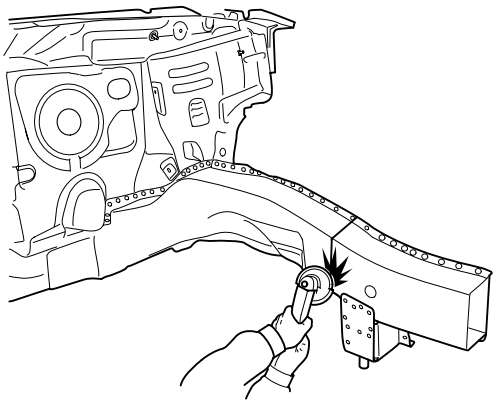
6. Clean and prepare all welds, remove all residue.

7. MIG plug weld all holes.



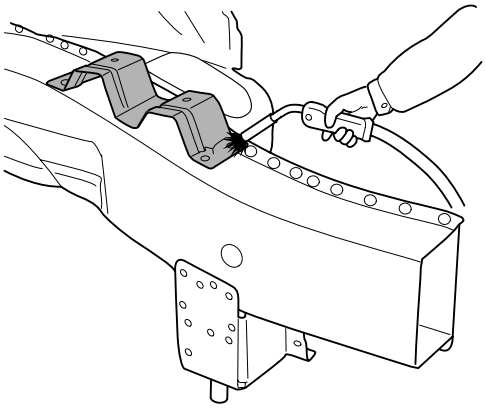
BVQBP6082

8. Clean MIG welds with a disc grinder.



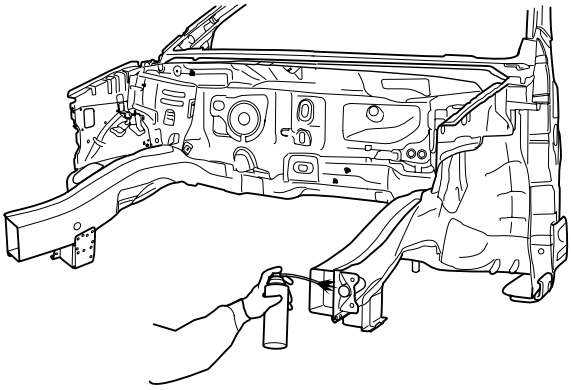
BVQBP6083

9. MIG plug weld engine mounting bracket from front side member.



BVQBP6084

10. Apply the two-part epoxy primer to the interior of the front side member.



BVQBP6085

11. Apply an anti-corrosion agent as required (Refer to the CORROSION PROTECTION).

12. Prepare the exterior surfaces for priming using wax and grease remover.

13. Apply metal conditioner and water rinse.

14. Apply conversion coating and water rinse.

15. Apply the two-part epoxy primer.

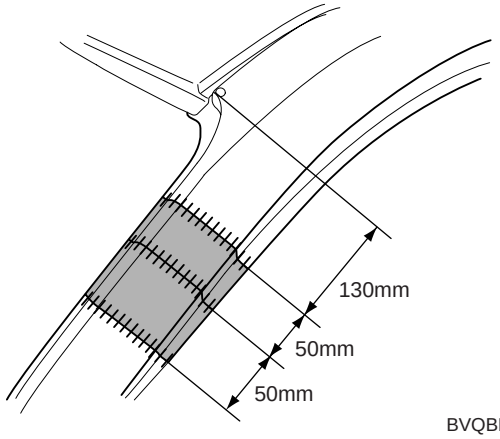
16. Apply the correct seam sealer to all joints carefully (Refer to the BODY SEALING LOCATIONS).

17. Reprime over the seam sealer to complete the repair.

FRONT PILLAR

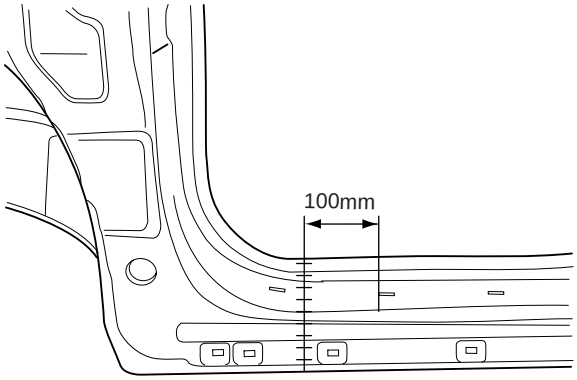
REMOVAL

1. Measure and mark the each cut line on the front outer pillar at 130mm from the roof panel end line as indicated in the illustration.



BVQBP6086

2. Measure and mark the cut line on front side sill outer panel as shown in the illustration.

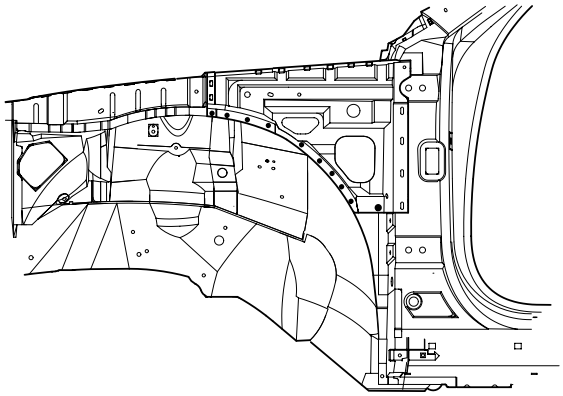


BVQBP6087

3. To remove the front pillar, grind away and drill out all welds and cut all laser welds attaching the cowl side upper outer panel as shown in the illustration.

NOTE

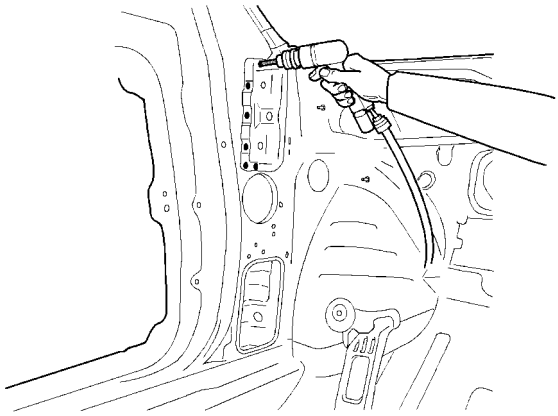
If it is possible that the cowl side upper outer panel is reusable, be careful not to damage it while removing.



BVQBP6088

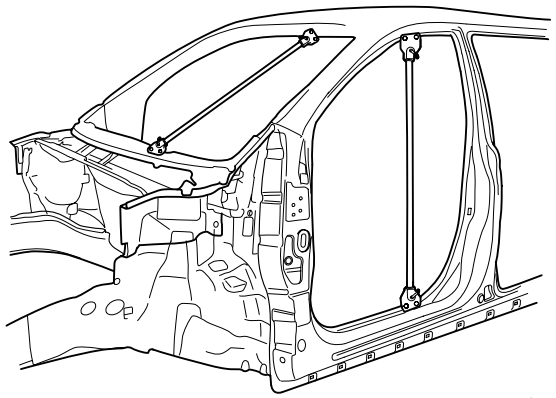
4. Drill out all welds attaching the front pillar to cowl cross member bracket.

5. Remove spotwelds attaching cowl cross member bracket to remove side inner pillar.



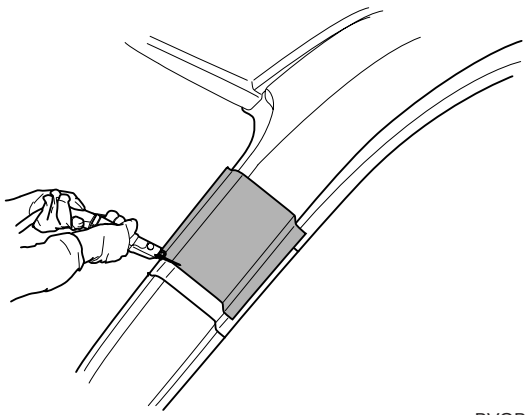
BVQBP6089

6. Before cutting front pillar, be sure to support roof panel.



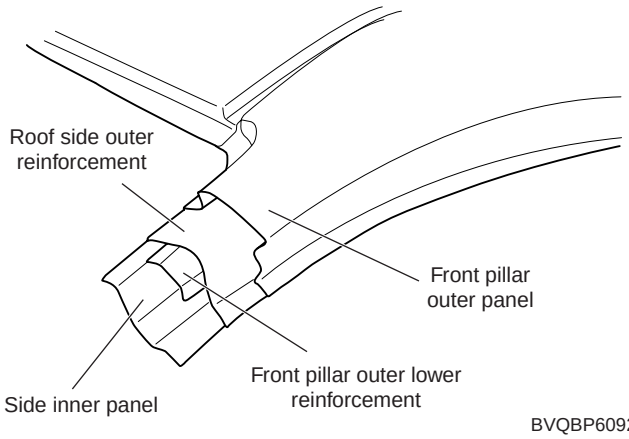
BVQBP6090

7. Cut through the front pillar outer at cutline.



BVQBP6091

8. Cut the front pillar through each cut line, taking care not to damage the other panel as illustration.

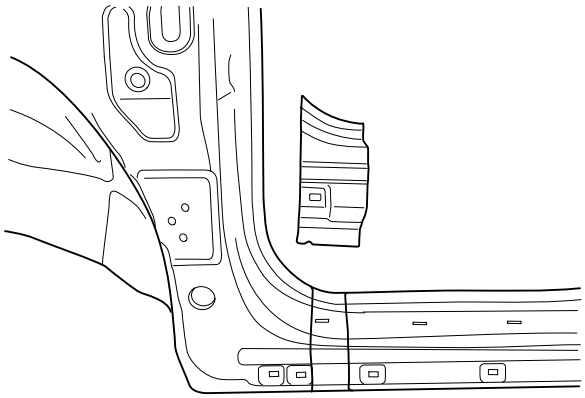


BVQBP6092

9. Before cutting the front side sill outer panel, make a rough cut the side sill outer panel only.

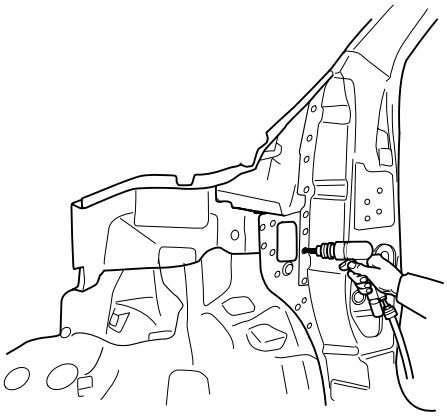
NOTE

When cutting the front side sill outer panel, be careful not to cut side outer reinforcement.



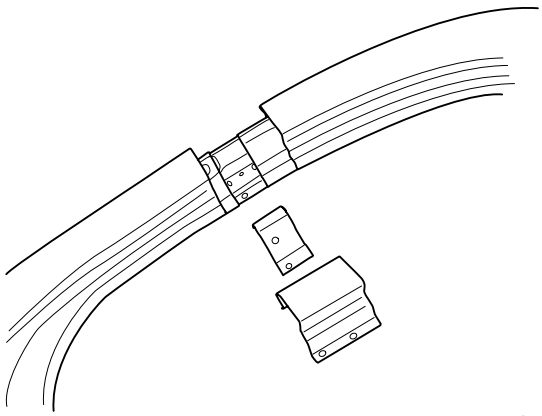
BVQBP6093

10. Drill out all the spotwelds to separate side outer panel from side inner panel (82points).



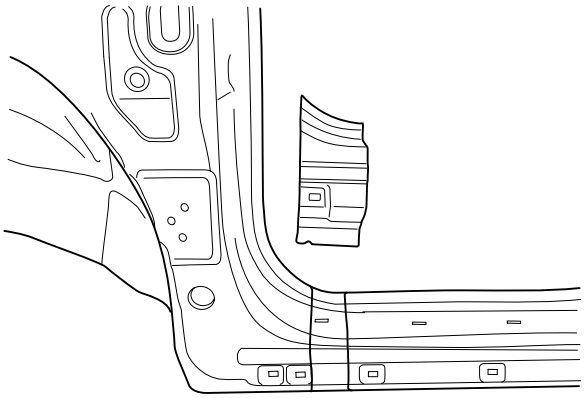
BVQBP6094

11. Cut the side outer reinforcement as shown in the illustration.



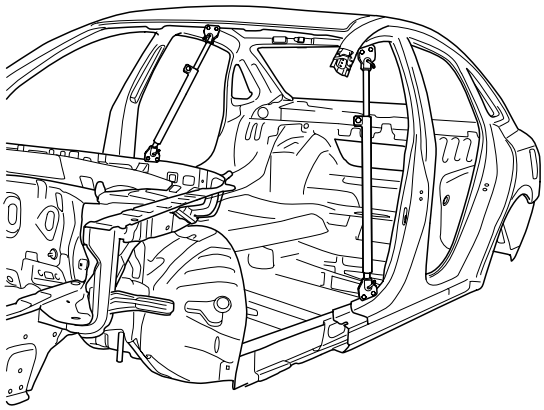
BVQBP6095

12. Cut the side sill inner panel vertical cutting line and remove the front pillar.



BVQBP6093

13. Straighten all flanges as necessary, prepare all surfaces to be welded.

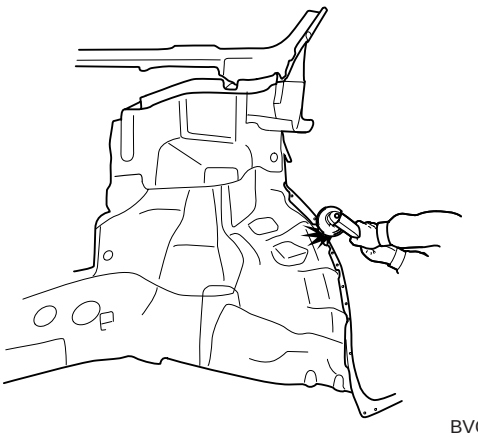


BVQBP6097

14. Clean all welds with a disc grinder.

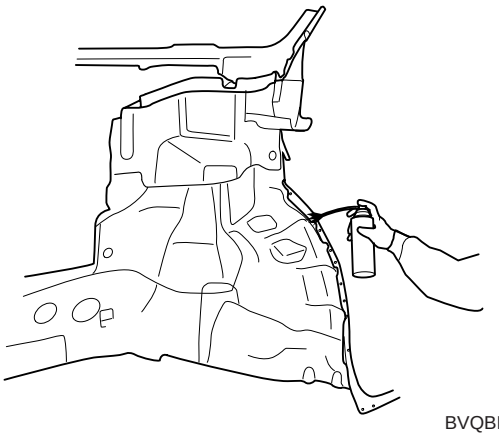
NOTE

- *Be careful not to grind welded portions too much.*
- *The internal parts will be stronger if the weld traces are not ground.*



BVQBP6098

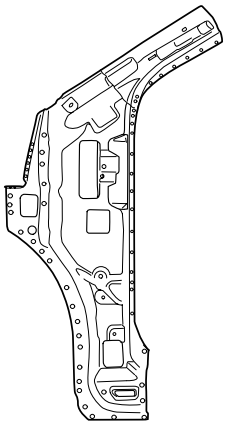
15. Apply the two-part epoxy primer to the interior of the front side member



BVQBP6099

INSTALLATION

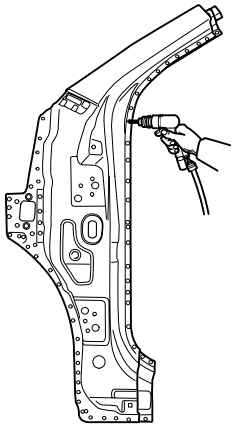
1. Transcribe the cut line to the new side inner panel, cut to length and chamfer butt end to improve weld surface.



BVQBP6100

2. Transcribe the cut line to the new side outer reinforcement and new front pillar, adding 30mm overlap to end and cut to length.

3. Drill 8mm holes along outer panel flanges in production location for attachment to other panels.



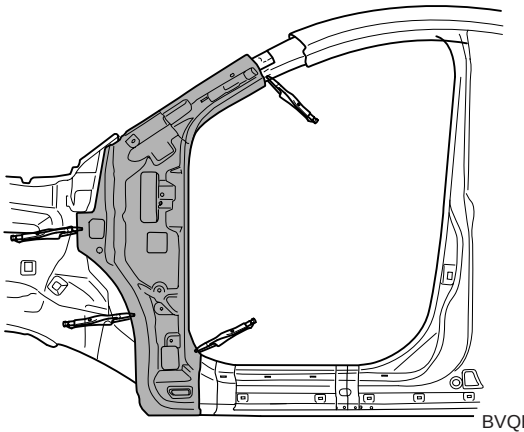
BVQBP6101

4. Transcribe the cutline to the new side inner panel, adding 30mm overlap to end and cut to length.

5. Drill 8mm holes in the side inner panel for MIG plug welding.

6. Fit and clamp the new side inner panel in place for welding.

7. MIG plug weld all holes and MIG butt weld the seams.

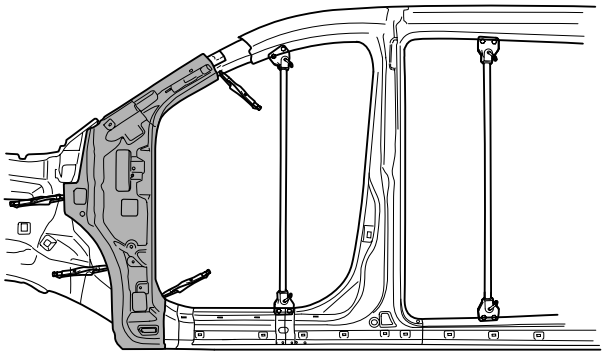


BVQBP6102

8. Temporarily install front pillar outer panel in place.

9. Measure and each measurement point (Refer to the BODY DIMENSIONS) and correct the installation position.

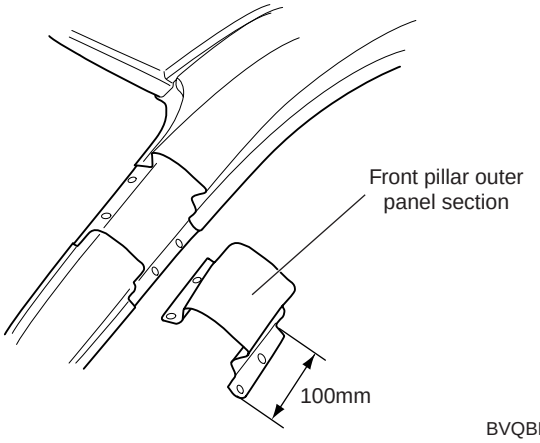
10. If necessary, make temporary welds, and then check to confirm that the closing and fit for windshield glass, door and fender are correct.



BVQBP6103

11. MIG butt weld front pillar outer panel and side sill outer reinforcement seams.

12. Reattach the cut away front pillar outer panel section, then MIG butt weld.



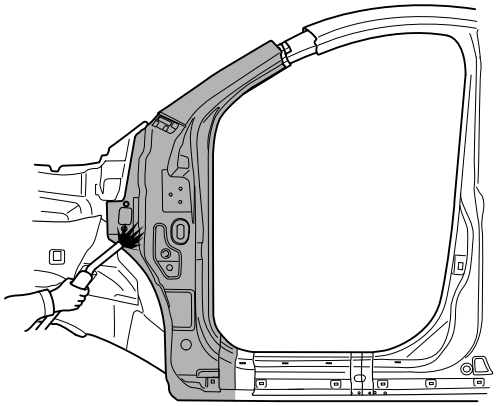
BVQBP6104

13. MIG plug weld all holes and MIG butt weld all seams in the side outer panel.

14. Clean and prepare all welds, remove all residue.

15. Apply body filler to joints and sand as needed.

16. Apply the two-part epoxy primer to the interior of the front pillar.

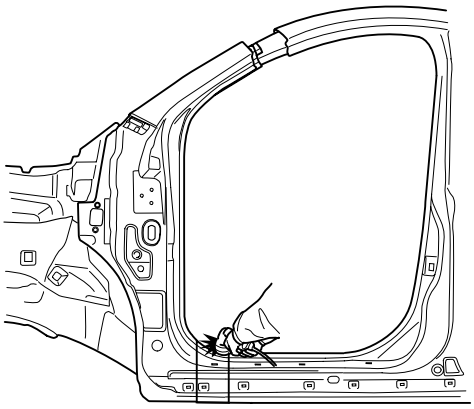


BVQBP6105

17. Clean all welds with a disc grinder.

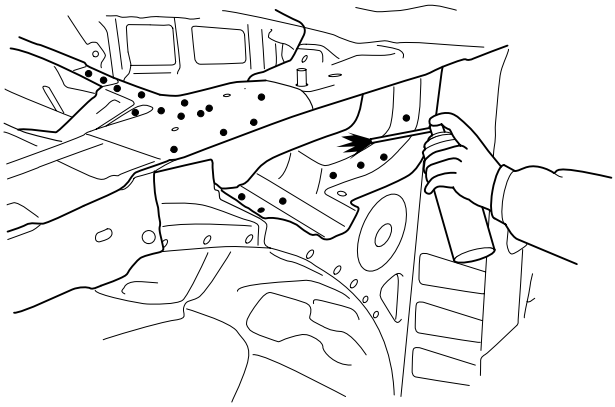
NOTE

- *Be careful not to grind welded portions too much.*
- *The internal parts will be stronger if the weld traces are not ground.*



BVQBP6106

18. Before welding the cowl side upper outer panel, apply the two-part epoxy primer and anti-corrosion agent to the interior of the cowl side upper outer panel.

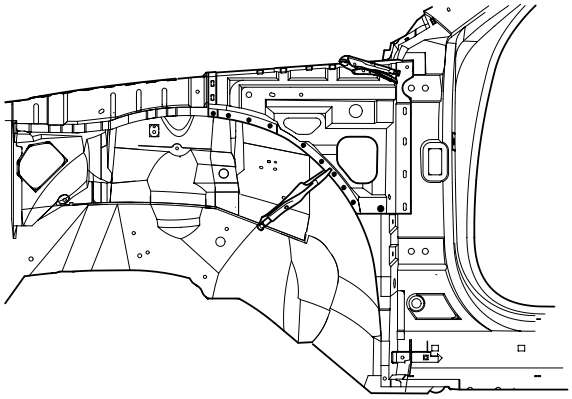


BVQBP6107

19. Install the cowl side upper outer panel in place.

20. MIG plug weld all holes.

21. Clean and prepare all welds, remove all residue.



BVQBP6108

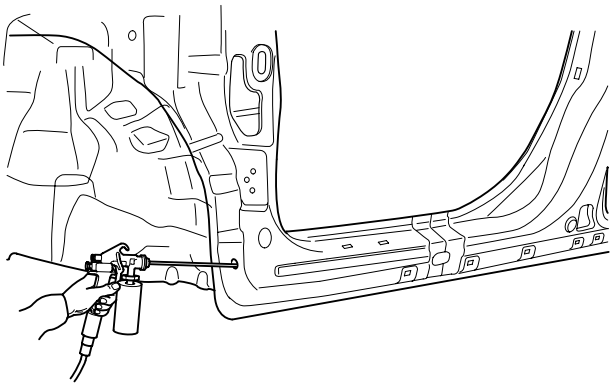
22. Apply an anti-corrosion agent to the welded parts and inside of front pillar (Refer to the CORROSION PROTECTION).

23. Prepare exterior surfaces for priming, using wax and grease remover.

24. Apply metal conditioner and water rinse.

25. Apply conversion coating and water rinse.

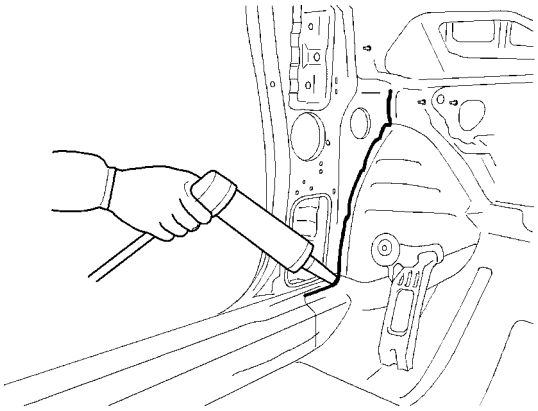
26. Apply the two-part epoxy primer.



BVQBP6109

27. Apply the correct seam sealer to all joints carefully (Refer to the BODY SEALING LOCATIONS).

28. Reprime over the seam sealer to complete the repair.

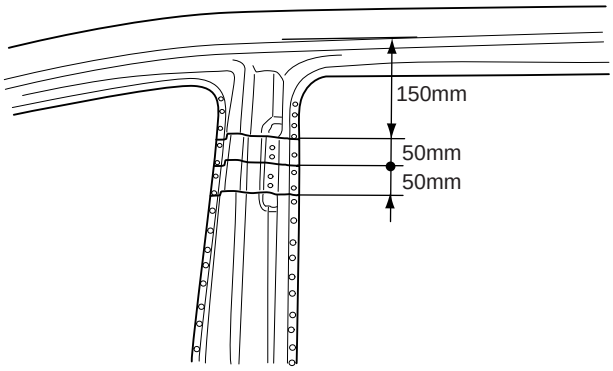


BVQBP6110

CENTER PILLAR

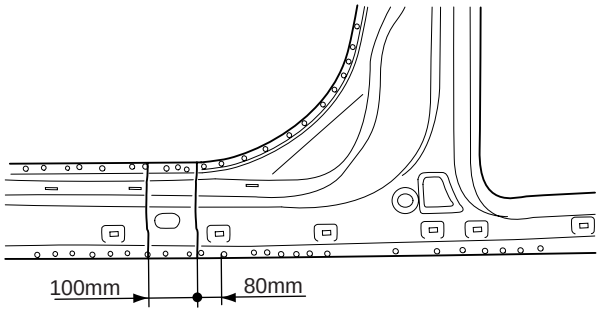
REMOVAL

1. Measure and mark the horizontal cutting line on center pillar outer panel as indicated in the illustration.



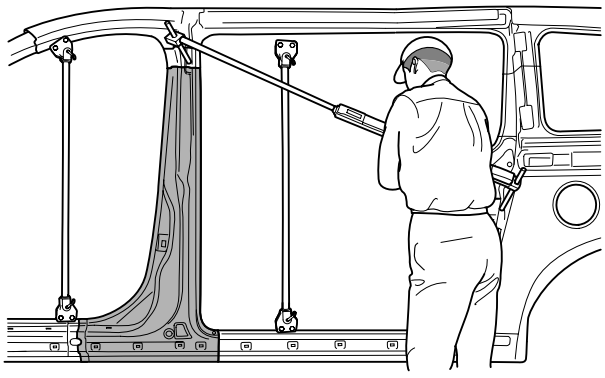
BVQBP6111

2. Measure and mark the vertical cutline on side sill outer panel 80mm from the front door step trim mounting hole.



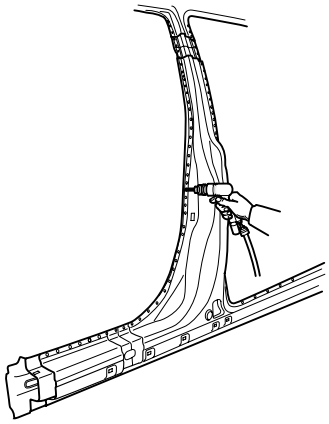
BVQBP6112

3. Before cutting center pillar, be sure to support roof panel.



BVQBP6113

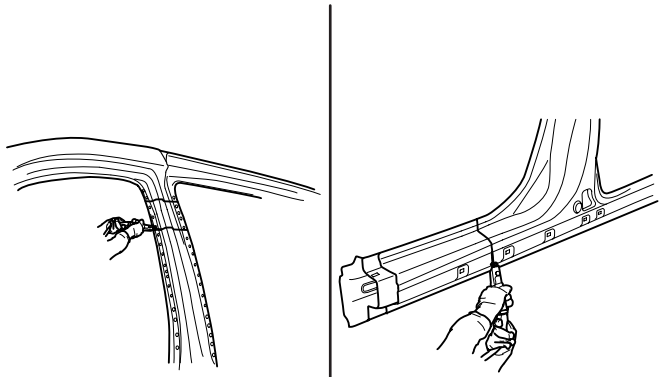
4. Drill out all spotwelds and cut all laser welds attaching the center outer pillar to the body to remove center outer pillar.



BVQBP6114

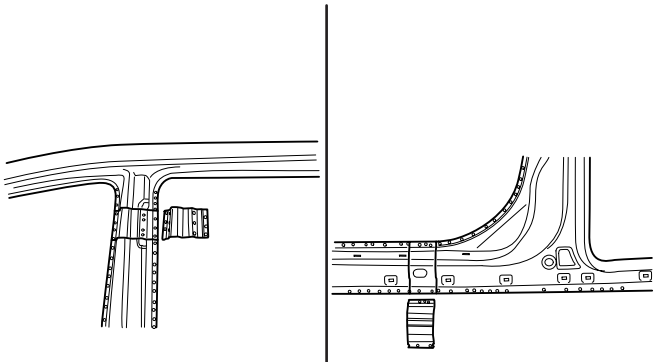
5. Cut through center outer pillar and side sill outer panel at cutlines.

NOTE
When cutting side sill outer panel take care not to cut through mating flanges or side outer reinforcement.



BVQBP6115

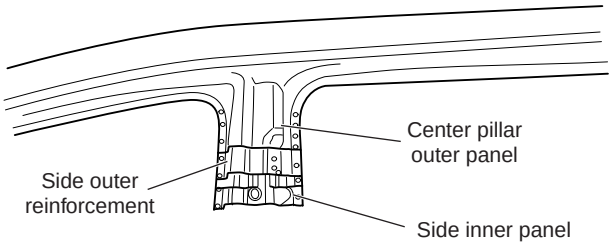
6. After cutting side outer panel (center pillar outer & side sill), cut the center pillar outer reinforcement and center pillar inner panel.



BVQBP6116

7. Remove the center pillar.

NOTE
When cutting center inner pillar, be careful not to cut front seat belt mounting upper bracket.

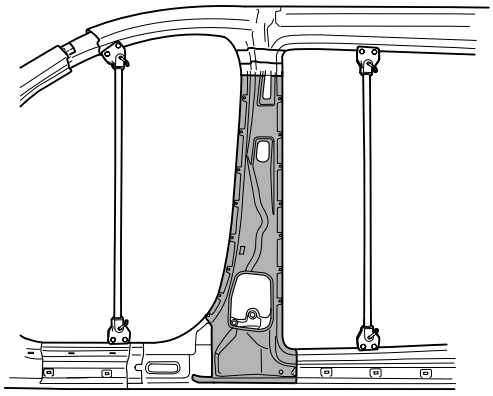


BVQBP6117

8. Determine if the side outer reinforcement is damaged and needs to be replaced. If replacing is necessary, mark out the damaged portion of the reinforcement. Cut at cutlines and remove damaged portion.

9. Straighten all flanges as necessary.

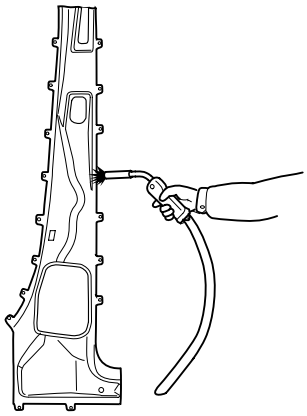
10. Prepare all surfaces to be welded.



BVQBP6118

INSTALLATION

1. In order to install center inner pillar drill out all spotwelds attaching the roof side outer rail to center inner pillar to separate them.

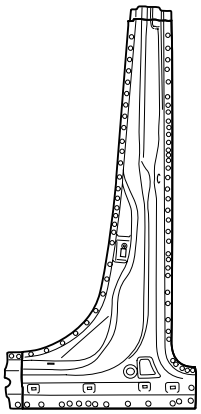


BVQBP6119

2. Transcribe the center outer pillar cutlines to the new center outer pillar, adding 50mm overlap at center lower pillar ends.

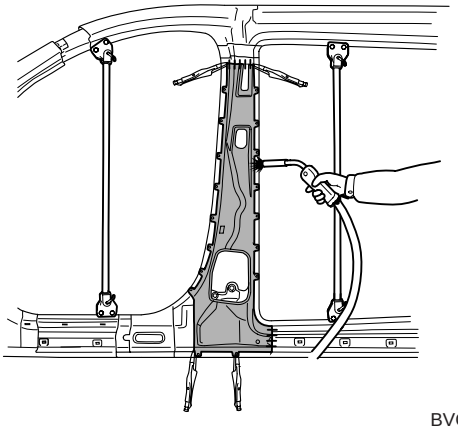
3. Cut and chamfer butt end to improve weld surface.

4. Drill 6mm holes in overlap area and along outer panel flanges.



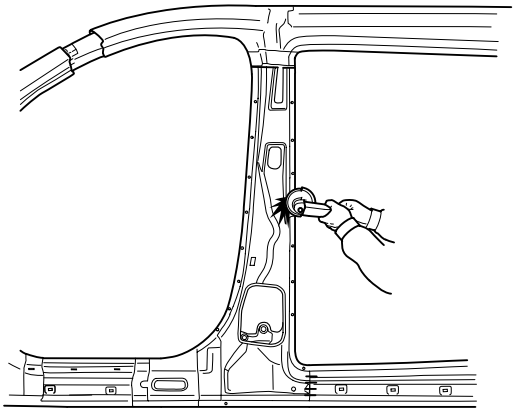
BVQBP6120

5. MIG butt weld all seams in center inner pillar and sill side outer reinforcement as shown in the illustration.



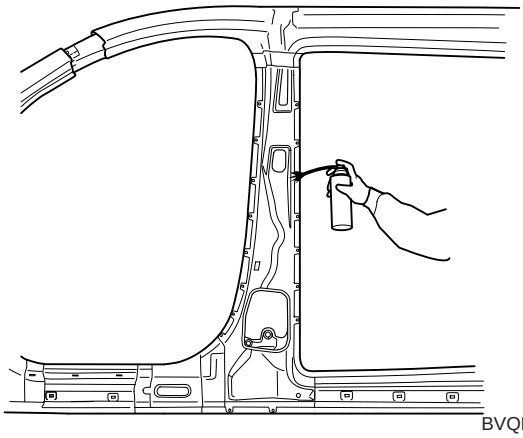
BVQBP6121

6. Clean MIG welds with a disc grinder.



BVQBP6122

7. Apply the epoxy primer to the side inner reinforcement.

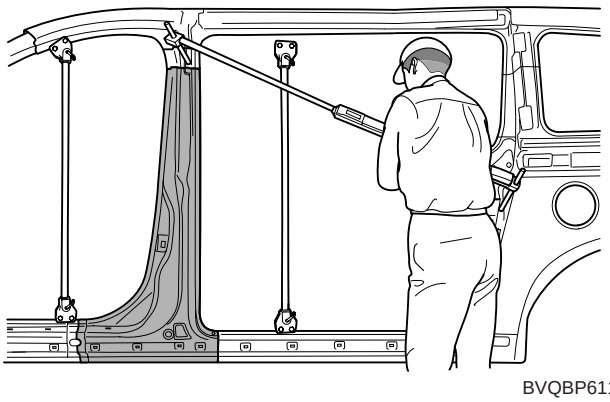


BVQBP6123

8. Temporarily install new center outer panel in place.

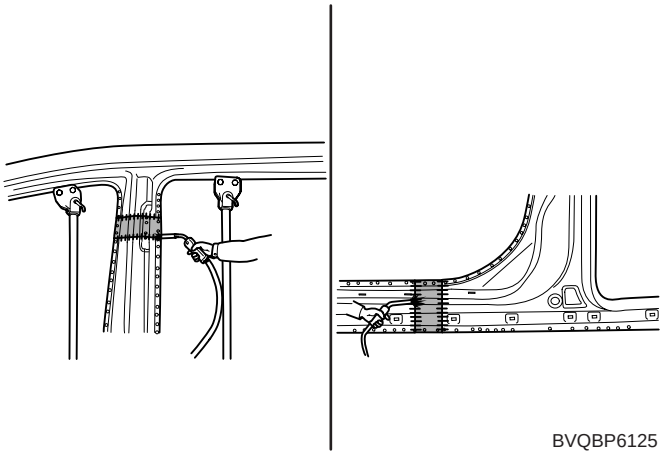
9. Screw center pillar in place.

10. Measure and each measurement point (Refer to the BODY DIMENSIONS) and correct the installation position.

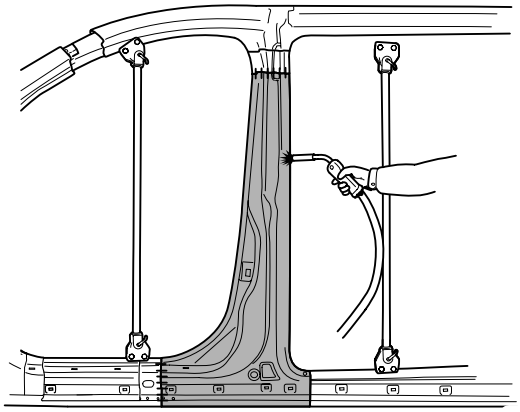


BVQBP6113

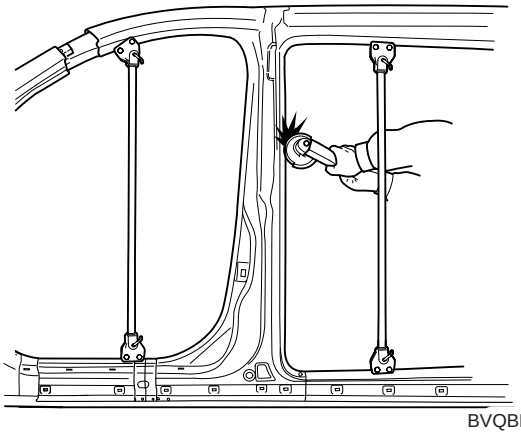
11. Check the fit of the front and rear doors.
12. Reinstall center outer pillar and screw in place.
13. MIG plug weld all holes and MIG butt weld all seams.
14. Clean and prepare all welds, and remove all residue.
15. Apply body filler to the outer center pillar seam. Sand and finish.



BVQBP6125

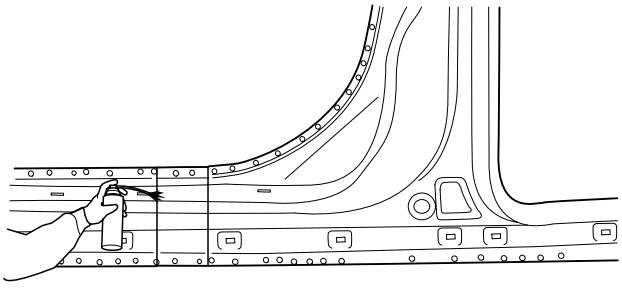


BVQBP6126



BVQBP6127

16. Apply the two-part epoxy primer to the interior of the center pillar.
17. Apply an anti-corrosion agent to the welded parts and interior of the center pillar (Refer to the CORROSION PROTECTION).
18. Prepare exterior surfaces for priming, using wax and grease remover.
19. Apply metal conditioner and water rinse.
20. Apply conversion coating and water rinse.
21. Apply the two-part epoxy primer.
22. Apply the correct seam sealer to all joints carefully (Refer to the BODY SEALING LOCATIONS).
23. Reprime over the seam sealer to complete the repair.

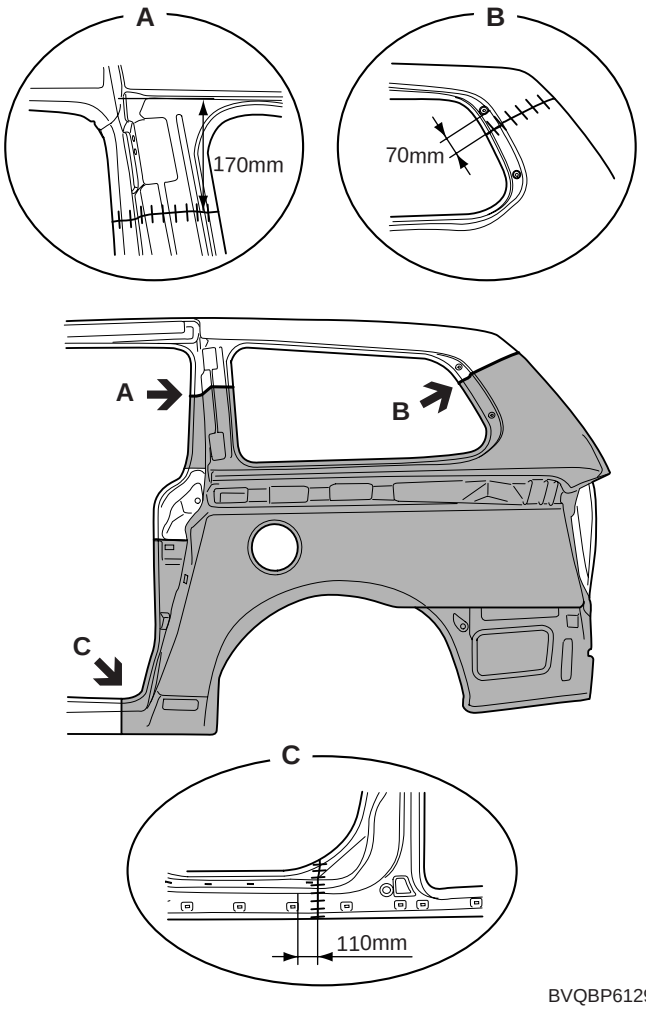


BVQBP6128

QUARTER PANEL

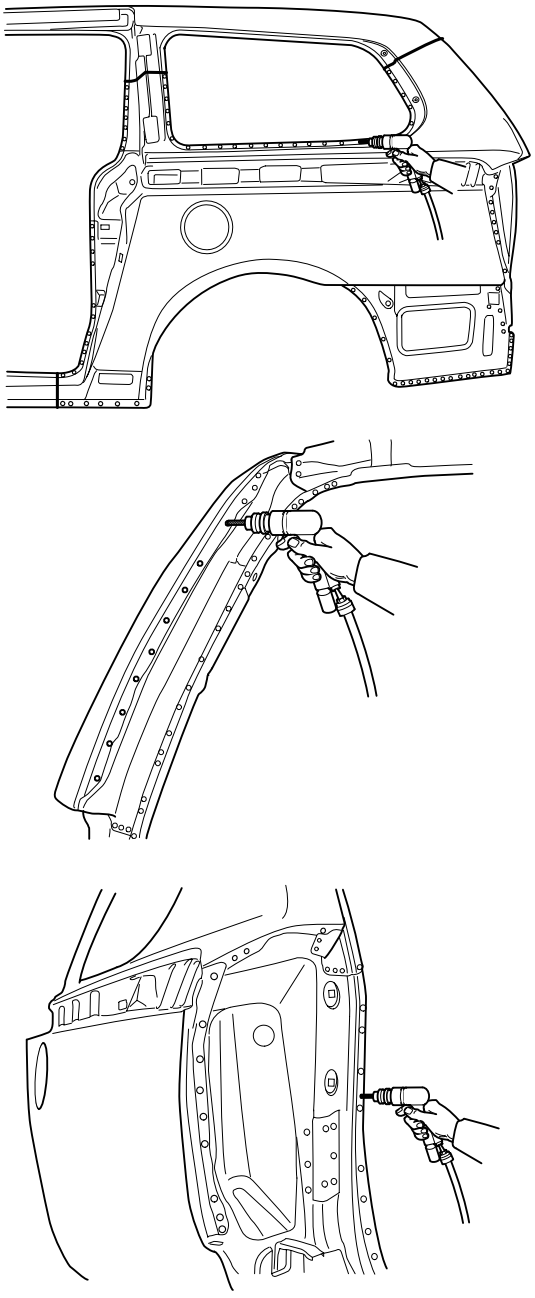
REMOVAL

1. Depending on the extent of damage, measure and mark cutlines on the quarter outer panel as indicated in the illustration



BVQBP6129

2. Drill out all attaching spdtwelds the quarter outer panel .

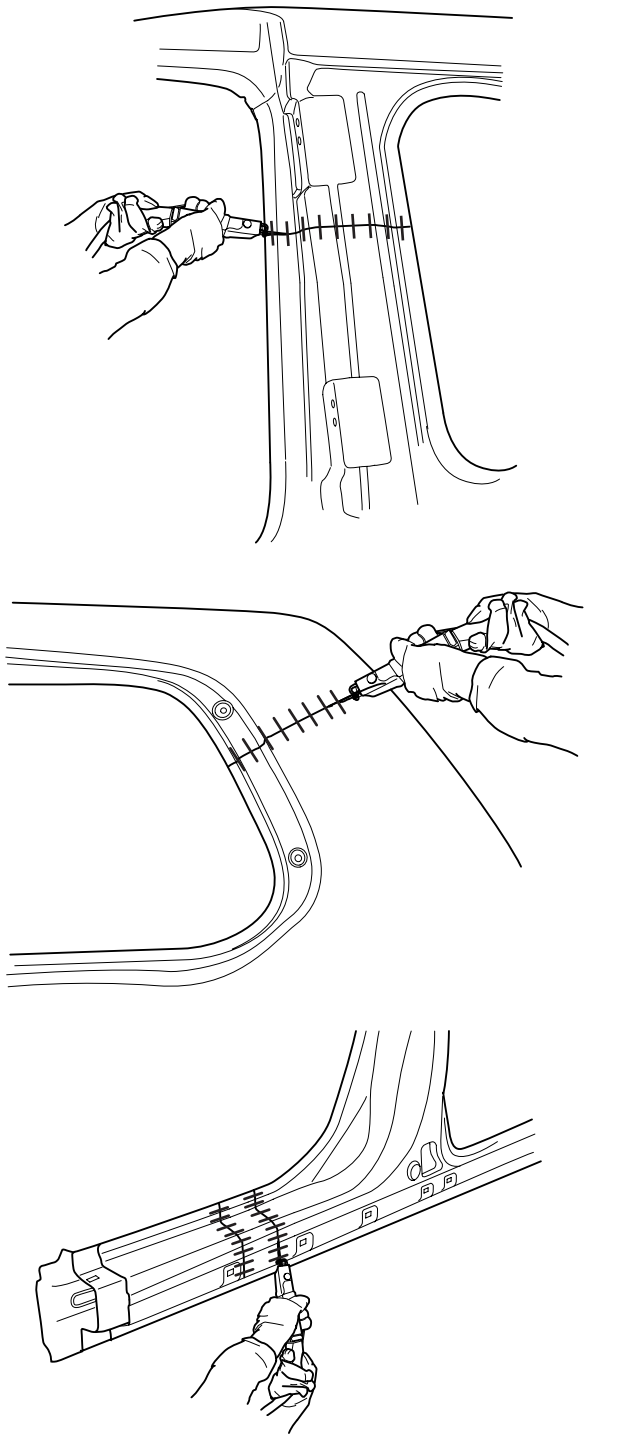


BVQBP6130

3. Cut the quarter outer panel at cutlines and remove the quarter outer panel as illustration.

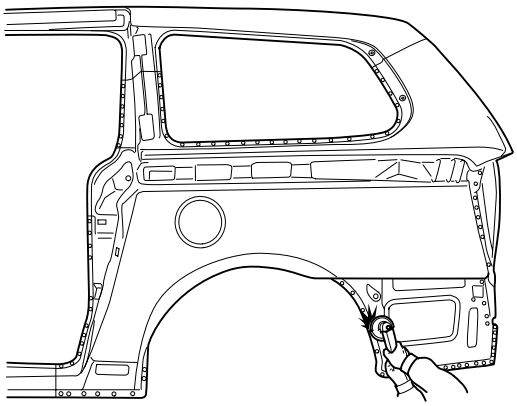
NOTE
When cutting the quarter outer panel, be careful not to cut side inner panel.

4. Prepare all surfaces to be welded.



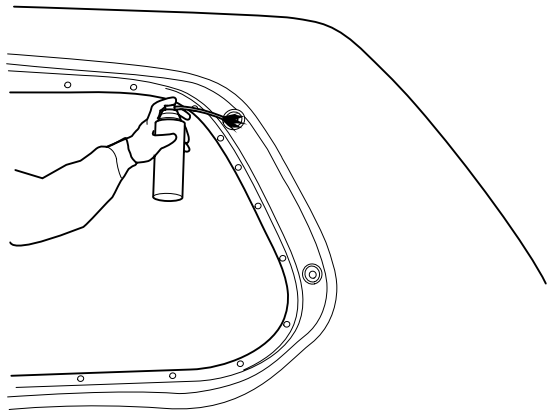
BVQBP6131

5. Clean MIG welds with a disc grinder.



BVQBP6132

6. Apply the two-part epoxy primer to the quarter inner panel.

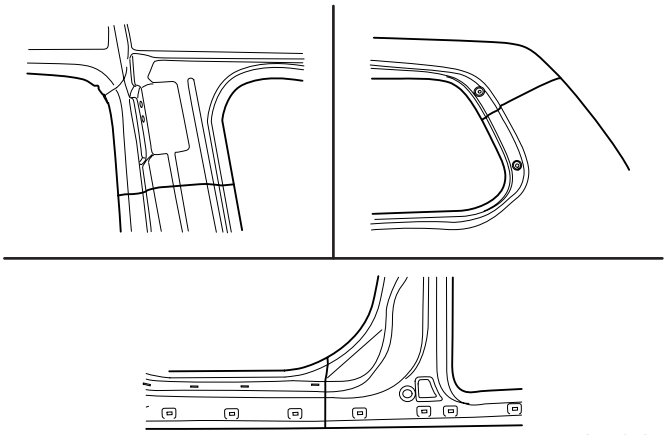


BVQBP6133

INSTALLATION

1. Transcribe the cutline to the new quarter outer panel, adding 30mm for overlap at the old joint.

2. Drill 6 mm holes in overlap areas and along upper and lower flanges of the new quarter outer panel for MIG plug welding.

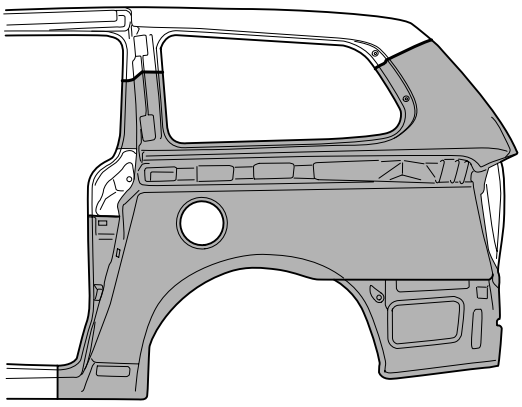


BVQBP6134

3. Fit and clamp the quarter outer panel in place.

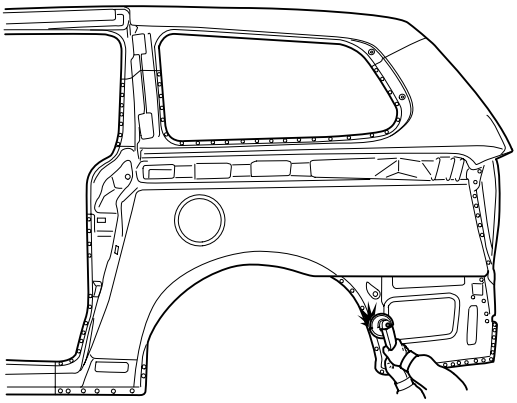
4. MIG plug weld all holes and MIG butt weld seams. At the wheel well the edge must be crimped over the wheel housing.
   This joint may be welded after crimping or applying a bead of adhesive which may be applied to the joint before or after crimping.

5. Clean and prepare all welds, remove all residue.



BVQBP6135

6. Apply body filler to the welded seam. Sand and finish. Apply the two-part epoxy primer to the interior of the quarter outer panel.



BVQBP6132

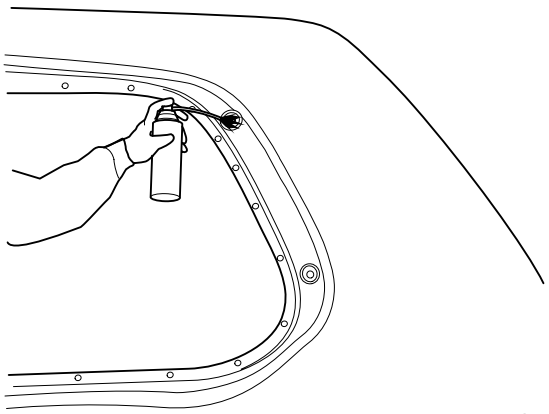
7. Apply an anti-corrosion agent to the welded parts and interior of the quarter outer panel (Refer to the CORROSION PROTECTION).

8. Prepare exterior surfaces for priming, using wax and grease remover.

9. Apply metal conditioner and water rinse.

10. Apply conversion coating and water rinse.

11. Apply the two-part epoxy primer.



BVQBP6133

REAR FLOOR SIDE MEMBER

REMOVAL

NOTE

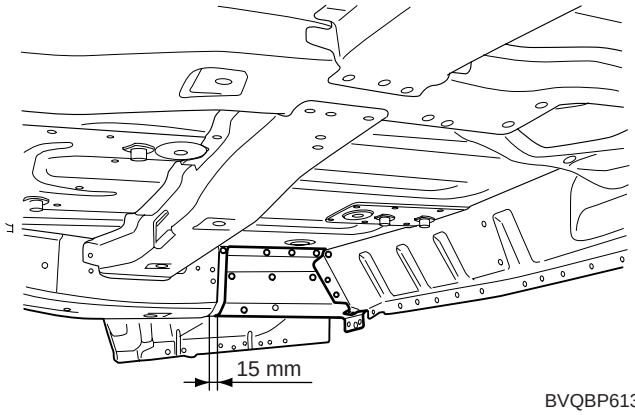
Because the rear floor side members are designed to absorb energy during a rear collision, care must be used when deciding to use this repair method. This repair is recommended only for moderate damage to the vehicle, where distortions do not extend forward of the trunk region. If the damage is more severe, then the entire side member assembly should be replaced at the factory seams without employing this sectioning procedure.

The following procedure applies when only one rear floor side member needs to be replaced. If both side members are damaged and need to be replaced, then the procedure of rear floor side members and rear floor section should be followed.

Refer to the body dimension charts and measure the vehicle to determine straightening and alignment requirements.

The body must be returned to its original dimensions before beginning the repair procedure.

1. Depending on the extent of damage, if the right side member is to be replaced it should be measured and marked 15mm from the rear floor side member end.

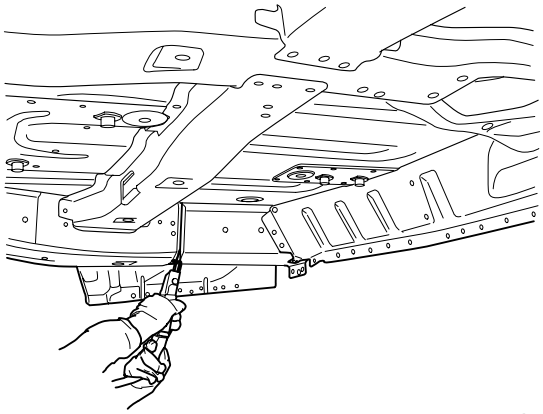


BVQBP6138

NOTE

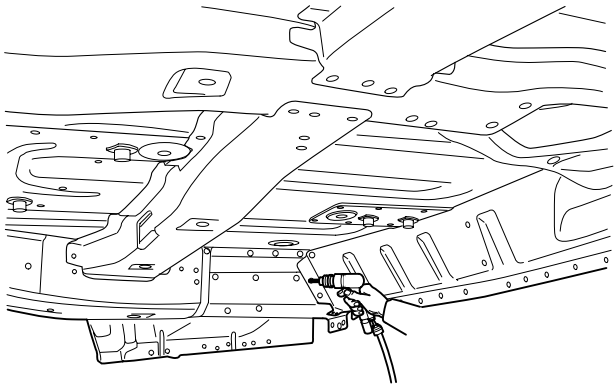
The flowing procedure illustrates a repair for the right rear floor side member. The procedure may also be applied the left rear floor side member.

2. Cut through rear floor side member at cutline being careful not to cut rear floor side member reinforcement.



BVQBP6139

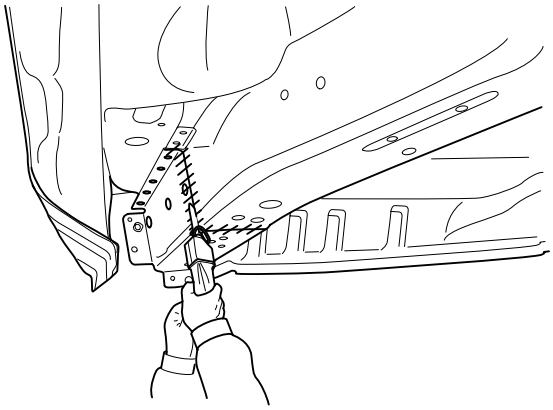
3. Remove the rear floor side member by drilling out all attaching spotwelds.



BVQBP6140

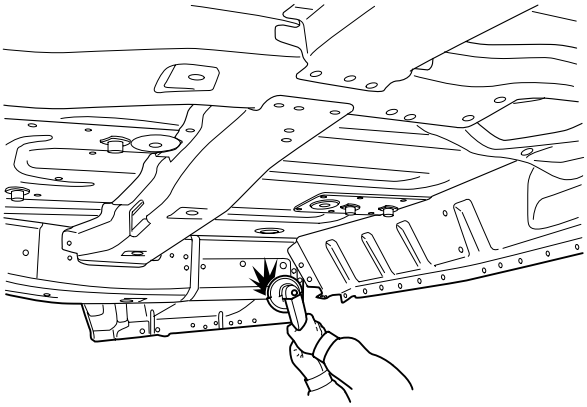
4. Using a belt sander, remove the rear floor side member by drilling out the spotwelds.

5. Prepare all surfaces to be welded.



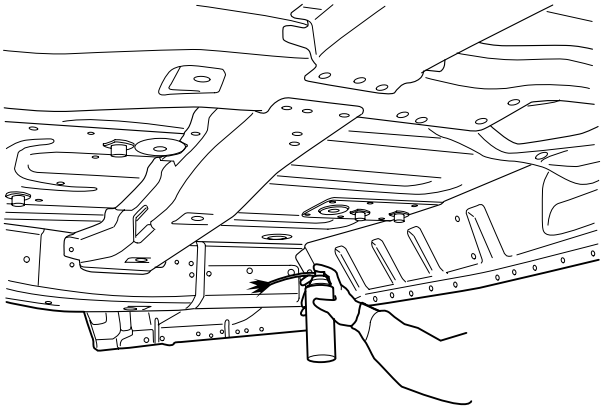
BVQBP6141

6. Clean MIG welds with a disc grinder.



BVQBP6142

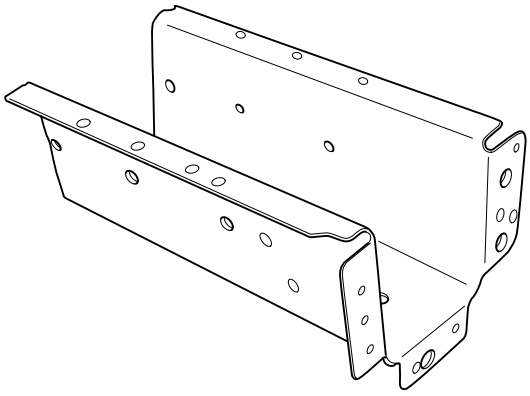
7. Apply the two-part epoxy primer to the rear floor side member.



BVQBP6143

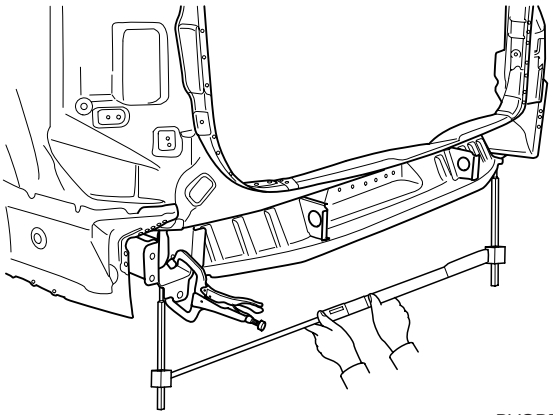
INSTALLATION

1. Transcribe the cutline to the new rear floor side member. Cut at line and drill out the spotwelds attaching the reinforcement and separate it.



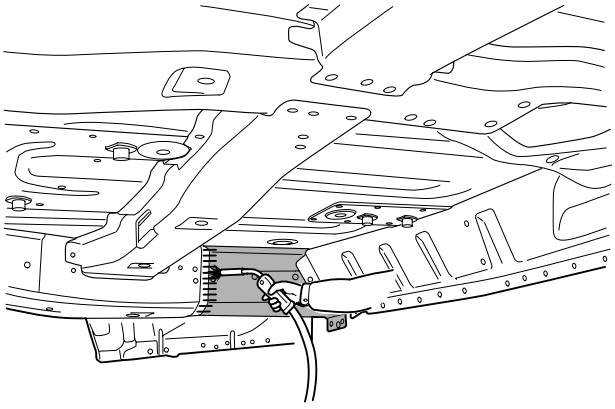
BVQBP6144

2. Fit and clamp the new rear floor side member in place for welding.
   Measure to ensure dimensions are accurate as given in the body dimension charts.



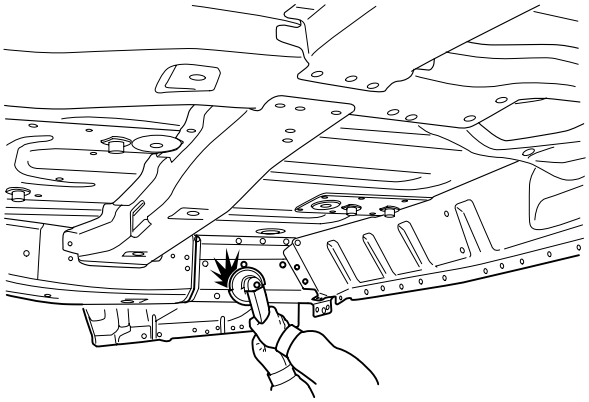
BVQBP6145

3. MIG plug weld at the holes and MIG butt weld the seam in the side member.



BVQBP6146

4. Clean and prepare all surfaces to be welded and remove all residue.



BVQBP6147

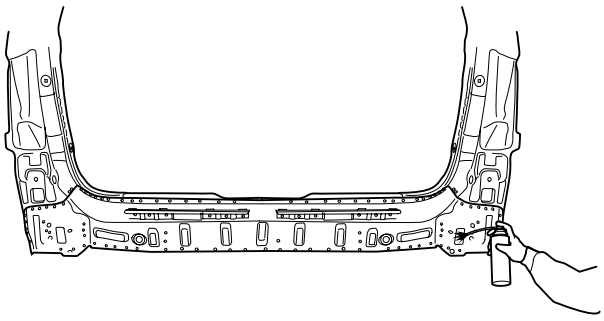
5. Apply the two-part epoxy primer to the interior of the rear floor side member.

6. Prepare exterior surfaces for priming, using wax and grease remover.

7. Apply metal conditioner and water rinse.

8. Apply conversion coating and water rinse.

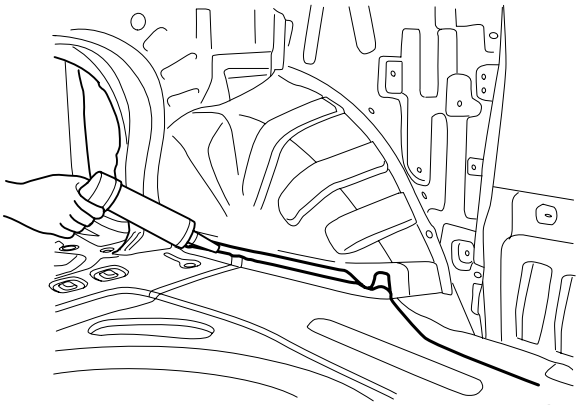
9. Apply the two-part epoxy primer.



BVQBP6148

10. Apply the correct seam sealer to all joints.

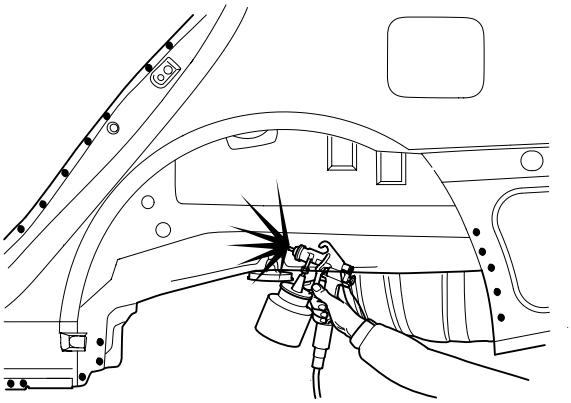
11. Reprime over the seam sealer to complete the repair.



BVQBP6149

12. After completing body repairs, carefully apply undercoating to the underbody.

13. In order to improve corrosion resistance, if necessary, apply on underbody anti-corrosion agent to the panel which is repaired or replaced.



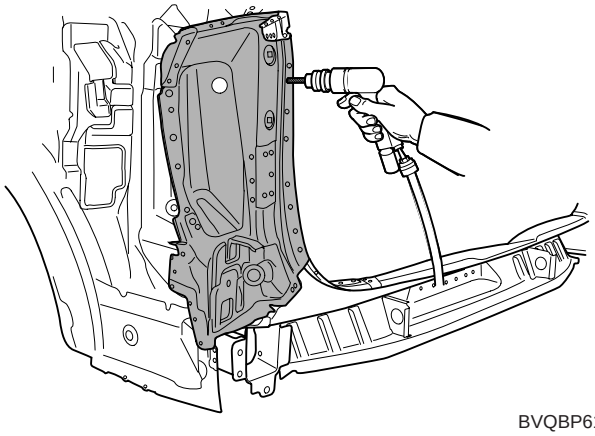
BVQBP6150

REAR COMBINATION LAMP HOUSING PANEL

REMOVAL

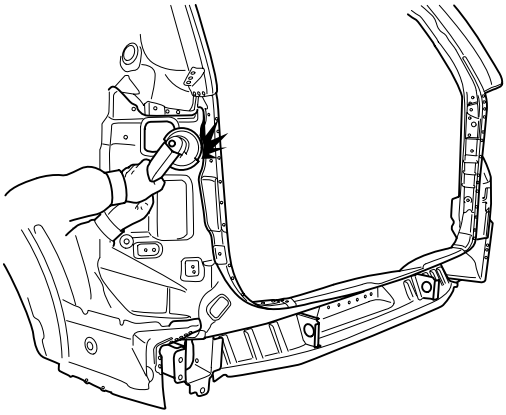
1. Drill out all spotwelds to separate rear combination lamp housing panel from side inner panel, quarter panel and back panel

   NOTE
   When spotwelded portions are not apparent, remove paint with a rotary wire brush.



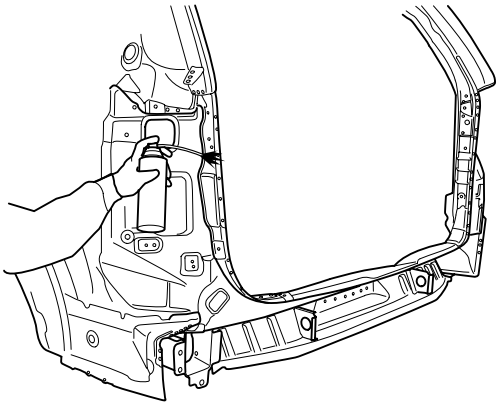
BVQBP6151

2. Clean MIG welds with s disc grinder.



BVQBP6152

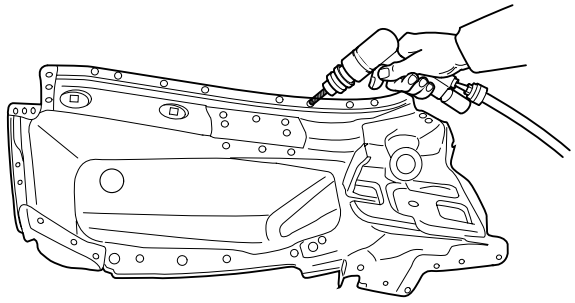
3. Apply the two-part epoxy primer to the interior of the rear floor side member.



BVQBP6153

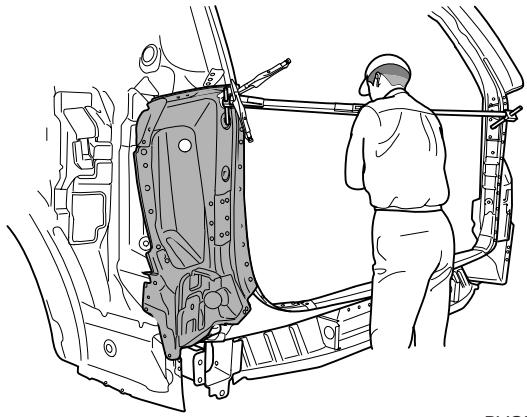
INSTALLATION

1. Drill 6mm holes in the new rear combination lamp housing panel for MIG plug welding.



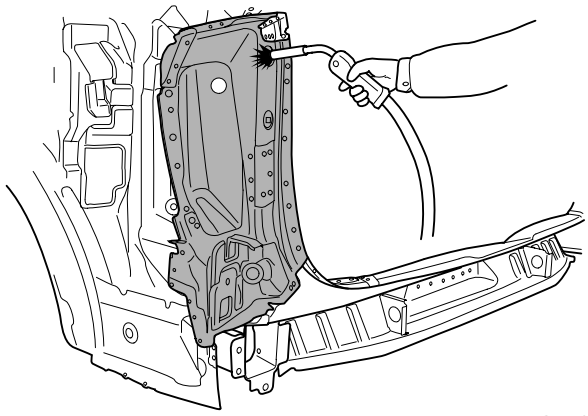
BVQBP6154

2. Fit and clamp the new rear combination lamp housing panel in place for welding.
   Measure to ensure dimensions are accurate as given in the body dimension charts.



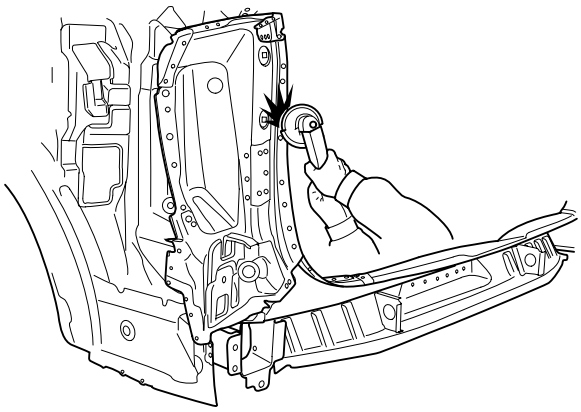
BVQBP6155

3. MIG plug weld all holes



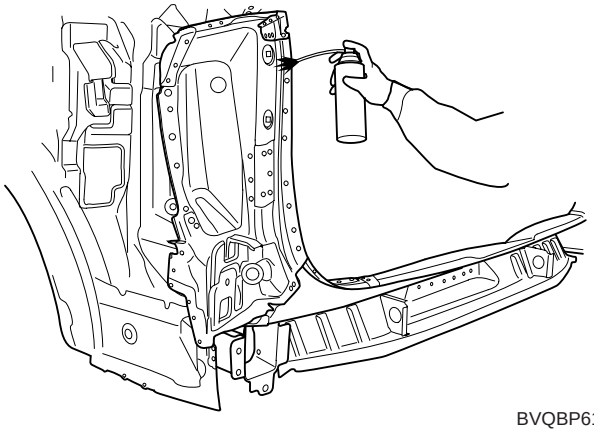
BVQBP6156

4. Clean and prepare all surfaces to be welded and remove all residue.



BVQBP6157

5. Apply the two-part epoxy primer to the interior of the rear floor side member.
6. Prepare the exterior surfoces for priming using wax and grease remover.
7. Apply metal conditioner and water rinse.
8. Apply conversion coating and water rinse.
9. Apply the two-part epoxy primer.



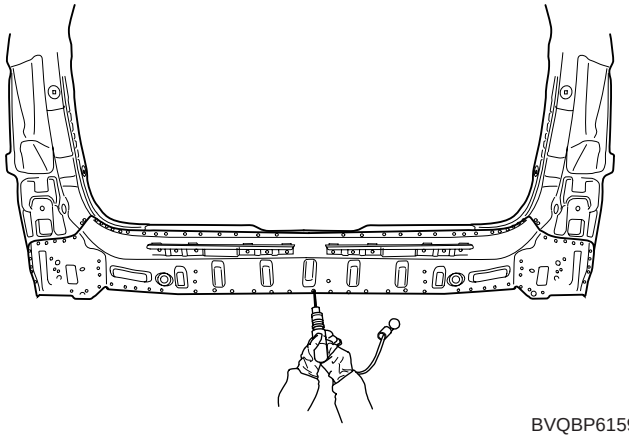
BVQBP6158

BACK PANEL

REMOVAL

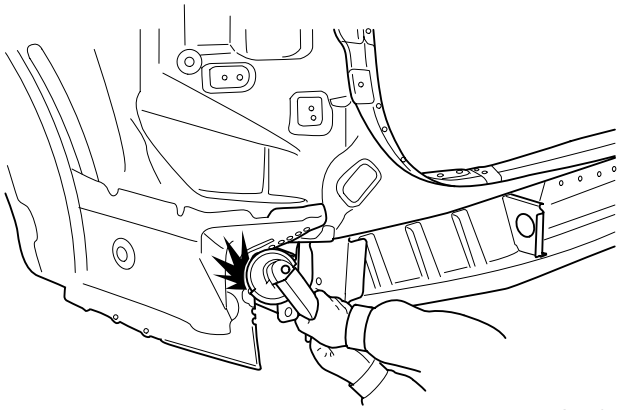
1. Drill out all spotwelds to separate back panel from side inner panel, quarter panel and back panel.

   NOTE
   When spotwelded portions are not apparent, remove paint with a rotary wire brush.



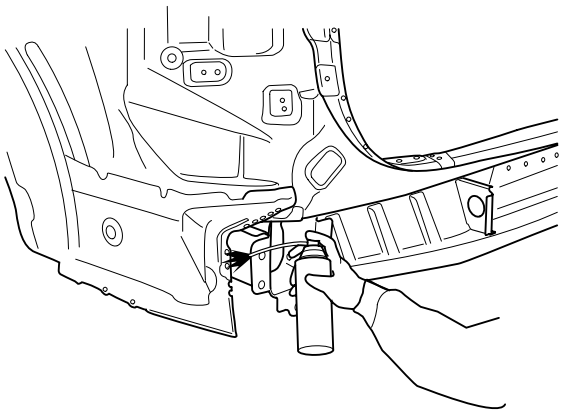
BVQBP6159

2. Clean MIG welds with s disc grinder.



BVQBP6160

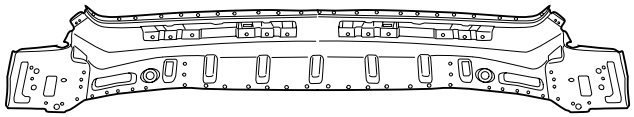
3. Apply the two-part epoxy primer to the interior of the rear floor side member.



BVQBP6161

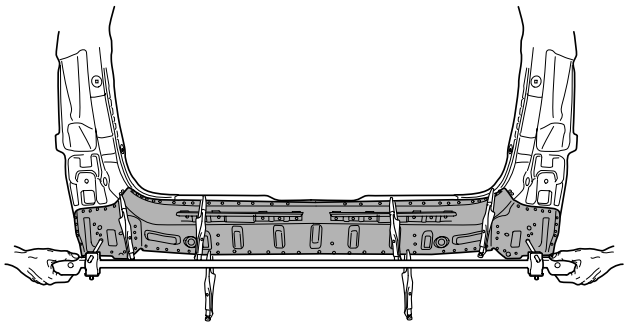
INSTALLATION

1. Drill 6mm holes in the new Back panel for MIG plug welding.



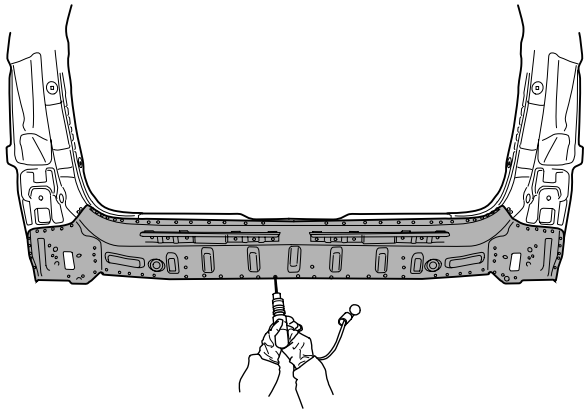
BVQBP6162

2. Fit and clamp the new back panel in place for welding. Measure to ensure dimensions are accurate as given in the body dimension charts.



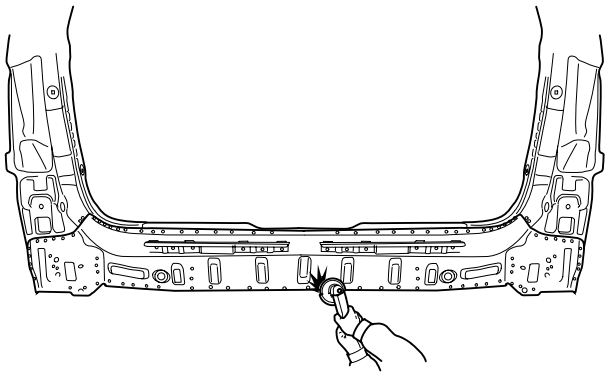
BVQBP6163

3. MIG plug weld all holes.



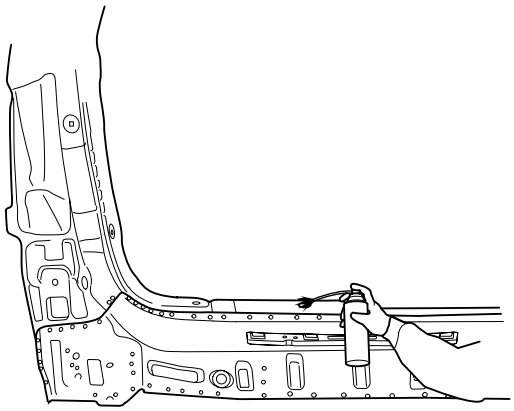
BVQBP6164

4. Clean and prepare all surfaces to be welded and remove all residue.



BVQBP6165

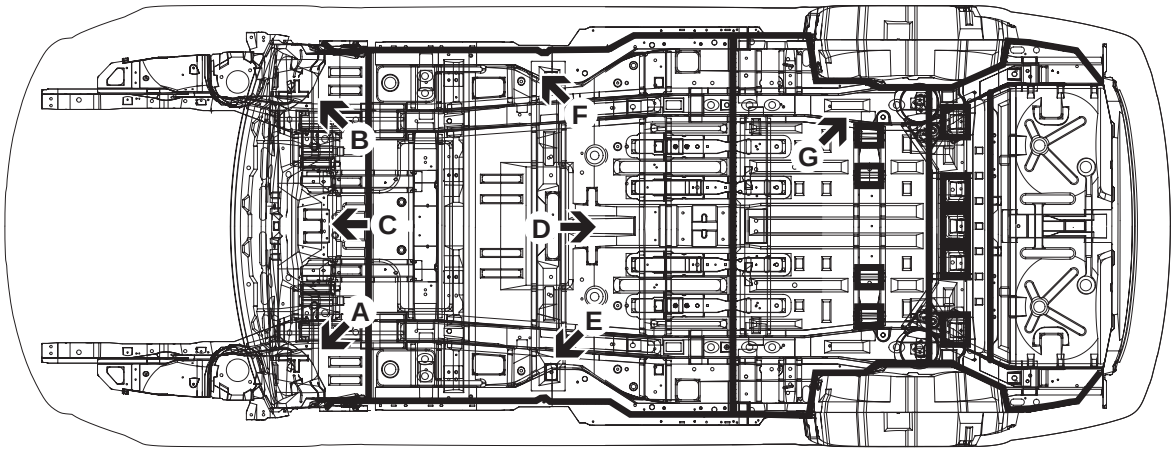
5. Apply the two-part epoxy primer to the interior of the rear floor side member.
6. Prepare the exterior surfaces for priming using wax and grease remover.
7. Apply metal conditioner and water rinse.
8. Apply conversion coating and water rinse.
9. Apply the two-port epoxy primer.



BVQBP6166

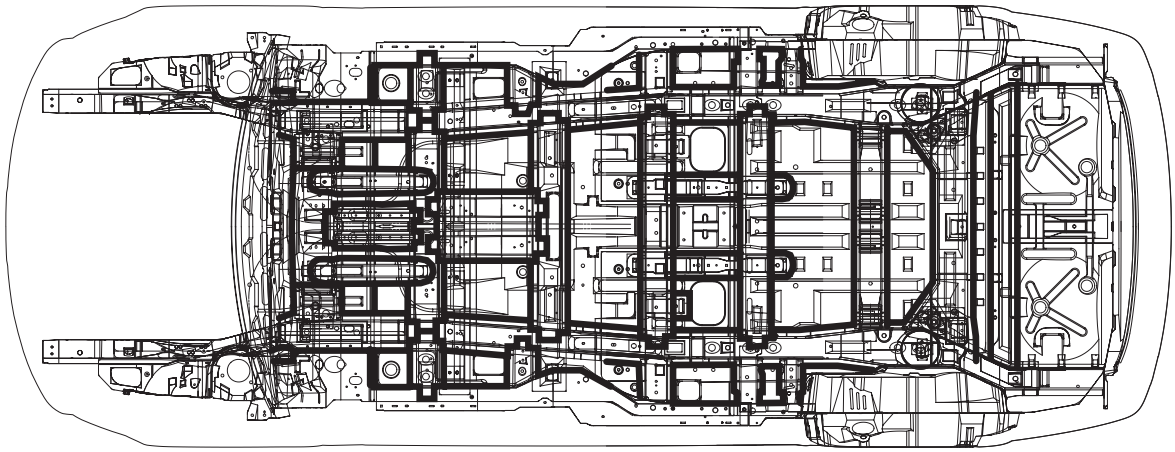
Body Sealing Locations

FLOOR



<Top View>

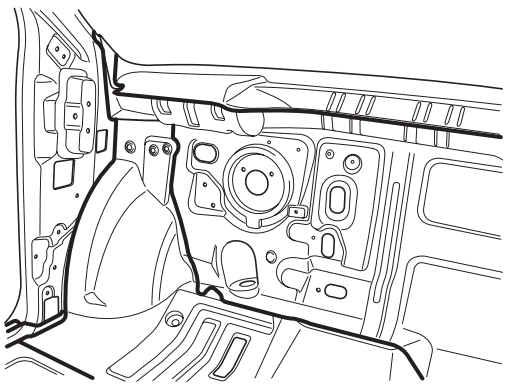
BVQBS6100



<Bottom View>

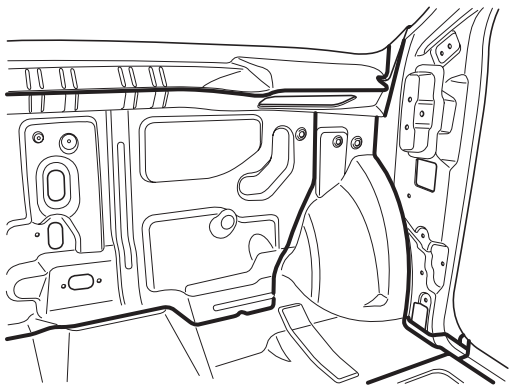
BVQBS6101

A



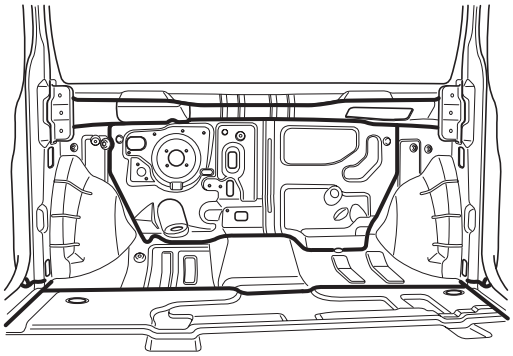
BVQBS6102

B



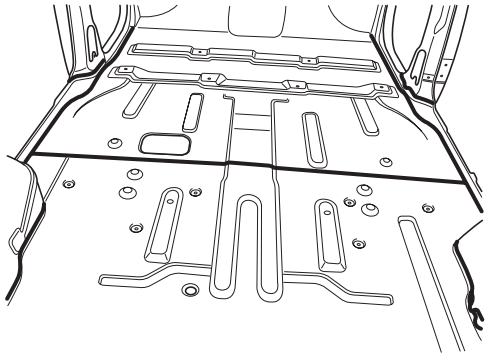
BVQBS6103

C



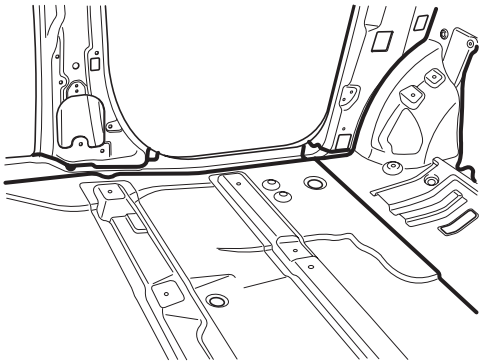
BVQBS6104

D



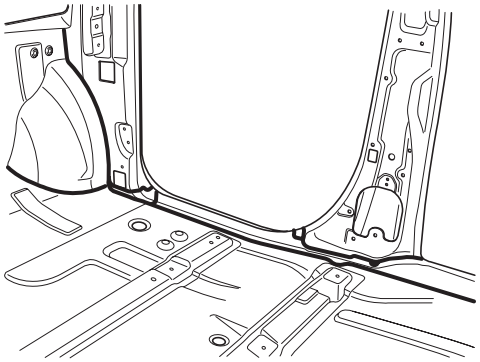
BVQBS6105

E



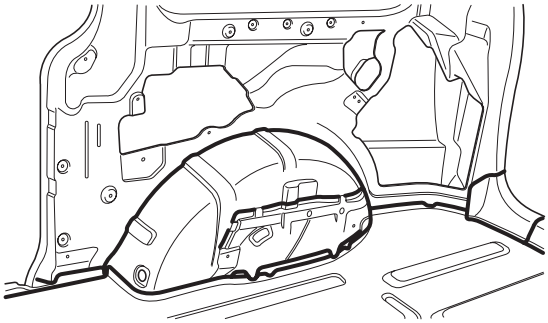
BVQBS6106

F



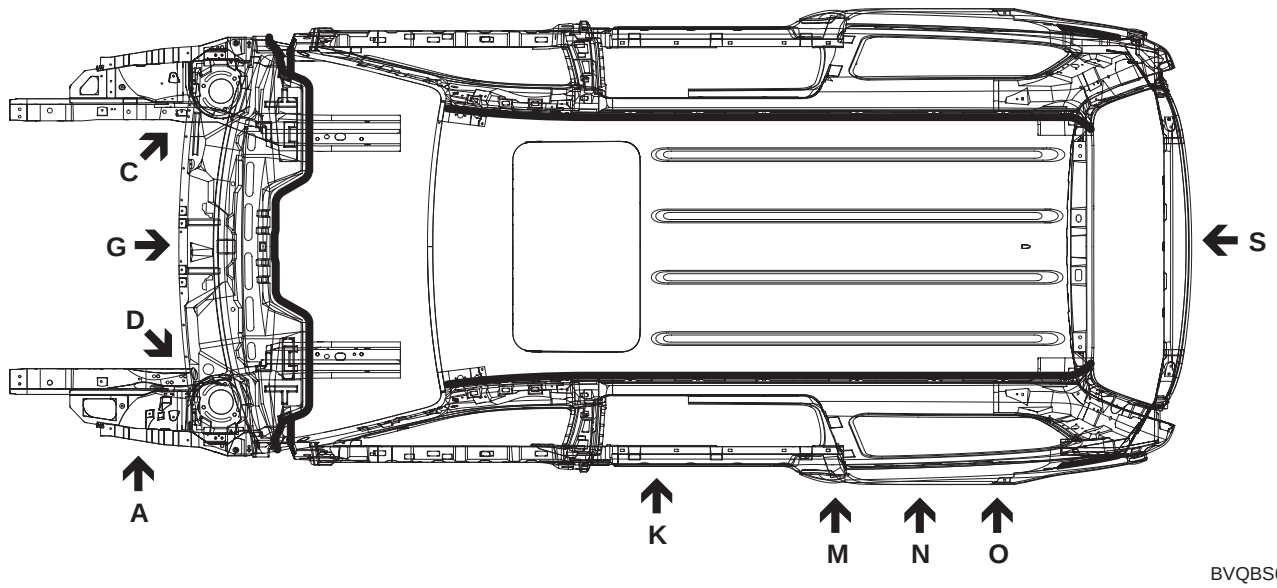
BVQBS6107

G

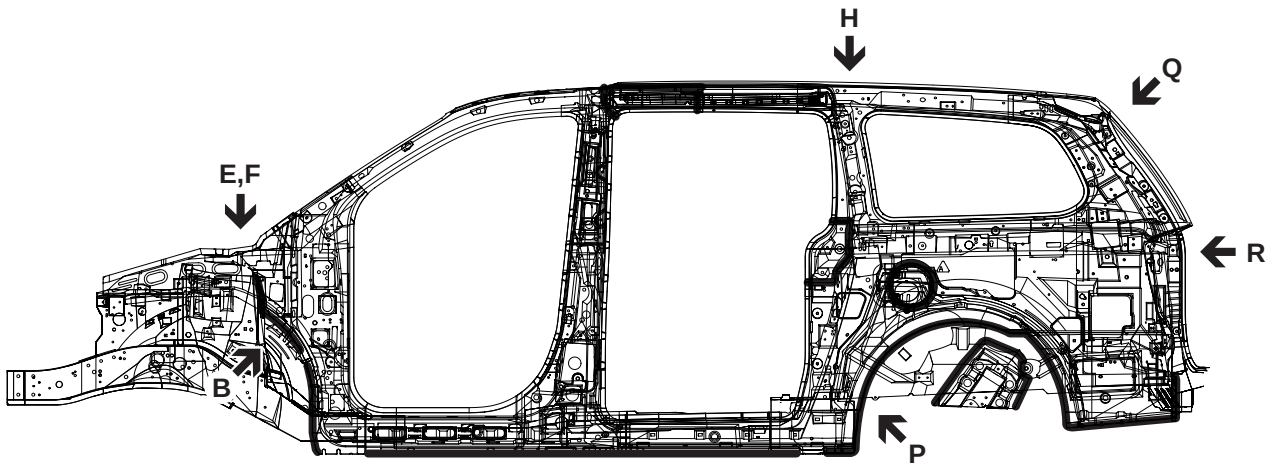


BVQBS6108

FRONT AND SIDE BODY



BVQBS6200



BVQBS6201

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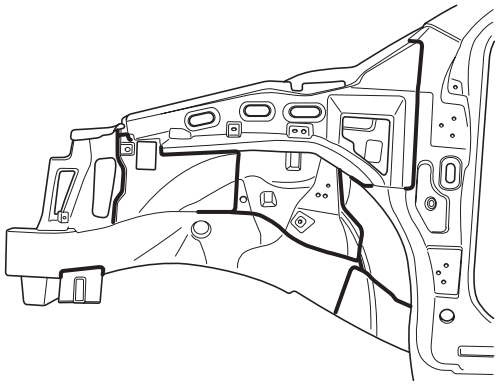

BVQBS6202

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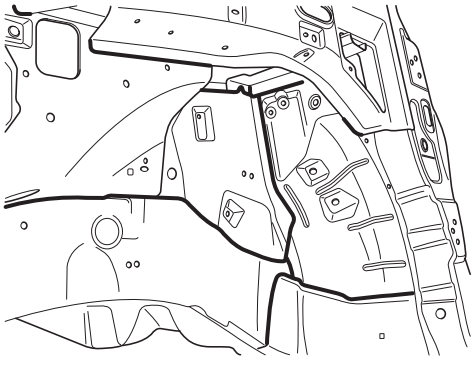

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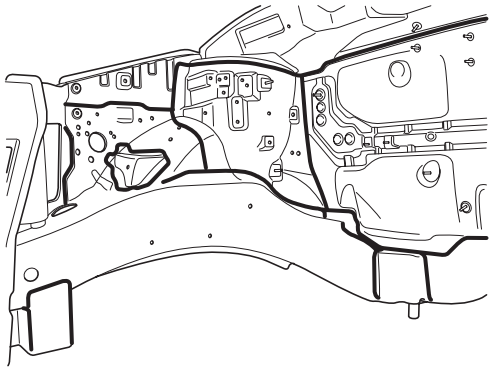

BVQBS6204

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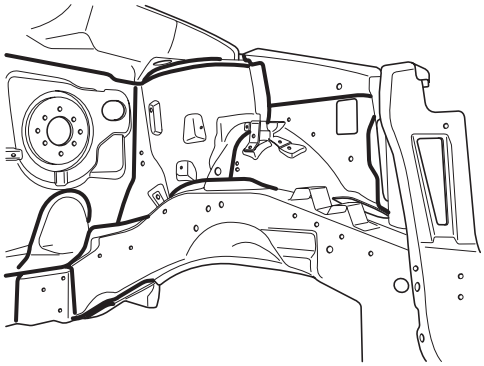

BVQBS6205

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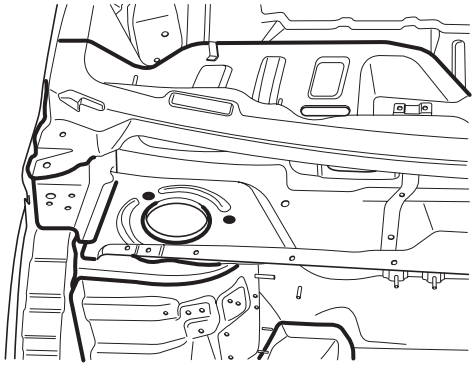

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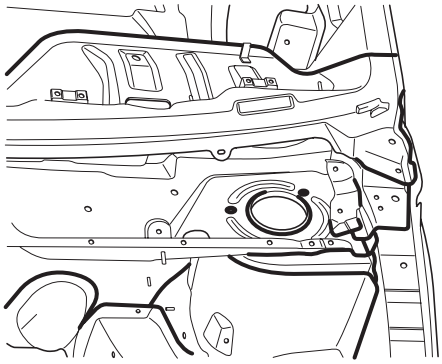

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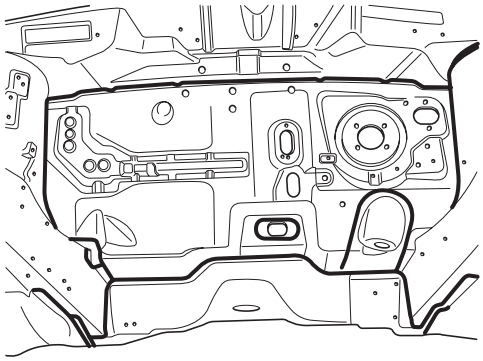

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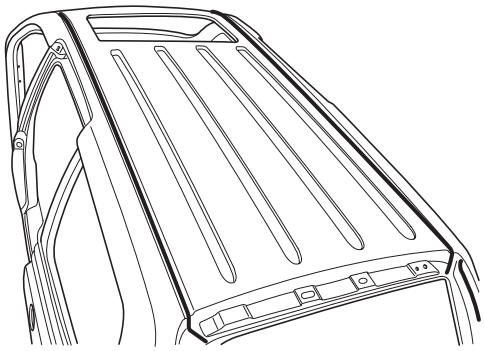

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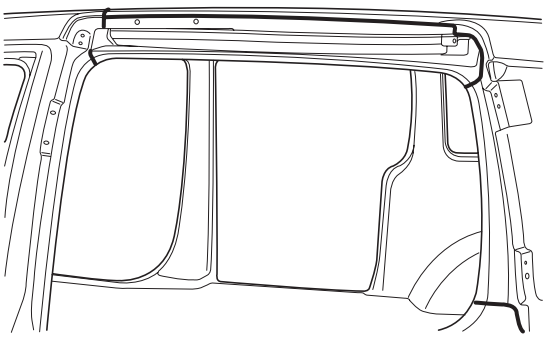

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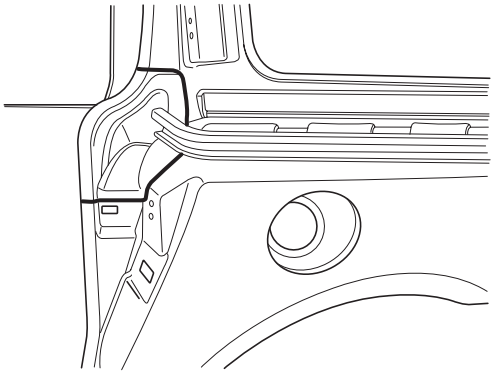

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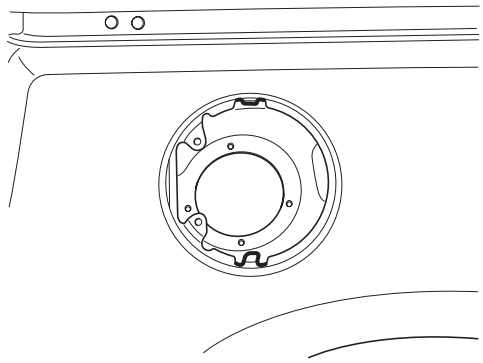

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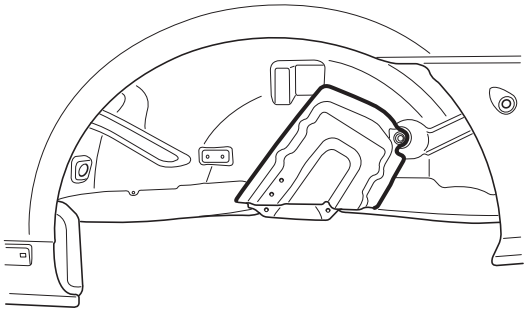

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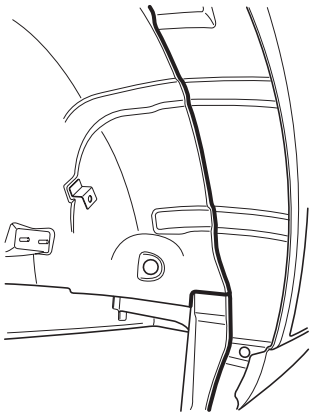

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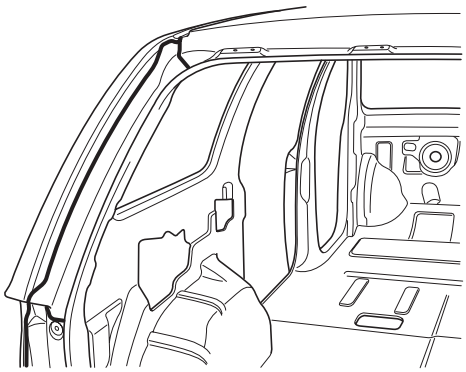

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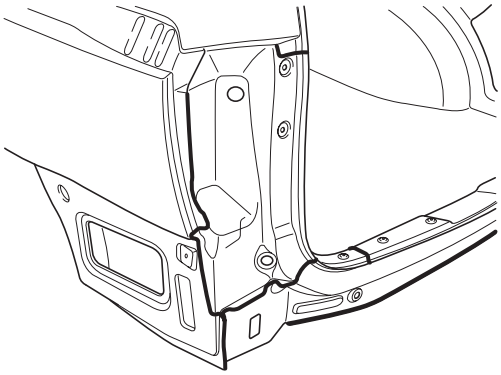

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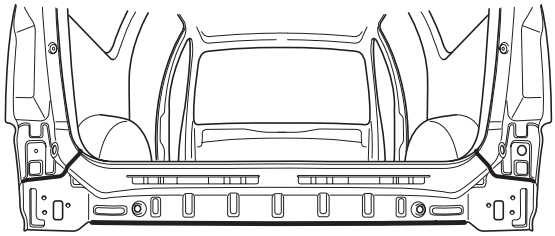

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DOOR

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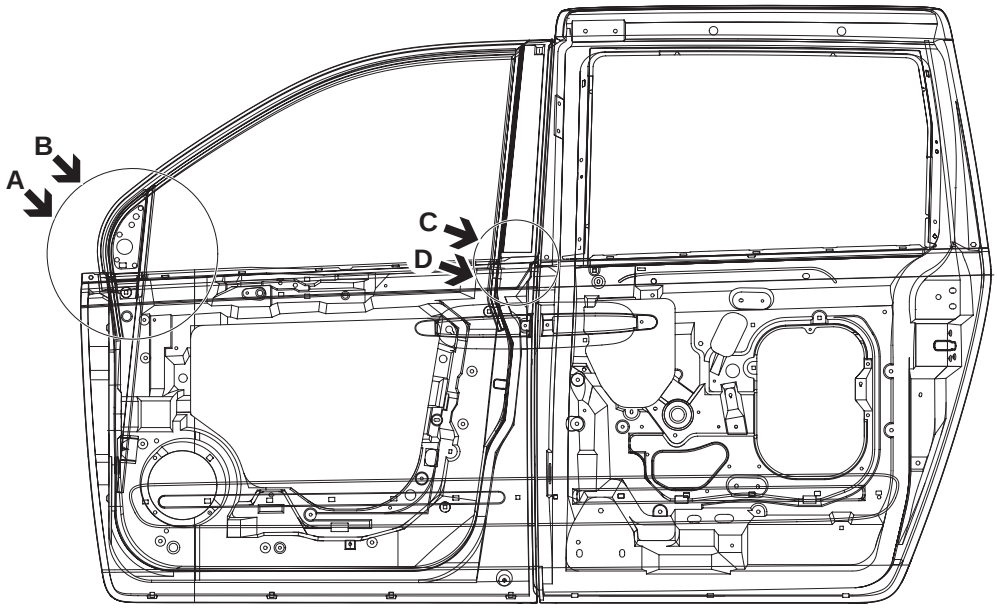

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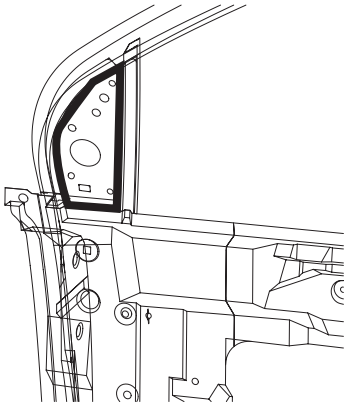

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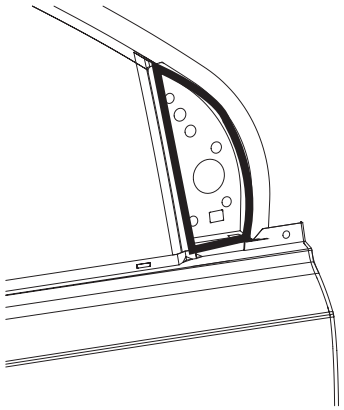

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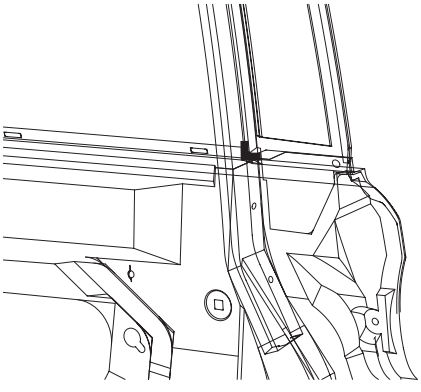

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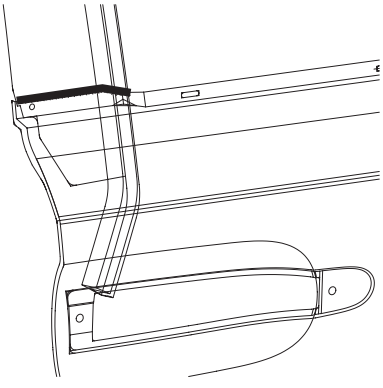

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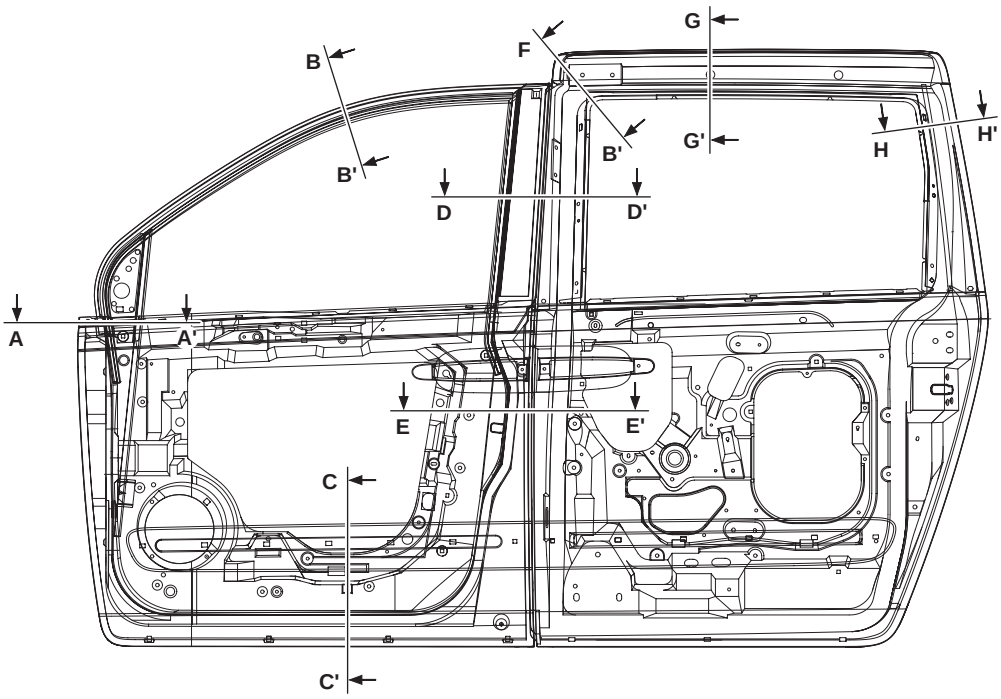

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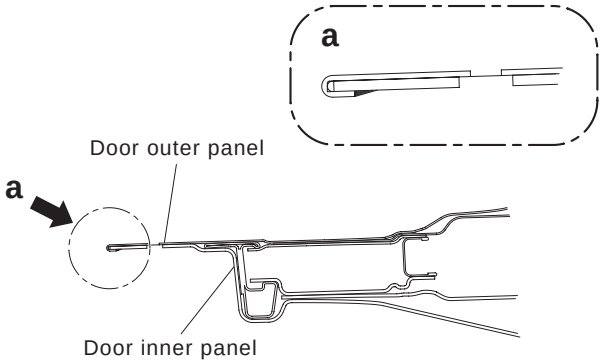

A - A'

BVQBS6306

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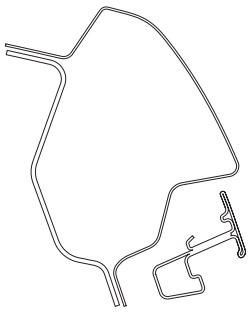

B - B'

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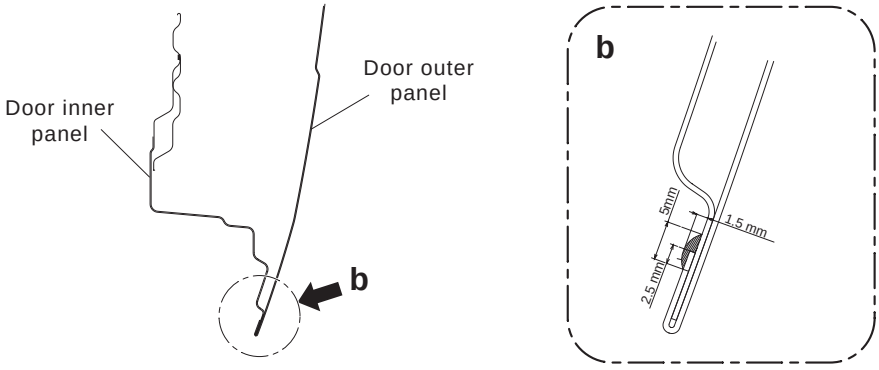

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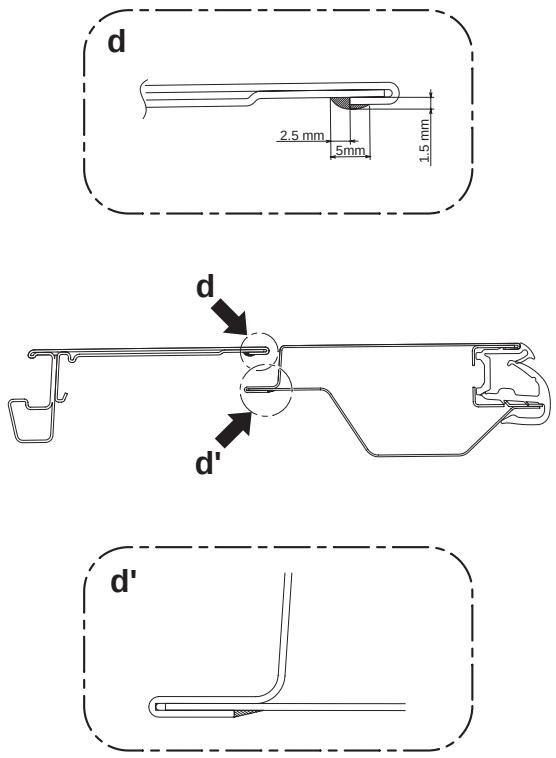

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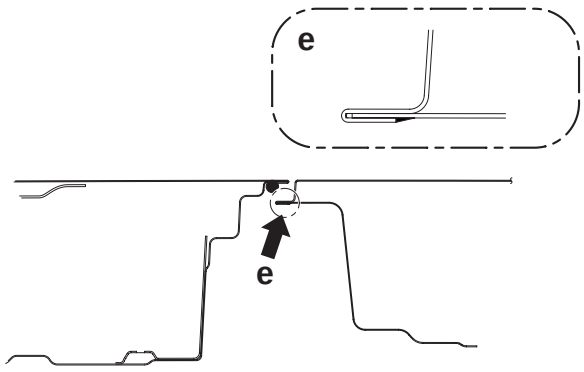

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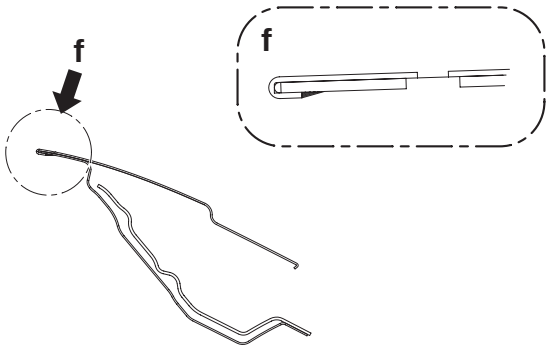

F - F'

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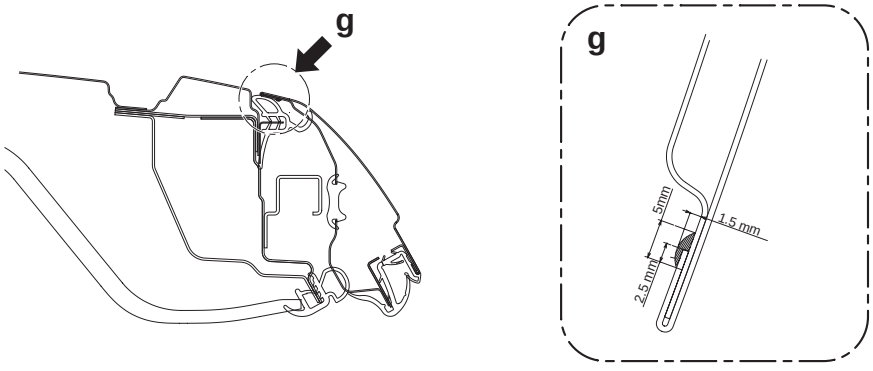

G - G'

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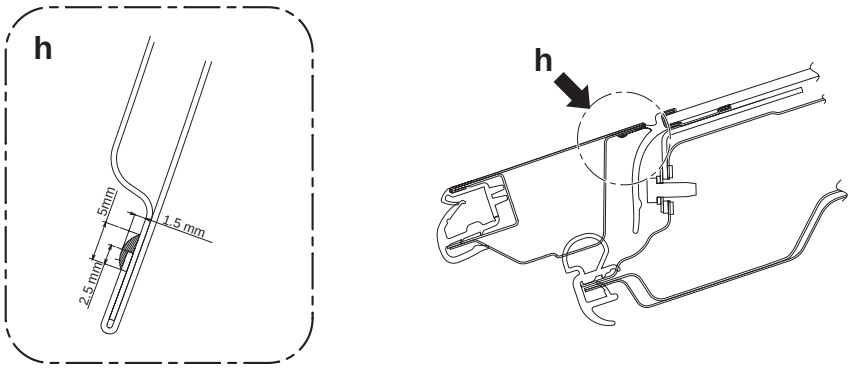

H - H'

BVQBS6313

HOOD

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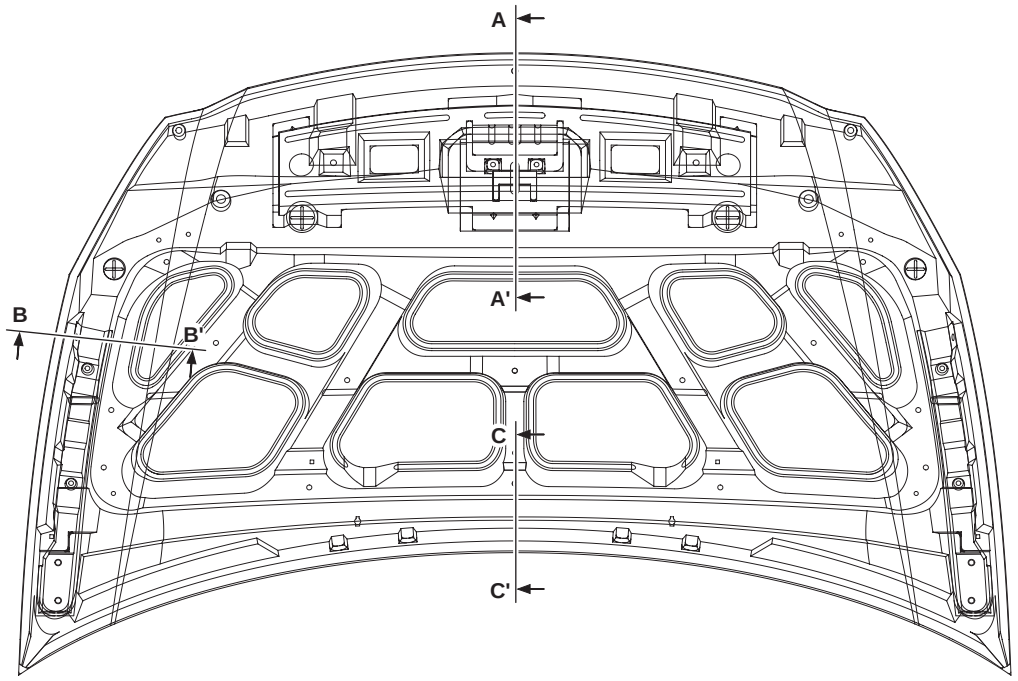

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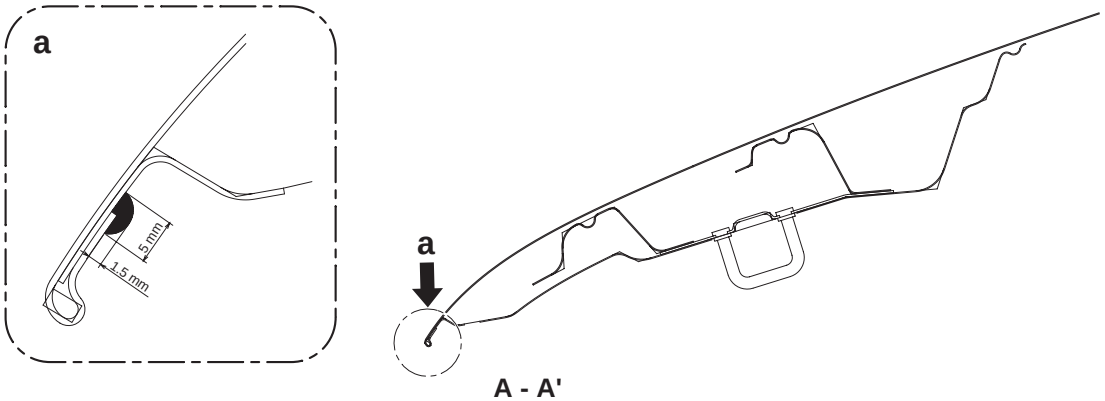

A - A'

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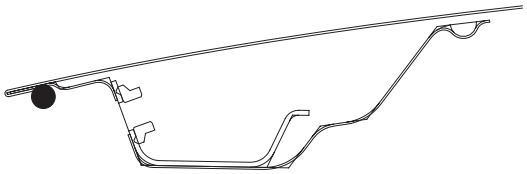

B - B'

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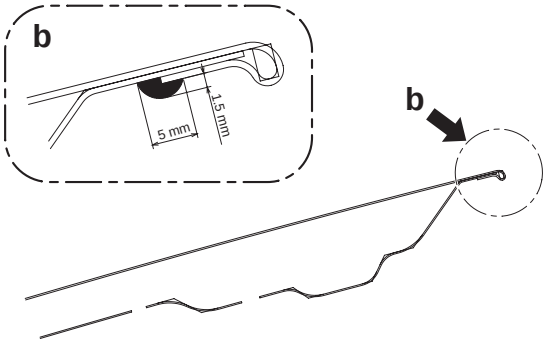

C - C'

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TAIL GATE

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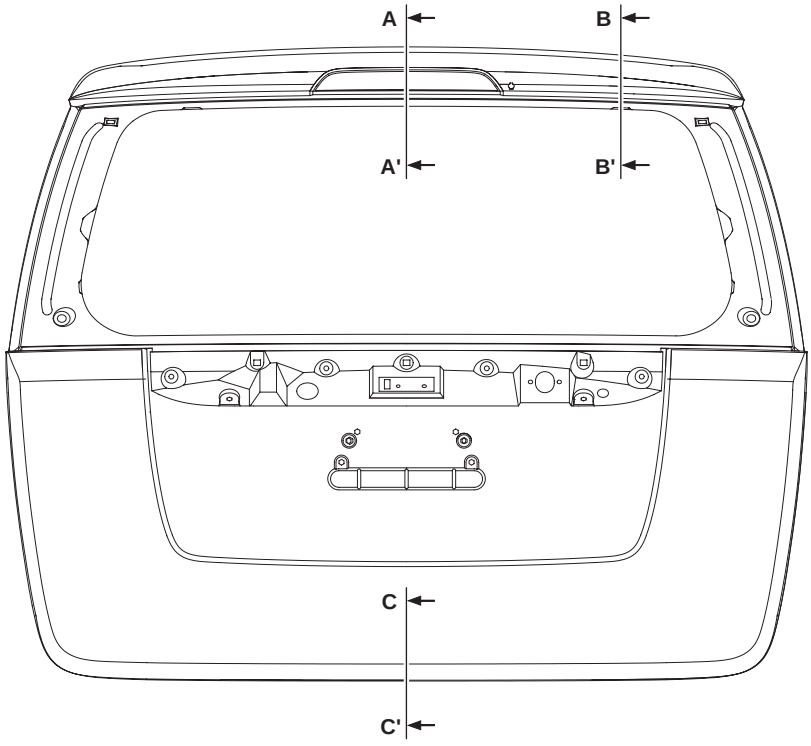

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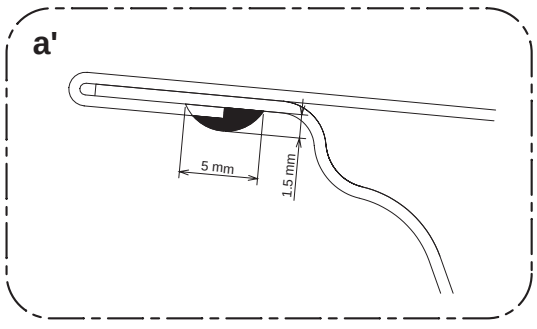

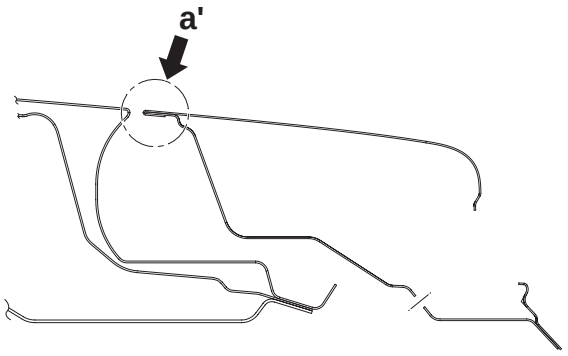

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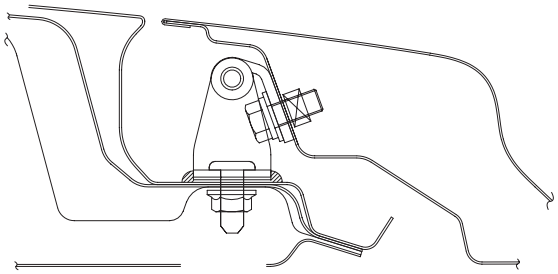

B - B'

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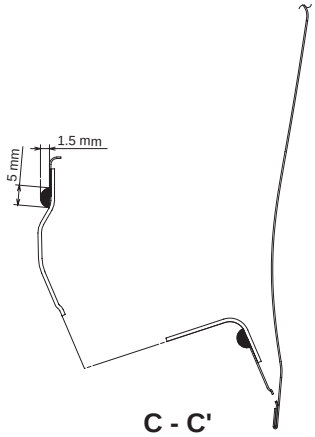


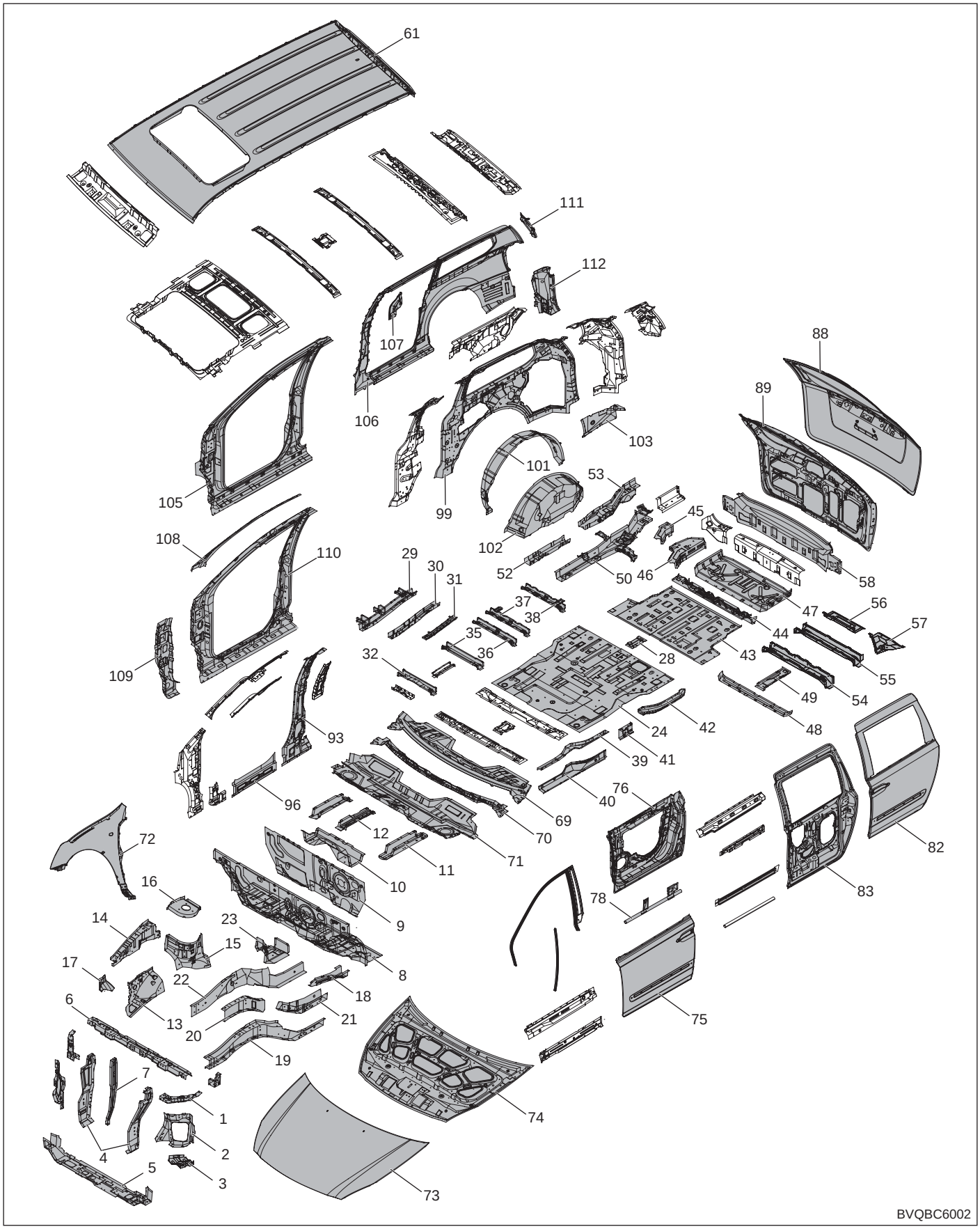
C - C'

BVQBS6503

Corrosion protection

ZINC-GALVANIZED STEEL PANELS

Becavanized steel panel has excellent resistance, it tis used in areas which have a high possibility of painting deficiency below.

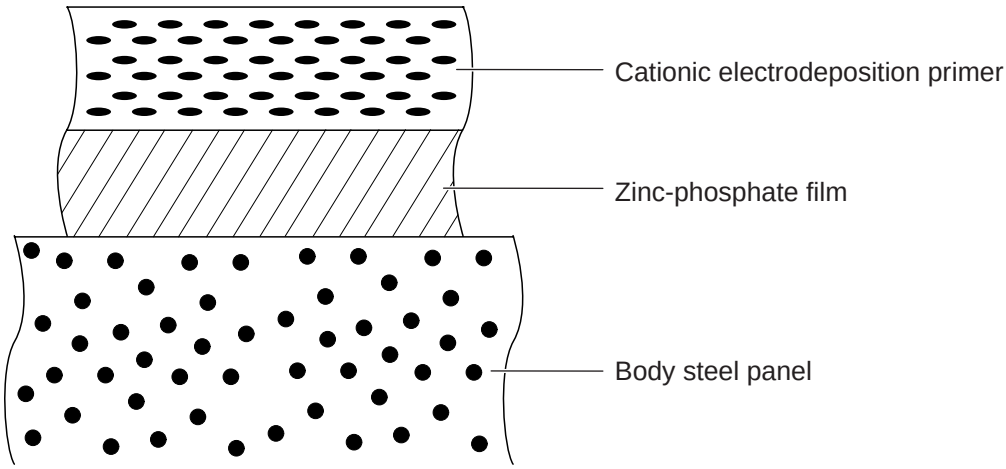


BVQBC6002

1. Radiator support side member assembly
2. Head lamp support panel
3. Fender mounting braket assembly
4. Radiator support side member assembly
5. Radiator support lower outer member assembly
6. Radiator upper center member assembly
7. Radiator center stay member assembly
8. Dash panel assembly
9. Dash rainforcement assembly
10. Dash lower member assembly
11. Dash lower outer member assembly
12. Dash lower outer center member assembly
13. Fender apron inner lower panel assembly
14. Fender apron inner upper panel assembly
15. Front shock absorber housing panel assembly
16. Front shock absorber housing upper panel
17. Fender apron inner front support
18. Engine mounting bracket assembly
19. Front side inner member assembly
20. Front side member inner reinforcement assembly
21. Front side member inner rear reinforcement assembly
22. Front side member outer member assembly
23. Side cross front member
24. Center floor panel
25. Front seat cross front member assembly
26. Front seat cross rear member assembly
27. Console mounting front bracket assembly
28. Console mounting rear bracket assembly
29. Center floor side member
30. Center floor side member reinforcement assembly
31. Center floor side member upper reinforcement
32. No.1 cross member reinforcement
33. No.1 cross member reinforcement
34. No.1 cross member support reinforcement
35. No.1 cross member assembly
36. No.3 cross member assembly
37. No.3 cross member assembly
38. No.3 cross member assembly
39. Side sill inner upper panel
40. Side sill inner lower panel
41. Side sill inner rear panel
42. Rail guide lower panel assembly
43. Rear floor panel
44. Rear floor extension assembly
45. Rear floor side reinforcement
46. Rear floor side panel assembly
47. Rear floor rear panel
48. Rear floor rear cross member assembly
49. Rear towing hook bracket assembly
50. Rear floor side member
51. Rear floor side member extension assembly
52. Rear floor side front reinforcement assembly
53. Rear floor side rear reinforcement assembly
54. No.4 cross member assembly
55. No.5 cross member assembly
56. No.6 cross member
57. No.6 cross gusset
58. Back panel
59. Rear transverse member
60. Rear transverse side member
61. Roof panel
62. Roof front lower rail assembly
63. Roof No.2 rail
64. Roof No.2 rail
65. Room lamp mounting bracket
66. Roof rear upper rail assembly
67 Roof rear lower rail
68. Sun roof rack front bracket assembly
69. Cowl top outer panel
70. Cowl top outer reinforcement
71. Cowl inner lower panel assembly
72. Fender panel
73. Hood outer panel
74. Hood inner panel
75. Front door outer panel
76. Front door inner panel
77. Front door quadrant channel
78. Front door reinforcement beam
79. Front door belt outer rail
80. Front door belt inner rail
81. Front door frame assembly
82. Rear door outer panel
83. Rear door inner panel
84. Rear door belt outer rail
85. Rear door belt inner rail assembly
86. Rear door outer rail
87. Rear door beam
88. Tail gate outer panel
89. Tail gate inner panel
90. Front inner upper pillar assembly
91. Side inner upper reinforcement assembly
92. Front inner lower pillar assembly
93. Center pillar inner panel assembly
94. Front seatbelt upper mounting bracket assembly
95. Front pillar inner lower reinforcement assembly
96. Sill side outer front reinforcement
97. Quarter inner front reinforcement
98. Rear side belt upper mounting reinforcement assembly
99. Quarter inner panel
100. Quarter inner belt reinforcement assembly
101. Wheel house outer panel
102. Rear wheel house inner panel assembly
103. Quarter inner rear lower extension assembly
104. D pillar reinforcement gusset assembly
105. Front side outer panel
106. Front side outer panel
107. Fender rear upper reinforcement
108. Front pillar outer upper reinforcement
109. Front pillar outer lower reinforcement
110. Front side outer panel
111. Quarter outer rear upper extension
112. Rear combination lamp housing panel

ZINC-PHOSPHATE COAT & CATIONIC ELECTRODEPOSITION PRIMER

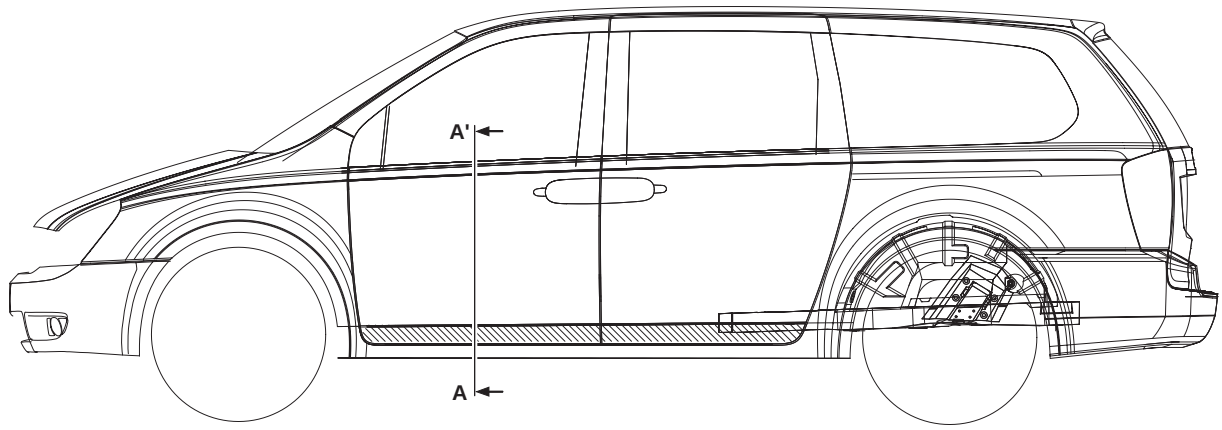
In order to improve the adhesion of the paint coat on the steel panel, and also to improve the corrosion resistance, the entire body is coated with a film of Zinc-phosphate and a cationic electrodeposition primer.



BMCCP6020

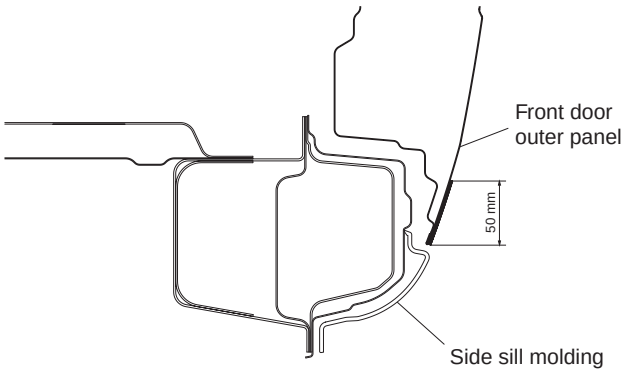
ANTI-CORROSION PRIMER

An anti-corrosion primer has been applied to the side sill outer panel for the purposes of corrosion prevention and abrasion protection. If this panel is replaced, apply an anti-corrosion primer between the undercoat and the intermediate coat, as shown in the following illustrations.



Rock panel primer (Thickness 180μ - 200μ)

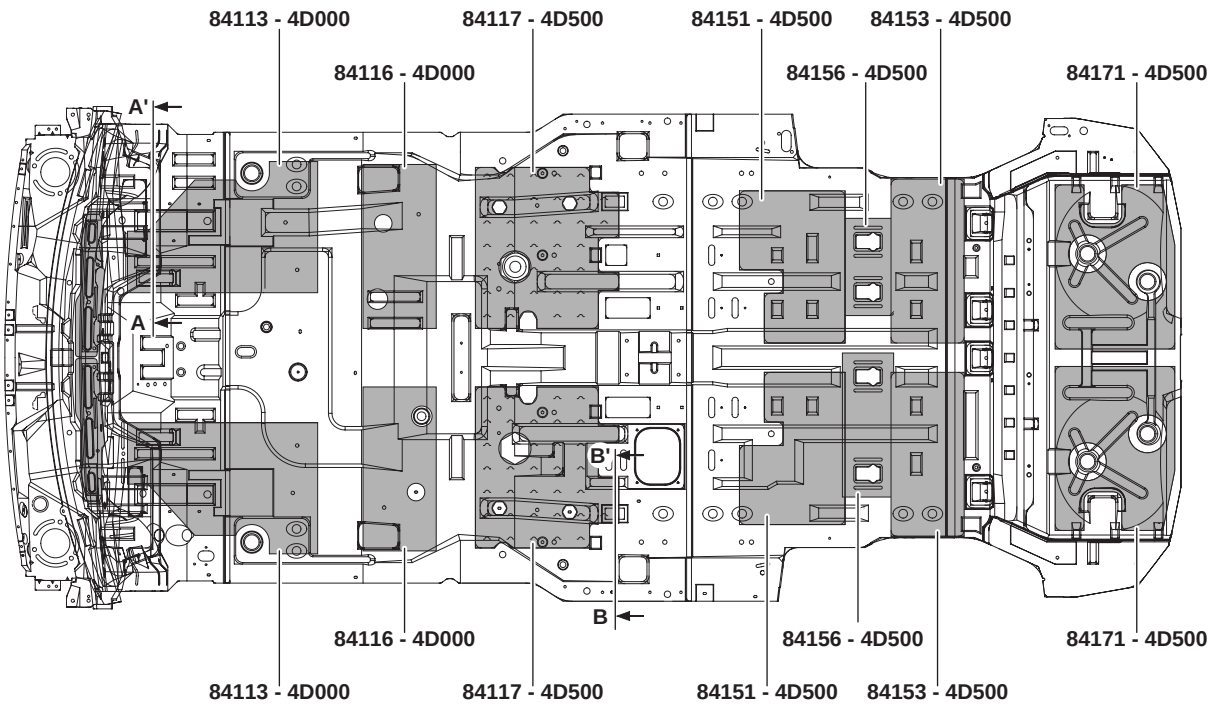
BVQCP6300



A - A'

BVQCP6301

ANTIVIBRATION PADS-LOCATION & SECTION



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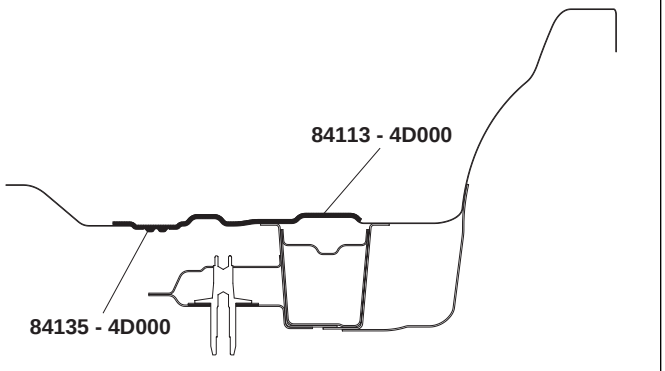

A - A'

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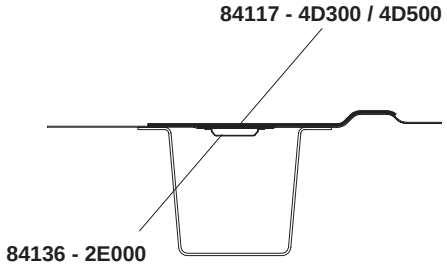
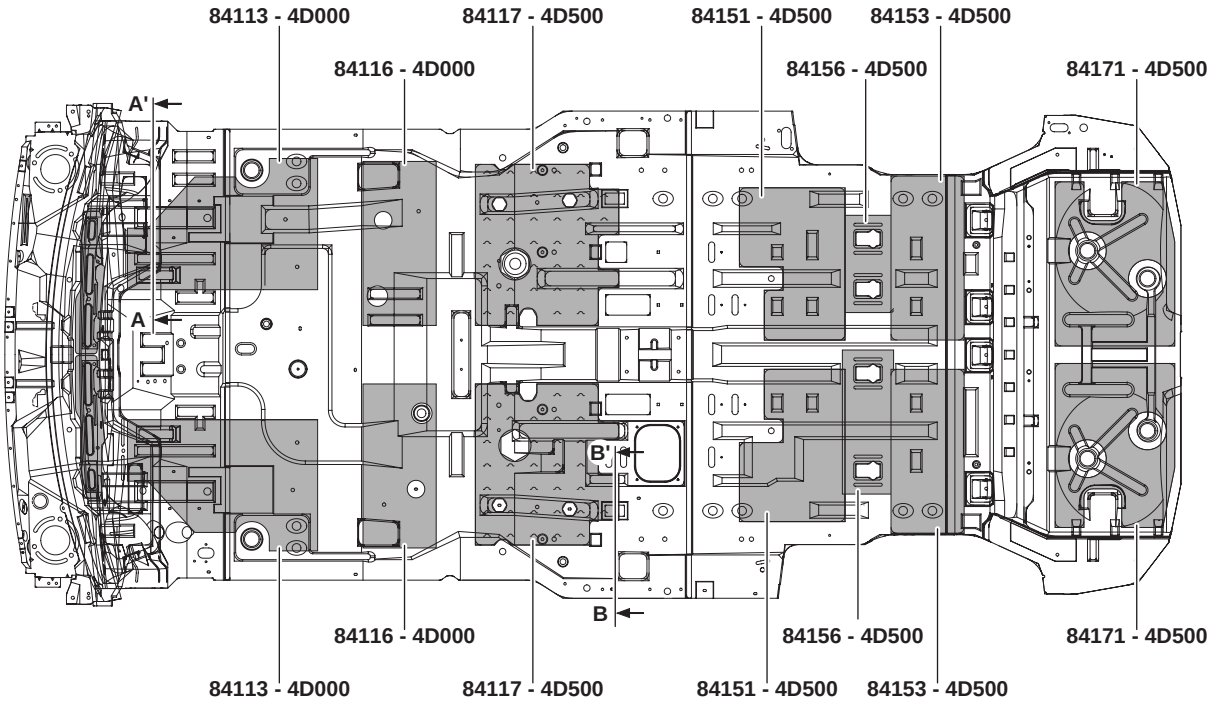


B - B'

BVQCP6402

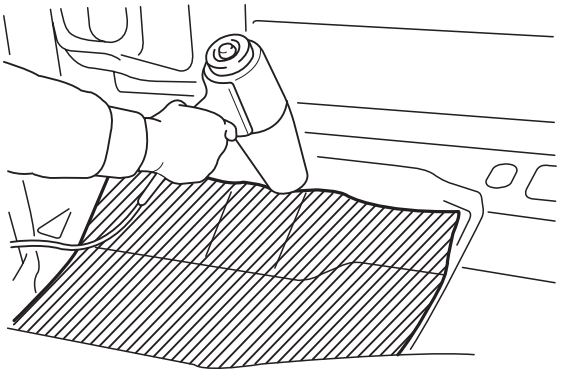
ATTACHMENT OF ANTIVIBRATION PADS

Antivibration pads are attached to the upper surface of the floor and at the interior side of the dash panel in order to absorb vibrations and shut out exhaust gas heat. If these antivibration pads are peeled off in the course of replacement or repair of a welded panel, cut and attach replacement material (in the shape shown in the figure).



BVQCP6410

1. Heat the "antivibration pad" with a blow drier to soften it.

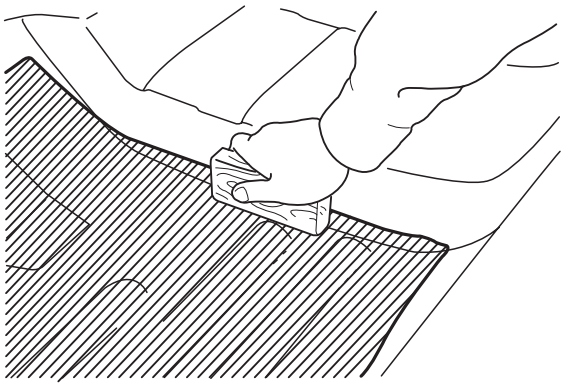


BMCCP6041

2. Align the antivibration pad layer in the position where it is to be installed, and then press it down with a roller or a block of wood so that it adheres well.

NOTE

An infrared lamp can also be used to heat both the antivibration pad layer and the body panels(be sure to wear gloves).

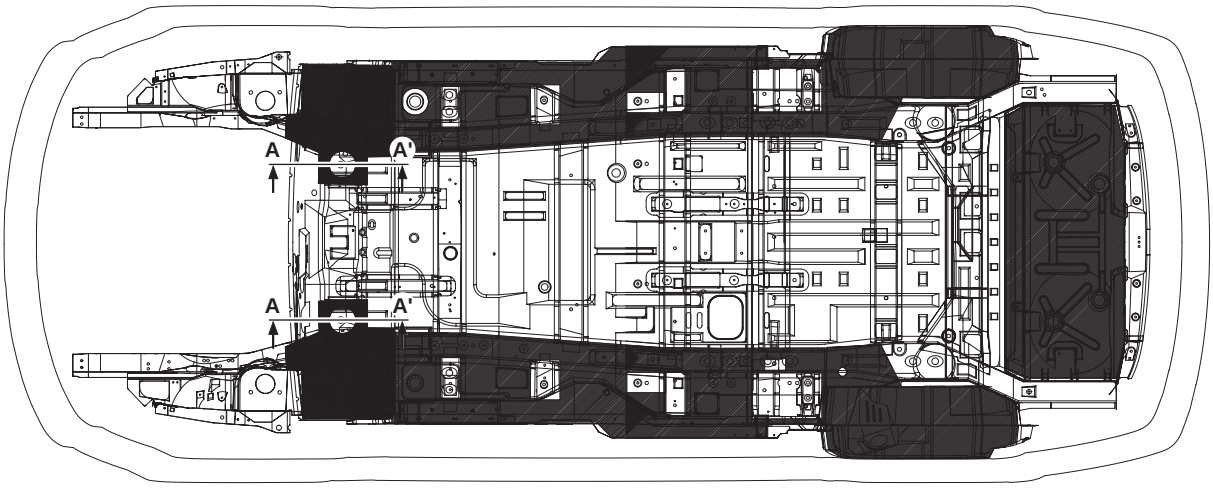


BMCCP6042

UNDER BODY COAT

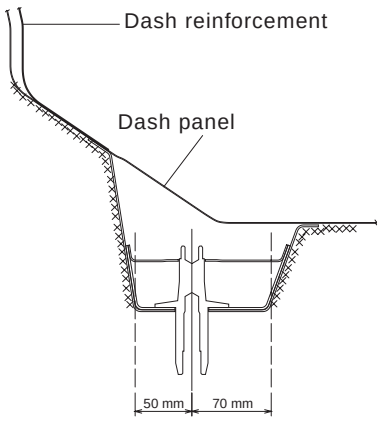
In order to provide corrosion, stone chipping and vibration resistance, under body coat is applied to the under sides of the floor and wheel house.
Therefore, when such panel is replaced or repaired, apply under body coat to that part.

FLOOR



Under body coating (Thickness : 0.8 mm , :1.5 mm)

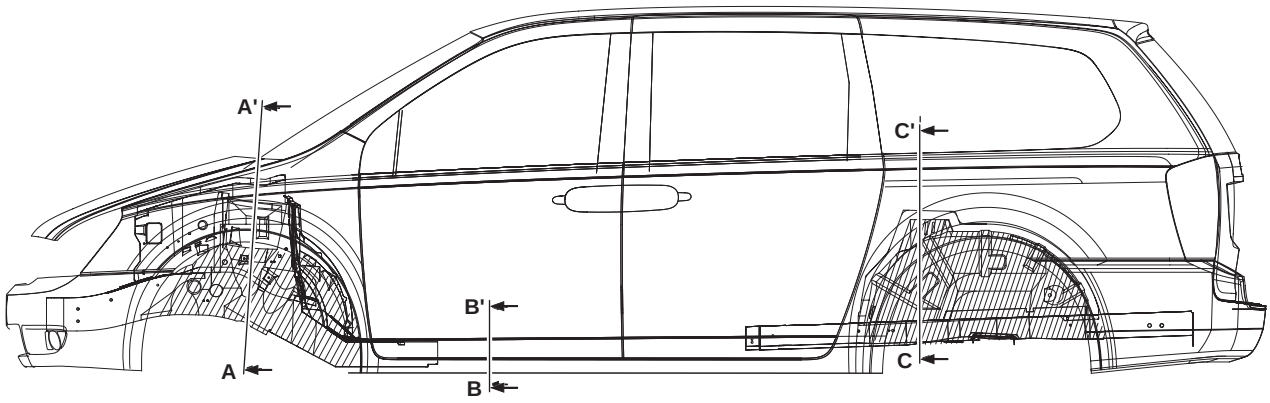
BVQCP6500



A - A'

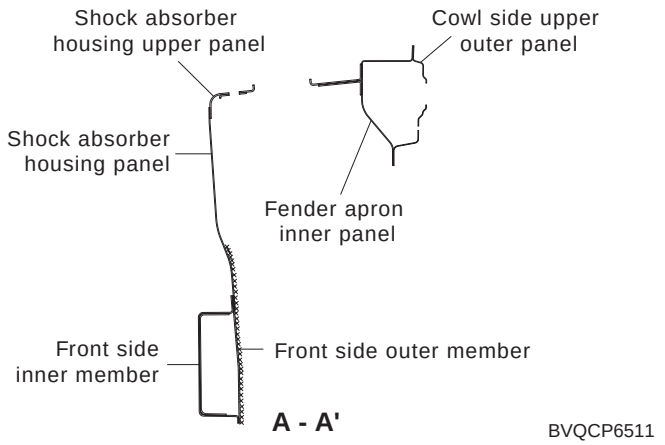
BVQCP6501

SIDE BODY



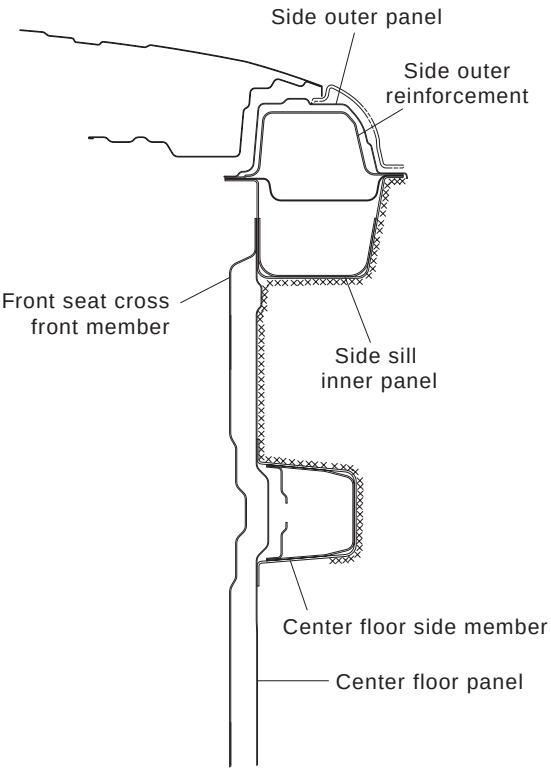
Under body coating (Thickness : 0.8 mm , :1.5 mm)

BVQCP6510



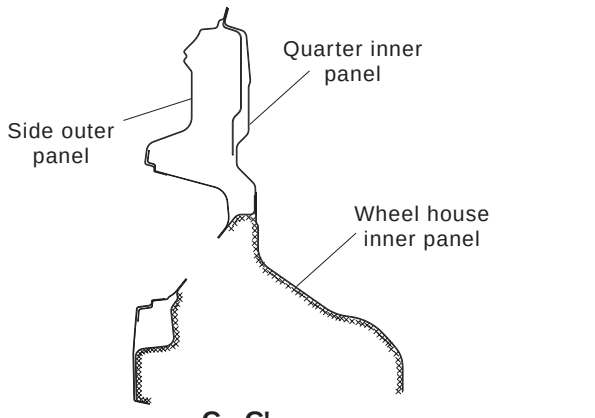
A - A'

BVQCP6511



B - B'

BVQCP6512

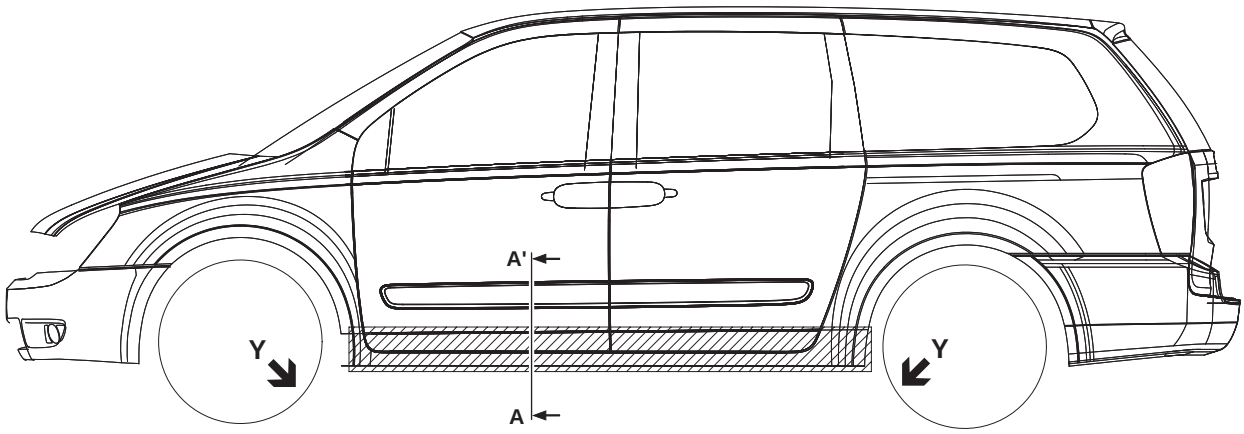


C - C'

BVQCP6513

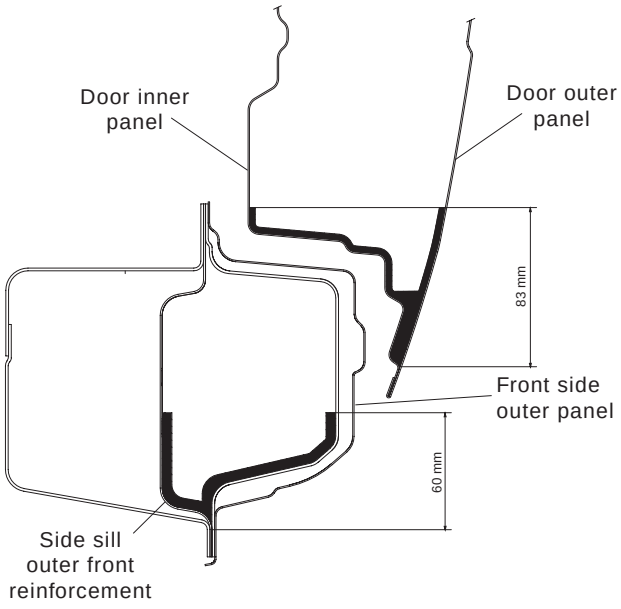
CAVITY WAX INJECTION

In order to provide greater corrosion resistance, cavity wax injection has been performed for the lower areas of the vehicle, such as the sidemember, the side sill and the inside of other panels which are a hollow construction.
When replacing these parts, be such to apply cavity wax to the appropriate areas of the new parts.

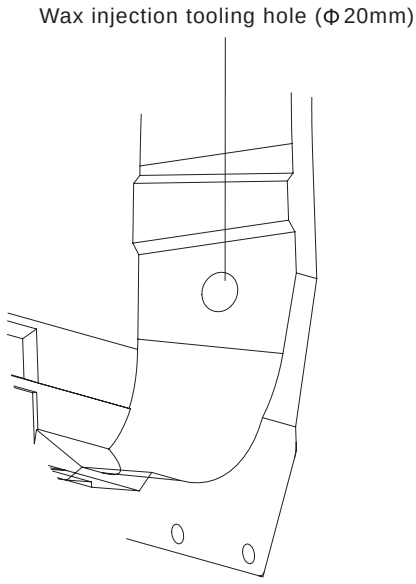


Cavity wax injection (Thickness 40μ - 50μ)

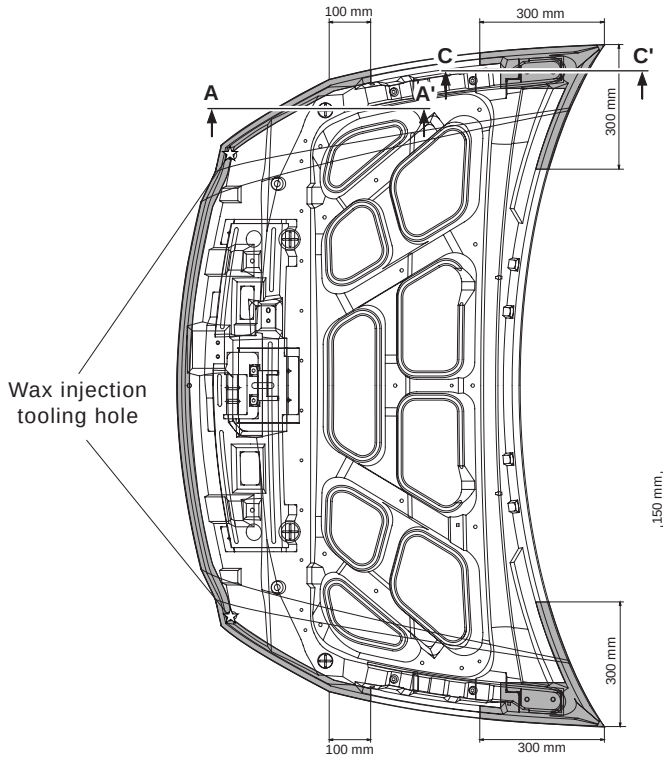
BVQCP6600

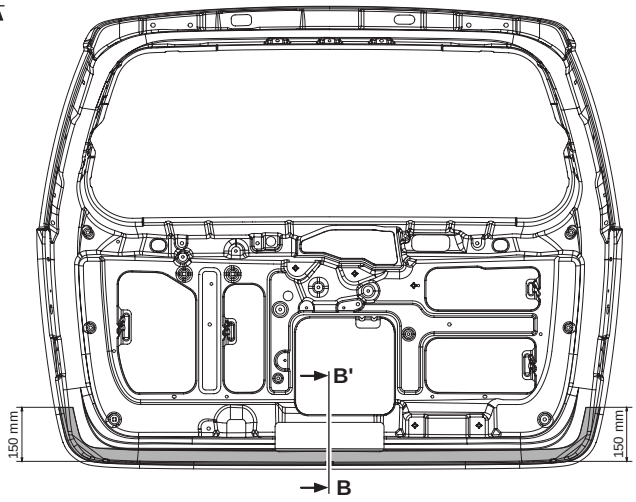


A - A' BVQCP6601



VIEW "Y" BVQCP6602

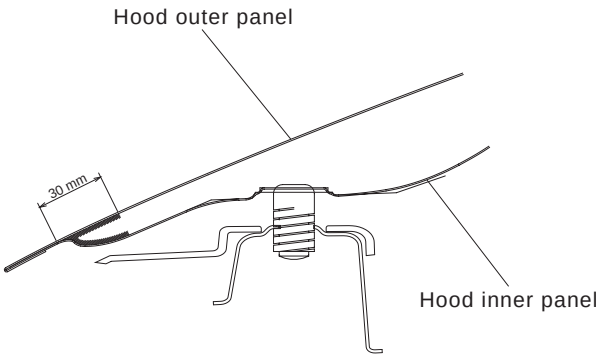




☆ Wax injection must be done through access holess marked.

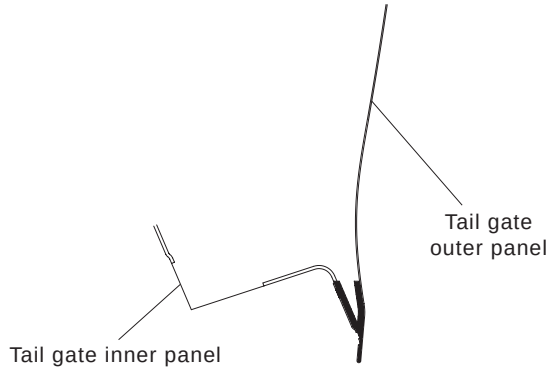
Cavity wax injection (Thickness 40μ - 50μ)

BVQCP6610



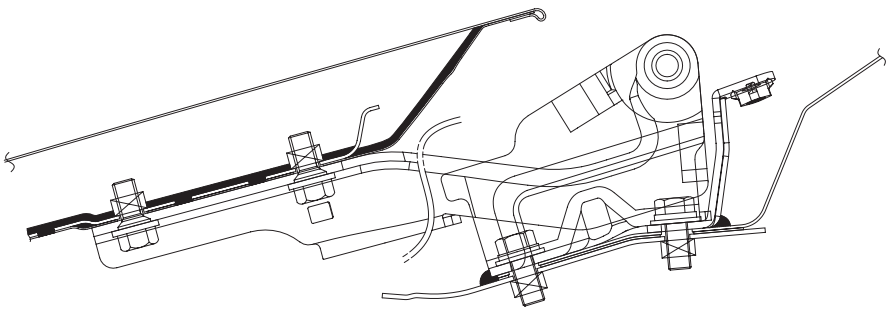
A - A'

BVQCP6611



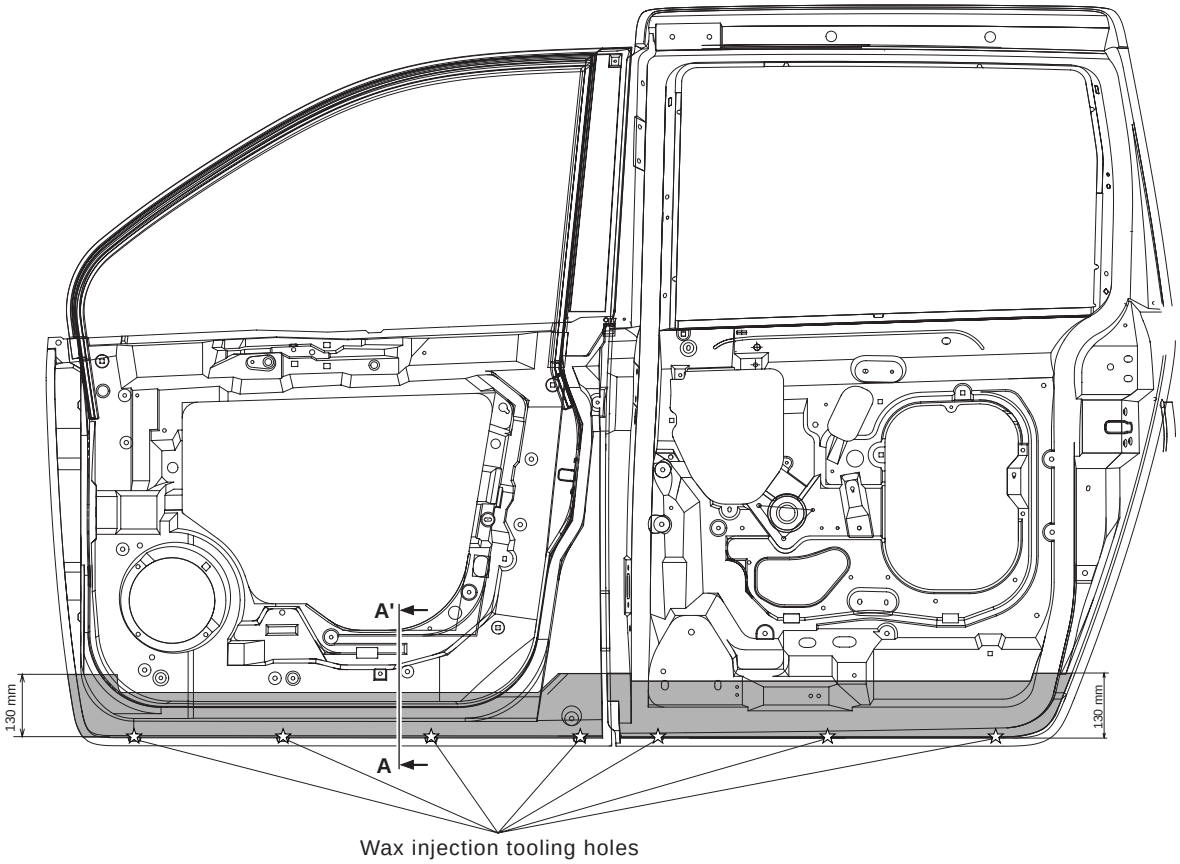
B - B'

BVQCP6612



C - C'

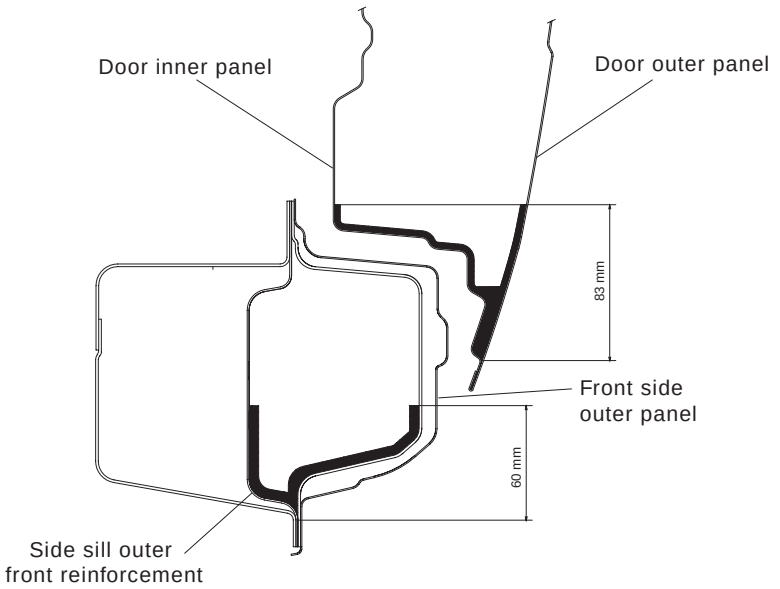
BVQCP6613



☆ Wax injection must be done through access holess marked.

Cavity wax injection (Thickness 40μ - 50μ)

BVQCP6620



A - A'

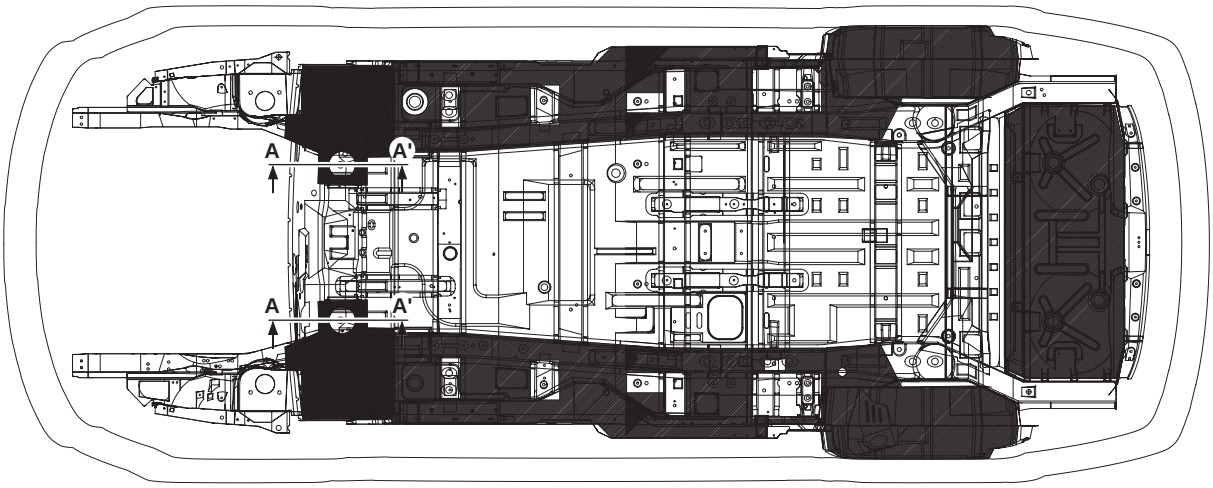
BVQCP6621

UNDER BODY ANTI-CORROSION AGENT

The undersides of the floor and wheel house are undercoated to provide greater corrosion resistance. Therefore, when such panel is replaced or repaired, apply under body anti-corrosion agent to that part.

NOTE

Do not apply the under body anti-corrosion agent to come in contact with tires, muffler and exhaust pipe.



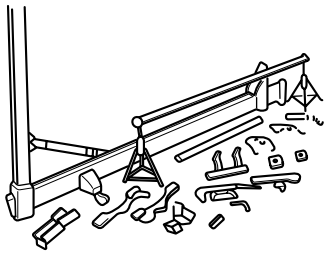
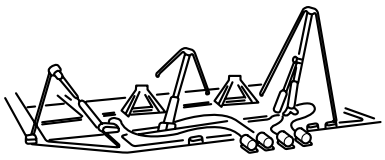
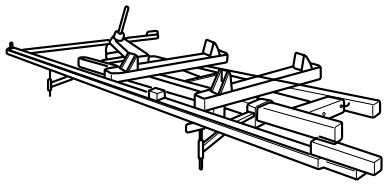
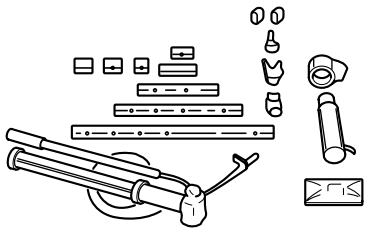
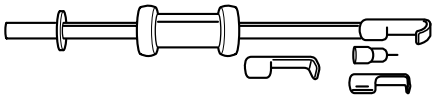
Under body coating (Thickness : 0.8 mm , :1.5 mm)

BVQCP6700

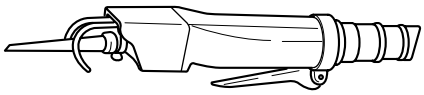
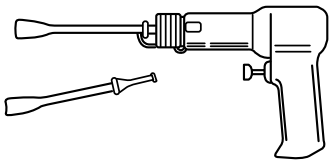
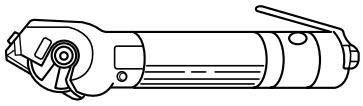
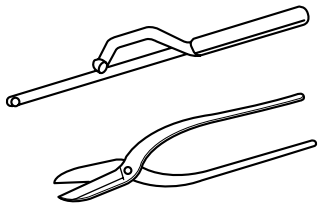
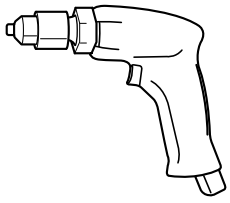
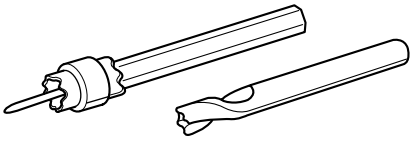
Body Modification Tools

BODY MODIFICATION TOOLS

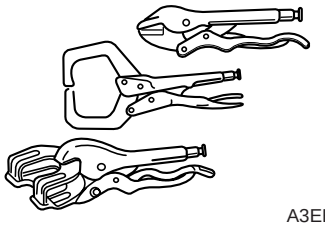
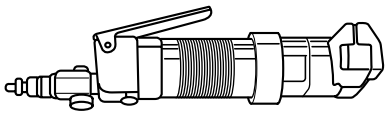
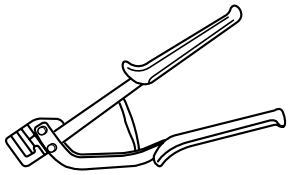
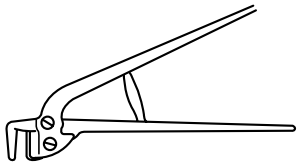
MODIFICATION TOOLS

Name	Used for	Figure
Frame straightener	Modify twisted or bent body	 A3EB3501
		 A3EB3502
		 A3EB3503
Port power	Push out, stretch, pull in damaged area	 A3EB3504
Body puller	Stretch damaged area	 A3EB3505

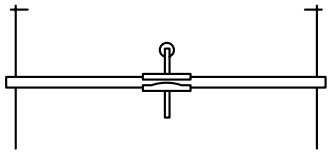
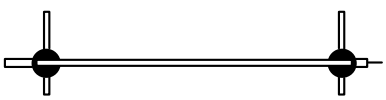
CUT AND DISASSEMBLY TOOLS

Name	Used for	Figure
Air saw	Cut a panel	 A3EB3506
Air chisel	Cut or bend a panel, cut and disassemble spot welded area	 A3EB3507
Rotary cutter	Cut a panel	 A3EB3508
Hand saw and metal scissors	Cut a panel	 A3EB3509
Air drill	Fix a spot cutter or drill to cut or disassembly spot welding area, to finish a hole	 A3EB3510
Spot cutter	Cut and disassemble spot welded area	 A3EB3511

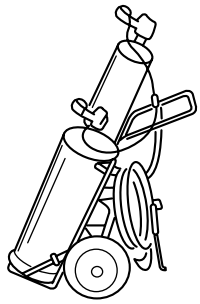
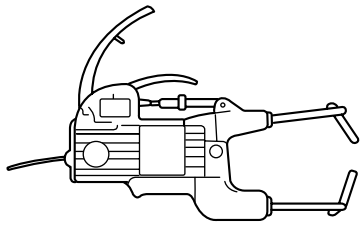
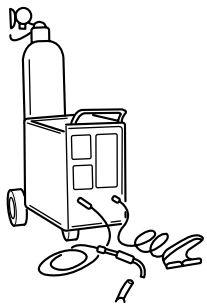
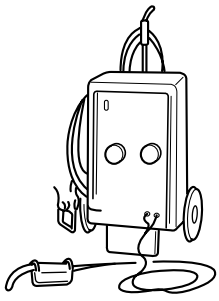
ASSEMBLY TOOLS

Name	Used for	Figure
Vice pliers	Fix a panel or area to weld	 A3EB3512
Air bench	Finish contact area of flange and finish a hole for plug welding	 A3EB3513
Quick bench	Finish a hole for plug welding	 A3EB3514
Flanging tool	Finish contact area of flange	 A3EB3515

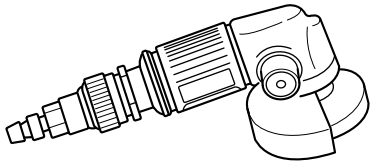
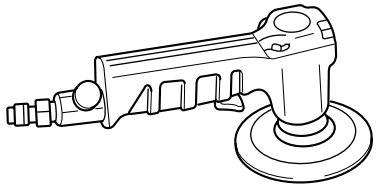
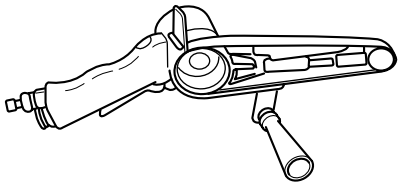
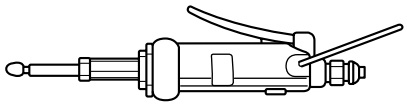
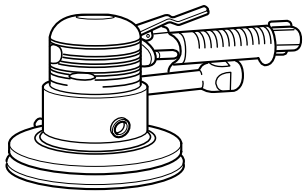
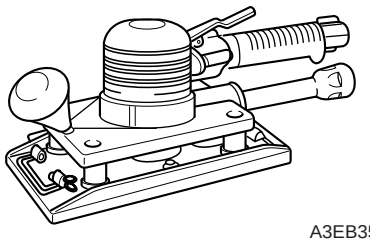
MEASUREMENT TOOLS

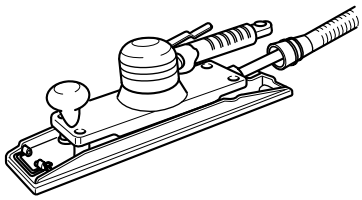
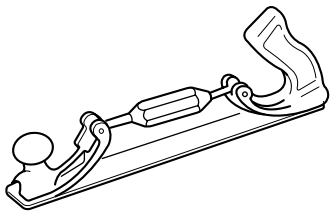
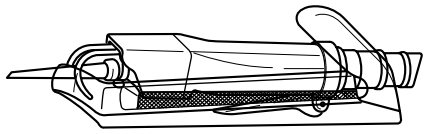
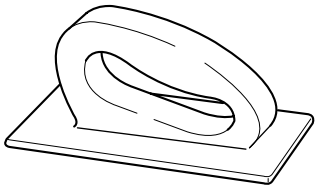
Name	Used for	Figure
Centering gauge	Measure distortion of body and frame	 A3EB3516
Tracking gauge	Measure body and frame	 A3EB3517

WELDING MACHINE

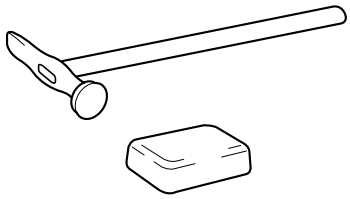
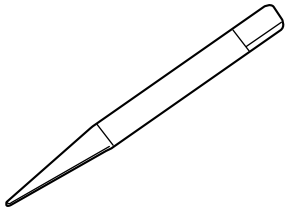
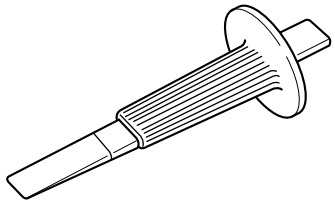
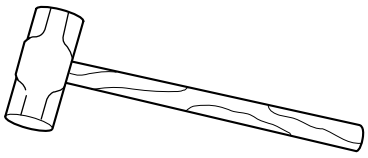
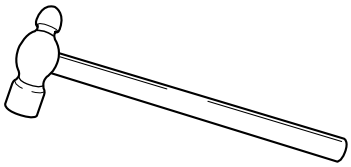
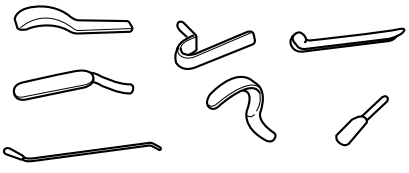
Name	Used for	Figure
Gas welding machine	Cut a panel	 A3EB3518
Spot welding machine	Weld a panel	 A3EB3519
Carbon arc welding machine	Weld a panel	 A3EB3520
Stud welding machine	Stretch a panel, weld a stud bolt to fix front window mold clip	 A3EB3521

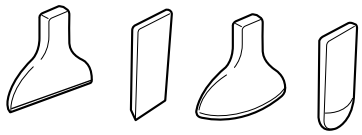
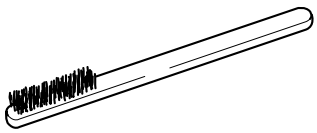
BUFFING AND GRINDING TOOLS

Name	Used for	Figure
Disk grinder	Buff	 A3EB3522
Disk sander	Buff	 A3EB3523
Belt sander	Buff paints	 A3EB3524
Small sized grinder	Buff paints or smooth finishing	 A3EB3525
Double action sander	Grind rough area of puttee assembled area	 A3EB3526
Orbital sander(short)	Grind rough area of puttee assembled area	 A3EB3527

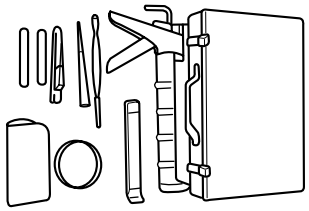
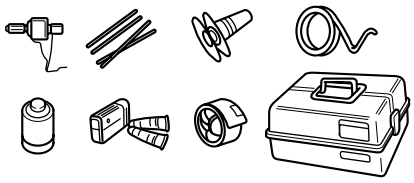
Name	Used for	Figure
Orbital sander(long)	Used for puttee grinding of wide area	 A3EB3528
Flexible file	Grind touch up area, uneven area of a panel	 A3EB3529
Surform tool	Buff rough area of puttee area	 A3EB3530
Hand file	Grind body puttee, pulley, finish puttee	 A3EB3531

HANDHELD TOOLS

Name	Used for	Figure
Body hammer and dolly	-	 A3EB3532
Center punch	Punch a hole in the middle of a spot welding area	 A3EB3533
Plane chisel	Cut and disassemble a panel	 A3EB3534
Weight hammer	Used when greater force is required	 A3EB3535
Bowl pin hammer	Used when smaller force is required	 A3EB3536
Spoon	Used for an area where not reached by hand	 A3EB3537

Name	Used for	Figure
Body chisel	Bend rough body line damaged or sheet metal etc.	 A3EB3538
Wire brush	Remove paints, rust, slag on welded area which are hard to recognize	 A3EB3539

REPAIR TOOLS SET

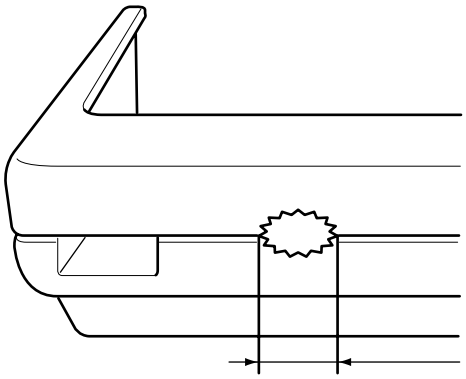
Name	Used for	Figure
Window tool set	Repair window collar	 A3EB3540
Repair tool set for plastics	Repair plastic parts	 A3EB3541

Plastic Parts

POLYPROPYLENE(PP) BUMPER REPAIRABILITY

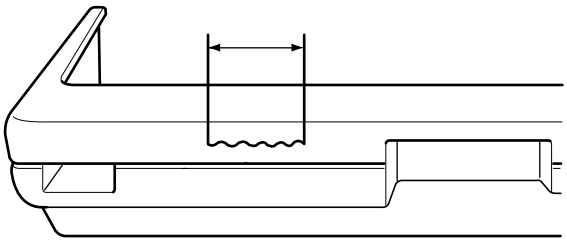
The three types of damaged bumpers shown below can be repaired. Because of cost and quality considerations, bumpers with more damage may be repaired, but replacing the bumper is encouraged.

1. If a hole on a bumper is less than 2 in.(50 mm).



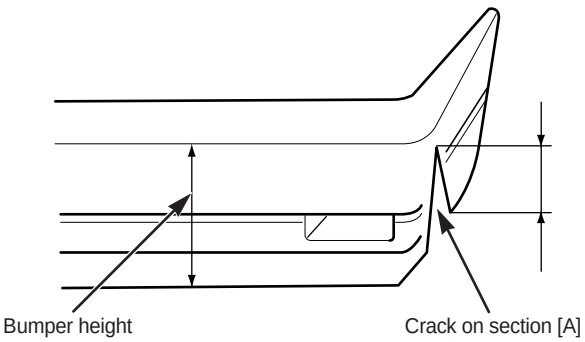
A3EB3601

2. If a crack on a bumper is less than 4 in.(100 mm).



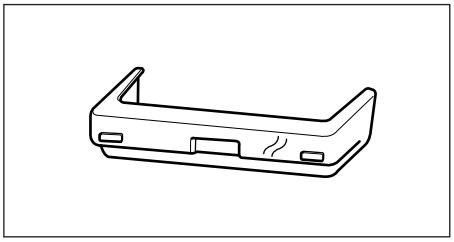
A3EB3602

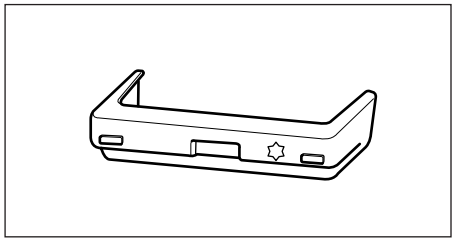
3. If a crack on bumper sectionis [A] is less than 4 in. (100 mm) (less than half of the bumper height).

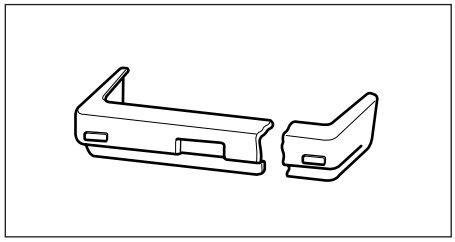


A3EB3603

BUMPER REPAIR PROCEDURE







Surface of bumper is not visible.

Surface of bumper is visible.

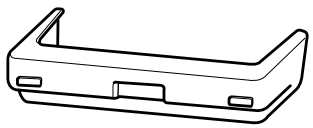
Remove paint.

Sand damaged area smooth.

Apply aluminum tape on the rear side of bumper.

Weld damaged area.

- Replace damaged bumper with a new bumper.
- Apply primer for polypropylene over bumper surface.



Sand damaged area with a rough sandpaper.

Clean and degrease damaged area(use TCE de-oil material).

Apply primer for polypropylene over damaged area.

Apply solvent over damaged area.

Spray primer surface over bumper and let dry.

Sand surface of bumper with sandpaper.

Clean and degrease with TCE de-oil material.

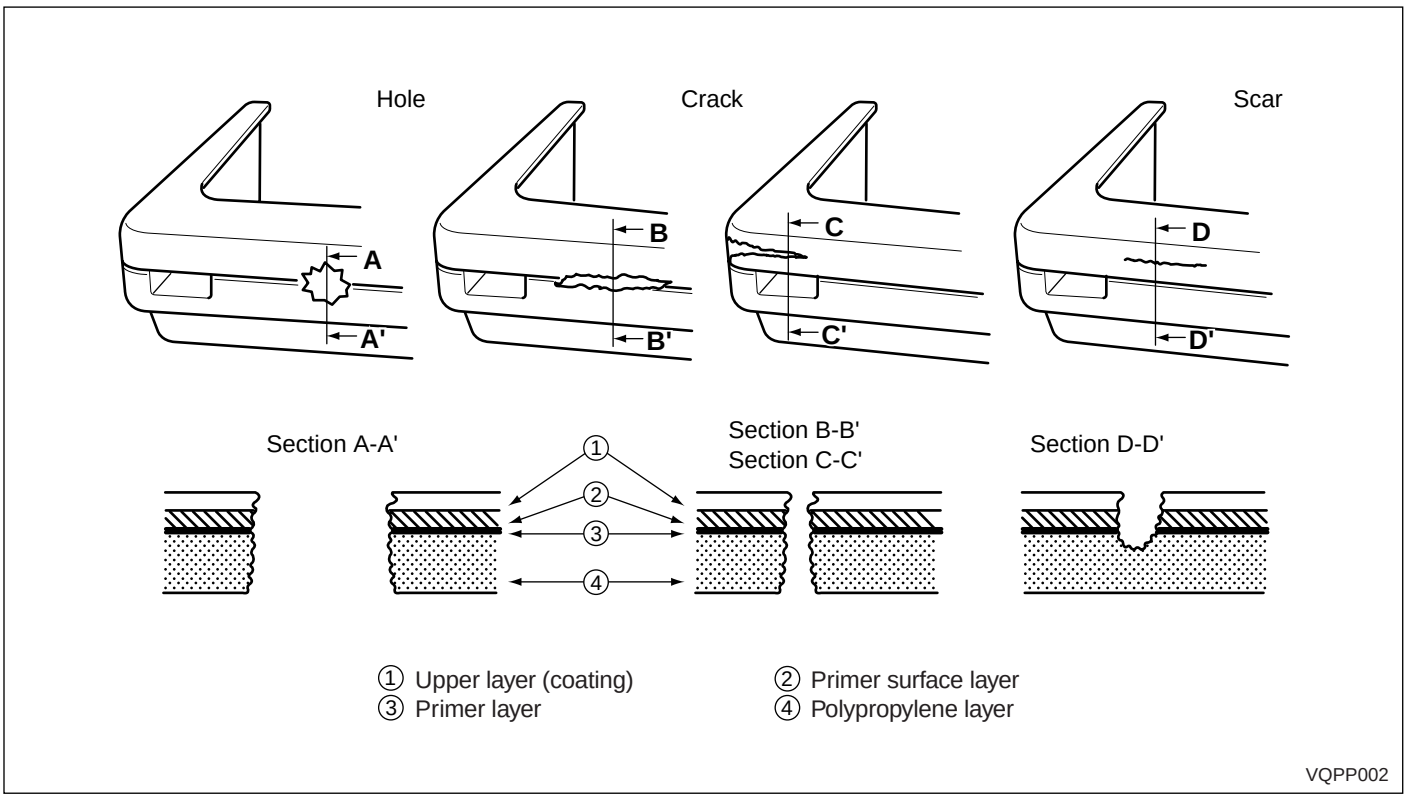
Wipe the surface of bumper with a tack cloth.

Paint bumper with a paint of the same color and let dry.

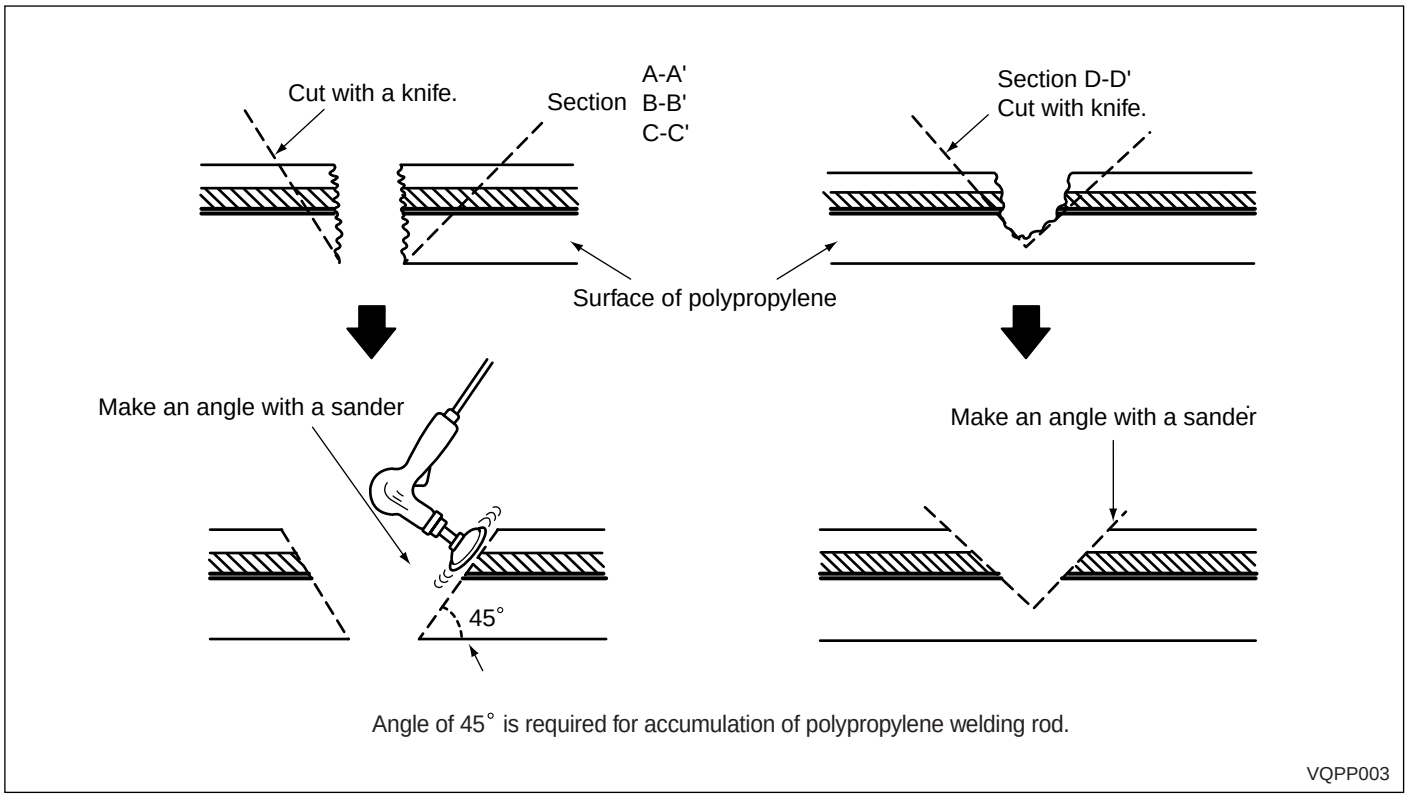
VQPP001

REPAIR METHOD FOR PP BUMPER

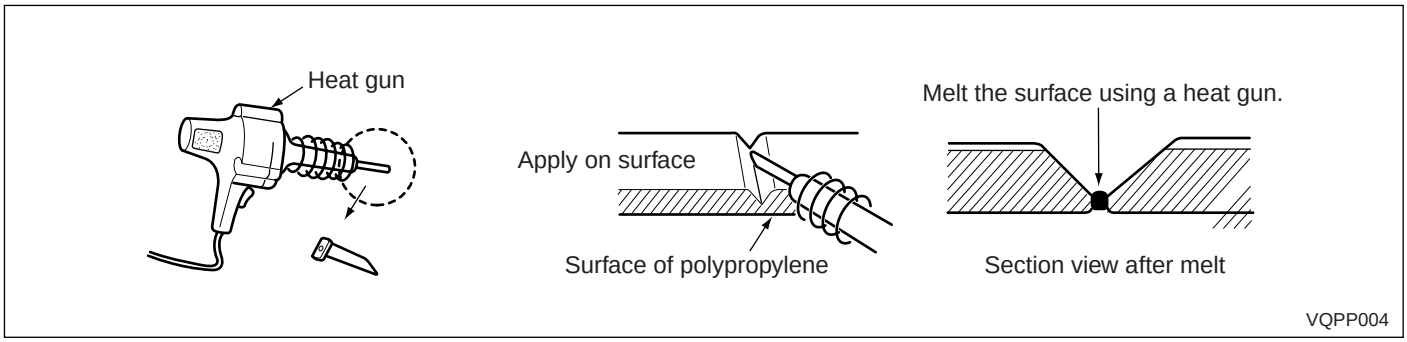
Damage to the bumper that reaches the surface of the polyporpylene cannot be fixed just by painting. Use the repair methods shown below to repair damage that reaches the surface of the polypropylene.



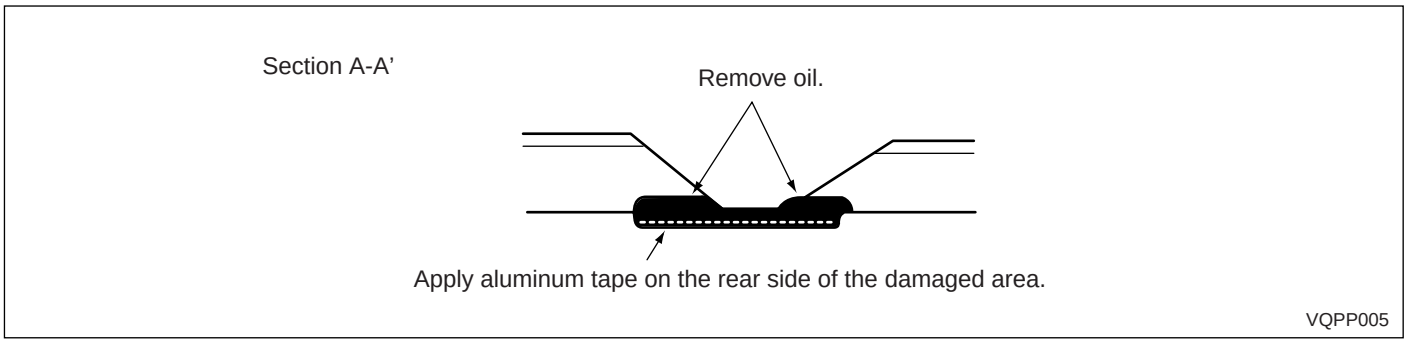
1. Rough cut the damaged area 45° using a knife and then sand the angle smooth.



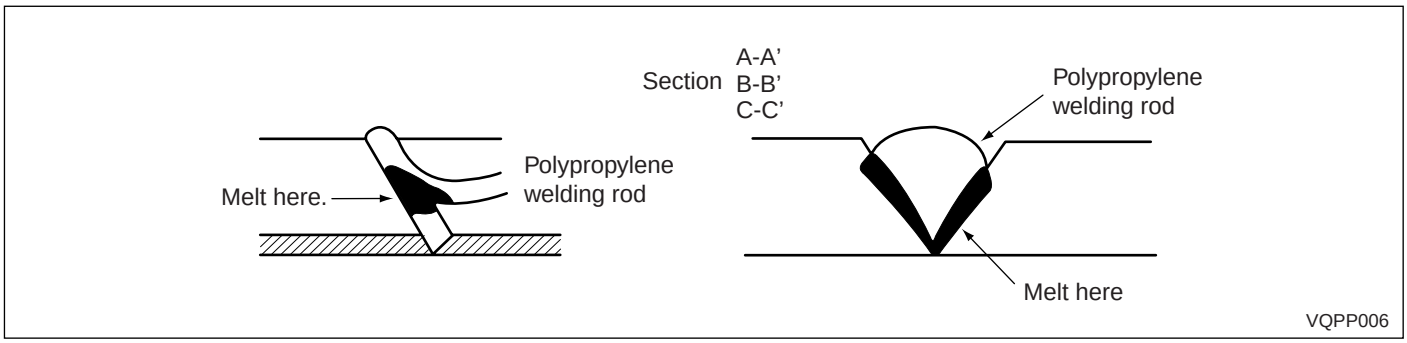
2. Welding damaged area
   a) To repair cracked area, melt the area using a heat gun and attachment.



   b) To repair a hole, remove oil from the damaged area and apply aluminum tape to the rear side of the damaged area.

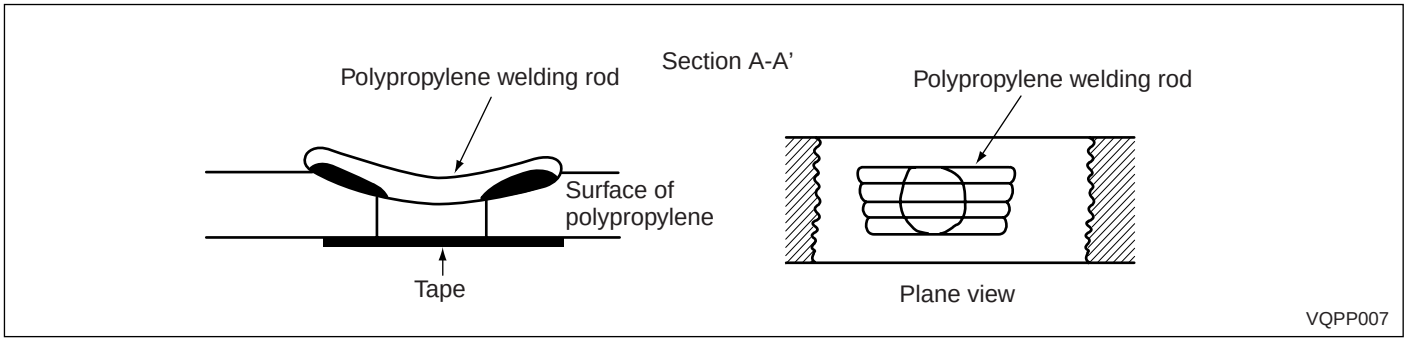


3. Melt polypropylene welding rod using a heat gun and fill in the cracked area.

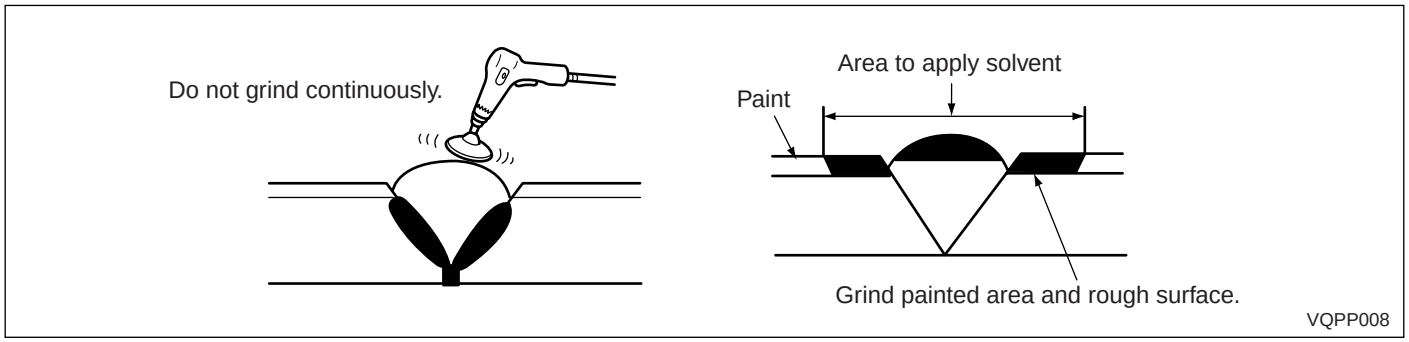


NOTE

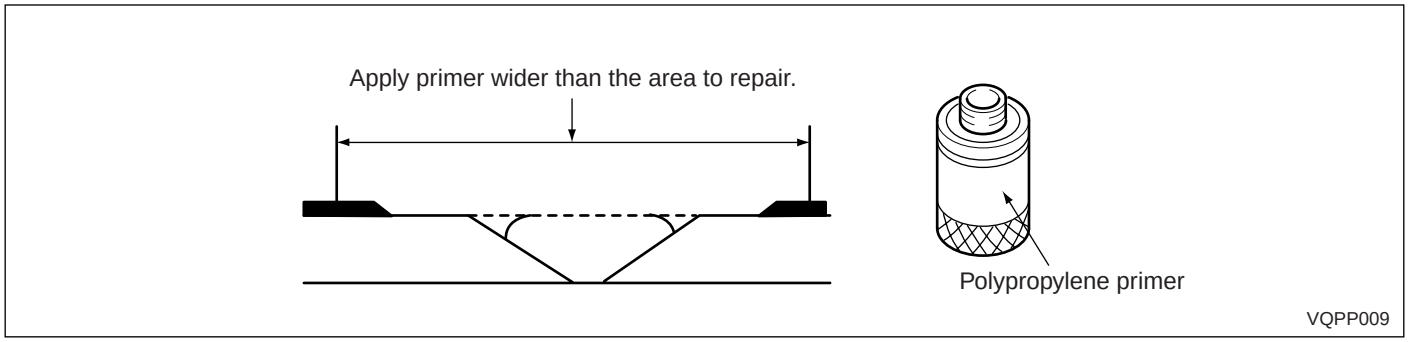
- *Heat and melt the area indicated.*
- *Melt the welding rod carefully so that it does not over-melt. If the welding rod over-melts like jelly, the welding strength will deteriorate.*
- *Use the heat gun 0.4~0.8 in.(10~20 mm) away from the repair area to be welded. Welding rod should not move until the welded area is cooled.*



4. Grind polypropylene surface carefully. It melts easily due to the heat generated by friction. If melted, remove that area. Also, grind the area where solvent is to be applied.



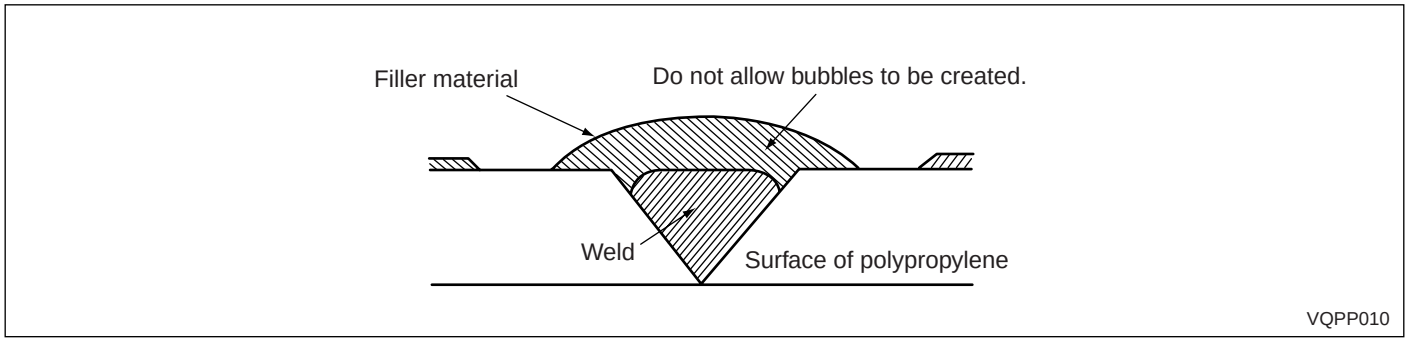
5. Apply polypropylene primer evenly with a brush over an area wider than the area to be repaired. Dry it at 20°C (68°F) for more than 10 minutes.



6. Mix main filler material and hardener at a ratio depending on paint specifications. Mix filler material and apply over the damaged area.

NOTE

- *Mix main filler material and hardener so that no bubbles are made.*
- *Work immediately after mixing filler material because the filler material hardens quickly(in about 5 minutes).*
- *Dry it at 20°C (68°F) for about 30 minutes before sanding.*

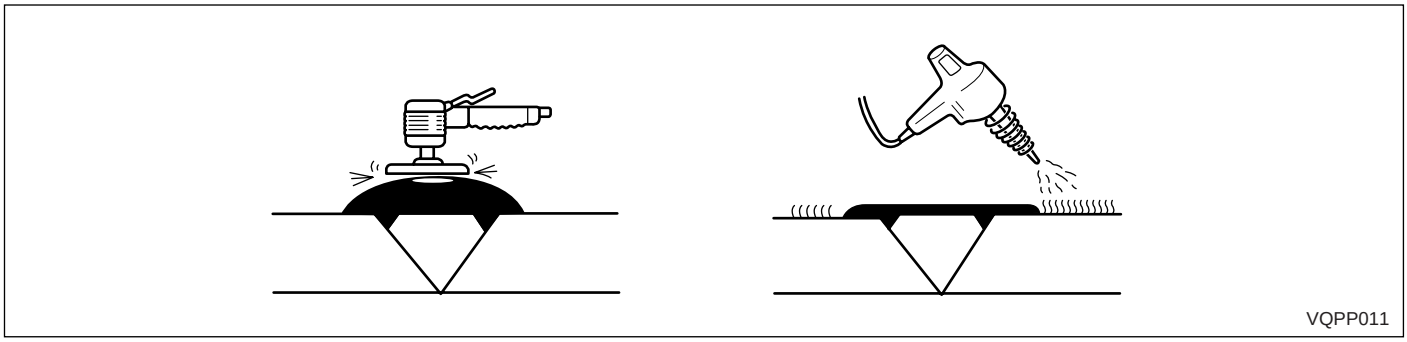


- *Filler material consists of two types of epoxy.*
  When the filler material hardens, you will have a desirable finish with flexibility like polypropylene.
- *Use only filler material designed for use on polypropylene bumpers.*

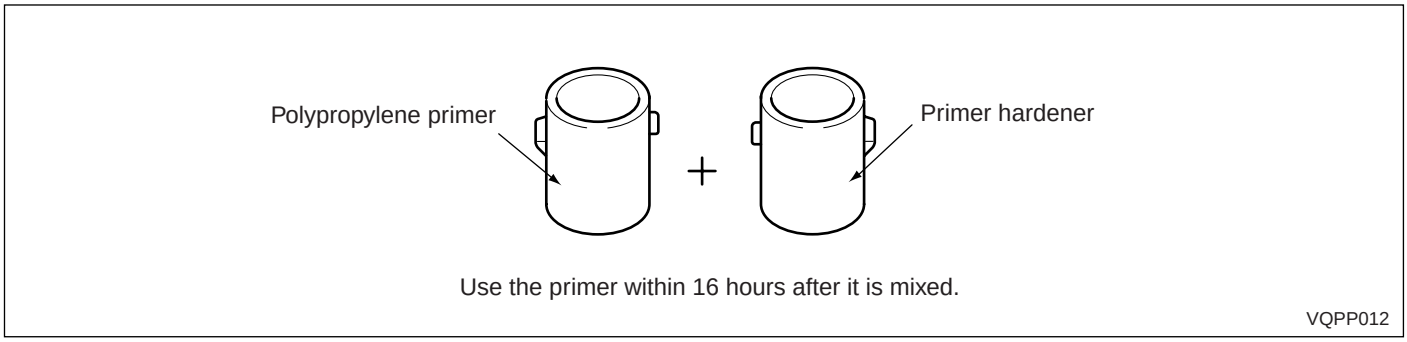
7. Sand the damaged area with sandpaper using #180~#240 grit paper.

NOTE
- *The surface will not be even if excessive force is applied during sanding.*
- *If there is fuzz in the damaged area, heat it a little bit with a heater gun and melt it.*

8. Degrease the painted surface.


VQPP011

9. Mix polypropylene primer and hardener at a ratio depending on paint specifications.
Spray polypropylene primer on the surface of the damaged area and the bumper.



10. Apply polypropylene primer.

NOTE
Use only water to clean after applying polypropylene primer. Solvent, if used, will melt the primer.

11. Lightly sand the sprayed area using a primer a sandpaper(#400~#600).
The polypropylene surface should not be exposed.(Either wet sanding or dry sanding is all right.)

12. Use agent(TCE(Tri Chloro Ethane) degreasing material) to remove any grease or oil, and wipe the finished surface of the bumper quickly with a clean cloth.

NOTE
- *The painting method for the polypropylene bumper is the same used to paint the urethane bumper.*
- *Therefore, use urethane primer only on urethane bumpers and polypropylene primer on polypropylene bumpers.*

13. Air dry at 20°C(68°F) for about 8 hours, or dry in 60°C(140°F) for about 2 hours.
(Since drying time varies according to the type of paint used, follow paint manufacturers directions for drying times.)

NOTE
Air dry if possible. Forced drying may create air bubbles on the top layer.