

SORENTO

Body shop Manual

FOREWORD

This Body Shop Manual illustrates body structures and service procedures for the SORENTO.

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 SORENTO Service Manual. Information regarding electrical harness routing/connections, etc. can be found in the SORENTO 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

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WARNING

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all motor vehicles as well as the personal safety of the individual doing the repair. There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or caution to each. Accordingly, anyone who departs from the instruction provided in this manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools, or parts. The following list contains general warnings that should always be followed while working on a vehicle.

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires underbody work.
- Be sure ignition switch is always off unless otherwise specified by a procedure.
- Set the parking brake when working on the vehicle.
- Operate the engine only in a well ventilated area.
- Keep clear of moving parts when engine is running.
- 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.

General information

Fundamental procedures

Vehicle protection	00- 1
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00

For best results

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Vehicle lift (2-Support type) & and safety stand positions

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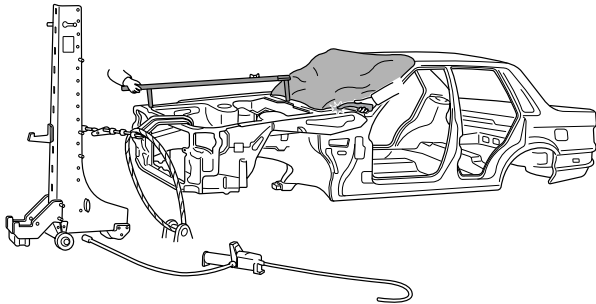
Body colors and major specifications

Kia color codes	00- 9
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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.

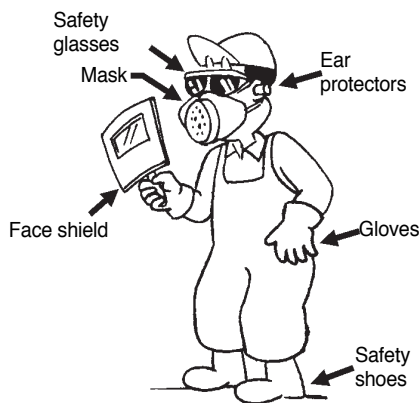


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3. Protect moldings, garnishes and ornaments.

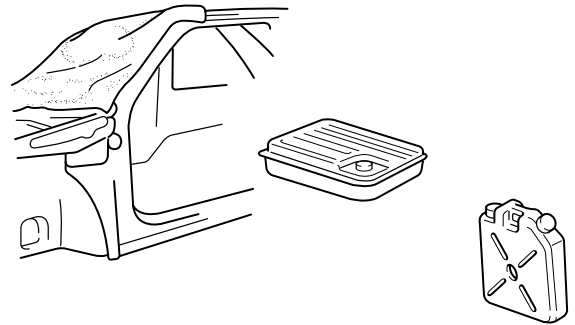
A word about safety

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.

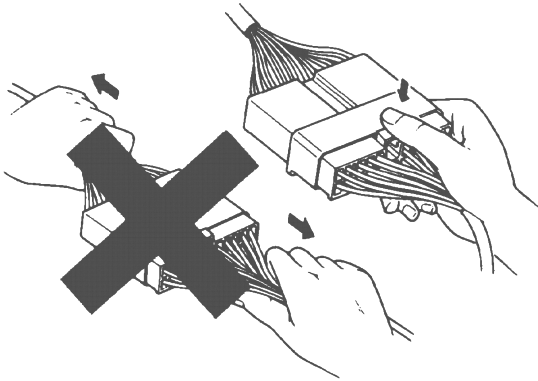
00-2 General information

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 “clicks” when connecting the connector.
4. Handle all electrical components with care.



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For best results

Disassembly

Measuring dimensions before beginning

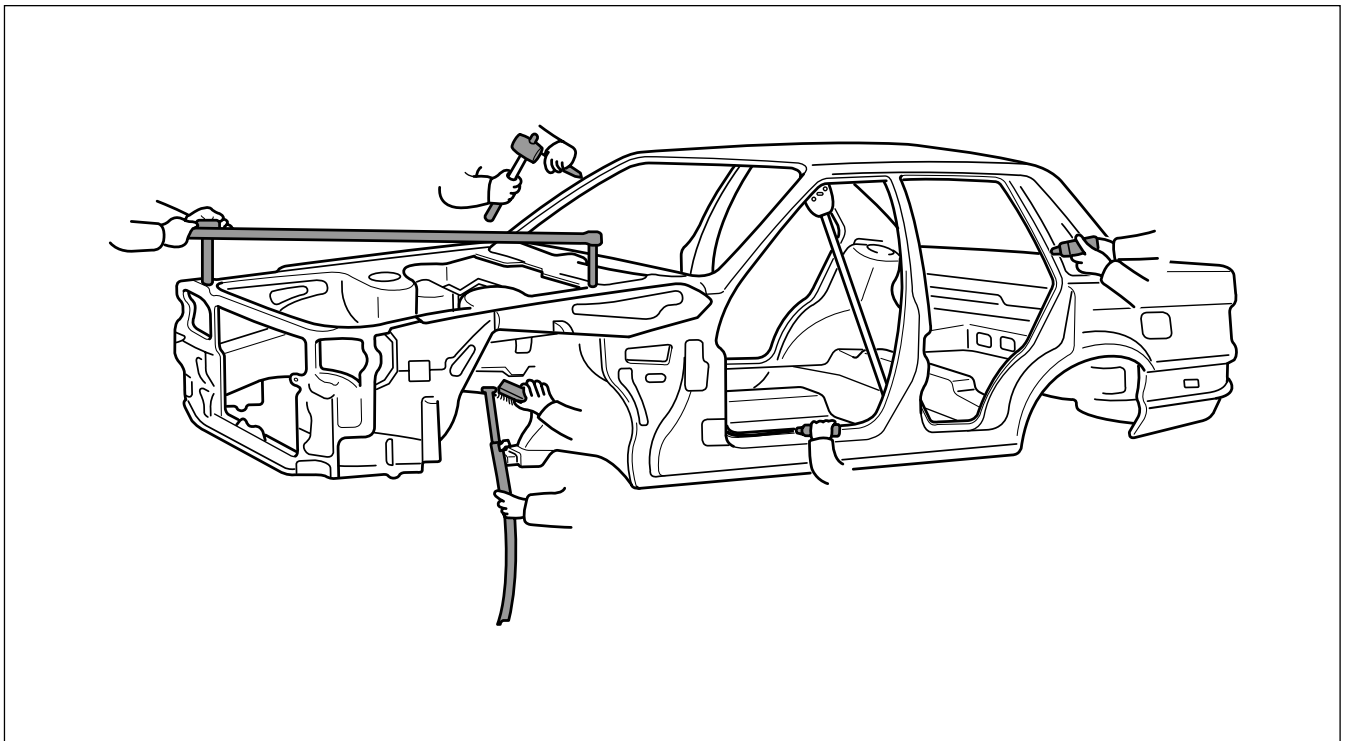
Measure the dimensions of the damaged area according to the body dimension drawings before disassembling and repairing. Adjust dimensions with body frame adjuster if deformed.

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.

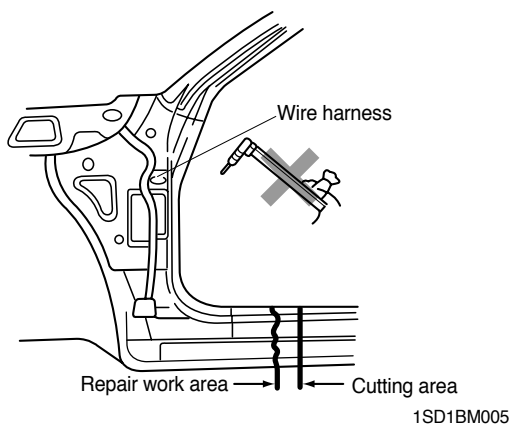


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00-4 General information

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.



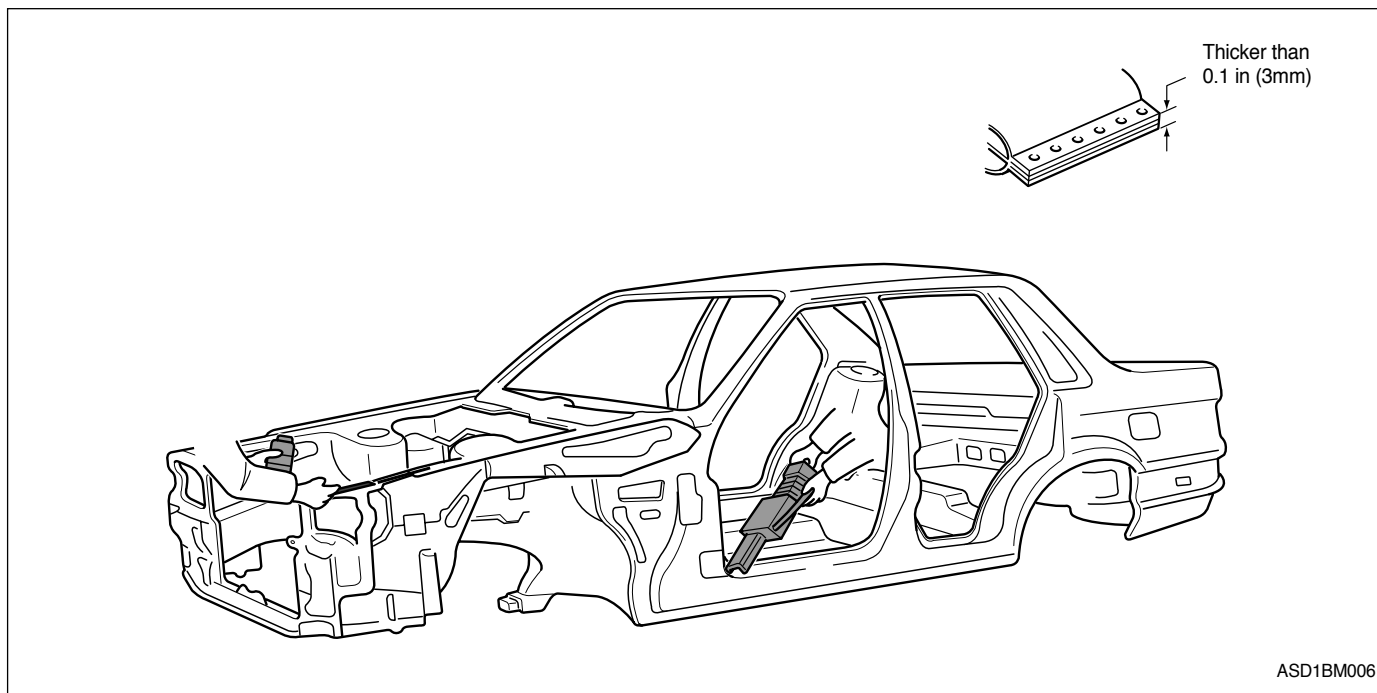
Preparation of assembly

Applying spot sealer

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

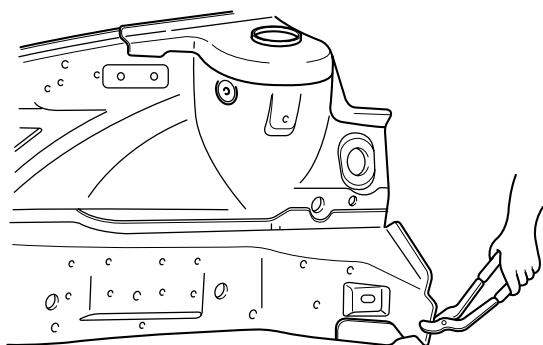
Selecting a welding method

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.



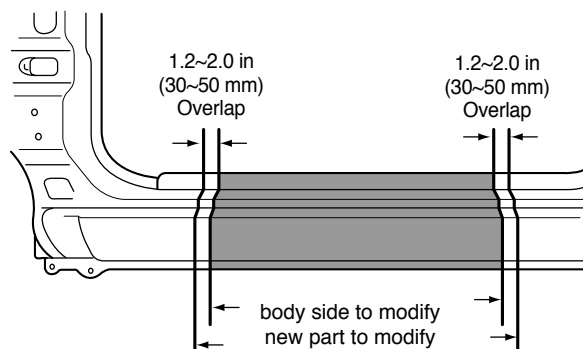
Machining holes for plug welding

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.



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).



00-6 General information

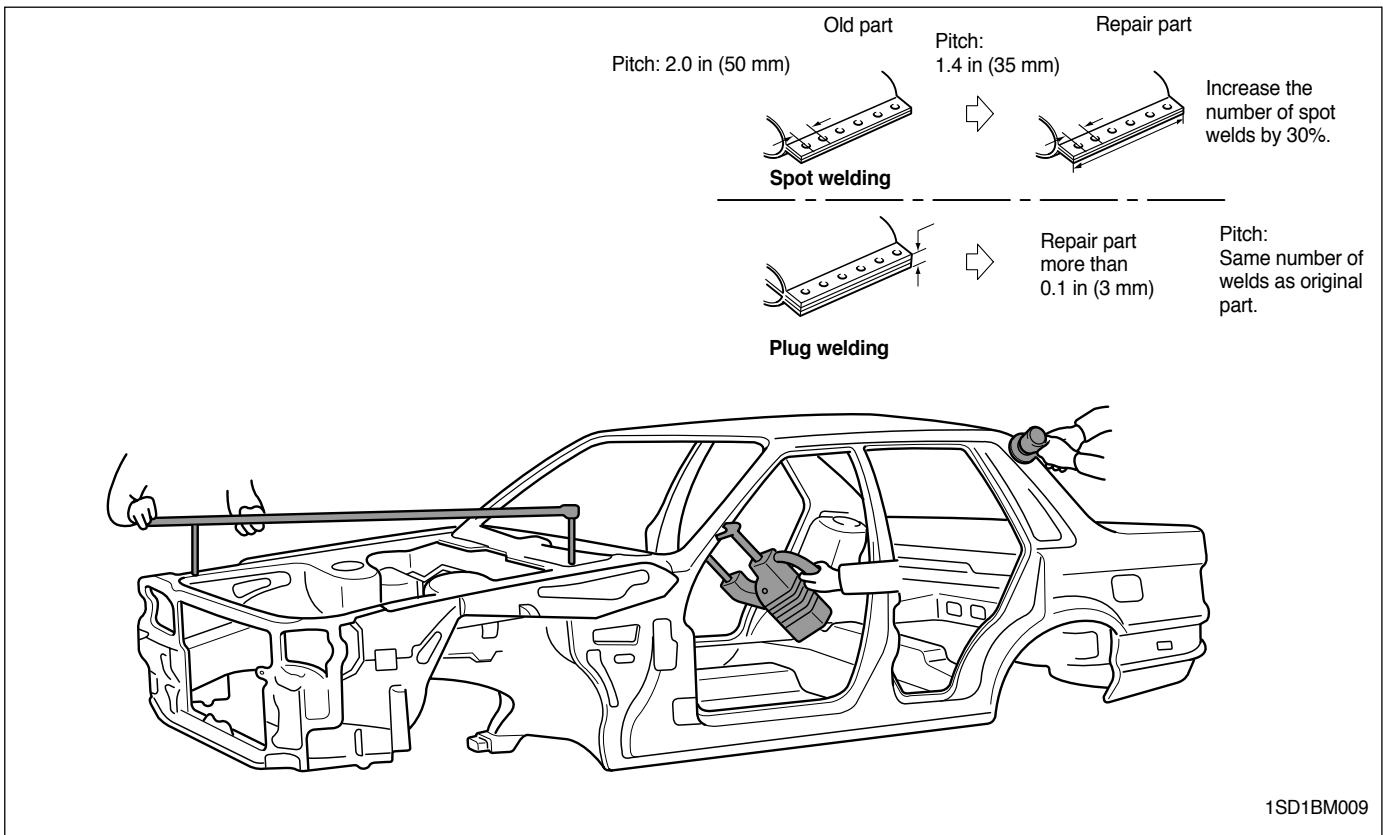
Assembly

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.

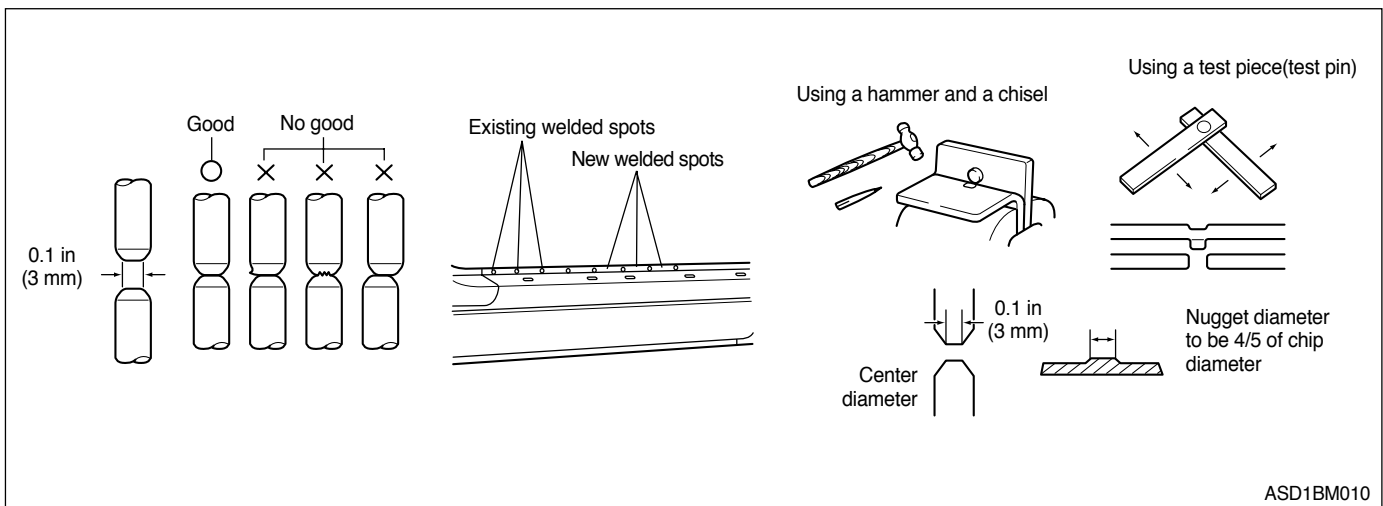
Caution when welding

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.



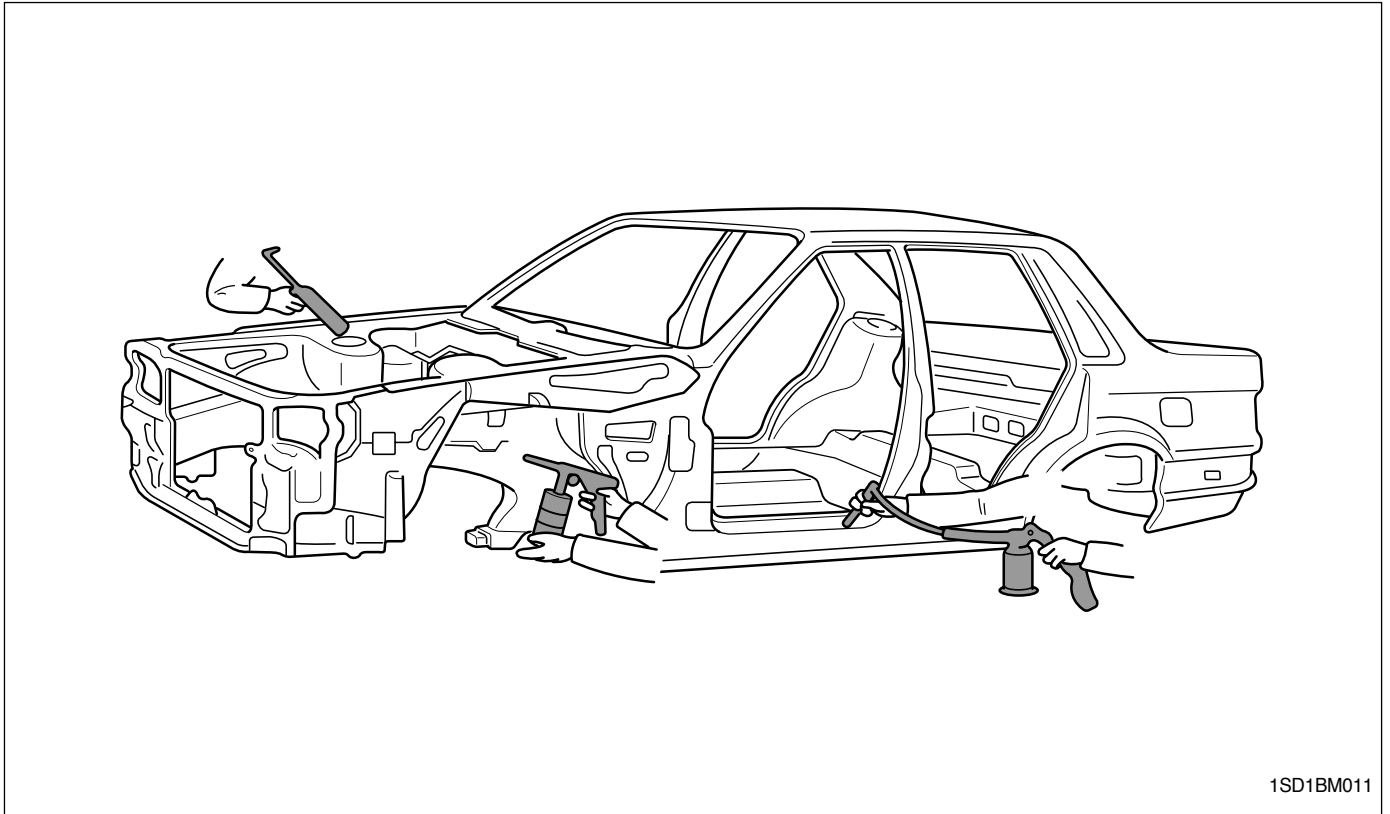
Rustproof treatment after assembly

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.

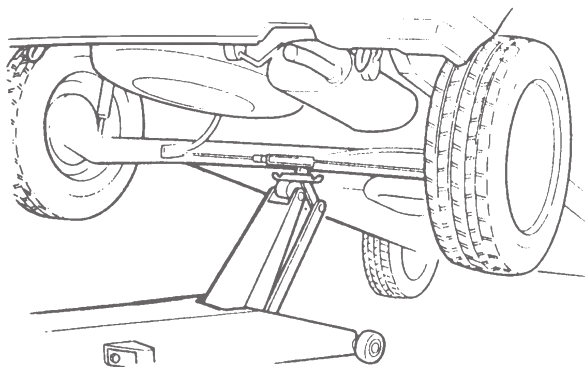
Vehicle Lift (2-Support Type) And Safety Stand Positions

Front end

At the front side member of the T/M cross member on the frame.

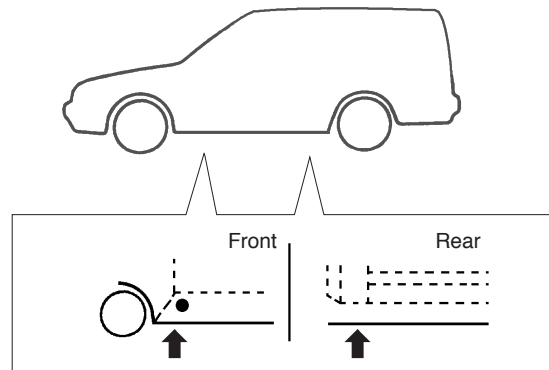
Rear end

At the front side member of the lower control arm bracket on the frame.



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Towing



133-07009 / 133-07009-1

If emergency towing is necessary, we recommend having it done by an authorized KIA dealer or a commercial tow-truck service. Proper lifting and towing procedures are necessary to prevent damage to the vehicle.

It is recommended that your vehicle be towed with a wheel lift or flatbed equipment. Do not tow with a slingbelt. Our company has not approved a slingbelt towing procedure.

On 4x4 vehicles, it is recommended that your vehicle be towed with a wheel lift and dollies or flatbed equipment with all the wheels off the ground.

Body colors and major specifications

Kia color codes

Kia code	Paint color
UD	Clear White
C5	Diamond Silver
G7	Grayish Purple
7Y	Gold Beige
R9	Ruby Red
3N	Ivy Green
K2	Indigo Blue
L4	Aqua Blue
EB	Ebony Black

Paint manufacture codes

Kia code	Paint color	DUPONT	SPIES HECKER	AKZO NOVEL SIKKENS
UD	Clear white	F2756	15689	KIA4004
C5	Silver Metallic	M7633	24303	KIA9716
G7	Silky Beige	P6790	87867	KIA9727
7Y	Ruby Red	M7671	26972	KIA9801
R9	Dark Emerald Green	M7791	37661	KIA9313
3N	Blue Sapphire	P6787	87864	KIA9614
K2	Misty Blue	P6789	87866	KIA9528
L4	Midnight Black	P6788	87865	KIA9527
EB	Ebony Black	F0193	35992	KIA4002

Body structure

Body composition

Body shell	11- 1
Body service holes	11- 1

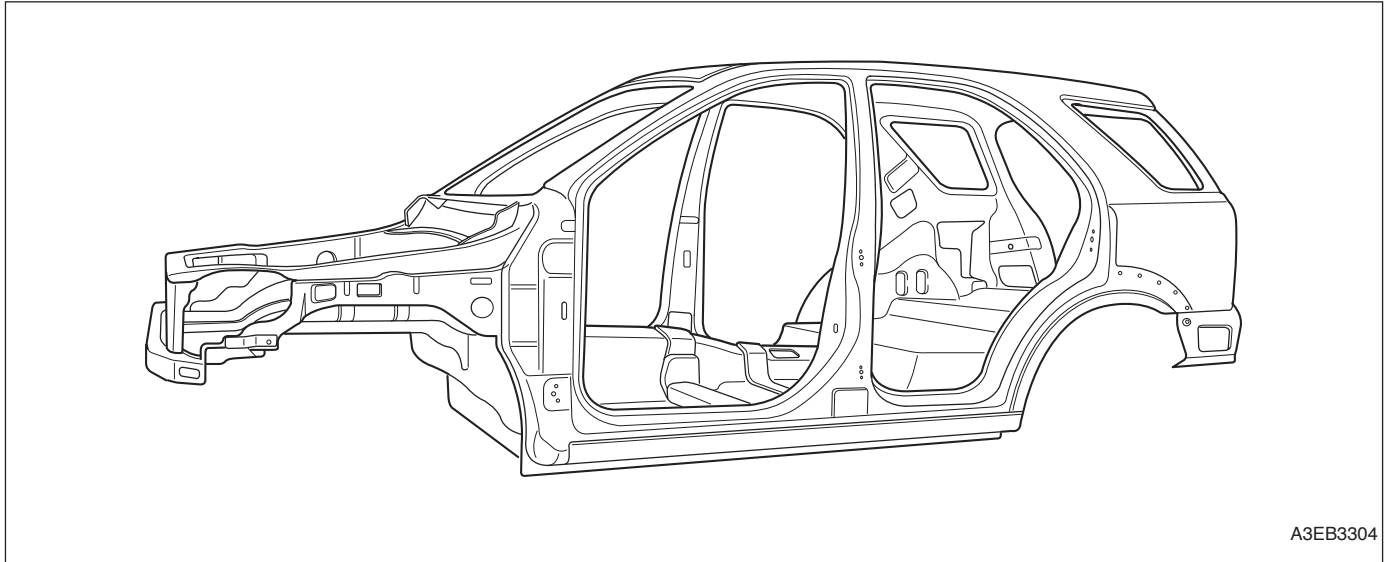
High tension steel sheet used area

Radiator support panel	11- 2
Fender & Wheel apron panel.....	11- 3
Dash & Cowl panel	11- 4
Side body panel.....	11- 5
Roof panel	11- 6
Floor panel	11- 7
Hood & Tail gate.....	11- 8
Front door & Rear door	11- 9

Body composition

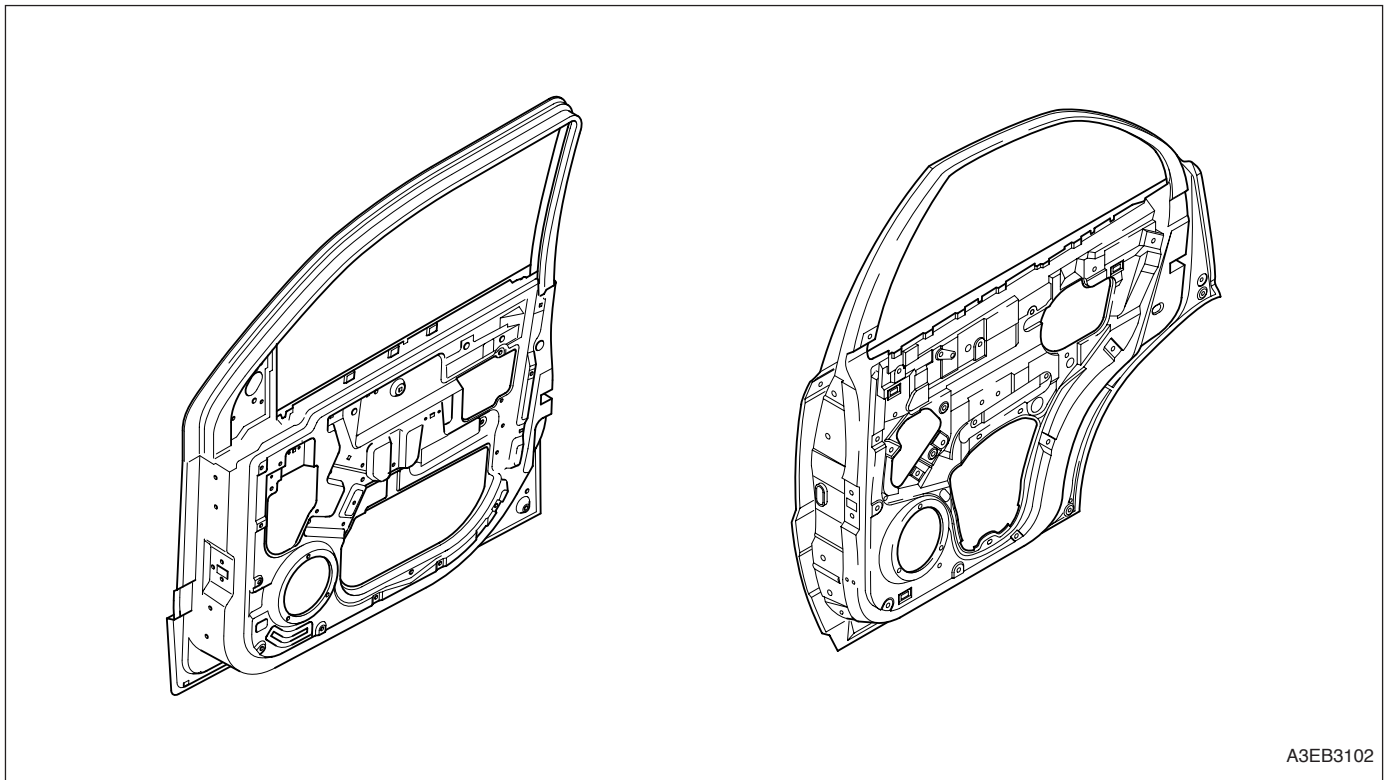
Body shell

The body consists of the body shell, frame and cross members, etc, welded together. This provides safety, durability, noise protection, rustproofing and vibration proofing of the vehicle.

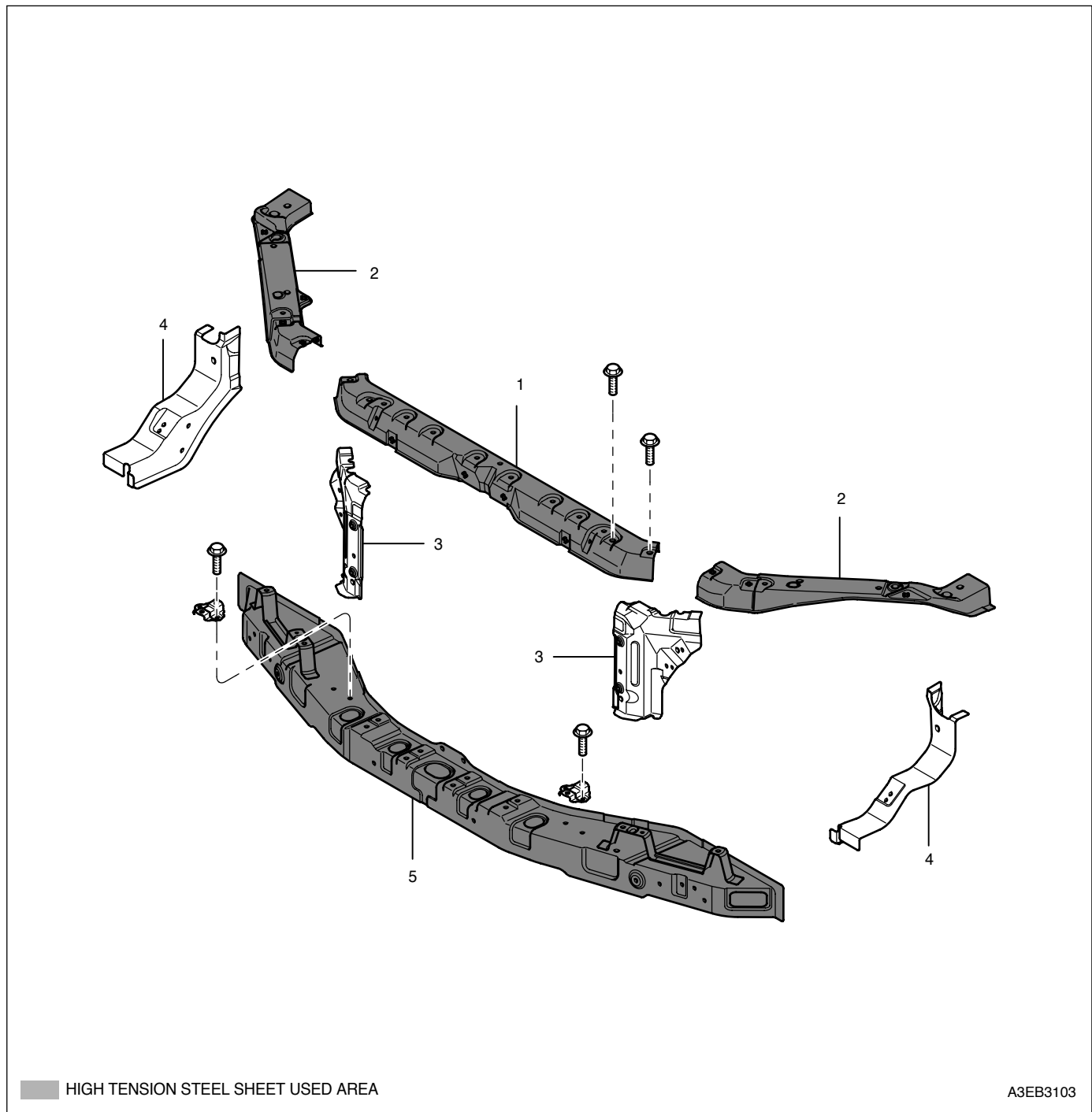


Body service holes

Body service holes are provided in the inner panel to improve serviceability of the body.



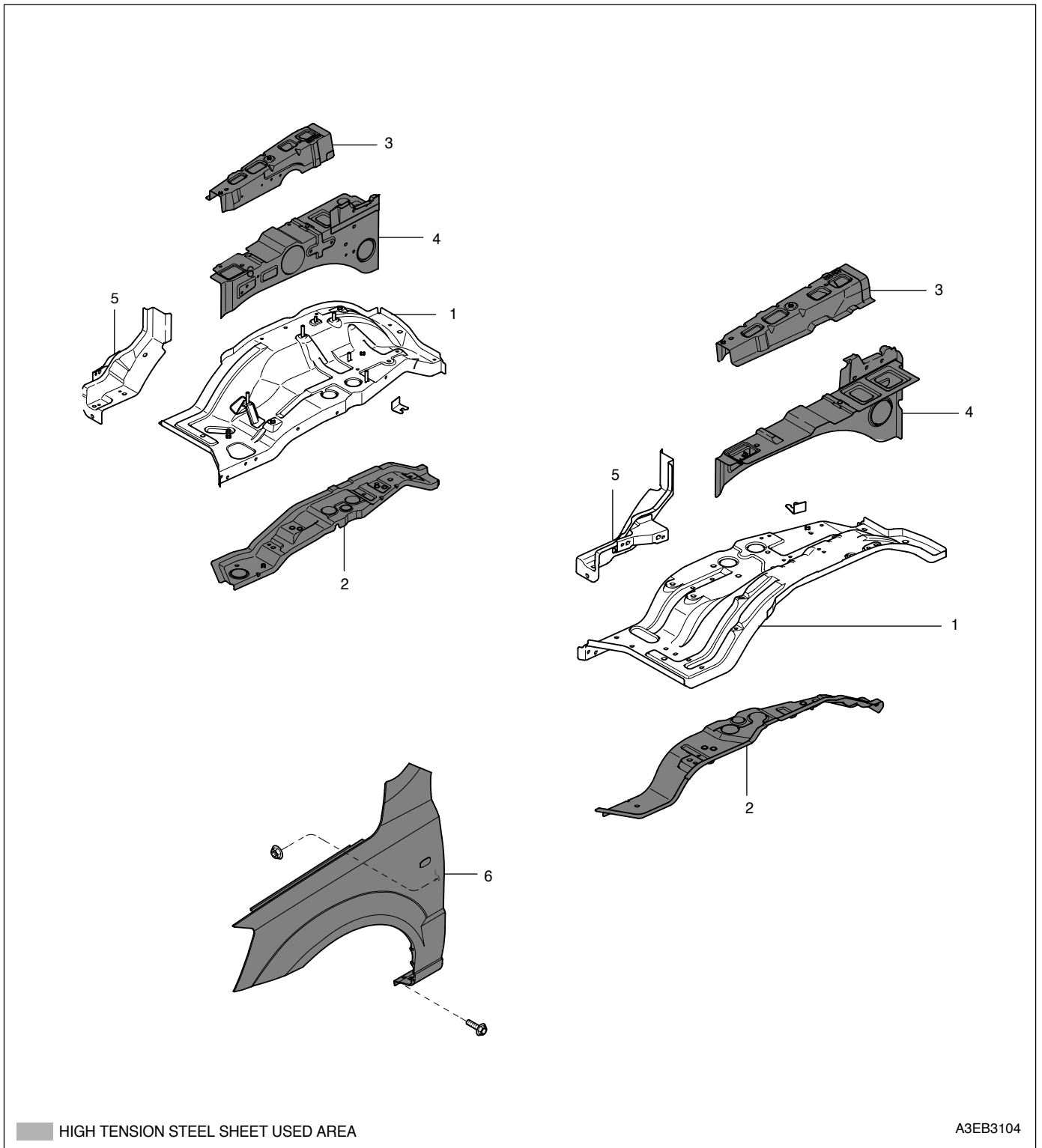
High tension steel sheet used area Radiator support panel



- (1) Radiator support upper member A
- (2) Radiator support upper member B
- (3) Headlight support panel A

- (4) Headlight support panel B
- (5) Radiator support lower member

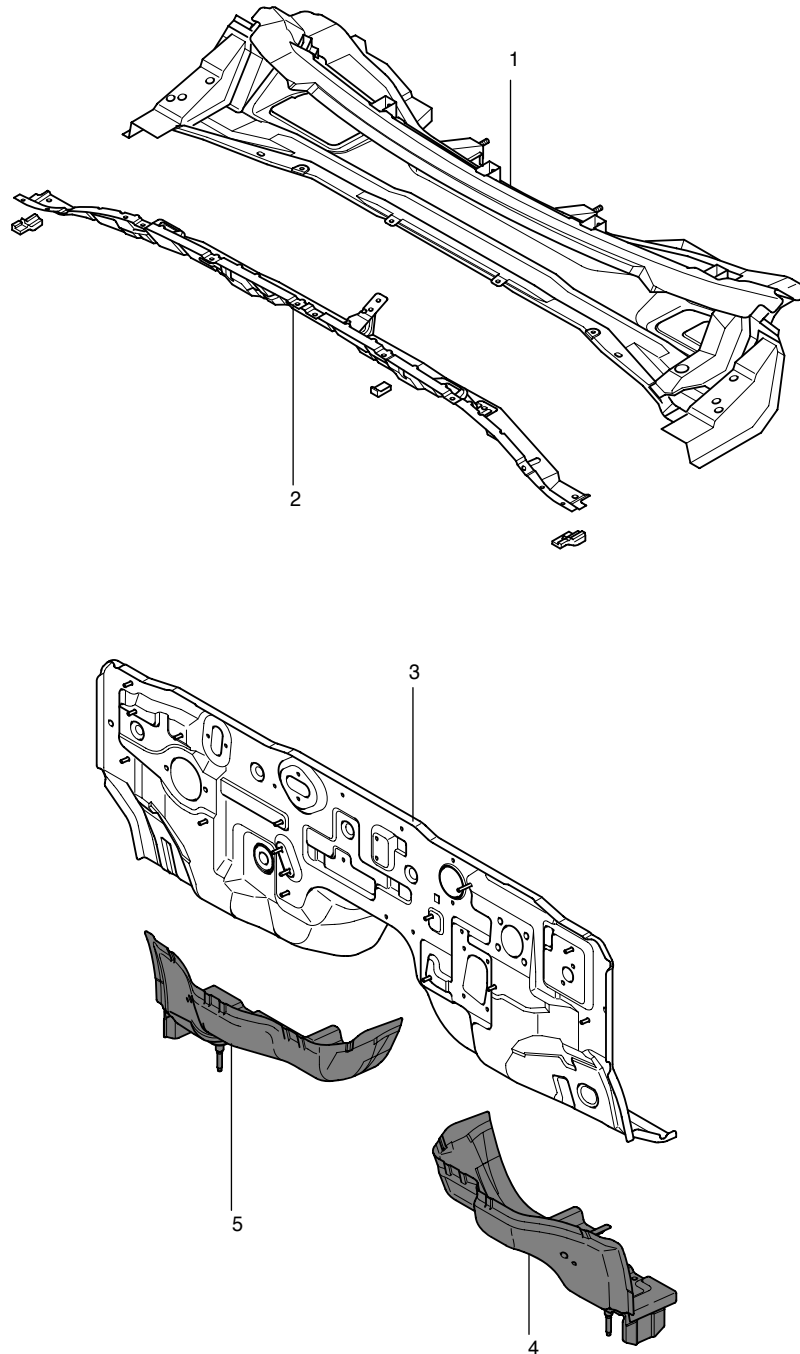
Fender & Wheel apron panel



- (1) Front wheel apron panel
- (2) Front wheel apron member
- (3) Side rail upper panel
- (4) Side rail lower panel
- (5) Front wheel apron reinforcement No. 1
- (6) Fender panel

11-4 Body structure

Dash & Cowl panel



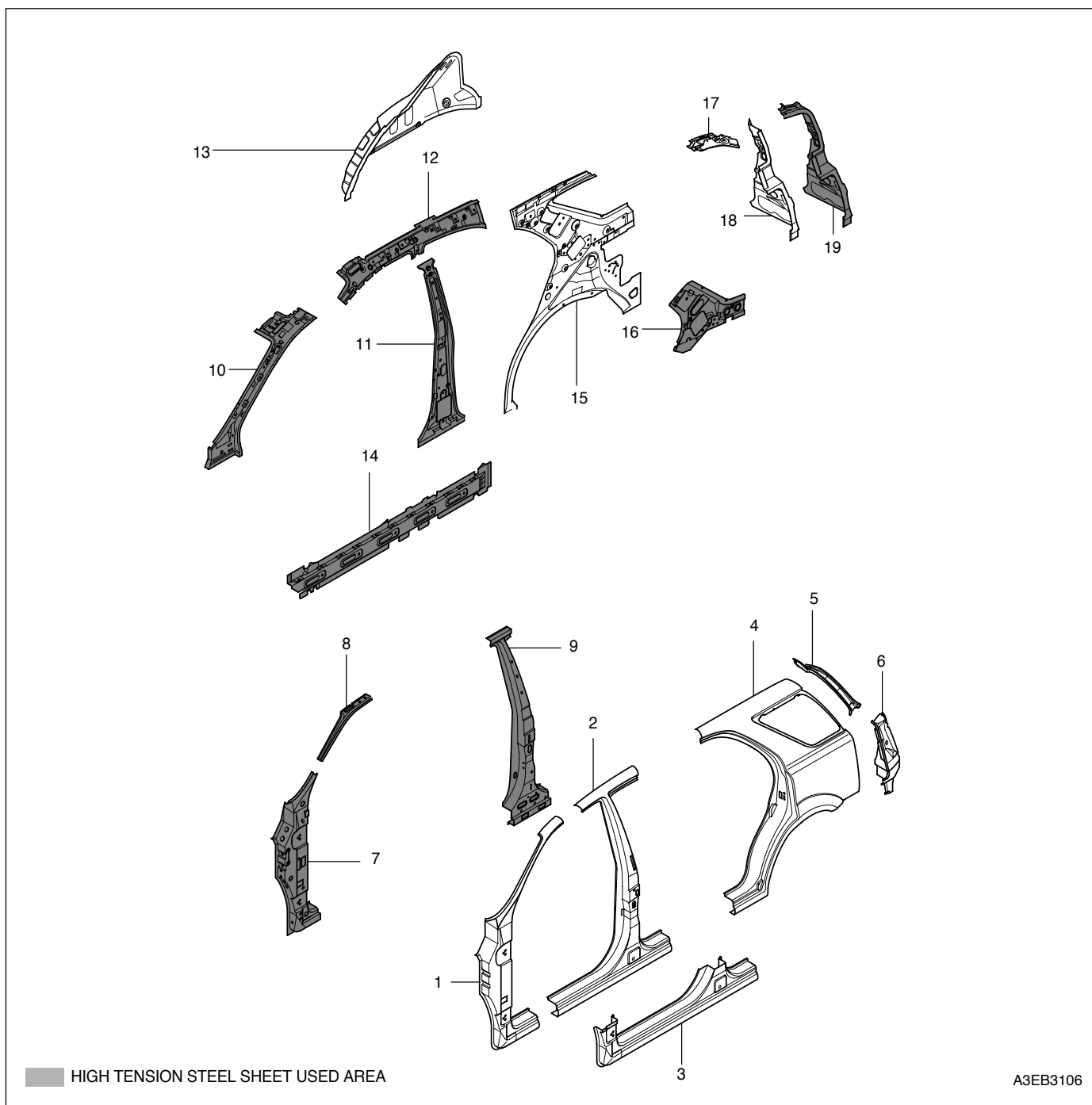
■ HIGH TENSION STEEL SHEET USED AREA

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- (1) Cowl panel
- (2) Front cowl panel
- (3) Dash lower panel

- (4) Dash lower member(LH)
- (5) Dash lower member(RH)

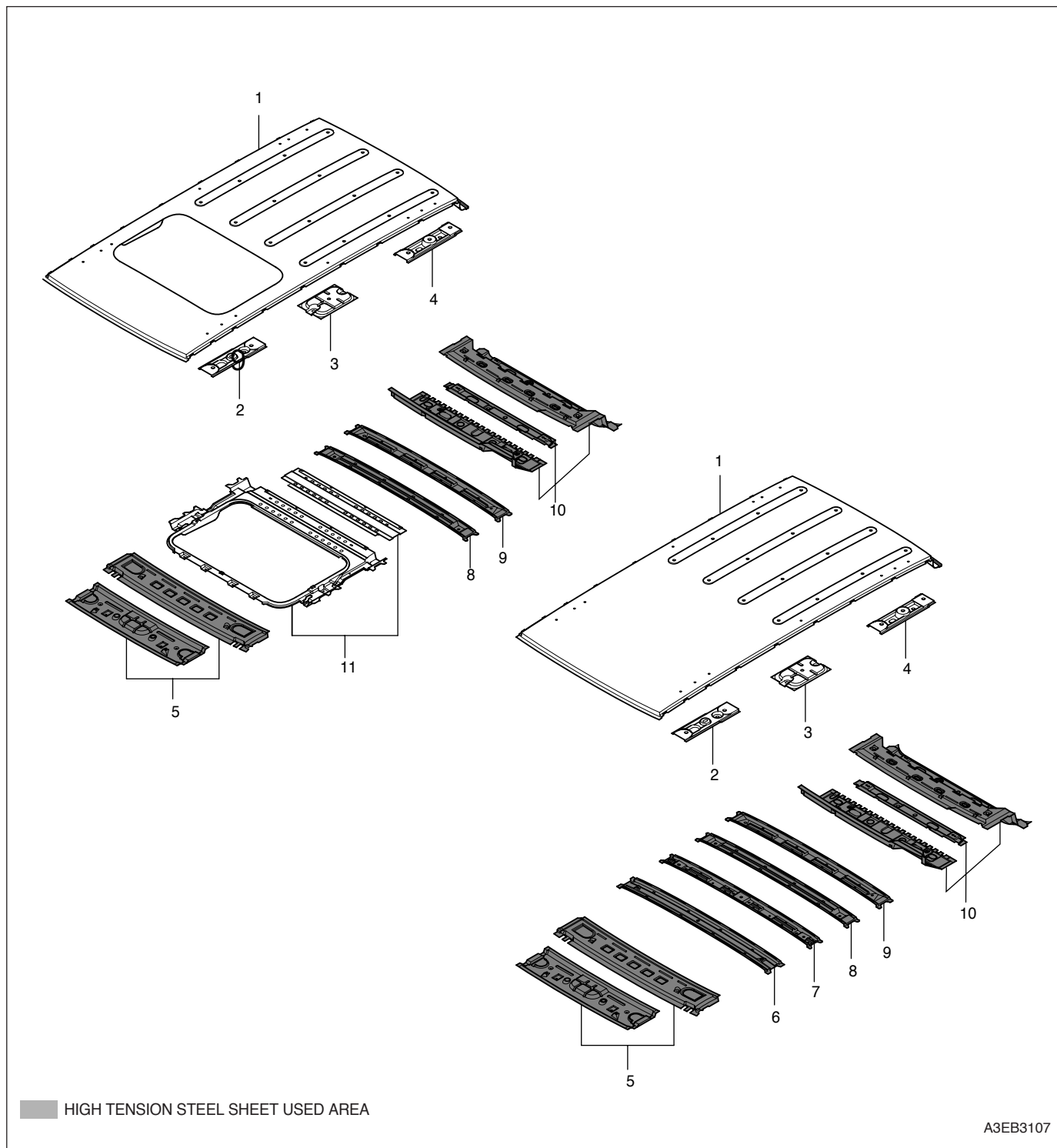
Side body panel



- | | |
|----------------------------------|------------------------------------|
| (1) Front pillar outer panel | (11) B pillar inner panel |
| (2) Center pillar outer panel | (12) Roof side inner rail |
| (3) Sill side outer panel | (13) Wheel house inner panel |
| (4) Quarter outer panel | (14) Sill side outer reinforcement |
| (5) Drain upper panel | (15) Quarter inner panel |
| (6) Drain lower panel | (16) C pillar reinforcement |
| (7) A pillar lower reinforcement | (17) D pillar inner up panel |
| (8) A pillar upper reinforcement | (18) D pillar inner lower panel |
| (9) B pillar reinforcement | (19) D pillar reinforcement |
| (10) A pillar inner up panel | |

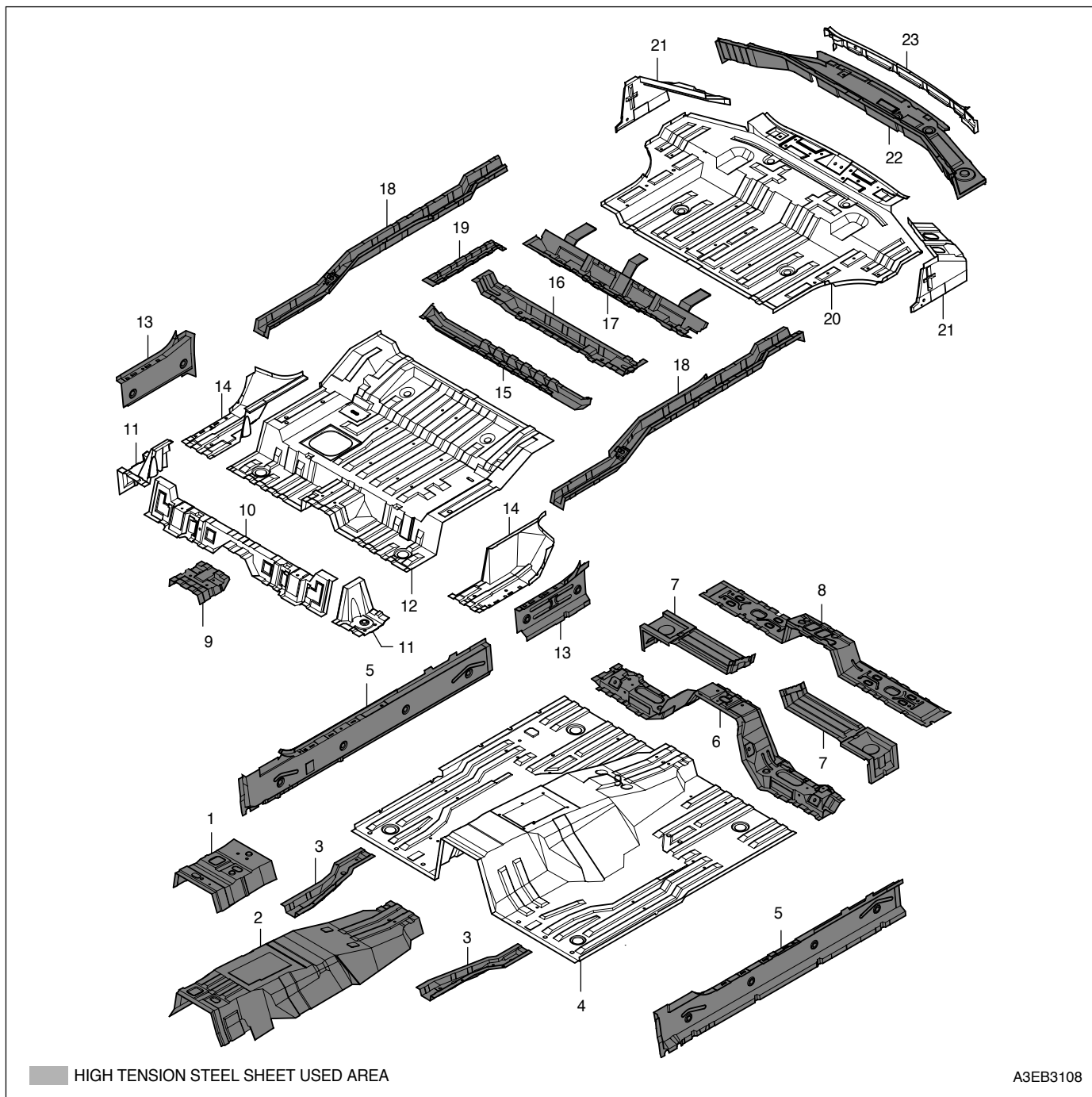
11-6 Body Structure

Roof panel



- (1) Roof panel
- (2) Roof rack reinforcement A
- (3) Roof rack reinforcement B
- (4) Roof rack reinforcement C
- (5) Roof front rail
- (6) Roof center lower rail No. 1
- (7) Roof center rail No. 2
- (8) Roof center rail No. 3
- (9) Roof center rail No. 4
- (10) Roof rear rail
- (11) Sunroof reinforcement ring

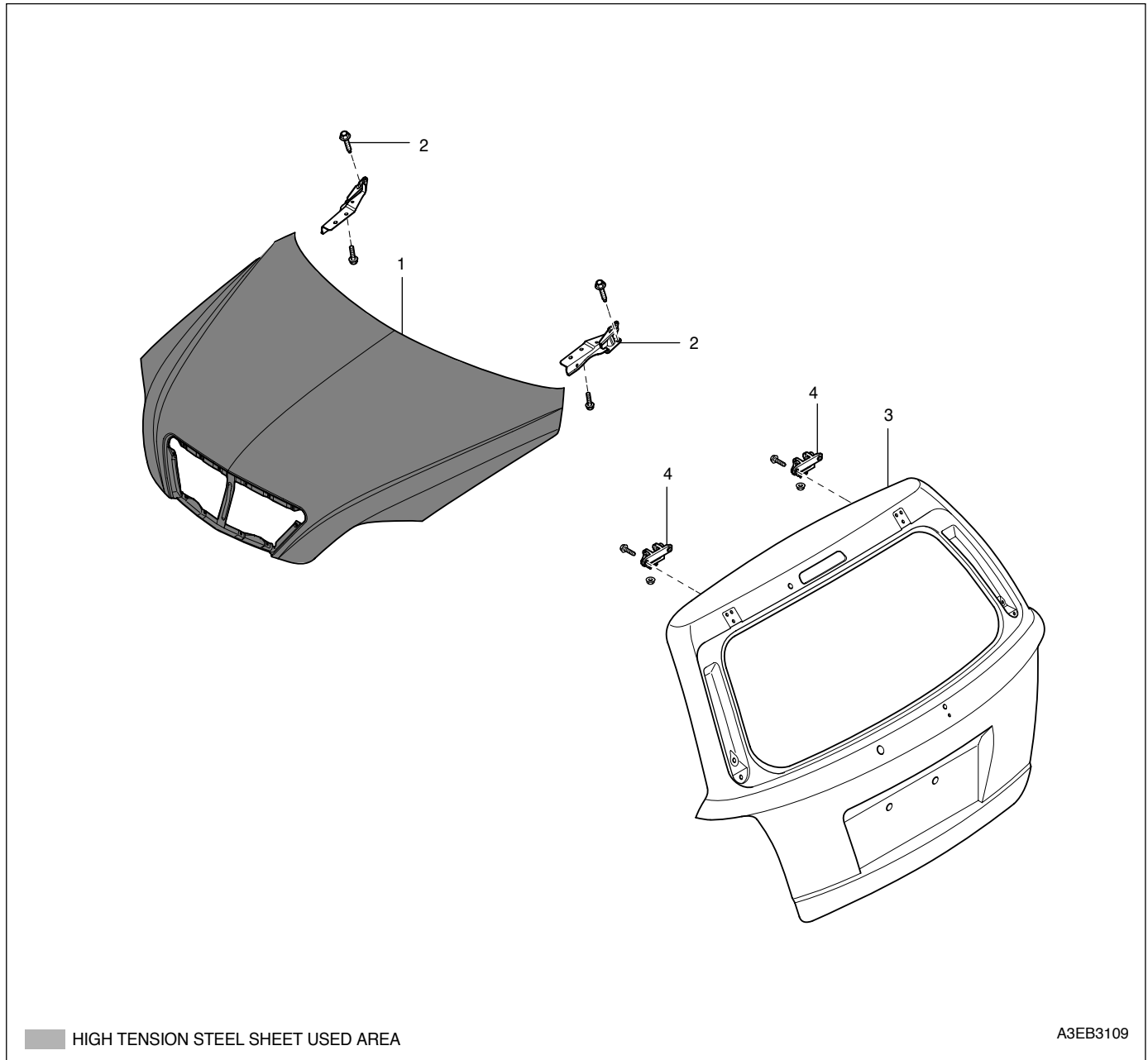
Floor panel



- | | |
|--|-----------------------------------|
| (1) Tunnel upper reinforcement | (13) Sill side inner rear panel |
| (2) Tunnel lower reinforcement | (14) Side floor panel |
| (3) Center floor side member | (15) Rear floor crossmember No. 1 |
| (4) Center floor panel | (16) Rear floor crossmember No. 2 |
| (5) Sill side inner front panel | (17) Rear floor crossmember No. 3 |
| (6) Center floor crossmember No. 2 | (18) Rear floor side member |
| (7) Center floor lower crossmember No. 2 | (19) Rear floor center member |
| (8) Center floor crossmember No. 1 | (20) Rear floor panel |
| (9) Tunnel reinforcement | (21) Rear corner plate |
| (10) Seat support panel | (22) Rear end member |
| (11) Body mounting bracket No. 4 | (23) Rear end member |
| (12) Inter floor panel | |

11-8 Body Structure

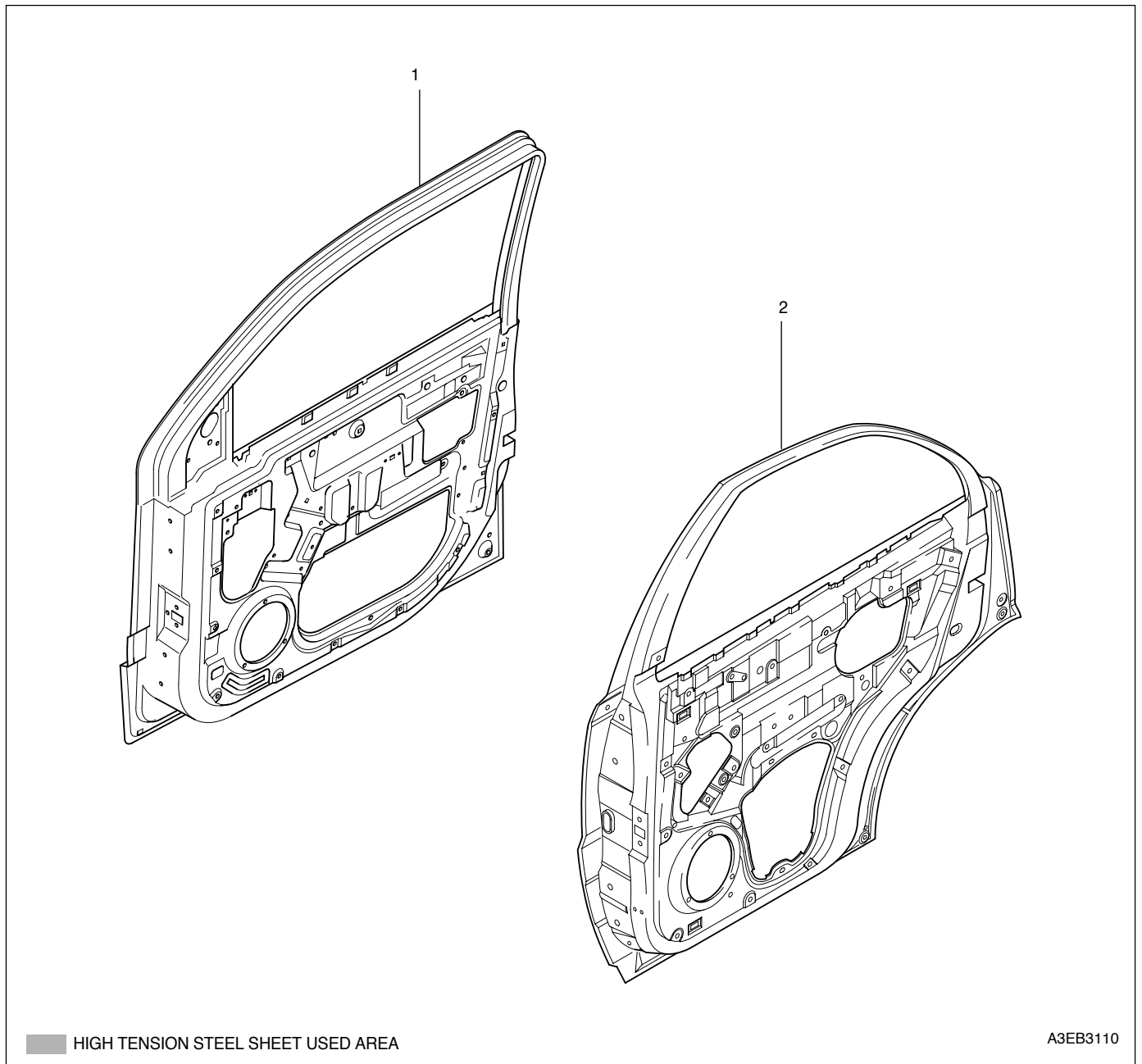
Hood & Tail gate



- (1) Hood panel
- (2) Hood hinge

- (3) Tail gate panel
- (4) Tail gate hinge

Front door & Rear door



- (1) Front door panel
- (2) Slide door panel

Replacing body panels

Replacing body panels	
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Body dimensions

Body dimensions	
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Body dimensions

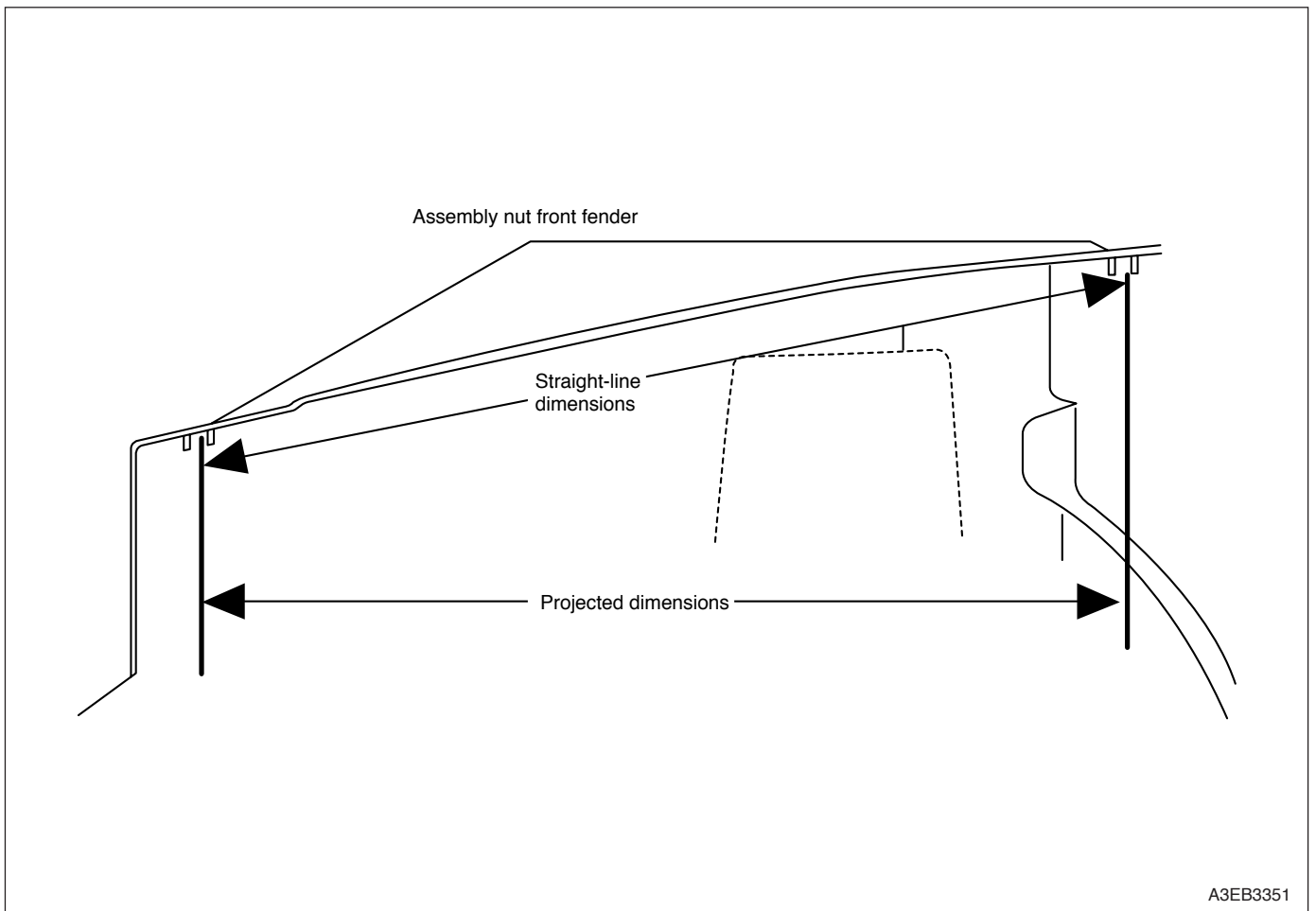
Body dimension indication

Projected dimensions

The projected dimension indicates a dimension from a reference point on the body. (Height may be different in some cases)

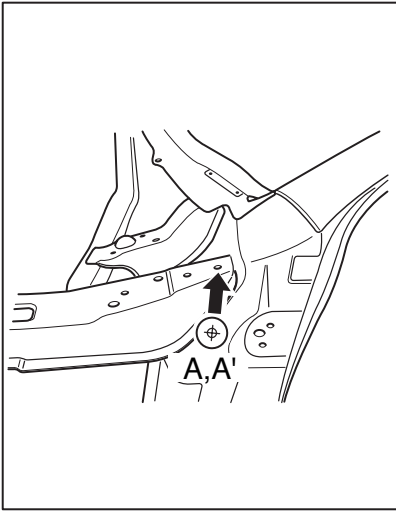
Straight-line dimensions (Actual measured dimensions)

The straight-line dimension indicates an actual measured dimension between the measurement reference points.

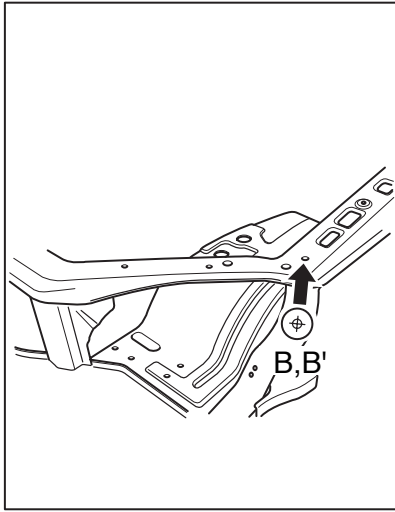


31-2 Body dimensions

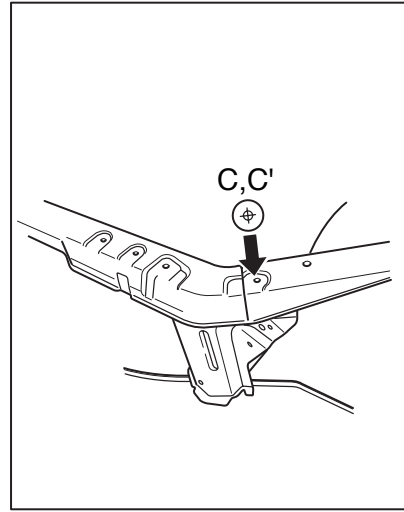
Front body straight - line dimensions



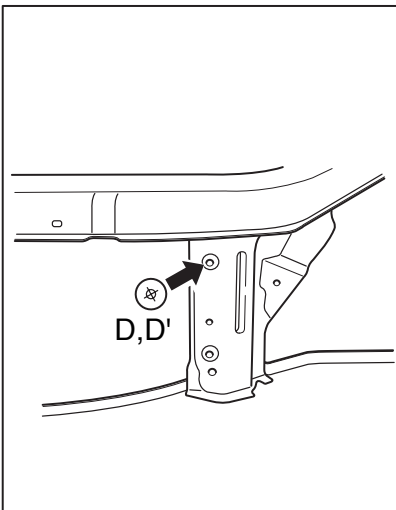
Hood hinge mounting hole



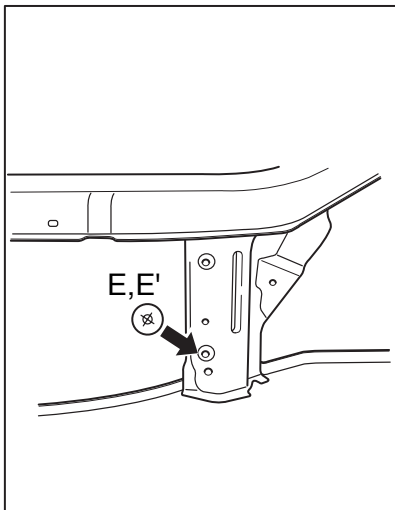
Front fender mounting hole



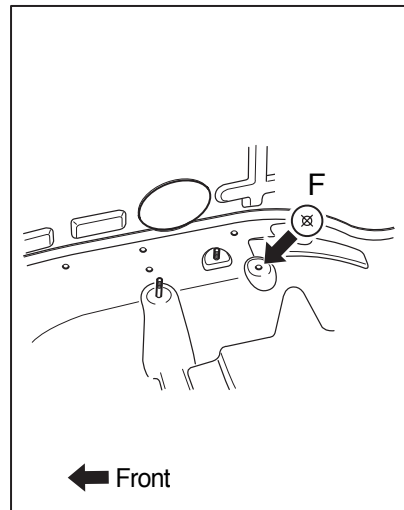
Head light mounting hole



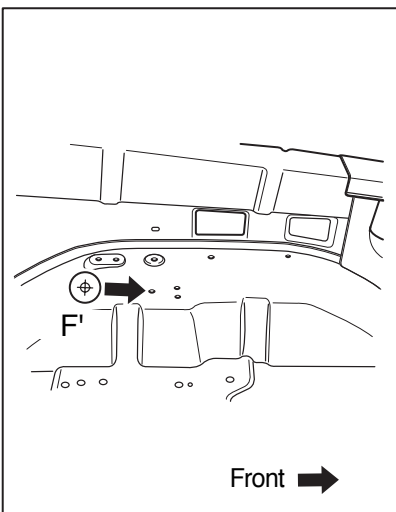
Seal board mounting hole



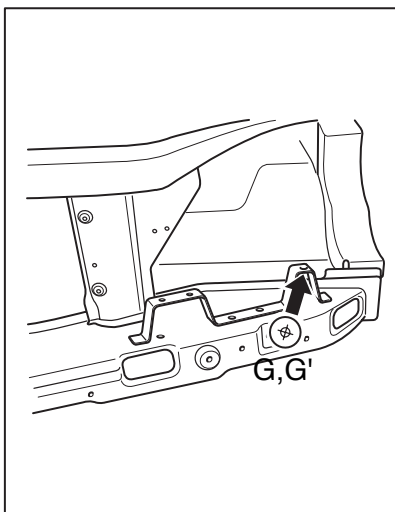
Seal board mounting hole



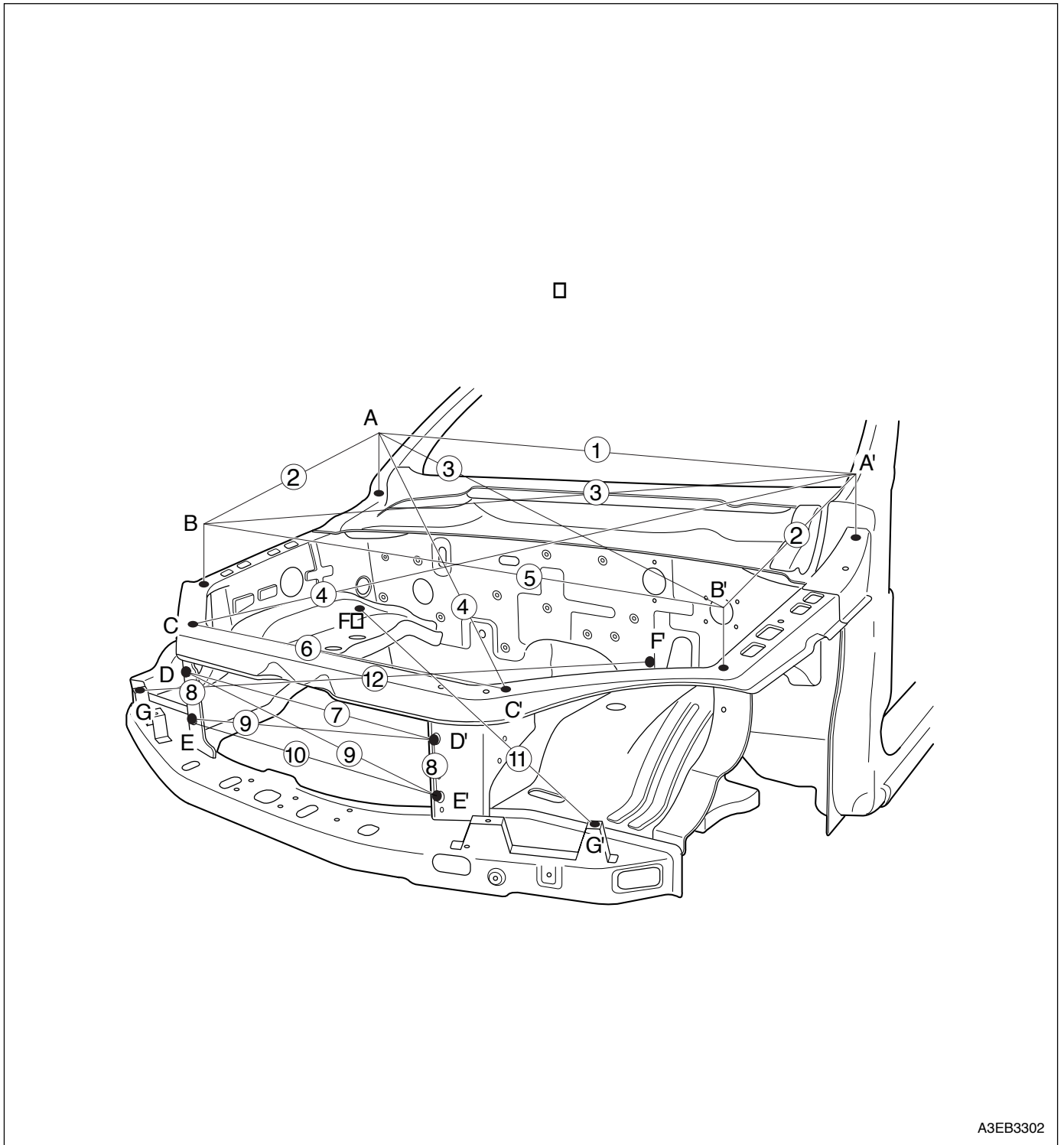
Front wheel apron hole



Front wheel apron hole



Bumper bracket hole

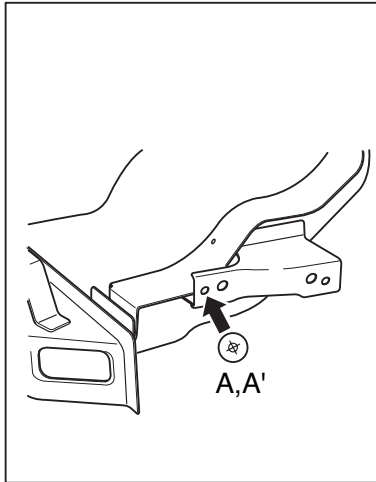


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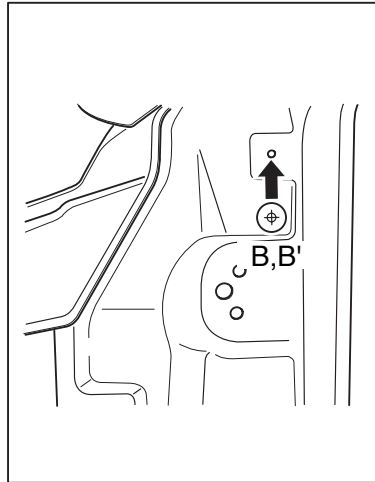
Measurement point	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Dimension (mm)	1556	680	1684	1566	1526	897	754	112	762
Measurement point	⑩	⑪	⑫						
Dimension (mm)	754	1496	1462						

31-4 Body dimensions

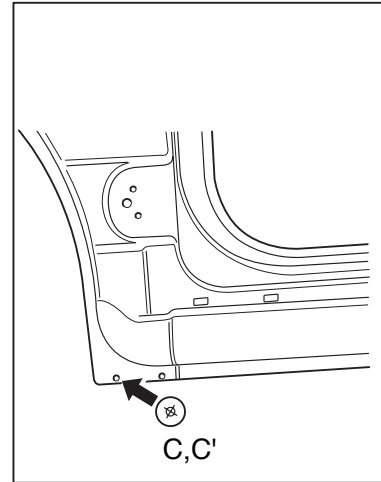
Side frame panel straight - line dimensions



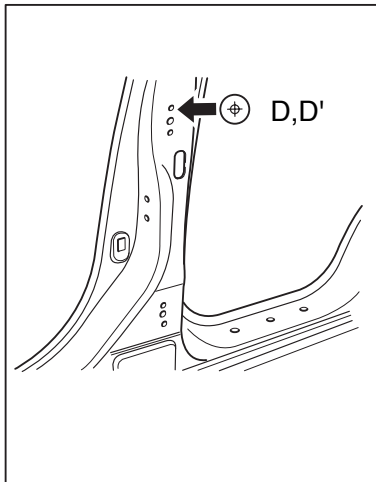
Front fender mounting hole



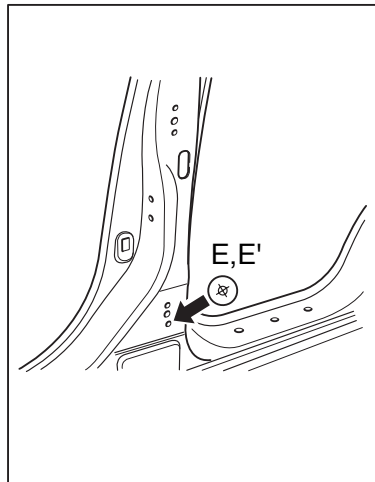
Front fender mounting hole



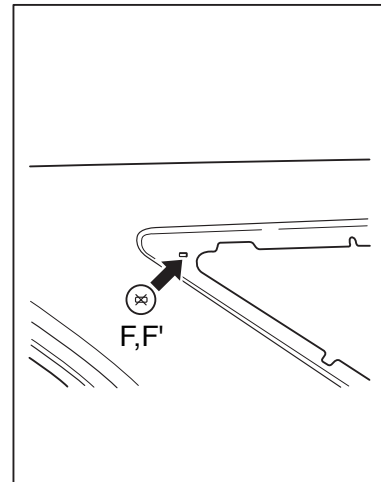
Front fender mounting hole



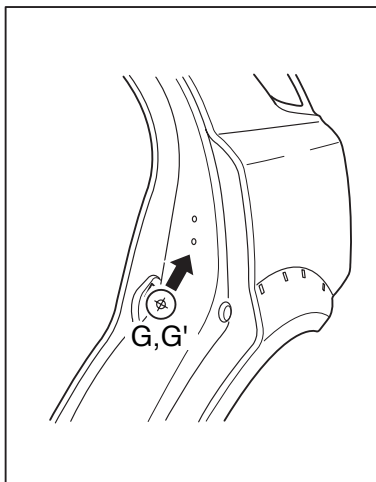
Door hinge mounting hole(upper)



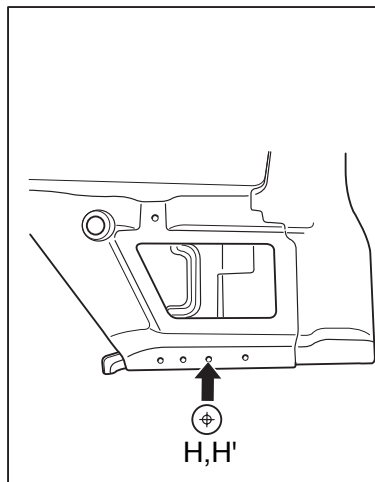
Door hinge mounting hole(lower)



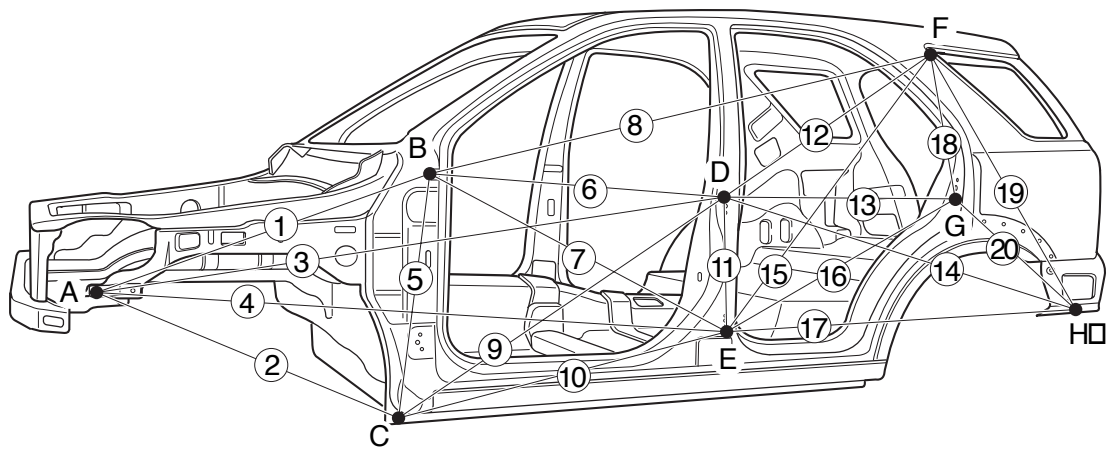
Quarter glass stopper hole



Rear door striker mounting hole



Rear bumper mounting hole

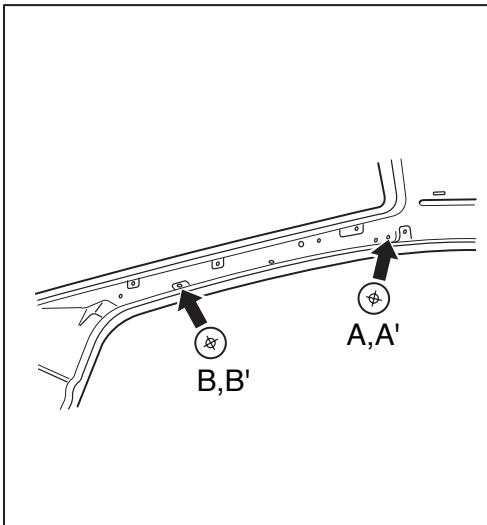


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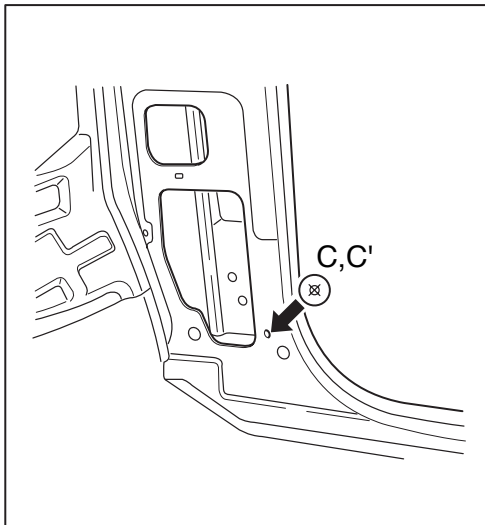
Measurement point	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Dimension (mm)	1053	1075	2054	2047	812	1058	1182	2101	1272
Measurement point	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
Dimension (mm)	1103	420	1158	1007	1717	1413	1098	1655	570
Measurement point	⑲	⑳							
Dimension (mm)	1221	804							

31-6 Body dimensions

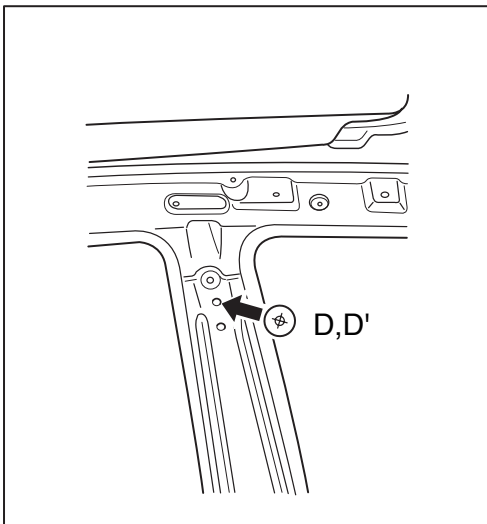
Interior A straight - line dimensions



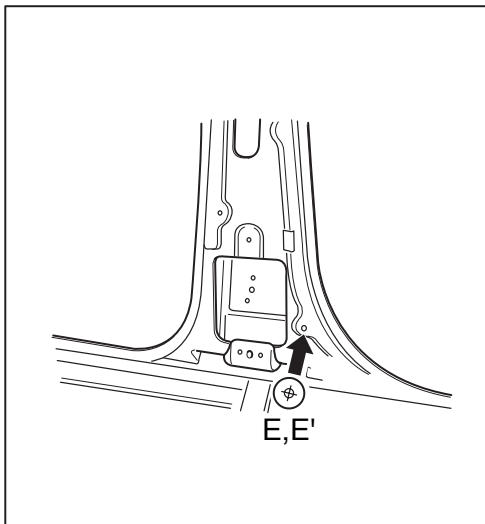
A pillar trim mounting hole



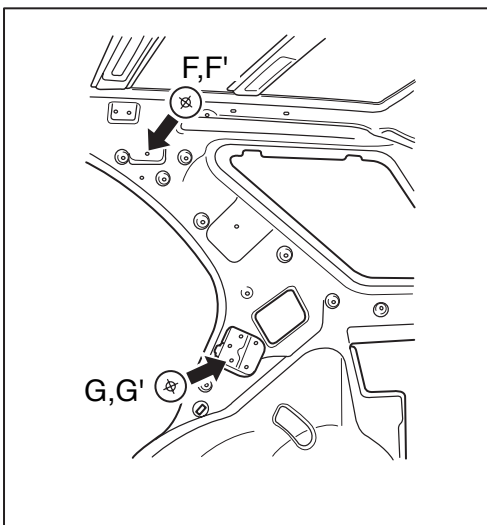
A pillar lower panel hole



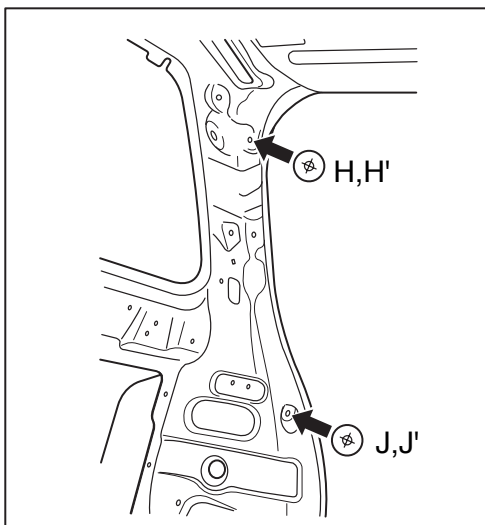
B pillar trim mounting hole



B pillar trim mounting hole

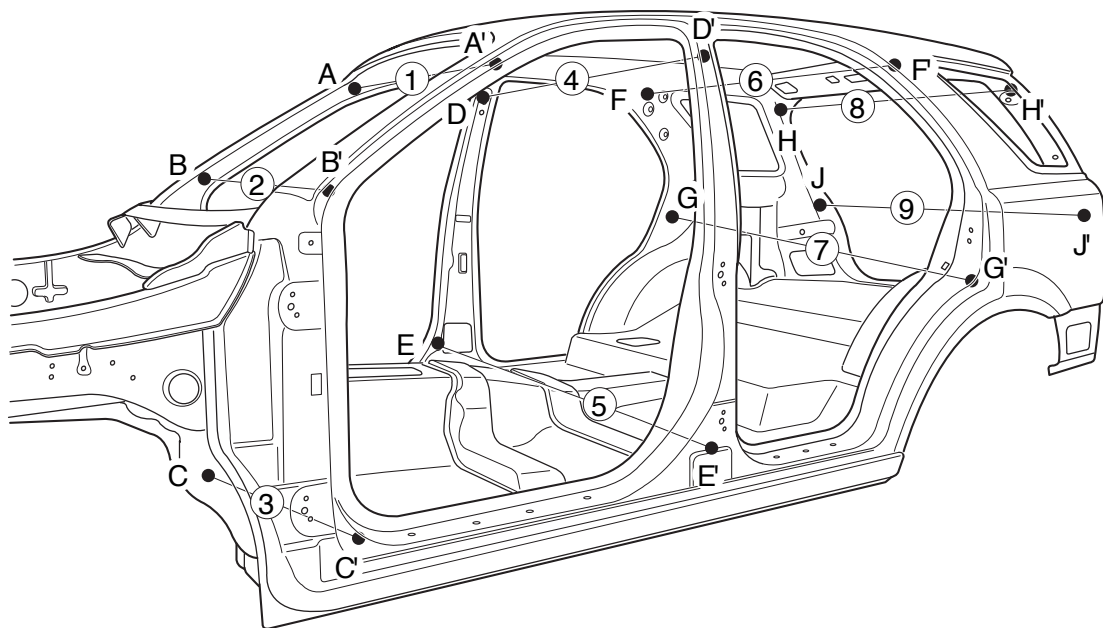


Quarter inner panel hole



H : D pillar trim mounting hole
J : Quarter trim mounting hole

A3EB3305

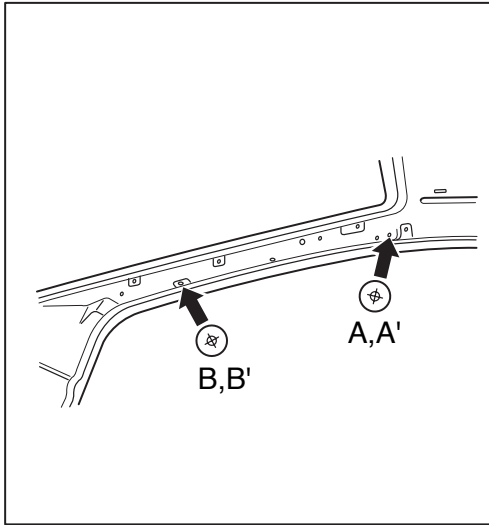


A3EB3306

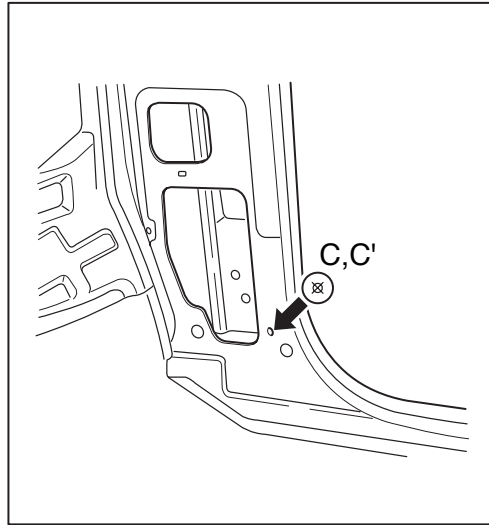
Measurement point	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Dimension (mm)	1260	1399	1454	1267	1452	1204	1448	1138	1174

31-8 Body dimensions

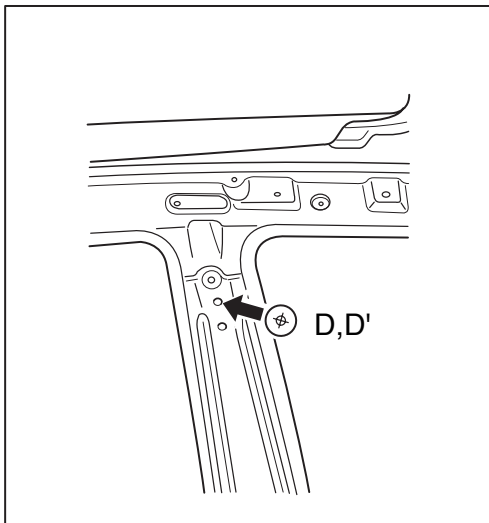
Interior B straight - line dimensions



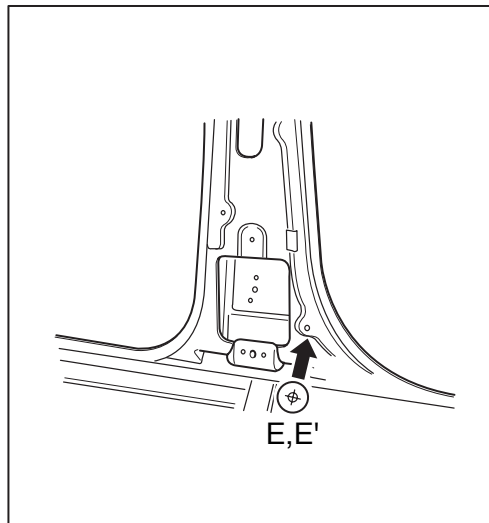
A pillar trim mounting hole



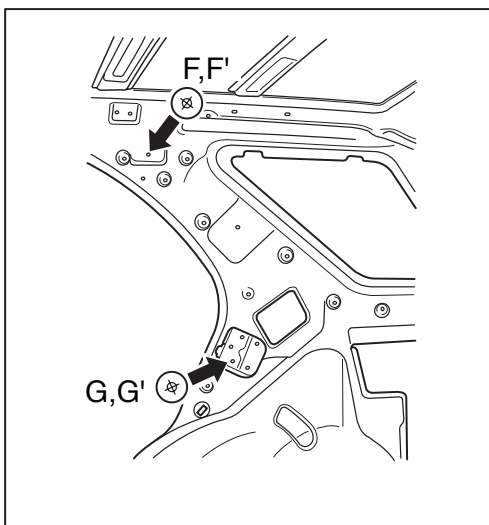
A pillar lower panel hole



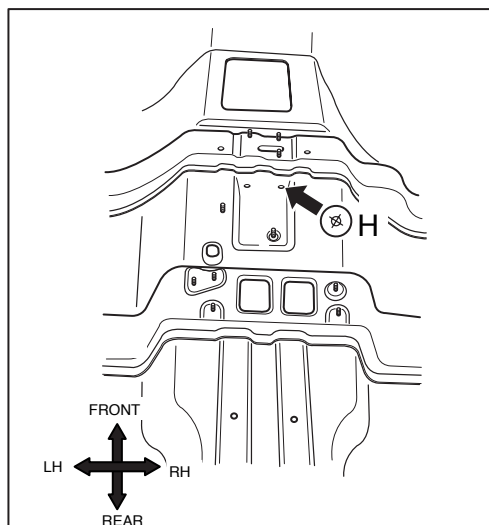
B pillar trim mounting hole



B pillar trim mounting hole

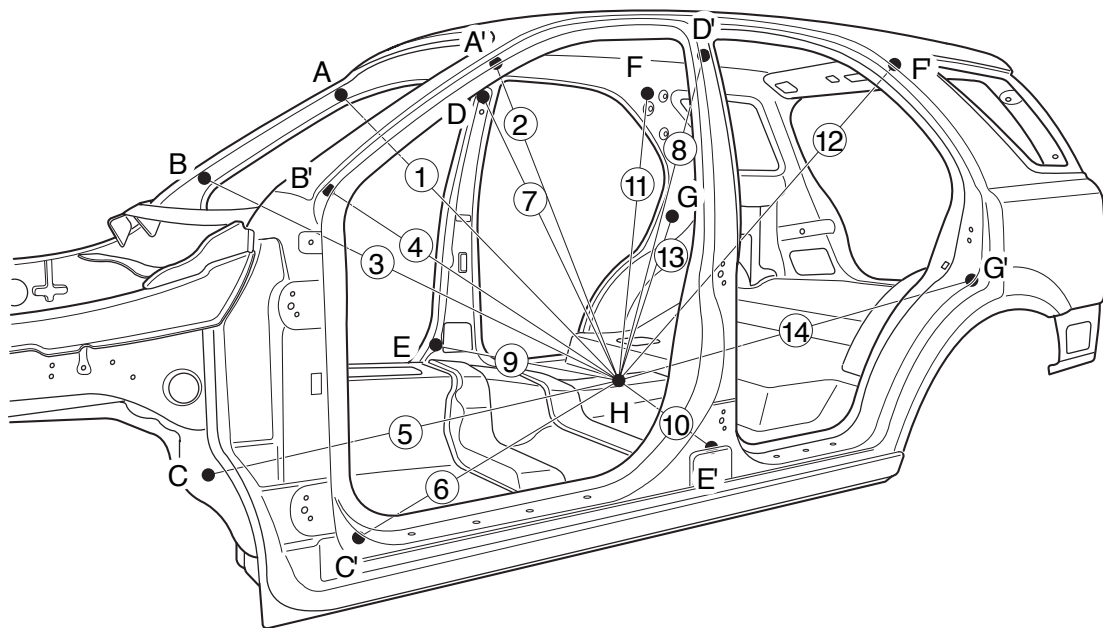


Quarter inner panel hole



Tunnel reinforcement hole

A3EB3307

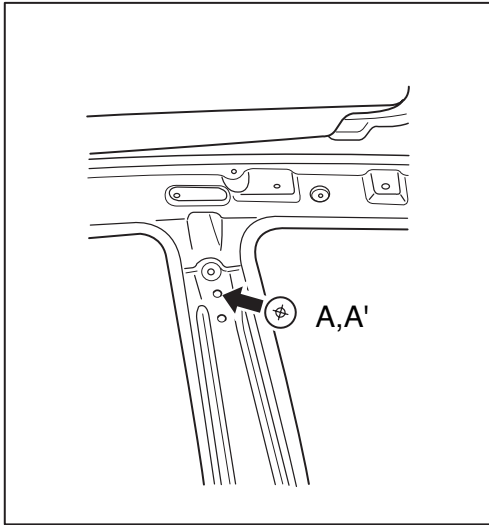


A3EB3308

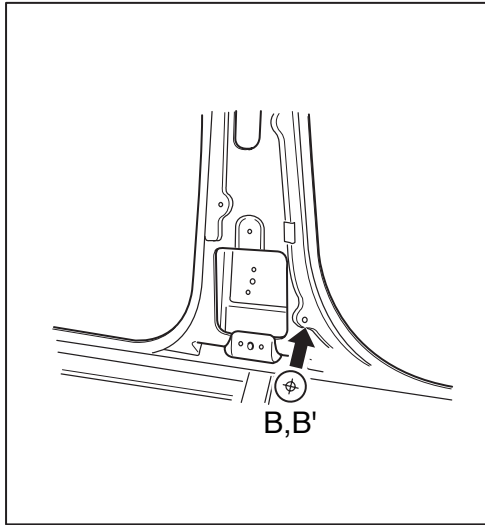
Measurement point	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Dimension (mm)	1085	1118	1108	1144	1011	1052	1152	1184	719
Measurement point	⑩	⑪	⑫	⑬	⑭				
Dimension (mm)	775	1534	1556	1530	1557				

31-10 Body dimensions

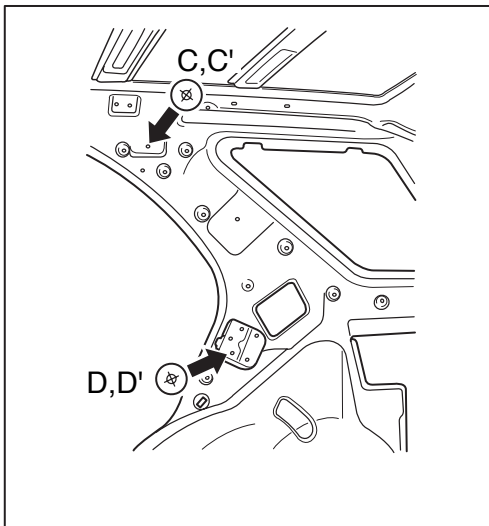
Interior C straight - line dimensions



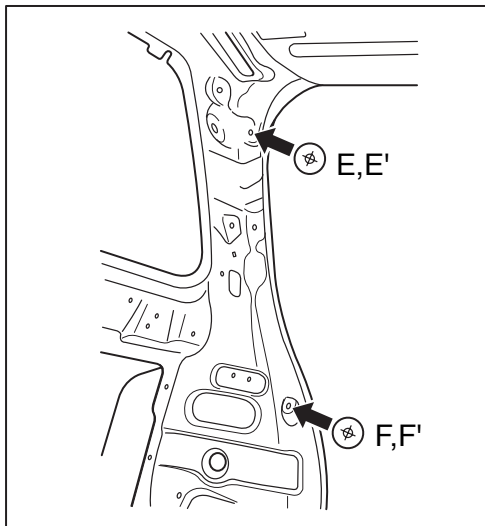
B pillar trim mounting hole



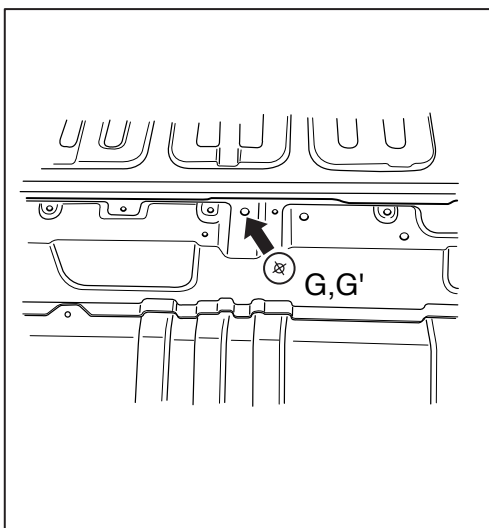
B pillar trim mounting hole



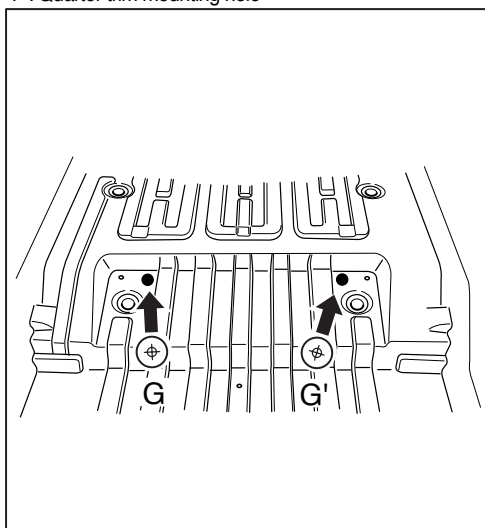
Quarter inner panel hole



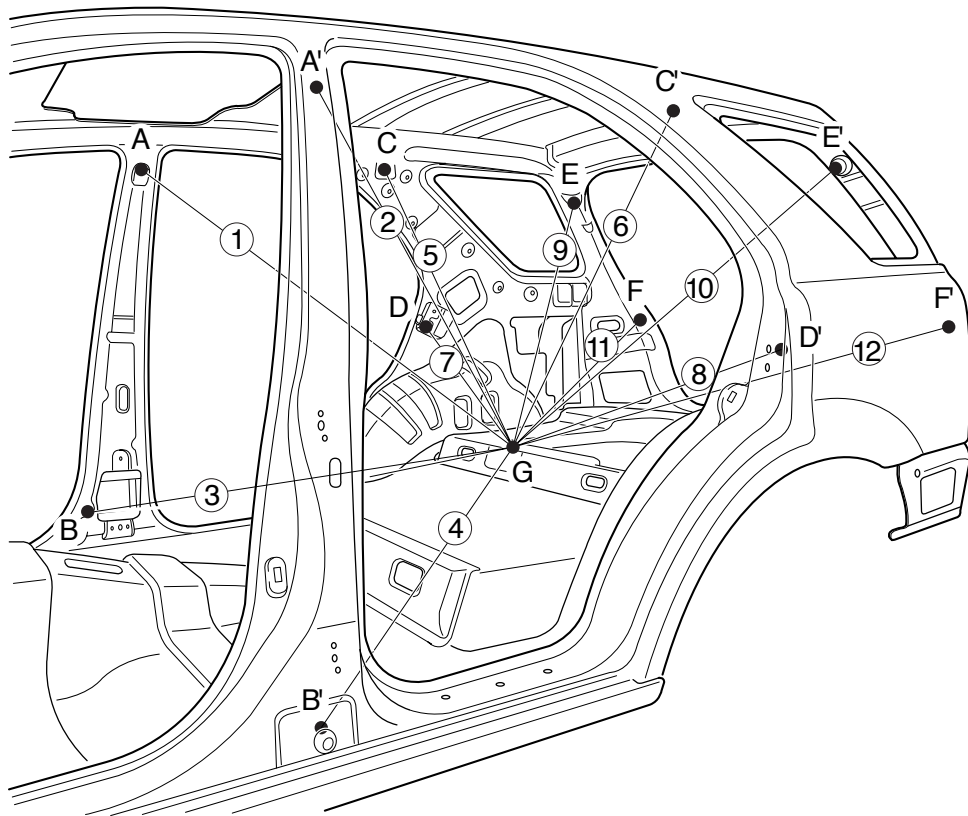
E : D pillar trim mounting hole
F : Quarter trim mounting hole



(5P) Rear seat support panel



(7P) 3rd seat mounting hole

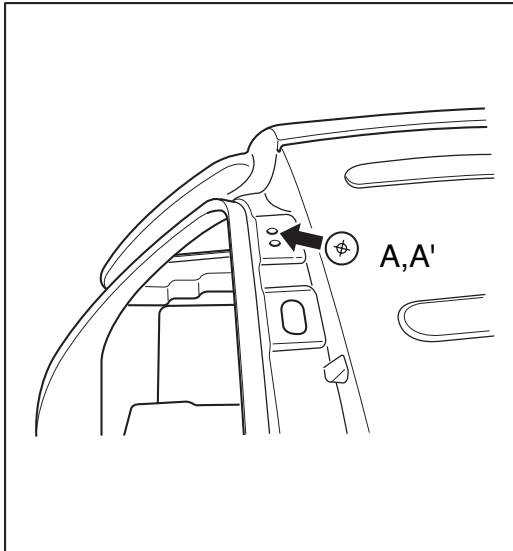


A3EB3310

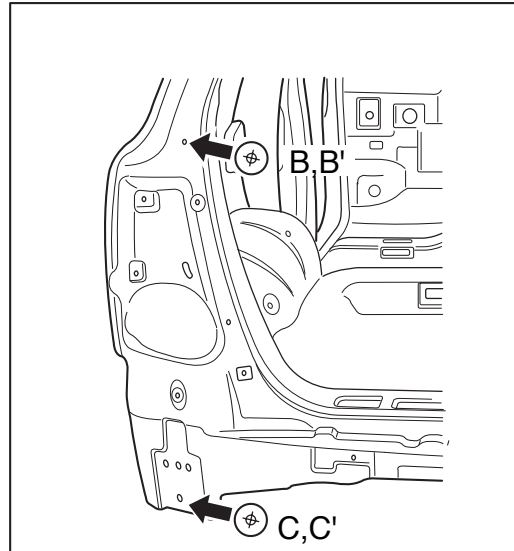
Measurement point	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Dimension (mm)	1319	1421	1250	1372	978	1105	696	896	1038
Measurement point	⑩	⑪	⑫						
Dimension (mm)	1153	1025	1144						

31-12 Body dimensions

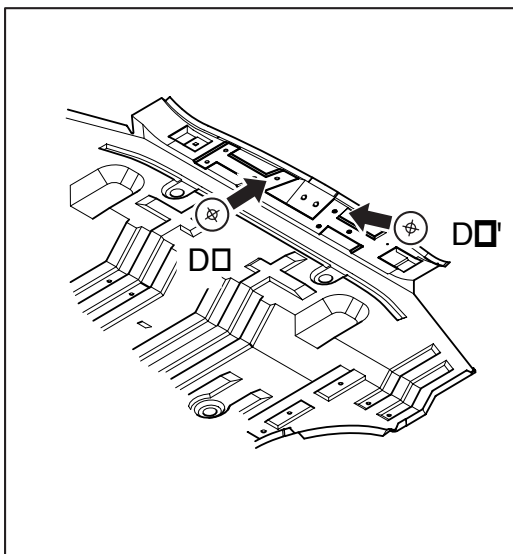
Rear body straight - line dimensions



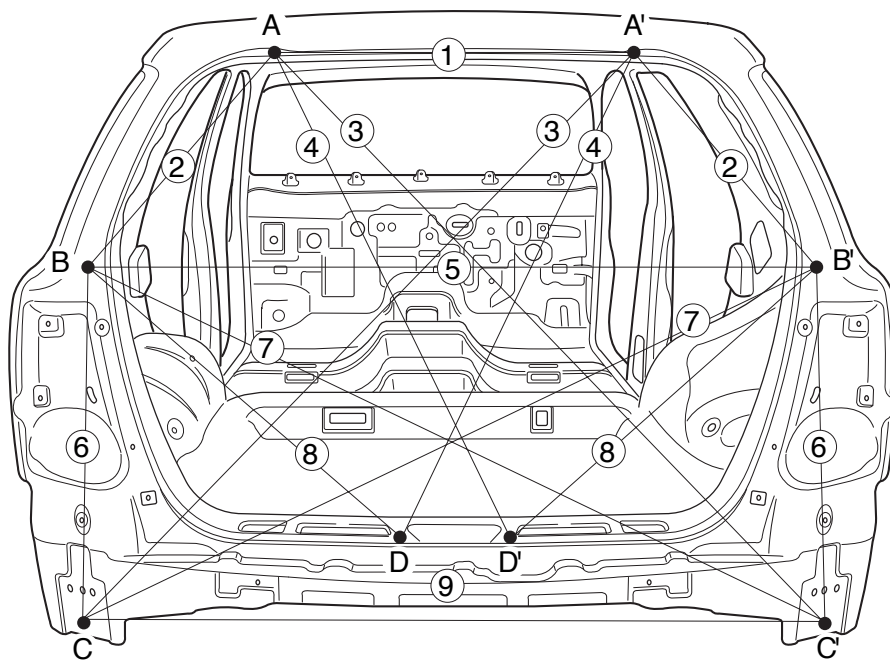
Tail gate hinge mounting hole



B : Damper mounting hole
C : Rear bumper mounting hole



Rear end trim mounting hole



A3EB3312

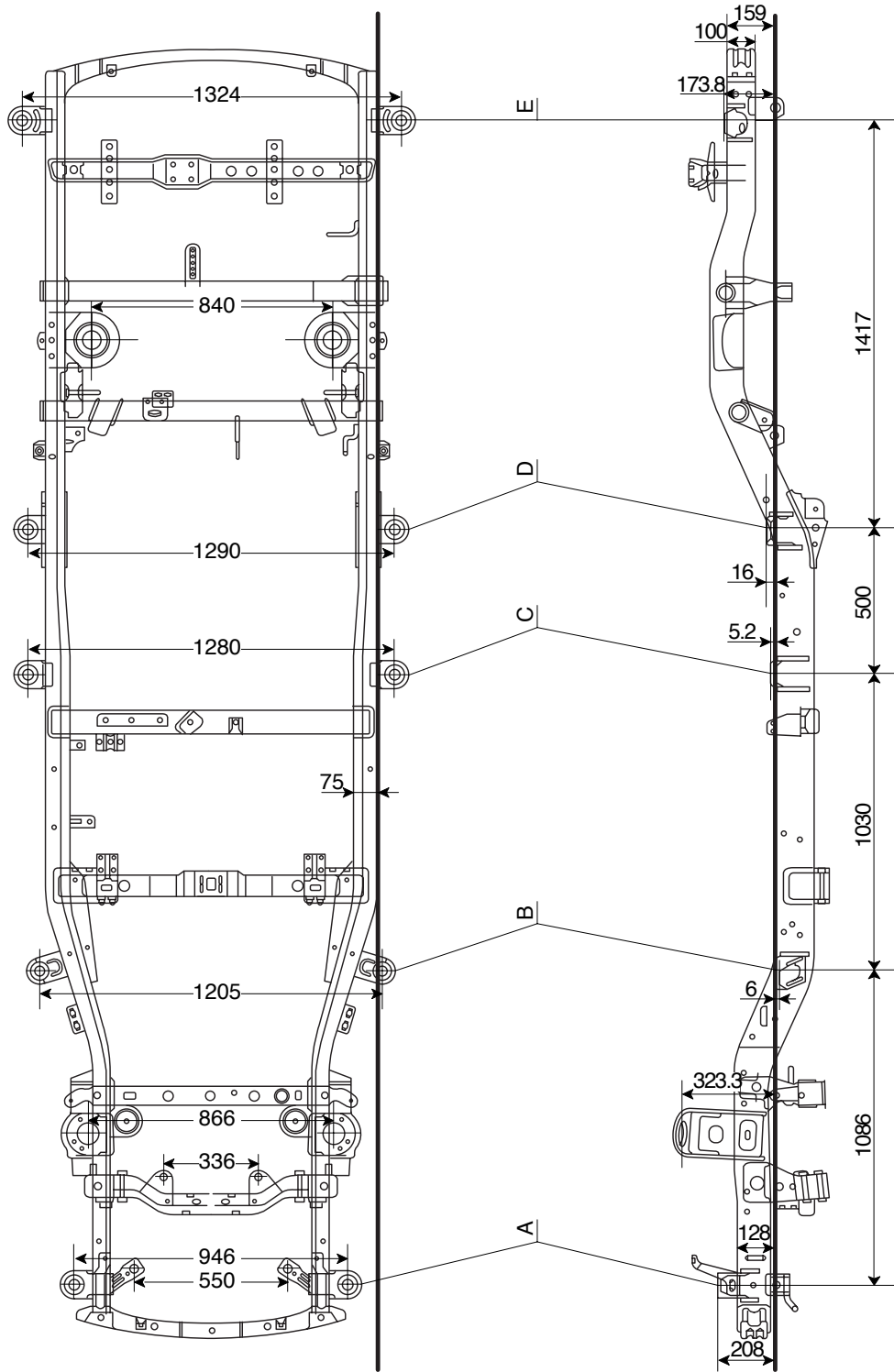
Measurement point	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Dimension (mm)	725	579	1535	1074	1341	660	1495	757	1343

31-14 Body dimensions

Under body dimensions

Projected dimensions

Measurement point	Description	Hole size
A	Body mounting bracket No.1	ø36 mm
B	Body mounting bracket No.2	LH : ø32 mm, RH : ø34 mm
C	Body mounting bracket No.3	ø30 mm
D	Body mounting bracket No.4	ø30 mm
E	Body mounting bracket No.5	LH : ø34 X 38 mm, RH : ø32 X 36 mm



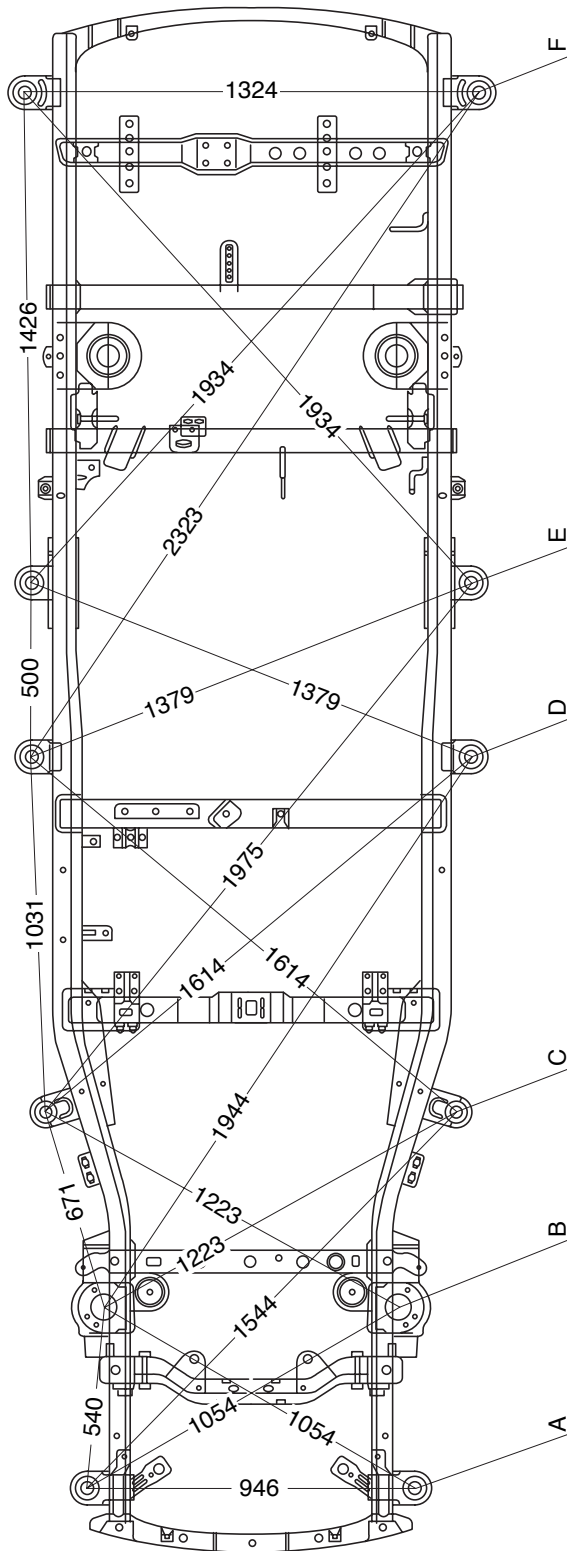
Unit : mm

LSAC310A

31-16 Body dimensions

Straight - line dimensions

Measurement point	Description	Hole size
A	Body mounting bracket No.1	ø36 mm
B	Body mounting bracket No.2	LH : ø32 mm, RH : ø34 mm
C	Body mounting bracket No.3	ø30 mm
D	Body mounting bracket No.4	ø30 mm
E	Body mounting bracket No.5	LH : ø34 X 38 mm, RH : ø32 X 36 mm



Unit : mm

LSAC320A

Waterproof and rustproof

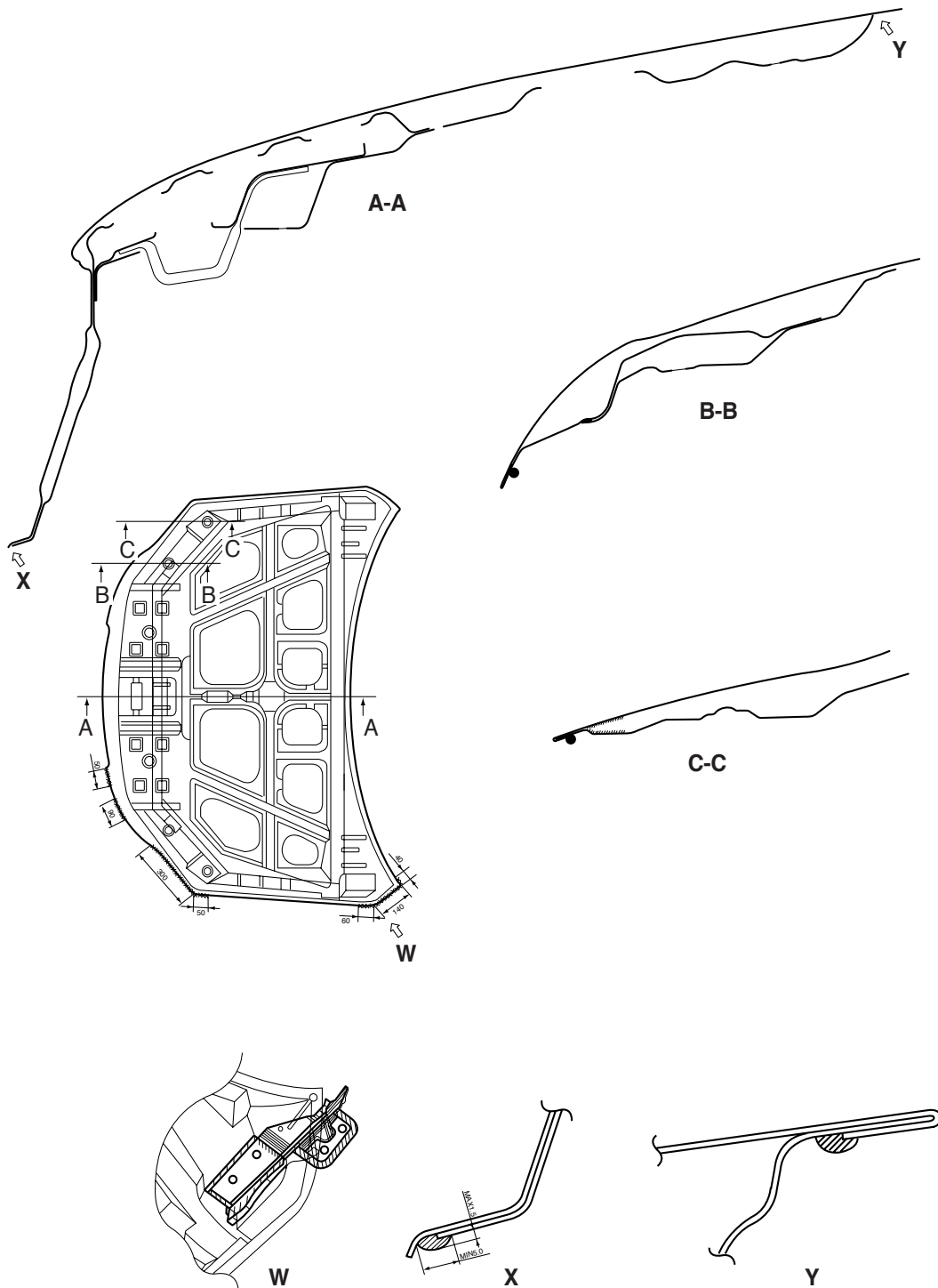
Body sealing	
Hood.....	41- 1
Front & Rear door.....	41- 2
Tail gate	41- 4
Front body.....	41- 5
Side frame panel(Front).....	41- 6
Side frame panel(Rear)	41- 8
Floor panel	41-10
Rear body	41-11
Under body	41-12
Under coating.....	41-14
Applying urethane	41-16
Applying rustproofing Material	
Hood / tailgate.....	41-17
Front door / Rear door	41-18
Body parts.....	41-19

Body sealing

To waterproof and rustproof the vehicle, apply sealer on assembled area of the body panel and on any areas in contact with the body, such as doors(inner/otter), hood(inner/outer), and tail gate(inner/outer).

Hood

※ Trim each edge.

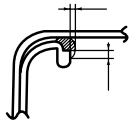


BMFL4101

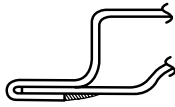
41-2 Waterproofing and rustproofing

Front & Rear door

※ Trim each edge.



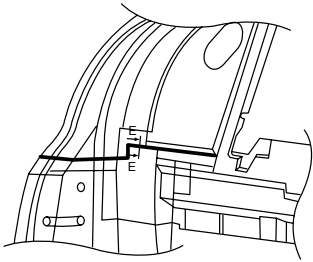
A



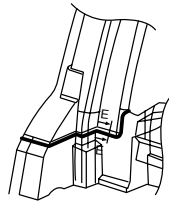
B



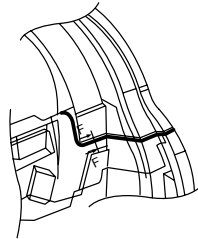
C



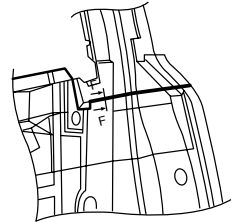
R



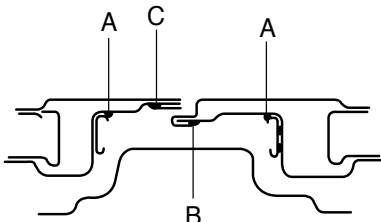
X



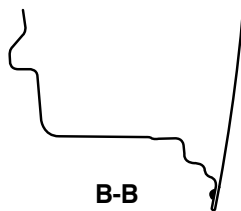
Y



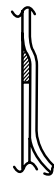
Z



A-A



B-B

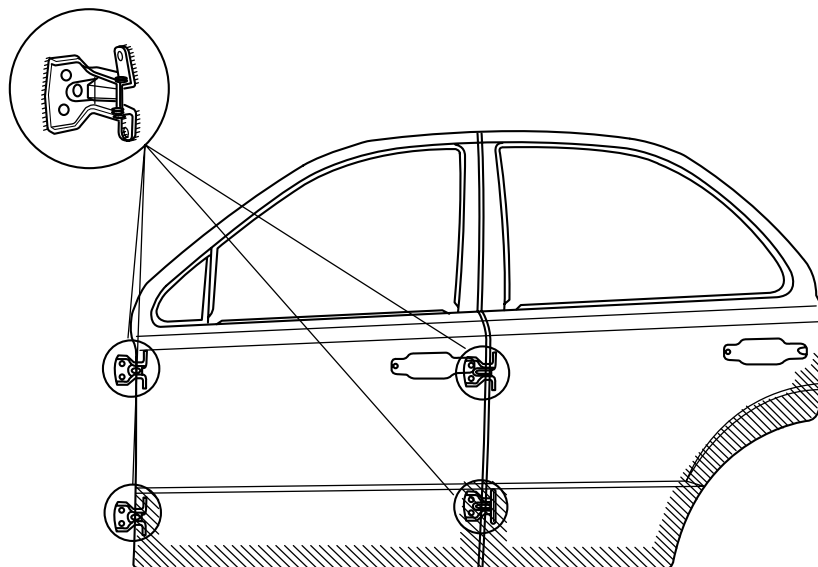
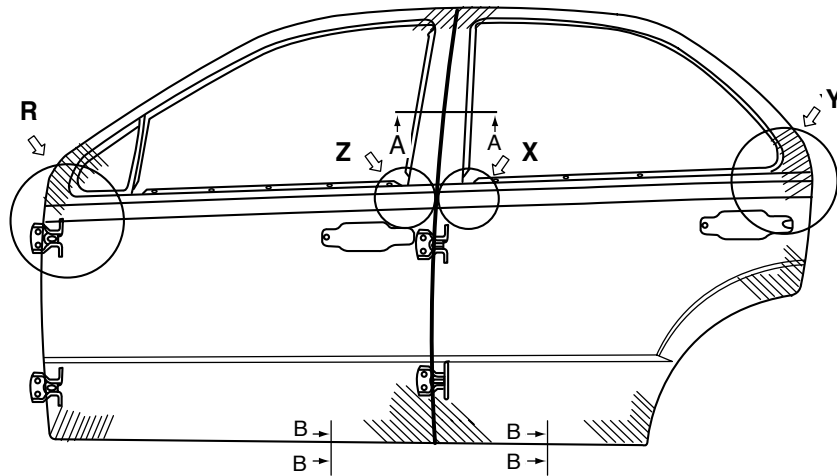


E-E



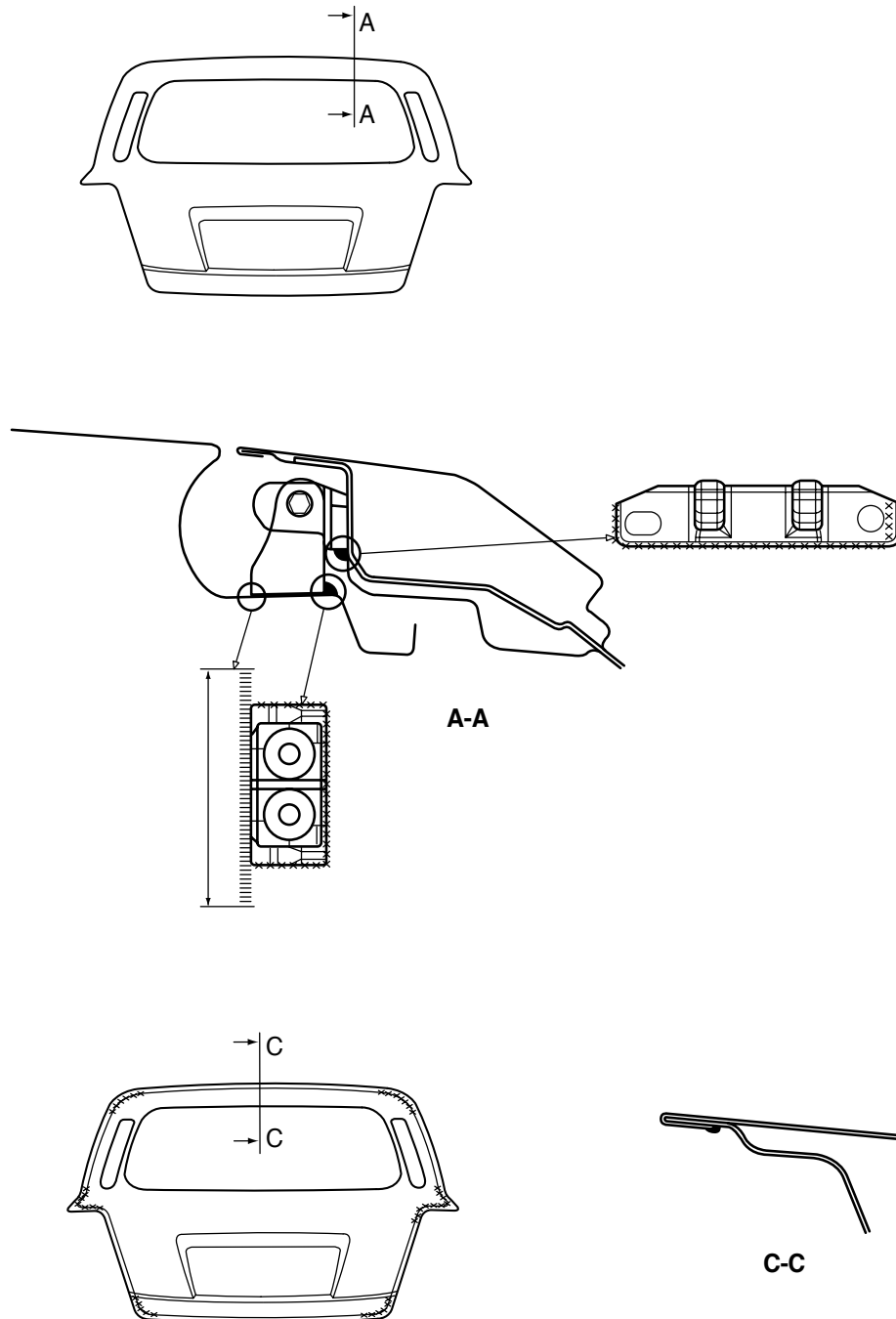
F-F

※ Trim each edge.

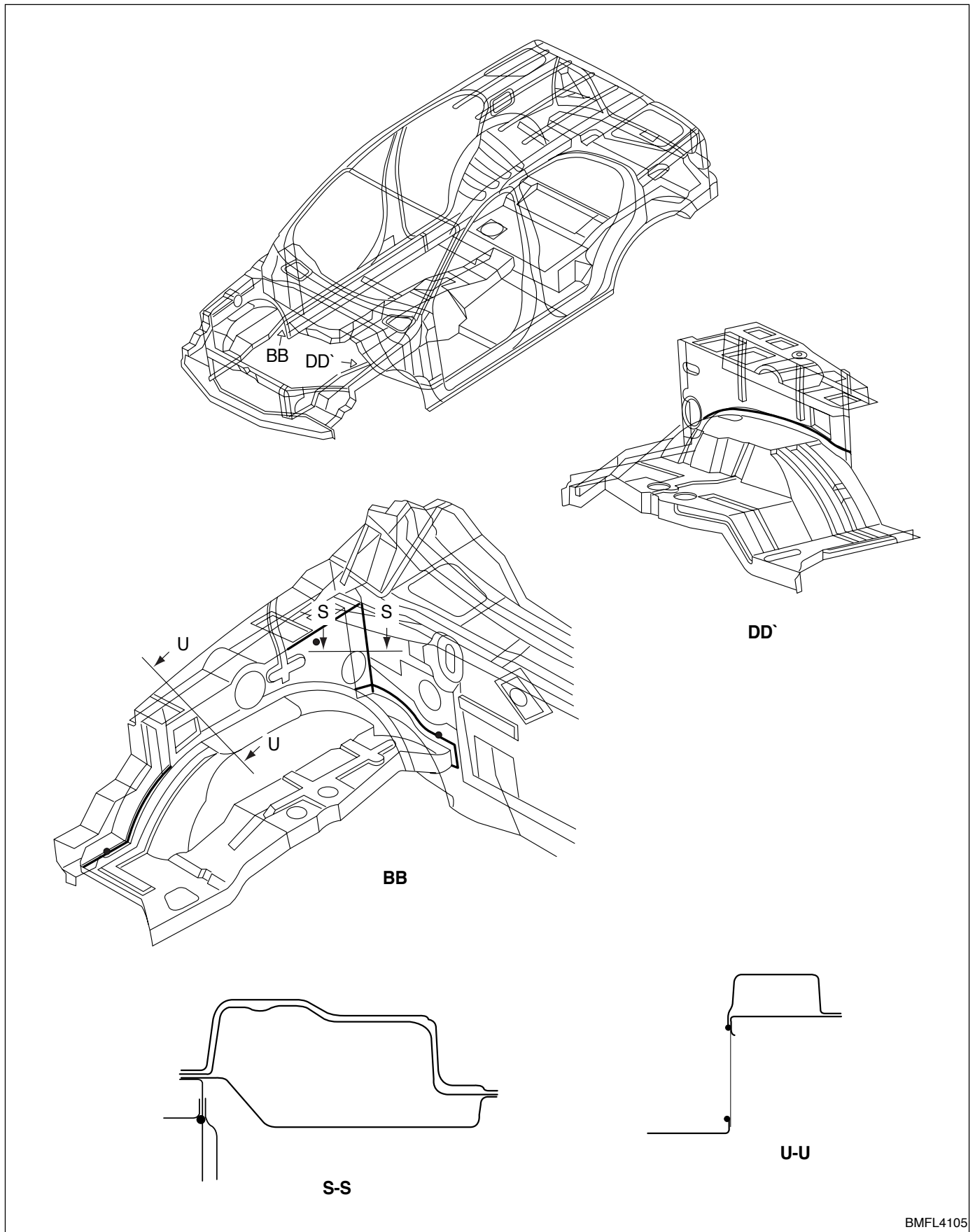


41-4 Waterproofing and rustproofing

Tail gate



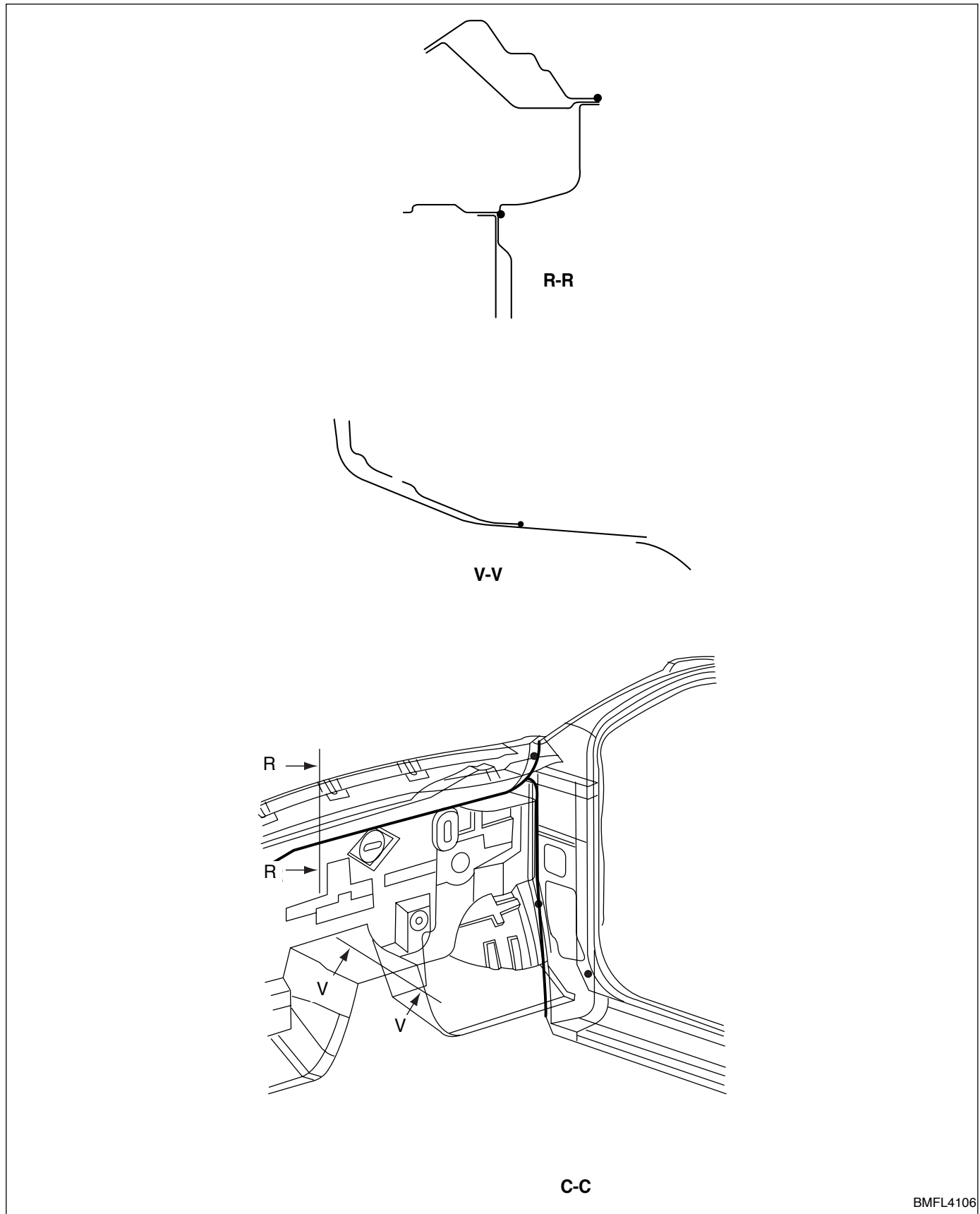
Front body



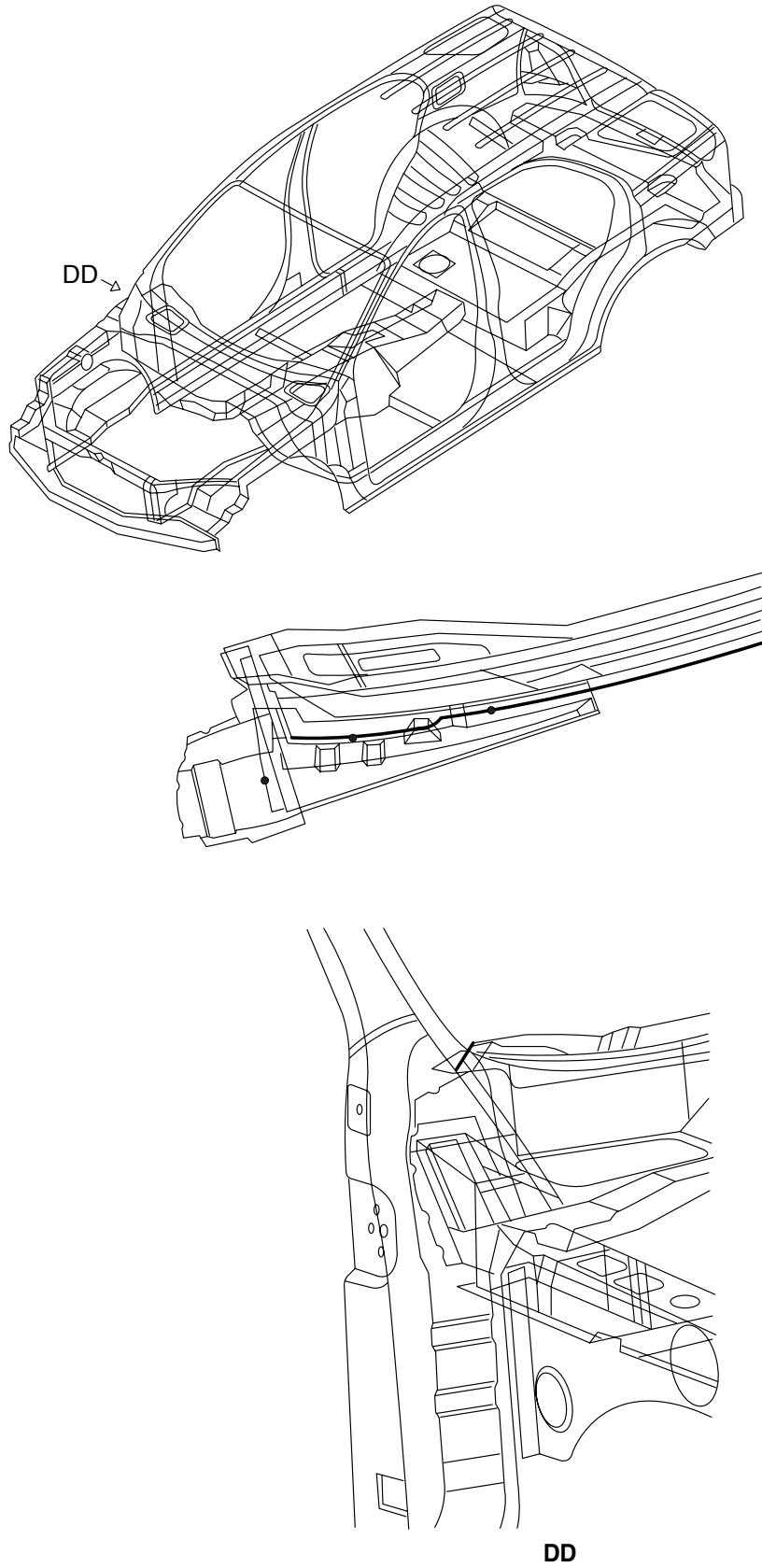
BMFL4105

41-6 Waterproofing and rustproofing

Side frame panel(Front)

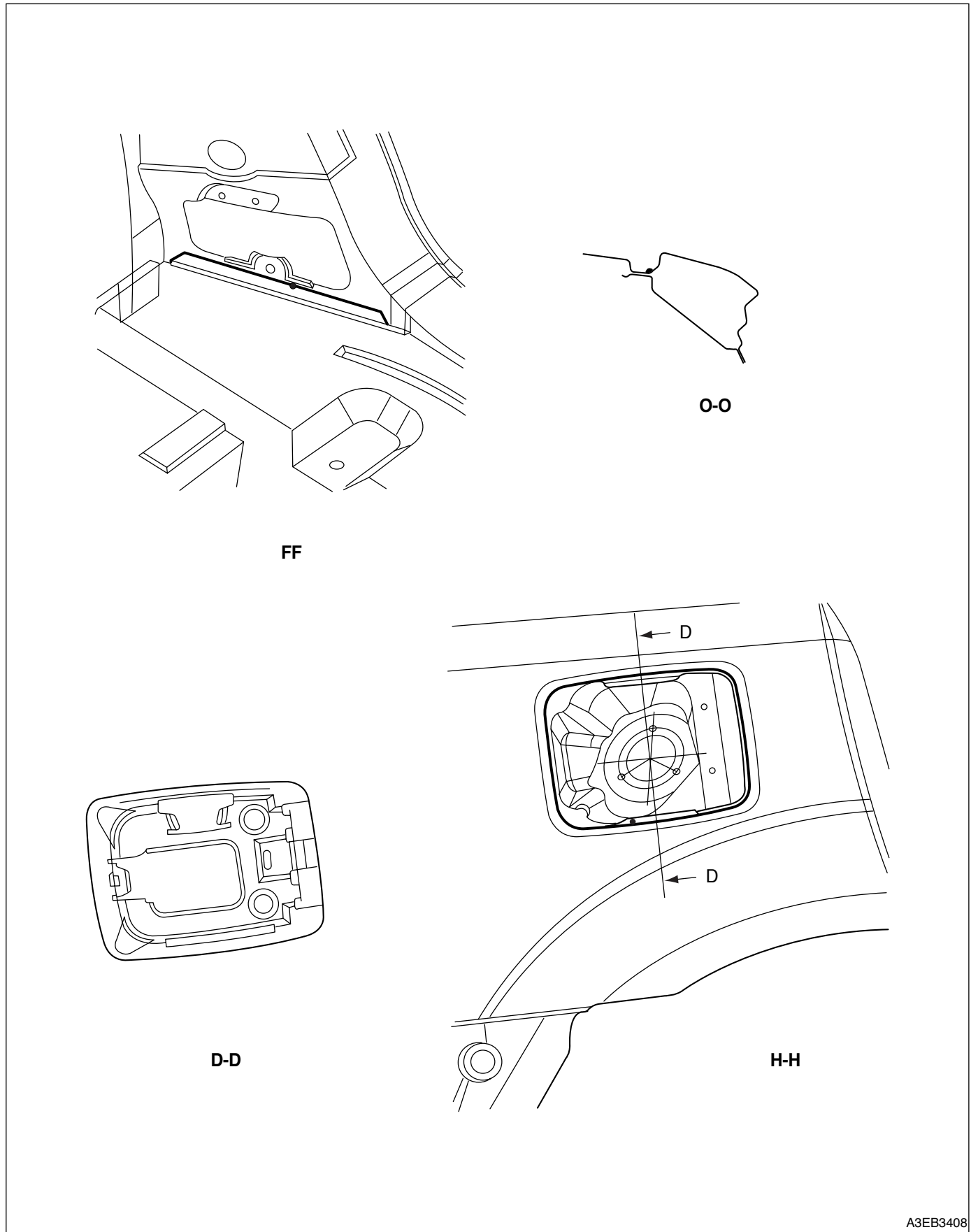


BMFL4106

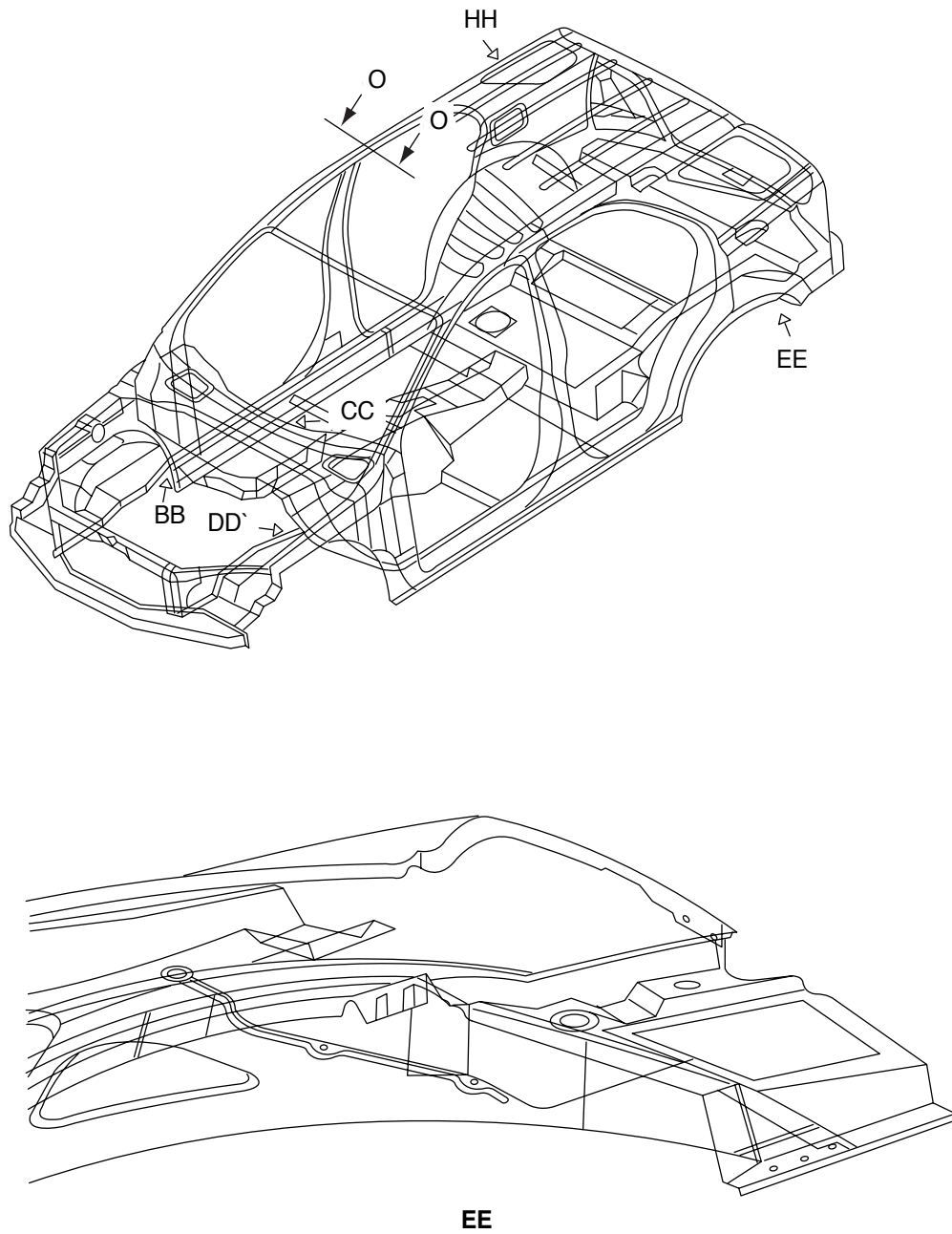


41-8 Waterproofing and rustproofing

Side frame panel(Rear)



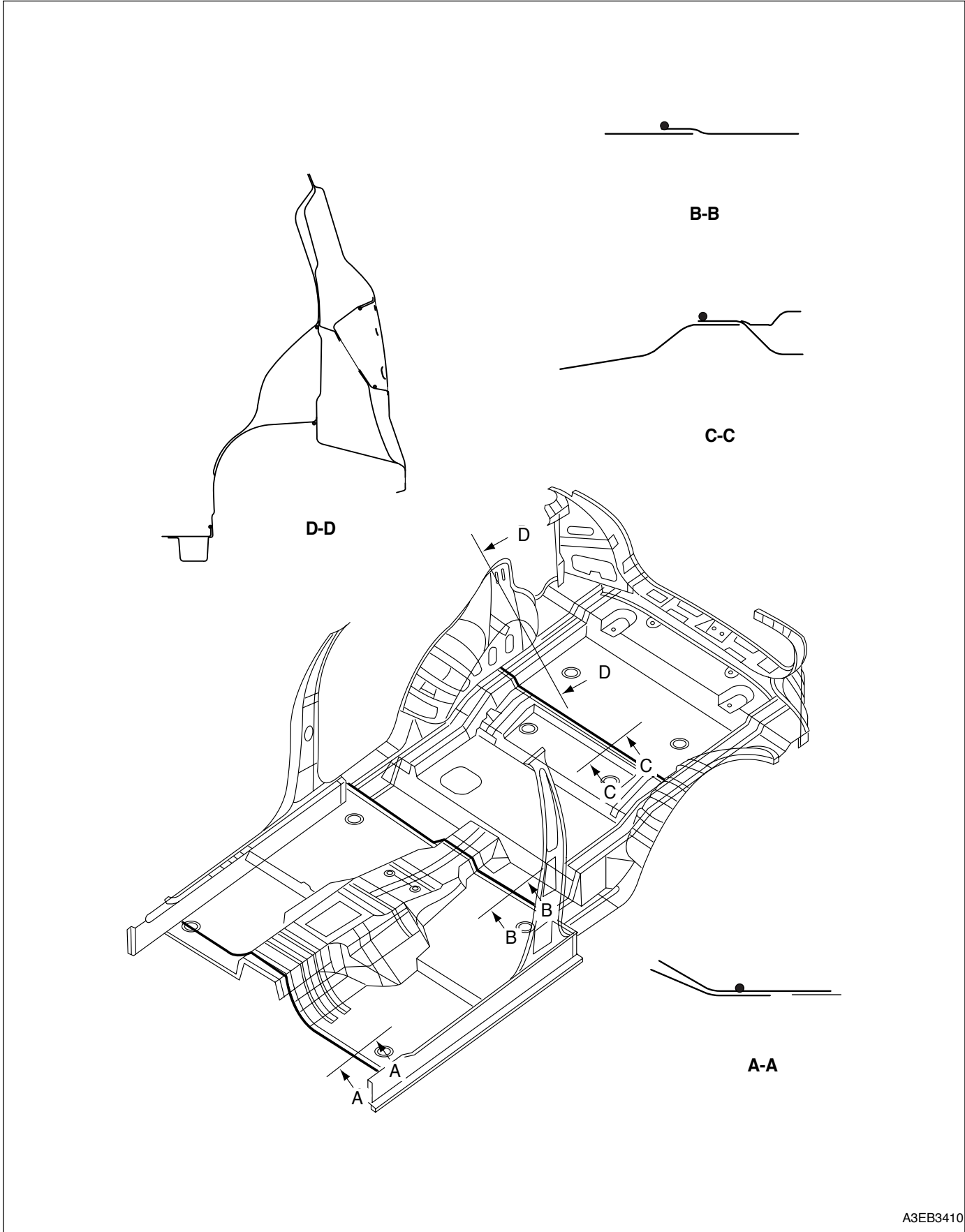
A3EB3408



A3EB3409

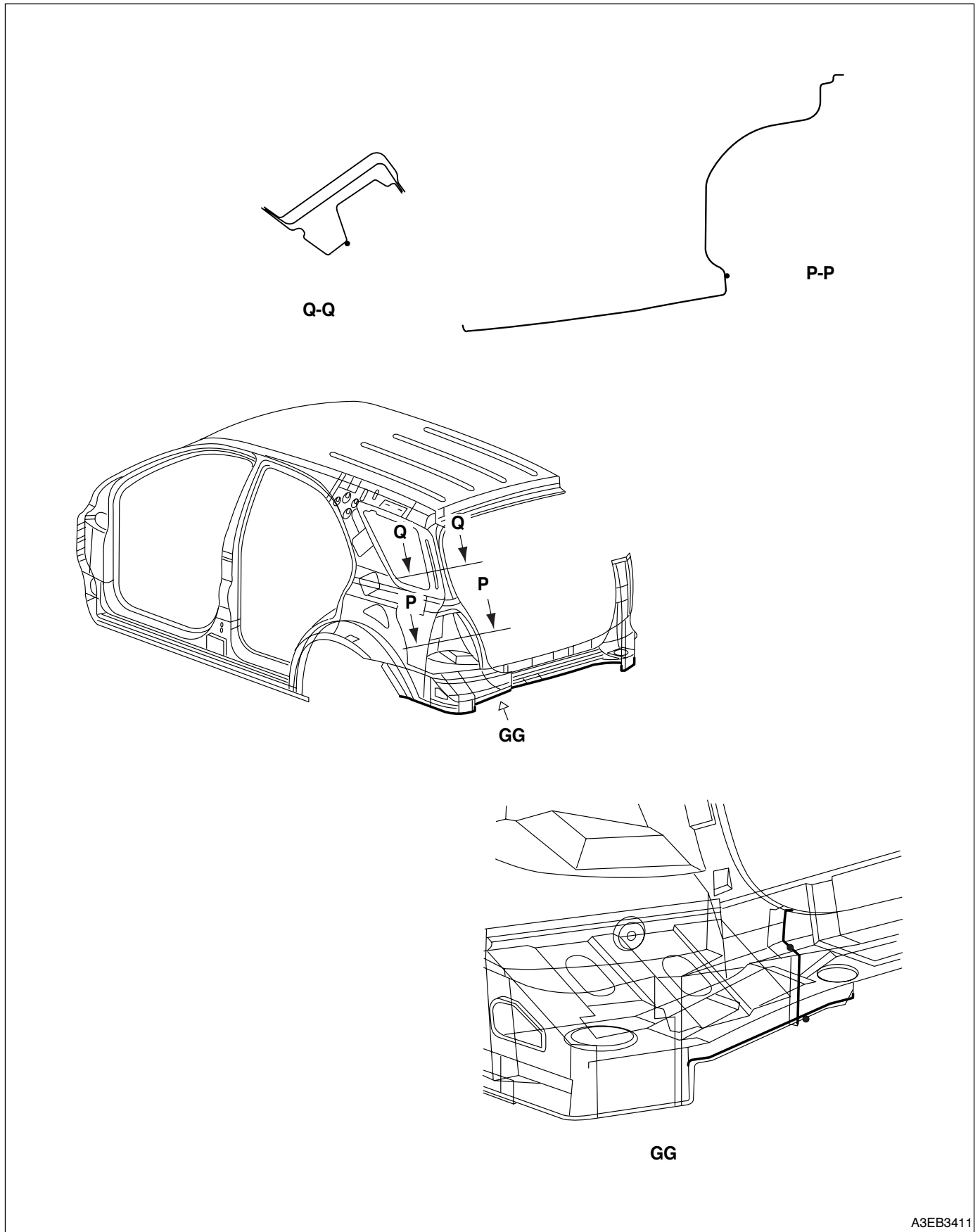
41-10 Waterproofing and rustproofing

Floor panel



A3EB3410

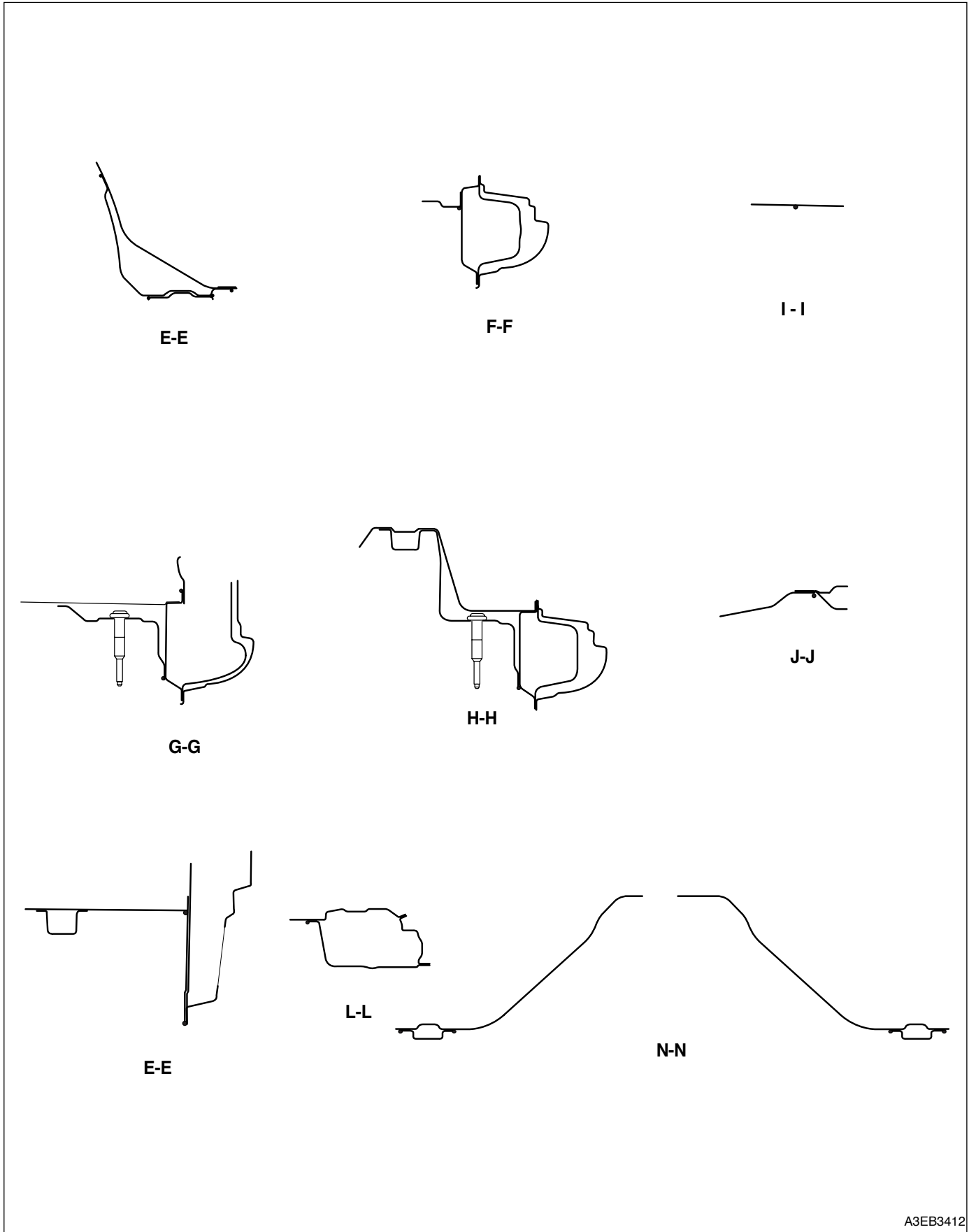
Rear body



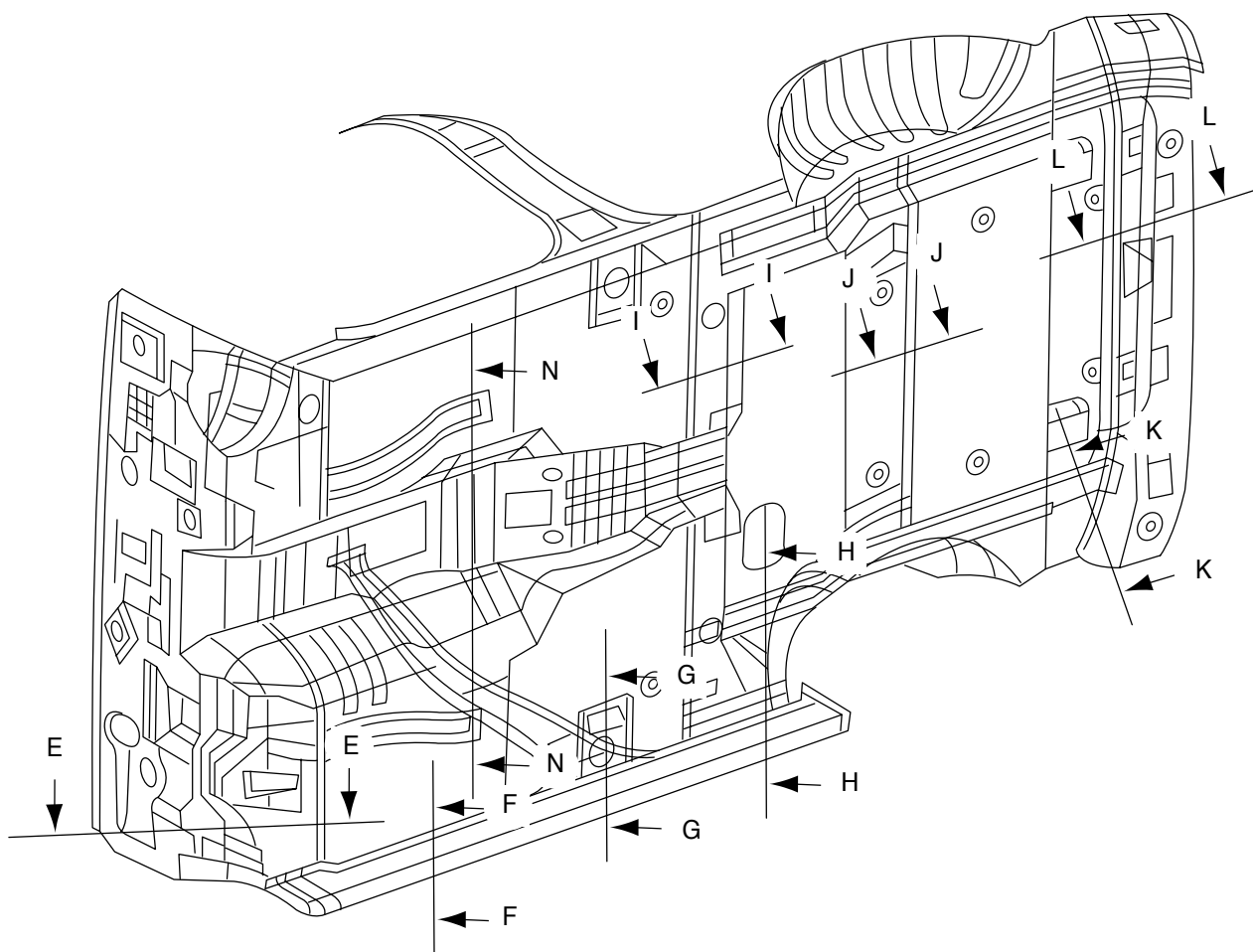
A3EB3411

41-12 Waterproofing and rustproofing

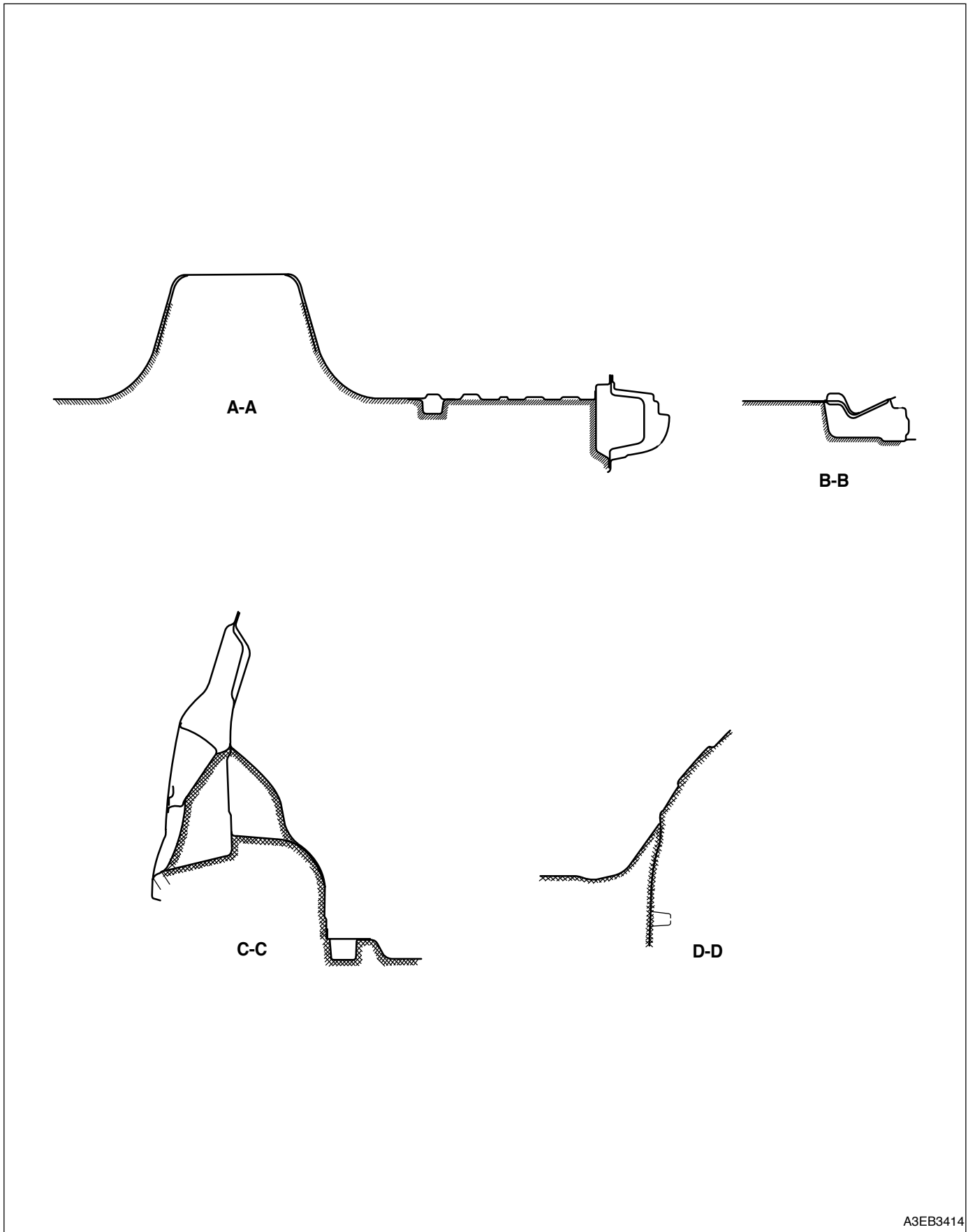
Under body

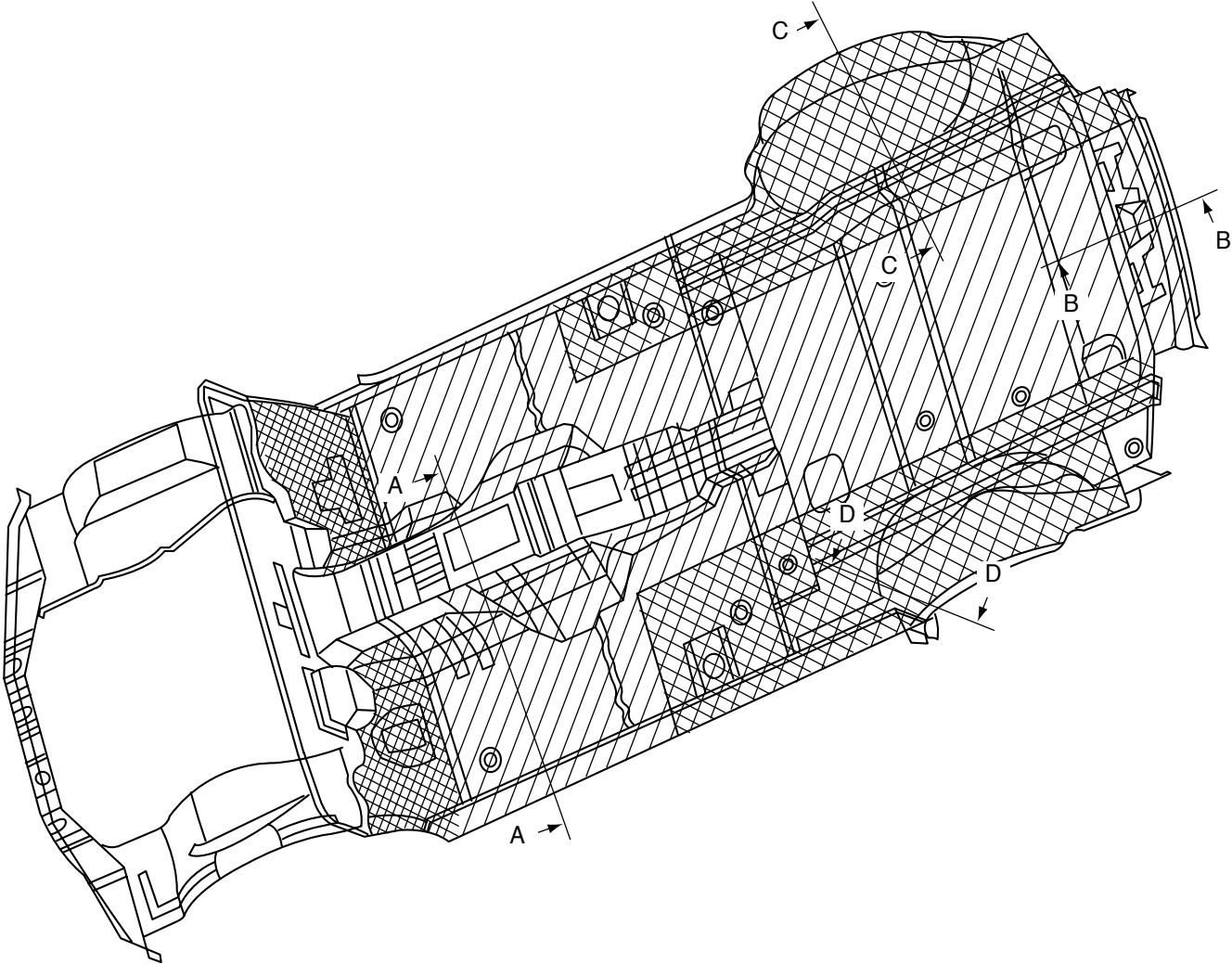


A3EB3412



Under coating

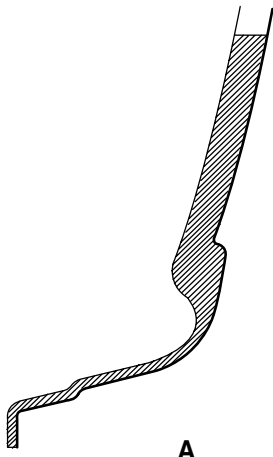
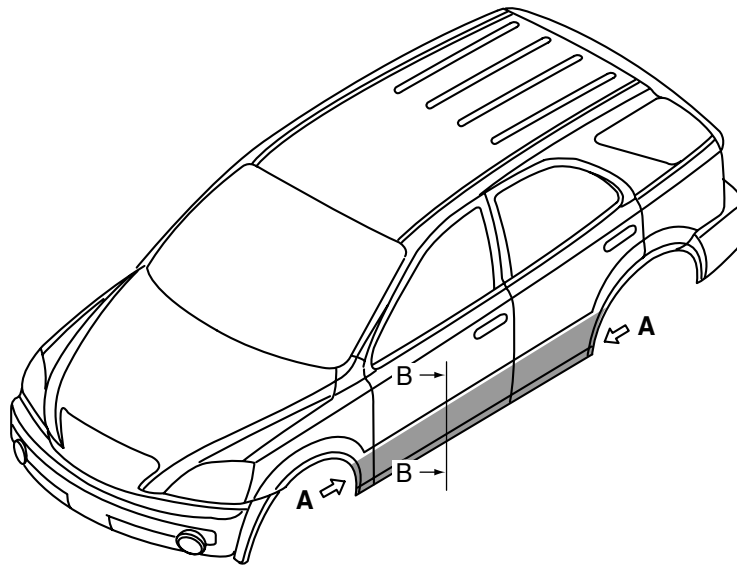




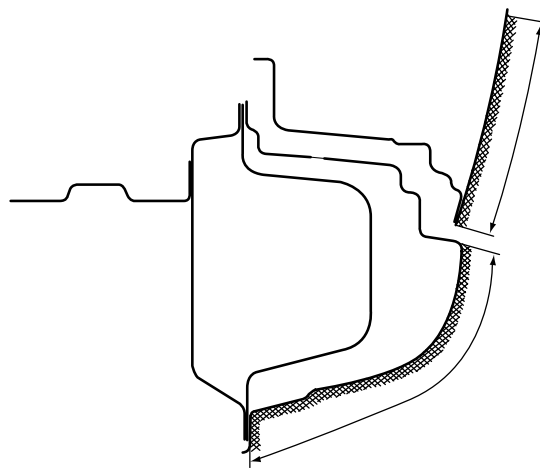
unit : mm

A3EB3415

Applying urethane



A

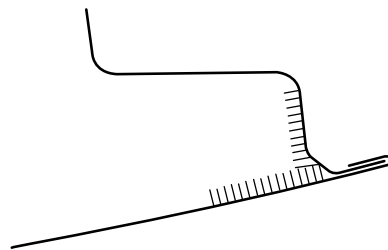
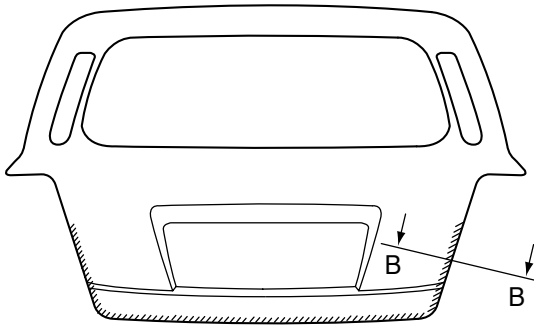
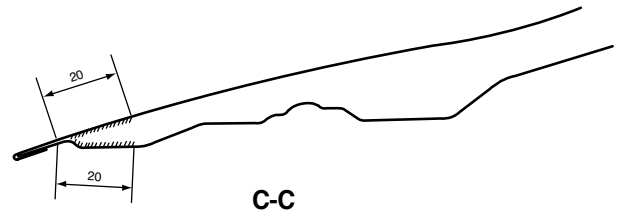
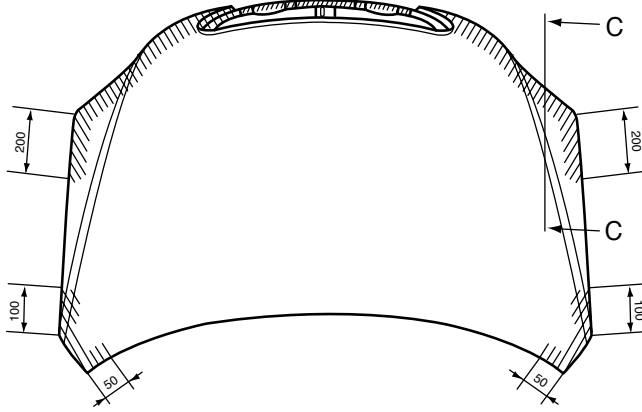


B-B

unit : mm

A3EB3416

Applying rustproofing material Hood/Tail gate



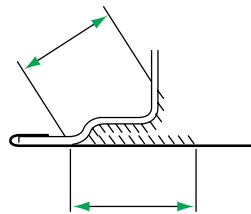
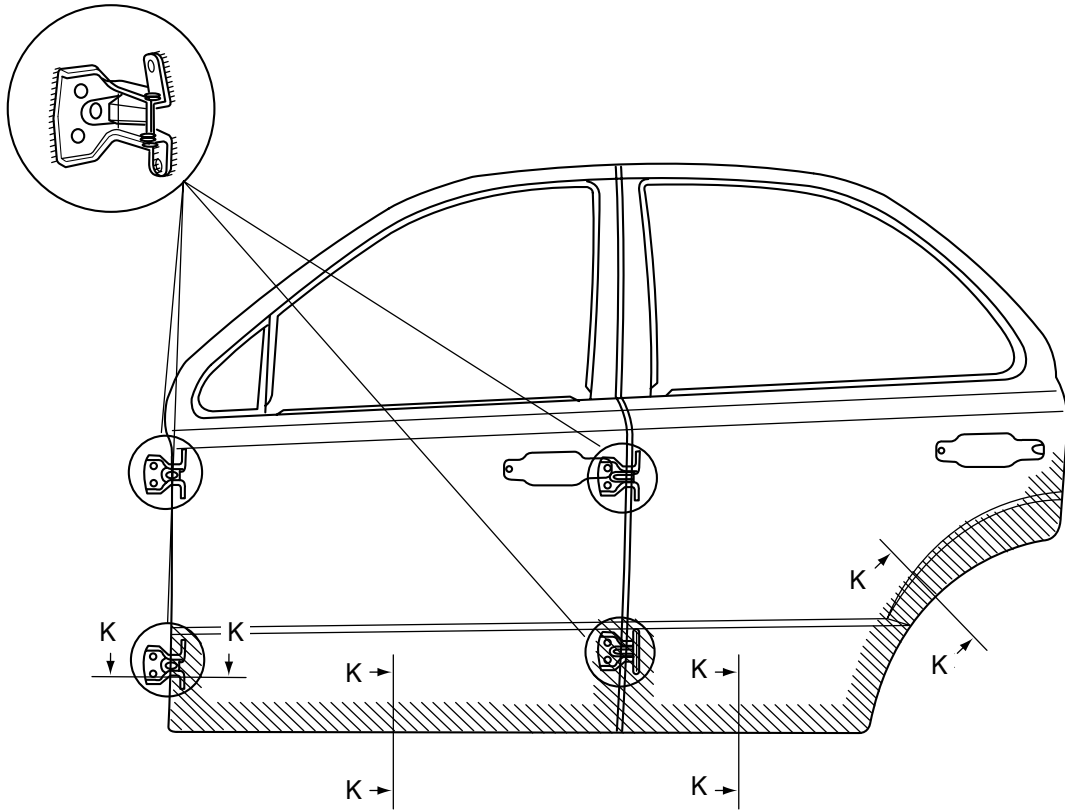
unit : mm

B-B

A3EB3417

41-18 Waterproofing and rustproofing

Front door / Rear door

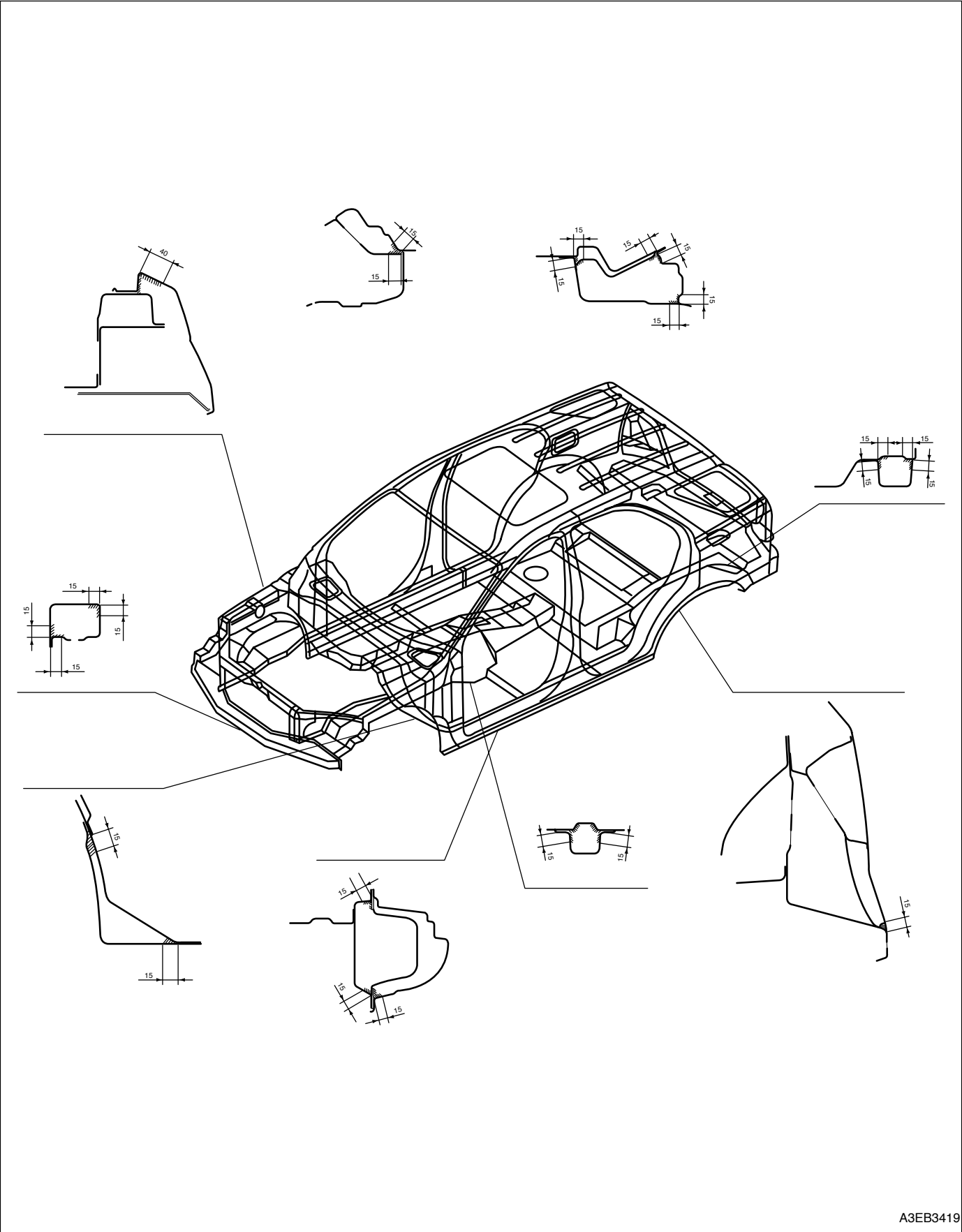


K-K

unit : mm

A3EB3418

Body parts

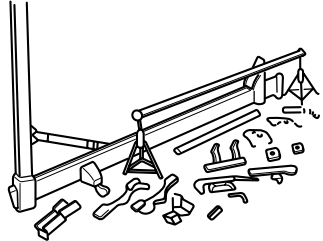
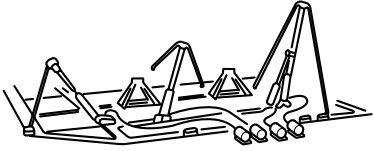
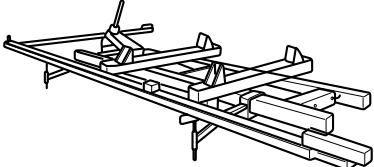
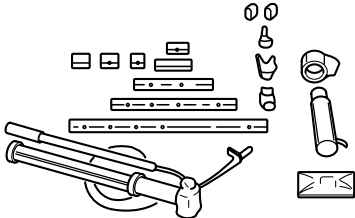
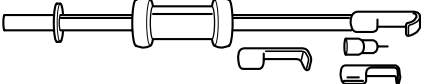


Body modification tools

Body modification tools	
Modification tools	51- 1
Cut and disassembly tools	51- 2
Assembly tools	51- 3
Measurement tools	51- 3
Welding machine	51- 4
Buffing and grinding tools	51- 5
Handheld tools	51- 7
Repair tools set	51- 8


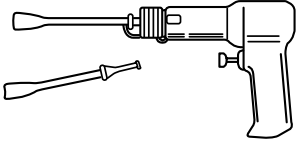
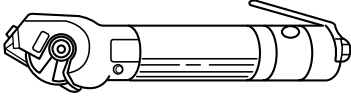
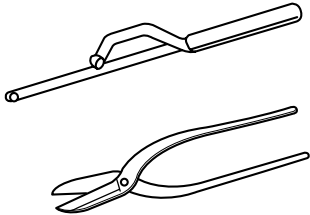
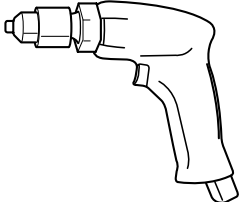
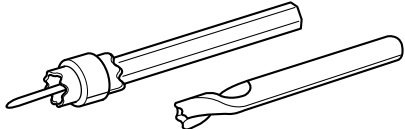
Body modification tools

Modification tools

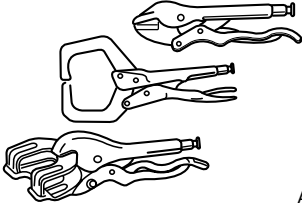
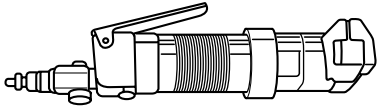
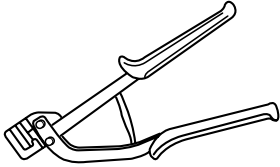
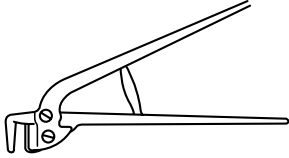
Name	Used for	Figure
Frame straightener	Modify twisted or bent body	 <p>A3EB3501</p>
		 <p>A3EB3502</p>
		 <p>A3EB3503</p>
Port power	Push out, stretch, pull in damaged area	 <p>A3EB3504</p>
Body puller	Stretch damaged area	 <p>A3EB3505</p>

51-2 Body modification tools

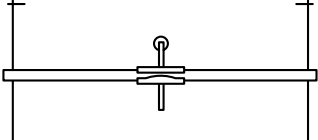
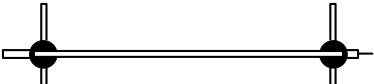
Cut and disassembly tools

Name	Used for	Figure
Air saw	Cut a panel	 A3EB3506
Air diesel	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 disassemble spot welding area, to finish a hole.	 A3EB3510
Spot cutter	Cut and disassemble spot welded area	 A3EB3511

Assembly tools

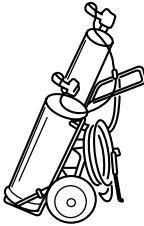
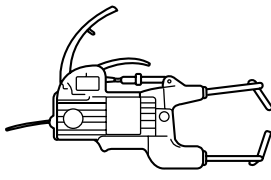

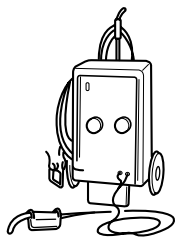
Name	Used for	Figure
Vice pliers	Fix a panel or area to weld	 A3EB3512
Air bench	Finish contact area of flange and finish a hole for plug welding	 A3EB3513
Quick bench	Finish a hole for plug welding	 A3EB3514
Flanging tool	Finish contact area of flange	 A3EB3515

Measurement tools

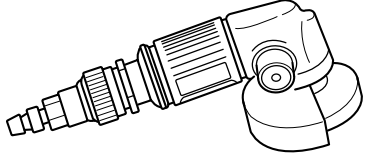
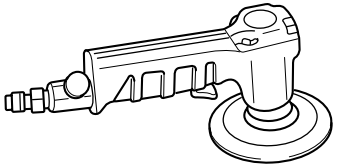
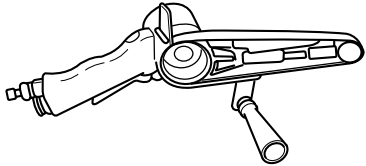
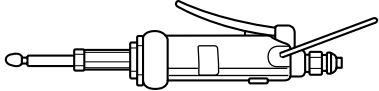
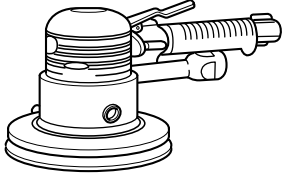
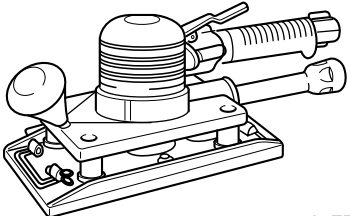
Name	Used for	Figure
Centering gauge	Measure distortion of body and frame	 A3EB3516
Tracking gauge	Measure body and frame	 A3EB3517

51-4 Body modification tools

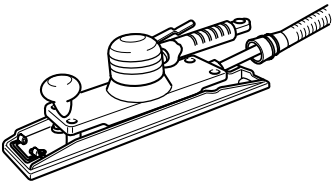
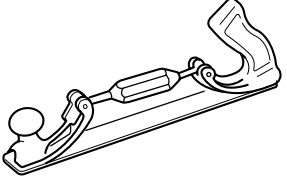
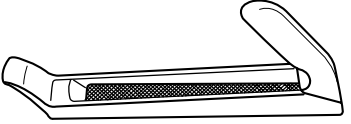
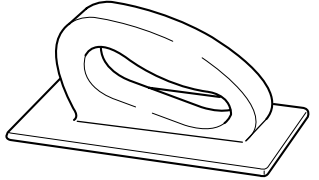
Welding machine

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

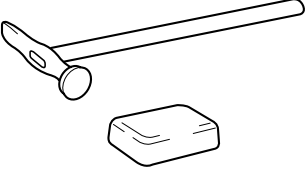
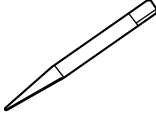
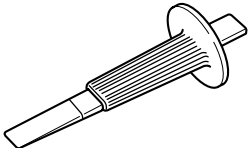
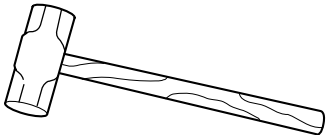
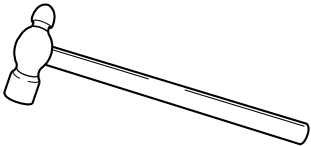
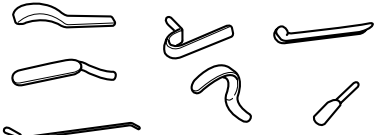
Buffing and grinding tools

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

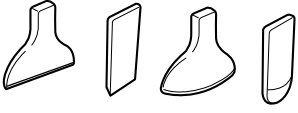
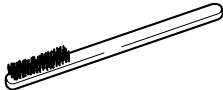
51-6 Body modification tools

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

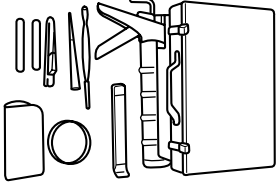
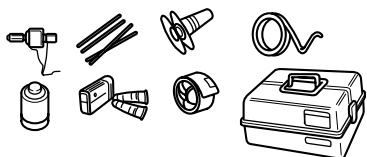
Handheld tools

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

51-8 Body modification tools

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

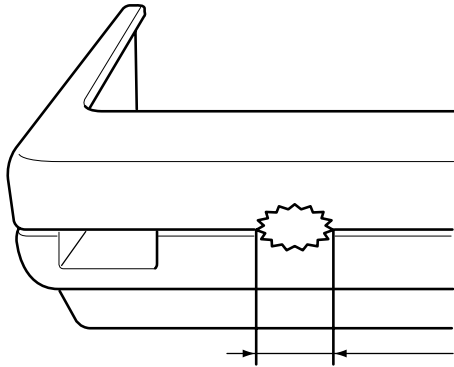
Plastic parts

Polypropylene (PP) bumper repairability	61- 1
Bumper repair procedure	61- 2
Repair method for PP bumper	61- 3

Polypropylene(PP) bumper repairability

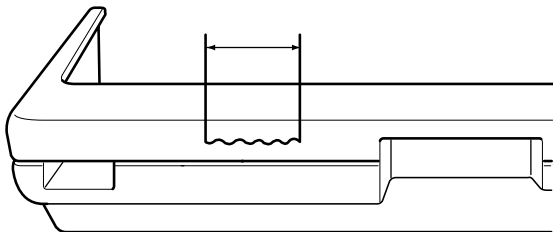
The three types of damaged bumpers shown below can be repaired. Because of cost and quality considerations, bumpers with more damage may be repaired, but replacing the bumper is encouraged.

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



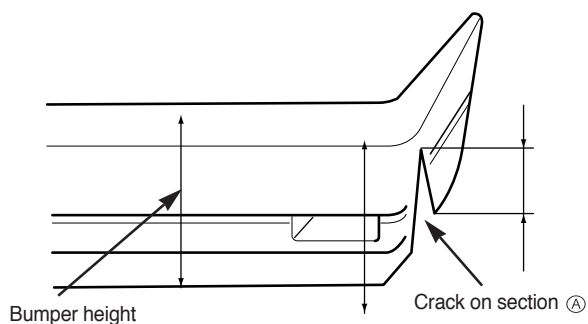
A3EB3601

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



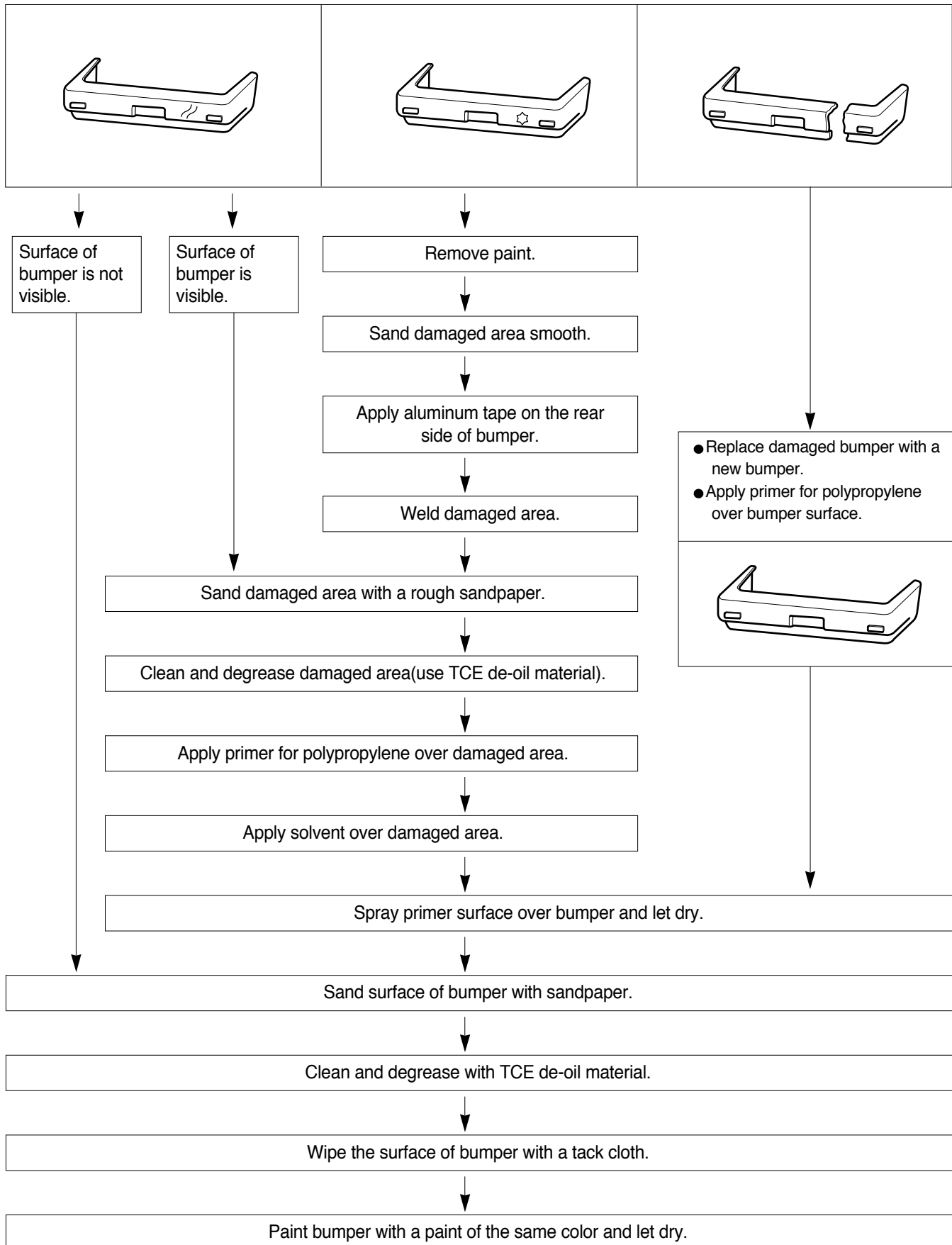
A3EB3602

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



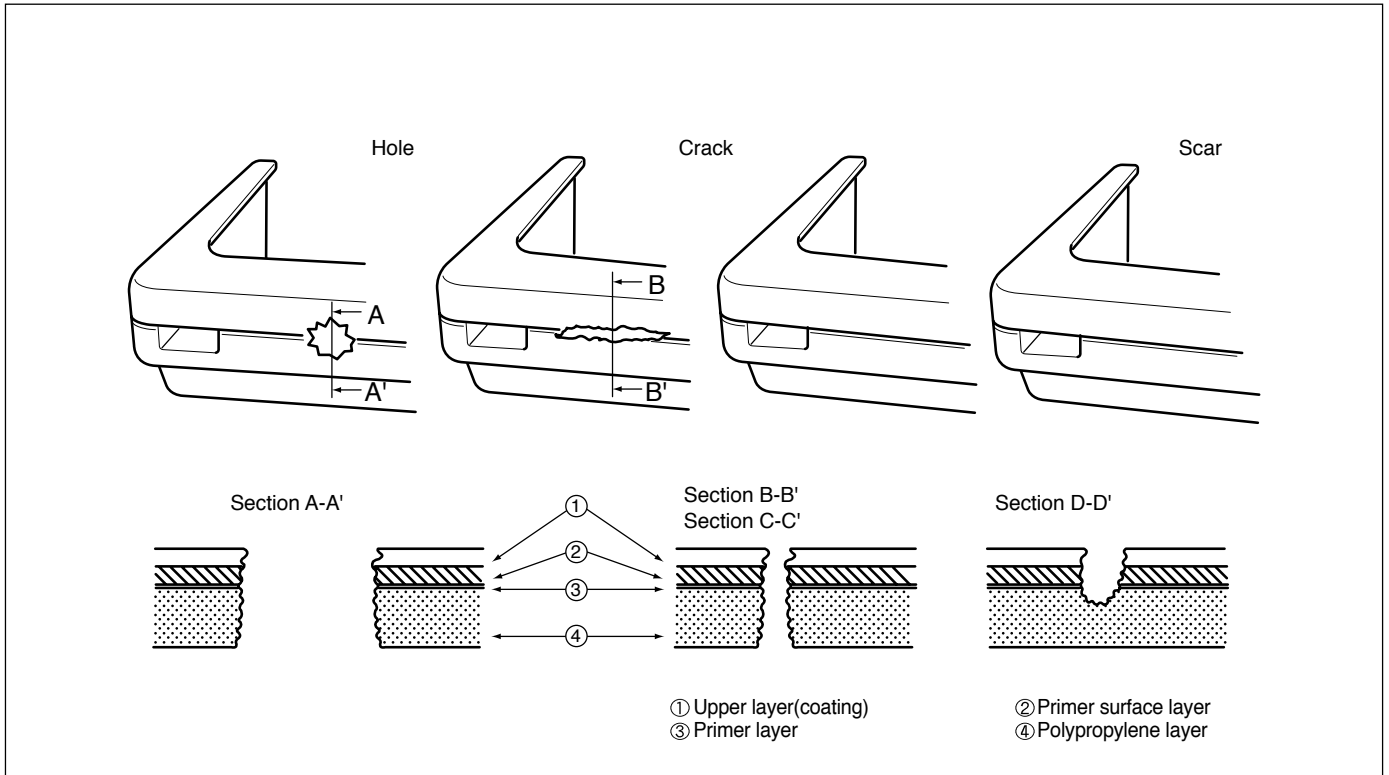
A3EB3603

Bumper repair procedure

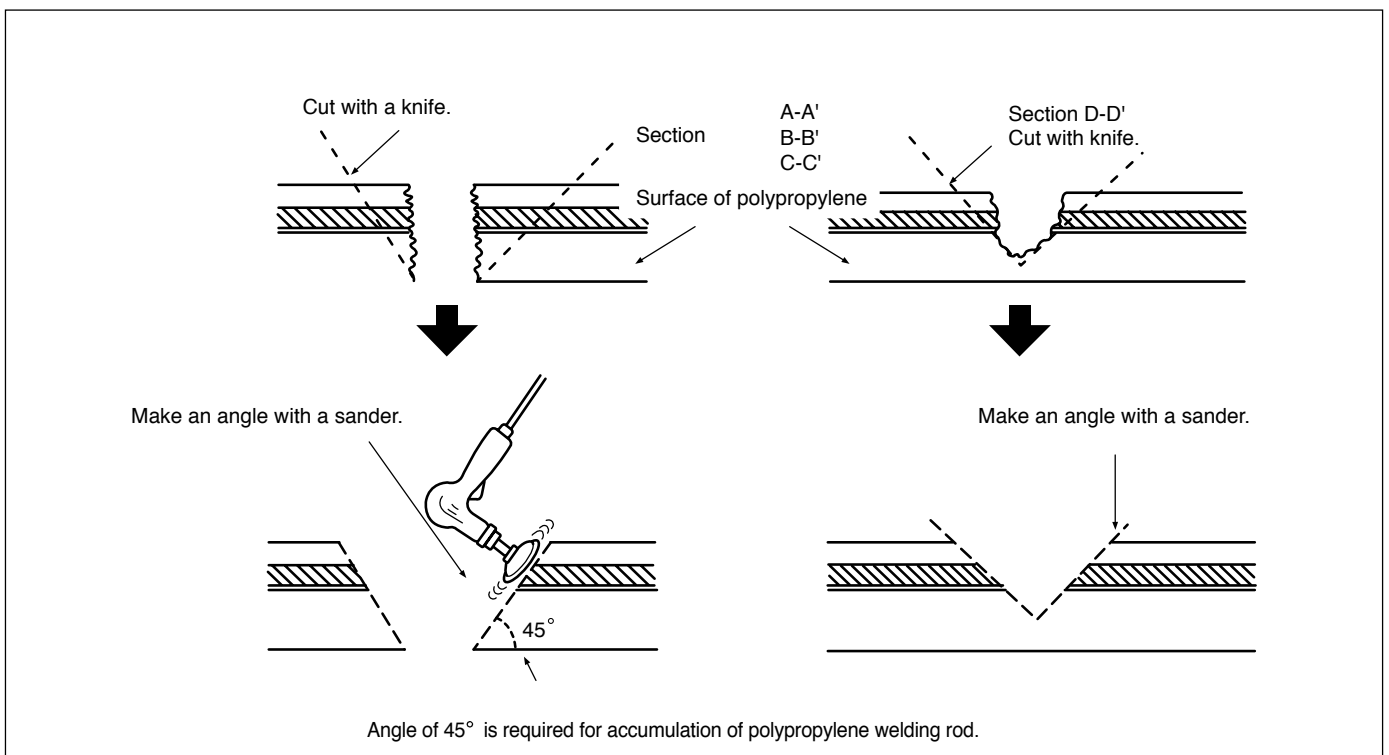


Repair method for PP bumper

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



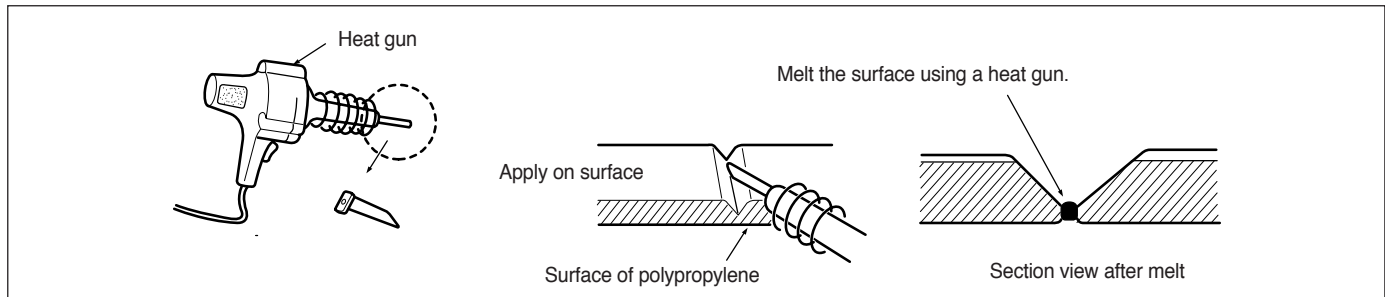
1. Rough cut the damaged area 45° using a knife and then sand the angle smooth.



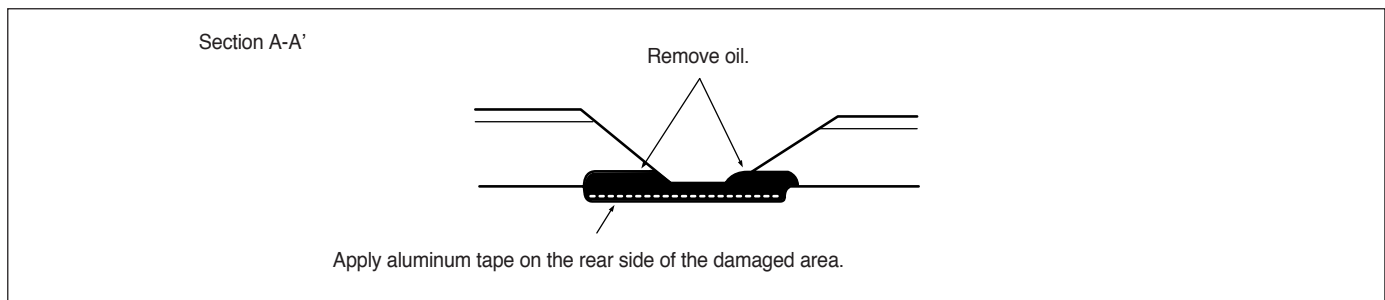
61-4 Plastic parts

2. Welding damaged area

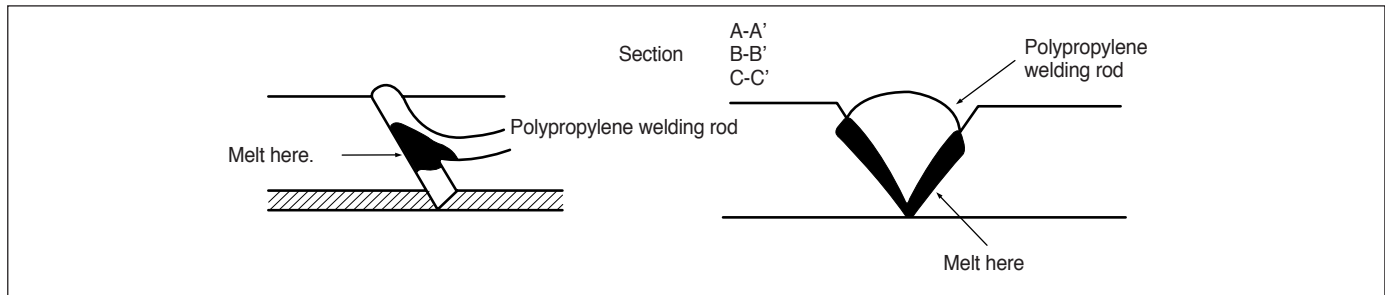
a) To repair cracked area, melt the area using a heat gun and attachment.



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

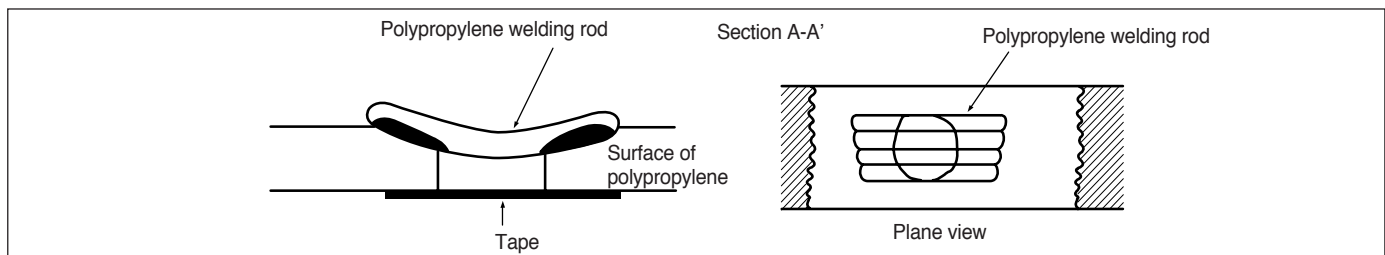


3. Melt polypropylene welding rod using a heat gun and fill in the cracked area.

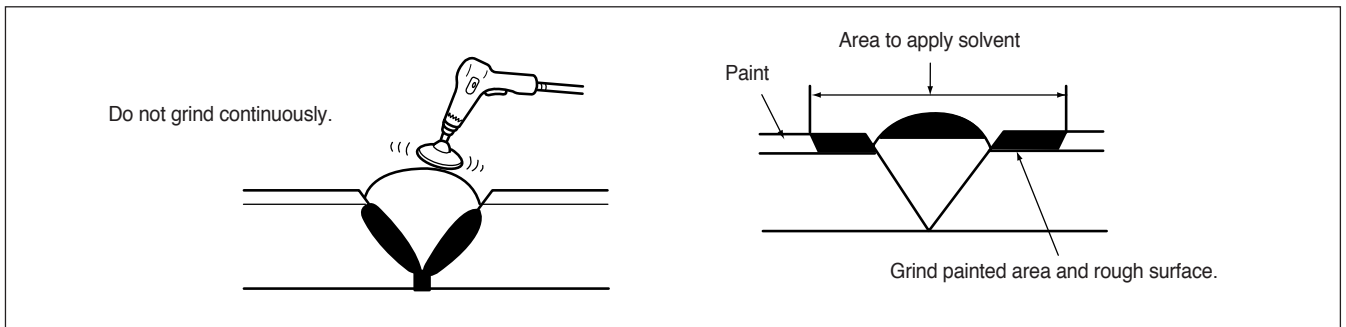


* Notice

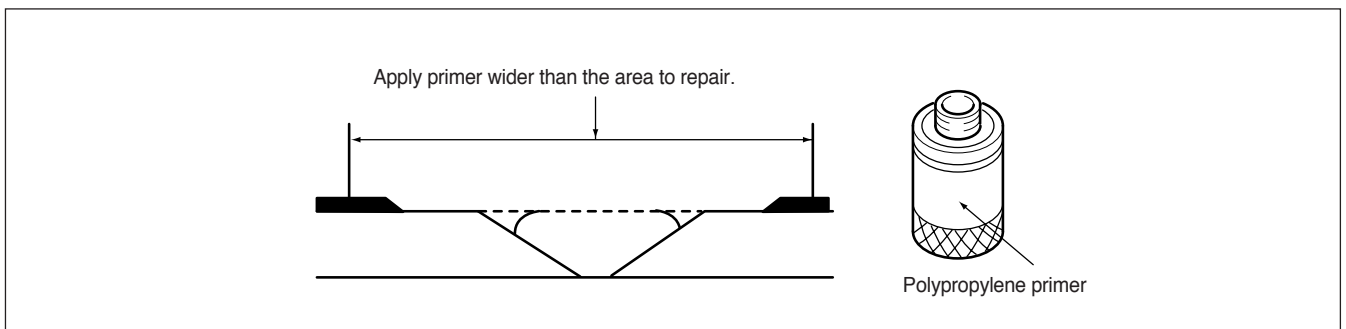
- Heat and melt the area indicated.
- Melt the welding rod carefully so that it does not over-melt. If the welding rod over-melts like jelly, the welding strength will deteriorate.
- Use the heat gun 0.4-0.8 in. (10-20 mm) away from the repair area to be welded.
- Welding rod should not move until the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



- 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.



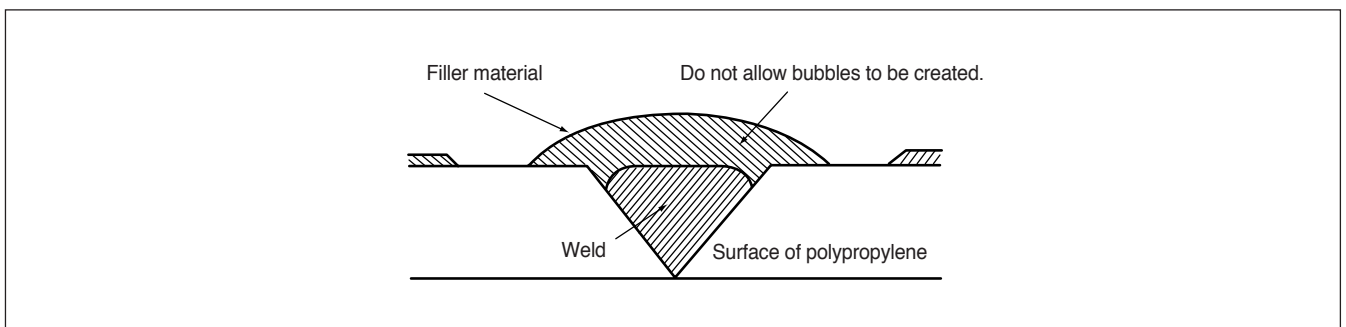
- Apply polypropylene primer evenly with a brush over an area wider than the area to be repaired. Dry it at 20°C(68°F) for more than 10 minutes.



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

*** Notice**

- 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.

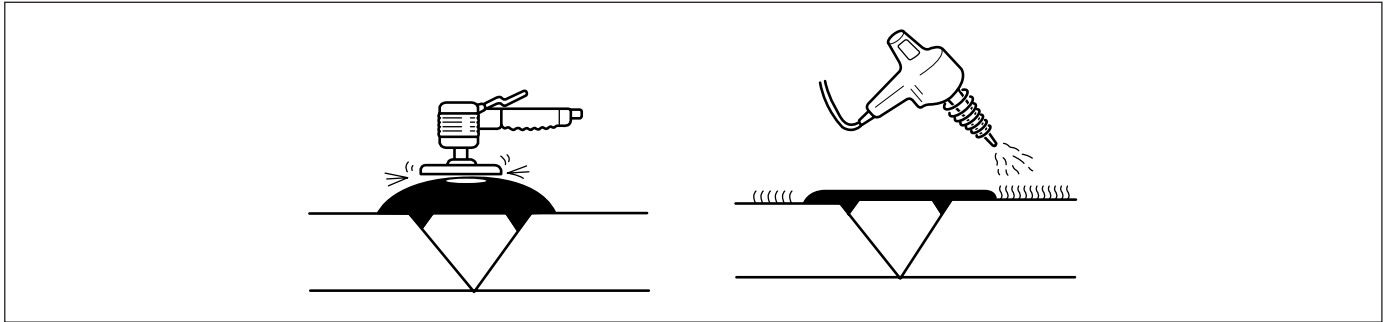
61-6 Plastic parts

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

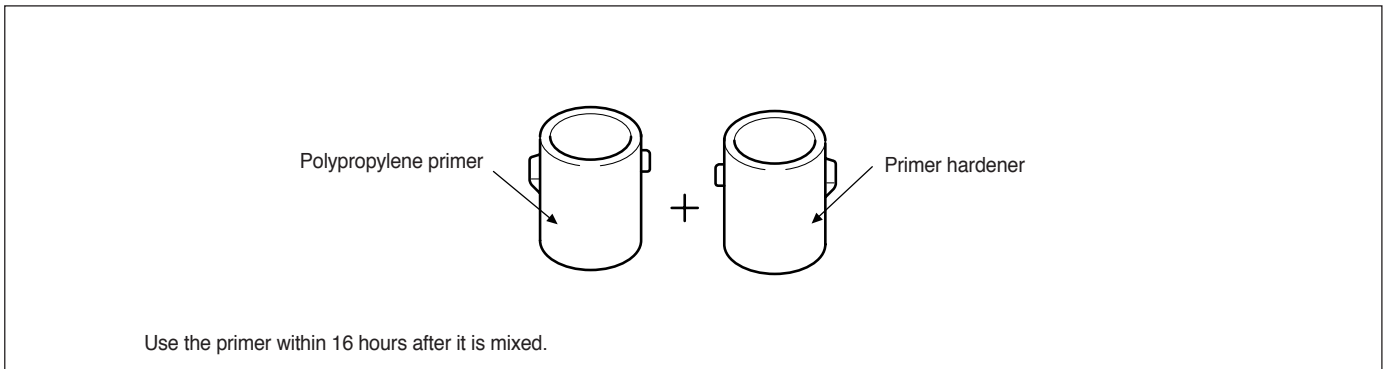
*** Notice**

- 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.



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.

*** Notice**

- 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 surfacer, and finish the surface of the bumper with a sandpaper(#400~#600).

The polypropylene surface should not be exposed.(Either wet sanding or dry sanding is all right.)

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

* Notice

- *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.*

14. 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.)

* Notice

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