

FOREWORD

This Body Repair Manual contains information, instructions and procedures for repairing the body structure of the PATHFINDER (D21 Four-door) model. In order to achieve reliable repair work and ensure customer satisfaction, the technician should study this manual and familiarize himself with appropriate sections before starting repair and rebuilding work.

It is especially important that the PRECAUTIONS section be read, understood and followed completely.

This Body Repair Manual is prepared for use by technicians who are assumed to have a high level of skill and experience in repairing collision-damaged vehicles and also use modern servicing tools and equipment. It is not recommended that persons unfamiliar with body repair techniques attempt to repair collision-damaged vehicles by using the manual.

Technicians are also required to read the PATHFINDER (D21 Four-door) Service Manual and Body Repair Manual (Fundamentals) in order to ensure that the original functions and quality of the vehicle can be maintained.

Please note that these manuals are prepared for worldwide usage, and as such, certain procedures might not apply in some regions or countries.

In the U.S.A., it is recommended that a M.I.G. welder be used by a trained technician to weld structural body parts.

All information in this manual is based on the latest product information at the time of publication. The right is reserved to make changes in specifications and methods at any time without notice.

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HOW TO USE THIS MANUAL

REPLACEMENT OPERATIONS
HOODLEDGE

(Work after radiator core support has been removed)

Service Joint

Portions to be welded

a 1st body mounting bracket	d Side dash	g Side cowl top panel
b Lower dash panel	e Side dash & lower dash panel	h Side cowl top panel
c Hoodledge reinforcement	f Front p bar or p rail & upper dash	i Side dash & lower dash panel
	g Front p bar or p rail	
	f Cowl top panel & side cowl top panel	

REMOVAL NOTES

- Cut off damaged portion to facilitate removal

- 46 -

REPLACEMENT OPERATIONS
HOODLEDGE

- When removing welded part with lower dash panel at portion (b) be careful not to spot cut through mating parts
- After welding apply an anti corrosive agent to welded parts and inside of hoodledge reinforcement

INSTALLATION NOTES

- When installing be sure to align locating holes on side cowl top with those on 1st body mounting and 1st cab body mounting holes with those on frame
- Install hoodledge reinforcement with locating holes aligned

- 47 -

(A) (Work after RADIATOR CORE SUPPORT has been removed):

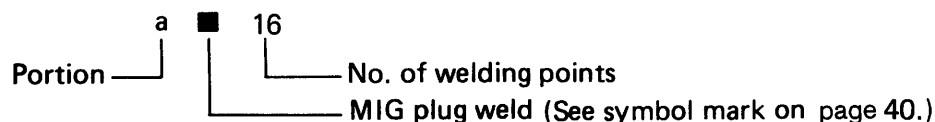
The replacement operation of the hoodledge panel is shown here, beginning from the condition where the radiator core support has already been removed. If the radiator core support and the hoodledge reinforcement are installed on the vehicle to be serviced, refer to "RADIATOR CORE SUPPORT" in REPLACEMENT OPERATIONS.

(B) SERVICE JOINT:

Welding methods and No. of welding points for performing body repair work are described (replacement of body parts).

To maintain the integrity of the vehicle body, work should be done, observing the instructions described here (particularly No. of welding points).

[Example]



(C) Symbols are used in illustrations to clearly identify welding methods. (See symbol mark on page 40.)

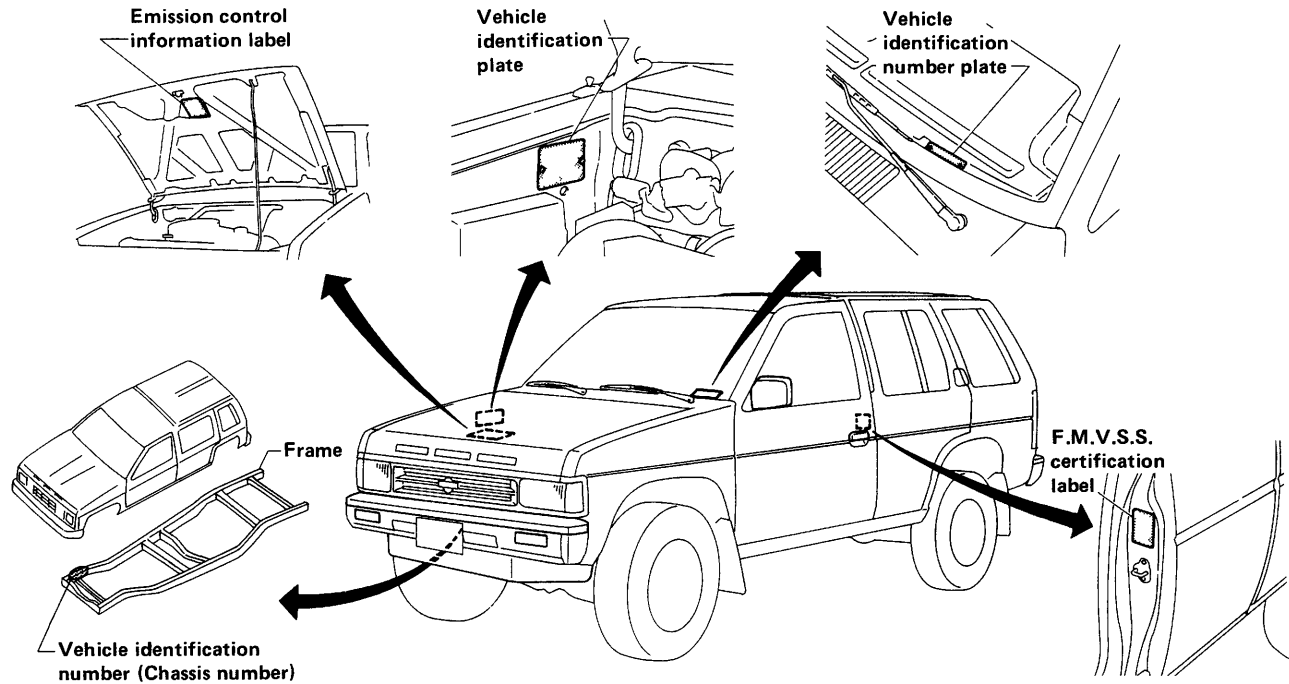
(D) PORTIONS TO BE WELDED:

Portions to be welded are listed, including descriptions of those areas to which the portion under the subtitle (ex. Hoodledge panel) will be welded.

(E) REMOVAL/INSTALLATION NOTES

Main service points and special notes for body repair work are described.

IDENTIFICATION NUMBERS (For U.S.A. & Canada)

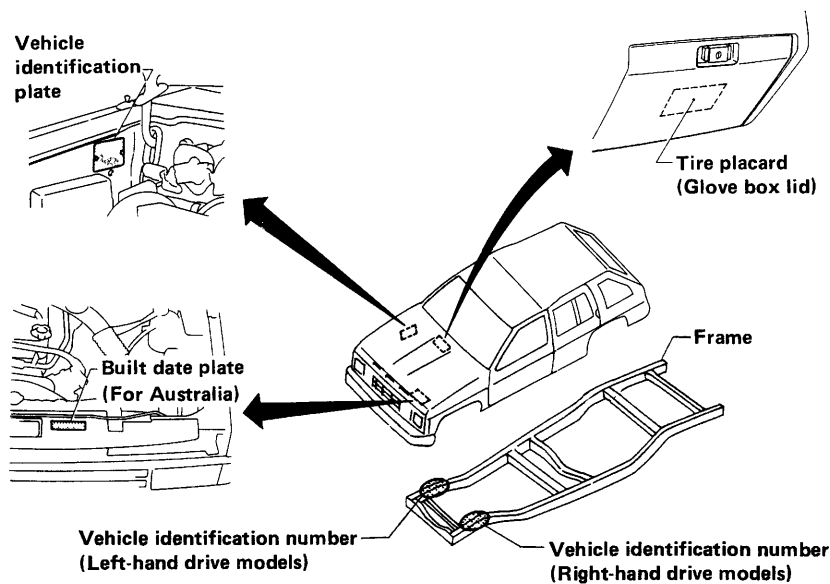


VEHICLE IDENTIFICATION NUMBER (ALIGNMENT)

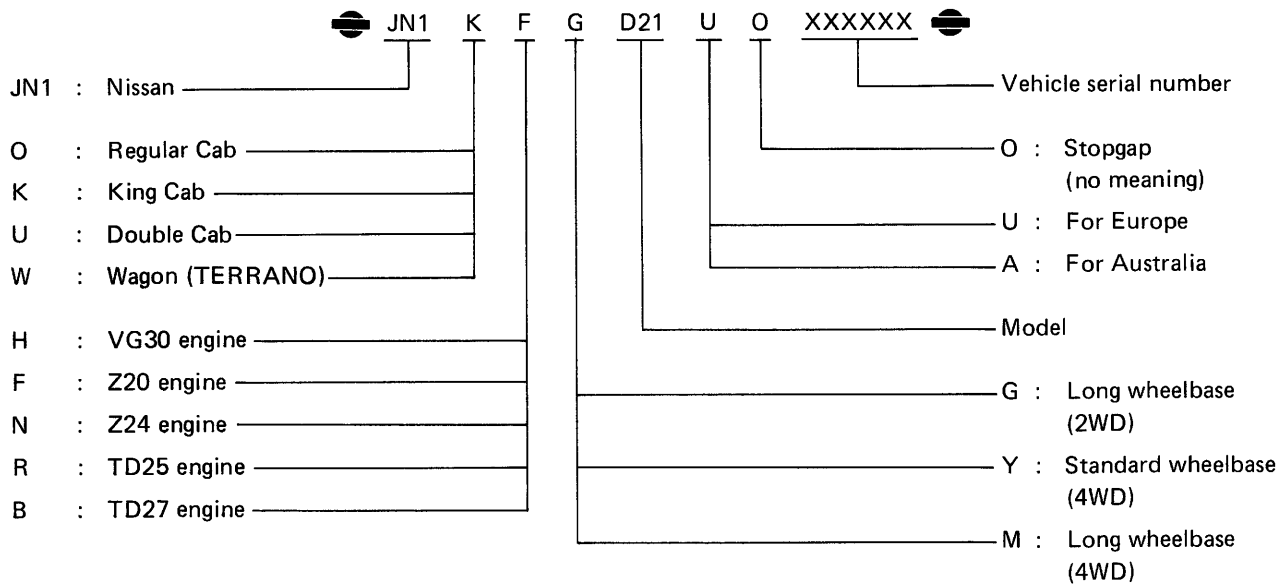
	JN6	H	D	1	1	S	*	L	W	000001	
Manufacturer	JN6 : Truck										Vehicle serial number
	1JN6 : Truck produced in U.S.A.										Manufacture plant
	JN8 : Multipurpose passenger vehicle (PATHFINDER)										W : Kyushu plant
											C : Smyrna, Tennessee
Engine type		H : VG30E									Model year
		S : KA24E									L : 1990 year model
Vehicle line			D : Nissan Truck, Nissan Pathfinder								Check digit (0 to 9 or X)
											The code for the check digit is determined by mathematical computation.
Model change (0 to 9)											Other information
											S : Standard
											Y : 4-wheel drive
											H : Heavy duty
Body type	1 : Standard wheelbase										
	2 : Long wheelbase										
	4 : Van										
	5 : Cab & chassis										
	6 : King Cab, Wagon										
	7 : 4-door Wagon										
	8 : 4-door Van										

GENERAL INFORMATION

IDENTIFICATION NUMBERS (Except for U.S.A. & Canada)



VEHICLE IDENTIFICATION NUMBER (ALIGNMENT)



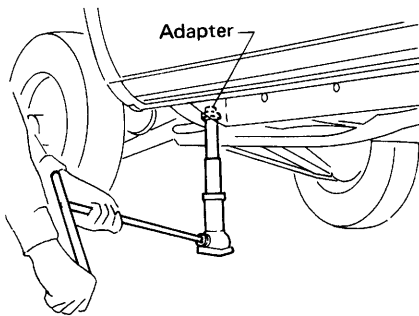
LIFTING POINTS

WARNING:

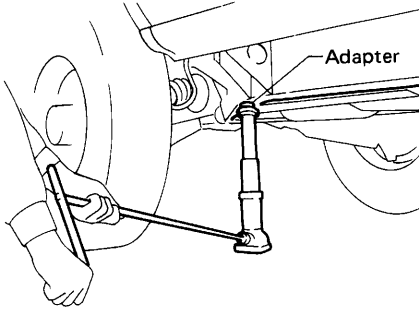
- When carrying out operations with the garage jack, be sure to support the vehicle with safety stands.
- Place wheel chocks at both front and back of the wheel, diagonally opposite the jack position.

SCREW JACK

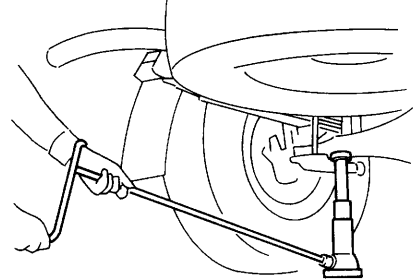
Front (2-wheel drive model)



Front (4-wheel drive model)



Rear



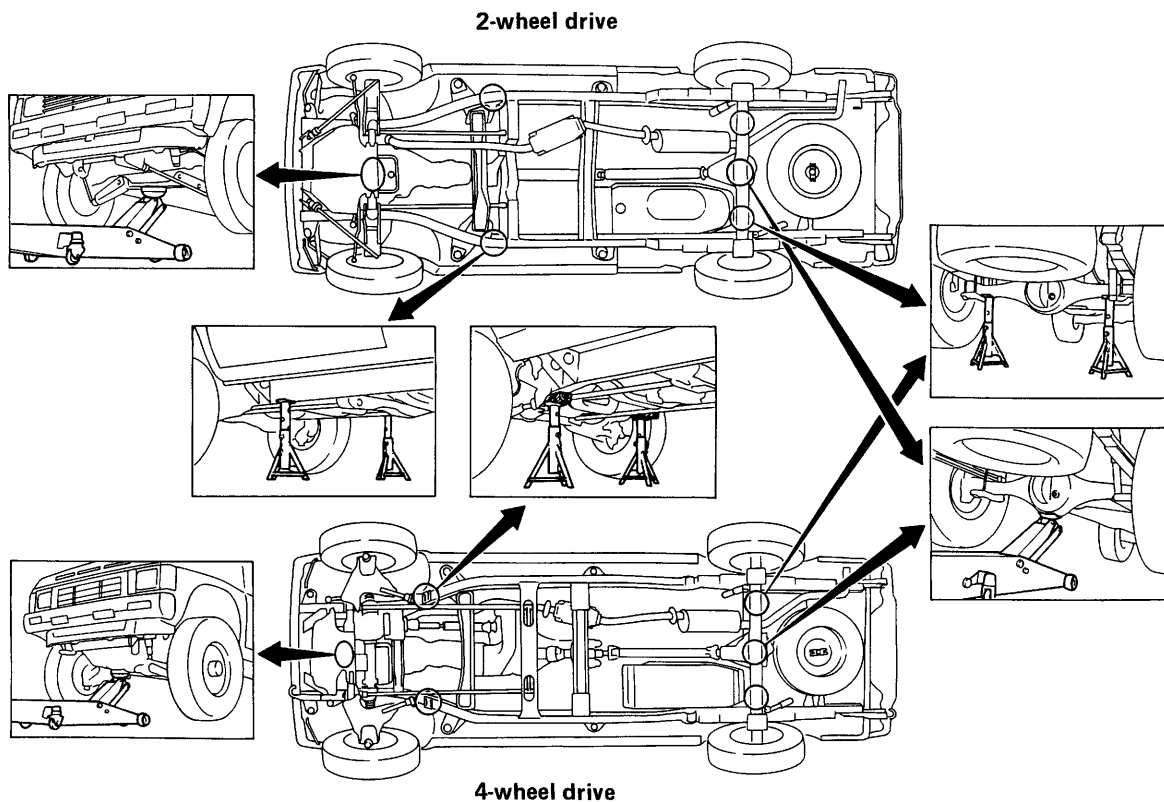
CE0072

GARAGE JACK AND SAFETY STAND

CAUTION:

Always place a wooden block between safety stand and vehicle body when supporting body with safety stand.

Apply the garage jack and safety stand to the position indicated in the figure in a safe manner.



SG1416

GENERAL INFORMATION

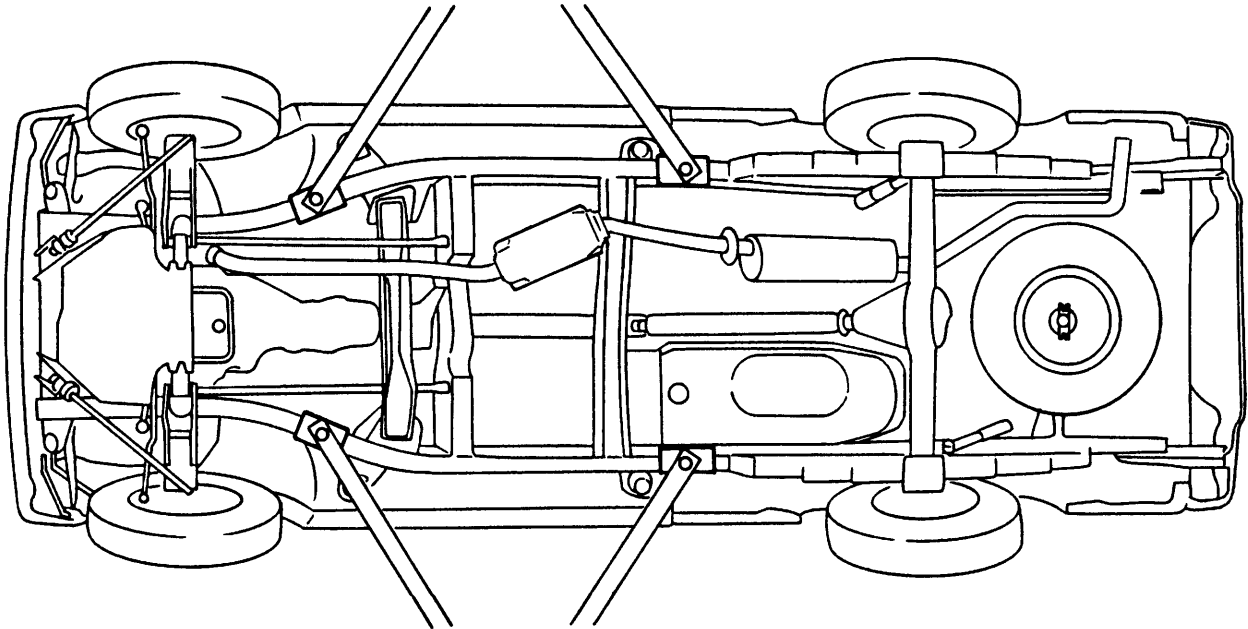
LIFTING POINTS

2-POLE LIFT

WARNING:

When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.

When setting the lift arm, do not allow the arm to contact the brake tubes and fuel lines.



SGI417

VEHICLE DIMENSIONS

Unit: mm (in)

	For U.S.A. & Canada	Except for U.S.A. & Canada
	VG30E	TD27T or VG30E
Overall length	4,365 (171.9)	4,365 (171.9)
Overall width	1,690 (66.5)	1,690 (66.5)
Overall height	1,670 (65.7)/1,680 (66.1)*	1,685 (66.3)
Front tread	1,425 (56.1)/1,445 (56.9)*	1,445 (56.9)
Rear tread	1,410 (55.5)/1,430 (56.3)*	1,430 (56.3)
Wheelbase	2,650 (104.3)	2,650 (104.3)

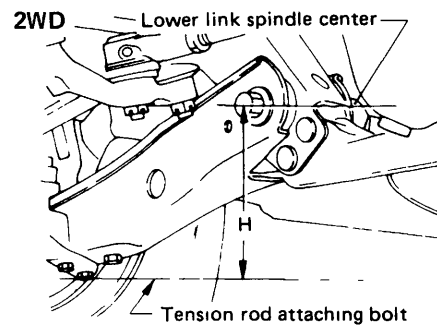
*: SE model

GENERAL INFORMATION

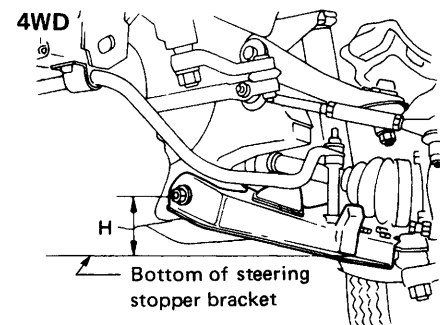
WHEEL ALIGNMENT

WHEEL ALIGNMENT (Unladen*1)

		Allowable limit			Adjusting range		
Applied model		2WD	4WD		2WD	4WD	
			Pickup	PATHFINDER and TERRANO		Pickup	PATHFINDER and TERRANO
Camber	degree	−28′ to 1°02′	−09′ to 1°21′		17′±30′	36′±30′	
Caster	degree	−24′ to 1°06′	33′ - 2°03′	52′.. 2°22′	21′±30′	1°18′±30′	1°37′±30′
Kingpin inclination	degree	8°28′ - 9°58′	7°20′ - 8°50′		9°13′±30′	8°06′±30′	8°05′±30′
Camber, caster, and kingpin inclination difference between both sides	degree	45′			30′		
Total toe-in							
Bias tire	mm (in)	3 - 7 (0.12 - 0.28)			5±1 (0.20±0.04)		
	degree	17′ - 34′			17′±5′		
Radial tire	mm (in)	1 - 5 (0.04 - 0.20)	2 - 6 (0.08 - 0.24)	1 - 5 (0.04 - 0.20)	3±1 (0.12±0.04)	4±1 (0.16±0.04)	3±1 (0.12±0.04)
	degree	7′ - 27′	10′ - 28′	0′ - 20′	17′±5′	19′±5′	15′±5′
Front wheel turning angle	degree						
Full turn*2							
Except 31 x 10.5R15							
Inside		34° - 38°	31° - 35°		36° - 38°	33° - 35°	
Outside		31° - 35°	29° - 33°		33° - 35°	31° - 33°	
31 x 10.5R15							
Inside		—	25° - 29°		—	—	27° - 29°
Outside		—	23° - 27°		—	—	25° - 27°
Toe-out turn							
Inside					22°		
Outside					20°		
Vehicle posture							
Lower arm pivot height (H)	mm (in)	117 - 127 (4.61 - 5.00)	49 - 59 (1.93 - 2.32)		122±2 (4.80±0.08)	54±2 (2.13±0.08)	



FA681



SFA535

*1: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

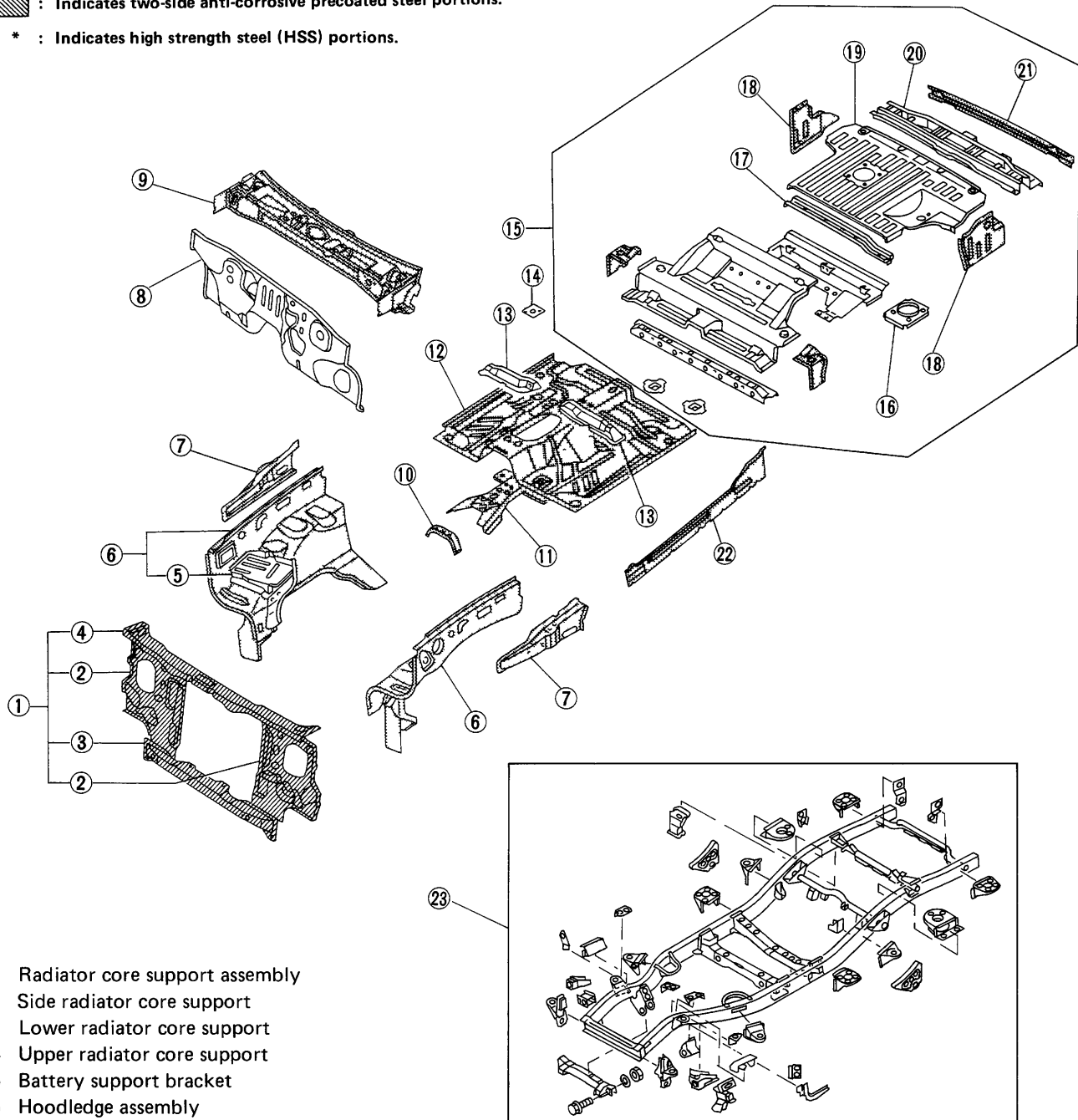
*2: On power steering models, wheel turning force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine idling.

UNDERBODY COMPONENT PARTS

 : Indicates anti-corrosive precoated steel portions.

 : Indicates two-side anti-corrosive precoated steel portions.

* : Indicates high strength steel (HSS) portions.

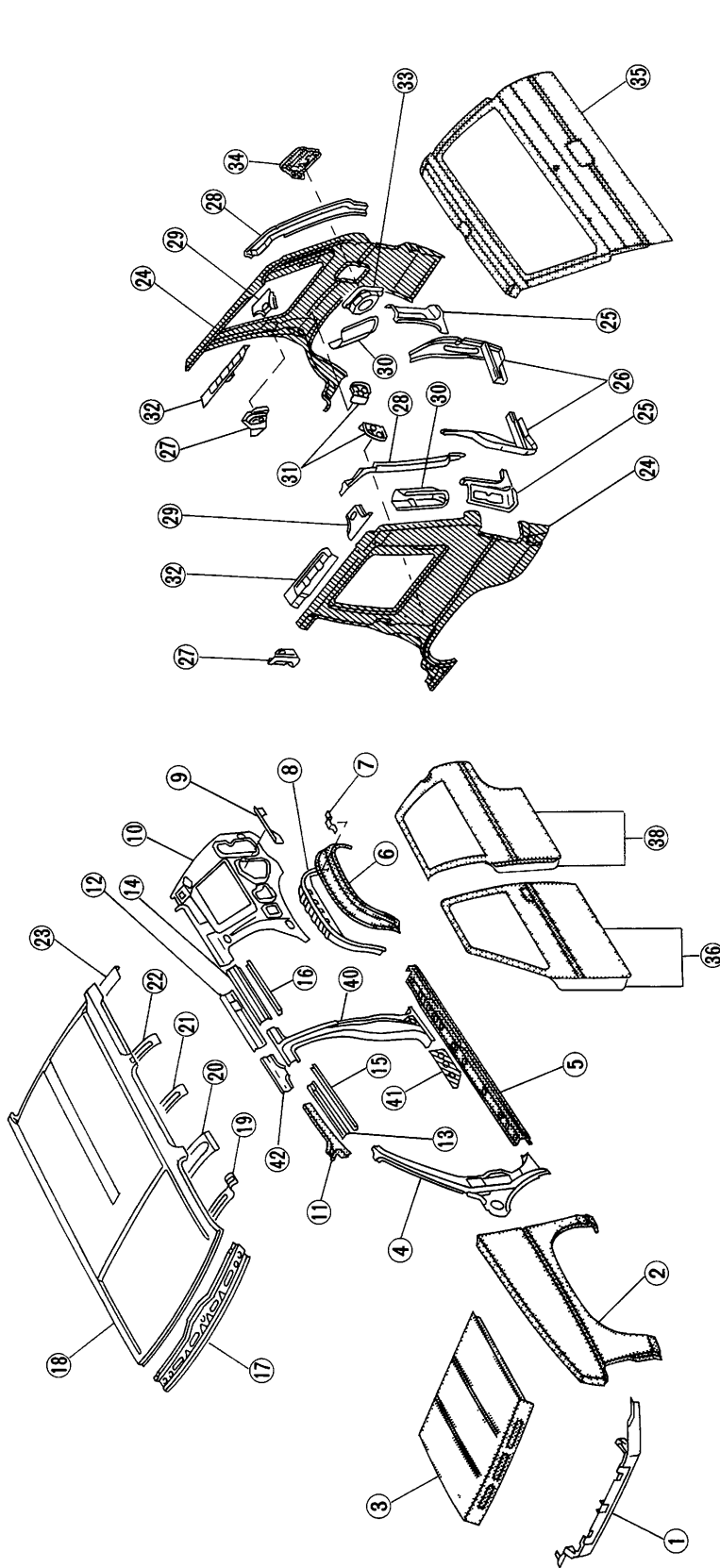


- 1 Radiator core support assembly
- 2 Side radiator core support
- 3 Lower radiator core support
- 4 Upper radiator core support
- 5 Battery support bracket
- *6 Hoodledge assembly
- *7 Hoodledge reinforcement
- 8 Lower dash
- 9 Cowl top
- 10 Instrument stay reinforcement
- 11 Hand brake reinforcement assembly
- 12 Front floor
- 13 2nd crossmember
- 14 Hand brake & seat belt reinforcement
- 15 Rear floor assembly
- 16 Catalyst sensor cab cover
- 17 Rear floor bolster

- *18 Rear floor side
- 19 Rear floor rear
- 20 Rear crossmember
- 21 Outer rear crossmember
- 22 Inner sill (R.H. & L.H.)
- 23 Frame assembly

BODY COMPONENT PARTS

-  : Indicates anti-corrosive pre-coated steel portions
 : Indicates two-side anti-corrosive pre-coated steel portions.
 * : Indicates high strength steel (HSS) portions.



- 1 Front apron (PP plastic)
 2 Front fender (R.H. & L.H.)
 3 Hood
 *4 Front pillar (R.H. & L.H.)
 *5 Outer sill (R.H. & L.H.)
 6 Outer rear wheelhouse (R.H. & L.H.)
 7 Seat rail mounting bracket (R.H. & L.H.)
 8 Inner rear wheelhouse (R.H. & L.H.)
 9 Tail pillar reinforcement (R.H. & L.H.)
 10 Inner side panel (R.H. & L.H.)
 *11 Inner front roof side rail (R.H. & L.H.)
 12 Inner rear roof side rail (R.H. & L.H.)
 13 Outer front roof side rail (R.H. & L.H.)
 14 Outer rear roof side rail (R.H. & L.H.)
 15 Front roof drip channel (R.H. & L.H.)

- 16 Rear roof drip channel (R.H. & L.H.)
 17 Front roof rail
 18 Roof
 19 Roof bow No. 1
 20 Roof bow No. 2
 21 Roof bow No. 3
 22 Roof bow No. 4
 23 Rear roof rail
 24 Rear fender
 25 Rear combination lamp base
 26 Outer back pillar
 27 Rear fender reinforcement
 28 Rear fender extension
 29 Rear fender brace

- 30 Drafter duct
 31 Striker retainer
 32 Rear seat belt anchor reinforcement
 33 Fuel filler base
 34 Fuel filler lid
 35 Back door
 36 Front door (R.H. & L.H.)
 37 Outer front door panel (R.H. & L.H.)
 38 Rear door (R.H. & L.H.)
 39 Outer rear door panel (R.H. & L.H.)
 40 Center pillar (R.H. & L.H.)
 41 Outer sill reinforcement (R.H. & L.H.)
 for North America
 42 Center roof rail brace (R.H. & L.H.)
 for North America

DESCRIPTION

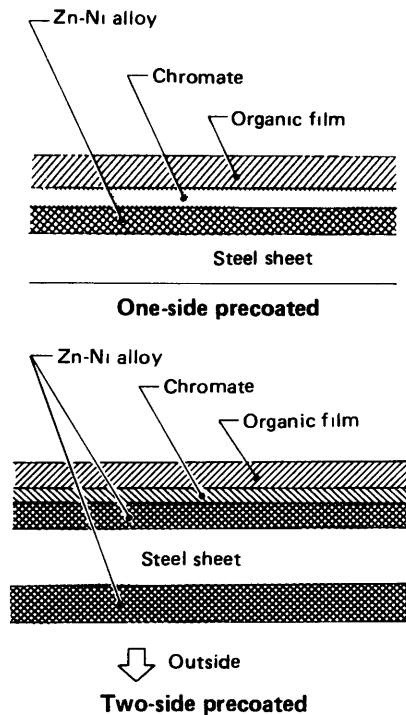
In order to provide improved corrosion prevention, the following anti-corrosive measures have been implemented in our production plants. When repairing or replacing body panels, it is necessary to use these same anti-corrosive measures.

ANTI-CORROSIVE PRECOATED STEEL (DURASTEEL)

In order to improve repairability and corrosion resistance, a new type of anti-corrosive precoated steel sheets have been adopted taking the place of conventional zinc-coated steel sheets.

This durasteel is electroplated, zinc-nickel alloy under organic film, which provides excellent corrosion resistance.

Durasteel is classified as either one-side precoated steel or two-side precoated steel. The two-side precoated steel provides excellent corrosion resistance.



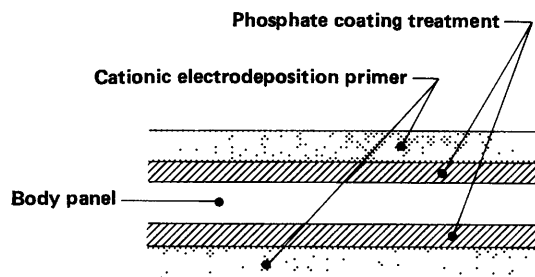
Nissan Genuine Service Parts are fabricated from durasteel sheets. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain the anti-corrosive performance built into the vehicle at the factory.

PHOSPHATE COATING TREATMENT AND CATIONIC ELECTRODEPOSITION PRIMER

A phosphate coating treatment and a cationic electrodeposition primer, which provide an excellent anti-corrosion effect, are employed on all body components.

CAUTION:

Confine paint removal in the welding operation to the absolute minimum.

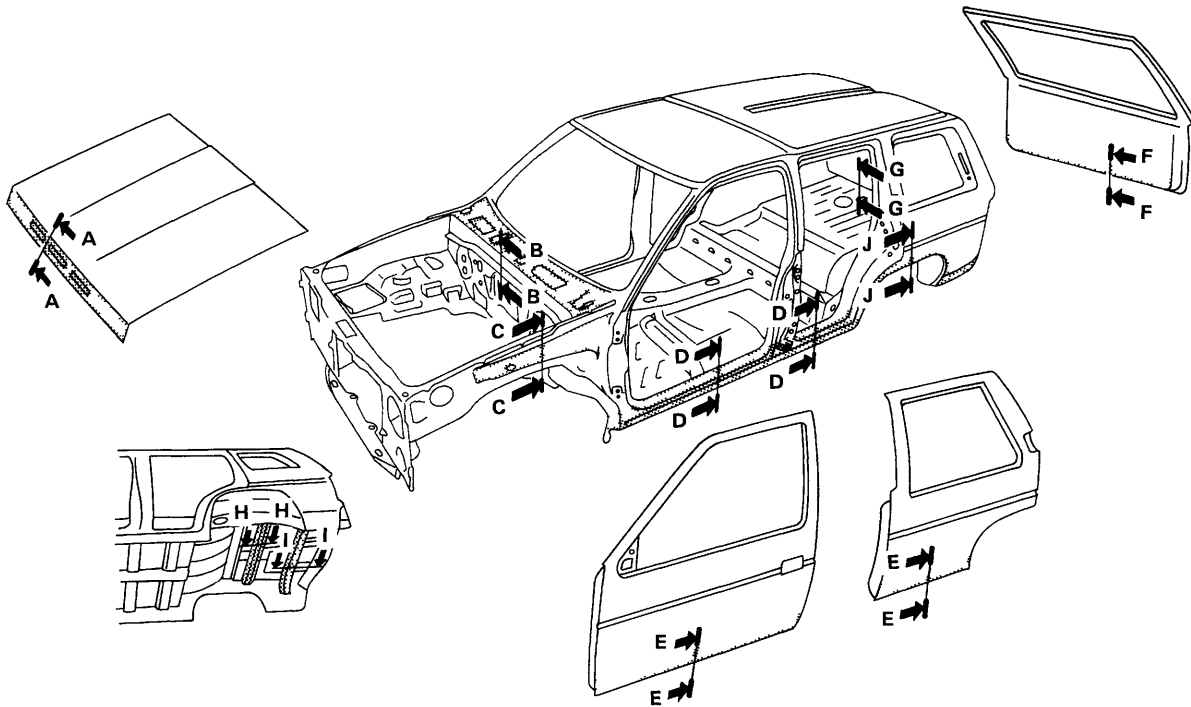


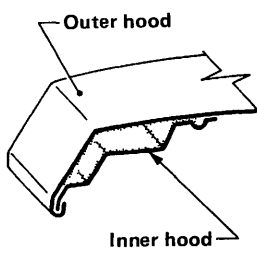
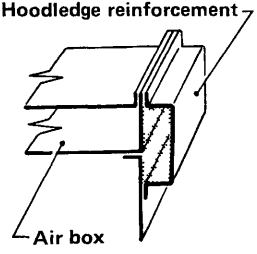
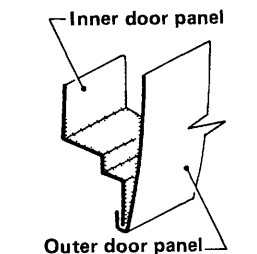
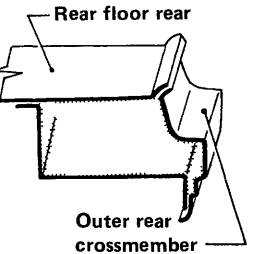
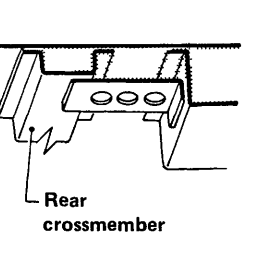
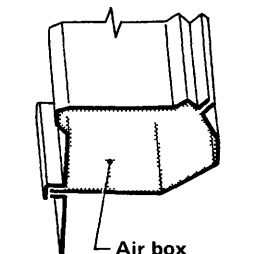
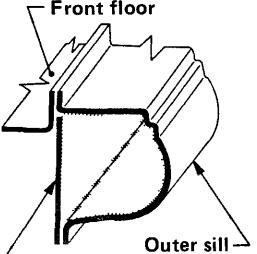
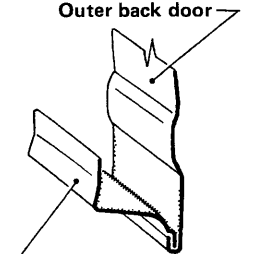
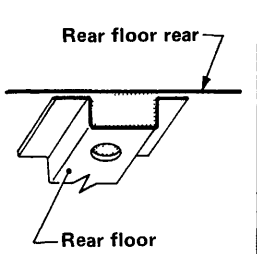
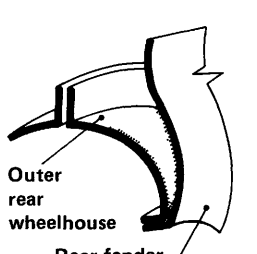
Nissan Genuine Service Parts also are treated in the same manner. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain anti-corrosive performance built into the vehicle at the factory.

ANTI-CORROSIVE WAX

In order to improve corrosion resistance, anti-corrosive wax is applied inside the body sill and inside other closed sections. Accordingly, when replacing these parts, be sure to apply anti-corrosive wax to the appropriate areas of the new parts. Select an excellent anti-corrosive wax which will penetrate after application and has a long shelf life.

 : Indicates anti-corrosive wax coated portions.



Section A—A	Section C—C	Section E—E	Section G—G	Section I—I
 Outer hood Inner hood	 Hoodledge reinforcement Air box	 Inner door panel Outer door panel	 Rear floor rear Outer rear crossmember	 Rear crossmember
Section B—B	Section D—D	Section F—F	Section H—H	Section J—J
 Air box	 Front floor Inner sill Outer sill	 Outer back door Inner back door	 Rear floor rear Rear floor bolster	 Outer rear wheelhouse Rear fender

UNDERCOATING

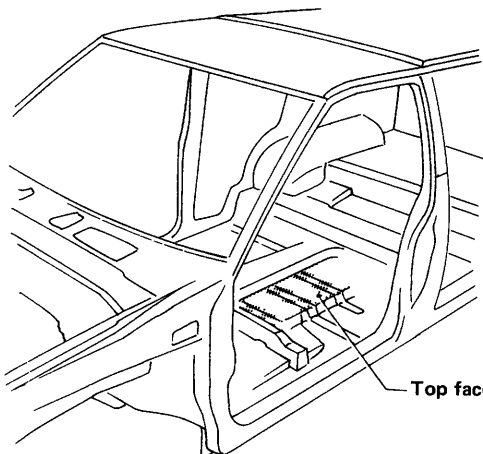
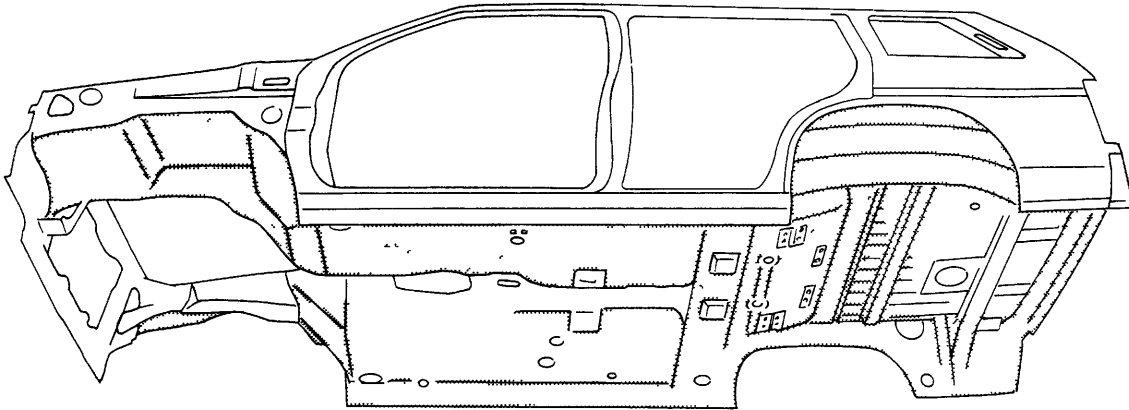
The undersides of the floor and wheelhouse are undercoated to prevent rust, vibration, noise and stone chipping.

Therefore, when such a panel is replaced or repaired, apply undercoating to that part. Use an undercoating with the following properties: rust preventive, soundproof, vibration-proof, shock-resistant, adhesive, and durable.

Precautions in undercoating

1. Do not apply undercoating to any place unless specified (such as the areas above the muffler and catalytic converter which are subjected to heat).
2. Do not undercoat the exhaust pipe, other parts which become hot, and rotary parts.
3. Apply bitumen wax after applying undercoating.

 : Indicates undercoated portions.



Top face on driver side portion

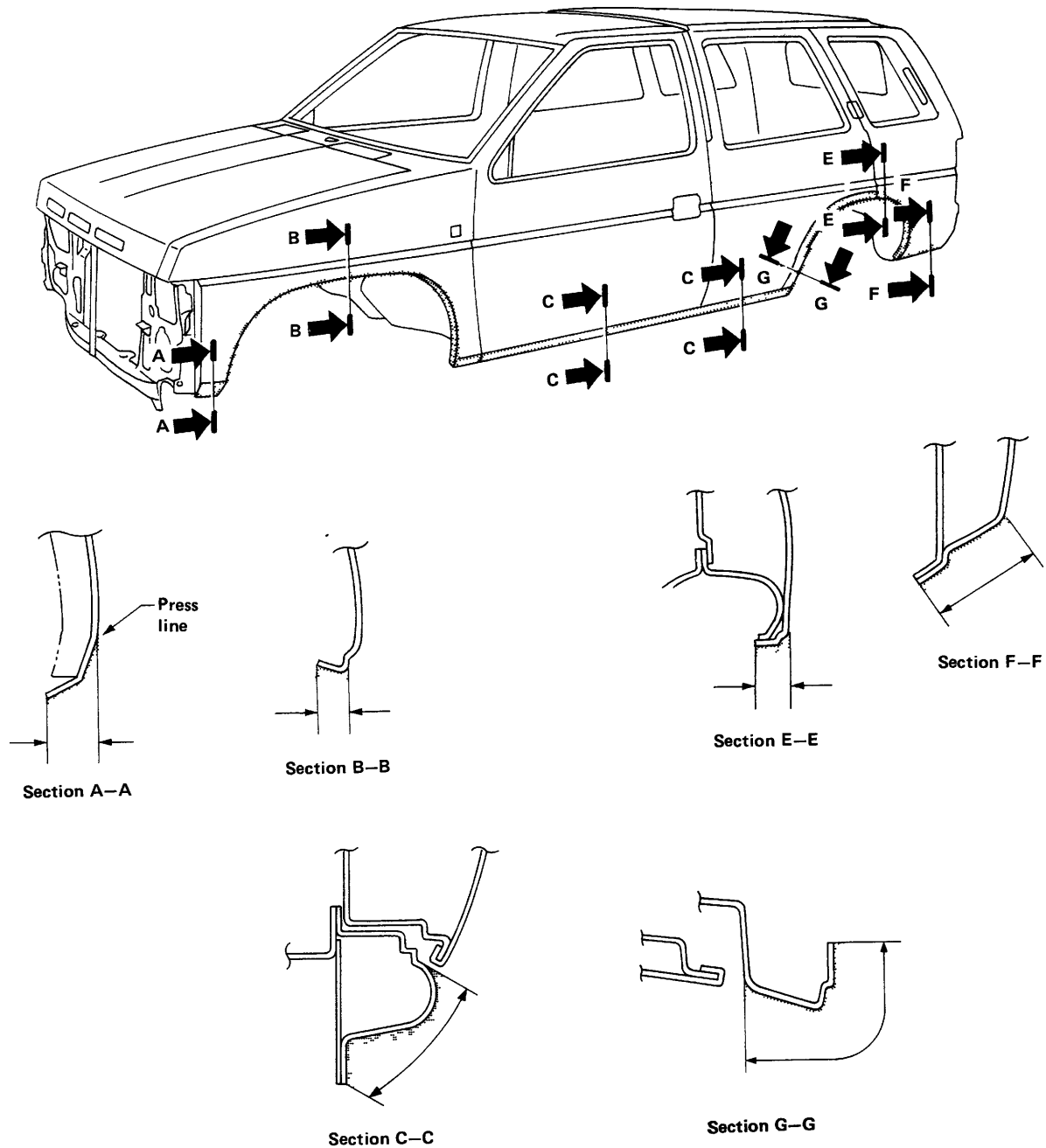


Front

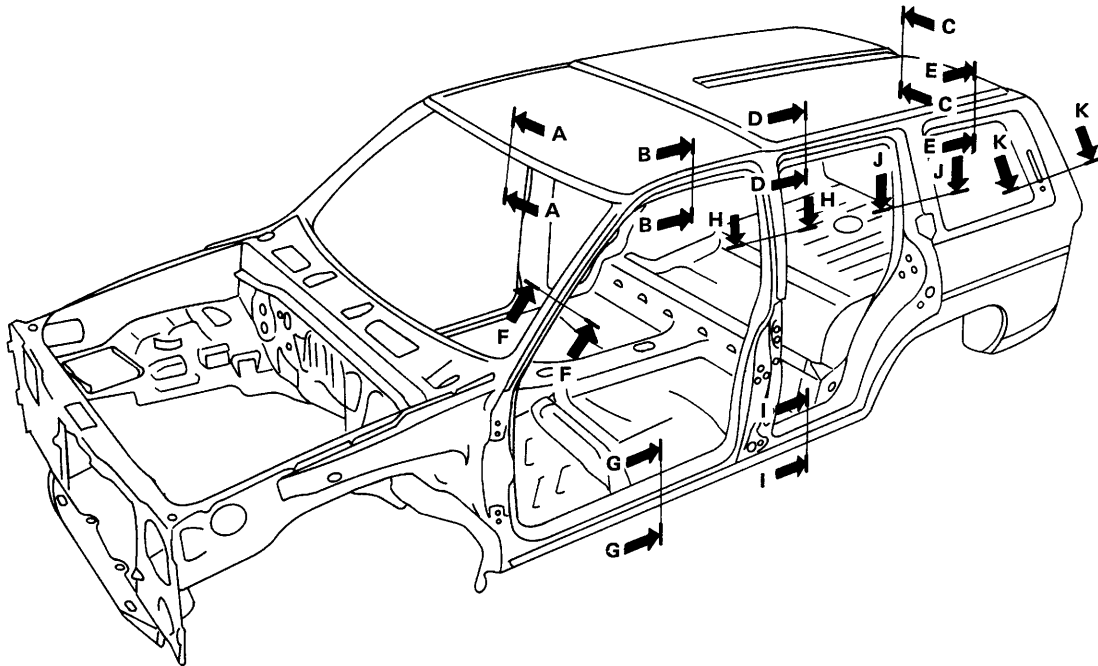
STONE GUARD COAT

In order to prevent damage caused by stones, the lower outer body panels (fender, door, etc.) have an additional layer of Stone Guard Coat over the ED primer coating. Thus, in replacing or repairing these panels, apply undercoat to the same portions as before. Use a coat which is rust preventive, durable, shock-resistant and has a long shelf life.

 : Indicates stone guard coated portions.



BODY CONSTRUCTION

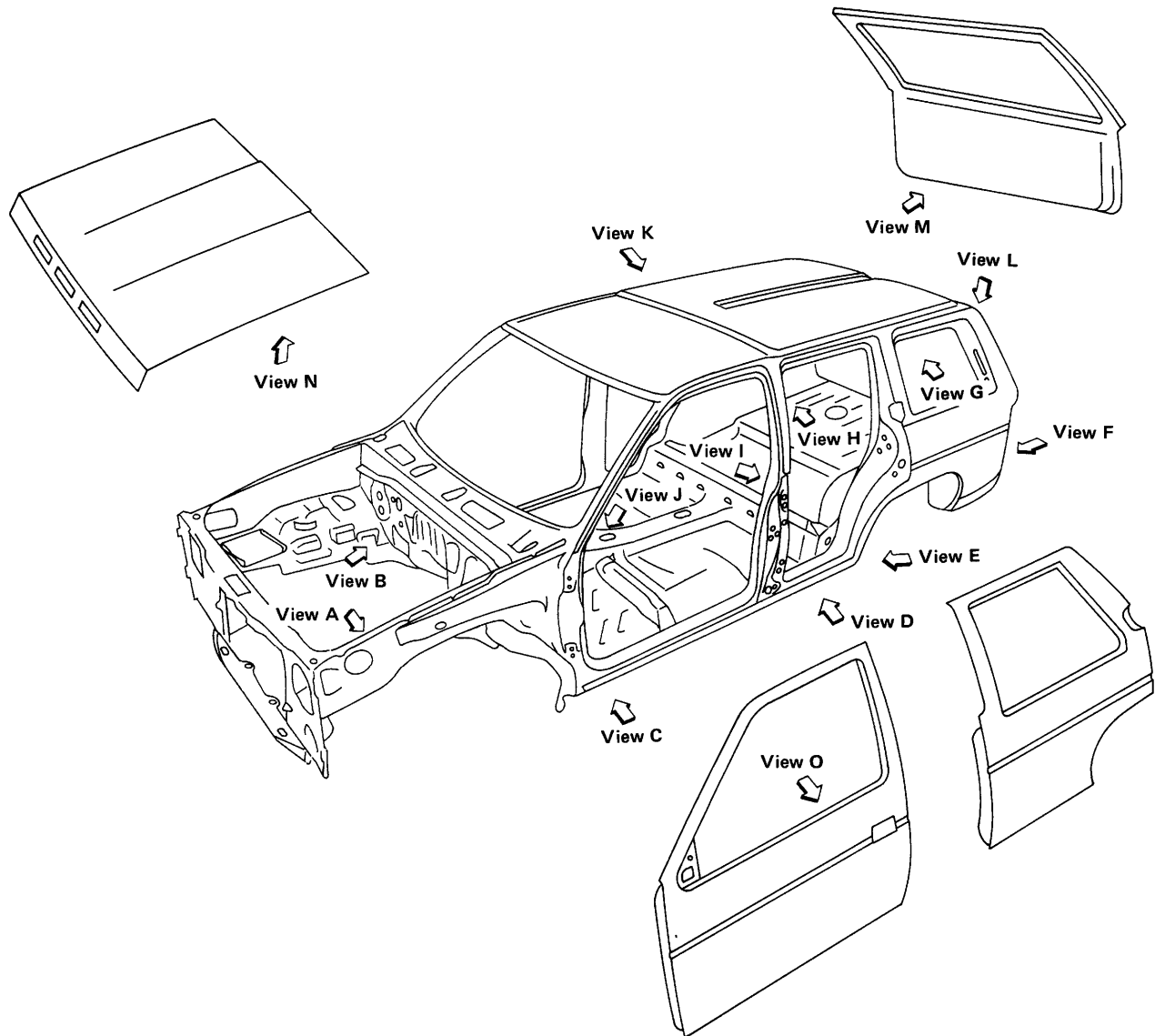


Section A—A	Section D—D	Section G—G	Section J—J
	For North America 		
Section B—B	Section E—E	Section H—H	Section K—K
Section C—C	Section F—F	Section I—I	

DESCRIPTION

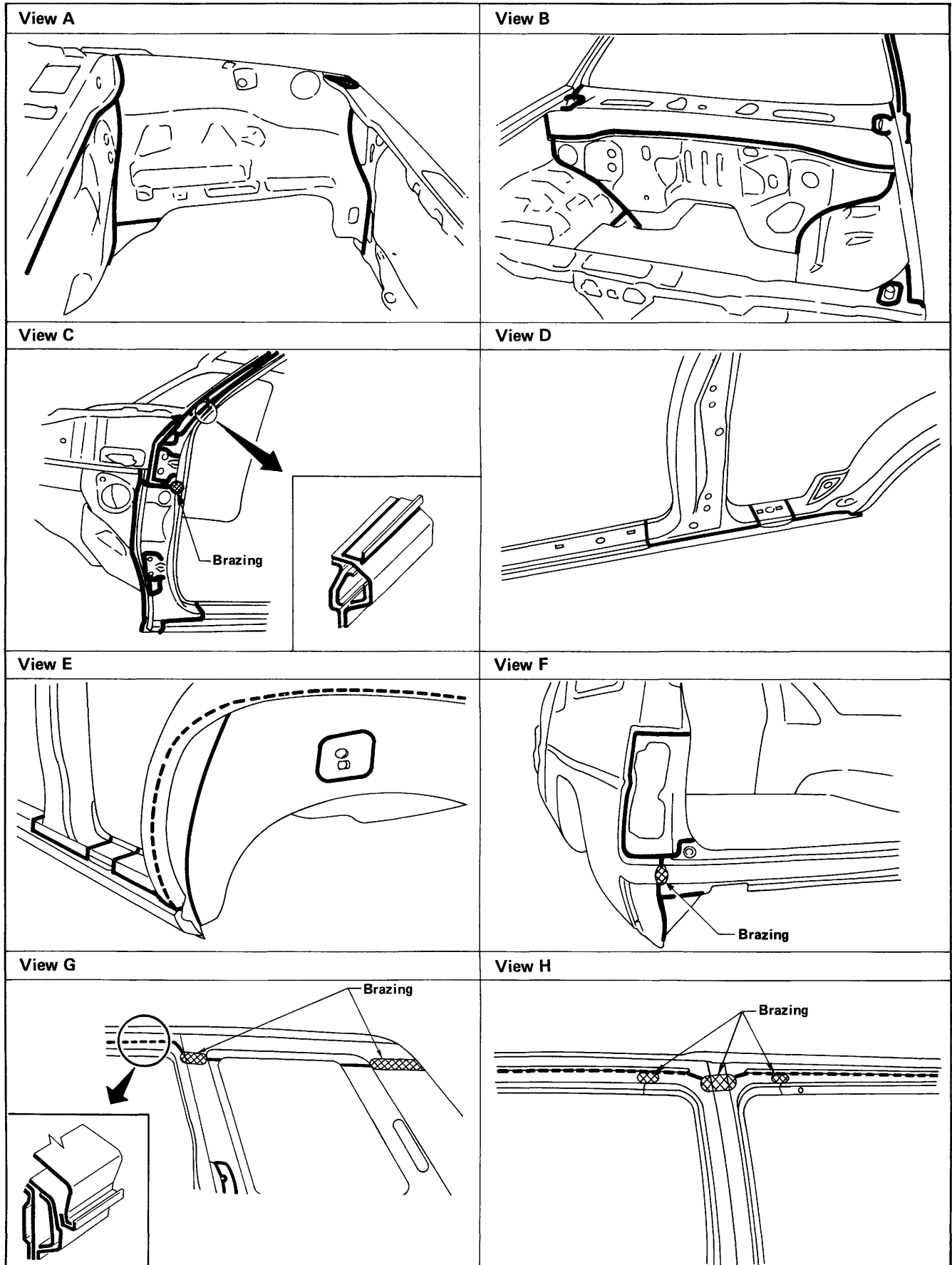
The following figure shows the areas which are sealed at the factory. Sealant which has been applied to these areas should be smooth and free from cuts or gaps.

Care should be taken not to apply an excess amount of sealant and not to allow other unaffected parts to come into contact with the sealant.

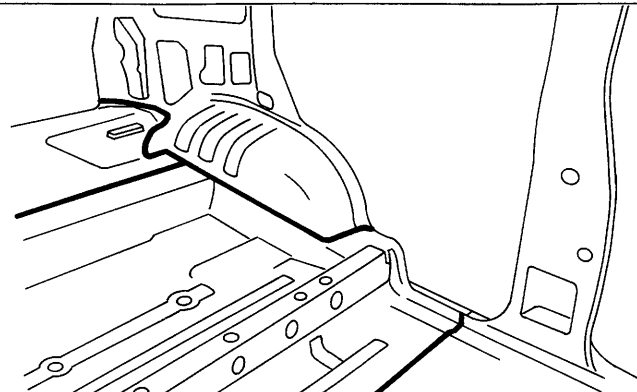
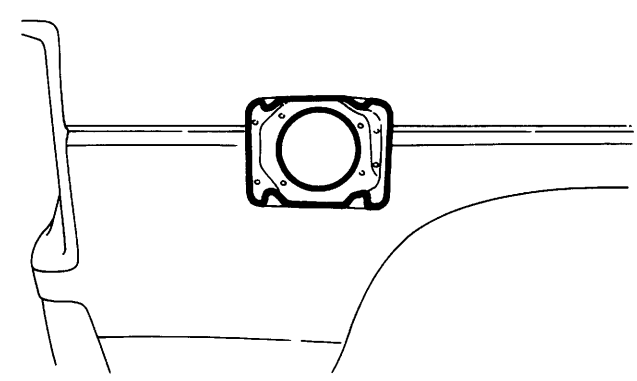
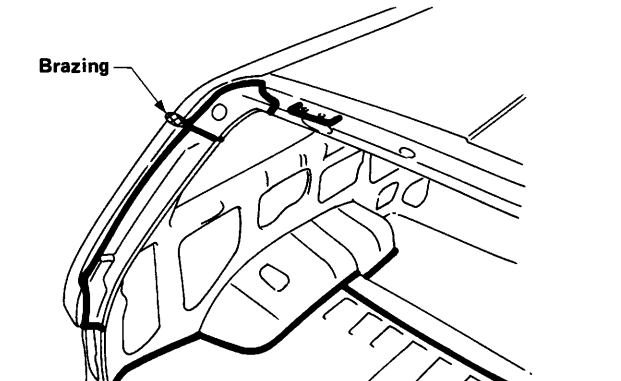
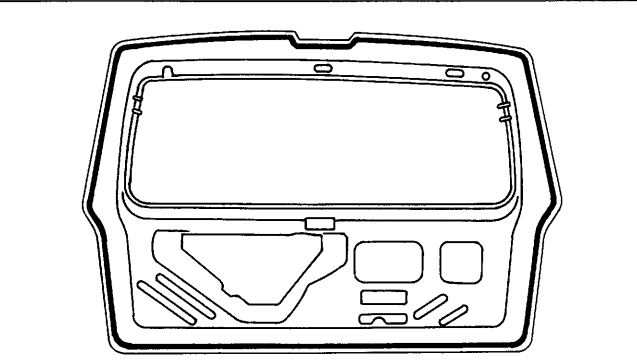
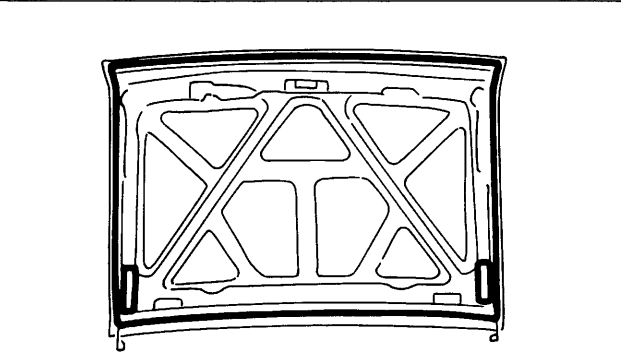
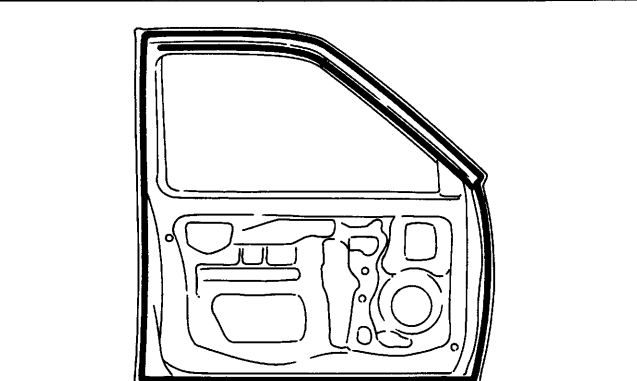


BODY SEALING

DESCRIPTION

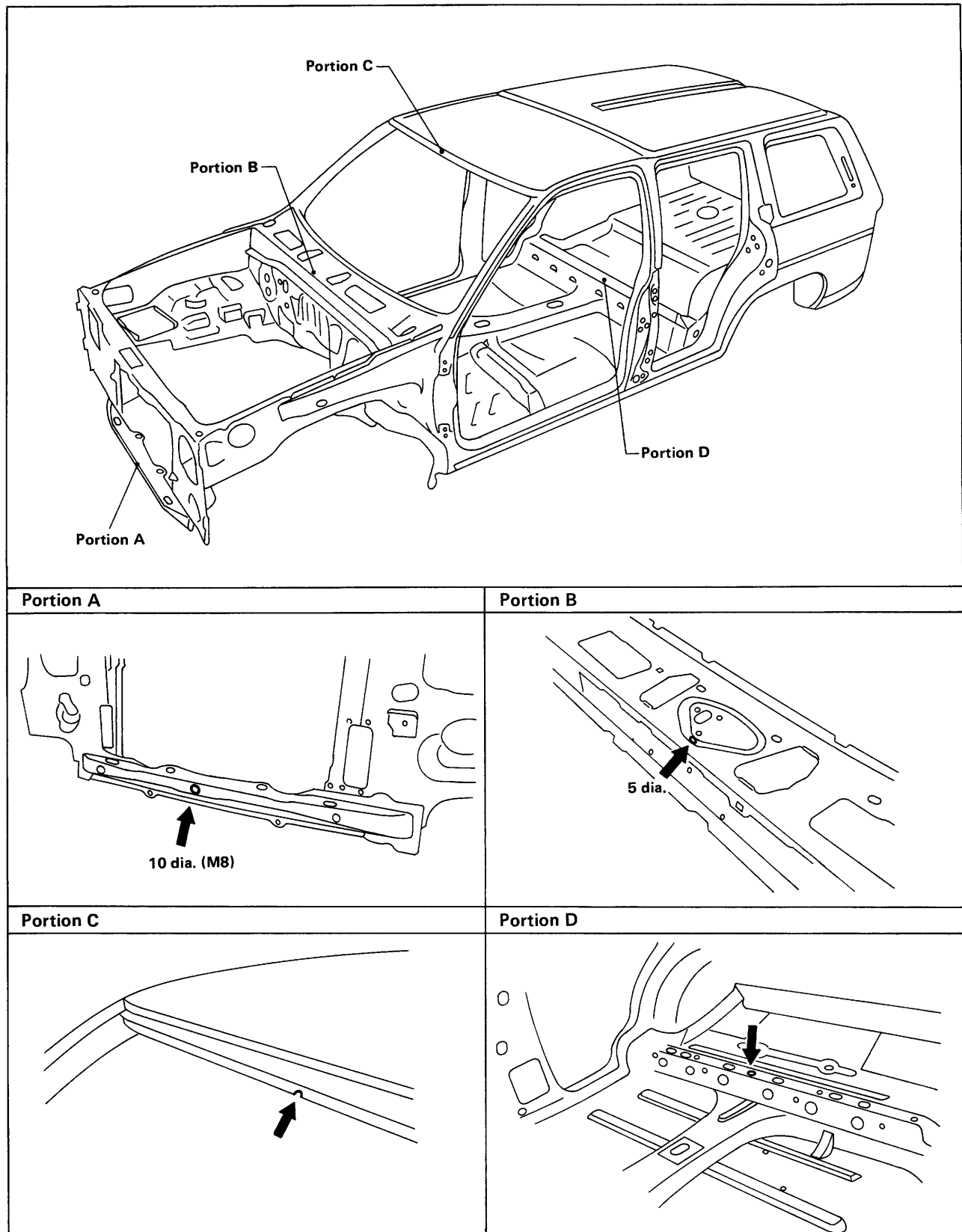


DESCRIPTION

View I 	View J 
View K 	View L 
View M 	View N 
View O 	

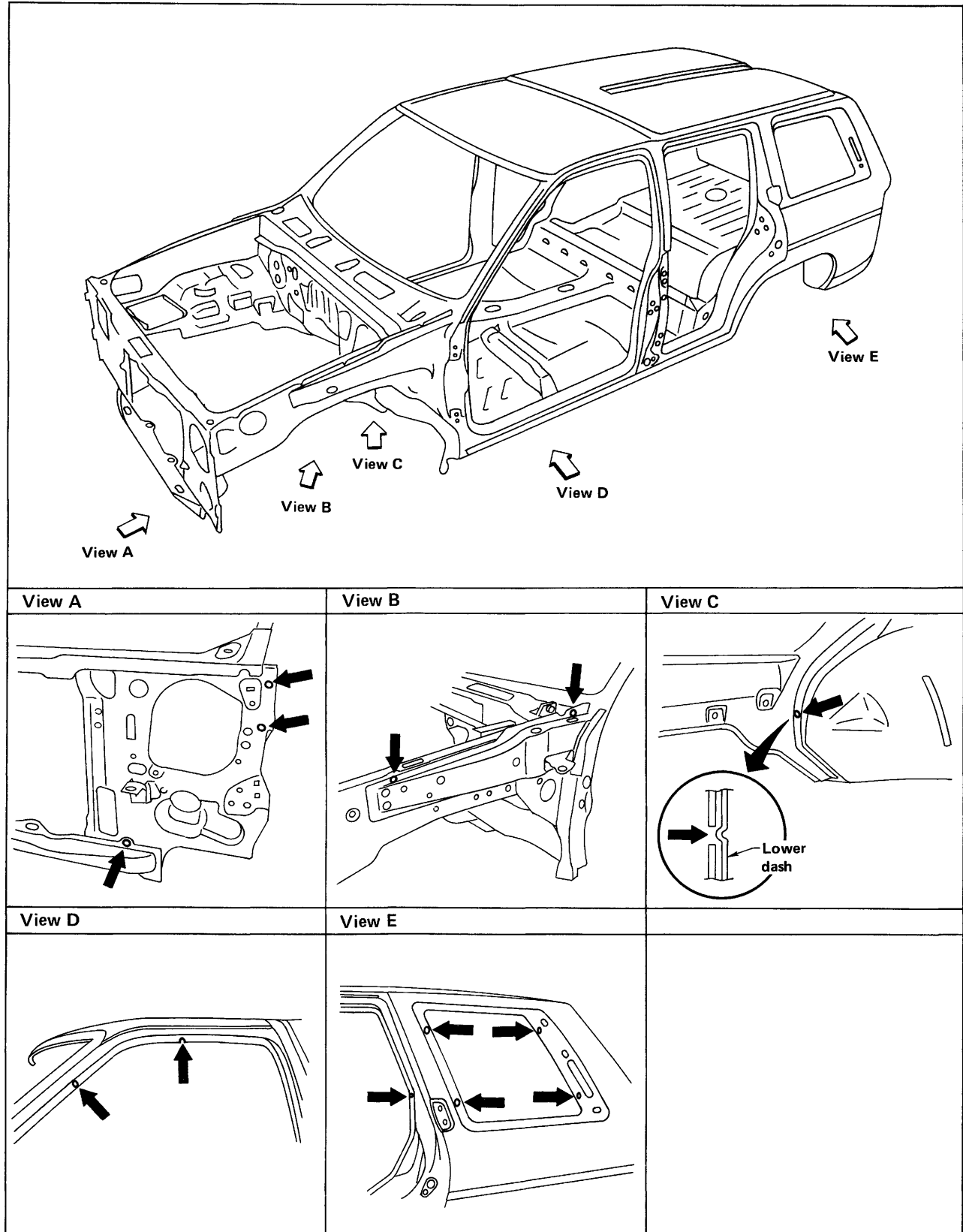
BODY CENTER MARKS

A mark has been placed on each part of the body to indicate the vehicle center. When repairing parts damaged by an accident which might affect the vehicle frame (members, pillars, etc.) more accurate, effective repair will be possible by using these marks together with body alignment data.



PANEL PARTS MATCHING MARKS

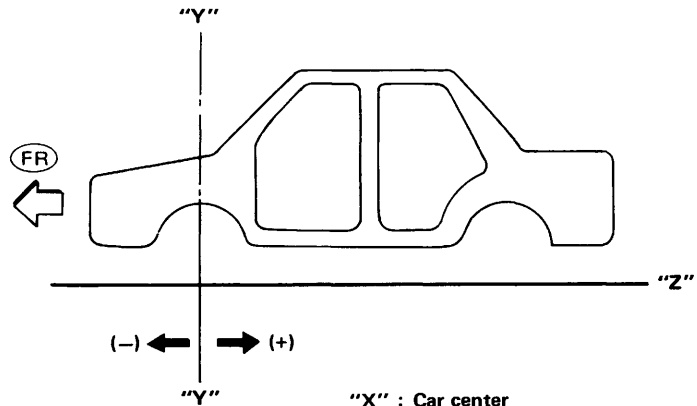
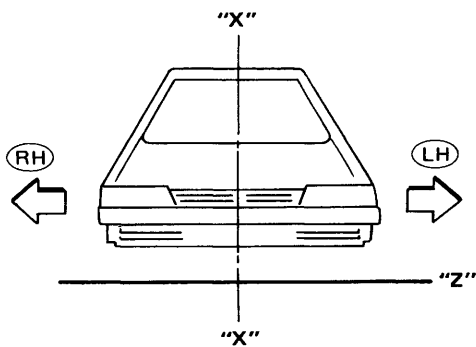
A mark has been placed on each part of the body to indicate the panel parts matching positions. When repairing parts damaged by an accident which might affect the vehicle frame (members, pillars, etc.) more accurate, effective repair will be possible by using these marks together with body alignment data.



BODY ALIGNMENT

DESCRIPTION

- All dimensions indicated in figures are actual ones.
- When a tram tracking gauge is used, adjust both pointers to equal length and check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- The coordinates of the measurement points are the distances measured from the standard line of "X", "Y" and "Z".



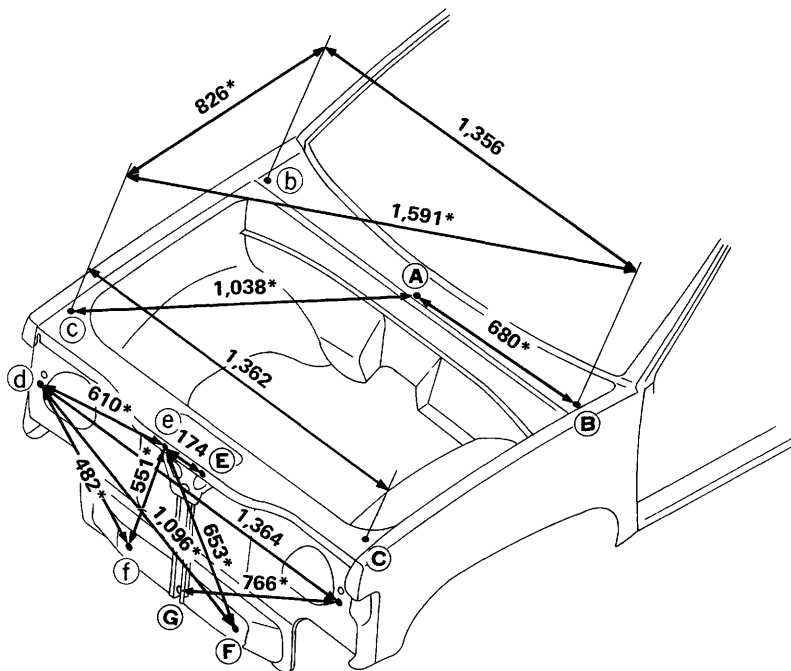
(LH) : Left hand
(RH) : Right hand
(FR) : Front side

"X" : Car center
"Y" : Center line of front axle
"Z" : Imaginary base line
[250 mm below datum line
("oz" at design plan)]

BODY ALIGNMENT

ENGINE COMPARTMENT

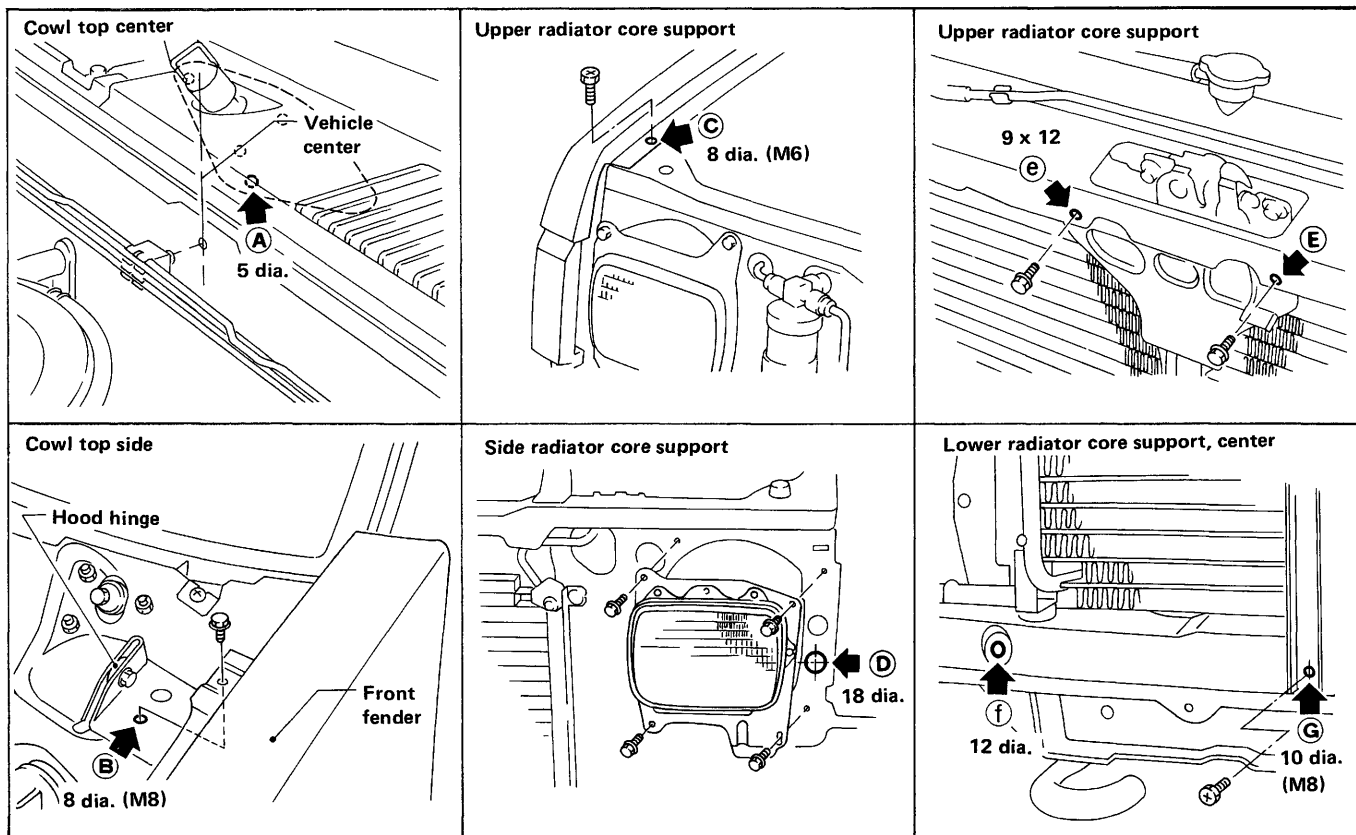
MEASUREMENT



Unit: mm

MEASUREMENT POINTS

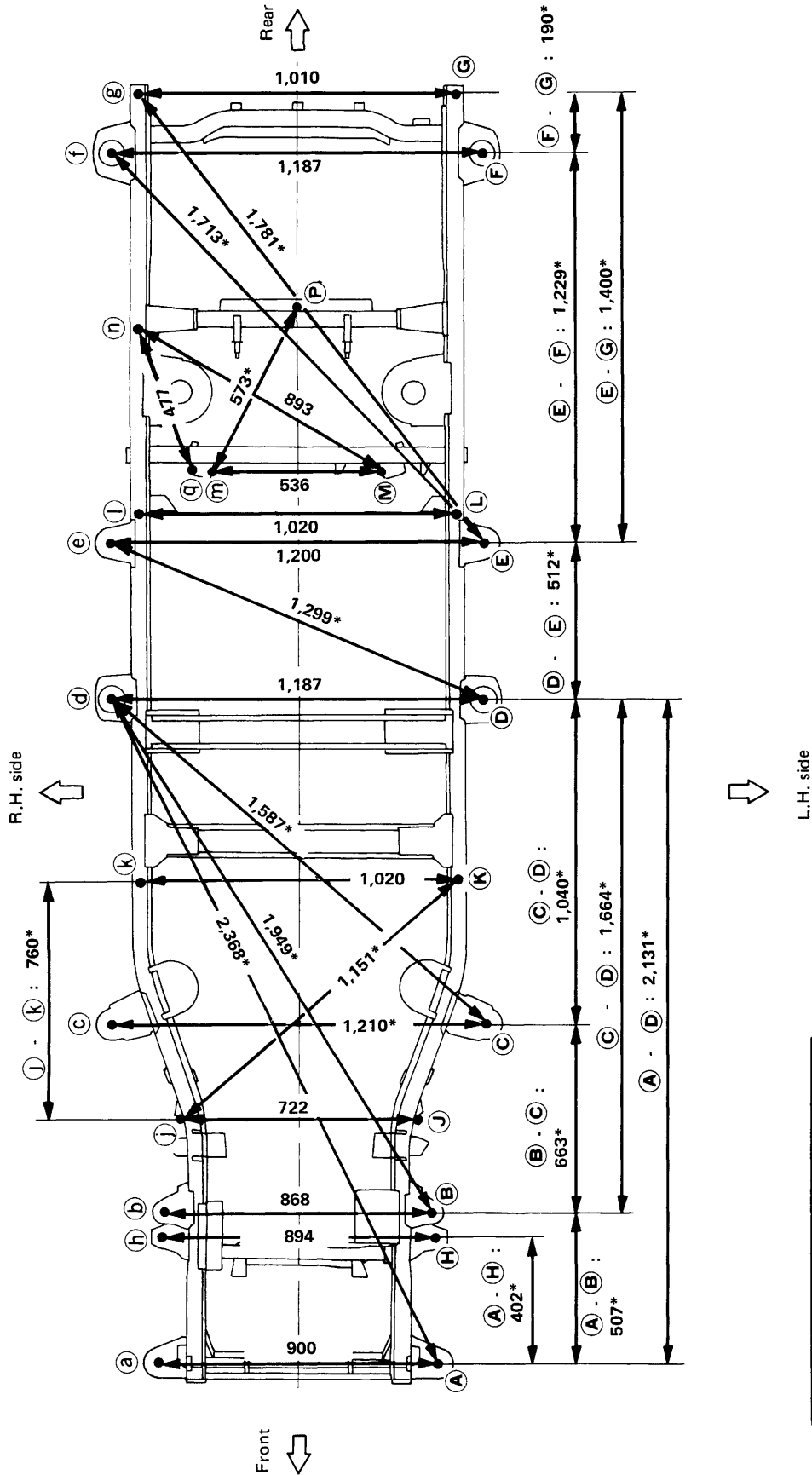
Unit: mm



BODY ALIGNMENT

UNDERBODY

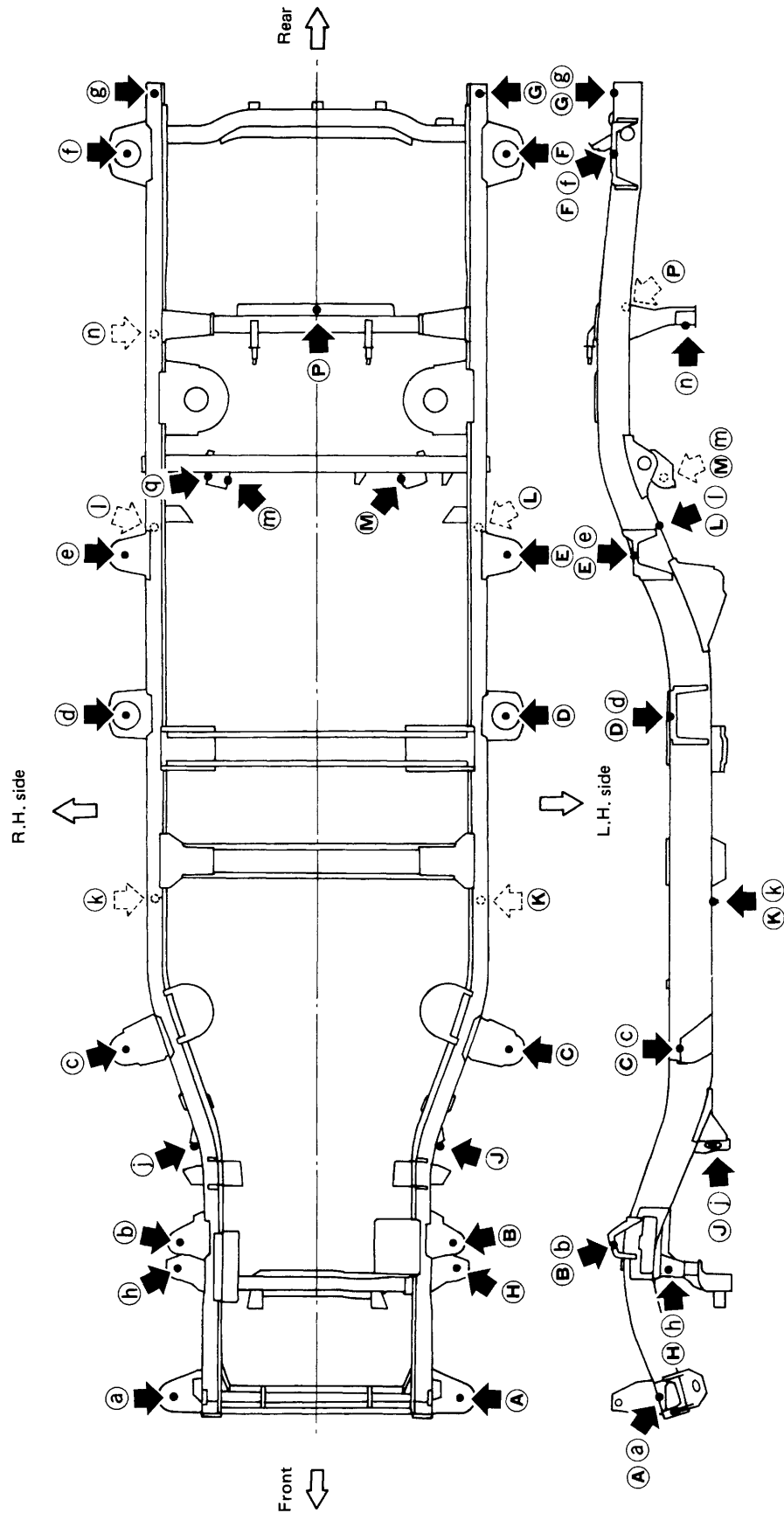
MEASUREMENT



All dimensions in this figure are actual ones.
There are no projected dimensions.

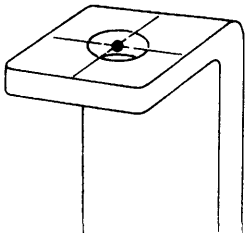
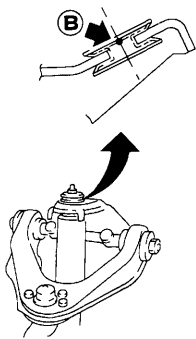
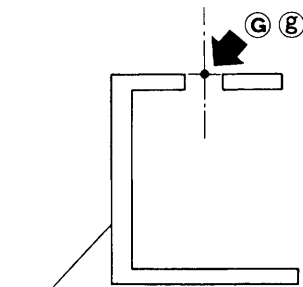
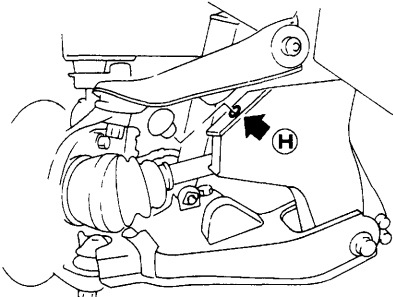
UNDERBODY

MEASUREMENT POINTS



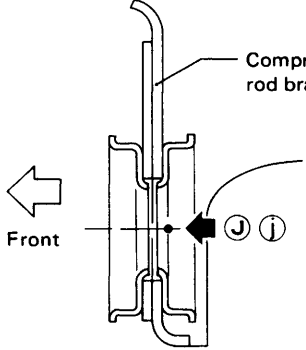
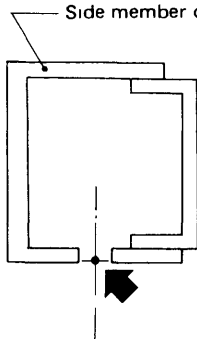
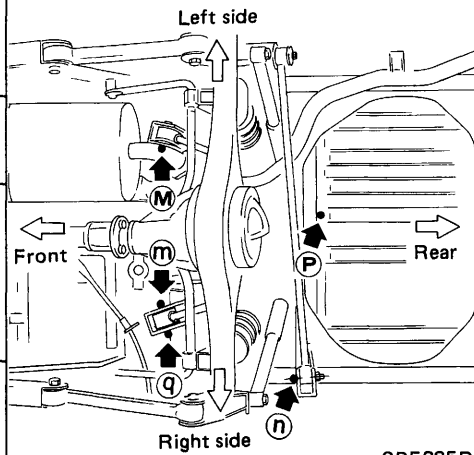
BODY ALIGNMENT

UNDERBODY

Points	Hole dia. mm	Detailed points		Coordinates mm		
				"x"	"y"	"z"
(A) (a)	24	Center of hole on top of bracket  SBF274B	Hole for body mounting insulator mounting	450.0	-488.5	271.2
(C) (c)	28			605.0	597.5	221.8
(D) (d)	85			593.5	1,637.0	235.0
(E) (e)	28			600.0	2,135.0	354.7
(F) (f)	85			593.5	3,362.0	420
(B) (b)	13	 SBF381D	Hole for front shock absorber mounting at the bracket	434.0	-7.7	431.9
(G) (g)	25	 Side member outer SBF671C	Hole for body mounting at rear of side member outer	505.0	3,530.0	420.0
(H) (h)	10.5	 SBF674C	Hole for rebound bumper mounting at lower link bracket	447.0	-88.0	235.1

BODY ALIGNMENT

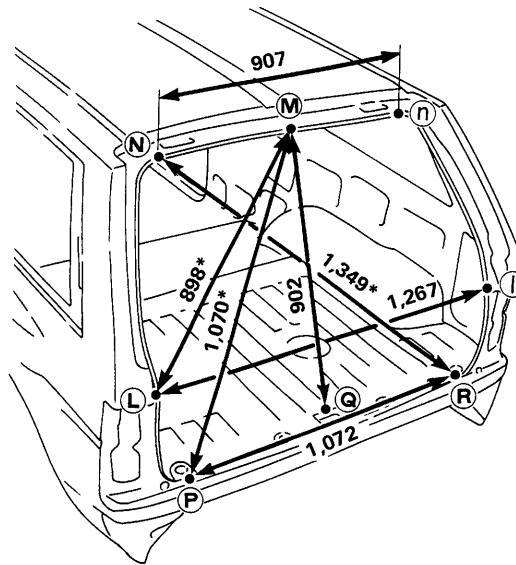
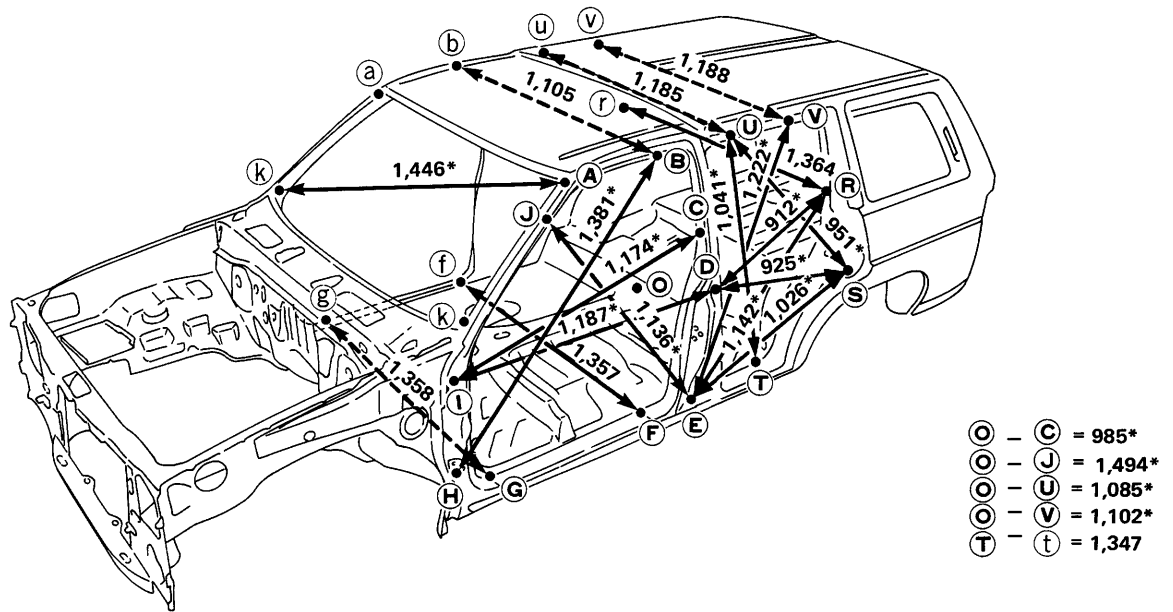
UNDERBODY

Points	Hole dia. mm	Detailed points	Coordinates mm		
			"x"	"y"	"z"
⓵ ⓶	27	 Compression rod bracket SBF675C	361.1	294.5	91.1
⓷ ⓸	13	 Side member outer SBF676C	510.0	1,040.0	115.0
⓹ ⓺	13		510.0	2,210.0	267.2
⓻ ⓼	14	 Left side Front Rear Right side SBF385D	268.0	2,381.6	255
⓽	14		⓻ 332.0	2,396.4	255
⓿	14		⓻ 496	2,840.5	195.0
⓿	11		0.0	2,878.0	356.0

BODY ALIGNMENT

PASSENGER COMPARTMENT AND REAR BODY

MEASUREMENT

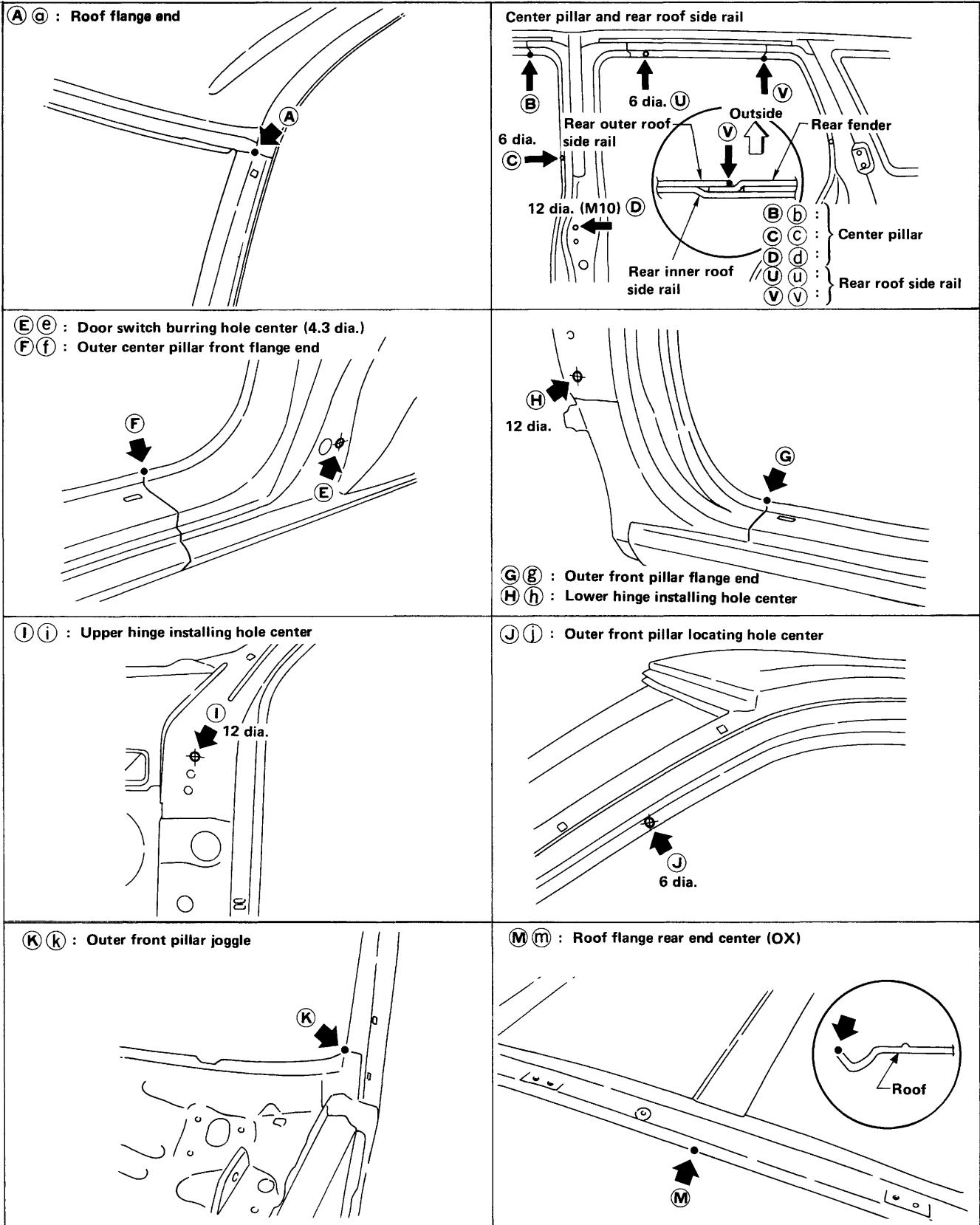


Unit: mm

PASSENGER COMPARTMENT AND REAR BODY

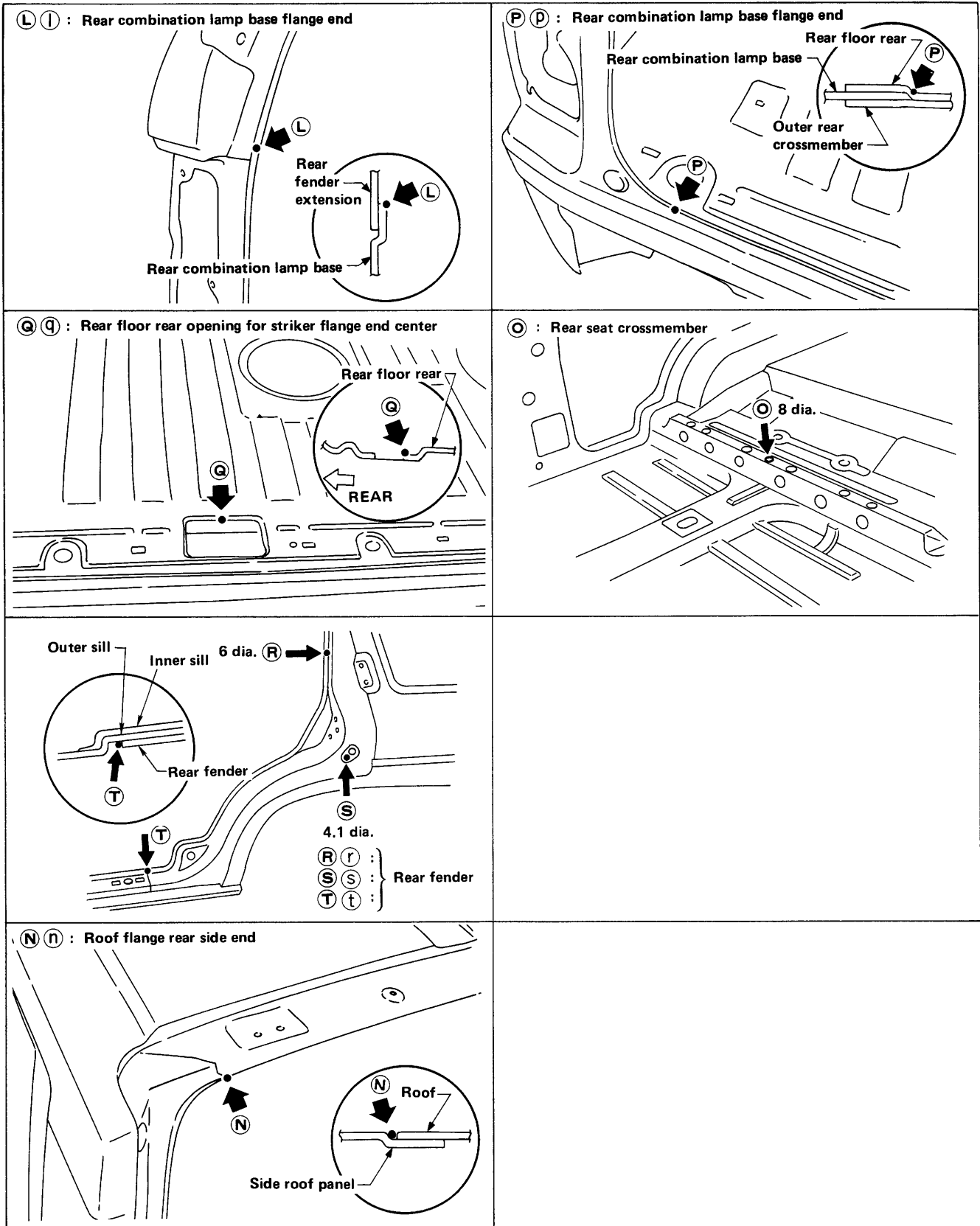
MEASUREMENT POINTS

Unit: mm



PASSENGER COMPARTMENT AND REAR BODY

Unit: mm



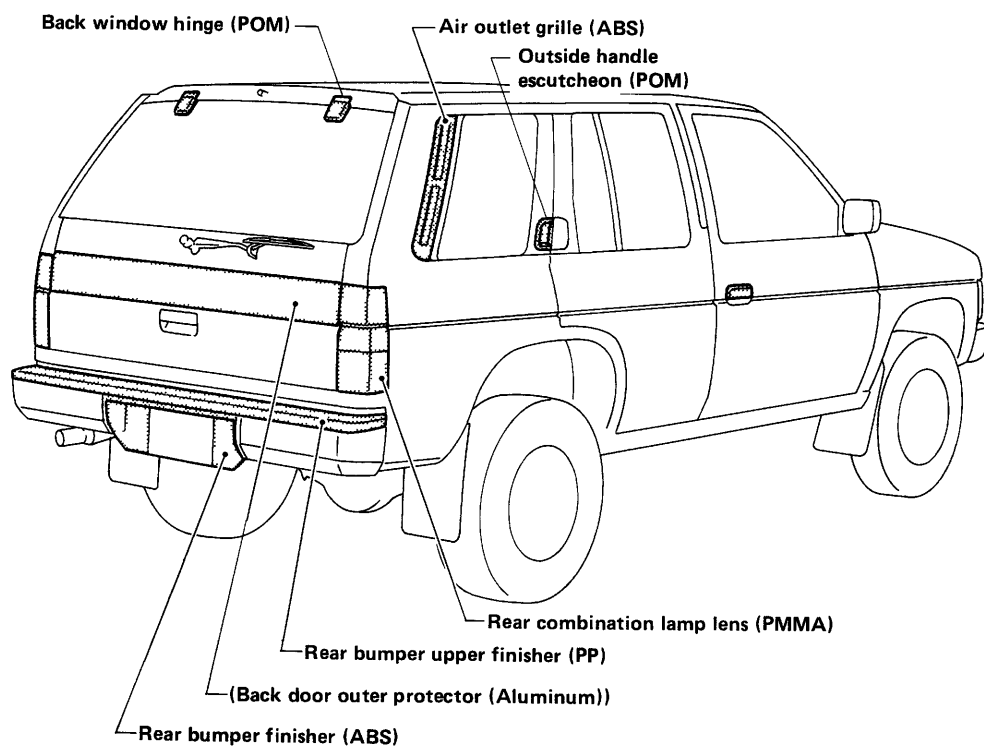
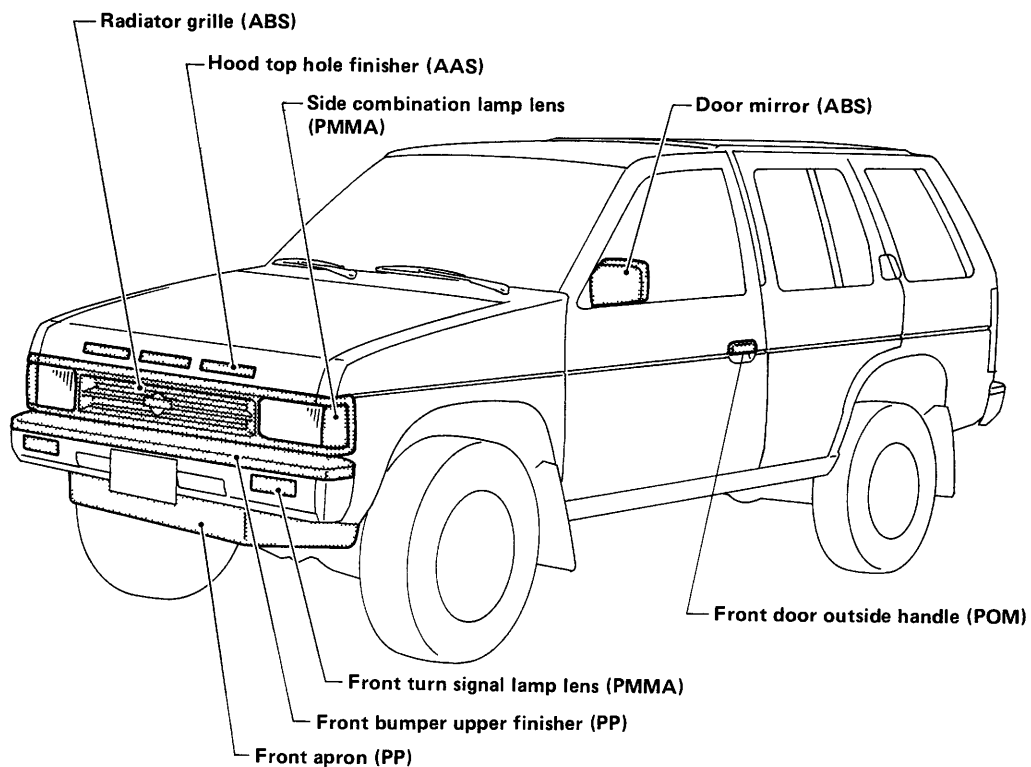
HANDLING PRECAUTIONS FOR PLASTICS

Abbreviation	Material name	Heat resisting temperature °C (°F)	Resistance to gasoline and solvents	Other cautions
PE	Polyethylene	80 (176)	Gasoline and most solvents are harmless.	Flammable
PVC	Polyvinyl chloride	90 (194)	Gasoline and most solvents are harmless if applied for a very short time (wipe up quickly).	Poison gas is emitted when burned.
PP	Polypropylene	90 (194)	Gasoline and most solvents are harmless.	Flammable
ABS	Acrylonitrile butadiene styrene resin	90 (194)	Avoid gasoline and solvents.	Avoid brake fluid.
AES	Acrylonitrile ethylene styrene	90 (194)	Avoid gasoline and solvents.	Avoid brake fluid.
PMMA	Polymethyl methacrylate	90 (194)	Avoid gasoline and solvents.	Avoid brake fluid.
AS	Styrene-acrylonitrile	80 (176)	—	—
PUR	Polyurethane	90 (194)	Gasoline and most solvents are harmless.	Avoid brake fluid.
AAS	Acrylonitrile acrylic rubber styrene	95 (203)	Avoid gasoline and solvents.	Avoid brake fluid.
PPO	Polyphenylene oxide	110 (230)	Avoid gasoline and solvents.	
POM	Polyacetal	120 (248)	Gasoline and solvents are harmless.	Avoid battery acid.
PC	Polycarbonate	120 (248)	Avoid gasoline and solvents.	
PA	Polyamide (Nylon)	150 (302)	Gasoline and most solvents are harmless.	Avoid immersing in water.
FRP	Fiber reinforced plastics	170 (338)	Gasoline and most solvents are harmless.	
PPC	Polypropylene composite	115 (239)	Gasoline and most solvents are harmless.	Flammable
PBT	Polybutylene terephthalate	140 (284)	Gasoline and most solvents are harmless.	
TPR	Thermoplastic rubber	80 (176)	Avoid gasoline and solvents.	
TPE	Thermoplastic elastomer	80 (176)	Avoid gasoline and solvents.	

1. When repairing and painting a portion of the body adjacent to plastic parts, consider their characteristics (influence of heat and solvent) and remove them if necessary or take suitable measures to protect them.
2. Plastic parts should be repaired and painted using methods suiting the materials.

HANDLING PRECAUTIONS FOR PLASTICS

LOCATION OF PLASTIC PARTS

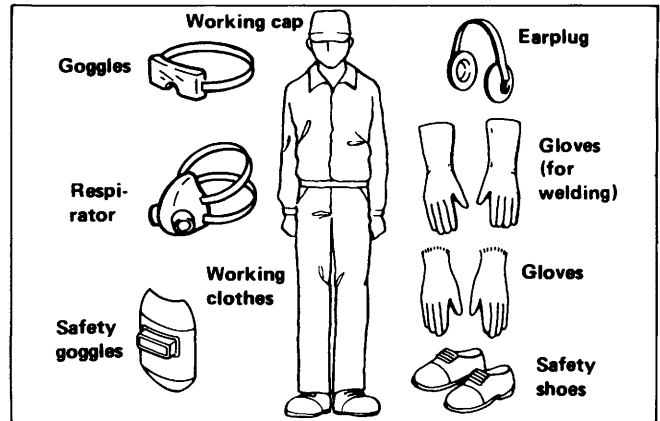


PRECAUTIONS IN OPERATION

WELDING PRECAUTIONS

1. Wear protectors

- Be sure to wear goggles, earplugs, respirator, gloves and so forth depending on the work to be performed. Working clothes, safety shoes, and working cap must be worn as usual.

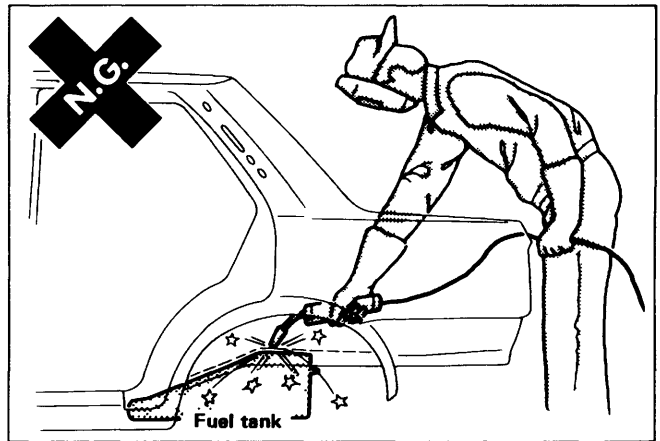


2. Safety stand

- After jacking up a vehicle body, be sure to support it with the safety stand. For the supporting positions, refer to "Lifting Points".

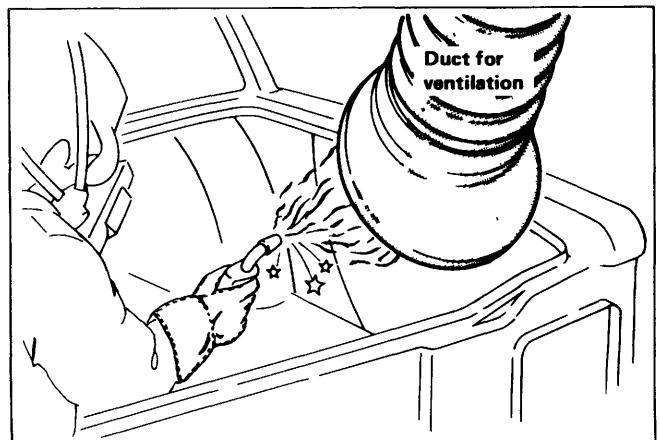
3. Inflammables

- Before starting repair work, be sure to disconnect the negative terminal of the battery.
- When welding parts near the fuel tank, be sure to remove the fuel tank. Plug the filler port of the tank.
- Plug the fuel pipe and brake pipes to avoid leakage when removing connectors from the pipes.



4. Working environment

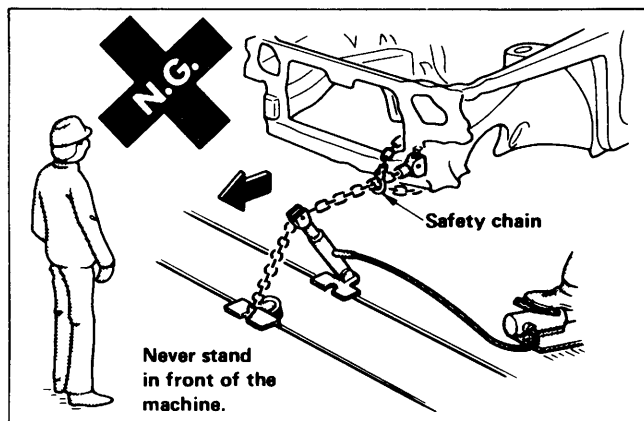
- Pay attention to ventilation and the health of operators.
- Paint and sealant may generate poisonous gases when heated by fire. To prevent this, do not use a gas welder for cutting off damaged portions. Use an air saw or an air chisel.
- Use a belt sander or rotary wire brush for removing paint from the panel.



PRECAUTIONS IN OPERATION

5. Vehicle body straightener

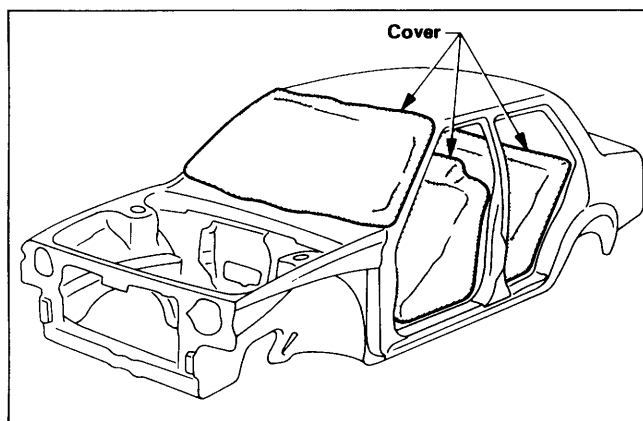
- Be sure to use correctly according to the instruction manual prepared by the manufacturer of the straightener. When straightening a damaged portion, never stand in front of the machine in the direction that the body is to be straightened. Equip with a safety chain in case of emergency.



PROTECTION OF BODY AND EXTERNALLY ATTACHED PARTS

1. Protection of body

- Remove or cover interior components (seats, instruments, carpet).
- When welding, cover glasses, seats, instruments and carpet with a heat-resistant material. (This protection is necessary especially when CO₂ arc welding.)



2. Protection of exterior parts

- When removing external parts (moldings and finishers) attached to the body, apply cloth or protection tape to the body to prevent scratching.
- If the painted surface is scratched, be sure to repair that portion: even a small flaw in the painted surface may cause corrosion.

PRECAUTIONS IN REPLACING OPERATION

Use of genuine parts

- In order to maintain the original functions and high quality of the vehicle, it is recommended that you use genuine Nissan parts.

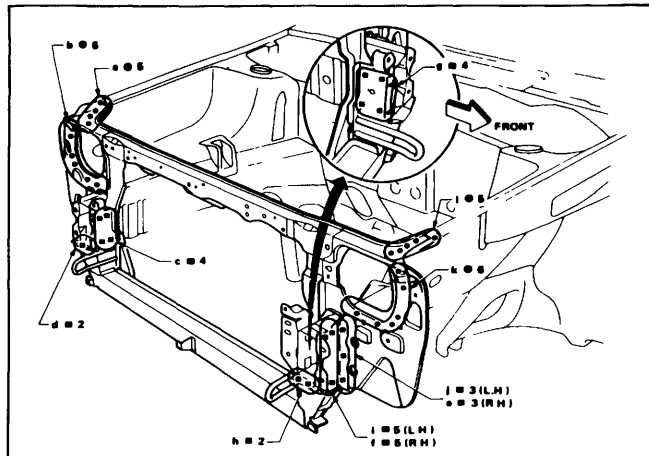
PRECAUTIONS IN OPERATION

WELDING PRECAUTIONS

General precautions

Welding must be properly performed so that vehicle body will retain sufficient strength and durability.

- The REPLACEMENT OPERATION section in the Manual deals with the welding methods, locations to be welded, number of welding spots (or welding pitches) for each body portion. It is recommended to perform welding according to the instructions.



- Resistance spot welding is superior in weld strength to other welding processes. In addition, it features a low amount of thermal strain, a short welding time and finishing is unnecessary.

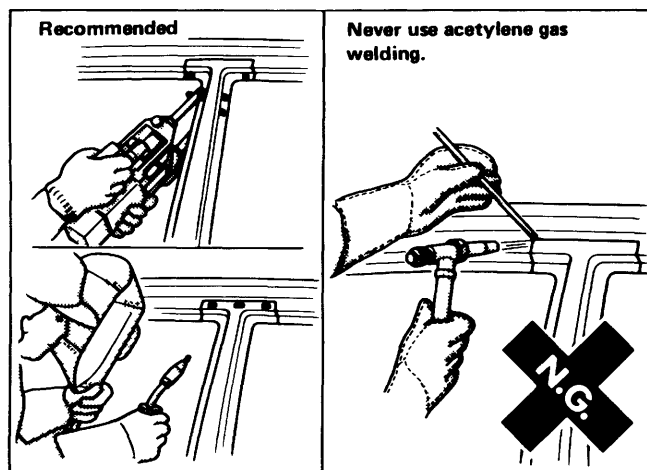
For these reasons, it is recommended that resistance spot welding be used whenever possible.

Further, use of mig welding is recommended for locations where resistance spot welding cannot be utilized.

CAUTION:

Gas welding (oxyacetylene gas welding) must not be used because it causes a decline in strength of areas surrounding the welded parts.

There are a variety of resistance spot welders on the market. Be sure to use a welder with a sufficient capacity to secure weld strength. Also, inspect welded parts to confirm weld strength.



PRECAUTIONS IN OPERATION

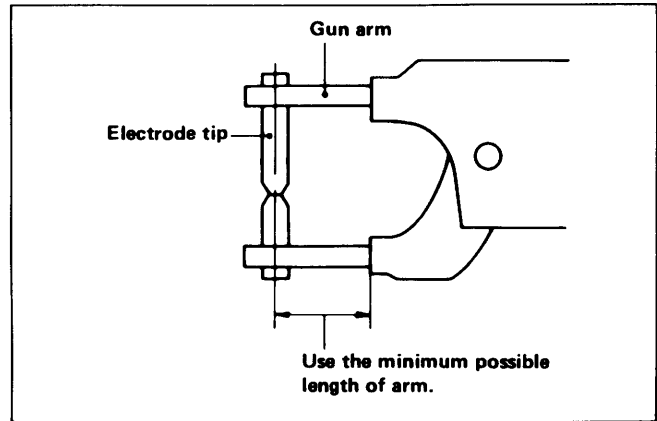
Spot welding

1. Spot welder

To obtain sufficient strength at the spot welded portions, perform the following checks and adjustment on the spot welding machine before starting operation.

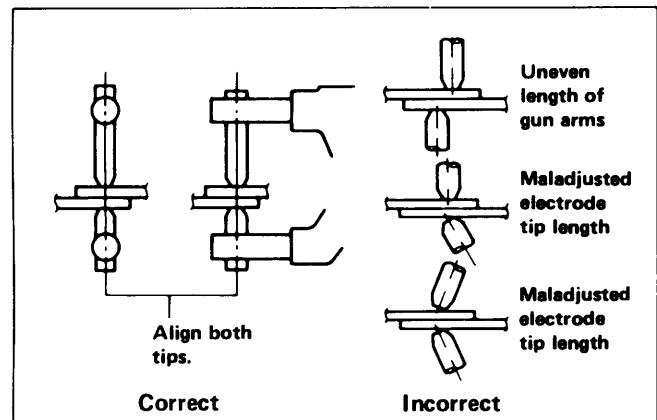
(1) Adjustment of arm

- a. Keep the gun arm as short as possible to obtain the maximum pressure for welding.
- b. Securely tighten the gun arm and tips so that they will not become loose during operation.



(2) Alignment of electrode tips

Align the upper and lower electrode tips on the same axis. Poor alignment of the tips causes insufficient pressure, resulting in insufficient current density and insufficient strength at the weld.

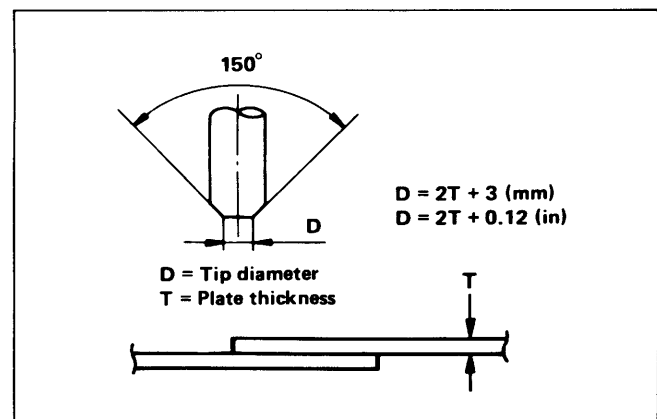


(3) Diameter of electrode tip

The tip diameter must be properly controlled to obtain the desired welding strength. Before starting operation, make sure that the tip diameter (D) is kept the proper size, and file it cleanly to remove burnt or foreign matter from the surface of the tip.

Unit: mm (in)

Thickness (T)	Diameter (D)	Thickness (T)	Diameter (D)
0.6 (0.024)	4.2 (0.165)	1.0 (0.039)	5.0 (0.197)
0.7 (0.028)	4.4 (0.173)	1.2 (0.047)	5.4 (0.213)
0.8 (0.031)	4.6 (0.181)	1.4 (0.055)	5.8 (0.228)
0.9 (0.035)	4.8 (0.189)	1.6 (0.063)	6.2 (0.244)



2. Condition of the panel

Presence of a gap, paint film, rust, or dust on the surface of the panel causes poor current flow and reduction in spot area and these lead to unsuccessful welding.

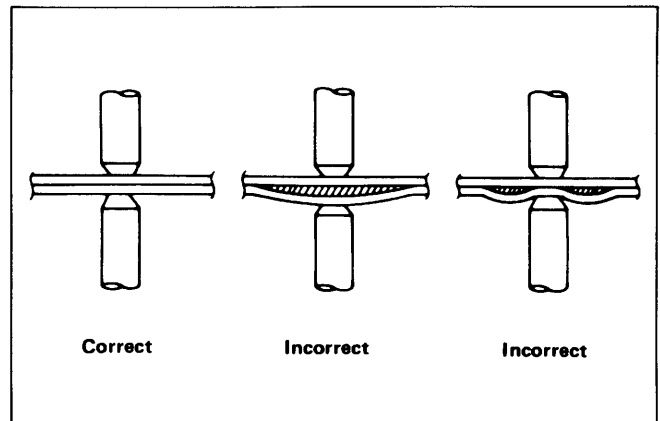
Before beginning, it is necessary to thoroughly check the condition of the panel, and make any necessary corrections.

PRECAUTIONS IN OPERATION

(1) Clearance between welding surfaces:

Any clearance between the surfaces to be welded causes poor current flow. Even if welding can be made without removing such gap, the welded area would become smaller, resulting in insufficient strength.

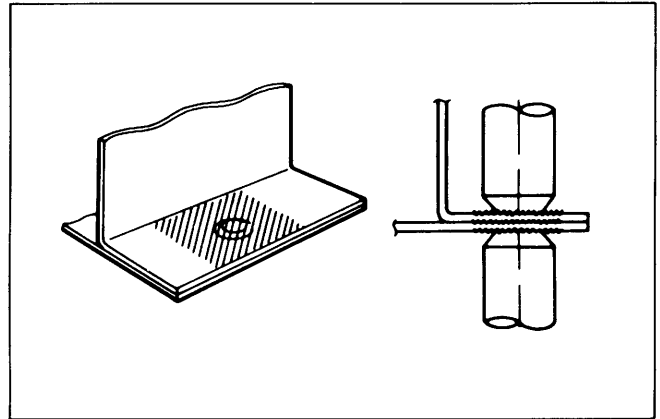
Flatten the two surfaces to remove the gaps, and clamp them tightly with a clamp before welding.



(2) Metal surfaces to be welded:

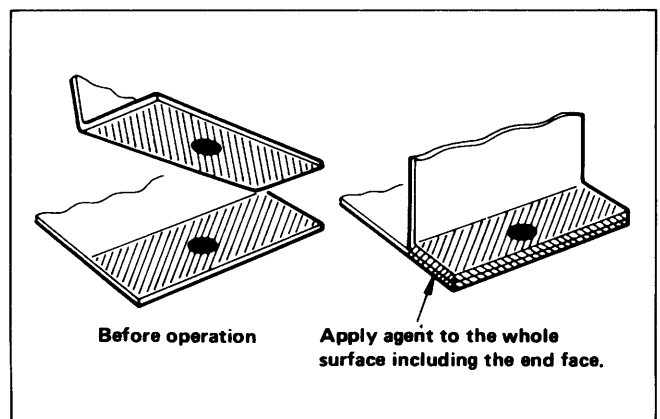
Paint film, rust, dust, or any other contamination on the metal surfaces to be welded cause insufficient current flow and poor results.

Remove all foreign matter from the surfaces to be welded.



(3) Corrosion prevents the welding process on metal surface:

Corrosion agent has higher conductivity. It is important to apply the agent evenly to the end face of the panel.



3. Precautions in performing spot welding:

(1) Selection of spot welding machine —

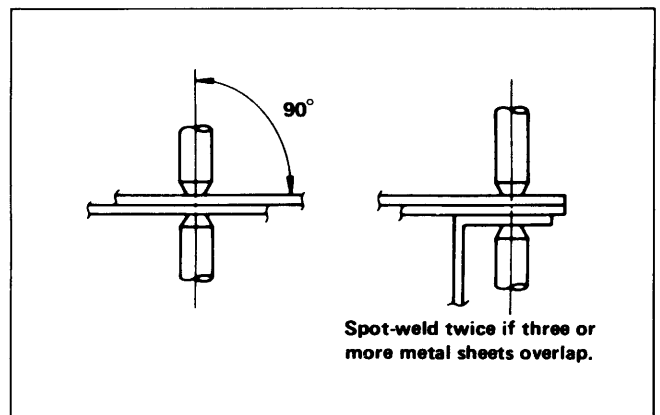
Use the direct welding method. (For the portions to which direct welding cannot be applied, use plug welding by mig welding.)

(2) Application of electrode tips —

Apply electrodes at right angle to the panel. If the electrodes are not applied at right angle, the current density will be low resulting in insufficient welding strength.

(3) Lap welding of more than three metal sheets —

For portions where three or more metal sheets are overlapping, spot welding should be done twice.



PRECAUTIONS IN OPERATION

(4) No. of points of spot-welding:

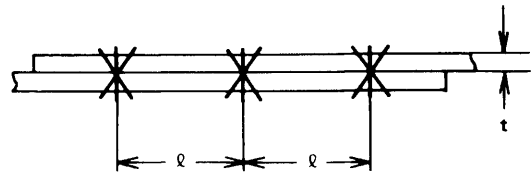
Generally, the capacity of spot welding machines available in repair shop is smaller than that of welding machines at the factory. Accordingly, the number of points of spot-welding should be increased by 20 to 30% in a service shop compared to spot-welding in the factory.

(5) Minimum welding pitch:

The minimum welding pitch varies with the thickness of plates to be welded. In general, the values given in the following table must be observed. Note that excessively small pitch allows the current to flow through surrounding portions, and this results in insufficient welding strength of the metal.

Unit: mm (in)

Thickness (t)	Minimum pitch (ℓ)
0.6 (0.024)	10 (0.39)
0.8 (0.031)	12 (0.47)
1.0 (0.039)	18 (0.71)
1.2 (0.047)	20 (0.79)
1.6 (0.063)	27 (1.06)
1.8 (0.071)	31 (1.22)

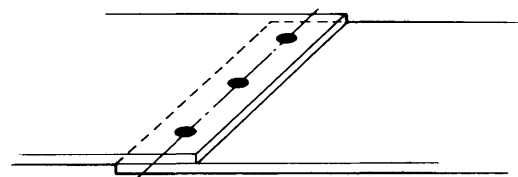
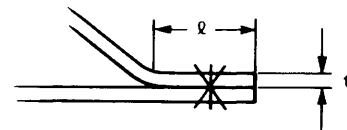
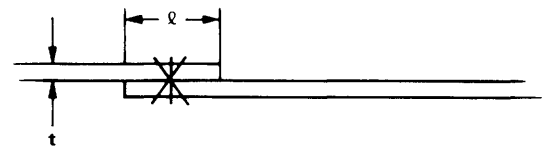


(6) Minimum lap of panels:

Observe the following values for the lap distance of panels. If the lap distance is too small, it results in insufficient strength and also in a strained panel.

Unit: mm (in)

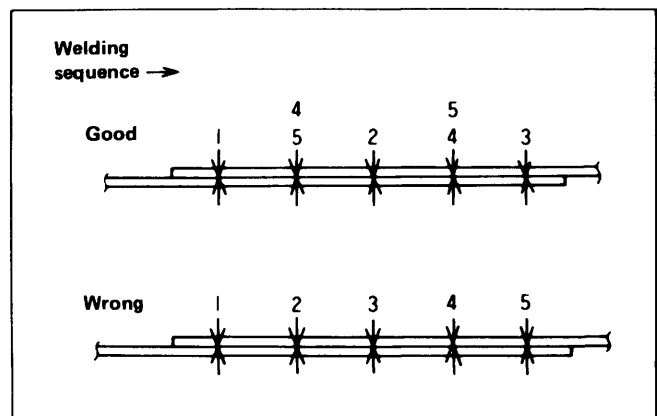
Thickness (t)	Minimum pitch (ℓ)
0.6 (0.024)	11 (0.43)
0.8 (0.031)	11 (0.43)
1.0 (0.039)	12 (0.47)
1.2 (0.047)	14 (0.55)
1.6 (0.063)	16 (0.63)
1.8 (0.071)	17 (0.67)



Be sure to spot weld at the center of the overlapped portion.

(7) Spotting sequence:

Do not spot continuously in only one direction. This method provides weak welding due to the shunt effect of the current. If the welding tips become hot and change their color, stop welding and allow the tips to cool.



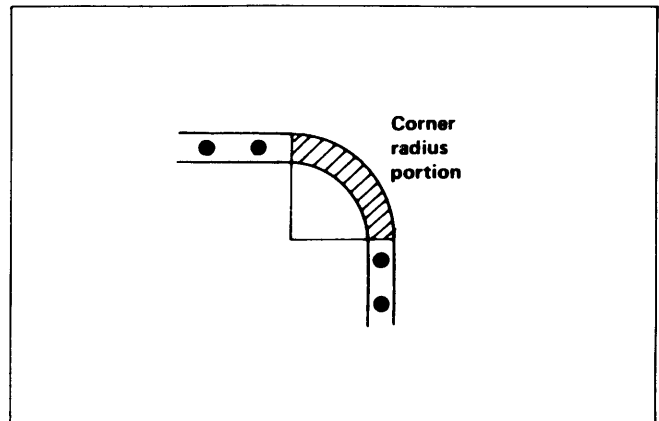
PRECAUTIONS IN OPERATION

(8) Welding corners:

Do not weld the corner radius portion. Welding this portion results in stress concentration, which leads to cracks.

Examples

- Upper corner of front and center pillars
- Front upper portion of rear fender
- Corner portion of front and rear windows



4. Inspection of welded portion

Spot-welded portions can be checked by visual inspection and destructive inspection. The destructive inspection explained below can be adopted easily at the time of welding. Before and after welding, be sure to perform this destructive inspection to check the strength of the welded portions.

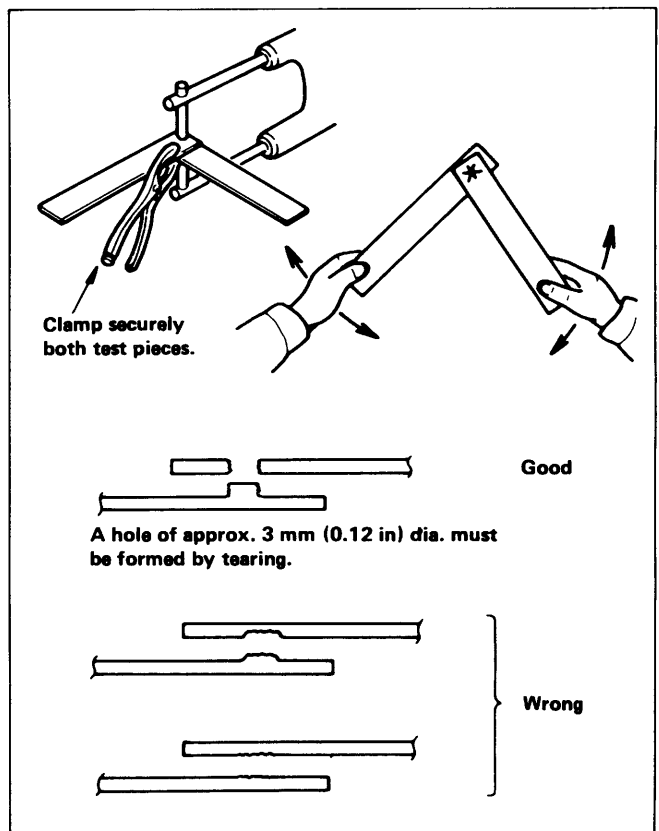
The welding spots should be spaced equally and arranged at the center of the flange to be welded.

(1) Check by using test piece (Confirmation before operation)

- Prepare test pieces having the same thickness as the panel to be welded and weld them together. Break the welded portion by twisting and examine the condition of the ruptured portion.

Clamp both test pieces together so that they will not slip or move during welding.

- With this test, a hole should be made on one test piece by tearing at the welded portion. If no hole is formed, it indicates that the welding conditions are incorrect. Adjust the pressure, welding current, current passing time and other conditions, and repeat test until the best result is obtained.



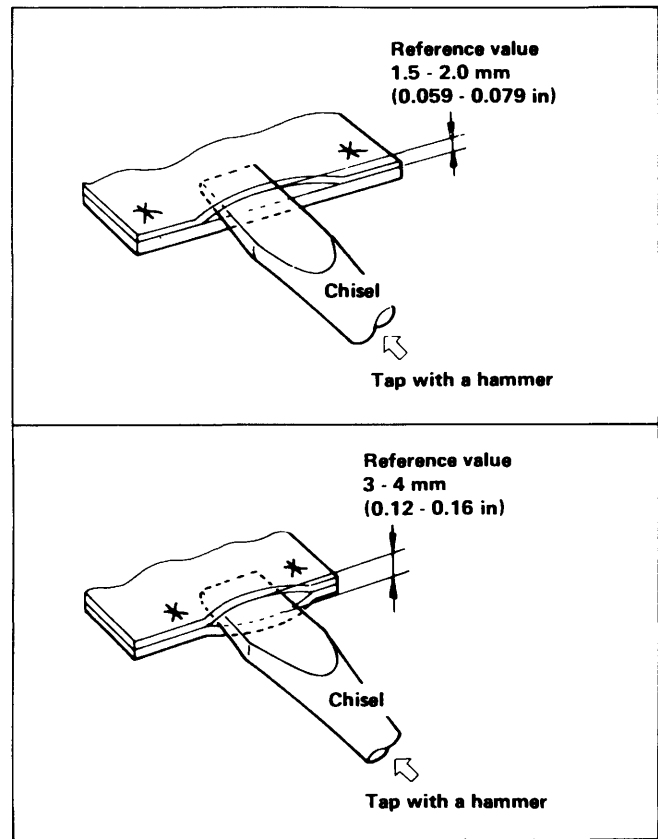
PRECAUTIONS IN OPERATION

(2) Check by using chisel and hammer (Confirmation after welding)

- Insert the tip of a chisel between the welded plates, and tap the end of the chisel until the clearance of 3 to 4 mm (0.12 to 0.16 in) [when the plate thickness is 0.8 to 1.0 mm (0.031 to 0.039 in)] is formed between the plates. If the welded portions remain normal, it indicates that the welding has been done properly.

This clearance varies with the location of the welded spots, length of the flange, plate thickness, welding pitch, and other factors. Note that the value shown above is only a reference value.

- If the thickness of the plates is not equal, the clearance between the plates must be limited to 1.5 to 2.0 mm (0.059 to 0.079 in). Note that further opening of the plates can become a destructive test.
- Be sure to repair the deformed portion of the panel after inspection.



Mig welding

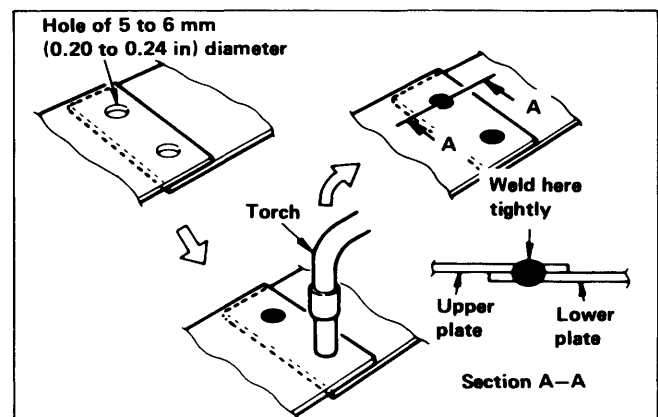
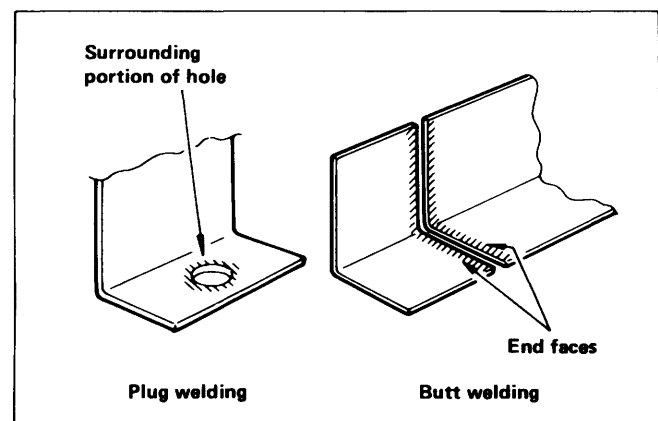
1. Condition of panel to be welded

Paint film, rust, or oils attached to the surface of the panel reduces the welding conditions, causing blowholes and spatter. Thoroughly remove any foreign matter from the surface to be welded by using a belt sander or wire brush.

2. Precautions in welding

(1) Plug welding

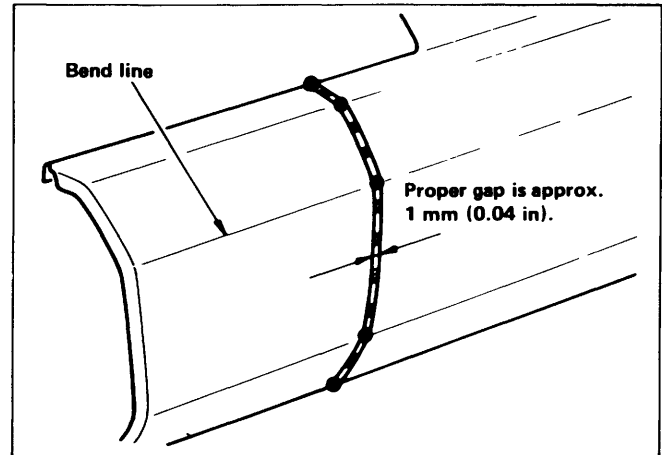
- Open a hole of 5 to 6 mm (0.20 to 0.24 in) diameter on one of the two metal plates to be welded and keep the upper plate and lower plate in tight contact.
- Apply the torch at right angle to the plate and fill metal into the hole at a stretch. Note that intermittent welding leads to the generation of oxide film on the surface and this causes blowholes. If this occurs remove the oxide film with a wire brush.
- Make sure that the upper and lower plates are welded together tightly.



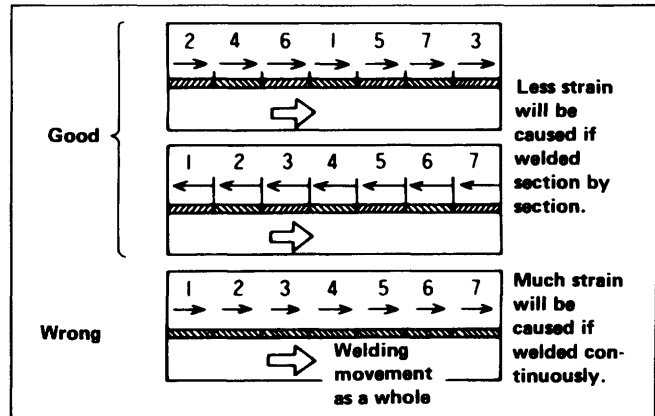
PRECAUTIONS IN OPERATION

(2) Butt welding

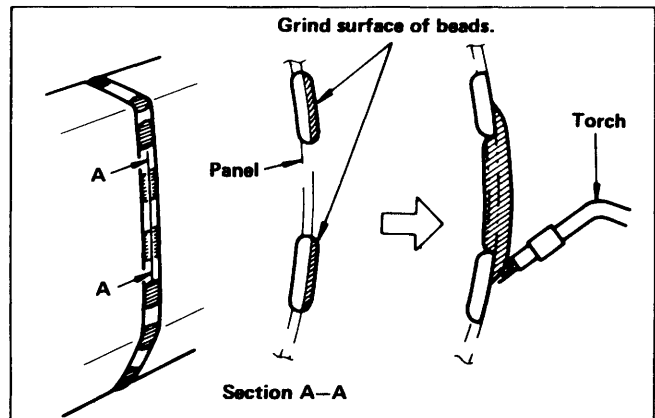
- a. Before performing this welding, tack-weld two pieces of the metals to be welded to prevent generation of strains and to align two metal surfaces. Tack two metal pieces by placing point welds and then fill in the spaces by placing short welding beads.



- b. Long weld line is apt to cause strain. Use the method shown at the left to reduce strain.



- c. To fill the spaces between intermittently placed beads, first grind the beads along the surface of the panel using a sander, then fill metal into the space. If weld metal is placed without grinding the surface of the beads, blowholes may be produced.



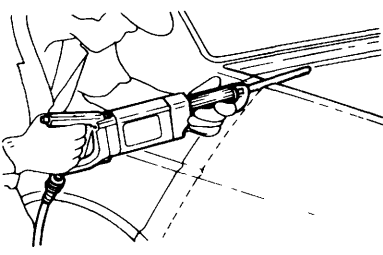
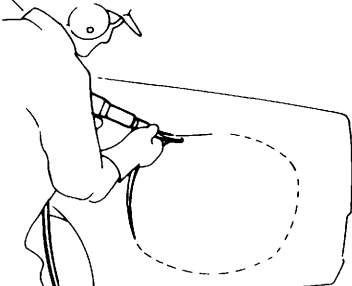
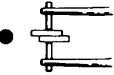
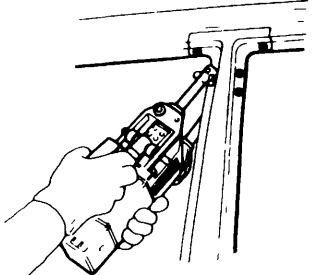
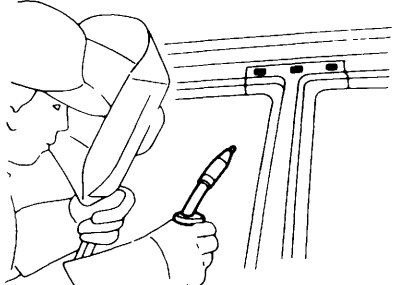
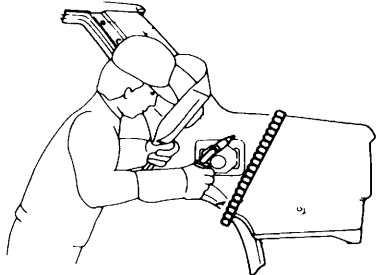
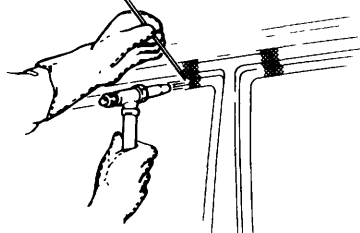
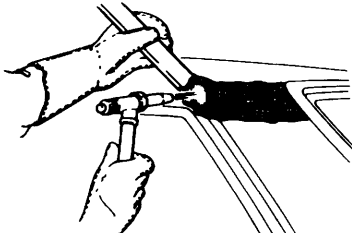
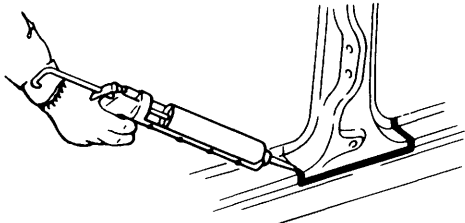
3. Inspection of welded portion

Refer to the inspection method described for spot welding.

REPLACEMENT OPERATIONS

DESCRIPTION SYMBOLS FOR CUTTING AND WELDING/BRAZING OPERATIONS

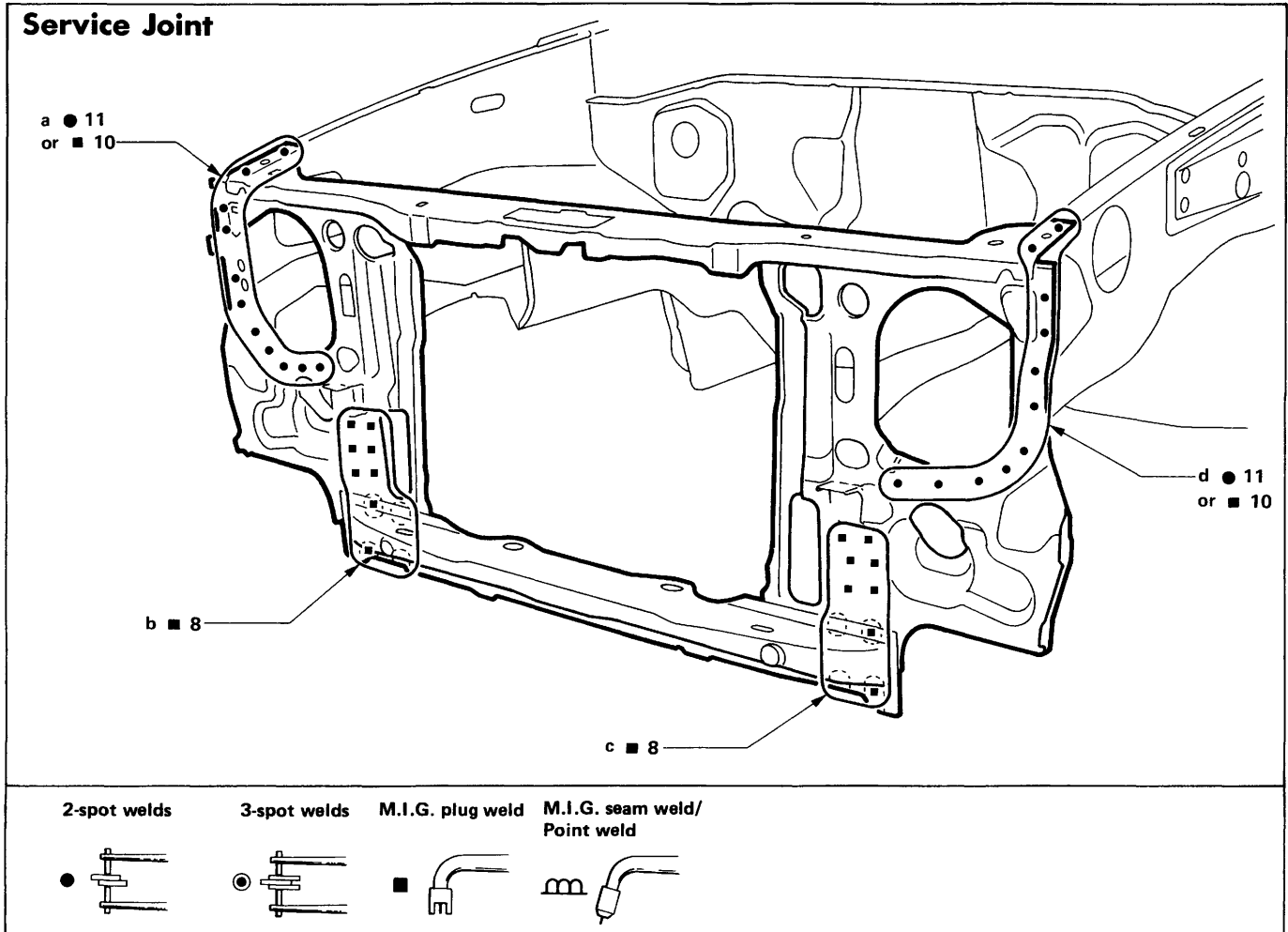
The identification of the cutting and the welding/brazing symbols used throughout this guide is given in the following pages.

 Saw cut or air chisel cut	 
 2-spot welds  3-spot welds  	2-spot welds (2-panel overlapping portions) 3-spot welds (3-panel overlapping portions) 
 M.I.G. plug weld	 
 M.I.G. seam weld/ Point weld	 
 Brazing	
 Soldering	
 Sealing	

REPLACEMENT OPERATIONS

RADIATOR CORE SUPPORT

Service Joint

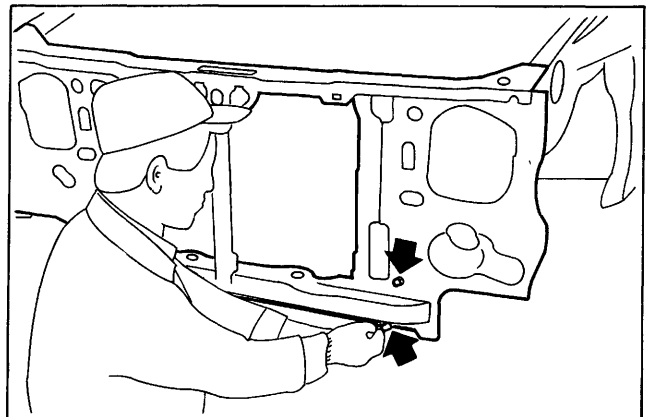


Portions to be welded

- | | |
|------------------------------|------------------------------|
| a Hoodedge | c. 1st body mounting bracket |
| b. 1st body mounting bracket | d Hoodedge |

REMOVAL NOTE

- Before spot cutting at portions (b) and (c), first loosen bolts on radiator core support. These bolts are used for improving body rigidity.

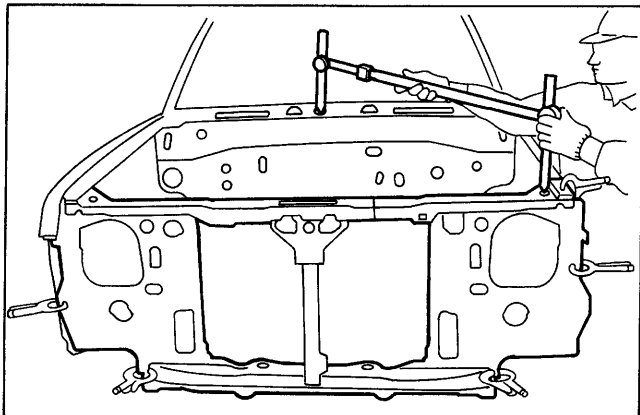


REPLACEMENT OPERATIONS

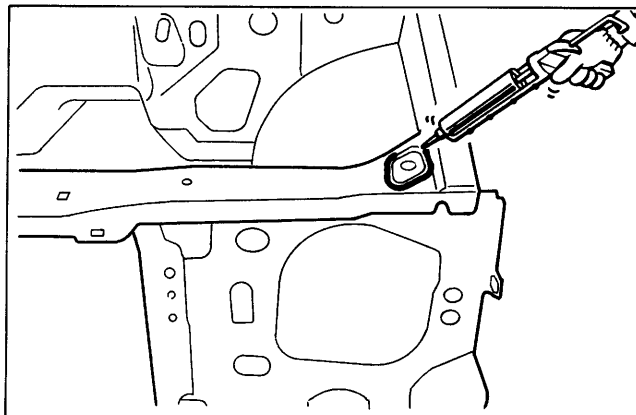
RADIATOR CORE SUPPORT

INSTALLATION NOTES

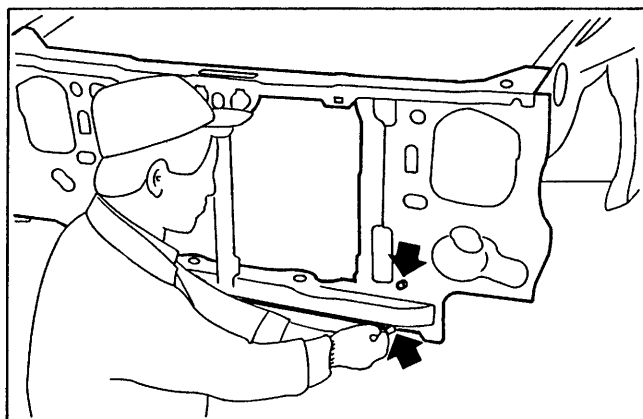
- Measure various dimensions of the part locations. Refer to "BODY ALIGNMENT" drawing.



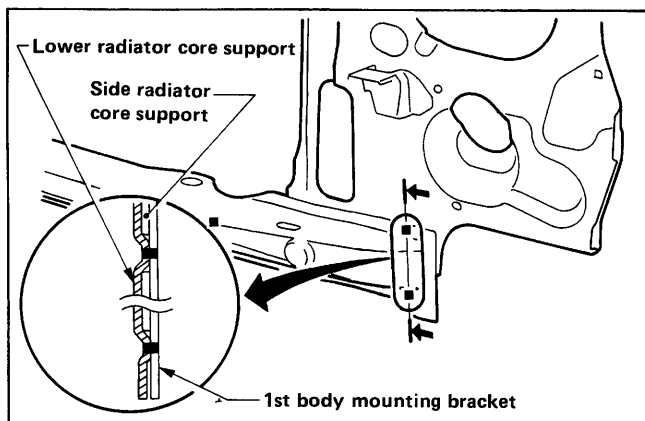
- Apply sealer.



- Before welding at portions (b) and (c), tighten the bolts.

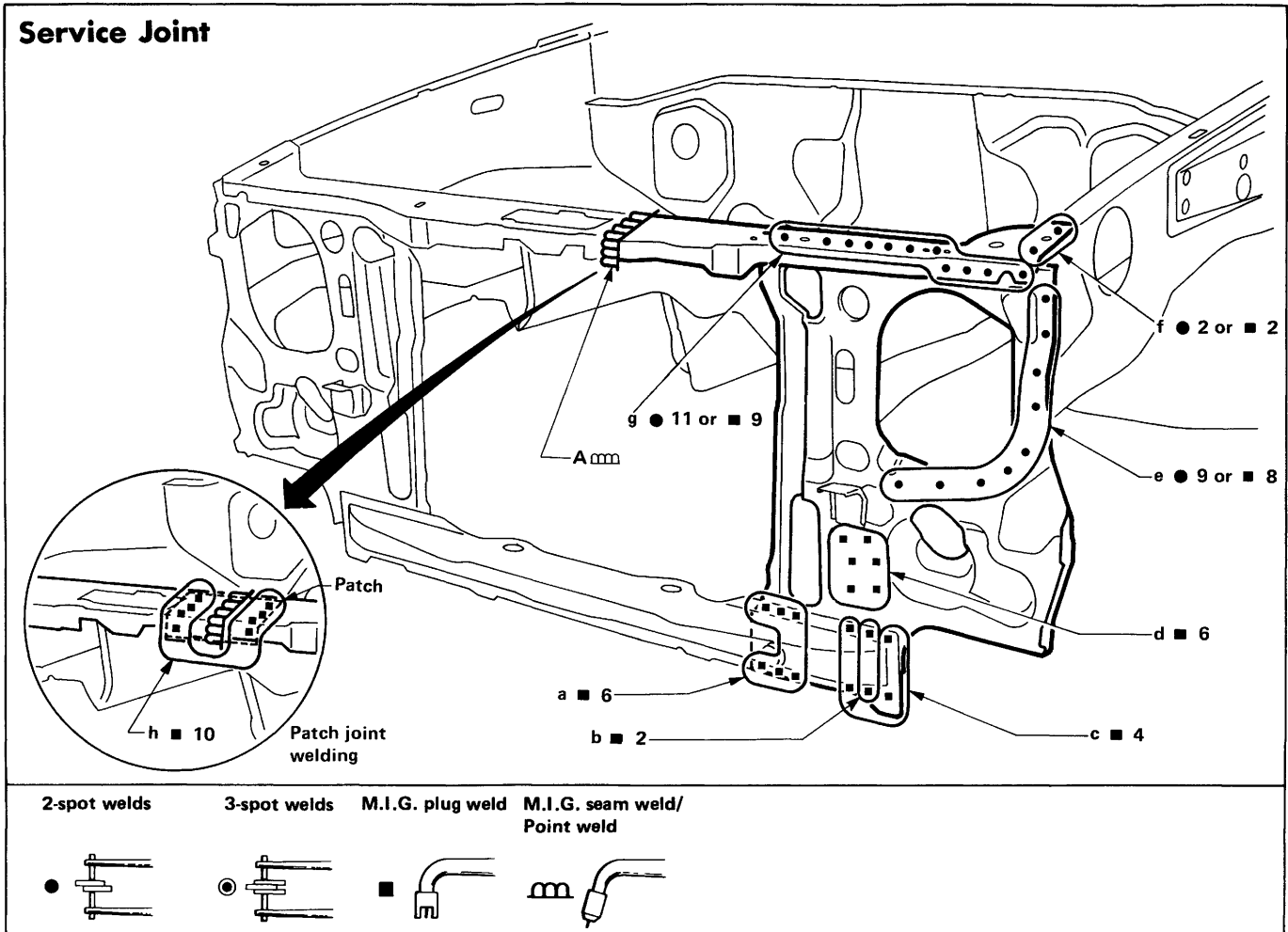


- At portions (b) and (c), welding should be done at positions avoiding side radiator core support.



RADIATOR CORE SUPPORT (Partial Replacement)

Service Joint



Portions to be welded

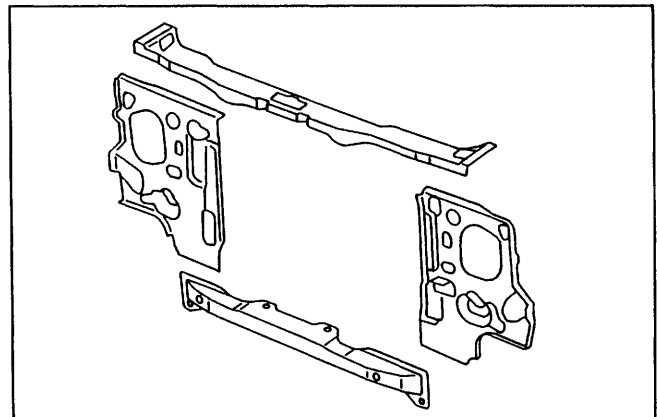
- A. Upper radiator core support
- a Lower radiator core support

- b. 1st body mounting bracket & lower radiator core support (Not welded to side radiator core support)
- c Lower radiator core support

- d 1st body mounting bracket
- e Hoodledge
- f. Hoodledge
- g. Side radiator core support
- h. Patch

Service parts for radiator core support are available in 4 parts in addition to an assembly.

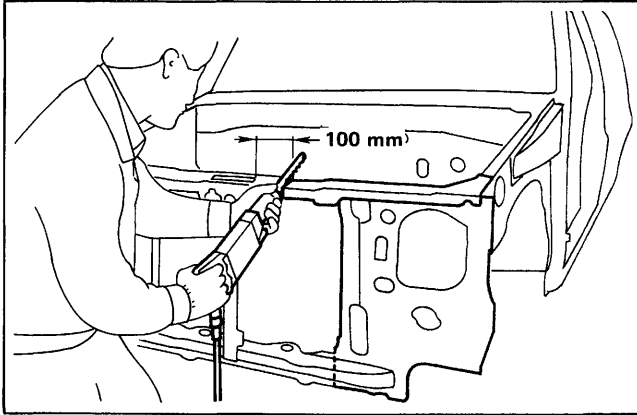
Thus, only the damaged part need be replaced. The procedure, whereby side radiator core support and upper radiator core support are replaced simultaneously, is described in the page that follows.



RADIATOR CORE SUPPORT (Partial Replacement)

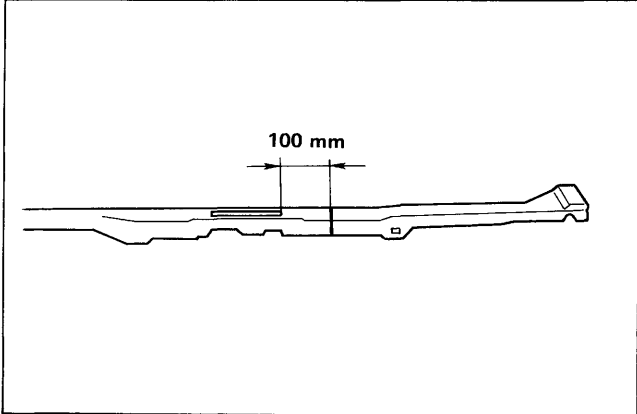
REMOVAL NOTE

- Cut off upper radiator core support 100 mm away from end of hood lock support installing opening. Use this distance when cutting service part.

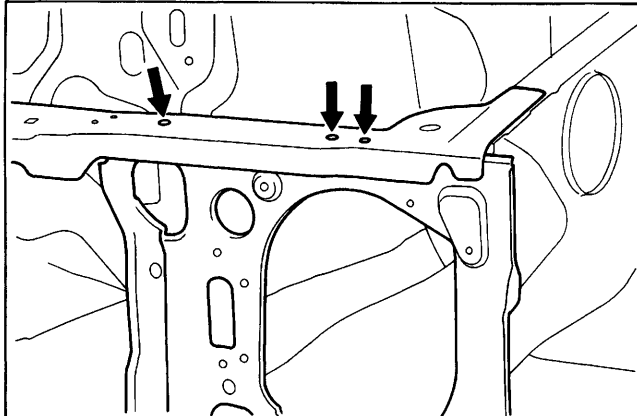


INSTALLATION NOTES

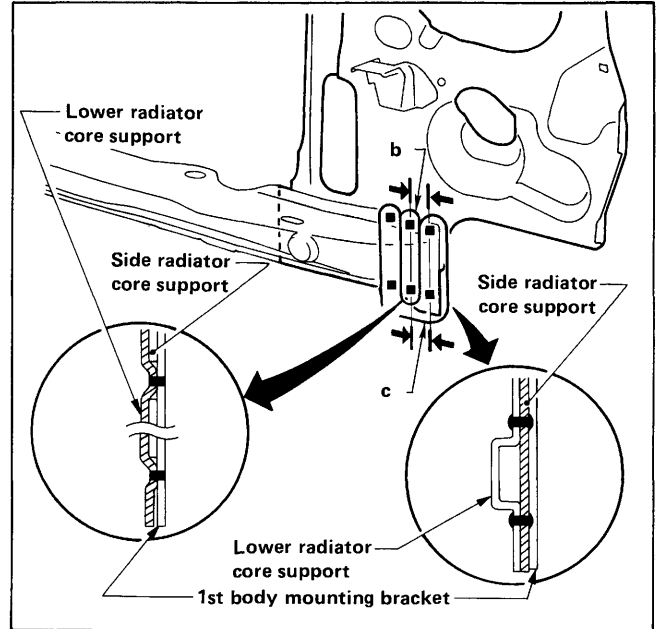
- Cut off service part 100 mm away from end of hood lock support installing opening.



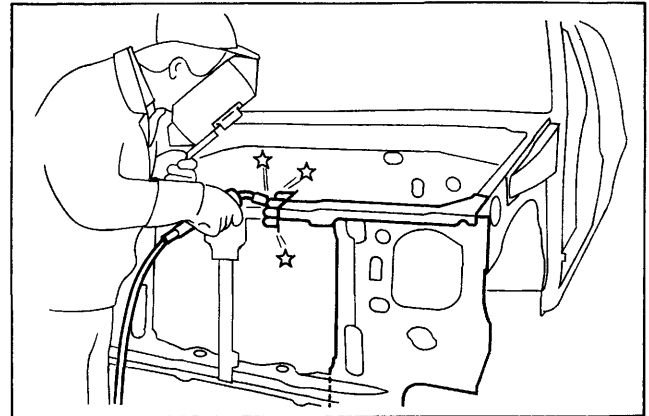
- When installing, be sure to align locating holes on upper and side radiator core support.



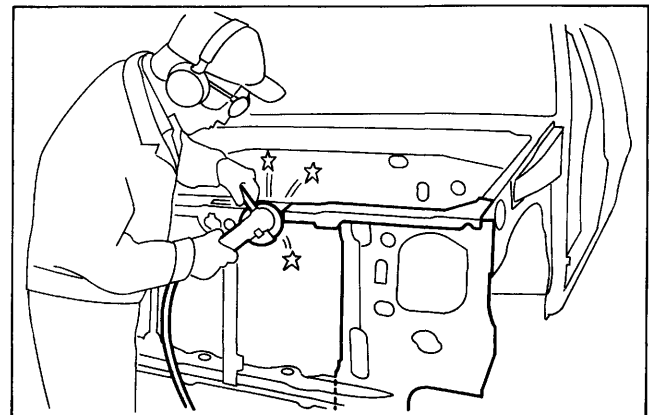
- At portion (b), welding should be done at positions avoiding side radiator core support.
- At portion (c), M.I.G. plug weld from front side only.



- Weld part to be M.I.G. seam welded as far as flange end portion.



- Finish welded part with an air grinder.

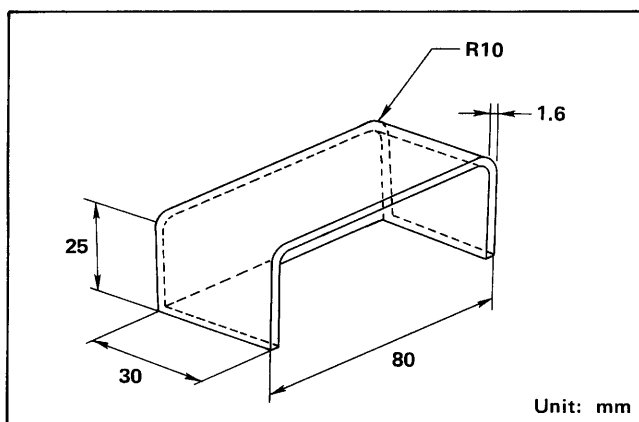


RADIATOR CORE SUPPORT (Partial Replacement)

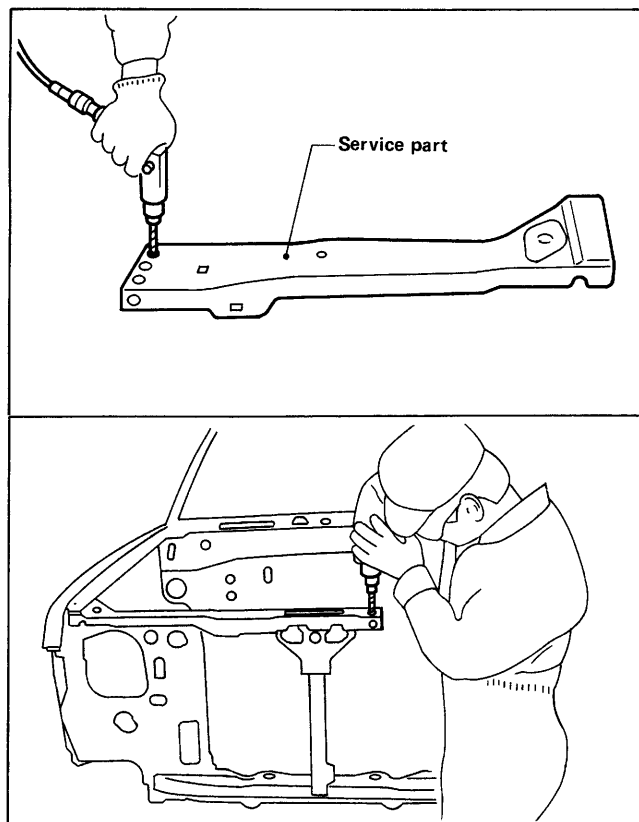
-Patch-Joint Welding-

INSTALLATION NOTES

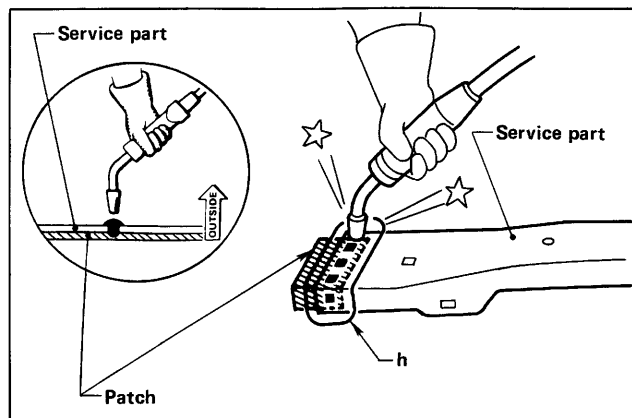
- For patch-joint welding, proceed as follows:
- Prepare a patch panel as shown in the figure below.
Use the service part leftovers to make a patch panel to improve work efficiency.



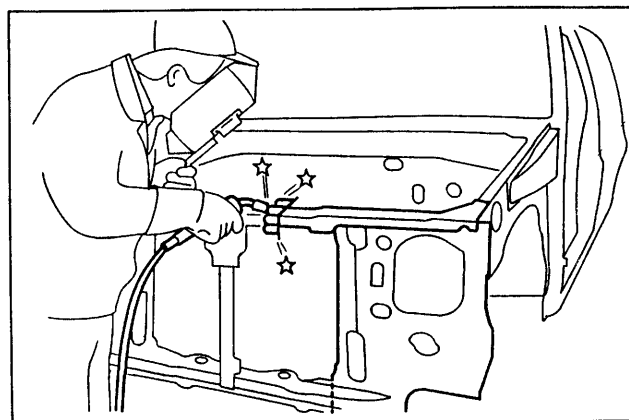
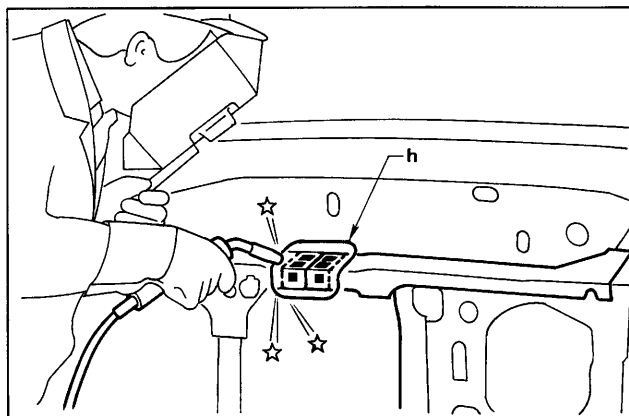
- Drill 6 mm dia., plug weld holes in portion (h) of service part and upper radiator core support.



- Fit patch panel to service part and plug weld.



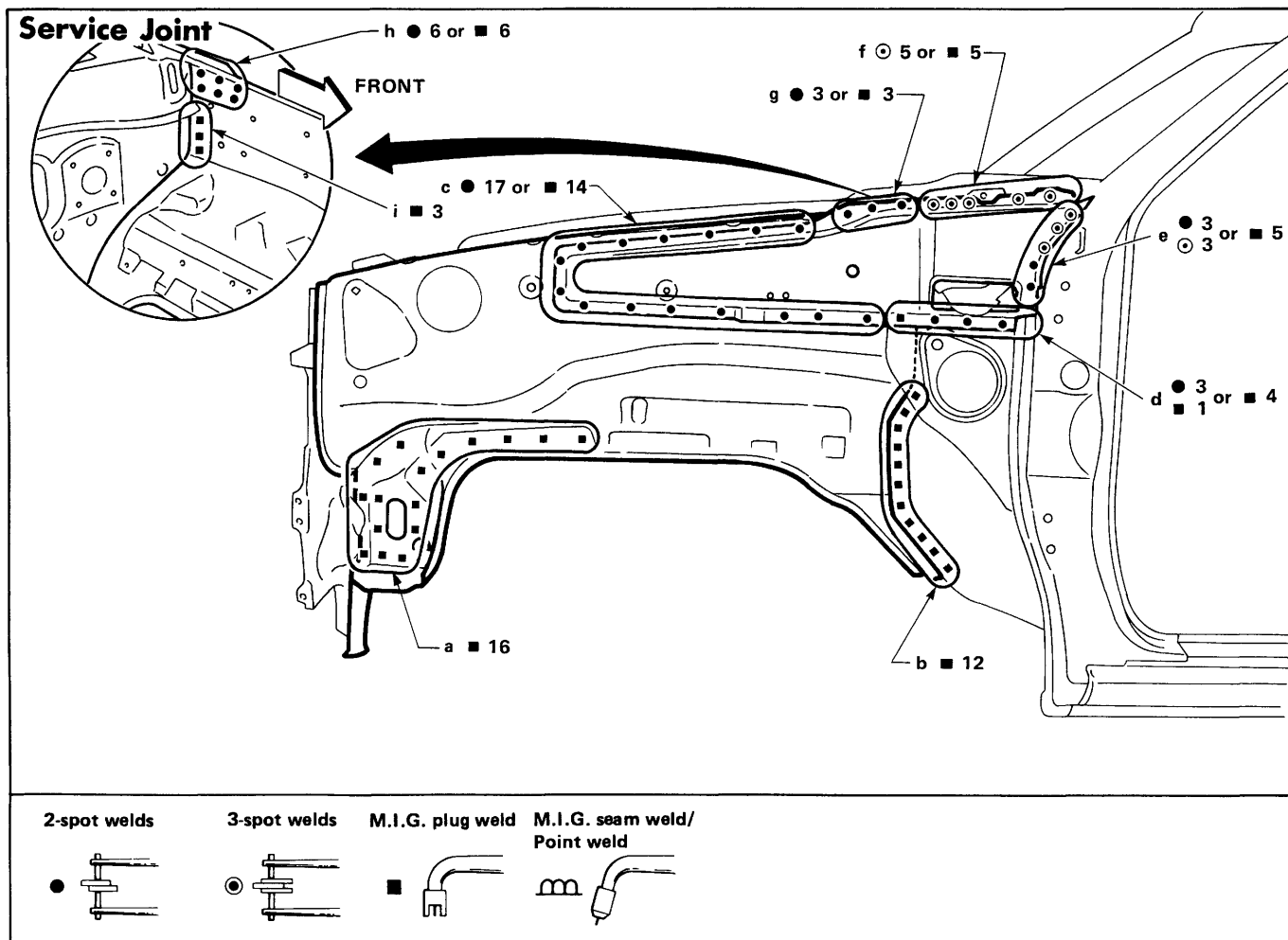
- Align service part with body. Plug weld at portion (h) first and then M.I.G. seam weld as specified.



REPLACEMENT OPERATIONS

HOODLEDGE

(Work after radiator core support has been removed.)



Portions to be welded

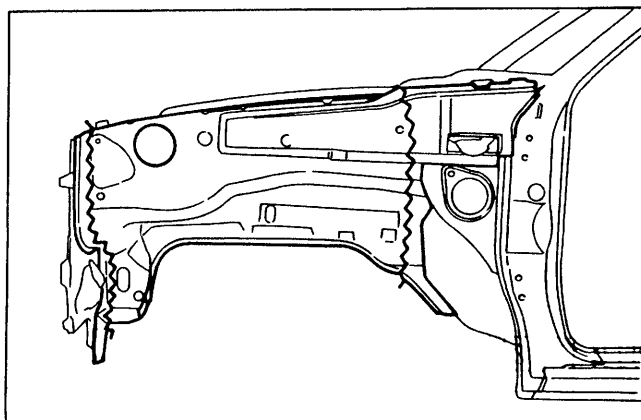
- a. 1st body mounting bracket
- b. Lower dash panel
- c. Hoodledge reinforcement

- d. Side dash
- e. Side dash & lower dash panel
- f. Front pillar drip rail & upper dash
- g. Front pillar drip rail
- h. Cowl top panel & side cowl top panel

- g. Side cowl top panel
- h. Side cowl top panel
- i. Side dash & lower dash panel

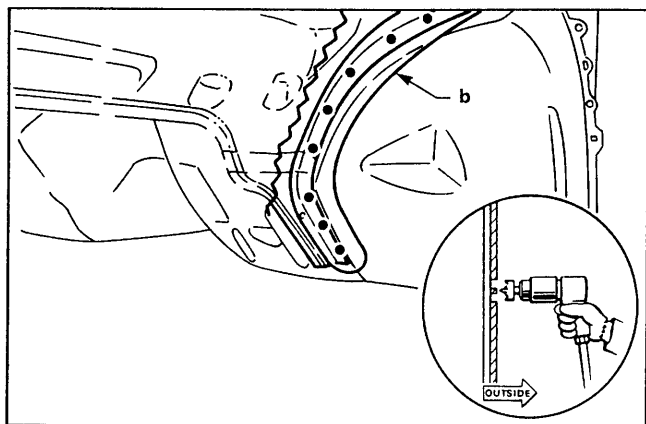
REMOVAL NOTES

- Cut off damaged portion to facilitate removal.

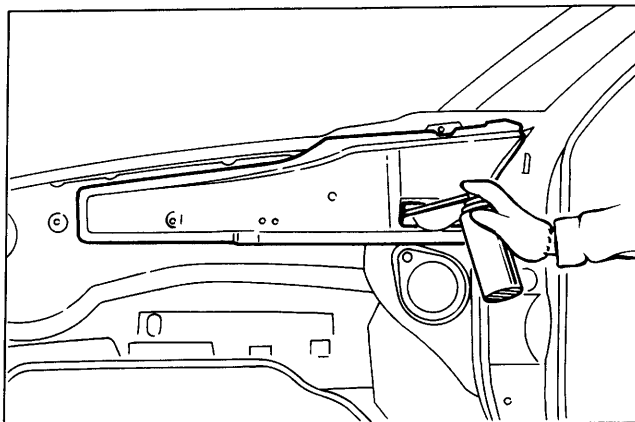


HOODLEDGE

- When removing welded part with lower dash panel at portion (b), be careful not to spot cut through mating parts.

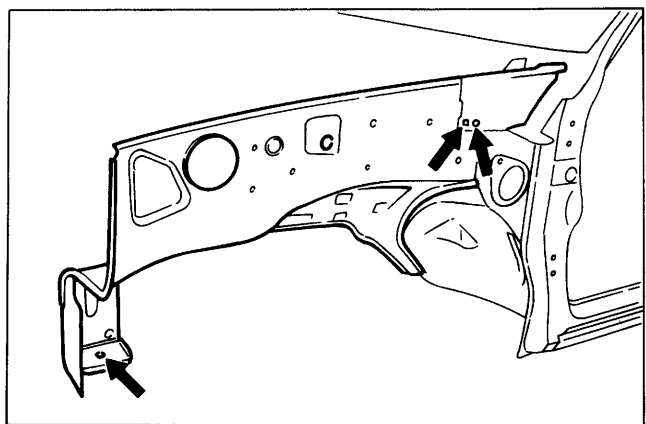


- After welding, apply an anti-corrosive agent to welded parts and inside of hoodledge reinforcement.

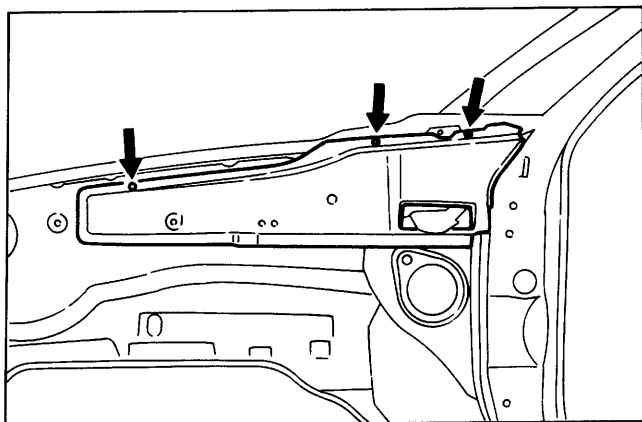


INSTALLATION NOTES

- When installing, be sure to align locating holes on side cowl top with those on 1st body mounting and 1st cab body mounting holes with those on frame.



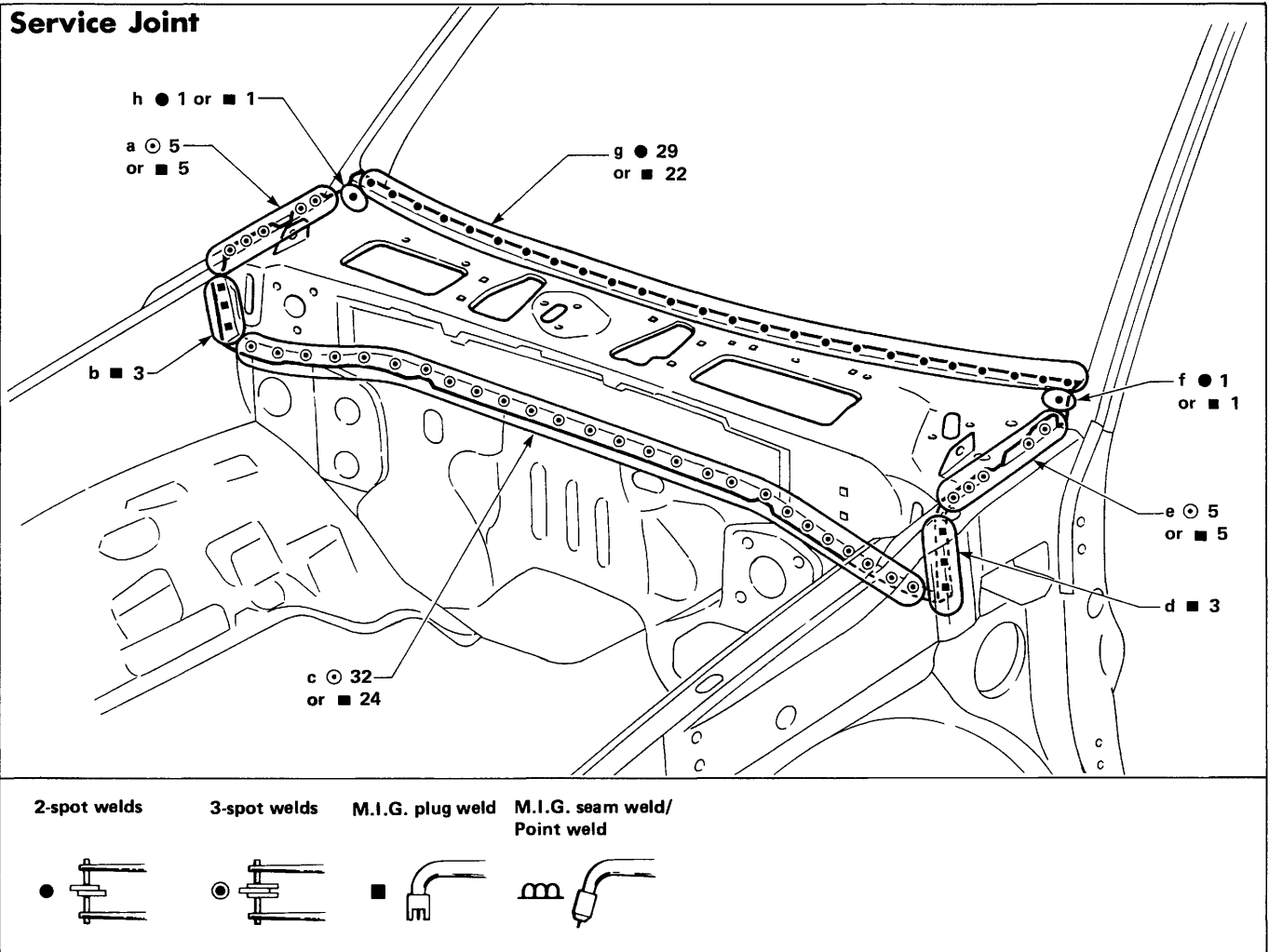
- Install hoodledge reinforcement with locating holes aligned.



REPLACEMENT OPERATIONS

COWL TOP PANEL

Service Joint



Portions to be welded

- a Side cowl top & hoodledge reinforcement
- b Side cowl top

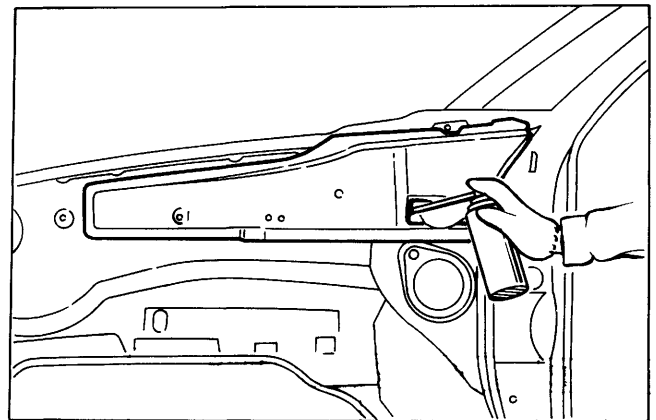
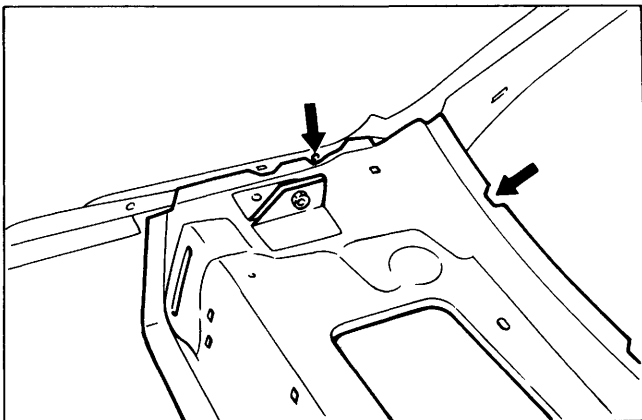
- c Upper dash & lower dash
- d Side cowl top
- e Side cowl top & hoodledge reinforcement

- f. Upper dash
- g Upper dash
- h Upper dash

INSTALLATION NOTES

- When installing, align locating holes on side cowl top and cowl top flange end, upper dash flange end and cowl top flange end.

- After welding, apply an anti-corrosive agent to inside of cowl top using holes of hoodledge reinforcement.

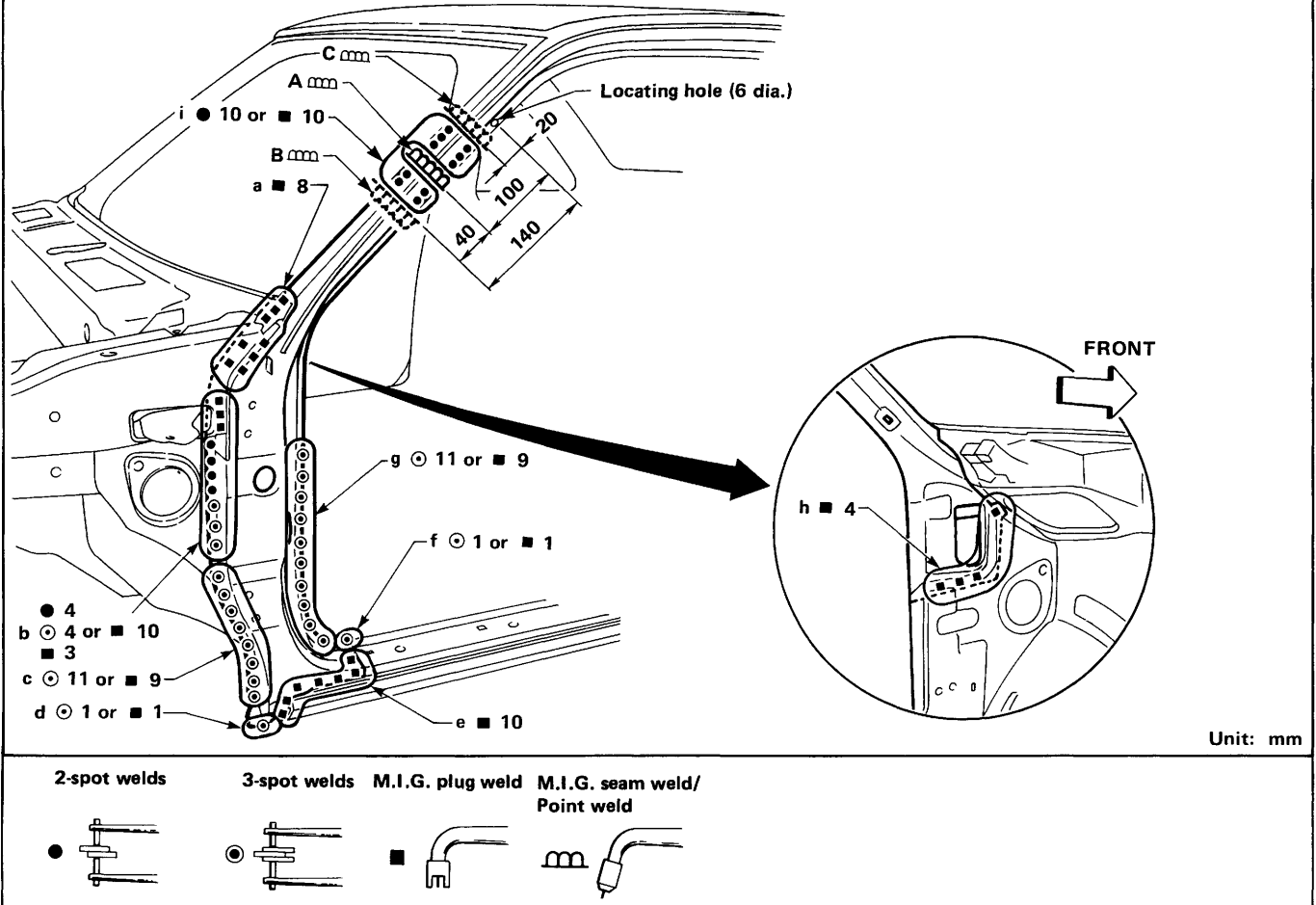


REPLACEMENT OPERATIONS

FRONT PILLAR

(Work after hoodledge reinforcement has been removed.)

Service Joint



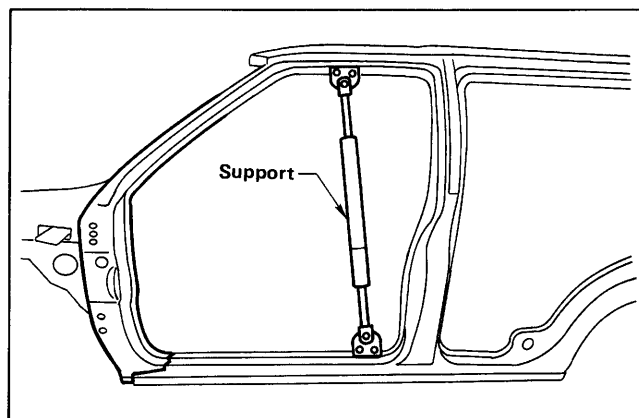
Portions to be welded

- | | | |
|---------------------------------|---|---|
| A. Outer front pillar | b. Side dash | f. Outer sill & inner sill |
| B. Inner front pillar | Side dash & inner front pillar | g. Side dash & lower front pillar reinforcement |
| C. Inner front pillar | Side dash & front pillar lower hinge brace | Side dash & front pillar lower hinge brace |
| a. Upper dash | c. Side dash & lower dash | h. Side dash |
| Upper dash & inner front pillar | Lower dash & inner sill | Upper dash |
| | d. Outer sill & inner sill | i. Inner front pillar |
| | e. Outer sill | |
| | Outer sill & lower front pillar reinforcement | |

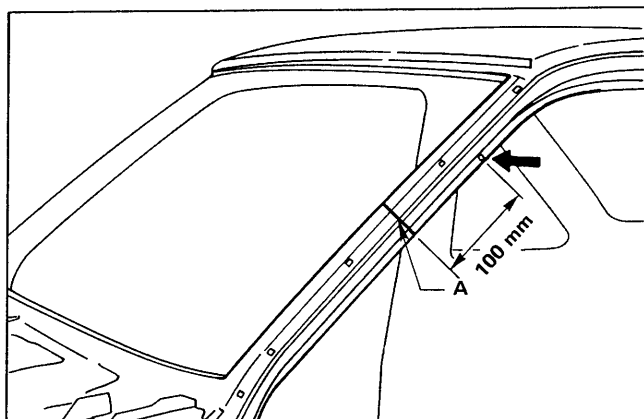
FRONT PILLAR

REMOVAL NOTES

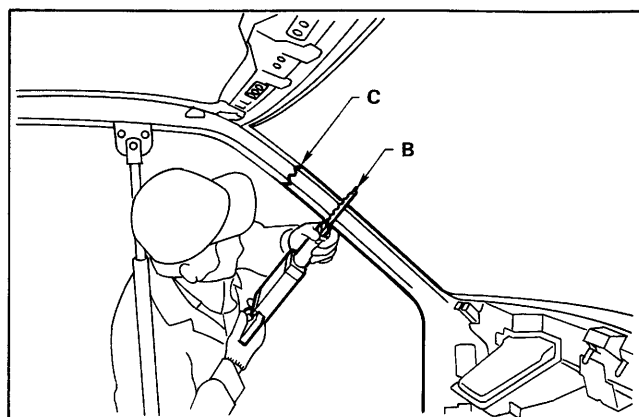
- Before cutting front pillar, be sure to support roof.



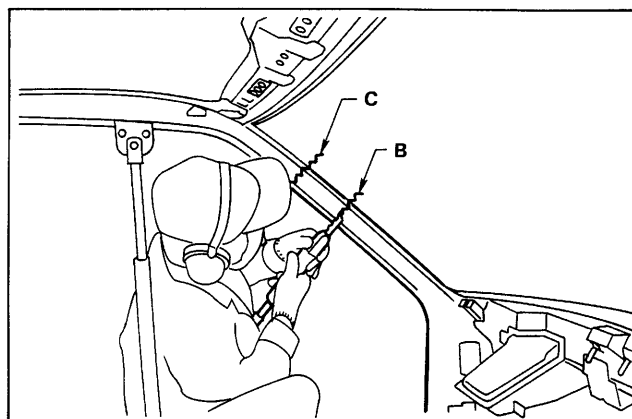
- Butting position is 100 mm away from locating hole. Due to construction of vehicle, it is better to butt at this position.



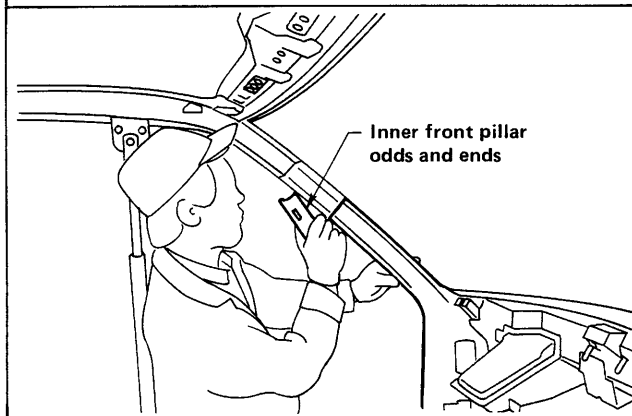
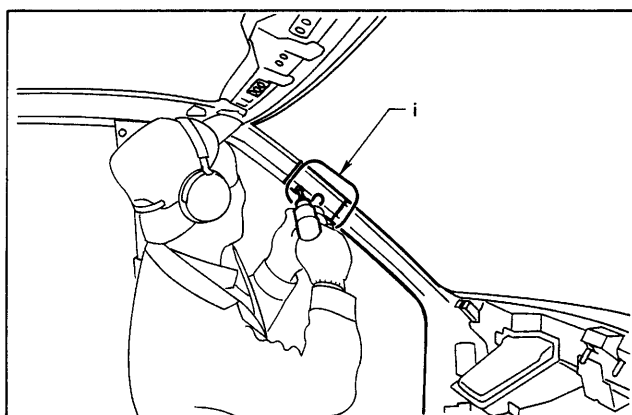
- Determine cutting position and record distance from locating hole. Use this distance when cutting service part.
First cut only inner front pillar at butting portions (B) and (C).



- When cutting flange end portion, use a mini air-saw to facilitate cutting.



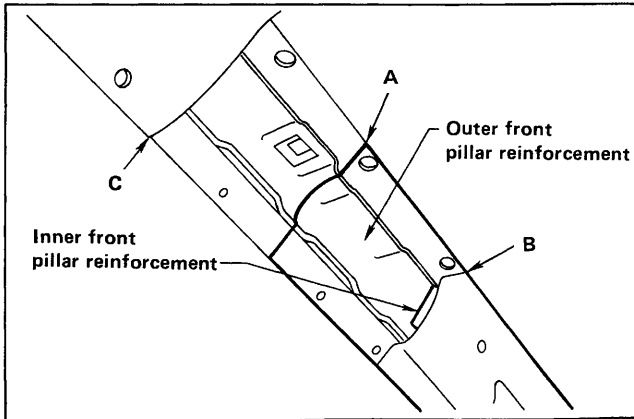
- Spot cut portion (i) and remove the inner front pillar odds and ends.



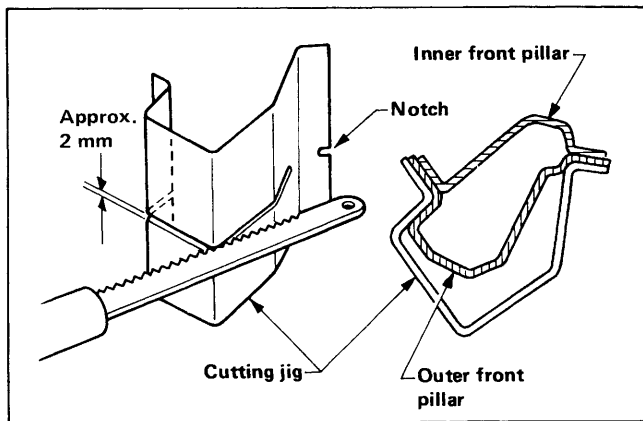
REPLACEMENT OPERATIONS

FRONT PILLAR

- When doing these operations, be careful not to cut inner front pillar reinforcement and outer front pillar reinforcement.

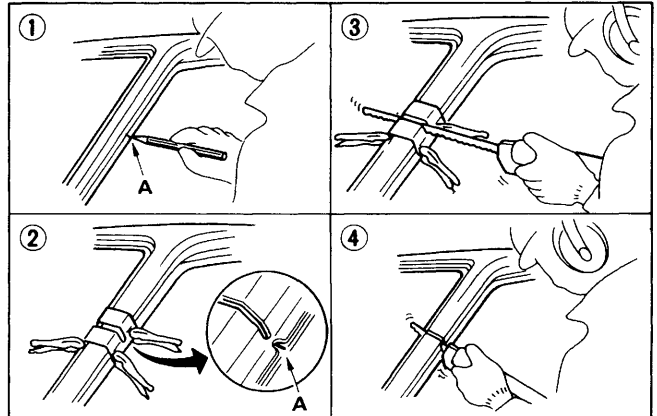


- Using a cutting jig makes it easier to cut. Also, it will permit the service part to be accurately cut at the joint position.



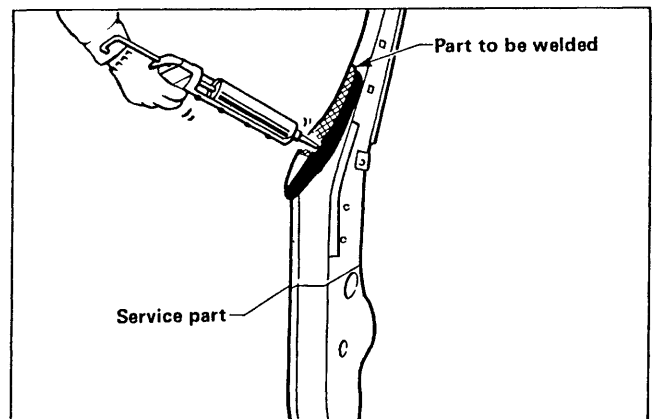
- An example of cutting operation using a cutting jig is as follows:

- ① Mark a cutting line.
A: Cut position of outer front pillar
B: Cut position of inner front pillar
- ② Align cutting line with a mark on jig and clamp jig.
- ③ Cut off along groove of jig.
- ④ Remove jig and cut the remaining portions.
- ⑤ Cut off at position B in the same manner.



INSTALLATION NOTES

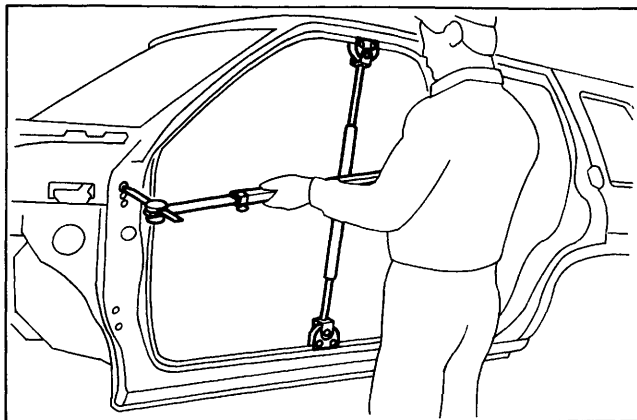
- Align service part with mating part, and cut off in same manner as removal.
- Apply sealant to joint of pillar on upper dash. Be careful not to apply to portions to be welded.



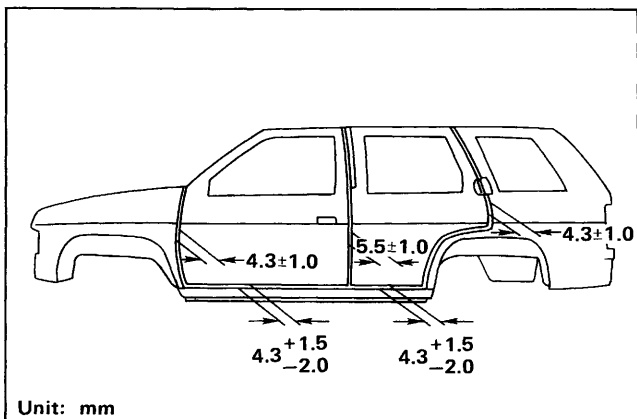
REPLACEMENT OPERATIONS

FRONT PILLAR

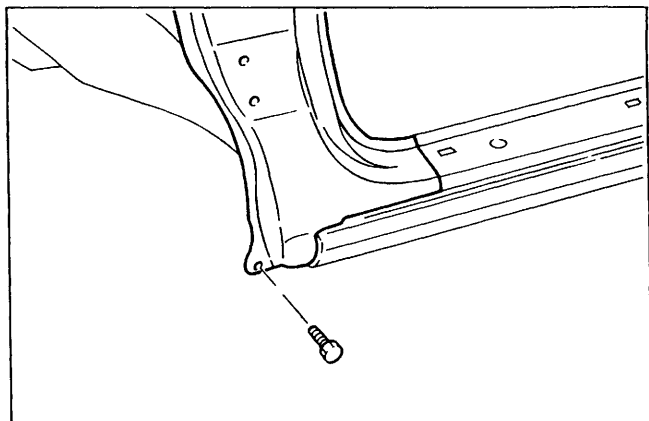
- Measure various dimensions of the part locations. Refer to "BODY ALIGNMENT" drawing.



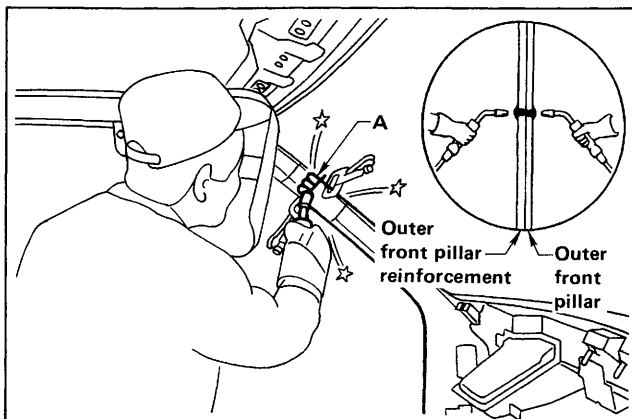
- Tack weld each clamping point and butting point.
- Install door and front fender. Check clearances, grades and parallelism.



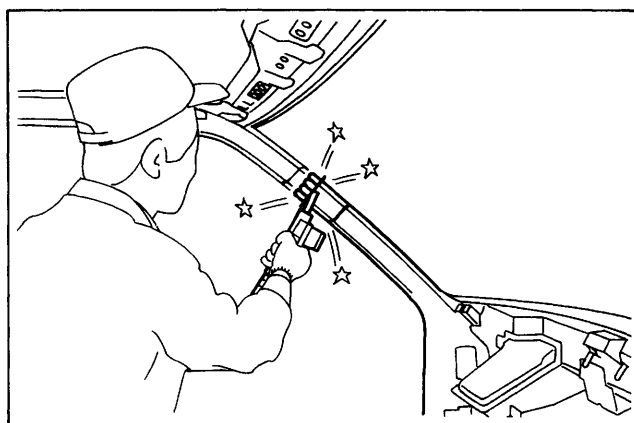
- When installing, align inner sill and front fender fixing hole on front pillar.



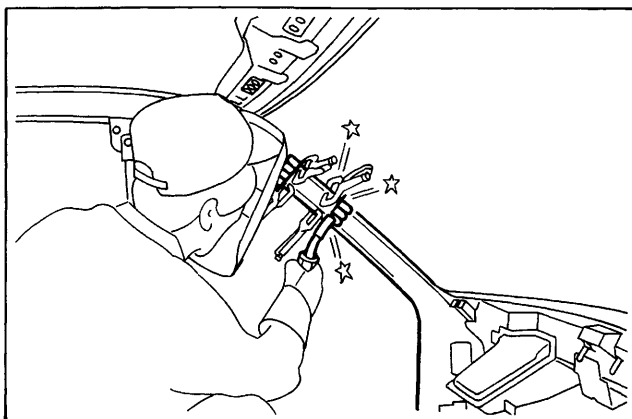
- Welding at portion (A), should be performed from both sides because it is a two-layered portion.



- Dress welded portion (A) with a mini-belt sander, then treat the inside of the welded part with anti-corrosive agent.

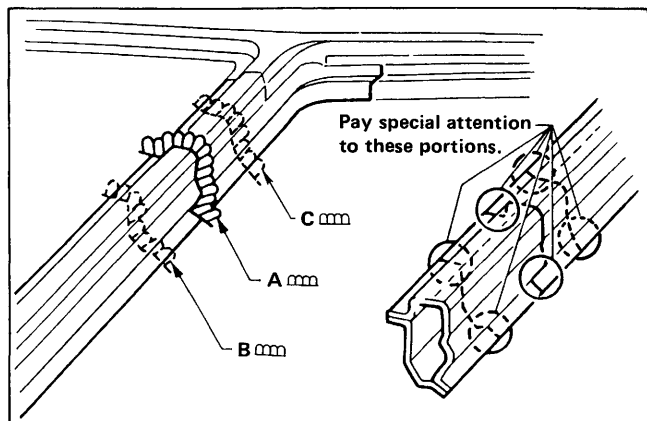


- Reattach inner front pillar odds and ends, then seam weld.

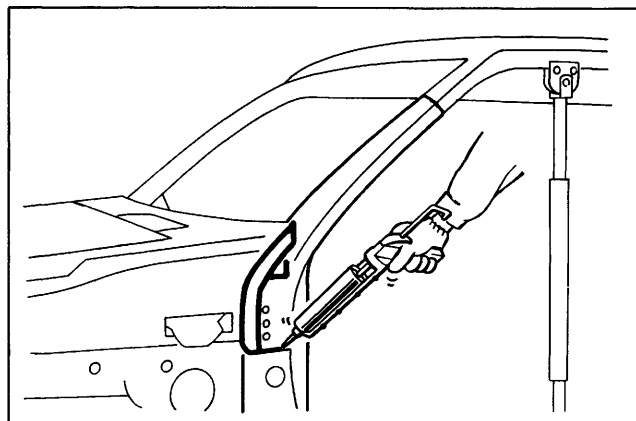


FRONT PILLAR

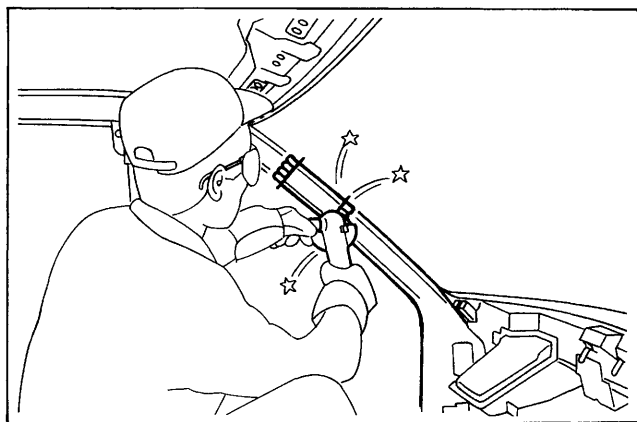
- Weld parts to be butt welded as far as flange end portion.



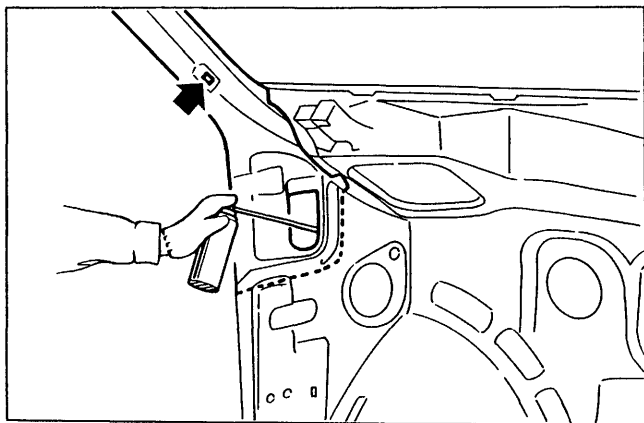
- Apply sealer according to "BODY SEALING" drawing.



- Finish welded parts with an air grinder.

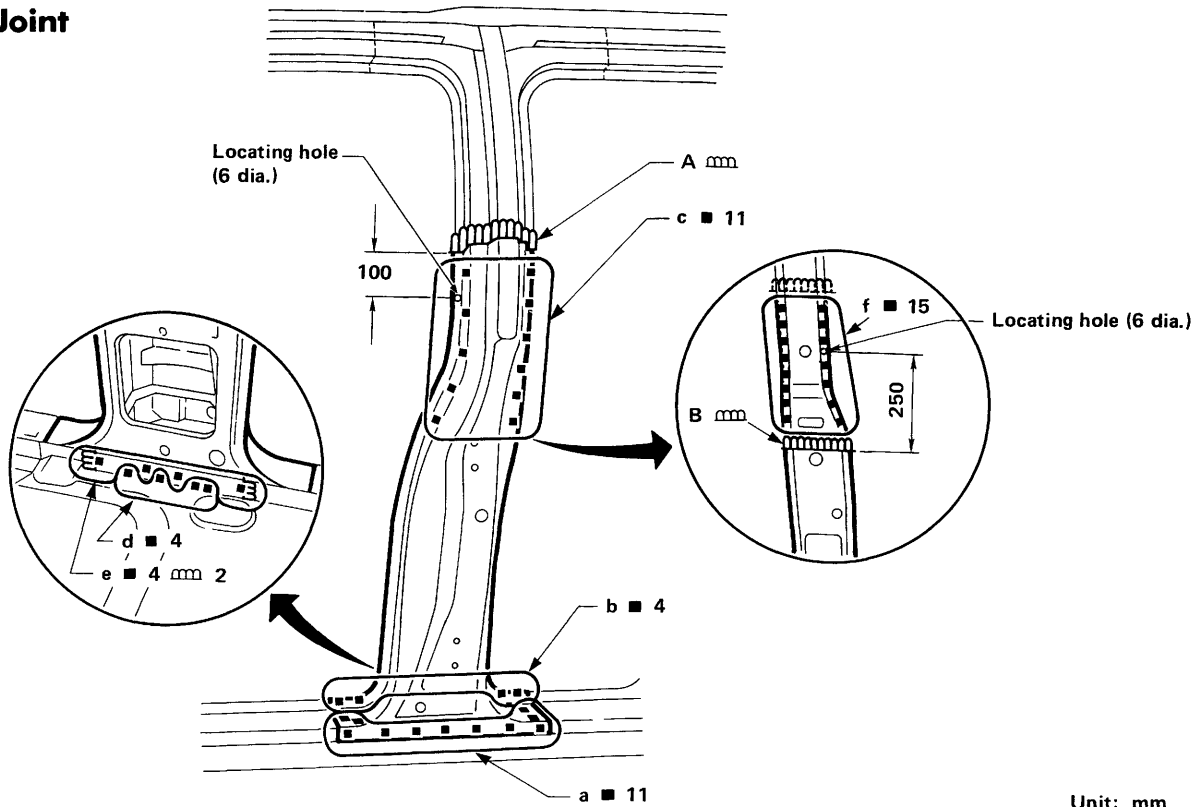


- Apply an anti-corrosive agent to welded parts and inside of front pillar.

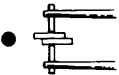


CENTER PILLAR

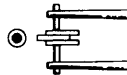
Service Joint



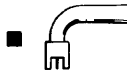
2-spot welds



3-spot welds



M.I.G. plug weld



M.I.G. seam weld/
Point weld



Portions to be welded

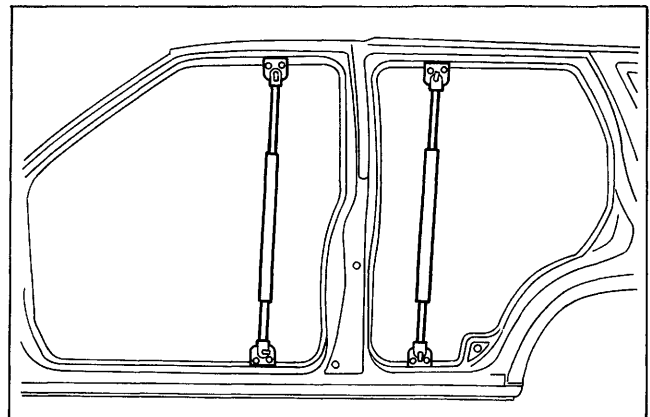
- A. Outer center pillar
- B. Inner center pillar

- a. Outer sill
- b. Outer sill, outer sill reinforcement & front floor
- c. Seat belt anchor reinforcement

- d. Outer sill & outer sill reinforcement
- e. Outer sill, outer sill reinforcement & front floor
- f. Inner center pillar

REMOVAL NOTES

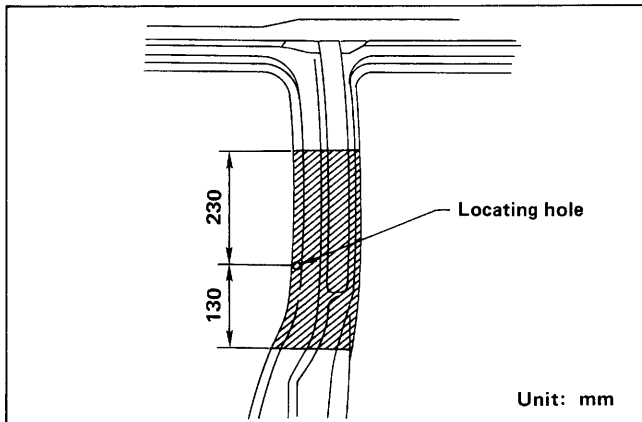
- Before cutting center pillar, be sure to support roof.



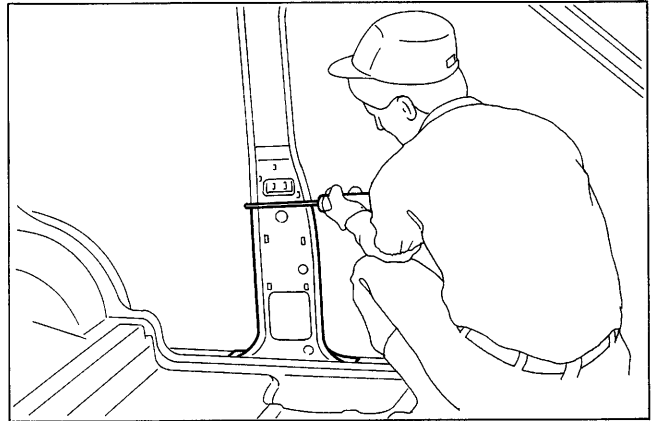
REPLACEMENT OPERATIONS

CENTER PILLAR

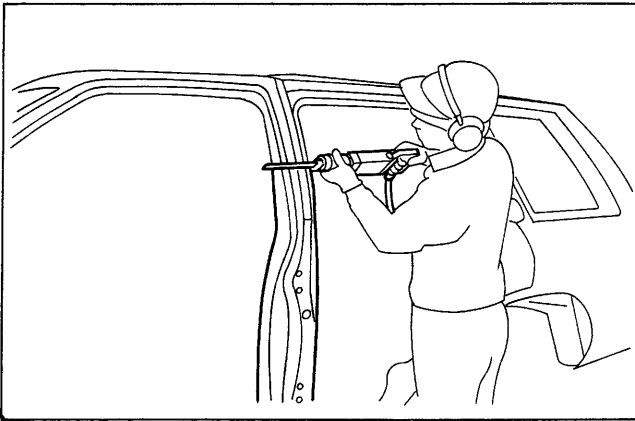
- Butt portion can be determined anywhere within shaded area as shown in the figure. It is better to butt in this position, due to the construction.



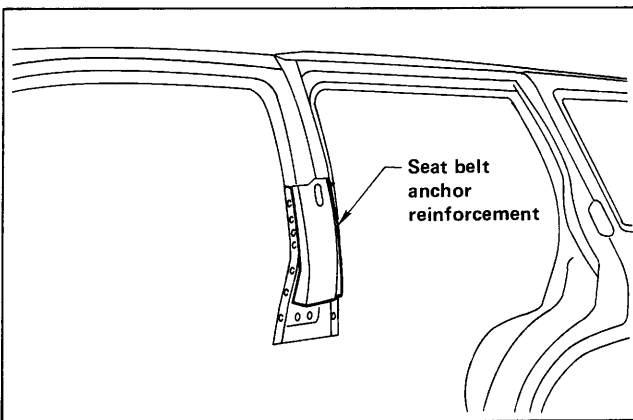
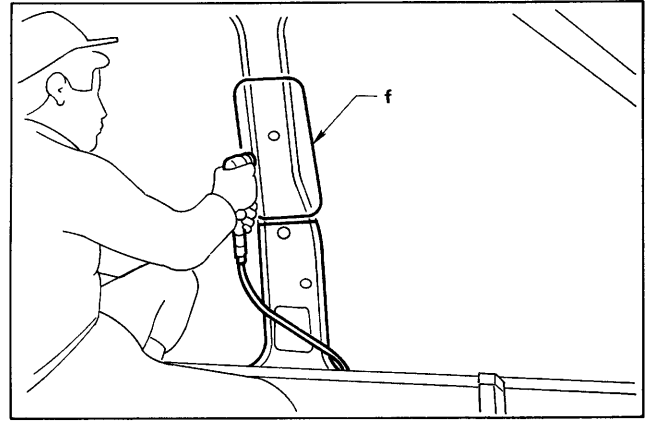
- Cut off inner center pillar as shown in the figure.



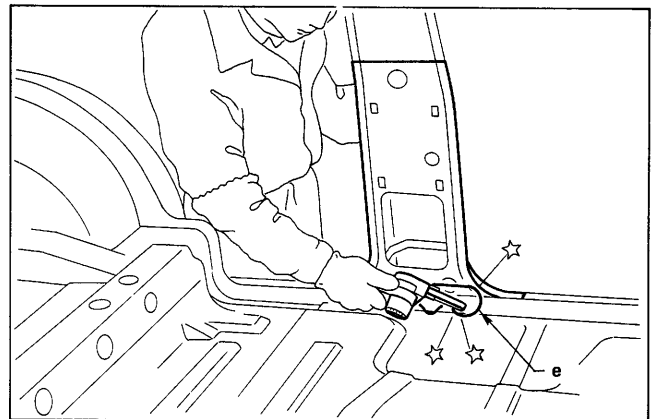
- Cut off outer center pillar. Be careful not to damage seat belt anchor reinforcement.



- Spot cut portion (f) with a spot cutter.
Use these holes as M.I.G. plug weld holes when installing.

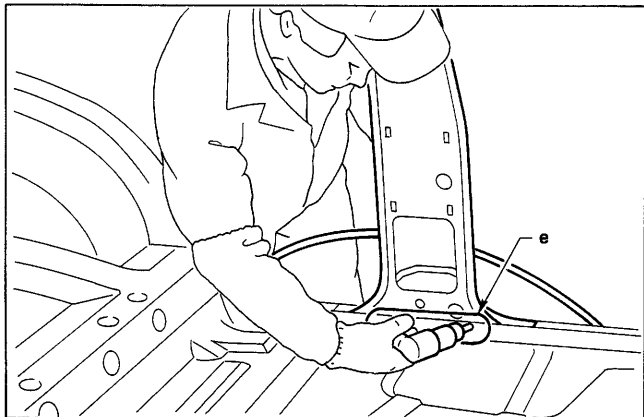


- Dress the surface of M.I.G. plug welded portion (e) with a mini belt-sander.

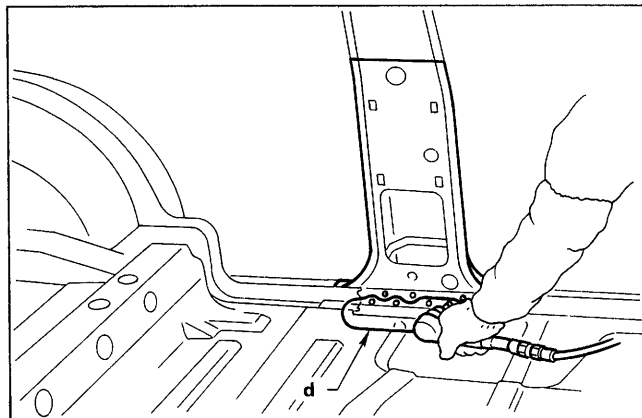


CENTER PILLAR

- Cut through the M.I.G. plug welds at portion (e) with a drill.
Use these holes as M.I.G. plug weld holes when installing service part.

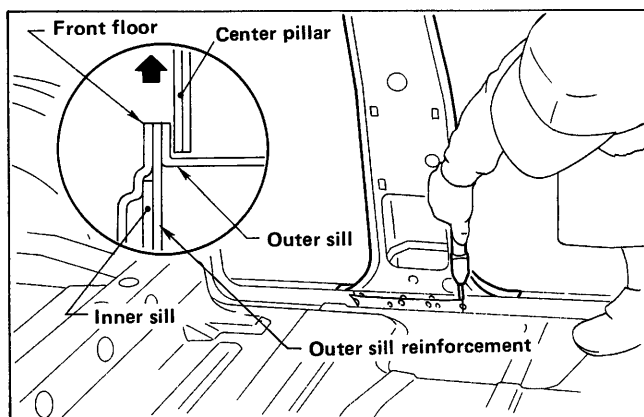


- Spot cut through welded portion (d) with a drill, then remove center pillar.

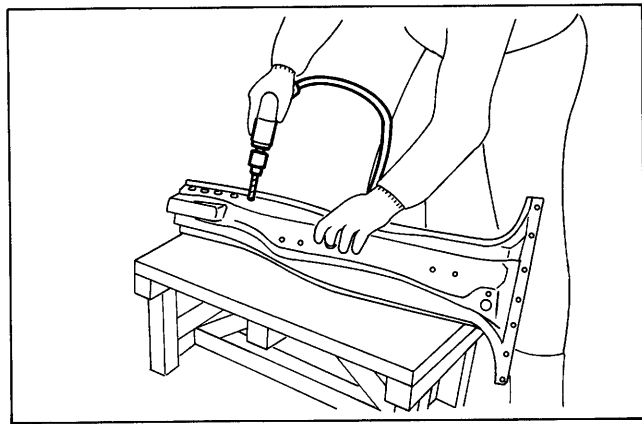
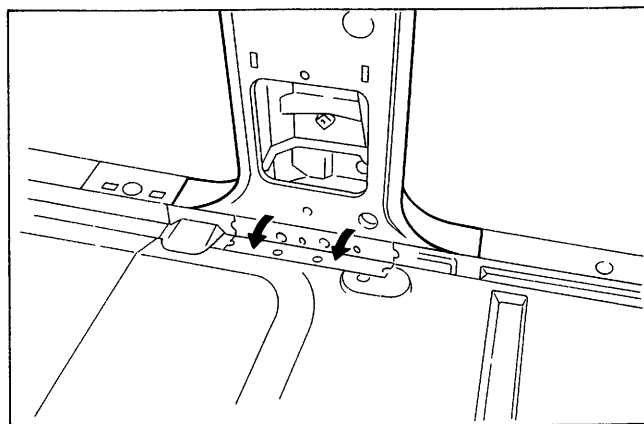
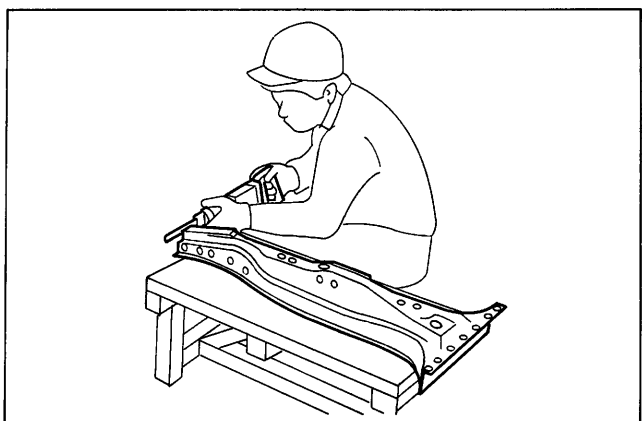


INSTALLATION NOTES

- Cut floor flange with a mini air-saw and bend the flange.

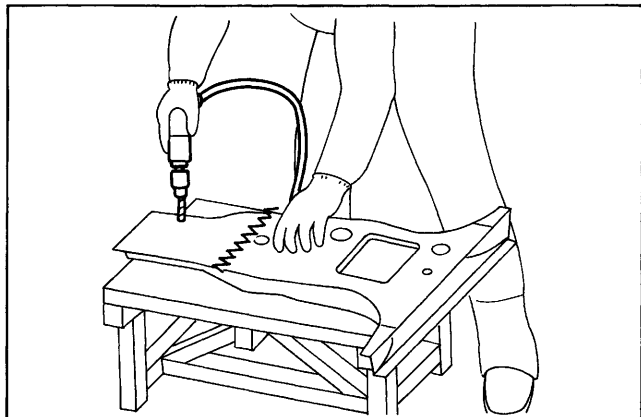


- Cut off center pillar service part and remove seat belt anchor reinforcement odds and ends.

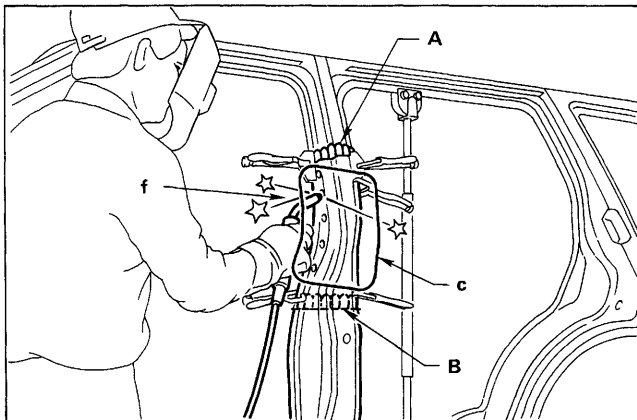


CENTER PILLAR

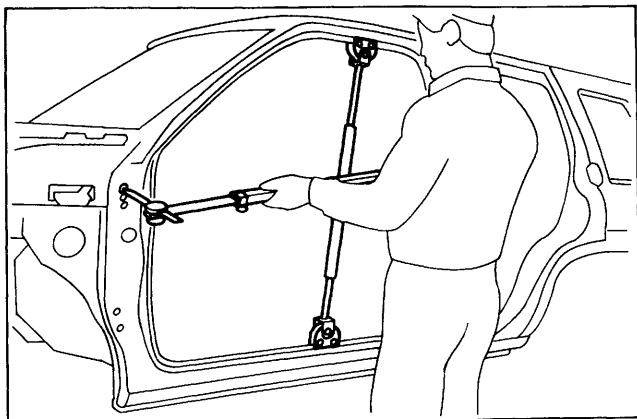
- Spot cut and remove inner center pillar odds and ends.



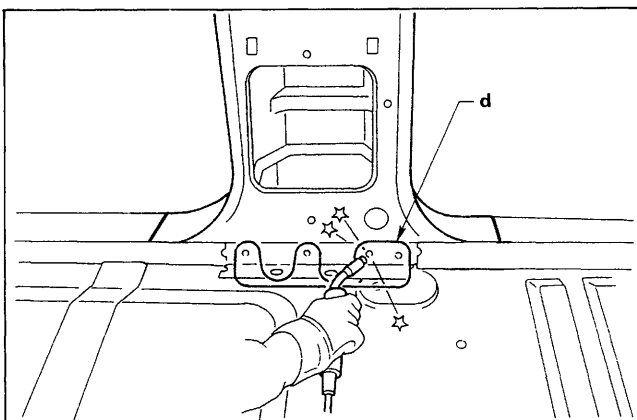
- M.I.G. plug weld at portions (c), (f) and seam weld at portions (A), (B).



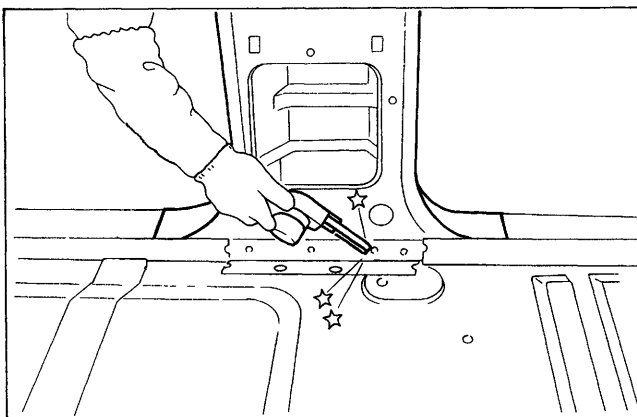
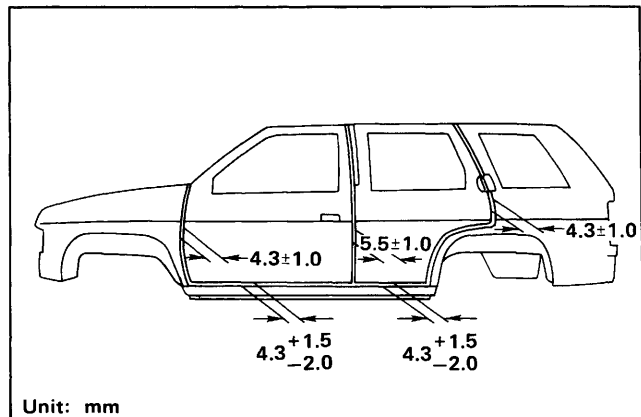
- Install service parts and measure various dimensions of part location. Refer to "BODY ALIGNMENT" drawing.



- M.I.G. plug weld at portion (d) and dress welded surface with a mini belt-sander.

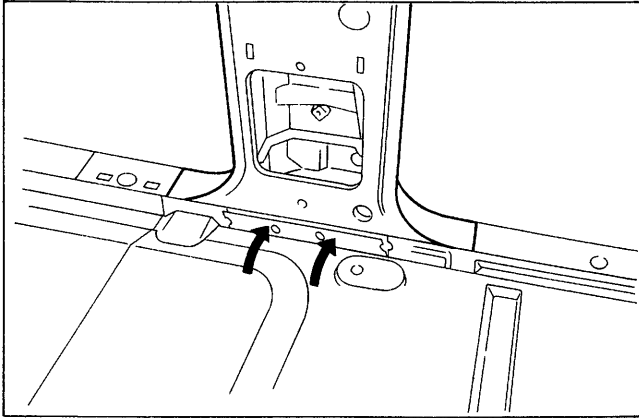


- Tack weld each clamping point and butting point.
- Install front door and rear door. Check clearances, grades and parallelism.

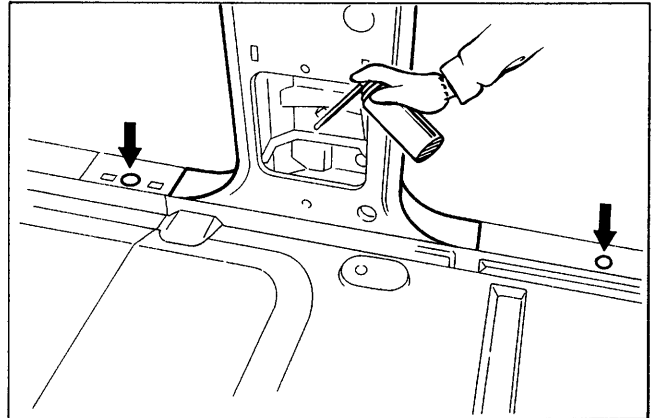


CENTER PILLAR

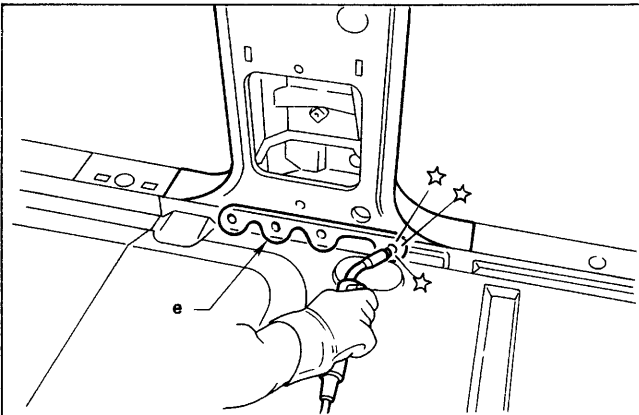
- Apply an anti-corrosive agent to welded portion and return floor flange to the original position.



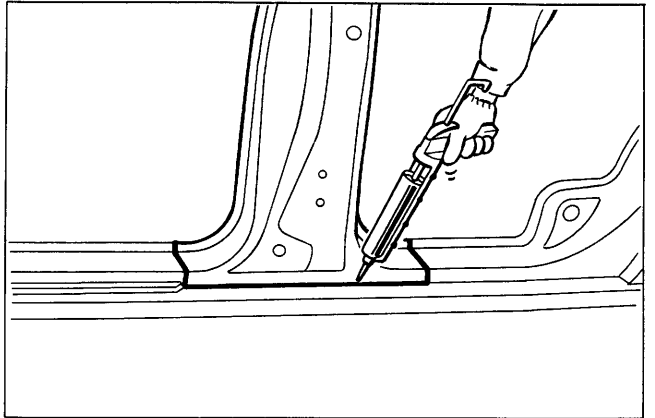
- Apply an anti-corrosive agent to welded parts and inside of center pillar.



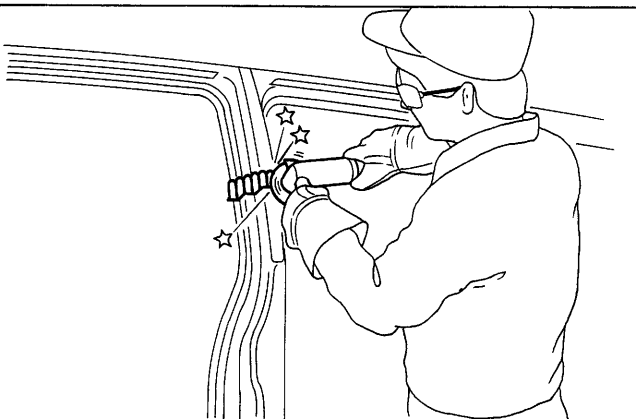
- M.I.G. plug weld at portion (e) through the holes and then butt weld.



- Apply sealant.



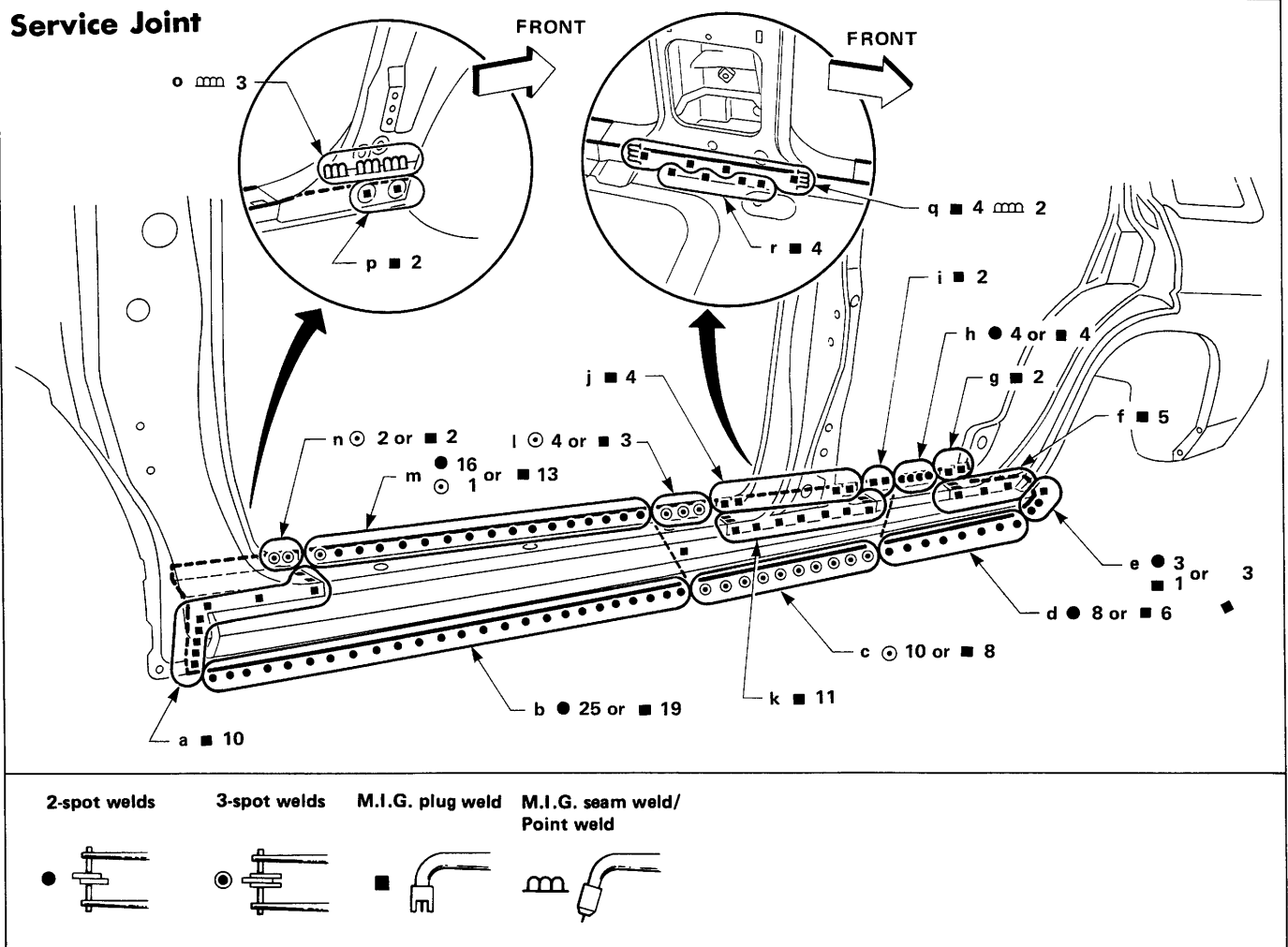
- Finish welded part with an air grinder.



REPLACEMENT OPERATIONS

OUTER SILL

Service Joint

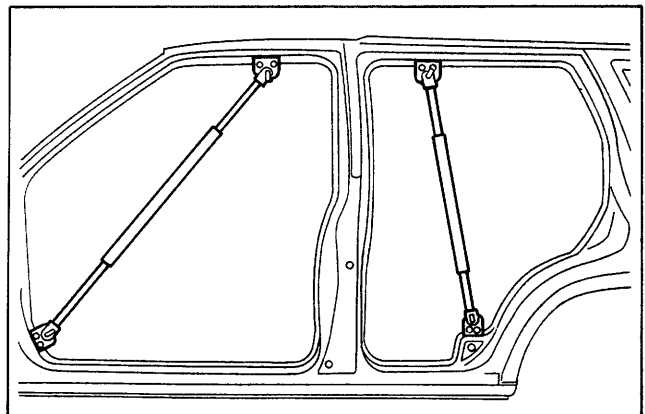


Portions to be welded

- | | | |
|--|---|--|
| a. Front pillar | g. Rear fender & inner sill | m. Front floor |
| Front pillar & inner sill | h. Inner sill | Front floor & inner sill |
| b. Inner sill | Rear floor front | n. Inner sill & front pillar |
| c. Inner sill & outer sill reinforcement | i. Rear floor front, front floor & outer sill reinforcement | o. Inner sill & side dash (Not welded to outer sill.) |
| d. Inner sill | j. Front floor, outer sill reinforcement & center pillar | p. Inner sill |
| e. Outer rear wheelhouse | k. Center pillar | q. Outer sill reinforcement, center pillar & front floor |
| Outer rear wheelhouse & rear fender | l. Outer sill reinforcement & front floor | r. Outer sill reinforcement & center pillar |
| f. Rear fender | | |

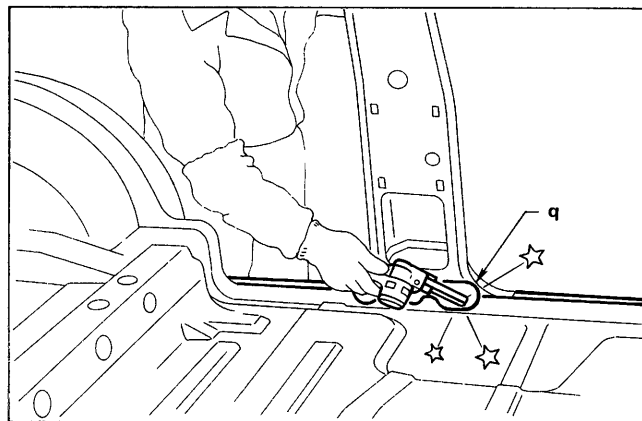
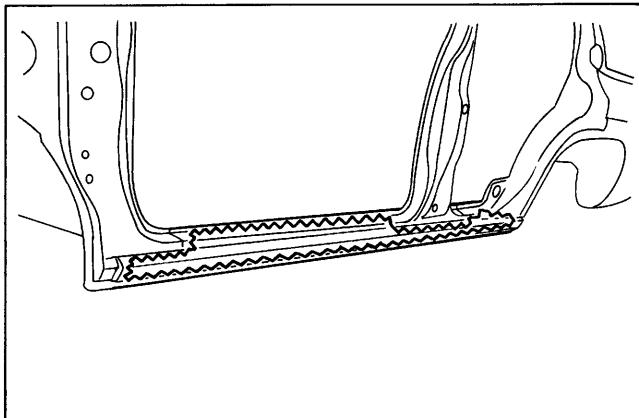
REMOVAL NOTES

- Before cutting welded portions, be sure to support roof.

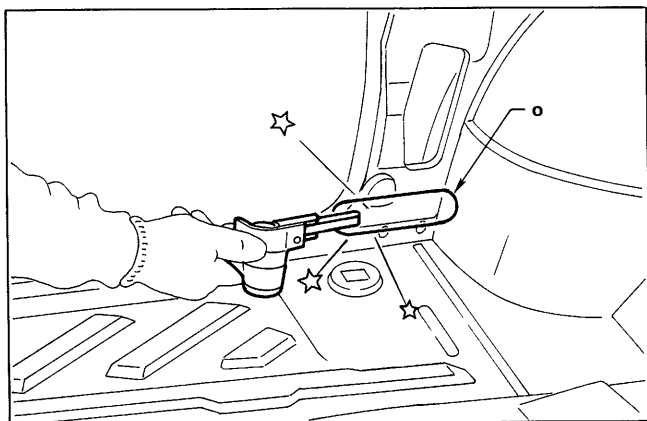


OUTER SILL

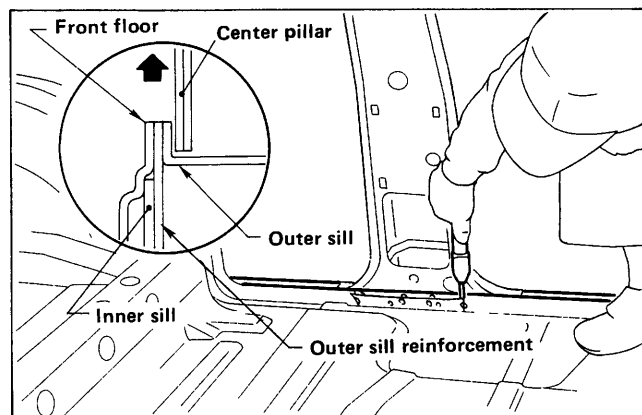
- Cut off damaged portion as shown in the figure to facilitate removal.



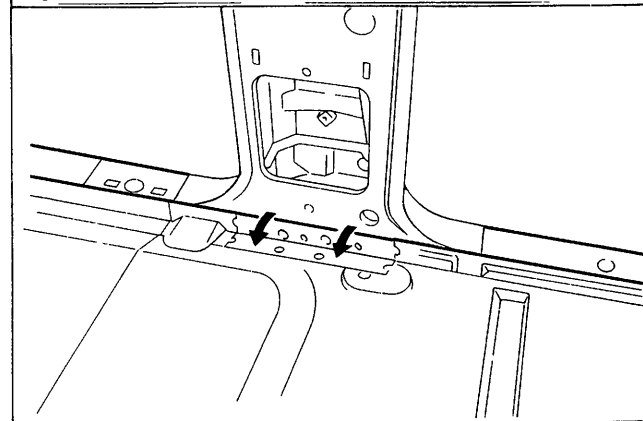
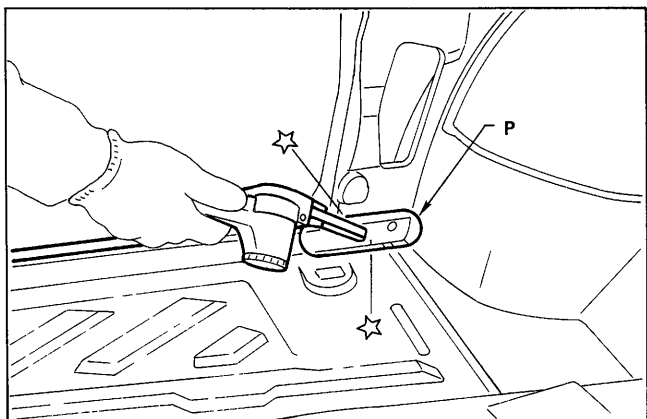
- Cut welded parts with a mini belt-sander at portion (o).



- Cut floor flange with a mini air-saw and bend the flange.

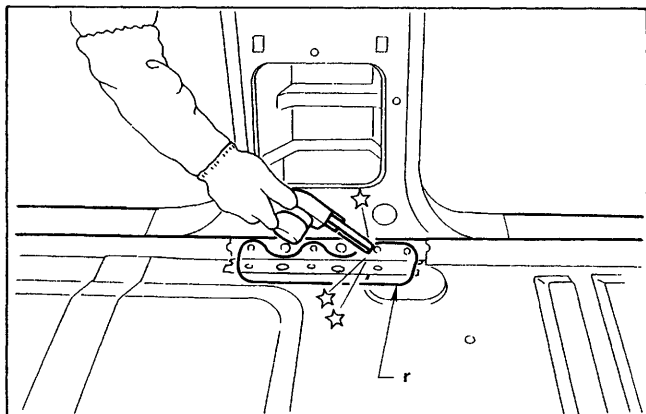


- Grind the surfaces of M.I.G. plug welded portions (p), (q) with a mini belt-sander. Be careful not to grind center pillar.

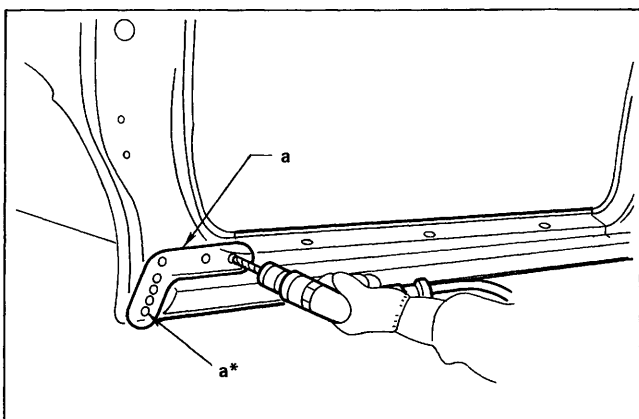


OUTER SILL

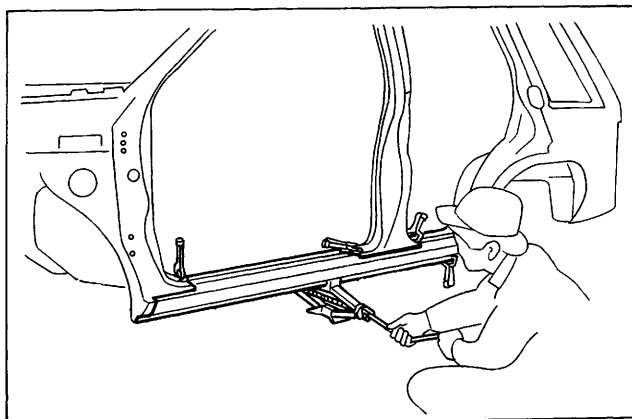
- Spot cut the welded portion (r) with a mini belt-sander. When doing this, be careful not to damage center pillar.



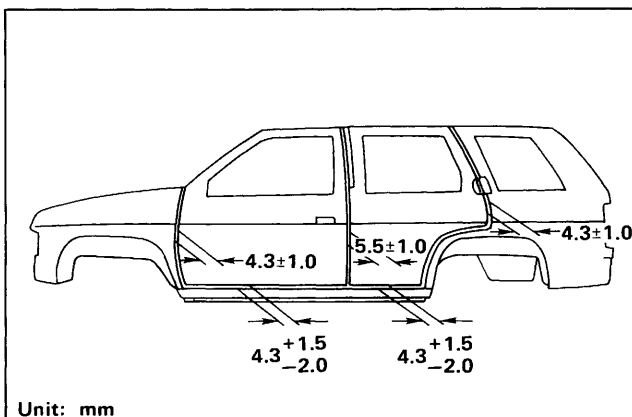
- Spot cut completely through welded parts at portions (a), (k), (f) except (a)*. Use these holes as M.I.G. plug weld holes when installing service part.



- Align lower end of service part with mating parts.

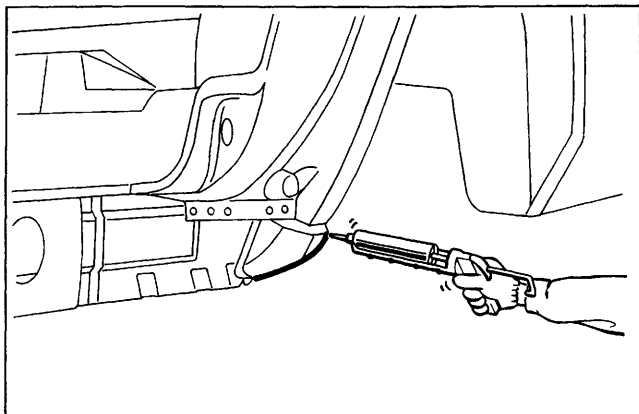


- Tack weld each clamping point, then install front and rear door. Check clearances, grades and parallelism.

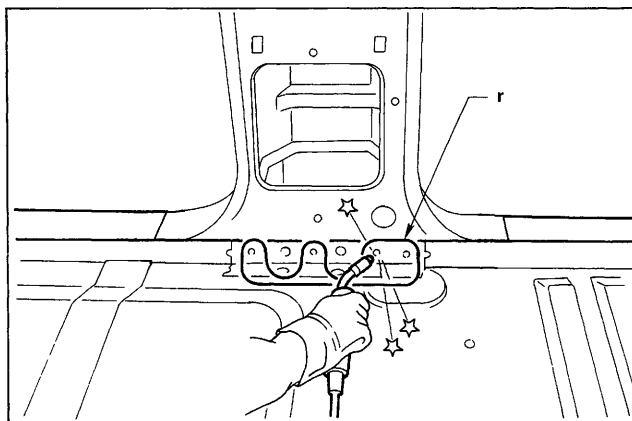


INSTALLATION NOTES

- Apply sealant to the joint between outer rear wheelhouse and outer sill.



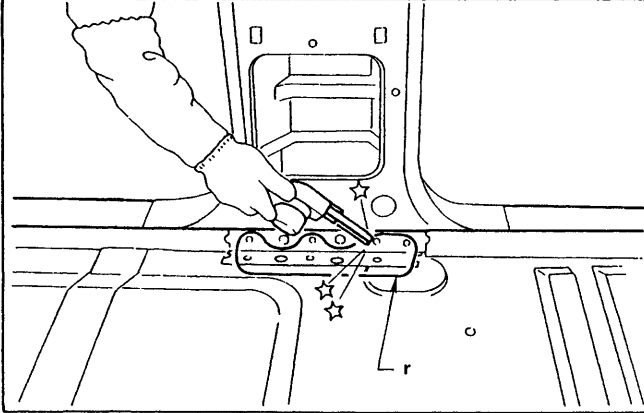
- M.I.G. plug weld at portion (r).



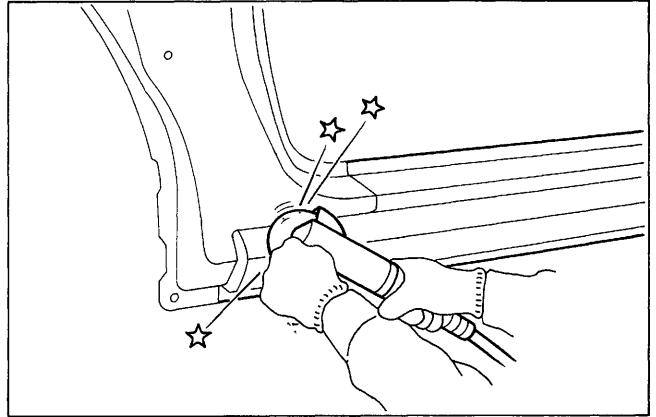
REPLACEMENT OPERATIONS

OUTER SILL

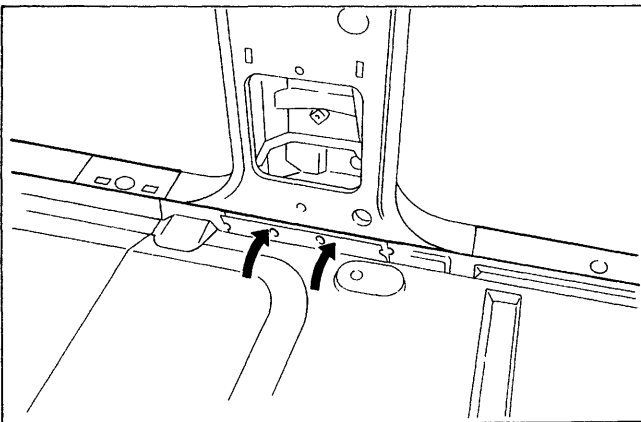
- Dress welded surfaces with a mini belt sander.



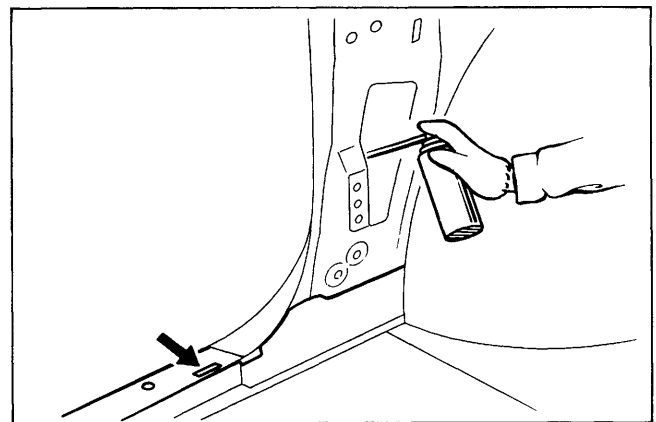
- Dress welded portion with an air grinder.



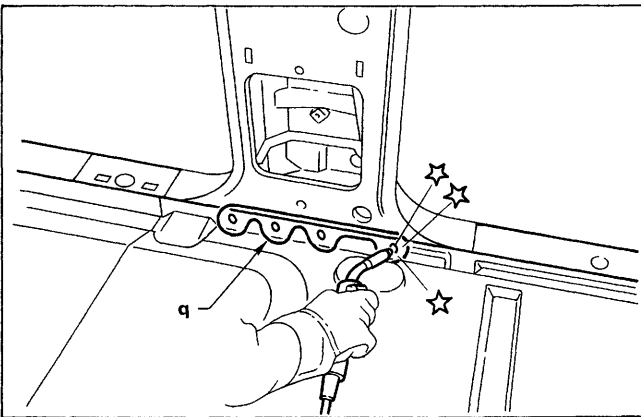
- Apply an anti-corrosive agent to welded portion and return floor flange to the original position.



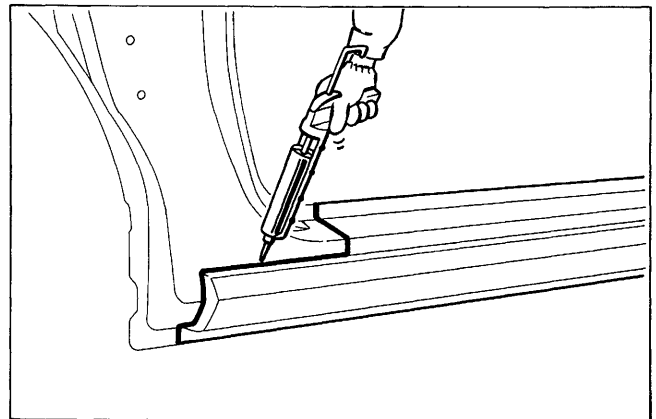
- After welding, apply an anti-corrosive agent to inside of outer sill.



- M.I.G. plug weld at portion (q) through the holes and then butt weld.



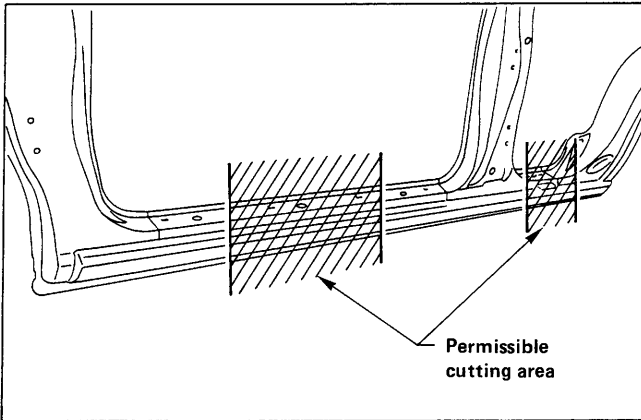
- Apply a sealer.



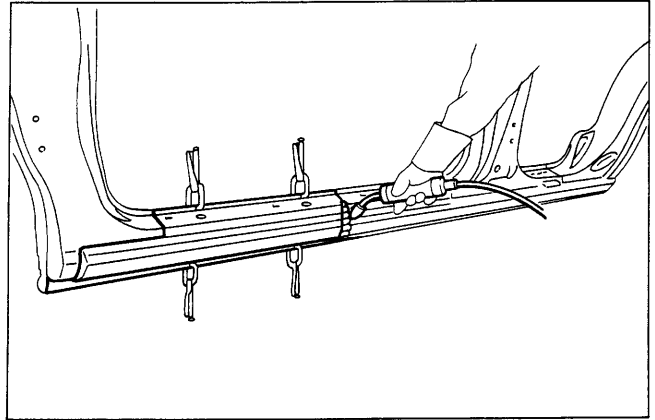
OUTER SILL (Partial Replacement)

REMOVAL NOTE

- Determine butting position, avoiding holes.

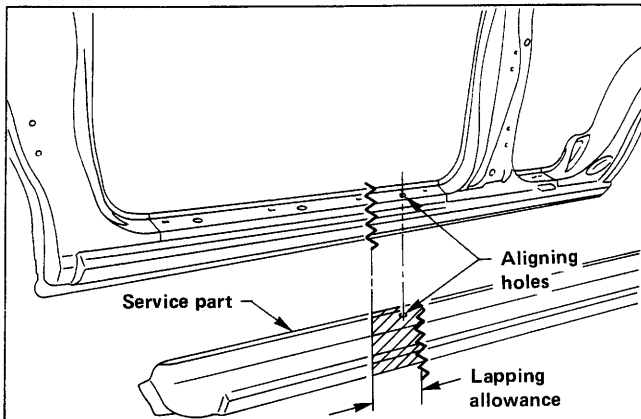


- When welding, temporarily weld each press line first to prevent movement.

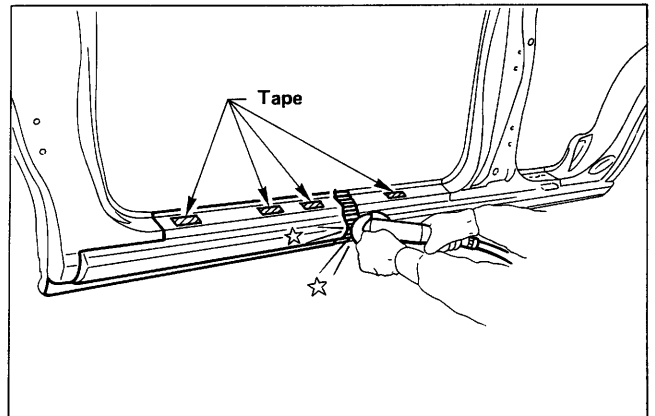


INSTALLATION NOTES

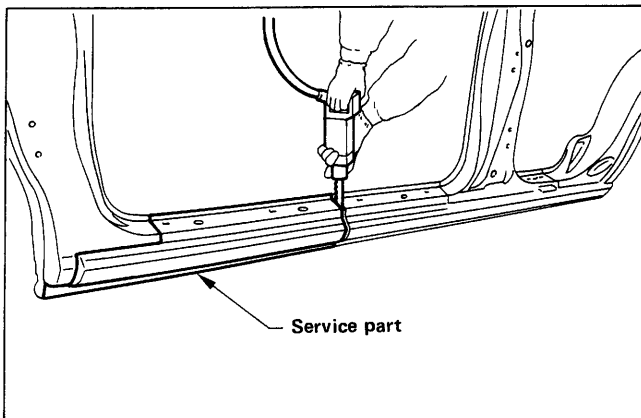
- Cut off service part, leaving its hole in the same position as that of vehicle body for positioning.



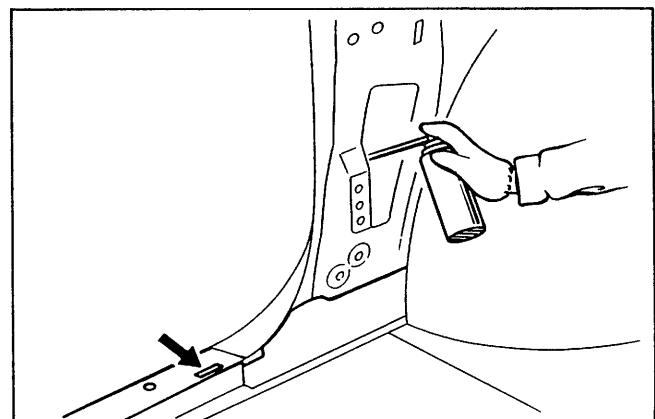
- When dressing butt weld part, cover up holes in upper part of outer sill with tape to prevent debris from entering.



- Place service part, align its hole with that of vehicle body, and perform overlap cutting.



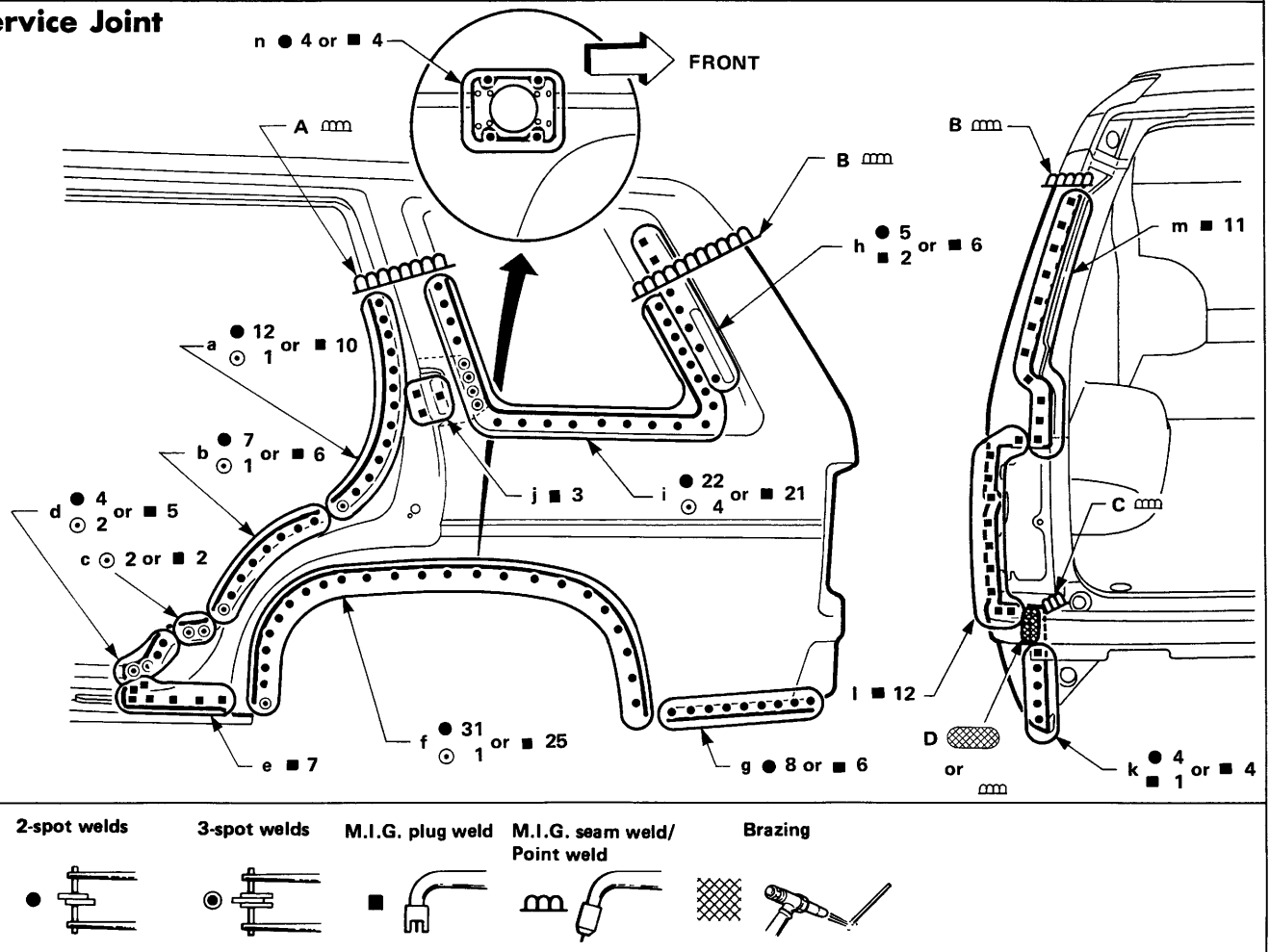
- Be sure to treat inside of outer sill with an anti-corrosive agent.



REPLACEMENT OPERATIONS

REAR FENDER

Service Joint



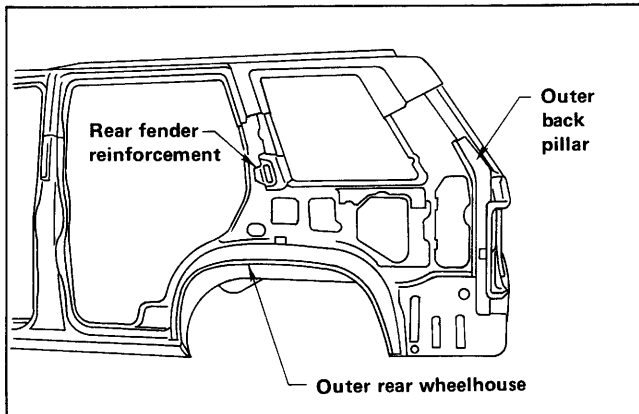
Portions to be welded

- | | | |
|--|---|---|
| <p>A. Rear fender</p> <p>B. Rear fender</p> <p>C. Outer rear crossmember & rear combination lamp base (Not welded to rear fender.)</p> <p>D. Outer rear crossmember</p> <p>a. Inner side panel</p> <p>b. Outer rear wheelhouse</p> <p>Outer rear wheelhouse & inner sill</p> | <p>c. Inner sill & rear floor front</p> <p>d. Inner sill</p> <p>e. Outer sill</p> <p>f. Outer rear wheelhouse</p> <p>Outer rear wheelhouse & outer sill</p> <p>g. Rear floor side</p> <p>h. Drafter duct</p> <p>i. Inner side panel</p> <p>Inner side panel & rear fender reinforcement</p> | <p>j. Rear fender reinforcement</p> <p>k. Rear floor side</p> <p>Rear floor side & outer rear crossmember</p> <p>l. Rear combination lamp base</p> <p>Rear combination lamp base & outer back pillar</p> <p>m. Rear fender extension</p> <p>Rear fender extension & rear combination lamp base</p> <p>n. Fuel filler base (R.H. side)</p> |
|--|---|---|

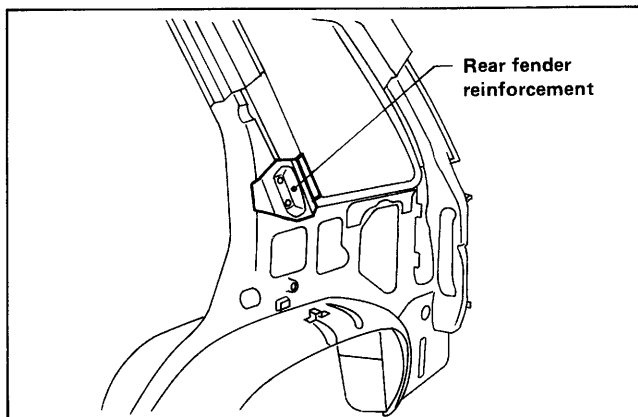
REAR FENDER

REMOVAL NOTES

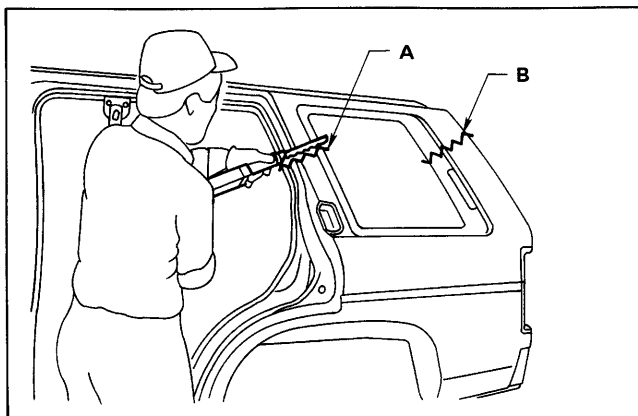
- The inside body construction is shown in the figure.



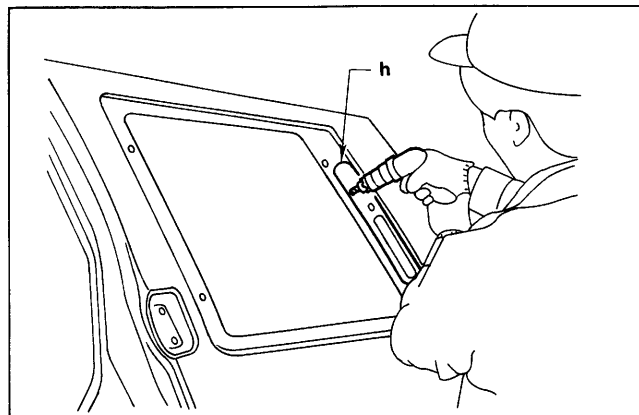
- Rear fender can be joined at any portion. When cutting rear fender, be careful not to cut rear fender reinforcement.



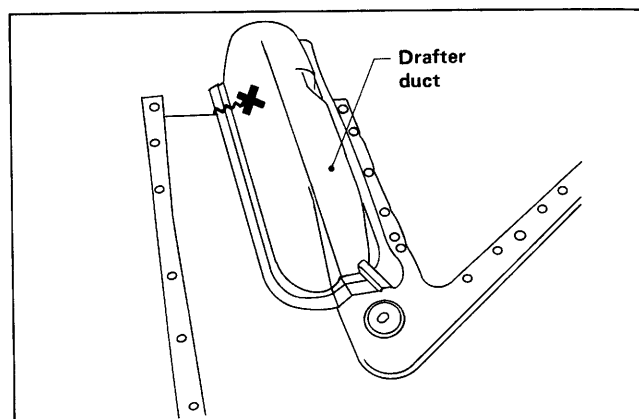
- Cut off rear fender portions (A) and (B) as shown in the figure.



- Spot cut only one panel at portion (h) with a flat tip drill.

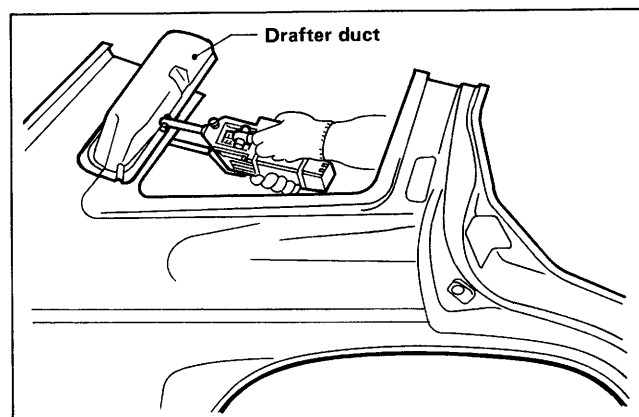


- If drafter duct will be reused, be careful not to cut it when cutting rear fender.



INSTALLATION NOTES

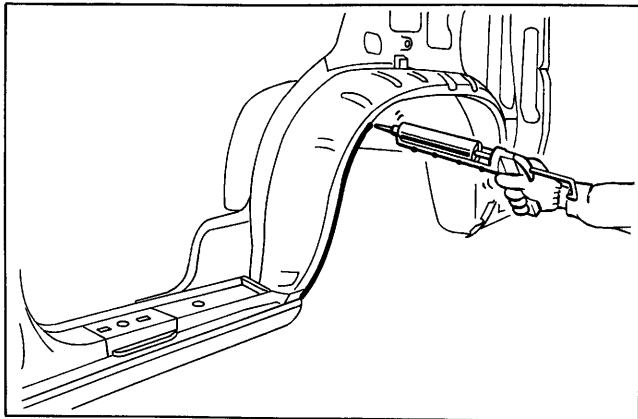
- Spot weld drafter duct with rear fender as originally installed.



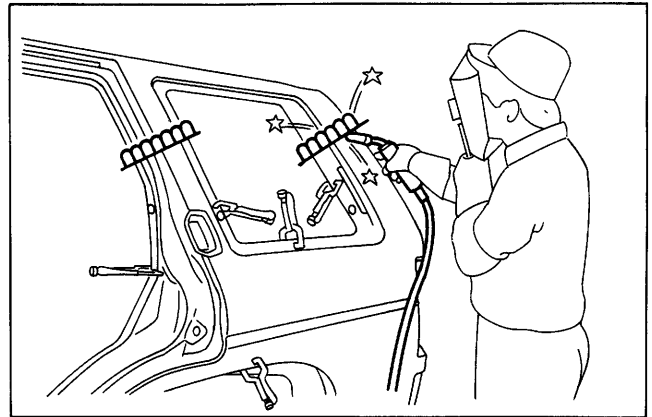
REPLACEMENT OPERATIONS

REAR FENDER

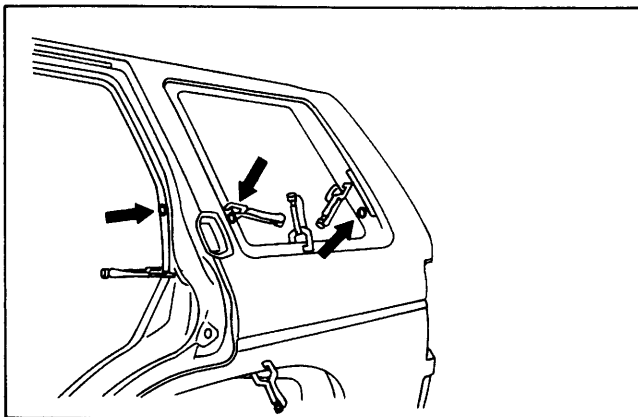
- Apply sealant to wheel arch.



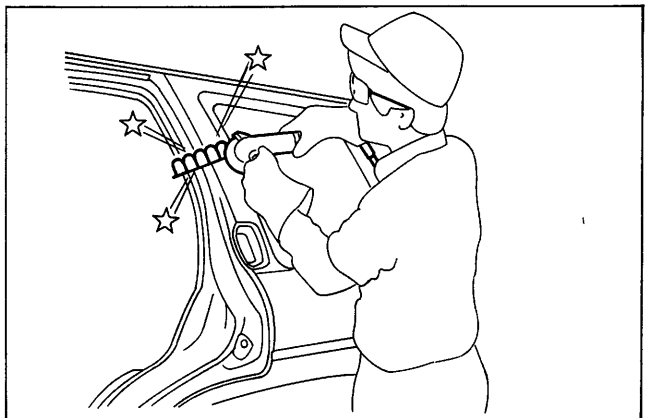
- Weld part to be butt welded up to flange end portion.



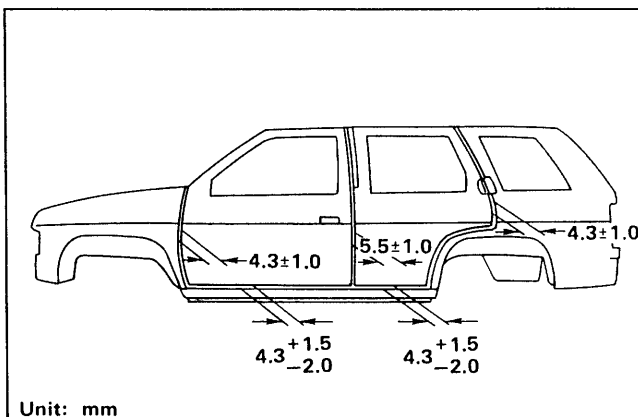
- When installing service part, measure various dimensions of part locations. Refer to "BODY ALIGNMENT" drawing and align locating holes.



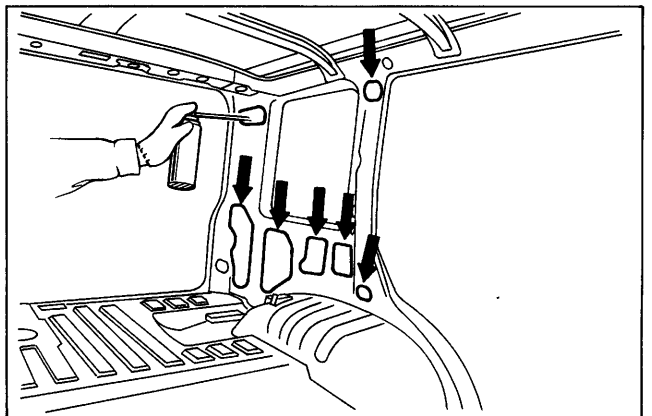
- Dress welded part with an air grinder and ensure the surface is smooth.



- After tack welding, install rear door and back door. Check clearances, grades and parallelism.



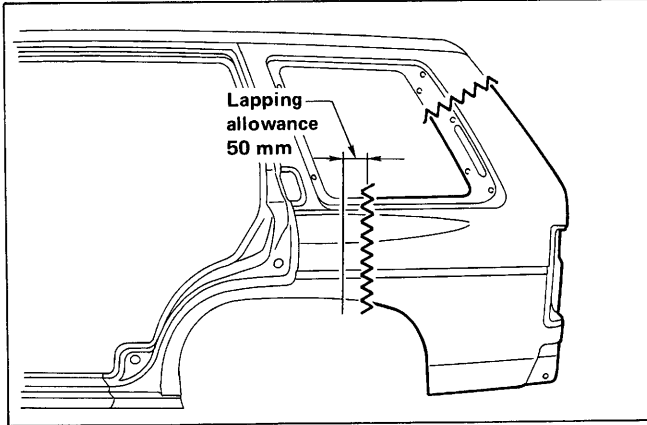
- After welding, apply an anti-corrosive agent to inside of welded part.



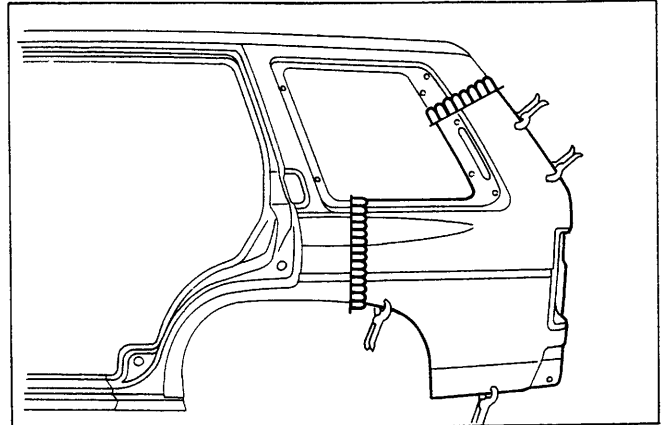
REAR FENDER (Partial Replacement)

REMOVAL NOTE

- Cut off the damaged portion with a lap allowance of about 50 mm.



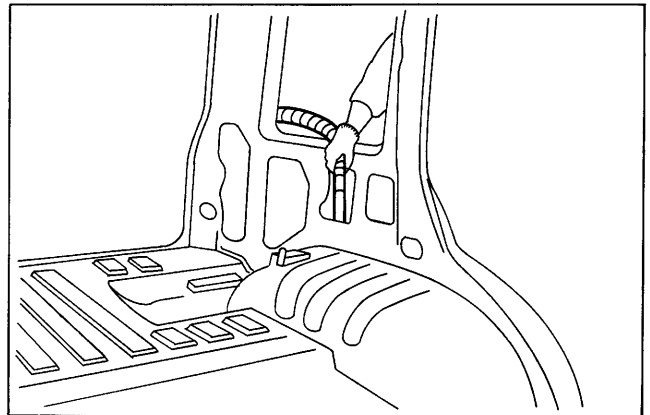
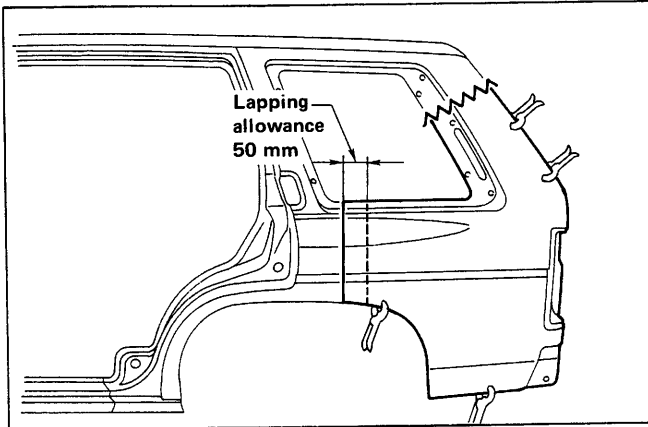
- M.I.G. seam weld butt ends.



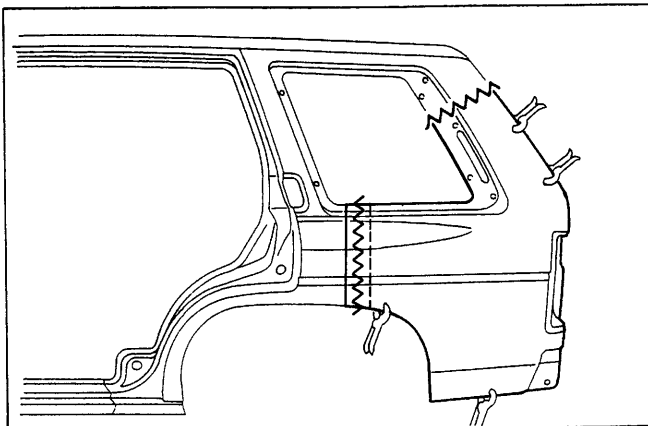
- Remove any debris with a vacuum cleaner to prevent rust and corrosion.

INSTALLATION NOTES

- Cut off the service part leaving a 50 mm lap allowance with the mating part.

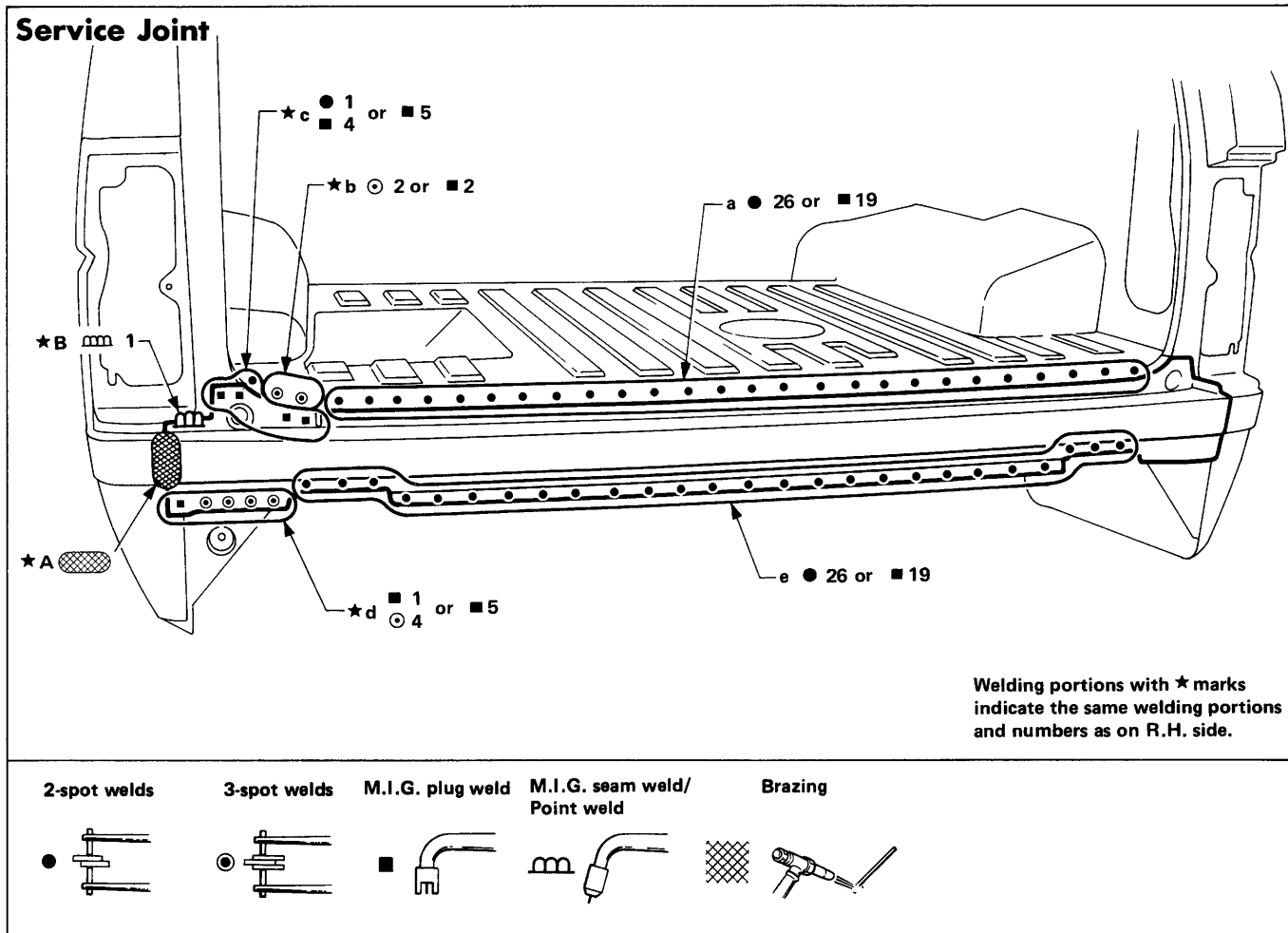


- Install the service part by holding it in place with vise grip pliers, and cutting it off in the middle of the lapped part.



REPLACEMENT OPERATIONS

OUTER REAR CROSSMEMBER



Portions to be welded

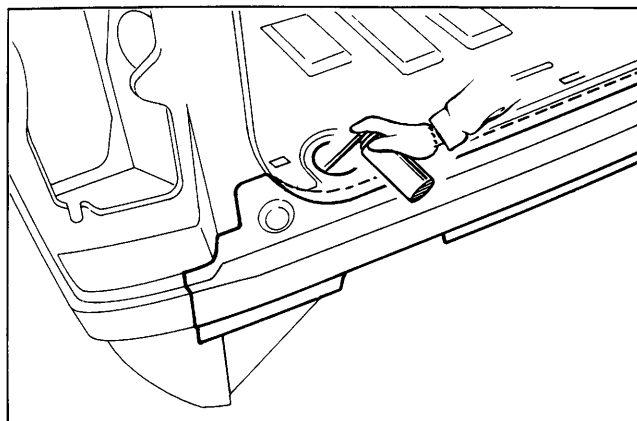
- A Rear fender
 B Rear combination lamp base

- a. Rear floor rear
 b. Rear floor rear & rear combination lamp base
 c. Rear combination lamp base

- d. Rear crossmember & rear floor side
 Rear crossmember, rear floor side & rear fender
 e. Rear crossmember

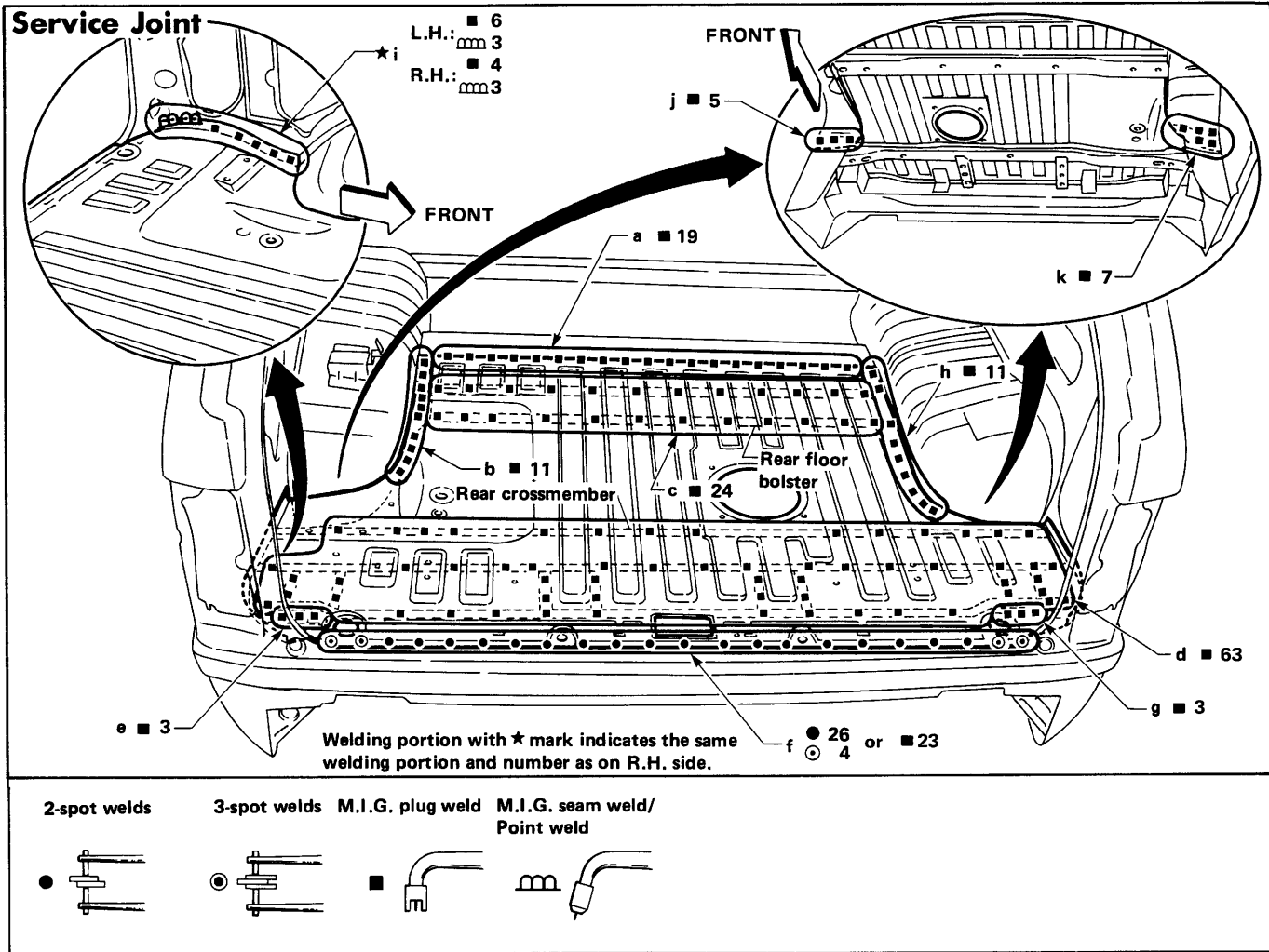
INSTALLATION NOTE

- After welding, apply an anti-corrosive agent to inside of outer rear crossmember using holes in rear floor rear.



REPLACEMENT OPERATIONS

REAR FLOOR REAR



Portions to be welded

- a. Rear floor front
- b. Inner rear wheelhouse
Inner rear wheelhouse & rear floor front
Inner rear wheelhouse & rear floor bolster

- c. Rear floor bolster
- d. Rear crossmember
- e. Outer back pillar
- f. Outer rear crossmember
Outer rear crossmember & rear combination lamp base
- g. Outer back pillar

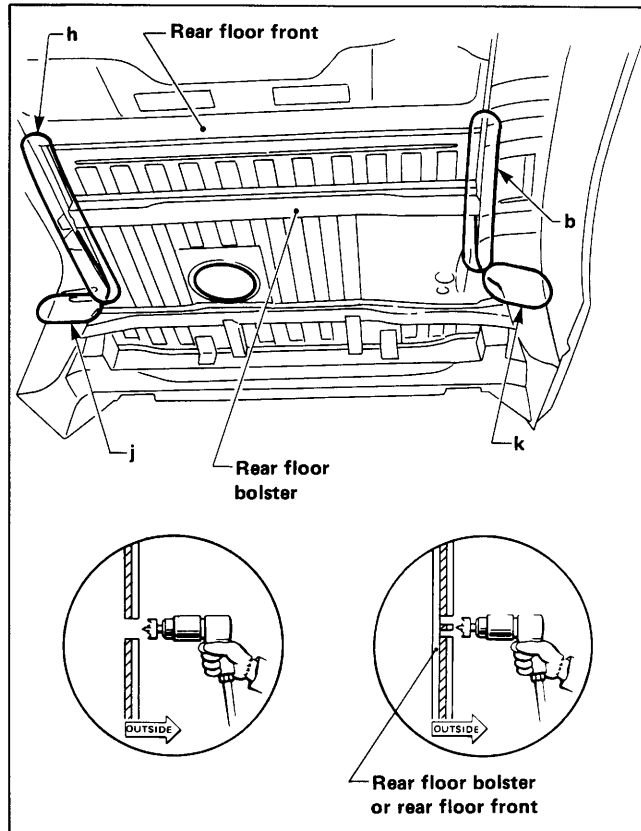
- h. Inner rear wheelhouse
Inner rear wheelhouse & rear floor front
Inner rear wheelhouse & rear floor bolster
- i. Inner side panel
- j. Inner rear wheelhouse
- k. Inner rear wheelhouse

REAR FLOOR REAR

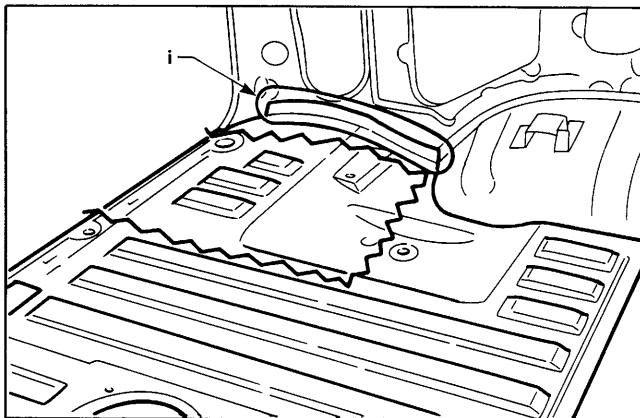
REMOVAL NOTES

Spot cut completely through portions (b), (h), (j) and (k) from outside.

But only spot cut two panels at rear floor bolster and rear floor front portions. Be careful not to cut through rear floor bolster and rear floor front.

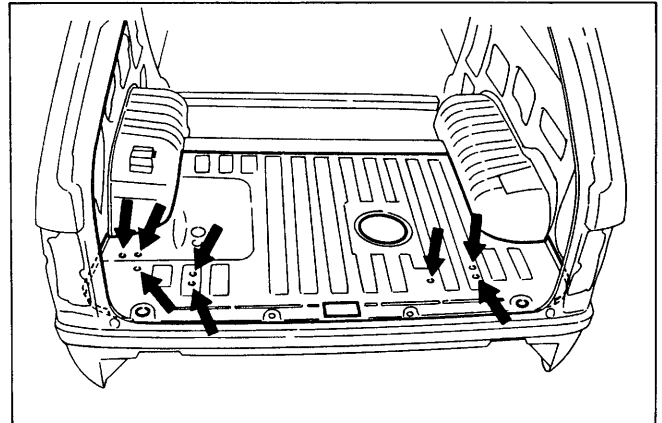


- When cutting portion (i), cut away damaged portion so that it is easy to remove.

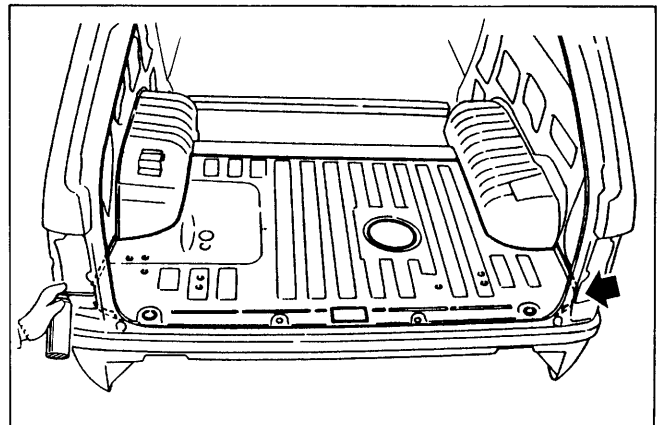


INSTALLATION NOTES

- When installing service part, be sure to align locating holes.



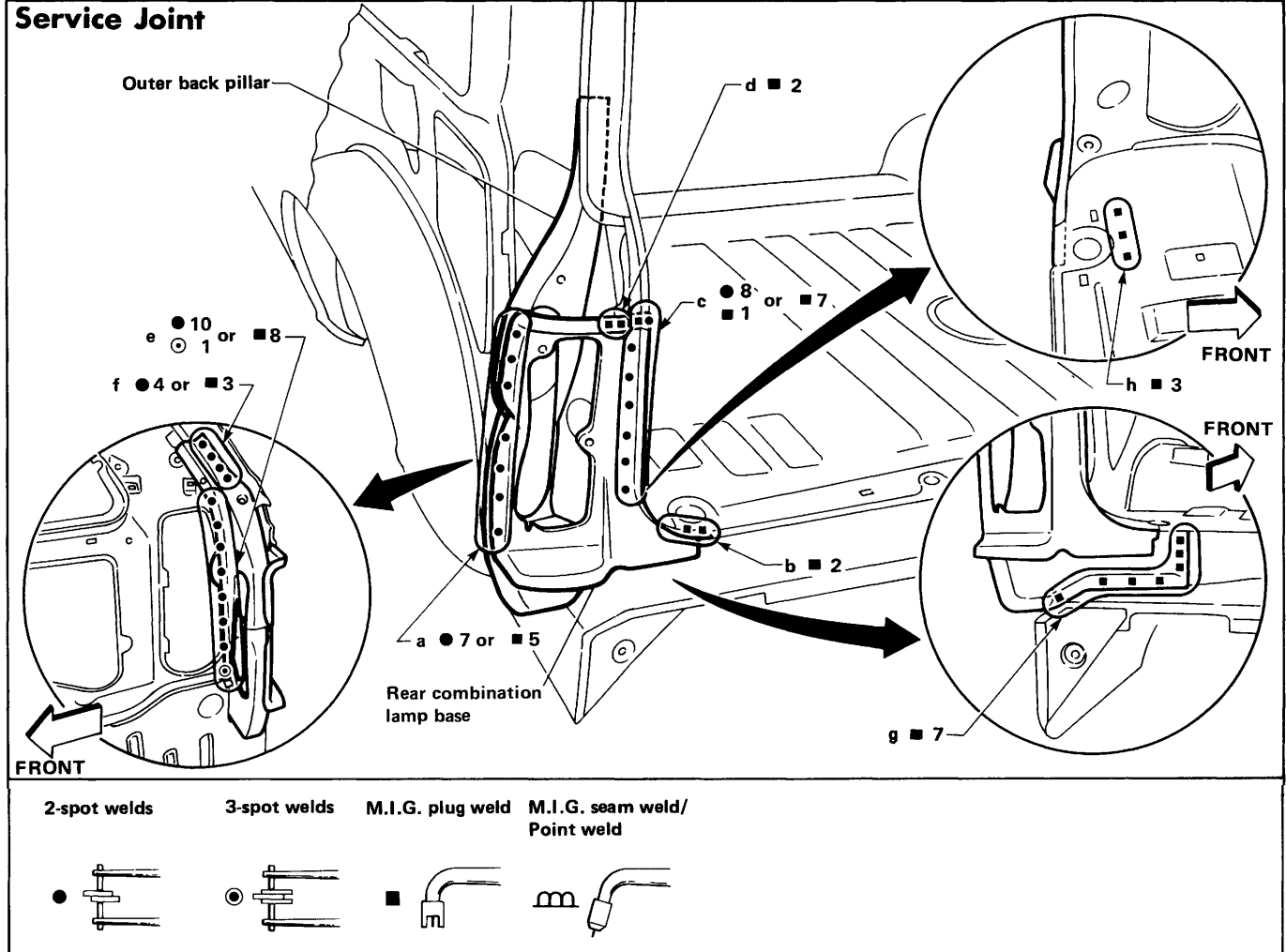
- After welding, apply anti-corrosive agent to inside of inner rear panel.



REPLACEMENT OPERATIONS

REAR COMBINATION LAMP BASE AND OUTER BACK PILLAR

(Work after rear fender and outer rear crossmember have been removed.)

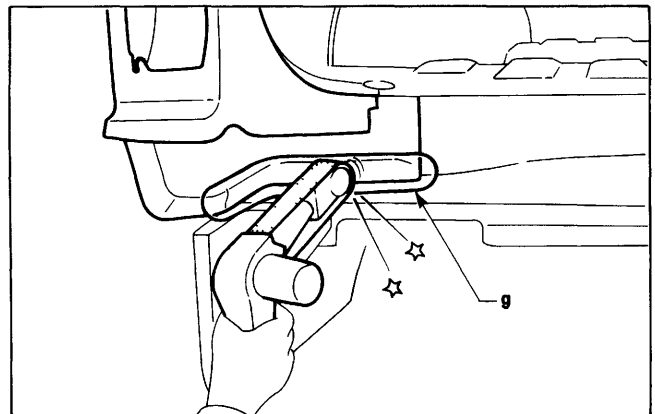


Portions to be welded

- | | | |
|---------------------|--|---|
| a Outer back pillar | c. Inner side panel
Rear fender extension
Rear fender extension & inner side panel | e. Inner side panel
Inner side panel & rear floor side |
| b Rear floor rear | d Rear fender extension | f. Rear fender extension |
| | | g. Rear crossmember
Rear crossmember & rear floor side |
| | | h Rear floor rear |

REMOVAL NOTE

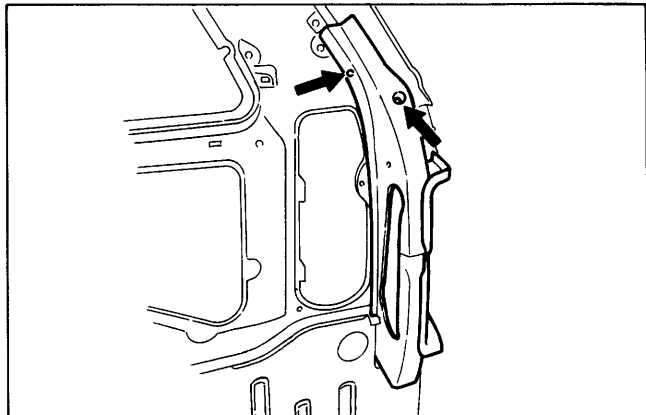
- Cut welds with a belt sander at portion (g) lower side.



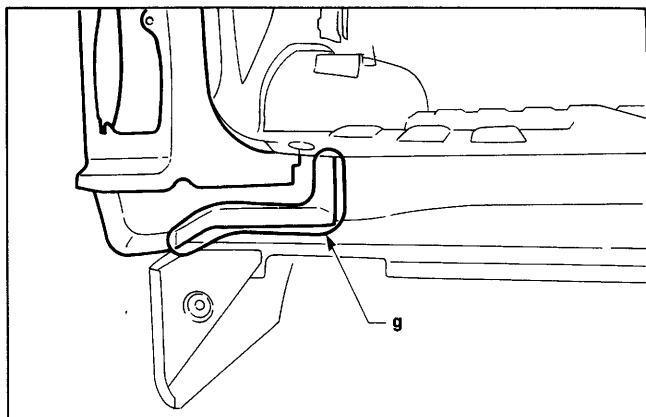
REAR COMBINATION LAMP BASE AND OUTER BACK PILLAR

INSTALLATION NOTES

- When installing service part, be sure to align locating holes.



- Drill and M.I.G. plug weld holes at portion (g). Use drill with 5 to 6 mm diameter then M.I.G. plug weld.

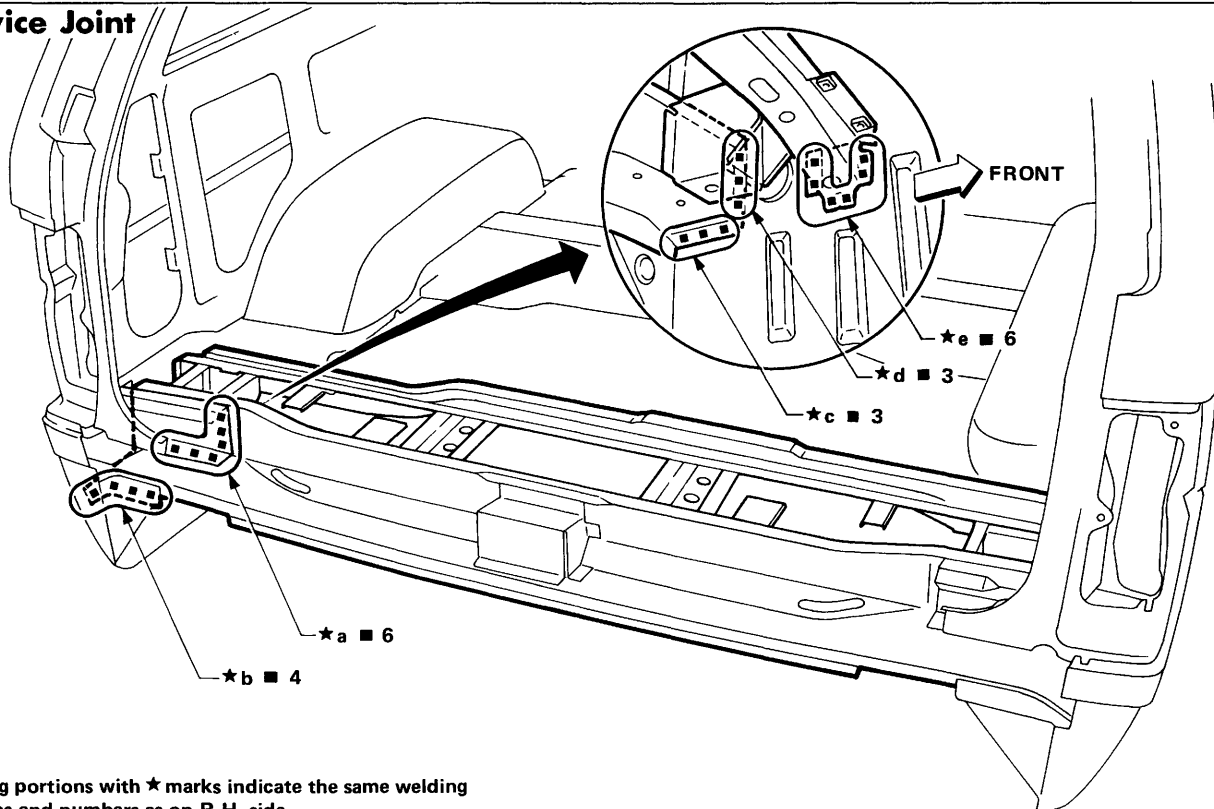


REPLACEMENT OPERATIONS

REAR CROSSMEMBER

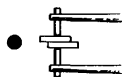
(Work after rear floor rear and outer rear crossmember have been removed.)

Service Joint

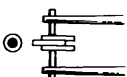


Welding portions with ★ marks indicate the same welding portions and numbers as on R.H. side.

2-spot welds



3-spot welds



M.I.G. plug weld



M.I.G. seam weld/
Point weld



Portions to be welded

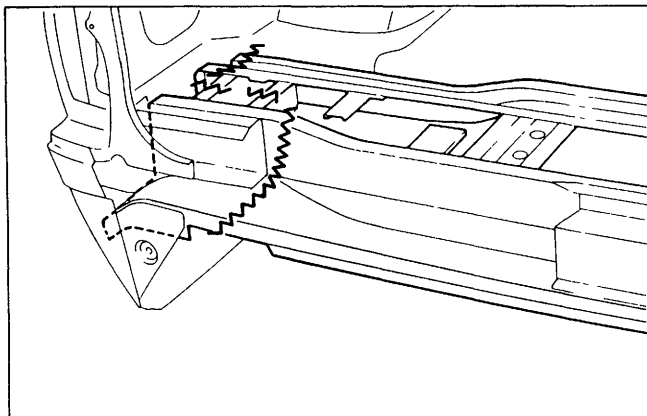
- a. Outer back pillar
- b. Rear floor side
Rear floor side & rear fender

- c. Rear floor side
Rear floor side & outer back pillar

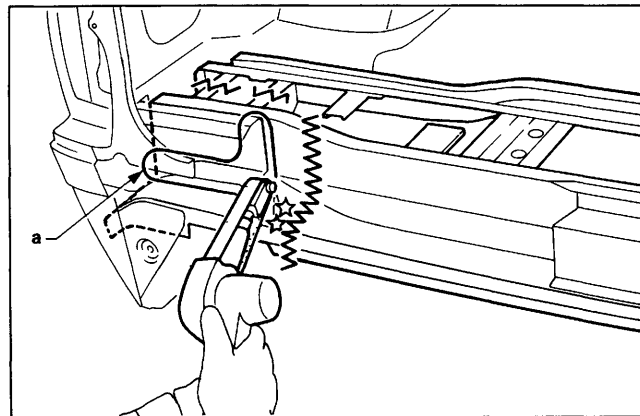
- d. Rear floor side
- e. Rear floor side

REMOVAL NOTES

- Cut off damaged portions so that it is easier to work.



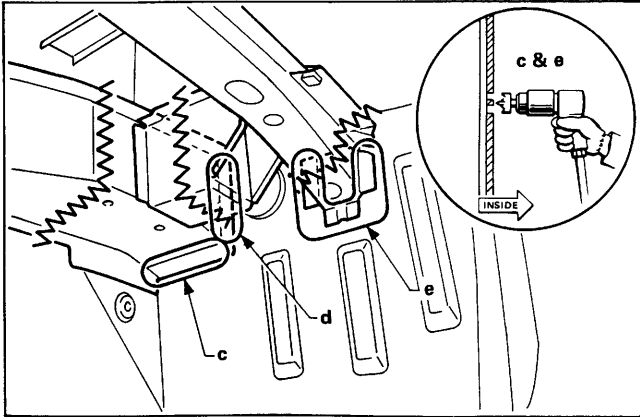
- Cut welds with a belt sander at portion (a) lower side.



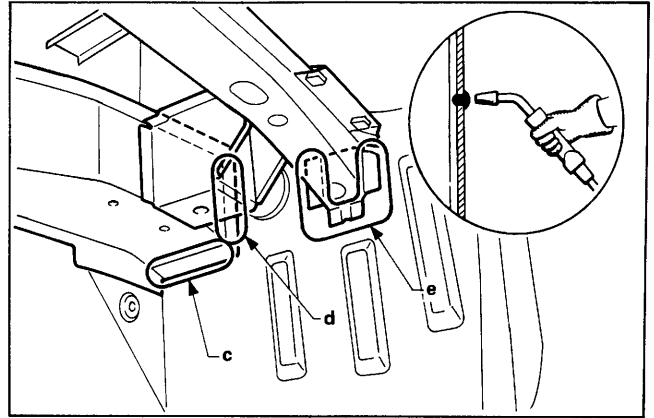
REPLACEMENT OPERATIONS

REAR CROSSMEMBER

- Cut welds with a belt sander at portion (d). Spot cut only surface part to be replaced at portions (c) and (e). Be careful not to cut through to mating parts.

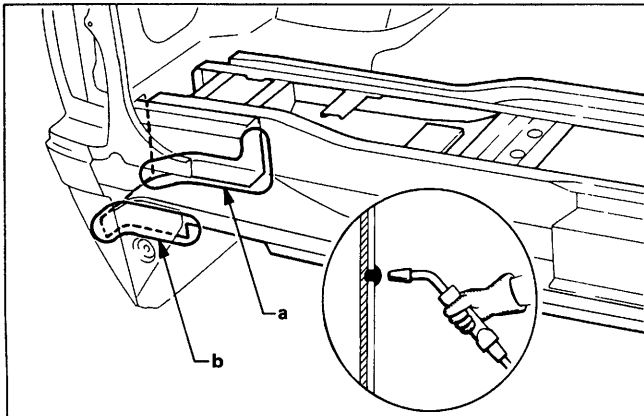


- Drill and M.I.G. plug weld holes at portions (c), (d) and (e). Use drill with 5 to 6 mm diameter then M.I.G. plug weld.



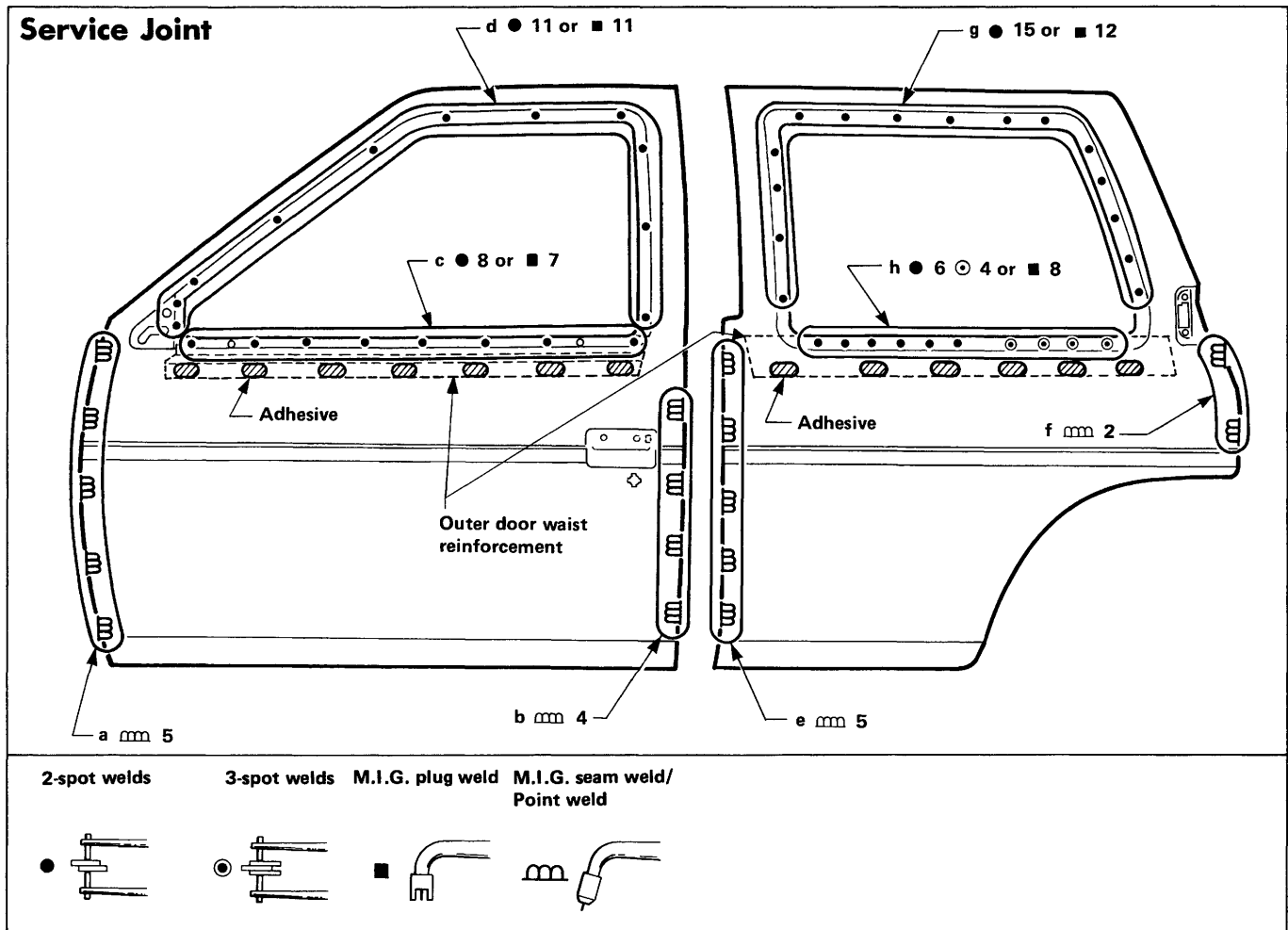
INSTALLATION NOTES

- M.I.G. plug weld portions (a) and (b) using spot cut holes.



REPLACEMENT OPERATIONS

OUTER DOOR PANEL



Portions to be welded

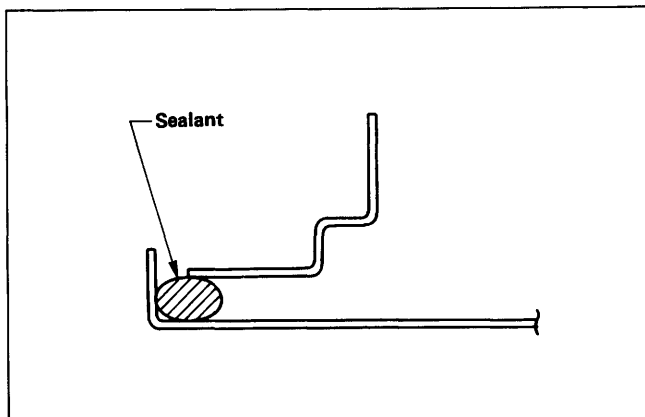
- a. Inner door panel
- b. Inner door panel

- c. Outer door waist reinforcement
- d. Inner door panel
- e. Inner door panel
- f. Inner door panel

- g. Inner door panel
- h. Outer door waist reinforcement
Outer door waist reinforcement & outer
door waist reinforcement bracket

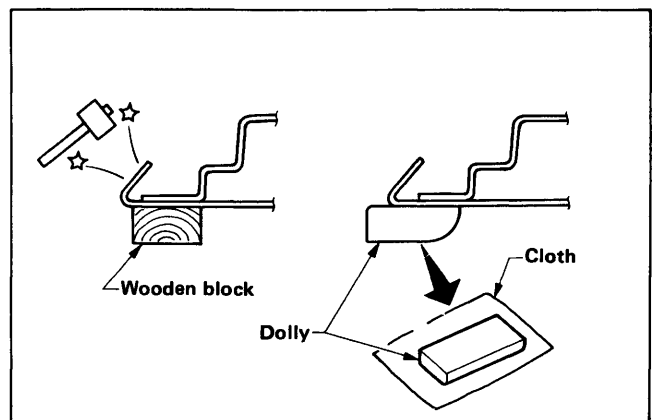
INSTALLATION NOTES

- Apply sealant to outer panel hem.



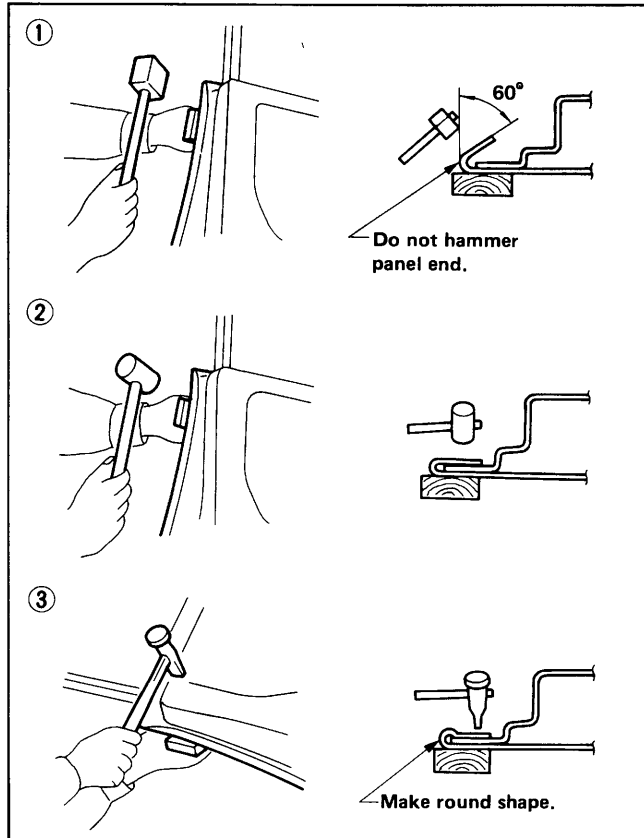
- Hemming work of outer door panel should be done, referring to the following tips.

- (1) Use wooden block as a dolly to avoid distorting outer panel. If it is not available, use dolly covered with cloth or other soft material.

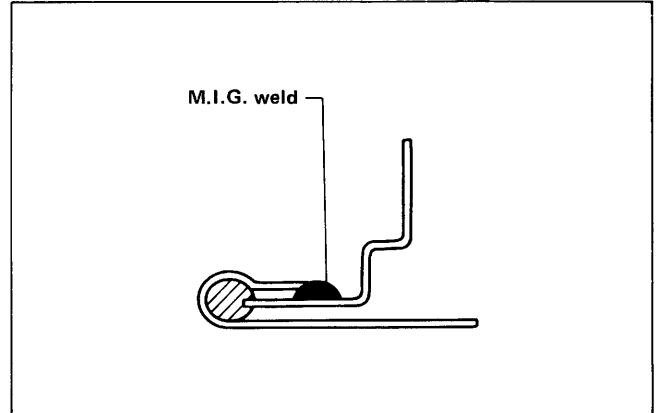


OUTER DOOR PANEL

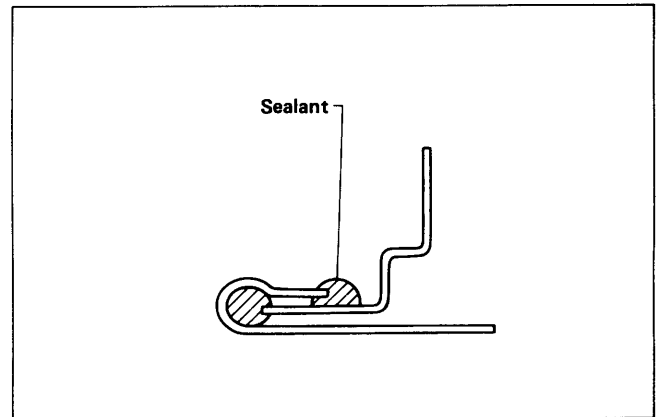
- (2) Hemming work should be done in three steps as shown in the figure.



- M.I.G. weld edge after hemming outer panel.

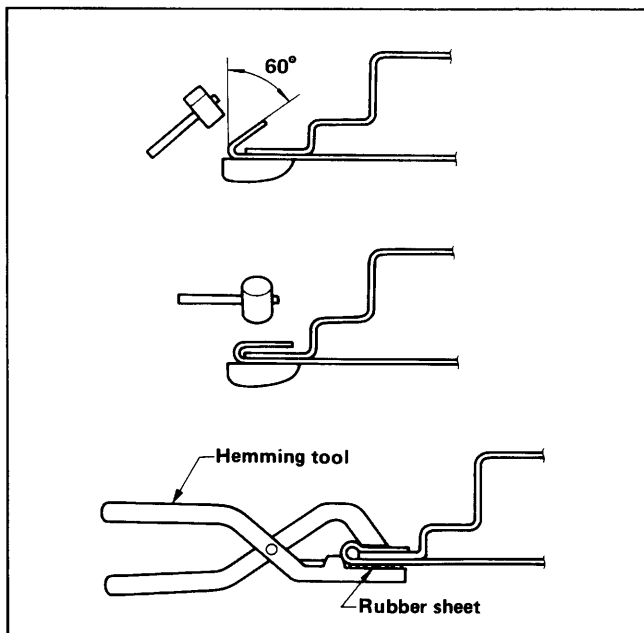


- Apply sealant to whole panel edge.



- (3) When using hemming tool, temporarily bend panel with hammer in advance and then use hemming tool.

Be sure to protect outer panel with rubber sheet.



- Apply an anti-corrosive wax to lower inside of door.

