GROUP-13

BODY AND FRAME ALIGNMENT

CONTENTS

GENERAL SPECIFICATIONS

Frame	
Type	Ladder type
Sectional form	Box type

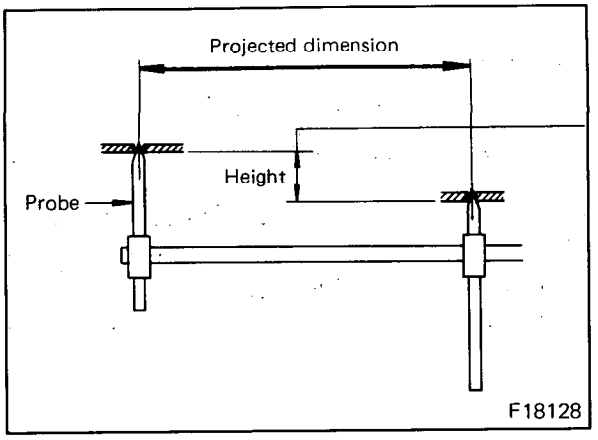
TORQUE SPECIFICATIONS

	Nm (ft.lbs.)
Front suspension crossmember to support bracket	100-120 (72-87)

BODY DIMENSIONS AND MEASUREMENT METHODS

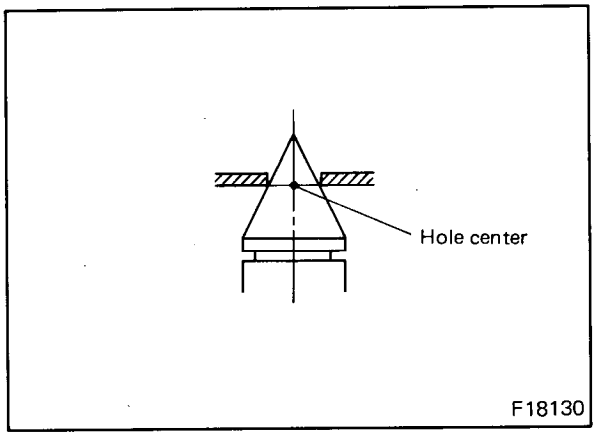
HOW BODY DIMENSIONS ARE INDICATED

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



MEASUREMENT METHODS (using a tracking gauge)

1. How to measure projected dimensions
   If the length of the tracking gauge probes are adjustable, make the measurement by lengthening one probe by the amount equivalent to the difference in height of the two surfaces.
2. If hole diameters are the same and the probes are conical, insert the probes into the holes, and then make the measurement. This method of measurement should be used if the diameters of the holes in the location to be measured are the same.
3. If hole diameters are different, or if the probes are pointed, measurement from the hole centers is impossible. The circumferences must be used instead.



How to Determine Dimensions

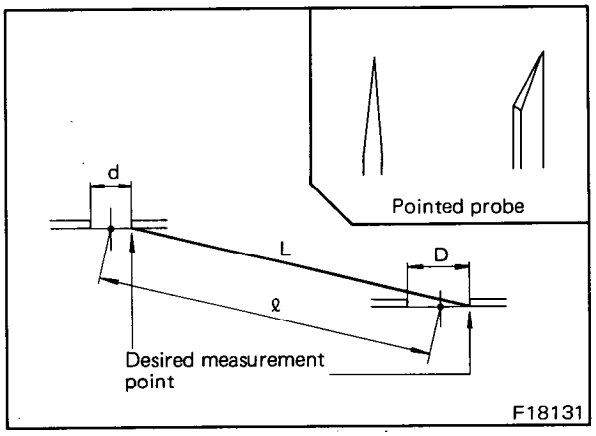
Desired dimension: $L = \ell + \frac{D - d}{2}$

Example: mm (in.)

Reference dimension: $\ell = 600\ (23.6)$

Measurement hole diameters: $D = 20\phi\ (.79)$, $d = 10\phi\ (.39)$

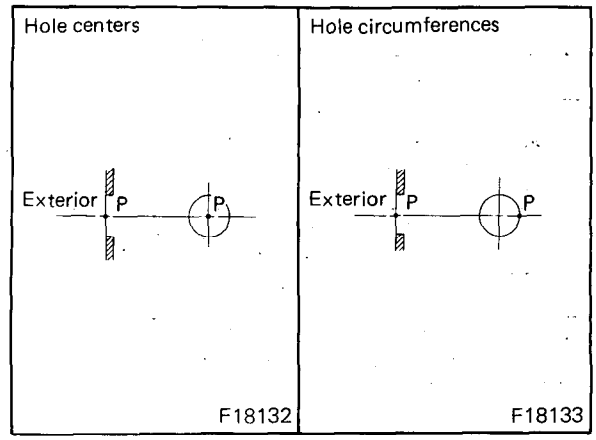
Desired dimension: $L = 600\ (23.6) + \frac{20\phi - 10\phi}{2} = 605\ (23.8)$



MEASUREMENT POINTS ("P" indicates the measurement point)

Measurement points are determined as follows:

1. If the measurement is to be made from the hole centers, the point at the surface from which the measuring instrument is applied is the measurement point.
2. If the measurement is to be made from the circumferences of the holes, the point at the hole circumference of the surface from which the measuring instrument is applied is the measurement point.

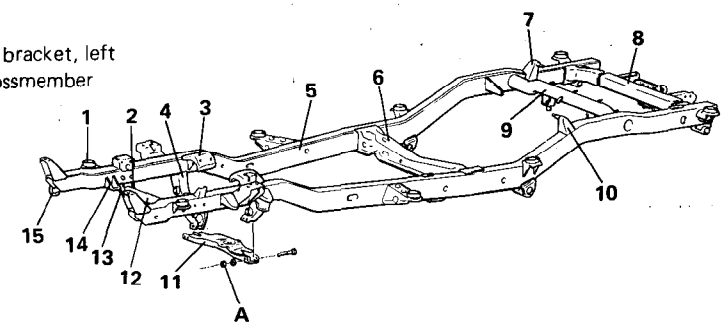


FRAME ALIGNMENT

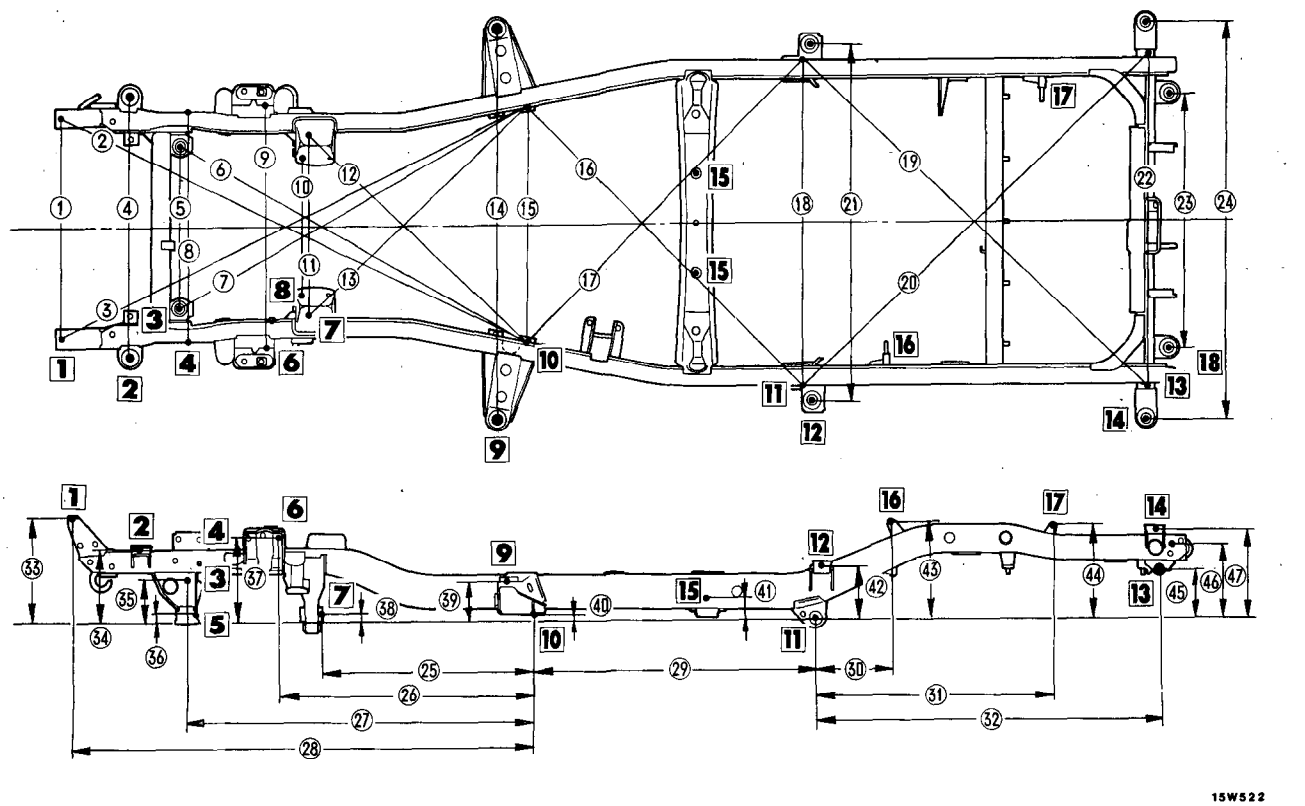
COMPONENTS

1. Body mounting bracket
2. Differential mounting bracket
3. Engine mounting bracket
4. Support bracket
5. Side frame
6. No. 4 crossmember
7. Rear shock absorber bracket, right
8. No. 6 crossmember
9. No. 5 crossmember
10. Rear shock absorber bracket, left
11. Front suspension crossmember
12. No. 1 crossmember
13. Lower arm bracket
14. Stabilizer bracket
15. Towing hook

	Nm	ft.lbs.
A	100-120	72-87

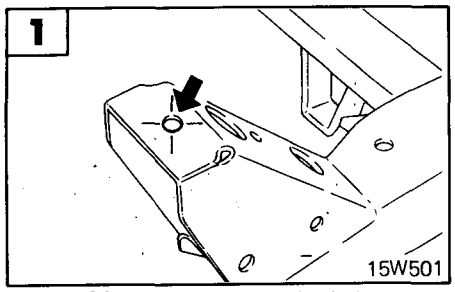


Projected Dimensions

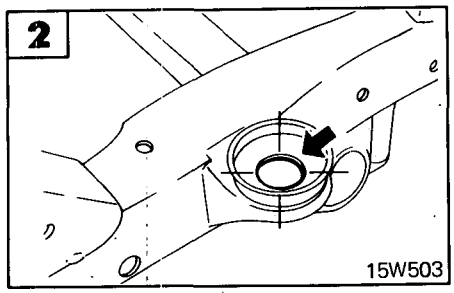


mm (in.)

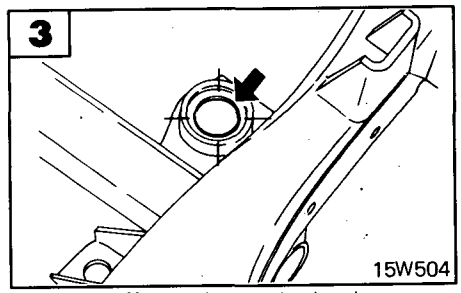
No.	①	②③	④	⑤	⑥⑦	⑧	⑨	⑩	⑪	⑫⑬	⑭	⑮	⑯⑰	⑱
Standard dimension	710 (27.95)	1,724 (67.87)	840 (33.07)	522 (20.55)	1,329 (52.32)	742 (29.21)	777 (30.59)	439 (17.28)	576 (22.68)	989 (38.94)	1,262 (49.68)	750 (29.53)	1,298 (51.10)	990 (38.98)
No.	⑲⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜	㉝
Standard dimension	1,580 (62.20)	1,150 (45.28)	1,080 (42.52)	820 (32.28)	1,280 (50.40)	734 (28.90)	880 (34.65)	1,167 (45.94)	1,562 (61.50)	923 (36.34)	250 (9.84)	795 (31.30)	1,155 (45.47)	347 (13.66)
No.	㉞	㉟	㊱	㊲	㊳	㊴	㊵	㊶	㊷	㊸	㊹	㊺	㊻	㊼
Standard dimension	233 (9.17)	138 (5.43)	21 (.83)	268 (10.55)	21 (.83)	116 (4.57)	13 (.51)	68 (2.68)	163 (6.42)	310 (12.20)	300 (11.81)	265 (10.43)	160 (6.30)	283 (11.14)



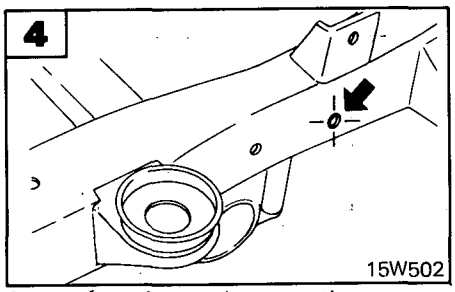
Center of front bumper mounting hole



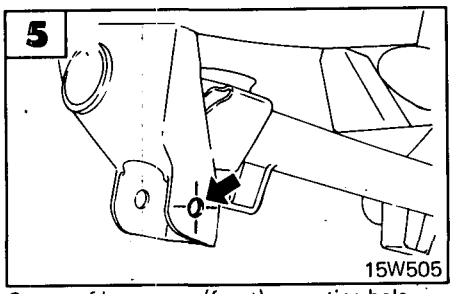
Center of body mounting hole



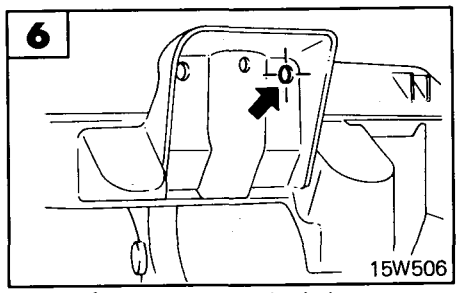
Center of differential mounting bracket hole



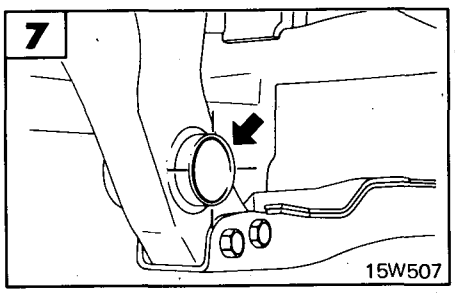
Center of steering gear box mounting hole



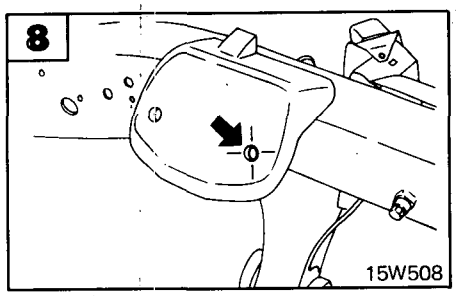
Center of lower arm (front) mounting hole



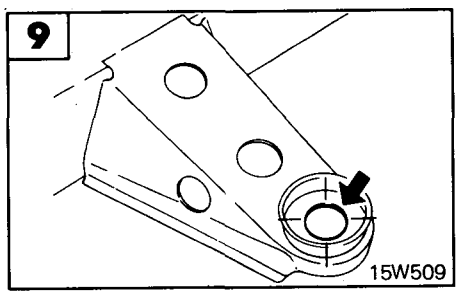
Center of upper arm mounting hole



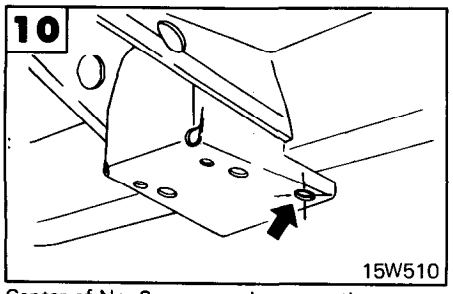
Center of lower arm (rear) mounting hole



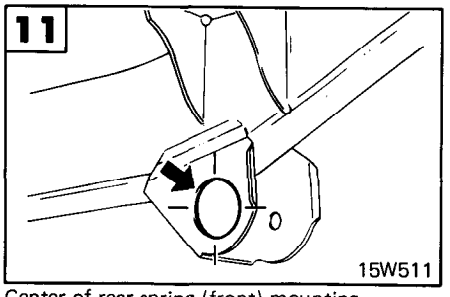
Center of engine mounting hole



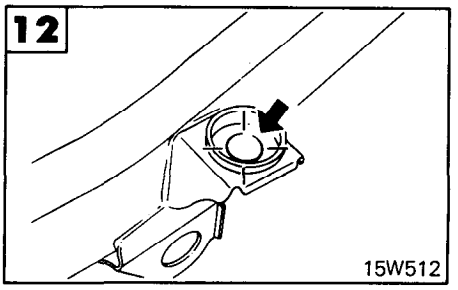
Center of body mounting hole



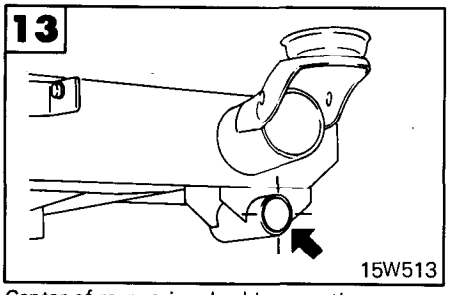
Center of No. 2 crossmember mounting hole



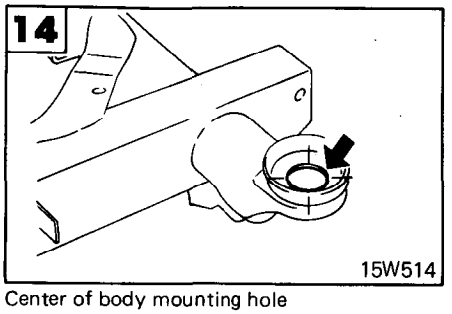
Center of rear spring (front) mounting hole



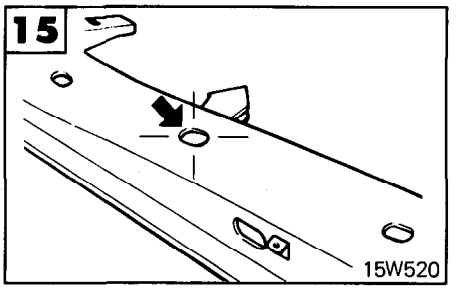
Center of body mounting hole



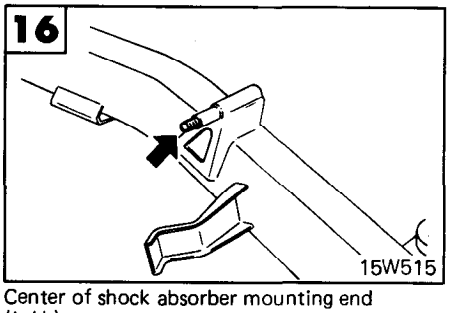
Center of rear spring shackle mounting hole



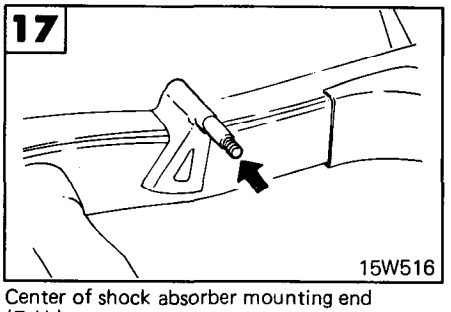
Center of body mounting hole



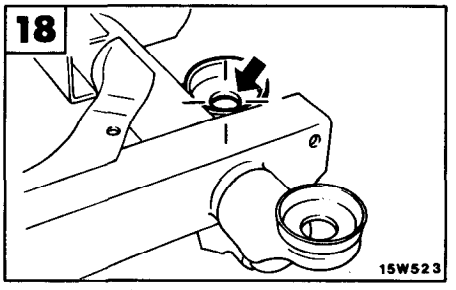
Center of torsion bar anchor arm mounting hole



Center of shock absorber mounting end (L.H.)



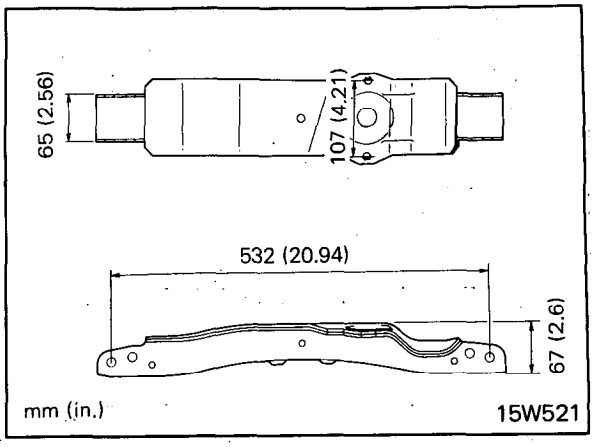
Center of shock absorber mounting end (R.H.)



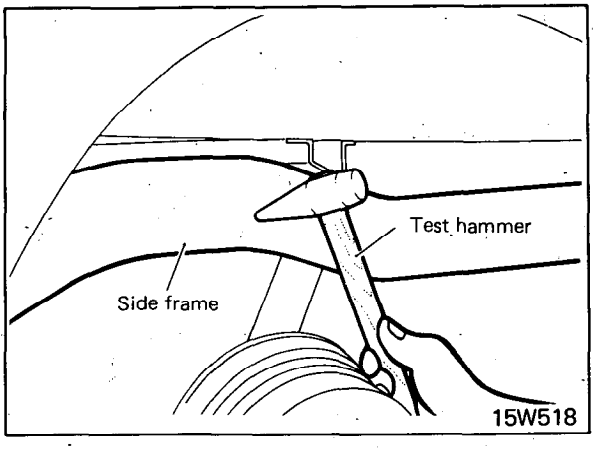
Center of body mounting hole

INSPECTION

1. Check crossmembers for cracks or damage.
2. Check crossmember as illustrated for dimensions. (15W521)



3. Check the side frames, crossmembers, and brackets for cracks or separated welds, by tapping them with a test hammer. (15W518) If in doubt, polish the frame surface well and check it with a crack detecting agent (Redcheck, etc.).
4. Check the frame for bends and distortion. Correct if not within specifications.

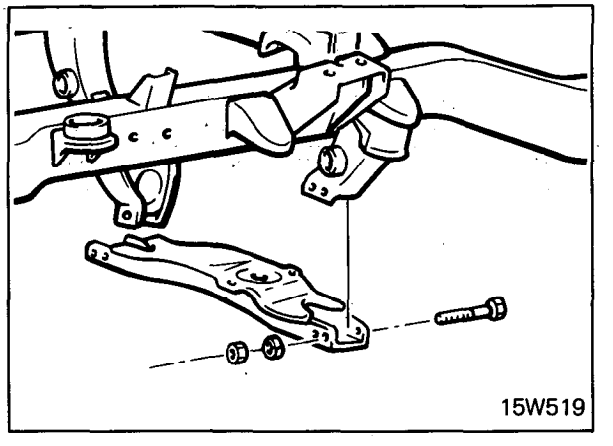


INSTALLATION

1. Install the front suspension crossmember.

NOTE
It is important that the bolts be installed from the rear. (15W519)

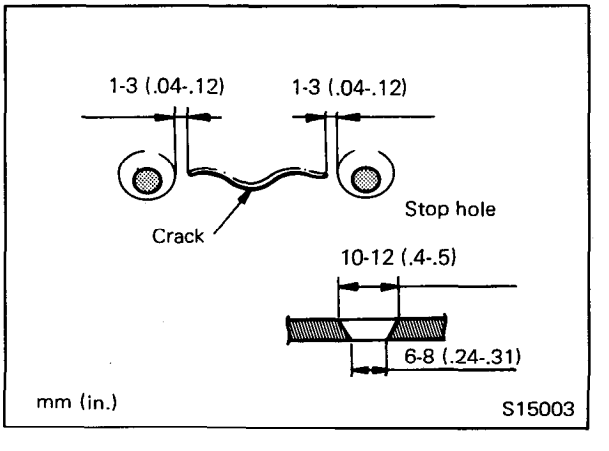
2. When replacing the floor plug, be sure to apply an appropriate amount of semi drying sealant.



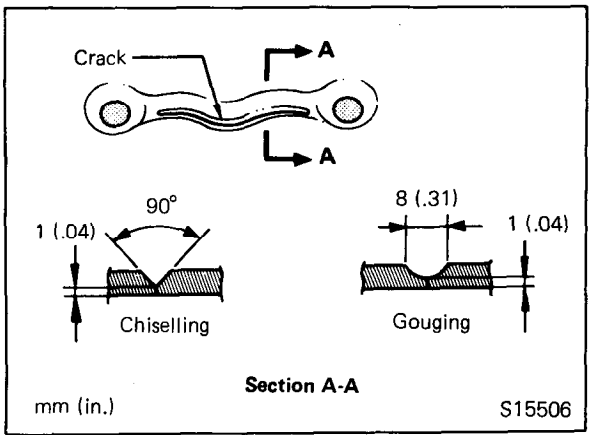
REPAIR

When a crack is found in the frame, it should be repaired as follows:

1. Using a 6-8 mm drill, drill a stop hole at a point 1-3 mm (.04-.12 in.) from each end of the crack.
2. Countersink each hole with a 10-12 mm (.4-.5 in.) drill.

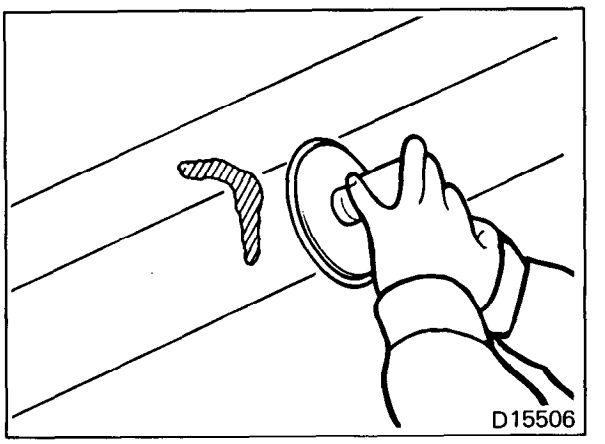


3. Make a groove along the crack by using a chisel or gouge.
4. Fill the groove and the stop holes completely with 2-3 -layers of electric-arc welding.

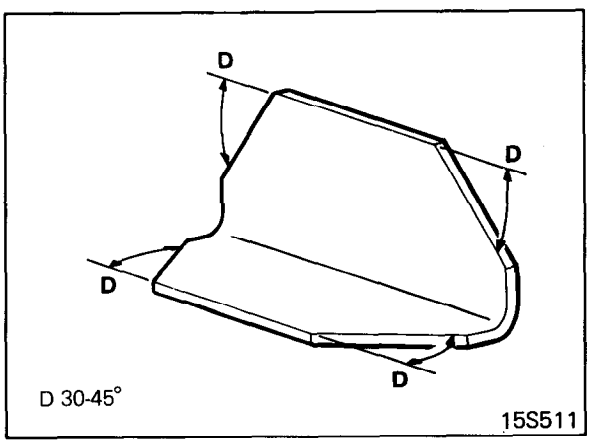


5. Finish the welded area with a grinder.

Caution
Do not use gas welding; doing so could cause distortion.
Use care to prevent thinning the frame itself by excessive grinding.



6. Make a patch of an angle steel stock as illustrated. (15S511)
7. Use an angle steel stock of the same material and thickness as frame.
8. To prevent stress concentration on the patch, make sure that its corners are cut away obliquely.
9. The patch should be long enough so that the ends properly extend beyond the crack.
10. Make sure that edges of the patch are not positioned near spring hangers, crossmember ends or other points subject to concentrated loads.



11. Arc weld the patch at points about 10 mm (.4 in.) from the crest of the patch to avoid stress concentration. (D15507)
12. Clean the welded area and apply chassis black.