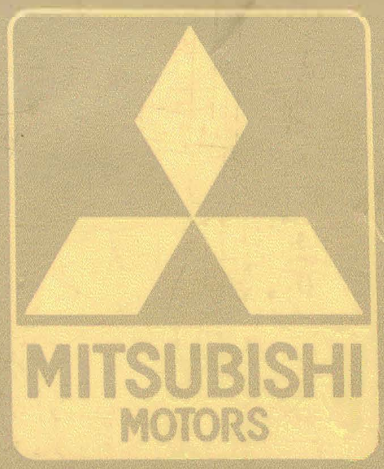
MONTERO

Service Manual 1984



Service Manual

MONTERO

1984

FOREWORD

This Service Manual has been prepared with the latest service information available at the time of publication. It is subdivided into various group categories and each section contains diagnosis, disassembly, repair, and installation procedures along with complete specifications and tightening references. Use of this manual will aid in properly performing any servicing necessary to maintain or restore the high ·vels of performance and reliability designed into .nese outstanding vehicles.

WE SUPPORT VOLUNTARY TECHNICIAN CERTIFICATION THROUGH

National Institute for AUTOMOTIVE SERVICE EXCELLENCE

MITSUBISHI MOTOR SALES OF AMERICA, Inc.

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Reprinted In USA

GROUP INDEX

INTRODUCTION

This publication contains the essential removal, installation, adjustment and maintenance procedures for servicing all Body Styles. This information is current as of time of publication.

INDEX

The preceding page contains a table of contents which lists the group number, group title and symbol of each group. The symbol is also located at the left or right top of each page.

GROUP INDEX

The first page in each group has an index to the subjects included in that group.

PAGE NUMBERS

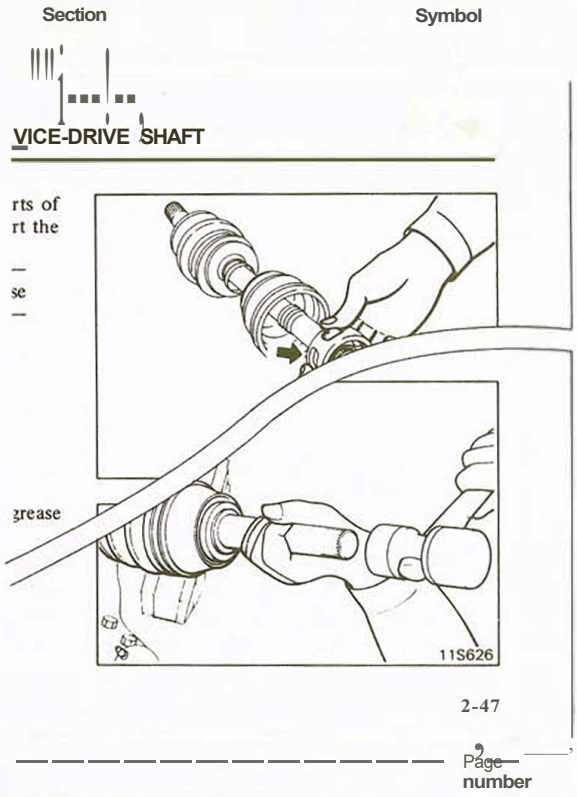
All page numbers consist of two sets of digits separated by a dash. The digits preceding the dash identify the number of the group. The digits following the dash represent the consecutive page number within the group. The page numbers can be found on the lower left or right of each page.

TEXT

1. This manual contains essential procedures for removal, disassembly, inspection, reassembly and installation. For reassembly and installation, reverse the order of disassembly and removal procedures respectively, paying attention to the key points.
2. Unless otherwise specified, each service procedure covers all models. Procedures covering specific models are identified by the model codes, destination or similar designation. A description of these designations is covered in this unit under "VEHICLE IDENTIFICATION".

ILLUSTRATIONS

Illustrations are placed abreast the text. If two or more texts are paired with one illustration, the illustration number at lower right comer of the illustration is given in ( ) at the end of the more pertinent text for reference.



DEFINITION OF TERMS

Standard Dimensions or Values

Design dimensions or values or finished dimensions after adjustment of part.

Service Limit

The allowable limitation of wear, bends, deformation or other damage which restricts the use of parts due to poor performance or insufficient strength.

Repair Limit

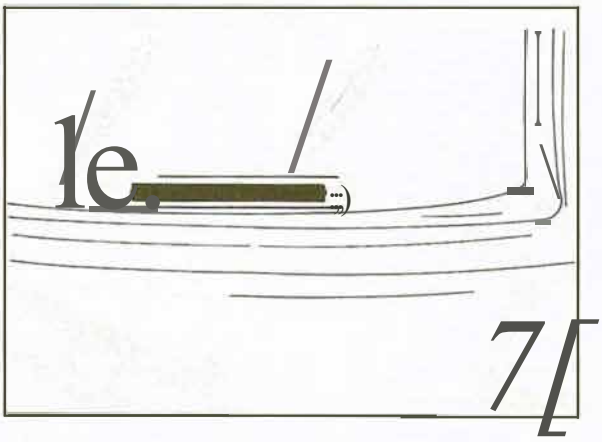
The limitation of wear, deterioration or functional decline of parts at which correction or adjustment is required to maintain their perfo rmance in use.

SPECIAL TOOLS

Some of the special tools which appear in this Manual are either not available in the United States, or have been modified or replaced. If the tool pictured on the "Special Tools" page at the beginning of each section has an "*", it has been modified or replaced. Refer to the Mitsubishi Motors special tool catalog, MSSP-3G-TC, check the numerical index and refer to the indicated page number for illustration, description and application. If it is not listed in the numerical index, refer to the replacement/interchange list for an illustration and description of the new tool.
If the pictured tool has a "D", it has been deleted, and is not available in the U.S.

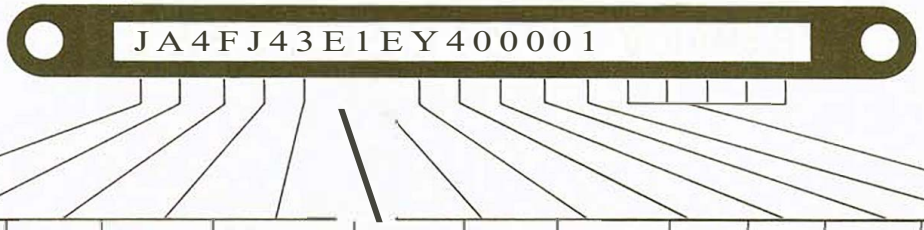
TEHICLE IDENTIFICATION NUMBER PLATE LOCATION

The vehicle identification number (V.I.N.) plate is located on the left top side of the instrument panel and it is visible through the windshield.



VEHICLE IDENTIFICATION NUMBER CODE CHART

All vehicle identification numbers contain 17 digits. The vehicle number is a code which tells country, make, vehicle type, line, etc.



1st digit	2nd digit	3rd digit	4th digit	5th digit	6th digit	7th digit	8th digit	9th digit	10th digit	11th digit	12th digit	13th thru 17th digit
Country	Make	Vehicle type		Line	Series	Body	Engine	Check digit	Model year	Plant	Transmission	Serial number
J. Japan	A- Mitsubishi	4. Multi-purpose vehicle (MPV)	F- 4001 lbs. or more with hydraulic brakes	J- MONTERO	4- High 5- Premium	2- 2-door canvas-top 3- 2-door metal-top	E- 2.6 liters (155.9 C.I.D.)	0 1 2 3 . . . . 9 X	E- 1984 year	y. Nagoya	4- 5-speed 49 states 5- 5-speed California• 7-A/T 49 states 8-A/T California*	00001 to 99999

NOTE Digit in position 9 is used for V.I.N. verification.
*Can also be sold in Federal States.

VEHICLE IDENTIFICATION NUMBER LIST

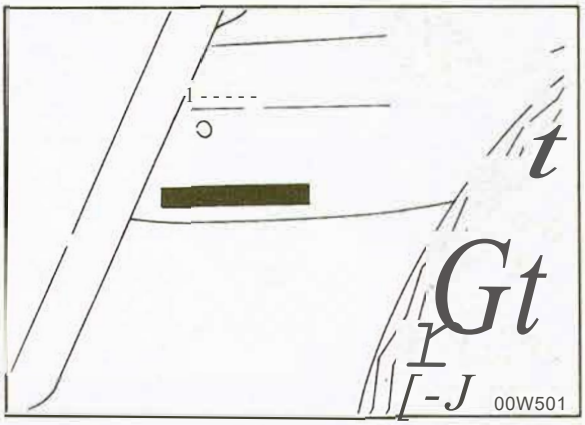
V. I. N. (except serial number)	Brand (Package)	Destination	Engine displacement	Model code
JA4FJ42EOEY4	MONTERO	Federal	2.555 liters (J 55.9 C. I. D.)	L042GNJLF
JA4FJ42E□EY5		California*		L042GNJLH
JA4FJ52EDEY4		Federal		L042GNULF
JA4FJ52EDEY5		California*		L042GNULH
JA4FJ43EOEY4		Federal		L042GVNJLF
JA4FJ43EOEY5		California*		L042GVNJLH
JA4FJ43EDEY7		Federal		L042GVKJLF
JA4FJ43EDEY8		California*		L042GVKJLH
JA4FJ53EOEY4		Federal		L042GVNULF
JA4FJ53EOEY5		California*		L042GVNULH
JA4FJ53E□EY7		Federal		L042GVKULF
JA4FJ53EOEY8		California*		L042GVKULH

*Can also be sold in Federal States.

CHASSIS NUMBER

Stamping Location

The chassis number is stamped on the side of the frame near the right rear shock absorber.



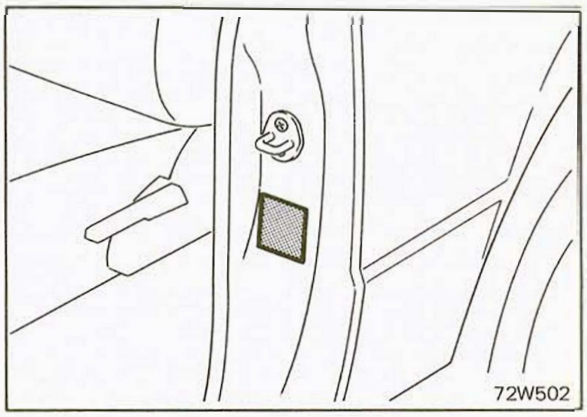
Chassis Number Code Chart

L O4 2 GV D Y 4 0 0 0 0 I

Vehicle line	Engine displacement	Body type	
L04- MONTERO	2- 2.555 liters (155.9 C.I.D.)	G- 2-door canvas-top GV- 2-door metal-top	Refer to I0th thru 17th digits of V.I.N. plate

VEHICLE SAFETY CERTIFICATION LABEL

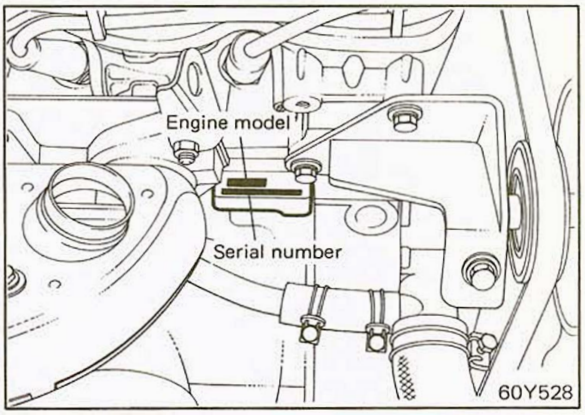
The vehicle safety certification label is attached to face of left door pillar. (72W502)
This label indicates the month and year of manufacture, Gross Vehicle Weight Rating (G.V.W.R.), front and rear Gross Axle Weight Rating (G.A.W.R.), and Vehicle Identification Number (V.I.N.).



ENGINE MODEL STAMPIN G

The engine model number is stamped at the right front side on the top edge of the cylinder block as shown in the following:

Engine model	Engine displacement
G54B	2.555 liters (155.9 C.l.D.)



The engine serial number is stamped near the engine model number, and the serial number cycles, as shown below.

Engine serial number	Number cycling	
AA0201 to YY9999	AA0201 - - -	AA99997
	LABOOOl - - -	AY99997
	[BA000l - - -	YY9999

ENGINE AND TRANSMISSION MODEL

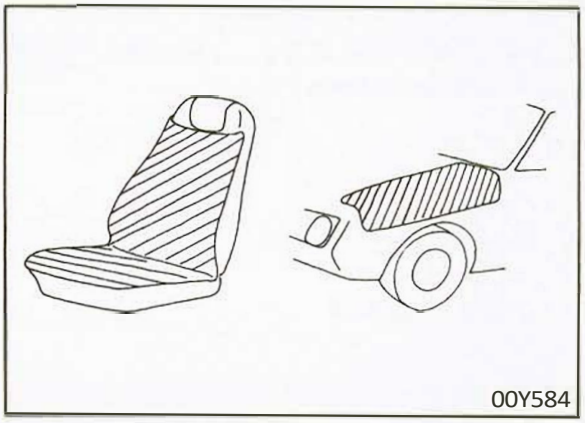
Vehicle model	Engine model	Transmission model
L042GNJLF L042GNJLH L042GNULF L042GNULH L042GVNJLF L042GVNJLH L042GVNULF L042GVNULH	G54B	KM145-O-THQ
L042GVKJLF L042GVKJLH L042GVKULF L042GVKULH	G54B	KM146

BODY COLOR CODE

Exterior code	Body color
Two-tone	
B93B91Xl3	Black/Light blue (Metallic)
C38C19X13	Black/Brown (Metallic)
H74H80X13	Black/Silver (Metallic)
R79R78X13	Black/Red
W44W42Xl3	Black/White
X04X21H80	Velvet black/Silver (Metallic)

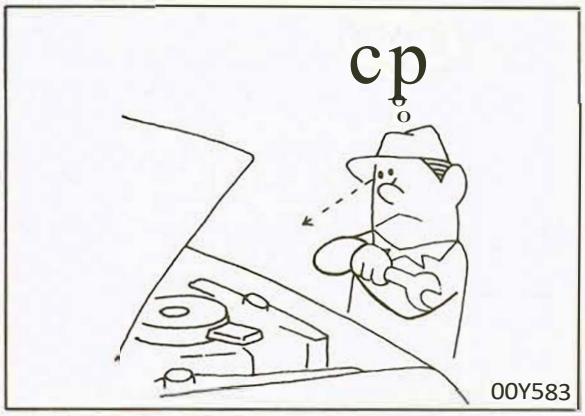
PROTECTING THE VEHICLE

If there is a likelihood of damaging painted or interior parts during service operations, protect them with suitable covers (such as seat covers, etc.).



REMOVAL AND DISASSEMBLY

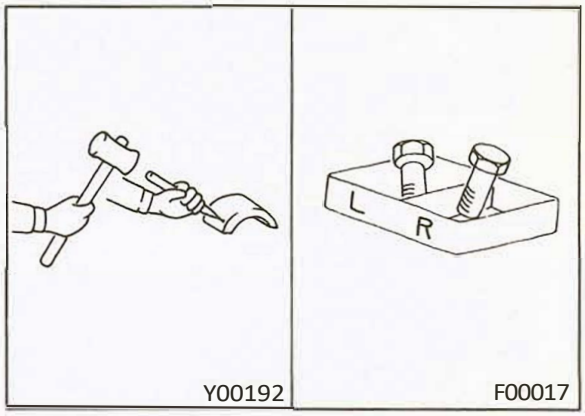
When checking a malfunction, find the cause of the problem. If it is determined that removal and/or disassembly is necessary, perform the work by following the procedures contained in this Service Manual.



If punch marks or mating marks are made to avoid error in assembly and facilitate the assembly work, be sure to make them in locations which will have no detrimental effect on performance and/or appearances.

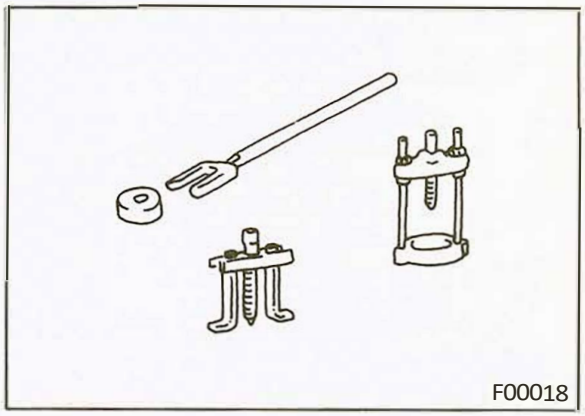
If an area having many parts, similar parts, and/or parts which are symmetrical right and left is disassembled, be sure to arrange the parts so that they do not become mixed during the assembly process.

1. Arrange the parts removed in the proper order.
2. Determine which parts are to be reused and which are to be replaced.
3. If bolts, nuts, etc., are to be replaced, be sure to use only the exact size specified.



SPECIAL TOOLS

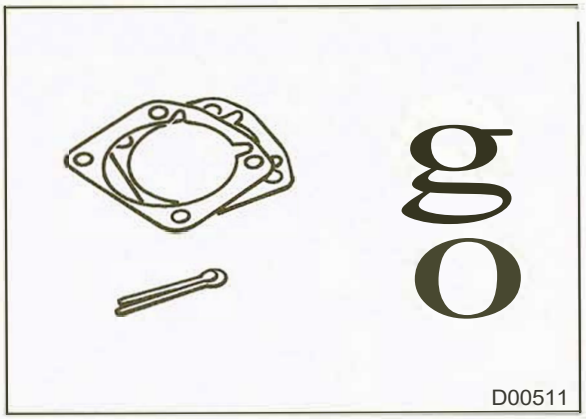
If other tools are substituted for the special tools to do service or repair work, there is the danger that vehicle parts might be damaged, or the mechanic might be injured; therefore, be sure to use the special tool whenever doing any work for which the use of one is specified.



PARTS TO BE REPLACED

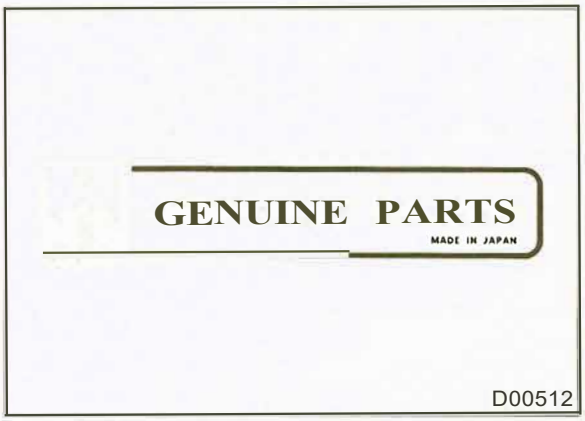
If any of the following parts are removed, they must be replaced with new parts.

1. Oil seals
2. Gaskets
3. Packings
4. O-rings
5. Lock washers
6. Cotter pins
7. Self-locking nuts



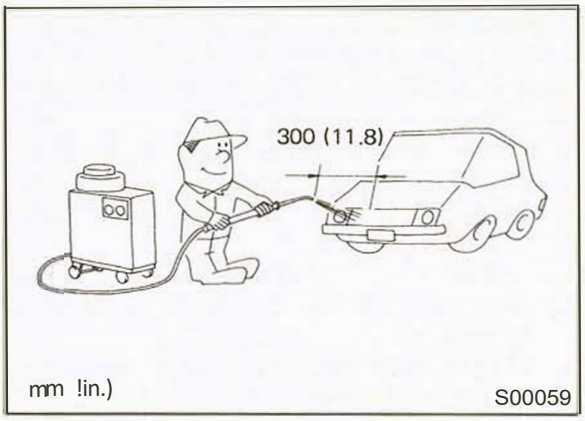
PARTS

When replacing parts, use Mitsubishi genuine parts.



VEHICLE WASHING

If high-pressure car-washing equipment or steam car-washing equipment is used to wash the vehicle, be sure to maintain the spray nozzle at a distance of at least 300 mm (11.8 in.) from any plastic parts and all opening parts (doors, luggage compartment, sunroof, etc.).

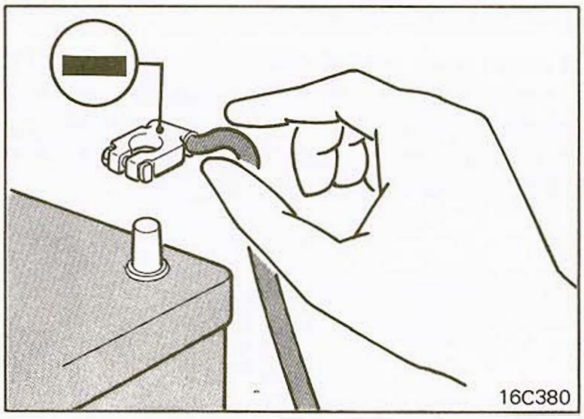


SERVICING THE ELECTRICAL SYSTEM

When servicing the electrical system, disconnect the negative cable terminal from the battery.

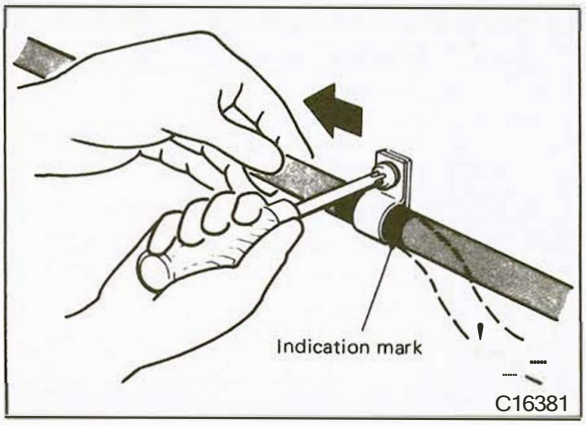
Caution

Before connecting or disconnecting the negative cable, be sure to tum off the ignition switch and the lighting switch. **(If** this is not done, there is the possibility of semi-conductor **parts being damaged.)**

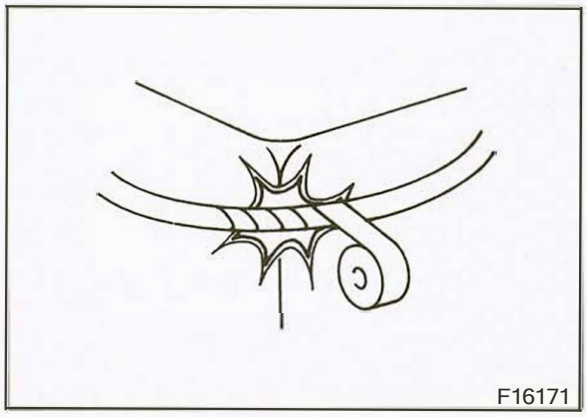


WIRING HARNESSES

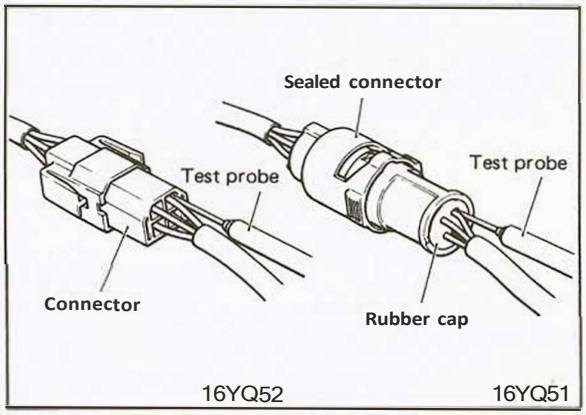
1. Secure the wiring harnesses by using clamps so that there is no slack. However, for any harness which passes to the engine or other vibrating parts of the vehicle, allow some slack within a range that does not allow the engine vibrations to cause the harness to come into contact with any of the surrounding parts. Then secure the harness by using a clamp.
   In addition, if a mounting indication mark (yellow tape) is on a harness, secure the indication mark in the specified location. (C 16381)



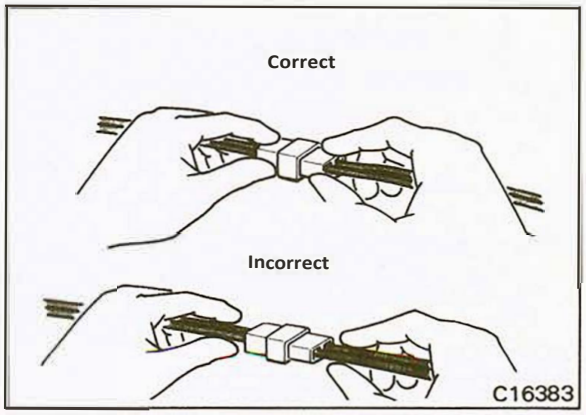
2. If any section of a wiring harness contacts the edge of a part, or a comer, wrap the section of the harness with tape or something similar in order to protect it from damage.



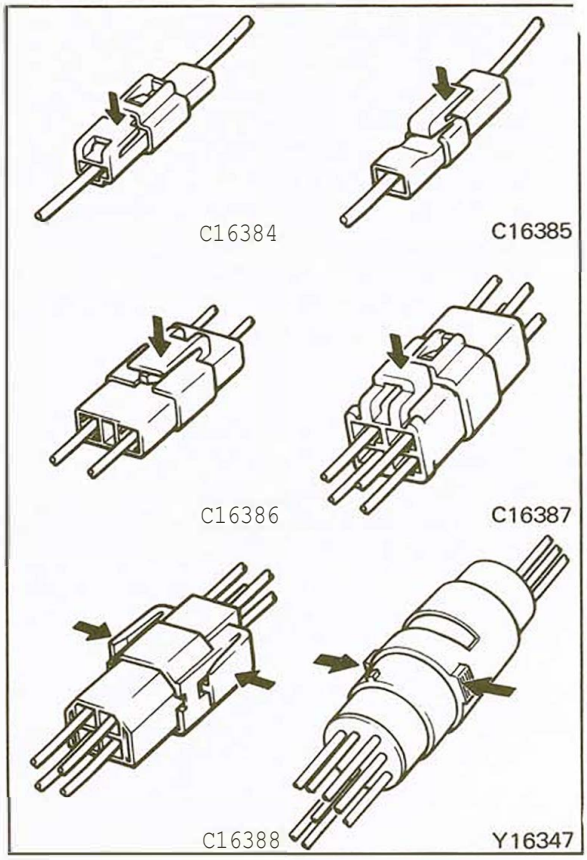
3. When using a circuit tester to perform continuity or voltage checks on connector terminals, insert the test probe from the harness side.
   If the connector is a sealed connector, insert the test probe into the hole in the rubber cap for the electrical wires, being careful not to damage the wire insulation. Continue to insert the test probe until it makes contact with the terminal.



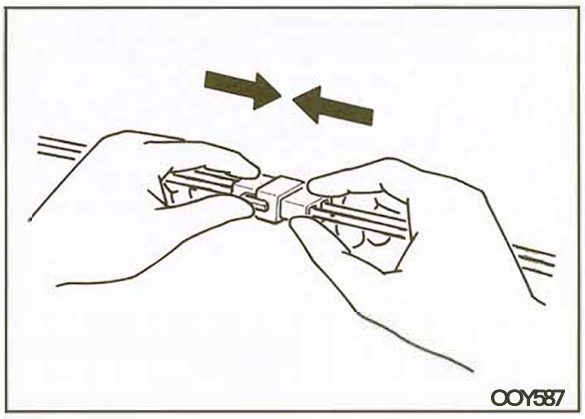
4. When disconnecting a connector, be sure to pull only the connector, not the harness.



5. Disconnect connectors which have catches by pressing in the direction indicated by the arrows'in the illustration.

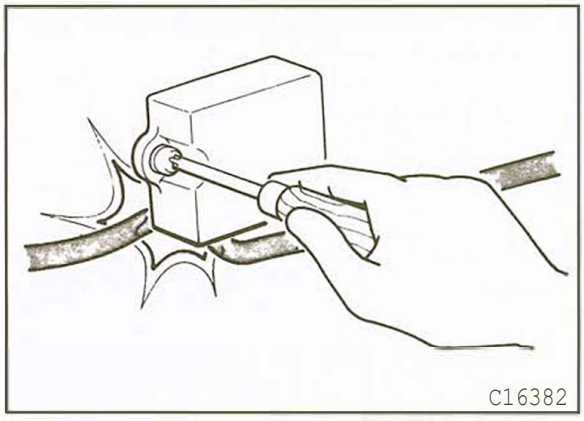


6. Connect connectors which have catches by inserting the connectors until they snap.

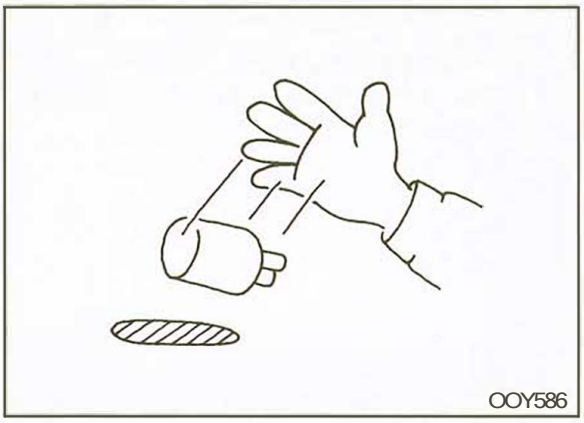


ELECTRICAL COMPONENTS

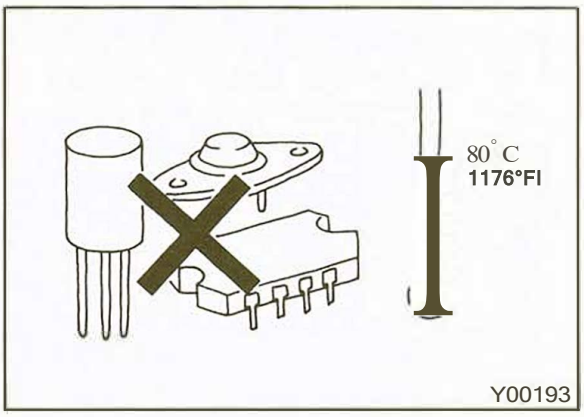
1. When installing any of the vehicle parts, be careful not to pinch or damage any of the wiring harnesses.



2. Sensors, relays, etc., are sensitive to strong impacts. Handle them with care so that they are not dropped or mishandled.

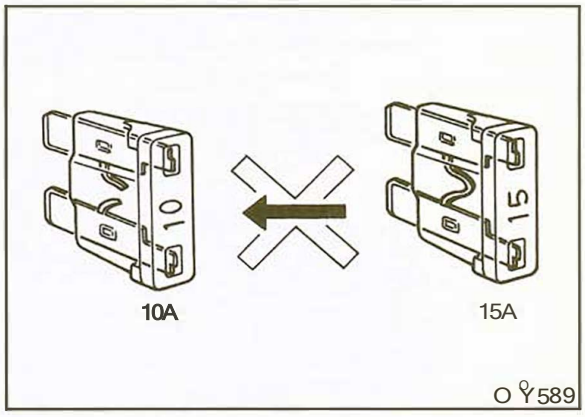


3. The electronic parts used for relays, etc., are sensitive to heat. **If** any service which causes a temperature of 80°C (176°F) or more is performed, remove the part or parts in question before carrying out the service.



FUSES AND FUSIBLE LINKS

I. If a blown-out fuse is to be replaced, be sure to use only a fuse of the specified capacity. **If** a fuse of a capacity larger than that specified is used, parts may be damaged and the circuit may not be protected adequately.

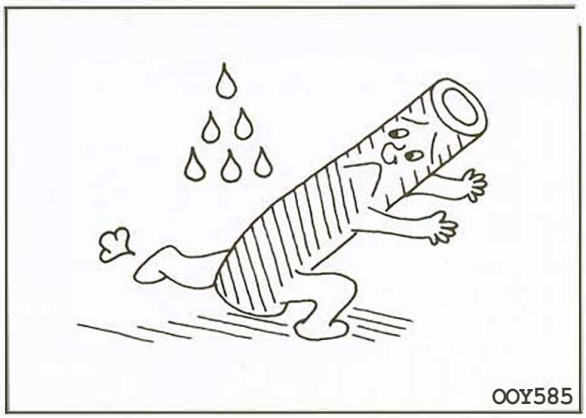


2. If additional optional equipment is to be installed in the vehicle, follow the procedure listed in the appropriate instruction manual; however, be sure to pay careful attention to the following points:
   (1) In order to avoid overloading the wiring, take the electrical current load of the optional equipment into consideration, and determine the appropriate wire size.
   (2) Where possible, route the wiring through the existing hamesses.
   (3) If an ammeter or similar instrument is to be connected to a live-wire circuit, use tape to protect the wire, use a clamp to secure the wire, and make sure that there is no contact with any other parts.
   (4) Be sure to provide a fuse for the load circuit of the optional equipment.

Nominal size	SAE gauge No.	Permissible current	
		In engine compartment	Other areas
0.3 mm²	AWG22	-	SA
0.5 mm²	AWG20	7A	13A
0.85 mm²	AWGl8	9A	17A
1.25 mm²	AWGl6	12A	22A
2.0 mm²	AWGl4	16A	30A
3.0 mm²	AWGl2	2IA	40A
5.0 mm²	AWGI0	31A	54A

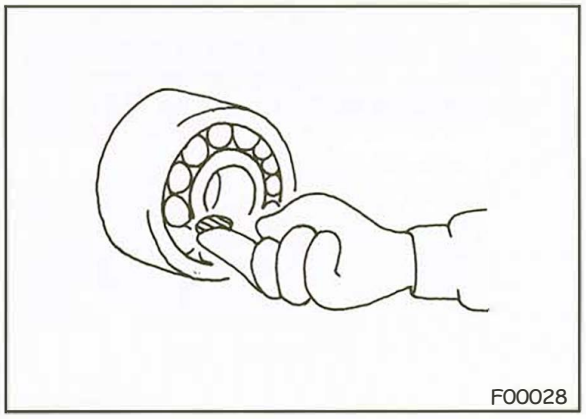
TUBES AND OTHER RUBBER PARTS

Be careful to avoid spilling any gasoline, oil, etc., because if it adheres to any tubes or other rubber parts, they might be adversely affected.



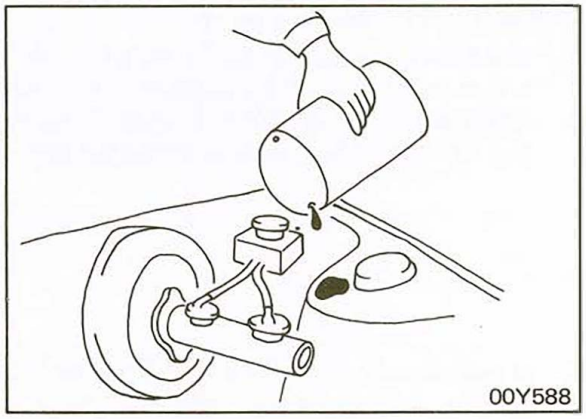
LUBRICANTS

In accordance with the instructions in this Service Manual, apply the specified lubricants in the specified locations during assembly and installation.



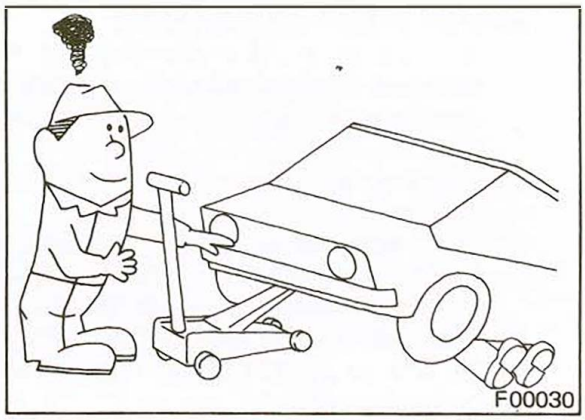
BRAKE FLUID

Be careful to avoid spilling any brake fluid, because if it adheres to the vehicle body, the paint coat might be discolored.

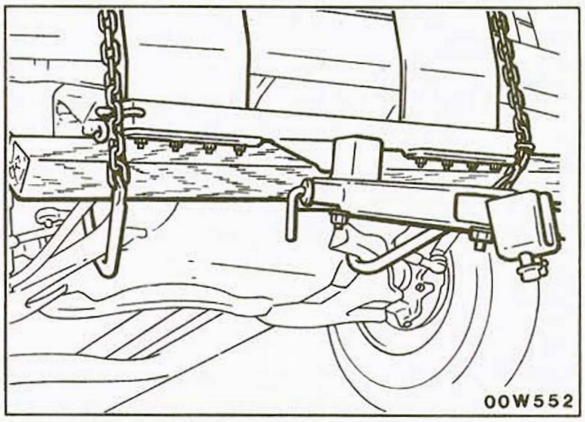


DOING SERVICE WORK IN GROUPS OF TWO OR MORE MECHANICS

If the service work is to be done by two or more mechanics working together, all the mechanics involved should take safety into consideration while they work.



TOWING AND HOISTING



The MONTERO can only be towed from the front with conventional sling-type equipment and tow chain with grab hooks.
If a vehicle is towed from the rear, use a tow dolly.
A lumber spacer (4" x 4" x 55" wood beam) should be placed forward of under guard and under towing hook/ shipping tie down hook.
Then, attach J-hook to the lower arm.
A safety chain system must be used. This system must be completely independent of the primary lifting and towing attachment. Care must be taken in the installation of safety chains to insure they do not cause damage to bumper, painted surfaces or lights.

Lifting-Ground Clearance

Towed vehicle should be raised until wheels are a minimum of IO cm (4 in.) from the ground. Be sure there is adequate ground clearance at the opposite end of the vehicle, especially when towing over rough terrain or when crossing sharp rises such as curbs. If necessary, ground clearance can be increased by removing the wheels from the lifted end of the disabled vehicle and carrying the lifted end closer to the ground. A 20 cm (8 in.) ground clearance must be maintained between brake drums and ground.

Front Towing Pickup

The vehicle may be towed on its rear wheels for extended distances, provided the parking brake is released.
Make certain the transmission remains in "NEUTRAL".

Safety Precautions

The following precautions should be taken when towing the vehicle.

1. Remove exhaust tips and any other optional equipment, that interface with the towing sling. Padding (heavy shop towel or carpeting) should be placed between the towing sling cross bar and any painted surfaces, and bumper surfaces.
2. A safety chain system completely independent of the primary lifting and towing attachment must be used.
3. Any loose or protruding parts of damaged vehicle such as hoods, doors, fenders, trim, etc., should be secured prior to moving the vehicle.
4. Operator should refrain from going under a vehicle unless the vehicle is adequately supported by safety stands.
5. Never allow passengers to ride in a towed vehicle.
6. State and local rules and regulations must be followed when towing a vehicle.

HOISTING

Post Type

Special care should be taken when raising the vehicle on a frame contact type hoist. The hoist must be equipped with the proper adapters in order to support the vehicle at the proper locations. (See next page)
Conventional hydraulic hoists may be used after determining that the adapter plates will make firm contact with the side frame.

Floor Jack

A regular floor jack may be used under the front crossmember or rear axle housing.

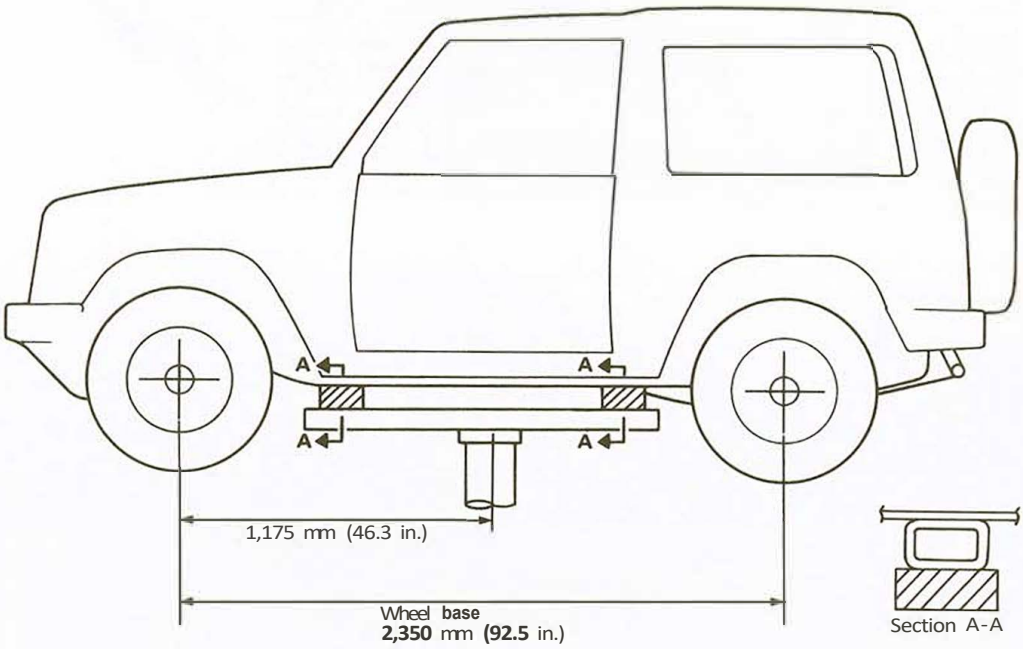
Caution

1. A floor jack must never be used on any part of the underbody.
2. Do not attempt to raise one entire side of the vehicle by placing a jack midway between front and rear wheels. This practice may result in permanent damage to the body.

Emergency Jacking

Jack receptacles are located at the front crossmember and rear axle housing to accept the jack supplied with the vehicle for emergency road service. Always block the opposite wheels and jack only on a level surface.

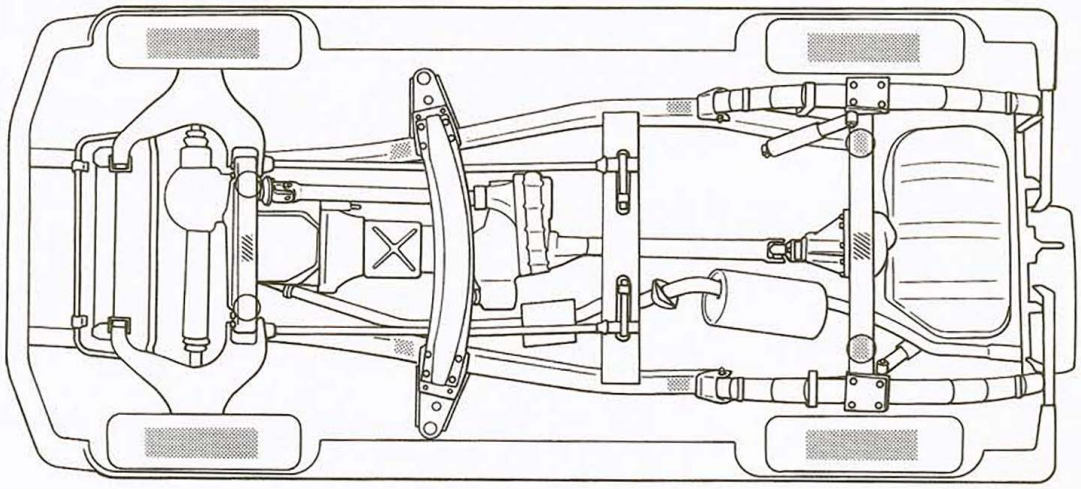
Frame Contact Support Locations



NOTE
The locations of the support point shown as Section A·A are the same as those of the twin post hoist or sissors jack (emergency) shown in the illustration (00W554) below.

00W553

Lifting and Jacking Support Locations

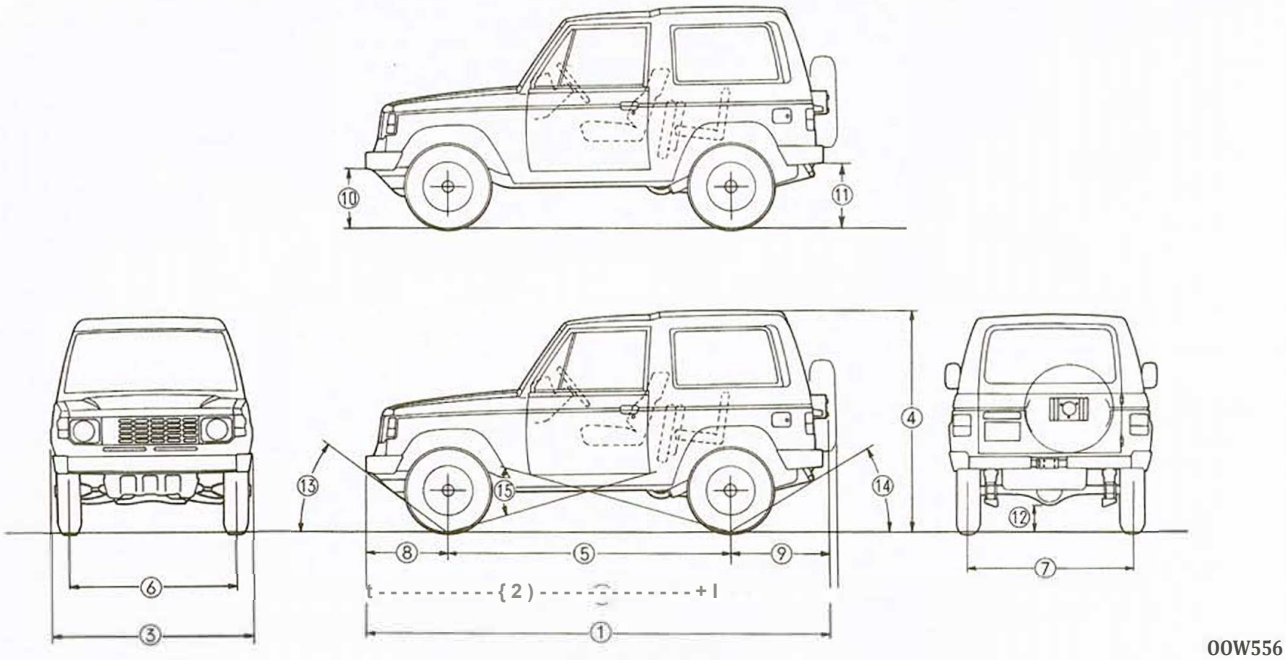


Twin post hoist

Floor jack

Q Frame contact or jack (jack supplied with the vehicle) on hoist

00N554



Description	L042G		NJLF/H	NULF/H	VNJLF/H	VKJLF/H	VNULF/H	VKULF/H
Vehicle dimensions	mm (in.)							
Overall length								
Without spare tire		(j)	3,930 (154.7)	3,930 (154.7)	3,930 (154.7)	3,930 (154.7)	3,930 (154.7)	3,930 (154.7)
With spare tire		®	3,995 (157.3)	3,995 (157.3)	3,995 (157.3)	3,995 (157.3)	3,995 (157.3)	3,995 (157.3)
Overall width		@	1,680(66.1)	1,680(66.1)	1,680(66.1)	1,680(66.1)	1,680(66.1)	1,680(66.1)
Overall height		©	1,760 (69.3)	1,760 (69.3)	1,800 (70.9)	1,800 (70.9)	1,800 (70.9)	1,800 (70.9)
Wheelbase		@	2,350 (92.5)	2,350 (92.5)	2,350 (92.5)	2,350 (92.5)	2,350 (92.5)	2,350 (92.5)
Tread	Front	@	1,400(55.1)	1,400(55.1)	1,400(55.1)	1,400(55.1)	1,400(55.1)	1,400(55.1)
	Rear	(j)	1,375(54.1)	1,375(54.1)	1,375(54.1)	1,375(54.1)	1,375(54.1)	1,375(54.1)
Overhang	Front	@	745 (29.3)	745 (29.3)	745 (29.3)	745 (29.3)	745 (29.3)	745 (29.3)
	Rear	®	900 (35.4)	900 (35.4)	900 (35.4)	900 (35.4)	900 (35.4)	900 (35.4)
Height at curb weighr (wt.)								
Front bumper to ground		®	480 (18.9)	480(18.9)	480 (18.9)	480 (18.9)	480 (18.9)	480 (18.9)
Rear bumper to ground		®	440 (17.3)	440 (17.3)	440(17.3)	440 (17.3)	440 (17.3)	440 (17.3)
Minimum running ground clearance		@	210 (8.3)	210 (8.3)	210 (8.3)	210 (8.3)	210 (8.3)	210 (8.3)
Angle of approach		®	38°	38°	38°	38°	38°	38°
Angle of departure		(13)	30°	30°	30°	30°	30°	30°
Ramp breakover angle		®	21°	21°	21°	21°	21°	21°
Vehfole weights	kg (lbs.)							
Curb weight			1,411 (3,111)/1,412 (3,113)	1,428 (3,148)/ 1,429 (3,150)	1,441 (3, 177)/ 1,442 (3,179)	1,456 (3,210)/ 1,457 (3,212)	1,462 (3,223)/ 1,463 (3,225)	1,477 (3,256)/ 1,478 (3,258)
Gross vehicle weight rating			1,910 (4,210)	1,910 (4,210)	1,910 (4,210)	1,910 (4,210)	1,910 (4,2!0)	1,910 (4,210)
Gross axle weight rating	Front		1,000 (2,205)	1,000 (2,205)	I,000 (2,205)	1,000 (2,205)	1,000 (2,205)	1,000 (2,205)
	Rear		1,450 (3,197)	1,450 (3,197)	1,450 (3,197)	1,450 (3,197)	1,450 (3,197)	1,450 (3,197)
Seating capacity			4	4	4	4	4	4

Description		L042G	NJLF/H	NULF/H	VNJLF/H	VKJLF/H	VNULF/H	VKULF/H
Engine								
Model No.					G54B			
Type					In-line OHC			
Number of cylinders					4			
Bore					91.1 mm (3 .59 in.)			
Stroke					98.0 mm (3.86 in.)			
Piston displacement					2,555 cm^3 (155.9 CID)			
Compression ratio					8.2			
Firing order					1-3-4-2			
Basic ignition timing					7° BTDC ± 2°			
Transmission & transfer case								
Model No.			KM145	KM145	KM145	KM146	KM145	KMI46
Type			5-speed manual	5-speed manual	5-speed manual	3-speed automatic	5-speed manual	3-speed automatic
Gear ratio								
Transmission	1st		3.740	3.740.	3.740	2.745	3.740	2.745
	2nd		2.136	2.136	2.136	1.543	2.136	1.543
	3rd		1.360	1.360	1.360	1.000	1360	1.000
	4th		1.000	1.000	1.000	–	1.000	–
	5th		0.856	0.856	0.856	–	0.856	–
	Reverse		3.578	3.578	3.578	2.214	3.578	2.214
Transfer case	High		1.000	1.000	1.000	1.000	1.000	1.000
	Low		1.944	1.944	1.944	1.944	1.944	1.944
Final ring gear ratio			4.625 4.875*	4.625 4.875*	4.625 4.875*	4.222 4.625*	4.625 4.875*	4.222 4.625*
Clutch								
Type			Dry single disc & diaphragm spring	Dry single disc & diaphragm spring	Dry single disc & diaphragm spring	–	Dry single disc & diaphragm spring	–
Chassis								
Tire size					215SR15			
Front suspension								
Type					Wishbone compression type			
Spring constant (Wheel position)					22 N/mm (123 lbs.fin.)			
Rear suspension								
Type					Asymmetrical semi-elliptic leaf spring			
Spring constant								
At load of 1,000-2,500 N (220-551 lbs.)					24 N/mm {134 lbs.fin.)			
At load of 4,670-8,870 N (1,030-1,955 lbs.)					56 N/mm {314 lbs./in.)			
Brakes								
Type	Front				Disc			
	Rear				Drum (Leading and trailing)			
Power steering								
Gear type					Integral type (Recirculating ball nut)			
Gear ratio					16.4			
Fuel tank capacity					60 liters {15.9 U.S. gal./13.2 Imp. gal.)			

*Optional for Federal (not available in California).

CAPACITY CONVERSION TABLE

U.S. gal.	Imperial gal.	U.S. gal.	Imperial gal.	U.S. gal.	Imperial gal.
1/4	1/5	7	5-3/4	15	12-1/2
1/2	3/8	7-1/4	6	15-1/2	13
3/4	5/8	7-1/2	6-1/4	16	13-1/4
		7-3/4	6-1/2	16-1/2	13-3/4
1	3/4			16-3/4	14
1-1/4	1	8	6-3/4		
1-1/2	1-1/4	8-1/4	6-3/4	17	14-1/4
1-3/4	1-1/2	8-1/2	7	17-1 /2	14-1/2
		8-3/4	7-1/4	18	15
2	1-3/4	9	7-1/2	18-1/2	15-1/2
2-1/4	1-3/4	9-1/4	7-3/4	19	15-3/4
2-1/2	2	9-1/2	8	19-1/2	16-1/4
2-3/4	2-1/4	9-3/4	8	20	16-3/4
				20-1/2	17
3	2-1/2	10	8-1/4		
3-1/4	2-3/4	10-1/4	8-1/2	21	17-1/2
3-1/2	3	10-1/2	8-3/4	21-1/2	18
3-3/4	3	10-3/4	9	22	18-1/4
				22-1/2	18-3/4
4	3-1/4	11	9-1/4	23	19-1/4
4-1/4	3-1/2	11-1 /4	9-1/4	23-1/2	19-1/2
4-1/2	3-3/4	11 ·1 /2	9-1/2	24	20
4-3/4	4	11-3/4	9-3/4	24-1 /2	20-1/2
5	4-1/4	12	10	25	20-3/4
5-1/4	4-1/4	12-1 /4	10-1/4	25-1/2	21-1/4
5-1/2	4-1/2	12-1 /2	10-1/2	26	21-3/4
5-3/4	4-3/4	12-3/4	10-1/2	26-1/2	22
				27	22-1/2
6	5	13	10-3/4	27-1/2	23
6-1/4	5-1/4	13-1/2	11-1/4	28	23-1/4
6-1/2	5-1/2	14	11-3/4	29	24-1/4
6-3/4	5-1/2	14-1/2	12	30	25

CAPACITY CONVERSION U.S. GALLONS TO LITERS

Gallons I	0	1	2	3	4	5	6	7	8	9
					Liters					
-	-	3.7854	7.5708	11.3560	15.1420	18.9270	22.7120	26.4980	30.2830	34.0690
10	37.854	41.640	45.425	49.210	52.996	56.781	60.567	64.352	68.137	71.923
20	75.708	79.494	83.279	87.064	90.850	94.635	98.421	102.210	105.990	109.781
30	113.56	117.35	121.13	124.92	128.70	132.49	136.27	140.06	143.85	147.63
40	151.42	155.20	158.99	162.77	166.56	170.34	174.13	177.91	181.70	185.49
50	189.27	193.06	196.84	200.63	204.41	208.20	211.98	215.77	219.55	223.34
60	227.12	230.91	234.70	238.48	242.27	246.05	249.84	253.62	257.41	261.19
70	264.98	268.76	272.55	276.33	280.12	283.91	287.69	291.48	295.26	299.05
80	302.83	306.62	310.40	314.19	317.97	321.76	325.55	329.33	333.12	336.90
90	340.69	344.47	348.26	352.04	355.83	359.61	363.40	367.18	370.97	374.76

DIMENSION AND TEMPERATURE CONVERSION CHART

Inches (fraction)	Inches (decimals)	Millimeters	Inches to millimeters: Inches	Inches to millimeters: mm	Millimeters to inches: mm	Millimeters to inches: Inches	Fahrenheit & Celsius: OF	Fahrenheit & Celsius: OC	Fahrenheit & Celsius: •C	Fahrenheit & Celsius: "F
1/64	.015625	.3969	.0001	.00254	0.001	.000039	-20	-28.9	-30	-22
1/32	.03125	.7937	.0002	.00508	0.002	.000079	-15	-26.1	-28	-18.4
3/64	.046875	1.1906	.0003	.00762	0.003	.000118	-10	-23.3	-26	-14.8
1/16	.0625	1.5875	.0004	.01016	0.004	.000157	-5	-20.6	-24	-11.2
5/64	.078125	1.9844	.0005	.01270	0.005	.000197	0	-17.8	-22	-7.6
3/32	.09375	2.3812	.0006	.01524	0.006	.000236	1	-17.2	-20	-4
7/64	.109375	2.7781	.0007	.01778	0.007	.000276	2	-16.7	-18	-0.4
1/8	.125	3.1750	.0008	.02032	0.008	.000315	3	-16.1	-16	3.2
9/64	.140625	3.5719	.0009	.02286	0.009	.000354	4	-15.6	-14	6.8
5/32	.15625	3.9687	.001	.0254	0.01	.00039	5	-15.0	-12	10.4
11/64	.171875	4.3656	.002	.0508	0-02	.00079	IO	-12.2	-10	14
3/16	.1875	4.7625	.003	.0762	0.03	.00118	15	-9.4	-8	17.6
13/64	.203125	5.1594	.004	.1016	0.04	.00157	20	-6.7	-6	21.2
7/32	.21875	5.5562	.005	.1270	0.05	.00197	25	-3.9	-4	24.8
15/64	.234375	5.9531	.006	.1524	0.06	.00236	30	-1.1	-2	28.4
1/4	.25	6.3500	.007	.1778	0,07	.00276	35	1.7	0	32
17/64	.265625	6.7469	.008	.2032	0.08	.00315	40	4.4	2	35.6
9/32	.28125	7.1437	.009	.2286	0.09	.00354	45	7.2	4	39.2
19/64	.296875	7.5406	.01	.254	0.1	.00394	50	10.0	6	42.8
5/16	.3125	7.9375	.02	.508	0.2	.00787	55	12.8	8	46.4
21/64	.328125	8.3344	.03	.762	0.3	.01181	60	15.6	10	50
11/32	.34375	8.7312	.04	1.016	0.4	.01575	65	18.3	12	53.6
23/64	.359375	9.1281	.05	1.270	0.5	.01969	70	21.1	14	57.2
3/8	.375	9.5250	.06	1.524	0.6	.02362	75	23.9	16	60.8
25/64	.390625	9.9219	.07	1.778	0.7	.02756	80	26.7	18	64.4
13/32	.40625	10.3187	.08	2.032	0.8	.03150	85	29.4	20	68
27/64	.421875	10.7156	.09	2.286	0.9	.03543	90	32.2	22	71.6
7/16	.4375	11.1125	.1	2.54	1	.03937	95	35.0	24	75.2
29/64	.453125	11.5094	.2	5.08	2	.07874	100	37.8	26	78.8
15/32	.46875	11.9062	3	7.62	3	.11811	105	40.6	28	82.4
31/64	.484375	12.3031	.4	10.16	4	.15748	110	43.3	30	86
1/2	.5	12.7000	.5	12.70	5	.19685	115	46.1	32	89.6
33/64	.515625	13.0969	.6	15.24	6	.23622	120	48.9	34	93.2
17/32	.53125	13.4937	.7	17.78	7	.27559	125	51.7	36	96.8
35/64	.546875	13.8906	.8	20.32	8	.31496	130	54.4	38	100.4
9/16	.5625	14.2875	.9	22.86	9	.35433	135	57.2	40	104
37/64	.578125	14.6844	1	25.4	10	.39370	140	60.0	42	107.6
19/32	.59375	15.0812	2	50.8	11	.43307	145	62.8	44	112.2
39/64	.609375	15.4781	3	76.2	12	.47244	150	65.6	46	114.8
5/8	.625	15.8750	4	101.6	13	.51181	155	68.3	48	118.4
41/64	.640625	16.2719	5	127.0	14	.55118	160	71.1	50	122
21/32	.65625	16.6687	6	152.4	15	.59055	165	73.9	52	125.6
43/64	.671875	17.0656	7	177.8	16	.62992	170	76.7	54	129.2
11/16	.6875	17.4625	8	203.2	17	.66929	175	79.4	56	132.8
45/64	.703125	17.8594	9	228.6	18	.70866	180	82.2	58	136.4
23/32	.71875	18.2562	10	254.0	19	.74803	185	85.0	60	140
47/64	.734375	18.6531	11	279.4	20	.78740	190	87.8	62	143.6
3/4	.75	19.0500	12	304.8	21	.82677	195	90.6	64	147.2
49/64	.765625	19.4469	13	330.2	22	.86614	200	93.3	66	150.8
25/32	.78125	19.8437	14	355.6	23	.90551	205	96.1	68	154.4
51/64	.796875	20.2406	15	381.0	24	.94488	210	98.9	70	158
13/16	.8125	20.6375	16	406.4	25	.98425	212	100.0	75	167
53/64	.828125	21.0344	17	431.8	26	1.02362	215	101.7	80	176
27/32	.84375	21.4312	18	457.2	27	1.06299	220	104.4	85	185
55/64	.859375	21.8281	19	482.6	28	1.10236	225	107.2	90	194
7/8	.875	22.2250	20	508.0	29	1.14173	230	110.0	95	203
57/64	.890625	22.6219	21	533.4	30	1.18110	235	112.8	100	212
29/32	.90625	23.0187	22	558.8	31	1.22047	240	115.6	105	221
59/64	.921875	23.4156	23	584.2	32	1.25984	245	118.3	110	230
15/16	.9375	23.8125	24	609.6	33	1.29921	250	121.1	115	239
61/64	.953125	24.2094	25	635.0	34	1.33858	255	123.9	120	248
31/32	.96875	24.6062	26	660.4	35	1.37795	260	126.6	125	257
63/64	.984375	25.0031	27	690.6	36	1.41732	265	129.4	130	266

ENGLISH AND SI METRIC MEASURE

Cubic Centimeters to Inches:

When changing cubic centimeters to cubic inches, multiply cubic centimeters times .061 to obtain cubic inches, (C.C. x .061 = Cubic Inches).

Cubic Inches to Centimeters:

When changing cubic inches to cubic centimeters, multiply cubic inches times 16.39 to obtain cubic centimeters, (Cubic Inches x 16.39 = C.C.).

Liters to Cubic Inches:

When changing liters to cubic inches, multiply liters times 61.02 to obtain cubic inches, (Liters x 61.02 = Cubic Inches).

Cubic Inches to Liters:

When changing cubic inches to liters, multiply cubic inches times .01639 to obtain liters, (Cubic Inches x .01639 = Liters).

Cubic Centimeters to Liters:

When changing cubic centimeters to liters, divide by 1,000 simply by moving the decimal point three figures to the left.

Liters to Cubic Centimeters:

When changing liters to cubic centimeters, move the decimal point three figures to the right.

Miles to **Kilometers:**

When changing miles to kilometers, multiply miles times 1.609 to obtain kilometers, (Miles x 1.609 = Kilometers).

Kilometers to **Miles:**

When changing kilometers to miles, multiply kilometers times .6214 to obtain miles, (Kilometers x .6214 = Miles).

Pounds to Kilograms:

When changing pounds to kilograms, multiply pounds times .4536 to obtain kilograms, (Pounds x .4536 = Kilograms).

Kilograms to Pounds:

When changing kilograms to pounds, multiply kilograms times 2.2046 to obtain pounds, (Kilograms x 2.2046 = Pounds).

Pounds to **Newtons:**

When changing pounds to newtons, multiply pounds times 4.4482 to obtain newtons, (Pounds x 4.4482 = Newtons)

Newtons to Pounds:

When changing newtons to pounds, multiply newtons times .2248 to obtain pounds, (Newtons x .2248 = Pounds).

Foot-pounds to Newton-meters:

When changing foot-pounds to newton-meters, multiply foot-pound times 1.3558 to newton-meters, (Foot-pound x 1.3558 = Newton-meters).

Newton-meters to Foot-pounds:

When changing newton-meters to foot-pounds, multiply newton-meters times .7376 to foot-pounds, (Newton-meters x .7376 = Foot-pounds).

Pounds Per Square Inch(psi) to Kilopascals:

When changing pounds per square inch(psi) to kilopascals, multiply pounds per square inch times 6.895 to kilopascals, (Pounds Per Square Inch(psi) x 6.895 = Kilopascals.).

Kolopascals to Pounds Per Square Inch(psi):

When changing kilopascals to pounds per square inch(psi), multiply kilopascals times .1450 to pounds per square inch(psi), (Kilopascals x .1450 = Pounds Per Square Inch(psi)).

Description	Torque Nm (ft. lbs.)				Remarks
Thread for general purposes (size x pitch) (mm)	Head mark ©		Head mark CZ)		
6 x 1.0	3.0 to 3.9	(2.2 to 2.9)	4.9 to 7.8	(3.6 to 5.8)	
8 x 1.25	7.9 to 12	(5.8 to 8.7)	13 to 19	(9.4 to 14)	
10 x 1.25	16 to 23	(12 to 17)	27 to 39	(20 to 29)	
12x1.25	29 to 43	(21 to 32)	47 to 72	(35 to 53)	
14 x 1.5	48 to 70	(35 to 52)	77 to 110	(57 to 85)	
16 x 1.5	67 to 100	(51to77)	130 to 160	(90 to 120)	
18 x 1.5	100 to 150	(74 to 110)	180 to 230	(130 to 170)	
20 x 1.5	150 to 190	(11Oto 140)	160 to 320	(190 to 240)	
22 x 1.5	200 to 260	(150 to 190)	340 to 430	(250 to 320)	
24x 1.5	260 to 320	(190 to 240)	420 to 550	(310 to 410)	
Taper thread for pipes (size)					
PT 1/8		7.9 to 12	(5.8 to 8.7)		Internal thread: Aluminum
		16 to. 19	(12 to 14)		Internal thread: Cast iron
PT 1/4		19 to 30	(14 to 22)		Internal thread: Aluminum
		34 to 45	(25 to 33)		Internal thread: Cast iron
PT 3/8		39 to 54	(29 to 40)		Internal thread: Aluminum
		58 to 73	(43 to 54)		Internal thread: Cast iron
Taper thread for dry sealed pipes (size)					
NPTF 1/16		4.9 to 7.8	(3.6 to 5.8)		Internal thread: Aluminum
		7.9 to 12	(5.8 to 8.7)		Internal thread: Cast iron
NPTF 1/8		7.9 to 12	(5.8 to 8.7)		Internal thread: Aluminum
		16 to 19	(12 to 14)		Internal thread: Cast iron
NPTF 1/4		19 to 30	(14 to 22		Internal thread: Aluminum
		34 to 45	(25 to 33		Internal thread: Cast iron

LUBRICATION AND MAINTENANCE

CONTENTS

Maintenance and lubrication service recommendations have been compiled to provide maximum protection for the vehicle owner's investment against all reasonable types of driving conditions.
Since these conditions vary with the individual vehicle owner's driving habits, the area in which the vehicle is operated and the type of driving to which the vehicle is subjected, it is necessary to prescribe lubrication and maintenance service on a time frequency as well as mileage interval basis.
Oils, lubricants and greases are classified and graded according to standards recommended by the Society of Automotive Engineers (SAE), the American Petroleum Institute (API) and the National Lubricating Grease Institute (NLGI).

MAINTENANCE SCHEDULES

Information for service maintenance is provided in the "SCHEDULED MAINTENANCE TABLE".
Three schedules are provided: one for "Required Maintenance", one for "General Maintenance" and one for "Severe Usage Service".

SEVERE SERVICE

Vehicles operated under severe service conditions will require more frequent service.
Component service information is included in appropriate units for vehicles operated under one or more of the following conditions:

(1) Trailer towing or police, taxi, or comercial type operation
(2) Operation of vehicle:
  (a) Short-trip operation at freezing temperatures (engine not thoroughly warmed up)
  (b) More than 50% operation in heavy city traffic during hot weather above 32° C (90° F)
  (c) Extensive idling
  (d) Driving in sandy areas
  (e) Driving in salty areas
  (f) Driving in dusty conditions
  (g) Off-road driving

ENGINE OIL

The SAE grade number indicates the viscosity of engine oils, for example SAE 30, which is a single grade oil. Engine oils are also identified by a dual number, for example SAE 10W-30, which indicates a multigrade oil.
The API classification system defines oil performance in terms of engine usage. Only engine oil designed "For Service SE" or "For Service SF" when available, should be used. These oils contain sufficient chemical additives to provide maximum engine protection. Both the SAE grade and the API designation can be found on the container.

GEAR LUBRICANTS

The SAE grade number also indicates the viscosity of multipurpose gear lubricants.
The API classification system defines gear lubricants in terms of usage. Gear lubricants conforming to API GL-4 or GL-5 with a viscosity of SAE 80W or SAE 90 are usually recommended for the manual transmission and rear axle (conventional differential), and MITSUBISHI genuine gear oil Part No. 8149630EX or Mopar Hypoid Gear Lubricant Part No. 3744994 or 3744995 plus Mopar Hypoid Gear Oil Additive/ Friction Modifier Part No. 4057100, or equivalent, for a limited slip differential.

LUBRICANTS - GREASES

Semi-solid lubricants bear the NLGI designation and are further classified as grades 0, I, 2, 3, etc.
Whenever "Chassis Lubricant" is specified, Multipurpose Grease NLGI grade #2EP should be used.

FUEL USAGE STATEMENT

Use gasoline having a minimum anti-knock index (Octane Value) of 87 (R + M)/2. This designation is comparable to a Research Octane Number of 91.
Unleaded gasoline only must be used. All vehicles so equipped have labels located on the instrument panel and on the back of fuel filler lid that state, "UNLEADED GASOLINE ONLY". These vehicles also have fuel filler tubes designed to accept only the smaller diameter unleaded gasoline dispensing nozzles.

MATERIALS ADDED TO FUEL

Indiscriminate use of fuel system cleaning agents should be avoided. Many of these materials intended for gum and varnish removal may contain highly active solvents or similar ingredients that can be harmful to gasket and diaphragm materials used in fuel system component parts.

:Cheduled Maintenance Services for Emission Control and Proper Vehicle Performance

Inspection and Service should be performed anytime a malfunction is observed or suspected. Retain receipts for vehicle emission services to protect your emission warranty.

EMISSION CONTROL SYSTEM **MAINTENANCE**	SERVICE **INTERVALS**	**MILEAGE IN THOUSANDS**	7.5	15	22.5	30	37.5	45	50
		KILOMETERS IN THOUSANDS	12	24	36	48	60	72	80
CHANGE ENGINE OIL **EVERY** 12 **MONTHS**	OR		x	x	x	x	x	x	
REPLACE ENGINE OIL FILTER EVERY 12 **MONTHS**	**OR**			x		x		x	
CHECK CONDITION OF **DRJVE** BELT **(FOR WATER PUMP** AND ALTERNATOR) **AND ADJUST** TENSION AS REQUIRED	AT			x				x	
REPLACE DRIVE BELT (FOR **WATER PUMP AND ALTERNATOR)**	AT					x			
CHECK **VALVE** CLEARANCE **AND ADJUST AS** REQUIRED	**AT**			x		x		x	
CHECK IGNITION TIMING AND ADJUST AS REQUIRED **EVERY** 5 **YEARS**	**OR**								x
CLEAN CARBURETOR CHOKE **MECHANISM AND LINKAGE**	**AT**					x			
REPLACE FUEL FILTER (EXCEPT FILTER IN FUEL **TANK)**	**AT**								x
CHECK FUEL **SYSTEM*** (CAP, **TANK,** LINE, AND CONNECTIONS) FOR **LEAKS EVERY** 5 **YEARS**	OR								x
REPLACE AIR CLEANER FILTER	AT					x			
REPLACE **SPARK PLUGS**	**AT**					x			
REPLACE **IGNITION** CABLES* EVERY 5 YEARS	OR								x
REPLACE VACUUM HOSES, **SECONDARY AIR** HOSES, AND **CRANKCASE VENTILATION** HOSES **EVERY** 5 **YEARS**	OR								x
REPLACE FUEL HOSES, **WATER** HOSES, AND FUEL **VAPOR HOSES* EVERY** 5 **YEARS**	**OR**								x
CHECK CRANKCASE EMISSION CONTROL SYSTEM AND CLEAN AS REQUIRED **EVERY** 5 **YEARS**	OR								x
CHECK **EVAPORATIVE EMISSION** CONTROL **SYSTEM** (EXCEPT **CANISTER) FOR LEAKS AND** CLOGGING EVERY 5 **YEARS**	OR								x
REPLACE CANISTER	**AT**								x

Note: *For California vehicles, ***this*** maintenance is recommended by Mitsubishi Motor Sales of America, Inc., but is not required by the warranty on these parts (except water hoses).

General Maintenance Service for Proper Vehicle Performance

GENERAL MAINTENANCE	SERVICE INTERVALS								
		MILEAGE IN THOUSANDS	7.5	15	22.5	30	37.5	45	50
		KILOMETERS IN THOUSANDS	12	24	36	48	60	72	80
COOLING SYSTEM	CHECK AND SERVICE AS REQUIRED EVERY 12 MONTHS								
	DRAIN, FLUSH, AND REFILL EVERY 24 MONTHS OR					●			
BRAKE FLUID	CHECK FLUID LEVEL AND INSPECT FOR LEAKS AT					•			
	CHANGE EVERY 4 YEARS								
FRONT DISC BRAKE PADS	INSPECT FOR WEAR AT			•		●		●	
REAR DRUM BRAKE LININGS AND REAR WHEEL CYLINDERS	INSPECT FOR WEAR AND LEAKS AT					•			
BRAKE HOSES	CHECK FOR DETERIORATION OR LEAKS AT			●		•		●	
BALL JOINT AND STEERING LINKAGE SEALS, AND DRIVE SHAFT BOOTS	INSPECT FOR GREASE LEAKS OR DAMAGE AT					•			
UPPER CONTROL ARM BUSIDNGS	LUBRICATE GREASE AT			•		•		•	
FRONT WHEEL BEARINGS	INSPECT FOR GREASE LEAKS AT					●			
FRONT AXLE AND REARAXLE*1	CHECK OIL LEVEL AT					●			
MANUAL TRANSMISSION AND TRANSFER CASE	CHANGE OIL (SEVERE USAGE CONDITIONS ONLY) AT					•			
AUTOMATIC TRANSMISSION AND TRANSFER CASE	CHANGE FLUID AT					•			
REARAXLE*2	CHANGE OIL AT			●		•		●	

Note: *1 Not applicable to vehicles with a limited slip differential
*2 Applicable only to vehicles with a limited slip differential

.evere Usage Service

The maintenance items should be performed according to the following table:

MAINTENANCE ITEM	SERVICE TO BE PERFORMED	MILEAGE INTERVALS- KILOMETERS IN THOUSANDS (MILES IN THOUSANDS)							SEVERE USAGE CONDITIONS							
		12 (7.5)	24 (15)	36 (22.5)	48 (30)	60 (37.5)	72 (45)	80 (50)	A	B	C	D	E	F	G	H
ENGINE OIL	CHANGE EVERY 3 MONTHS OR-	EVERY 4,800 KM (3,000 MILES)							o	o	o	o			o	
ENGINE OIL FILTER	REPLACE EVERY 6 MONTHS OR-	EVERY 9,600 KM (6,000 MILES)							o	o	o	o			o	
AIR CLEANER FILTER	REPLACE	MORE FREQUENTLY							o				o			
CRANKCASE EMISSION CONTROL SYSTEM	CHECK AND CLEAN AS REQUIRED	MORE FREQUENTLY							o							
SPARK PLUGS	REPLACE		•		•		•			o		o				
FRONT DISC BRAKE PADS	INSPECT FOR WEAR	MORE FREQUENTLY							o					o		
REAR DRUM BRAKE LININGS AND REAR WHEEL CYLINDERS	INSPECT FOR WEAR OR LEAKS	MORE FREQUENTLY							o					o		
MANUAL TRANSMISSION AND TRANSFER CASE	CHANGE OIL				•					o					o	o
UPPER CONTROL ARM BUSHINGS	LUBRICATE GREASE	EVERY 12,000 KM (7,500 MILES)							o				o	o		o

Sever usage conditions

A - Driving in dusty conditions
B - Police, taxi, or commercial type operation
C - Extensive idling
D - Short-trip operation at freezing temperatures (engine not thoroughly warmed up)
E - Driving in sandy areas
F - Driving in salty areas
G - More than 50% operation in heavy city traffic during hot weather above 32° C (90° F)
H - Off-road driving

LUBRICANT CAPACITIES TABLE

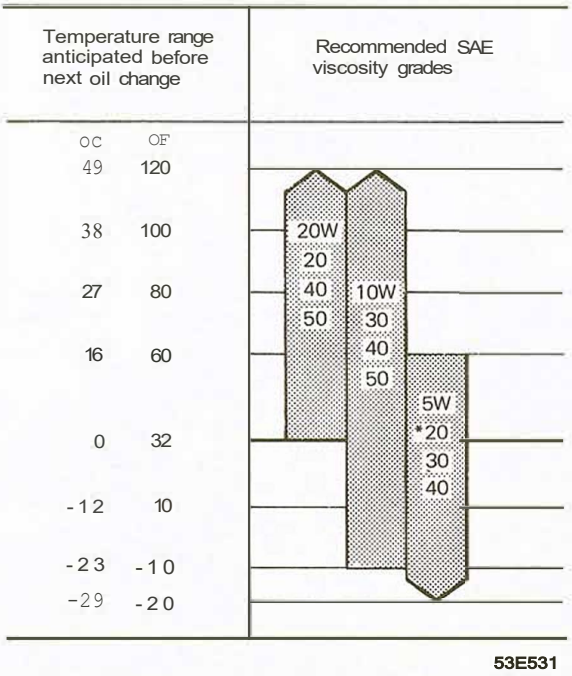
Description	Metric measure	U.S. measure	Imperial measure
Engine oil			
Crankcase (including oil filter)	5.8 liters	6.1 qts.	5.1 qts.
Oil filter	0.50 liter	0.53 qt.	0.44 qt.
Cooling system (including heater and coolant reseivoir)	8.0 liters	8.45 qts.	7.04 qts.
Manual transmission	2.2 liters	4.6 pints	3.9 pints
Automatic transmission	6.8 liters	14.4 pints	12.0 pints
Transfer case	2.2 liters	4.6 pints	3.9 pints
Front axle	1.1 liters	2.3 pints	1.9 pints
Rear axle	1.8 liters	3.8 pints	3.2 pints
Power steering	0.9 liter	1.9 pints	1.6 pints
Fuel tank	60 liters	15.9 gals.	13.2 gals.

RECOMMENDED LUBRICANTS

Component	Lubricant specification	Remarks
Engine	API classification SE or SF	For further details, refer to SAE viscosity number
Power steering	Automatic transmission fluid ATF "DEXRON" or "DEXRON II" type	
Manual transmission	API classification GL-4	SAE grade number: SAE 75W-85W SAE80W
Automatic transmission	Automatic transmission fluid ATF "DEXRON" or "DEXRON II" type	
Transfer case	API classification GL-4	SAE grade number: SAE 75W-85W SAE 80W
Front axle	API classification GL-4 orGL-5	For further details, refer to SAE viscosity number
Rear axle (convel).tional differential)	API classification GL-4 orGL-5	
Rear axle (limited slip differential)		MITSUBISHI genuine gear oil Part No. 8149630EX or Moper Hypoid Gear Lubricant Part No. 3744994 or 3744995 plus Moper Hypoid Gear Oil Additive/ Friction Modifier Part No. 4057100 or equivalent
Brake and clutch	Conforming to DOT 3	
Front wheel bearing	Multipurpose grease NLGI grade #2EP	
Cooling system	High quality ethylene glycol	Concentration level: 50%
Transmission linkage, parking brake cable mechanism, hood lock and hook, door latch, hatch latch, seat adjuster	Multipurpose grease NLGI grade #2EP	
Door hinges	Engine oil	

\ELECTION OF LUBRICANTS

Engine Oil



53E531

* SAE 5W-20 is not recommended for sustained high speed vehicle operation_

Front Axle/Rear Axle (Conventional differential)

Lubricant	API classification GL-4 or GL-5
Anticipated temperature range	Viscosity range
Above -23° C (-10° F)	SAE90 SAE 85W-90 SAE 80W-90
-23° C to -34° C	SAE80W
(-10° F to -30° F)	SAE80W-90
Below -34° C (-30° F)	SAE 75W

COOLANT

Relation Between Antifreeze Concentration and Specific Gravity

Coolant temperature °C (° F) and specific gravity					Freezing temperature oc (OF)	Safe operating temperature oc (OF)	Coolant concentration (specific volume)
JO (50)	20 (68)	30 {86)	40 (104)	50 (122)			
1.037	1.034	1.031	1.027	1.023	-9 (15.8)	-4 (24.8)	20%
1.045	1.042	1.038	1.034	1.029	-12 (10.4)	-7 (19.4)	25 %
1.054	1.050	1.046	1.042	1.036	-16 (3.2)	-11 (12.2)	30%
1.063	1.058	1.054	1.049	1.044	-20 (-4)	-15(5)	35 %
1.071	1.067	1.062	1.057	1.052	-25 (-13)	-20 (-4)	40%
1.079	1.074	1.069	1.064	1.058	-30 (-22)	-25 (-13)	45 %
1.087	1.082	1.076	1.070	1.064	-36 (-32.8)	-31 (-23.8)	50%
1.095	1.090	1.084	1.077	1.070	-42 (-44)	-37 (-35)	55 %
1.103	1.098	1.092	1.084	1.076	-50 (-58)	-45 (-49)	60%

.IJOTE: The information in the table pertains to the antifreeze used by the manufacturer.

Example
The safe operating temperature is -15° C (5° F) when the measured specific gravity is 1.058 at a coolant temperature of 20° C (68° F).

JET VALVE CLEARANCE ADJUSTMENT

Adjustment condition:
Normal operating temperature [Coolant temperature 80-90°C, (176-194°F)]

Caution

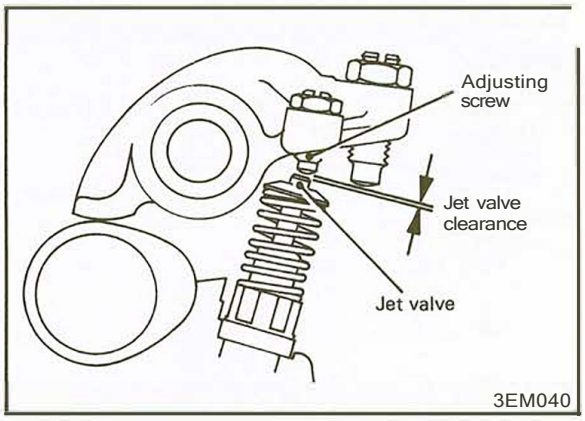
1. **An incorrect jet valve clearance will affect the emission levels and could also cause engine troubles.**
2. **Adjust the jet valve clearance before adjusting the intake valve clearance.**
3. **The jet valve clearance should be adjusted with the intake valve adjusting screw fully loosened.**

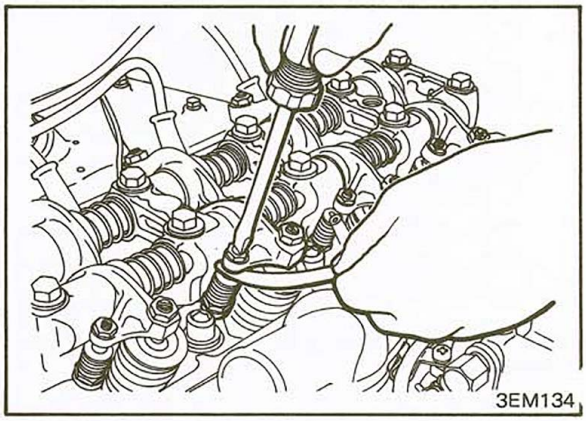
Adjusting procedure:

1. Place piston of No. 1 cylinder at top dead center of compression stroke to adjust valve clearances marked @ of intake valve side is shown. (5EN062)
2. Back off the intake valve adjusting screw (two or more turns).
3. Loosen the lock nut on the jet valve adjusting screw.
4. Back off the jet valve adjusting screw and place a 0.25 mm (.010 in.) leaf of a feeler gauge between the top end of the jet valve stem and the bottom end of the adjusting screw. (3EM040)

Jet valve clearance (on hot engine) ..... .
0.25 mm (.010 in.)

5. Screw in the adjusting screw (clockwise) until the bottom end of the adjusting screw touches the feeler gauge. Since the jet valve spring has a low spring force, use special care not to compress the spring. Be particularly careful if the adjusting screw is hard to turn. (3EM 134)
6. While holding the adjusting screw in place with a screwdriver, tighten the lock nut firmly.
7. Check with a feeler gauge lead to ensure a clearance of 0.25 mm (.010 in.)
8. Adjust the intake valve clearance.
9. Place piston of in No. 4 cylinder at top dead center on compression stroke to adjust valve clearances marked @ of intake valve side. (5EN062)
10. Adjust by repeating Steps 2 through 8.

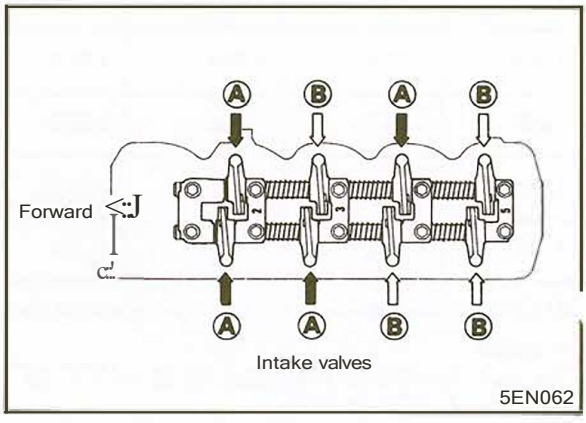




VALVE CLEARANCE ADJUSTMENT

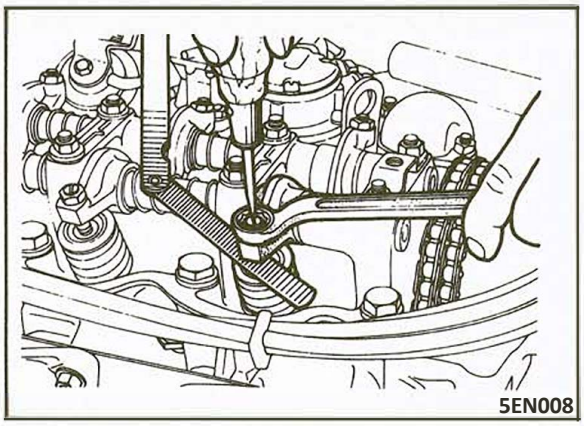
Adjustment condition:
Normal operating temperature [Coolant temperature 80-90°C, (176-194°F)]

I. Place piston of No. I cylinder at top dead center of compression stroke to adjust valve clearances marked @ . (5EN062)



'. Loosen nut and adjust to specification with adjusting screw. Then retighten nut. (5EN008)

Valve clearance (on hot engine):	
Intake	0.15 mm (.006 in.)
Exhaust	0.25 mm (.010 in.)


5EN008

3. After nut has been retightened, recheck to ensure clearance is correct.
4. Place piston of No. 4 cylinder at top dead center on compression stroke to adjust valve clearances marked @ . (5EN062)
5. Adjust by repeating Steps 2 and 3.
6. Check idle speed and readjust if necessary.

BASIC IGNITION TIMING ADJUSTMENT

Adjustment condition:
Lights and all accessories off, transmission in neutral and **parking** brake pulled.

I. Run the cold engine at fast idle until the coolant temperature is 85-95° C (185-205° F).
2. Disconnect the white stripe vacuum hose from the distributor and temporarily plug the hoses.
3. Run the engine at the specified curb idle speed.

Curb idle speed:	
First 500 km (300 miles)	675 } 8 rpm
After 500 km (300 miles).	750 ± 150 rpm

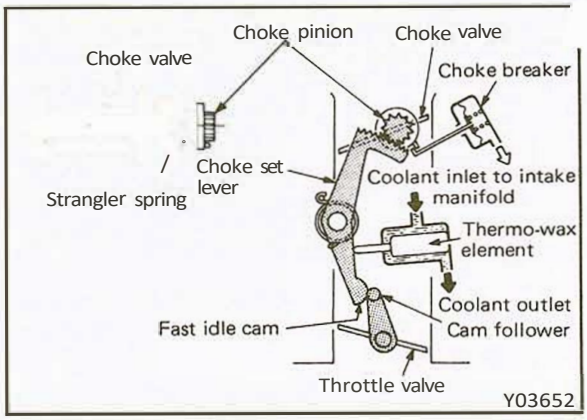
4. Using a timing light, check the ignition timing.
   If it does not meet specifications, adjust the ignition timing by rotating the distributor after loosening the distributor lock nut.

Basic timing	7° BTDC ± 2°

5. Reconnect the white stripe vacuum hose to the distributor.

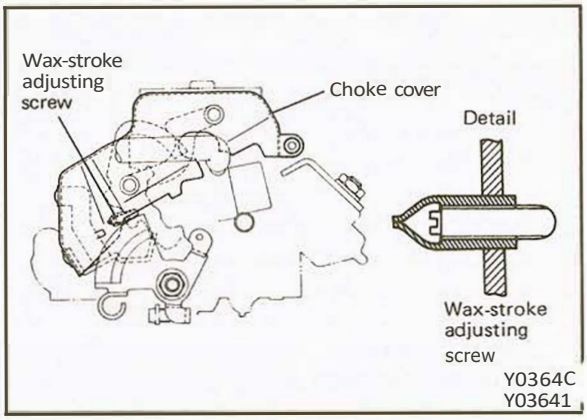
CARBURETOR CHOKE MECHANISM AND LINKAGE

The choke mechanism is used to facilitate engine starting during cold weather. Spray solvent into the end of the auto-choke and throttle valves (where they pass through the air horn) to prevent the choke from becoming stuck from gum deposits on the shaft. At the same time, spray a solvent to clean dirt from the fast idle cam and link.



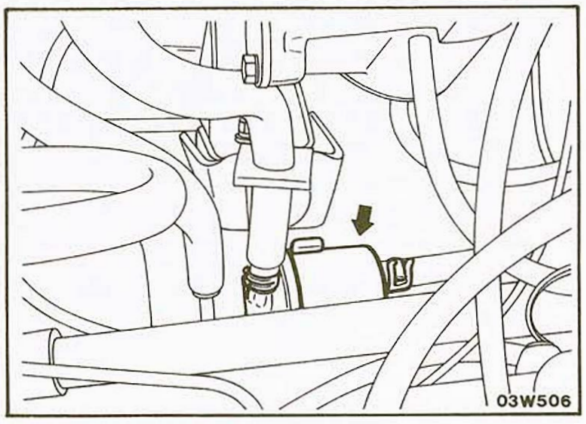
Tamper-Proof Automatic Choke

All carburetors have tamper-proof choke. The choke-related parts are factory-adjusted.



FUEL FILTER (Replace) - except in-tank fuel filter

The fuel filter should be replaced regularly because its performance is reduced by dirt and water collected over an extended period of use. Replace as required.



FUEL SYSTEM (Check for leaks)

Cap, TanJc, Lines and Connections

Check for damage or leakage in the fuel lines and connections, and for looseness of the fuel tank cap.

Inspect the surface of fuel hoses for heat and mechanical damage. Hard and brittle rubber, cracking, checking, tears, cuts, abrasions and excessive swelling indicate deterioration of the rubber.

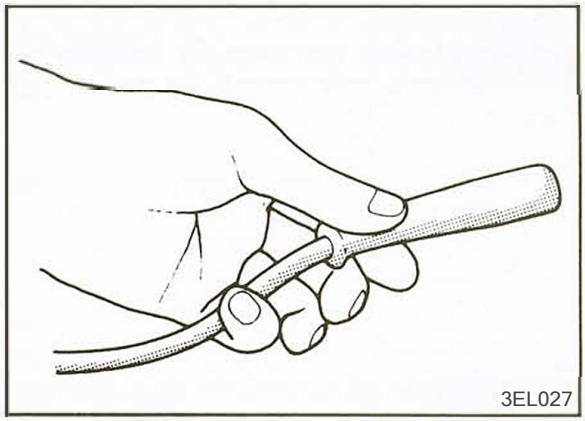
If the fabric casing of the rubber hose is exposed by cracks and abrasions in the fuel system, the hoses should be changed.

:;NITION CABLES (Check and replace)

The ignition cables should be kept clean and properly connected.
Cracked, damaged or faulty cables must be replaced.

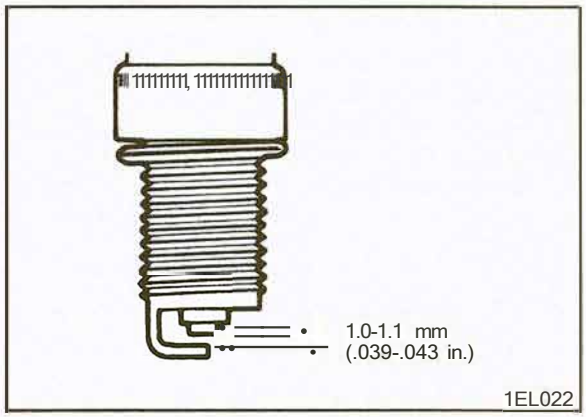
NOTE
When disconnecting an ignition cable, be sure to hold cable cap. If the cable is disconnected by pulling on the cable alone, an open circuit might result.

Resistance	16 kQ/m



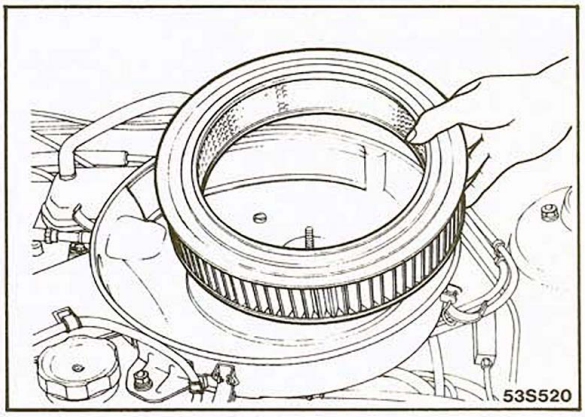
SPARK PLUGS (Replace)

I. Spark plugs must fire properly to assure proper engine performance and emission-control. They should operate satisfactorily in normal vehicle service for the specified maintenance interval or they should be replaced.
2. The new plugs should be checked for the proper gap. (1EL022)

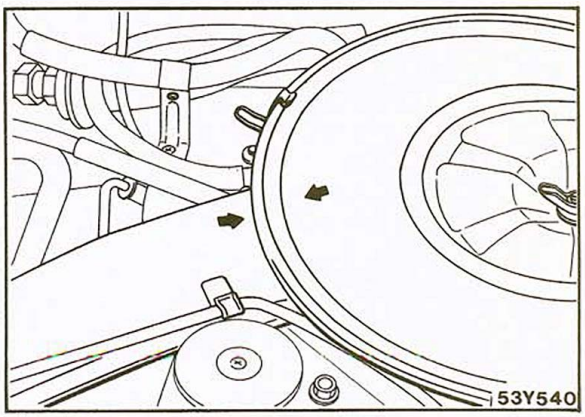


AIR CLEANER FILTER (Relpace)

1. Remove the wing nut. Use pliers only if the wing nut is difficult to remove.
2. Unsnap the clips and remove air cleaner cover.
3. Remove the filter and replace it with a new filter. (53S520)

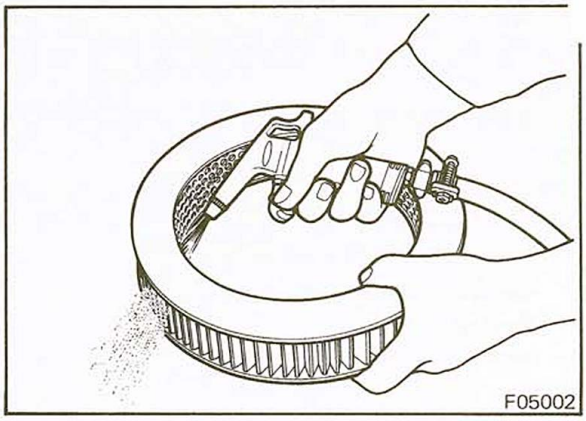


4. Reinount the cover, taking care that the arrows are aligned. (53Y540)
5. Tighten the wing nut by hand.



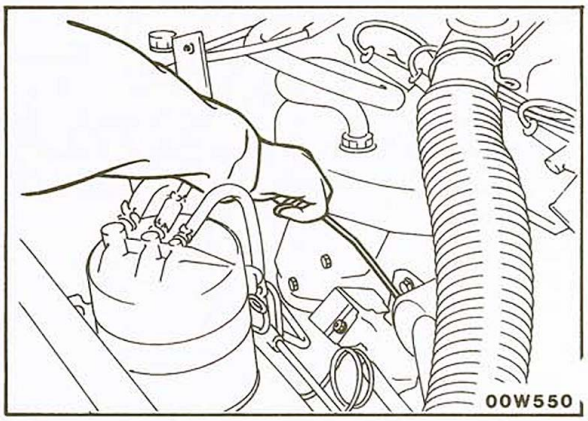
Cleaning

Remove the filter and clean the inside by using compressed air. (Dust can also be removed by gently tapping the filter by hand.)



ENGINE OIL (Change)

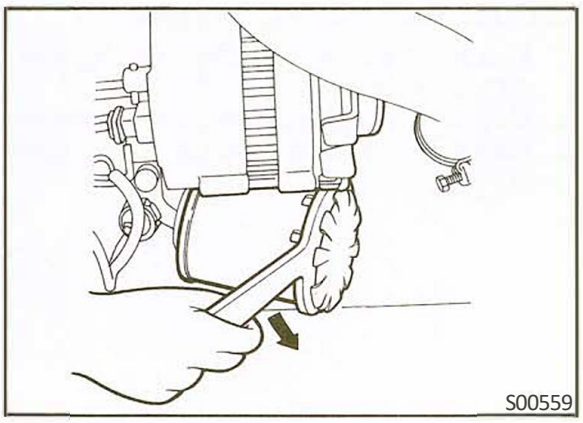
Always use lubricants which (1) conform to the requirements of the API classification "For Service SE" or "For Service SF" when available, and (2) have the proper SAE grade number for the expected temperature range.
Never use nondetergent or straight mineral oil.



ENGINE OIL FILTER (Replace)

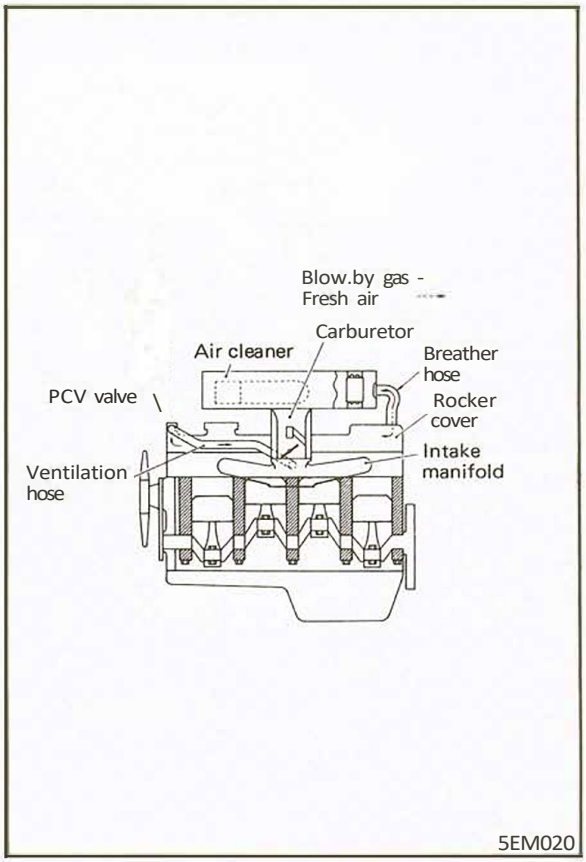
The quality of replacement filters varies considerably. Only high quality filters should be used to assure most efficient service. Genuine oil filters require that the filter be capable of withstanding a pressure of 256 psi and are recommended as follows:

Oil Filter Part Number	.
Mitsubishi Genuine Parts	MD03 I 805 or equivalent



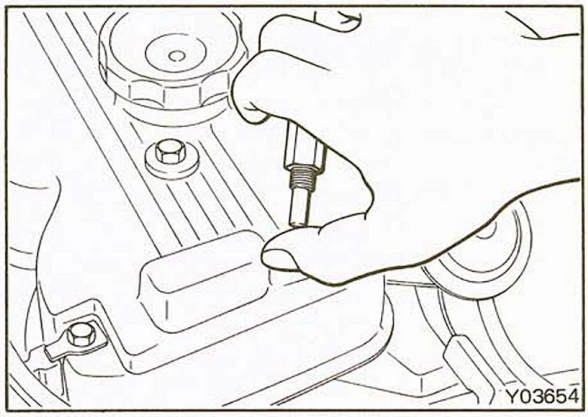
RANKCASE VENTILATION SYSTEM (Check, and clean dS required)

A closed-type crankcase ventilation system is utilized to prevent the blow-by gas from escaping into the atmosphere. This system has a positive crankcase vent valve (PCV valve) at the rocker arm cover.
This system supplies fresh air to the crankcase through the air cleaner. Inside the crankcase, the fresh air is mixed with blow-by gases, and this mixture passes through the PCV valve into the induction system.

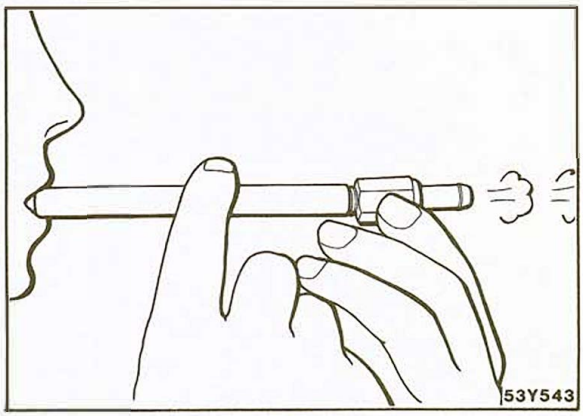


Inspection and Service Procedure

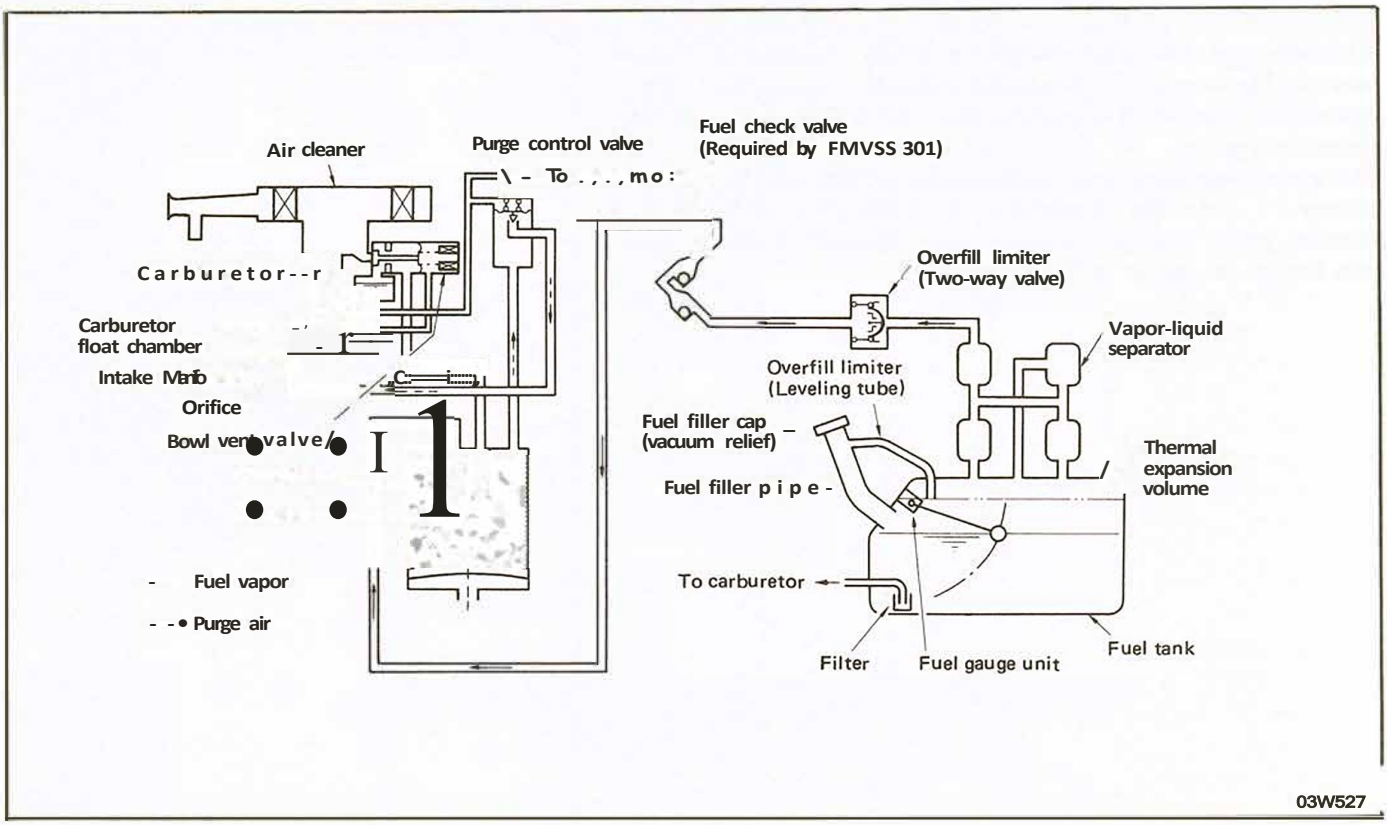
I. Remove **PCV** valve from rocker cover. If the valve is not clogged, a hissing noise will be heard as air passes through the valve, and a strong vacuum should be felt when a finger is placed over the valve inlet.



2. Disconnect ventilation hose from the PCV valve.
3. Blow from the threaded end of PCV valve. If you cannot blow through it, the PCV valve is plugged. (53Y543)
4. If the ventilation system is restricted, clean the hose and **PCV** valve with appropriate solvent for dissolving carbon, oil, sludge, etc.



EVAPORATIVE EMISSION CONTROL SYSTEM



Checking Evaporative Emission Control System - (Except canister)

If the fuel-vapor vent line is clogged or damaged, a fuel-vapor mixture will escape into the atmosphere.

Disconnect the line at both ends and blow it clean with compressed air. Remove the filler cap from the filler pipe and check to see if there is any problem with the sealing surface to the filler pipe.

The over-fill limiter (2-way valve) installed in the vapor line between the canister intake and fuel tank outlet should be checked for correct operation.

The purge control valve installed on the vaper line between canister and intake manifold should be checked for correct operation.

Canister (Replace)

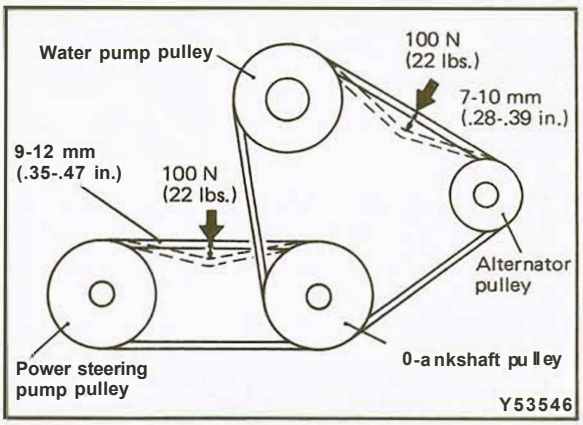
If the canister filter becomes clogged, the purge air volume will decrease and, consequently, the canister capacity will be reduced.

)RIVE BELTS (Check, and adjust or replace)

Inspect the drive belts for cuts and cracks. Replace if necessary.

Check for proper tension. If necessary, adjust the belt tension as follows:

I. Push with a force of 100 N (22 lbs.) on one belt at a point halfway between alternator pulley and water pump pulley and the other belt at a point halfway between the power steering pulley and crankshaft pulley. The specified limits of the belt deflection are shown in the illustration.
2. If belt deflection is not within specified limits, loosen alternator support bolt, alternator brace bolt and power steering pump brace bolt, and move alternator and power steering pump to obtain proper belt deflection at 100 N (22 lbs.) of force. (Y53546)
3. After adjustment, tighten the alternator support bolt, alternator brace bolt and power steering pump brace bolt to specified torque.



Part	Torque Nm (ft.lbs.)
Alternator support bolt	20-25 (14-18)
Alternator brace bolt	12-15 (8.5-11)
Power steering oil pump brace bolt	27-41 (20-30)

COOLING SYSTEM (Check and service)

Check the cooling system for damaged hoses, loose or seeping connections, or other possible causes of coolant leaks.

Coolant Change

I. Remove the radiator cap, radiator drain plug and engine drain plug to drain the coolant.

Caution

When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and tum the cap counterclockwise a little to let pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it counterclockwise.

2. Remove the reserve tank and drain the coolant.
3. After draining coolant completely, reinstall the drain plugs and flush the engine and radiator using a radiator cleaning fluid.
4. After the flushing is completed, completely drain the cleaning fluid and install the radiator and engine drain plugs.
5. Refill the system with water and a high quality ethylene glycol antifreeze. A convenient mixture is a 50% water and 50% antifreeze solution. [Freezing point: -36°C (-32.8°F)]. Reinstall radiator cap.
6. After running the engine a while, check the coolant level and add coolant until the specified coolant level is maintained.

7. Add coolant to the reserve tank between the "FULL" and "LOW" mark if necessary.

Caution
Do not overfill the reserve tank.

Antifreeze

Since the cylinder head and water pump body are made of aluminum alloy casting, be sure to use a 50% ethylene glycol antifreeze coolant to provide corrosion protection and freezing prevention.

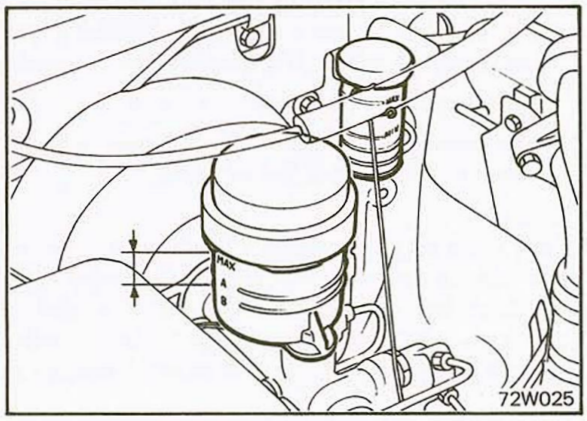
Recommended antifreeze	Quantity
Permanent type antifreeze	50% or more by volume

Measurement of Antifreeze Concentration

Run the engine until coolant is fully mixed. Drain some coolant (antifreeze), and measure temperature and specific gravity of the coolant. Determine concentration and safe working temperature. If the coolant is short of antifreeze, add antifreeze up to a concentration of 50%.

NOTE
As the antifreeze also serves as a corrosion inhibitor, be sure to maintain its concentration at 50% even when temperature is high.

BRAKE FLUID (Check fluid level and inspect for leaks)



1. Check to make certain that the brake fluid is between the **"MAX"** and "A" markings on the fluid reservoir. Fill as required. (72W025)
2. With disc brakes the fluid level can be expected to fall as the brake pads wear. A rapid fluid loss indicates a leak in the brake system which should be inspected and repaired immediately.

Caution
Take care in **handling brake fluid as it may cause damage to painted sur4a ces.**

Fluid Change

I. Check the brake system for leakage before replacing brake fluid. Completely drain the brake fluid with the bleeder screws loosened on each brake and refill the brake system with new brake fluid.

Recommended fluid	Brake fluid conforming to DOT3

2. The reservoir cap must be fully tightened to avoid contamination from foreign matter or moisture.

DO NOT ALLOW PETROLEUM BASE FLUID TO CONTAMINATE THE BRAKE FLUID - SEAL DAMAGE WILL RESULT-

3RAKE HOSES (Check for deterioration or leaks)

Inspection of brake hoses and tubes should be included in all brake service operations. The hoses should be checked for:

(1) Correct length, and for severe surface cracking, pulling, scuffing or worn spots. (If the fabric casing of the hoses is exposed by cracks or abrasion in the rubber hose cover, the hoses should be replaced.)

(2) Faulty installation, case twisting or friction against wheels, tires or chassis.

BRAKES

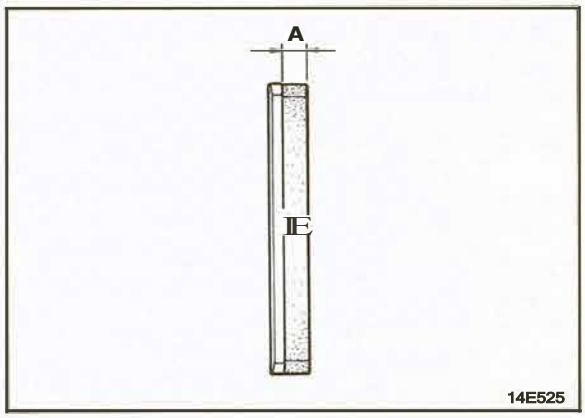
1. Inspect the disc brakes for pad wear and proper operation, and the rear brake linings and wheel cylinders for wear and leaks respectively. If the vehicle is driven in dusty or salty areas, it should be inspected more frequently.
2. The frequency of these inspections depends upon driving conditions, such as traffic or terrain, and upon the driving habits of the owner.

Front Disc Brake Pads (Inspect for wear)

Check for fluid contamination and wear. Replace complete set of pads if defective. (14E525)

Caution
The pads for the right and left wheels should be replaced at the same time. Never split or intermix brake pad sets. All four pads must be replaced as a complete set.

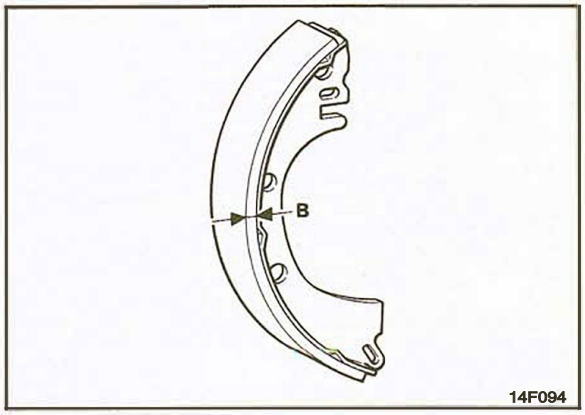
Thickness of lining "A"	
Standard value	10.5 mm (.41 in.)
Service limit	1.0 mm (.04 in.)



Rear Drum Brake Linings and Wheel Cylinders (Inspect for wear and leaks)

1. Remove the brake drum and check the thickness of brake shoe lining for wear. (14F094)

Thickness of lining "B"	
Standard value	4.6 (.18 in.)
Service limit	1.0 (.04 in.)



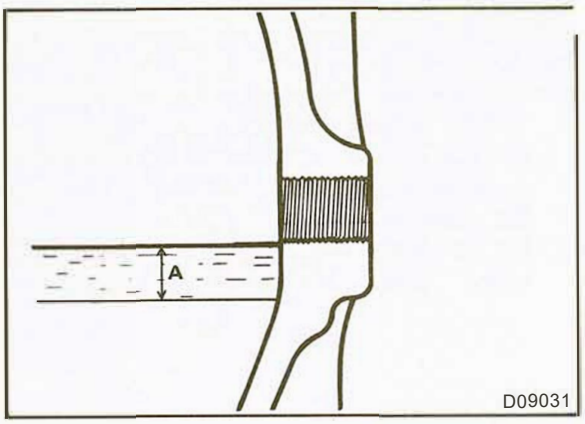
Check the automatic brake adjusting system by hand to see if it operates smoothly. Also see if the gears are in proper mesh with each other. To assure smooth functioning, apply a very thin coat of grease to the friction surface of adjuster and link shaft.

2. Inspect the wheel cylinder boots for evidence of a brake fluid leak. Visually check the boots for cuts, tears or heat cracks. (A slight amount of fluid on the boot may not be a leak, but may be preservative fluid used at assembly.)

FRONT AXLE AND REAR AXLE (Check oil level)

Remove the filler plug and check the oil level. (D09031)

Front axle oil level (A)	Within 8 mm (.31 in.)
Rear axle oil level (A)	Within 14 mm (.55 in.)



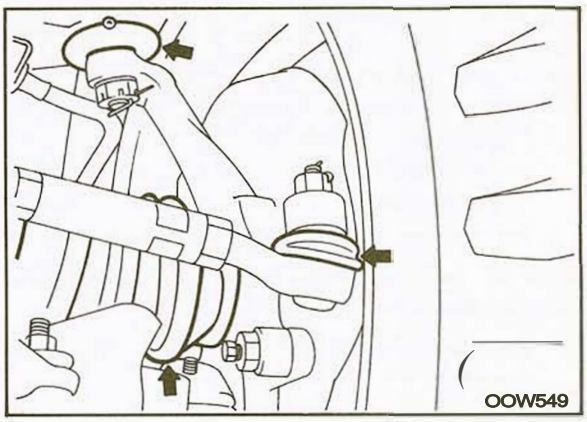
FRONT WHEEL BEARINGS (Inspect for grease leaks)

Inspect for evidence of grease leakage about the hub cap and the back of the hub.
If there is leakage of grease, remove the hub and its oil seal and check for damage.
Clean the grease off the hub and bearing, and repack with the specified new grease.

Recommended multipurpose grease	SAE 131 0a, NLGI grade #2EP

BALL JOINT SEALS, STEERING LINKAGE SEALS AND DRIVE SHAFT BOOTS (Inspect for leaks and damage)

These components are permanently lubricated at the factory and do not require periodic lubrication.
Damaged seals and boots should be replaced to prevent leakage or contamination of the grease.
Inspect the dust cover and boots for proper sealing, and check for leakage or damage. Replace if defective.



UPPER CONTROL ARM BUSHINGS

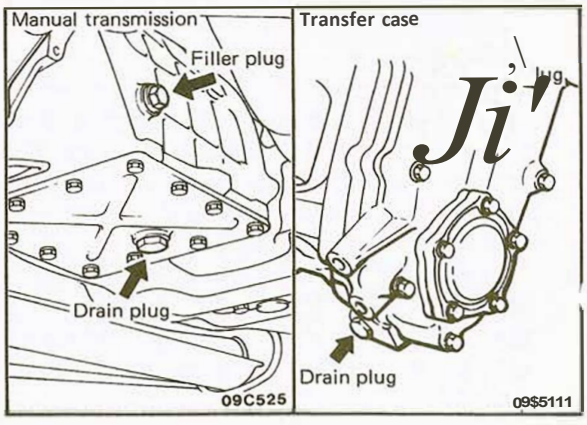
Supply grease at the grease nipple until the grease comes out of the dust seal of the upper arm shaft.
Lubricate the upper control arm bushings with Multipurpose Grease, NLGI Grade 2 EP.

MANUAL TRANSMISSION AND TRANSFER CASE (Oil change)

Fluid replacement is required every 48,000 km (30,000 miles) if the vehicle is used in severe usage conditions.

AUTOMATIC TRANSMISSION AND TRANSFER CASE (Fluid change)

Fluid replacement is required every 48,000 km (30,000 miles).



FRONT SUSPENSION

CONTENTS

GENERAL SPECIFICATIONS

Suspension system	Independent double wishbone with torsion bar and telescopic shock absorber
Torsion bar	
Length x O.D. mm (in.)	J,277.5 x 24.5 (50.30 x .96)
Spring constant (wheel position) N/mm (lbs.fin.)	22 (123)
Shock absorber	
Type	Hydraulic cylindrical double-acting type
Maximum length mm (in.)	335 (13.19)
Compressed length mm (in.)	215 {8.46}
Stroke mm (in.)	120 (4.72)
Damping force [at 0.3 m/sec. (0.984 ft./set.)]	
Expansion N {lbs.)	2,250 (495)
Contraction N (lbs.)	1,100 (242)
Wheel bearing	
Type	Tapered roller bearing
Dimensions (O.D. x I.D.) mm (in.)	
Outer	73.431 x 45.242 (2.891 x l.781)
Inner	73.431 x 45.242 (2.891 x l.781)
Drive shaft	
Joint type Outer	B J.
Inner	D.O.J.
Length Right mm (in.)	528.5 (20.8)
(Joint to joint) Left mm (in.)	605.6 (23.8)
Inner shaft	
Shaft overall length mm (in.)	431 (17.0)
Bearing	
O.D. x I.D. mm (in.)	62 x 35 (2.44 x }.38)
Differential	
Final ring gear type	Hypoid gear
Reduction ratio	
Manual transmission	4.625
Optional for Federal (not available in CaHfornia)	4.875
Automatic transmission	4.222
Optional for Federal (not available in California)	4.625
Differential gear type	Straight bevel gear
Number of teeth	
Drive gear	
Manual transmission	37
Optional for Federal (not available in California)	39
Automatic transmission	38
Optional for Federal (not available in California)	37
Drive pinion	
Manual transmission	8
Automatic transmission	9
Optional for Federal (not available in California)	8
Side gear	14
Pinion gear	10

:ERVICE SPECIFICATIONS

Standard Values	
Steering angle	
Inner wheel	33 °+0° −3°
Outer wheel	29°
Toe-in mm (in)	2-9 (.08-.35)
Camber	1° ± 30'
Caster	2° 55' ± 30'
Kingpin inclination angle	8⁰
Upper ann shaft starting torque Nm (ft.lbs.)	IS {11)
Upper ball joint starting torque Nem (in. lbs.)	80-350 (7.0-30)
Upper ann shaft reference dimension mm (in.)	72.5 (2.85)
Anchor ann reference dimension	
L.H. mm (in.)	138-146 (5.43-5.75)
R.H. mm (in.)	128-136 (5.04-5.35)
Stabilizer link assembly mounting bolt end reference dimension mm (in.)	16-18 (.69-.71)
Stabilizer mounting bolt end reference dimension mm (in.)	16-18 (.69-.71)
Shock absorber reference dimension mm (in.)	16.3 (.64)
Clearance between bump stopper and bump stopper bracket mm (in.)	71 (2.8)
Turning force of front hub assembly N (lbs.)	4-18 (0.9-4.1)
SettingofD.O.J. boot length mm (in.)	79 (3.1)
Drive shaft end play mm (in.)	0.2-0.5 (.08-.20)
Automatic free-wheeling hub	
Brake contact surface depth mm (in.)	11.8-12.2 (.46-.48)
Final ring gear backlash mm (in.)	0.13-0.18 (.005-.007)
Drive pinion preload	
With oil seal Nem (in. lbs.)	100-130 {8.7-11.3)
Without oil seal Nem (in. lbs.)	7-100 (6.1-8.7)
Repair limits	
Front axle total backlash mm (in.)	14 (.6)
Differential gear backlash mm (in.)	0.15 (.006)
Ring gear runout mm (in.)	0.05 (.002)
Automatic free wheeling hub	
Brake wear mm (in.)	9.6 {.38)
Return spring deterioration mm (in.)	35 {1.4)
Shift spring deterioration mm (in.)	30 (1.2)
Service limits	
Lower ball joint end play mm (in.)	0.5 (.02)
Drive shaft or inner shaft spline play mm (in.)	0.5 (.02)

TORQUE SPECIFICATIONS

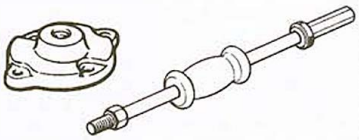
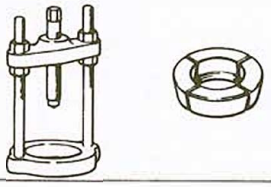
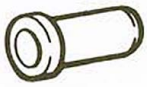
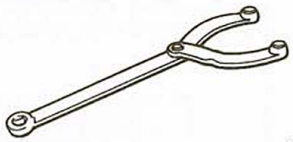
	Nm {ft.lb
Stabilizer bar bracket	8-12 (6-9)
Upper arm shaft to crossmem ber	100-120 (72-87)
Rebound stopper to upper arm	8-12(6-9)
Upper ball joint to knuckle	60-90 (43-65)
Lower ball joint to knuckle	120-180 (87-130)
Front shock absorber to crossmember	12-18 (9-13)
Front shock absorber to lower arm	15-22 (11-16)
Lower ann shaft	140-160(101-116)
Lower arm ball joint to lower arm	54-75 (39-54)
Bump stopper to lower arm	20-30 (14-22)
Anchor arm B	95-120 (69-87)
Anchor arm lock nut	40-50 (29-36)
Front hub to brake disc	50-60 (36-43)
Free wheeling hub body	50-60 (36-43)
Automatic free-wheeling hub cover	18-22 (13-16)
Manual free-wheeling hub cover	10-14 (7-10)
Right drive shaft to inner shaft	50-60 (36-43)
Differential mounting brackets to frame	80-100 {58-72)
Right differential mounting bracket to housing tube	80-100 (58-72)
Housing tube to differential carrier	80-100 (58-72)
Differential mounting bracket to differential carrier	80-100 (58-72)
Bracket to front suspension crossrnember	30-42 (22-30)
Bracket to differential carrier	80-100 (58-72)
Filler plug	40-60 (29-43)
Cover	15-22 (11-16)
Vent plug	16-20 (12-14)
Differential case to ring gear	80-90 (58-65)
Bearing cap	55-65 (40-47)
Drain plug	60-70 (43-51)
Companion flange	160-220 (116-159)

LUBRICANTS

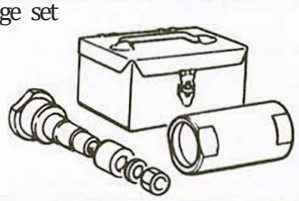
	Specified lubricant	Quantity
B.J. boot grease	Repair kit grease	100-150gr (3.5-5.3 oz.)
D.0.J. boot grease	Repair kit grease	100-150gr (3.5-5.3 oz.)
Conventional differential	Hypoid gear oil API classification GIA or GlrS SAE viscosity No. 90	1.10 lit. (1.16 U.S. qt.,0.97 lmp. qt.)
Front hub bearing	Multipurpose grease SAE J310a, NLGI grade #2EP	As required
Automatic free-wheeling hub	Multipurpose grease SAE J310a, NLGI grade #2EP	As required
Upper and lower ball joints	Multipurpose grease SAE J310a, NLGI grade #2EP	As required

Tool (Number and name)	Use	Tool (Number and name)	Use
MB991034 Gauge attachment	Measurement of wheel alignment	MB990799 Ball joint remover and installer A MB990800 Ball joint remover and installer B	Removal and installation of upper arm ball joint
MB990958 Torsion bar bushing remover and installer	Removal and pressing of bushing A	MB990883 Arbor	Removal and pressing of the bushing B
MB990635 "*" Steering linkage puller	Removal of knuckle Disconnection of tie rod Disconnection of upper ball joint	MB990809 "*" Pitman arm puller	Removal of knuckle Disconnection of lower ball joint
MB990954 Lock nut wrench	Removal and adjustment of lock nut	MB990925 Bearing and oil seal installer set	Pressing of front axle hub bearing outer race Removal and pressing of drive pinion bearing outer race
MD998360 "D" Cylinder head bolt wrench	Removal, installation and retightening of automatic free-wheeling hub	MB990811 Differential side bearing cup	Removal of side bearing inner race Disassembly and reassembly of automatic free-wheeling hub

"*", "D" see page 2 for instructions.

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990956 Needle bearing installer 	Pressing of needle bearing	MB990985 Oil seal installer 	Pressing of knuckle oil seal
MB990906 "*" Drive shaft attachment MB990211 Sliding hammer 	Removal and insertion of inner shaft assembly	MB990560 {A800ST15) "*" Bearing remover 	Removal and pressing of inner shaft bearing
MB990339 "*" (WT-00104) Bearing puller MB990648 "*" Bearing remover 	Removal of drive pinion front bearing inner race	MB990802 Bearing installer 	Pressing of drive pinion front bearing inner race Pressing of side bearing inner race
MB990031 Drive pinion oil seal installer 	Pressing of drive pinion oil seal	MB990810 "*" Side bearing puller 	Removal of side bearing inner race
MB990767 "D" End yoke holder 	Removal of companion flange	MB990955 Oil seal installer 	Pressing of front axle hub oil seal

"*", "D" see page 2 for instructions.

Tool (Number and name)	Use
MB990901 "*" Pinion heigh t measurement gauge set 	Measurement of drive pinion height

"*" see page 2 for instructions.

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Steering wheel is heavy, vibrates or pulls to one side	Suspension malfunction: Ball joint Torsion bar Wheel alignment	Inspect, adjust or replace appropriate parts (Refer to GROUP 19.)
Excessive vehicle rolling	Broken or deteriorated stabilizer Shock absorber malfunctioning	Replace
Poor riding	Excessive tire inflation pressure	Adjust the tire inflation pressure (Refer to GROUP 22.)
	Shock absorber malfunctioning Deteriorated bump stopper or rebound stopper Worn or deformed torsion bar support	Replace
	Deformed torsion bar	Replace
	Broken or deteriorated torsion bar	Replace
Noise	Loose or deformed anchor bolt	Retighten or replace
	Worn torsion bar serration Oil leakage from shock absorber	Replace
	Inadequate lubrication of various sections	Lubricate
	Worn or deformed bushing Shock absorber malfunctioning	Replace
Vehicle leans to one side	Anchor arm assembly not installed in correct position Inadequately tightened anc)lor bolt	Retighten or replace
	Deformed crossmember Broken or deteriorated torsion bar	Replace

Symptom	Probable cause	Remedy
MANUAL FREE-WHEELING HUB, FRONT AXLE HUB, KNUCKLE Noise due to excessive play of wheel in the direction of rotation	Play in free-wheeling hub serration	Adjust or replace
Noise due to excessive wheel end play	Wheel bearing play, seizure, wear	Check, and adjust or replace if necessary
	Knuckle needle bearing play, seizure, wear	Replace
	Free-wheeling hub serration play	Adjust or replace
	Free-wheeling hub looseness	Tighten or replace
Steering wheel shimmy	Wheel bearing wear, play, seizure	Check, and adjust or replace if necessary
	Free-wheeling hub serration play	Adjust or replace
Car pulls to one side	Wheel bearing wear, play, seizure	Check, and adjust or replace if necessary
	Free-wheeling hub serration play	Adjust or replace
AUTOMATIC FREE-WHEELING HUB Does not lock	Brake sliding portion worn Brake B lug broken Housing damaged	Replace parts and adjust shims on hub mounting surface shims
	Drive gear damaged Slide gear damaged Retainer A damaged Cam damaged Shift spring deteriorated Slide gear C-ring out of position	Replace parts
	Automatic free-wheeling hub mounting bolts loose	Retighten mounting bolts
Locks but does not become free	Return spring deteriorated Slide gear snap ring out of position	Replace parts
	Foreign substance on tooth surfaces of drive gear and slide gear Foreign substance on tooth surfaces of slide gear and housing gear	Clean tooth surfaces or replace parts
	Excessive front power train resistance	Adjust differential preload

Symptom	Probable cause	Remedy
Ratcheting occurs easily	Water in brake	Clean and apply grease
	Retainer B worn Slide gear damaged Housing gear damaged Shift spring deteriorated Slide gear C-ring out of position	Replace parts
	Automatic free-wheeling hub mounting bolts loose	Retighten the mounting bolts
DRIVE SHAFT, INNER SHAFT Noise during tire rotation	Housing tube bent Inner shaft bent Inner shaft bearing worn, pounding	Replace
	Drive shaft assembly worn, damaged, bent	Check or replace
Noise due to excessive play of wheel in turning direction	Inner shaft and side gear serration play Drive shaft and side gear serration play Drive shaft and drive flange play	Adjust or replace
Noise due to excessive wheel end play	Drive shaft and drive flange end play	Adjust or replace
	Drive flange looseness	Tighten or replace
Steering wheel shimmy	Drive shaft assembly bent, damaged, worn	Replace
	Drive shaft assembly and drive flange play	Adjust or replace
Car pulls to one side	Drive shaft assembly and drive flange play	Adjust or replace
DIFFERENTIAL Constant noise	Improper adjustment of ring gear and drive pinion (poor meshing) Loose, worn or damaged side bearing Loose, worn or damaged drive pinion bearing	Correct or replace
	Worn ring gear or drive pinion Worn side gear thrust washer or pinion shaft Deformed ring gear or differential case Damaged gear	Replace
	Foreign material	Eliminate the foreign material and check; replace the parts if necessary
	Insufficient oil	Replenish

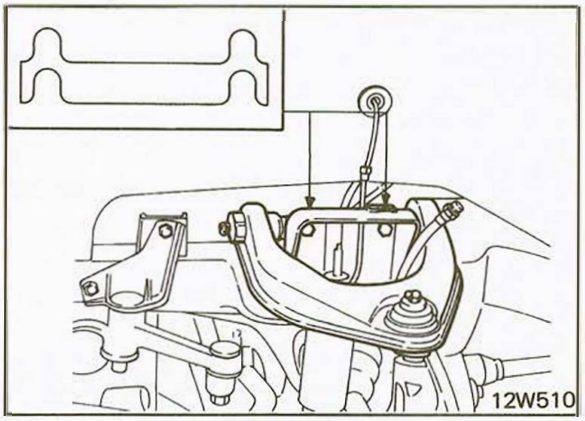
Symptom	Probable cause	Remedy
Gear noise while driving	Poor gear engagement Improper gear adjustment Improper drive pinion preload adjustment	Correct or replace
	Damaged gear	Replace
	Foreign material	Eliminate the foreign material and check; replace the parts if necessary
	Insufficient oil	Replenish
Gear noise while coasting	Improper drive pinion preload adjustment	Correct or replace
	Damaged gear	Replace
Bearing noise while driving or coasting	Cracked or damaged drive pinion rear bearing	Replace
Noise while turning	Loose side bearing Damaged side gear, pinion gear or pinion shaft	Replace
Heat	Insufficient gear backlash Excessive preload	Adjust
	Insufficient oil	Replenish
Oil leakage	Clogged vent plug	Clean or replace the parts
	Loose cover Poor sealing	Retighten, apply sealant, or replace the gasket
	Worn or damaged oil seal	Replace
	Excessive oil	Adjust the oil level

NSPECTION AND ADJUSTMENT OF THE WHEEL ALIGNMENT

Camber

1. Remove the free-wheeling hub and mount the special tool onto the front hub.
2. Measure the camber with a camber/caster/kingpin gauge.
3. Make adjustment of the camber by increasing or decreasing the thickness of the adjusting shims between the upper arm shaft and the crossmember. (12W510)

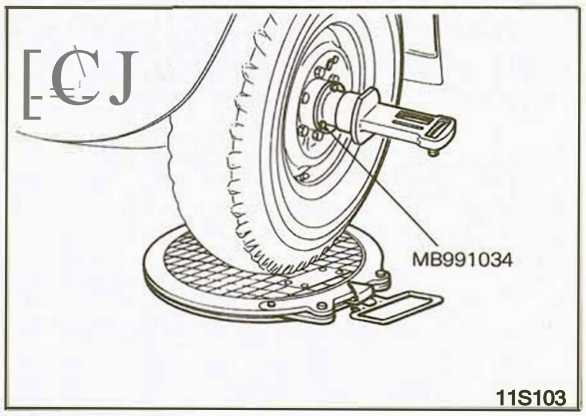
Camber	1° ± 30'



Caster

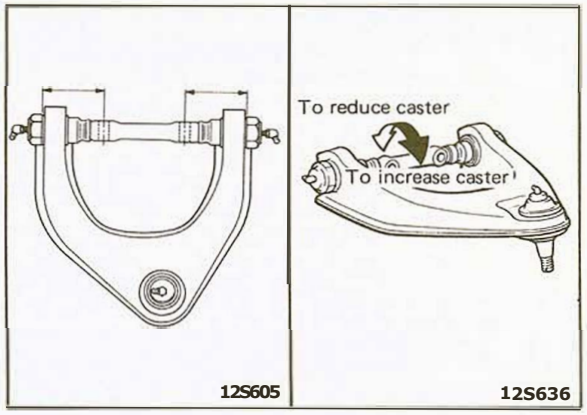
1. Remove the free-wheeling hub anq mount the special tool onto the front hub.
2. Measure caster with a camber/caster/kingpin gauge and a turning radius gauge. (11S103)

Caster	2° 55' ± 30'



3. If caster does not meet specifications, remove the upper arm from the crossmember and then adjust by turning the upper arm shaft.

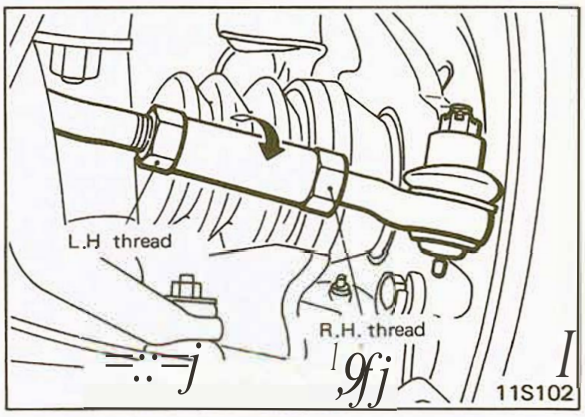
Upper arm shaft reference dimension	72.5 mm (2.85 in.)



Toe-in

1. If the toe-in does not agree with the standard value, use the left and right tie rod turnbuckles to adjust it. (11S102)
2. Make the adjustment by turning the left and right turnbuckles the same amount in opposite directions. The toe-in value will decrease if the left turnbuckle is turned toward the front of vehicle and the right one is turned toward the rear, and vice A half-turn of the turnbuckles will result in an approximately 7.5 mm (.29 in.) adjustment in the toe-in.

Toe-in	2-9 mm (.08-.35 in.)



FRONT AXLE TOTAL BACKLASH

If the vehicle vibrates and produces a booming sound due to the unbalance of the drivetrain, measure the front axle total backlash as follows to see if the differential carrier assembly requires removal.

(1) For vehicles equipped with free-wheeling hubs, set the hubs for 4-wheel drive.

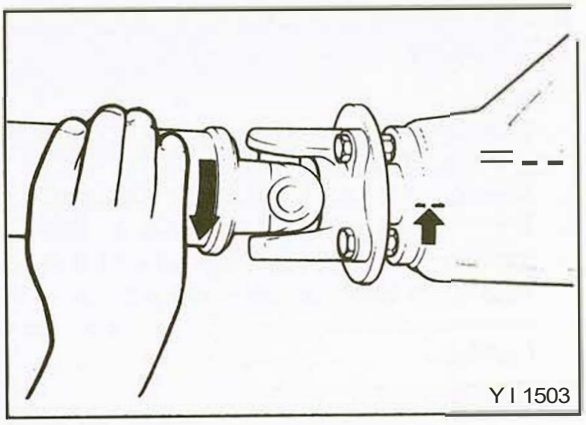
NOTE
For vehicles with manual free-wheeling hubs, set the control handle to the "LOCK" position.
For vehicles with automatic free-wheeling hubs, set the transfer shift lever to "4H" and drive 1 to 2 m to engage the hubs with the drive shafts.

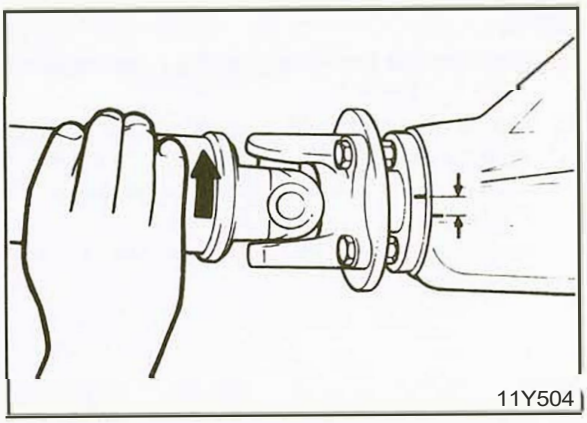
(2) Secure the wheels and set the transfer control lever to "2H".

NOTE
If the vehicle is raised on a jack, the wheels will turn and it will not be possible to measure the backlash.

(3) Turn the companion flange clockwise until all play is removed. Make mating marks on the dust cover of the companion flange and on the differential carrier. (Y1l503)
(4) Turn the companion flange counterclockwise until all play is removed and measure the amount of distance through which the mating marks moved. (11 Y504)
(5) If the backlash exceeds the repair limit, remove the differential carrier assembly and adjust the backlash and drive shaft or inner shaft spline play.

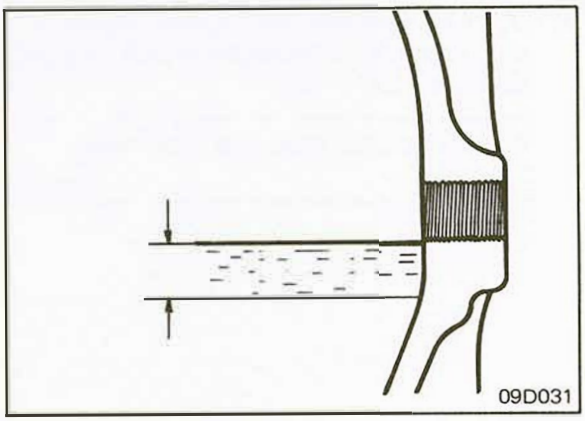
Front axle total backlash [Repair limit]	14 mm (.6 in.)





CHECKING GEAR OIL LEVEL

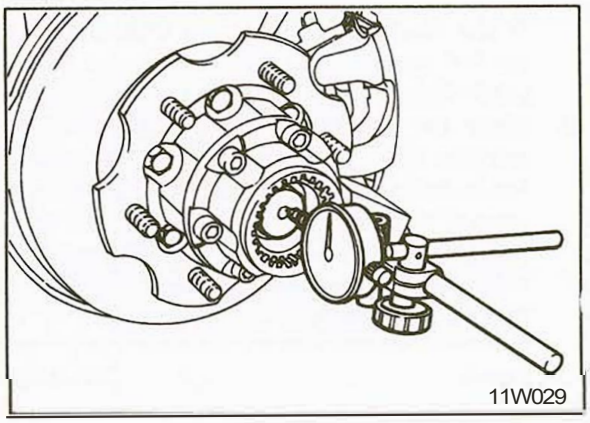
Remove the filler plug and check the oil level. The oil level should be somewhere within 8 mm (.31 in.) from the bottom of the filler plug hole.



INSPECTION OF ORNE SHAFT END PLAY

Measure drive shaft end play with a dial indicator.

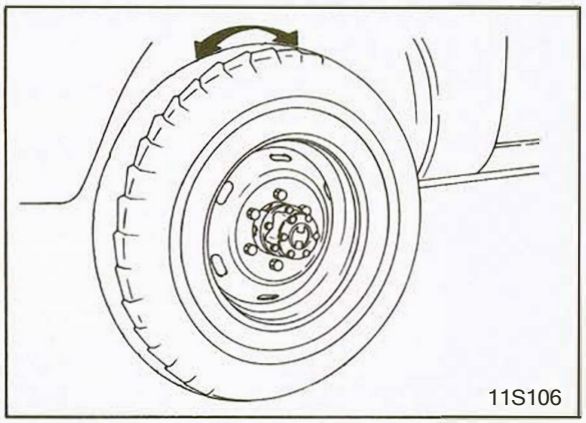
Drive shaft end play	0.2-0.5 mm (.008-.020 in.)



/HEEL BEARING PLAY INSPECTION

I. Inspect the play of the bearings while the vehicle is jacked up. (11 SI 06)
2. If there is play, adjust by tightening the lock nuts. (Refer top. 2-29.)

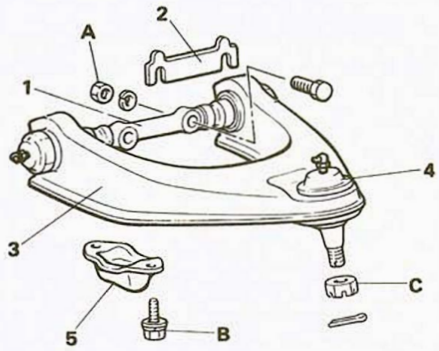
Caution
Do not confuse the end play of the bearings with the play of ball joint.



UPPER ARM COMPONENTS

1. Upper arm shaft
2. Adjusting shim
3. Upper arm
4. Upper ball joint
5. Rebound stopper

	Nm	ft. lbs.
A	100-120	72-87
B	8-12	6-9
C	60-90	43-65

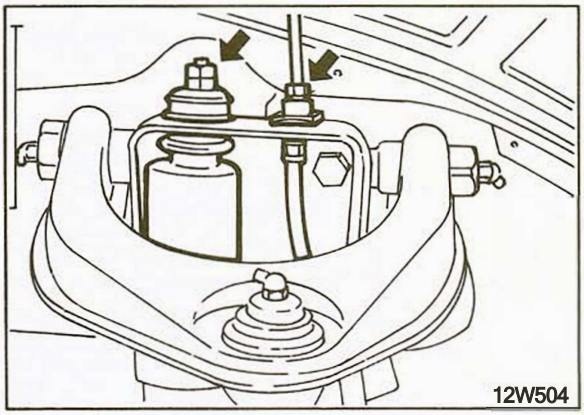


11W517

REMOVAL

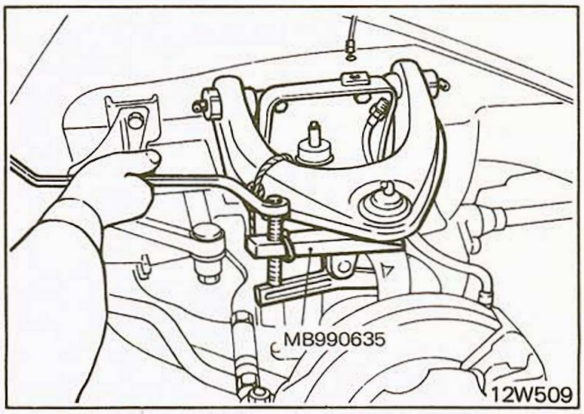
1. Loosen the anchor bolt of the torsion bar all the way. (Refer top. 2-20.)
2. Remove the lower part of the shock absorber. (Refer top. 2-24.) (12WS04)
3. Discharge brake fluid and disconnect the brake hose. (Refer to **GROUP** 5.) (12WS04)
4. Loosen the nut holding the upper ball joint to the knuckle.

NOTE
The nut should only be partially loosened and should not be removed.



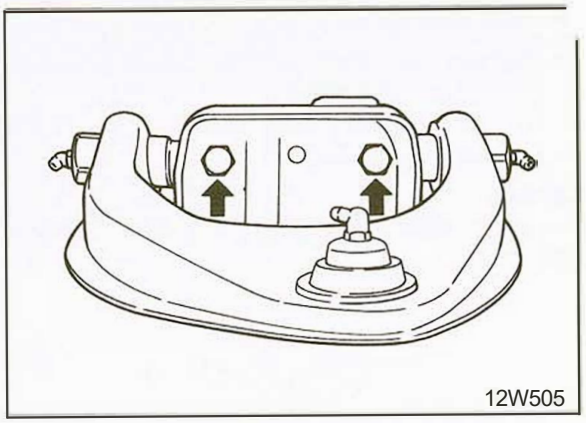
5. Using the special tool, disconnect the upper ball joint from the knuckle. (l 2WS09)

Caution
Tie the special tool to the upper arm with rope to prevent bouncing.



6. Remove the upper arm from the crossmember.

NOTE
The camber adjustment shims should be marked for reference during assembly.
Do not turn the upper arm shaft, since it changes the caster.

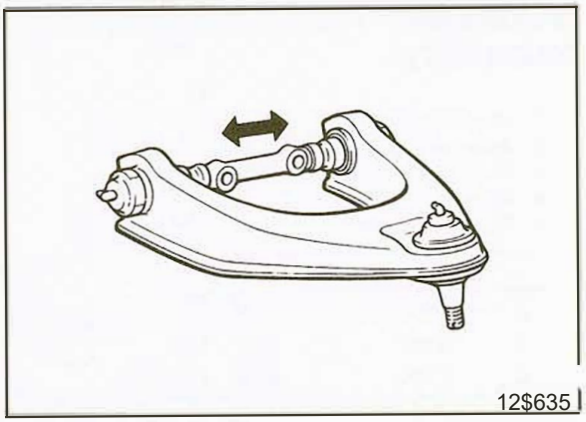

12W505

INSPECTION

I. Check upper arm for deformation or cracks.
2. Check upper arm shaft for bends or cracks.

Inspection for Play of the Upper Arm Shaft

I. With the upper arm assembly held in a vice, move the upper arm shaft to check for play.
2. **If** the upper arm shaft has play, replace the upper ann assembly. (12S635)

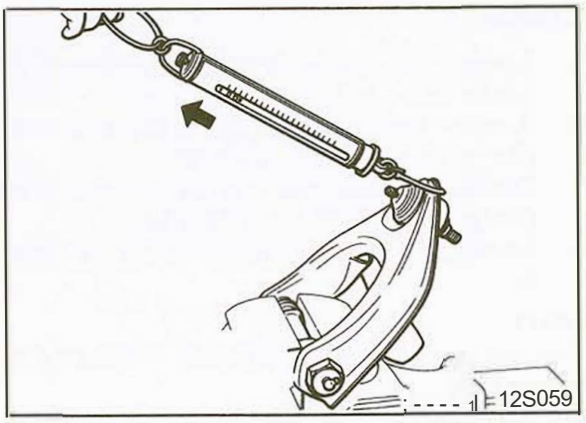

12$635

Measurement of the Upper Arm Shaft Starting Torque

1. With the upper arm shaft held in a vice, measure the upper arm shaft starting torque with a spring scale. (12S059)

Upper arm shaft starting torque ..... .
15 Nm (11 ft.lbs.)

2. **If** the upper ann shaft starting torque exceeds the standard value, replace the upper ann assembly.

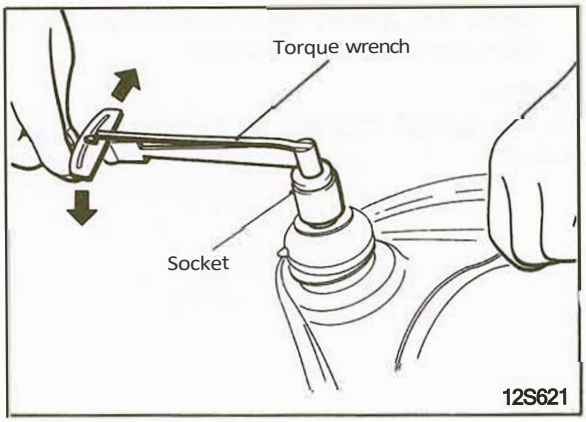

12S059

Measurement of the Upper Ball Joint Starting Torque

1. Measure the upper ball joint starting torque with a torque wrench. (12S621)

Upper ball joint starting torque ..... .
80-350 Nern (7.0-30 in. lbs.)

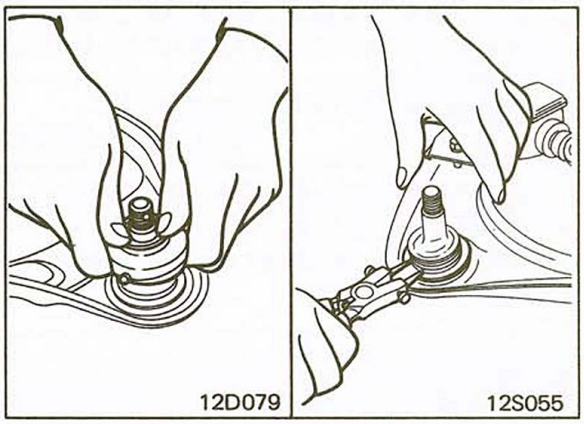
2. If the upper ball joint starting torque is out of specification, replace the upper ball joint.



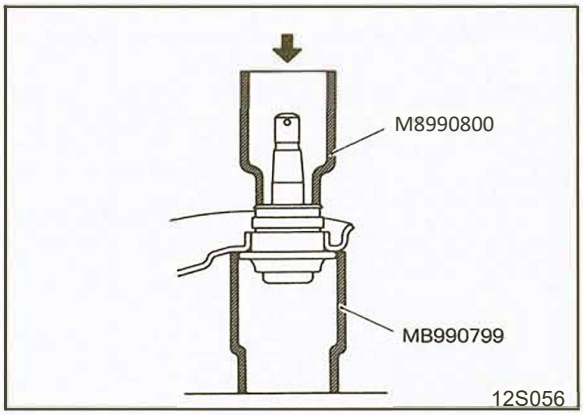
12S621

JPPER BALL JOINT REPLACEMENT

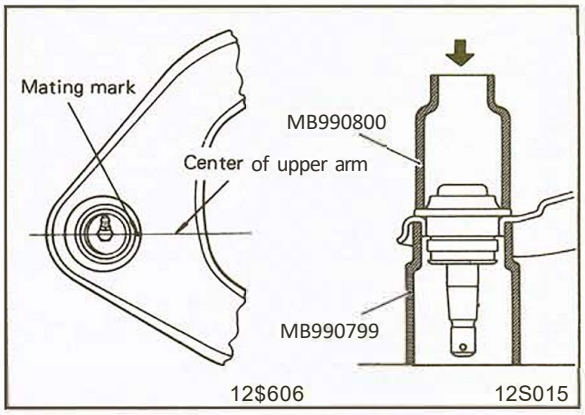
1. Remove the dust cover together with the ring. (12D079)
2. Remove the snap ring from the upper ball joint. (12$055)



3. Press the upper ball joint out of the upper arm **with** the special tools.

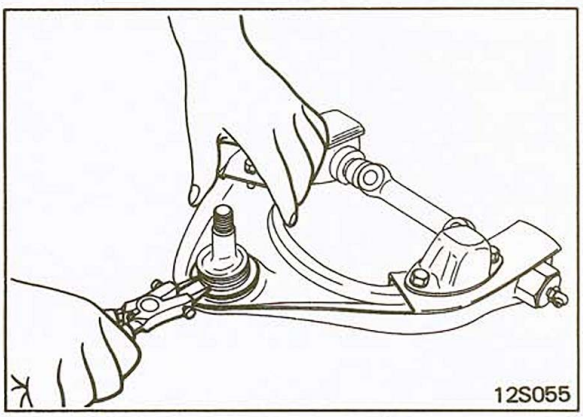


4. Use the special tools illustrated to press the new ball joint into the upper arm. Be sure to align the mating mark with the upper arm center.



5. Using snap ring pliers, fit the snap ring securely into the groove of the joint case.

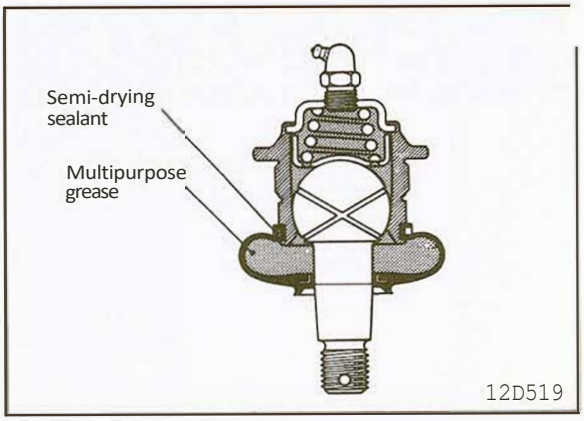
Caution
Be careful not to distort the snap ring.
Check to ensure that there is no play between the ball joint groove and snap ring. If there is play, replace the snap ring with a new one.



6. Apply multipurpose grease to both the interior of the dust cover and the upper ball joint. (12D519)

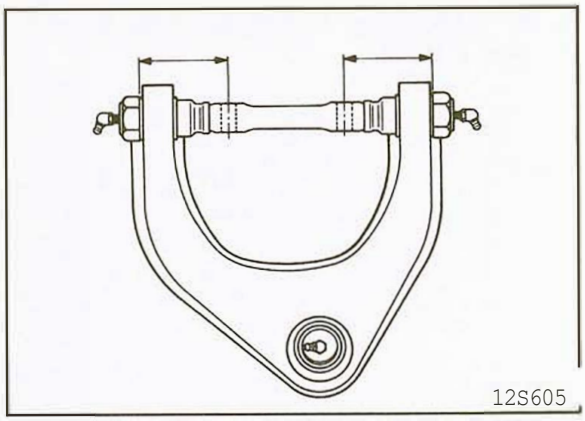
Recommended multipurpose grease ..... SAE 131 Oa, NLGI grade #2EP

7. Apply semi-drying sealant to the grooves in the upper ball joint. (12D519)
8. Secure the dust cover to the upper ball joint with the ring.



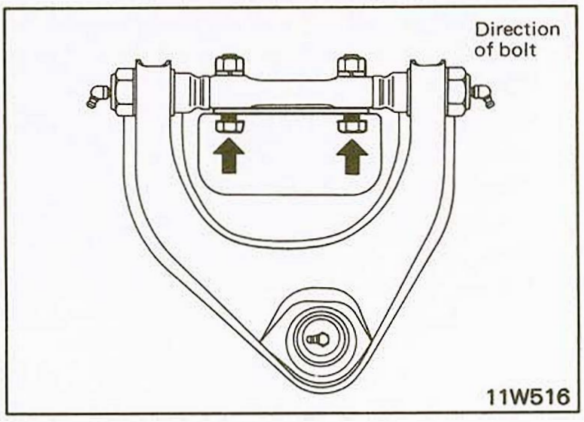
9. Turn the shaft the amount necessary to obtain the reference dimension. (Refer to p. 2-11.)

Caution
The dimension shown in the illustration determine caster.



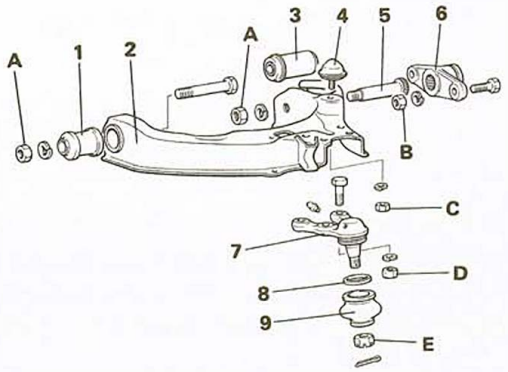
INSTALLATION

1. When installing the upper arm assembly onto the crossmember, insert the upper arm shaft mounting bolts from the outside of the crossmember and put adjusting shims between the crossmember and upper arm shaft. (11 WS 16)
2. Tighten the torsion bar anchor bolts to the reference dimension. (Refer top. 2-21.)
3. Tighten the lower arm mounting bolts to specifications with the vehicle unladen.
4. Check the wheel alignment.
5. Torque all parts to specifications during assembly.



:OMPONENTS

1. Bushing B
2. Lower arm assembly
3. Bushing A
4. Bump stopper
5. Lower arm shaft
6. Anchor arm B
7. Lower ball joint
8. Ring
9. Dust cover



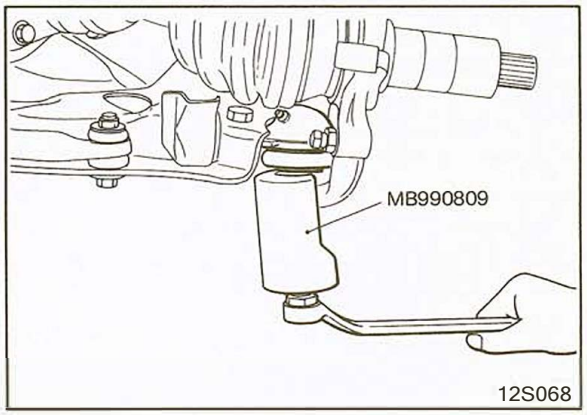
	Nm	ft.lbs.
A"	140-160	101-116
B	95-120	69-87
C	20-30	14-22
D	54-75	39-54
E	120-180	87-130

"To be tightened with vehicle lowered to the ground.

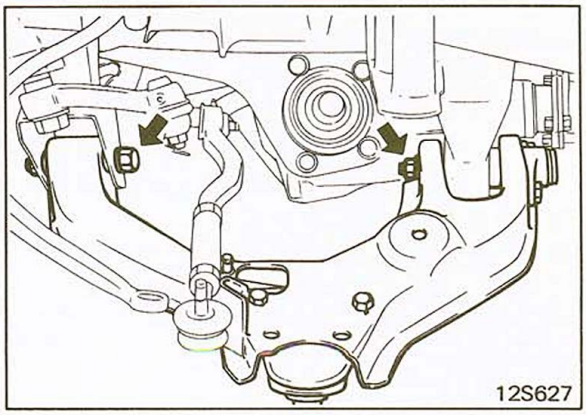
12S038

REMOVAL

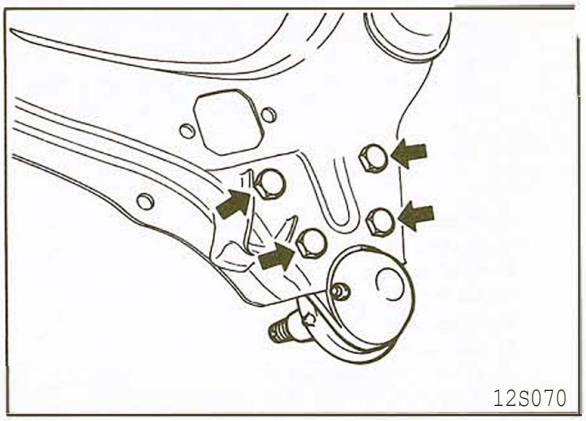
I. Remove the front skid plate and under cover.
2. Remove the torsion bar. (Refer top. 2-20.)
3. Remove the stabilizer bar. (Refer top. 2-23.)
4. Remove the lower portion of the shock absorber. (Refer top. 2-24.)
5. Remove the nut which retains the lower ball joint to the knuckle.
6. Using the special tool, disconnect the lower ball joint from the knuckle. (12S068)



7. Remove the front mounting bolts of the lower arm. (12S627)
8. Remove the lower arm assembly.
9. Remove anchor arm B if necessary.



10. Remove the lower ball joint. (12S070)
11. Remove the dust cover and ring.



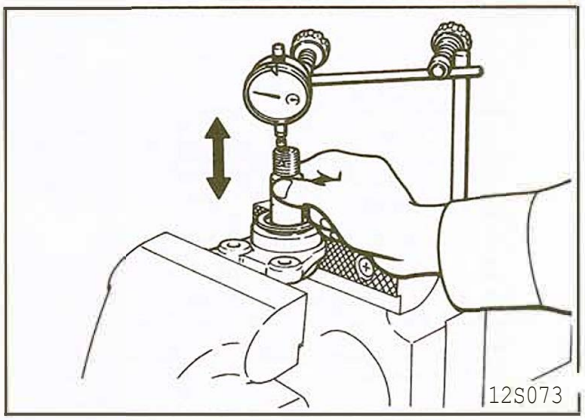
INSPECTION

I. Check lower ann for cracks and deformation.
2. Check anchor arm for worn and damage.
3. Check lower ball joint dust boot for cracks and deterioration.

Measurement of the Lower Ball Joint End Play

I. Measure the lower ball joint end play with a dial indicator. (12S073)

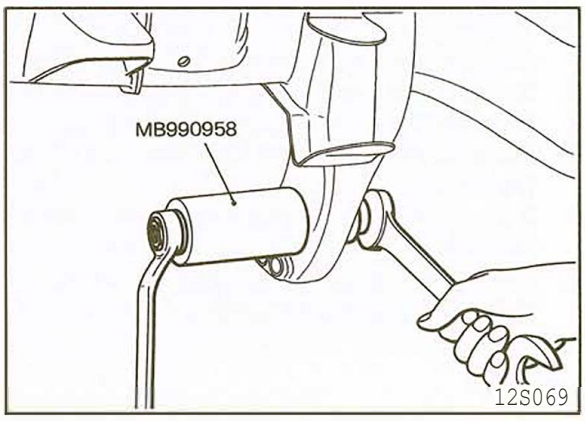
Lower ball joint end play [Service limit].	0.5 mm (.02 in.)



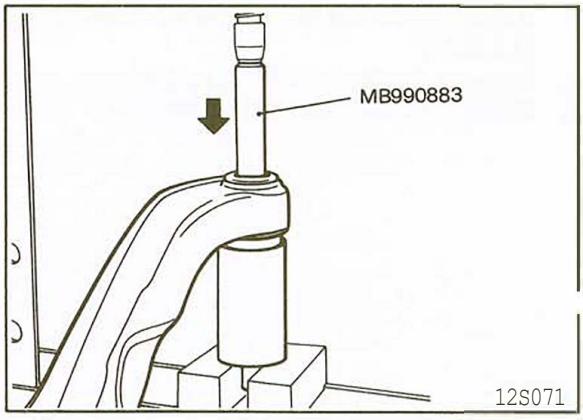
2. If the lower ball joint end play exceeds the service limit, replace the lower ball joint.

Replacement of Lower Arm Bushing

I. Using the special tool, remove bushing A from the crossmember bracket.

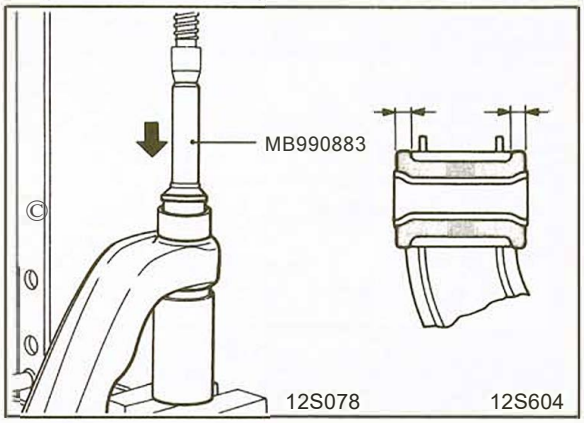


2. Remove bushing B from the lower arm using the special tool.

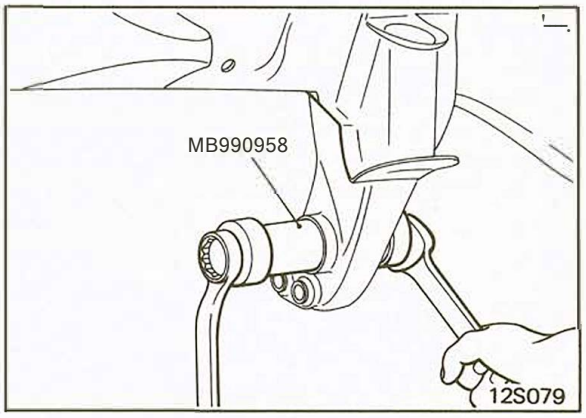


. Coat bushing B and the lower arm with a soap solution and press bushing B into the lower arm with the special tool. Take care not to twist or tilt bushing B.

NOTE
Press the bushing again from the opposite side if necessary, to equalize the amount of projections at both ends.



4. Using the special tool, press bushing A into the cross-member bracket.

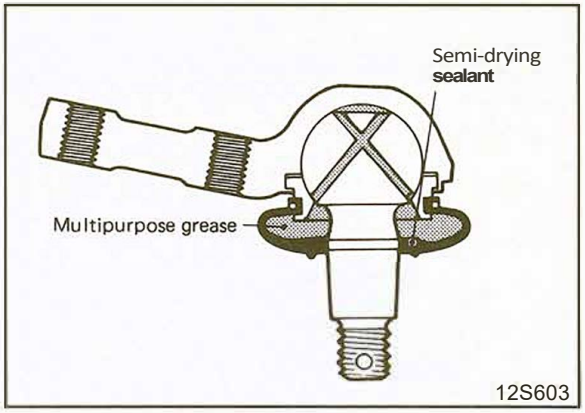


Replacement of Lower Ball Joint Dust Boot

1. Apply the specified multipurpose grease to the interior of the dust cover and to the lower ball joint. (12S603)

Recommended multipurpose grease ..... SAE 131 0a, NLGI grade #2EP

2. Apply the specified semi-drying sealant to the grooves in the lower ball joint. (12S603)
3. Secure the dust cover to the lower ball joint with the ring.



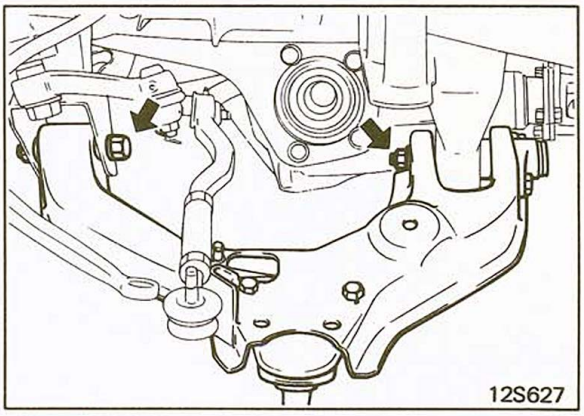
INSTALLATION

1. Temporarily mount the lower arm shaft to the cross-member. (12S627)

NOTE
Work will be easier if a solution of neutral detergent is applied to the lower arm shaft and to the rubber bushing.

Caution
Tighten the lower arm shaft with the vehicle lowered to the ound and unladen.

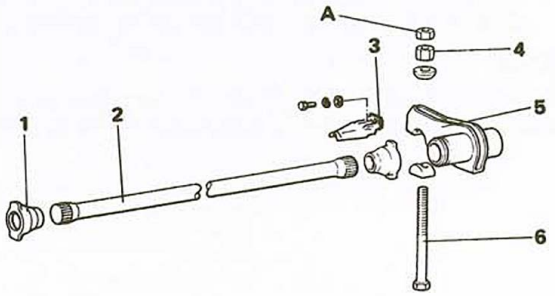
. Install the shock absorber. (Refer top. 2-24.)
3. Install the torsion bar. (Refer top. 2-21.)
4. Install the stabilizer bar. (Refer top. 2-23.)
5. Torque all parts to specifications during assembly.



COMPONENTS

1. Oust cover
2. Torsion bar
3. Heat protector
4. Adjusting nut
5. Anchor arm assembly
6. Anchor bolt

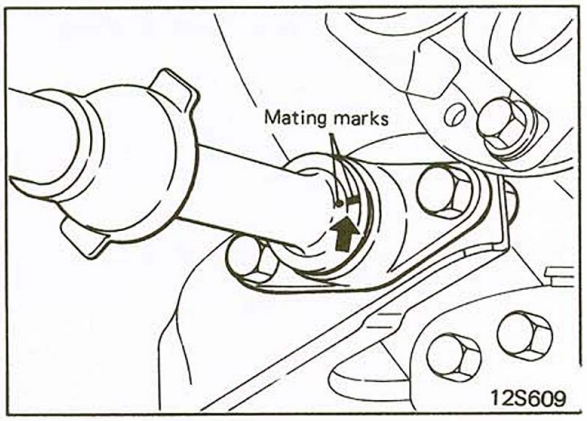
	Nm	ft.lbs.
A	40-50	29-36



12W519

REMOVAL

1. Support the vehicle with floor stands at the specified points.
2. Support the lower arm from which the torsion bar is to be removed, with a jack.
3. Detach the torsion bar dust covers from the anchor arm assembly and anchor arm B, respectively.
4. Put a mating mark on the torsion bar in alignment with the mark on anchor arm B. (12S609)

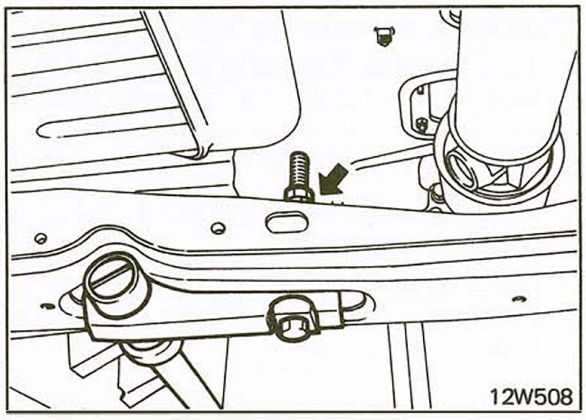


12S609

5. Loosen the adjusting nut and pull the torsion bar out of anchor arm B. (12W508)

NOTE
Remove the anchor arm assembly as necessary to faciHtate removal of the torsion bar.

6. Detach the stabilizer bar from the lower arm assembly.


12W508

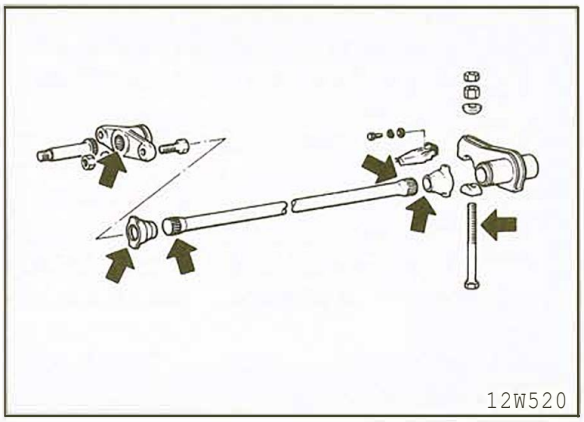
INSPECTION

1. Check torsion bar for bend and damage.
2. Check dust cover for cracks and damage.
3. Check anchor bolt for bend.

"NSTALLATION

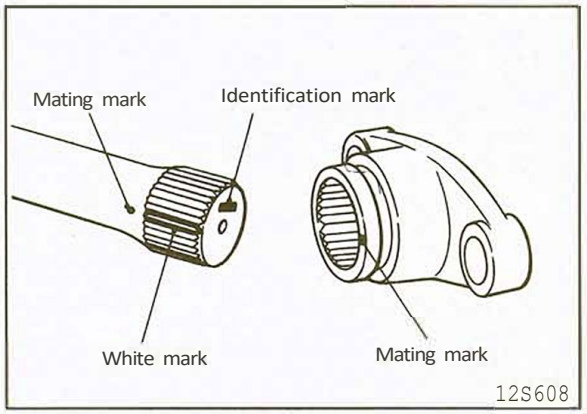
1. Apply multipurpose grease to the torsion bar serrations, the anchor arm assembly serrations, the anchor arm B serrations, the inside of the dust boot and the anchor bolt threads.

Recommended multipurpose grease	SAE J3 1Oa NLGI grade #2EP



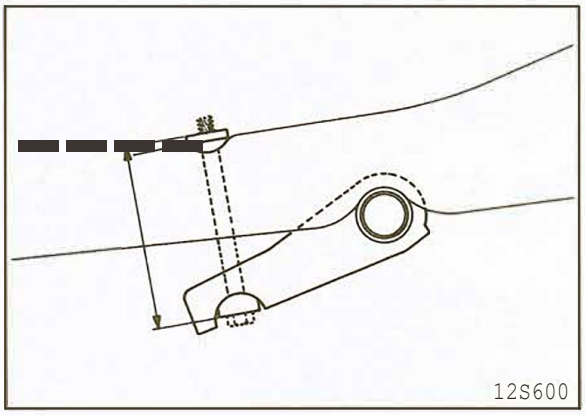
2. Identify the right and left torsion bars referring to the identification mark.
3. When inserting the torsion bar into anchor arm B, face the end having the identification mark forward and align the mark on anchor arm B with the mating mark on the torsion bar. (12S608)

NOTE
When installing a new torsion bar, align the serration which has been painted white with the mark on anchor arm B.



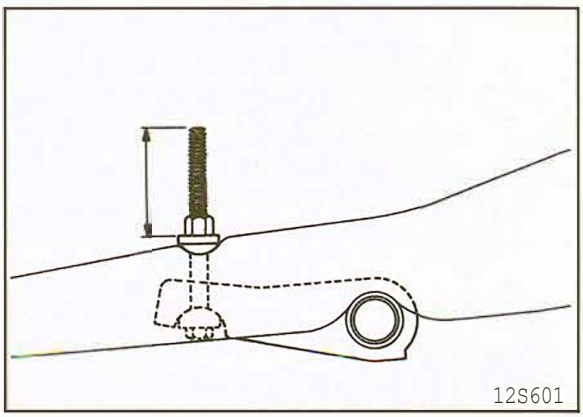
4. Select the relative position of the torsion bar and anchor arm serrations so that the length shown in the illustration is within the specified dimension when the torsion bar and the anchor arm are assembled, with the upper arm rebound stopper in contact with the crossmember.

Anchor arm reference dimension	L.H. side 138-146 mm (5.43-5.73 in.) R.H. side 128-136 mm (5 .04-5 .35 in.)



5. Tighten the adjusting nut so that the anchor bolt protrusion will become the dimension as follows.

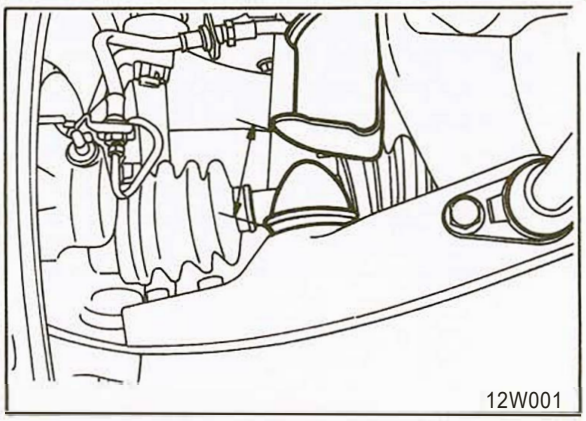
Anchor bolt protrusion	L.H. 55 mm (2.17 in.) R.H. 68 mm (2.68 in.)



6. With the vehicle unladen, measure the clearance between the bump stopper and the bump stopper bracket to confirm that it agrees with the specification. (12W00 1)

Clearance between bump stopper and bump stopper bracket	71 mm (2.8 in.)

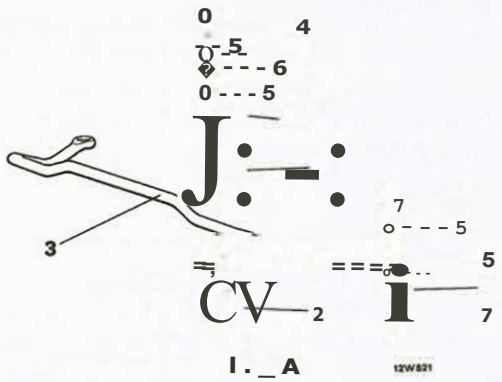
7. If the clearance does agree with the specification, use the adjusting nut on the anchor bolt to adjust it.
8. Torque all parts to specifications during assembly.



.::OMPONENTS

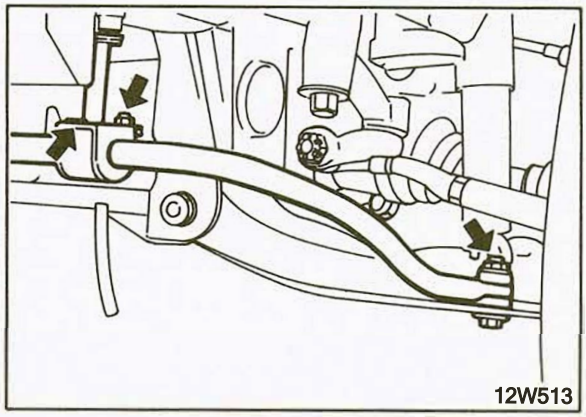
1. Bushing
2. Stabilizer bracket
3. Stabilizer bar
4. Joint cup A
5. Rubber bushing
6. Joint cup B
7. Washer
8. Stabilizer link

	Nm	ft.lbs.
A	8-12	6-9



REMOVAL

1. Support the vehicle with floor stands at the specified points.
2. Remove the skid plate.
3. Remove the stabilizer bar. (12W513)



INSPECTION

1. Check stabilizer bar for deformation or damage.
2. Check stabilizer link for bending or damage.
3. Check bushings for cracks, deterioration or wear.

INSTALLATION

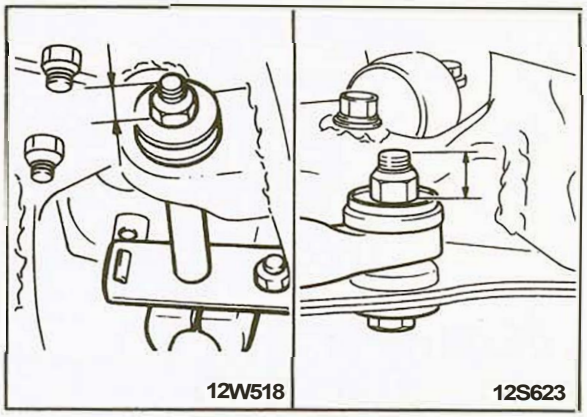
1. When mounting the stabilizer link to the No. 1 crossmember, tighten the nut so as to obtain the specified dimension. (12W518)

   Stabilizer link assembly mounting bolt end reference dimension ..... 16-18 mm (.63-.71 in.)

2. When mounting the ends of the stabilizer bar to the lower arms, tighten the nut so as to obtain the specified dimension. (12S623)

   Stabilizer mounting bolt end reference dimension ..... 16-18 mm (.63-.71 in.)

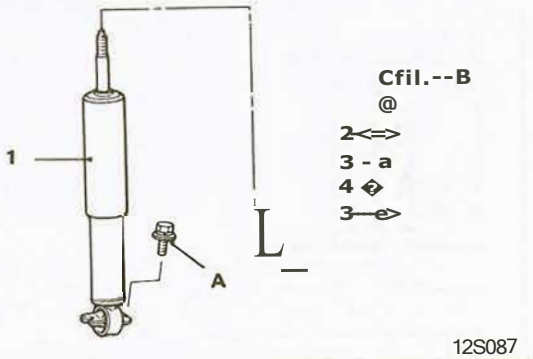
3. Torque all parts to specifications during assembly.



COMPONENTS

1. Shock absorber
2. Joint cup A
3. Bushing
4. Joint cup B

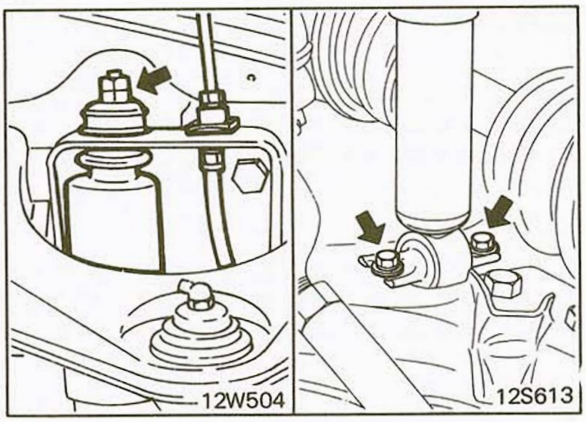
	Nm	ft. lbs.
A	15-22	11-16
B	12-18	9-13



12S087

REMOVAL

Remove the shock absorber.



INSPECTION

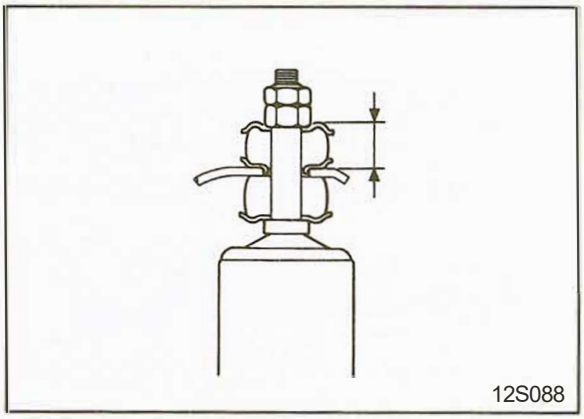
1. Check shock absorbers for malfunctions, oil leakage or noise.

INSTALLATION

1. When mounting the shock absorber to the arm post of the side frame, tighten until the distance from joint cup A to joint cup B agrees with the reference dimension.

Shock absorber reference dimension ..... .
16.3 mm (.64 in.)

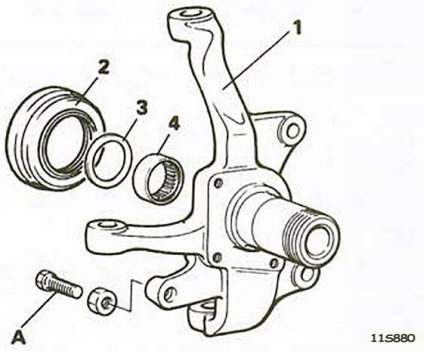
2. Torque all parts to specifications during assembly.



)MPONENTS

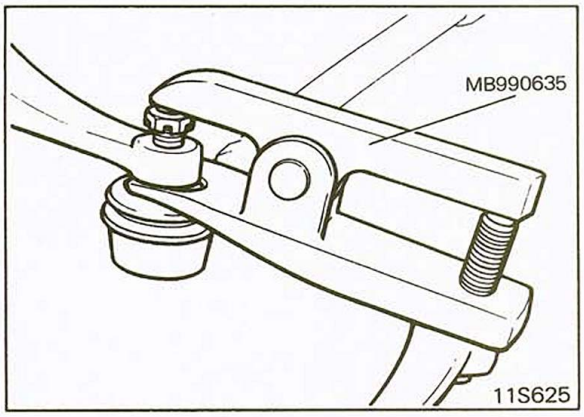
1. Knuckle
2. Oil seal
3. Spacer
4. Needle bearing

	Nm	ft. lbs.
A	50-60	36-43

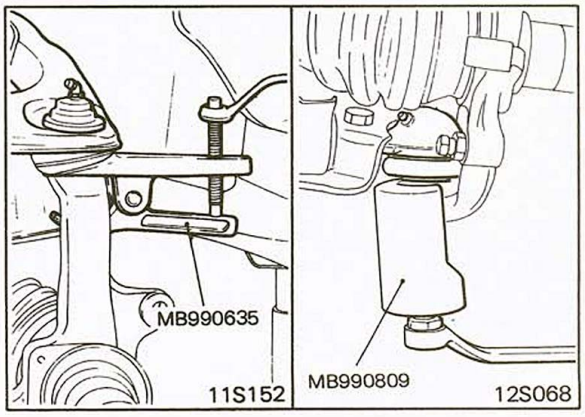


REMOVAL

1. Remove the front hub assembly. (Refer top. 2-27.)
2. Remove the dust cover.
3. Disconnect the tie rod from the knuckle with a special tool. (I IS625)



4. Using the special tools, remove the upper and lower ball joints. (11 S152, I2S068)
5. Remove the knuckle from the drive shaft.



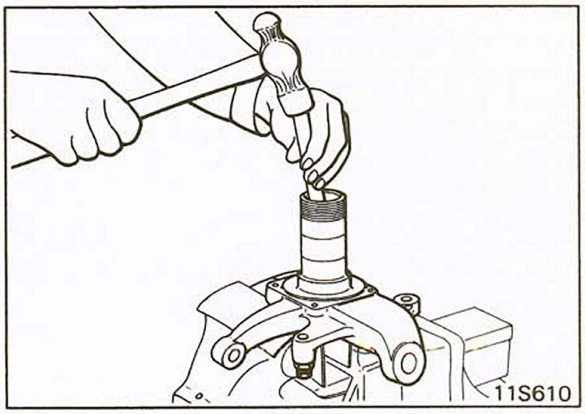
INSPECTION

1. Check needle bearing for wear or damage.
2. Check knuckle for cracks or bends.
3. Check knuckle spindle for wear or pounding.

BEARING REPLACEMENT

I. Remove the oil seal and then remove the spacer.
2. Remove the needle bearing by tapping the needles uniformly. (1 1S610)

Caution
Once removed, the needle bearing must not be reused.

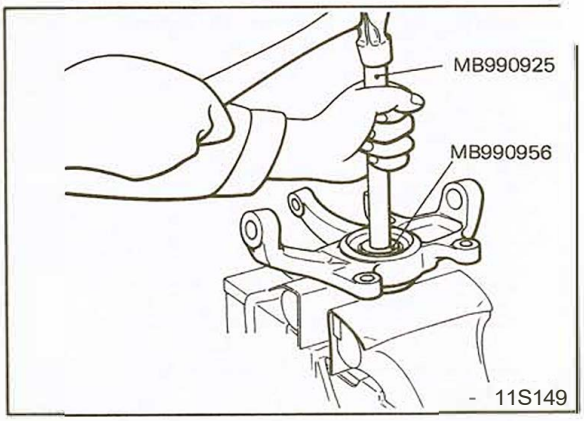


3. Apply the specified multipurpose grease to the roller surface of the new needle bearing.

Recommended multipurpose grease ..... SAE 131 0a, NLGI grade #2EP

4. Press the needle bearing with the special tools until it is flush with the knuckle end face. (11 S 149)

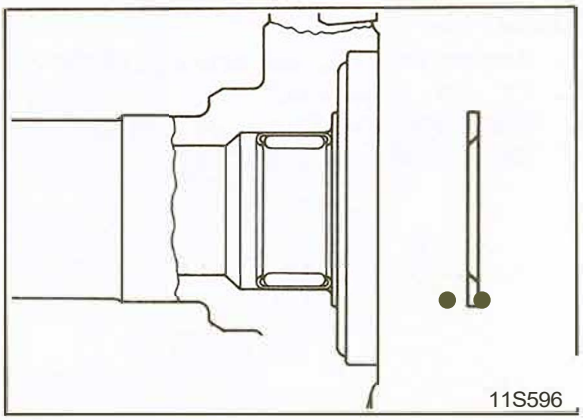
Caution
Use care to avoid driving the needle bearing too far in.



5. Apply the specified multipurpose grease to the knuckle contacting surface of the spacer. (l 1S596)

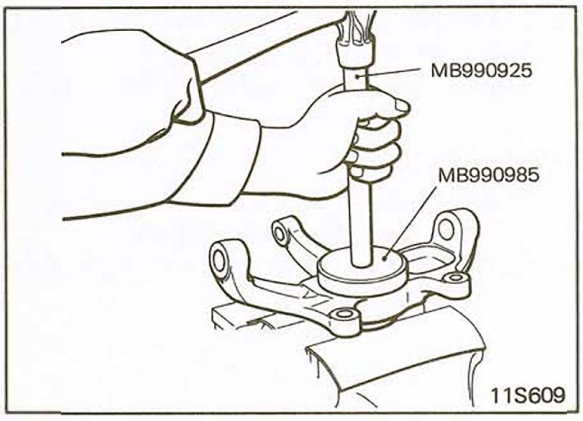
Recommended multipurpose grease ..... SAE J3 10a, NLGI grade #2EP

6. Install the spacer onto the knuckle with the chamfered side toward the center of vehicle.



7. Press the new oil seal with the special tools until it is flush with the knuckle end face. (11 S609)
8. Apply the specified multipurpose grease to the inside and lip of the oil seal.

Recommended multipurpose grease ..... SAE J310a, NLGI grade #2EP



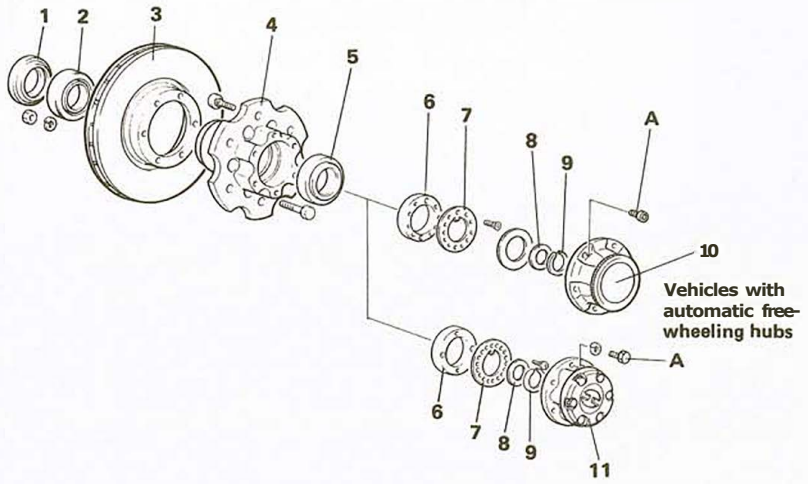
INSTALLATION

I. Install the tie rod. (Refer to GROUP 19.)
2. Install the front hub assembly. (Refer top. 2-29.)
3. Torque all parts to specifications during assembly.

OMPONENTS

1. Oil seal
2. Inner bearing
3. Brake disc
4. Front hub
5. Outer bearing
6. Lock nut
7. Lock washer
8. Spacer
9. Snap ring
10. Automatic free-wheeling hub assembly
11. Manual free-wheeling hub assembly

	Nm	ft.lbs.
A	50-60	36-43

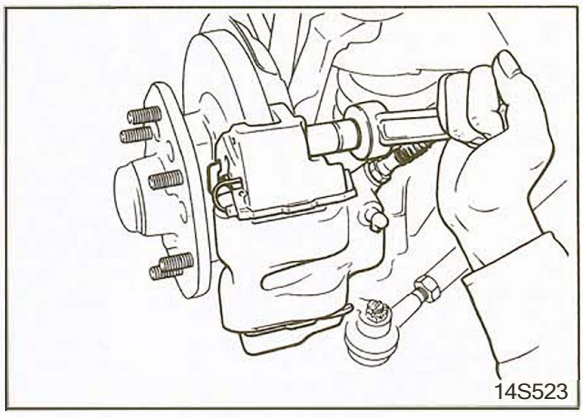


11W041

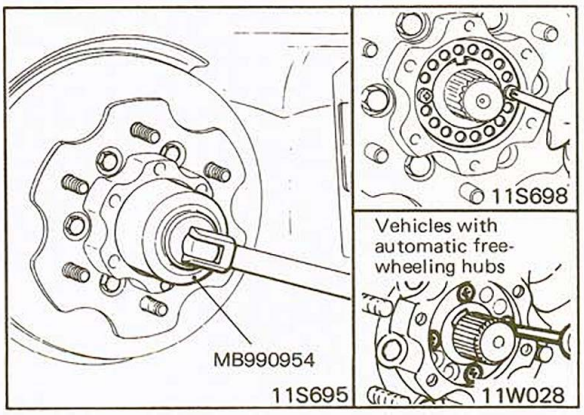
REMOVAL

1. Remove the front caliper assembly. Do not disconnect the brake hose.

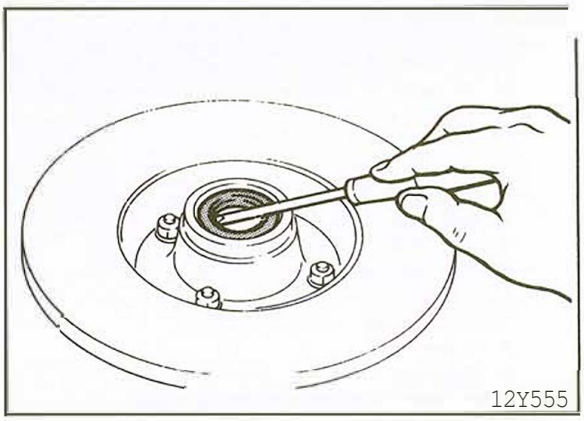
Caution
To prevent the brake hose from being twisted, suspend the **brake assembly with wire.**



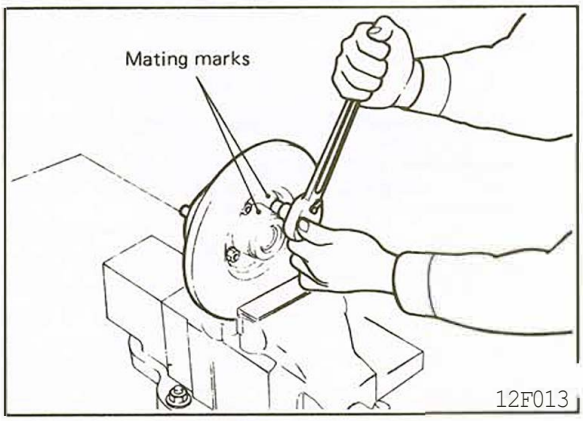
2. Remove the free-wheeling hub. (Refer top. 2-32, 35.)
3. Remove the lock washer, and then remove the lock nut with a special tool. (11S695)
4. Remove the front hub assembly from the knuckle, together with the inner and outer bearings. (11 S698, 11W028)



5. Remove the outer bearing inner race.
6. Remove the oil seal and the inner bearing inner race. (12YSSS)



7. If necessary, make the mating marks on the brake disc and front hub and separate the front hub and brake disc.



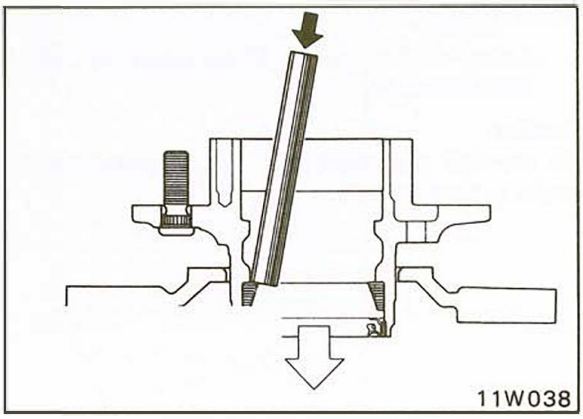
rNSPECTION

I. Check wheel bearing for seizure, discoloration and rough raceway surface.
2. Check front hub for cracks.
3. Check oil seals for cracks and damage.

BEARING REPLACEMENT

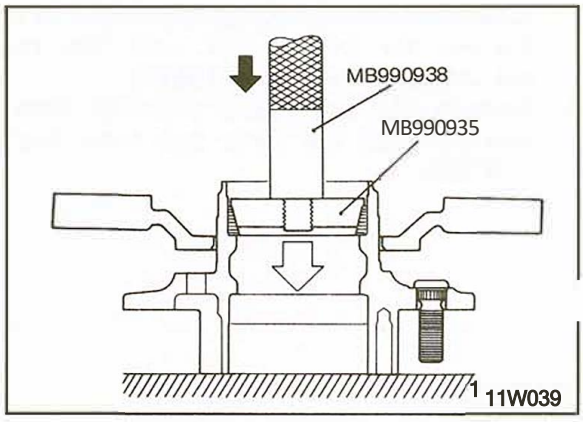
1. Wipe grease from the inside of the front hub.
2. Remove the inner and outer bearing outer races by tapping them uniformly. (11W038)
3. Apply the specified multipurpose grease to the outside surface of the new inner and outer bearing outer races.

Recommended multipurpose grease	SAE J3 1Oa, NLGI grade #2EP



4. Install the inner and outer bearing outer races with the special tools.

NOTE
The bearing inner race and outer race should be replaced as an assembly.



NSTALLATION

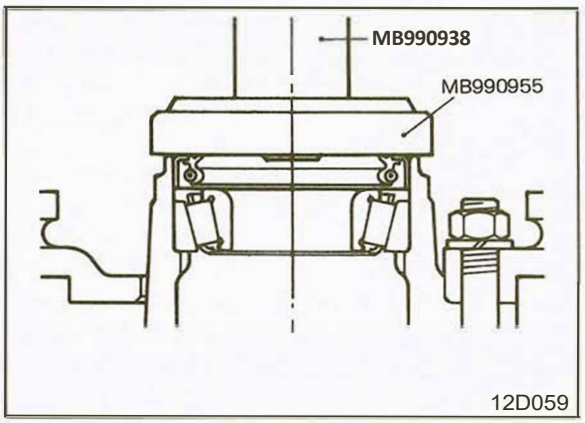
1. Apply the specified multipurpose grease to the outer bearing outer race, oil seal lip and inside surface of the front hub.

   Recommended multipurpose grease ..... .
   SAE J31 0a, NLGI grade #2EP

2. Apply the specified multipurpose grease to the inner bearing inner race and fit the inner race into the front hub.

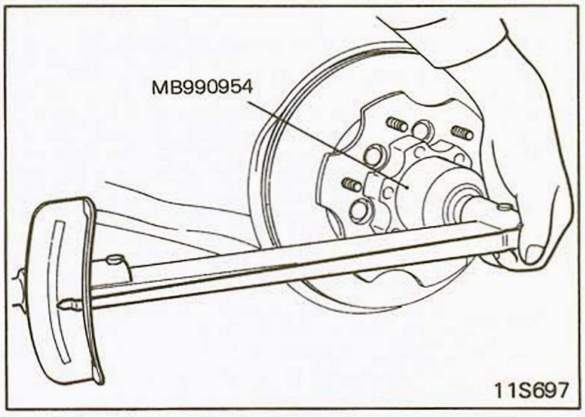
   Recommended multipurpose grease ..... .
   SAE J31 0a, NLGI grade #2EP

3. Press the new oil seal into the front hub with the special tools until it is flush with the front hub end face. (12D059)

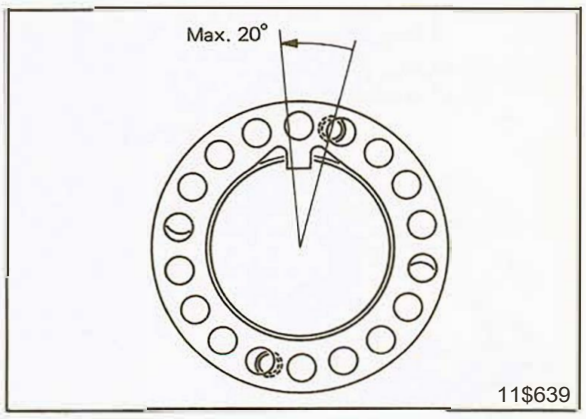


4. Install the front hub assembly as follows:
   (I) Fit the knuckle into the front hub assembly.
   (2) Using a special tool, torque the lock nut as follows. (11S697)

Tighten to 130-200 Nm (95-145 ft.lbs.)
...
Loosen to 0 Nm (0 ft.lbs.)
...
Retighten to 25 Nm (l8 ft. lbs.) and then loosen to 30°

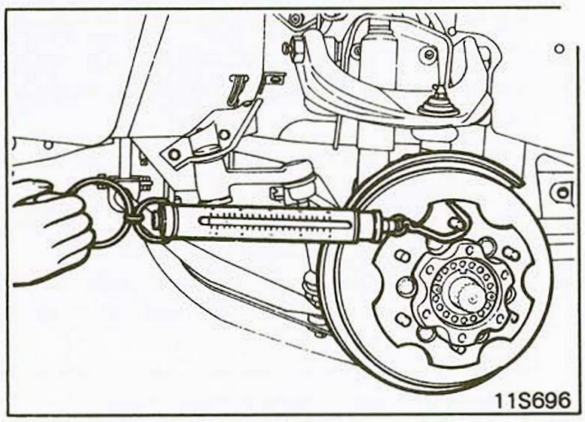


   (3) Install the lock washer. If the lock washer and lock nut holes do not align, align the holes by loosening the nut not more than 20°.



(4) Before installing the free-wheeling hub assembly, measure the turning force of the front hub. **If** the measured value does not meet the specifications, retigten the lock nut to the specified torque. (l 1S696)

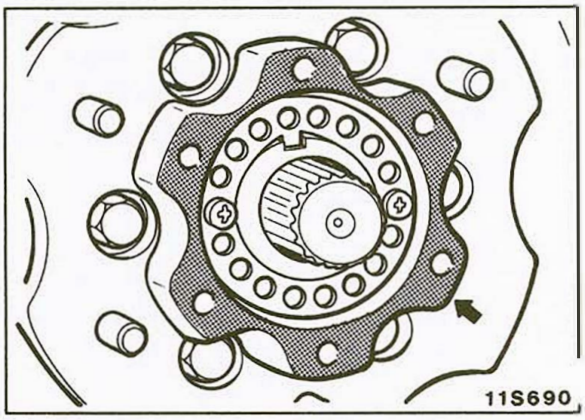
Turning force of front hub assembly	4-18N(0.9-4.1 lbs.)



(5) On vehicles with automatic free-wheeling hubs, adjust the brake contact surface height by adding or removing shims. (Refer to p. 2-40.)

(6) Apply a semi-drying sealant to the free-wheeling hub assembly mounting surface of the front hub and then tighten the front hub to the specified torque. (l 1S690)

Free-wheeling hub body tightening torque	50-60 Nm (36-43 ft.lbs.)



(7) Measure the drive shaft end play. **If** the measured value does not meet specifications, adjust by adding or removing spacers.

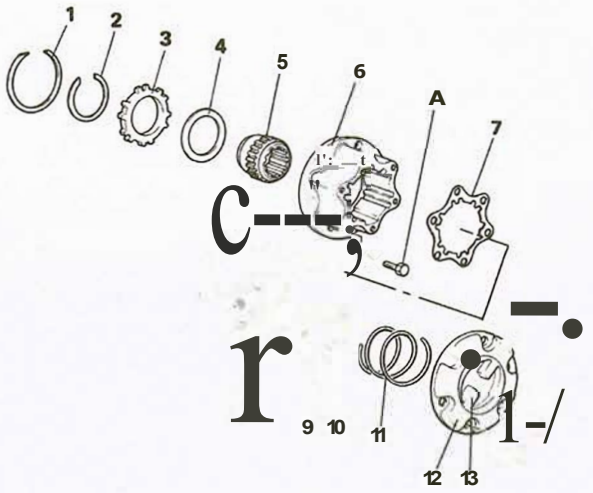
NOTE
For end play measurement and adjustment procedures, refer to p. 2-48.

(8) On vehicles with free-wheeling hubs, install the free-wheeling hub cover.

5. Torque all parts to specifications during assembly.

OMPONENTS

1. Wheel snap ring
2. Shaft snap ring
3. Free-wheeling hub ring
4. Spacer
5. Inner hub
6. Free-wheeling hub body
7. Gasket
8. Free-wheeling hub clutch
9. Follower
10. Tension spring
11. Compression spring
12. Free-wheeling hub cover
13. Control hand le



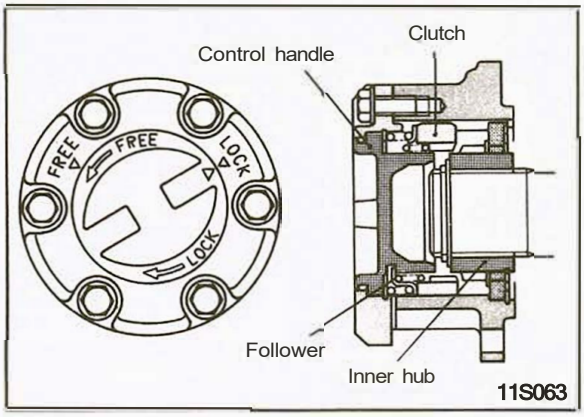
	Nm	ft.lbs.
A	50-60	36-43
B	10-14	7-10

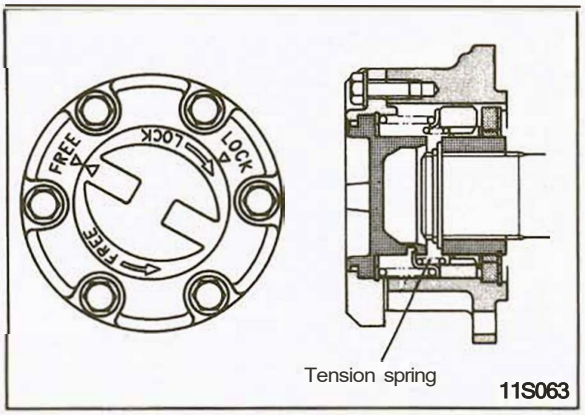
11S693

OPERATION

The free-wheeling hub is designed to minimize torque loss by cutting off transmission of front tire rotation to the drive shafts, front differential and front propeller shaft during 2-wheel drive operation. It can disconnect the front wheels from the drive shafts during 2-wheel drive operation and can reconnect them during 4-wheel drive operation.

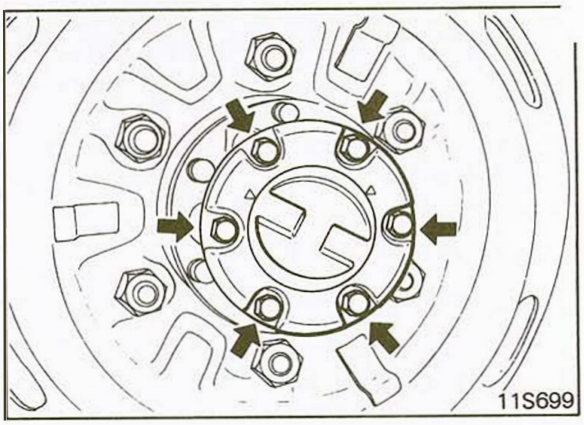
When the control handle is set to the LOCK position, the follower moves along the oblique groove in the control handle and causes the clutch (which is always in mesh with the free-wheeling hub body) to engage the splines of the inner hub, thus coupling the free-wheeling hub body with the drive shaft. When the control handle is set to the FREE position, the follower moves along the oblique groove in the control handle and uses the tension spring to disengage the clutch from the splines of the inner hub, thus separating the free-wheeling hub body from the drive shaft.



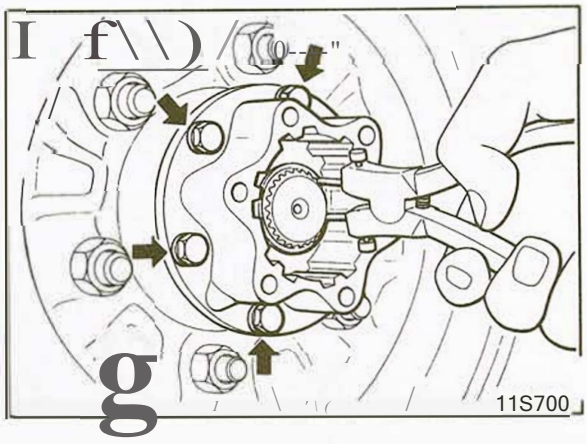


REMOVAL

I. Set the control handle to the FREE position. Remove the free-wheeling hub cover.

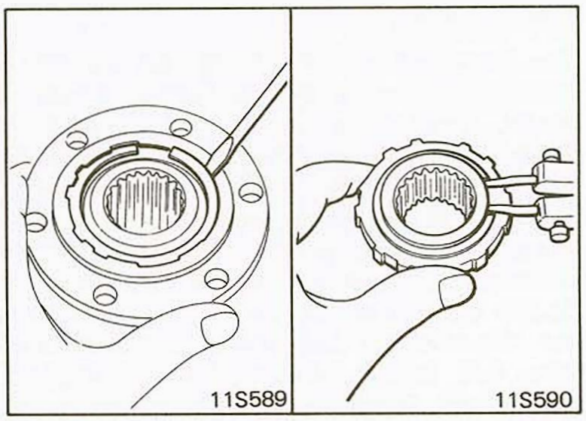


2. Remove the snap ring from the drive shaft, with snap ring pliers. (11 S700)
3. Remove the free-wheeling hub assembly from the front hub. (11 S700)



DISASSEMBLY

I. Using a screwdriver, remove the snap ring and the inner hub from the free-wheeling hub body. (11S589)
2. Remove the snap ring from the inner hub with snap ring pliers. (11 S590)



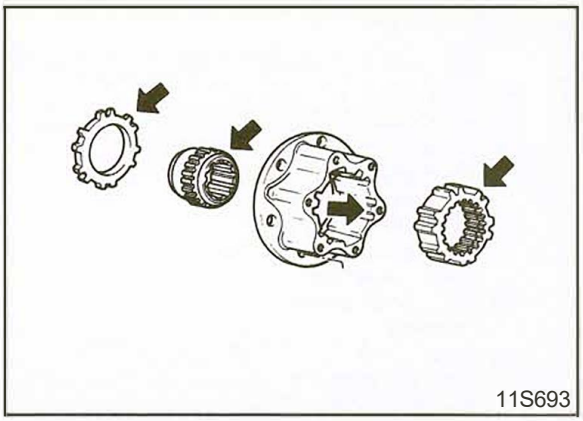
INSPECTION

I. Check free wheeling hub ring, inner hub, free-wheeling hub body, and clutch for wear and seizure.
2. Check gasket for damage.
3. Check compression spring and tension spring for deterioration.

'.EASSEMBLY

Apply the specified multipurpose grease to the entire periphery of the free-wheeling hub ring, inner hub and free-wheeling hub clutch, and the inside of the free-wheeling hub body.

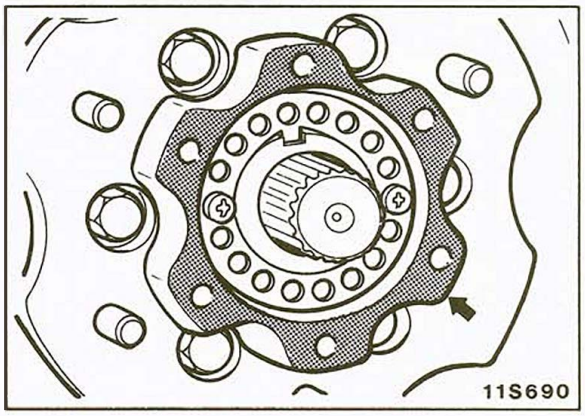
Recommended multipurpose grease ..... . SAE 131 0a, NLGI grade #2EP



INSTALLATION

I. Apply semi-drying sealant to the front hub mounting surface of the free-wheeling hub body assembly and then tighten the assembly to the specified torque. (l 1S690)

Free-wheeling hub body tightening torque ..... . 50-60 Nm (36-43 ft.lbs.)



2. Measure the drive shaft end play. (Refer top. 2-12.)
3. If the measured value does not agree with the specifications, adjust by using a spacer.

OTE

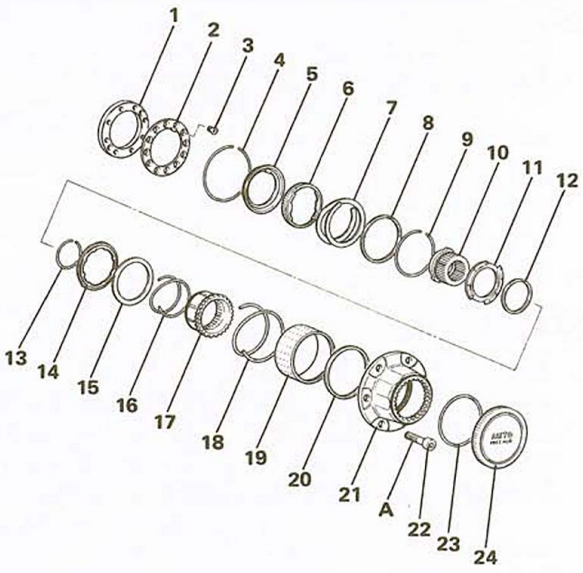
For play measurement and adjustment procedures, refer top. 2-48.

Install the free-wheeling hub cover with the control handle and clutch in the FREE position.

4. Torque all parts to specifications during assembly.

COMPONENTS

1. Lock nut
2. Lock washer
3. Screw
4. Housing C-ring
5. Brake (B)
6. Brake (A)
7. Brake spring
8. Housing snap ring
9. Retainer (8) C-ring
10. Drive gear
11. Retainer (A)
12. Drive gear snap ring
13. Slide gear C-ring
14. Cam
15. Spring holder
16. Shift spring
17. Slide gear
18. Return spring
19. Retainer (8)
20. Thrust washer
21. Housing
22. Bolt
23. 0-ring
24. Cover



	Nm	ft.lbs.
A	50-60	36-43

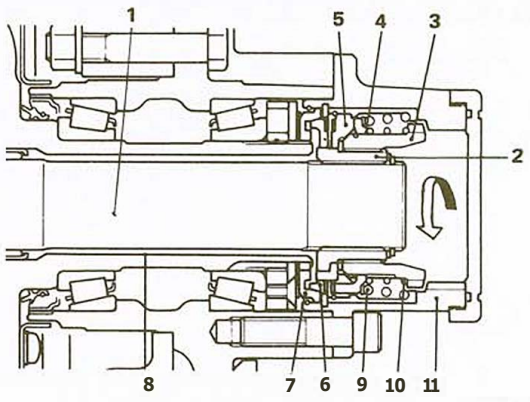
11W03<

CONSTRUCTION AND OPERATION

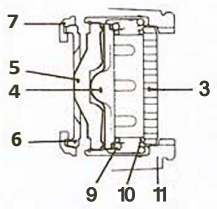
Free State -+ Locked State

When the transfer is shifted from 2WD (2-wheel drive) to 4WD (4-wheel drive) and driving is begun, rotation of the drive shaft (1) is transmitted from the drive gear (2) to the slide gear (3) to the cam (4) to retainer A (5) to brake A (6). When this happens, brake A (6) is pressed against brake B (7) by the function of the cam of retainer A (5) , and friction force is generated.

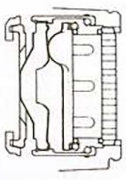
Because brake B (7) is secured to the knuckle (8), retainer A (5) ceases to rotate, (see Fig. A), and therefore, the cam (4), while compressing the return spring (9), rises out of the cam groove of the retainer A (5) and compresses the shift spring (10). The slide gear (3) is pushed by the shift spring (I0), and then engages with the gear of the housing (I I) when the two are in phase and enters the locked state (see Fig. B).



11W045



Free state
(Fig. A)



Locked state
(Fig. B)

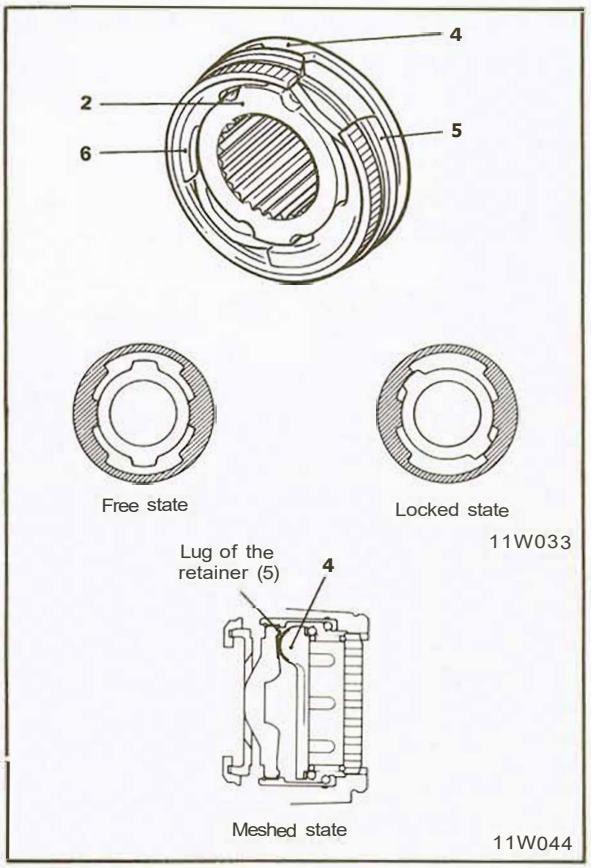
11W043

he cam (4) turns until the lug of the drive gear (2) contacts :he lug of brake A (6). Because of this contact, brake A (6) is turned by the drive gear (2), and therefore, there is also no longer any force of retainer A (5) with a tendency to tum brake A (6). As a result, there is also no longer any force which presses brake **A** (6) against brake B (7) and the drive gear (2) causes brake A (6) to tum lightly (there is no friction force).

Because the cam (4) remains meshed, it turns until it contacts the lug of retainer A (5), and is locked.

Locked State Free State

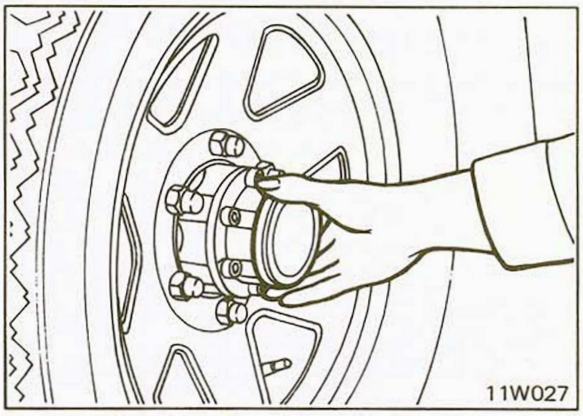
When the transfer is shifted from 4-WHEEL DRIVE to REAR-WHEEL DRIVE and the vehicle is driven in reverse, rotation of the gear of the housing (11) is transmitted from the slide gear (3) to cam (4) to retainer A (5) to brake A (6), but retainer A (5) ceases to turn, just as when the shift is made from the free state to the locked state. The cam (4), therefore, turns as far as the cam groove of retainer A (5) and is pushed into the cam groove by the return spring (9). The slide gear (3) moves with the cam (4), disengages from the gear of the housing (11), and enters a free state.



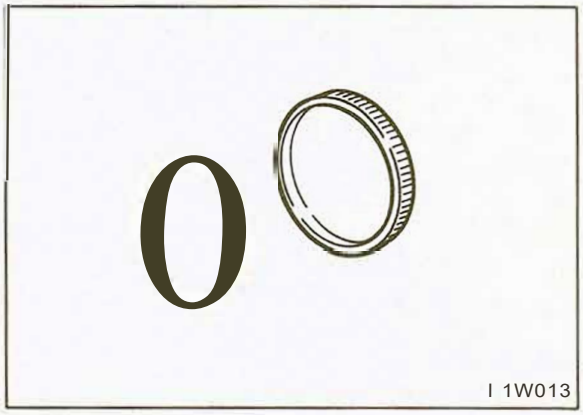
REMOVAL

1. Remove the automatic free-wheeling hub cover.

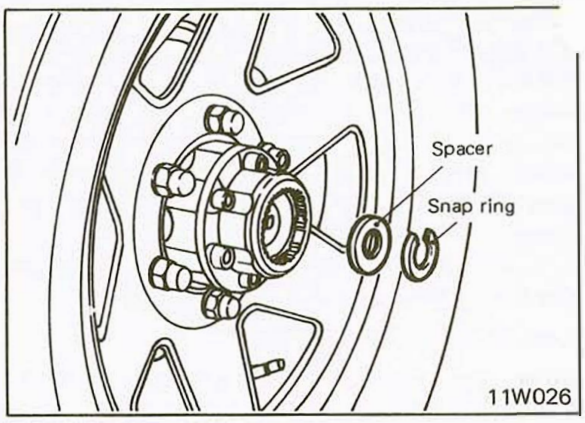
NOTE
When the cover cannot be loosened by hand, protect the cover with a shop towel to avoid damaging it and use an oil filter wrench to loosen it.



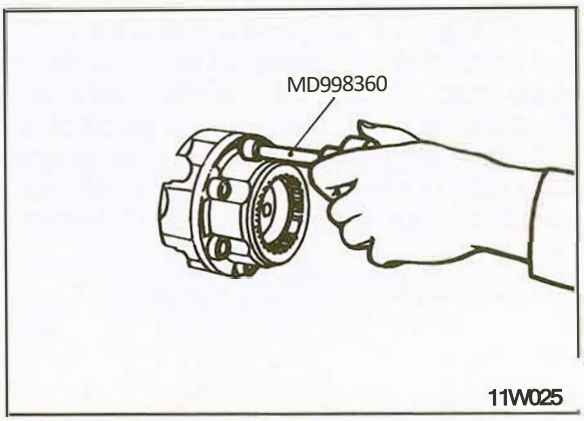
2. Remove the 0-ring from the automatic free-wheeling hub cover.



3. Remove the snap ring and then remove the spacer.



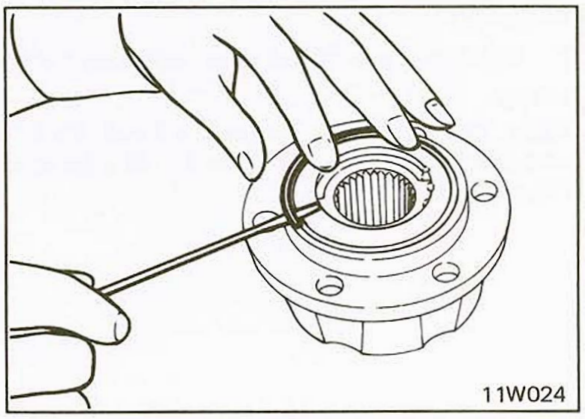
4. Using a special tool, remove the automatic free-wheeling hub.



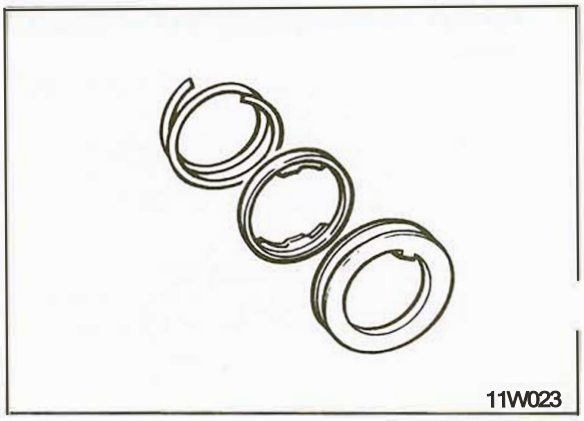
DISASSEMBLY

1. Remove the housing C-ring.

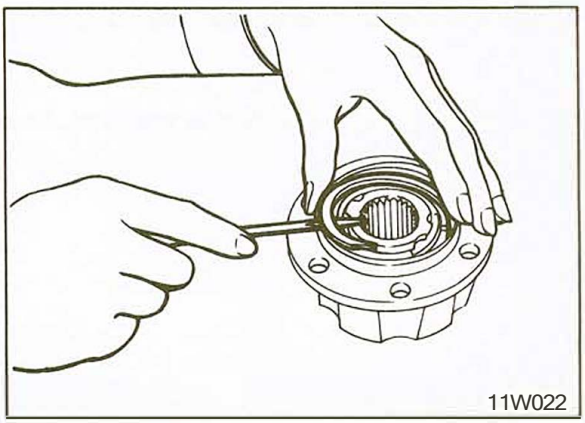
NOTE
The ring can be easily removed by pushing in brake B and using a small-tipped screwdriver or similar tool.



2. Remove brake A, brake Band the brake spring.



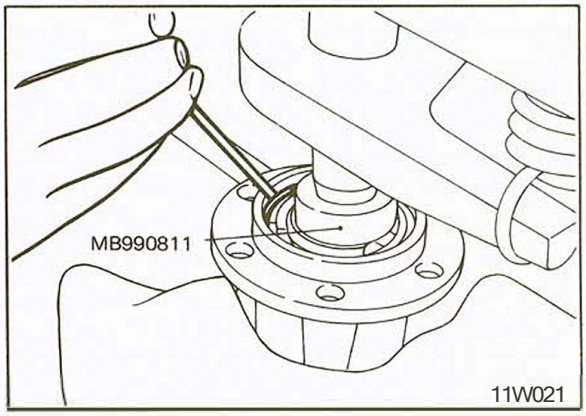
. Remove the housing snap ring.



4. Using the special tool, lightly push in the drive gear and remove the retainer B C-ring. () 1W02 l)

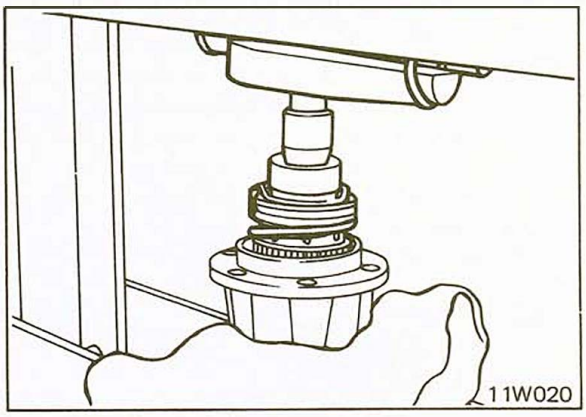
NOTE
Bt;cause the return spring relaxes approx. 40 mm (1.57 in.), the stroke of the press should be set to more than 40 mm (1.57 in.)

Caution
Place a protective cloth under the cover attaching surface of the housing before setting on the press table.
Make sure that the pressing force does not exceed 200 N (441 lbs.).

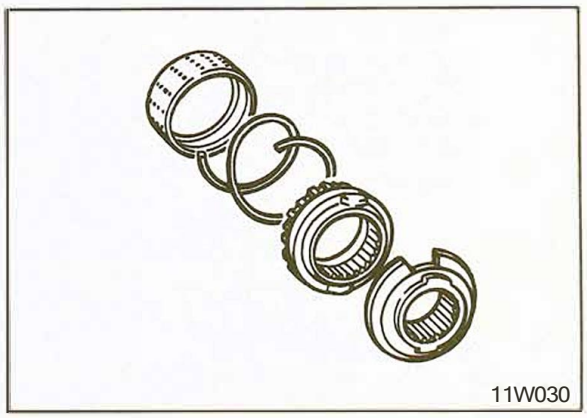


5. Slowly reduce the pressure of the press until the return spring fully relaxes.

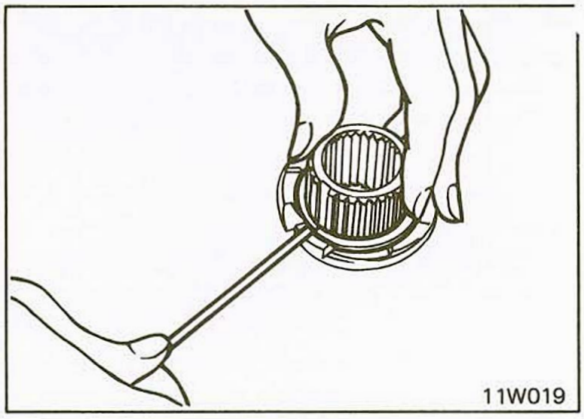
Caution
When reducing the pressure of the press, be sure that retainer A is not caught by retainer B.



6. Remove the following parts from the housing.
   (I) Retainer B
   (2) Return spring
   (3) Slide gear assembly
   (4) Drive gear assembly

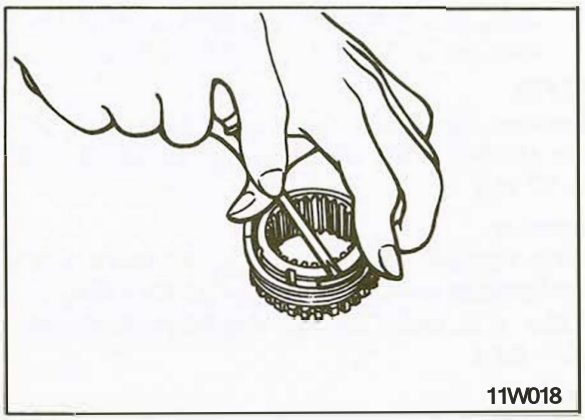


7. Remove the drive gear snap ring.



Caution
When the drive gear snap ring is removed, be sure to replace it with a new one.

8. Push in the cam and remove the slide gear C-ring while the spring is compressed.



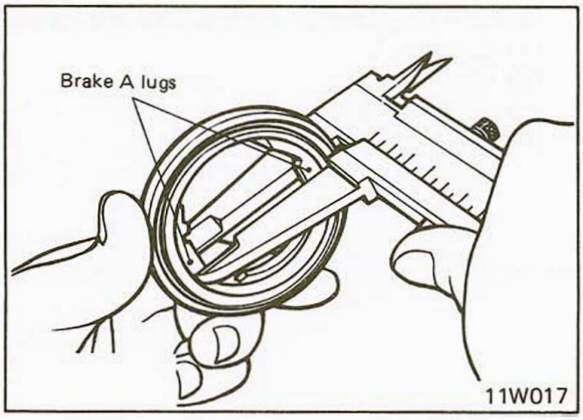
INSPECTION

I. Check drive gear and slide gear splines for damage.
2. Check cam portion of retainer {A) for wear and damage.
3. Check cam for wear and damage.
4. Check slide gear and housing tooth surfaces for damage.
5. Check retainer B and housing contact surfaces for wear and damage.

Brake Wear

{I) Assemble brake A and brake B, set the vernier callipers so that the measuring jaws simultaneously touch the two lugs of brake A, and then measure the combined brake thickness. { 11 WOI 7)

Brake A wear [Repair limit]	9.6 mm {.38 in.)



Caution
To equalize the combined brake thickness, make sure that the measuring jaws of the vernier callipers simultaneously touch both lugs.

(2) If the measured value is below the service limit, replace brake A and brake B as a set.

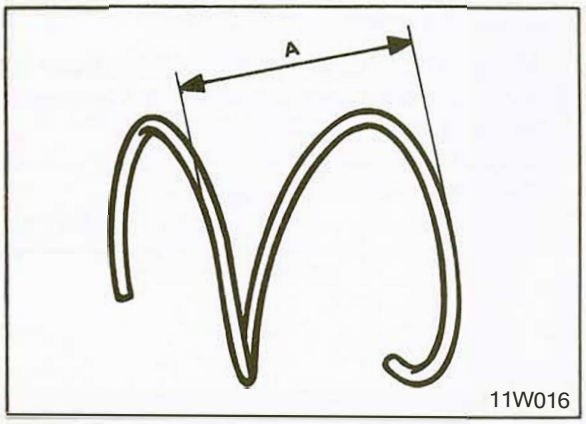
>eterioration of Return Spring

(1) Measure dimension A as shown. (I 1W016)

Return spring deterioration [Repair limit 1	35 mm (1.4 in.)

Caution
To measure the dimension A shown in illustration, measure the dimension from the outermost extremity of one wire diameter to that of the other wire diameter.

(2) If the measured value is below the service limit, replace the spring.



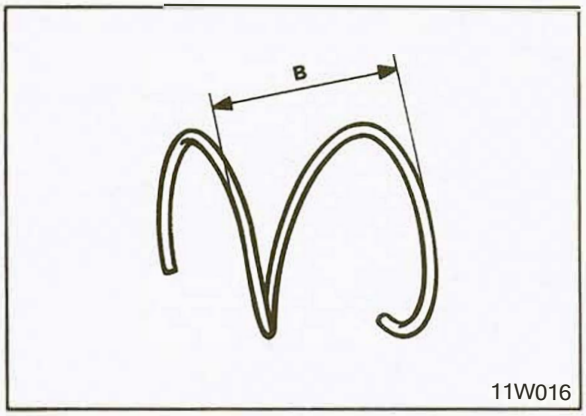
Deterioration of Shift Spring

(1) Measure dimension Bas shown. (I 1W016)

Shift spring deterioration [Repair limit]	30 mm (1.2 in.)

Caution
To measure the dimension B, measure the dimension from the outermost extremity of one wire diameter to that of the other wire diameter.

(2) If the measured value is below the service limit, replace the spring.



REASSEMBLY

1. Apply the specified grease to the mounting surfaces of all components.

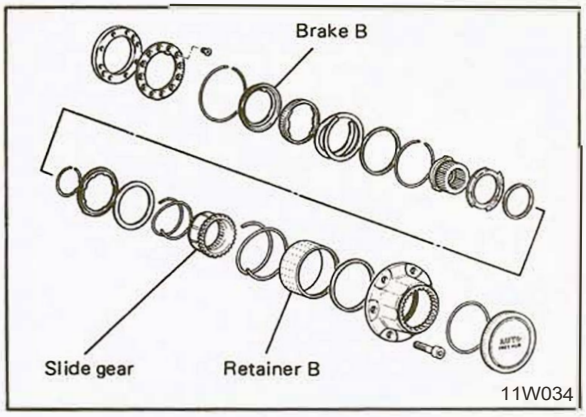
Recommended multipurpose grease ..... . SAE 131 Oa, NLGI grade #2EP

2. Pack the grooves of brake B and retainer B with the specified grease.

Recommended multipurpose grease ..... . SAE J3 IOa, NLGI grade #2EP

3. Apply the specified grease to the slide gear. Install the return spring with the smaller coil diameter side toward the spring seat.

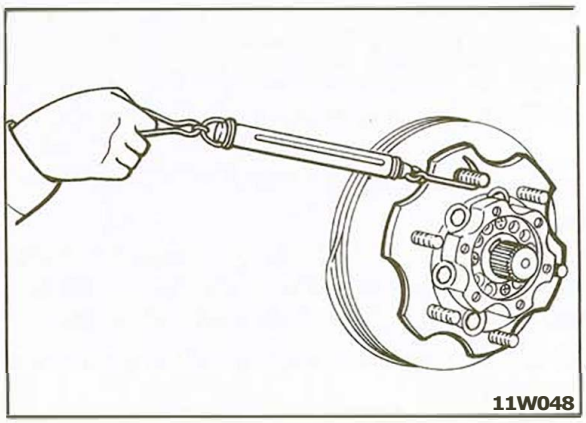
Recommended multipurpose grease ..... . SAE 1310a, NLGI grade #2EP



INSTALLATION

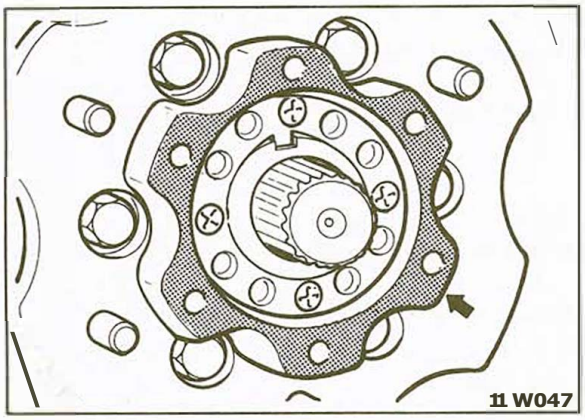
1. Measure the starting torque of the front hub assembly. If the measured value is not within the standard value range, adjust by using the lock nut.

Turning force of front hub assembly	4-18 N (0.9-4.1 lbs.)

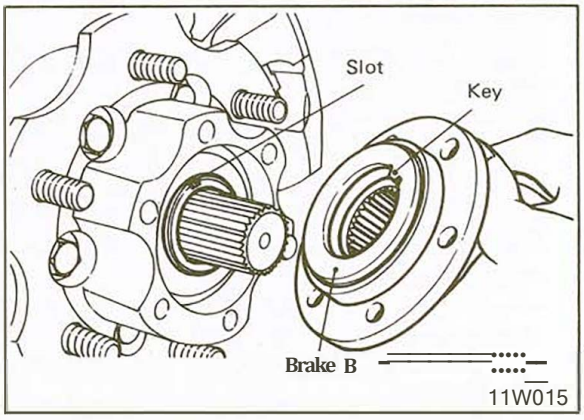


2. Apply a semi-drying sealant to the hub surface.

Caution
Make sure that there is no excess sealant on the outside of the hub.

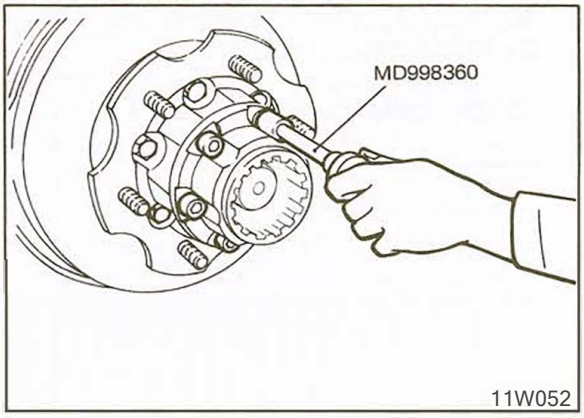


3. Aligning the key of brake B with the slot in the knuckle spindle and loosely install the automatic free-wheeling hub assembly. (I 1W0I5)
4. Confirm that the hub and the automatic free-wheeling hub assembly are in close contact when the assembly is forced lightly against the hub. If not, tum the hub until close contact is obtained .



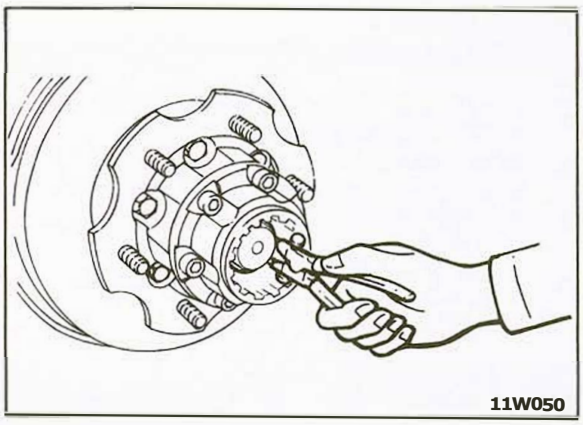
5. Using the special tool, tighten the automatic free-wheeling hub mounting bolts to the specified torque.

Free-wheeling hub body tightening torque	50-60 Nm (36-43 ft.lbs.)



). Adjust the drive shaft end play as follows.
(I) Install the snap ring on the drive shaft.

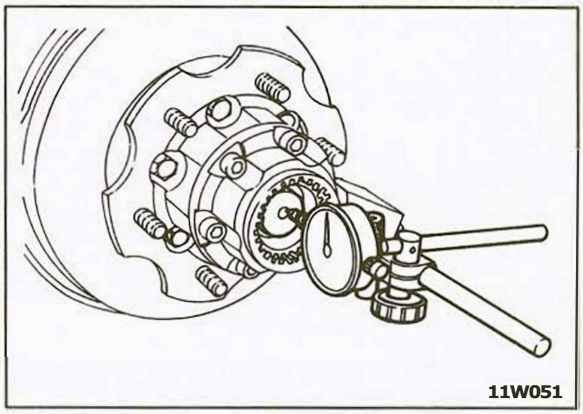
NOTE
Do not install any shims.


11W050

(2) Position the dial indicator at the end of the drive shaft. (**1** IW0Sl)

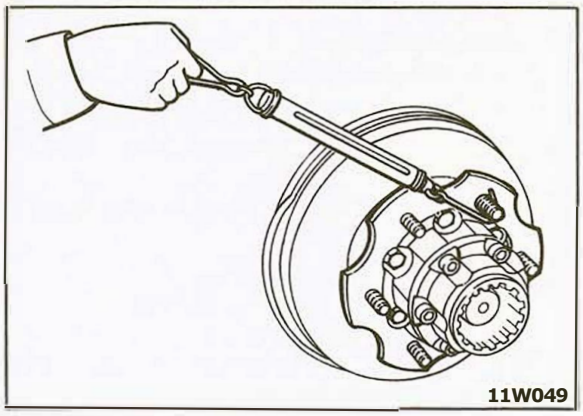
Caution
Secure the magnetic base to the hub or brake disc.

(3) Tum the drive shaft in the forward and reverse directions until resistance is felt to find the center of the turning stroke. At this position, move by hand the drive shaft in the axial direction to measure the play. **If** the measured value is not within the standard value range, select an adequate shim and install it on the drive shaft.


11W051

Drive shaft end play	0.2-0.5 mm (.008-.020 in.)

7. Measure the starting torque of the front hub assembly and compare it with that measured before installation of the automatic free-wheeling hub assembly. **If** the diff rence exceeds 14 N (3.1 lbs.), the automatic free-wheeling hub is probably not installed correctly; remove and reinstall all it. (11W049)
8. Install the front brake assembly and tighten the bolts to the specified torque.


11W049

Front brake assembly tightening torque	70-90 Nm (43-65 ft.lbs.)

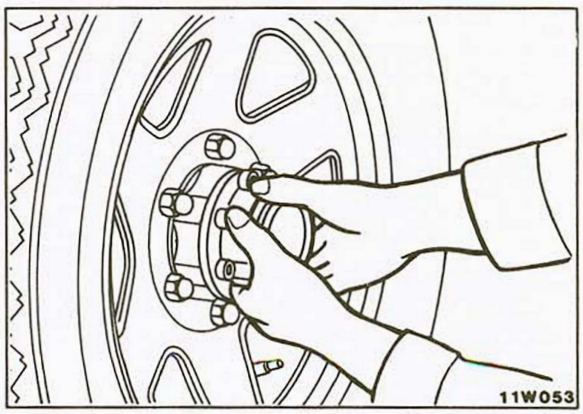
9. Mount the wheel and lower the vehicle.
10. Tighten the wheel nuts to the specified torque.

Wheel nuts tightening torque	70-80 Nm (43-58 ft.lbs.)

11. Apply the specified grease to the 0-ring before mounting it onto the cover.

Recommended multipurpose grease	SAE J3 I0a, NLGI grade #2EP

12. Install the cover with both hands securely. (11W053)


11W053

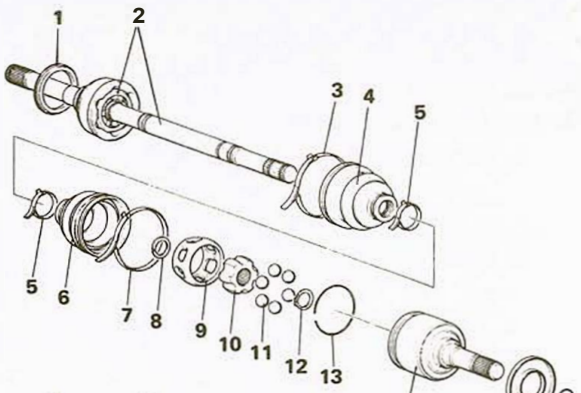
COMPONENTS

1. Dust cover
2. Drive shaft and B.J.
3. Boot band A
4. B.J. boot
5. Boot band C
6. D.O.J. boot
7. Boot band B
8. Circlip
9. D.O.J. cage
10. D.O.J. inner race
11. Ball
12. Snap ring
13. Circlip
14. D.O.J. outer race
15. Dust cover
16. Circlip
17. D.O.J. outer race
18. End plate

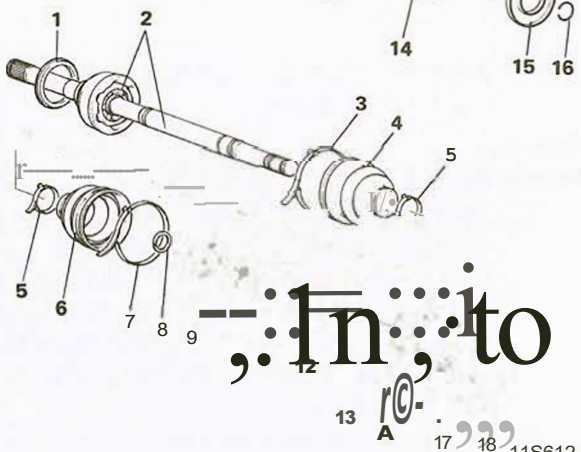
NOTE
D.O.J. : Double offset joint
B.J. : Birfield joint

	Nm	ft.lbs.
A	50-60	36-43

Left drive shaft



Right drive shaft

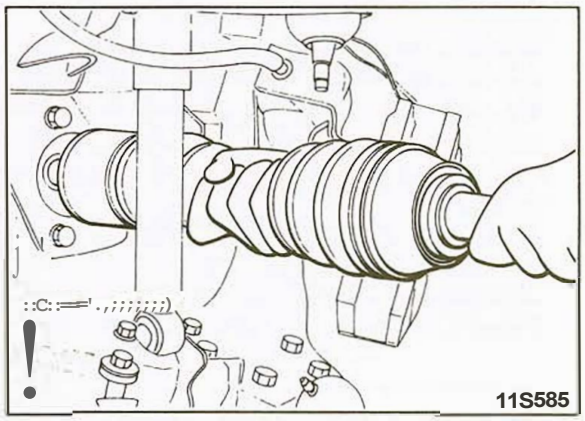


11S612

REMOVAL

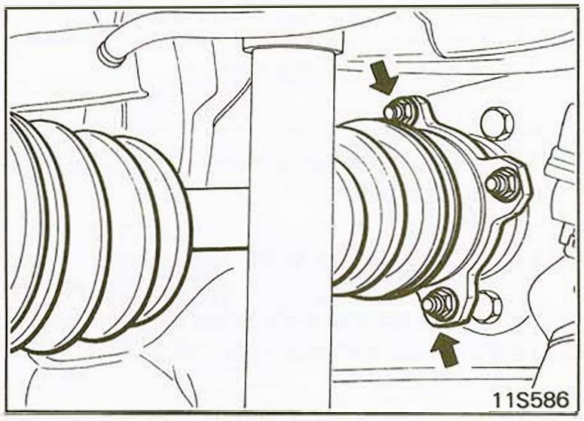
1. Remove the front brake caliper assembly. Do not disconnect the brake hose. (Refer top. 2-27.)
2. Remove the free-wheeling hub cover or hub cap.
3. Remove the snap ring from the drive shaft. (Refer to p. 2-32.)
4. Remove the knuckle together with the front hub assembly. (Refer top. 2-25.)

5. Remove the drive shaft as follows:
   FOR LEFT DRIVE SHAFT
   (1) Pull the drive shaft out of the differential carrier. (11S585)



Caution
When pulling the drive shaft out of the differential carrier, be careful that the spline part of the drive shaft **does not damage the oil seal.**

   FOR RIGHT DRIVE SHAFT
   (I) Detach the drive shaft from the differential carrier inner shaft.
   (2) Remove the drive shaft. (11S586)

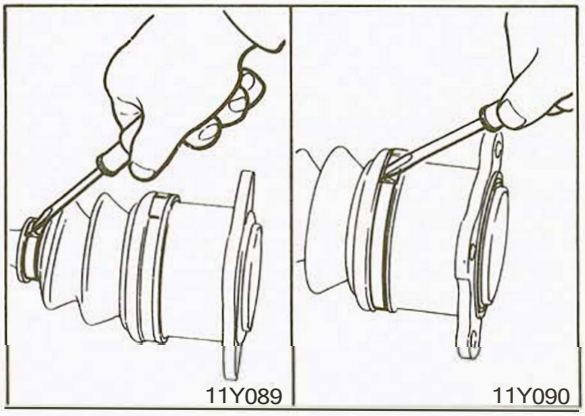


NSPECTION

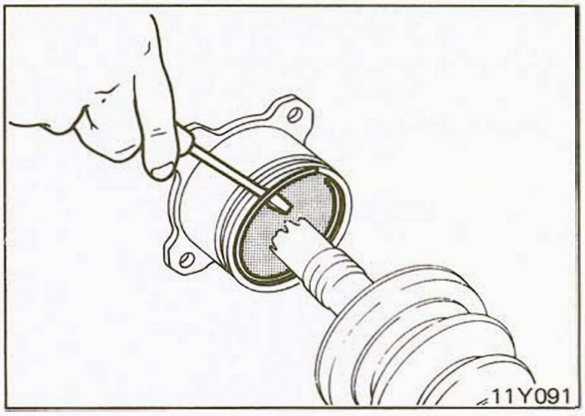
1. Check boot for damage or deterioration.
2. Check ball joint for operating condition and excessive looseness.
3. Check splines for wear or damage.

DISASSEMBLY

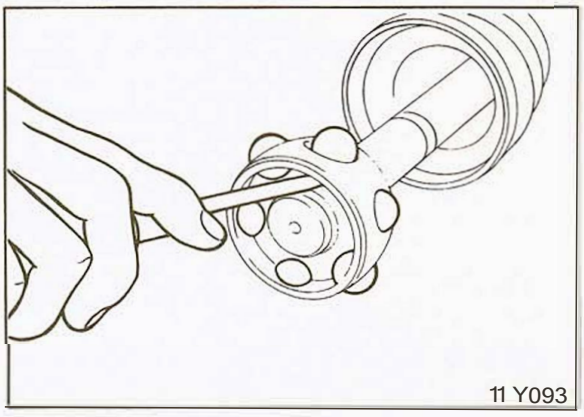
1. Remove the boot bands.



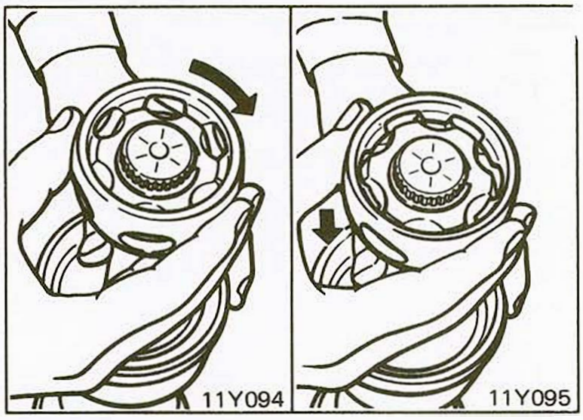
2. Remove the circlip from the D.O.J. outer race. Separate the drive shaft from the D.O.J. outer race.



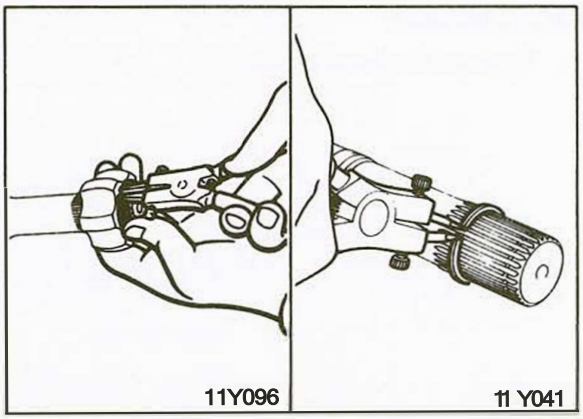
3. Remove the balls from the D.O.J. cage.



4. Remove the D.O.J. cage from the D.O.J. inner race in the direction of the B.J.

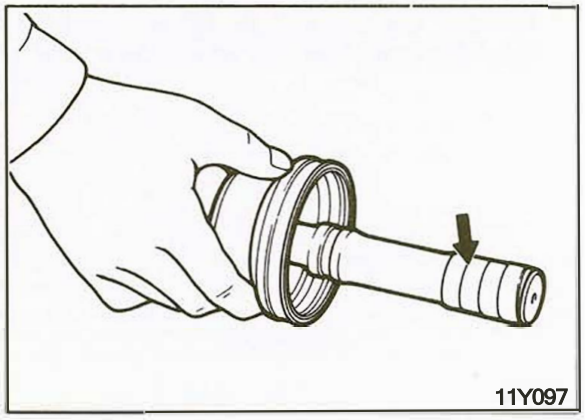


S. Remove the snap ring from the drive shaft with snap ring pliers, and then remove the D.O.J. inner race and D.O.J. cage from the drive shaft. Remove the circlip from the drive shaft with snap ring pliers.

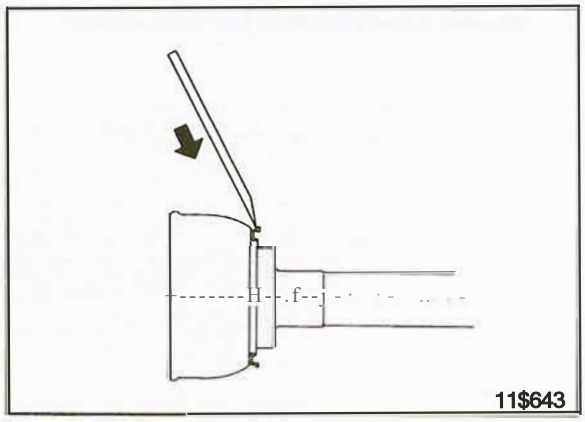


6. Wrap vinyl tape around the spline on the D.O.J. side of the drive shaft so that the D.O.J. and B.J. boots are not damaged when they are removed. (] 1Y097)
7. Remove the D.O.J. and B.J. boots from the drive shaft.

Caution
Do not disassemble the B.J.



8. Remove the dust cover from the B.J.



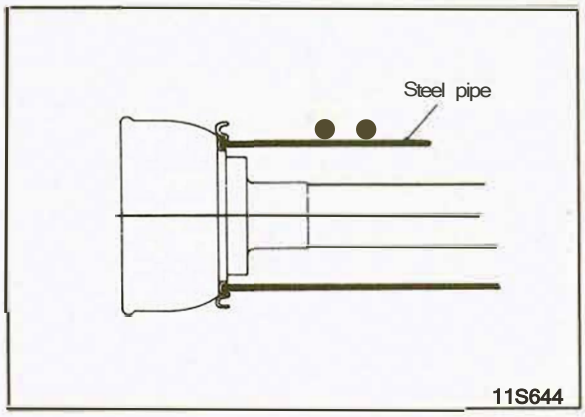
NSPECTION

1. Check drive shaft for bending or wear.
2. Check B.J. for entry of water, foreign matter and rust.
3. Check B.J. ball for damage.
4. Check D.O.J. cage, D.O.J. inner race and ball for rust, wear and damage.
5. Check the circlip for damage or deformation.
6. Check D.O.J. outer race for wear or damage.

REASSEMBLY

1. Using the steel pipe as specified below, force the dust cover to the drive shaft.

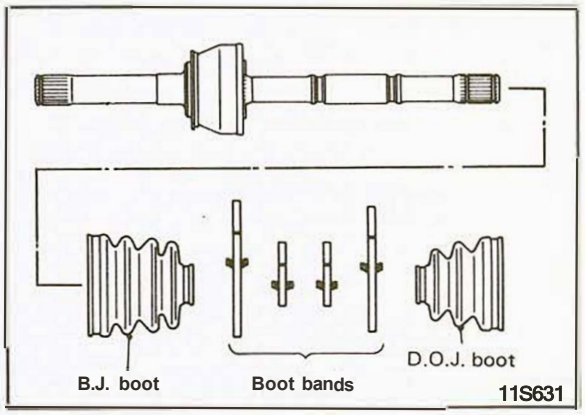
Steel Pipe	mm (in.)
Overall length	170 (6.70)
Outside diameter	68.9 (2.71)
Wall thickness	2.3 (.09)



2. Apply the specified grease to the drive shaft, and wrap vinyl tape around the spline on the D.O.J. side of the drive shaft.

Recommended grease	Repair kit grease

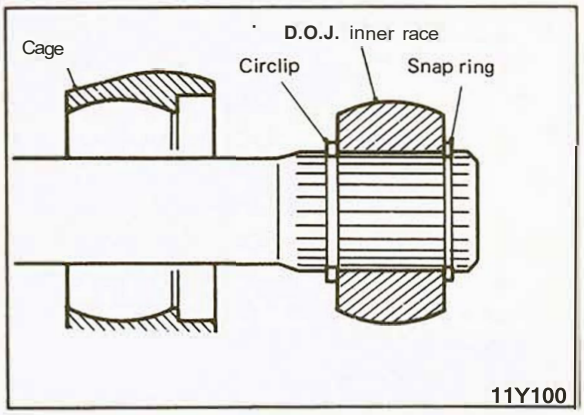
3. Install the B.J. boot, boot bands (new ones), and D.O.J. boot onto the drive shaft, in that order. (11 S631)



Caution
The B.J. and D.O.J. boots are different in size and shape, so be sure to install them correctly.
The identification stamp mark on boot band A is "20-11 #B.J.95", and that on boot band Bis "20-20 #B.J.95"; do not confuse these bands during assembly.

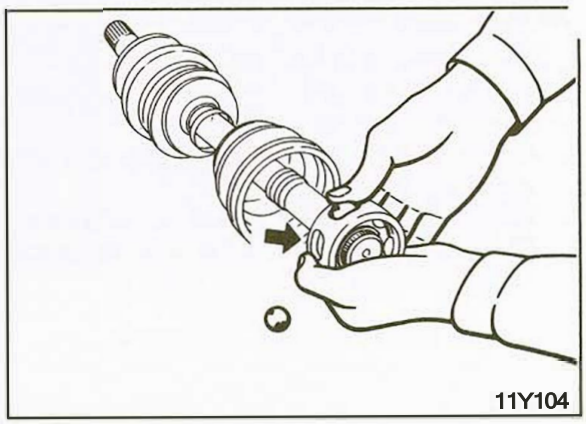
4. Install the D.O.J. cage onto the drive shaft so that the smaller diameter side of the cage is installed first. (11 YI 00)
5. Install the circlip onto the drive shaft.
6. Install the D.O.J. inner race onto the drive shaft, and secure it with a snap ring.
7. Apply the specified grease to the D.O.J. inner race and the D.O.J. cage, and then fit them together.

Recommended grease	Repair kit grease



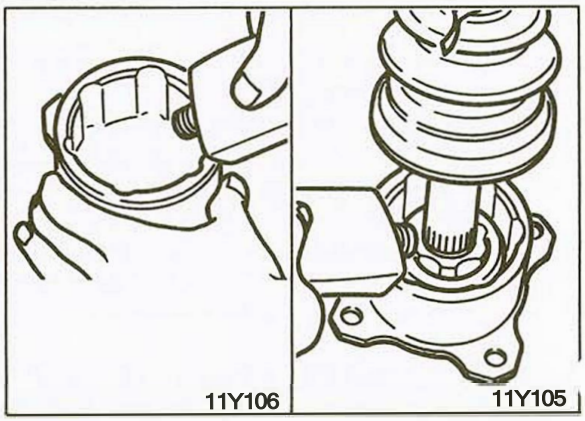
8. Apply the specified grease to the ball insertion parts of the D.O.J. inner race and D.O.J. cage, and then insert the balls.

Recommended grease	Repair kit grease



9. Apply 50 to 80 gr (1.8 to 2.8 oz) of the specified grease to the D.O.J. outer race. (11Y106)
10. Install the drive shaft into the D.O.J. outer race, and then apply 50 to 70 gr (1.8 to 2.5 oz) of the specified grease to the race. (11Y105)

Recommended grease	Repair kit grease

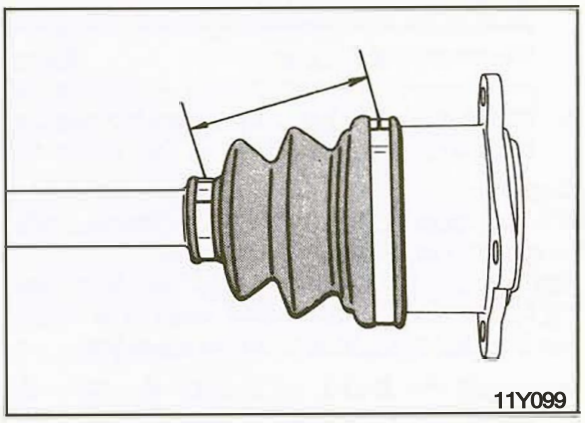


11. Install the circlip onto the D.O.J. outer race.
12. Place the D.O.J. boot over the D.O.J. outer race, and then use boot band B to secure the boot.
13. Place boot band C at the specified distance in order to adjust the amount of air inside the D.O.J. boot, and then tighten boot band C. (11Y099)

Setting of D.O.J. boot length	79 mm (3.1 in.)

14. If the B.J. is to be reused, pack 100 to 150 gr (3.5 to 5.3 oz) of the specified grease into the B.J. boot, and then secure the boot with the boot band.

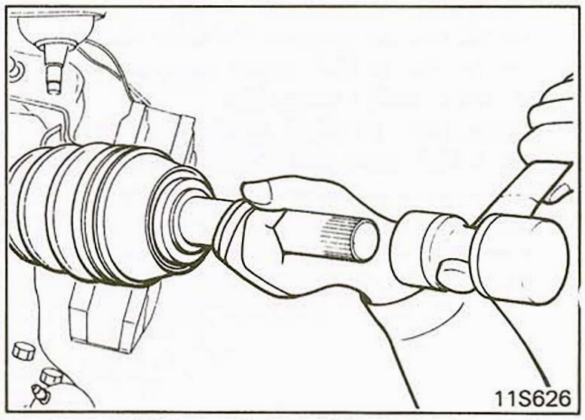
Recommended grease	Repair kit grease



INSTALLATION

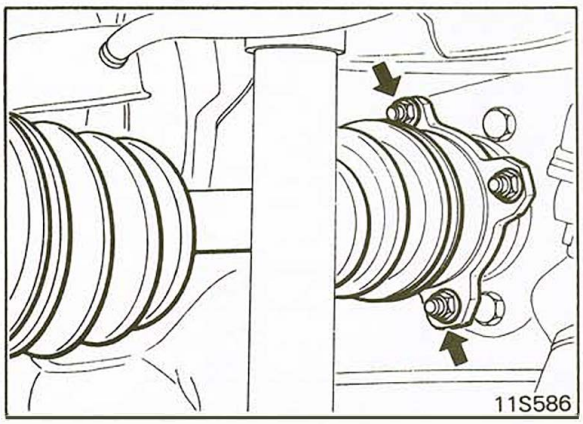
I. Drive the left drive shaft into the front differential carrier with a plastic hammer.

Caution
Be careful not to damage the lip of the oil **seal.**
Replace the circlip on the spline on the B.J. side with a new one.



2. Connect the right drive shaft to the inner shaft, and then tighten to the specified torque. (11S586)

Right drive shaft to inner shaft	50-60 Nm (36-43 ft.lbs.)



3. Install the knuckle together with the front hub assembly. (Refer top. 2-26.)

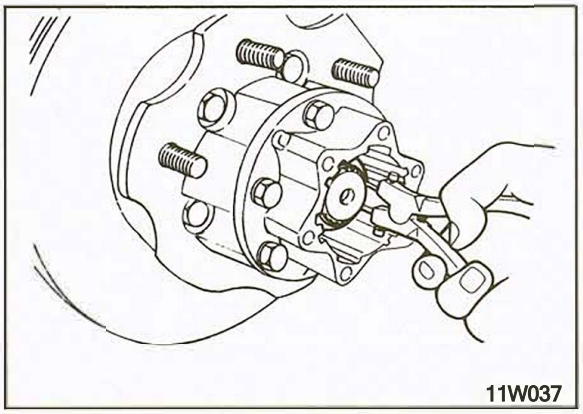
4. Adjust the drive shaft end play as follows:

Drive shaft end play	0.2-0.5 mm (.008-.020 in.)

(I) Remove the free-wheeling hub cover.
(2) Remove the snap ring of the drive shaft and then remove the spacer. (11W037)
(3) Mount the snap ring onto the drive shaft.

NOTE
Do not install a spacer.

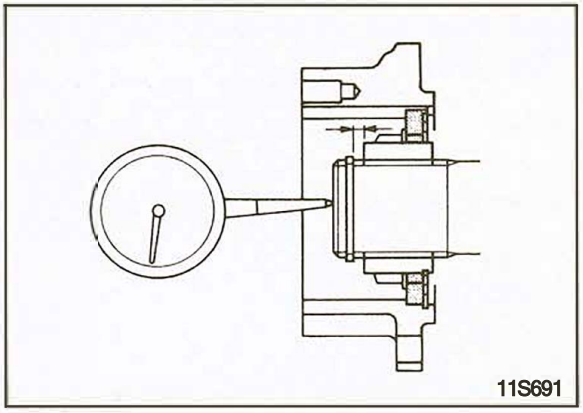
(4) Move the drive shaft in the axial direction and measure the play.



NOTE
To measure the play, use a dial indicator. (Refer to p. 2-12.) (1 IS691)

(5) Select a spacer so that the measured value will be within specifications, and then install it onto the drive shaft.
(6) Install the snap ring.
(7) Install the free-wheeling hub cover.

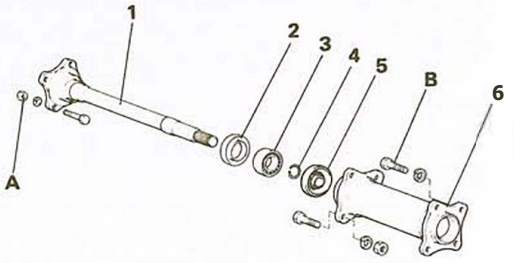
5. Torque all parts to specifications during assembly.



COMPONENTS

1. Inner shaft
2. Dust cover
3. Bearing
4. Circlip
5. Dust seal
6. Housing tube

	Nm	ft.lbs.
A	50-60	36-43
B	80-100	58-72



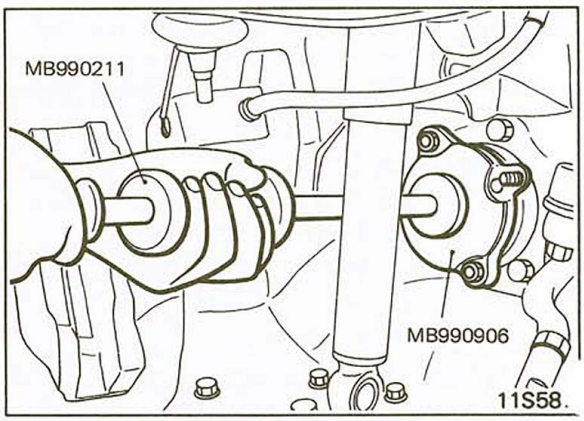
11S681

REMOVAL

1. · Slightly raise the lower arm on a jack.
2. · Remove the mounting nut from the top of the shock absorber and then detach the shock absorber from the crossmember.

Caution
When removing the shock absorber, do not lower the jack. Do not remove the jack until the top of the shock abosrber is reattached to the crossmember.

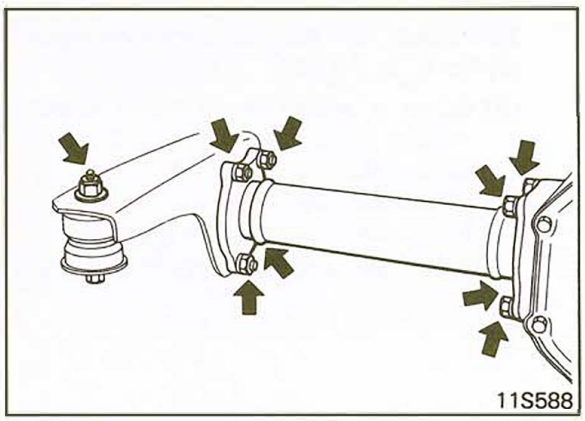
3. Remove the right drive shaft. (Refer top. 2-42.) (11S587)



4. Attach the special tools to the shaft flange and pull the inner shaft from the front differential carrier. (11S587)

Caution
When pulling the inner shaft out of the front differential carrier, be careful that the spline part of the inner shaft does not damage the oil seal.

5. If necessary, remove the housing tube. (11S588)

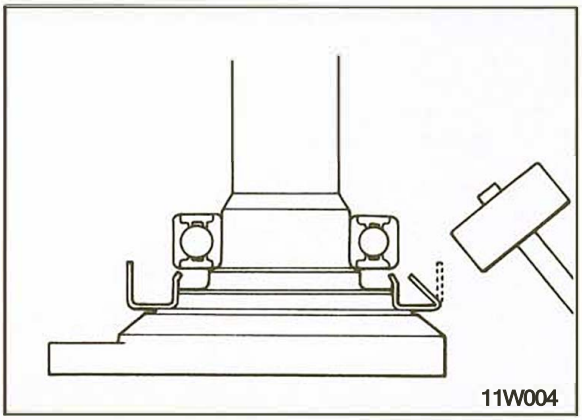


INSPECTION BEFORE DISASSEMBLY

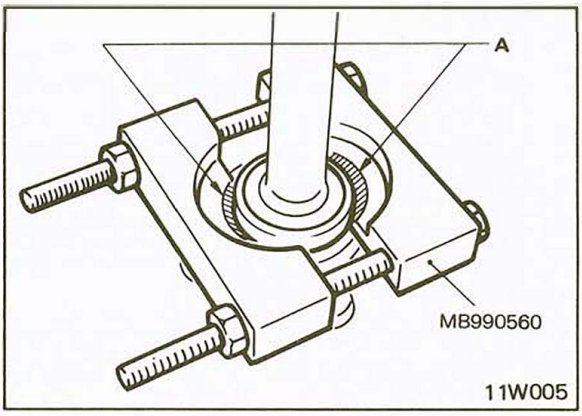
1. Check inner shaft for bend.
2. Check bearing for wear or discoloration.
3. Check housing tube for cracks.
4. Check dust seal for cracks or damage.

>ISASSEMBLY

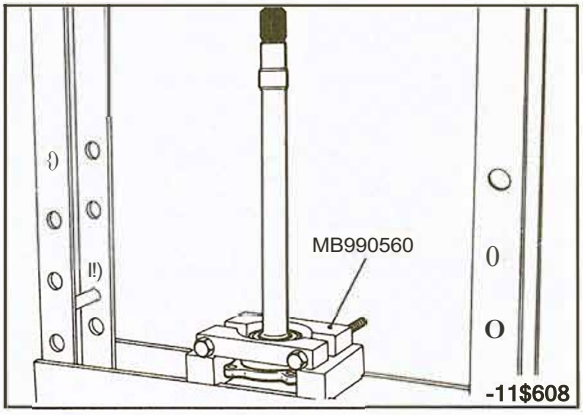
1. Bend the outside circumference of dust cover inward with a hammer.



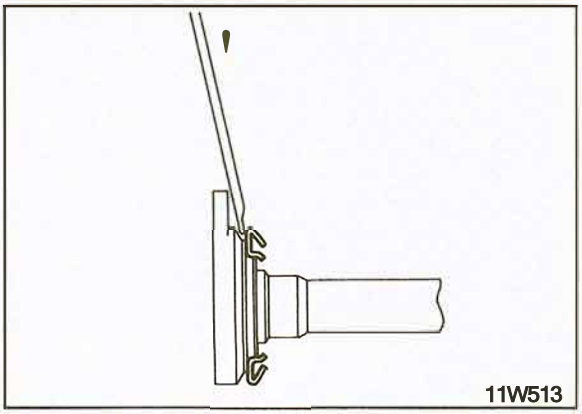
2. After a special tool has been mounted as shown, tighten the nut until part A contacts the bearing outer race.



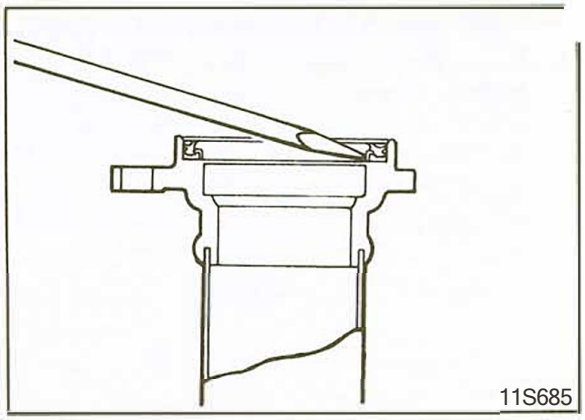
3. Remove the inner shaft from the bearing.



4. Remove the dust cover from the inner shaft.



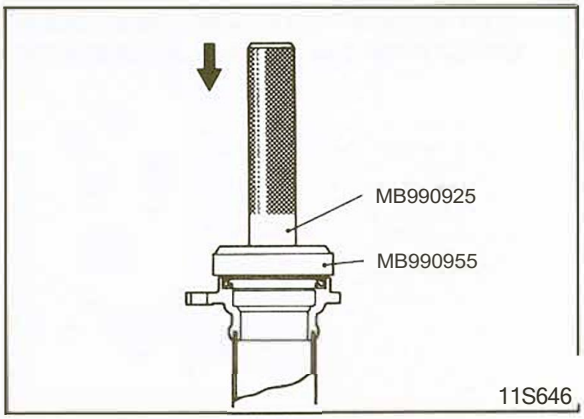
5. Remove the dust seal from the housing tube.



REASSEMBLY

1. Press the new dust seal into the housing tube with the special tools until it is flush with end of the housing tube. (11 S646)
2. Apply the specified grease to the dust seal lip.

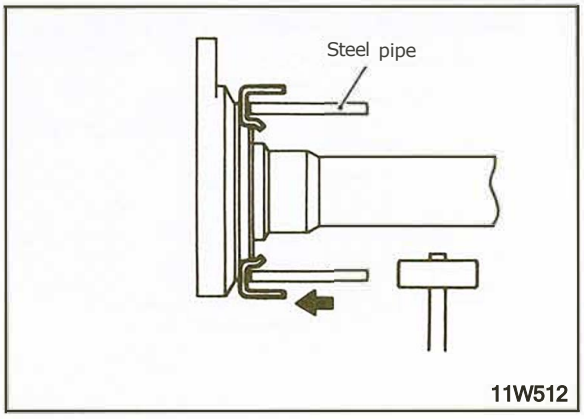
Recommended multipurpose grease	SAE J3 10a, NLGI grade #2EP



Caution
When installing the inner shaft, be careful that the bearing outer race does not damage the lip of the dust seal.

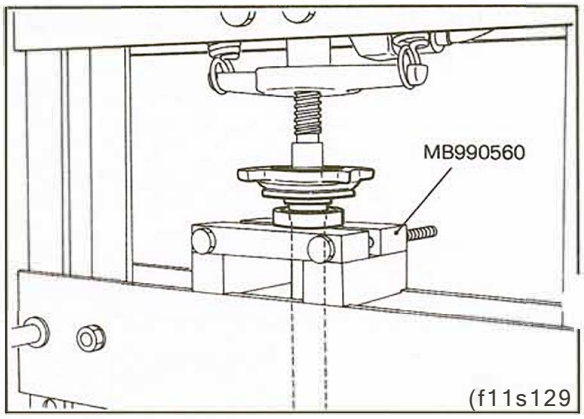
3. Using the steel pipe described below, force a new dust cover onto the inner shaft.

Steel Pipe	mm (in.)
Overall length	50 (1.7)
Outside diameter	75 (3.0)
Wall thickness	4 (.2)



NOTE
After the dust cover has been installed, apply the specified grease to the bearing mounting surface of the dust cover.

4. Using a special tool, force the bearing onto the inner shaft.



NSTALLATION

1. Install the housing tube onto the front differential carrier and differential mounting bracket.
2. Drive the inner shaft into the front differential carrier with the special tool (MB990906).

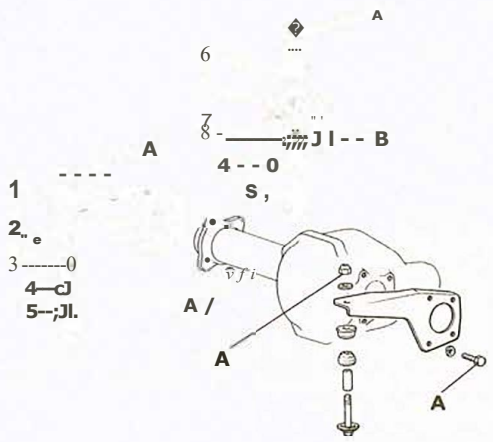
Caution
Replace the circlip on the spline part of the inner shaft with a new one.
Be careful not to damage the lip of the dust seal on the oil seal.

3. Install the right drive shaft. **(Refer** to p. 2-46.)
4. Torque all parts to specifications during assembly.

DIFFERENTIAL MOUNTING

COMPONENTS

1. Differential mounting bracket
2. Differential mounting rubber A
3. Differential mounting rubber B
4. Spacer
5. Pin
6. Differential mounting rubber C
7. Bracket
8. Differential mounting rubber D

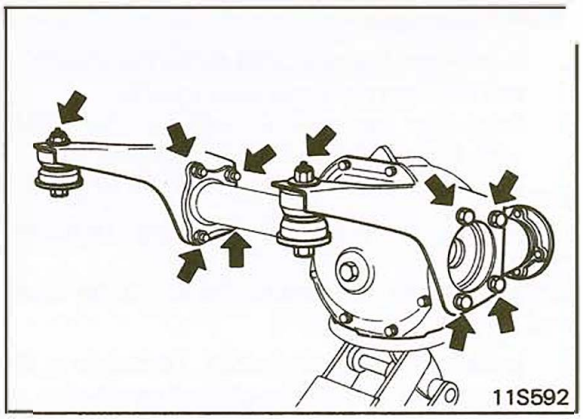


	Nm	ft. lbs.
A	80-100	58-72
B	30-42	22-30

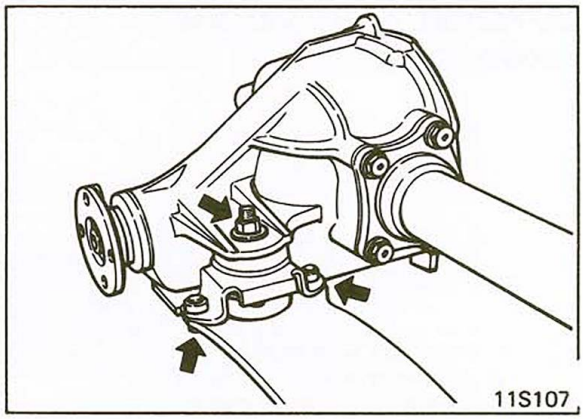
11 St 30

REMOVAL

1. Remove the drive shafts. (Refer top. 2-42.)
2. Remove the inner shaft. (Refer to p. 2-48.)
3. Support the differential carrier with a jack.
4. Remove the right and left differential mounting brackets. (1 IS592)



5. Support the differential carrier with a jack.
6. Remove the bracket from the differential carrier and front suspension crossmem ber. (I IS I07)



INSPECTION

1. Check differential mounting bracket for deformation and damage.
2. Check bracket for deformation and damage.
3. Check differential mounting rubber for cracks and damage.

INSTALLATION

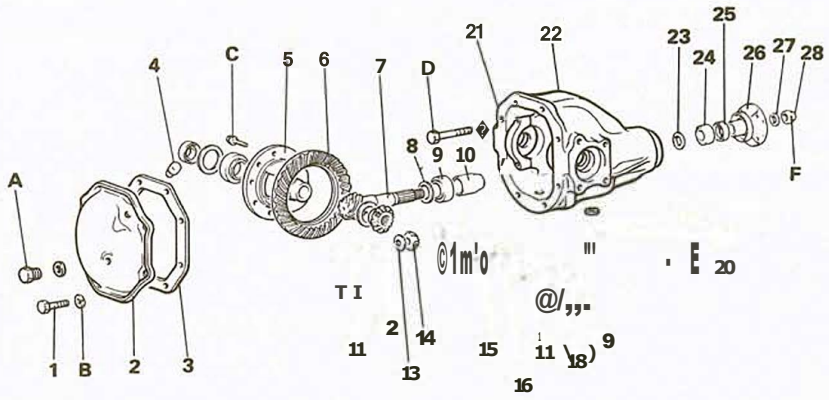
1. Install the right and left differential mounting brackets and the rear side bracket by tightening the self-locking nuts to the specified torque.

Differential mounting bracket tightening torque . . .
80-100 Nm (58-72 ft.lbs.)

2. Torque all parts to specifications during assembly.

OMPONENTS

1. Filler plug
2. Cover
3. Gasket
4. Vent plug
5. Differential case
6. Ring gear
7. Drive pinion
8. Drive pinion front shim (for pinion height adjustment)
9. Drive pinion front bearing
10. Drive pinion spacer
11. Pinion shaft
12. Lock pin
13. Pinion washer
14. Pinion gear
15. Side gear
16. Side gear thrust spacer
17. Side bearing
18. Side bearing adjusting spacer
19. Oil seal
20. Drain plug
21. Bearing cap
22. Gear carrier
23. Drive pinion rear shim (for preload adjustment)
24. Drive pinion rear bearing
25. Oil seal
26. Companion flange
27. Washer
28. Self-locking nut



	Nm	ft. lbs.
A	40-60	29-43
B	15-22	11-16
C	80-90	58-65
D	55-65	40-47
E	60-70	43-51
F	160-220	116-159

11S058

REMOVAL

1. Remove the drain plug to drain the differential gear oil.
2. Remove the drive shafts. (Refer top. 2-42.)
3. Remove the inner shaft. (Refer top. 2-48.)
4. Detach the propeller shaft from the differential carrier. (Refer to GROUP 16.)
5. Remove the left differential mounting bracket. (Refer to p. 2-52.)
6. Detach the right differential mounting bracket from the frame. (Refer top. 2-52.)

7. Detach the front suspension crossmember from the frame, and then remove the differential carrier together with the front suspension crossmember.
(Refer to p. 2-52.)
8. Secure the working base in a vice and mount the differential carrier on to the working base.

INSPECTION BEFORE DISASSEMBLY

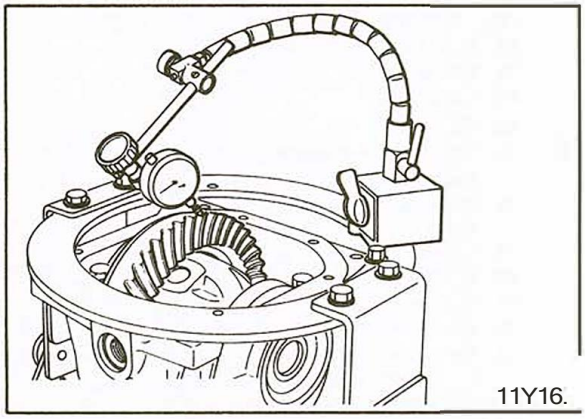
NOTE
For the differential carrier inspection procedure, refer to GROUP 3.

Final **Ring Gear Backlash**

With the drive pinion locked in place, measure the final ring gear backlash with a dial indicator. (I l Y 167)

Final ring gear backlash	0.13-0. 18 mm (.005-.007 in.)

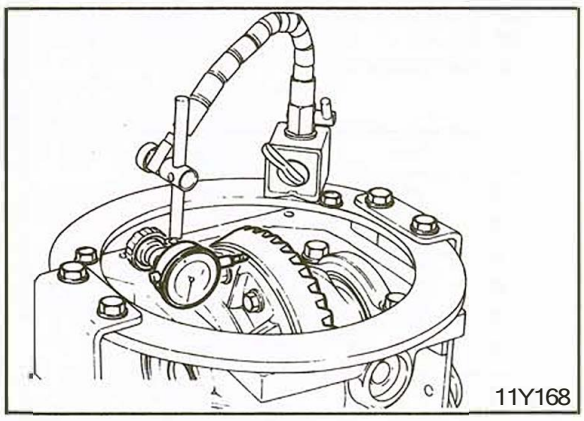
NOTE
Measure at four different points on the circumference of the ring gear.



Ring Gear Runout

Measure the ring gear runout at the shoulder on the reverse side of the gear teeth. (I l Y 168)

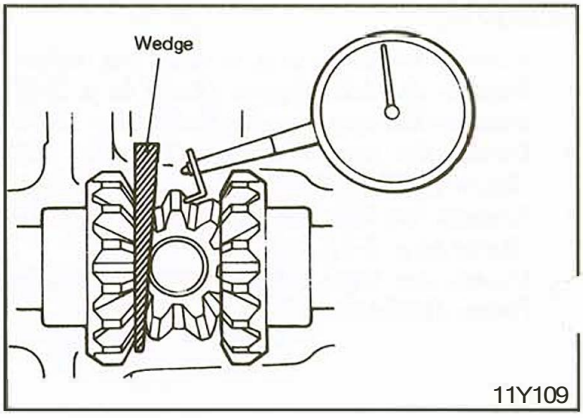
Ring gear runout [Repair limit]	0.05 mm (.002 in.)



Differential Gear Backlash

Lock the side gear with a wedge and measure the differential gear backlash with a dial indicator positioned on the pinion gear. (11 YI 09)

Differential gear backlash [Repair limit]	0.15 mm (.006 in.)



Final Ring Gear Tooth Contact

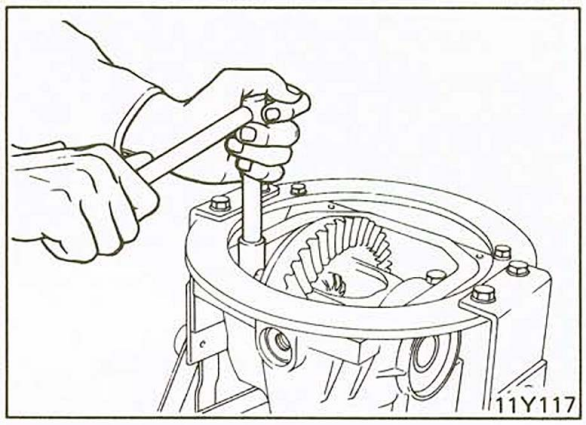
Check the tooth contact of the final ring gear tooth contact.

•ISASSEMBLY

Differential Case Assembly

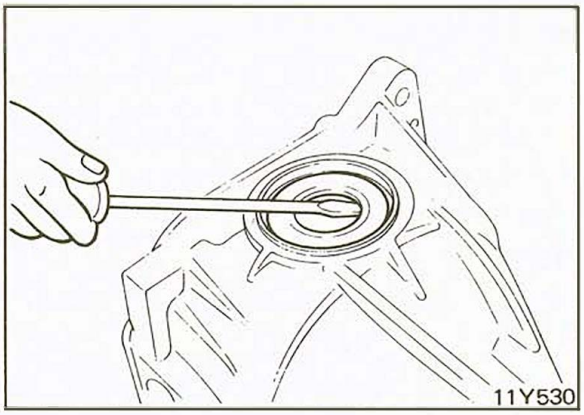
I. Remove the bearing caps. (11 Y 117)
2. For the procedure from removal of the differential case to removal of the differential gears, refer to GROUP 3.

NOTE
When reference is made to GROUP 3 as mentioned above, the "Side bearing nut" in GROUP 3 should be interpreted as the "Side bearing adjusting spacer".



3. Remove the oil seal for the drive shaft or the inner shaft.

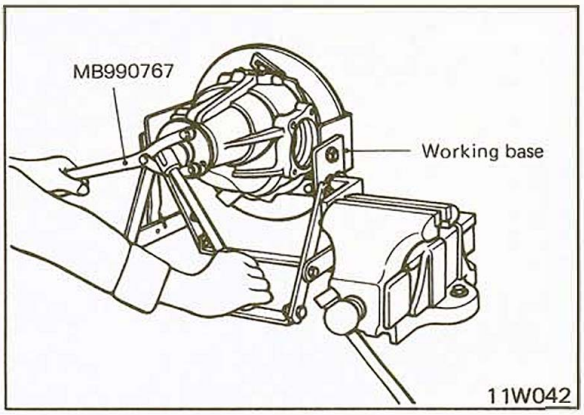
NOTE
The oil seal for the drive shaft or the inner shaft can also be replaced by pulling out the drive shaft or the inner shaft, without removing the differential carrier from the vehicle. (Refer top. 2-42.) (I lY530)



Drive Pinion

1. For the drive pinion disassembly procedure, refer to GROUP 3.

NOTE
The names used for the special tools in GROUP 3 differ from those used here, and also the following parts should be interpreted as indicated below:
(I IW042)
Drive pinion front shim
Drive pinion rear shim
Drive pinion rear bearing
Drive pinion front bearing

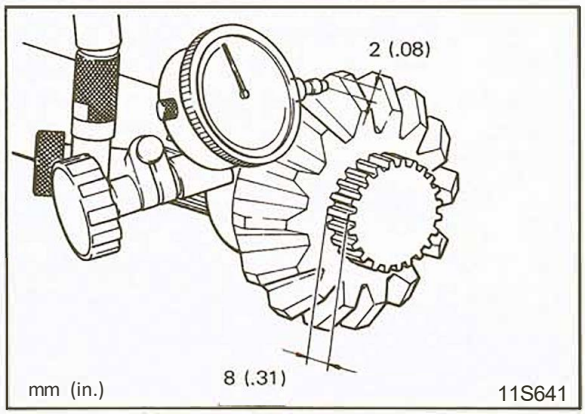


INSPECTION

I. Check spline coupling for wear and damage.
2. Check oil seal for wear and deterioration.
3. Check bearings for wear and discoloration.
4. Check gear carrier for cracks.
5. Check drive pinion and ring gear for wear and cracks.
6. Check side gear, pinion gear and pinion shaft for wear and seizure.

,becking of the Drive Shaft Spline for Looseness

#ith the drive shaft secured in a vice, measure the free play with a dial in clica tor. (11 S641)



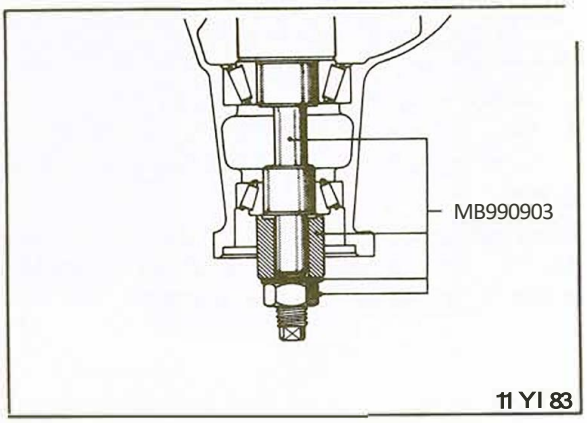
REASSEMBLY

Drive Pinion

For the drive pinion reassembly procedure, refer to GROUP 3.

NOTE
The names used for the special tools in GROUP 3 differ from those used here, and also the following parts should be interpreted as indicated below:
(l IY183)

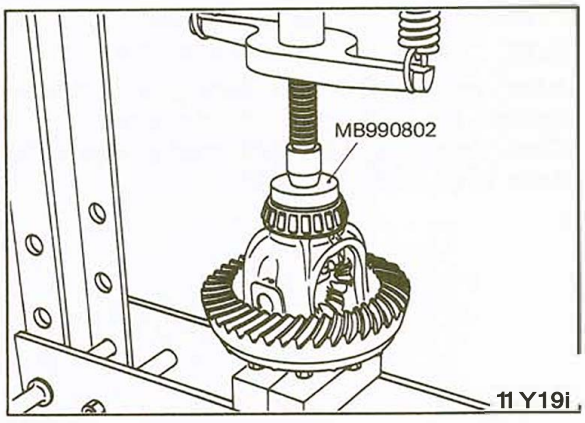
Drive pinion front shim
Drive pinion rear shim
Drive pinion front bearing
Drive pinion rear bearing



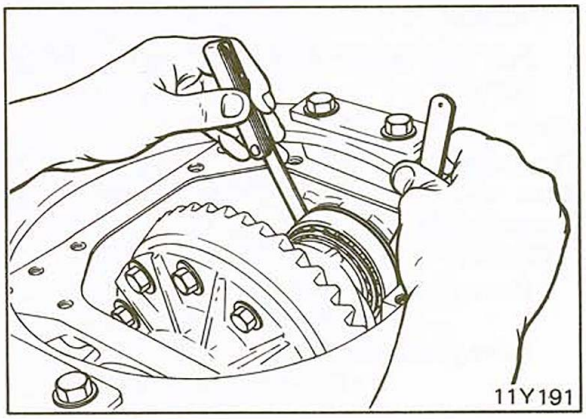
Differential Case Assembly

1. For the differential case reassembly procedure except for the final ring gear backlash adjustment procedure, refer to **GROUP** 3.
2. Adjust the final ring gear backlash as follows:
   (I) Press the side bearing inner races into the differential case with a special tool. (11 Y 197)
   (2) Install side bearing adjusting spacers which are thinner than those removed on both the pinion gear and the ring gear sides of the differential case assembly, and then fit the differential case assembly into the gear carrier.

   NOTE
   Select side bearing adjusting spacers with the same thickness for both the drive pinion side and the ring gear side.

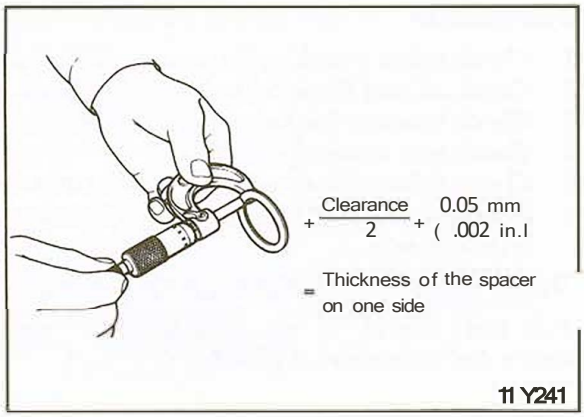


   (3) Push the differential case assembly to one side and measure the clearance between the gear carrier and the side bearing adjusting spacer with a feeler gauge. (l lYI 91)

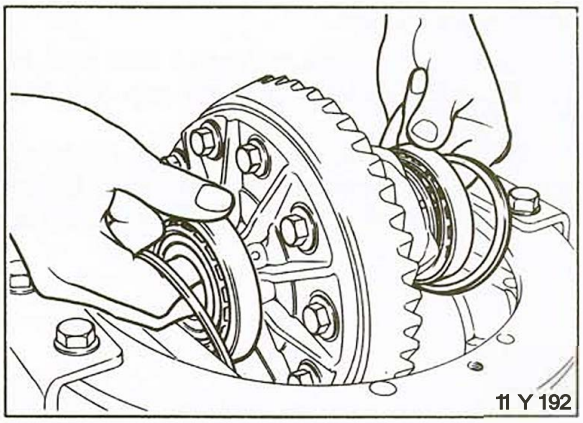


   (4) Measure the thickness of the side bearing adjusting spacers on one side, select two pairs of spacers which correspond to that thickness plus one half of the clearance plus 0.05 mm (.002 in.), and then install one pair each on the drive pinion side and the ring gear side. (11 Y241)

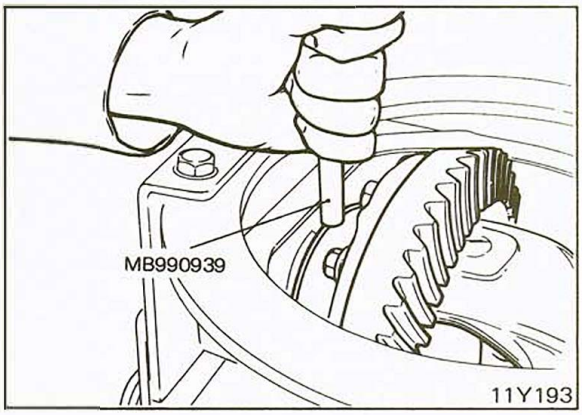
   NOTE
   Be sure that there is no clearance between the gear carrier and the side bearing adjusting spacer.



(5) Install the side bearing adjusting spacers and differential case assembly, on the gear carrier as shown in the illustration.

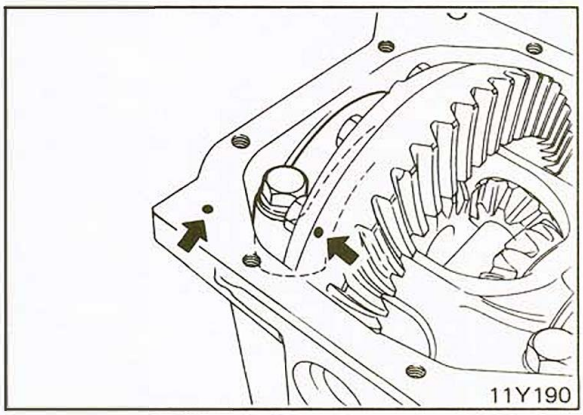


(6) Tap the side bearing adjusting spacers with a brass bar to fit them into the side bearing outer race.



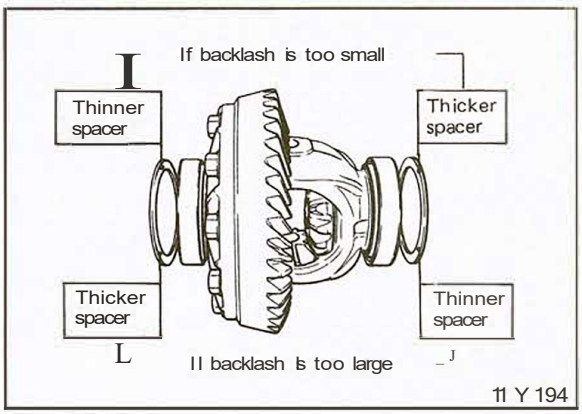
(7) Align the mating marks on the gear carrier and the bearing cap, and then tighten the bearing cap. (11Y 190)

(8) Measure the final ring gear backlash. (Refer to GROUP 3.)



(9) Select the side bearing adjusting spacers as illustrated, and then adjust the final ring gear backlash between the ring gear and the drive pinion. (11Y194)

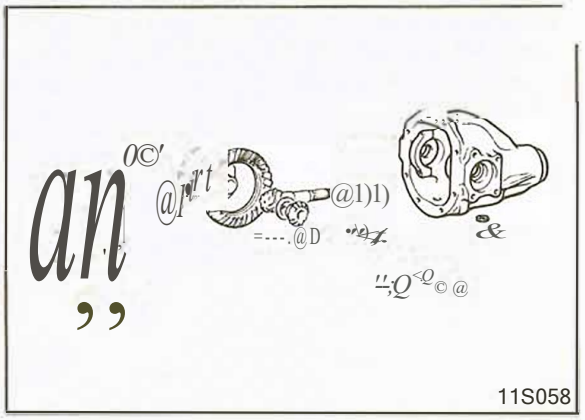
NOTE
Be sure to select the side bearing adjusting spacers on the drive pinion side and on the ring gear side so that the total thickness is equal to that obtained from the calculation in step (4).
When selecting the side bearing adjusting spacers, keep the number of spacers to a minimum.



3. Torque all parts to specifications during assembly.

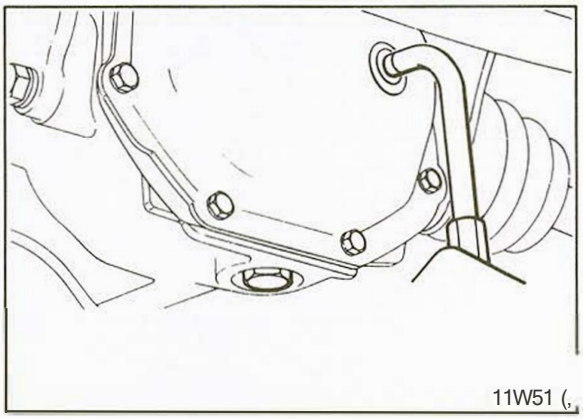
INSTALLATINON

1 Apply semi-drying sealant to both sides of the gasket and install the differential cover onto the differential carrier. (1 1S058)
2. Install the differential mounting. (Refer top. 2-52.)
3. Install the propeller shaft. (Refer to GROUP 16.)
4. Torque all parts to specifications during assembly.



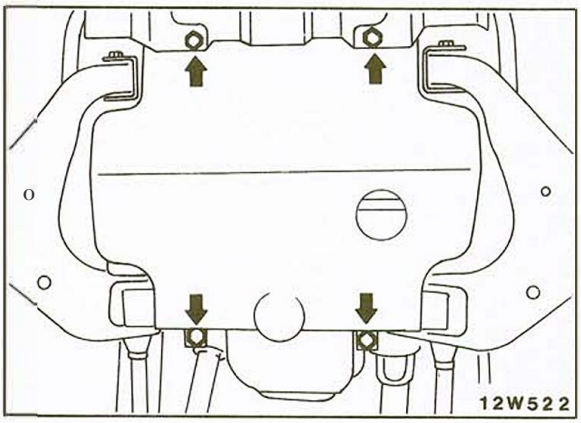
5. Supply the specified differential gear oil to the differential.

Recommended front axle gear oil	Hypoid gear oil API classification GL-4 or GL-5 SAE viscosity No. 90
1.10 lit. (1.16 U.S. qt., 0.97 Imp.qt.)	



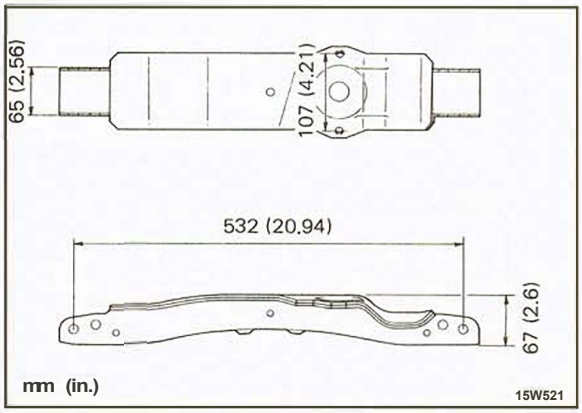
lliMOVAL

I. Remove the under cover. (l 2W522)
2. Remove the front suspension crossmember.



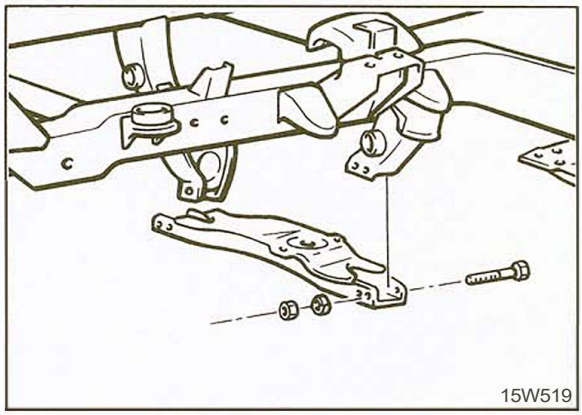
INSPECTION

I. Check crossmember for incorrect alignment.
2. Check crossmember for cracks, bends and dents.



INSTALLATION

I. Install the front suspension crossmember, making sure that the direction o f the bolts is correct. (l 5W5 l 9)
2. Torque all parts to specifications during assembly.



REAR AXLE

CONTENTS

GENERAL SPECIFICATIONS

	Vehicles with conventional differential	Vehicles with limited slip differential
Axle shaft		
Type	Semi-floating type	Semi-floating type
Shaft dimensions		
Bearing portion dia. mm (in.)	40 (1.57)	40 (1.57)
Center portion dia. mm (in.)	34.5 (1.36)	34.5 (1.36)
Overall length mm (in.)	700.5 (27.6)	700.5 (27.6)
Bearing		
O.D. x I.D. mm (in.)	80 x 40 (3.15 x 1.57)	80 x 40 (3.15 x 1.57)
Differential		
Reduction gear type	Hypoid gear	Hypoid gear
Reduction ratio		
Manual transmission	4.625	4.625
Optional for Federal (not available in California)	4.875	4.875
Automatic transmission	4.222	4.222
Optional for Federal (not available in California)	4.625	4.625
Differential lock type		Disc type
Differential gear type and configuration		
Side gear	Straight bevel gear x 2	Straight bevel gear x 2
Pinion gear	Straight bevel gear x 2	Straight bevel gear x 4
Number of teeth		
Drive gear		
Manual transmission	37	37
Optional for Federal (not available in California)	39	39
Automatic transmission	38	38
Optional for Federal (not available in California)	37	37
Drive pinion		
Manual transmission	8	8
Automatic transmission	9	9
Optional for Federal (not available in California)	8	8
Side gear	14	14
Pinion gear	10	10

:ERVICE SPECIFICATIONS

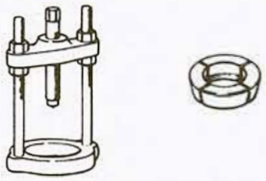
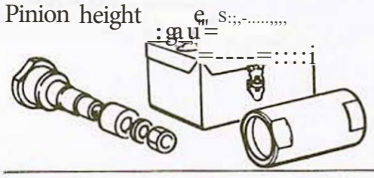
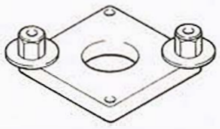
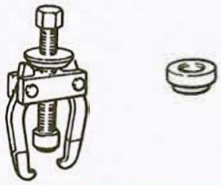
	Vehicles with conventional differential	Vehicles with limited slip differential
Standard values		
Limited slip differential preload		
Using special tool Nm (ft.lbs.)	–	15 {11) or more
Without using special tool Nm {ftlbs.)	–	30 (22) or more
Final ring gear backlash mm (in.)	0.13-0.18 (.005-.007)	0.13-0.18 (.005-.007)
Drive pinion preload		
With oil seal Ncm (in.lbs.)	100-130 (8.7-11.3)	100-130 (8.7-11.3)
Without oil seal Nern (in.lbs.)	70-100 (6.1-8.7)	70-100 (6.1-8.7)
Clearance between the clutch plates and the differential case mm (in.)	–	0.06-0.20 (.002-.008)
Axial clearance of the differential gear mm (in.)-		0.05-0.20 (.002-.008)
Differential gear backlash mm (in.)	0.051-0.127 (.002-.005)	–
Clutch plate preload		
When equipped with new clutch plates Nm (ftJbs.)	–	60-100 (43-72)
When equipped with old clutch plates Nm {ft.lbs.)	–	30-80 (22-58)
Repair limits		
Rear axle total backlash mm (in.)	5 (.2)	5 (.2)
Ring gear runout mm (in.)	0.05 (.002)	0.05 (.002)
Difference in total thickness mm (in.) between left and right clutch plates	–	0.05 (.002) or less
Difference in distances mm (in.) from backs of left and right pressure rings to end of thrust washer	–	0.05 (.002) or less
Service limits		
Axle shaft end play mm (in.)	0.05-0.20 (.002-.008)	0.05-0.20 (.002-.008)
Axle shaft runout mm (in.)	0.1 (.004)	0.1 (.004)
Axle shaft spline play mm (in.)	0.6 (.024)	0.6 (.024)
Friction plate/disc warping		
Total deviation mm (in.)	–	0.08 (.003) or less
Clutch plate wear		
Difference in thick- mm (in.) nesses of friction surface and projections	–	0.1 (.004) or less
Thrust washer thickness mm (in.)	–	1.4 (.055) or more

TORQUE SPECIFICATIONS

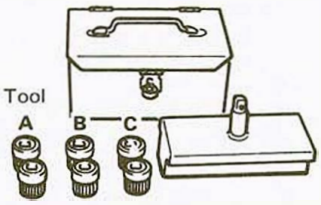
	Nm (ft.lbt
Rear axle bearing lock nut	180-220 (130-159)
Bearing case to rear axle housing	50-60 (36-43)
Companion flange to drive pinion	190-250 (137-181)
Filler plug	40-60 (29-43)
Drain plug	60-70 (43-51)
Bearing cap to gear carrier	55-65 (40-47)
Differential case to ring gear	80-90 (58-65)
Lock plate	15-22 (I 1-16)
Differential carrier to rear axle housing	25-30 {18-22)

LUBRICANTS

	Specified lubricant	Quantity
Rear axle gear oil		
Conventional differential	Hypoid gear oil API classification GL-4 or GL-5 SAE viscosity No. 90	1.80 liter (1.90 U.S.qt., 1.58 Imp.qt.)
Limited slip differential	MITSUBISHI genuine gear oil Part No. 8149630EX, or Mopar Hypoid Gear Lubricant part No. 3744994 or 3744995 plus Mopar Hypoid Gear Oil Additive/Friction Modifier part No. 4057100, or equivalent	1.80 liter (1.90 U.S.qt., 1.58 Imp.qt.)
Axle housing grease	Multipurpose grease SAE J310a, NLGI grade #2.EP	As required

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990785 "*" Lock nut special wrench 	Removal of the lock nut	MB990799 Bearing inner race installer 	Pressing of the axle shaft bearing inner race
MB990925 Bearing and oil seal installer set	Pressing of the axle shaft bearing outer race and oil seal Insertion of the axle shaft oil seal Removing and pressing of the drive pinion bearing outer race	MB990201 "*" Side bearing special adjusting wrench 	Removal and adjustment of the side bearing nut
MB990850 "D" End yoke holder 	Removal of the companion flange	MB990339 "*" MB990648 "*" Bearing puller Bearing remover 	Removal of the drive pinion rear bearing inner race
MB990552 "*" Pinion height gauge set MB990819 "*" Pinion height 	Measurement of the pinion height	MB990802 Bearing installer 	Pressing of the drive pinion rear bearing inner race Pressing of the side bearing inner race
MB990787-A Puller 	Removal of the axle shaft bearing and bearing case	MB990810 "*" MB990811 Side bearing puller Side bearing cup 	Removal of the side bearing inner race

"*", "D" see page 2 for instructions.

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990241 "*" **Rea, rude shaft pullo,** MB990211 Sliding hammer	Removal of axle shaft	MB990031 "*" Drive pinion oil seal installer 	Pressing of the drive pinion oil seal
MB990767 "*" End yoke holder 	Measurement of the limited slip differential preload	MB990988 Side gear holding tool set 	Measurement of the clutch plate preload

"*"seepage 2 for instructions.

Symptom	Probable cause	Remedy
AXLE SHAFT, AXLE HOUSING Noise while wheels are rotating	Brake drag Bent axle shaft Worn or damaged axle shaft bearing	Replace
Grease leakage	Worn or damaged oil seal Malfunction of bearing seal	Replace
CONVENTIONAL DIFFERENTIAL Constant noise	Improper final ring gear tooth contact adjustment Loose, worn or damaged side bearing Loose, worn or damaged drive pinion bearing	Correct or replace
	Worn ring gear, drive pinion Worn side gear thrust washer or pinion shaft Deformed ring gear or differential case Damaged gear	Replace
	Foreign material	Eliminate the foreign material and check; replace parts if necessary
	Insufficient oil	Replenish
Gear noise while driving	Poor gear engagement Improper gear adjustment Improper drive pinion preload adjustment	Correct or replace
	Damaged gear	Replace
	Foreign material	Eliminate the foreign material and check; replace parts if necessary
	Insufficient oil	Replenish
Gear noise while coasting	Improper drive pinion preload adjustment	Correct or replace
	Damaged gear	Replace
Bearing noise while driving or coasting	Cracked or damaged drive pinion rear bearing	Replace
Noise while turning	Loose side bearing Damaged side gear, pinion gear or pinion shaft	Replace

Symptom	Probable cause	Remedy
Heat	Insufficient gear backlash Excessive preload	Adjust
	Insufficient oil	Replenish
Oil leakage	Clogged breather hose	Clean or replace
	Cover insufficiently tightened Seal malfunction	Retighten, apply sealant, or replace the gasket
	Worn or damaged oil seal	Replace
	Excessive oil	Adjust the oil level
LIMITED SLIP DIFFERENTIAL Abnormal noise during driving or gear changing	Excessive final ring gear backlash Insufficient drive pinion preload	Adjust
	Excessive differential gear backlash	Adjust or replace
	Worn side gear spline	Replace
	Loose companion flange self-locking nut	Retighten or replace

NOTE
In addition to a malfunction of the differential carrier components, abnormal noise can also be caused by the propeller shal universal joint, the axle shafts, the wheel bearings, etc. Before disassembling any parts, take all possibilities into consideration and confirm the source of the noise.

Abnormal noise when cornering	Damaged differential gears Damaged pinion shaft Nicked and/or abnormally worn inner or outer clutch plates Inferior gear oil Abnormally worn or damaged thrust washer	Replace
	Insufficient gear oil quantity	Replenish
Gear noise	Improper final ring gear tooth contact adjustment	Adjust or replace
	Incorrect final ring gear backlash Improper drive pinion preload adjustment	Adjust
	Damaged, broken, or seized tooth surfaces of the ring gear and drive pinioP. Damaged, broken, or seized drive pinion bearings Damaged, broken, and/or seized side bearings Damaged differential case Inferior gear oil	Replace
	Insufficient gear oil quantity	Replenish

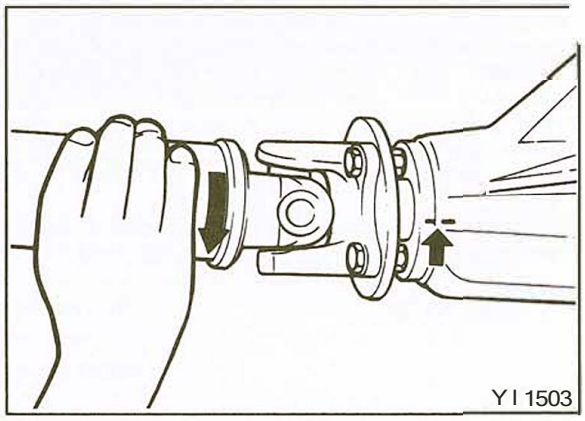
Symptom	Probable cause	Remedy
NOTE Noise from the engine, muffler vibration, transmission, propeller shaft, wheel bearings, tires, body, etc., is easily mistaken as being caused by malfunctions in the differential carrier components. Be extremely careful and attentive when performing the driving test. Test methods to confirm the source of the abnormal noise include: coasting, acceleration, constant speed driving, raising the rear wheels on a jack, etc. Use the method most appropriate to the circumstances.		
Gear oil leakage	Worn or damaged front oil seal, or improperly installed oil seal Damaged gasket	Replace
	Loose companion flange self-locking nut	Retighten or replace
	Loose filler or drain plug	Retighten or apply adhesive
	Oogged or damaged breather hose	Clean or replace
Seizure	Insufficient final ring gear backlash Excessive drive pinion preload Excessive side bearing preload Insufficient differential gear backlash Excessive clutch plate preload	Adjust
	Inferior gear oil	Replace
	Insufficient gear oil quantity	Replenish
NOTE In the event of seizure, disassemble and replace the parts involved, and also be sure to check all components for any irregularities and repair or replace as necessary.		
Breakdown	Incorrect final ririg gear backlash Insufficient drive pinion preload Insufficient side bearing preload Excessive differential gear backlash Insufficient clutch plate preload	Adjust
	Loose ring gear clamping bolts	Retighten
	Operational malfunction due to overloaded clutch	Avoid excessively rough operation
NOTE In addition to disassembling and replacing the failed parts, be sure to check all components for irregularities and repair or replace as necessary.		
The limited slip differential does not function (on snow, mud, ice, etc.)	The limited slip device is damaged	Disassemble, check the functioning, and replace the damaged parts

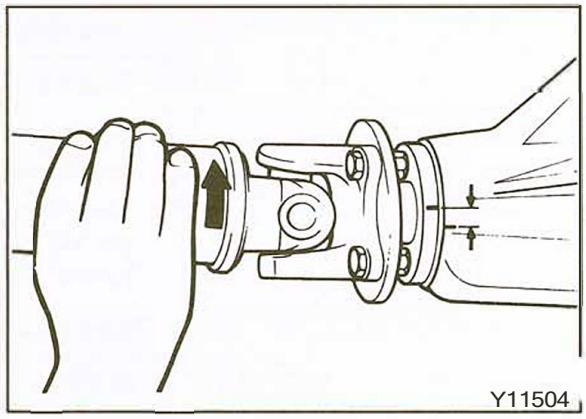
REAR AXLE TOTAL BACKLASH

If the vehicle vibrates and produces a booming sound due to the unbalance of the drivetrain, use the following procedure to measure the rear axle total backlash to see if it is necessary to remove the differential carrier assembly.

(1) Set the transmission control lever to the neutral position, set the transfer control lever to 2H, apply the parking brake and raise the vehicle.
(2) Tum the companion flange clockwise far enough to remove all slack. Make mating marks on the dust cover of the companion flange and on the differential carrier. (**YI** 1503)
(3) Turn the companion flange fully counterclockwise to remove all slack, and measure the distance the mating marks moved. (YI 1504)
(4) If the backlash exceeds the repair limit, remove the differential carrier assembly and adjust it.

Rear axle total backlash [Repair limit)	5mm (.2 in.)

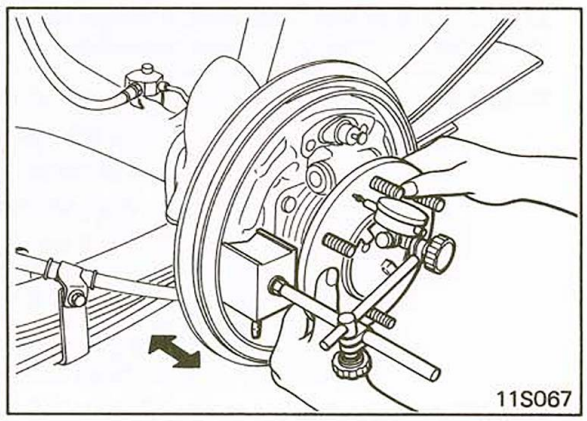

YI 1503


Y11504

AXLESHAFTENDPLAY

1. Measure the axle shaft end play with a dial indicator.
2. Push the axle shaft **all** the way in, and mount the dial indicator and set it to zero.
3. Pull the axle shaft all the way out and note the end play indication on the dial indicator. (11 S067)
4. **If** the end play exceeds the service limit, replace the bearing.

Axle shaft end play [Service limit)	0.05-0.20 mm (.002-.008 in.)


11S067

CHECKING GEAR OIL LEVEL

Remove the filler plug and check the oil level. (Refer to GROUP 2.)

Distance from the lower end of the filler plug to the oil surface	Within 14 mm (.6 in.)

CHANGING GEAR OIL (Limited Slip Differential)

Remove drain plug and drain the lubricant from axle. Fill axle with 1.8 liter (1.90 U.S.qt., 1.58 Imp.qt.) of Mitsubishi genuine gear oil part No. 8149630EX, or 113 g (4 oz.) Mopar Hypoid Gear Oil Additive/Friction Modifier 4057100 plus 1.1 liter (1.16 U.S.qt., 0.97 Imp.qt.) of Mopar Hypoid Gear Lubricant part No. 3744994 or 3744995, or equivalent.

™ITED SLIP DIFFERENTIAL PRELOAD MEASURE-1\fENT

To measure the preload of the limited slip differential, set the shift lever of the transmission to the neutral position, lock the front wheels, and fully release the parking brake. One of the rear wheels should be maintained in contact with the ground surface, and the other should be raised up.
Measure the starting torque at the side on which the wheel is raised by using the following procedure:

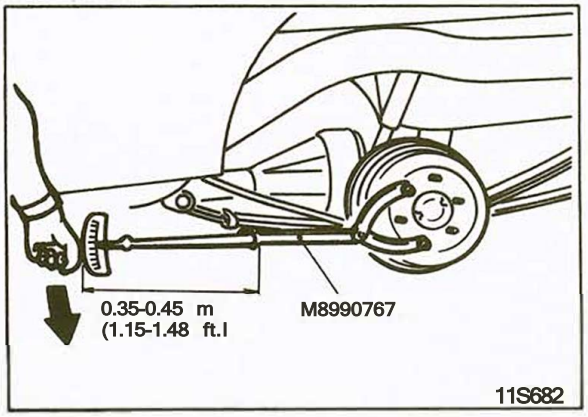
(1) Remove the wheel.

(2) Mount the special tool to the hub bolts with the hub nuts.

(3) Find the limited slip differential preload by measuring the axle shaft starting torque in the forward direction with a torque wrench. (11$682)

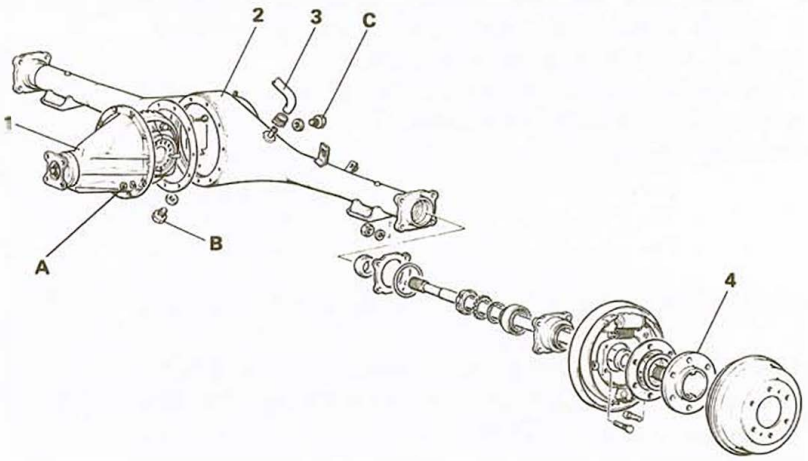
Limited slip differential preload ..... . 15 Nm (11 ft.I bs.) or more

(4) If the torque is less than the specified value, remove the limited slip differential from the vehicle and repair it.



COMPONENTS

1. Gear carrier
2. Axle housing
3. Breather hose
4. Axle shaft

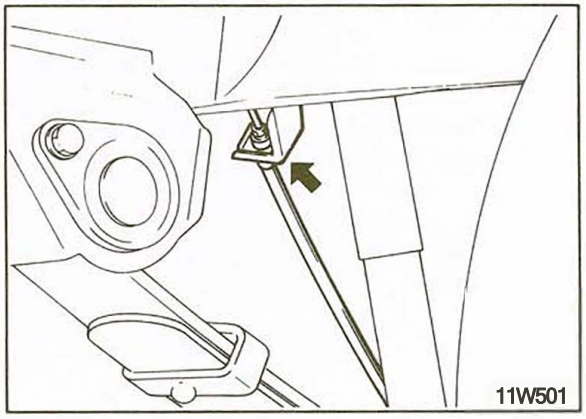


	Nm	ft.lbs.
A	25-30	18-22
B	60-70	43-51
C	40-60	29-43

11W046

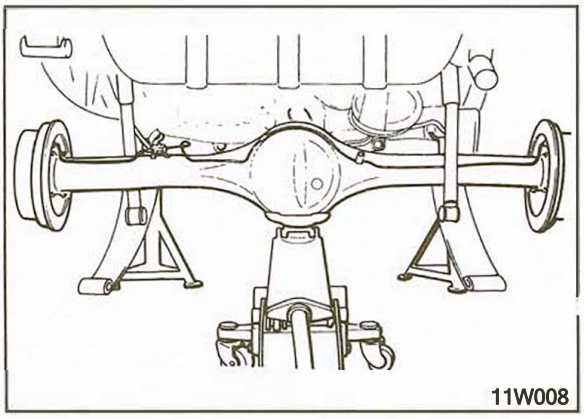
REMOVAL

1. Support the vehicle with floor stands at the specified points.
2. Remove the parking brake cable and clips. (Refer to GROUP 5.) (1 1W501)
3. Completely drain the brake fluid and disconnect the brake hoses.
4. Detach the rear propeller shaft assembly from the differential carrier assembly. (Refer to GROUP 16.)



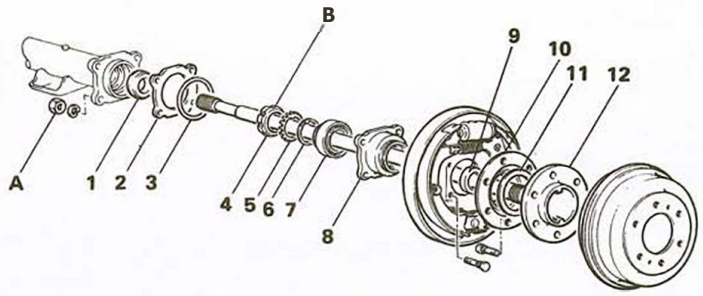
5. Raise the axle housing slightly on a jack.
6. Detach the shock absorbers from the U-bolt seats. (Refer to GROUP 17.)
7. Remove the U-bolts and the U-bolt seats. (Refer to GROUP 17.)
8. Remove the shackles to separate the spring assemblies from the side frame and lower the rear portions of the spring assemblies. (Refer to GROUP 17.)
9. Remove the axle assembly toward the rear of the vehicle. (11 W008)

Caution
The axle assembly is unstable on the jack; be careful not to **allow it to fall.**



:oMPONENTS

1. Oil seal
2. Shim
3. O-ring
4. Lock nut
5. Lock washer
6. Washer
7. Bearing
8. Bearing case
9. Oil seal
10. Dust cover
11. Packing
12. Rear axle shaft



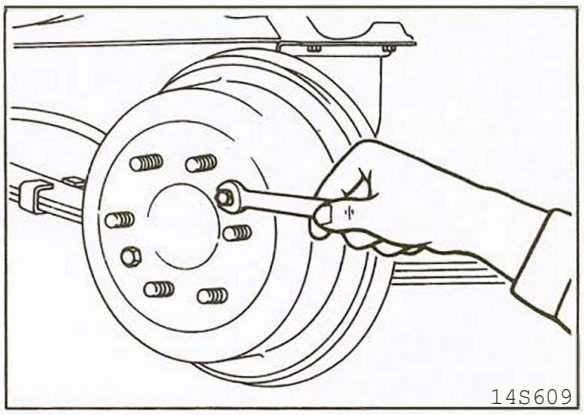
	Nm	ft.lbs.
A	50-60	36-43
B	180-220	130-159

11W509

REMOVAL

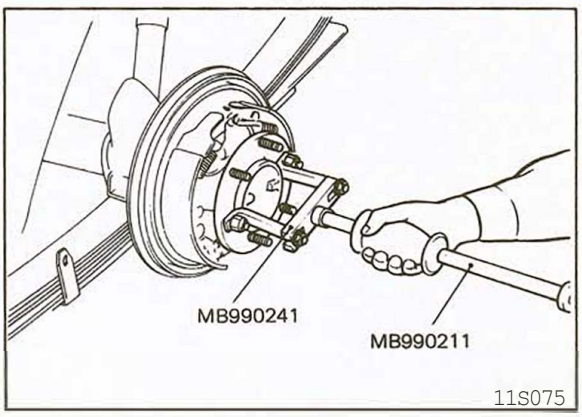
L Disconnect the parking brake cables from the equalizer and then remove the clamps from the parking brake cables. (Refer to GROUP 5.)
2. Remove the brake drum.

NOTE
If it is hard to remove the brake drum, screw bolts (M8 x 1.25) into the threaded holes provided in the brake drum flange surface. (14S609)

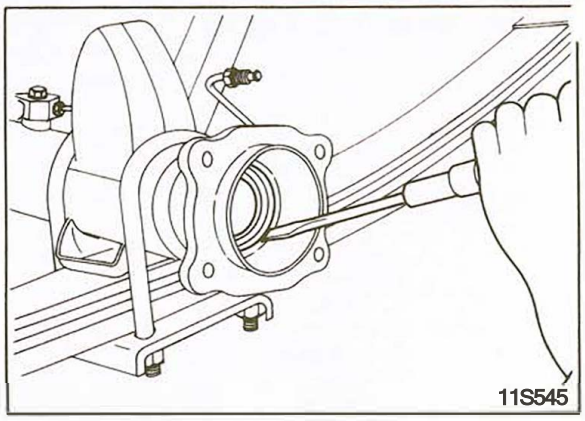


3. Disconnect the Brake tubes from the rear wheel cylinder.
4. Detach the bearing case from the end of the rear axle housing.
5. Pull the wheel toward you with the rear axle shaft and rear brake assembly still attached. **If** the rear axle shaft is hard to remove, use the special tools to loosen it. (l 1S075)

NOTE
Do not damage the oil seal during removal of axle shaft

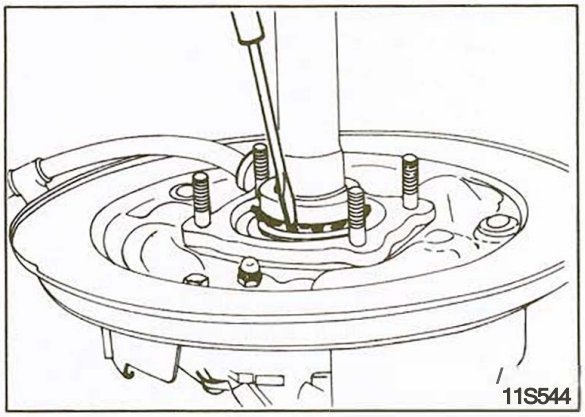


6. Remove the oil seal from the end of the rear axle housing if necessary.

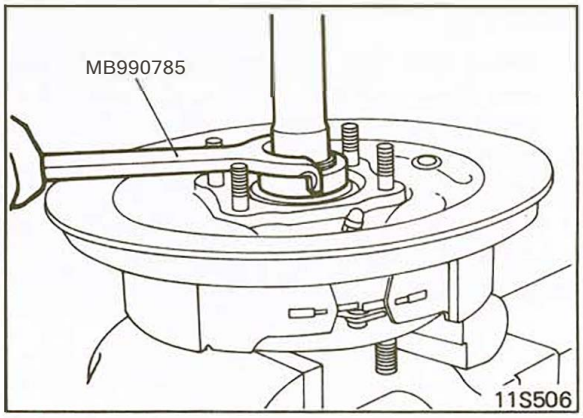


DISASSEMBLY

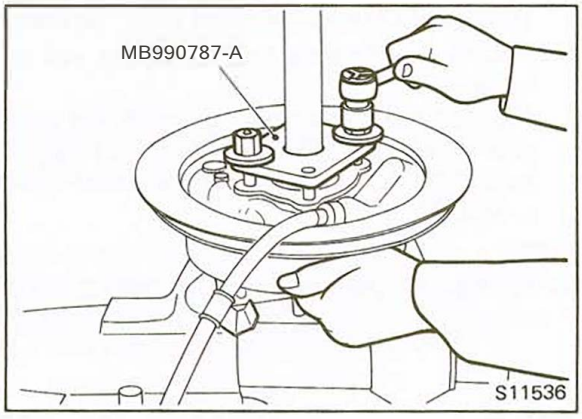
1. Straighten the bent tab of the lock washer.



2. Remove the lock nut with the special tool. (l 1S506)
3. Remove the lock washer and the washer.
4. Reinsert the lock nut on the axle shaft approximately three turns.



5. Using the special tool, push the axle shaft out of the bearing case. (S 11536)
6. Apply equal pressure to nuts to ensure smooth removal of wheel bearing.
7. Using a hammer and drift, remove the bearing outer race from the bearing case.
8. Remove the oil seal from the bearing case.



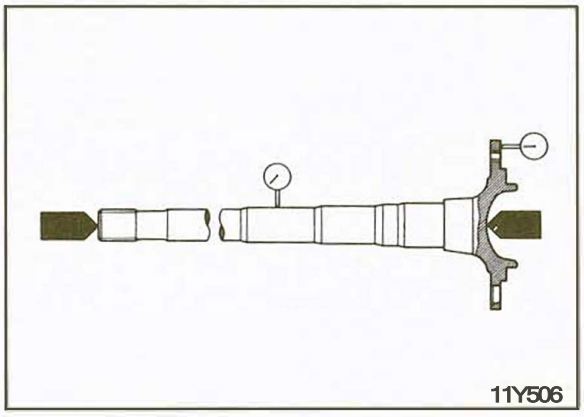
SPECTION

I. Check dust cover for deformation and damage.
2. Check oil seal for damage.
3. Check inner and outer bearings for seizure, discoloration and rough raceway surface.
4. Check axle shaft for cracks, wear and damage.

Checking of the Axle Shaft for Runout

With the axle shaft supported at the center holes on both ends, measure the axle shaft flange face for runout with a dial indicator.

Axle shaft runout [Service limit] .....
0.1 mm (.004 in.)



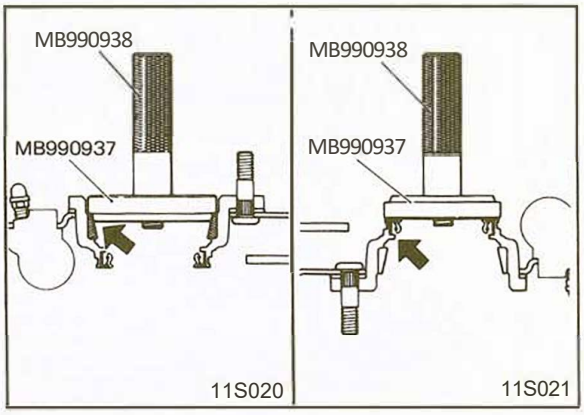
REASSEMBLY

1. Apply the specified wheel bearing grease to the outside circumference of the bearing outer race.

Recommended multipurpose grease .....
SAE J310a, NLGI grade #2EP

2. Press the bearing outer race into the bearing case with the special tools. (l 1S020)
3. Apply the specified wheel bearing grease to the outside circumference of the new oil seal. (11S021)

Recommended multipurpose grease .....
SAE 131 0a, NLGI grade #2EP

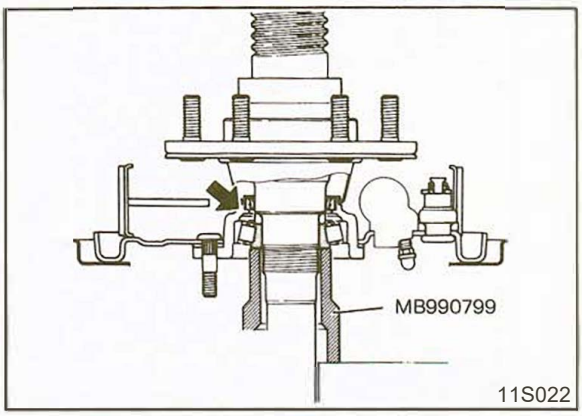


4. Press the new oil seal into the bearing case with the special tools until it is flush with the surface of the bearing cases. (11 S02 l)
5. Apply the specified wheel bearing grease to the lip of the oil seal.

Recommended multipurpose grease .....
SAE 131 0a, **NLGI** grade #2EP

6. Apply the specified wheel bearing grease to the roller surfaces of the bearing inner race.

Recommended multipurpose grease .....
SAE J3 l 0a, NLGI grade #2EP

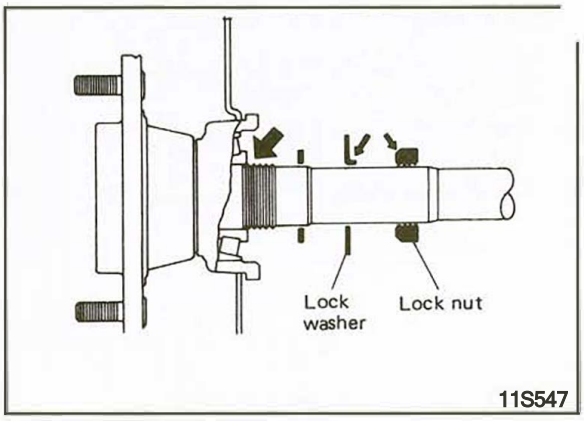


7. Install the rear brake assembly, the bearing case, and the bearing inner race in that order to the axle shaft.
8. Press the bearing inner race onto the axle shaft with the special tool. (11S022)

9. Pack the bearing case with the specified wheel bearing grease.

Recommended multipurpose grease ..... .
SAE J3 I0a, NLGI grade #2EP

10. Install the lock washer and the lock nut with the chamfered side in the direction shown in the illustration. When installing the lock washer, align the tab of the lock washer with the slot in the axle shaft. (11S547)

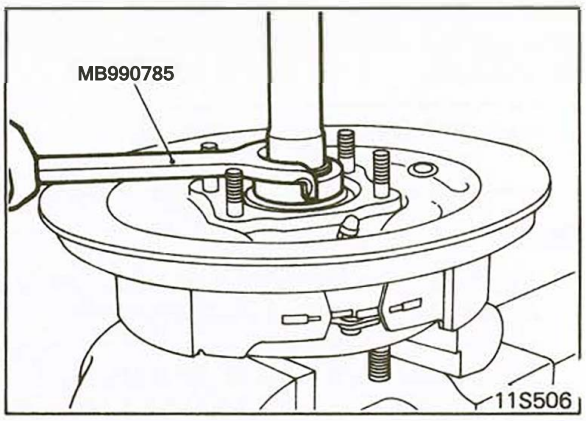


NOTE
Apply the specified wheel bearing grease to the threaded portion of the axle shaft before installing the lock nut.

Recommended multipurpose grease ..... .
SAE J3 10a, NLGI grade #2EP

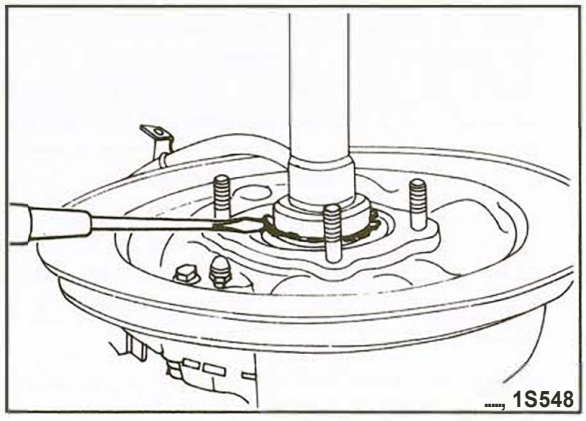
11. Tighten the lock nut to the specified torque using the special tool.

Rear axle bearing lock nut tightening torque .....
180-220 Nm (130-159 ft.lbs.)



12. Bend the tabs of the lock washer into the slots of the lock nut.

NOTE
If the slots in the lock nut and the tabs of the Jock washer are out of alignment, tighten the lock nut until they align.



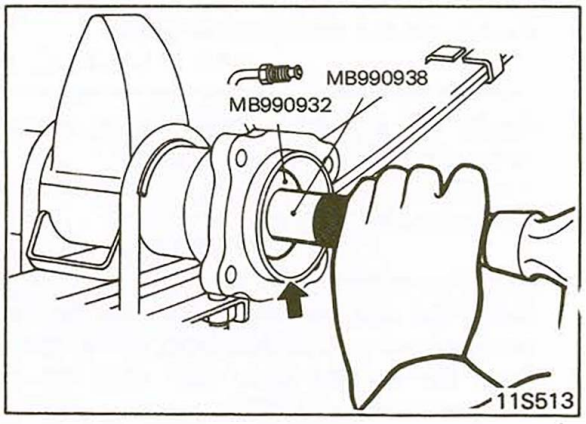
INSTALLATION

1. Apply the specified wheel bearing grease to the oil seal area of the rear axle housing.

Recommended multipurpose grease ..... .
SAE J3 10a, NLGI grade #2EP

2. Drive the new oil seal into the end of the rear axle housing with the special tools.(11S513)
3. Apply the specified wheel bearing grease to the oil seal lip.

Recommended multipurpose grease ..... .
SAE J31 0a, NLGI grade #2EP



4. Adjust the clearance between the bearing case and rear axle housing as follows: (1 1D528)
   (I) Insert a I-mm (.04-in.) shim and the 0-ring into the left rear axle housing.
   (2) Apply semi-drying sealant to the mating surface of bearing case, install the left axle shaft into the rear axle housing and tighten the nuts to the specified torque.

Bearing case to rear axle housing torque . . . . . .
50-60 Nm (36-43 ft.lbs.)

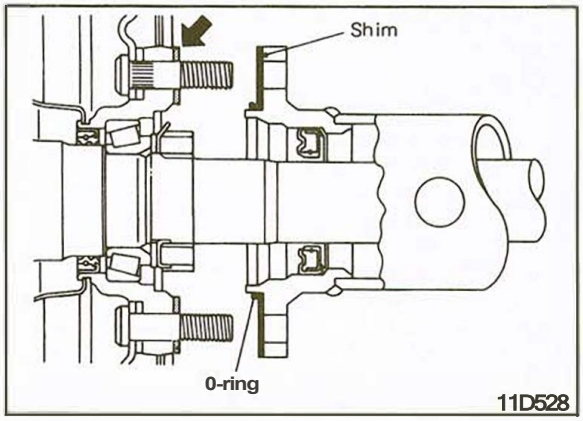
NOTE
Tighten the nuts diagonally.

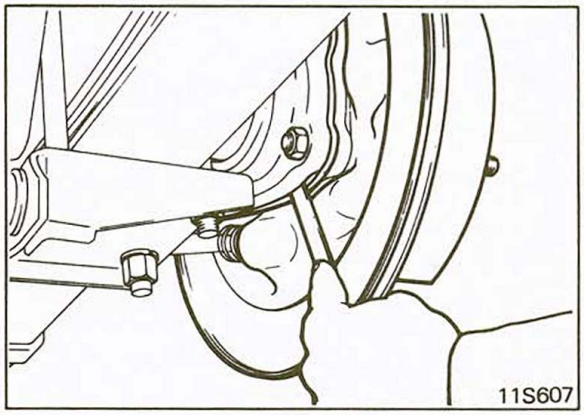
   (3) Install the right axle shaft without shim(s) and 0-ring, and temporarily tighten to about 6 Nm (4.3 ft.lbs.).
   (4) Measure the clearance between the bearing case and rear axle housing with a feeler gauge. (I 1S607)
   (5) Select shim(s) of the thickness which is equal to the sum of the measured clearance plus 0.05-0.20 mm (.002-.008 in.).
   (6) Remove the right axle shaft and install shim(s) and 0-ring on the right rear axle housing.
   (7) Apply semi-drying sealant to the mating surface of bearing case, install the right axle shaft into the rear axle housing and tighten the retainer bolts to the specified torque.

Bearing case to rear axle housing torque . . . . . .
50-60 Nm (36-43 ft.lbs.)

NOTE
Tighten the nuts diagonally.

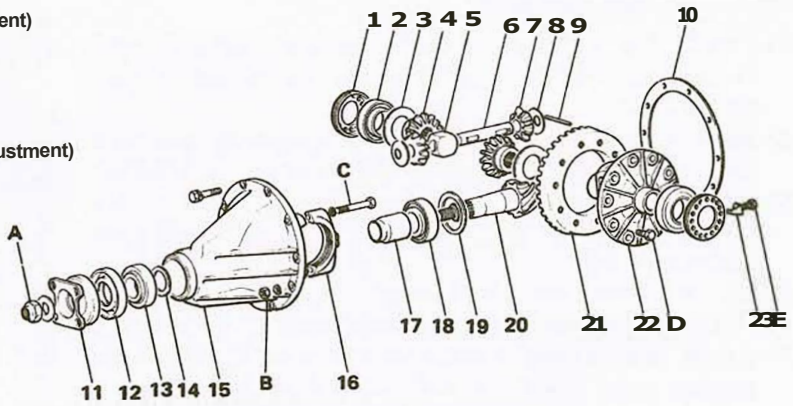
5. Check to be sure that the axle shaft end play is within the service limit. (Refer top. 3-10.)





COMPONENTS

1. Side bearing nut
2. Side bearing
3. Side gear thrust spacer
4. Side gear
5. Thrust block
6. Pinion shaft
7. Pinion gear
8. Pinion washer
9. Lock pin
10. Gasket
11. Companion flange
12. Oil seal
13. Drive pinion front bearing
14. Drive pinion front shim (for preload adjustment)
15. Gear carrier
16. Bearing cap
17. Drive pinion spacer
18. Drive pinion rear bearing
19. Drive pinion rear shim (for pinion height adjustment)
20. Drive pinion
21. Ring gear
22. Differential case
23. Lock plate

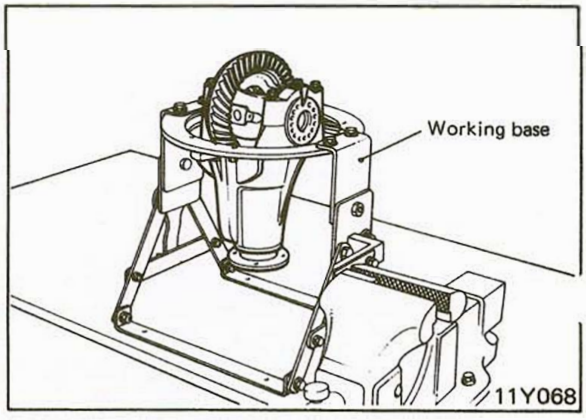


	Nm	ft.lbs.
A	190-250	137-181
B	25-30	18-22
C	55-65	40-47
D	80-90	58-65
E	15-22	11-16

11S079

REMOVAL

1. Remove the drain plug and drain the differential gear oil.
2. Detach the propeller shaft from the differential carrier. (Refer to GROUP 16.)
3. Pull the right and left axle shafts out about 70 mm (3 in.). (Refer top. 3-13.)
4. Remove the differential carrier from the rear axle housing. (Refer top. 3-12.)
5. Secure the working base in a vice, and mount the differential carrier to the working base. (11 Y068)



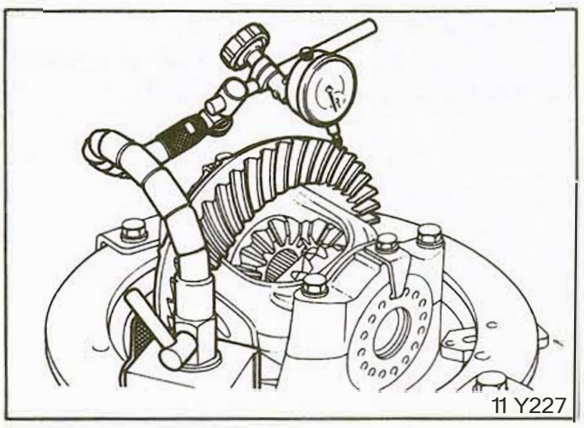
.'lSPECTION BEFORE DISASSEMBLY

Final Ring Gear Backlash

With the drive pinion locked in place, measure the final ring gear backlash with a dial indicator.

Final ring gear backlash ..... .
0.13-0. 18 mm (.005-.007 in.)

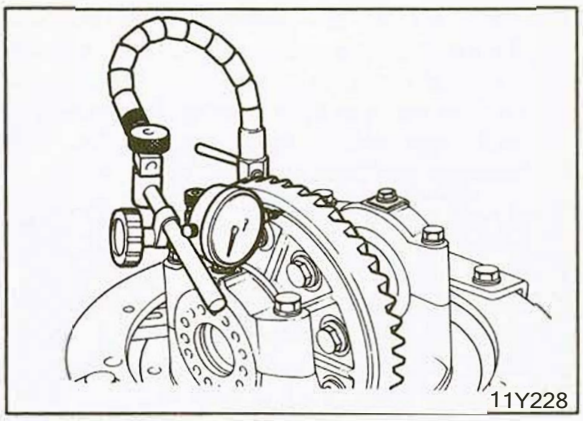
NOTE
Measure at four different points on the circumference of the ring gear.



Ring Gear Runout

Measure the ring gear runout at the shoulder on the back of the gear teeth.

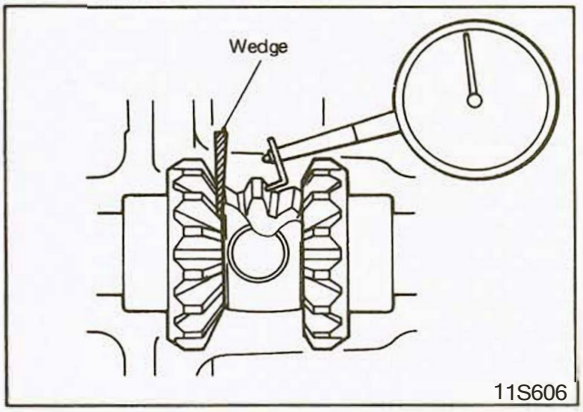
Ring gear runout [Repair limit] .....
0.05 mm (.002 in.)



Differential Gear Backlash

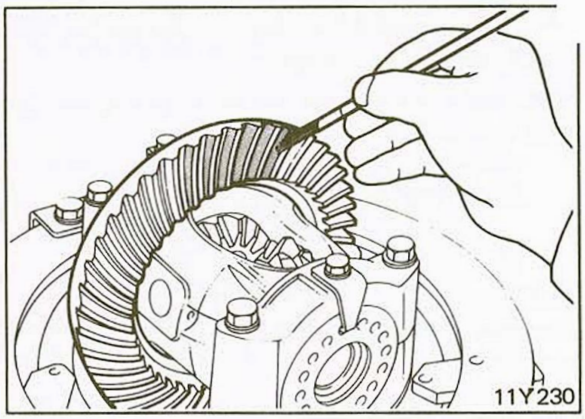
Lock the side gear with a wedge and measure the differential gear backlash with a dial indicator positioned on the pinion gear.

Differential gear backlash ..... .
0.05-0.13 mm (.002-.005 in.)



Final Ring Gear Tooth Contact

1. Apply a thin, uniform coat of marking compound to both sides of the ring gear teeth.



2. Insert a brass rod between the differential carrier and the differential case, and then rotate the companion flange by hand (once in the normal direction, and then once in the reverse direction) while applying a load to the ring gear [approximately 2.5 to 3.0 Nm (1.8 to 2.2 ft.lbs.) through the drive pinion]. (1 1Y628)

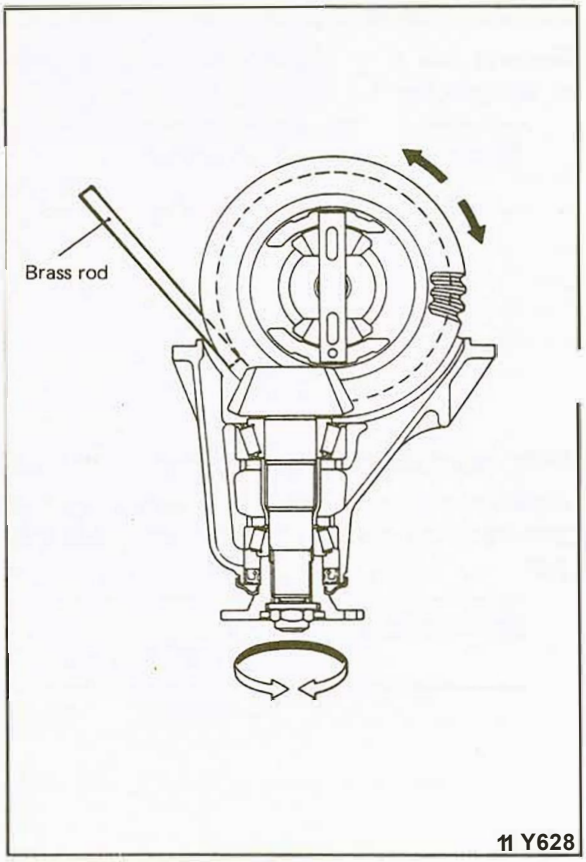
Caution
If the ring gear is rotated too much, the tooth contact pattern will become unclear and difficult to check.

3. Inspect the tooth contact pattern of the ring gear and drive pinion.

NOTE
Checking the tooth contact pattern is the way to confirm that the adjustments of the pinion height and backlash have been done properly. Continue to adjust the pinion height and backlash until the tooth contact pattern resembles the standard pattern.

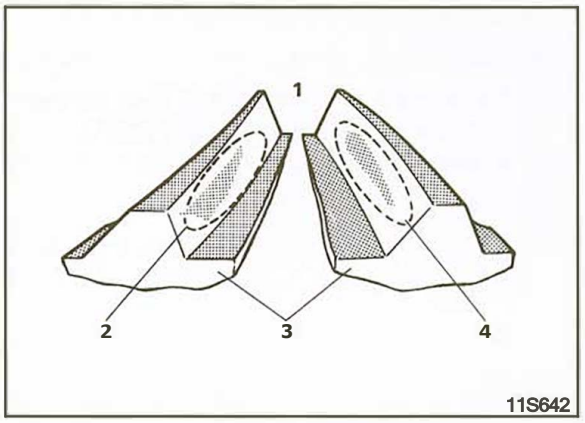
4. If the correct tooth contact pattern cannot be obtained even after adjustments have been made, replace the ring gear and pinion.

Caution
If either the ring gear or the drive pinion is to be replaced, be sure to replace them as a set.



landard tooth contact pattern

1. Toe
2. Drive-side
3. Heel
4. Coast-side



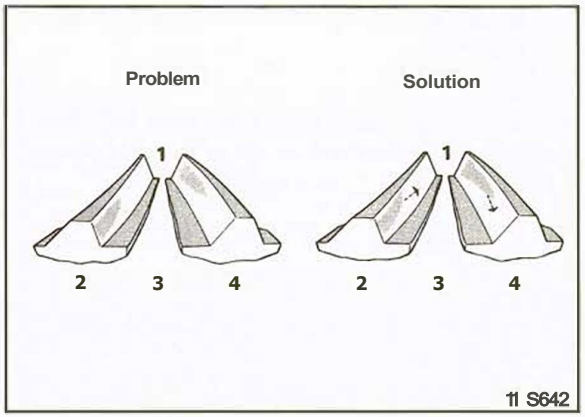
Tooth contact pattern resulting from excessive pinion height

Problem

The drive pinion is positioned too far from the center of the ring gear.

Solution

Increase the thickness of the pinion height adjusting shim, and position the drive pinion closer to the center of the ring gear.
For backlash adjustment, position the ring gear farther from the drive pinion.



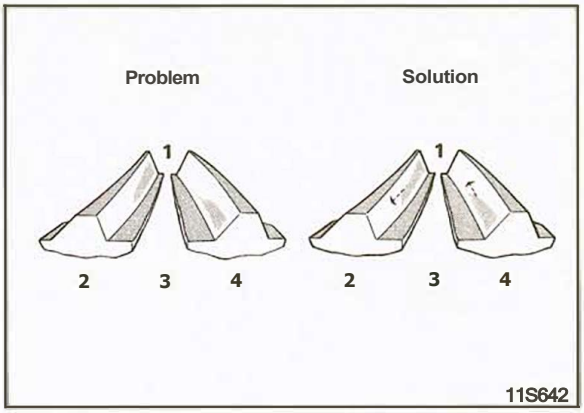
Tooth contact pattern resulting from insufficient pinion height

Problem

The drive pinion is positioned too close to the center of the ring gear.

Solution

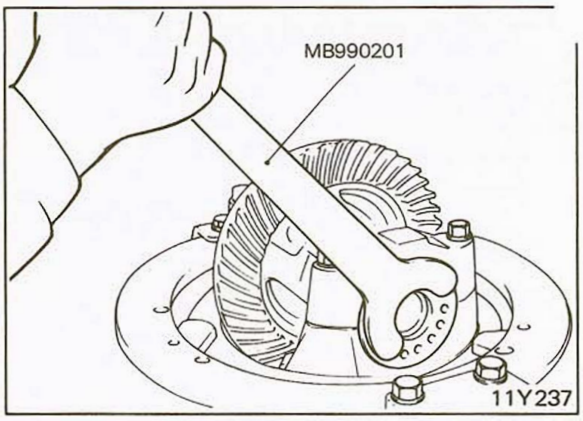
Decrease the thickness of the pinion height adjusting shim, and position the drive pinion farther from the center of the ring gear.
For backlash adjustment, position the ring gear closer to the drive pinion.



DISASSEMBLY

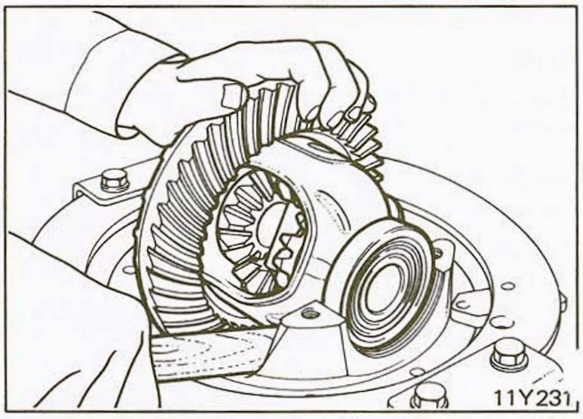
Differential Case Assembly

1. Remove the lock plates and then remove the side bearing nuts with the special tool. (11¥237)
2. Remove the bearing caps.

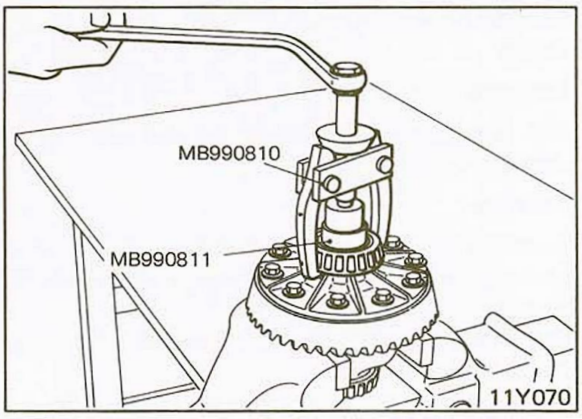


3. Remove the differential case assembly with hammer handles.

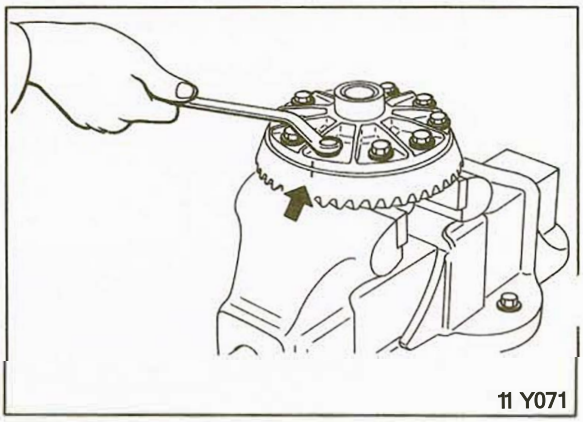
NOTE
Keep the right and left side bearings, bearing caps and side bearing adjusting spacers separate so that they do not become mixed up at the time of reassembly.



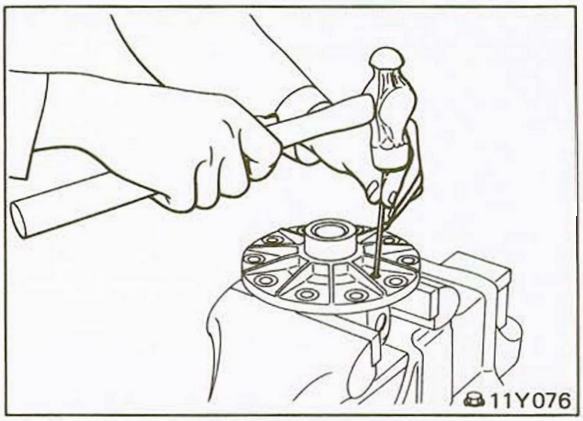
4. Remove the side bearing inner races with the special tools shown in the illustration.



S. Make mating marks on the differential case and ring gear. (1 JY071)
6. Loosen the ring gear bolts diagonally and remove the ring gear.

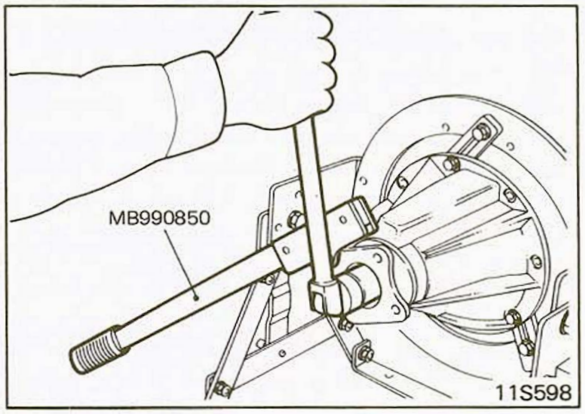


Remove the lock pin with a punch, and then remove the pinion shaft, pinion gears, pinion washers, side gears and side gear thrust spacers.

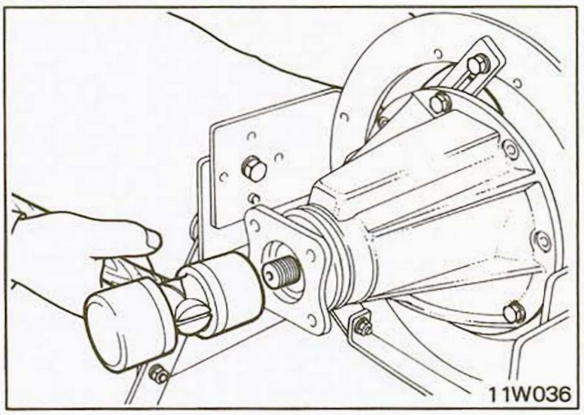


Drive Pinion

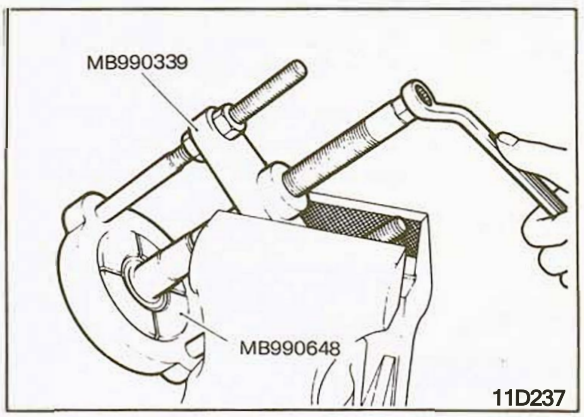
1. Use a special tool shown in the illustration to hold the companion flange and then remove the companion flange self-locking nut.



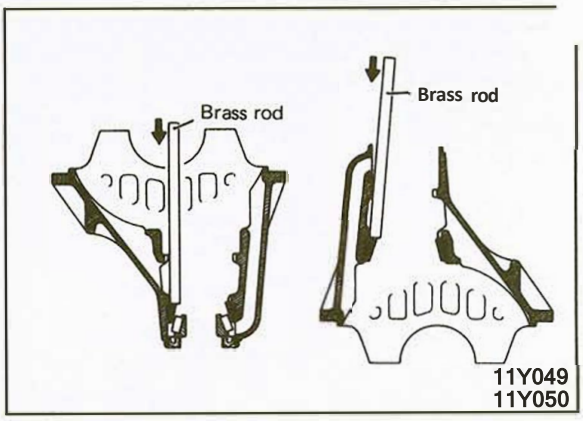
2. Make mating marks on the drive pinion and companion flange.
3. Remove the drive pinion together with the drive pinion spacer and drive pinion front shims. (11 W036)



4. Remove the drive pinion rear bearing inner race with the special tools shown in the illustration.



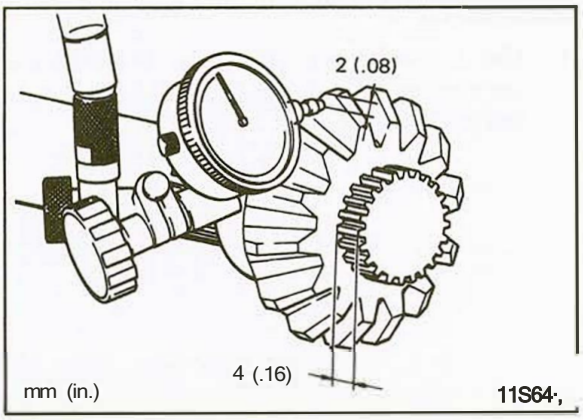
5. Remove the front drive pinion and rear bearing outer races with a brass rod.



INSPECTION

1. Check companion flange for wear or damage.
2. Check oil seal for wear or deterioration.
3. Check bearings for wear or discoloration.
4. Check gear carrier for cracks.
5. Check drive pinion and ring gear for wear or cracks.
6. Check side gears, pinion gears and pinion shaft for wear or damage.
7. Check axle shaft spline for looseness. With the axle shaft secured in a vice, measure the free play with a dial indicator. (11S641)

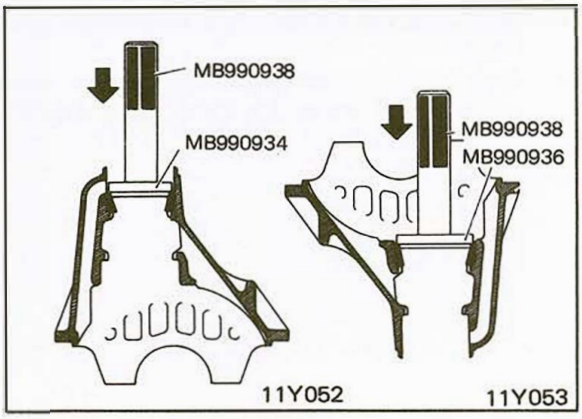
Axle shaft spline play	
[Service limit]	0.6 mm (.024 in.)



REASSEMBLY

Drive Pinion

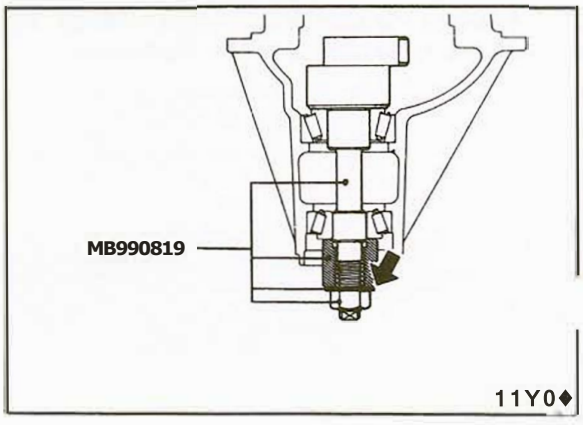
1. Press the drive pinion front and rear bearing outer races into the gear carrier with the special tools shown in the illustration.



2. Adjust the drive pinion height.
   (1) Mount the special tools and front and rear drive pinion bearings onto the gear carrier.

NOTE
Apply a thin coat of the specified multipurpose grease to the mating surfaces of the washer of the special tool.

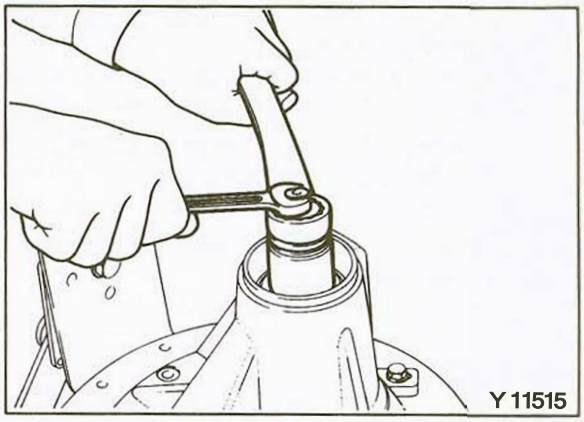
Recommended multipurpose grease	SAE 131 0a, NLGI grade #2EP

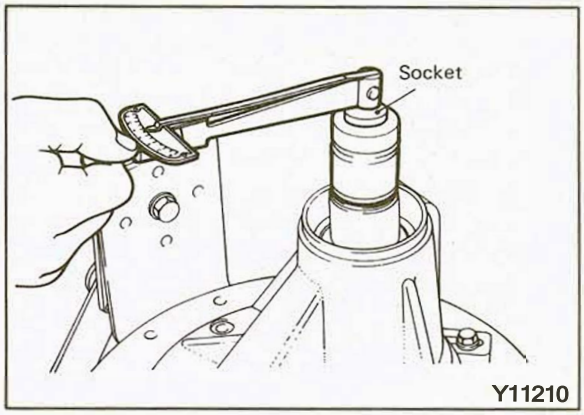


(2) Tighten the nut and measure the drive pinion turning torque (without the oil seal). (YI 1515, Y 11210)

NOTE
Loosen or tighten the nut as necessary to obtain the specified drive pinion turning torque.

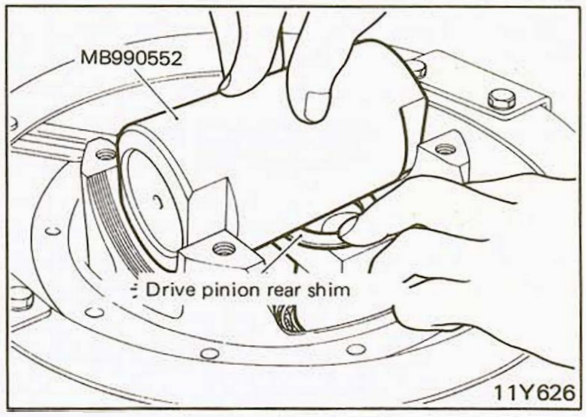
Drive pinion turning torque [without oil seal] ....
70-100 Nern (6.1-8.7 in.lbs.)





(3) Position the drum of the special tools in the side bearing seat of the gear carrier, and then select a drive pinion rear shim(s) of a thickness which corresponds to the gap between the special tools.

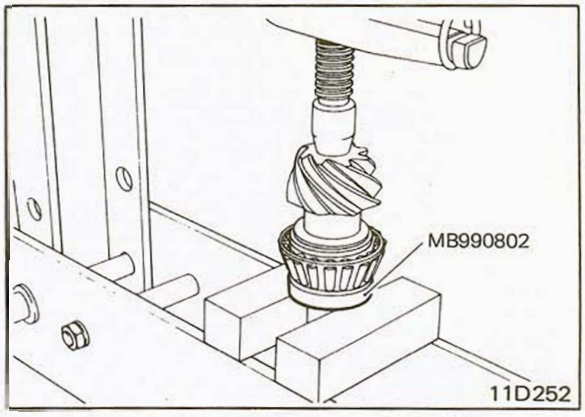
NOTE
Be sure to clean the side bearing seat thoroughly. When positioning the special tool, be sure that the cut-out sections of the special tool are in the positions shown in the illustration. Also confirm that the special tool is in close contact with the side bearing seat. When selecting the drive pinion rear shims, keep the number of shims to a minimum.



(4) Install the selected drive pinion rear shim(s) onto the drive pinion, and press the drive pinion rear bearing onto the pinion with a special tool. (11D252)

3. Adjust the drive pinion preload.
(1) Fit the drive pinion front shim(s) between the drive pinion spacer and the drive pinion front bearing inner race.
(2) Tighten the companion flange to the specified torque with the special tool (MB990850). (Refer top. 3-23.)

/OTE
Do not install the oil seal at this time.

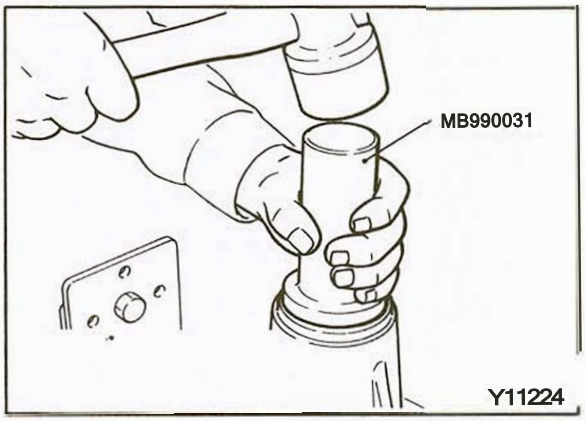


(3) Measure the drive pinion preload (without the oil seal). (Refer to p. 3-25.)
(4) If the drive pinion preload is not within the range of the standard value, adjust the preload by replacing either the drive pinion front shim(s) or the drive pinion spacer.

NOTE
Select a thicker drive pinion spacer if necessary to avoid using a large number of shims.

4. Remove the companion flange and drive pinion and drive the pinion seal into place with the special tool. (Y 11224)
5. Apply the specified multipurpose grease to the oil seal lip.

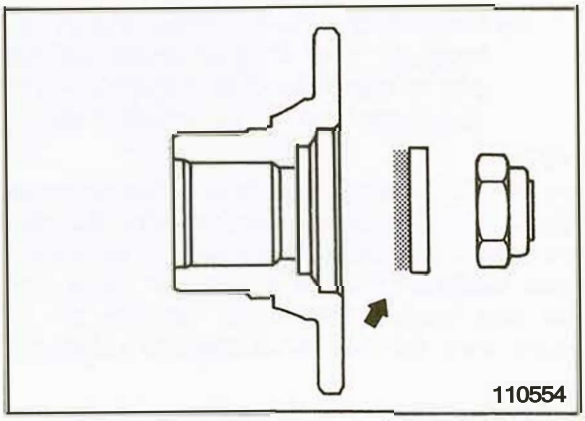
Recommended multipurpose grease	SAE J310a, NLGI grade #2EP



6. Install the drive pinion assembly and companion flange with the mating marks properly aligned, and tighten the companion flange self-locking nut to the specified torque with the special tool (MB990850). (Refer top. 3-23.)

NOTE
Apply a thin coat of specified multipurpose grease to the surface of the washer that contacts the companion flange before installing the drive pinion assembly.

Recommended multipurpose grease	SAE J310a, NLGI grade #2EP



7. Measure the drive pinion preload (with the oil seal) to verify that the drive pinion preload complies with the standard value. (Refer top. 3-25.)

ifferential Case Assembly

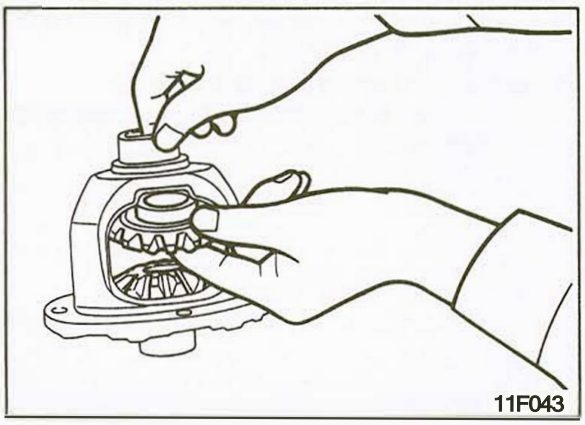
1. Assemble the side gears, side gear thrust spacers, pinion gears, and pinion washers into the differential case.

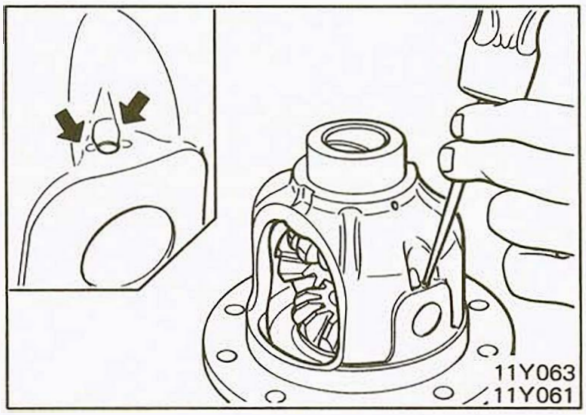
NOTE
Install the side gear thrust spacers with the oil grooves facing the side gears.

2. Install the pinion shaft and thrust block.

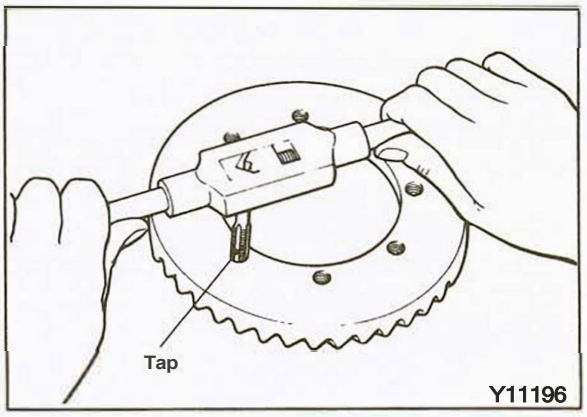
NOTE
Do not drive in the lock pin at this time.

3. Adjust the differential gear backlash.
   (I) Insert a wedge between the side gear and the pinion shaft to lock the side gear.
   (2) Measure the differential gear backlash with a dial indicator. (Refer top. 3-19.)
   (3) If the differential gear backlash exceeds the repair limit, adjust the backlash by installing thicker side gear thrust spacers.
   (4) Measure the differential gear backlash once again, and confirm that it meets specifications.
4. Align the pinion shaft lock pin hole with the differential case lock pin hole and then drive in the lock pin. (11 Y063)
5. Stake the lock pin at two points with a punch. (11 Y061)



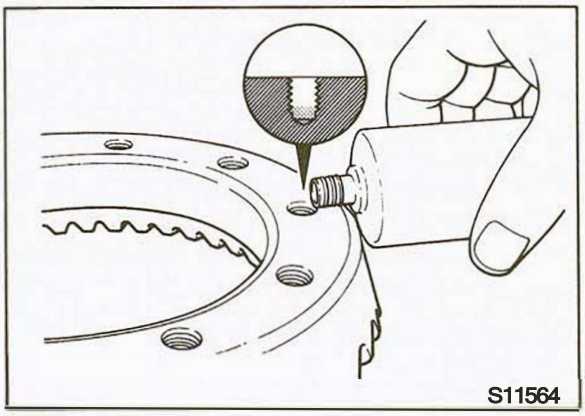


6. Clean the ring gear attaching bolts and remove the adhesive from the threaded holes of the ring gear with a M10 x 1.25 tap. Clean the threaded holes with compressed air.

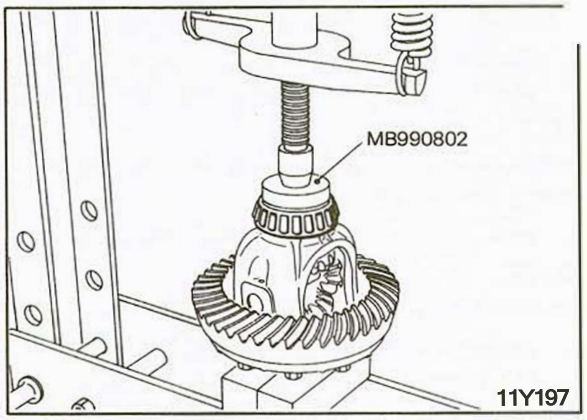


7. Apply LOCTITE 270 or 271 to the threaded holes of the ring gear. (S 11564)
8. Install the ring gear into the differential case with the mating marks properly aligned. Be sure to tighten the bolts diagonally to the specified torque.

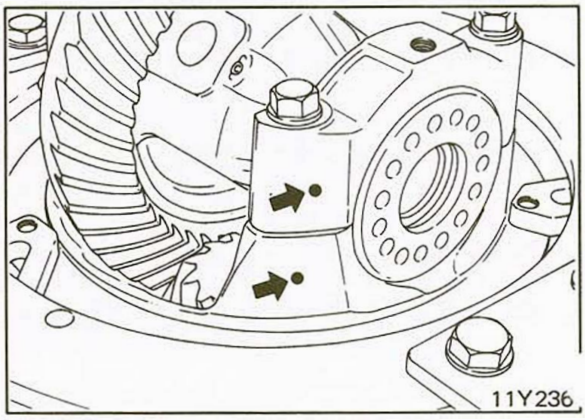
Ring gear bolt tightening torque	80-90 Nm (58-65 ft.lbs.)



9. Press the side bearings onto the differential case using the special tool. (11 Y 197)
10. Adjust the final ring gear backlash.
    (I) Mount the differential case assembly into the gear carrier.

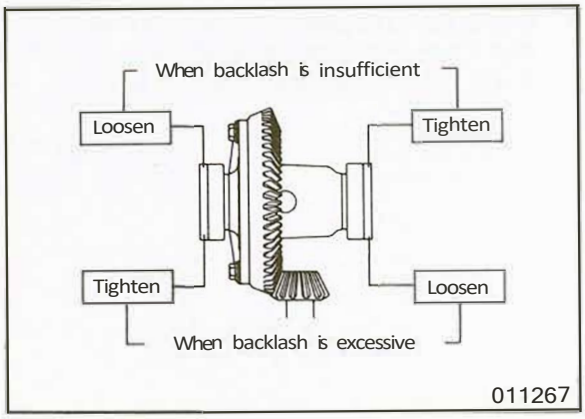


    (2) Align the mating marks on the gear carrier and the bearing cap, and then tighten the bearing cap. (l 1Y236)
    (3) Using the special tool (MB99020 l), temporarily tighten the side bearing nut until it is in the position just preloading of the side bearing. (Refer top. 3-22.)
    (4) Measure the final ring gear backlash. (Refer to p. 3-19.)



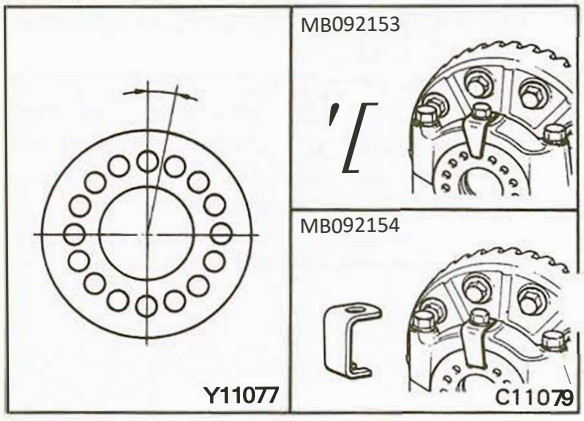
    (5) Using the special tool (MB99020 I), adjust the backlash to meet specifications by moving the side bearing nut as shown.

NOTE
First loosen the side bearing nut, and then tighten it by the same amount.



    (6) Using the special tool (MB990201), tighten both right and left side bearing nuts half the distance between centers of two neighboring holes. (YI I077)
    (7) Select and install the necessary lock plates (two kinds). (C 11079)

    (8) Check tooth contact of the ring gear and drive pinion. If the contact is not good, adjust (Refer to p. 3-20.), and then remeasure the backlash to verify that it agrees with the standard value.

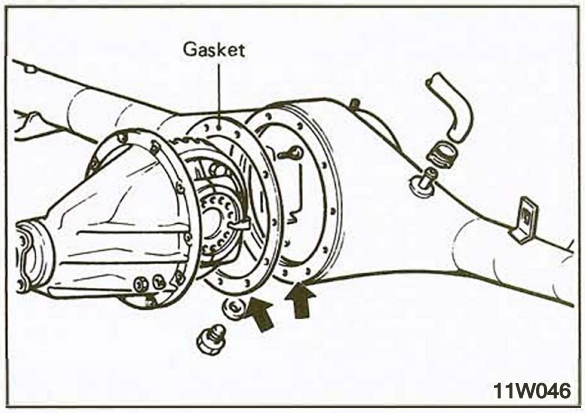


OTE
There is a correlation between the backlash and tooth contact of the ring gear. Coordinate their adjustment while checking both until both are within specifications. If correct adjustment cannot be made by moving the ring gear, adjustment of the drive pinion height is required.

11. Measure the ring gear runout. (Refer to p. 3-19.) If the ring gear runout exceeds the repair limit, reinstall the ring gear by changing the phase of the ring gear and differential case, and then remeasure the runout.
12. Torque all parts to specifications during assembly.

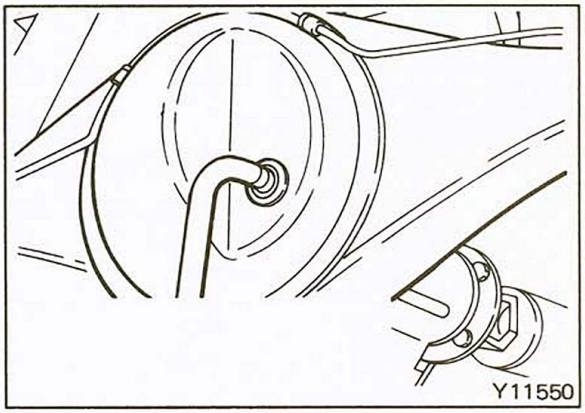
INSTALLATION

1. Before installing the differential carrier assembly, apply semi-drying sealant to both sides of the gasket and threaded portions of bolts. (11 W046)
2. Torque all parts to specifications during assembly.



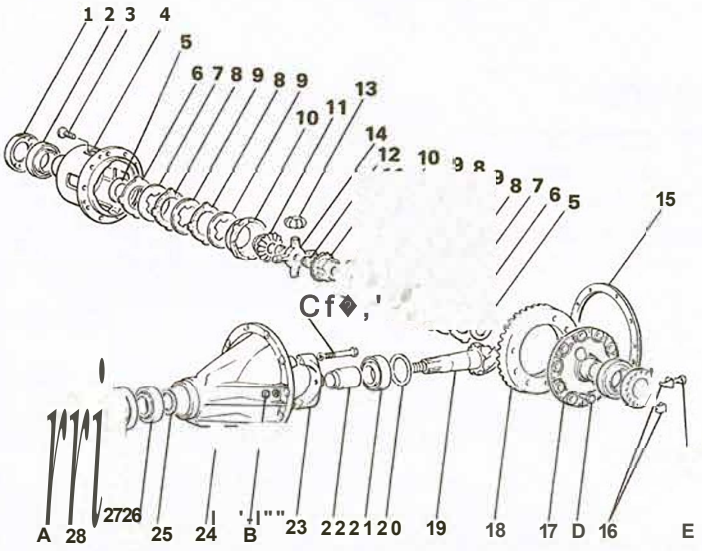
3. Supply the specified quantity of the specified gear oil.

Rear axle gear oil	Hypoid gear oil API classification GL-4 or GL-5 SAE viscosity No. 90, 1.80 liter (1.90 U.S.qt., 1.58 Imp.qt.)



COMPONENTS

1. Side beanng nut
2. Side bearing
3. Screw
4. Differential case B
5. Thrust washer
6. Spring plate
7. Spring disc
8. Friction plate
9. Friction disc
10. Pressure ring
11. Side gear
12. Thrust block
13. Differential pinion gear
14. Differential pinion shaft
15. Gasket
16. Lock plate
17. Differential case A
18. Ring gear
19. Drive pinion
20. Drive pinion rearshim (for pinion height adjustment)
21. Drive pinion rear bearing
22. Drive pinion spacer
23. Bearing cage
24. Gear came
25. Drive pinion front shim (for preload adjustment)
26. Drive pinion front bearing
27. Oil seal
28. Companion flange



	Nm	ft.lbs.
A	190-250	137-181
B	25-30	18-22
C	55-65	40-47
D	80-90	58-65
E	15-22	11-16

11S661

iUTLINE

A limited slip differential is an anit-slipping device which functions as a differential during cornering to allow the outer wheel to turn at a faster speed than the inner wheel. In the event that one wheel begins spinning (driving on slippery road surfaces, one wheel leaves the road surface, etc.), it automatically functions to prevent such spinning.

The only component of the limited slip differential that differs from a conventional differential is the differential case assembly. Therefore, the basic operation procedures for the following points are the same as those for a conventional differential. Refer to the following items.

INSTALLATION and REMOVAL of DIFFERENTIAL CARRIER ASSEMBLY (Refer to pp. 3-18 and 3-29.)

NOTE

Use the special oil in the limited slip differential.

MITSUBISHI genuine gear oil Part No. 8149630EX, or Mopar Hypoid Gear Lubricant Part No. 3744994 or 3744995 Plus Mopar Hypoid Gear Oil Additive/ Friction Modifier Part No. 4057100, or equivalent.

INSPECTION and ADJUSTMENT of Final Ring Gear Tooth Contact (Refer top. 3-20.)

INSPECTION and ADJUSTMENT of Final Ring Gear Backlsh (Refer top. 3-19.)

.1.NSPECTION and ADJUSTMENT of Drive Pinion Height (Refer to p. 3-24.)

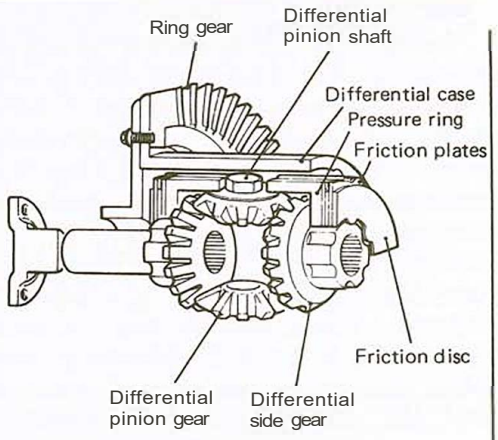
INSPECTION and ADJUSTMENT of Drive Pinion Preload (Refer top. 3-25.)

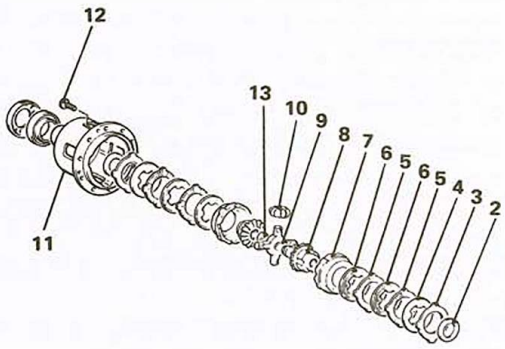
INSPECTION and ADJUSTMENT of Ring Gear Runout (Refer top. 3-19.)

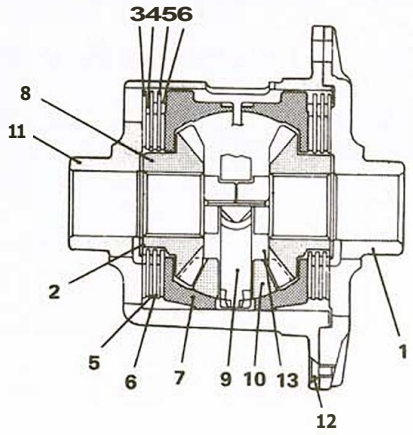
DISASSEMBLY, INSPECTION and REASSEMBLY of Drive Pinion (Refer to pp. 3-22 and 3-29.)

CONSTRUCTION AND FUNCTION

With a conventional differential, in the event that one wheel of the vehicle is on ice, mud, or some other slippery surface, the wheel will spin and the drive force of the vehicle will be greatly reduced. If this happens, the speeds of the differential case and of the side gear (axle shaft) are different because of differential operation. The limited slip function acts to limit this differential operation. The construction is shown in the illustration. The multi-plate clutches engage with the differential case and **with** each of the differential side gears. If spinning causes a differenece in component speeds, the frictional force between the clutch plates will cause the speed of the differential side gear to become closer to that of the differential case, and thus the limited slip function will control the spinning. In addition, the purpose of the pressure rings inside the differential case is to transmit the driving force to the pinion gear, and the reason for the separation is to provide an increase in the clutch plate pressing force through the leverage of the pinion shaft.





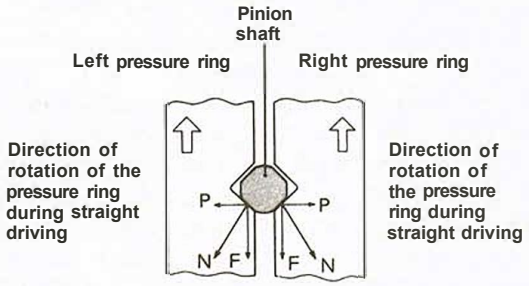


1. Differential case A
2. Thrust washer
3. Spring plate
4. Spring disc
5. Friction plates
6. Friction discs
7. Pressure ring
8. Differential side gear
9. Differential pinion shaft
10. Differential pinion gear
11. Differential case B
12. Screw
13. Thrust block

11S675
11S653
11S677

)PERATION (TORQUE TRANSMISSION) DURING STRAIGHT DRIVING

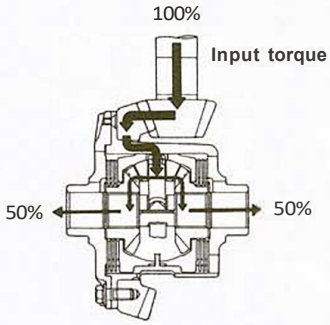
When the differential case is turned the drive pinion via the ring gear, the pressure rings which are interlocked with the differential case will also tum at the same speed. (The projections located on the outside of the pressure rings engage (with some play) the grooves located on the inside of the differential case.) When the pressure rings move in the direction of rotation, they contact the tapered portion of the differential pinion shaft, and thereby receive reaction force in both the lateral direction and the direction of rotation. The reaction force in the lateral direction presses the clutch plates together, and maintains straight driving. During such driving, because the road surface gives equal resistance to both the left and right wheels, equal resistance is applied to the left and right differential side gears. Therefore, the differential pinion gear does not revolve, and the ring gear, the differential case, the differential pinion shaft, the differential pinion gear, and the left and right differential side gears all tum as one unit.



Reaction force symbol code
P = Force of the pressure rings on the clutch plates
F = Force of the pressure rings on the pinion shaft
N = Resultant force of P + F

Distribution of the reaction force of the pressure rings

11 F 108



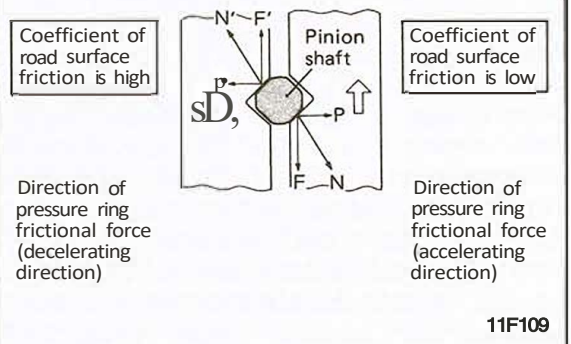
Transmission of torque (during straight driving)

11S652

OPERATION (TORQUE TRANSMISSION) WHEN THE SPEEDS OF THE LEFT AND RIGHT WHEELS ARE DIFFERENT

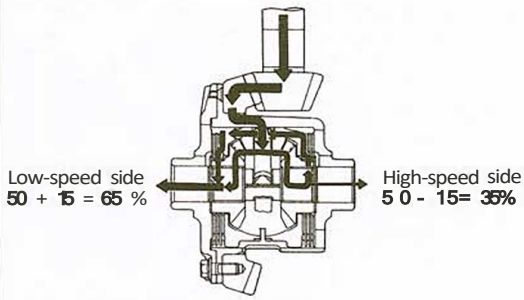
When one wheel is in contact with a concrete road surface (which has high coefficient of friction) and the other wheel is in contact with a muddy or other slippery road surface (which has low coefficient of friction), the differential operation will cause the speed of the wheel in contact with the slippery surface to be faster than the speed of the ring gear, lowering the maximum drive force. If this occurs, the limited slip function will control the differential operation and increase the driving force. The transmission of torque through the limited slip device in this event is as follows:

When the differential case is turned by the ring gear and the drive pinion, the pressure rings which are interlocked with the differential case will turn at the same speed. Also, the difference in the road surface resistances will cause differential operation and the left and right side gears will revolve at speeds different from that of the differential case. Because of the friction produced between the clutch plates in mesh with both the differential side gear and differential case, one of the pressure rings increases its rotating speed, whereas the other reduces its rotating speed. The pressure rings press the tapered portion of the differential pinion shaft with which they are in contact, and thereby receive reaction force in both the lateral direction and the direction of rotation. The reaction force in the lateral direction causes the clutch plates to mesh, increasing the frictional and the drive force.



Distribution of the reaction force of the pressure rings when there is a difference in the turning speed between the left and right wheels

Opposing force symbol code
P,P' = Pressing force of the pressure rings on the clutch plates
F,F' = Pressing force of the pressure rings on the pinion shaft
N,N' = Resultant force of P + F and P' + F'



Transmission of torque (when the revolution speeds of the left and right wheels are different)

11W511

i'EATURES OF THE LIMITED SLIP DIFFERENTIAL

When one wheel of the vehicle is in contact with a road surface which has poor traction, the limited slip differential, in comparison to a conventional differential, supplies additional torque to the wheel which has the better traction conditions by utilizing clutch plates, thus improving the traction capacity. Moreover, the effect of the limited slip differential is to prevent the vehicle from becoming stuck, even if the traction of one of the wheels becomes radically reduced.

When one wheel moves from a road surface which has poor traction onto one which has good traction, or when the wheels are constantly leaving the road surface while driving on a rough, bumpy road, the clutch plates of the limited slip differential allow the torque to absorb the differences between the revolution speeds of the right and left wheels. In addition, the sudden changes (jolting) in the drive force are also absorbed, thus preventing skidding.

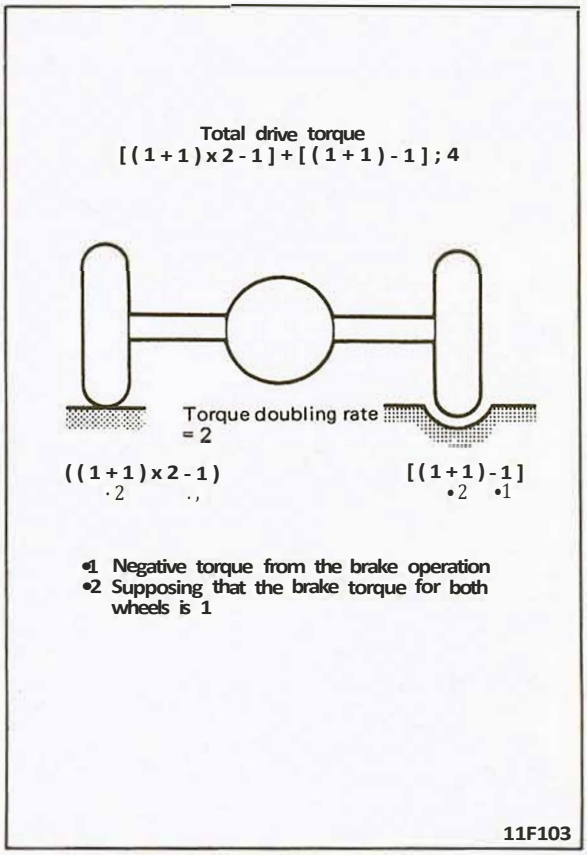
Because in the limited slip differential, the differential operation is slightly restricted during normal cornering, the understeer tendency (the tendency for the cornering of the vehicle to exceed the turning of the steering wheel) becomes greater; however, this does not have any detrimental effect on the driving of the vehicle. Moreover, in the event that the inside wheel lifts up (the tire leaves the road surface) during high-speed cornering, the clutch plates function to limit differential operation which would simultaneously decrease the drive t'orce of the outside wheel; therefore, the limited slip differential moderates sudden speed reductions during vehicle cornering, and thereby provides greater cornering capability than a conventional differential.

MAKING EFFECTNE USE OF A LIMITED SLIP DIFFERENTIAL

Effective Use in Combination with the Brakes

If a wheel is in contact with a slippery road surface and has begun to spin, using the brakes in combination with the limited slip differential will provide even greater traction capability. The resistance caused by the brakes will further increase the drive torque of the engine, and this increased torque will increase the clutch plate pressing force of the pressure ring, thus increasing the traction. Also, the drive force transmitted to the brakes will not function as real drive force. This is shown in the illustration at right.

In the illustration at the right, the application rate is Rt = 2, and, supposing the torque from the brake operation is 1, a drive torque of 1 + I = 2 will be applied to the spinning wheel (the right wheel), and a drive torque of twice that which is applied to the spinning wheel, or (1 + 1) x 2 = 4, will be applied to the wheel which is not spuming (the left wheel). However, because the brake force of 1 is a negative ;alue with regard to the propulsion torque of each wheel, the propulsion torque actually obtained by the right wheel is (I + 1) - 1 = 1, and that obtained by the left wheel is [(I + I) x 2 - 1) = 3.



Therefore, the total drive torque is I + 3 = 4. In the same circumstances, the total drive torque of a conventional differential is 1 + I = 2, and that of a limited slip differential when the brakes are not used in combination is I + 2 = 3. This represents an increase in the traction by a factor of 2 over that of a conventional differential, and by a factor of 1.3 over that of a limited slip differential when the brakes are not used.

NOTES REGARDING SERVICE PROCEDURES FOR THE LIMITED SLIP DIFFERENTIAL

The engine must never be operated while only a single wheel is jacked up. Doing so is extremely dangerous; if the differential functions while the engine is operated at high speed, the oil film between the clutch plates will decrease, thus causing the friction coefficient to increase, the prescribed torque ratio will be exceeded, an excessive amount of torque will be applied to the stationary wheel, and the vehicle will move forward. Also, resistance must never be applied to the spinning wheel.

In the event that one of the wheels comes in contact with a slippery road surface and begins to spin, if the engine continues to be operated at high speed for too long, the clutch plates might become abnormally worn; such action must be avoided.

Use only Mitsubishi genuine gear oil, part No. 8149630. This oil has been developed exclusively for use in the limited slip differential and it differs from ordinary gear oil. When changing the oil, the oil which is removed will appear considerably blacker than ordinary oil. This, however, is not a change in color due to the deterioration of the oil, but rather the oil has become mixed with worn particles of the special treatment on the clutch plates.

REMOVAL/INSPECTION BEFORE DISASSEMBLY

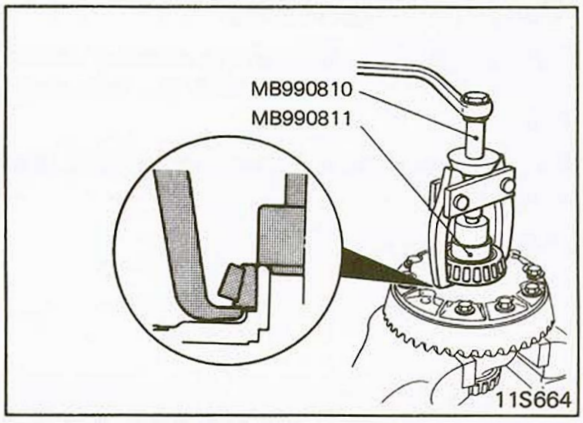
For information concerning REMOVAL/INSPECTION BEFORE DISASSEMBLY (except for differential gear backlash), refer top. 3-18 and p. 3-19.

>ISASSEMBLY

Differential Case Assembly

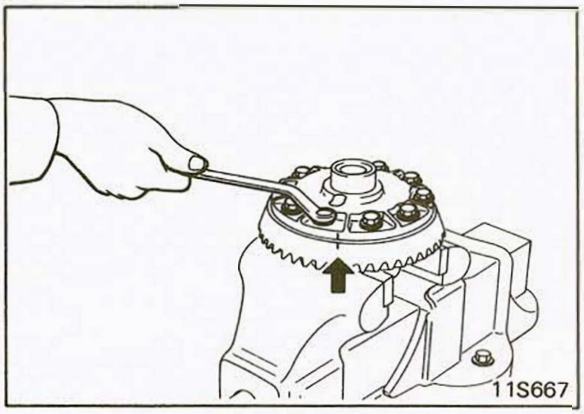
1. Remove the differential case assembly from the gear carrier. (Refer to p. 3-22.)
2. Remove the side bearings with the special tools. (l 1S664) Attach the prongs of the special tool to the inner race of the side bearing through the openings in the differential case.

NOTE
Keep the right and left wheel bearings separate in order to be able to distinguish them for reassembly.



3. Make mating marks on the case and ring gear and remove the ring gear bolts diagonally. (1 IS667)
4. Remove the ring gear.

NOTE
An anti-looseness agent has been used on the bolts. If they cannot be loosened, heat the area to approximately 150°C (302°F) with a propane torch, and then loosen them.

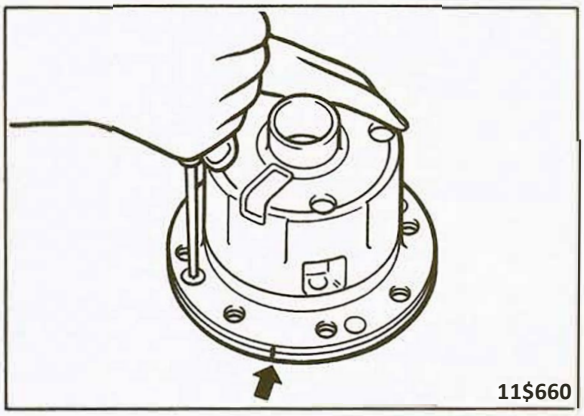


5. Loosen the screws of differential cases A and B evenly, a little at a time. (11S660)
6. Separate differential case A from differential case B.

NOTE
Before disassembling the differential cases, confirm that the mating marks (numbers) on case A and case B are the same.

7. Remove the components from differential case B.

NOTE
Keep the right and left thrust washers, spring plates, spring discs, friction plates, and friction discs separate in order to be able to distinguish them for reassembly.



Drive Pinion

Refer to p. 3-23 for information concerning drive pinion DISASSEMBLY.

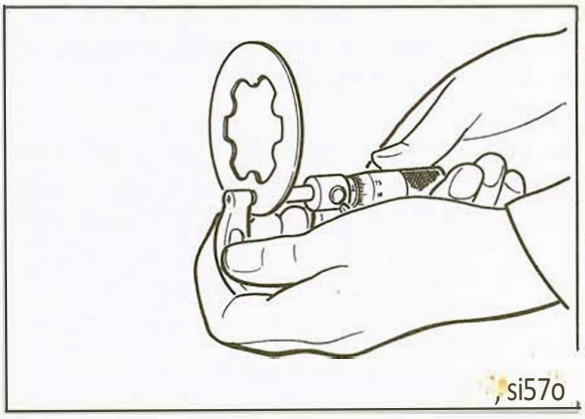
INSPECTION AND REPAIR

Wash the disassembled parts in cleaning solvent and dry them with compressed air, then check the following areas.

NOTE
For inspection information other than that given below, refer to p. 3-24.

Inspection of Friction Plates and Discs for Wear

(I) In order to check the wear, measure the thicknesses of the friction surfaces and projections of the friction discs and plates, and then find the difference.
(The same procedure is used for the spring discs and the spring plates.) (11S670)



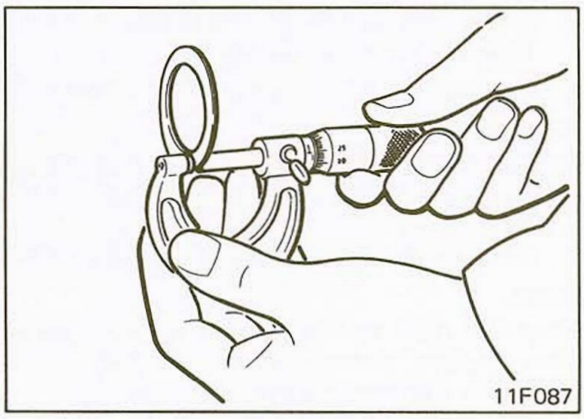
Clutch plate thickness [Service limit] ..... .
0.1 mm (.004 in.) or less

NOTE
Make the measurement at several different points.

(2) If the parts are worn beyond the allowable limit, replace them with new parts.
Refer to the section regarding adjustments for information concerning selection of thickn ss.

Inspection of Thrust Washer for Wear

(1) Measure the thickness of the thrust washer. (I IF087)



Thrust washer thickness [Service limit] ..... .
1.4 mm (.55 in.) or more

(2) If the thrust washer is worn beyond the limit, replace it with a new one. Refer to the section regarding adjustments for information concerning selection of thickness.

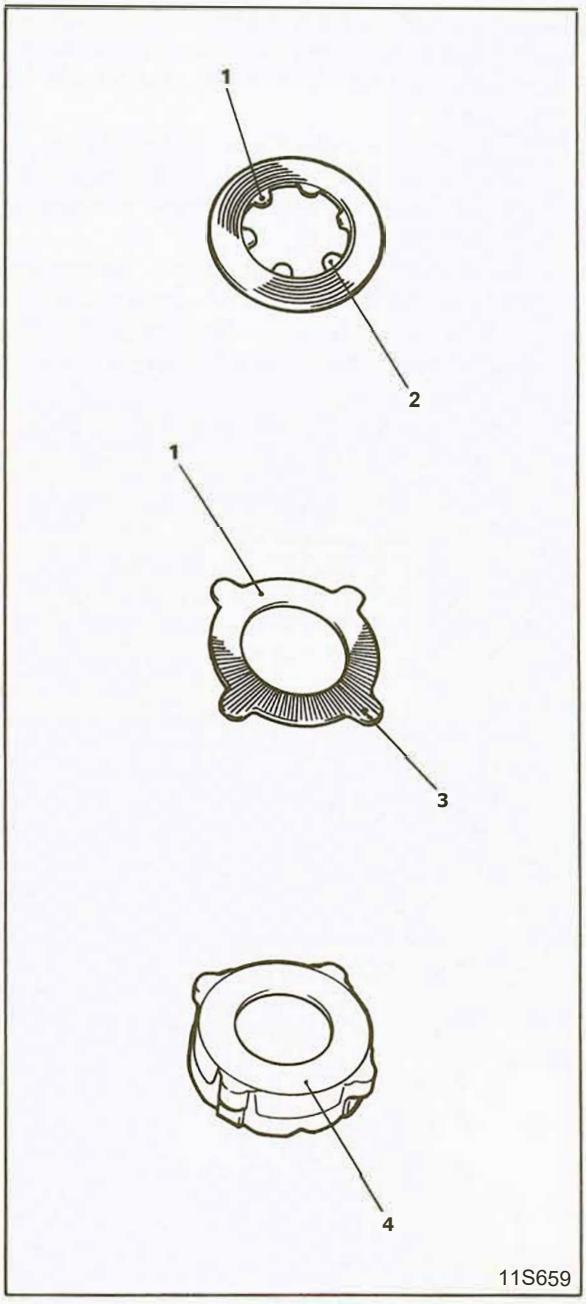
spection of Contact and Sliding Surfaces of Parts

1. Inspect the clutch plates and pressure rings.
   (1) The friction surfaces of the friction plates, friction discs, spring plates, and spring discs.
   If there are any signs of seizure, severe friction, or color change from heat, the locking performance will be adversely affected. Replace the part with a new one.

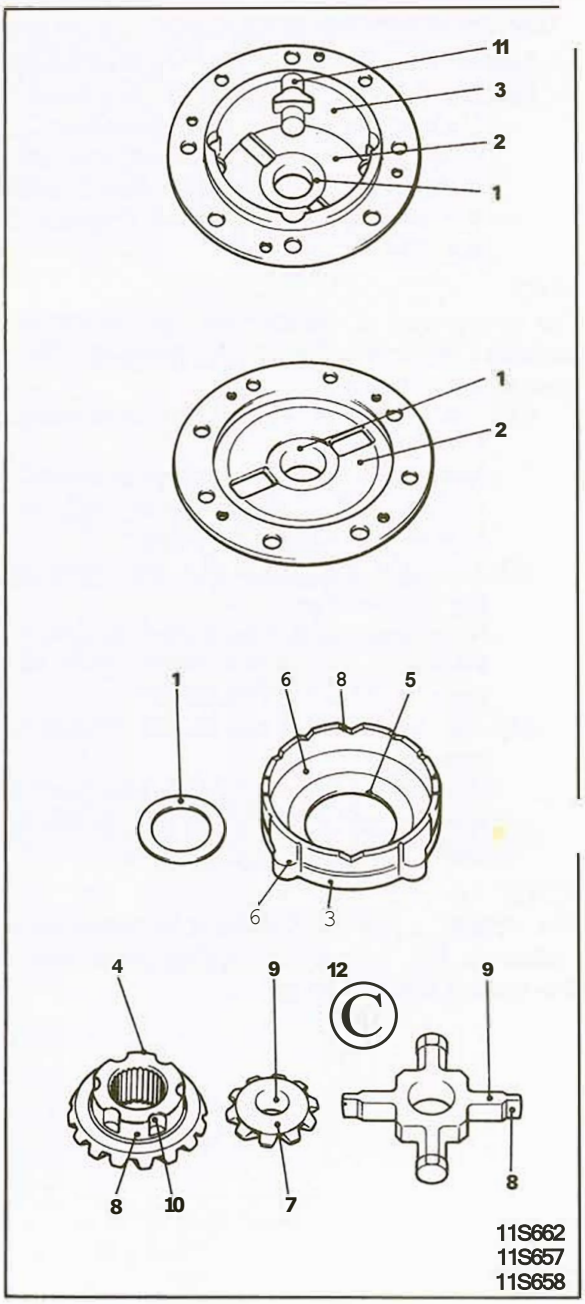
NOTE
The strong contact on the inner circumference of the friction surfaces is because of the spring plate and the spring disc; this wear is not abnormal.

   (2) The six projections on the inner circumference of the friction disc.
   Nicks or dents will cause abnormalities in the clutch pressure; if present, repair with an oil stone, or replace the parts if necessary.
   (3) The four projections on the outer circumference of the friction disc.
   Nicks and dents will cause abnormalities in the clutch pressure; if present, repair with an oil stone, or replace the parts if necessary.
   (4) The friction surface of the friction disc of the pressure **ring.**
   If there are nicks or scratches, repair by first grinding with an oil stone and then polishing with rubbing compound on a surface plate.

NOTE
The strong contact on the inner circumference of the friction surface is because of the spring plate and the spring disc; this wear is not abnormal.



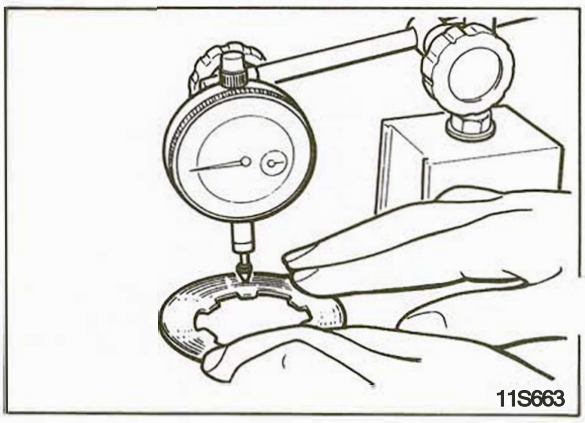
2. Inspect the contact and sliding surfaces listed below, and repair any nicks and burrs with an oil stone.
   (1) The sliding surfaces of the thrust washers and the case.
   (2) The spring contacting surface of the differential case.
   (3) The contact surfaces of the outer circumference of the pressure rings and the inner circumference of the differential case.
   (4) The sliding surface of the thrust washers.
   (5) The sliding surfaces of the hole in the pressure rings and the outer circumference of the side gears.
   (6) The projections on the outer circumference of the pressure rings.
   (7) The spherical surface of the differential pinion gears and the inner diameter of the pressure rings.
   (8) The V-shaped groove in the pressure rings, and the V-shaped part in the pinion shaft.
   (9) The outer diameter of the pinion shaft and the hole in the differential pinion gears.
   (10) The outer circumference groove of the side gears.
   (11) The inner circumference groove of the differential case.
   (12) The sliding surface of the thrust blocks.



Inspection of Friction Plates and Discs for Warping

Using a dial indicator, measure the amount of warping (the flatness) of the friction plate and friction disc on a surface plate.

Friction plate and disc warping [Service limit]	0.08 mm (.03 in) or less



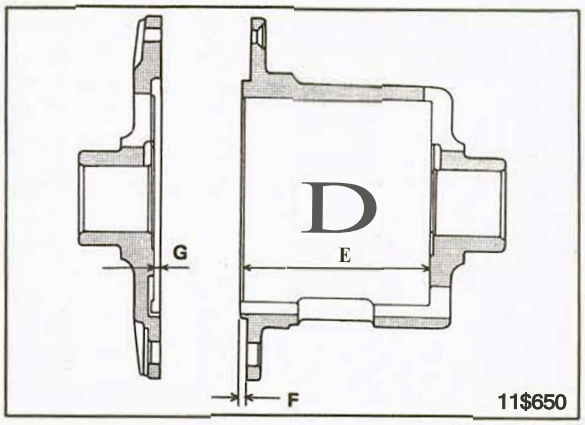
EASSEMBLY

Drive Pinion

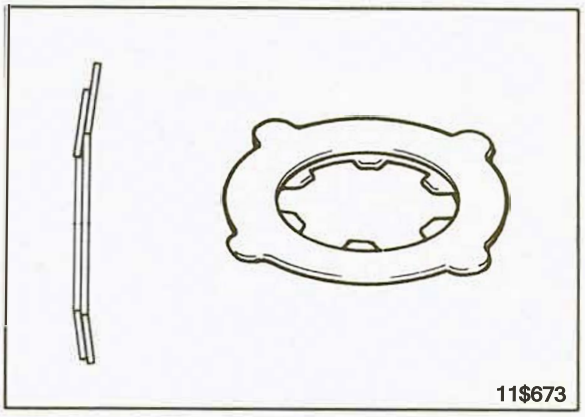
For information concerning drive pinion reassembly, refer to p. 3-24.

Differential Case Assembly

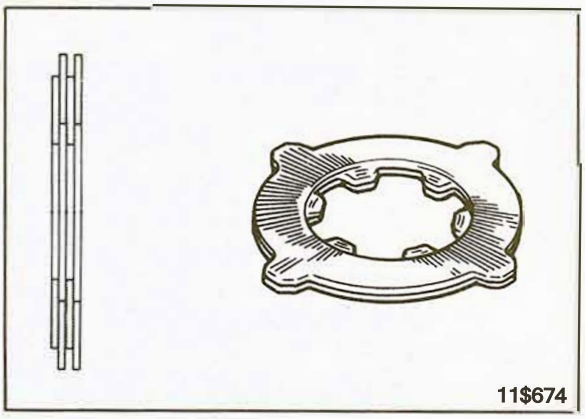
1. Before assembly, use the following method to adjust the dimensional differences of the clearance between the clutch plates and differential case when installing the internal components into the differential case.
   (I) Measurement of differential case depth
   Depth of the differential case: A
   A=E−F+G



   (2) Measurement of spring disc and spring plate thickness
   Measure the thickness using a micrometer, with the spring disc and spring plate both extended in the same direction and one placed over the other. Arrange them so that the difference between right and left is minimized.
   Right side: Lr
   Left side: U

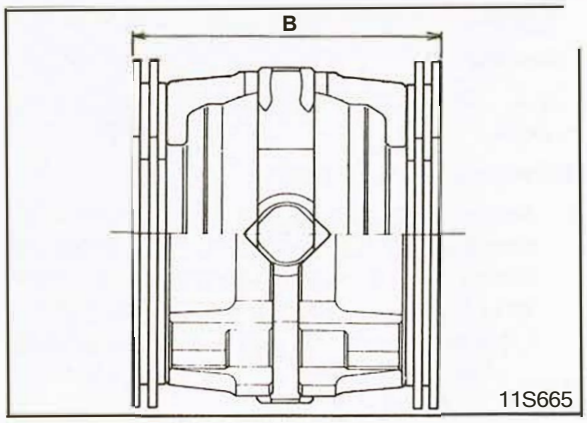


   (3) Measurement of friction disc and friction plate thickness
   In the same way as described the above, combine the two friction discs and the two friction plates, as shown in the illustration, so that the difference in thickness is minimized.
   Right side: Kr
   Left side: K£



NOTE
The difference between (Lr + Kr) and (LQ + K12) must be 0.05 mm (.002 in.) or less.

(4) Assemble the right and left friction plates, friction discs, differential pinion shafts, and pressure rings, and then measure the total width, as shown in the illustration. Consider this to be "B". (l 1S665)



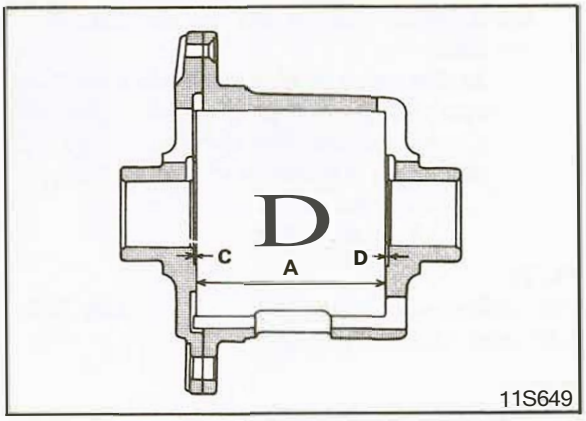
NOTE
Manually hold the V-shaped groove, squeeze the groove together, and measure.
All parts should be dry.

(5) If the difference "S" between the depth "A" of the differential case and the overall width "B" obtained previously plus the spring thickness is not within the range of the standard value, replace the friction discs to adjust.

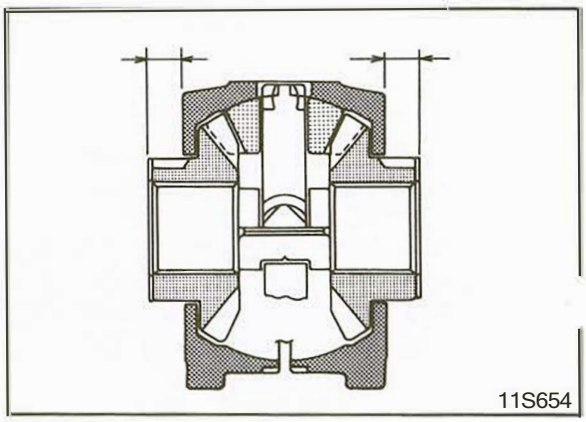
$$S = A - (B + IQ + Lr)$$

NOTE
Be careful not to mix the types of clutch plates selected for the right and left sides.

2. Make the adjustment as follows so that the dimensional difference of the shaft direction of the differential side gear while it is assembled into the differential case agrees with the standard value.
   (1) Measure depth of contact surfaces of differential case. Measure the depths of the thrust washer contact surfaces of differential case A and B with calipers. Assume these to be "C" and "D".
   (2) Assemble the pressure rings, the differential pinion gears, the differential side gears, the differential pinion shafts, and the thrust washers, and then measure the distances from the backs of the pressure rings to the ends of the thrust washers. Select thrust washers so that the difference between the right and left measured values is less than 0.05 mm (.002 in.).



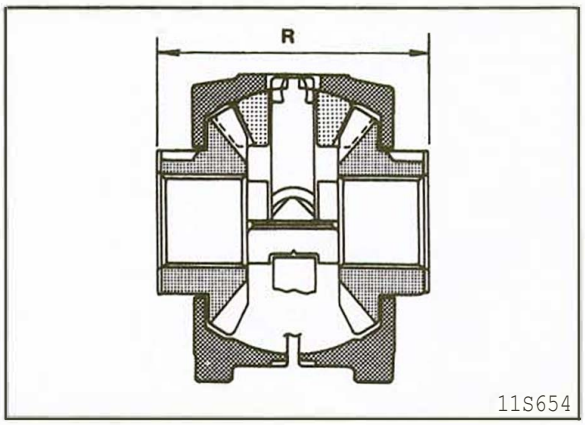
NOTE
Measure with calipers while squeezing the V-shaped groove manually.



(3) Overall width measurement
In the same condition as described above, measure the overall width as shown in the illustration.
Consider this to be "R". (l 1S654)

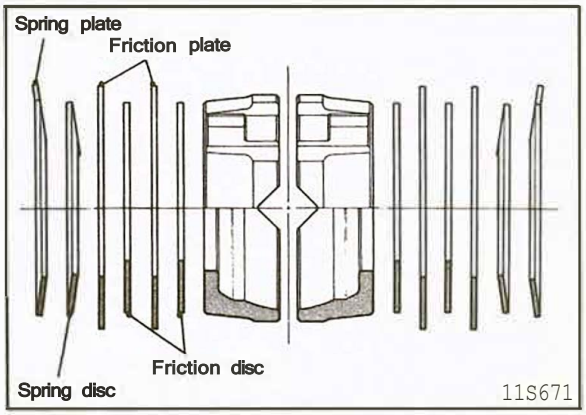
(4) Clearance adjustment
Using the width of the assembled differential unit and the depth of the differential case, check whether the clearance "V" is within the standard value or not. If it is not within the standard value, replace the thrust washers to adjust.

$$V=A+C+D-R$$



3. Before assembly, apply the specified gear oil to each component.
4. Be especially careful to coat all contact surfaces and sliding surfaces.
The order of assembly is the reverse of that for disassembly.

5. The directions for assembly is as shown in the illustration. (11S671)
6. Be careful not to insert the clutch plates in the incorrect order or to install the springs in the wrong direction.

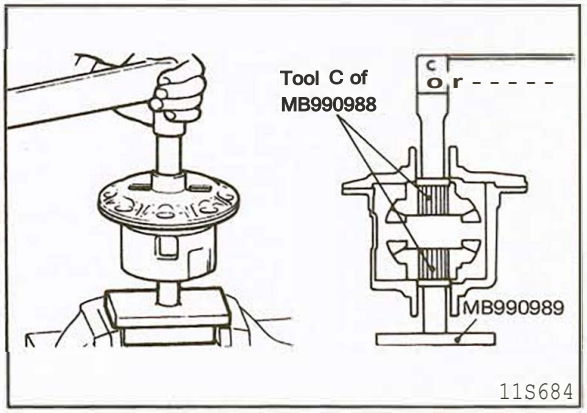


NOTE
Be sure that mating marks on the differential cases are matched.

7. After assembly, in order to check the frictional force of the clutch plates, use the special tools to measure the starting torque. (11S684)

NOTE
Rotate the unit slightly before measuring the starting torque. When measuring the torque, do so at the beginning of movement.

8. For reassembly of the unit, beginning with the adjustment of ring gear runout, refer to p. 3-27.
9. Torque parts to specifications during assembly.



BRAKES
SERVICE AND PARKING

CONTENTS

GENERAL SPECIFICATIONS

Master cylinder	
Type	Tandem type
I.D. mm (in.)	22.22 (.87)
Brake booster	
Type	Vacuum type
Effective dia. of power cylinder mm (in.)	203.2 (8.0)
Boosting ratio [Brake pedal depressing force]	4.0
Front brakes	
Type	F-type disc
Disc O.D. mm (in.)	255 (10.04)
Disc thickness mm (in.)	20 (.79)
Pad thickness mm (in.)	10.5 (.41)
Cylinder I.D. mm (in.)	53.97 (2.12)
Clearance adjustment	Automatic
Rear brakes	
Type	Leading and trailing shoe type drum
Drum I.D. mm (in.)	254 (10.0)
lining thickness mm (in.)	4.6(.18)
Cylinder I.D. mm (in.)	20.64 (.81)
Clearance adjustment	Automatic
Parking brakes	
Type	Mechanical brake acting on rear wheels
Brake engagement	Lever type
Cable routing	V-type

SERVICE SPECIFICATIONS

Standard values	
Brake pedal height mm (in.)	191-196 (7.5-7.7)
Stop light switch outer case to pedal arm clearance mm (in.)	0.5-1.0 (.02-.04)
Brake pedal free play mm (in.)	10-15 (.4-.6)
Brake pedal to floorboard clearance mm (in.)	95 (3.7) or more
Booster push rod to master cylinder piston clearance mm (in.)	0.1-0.5 (.004-.020)
Disc brake dragging force N (lbs.)	74 (16)
Brake shoe outside diameter mm (in.)	253.2-253.5 (9.97-9.98)
Parking brake lever stroke	4-6 clicks
Repair limit	
Brake disc runout mm (in.)	0.15 (.006)
Service limits	
Master cylinder body to piston clearance mm (in.)	0.15 (.006)
Pad thickness mm (in.)	1.0 (.04)
Disc thickness mm (in.)	18.4 (.72)
lining thickness mm (in.)	1.0 (.04)
Drum I.D. mm (in.)	256.0 (10.08)
Wheel cylinder body to piston clearance mm (in.)	0.15 (.006)

ORQUE SPECIFICATIONS

	Nm (ft.lbs.)
Brake booster to pedal support	8-12 (6-9)
Pedal shaft	25-35 (18-25)
Reservoir stopper bolt	1.5-3.0 (1-2)
Check valve case	40-50 (29-36)
Check valve cap	25-35 {18-25)
Piston stopper	1.5-3.0 (1-2)
Master cylinder to brake booster	8-12 (6-9)
Fitting	15-18 (11-13)
Master cylinder to brake line connector	25-35 {17-25)
Brake line flare nut	13-17 (9-12)
Brake tube to rear axle housing	9-11 (7-8)
Bleeder screw	7-9 (5-7)
Mounting support to knuckle	70-90 (51-65)
Brake disc to hub	50-60 (36-43)
Bearing case to rear axle housing	50-60 {36-43)
Wheel cylinder to backing plate	18-21 {13-15)

LUBRICANTS

	Specified lubricant	Quantity
Brake fluid	**DOT3**	As required
Brake pedal bushing and spacer	Multipurpose grease SAE J310a, NLGI#3	Small quantity
Clevis pin and washer	Wheel bearing grease SAE J310a, NLGI #2EP	Small quantity
Brake booster push rod seal lip	Silicon grease	Small quantity
Brake booster push rod perimeter	Silicon grease	Small quantity
Brake booster push rod body perimeter	Silicon grease	Small quantity
Plug plate and stopper plug	WARREN Plastilube 2 brake grease	Small quantity
Caliper bore	Repair kit grease (red)	Small quantity
Dust boot mounting groove in caliper body	Repair kit grease (orange)	Small quantity
Rear brake piston and wheel cylinder	Repair kit grease (orange)	Small quantity
Contact surfaces at shoe assemblies and backing plate	WARREN Plastilube 2 brake grease	Small quantity
Rotating portion of shoe adjuster assembly	WARREN Plastilube 2 brake grease	Small quantity
Clevis pin and bushing and ratchet plate	Multipurpose grease SAE J310a NLGI grade #2EP	As required

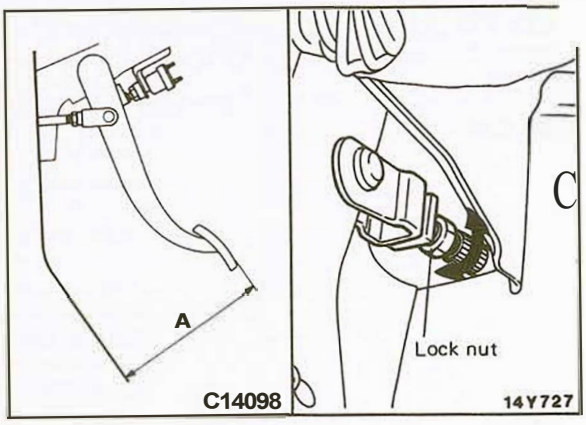
Symptom	Probable cause	Remedy
Noise or vibration when brakes are applied	Backing plate or caliper improperly mounted	Correct
	Loose backing plate or caliper mounting bolts	Retighten
	Unevenly worn or cracked brake drum or brake disc	Replace
	Foreign material in brake drum	Clean
	Seized pad or lining contact surface	Replace
	Excessive caliper to pad assembly clearance	Correct
	Uneven pad contact	Correct
	Lack of lubrication in sliding parts	Lubricate
	Loose suspension parts	Retighten
Vehicle pulls to one side when brakes are applied	Difference in left and right tire inflation pressures	Adjust
	Inadequate contact of pad or lining	Correct
	Grease or oil on pad or lining surface	Replace
	Drum eccentricity or uneven wear	Replace
	Incorrect wheel cylinder installation	Correct
	Auto adjuster malfunction	Correct
Insufficient braking power	Low or deteriorated brake fluid	Replenish or change
	Air in brake system	Bleed the system
	Brake booster malfunction	Correct
	Inadequate contact of pad or lining	Correct
	Grease or oil on pad surface	Replace
	Auto adjuster malfunction	Correct
	Overheated brake rotor due to dragging of pad or lining	Correct
	Clogged brake line	Correct
	Blend proportioning valve malfunction	Replace
Increased pedal stroke (Reduced pedal to floor clearance)	Air in brake system	Bleed the system
	Brake fluid leaks	Correct
	Auto adjuster malfunction	Correct
	Excessive push rod to master cylinder clearance	**Adjust**

Symptom	Probable cause	Remedy
Brake drag	Incomplete release of parking brake	Correct
	Incorrect parking brake adjustment	Adjust
	Worn brake pedal return spring	Replace
	Clogged master cylinder return port	Correct
	Broken rear drum brake shoe return spring	Replace
	lack oflubrication in sliding parts	Lubricate
	Defective master cylinder check valve or piston return spring	Replace
	Excessive push rod to master cylinder clearance	Adjust
Insufficient parking brake function	Worn brake lining Grease or oil on lining surface Parking brake cable sticking	Replace
	Auto adjuster malfunction	Correct
	Excessive parking brake lever stroke	Adjust the parking brake lever stroke or check the parking brake cable routing

SERVICE BRAKE PEDAL INSPECTION AND ADJUSTMENT

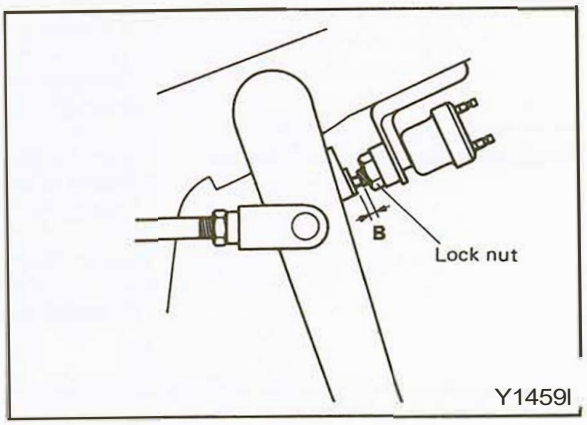
1. Measure the brake pedal height as illustrated.
   If the brake pedal height is not within the standard value, adjust as follows.

Pedal height (from top of the pedal to floorboard) A	191-196 mm (7.5-7.7 in.)



   (1) Move the stop light switch to a position where it does not contact the brake pedal arm.
   (2) Adjust the brake pedal height by turning the operating rod with pliers (with the operating rod lock nut loosened), until the correct clearance is obtained. (14Y727)
   (3) Adjust the stop light switch until the dimension (between the outer case of the stop light switch and the brake pedal arm) agree with the standard value, and then lock the switch in place with lock nut. (Y14591)

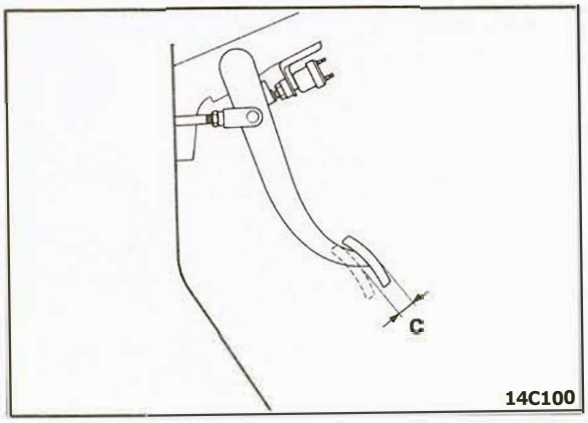
Dimension B	0.5-1.0 mm (.02-.04 in.)



2. While the engine is stopped, depress the brake pedal two or three times. After thus eliminating the vacuum in the power brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (the free play) is within the standard value range.

Brake pedal free play C	I0-15 mm (.4-.6 in.)

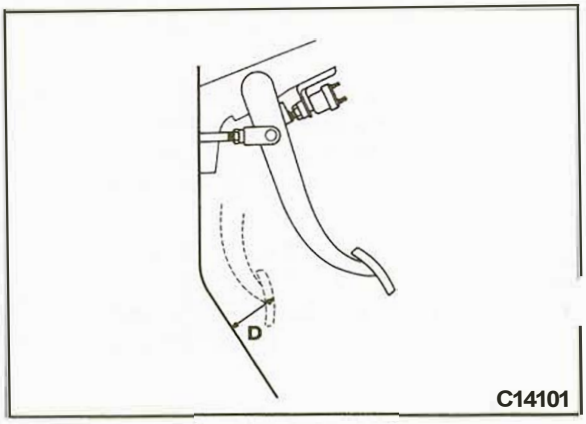
   If the free play is less than the standard value, confirm that the clearance between the outer case of the stop light and the brake pedal is within the standard value.



3. Start the engine, depress the brake pedal with approximately 500 N (110 lbs.) of force, and measure the clearance between the brake pedal and the floorboard. (C14101)

Pedal to floorboard clearance D when pedal is depressed [Pedal depressing force of 500 N (110 lbs.)]	95 mm (3.7 in.) or more

   If the pedal to floorboad clearance is less than the standard value, correct it according to the troubleshooting.

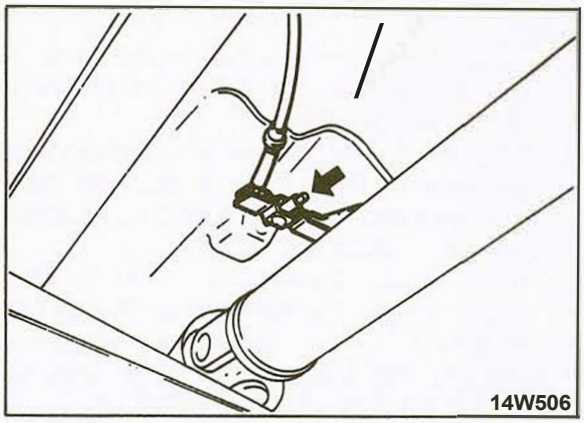


ARKING BRAKE STROKE ADJUSTMENT

1. Pull the parking brake lever with a force of approx. 200 N (45 lbs.), and count the number of clicks.

Parking brake lever stroke	4 - 6 clicks

2. If the parking brake lever stroke is not within the standard value range, pull the parking brake lever repeatedly to adjust the shoe clearance.
3. Adjust the parking brake lever stroke by turning the cable adjusting nut. (l4W506)



Caution

1. If the number of brake lever clicks is less than the standard value, the cable has been tightened excessively, and failure of the automatic adjuster mechanism will result. Be sure to adjust it to within the standard value.
2. Overtightening of the parking brake will result in brake drag.

BRAKE BOOSTER OPERATING TEST (WITHOUT A TESTER)

For simple checking of the brake booster operation, perform the following tests:

(1) Run the engine for one or two minutes, and then stop it. Step on the brake pedal several times with normal pressure. If the pedal depresses fully the first time but gradually becomes higher when depressed succeeding times, the booster is operating properly. If the pedal height remains unchanged each time, the booster is defective.

(2) With the engine stopped, step on the brake pedal several times with the same foot pressure to confirm that the pedal height does not change, and then step on the brake pedal and start the engine. If the pedal moves downward slightly, the booster is in good condition. If there is no change, the booster is defective.

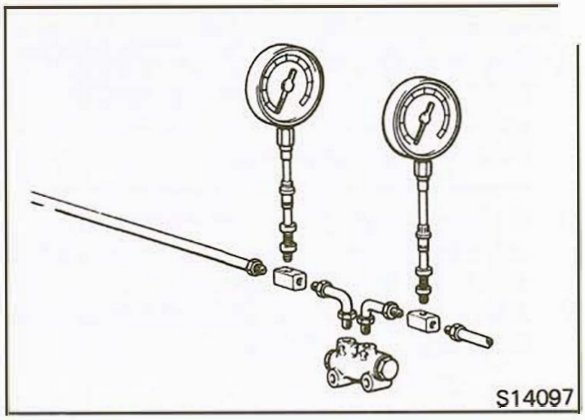
(3) With the engine running, step on the brake pedal and then stop engine. Hold the pedal depressed for 30 seconds. If the pedal height does not change, the booster is in good condition, if the pedal rises, the booster is defective.

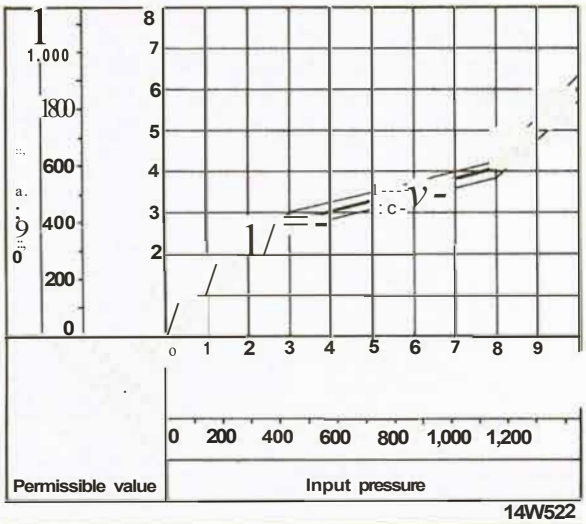
If the above three tests are okay the booster is operating .,roperly.

[one of the above three tests is not okay, the check valve, vacuum hose, or booster is defective.

BLEND PROPORTIONING VALVE FUNCTION TEST

1. Connect two pressure gauges, one each to the input side and output side of the blend proportioning valve, as illustrated. (S 14097)
2. With the brakes applied, measure the input pressure and the output pressure. **If** the measured pressures are within the permissible ranges shown, the blend proportioning valve is functioning properly.
3. If the measured pressures are not within the permissible ranges, replace the blend proportioning valve.
4. Measure both input and output pressure; if the difference between input and output is 0.4 MPa (60 psi) or more, replace the blend proportioning valve.





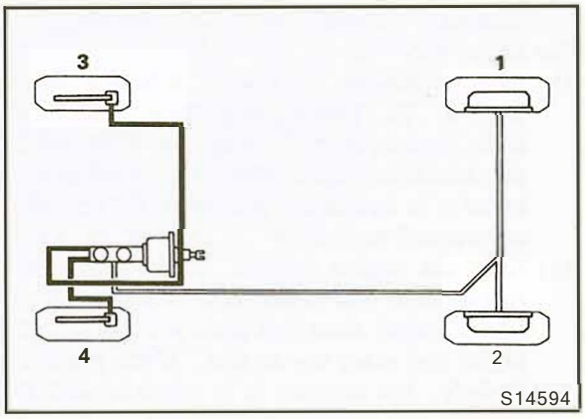
BLEEDING

NOTE

The brake hydraulic system should be bled whenever the brake tube, brake hose, master cylinder or wheel cylinder has been removed or whenever the brake pedal feels spongy when depressed.

Bleed the brake system in the sequence shown in the illustration. (S14594)

Recommended brake fluid	DOT 3



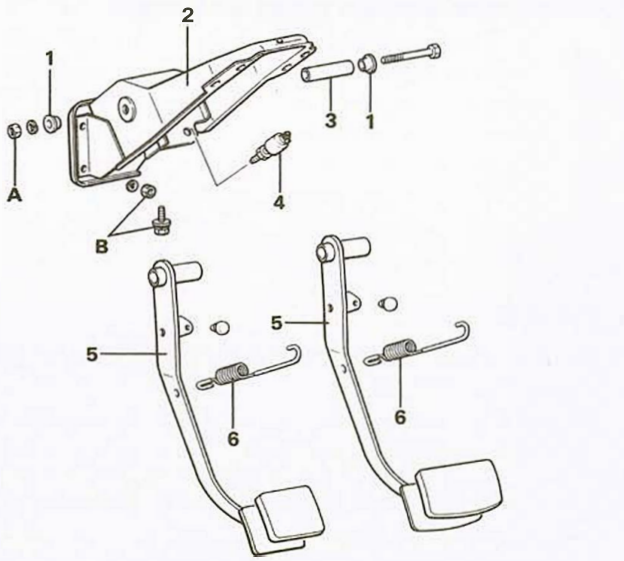
Caution

1. Use the recommended brake fluid. Avoid using a mixture of the recommended brake fluid and other fluid.
2. If brake fluid is exposed to the air, **it will** absorb moisture; as water is absorbed from the atmosphere, the boiling point of the brake fluid will decrease and the **braking performance will be seriously impaired. For this reason, use a hermetically sealed 1 liter (1.06 U.S.qt., 0.88 Imp.qt.) or 0.5 liter (0.52 U.S.qt., 0.44 Imp.qt.) brake fluid container.**
3. **Firmly close the cap of the brake fluid container after use.**

COMPONENTS

1. Bushing
2. Pedal support member
3. Spacer
4. Stop light switch
5. Brake pedal
6. Return spring

	Nm	ft.lbs.
A	25-35	18-25
B	8-12	6-9



Vehicles with a manual transmission

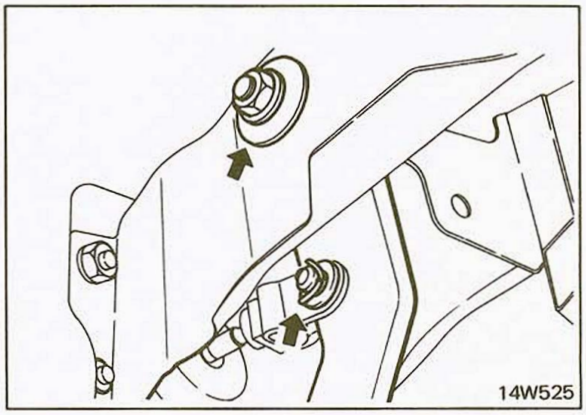
Vehicles with an automatic transmission

14W548

REMOVAL

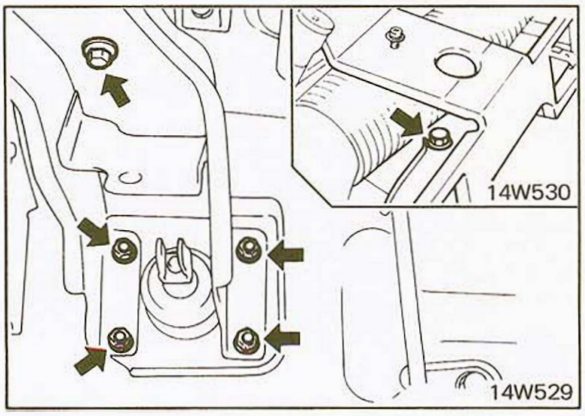
Brake Pedal

1. Remove the return spring and stop light switch.
2. Remove the cotter pin that connects the operating rod of the brake booster to the brake pedal. (14WS2S)
3. Remove the bolt that attaches the brake pedal to the pedal support member.
4. Remove the brake pedal.



Brake Pedal Support

1. Remove the steering column assembly. (Refer to GROUP 19.)
2. Remove the brake pedal.
3. Remove the pedal support member. (14WS30, 14WS29)



INSPECTION

1. Check spacer and bushing for wear.
2. Check stop light switch for operation.
3. Check brake pedal for bend or twisting.
4. Check brake pedal return spring for damage.

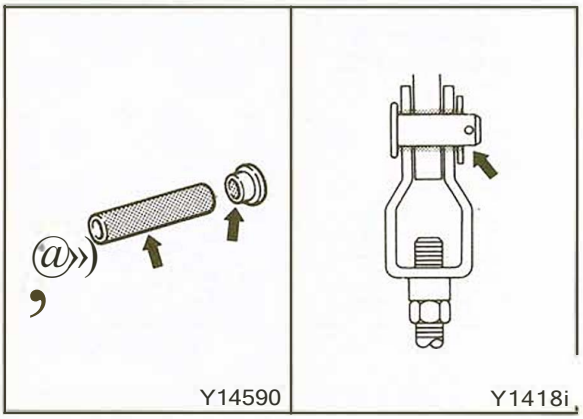
INSTALLATION

1. Apply the specified multipurpose grease to the bushing and the spacer. (Yl4590)

Recommended multipurpose grease ..... .
SAE J3 l Oa, NLGI grade #3

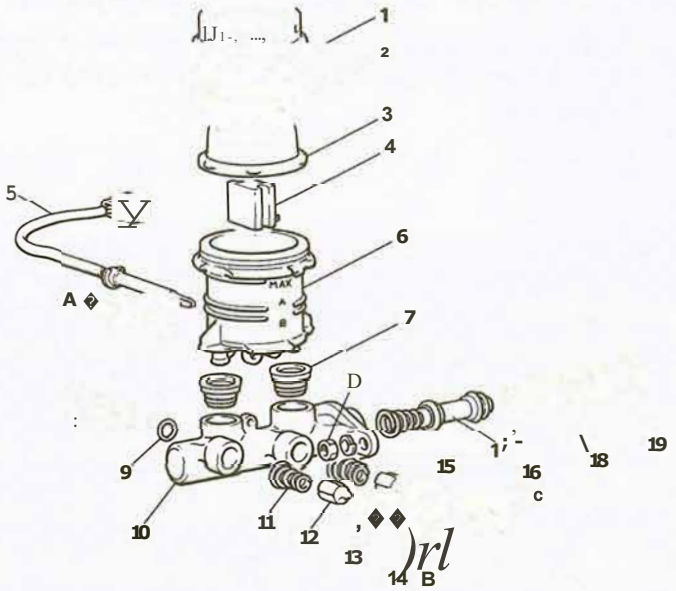
2. Apply the specified multipurpose grease to the clevis pin and washer. (Yl4187)

Recommended multipurpose grease ..... .
SAE J3 l Oa, NLGI grade #2EP



:OMPONENTS

1. Reservoir cap
2. Slide ring
3. Diaphragm
4. Float
5. Fluid level sensor
6. Reservoir
7. Reservoir seal
8. Secondary piston stopper
9. Gasket
10. Master cylinder body
11. Check valve spring
12. Check valve
13. Gasket
14. Check valve case
15. Tube seat
16. Check valve cap
17. Secondary piston
18. Primary piston
19. Piston stopper ring

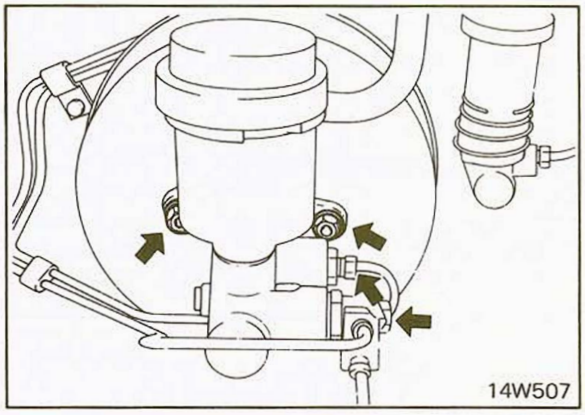


	Nm	ft. lbs.
A	1.5-3.0	1-2
B	40-50	29-36
C	25-35	18-25
D	8-12	6-9

14W547

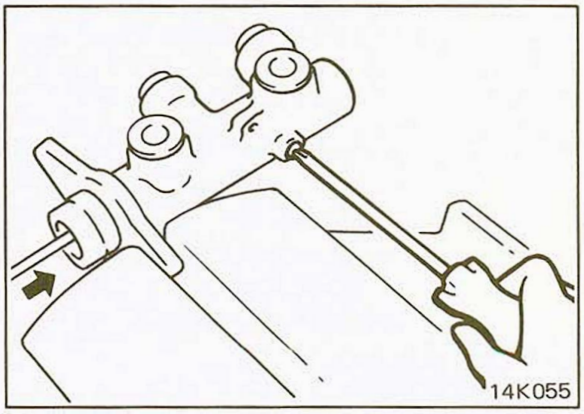
REMOVAL

1. Disc.onnect the harness connector of the fluid level sensor.
2. Detach the brake tubes from the master cylinder. (14W507)
3. Remove the master cylinder from the brake booster. (14W507)



DISASSEMBLY

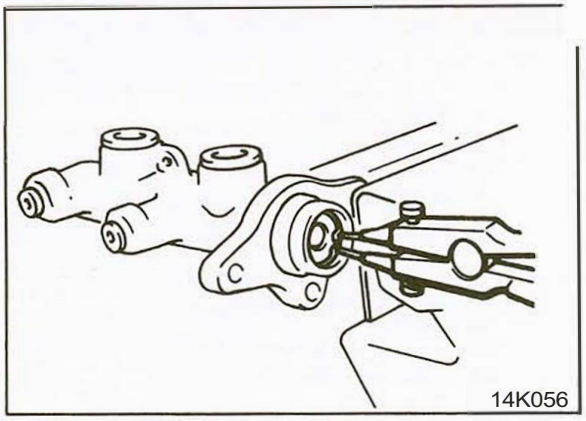
I. Remove the reservoir.
2. While depressing the piston, remove the secondary piston stopper. (14K055)



3. Remove the piston stopper ring. (14K056)
4. Remove the primary and secondary pistons from the master cylinder body.

Caution
Do not disassemble the primary and secondary pistons.

5. Remove the check valve cap and check valve case, and then remove the gasket, the check valves and the check valve springs.



INSPECTION

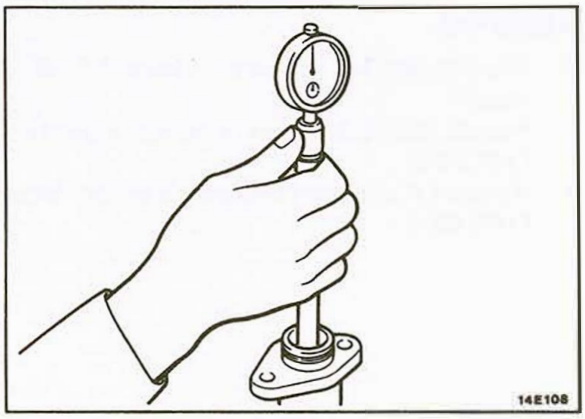
1. Check check valve and check valve spring for deterioration.
2. Check gasket for damage.
3. Check inner surface of master cylinder body for rust or scars.
4. Check primary and secondary pistons for rust, scouring, wear, damage or deterioration.
5. Check primary and secondary piston springs for deterioration.
6. Check the clearance between master cylinder inner diameter and piston outer diameter as follows:

Clearance between Master Cylinder Inner Diameter and Piston Outer Diameter

(1) Measure of the master cylinder inner diameter at three different positions (bottom, middle and top) by using a cylinder gauge. (14El 08)

Master cylinder to piston clearance [Service limit]	0.15 mm (.006 in.)

(2) If the clearance between these inner diameters and the piston outer diameter is not less than the service *limit,* replace the master cylinder and the piston assembly as set.

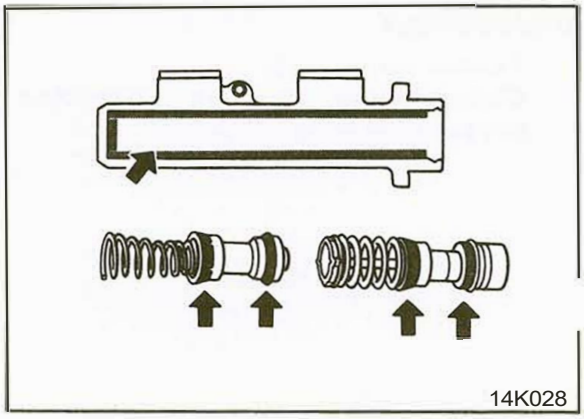


REASSEMBLY

1. Apply brake fluid to the inner surface of the master cylinder body and to the entire periphery of the secondary and primary pistons. (14K028)

Recommended brake fluid	DOT 3

2. Torque parts to specifications during assembly.



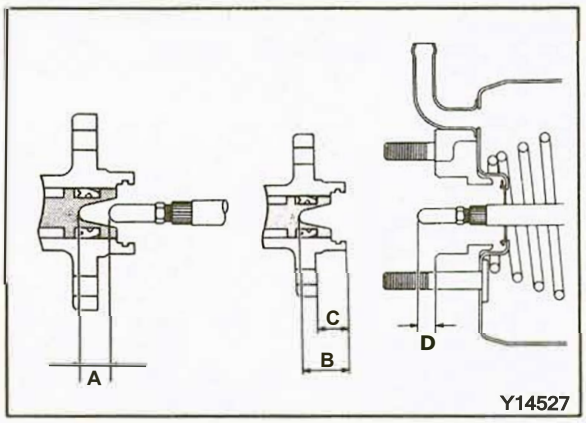
INSTALLATION

Bleed the brake system. (Refer to p. 5-8.)

:ASTER CYLINDER PUSH ROD ADJUSTMENT

1. Measure the clearance between the brake booster push rod and the primary piston.

Booster push rod to master cylinder piston clearance A (A= B - C - D)	0.1-0.5 mm (.004-.020 in.)



NOTE
If the clearance is not within the standard value range, adjust by changing the push rod length by turning the screw of the push rod.

Caution
Insufficient clearance may cause excessive brake drag.

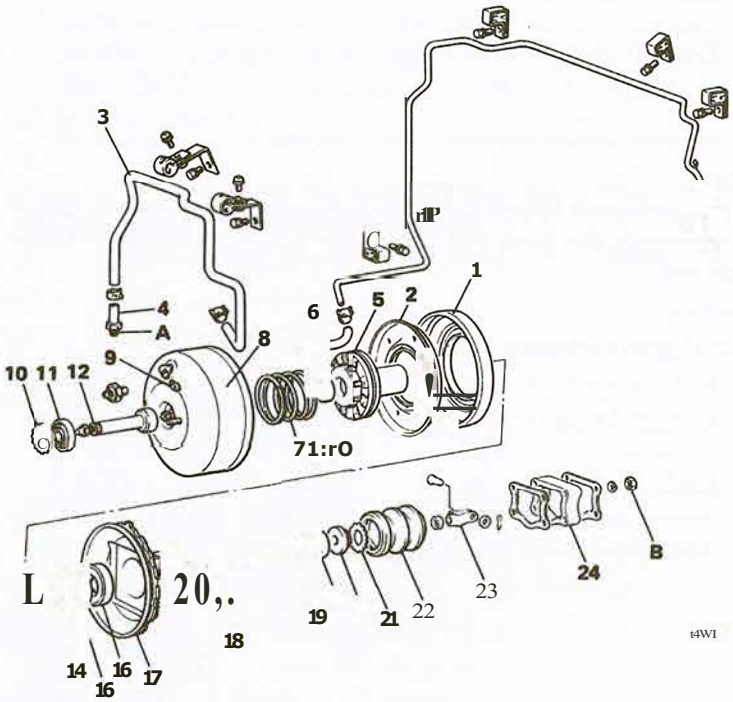
2. Make sure that the brake pedal free play is within the standard value range.

Brake pedal free play	10-15 mm (.4-.6 in.)

3. Torque all parts to specifications during assembly.

COMPONENTS

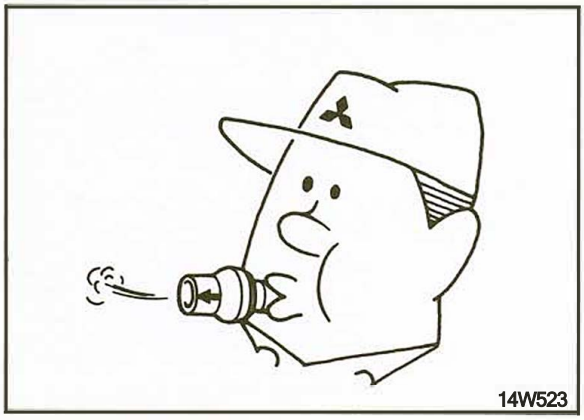
1. Diaphragm
2. Diaphragm plate
3. Vacuum hose
4. Fitting
5. Valve body
6. Reaction disc
7. Spring
8. Front shell
9. Check valve
10. Retainer
11. Plate and seal assembly
12. Push rod
13. Valve plunger stop key
14. Retainer
15. Bearing
16. Valve body seal
17. Rear shell
18. Valve rod and plunger
19. Filter
20. Silencer
21. Retainer
22. Boot
23. Operating rod yoke
24. Spacer



	Nm	ft. lbs.
A	15-18	11-13
B	8-12	6-9

INSPECTION

Check check valve operation as follows. (14W523)
(1) Blow into the check valve.
(2) If the air passes through when you blow from the booster side, but not when you blow from the engine side, the check valve is functioning properly.



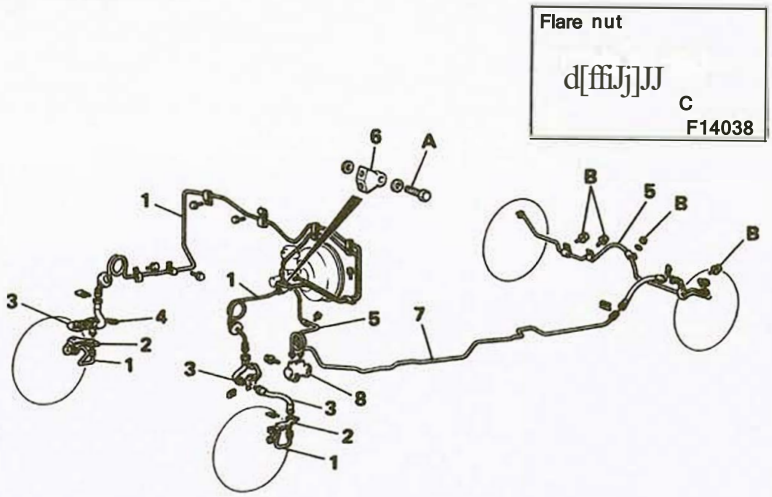
INSTALLATION

1. Check the booster push rod to master cylinder piston clearance. (Refer top. 5-13.)
2. Install the check valve, being careful that the direction of installation is correct.
3. Fasten the vacuum hose securely to prevent air leaks from the connections.
4. After bleeding, adjust the brake pedal. (Refer top. 5-6.)
5. Confirm that the brake booster operates properly. When installing the vacuum hose fitting, apply semi-drying sealant to its threaded portion and tighten it to the specified torque.

Tightening torque ..... 15-18 Nm (11-13 ft.lbs.)

0MPONENTS

1. Front brake tube
2. Brake hose bracket
3. Brake hose
4. Brake hose support
5. Rear brake tube
6. Connector
7. Main brake tube
8. Blend proportioning valve (B.P.V.)



	Nm	ft. lbs.
A	25-35	17-25
B	9-11	7-8
C	13-17	9-12

14W541

INSPECTION

1. Check brake tubes for cracks, crimps and corrosion.
2. Check brake hoses for cracks, damage and leakage.
3. Check brake tube flare nuts for damage and leakage.

INSTALLATION

1. Install the brake hoses, being careful not to twist them.
2. The brake tubes should be installed away from sharp edges, weld beads or moving parts.
3. Tighten the connections to the specified torque.

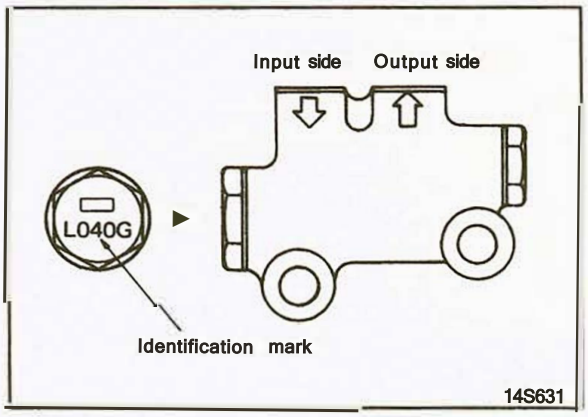
Flare nuts tightening torque ..... .
13-17 Nm (9-12 ft.lbs.)

BLEND PROPORTIONING VALVE (B.P.V.)

Connect the brake tubes in accordance with the arrows marked on the B.P.V. body. (14S631)

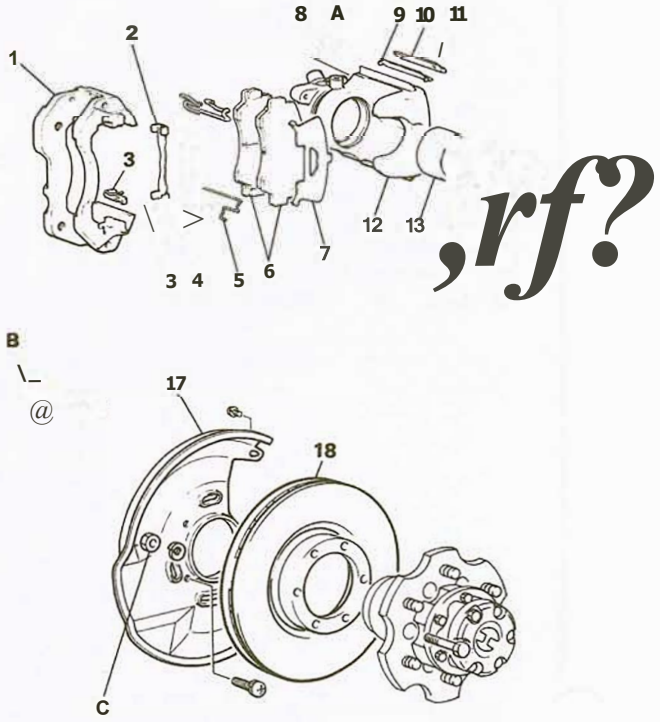
Caution

1. Do not disassemble the B.P.V. since its performance depends on the preset load of the spring.
2. Use only a B.P.V. which is marked L040G. (t4S63t)



COMPONENTS

1. Mounting support
2. Inner pad clip
3. Pad clip B
4. Outer pad clip
5. Anti-rattle spring
6. Pad assembly
7. Outer shim
8. Bleeder screw
9. Plug plate
10. Stopper plug
11. Spigot pin
12. Caliper body
13. Piston
14. Piston seal
15. Piston boot
16. Boot ring
17. Dust cover
18. Brake disc



	Nm	ft.lbs.
A	7-9	5-7
B	70-90	51-65
C	50-60	36-43

BRAKE PAD INSPECTION

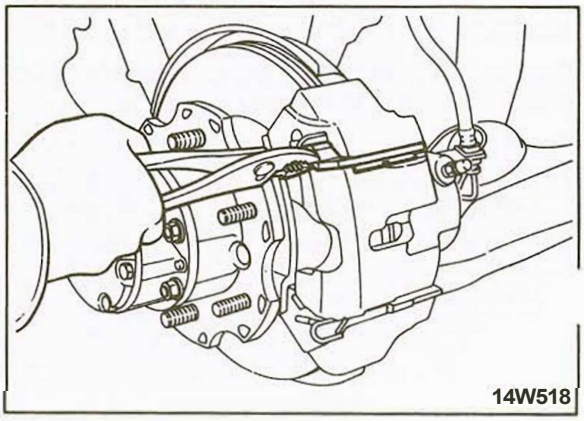
I. Check the pads for wear.
2. If the pad thickness is less than the service limit, replace the pads.

Brake pad thickness [Service limit] ..... .
1 mm (.04 in.)

BRAKE PAD REPLACEMENT

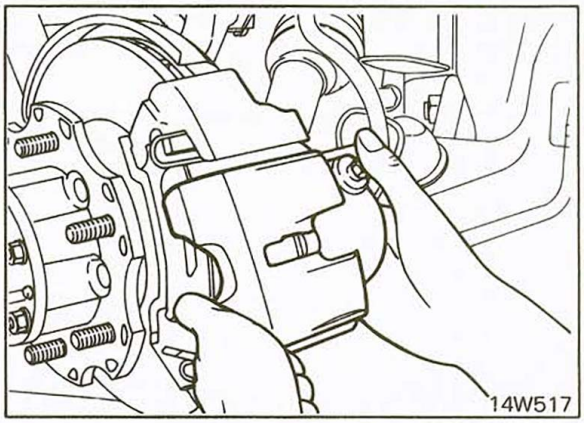
Removal

I. Remove the spigot pins.
2. Remove the stopper plugs and remove the plug plates. (14W518)

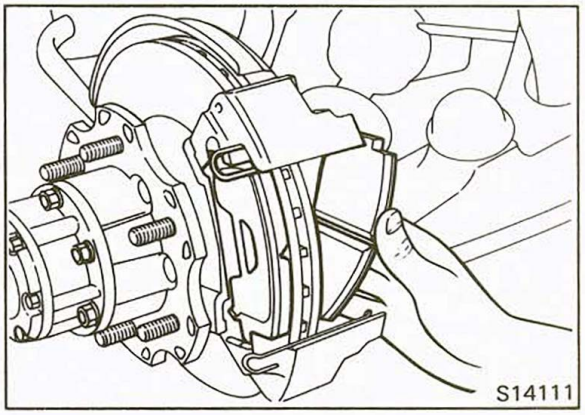


. Remove the caliper body by moving it upward or downward at an angle.

NOTE
Support the front brake assembly by suspending it with wire or other suitable means in such a manner so that the brake hoses are not twisted.

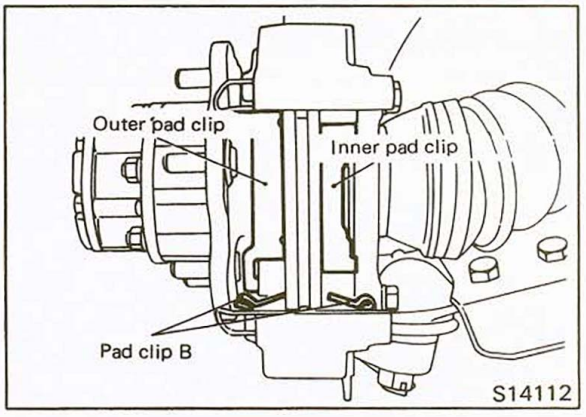


4. Remove the pad, outer shim, pad clips and anti-rattle springs from the mounting support.

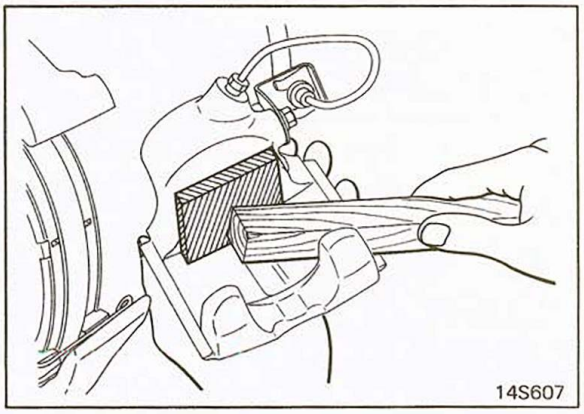


Installation

1. Install the anti-rattle springs, pad clip B, inner pad clip and outer pad clip onto the mounting support. (S 14112)
2. Install the pads together with the outer shim.

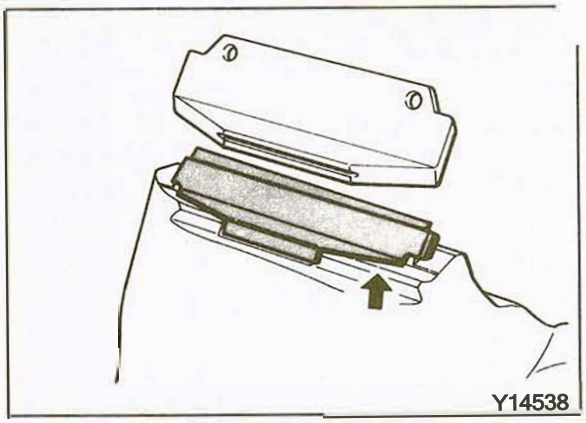


3. Bottom the piston into the caliper bore.



4. Apply a thin coat of the specified brake grease to the plug plate and stopper plug contact surface.

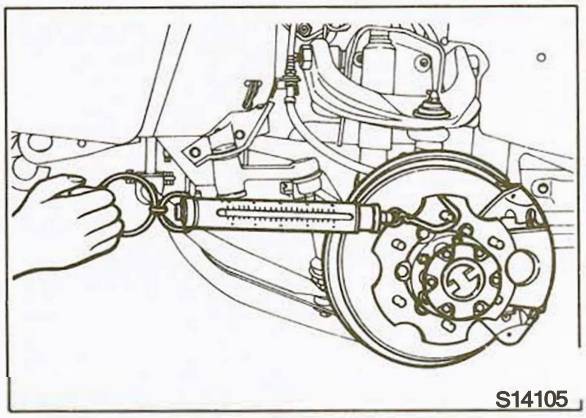
Recommended brake grease	Plastilube 2 brake grease



BRAKE DRAG INSPECTION

1. Start the engine and depress the brake pedal for 5 seconds.
2. Turn the engine off.
3. Rotate the brake disc a few revolutions.
4. Use a spring scale as illustrated to measure the brake drag. (S14105)
5. Remove the brake pads and use the spring scale to measure the rotational force.
   The difference between brake drag and rotational force should not exceed the standard value.

Brake drag	74 N (16 lbs.)

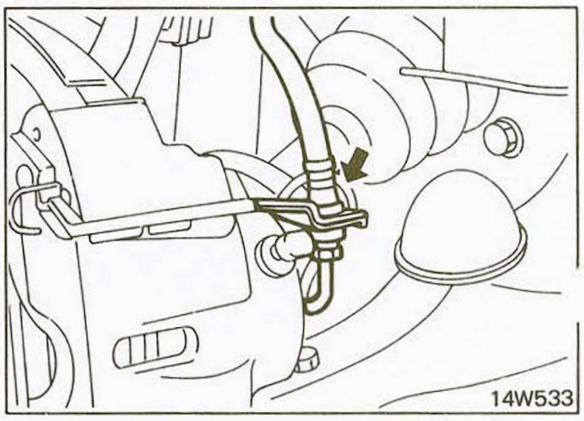


NOTE
If the difference exceeds the standard value, remove the caliper body and disassemble it. Check the piston and seal for deterioration, corrosion, dirt or scoring.

FRONT BRAKE ASSEMBLY

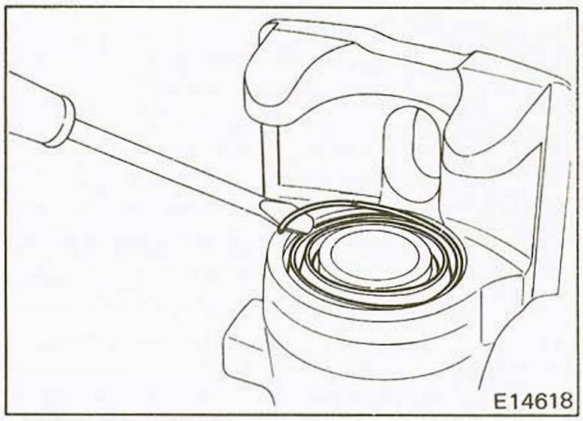
Removal

1. Disconnect the brake tube.
2. Remove the caliper body.
3. Remove the brake hose bracket from the caliper body. (14W533)
4. Remove the mounting support.



isassembly

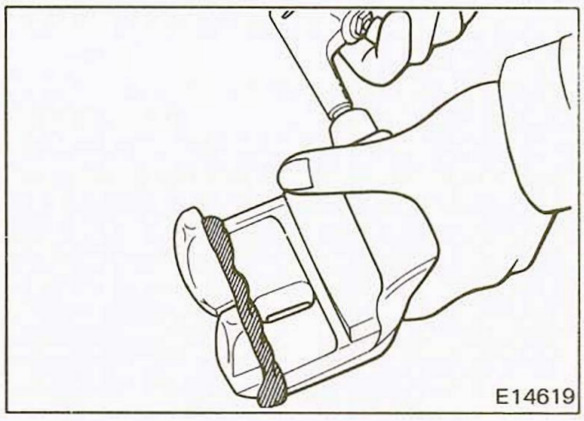
1. Remove the boot ring from the caliper body.



2. Remove the piston and dust boot by applying compressed air through the brake hose fitting hole.

Caution

1. Place a rag in front of the piston to catch it when it comes out, and slowly increase the amount of compressed air being applied behind the piston.
2. Be sure to keep your fingers away from the front of the piston during removal.

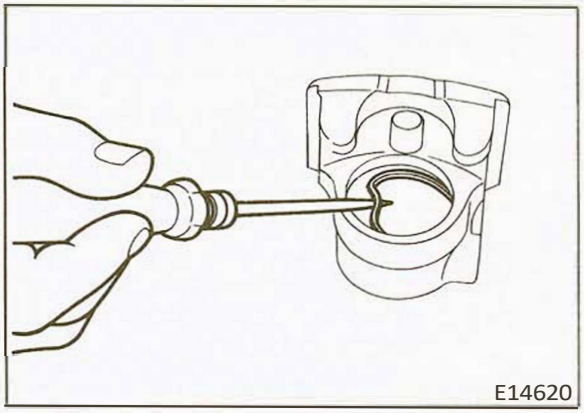


3. Remove the piston seal. (E 14620)

Caution

Be careful not to damage the caliper bore. The piston seal must be replaced with a new one.

4. Clean the caliper bore with alcohol or brake fluid.



Inspection

1. Check mounting support for cracks.
2. Check caliper body for cracks or rust of cylinder portion.
3. Check piston for rust.
4. Check piston seal for wear or deterioration.
5. Check piston boot for cracks or deterioration.

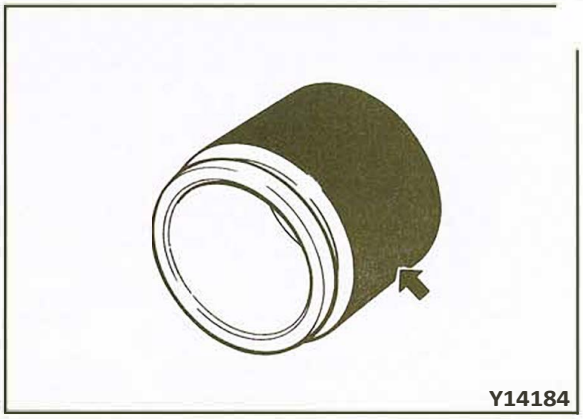
Reassembly

1. Apply the specified brake grease to a new piston seal and install the seal to the cylinder.

Recommended brake grease	Repair kit grease (red)

2. Apply the brake fluid to the outside surface of the piston and slowly insert the piston by hand, taking care not to twist it. (Y14184)

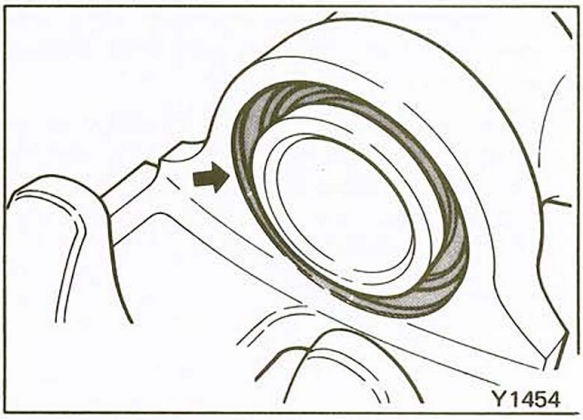
Recommended brake fluid	DOT 3



3. Apply the specified brake grease to the piston boot mounting groove in the caliper body. (Y14541)

Recommended brake grease	Repair kit grease (orange)

4. Install the piston boot and retain it with the boot ring.



Installation

1. Bleed the air from the caliper.
2. Check the brake drag. (Refer top. 5-18.)

BRAKE DISC

Inspection

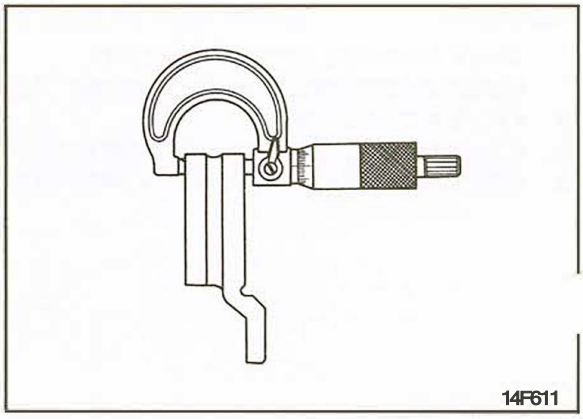
BRAKE DISC WEAR

If the brake disc thickness becomes less than the service limit, replace the disc. (14F6 l l)

Disc thickness [Service limit]	184 mm(. 72 in.)

BRAKE DISC DAMAGE

Replace the brake disc if necessary.



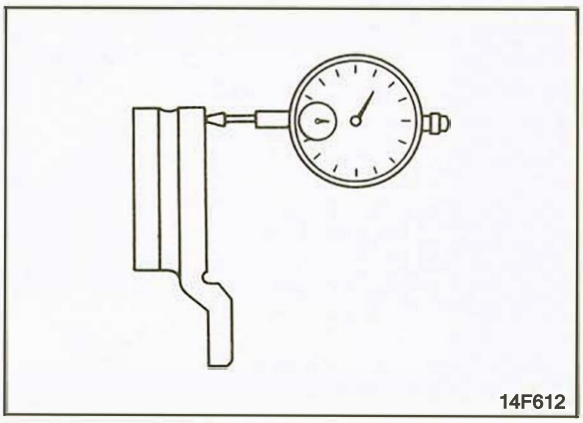
RAKE DISC RUNOUT

1. If the brake disc runout exceeds the repair limit, change its position on the hub and/or retorque evenly. (14F612)

Disc runout [Repair limit]	0.15 mm (.006 in.)

2. Check the runout again, and if it cannot be corrected, resurface the brake disc. (14F612)

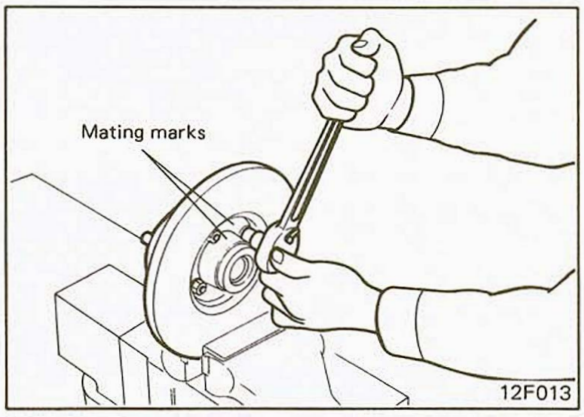
Thickness of brake disc [Service limit]	18.4 mm (.72 in.)



Caution
Do not grind the brake disc beyond the service limit.

Removal

1. Remove the front brake assembly and use wire to support it.
2. Remove the front hub assembly from the knuckle.
3. Make mating marks, and then disassemble the brake disc from the hub. (12F013)

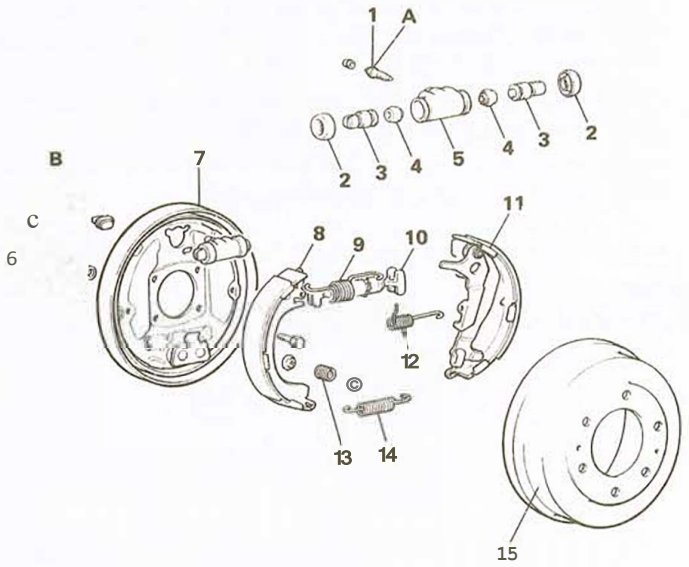


Installation

1. Align the mating marks and assemble the brake disc to the hub.
2. Check the brake dragging torque. (Refer to p. 5-18.)
3. Torque all parts to specifications during assembly.

COMPONENTS

1. Bleeder screw
2. Wheel cylinder boot
3. Wheel cylinder piston
4. Piston cup
5. Wheel cylinder body
6. Shoe hold-down pin
7. Backing plate
8. Shoe and lining assembly
9. Shoe return spring
10. Brake shoe adjuster
11. Shoe and lever assembly
12. Adjusting spring
13. Shoe hold-down spring
14. Shoe retainer spring
15. Brake drum



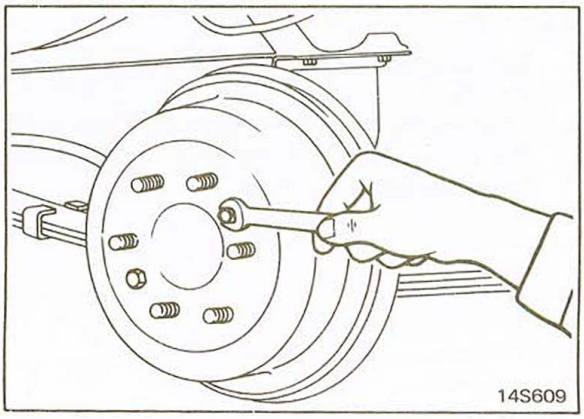
	Nm	ft. lbs.
A	7.9	5.7
B	18-21	13-15
C	50-60	36-43

14W535

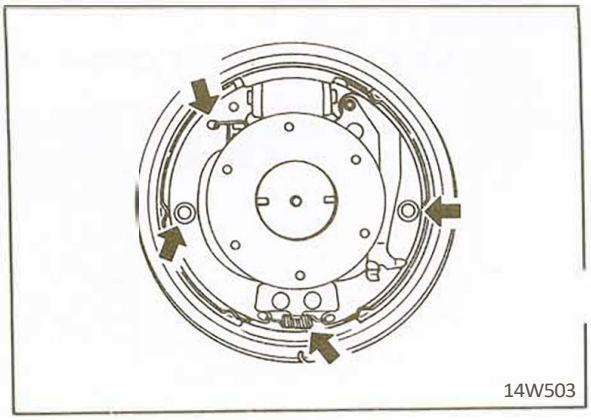
REMOVAL

I. Remove the brake drum.

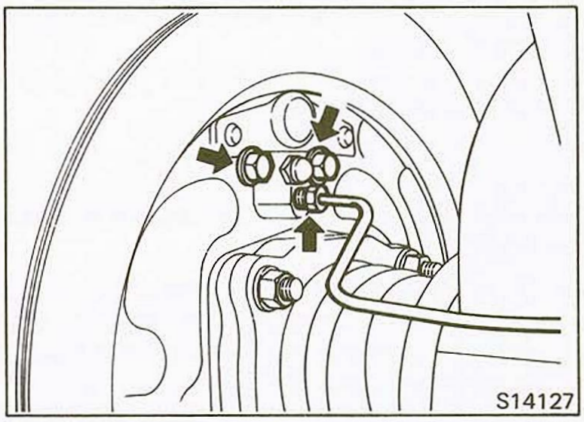
NOTE
If it is hard to remove the brake drum, install two bolts (M8 x 1.25) into the threaded holes provided in the drum flange surface. (I4S609)



2. Disconnect the parking brake cable from the shoe and lever assembly.
3. Remove the shoe return spring, shoe retainer spring and shoe hold-down pin, and remove the shoe and lining assembly and the shoe and lever assembly. (14W503)



4. Disconnect the brake tube, remove the wheel cylinder mounting bolts and remove the wheel cylinder. (S 14127)
5. Disconnect the parking brake cable from the backing plate. (Refer top. 5-28.)
6. Disconnect the bearing case from the axle housing end. (Refer to GROUP 3.)
7. Remove the axle shaft toward you together with the backing plate. (Refer to GROUP 3.)
8. Remove the backing plate from the axle shaft.


S14127

INSPECTION OF BRAKE LINING AND BRAKE DRUM WEAR

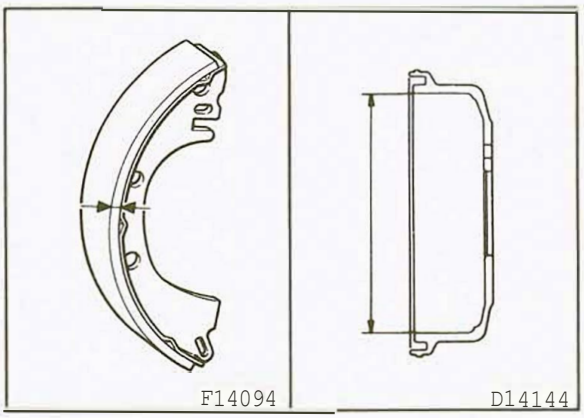
1. Measure the wear of the brake lining at the place worn the most. (F14094)

Brake lining thickness [Service limit]	1.0 mm (.04 in.)

2. Use a caliper gauge to measure the inside diameter of the brake drum. (D14144)

Brake drum inside diameter [Service limit}	256 mm (10.08 in.)

3. If the brake lining or brake drum wear exceeds the service limit, replace the parts.

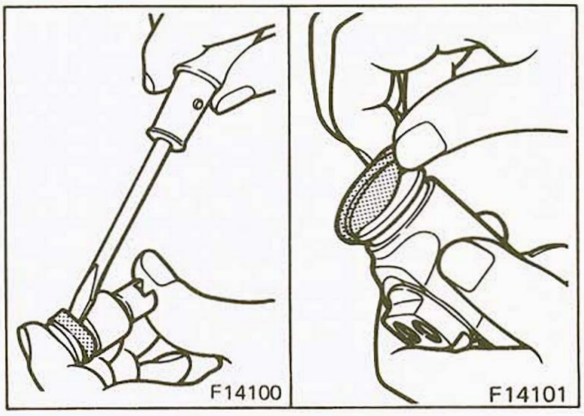

F14094 D14144

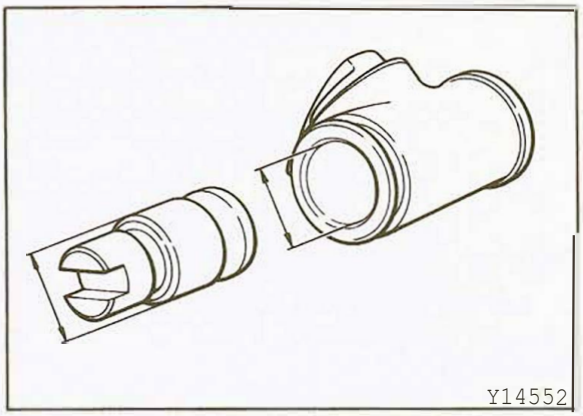
WHEEL CYLINDER PISTON CUP REPLACEMENT

1. Remove the wheel cylinder to backing plate retaining bolt.
2. Detach the wheel cylinder boot and remove the piston assembly. (F 14100)
3. Remove the piston cup from the piston. (F14101)

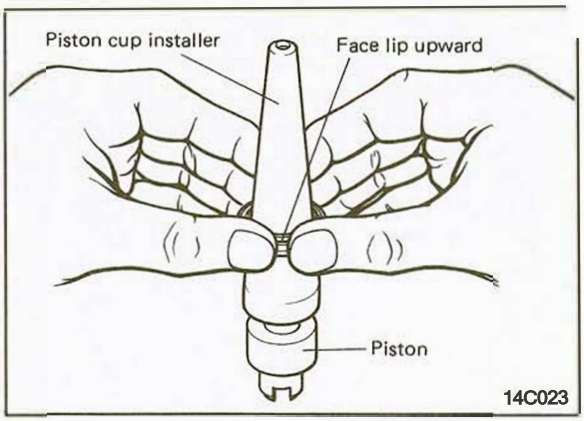
Caution
If **the piston cup is removed, it must** be **replaced with a new one.**

4. Check the following points, and if there is any abnormality, replace the entire wheel cylinder assembly.
   (1) Check the piston and wheel cylinder walls for rust or damage.
   (2) Check the clearance between the cylinder and the piston. (Y14552)


F14100 F14101


Y14552

5. Use alcohol or the brake fluid to clean the wheel cylinder and the piston.
6. Apply the brake fluid to the piston cup and the piston cup installer. (14C023)



Caution
The repair kit must be used to replace the piston cup and the wheel cylinder boot.

7. Set the piston cup on the piston cup installer with the lip of the cup facing up, fit the cup onto the piston cup installer, and then slide it down the outside of the tool into the piston groove. (14C023)

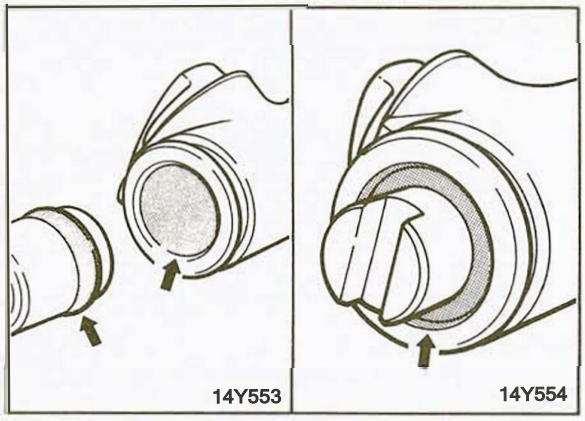
Caution
In order to keep the piston cup from becoming twisted or slanted, slide it down the tool slowly and carefully, without stopping.

8. Use the brake fluid to clean the cylinder wall and the piston.

Recommended brake fluid	DOT 3

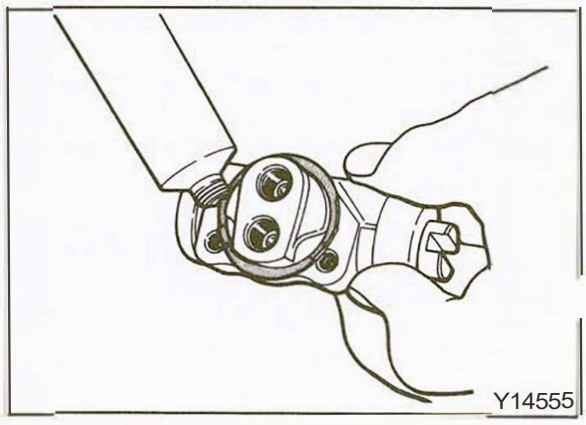
9. Apply the brake fluid to the wheel cylinder walls and the piston cup, and then install the piston assembly. (14Y553)
10. Apply a sufficient amount of grease to both ends of the piston, and then install the boots. (14Y554)

Recommended brake grease	Repair kit grease (orange)



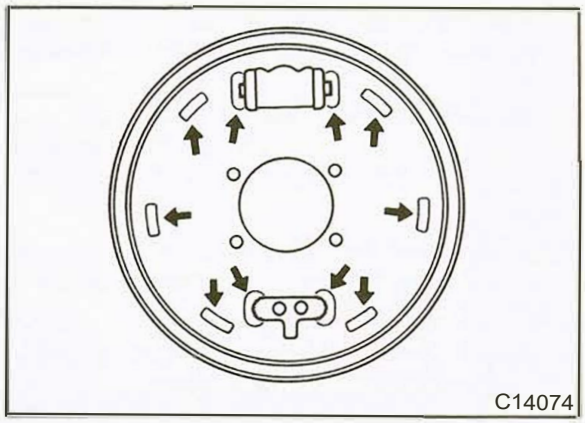
INSTALLATION

I. Apply drying sealant to the wheel cylinder assembly attaching surface before installation to the backing plate.



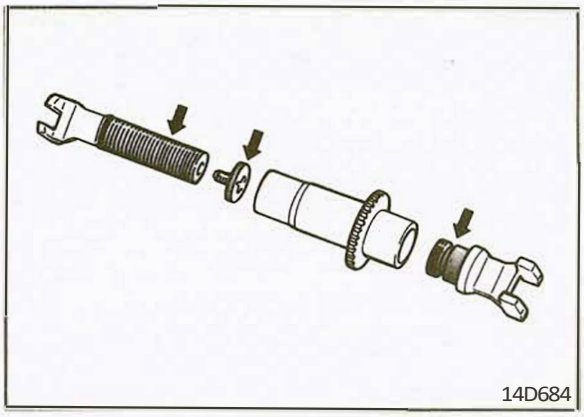
Apply the specified brake grease to the contacting surfaces of the shoes, backing plate, anchor plate and wheel cylinder piston ends.

Recommended brake grease ..... .
WARREN Plastilube 2 brake grease



3. Apply the specified brake grease to the rotating portion of the shoe adjuster and verify that it turns lightly.

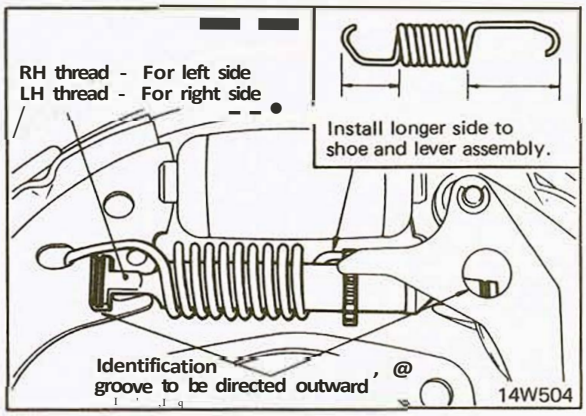
Recommended brake grease ..... .
WARREN Plastilube 2 brake grease



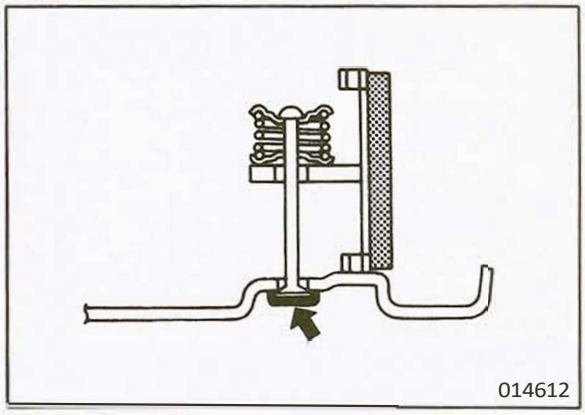
4. Attach the brake shoe adjuster and shoe return spring and install the shoe and lining assembly and the shoe and lever assembly. (14W504)

Caution
Note the differences between right and left brake shoe adjusters and between right and left shoe return springs and install them in the correct position.
The shoe return spring should first be installed to only the shoe and lever assembly.

5. After the shoe hold-down pin and shoe retainer spring have been installed, install the shoe return spring to the shoe and lining assembly.

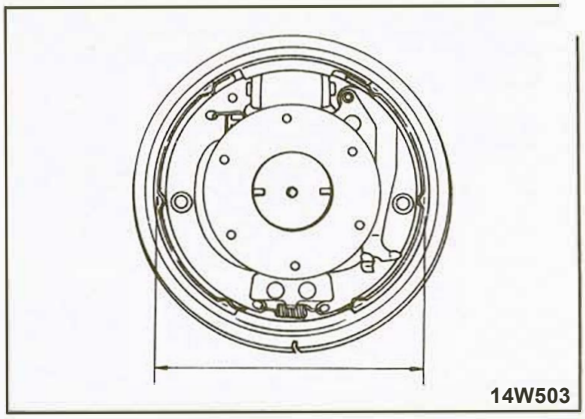


6. Apply a drying sealant to the shoe hold-down pin hole of the backing plate.



7. Tum the brake shoe adjuster to adjust the outer diameter of the brake shoes to the standard value.

Brake shoe outer diameter	253.2-253.5 mm (9.97-9.98 in.)

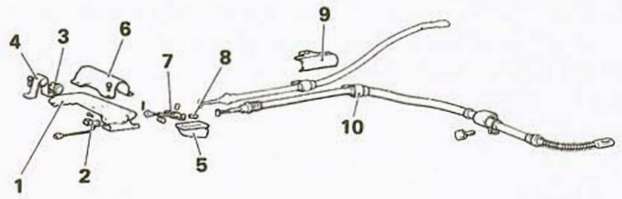


NOTE
Adjusting the outer diameter of brake shoes to the standard value will also facilitate adjustment of the shoe clearance. (14W503)

8. Check to ensure that the parking brake cable is loose before installing the brake drum.
9. Pull the parking brake lever repeatedly to adjust the shoe clearance. (Refer top. 5-29.)
10. Adjust the parking brake lever stroke. (Refer to p. 5-7.)
11. Torque all parts to specifications during installation.

)MPONENTS

1. Parking brake lever assembly
2. Parking brake switch
3. Bushing
4. Stay
5. Dust boot
6. Parking brake shaft cover
7. Equalizer
8. Cable adjuster
9. Parking brake heat protector
10. Parking brake cable

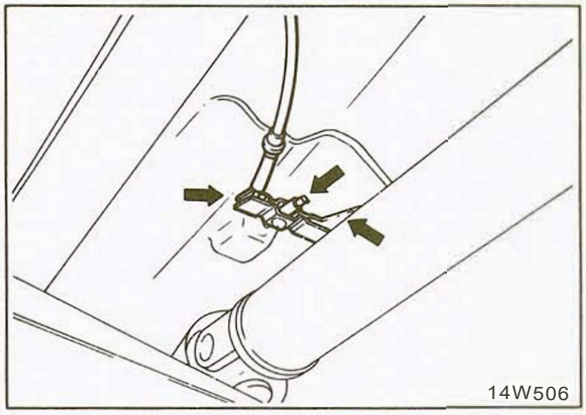


14W521

REMOVAL

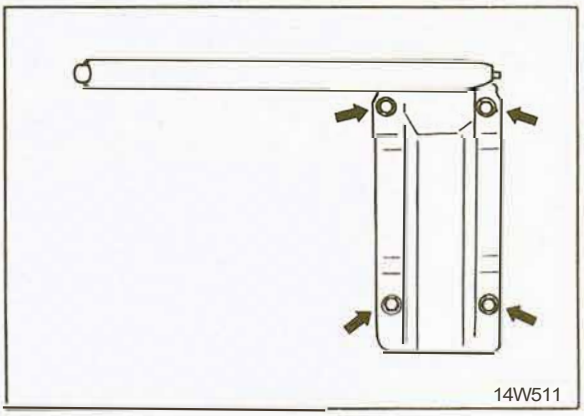
Parking Brake Lever

1. Loosen the parking brake lever.
2. Loosen the cable adjuster from under the vehicle and disconnect the parking brake cable and equalizer. (14W506)
3. Disconnect the parking brake switch connector.



14W506

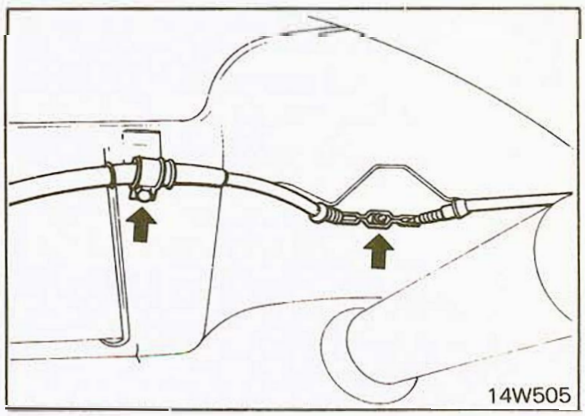
4. Remove the parking brake shaft cover mounting bolts. (The parking brake shaft cover is fasten to the stay together with the ratchet plate.)



14W511

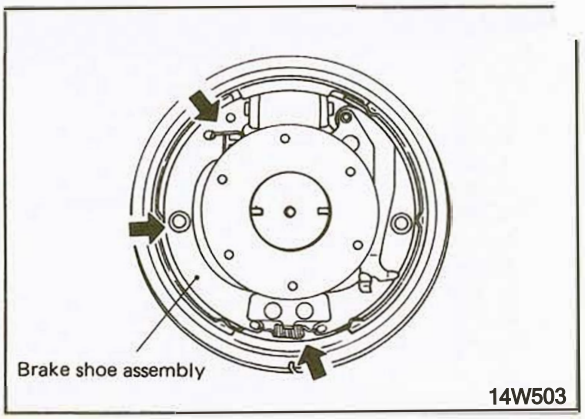
Parking Brake Cable

1. Loosen the parking brake lever.
2. Remove the parking brake cable clamps from the leaf spring and floor panel. (14WS0S)
3. Loosen the cable adjusting nuts and disconnect the parking brake cables from the equalizer.

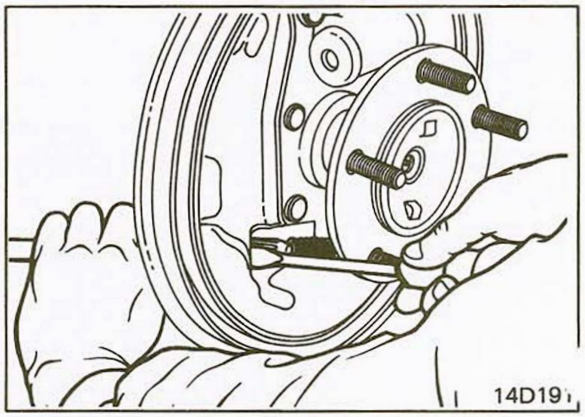


14W505

4. Remove the rear brake drum and disconnect the rear end of the parking brake cable from the shoe and lever assembly.
5. Remove the shoe return spring, shoe retainer spring and shoe hold-down pin, and then remove the brake shoe assembly. (14W503)



6. Using a screwdriver, draw out the parking brake cable from the backing plate.



INSPECTION

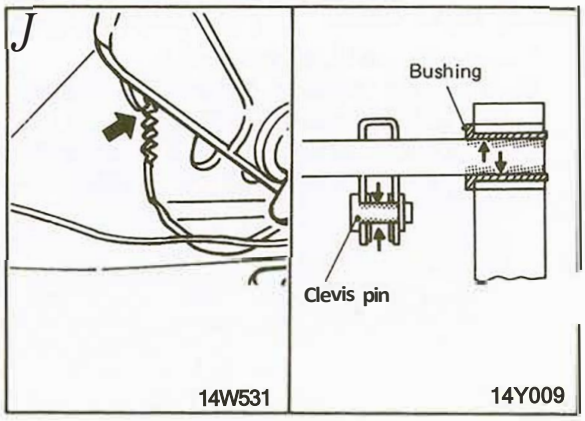
1. Check bushing for wear.
2. Check parking brake switch for malfunction.
3. Check parking lever latch for wear.
4. Check parking brake cable for damage and rough operation.

INSTALLATION

Parking Brake Lever mbly

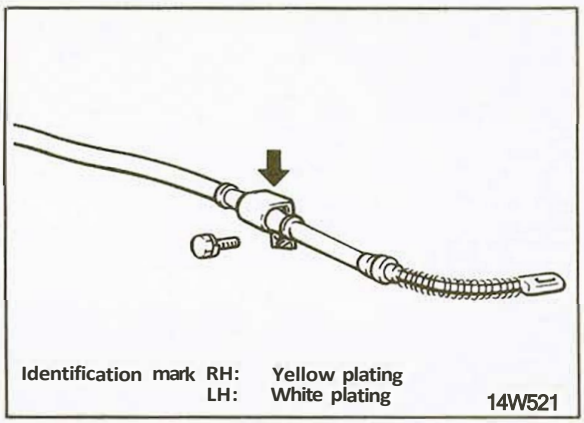
Apply the specified multipurpose grease to the clevis pin, bushing and ratchet plate.

Recommended multipurpose grease	SAE 131 Oa, NLGI grade #3



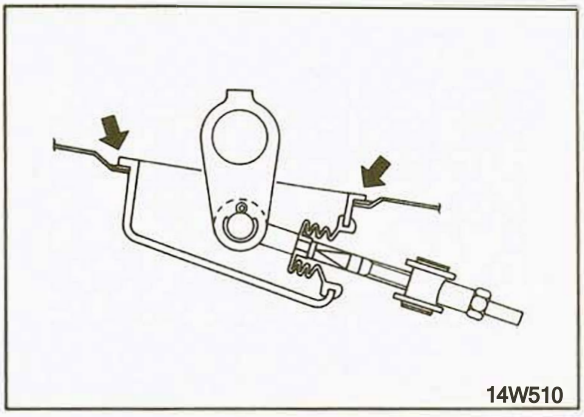
irking Brake Cable

1. Before installation of the parking brake cable, check the identification mark made on the clip of the parking brake cable.



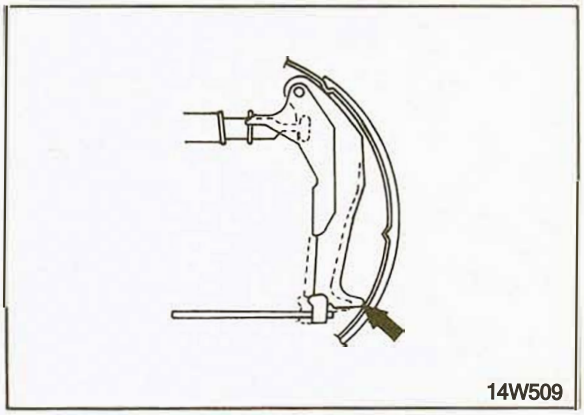
2. Apply drying sealant to the grommet. (14W510)
3. After the cable adjuster has been temporarily tightened, repeatedly pull the parking brake lever until its stroke becomes constant to adjust for proper shoe clearance.
4. Adjust the parking brake lever stroke to the standard value with the cable adjuster.

Parking brake lever stroke	4-6 clicks



5. Release the parking brake lever, remove the brake drum, and check to ensure that the brake lever adjuster is touching the shoe. (14W509)

Caution
If the parking brake cable is pulled too far, the adjuster lever will not fit the adjuster, resulting in faulty operation of the brake shoe adjuster.



CLUTCH

CONTENTS

GENERAL SPECIFICATIONS

Clutch operating method	Hydraulic type
Inside diameter of clutch master cylinder mm **(in.)**	15.87 (.62)
Clutch disc	
Type	Single dry disc type
Facing diameter (outside x inside) mm (in.)	225 X 150 (8.86 X 5.91)
Number of torsion springs	4
Spline inside diameter mm (in.)	23.16-23.21 (.912-.914)
Clutch cover assembly	
Type	Diaphragm spring, strap rivet type
Setting load N (lbs.)	3,432 (772)
Mounting bolt circle diameter mm (in.)	264 (10.39)
Clutch release bearing	
Type	Angular contact, self-centering type
Free travel mm (in.)	1.6 (.06)
Clutch release cylinder	
Cylinder bore diameter mm (in.)	19.05 (.75)

SERVICE SPECIFICATIONS

mm (in.)

Standard value	
Clutch pedal height	186-191 (7.3-7.5)
Clutch pedal free play	5-10 (.2-.4)
Clearance between clutch pedal and floorboard when pedal is depressed	35 (1.4) or more
Service limit	
Clutch disc	
Rivet sink	0.3 (.012)

TORQUE SPECIFICATIONS

Nm (ft.lbs.)

Clutch to flywheel	15-21(11-15)
Flywheel to crankshaft	128-137 (94-101)
Release cylinder to transmission case	30-41 {22-30)
Transmission to engine	43-53 (32-39)
Fulcrum	30-41 {22-30)
Clutch pedal to pedal bracket	25-35 (18-25)
Eye bolt	20-25 {15-18)
Clutch tube flare nut	13-17 (10-12)
Clutch master cylinder to firewall	7-9 (5-7)
Clutch pedal bracket	8-12 (6-9)
Push rod lock nut	8-12 (6-9)

,UBRICANTS

	Specified lubricants	Quantity
Fluid	Brake fluid DOT 3	As required
Grease for clutch pedal shaft, bushings, and return spring	Multipurpose grease SAEJ3 I0a, NLGI grade #3	As required

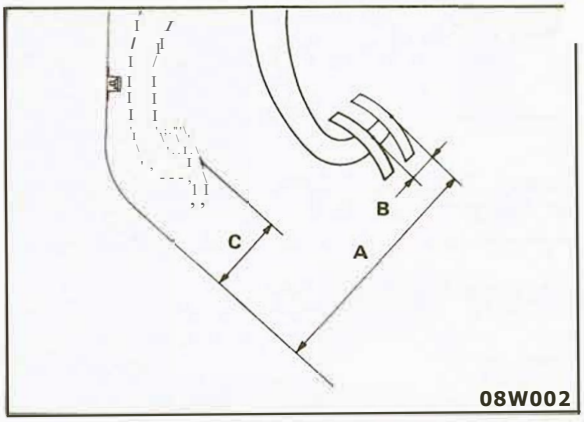
TROUBLESHOOTING

Symptom	Probable cause	Remedy
Clutch slips	Insufficient clutch pedal free play	Adjust
	Oil or grease on clutch facing Clutch facing worn Pressure spring deteriorated	Replace
	Pressure plate or flywheel runout Hydraulic system failure	Repair or replace
Clutch drags or does not release	Excessive clutch pedal free play	Adjust
	Interference between pedal and floor panel	Correct
	Pilot bearing worn or broken Clutch disc warped Pressure plate, disc or throwout bearing damaged	Replace
	Hydraulic system failure	Repair or replace
Clutch chatters	Facing hardened Facing stained with oil or grease Weak or broken disc damper springs Improper facing contact or disc runout Pressure plate or flywheel warped	Replace
	Loose engine mounting	Repair or replace
Clutch noises	Release bearing broken, worn or poorly lubricated Pilot bearing worn Disc hub loose Disc plate cracked Torsion springs deteriorated or broken	Replace
Clutch operation erratic or rough	Facing stained with grease or oil Facing worn or rivet loose Torsion spring deteriorated or broken	Replace
	Insufficient lubricant on clutch pedal pivot	Lubricate

CLUTCH PEDAL INSPECTION AND ADJUSTMENT

1. Measure the clutch pedal height and free play.

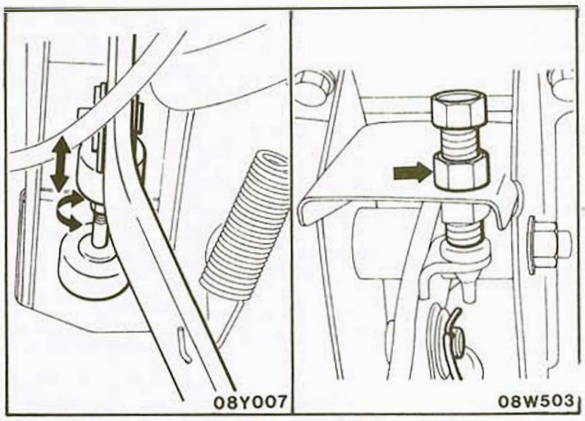
Clutch pedal height A	186-191 mm (7.3-7.5 in.)
Clutch pedal free play B	5-10 mm (.2-.4 in.)



NOTE
The clutch pedal is so made that no adjustment of free play is possible.

2. If the clutch pedal height and free play are not within the standard value, adjust as follows:
   (1) Turn the pedal stopper bolt back to a position where it does not contact the pedal arm. (08W503)
   (2) Loosen the push rod lock nut and adjust the pedal height to the standard value by turning the push rod. (08Y007)
   (3) Turn the pedal stopper bolt until it comes into contact with the pedal arm, and then tighten the lock nut.
3. After making the adjustment, depress the clutch pedal several times and check the clutch pedal to floorboard clearance is within the standard value range when the clutch is disengaged.

Pedal to floorboard clearance C when pedal is depressed	35 mm (1.4 in.) or more



4. If the clutch pedal to floorboard clearance is less than the standard value, air mixture in hydraulic system or defective clutch assembly is suspected.
   Bleed the hydraulic system or repair the clutch assembly.

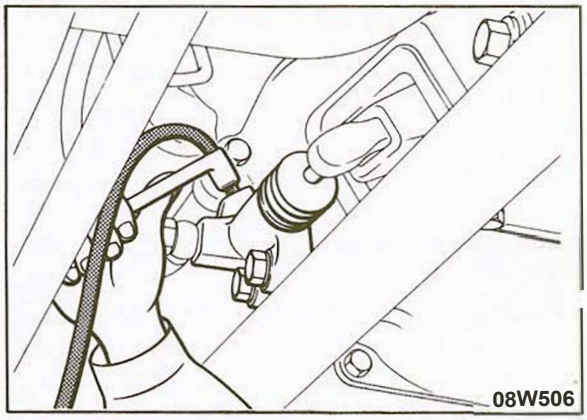
BLEEDING

Whenever the clutch tube, the clutch hose, and/or the clutch master cylinder have been removed, or if the clutch pedal is spongy, bleed the system.

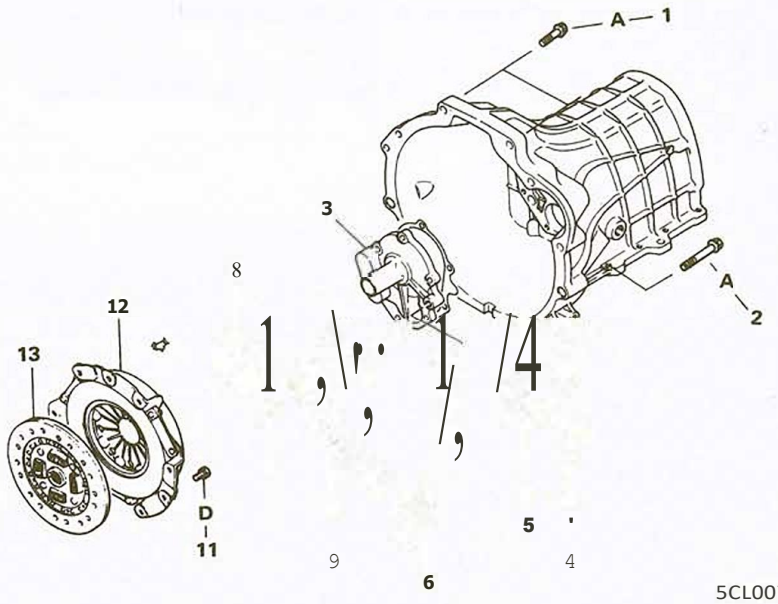
1. Loosen the bleeder screw at the clutch release cylinder.
2. Push clutch pedal down slowly until all air is expelled.
3. Hold clutch pedal down until bleeder screw isretightened.
4. Refill clutch master cylinder with recommended brake fluid.

Caution
Use the recommended brake fluid. Avoid using a mixture of the recommended fluid and other fluid.

Recommended brake fluid	DOT 3



OMPONENTS

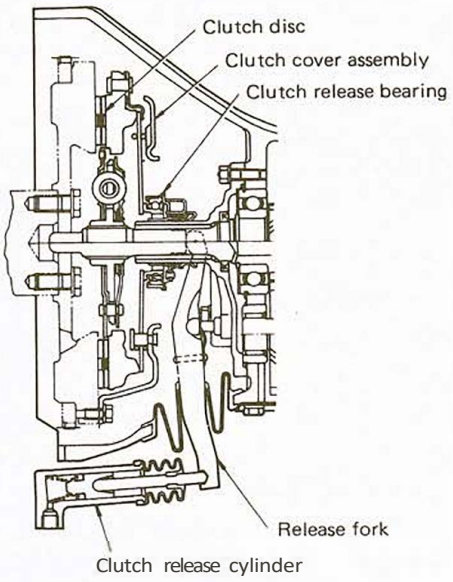


5CL007

1. Flange bolt - M10x40 (2)
2. Flange bolt - M10x65 (2)
3. Transmission assembly
4. Bolt - M10x30 (2)
5. Clutch release cylinder
6. Release fork boot
7. Return clip (2)
8. Clutch release bearing
9. Release fork
10. Fulcrum
11. Bolt (6)
12. Clutch cover assembly
13. Clutch disc

NOTE
Numbers show order of disassembly_
For reassembly. reverse order of disassembly.

	Nm	ft.lbs.
A	43-53	32-39
B	30-41	22-30
C	30-41	22-30
D	15-21	11-15

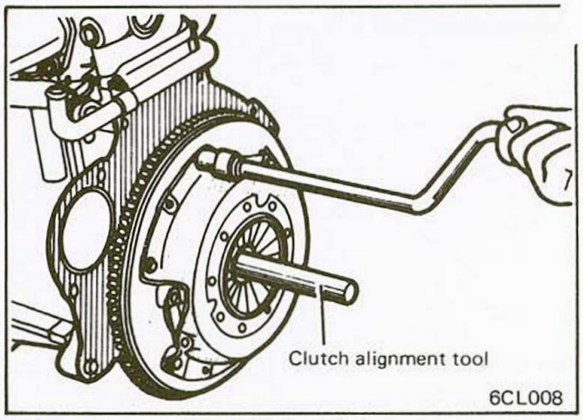


6CL012

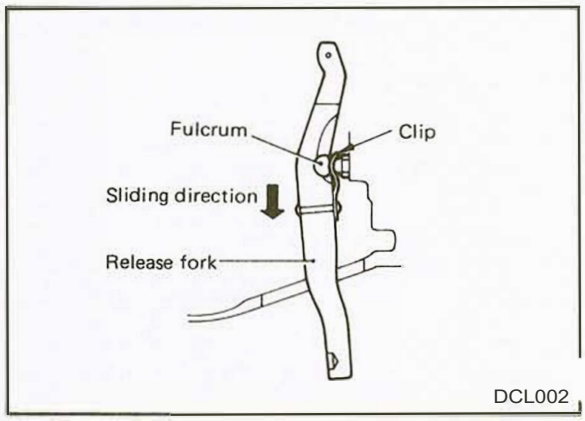
REMOVAL

1. Insert a universal clutch alignment tool, or the main drive gear of transmission in center spline to prevent dropping of clutch disc.
2. Loosen bolts that hold clutch cover assembly diagonally one by one and remove clutch cover assembly.

Caution
DO NOT clean clutch disc or release bearing with cleaning solvent.



3. Slide release fork in direction indicated by arrow to disengage fulcrum from clip. Attempting to remove release fork by sliding it in other direction will result in damage to clip.

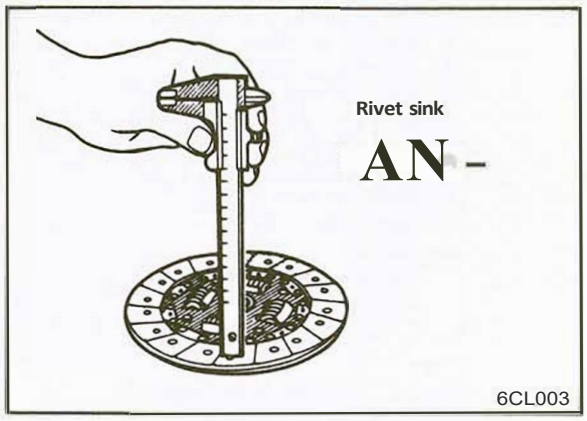


INSPECTION

Outch Disc

Check facing for wear. Replace excessively worn facing. Wear is measured from facing surface to rivet head. (6CL003)

Clutch disc (rivet sink) [Service limit]	0.3 mm (.012 in.)



Clutch Cover Assembly

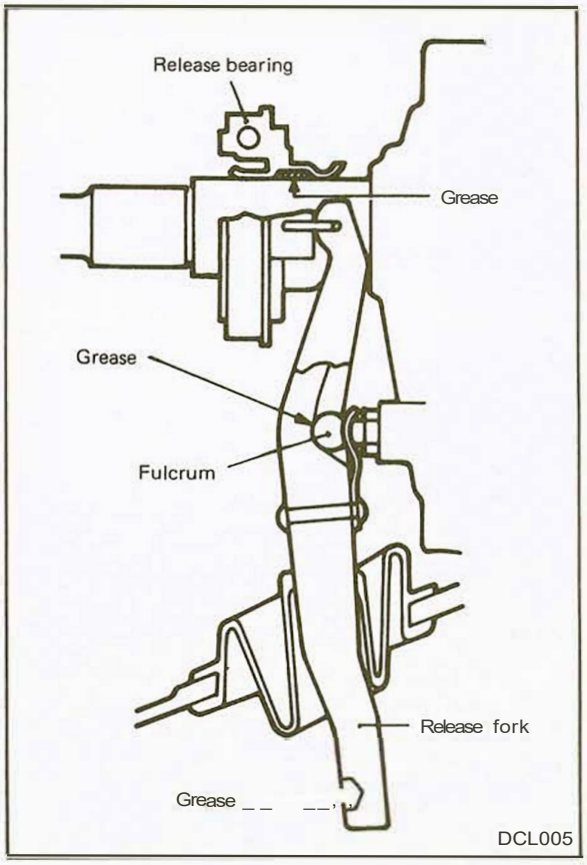
Inspect diaphragm spring for excessive wear of fingers and looseness of strap rivets, and inspect pressure plate for scoring. Replace if damage is evident.

Release Bearing and Release Fork

1. Check the release bearing for rough rotation or abnormal noise. Check the diaphragm spring contacting portions for abnormal wear.
2. Check the bearing and fulcrum contacting portions of the release fork for abnormal wear.

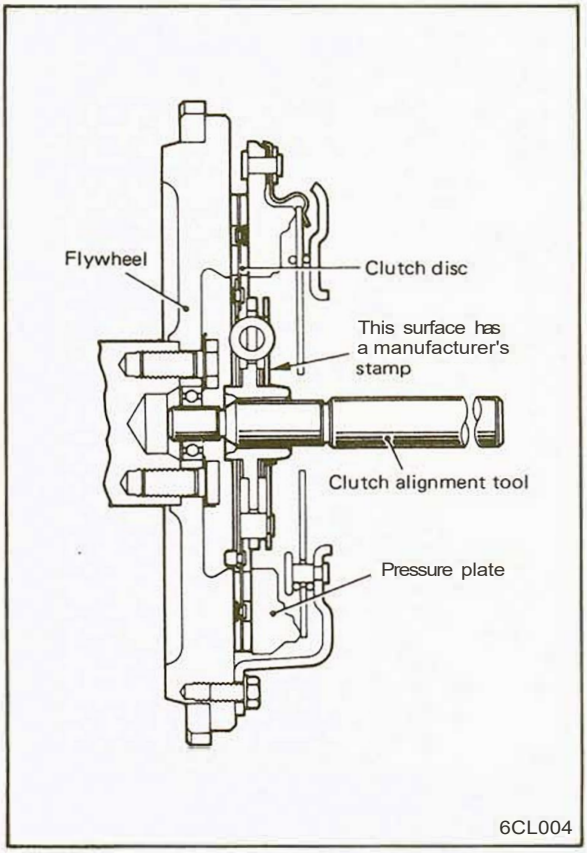
JSTALLATION

I. Pack the release fork fulcrum hole and release cylinder push rod hole with grease. (DCL005)
2. Pack grease into groove on release bearing I.D.
3. If there is oil or grease on clutch facing or pressure plate, thoroughly wipe away with a dry shop towel.
4. Lightly grease clutch disc spline and main drive gear spline of transmission.



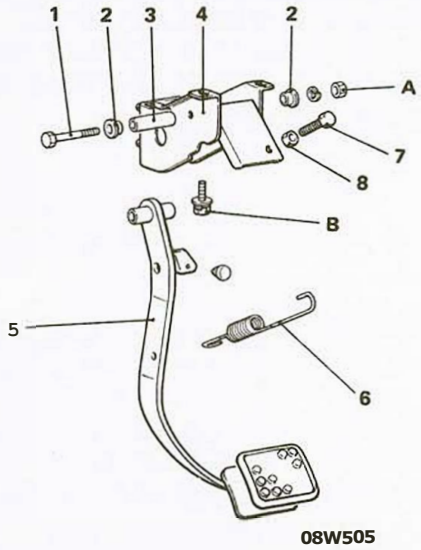
5. Using a universal clutch alignment tool, or the main drive gear of transmission, install clutch disc and clutch cover assembly onto flywheel. (6CL004)
6. When installing clutch disc, be sure that surface having manufacturer's stamped mark is on pressure plate side.

Caution
When installing transmission, do not shake it or install in such a manner that main drive gear is stressed unduly. Make sure that main drive gear enters clutch disc squarely.



COMPONENTS

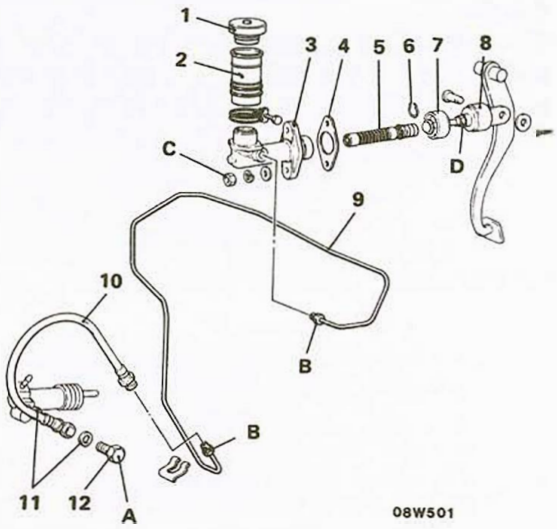
Clutch Pedal



1. Pedal shaft
2. Bushing
3. Spacer
4. Clutch pedal bracket
5. Clutch pedal
6. Return spring
7. Stopper bolt
8. Lock nut

	Nm	ft.lbs.
A	25-35	18-25
B	8-12	6-9

Clutch Master Cylinder and Tube

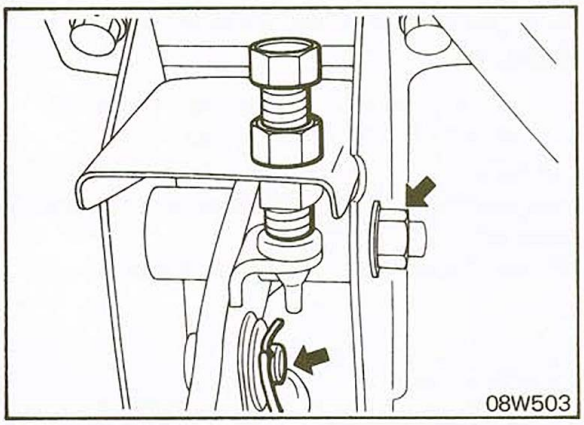


1. Reservoir cap
2. Reservoir
3. Clutch master cylinder
4. Sealer
5. Piston assembly
6. Piston stop ring
7. Piston boot
8. Damper and push rod assembly
9. Clutch tube
10. Clutch hose
11. Gasket
12. Eye bolt

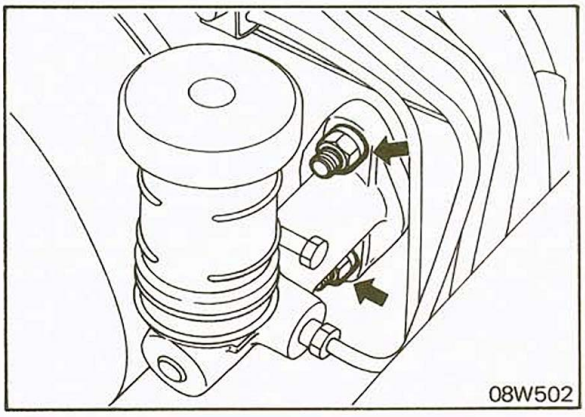
	Nm	ft.lbs.
A	20-25	15-18
B	13-17	10-12
C	7-9	5-7
D	8-12	6-9

EMOVAL

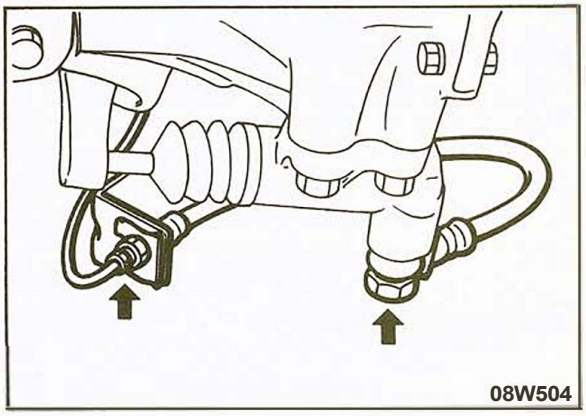
I. Loosen the bleeder screw of the release cylinder and drain the brake fluid.
2. Disconnect the push rod from the clutch pedal. (08W503)
3. Remove the clutch pedal from the pedal bracket.



4. Disconnect the clutch tube from the master cylinder.
5. Remove the master cylinder. (08W502)



6. Disconnect the clutch hose from the clutch tube and release cylinder. (08W504)
7. Remove the clutch tube.



INSPECTION

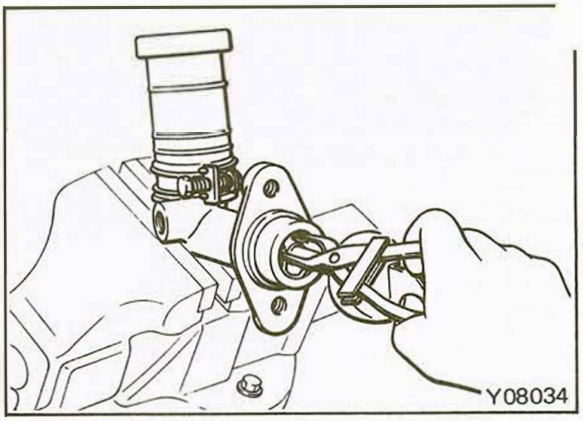
I. Check sealer for damage.
2. Check master cylinder or clutch hose for fluid leakage.
3. Check clutch hose and tube for cracks or clogging.
4. Check pedal shaft bushings for wear.
5. Check pedal arm for bending and twisting.
6. Check return spring for weakening.

MASTER CYLINDER OVERHAUL

Disassembly

1. Remove the piston stop ring. (Y08034)
2. Remove the piston assembly.

Caution
Use care not to damage the master cylinder body and piston assembly.
Do not disassemble the piston assembly.



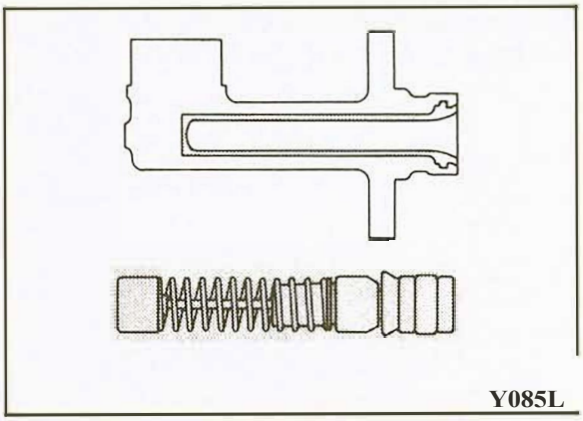
Inspection

1. Check inside cylinder body for rust or scoring.
2. Check piston cup for wear or deformation.
3. Check piston for rust or scoring.
4. Check clutch tube inside connecting section for clogging.

Reassembly

Apply specified brake fluid to the inner surface of the cylinder and to the entire periphery of the piston assembly. (Y085 I7)

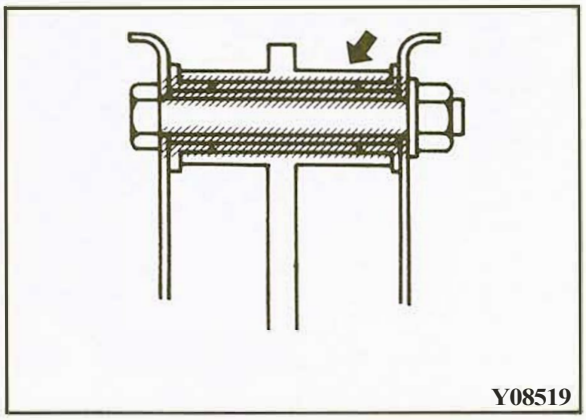
Recommemded brake fluid	DOT 3



INSTALLATION

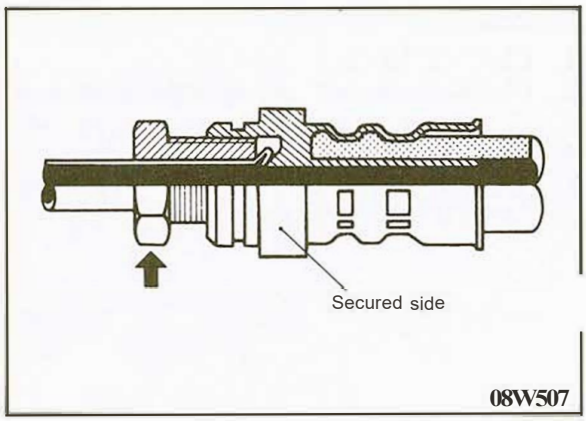
I. After tightening the clutch tube flare nut and eye bolt, check to be sure there is no leakage of the clutch fluid.
2. Apply specified multipurpose grease to the pedal shaft and bushings. (Y085 19)

Recommended multipurpose grease	SAEJ3 I0a, NLGI grade #3

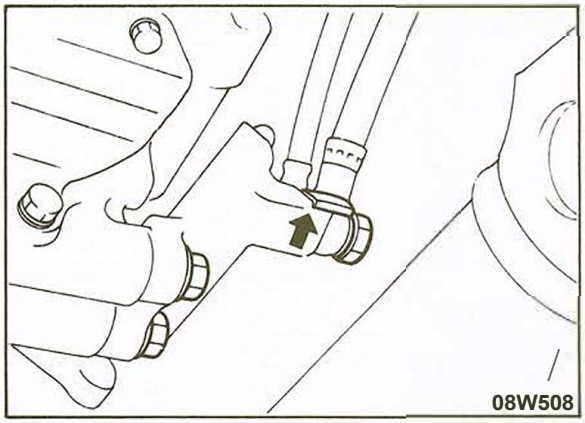


3. Temporarily tighten the flare nut by hand, and then tighten it to the specified torque, being careful that the clutch hose does not become twisted. (08W507)

Clutch tube flare nut tightening torque	13-17 Nm (I 0-12 ft.lbs.)



Connect the clutch hose to the release cylinder at the stepped portion shown in the illustration. (08W508)
5. Torque all parts to specifications during assembly.
6. Bleed the air from the system. (Refer to p. 6-4.)
7. Adjust the clutch pedal height. (Refer to p. 6-4.)



CLUTCH RELEASE CYLINDER

Removal and Disassembly

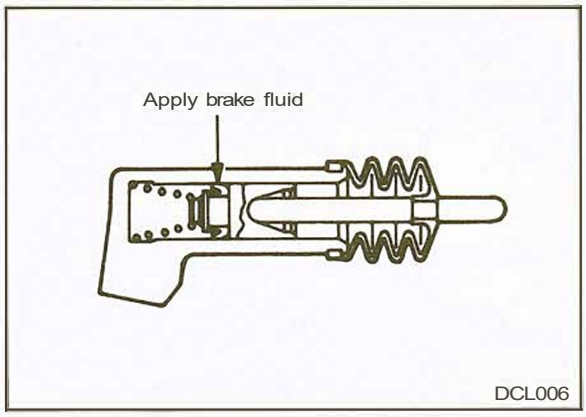
I. Remove eye bolt and gaskets and disconnect clutch hose from clutch release cylinder.
2. Remove two bolts securing the clutch release cylinder and clutch housing and remove clutch release cylinder assembly.
3. Remove the boot and push rod and take out piston and spring.

Inspection

1. Check inside cylinder body for rust or scoring.
2. Check piston cup for wear or deformation.
3. Check piston for rust or scoring.

Reassembly and Installation

1. Insert spring into release cylinder.
2. Apply brake fluid to outer surface of piston, piston cup and cylinder bore. (DCL006)
3. Install the piston and piston cup into the release cylinder.
4. Install push rod and boot.
5. Install release cylinder to clutch housing and tighten two bolts to specified torque.
6. Connect clutch hose to release cylinder and tighten eye bolt.
7. Bleed the air from the system. (Refer top. 6-4)



COOLING

CONTENTS

GENERAL SPECIFICATIONS

Cooling method	Water-cooling, forced circulation type
Radiator	
Type	Pressurized corrugated fin type
Performance kcal/h	43,600
Radiator cap	
High pressure valve opening pressure kPa (psi)	74-103 (11-15)
Vacuum valve opening pressure kPa (psi)	- 5 orless (-0.7 or less)
Water pump	Centrifugal type impeller
Cooling fan	
Diameter mm (in.)	410(16.1)
No. of blades	7
Fan clutch	
Type	Thermostatic controlled fluid coupling
Fan speed	2,750 ± 150 rpm at pulley speed of 4,000 rpm, 65°C (149°F) or higher 1,300 rpm at pulley speed of 4,000 rpm, 55°C (131°F) or lower
Thermostat	
Type	Wax pellet type with jiggle valve
Valve opening temperature	88°C (190°F)
Full-open temperature	100°C (212°F) at valve lift of 8 mm (.31 in.) or more
Identification mark	88 (stamped on flange)
Water temperature gauge unit	
Type	Thermistor type
Resistance	104 Ω at 70°C (158°F) 38 Ω at 100°c (212°F)
Drive belt	
Length mm (in.)	964 (37.95)
Automatic transmission oil cooler	
Performance kcal/h	1,200

SERVICE SPECIFICATION

	kPa (psi)
Service limit	
Opening pressure of radiator cap high pressure valve	65 (9.2)

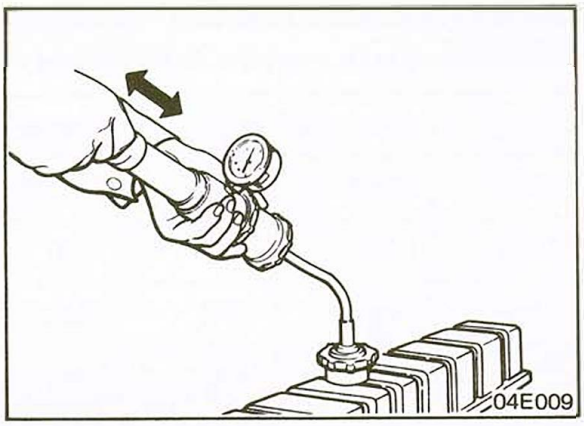
0RQUE SPECIFICATIONS	Nm (ft.lbs.)
Alternator to timing chain case	20-25 (14-18)
Brace to alternator	12-15 (8.5-11)
Water pump to timing chain case	12-14 (8.5-10.5)
Water temperature gauge unit	30-39 (22-28)
Radiator	
Radiator shroud to radiator (vehicles with a manual transmission)	3-7 (2-5)
Radiator shroud to radiator (vehicles with an automatic transmission)	8-11 (6-8)
Radiator to headlight support	8-11 (6-8)
Automatic transmission oil cooler	
Oil cooler tubes to transmission	20 (14)

LUBRICANT	lit. (U.S.qts., Imp. qts.)
Engine coolant	
Total quantity	8.0 (8.45, 7.04)
Quantity in reserve tank	0.65 (.69, .57)

Symptom	Probable cause	Remedy
Low coolant level	Leakage of coolant	
	Radiator	Repair or replace
	Heater or radiator hose	Tighten clamps or replace
	Thermostat housing gasket broken or bolts loose	Replace gasket or retighten
	Water pump gasket broken or bolts loose	Replace gasket or retighten
	Faulty radiator cap	Replace
Clogged radiator	Foreign material in coolant	Replace coolant
Abnormally high coolant temperature	Faulty thermostat	Replace
	Faulty radiator cap	Replace
	Restriction of flow in cooling system	Clear restriction
	Loose or slipping drive belt	Adjust tension or replace
	Faulty water pump	Replace
	Faulty temperature gauge or wiring	Repair or replace
Abnormally low coolant temperature	Faulty thermostat	Replace
	Faulty temperature gauge or wiring	Repair or replace

.:>OLANT LEAK CHECK

1. Loosen radiator cap.
2. Run the engine until coolant has warmed up enough so that the thermostat valve opens, and then stop the engine.
3. Confirm that the coolant level is up to the filler neck.
4. Install a radiator cap tester to the radiator filler neck and apply 160 **kPa** (23 psi) pressure, then check for leakage from the radiator, hoses or connections. (04E009)



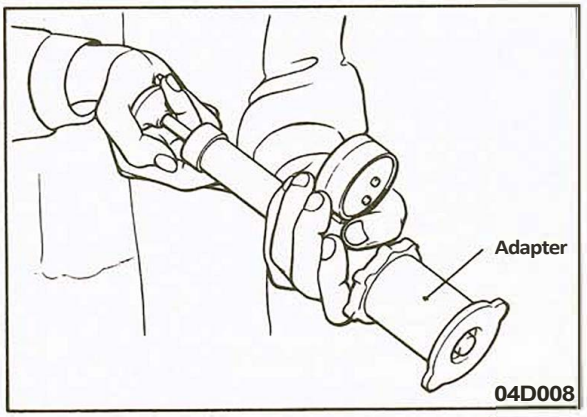
Caution
Be sure to completely clean away any moisture from the places checked.
When the tester is removed, be careful not to spill any coolant from it.
Be careful not to deform the radiator filler neck when installing and removing the tester and when testing.

5. If there is leakage, repair or replace the appropriate part.

RADIATOR CAP PRESSURE TEST

1. Use an adapter to attach the cap to the tester. (04D008)
2. Increase the pressure until the indicator of the gauge stops moving.
3. Check that the pressure level is maintained at or above the service limit for 5 to 6 seconds.
4. Replace the radiator cap if the reading does not remain at or above the service limit.

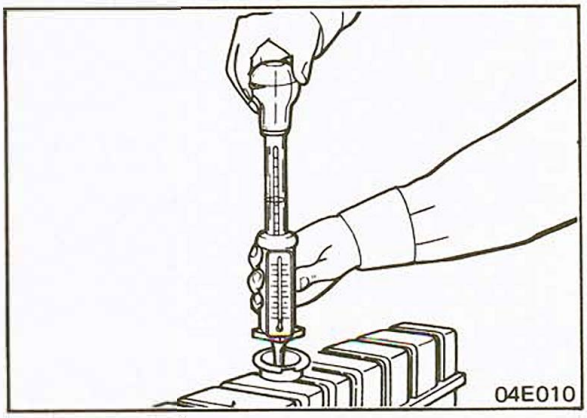
Opening pressure of radiator cap high pressure valve 65 kPa (9.2 psi)



NOTE
Be sure that the cap is clean before testing, since rust or other foreign material on the cap seal will cause an improper indication.

SPECIFIC GRAVITY TEST

I. Measure the specific gravity of the coolant with a hydrometer. (04E0 l0)
2. Measure the coolant temperature and calculate the concentration from the relation between the specific gravity and temperature, using the following table for reference.



Relationship Between Antifreeze Concentration and Specific Gravity

The following table is applicable only to the specified antifreeze DIA-QUEEN LONG-LIFE COOLANT.

Coolant temperature °C (°F) and specific gravity					Freezing temperature °C (°F)	Safe operating temperature °C (°F)	Coolant concentration (Specific volume)
10 (50)	20 (68)	30 (86)	40 (104)	50 (122)			
1.037	1.034	1.031	1.027	1.023	-9 (15.8)	-4 (24.8)	20%
1.045	1.042	1.038	1.034	1.029	-12 (10.4)	-7 (19.4)	25 %
1.054	1.050	1.046	1.042	1.036	-16(3.2)	-11(12.2)	30%
J.063	1.058	1.054	1.049	1.044	-20 (-4)	-15(5)	35 %
1.071	1.067	1.062	1.057	1.052	-25 (-13)	-20 (-4)	40%
1.079	1.074	1.069	1.064	1.058	-30 (-22)	-25 (-13)	45 %
1.087	1.082	1.076	1.070	1.064	-36 (-32.8)	-31 (-23.8)	50%
1.095	1.090	1.084	1.077	1.070	-42 (-44)	-37 (-35)	55 %
1.103	1.098	1.092	1.084	1.076	-50 (-58)	-45 (-49)	60%

Example
The safe operating temperature is -15° C (5° F) when the measured specific gravity is 1.058 at the coolant temperature of 20° C (68° F).

Recommended Antifreeze

Antifreeze	Concentration
DIA-QUEEN LONG-LIFE COOLANT (Part No. 0103044) or HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT	50%

Caution

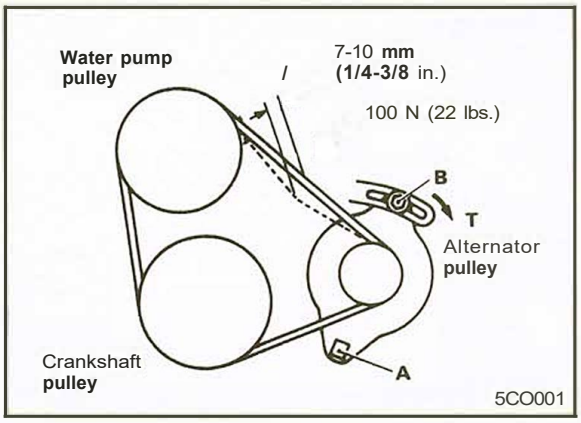
If the concentration of the antifreeze is below 20%, the anti-corrosion property will be adversely affe.cted. In addition, if the concentration is above 60%, both the anti-freeze and engine cooling properties will decrease, affecting the engine adversely. For these reasons, be sure to maintain the concentration level within the specified range.

\N BELT TENSION ADJUSTMENT

1. Loosen alternator support bolt ' A" and brace bolt "B".
2. Move alternator in direction of arrow "T" to adjust belt tension to specifications.

Fan belt deflection	7-10 mm (.28-.39 in.)

3. Tighten bolt "B" and then tighten bolt "A".

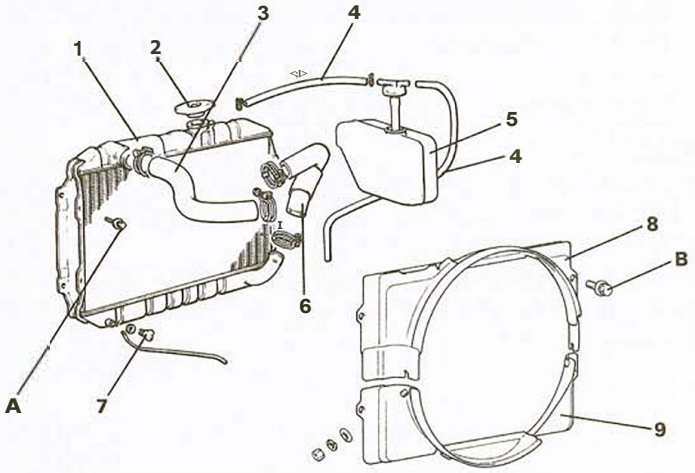


Caution

An over tensioned belt could cause not only premature wear of belt but also noise and damage to water pump bearing and alternator bearing.

A loose belt also could cause damage to the belt and failure of the alternator to generate enough power and consequently a rundown battery.

COMPONENTS



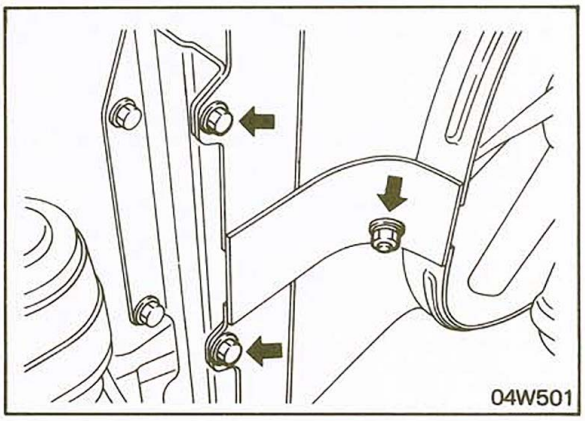
1. Radiator
2. Radiator cap
3. Radiator hose, upper
4. Overflow tube
5. Reserve tank
6. Radiator hose, lower
7. Drain plug
8. Upper shroud
9. Lower shroud

	Nm	ft.lbs.
A	8-11	6-8
B	3-7	2-5

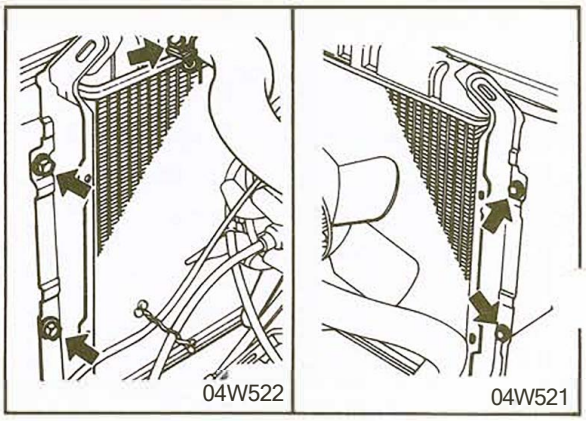
04W5).

REMOVAL

1. Set the warm water flow control lever to the hot position.
2. Loosen the radiator drain plug to drain the coolant.
3. Disconnect the upper and lower hoses.
4. Remove the upper and lower shrouds. (04W501)



5. Remove the radiator mounting bolts. (04W522, 04W521)
6. Remove the radiator.



!SPECTION

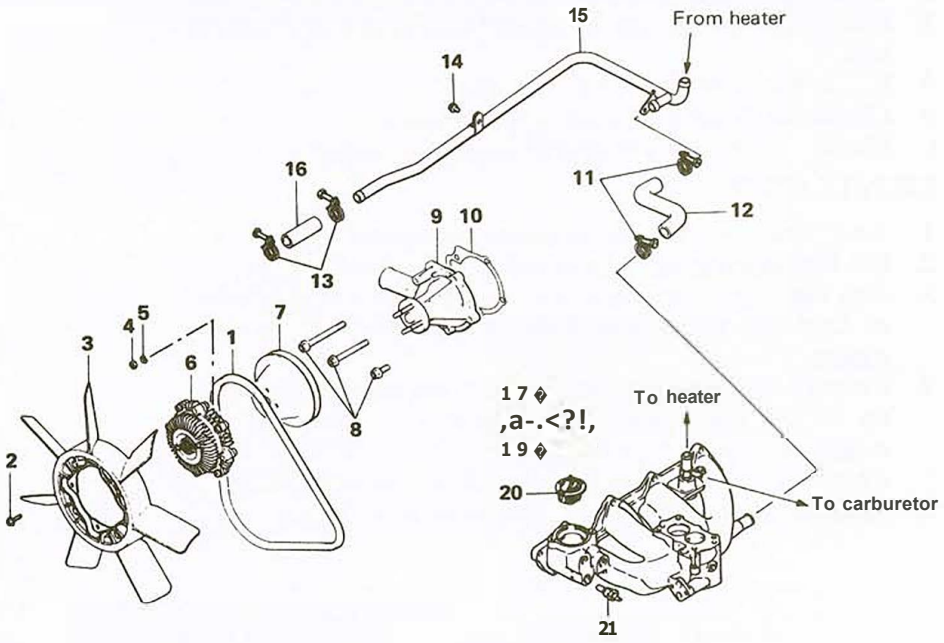
1. Check radiator fins for bent, broken or clogged.
2. Check the radiator for corrosion, damage, rust or scale.
3. Check the radiator hoses for cracks, damage or deterioration.
4. Check the reseive tank for damage.
5. Check the radiator cap spring for damage.
6. Check the radiator cap seal for cracks or damage.

INSTALLATION

1. Torque all parts to specifications during assembly.
2. Fill the radiator and reserve tank with clean coolant.
3. Run the engine until the coolant has warmed up enough so that the thermostat valve opens, and then stop the engine.
4. Remove the radiator cap, pour in the coolant until it is up to the filler neck of the radiator, and then fill the reserve tank to the upper level.
5. Check to be sure that there is no leakage froqi. the radiator, hoses or connections. (Refer top. 7-4.)

COMPONENTS

1. Belt
2. Flange bolt (4)
3. Cooling fan
4. Nut (4)
5. Spring washer (4)
6. Fan clutch
7. Pulley
8. Flange bolt (5)
9. Water pump assembly
10. Water pump gasket
11. Hose clamp (2)
12. Water hose
13. Hose clamp (2)
14. Bolt
15. Water pipe
16. Water hose
17. Bolt (2)
18. Water outlet fitting
19. Gasket
20. Thermostat
21. Water temperature gauge unit



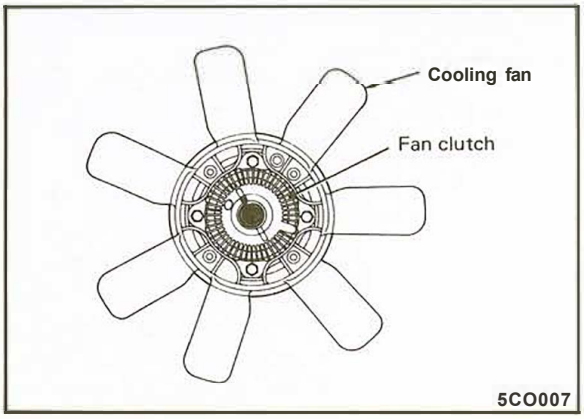
NOTE
Numbers show order of disassembly.
For reassembly, reverse the order of disassembly.

5CO01

INSPECTION

Cooling Fan

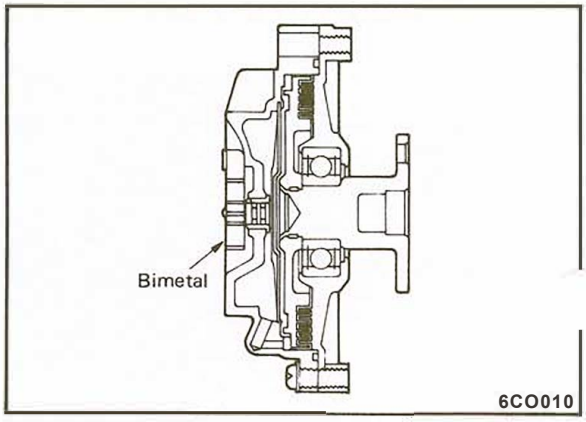
Check following items and replace if defective.
1. Check blades for damage or cracks.
2. Check around bolt holes in fan hub for cracks and damage.



5CO007

Fan Clutch

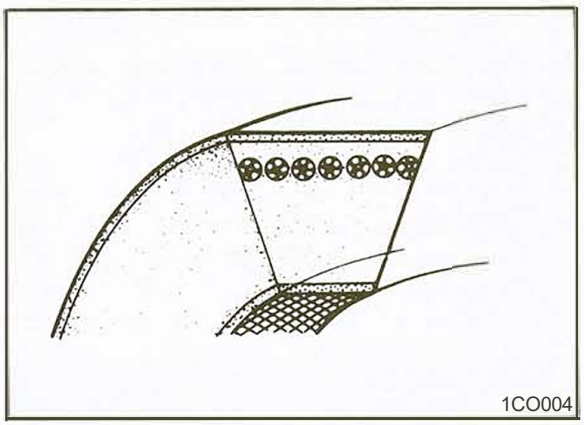
Check following items and replace if defective.
1. Check to ensure that fluid in the fan clutch is not leaking at case joint and seals. **If** fluid quantity decreases due to leakage, fan speed **will** decrease and engine overheating might result.
2. When a fan is attached to an engine and turned by hand, it should give a sense of some resistance. **If** fan turns lightly, it is defective.
3. Check the bimetal strip for damage.



6CO010

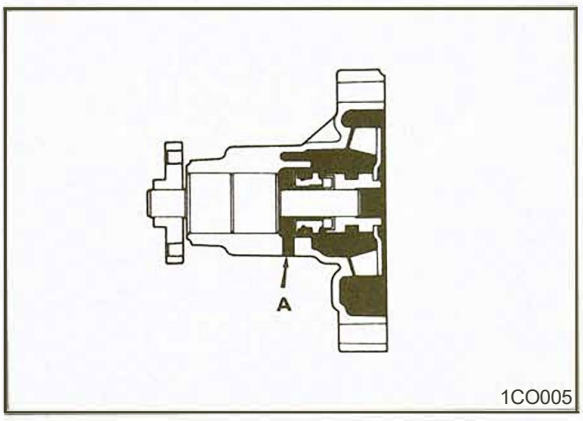
elt

Check following items and replace if defective.
1. Check surface for damage, peeling or cracks.
2. Check for oil or grease on surface.
3. Check for worn or hardened rubber.



Water Pump

Check the following items and replace if defective.
1. Check for water leakage. If water leaks from hole **"A"**, seal unit is defective. Replace as an assembly.
2. Check bearing for noise or roughness.



INSTALLATION

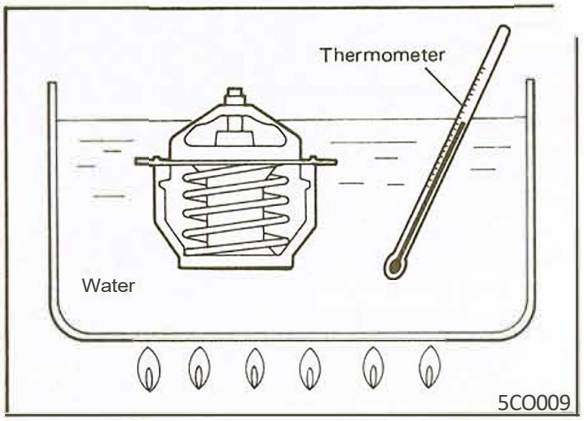
Water Pump

1. Install new water pump gasket and install water pump.
2. Install fan belt and adjust belt tension. (Reter to p. 7-7.)

INSPECTION

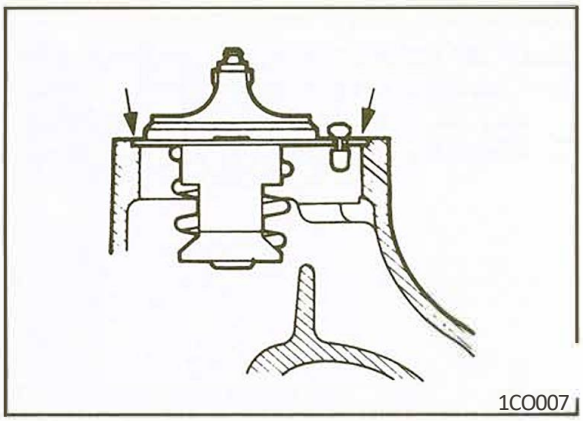
1. Heat thermostat as shown in illustration.
2. Check to see if valve operates properly.
3. Check to determine temperature at which valve begins to open.

Valve opening temperature	88° C (190° F)
Full opening temperature	100° C (212° F)
Valve lift (at full open)	8 mm (.31 in.) or more



INSTALLATION

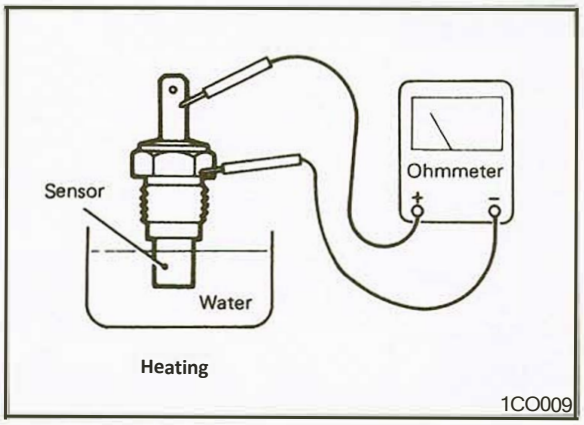
Check to ensure that flange of thermostat is correctly seated in socket of thermostat housing. If thermostat is installed in wrong direction, bottom of thermostat will touch rib inside inlet manifold, making it impossible to seat flange in position.



,sPECTION

1. Submerge the sensor element in water and then heat the water.
2. Connect an ohmmeter to the sensor terminal and ground it as illustrated (1CO009).
3. Observe the decrease in resistance as the temperature increases.

Indication point	Resistance value
70° C (158° F)	104 n
l 00° C (21 2° F)	38 n

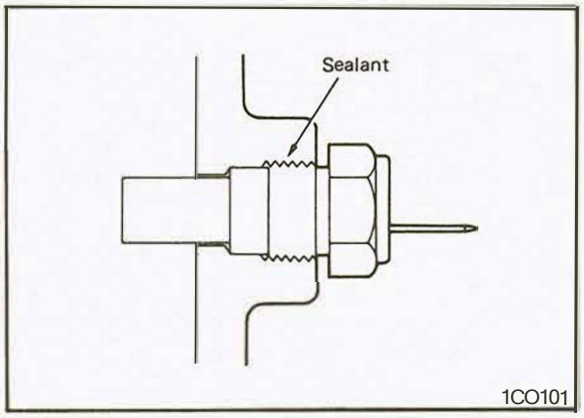


1CO009

INSTALLATION

Apply sealant to the threaded portion and tighten to the specified torque.

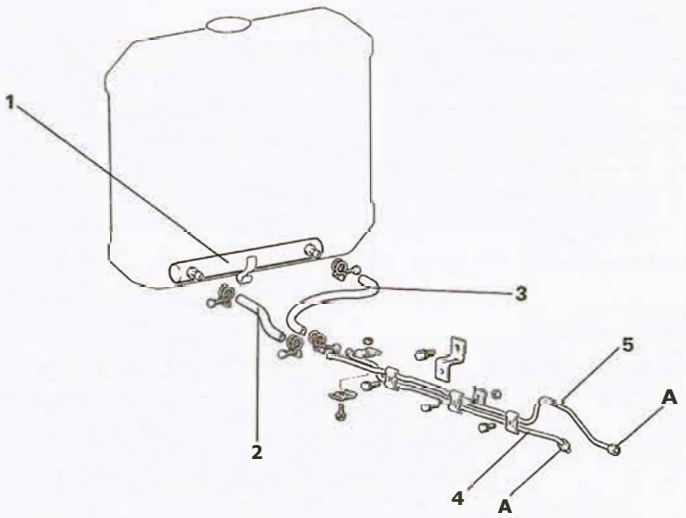
Water temperature gauge unit tightening torque .....
3 39 Nm (22-28 ft.lbs.)



1CO101

COMPONENTS

1. Oil cooler
2. Return hose
3. Feed hose
4. Feed tube
5. Return tube



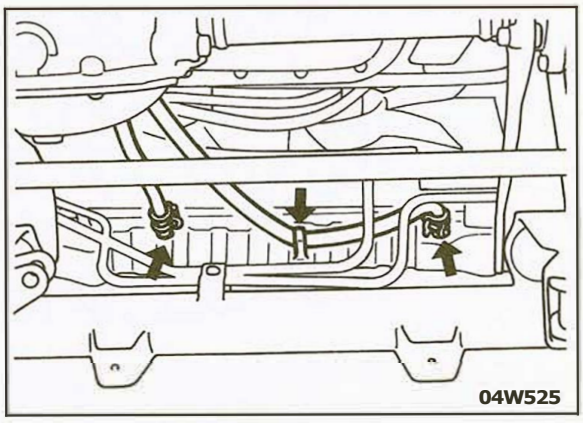
	Nm	ft.lbs.
A	20	14

04W524

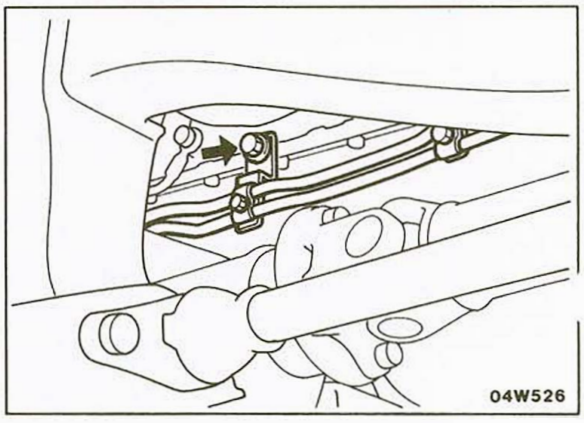
REMOVAL

1. Disconnect the oil cooler hoses from the radiator. (04W525)

NOTE
Be careful that the automatic transmission fluid does not spill out of the hoses.

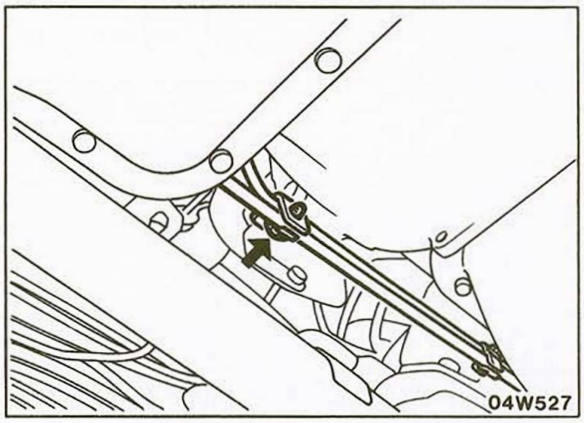


2. Detach the oil cooler tubes from where they are secured to the engine.



. Detach the oil cooler tubes from where they are secured to the transmission. (04W527)
4. Disconnect the oil cooler tubes from the transmission, and remove the oil cooler hoses and tubes.

NOTE
Plug the transmission and oil cooler tube openings to prevent fluid from spilling out.



INSPECTION

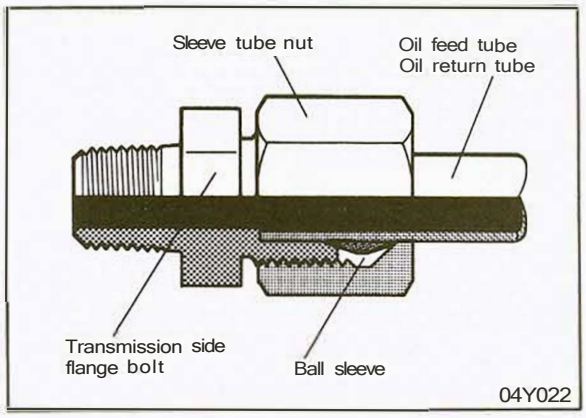
1. Check oil cooler hoses for cracks, damage and deterioration.
2. Check oil cooler tubes for leakage and deformation .

INSTALLATION

1. Torque all parts to specifications during assembly.

NOTE
When connecting the oil cooler tubes to the transmission, first securely connect the oil cooler tubes to the transmission ,de flange bolts, and then tighten by the sleeve tube nuts. ,04Y022)

2. After installation, add 120 cc of transmission fluid, and then, with the engine idling, check the fluid level and inspect for leakage.



ELECTRICAL SYSTEM

CONTENTS

GENERAL SPECIFICATIONS

Starter Motor

	Engine with M/T	Engine with A/T
Model No.	M3T25882	M2T53083
Type	Direct drive	Reduction drive
Output (nominal) kW/V	0.9/12	1.2/12
Turning direction (as viewed from pinion side)	Clockwise	Clockwise
No. of teeth of pinion	8	9
No-load characteristics		
Terminal voltage V	11.5	11.5
Current A	60 or less	100 or less
Speed rpm	6,500 or more	3,000 or more
Under-cut depth mm (in.)	0.5-1 (.020-.039)	0.5-1 (.020-.039)
Service limit	0.2 (.008) or less	0.2 (.008) or less
Commutator diameter mm {in.)	38.7 (1.524)	32 (1.260)
Service limit	37.7 (1.484)	31 (1.220)
Pinion gap mm (in.)	0.5-2.0 (.020-.079)	0.5-2.0 (.020-.079)

Distributor

	Federal	California
Model No.	T3T61971 (MD073074)	T3T61972 (MD073075)
Type	Contact-pointless type	Contact-pointless type
Igniter	Built-in type	Built-in type
Turning direction	Clockwise	Clockwise
Firing order	1-3-4-2	1-3-4-2
Centrifugal advance (distributor angle at distributor rpm)		
Initial	0° at 750	0° at 750
Middle	7° at 1,900	7° at 1,900
Final	8.5° at 2,500	8.5° at 2,500
Vacuum advance (distributor angle at mm (in.) of mercury)		
Initial	0° at 130 (5.12)	0° at 130 (5.12)
Middle	6.5° at 180 (7 .09)	5.3° at 180 (7.09)
Final	I 5° at 300 (I 1.81)	11.5° at 280(11.02)

nition Coil

Identification model No.	E-089
Primary resistance n	1.2
Secondary resistance kQ	13.7
External resistor resistance n	1.35

Spark Plugs

Model No. NGK	BP5ES-11
NIPPONDENSO	W16EPR-U10
Plug gap mm (in.)	1.0-1.1 (.039-.043)

Alternator

Model No.	A5T21077 {MD064068)	A2T41377 {MD074645)
Output (nominal) V/A	12/50	12/55
Regulated voltage V	14.4 ± 0.5 at 20° C {68° F)	14.4 ± 0.5 at 20° C (68° F)
Polarity	Minus(-) ground	Minus(-) ground
Turning direction (as viewed from pulley)	Clockwise	Clockwise
,'oltage regulator	Electronic, built-in type	Electronic, built-in type

Battery

Type	NXI00-S6 (S)-MF {Maintenance free battery)	NX120-7-MF (Maintenance free battery)
Capacity (20HR) Ah	45	80
Voltage V	12	12
Electrolyte specific gravity [20° C (60° F))	1.280	1.280

NOTE
If the specific gravity of the battery electrolyte falls 0.06 or more, recharge the battery.

Fuses

Fusible links	For Federal (not available in California)	For California (can also be sold in Federal states)	
Main			
Cable color	Red	**Red**	Green
Fusible link size mm² (in.2)	0.85 (.0013)	0.85 (.0013)	0.5 (.0008)
Permissible continuous current A	34	34	27
Fusing current A	150	150	100
Sub	Ignition circuit	Power window circuit	Headlight, headlight washer circuit
Cable color	Green	Green	Brown
Fusible link size mm² (in.²)	0.5 (.0008)	0.5 (.0008)	0.3 (.0005)
Permissible continuous current A	27	27	19
Fusing current A	100	100	65
Fuse capacity A	10	15	20
Color	Red	Light blue	Yellow

Ignition Switch

Ignition switch	
Type	Rotary switch with steering wheel lock and key-reminder switch
Load capacity A	
AM-ACC	15
AM-IG	30
AM-ST	15
AM-R	15
Key-reminder switch	
Load capacity W	1

?ters and Gauges

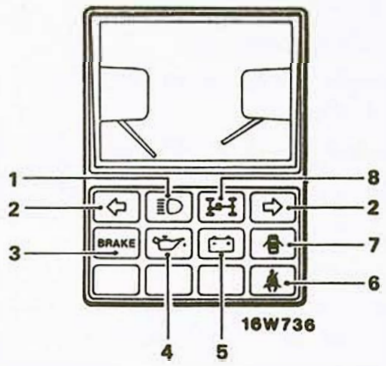
Speedometer	
Speed indication range mph (km/h)	0-85 (0-137)
Indication ratings (range of allowable error)	
Meter with "mph" indication mph	
25mph	+2.S 0
50mph	+3.5 +o.3
75 mph	+5 +I
Tachometer	
Type	Pulse type
Detection source	Ignition coil
Red zone rpm	6,000-8,000
Indication ratings (range of allowable error) rpm	
1,000 rpm	± 100
2,000 rpm	±100
3,000 rpm	± 150
4,000 rpm	±200
5,000 rpm	± 250
Fuel gauge	
Type	Bi-metal type (built-in constant voltage relay)
Constant voltage relay resistance value n	68-72
Fuel gauge unit	
Type	7-V resistance type
Standard resistance value n	
Aoat position "F" point	14.9-19.1
Float position "E" point	113.5-126.5
Aoat vertical movement range mm (in.)	222-220 (8.81-8.97)
Water temperature gauge	
Type	Bi-metal type
Water temperature gauge unit	
Type	Thermistor type
Standard resistance value n	
70° C (158° F)	90.5-117.5
I 15° C (239° F)	21.3-26.3

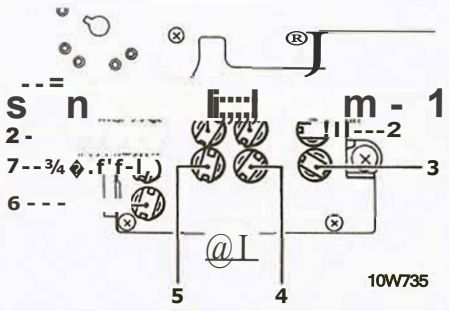
Oil pressure gauge	
Type	Bi-metal type
Oil pressure gauge unit	
Type	Bi-metal type
Standard resistance value n	
0 kPa (0 psi)	0
588 kPa (85 psi)	136
Inclinometer	
Type	Gravity type
Damping system	Oil-ftlled system
Indication angle	
Forward, backward	45° max.
Right, left	45° max.
Voltage meter	
Type	Bimetal type
Indication ratings (range of allowable error) V	
lO V	± 0.5
14 V	± 0.5

dicator and Warning Lights

W (SAE trade numbers)

1. Upper-beam and passing indicator light	1.4 (74)
2. Tum-signal indicator lights	1.4 (74)
3. Brake warning light	1.4 (74)
4. Oil pressure warning light	1.4 (74)
5. Charging warning light	1.4 (74)
6. Fasten-seat-belt warning light	1.4 (74)
7. Door-ajar warning light	1.4 (74)
8. 4WD indicator light	1.4 (74)





Sensor and Switches

Parking brake switch	
Rated load W	S
Voltage drop (at 12 V, rated load) V	0.1 orless
Brake fluid lever sensor	
Rated load W	3.6
Voltage drop (at 12 V, rated load) V	0.1 or less
Door switch	
Rated load W	15
Voltage drop (at 12 V, rated load) V	0.2 or less
Belt switch	
Type	Normally closed type

Seat Belt Warning Timer

Rated load	3.4 W (light) and 24 V 1.1 (buzzer)
Operating voltage V	8.0-16.0

Buzzer

Rated voltage V	13.5
Operating voltage range V	11-15
While buzzing (Terminal voltage at 13 V)	
Sound pressure dB	70 ± 5
Fundamental frequency Hz	700

Lighting System

Main lights W(SAE trade numbers)	
Headlights	60/50
Front combination lights	
Tum-signal lights	27 (1156)
Front side marker and position lights	3.8 (194)
Rear combination lights	
Tum-signal, stop and tail lights	27/8(1157)
Rear side marker lights	3.8 (194)
Back-up lights	27 (I 156)
License plate lights	6
Sub lights W(SAE trade number)	
Dome light	IO
Combination meter illumination light	3.4 (158)
Cigarette lighter illumination light	1.4 (74)
Heater panel illumination light	1.4 (74)
Rear window defogger switch illumination light	0.9
Ashtray illumination light	1.4 (74)
Tum-signal flasher unit	
Type	Condenser type
Rated load W	82.9-84.2
Blinking fre9uenCY, cycle/min [12.8 V, 20 C (68 F)]	85 ± IO
Hazard warning flasher unit	
Type	Heat-band type
Rated load W	49.4-168.8
Blinking fre uency cycle/min [12.8 V, 20 C (68 F)]	90 ± 10

Column switch	
Tum-signal switch	
Rated load A	6.1-7.1
Voltage drop (at 12 V and the rated load) V	0.2 or less
Dimmer switch	
Rated load A	
High beam	16.1-18.7
Low beam	9.4-10.8
Voltage drop (at 12 V and the rated load) V	0.2 or less
Passing switch	
Rated load A	
High beam	16.1-18.7
Low beam	9.4-10.8
Voltage drop (at 12 V and the rated load) V	0.2 or less
Lighting switch	
Rated load A	0.17-0.27
Voltage drop (at 12 V and the rated load) V	0.2 or less
Headlight washer switch	
Rated load A	0.5
Voltage drop (at 12 V and the rated load) V	0.2 or less
.fazard warning switch	
Voltage drop (at 12 V and the rated load) V	0.2 or less
Light control relay	
Rated load W	200
Range of voltage used V	10-16
Voltage drop between terminals V	0.2 or less
Dimmer control switch	
Type	Variable-resistance type
Rated load W	15 (Min.)-26.6 (Max.)
Stop light switch	
Rated load W	150
Voltage drop (at 12 V and the rated load) V	0.15 or less

Windshield Wipers and Washer

Wiper motor	
Type	Permanent-magnet type
Speed control system	3-brush system
Braking system	Dynamic brake system
Revolution under load rpm	
Low speed [1.9 Nm (1.4 ft.lbs.)]	35 ±4
High speed [1.3 Nm (0.9 ft.lbs.)]	45 ±8
Nominal torque Nm (ftJbs.)	13 (9)
Wiper blades	
Wiping angle	
Driver's side	85.5°
Passenger's side	114°
Blade length mm (in.)	401 (16)
Washer motor and pump	
Motor type	Direct current ferrite magnet type
Pump type	Centrifugal type
Power consumption A	3.5 or less
Time of continuous use sec.	
With washer fluid	**Max. 60**
Empty operation	**Max.** 20
Nozzle jet pressure kPa (psi)	69 (10.0) or more
Tank capacity lit. (U.S.qts., lmp.qts.)	1.5 (1.6, 1.3)
Intermittent wiper relay	
Intermittent cycle sec.	1.5 ±0.7-10.5 ±3
Delay time in combined intermittent wiper and washer operation sec.	0.4-1.2
Load current A	5 (motor load)
Wiper switch	
Rated load A	0.5
Intermittent	0.22 ±0.05
Low speed	3.5
High speed	4.5
Lock	18
Voltage drop (at 12 V and the rated load) V	0.2 or less
Washer switch	
Rated load A	3
Voltage drop (at 12 V and the rated load) V	0.5 or less

ar Window Wiper and Washer

Wiper motor	
Motor type	Ferrite magnet type
Braking system	Dynamic braking system
Revolution under no-load rpm	SO± 5
Nominal torque Nm (ft.lbs.)	6 (4) or more
No-load current A	2 or less
Wiper blade	
Wiping angle	108°
Blade length mm (in.)	334 (13)
Window washer motor and pump	
Motor type	Direct current ferrite magnet type
Pump type	Centrifugal type
Power consumption A	3.5 or less
Allowable period of continuous use sec.	
With washer fluid	Max. 60
Empty operation	Max. 20
Nozzle jet-spray pressure kPa (psi)	78 (11.4) or more
Tank capacity lit. (U.S.qts., Imp.qt.)	1.1 (1.2, 1.0) or more
Wiper and washer switch	
Rated load A	
Wiper switch	3
Washer switch	5
Voltage drop (at 12 V and the rated load) V	0.2 or less

Headlight washer

Headlight washer motor	
Motor type	Ferrite magnet type
Pump type	Centrifugal type
Power consumption A	21 or less
Nozzle injection pressure kPa (psi)	177 (25.6) or more
Tank capacity lit. (U.S.qts., Imp.qts.)	3.0 (3.2, 26)
Headlight washer control relay	
Timer setting sec.	0.52 ± 0.1
Check valve	
Valve opening and closing pressure kPa (psi)	49-108 (7.1-15.6)

Horn

Type	Flat type
Effective sounding voltage V	11-14.5
Power consumption A	3.5 or less
Sound level dB	100-110
Fundamental frequency Hz	
"low" sound	340-380
"high" sound	400-440

Clock

Type	Crystal oscillating type
Display type	Fluorescent digital display (12 hour display)
Daily variation seconds/day [at a power supply of 9 to 16V, 20° C (68° F) ambient temperature]	±2

Cigarette Lighter

Rated input W	120
Timing of plug pop-up	Within 18 seconds
Cigarette lighter light bulb capacity W	1.4 x 1
Ashtray light bulb capacity W	1.4 X 1

Rear Window Defogger

Rear window defogger switch	
Type	Seesaw type
Rated current A	12
Indicator light W	0.9
Rear window glass with defogger	
No. of printed heater lines	11
Power consumption [20° C (68° F)] W	102-138

,dio and Stereo

Radio			
Model			AR-8729 SEKR-Y
Receiving bands			**AM/FM-MPX**
Circuitry	AM		High frequency: 1 step; mid frequency: 1 step, superheterodyne amplification
	FM		High frequency: 1 step; mid frequency: 1 step, superheterodyne amplification Ratio detection, PLL, FM stereo demodulation, and noise killer circuits
Reception frequencies	AM	**kHz**	525-1,615
	FM	**MHz**	88-108
Tape player			
Model			RX-750 **SY-RY**
Playback system			4-track auto-reverse stereo playback
Adaptable tape			Normal, C-90 or shorter tape
Output W			4
Tape speed cm/sec.			4.76
Tuning system			Manual search tuning, Mechanical memory tuning
Frequency coverage	**AM**	**kHz**	525-1,615
	FM	**MHz**	88-108

ieakers			
Model		SG-28A8	SG-3K44-G, SG-3K44-R
Rated input power W		*5* (Max. 7)	5 (Max. 7)
Output sound pressure level	dB	88-92	88-92
Mounting position		Instrument panel, driver's side	Left and right center pillars

Antenna	
Type	Whip antenna (Fender-mounted)

Power Windows

Power window motor	
Type	Permanent magnet type (built-in circuit breaker)
Revolutions under load rpm	
At 1 Nm (.72 ft. lbs.)	60-90
At 2 Nm (1.45 ft. lbs.)	50-80
Bound current A	34 or less
Direction of rotation	Clockwise and counterclockwise
Power window main switch	
Type	Automatic reset type
Rated load current A	
Lock switch	30
L.H. switch	11
R.H. switch	11
Power window sub switch	
Type	Automatic reset type
Rated load current A	11
Power window relay	
Maximum contact current A	20
Rated coil current A	0.13-0.19
Voltage drop between terminals V (at 12 V and the rated load current)	0.2 or less

3-Point ELR seat belts with tension reliefers

Belt switches	Normally open type
Seat belt solenoids	
Operating voltage V	8-16
Continuous rating (50 n , 240 mA)	2.88W
Insulation resistance (measured with 500-VOC megger)	100 Mil

'RVICE SPECIFICATIONS

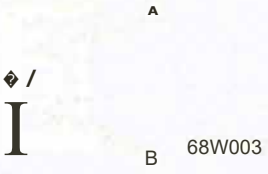
Engine

General	
Basic ignition timing	7 ± 2° BTDC

Meters and Gauges

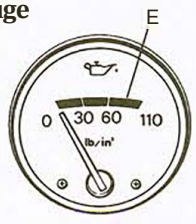
Fuel gauge indication test	
When resistance is 17 n	Scale indication A
When resistance is 120 n	Scale indication B
Fuel gauge continuity test	
Resistance value n	Approx. 25
Water temperature gauge indication test	
When resistance is 23.8 n	Scale indication C
When resistance is I04 n	Scale indication D
Water temperature gauge continuity test	
Resistance value n	Approx. 55
Water temperature gauge unit operation check	
When water temperature is 70° C (I 58° F) n	104
Oil pressure gague indication test	
When resistance is 120 n	Scale indication E
Oil pressure gauge continuity test	
Resistance value n	Approx. 42
Voltage meter continuity test	
Resistance value n	420

Fuel gauge



Water temperature gauge

Oil pressure gauge



Lighting System

Standard value	
Headlight intensity	20,000 cd or more

Windshield Wipers and Washer

Standard value	
Wiper blade stopping position mm (in.) {distance between blade tip and front deck garnish)	37-47 (1.5-1.9)

Rear Window Wiper and Washer

Standard value	
Wiper blade stopping position mm (in.) (distance between blade tip and back door window weatherstrip)	20 (.8)

TORQUE SPECIFICATIONS

Fuel Gauge Unit

	Nm (ft.lbs.)
Fuel gauge unit	1 {0.7)

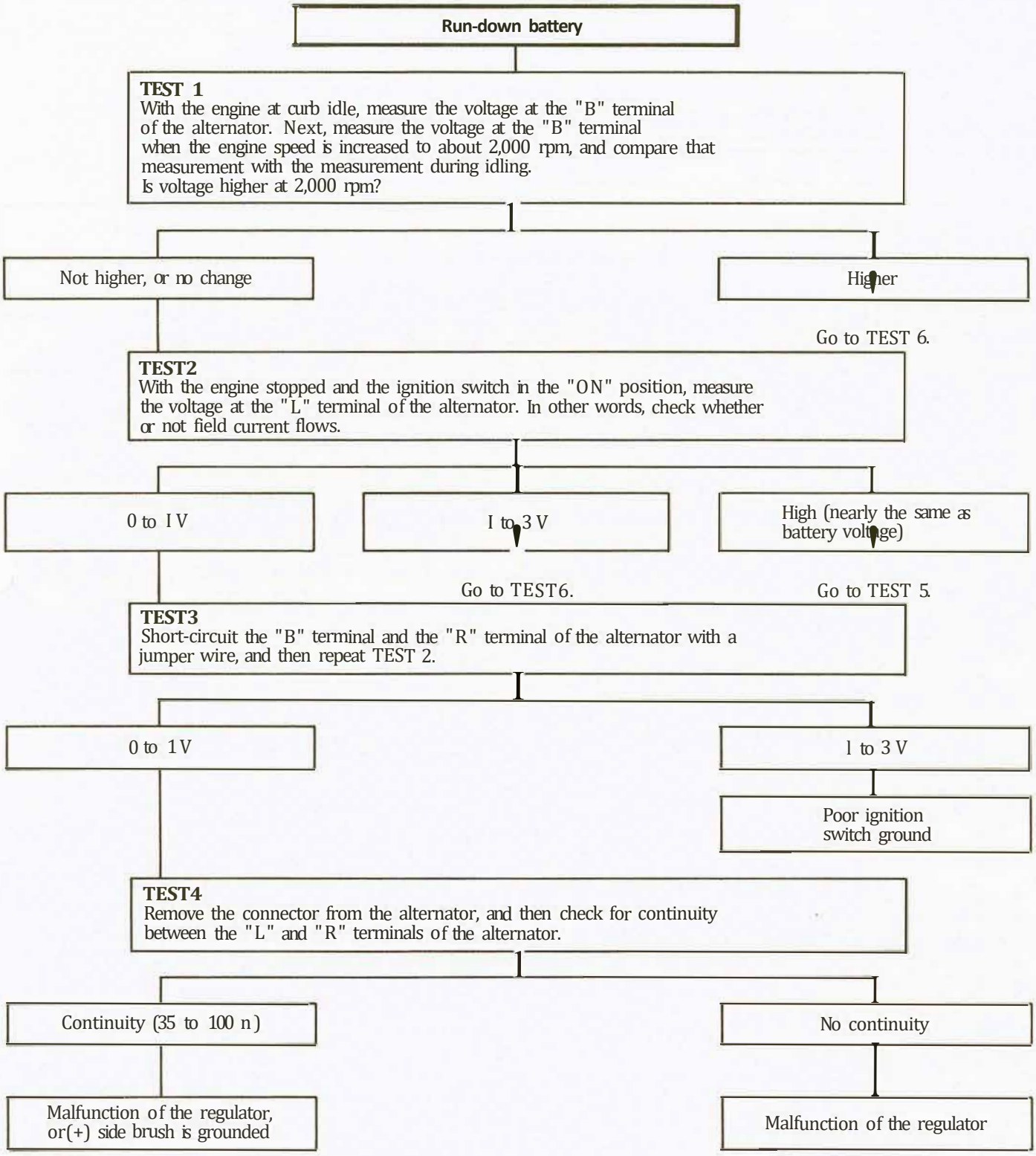
Windshield Wipers and Washer

	Nm {ft.lbs.)
Wiper pivot shaft mounting nut	7 (5)
Wiper arm locking nut	10-16 (7-12)
Wiper motor	3 (2)

Rear Window Wiper and Washer

	Nm (ft.lbs.)
Rear wiper pivot shaft mounting nut	8-12 {6-9)
Rear wiper arm locking nut	7-10 (5-7)
Rear wiper motor	7-10 (5-7)

ATTERY



:AUTION

While engine is running (alternator generating power), make sure that **L-terminal is not grounded.** If **L-tenninal is grounded,** auxiliary **diode** will be short-circuited and no voltage will be available at L-terminaJ, so no power will be generated. Therefore, CHARGE lamp will remain **lit.**

TESTS
With the engine stopped and the ignition switch in the "ON" position, measure the voltage at the "F" terminal (for testing the alternator).

High (nearly the same as battery voltage)	0 to 0.5 V	0.5 to 2 V
Malfunction of the regulator (power transistor open}	Field coil wiring damaged, or poor brush contact	(±) diode short

With the ignition switch in the "OFF" position, pull the connector from the alternator. Then, measure the voltage at the "L" terminal. If the voltage is close to battery voltage, the(+) diode is short-circuitd.

CAUTION
When measuring the voltage of the "F" tenninal (for testing), b careful not to let the voltmeter probe contact the rear bracket... by chance it does contact it, there's no problem if it's immediately pulled away.

TEST6
Output current test
Disconnect the wiring from the "B" terminal of the alternator, and connect an ammeter (60 A or higher) between the wires and the ternunal.
Start the engine. Then immediately increase the engine speed to 2,500 to 3,000 rpm and quickly read the maximum value shown by the ammeter. Note that all loads on the electrical system should be "ON" when this test is made.

- 70% or less of nominal output → Normal function of alternator
- 70% to 90% of nominal output → **TEST7**
- 90% or more of nominal output → Alternator is normal

TEST7
Output current test (re-check)
Check for poor contact of the wiring between the "B" terminal of the alternator and the positive(+) terminal of the battery.
After slightly discharging the battery make TEST 6 once again.

- Less than 90% of nominal output → Remove the alternator from the engine and check it.
- More than 90% of nominal output → Alternator is nonnal

NOTE
Make TEST 8 if it is necessary after finishing TESTS 6 and 7.

TEST8
Regulated voltage test
(See p.8-76.)

- 14.4 ± 0.5 V at 20°C → Electronic voltage regulator is normal
- There is an abnormal condition → Malfunction of alternator

Overcharge

TEST 1
While measuring the voltage at the "B" terminal of the alternator, slowly increase the engine rpm from idle speed.
Is the "B" terminal voltage 15.5 V or more?

- Not 15.5 V or more
- 15.5 V or less → Malfunction of alternator (malfunction of electronic voltage regulator, or negative (-) brush is grounded)

TEST2
Measure and compare the voltage of the "F" terminal (for checking the alternator) at idle speed and at approx. 3,000 rpm.
Is the voltage higher at 3,000 rpm?

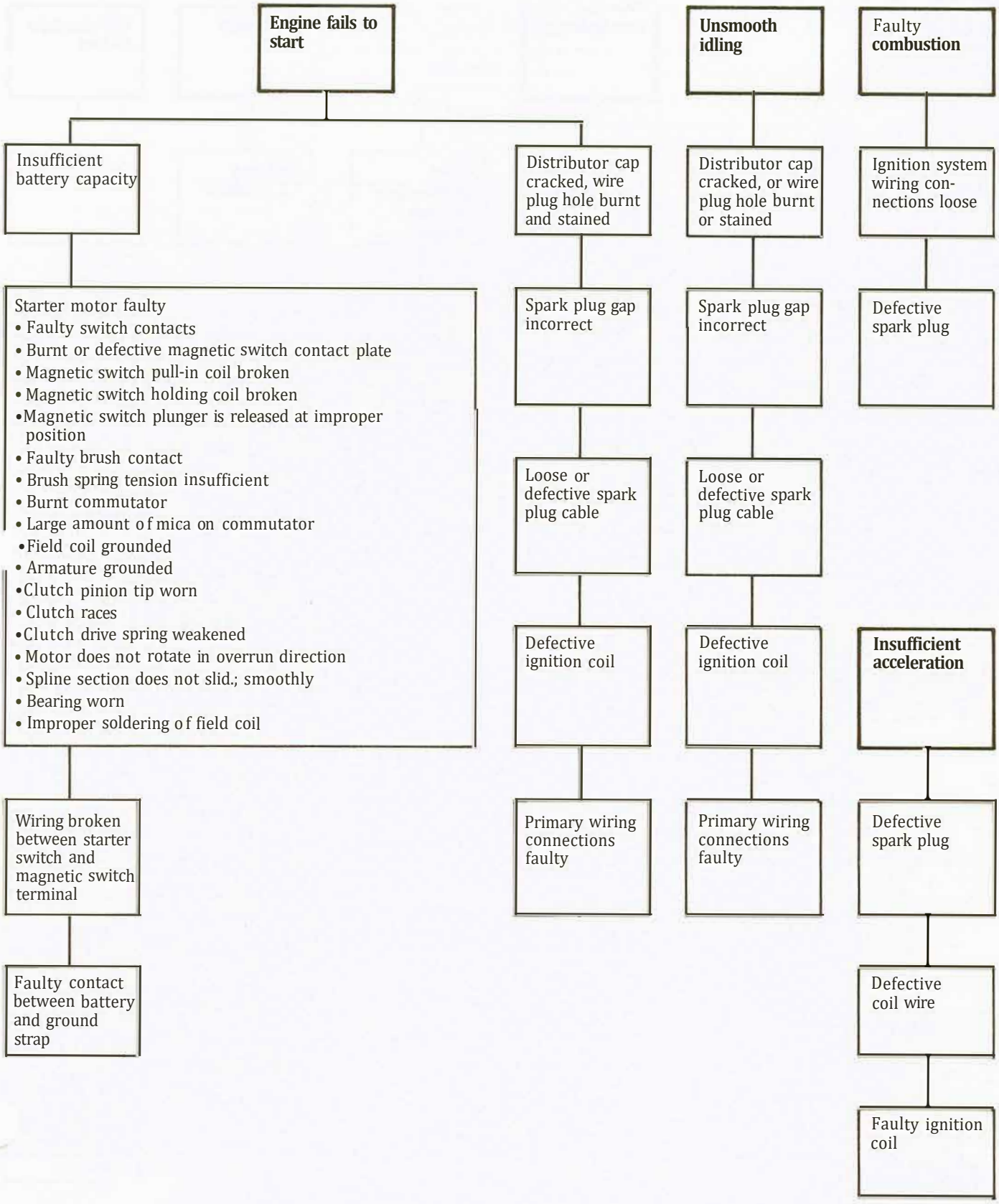
- Higher
- Not higher, or no change → Malfunction of alternator (malfunction of electronic voltage regulator, or negative (-) brush is grounded)

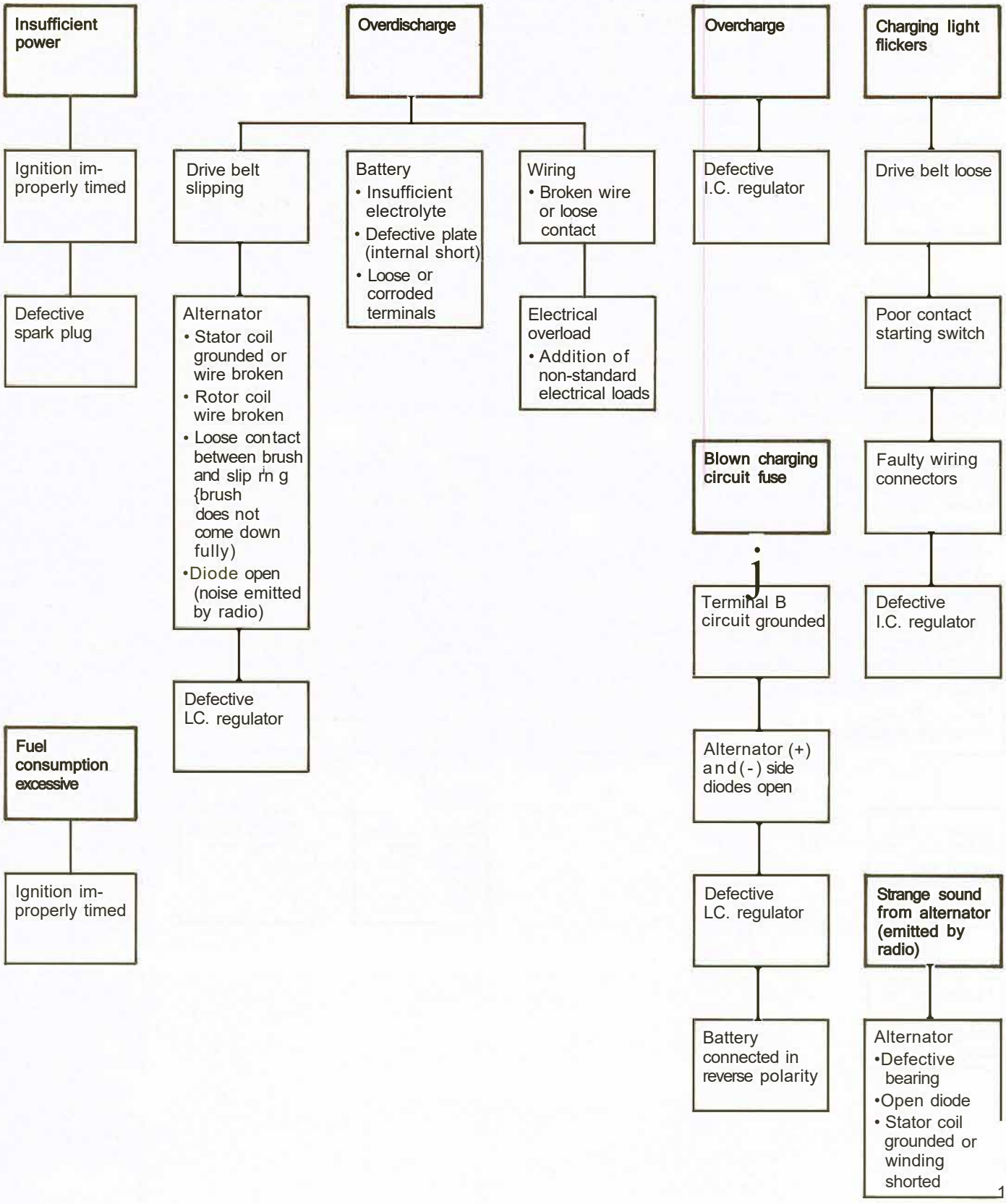
NOTE
The voltage of the "F" terminal may not increase if the battery is discharged.

TEST3
Regulated voltage test.
(See p.8-76.)

- 14.4 ± 0.5 V at 20° C → Alternator normal
- There is an abnormal condition → Malfunction of alternator

GINE

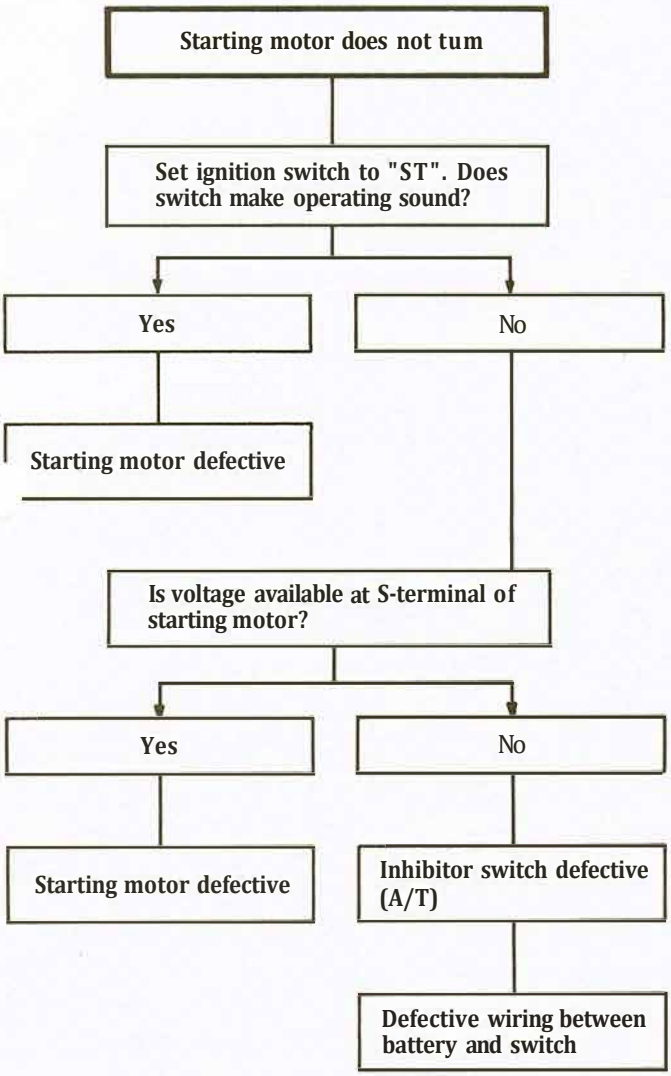

Engine fails to start
Insufficient battery capacity
Starter motor faulty
• Faulty switch contacts
• Burnt or defective magnetic switch contact plate
• Magnetic switch pull-in coil broken
• Magnetic switch holding coil broken
• Magnetic switch plunger is released at improper position
• Faulty brush contact
• Brush spring tension insufficient
• Burnt commutator
• Large amount of mica on commutator
• Field coil grounded
• Armature grounded
• Clutch pinion tip worn
• Clutch races
• Clutch drive spring weakened
• Motor does not rotate in overrun direction
• Spline section does not slid.; smoothly
• Bearing worn
• Improper soldering of field coil
Wiring broken between starter switch and magnetic switch terminal
Faulty contact between battery and ground strap
Distributor cap cracked, wire plug hole burnt and stained
Spark plug gap incorrect
Loose or defective spark plug cable
Defective ignition coil
Primary wiring connections faulty
Unsmooth idling
Distributor cap cracked, or wire plug hole burnt or stained
Spark plug gap incorrect
Loose or defective spark plug cable
Defective ignition coil
Primary wiring connections faulty
Faulty combustion
Ignition system wiring connections loose
Defective spark plug
Insufficient acceleration
Defective spark plug
Defective coil wire
Faulty ignition coil

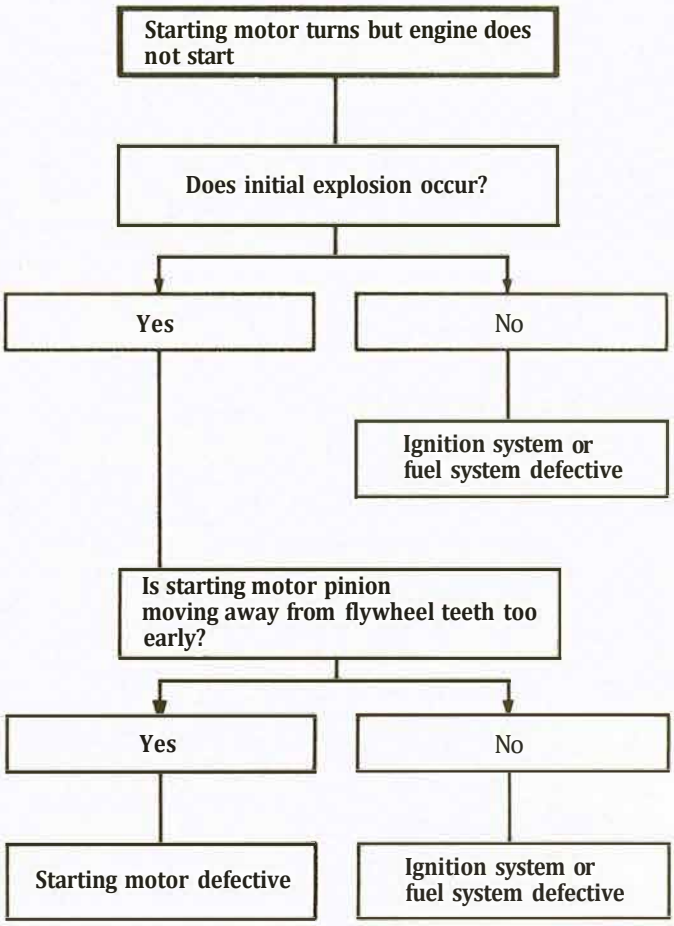

Insufficient power
Ignition improperly timed
Defective spark plug
Overdischarge
Drive belt slipping
Alternator
• Stator coil grounded or wire broken
• Rotor coil wire broken
• Loose contact between brush and slip r'n g {brush does not come down fully)
•Diode open (noise emitted by radio)
Defective LC. regulator
Battery
• Insufficient electrolyte
• Defective plate (internal short)
• Loose or corroded terminals
Wiring
• Broken wire or loose contact
Electrical overload
• Addition of non-standard electrical loads
Overcharge
Defective I.C. regulator
Blown charging circuit fuse
Terminal B circuit grounded
Alternator (+) and (-) side diodes open
Defective LC. regulator
Battery connected in reverse polarity
Charging light flickers
Drive belt loose
Poor contact starting switch
Faulty wiring connectors
Defective I.C. regulator
Fuel consumption excessive
Ignition improperly timed
Strange sound from alternator (emitted by radio)
Alternator
•Defective bearing
•Open diode
• Stator coil grounded or winding shorted

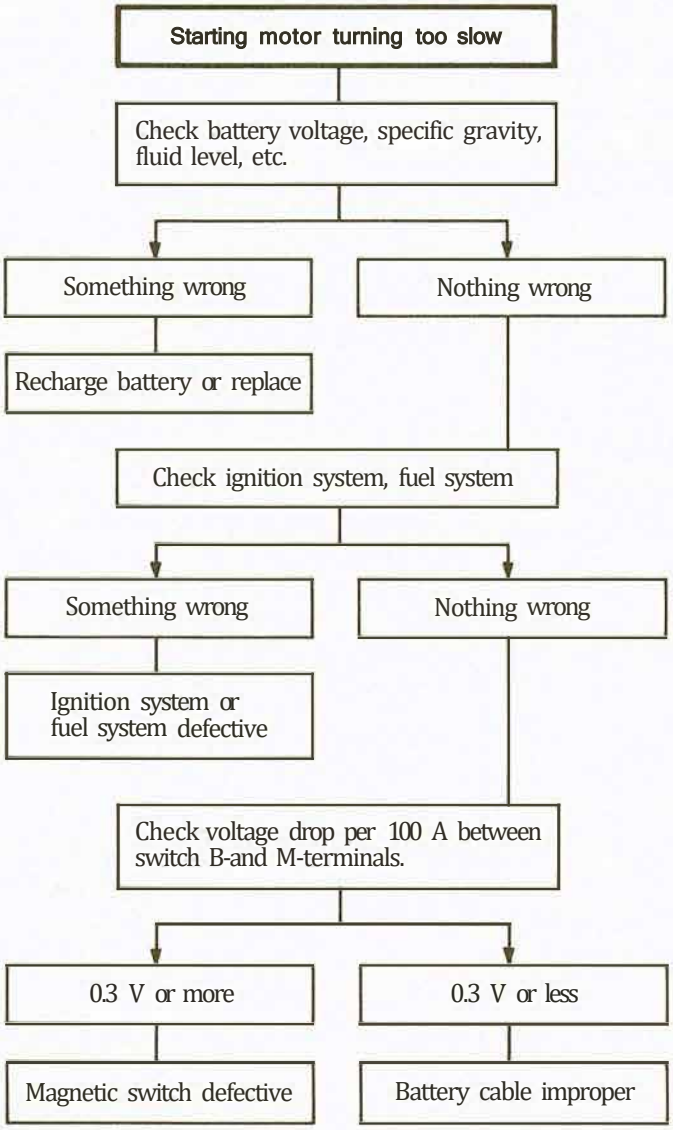
fARTING SYSTEM

The troubles of starting system may be divided into "Starting motor does not turn", "Starting motor turns but engine does not start" and "It takes some time before engine starts". When there is something wrong with starting system, therefore, it is important to determine which part of starting system is defective with starting motor attached to engine.

Generally, starting difficulty, aside from inoperative starting motor, is often attributable to defective ignition system, fuel system, battery, electrical wiring, etc. If makeshift corrective steps are taken without locating the cause, same trouble will develop again.

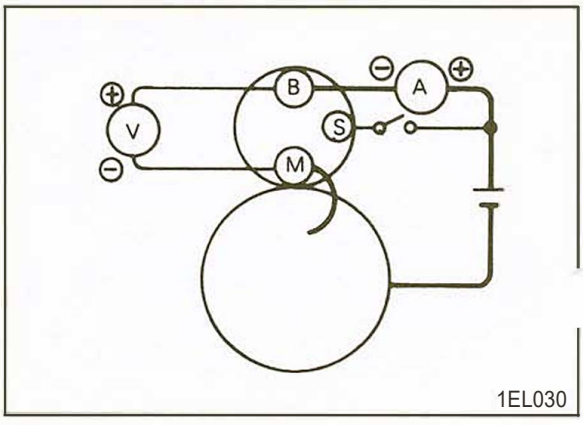






Point to Note when Checking

1. To measure a voltage drop across contacts Band M, make connections as shown. (1EL030)
   If there is a voltage drop of more than 0.3 V per 100 A, hard starting could result, when engine resistance increases as in very cold weather. In such a case, replace switch assembly.

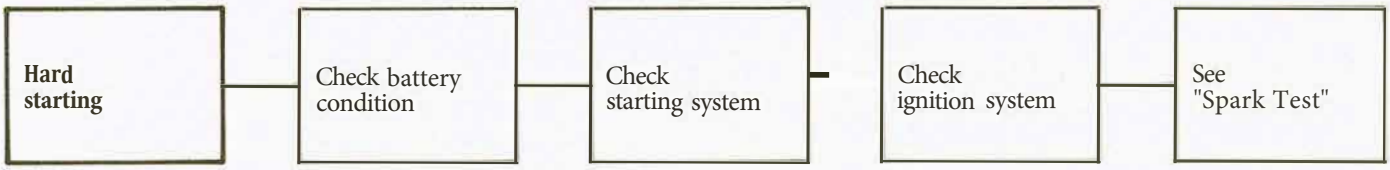


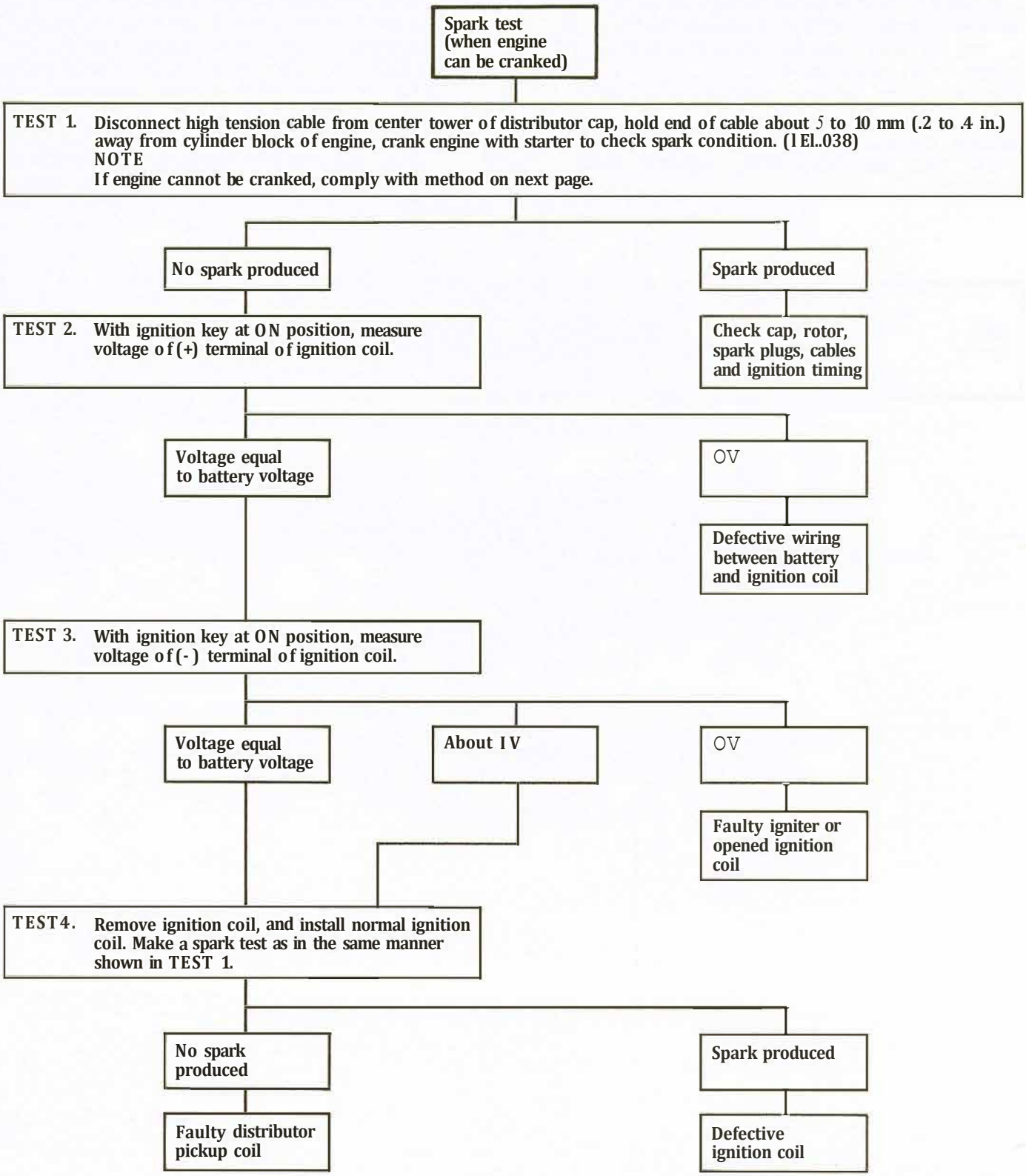
}NITION SYSTEM

The cause of hard engine starting is not always in the ignition system. Defective parts may exist in the fuel system, exhaust emission control system, starting system or the engine itself.

The role of the ignition system is to generate sufficient electric sparks at the proper time. To check the ignition system, therefore, it is necessary that the spark check and timing measurement are carefully performed.

For on-vehicle troubleshooting of the ignition system, the short cut is to determine on the basis of symptoms which is defective: the power supply, primary low-tension circuit or high-tension circuit. For example, when all spark plugs fail to produce sparks, the probable cause is in power supply or primary circuit. If misfiring occurs only at a specific spark plug, the high tension circuit is likely to be defective. If misfiring occurs occasionally, loose leads or spark plugs may be suspected.




Spark test (when engine can be cranked)
TEST 1. Disconnect high tension cable from center tower of distributor cap, hold end of cable about 5 to 10 mm (.2 to .4 in.) away from cylinder block of engine, crank engine with starter to check spark condition. (l El..038)
NOTE
If engine cannot be cranked, comply with method on next page.
No spark produced
Spark produced
TEST 2. With ignition key at ON position, measure voltage of (+) terminal of ignition coil.
Check cap, rotor, spark plugs, cables and ignition timing
Voltage equal to battery voltage
OV
Defective wiring between battery and ignition coil
TEST 3. With ignition key at ON position, measure voltage of (-) terminal of ignition coil.
Voltage equal to battery voltage
About I V
OV
Faulty igniter or opened ignition coil
TEST4. Remove ignition coil, and install normal ignition coil. Make a spark test as in the same manner shown in TEST 1.
No spark produced
Spark produced
Faulty distributor pickup coil
Defective ignition coil

Poor low speed perfonnance (Backfiring or hard starting)

- Distributor improperly installed
- Improper ignition timing
- Faulty distributor or igniter

Poor acceleration (Poor high speed perfonnance, insufficient output, Engine stalls during acceleration)

- Incorrect spark plug heat value
- Incorrect spark plug gap
- Defective governor advance mechanism
- Defective vacuum advance mechanism
- Faulty ignition coil

Knocking

- Incorrect fuel octane value
- Incorrect spark plug heat value
- Faulty advance mechanism

Engine stalls or misfires .>ccasionally

- Faulty insulation of high-tension cables, cap, rotor and/or spark plugs
- Faulty primary circuit (Damaged primary wire or ignition coil, or overheated ignition coil)

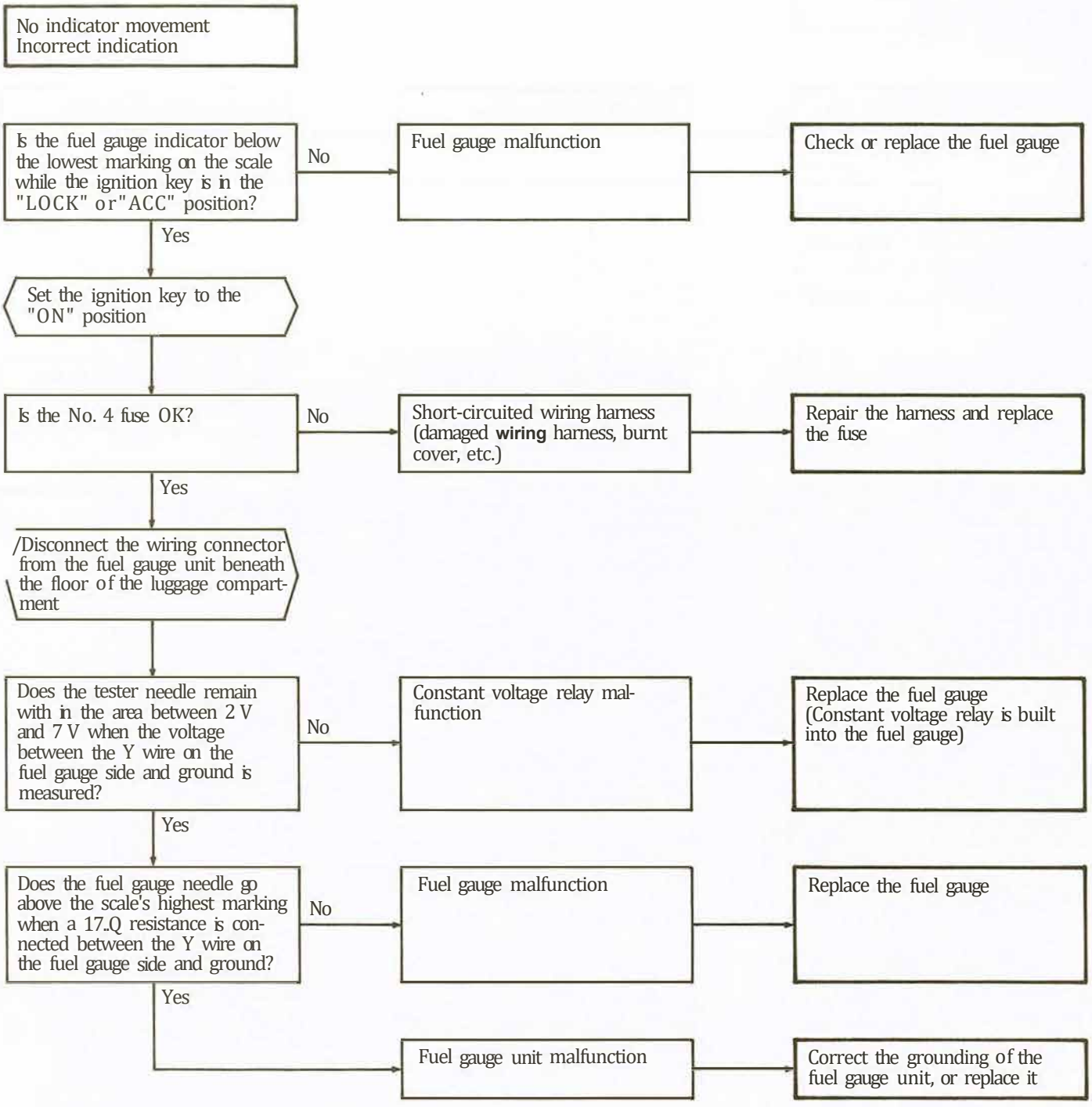
SPEEDOMETER

Symptom	Probable cause	Remedy
The speedometer pointer and/or the odometer do not function	Flexible shaft improperly connected Damaged flexible shaft	Repair the routing of the speedometer cable or replace the cable
	Drive gear is broken	Replace the speedometer
The speedometer pointer moves off the scale	Oil inside meter Damaged hair spring	
The speedometer pointer will not return to "O" or will not move above a certain speed	Oil inside meter Deformed hair spring Foreign matter caught on the magnet	
The speedometer pointer moves erratically	Flexible shaft improperly routed	Repair the routing of the speedometer cable or replace the cable
	Worn induction panel end or bearing	Replace the speedometer
The speedometer functions but the odometer does not	Gear malfunction inside the speedometer	

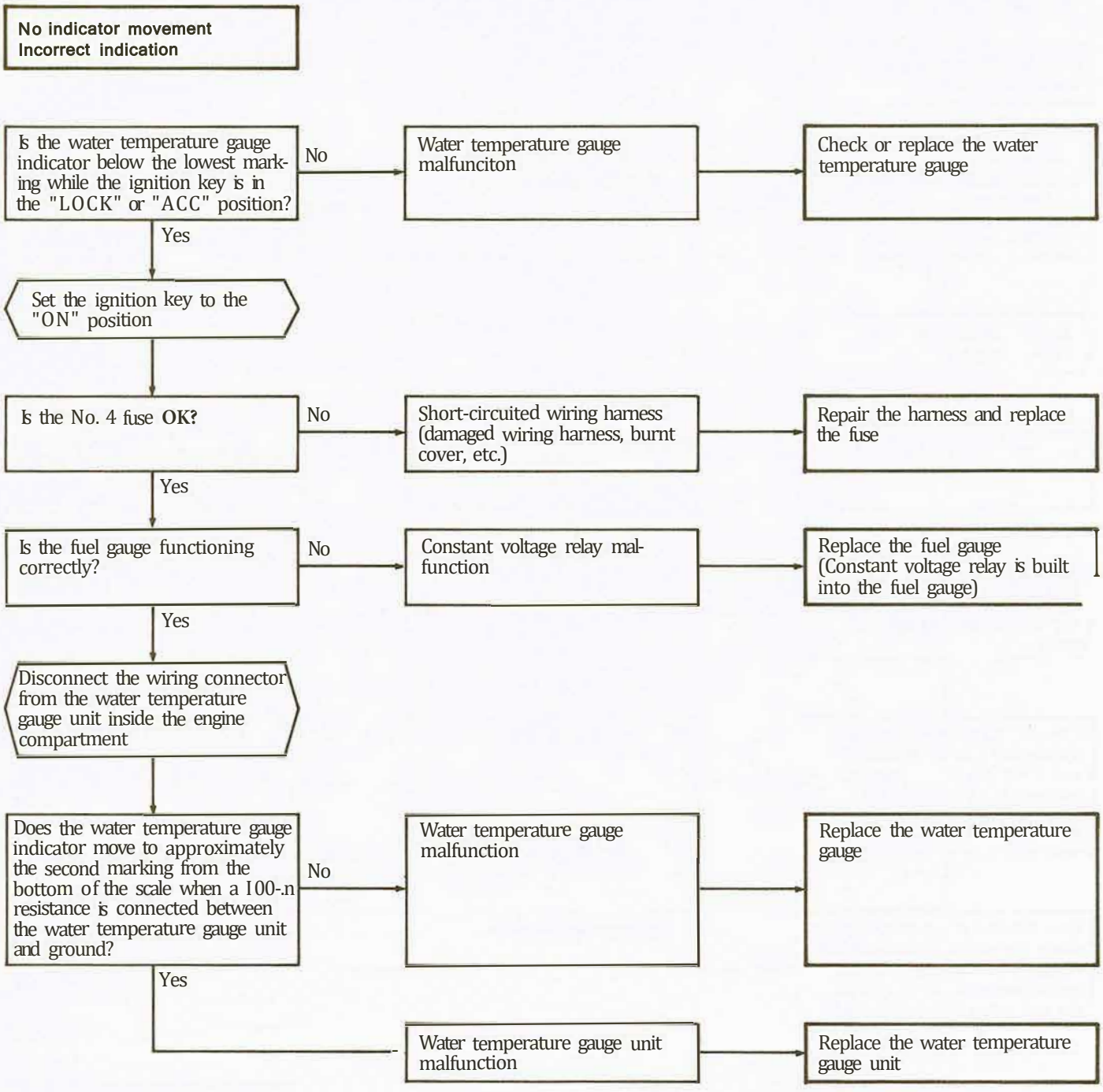
NOTE
If oil is inside the meter, replace the speedometer cable as well. Check the transmission fluid quantity and check for clogged breather plug, too.

AUGES

Fuel Gauge and Unit



Water Temperature Gauge and Unit



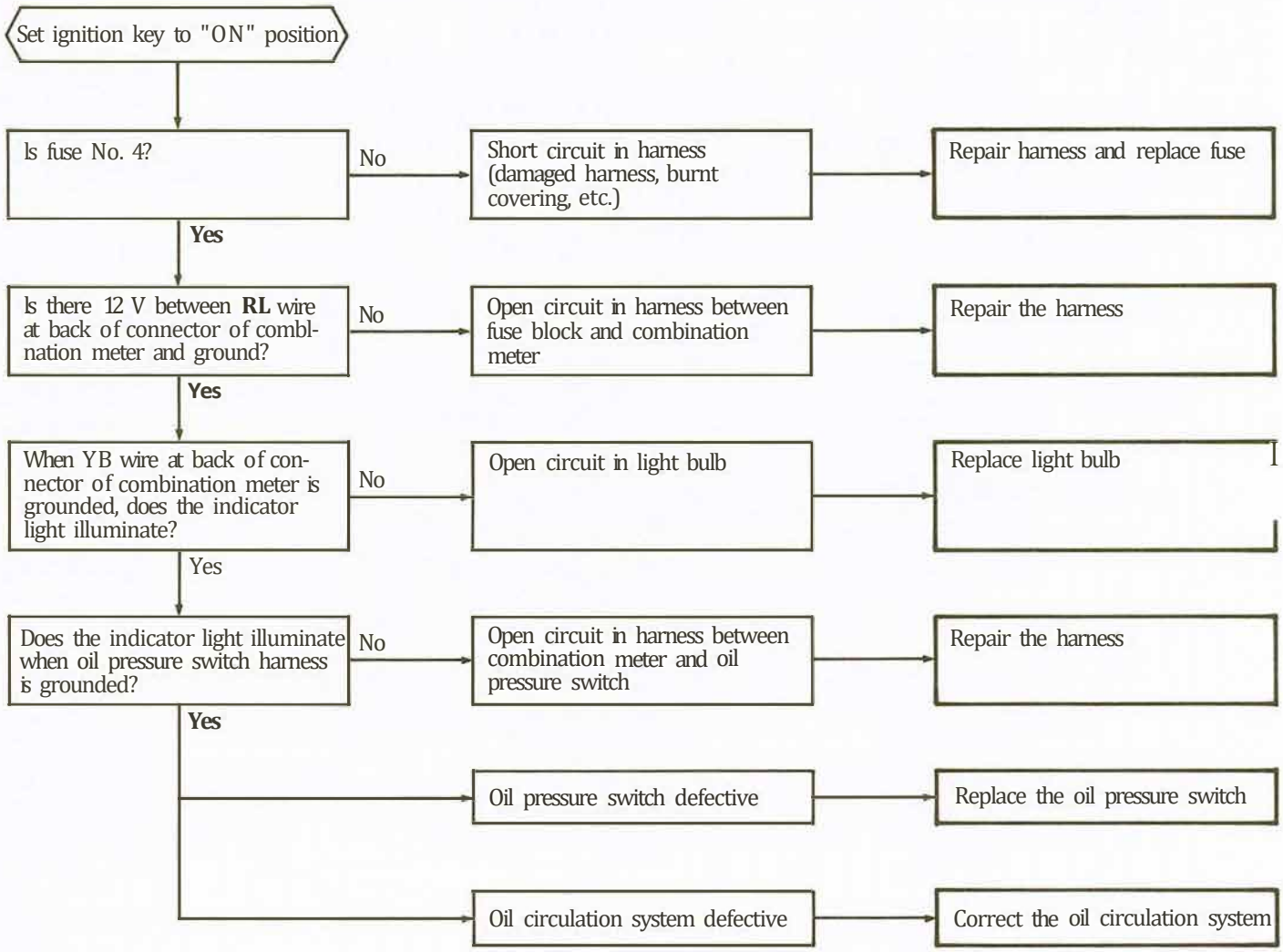
CLINOMETER

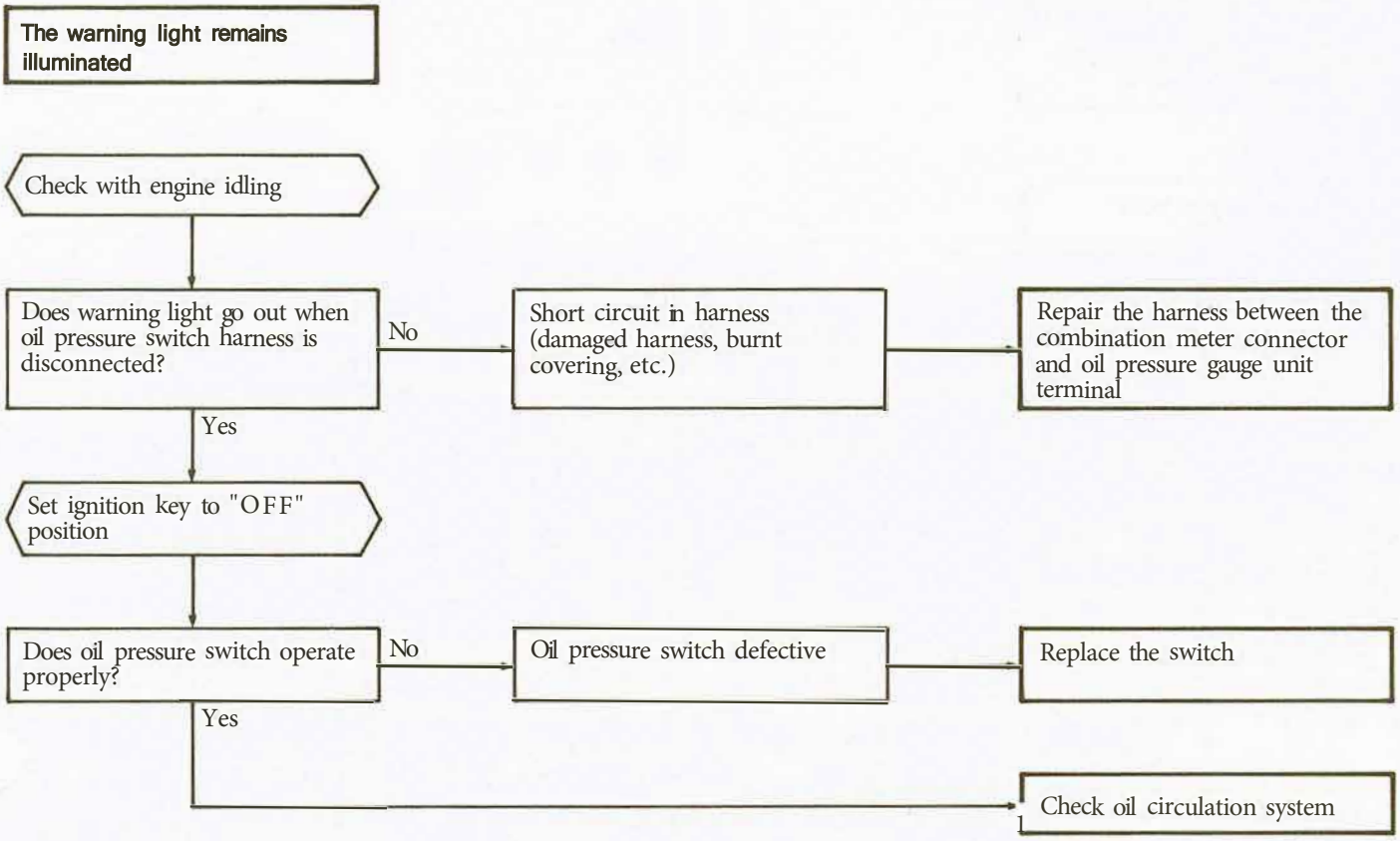
Symptom	Probable cause	Remedy
When vehicle inclines forward or backward, pointer does not move up or down	Internal parts such as pointer and pendulum defective	Replace inclinometer assembly
When vehicle inclines to right or left, spherical dial does not perform follow-up operation.	Internal parts such as dial and pendulum defective	
Oil-like fluid flows out from bottom of case	Seal of oil case broken	
Pointer and spherical dial frequently swing during vehicle operation	Oil case broken and oil leaking	

INDICATORS AND WARNING LIGHTS

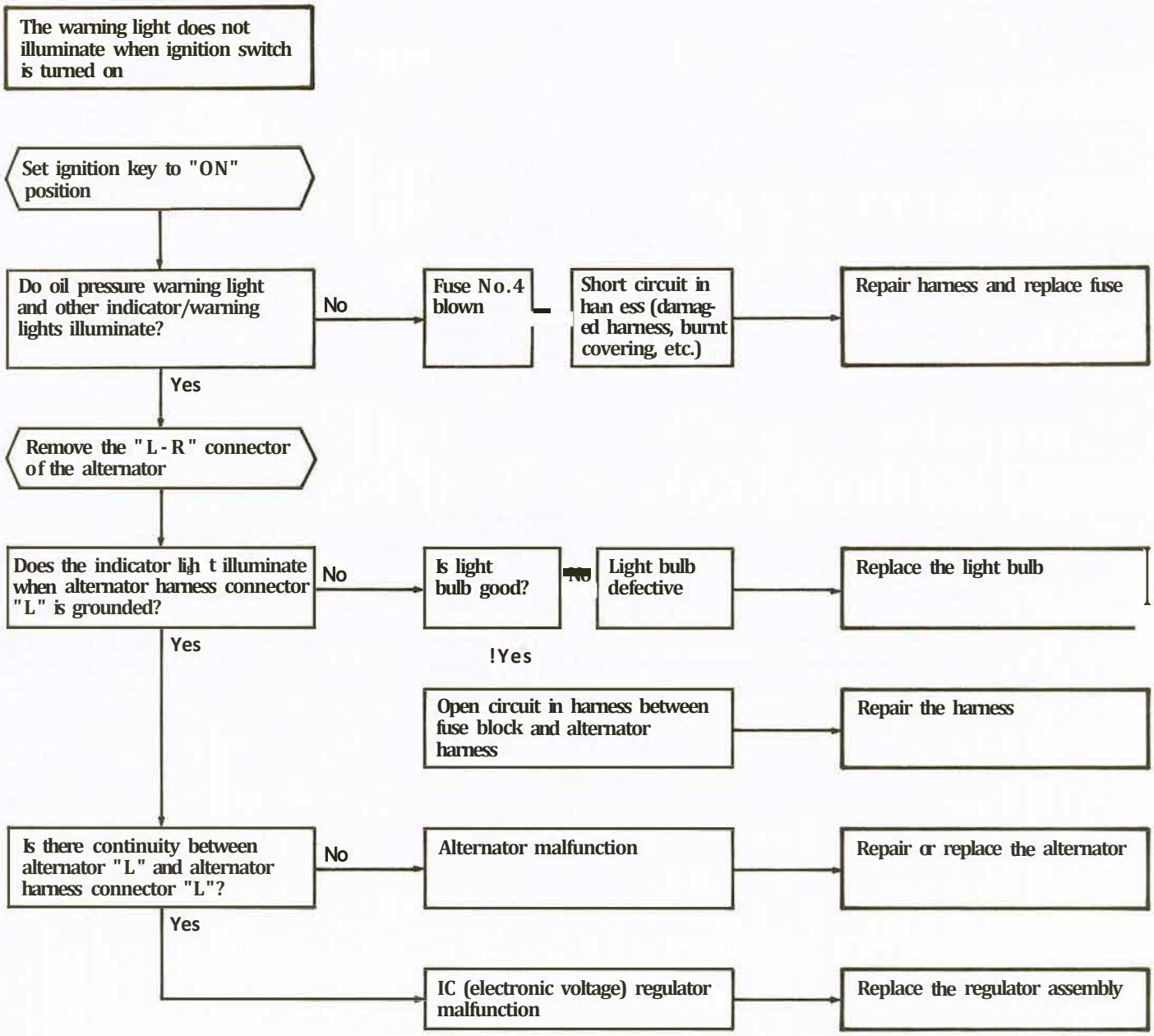
Oil Preure Warning Light

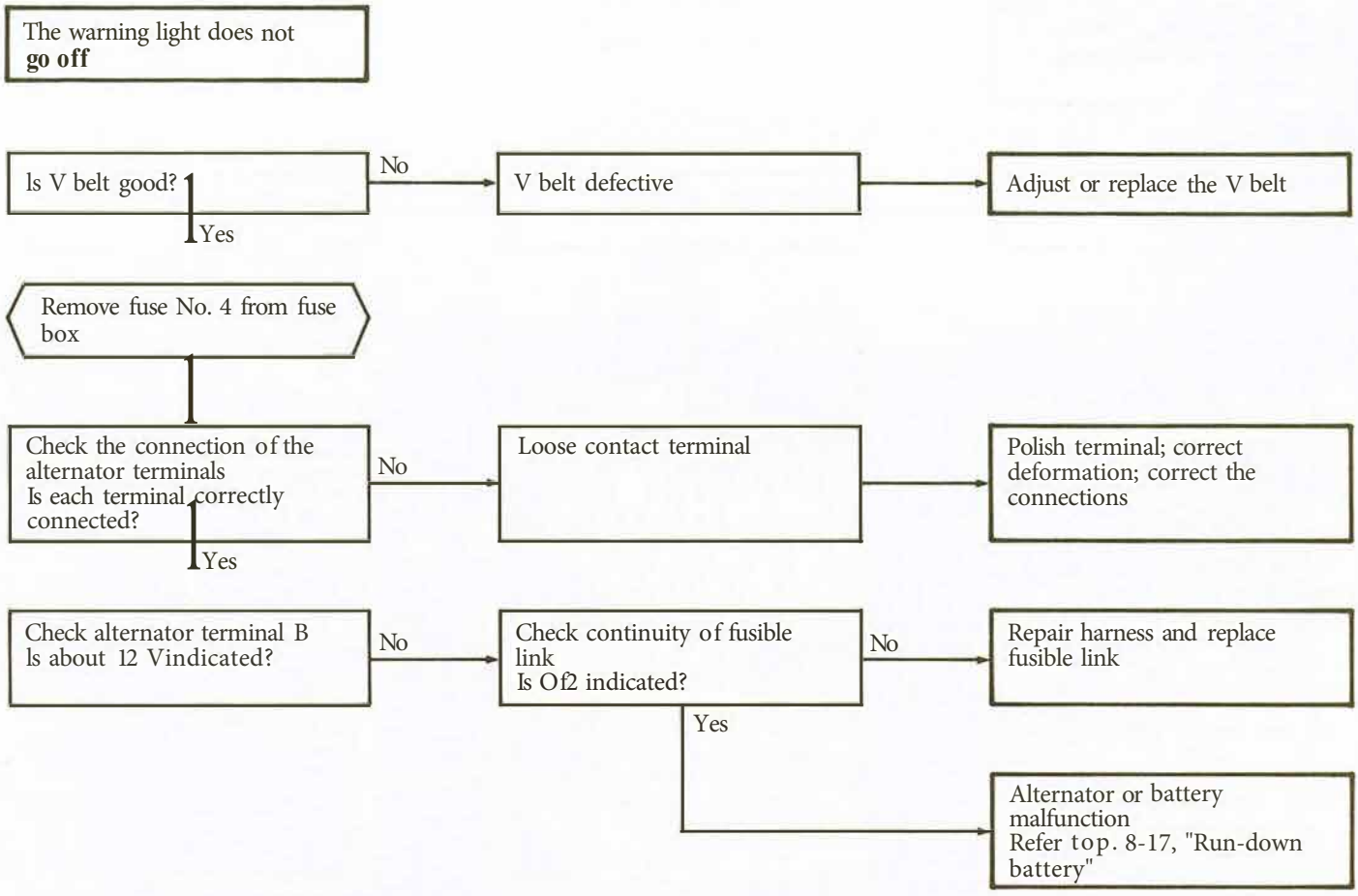
The warning light does not illuminate when **ignition** switch **is turned on.**




The warning light remains illuminated
Check with engine idling
Does warning light go out when oil pressure switch harness is disconnected?
No
Short circuit in harness (damaged harness, burnt covering, etc.)
Repair the harness between the combination meter connector and oil pressure gauge unit terminal
Yes
Set ignition key to "OFF" position
Does oil pressure switch operate properly?
No
Oil pressure switch defective
Replace the switch
Yes
Check oil circulation system

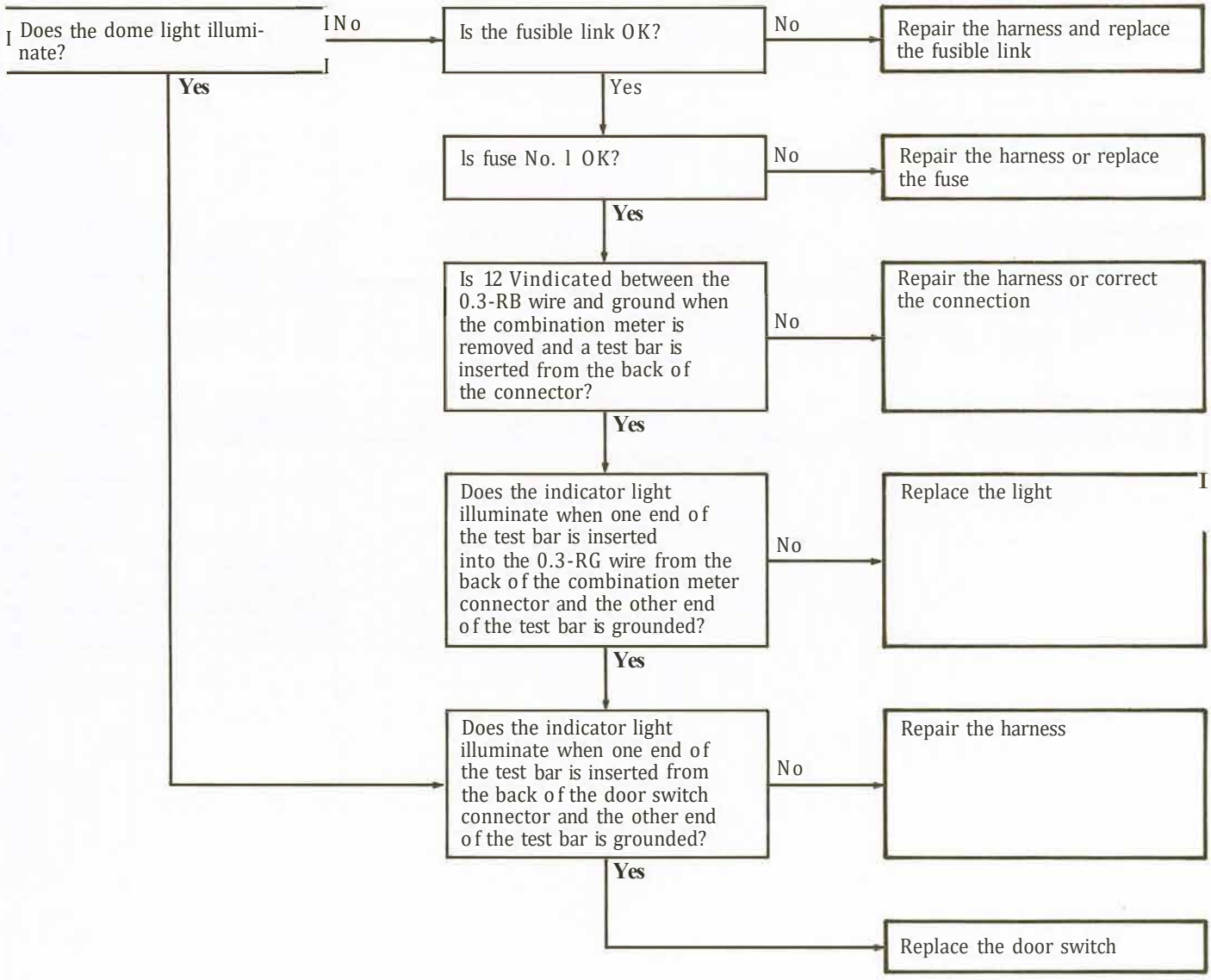
Charging Warning Light




The warning light does not go off
ls V belt good?
No
V belt defective
Adjust or replace the V belt
Yes
Remove fuse No. 4 from fuse box
Check the connection of the alternator terminals
Is each terminal correctly connected?
No
Loose contact terminal
Polish terminal; correct deformation; correct the connections
Yes
Check alternator terminal B
ls about 12 Vindicated?
No
Check continuity of fusible link
Is Of2 indicated?
No
Repair harness and replace fusible link
Yes
Alternator or battery malfunction
Refer top. 8-17, "Run-down battery"

Door-Ajar Warning Light

The indicator light does not illuminate when the door is open



ake System Warning Light

Brake warning light does not light under following conditions.
(1) When parking brake switch is ON
(2) When brake fluid level sensor switch is ON

Set ignition key to "ON" position

Is fuse No. 4 good?
- No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair harness and replace fuse
- Yes ↓

Is there 12 V between combination meter RL wire and ground?
- No → Open circuit in harness RL wire between fuse block and combination meter → I RepID th, homos,
- Yes ↓

Is brake warning light bulb good?
- No → Open circuit in brake warning light bulb → Replace light bulb
- Yes ↓

Open circuit in brake warning light circuit ground side harness YG wire → Repair the harness

I Brake warning light remains lit

NOTE
Check the brake fluid level and make sure it is correct.

Caution
Make sure that vehicle is maintained in level position and wheels chocked.

Inspect with parking brake lever released and ignition key at "ON"

Does light remain lit after disconnection of parking brake switch connector?
- No → Parking brake switch defective → Replace the parking brake switch
- Yes →

Does light remain lit after disconnection of brake fluid level sensor connector?
- No → Brake fluid level sensor defective → Replace the brake fluid sensor
- Yes → Ground side of brake warning light circuit short circuited → Repair the harness

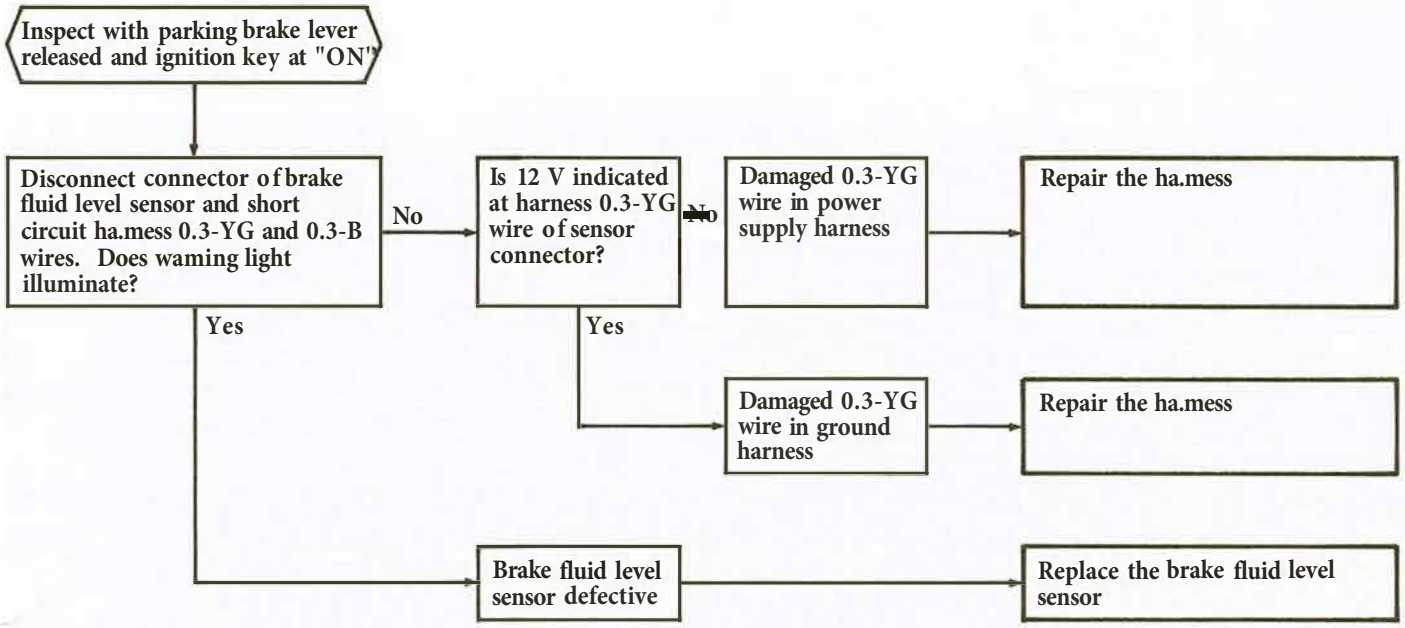
Brake warning light does not light when parking brake lever is pulled

With ignition key in "ON" position, check by pulling parking brake lever

Does the indicator light illuminate when parking brake switch connector is disconneted and YG wire grounded?
- No → Open circuit in harness between brake warning light and parking brake switch → Repair the harness
- Yes → Parking brake switch defective → Replace the parking brake switch

Brake warning liaht does not illuminate when brake fluid level is low.

Caution
Be sure the vehicle is level and the wheels are chocked.



Fasten Seat Belt Warning Light and Buzzer

Fasten seat belt warning light does not illuminate when ignition key is turned to "ON" with driver's seat belt not buckled.

Check with ignition key in "OFF" position

Is fuse No. 7 good?
- No → Short circuit in harness (damaged harness, burnt cover, etc.) → Repair harness and replace fuse
- Yes ↓

Is there continuity between GR wire of key-reminder switch connector and ground?
- No → Open circuit in harness between fuse block and key-reminder switch → Repair the harness
- Yes ↓

Is there continuity between G wire of key-reminder switch connector and ground?
- No → Key-reminder switch defective → Replace the key-reminder switch
- Yes ↓

Is there 12 V between G wire at back of connector of combination meter and ground?
- No → Open circuit in harness between key-reminder switch and combination meter → Repair the harness
- Yes ↓

When 0.3-YB wire at back of connector of combination meter is grounded, does the warning light illuminate?
- No → Open circuit in light bulb → Repair the light bulb
- Yes ↓

Is there 12 V between 0.3-YB wire at back of connector of seat belt warning timer and ground
- No → Open circuit in harness between combination meter and seat belt warning timer → Repair the harness
- Yes ↓

Set ignition key to "ON"

NOTE
If the malfunction is in the following circuits, in addition to the warning light not illuminating, the buzzer will not sound.

Is fuse No. 3 good?
- No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair harness and replace fuse
- Yes ↓

Is there 12 V between 0.3-RL wire at back of connector of seat belt warning timer and ground?
- No → Open circuit in harness between fuse block and seat belt warning timer → Repair the harness
- Yes → Belt warning timer defective → Replace the belt warning timer

Seat belt warning buzzer does not sound when ignition key is turned to "ON" with driver's **seat belt** not **buckled.**

Check with igrution key in "OFF" position

Is fuse No. 7 good?
- No → Short circuit in harness (damaged harness, burnt cover, etc.) → Repair harness and replace fuse
- **Yes**

Does buzzer sound when driver's door is opened?
- No → Faulty key-reminder switch or buzzer → Refer to "Key-reminder buzzer does not sound" on p. 8-63
- Yes

Is there 12 V between 0.3-Y wire at back of seat belt switch connector and ground?
- No → Open circuit in harness between buzzer and seat belt switch → Repair the harness
- **Yes**

Ground 0.3-RB wire from back of belt switch connector (with buckle unlocked). Does buzzer sound?
- No → Seat belt switch defective → Replace the buckle
- Yes

Is there 12 V between 0.3-RB wire at back of seat belt warning timer connector and ground (with buckle unlocked)?
- No → Open circuit in harness between seat belt switch and seat belt warning timer → Repair the harness
- **Yes**

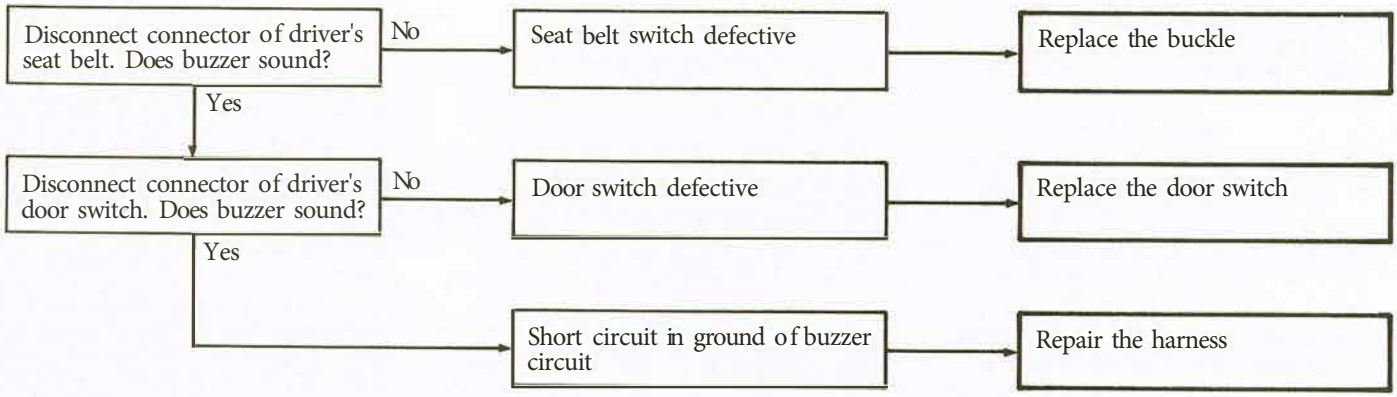
Set ignition key to "ON"

NOTE
If the malfunction is in the following circuits, in addition to warning buzzer not sounding, the warning light will not illuminate.

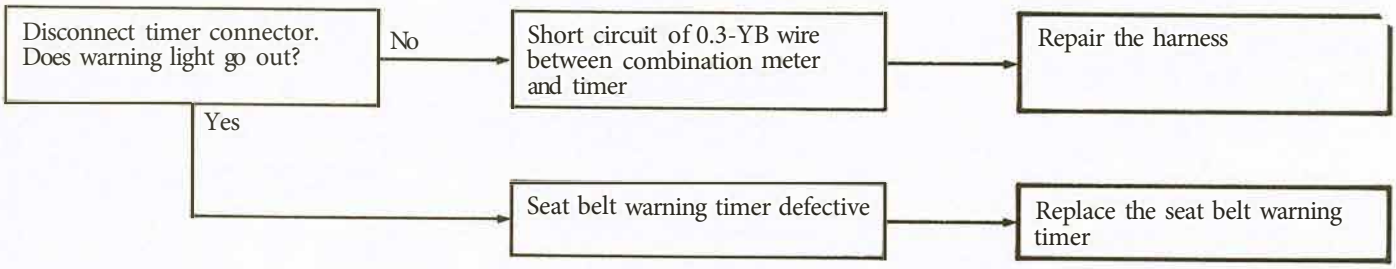
ls fuse No. 3 good?
- No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair harness and replace fuse
- Yes

Is there 12 V between 0.3-RL wire at back of connector of seat belt warning timer and ground?
- No → Open circuit in harness between fuse block and seat belt warning timer → Repair the harness
- Yes → Seat belt warning timer defective → Replace the seat belt warning timer

Fasten seat belt warning **buzzer** continues **to after driver's seat belt** is **fastened.**



Fasten seat belt warning light remains illuminated for 8 seconds after ignition key is set to "ON"



.ghting System

Check the illumination of all lights; if there are any problems, use the following chart to check the appropriate location. (For trouble symptom Nos. 3, 4, and 7, refer to the corresponding yes/no troubleshooting chart.)

Location	Trouble symptoms						
	1	2	3	4	5	6	7
Headlights [Both left and right lights should illuminate in both high and low beams]	x	o	x	o	t.	o	t.
passing lights [Both left and right lights should illuminate in high beams when the passing switch is at "ON" position]	o	x	x	o	o	t.	Δ
Position, tail, rear side marker and license plate lights [All of these lights should illuminate when the lighting switch is at the first stage]	o	o	o	x	o	o	t.
probable cause	●	●	●	J	!	!	!
'.ight control relay	-	-	•	•	-	-	•
t:olumn switch Dimmer switch segment	•	-	•	-	•	-	•
Passing switch segment	-	•	•	-	-	•	•
lighting switch segment	•	-	•	•	-	-	•
Body ground points Front pillar, inner	-	-	•	-	-	-	•
Left side of engine compartment	-	-	-	•	-	-	•
Between battery and body	-	-	-	•	-	-	•
Fuse block (No. 2 fuse)	-	-	-	•	-	-	-
Llght bulb	•	-	•	•	•	-	•

Remarks
The symbols used in the table indicate the following:
- o : Normal illumination
- t. : Dim illumination
- x : No illumination
- • : Parts requiring check

Trouble Symptom 3

Headlights do not illuminate in either upper or lower beams (Passing lights do not illuminate either)

Turn the lighting switch to 2nd stage. The dimmer switch may be set to either upper or lower position

Do the headlights illuminate when 0.5-R wire located on back of light control relay connector is grounded?
Caution
Be sure not to ground 2-R, 1.25-R and 0.5-GW wires.

No → Light relay defective → Replace the light control relay

Yes

Do the headlights illuminate when 0.5-R wire located on back of lighting switch connector is grounded?

No → Broken wire in the wiring harness between the light control relay and the column switch → Repair the harness or replace the column switch

Yes

Do headlights light illuminate when 0.3-B wire at back of column switch connector is grounded?

No → Column switch defective → Replace the column switch

Yes

Improperly grounded → Correct the ground connection

rouble symptom 4

Position, tail, rear side marker and license plate lights do not illuminate on either side

Tum the lighting switch to 1st stage

Are main and sub fusible links good?
- No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair the harness and replace the fusible link
- Yes ↓

Is fuse No. 2 good?
- No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair the harness and replace the fuse
- Yes ↓

Do tail and rear side marker lights illuminate when 0.5-GW wire at back of light control relay connector is grounded?
- No → Open circuit in coil of light control relay and poor relay contacts → Replace the light control relay

Caution
Be sure not to ground the other wires.

- Yes ↓

Do tail and rear side marker lights illuminate when 0.5-GW wire at back of column switch connector is grounded?
- No → Open circuit in 0.5-GW wire between relay and switch → Repair the harness

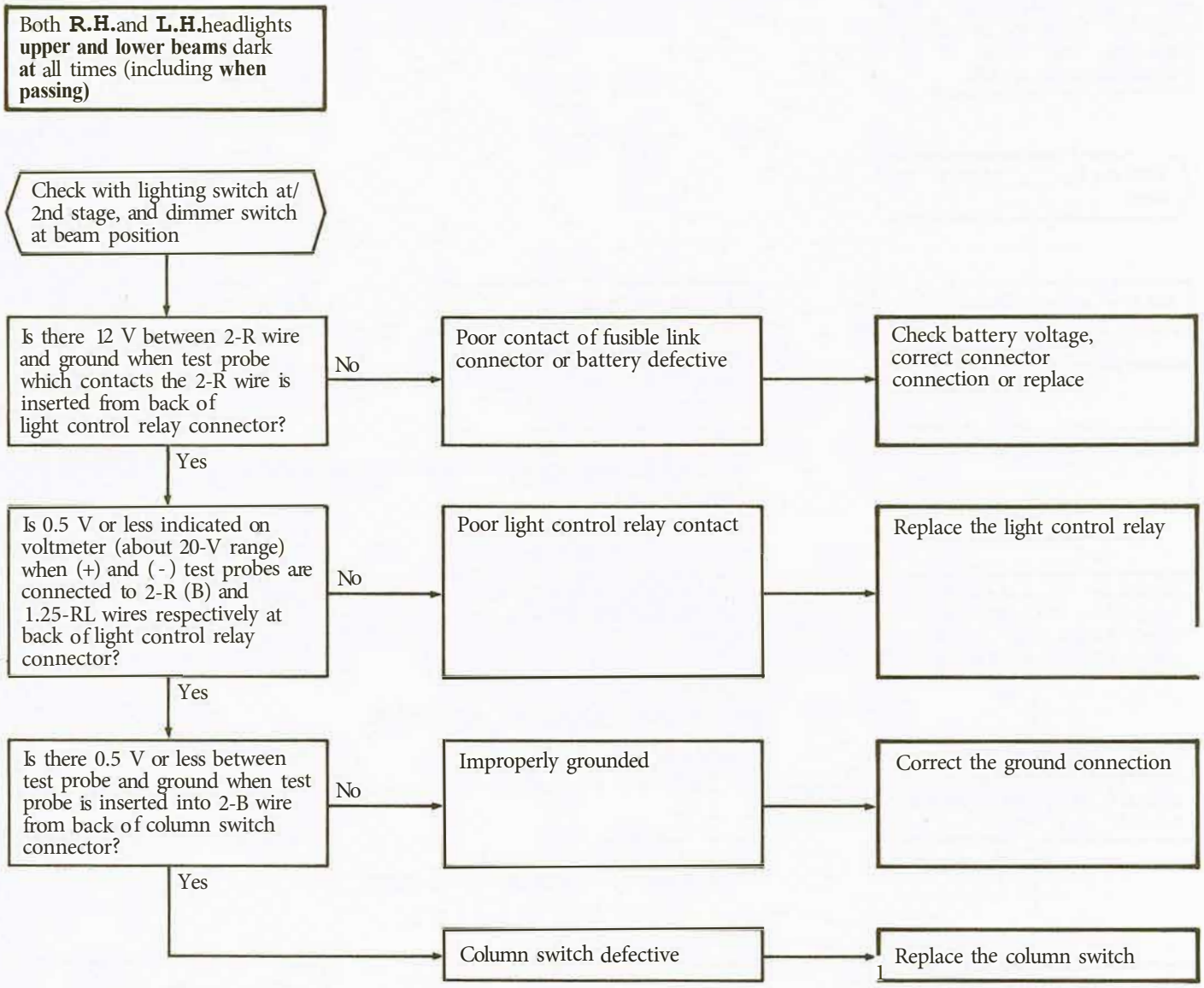
Caution
Be sure not to ground the other wires.

- Yes ↓

Do position, tail, rear side marker and license plate lights illuminate when 0.3-B wire at back of column switch connector is grounded?
- No → Column switch defective → Replace the column switch
- Yes ↓

Improperly grounded → Correct the ground point

Trouble Symptom 7



op Light

Stop light does not illuminate

Is fuse No. 7 good?
- No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair harness and replace fuse
- Yes ↓

Is there 12 V between 0.85-GR wire of stop light switch and ground?
- No → Open circuit in harness between fuse block and stop light switch → Repair the harness
- Yes ↓

Is there 12 V between 0.85 wire of stop light switch and ground when brake pedal is depressed?
- No → Stop light switch defective / Stop light switch mounted at incorrect position → Replace stop light switch / Adjust stop light switch mounting position
- Yes ↓

Check with stop light switch ON

Is there 12 V between 0.85-G wire of hazard warning switch and ground?
- No → Open circuit in harness between stop light switch and hazard warning switch → Repair the harness
- Yes ↓

Is there 12 V between 0.85-WG wire of hazard warning switch and ground?
- No → Hazard warning switch defective → Replace the hazard warning switch
- Yes ↓

Is there 12 V between 0.85-WG wire of column switch and ground?
- No → Open circuit in harness between hazard warning switch and column switch → Repair the harness
- Yes ↓

Is 12 V indicated between column switch connector's WL wire and ground and VR wire and ground?
- No → Column switch defective → Replace the column switch
- Yes ↓

Left stop light:
Is 12 V indicated between 0.3-GY wire of rear combination light (left) and ground?
Right stop light
Is 12 V indicated between 0.3-GL wire of rear combination light (right) and ground?
- No → Open circuit in harness between column switch and stop light bulb → Repair the harness
- Yes ↓

Is there 12 V in B wire of stop light bulb connector?
- No → Open circuit in stop light bulb → Replace the light bulb
- Yes → Ground circuit defective → Correct ground circuit harness or correct ground connection

Stop light does not go out

Stop light switch improperly adjusted or defective	Adjust stop light switch position Replace stop light switch

Turn-signal and hazard lights

One of the turn-signal lights or indicator lights does not illuminate

Incorrect connector connection	Correct the connector
Improper ground connection	Correct the ground connection
Light bulb malfunction	Replace the light bulb

Turn-signal light does not illuminate

Set ignition key to "ON" position

Are the battery and fusible links (main, sub) normal?

No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair the harness and replace fusible link

No → Battery defective / Charging system defective → Charge or replace the battery / Check and correct charging system

Yes

Is fuse No. 3 good?

No → Short circuit in harness (damaged harness, burnt covering, etc.) → Repair the harness and replace the fuse

Yes

Remove the turn-signal flasher unit

Is there continuity between 0.85-RL wire of turn signal flasher unit connector and fuse block?

No → Open circuit in harness between fuse block and turn signal flasher unit → Repair the harness

Yes

With hazard warning switch OFF, is there continuity between GR wires?

No → Hazard warning switch defective → Replace the hazard warning switch

Yes

Is there continuity between GR wire of turn-signal flasher unit connector and GR wire of hazard warning switch?

No → Open circuit in harness between turn-signal flasher unit and hazard warning switch → Repair the harness

Yes

Is there continuity between GR wire of hazard warning switch and GR wire of column switch?

No → Open circuit in harness between hazard warning switch and column switch → Repair the harness

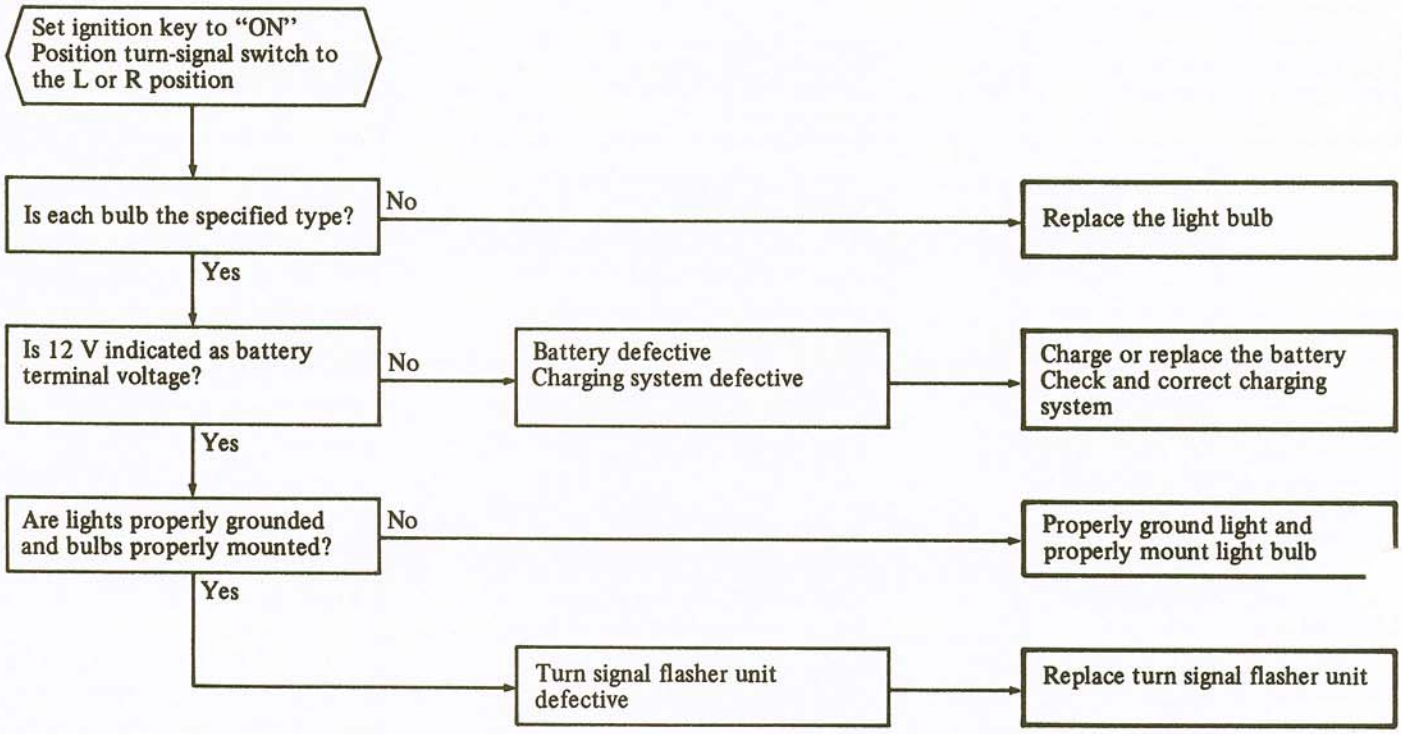
Yes

Is there continuity between GR wire and 0.85-GY and 0.85-GL wires of turn signal switch connector (12P) when switch lever is operated?

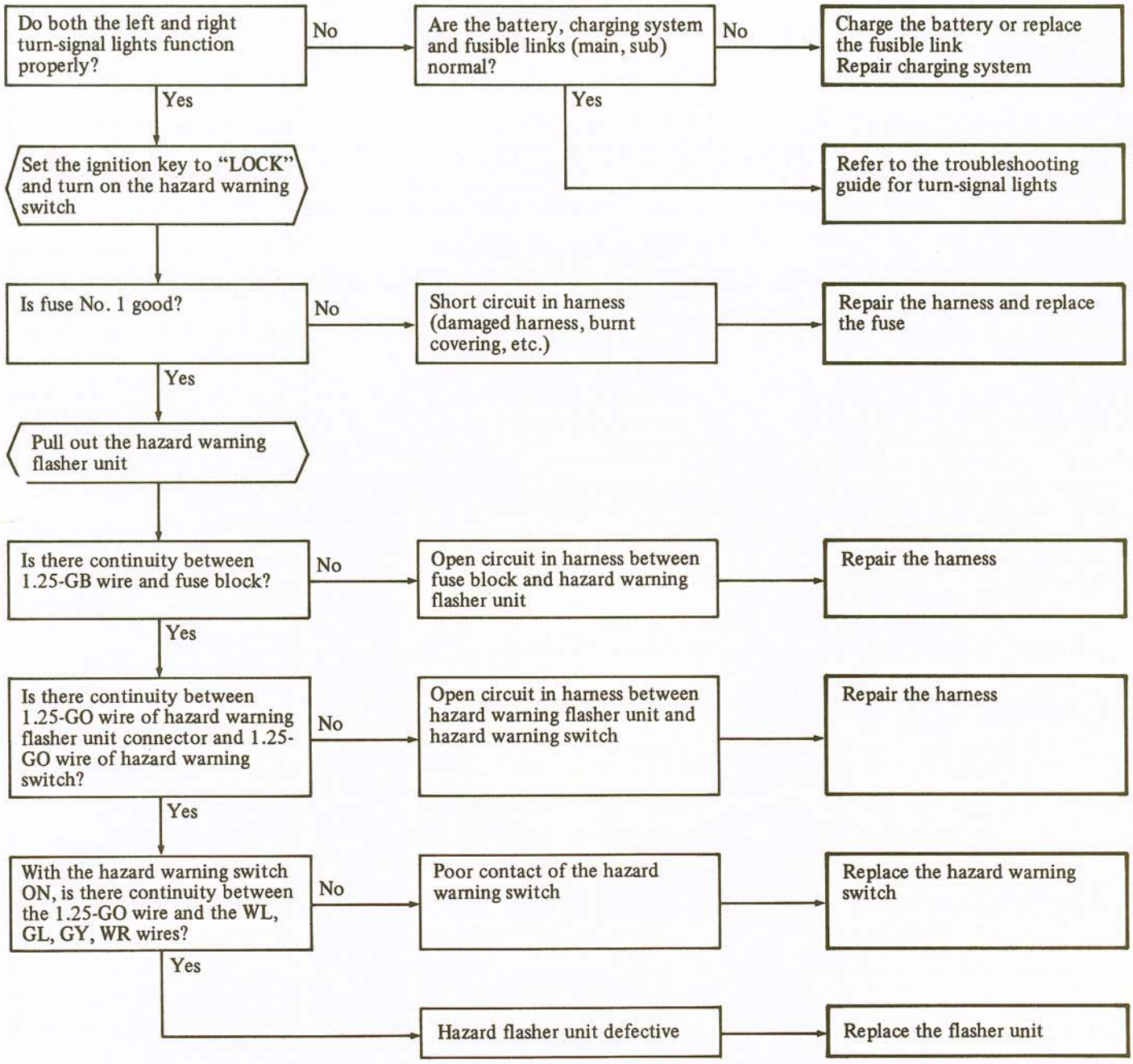
No → Poor column switch contact or open circuit in harness of column switch → Correct or replace the column switch

Yes → Turn signal flasher unit defective → Replace the flasher unit

All lights illuminate, but flashing is irregular
All lights illuminate without flashing



Hazard lights and indicator lights do not illuminate



WINDSHIELD WIPERS AND WASHER

Wipers do not operate

Check while the ignition key is in the "ACC" position

Are the main fusible link and the sub fusible link OK?
- No → A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fusible link
- Yes ↓

Is fuse No. 8 OK?
- No → A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fuse
- Yes ↓

Is 12 V indicated between each of the various wires (0.85-L, LO, LB) and ground when a test probe is inserted from the back of the wiper motor connector?
- No → A broken wire between the fuse block and the wiper motor, or an improperly connected connector → Correct the connector or repair the harness
- No → A malfunction in the wiper motor brushes, or a broken wire in the coil → Replace the wiper motor
- Yes ↓

Is 12 V indicated between each wire (LO and LB) and ground when a test probe is inserted from the back of the column switch connector?
- No → A broken wire between the wiper motor and the wiper switch, or an improperly connected connector → Correct the connector or repair the harness
- Yes ↓

Is there 12 V between 2-B wire of column switch connector and ground when wiper switch is set to "1" and "2"?
- No → Improperly connected connector or defective wiper switch → Correct connector or replace column switch
- Yes → Open circuit between wiper switch and ground or improperly grounded → Correct harness or ground connection

Washer does not operate

Check while the ignition key is in the "ACC" position

Are the main fusible link and the sub fusible link OK?
- No → A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fusible link
- Yes ↓

Is fuse No. 8 OK?
- No → A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fuse
- Yes ↓

Is 12 V indicated between the L wire and ground when a test probe is inserted from the back of the washer motor connector?
- No → A broken harness between the fuse block and washer motor, or an improperly connected connector → Correct the connector or repair the harness
- Yes ↓

Does the washer function when the YL wire of the washer motor connector is grounded?
- No → Malfunction in the washer motor → Replace the washer motor
- Yes ↓

Does the washer function when the YL wire of the column switch connector is grounded?
- No → A broken harness between the washer motor and the column switch or an improperly connected connector → Correct the connector or repair the harness
- Yes ↓

Does the washer operate when the washer switch is turned on while the 2B wire of the column switch connector is grounded?
- No → A poor connection in the column switch → Replace the column switch
- Yes ↓

Open circuit between washer switch and ground or improperly grounded → Repair harness or correct the ground connection

The wipers do not operate when the washer switch is turned on, but washer operates properly

Check while the ignition key is in the "ACC" position

Do the wipers operate when the wiper switch is set to the star mark?

No → Refer to the troubleshooting section, "The wipers do not operate at all when the wiper switch is set to the star mark"

Yes → A malfunction in the intermittent wiper control unit → Replace the wiper control unit

The wipers do not operate at all when the wiper switch is set to the star mark

Check while the ignition key is in the "ACC" position

Do the wipers operate when the wiper switch is set to the "1" postion?

No → Refer to the troubleshooting section, "Wipers do not operate"

Yes

Set wiper switch to the star mark

Is there 12 V between LW wire and ground when test probe is inserted from back of inter- nittent wiper control unit connector?

No → Open circuit in harness between intermittent wiper control unit and wiper motor → Correct harness

Yes

Does wiper perform inter- mittent operation when test probe is inserted from back of intermittent wiper control unit and grounds:
1. 0.3-BY wire?
2. B wire?

No → Malfunction in intermittent wiper control unit → Replace intermittent wiper control unit

1. Yes → Open circuit in harness between intermittent wiper control unit and wiper switch, or loose connector → Correct harness or correct connector

2. Yes → Improperly grounded → Correct ground connection

Wipers operate continuously even after wiper switch is set to the star mark

Check with ignition key at "ACC" position.

Do wipers operate continuously when intermittent wiper control unit connector is disconnected and wiper switch is set to the star mark?

No → Intermittent wiper control unit defective → Replace intermittent wiper control unit

Yes → Short circuit in wiper switch → Replace column switch

Intermittent time cannot be adjusted

Inspect with ignition key at "OFF"

Disconnect wiper switch connector and operate time adjustment switch. Does resistance between 0.3-Y wire and 2-B wire vary between 0 and 50 ohms?

No → Faulty wiper switch variable resistor → Faulty column switch

Yes → Is there continuity between intermittent wiper relay and wiper switch?

No → Damaged harness between intermittent wiper relay and wiper switch → Repair harness

Yes → Faulty intermittent wiper relay → Replace intermittent wiper relay

REAR WINDOW WIPER AND WASHER

Rear wiper does not operate

Check while the ignition key is in the "ACC" position

Is fuse No. 9 OK?
- No → A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fuse
- Yes ↓

Is 12 V indicated between the L wire and ground when a test probe is inserted from the back of the rear wiper motor connector?
- No → A broken wire between fuse No. 9 and the wiper motor connector, or a poor connector connection → Correct the connector or repair the harness
- Yes ↓

Is 12 V indicated between the BrW wire and ground when a test probe is inserted from the back of the rear wiper motor connector?
- No → A malfunction in the wiper motor brush, or a broken wire in the coil → Replace the wiper motor
- Yes ↓

Does the wiper motor function when a test probe is inserted from the back of the rear wiper and washer switch connector and the BrW wire is grounded?
- No → A broken wire between the wiper motor and the rear wiper and washer switch, or a poor connector connection → Correct the connector or repair the harness
- Yes ↓

Set the igniton key to the "OFF" position

Does continuity exist between the 0.3-B wire and ground when the rear wiper switch is turned on?
- No → A poor connection of the rear wiper and washer switch connector, or a malfunction in the rear wiper and washer switch → Repair the connector or replace the wiper and washer switch
- Yes → Improperly grounded → Correct the ground connection

Rear window washer does not operate

Check while the ignition key is in the "ACC" position

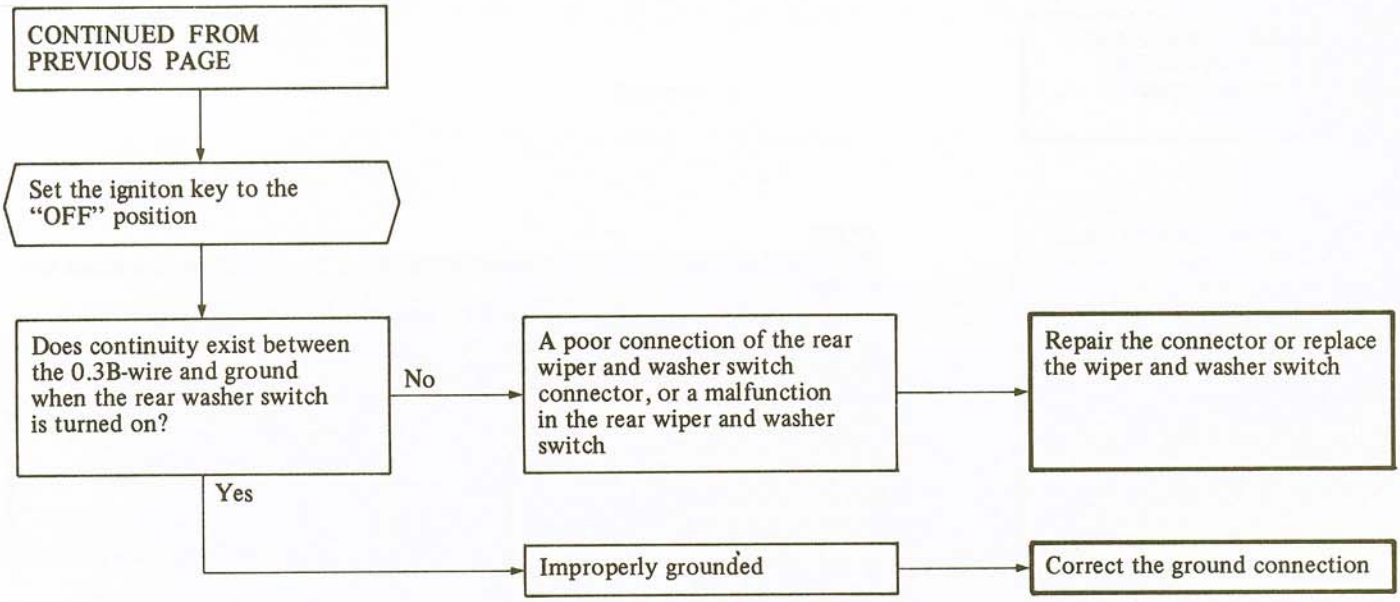
Is fuse No. 9 OK?
- No → A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fuse
- Yes ↓

Is 12 V indicated between the 0.3-L wire and ground when a test probe is inserted from the back of the rear window washer motor?
- No → A broken harness between the fuse block and the rear window washer motor, or a poor connector connection → Correct the connector or repair the harness
- Yes ↓

Does the washer function when a test probe is inserted from the back of the rear window washer motor and the 0.3-WB wire is grounded?
- No → Malfunction in the rear window washer motor → Replace the rear washer motor
- Yes ↓

Does the washer motor function when a test probe is inserted from the back of the rear window wiper and washer switch connector and the 0.3-WB wire is grounded?
- No → A broken harness between the rear window washer motor and the rear wiper and washer switch, or a poor connector connection → Correct the connector or repair the harness
- Yes ↓

SEE NEXT PAGE


CONTINUED FROM PREVIOUS PAGE
Set the igniton key to the "OFF" position
Does continuity exist between the 0.3B-wire and ground when the rear washer switch is turned on?
No
A poor connection of the rear wiper and washer switch connector, or a malfunction in the rear wiper and washer switch
Repair the connector or replace the wiper and washer switch
Yes
Improperly grounded
Correct the ground connection

HEADLIGHT WASHER

The headlight washer motor does not operate when the headlight washer switch is pressed

Disconnect the headlight washer control relay connector, and check with ignition key at "ACC"

NOTE
The headlight washer should operate when all of the following conditions are fulfilled:
(1) The ignition key is at either the ACC position or the ON position.
(2) The lighting switch is at the ON position.
(3) The headlight washer switch is at the ON position.

Does continuity exist between the 1.25-B wire and ground when a test probe is inserted from the back of the headlight washer control relay connector?
- No → An improper ground connection between the headlight washer control relay and ground, or a broken harness → Repair the harness or correct the ground connection
- Yes ↓

Is 12 V indicated between the 0.3-LW wire and ground when a test probe is inserted from the back of the headlight washer control relay connector?
- No → Is fuse No. 8 OK?
  - No → Repair the harness and replace the fuse
  - Yes → Repair the harness between the fuse block and the headlight washer control relay connector
- Yes ↓

Does the headlight washer motor operate when the 1.25-L wire of the headlight washer control relay connector is grounded?
- No → A malfunction in the headlight washer motor → Replace the headlight washer motor
- Yes ↓

Does continuity exist between the terminals when a test probe is inserted between the 0.3-LB wire and ground from the back of the headlight washer control relay connector and the headlight washer switch is pressed?
- No → A malfunction or poor connection in the headlight washer switch or a broken harness between the ground branch points of the headlight washer switch → Correct connector, replace column switch, or correct harness or ground connection
- Yes ↓

Check with the lighting switch ON

SEE NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

Is 12 V indicated between GW wire and ground when a test probe is inserted from the back of the headlight washer control relay connector?

No → Do the tail lights, position lights, meter illumination lights, etc., illuminate

No → Refer to p. 8-45, "Position, tail, rear side marker and license plate lights do not illuminate on either side"

Yes → Inspect the harness between the fuse block and the headlight washer control relay connector, and repair if necessary

Yes → A malfunction in the headlight washer control relay → Replace the headlight washer control relay

The headlight washer motor operates, but the washer fluid does not spray

Disconnect the main hose from the check valve

NOTE
Have a receptacle prepared in order to avoid spilling the washer fluid.

Does the washer fluid spray when the headlight washer switch is pressed?

No → Are the hoses free from clogging, twisting, leakage, etc.?

No → Correct the hose installation, remove the clogging, or replace the hose

Yes → Inspect the washer motor (for pump blockage), and repair or replace it

Yes → Connect the main hose to the check valve, and then disconnect the hoses which are connected to the left and right nozzles from the check valve

Does the washer fluid spray from both the left and right discharge ports when the headlight washer switch is pressed?

No → Blockage inside the check valve, or a malfunction in the stopper valve → Replace the check valve

Yes → Are the hoses between the left and right nozzles and the check valve free from cracks, clogging, and/or leakage?

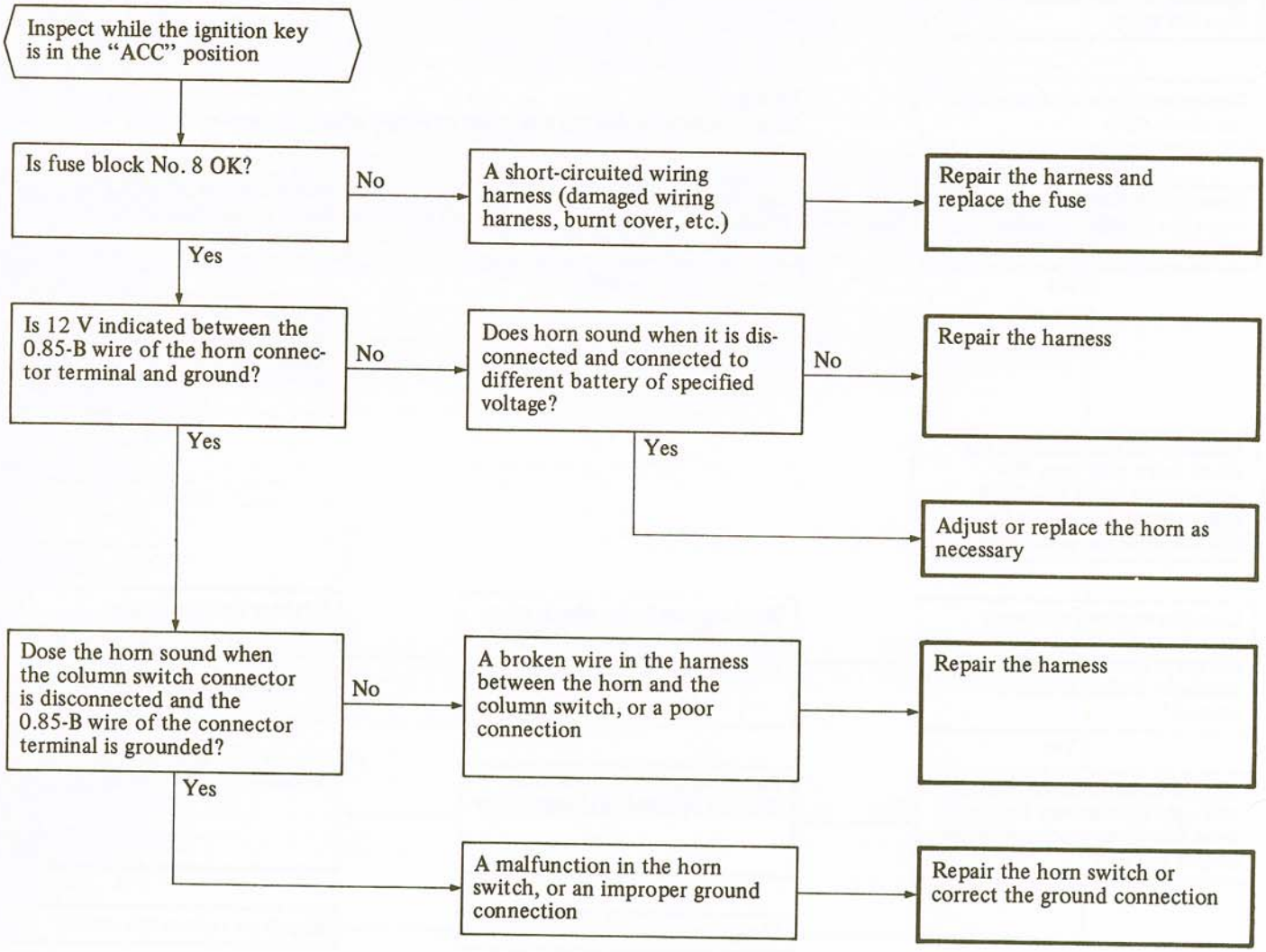
No → Fluid leakage or pressure loss due to a cracked or clogged hose → Repair or replace the hose

Yes → Clogged nozzle → Repair or replace the nozzle

HORN

Symptom	Probable cause	Remedy
Sound volume of horn is low or fluctuates	A loose or bent adjustment screw	Adjust the horn
	Water, dirt, or other foreign matter lodged inside	Replace the horn
	A loose horn or bracket mounting bolt	Tighten the bolt
	A drop in battery voltage	Check the battery
	A poor connection of the horn switch	Repair or replace the horn switch
	A poor connection of the horn ground terminal	Repair

Horn does not sound



ey-Reminder Switch

Key-reminder buzzer does not sound.

Check with ignition key in "OFF" position

Is fuse No. 7 good?
- No → Short circuit in harness (damaged harness, burnt cover, etc.) → Repair the harness and replace fuse
- Yes ↓

Is there continuity between GR wire of key-reminder switch connector and ground?
- No → Open circuit in harness between fuse block and key-reminder switch → Repair the harness
- Yes ↓

Is there continuity between G wire of key-reminder switch connector and ground?
- No → Key-reminder switch defective → Replace the key-reminder switch
- Yes ↓

Is there continuity between G wire of buzzer connector and ground?
- No → Open circuit in harness between key-reminder switch and buzzer → Repair the harness
- Yes ↓

Does buzzer sound when 0.3-Y wire of buzzer connector is grounded?
- No → Buzzer defective → Replace the buzzer
- Yes ↓

Does buzzer sound when YW wire of driver's door switch connector is grounded?
- No → Open circuit in harness between buzzer and door switch → Repair the harness
- Yes ↓

Door switch defective → Replace the door switch

Key-reminder buzzer won't stop sounding.

Check with ignition key removed

Does buzzer sound when YW wire of driver's door switch connector is disconnected?

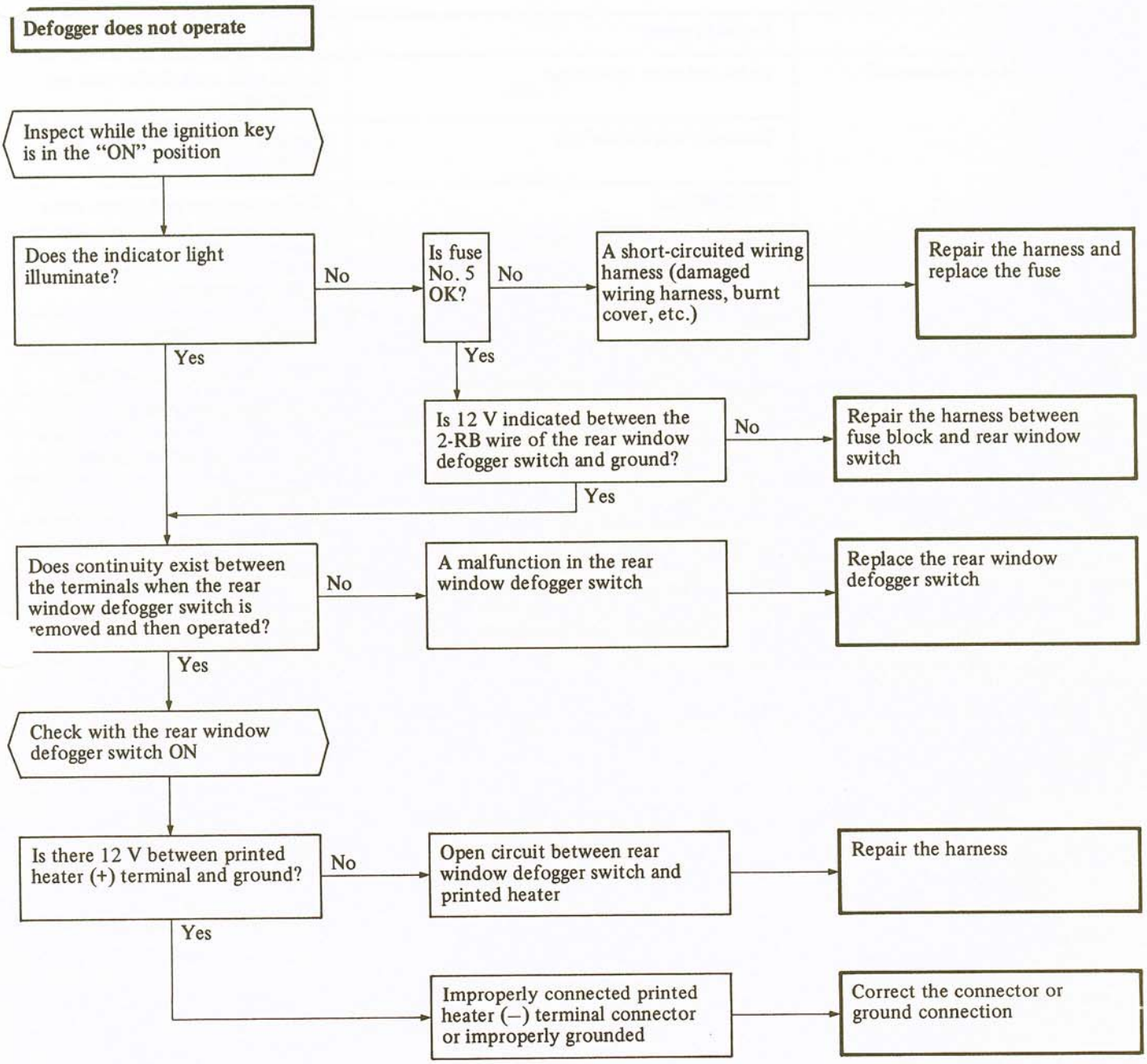
No → Door switch defective → Replace door switch

Yes

Does buzzer sound when seat belt switch connector of driver's seat belt is disconnected?

No → Belt switch or timer defective → Refer to "Fasten-Seat-Belt Warning Light" section

Yes → Short circuit at ground side of buzzer circuit → Repair the harness

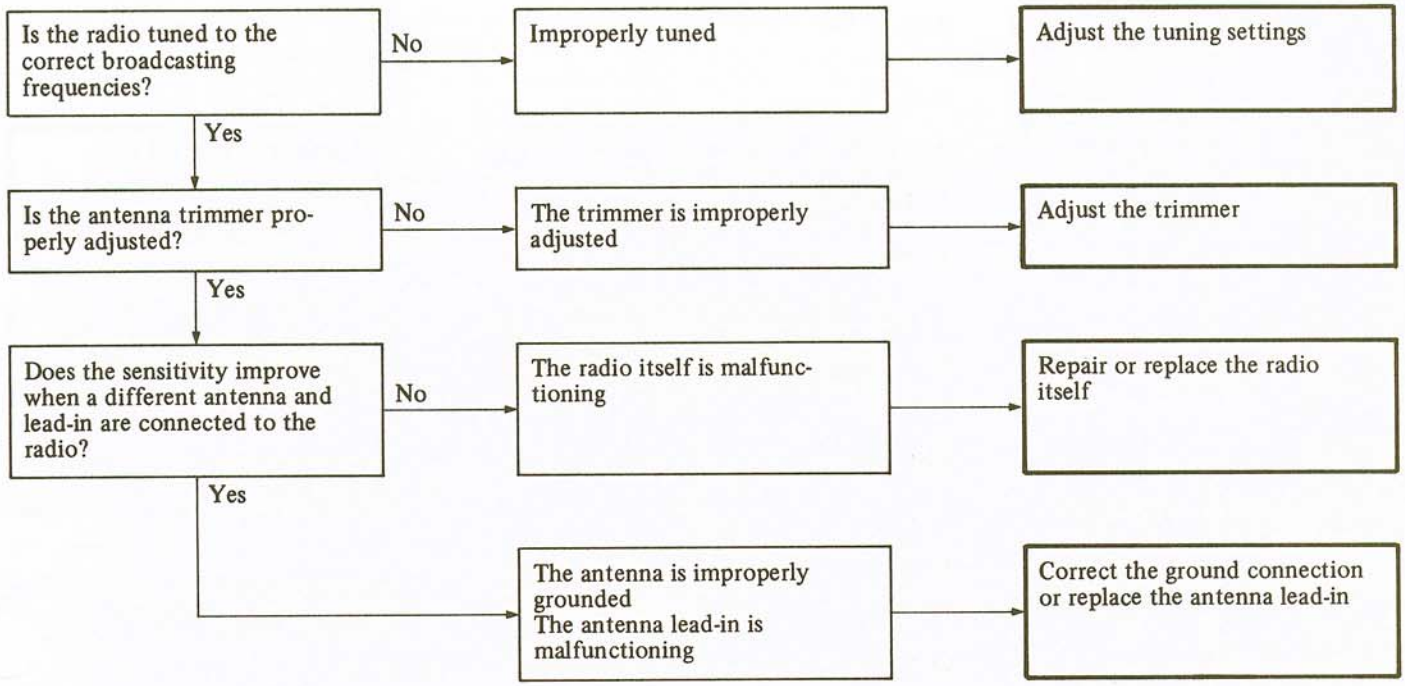

Defogger does not operate
Inspect while the ignition key is in the "ON" position
Does the indicator light illuminate?
No
Is fuse No. 5 OK?
No
A short-circuited wiring harness (damaged wiring harness, burnt cover, etc.)
Repair the harness and replace the fuse
Yes
Yes
Is 12 V indicated between the 2-RB wire of the rear window defogger switch and ground?
No
Repair the harness between fuse block and rear window switch
Yes
Does continuity exist between the terminals when the rear window defogger switch is removed and then operated?
No
A malfunction in the rear window defogger switch
Replace the rear window defogger switch
Yes
Check with the rear window defogger switch ON
Is there 12 V between printed heater (+) terminal and ground?
No
Open circuit between rear window defogger switch and printed heater
Repair the harness
Yes
Improperly connected printed heater (–) terminal connector or improperly grounded
Correct the connector or ground connection

POWER WINDOWS

Symptom	Probable cause	Remedy
None of the door windows will operate	Burnt-out main fusible link	Replace the main fusible link and isolate cause
	Burnt-out sub fusible link	Replace the sub fusible link and isolate cause
	Burnt-out fuse	Replace the fuse and isolate cause
	Poor grounding power window relay	Correct grounding
	Malfunctioning power window relay	Replace the relay
	Malfunctioning main switch	Replace the main switch
	Break in harness, or poor connection	Correct or replace the harness
The front door windows cannot be operated by using the main switches	Malfunctioning main switch	Replace the main switch
	Break in harness, or poor connection	Correct or replace the harness
	Malfunctioning motor	Replace motor
The door windows can be operated by using the main switches, but cannot be operated by using the sub switches	Malfunctioning main switch	Replace the main switch
	Malfunctioning sub switch	Replace the sub switch
	Break in harness, or poor connection	Correct or replace the harness
The door windows can be operated even though the lock switch is at "ON"	Malfunctioning main switch	Replace the main switch

ADIO AND STEREO

Poor sensitivity



Noise is produced

Start the engine

Is there noise when any of the electrical equipment is operated?

No → Does the noise cease when the antenna lead-in is disconnected from the radio?

No → Repair or replace the radio

Yes → Is the antenna lead-in routed too close to a harness?

No → Correct the ground connection of replace the antenna lead-in

No → There is no malfunction

Yes → Reroute the antenna lead-in

Yes →

Beeping ..... Horn
Irregular cracking ..... Tachometer
Popping ..... Stop light switch
Sputtering ..... Ignition system
Whining ..... Motor
Whining ..... Wiper motor
Whining ..... Alternator
Intermittent clattering ..... Turn-signal flasher unit

→ Correct the ground connection or replace the noise filter

Car stereo
Insufficient volume
Poor sound quality

Does the problem disappear when switched from the stereo to the radio?

No → Improperly connected harness or connector → Correct the connection of the harness or the connector

Yes

Is the tape player head OK?

No → Dirty, worn or damaged tape player head
Improperly installed tape player head → Clean or replace the tape player head

Yes

Improperly connected tape player head lead wire, or a malfunction in either a capacitor or in the tape player itself → Correct the connection or replace the malfunctioning parts

The tape being used was recorded monaurally → Use tapes which have been recorded in stereo

The auto reverse does not function

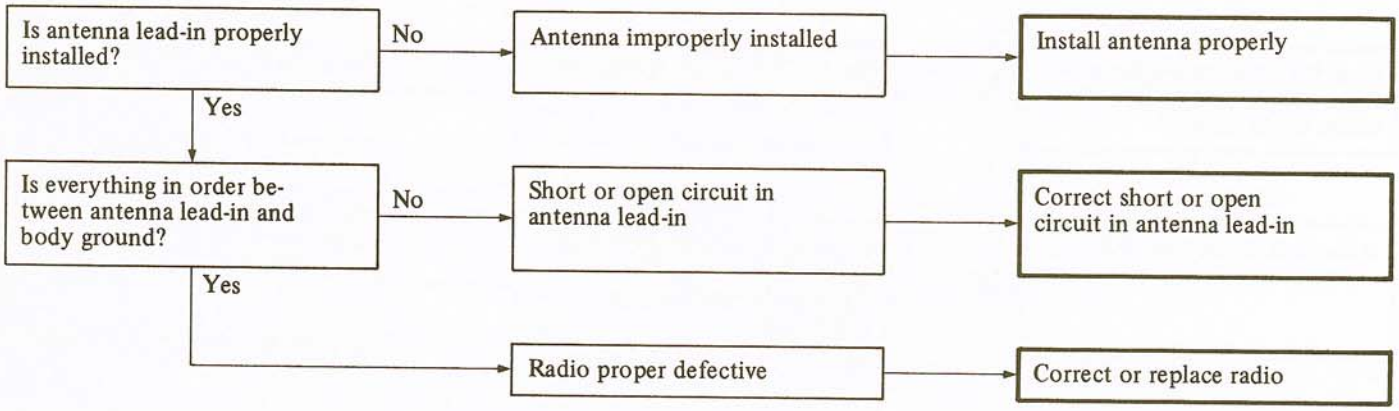
The program changes when the direction selector button is pressed

No → A malfunction in the reverse circuit → Repair or replace

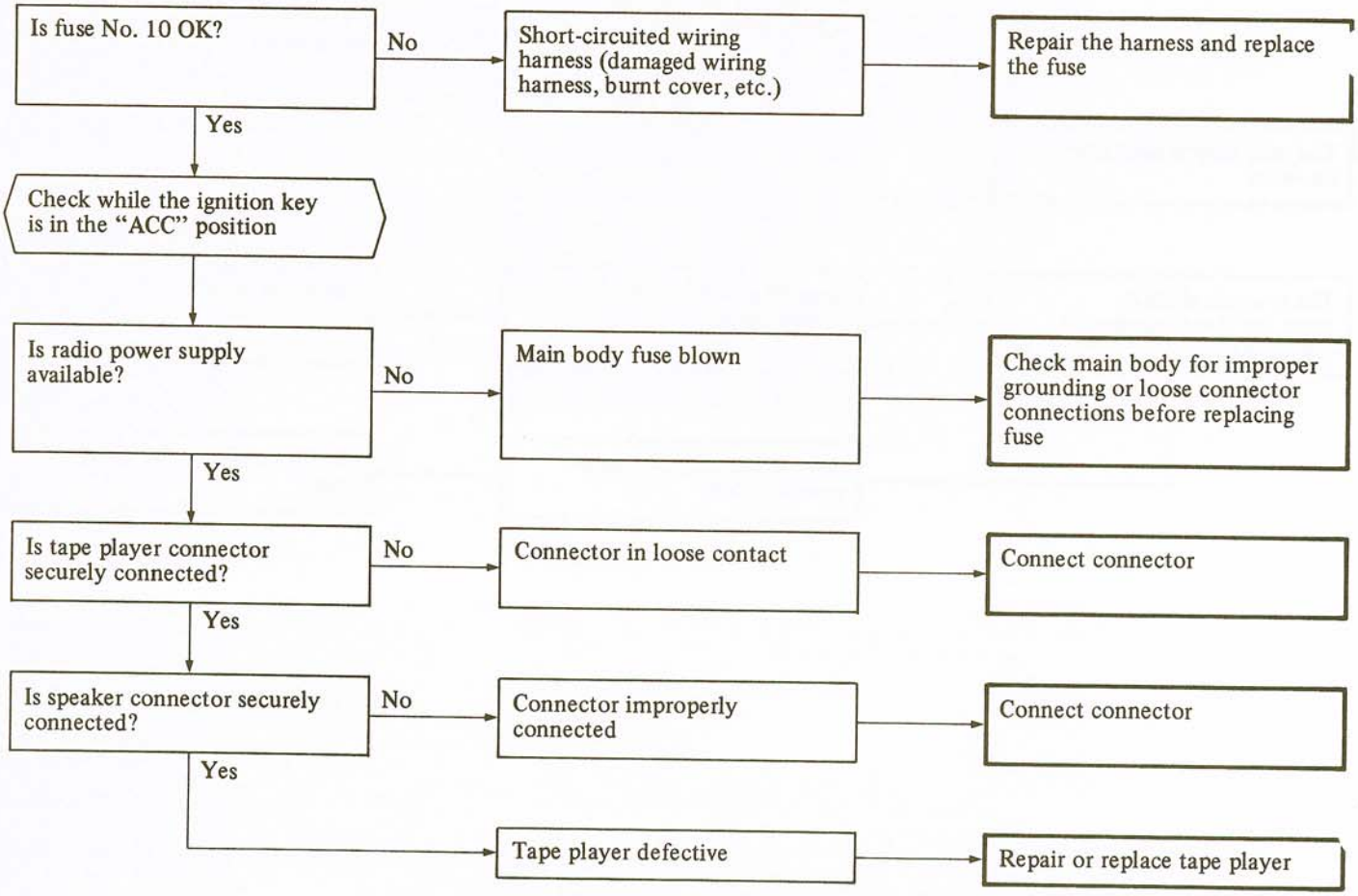
Yes

A malfunction in the auto-reverse circuit → Repair or replace the radio itself

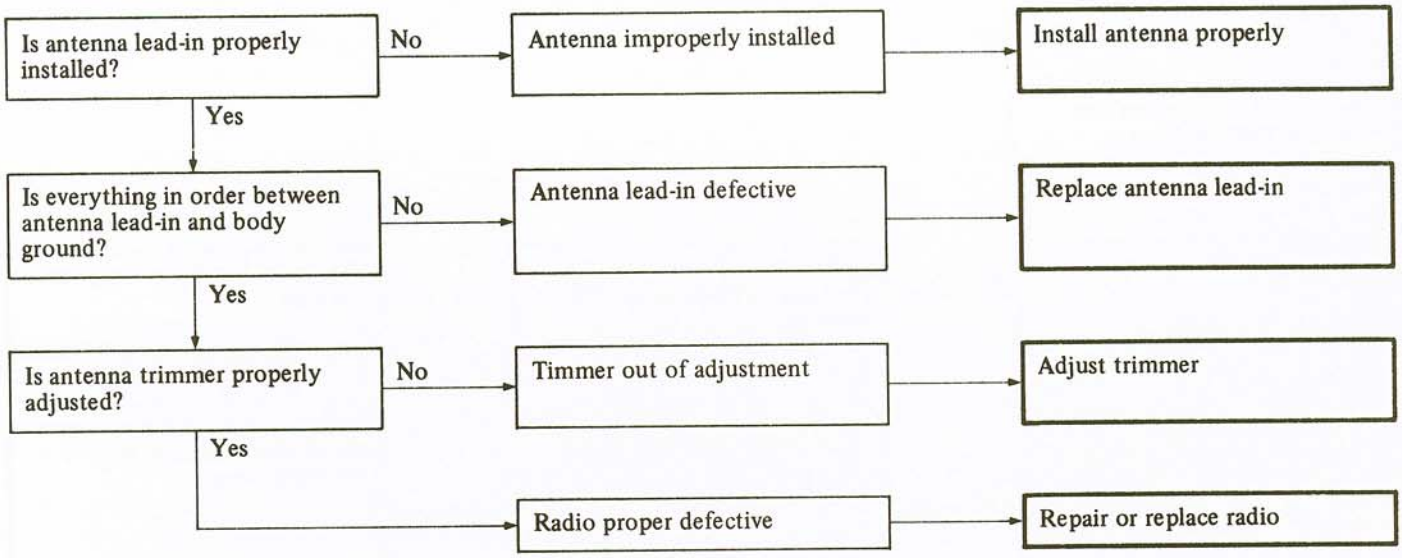
No automatic tuning, excessive noise



No sound



Poor radio sensitivity, excessive noise



3-POINT ELR SEAT BELTS WITH TENSION RELIEFERS

Seat belt tension reliefer system does not function when ignition key is at "ON"

Check while the ignition key is in the "ON" position

Is fuse No. 3 OK?
- No → Short-circuited wiring harness (damaged wiring harness, burnt cover, etc.) → Repair the harness and replace the fuse
- Yes ↓

Is 12 V indicated between the 0.3-RL wire (L.H.) or RL wire (R.H.) and ground when the seat belt solenoid is removed and a test probe is inserted from the back of the connector?
- No → A broken harness between the fuse block and the seat belt solenoid, or a poor connection → Repair the harness or correct the connection
- Yes ↓

Does tension reliefer system operate when one end of test probe is inserted into the 0.3-YB wire from the back of the seat belt solenoid connector and the other end of the test probe is grounded?
- No → Seat belt solenoid defective → Replace the seat belt assembly
- Yes ↓

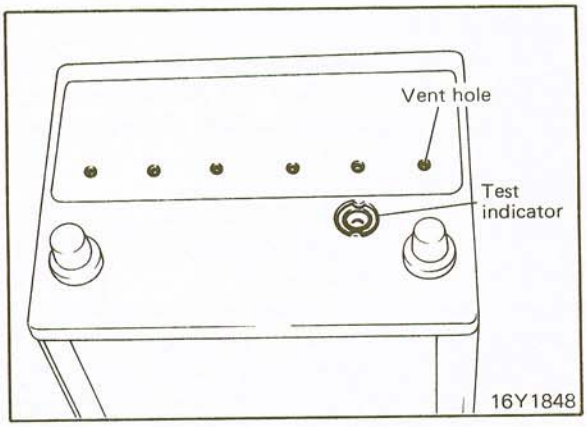
Does tension reliefer system operate when the belt switch is disconnected and the 0.3-YB wire is grounded?
- No → A broken harness between the seat belt solenoid and the belt switch, or a poor connection → Repair the harness or correct the connection
- Yes ↓

A poor connection of the belt switch connector, or belt switch malfunction → Correct the connection or replace the belt switch

BATTERY

General Information

The maintenace-free battery is, as the name implies, totally maintenance free and has no removable battery cell caps. Water never needs to be added to the maintenace-free battery. The battery is completely sealed, except for small vent holes in the cover. These vent holes allow what small amount of gasses are produced in the battery to escape. The special chemical composition inside the battery reduces the production of gas to an extremely small amount at normal charging voltages. The battery contains a visual test indicator which indicates the condition of the battery.



Battery Visual Inspection

1. Make sure ignition switch is in OFF position and all battery feed accessories are OFF.
2. Disconnect battery cables from battery (negative first).
3. Remove battery from vehicle.

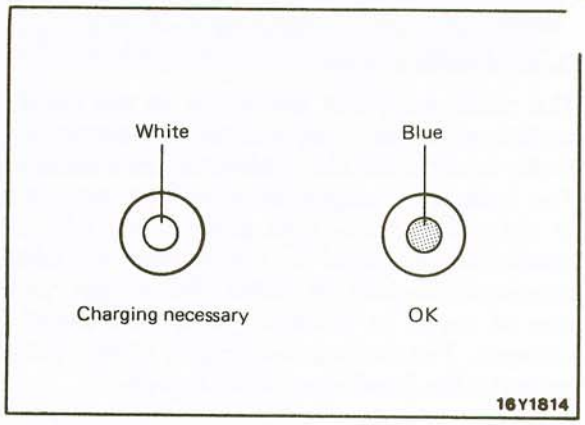
Caution

Care should be taken in the event battery case is cracked or leaking to protect hands from the electrolyte. A suitable pair of rubber gloves (not the household type) should be worn when removing battery by hand.

4. Inspect battery carrier for damage caused by loss of acid from battery. If acid damage is present it will be necessary to clean area with a solution of clean warm water and baking soda. Scrub area with a stiff bristle brush and wipe off with a shop towel moistened with ammonia or baking soda in water.
5. Clean top of battery with same solution as described in Step 4.
6. Inspect battery case and cover for cracks. If cracks are present battery must be replaced.
7. Clean the battery posts with a suitable battery post cleaning tool.
8. Clean the inside surfaces of the terminal clamps with a suitable battery terminal cleaning tool. Replace damaged or frayed cables and broken terminal clamps.
9. Reinstall the battery in vehicle.
10. Connect cable clamps to battery post making sure top of clamp is flush with top of post.
11. Tighten the clamp nut securely.
12. Coat all connections with light mineral grease after tightening.

Charge Rate

If the test indicator is white, the battery should be charged as outlined below. When the dot appears or when maximum charge shown below is reached, charging should be stopped.



Charge Rate Chart

Battery	NX100-S6 (S)-MF (420 amps)		NX120-7-MF (600 amps)	
Slow charging	5 amps 10 hrs.	10 amps 5 hrs.	5 amps 12 hrs.	10 amps 6 hrs.
Fast charging	20 amps 2.5 hrs.	30 amps 1.5 hrs.	20 amps 3 hrs.	30 amps 2 hrs.

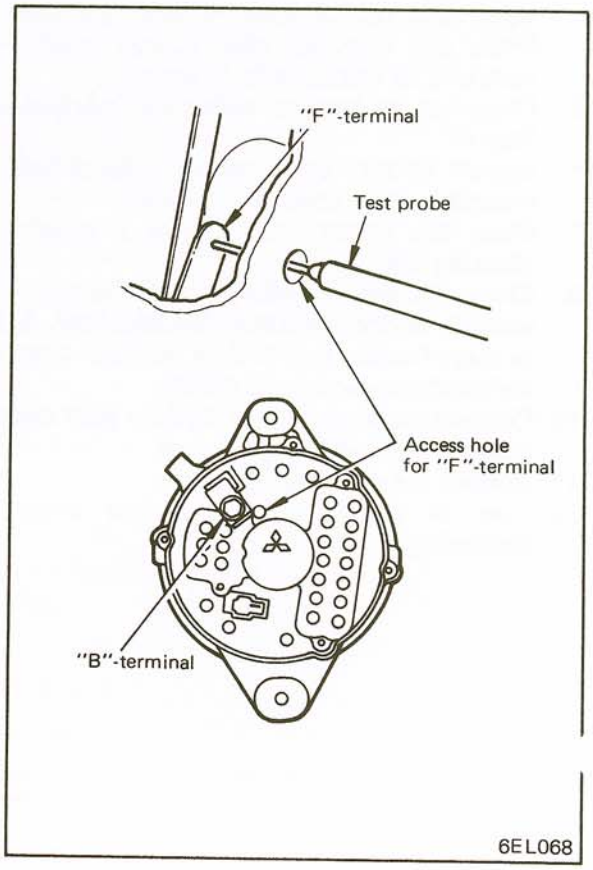
CHARGING SYSTEM

Problems in charging system could be due to improper fan belt deflection, faulty wiring or connector, or a discharged battery. A defective electronic voltage regulator is not always the cause. What is important in troubleshooting of charging system, therefore, is to determine whether the problem is due to a run-down or overcharged battery. Then check previously mentioned items before checking alternator. In this manner a fault in a circuit other than alternator might also be detected.

This alternator has an "F" terminal for checking, as shown in the illustration (6EL068), which is provided in order to make troubleshooting easier. The (F) in the circuit in the illustration (1EL042) is the "F" terminal for checking. The voltage of this terminal can be checked from outside the alternator through the access hole provided in the rear bracket.

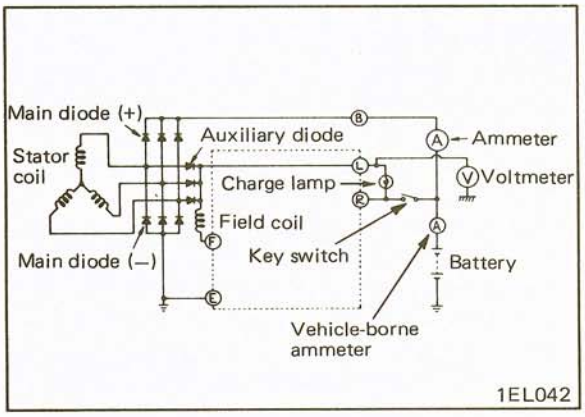
The voltage readings of the "F" terminal indicate as follows:

1. Ignition switch at "OFF"
   Normal if voltage is 0 V. If voltage is close to battery voltage, the (+) diode is short-circuited, and, moreover, there is a malfunction of the electronic voltage regulator. If the voltage is 0.5 to 2.0 V, the (+) diode is short-circuited.
2. Ignition switch "ON"
   Under normal conditions, only voltage equivalent to the voltage drop (0.5 to 2.0 V) of the power transistor within the electronic voltage regulator will appear.
   If a voltage close to battery voltage is noted, current is not flowing to the field coil, which means that there is a malfunction of the electronic voltage regulator. In this instance, there should be no voltage generation, so start the engine and confirm that there is none. Also check to be sure that field current flows and there is voltage generation at the instant when, with the engine running, the "F" terminal for checking is grounded to the rear bracket.



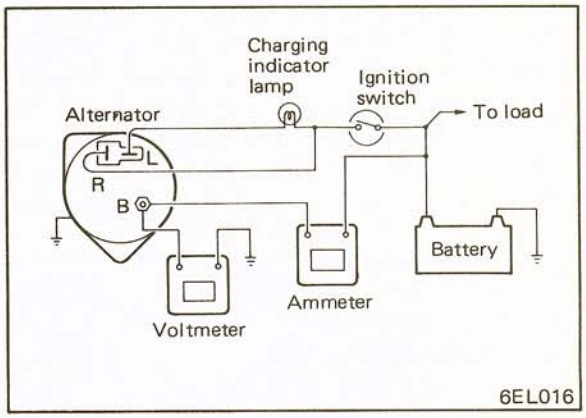
If the voltage reading is 0 V, the possible causes could be wiring damage of the field coil, poor contact of the brushes, a malfunction of the electronic voltage regulator, poor contact of the connector, and/or poor contact in the ignition switch. In any case, the alternator will not generate. In addition, if the negative (–) brush is grounded, or if there is a short-circuit inside the electronic voltage regulator, the voltage of the "F" terminal will be 0 V, which means that there is an overcharge.

3. While engine is running
   Under normal conditions, the voltage will increase as the engine rpm is increased. If, with the battery fully charged, there is no load on the alternator, voltage will be close to output voltage.
   If the voltage remains low even though the engine rpm is increased, the regulator has not yet reached the operating voltage, or current is continuing to flow to the regulator. If the latter, an overcharge will result.



CURRENT OUTPUT TEST

1. Place the ignition switch at OFF.
2. Disconnect the battery ground cable.
3. Disconnect the cable from terminal "B" of the alternator and connect a 60 A ammeter between the terminal "B" and cable.
4. Connect a voltmeter between terminal "B" (+) and ground (–).
5. Set the engine tachometer.
6. Reconnect battery ground cable to the battery. The voltmeter should indicate the battery voltage.
7. Start the engine.
8. Turn on all electrical loads, accelerate the engine speed to 2,500 to 3,000 rpm and read the output current.



Output current:
Over 90% of nominal output: Alternator is good.
70 to 90% of nominal output: Recheck output current.
Less than 70% of nominal output: Alternator defective.

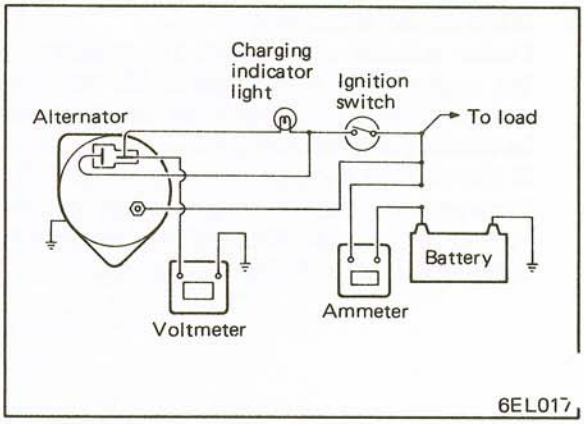
NOTES

1. After the engine has been started, the ammeter indication will drop as the battery reaches the fully charged condition.
   Read the indication at its maximum value while increasing the engine revolution.
2. If the battery is in the fully charged condition, current will not flow, resulting in a no-flow condition of the nominal output current. In this case, measure the output current after the battery has been discharged by cranking the engine or increase the electrical load by adding new parallel circuits.

REGULATED VOLTAGE TEST

1. Turn ignition switch OFF.
2. Disconnect the battery ground cable.
3. Disconnect the battery positive cable and connect a 60 A ammeter between the battery positive terminal and cable.
4. Connect a voltmeter between terminal "L" of alternator and ground.
5. Set the engine tachometer.
6. Reconnect the battery ground cable to the battery. The voltmeter should indicate 0 V; if it is not, the alternator or wiring is defective.
7. Short circuit the ammeter terminals and start the engine.
   NOTE
   Make sure that the starter current does not flow through the ammeter while starting the engine.
8. Increase the engine speed to 2,000 to 3,000 rpm and check the ammeter reading. If the reading is 5 A or less, check the voltmeter reading. This reading is the regulated voltage. If the ammeter reading is more than 5 A, either continue charging until the reading drops below 5 A or replace the battery with one that is fully charged and then repeat the test.

Regulated voltage . . . . . 14.4 V ± 0.5 at 20°C (68°F)



HANDLING PRECAUTIONS

1. Make sure that alternator, battery, etc., are connected properly. If battery polarity is reversed, excessive current will flow from battery to alternator, and damage to diodes or wiring harness could result.
2. Do not disconnect battery terminals while engine is running. Surge voltage will be produced which could cause deterioration of diodes or transistors.
3. When battery is to be quick-charged, be sure to disconnect battery terminals first. If terminals are not disconnected, damage to diodes could result.
4. When a steam cleaner is used, make sure that alternator is not directly exposed to steam.

IGNITION SYSTEM

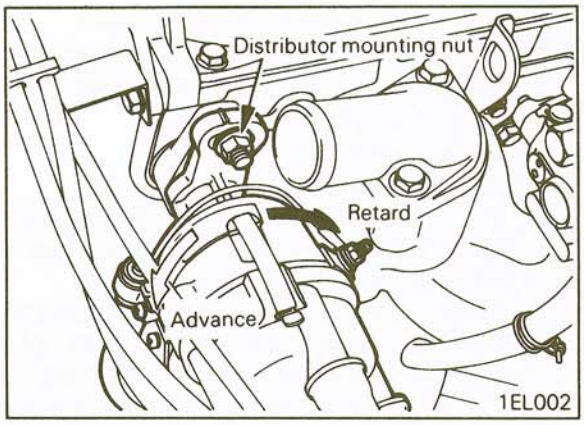
Ignition Timing Adjustment

Adjustment condition
Coolant temperature: 80 to 90°C (170 to 190°F)
Lights and all accessories: OFF
Transmission: N (Neutral)

1. Start engine and run at curb idle speed.
2. Connect tachometer and timing light.
3. Check basic ignition timing and adjust if necessary.

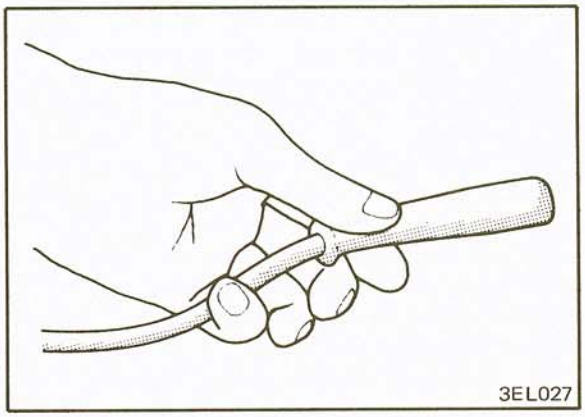
Basic ignition timing	7 ± 2° BTDC

4. To adjust ignition timing, loosen distributor mounting nut and turn distributor housing. (1EL002)
5. After adjustment, securely tighten mounting nut.

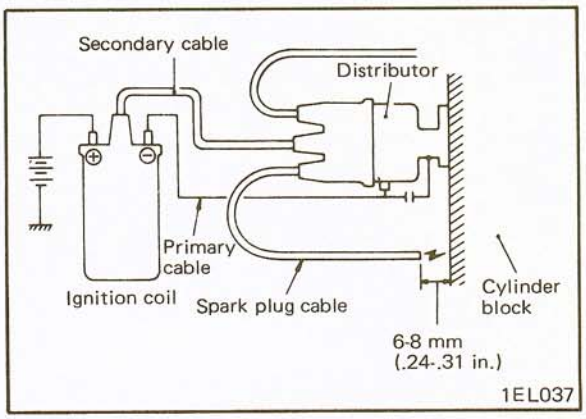


SPARK PLUG CABLE TEST

1. Disconnect spark plug cable from spark plug.
   When spark plug cable is pulled out, be sure to pull by the cable cap. If spark plug is removed by pulling on cable only open circuit might result.



2. Hold the spark plug cable about 6-8 mm (.24-.31 in.) away from engine proper (grounding portion such as cylinder block) and crank engine to verify that sparks are produced.



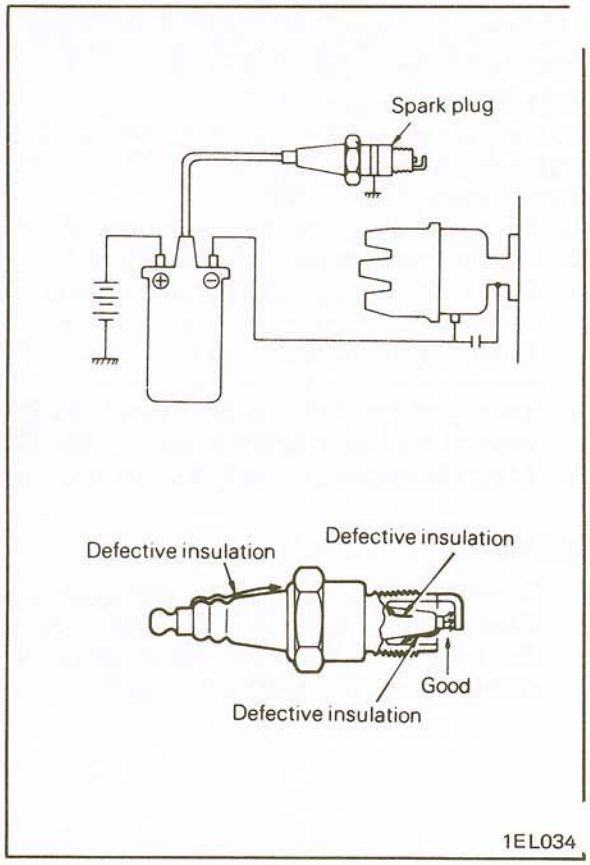
SPARK PLUG INSPECTION AND TEST

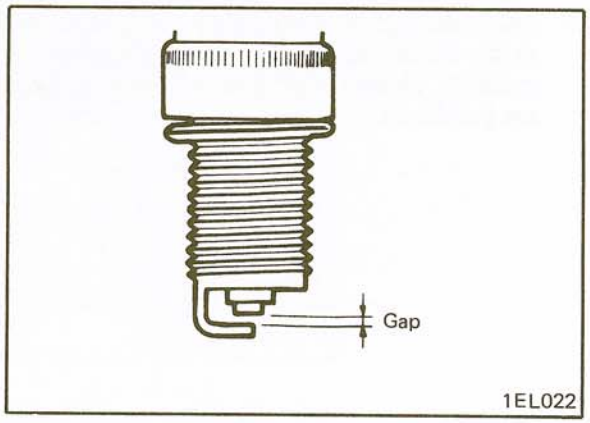
1. Remove the spark plugs from the engine.
2. Visually check the spark plugs for the following and replace if defective.
   - Broken insulator.
   - Worn electrode.
   - Deposited carbon. Use a plug cleaner for cleaning. Clean porcelain insulator above shell as well.
   - Damaged or broken gasket.
   - Burnt condition of porcelain insulator at spark gap. If black carbon deposit is evident, probable cause is too rich a fuel mixture or extremely low air intake. Misfiring due to excessive spark gap is also suspected. If insulator is burnt white, too lean a fuel mixture, excessively advanced ignition timing, improperly tightened plug, etc. are suspected.
3. Connect the spark plug to the high tension cable, ground outer electrode (main body), and crank engine. In the atmosphere, only short sparks are produced because of small discharge gap. If the spark plug is good, however, sparks will occur in discharge gap (between electrodes). In a defective spark plug, no sparks will occur because of leak of insulation puncture.
4. Check plug gap with plug gap gauge. If it is not within specified limit, adjust by bending ground electrode. Make sure that the gap of even a new spark plug is checked before spark plug is mounted to engine.

Spark plug gap	1.0-1.1 mm (.039-.043 in.)

5. Install the spark plug and tighten to specified torque. If it is overtorqued, damage to threaded portion of cylinder head might result.

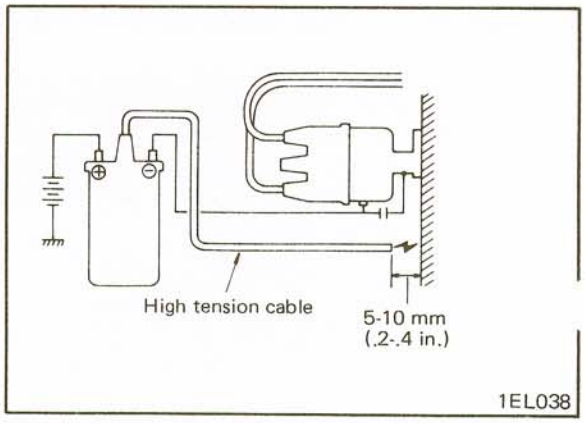
Spark plug	20-29 Nm (15-21 ft.lbs.)





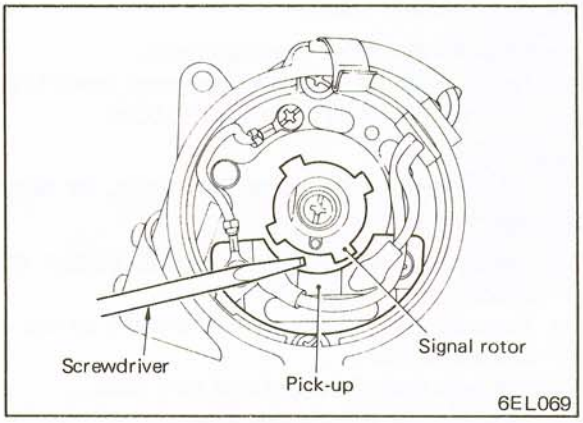
Spark Test Without Cranking

If spark test is performed by cranking while the catalyst is hot, unburned gas will be supplied to the catalyst, and this is not desirable to the catalyst.
For this reason, use the following methods which allow spark test to be performed without cranking.



Remove the distributor cap.

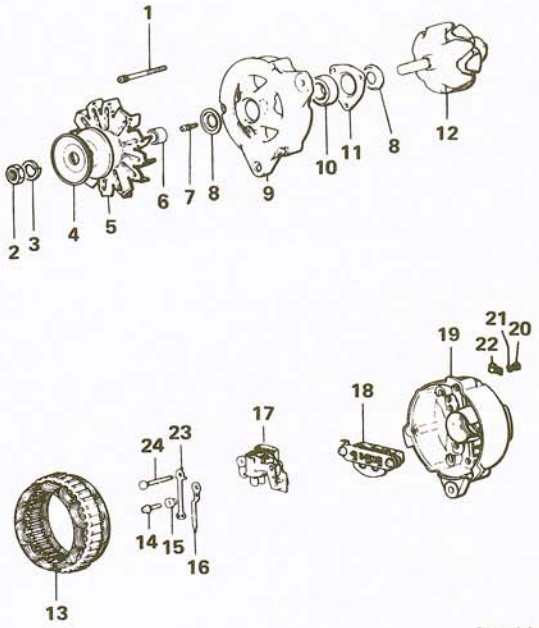
2. Check signal rotor position in relation to the pick-up. If it is not the position shown in the illustration (6EL069), turn the crankshaft manually so that the projection of the signal rotor is moved away from the center part of the pick-up. In other words, the signal rotor should be positioned so that current can flow to the ignition coil.
3. Disconnect the high-tension cable from the center tower of the distributor cap, and hold the end of the cable about 5 to 10 mm (.2 to .4 in.) away from the cylinder block of the engine. (1EL038)
4. Turn the ignition switch to "ON". Then, when a piece of metal (the tip of a screwdriver for instance) is inserted into the detection coil of the pick-up and then moved away, a spark can be generated. (6EL069)



CHARGING SYSTEM

COMPONENTS

1. Through bolt (3)
2. Nut
3. Spring washer
4. Pulley
5. Fan
6. Collar
7. Screw (3)
8. Seal (2)
9. Front bracket
10. Bearing
11. Retainer
12. Rotor
13. Stator
14. Screw
15. Insulator
16. Plate "L"
17. Brush holder and regulator
18. Rectifier
19. Rear bracket
20. Nut
21. Washer
22. Condenser
23. Plate "B"
24. Screw ("B"-terminal)



REMOVAL

1. Disconnect battery ground cable.
2. Remove the drive belt. See "Cooling system", Group 7, for detailed procedure.
3. Disconnect wiring and connector from the alternator.
4. Remove the brace bolt and support bolt and remove alternator from engine.

DISASSEMBLY

1. Remove the three through bolts.
2. Insert plain screwdriver between front bracket and stator core and pry downward. (3EL029)

Caution

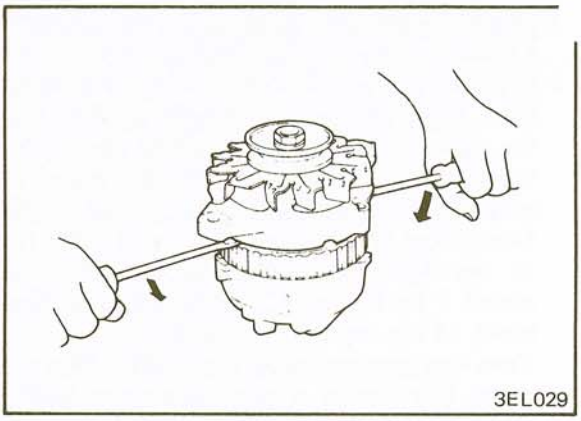
Do not insert screwdriver too deep, as there is danger of damage to stator coil.

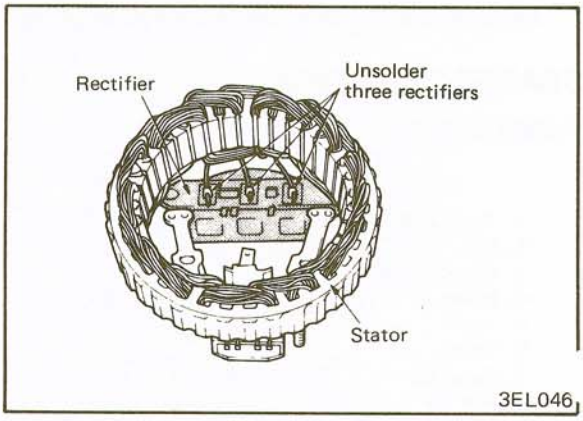
3. Clamp the rotor in a vise with pulley side up (protect rotor from vise jaws).
4. Remove pulley nut. Then remove spring washer, pulley, fan and collar.
5. Remove front bracket and two seals.
6. Remove the rotor from vise.
7. Remove the nut from "B" terminal and remove the washer and condenser.
8. Remove the brush holder screw and rectifier screws.
9. Remove the stator assembly from the rear bracket.
10. When stator is to be removed, unsolder three stator leads soldered to main diodes on rectifier. (3EL046)

Caution

1. **When soldering or unsoldering, use care to make sure that heat of soldering iron is not transmitted to diodes for a long period. Finish soldering or unsoldering in as short a time as possible.**
2. **Use care that no undue force is exerted to leads of diodes.**

11. When separate the rectifier from brush holder, unsolder two plates soldered to rectifier.


3EL029



3EL046

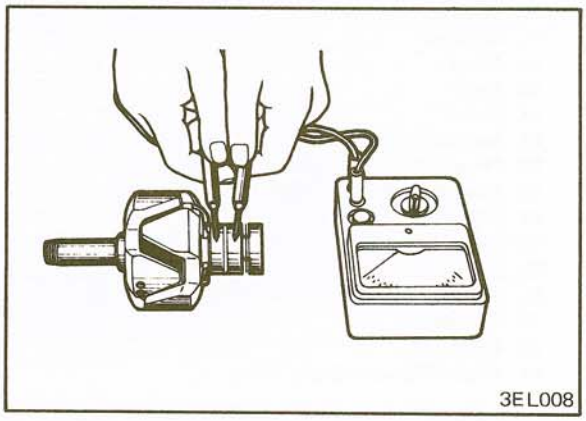
INSPECTION

Rotor

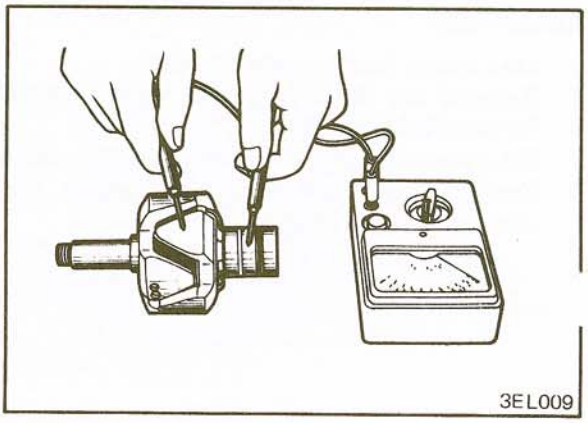
1. Check rotor coil for continuity. Check to ensure that there is continuity between slip rings.

Resistance value	2.5-4Ω

If resistance is extremely small, it means that there is a short. If there is no continuity or if there is short circuit, replace rotor assembly.


3EL008

2. Check rotor coil for grounding. Check to ensure that there is no continuity between slip ring and core. If there is continuity, replace rotor assembly.

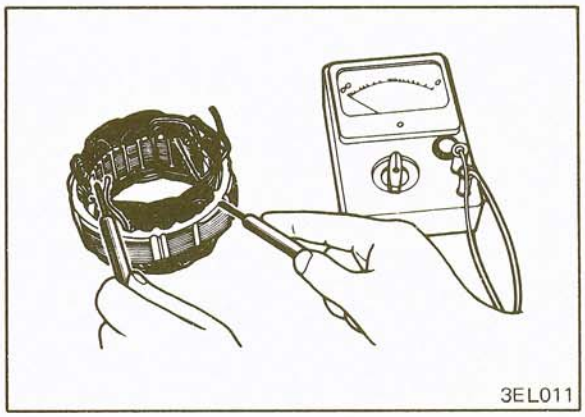

3EL009

.ator

1. Make continuity test on stator coil. Check to ensure that there is continuity between coil leads.
   If there is no continuity, replace stator assembly.


3EL010

2. Check coil for grounding. Check to ensure that there is no continuity between coil and core. If there is continuity, replace stator assembly.


3EL011

Rectifier

1. (+) HEATSINK ASSEMBLY TEST

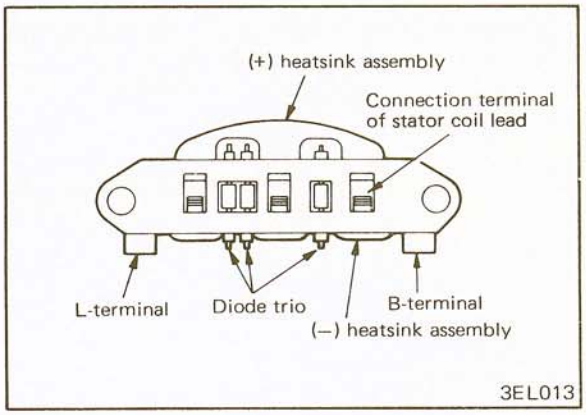
   Check for continuity between (+) heatsink and stator coil lead connection terminal with a circuit tester. If there is continuity in both directions, diode is shorted. Replace rectifier assembly.

2. (–) HEATSINK ASSEMBLY TEST

   Check for continuity between (–) heatsink and stator coil lead connection terminal. If there is continuity in both direction, diode is shorted, and rectifier assembly must be replaced.

3. DIODE TRIO TEST

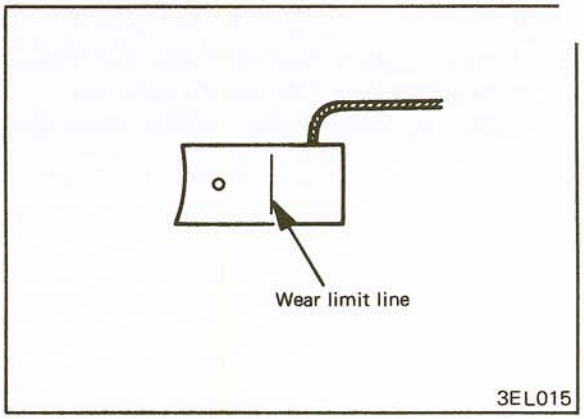
   Check three diodes for continuity by connecting a circuit tester to both ends of each diode. If there is no continuity or no continuity in both directions, diode is defective and heatsink assembly must be replaced.



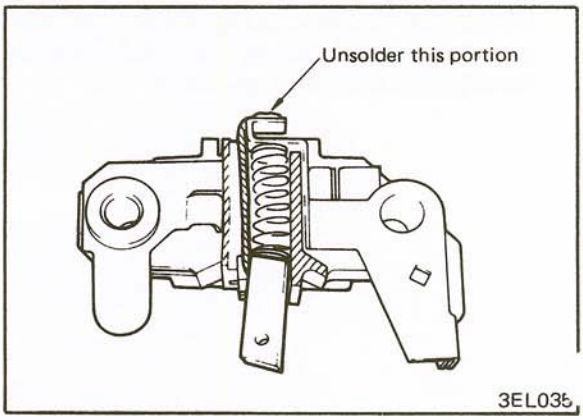
3EL013

BRUSH REPLACEMENT

1. Brush worn down to wear limit line should be replaced.

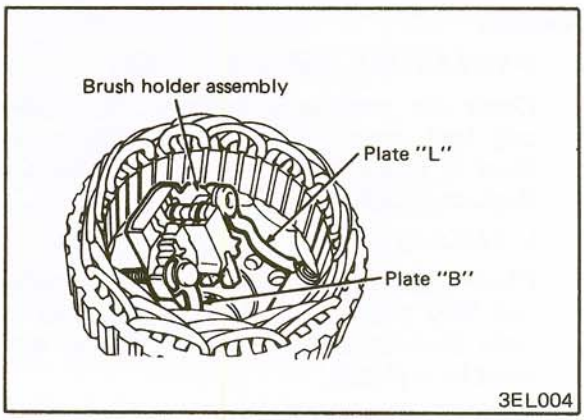


2. If pigtail is unsoldered, brush and spring will come off.

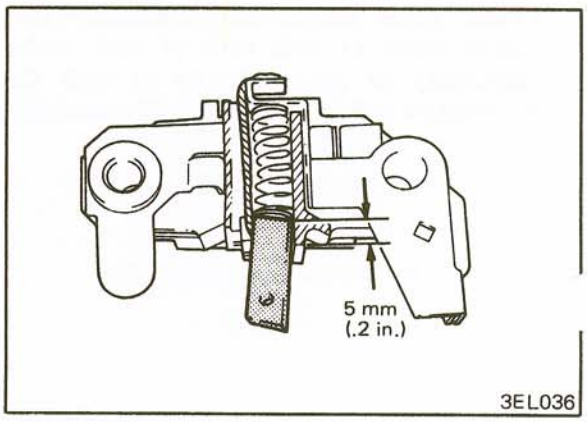


3. When only brush or brush spring is to be replaced, it can be replaced without removing stator, etc. With brush holder assembly raised as illustrated, unsolder pigtail of brush.

NOTE
If L- and B-terminals of rectifier assembly are bent, damage to rectifier moulding might result. Therefore, plates "B" and "L" should be gently bent at center.



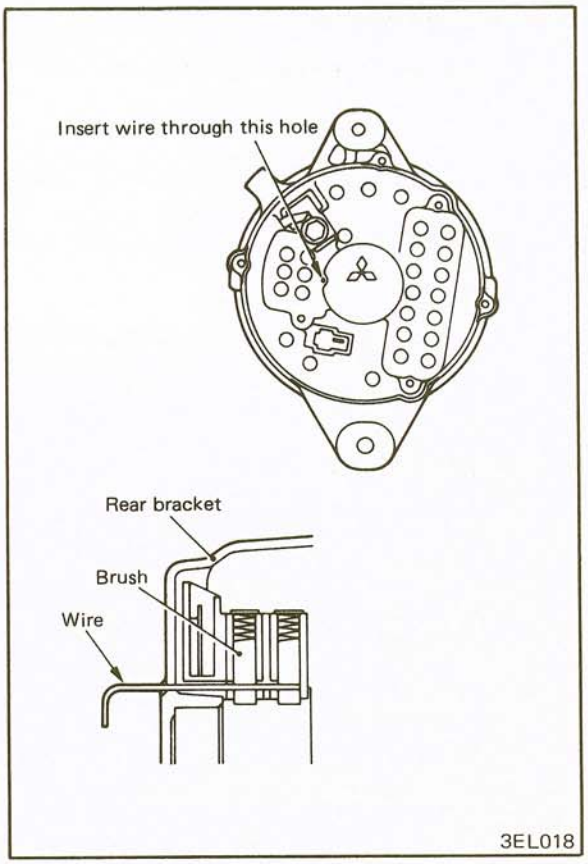
4. When installing new brush, solder pigtail so that brush will be pressed into holder about 5 mm (.2 in.).



EASSEMBLY

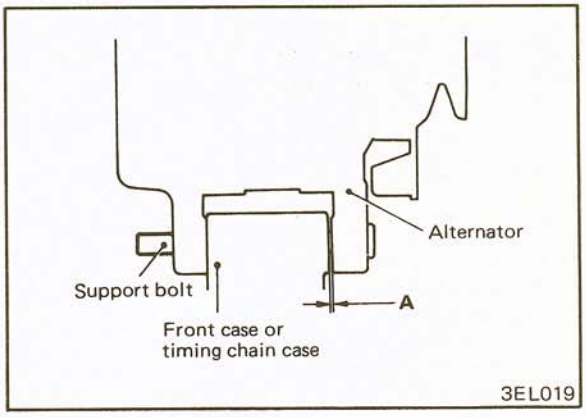
Perform reassembly in reverse procedure of disassembly, pay attention to the following item:

1. Before rotor is attached to rear bracket, insert wire through small hole made in rear bracket to lift brush. After rotor has been installed, the wire can be removed.



INSTALLATION

1. Install the alternator to the engine front case and insert the support bolt through the alternator leg into front case. Do not install the nut.
2. Install the brace bolt but do not tighten the bolt.
3. Push alternator toward front of engine and check clearance "A" between alternator leg and front case or timing chain case. If clearance is more than 0.2 mm (.008 in.), insert spacers [0.198 mm (.0078 in.) thick] as required. If support bolt is tightened without reducing clearance "A", alternator leg might be broken.
4. Install the washer and nut to the support bolt.
5. Install drive belt and adjust the drive belt tension.
6. Tighten first the brace bolt and then tighten the support bolt nut to the specified torque.



Tightening torque:
Alternator brace bolt ..... 12-14 Nm (9-10 ft.lbs.)
Alternator support bolt nut .....
20-24 Nm (15-18 ft.lbs.)

---

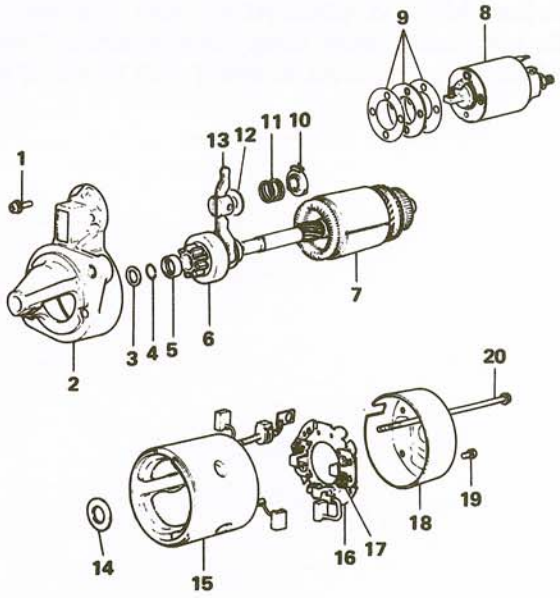
7. Connect wiring and connector to the alternator.
8. Connect the battery ground cable.

COMPONENTS

Direct drive type

1. Screw (2)
2. Front bracket
3. Washer
4. Snap ring
5. Stop ring
6. Overrunning clutch
7. Armature
8. Magnetic switch
9. Packing
10. Spring retainer
11. Lever spring
12. Spring seat
13. Lever
14. Washer
15. Yoke assembly
16. Brush holder
17. Brush spring
18. Rear bracket
19. Screw (2)
20. Through bolt (2)

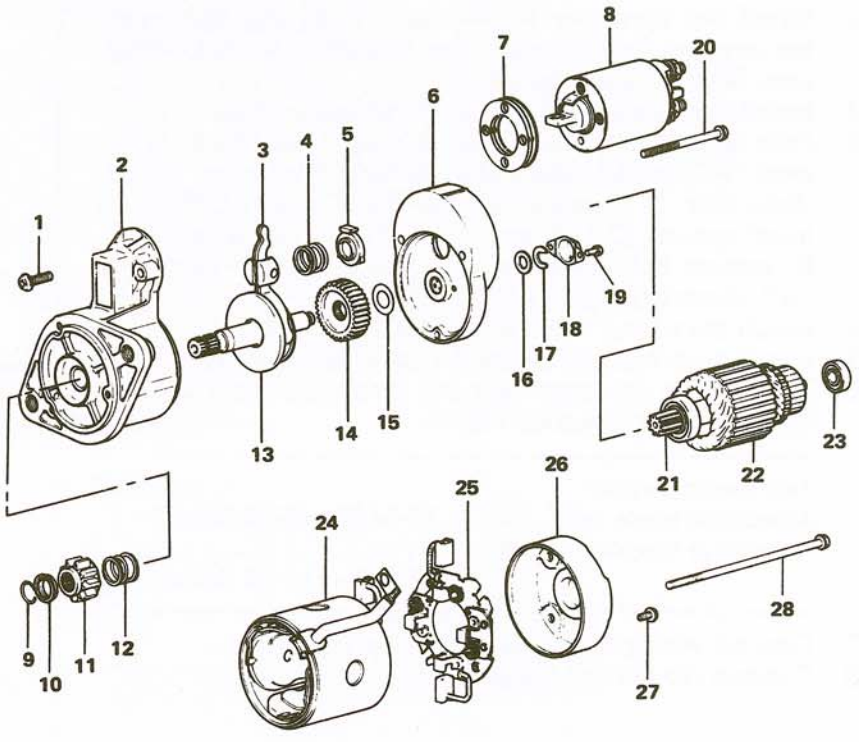
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.



6EL07C

Reduction drive type

1. Screw (2)
2. Front bracket
3. Lever
4. Spring
5. Spring retainer
6. Center bracket
7. Packing
8. Magnetic switch
9. Snap ring
10. Stop ring
11. Pinion gear
12. Spring
13. Pinion shaft and overrunning clutch
14. Reduction gear
15. Adjusting washer
16. Washer
17. Retaining ring
18. Cover
19. Screw (2)
20. Bolt
21. Front ball bearing
22. Armature
23. Rear ball bearing
24. Yoke assembly
25. Brush holder
26. Rear bracket
27. Screw (2)
28. Through bolt (2)



6EL002

EMOVAL

1. Disconnect battery ground cable.
2. Disconnect starting motor harness from the starter motor.
3. Remove the two starting motor mounting bolts and remove starter motor.

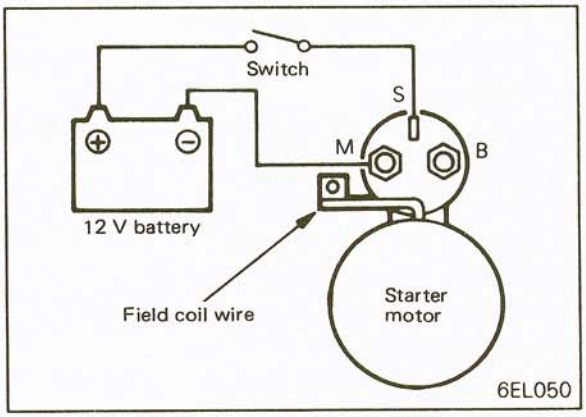
INSPECTION (after removal)

Pinion Gap Adjustment

1. Disconnect field coil wire from M-terminal of magnetic switch.
2. Connect a 12 V battery between S-terminal and M-terminal. (6EL050)
3. Set switch to "ON", and pinion will move out.

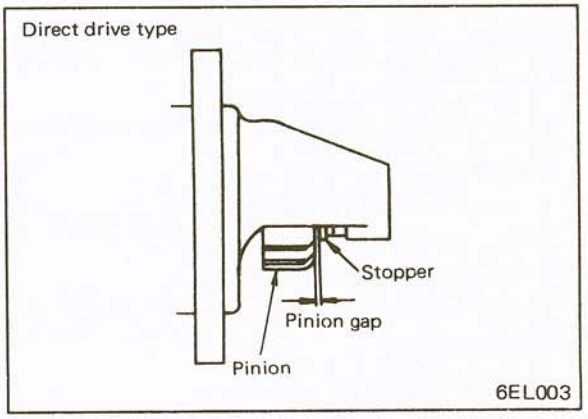
Caution

This test must be performed quickly (in less than 10 seconds) to prevent coil from bourning.

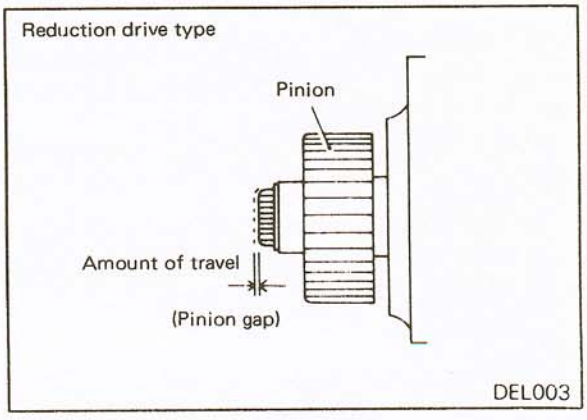


4. Check pinion to stopper clearance (pinion gap) with a feeler gauge. (6EL003)
   If pinion gap is out of specification, adjust by adding or removing washers between magnetic switch and front bracket.

Pinion gap	0.5-2.0 mm (.020-.079 in.)



5. Lightly push back the pinion, and measure the amount of travel, which represents the pinion gap. Adjust the thickness (number) of washers at switch area so that the gap becomes 0.5 to 2.0 mm (.020 to .079 in.).

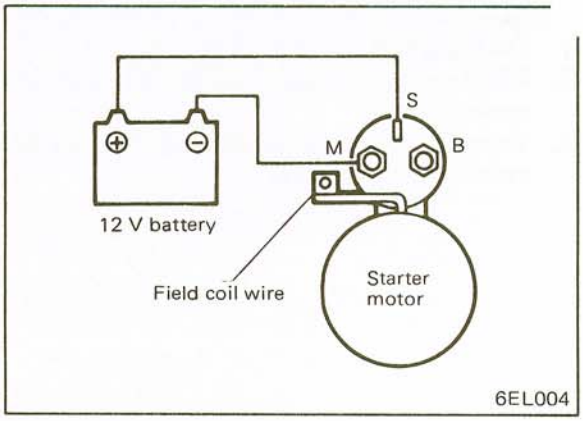


Pull-in Test of Magnetic Switch

1. Disconnect field coil wire from M-terminal of magnetic switch.
2. Connect a 12 V battery between S-terminal and M-terminal. (6EL004)

Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

3. If pinion moves out, then pull-in coil is good. If it doesn't, replace magnetic switch.

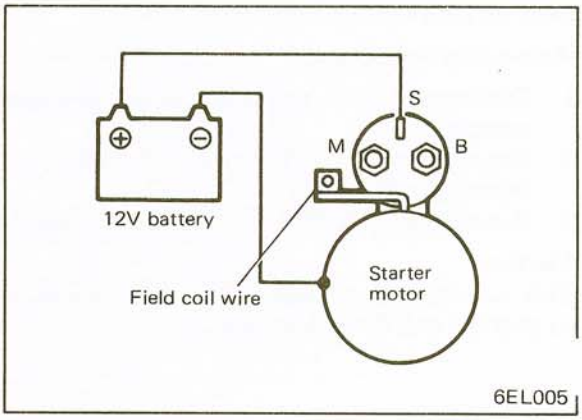


Hold-in Test of Magnetic Switch

1. Disconnect field coil wire from M-terminal of magnetic switch.
2. Connect a 12 V battery between S-terminal and body. (6EL005)

Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

3. If pinion remains out, everything is in order. If pinion moves in, hold-in circuit is open. Replace magnetic switch.

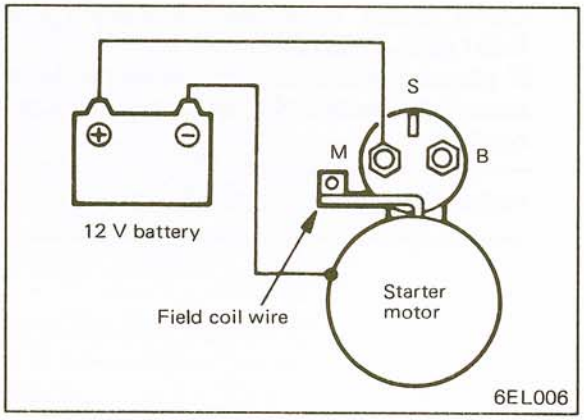


Return Test of Magnetic Switch

1. Disconnect field coil wire from "M" terminal of magnetic switch.
2. Connect a 12 V battery between M-terminal and body. (6EL006)

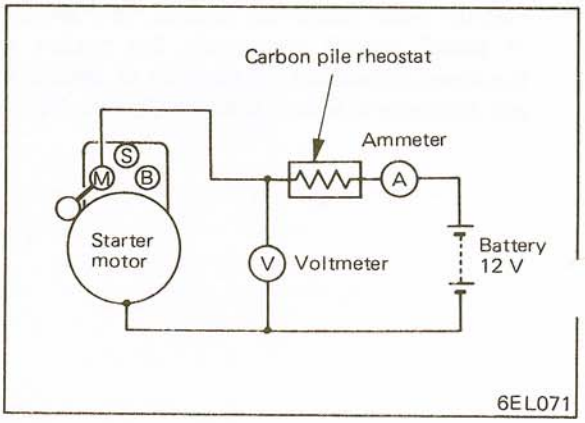
Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

3. Pull pinion out and release. If pinion quickly returns to its original position, everything is in order. If it doesn't replace magnetic switch.



Free Running Test

1. Place starter motor in a vise equipped with soft jaws and connect a fully-charged, 12 volt battery to starter motor as follows:
2. Connect a test ammeter (100 amperes scale) and carbon pile rheostat in series with battery positive post and starter motor terminal.
3. Connect a voltmeter (15 volt scale) across starter motor.
4. Rotate carbon pile to full-resistance position. (6EL071)



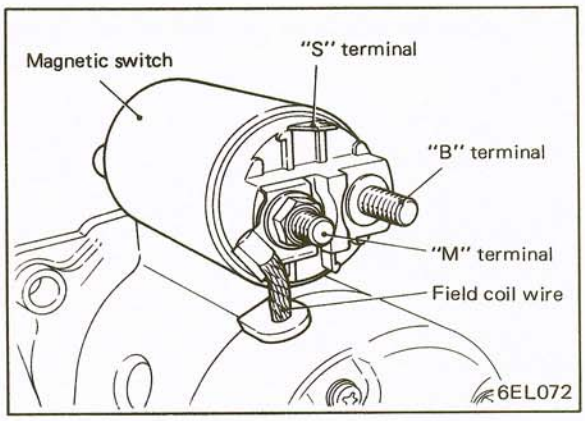
Connect battery cable from battery negative post to starter motor body.

6. Adjust rheostat until battery voltage shown on voltmeter reads 11.5 volts.
7. Check specifications for maximum amperage draw and minimum rpm.

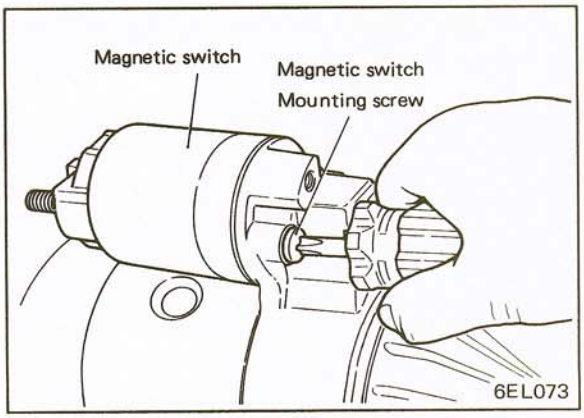
Voltage	11.5 Volts
Amperage draw	60 Amps
Minimum rpm	6,800 rpm

DISASSEMBLY-DIRECT DRIVE TYPE

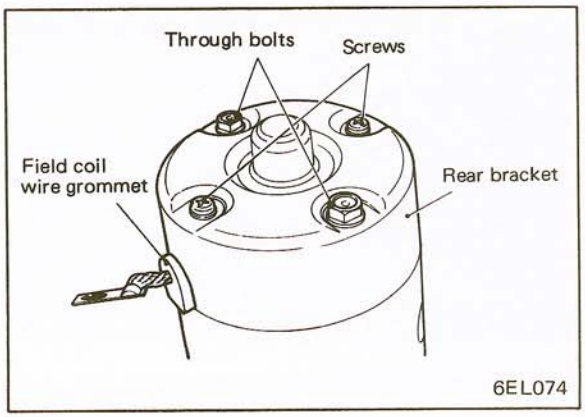
1. Disconnect field coil wire from "M" terminal of magnetic switch.



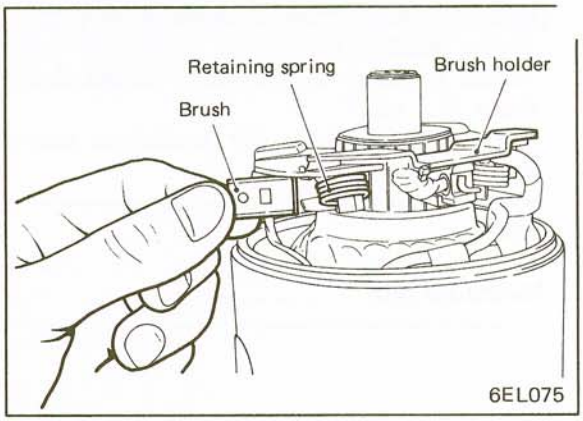
2. Remove two magnetic switch mounting screws and remove magnetic switch.



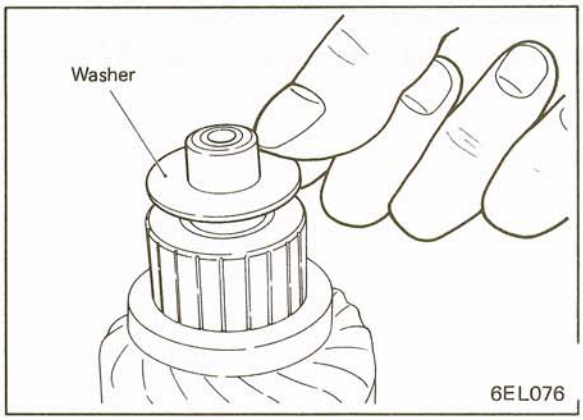
3. Remove two through bolts and two screws.
4. Remove rear bracket.



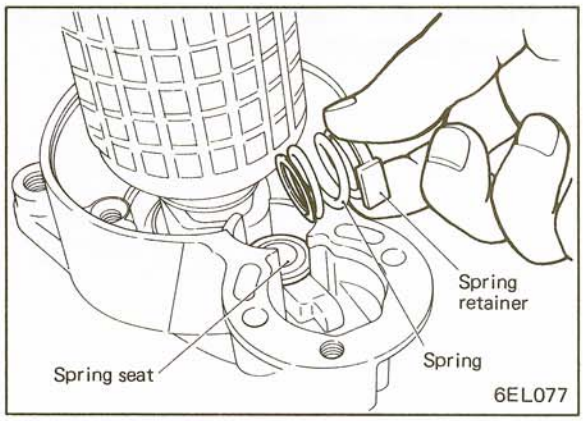
5. Slide the two brushes from brush holder by prying retaining springs back.
6. Remove brush holder.
7. Remove yoke assembly.



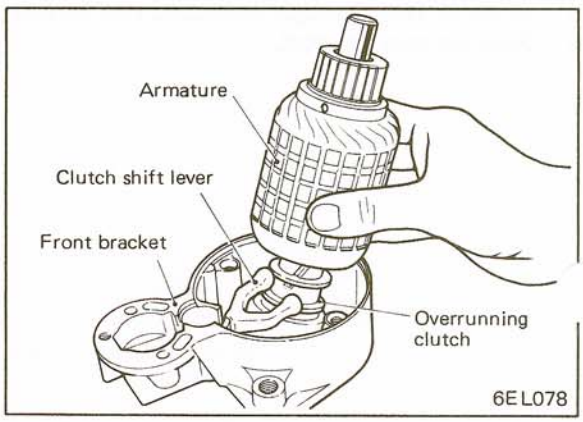
8. Remove washer from rear end of armature.



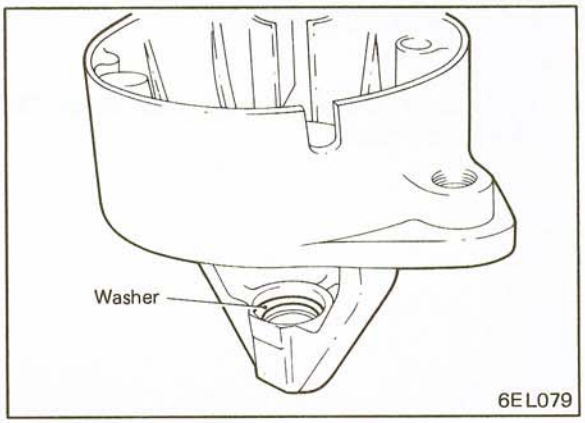
9. Remove spring retainer, spring and spring seat from front bracket.



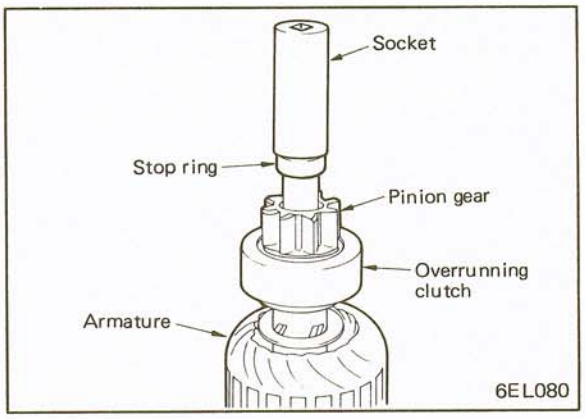
10. Remove armature assembly and lever from front bracket.



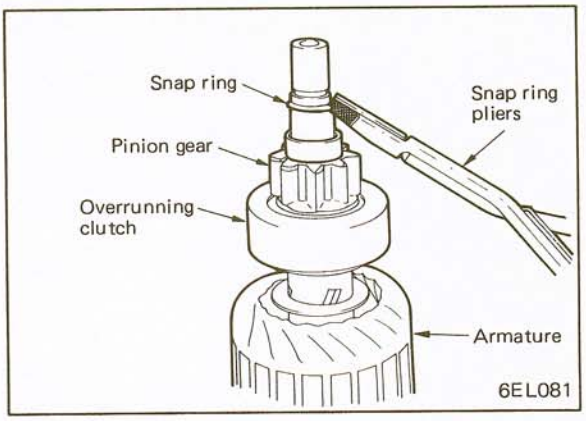
. Remove washer from front bracket.



12. Press stop ring off snap ring with suitable socket.



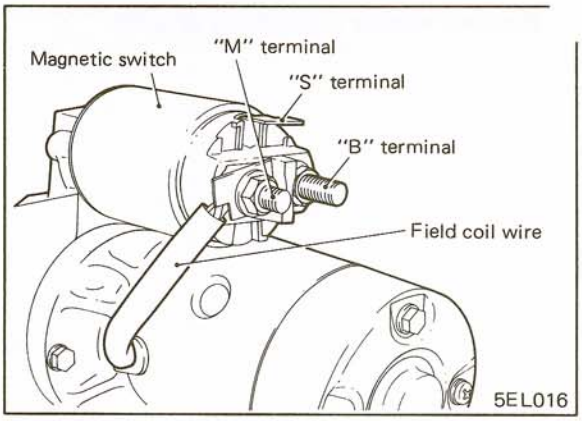
13. Remove snap ring with snap ring pliers and then remove stop ring and overrunning clutch.



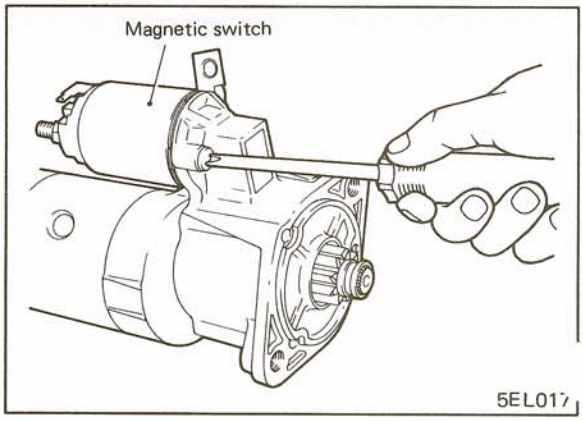
DISASSEMBLY-REDUCTION

Drive Type

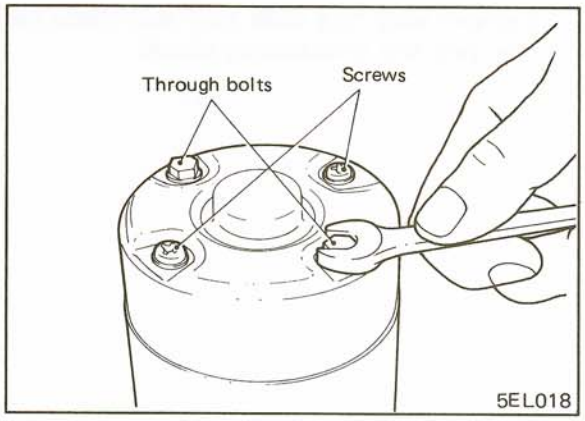
1. Disconnect the field coil wire from "M" terminal of magnetic switch.



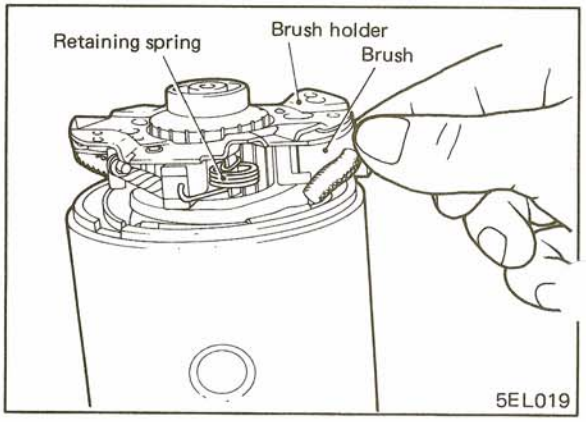
2. Remove the two magnetic switch mounting screws and remove the magnetic switch.



3. Remove the two through bolts and two screws, and then remove the rear bracket.

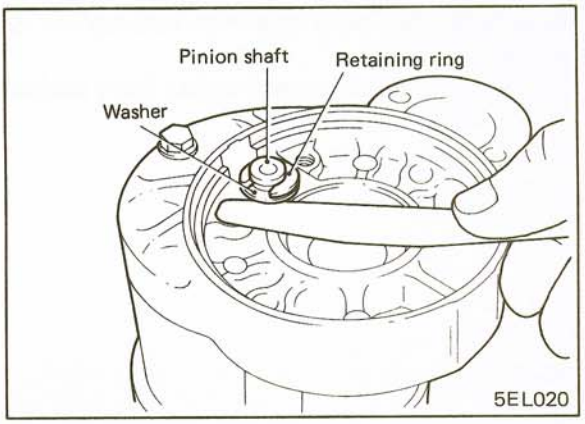


4. Slide the two brushes from brush holder by prying retaining springs back, and then remove the brush holder assembly.
5. Remove the yoke assembly.
6. Remove the armature.

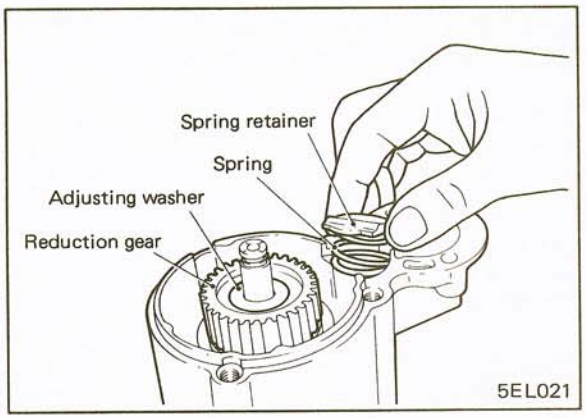


Remove the pinion shaft end cover from the center cover.

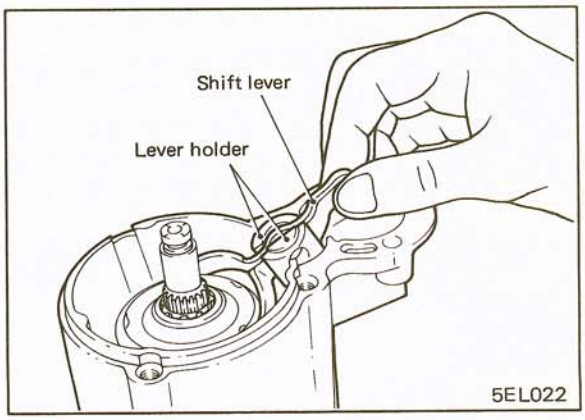
8. Measure the pinion shaft end play using feeler gauge for reassembly.
9. Remove the retaining ring and washer from the pinion shaft.
10. Remove the center bracket.



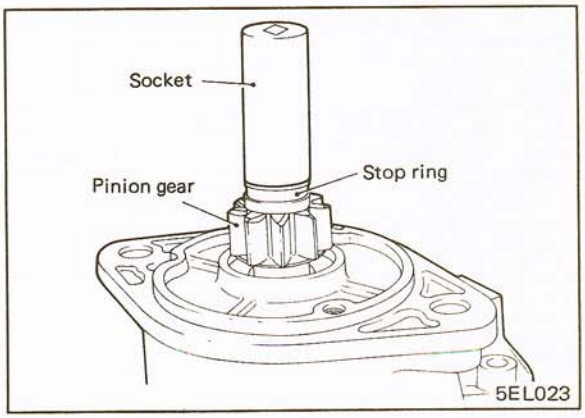
11. Remove the lever spring retainer and spring.
12. Remove the adjusting washer and reduction gear.



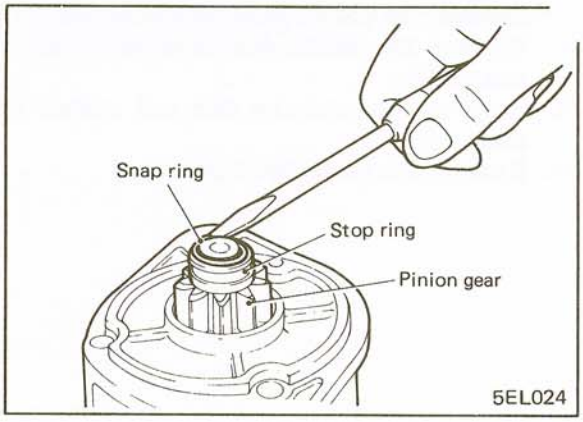
13. Remove the clutch shift lever and two lever holder.



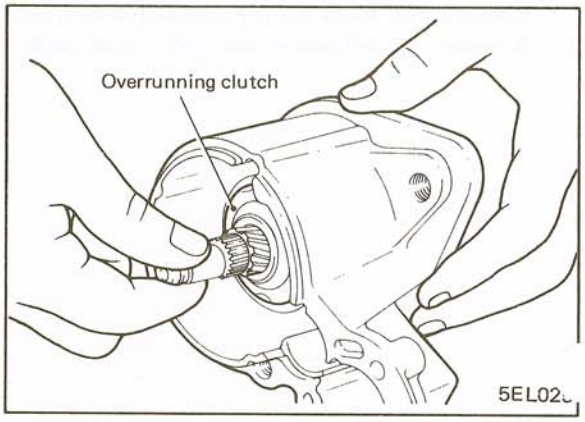
14. Press the stop ring off the snap ring with suitable socket.



15. Remove the snap ring with screwdriver, and then remove the stop ring.
16. Remove the pinion and spring from pinion shaft.



17. Remove the overrunning clutch from the front bracket.

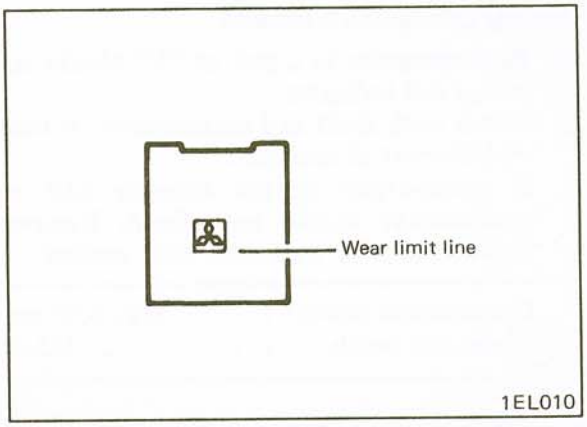


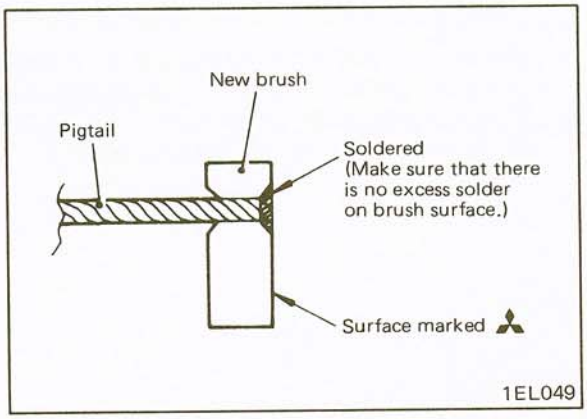
CLEANING STARTER MOTOR PARTS

1. Do not immerse parts in cleaning solvent. Immersing the yoke and field coil assembly and/or armature will damage insulation. Wipe these parts with a cloth only.
2. Do not immerse drive unit in cleaning solvent. Overrunning clutch is pre-lubricated at the factory and solvent will wash lubrication from clutch.
3. The drive unit may be cleaned with a brush moistened with cleaning solvent and wiped dry with a cloth.

RUSHES AND SPRINGS-REPLACEMENT

1. Brushes that are worn beyond wear limit line, or are oil-soaked, should be replaced.
2. When replacing field coil brushes, crush worn brush with pliers, taking care not to damage pigtail.
3. Sand pigtail end with sandpaper to ensure good soldering.
4. Insert pigtail into hole provided in new brush and solder it. Make sure that pigtail and excess solder do not come out onto brush surface.
5. When replacing ground brush, slide the brush from brush holder by prying retaining spring back.

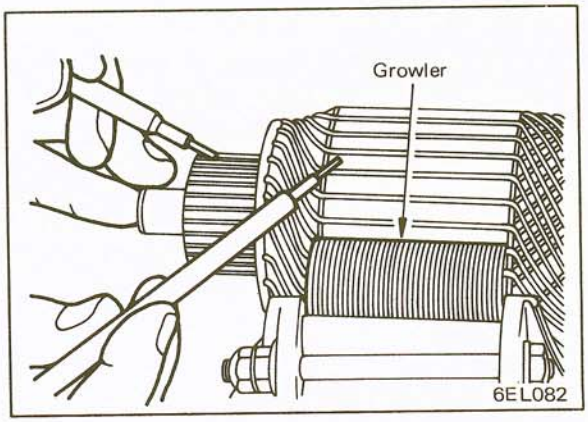




TESTING ARMATURE

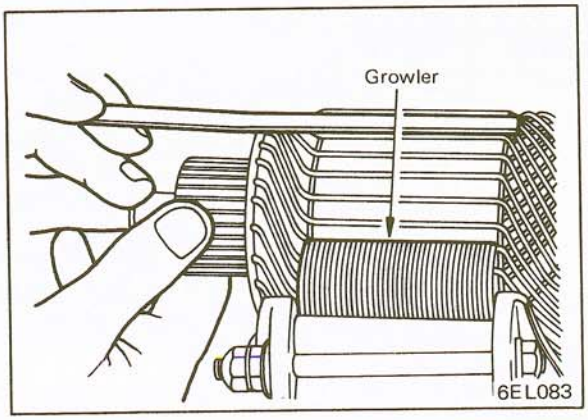
Testing Armature for Short Circuit

1. Place armature in a growler.
2. Hold a thin steel blade parallel and just above while rotating armature slowly in growler. A shorted armature will cause blade to vibrate and be attracted to the core. Replace shorted armature.



Testing Armature for Grounding

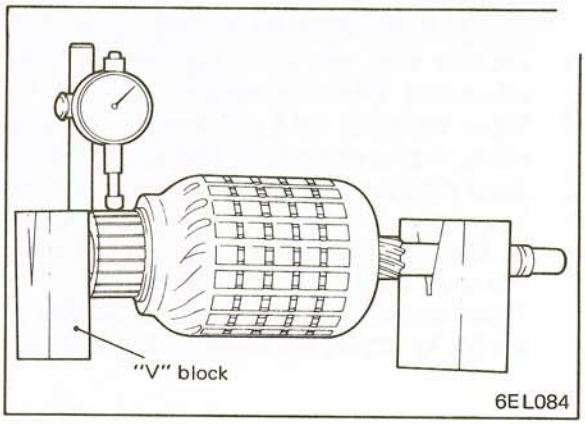
1. Touch armature coil core and the end of each commutator bar with a pair of test lamp prods.
2. If lamp lights, it indicates a grounded armature. Replace grounded armature.



Testing Commutator Runout

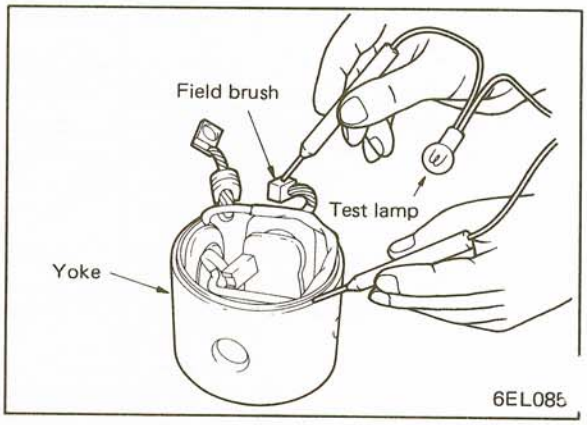
1. Place armature in a pair of "V" blocks and check runout with a dial indicator.
2. Check both shaft and commutator. A bent shaft requires replacement of armature.
3. If commutator runout exceeds 0.05 mm (.002 in.), commutator should be refaced. Remove only enough metal to provide a smooth, even surface.

Commutator runout	Max 0.05 mm (.002 in.)
Under cut depth	0.5 mm (.02 in.)



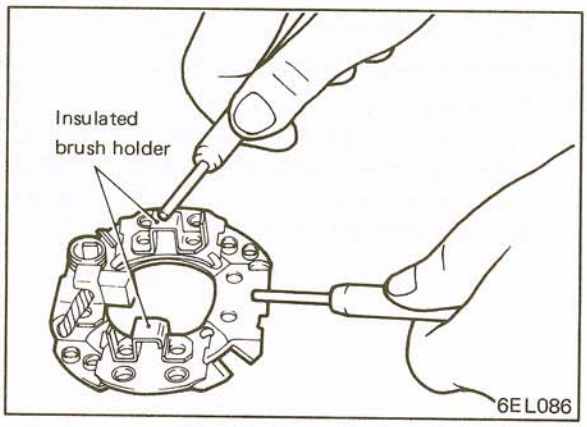
TESTING FIELD COILS FOR GROUNDING

1. Touch one probe of test lamp to series field coil lead and other probe to yoke. Lamp should not light.
   If lamp lights, coils are grounded. If field coils are grounded, replace field coil and yoke assembly.



TESTING BRUSH HOLDER

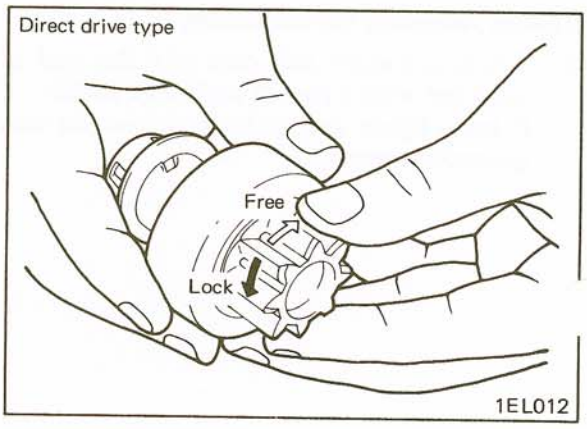
1. Touch each of the insulated brush holders with one test probe, while holding other test probe against brush holder plate.
2. The lamp should not light during this test since the brush holders are insulated. If the lamp lights brush holders on brush holder plate are grounded. Replace brush holder assembly if brush holders are grounded.

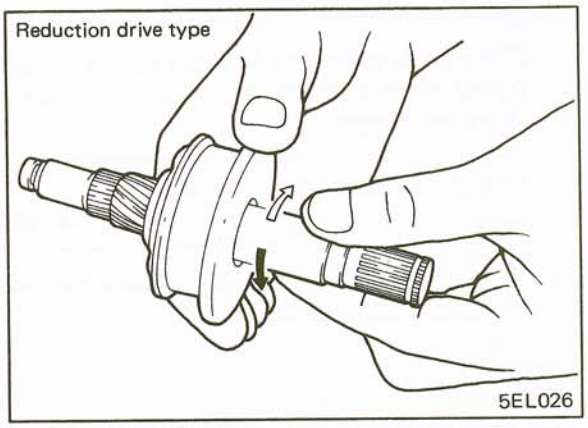


SERVICING DRIVE UNIT

Overrunning Clutch

1. While holding clutch housing, rotate the pinion. Drive pinion should rotate smoothly in one direction, but should not rotate in opposite direction. If clutch does not function properly, replace overrunning clutch assembly.
2. Inspect pinion for wear or burrs. If pinion is worn or burred, replace overrunning clutch assembly. If pinion is damaged, also inspect ring gear for wear or burrs.





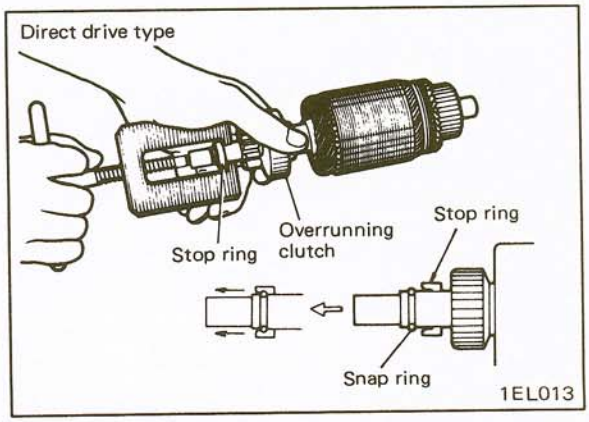
FRONT AND REAR BRACKET BUSHING-DIRECT DRIVE TYPE

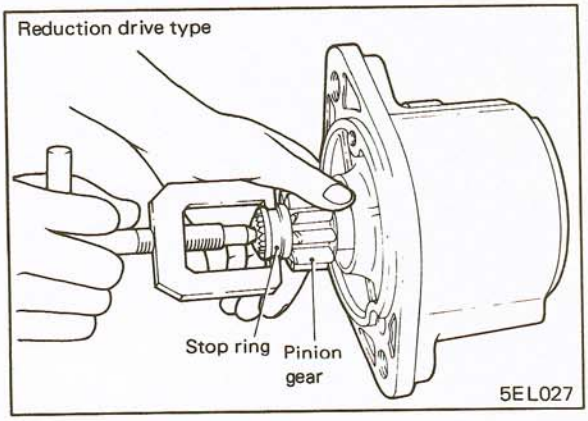
1. Inspect bushing for wear or burr. If bushing is worn or burred, replace front bracket assembly or rear bracket assembly.

REASSEMBLY

Reassemble starter motor in the reverse order of disassembly with the following exception.

1. Using a suitable pulling tool, pull overrunning clutch stop ring over snap ring.





INSTALLATION

1. Clean both surfaces of starter motor flange and rear plate.
2. Install starter motor to engine and tighten two bolts to specified torque.

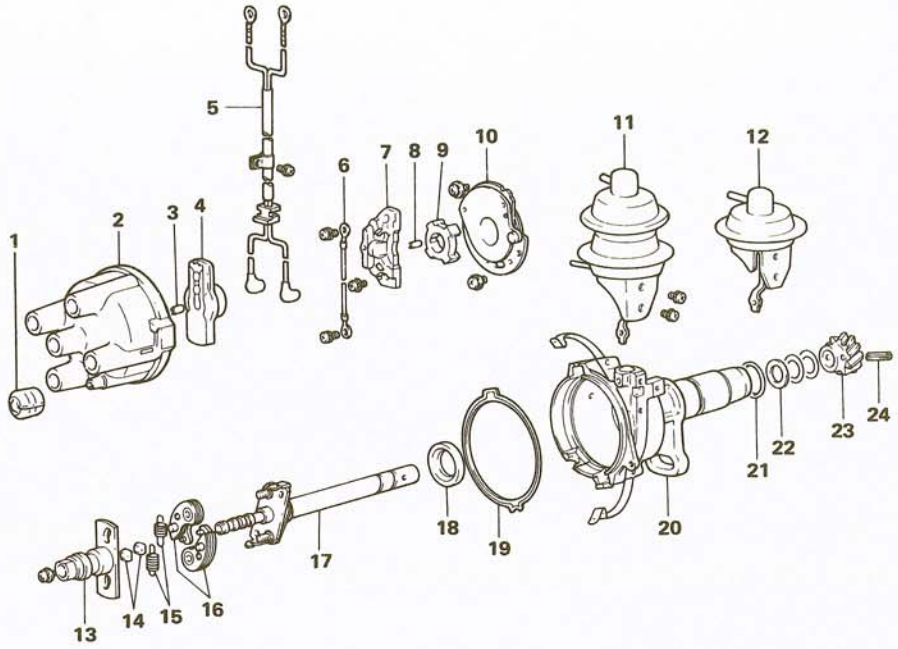
Starter motor mounting bolts	22-31 Nm (16-23 ft.lbs.)

3. Connect battery cable and switch wire to starter motor.
4. Connect battery ground cable.

OMPONENTS

1. Breather
2. Cap
3. Contact carbon
4. Rotor
5. Lead wire
6. Earth wire
7. Igniter
8. Pin
9. Rotor
10. Breaker base
11. Vacuum controller for dual diaphragm
12. Vacuum controller for single diaphragm
13. Rotor shaft
14. Spring retainer (2)
15. Governor spring (2)
16. Governor weight (2)
17. Distributor shaft
18. Oil seal
19. Packing
20. Distributor housing
21. O-ring
22. Washer
23. Gear
24. Pin

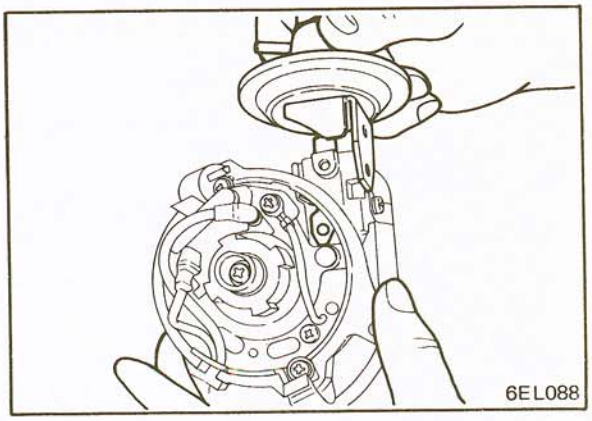
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.



6EL087

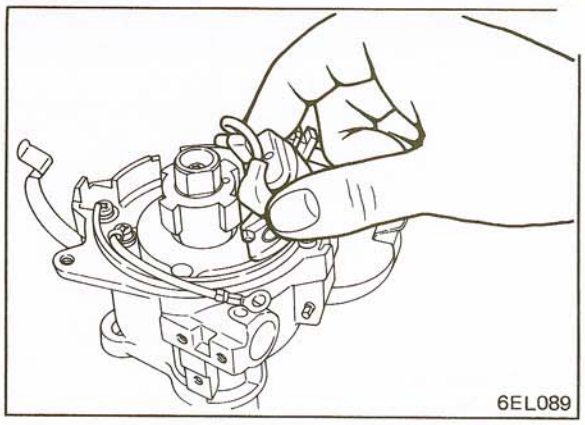
DISASSEMBLY

1. Lightly clamp distributor in a vise equipped with soft jaws.
2. Remove retaining clips and lift off distributor cap and seal ring.
3. Pull-off rotor from rotor shaft.
4. Remove two vacuum controller mounting screws.
5. Remove link of controller from pin on the breaker base, and then remove vacuum controller.

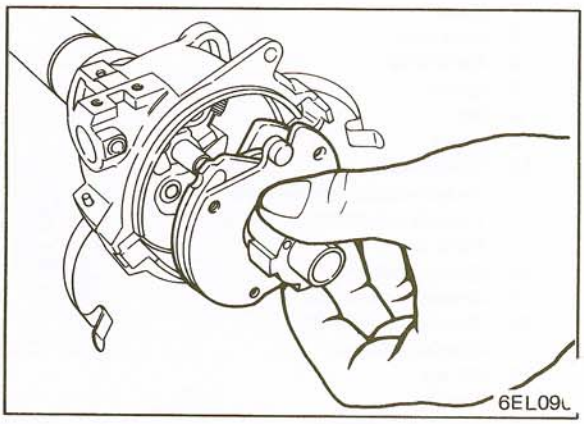


6EL088

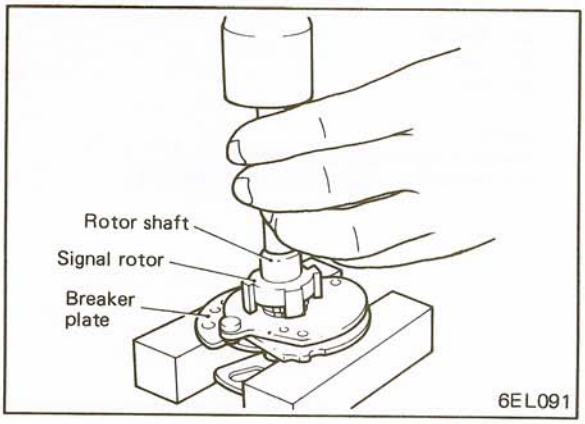
6. Remove two screws and remove igniter.
7. Remove lead wire (black).



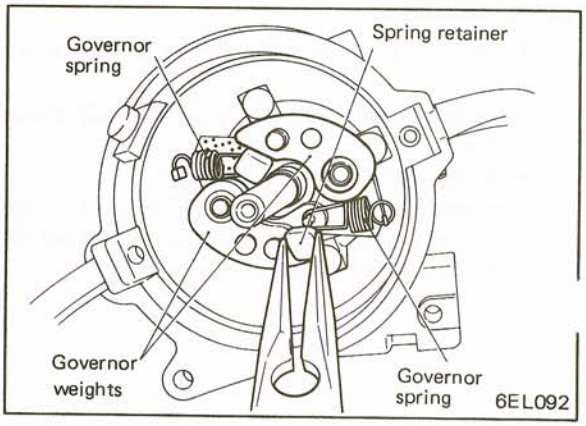
8. Remove signal rotor shaft tightening screw and two breaker plate retaining screws.
9. Remove signal rotor shaft and breaker plate assembly.



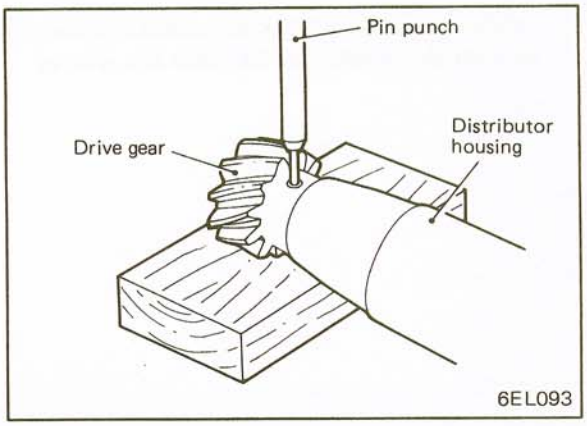
10. Remove signal rotor shaft from signal rotor.



11. Remove two spring retainers with pliers and then remove two governor springs.
12. Remove two governor weights.

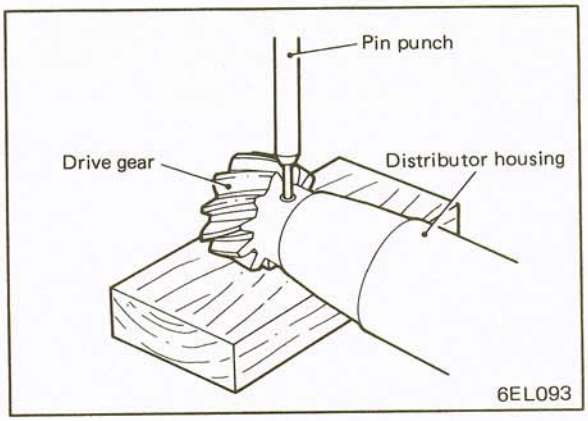


13. Mark location of drive gear on distributor shaft.
14. Place drive gear on soft base (wood block) so that roll pin can be removed.
15. Using a pin punch, remove roll pin.
16. Remove drive gear and washer.
17. Remove distributor shaft from housing.

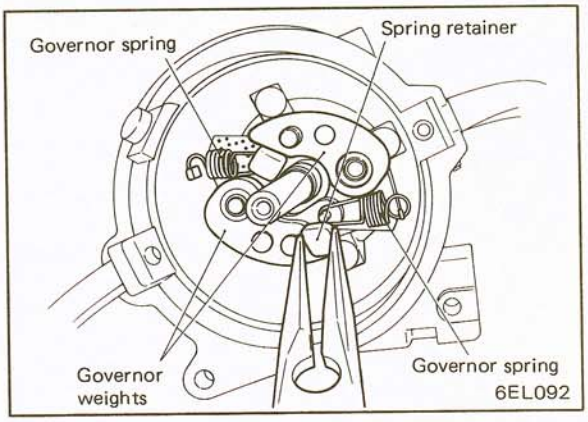


REASSEMBLY

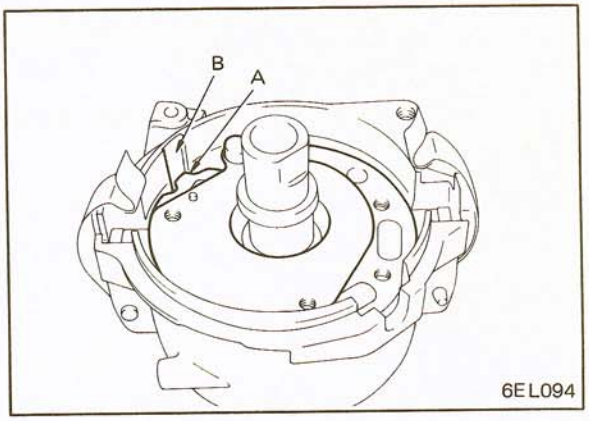
1. Clean and inspect all parts.
2. Install shaft into housing.
3. Install drive gear into distributor shaft at previously marked location. Then install new roll pin.



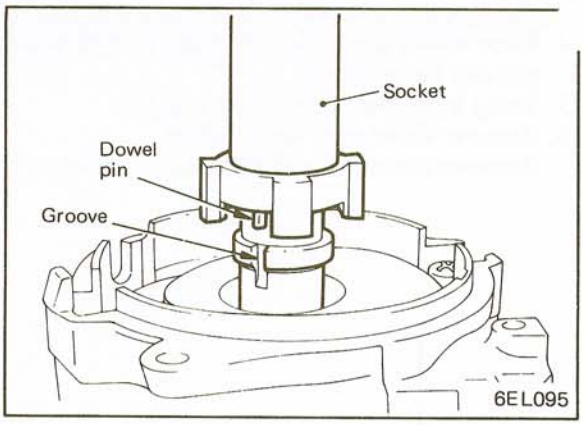
4. Install governor weights on the governor plate.
5. Install governor springs and spring retainer.



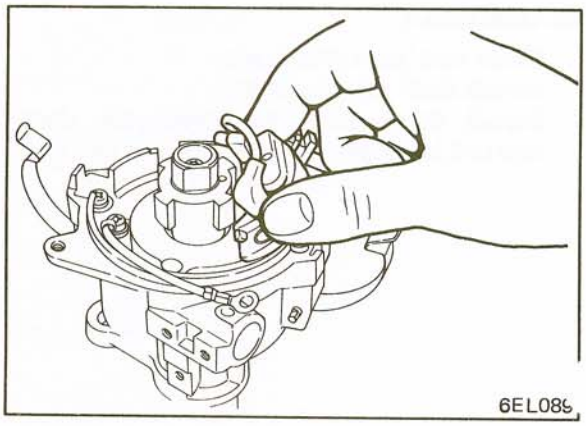
6. Install signal rotor shaft into distributor shaft.
7. Install breaker plate to housing. Position the breaker plate so that the projection (A) fits into the groove (B).
8. Tighten two breaker plate retaining screws.



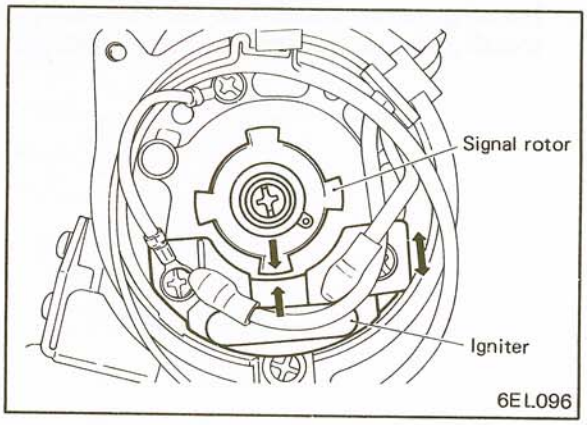
9. Install signal rotor to rotor shaft. Position the signal rotor so that the dowel pin fits into the groove.



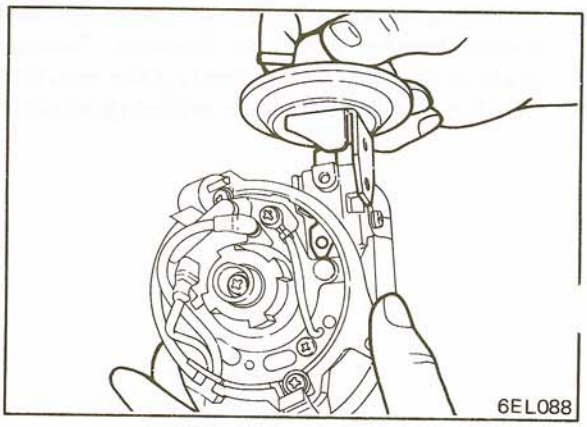
10. Install igniter to breaker plate and install two screws.
11. Connect one end of lead wire to igniter mounting screw and other end to breaker plate.



12. Adjust air gap between signal rotor and pick-up of igniter.

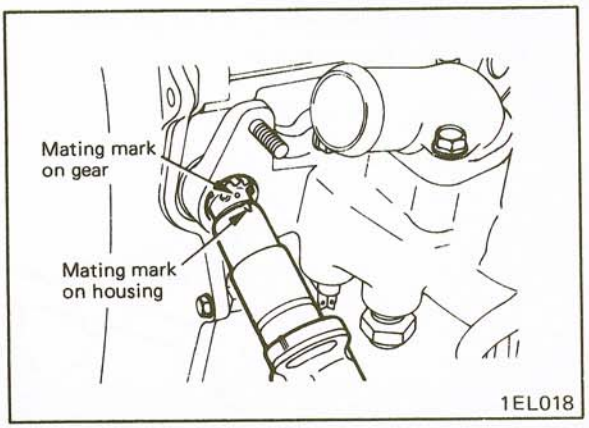


13. Connect vacuum control link to breaker plate and tighten two vacuum controller screws.
14. Install rotor to rotor shaft.
15. Install seal ring and distributor cap to housing and set the retaining clips.

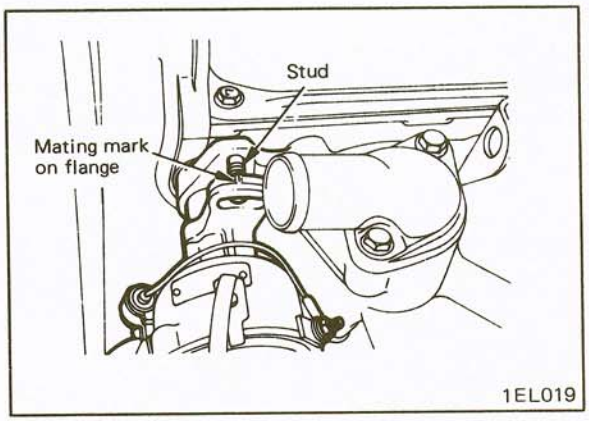


INSTALLATION

1. Turn crankshaft until piston of No. 1 cylinder is at top dead center of compression stroke.
2. Align mating mark on distributor housing with mating mark (punch) on distributor driven gear. (1EL018)



3. Install distributor to cylinder head while aligning mating mark on distributor attaching flange with center of distributor installing stud and tighten nuts. (1EL019)
4. Adjust ignition timing.

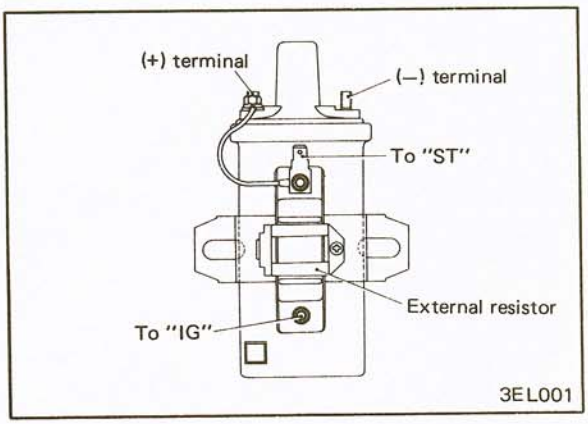


IGNITION COIL

INSPECTION

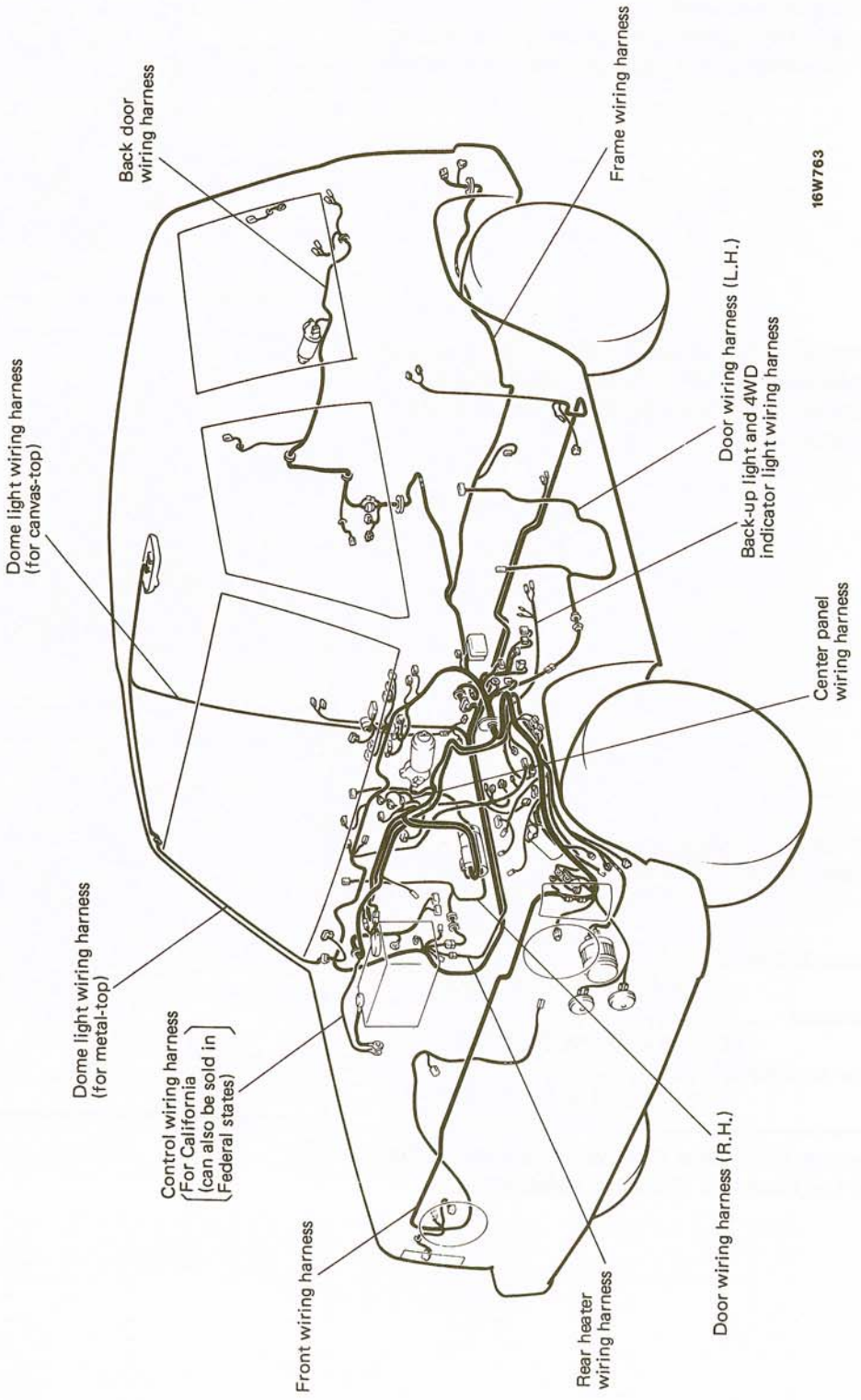
1. Using a circuit tester, measure resistance. An open- or short-circuited coil should be replaced.

Model No.	
Primary resistance E-064	1.1-1.3 Ω at 20°C (68°F)
Secondary resistance	11.6-15.8 kΩ at 20°C (68°F)
External resistor resistance	1.2-1.5 Ω at 20°C (68°F)



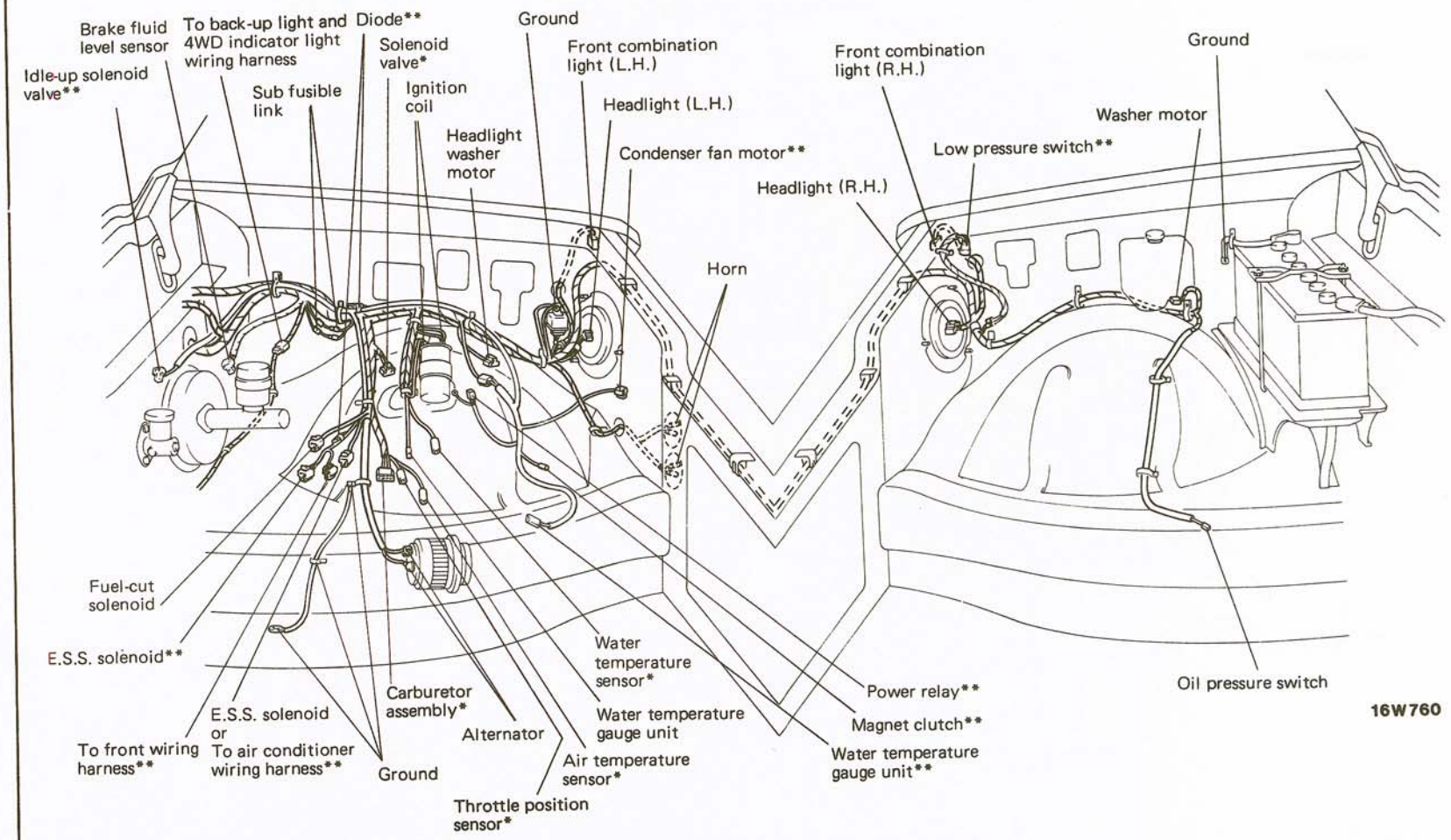
2. Check resin portion for cracks. If there are cranks, replace.
3. Check for fluid (oil) leaks. If there are leaks, replace.

WIRING HARNESSES



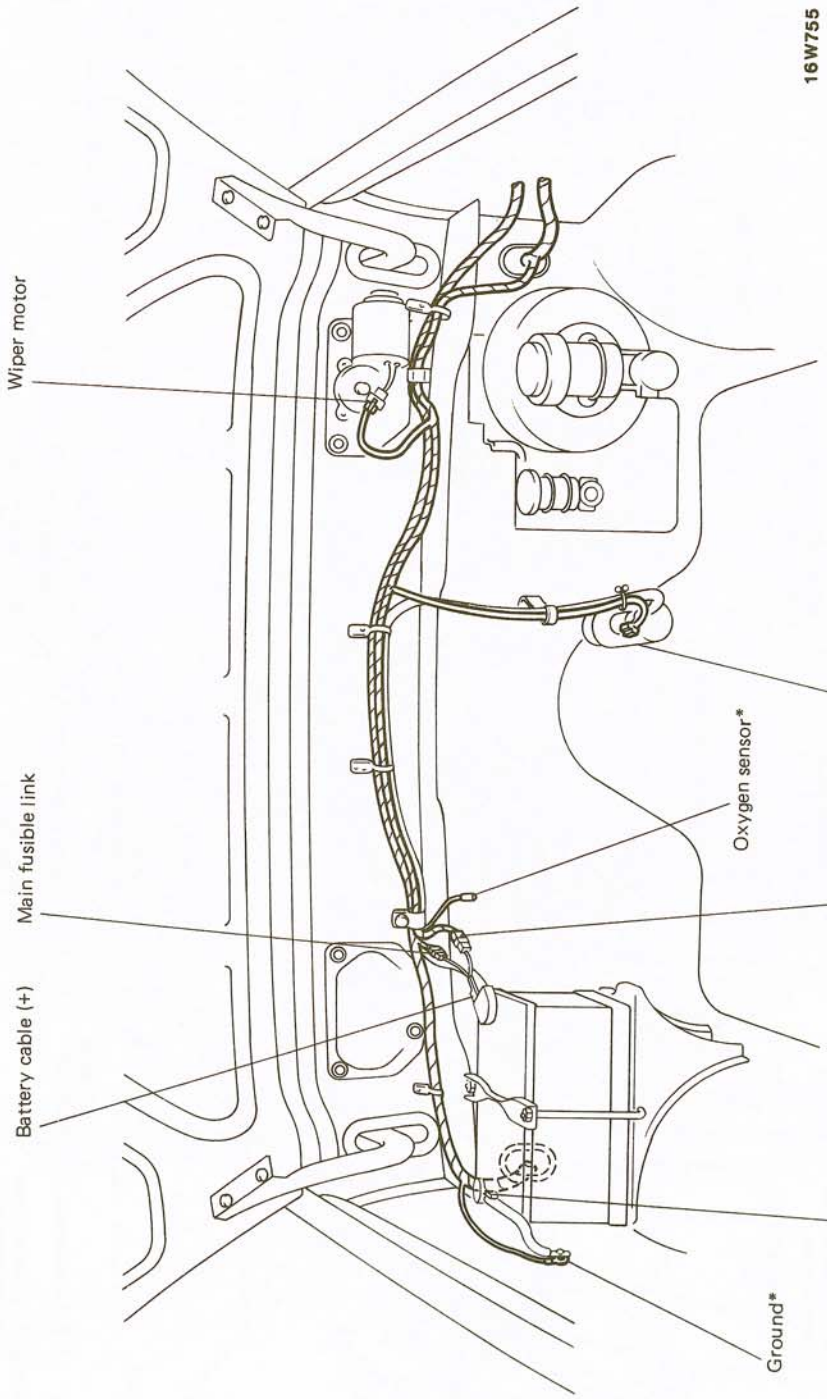
Wiring harness locations

Engine compartment — Front



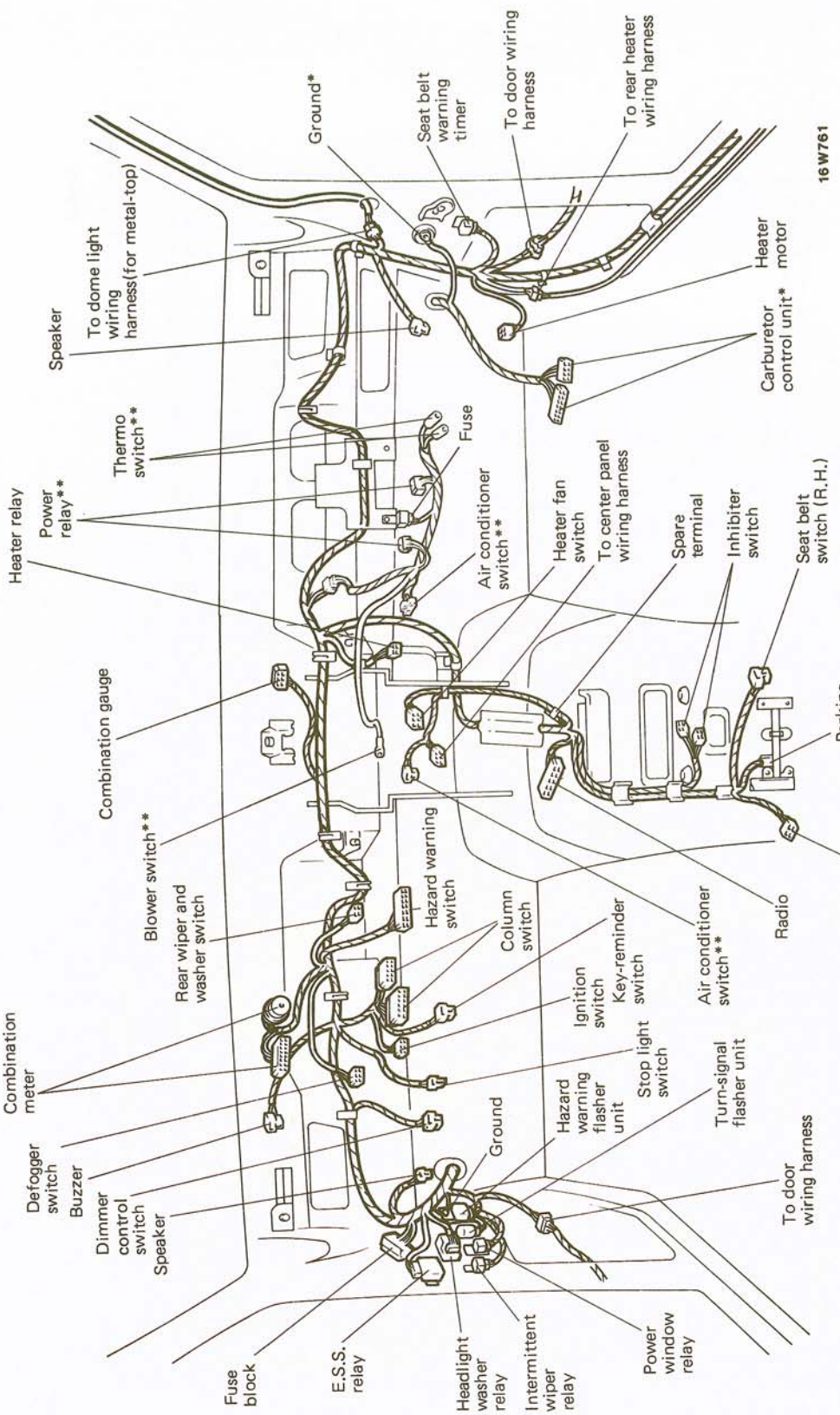
NOTE
* : For California (can also be sold in Federal States).
** : indicates connection for vehicles with an air conditioner.

Engine compartment – Rear

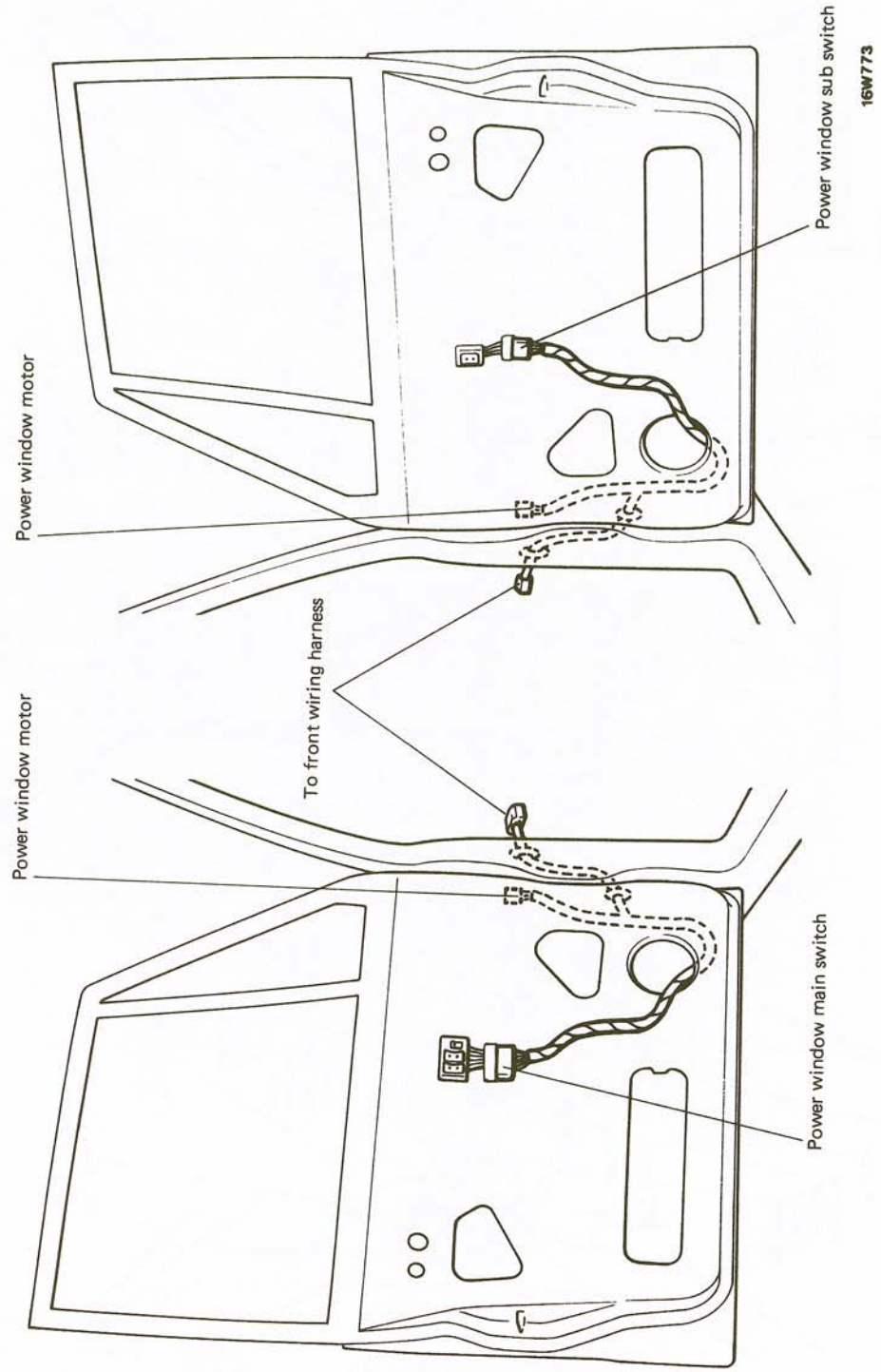


NOTE
* : For California (can also be sold in Federal States)

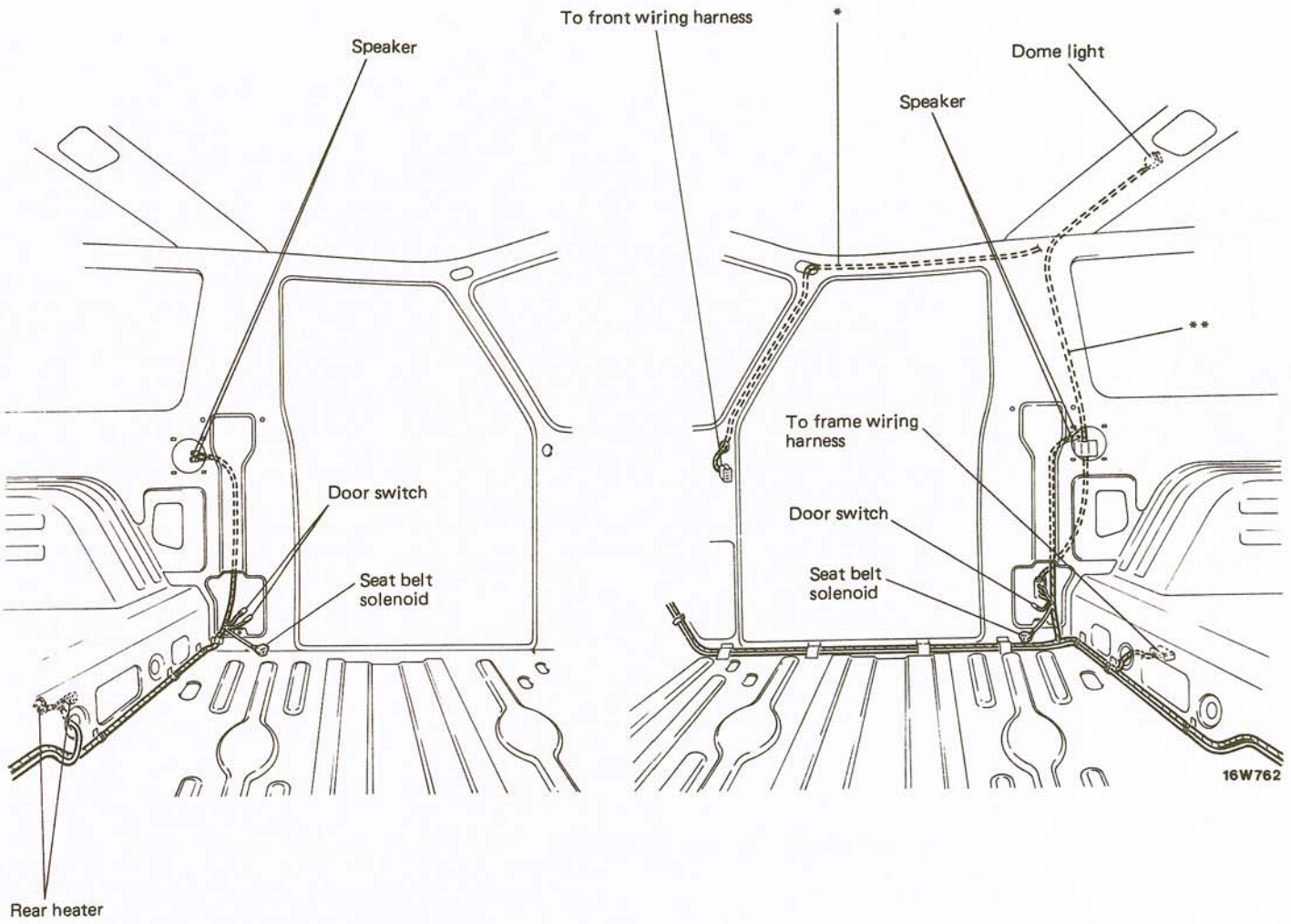
Instrument panel



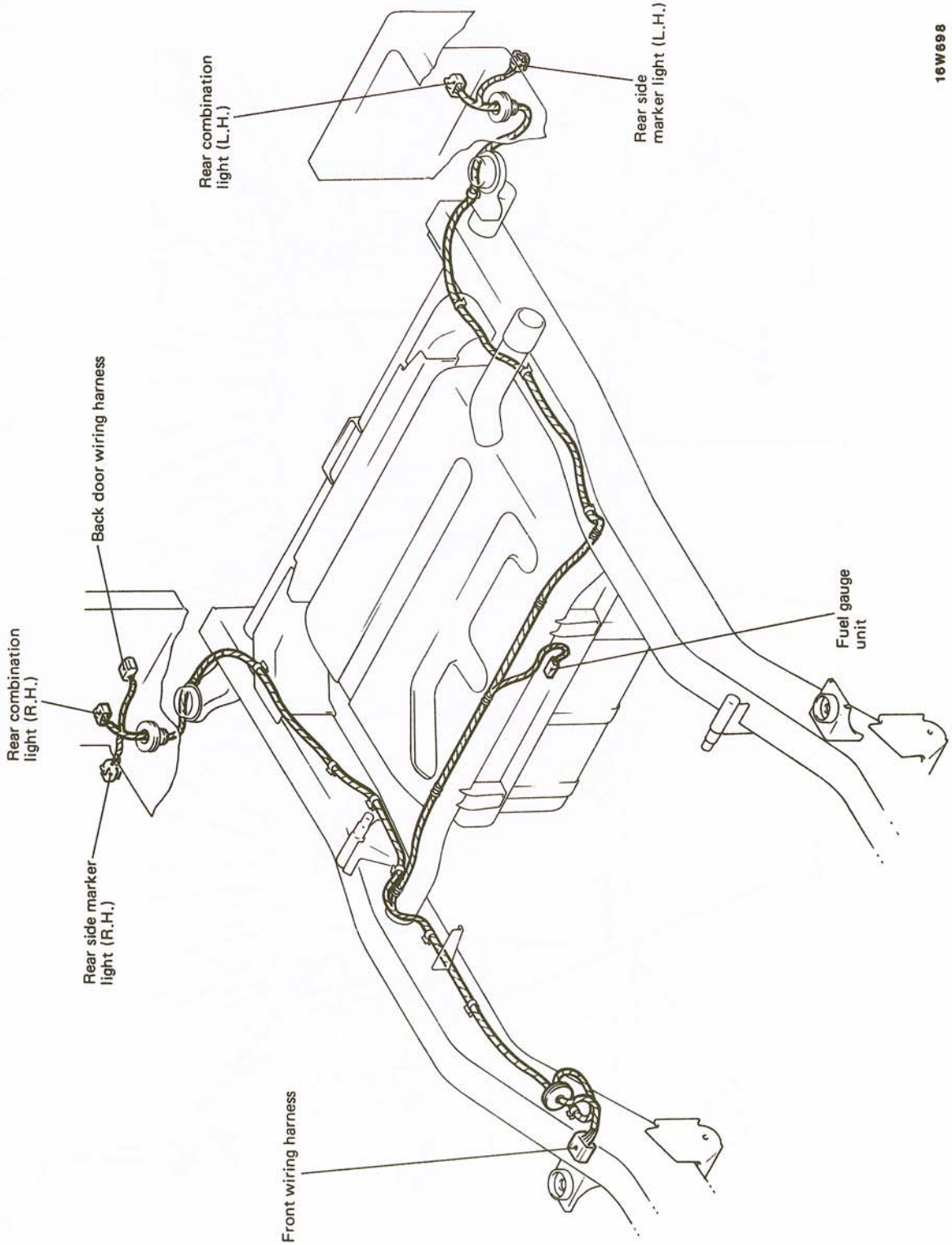
NOTE
* : For California (can also be sold in Federal States).
** : indicates connection for vehicles with an air conditioner.


Power window sub switch
16W773
Power window motor
To front wiring harness
Power window motor
Power window main switch

Door

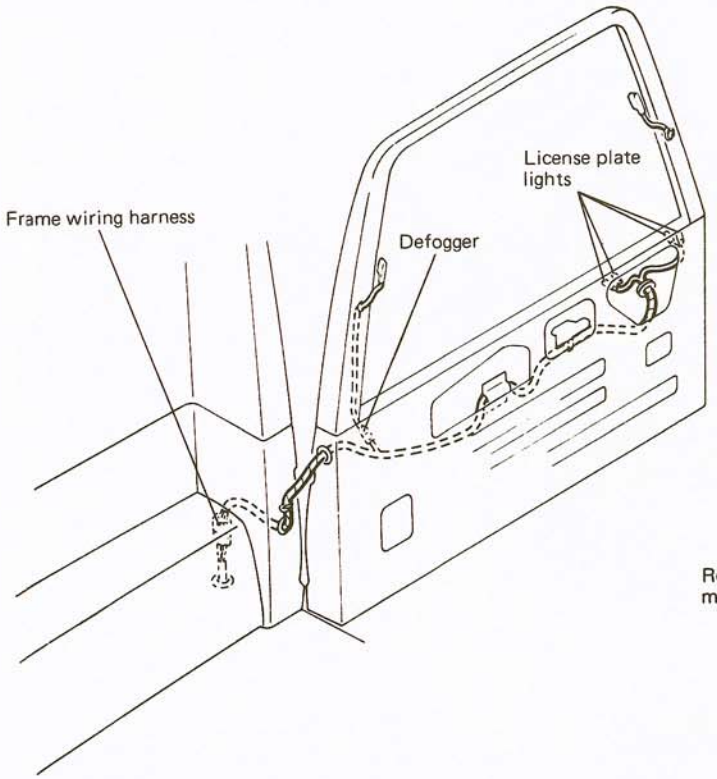


NOTE
* : Routing of the dome light wiring harness for vehicles equipped with a metal-top.
** : Routing of the dome light wiring harness for vehicles equipped with a canvas-top.

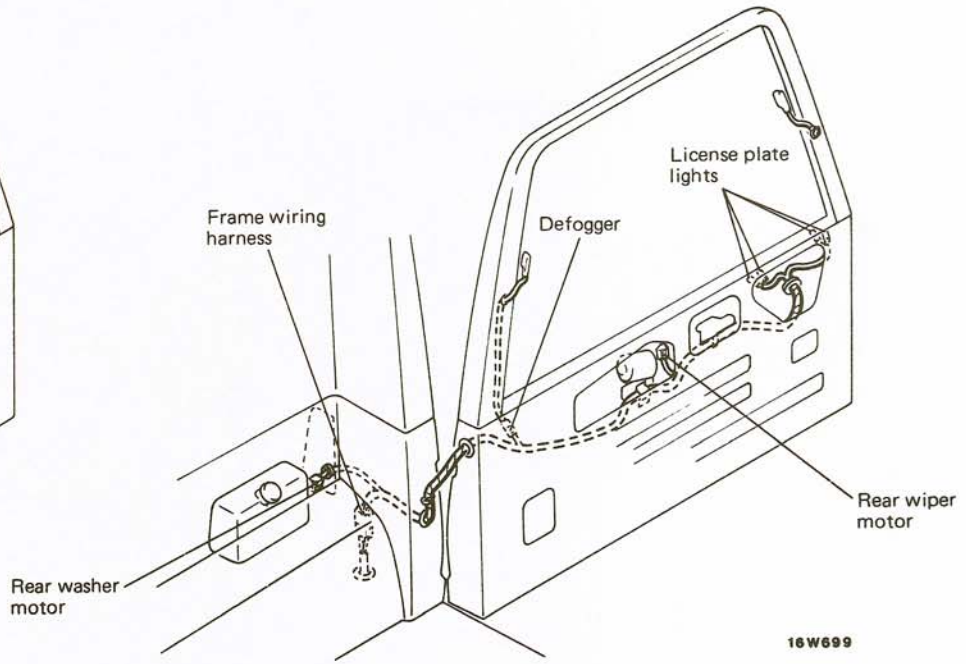

Rear combination light (L.H.)
Rear side marker light (L.H.)
16W698
Back door wiring harness
Rear combination light (R.H.)
Fuel gauge unit
Rear side marker light (R.H.)
Front wiring harness

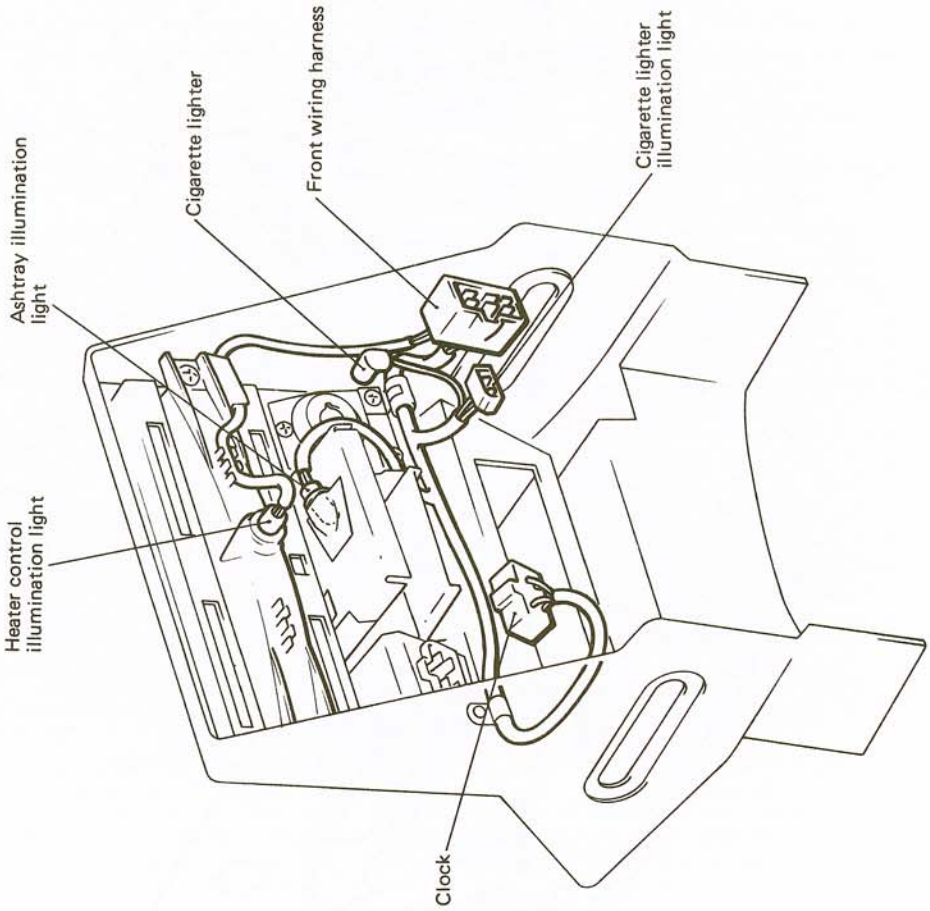
Frame

Back door — Vehicles without a rear wiper and washer



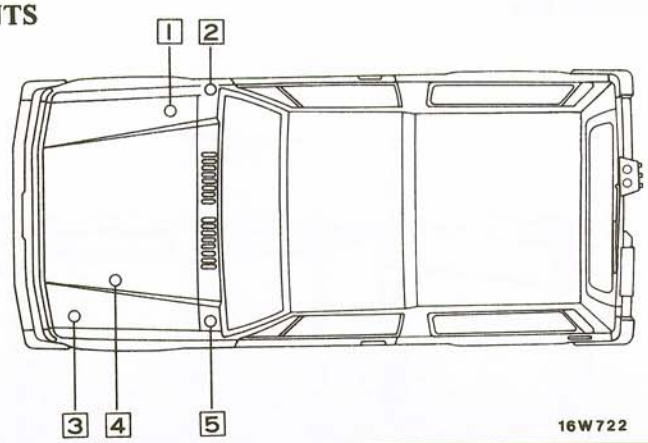
Back door — Vehicles with a rear wiper and washer



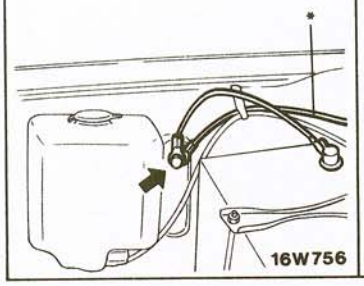
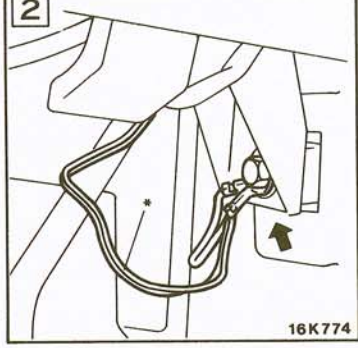
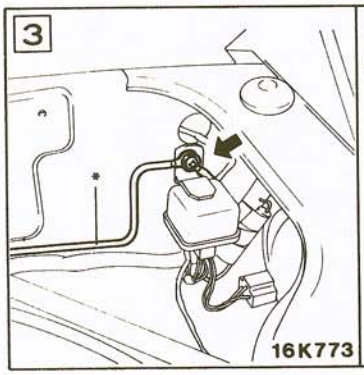
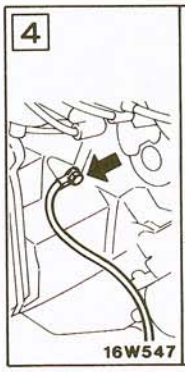
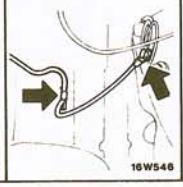
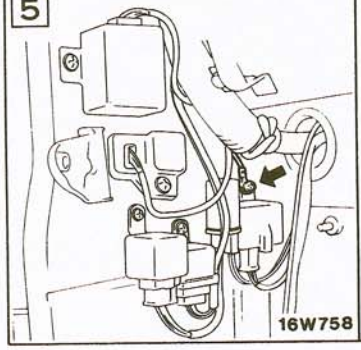


Center panel

ENTRALIZED GROUND POINTS

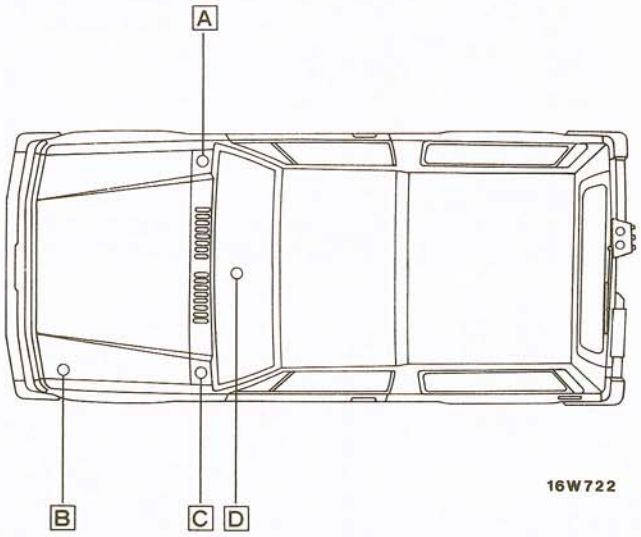


16W722

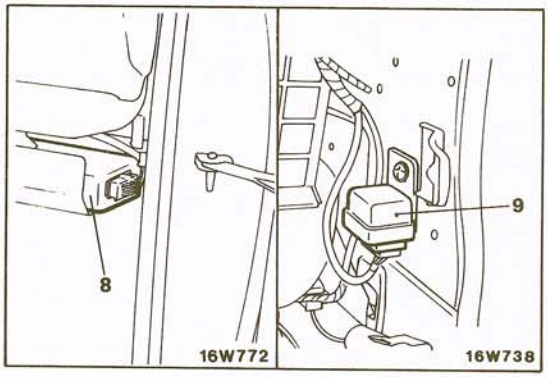
1  16W756	Fender shield, inner (right side)
2  16K774	Front pillar, inner (right side)
3  16K773	Fender shield, inner (left side)
4  16W547  16W546	Engine block (left side) Frame (left side) Fender shield (left side)
5  16W758	Front pillar, inner (left side)

NOTE
* : For California (can also be sold in Federal States).

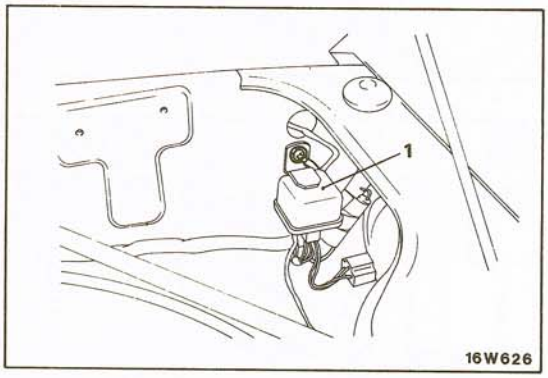
RELAY MOUNTING LOCATIONS



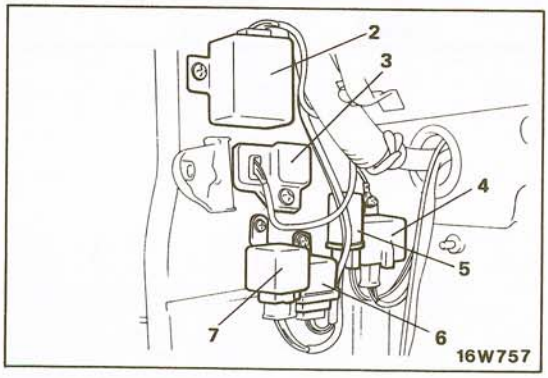
A Front pillar (right side)



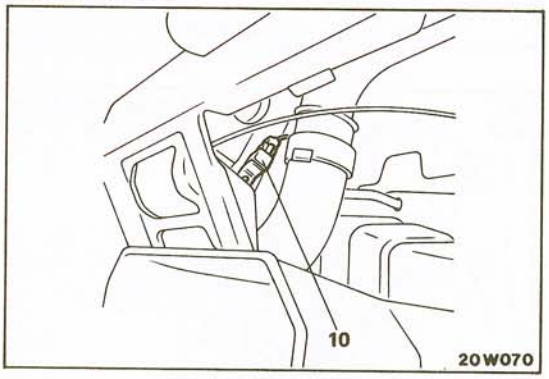
B Fender shield, inner (left side)



C Front pillar, inner (left side)

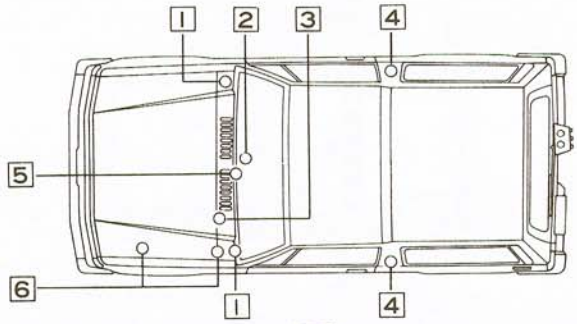


D Dash panel, upper (inside right)



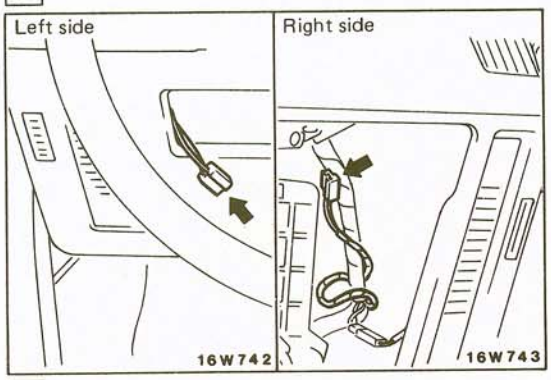
1. Light control relay
2. E.S.S. relay
3. Headlight washer relay
4. Turn-signal flasher unit
5. Hazard warning flasher unit
6. Power window relay
7. Intermittent wiper relay
8. Carburetor control unit (For California (can also be sold in Federal States))
9. Seat belt timer
10. Heater relay

?ARE TERMINALS

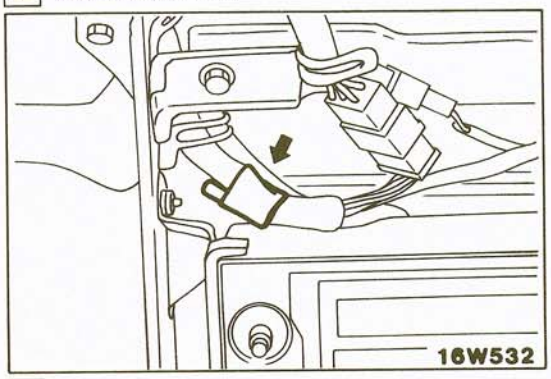


16W722

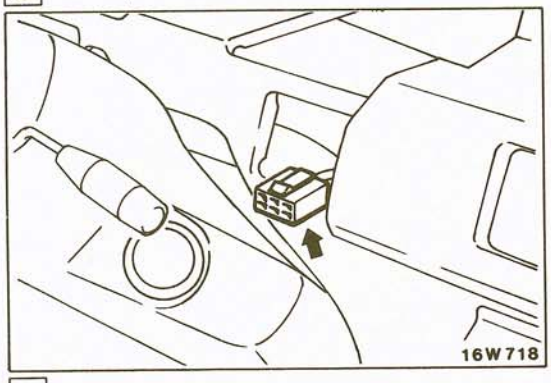
1 Front speaker



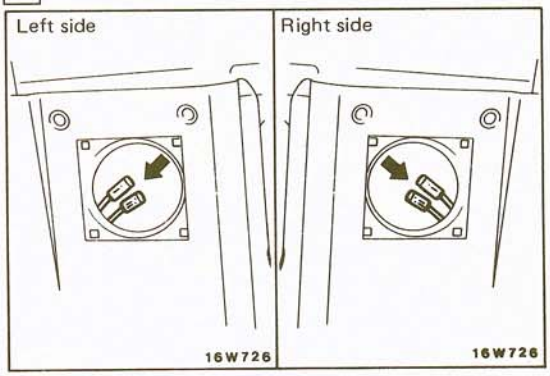
2 ACC spare terminal



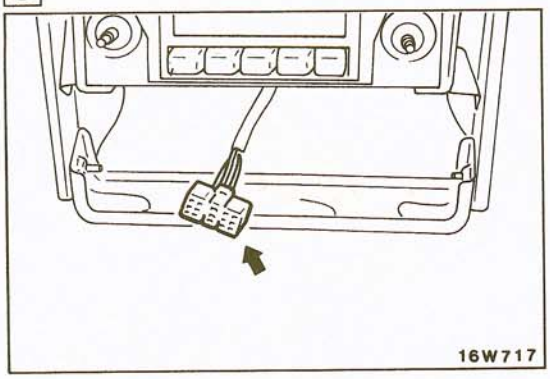
3 Rear wiper and washer switch



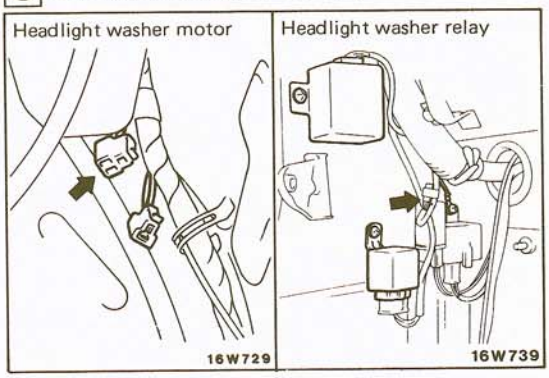
4 Rear speaker



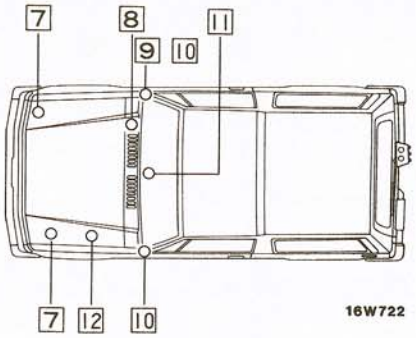
5 Radio



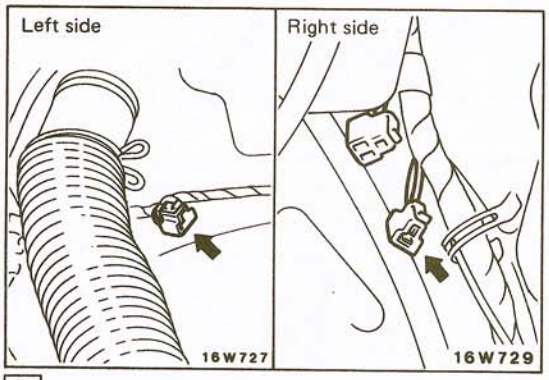
6 Headlight washer motor and relay



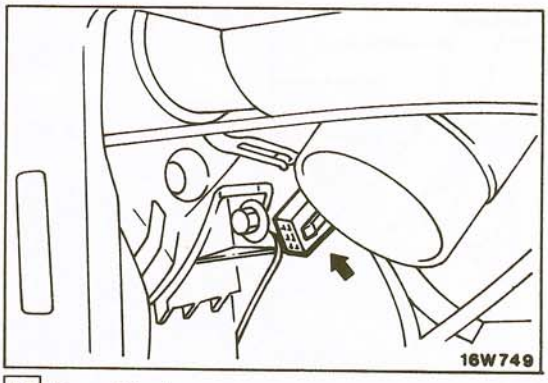
NOTES
(1) If ACC spare terminal 1 is used, it must not be used for more than 5 A.
(2) If the vehicle is not equipped with the optional equipment corresponding to a spare terminal, that spare terminal will be secured to the main line with blue tape.



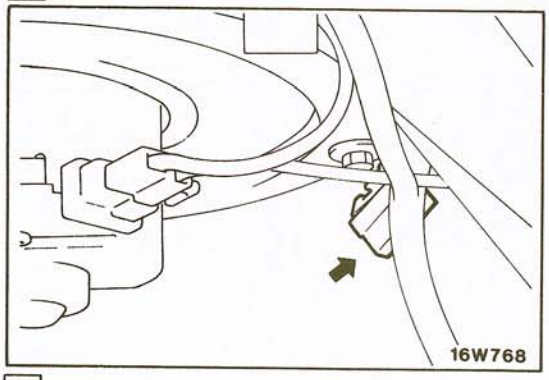
7 Air conditioner compressor and low pressure switch



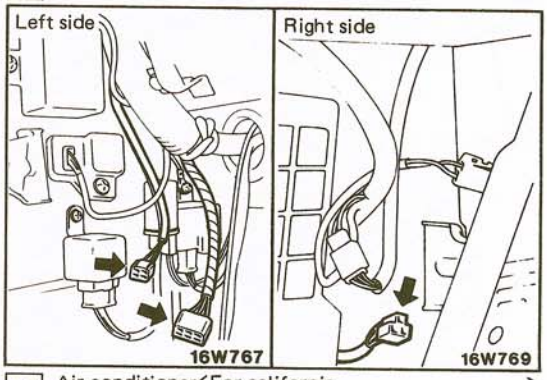
8 Air conditioner unit



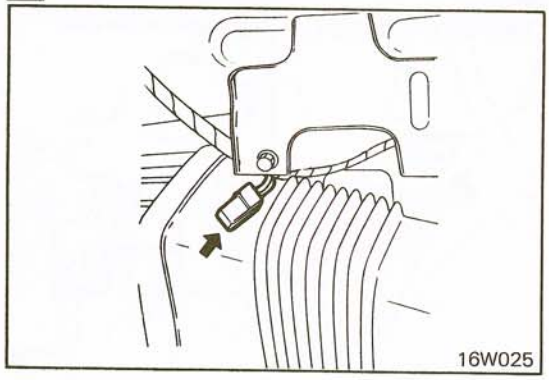
9 Rear Heater



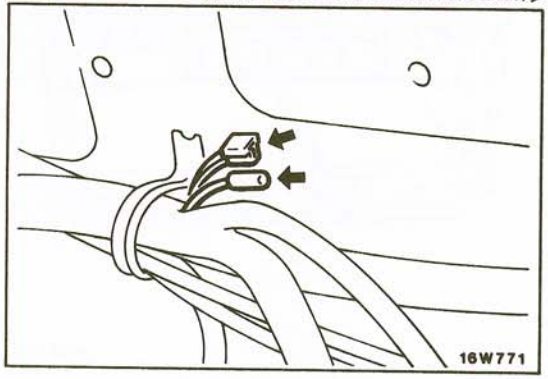
10 Power Window



11 Air conditioner switch

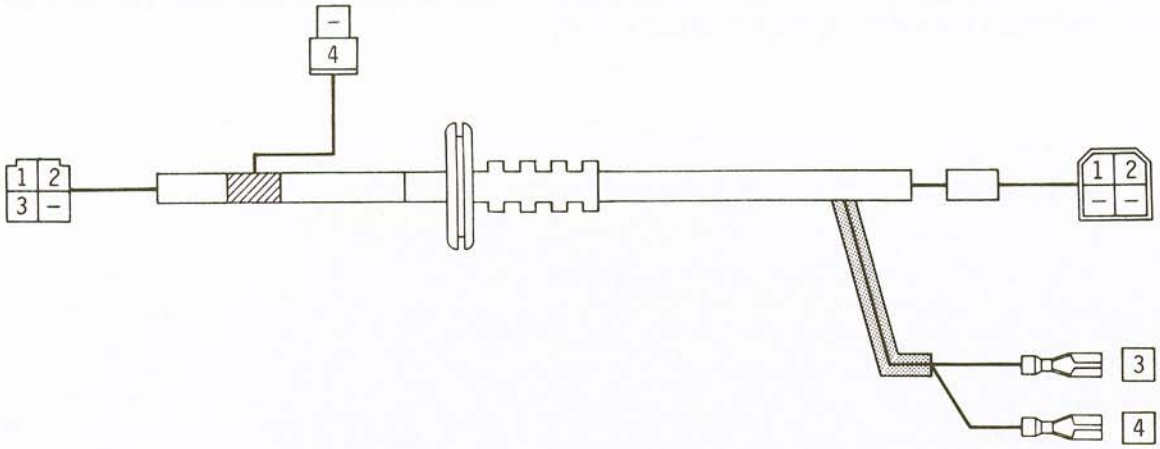


12 Air conditioner { For california (can also be sold in Federal states) }



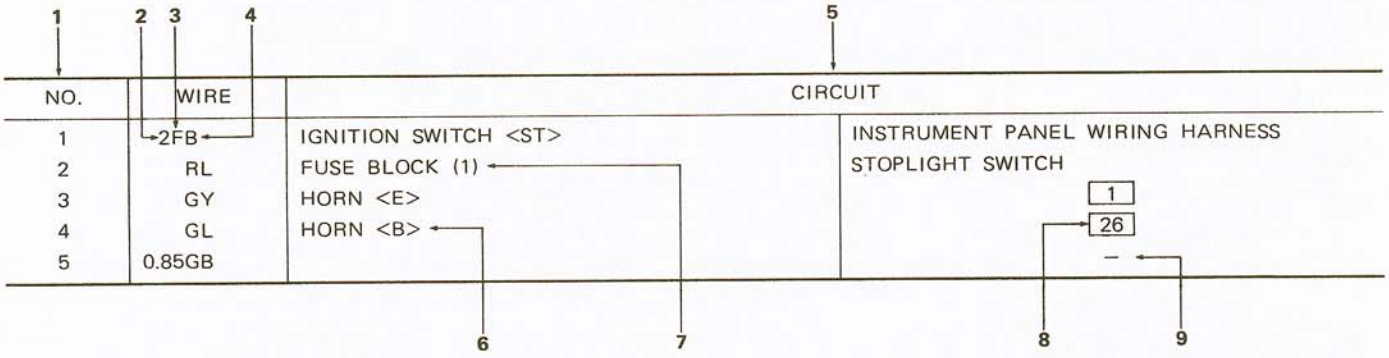
EADING THE HARNESS DIAGRAMS

Harness Diagram Example



16E962

ow to Read the Accompanying



1. The connector terminal number indicated in the diagram.
2. The numbers indicate the nominal cross-sectional area of the wire; refer to the table at right. If a number is not used, it indicates that the cross-sectional area of the wire is 0.5 mm².
3. "F" indicates that this is flexible wire.

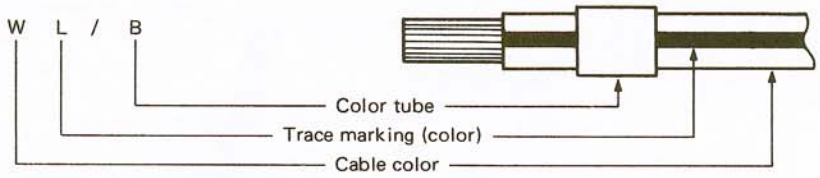
No.	Nominal size mm²	SAE gauge No.	Permissible current	
			In engine compartment	Other areas
0.3	0.3	AWG 22	–	5 A
–	0.5	AWG 20	7 A	13 A
0.85	0.85	AWG 18	9 A	17 A
1.25	1.25	AWG 16	12 A	22 A
2	2.0	AWG 14	16 A	30 A
3	3.0	AWG 12	21 A	40 A
5	5.0	AWG 10	31 A	54 A

4. The letters indicate the color of the wire.

Symbol	B	G	L	O	R	W	Y	Br
Color	Black	Green	Blue	Orange	Red	White	Yellow	Brown

Wires which have two-color insulation covering are indicated by two letters. The first letter indicates the cable color and the second letter indicates the trace marking (color).

Example



M16063

5. Indicates the circuits which are connected.
6. The letters in angular brackets indicate which part of the circuit this terminal is connected to; refer to the following table.

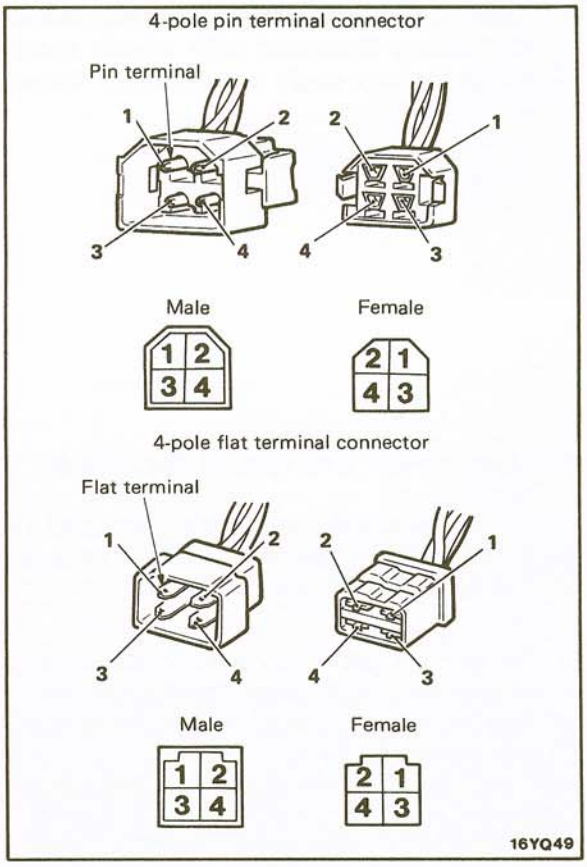
Letter	Meaning	Letter	Meaning
ACC	Accessory	L	Load
AS	Auto-stop	LO	Low-speed terminal
B	Battery	LI	License plate lights
BACK	Back-up lights	OIL	Oil pressure
BEAM	Headlight upper beam indicator light	RL	Rear left
BK	Brake	RR	Rear right
CHG	Charging	S	Soft
DEF	Defogger	ST	Starter
DR	Door	STOP	Stop lights
E	Ground	TAC	Tachometer
FL	Front left	TAIL	Tail lights
FR	Front right	TEMP	Water temperature
H	Hard	TUL	Turn-signal light, left
HI	High speed terminal	TUR	Turn-signal light, right
HL	Headlight low beam	W	Washer
HU	Headlight high beam	+	Positive terminal
IG	Ignition	–	Negative terminal
ILL	Illumination	4WD	4WD indicator light
IND	Indicator light		

7. Parentheses contain supplementary information; in the example, the "1" indicates the number 1 fuse of the fuse block.
8. The boxed numbers ☐ indicate to which terminal is connected.
9. If neither a circuit nor a number is listed, it indicates that this wire of this terminal is not connected to another terminal.

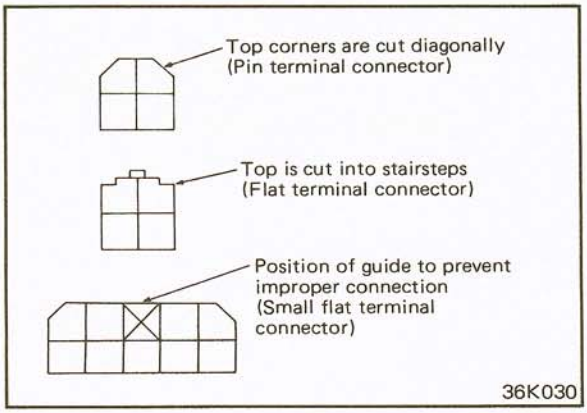
IRING CONNECTORS

Connector Classifications

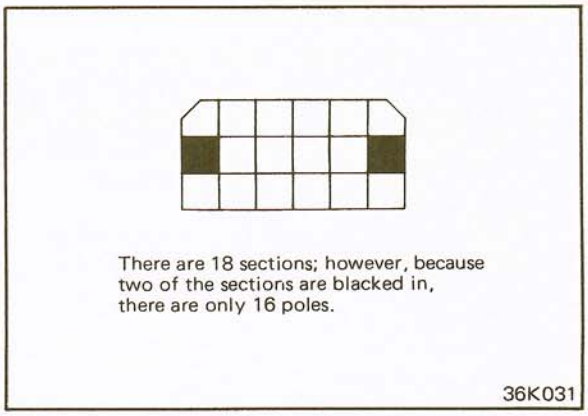
Electrical wiring connectors can be classified according to the type of terminals (such as pin terminals or flat terminals), the number of poles (terminals), whether they are male or female, whether they have a locking device or not, etc. In this Service Manual, connectors will generally be classified as follows:



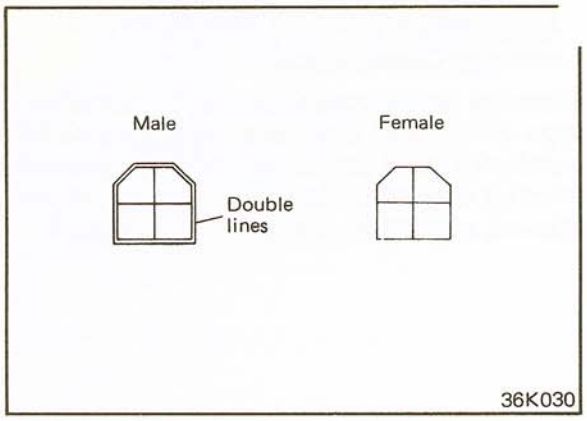
1. Classification according to terminal type
   Connectors illustrated with outer lines shaped so that the top corners are cut diagonally usually have pin terminals, and those illustrated with outer lines shaped so that the top is cut into stairsteps usually have flat terminals.
   Note that connectors illustrated with diagonally cut corners on which one section is marked with an "X" are small flat terminal connectors. The "X" indicates the position of a guide to prevent the connector from being improperly connected.



2. Classification according to number of poles
   The number of sections represents the number of poles inside the connector. However, sections in the illustration marked with an "X" or blacked in do not represent poles.

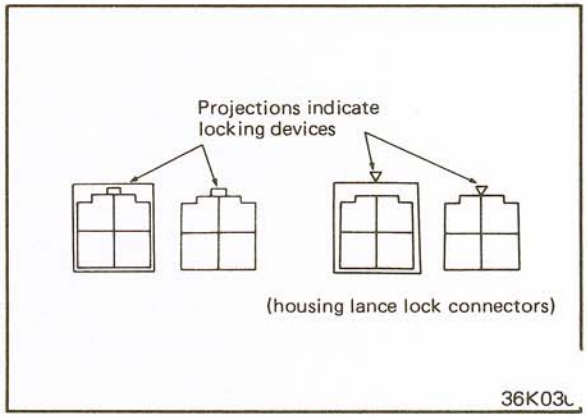


3. Classification according to male and female
   Connectors illustrated with double outer lines are male, and those with single outer lines are female.

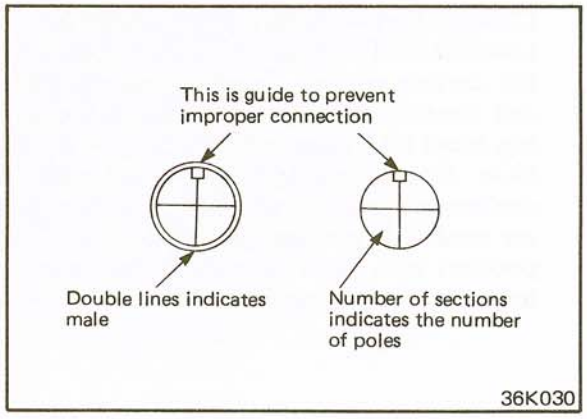


4. Classification according to the presence of a locking device
   If a flat terminal connector is illustrated with a projection at the top, it indicates that the connector is equipped with a locking device.

NOTE
(1) Because all pin terminal connectors, small flat terminal connectors, and sealed connectors are equipped with locking devices, there are special indications in the graphic illustrations.
(2) Housing lance lock connectors have lances inside the connector housing which securely lock the terminals to prevent them from becoming disconnected, thus providing increased reliability.

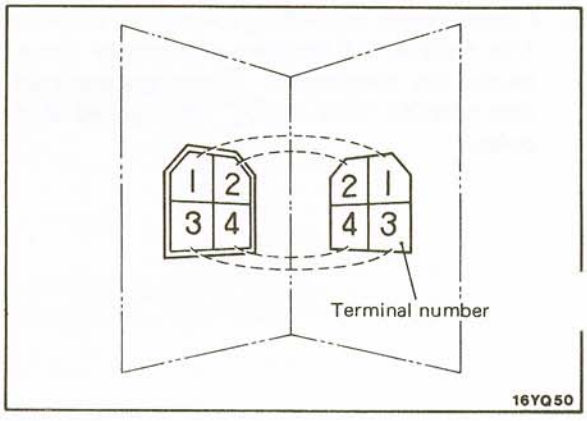


5. Classification according to sealed connector
   Classification of round shape-sealed connector (pin terminal water-proofed connector) which is used for engine wiring harness is the same as above.

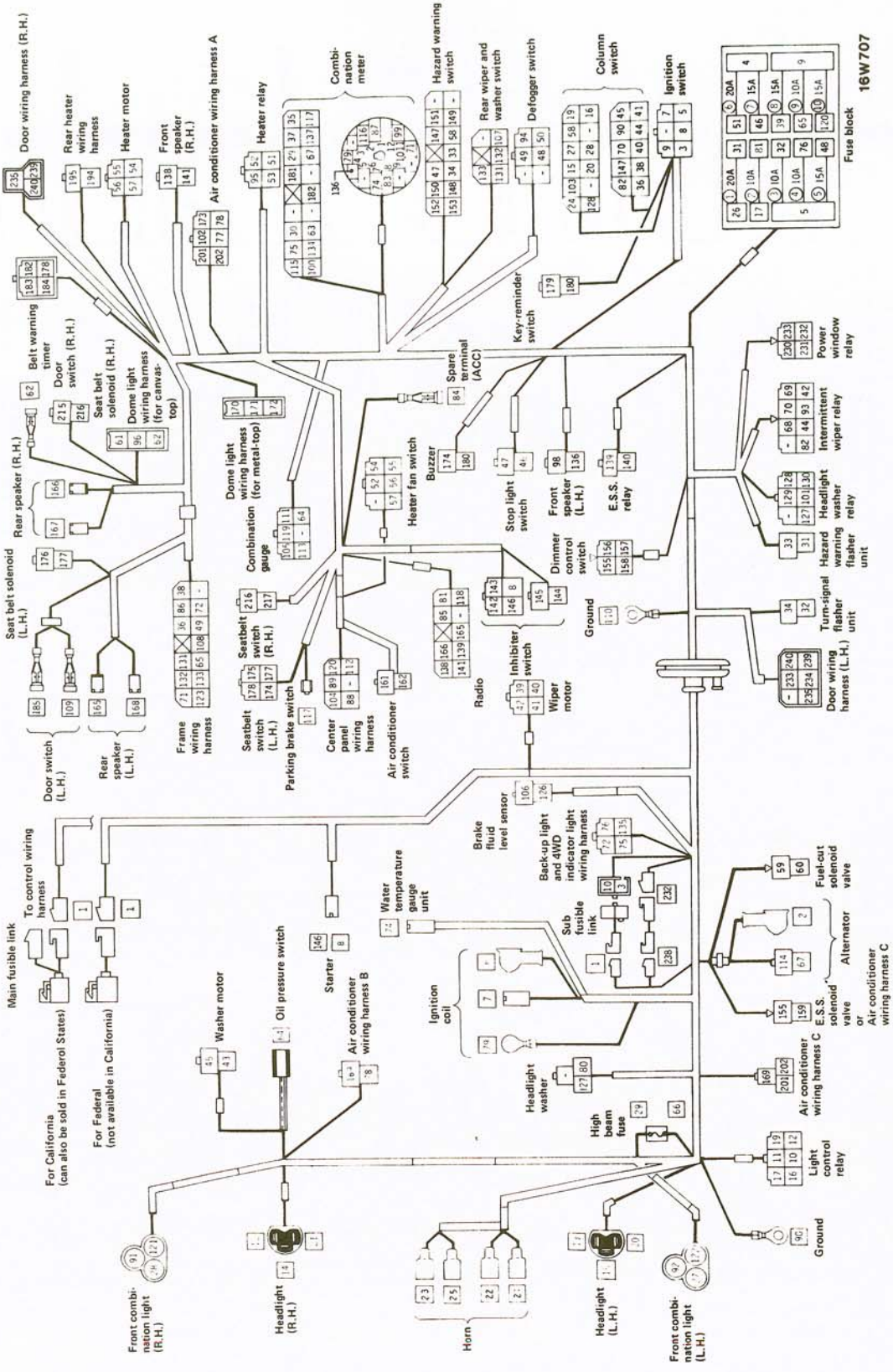


Terminal numbers

If a pair of connectors (male and female) is illustrated as disconnected, the corresponding terminal numbers will be positioned symmetrically. Therefore when the pair of connectors is connected, the corresponding terminal numbers on the male and female connectors will match.



RONT WIRING HARNESSES



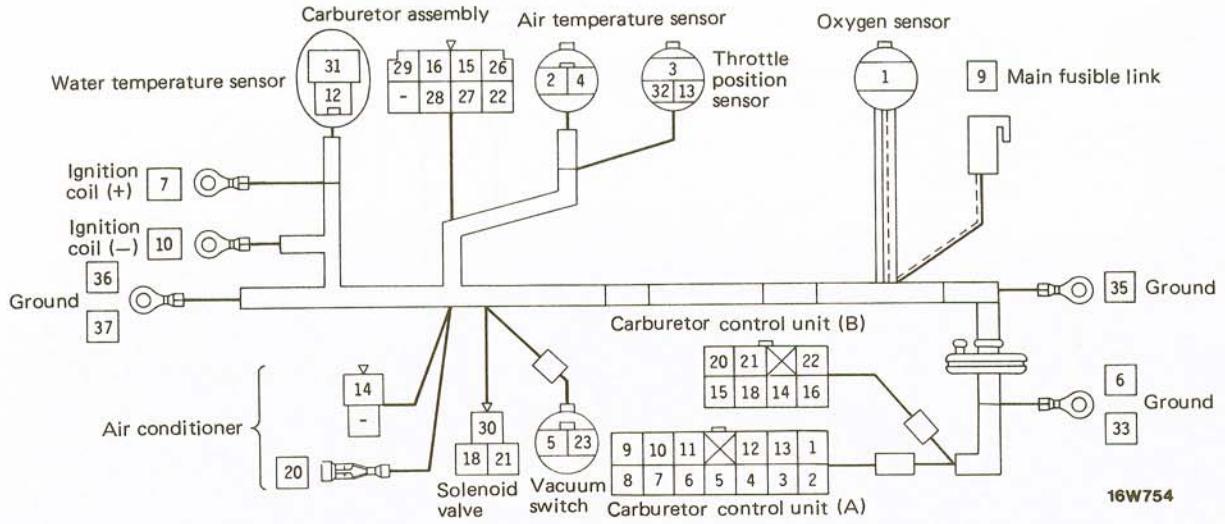
No.	WIRE	CIRCUIT	
1	3W	MAIN FUSIBLE LINK <BATTERY>	SUB FUSIBLE LINK
2	5W	ALTERNATOR <B>	[1]
3	2W	FUSIBLE LINK	IGNITION SWITCH
4	3W	FUSE BLOCK	[2]
5	2BW	IGNITION SWITCH <IG>	FUSE BLOCK
6	2BW	IGNITION COIL <+>	[5]
7	2BR	IGNITION SWITCH	IGNITION COIL
8	2BY	IGNITION SWITCH <ST>	STARTER
*8	2BY	IGNITION SWITCH <ST>	INHIBITER SWITCH
9	2LW	IGNITION SWITCH <ACC>	FUSE BLOCK
10	2R	LIGHT CONTROL RELAY	FUSIBLE LINK
11	1.25R	LIGHT CONTROL RELAY	[10]
12	1.25RL	LIGHT CONTROL RELAY	HEADLIGHT (R.H.) <B>
13	1.25RL	HEADLIGHT (L.H.) <B>	[12]
14	0.85RW	HEADLIGHT (R.H.) <HL>	[15]
15	0.85RW	HEADLIGHT (L.H.) <HL>	COLUMN SWITCH
16	R	LIGHT CONTROL RELAY	COLUMN SWITCH
17	1.25RW	LIGHT CONTROL RELAY	FUSE BLOCK
19	GW	LIGHT CONTROL RELAY	COLUMN SWITCH
20	0.85R	HEADLIGHT (L.H.) <HU>	COLUMN SWITCH
21	0.85R	HEADLIGHT (R.H.) <HU>	[20]
22	0.85B	HORN <S>	[39]
23	0.85B	HORN <H>	[22]
24	0.85B	HORN <S>	COLUMN SWITCH
25	0.85B	HORN <H>	[24]
26	1.25R	FUSE BLOCK	[10]
27	0.85GL	FRONT COMBINATION LIGHT (L.H.)	COLUMN SWITCH
28	0.85GY	FRONT COMBINATION LIGHT (R.H.)	COLUMN SWITCH
29	YR	UPPER BEAM FUSE	COMBINATION METER <BEAM>
30	0.3R	COMBINATION METER <BEAM>	[20]
31	1.25GB	HAZARD WARNING FLASHER UNIT <B>	FUSE BLOCK (1)
32	0.85RL	TURN-SIGNAL FLASHER UNIT <IG>	FUSE BLOCK (3)
33	1.25GO	HAZARD WARNING FLASHER UNIT	HAZARD WARNING SWITCH
34	GR	TURN-SIGNAL FLASHER UNIT	HAZARD WARNING SWITCH
35	0.3GL	COMBINATION METER	[27]
36	WL	FRAME WIRING HARNESS	COLUMN SWITCH
37	0.3GY	COMBINATION METER	[28]
38	WR	FRAME WIRING HARNESS	COLUMN SWITCH
39	0.85L	WIPER MOTOR <ACC>	FUSE BLOCK (8)
40	LO	WIPER MOTOR <LO>	COLUMN SWITCH
41	LB	WIPER MOTOR <HI>	COLUMN SWITCH
42	LW	WIPER MOTOR <AS>	INTERMITTENT WIPER RELAY
43	L	WASHER MOTOR <ACC>	[39]
44	0.3BY	INTERMITTENT WIPER RELAY	COLUMN SWITCH
45	YL	WASHER MOTOR	COLUMN SWITCH
46	0.85GR	FUSE BLOCK (7)	STOP LIGHT SWITCH <B>
47	0.85G	HAZARD SWITCH	STOP LIGHT SWITCH <L>
48	2RB	FUSE BLOCK (5)	DEFOGGER SWITCH <IG>
49	2B	FRAME WIRING HARNESS	DEFOGGER SWITCH <DEF>
50	BR	DEFOGGER SWITCH <IND>	[49]
51	2LR	FUSE BLOCK (6)	HEATER RELAY <B>
52	2L	HEATER FAN SWITCH <B>	HEATER RELAY
53	LR	HEATER RELAY <IG>	[32]
54	0.85LW	HEATER MOTOR <LO>	HEATER FAN SWITCH
55	1.25LY	HEATER MOTOR	HEATER FAN SWITCH
56	1.25LB	HEATER MOTOR	HEATER FAN SWITCH
57	2LR	HEATER MOTOR <HI>	HEATER FAN SWITCH
58	GR	COLUMN SWITCH	HAZARD WARNING SWITCH
59	1.25BW	FUEL-CUT SOLENOID VALVE	[60]
60	2BW	FUEL-CUT SOLENOID VALVE	[6]
61	RB	DOME LIGHT WIRING HARNESS <B>	[31]
62	RG	DOME LIGHT WIRING HARNESS	DOOR SWITCH (R.H.)
63	0.3RG	COMBINATION METER	[62]
64	YB	OIL PRESSURE SWITCH	COMBINATION GAUGE
65	L	FUSE BLOCK (9)	FRAME WIRING HARNESS <ACC>
66	1.25Y	HIGH BEAM FUSE	[12]
67	0.85W	COMBINATION METER <CHG>	ALTERNATOR <L>
68	0.3YL	INTERMITTENT WIPER RELAY <W>	[45]
69	L	INTERMITTENT WIPER RELAY <ACC>	[39]
70	BR	INTERMITTENT WIPER RELAY <LO>	COLUMN SWITCH
71	Y	FRAME WIRING HARNESS	COMBINATION METER
72	RL	FRAME WIRING HARNESS	B/LP AND 4WD INDICATOR LIGHT WIRING HARNESS
74	YL	WATER TEMPERATURE GAUGE UNIT	COMBINATION METER <TEMP>
75	YR	B/LP AND 4WD INDICATOR LIGHT WIRING HARNESS	COMBINATION METER <4WD>
76	R	B/LP AND 4WD INDICATOR LIGHT WIRING HARNESS	FUSE BLOCK (4)
77	3LR	AIR CONDITIONER WIRING HARNESS A	[4]
78	0.85BW	AIR CONDITIONER WIRING HARNESS B	AIR CONDITIONER WIRING HARNESS A
79	WL/B	IGNITON COIL <–>	COMBINATION METER <TAC>
80	1.25LW	HEADLIGHT WASHER <B>	[10]
81	GW	FUSE BLOCK (2)	RADIO <ILL>
82	0.3Y	INTERMITTENT WIPER RELAY	COLUMN SWITCH
83	YR	COMBINATION METER	[75]
84	LW	SPARE TERMINAL <ACC>	[120]
85	0.3BY	RADIO <ILL–>	[136]
86	0.3GW	FRAME WIRING HARNESS	[81]
87	GW	COMBINATION METER <ILL+>	[81]
88	0.3BY	CENTER PANEL WIRING HARNESS <ILL–>	[136]
89	0.3GW	CENTER PANEL WIRING HARNESS <ILL+>	[81]
90	2B	COLUMN SWITCH <E>	GROUND
91	B	FRONT COMBINATION LIGHT (R.H.) <E>	[90]
92	B	FRONT COMBINATION LIGHT (L.H.) <E>	[90]
93	B	INTERMITTENT WIPER RELAY <E>	[101]
94	0.3B	DEFOGGER SWITCH <E>	[90]
95	0.3B	HEATER RELAY <E>	[104]
96	B	DOME LIGHT WIRING HARNESS <E>	[108]
98	0.3B	DIMMER CONTROL SWITCH <E>	[90]
99	B	COMBINATION METER <E>	[100]

No.	WIRE	CIRCUIT	
100	B	COMBINATION METER <E>	[90]
101	1.25B	HEADLIGHT WASHER RELAY <E>	[90]
102	0.3B	AIR CONDITIONER WIRING HARNESS A	[90]
103	0.3B	COLUMN SWITCH <E>	[90]
104	0.85B	CENTER PANEL WIRING HARNESS <E>	[90]
105	0.3B	COMBINATION GAUGE < E >	[104]
106	0.3B	BRAKE FLUID LEVEL SENSOR	[90]
107	0.3B	REAR WIPER AND WASHER SWITCH <E>	[90]
108	B	FRAME WIRING HARNESS <E>	[90]
109	RG	DOOR SWITCH (L.H.)	[62]
110	2B	GROUND	[90]
111	0.3RL	COMBINATION GAUGE < IG >	[115]
112	0.3RB	CENTER PANEL WIRING HARNESS <B>	[61]
113	0.3BY	COMBINATION GAUGE	[136]
114	0.85L	ALTERNATOR <IG>	[32]
115	RL	COMBINATION METER <IG>	[76]
116	RL	COMBINATION METER <IG>	[115]
117	YG	PARKING BRAKE SWITCH	COMBINATION METER <BK>
118	LW	RADIO <ACC>	[120]
119	0.3GW	COMBINATION GAUGE	[81]
120	0.85LW	FUSE BLOCK (10)	CENTER PANEL WIRING HARNESS <ACC>
121	RG	FRONT COMBINATION LIGHT (R.H.)	[81]
122	RG	FRONT COMBINATION LIGHT (L.H.)	[121]
123	0.3RG	FRAME WIRING HARNESS <TAIL>	[86]
126	0.3YG	BRAKE FLUID LEVEL SENSOR	[117]
127	1.25L	HEADLIGHT WASHER RELAY	HEADLIGHT WASHER
128	0.3LB	HEADLIGHT WASHER RELAY	COLUMN SWITCH
129	GW	HEADLIGHT WASHER RELAY	[81]
130	0.3LW	HEADLIGHT WASHER RELAY <ACC>	[69]
131	0.3WB	FRAME WIRING HARNESS <W>	REAR WIPER AND WASHER SWITCH
132	0.3BrW	FRAME WIRING HARNESS <LO>	REAR WIPER AND WASHER SWITCH
133	0.3Br	FRAME WIRING HARNESS <AS>	REAR WIPER AND WASHER SWITCH
134	0.3RB	COMBINATION METER <B>	[61]
135	B	B/LP AND 4WD INDICATOR LIGHT WIRING HARNESS <E>	[106]
136	BY	DIMMER CONTROL SWITCH	COMBINATION METER <ILL–>
137	YB	COMBINATION METER <OIL>	[64]
138	0.3BW	SPEAKER <FR+>	RADIO <FR+>
139	0.3BY	SPEAKER <FL+>	RADIO <FL+>
140	0.3B	SPEAKER <FL–>	[141]
141	B	SPEAKER <FL–>	RADIO <E>
*142	R	INHIBITER SWITCH	[76]
*143	RL	INHIBITER SWITCH	[72]
*144	0.3GW	INHIBITER SWITCH	[81]
*145	BY	INHIBITER SWITCH	[85]
*146	2BY	INHIBITER SWITCH	STARTER
147	0.85WG	HAZARD WARNING SWITCH <ST>	COLUMN SWITCH <ST>
148	WL	HAZARD WARNING SWITCH <RL>	COLUMN SWITCH <ST>
149	WR	HAZARD WARNING SWITCH <RR>	[38]
150	GL	HAZARD WARNING SWITCH <FL>	[27]
151	GY	HAZARD WARNING SWITCH <FR>	[28]
152	0.3GW	HAZARD WARNING SWITCH <ILL+>	[87]
153	0.3BY	HAZARD WARNING SWITCH <ILL–>	[136]
155	BW	E.S.S. SOLENOID VALVE	E.S.S. RELAY
**155	BW	AIR CONDITIONER WIRING HARNESS C	E.S.S. RELAY
156	2L	E.S.S. RELAY	[6]
157	B	E.S.S. RELAY	[90]
158	W	E.S.S. RELAY	[79]
159	2L	E.S.S. SOLENOID VALVE	[6]
**159	2L	AIR CONDITIONER WIRING HARNESS C	[6]
161	0.3GW	AIR CONDITIONER SWITCH	[81]
162	0.5BY	AIR CONDITIONER SWITCH	[88]
165	BG	SPEAKER <RL+>	RADIO <RL+>
166	BR	SPEAKER <RR+>	RADIO <RR+>
167	B	SPEAKER <RR–>	[141]
168	B	SPEAKER <RL–>	[167]
169	0.85BW	AIR CONDITIONER WIRING HARNESS B	AIR CONDITIONER WIRING HARNESS C
170	RB	DOME LIGHT WIRING HARNESS <B>	[61]
171	B	DOME LIGHT WIRING HARNESS <B>	[108]
172	RG	DOME LIGHT WIRING HARNESS <DR>	[109]
173	LW	AIR CONDITIONER WIRING HARNESS A	[120]
174	0.3Y	SEAT BELT SWITCH	BUZZER
175	0.3B	SEAT BELT SWITCH (L.H.)	[104]
176	0.3RL	SEAT BELT SOLENOID	[215]
177	0.3YB	SEAT BELT SOLENOID	SEAT BELT SWITCH (L.H.)
178	0.3RB	SEAT BELT SWITCH	BELT WARNING TIMER
179	GR	KEY-REMINDER SWITCH	[46]
180	G	KEY-REMINDER SWITCH	BUZZER
181	G	COMBINATION METER	[180]
182	0.3YB	COMBINATION METER	BELT WARNING TIMER
183	0.3RL	BELT WARNING TIMER	[53]
184	0.3B	BELT WARNING TIMER	[195]
185	YW	DOOR SWITCH (L.H.)	[174]
194	0.85RB	REAR HEATER WIRING HARNESS	[48]
195	0.85B	REAR HEATER WIRING HARNESS <E>	[90]
201	BY	AIR CONDITIONER WIRING HARNESS A	AIR CONDITIONER WIRING HARNESS C
202	0.85L	AIR CONDITIONER WIRING HARNESS A	AIR CONDITIONER WIRING HARNESS C
215	RL	SEAT BELT SOLENOID	[32]
216	0.3YB	SEAT BELT SOLENOID	SEAT BELT SWITCH (R.H.)
217	0.3B	SEAT BELT SWITCH	[104]
***230	0.3RL	POWER WINDOW RELAY	[32]
***231	0.3B	POWER WINDOW RELAY	[101]
***232	2LR	POWER WINDOW RELAY	FUSIBLE LINK
***233	2L	POWER WINDOW RELAY	DOOR WIRING HARNESS
***234	2B	DOOR WIRING HARNESS (DRIVER'S SIDE)	[90]
***235	2LB	DOOR WIRING HARNESS (DRIVER'S SIDE)	DOOR WIRING HARNESS
***238	3W	FUSIBLE LINK	[2]
***239	2RL	DOOR WIRING HARNESS (DRIVER'S SIDE)	DOOR WIRING HARNESS
***240	2GL	DOOR WIRING HARNESS (DRIVER'S SIDE)	DOOR WIRING HARNESS

NOTES
* : Vehicles with an automatic transmission.
** : Vehicles equipped with an air conditioner.
*** : Vehicles with power windows.

)NTROL WIRING HARNESS

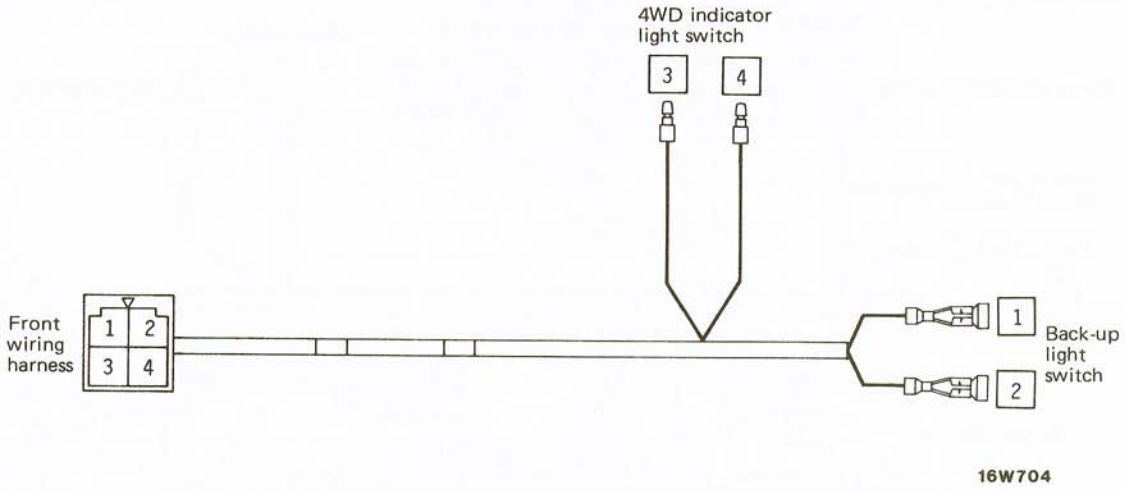
For California (can also be sold in Federal States)



NO.	WIRE	CIRCUIT	
1	SB	CARBURETOR CONTROL UNIT (A)	OXYGEN SENSOR
2	1.25GY	CARBURETOR CONTROL UNIT (A)	AIR TEMPERATURE SENSOR
3	G	CARBURETOR CONTROL UNIT (A)	THROTTLE POSITION SENSOR
4	GR	CARBURETOR CONTROL UNIT (A)	AIR TEMPERATURE SENSOR
5	GB	CARBURETOR CONTROL UNIT (A)	VACUUM SWITCH
6	1.25B	CARBURETOR CONTROL UNIT (A)	GROUND
7	2BW	CARBURETOR CONTROL UNIT (A)	IGNITION COIL (+) [7]
8	2BW	CARBURETOR CONTROL UNIT (A)	
9	2RL	CARBURETOR CONTROL UNIT (A)	MAIN FUSIBLE LINK
10	SB	CARBURETOR CONTROL UNIT (A)	IGNITION COIL (–) [6]
11	1.25B	CARBURETOR CONTROL UNIT (A)	
12	YG	CARBURETOR CONTROL UNIT (A)	WATER TEMPERATURE SENSOR
13	YR	CARBURETOR CONTROL UNIT (A)	THROTTLE POSITION SENSOR
*14	0.85BW	CARBURETOR CONTROL UNIT (B)	AIR CONDITIONER
15	YW	CARBURETOR CONTROL UNIT (B)	CARBURETOR ASSEMBLY
16	YL	CARBURETOR CONTROL UNIT (B)	CARBURETOR ASSEMBLY
18	RW	CARBURETOR CONTROL UNIT (B)	SOLENOID VALVE ASSEMBLY
*20	0.85L	CARBURETOR CONTROL UNIT (B)	AIR CONDITIONER
21	GL	CARBURETOR CONTROL UNIT (B)	SOLENOID VALVE ASSEMBLY
22	YG	CARBURETOR CONTROL UNIT (B)	CARBURETOR ASSEMBLY
23	B	VACUUM SWITCH	[37]
26	1.25BW	CARBURETOR ASSEMBLY	[7]
27	1.25BW	CARBURETOR ASSEMBLY	[7]
28	1.25BW	CARBURETOR ASSEMBLY	[7]
29	1.25BW	CARBURETOR ASSEMBLY	[7]
30	1.25BW	SOLENOID VALVE	[7]
31	GY	WATER TEMPERATURE SENSOR	[2]
32	GY	CARBURETOR	[2]
33	B	GROUND	[1]
35	1.25B	GROUND	[6]
36	B	GROUND	[10]
37	1.25B	GROUND	[35]

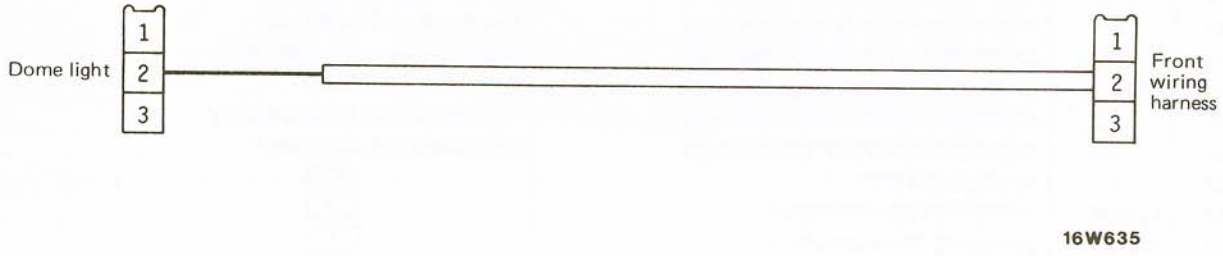
NOTE
*Vehicles equipped with an air conditioner.

BACK-UP LIGHT AND 4WD INDICATOR LIGHT WIRING HARNESS



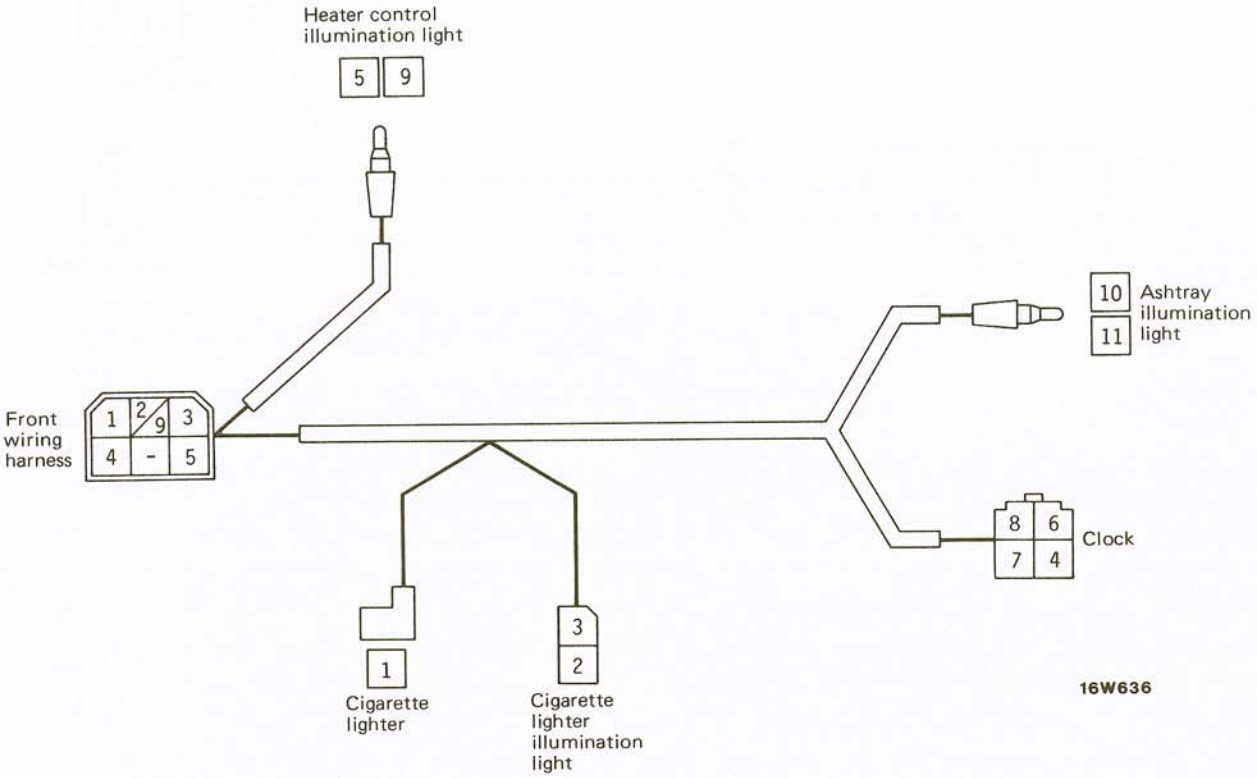
NO.	WIRE	CIRCUIT	
1	R	FRONT WIRING HARNESS	BACK-UP LIGHT SWITCH
2	RL	FRONT WIRING HARNESS	BACK-UP LIGHT SWITCH
3	BR	FRONT WIRING HARNESS	4WD INDICATOR LIGHT SWITCH
4	YR	FRONT WIRING HARNESS	4WD INDICATOR LIGHT SWITCH

DOME LIGHT WIRING HARNESS



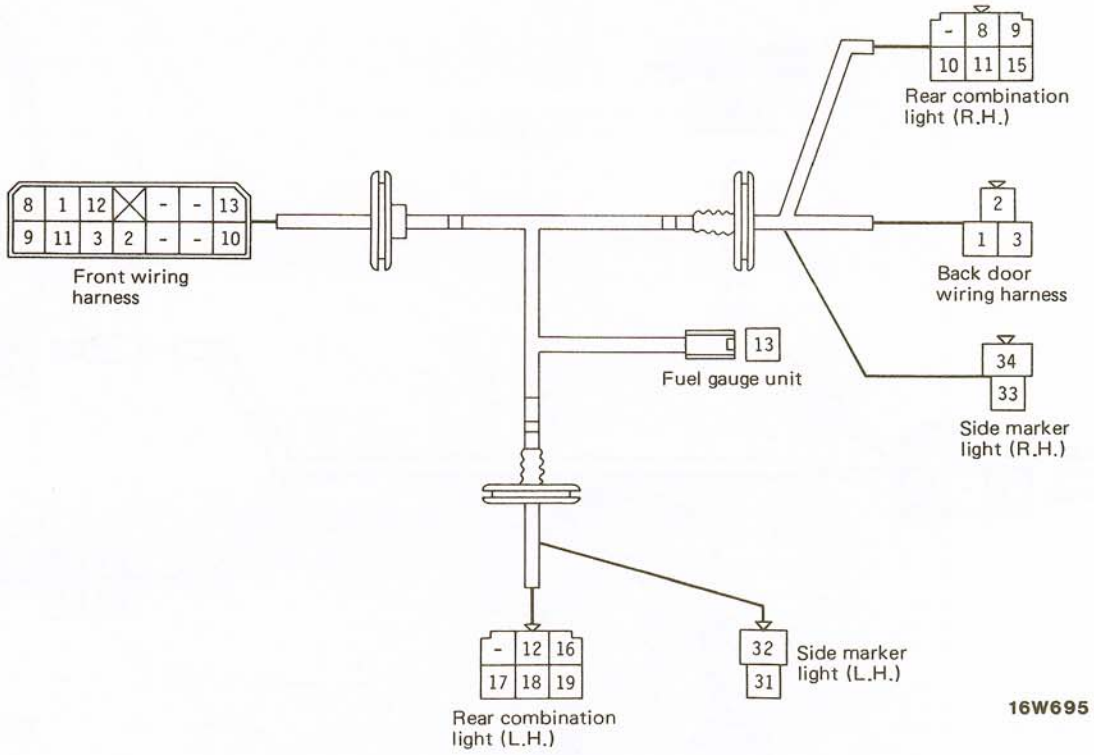
NO.	WIRE	CIRCUIT	
1	RB	FRONT WIRING HARNESS	DOME LIGHT <B>
2	B	FRONT WIRING HARNESS	DOME LIGHT <E>
3	RG	FRONT WIRING HARNESS	DOME LIGHT <DR>

ENTER PANEL WIRING HARNESS



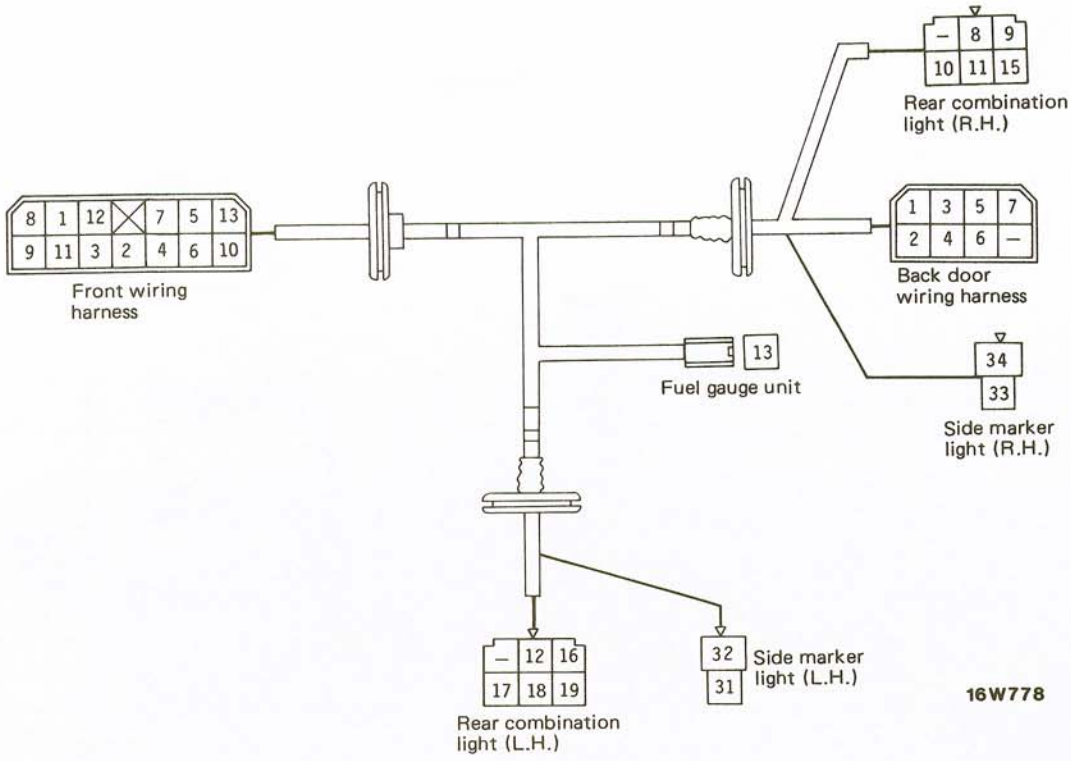
NO.	WIRE	CIRCUIT	
1	0.85LW	FRONT WIRING HARNESS <ACC>	CIGARETTE LIGHTER
2	GW	FRONT WIRING HARNESS <ILL+>	CIGARETTE LIGHTER ILLUMINATION LIGHT
3	0.85B	FRONT WIRING HARNESS <E>	CIGARETTE LIGHTER ILLUMINATION LIGHT
4	0.3RB	FRONT WIRING HARNESS <B>	CLOCK
5	0.3GY	FRONT WIRING HARNESS <ILL–>	HEATER CONTROL ILLUMINATION LIGHT
6	B	CLOCK <E>	3
7	LW	CLOCK <ACC>	1
8	0.3GW	CLOCK <ILL+>	2
9	0.3GW	FRONT WIRING HARNESS <ILL+>	HEATER CONTROL ILLUMINATION LIGHT
10	0.3B	ASHTRAY ILLUMINATION LIGHT <E>	3
11	0.3GW	ASHTRAY ILLUMINATION LIGHT <ILL>	2

FRAME WIRING HARNESS – Vehicles without a rear wiper and washer



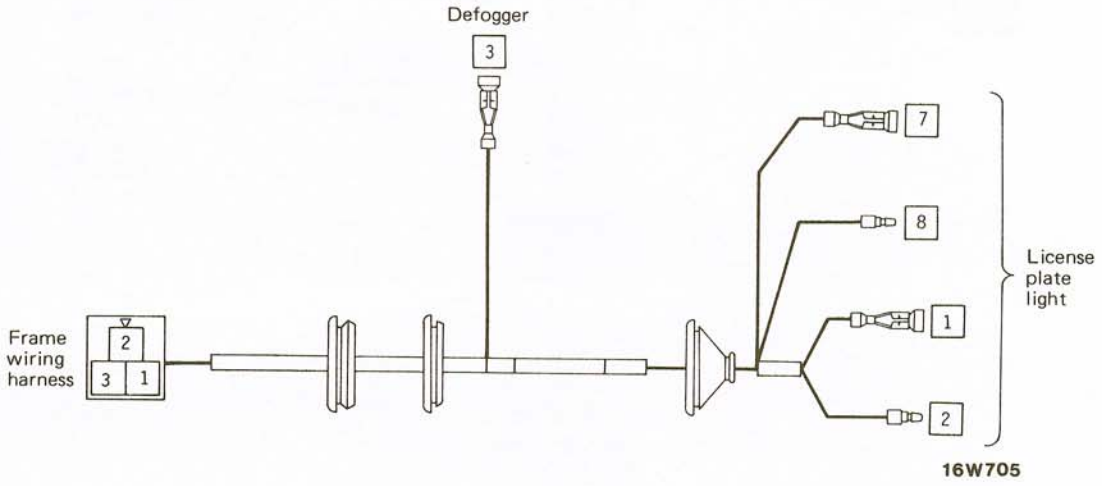
NO.	WIRE	CIRCUIT	
1	0.3GW	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS <LI>
2	B	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS <E>
3	2B	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS <DEF>
8	0.3GY	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.) <TUR/STOP>
9	G	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.)
10	RG	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.) <TAIL>
11	RL	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.) <BACK>
12	0.3GL	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (L.H.) <TUL/STOP>
13	Y	FRONT WIRING HARNESS	FUEL GAUGE UNIT
15	B	REAR COMBINATION LIGHT (R.H.) <E>	2
16	0.3G	REAR COMBINATION LIGHT (L.H.)	9
17	0.3RG	REAR COMBINATION LIGHT (L.H.) <TAIL>	10
18	0.3RL	REAR COMBINATION LIGHT (L.H.) <BACK>	11
19	B	REAR COMBINATION LIGHT (L.H.) <E>	2
31	GW	SIDE MARKER LIGHT (L.H.)	17
32	0.3B	SIDE MARKER LIGHT (L.H.)	19
33	0.3GW	SIDE MARKER LIGHT (R.H.)	10
34	0.3B	SIDE MARKER LIGHT (R.H.)	15

'RAME WIRING HARNESS – Vehicles with a rear wiper and washer



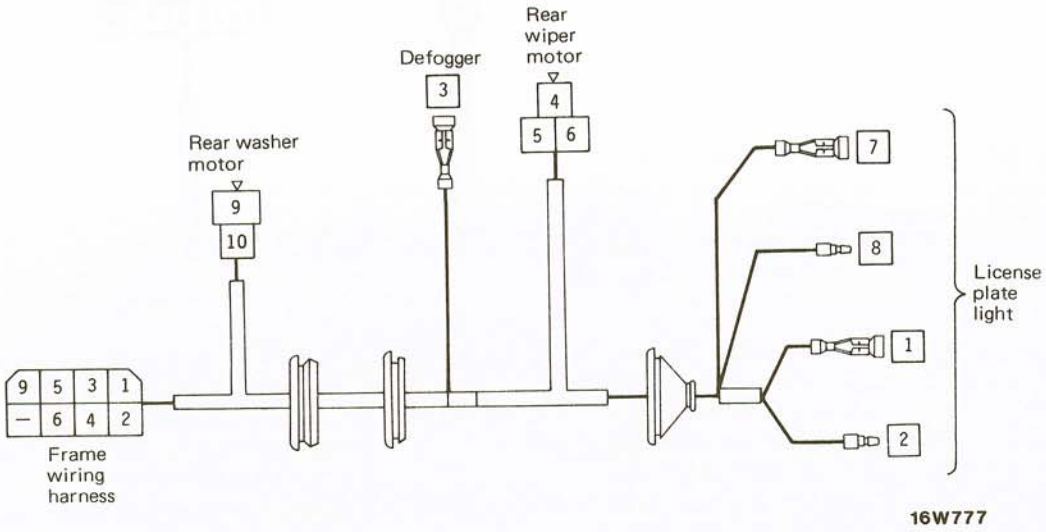
NO.	WIRE	CIRCUIT	
1	0.3GW	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS <LI>
2	B	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS <E>
3	2B	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS <DEF>
4	L	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS (REAR WIPER) <ACC>
5	0.3BrW	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS (REAR WIPER) <LO>
6	0.3Br	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS (REAR WIPER) <AS>
7	0.3WB	FRONT WIRING HARNESS	BACK DOOR WIRING HARNESS (REAR WASHER)
8	0.3GY	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.) <TUR/STOP>
9	G	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.)
10	RG	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.) <TAIL>
11	RL	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (R.H.) <BACK>
12	0.3GL	FRONT WIRING HARNESS	REAR COMBINATION LIGHT (L.H.) <TUL/STOP>
13	Y	FRONT WIRING HARNESS	FUEL GAUGE UNIT
15	B	REAR COMBINATION LIGHT (R.H.) <E>	2
16	0.3G	REAR COMBINATION LIGHT (L.H.)	9
17	0.3RG	REAR COMBINATION LIGHT (L.H.) <TAIL>	10
18	0.3RL	REAR COMBINATION LIGHT (L.H.) <BACK>	11
19	B	REAR COMBINATION LIGHT (L.H.) <E>	2
31	GW	SIDE MARKER LIGHT (L.H.)	17
32	0.3B	SIDE MARKER LIGHT (L.H.)	19
33	0.3GW	SIDE MARKER LIGHT (R.H.)	10
34	0.3B	SIDE MARKER LIGHT (R.H.)	15

BACK DOOR WIRING HARNESS – Vehicles without a rear wiper and washer



NO.	WIRE	CIRCUIT	
1	FGW	FRAME WIRING HARNESS	LICENSE PLATE LIGHT <B>
2	FB	FRAME WIRING HARNESS	LICENSE PLATE LIGHT <E>
3	2FB	FRAME WIRING HARNESS	DEFOGGER
7	GW	LICENSE PLATE LIGHT <B>	1
8	B	LICENSE PLATE LIGHT <E>	2

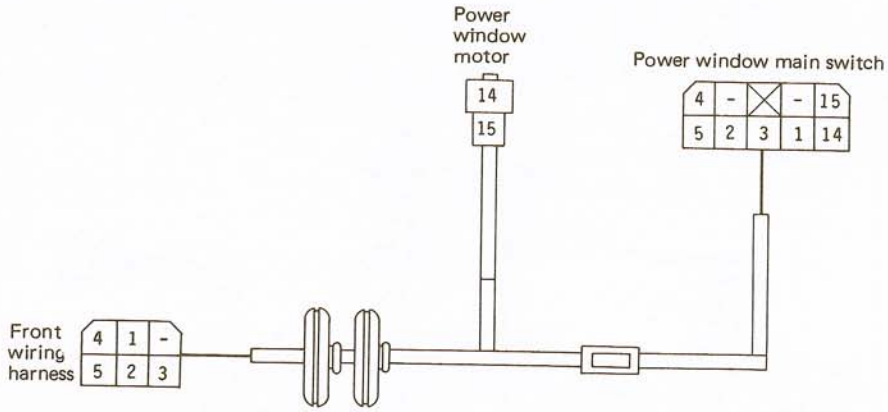
ACK DOOR WIRING HARNESS – Vehicles with a rear wiper and washer



NO.	WIRE	CIRCUIT	
1	FGW	FRAME WIRING HARNESS	LICENSE PLATE LIGHT <B>
2	FB	FRAME WIRING HARNESS	LICENSE PLATE LIGHT <E>
3	2FB	FRAME WIRING HARNESS	DEFOGGER
4	FL	FRAME WIRING HARNESS	REAR WIPER MOTOR <ACC>
5	FBrW	FRAME WIRING HARNESS	REAR WIPER MOTOR <LO>
6	FBr	FRAME WIRING HARNESS	REAR WIPER MOTOR <AS>
7	GW	LICENSE PLATE LIGHT <B>	1
8	B	LICENSE PLATE LIGHT <E>	2
9	0.3WB	FRAME WIRING HARNESS	REAR WASHER MOTOR <–>
10	0.3L	REAR WASHER MOTOR <+>	4

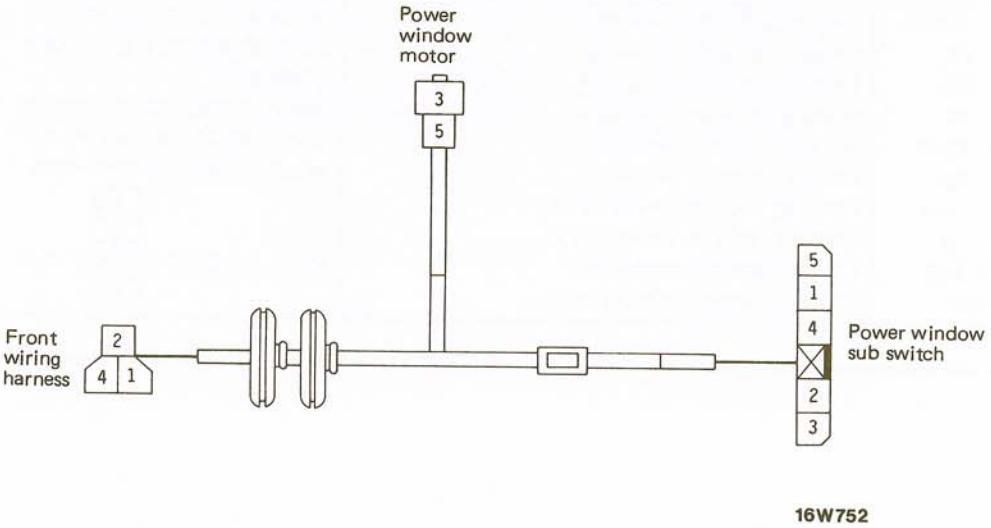
DOOR WIRING HARNESS – Vehicles with a rear power window

Left side



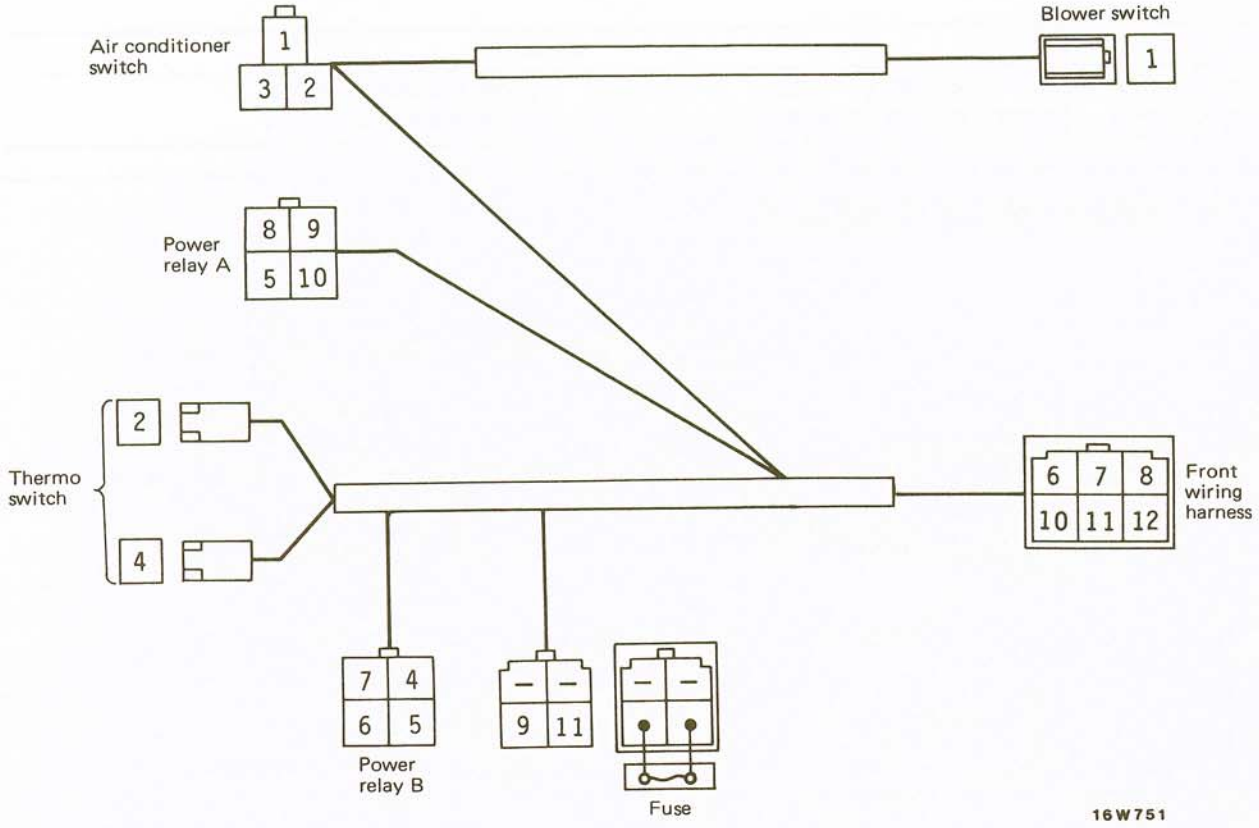
NO.	WIRE	CIRCUIT	
1	2FL	FRONT WIRING HARNESS	POWER WINDOW MAIN SWITCH <B>
2	2FL	FRONT WIRING HARNESS	POWER WINDOW MAIN SWITCH <E>
3	2FW	FRONT WIRING HARNESS	POWER WINDOW MAIN SWITCH
4	1.25FG	FRONT WIRING HARNESS	POWER WINDOW MAIN SWITCH (R.H.-UP)
5	1.25FR	FRONT WIRING HARNESS	POWER WINDOW MAIN SWITCH (R.H.-DOWN)
14	1.25R	POWER WINDOW MAIN SWITCH	POWER WINDOW MOTOR
15	1.25G	POWER WINDOW MAIN SWITCH	POWER WINDOW MOTOR

Right side



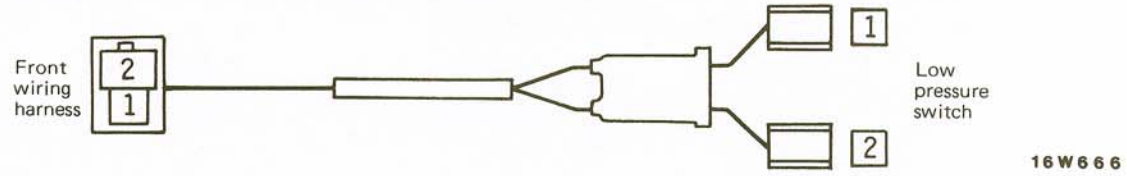
NO.	WIRE	CIRCUIT	
1	2FR	FRONT WIRING HARNESS	POWER WINDOW SUB SWITCH (UP)
2	2FL	FRONT WIRING HARNESS	POWER WINDOW SUB SWITCH <B>
3	2RB	POWER WINDOW MOTOR	POWER WINDOW SUB SWITCH (UP)
4	2FG	FRONT WIRING HARNESS	POWER WINDOW SUB SWITCH (DOWN)
5	2GB	POWER WINDOW MOTOR	POWER WINDOW SUB SWITCH (DOWN)

IR CONDITIONER WIRING HARNESS A



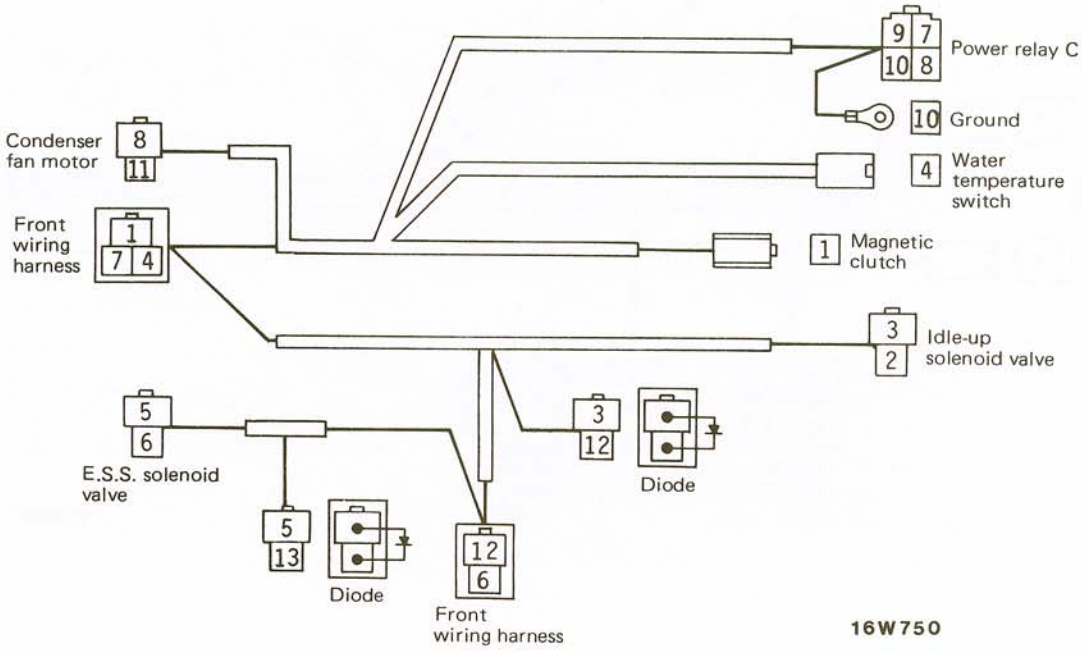
NO.	WIRE	CIRCUIT	
1	0.85WB	BLOWER SWITCH	AIR CONDITIONER SWITCH
2	0.85LB	AIR CONDITIONER SWITCH	THERMO SWITCH
3	B	AIR CONDITIONER SWITCH	[7]
4	0.85GB	THERMO SWITCH	POWER RELAY B
5	0.85L	POWER RELAY B	POWER RELAY A
6	0.85LW	POWER RELAY B	FRONT WIRING HARNESS <ACC>
7	0.85B	POWER RELAY B	FRONT WIRING HARNESS <E>
8	0.85BY	POWER RELAY A	FRONT WIRING HARNESS
9	0.85LR	POWER RELAY A	FUSE
10	0.85BW	POWER RELAY A	FRONT WIRING HARNESS
11	3LR	FUSE	FRONT WIRING HARNESS
12	0.85L	FRONT WIRING HARNESS	[9]

AIR CONDITIONER WIRING HARNESS B



NO.	WIRE	CIRCUIT	
1	0.85BW	FRONT WIRING HARNESS	LOW PRESSURE SWITCH
2	0.85BW	FRONT WIRING HARNESS	LOW PRESSURE SWITCH

AIR CONDITIONER WIRING HARNESS C



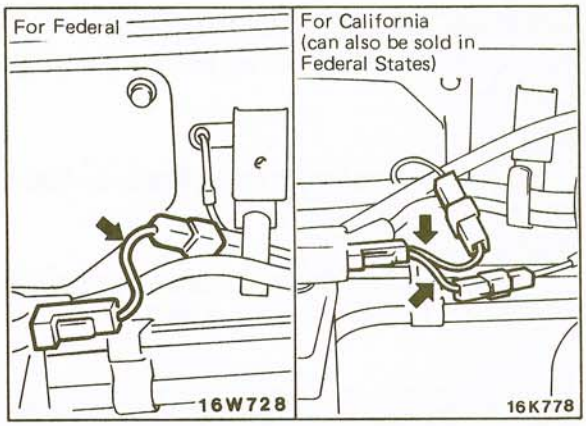
NO.	WIRE	CIRCUIT	
1	0.85BW	FRONT WIRING HARNESS	MAGNETIC CLUTCH [1]
2	0.85BW	IDLE-UP SOLENOID VALVE	
3	0.85B	IDLE-UP SOLENOID VALVE	DIODE
4	0.85BY	WATER TEMPERATURE SWITCH	FRONT WIRING HARNESS
5	0.85BW	E.S.S. SOLENOID VALVE	DIODE
6	0.85L	E.S.S. SOLENOID VALVE	FRONT WIRING HARNESS
7	0.85L	POWER RELAY C	FRONT WIRING HARNESS
8	0.85GB	POWER RELAY C	CONDENSER FAN MOTOR [1]
9	0.85BW	POWER RELAY C	
10	0.85B	POWER RELAY C	GROUND [10]
11	0.85GY	CONDENSER FAN MOTOR	
12	0.85BW	DIODE	FRONT WIRING HARNESS [12]
13	0.85BW	DIODE	

FUSIBLE LINKS

The fusible links consist of main link and sub link. Every circuit except the starter motor uses fusible links.

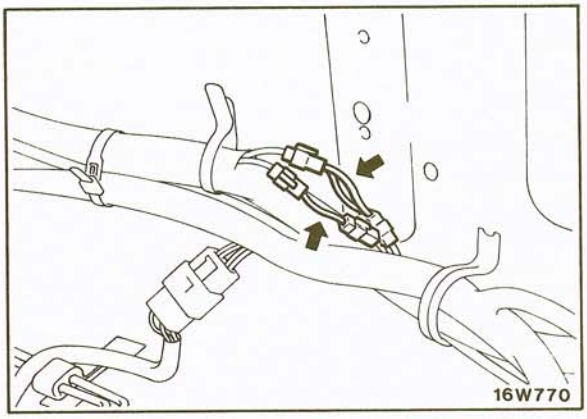
Main fusible link

Connected to the positive (+) terminal of the battery.



Sub fusible link

The sub fusible link is secured with tape to the wiring harness at the rear of the left front fender shield.



Inspection

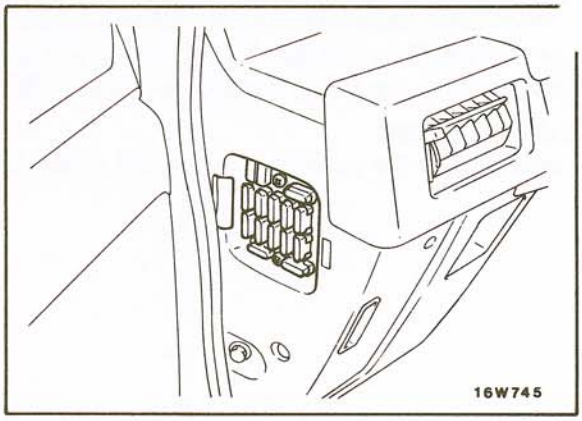
Check for a burnt fusible link with a circuit tester, since visual diagnosis may be difficult.

If a fusible link burns out, the cause is a short or some other problem in the circuit. Carefully determine the cause and correct it before replacing the fusible link.

When replacing fusible links, be sure to use a fusible link of the specified capacity.

FUSE BLOCK

The fuse block is located on the left hand side of the instrument panel.



Inspection

If any of the fuses are to be replaced, be sure to use a fuse of the specified capacity.

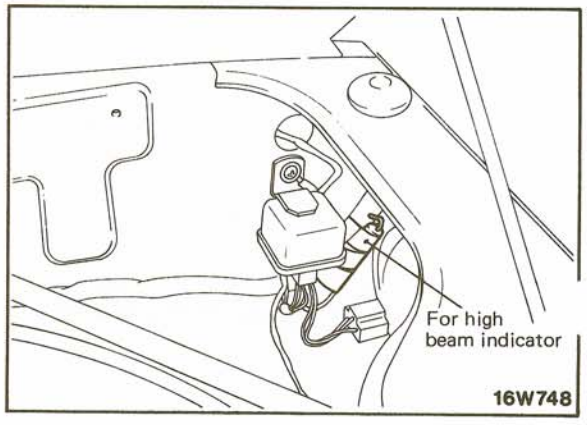
NOTE
If a fuse has failed, locate the cause and completely eliminate the problem before installing a new fuse.

Fuse Capacity Table

Power supply circuit	Fuse No.	Rated capacity A	Applicable circuits
Battery	1	20	Clock, Dome light, Door switches, Hazard warning flashers
Headlight relay	2	10	Tail lights, License plate lights, Illumination lights, Headlight washer relay, Position lights
Ignition switch (IG)	3	10	Heater relay, Seat belt warning timer, Turn-signal lights, Alternator, Seat belt switches, power window relay
	4	10	Back-up lights, Fuel and water temperature gauges, indicator and warning lights, oil pressure gauge, voltage meter
	5	15	Rear window defogger, Rear heater
Battery	6	20	Heater
	7	15	Key-reminder switch, Stop lights, Buzzer, Seat belt switch (L.H.) Door switch (L.H.)
Ignition switch (ACC)	8	15	Windshield wipers and washer, Headlight washer relay, Intermittent wiper relay, Horn
	9	10	Rear window wiper and washer
	10	15	Cigarette lighter, Radio, Tape player, Clock (ACC), Spare terminal

INDEPENDENT FUSE

An independent fuse is provided behind the left-hand headlight, for the high beam indicator light.



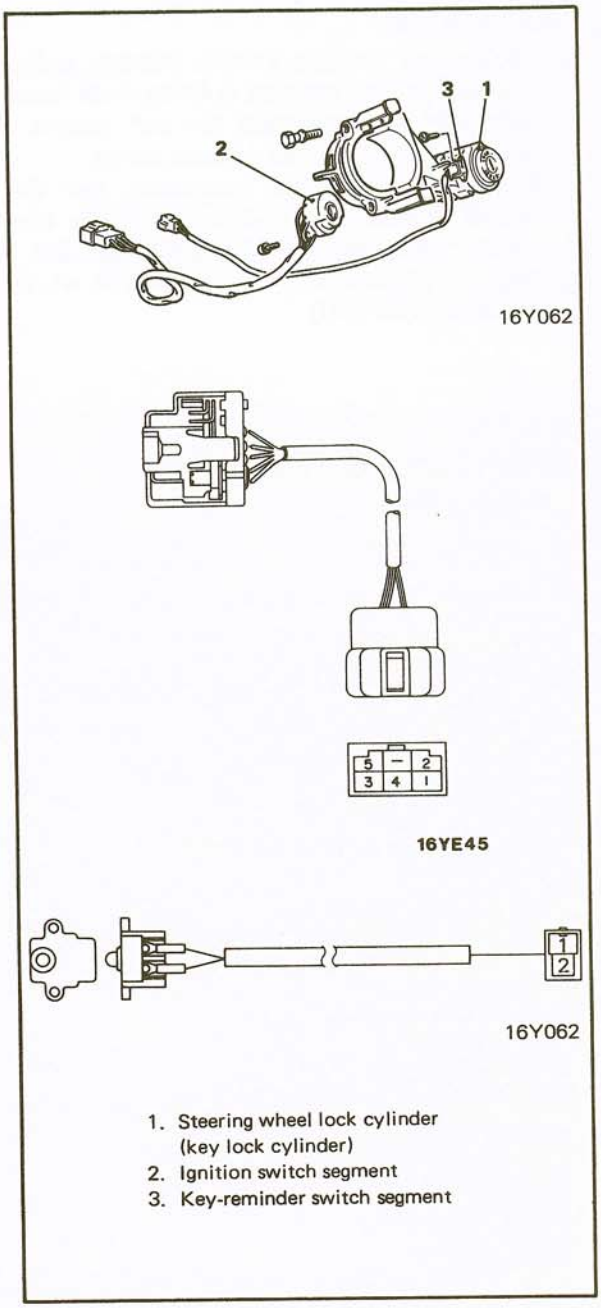
OMPONENTS

Ignition switch

Key position \ Terminal	1	2	3	4	5
LOCK					
ACC	○	○			
ON	○	○	○		
START	○		○	○	○

Key-reminder switch

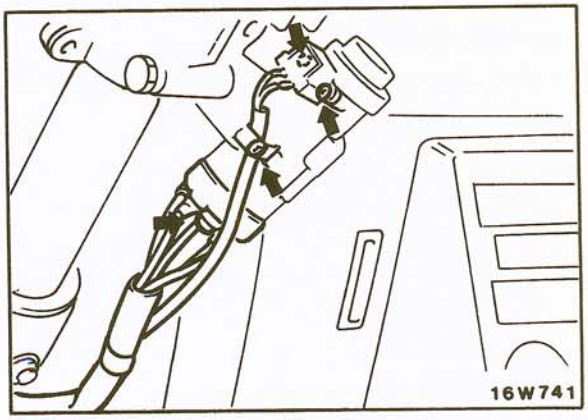
Key position \ Terminal	1	2
When the key is removed	○	○
When the key is inserted		



1. Steering wheel lock cylinder (key lock cylinder)
2. Ignition switch segment
3. Key-reminder switch segment

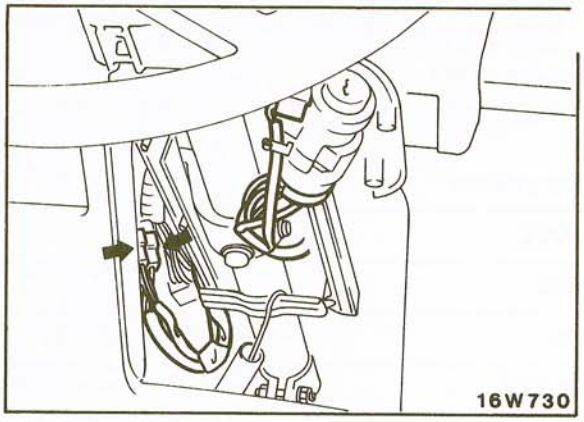
REPLACEMENT OF THE IGNITION SWITCH SEGMENT

1. Disconnect the negative cable from the terminal of the battery.
2. Remove the column cover. (Refer to GROUP 19.)
3. Remove the band clip of the wiring harness, and then disconnect the ignition switch harness connector and the key-reminder switch harness connector.
4. Remove the ignition switch segment and key-reminder switch mounting screws, and then pull the switch segment out of the key cylinder. (16W741)



INSTALLATION

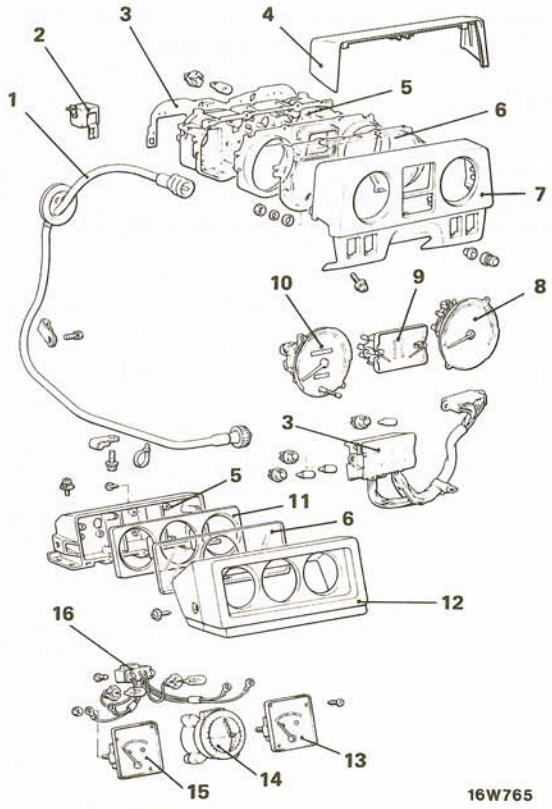
1. Secure the column switch harness and ignition switch harness to the steering column with band clips to make sure that the harnesses are not caught in the boss or moving portion of the column cover.
2. The ignition harness connector and the key-reminder switch harness connector should be connected to the front wiring harness together with the column switch harness connector at the left side of steering support bracket. (16W730)



METERS AND GAUGES

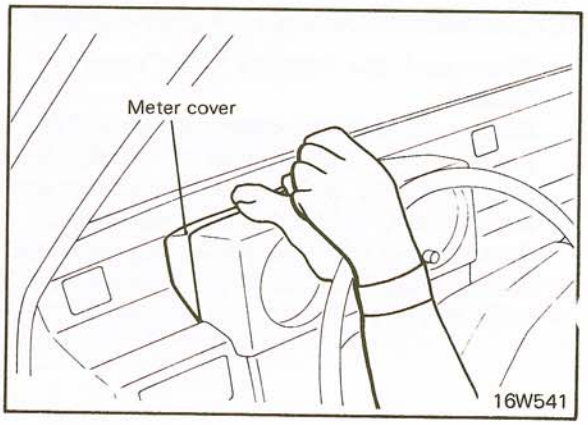
COMPONENTS

1. Speedometer cable
2. Buzzer
3. Printed-circuit board
4. Meter cover
5. Meter case
6. Meter glass
7. Meter hood
8. Speedometer
9. Fuel gauge, water temperature gauge
10. Tachometer
11. Window plate
12. Combination meter pad
13. Voltage gauge
14. Inclinometer
15. Oil pressure gauge
16. Meter wiring harness



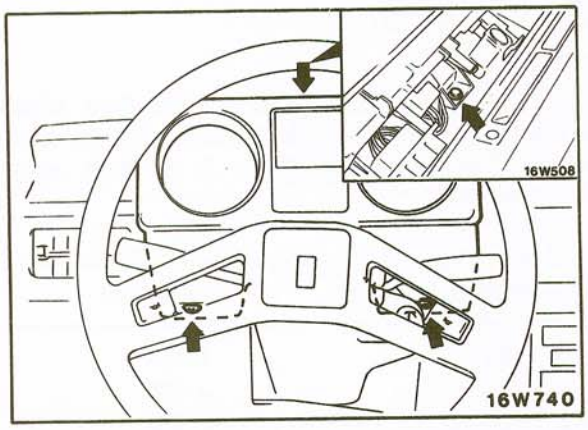
REMOVAL

1. Remove the meter cover.

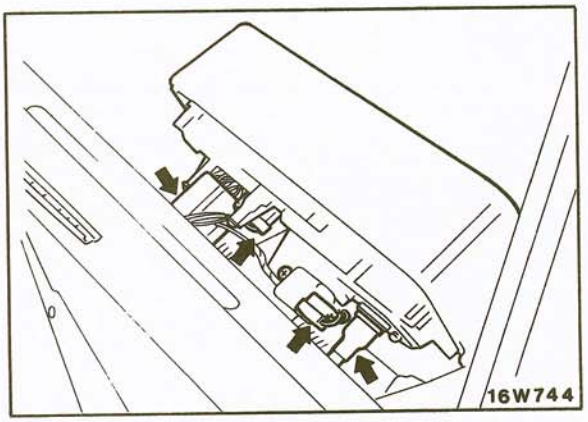


Remove the screws from the bottom of the case. (16W740)

3. Remove the bolt from the upper part of the case. (16W508)



4. Disconnect the speedometer cable from the meter case by pushing the stopper of the plug on the speedometer cable side of the connection. (16W744)
5. Disconnect the connectors of the meter harness and the buzzer (located behind the meter case), and also of the body harness.
6. Disconnect the connectors (all located behind the meter case at the bottom) of the hazard switch, the rear window defogger, and the rear wiper/washer switch, and then remove the meter case.



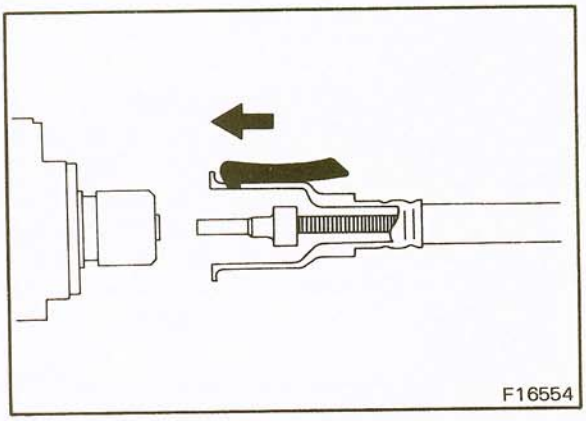
INSTALLATION

When installing the instrument cluster, be sure to secure the speedometer cable and connector positively.

SPEEDOMETER

Replacement of the Speedometer Cable

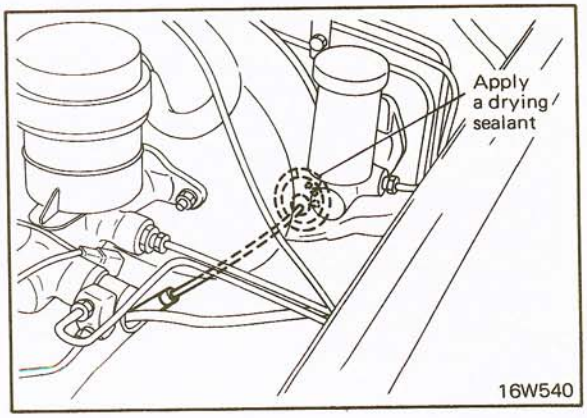
1. Replace the cable assembly if there is a malfunction.
2. When connecting the cable to the speedometer, insert the cable until the stopper properly fits to the speedometer groove. (16F554)



3. After installing the speedometer, pull the speedometer cable through the grommet in the fire wall until the cable marking is visible from the engine compartment side.
4. Apply a drying sealant to the outside surface of the grommet. (16W540)
5. Securely clamp the speedometer cable to the frame clip at the marking (yellow) on the transmission side.

Caution

Disconnect installation of the cable may cause the meter indication to fluctuate, damage a harness, or produce noise.



TACHOMETER

Inspection

Connect a tach-dwell meter, and then compare the meter readings at various engine speeds with the values indicated on the tachometer. If there is a large error, replace the tachometer.

rpm

Engine speed	Tolerance
1,000	± 100
2,000	± 100
3,000	± 150
4,000	± 200
5,000	± 250

Caution
The tachometer is the negative-ground type, and therefore should not be connected in reverse polarity to the battery. If the tachometer is connected in reverse polarity, the transistors and diodes will be damaged.

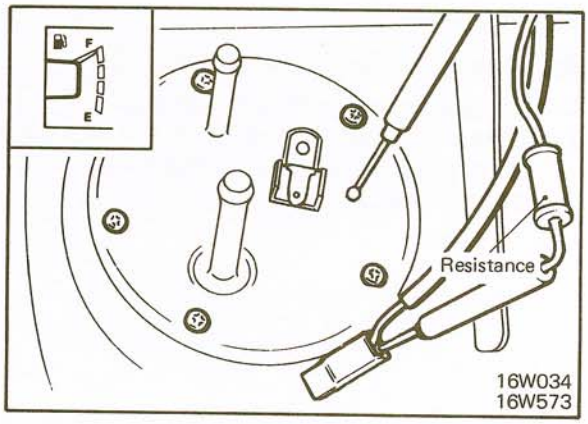
FUEL GAUGE AND UNIT

Inspection

FUEL GAUGE INDICATION TEST

Disconnect the wiring connector from the fuel gauge unit inside the luggage compartment. Connect a resistance between the terminals and confirm the gauge indications.

Indication point	Resistance value
Empty	120 Ω
Full	17 Ω



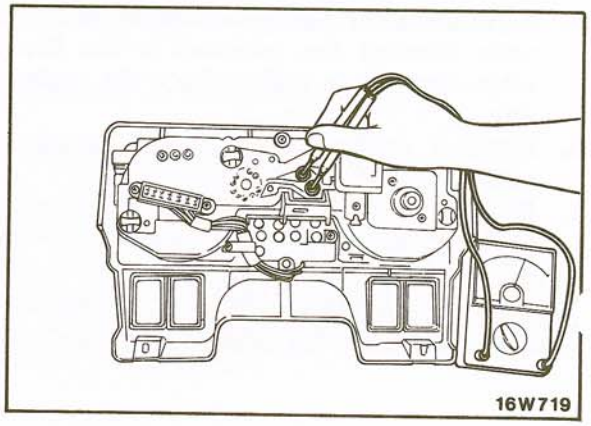
FUEL GAUGE CONTINUITY TEST

Measure the resistance value between the terminals with an ohmmeter.

Resistance value ..... Approx. 25 Ω

NOTE

If the resistance value is extremely small, there may be a short in the coil. If it is extremely large, there may be a broken wire or some other problem in the coil. In either case, replace the gauge.



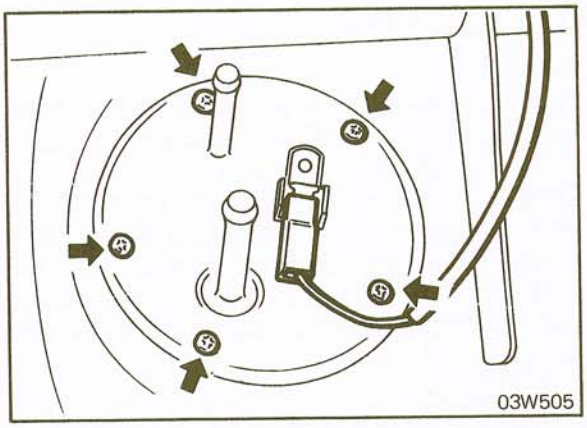
eplacement of the Fuel Gauge Unit

1. Remove the fuel gauge unit. (03W505)

Caution
Since the fuel gauge unit is mounted to the side of the tank, drain the fuel first. The in-tank filter of the fuel gauge unit should be handled carefully because there is the danger of the filter coming out of position.

2. When installing the fuel gauge unit, be careful not to bend the float arm.
3. After installation, confirm that the unit is securely grounded.

Tightening torque	
Fuel gauge unit	1 Nm (0.7 ft.lbs.)



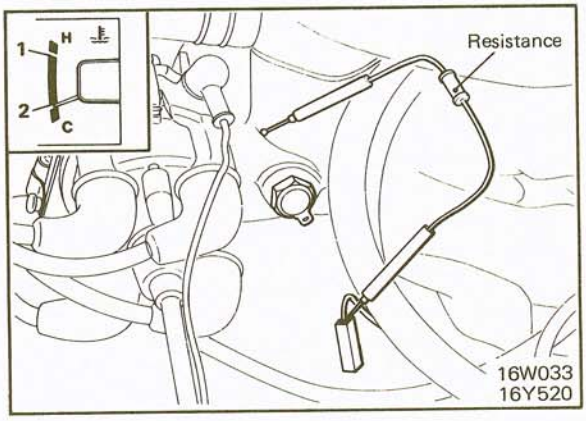
WATER TEMPERATURE GAUGE AND UNIT

Inspection

WATER TEMPERATURE GAUGE INDICATION TEST

1. Disconnect the wiring connector from the water temperature gauge unit inside the engine compartment.
2. Connect a resistance to the connector, and then confirm the gauge indications.

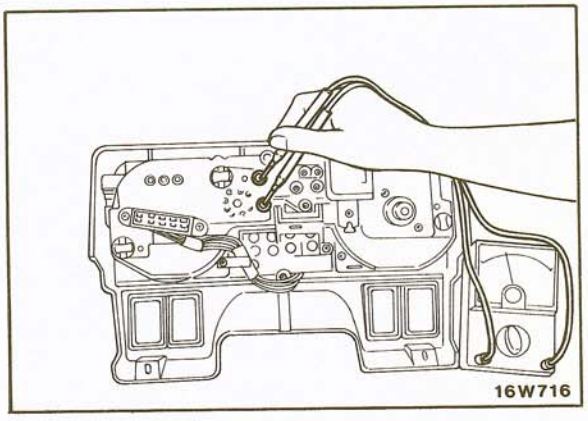
Indication point	Resistance value
(1) 115°C (239°F)	23.8 Ω
(2) 70°C (158°F)	104 Ω



WATER TEMPERATURE GAUGE CONTINUITY TEST

Measure the resistance value between the terminals with an ohmmeter.

Resistance value	Approx. 55 Ω



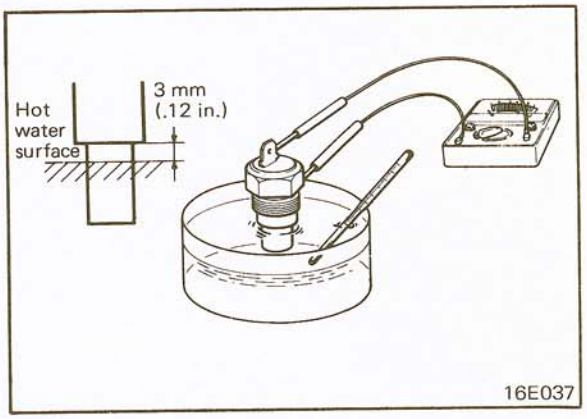
NOTE
If the resistance value is extremely small, there may be a short in the coil; if it is extremely large, there may be a broken wire or some other problem in the coil. In either case, replace the gauge.

WATER TEMPERATURE GAUGE UNIT OPERATION CHECK

Measure the resistance with the gauge unit in hot water at 70° C (158° F).

Resistance value	104 Ω

Caution
The gauge unit should be held with its housing 3 mm (.12 in.) away from the surface of the hot water.



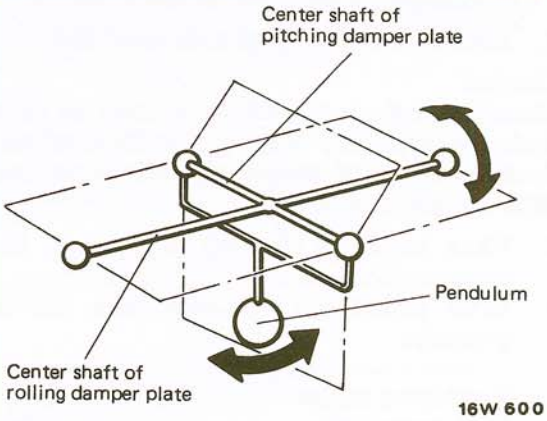
INCLINOMETER

Outline

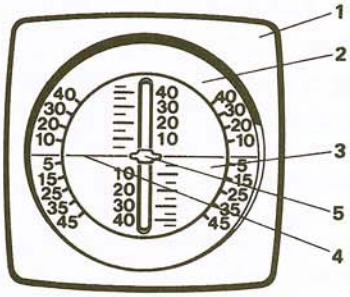
The inclinometer is an instrument which indicates the forward or backward inclination (pitching) or side to side inclination (rolling) of vehicle.
Motion of a pendulum in the system is displayed on the system. The pitching and rolling pointer is supported by a double support mechanism in which the rolling fulcrum is supported in such a way as to be rotatable around the case and the pitching fulcrum supported on the rolling system.

Construction

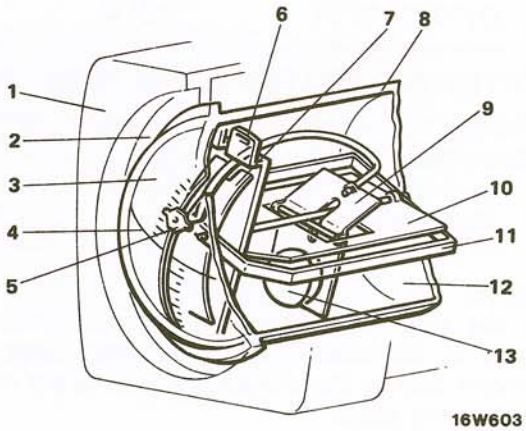
The inclinometer consists of an outer case which inclines with the vehicle, a pointer which is provided in an oil case and always maintains a level position, and a spherical dial. The spherical dial is coupled through the dial support plate to the rolling damper plate. The rolling damper plate is swivel bearing coupled to a stationary frame by the center axis, so it can incline side-to-side, but is always held in a level position by a pendulum. The pointer is coupled with the pitching damper plate.
Since the pitching damper plate is swivel bearing coupled to the rolling damper plate by the center axis, it can incline forward and backward, but is always maintained in a level position by the pendulum.



16W 600



68W500

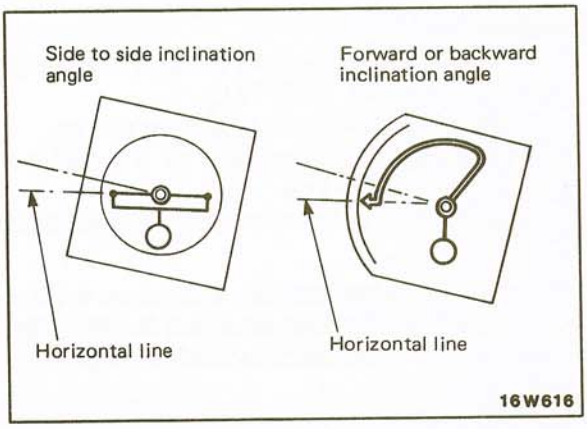


16W603

1. Outer case
2. Front panel
3. Spherical dial
4. Spherical dial horizontal centerline
5. Pointer
6. Dial support plate
7. Blind plate
8. Oil case
9. Pitching damper plate
10. Rolling damper plate
11. Stationary frame
12. Oil
13. Pendulum

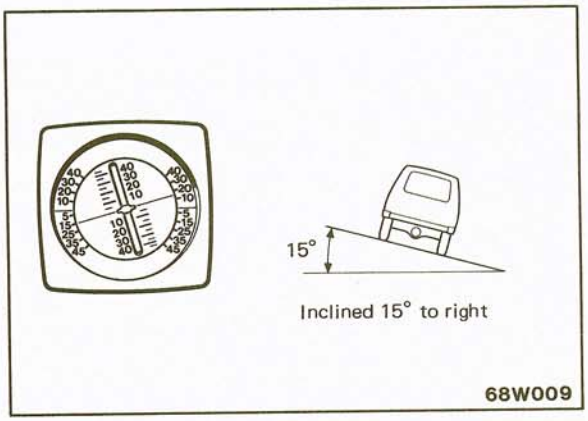
Operation

The side-to-side inclination angle should be read on a scale of the front panel as indicated by the horizontal centerline of the spherical dial, whereas the forward or backward inclination angle should be read on a scale of the spherical dial as indicated by the pointer.



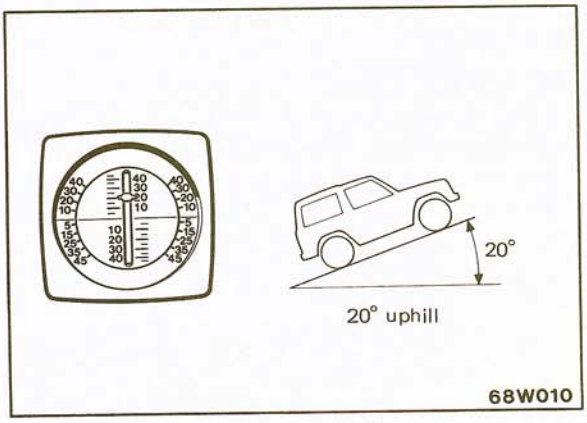
SIDE-TO-SIDE INCLINATION

The front panel inclines with the vehicle, but the spherical dial maintains a horizontal condition, so the horizontal centerline of the spherical dial shows the side-to-side inclination angle.



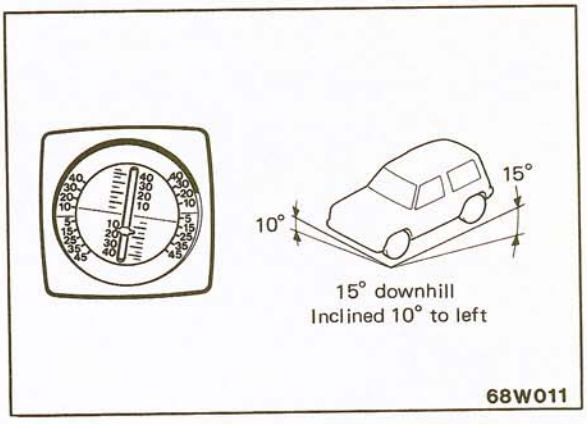
FORWARD OR BACKWARD INCLINATION

The spherical dial inclines forward or backward with the vehicle, but the pointer maintains a level position, so the pointer indicates the forward or backward inclination angle.



COMBINED FORWARD OR BACKWARD AND SIDE-TO-SIDE INCLINATION

The forward or backward inclination angle and the side-to-side inclination angle are indicated by the pointer and spherical dial.

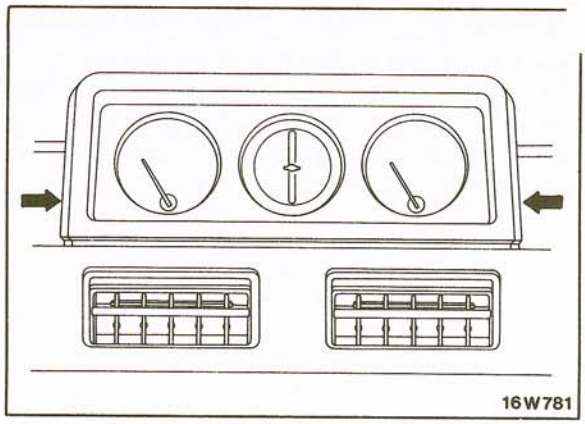


Removal

1. Remove the combination meter. (Refer to p. 8-134.)
2. Remove the pad. (16W781)
3. Remove the meter case attaching screws.
4. Disconnect the connectors of the meter harness located behind the meter case.
5. Remove the inclinometer from the meter case.

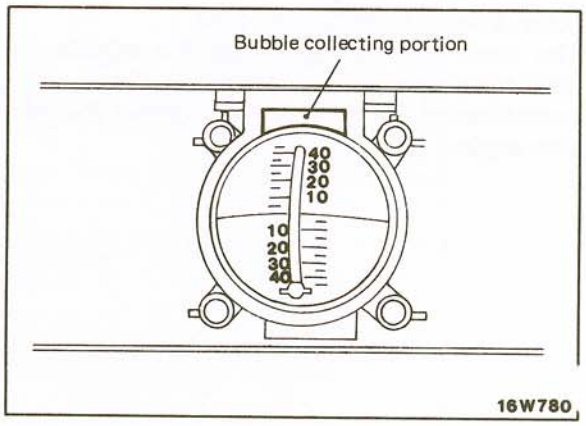
Caution

To prevent internal trouble, the meter must not be dropped or subjected to shock or must not be abruptly inclined to the extent that the maximum indication angle is exceeded.



Installation

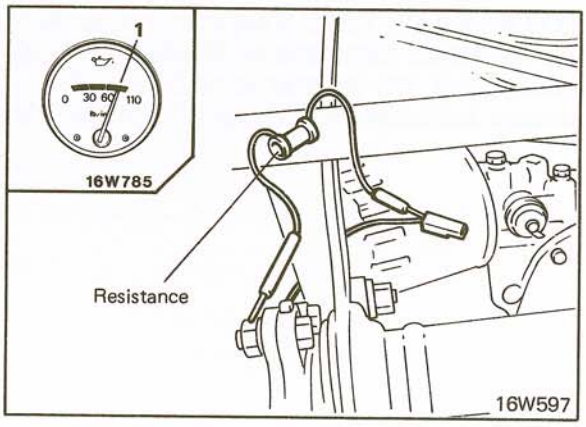
1. Make sure that all water bubbles in the oil case are collected in the upper bubble collecting portion before installation. (16W780)
2. With the vehicle in a level postiion (unladen), check to ensure that the spherical dial and pointer indicate a level position.
3. If the spherical dial and pointer do not indicate that the vehicle is level, adjust the inclinometer by inserting shims between it and either the combination gauge bracket or the instrument panel. If the pointer indication is very far from horizontal, replace the inclinometer.



OIL PRESSURE GAUGE AND UNIT

Removal

1. Remove the combination meter.
2. Remove the pad.
3. Disconnect the oil pressure gauge from the meter wiring harness.
4. Remove the oil pressure gauge to meter case attaching screws.



Inspection

OIL PRESSURE GAUGE INDICATION TEST

Disconnect the wiring connector from the oil pressure gauge unit inside the engine compartment.

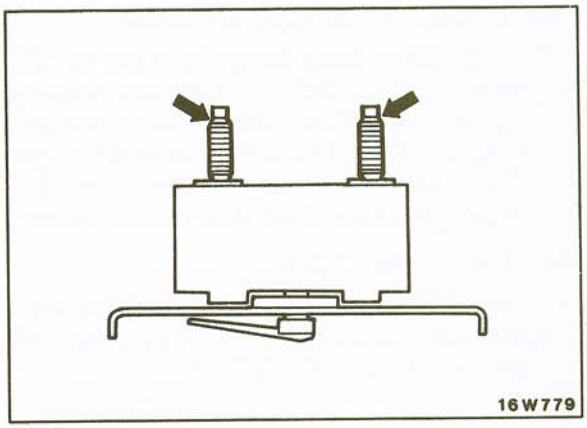
Connect a resistance to the connector, and then confirm the gauge indications. (16W785, 16W597)

Indication point	Resistance value
(1) 588 kPa (85 psi)	120Ω

IL PRESSURE GAUGE CONTINUITY TEST

Measure the resistance value between the terminals with an ohmmeter.

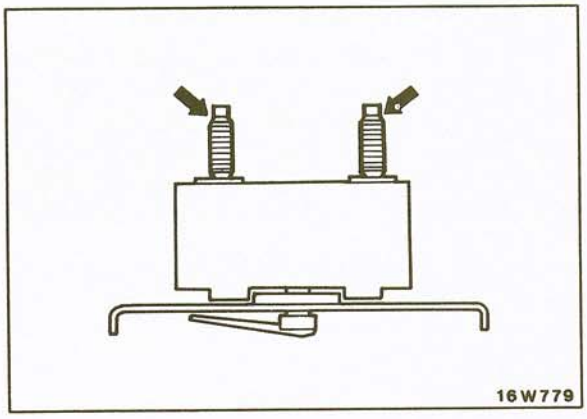
NOTE
If the resistance value is extremely small, there may be a short in the coil; if it is extremely large, there may be a broken wire or some other problem in the coil.



VOLTAGE METER

Removal

1. Remove the combination meter.
2. Remove the pad.
3. Disconnect the voltage meter from the meter wiring harness.
4. Remove the voltage meter to meter case attaching screws.



Inspection

VOLTAGE METER CONTINUITY TEST

1. Connect an ohmmeter to the voltmeter. (16W779)
2. Confirm that the value indicated on the ohmmeter agrees with the standard value.

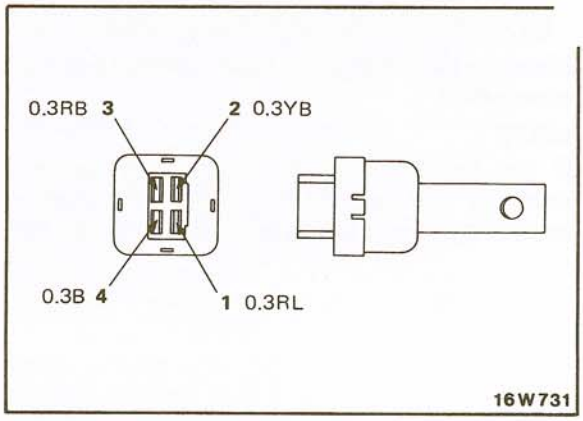
Resistance value	420Ω

SEAT BELT WARNING SYSTEM

1. If the driver turns the ignition key to "ON" while his seat belt is unbuckled, the seat belt warning system is activated to provide an audible and visual reminder through a buzzer and light to fasten the seat belt properly.
2. The seat belt warning system consists of a belt switch, buzzer, warning light, belt warning timer.

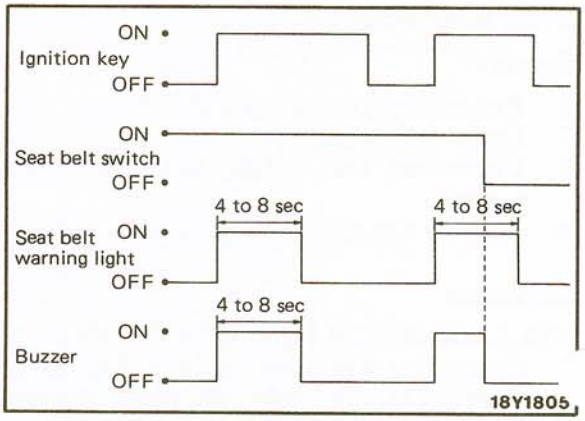
Seat Belt Warning Timer

The timer operates when the ignition key is in the "ON" position and terminals 2 and 3 are electrically connected to terminal 4 (ground). (16W731)



Seat Belt Warning Light and Buzzer

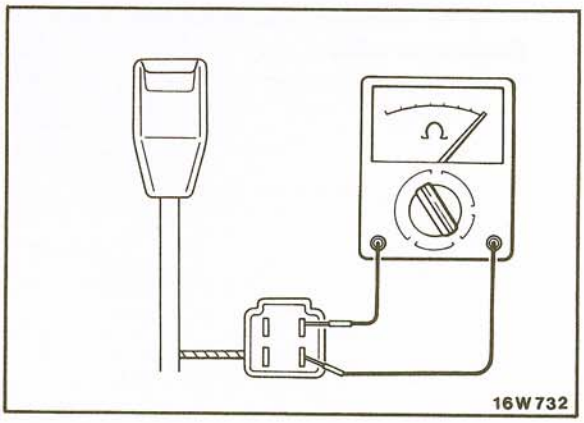
When the seat belt switch is ON (seat belts not buckled) with the ignition key at the ON position, the seat belt warning timer causes the seat belt warning light to illuminate and the buzzer to sound for 4 to 8 seconds. If the seat belt switch is set to OFF (the seat belts buckled) during the seat belt warning timer interval, only the buzzer is cancelled.



Seat Belt Switch

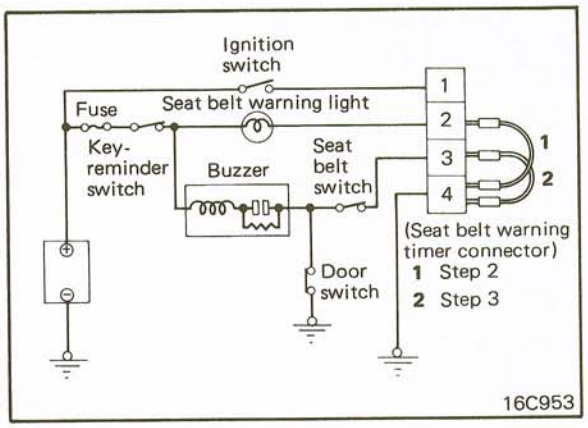
CONTINUITY TEST

1. Pull back the floor mat and disconnect the seat belt switch connector from where it is at the attachment to the buckle stalk assembly.
2. Use an ohmmeter to check for a short circuit at the 0.3-Y wire and the 0.3-RB wire of the driver's seat belt switch. (16W732)
3. If the ohmmeter reads no resistance with the buckle unlocked and indicates an open circuit when the buckle is locked, the belt switch is operating properly.
4. If a microswitch is defective, the buckle stalk assembly containing microswitch should be replaced. For replacement, see GROUP 23.

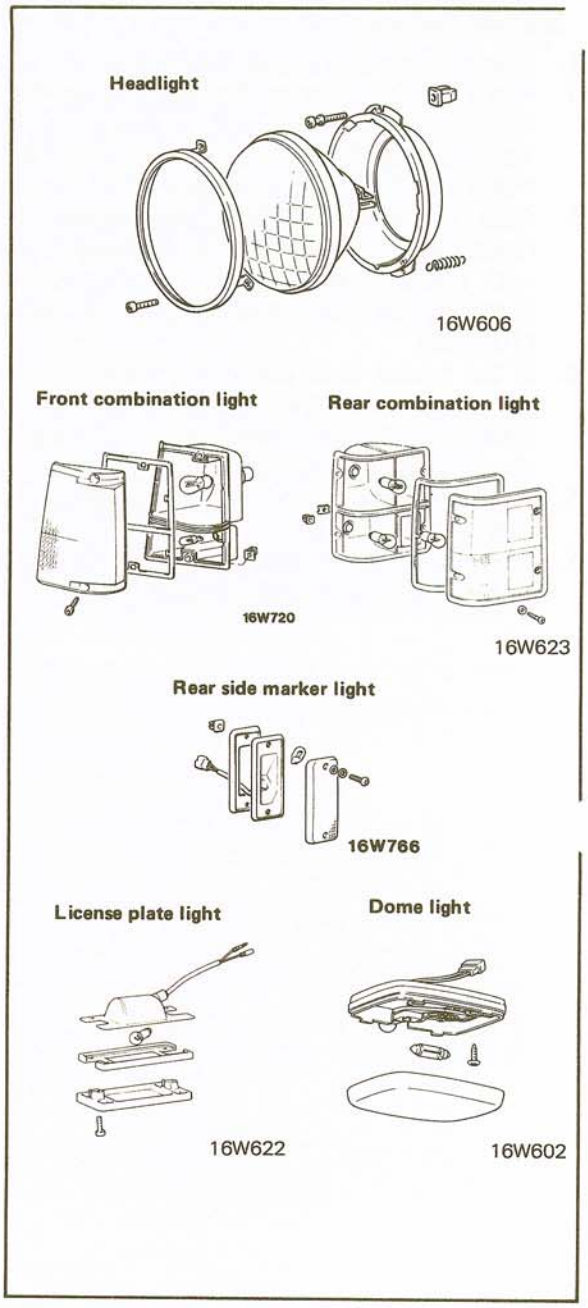


ystem Inspection

1. Disconnect the seat belt warning timer connector.
2. When the 0.3-YB wire (terminal 2) and 0.3-B wire (terminal 4) are connected with a jumper wire, the seat belt warning light should illuminate. If it fails to illuminate, check the bulb, key-reminder switch and fuse. (16C953)
3. Also the buzzer should sound when the 0.3-RB wire (terminal 3) and 0.3-B wire (terminal 4) are connected with a jumper wire. In this condition, fasten the buckle; if the buzzer stops sounding, the seat belt switch is good. (16C953)
4. If the buzzer does not sound when terminal 3 and terminal 4 are connected with a jumper wire, and check continuity of the seat belt switch. If these is continuity in the seat belt switch, replace the buzzer.
5. After performing the above inspections, connect the seat belt warning timer.
6. With the ignition switch turned to IG, verify the function of the seat belt warning system.



COMPONENTS



HEADLIGHTS

1. The headlight system consists of two sealed-beam bulbs.
2. The bulbs are the dual filament type for low and high beams and are marked by a number 2DI molded in the lens.
3. The low beam is intended for use in congested areas and on highways when oncoming vehicles are within a distance of 153 m (500 ft.).
4. The high beam is intended primarily for distant illumination and for use on the open highway when there are no oncoming vehicles.

IMING

Pre-aiming Instructions

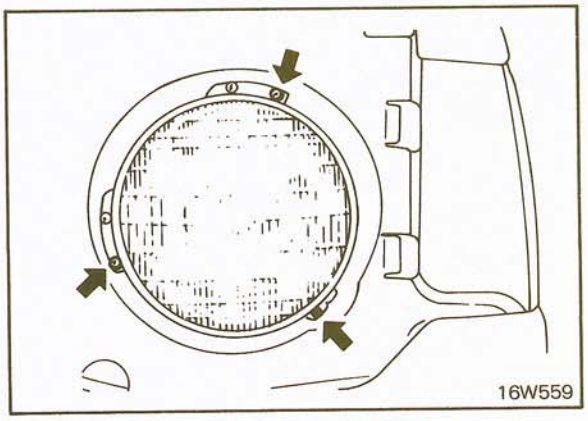
1. Test dimmer switch operation.
2. Confirm operation of high beam indicator light mounted in instrument cluster.
3. Inspect for badly rusted or faulty headlight assemblies. These conditions must be corrected before a satisfactory adjustment can be made.
4. Fill the fuel tank.
5. Position vehicle on a level floor.
6. Bounce the front of the vehicle up and down three times by applying your body weight to the hood or bumper.
7. Check tire inflation.
8. Rock vehicle sideways to allow it to assume its normal position.
9. There should be no other load in the vehicle except the driver or substituted weight of approximately 70 kg (150 lbs.) placed in driver's seat.
10. Thoroughly clean headlight lenses.
11. Adjust headlights by following the instructions for the headlight tester.

Removal

1. Remove the radiator grille, front combination light and headlight bezel. (Refer to GROUP 23.)
2. Disconnect the harness connector from the bulb socket.
3. Remove the retaining ring from the mounting ring. (16W559)

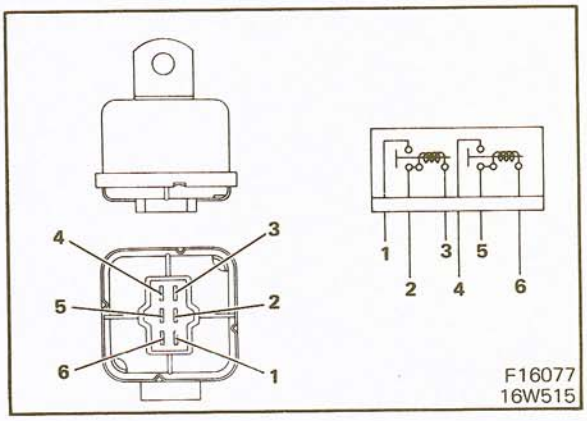
Caution
Do not disturb headlight adjusting screws.

4. Remove the headlight assembly.

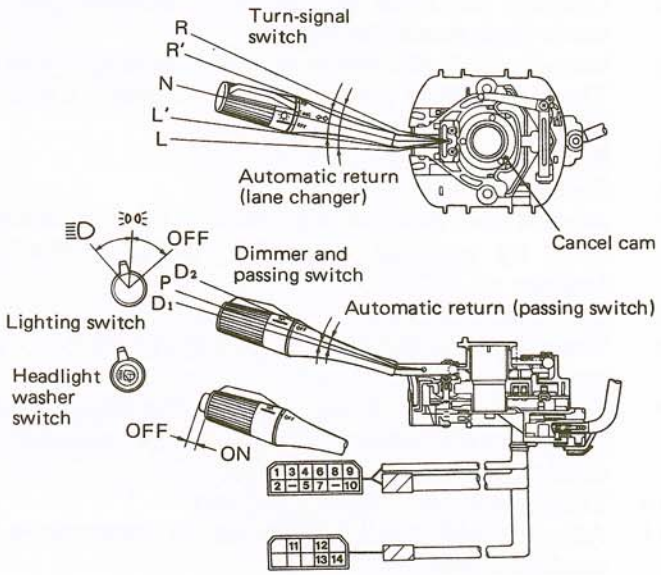


LIGHT CONTROL RELAY

1. Check to ensure that when battery voltage is applied between terminals 2 and 3 and between terminals 5 and 6 an operating sound (click) is heard. (F16077, 16W515)
2. In the above conditions, check to see if the battery voltage is applied to terminals 1 and 4. (F16077, 16W515)



LIGHTING SWITCH



NOTE
R' and L' indicate lane-changing operation.

16W734

Terminal			Lighting switch			Dimmer and passing switch			Turn-signal switch			Headlight washer switch		Horn switch	
No.	Wire	Used for	OFF	≡D	≡D	D_1	D_2	P	L (L')	N	R (R')	OFF	ON	OFF	ON
1	(G)	Lighting switch (≡D)		○	○										
2	R	Lighting switch (≡D)			○			○							
3	0.85GR	Turn-signal power supply							○		○				
4	0.85GL	Turn-signal light (L.H.)							○						
5	0.85GY	Turn-signal light (R.H.)									○				
6	2RW	Dimmer switch (low beam)				○		○							
7	2R	Dimmer switch (high beam)					○	○							
8	(B)	Lighting switch ground		○	○										
9	GB	Horn switch													○
10	(L)	Headlight washer relay											○		○
11	2B	Ground				○	○	○					○		
12	0.85WG	Stop light switch								○					
13	0.85WR	Stop light (R.H.)								○	○				
14	0.85WL	Stop light (L.H.)							○	○					

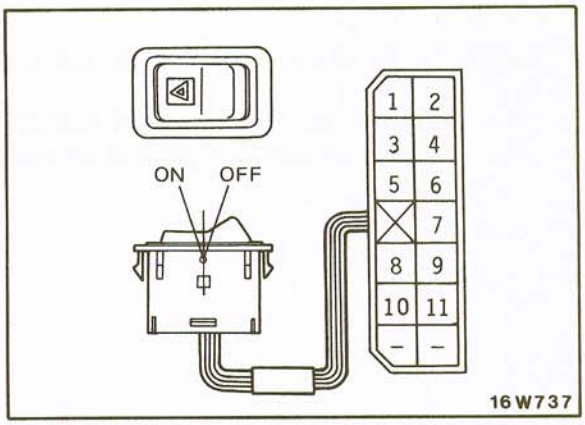
NOTE
The sizes for wires whose size is not specified in the "Wire" column above are 0.3 mm² for items in parentheses, and 0.5 mm² for all others.

AZARD WARNING SWITCH

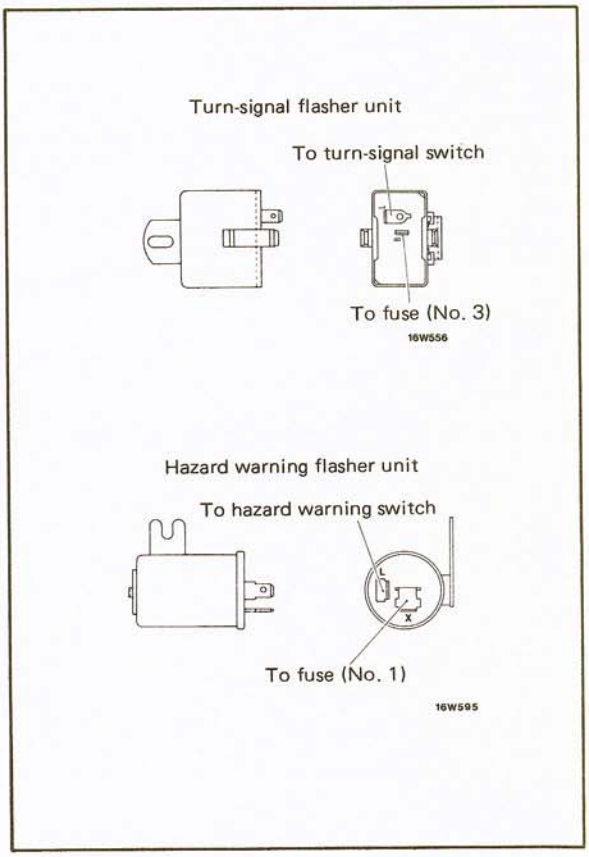
Inspeciton

Move the switch to ON and OFF, and check the continuity between the terminals.

Terminal No.	Switch position OFF	Switch position ON	Connection point
1	○	○	Fuse block No.2
2	○	○	Ground
3		○	Front turn-signal light (L.H.)
4		○	Rear turn-signal light (L.H.)
5	○		Stop light switch
6	○		Turn-signal flasher unit
7		○	Hazard warning flasher unit
8	○		Column switch
9	○		Column switch
10		○	Front turn-signal light (R.H.)
11		○	Rear turn-signal light (R.H.)

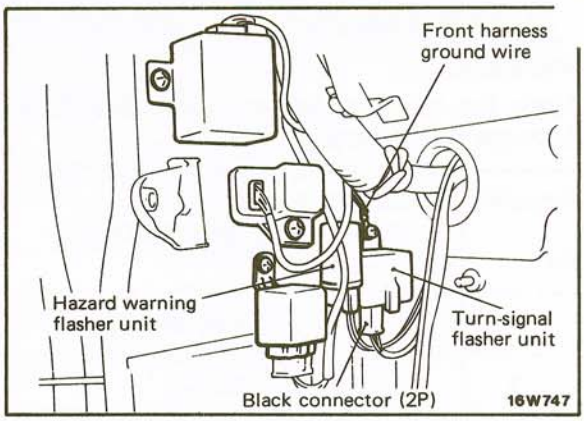


TURN-SIGNAL AND HAZARD WARNING FLASHER UNIT



Installation

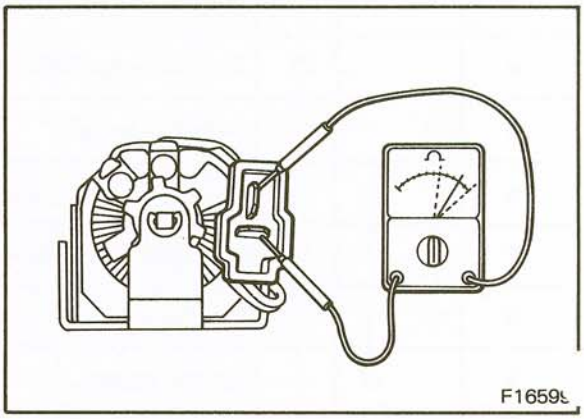
1. Connect the black connector to the turn-signal flasher unit. (16W747)
2. The ground wires for turn-signal flasher unit and front-wiring harness should be tightened together. (16W747)



DIMMER CONTROL SWITCH

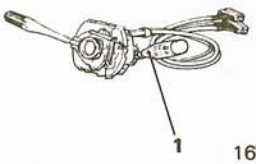
Inspection

1. With the connector disconnected, measure the continuity between the dimmer control switch terminals with an ohmmeter. (F16599)
2. If the resistance value varies smoothly between 0 and 10 ohms throughout the entire operation range, the dimmer control switch is functioning properly. (F16599)

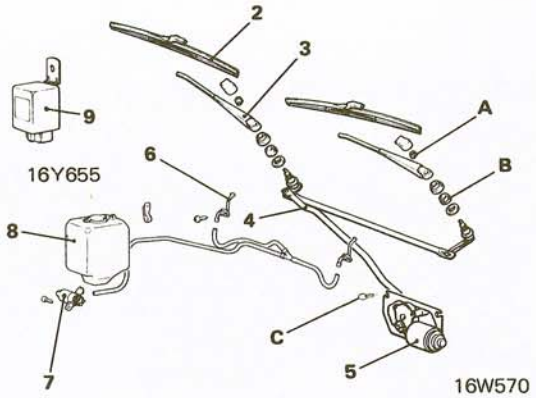


ɔMPONENTS

1. Wipers and washer switch assembly
2. Wiper blade
3. Wiper arm
4. Wiper linkage
5. Wiper motor
6. Washer nozzle
7. Washer motor
8. Washer tank
9. Intermittent wiper relay



16W712



16W570

	Nm	ft.lbs.
A	10-16	7-12
B	7	5
C	3	2

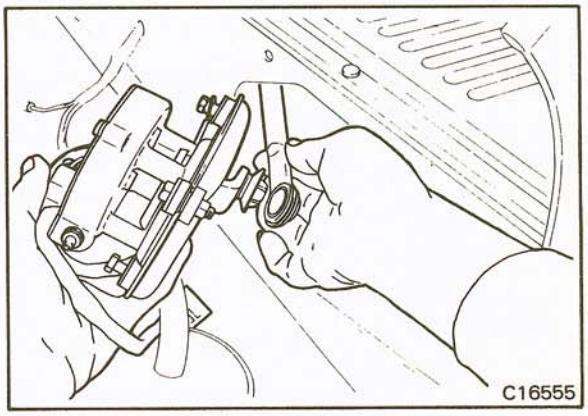
WIPER MOTOR AND LINKAGE

Removal

1. Remove the wiper arms and the pivot shaft mounting nuts, then push the pivot shafts toward the inside.
2. Loosen the wiper motor mounting bolts, and then with the motor pulled out slightly, disconnect the linkage and the motor. (C16555)
3. Remove both the motor and the linkage.

Caution

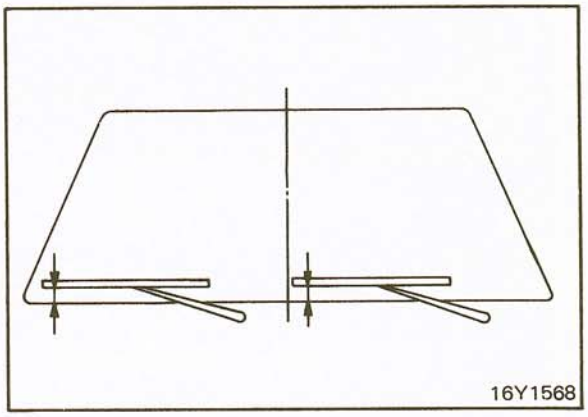
Because the installation angle of the crank arm and the motor has been set, do not separate them unless it is necessary to do so. If they must be separated, do so only after marking the mounting positions.



Installation

Install the wiper arms on the pivot shafts so that the stopping position of the wiper blades is at the specified point. (16Y1568)

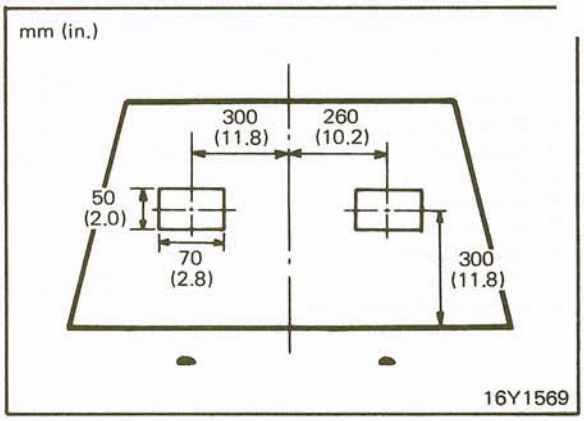
Wiper blade stopping position (distance between blade tip and front deck garnish) . . . . . 37-47 mm (1.5-1.9 in.)



WINDSHIELD WASHER

Inspection and Adjustment

Check the washer fluid spray pattern.
Adjust by moving the nozzle.



INTERMITTENT WIPER RELAY

Inspection

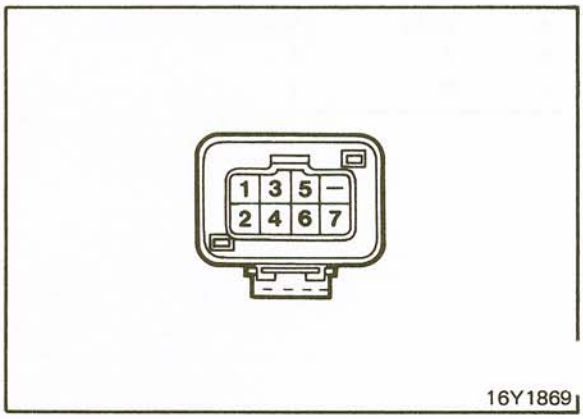
If the wipers do not stop in the correct position when the wiper switch is set to the star mark:
(1) Check whether the output of the voltage from terminal 3 is synchronized with the operation of the wipers.

When the wipers are stopped:	12 V
When the wipers are operating:	0 V

If the wipers do not operate intermittently when the wiper switch is set to the star mark:
(1) Perform the same check as described above.

If the wipers do not operate when the wiper switch is set to the star mark:
(1) Confirm that power is being supplied to terminals 1 and 4.
(2) Confirm that the voltage between terminal 6 and ground is 0 V.
(3) Confirm that the voltage between terminal 3 and ground is 0 V.

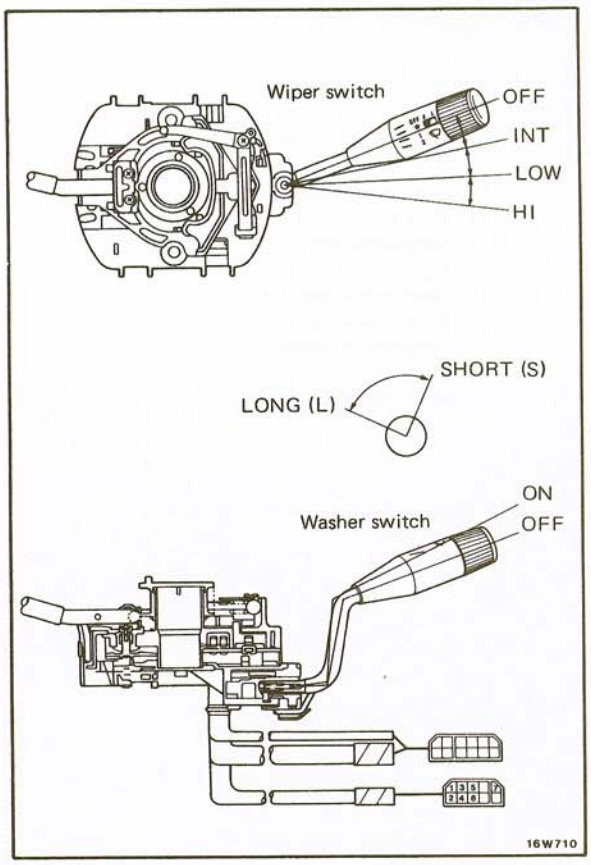
If the wipers do not operate when the washer switch is turned ON:
(1) Confirm that power is being supplied to terminals 1 and 4.
(2) Confirm that the voltage between terminal 5 and ground is 0 V while the washer switch is ON.
(3) Confirm that the voltage between terminal 3 and ground is 12 V at the moment that the washer switch is turned on, and that the voltage is 0 V approximately one second later. Also, confirm that the voltage is 0 V 2 to 5 seconds after the washer switch is turned off.



INDSHIELD WIPER AND WASHER SWITCH ASSEMBLY (COLUMN SWITCH)

Inspection

Move the column switch to each position to check for continuity between terminals.



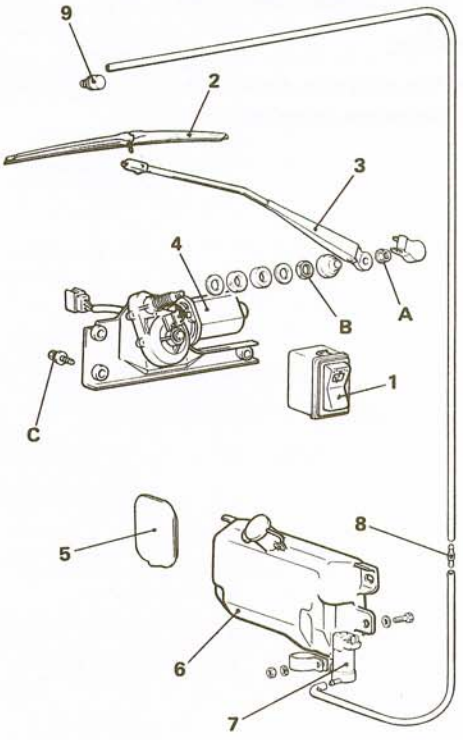
Terminal			Wiper/washer switch				Intermittent time adjusting switch
No.	Wire	Used for	OFF	INT (★)	LOW (1)	HI (2)	SHORT ~ LONG (S) (L)
1	YL	Washer switch (ON)	○	○	○	○	
2	LB	Wiper switch (High speed)				○	
3	2B	Ground	○	○ ○	○ ○	○ ○	○
4	BY	Wiper switch (Intermittent)		○			
5	BR	Wiper switch (OFF)	○	○			
6	LO	Wiper switch (Low speed)	○	○	○		
7	0.3Y	Intermittent time adjusting switch					○

Remarks
The dotted lines indicate that the automatic-return switch is ON.

COMPONENTS

1. Rear wiper and washer switch
2. Rear wiper blade
3. Rear wiper arm
4. Rear wiper motor
5. Rear washer tank lid
6. Rear washer tank
7. Rear washer motor
8. Joint
9. Rear washer nozzle

	Nm	ft.lbs.
A	7-10	5-7
B	8-12	6-9
C	7-10	5-7

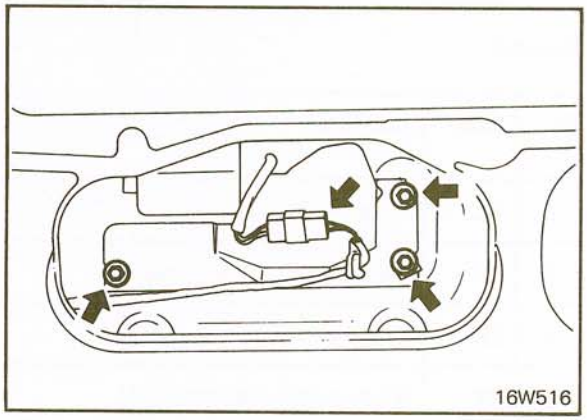


16W568

REAR WIPER MOTOR AND WIPER ARM

Removal

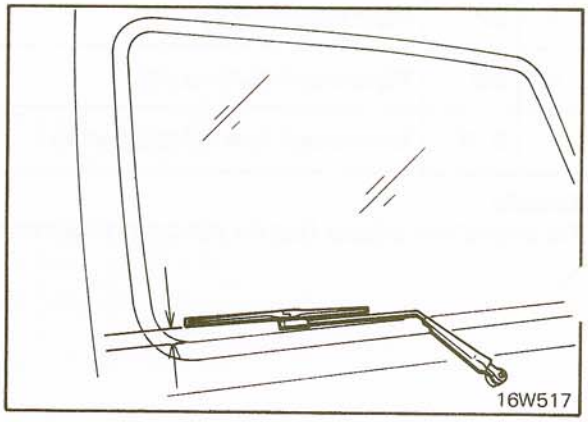
1. Remove the spare wheel from the back door.
2. Remove the wiper arm and remove the pivot shaft locking nut.
3. Remove the back door trim and remove the waterproof film. (Refer to GROUP 23.)
4. Remove the rear wiper motor mounting bolts and remove the rear wiper motor. (16W516)


16W516

Installation

Adjust the mounting position of the wiper arm so that the stopping position of the wiper blade agrees with the standard value.

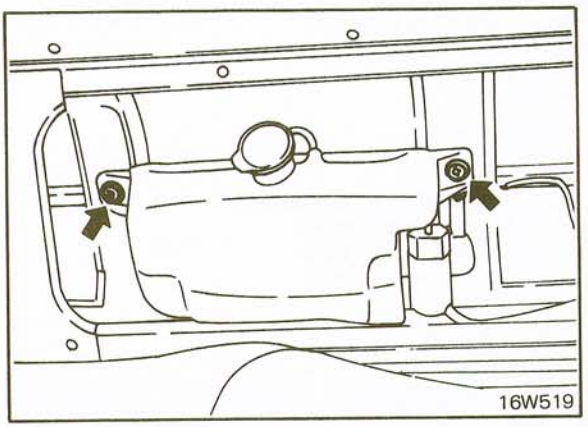
Wiper blade stopping position (distance between blade tip and back door window weatherstrip . . . . 20 mm (.8 in.)


16W517

:AR WASHER TANK

Removal

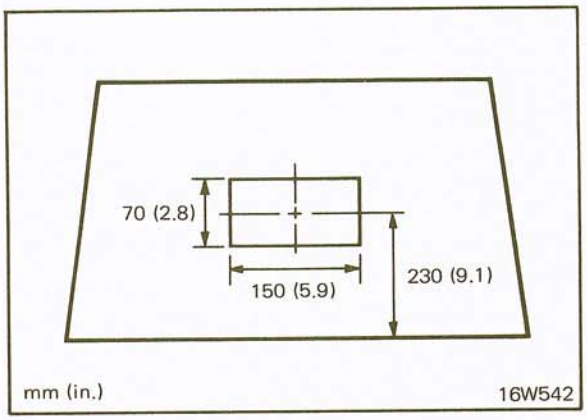
1. Remove the right rear quarter trim.
2. Remove the rear washer tank mounting screws and then remove the tank. (16W519)



REAR WASHER NOZZLE

Inspection and Adjustment

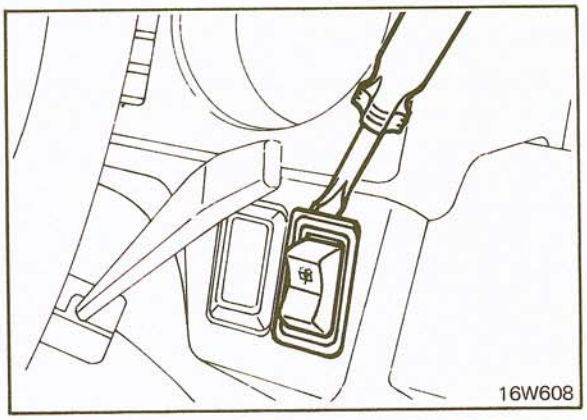
Check the washer fluid spray pattern.
Adjust the nozzle.



REAR WIPER AND WASHER SWITCH

Removal

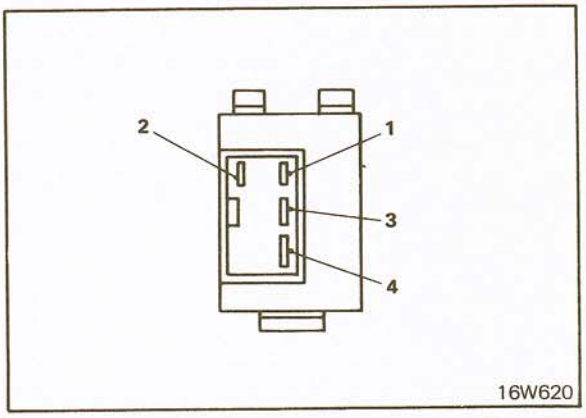
Remove the switch from the instrument cluster and disconnect the connector.



Inspection

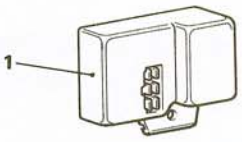
Operate the switch and check the continuity between the terminals.

Position \ Terminal	1	2	3	4
Washer	○			○
Wiper OFF		○	○	
Wiper ON			○	○
Wiper Washer	○		○	○

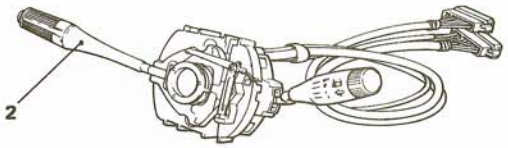


COMPONENTS

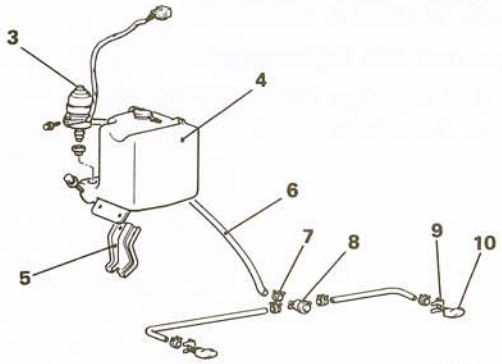
1. Headlight washer control relay
2. Headlight washer switch
3. Headlight washer motor
4. Headlight washer tank
5. Bracket
6. Main hose
7. Clamp
8. Check valve
9. Nozzle clamp
10. Headlight washer nozzle



16Y1514



16W712

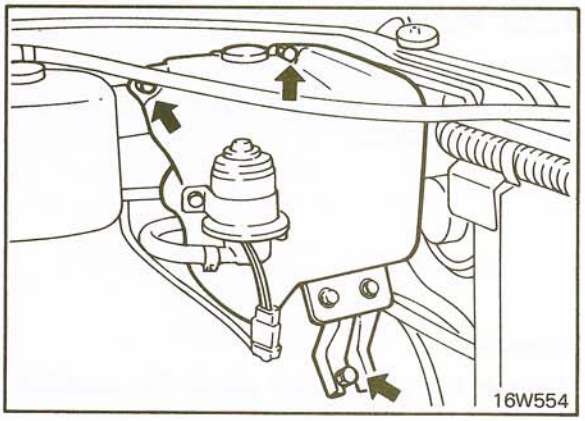


16W569

HEADLIGHT WASHER TANK

Removal

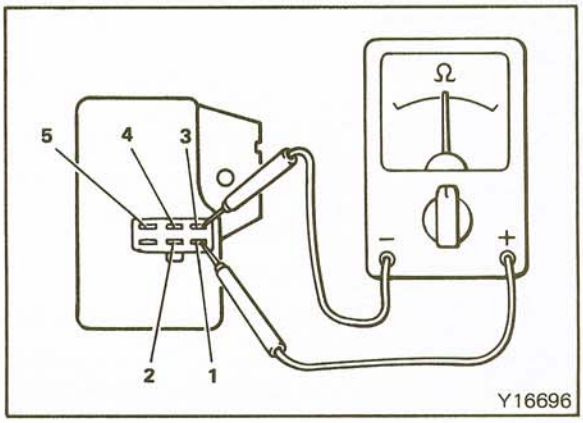
Remove the headlight washer tank mounting bolts and remove the tank.


16W554

HEADLIGHT WASHER CONTROL RELAY

Continuity Test

1. Check for continuity between the terminals of the headlight washer control relay with an ohmmeter. (Y16696)
2. If the results obtained do not agree with the conditions of continuity shown in the chart below, replace the relay.



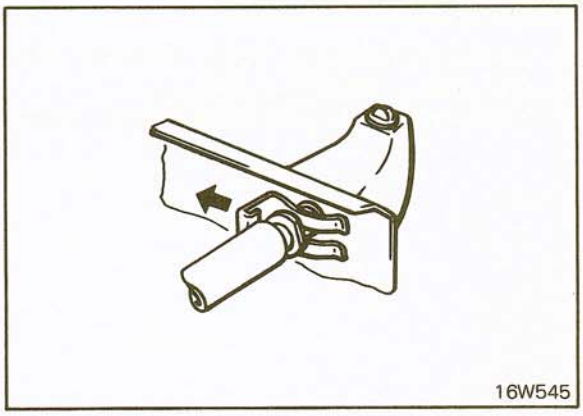
1	2	3	4	5
⊖		⊕		
	⊖	⊕		
		⊕	⊖	
		⊕		⊖

NOTE
Connect the test probe (+) to terminal 3. There should be no continuity in the opposite direction; therefore, during inspection, pay attention to the direction of continuity when connecting the test probe.

HEADLIGHT WASHER NOZZLES

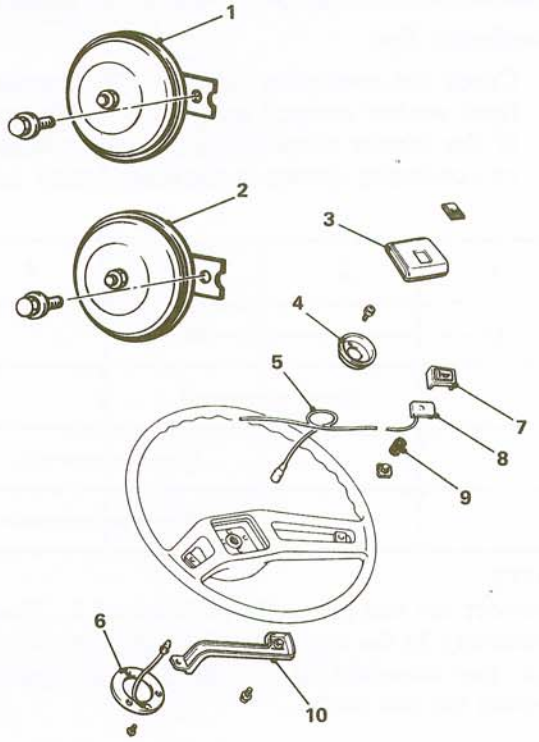
Removal

1. Remove the radiator grille and headlight bezels. (Refer to GROUP 23.)
2. Remove the nozzle clamp and remove the washer nozzle from the grille filler panel. (16W545)



COMPONENTS

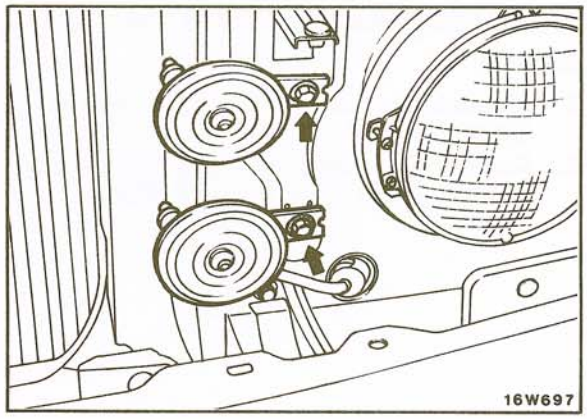
1. Horn (high pitch)
2. Horn (low pitch)
3. Center pad
4. Fixture
5. Horn cable
6. Contact plate
7. Horn button
8. Contact cup
9. Horn spring
10. Pad



16W5
16D86

REMOVAL

1. Remove the radiator grille. (Refer to GROUP 23.)
2. Disconnect the horn connectors.
3. Remove the horn mounting bolts. (16W697)



INSPECTION

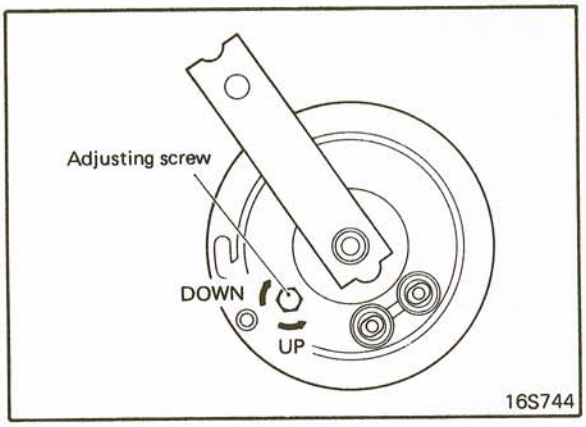
1. Check horn switch contact for burned-out or short-circuited.
2. Check horn switch spring for broken or damaged.
3. Check horn switch harness for damage.
4. Check horn adjustment screw for looseness.
5. Check the horn for water, dirt or other foreign matter lodged.

ORN ADJUSTMENT

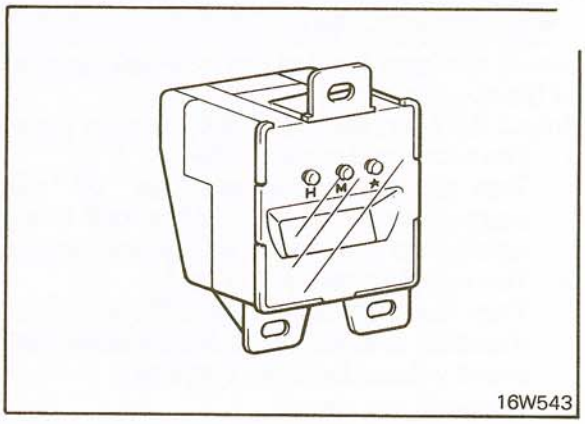
Secure the horn bracket in a vice, and then connect a battery of the specified voltage (12 volts).
Sound the horn, and adjust it by turning the adjusting screw.

1. The sound volume is too low:
   Turn the adjusting screw in the "UP" direction within a range of about 180°, and then lock it in position when a satisfactory sound volume has been obtained.
2. The sound volume is too loud:
   Turn the adjusting screw 20° to 30° in the "DOWN" direction, and then lock it in positon when a satisfactory sound volume has been obtained.
3. Horn will not sound:
   Turn the adjusting screw slightly in the "UP" direction until the horn sounds, find a satisfactory sound volume by continuing to turn the screw within a range of 180°, and then lock the screw in place.
   If a satisfactory volume cannot be obtained, replace the horn.

Caution
After the adjustment, apply lacquer to prevent the adjusting screw from becoming loose.

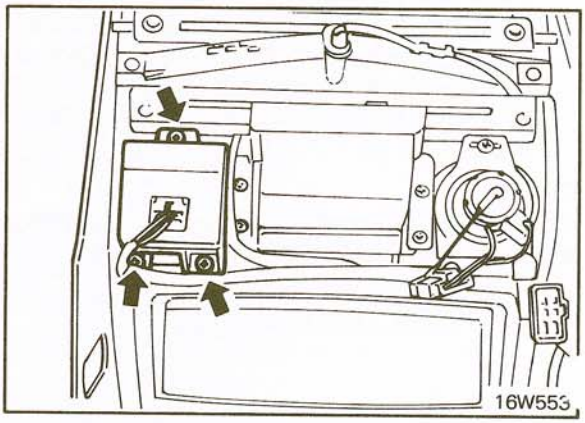


COMPONENTS



REMOVAL

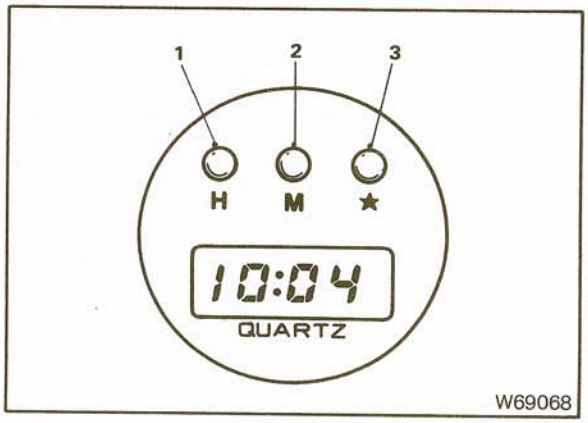
1. Remove the center console. (Refer to GROUP 23.)
2. Remove the mounting screws and disconnect the power supply connector. (16W553)



TIME ADJUSTMENT

Adjust the clock as follows:

1. To adjust the hour, push button (1).
2. To adjust the minutes, push button (2).
3. To clear away the minutes display, push button (3).



Example of time adjustment

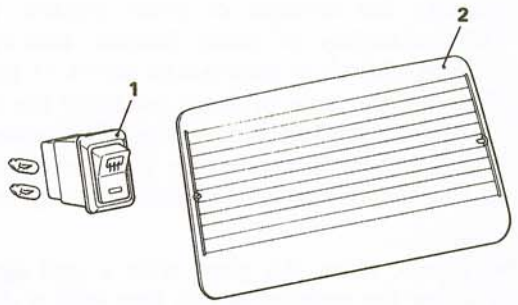
Before adjustment	After adjustment
10:01 – 10:29	10:00
10:30 – 10:59	11:00

Caution

This clock is a delicate mechanism containing a crystal oscillator, transistors, etc., and should be handled with care. Specialized technical skill is needed to repair the internal mechanism; do not attempt to disassemble it. If the clock itself is malfunctioning, replace the entire assembly. When bake-finishing a paint coat, take care not to allow the clock to be exposed to temperatures exceeding 60°C (140°F).

ɔMPONENTS

1. Rear window defogger switch
2. Rear window defogger glass

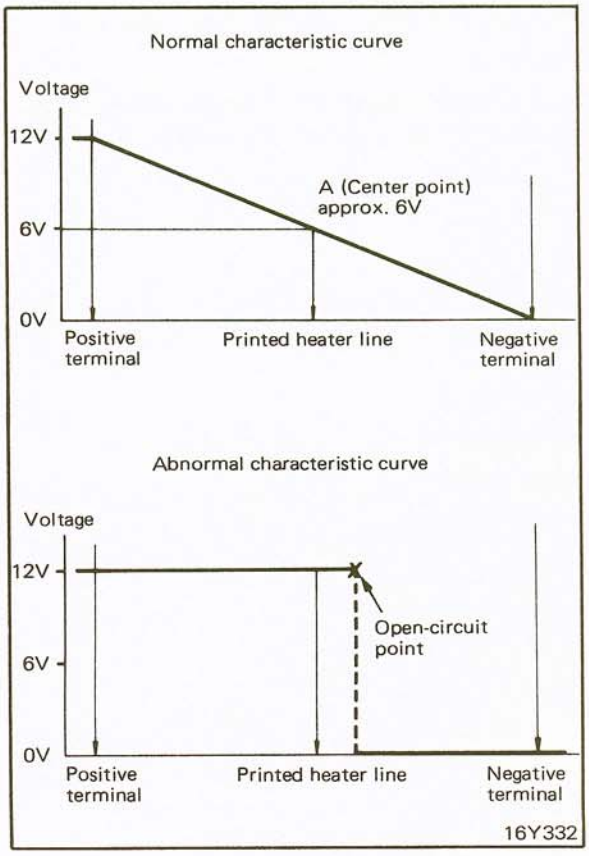


16W708

PRINTED HEATER LINES

Inspection

1. The printed heater lines should be tested while the engine is running at 2,000 rpm and the battery is being charged.
2. Turn the defogger switch to the "ON" position, and use voltmeter to measure the voltage of each printed heater line at the rear window glass center point "A".
3. If all of the heater lines indicate approximately 6V, the rear window printed heater lines are functioning properly.
4. If a voltage of 12V is indicated at point "A", the wire is broken between point "A" and the negative (−) terminal. Move the test probe gradually toward the negative (−) terminal and search for the place where there is a sudden change in the voltage (to 0V).
5. This place where the voltage suddenly changes indicates the location of the broken wire.
6. If 0V is indicated at point "A", the wire is broken between point "A" and the positive (+) terminal. Find the point where there is a sudden change in the voltage (to 12V), as described in step 4. above.

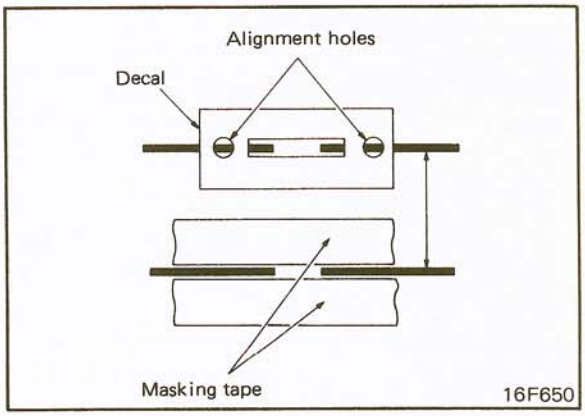


16Y332

Repair

1. Prepare the following items:
   - Conductive paint
   - Paint thinner
   - Masking tape, decal, etc.
   - Unleaded gasoline
   - Thin brush

   Wipe the glass adjacent to the broken heater line, clean with unleaded gasoline, and bond a decal or masking tape as shown.



16F650

2. Shake the electroconductive paint container well, and remove the amount of paint needed. Dilute it with a small quantity of paint thinner, and apply three coats with the brush at intervals of about 15 minutes.
3. Remove the tape or decal and leave the repaired defogger unused for a while before supplying power.
4. For a better finish, scrape away excess deposits with a knife after drying is complete (one day later).

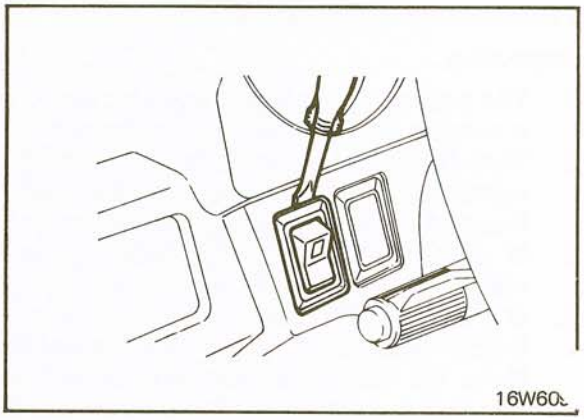
Caution

After repair, clean the glass with a soft dry shop towel or wipe along the printed heater line with a slightly moistened shop towel.

REAR WINDOW DEFOGGER SWITCH

Removal

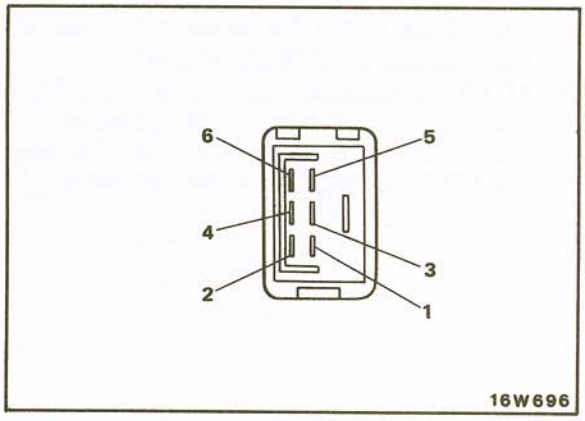
Remove the switch from the instrument cluster and push the connector bar to detach the switch.



Inspection

Operate the switch and check continuity between the terminals.

Position \ Terminal	1	*	2	3	4	5	*	6
OFF	○	⊚	○			○	⊚	○
ON	○	⊚	○	○	○	○	⊚	○



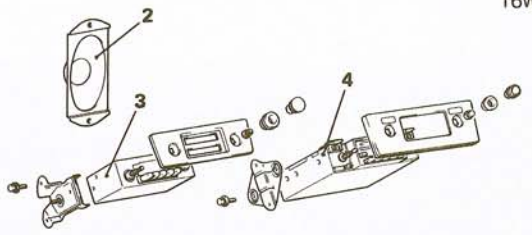
NOTE

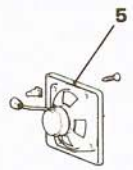
* Denotes indicator light.

ɔMPONENTS

1. Whip antenna
2. Front speaker
3. Radio
4. Tape player
5. Rear speaker

16W700



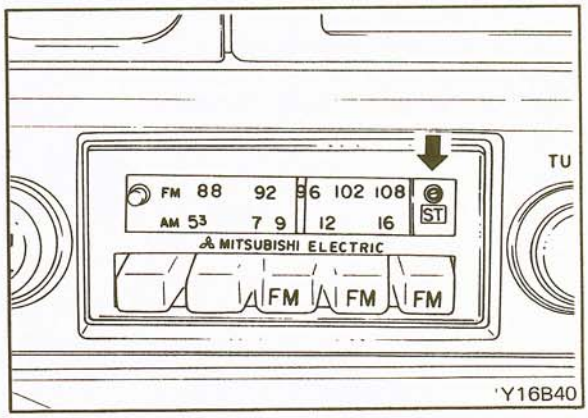


16W567

ANTENNA TRIMMER

The antenna trimmer is essential for matching the antenna with the radio in order to obtain the maximum sensitivity of the radio. It must be adjusted with the antenna actually mounted on the vehicle. If the trimmer is not adjusted properly, the radio suffers from not only low sensitivity but also noises, such as external noise and noise from passing vehicles. In the following cases, therefore, adjust it as described below:

(1) When radio is installed.
(2) If antenna is replaced.
(3) If radio has low sensitivity.
(4) If radio is noisy.



'Y16B40

Trimmer Adjustment

Make the following preparations for adjustment.

(1) Turn the ignition key to the "ACC" position.
(2) Extend the antenna all the way.
(3) Tune accurately to a station near 1,400 kHz in order to receive a broadcast in as weak an electric field as can be barely received. If there is no station near 1,400 kHz, tune to any high-frequency station (above 1,000 kHz) available. If there are two or more stations near 1,400 kHz, choose the stronger one.
(4) Set the volume control to the proper volume.
(5) Set the tone control to high-pitched tone.

Be sure that preparations 1 through 5 have been correctly made.
Insert a screwdriver into the trimmer adjusting hole.
Turn the screwdriver clockwise or counterclockwise for maximum sensitivity (maximum broadcast wave sound).
If the optimum sensitivity point cannot be found, check for an antenna malfunction or a broken wire.

NOISE SUPPRESSION

Noise interfering with radio reception may be roughly classified as follows:
(1) Noise produced by the vehicle itself
Noise from the ignition circuit, alternator circuit, etc.
(2) Noise generated in the radio itself
Thermal noise from transistors, IC, resistor, etc.
(3) Atmospheric noise
Noise from other cars, neon signs, etc.
The radio has devices to suppress noise of the radio itself and atmospheric noise, but it is difficult to eliminate them completely. Noise produced by the vehicle includes whining from the alternator system, and a strong, impulsive, fast popping noise from the ignition system.
Before performing any checking or adjustments, first confirm the following points.

- Adjust the antenna trimmer completely.
- Set the pushbuttons (tuning) properly.
- Extend the antenna all the way.

Prevention of Ignition Circuit Noise

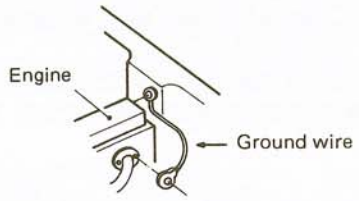
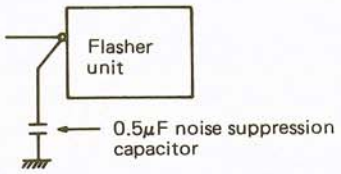
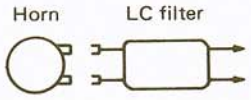
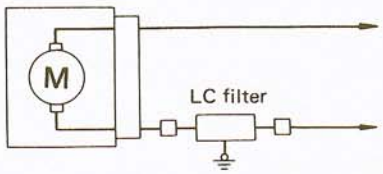
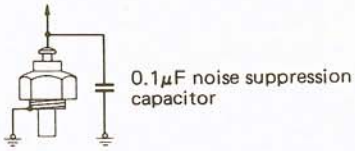
A resistance-equipped cable is used for the high-tension cable in order to prevent noise; however, if any noise from the ignition circuit does occur, check the tightness and ground connection of the positive (+) terminal of the noise filter, and, if necessary, check the noise filter.

Caution
Be careful not to connect the noise filter to the high-tension cable; doing so could damage the noise filter.

Prevention of Other Circuit Noise

For other noises, take necessary corrective actions in accordance with the following items and the NOISE SUPPRESSION CHART.
Polish the grounding cable terminal, and connect it properly.
Polish the pillar antenna ground terminal, and connect it properly.
Ground electric parts completely.
Keep the antenna cable and speaker lead wire away from other electric wiring.

NOISE SUPPRESSION CHART

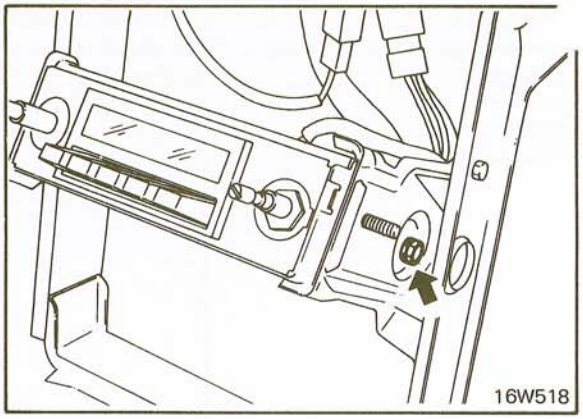
Symptom	Noise source	Remedy
Unusual noise related to engine speed.	Engine	Securely ground the engine, frame and/or body and engine hood.  16E710
"Clatter" noise related to the flashing of turn signal lights.	Turn signals	Connect a 0.5 μF noise-suppression capacitor to the B-terminal of the flasher unit.  16E712
Abnormal noise when the horn is operated.	Horn	1. Connect a 0.5 μF noise-suppression capacitor to the + B-terminal of the horn. 2. For an FM radio, connect an LC filter to the horn terminals.  16E713
Noise when the windshield washer operates.	Washer motor	Connect an LC filter between the terminal of the washer motor and the power source wire.  16F671
Unusual noise when the engine is started.	Water temperature gauge unit	Connect a 0.1 μF noise-suppression capacitor to the terminal of the water temperature gauge unit.  16F672

RADIO AND TAPE PLAYER

Removal

1. Remove the radio switch knobs, loosen the mounting nuts, and then detach the radio panel.
2. Remove the center console, loosen the mounting screws on the side of the radio, and then remove the radio. (16W518)
3. Disconnect the antenna lead wire, the speaker connector, and the power supply connector from the back of the radio.

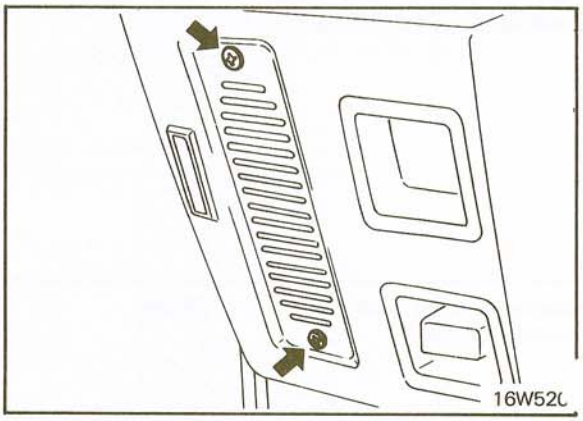
NOTE
The fuse box for the radio circuits is located on the back of the radio; therefore, the radio must be removed in order to replace a fuse.



FRONT SPEAKER

Removal

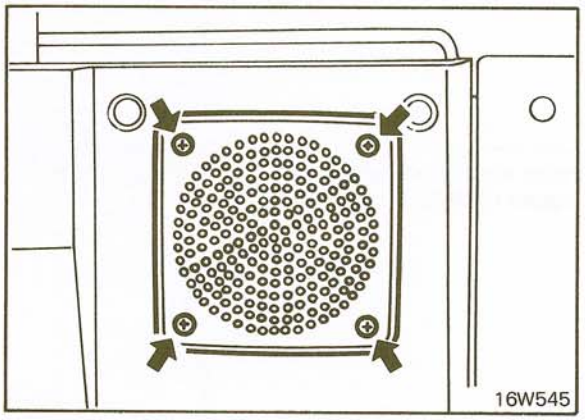
1. Remove the speaker mounting screws. (16W520)
2. Remove the speaker from inside of the instrument panel.
3. Disconnect the speaker wiring connector.



REAR SPEAKER

Removal

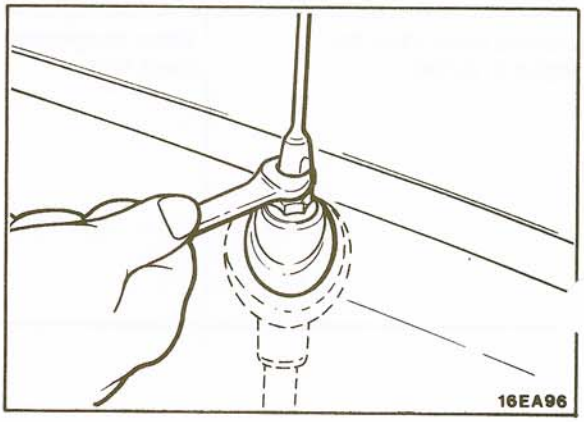
1. Remove the speaker mounting screws. (16W545)
2. Remove the speaker and disconnect the speaker wiring connector.



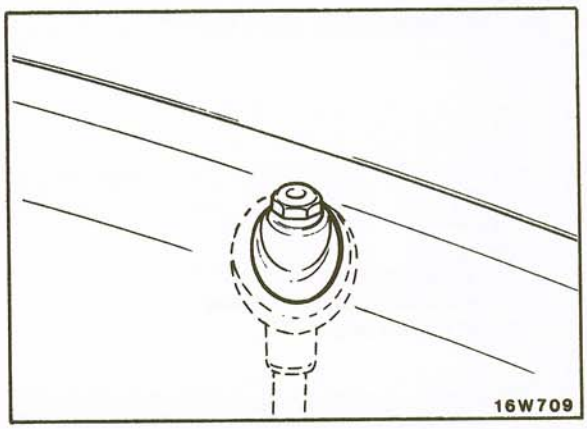
ANTENNA

Removal

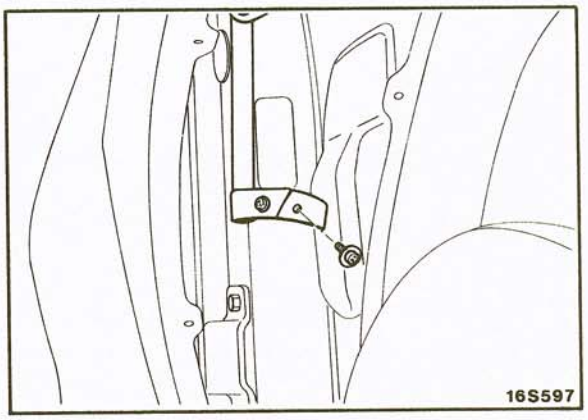
1. Disconnect the antenna lead wire from the back of the radio.
2. Remove antenna mast. (16EA96)



Remove splash shield mounting bolts and screws.
4. Detach splash shields from fender about a half of rearward.
5. Remove the antenna mounting nut. (16W709)

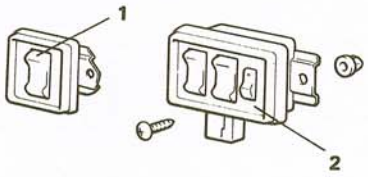


6. Remove the screw which mounts the antenna bracket to the body from inside the fender. (16S597)
7. Remove the antenna toward the bottom.

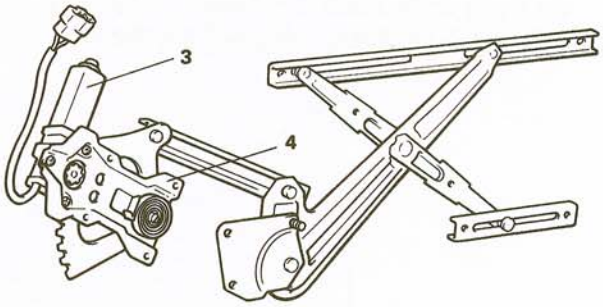


COMPONENTS

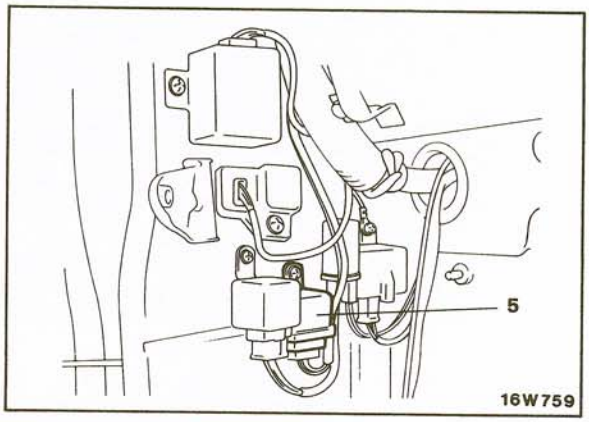
1. Sub switch
2. Main switch
3. Power window motor
4. Power window regulator assembly
5. Power window relay



16W764



18W671



16W759

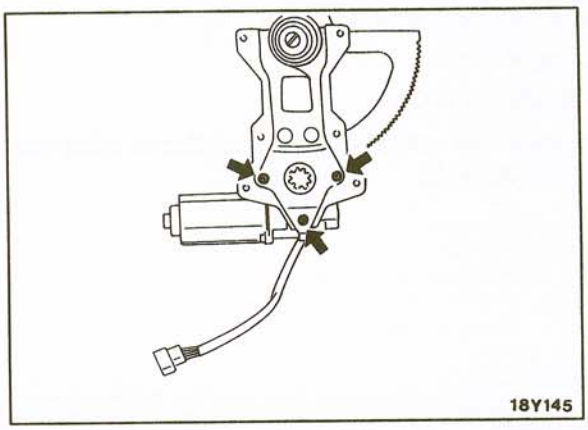
NOTE
For information regarding adjustments, removal, inspection, and installation, or installation procedures other than those contained in this section on the Power Window Regulator System, refer to GROUP 23.

)WER WINDOW MOTOR

Removal

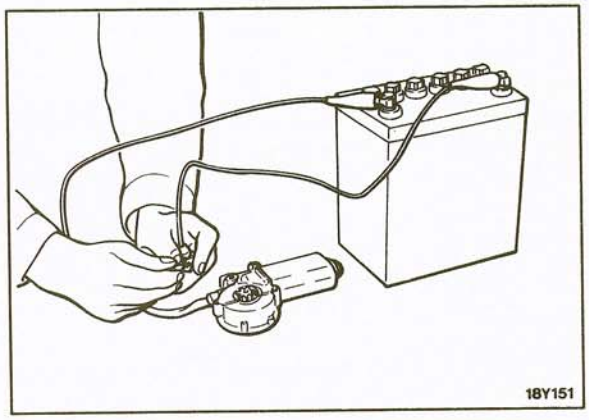
1. Detach the regulator assembly. (Refer to GROUP 23.)
2. Disconnect the power window motor from the regulator assembly. (18Y415)

Caution
When loosening the connecting screws of the regulator and the motor assembly, the compressed force of the regulator spring may cause the regulator arm to spring up.



Inspection

Connect the motor terminals directly to the battery and check that the motor operates smoothly.
Next, reverse the polarity and check that the motor operates smoothly in the reverse direction.

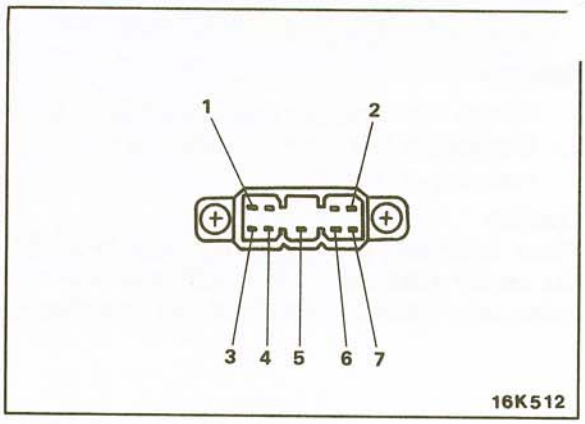


POWER WINDOW SWITCH

Inspection

MAIN SWITCH

Check for continuity in accordance with the following connection table.

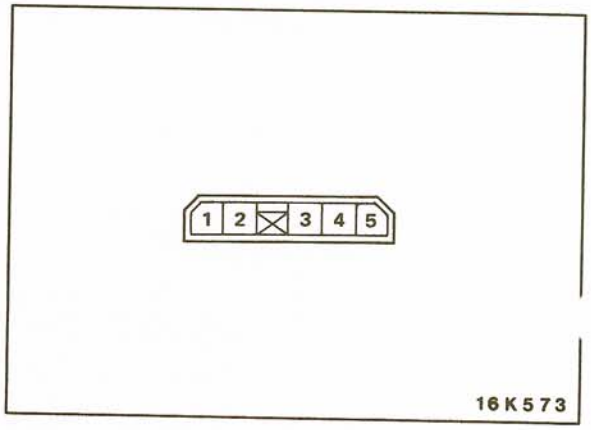


Switch \ Terminal		L.H. side				R.H. side				LOCK	
		1	4	3	6	2	4	7	6	4	5
Power window switch (manual)	UP	○—○		○—○		○—○		○—○			
	OFF	○		○—○	○—○	○		○—○	○—○		
	DOWN	○	○—○		○	○	○—○		○		
Lock switch	ON (LOCK)										
	OFF (FREE)									○—○	

SUB SWITCH

Check for continuity in accordance with the following connection table.

Switch \ Terminal	2	1	5	4	3
UP	○—○		○		○
OFF		○	○	○	○
DOWN	○		○	○	

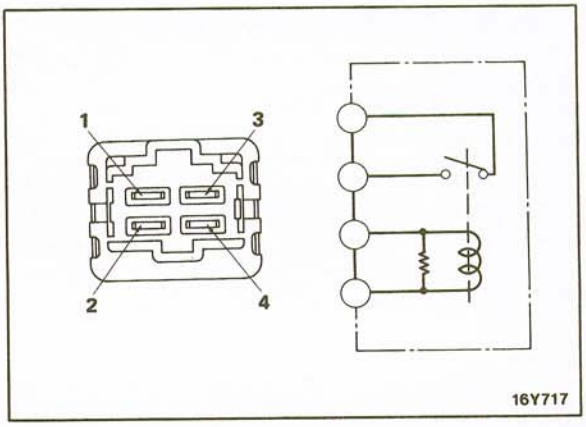


OWER WINDOW RELAY

Inspection

Check for continuity between the terminals with the power ON and OFF.

While power is OFF	
Between terminals 1 – 2	no continuity
Between terminals 3 – 4	continuity
While power is ON	
Between terminals 1 – 2	continuity

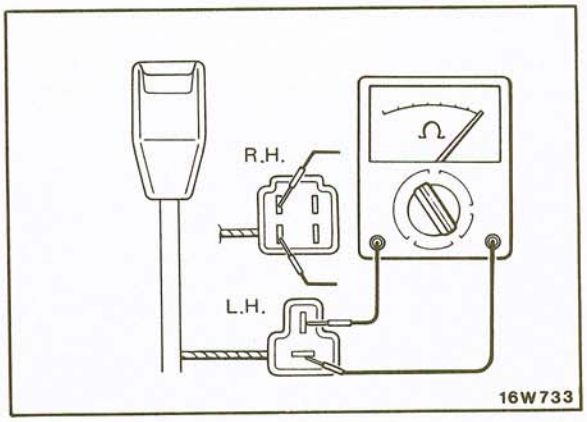


3-POINT ELR SEAT BELTS WITH TENSION RELIEFERS

SEAT BELT SWITCH

Inspection

1. Pull back the floor mat and disconnect the seat belt switch connection from where it is at the attachment to the buckle stalk assembly.
2. Use an ohmmeter to check the YB wire and the B wire for breakage. (16W733)
3. If there is no continuity when the buckle is unlocked and continuity when it is locked, the seat belt switch can be assumed to be functioning properly.
4. If a microswitch is defective, the buckle stalk assembly containing the microswitch should be replaced. For replacement. (Refer to GROUP 23.)



SOLENOID

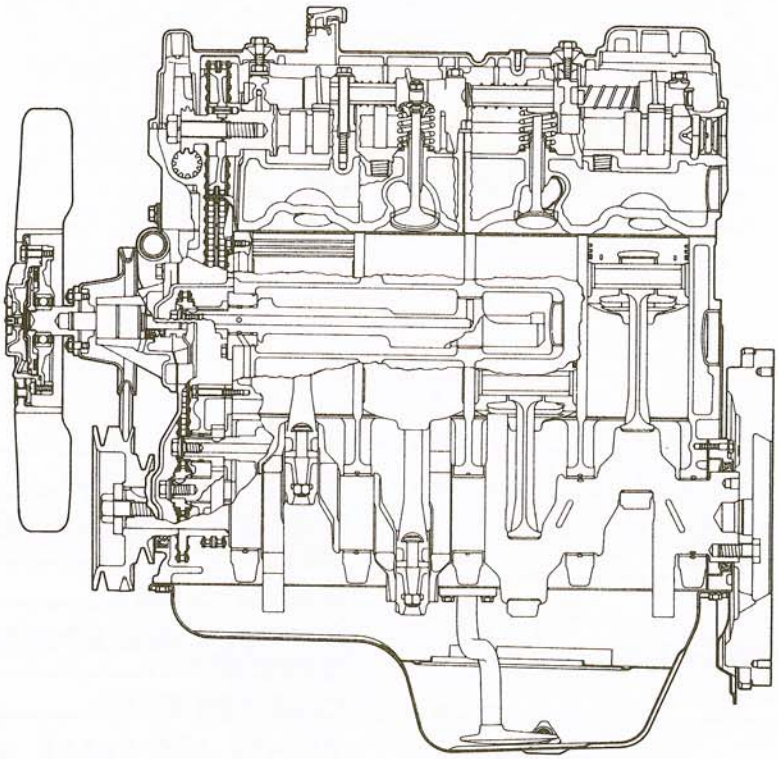
Inspection

1. Lock the buckle and set the ignition key to "ON".
2. Pull the seat belt out slightly from the retractor and allow about 40 mm (1.5 in.) to be taken up.
3. Pull the seat belt out again and let go of it. If the retractor stops and there is slack in the seat belts, the solenoid can be assumed to be funcitoning properly.
4. If the results of the above test are not satisfactory, inspect the seat belt switch. If no problem can be found, replace the entire seat belt assembly in order to replace the seat belt solenoid.

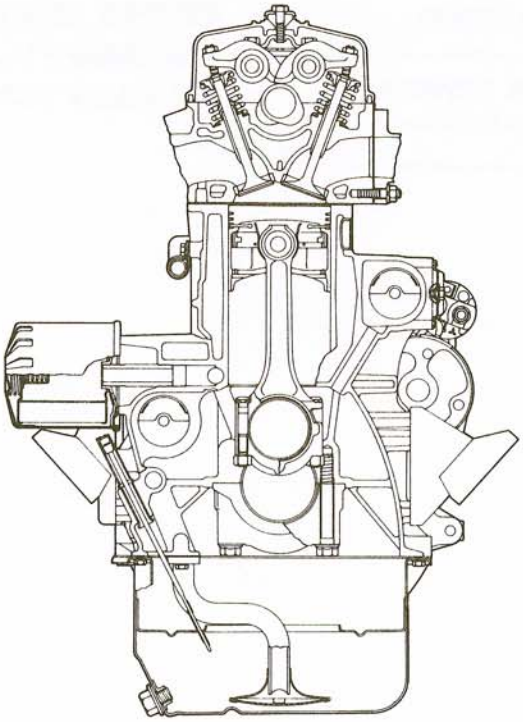
ENGINE

CONTENTS

G54B ENGINE



5EN116



5EN117

GENERAL SPECIFICATIONS

Description	Specifications
General	
No. and arrangement of cylinders	4, in-line, vertical
Combustion chamber type	Hemispherical
Valve arrangement	Overhead valve type
Camshaft arrangement	Overhead camshaft type
Total displacement cc (cu.in.)	2,555 (155.9)
Bore x stroke mm (in.)	91.1 x 98 (3.59 x 3.86)
Compression ratio	8.2
Valve timing	
Intake valve and jet valve open/close	25°BTDC/59°ABDC
Exhaust valve open/close	64°BBDC/20°ATDC
Firing order	1–3–4–2
Valve clearance at hot engine mm (in.)	0.15 (.006) – intake
	0.25 (.010) – exhaust and jet
Timing chain	
Type	Double roller
No. of links	102
Pitch mm (in.)	9.5 (.375)
Timing chain "B" for silent shaft drive	
Type	Single roller
No. of links	90
Pitch mm (in.)	8.0 (.315)
Crankshaft sprocket	
Material	Ferrous sintered alloy
No. of teeth	19
Crankshaft sprocket "B"	
Material	Cast iron
No. of teeth	34
Camshaft sprocket	
Material	Cast iron
No. of teeth	38
Silent shaft and oil pump sprocket	
Material	Steel
No. of teeth	17
Rocker arm	
Material	Aluminum die casting
	Slipper made from special sintered alloy
I.D. mm (in.)	18.9 (.744)
Oil clearance mm (in.)	0.01-0.04 (.0004-.0016)

Description	Specifications
Camshaft	
Driven by	Chain
Material	Cast iron, cam surface chilled
Cam height mm (in.)	42.5 (1.673)
Valve lift mm (in.)	10.5 (.413)
Cam diameter for fuel pump drive mm (in.)	37 (1.457)
Journal diameter mm (in.)	34 (1.339)
Oil clearance mm (in.)	0.05-0.09 (.002-.004)
Identification mark	6
Cylinder head	
Material	Aluminum alloy
Deflection of gasket surface mm (in.)	Less than 0.05 (.002)
Valve guide hole diameter mm (in.)	
0.05 (.002) O.S.	13.050-13.068 (.5138-.5145)
0.25 (.010) O.S.	13.250-13.268 (.5217-.5224)
0.50 (.020) O.S.	13.500-13.518 (.5315-.5422)
Intake valve seat ring hole diameter mm (in.)	
0.3 (.012) O.S.	47.300-47.325 (1.8622-1.8632)
0.6 (.024) O.S.	47.600-47.625 (1.8740-1.8750)
Exhaust valve seat ring hole diameter mm (in.)	
0.3 (.012) O.S.	40.300-40.325 (1.5866-1.5876)
0.6 (.024) O.S.	40.600-40.625 (1.5984-1.5994)
Valve guide installation height mm (in.)	14 (.551)
Intake valves	
Material	Special heat-resistant steel
Treatment	Sur-sulf
Valve diameter mm (in.)	46 (1.811)
Stem diameter mm (in.)	8.0 (.3150)
Clearance (stem-to-guide) mm (in.)	0.03-0.06 (.0012-.0024)
Margin mm (in.)	1.2 (.047)
Identification mark	N
Exhaust valves	
Material	Special heat-resistant steel Valve face padded with stellite
Treatment	Tufftriding
Valve diameter mm (in.)	38 (1.496)
Stem diameter mm (in.)	8.0 (.3150)
Clearance (Stem to guide) mm (in.)	0.05-0.09 (.0020-.0035)
Margin mm (in.)	2.0 (.079)
Identification mark	N

Description	Specifications
Valve springs	
Free height mm (in.)	47.5 (1.870)
Load N (lbs)/mm (in.)	275 (62)/40.4 (1.591)
Square	Less than 1.5°
Identification color	Blue
Right silent shaft	
Driven by	Chain
Material	Steel
Rear journal diameter mm (in.)	43 (1.693)
Oil clearance mm (in.)	0.06-0.10 (.0024-.0039)
Left silent shaft	
Driven by	Chain
Material	Steel
Front journal diameter mm (in.)	23 (.906)
Rear journal diameter mm (in.)	43 (1.693)
Oil clearance mm (in.)	
Front	0.02-0.06 (.0008-.0024)
Rear	0.06-0.10 (.0024-.0039)
Piston	
Material	Special aluminum alloy
Type	Autothermic (Steel strut used for 4G54)
Diameter (Standard) mm (in.)	91.1 (3.587)
Clearance (Piston-to-cylinder) mm (in.)	0.02-0.04 (.0008-.0016)
Pistons for service mm (in.)	0.25 (.010), 0.50 (.020), 0.75 (.030), 1.00 (.040), oversize
Piston rings	
No. of rings per piston	3
No. of compression rings	2
No. of oil rings	1
Compression ring type	
No. 1 ring	Barrel type, special cast iron, chrome face
No. 2 ring	Taper type, special cast iron, chrome face
Oil ring type	3-piece steel rail, chrome face
Ring gap mm (in.)	
No. 1 ring	0.30-0.45 (.012-.018)
No. 2 ring	0.25-0.40 (.010-.015)
Oil ring	0.3-0.6 (.012-.024)
Ring side clearance mm (in.)	
No. 1 ring	0.05-0.09 (.002-.004)
No. 2 ring	0.02-0.06 (.001-.002)
Rings for service mm (in.)	0.25 (.010), 0.50 (.020), 0.75 (.030), 1.00 (.040), oversize

Description	Specifications
Connecting rod	
Length (Center to center) mm (in.)	166 (6.535)
Piston pin bore diameter mm (in.)	21.974-21.985 (.8651-.8655)
Side clearance (Big end) mm (in.)	0.1-0.25 (.004-.010)
Crankshaft	
Material	Steel
Main bearing journal diameter mm (in.)	60 (2.362)
Connecting rod journal diameter mm (in.)	53 (2.087)
Maximum allowable out-of-round and/or taper of journal mm (in.)	0.01 (.0004)
Oil clearance mm (in.)	
Main bearing journal	0.02-0.05 (.0008-.0020)
Connecting rod journal	0.02-0.06 (.0008-.0024)
Thrust taken by	No. 3 main bearing
End play mm (in.)	0.05-0.18 (.0020-.0071)
Bearings for service available in standard size and following undersizes mm (in.)	0.25 (.010), 0.50 (.020), 0.75 (.030)
Cylinder block	
Material	Cast iron
Water jacket	Siamese type
Cylinder bore mm (in.)	91.1 (3.587)
Out-of-round and taper mm (in.)	Less than 0.02 (.0008)
Maximum allowable oversize (Cylinder bore) mm (in.)	1.00 (.039)
Oil pump	
Type	Gear
Driven by	Chain
Oil pressure at idle kPa (psi)	49 (7.1) or more
Relief valve opening pressure kPa (psi)	392 (57)
Oil filter	
Type	Cartridge, full flow
Size (Diameter x Length) mm (in.)	90 x 100 (3.54 x 3.94)
Engine oil	
Capacity including that of oil filter liters (U.S.qts., Imp.qts.)	
Rear-wheel drive models	5.0 (5.2, 4.4)
4-wheel drive models	5.8 (6.1, 5.1)
Recommended oil (API classification)	SE or SF

:RVICE SPECIFICATIONS

Standard value	
Valve clearance – Hot engine mm (in.)	
Intake valve	0.15 (.006)
Exhaust valve	0.25 (.010)
Jet valve	0.25 (.010)
Piston pin press-in load N (lbs.)	7,355-17,162 (1,653-3,858)
Flywheel runout mm (in.)	0.1 (.004) max.
Oil pressure gauge unit	
Current value mA	
at 0 kPa (0 psi)	0
at 392 kPa (57 psi)	84
at 785 kPa (114 psi)	110

TORQUE SPECIFICATIONS

Nm (ft.lbs.)

Front engine mounting	
Engine support front insulator to engine	13-20 (9-14)
Front insulator stopper to heat protector	6-10 (4-7)
Engine support front insulator to engine mounting bracket	30-40 (22-29)
Rear engine mounting	
Vehicles with a manual transmission	
Engine support rear insulator to No. 2 crossmember	18-25 (13-18)
Engine support rear insulator to transmission	18-25 (13-18)
No. 2 crossmember to frame	55-75 (40-54)
Frame to plate	18-25 (13-18)
Transfer support insulator to transfer mounting bracket	18-25 (13-18)
Transfer support insulator to plate	18-25 (13-18)
Transfer mounting bracket to transfer	18-25 (13-18)
Vehicles with an automatic transmission	
Engine support rear insulator to No. 2 crossmember	30-42 (22-30)
Engine support rear insulator to transmission	17-23 (12-17)
No. 2 crossmember to frame	55-75 (40-54)
Frame to plate	18-25 (13-18)
Transfer support insulator to plate	18-25 (13-18)
Transfer mounting bracket to transfer	18-25 (13-18)
Transfer mounting bracket to pipe	30-42 (22-30)
Cylinder head bolts – cold engine	
Nos. 1 through 10	89-98 (65-72)
No. 11	15-21 (11-15)
Cylinder head bolts – hot engine	
Nos. 1 through 10	98-107 (73-79)
No. 11	15-21 (11-15)
ımshaft bearing cap bolts	17-20 (14-15)
Camshaft sprocket bolt	49-58 (37-43)

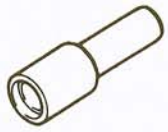
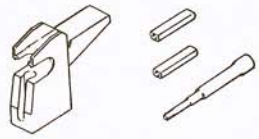
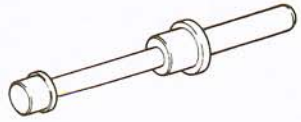
Rocker cover bolts	5-6 (4-5)
Heater joint	20-39 (15-28)
Intake and exhaust manifold nuts or bolts	15-19 (11-14)
Rocker arm adjusting nuts	12-17 (9-13)
Main bearing cap bolts	74-83 (55-61)
Connecting rod cap nuts	45-47 (33-34)
Crankshaft pulley bolts	108-127 (80-94)
Oil pump sprocket bolt	30-39 (22-28)
Silent shaft sprocket bolt	30-39 (22-28)
Silent shaft chamber cover bolts	4-5 (3-4)
Flywheel bolts	128-137 (94-101)
Drive plate bolts	128-137 (94-101)
Engine support bracket bolts	40-49 (29-36)
Chain guide "B" bolt (upper)	8-9 (6-7)
Chain guide "B" bolt (lower)	15-21 (11-15)
Chain guide access hole cover bolts	10-11.5 (7.5-8.5)
Oil pump cover bolt	10 -11 (7-8)
Oil pump assembly mounting bolt	8-9 (6-7)
Oil pressure switch and gauge unit	15-21 (11-15)
Oil pan bolt	6-7 (4.5-5.5)
Oil pan drain plug	59-78 (44-57)
Oil filter	11-12 (8-9)
Oil filter stud	50-58 (37-43)
Oil relief valve plug	40-49 (29-36)
Water temperature gauge unit	30-39 (22-28)

LUBRICANT

	Specified lubricant	Quantity
Engine oil (including oil filter and cooler)	API classification SE or higher	4.5 liters (4.5 U.S. qts., 3.7 Imp. qts.)

SEALANT AND ADHESIVE

	Specified sealant and adhesive	Quantity
Top of cylinder head circular packing	3M Super Weather Strip adhesive 8001 or equivalent	As required
Threaded portion of oil pressure gauge unit	3M Liquid Gasket 8959 or equivalent	As required

Tool (Number and name)	Use	Tool (Number and name)	Use
MD998115 Valve guide installer 		MD998148 "D" Valve seat cutter pilot 	
MD998173 "D" Valve seat cutter [30° – O.D. 40 mm (1.57 in.)] 		MD998377 Valve stem seal installer 	Use with valve spring seat
MD998175 "D" Valve seat cutter [30° – O.D. 44 mm (1.73 in.)] 		MD998303 "*" Valve spring compressor 	May also be used for MA904
MD998158 "D" Valve seat cutter [45° – O.D. 40 mm (1.57 in.)] 		MD998184 "*" Piston pin setting tool 	
MD998159 "D" Valve seat cutter [45° – O.D. 44 mm (1.73 in.)] 		MD998251 "*" Silent shaft bearing puller 	For rear bearing
MD998165 "D" Valve seat cutter [65° – O.D. 44 mm (1.73 in.)] 		MD998250 "*" Silent shaft bearing installer 	For rear bearing

"*", "D" see page 2 for instructions.

Tool (Number and name)	Use	Tool (Number and name)	Use
MD998376 "*" Crankshaft rear oil seal installer 		MD998054 Oil pressure switch wrench 	
MD998308 Jet valve stem seal installer 		MD998310 Jet valve socket wrench 	
MD998309 Jet valve spring pliers 			

"*" see page 2 for instructions.

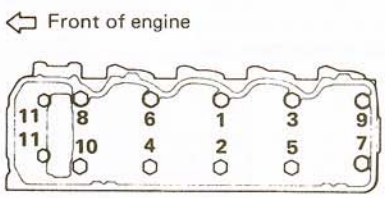
Symptom	Probable cause	Remedy
NOISY ENGINE		
Knocking of crankshaft and bearing	Loose main bearing	Replace
	Seized bearing	Replace
	Bent crankshaft	Replace
	Excessive crankshaft end play	Replace thrust bearing
Piston and connecting rod knocking	Loose bearing	Replace
	Seized bearing	Replace
	Loose piston pin	Replace piston and pin or connecting rod
	Loose piston in cylinder	Recondition cylinder
	Broken piston ring	Repair or replace
	Improper connecting rod alignment	Realign
Camshaft knocking	Loose bearing	Replace
	Excessive end play	Replace
	Broken cam gear	Replace
Timing chain noise	Improper chain tension	Adjust or replace
	Worn and/or damaged chain	Replace
	Worn sprocket	Replace
	Worn and/or broken tension adjusting mechanism	Replace
	Excessive camshaft and bearing clearance	Replace
Camshaft and valve mechanism knocking	Improper valve clearance	Adjust
	Worn adjusting screw	Replace
	Worn rocker face	Replace
	Loose valve stem in guide	Replace guide
	Weakened valve spring	Replace
	Seized valve	Repair or replace
Water pump knocking	Improper shaft end play	Replace water pump assembly
	Broken impeller	Replace water pump assembly

Symptom	Probable cause	Remedy
OTHER MECHANICAL TROUBLE		
Stuck valve in guide	Improper valve clearance	Adjust
	Insufficient clearance between valve stem and guide	Clean stem or ream guide
	Weakened or broken valve spring	Replace
	Damage to valve stem	Replace
Valve stuck on seat	Improper valve clearance	Adjust
	Weakened valve spring	Replace
	Thin valve head edge	Replace valve
	Narrow valve seat	Reface
	Overheating	Repair or replace
	Excessive engine speed	Drive at proper speed
	Stuck valve guide	Repair or replace
Excessively worn cylinder and piston	Shortage of engine oil	Add or change oil Check oil level on daily basis
	Dirty engine oil	Clean crankcase, change oil and replace oil filter element
	Poor oil quality	Use proper oil
	Overheating	Repair or replace
	Wrong assembly of piston with connecting rod	Repair or replace
	Improper piston ring clearance	Replace
	Dirty air cleaner	Clean air cleaner and replace filter
	Too rich mixture	Adjust or replace carburetor
	Stuck choke valve	Clean or replace carburetor choke chamber
	Over choking	Repair or replace choke assembly
Damaged connecting rod	Shortage of engine oil	Add or change oil Check oil level on daily basis
	Low oil pressure	Correct
	Poor engine oil quality	Use proper oil
	Rough crankshaft surface	Grind or replace
	Clogged oil passage	Clean

Symptom	Probable cause	Remedy
Damaged connecting rod (continued)	Bearing worn or eccentric	Replace
	Bearing improperly assembled	Correct or replace
	Loose bearing	Replace
	Incorrect connecting rod alignment	Repair or replace
Damaged crankshaft bearing	Shortage of engine oil	Add or change oil Check oil level on daily basis
	Low oil pressure	Adjust or repair
	Poor quality engine oil	Use proper oil
	Worn or out-of-round crankshaft journal	Repair or replace
	Clogged oil passage in crankshaft	Clean
	Bearing worn or eccentric	Replace bearings and check engine oil lubrication system
	Bearing improperly assembled	Repair or replace
	Non-concentric crankshaft or bearing	Replace
Excessive vibration	Loose engine mounts	Tighten or replace
	Silent shaft bearings damaged	Replace
	Improper phase of silent shafts	Adjust

RETORQUING OF CYLINDER HEAD BOLTS

1. When cylinder head bolts are retorqued, first slightly loosen and then tighten to specified torque.
2. Be sure to follow the specified torquing sequence. (5EN016)

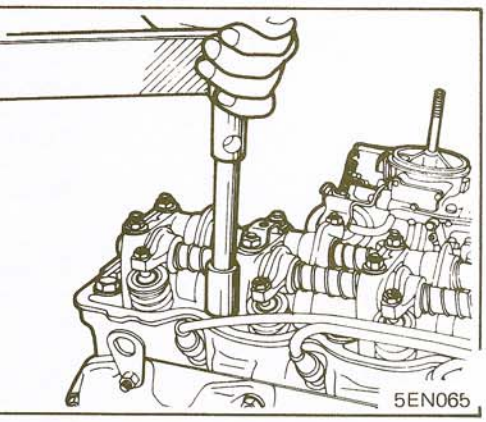


Cylinder head bolt tightening sequence

5EN016

3. After cylinder head bolts have been tightened to specified torque, run engine until normal operating temperature is reached, allow it to cool down, and then retorque bolts to specification for best results.

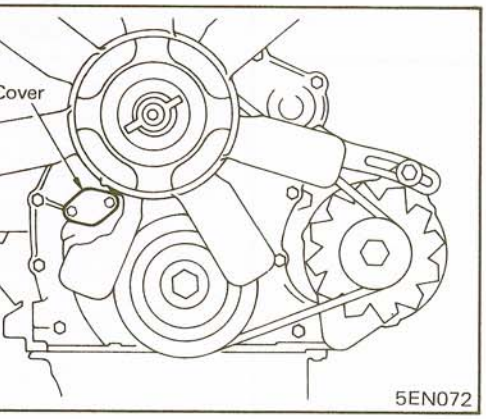
Tightening torque
Cylinder head bolt (No. 1 to 10)
Cold engine ..... 89-98 Nm (65-72 ft.lbs.)
Hot enging ..... 98-107 Nm (73-79 ft.lbs.)
Cylinder head bolt (No. 11) ..... 15-21 Nm (11-15 ft.lbs.)


5EN065

SILENT SHAFT DRIVE CHAIN TENSION ADJUSTMENT PROCEDURE

When a loose silent shaft drive chain is suspected as the probable cause of abnormal noise, the tension must be readjusted. Tension of silent shaft drive chain can be adjusted without removing timing chain cover as follows:

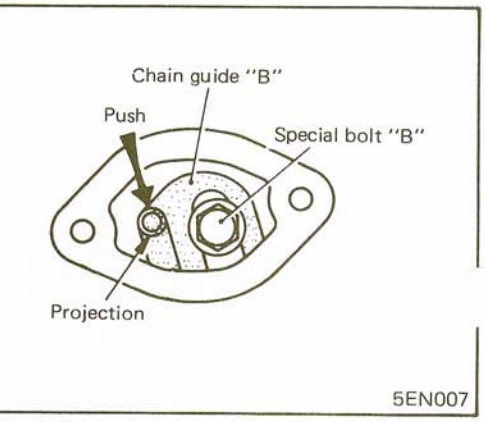
1. Remove cover from access hole provided at center of chain case (under water pump).



5EN072

2. Loosen special bolt "B".
3. Using your finger push projection on chain guide "B" in direction of arrow. Do not push projection with a screwdriver or other tool. Improperly chain tension will cause abnormal noise. (5EN007)
4. Tighten special bolt "B".
5. Install cover. Do not reuse damaged gasket.

Cover bolt tightening torque ..... 10-11.5 Nm (7.5-8.5 ft. lbs.)



5EN007

ɴGINE OIL LEVEL GAUGE

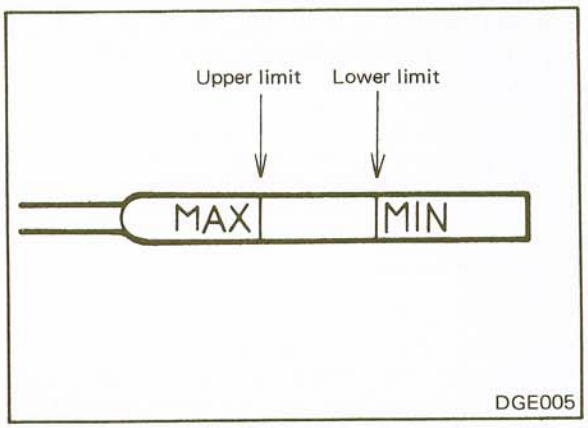
The oil level gauge is located on the right side of the engine. Maintain engine oil level within the marking lines on the oil level gauge. (DGE005)

The oil level in the oil pan may read at the "MAX" mark line (upper limit) after the engine has been standing for several hours. When the engine is started the oil level drop somewhat due to filling of oil passages, etc.

When the oil level is at or below the "MIN" mark line (lower limit) on the level gauge, add 1 liter (1 U.S. qt., 0.9 Imp. qt.). The oil should never be allowed to remain below the lower limit.

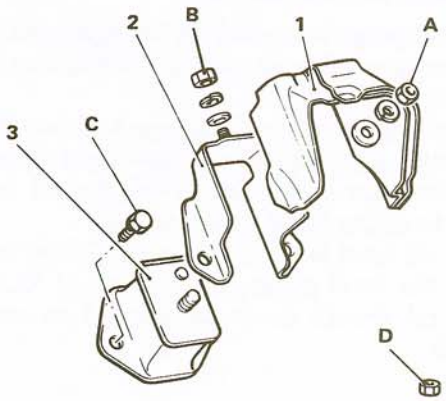
Caution

Do not overfill crankcase. This will cause oil aeration and loss of oil pressure.



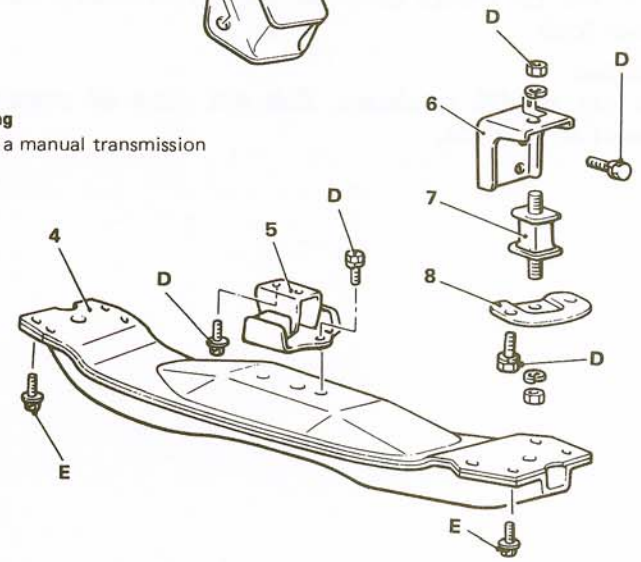
COMPONENTS

Front mounting



Rear mounting

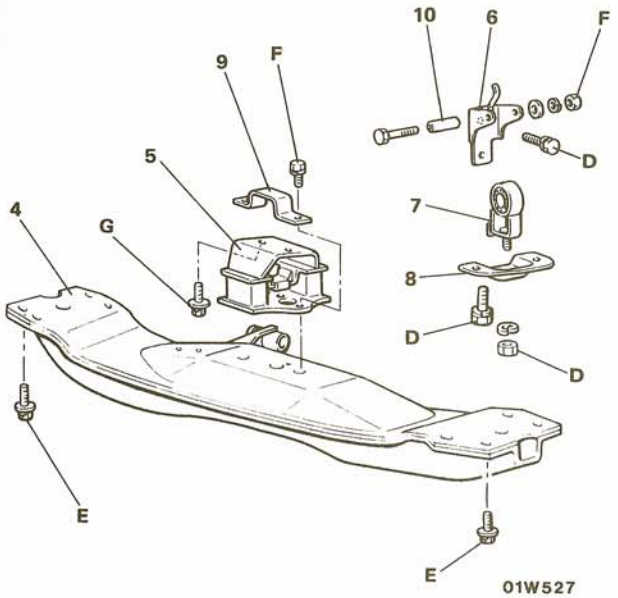
Vehicles with a manual transmission



01W502

1. Heat protector
2. Front insulator stopper
3. Engine support front insulator
4. No. 2 crossmember
5. Engine support rear insulator
6. Transfer mounting bracket
7. Transfer support insulator
8. Plate
9. Stopper
10. Pipe

Vehicles with an automatic transmission



01W527

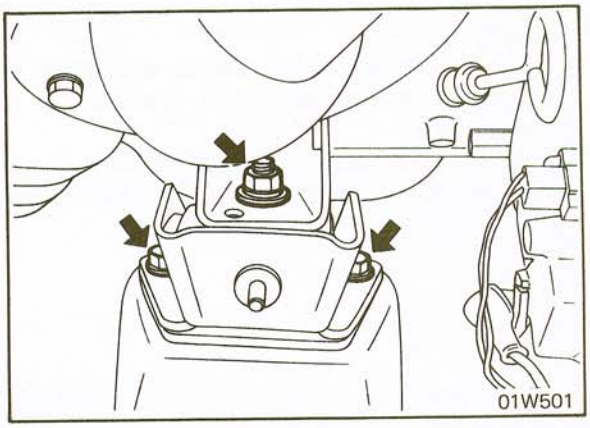
	Nm	ft.lbs.
A	13-20	9-14
B	6-10	4-7
C	30-40	22-29
D	18-25	13-18
E	55-75	40-54
F	30-42	22-30
G	17-23	12-17

EMOVAL

Front Mounting

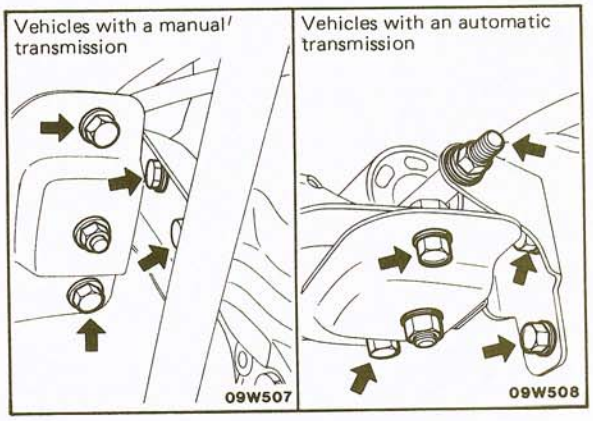
1. Remove the heat protector from the front insulator stopper.
2. Remove the engine mounting nuts and bolts from the front insulators. (01W501)
3. Attach a chain to the engine hangers.
4. Using a chain block and tackle, raise the engine and remove the insulators.

Caution
Avoid applying a strain on the radiator, fuel hoses or cables by raising the engine too high.

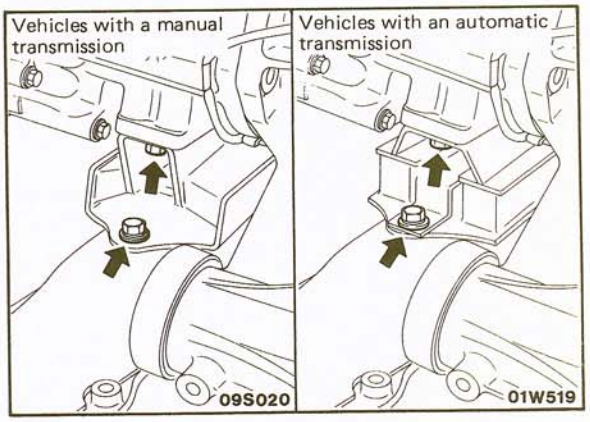


Rear Mounting

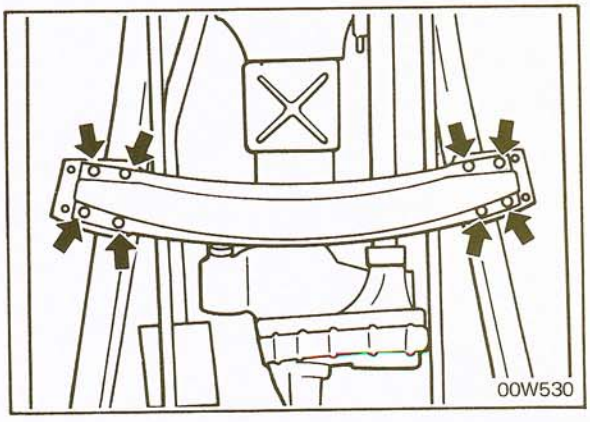
1. Support the transfer with a jack.
2. After the transfer mounting bracket and transfer support insulator have been separated, remove the plate from the side frame. (09W507, 09W508)
3. Detach the transfer mounting bracket from the transfer. (09W507, 09W508)



4. Support the transmission with a jack.
5. Detach the engine support rear insulator from the engine. (S09020, 01W519)

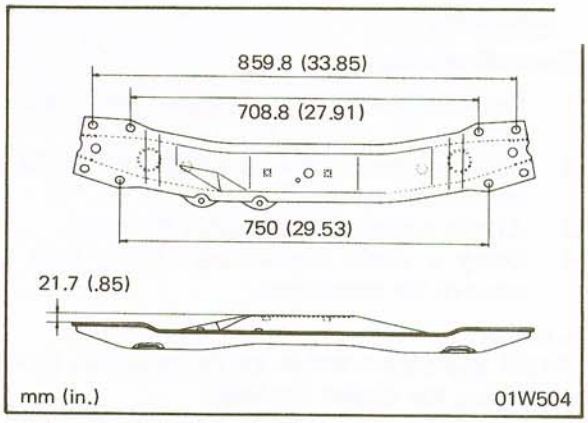


6. For vehicles with an automatic transmission, detach the cross select shaft from the No. 2 crossmember. (Refer to GROUP 21.)
7. Remove the No. 2 crossmember mounting bolts. (00W530)
8. Remove the engine support rear insulator from the No. 2 crossmember.



INSPECTION

1. Check insulators for cracks, separation or deformation.
2. Check transfer mounting bracket for deformation or corrosion.
3. Check plate for deformation or corrosion.
4. Check No. 2 crossmember for deformation or corrosion.



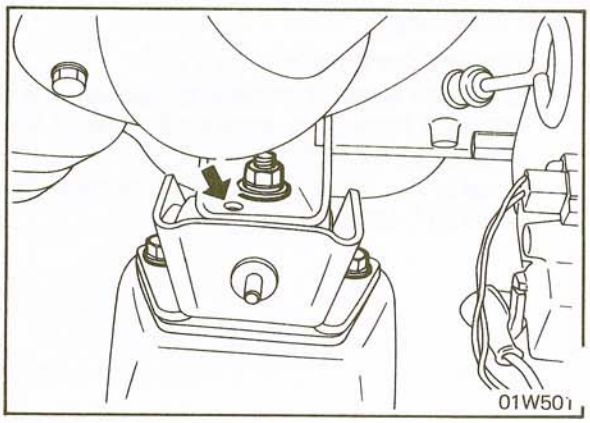
INSTALLATION

Front Insulator

Make sure that the locating boss and hole are in alignment.

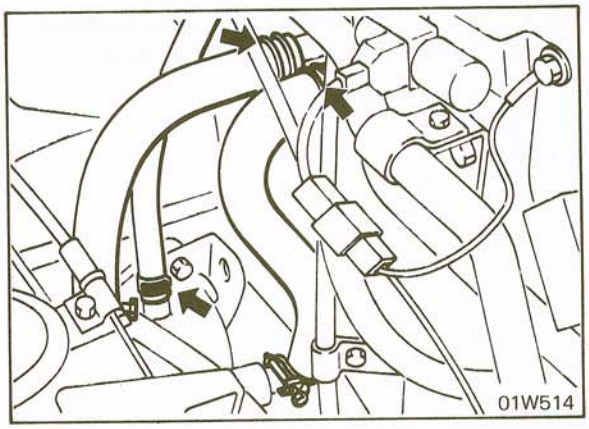
Caution

Do not distort rubber portions, and never stain rubber portions with fuel or oil.

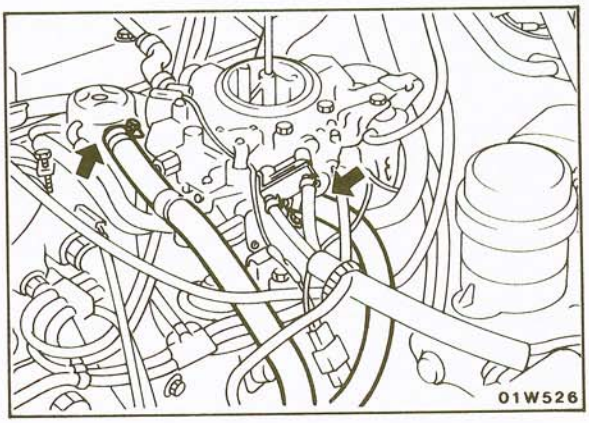


REMOVAL

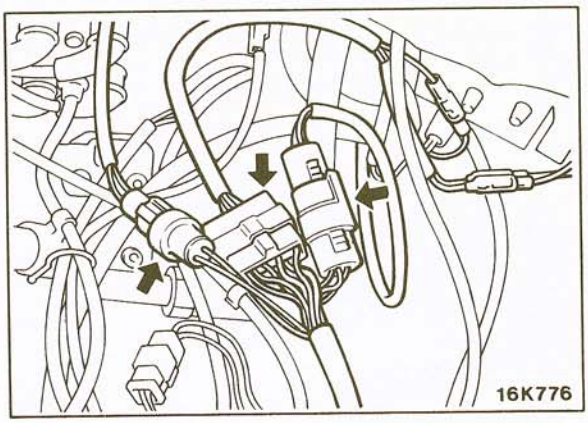
1. Disconnect the ground cable from the battery terminal.
2. Remove the hood. (Refer to GROUP 23.)
3. Remove the air cleaner.
4. Disconnect the heater hoses. (01W514)
5. Disconnect the brake booster vacuum hose. (01W514)



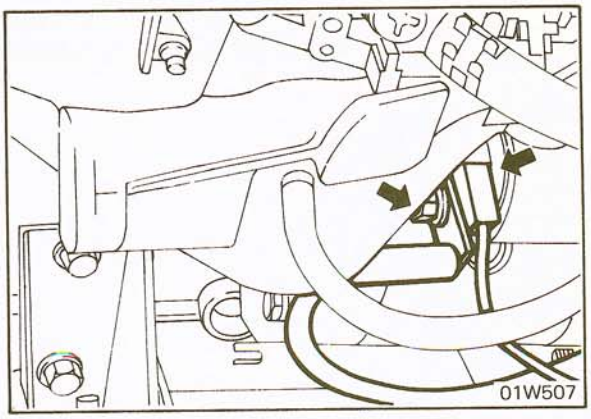
6. Disconnect the fuel hoses. (01W526)
7. Disconnect the accelerator cable. (Refer to GROUP 14.)



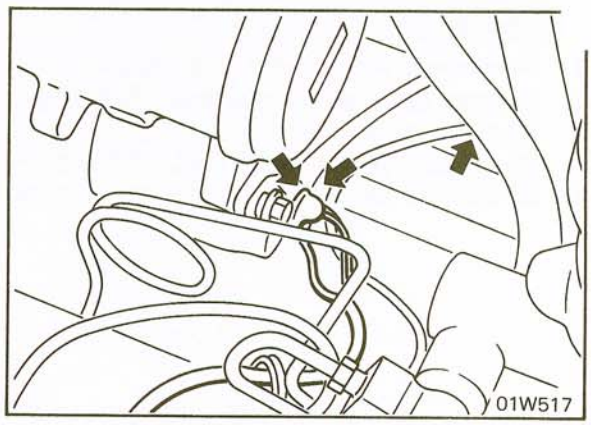
8. For vehicles equipped to meet California regulations (can also be sold in Federal States), disconnect the air temperature sensor connector, throttle position sensor connector and the carburetor control wiring harness connector.



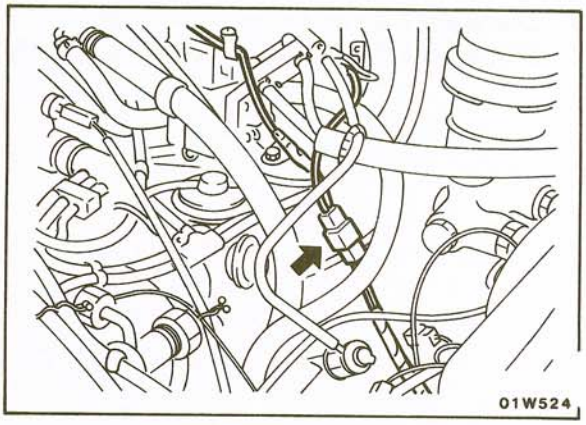
9. Disconnect the starter motor wiring harness. (01W507)
10. Remove the clutch release cylinder from the transmission. (Refer to GROUP 21.)



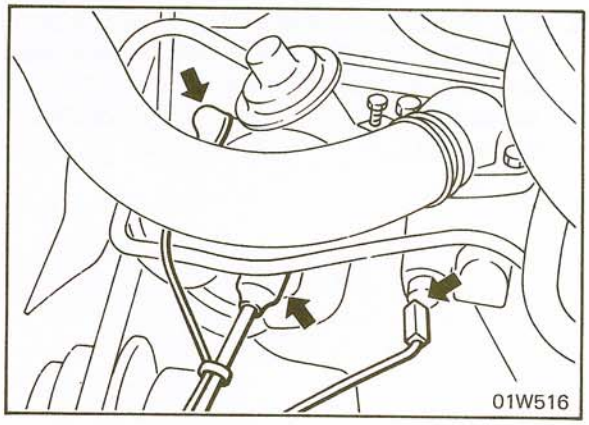
11. Disconnect the alternator wiring harness.
12. Disconnect the engine ground cable.



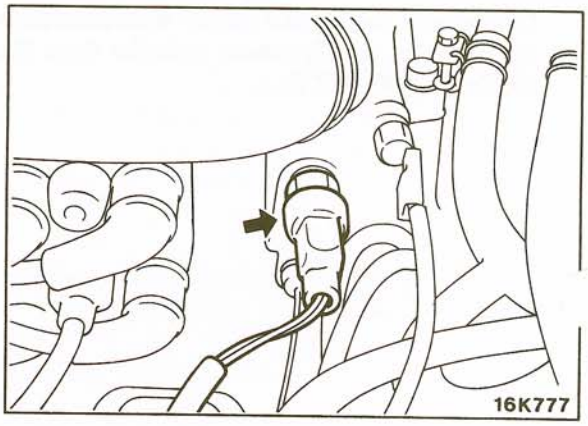
13. Disconnect the fuel cut solenoid valve and bowl vent valve connector.



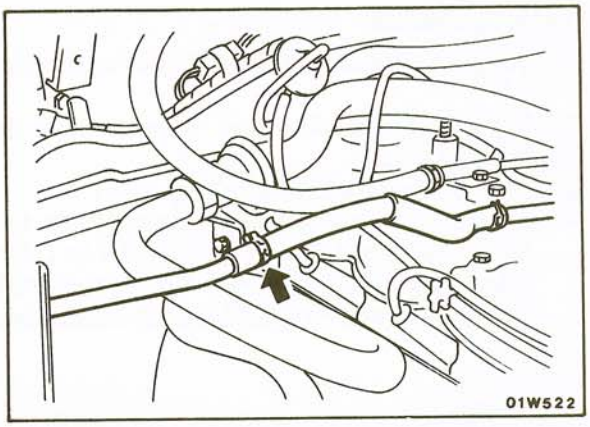
14. Disconnect the high-tension cable. (01W516)
15. Disconnect the water temperature gauge connector. (01W516)
16. Remove the power steering pump. (Refer to GROUP 19.)



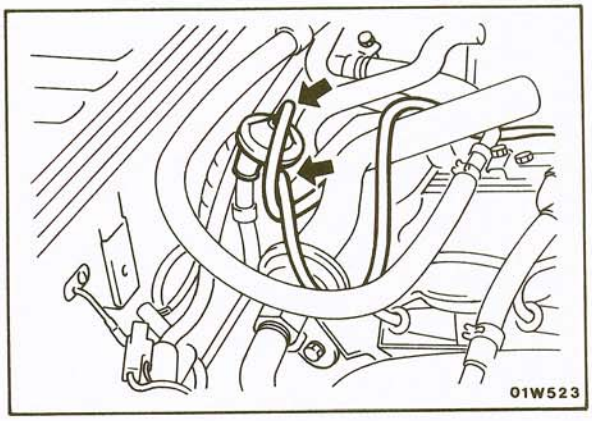
17. For vehicles equipped to meet California regulations (can also be sold in Federal States), disconnect the water temperature sensor.



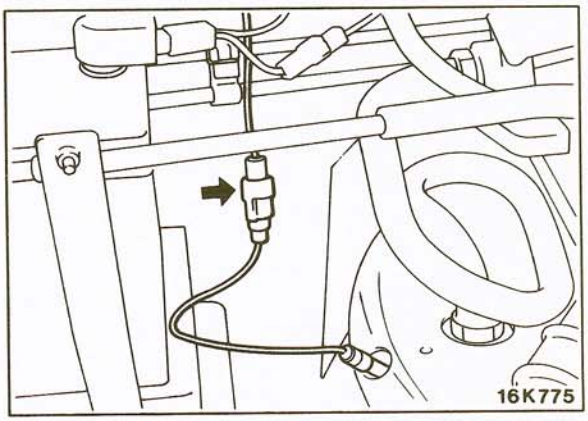
. Disconnect the vapor hose.



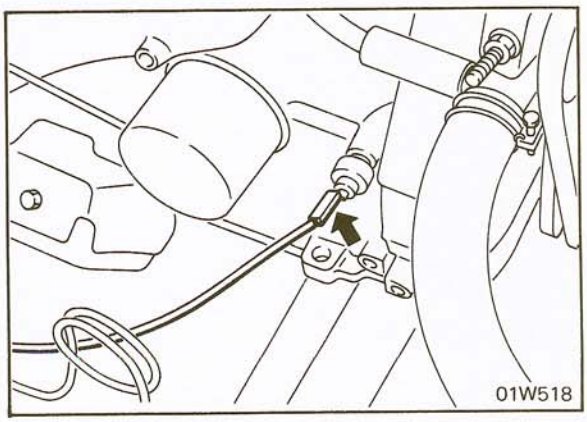
19. Disconnect the purge hoses from the purge control valve.



20. For vehicles equipped to meet California regulations (can also be sold in Federal States), disconnect the Oxygen sensor connector.



21. Disconnect the oil pressure switch harness. (01W518)
22. Remove the radiator assembly. (Refer to GROUP 7.)
23. Remove the front exhaust pipe. (Refer to GROUP 11.)
24. Remove the transfer case protector. (Refer to GROUP 21.)
25. Disconnect the speedometer cable. (Refer to GROUP 21.)
26. Disconnect the back-up light switch harness and 4-wheel drive indicator light switch harness. (Refer to GROUP 21.)
27. Remove the front and rear propeller shafts. (Refer to GROUP 16.)
28. Remove the transmission gearshift lever (vehicles with a manual transmission) or transmission selector lever (vehicles with an automatic transmission) and transfer shift lever.
29. For vehicles with an automatic transmission, remove the oil cooler hoses and tubes. (Refer to GROUP 7.)
0. Remove the engine mounting. (Refer to p. 9-17.)
31. Using a chain block and tackle, raise and remove the engine and transmission assembly diagonally out of the engine compartment.

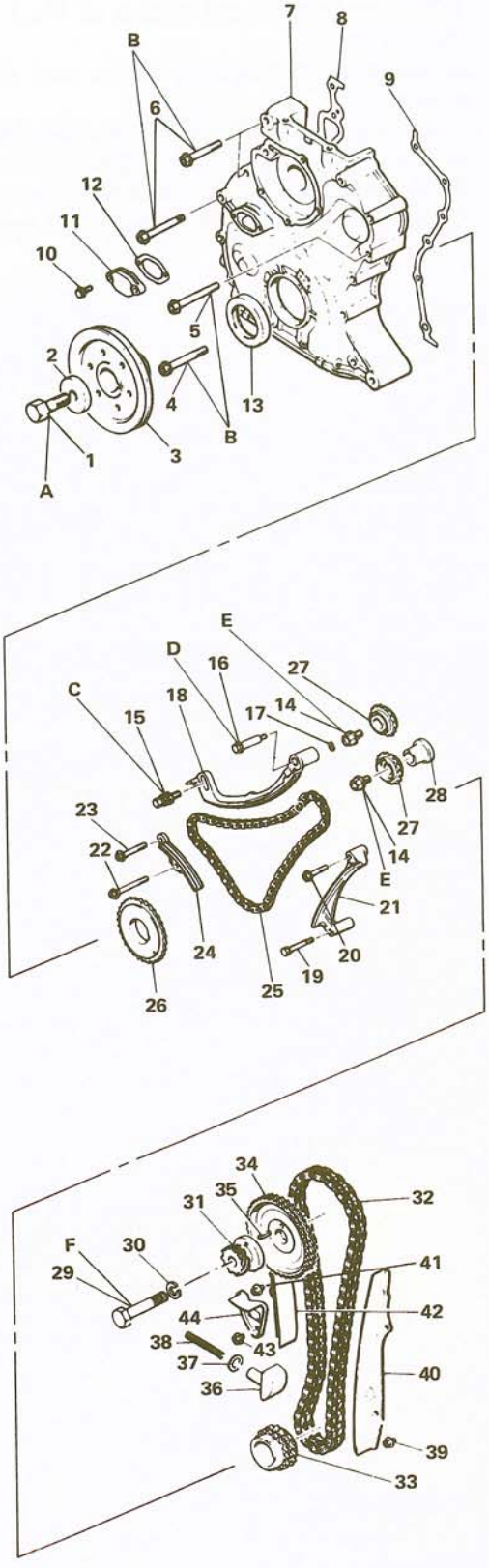


INSTALLATION

1. Supply coolant to the cooling system. (Refer to GROUP 7.)
2. Supply transmission and transfer case fluid. (Refer to GROUP 21.)
3. Supply engine oil. (Refer to p. 9-8.)
4. Adjust the clutch control system. (Refer to GROUP 6.)
   Adjust the accelerator cable. (Refer to GROUP 14.)
   Adjust the hood alignment. (Refer to GROUP 23.)
5. Torque all parts to specifications during assembly.

ɔMPONENTS

1. Crankshaft pulley bolt
2. Special washer
3. Pulley
4. Flange bolt – 8x68 (8)
5. Flange bolt – 8x73
6. Flange bolt – 8x58 (2)
7. Timing chain case
8. Chain case gasket (R)
9. Chain case gasket (L)
10. Flange bolt – 6x18 (2)
11. Cover
12. Gasket
13. Oil seal
14. Flange bolt – 10x15 (2)
15. Special bolt "B"
16. Special bolt "A"
17. Spring washer
18. Chain guide "B"
19. Flange bolt – 6x60
20. Flange bolt – 6x45
21. Chain guide "A"
22. Flange bolt – 6x45
23. Flange bolt – 6x32
24. Chain guide "C"
25. Chain "B"
26. Crankshaft sprocket "B"
27. Sprocket "B" (2)
28. Spacer
29. Bolt w/washer – 14x70
30. Plain washer
31. Distributor gear
32. Timing chain
33. Crankshaft sprocket
34. Camshaft sprocket
35. Spring pin
36. Tensioner
37. Rubber sheet
38. Spring
39. Flange bolt – 6x10
40. Tension side chain guide
41. Flange bolt – 6 x 10 (2)
42. Loose side chain guide
43. Flange bolt (2)
44. Sprocket holder



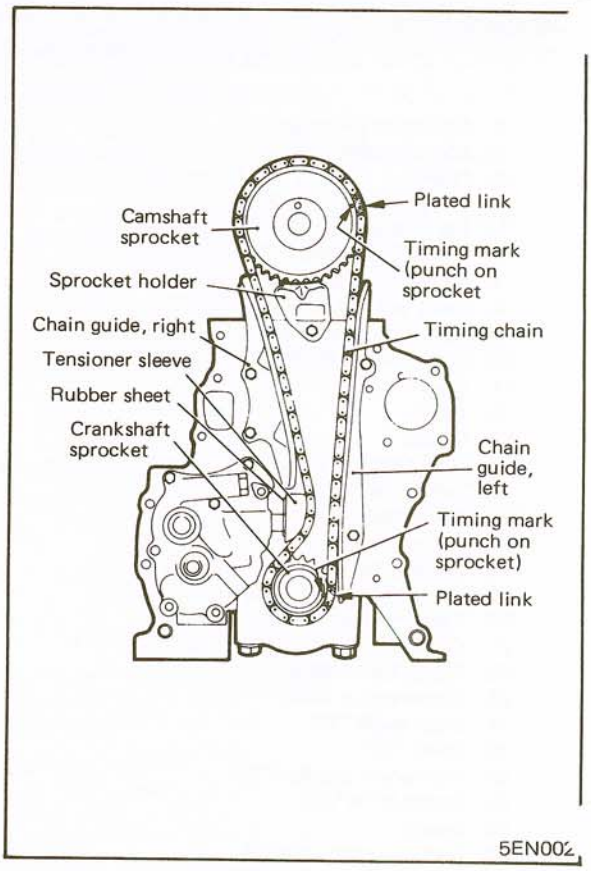
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

	Nm	ft.lbs.
A	108-127	80-94
B	12-14	9-10.5
C	15-21	11-15
D	8-9	6-7
E	59-68	44-50
F	49-58	37-43

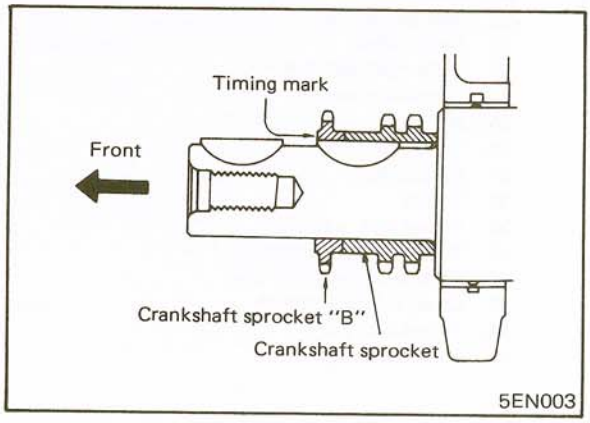
5EN119

TIMING CHAIN INSTALLATION PROCEDURE

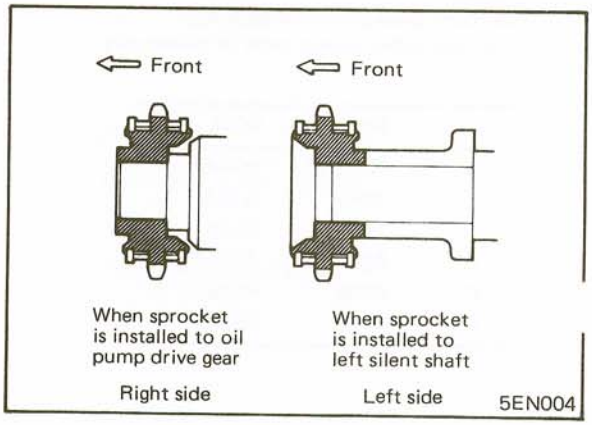
1. Install sprocket holder and chain guides.
2. Turn crankshaft until piston of No.1 cylinder is at top dead center.
3. Install tensioner spring, sleeve and rubber sheet to oil pump.
4. Line up plated links of timing chain and timing marks on sprockets as chain and sprockets are assembled.
5. While sliding crankshaft sprocket onto crankshaft, install chain and sprocket. Place camshaft sprocket on sprocket holder.



6. Install crankshaft sprocket "B" (for driving silent shafts) on crankshaft.

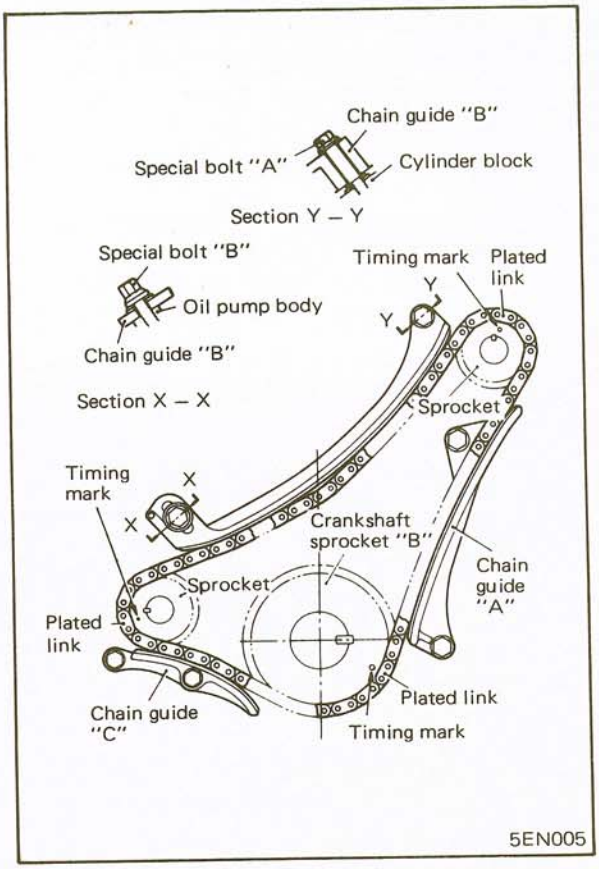


7. Assemble silent shaft sprockets to chain "B". Make sure that timing marks are in alignment with plated links. Use care not to confuse right and left sprockets, as they are installed in opposite directions.



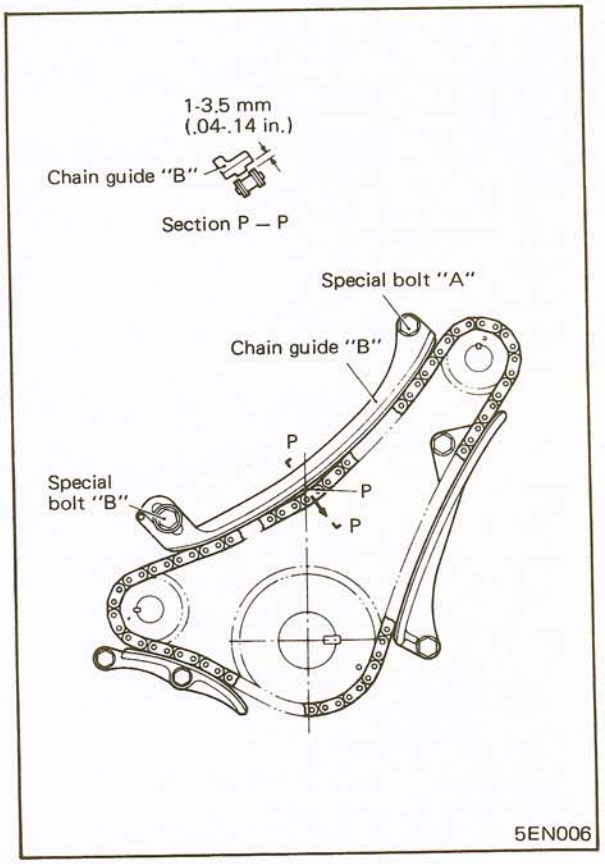
Holding assembled sprockets and chain "B", align timing mark on crankshaft sprocket "B" with that on chain "B", and install sprockets to oil pump drive gear and left silent shaft. Partially tighten bolt.

9. Temporarily install chain guides "A", "B" and "C".
10. Tighten silent shaft sprocket bolts to specified torque.
11. Tighten chain guide "A" mounting bolts firmly.
12. Tighten chain guide "C" mounting bolts firmly.

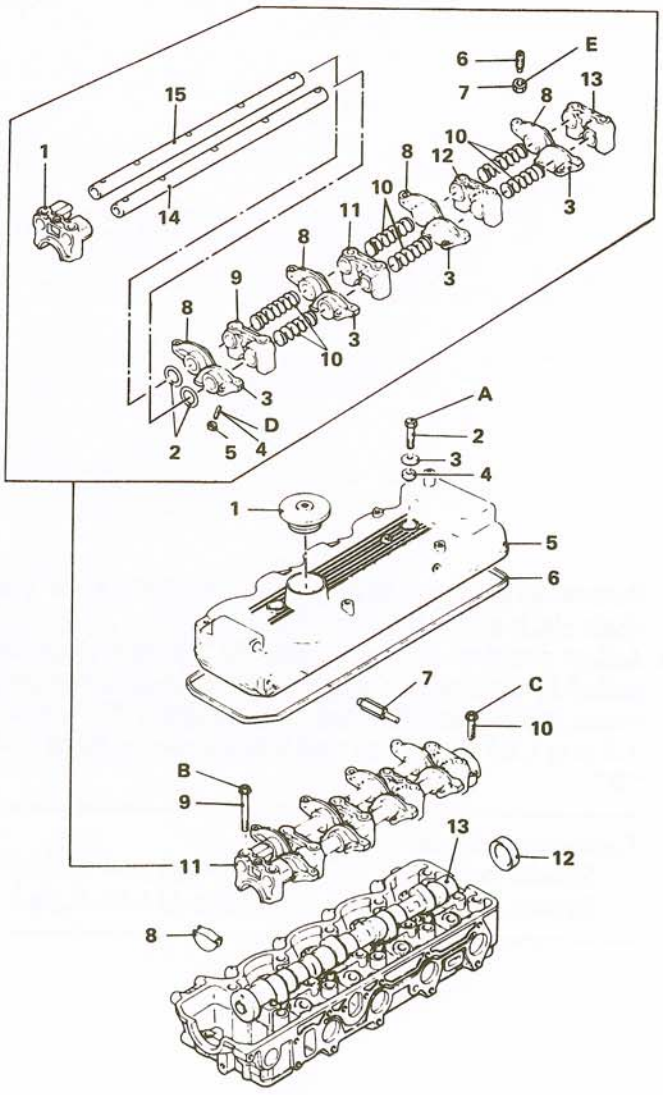


13. Rotate both silent shaft sprockets slightly to position chain slack at point P.
14. Adjust position of chain guide "B" so that when chain is pulled in direction of arrow with finger tips, clearance between chain guide "B" and links of chain "B" will be 1 to 3.5 mm (.04 to .14 in.) and tighten special bolts "A" and "B".

Tightening torque
Special bolt "A" . . . . . 8-9 Nm (6-7 ft.lbs.)
Special bolt "B" . . . . 15-21 Nm (11-15 ft.lbs.)



COMPONENTS



1. Oil filler cap
2. Bolt – 8x40 (2)
3. Washer (2)
4. Oil seal (2)
5. Rocker cover
6. Rocker cover gasket
7. PCV valve
8. Semi-circular packing
9. Flange bolt (10)
10. Flange bolt – 8x25 (2)
11. Rocker arm and shaft assembly
    -1 Bearing cap, front
    -2 Wave washer (2)
    -3 Rocker arm "A" (4)
    -4 Adjusting screw (4)
    -5 Nut (4)
    -6 Adjusting screw (8)
    -7 Nut (8)
    -8 Rocker arm "C" (4)
    -9 Bearing cap No. 2
    -10 Rocker arm spring (6)
    -11 Bearing cap No. 3
    -12 Bearing cap No. 4
    -13 Bearing cap, rear
    -14 Rocker arm shaft left
    -15 Rocker arm shaft right
12. Circular packing
13. Camshaft

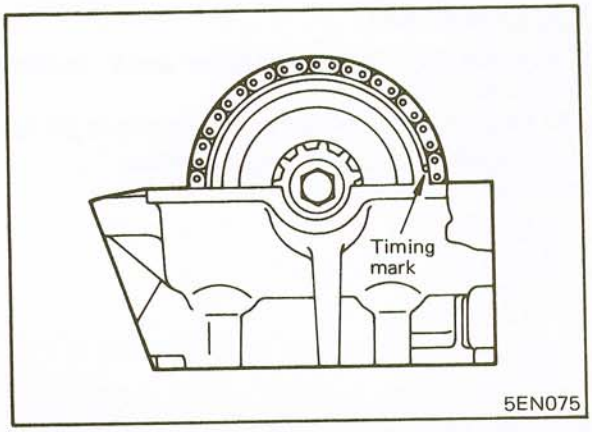
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

	Nm	ft.lbs.
A	5-6.8	3.7-5.0
B	19-20	14-15
C	20-26	15-19
D	8-9.5	6-7
E	12-17	9-13

5EN074

EMOVAL

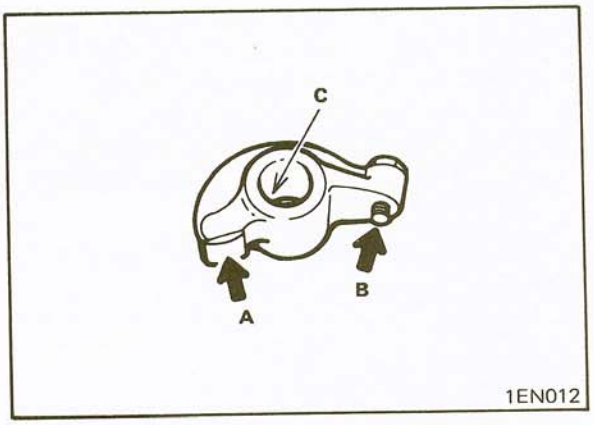
1. Before rocker arm and rocker shaft are removed, make sure that piston in No. 1 cylinder is at top dead center on compression stroke.
2. Illustration shows position of camshaft sprocket timing mark when piston in No. 1 cylinder is placed at top dead center on compression stroke. (5EN075)



INSPECTION

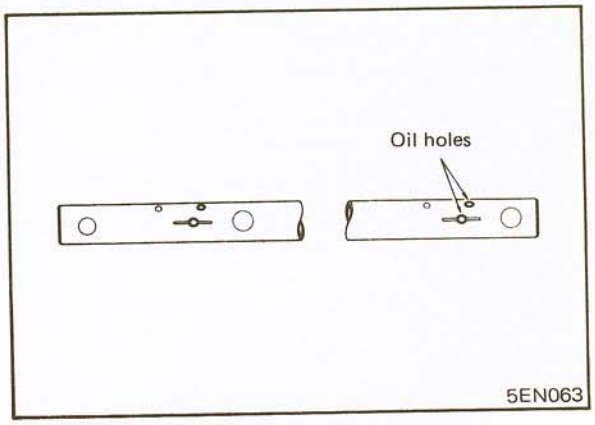
Rocker Arm

1. Check for wear of portions A, B and C, and replace if following conditions are evident. (1EN012)
   (1) Portion A dented or worn
   (2) Portion B eccentric
   (3) Portion C (inside diameter) excessively loose on shaft
2. Check to ensure that oil holes are clear. (rocker arm with oil holes only)



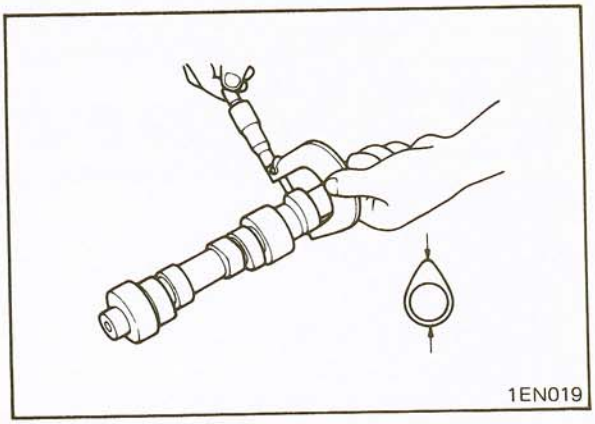
Rocker Arm Shaft

1. Check to ensure that rocker arm mounting portion is not worn.
2. Check to ensure that oil holes are clear. (5EN063)



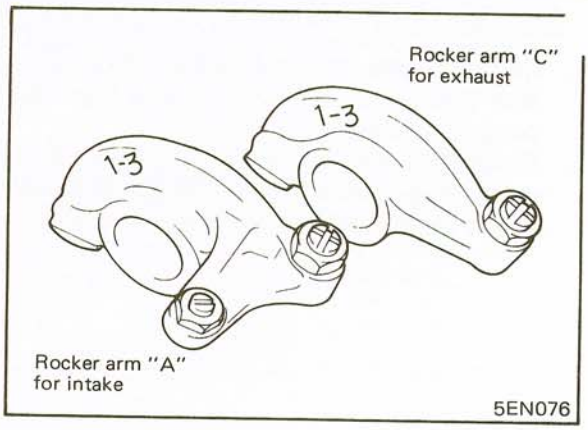
Camshaft

1. If the following areas of the camshaft are badly worn or damaged, replace. (1EN019)
   (1) Journals
   (2) Cam lobes
   (3) Fuel pump drive cam
   (4) Distributor drive gear teeth
   (5) Oil seal contacting surface
2. If camshaft bearing is badly worn, replace cylinder head.
3. If oil seal lip is worn, replace.

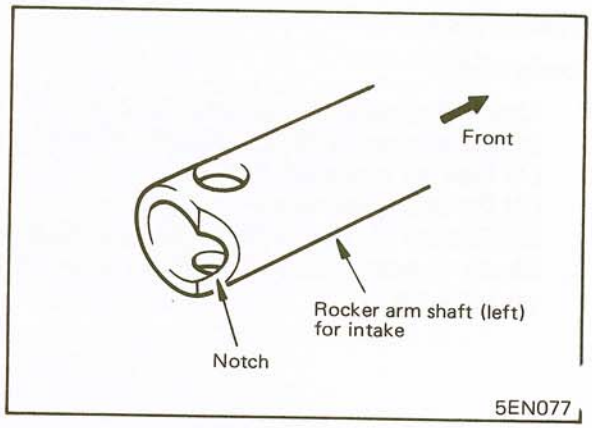


INSTALLATION

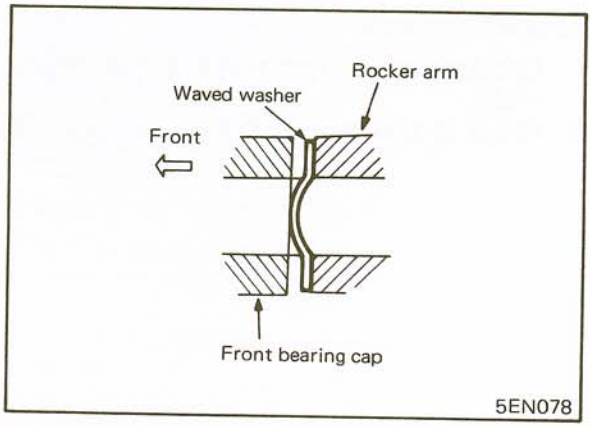
There are two kinds of rocker arms: rocker arm "A" and rocker arm "C".
Rocker arm "A" drives intake valves and jet valves.
Rocker arm "C" drives exhaust valves.



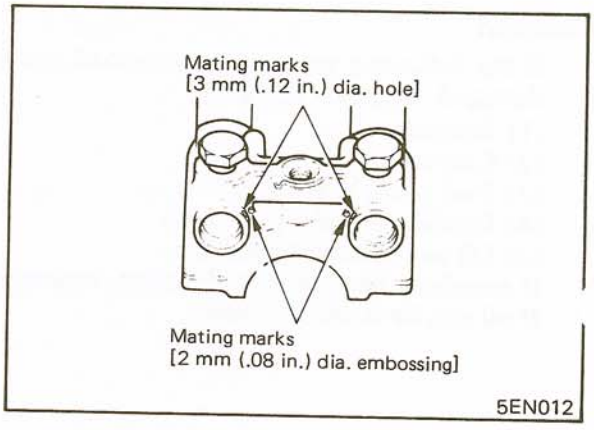
1. Insert the left and right rocker shafts into the front bearing cap. The rear end of left (intake) rocker arm shaft has a notch as shown in 5EN077.
2. Align the mating mark of the rocker arm shaft front end to the mating mark of the front bearing cap. Then insert the bolts to hold shafts in bearing cap.



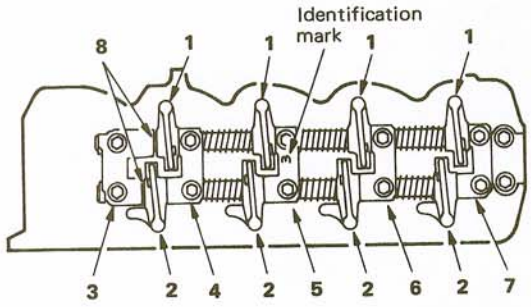
3. Install the waved washer in the direction shown in the illustration.



4. Assemble the rocker arm shaft so that the alignment mark at the front end matches the alignment mark of the front bearing cap. (5EN012)
5. Install the rocker arms, shafts, caps, etc., as shown in illustration before installation to the cylinder head. Insert the bolts to hold parts in position. (5EN079)

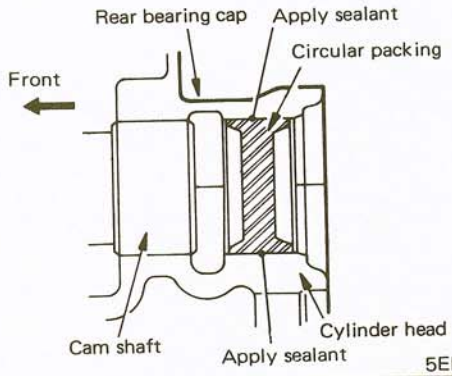


1. Rocker arm "C"
2. Rocker arm "A"
3. Front bearing cap
4. No. 2 bearing cap
5. No. 3 bearing cap
   (Inscribed mark 3 on top surface)
6. No. 4 bearing cap
   (Rocker screw hole on top surface)
7. Rear bearing cap
8. Waved washer



5EN079

6. Apply engine oil to the journals of camshaft and install it to cylinder head.
7. Coat the sealant to the O.D. of circular packing and install the circular packing to cylinder head as shown in 5EN080.
8. Install the rocker arms, shafts and bearing caps assembly to the cylinder head, and tighten the bearing cap bolts to specified torque.
9. Adjust the valve clearance. See "Lubrication and Maintenance", Group 0, for detailed procedure.



5EN080

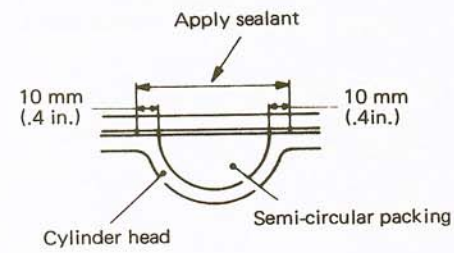
10. Install the semi-circular packing to the front of cylinder head and apply sealant to top of semi-circular packing.

Recommended adhesive . . . . . .
3M Super Weather Strip Adhesive 8001 or equivalent

11. Install the rocker cover gasket and rocker cover.

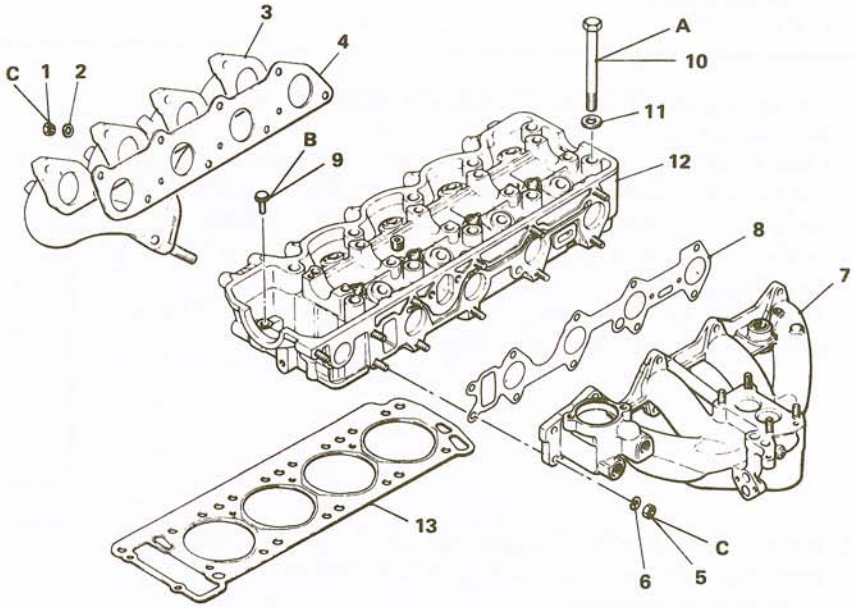
Caution
Make sure that rocker cover bolts are tightened to specified torque.
If they are overtorqued, a deformed rocker cover or oil leakage could result.

Tightening torque
Rocker cover bolts . . . . . 5-6 Nm (3.7-5.0 ft.lbs.)



6EN013

COMPONENTS



1. Nut (8)
2. Plain washer (7)
3. Exhaust manifold
4. Exhaust manifold gasket
5. Nut (9)
6. Spring washer (9)
7. Intake manifold
8. Intake manifold gasket
9. Flange bolt (2)
10. Cylinder head bolt (10)
11. Washer (10)
12. Cylinder head
13. Cylinder head gasket

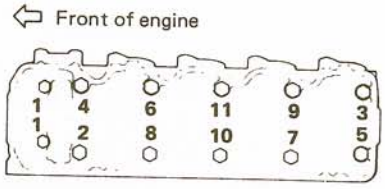
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

		Nm	ft.lbs.
A	Cold engine	89-98	65-72
	Hot engine	98-107	73-79
B		15-21	11-15
C		15-19	11-14

5EN086

REMOVAL

1. Remove cylinder head bolts in sequence shown in illustration. (5EN015)
2. Cylinder head bolts can be loosened with ordinary socket wrench or special tool MD998051.

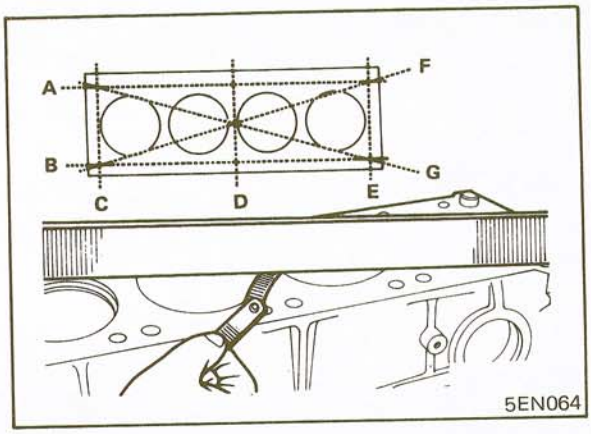


5EN015

INSPECTION

Cylinder Head

1. Check cylinder head gasket surface for warping by using a straight edge in directions of A, B, ... as shown in illustration. (5EN064)
2. If warping exceeds 0.1 mm (.004 in.) in any direction, either replace cylinder head or lightly machine cylinder head gasket surface.

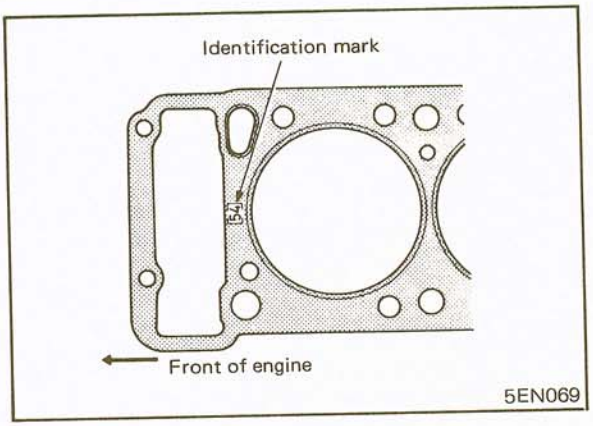


INSTALLATION

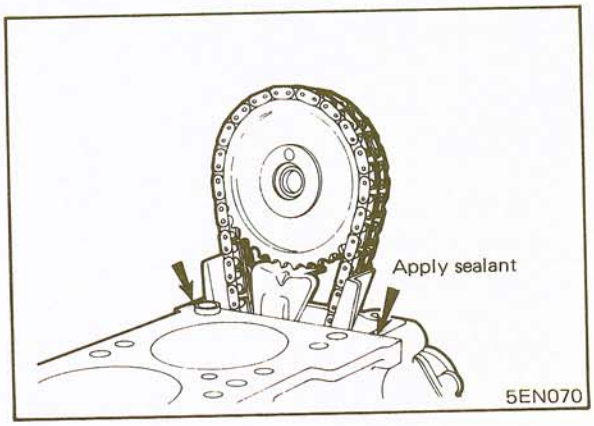
Cylinder Head Gasket

1. Clean gasket surfaces of cylinder head and cylinder block.
2. Install gasket surface with identification mark toward cylinder head. (5EN069)

Caution
Do not apply sealant to cylinder head gasket.



3. Before cylinder head gasket is installed, apply sealant to top surface (indicated by arrows in illustration) of each butt joint between cylinder block and chain case.

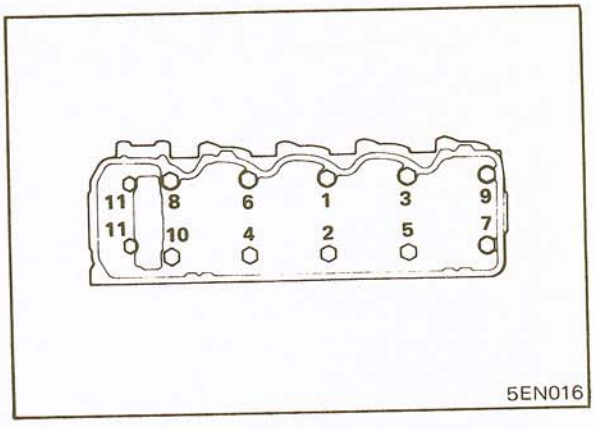


Cylinder Head

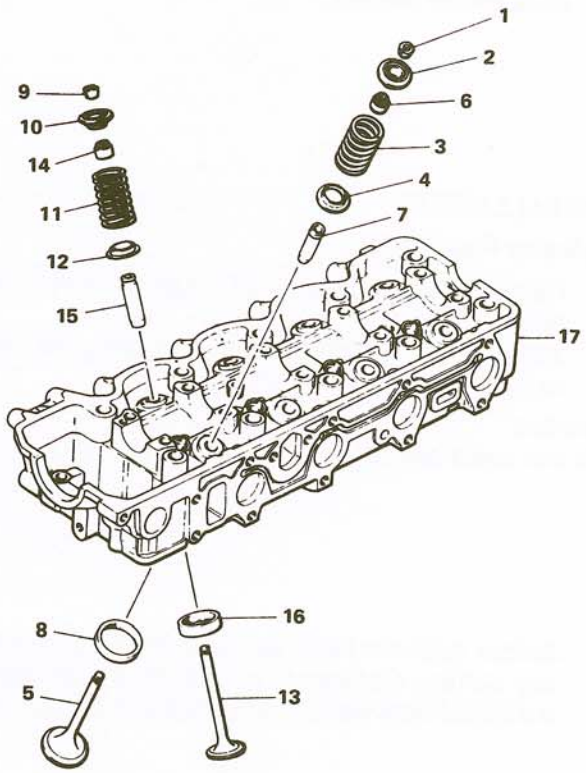
1. Install cylinder head assembly.
2. Install cylinder head bolts.
3. Starting at top center, tighten all cylinder head bolts to 1/2 of specified torque in the sequence shown in illustration. (5EN016)
4. Torque all cylinder head bolts to the specifications in the same sequence.

Cylinder head bolt (Nos.1 through 10) tightening torque
- Cold engine ..... 89-98 Nm (65-72 ft.lbs.)
- Hot engine ..... 98-107 Nm (73-79 ft.lbs.)

Cylinder head bolt (No.11) tightening torque
15-21 Nm (11-15 ft.lbs.)



COMPONENTS



1. Lock (8)
2. Retainer (4)
3. Spring (4)
4. Seat (4)
5. Intake valve (4)
6. Valve stem seal (4)
7. Intake valve guide (4)
8. Intake valve seat (4)
9. Lock (8)
10. Retainer (4)
11. Spring (4)
12. Seat (4)
13. Exhaust valve (4)
14. Valve stem seal (4)
15. Exhaust valve guide (4)
16. Exhaust valve seat (4)
17. Cylinder head

NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

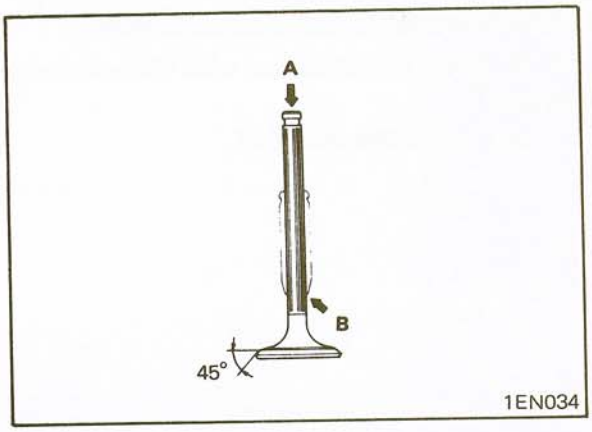
5EN017

Disassembled parts, such as valves, valve springs, should be grouped in accordance with their cylinder numbers.

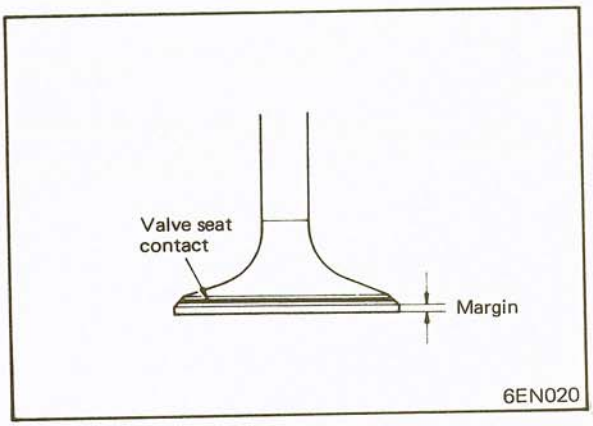
INSPECTION

Valves

1. Check each valve for wear, damage or deformation of head and stem at "B". Repair or replace excessively worn, damaged or deformed valves.
2. If stem tip "A" is pitted, correct by grinding. This correction must be limited to a minimum. Also reface valves with a valve grinder.
3. Check valve stem-to-guide clearance. Replace valve and/or valve guide if necessary.

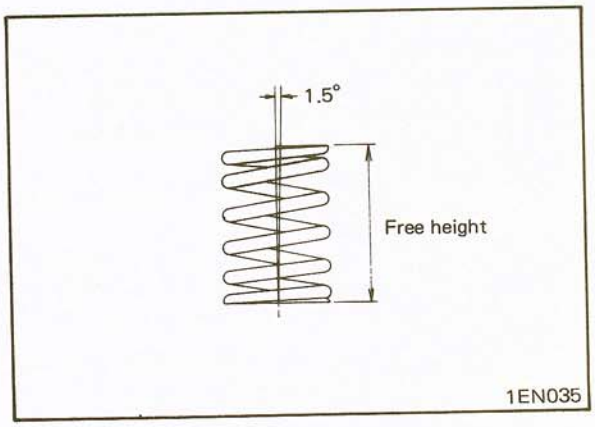


4. Replace valve if the margin of the face has decreased to less than 0.5 mm (.02 in.). (6EN020)
5. Valve seat contact should be made at center of valve face.
6. Using marking compound, check for even contact with valve seat.
7. If inadequate contact with valve seat is evident, correct valve seat and/or reface valve.



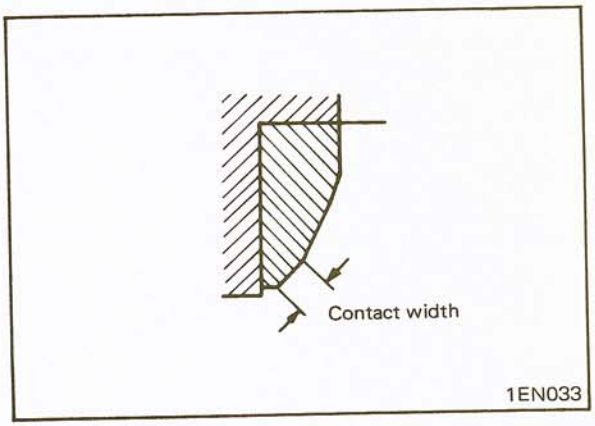
Valve Springs

1. Check free height of each valve spring and replace if necessary. (1EN035)
2. Using a square, test squareness of each valve spring. If spring is excessively deformed, replace it.



Valve Seats

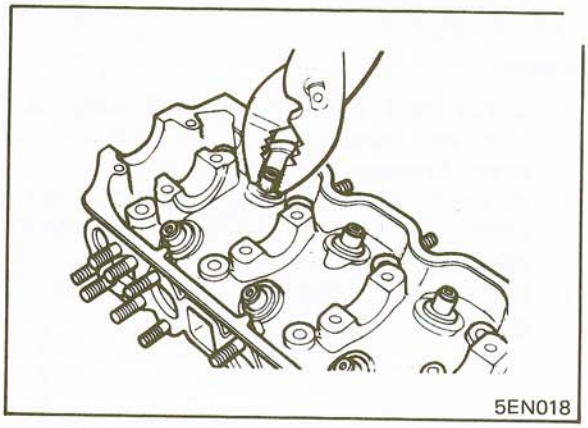
1. Check valve seats for evidence of overheating or improper contact with valve face. Correct or replace seat if necessary.
2. Valve seat contact width should be as specified. (Refer to p. 9-32.) (1EN033)



VALVE STEM SEAL REPLACEMENT

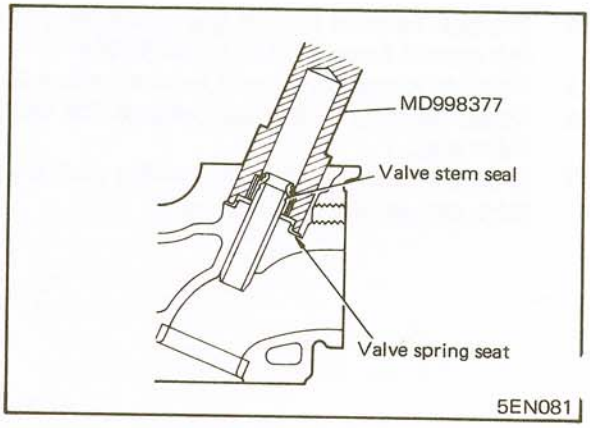
1. Remove valve stem seal with pliers and discard it.

Caution
Do not reuse valve stem seal.


5EN018

2. Install spring seats.
3. Lightly tap seal into place with special tool. (5EN081)

NOTE
Incorrect installation of seal will adversely affect lip and eccentricity, resulting in oil leakage past valve guides.



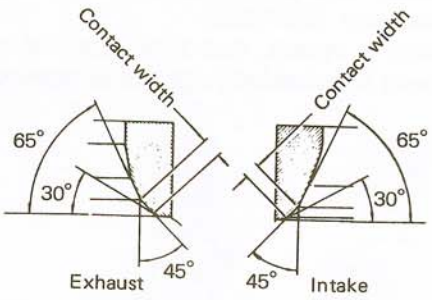
5EN081

VALVE SEAT RECONDITIONING

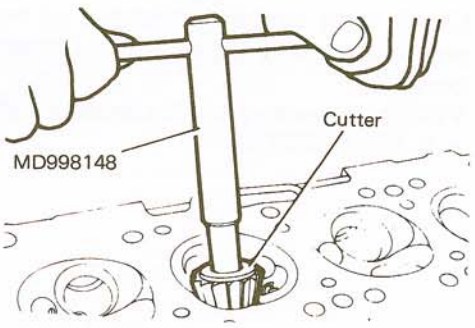
1. When correcting, check valve guide for wear. Replace guide if worn, and then correct seat.
2. To correct valve seat, use special tools. (1EN036, 1EN037)

Contact width	
Exhaust	1.2-1.6 mm (.047-.063 in.)
Intake	0.9-1.3 mm (.035-.051 in.)

3. After correction, valve and valve seat should be lapped with a lapping compound.



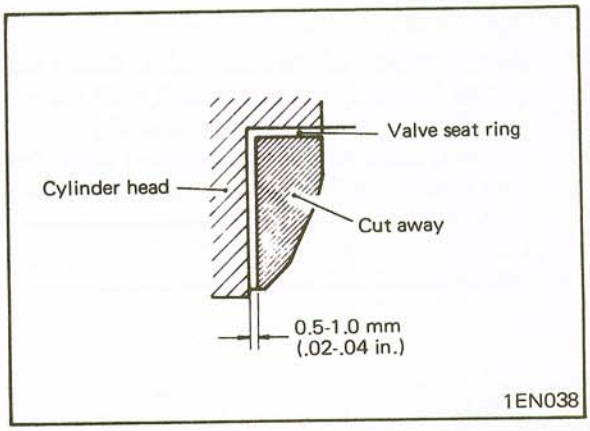
1EN036



1EN037

ALVE SEAT INSERT REPLACEMENT PROCEDURE

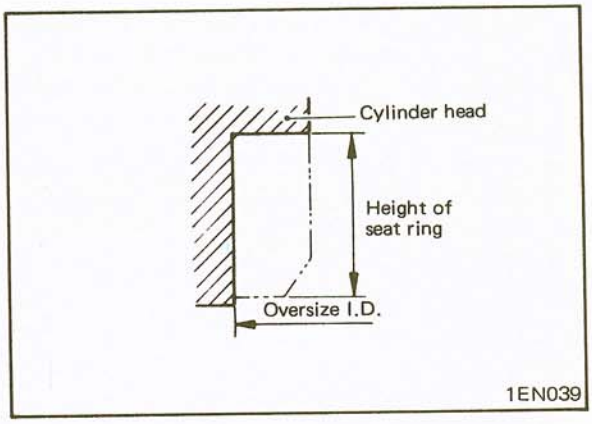
1. When seat insert is to be removed, cut away excess metal from inside of insert with cutter before removal.



2. Grind valve insert bore in cylinder head to match the outside diameter and height of oversize seat insert. (1EN039)
3. Before insert is installed, heat cylinder head proper to approx. 250° C (480° F).

Caution
If seat insert is installed at room temperature, cylinder head will be ground and seat ring will not tightly fit.

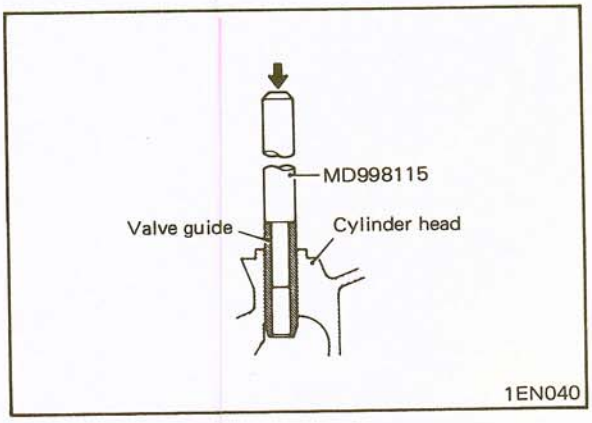
4. Press-fit insert quickly in hole provided in cylinder head.
5. After installation, recondition valve seat with seat cutter. See "Valve Seat Reconditioning".



VALVE GUIDE REPLACEMENT PROCEDURE

Replace the valve guide as follows.

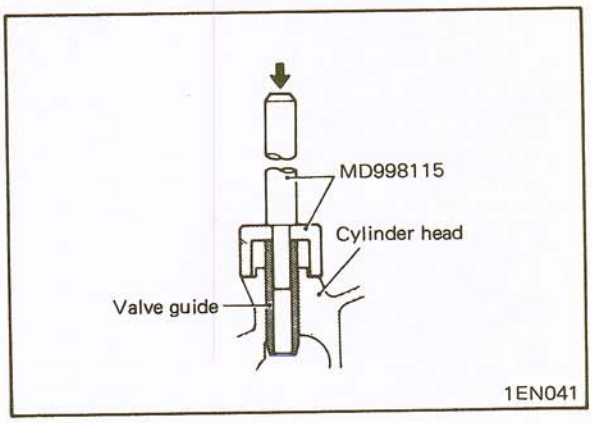
1. Using special tool, press valve guide out toward cylinder head lower surface. (1EN040)
2. Machine valve guide hole in cylinder head to outer diameter of oversize valve guide.



3. Using special tool install the valve guide. Use of valve guide installer makes it possible to press the valve guide to a predetermined height. Valve guide should be installed from top of cylinder head. (1EN041)

Caution
If valve guide of standard size has been removed, do not reinstall a standard size valve guide. Be sure to install valve guide at room temperature.

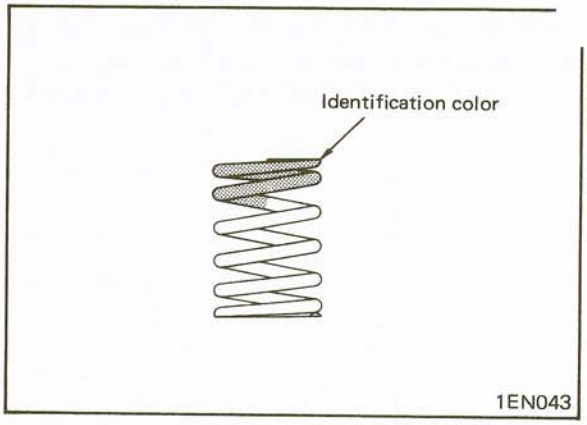
4. After valve guides have been installed, insert new valves and check for free movement.
5. When valve guides have been replaced, check for valve face-to-seat contact and correct valve seats as necessary.



REASSEMBLY

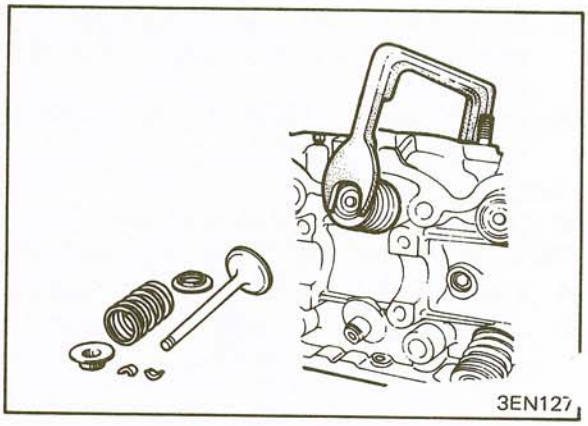
1. Apply engine oil to each valve. Insert valves into guides. Avoid inserting valve into seal with force. After insertion, check to see if valve moves smoothly.
2. Valve springs should be installed with identification color side toward valve spring retainer. (1EN043)

Identification color	Blue

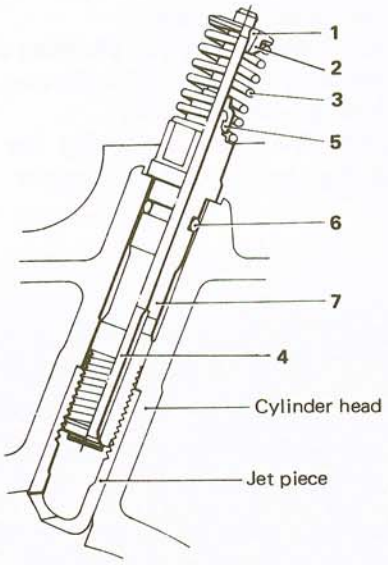


3. Use valve spring compressor or suitable tool to compress spring and install retainer lock. (3EN127)
4. After installation of valves, make certain that retainer locks are positively installed.

Caution
When spring is compressed with Valve Spring Compressor or suitable tool, check to see that the bottom of retainer does not contact the valve stem seals.



OMPONENTS



1. Retainer lock
2. Spring retainer
3. Spring
4. Jet valve
5. Valve stem seal
6. O-ring
7. Jet body

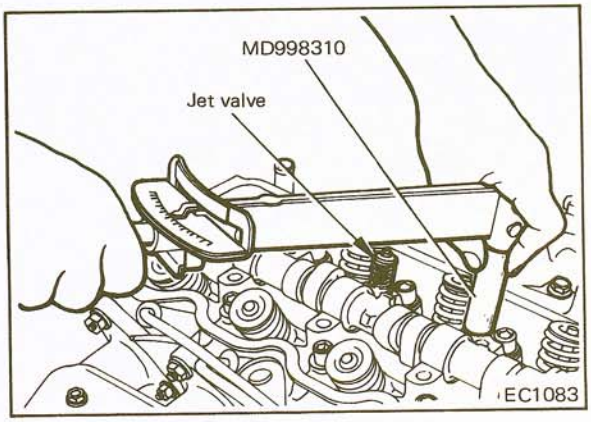
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

EC1084

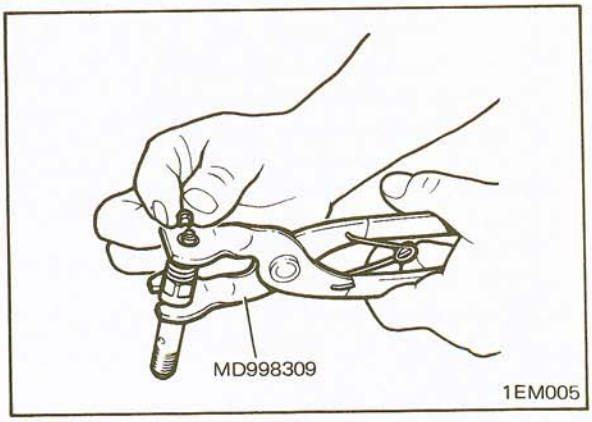
REMOVAL

1. Remove the jet valve assembly with special tool.

Caution
When using the jet valve socket wrench, make certain that the wrench is not tilted with respect to the center of the jet valve. If the tool is tilted, the valve stem might be bent by the force exerted on the valve spring retainer, resulting in defective jet valve operation.



2. Remove the jet valve spring retainer lock with special tool and remove the valve spring retainer and valve spring.



INSPECTION

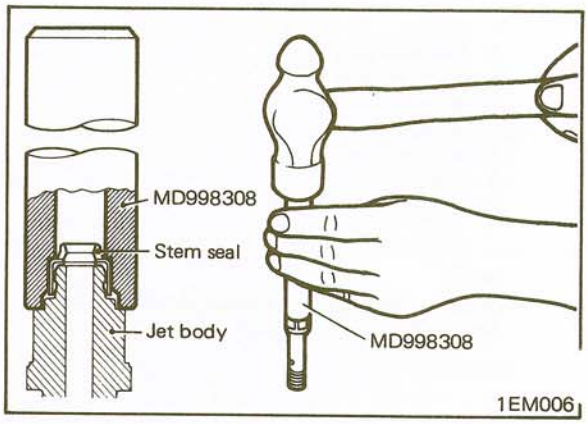
1. Check to ensure that the jet valve slides smoothly with no play in the jet body. Do not attempt to adjust the fit of the jet valve in the jet body. Replace the jet valve and jet body as an assembly.
2. Check the face of the jet valve and the jet body seat for seizure or damage. If defective, replace the jet valve and jet body as an assembly.
3. Check the jet valve spring for deterioration, cracks or damage, and replace if defective.

INSTALLATION

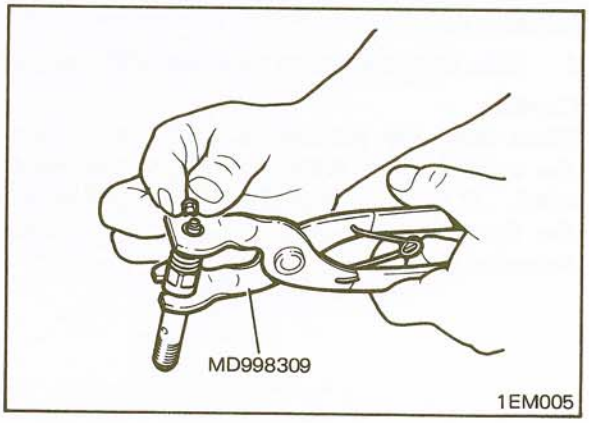
1. Install the jet valve stem seal with the special tool. (1EM006)

Caution
Do not reuse old valve stem seal.

2. Apply engine oil to the stem of the jet valve before inserting the jet valve into the jet body. When inserting the valve, use care to prevent damage to the new valve stem seal lips. After installation, check to ensure that the valve slides smoothly.

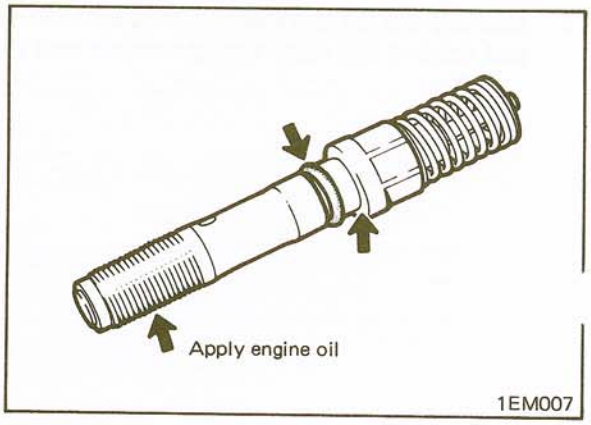


3. Mount the jet valve spring and jet valve spring retainer. Then compress the spring with the special tool, and install the retainer lock. When compressing the spring with pliers, use care not to avoid damaging the valve stem with the bottom of the spring retainer.



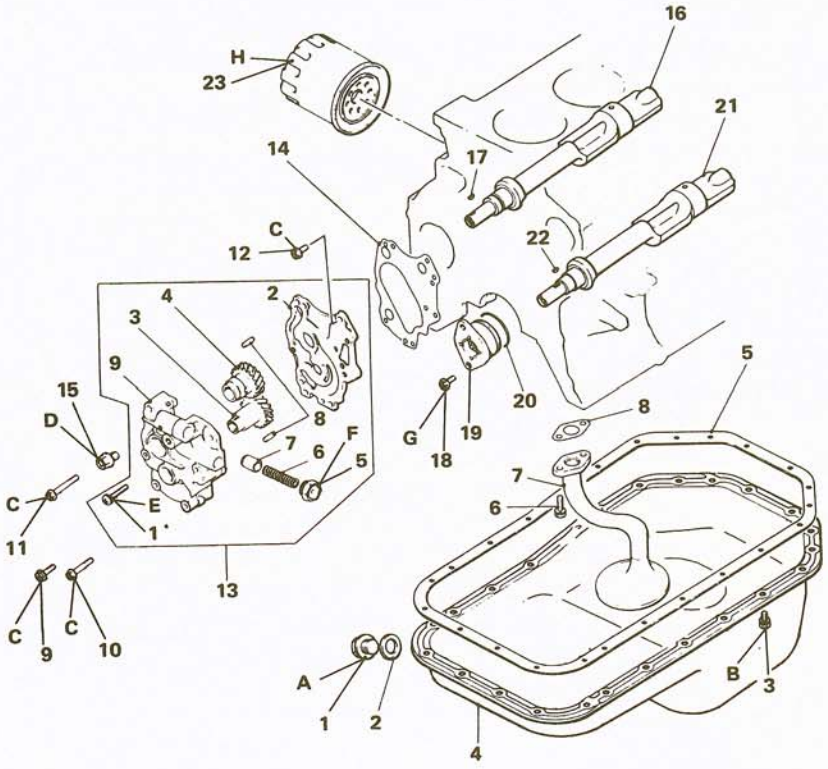
4. Install a new O-ring into the groove around the jet body and apply engine oil to the O-ring. Apply engine oil to the jet body threaded area and seat surface. (1EM007)
5. Screw the jet valve assembly into the cylinder head by hand, and tighten to the specified torque with special tool. Hold the jet valve socket wrench firmly to make sure that it is not tilted with respect to the center of the jet valve.

Tightening torque
Jet valve assembly ..... 18-21 Nm (13-15 ft.lbs.)



ɔMPONENTS

1. Oil drain plug
2. Oil drain plug gasket
3. Bolt (24)
4. Oil pan
5. Gasket
6. Bolt (2)
7. Oil screen
8. Oil screen gasket
9. Flange bolt – 6x22
10. Flange bolt – 6x38
11. Flange bolt – 6x45
12. Flange bolt – 6x16
13. Oil pump assembly
    - -1 Screw
    - -2 Oil pump cover
    - -3 Oil pump drive gear
    - -4 Oil pump driven gear
    - -5 Plug
    - -6 Relief spring
    - -7 Relief valve
    - -8 Pin (2)
    - -9 Oil pump body
14. Oil pump gasket
15. Flange bolt
16. Silent shaft, right
17. Woodruff key
18. Flange bolt (2)
19. Thrust plate
20. O-ring
21. Silent shaft, left
22. Woodruff key
23. Oil filter



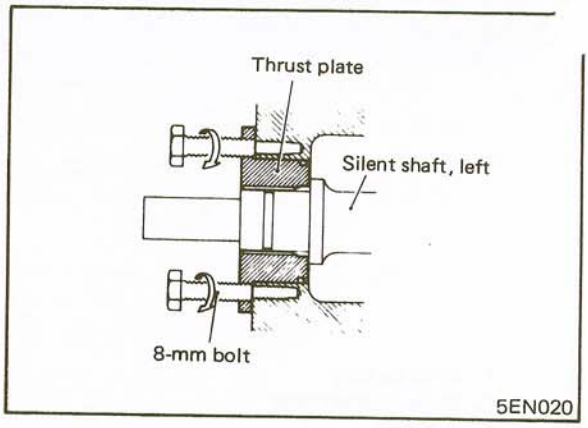
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

	Nm	ft.lbs.
A	59-78	44-57
B	6-7	4.5-5.5
C	10-11.5	7.5-8.5
D	59-68	44-50
E	8-9	6-7
F	30-44	22-32
G	10-11.5	7.5-8.5
H	11-12	8-9

5EN118

REMOVAL

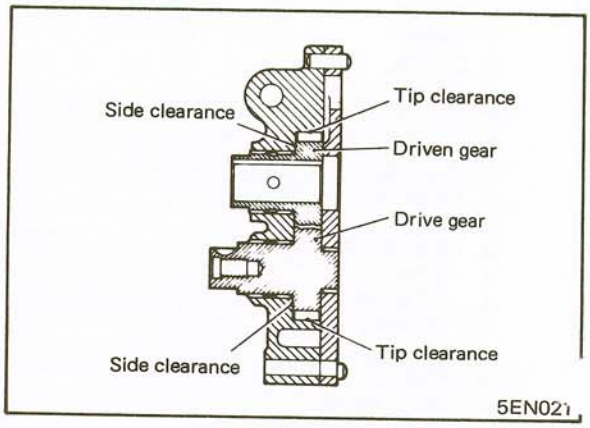
When the thrust plate is to be removed, install 8 mm dia. bolts into threaded holes of flange and turn bolts equally to remove the thrust plate.



INSPECTION

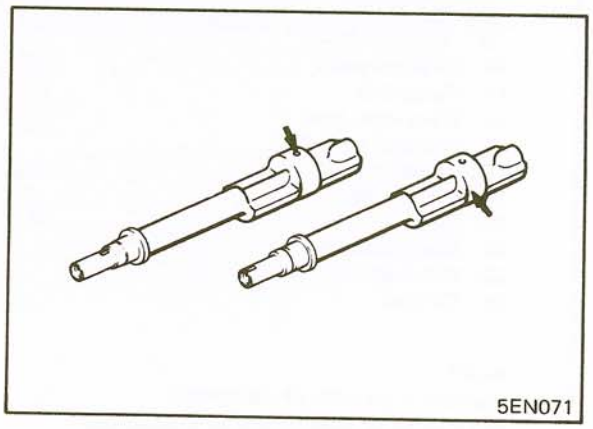
Oil Pump

1. Install drive gear and driven gear to oil pump body and measure clearance.
2. Check for stepped wear of gear contacting surfaces of body and cover.
3. If clearance is excessive, or if case or cover has stepped wear, replace case and cover assembly, replace gears, or both.



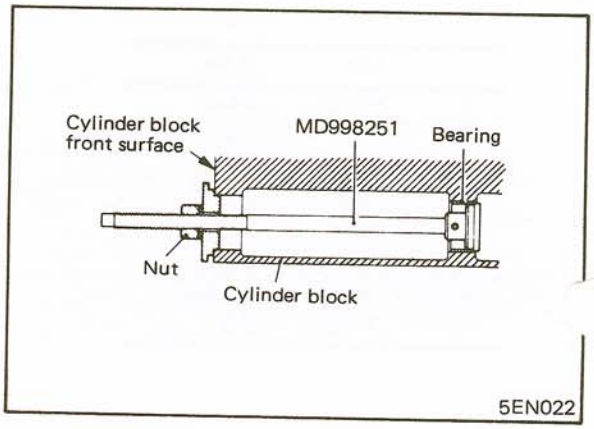
Silent Shafts

1. Check journals for wear, damage or seizure. If excessive damage or seizure is evident, check bearing also. If necessary, replace silent shaft, bearing, or both.
2. Check oil hole passage for clogging. Clean or repair if necessary.



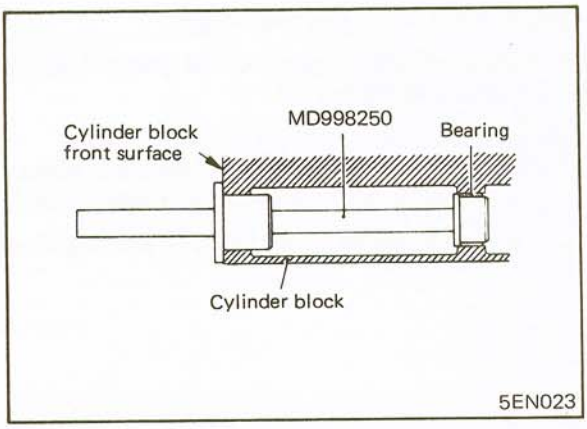
SILENT SHAFT BEARING REPLACEMENT PROCEDURE

1. Using special tool, remove silent shaft rear bearing.



Using special tool, install silent shaft bearing to cylinder block.

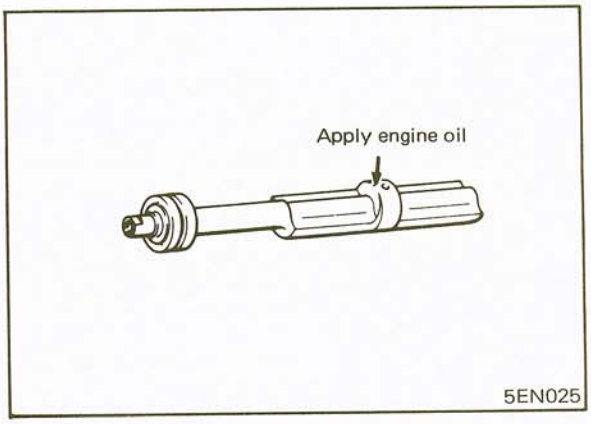
Caution
Before installing bearing, apply engine oil to outer surface of bearing.



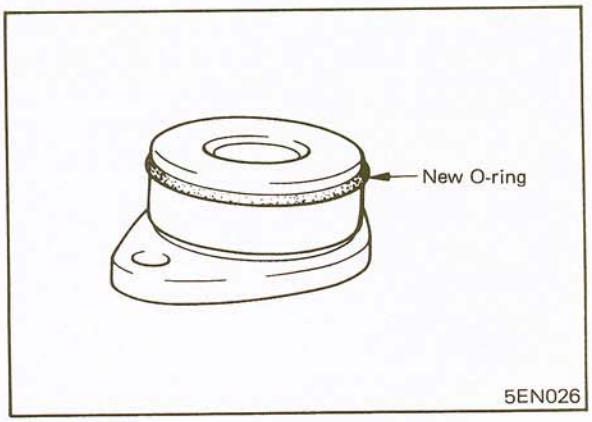
INSTALLATION

Left Silent Shaft

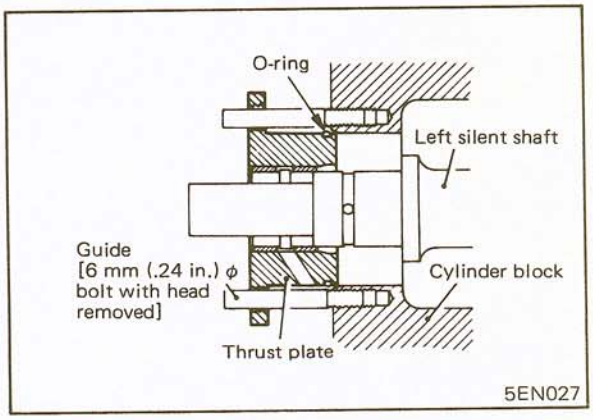
1. Apply engine oil to journal of left silent shaft. (5EN025)
2. Install left silent shaft into cylinder block carefully, to prevent damage to the bearing.



3. Install new O-ring into groove of thrust plate. (5EN026)
4. Apply engine oil around O-ring.



5. Install two guides into threaded holes for mounting thrust plate. Guides should be fabricated by cutting off hexagonal heads of bolts 6 mm (.24 in.) in diameter and 50 mm (2 in.) long. (5EN027)
6. Install since thrust plate into cylinder block along guides. Without use of guides, threaded holes will be hard to align, turning to align holes might twist or damage the O-ring, so make sure that thrust plate is correctly installed by use of the guides.



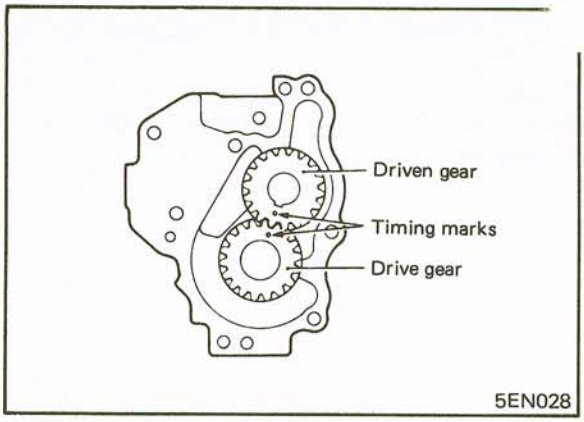
Right Silent Shaft and Oil Pump

1. Install oil pump gears to oil pump body and align timing marks. (5EN028)

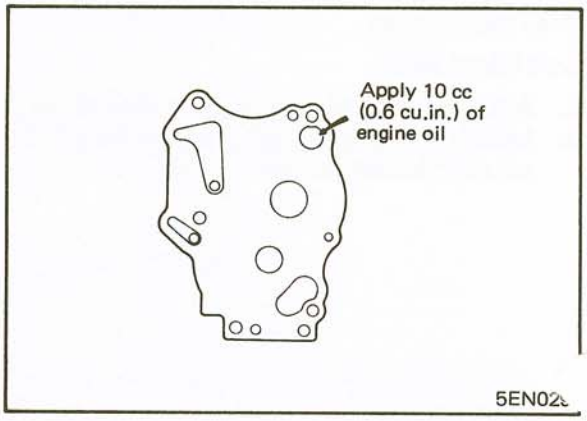
Caution

If timing marks are out of alignment, phase of silent shaft will be out of phase, and vibration will result.

2. Install oil pump cover to body and tighten screws.



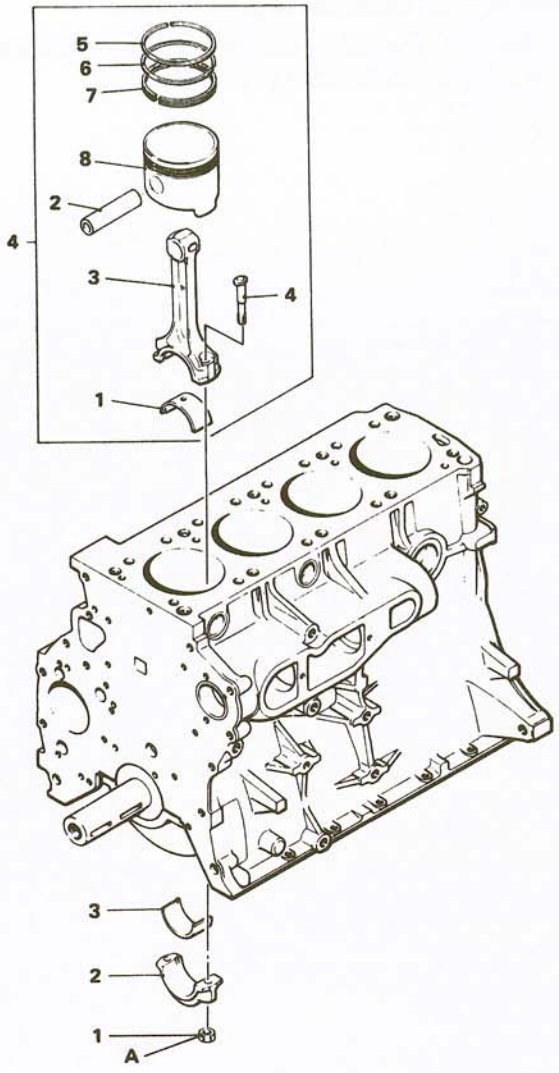
3. After installing pump cover, position pump assembly in same position as it was originally installed on engine and put approx. 10 cc (0.6 cu.in.) of clean engine oil in delivery port. (5EN029)
4. Install right silent shaft into oil pump driven gear.
5. Install driven gear and silent shaft tightening bolt and tighten to specified torque.
6. Apply engine oil to journal of right silent shaft.
7. Install silent shaft and oil pump as an assembly to cylinder block. Use care to avoid damaging rear bearing as the shaft is installed.
8. Tighten oil pump mounting bolts to specified torque.



Torque specification

Oil pump mounting bolts . . . . . 10-10.5 Nm (7.5-8.5 ft.lbs.)

)MPONENTS



1. Nut (8)
2. Bearing cap (4)
3. Bearing (4)
4. Piston and connecting rod assembly (4)
   -1 Bearing (4)
   -2 Piston pin (4)
   -3 Connecting rod (4)
   -4 Bolt (8)
   -5 No. 1 piston ring (4)
   -6 No. 2 piston ring (4)
   -7 Oil ring (4)
   -8 Piston (4)

NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

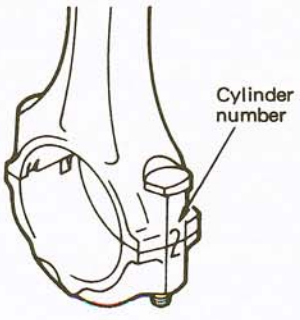
	Nm	ft.lbs.
A	45-47	33-34

5EN120

REMOVAL

Connecting Rod Cap

1. Before connecting rod cap is removed, make the cylinder number on the connecting rod and on the cap and big end side surfaces. (DEN050)
2. Keep bearings in order of corresponding connecting rods (according to cylinder numbers) for proper reassembly.

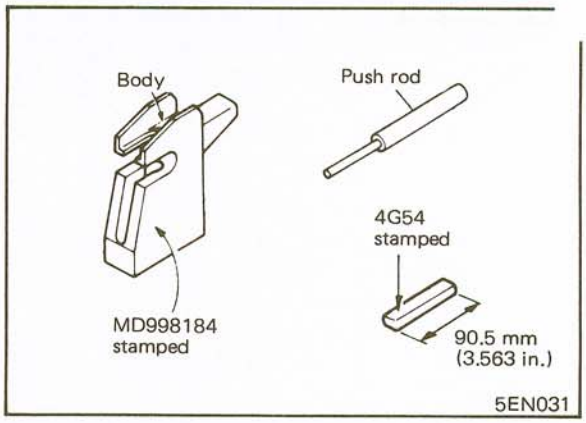


DEN050

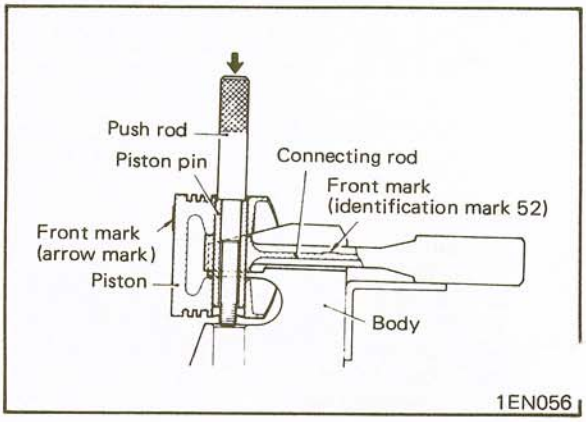
PISTON PIN REMOVAL AND INSTALLATION PROCEDURES

Caution
Tools vary on different engine models.

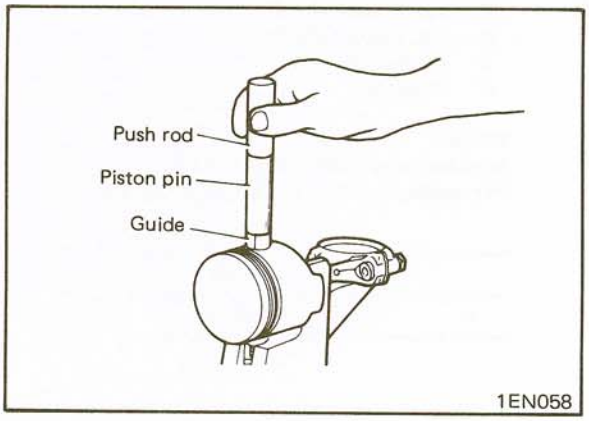
1. Use the special tools illustrated to remove and install piston and connecting rod.



2. Set piston and connecting rod assembly in tool body so that the front mark (arrow mark of piston or identification mark of connecting rod) is positioned upward.
3. Place connecting rod securely on tool body.
4. Insert push rod into piston pin and remove piston pin with press. (1EN056)

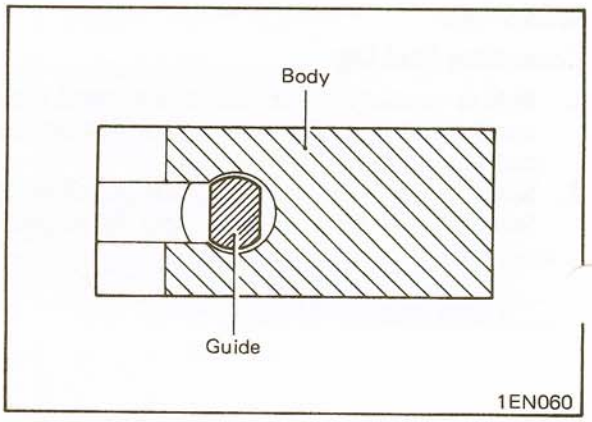


5. Assemble piston pin, push rod and guide. (1EN058)
6. Apply engine oil to outer surface of piston pin and small end bore of connecting rod.
7. Set connecting rod and piston with front mark facing up.

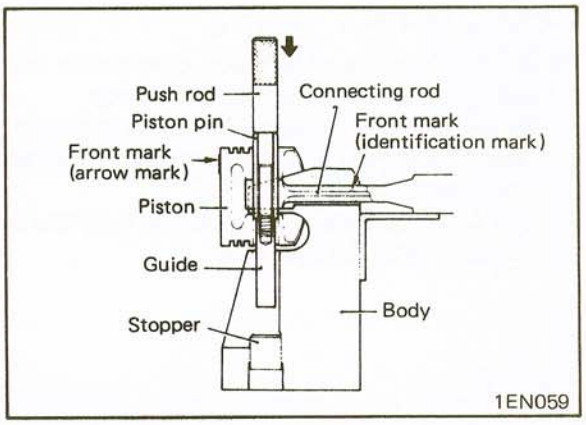


8. Insert push rod, piston pin and guide as a unit into piston pin hole and connecting rod small end hole.
9. Align the guide so that the two parallel surfaces are positioned as shown in illustration. (1EN060)
10. Press piston pin into piston pin hole applying the specified load with a press. If required installation load is not within specifications, replace piston pin and/or connecting rod.

Piston pin press-in load	7,355-17,162 N (1,653-3,858 lbs.)

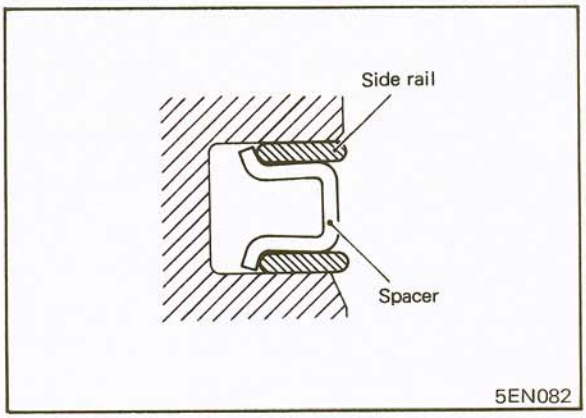


.. Turn the push rod 1/4 turn and separate the piston and connecting rod assembly from the special tool.
12. After pressing in piston pin, make sure that connecting rod turns and slides easily.



PISTON RING INSTALLATION PROCEDURE

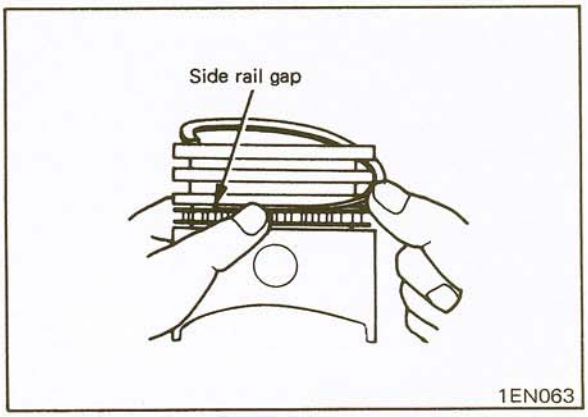
1. Install spacer.



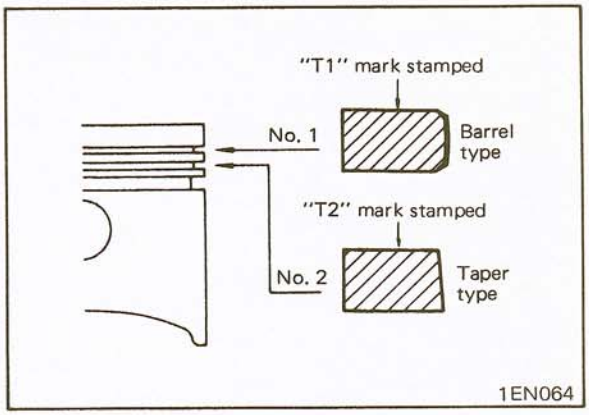
2. Install upper side rail. To install side rail, first put one end of side rail between piston ring groove and spacer, hold it down firmly, and then press down the portion which is to be inserted into groove with a finger as illustrated. (1EN063)

Caution
Do not use piston ring expander when installing side rail.

3. Install lower side rail by same procedure as Step 2.



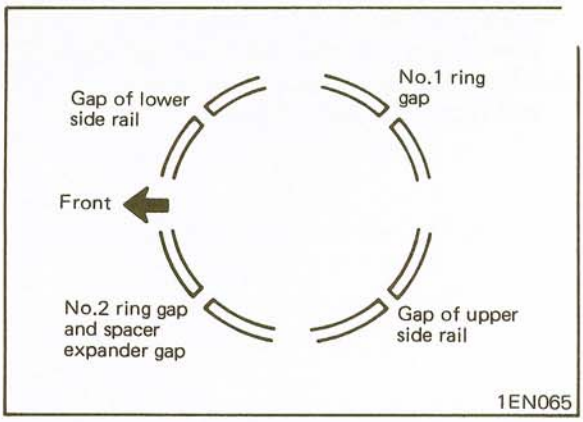
4. Using piston ring expander, install No. 2 piston ring.
5. Install No.1 piston ring.
6. Apply engine oil around piston and piston rings.



INSTALLATION

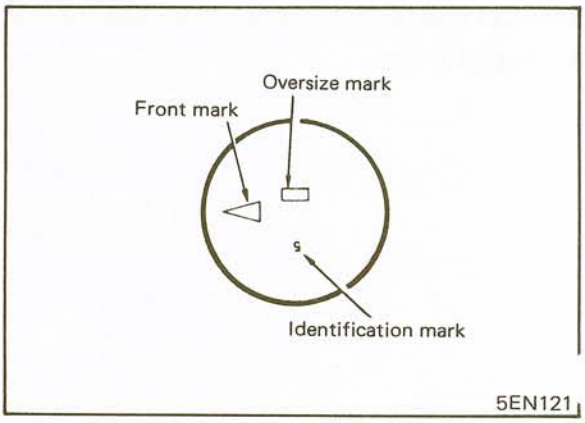
When installing the piston and connecting rod assembly into cylinder, be sure to check the following:

1. Position the ring gaps as far as possible from adjacent gaps. Make sure that gaps are not positioned in thrust or pin directions. (1EN065)
2. Use a piston ring compressor to hold the rings as they are installed into the cylinder.

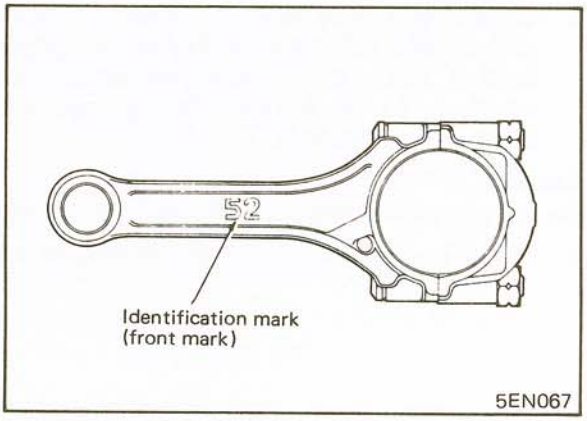


1EN065

3. Make sure that front mark of piston and front mark (identification mark) of connecting rod are directed toward front of engine. (5EN121, 5EN067)
4. When connecting rod cap is installed, make sure that cylinder numbers which were put on rod and cap at disassembly match.

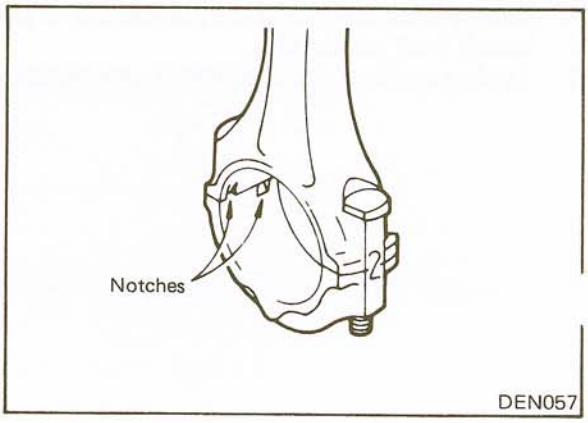


5EN121



5EN067

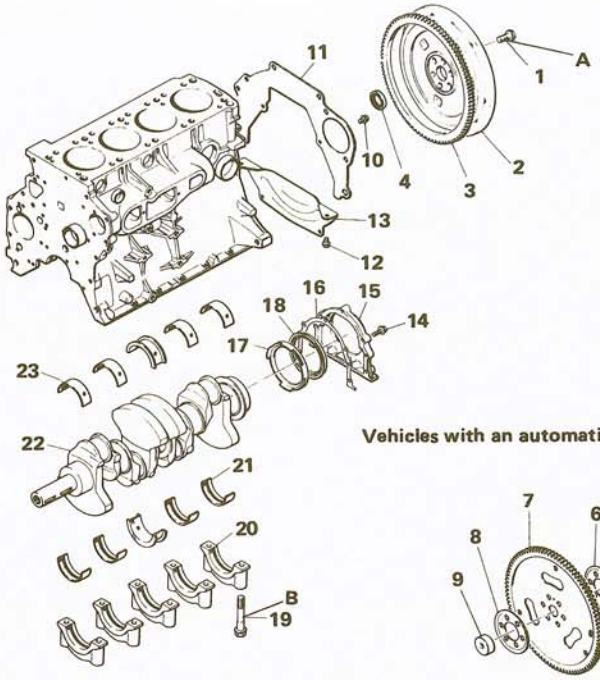
5. When installing a new connecting rod, make sure that the notches for holding the bearing in place are on the same side.



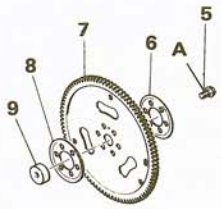
DEN057

⟩MPONENTS

Vehicles with a manual transmission



Vehicles with an automatic transmission



1. Flywheel bolt (6)
2. Flywheel
3. Ring gear
4. Ball bearing
5. Drive plate bolt (6)
6. Adapter plate
7. Drive plate assembly
8. Adapter plate
9. Crankshaft bushing
10. Flange bolt (2)
11. Rear plate
12. Flange bolt (2)
13. Bell housing cover
14. Flange bolt (5)
15. Oil seal case
16. Gasket
17. Separator
18. Rear oil seal
19. Bolt (10)
20. Bearing cap (5)
21. Crankshaft bearing (5)
22. Crankshaft
23. Crankshaft bearing (5)

NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

	Nm	ft.lbs.
A	128-137	94-101
B	74-83	55-61

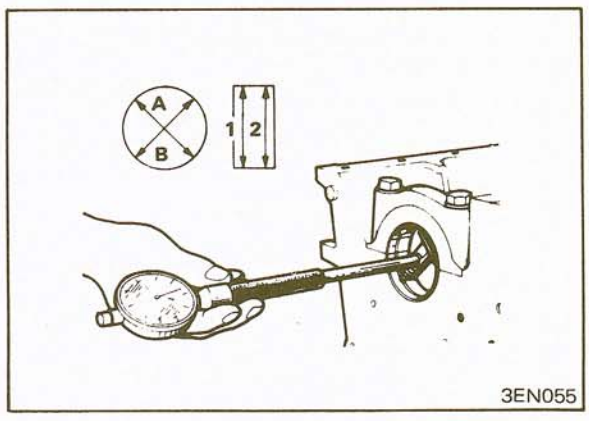
5EN033

INSPECTION

Oil Clearance Measurement

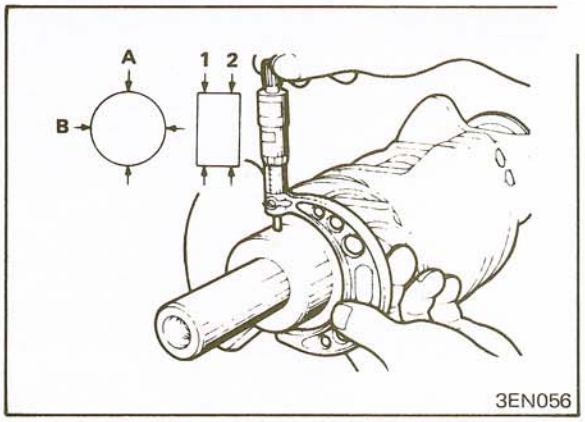
1. After main bearing cap has been tightened to specified torque, measure inside diameter of main bearing with a cylinder gauge.

Tightening torque
Main bearing cap belt ..... 74-83 Nm (55-61 ft.lbs.)



3EN055

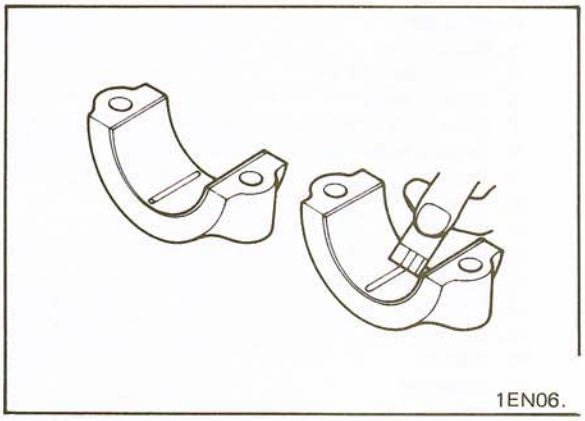
2. Measure outside diameter of crankshaft journal with a micrometer. (3EN056)
3. If oil clearance is excessive, replace main bearing.
4. Check bearing and journal for seizure or damage. If necessary, replace bearing or crankshaft or machine journal to undersize.



3EN056

Oil Clearance Measurement (Plastigage Method)

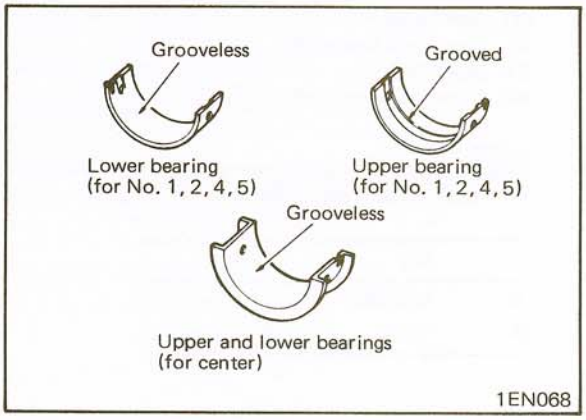
1. Remove oil and dirt from bearings and journals.
2. Cut plastigage to same length as width of bearing and install it parallel with journal, away from oil holes.
3. Install crankshaft, bearings and caps and tighten them to specified torque. During this operation, do NOT turn crankshaft.
4. Remove caps. Measure width of plastigage at the widest part with the scale printed on gauge envelope. (1EN067)


1EN06.

INSTALLATION

Main Bearing

1. Install grooved main bearing (upper bearing) on cylinder block side.
2. Install grooveless main bearing (lower bearing) on main bearing cap side.
3. Both upper and lower bearings for center (thrust bearing) are grooveless.



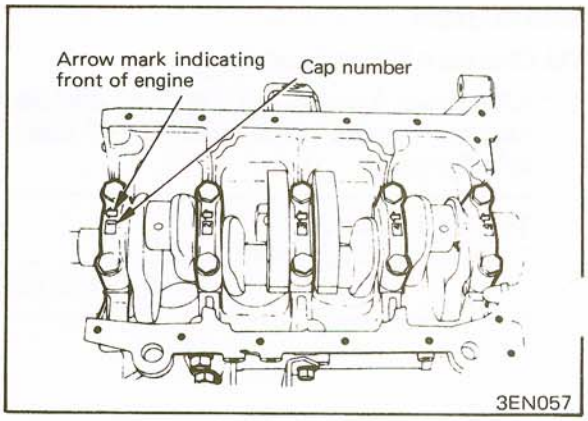
1EN068

Crankshaft

1. Install crankshaft. Apply engine oil to journals and pins.
2. Caps should be installed with arrow mark directed toward front of engine. Cap number must be correct.
3. Tighten cap bolts to specified torque in sequence of center, No. 2, No. 4, front and rear caps.

Cap bolt tightening torque . . . . . 74-84 Nm (55-61 ft.lbs.)

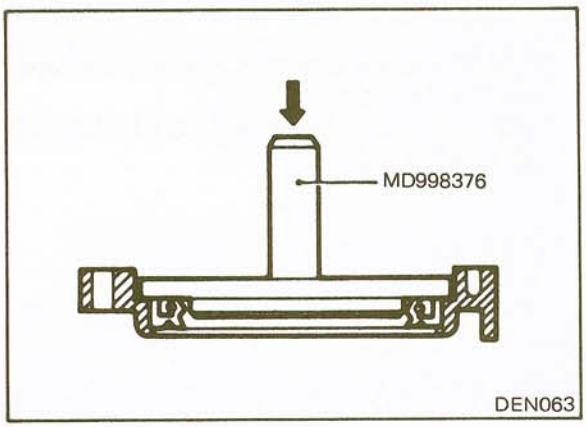
4. Cap bolts should be tightened evenly in 2 to 3 stages before they are tightened to specified torque.
5. Make certain that crankshaft turns freely and has proper end play.



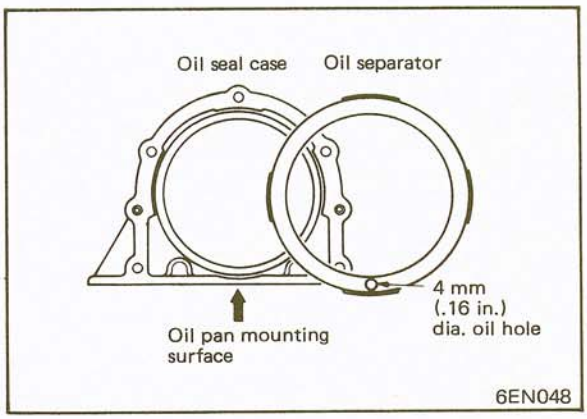
3EN057

rankshaft Rear Oil Seal

1. Using special tool, install oil seal into oil seal case.



2. Push the oil separator into case, being sure that the 4 mm (.16 in.) diameter oil hole positioned at the bottom of the case (oil pan mounting surface side).
3. Install the oil seal case to the engine block, install 7 bolt and torque to specifications.

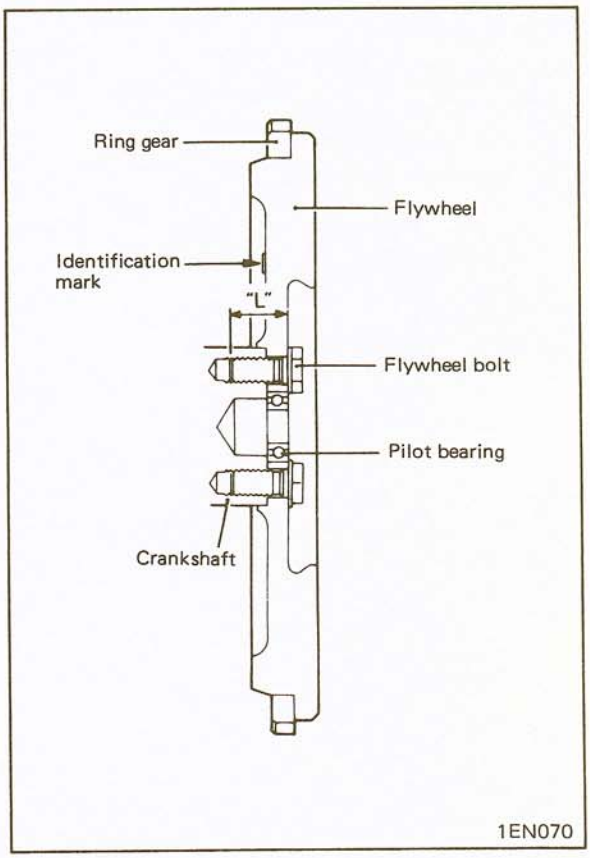


Flywheel

1. Install flywheel and tighten bolts to specified torque. Check clutch mounting surface for runout.

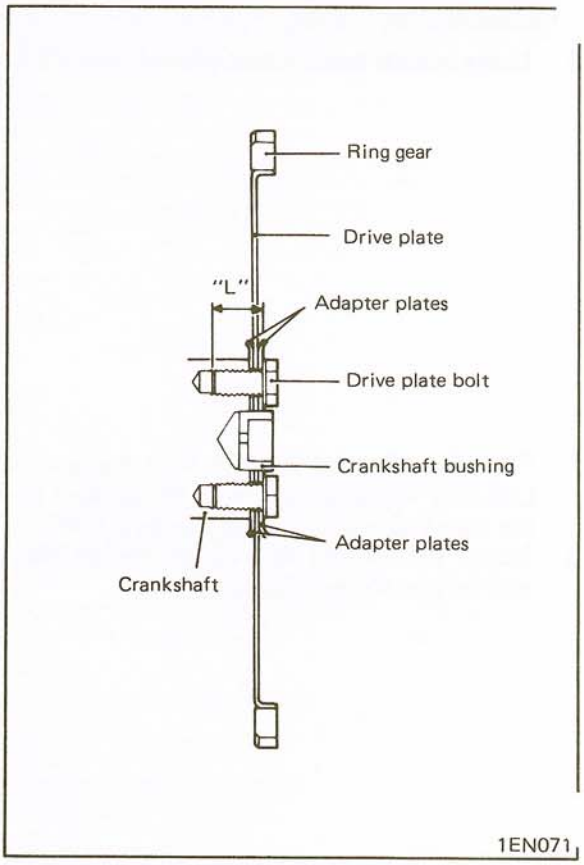
Tightening torque	128-137 Nm (94-101 ft.lbs.)
Flywheel runout	0.1 mm (.004 in.) max.

2. To install flywheel, use 26 mm (1.024 in.) bolts with "11" marked on the heads. Do not use shorter bolts for installing drive plate.

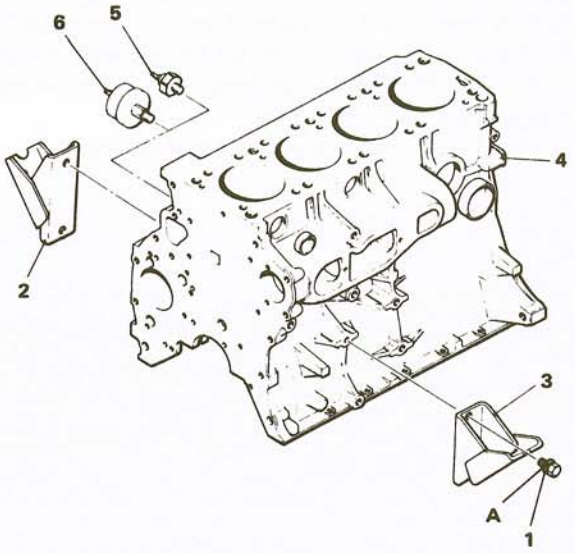


Drive Plate

1. Install adapter plates and drive plate and tighten bolts to specified torque.
2. Use bolts 21.5 mm (.846 in.) in length ("L") to install drive plate.



OMPONENTS



1. Bolt (4)
2. Engine support bracket
3. Engine support bracket
4. Cylinder block
5. Oil pressure switch
6. Oil pressure gauge unit (if so equipped)

NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

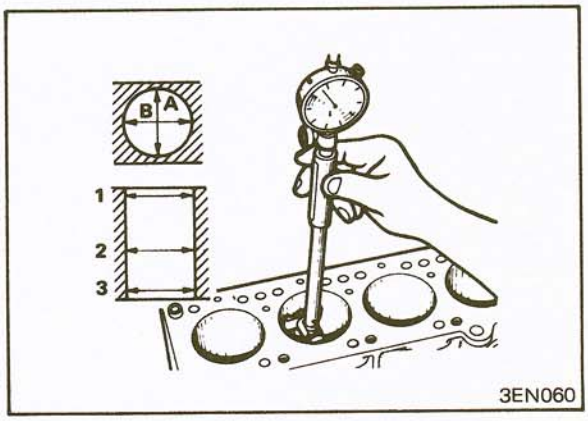
	Nm	ft.lbs.
A	40-49	29-36

5EN034

INSPECTION

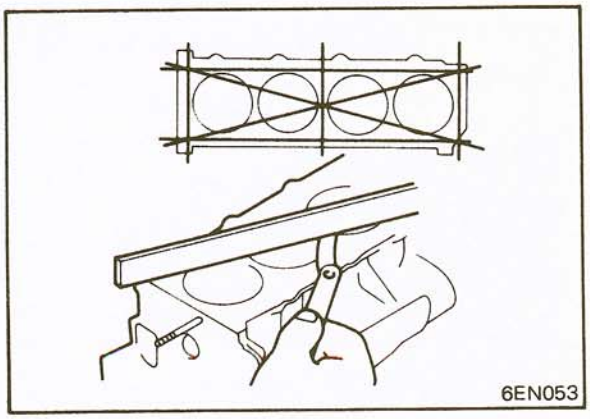
Cylinder Block

1. Measure cylinder bore with a cylinder gauge at three levels in directions of A and B. (3EN060)
   Level 1: No. 1 piston ring position with piston at TDC
   Level 2: Center of cylinder
   Level 3: Bottom of cylinder
2. If cylinder bores show more than specified out-of-round or taper, or if cylinder walls are badly scuffed or scored, cylinder block should be rebored and honed, and new oversize piston and rings fitted.



3EN060

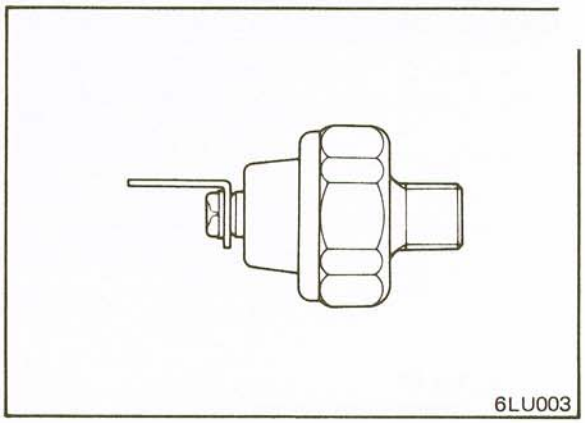
3. Check for damage and cracks.
4. Check top surface for distortion. If excessive distortion is evident, grind to minimum limit or replace. (6EN053)



6EN053

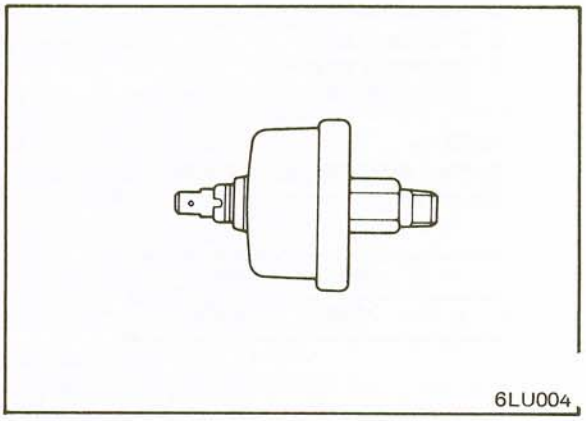
Oil Pressure Switch

1. If "OIL PRESSURE" indicating lamp lights when ignition switch is set to "ON" and goes out when engine is started and running at idle, then everything is in order. If "OIL PRESSURE" lamp does not light when ignition switch is set to "ON", check switch, lamp and wiring.
2. If there is current flow when ignition switch is set to "ON" and if there is no current flow when engine is running at idle, switch is good.
   If switch is good, check lamp and wiring.


6LU003

Oil Pressure Gauge Unit

1. Since bimetal type has constructional characteristics which vary its resistance as it repeats ON-OFF states, it cannot be checked by measuring its resistance.
2. It can be checked by use of an AC type ammeter measuring changes in current.


6LU004

CYLINDER BORING

1. Oversize of pistons to be used should be determined on the basis of the largest cylinder bore.

Size mark	
0.25 mm (.01 in.) O.S.	0.25
0.50 mm (.02 in.) O.S.	0.50
0.75 mm (.03 in.) O.S.	0.75
1.00 mm (.04 in.) O.S.	1.00

NOTE
Size mark is stamped on top of piston.

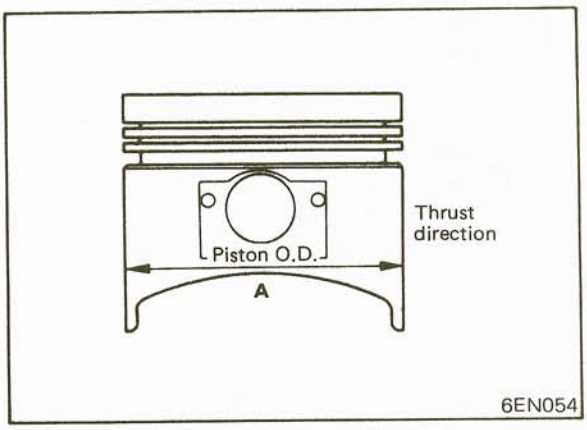
2. Measure outside diameter of piston to be used at position "A", in thrust direction, as shown. (6EN054)
3. Based on measured piston O.D., calculate the boring finish dimension.
   Boring finish dimension = Piston O.D. + 0.01 to 0.03 mm (.0004 to .0012 in.) (clearance between piston O.D. and cylinder) – 0.02 mm (.0008 in.) (honing margin)
4. Bore all cylinders to calculated bore finish dimension.

Caution
To prevent distortion that may result from temperature rise during honing, bore cylinders in the following order: No. 2, No. 4, No. 1, No. 3.

5. Hone to final finish dimension [piston O.D. + 0.01 to 0.03 mm (.0004 to .0012 in.)].
6. Check clearance between piston and cylinder.

Clearance between piston and cylinder	0.01-0.03 mm (.0004-.0012 in.)

NOTE
When boring cylinders, finish all four cylinders to same oversize. Do not bore only one cylinder to an oversize.



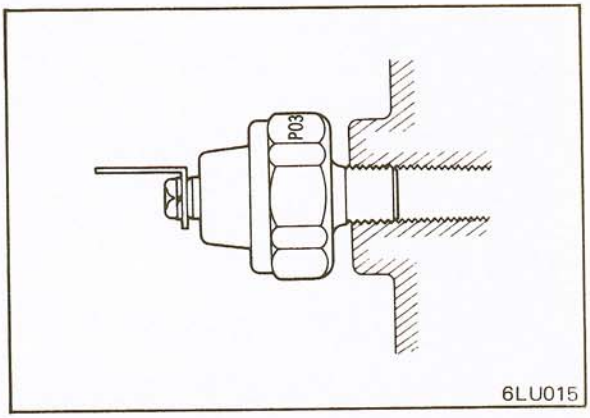
INSTALLATION

1. Apply recommended sealant to threaded portion.

Recommended sealant	3M Liquid Gasket 8959 or equivalent

2. Using special tool (MD998054), tighten switch to specified toruqe.

Tightening torque	
Oil pressure gauge unit	15-21 Nm (11-15 ft.lbs.)



EXHAUST SYSTEM

CONTENTS

GENERAL SPECIFICATIONS

Exhaust system	
Muffler	Expansion resonance type
Coupling	
For Federal (not available in California)	Spherical coupling
For California (can also be sold in Federal States)	Flat coupling
Suspension system	Rubber hangers and suspender

TORQUE SPECIFICATIONS

Nm (ft.lbs.)

Front exhaust pipe to catalytic converter	15-25 (11-18)
Front exhaust pipe to main muffler assembly	20-30 (15-22)
Front exhaust pipe to suspender	8-12 (6-9)
Suspender to No. 4 crossmember	8-12 (6-9)
Main muffler assembly to hangers	5-10 (4-7)

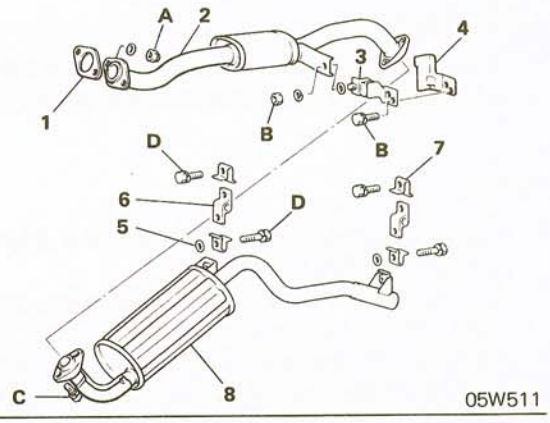
TROUBLESHOOTING

Symptom	Probable cause	Remedy
Exhaust gas leakage	Loose connections	Retighten
	Broken pipe or muffler	Repair or replace
Abnormal noise	Broken separator in muffler Broken hangers or suspender	Replace
	Interference of pipe or muffler with vehicle body	Correct
	Broken pipe or muffler	Repair or replace

)MPONENTS

1. Gasket
2. Front exhaust pipe
3. Suspender
4. Protector
5. Seat
6. Hanger
7. Plate
8. Main muffler

	Nm	ft.lbs.
A	15-25	11-18
B	8-12	6-9
C	20-30	15-22
D	5-10	4-7

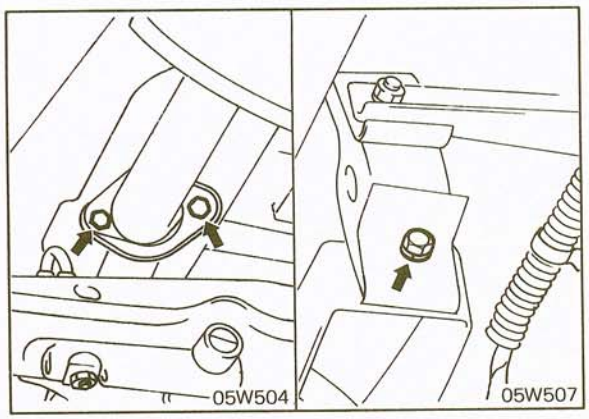


05W511

REMOVAL

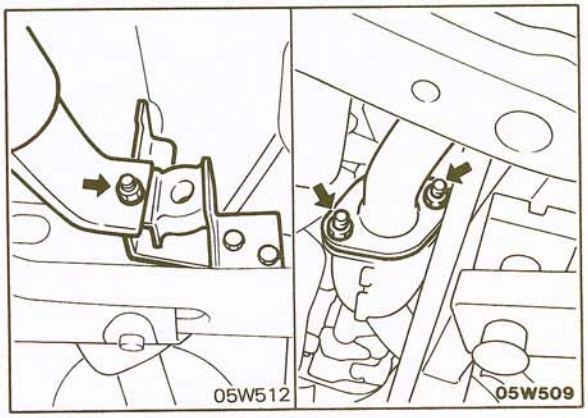
Main Muffler

1. Disconnect the main muffler from the front exhaust pipe. (05W504)
2. Remove the hangers and take out the main muffler. (05W507)

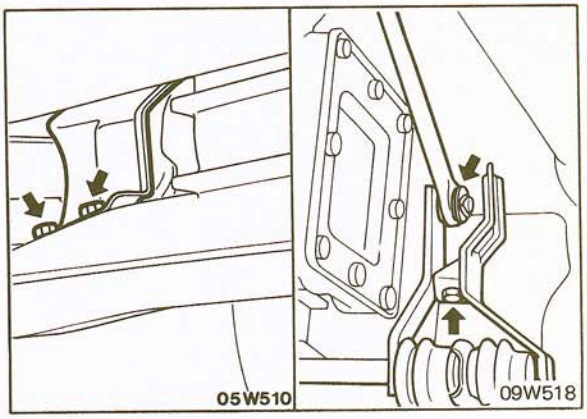


Front Exhaust Pipe

1. Disconnect the front exhaust pipe from the main muffler.
2. Disconnect the front exhaust pipe from the suspender. (05W512)
3. Disconnect the front exhaust pipe from the catalytic converter and remove the front exhaust pipe. (05W509)



4. For vehicles with an automatic transmission, remove the No. 2 crossmember protector and the cross select shaft heat protector, disconnect the shaft control rod from the cross select shaft, and then remove the front extension pipe.



INSPECTION

1. Check mufflers and pipes for corrosion and damage.
2. Check hangers and suspender for deterioration and cracks.

INSTALLATION

1. Loosely install the front exhaust pipe and the main muffler, in that order.
2. Install the hangers and suspender, making sure that they are not strained or twisted.
3. Tighten the parts securely and then confirm that there is no interference with any body components.

GROUP-13

BODY AND FRAME ALIGNMENT

CONTENTS

GENERAL SPECIFICATIONS

Frame	
Type	Ladder type
Sectional form	Box type

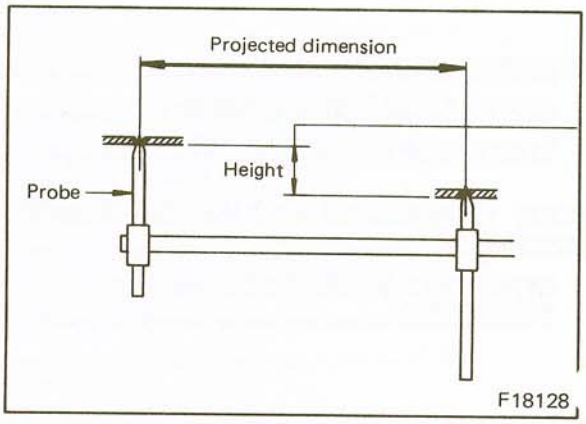
TORQUE SPECIFICATIONS

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

BODY DIMENSIONS AND MEASUREMENT METHODS

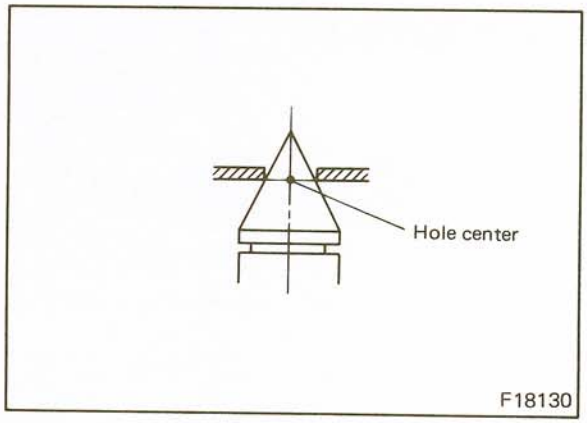
HOW BODY DIMENSIONS ARE INDICATED

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

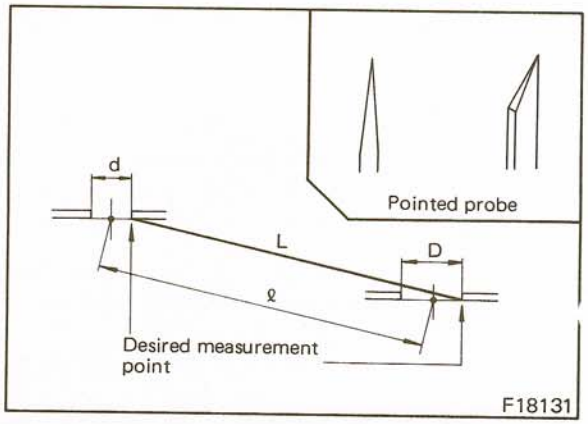
Desired dimension: $L = \ell + \frac{D - d}{2}$

Example: mm (in.)

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

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

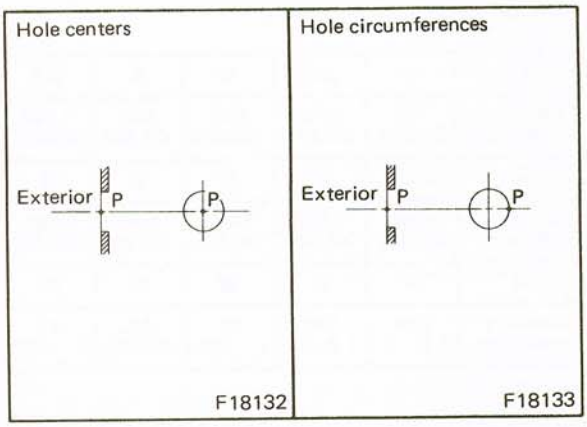
Desired dimension: $L = 600\ (23.6) + \frac{20\phi - 10\phi}{2} = 605\ (23.8)$



EASUREMENT 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.

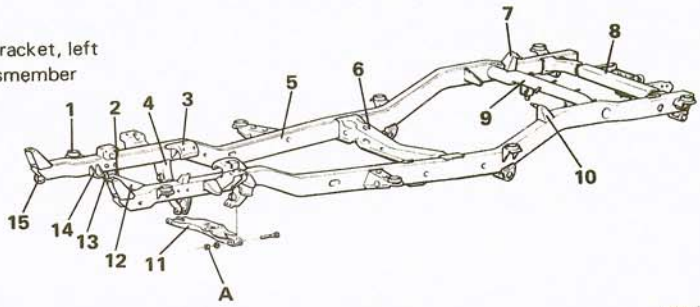


FRAME ALIGNMENT

COMPONENTS

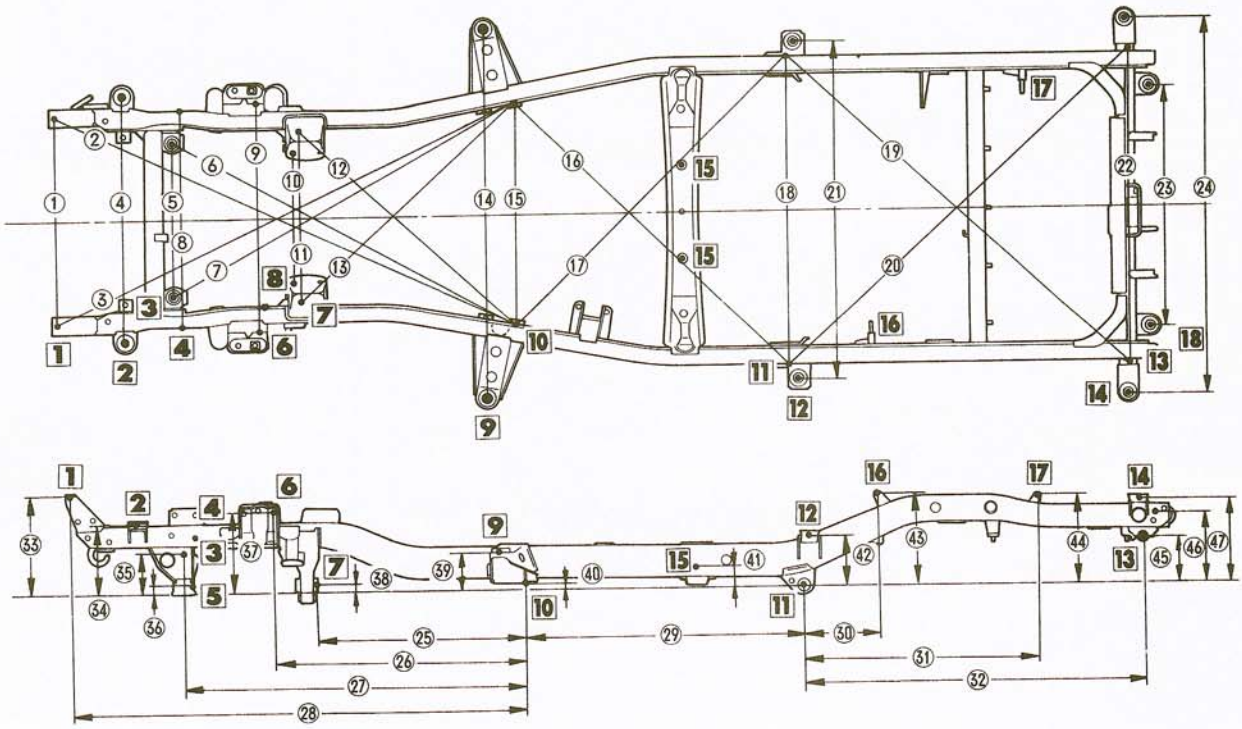
1. Body mounting bracket
2. Differential mounting bracket
3. Engine mounting bracket
4. Support bracket
5. Side frame
6. No. 4 crossmember
7. Rear shock absorber bracket, right
8. No. 6 crossmember
9. No. 5 crossmember
10. Rear shock absorber bracket, left
11. Front suspension crossmember
12. No. 1 crossmember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

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



15W519

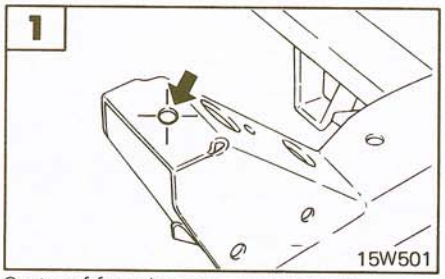
Projected Dimensions



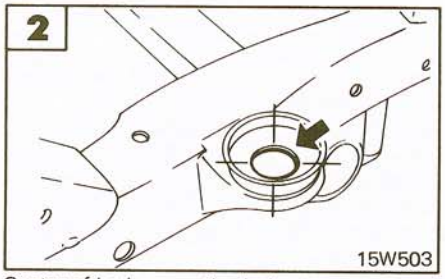
15W522

mm (in.)

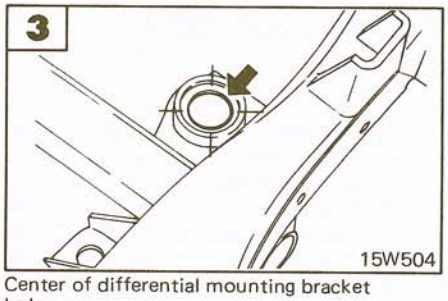
No.	①	②③	④	⑤	⑥⑦	⑧	⑨	⑩	⑪	⑫⑬	⑭	⑮	⑯⑰	⑱
Standard dimension	710 (27.95)	1,724 (67.87)	840 (33.07)	522 (20.55)	1,329 (52.32)	742 (29.21)	777 (30.59)	439 (17.28)	576 (22.68)	989 (38.94)	1,262 (49.68)	750 (29.53)	1,298 (51.10)	990 (38.98)
No.	⑲⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜	㉝
Standard dimension	1,580 (62.20)	1,150 (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)



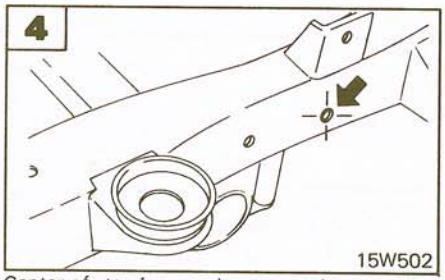
Center of front bumper mounting hole



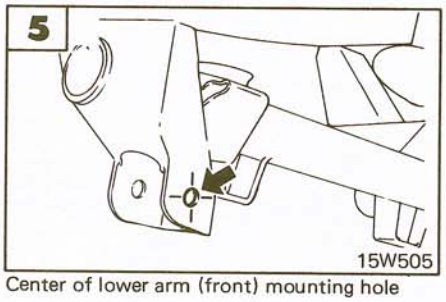
Center of body mounting hole



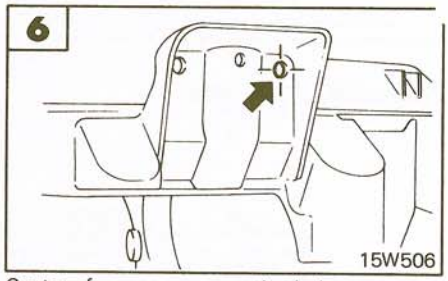
Center of differential mounting bracket hole



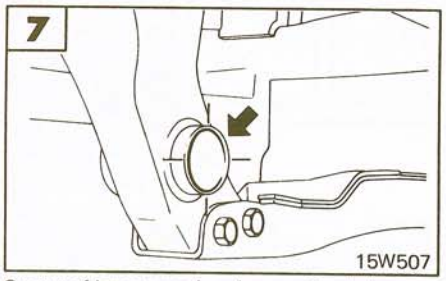
Center of steering gear box mounting hole



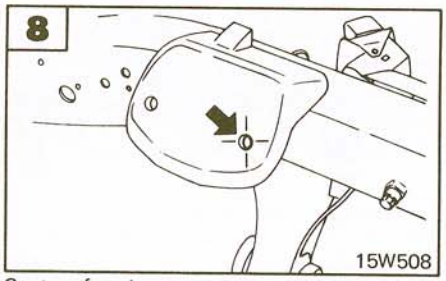
Center of lower arm (front) mounting hole



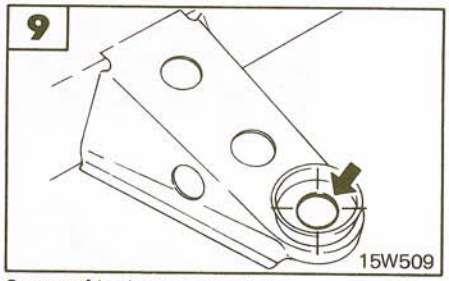
Center of upper arm mounting hole



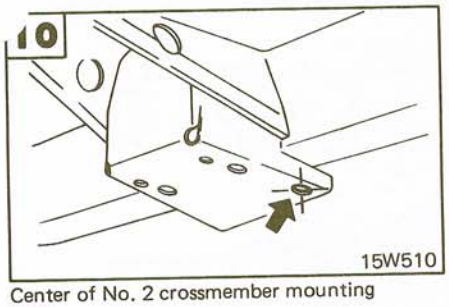
Center of lower arm (rear) mounting hole



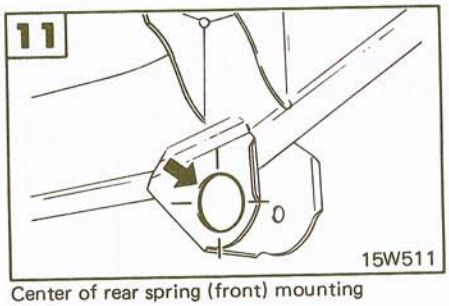
Center of engine mounting hole



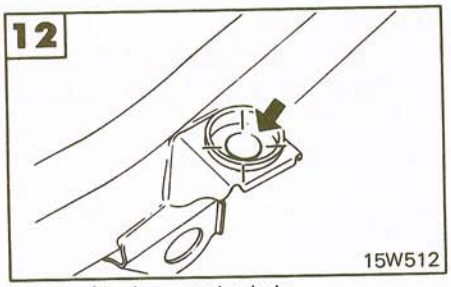
Center of body mounting hole



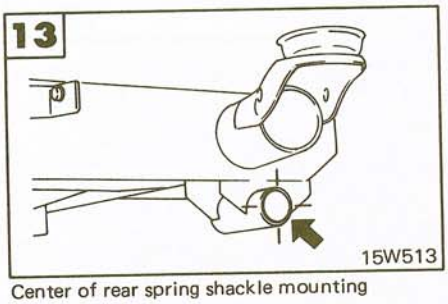
Center of No. 2 crossmember mounting hole



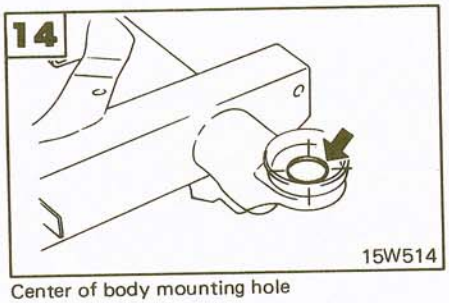
Center of rear spring (front) mounting hole



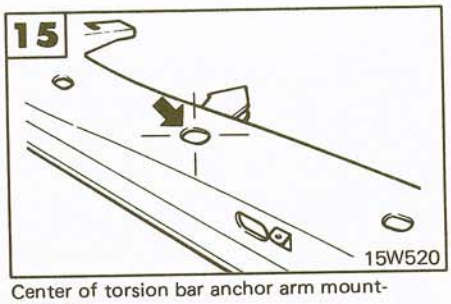
Center of body mounting hole



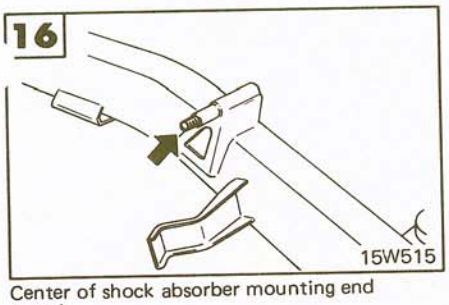
Center of rear spring shackle mounting hole



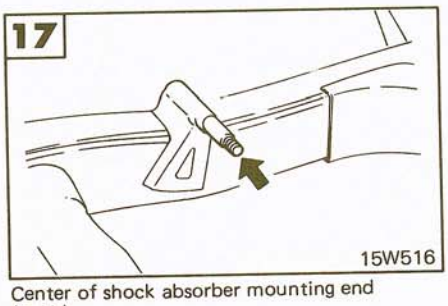
Center of body mounting hole



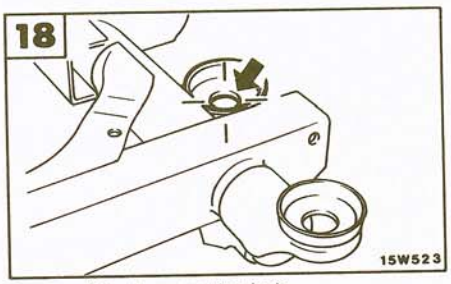
Center of torsion bar anchor arm mounting hole



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



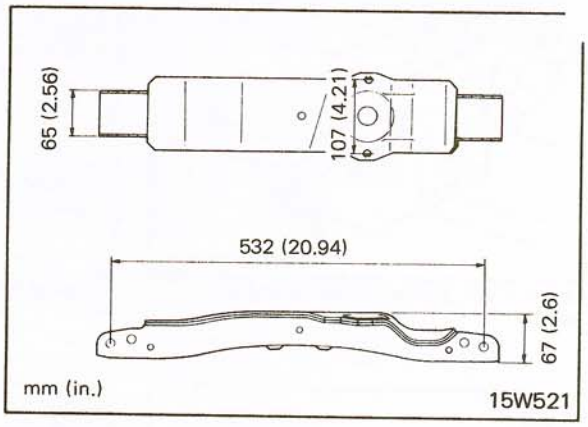
Center of shock absorber mounting end (R.H.)



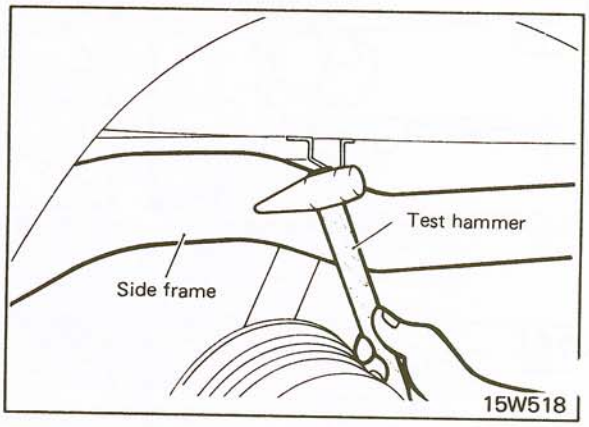
Center of body mounting hole

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.

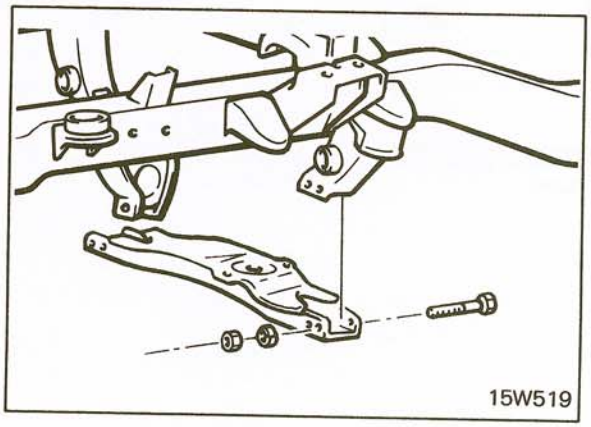


INSTALLATION

1. Install the front suspension crossmember.

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

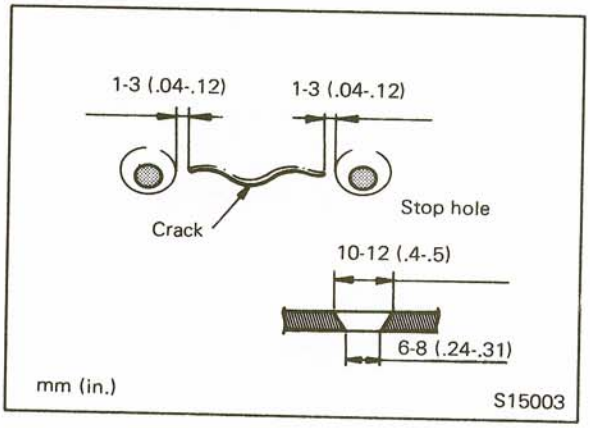
2. When replacing the floor plug, be sure to apply an appropriate amount of semi drying sealant.



REPAIR

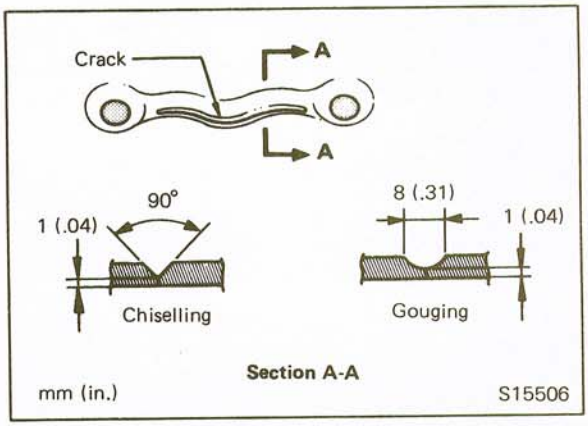
When a crack is found in the frame, it should be repaired as follows:

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.



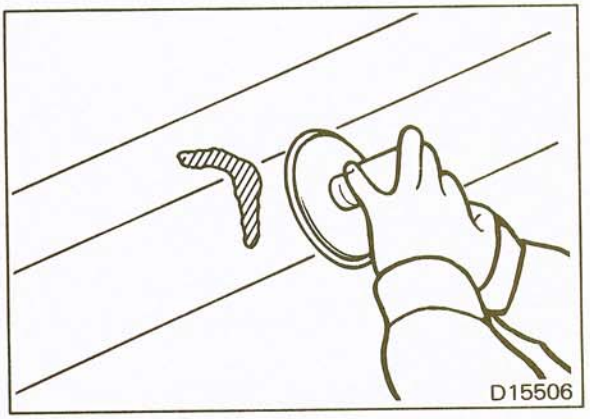
Make a groove along the crack by using a chisel or gouge.

4. Fill the groove and the stop holes completely with 2-3 -layers of electric-arc welding.

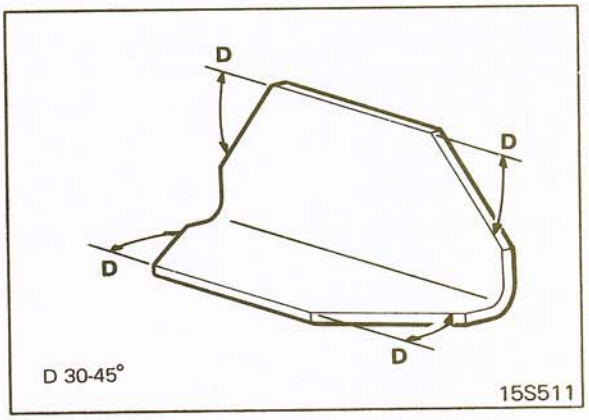


5. Finish the welded area with a grinder.

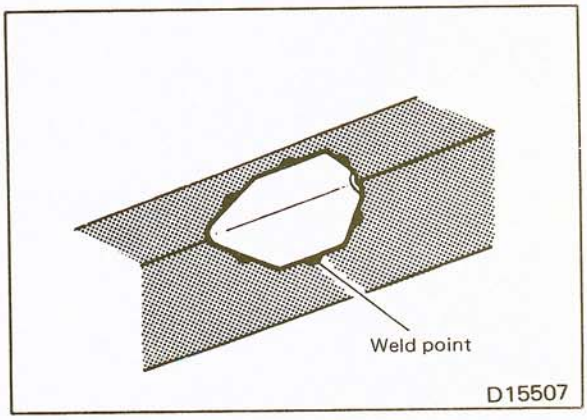
Caution
Do not use gas welding; doing so could cause distortion.
Use care to prevent thinning the frame itself by excessive grinding.



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.



GROUP-14

FUEL SYSTEM

CONTENTS

GENERAL SPECIFICATIONS

	For Federal (not available in California)	For California (can also be sold in Federal States)
Fuel tank and filter		
Fuel tank capacity	60 lit. (15.9 U.S.gal., 13.2 Imp.gal.)	60 lit. (15.9 U.S.gal., 13.2 Imp.gal.)
Fuel return system	Provided	Provided
Fuel filter	Cartridge type	Cartridge type
Fuel pump		
Type	Mechanical diaphragm	Mechanical diaphragm
Driven by	Camshaft	Camshaft
Carburetor		
Type	Down-draft, 2 barrel, automatic choke	Down-draft, 2 barrel, Feed back type
Model No.	32-35DIDTA-170 . . . M/T (High Altitude) 32-35DIDTA-171 . . . A/T (High Altitude) 32-35DIDTA-186 . . . M/T 32-35DIDTA-187 . . . A/T	32-35DIDTA-184 . . . M/T 32-35DIDTA-185 . . . A/T
Throttle bore		
Primary	32 mm (1.260 in.)	32 mm (1.260 in.)
Secondary	35 mm (1.378 in.)	35 mm (1.378 in.)
Main jet		
Primary	#113.8 . . . M/T #115 . . . A/T	#110
Secondary	#195	#185
Pilot jet		
Primary	#65	#47.5
Secondary	#65	#65
Enrichment jet	#45	#100
Fast idle opening degree at 23°C (73°F)	13.5° ± 0.5° . . . M/T 14.5° ± 0.5° . . . A/T	13.5° ± 0.5° . . . M/T 14.5° ± 0.5° . . . A/T
Additional mechanisms	Dashpot Air switching valve (ASV) Coasting air valve (CAV) Jet air control valve (JACV) Sub-EGR valve Fuel cut-off solenoid	Dashpot Duty control solenoid valve Sub-EGR valve Throttle position sensor
Accelerator control method	Cable type	Cable type
Choke control method	Automatic choke	Automatic choke

M/T . . . Manual transmission, A/T . . . Automatic transmission

ERVICE SPECIFICATIONS

Standard values	
Accelerator cable free play	0-1 mm (0-.04 in.)
Length of vinyl tube protruding from connecting hose	Approx. 5 mm (.20 in.)
Ignition timing	7°BTDC±2° at curb idle speed
Idle speed	675 $^{+150}_{-100}$ rpm [first 500 km (300 miles)]
	750 ± 100 rpm [after 500 km (300 miles)]

TORQUE SPECIFICATIONS

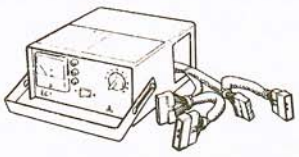
Nm (ft.lbs.)

Drain plug	15-25 (11-18)
Fuel tank to body	25-30 (18-22)
Fuel gauge unit	1 (0.7)

LUBRICANTS

	Specified lubricant	Quantity
Accelerator arm pin and return spring	Multipurpose grease, SAE J310a, NLGI grade #3 or equivalent	As required
Sliding surfaces of accelerator pedal	Multipurpose grease, SAE J310a, NLGI grade #3 or equivalent	As required
Sliding surfaces of accelerator arm	Multipurpose grease, SAE J310a, NLGI grade #3 or equivalent	As required

SPECIAL TOOL

Tool (Number and name)	Use
MD998406 ECI checker 	Diagnosis for FBC system

Symptom	Probable cause	Remedy
Poor driveability	Improper fuel mixture (Too rich or lean)	Overhaul carburetor or replace as required
	Abnormal air flow from jet air mixture	Repair jet valve, and replace as required
	Fuel leakage from deceleration device	Replace as required
	Loose vacuum hose in heated inlet air system	Repair or replace as required.
	Broken air-control valve of heated air inlet system	Repair or replace as required
	Disconnected air cleaner snorkel	Repair or replace as required
Rough idle	Improper idle adjustment	Readjust ignition timing and idle speed
	Choke valve not opening	Repair or replace as required
	Over-flooded carburetor	Repair or replace as required
	Fuel level improperly (Too high or low)	Repair or replace as required
	Leaned inlet air	Clean up or replace as required
	Restricted exhaust system	Replace
	EGR (Exhaust Gas Recirculation) valve does not close	Repair or replace as required
	Jet air control valve does not close (Except Feed back carburetor)	Repair or replace as required
	Deceleration device does not shut off (Except Feed back carburetor)	Repair or replace as required
	Clogged nipple of EGR valve	Clean up
	Clogged passage in EGR valve	Clean up
Engine will not keep running	Carburetor icing Loose vacuum hose in heated inlet air system Loose connecting rod between diaphragm and high altitude compensator	Repair and replace as required
	Clogged fuel pipe due to foreign material	Clean or replace as required
	Clogged fuel hose	Clean or replace as required
	Clogged fuel filter Water in fuel tank Deposit due to improper fuel type	Clean up filter Clean filter and pipe, and install clean fuel

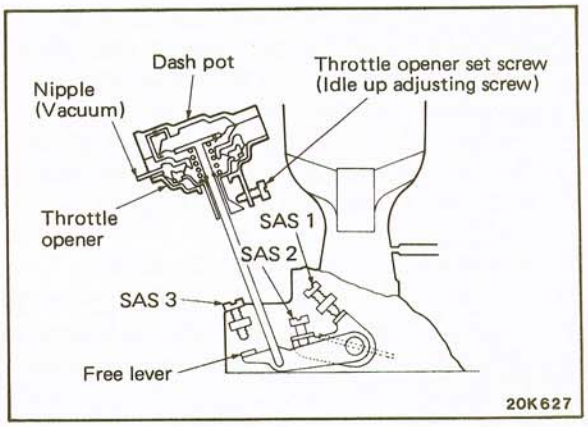
Symptom	Probable cause	Remedy
Low engine power	Broken or burned out catalyst	Replace as assembly
	Inadequate sealing of gasket in air cleaner case	Repair
	Inadequate sealing between air cleaner and carburetor body	Reposition and replace as required
	Broken air intake manifold gasket	Repair or replace as required
Noise	Loose wing nut in air cleaner case	Retighten
	Broken air cleaner snorkel	Repair or replace as required
	Worn bearing or shaft of heated air inlet system	Repair or replace as required
	Exhaust gas leakage from EGR valve	Replace as assembly
	Broken bracket of air pipe	Repair or replace as required
	Broken exhaust pipe	Repair or replace as required
Increased clattering noise	Inadequate sealing of secondary-air system	Repair or replace as required
Exhaust gas odor	Broken exhaust manifold case	Replace
	Exhaust gas leakage due to loose connections	Retighten
	Air pipe nut loose	Retighten
	Deceleration device inoperative	Repair or replace as required
	Purge control device inoperative	Replace or replace as required
Poor exhaust gas	Pressure leakage from purge air solenoid valve	Replace as assembly
	Seized plunger seat in purge air solenoid valve	Clean up
	Broken or burned out catalyst	Replace as assembly
	Abnormal reaction of catalyst	Replace as assembly
Engine overspeed when throttle is released	Seized plunger seat in purge air solenoid valve	Clean up
	Inadequate idle speed	Reset idle speed
	Air/Fuel mixture will enter vacuum switch	Replace as assembly
Deteriorating exhaust emission during accel. or decel.	Broken exhaust manifold case or burned out catalyst	Replace as assembly
	Catalytic converter deteriorated by too high temperature	Replace as assembly
	Clogged catalytic converter	Replace as assembly

Symptom	Probable cause	Remedy
Fuel leakage	Inoperative check valve (Two-way valve)	Replace as assembly
	Broken fuel hose or pipe	Replace
	Wrong position of two-way valve	Reposition the valve
	Clogged or kinked vapor hose	Clean/reposition the hose
	Loose fuel hose nipple	Retighten or replace as required
Fuel leakage from fuel tank	Deposit due to improper fuel type	Clean or replace as required
Back fuel from filler	Misaligned filler hose	Reposition the hose

NGINE IDLE SPEED ADJUSTMENT (Unscheduled maintenance only)

Adjustment condition:
Lights and all accessories off, transmission in neutral and parking brake pulled.

1. Run the cold engine at fast idle until the coolant temperature is 85 to 95°C (185 to 205°F).
2. Run the engine for more than 5 seconds at an engine speed of 2,000 to 3,000 rpm.
3. Run the engine at idle for 2 minutes.
4. Using a tachometer, check the idling speed. If it does not meet specifications, readjust the speed to the nominal specificaiton using the idle speed adjusting screw No.1 (SAS). (20K627)



FAST IDLE ADJUSTMENT FOR VEHICLES EQUIPPED WITH AIR CONDITIONING

Adjustment condition:

Coolant temp.: 85 to 95°C (185 to 205°F)
All lights and accessories: Off
Transmission: Neutral
Parking Brake: Pulled

1. Make sure curb idle speed is within the specified speed. Reset it by readjusting the idle speed adjusting screw No.1 (SAS) as necessary.
2. Switch the air conditioning system on.
3. Adjust the engine speed to the specified speed with the throttle opener setting screw (idle-up adjusting screw). (20K627)

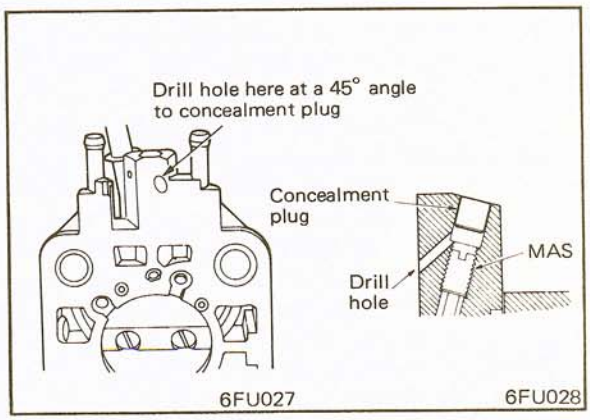
A/C on idle rpm

Specified speed	900 to 950 rpm

4. Reconnect cooling fan connector.
5. Turn ON/OFF air conditioner switch several times to check the throttle opener for operation (lever up/down).

IDLE SPEED AND MIXTURE ADJUSTMENT-except FEEDBACK CARBURETOR VEHICLES (Unscheduled maintenance only)

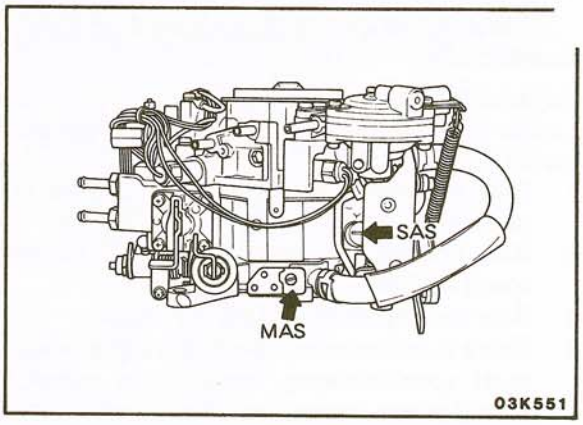
1. Remove carburetor from engine.
2. Clamp carburetor in a vise with idle mixture adjusting screw (MAS) facing up (protect gasket surface from vise jaws).
3. Drill a 2.0 mm (5/64 in.) pilot hole in the casting surrounding the idle mixture adjusting screw (MAS) and then redrill the hole to 3.0 mm (1/8 in.). (6FU027, 6FU028)
4. Insert a blunt punch into the hole and remove the plug.
5. Reinstall carburetor on engine.
6. Lights and all accessories off, and transmission in neutral.
7. Run the cold engine at fast idle until the coolant temperature is 85 to 95°C (185 to 205°F).



8. Disconnent the secondary air hose running between the reed valve and the air cleaner, and plug the air hose to stop any secondary air flow into the reed valve.
   Or, clamp the air hose running between the pulse air feeder and the air cleaner, with a special hose clamp, to stop any secondary air flow into the reed valve.
9. Run the engine for more than 5 seconds at 2,000 to 3,000 rpm.
10. Run the engine at idle for 2 minutes.
11. Set the idle CO and the engine speed to the specified values by adjusting the idle mixture adjusting screw (MAS) and the idle speed adjusting screw (SAS). (Y03645)

Idle CO at nominal curb idle speed: 0.5 ± 0 %

12. Unplug the secondary air hose and reconnect it to the air cleaner. Or, take off the special hose clamp from the air hose.
13. Reset the engine speed to the nominal idle speed by adjusting the idle speed adjusting screw, if the engine speed is out of the specified speed range.
14. Install the concealment plug into the hole to seal the idle mixture adjusting screw (MAS).



IDLE SPEED AND MIXTURE ADJUSTMENT-for FEEDBACK CARBURETOR VEHICLES (Unscheduled Maintenance only)

1. Remove carburetor from engine. Carburetor is to be transferred to a bench and held in a suitable fixture for removing the concealment plug.
2. Reinstall carburetor on engine without concealment plug.
3. Set condition: Light, electric cooling fan (if applicable) and all accessories are off, and transmission in neutral.
4. Run the cold engine at fast idle until the cooling water temperature is raised to 85-95°C (185-205°F).
5. Turn off the ignition key.
6. Disconnect the cable from the negative terminal of the battery for about 3 seconds. And then reconnect the cable to the original terminal.
7. Disconnect the connector of the exhaust oxygen sensor.
8. Run the vehicle for 5 minutes at the vehicle speed of 30 mile/hour, or run the engine for more than 5 seconds at the engine speed of 2,000 to 3,000 rpm.
9. Run the engine at idle for 2 minutes.
10. Set the idle CO and the engine speed to the specified value by adjusting the speed adjusting screw and the mixture adjusting screw.

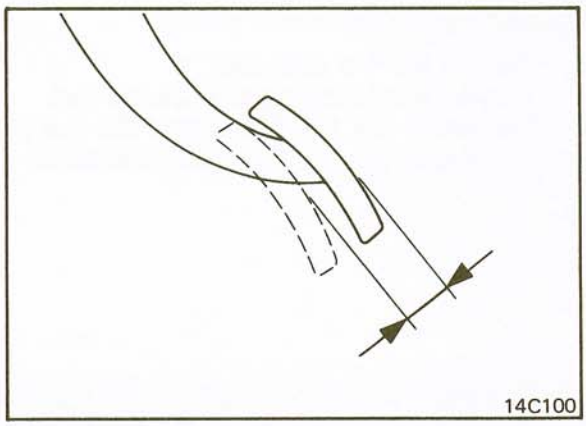
Idle CO: 0.1-0.3 % at nominal curb idle speed

11. Reconnect the connector of the exhaust oxygen sensor.
12. Reset the engine speed to the nominal idle speed by adjusting the speed adjusting screw, if the engine speed is out of the specified speed range.
13. Install the concealment plug into the hole to seal the idle mixture adjusting screw.

DJUSTMENT OF ACCELERATOR CABLE

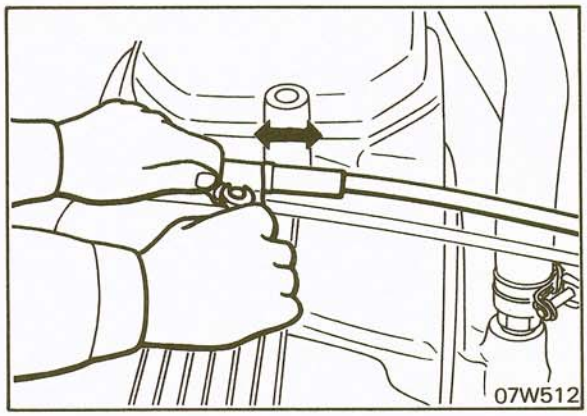
Run the engine until it reaches the specified idle speed. Measure the free play of the accelerator pedal. (14C100)

Accelerator cable free play . . . . . 0-1 mm (0-.04 in.)



If the measured free play is not within the standard value, adjust it as follows.

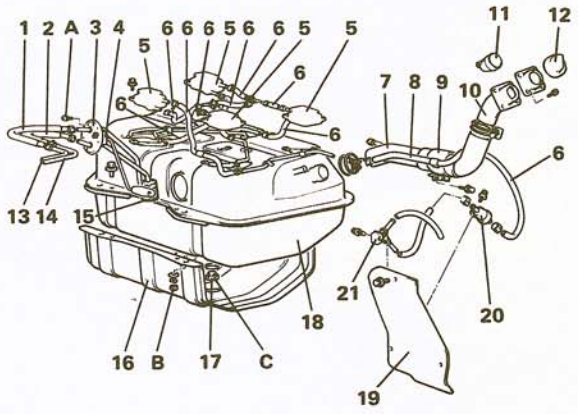
1. Loosen the tightening bolt so that the throttle lever is free.
2. Use the tightening bolt to make the adjustment of the accelerator cable free play so that it is within the standard value. (07W512)



FUEL TANK

COMPONENTS

1. Return hose
2. Main hose
3. Pipe assembly
4. Fuel gauge unit
5. Separator tank
6. Vapor hose
7. Connecting hose
8. Breather hose
9. Clamp assembly
10. Fuel filler neck
11. Shutter assembly
12. Fuel tank cap
13. Fuel return pipe
14. Fuel main pipe
15. In-tank fuel filter
16. Tank protector
17. Drain plug
18. Fuel tank
19. Filler hose protector
20. 2-way valve
21. Check valve

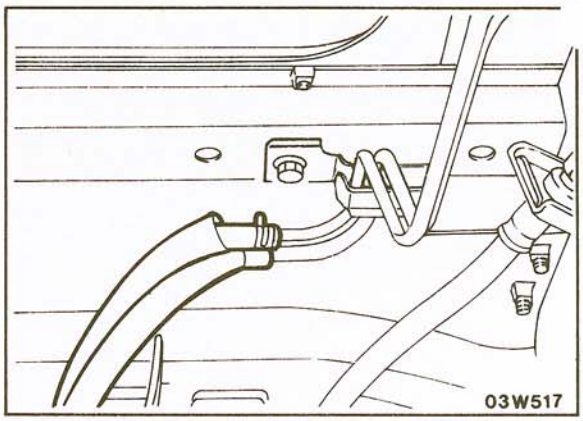


	Nm	ft.lbs.
A	1	0.7
B	25-30	18-22
C	15-25	11-18

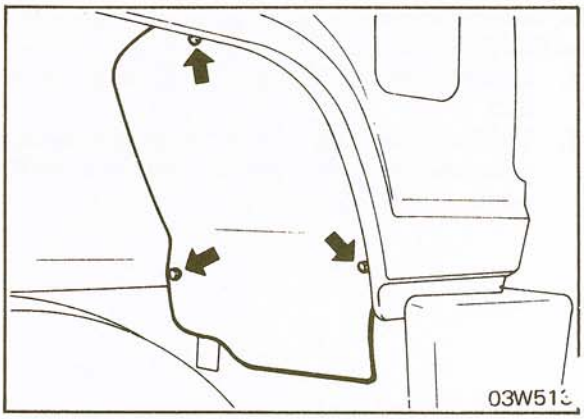
03W522

REMOVAL

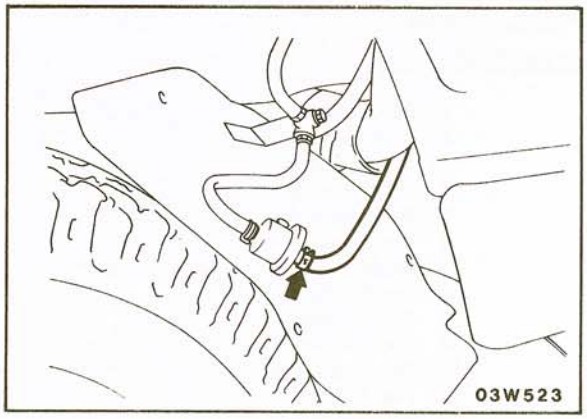
1. Remove the fuel tank cap.
2. Remove the drain plug to drain the fuel.
3. Disconnect the fuel hoses from the fuel pipes. (03W517)
4. Disconnect the fuel gauge unit connector.



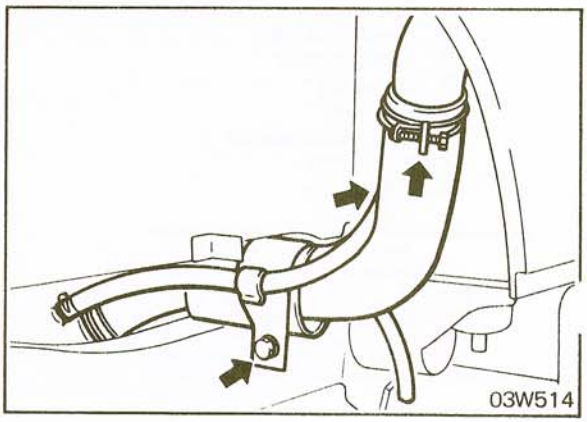
5. Remove the filler hose protector mounting bolts from the left rear wheelhouse.



6. Remove the filler hose protector and disconnect the 2-way valve and vapor hose from behind the protector.

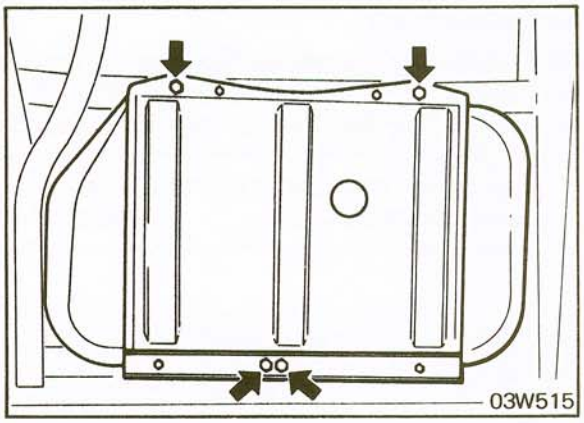


7. Disconnect the fuel filler neck connecting hose and breather hose. (03W514)
8. Remove the clamp assembly.



Remove the fuel tank.

NOTE
If the inside of the fuel tank is to be cleaned, use any one of the following:
(1) Kerosene
(2) Trichloroethylene
(3) Neutral emulsion detergent



INSPECTION

1. Check the fuel tank cap for malfunctions.
2. Check the fuel tank for cracks, corrosion or deformation.
3. Check the fuel tank for foreign material.
4. Check the in-tank fuel filter for clogging.
5. Check the fuel tank protector for cracks or deformation.

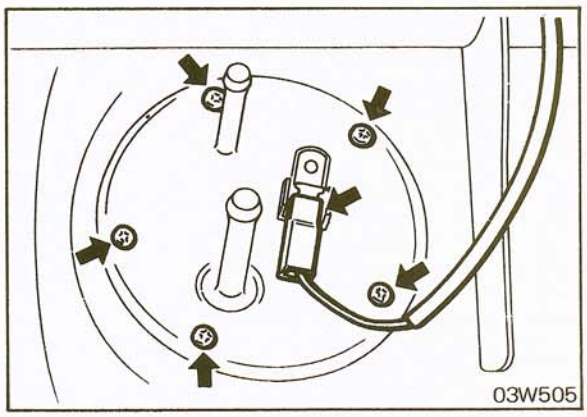
FUEL GAUGE UNIT AND IN-TANK FUEL FILTER REPLACEMENT

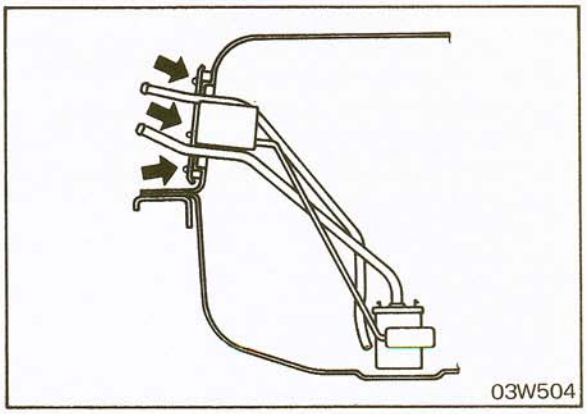
1. Disconnect the fuel hoses and fuel gauge unit connector from the pipe assembly. (03W505)

NOTE
The pipe assembly is mounted to the side of the fuel tank; when the fuel hose and the pipe assembly are to be disconnected, remove fuel as necessary so as not to spill the fuel.

2. Remove the pipe assembly from the tank.
3. Remove the in-tank fuel filter by pressing the tabs.
4. After installation, check for fuel leaks from the connection between the tank and the pipe assembly. (03W504)

NOTE
When the pipe assembly is installed, make sure that it is evenly tightened to prevent changing the set position of the float, because the pipe assembly and fuel gauge unit are one assembly.

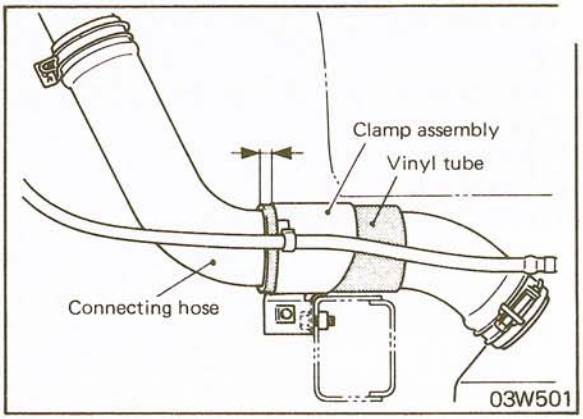




INSTALLATION

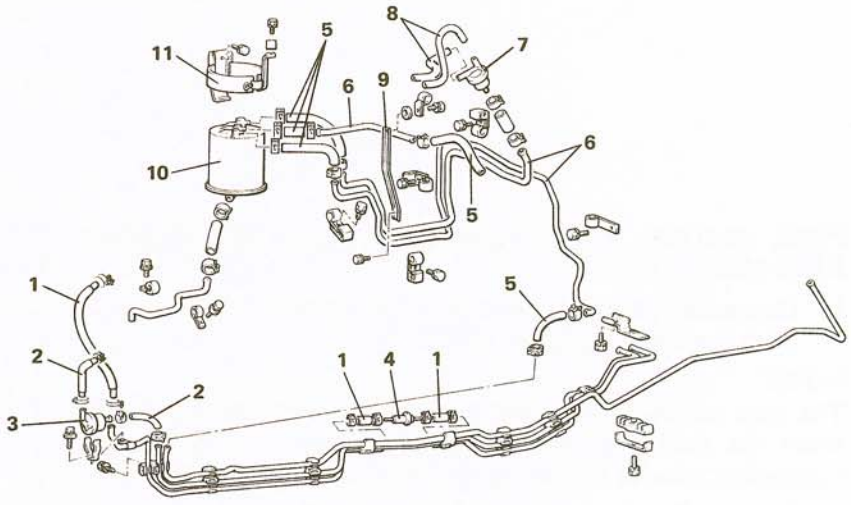
When clamping the connecting hose to the frame, make sure that the vinyl tube protrudes as specified from the clamp toward the fuel filler neck to prevent damage to the hose.

Length of vinyl tube protruding from clamp assembly	Approx. 5 mm (.20 in.)



FUEL LINE

COMPONENTS



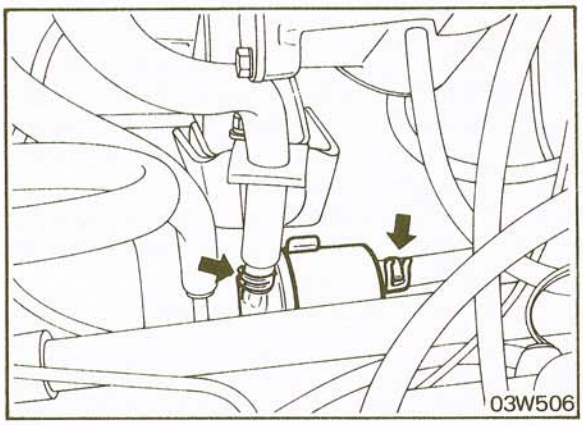
1. Fuel return hose
2. Fuel main hose
3. Fuel filter
4. Fuel return valve
5. Vapor hose
6. Vapor pipe
7. Purge control valve
8. Purge hose
9. Stay
10. Canister
11. Canister holder

INSPECTION

1. Check fuel hoses and pipes for cracks, bends, deformation, deterioration or clogging.
2. Check fuel filter for clogging or damage.
3. Check 2-way valve for malfunction.
4. Check separator tank for cracks or deformation.

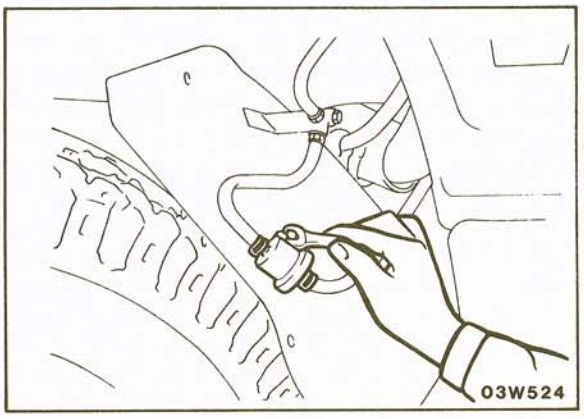
JEL FILTER REPLACEMENT

1. Remove the fuel tank cap to decrease the pressure in the fuel tank.
2. Remove the fuel filter after removing the clip and clamp. (03W506)



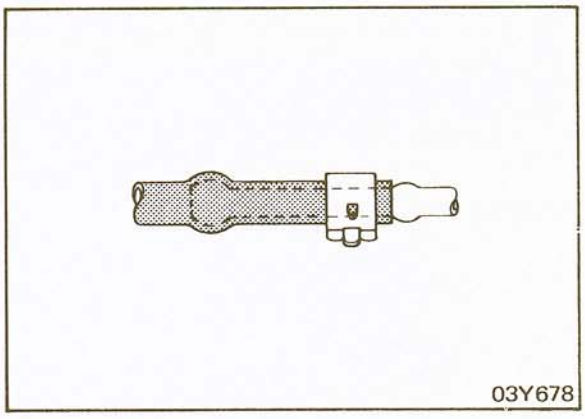
2-WAY VALVE REPLACEMENT

1. Remove the filler hose protector from the left rear wheelhouse.
2. Remove the 2-way valve from the back side of the filler hose protector. (03W524)



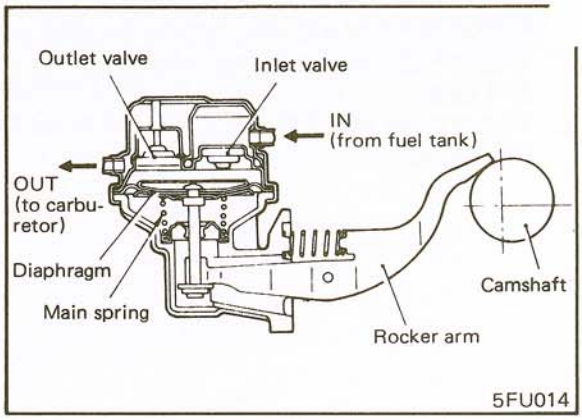
INSTALLATION

1. When attaching the fuel hose to the pipe, be sure that the hose is attached as shown in the illustration. (03Y678)
2. After all of the fuel pipes and hoses have been connected, start the engine, and confirm that there is no fuel leakage from any of the connections.



REMOVAL

1. Position the piston of the No. 1 cylinder at top dead center of the compression stroke. When the piston is in this position, the lift of the fuel pump drive eccentric cam will be reduced to a minimum and the fuel pump will be easier to remove.
2. Disconnect the fuel hoses from the fuel pump.
3. Remove the fuel pump mounting nuts and then remove the fuel pump assembly.
4. Remove the insulator and gaskets.



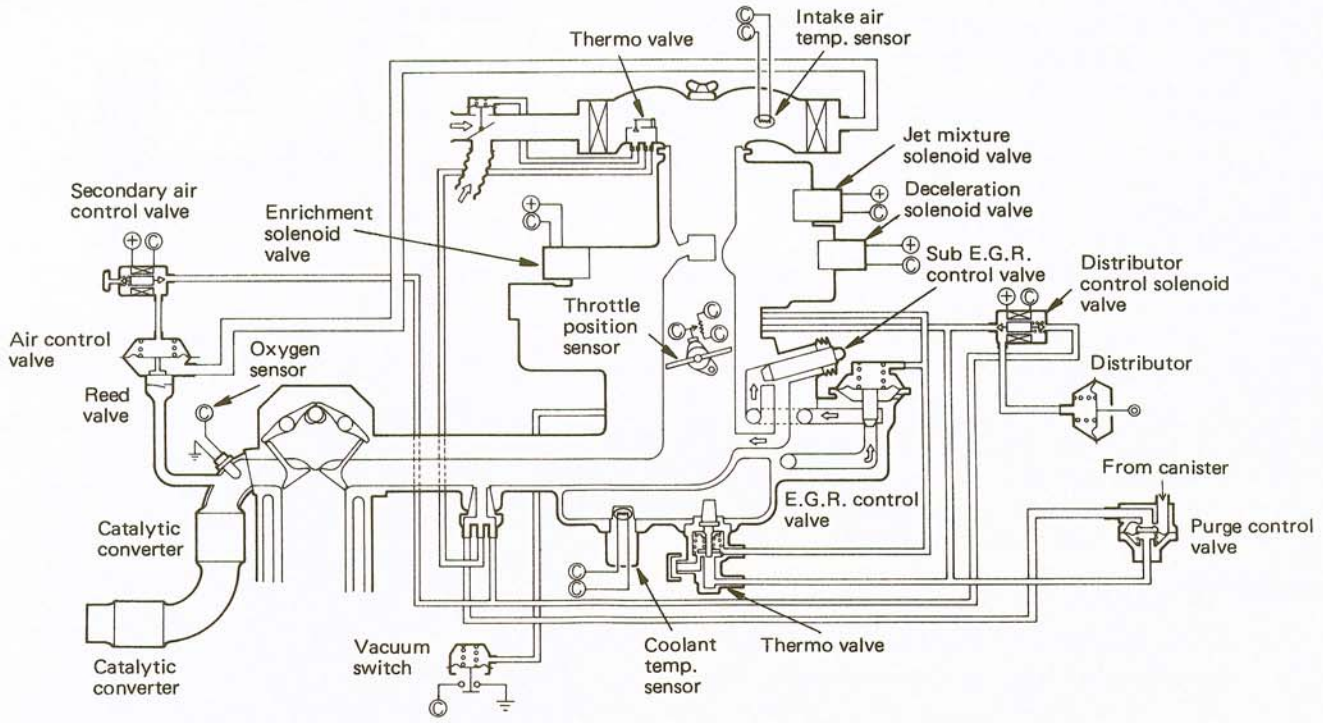
INSPECTION

1. Check the arm where it contacts the camshaft eccentric cam for wear on the end rocker.
2. Move the rocker arm to check for spring weakening.
3. Check the pump body and the cover for cracks or damage.

INSTALLATION

1. Position the piston of No. 1 cylinder at top dead center of the compression stroke.
2. Install new gaskets and insulator.
3. Install the fuel pump assembly and tighten the nuts.
4. Connect the fuel hoses to the fuel pump. Secure the hoses with hose clamps. Make certain that the fuel hoses are not broken or cracked.
5. Start the engine and check for fuel leaks or oil leaks.

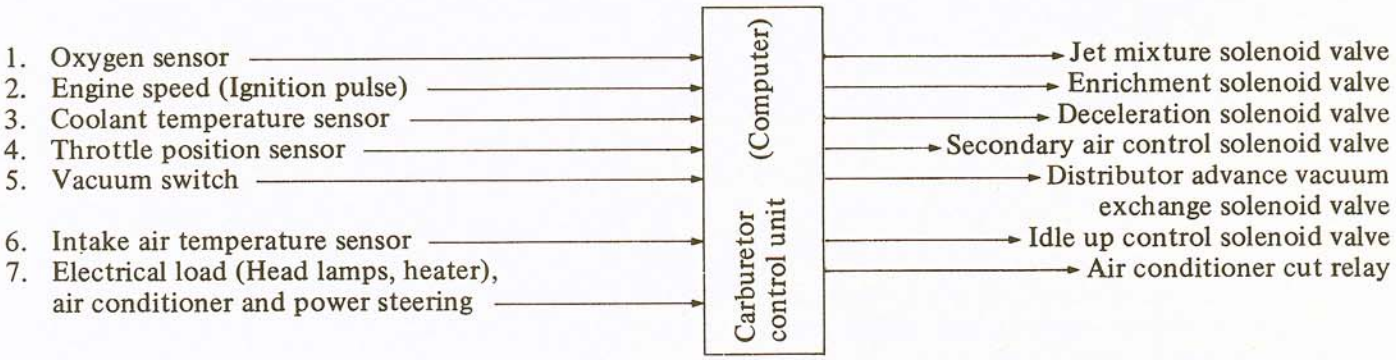
OMPONENTS



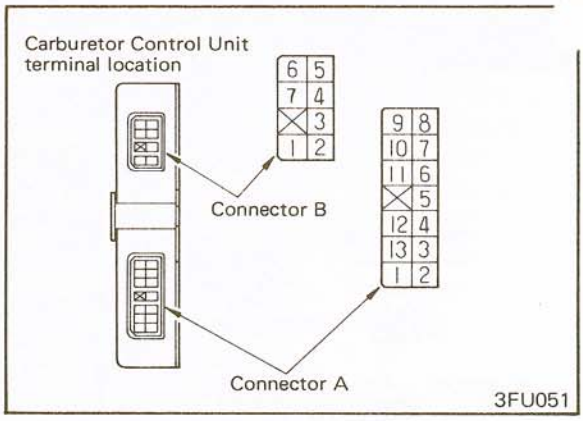
NOTE
© indicates the computer connection.
⊕ is the power cord.

5FU053

FBC (Feed Back Carburetor) system is composed of various kinds of sensors and actuators and a computer (carburetor control unit) as shown in the system diagram in the preceding figure. The flow of input and output signals of the control unit is as shown in the following chart.



A-1. Oxygen sensor
A-2. Ground for sensor
A-3. Throttle position sensor ⊕
A-4. Intake air temperature sensor
A-5. Idle positon switch
A-6. Ground
A-7. Ignition switch
A-8. Ignition switch
A-9. Battery ⊕
A-10. Ignition coil ⊖
A-11. Ground
A-12. Coolant temperature sensor
A-13. Throttle position sensor (out put)
B-1. Jet mixture solenoid valve
B-2. Deceleration solenoid valve
B-3. Idle up control solenoid valve
B-4. Secondary air control solenoid
B-5. Enrichment solenoid valve
B-6. Air conditioner cut relay
B-7. Distributer advance vacuum exchange solenoid valve



INSPECITON OF FBC SYSTEM

If FBC system components (sensors, carburetor control unit computer, solenoid, etc.) fail, interruption of fuel supply or failure to supply proper amount of fuel for engine operating conditions will result. Therefore, the following situations will be encountered.
(1) Engine is hard to start or does not start at all.
(2) Unstable idle.
(3) Poor driveability.
If any of above conditions is noted, first perform basic engine checks (ignition system malfunctions, incorrect engine adjustment, etc.).
The FBC system can be checked by use of ECI checker and adapter. Inspection procedure as follows.

INSPECTION PROCEDURE

Cautions

- **Before battery terminals are disconnected, make sure that ignition switch is set to OFF. If battery terminals are disconnected while engine is running or when ignition switch is in ON position, malfunction of computer or damage to semiconductors could result.**
- **Disconnect battery cables before charging battery.**
- **When battery is connencted, be sure not to reverse polarity.**
- **Make sure that harness connectors are securely connected. Use care not to allow entry of water or oil into connectors.**

1. Turn ignition switch to OFF.
2. Remove the harness connector "A" (13 poles) and connector "B" (7 poles) from carburetor control unit (computer).

aution

Before harness connectors are removed from, or inserted into carburetor control unit, make sure that ignition switch is turned off.

Hold down lock all the way when harness connector of carburetor control unit or connector of ECI checker is removed. When connector is connected, push it in all the way and check to ensure that lock is in position.

3. Set check switch of ECI checker to OFF.
4. Set select switch of checker to A.
5. Connect the adapter to the connectors of ECI checker, and then connect adapter to carburetor control unit and harness connectors. Place ECI checker on front passenger's seat.
6. Perform checks according to the "FBC System Check Procedure Chart".

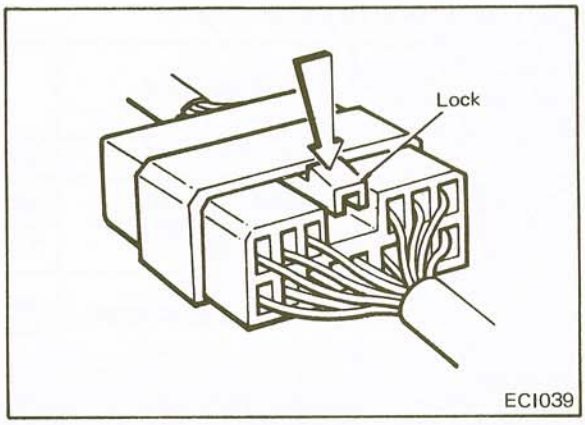
Caution

When steps 1. through 12. of the select switch "A" are checked, finish each step quickly and switch the ignition switch to OFF after inspection of each step to save current consumption. This is important for protection of the battery.

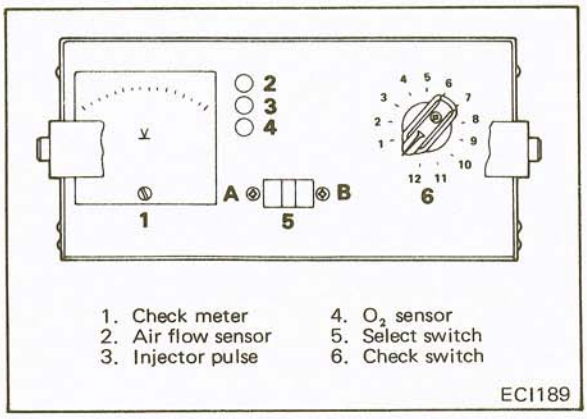
7. If checker shows any departure from specifications, check corresponding sensor and related electrical wiring, repair or replace.
8. After repair or replacement, recheck with ECI checker to confirm that repaired or replaced part is performing well.
9. Set check switch of ECI checker to OFF.
10. Set ignition switch to OFF.
11. Disconnect connectors of ECI checker and adapter from carburetor control unit and body side harness connectors.
12. Connect body side harness connector to carburetor control unit.

Caution

Make sure that connector is securely connected.



ECI039



1. Check meter
2. Air flow sensor
3. Injector pulse
4. O_2 sensor
5. Select switch
6. Check switch

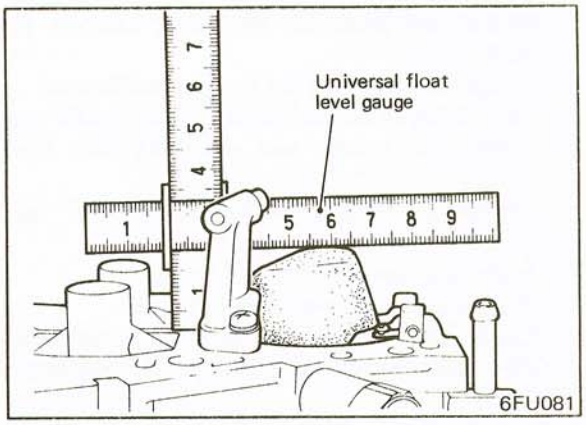
ECI189

FBC System Check Procedure Chart

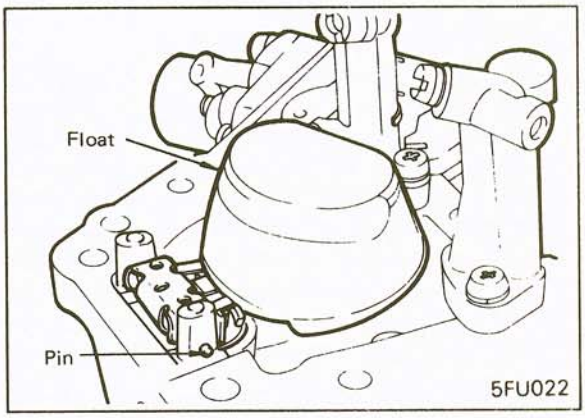
Select switch	Check switch	Check item	Condition		Check meter reading when normal	Terminal number of computer
A	1	Power supply	Ignition switch OFF → ON		11-13V	A-7
	2	Distributor advance vacuum exchange solenoid valve	Idling		13-15V	B-7
			2,000 rpm		0-1 V	
	3	Throttle position sensor	Ignition switch OFF → ON	Accelerator closed	0-0.6 V	A-13
				Accelerator wide opened	4-4.5 V	
	4	Coolant temperature sensor	Ignition switch OFF → ON	20°C (68°F)	2.4-2.6 V	A-12
				40°C (104°F)	1.4-1.6 V	
				80°C (176°F)	0.5-0.7 V	
	5	Intake air temperature sensor	Ignition switch OFF → ON	20°C (68°F)	2.4-2.6 V	A-4
				40°C (104°F)	1.4-1.6 V	
				80°C (176°F)	0.5-0.7 V	
	6	Vacuum switch	Ignition switch OFF → ON			A-5
			Idling			
	7	Idle up control solenoid valve	Ignition switch OFF → ON		0-0.6 V	B-3
	8	Enrichment solenoid valve	Ignition switch OFF → ON		11-13 V	B-5
	9	A/C cut relay	Ignition switch OFF → ON	A/C switch OFF → ON	0-0.6 V	B-6
	10	Power supply for sensor	Ignition switch OFF → ON		5 V	A-3
	11	–	–		–	–
	12	Secordary air control solenoid valve	Ignition switch OFF → ON	Coolant temp. 30-40°C (86-104°F)	0-0.6 V	B-4
B	1	–	–		–	–
	2	Jet mixture solenoid valve	Ignition switch OFF → ON		11-13 V	B-1
			Idling			
	3	Idle up control solenoid valve	Keep 1,500 rpm		13-15V	B-3
	4	Ignition pulse	Idling		12-15 V	A-10
			3,000 rpm		11-13 V	
	5	–	–		–	–
	6	Power supply for back up	Idling		13-15 V	A-9
	7	Deceleration solenoid valve	Idling		0-0.6 V	B-2
	8	Oxygen sensor	Keep 1,300 rpm after warming up		0.4-1 V ↕ 2.7 V Flashing	A-1
	9	Enrichment solenoid valve				B-5
	10	–	–		–	–
	11	A/C cut relay	Ignition switch OFF → ON	A/C switch OFF → ON at accel. wide opened	11-13 V	B-6
	12	Secondary air control solenoid valve	Keep idling after warming up		11-13 V	B-4

LOAT LEVEL ADJUSTMENT-DRY SETTING

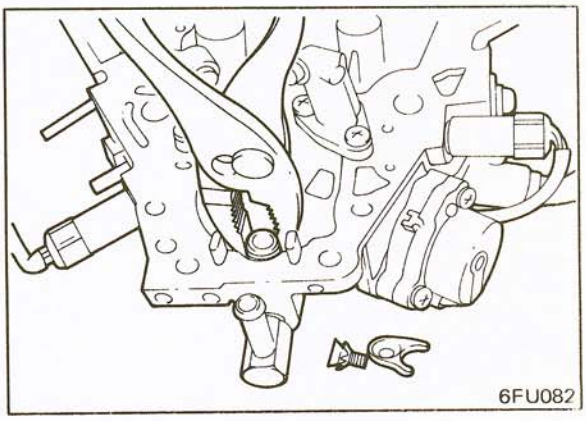
1. Invert the float chamber cover assembly without a gasket.
2. Position universal float level gauge or suitable depth gauge, distance from bottom of float to surface of float chamber cover should be 20 mm (.787 in.) ± 1 mm (.0394 in.). If reading is not within this range the shim under the needle seat must be changed. Shim kit MD606952 has 3 shims 0.3 mm (.0118 in.), 0.4 mm (.0157 in.), 0.5 mm (.0196 in.). Adding or removing a shim will change the float level by three times the thickness of the shim.



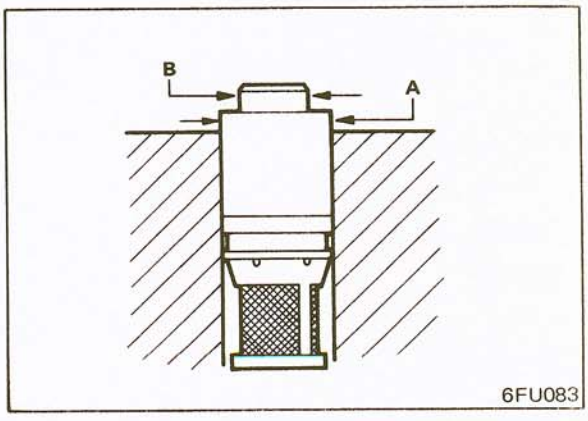
3. To remove the float slide the pin out and remove the float and the needle.



4. Unscrew retainer and remove the needle seat use with pliers.



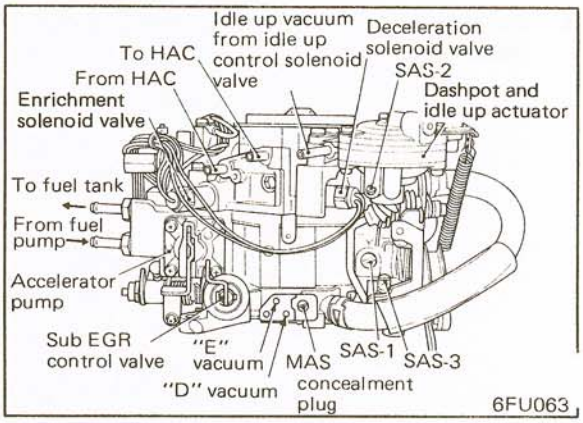
When removing the needle seat, clamp the portion A with pliers.
Do not clamp portion B of needle seat.

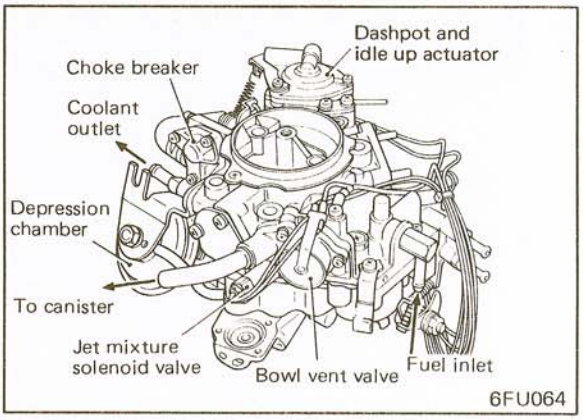


5. Check the filter for clogge or damage. Replace if necessary.
6. Install the new O-ring to the needle seat.
7. Install the shim and filter to the needle seat.
8. Insert the needle seat assembly into the float chamber cover.
9. Install the needle seal retainer and tighten the screw firmly.
10. Insert the needle into the seat.
11. Install the float and insert the pin.
12. Check the distance from bottom of float to surface of float chamber cover. Readjust if necessary.

REMOVAL

1. Disconnect battery ground cable.
2. Drain coolant down to intake manifold level or below.
3. Remove air cleaner.
4. Place a container under fuel inlet fitting to catch any fuel that may be trapped in fuel line and disconnect the fuel hose from the carburetor inlet connection.
5. Disconnect the vacuum hoses from carburetor.
6. Disconnect the throttle cable from carburetor.
7. Remove carburetor mounting bolts and carefully remove the carburetor from the engine. Hold carburetor level to avoid spilling fuel from fuel bowl.

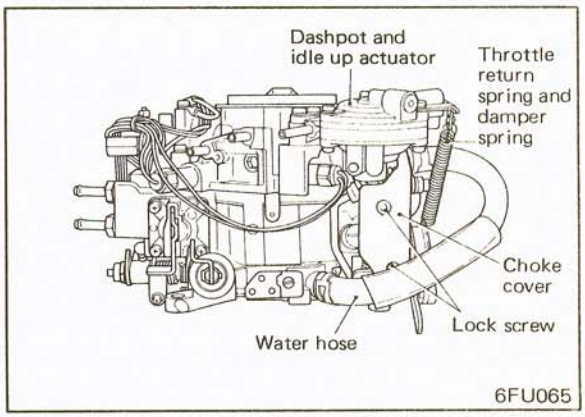




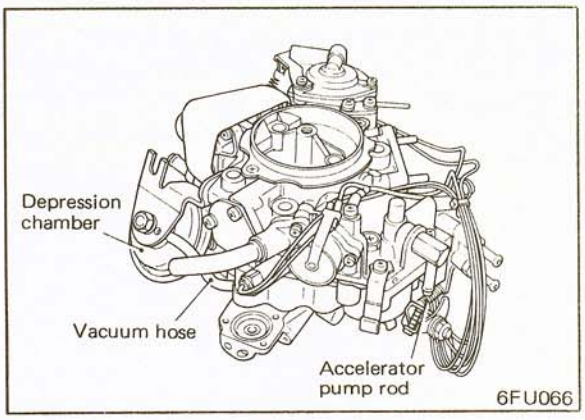
ISASSEMBLY

Caution
Do not remove the following parts:
1. **Choke valves.**
2. **Choke levers and related parts.**
3. **Round nut of accelerator pump link.**
4. **Adjusting screws except idle speed adjusting screws, idle mixture adjusting screw and dashpot adjusting screw.**
5. **Throttle valves.**

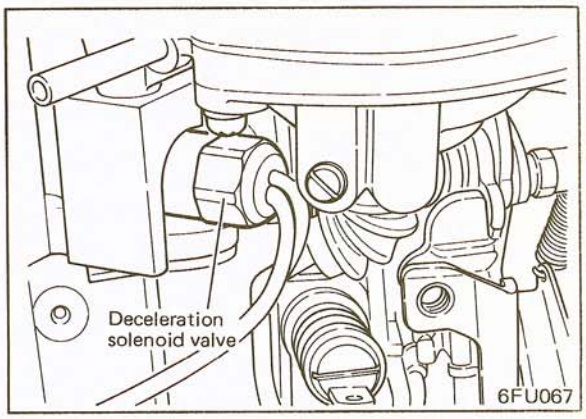
1. Pull the water hose off the nipple of throttle body and off the nipple of wax element portion.
2. Grind down the head of choke cover lock screws (in 2 positions) by using a hand grinder or other instruments. (6FU066)



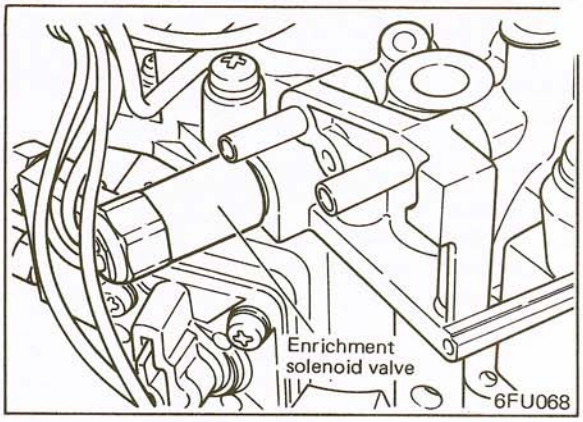
3. Remove the throttle return spring and the damper spring.
4. Remove the vacuum hose from the depression chamber and the throttle body.
5. Remove the accelerator pump rod from the throttle lever.
6. Remove the dashpot/idle up actuator rod (for a manual transmission) or idle up actuator rod (for an automatic transmission) from the free lever.
7. Remove the dashpot/idle up actuator (for a manual transmission) or the idle up actuator (for an automatic transmission) from the float chamber cover.



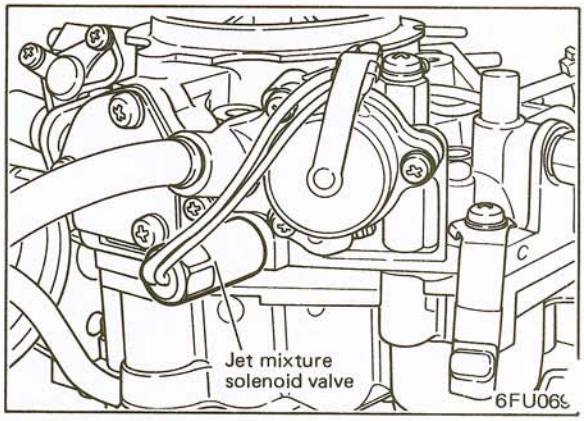
8. Remove the deceleration solenoid valve from the float chamber cover.



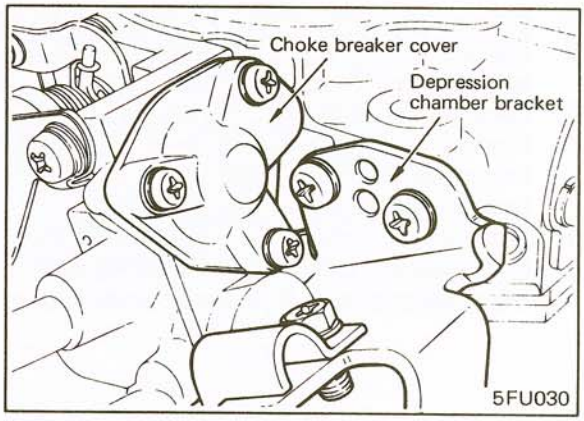
9. Remove the enrichment solenoid valve from the float chamber cover.



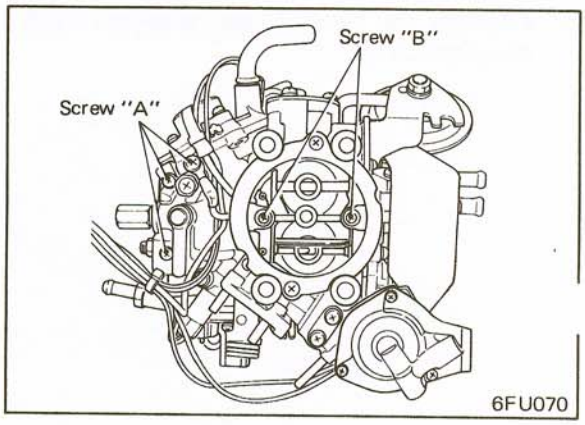
10. Remove the jet mixture solenoid valve from the float chamber cover.



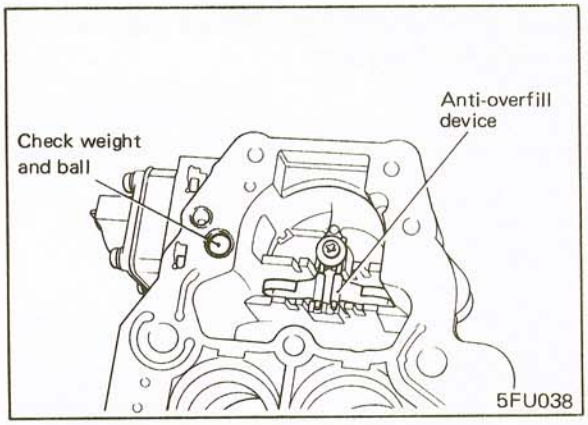
11. Remove the depression chamber rod from the secondary throttle lever.
12. Remove the depression chamber.
    To remove depression chamber, first remove choke breaker cover. Then remove depression chamber attaching screws.



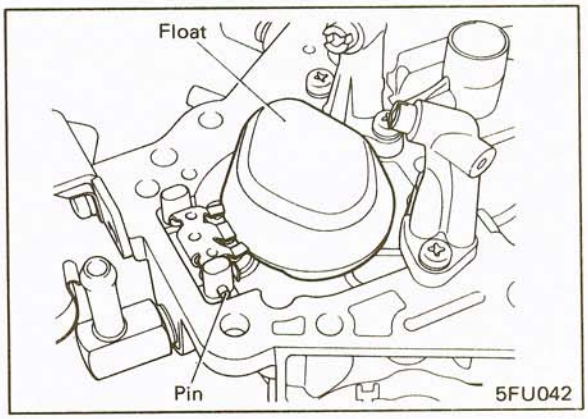
13. Remove the float chamber cover screws "B" and remove the throttle body.
14. Remove the screws "A" and remove the float chamber cover from main body.



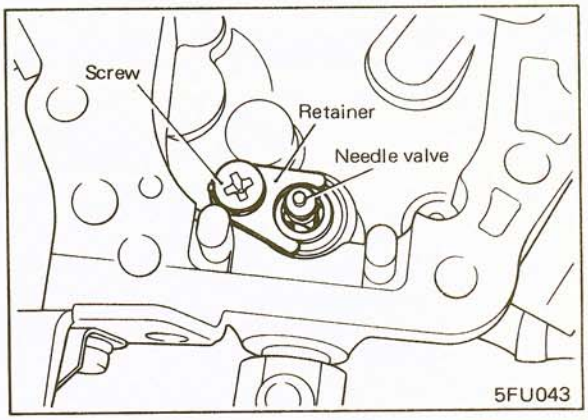
. Remove the check weight and ball, and steel ball of anti-overfill device.



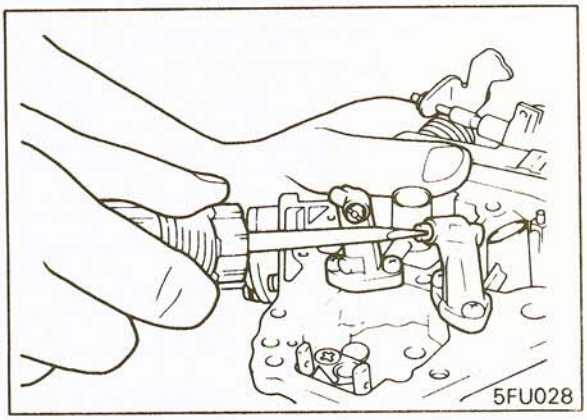
16. Pull off the pin and remove the float.



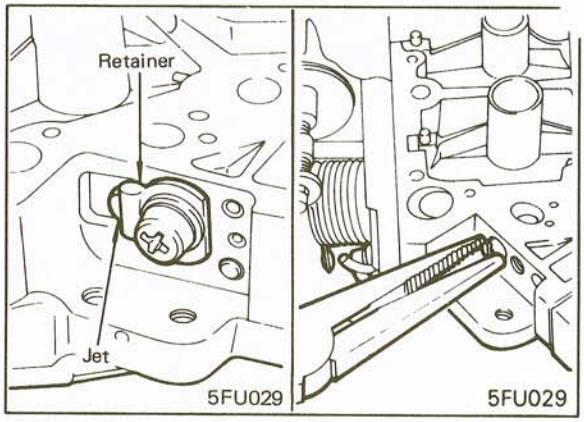
17. Remove the needle valve retainer and then remove the needle valve assembly with pliers.



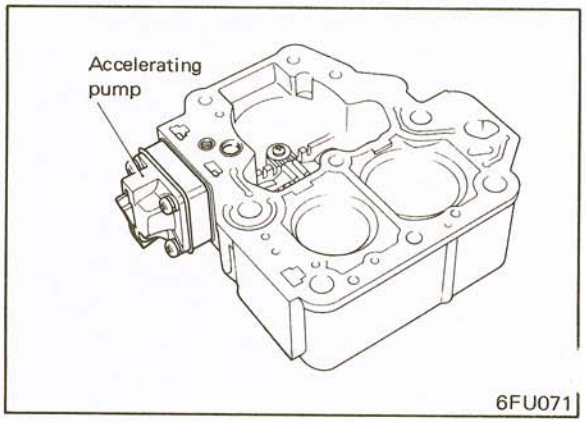
18. Remove the main jets from the jet blocks. When the main jet is to be removed, use a screwdriver with proper blade for slot in jet.



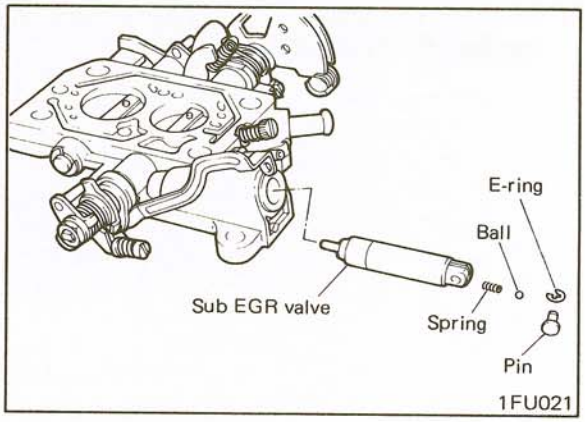
19. Remove the pilot jet retainer and pull out the secondary pilot jet with pliers.



20. Remove the accelerator pump mounting screws and remove the pump cover-link assembly, diaphragm, spring, body and gasket from main body.



21. Remove the snap ring from the sub EGR control valve pin.
22. Remove the pin and then remove the link from the valve. Then take out the little steel ball and spring from the sub EGR control valve.
23. Remove the sub EGR control valve from the throttle body.



REASSEMBLY

Perform reassemble in reverse procedure of disassembly, pay attention to the following items:

1. Clean the all reassembling parts.
2. Check to be sure that no clogging is in the air passages and fuel passages.
3. Check for rough operation of throttle and choke linkage. If they are binding, apply a small amount of lubricant after cleaning them up.
4. Sub EGR valve must operate smoothly.
5. When replacing a main or a pilot jet, the old jet and the new jet must be of the same size, because the jet is selected after exact flow measurement by factory (a No. is stamped on each jet).

INSTALLATION

1. Inspect the gasket surfaces of carburetor and intake manifold. Be sure both surfaces are clean and free of gasket material, nicks, burrs or other damage.
2. Place a new carburetor gasket on the intake manifold surface.
3. Carefully place the carburetor on the intake manifold.
4. Install carburetor mounting bolts and tighten alternately, a little at a time, to compress carburetor gasket evenly. The nuts must be drawn down tightly to prevent vacuum leakage between the carburetor and intake manifold.
5. Connect the throttle cable, vacuum hoses and fuel hoses.
6. Check carefully for worn or loose vacuum hose connections.
7. Check to be sure the choke plate opens and closes fully when operated.
8. Check to see that full throttle travel is obtained.
9. Install air cleaner. The air cleaner should be cleaned or replaced at this time to insure proper carburetor performance.
10. Connect battery cable.

Caution

The practice of priming an engine by pouring gasoline into the carburetor air horn for starting after servicing the fuel system should be strictly avoided. Cranking the engine, and then priming by depressing the accelerator pedal several times should be adequate.

11. Set carburetor idle speed and mixture adjustment.

REMOVAL

1. Disconnect battery ground cable.
2. Drain coolant down to intake manifold level or below.
3. Remove air cleaner.
4. Place a container under fuel inlet fitting to catch any fuel that may be trapped in fuel line and disconnect the fuel hose from the carburetor inlet connection.
5. Disconnect the vacuum hoses from carburetor.
6. Disconnect the throttle cable from carburetor.
7. Remove carburetor mounting bolts and carefully remove the carburetor from the engine. Hold carburetor level to avoid spilling fuel from fuel bowl.

DISASSEMBLY

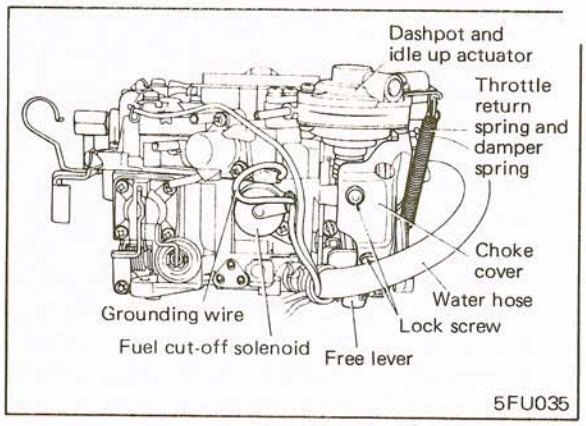
Caution

Do not remove the following parts:

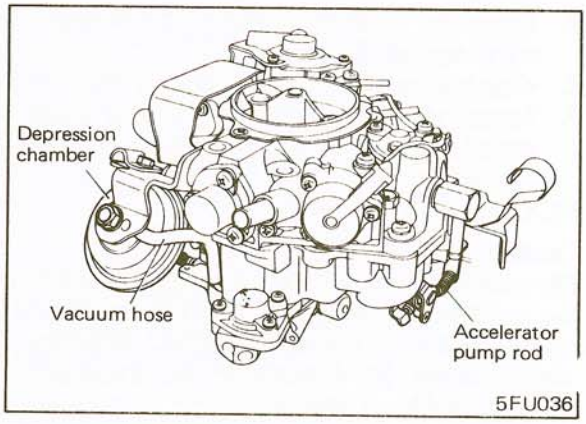
1. **Choke valves.**
2. **Choke levers and related parts.**
3. **Round nut of accelerator pump link.**
4. **Adjusting screws except idle speed adjusting screws, idle mixture adjusting screw and dashpot adjusting screw.**
5. **Throttle valves.**

REMOVAL

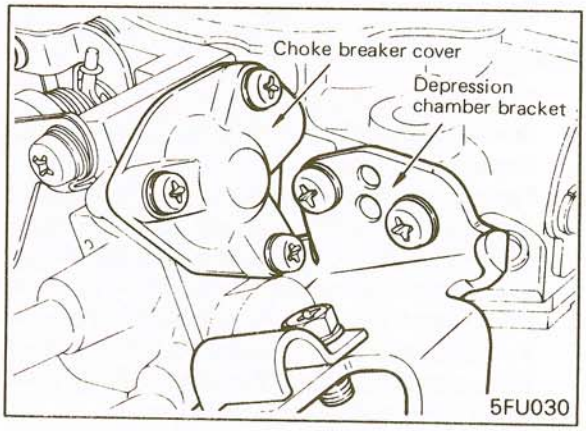
1. Disconnect the water hose from the connection of throttle body and from the connection of wax element.
2. Remove the tamper proof screws from the choke cover and then remove the choke cover.
3. Disconnect the ground wire of the fuel cut-off solenoid at the float chamber cover.
4. Remove the throttle return spring and the damper spring.
5. Disconnect the vacuum hose connecting the depression chamber and the throttle body.
6. Detach the accelerator pump rod from the throttle lever.
7. Detach the dashpot/idle up actuator rod from the free lever.



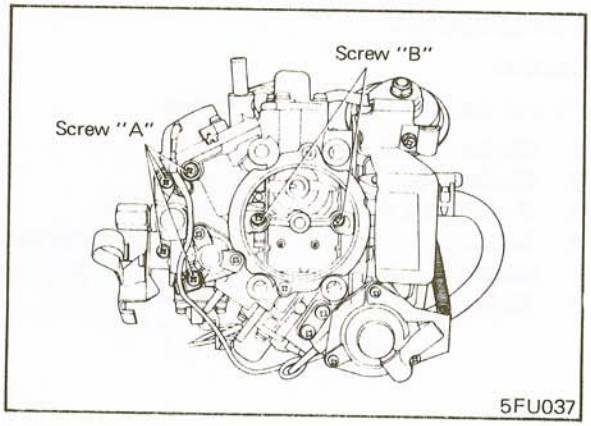
8. Remove the dashpot/idle up actuator from the float chamber cover.
9. Detach the depression chamber rod from the secondary throttle lever.



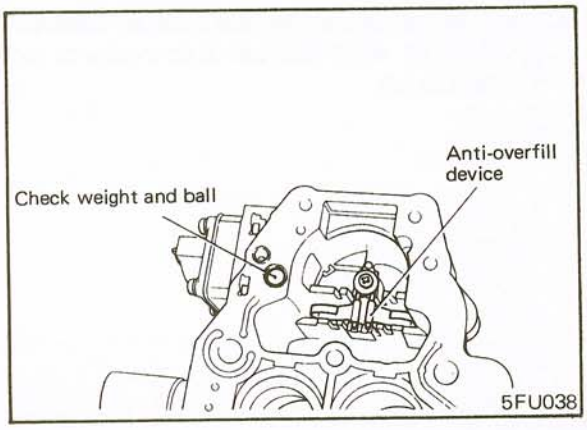
10. Remove the depression chamber. To remove depression chamber, first remove choke breaker cover. Then remove depression chamber attaching screws.



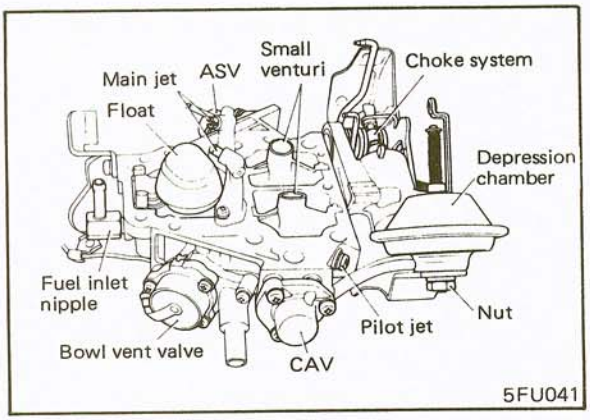
11. Remove the float chamber cover screws "B" and remove the throttle body.
12. Remove the screws "A" and remove the float chamber cover from main body.



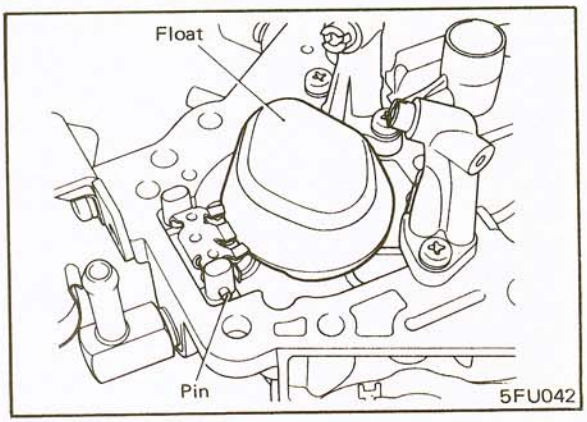
13. Remove the check weight and ball, and steel ball of anti-overfill device.



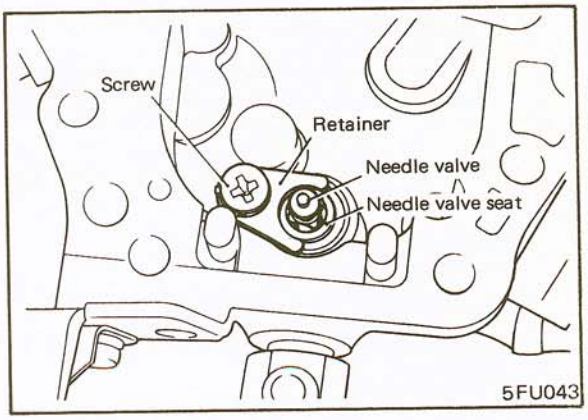
14. Do not remove components unless necessary, do not disassemble the auto choke system.



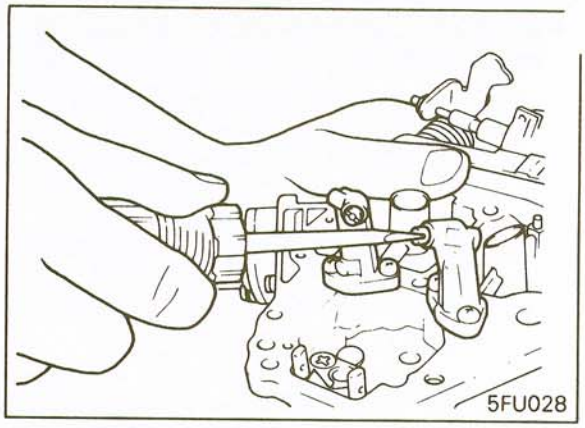
15. Pull out the float pin and remove the float.



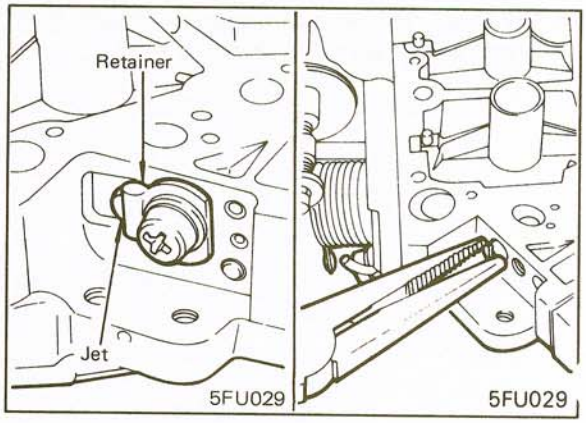
16. Remove the needle valve retainer and then remove the needle valve assembly with pliers.



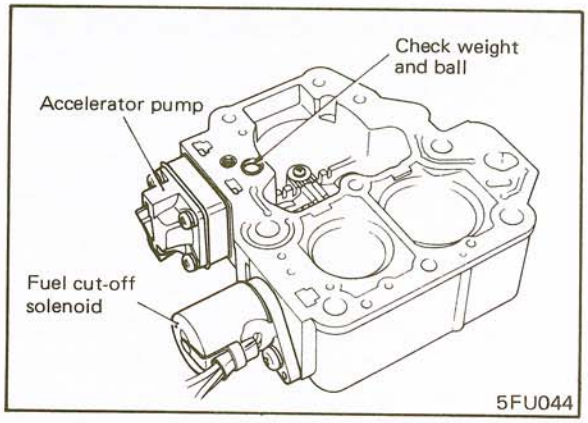
17. Remove the main jets from the jet blocks. When the main jet is to be removed, use a screwdriver with proper blade for slot in jet.



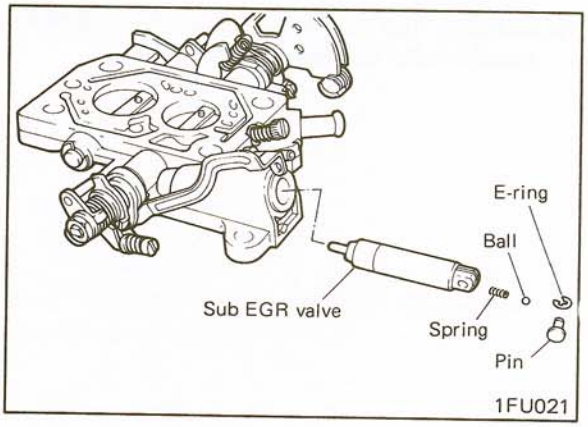
18. Remove the pilot jet retainer and pull out the secondary pilot jet with pliers.



19. Remove the accelerator pump and fuel cut-off solenoid.



20. Remove the snap ring from the sub EGR control valve pin.
21. Remove the pin and then remove the link from the valve. Then take out the little steel ball and spring from the sub EGR control valve.
22. Remove the sub EGR control valve from the throttle body.



EASSEMBLY

Perform reassemble in reverse procedure of disassembly, pay attention to the following items:

1. Clean the all reassembling parts.
2. Check to be sure that no clogging is in the air passages and fuel passages.
3. Check for rough operation of throttle and choke linkage. If they are binding, apply a small amount of lubricant after cleaning them up.
4. Sub EGR valve must operate smoothly.
5. When replacing a main or a pilot jet, the old jet and the new jet must be of the same size, because the jet is selected after exact flow measurement by factory (a No. is stamped on each jet).

INSTALLATION

1. Inspect the gasket surfaces of carburetor and intake manifold. Be sure both surfaces are clean and free of gasket material, nicks, burrs or other damage.
2. Place a new carburetor gasket on the intake manifold surface.
3. Carefully place the carburetor on the intake manifold.
4. Install carburetor mounting bolts and tighten alternately, a little at a time, to compress carburetor gasket evenly. The nuts must be drawn down tightly to prevent vacuum leakage between the carburetor and intake manifold.
5. Connect the throttle cable, vacuum hoses and fuel hoses.
6. Check carefully for worn or loose vacuum hose connections.
7. Check to be sure the choke plate opens and closes fully when operated.
8. Check to see that full throttle travel is obtained.
9. Install air cleaner. The air cleaner should be cleaned or replaced at this time to insure proper carburetor performance.
10. Connect battery cable.

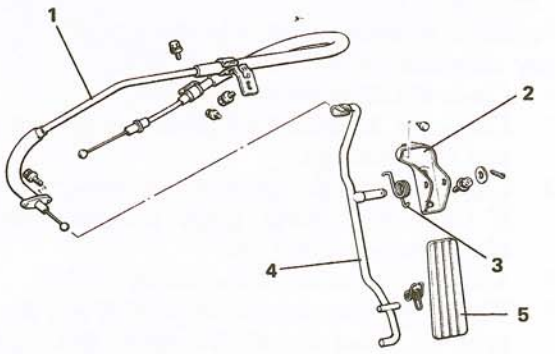
Caution

The practice of priming an engine by pouring gasoline into the carburetor air horn for starting after servicing the fuel system should be strictly avoided. Cranking the engine, and then priming by depressing the accelerator pedal several times should be adequate.

11. Set carburetor idle speed and mixture adjustment.

COMPONENTS

1. Accelerator cable
2. Accelerator arm bracket
3. Return spring
4. Accelerator arm
5. Pedal

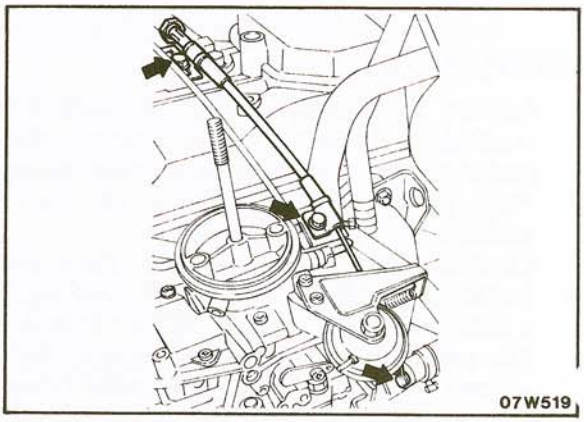


07W523

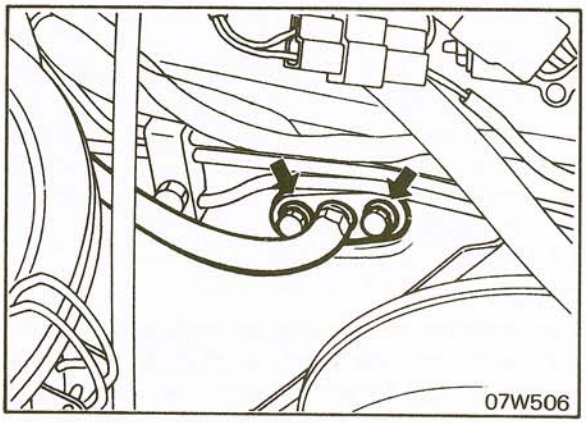
REMOVAL

Accelerator Cable

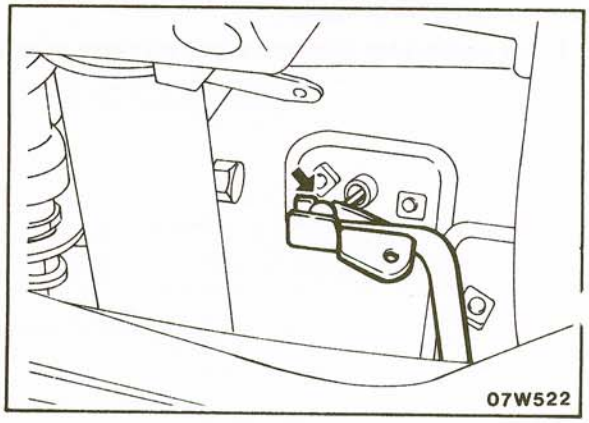
1. Loosen the accelerator cable tightening bolts. (07W519)
2. Disconnect the accelerator cable from the throttle lever.


07W519

3. Remove the bolts which hold the accelerator cable guide from the floorboard within the engine compartment.

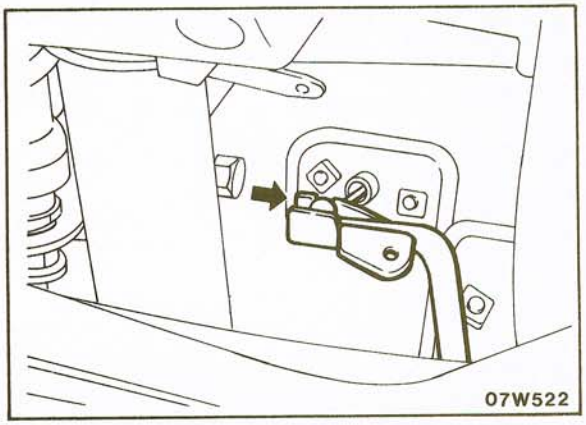

07W506

4. Disconnect the accelerator cable from the end of the accelerator arm, and then remove the cable from the engine compartment.

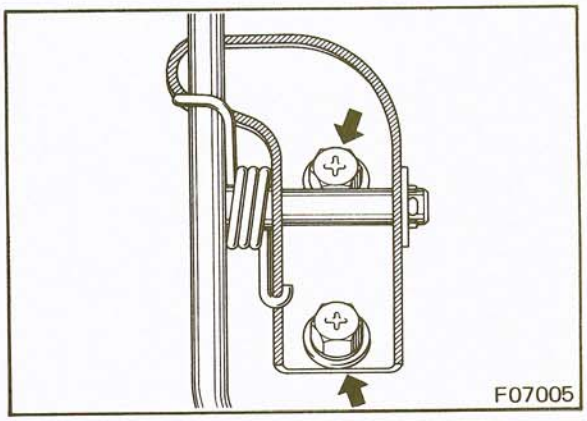

07W522

.ccelerator Pedal

1. Disconnect the accelerator cable from the end of the accelerator arm.



2. Remove the accelerator arm together with the accelerator bracket. (F07005)
3. Remove the pedal from the accelerator arm.



INSPECTION

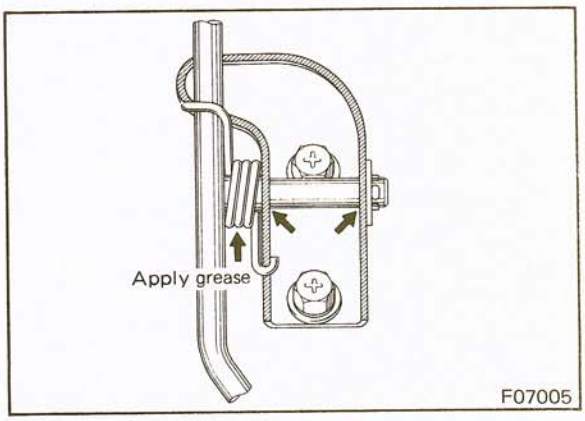
1. Check accelerator cable for damage.
2. Check cable outer casing for damage.
3. Check cable for roughness in the movement.
4. Check accelerator arm for bending.
5. Check return spring for deterioration.

INSTALLATION

1. Apply specified multipurpose grease and drying-type sealant to the specified positions. (F07005, 07W503)

Recommended grease	Multipurpose grease SAE J310a, NLGI grade #3, or equivalent

2. Eliminate sharp bends from the accelerator cable.
3. Adjust the free play of the accelerator cable. (Refer to p. 14-9.)



PROPELLER SHAFT AND UNIVERSAL JOINTS

CONTENTS

GENERAL SPECIFICATIONS

mm (i

Propeller shaft		
Type		Two-joint type
Length x O.D.	Front	665 x 50.8 (26.2 x 2.0)
	Rear	598 x 75.0 (23.5 x 3.0)
Universal joint		
Type		Cross type
Bearing		Lubricated needle roller bearing
Journal O.D.		14.7 (.58)

SERVICE SPECIFICATIONS

mm (in.)

Service limits		
Propeller shaft runout (Dial indicator reading)		
	Front	0.5 (.02)
	Rear	0.6 (.024)
Journal end play		0.06 (.0024)

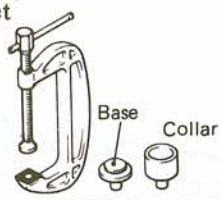
TORQUE SPECIFICATION

Nm (ft.lbs

Flange yoke attaching bolts	50-60 (36-43)

LUBRICANTS

	Specified lubricant	Quantity
Universal joint	Multipurpose grease, SAE J310a, NLGI grade #2EP	As required
Sleeve yoke surface	Hypoid gear oil, SAE 80, 75W-85W conforming to API GL-4	As required

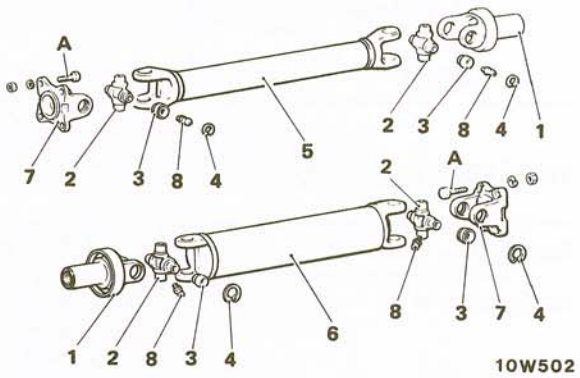
Tool (Number and name)	Use
MB990840 Universal joint remover and installer set 	Removal and installation of journal bearing

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Abnormal noise	Universal joint bearings worn, damaged or broken Sleeve yoke loose in transmission Universal joint yokes worn or broken	Replace
	Companion flange bolts loose	Torque to specifications
Vibration	Universal joints worn, damaged or broken Sleeve yoke loose in transmission Propeller shaft bent, distorted or damaged Universal joint yokes out of phase	Replace
	Companion flange bolts loose	Torque to specifications

COMPONENTS

1. Sleeve yoke assembly
2. Journal
3. Journal bearing
4. Snap ring
5. Front propeller shaft
6. Rear propeller shaft
7. Flange yoke
8. Grease nipple



10W502

	Nm	ft.lbs.
A	50-60	36-43

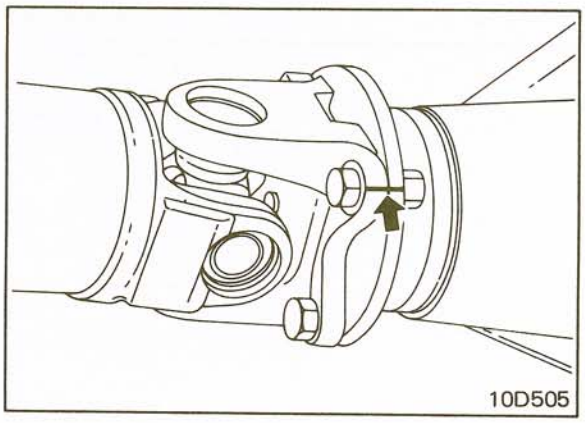
REMOVAL

1. Place the free wheel hubs in the FREE position and set the transfer lever to "2H".
2. Make mating marks on the flange yoke and the differential companion flange. (10D505)
3. Detach the propeller shafts from the front and rear differential carrier assemblies.
4. Remove the propeller shafts.

Caution

Be careful not to damage the lip of the transmission oil seal or the lip of the transfer oil seal.

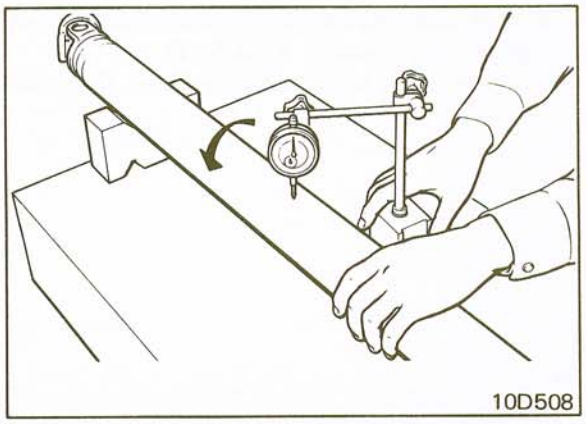
Do not allow foreign matter to enter the transmission or transfer.


10D505

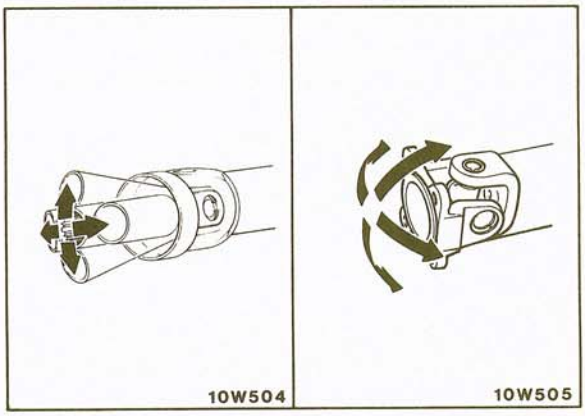
SPECTION

1. Check sleeve yoke and flange yoke for wear, damage or cracks.
2. Check propeller shaft yokes for wear, damage or cracks.
3. Check propeller shaft for bends, twisting or damage. (10D508)

Propeller shaft runout (Dial indicator reading)	
[Service limit]	Front 0.5 mm (.02 in.)
	Rear 0.6 mm (.024 in.)

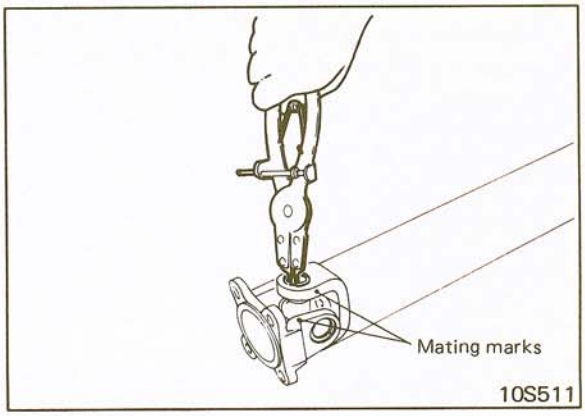


4. Check universal joints for smooth operation in all directions.



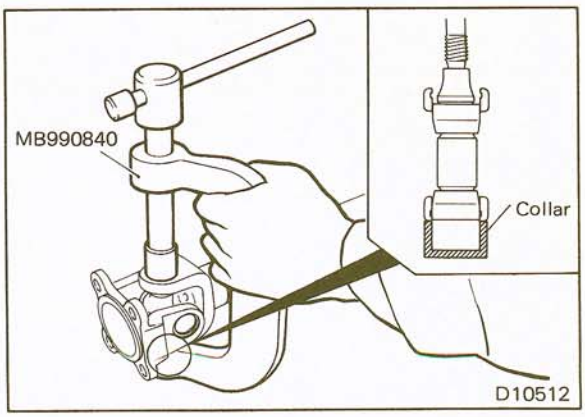
UNIVERSAL JOINT REPLACEMENT

1. Make mating marks on the yokes of the universal joint that is to be disassembled. (10S511)
2. Remove the snap rings from the yoke with snap ring pliers. (10S511)

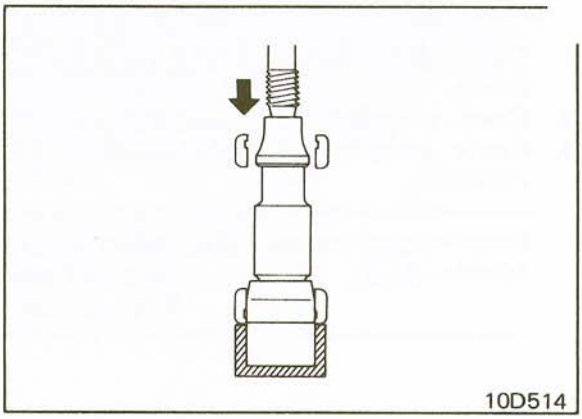


3. Remove the journal bearings from the propeller shaft yoke with the special tool. Use the collar as illustrated.

NOTE
If the journal bearings are hard to remove, strike the yoke with a plastic hammer.



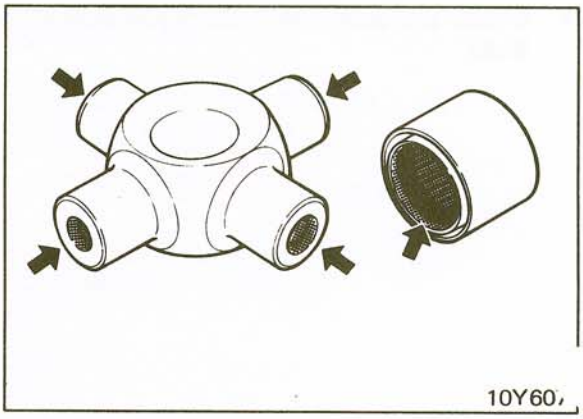
4. Press the journal shaft using special tool to remove the remaining bearing. (10D514)
5. Separate the universal joint from the yokes.



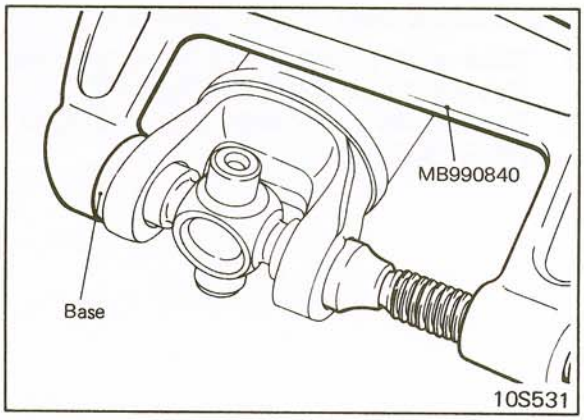
6. Apply the specified multipurpose grease to the following parts of universal joint kit:
   (1) Shafts and grease sumps of journal
   (2) Dust seal lips
   (3) Needle roller bearings

Specified multipurpose grease ..... SAE J310a, NLGI grade #2EP

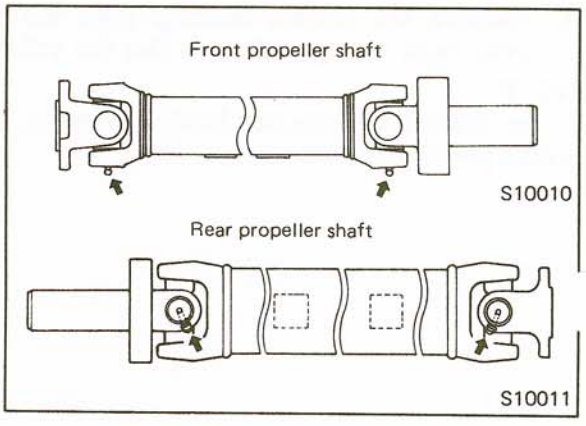
Caution
Use of excessive amounts of grease may result in difficulty in assembling unit and incorrect selection of snap rings.



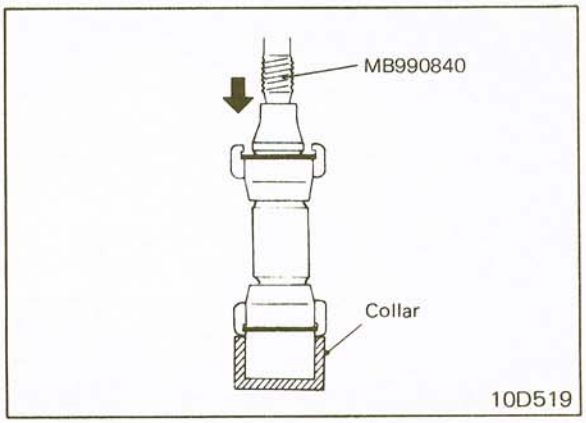
7. Press the journal bearings to the yoke with the special tool and base as illustrated. Be sure to align the mating marks on the yokes.



8. When attaching the universal joint journals to the propeller shaft, be sure that the grease nipples face in the same direction for the front propeller shaft, and that they face each other (as shown in the figure) for the rear propeller shaft.



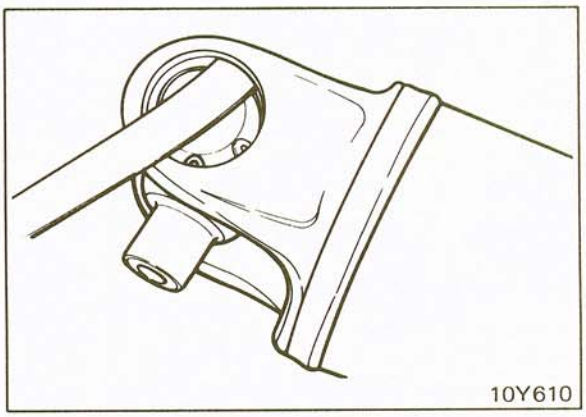
Install snap rings of the same thickness onto both sides of each yoke. Press the bearing and journal into one side with the special tool. (10D519)



10. Measure the clearance between the snap ring and the groove wall of the yoke with a feeler gauge. (10Y610)

Journal end play [Service limit] . . . . . .
0.06 mm (.0024 in.)

If the clearance exceeds the service limit, the snap rings should be replaced.



INSTALLATION

1. Apply hypoid gear oil to the sleeve yoke and install the propeller shaft into the transmission.

Specified hypoid gear oil . . . . . .
SAE80, 75W-85W conforming to API GL-4

2. Align the mating marks on the flange yoke and the differential companion flange.
3. Install bolts and torque to specifications.

Flange yoke bolt tightening torque . . . . . .
50-60 Nm (36-43 ft.lbs.)

REAR SUSPENSION

CONTENTS

GENERAL SPECIFICATIONS

Suspension system	Asymmetrical semielliptic leaf springs
Leaf springs (Standard)	
Number of leaf springs	4
Straight span mm (in.)	1,200 (47.2)
Camber (unladen) mm (in.)	78 (3.1)
Spring constant N/mm (lbs./in.)	
– as installed	
at load of 1,000-2,500 N (220-551 lbs.)	24 (134)
at load of 4,670-8,870 N (1,030-1,955 lbs.)	56 (314)
Leaf springs (Heavy duty)	
Number of leaf springs	4
Straight span mm (in.)	1,200 (47.2)
Camber (unladen) mm (in.)	78 (3.1)
Spring constant N/mm (lbs./in.)	
– as installed	
at load of 700-2,700 N (154-595 lbs.)	35 (196)
at load of 5,000-15,000 N (1,102-3,307 lbs.)	124 (694)
Shock absorbers	
Type	Hydraulic cylinder, double-acting type
Max. length mm (in.)	548 (21.6)
Min. length mm (in.)	328 (12.9)
Stroke mm (in.)	220 (8.7)
Damping force [at 0.3 m/sec. (0.984 ft./sec.)]	
Expansion N (lbs.)	1,840 (406)
Compression N (lbs.)	720 (159)

TORQUE SPECIFICATIONS

	Nm (ft.lbs.)
Shackle assembly mounting nuts	45-60 (33-43)
Front pin assembly mounting nuts	45-60 (33-43)
Shock absorber mounting nuts	18-25 (13-18)
Front pin assembly mounting bolts	14-20 (10-14)
U-bolt mounting nuts	85-110 (61-80)

Symptom	Probable cause	Remedy
Abnormal sound	Suspension securing bolt(s) loose Loose wheel nuts	Tighten to specified torque
	Faulty shock absorber Worn bushings Damaged or worn wheel bearings Components bent or distorted Broken spring	Replace damaged parts
	Wheel or tire imbalance	Balance
	Improper tire inflation	Inflate to specification
	Defective tire	Replace
Poor riding comfort	Over-inflated tire	Adjust inflation pressures (Refer to GROUP 22.)
	Malfunctioning shock absorber Deteriorated or broken spring	Replace
Vehicle tilts	Uneven camber Deteriorated or worn bushing Deteriorated or broken spring	Replace

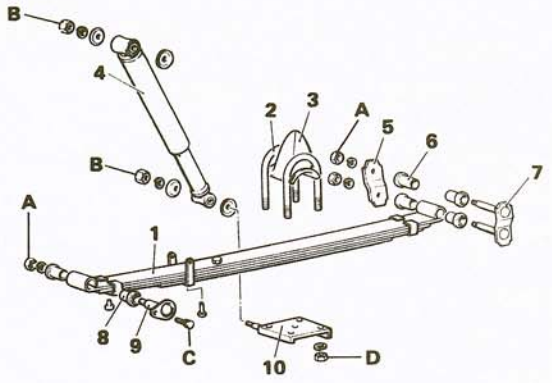
REAR SUSPENSION

COMPONENTS

1. Spring assembly
2. U-bolt
3. Bump stopper
4. Shock absorber
5. Shackle plate
6. Rubber bushing
7. Shackle
8. Rubber bushing
9. Front pin
10. U-bolt seat

	Nm	ft.lbs.
A*	45-60	33-43
B*	18-25	13-18
C	14-20	10-14
D	85-110	61-80

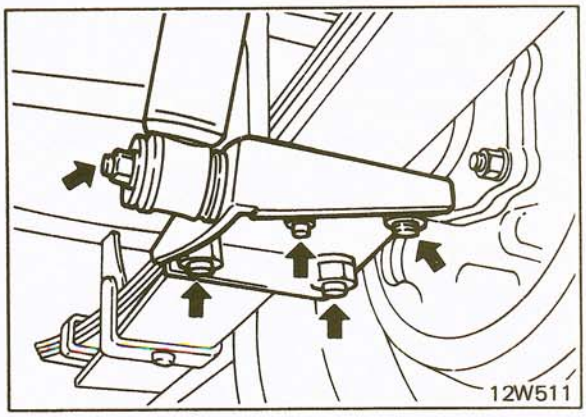
*To be tightened with vehicle lowered to the ground.



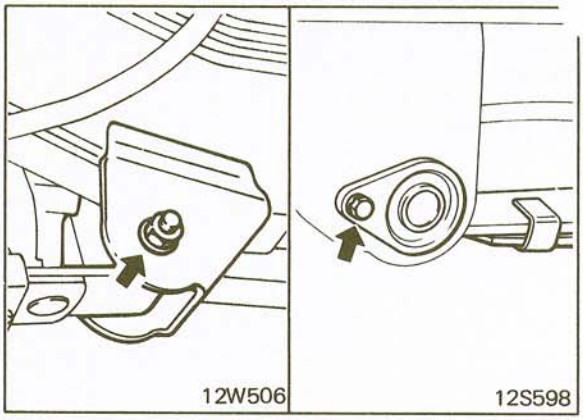
12W503

REMOVAL

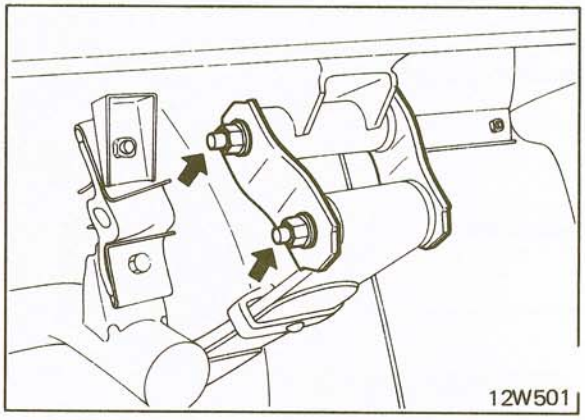
1. Support the vehicle with floor stands positioned on the frame.
2. Remove the wheel.
3. Jack up the rear axle housing so that it is not supported by the spring assembly.
4. Remove the parking brake cable clamp. (Refer to GROUP 5.)
5. Detach the shock absorber from the U-bolt seat. (12W511)
6. Remove the U-bolts, the U-bolt seat, and the bump stopper. (12W511)


12W511

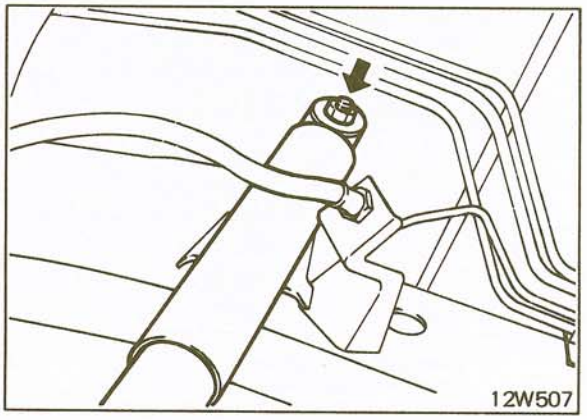
7. Remove the front pin and lower the front end of the spring assembly.



8. Remove the shackle to separate the spring assembly from the side frame.



9. Remove the shock absorber from the side frame. (12W507)
10. Remove the rubber bushings.



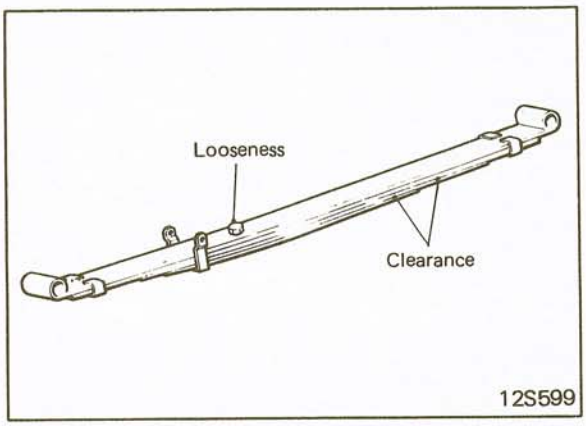
INSPECTION

1. Check shock absorber for damage, fluid leaks and noise.
2. Check leaf spring for deterioration and damage.
3. Check U-bolt for bend.
4. Check rubber bushings for wear and damage.

ıecking of the Spring Assembly

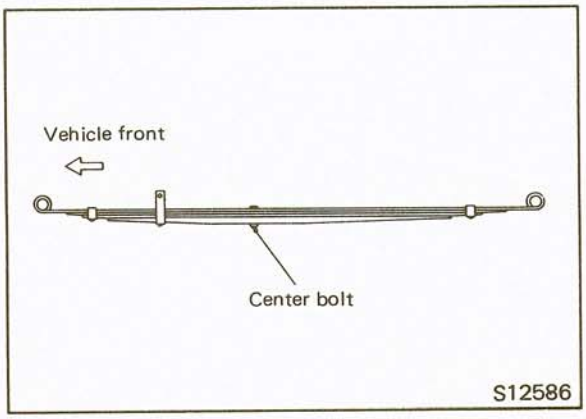
1. Check the center bolt for looseness. (12S599)
2. Check to be sure that each spring leaf is correctly in contact with the one above it. (Also check to be sure that the spring leaves are in positive contact with each other at both ends.) (12S599)
3. If loose contact is evident, replace the spring as an assembly.

NOTE
If the spring leaves move, or if there is a clearance between one spring leaf and another, the spring leaves will not absorb shock properly, and could break.

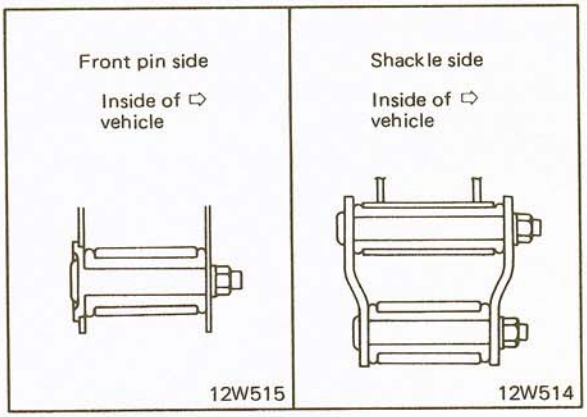


INSTALLATION

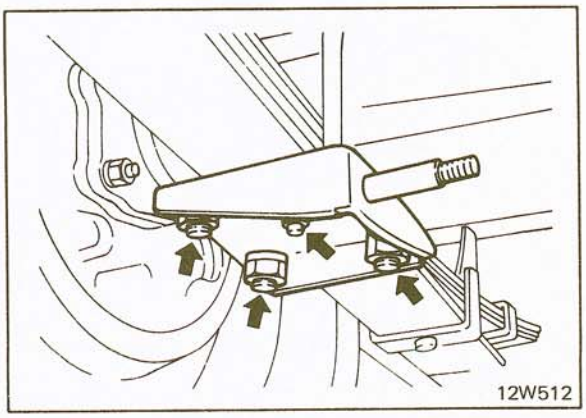
1. Install the spring assembly on the vehicle. Make sure the front end (front pin side) to center bolt distance is shorter than the rear end to center bolt distance.



2. Install the front pin from the outside, toward the inside of vehicle. (12W515)
3. Install the shackle from the outside, toward the inside of vehicle. (12W514)



4. Tighten the U-bolt nuts evenly so that the ends of each bolt protrude an equal amount. (12W512)
5. Loosely install the shock absorber.
6. Tighten components with the vehicle on the ground to eliminate torsion on the bushings.



STEERING
POWER

CONTENTS

GENERAL SPECIFICATIONS

Steering wheel diameter mm (in.)	403 (15.9)
Steering shaft type	Collapsible type
Gear box	
Steering gear type	Ball and nut, torsion bar type
Steering gear ratio	16.4
Oil pump	
Oil pump type	Vane type
Displacement	10.5 cc/rev. (0.64 $in.^3$/rev.)

SERVICE SPECIFICATIONS

Standard values	
Steering angle	
Inner wheel	$33°00'^{0}_{-3°}$
Outer wheel	29°00'
Steering wheel free play mm (in.)	25 (1.0) or less
Stationary steering effort N (lbs.)	37 (8.2) or less
V belt deflection mm (in.)	9-12 (.35-.47)
Mainshaft starting torque Ncm (in.lbs.)	25-65 (2-6)
Distance between top of balls and rack piston surface mm (in.)	13 (.5)
Cross-shaft end play mm (in.)	0-0.05 (0-.002)
Mainshaft total starting torque Ncm (in.lbs.)	50-90 (4-8)
Oil pump pressure kPa (psi)	
Gauge hose valve closed	7,500-8,200 (1,067-1,166)
Gauge hose valve opened	980 (142) or less
Tie rod ends ball joint center distance mm (in.)	297.5 (11.7)
Idler arm turning torque Ncm (in.lbs.)	300-900 (26-78)
Spring scale reading N (lbs.)	25-75 (5.5-16.5)
Repair limits	
Steering wheel free play mm (in.)	50 (2.0)
Steering gear backlash mm (in.)	0.5 (.02)
Service limits	
Steering shaft runout mm (in.)	0.5 (.02)
Steering shaft length mm (in.)	750 ± 5 (29.5 ± .2)
Backlash between rack piston ball groove and balls mm (in.)	0.2 (.008)
Free length of flow control spring mm (in.)	36.5 (1.44)
Clearance between oil pump drive shaft and bushing mm (in.)	0.09 (.004)
Ball joint end play mm (in.)	1.5 (.06)
Joint assembly end play mm (in.)	0.2 (.008)

ORQUE SPECIFICATIONS

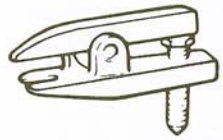
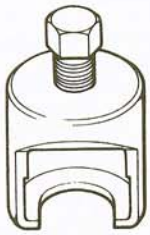
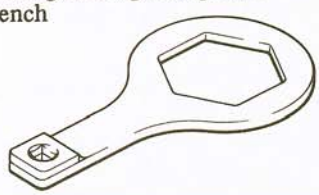
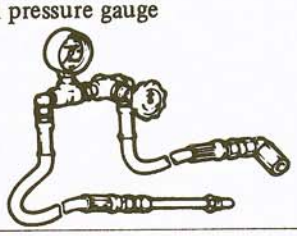
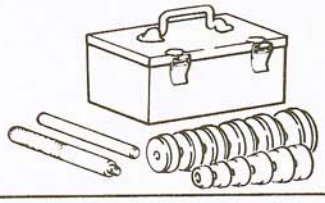
Nm (ft.lbs.)

Steering column and shaft	
Steering wheel lock nut	35-45 (26-33)
Column tube calmp	8-11 (6-8)
Dash panel cover	3-5 (2-4)
Joint assembly	30-35 (22-26)
Column bracket	8-12 (6-9)
Special bolt for column bracket	8-11 (6-8)
Power steering gear box	
Side cover	45-55 (33-40)
Adjusting bolt lock nut	30-45 (22-33)
Breather plug	3-4 (2-3)
Pitman arm installation	130-150 (94-108)
Gear box installation	55-65 (40-47)
Ball guides installation	3.5-4.5 (2.5-3.3)
Valve housing	45-55 (33-40)
Lock nut*	180-230 (130-166)*
Oil pump	
Suction plate	6-10 (4-7)
Connector	50-70 (36-51)
Reservoir to reservoir bracket	6-10 (4-7)
Reservoir bracket to oil pump body	18-22 (13-16)
Oil pump bracket to oil pump body	
Front	25-33 (18-24)
Rear	14-21 (10-15)
Oil pump bracket to engine	
Left	27-41 (20-30)
Right	14-21 (10-15)
Oil pump brace bolt	25-33 (18-24)
Pump bracket stay	14-21 (10-15)
Oil pump cover	18-22 (13-16)
Steering hoses	
Pressure hose	30-40 (22-29)
Return hose	40-50 (29-36)
Clamp bolts	8-12 (6-9)
Breather stays	8-12 (6-9)
Steering linkage	
Tie rod ends	45 (33)
Tie rod sockets and relay rod	45 (33)
Relay rod to pitman arm	45 (33)
Relay rod to idler arm	45 (33)
Idler arm and bracket	40-60 (29-43)
Tie rod end studs	65-80 (47-58)
Idler arm bracket and frame	55-65 (40-47)

NOTE
*If the special tool is used to measure the torque, the measurement should be 135-175 Nm (98-127 ft.lbs.).

LUBRICANTS

	Specified lubricants	Quantity
Power steering fluid	Automatic transmission fluid ATF DEXRON or DEXRON II type	900 cc (54.9 $in.^3$)
Dash panel cover grommet	Multipurpose grease SAE J310a, NLGI grade #2	As required
Cross-shaft oil seal lip	Multipurpose grease SAE J310a, NLGI grade #2EP	As required
Side cover needle bearing	Multipurpose grease SAE J310a, NLGI grade #2EP	As required
U-packing of side cover	Multipurpose grease SAE J310a, NLGI grade #2EP	As required
Ball joint dust covers	Multipurpose grease SAE J310a, NLGI grade #2EP	As required
Idler arm support and bushings	Multipurpose grease SAE J310a, NLGI grade #2EP	As required

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990635 "*" Steering linkage puller 	Disconnection of the relay rod	MB990228 Preload socket 	Measurement of mainshaft starting torque
MB990809 "*" Pitman arm puller 	Removal of the pitman arm	MB990826 "D" Torx wrench 	Removal and installation of the tilt bracket
MB990852 Housing locking nut special wrench 	Removal and installation of the housing lock nut	MB990662 Oil pressure gauge 	Measurement of oil pump pressure
MB990853 "*" Top cover remover 	Removal and installation of the top cover	MB990854 Snap ring installer 	Installation of the snap ring
MB990925 Bearing and oil seal installer set 	Installation of the oil seal and the ball bearing (Refer to GROUP 3.)		

"*", "D" see page 2 for instructions.

Symptom	Probable cause	Remedy
Steering wheel return malfunction	Steering components damaged Incorrect tire pressure Steering components binding	Replace Adjust the tire pressure Repair or replace
Steering operation is "heavy"	Incorrect tire pressure	Adjust the tire pressure
	Loose belt	Adjust the belt tension
	Damaged belt	Replace the belt
	Low fluid level	Replenish fluid
	Air in fluid line	Bleed the system
	Restricted hose(s)	Correct the hose routing or replace the hose(s)
	Fluid leakage	Locate and correct
	Incorrect wheel alignment (especially caster)	Adjust the wheel alignment
	Binding linkage ball joint	Check the ball joint turning torque, and replace the ball joint if necessary
	Malfunction of gear box	Check, and replace the gear box if necessary
	Malfunction of oil pump	Check the oil pump pressure, and repair oil pump(Refer to p. 19-12.)
Steering wheel pulls to one side	Excessive steering wheel play	Adjust the steering wheel play
	Insufficient tire inflation pressure	Adjust the tire pressure (Refer to GROUP 22)
	Unevenly worn or deformed tire(s)	Rotate the wheels or replace the tire(s) (Refer to GROUP 22)
	Dragging brakes	Adjust (Refer to GROUP 5)
	Deteriorated or broken front spring Distorted knuckle arm	Replace
	Incorrect wheel alignment	Adjust the wheel alignment (Refer to GROUP 2)
	Damaged wheel bearing	Replace
	Distorted or loose lower arm	Retighten or replace (Refer to GROUP 2)
	Loose linkage joints	Retighten
	Worn or damaged ball joints Deteriorated or broken lower arm bushing	Replace
	Incorrect installation or internal damage of gear box	Correct or replace

Symptom	Probable cause	Remedy
Steering wheel pulls to one side (continued)	Malfunction of shock absorber	Replace
	Uneven wheel base (between right side and left side)	Adjust the body alignment (Refer to GROUP 13)
Steering wheel vibrates	Insufficient tire inflation pressure	Adjust the tire pressure (Refer to GROUP 22)
	Unevenly worn or deformed tire(s)	Rotate the wheels or replace the tire(s) (Refer to GROUP 22)
	Loose hub nut	Retighten (Refer to GROUP 2)
	Excessive runout, or unbalance of tire and wheel	Adjust the wheel balance, or replace wheel(s) and/or tire(s) (Refer to GROUP 22)
	Poor wheel alignment	Adjust the wheel alignment (Refer to GROUP 2)
	Damaged wheel bearing	Replace
	Distorted or loose lower arm	Retighten or replace (Refer to GROUP 2)
	Bent or damaged linkage	Repair or replace
	Loose linkage joints	Retighten
	Worn or damaged ball joints	Replace
	Malfunction of front suspension	Check and adjust; replace the parts if necessary (Refer to GROUP 2)
	Incorrect installation or internal damage of gear box	Correct or replace
	Malfunction of shock absorber	Replace
	Loose joint assembly	Retighten
Road shock is felt in steering wheel	Insufficient steering wheel play	Adjust the steering wheel play
	Insufficient tire inflation pressure	Adjust the tire pressure (Refer to GROUP 22)
	Unevenly worn or deformed tire(s)	Rotate the wheels or replace the tire(s)
	Malfunction of shock absorber	Replace
Poor recovery of steering wheel to straight ahead position	Insufficient tire inflation pressure	Adjust the tire pressure (Refer to GROUP 22)
	Excessive mainshaft preload	Adjust the preload
	Stuck or damaged ball joint	Replace
	Improper wheel alignment angles	Adjust the wheel alignment (Refer to GROUP 2)

Symptom	Probable cause	Remedy
Poor recovery of steering wheel to straight ahead position (continued)	Seizure of steering shaft bearing Seizure of steering column bearing	Lubricate or replace
Rattling noise	Loose installation of oil pump or gear box	Retighten the oil pump or gear box
	Steering linkage looseness or play	Retighten or replace the steering linkage
	Loose oil pump pulley nut	Retighten the oil pump pulley nut
	Interference around column or between pressure hose and other parts	Correct, or replace the pressure hose and the parts around the column
	Abnormal noise inside gear box or oil pump	Replace the gear box or oil pump
Shrill noise	Air sucked into oil pump	Check the oil level and hose clips; bleed the system or replace the oil pump
	Oil pump seizure	Replace the oil pump
Squealing noise	Loose belt	Adjust the belt tension
	Oil pump seizure	Replace the oil pump
Hissing noise	Air sucked into oil pump	Check the oil level and hose clips; bleed the system
	Damage to the gear box port section	Replace the gear box
	Malfunction of return hose	Replace the hose
Whistling noise	Malfunction of gear box port section	Replace the gear box
Droning noise	Loose mounting bolt on oil pump or oil pump bracket	Retighten the pump bracket or pump mounting bolt
	Poor condition of oil pump body*	Replace the oil pump
Squeaking noise	Malfunction of steering stopper contact	Check and adjust the steering stopper
	Interference of wheel with vehicle body	Adjust the steering angle
	Interference of steering shaft and joint assembly with other parts	Reposition the interfering parts
	Malfunction of gear box	Replace the gear box
Vibration**	Air suction	Bleed the system
	Malfunction of gear box	Replace the gear box

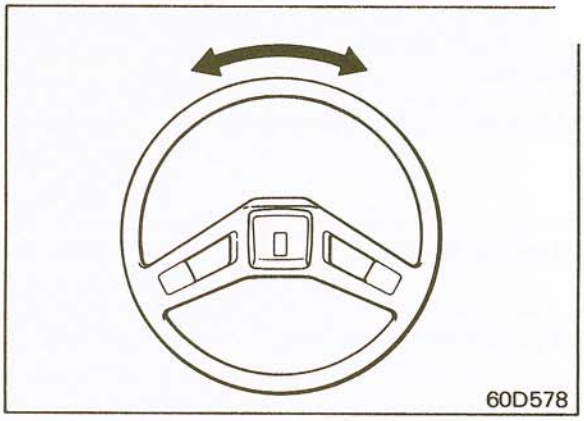
NOTE
* A slight beating noise is produced by the oil pump; this is not a malfunction. (This noise occurs particularly during stationary steering effort.)
** A slight vibration may be felt during stationary steering effort due to the condition of the road surface.
To check whether the vibration is a problem or not, test drive the vehicle on a dry concrete or asphalt surface.
Moreover, a very slight amount of vibration is not a malfunction.

Symptom	Probable cause	Remedy
Oil leakage from hose connections	Improperly tightened flare nut Incorrectly inserted hose Improperly clamped hose	Check, and repair or replace
Oil leakage from hose assembly	Damaged or clogged hose Hose connector malfunction	Replace
Oil leakage from oil reservoir	Leaking reservoir Improperly welded pipe	Replace
	Overflow	Bleed the system or adjust the oil level
Oil leakage from oil pump	Malfunction of oil pump housing	Replace the oil pump
	Malfunction of O-ring and/or oil seal	Replace the O-ring and oil seal
Oil leakage from gear box	Malfunction of gear box housing (including leakage from air hole)	Replace the gear box
	Malfunction of O-ring and/or oil seal	Replace the O-ring and oil seal

CHECKING STEERING WHEEL FREE PLAY

1. With the engine turned off and the steering wheel in the straight-ahead position, apply a force of 5 N (1.1 lbs.) to the steering wheel in the peripheral direction.
2. Measure the play at the circumference of the steering wheel. (60D578)

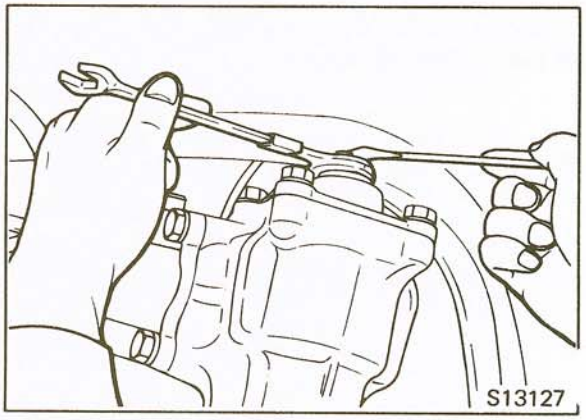
Steering wheel free play [Repair limit] . . . . . 50 mm (2.0 in.)


60D578

3. If the measured value exceeds the repair limit, screw in the cross-shaft adjusting bolt until the steering wheel free play meets specifications. (S13127)

Caution
If the adjusting bolt is overtightened, more steering effort will be required and return of the wheel will be adversely affected.

Mainshaft starting torque . . . . . 25-65 Ncm (2-6 in. lbs.)

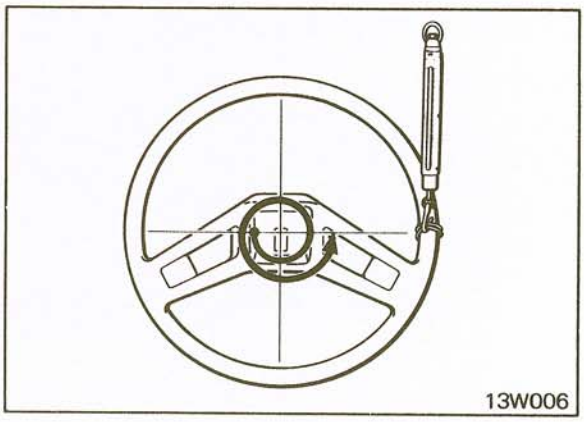

S13127

4. If steering wheel free play cannot be adjusted to meet specifications, check the mainshaft or steering linkage ball joint for wear.

CHECKING STATIONARY STEERING EFFORT

1. Position the vehicle on a level surface with the steering wheel in the straight-ahead position.
2. Run the engine at 1,000 rpm.
3. Measure the turning force with a spring scale by turning the steering wheel clockwise and counterclockwise one and a half turns. (13W006)

Stationary steering effort . . . . . 37 N (8.2 lbs.)


13W006

4. If the stationary steering effort exceeds the standard value, check for belt looseness, damage, insufficient oil, air mixed into oil, collapsed or twisted hoses, etc., and repair as necessary.

CHECKING STEERING WHEEL RETURN TO CENTER

1. To check for the return of steering wheel to center, during a test drive, check the following points.
2. Make both gentle and sharp turns and check to get a feel that there is no appreciable difference either in steering effort or return to center between right and left turns.

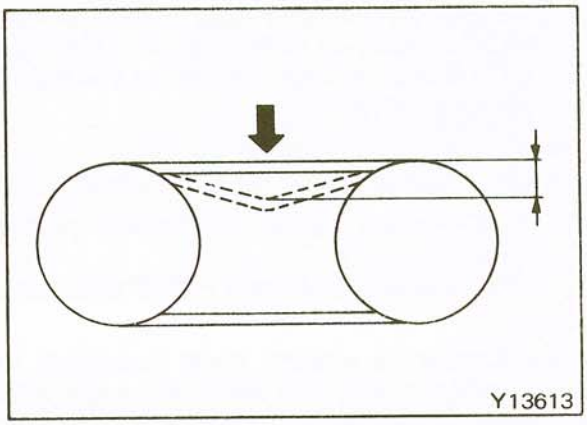
NOTE
When the steering wheel is turned abruptly, momentary hard steering might result, but this does not indicate a problem, since it is caused by low oil pump delivery during idling.

HECKING POWER STEERING BELT TENSION

1. Check the belt for looseness by applying pressure of 100 N (22 lbs.) to the center of the belt. (Y13613)

V belt deflection	9-12 mm (.35-.47 in.)

2. If the measured value exceeds the standard value, adjust the belt tension.



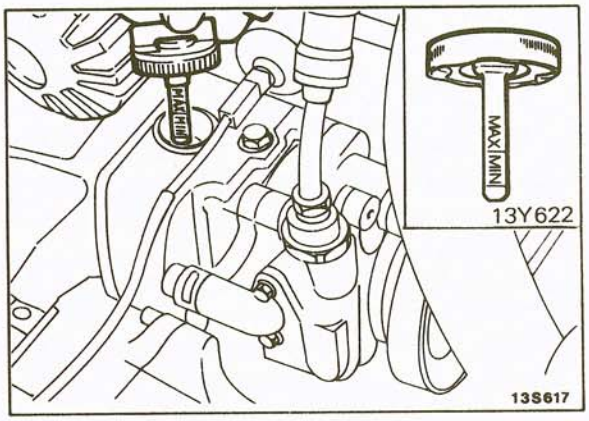
CHECKING FLUID LEVEL

1. Start the engine on a level surface, and turn the steering wheel several times fully to the right and left while the engine is idling, and then check the fluid for contamination.

NOTE
Replace the fluid if it has bubbles or is somewhat white in color.

2. Fill the reservoir to the MAX level with the specified automatic transmission fluid. (13Y622, 13S617)

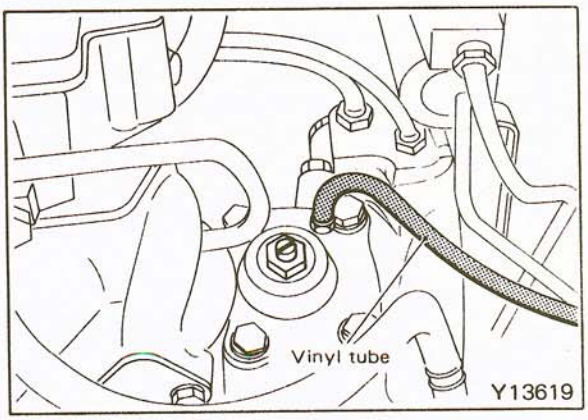
Specified fluid	Automatic transmission fluid ATF DEXRON or DEXRON II type



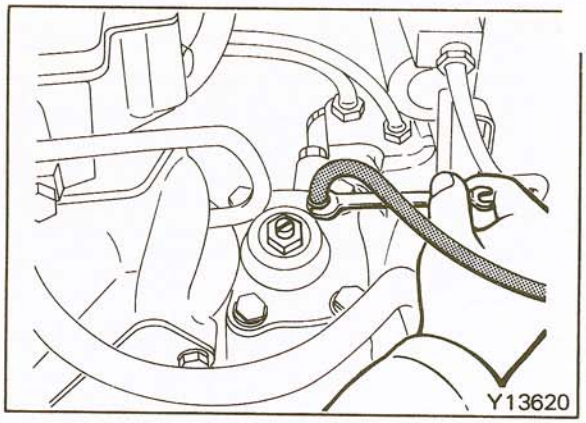
BLEEDING

Check the stationary steering effort. If it is not within the range of the standard value, it is possible that there is air in the system. Bleed the system.

1. Make certain the reservoir is full.
2. Jack up the front wheels.
3. Disconnect and ground the coil high tension cable.
4. Crank the engine with the starter motor while turning the steering wheel completely to the right and left.
   Repeat several times.
5. Lower the front wheels.
6. Connect one end of a clear vinyl hose to the breather plug on the gear box, and place the other end in a container. Start the engine and run at idle speed.



7. Loosen the breather plug and then turn the steering wheel completely to the right and left continuously until air bubbles no longer appear in the fluid coming out of the tube. (Y13620)



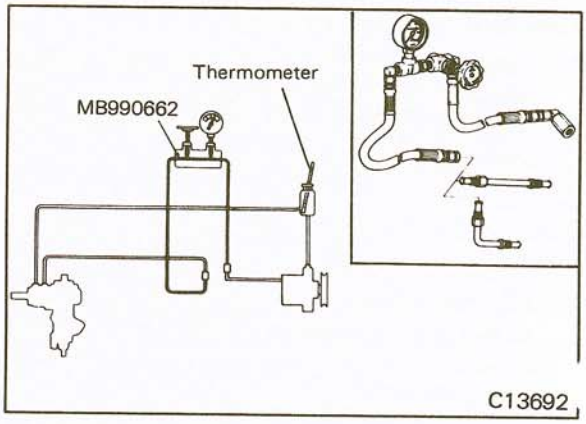
NOTE
Do not allow the power steering reservoir to run dry.

8. After bleeding, tighten the breather plug and remove the tube.
9. Check the fluid level, and refill if necessary.

NOTE
When turning the steering wheel completely to the right and left, check that the fluid level fluctuation is less than 4 mm (.16 in.) at a constant temperature.

OIL PUMP PRESSURE TEST

1. Disconnect the pressure hose from the oil pump and connect the special tool as illustrated. (C13692)



NOTE
Use the adapter to connect the special tool to the pump.

2. Bleed the power steering system.
3. Start the engine and operate it until the fluid temperature reaches about 55°C (131°F).
4. Run the engine at 1,000 rpm.
5. Completely close the shut-off valve of the special tool and read the gauge pressure.

Caution
Do not close the shut-off valve of the special tool for more than 3 seconds.

If the hydraulic pressure is not within the range of the standard value, replace the oil pump.

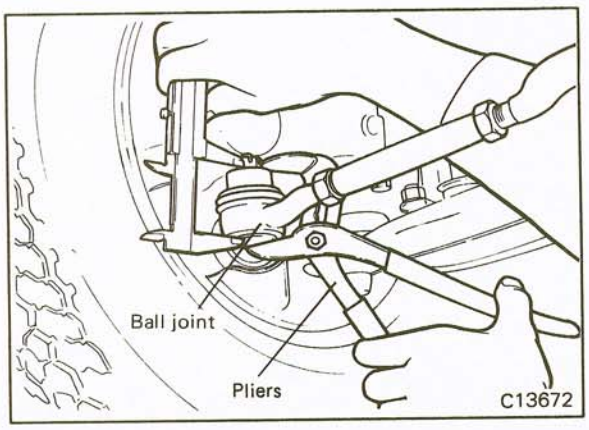
Oil pump pressure	
Valve closed	7,500-8,200 kPa (1,067-1,166 psi)
Valve opened	980 kPa (142 psi) or less

6. Completely open the shut-off valve of the special tool and read the gauge pressure. If the hydraulic pressure is not within the range of the standard value, check for a clogged or collapsed oil line, or for a clogged oil passage inside the gear box.
7. With the shut-off valve of the special tool completely open, and turn the steering wheel completely to the right or left, then measure the maximum oil pressure in this condition. If the maximum oil pressure is not within the range of the standard value, (valve closed) the valve of the gear box is faulty, and the gear box must be replaced.

HECKING BALL JOINT END PLAY

Grip the ball joint with pliers and, compressing the stud fully, measure the deflection.

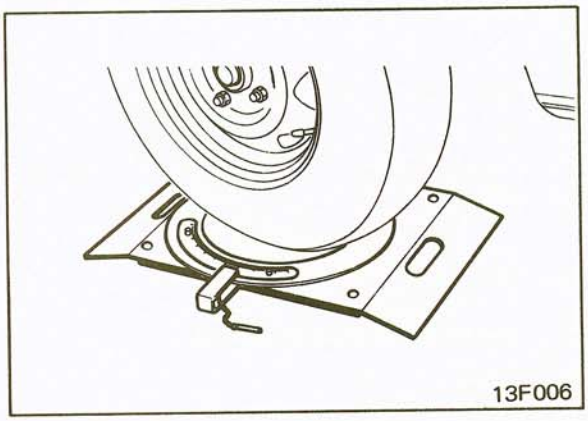
Ball joint end play [Service limit]	1.5 mm (.06 in.)



CHECKING STEERING ANGLE

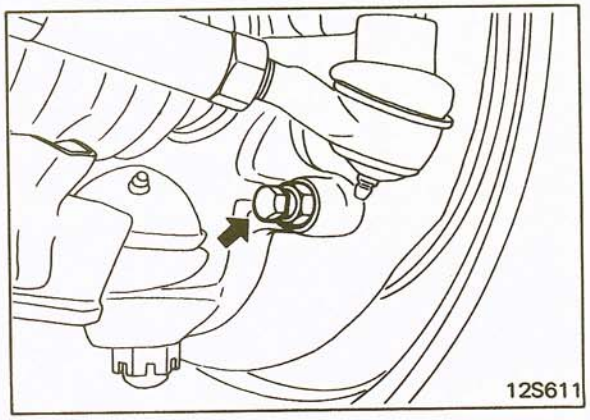
1. Place the front wheel on a turning radius gauge and measure the steering angle.

Steering angle	
Inner wheel	$33°00' \, {}^{0}_{-3°}$
Outer wheel	29°00'



2. Adjust the steering angle of each wheel by turning the stop bolt of the knuckle arm.

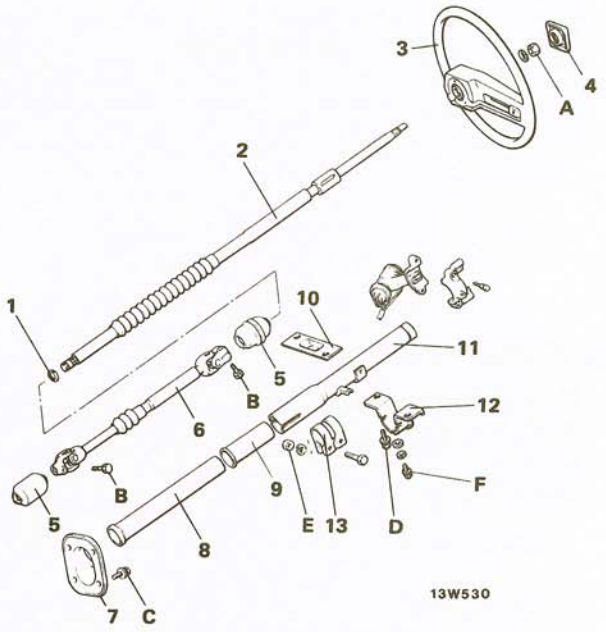
Caution
Be sure that the toe-in is properly adjusted before adjusting the steering angle.



COMPONENTS

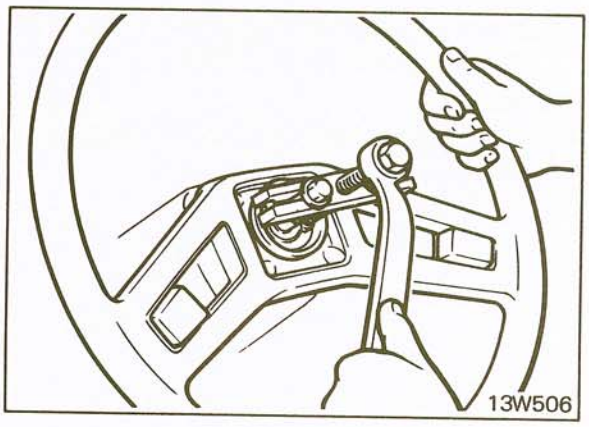
1. Snap ring
2. Steering shaft
3. Steering wheel
4. Center pad
5. Boot
6. Joint assembly
7. Dash panel cover
8. Column tube, lower
9. Column bushing
10. Column support
11. Column tube, upper
12. Column bracket
13. Column tube clamp

	Nm	ft.lbs.
A	35-45	26-33
B	30-35	22-26
C	3-5	2-4
D	8-12	6-9
E	8-11	6-8
F	8-11	6-8

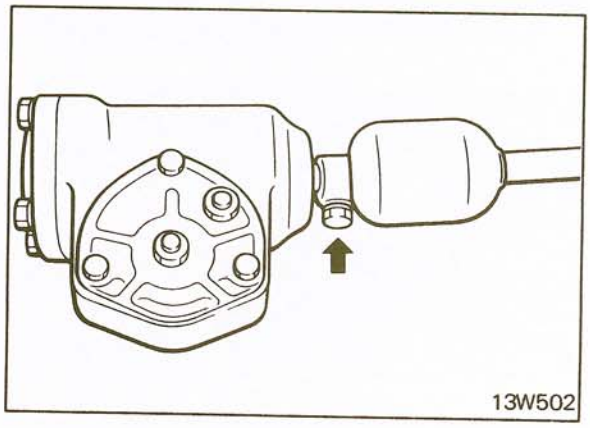


REMOVAL

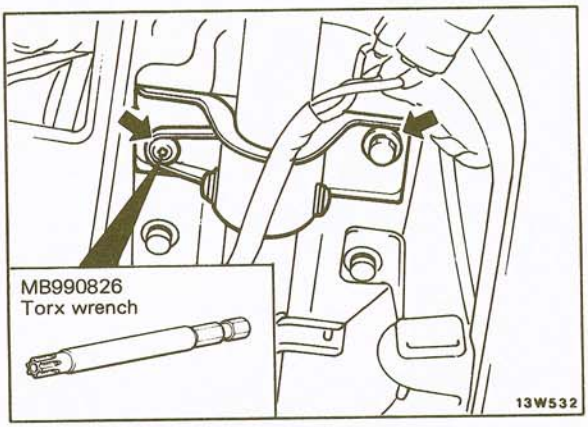
1. Remove the center pad.
2. Remove the steering wheel. (13W506)
3. Remove the instrument cluster.
4. Remove the column cover and then remove the column switch assembly.
5. Remove the heater duct. (Refer to GROUP 24.)
6. Loosen the dash panel cover.



7. Disconnect the joint assembly from the steering gear box.

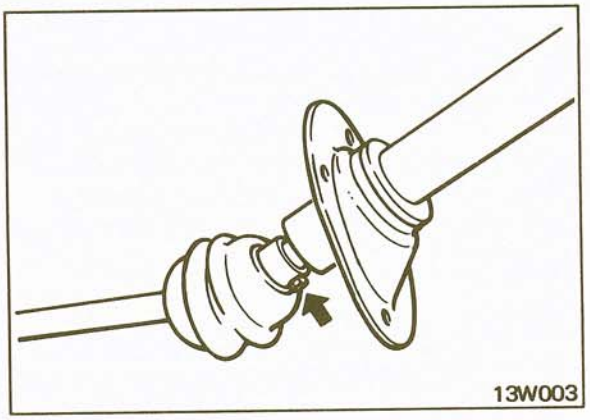


Remove the Torx bolt and the clamping bolts of the column support, and remove the steering column assembly.

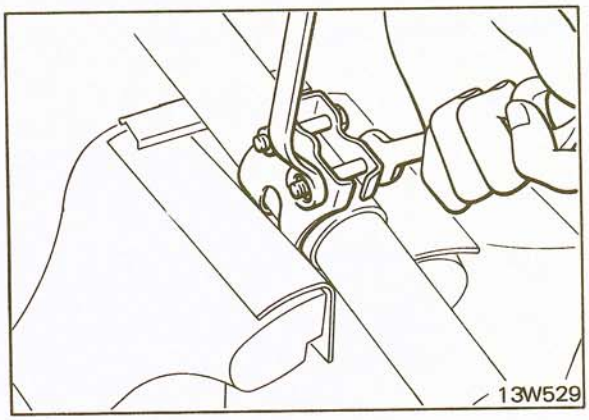


DISASSEMBLY

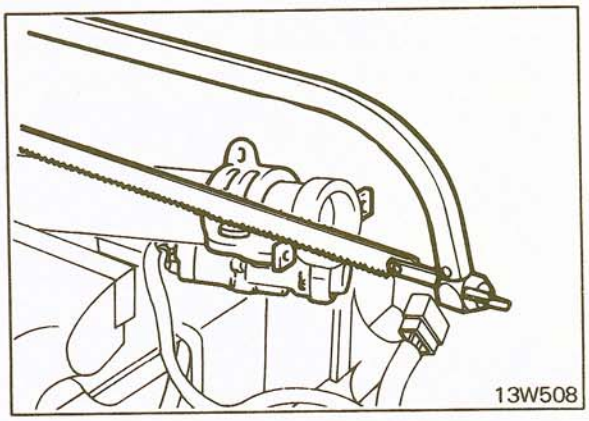
1. Disconnect the joint assembly from the steering shaft.



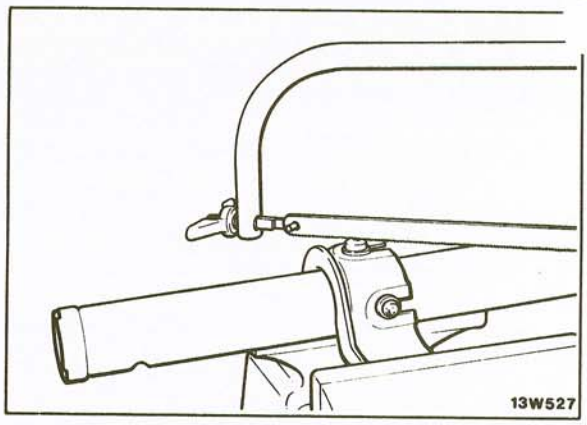
2. Undo the column tube clamp, and then separate the upper column tube from the lower column tube. (13W529)
3. Unlock the steering lock and remove the steering shaft from the lower column tube.
4. Remove the dash panel cover from the lower column tube.



5. If it is necessary to remove the steering lock, cut a groove on the head of each special bolt with a metal saw, and remove the steering lock with a screwdriver.



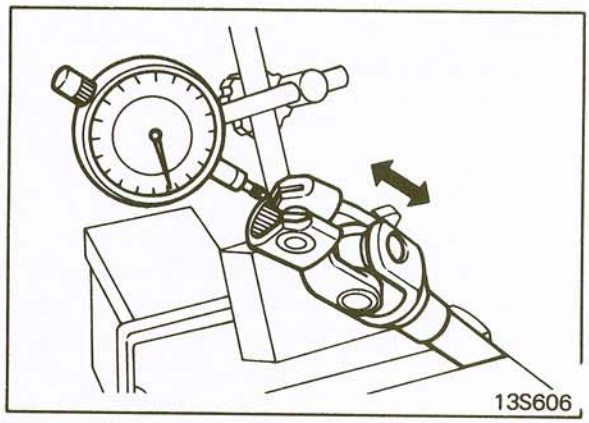
6. If it is necessary to remove the column bracket of the upper tube, cut a groove on the head of each special bolt with a metal saw, and remove the column bracket with a screwdriver.



INSPECTION

1. Check tilt bracket for cracks or damage.
2. Check column bushing for damage.
3. Check dash panel cover for damage.
4. Check steering shaft bearing for wear.
5. Check steering shaft for length, damage and deformation.

Steering shaft runout [Service limit]	0.5 mm (.02 in.)
Steering shaft length [Service limit]	745 (29.33 in.)

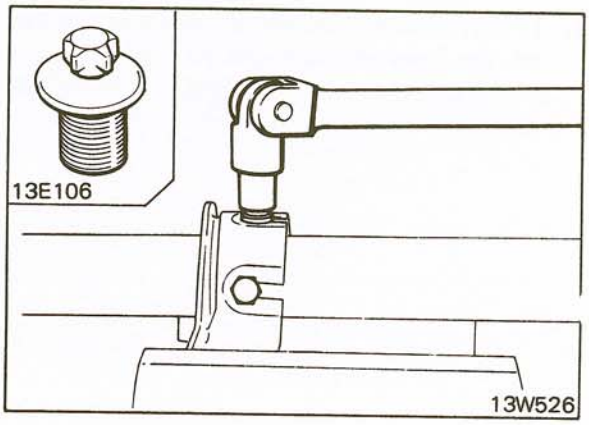


6. Check joint assembly for end play. (13S606)

Joint assembly end play [Service limit]	0.2 mm (.008 in.)

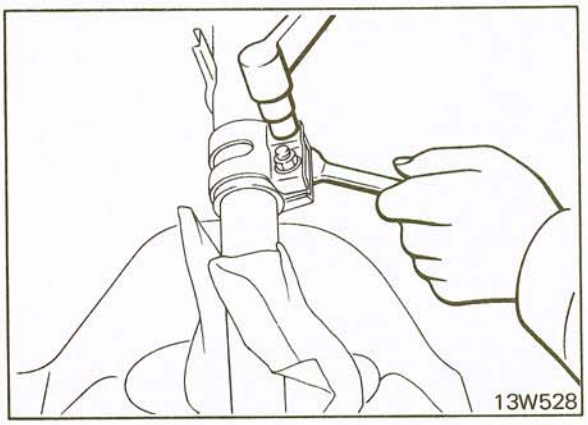
REASSEMBLY

1. When mounting the column bracket onto the column, tighten the special bolts until the heads twist off.

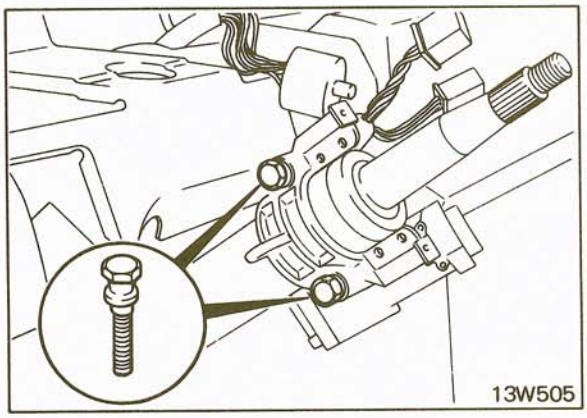


Attach the column bushing to the upper and lower column tubes, and then tighten the column tube clamp bolts to the specified torque. (13W528)

Column tube clamp bolts tightening torque . . . . . 8-11 Nm (6-8 ft.lbs.)



3. When installing the steering lock onto the column, install it loosely in alignment with the column boss and check that it works properly, and then tighten the special bolts until the heads twist off. (13W505)



4. Apply the specified multipurpose grease to the dash panel cover grommet. (13S620)

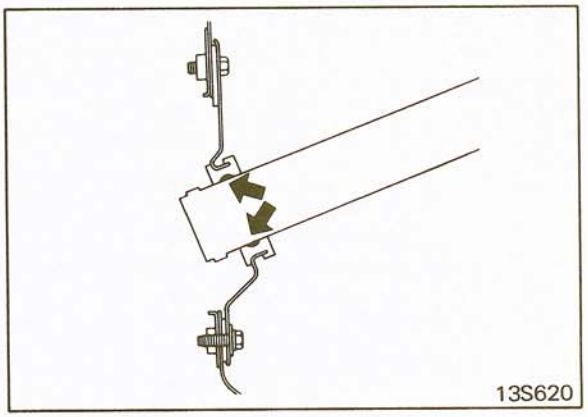
Recommended multipurpose grease . . . . . SAE J310a, NLGI grade #2

INSTALLATION

1. Loosely connect the joint assembly to the steering shaft and to the steering gear box.

Caution
Install the boot with the bellows toward the steering column. Also, be sure that the boots are not damaged by the bolts when the joint assembly is installed.

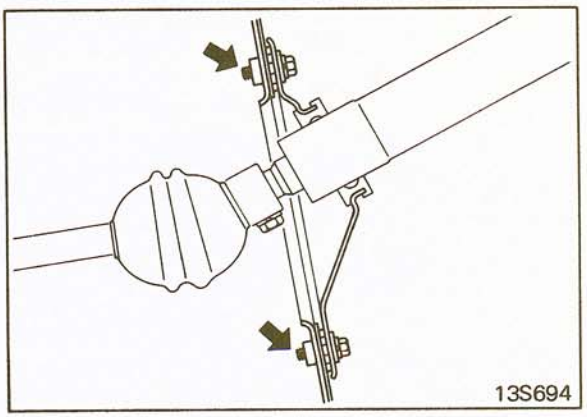
2. Install the column assembly to pedal support.
3. Tighten the joint assembly bolt.
4. Attach the dash panel cover and apply sealant around the bolt holes. (13S694)



Caution
Do not loosen the column tube clamp bolts. If the clamp bolts should be loosened, retighten them securely while pulling the steering shaft out fully toward the interior side.

5. Position the front wheels in the straight-ahead position and install the steering wheel.
6. Tighten the steering wheel lock nut to the specified torque.

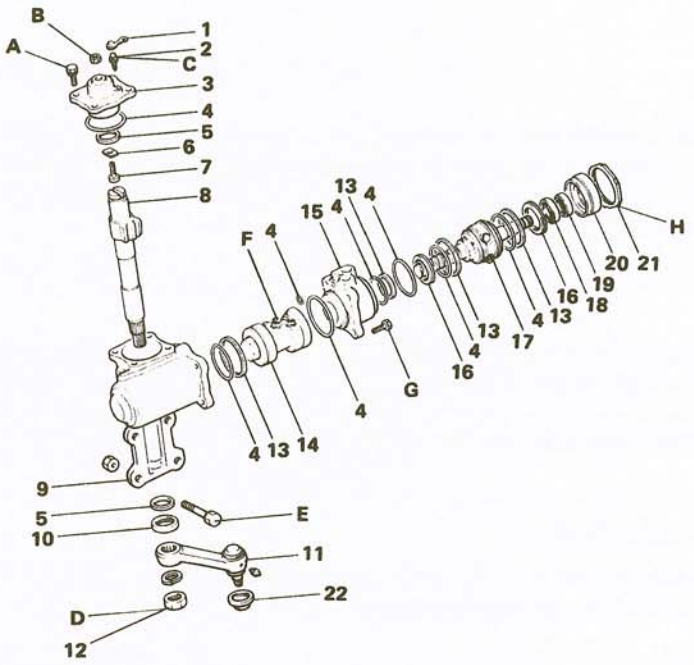
Steering wheel lock nut tightening torque . . . . . 35-45 Nm (26-33 ft.lbs.)



NOTE
Check to be sure that when the steering wheel is turned clockwise or counterclockwise and returned, the turn signal is automatically released.

COMPONENTS

1. Breather plug cap
2. Breather plug
3. Side cover
4. O-ring
5. U-packing
6. Adjusting plate
7. Adjusting bolt
8. Cross-shaft
9. Gear box housing
10. Oil seal
11. Pitman arm
12. Nut
13. Seal ring
14. Rack piston
15. Valve housing
16. Needle thrust bearing
17. Mainshaft
18. Ball bearing
19. Oil seal
20. Top cover
21. Valve housing lock nut
22. Dust cover

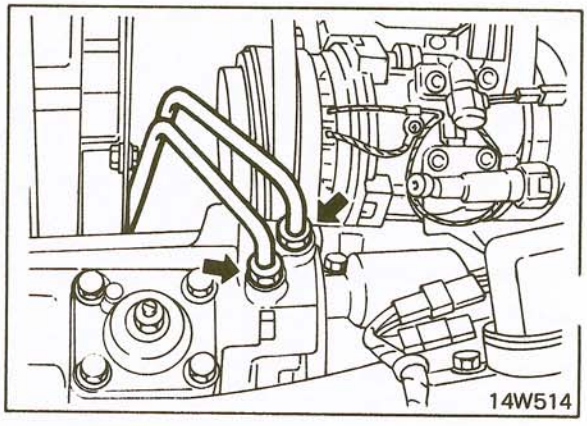


	Nm	ft.lbs.
A	45-55	33-40
B	30-45	22-33
C	3.0-4.0	2-3
D	130-150	94-108
E	55-65	40-47
F	3.5-4.5	2.5-3.3
G	45-55	33-40
H	180-230	130-166

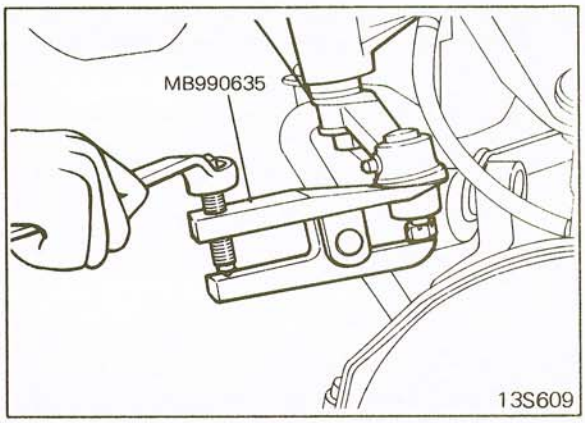
13W521

REMOVAL

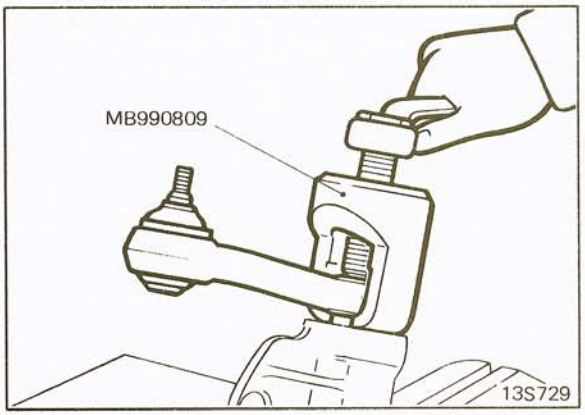
1. Remove the clamp bolt which connects the joint assembly to the gear box mainshaft.
2. Disconnect the pressure hose and return hose from the gear box. (14W514)



Disconnect the pitman arm from the relay rod with the special tool shown in the illustration.



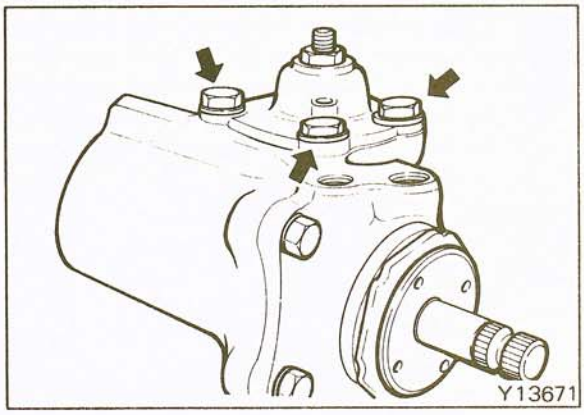
4. Remove the gear box assembly.
5. Remove the pitman arm from the gear box assembly with the special tool shown in the illustration. (13S729)



SEALS REPLACEMENT

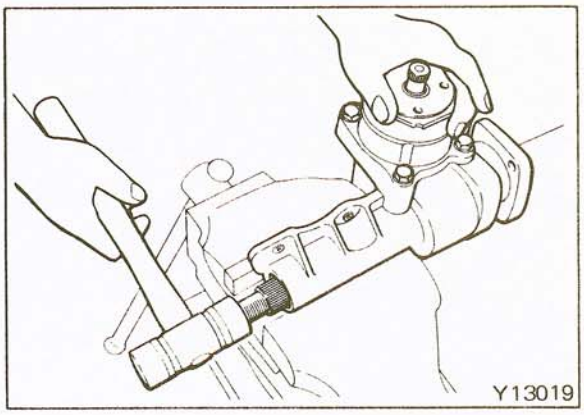
Side Cover and Gear Box Housing

1. Place the mainshaft and cross-shaft in the straight-ahead position.
2. Remove the breather plug, and drain off the steering gear oil.
3. Remove the side cover attaching bolts. (Y13671)
4. Remove the lock nut of the adjusting bolt, and screw in the adjusting bolt so that the side cover rises slightly.

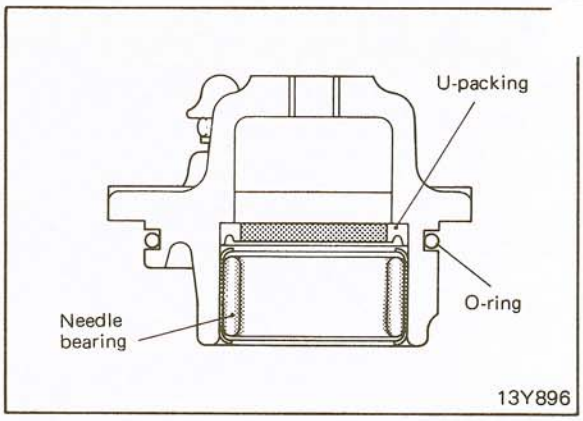


5. Tap the bottom of the cross-shaft with a plastic hammer to remove the cross-shaft and the side cover. (Y13019)
6. Remove the side cover from the cross-shaft by turning the adjusting bolt.

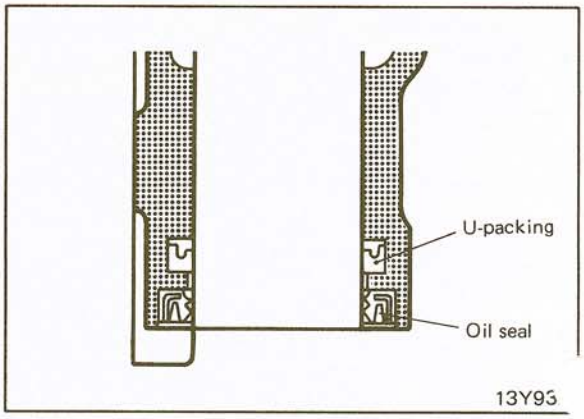
Caution
Do not lose the needle bearing rollers.



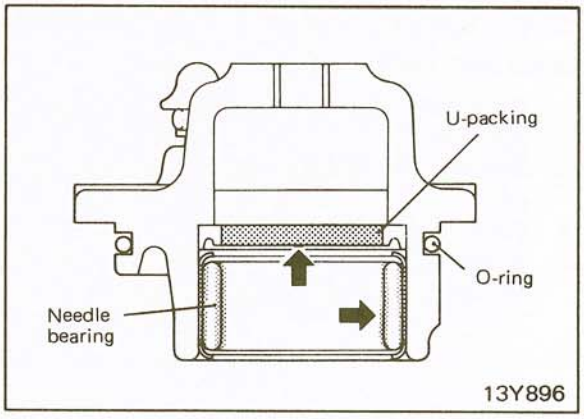
7. Remove the needle rollers from the side cover. (13Y896)
8. Remove the O-ring and U-packing from the side cover.



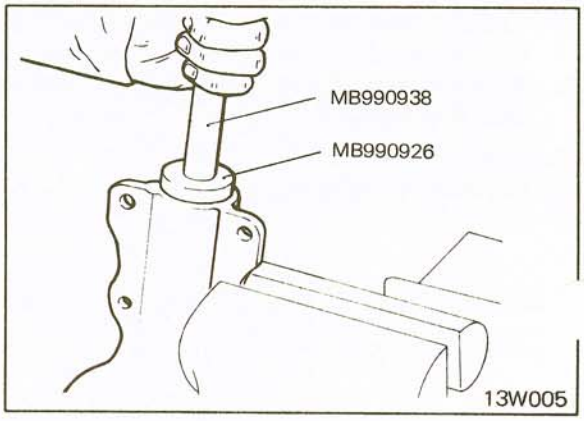
9. Remove the oil seal and U-packing from the gear box housing.



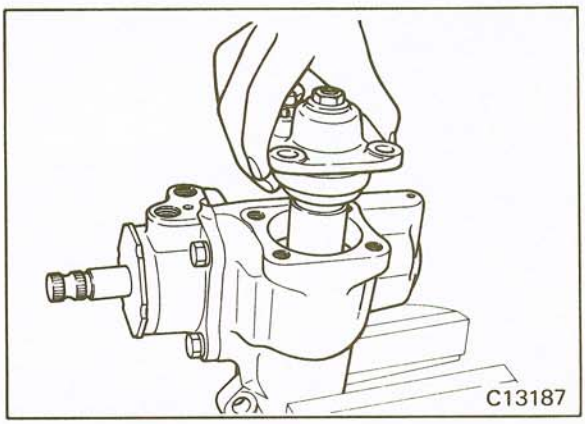
10. Apply specified multipurpose grease to the seal surface of the U-packing and fit it into the side cover. (13Y896)
11. Apply specified automatic transmission fluid to the O-ring, and attach it to the side cover.
12. Install the needle rollers into the side cover.
13. Apply specified multipurpose grease to the needle rollers.



14. Apply specified multipurpose grease to the seal surface of the U-packing, and fit it into the gear box housing.
15. Apply specified automatic transmission fluid to the oil seal lip, and press it into the gear box housing with the special tools. (13W005)



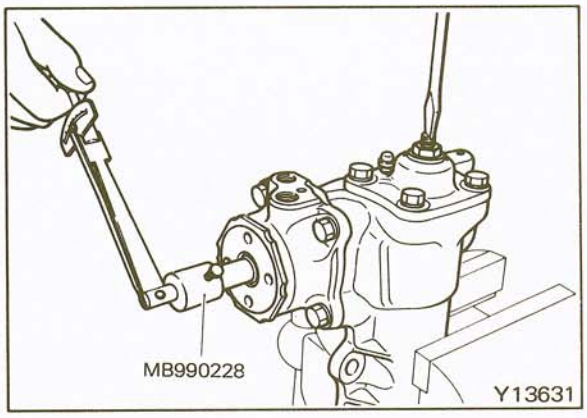
16. Attach the side cover to the cross-shaft and temporarily tighten the adjusting bolt lock nut.
17. Install the cross-shaft assembly (with the side cover) to the gear box. (C13187)



Caution
1. **Do not rotate the side cover during installation.**
2. **Take care not to damage the cross-shaft oil seal.**

18. While turning the adjusting bolt, measure the mainshaft total starting torque by using the special tool. (Y13631)

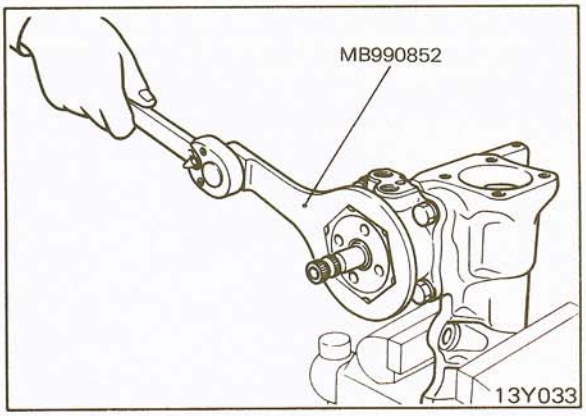
Mainshaft total starting torque	50-90 Ncm (4-8 in.lbs.)



NOTE
Position the mainshaft in the center position during measurement.

19. Tighten the adjusting bolt lock nut to the specified torque.

Lock nut tightening torque	30-45 Nm (22-33 ft.lbs.)

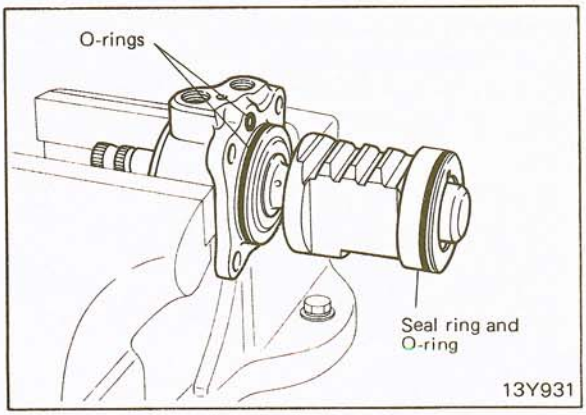


Valve Housing and Top Cover

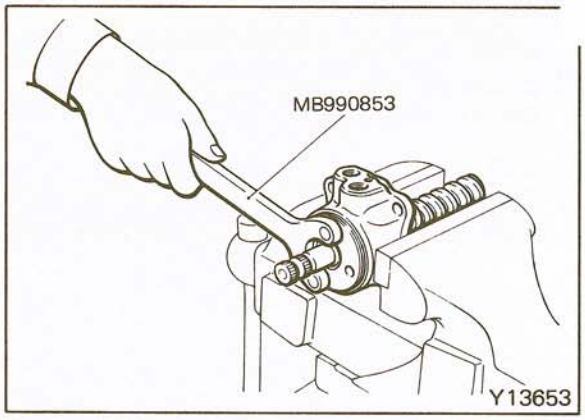
1. Remove the cross-shaft assembly. (Refer to p. 19-19.)
2. Remove the valve housing lock nut with the special tool as illustrated. (13Y033)
3. Remove the valve housing bolts and remove the valve housing and rack piston while holding the rack piston by hand to avoid rotation.

Caution
Do not hold housing with rack piston facing downward, otherwise the rack piston will fall off, scattering the steel balls.

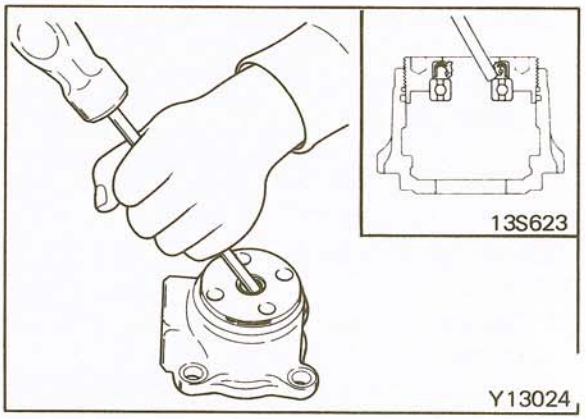
4. Remove the O-ring and seal ring from the rack piston and remove O-rings from the valve housing.



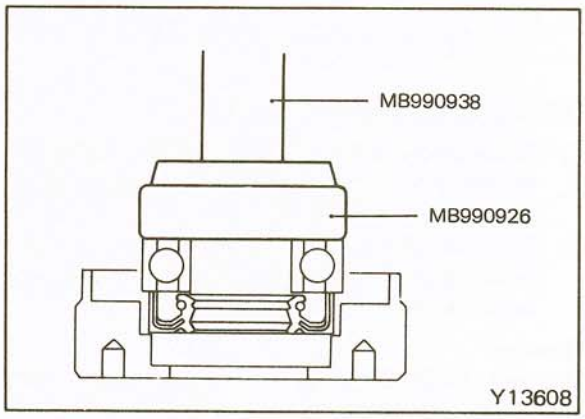
5. Remove the top cover from the valve housing with the special tool.



6. Remove the ball bearing and the oil seal with a punch.

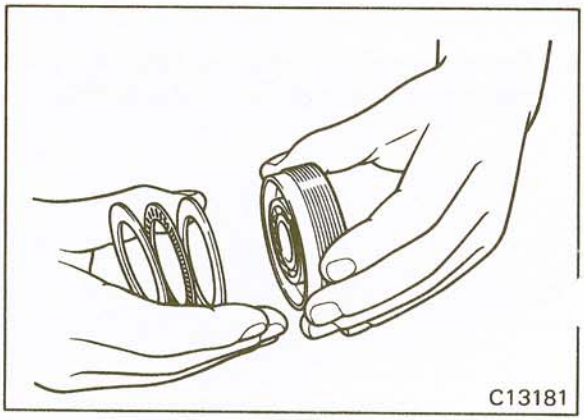


7. Apply specified multipurpose grease to the new oil seal, then press the oil seal and ball bearing into the top cover with special tools.

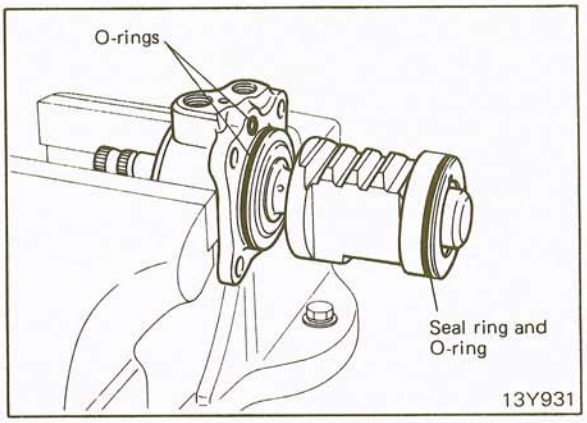


8. Install the thinner thrust plate, needle thrust bearing and thicker thrust plate into the top cover in the order shown in the illustration. (C13181)
9. Attach the top cover to the valve housing.

Caution
Be careful that the thrust plates and the needle thrust bearing do not come off the top cover.

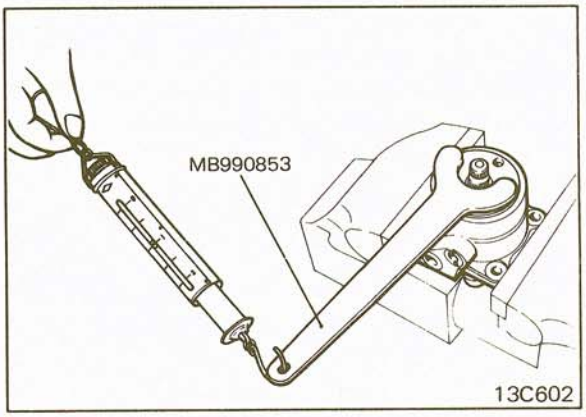


10. Apply specified automatic transmission fluid to the new O-rings and new seal ring, then install them onto the rack piston and valve housing.



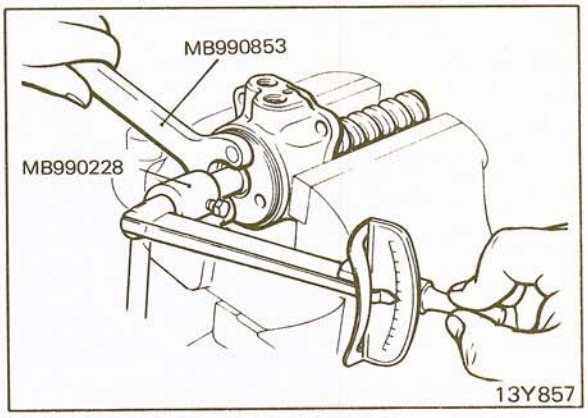
11. In order to fit in the assembly parts, use the special tool and a spring scale, and tighten the top cover until the force becomes 62-83 N (14-19 lbs.). Then turn the top cover lock nut until the force becomes 0 N (0 lbs.).

Caution
After tightening the top cover lock nut, rotate the mainshaft to confirm that there is no binding or abnormal noise.



12. Measure the mainshaft starting torque with the special tools as illustrated. (13Y857)
13. Tighten the top cover until the mainshaft starting torque is 20-30 Ncm (1.8-2.7 in.lbs.) greater than the measured value.

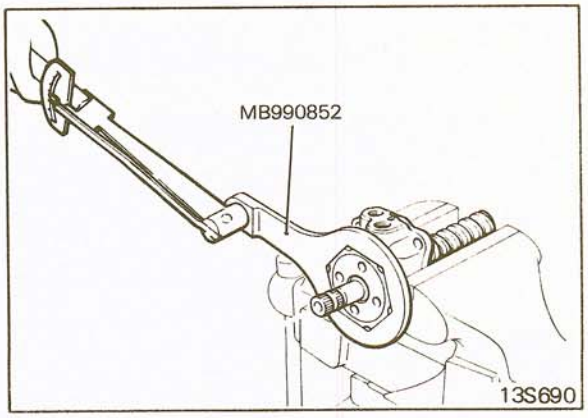
NOTE
Tighten the top cover gradually while measuring the starting torque.



14. Tighten the valve housing lock nut to the specified torque with the special tool as illustrated.

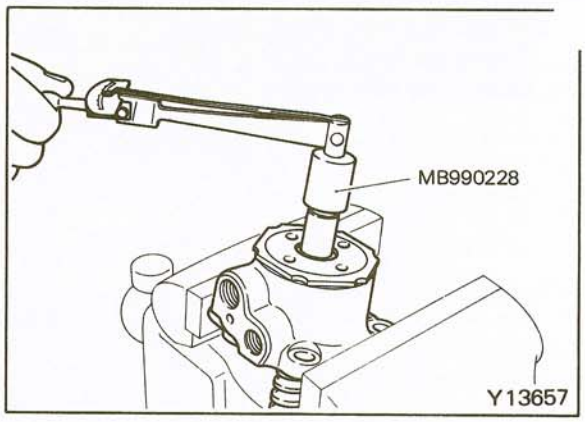
Lock nut tightening torque .....
180-230 Nm (130-66 ft.lbs.)
With special tool attached
135-175 Nm (98-127 ft.lbs.)

Caution
Be sure that the top cover does not turn with the lock nut.



15. Measure the mainshaft starting torque by using the special tools as illustrated. If the measured mainshaft starting torque does not comply with the standard value, remove the valve housing lock nut and adjust the tightening of the top cover.

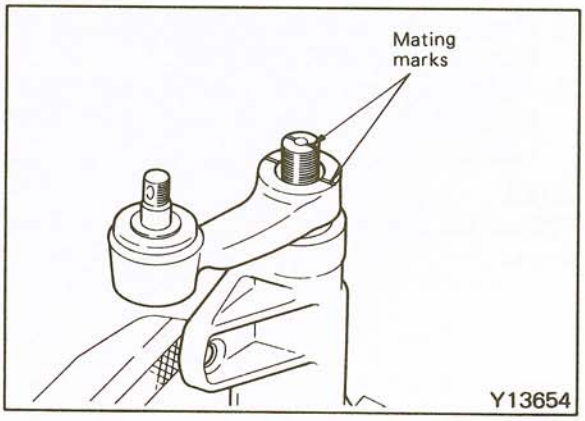
Mainshaft starting torque ..... 25-65 Ncm (2-6 in.lbs.)



16. Install valve housing assembly and cross-shaft assembly to the gear box housing.
17. Adjust the mainshaft total starting torque and tighten the adjusting bolt lock nut. (Refer to p. 19-21.)

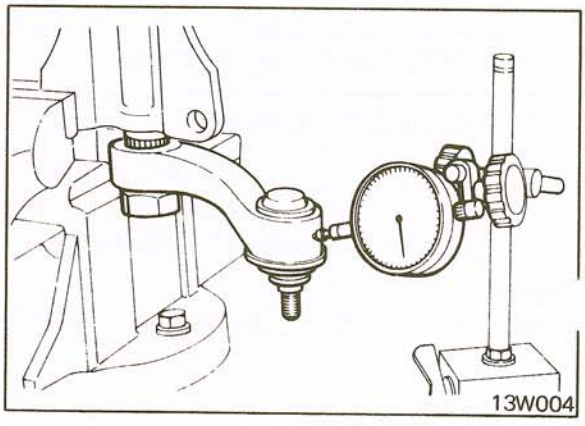
INSPECTION

1. Install the pitman arm to the gear box with the mating marks aligned.



2. Measure the steering gear backlash at the pitman arm top end with a dial indicator.

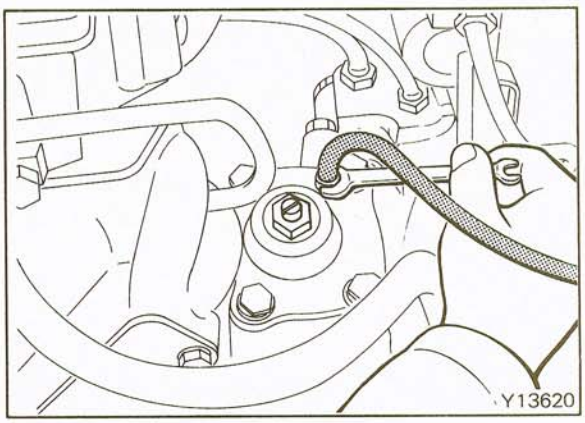
Steering gear backlash [Repair limit] ..... 0.5 mm (.02 in.)



INSTALLATION

1. Connect the pressure hose and the return hose to the gear box. (Y13620)
2. Pour specified automatic transmission fluid into the reservoir, and then bleed the system. (Refer to p. 19-11, 12.)
3. Start the engine, run it for approximately five minutes at 2,000 rpm, and then check each seal for oil leakage.

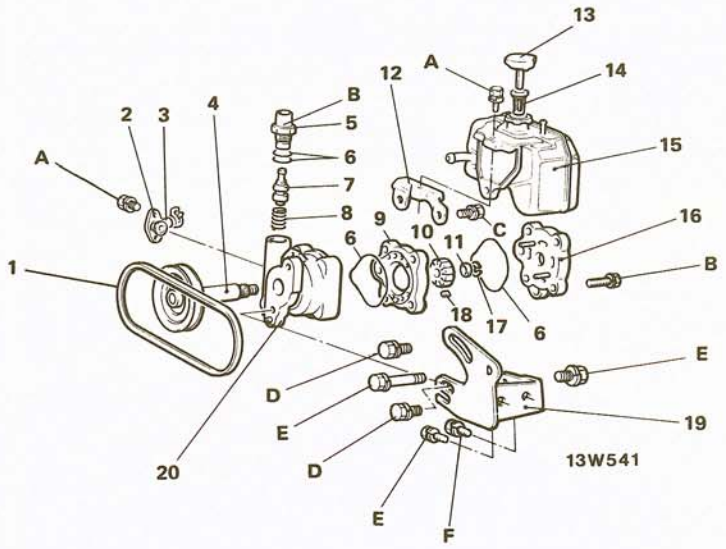
Caution
If the gear box has been disassembled, be sure to check the oil pressure. (Refer to p. 19-12.)



POWER STEERING OIL PUMP

COMPONENTS

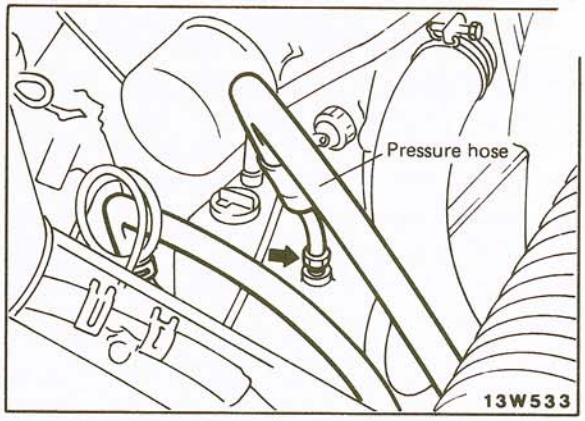
1. Drive belt
2. Suction plate
3. Suction tube
4. Pulley assembly
5. Connector
6. O-ring
7. Flow control valve
8. Flow control spring
9. Cam ring
10. Rotor
11. Collar
12. Reservoir bracket
13. Reservoir cap
14. Oil filter
15. Reservoir
16. Pump cover
17. Snap ring
18. Vanes
19. Oil pump bracket
20. Oil pump body



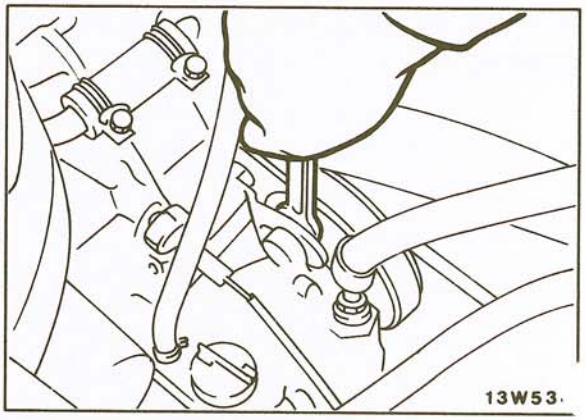
	Nm	ft.lbs.
A	6-10	4-7
B	50-70	36-51
C	18-22	13-16
D	25-33	18-24
E	14-21	10-15
F	27-41	20-30

REMOVAL

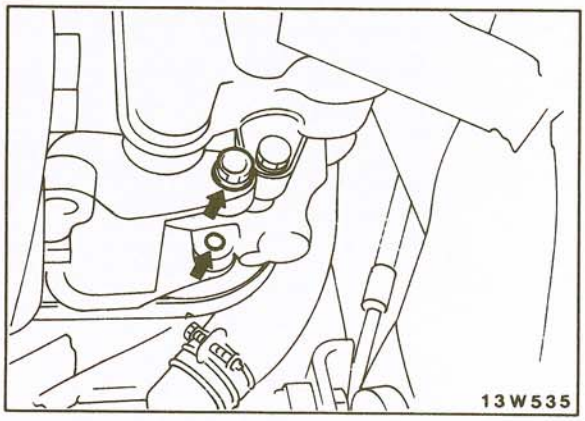
1. Remove the reservoir cap and disconnect the return hose from the reservoir to drain the fluid. (13W533)
2. Jack up the front of the vehicle and support it with floor stands.
3. Disconnect the coil high tension cable and crank the engine over serveral times to drain the fluid from the power steering system.



4. Loosen the brace bolts and lock bolt, and then remove the drive belt. (13W534)
5. Disconnect the pressure hose form the oil pump.

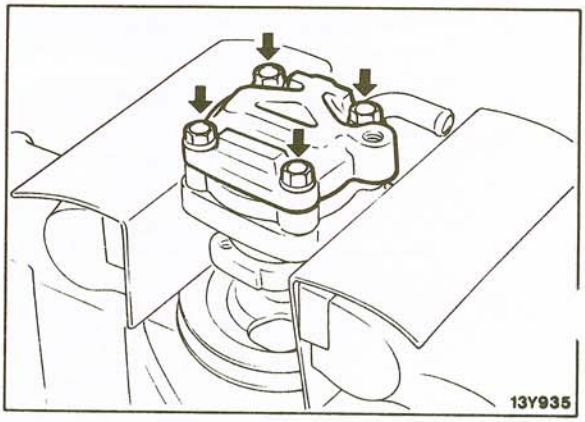


6. Remove the oil pump and reservoir from the bracket. (13W535)



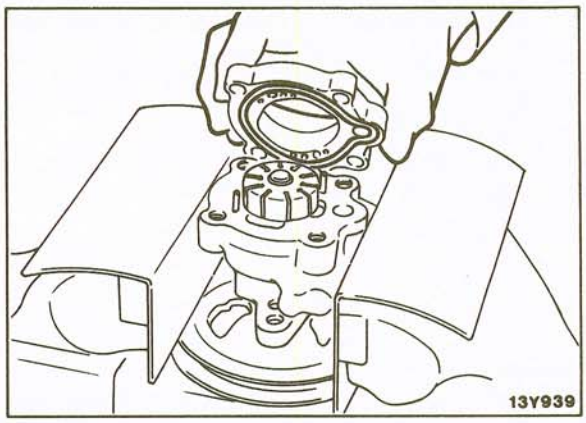
DISASSEMBLY

1. Remove the oil pump cover.

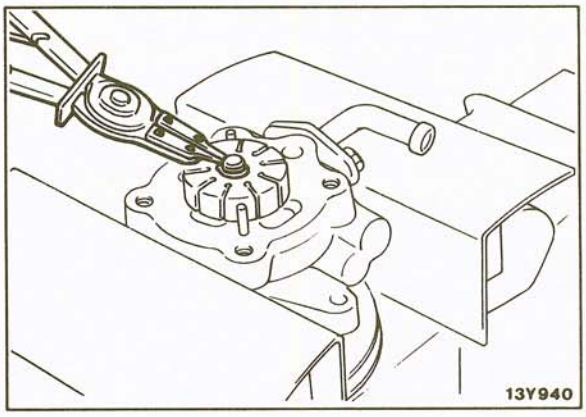


Remove the cam ring.

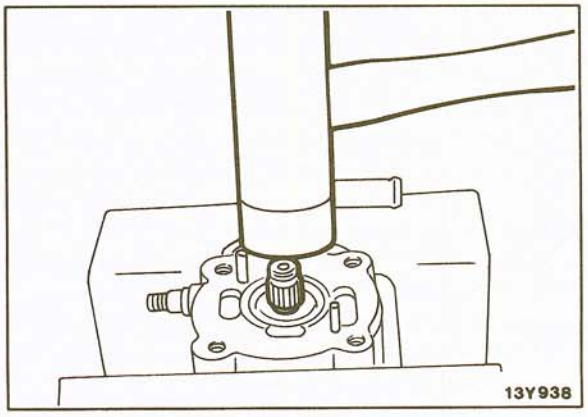
3. Remove the O-rings from the cam ring.
4. Remove the vanes from the rotor.



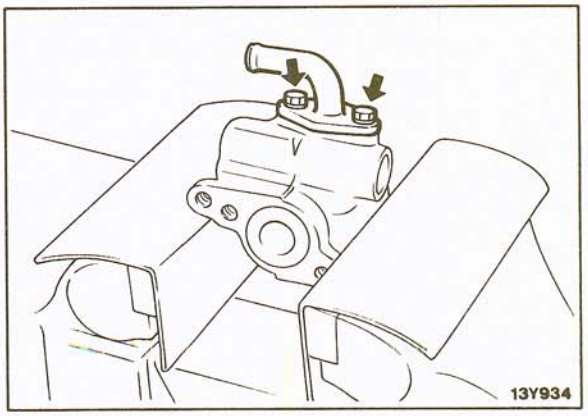
5. Remove the snap ring of the shaft with snap ring pliers and separate the rotor from the shaft.



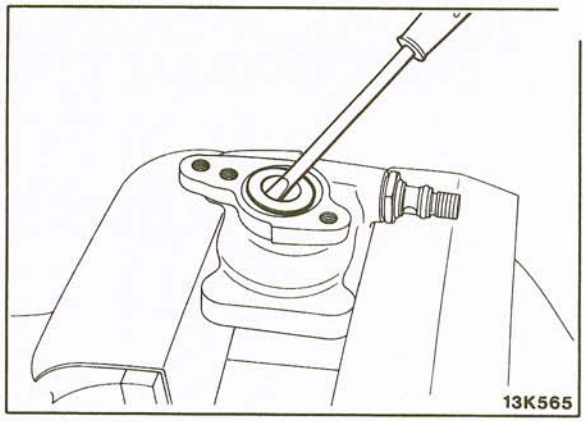
6. Tap the rotor side of the shaft lightly with a plastic hammer, and take out the pulley assembly.



7. Remove the suction connector from the oil pump body.
8. Remove the O-ring from suction connector.

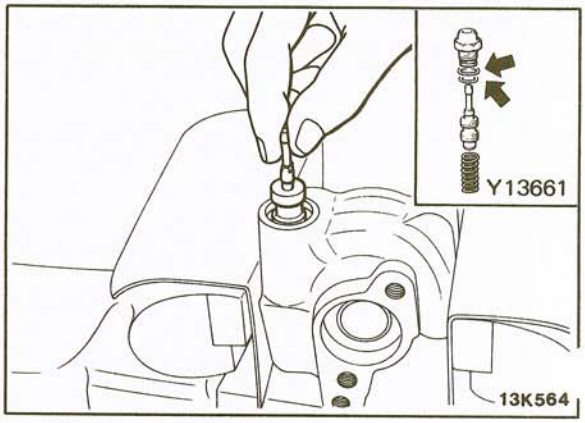


9. Remove the oil seal from the oil pump body.



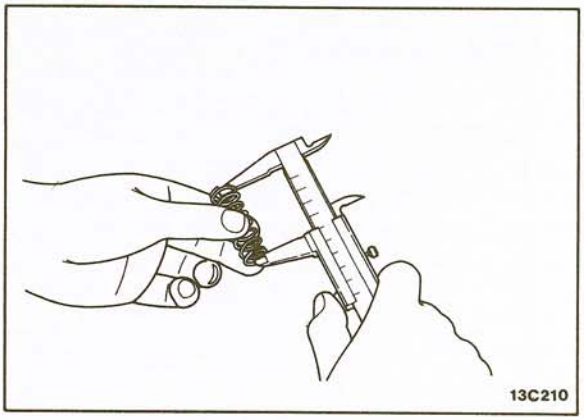
10. Remove the connector from the oil pump body, and take out the flow control valve and flow control spring. (13K564)
11. Remove the O-ring from the connector. (Y13661)

Caution
Do not disassemble the flow contol valve.



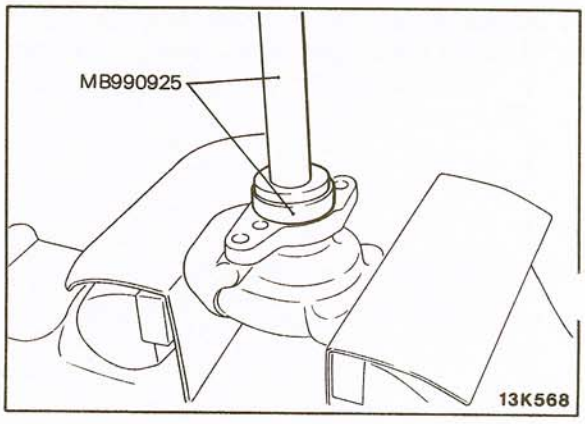
INSPECTION

1. Check flow control spring for spring free length. (13C210)
2. Check flor control valve for clogging.
3. Check pulley assembly for wear or damage.
4. Check V-belt for cracks and deterioration.
5. Check groove of rotor and vane for "stepped" wear.
6. Check contact surface of cam ring and vanes for "stepped" wear.
7. Check vanes for damage.
8. Check contact surface of pump body, and pump cover with rotor for streak-like abrasion.

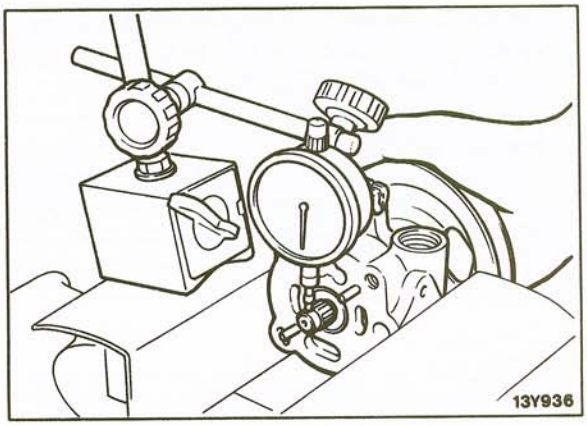


REASSEMBLY

1. Drive the oil seal into the pump body with the special tools.



Gently move the pulley assembly up and down, and measure the clearance between it and the bushing as illustrated.

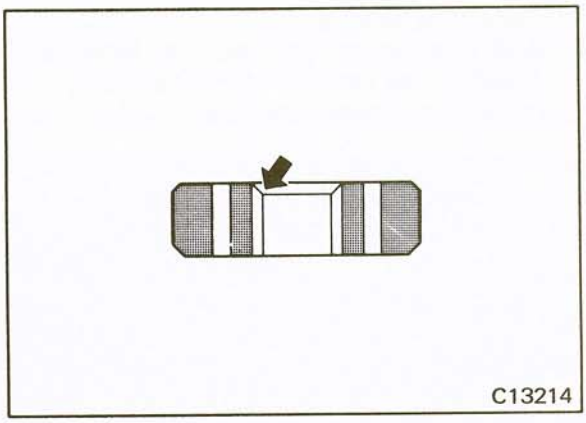


3. Install the rotor to the pulley assembly. When the rotor is to be installed, face the countersunk portion to the pump cover side. (C13214)

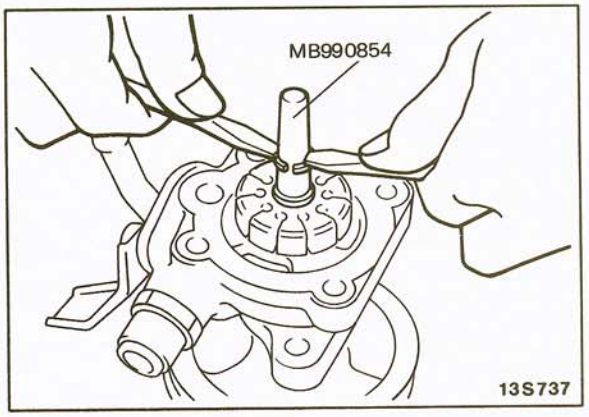
4. Apply automatic transmission fluid to the O-rings.

Recommended fluid	Automatic transmission fluid ATF DEXRON or DEXRON II type

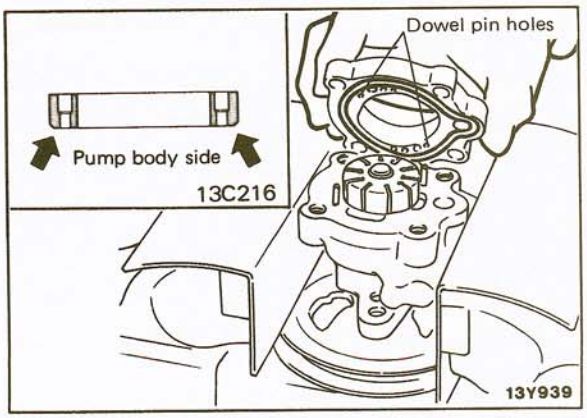
5. Install the O-rings to the cam ring.



6. Install the snap ring with the special tool as illustrated.

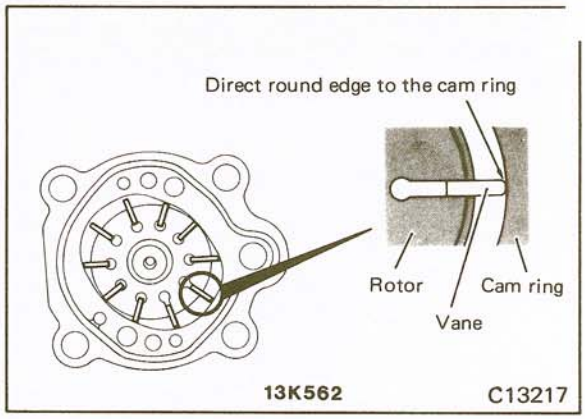


7. Install the cam ring to the pump body. (13C216)
8. Install the cam ring hole shown in the illustration so that it aligns with the dowel protruding from the oil pump body. (13Y939)

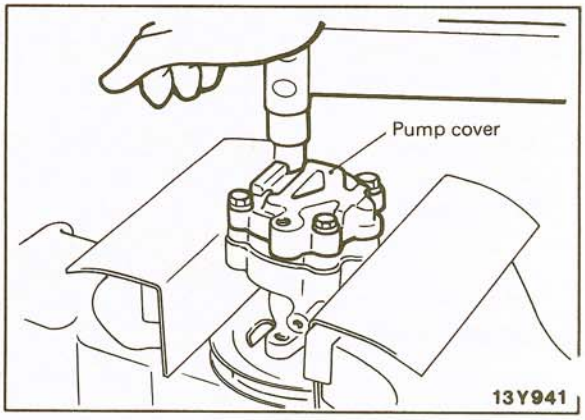


9. Apply automatic transmission fluid to the vanes and install the vanes on the rotor, paying close attention to the installation direction. (C13217)

Recommended fluid	Automatic transmission fluid ATF DEXRON or DEXRON II type



10. Install the pump cover. (13Y941)
11. Apply automatic transmission fluid to the O-ring and install O-ring to the suction connector.
12. Install the suction connector.



INSTALLATION

1. Mount the oil pump onto the oil pump bracket.
2. Install the drive belt, and adjust the deflection. (Refer to p. 19-11.)
3. Connect the pressure hose and return hose to the oil pump.

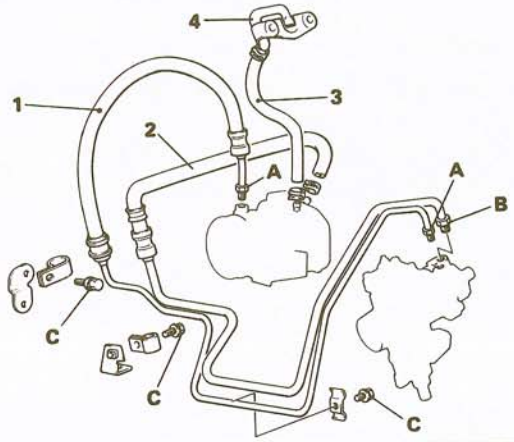
NOTE
Install the hoses so that they are not twisted and so that they do not come in contact with any other parts.

4. Fill with automatic transmission fluid. (Refer to p. 19-11.)
5. Bleed the system. (Refer to p. 19-11.)
6. Check the oil pump pressure. (Refer to p. 19-12.)
7. Torque all parts to specifications during assembly.

ɔMPONENTS

1. Pressure hose
2. Return hose
3. Breather hose
4. Breather pipe

	Nm	ft.lbs.
A	30-40	22-29
B	40-50	29-36
C	8-12	6-9

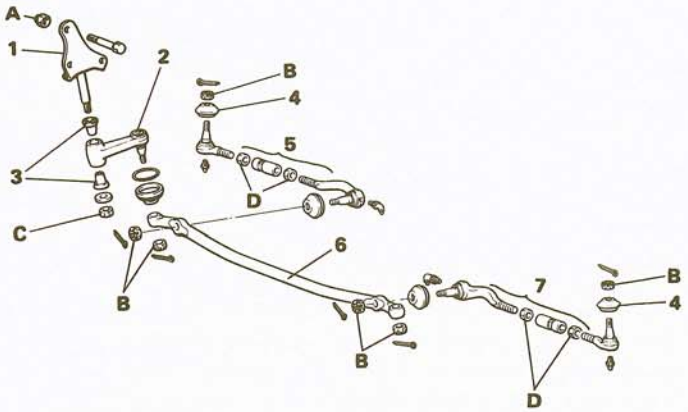


13W524

STEERING LINKAGE

COMPONENTS

1. Idler arm support
2. Idler arm assembly
3. Idler arm bushing
4. Tie rod end dust cover
5. Tie rod assembly, right
6. Relay rod
7. Tie rod assembly, left



	Nm	ft.lbs.
A	55-65	40-47
B	45	33
C	40-60	29-43
D	65-80	47-58

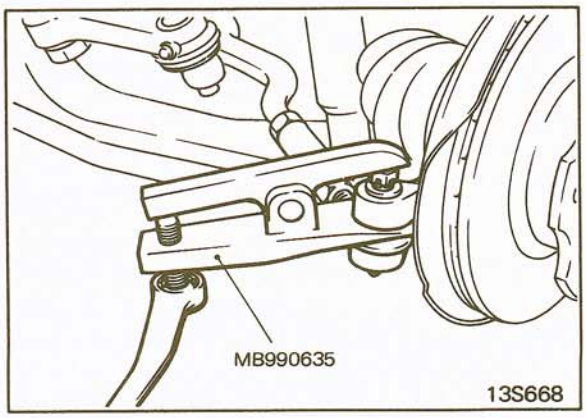
13W518

REMOVAL

Tie Rods and Relay Rod

1. Loosen the nut on the ball joint and remove the linkage by using the special tool as illustrated. (13S668)
2. Disassemble the tie rod.

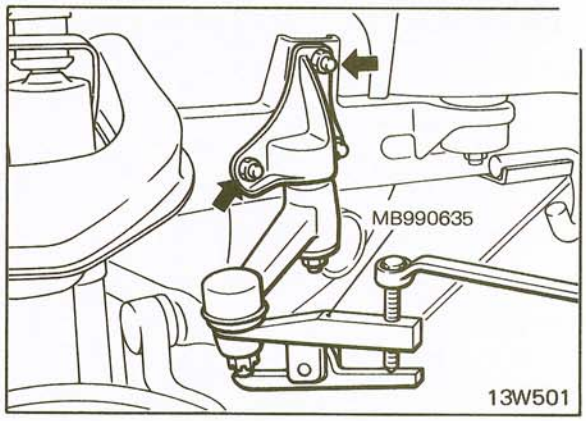
NOTE
The outer tie rod end is left threaded and the inner tie rod end is right threaded.



13S668

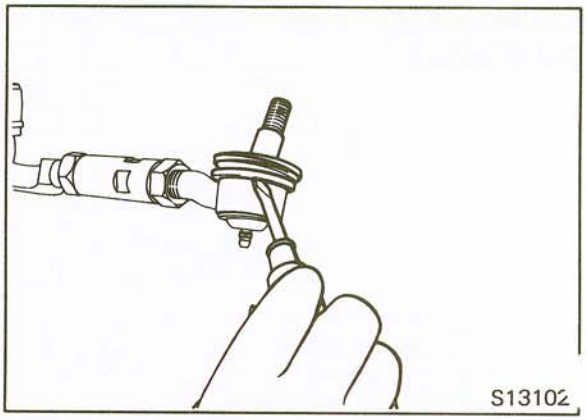
Idler Arm Assembly

1. Detach the relay rod from the idler arm by using the special tool. (13W501)
2. Remove the idler arm assembly. (13W501)
3. Disassemble the idler arm assembly.



Ball Joint Dust Cover

Remove the dust cover and O-ring from the ball joint.



INSPECTION

1. Check idler arm support for damage or deformation.
2. Check idler arm for damage or deformation.
3. Check idler arm bushings for wear or deterioration.
4. Check dust covers and O-rings for damage or deterioration.
5. Check tie rods for damage or deformation.
6. Check relay rod for bends or damage.

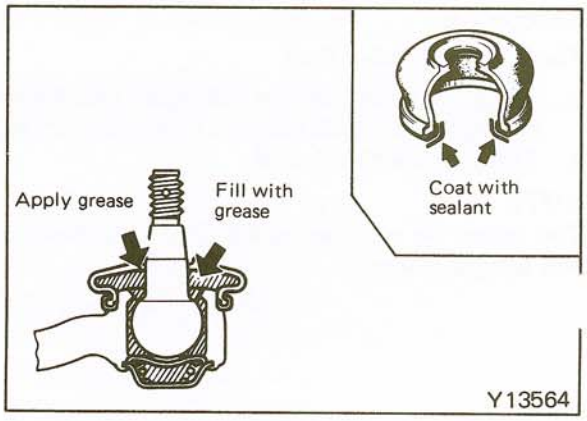
INSTALLATION

Ball Joint Dust Cover

1. Before installing the dust cover, apply the specified multipurpose grease to the cover lip and the interior.

Recommeded multipurpose grease	SAE J310a, NLGI grade #2EP

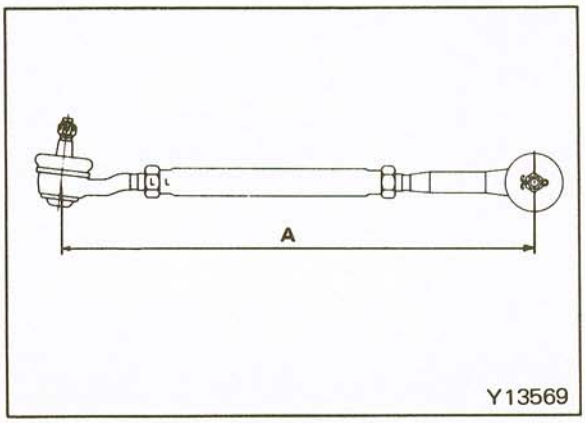
2. Apply packing sealant to the tie rod mounting surface.



ie Rod

1. Apply the specified multipurpose grease to the threaded portion of the tie rods, and then adjust the tie rod so that the distance between the stud bolts of the tie rod agrees with the standard value. (Y13569)

Tie rod ends ball joint center distance A . . . . . 326.5 mm (12.85 in.)



Caution
Tie rod end tightness, left to right, should be uniform.

2. Connect the tie rod to the steering arm and to the relay rod. Torque to specification and insert cotter pins.
3. Adjust toe-in. (Refer to GROUP 2.)

Idler Arm Assembly

1. Apply a thin coat of the specified multipurpose grease to the arm support and bushings. (13W001)

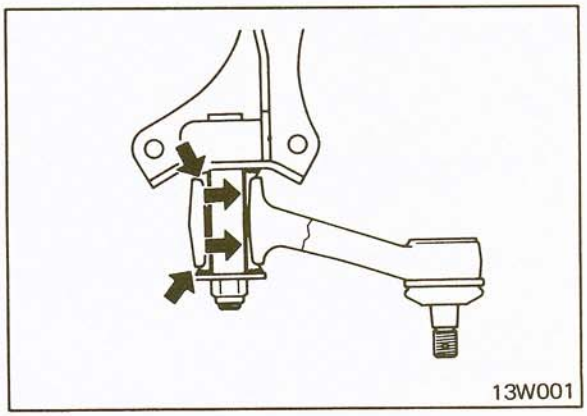
Recommended multipurpose grease . . . . . SAE J310a, NLGI grade #2EP

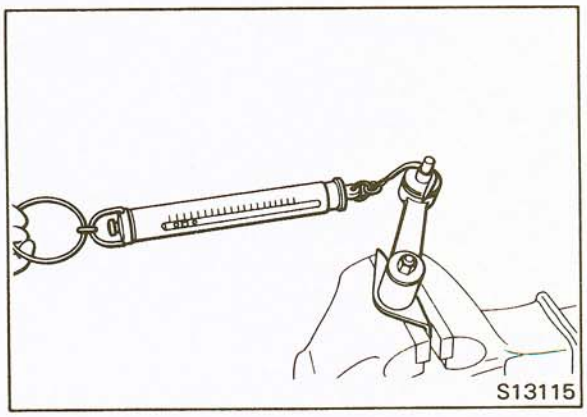
2. Insert the bushings into the idler arm.
3. Insert the support into the idler arm.

NOTE
The washer should be installed with the knurled surface facing the bushing.

4. Measure the turning torque of the idler arm with a spring scale. (S13115)

Idler arm turning torque . . . . . 300-900 Ncm (26-78 in.lbs.)
Turning force (when measured with a spring scale) 25-75 N (5.5-16.5 lbs.)





TRANSMISSION MANUAL AUTOMATIC

CONTENTS

GENERAL SPECIFICATIONS

Manual transmission and transfer case model	KM145
Transmission	
Type	Forward full-synchromeshed
Gear ratio 1st	3.740
2nd	2.136
3rd	1.360
4th	1.000
5th	0.856
Reverse	3.578
Final gear ratio	4.625 4.875 (Option)
Speedometer gear ratio	26/8 . . . Final gear ratio 4.625 27/8 . . . Final gear ratio 4.875 (Option)
Transfer case	
Type	Constant mesh type
Gear ratio High	1.000
Low	1.944
Drive system Front wheel	Chain drive
Rear wheel	Direct drive
Automatic transmission and transfer case model	KM146
Automatic transmission	
Type	Full automatic three speed with torque converter
Torque converter diameter	241 mm (9.5 in.)
Oil capacity – transmission and torque converter	6.8 liters (7.2 U.S.pts.) (6.0 Imp.pts.)
Cooling method	Water cooling
Oil pump	Rotor type
Gear ratio 1st	2.745
2nd	1.545
3rd	1.000
Reverse	2.214
Speedometer gear ratio	24/8 . . . Final gear ratio 4.222 26/8 . . . Final gear ratio 4.625 (Option)
Transfer case	
Type	Constant mesh type
Gear ratio High	1.000
Low	1.944
Drive system Front wheel	Chain drive
Rear wheel	Direct drive

ERVICE SPECIFICATIONS

mm (in.)

Manual transmission	
Retainer to bearing clearance	0-0.1 (0-.004) . . . Adjusting with spacer
Reverse idler gear end play	0.12-0.28 (.005-.011)
Over drive gear end play	0.1-0.25 (.004-.10)
Main drive gear end play	0-0.06 (0-.002) . . . Adjusting with snap ring
3rd-4th synchronizer hub end play	0-0.08 (0-.003) . . . Adjusting with snap ring
Resistance springs free length	28 (1.10)
Plunger springs free length	42 (1.65)
Automatic transmission	
Inhibitor switch to selector lever clearance	2.5 (.1)
Clutches	
Number of front clutch plates	3
Number of front clutch discs	3
Number of rear clutch plates	3
Number of rear clutch discs	4
Clutch plate clearance	
Front clutch	0.61-1.78 (.024-.070)
Rear clutch	0.64-1.22 (.025-.048) . . . Adjusting snap ring
Input shaft end play	0.56-2.3 (.022-.091)
Gear train end play	0.16-0.83 (.006-.033)
Pump clearance	
Side clearance	0.025-0.064 (.001-.0025)
Tip clearance	0.13-0.25 (.005-.010)
Body clearance	0.09-0.19 (.0035-.0075)
Band adjustments	
Kickdown	Backed off 3 1/2 turns from 5.9 Nm (4.3 ft.lbs.)
Low-reverse band	Backed off 7 turns from 4.9 Nm (3.6 ft.lbs.)
Transfer case	
Rear bearing end play	0-0.1 (0-.004) . . . Adjusting with snap ring

Adjustment Spacer and Snap Ring

Manual transmission		
Snap ring for main drive gear		
Thickness mm (in.)-Ident. color-Part No.		2.30 (.091)-White-MD701729
		2.35 (.093)-None-MD701730
		2.40 (.094)-Red-MD701731
		2.45 (.096)-Blue-MD701732
		2.50 (.098)-Yellow-MD701733
Spacer for main drive gear bearing to front retainer		
Thickness mm (in.)-Ident. color-Part No.		0.84 (.033)-Black-MD701845
		0.93 (.037)-None-MD701839
		1.02 (.040)-Red-MD701840
		1.11 (.044)-White-MD701841
		1.20 (.047)-Yellow-MD701842
		1.29 (.051)-Blue-MD701843
		1.38 (.054)-Green-MD701844
Snap ring for mainshaft front end		
Thickness mm (in.)-Ident. color-Part No.		2.15 (.085)-Blue-MD701761
		2.22 (.087)-None-MD701762
		2.29 (.090)-Brown-MD701763
		2.36 (.093)-White-MD701764
Automatic transmission		
Snap rings		
Rear clutch snap ring		
Thickness mm (in.)		1.52-1.57 (.060-.062)
		1.93-1.98 (.076-.078)
		2.49-2.54 (.098-.100)
Output shaft forward end		
Thickness mm (in.) – color		1.02-1.12 (.040-.044) – Red
		1.57-1.68 (.062-.066) – Green
		2.08-2.18 (.082-.086) – White
Thrust washers		
Reaction shaft support to front clutch retainer	#1	1.55-1.60 (.061-.063)
Front clutch to rear clutch	#2	1.55-1.60 (.061-.063)
Input shaft to output shaft	#3	selective
		1.32-1.37 (.052-.054)
		1.73-1.78 (.068-.070) – Red
		2.11-2.16 (.083-.085) – Green
Front annulus gear support to snap ring	#4	3.07-3.18 (.120-.125)
Front annulus support to front carrier	#5	1.22-1.27 (.048-.050)
Front carrier to driving shell thrust plate	#6	1.22-1.27 (.048-.050)
Driving shell thrust plate	#7, #8	1.27-1.32 (.050-.052)
Driving shell thrust plate to rear carrier	#9	1.22-1.27 (.048-.050)
Rear carrier to rear annulus support	#10	1.22-1.27 (.048-.050)

Transfer case	
Snap ring for input gear assemby	
Thickness mm (in.) – color	2.70 (.106) – Purple
	2.75 (.108) – Pink
	2.80 (.110) – Yellow
	2.85 (.112) – White
	2.90 (.114) – Blue
Snap ring for H-L clutch hub	
Thickness mm (in.) – color	2.14 (.084) – None
	2.21 (.087) – Yellow
	2.28 (.090) – White
	2.35 (.093) – Blue
	2.42 (.095) – Red
Snap ring for input gear bearing	
Thickness mm (in.) – color	2.30 (.091) – None
	2.35 (.093) – Red
	2.40 (.094) – White
	2.45 (.096) – Blue
	2.50 (.098) – Green
Spacer for rear output shaft bearing	
Thickness mm (in.) – color	0.84 (.033) – Black
	0.93 (.037) – None
	1.02 (.040) – Red
	1.11 (.044) – White
	1.20 (.047) – Yellow
	1.29 (.051) – Blue
	1.38 (.054) – Green

TORQUE SPECIFICATIONS

	Nm (ft.lb
Manual transmission	
Transmission mounting bolts	42-54 (31-40)
Starting motor mounting bolts	22-31 (16-23)
Clutch cable bracket attaching bolts	9.8-12.7 (7.2-9.4)
Mainshaft lock nut	98-127 (72-94)
Idler shaft lock nut	19.6-58.8 (14.5-43)
Under cover attaching bolt	7.8-9.8 (6-7)
Control lever housing attaching bolts	4.9-6.9 (4-5)
Countershaft gear lock nut	68.6-98.0 (50-72)
Reverse shaft nut	19.6-58.8 (15-43)
Backup light switch	29.4 (22)
Drain plug	58.8 (43)
Oil filler plug	29.4-34.3 (22-25)
Automatic transmission	
Selector handle set screw	2.0 (1.4) or more
Control arm to control rod (B)	13 (9)
Cross shaft bracket mounting bolt	10-13 (7-9)
Control arm-to-selector lever lock nut	18-24 (13-17)
Cooler line fitting	11-14 (8-10)
Cooler line nut	9.6 (7.1)
Transmission mounting bolts	42-54 (31-40)
Starting motor mounting bolts	20-29 (15-22)
Converter drive plate to crankshaft bolt	112.7-121.5 (83-90)
Converter drive plate to torque converter bolt	46-51 (34-38)
Governor body to support bolt	10-12 (8-9)
Kickdown band adjusting screw lock nut	41-54 (30-40)
Kickdown lever shaft plug	15-19 (11-14)
Oil pan bolt	15-19 (11-14)
Oil pump housing to transmission case bolt	17-23 (12-17)
Output shaft support bolt	15-19 (11-14)
Pressure test take-off plug	11-14 (8-10)
Reaction shaft support to oil pump bolt	16-21 (12-15)
Reverse band adjusting screw lock nut	35-47 (26-34)
Transmission to engine bolt	38.2 (28)
Valve body screw	2.9-4.9 (2.2-3.6)
Valve body to transmission case bolt	10-13 (7-9)

Nm (ft.lbs.)

Transfer case	
Adapter to transfer case mounting bolts and nuts	30-41 (22-30)
Chain cover bolt	30-41 (22-30)
Side cover bolt	30-41 (22-30)
Rear cover bolt	8-9.5 (6-7)
Cover bolt	15-21 (11-15)
Control housing bolt	10-12 (7.5-9)
Oil filler plug	30-34 (22-25)
Drain plug	30-34 (22-25)
Select plug	30-34 (22-25)
Rocking plate bolt	15-21 (11-15)
Rear output shaft lock nut	98-127 (73-94)
Speedometer sleeve clamp bolt	15-21 (11-15)
Seal plug	30-41 (22-30)
4WD switch	30 (22)

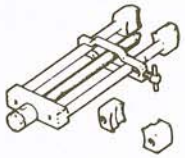
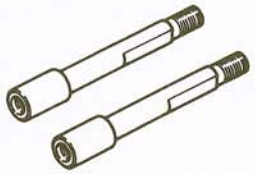
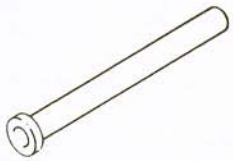
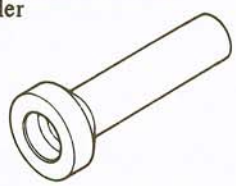
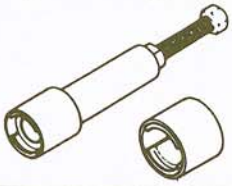
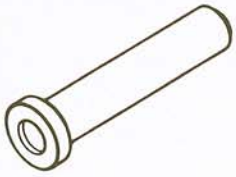
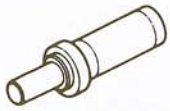
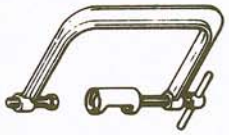
LUBRICANTS

lit. (U.S.qts., Imp.qts.)

	Specified lubricant	Quantity
Ianual transmission	Hypoid gear oil SAE80W, 75W-85W, conforming to API GL-4	2.2 (2.3, 1.9)
Automatic transmission	ATF "DEXRON" or "DEXRON II" type	6.8 (7.2, 6.0)
Transfer case	Hypoid gear oil SAE80W, 75W-85W, conforming to API GL-4	2.2 (2.3, 1.9)
Sliding parts of the selector lever	Multipurpose grease SAE J310a, NLGI grade #3	As required
Sliding parts of the selector handle	Multipurpose grease SAE J310a, NLGI grade #3	As required
Sliding parts of the control rods	Multipurpose grease SAE J310a, NLGI grade #3	As required

SEALANT

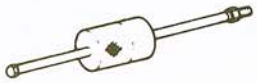
	Specified sealant	Quantity
Both sides of the extension housing gasket	3M Super silicone 8662 or equivalent	As required
Threads of extension housing ıttaching bolts	3M Super silicone 8662 or equivalent	As required

Tool (Number and name)	Use	Tool (Number and name)	Use
MD998020 Bearing puller 	Removal of the main drive gear bearing	MD998028 Bearing puller adapter 	Use with MD998020
MD998067 "*" Mainshaft bearing installer 		MD998029 "*" Main ring gear bearing installer 	
MD998192 "*" Counter gear bearing puller 		MD998199 "*" Countershaft bearing installer 	
MD998200 "*" Front bearing retainer oil seal installer 		MD998303 "*" (C-3422-B) Valve spring compressor 	Common to engine and automatic transmission Removal and installation of the kickdown servo and low-reverse servo
MD998330 "*" (C-3292 for 100 psi. and C-3293 for 300 psi.) Oil pressure gauge 	Measurement of the oil pressure	MD998335 "*" Oil pump band 	Assembling the oil pump
MD998352 "D" Dial gauge support 	Measurement of the input shaft end play	MD998353 "D" Torque driver set 	Tightening the valve body bolts

"*", "D" see page 2 for instructions.

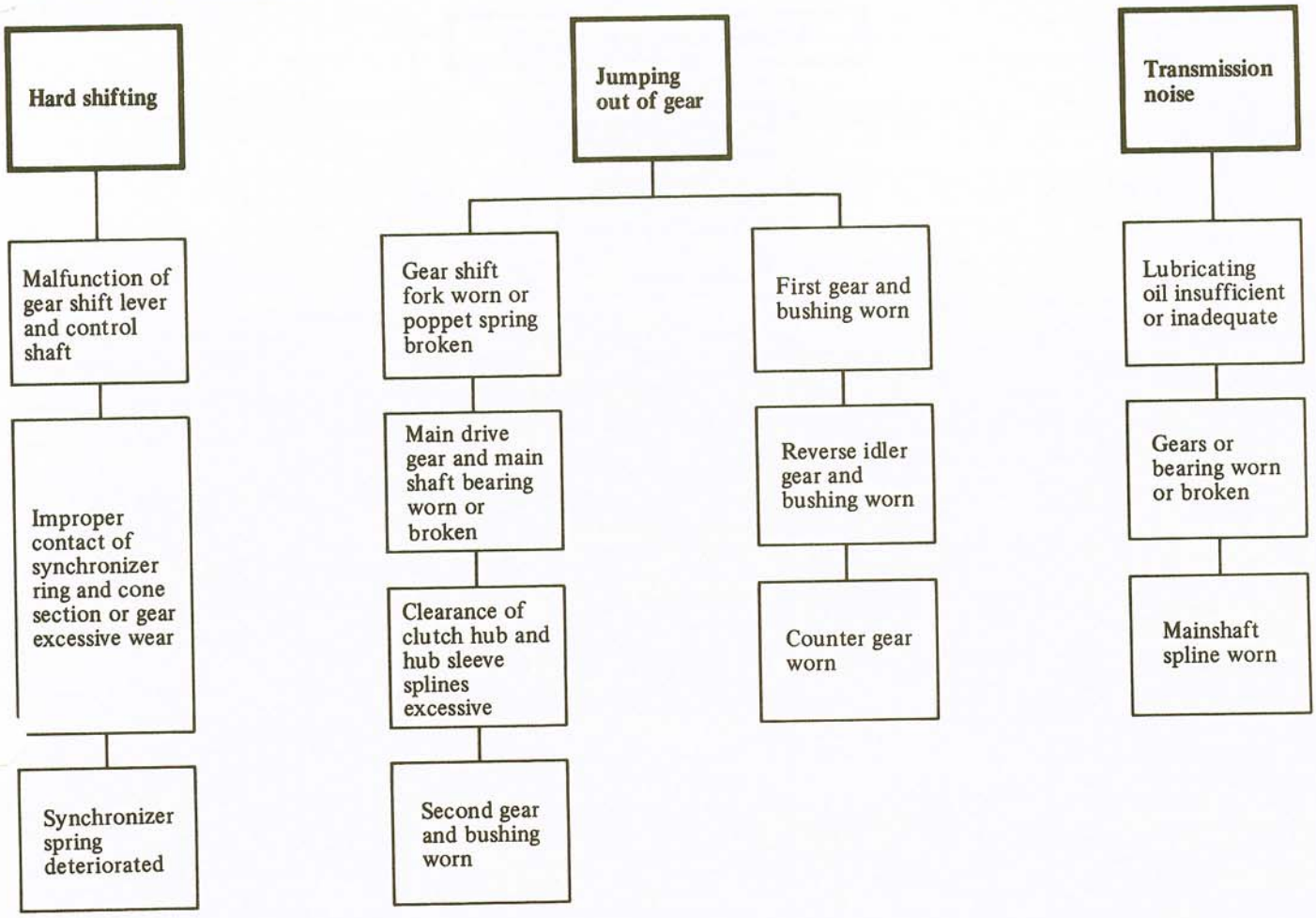
Tool (Number and name)	Use	Tool (Number and name)	Use
MD998356 "*" Oil pressure gauge adapter 	Connecting the oil pressure gauge	MD998357 "D" Kickdown band adjusting wrench 	Adjustment of the kickdown band
MD998358 "D" Low-reverse band adjusting wrench 	Adjustment of the low-reverse band	MD998500 "D" (SP-3551) Pump housing bushing remover 	
MD998501 "D" (SP-5117) Pump housing bushing installer 		MD998502 "D" (SP-3524) Reaction shaft bushing remover 	
MD998503 "D" (SP-3633) Cup 	Use with MD998502	MD998504 "D" (SP-1911) Nut 	Use with MD998502
MD998505 "D" (SP-5325) Reaction shaft bushing installer 		MD998506 "D" (SP-3627) Front clutch retainer bushing 	
MD998507 "D" (SP-3626) Front clutch retainer bushing 		MD998563 "*" (C-3763) Throttle pressure adjust tool 	Adjustment of the throttle pressure

"*", "D" see page 2 for instructions.

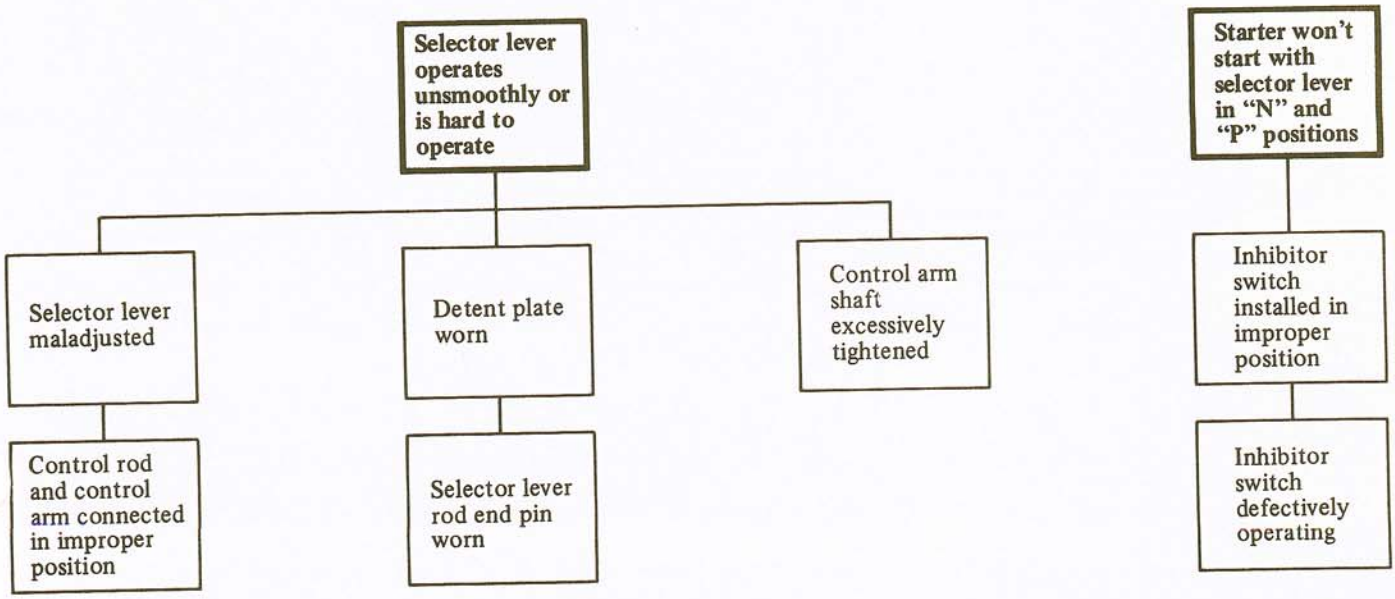
Tool (Number and name)	Use	Tool (Number and name)	Use
MD998572 "*" (C-3575-A) Spring compressor 	Removal and installation of the front clutch bearing	MD998573 "D" (C-3756) Converter alignment tool 	Alignment of holes of the oil pump rotor
MD998580 "*" (C-4193) Oil pump oil seal installer 		MD998581 "*" (C-4171) Driver handle 	Removal and installation of pump housing bushing Use with MD998500 or MD998501
MD998583 "*" (C-3752) Oil pump remover 	Removing oil pump housing	MD998584 "*" (C-3238-B) Pilot stud "A" 	Installation of output shaft support
MD998585 "*" (C-3283-A) Pilot stud "B" 	Assembly of oil pump		

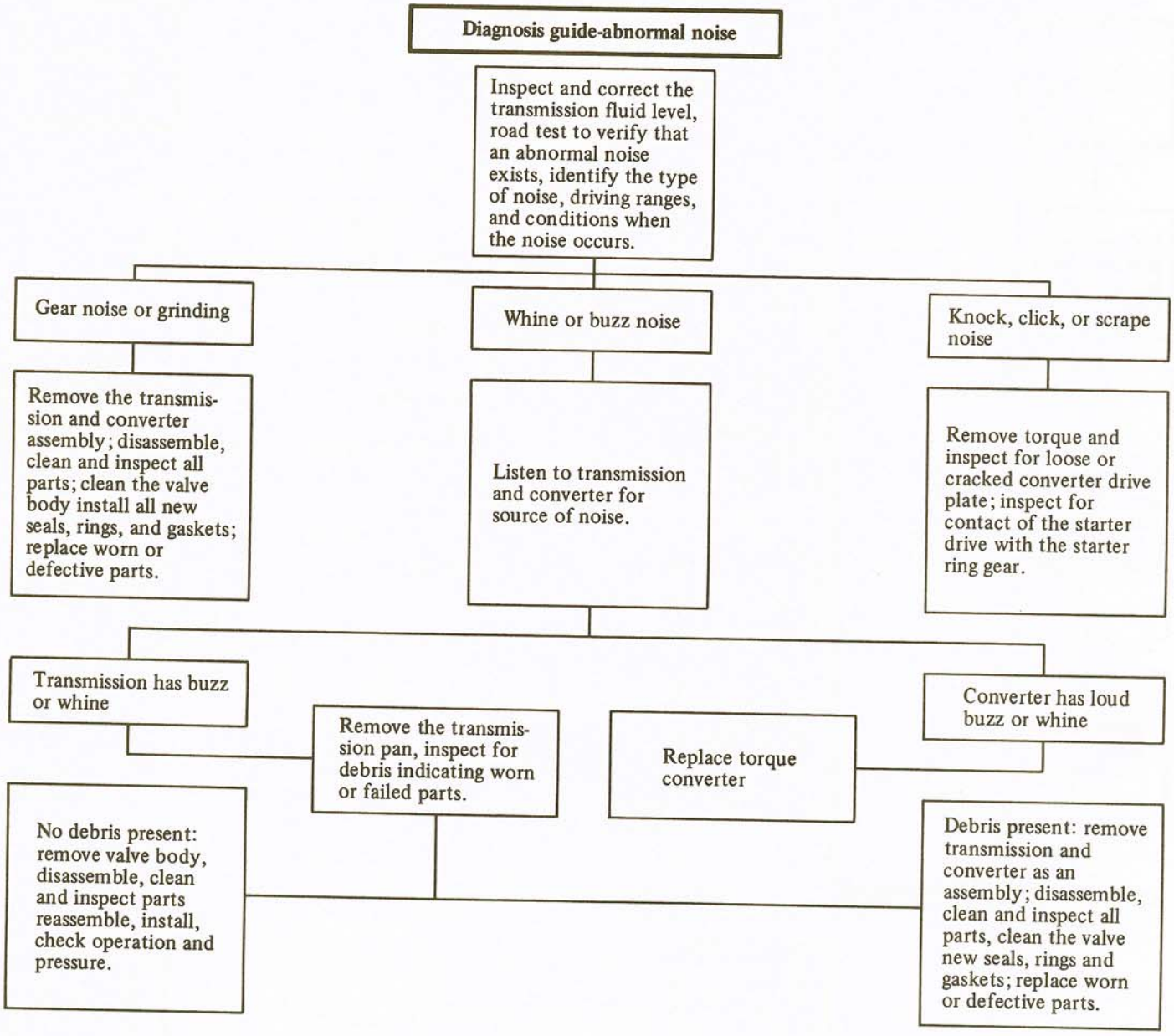
"*", "D" see page 2 for instructions.

ANUAL TRANSMISSION



AUTOMATIC TRANSMISSION




Diagnosis guide-abnormal noise
Inspect and correct the transmission fluid level, road test to verify that an abnormal noise exists, identify the type of noise, driving ranges, and conditions when the noise occurs.
Gear noise or grinding
Whine or buzz noise
Knock, click, or scrape noise
Remove the transmission and converter assembly; disassemble, clean and inspect all parts; clean the valve body install all new seals, rings, and gaskets; replace worn or defective parts.
Listen to transmission and converter for source of noise.
Remove torque and inspect for loose or cracked converter drive plate; inspect for contact of the starter drive with the starter ring gear.
Transmission has buzz or whine
Converter has loud buzz or whine
Remove the transmission pan, inspect for debris indicating worn or failed parts.
Replace torque converter
No debris present: remove valve body, disassemble, clean and inspect parts reassemble, install, check operation and pressure.
Debris present: remove transmission and converter as an assembly; disassemble, clean and inspect all parts, clean the valve new seals, rings and gaskets; replace worn or defective parts.

Diagnosis guide-vehicle will not move

Check the transmission fluid level before starting the engine. If no fluid is visible on the dip stick, add fluid to the 'L' mark before starting the engine. Then start the engine with the transmission in neutral and listen for noise.

- No abnormal noise, move the selector to a forward drive range and observe the propeller shaft for turning.
  - Propeller shaft turns but rear wheels do not turn: inspect for broken rear axle parts.
  - Propeller shaft does not turn: remove the transmission oil pan. Inspect for debris.
    - No debris: remove valve body; disassemble, clean and inspect all parts. Reassemble, install and check pressures and operation.
    - Debris is present: remove transmission and converter as an assembly; disassemble, clean and inspect all parts. Clean valve body; install all new seals, rings, and gaskets; replace worn or defective parts.
- Abnormal noise: stop engine immediately; remove the transmission and converter as an assembly. Disassemble, clean and inspect all parts. Clean valve body; install all new seals, rings, and gaskets; replace worn or defective parts.

Diagnosis guide-fluid leaks

Visually inspect for source of leak. If the source of leak cannot be readily determined, clean the exterior of the transmission. Check transmission fluid level. Correct if necessary.

- The following leaks may be corrected without removing the transmission: manual lever shaft oil seal, filler tube 'O' ring pressure, gauge plug neutral start switch, pan gasket oil cooler fittings, extension housing to case gasket, extension housing to case bolts, extension housing yoke seal, speedometer adapter 'O' ring, front band adjusting screw.
- The following leaks require removal of the transmission and torque converter for correction: transmission fluid leaking from the lower edge of the converter housing, caused by front pump to case seal, or torque converter weld. Cracked or porous transmission case.

DIAGNOSIS CHART-GENERAL (AUTOMATIC TRANSMISSION)

Diagnosis Chart-General

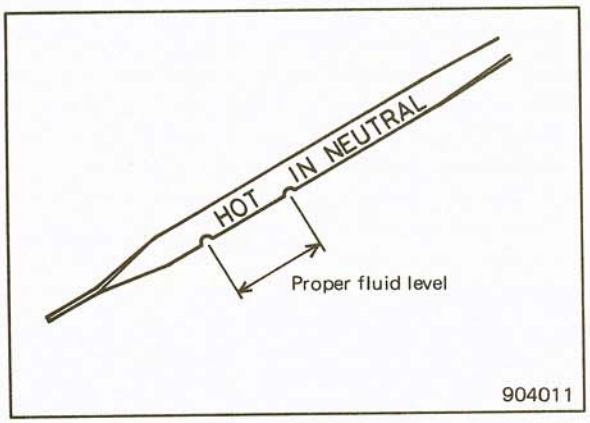
CONDITION	POSSIBLE CAUSE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
HARSH ENGAGEMENT FROM NEUTRAL TO D OR R	Engine idle speed too high.	x																															
	Hydraulic pressures too low.		x		x																				x								
	Low-reverse band out of adjustment.																																
	Valve body malfunction or leakage.																																
	Low-reverse servo, band or linkage malfunction.																																
	Low fluid level.																																
	Incorrect gearshift control linkage adjustment.																																
	Oil filter clogged.																																
	Faulty oil pump.																																
	Worn or broken input shaft seal rings.																																
	Aerated fluid.																																
	Engine idle speed too low.																																
	Incorrect throttle linkage adjustment.																																
	Kickdown band out of adjustment.																																
	Overrunning clutch not holding.																																
	Output shaft bearing and/or bushing damaged.																																
	Governor support seal rings broken or worn.																																
	Worn or broken reaction shaft support seal rings.																																
	Governor malfunction.																																
	Kickdown servo band or linkage malfunction.																																
	Worn or faulty front clutch.																																
	High fluid level.																																
	Breather clogged.																																
	Hydraulic pressure too high.																																
	Kickdown band adjustment too tight.																																
	Faulty cooling system.																																
	Insufficient clutch plate clearance.																																
	Worn or faulty rear clutch.																																
	Rear clutch dragging.																																
	Planetary gear sets broken or seized.																																
	Overrunning clutch worn, broken or seized.																																
	Overrunning clutch inner race damaged.																																
DRIVES IN NEUTRAL				x				x											x									x	x			
DRAGS OR LOCKS			x																							x					x	x	
GRATING, SCRAPING, GROWLING NOISE			x											x		x														x	x	
BUZZING NOISE				x		x					x																						x
HARD TO FILL, OIL BLOWS OUT FILLER TUBE									x		x												x	x									
TRANSMISSION OVERHEATS		x	x			x	x			x																x	x	x					
HARSH UPSHIFT				x									x	x											x								
DELAYED UPSHIFT																		x	x	x	x	x											

'AGNOSIS

Automatic transmission malfunctions may be caused by four general conditions: poor engine performance, improper adjustments, hydraulic malfunctions, and mechanical malfunctions, Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level and ATF condition, control rod adjustment, and throttle linkage adjustment. Then perform a road test to determine whether the problem has been corrected or that more diagnosis is necessary. If the problem exists after the preliminary tests and corrections are completed, hydraulic pressure tests should be performed.

Fluid level and condition

1. Drive to a flat surface.
2. Before the dipstick is removed, clean the protective cap and the top of the filler tube.
3. Run the engine at idle.
4. Move the selector lever through a round of all positions (P-L) before placing it in "N" position. Pull the parking brake lever beforehand.
5. Make sure that the ATF is heated to normal operating temperature [approx. 80°C (170°F)].
6. The fluid level should be between the notches above "ADD-1-PINT" and below "FULL" inscribed on the dipstick. (904011)



Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy, therefore, pressures will be low and build up slowly.

Improper filling can also raise the fluid level too high. When the transmission has too much fluid, the gears churn up foam and cause the same conditions which occur with a low fluid level.

In either case, the air bubbles can cause overheating, fluid oxidation and varnish which can interfere with normal valve, clutch and servo operation. Foaming can also result in fluid escaping from the transmission vent and oil filler tube where it may be mistaken for a leak.

Along with fluid level, it is important to check the condition of the fluid. When the fluid smells burned and is contaminated with metal or friction material particles, a complete transmission overhaul is needed. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its condition, drain out a sample for a double check.

7. Insert the dipstick all the way in.

Adjustment of control rod

1. Check to ensure that when the manual control lever of the transmission is placed in the "N" position, the position indicator correctly shows "N".
2. Check to ensure that the selector lever can be operated smoothly and clicks into each position and that the position indicator correctly indicates the position.
3. For adjustment, refer to "Maintenance and Adjustment."

Throttle linkage

The throttle linkage adjustment is very important to proper transmission operation. This adjustment positions a valve which controls shift speed, shift quality and part throttle down shift sensitivity. If the setting is too short, early shifts and slippage between shifts may occur. If the setting is too long, shifts may be delayed and part throttle down shifts may be very sensitive.
For adjustment, refer to "Maintenance and Adjustment."

oad test

Prior to performing a road test, be certain that the fluid level and ATF condition, control rod adjustments and throttle linkage adjustments have been checked and approved.

During the road test the transmission should be operated in each position to check for slipping and any variation in shifting. Note whether the shifts are harsh or spongy and check the speeds where the upshifts and downshifts occur. Approximate shift speeds for the various modes of operation are shown in the "Automatic Shift Speed Pattern".

Observe closely for slipping or engine speed flare-up. Slipping or flare-up in any gear usually indicates clutch, band or overrunning clutch problems. If the condition is far advanced, an overhaul will probably be necessary to restore normal operation.

In most cases, the clutch or band that is slipping can be determined by noting the transmission operation in all selector positions and by comparing which internal units are applied in those positions. The "Elements in Use Chart" provides a basis for road test analysis.

By observing that the rear clutch and the overrunning clutch are applied in the "D" first gear and that the rear clutch and low-reverse band are applied in "L" first, if the transmission slips in "D" range first gear but does not slip in "L" first gear, the overrunning clutch must be the unit that is slipping.

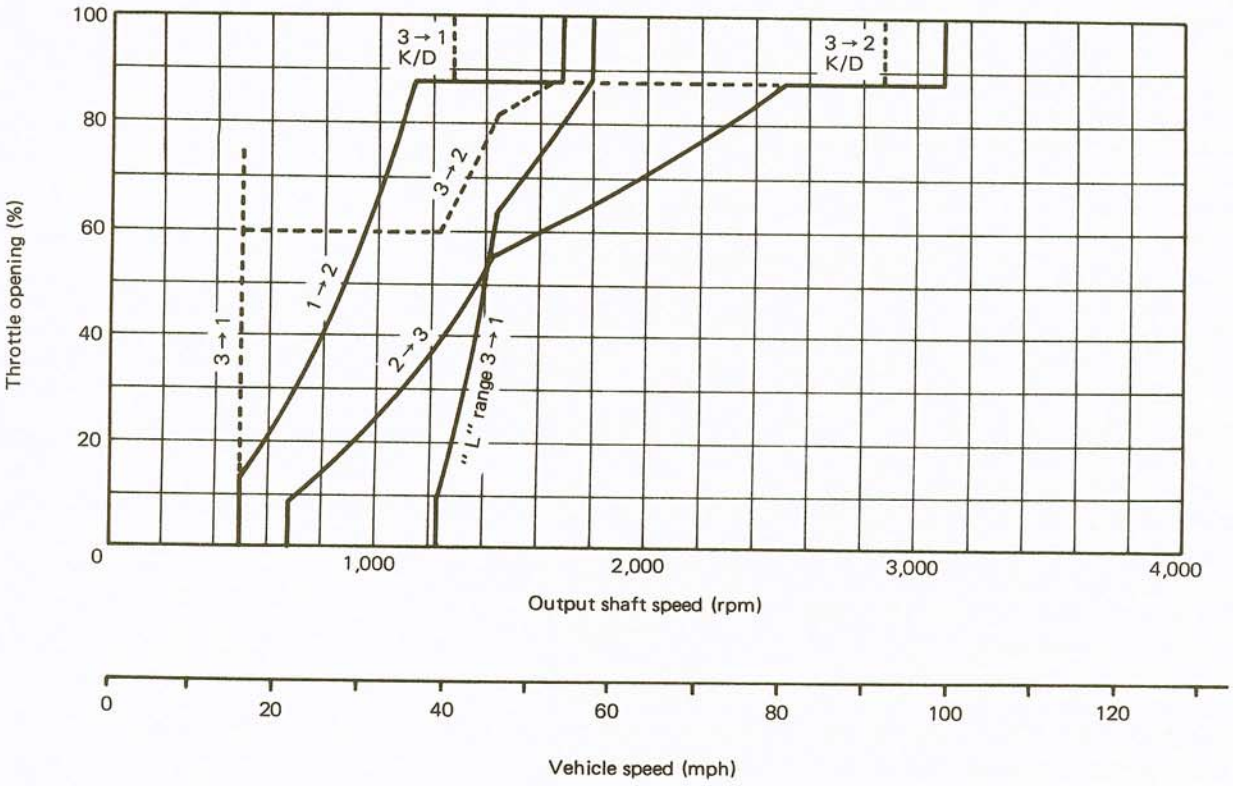
imilarly, if the transmission slips in any two forward gears, the rear clutch is the slipping unit.

Using the same procedure, the rear clutch and front clutch are applied in "D" third gear. If the transmission slips in third gear, either the front clutch or the rear clutch is slipping. By selecting another gear which does not use one of those units, the unit which is slipping can be determined. If the transmission also slips in reverse, the front clutch is slipping. If the transmission does not slip in reverse, the rear clutch is slipping.

This process of elimination can be used to detect any unit which slips and to confirm proper operation of good units. However, although road test analysis can usually diagnose slipping units, the actual cause of the malfunction usually cannot be decided. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

Therefore, unless the condition is obvious, like no drive in "D" range first gear only, the transmission should never be disassembled until hydraulic pressure tests have been performed.

Automatic Shift Speed Pattern



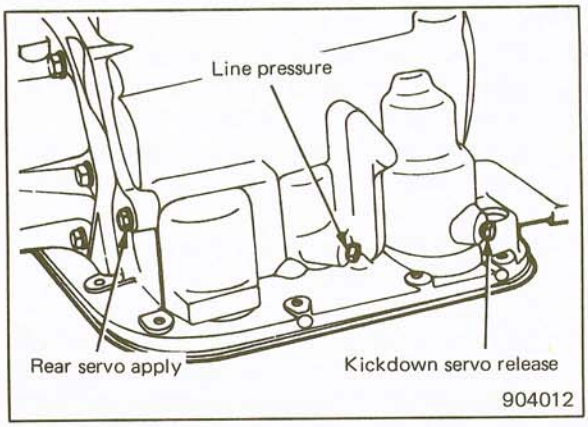
Elements in Use at Each Position of the Selector Lever

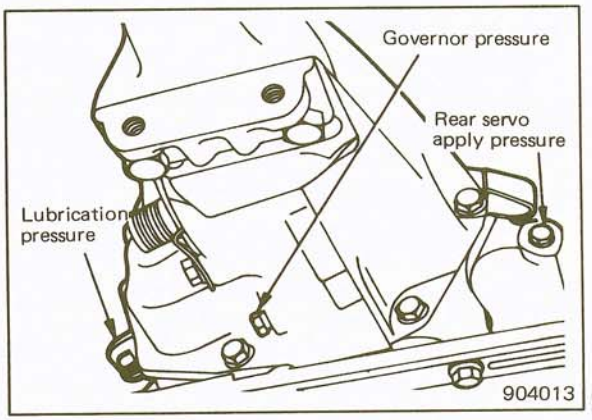
Selector Lever Position	Gear Ratio	Start Safety	Parking Sprag	Clutches			Bands	
				Front	Rear	Over-running	(Kickdown) Front	(Low-Rev.) Rear
P–PARK		X	X					
R–REVERSE	2.21			X				X
N–NEUTRAL		X						
D–DRIVE								
First	2.45				X	X		
Second	1.45				X		X	
Direct	1.00			X	X			
2–SECOND								
First	2.45				X	X		
Second	1.45				X		X	
L–LOCK–UP								
First	2.45				X			X

HYDRAULIC PRESSURE TESTS

Pressure testing is a very important step in the diagnostic procedure. These tests usually reveal the cause of most transmission problems.

1. Before performing pressure tests, be certain that fluid level and ATF condition, control rod adjustments and throttle linkage adjustments have been checked and approved. Fluid must be at operating temperature [approx. 80°C (170°F)].
2. Install an engine tachometer, raise vehicle on hoist which allows rear wheels to turn, and position tachometer so it can be read under the vehicle.
3. Disconnect throttle rod and shift rod A from transmission levers so they can be controlled under the vehicle.
4. Attach 3MPa (300 psi) gauge (MD998300) and adaptor (MD998356) to ports required for test being conducted.
5. Test port locations are shown in illustration. (904012, 904013)





Test 1 (Selector in "L")

1. Attach gauges to "line" and "rear servo" ports.
2. Operate engine at 1,600 rpm for test.
3. Move selector lever on transmission all the way forward ("L" position).
4. Read pressures on both gauges as throttle lever on transmission is moved from full rearward position to full forward position.
5. Line pressure should read 372 to 414 kPa (54 to 60 psi) with throttle lever rearward and gradually increase, as lever is moved forward, to 621 to 662 kPa (90 to 95 psi).
6. Rear servo pressure should read the same as line pressure within 21 kPa (3 psi).
7. This tests oil pump, oil pressure regulating valves (regulator valve and throttle valve) and hydraulic circuit conditions.

Test 2 (Selector in "2")

1. Attach gauge to "line pressure" port and "tee" into rear cooler line fitting to read "lubrication" pressure.
2. Operate engine at 1,600 rpm for test.
3. Move selector lever on transmission one "detent" rearward from full forward position. This is selector "2" position.
4. Read pressures on both gauges as throttle lever on transmission is moved from full rearward position to full forward position.
5. Line pressure should read 372 to 657 kPa (54 to 95 psi) with throttle lever rearward and gradually increase, as lever is moved forward, to 621 to 662 kPa (90 to 96 psi).
6. Lubrication pressure should be 39 to 108 kPa (6 to 16 psi) with lever rearward and 69 to 207 kPa (10 to 30 psi) with lever forward.
7. This tests pump output, pressure regulation, and condition of rear clutch and lubrication hydraulic circuits.

Test 3 (Selector in "D")

1. Attach gauges to "line" and "kickdown servo release" ports.
2. Operate engine at 1,600 rpm for test.
3. Move selector lever on transmission two "detents" rearward from full forward position. This is selector "D" position.
4. Read pressures on both gauges as throttle lever on transmission is moved from full rearward position to full forward position.
5. Line pressure should read 372 to 414 kPa (54 to 60 psi) with throttle lever rearward and gradually increase, as lever is moved forward.
6. Kickdown servo release is pressurized only in 3rd gear (direct drive) and should be same as line pressure within 21 kPa (3 psi), up to downshift point.
7. This tests pump output, pressure regulation, and condition of rear clutch and front clutch hydraulic circuits.

Test 4 (Selector in Reverse)

1. Attach gauge to "rear servo apply" port.
2. Operate engine at 1,600 rpm for test.
3. Move selector lever on transmission four "detents" rearward from full forward position. This is selector "R" position.
4. Rear servo pressure should read 1,570 to 1,790 kPa (230 to 260 psi).
5. This tests pump output, pressure regulation, and condition of front clutch and rear servo hydraulic circuits.
6. Move selector lever on transmission to "D" position to check that rear servo pressure drops to zero.
7. This tests for leakage into rear servo, due to case porosity, which can cause low-reverse band burn out.

st result indications

1. If proper line pressure, minimum to maximum, is found in any one test, the pump and pressure regulator are working properly.
2. Low pressure in "D, L and 2" but correct pressure in "R" indicates rear clutch circuit leakage.
3. Low pressure in "D and R" but correct pressure in "L" indicates front clutch circuit leakage.
4. Low pressure in "R and L" but correct pressure in "2" indicates rear servo circuit leakage.
5. Low line pressure in all positions indicates a defective pump, a clogged filter or a stuck pressure regulator valve or throttle valve.

GOVERNOR PRESSURE TEST

Test only if transmission shifts at wrong vehicle speeds when throttle rod is correctly adjusted.

1. Connect a pressure gauge, to governor pressure take-off point, located at lower left side of extension near the mounting flange.
2. Operate transmission in third gear to read pressures and compare speeds shown in chart.
   If governor pressures are incorrect at the given vehicle speeds, the governor valve and/or weights are probably sticking. The governor pressure should respond smoothly to changes in km/h (mph) and should return to 0 to 10 kPa (0 to 1.5 psi) when vehicle is stopped. High pressure at stand still [above 14 kPa (2 psi)] will prevent the transmission from down shifting.

THROTTLE PRESSURE TEST

No gauge port is provided for the throttle pressure. Incorrect throttle pressure should only be suspected if part throttle up-shift speeds are either delayed or occur too early in relation to vehicle speeds. Engine runaway on either up shifts or down shifts can also be an indicator of incorrect (low) throttle pressure setting.

Caution

In no case should throttle pressure be adjusted until the transmission throttle linkage adjustment has been verified to be correct.

CONVERTER STALL TEST

Warning

During test let no one stand in front of vehicle

The stall test consists of determining the engine speed obtained at full throttle in "D" position. This test checks the torque converter stator clutch operation, and the holding ability of the transmission clutches. The transmission fluid level should be checked and the engine brought to normal operating temperature before stall operation. Both the parking and service brakes must be fully applied and front wheels blocked while making this test.

Do not hold the throttle open any longer than is necessary to obtain a maximum engine speed reading, and never longer than five seconds at a time. If more than one stall check is required, operate the engine at idle in neutral for 20 seconds to cool the ATF between runs. If engine speed exceeds the maximum limits shown, release the accelerator immediately since transmission clutch slippage is indicated.

Engine stall speed	2,300-2,800 rpm

Stall Speed Above Specification in "D"

If stall speed exceeds specification, transmission overrunning clutch or rear clutch slippage is indicated. Follow the transmission oil pressure checks outlined in this section to determine the cause of slippage.

Stall Speed Below Specification

Low stall speeds with a properly tuned engine indicate torque converter problems.

If stall speeds are below specification and the vehicle operates properly at highway speeds, but has poor through-gear acceleration, the stator overrunning clutch is slipping.

If stall speed and acceleration are normal, but abnormally high throttle opening is required to maintain highway speeds, the stator clutch has seized.

Both of these stator defects require replacement of the torque converter.

Noise

A whining or siren-like noise due to fluid flow is normal during stall operation with some converters; however, loud metallic noises from loose parts or interference within the assembly indicate a defective torque converter. To confirm that the noise originates within the converter, operate the vehicle at light throttle in "D" and "N" on a hoist and listen under the transmission bell housing.

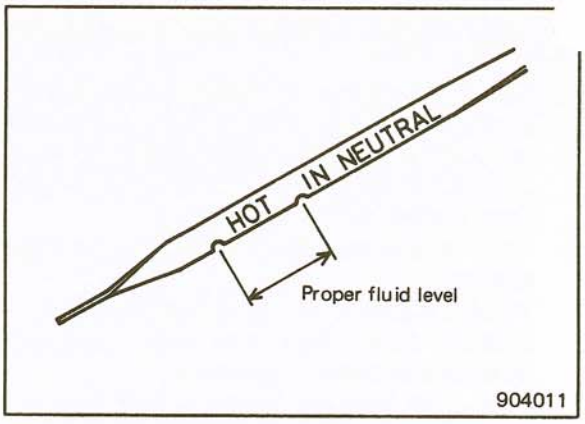
‿UID LEAKAGE–TRANSMISSION CONVERTER ɦOUSING AREA

1. Check for Source of Leakage. Since fluid leakage at or around the converter area may originate from an engine oil leak, the area should be examined closely. Factory fill ATF is dyed red and, therefore, can be distinguished from engine oil.
2. Prior to removing the transmission, perform the following checks:
   When leakage is determined to originate from the transmission, check fluid level prior to removal of the transmission and torque converter.
   High fluid level can result in fluid leakage out of the vent located at the top of the front pump housing. If the fluid level is high, adjust to proper level.
   After performing these operations, re-check for leakage. If a leakage persists, carefully check to determine whether it is the converter or the transmission (the oil seal of the oil pump housing or the fitting portions of the oil pump housing and case) that is leaking.

LUBRICATION

Checking Fluid Level and Replenishing Fluid

Check and replenish interval:
Every 48,000 km (30,000 miles)
Inspect fluid level of dipstick with engine idling and transmission in neutral position. When ATF temperature is about 80°C (170°F) (average operating temperature), fluid level should be between upper and lower notches of dipstick. (904011)



Changing Fluid

Recommended fluid . . . . . .
ATF "DEXRON" or "DEXRON II" type

NOTES
1. When factory fill fluid is changed as recommended above, only fluids of type labeled ATF "DEXRON" or "DEXRON II" type should be used.
2. If the transmission is disassembled for any reason, the fluid and filter should be changed.

Fluid Changing Procedure

1. Raise vehicle on a hoist. Place a drain container with a large opening, under transmission fluid pan.
2. Loosen pan bolts and tap the pan at one corner to break it loose allowing fluid to drain, then remove the oil pan.
3. If necessary, adjust the low-reverse band.
4. Install a new filter on bottom of the valve body, and tighten retaining screws to specified torque.

   Tightening torque . . . . . 3-5 Nm (2.2-3.6 ft.lbs.)

5. Clean the oil pan, and reinstall using a new gasket. Tighten oil pan bolts to specified torque.

   Tightening torque . . . . . 15-20 Nm (11-14 ft.lbs.)

6. Pour 3.8 liter (4.0 U.S. qts., 3.4 Imp. qts.) of recommended fluid through the filler tube.

   Recommended fluid . . . . . .
   ATF "DEXRON" or "DEXRON II" type

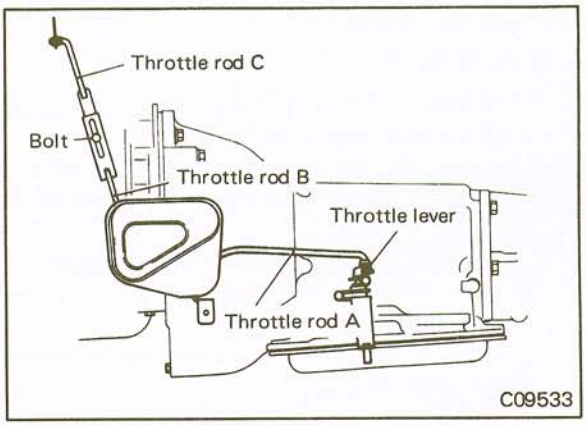
7. Start engine and allow it to idle for at least two minutes. Then, with parking brake on, move selector lever momentarily to each position ("P" to "L"), ending in the neutral position.
8. Add ATF until fluid level reaches lower notch of dipstick. After transmission has reached average operating temperature, recheck fluid level. Fluid level should be between notches of dipstick.

Caution
Check fluid level with vehicle on flat surface.
Use care to prevent entry of dust and foreign matter through filler tube. After inspection, reinsert dipstick all the way into filler tube.

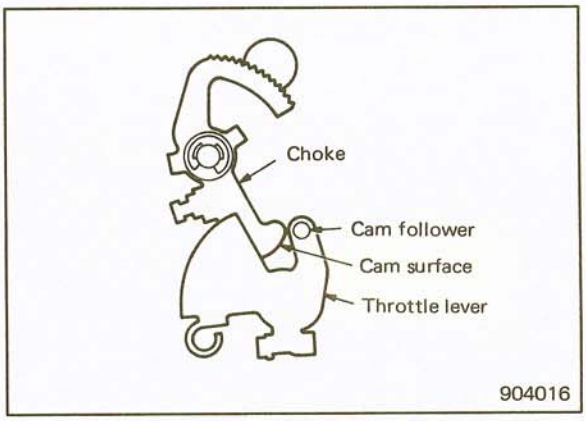
DJUSTMENT OF THROTTLE LINKAGE

Caution
When engine idling adjustment is made, make sure that throttle linkage is readjusted.

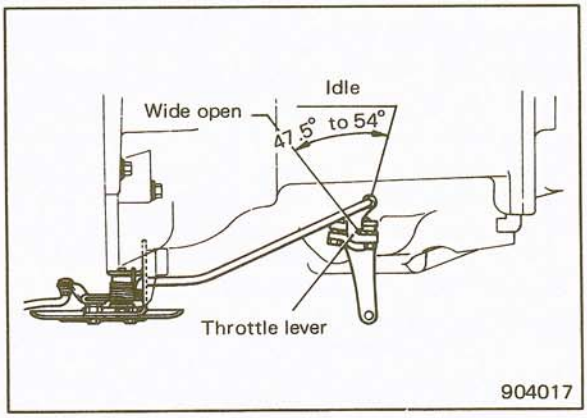
1. Install each linkage. Loosen the bolts so that rods B and C slide properly.



2. Allow engine to warm up until engine coolant temperature reaches average operating temperature [about 80°C (170°F)]. Confirm complete release of fast idle. This confirmation can be made by checking to see if cam surface of choke lever of carburetor is completely off cam follower of throttle lever.



3. Lightly push rod A or the transmission throttle lever toward the idle stopper (to the right in illustration (904017)), and set the rods to the idle position. Tighten the bolt securely to connect rods B and C.
4. Make sure that, when the carburetor throttle valve is wide-open, the transmission throttle lever moves as shown in illustration (904017) (operating angle: 47.5°-54°), and that there is some range in the lever stroke. Also make sure that, when the throttle linkage alone is slowly returned from the fully opened position, the transmission throttle lever completely returns to IDLE by return-spring force.



BAND ADJUSTMENTS

Kickdown Band

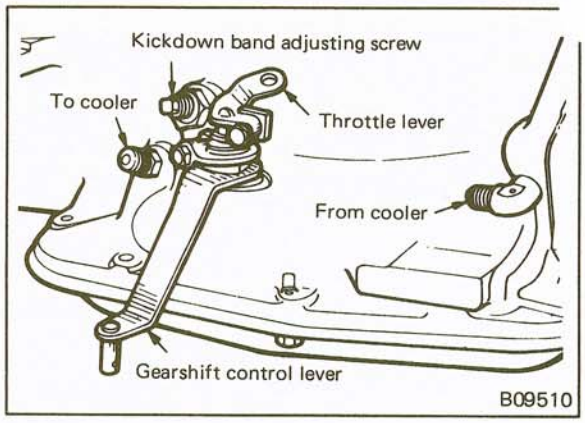
The kickdown band adjusting screw is located on left side of the transmission case. (B09510)

1. Loosen lock nut and back off approximately five turns. Test adjusting screw for free turning in the transmission case.
2. Using torque wrench with kickdown band adjusting wrench MD998357, tighten band adjusting screw to specified torque.

Tightening torque	
When adjuster MD998357 is used	5.9 Nm (4.3 ft.lbs.)
When adjuster MD998357 is not used	7.8 Nm (5.8 ft.lbs.)

3. Back off adjusting screw three and a half turns from 5.9 Nm (4.3 ft.lbs.). Hold adjusting screw in this position and tighten lock nut to specified torque.

Tightening torque ..... 40-55 Nm (30-41 ft.lbs.)



Low and Reverse Band

1. Raise vehicle, drain ATF from loosened oil pan and remove the oil pan.
2. After lock nut has been removed, tighten adjusting screw to specified torque using special tool. (904133)

Tightening torque ..... 4.9 Nm (3.6 ft.lbs.)

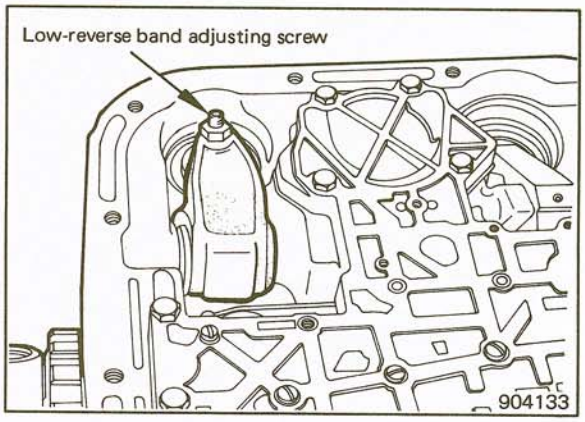
3. Back off adjusting screw 7 turns from 4.9 Nm (3.6 ft.lbs.)
4. Mount and tighten lock nut to specified torque.

Tightening torque ..... 34-47 Nm (25-35 ft.lbs.)

5. Clean oil pan, replace gasket, and reinstall. Tighten oil pan bolts to specified toruqe.

Tightening torque ..... 15-20 Nm (11-14 ft.lbs.)

6. Fill transmission with specified ATF. For how to pour in ATF, refer to "Lubrication" in this section.



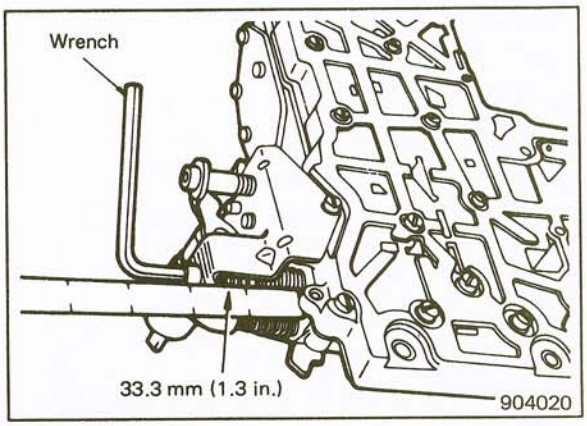
YDRAULIC CONTROL PRESSURE ADJUSTMENTS

Line Pressure

An incorrect throttle pressure setting will cause incorrect line pressure readings even though line pressure adjustment is correct. Always inspect and correct throttle pressure adjustment before adjusting the line pressure.

The approximate adjustment is 33.3 mm (1.3 in.), measured from valve body to inner edge of adjusting nut. However, due to manufacturing tolerances, the adjustment can be varied to obtain specified line pressure.

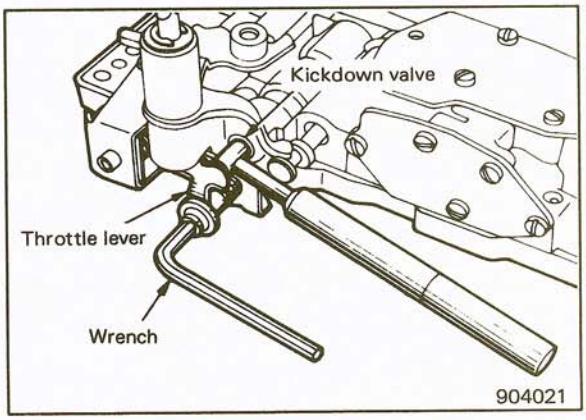
The adjusting screw may be turned with an Allen wrench. One complete turn of adjusting screw changes closed throttle line pressure approximately 9.8 kPa (1.4 psi). Turning adjusting screw counterclockwise increases pressure, and clockwise decreases pressure.



Throttle Pressure

Throttle pressures cannot be tested accurately; therefore, the adjustment should be measured if a malfunction is evident.

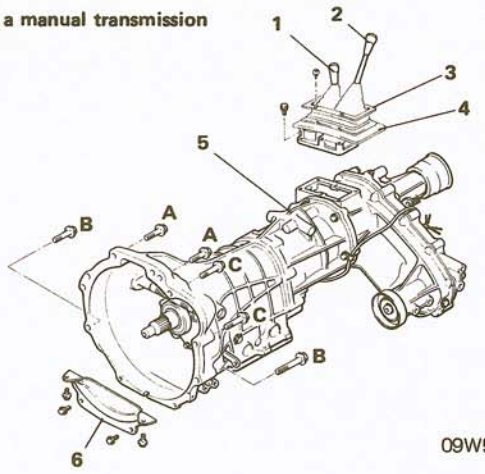
1. Insert Special Tool Throttle Pressure Adjust Tool MD998563 between the throttle lever cam and kickdown valve.
2. By pushing in on tool, compress kickdown valve against its spring so that throttle valve is completely bottomed inside the valve body.
3. As force is being exerted to compress spring, turn throttle lever stop screw with Allen wrench until head of screw touches the throttle lever tang with throttle lever cam touching tool and the throttle valve bottomed. Be sure adjustment is made with spring fully compressed and valve bottomed in the valve body.



COMPONENTS

1. Transfer gearshift lever
2. Transmission gearshift lever
3. Dust cover retaining plate
4. Gearshift lever cover
5. Manual transmission and transfer assembly
6. Bell housing cover
7. Automatic transmission and transfer assembly

Vehicles with a manual transmission



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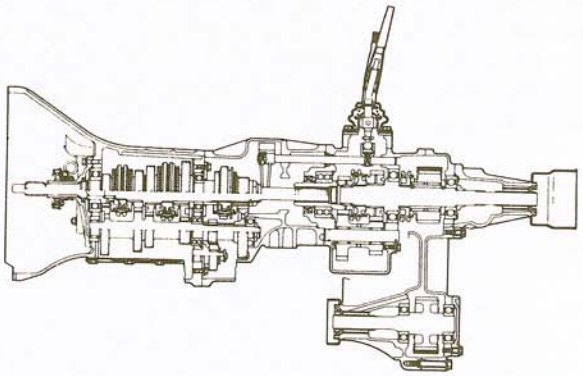

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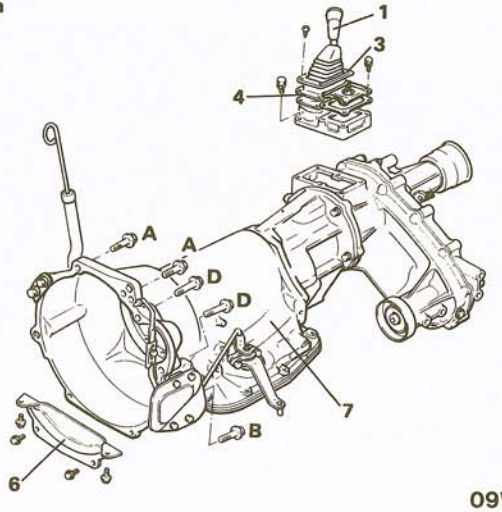
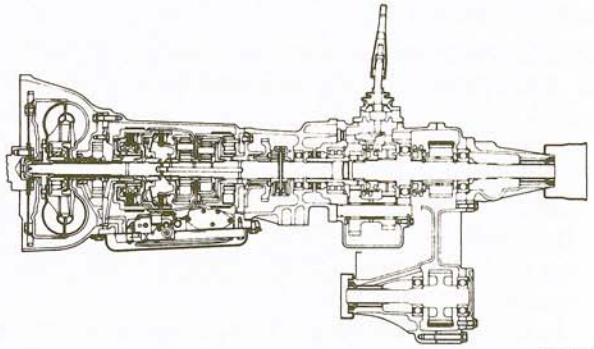
Vehicles with an automatic transmission





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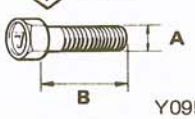
	Nm	ft.lbs.	O.D. x Length mm (in.)
A	42-54	31-40	⑦ 10 x 40 (.4 x 1.6)
B	42-54	31-40	⑦ 10 x 65 (.4 x 2.6)
C	22-31	16-23	⑦ 10 x 60 (.4 x 2.4)
D	20-29	15-22	⑦ 10 x 65 (.4 x 2.6)

Bolt identification

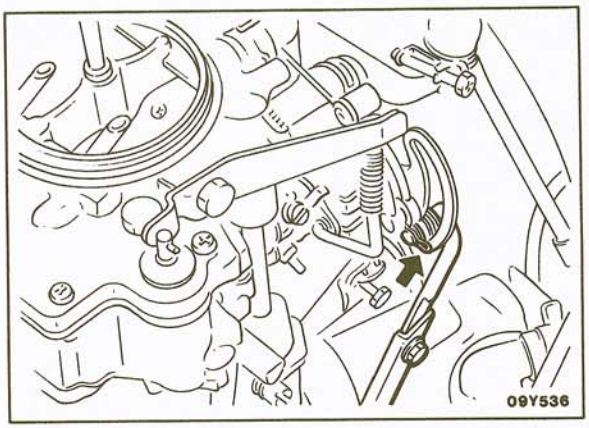
⑦ A x B



Y09512

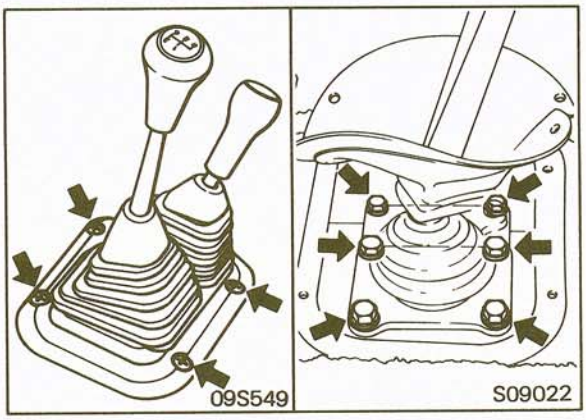
REMOVAL

1. Disconnect the negative cable from the battery.
2. Vehicles with an automatic transmission, disconnect the down shift link. (09Y536)

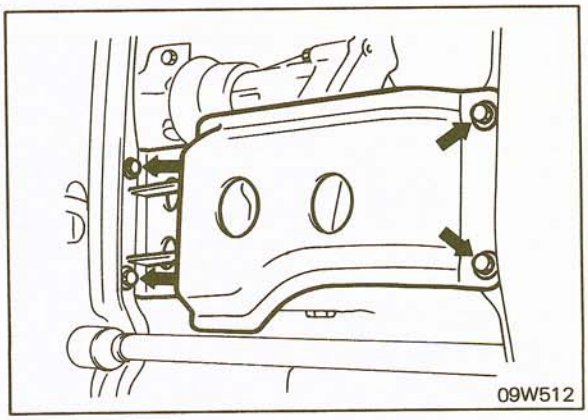


3. Remove the transmission gearshift lever (vehicles with a manual transmission) or transmission selecter lever (vehicles with an automatic transmission, refer to P.21-33.) and transfer shift lever. (09S549, S09022)

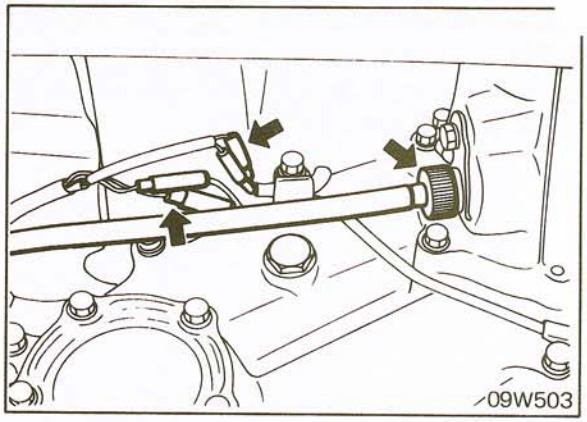
Caution
When removing the gearshift lever assembly, keep the transmission gearshift lever and the transfer gearshift lever in the following positions:
Transmission gearshift lever (vehicles with a manual transmission only) –
Neutral position
Transfer gearshift lever –
4H (4-wheel drive – high range) position
After the gearshift lever assembly has been removed, cover it with a shop towel to prevent entry of foreign substances into the extension housing.



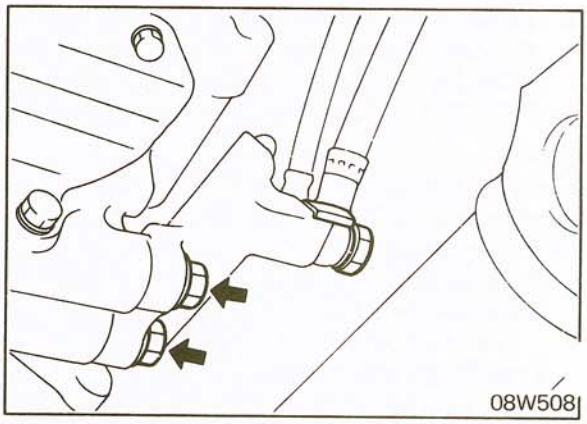
4. Raise the vehicle.
5. Remove the transfer case protector. (09W512)
6. Vehicles with an automatic transmission, remove the control arm, control rod, cross select shaft. (Refer to P. 21-34.)
7. Drain the transmission and transfer case oil.
8. Vehicles with an automatic transmission, remove the oil cooler hoses and tubes. (Refer to GROUP 7.)
9. Remove the front and rear propeller shafts. (Refer to GROUP 16.)



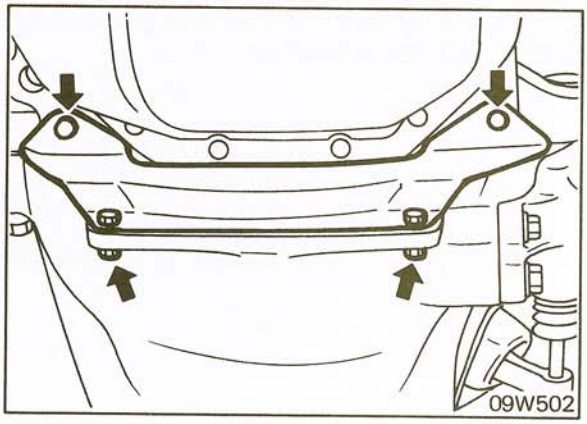
10. Disconnect speedometer cable, back-up light switch harness, and the 4-wheel-drive indicator light harness.



11. Vehicles with a manual transmission, detach the clutch release cylinder from the transmission.

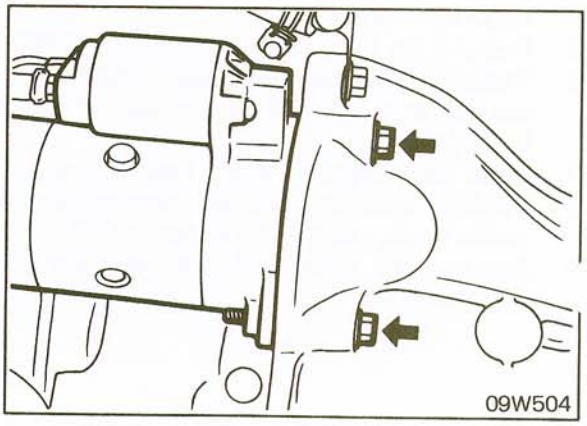


12. Remove the bell housing cover.

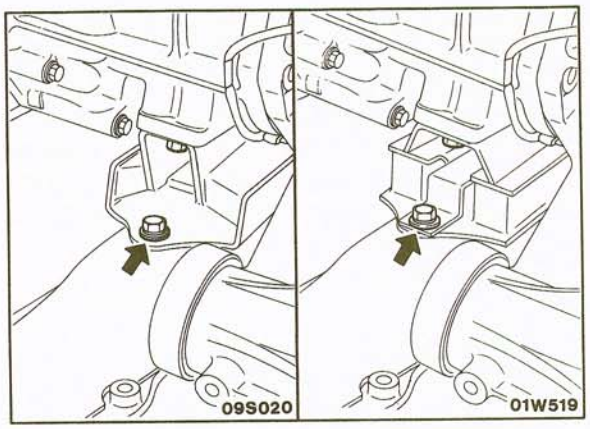


13. Detach the starting motor from the transmission.

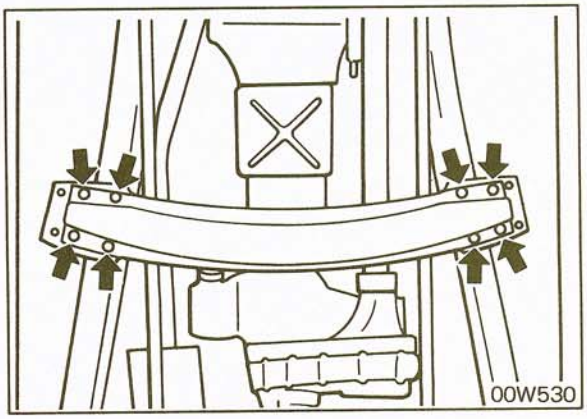
NOTE
On vehicles with an air conditioner, remove the front propeller shaft and then lower the starting motor downward from under the vehicle to remove it.



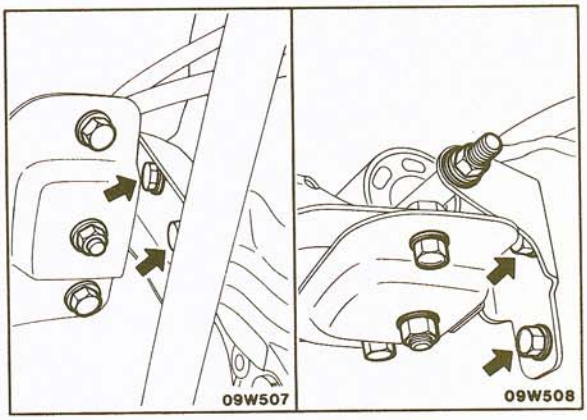
14. Detach the engine support rear insulator from the No. 2 crossmember.



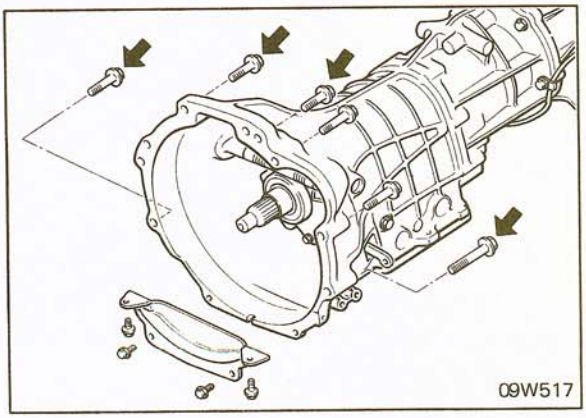
15. Remove the No. 2 crossmember. (00W530)
16. Support the transmission and transfer assembly with a transmission jack.



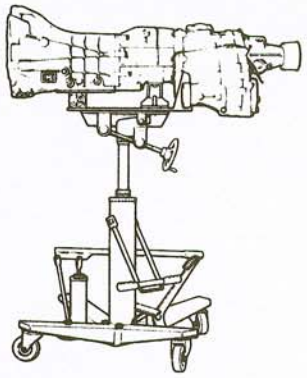
17. Detach the transfer from the transfer mounting bracket.



18. Remove the transmission mounting bolts from the engine.



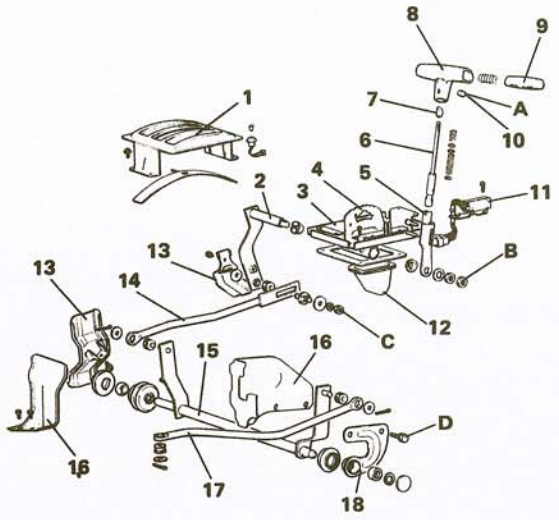
19. Disconnect the transmission and transfer assembly from the engine by pulling it slowly toward the rear of the vehicle. (09W511)
20. When lowering the transmission and transfer assembly, tilt the front of the transmission downward and slowly lower forward, while using care to make sure that the rear of the transmission does not hit the No. 4 crossmember. (09W511)


09W511

ƆMPONENTS

1. Position indicator cover
2. Control arm
3. Lever bracket assembly
4. Detent plate
5. Selector lever
6. Selector lever rod assembly
7. Rod adjusting cam
8. Selector handle
9. Pushbutton
10. Set screw
11. Inhibitor switch
12. Lever bracket cover
13. Heat protector
14. Control rod (B)
15. Cross select shaft
16. Protector
17. Control rod (A)
18. Cross shaft bracket

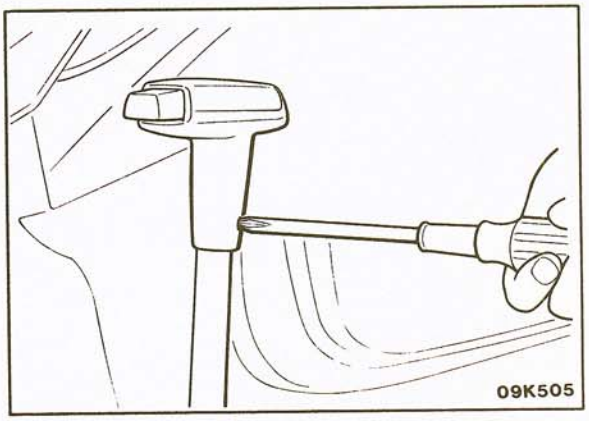
	Nm	ft.lbs.
A	2 or more	1.4 or more
B	18-24	13-17
C	13	9
D	10-13	7-9



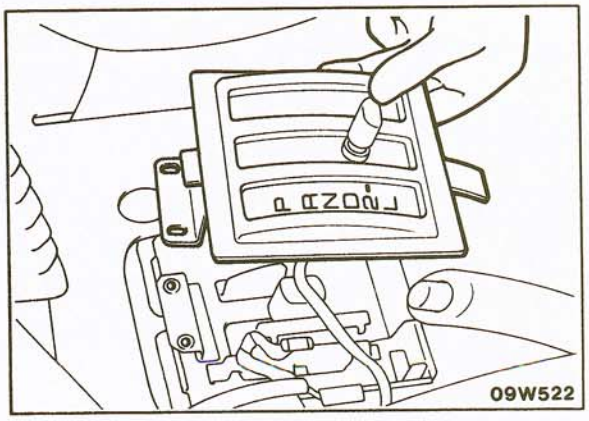
09W001

REMOVAL

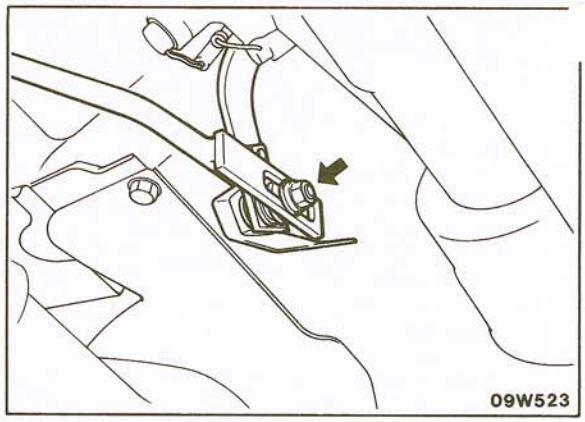
1. Remove the selector handle from the selector lever. (09K505)
2. Remove the console box. (Refer to GROUP 23.)



3. Remove the indicator panel. (09W522)
4. Disconnect the connector of the position indicator light.



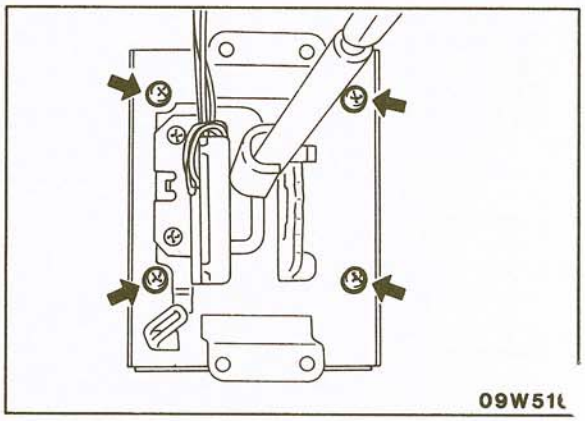
5. Disconnect the control rod (B) from the control arm by lossening the nut from under the floor.



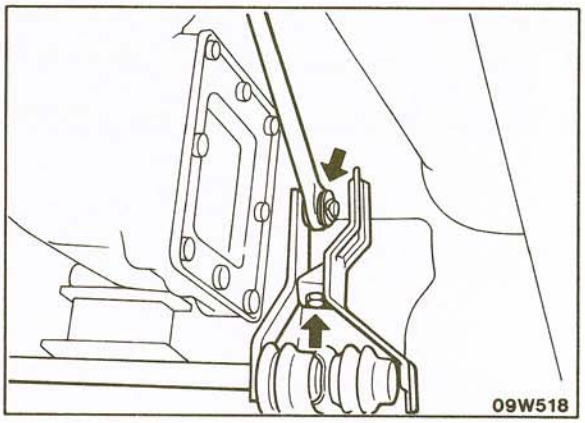
6. Disconnect the connector of the inhibitor switch.

NOTE
Do not remove the inhibitor switch from the lever bracket assembly unless it is necessary to do so.

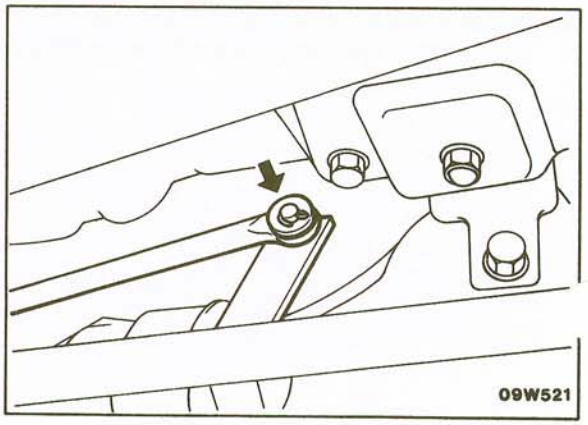
7. Remove the lever bracket assembly by loosening the attaching screws. (09W516)



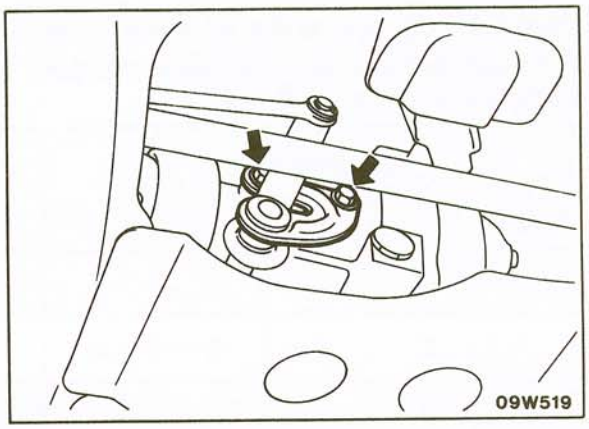
8. Disconnect the cross select shaft from the heat protector.
9. Disconnect the cross select shaft from control rod B. (09W518)



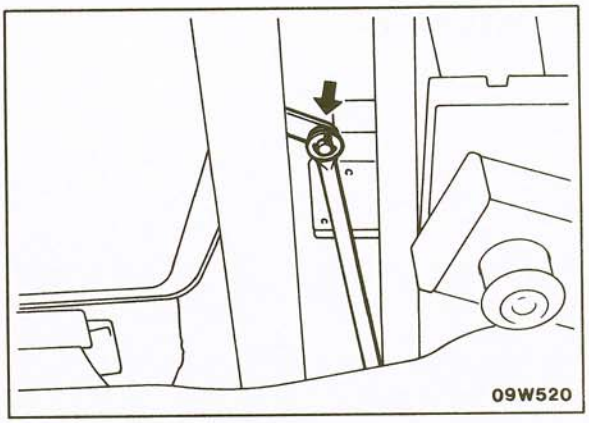
10. Disconnect the cross select shaft from control rod A.



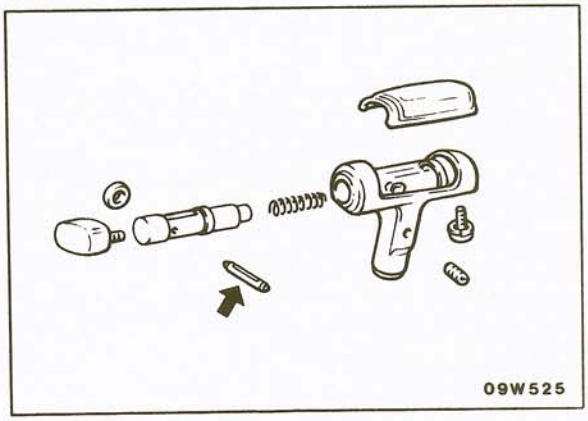
. Remove the cross shaft bracket mounting bolts from the transfer assembly. (09W519)
12. Detach the cross shaft bracket from the bracket on the No. 1 crossmember side.



13. Remove control rod A from the transmission.



14. Remove the cover of selector handle.
15. Remove the spring pin in order to disassemble the selector handle. (09W525)



INSPECTION

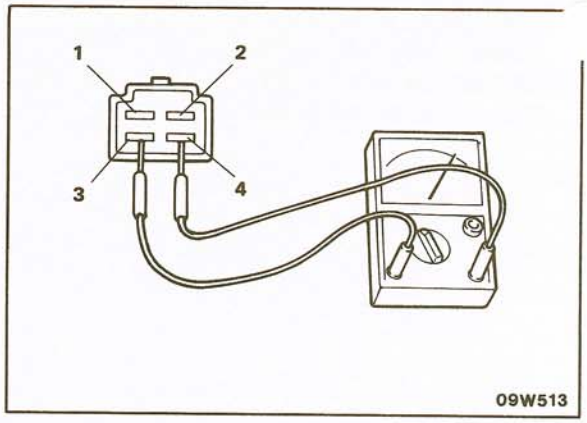
1. Check detent plate for wear.
2. Check pin at the end of selector lever for wear.
3. Check the pushbutton and the rod adjusting cam for worn contact surface.
4. Check control rods for damage, cracking, or deformation.
5. Check each bushing for cracking, deterioration, or wear.
6. Check the cross select shaft for damage, cracking, or deformation.

Operating Condition of the Inhibitor Switch

Shift the selector lever to each position, and check for continuity as shown in the table.

Position \ Terminal	1	2	3	4
P			O—O	
R	O—O			
N			O—O	

O—O: Continuity



INSTALLATION

Selector Lever

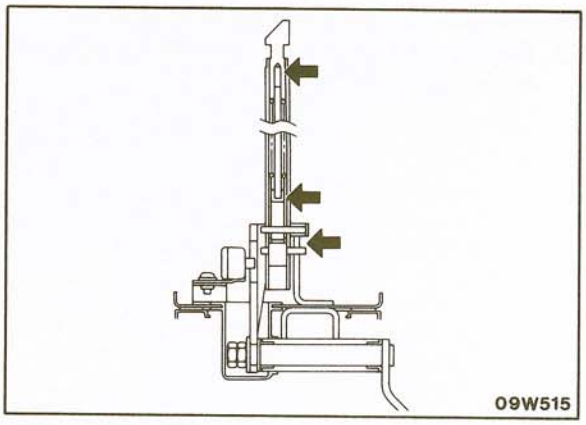
1. Apply multipurpose grease to each sliding part. (09W515)

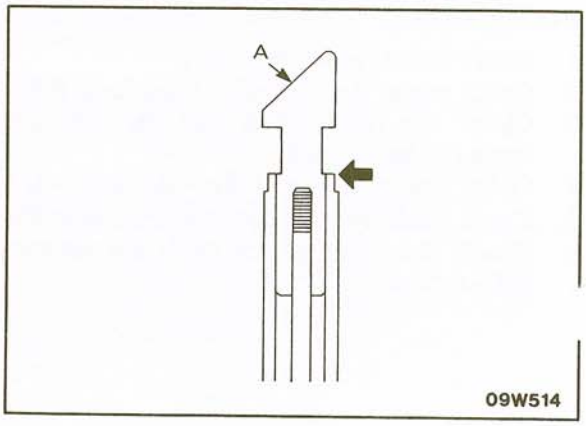
   Recommended grease ..... Multipurpose grease, SAE J310a, NLGI grade #3

2. Mount the selector lever and the control arm onto the lever bracket assembly, and then tighten the lock nut to the specified torque.

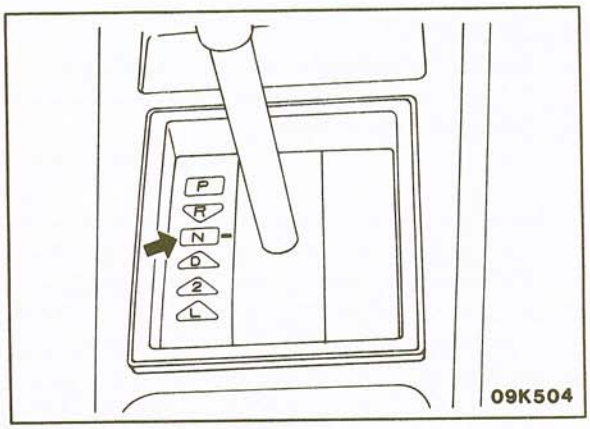
   Lock nut tightening torque ..... 18-24 Nm (13-17 ft.lbs.)

3. Set the selector lever to the "N" position, and then turn the rod adjusting cam to adjust it so that its bottom surface is flush with the end of the selector lever as shown in the illustration. At this time, position the rod adjusting cam so that surface A faces the direction of the driver's seat.





Set the selector lever to the "N" position, and then mount the indicator panel so that the "N" indication is properly aligned. (09K504)



Selector Handle

1. Apply multipurpose grease to each sliding part.

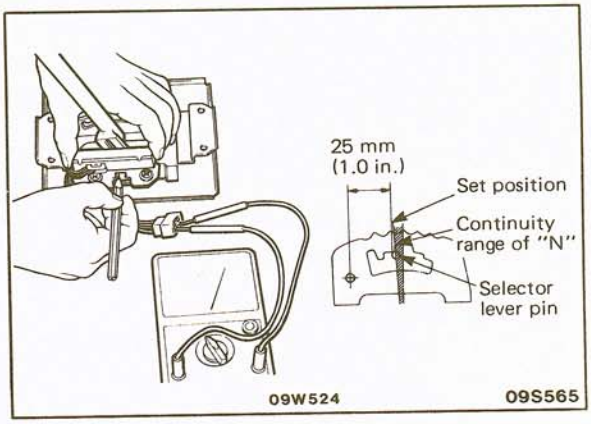
Recommended grease	Multipurpose grease, SAE J310a, NLGI grade #3

2. Tighten the selector handle to the specified torque.

Selector handle set screw tightening torque	2.0 Nm (1.4 ft.lbs.) or more

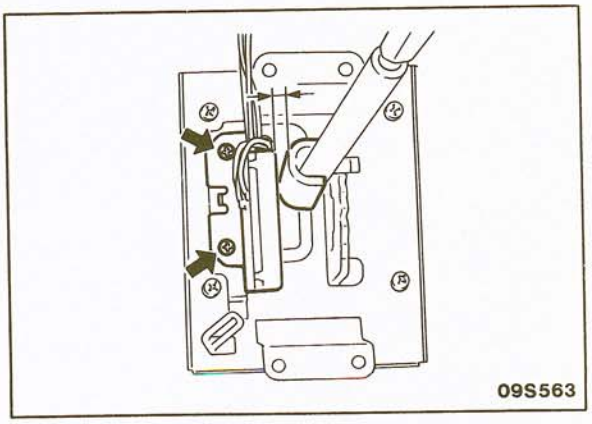
Inhibitor Switch

1. Install the inhibitor switch temporarily.
2. Connect an ohmmeter to the terminals (BY-BY) of the inhibitor switch connector, and prepare for continuity check.
3. Set the selector lever so that the selector lever pin comes to the position shown in the illustration. (09S565)
4. Slide the inhibitor switch from the rear to the front, secure it at the point at which continuity begins, and then make a mark on the lever bracket assembly. (09W524)



5. Tighten the inhibitor switch mounting screws at the position where the clearance between the inhibitor switch and the selector lever is the specified distance.

Clearance between the side of the inhibitor switch and the selector lever	2.5 mm (.1 in.)



Control Rods

1. Apply multipurpose grease to each sliding part.

Recommended grease . . . . . .
Multipurpose grease, SAE J310a,
NLGI grade #3

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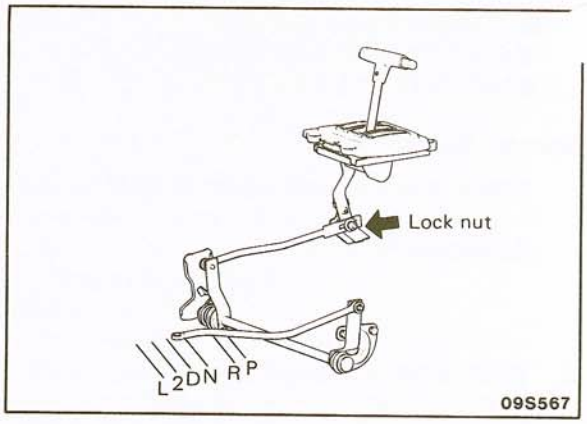
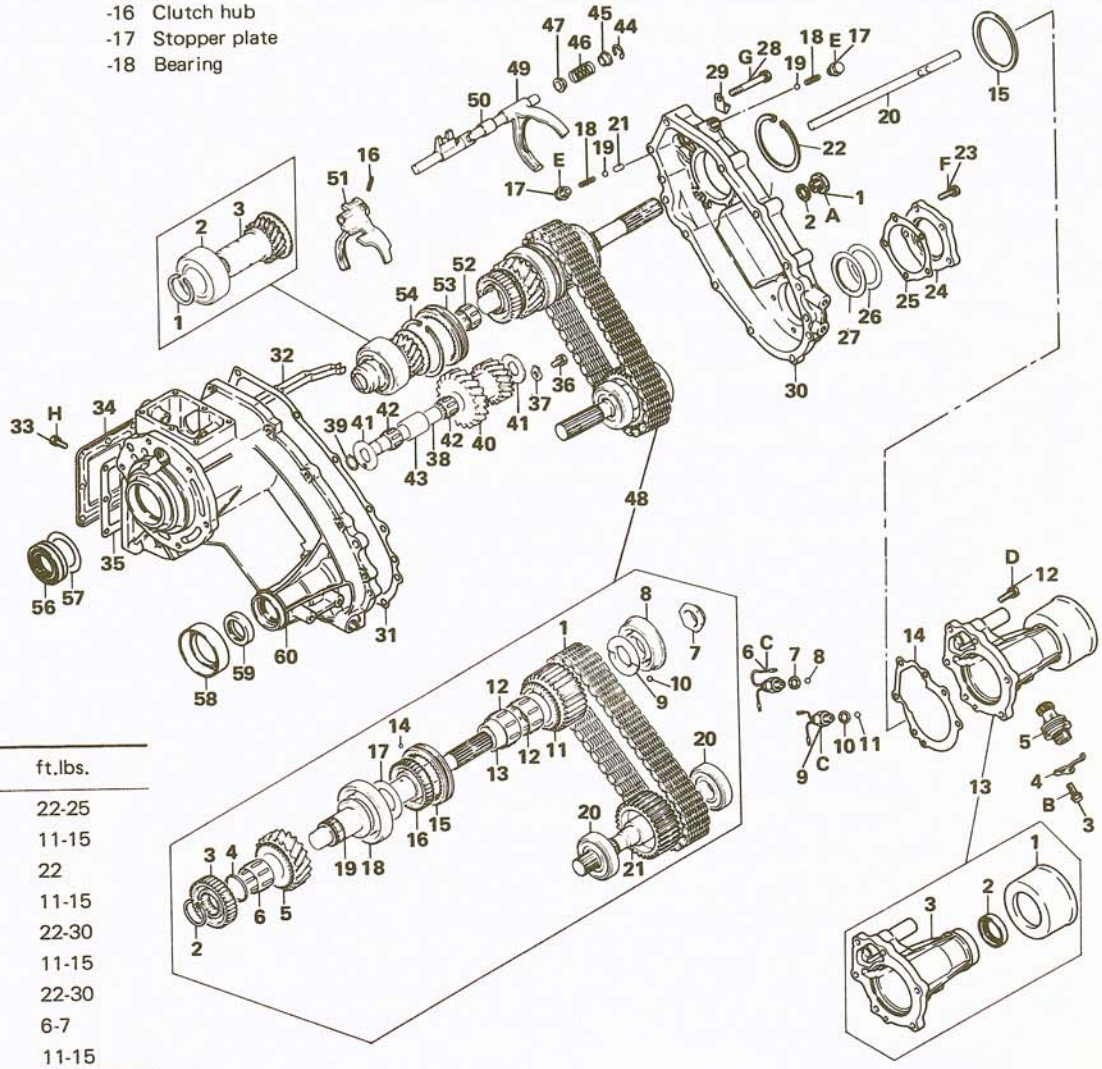
2. To connect the control rod (B) to the control arm, set the selector lever to the "N" position, move the control rod (A) to place the transmission in the Neutral position, and then tighten the rod to the lever lock nut. (09S567)
3. Torque all parts to specifications during assembly.
4. After installing each part, make certain that the selector lever moves smoothly and that the lever on the transmission side moves properly to each selector position. (09S567)



'OMPONENTS

1. Filler plug
2. Gasket
3. Bolt
4. Sleeve clamp
5. Speedometer sleeve assembly
6. 4WD indicator lamp switch
7. Gasket
8. Steel ball
9. 4WD indicator lamp switch
10. Gasket
11. Steel ball
12. Bolt (6)
13. Rear cover assembly
    -1 Dust seal
    -2 Dust seal guard
    -3 Rear cover
14. Rear cover gasket
15. Wave spring
16. Spring pin
17. Seal plug (2)
18. Poppet spring (2)
19. Steel ball (2)
20. Interlock plunger
21. H-L shift rail
22. Snap ring
23. Bolt (5)
24. Cover
25. Cover gasket
26. Spacer (AR)
27. Wave spring
28. Bolt (10)
29. Cord fastener (4)
30. Chain cover
31. Chain cover gasket
32. Oil guide
33. Bolt (8)
34. Side cover
35. Side cover gasket
36. Bolt
37. Lock plate
38. Counter gear shaft
39. O-ring
40. Counter shaft gear
41. Thrust washer (2)
42. Needle bearing (2)
43. Bearing spacer
44. Snap ring
45. Spring retainer
46. Spring
47. Spring retainer
48. Output shaft assembly
    -1 HY-VO chain
    -2 Snap ring
    -3 Clutch hub (High and Low)
    -4 Bearing spacer
    -5 Low speed gear
    -6 Needle bearing
    -7 Locking nut
    -8 Radial ball bearing
    -9 Sprocket spacer
    -10 Steel ball
    -11 Drive sprocket
    -12 Needle bearing (2)
    -13 Sprocket sleeve
    -14 Steel ball
    -15 Clutch sleeve
    -16 Clutch hub
    -17 Stopper plate
    -18 Bearing
    -19 Rear output shaft
    -20 Bearing (2)
    -21 Front output shaft
49. Rear-wheel drive-4-wheel drive shift fork
50. Rear-wheel drive-4-wheel drive shift rail
51. H-L shift fork
52. Needle bearing
53. Clutch sleeve
54. Snap ring
55. Input gear assembly
    -1 Snap ring
    -2 Bearing
    -3 Input gear
56. Oil seal
57. Baffle plate
58. Dust seal guard
59. Oil seal
60. Transfer case



	Nm	ft.lbs.
A	30-34	22-25
B	15-21	11-15
C	30	22
D	15-21	11-15
E	30-41	22-30
F	15-21	11-15
G	30-41	22-30
H	8.0-9.5	6-7
I	15-21	11-15

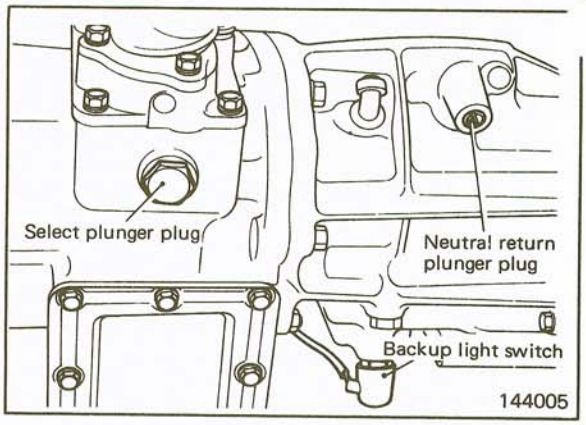
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

145026

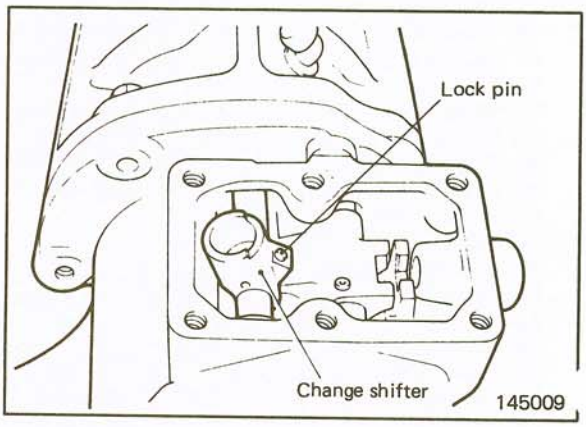
REMOVAL

Manual Transmission

1. Remove the backup light switch from the lower right of the adapter. Remove the steel ball. (144005)
2. Remove the plug from the right side of the transfer case and then remove the select spring and the select plunger. (144005)
3. Remove the six bolts securing the control lever assembly and remove the control lever assembly and the gasket.
4. Remove the plugs from the top of the adapter and remove the resistance spring, steel ball, neutral return springs and plungers.



5. Remove the lock pin from the change shifter using a 4.8-mm (3/16-in.) punch. (145009)
6. Remove the four bolts and two nuts securing the transfer case to the adapter.
7. Remove the transfer case assembly from the adapter and remove the change shifter from the control shaft.

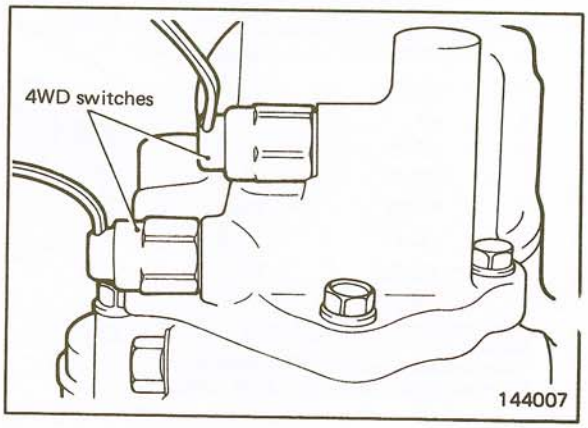


Automatic Transmission

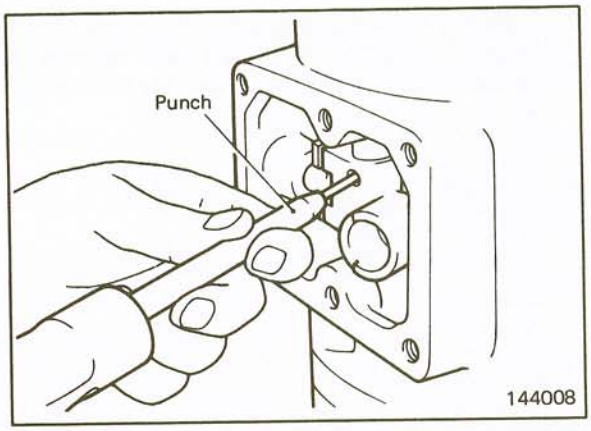
1. Remove the bolts securing the transfer case and transmission case.
2. Remove the transfer case assembly from the transmission.
3. Remove the four bolts and two nuts securing the transfer case to the adapter.
4. Remove the adapter from the transfer case.

DISASSEMBLY

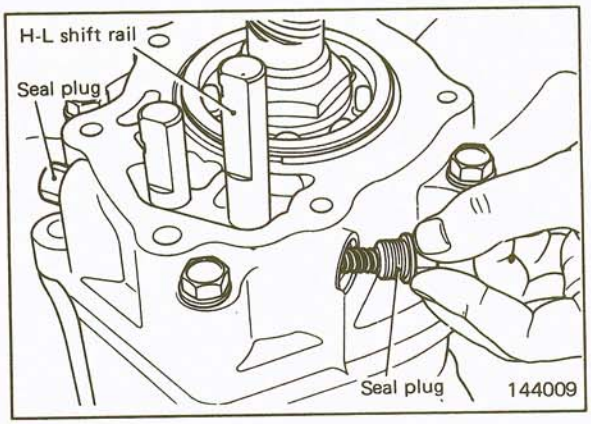
1. Remove two 4WD indicator light switches. Remove two steel balls. (144007)
2. Remove the speedometer sleeve clamp and remove the speedometer sleeve assembly.
3. Remove the bolts securing the rear cover and remove the rear cover, the gasket and the wave spring.
4. Remove the cover and gasket and then remove the wave spring and spacer.



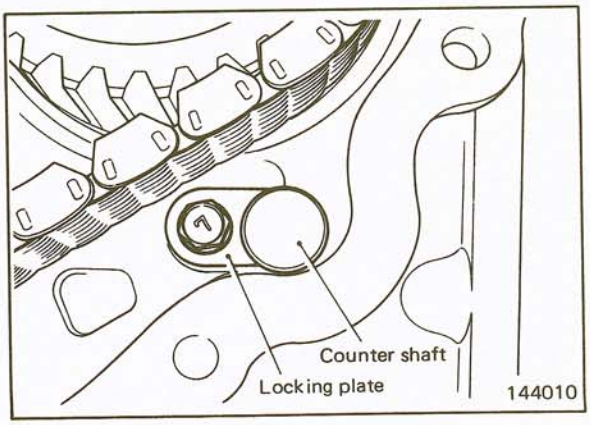
Remove the spring pin from the H-L shift fork using a 4.8-mm (3/16-in.) punch.



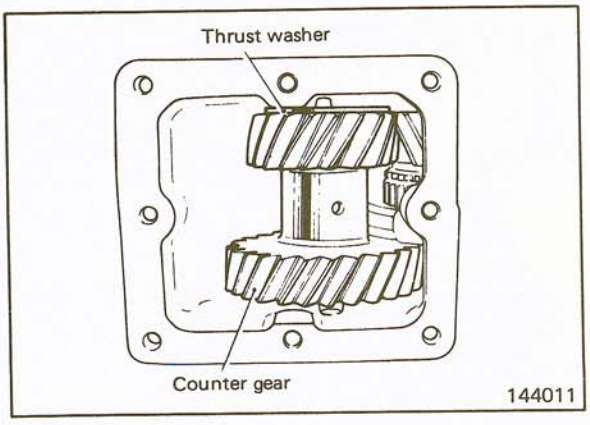
6. Remove the two seal plugs and remove the two poppet springs and two balls. (144009)
7. Pull the H-L shift rail out toward the rear.
8. Remove the interlock plunger.
9. Remove the snap ring from the rear bearing of the rear output shaft.
10. Remove the chain cover.
11. Remove the oil guide.
12. Remove the side cover.



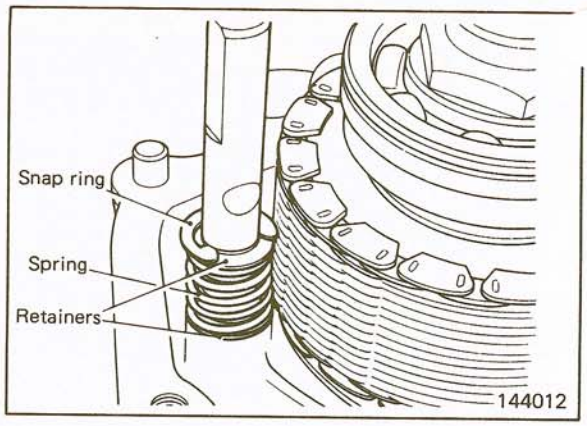
13. Remove the counter shaft locking plate and remove the counter shaft.



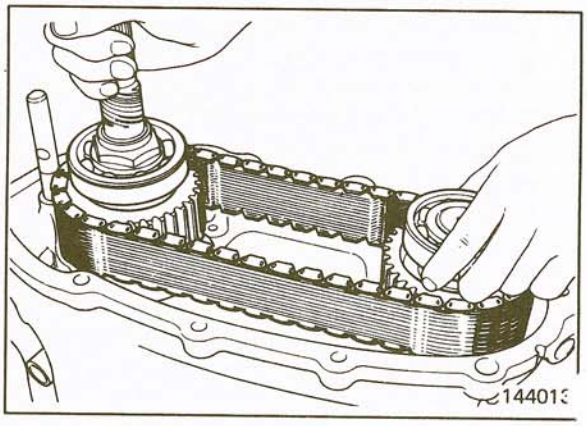
14. Remove the counter gear, two thrust washers, two needle bearings and the spacer through the side cover opening.



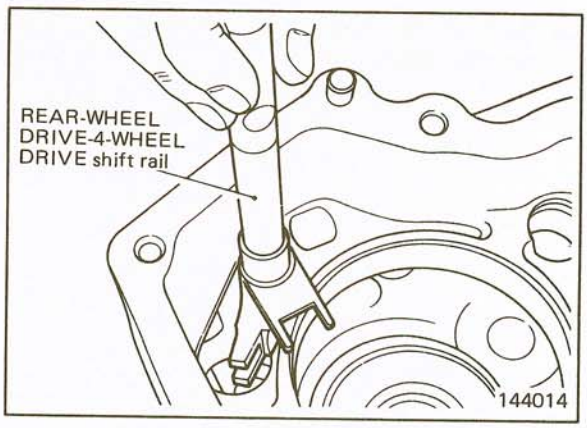
15. Remove the snap ring from the REAR-WHEEL DRIVE-4-WHEEL DRIVE shift rail and remove the two spring retainers and the spring from the shift rail.



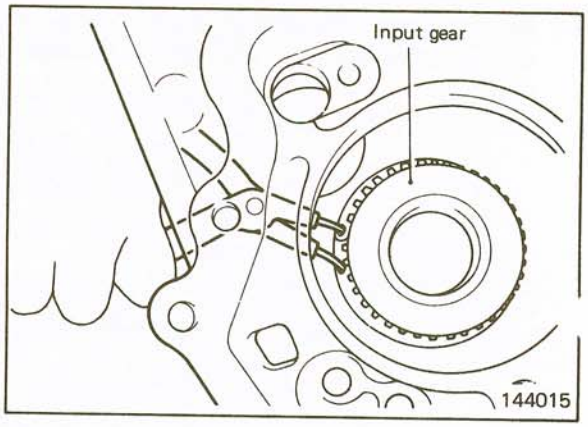
16. Remove the front output shaft, the rear output shaft and the chain from the transfer case as a unit.



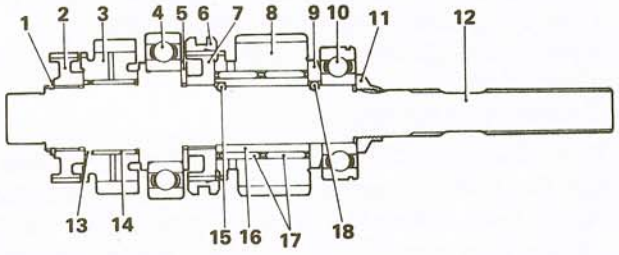
17. Remove the REAR-WHEEL DRIVE-4-WHEEL DRIVE shift rail. (144014)
18. Remove the H-L shift fork and the clutch sleeve.
19. Remove the needle bearing from the input gear.



20. Remove the snap ring, and the input gear assembly. (144015)
21. Remove the snap ring from the front end of the rear output shaft and remove the H-L clutch hub, the low speed gear, the thrust washer and the needle bearing.



1. Snap ring
2. H – L clutch hub
3. Low speed gear
4. Ball bearing
5. Stop plate
6. REAR-WHEEL DRIVE-4-WHEEL DRIVE clutch sleeve
7. REAR-WHEEL DRIVE-4-WHEEL DRIVE clutch hub
8. Drive sprocket
9. Sprocket spacer
10. Ball bearing
11. Lock nut
12. Rear output shaft
13. Thrust washer
14. Needle bearing
15. Steel ball
16. Sprocket sleeve
17. Needle bearings
18. Steel ball



144016

22. Loosen the staking on the rear output shaft lock nut and remove the lock nut.
23. Remove the ball bearing from the rear end using a universal bearing puller or a press.
24. Remove the sprocket spacer and the steel balls.
25. Remove the drive sprocket, the two needle bearings, the sprocket sleeve and the steel ball.
26. Remove the REAR-WHEEL DRIVE-4-WHEEL DRIVE clutch sleeve, the hub and the stop plate and remove the ball bearing using a puller or press.
27. Remove the snap ring from the input gear. With the bearing supported by the press base, push on the front end of the input gear to remove the bearing.
28. Remove two bearings from the front output shaft using a universal bearing puller or a press base.
29. Remove the control shaft oil seal, input gear oil seal and front output shaft oil seal from the transfer case.

REASSEMBLY

Cautions

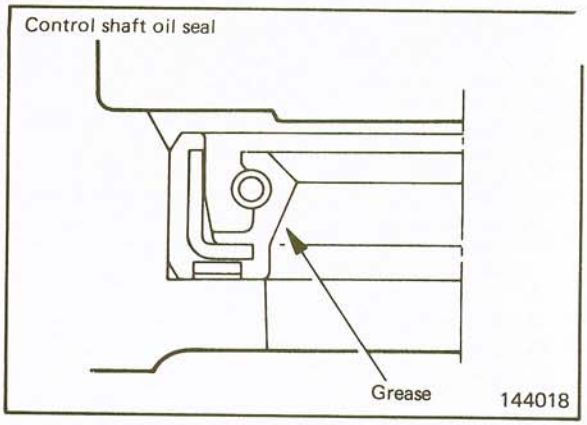
1. **Replace gaskets, oil seals, etc., with new ones.**
2. **Coat the gaskets and threads with sealant.**
3. **Apply transmission oil to sliding and rotating parts before assembling.**
4. **Do not reuse spring pin.**

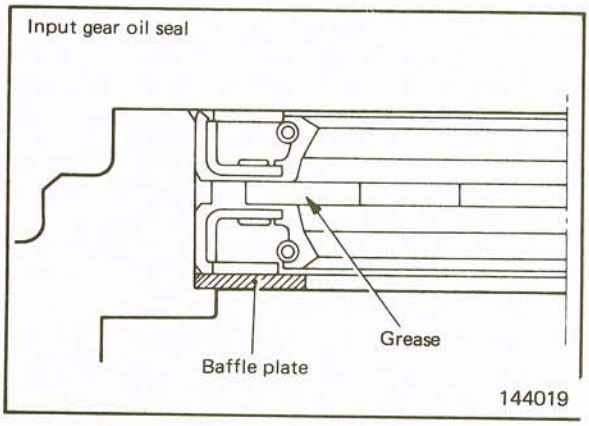
1. Press the control shaft oil seal, the input gear oil seal and the front output shaft oil seal into the transfer case. When press fitting the oil seals, push down on the outer circumference uniformly. After press fitting, pack grease between lips. (144018, 144019, 144020)
2. Assemble the adapter and the transfer case with a new gasket placed between them. Tighten the bolts and nuts. Be sure to install the change shifter over the control shaft before tightening the bolts and nuts.

Caution

If this sequence is reversed, the change shifter cannot be installed.

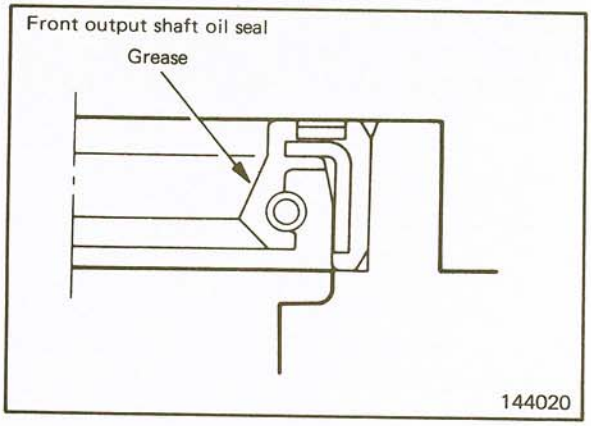
Transfer case mounting bolts and nuts tightening torque	30-41 Nm (22-30 ft.lbs.)



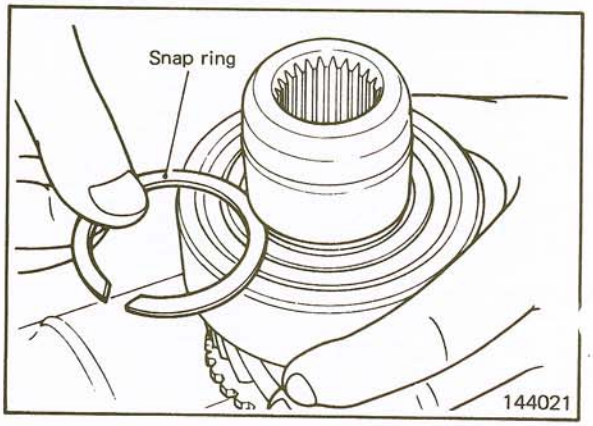


Caution

When inserting the transmission control shaft through the oil seal, take care not to damage the oil seal lip. If the change shifter lock pin hole in the shaft has burrs, remove them before inserting the shaft through the oil seal.



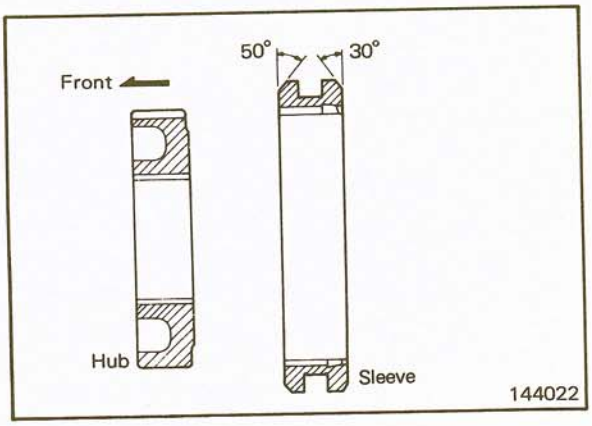
3. Press the bearing onto the input gear, being sure to push on the inner race. After fitting, check to see that the bearing rotates smoothly.
4. Fit a snap ring over the front end of the input gear. Snap rings are available in five different thicknesses. Use the thickest one that will fit into the groove. (144021)

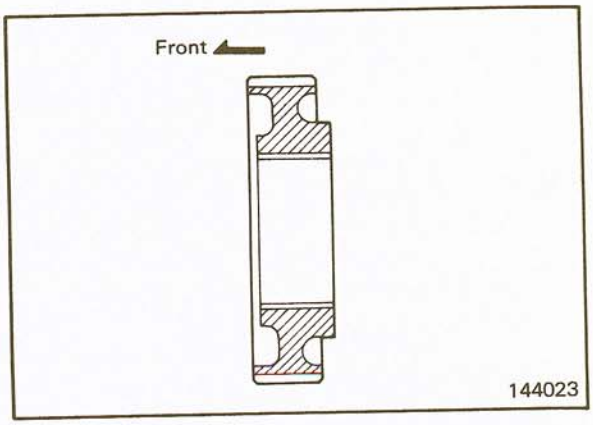


Snap ring thickness mm (in.)	Identification color
2.30 (.091)	None
2.35 (.093)	Red
2.40 (.094)	White
2.45 (.096)	Blue
2.50 (.098)	Green

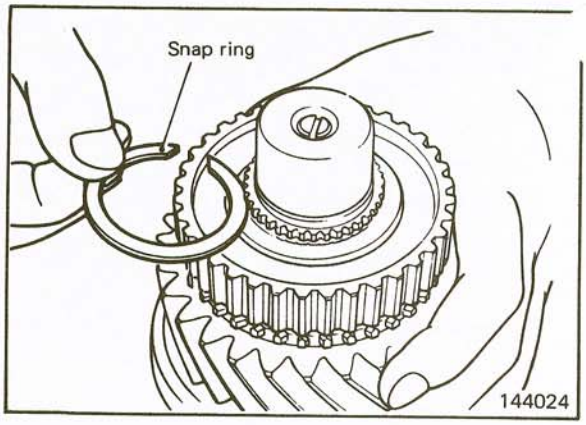
5. Press two ball bearings over the front output shaft, pushing down on the inner race. After fitting, check to see that they rotate smoothly.
6. Install the ball bearing over the rear output shaft from the rear and press into place. To install, push on the inner race. (Refer to p.21-43.) After installation, oheck to see that the ball bearing rotates smoothly.

7. Mount the stop plate and install the REAR-WHEEL DRIVE-4-WHEEL DRIVE clutch hub and sleeve. (Refer to p.21-43.) When mounting the hub and sleeve, be sure the direction of installation is correct. (144022)
8. Mount the steel ball (for sprocket sleeve positioning) on the rear output shaft and mount the sprocket sleeve. (Refer to p.21-43.)
9. Mount the two needle bearings on the outer circumference of the sprocket sleeve, and then mount the drive sprocket. (Refer to p.21-43.)
10. After mounting the steel balls and the sprocket spacer, press the ball bearing (Refer to p.21-43.), by pushing on the inner race. Check that the bearing rotates smoothly after it is fully installed.
11. Tighten the mainshaft lock nut and drive in the detent section with a punch.
    After the lock nut is tightened, check that the drive sprocket rotates smoothly.
12. Mount the needle bearing, the thrust washer and the low-speed gear on the rear output shaft from the front end.
13. Mount the H-L clutch hub, making sure that the direction of installation is correct. (144023)





14. Mount the H-L clutch hub snap ring on the front end of the rear output shaft. Snap rings are available in five different thicknesses. Use the thickest one that will fit into the groove. (144024)

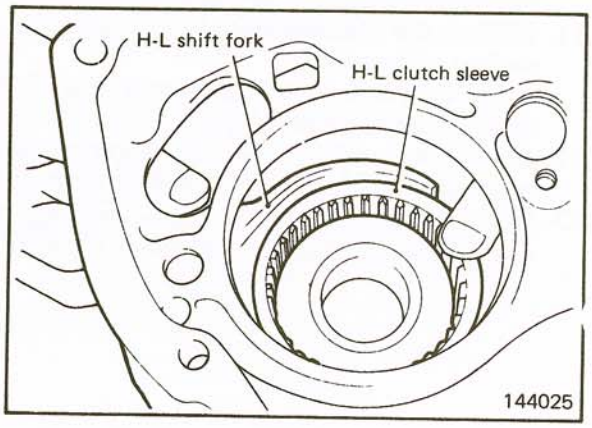


Snap ring thickness mm (in.)	Identification color
2.14 (.084)	None
2.21 (.087)	Yellow
2.28 (.090)	White
2.35 (.093)	Blue
2.42 (.095)	Red

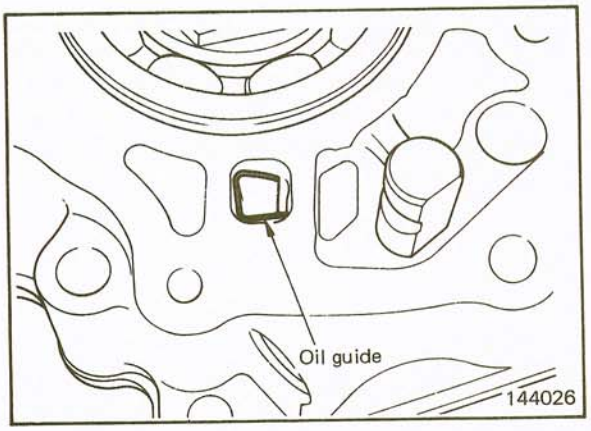
15. Insert the input gear assembly into the transfer case and mount the snap ring. (Refer to p.21-42.) Snap rings are available in five different thicknesses. Use the thickest one that will fit into the groove.

Snap ring thickness mm (in.)	Identification color
2.70 (.106)	Purple
2.75 (.108)	Pink
2.80 (.110)	Yellow
2.85 (.112)	White
2.90 (.114)	Blue

16. Insert the needle bearing into the input gear.
17. Mount the H-L clutch sleeve and shift fork, making sure that the direction of the clutch sleeve is correct. The direction of installation is the same as for the clutch sleeve for REAR-WHEEL DRIVE-4-WHEEL DRIVE. (144025)
18. Install the REAR-WHEEL DRIVE-4-WHEEL DRIVE shift rail. (Refer to p.21-42.)
19. Securely engage the chain with the front and rear output shaft sprockets. Assemble the REAR-WHEEL DRIVE-4-WHEEL DRIVE clutch sleeve with the REAR-WHEEL DRIVE-4-WHEEL DRIVE shift fork and install the assembly over the REAR-WHEEL DRIVE-4-WHEEL DRIVE shift rail. At the same time, mount the front and rear output shafts and chain, etc. as a unit. (Refer to p.21-42.)
20. Mount the two spring retainers and the spring. (Refer to p.21-42.)

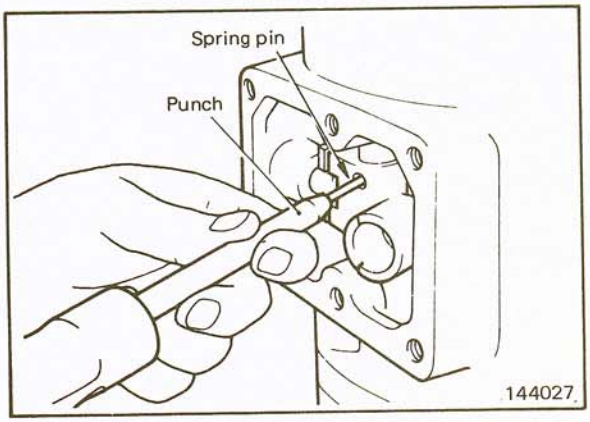


1. Insert the two needle bearings and the spacer into the counter gear, and install the assembly into the transfer case. Mount one thrust washer at the front of the counter gear and the other at the rear. (Refer to p.21-41.)
22. Insert the counter shaft and install the locking plate. (Refer to p.21-41.)
23. Install the side cover and gasket.
24. Install the oil guide. (144026)
25. Install the chain cover and gasket, making sure that the oil guide end fits into the chain cover opening. (144026)
26. Fit the snap ring into the groove of the rear output shaft rear bearing.
27. Insert the interlock plunger.
28. Insert the H-L shift rail and pass it through the H-L shift fork.

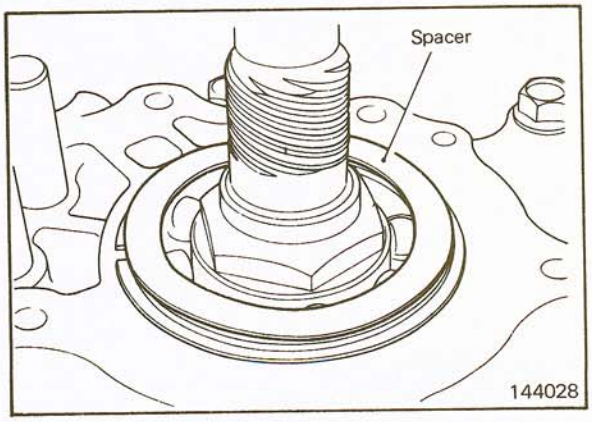


Caution
Unless the REAR-WHEEL DRIVE-4-WHEEL DRIVE shift fork is shifted to the 4-WHEEL DRIVE side, the H-L shift rail can not be inserted.

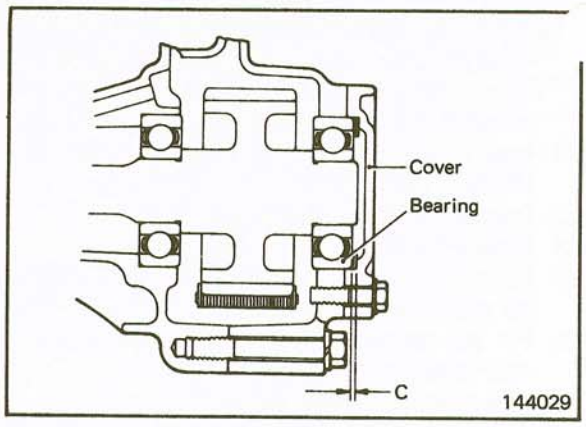
29. Mount the two poppet balls and springs, and mount the seal plugs. (Refer to p.21-41.) When mounting the poppet springs, the smaller end should face toward the ball.
30. With the H-L shift fork and shift rail spring pin holes aligned, drive in the spring pin using a punch. When driving in the spring pin, position it so that its slot is placed on the center line of the shift rail. (144027)
31. Mount the spacer onto the rear end of the rear output shaft bearing, and install the rear cover and gasket. Be sure to select and mount a spacer which is thick enough to keep the end play of the rear bearing outer race in the range of 0 to 0.1 mm (0 to .04 in.).



Thickness of spacer mm (in.)	Identification color
0.84 (.033)	Black
0.93 (.037)	None
1.02 (.040)	Red
1.11 (.044)	White
1.2 (.047)	Yellow
1.29 (.051)	Blue
1.38 (.054)	Green



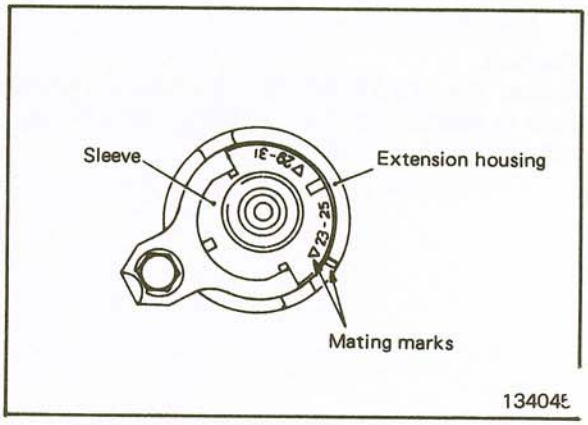
32. Mount the wave spring on the rear end of the front output shaft rear bearing, and install the cover and the gasket. (144028) If the bearing rear end to cover clearance (C) exceeds 2 mm (.079 in.), use an appropriate spacer to reduce the clearance to 2 mm (.079 in.) or less. (144029)



33. Insert the speedometer sleeve assembly into the rear cover. Align the mating mark on the sleeve with that on the case according to the number of teeth of the speedometer driven gear. (134045)
34. Mount the sleeve clamp and tighten the bolt.

Clamp bolt tightening torque . . . . . 10-12 Nm (7.5-9 ft.lbs.)

35. Install two 4WD indicator light switches, along with their steel balls.

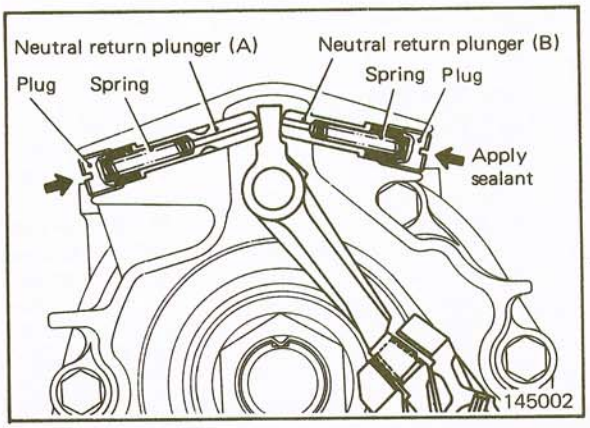


ISTALLATION

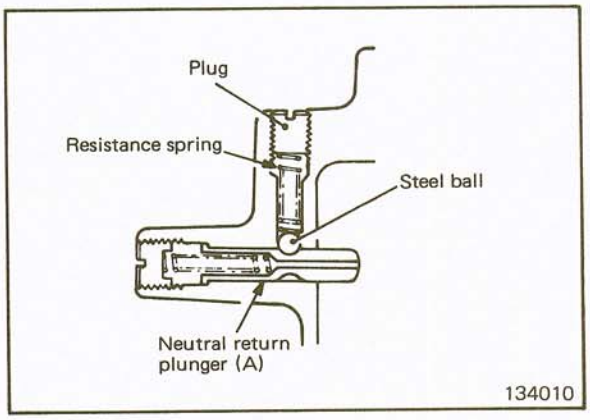
Manual Transmission

Perform reinstallation in reverse procedure of removal, pay attention to the following items:

1. Mount the neutral return plungers and the springs in the hole on top of the adapter and tighten the plug until it is flush with the adapter surface.



2. Install steel ball, resistance spring and plug.



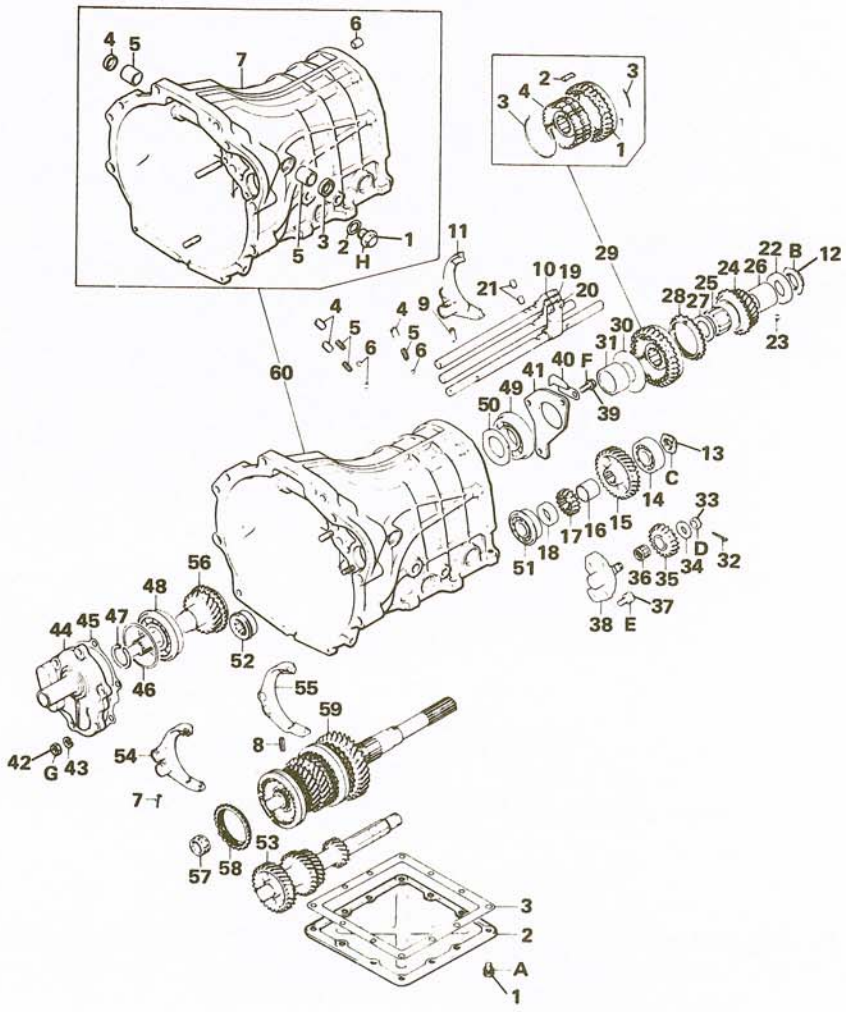
Automatic Transmission

Perform reinstallation in reverse procedure of removal.

COMPONENTS

1. Bolt w/washer (12)
2. Under cover
3. Under cover gasket
4. Plug (3)
5. Poppet spring (3)
6. Steel ball (3)
7. Spring pin for 3-4 shift fork
8. Spring pin for 1-2 shift fork
9. Spring pin for OD-R shift fork
10. OD-R shift rail
11. OD-R shift fork
12. Mainshaft lock nut
13. Counter gear lock nut
14. Ball bearing
15. Counter overdrive gear
16. Spacer
17. Counter reverse gear
18. Spacer
19. 3-4 shift rail
20. 1-2 shift rail
21. Interlock plunger
22. Spacer
23. Steel ball
24. Overdrive gear
25. Needle bearing
26. Overdrive gear sleeve
27. Bearing spacer
28. Synchronizer ring
29. Overdrive synchronizer assembly
    -1 Synchronizer sleeve
    -2 Synchronizer key (3)
    -3 Synchronizer spring (2)
    -4 Synchronizer hub
30. Stop plate
31. Spacer
32. Split pin
33. Nut
34. Thrust washer
35. Reverse idler gear
36. Needle bearing
37. Bolt w/washer (4)
38. Reverse idler shaft
39. Bolt w/washer (3)
40. Baffle plate
41. Rear bearing retainer
42. Nut (6)
43. Spring washer (6)
44. Front bearing retainer
45. Front bearing retainer gasket
46. Spacer
47. Snap ring
48. Ball bearing
49. Ball bearing
50. Spacer
51. Counter rear bearing
52. Counter front bearing
53. Counter gear
54. 3-4 shift fork
55. 1-2 shift fork
56. Main drive gear
57. Needle bearing
58. Synchronizer ring
59. Mainshaft assembly
60. Transmission case assembly
    -1 Oil filler plug
    -2 Gasket
    -3 Oil seal
    -4 Cap
    -5 Clutch shaft bushing
    -6 Bush knock
    -7 Transmission case

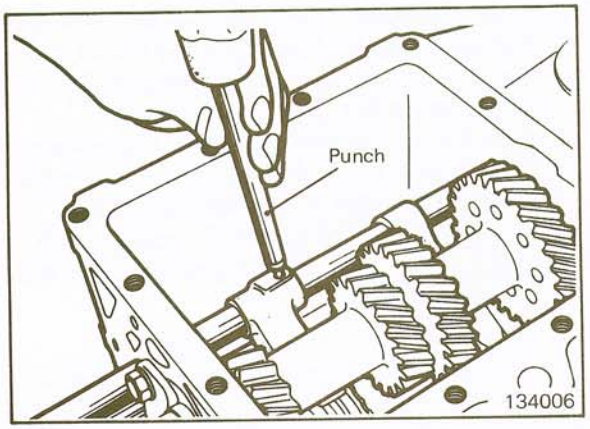
	Nm	ft.lbs.
A	8.0-9.5	6-7
B	99-127	73-94
C	69-98	51-72
D	20-58	15-43
E	15-21	11-15
F	15-21	11-15
G	10-12	7.5-9.0
H	30-34	22-25



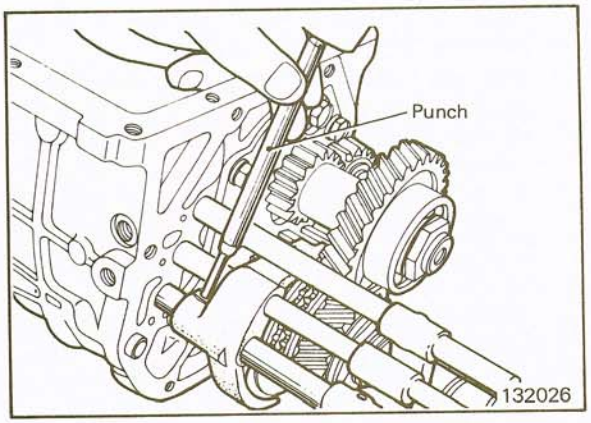
145013

DISASSEMBLY

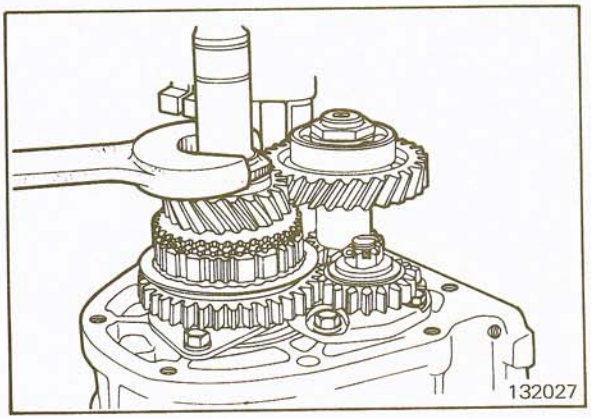
1. Remove the under cover.
2. Remove the snap ring and ball bearing from the rear end of the mainshaft.
3. Loosen the three poppet spring plugs, then remove three poppet springs and three steel balls.
4. Using a 3/16-in. punch, remove 3-4 and 1-2 shift fork spring pins. (134006)



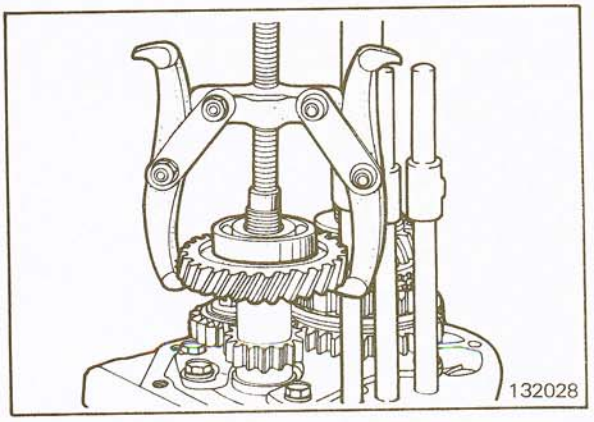
5. Using a 3/16-in. punch, drive the overdrive-reverse shift forks spring pins out, then remove the shift rails and forks.



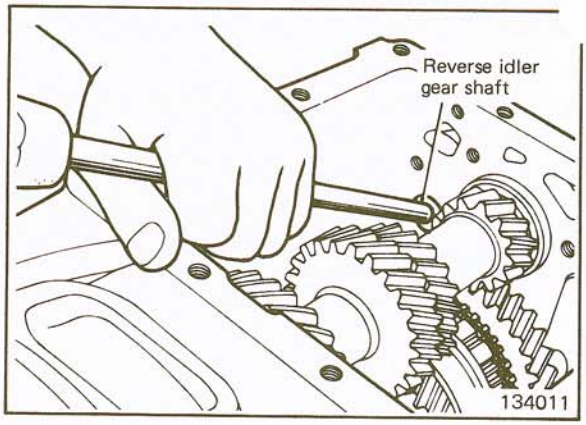
6. Bend back the locking washer and loosen the lock nuts (mainshaft and countershaft). The nuts can be loosened by double-engaging reverse and 2nd gears. (132027)
7. Move the 1-2 shift rail toward the 1st speed side.



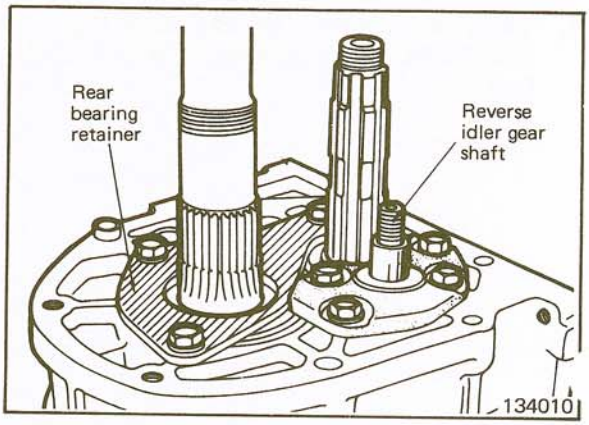
8. Remove the counter overdrive gear and ball bearing with a suitable puller. (132028) Be sure to remove the ball bearing and the overdrive gear as a unit by installing the puller onto the gear.
9. Remove distance spacers and counter reverse gear from countergear shaft.
10. Remove the shift rails toward the rear of the transmission case. Remove the shift forks.
11. Remove the spacer and steel ball from the mainshaft.
12. Remove the overdrive gear, needle bearing and synchronizer ring from the mainshaft.
13. Remove the overdrive synchronizer sleeve from the hub.



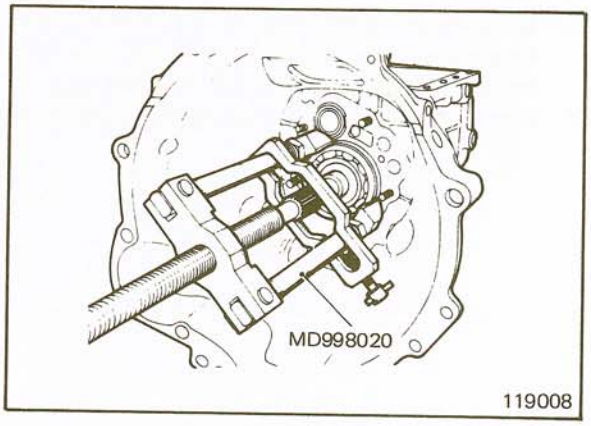
14. Using special tool MD998056, remove synchronizer hub and overdrive gear bearing sleeve.
15. Remove the synchronizer key stop plate and the distance spacer from the mainshaft.
16. Remove the cotter pin from the reverse idler gear shaft and loosen the nut, and then remove the thrust washer, reverse idler gear and needle bearing.
17. Remove the idler gear shaft locking bolts.
18. Loosen the reverse idler gear shaft by driving from inside the case. (134011)



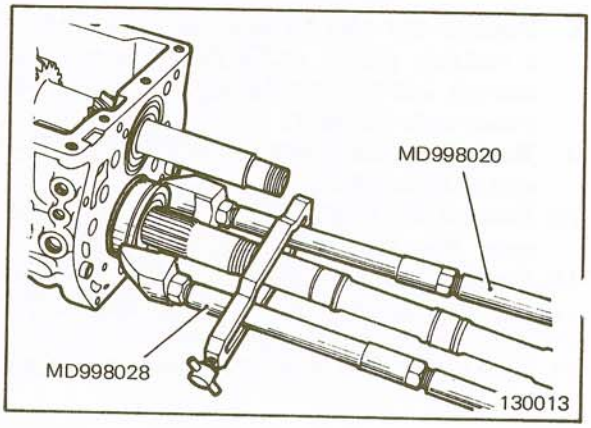
19. Remove the rear bearing retainer. (134010)
20. Remove the front bearing retainer.
21. Remove snap rings from main drive gear and main drive gear bearing.



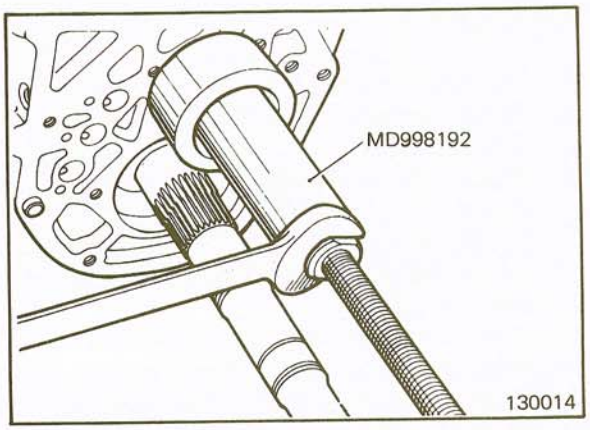
22. Using special tool, remove the main drive gear bearing.



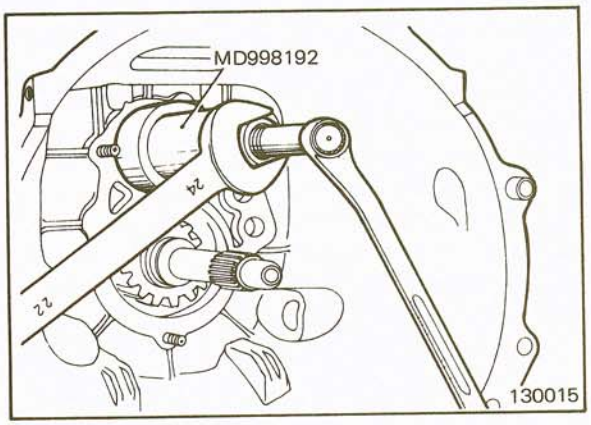
23. Remove the mainshaft bearing outer race snap ring.
24. Using special tools, remove the double row ball bearing. The inner race of the front bearing will remain on the mainshaft. (130013)



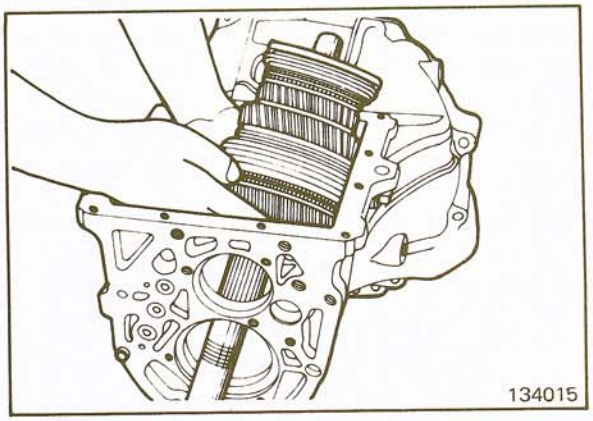
25. Remove the rear bearing snap ring. Then remove the counter rear bearing, using special tool.



26. Remove the snap ring from the counter front bearing, and then remove the bearing with the special tool.

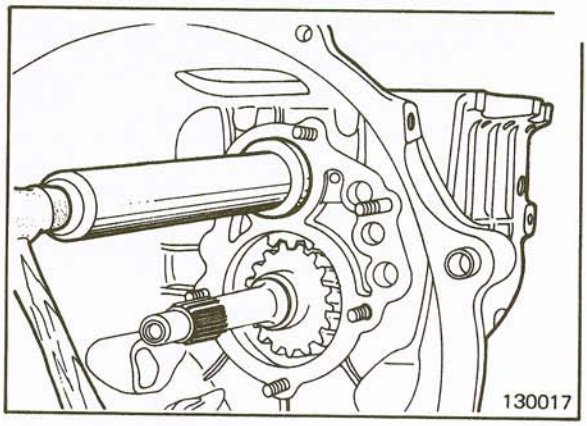


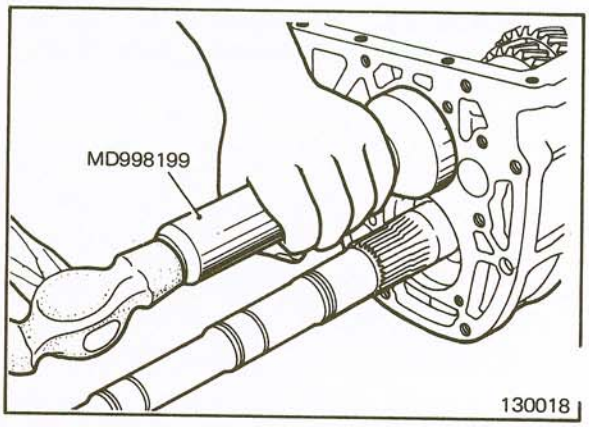
27. Remove the countershaft gear from the transmission case.
28. Remove the main drive gear from case.
29. Lift the mainshaft assembly from the case. (134015)
30. Disassemble the mainshaft assembly in the following order.
    (1) Install suitable puller to the 1st speed gear and remove it along with the inner race of the double row bearing.
    (2) Remove the 1-2 synchronizer and the 2nd speed gear by moving them toward the rear of the mainshaft.
    (3) Remove the snap ring from the front end of the mainshaft, and then remove the 3-4 synchronizer and the 3rd speed gear.



REASSEMBLY

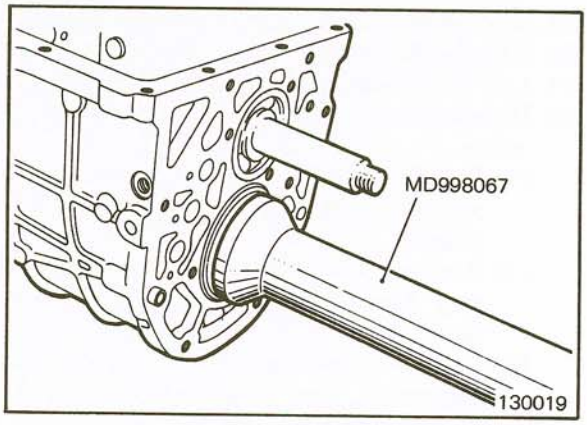
1. Insert the mainshaft assembly in the transmission case.
2. Install the pilot bearing (needle bearing) on front end of the mainshaft.
3. Install the synchronizer ring to 3-4 synchronizer assembly.
4. Install the main drive gear to the mainshaft.
5. Insert the 1-2 and 3-4 shift forks to the synchronizer sleeve groove.
6. Insert the countershaft gear into the transmission case.
7. With the snap ring fitted to the countershaft front bearing (needle), drive the bearing into the case by pushing on the outer race. (130017)
8. Install the snap ring to the countershaft rear bearing (ball), then install it into place with special tool. (130018)
9. Drive in the main drive gear bearing using special tool (MD998029)
10. Drive in the mainshaft bearing using special tool. (130019) While driving the bearing in, make sure that the synchronizer ring is properly positioned between the main drive gear and the 3-4 synchronizer.





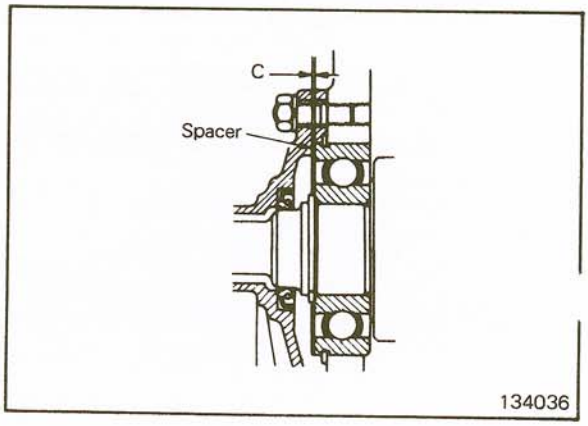
11. Install the snap ring (large) to the main drive gear bearing.
12. Select and install a main drive gear snap ring of the proper thickness to minimize clearance between the snap ring and bearing. In other words, install the thickest snap ring that will fit into the snap ring groove.

Thickness of snap ring mm (in.)	Identification color
2.3 (.091)	White
2.35 (.092)	None
2.4 (.094)	Red
2.45 (.096)	Blue
2.5 (.098)	Yellow

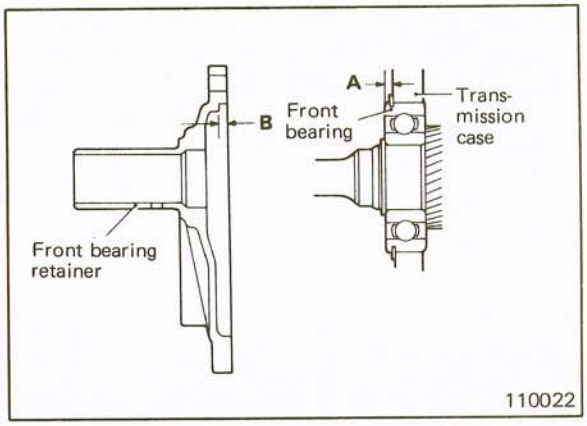


13. Install the front bearing retainer. When installing the retainer, install a spacer of proper size so that the clearance (C) shown in illustration will be within the specified tolerance. (134036 and 110022)

Front bearing retainer to bearing clearance (C) ..... 0-0.1 mm (0-.004 in.)
Clearance (C) ..... B + 0.3 mm (.012 in.) – A

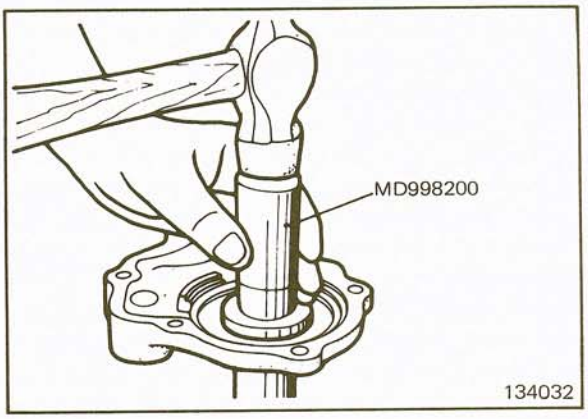


Thickness of spacer mm (in.)	Identification color
0.84 (.033)	Black
0.93 (.037)	None
1.02 (.040)	Red
1.11 (.044)	White
1.2 (.047)	Yellow
1.29 (.051)	Blue
1.38 (.054)	Green



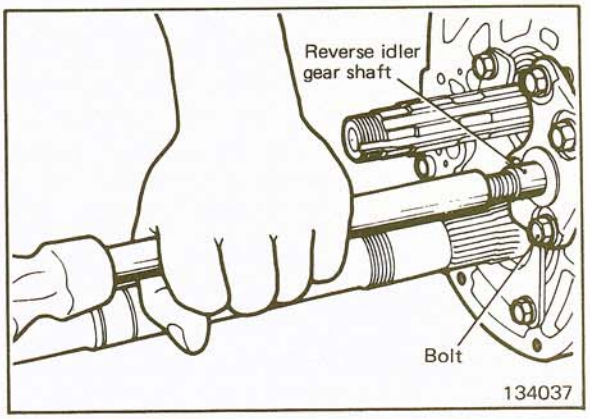
14. Apply recommended sealant to both sides of the front bearing retainer gasket and fill with gear oil to the oil seal lip; then install the gasket and oil seal. When installing the new oil seal, use special tool. (134032)

Recommended sealant . . . . . .
3M Super Silicone 8662 or equivalent



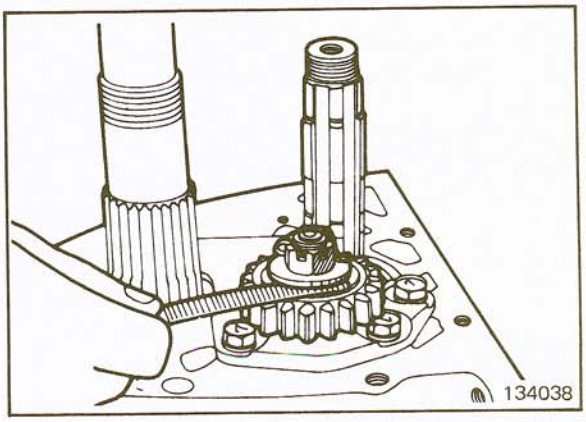
15. Install the rear bearing retainer.

16. Install the reverse idler gear shaft. When installing the shaft, install the bolts as guides as illustrated.

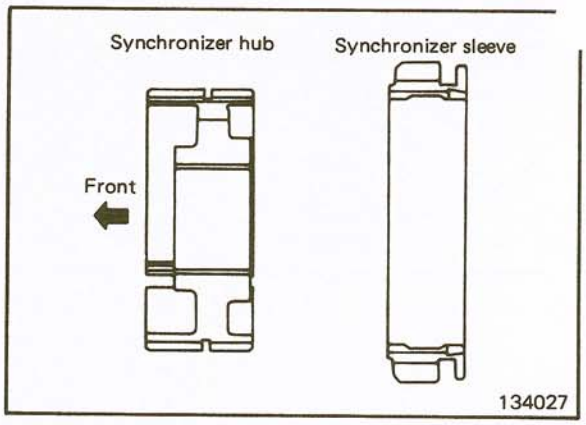


17. Install the needle bearing, the reverse idler gear, the thrust washer and the nut. Install the cotter pin to lock the nut and prevent it from turning, and check the reverse idler gear end play. (134038)
Install the thrust washer with the ground side directed toward the gear.

Reverse idler gear end play . . . . . .
0.12-0.28 mm (.005-.011 in.)

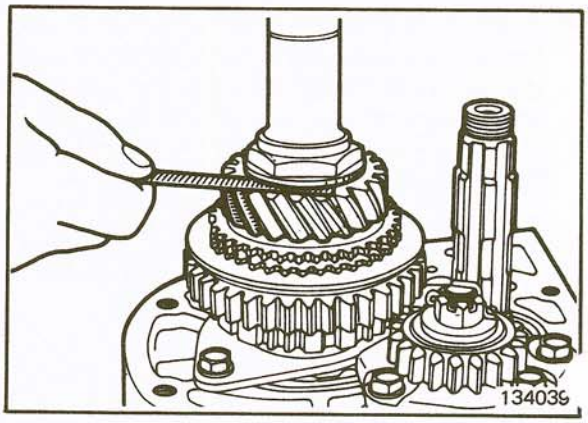


18. Assemble the overdrive synchronizer. The front and rear directions of the synchronizer hub and sleeve can be identified as illustrated. (134027) The spring can be installed in a manner similar to the installation of the 3-4 and 1-2 synchronizer springs.



19. Install the spacer, the stop plate, the overdrive synchronizer assembly, the overdrive gear bearing sleeve, the needle bearing, the synchronizer ring and the overdrive gear, in that order, onto the mainshaft from the rear end. Tighten the lock nut and stake it at the mainshaft notch and then check the overdrive gear end play. (134039)

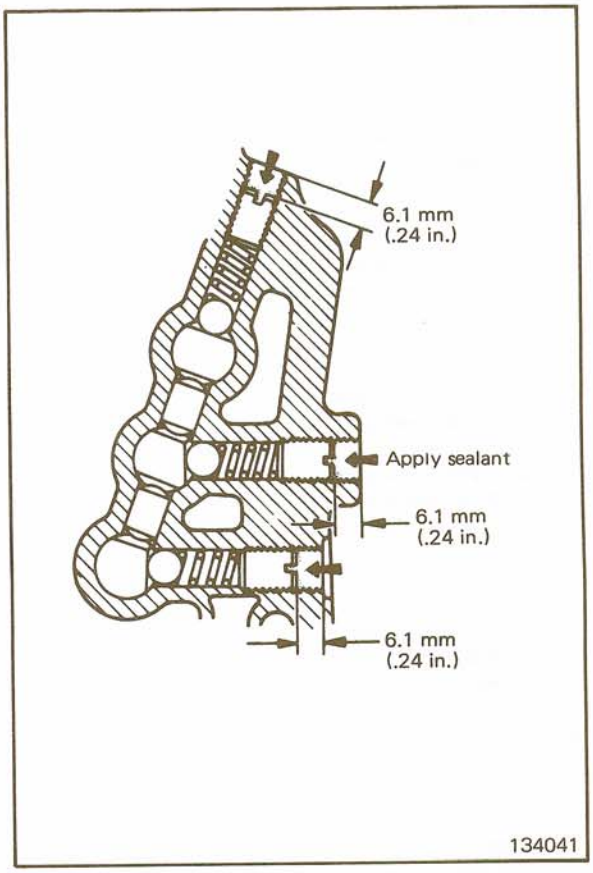
Overdrive gear end play	0.1-0.25 mm (.004-.010 in.)



20. Install the spacer, the counter reverse gear, the spacer, the counter overdrive gear and the ball bearing onto the countershaft gear from the rear end. After tightening the nut, stake the nut at the notch at the rear end of the counter shaft gear.
21. Insert the 3-4 and 1-2 shift forks into their respective synchronizer sleeves. Insert each shift rail from the rear of the case. Lock the shift forks and rails with spring pins, and then install the interlock plunger between shift rails. The spring pin should be installed with the slot in the axial direction of the shift rail.

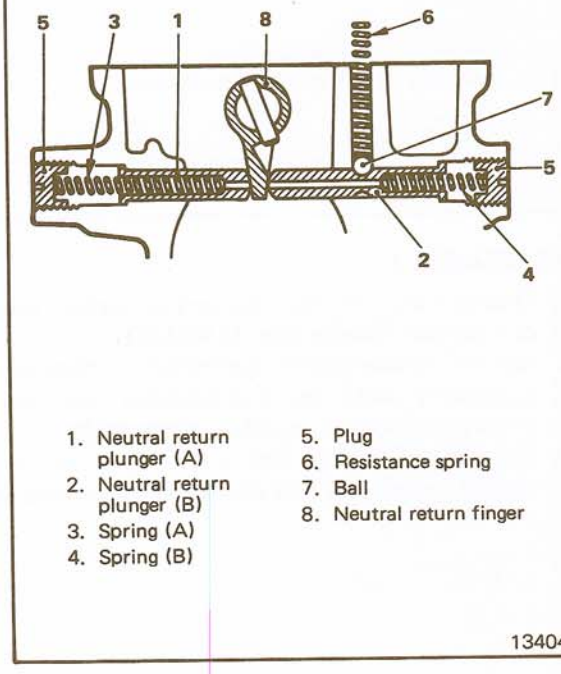
22. Insert the ball and poppet spring (small end facing the ball) into each shift rail. Tighten the plug to the specified position. After installation, seal the plug head with sealant. (134041)
23. Install the ball bearing on to the rear end of the mainshaft.
24. Install the speedometer drive gear.
25. Apply recommended sealant to both sides of the extension housing gasket and install the gasket on the housing. Next, install the extension housing to the transmission case. When installing the housing, turn the change shifter fully down to the left. Make sure the forward end of the control finger fits snugly in the slot of the shift lug.
Apply recommended sealant to the threads of extension housing attaching bolts before installation.

Recommended sealant .....
3M Super Silicone 8662 or equivalent



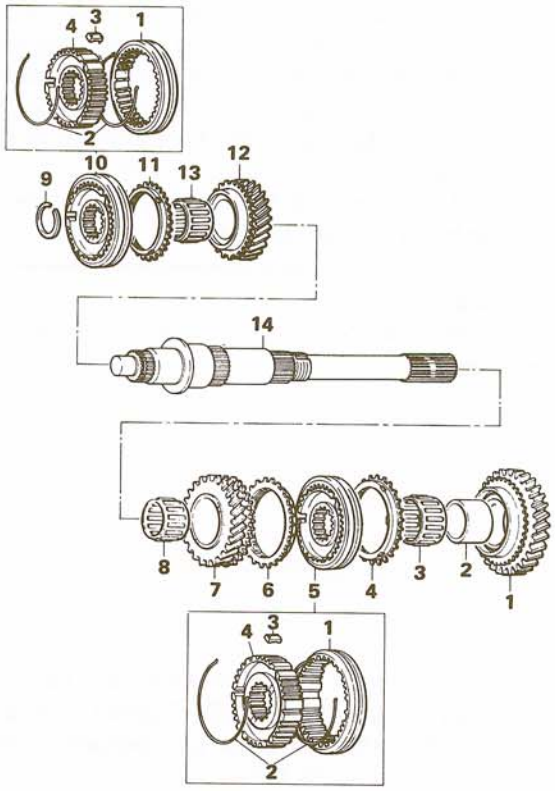
26. Install the neutral return plungers (A) and (B), the springs, and resistance spring and ball. Tighten each plug till the top is flush with the boss top surface. Apply sealant to the plug heads. (134044)
27. Apply sealant to the outside surface of the speedometer driven gear sleeve, install the sleeve into the extension housing and mesh it with the drive gear. After installing into the locking plate groove, lock the sleeve with the locking plate.
28. Install the backup light switch after applying sealant to the threads. Remember to install the steel ball.
29. Install the under cover, and then tighten attaching bolts to the specified torque. Be careful not to overtighten the bolts, otherwise the gasket will be damaged, resulting in oil leakage.

Under cover attaching bolts
torque specification ..... 7.8-9.8 Nm (6-7 ft.lbs.)



COMPONENTS

1. First speed gear
2. Needle bearing
3. Bearing sleeve
4. Synchronizer ring
5. 1-2 synchronizer assembly
-1 1-2 synchronizer sleeve
-2 Synchronizer spring (2)
-3 Synchronizer key (3)
-4 1-2 synchronizer hub
6. Synchronizer ring
7. Second speed gear
8. Needle bearing
9. Snap ring
10. 3-4 synchronizer assembly
-1 3-4 synchronizer sleeve
-2 Synchronizer spring (2)
-3 Synchronizer key (3)
-4 3-4 synchronizer hub
11. Synchronizer ring
12. Third speed gear
13. Needle bearing
14. Mainshaft



NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

145024

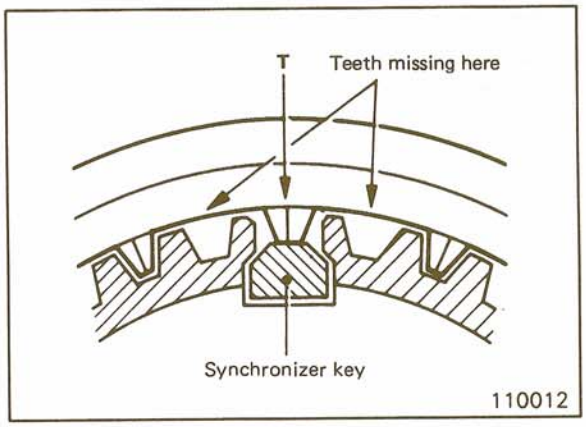
DISASSEMBLY

1. Disassemble in the numerical order indicated in the component illustration. (145024)
2. Before synchronizer assembly is disassembled, put an alignment mark on synchronizer hub and sleeve at appropriate location in aid of reassembly.
3. Since synchronizer key is common to both 1-2 and 3-4 synchronizers, do not change the combination.

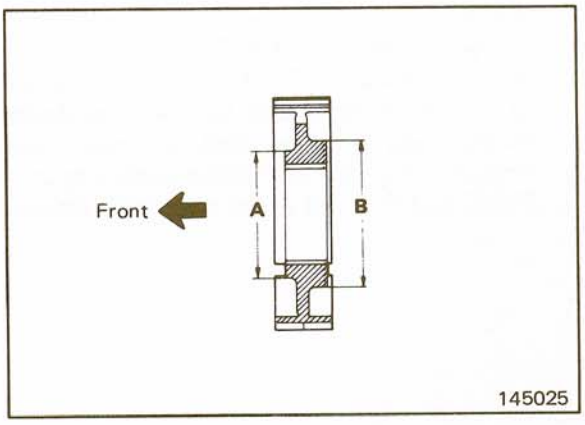
REASSEMBLY

1-2 and 3-4 synchronizer

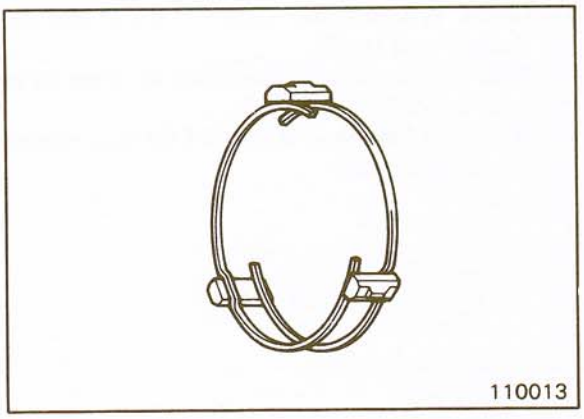
1. Mate synchronizer hub with sleeve using mark made at disassembly. Make sure that hub and sleeve slide smoothly. If they slide unsmoothly, replace hub and sleeve assembly.
2. 3-4 synchronizer sleeve has teeth missing at six portions. Assemble hub to sleeve in such a way that center tooth "T" between two missing teeth will touch synchronizer key. (110012)



3. Use care when installing 3-4 synchronizer hub since only 3-4 synchronizer is directional. Smaller diameter side "A" of center boss is front of 3-4 synchronizer hub.



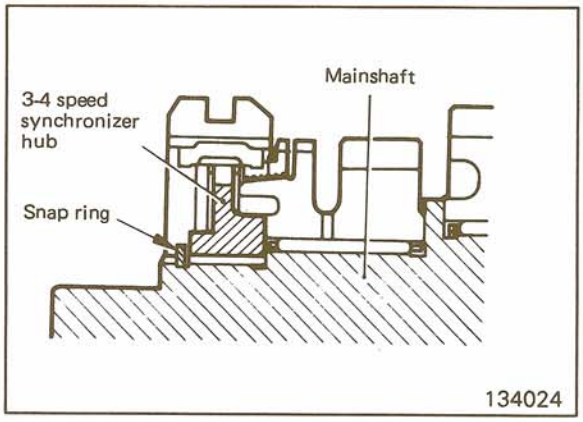
4. Insert three keys into groove of synchronizer hub.
5. Install two synchronizer springs to synchronizer. When synchronizer springs are installed, make sure that front and rear ones are not faced in same direction. (110013)



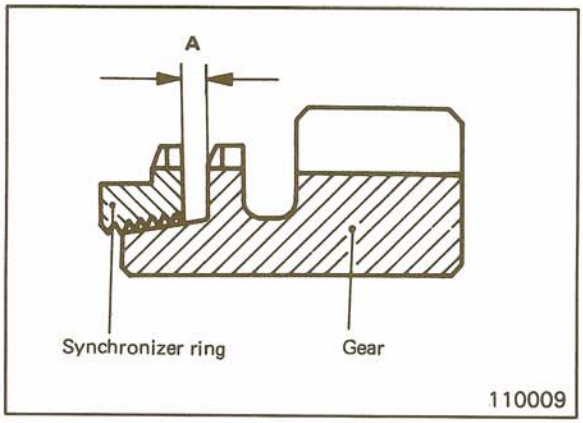
Mainshaft

1. Assemble the mainshaft assembly in the reverse of the order indicated in the component illustration. (145024)

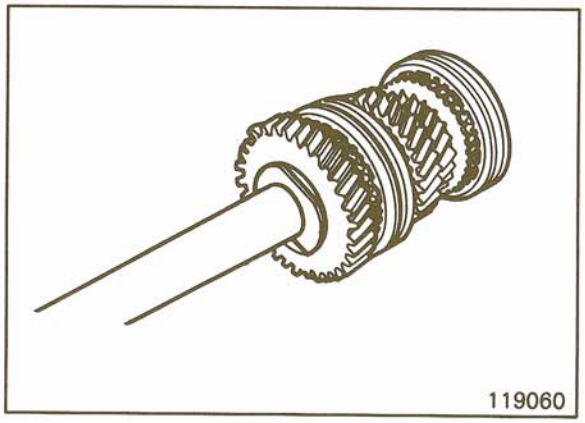
2. Assemble 3-4 synchronizer positioning hub toward correct direction. (110009)
3. As for mainshaft front end snap ring, select and install one of such thickness that will minimize clearance between snap ring and hub. In other words, install the thickest snap ring that fits in snap ring groove.
4. Make sure that 3rd speed gear turns smoothly.



5. Check synchronizer ring for worn and damaged internal threads and teeth.
6. With synchronizer assembled to cone of each gear, check dimension"A" (110009)
   If "A" is less than 0.5 mm (.02 in.), replace synchronizer ring and/or gear.

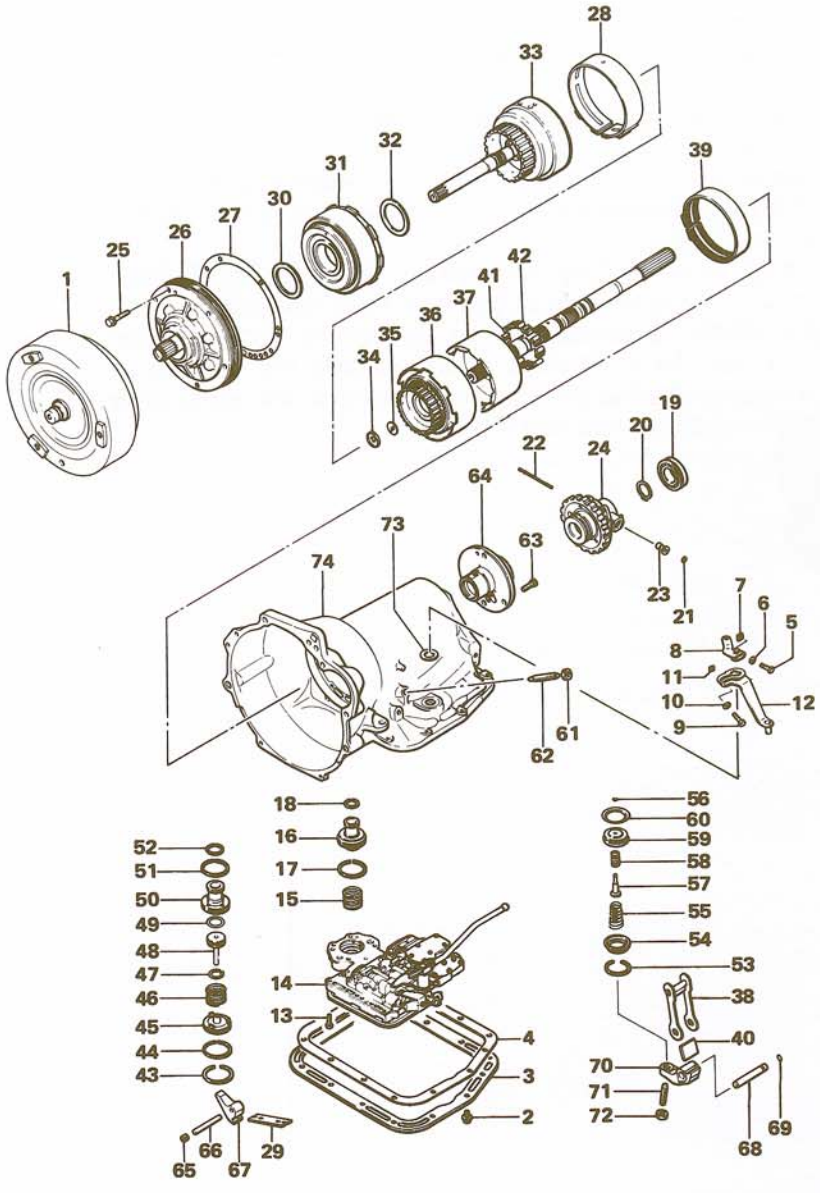


7. After installation of 2nd speed gear, 1st-2nd synchronizer and 1st speed gear, push bearing spacer firmly toward 1st speed gear and make sure that 1st and 2nd speed gears turn smoothly.



COMPONENTS

1. Torque converter
2. Screw (14)
3. Oil pan
4. Oil pan gasket
5. Bolt
6. Plain washer
7. Square nut
8. Transmission throttle lever
9. Bolt
10. Plain washer
11. Square nut
12. Manual control lever
13. Flange bolt (10)
14. Valve body assembly
15. Accumulator spring
16. Accumulator piston
17. Seal ring
18. Seal ring
19. Output shaft bearing
20. Governor body snap ring
21. Governor valve shaft snap ring
22. Governor valve shaft
23. Governor valve
24. Governor and support
25. Screw (6)
26. Oil pump and reaction shaft support assembly
27. Reaction shaft support gasket
28. Kickdown band
29. Kickdown band strut
30. Thrust washer (#1)
31. Front clutch assembly
32. Front clutch thrust washer (#2)
33. Rear clutch assembly
34. Input shaft thrust plate (#3)
35. Output shaft thrust washer (#4)
36. Planet and output shaft assembly
37. Low-reverse drum
38. Reverse band link
39. Reverse band
40. Reverse band strut
41. Overrunning clutch roller (10)
42. Overrunning clutch roller spring (10)
43. Kickdown servo snap ring
44. Kickdown servo guide
45. Kickdown servo guide ring
46. Kickdown servo spring
47. Snap ring
48. Kickdown servo piston rod
49. O-ring
50. Kickdown servo piston
51. Seal ring
52. Seal ring
53. Spring retainer snap ring
54. Reverse servo spring retainer
55. Reverse servo spring
56. Reverse servo plug ring
57. Reverse servo piston plug
58. Reverse servo cushion spring
59. Reverse servo piston
60. Reverse servo piston seal
61. Kickdown band locking nut
62. Kickdown band adjusting screw
63. Output shaft support bolt (4)
64. Output shaft support
65. Kickdown lever shaft plug
66. Kickdown band lever shaft
67. Kickdown band lever
68. Reverse band lever shaft
69. Seal
70. Reverse band lever
71. Reverse band adjusting screw
72. Locking nut
73. Manual valve shaft seal
74. Transmission case



NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

904131

GENERAL INFORMATION

The MA904A automatic transmission combines a torque converter and a fully-automatic 3-speed gear system. The converter housing and transmission case are an integral aluminum alloy die casting. The transmission consists of two multiple disc clutches, an overruning clutch, two servos and bands, and two planetary gear sets to provide three forward ratios and a reverse ratio. The common sun gear of the planetary gear sets is connected to the front clutch by a driving shell which is splined to the sun gear and to the front clutch retainer. The hydraulic system consists of an oil pump, and a single valve body which contains all of the valves except the governor valve.

Venting of the transmission is accomplished by a passage through the upper part of the oil pump housing.

The torque converter is attached to the crankshaft through a flexible driving plate.

Cooling of the ATF (automatic transmission fluid) heated in the converter is accomplished by circulating the ATF through the water cooled type cooler in the radiator lower tank. The torque converter assembly is a sealed unit which cannot be disassembled.

The ATF is filtered by an internal "Dacron Type" filter attached to the lower side of the valve body assembly.

Engine torque is transmitted to the torque converter and then through the input shaft to the multiple disc clutches in the transmission. The power flow depends on the application of the two clutches and two bands.

HYDRAULIC CONTROL SYSTEM

The hydraulic control circuits show the position of the various valves with color coded passages to indicate those under hydraulic pressure for all operations of the transmission.

The hydraulic control system makes the transmission fully automatic, and has four important functions to perform. In a general way, the components of any automatic control system may be grouped into the following four basic groups: 1: the pressure supply system, 2: the pressure regulating valves, 3: the flow control valves, and 4: the clutches and band servos.

Taking each of these basic groups of systems in turn, the control system may be described as follows:

Pressure Supply System

The pressure supply system consists of an oil pump driven by the engine through the torque converter.

The single front pump furnishes pressure for all the hydraulic and lubrication requirements.

Pressure Regulating Valves

The pressure regulating valves consist of a regulator valve which controls line pressure at a value dependent on throttle opening.

The switch valve maintains torque converter operating pressure and transmission lubricating pressure.

The governor valve transmits regulated pressure to the transmission (in conjunction with vehicle speed) to control upshift and downshift speeds.

The throttle valve transmits regulated pressure to the transmission (in conjunction with throttle position) to control upshift and downshift speeds.

Flow Control Valves

The manual valve provides the different transmission drive ranges as selected by the vehicle operator.

The 1-2 shift valve and governor pressure plug automatically shifts the transmission from low to second or vice versa depending on vehicle operation.

When a shift is made from direct to second, the 1-2 shift control valve controls the orifice of the hydraulic pressure feed circuit to the kickdown servo to assure smooth shifting.

The 2-3 shift valve, governor pressure plug and throttle pressure plug automatically shift the transmission from second to direct or vice versa depending on vehicle operation.
The kickdown valve makes possible a forced downshift from direct to second or from second to low or from direct to low (depending on vehicle speed) by depressing the accelerator pedal past the detent near wide open throttle.
The limit valve determines the maximum speed at which a 3-2 part downshift can be made.
The shuttle valve has two separate functions and performs each independently of the other. The first is that of providing fast release of the kickdown band and smooth front clutch engagement when the driver takes a "lift-foot" upshift from second to direct.
The second function of the shuttle valve is to regulate kickband application and timing when making direct to second kickdowns.

Clutches, Band Servos and Accumulator

The front and rear clutch pistons, and both servo pistons are moved hydraulically to engage the clutches and apply the bands. The pistons are released by spring tension when hydraulic pressure is released. On the 2-3 upshift, the kickdown servo piston is released by spring tension and hydraulic pressure.
The accumulator controls the hydraulic pressure on the apply side of the kickdown servo during the 1-2 shift; thereby, cushioning the kickdown band application at any throttle position.

OPERATING INSTRUCTIONS

The transmission will automatically upshift and downshift at approximately the speeds shown in the "Automatic Shift Speed Chart." (described under SERVICE DIAGNOSIS AND TESTS). All shift speeds given in the "Chart" may vary somewhat due to production tolerances and rear axle ratios. The quality of the shifts is very important. All shifts should be smooth and positive with no noticeable engine runaway.

Selector Lever and Parking Lock Controls

The transmission is controlled by a "lever type" selector lever incorporated within the console box.
The control has six selector lever positions: "P" (park) "R" (reverse), "N" (neutral), and "D" (drive), "2" (second) and "L" (lock-up).
The parking lock is applied by moving the selector lever to the "P" position.

Caution

Do not apply the parking lock until the vehicle has stopped; otherwise, a severe ratcheting noise will occur.

Starting the Engine

The engine will start with the selector lever in either the "P" or "N" positions. As a safety precaution when starting in the "N" position, apply the parking or foot brake. The automatic transmission will not permit starting the engine by pushing or towing.

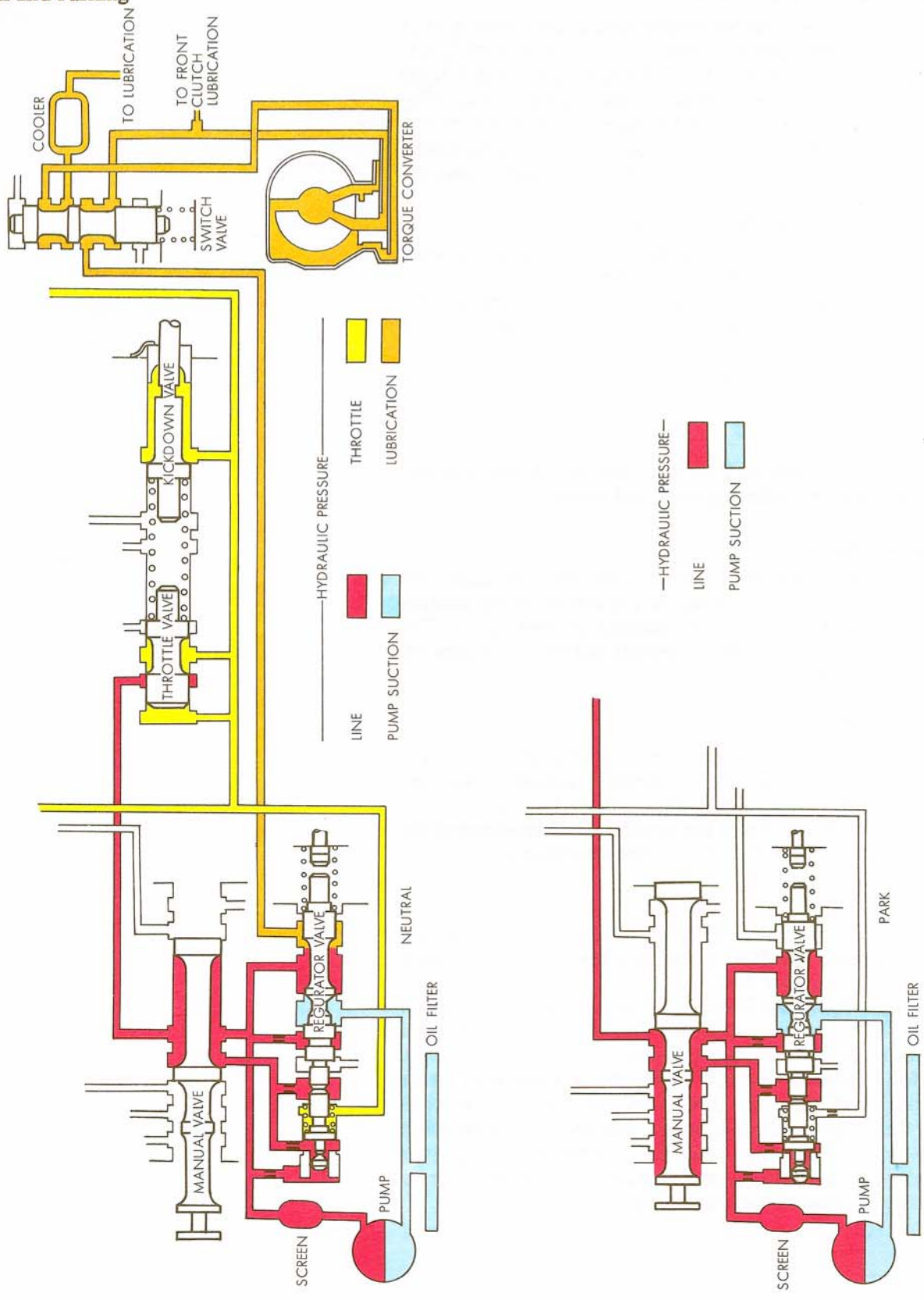
Mountain Driving

When driving in the mountains with heavy loads or when pulling a trailer, the "2" or "L" position should be selected on upgrades which require heavy throttle for 0.8 km (1/2 mile) or more. This reduces the possibility of overheating the transmission and converter under these conditions.

Towing Vehicle

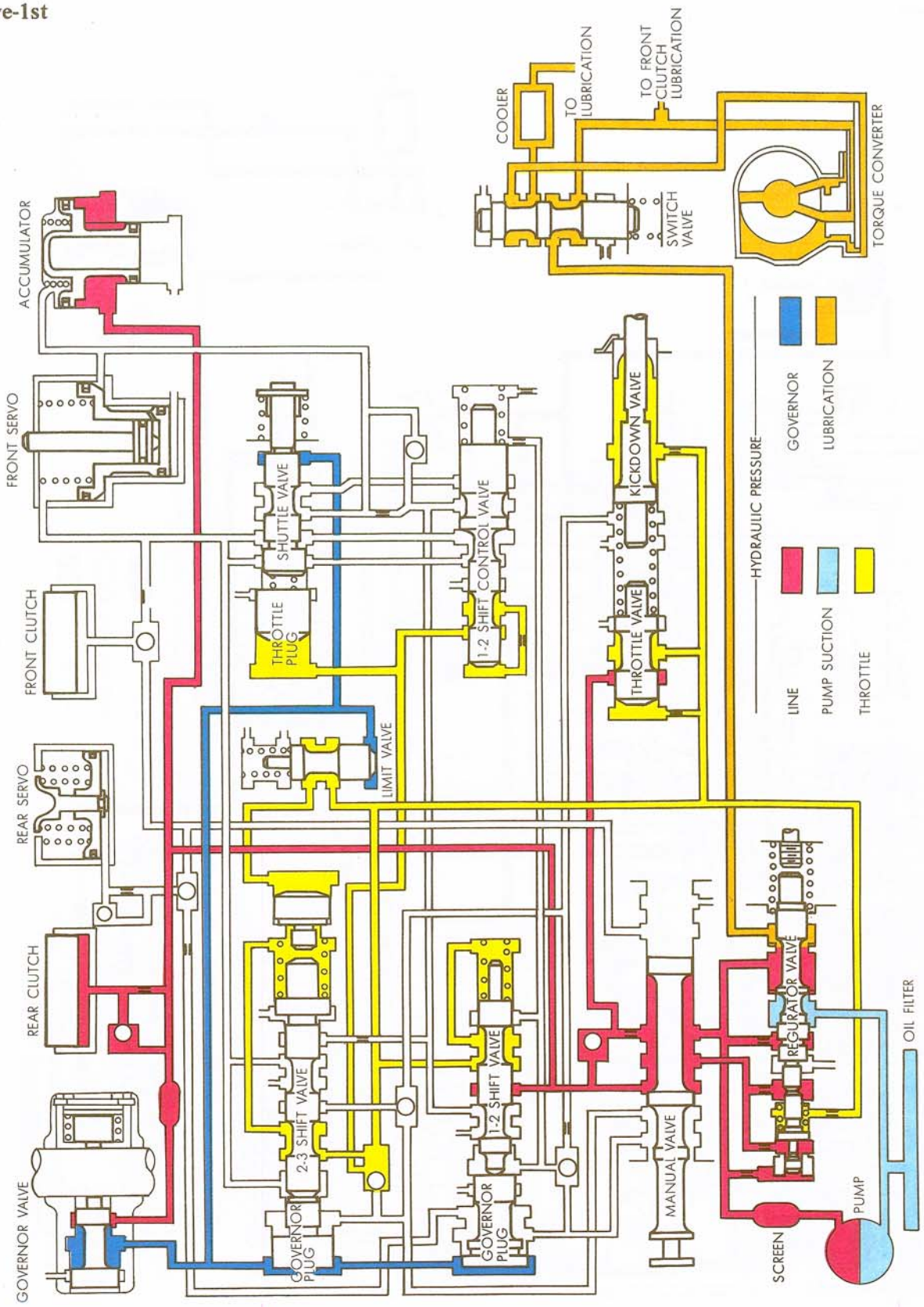
Transmission Inoperative: Tow the vehicle with a rear end pickup and place the free wheel hub lever to free position or remove the propeller shaft.
Transmission Operating Properly: The vehicle may be towed safety in "N" (neutral) with rear wheels on the ground at a speed not to exceed 50 km/h (30 mph). If the vehicle is to be towed for extended distance, it should be done with a rear end pickup and place the free wheel hub lever to free position or the propeller shaft removed. Because the transmission receives lubrication only when the engine is running, it is good practice to always tow a disabled vehicle with a rear end pickup or remove the propeller shaft.

Neutral and Parking



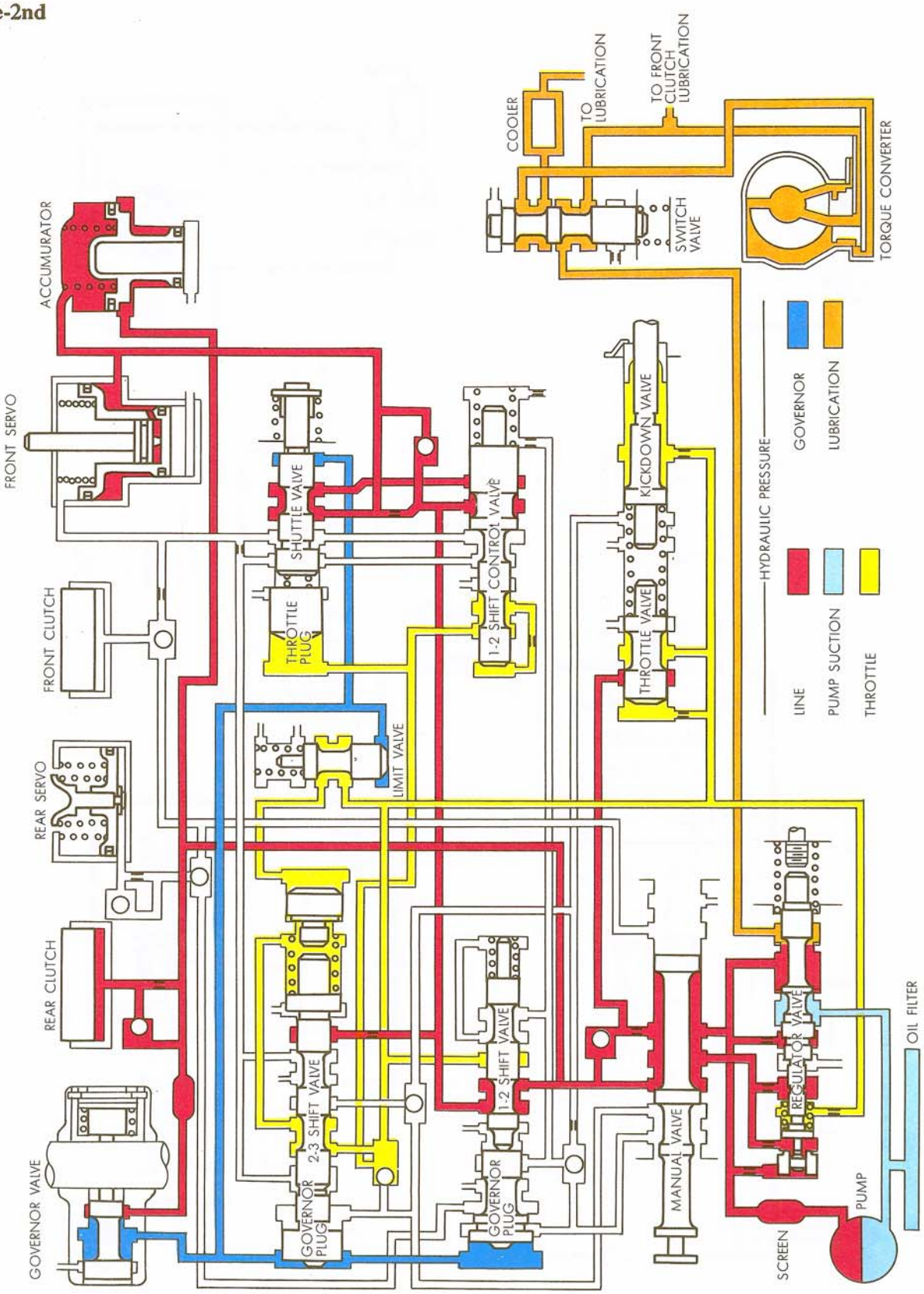
904002

Drive-1st



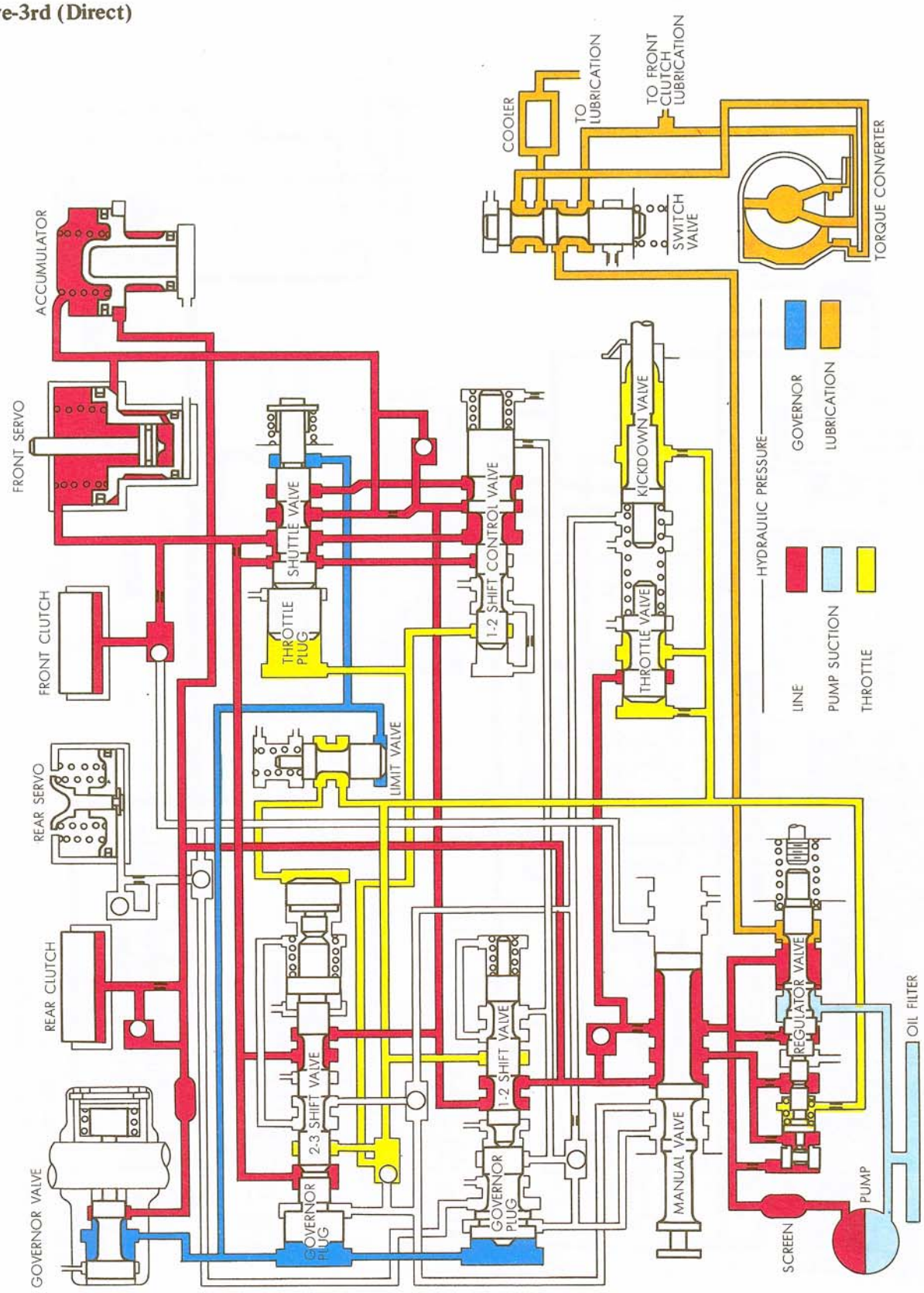
904003

Drive-2nd



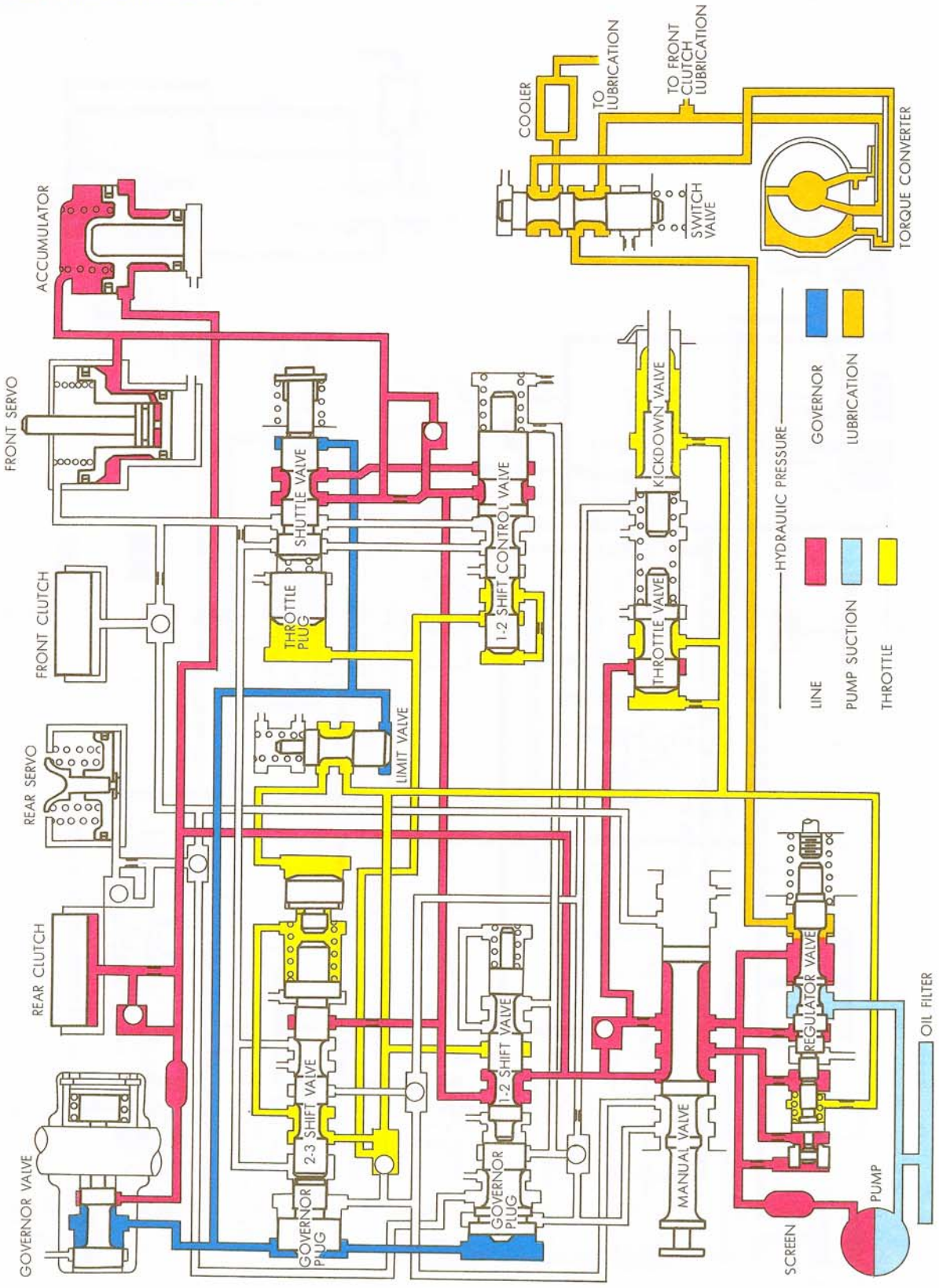
904004

Drive-3rd (Direct)



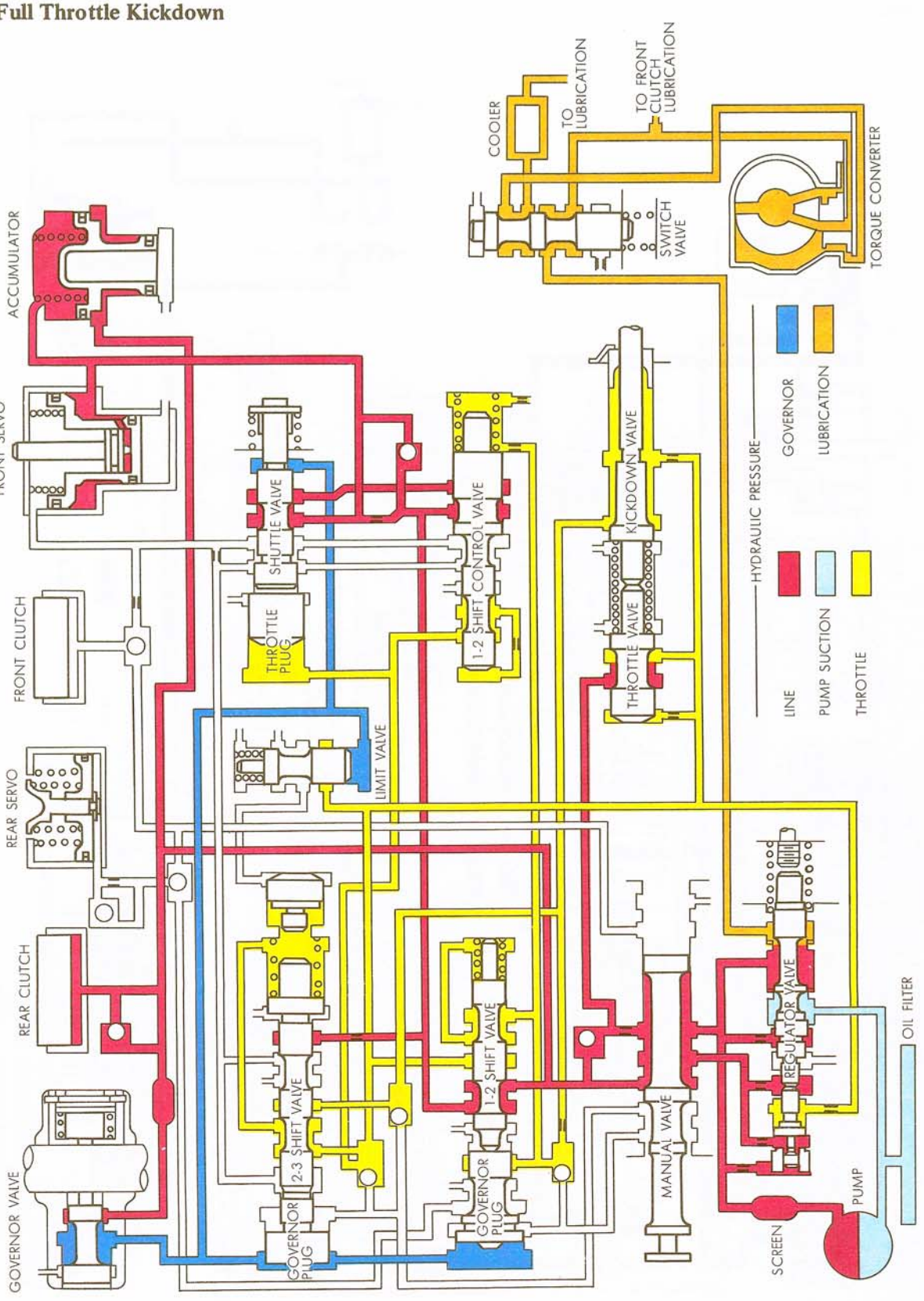
904005

Drive-Part Throttle Kickdown



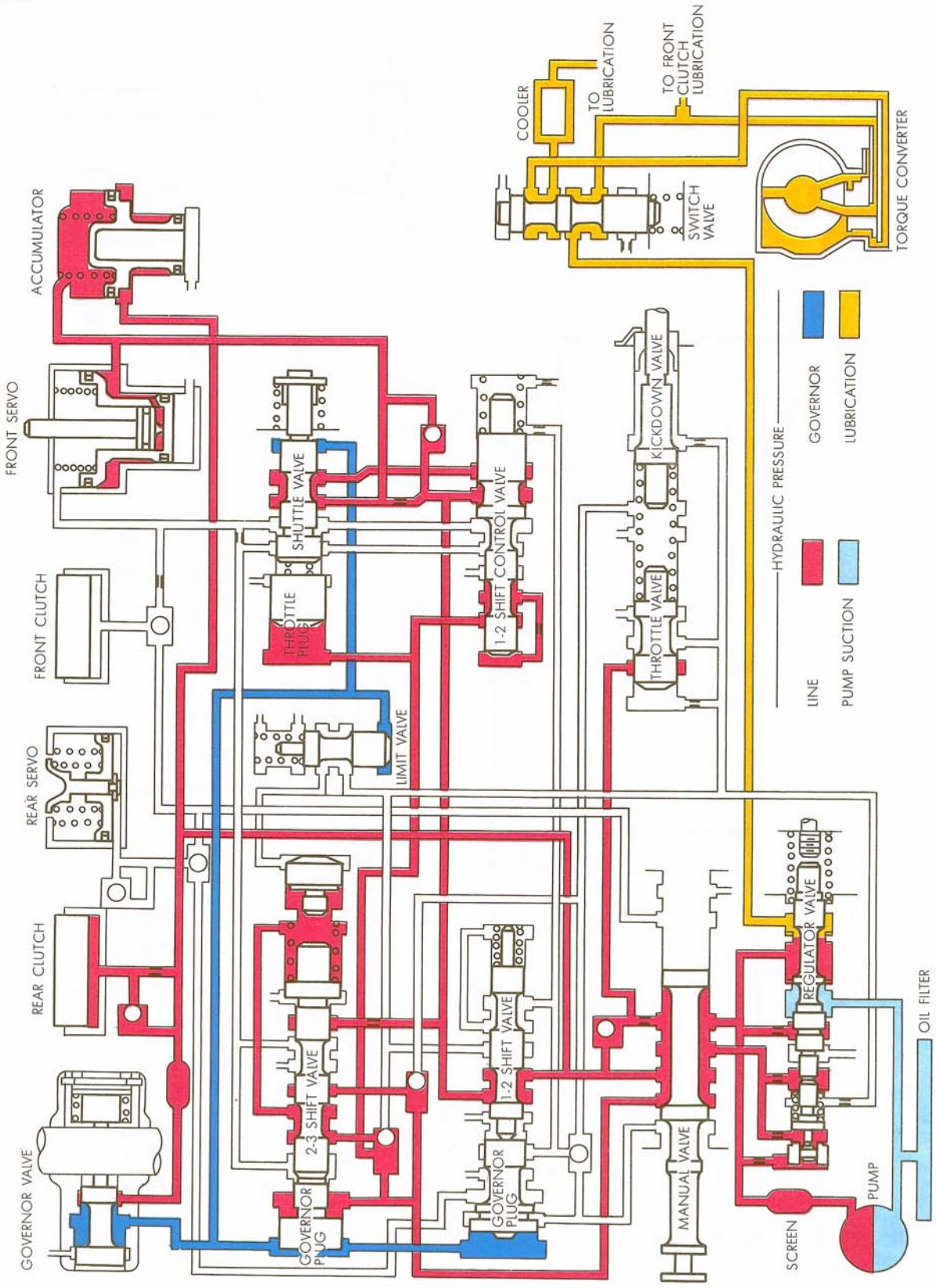
904006

Drive-Full Throttle Kickdown



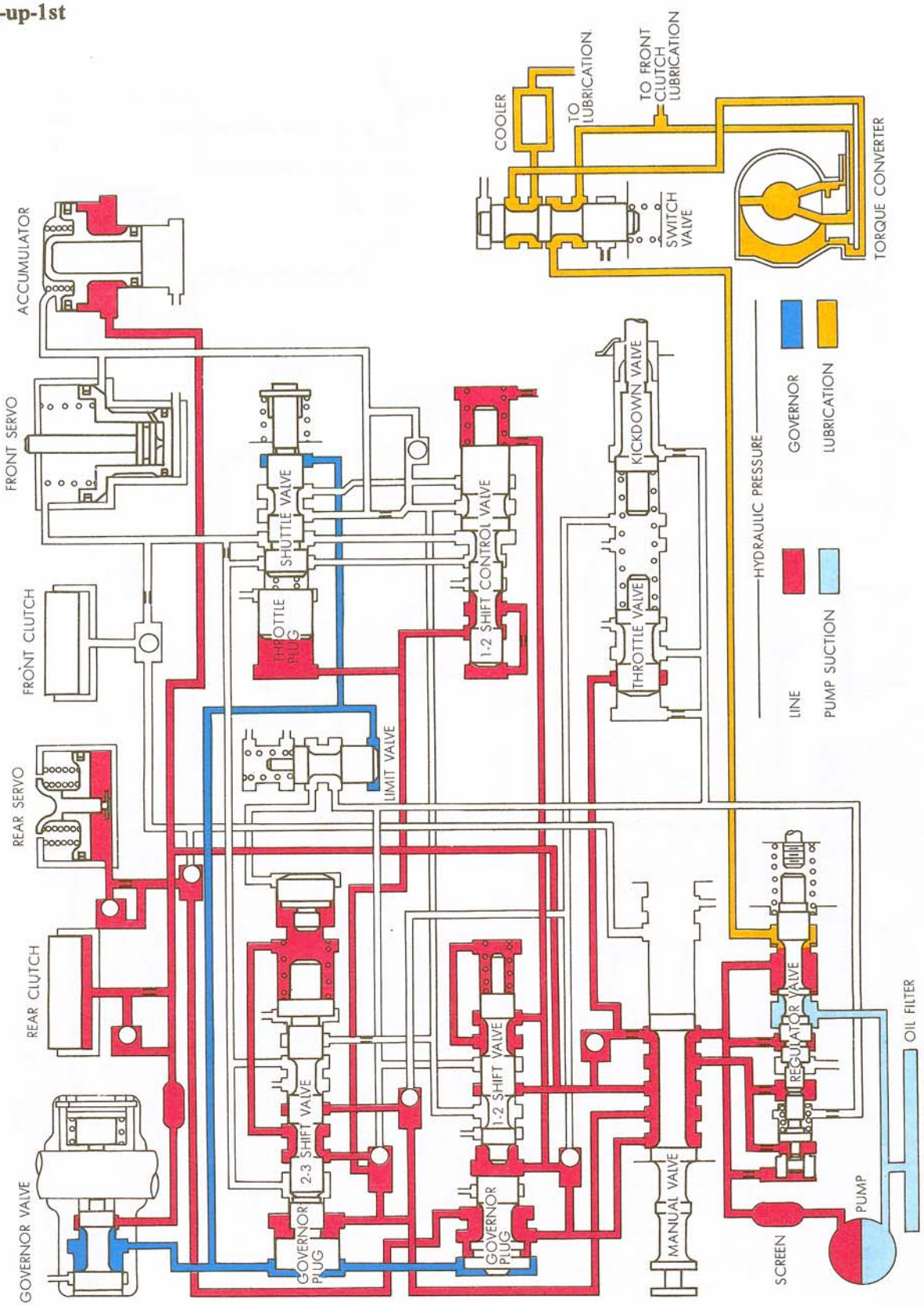
904007

2-Second



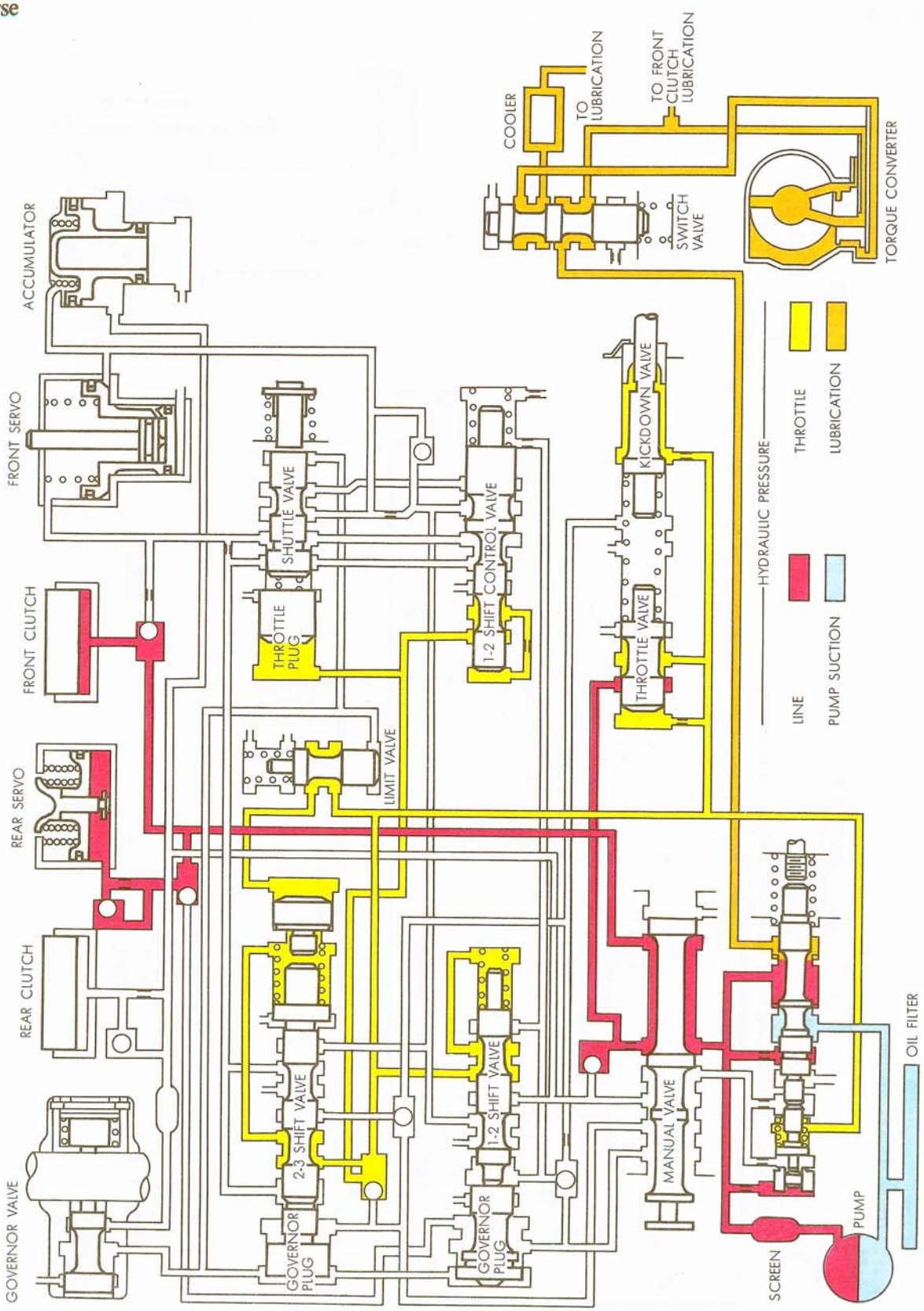
904008

Lock-up-1st



904009

Reverse



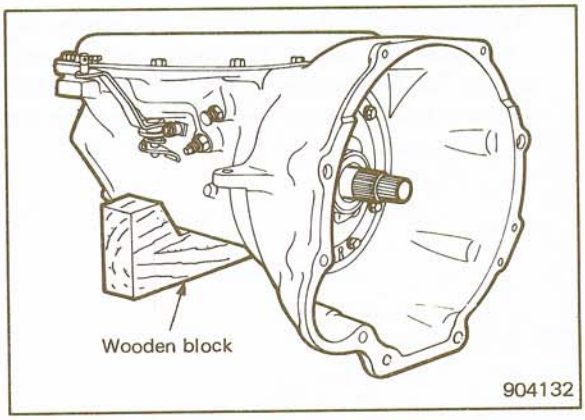
904010

DISASSEMBLY

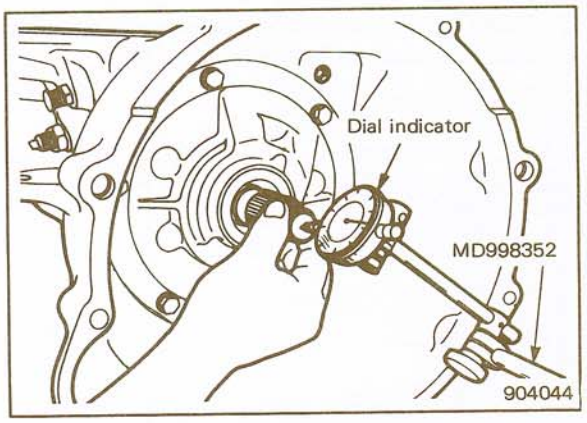
Caution

Prior to removing any transmission sub-assemblies, plug all openings and thoroughly clean exterior of the unit, preferably by steam. Cleanliness through entire disassembly and assembly cannot be overemphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. Do not wipe parts with shop towels. All mating surfaces in the transmission are accurately machined; therefore, careful handling of parts must be exercised to avoid nicks or burrs.

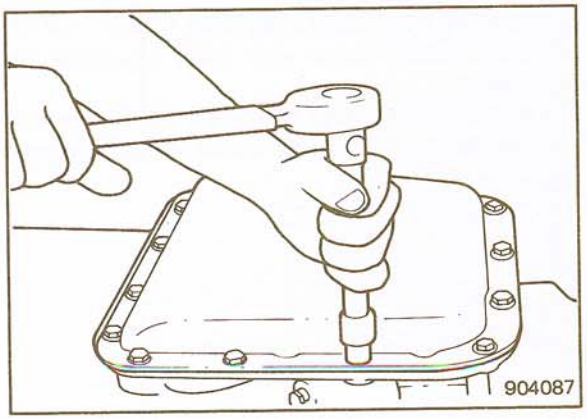
1. Remove torque converter.
2. Remove the transfer case assembly.
   See "Component Service-Transfer Case", for detailed procedure.
3. Place transmission assembly on work bench with oil pan upward. Use block such as the one shown in illustration (904132) under rear of case to hold assembly in position.



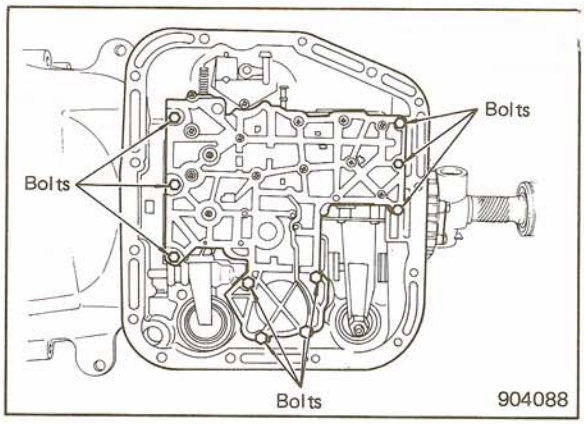
4. Measuring input shaft end play before disassembly will usually indicate when a thrust washer change is required (except when major parts are replaced). Thrust washer is located between input and output shafts.
   Attach a dial indicator to transmission bell housing with its plunger seated against end of input shaft.
   Move input shaft in and out to obtain end play reading. Record indicator reading for reference when reassembling the transmission.



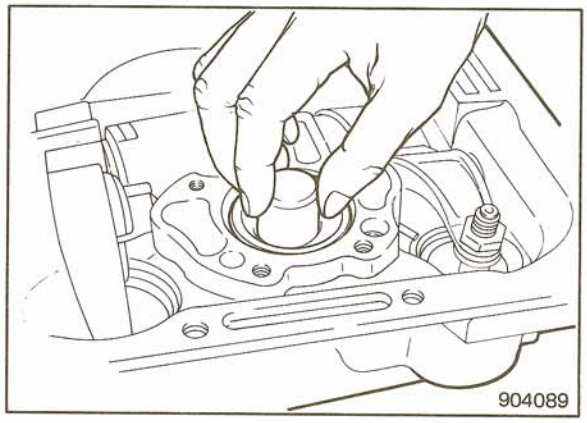
5. Unscrew oil pan screws and remove oil pan and gasket. (904087)
6. Loosen clamp bolts and remove throttle and manual control levers from transmission.



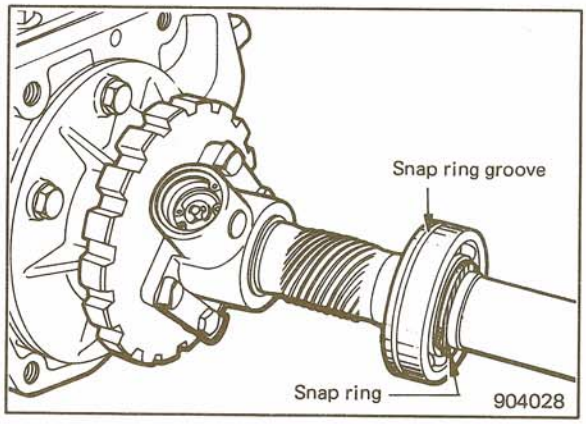
7. Remove ten hex-head valve body to transmission case bolts. (904088)
8. Remove valve body assembly, while lifting the valve body assembly upward out of transmission case.



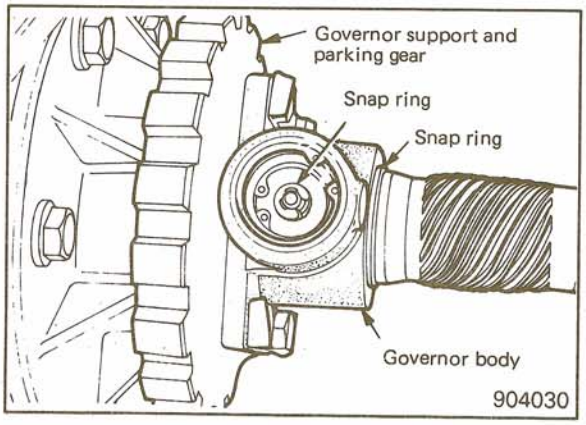
9. Remove accumulator piston and spring from transmission case. Inspect piston for nicks, scores and wear. Inspect spring for distortion. Inspect rings for freedom in piston grooves and wear or breakage. Replace parts as required.



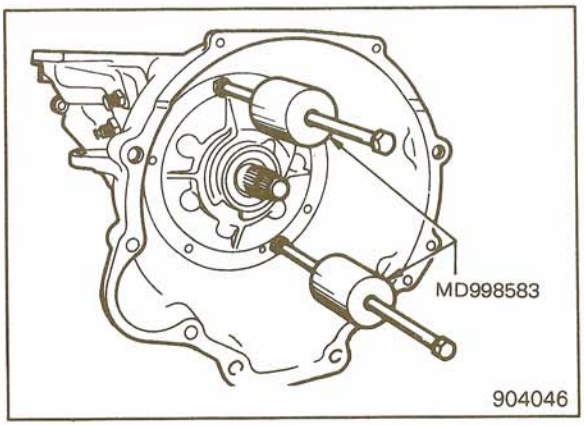
10. Using snap ring pliers, remove output shaft bearing snap ring and remove bearing from shaft.



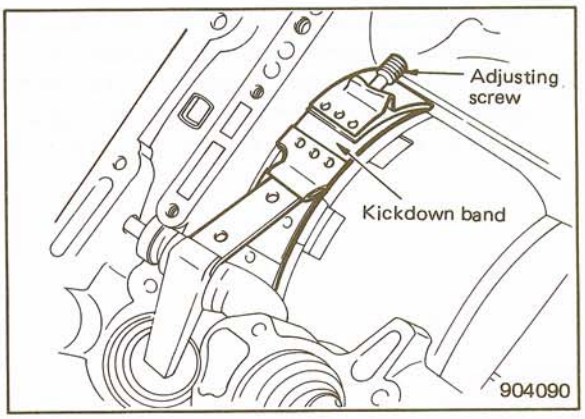
11. Carefully pry snap ring from weight end of governor valve shaft. Slide valve and shaft assembly out of governor body.
12. Remove snap ring from behind governor body, then slide governor and support assembly off output shaft. (904030)



13. Tighten kickdown band adjusting screw until band is tight on front clutch retainer. This prevents front clutch retainer from coming out with pump which might cause unnecessary damage to clutches.
14. Remove oil pump housing retaining bolts.
15. Attach two Special Tools (904046) to pump housing flange in threaded holes in flange.
16. Bump outward evenly with two "knocker weights" to withdraw pump and reaction shaft support assembly from the case.

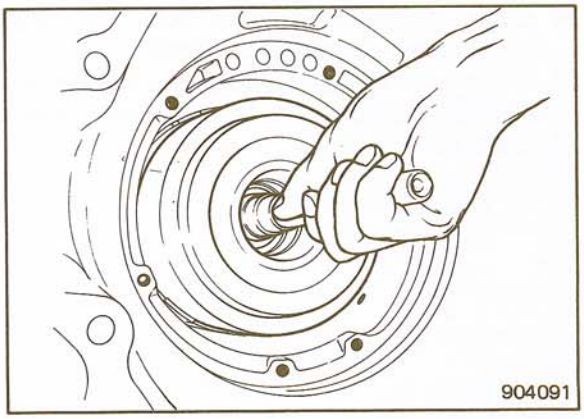


17. Loosen kickdown band adjusting screw, remove band strut and slide band out of the case. (904090)
18. Slide front clutch assembly out of the case.



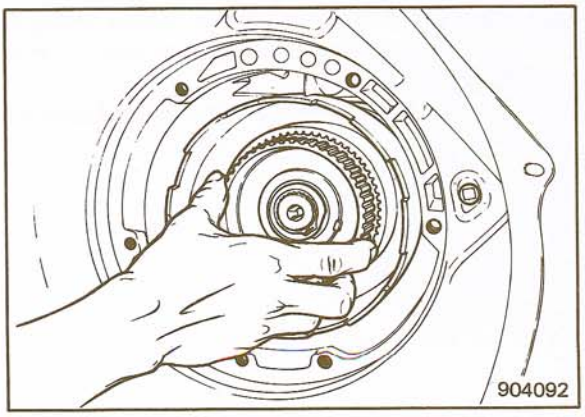
19. Grasp input shaft, and slide input shaft and rear clutch assembly out of the case.

Caution
Be careful not to lose thrust washer located between rear end of input shaft and forward end of output shaft.

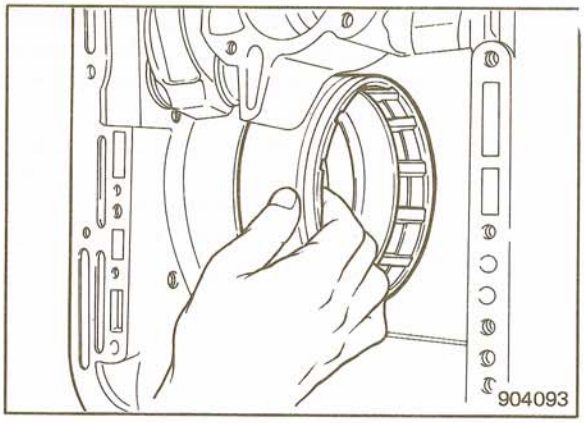


20. While supporting output shaft and driving shell, carefully slide assembly forward and out through the case.

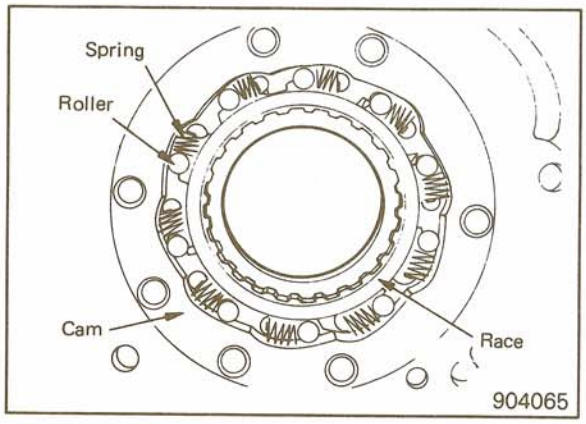
Caution
Be very careful not to damage ground surfaces on output shaft during removal.



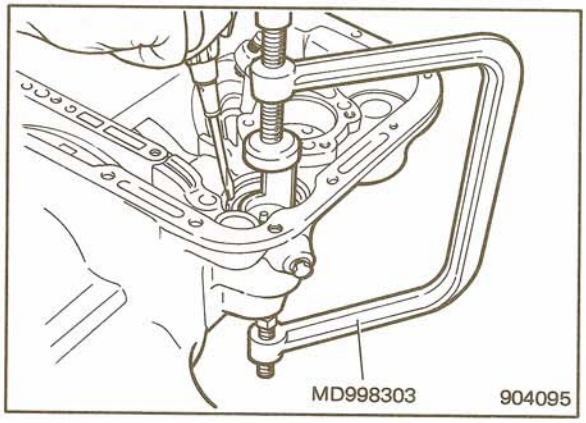
21. Remove low-reverse drum, then loosen low-reverse band adjusting screw, remove band strut and link, then remove band from the case.



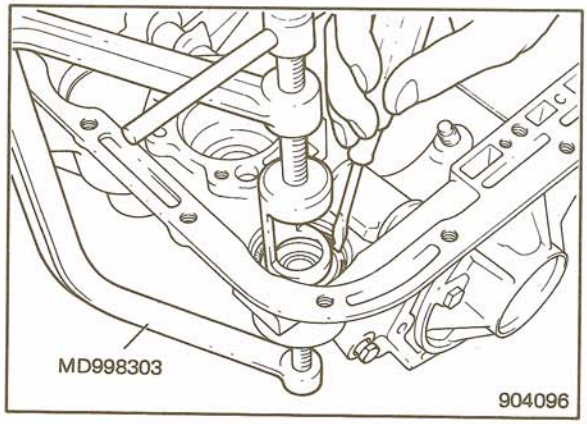
22. Note position of overrunning clutch rollers and springs before disassembly to assist in reassembly.
23. Carefully slide out clutch race and remove rollers and springs. If overrunning clutch cam and/or roller spring retainer are found damaged or worn, replace. (904065)



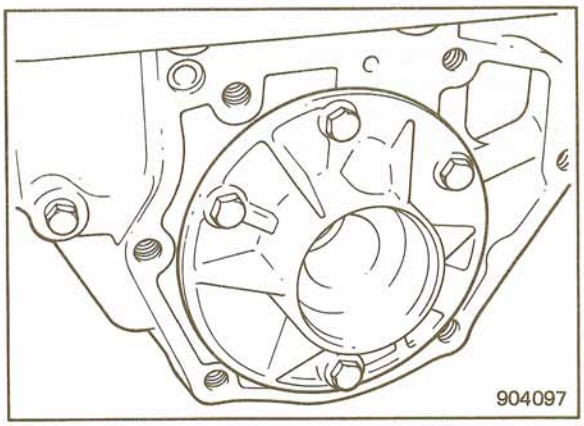
24. Compress kickdown servo spring by using Special Tool, then remove snap ring. (904095)
25. Remove servo guide, spring rod and servo piston from the case. Be careful not to damage piston rod or guide during removal.



26. Compress low-reverse servo piston spring by using Engine Valve Spring Compressor, then remove snap ring. (904096)
27. Remove spring retainer, spring and servo piston from the case.

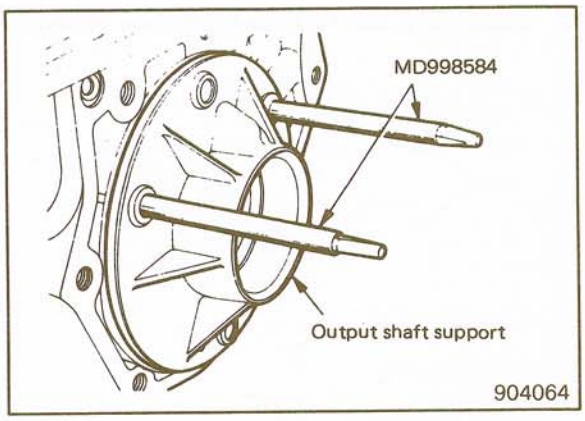


28. Remove four output shaft support to case bolts and then remove output shaft support.

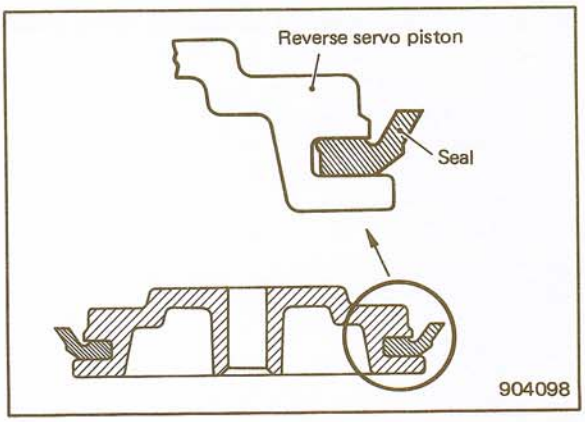


REASSEMBLY

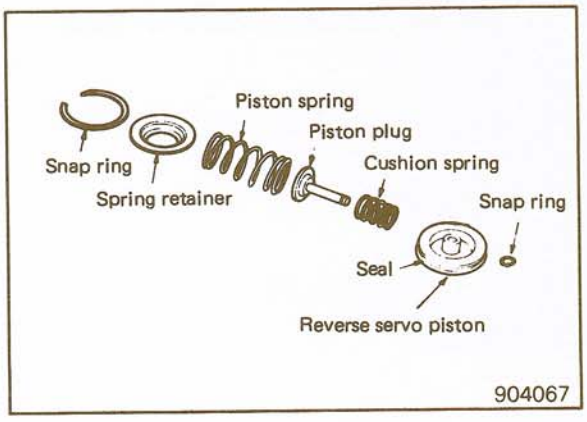
1. Screw two Special Tools into the case. Position output shaft support over pilot studs, and tap it firmly into the case with a soft faced hammer. (904064)
2. Remove pilot studs.
3. Install four bolts and tighten to specified torque.



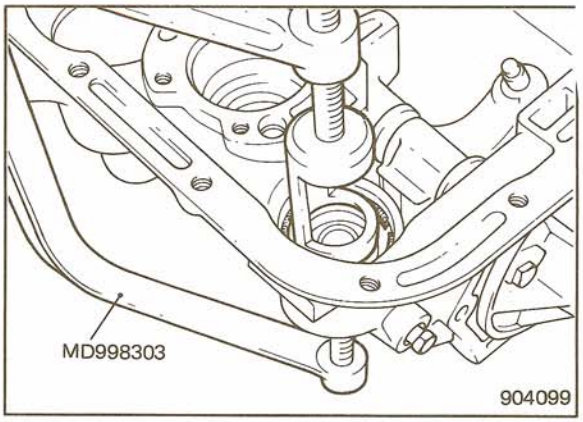
4. Install new seal to reverse servo piston.



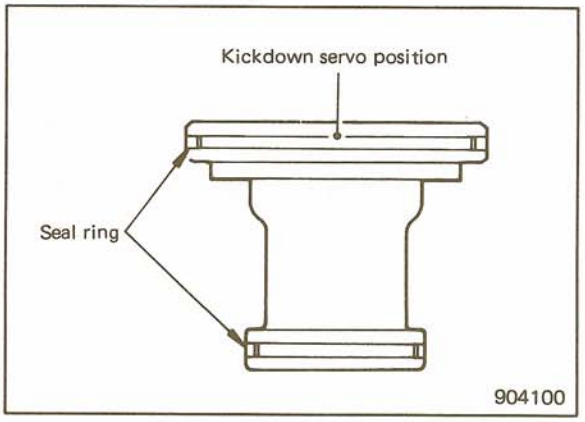
5. Install cushion spring and piston plug to reverse servo piston, and secure with snap ring.



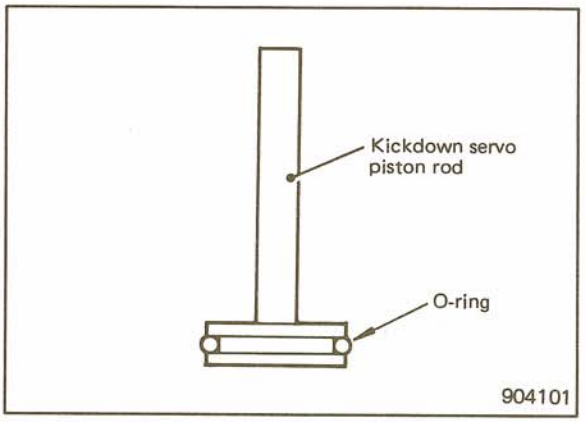
6. Carefully work servo piston assembly into the case with a twisting motion. Place spring, retainer and snap ring over piston.
7. Compress low and reverse servo piston spring by using Special Tool, and then install snap ring. (904099)



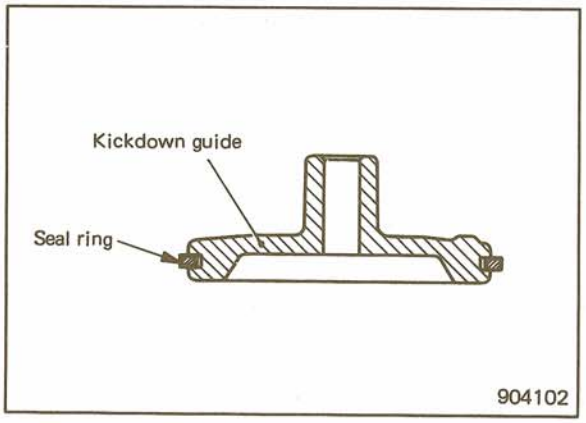
8. Install new seal rings to kickdown servo piston.



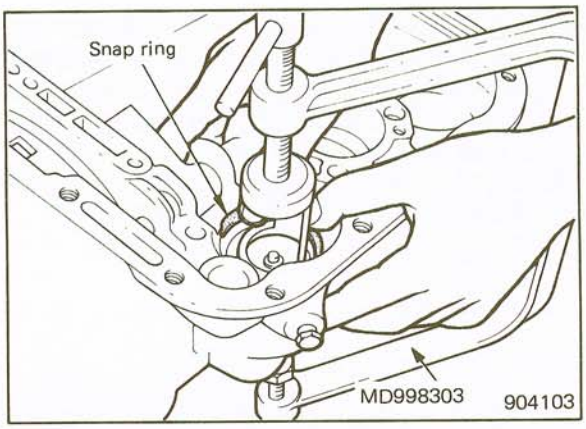
9. Install new O-ring to kickdown servo piston rod.



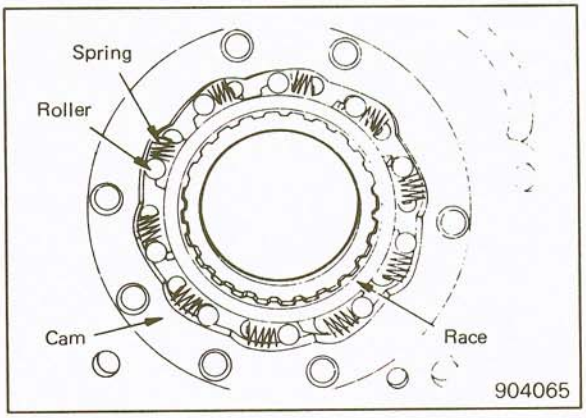
10. Install new seal ring to kickdown guide.



. Carefully push kickdown servo piston into case bore.
12. Install piston rod, spring and guide.
13. Compress kickdown servo springs by using Special Tool, then install snap ring. (904103)

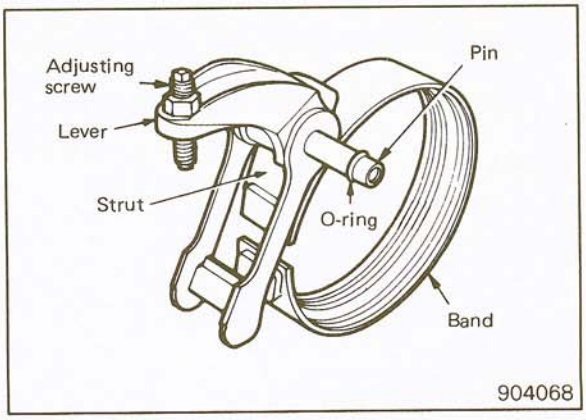


14. With transmission case in an upright position, insert overrunning clutch race inside the cam.
15. Install overrunning clutch rollers and springs exactly as shown in illustration. (904065)

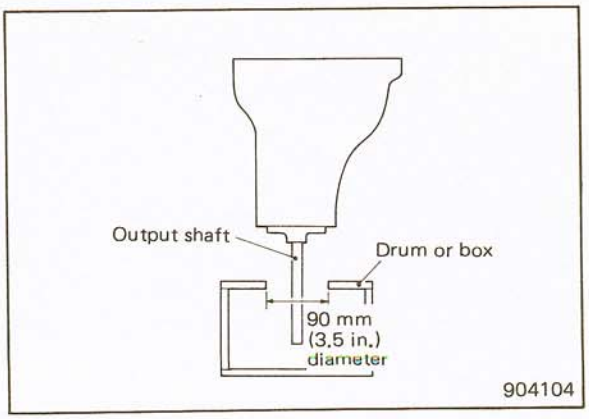


16. Position low-reverse band in the case, install short strut, then connect long link to band. Screw in band adjusting screw just enough to hold strut in place. (904068)
17. Install low-reverse drum. Be sure long link assembly is installed to provide running clearance for the low and reverse drum.
18. While supporting assembly in the case, insert output shaft through rear support. Carefully work assembly rearward, engaging rear planetary carrier lugs into low-reverse drum slots.

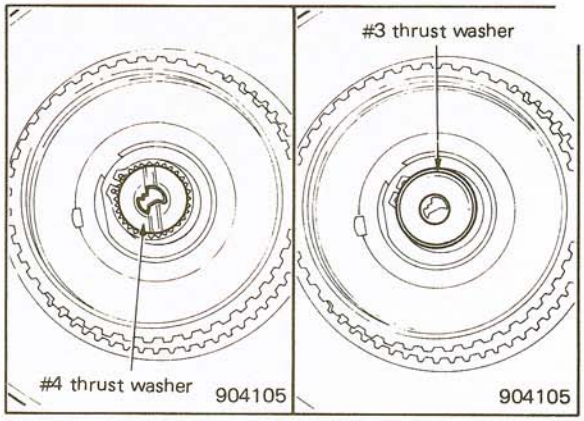
Caution
Be very careful not to damage ground surfaces on output shaft during installation.



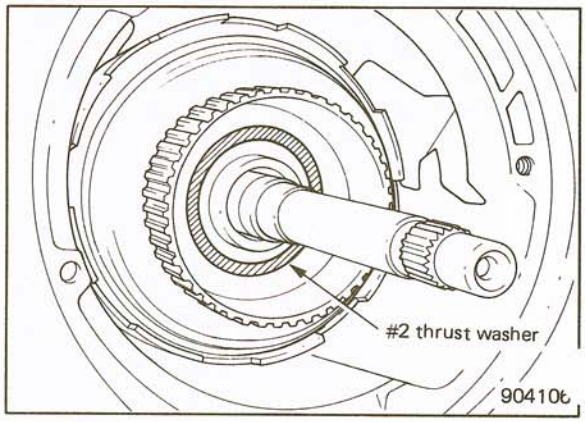
19. Front and rear clutches, kickdown band and oil pump assembly are more easily installed with transmission in an upright position.
    One method to support transmission is outlined as follows:
(1) Cut a 90 mm (3.5 in.) diameter hole in a bench, in the end of a small oil drum or a large wooden box strong enough to support transmission. Cut or file notches at edge of 90 mm (3.5 in.) hole so that output shaft support will fit and lay flat in the hole.
(2) Carefully insert output shaft into hole to support transmission upright, with its weight resting on flange of output shaft support.



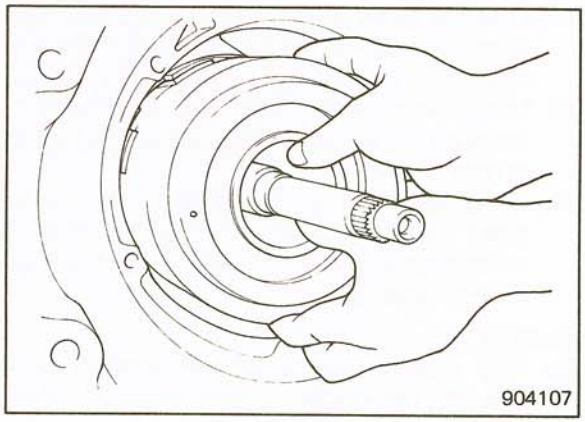
20. Apply a coat of grease to #4 selective thrust washer and install washer on front end of output shaft. If input shaft end play was not within specifications when tested before disassembly, replace thrust washer with one of proper thickness. (904105)
21. Apply a coat of grease to #3 thrust plate and install plate on thrust washer. (904105)



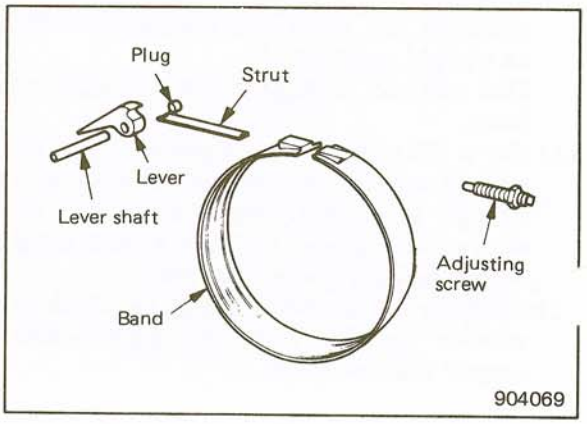
22. Apply a coat of grease to #2 thrust washer and install washer on rear clutch retainer. (904106)
23. Align front clutch disc inner splines, and place front clutch in position on rear clutch. Make sure front clutch disc splines are fully engaged on rear clutch splines.



24. Align rear clutch disc inner splines, grasp input shaft and lower the front and rear clutch assemblies into transmission case. (904107)
25. Engage rear clutch splines over splines of front annulus gear. Make sure front clutch retainer lugs are fully engaged in slots in the driving shell.



26. Slide kickdown band over front clutch assembly.
27. Install band strut, screw in adjusting screw just enough to hold strut in place. (904069)

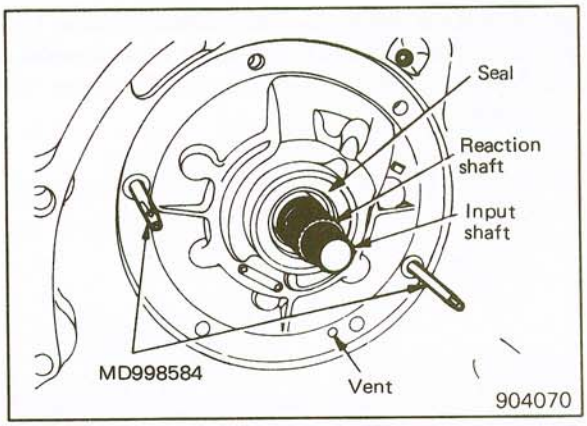


ıution
ıf difficulty was encountered in removing pump assembly due to an exceptionally tight fit in the case, it may be necessary to expand the case with heat during pump installation. Using a suitable heat light, heat the case in area of pump for a few minutes prior to installing pump assembly.

28. Screw two Special Tools in pump opening in the case. Install a new gasket over the pilot studs. (904070)
29. Place a new rubber seal ring in groove on outer flange of pump housing. Make sure seal ring is not twisted. Coat seal ring with grease for easy installation.
30. Install pump assembly in the case; tap it lightly with a soft mallet, if necessary.
    Make sure #1 thrust washer is installed on reaction shaft support hub.
31. Remove pilot studs, install bolts and snug down evenly. Rotate input and output shafts to see if any binding exists, then tighten bolts to specified torque. Check shafts again for free rotation.

Tightening torque . . . . . .
Oil pump tightening bolts 17-23 Nm (20-17ft.lbs.)

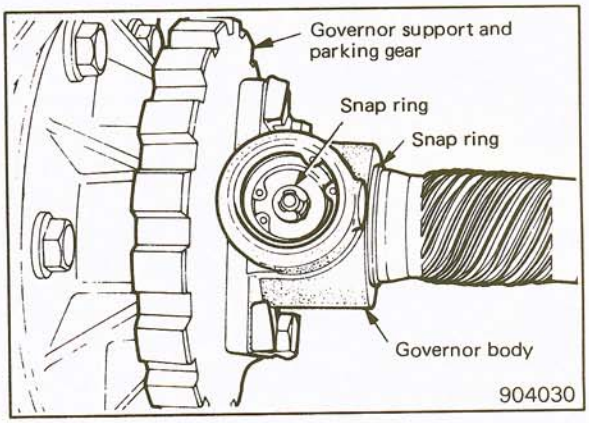
32. Adjust both bands as described in "Maintenance and adjustment".



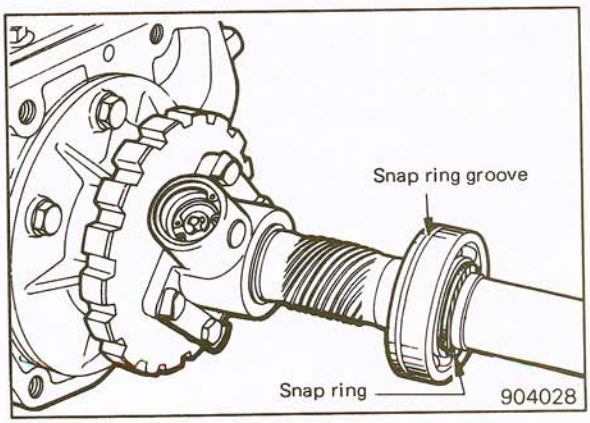
33. Position support and governor body assembly on output shaft. Align assembly so governor valve shaft hole in governor body aligns with hole in output shaft. Install snap ring behind governor body. Tighten body to support bolts to specified torque.

Tightening torque . . . . . .
Governor tightening bolt 10-12 Nm (8-9 ft.lbs.)

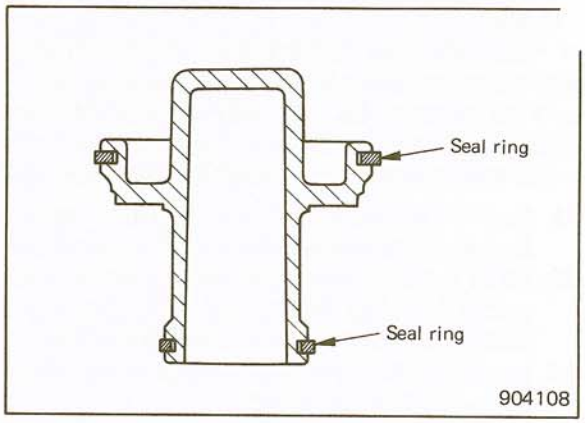
34. Place governor valve on valve shaft, insert assembly into body and through governor weights. Install valve shaft retaining snap ring. (904030)



35. Install bearing on shaft with its outer race ring groove toward front. Press or tap bearing tightly against front shoulder on output shaft, then install rear snap ring.

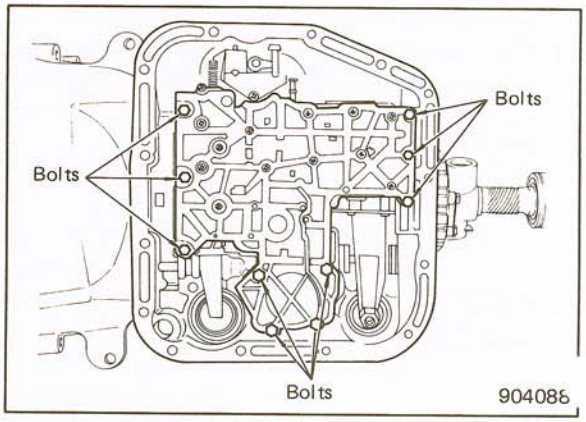


36. Install seal rings to accumulator piston. (904108)
37. Install accumulator piston in transmission case.
38. Position accumulator spring between piston and valve body.



39. Place valve body in position, working parking sprag rod through opening, install ten hex-head valve body to transmission case bolts finger tight. (904088)
40. Snug bolts down evenly, then tighten to specified torque.

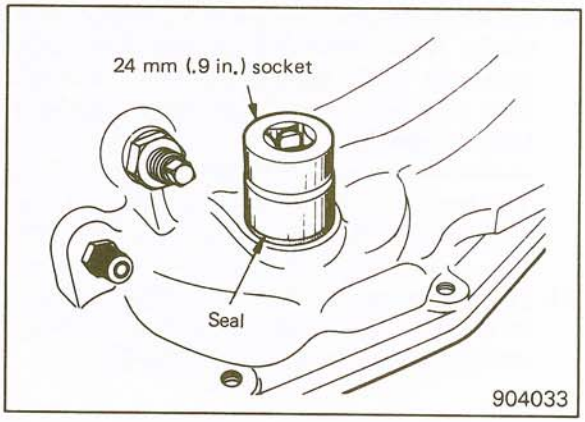
Tightening torque . . . . . 10-13 Nm (7-9 ft.lbs.)



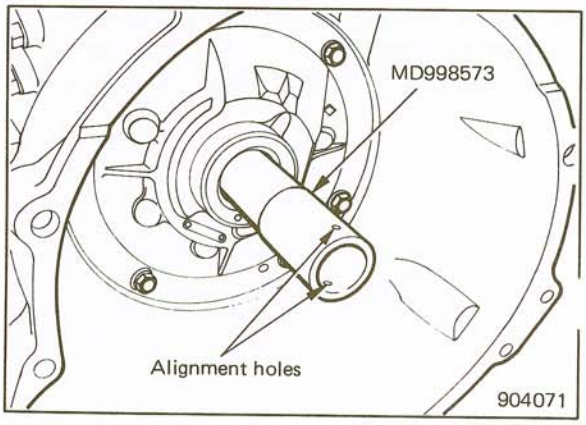
41. Drive a new seal into the case with a 24 mm (.9 in.) socket and hammer. (904033)

NOTE
This seal can be replaced without removing valve body from transmission by using a small screwdriver to pry seal out of its bore. Be careful not to scratch manual lever shaft or the seal bore in transmission.

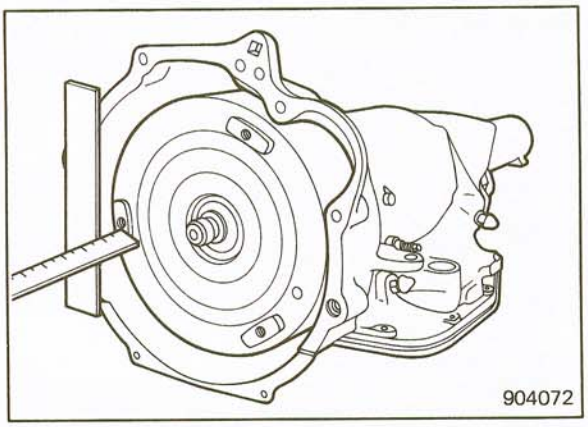
42. Install gearshift lever and tighten clamp bolt. Check lever shaft for binding in the case by moving lever through all detent positions. If binding exists, loosen valve body bolts and realign.
43. Install throttle lever and tighten clamp bolt.
44. Install oil pan and a new gasket.



45. Insert Special Tool into oil pump rotor and turn tool until two small holes of handle are vertical. Remove tool, while using care not to turn tool. By so doing, projection of pump inner rotor can be set in vertical position.

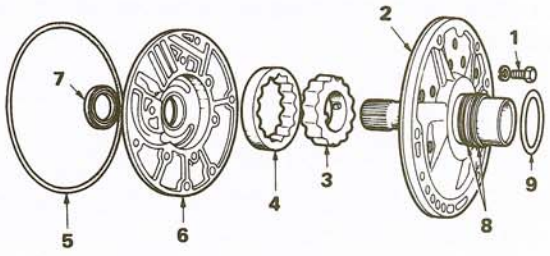


i. Apply thin coat of vaseline to outside periphery of converter. Turn converter hub until slots are vertical, carefully install converter assembly onto input shaft and reaction shaft until it securely fits projection of pump inner rotor.
To confirm that they are in complete engagement, measure distance from transmission case bell housing front surface to ends of three drive plate attaching bosses of torque converter. Distance should be at least 15 mm (.6 in.) when torque converter is pushed all the way into transmission.



COMPONENTS

1. Bolt (6)
2. Reaction shaft support
3. Inner rotor
4. Outer rotor
5. Oil pump housing seal
6. Oil pump housing
7. Oil seal
8. Reaction shaft support seal ring (2)
9. Front clutch thrust washer (#1)



NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

90404.

DISASSEMBLY

Thrust washer #1 cannot be removed unless two seal rings of reaction shaft support are removed.

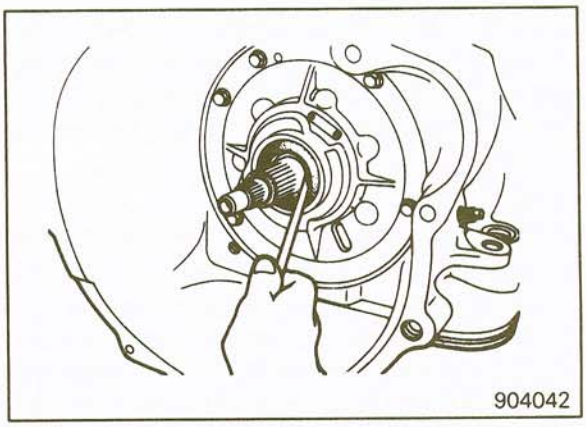
INSPECTION

1. Check seal ring of reaction shaft support for wear and damage. Check to ensure that it turns freely in groove.
2. Check thrust washer #1 (inserted between reaction shaft support and front clutch retainer) for wear and replace if necessary.
3. Check finished surfaces of oil pump housing and reaction shaft support for damage and burr. Check bushing for wear and damage.
4. Check pump rotor for scratches and pitching. Clean pump rotor, reinstall to pump housing, and measure all clearances with thickness gauge. Hold straight edge to rotor end and pump housing surface to measure clearance between rotor end and straight edge (side clearance). Measure rotor tip clearance between inside and outside teeth of rotor. Measure clearance between bore (I.D.) of oil pump housing and outer rotor O.D. (body clearance).

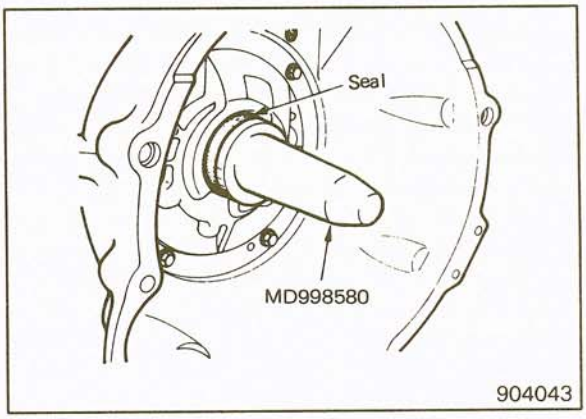
IL PUMP SEAL REPLACEMENT

Oil pump seal can be replaced without removing oil pump housing assembly from transmission case.

1. Use screwdriver as lever to remove oil seal.

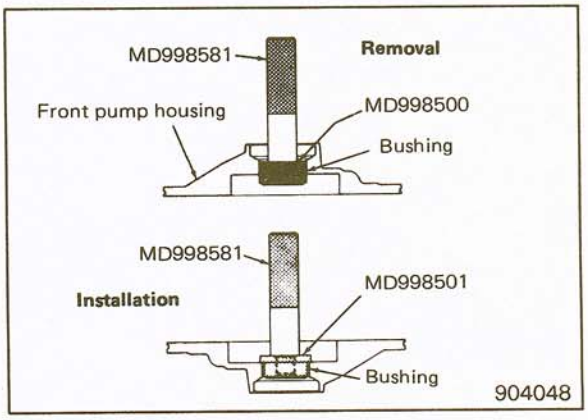


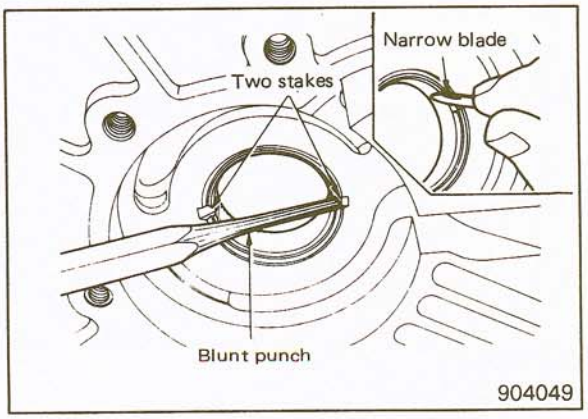
2. To install a new seal, place seal in opening of pump housing (lip side facing inward). Using Special Tool, drive seal into housing until tool bottoms.



PUMP HOUSING BUSHING REPLACEMENT

1. Place pump housing (seal face down) on a smooth firm surface.
2. Place Special Tool in bushing and install Special Tool in the removing head. (904048)
3. Drive bushing straight down and out of pump housing bore. Be careful not to cock tool in the bore.
4. Position new bushing on Special Tool. (904048)
5. With pump housing on a smooth clean surface, start bushing and installer in bushing bore. Install Handle (MD998581), in installer.
6. Drive bushing into housing until tool bottoms in the pump rotor housing. Be careful not to cock tool during installation.
7. Stake bushing in place by using a blunt punch or similar tool. A gentle tap at each stake slot location will suffice. (904049)
8. Using a narrow-bladed knife or similar tool, remove high points or burrs around staked area. Do not use a file or similar tool that will remove more metal than is necessary.





REACTION SHAFT BUSHING REPLACEMENT

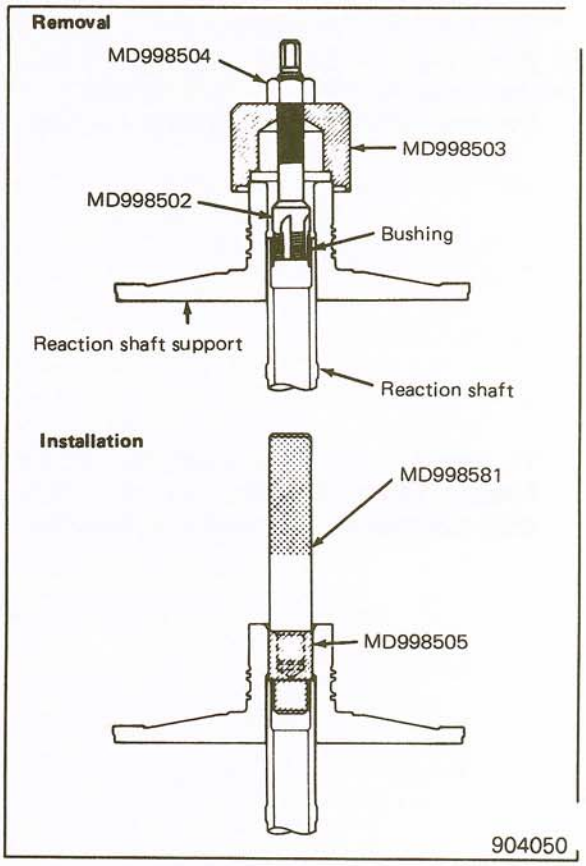
In case of a reaction shaft bushing failure, always inspect the support for wear from input shaft seal ring lands. If worn or grooved, replace reaction shaft support assembly.

1. Assemble Special Tools.

Caution

Do not clamp any part of reaction shaft or support in a vise.

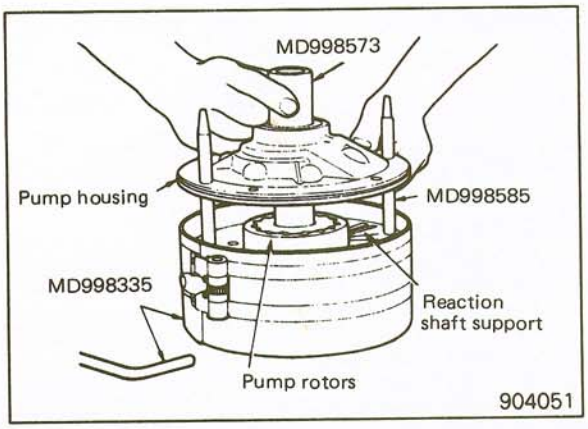
2. With cup held firmly against reaction shaft, screw bushing remover into bushing as far as possible by hand.
3. Using a wrench, screw bushing remover into bushing 3 to 4 additional turns to firmly engage threads in bushing.
4. Turn hex nut down against cup to pull bushing from reaction shaft. Thoroughly clean reaction shaft to remove chips made by remover threads.
5. Lightly grip bushing in a vise or with pliers and back tool (remover) out of bushing. Be careful not to damage threads on bushing remover.
6. Slide a new bushing on Special Tool and start them in the bore of reaction shaft. (904050)
7. Support reaction shaft upright on a clean smooth surface and install Special Tool in installing head. Drive bushing into shaft until tool bottoms.
8. Thoroughly clean reaction shaft support assembly before installation.



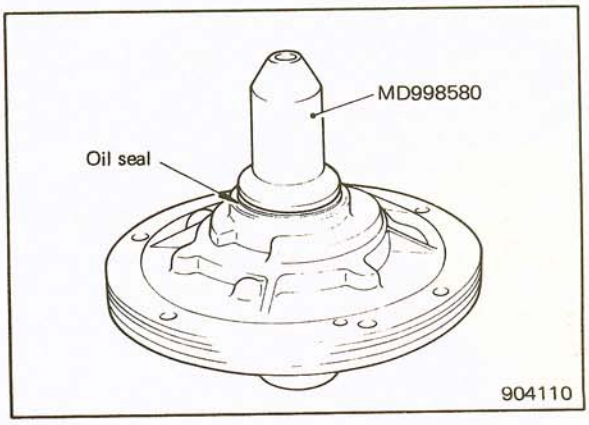
EASSEMBLY

1. Place reaction shaft support in Special Tool with hub of support and tool resting on a smooth flat surface bench. Screw two Special Tools into threaded holes of reaction shaft support flange. (904051)
2. Assemble and place rotors in center of the support.
3. Lower pump body over pilot studs, insert Special Tool through pump body and engage pump inner rotor. Rotate rotors with tool to center rotors in pump body, then with pump body firm against reaction shaft support, tighten clamping tool securely. (904051)
4. Invert pump housing and reaction shaft support assembly with oil pump band intact. Install support to pump housing bolts and tighten to specified torque. Remove oil pump band, pilot studs B and rotor alignment tool.

Tightening torque	16-21 Nm (12-15 ft.lbs.)

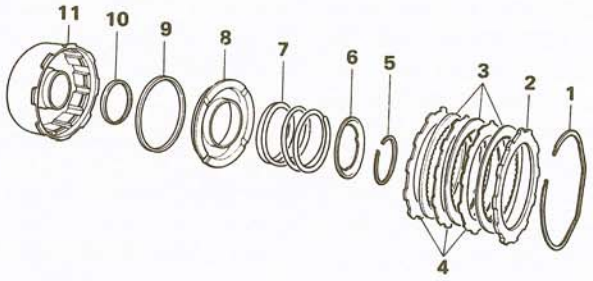


5. Place a new oil seal in opening of pump housing (lip of seal facing inward). Using Special Tool, drive seal into housing until tool bottoms. (904110)



COMPONENTS

1. Wave snap ring
2. Pressure plate
3. Clutch disc (3)
4. Clutch plate (3)
5. Snap ring
6. Piston spring retainer
7. Piston spring
8. Front clutch piston
9. Seal (outer)
10. Seal (inner)
11. Front clutch retainer

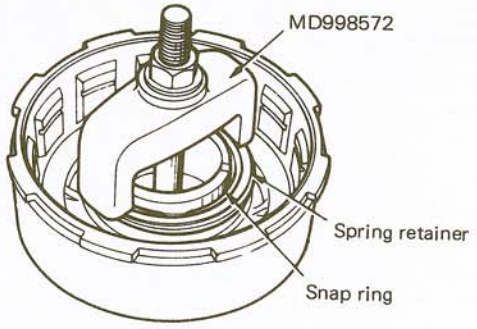


NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

904134

DISASSEMBLY

1. Install Special Tool over piston spring retainer. Compress spring and remove snap ring, then slowly release tool until spring retainer is free of hub. Remove tool, retainer and spring. (904053)
2. Invert clutch retainer assembly and bump it on a wood block to remove piston. Remove seals from piston and clutch retainer hub.



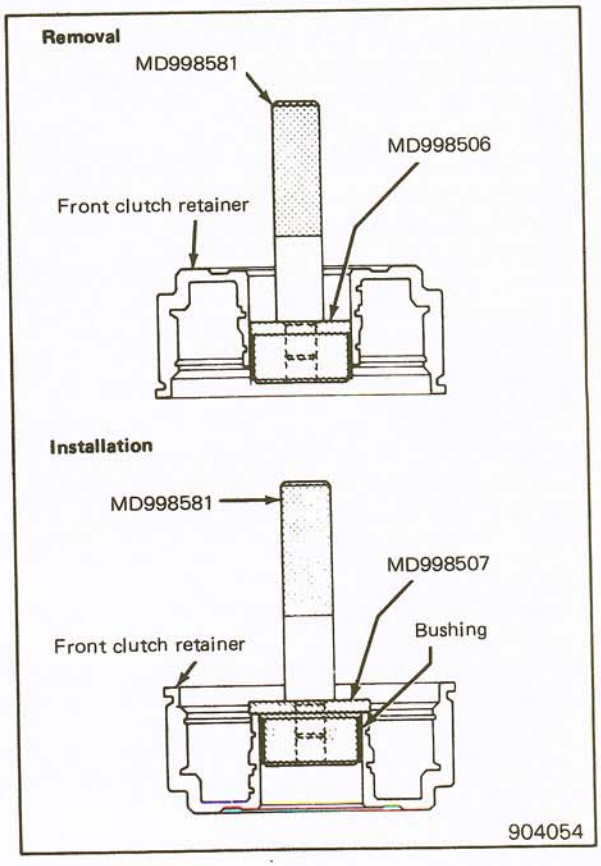
904053

ISPECTION

1. Inspect plates and discs for flatness. They must not be warped or cone shaped.
   Inspect facing material on all clutch discs. Replace discs that are charred, glazed or heavily pitted. Discs should also be replaced if they shown evidence of mateiral flaking off or if facing material can be scraped off easily. Inspect clutch disc splines for wear or other damage. Inspect clutch plate and pressure plate surfaces for burning, scoring or damaged driving lugs.
2. Inspect clutch plate lug grooves in clutch retainer for smooth surfaces, plates must travel freely in grooves. Inspect band contacting surface on clutch retainer for scores, the contact surface should be protected from damage during disassembly and handling. Note ball check in clutch retainer, make sure ball moves freely. Inspect piston seal surfaces in clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of seal rings. Inspect clutch retainer inner bore surface for wear from reaction shaft support seal rings. Inspect clutch retainer bushing for wear or scores.
   Inspect inside bore of piston for score marks; if light, remove with crocus cloth. Inspect seal grooves for nicks and burrs. Inspect seal rings for deterioration, wear and hardness. Inspect piston spring, retainer and snap ring for distortion.

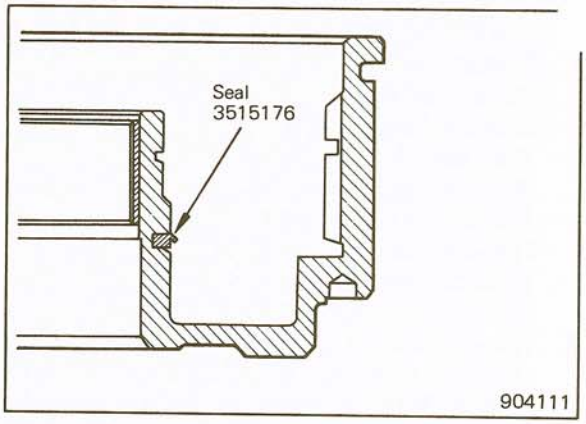
FRONT CLUTCH RETAINER BUSHING REPLACEMENT

1. Lay clutch retainer (open end down) on a clean smooth surface and place Special Tool in bushing. Install Special Tool in removing head. (904054)
2. Drive bushing straight down and out of clutch retainer bore. Be careful not to cock tool in the bore.
3. Lay clutch retainer (open end up) on a clean smooth surface. Slide a new bushing on Special Tool and start them in clutch retainer bore. (904054)
4. Install handle in installing head. Drive bushing into clutch retainer until tool bottoms.
5. Thoroughly clean clutch retainer before assembly and installation.

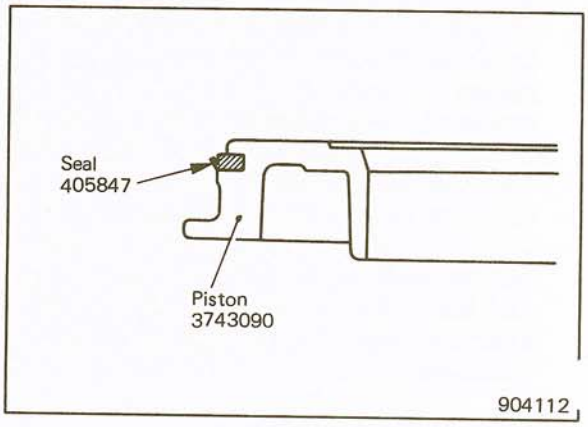


REASSEMBLY

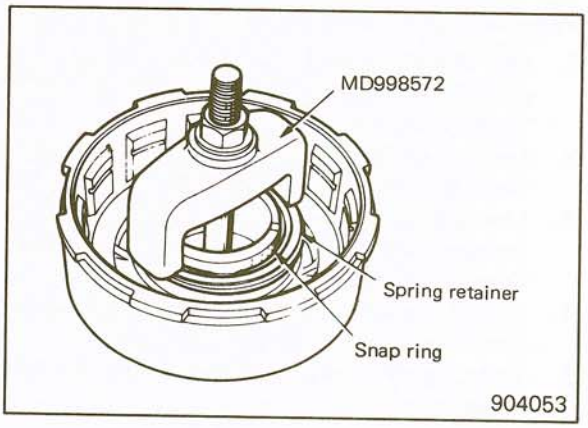
1. Lubricate inner seal with ATF and install on hub of clutch retainer. Make sure lip of seal faces down and is properly seated in groove.



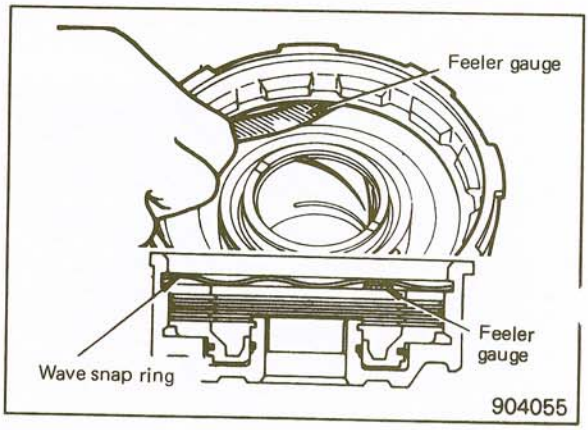
2. Install outer seal on clutch piston, with lip of seal toward bottom of clutch retainer. Apply vaseline to outer edge of seals and press seal to bottom of its groove around piston diameter for easier installation of piston assembly. Place piston assembly in retainer and carefully seat piston in bottom of retainer.



3. Place spring on piston hub and position spring retainer and snap ring on spring. Compress spring with Special Tool and seat snap ring in hub groove. Remove compressor tool. (904053)
4. Immerse all clutch plates and discs in ATF and install two clutch plates (made of steel) and clutch discs (with facing) each alternately in retainer. Install pressure plate and snap ring.
   Check to ensure that snap ring is correctly positioned in groove.

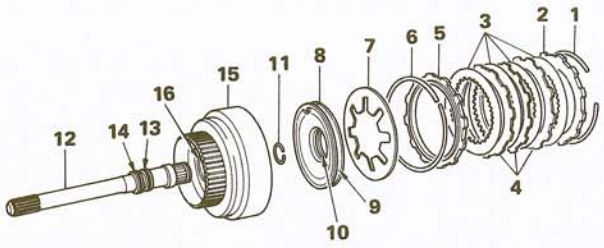


5. Insert a feeler gauge between pressure plate and wave snap ring to measure maximum clearance where snap ring is waved away from pressure plate.



'OMPONENTS

1. Snap ring (selective)
2. Pressure plate
3. Clutch disc (4)
4. Clutch plate (3)
5. Pressure plate
6. Wave snap ring
7. Piston spring
8. Rear clutch piston
9. Seal (outer)
10. Seal (inner)
11. Input shaft snap ring
12. Input shaft
13. Seal ring
14. Seal ring
15. Rear clutch retainer
16. Seal ring

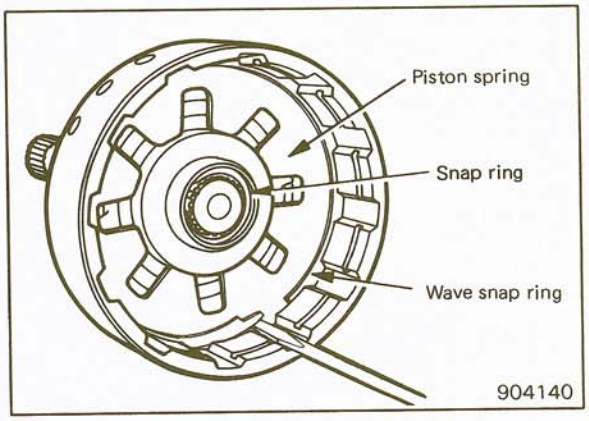


NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

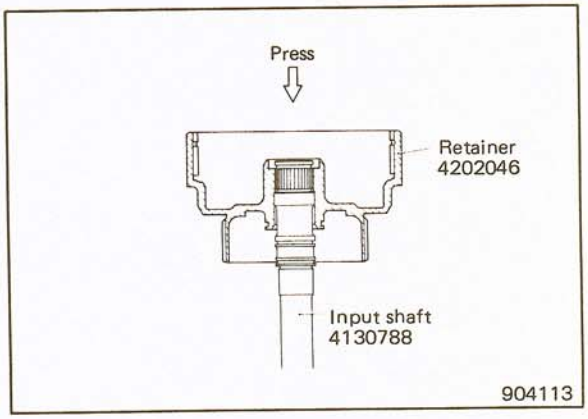
904060

Disassembly

1. Carefully pry one end of wave snap ring out of its groove in clutch retainer, then remove wave spring and clutch piston spring. (904140)
2. Invert clutch retainer assembly and bump it on a wood block to remove piston. Remove seals from piston.



3. If necessary, remove snap ring and press input shaft from clutch retainer.

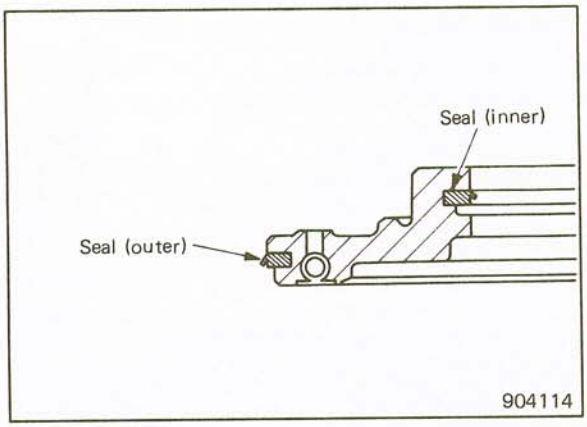


INSPECTION

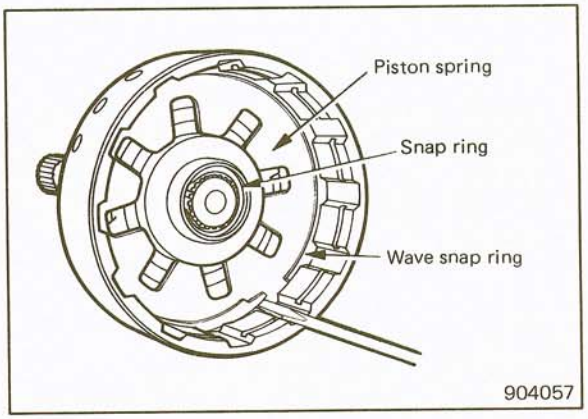
1. Inspect plates and discs for flatness. They must not be warped or cone shaped. Inspect facing material on all clutch discs. Replace discs that are charred, glazed or heavily pitted. Discs should also be replaced if they show evidence of material flaking off or if facing material can be scraped off easily. Inspect clutch disc splines for wear or other damage. Inspect clutch plate and pressure plate surface for burning, scoring or damaged driving lugs. Replace if necessary.
2. Inspect clutch plate lug grooves in clutch retainer for smooth surfaces, plates must travel freely in grooves. Inspect piston seal surfaces in clutch retainer for nicks or deep scratches. Light scratches will not interfere with sealing of seal rings.
3. Check to ensure that check ball of piston can move freely.
4. Inspect piston spring and wave spring for distortion or breakage.
5. Inspect teflon seal rings on input shaft for wear. Do not remove rings unless conditions warrant.
6. Inspect rear clutch to front clutch thrust washer for wear.

REASSEMBLY

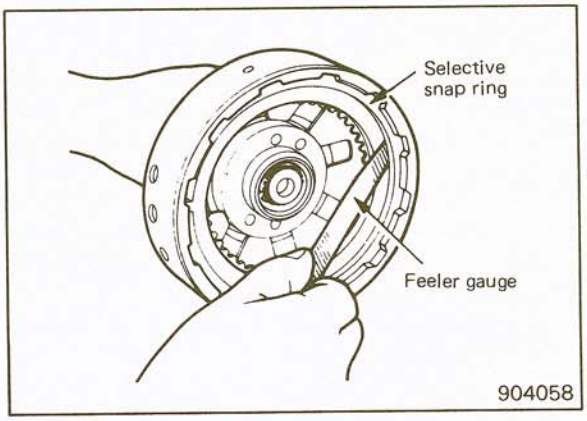
1. If removed, press input shaft into clutch retainer and install snap ring.
2. Install inner and outer seals on clutch piston and lubricate with ATF. Make sure lip of seals face toward head of clutch retainer, and are properly seated in piston grooves. (904114)
3. Place piston assembly in retainer and with a twisting motion, seat piston in bottom of retainer.



4. Place clutch piston spring on top of piston in clutch retainer. Start one end of wave spring in retainer groove, then progressively push or tap spring into place making sure it is fully seated in groove. (904057)
5. Install inner pressure plate in clutch retainer with raised portion of plate resting on spring.
6. Lubricate all clutch plates and discs with ATF, install one clutch disc (facing material) followed by a steel clutch plate until all plates are installed. Install outer pressure plate and selective snap ring.



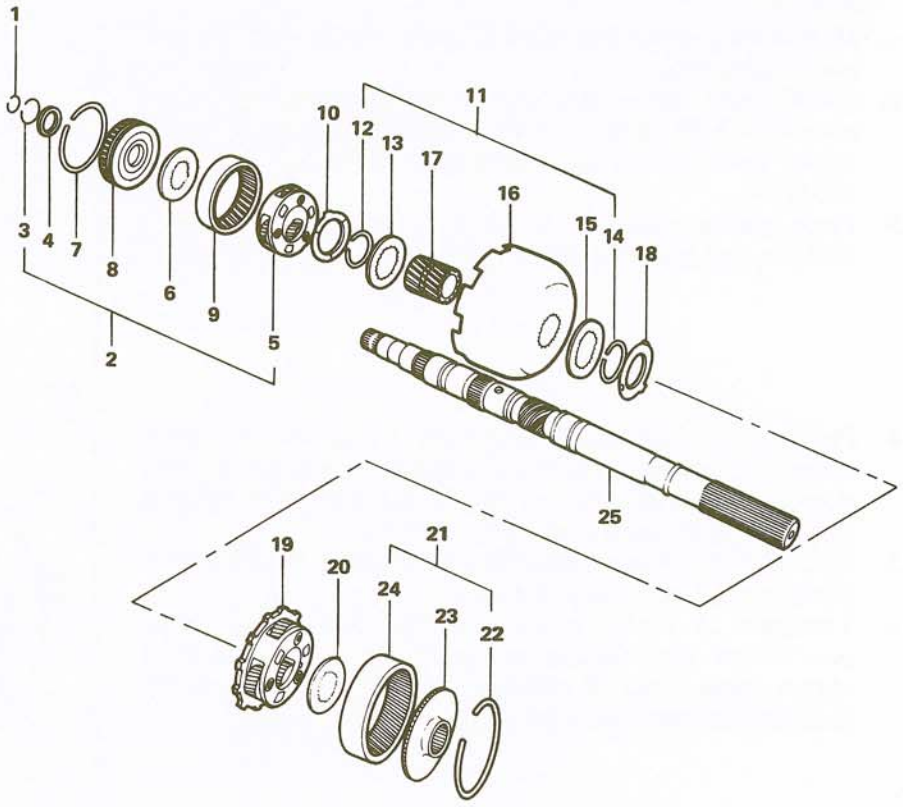
7. Measure rear clutch plate clearance by having an assistant press down firmly on outer pressure plate, then insert a feeler gauge between plate and snap ring.
   If necessary, install a new snap ring of proper thickness to obtain specified clearance. Low limit clearance is desirable. Rear clutch plate clearance is very important in obtaining proper clutch operation. Clearance can be adjusted by use of various thickness snap rings.



COMPONENTS

1. Snap ring (selective)
2. Front planetary gear assembly
3. Snap ring
4. Thrust washer (#5)
5. Front planetary gear
6. Thrust washer (#6)
7. Snap ring
8. Front annulus gear support
9. Annulus gear
10. Thrust washer (#7)
11. Sun gear and driving shell assembly
12. Lock ring
13. Thrust plate (#8)
14. Lock ring
15. Thrust plate (#9)
16. Sun gear driving shell
17. Sun gear
18. Thrust washer (#10)
19. Rear planetary gear
20. Thrust washer (#11)
21. Rear annulus gear assembly
22. Snap ring
23. Annulus gear support
24. Annulus gear
25. Output shaft

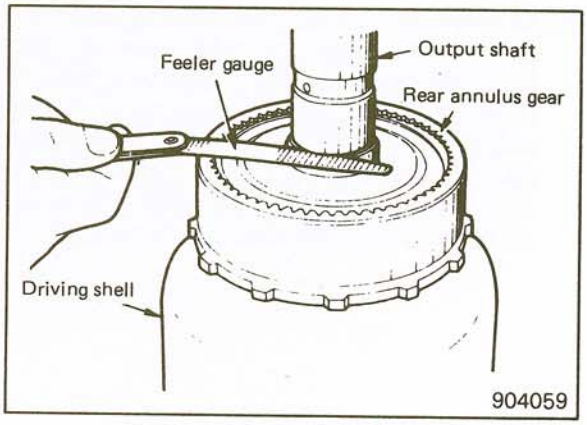
NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.



904060

DISASSEMBLY

Measure end play of planetary gear assemblies, sun gear and driving shell before removing these parts from output shaft. Stand assembly upright with forward end of output shaft on a wood block so that all parts will move forward against selective snap ring at front of shaft. Insert a feeler gauge between rear annulus gear support hub and shoulder on output shaft. The clearance should satisfy specifications. If clearance exceeds specifications, replace thrust washers and/or necessary parts.



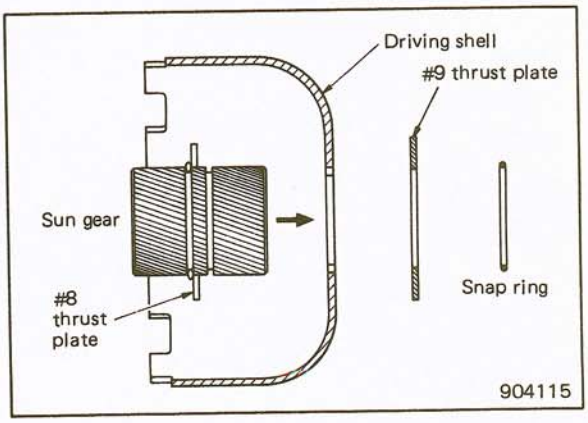
904059

INSPECTION

1. Inspect bearing surfaces on output shaft for nicks, burrs, scores or other damage. Light scratches, small nicks or burrs can be removed with crocus cloth or a fine stone. Inspect speedometer drive gear for any nicks or burrs, and remove with a sharp edged stone. Make sure all oil passages in shaft are open and clean.
2. Inspect bushings in sun gear for wear or scores. Replace sun gear assembly if bushings are damaged.
3. Inspect all thrust washers for wear and scores, and replace if damaged or worn below specifications.
4. Inspect thrust faces of planetary gear carriers for wear, scores or other damage, and replace as required. Inspect planetary gear carrier for cracks and pinions for broken or worn gear teeth, and for broken pinion shaft lock pins. Inspect annulus gear and support teeth for damage. Replace distorted snap rings.

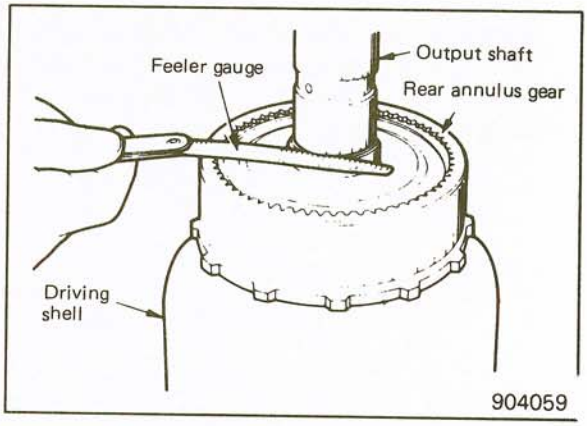
REASSEMBLY

1. Place rear annulus gear support in annulus gear and install snap ring.
2. Position rear planetary gear assembly in rear annulus gear and place #10 and #11 thrust washers on front and rear sides of planetary gear assembly.
3. Carefully work output shaft through annulus gear support. Make sure shaft splines are fully engaged in splines of annulus gear support.
4. Install thrust plate and snap ring on one end of sun gear. Insert sun gear through front side of driving shell and install rear thrust plate and snap ring. (904115)
5. Carefully slide driving shell and sun gear assembly on output shaft, engaging sun gear teeth with rear planetary pinion teeth.
6. Place front annulus gear support in annulus gear and install snap ring.



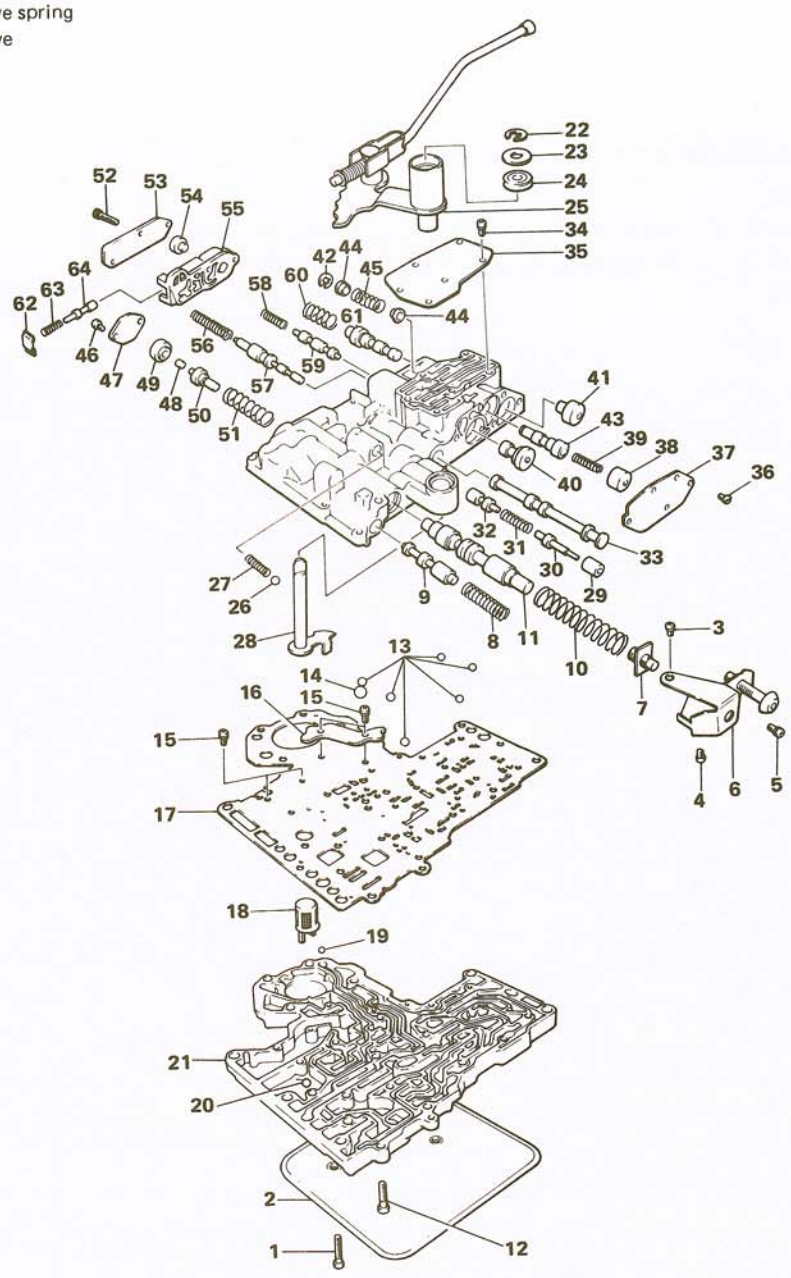
7. Position front planetary gear assembly in front annulus gear, place #5 thrust washer over planetary gear assembly hub and install snap ring. Position #6 and #7 thrust washers on front and rear sides of planetary gear assembly.
8. Carefully work front planetary and annulus gear assembly on output shaft, meshing planetary pinions with sun gear teeth.

9. With all components properly positioned, install selective snap ring on front end of output shaft. Check end play of planetary gear train. End play can be adjusted by the use of various thickness snap rings.



COMPONENTS

1. Screw (3)
2. Fluid filter
3. Screw
4. Screw
5. Screw
6. Adjusting screw bracket
7. Line pressure adjusting screw
8. Switch valve spring
9. Switch valve
10. Regulator valve spring
11. Regulator valve
12. Screw (13)
13. Check ball-small (6)
14. Check ball-large (1)
15. Screw (4)
16. Transfer plate support
17. Valve body plate
18. Screen
19. Steel ball
20. Steel ball
21. Transfer plate
22. Snap ring
23. Washer
24. Seal
25. Manual valve lever
26. Detent ball
27. Detent spring
28. Throttle valve lever
29. Kickdown detent
30. Kickdown valve
31. Throttle valve spring
32. Throttle valve
33. Manual valve
34. Screw (6)
35. Shuttle valve cover
36. Screw (5)
37. Shift valve plug cover
38. Shuttle valve plug
39. Primary spring
40. 1-2 shift valve plug
41. 2-3 shift valve plug
42. Snap ring
43. Shuttle valve
44. Sleeve (2)
45. Secondary spring
46. Screw (2)
47. Regulator valve cover
48. Line pressure plug
49. Sleeve
50. Throttle pressure plug
51. Spring
52. Screw (3)
53. Shift valve cover
54. Throttle plug
55. Limit valve body
56. 1-2 shift control valve spring
57. 1-2 shift control valve
58. 1-2 shift valve spring
59. 1-2 shift valve spring
60. 2-3 shift valve spring
61. 2-3 shift valve
62. Retainer
63. Limit valve spring
64. Limit valve



NOTE
Numbers show order of disassembly.
For reassembly, reverse order of disassembly.

904116

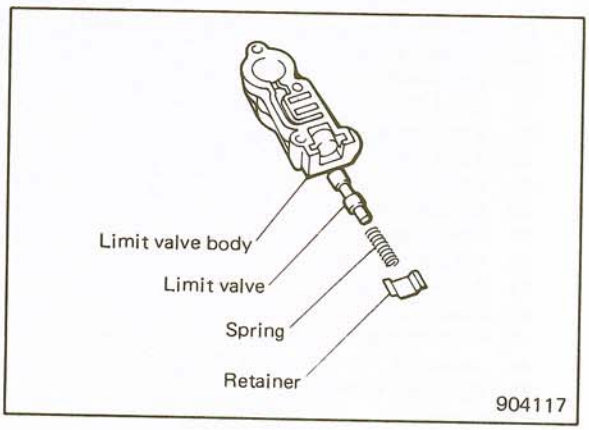
DISASSEMBLY

Caution
Never clamp any portion of valve body or transfer plate in a vise. Any slight distortion of valve body or transfer plate will result in sticking valves, excessive leakage or both.
When removing or installing valves or plugs, slide them in or out carefully. Do not use force.
Tag all springs and valves as they are removed for reassembly identification.

REASSEMBLY

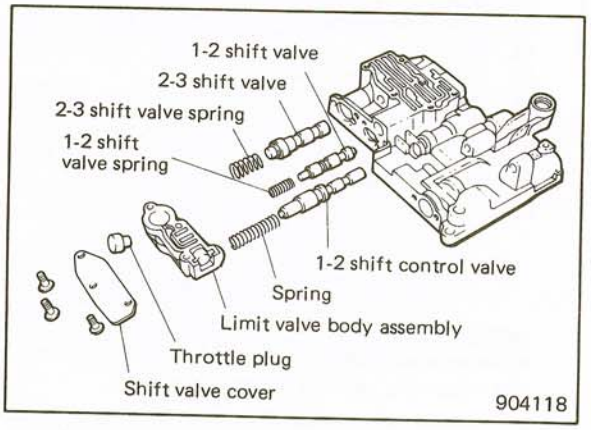
Caution
Tighten all valve body screws to 2.9 to 4.9 Nm (2.2 to 3.6 ft.lbs.). Using torque set driver, etc., torque all screws evenly.

1. Insert limit valve and spring into limit valve body. (904117)
2. Fit spring retainer in groove of limit valve body. (904117)
3. Put throttle plug in limit valve body.

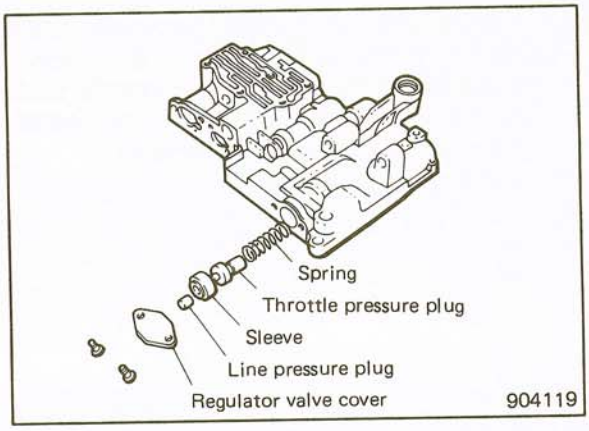


4. Insert 1-2 and 2-3 shift valves and springs into hole of valve body. (904118)
5. Set limit valve body assembly against shift valve spring.
6. Mount shift valve cover to valve body. Tighten screw to specified torque.

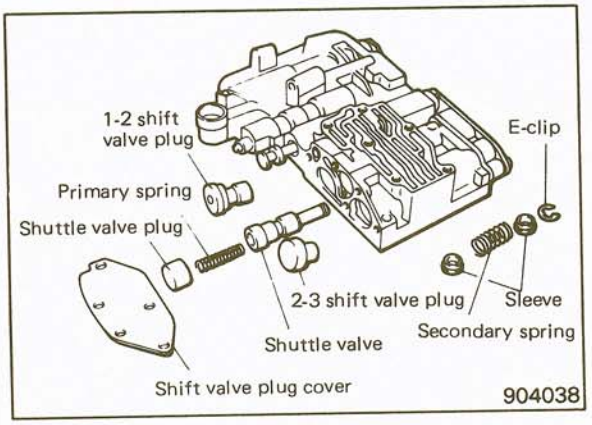
Tightening torque	
Cover screw	2.9-4.9 Nm (2.2-3.6 ft.lbs.)



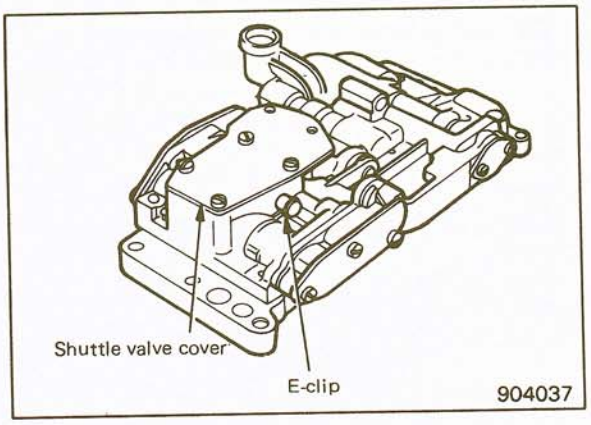
Install springs, throttle pressure plug, line pressure plug and sleeve and secure regulator valve cover to valve body.



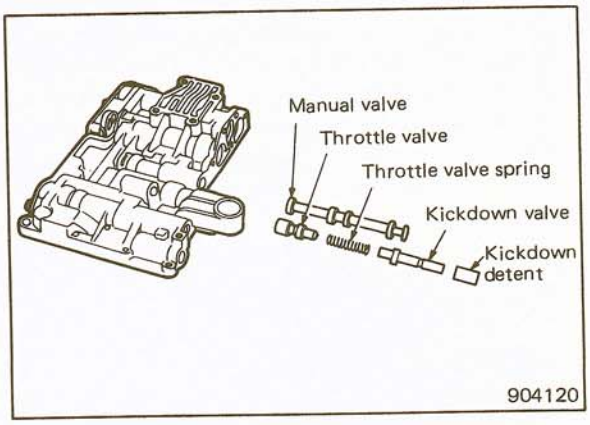
8. Place 1-2 and 2-3 shift valve plugs in their respective bores. (904038)
9. Install shuttle valve, primary spring and shuttle valve throttle plug. (904038)
10. Install sleeve and secondary spring to shuttle valve end and secure with E-clip. (904038)
11. Install shift valve plug cover and tighten five screws.



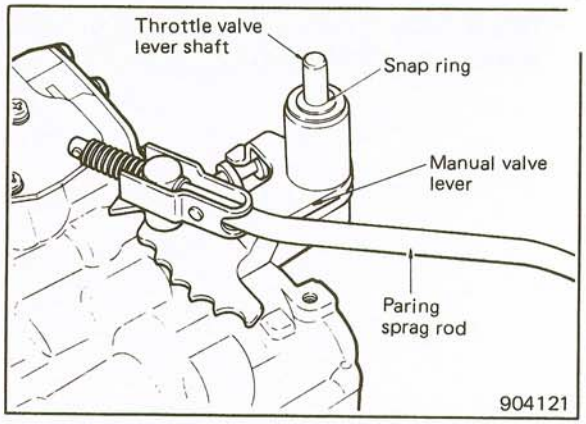
12. Install shuttle valve cover and tighten six screws.



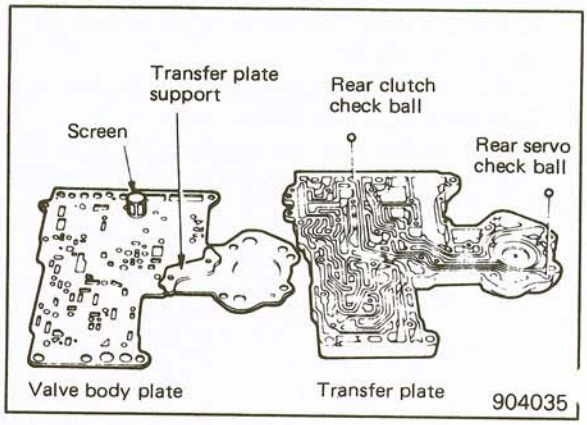
13. Install throttle valve, throttle valve spring, kickdown valve and kickdown detent plug. (904120)
14. Slide manual valve into its bore.



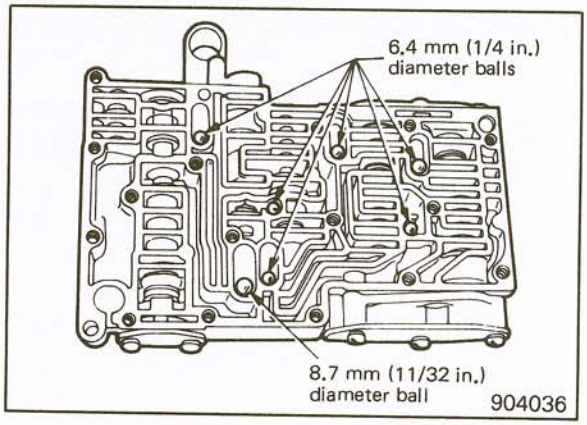
15. Install throttle lever on valve body. Insert detent spring and ball in its bore in valve body. Depress ball and spring and slide manual lever over throttle shaft so that it engages manual valve and detent ball. Install seal, retaining washer and E-clip on throttle shaft.



16. Install rear clutch check ball and rear servo check ball to transfer plate and install regulator valve screen to valve body plate. (904035)
17. Install transfer plate support and valve body plate to transfer plate with four screws. (904035)

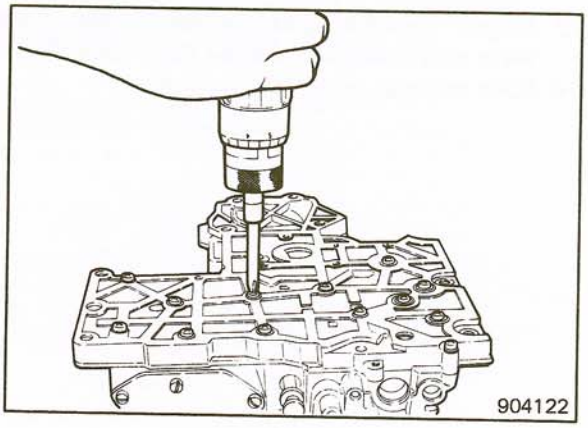


18. Install the seven check balls in valve body.

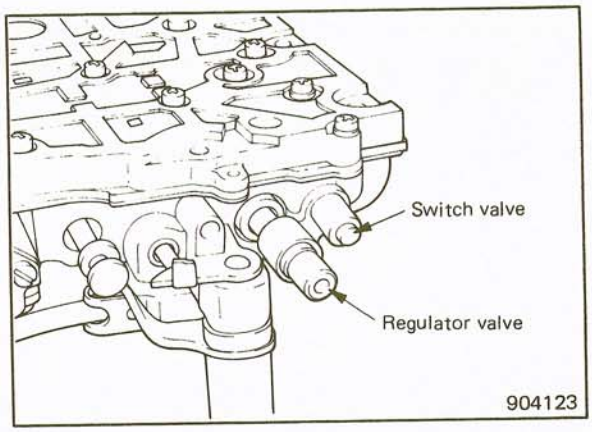


19. Place transfer plate assembly on valve body and temporarily tighten 13 screws. (904122)
20. Torque screws to specified torque in correct sequence, working from center screw to outward ones.

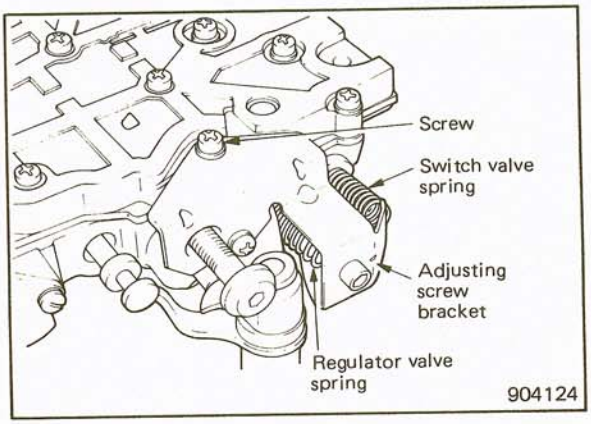
Tightening torque	
Valve body screw	2.9-4.9 Nm (2.2-3.6 ft.lbs.)



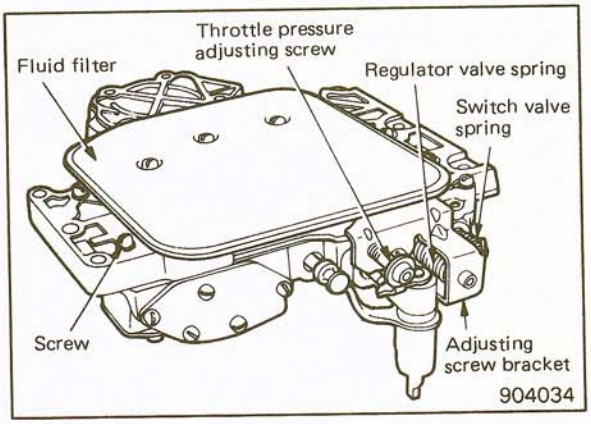
1. Put switch valve, regulator valve and spring in respective bores.



22. Set adjustment screw bracket on spring and temporarily tighten one screw (one for mounting to side of valve body). After top and bottom screws have been tightened, tighten side screw.

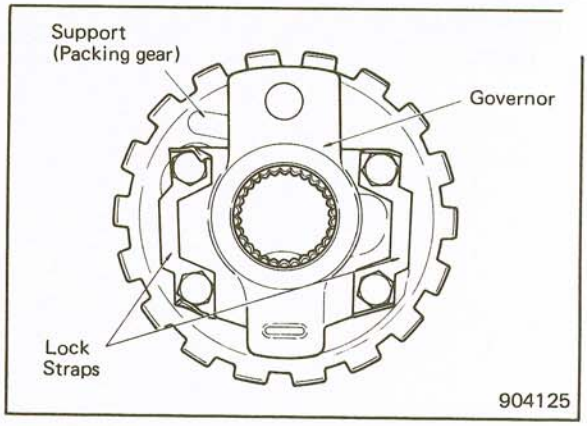


23. Install oil filter and tighten.
24. After valve body has been serviced and completely assembled, measure throttle and line pressure adjustments. However, if pressures were satisfactory prior to disassembly, use original settings. (904034)

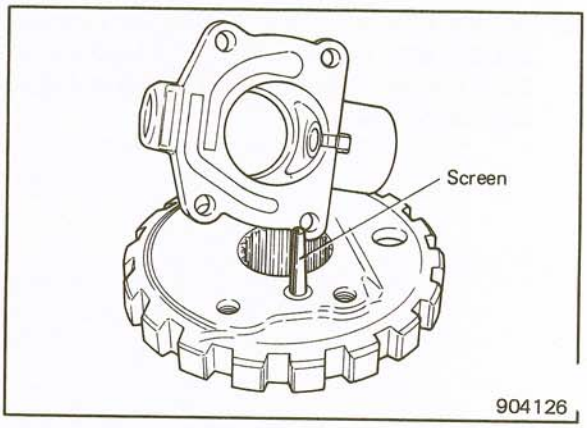


DISASSEMBLY

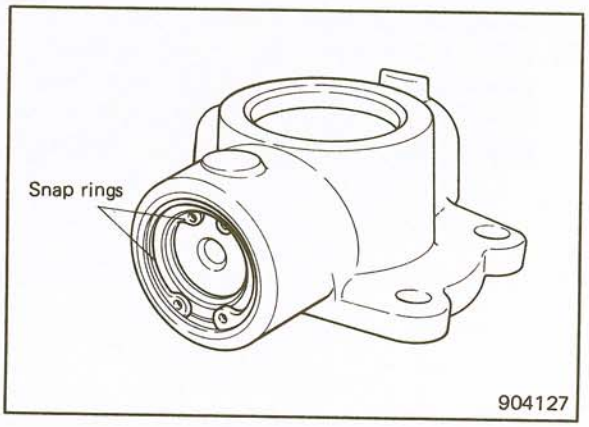
1. Remove four bolts and separate governor and support (parking gear).



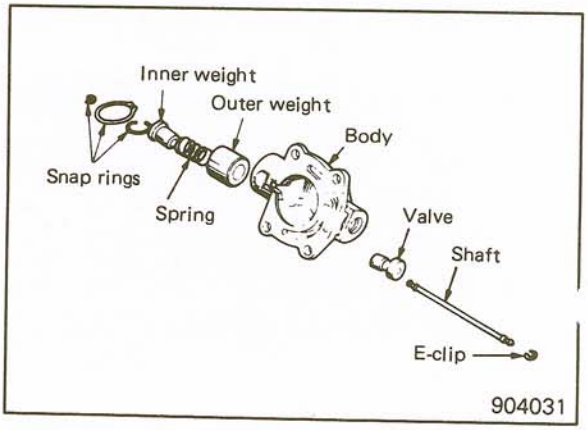
2. Take out governor screen from governor body.



3. Remove two snap rings.



4. Take out governor weight and spring.



INSPECTION

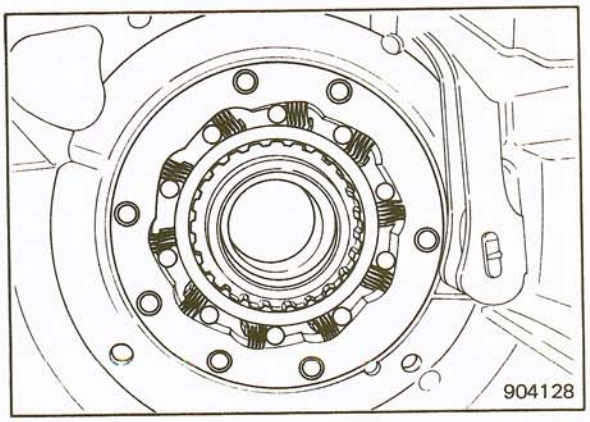
1. Check all parts for burrs and wear.
2. Check inner weight for free movement in outer weight, and outer weight for free movement in governor body.
3. Check valve for free movement in governor body.
4. Weights and valve should fall freely in bores when clean and dry.
5. Rough surfaces may be removed with crocus cloth.
6. Wash governor screen.
7. Check governor weight spring for distortion.
8. Thoroughly clean all governor parts in clean solvent, dry with compressed air and test for free movement before assembly.
9. Check lugs on parking gear for broken edges or other damage.

REASSEMBLY

1. Assemble governor body and filter to the support and tighten bolts finger tight. Make sure oil passage of governor body aligns with passage in the support.
2. Assemble inner weight and spring to outer weight, and secure with snap ring. Place weight assembly in governor body and install snap ring.

INSPECTION

Inspect clutch rollers for smooth round surfaces, they must be free of flat spots and chipped edges. Inspect roller contacting surfaces in cam and race for brinelling.
Inspect roller springs for distortion, wear or other damage.

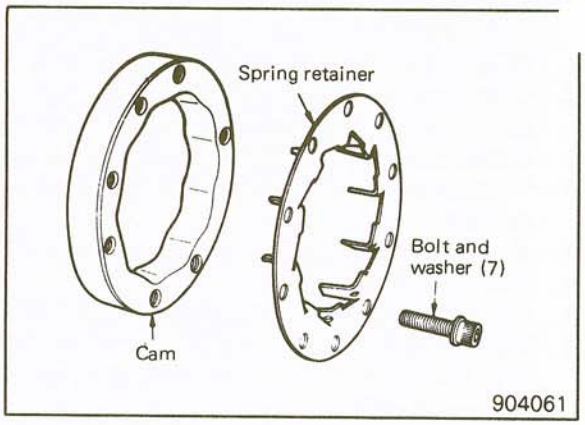


OVERRUNNING CLUTCH CAM REPLACEMENT

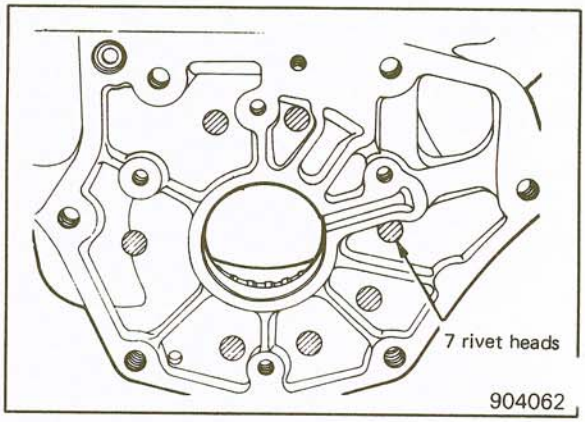
If overrunning clutch cam or spring retainer is found damaged, it can be replaced with a service replacement cam, spring retainer and retaining bolts.

The service parts are retained in the case with bolts instead of rivets. To install, proceed as follows:

1. Remove four bolts securing output shaft support to rear of transmission case. Tap support rearward out of the case with a soft faced hammer.

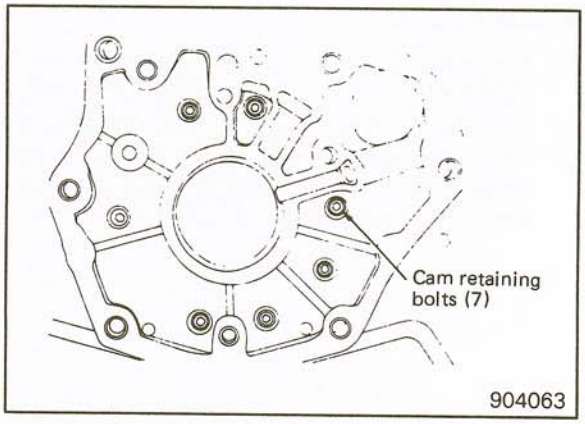


2. Center punch rivets exactly in center of each rivet head. (904062)
3. Drill through each rivet head with a 9.5 mm (.4 in.) drill. Be careful not to drill into transmission case. Chip off rivet heads with a small chisel and drive rivets and cam from the case with a blunt punch of proper size. (904062)
4. Carefully enlarge rivet holes in the case with a 6.7 mm (17/64 in.) drill. Remove all chips and foreign matter from the case, and make sure cam area is free of chips and burrs. (904062)



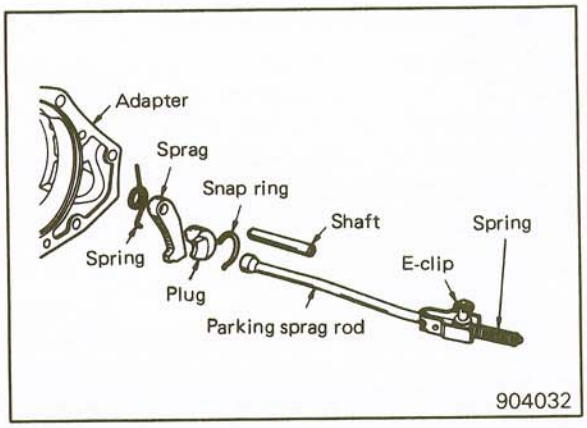
5. To install, position cam and roller spring retainer in the case. Align cam bolt holes with holes in the case, then thread all seven retaining bolts and washer assemblies into cam a few turns. (904063)
6. Tap cam firmly into the case if necessary. Draw retaining bolts down evenly, then tighten to specified torque.

Tightening torque	12 Nm (9ft.lbs.)



DISASSEMBLY

1. Slide shaft out of adapter to remove parking sprag and spring. (904032)
2. Remove snap ring and slide reaction plug assembly out of the housing. (904032)



INSPECTION

1. Check sprag shaft for scores and free movement in adapter and sprag.
2. Check sprag and sprag rod springs for distortion and tension.
3. Check square lug on sprag for broken edges, also lugs on parking gear for damage.
4. Check cam on end of sprag rod for nicks, burrs and free turning.

REASSEMBLY

1. Install reaction plug assembly in adapter and secure with snap ring.
2. Position sprag and spring in adapter and insert shaft. Make sure square lug on sprag is toward parking gear, and spring is positioned so it moves sprag away from gear.

WHEELS AND TIRES

CONTENTS

GENERAL SPECIFICATIONS

Wheels	
Tire size	215SR15
Wheel type	Steel type
Wheel size	6JJ x 15
Amount of wheel offset mm (in.)	22 (.87)

SERVICE SPECIFICATIONS

Service limits	
Wheel runout mm (in.)	
Radial runout	1.2 (.05)
Tire runout mm (in.)	
Radial runout	3.0 (.12)
Tread depth of tires mm (in.)	1.6 (.06)
Repair limit	
Wheel dynamic balance Ncm (in.lbs.)	3.5 (.3)
Tire inflation pressures kPa (psi)	
For vehicle unladen	
Front	180 (26)
Rear	180 (26)
For vehicle laded	
Front	180 (26)
Rear	240 (34)

TORQUE SPECIFICATION

	Nm (ft.lbs.)
Hub nuts for wheels	100-120 (72-87)

Symptom	Probable cause	Remedy
Unevenly worn tires Center of tread worn 	Over-inflation	Adjust the tire pressure
Both sides of tread worn 	Under-inflation	Adjust the tire pressure
Inside of tread worn 	Insufficient toe-in Insufficient camber	Adjust
Outside of tread worn 	Excessive toe-in Excessive camber	Adjust
Feathering 	Excessive toe-in	Adjust
Cupping 	Unbalanced wheels	Adjust
	Loose wheel bearings	Inspect for looseness and adjust the preload
	Loose ball joints	Inspect, and repair as necessary
	Malfunction of shock absorbers	Inspect, and repair as necessary
Road noise, body vibration	Over-inflation or under-inflation	Adjust the tire pressure
	Unbalanced wheels	Adjust
	Wheel runout	Replace the wheel(s)
	Abnormally worn tires	Replace the tires
	Unbalanced propeller shaft	Adjust or replace

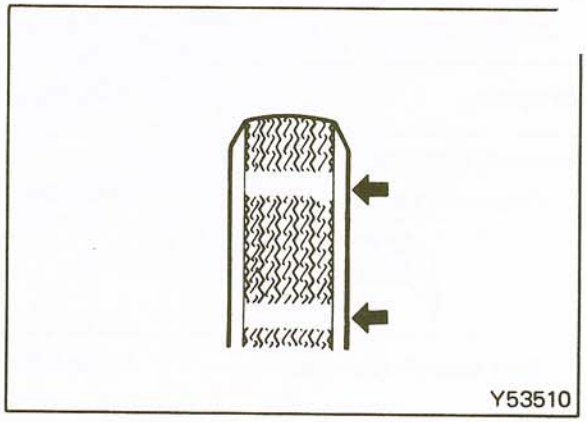
D11071

CHECKING OF TIRE WEAR

Measure the tread depth. If the remaining tread depth is less than the service limit, replace the tire.

Tread depth [Service limit]	1.6 mm (.06 in.)

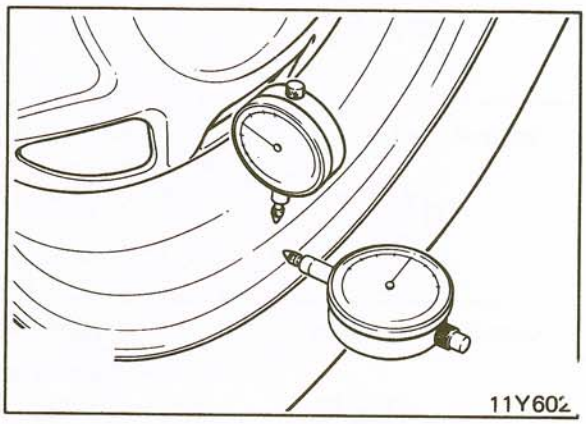
NOTE
When the tread depth of tires is reduced to 1.6 mm (.06 in.) or less, wear indicators will appear.



CHECKING OF WHEEL RUNOUT

1. Jack up the vehicle and support with floor stands.
2. Measure wheel runout with a dial indicator. If the runout exceeds the service limit, replace the wheel.

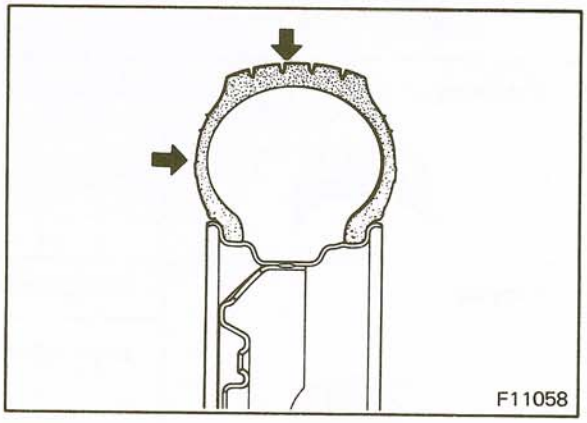
Wheel runout [Service limit]	Radial 1.2 mm (.05 in.)



CHECKING OF TIRE RUNOUT

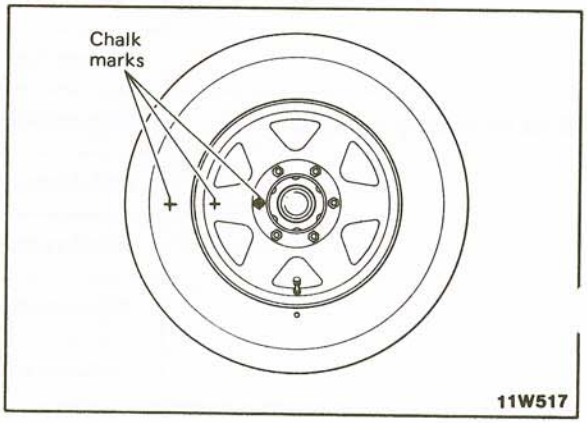
Measure the radial.

Tire runout [Service limit]	Radial 3.0 mm (.1 in.)



Simple Method to Reduce Runout

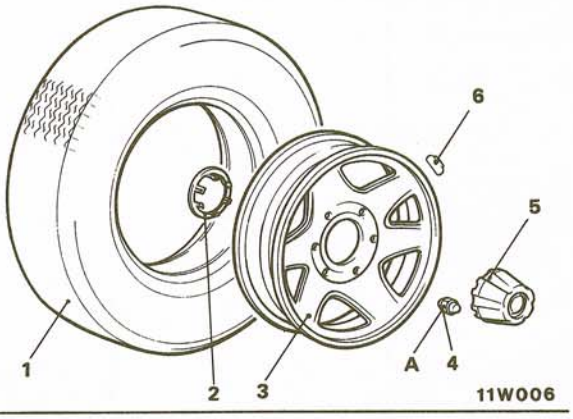
1. Measure runout and make chalk marks on tire sidewall, wheel and nearest stud at point of maximum runout before removing the tire from the wheel.
2. Remove the tire from the wheel and remount the wheel on the drum or hub in the former position.
3. Check the radial and lateral wheel runout. They should not exceed the service limits.
4. If the point of greatest wheel runout is near the original chalk mark, remount the tire, so that the chalk mark is 180 degrees from the original mark. Recheck tire runout.



COMPONENTS

1. Tire
2. Holder
3. Wheel
4. Hub nut
5. Center cap
6. Balance weight

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

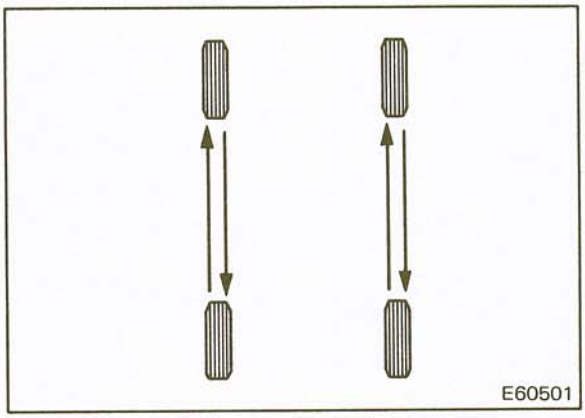


TIRE ROTATION

1. Rotate the tires in the pattern illustrated. (E60501)
2. Hand tighten the hub nuts, and then use a torque wrench to tighten them to specification.

Tightening torque . . . . . 70-80 Nm (50-57 ft.lbs.)

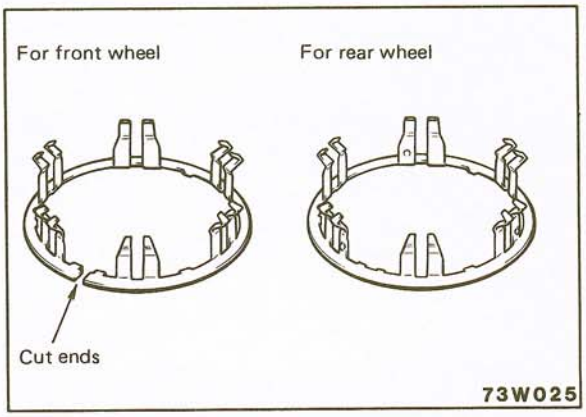
NOTE
Do not use an impact wrench or apply oil to the wheel studs.



CENTER CAP

Installation

NOTE
The metal fittings which attach the center caps, are different on the front wheels from those on the rear.

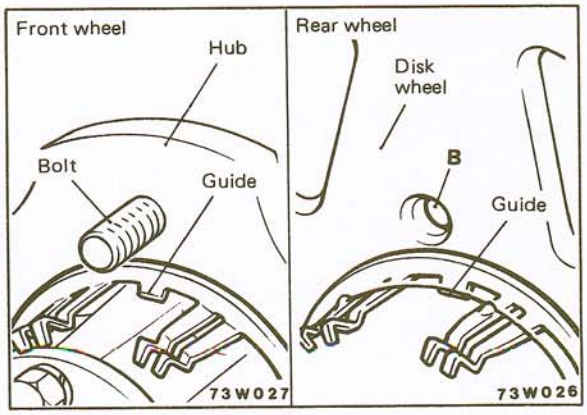


Attaching Center Cap Metal Fittings to Front Wheels

Align any of the guides (three projections) inside the fitting with a bolt position, and then mount the fitting on the hub, being careful that the cut ends are not opened. (73W027)

Attaching Center Cap Metal Fittings to Rear Wheels

Align any of the guides (three projections) inside the fitting with the position of the wheel mounting hole (B) and mount the fitting to the wheel from the inside. (73W026)



BODY AND SHEET METAL

CONTENTS

GENERAL SPECIFICATIONS

Front doors	
Construction	Front-hinged, sash construction
Regulator system	X-arm type
Locking system	Pin-fork type
Glass installation method	
Windshield glass	Weatherstrip type
Quarter window glass (metal-top vehicle)	Weatherstrip type
Back door window glass (metal-top vehicle)	Weatherstrip type
Glass thickness	
Windshield galss mm (in.)	5.7 (.22)
Quarter window glass (metal-top vehicle) mm (in.)	4 (.16)
Back door window glass (metal-top vehicle) mm (in.)	4 (.16)
Door window glass mm (in.)	4 (.16)
Ventilator window glass mm (in.)	5 (.2)
Suspension seats	
Suspension mechanism	Coil spring type with shock absorber
Up-and-down movement stroke mm (in.)	80 (3.15)
Body weight adjustment kg (lbs.)	50-100 (110.2-220.5)
Seat height adjustment	3 levels

TORQUE SPECIFICATIONS

	Nm (ft.lbs.)
Body to frame	28-32 (20-23)
Under skid plate to frame	18-25 (13-18)
Under cover to under skid plate	10-13 (7-9)
Hood release cable	3.5-4.0 (2.5-2.9)
Front door hinges to body	30-40 (22-29)
Back door hinges to body	30-40 (22-29)
Spare tire carrier to back door	8-10 (5.8-7.0)
Seat anchor bolts	
Head marked 8	10-14 (7-10)
Head marked 10	32-49 (23-35)
Suspension seats	
Shock absorber attaching bolts	7-10 (5-7)
Link attaching bolts	27-36 (20-26)
Rear seat back stopper	20-30 (14-22)
Seat belt tightening bolts	23-65 (17-47)

LUBRICANTS

	Recommended lubricant	Quantity
Sliding portion of seat adjuster	Multipurpose grease SAE J310a, NLGI grade #2EP	As required

ADHESIVE

	Specified adhesive	Quantity
Windshield weatherstrip and windshield	3M Super Weatherstrip Adhesive 8001 or equivalent	As required
Windshield weatherstrip and body flange	3M Super Weatherstrip Adhesive 8001 or equivalent	As required
Back door window weatherstrip and back door window glass	3M Super Weatherstrip Adhesive 8001 or equivalent	As required

SPECIAL TOOL

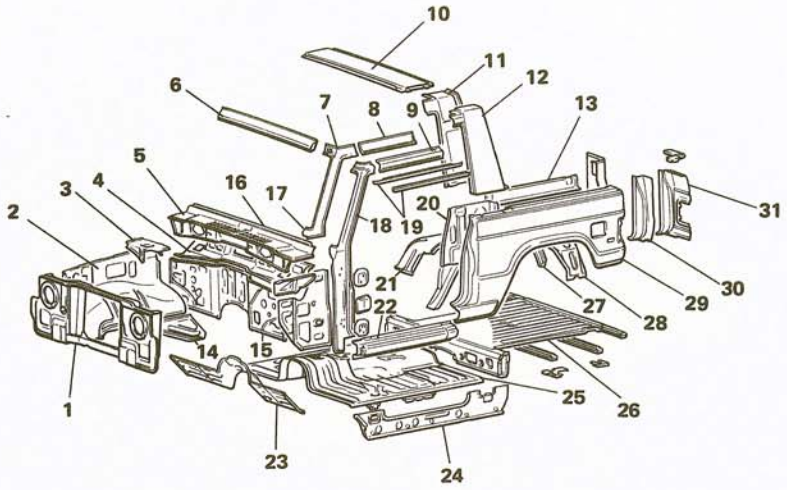
Tool (Number and name)	Use
MB990784 "D" Ornament remover 	Removal of trims

"D" see page 2 for instructions.

Symptom	Probable cause	Remedy
HOOD		
Floating	Incorrect hood lock height	Adjust
Stiff lock operation	Incorrect hook-to-lock alignment	Adjust
Uneven height	Incorrect hood bumper height	Adjust
Uneven clearance	Incorrectly installed hood	Adjust
DOORS		
Stiff opening and closing	Improperly adjusted latch and striker	Adjust
Level difference	Improperly installed door	Adjust
Uneven clearance	Improperly installed door	Adjust
WATER LEAKS		
Leaking in from bulkhead holes	Sealant improperly applied to grommets in bulkhead	Apply sealant
Leaking in from door glass	Poor contact of door glass	Adjust
	Gap at top of glass	Adjust
Leaking in from door edges	Deformed or damaged weatherstrip	Replace
Leaking in from center of door	Clogged drainage hole	Clean hole
	Insufficiently bonded or damaged waterproof film	Replace
DUST		
Entering from floor	Cracked or improperly filled sealant at floor joints	Apply sealant

COMPONENTS

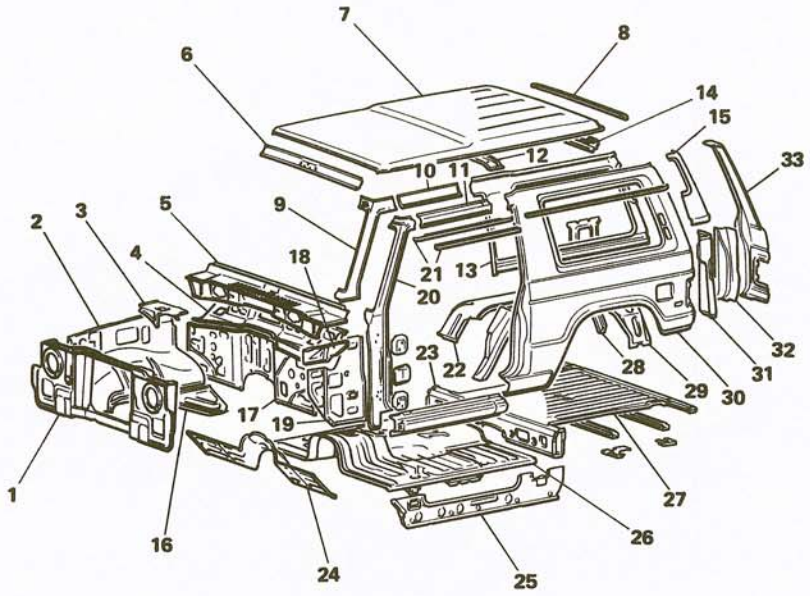
Canvas-top vehicle



1. Headlamp support
2. Front fender shield
3. Battery tray
4. Cowl top inner panel
5. Cowl top outer panel
6. Front roof rail
7. Front pillar, inner, upper
8. Side roof panel, inner
9. Side roof panel, outer
10. Center roof rail
11. Center pillar, inner
12. Center pillar, outer
13. Side rail, upper
14. Fender shield extenison
15. Dash panel, upper
16. Cowl top extenison
17. Front pillar, inner, lower
18. Front pillar, outer
19. Drip channel
20. Center pillar, inner, lower
21. Rear wheel house inner panel
22. Side sill, outer
23. Dash panel, lower
24. Side sill, inner
25. Front floor pan
26. Rear floor pan
27. Rear wheel house outer panel
28. Side panel, inner, lower
29. Side panel, outer
30. Rear end panel reinforcement
31. Rear end panel, outer

18W631

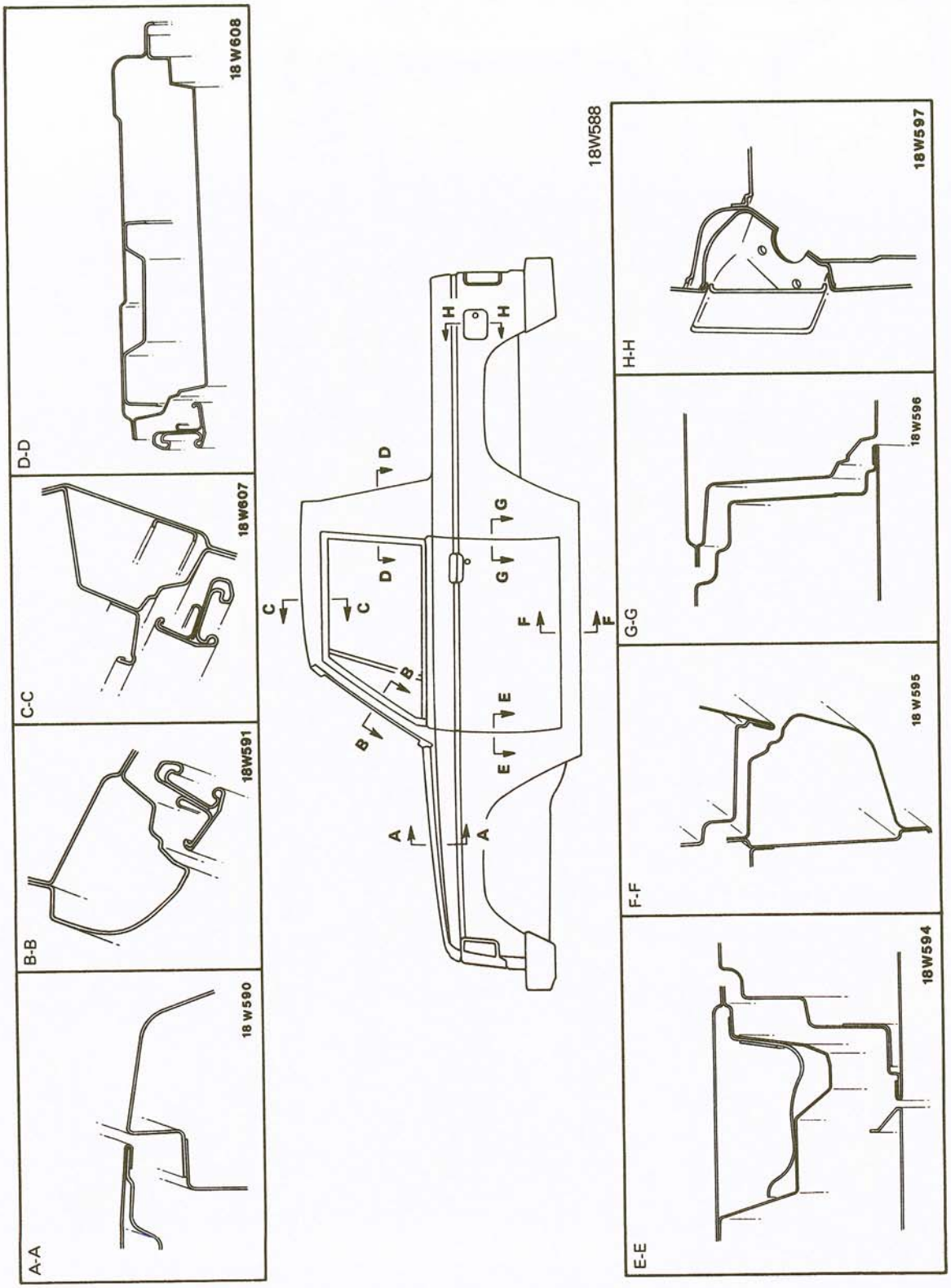
Metal-top vehicle

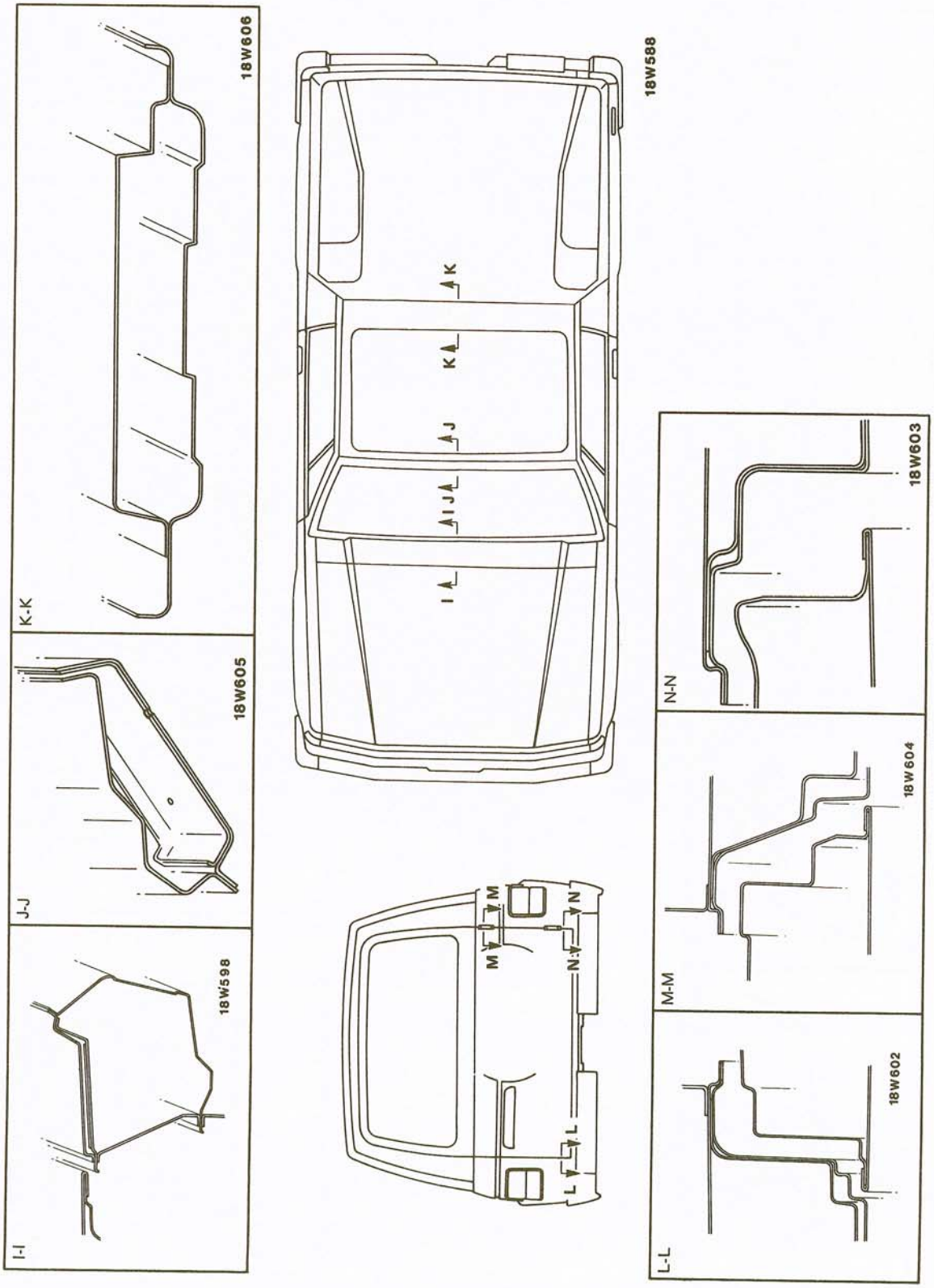


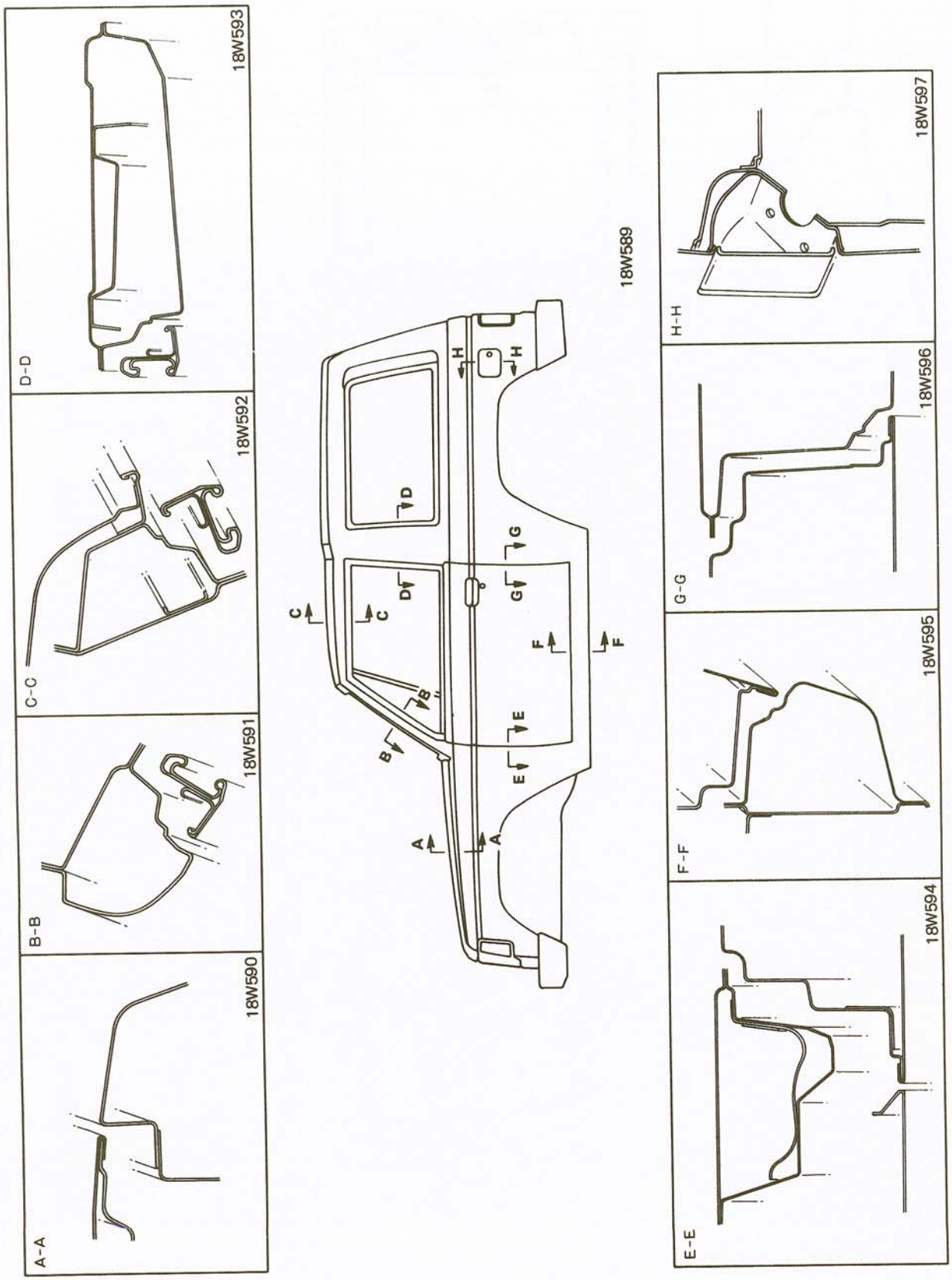
1. Headlight support
2. Front fender shield
3. Battery tray
4. Cowl top inner panel
5. Cowl top outer panel
6. Front roof rail, inner
7. Roof panel
8. Rear drip channel
9. Front pillar, inner, upper
10. Side roof panel, inner
11. Side roof panel, outer
12. Roof bow
13. Side panel, inner, upper
14. Rear roof rail
15. Rear end panel, inner, upper
16. Fender shield extension
17. Dash panel, upper
18. Cowl top extension
19. Front pillar, inner, lower
20. Front pillar, outer
21. Drip channel
22. Rear wheelhouse inner panel
23. Side sill, outer
24. Dash panel, lower
25. Side sill, inner
26. Front floor pan
27. Rear floor pan
28. Rear wheelhouse outer panel
29. Side panel, inner, lower
30. Side panel, outer
31. Rear end panel, inner, lower
32. Rear end panel reinforcement
33. Rear end panel, outer

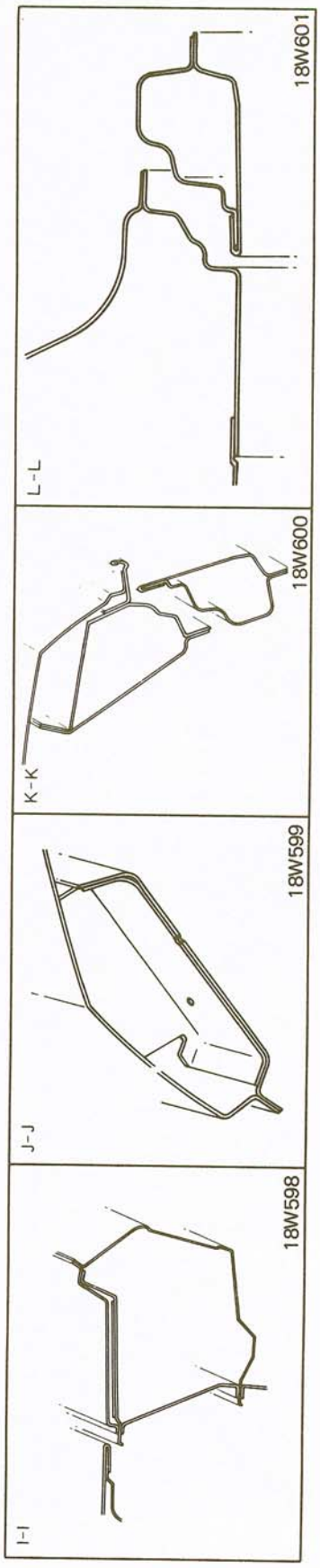
18W630

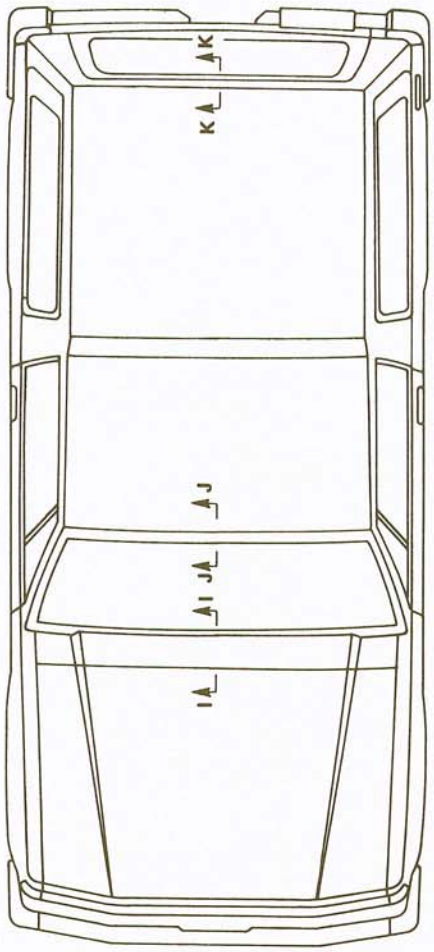
CROSS SECTIONS OF SHELL-TO-BODY JUNCTIONS

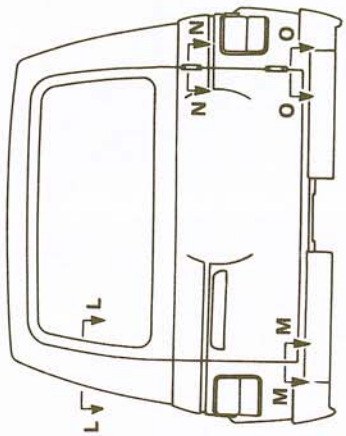


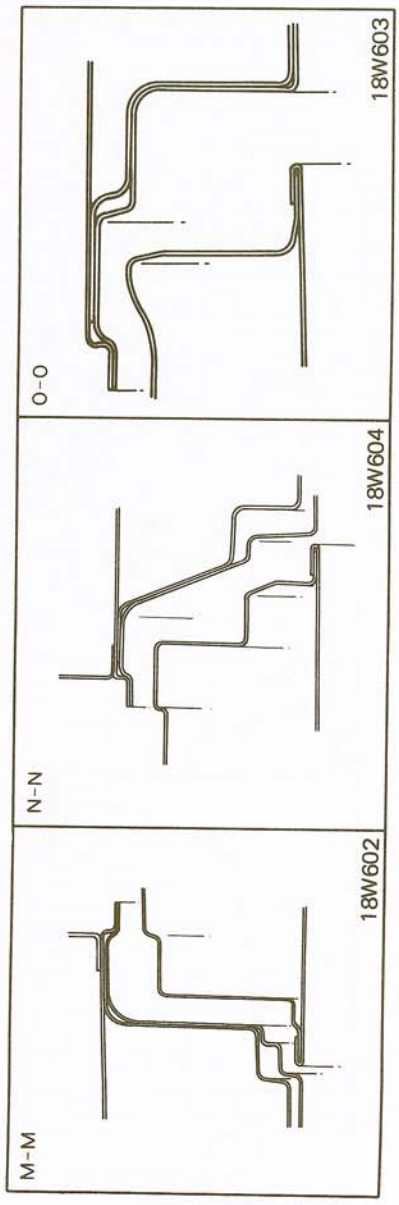

I-I
18W598
J-J
18W605
K-K
18W606
18W588
I
J
K
M
N
L
L-L
18W602
M-M
18W604
N-N
18W603


A-A
18W590
B-B
18W591
C-C
18W592
D-D
18W593
18W589
E-E
18W594
F-F
18W595
G-G
18W596
H-H
18W597

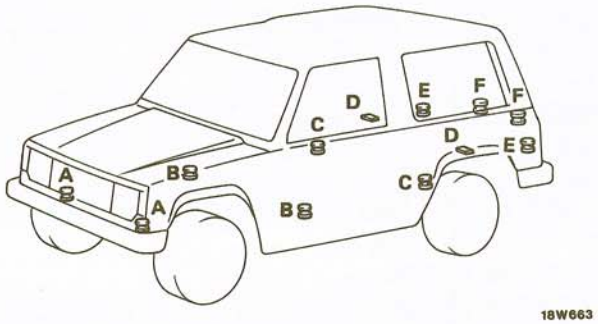

18W601
L-L
18W600
K-K
18W599
J-J
18W598
I-I


18W589
K
K
J
I
J
I


N
N
O
O
M
M
L
L

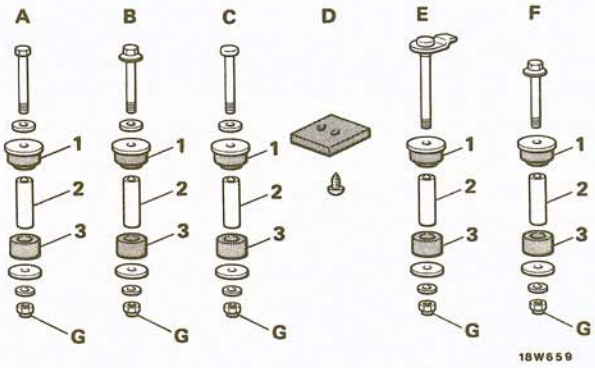

18W603
O-O
18W604
N-N
18W602
M-M

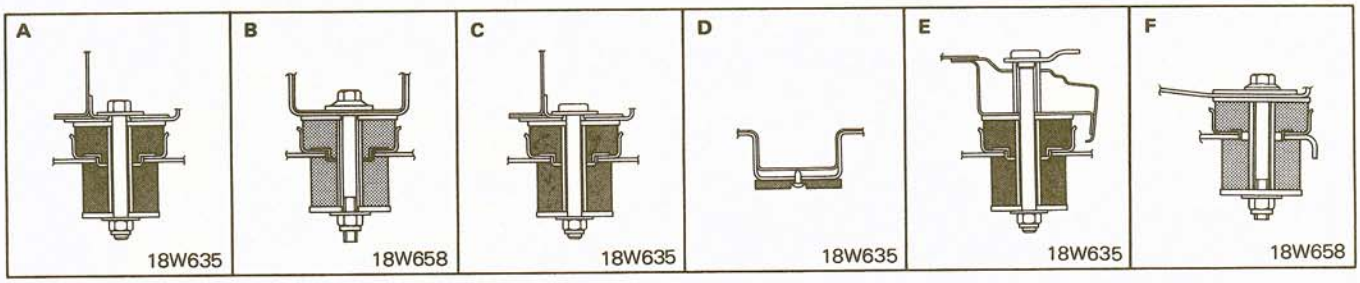
OMPONENTS



1. Body mounting rubber A
2. Spacer
3. Body mounting rubber B

	Nm	ft.lbs.
G	28-32	20-23





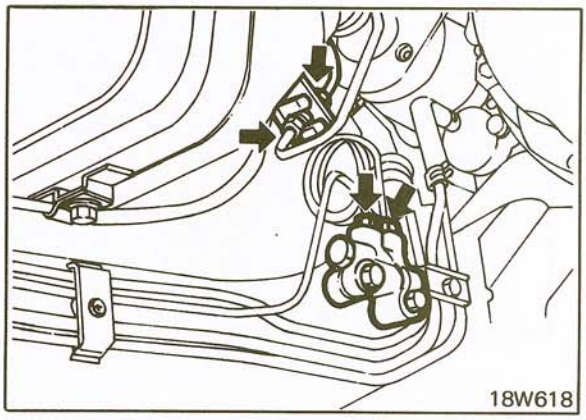
REMOVAL

Engine compartment

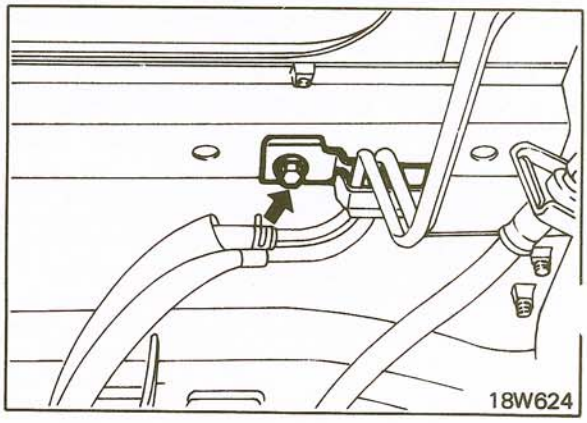
Remove or disconnect the following parts.
(Refer to GROUP 9.)
(1) Air cleaner
(2) Accelerator cable
(3) Vapor hose
(4) Heater hoses
(5) Brake booster vacuum hose
(6) Starter motor wiring harness
(7) Alternator wiring harness
(8) Engine ground (on body side)
(9) Fuel cut solenoid valve connector
(10) E.S.S. solenoid valve connector
(11) High-tension cable
(12) Water temperature gauge connector
(13) Power steering pump
(14) Oil pressure switch harness
(15) Radiator assembly
For California (can also be sold in Federal States)
(16) Oxygen sensor connector
(17) Carburetor control wiring harness
(18) Air temperature sensor connector
(19) Water temperature sensor connector

Under body and rear of body

1. Disconnect the hydraulic clutch hoses from the body.
2. Disconnect the brake pipes and BPV (blend proportioning valve). (18W618)
3. Remove the steering shaft from the steering gear box. (Refer to GROUP 19.)


18W618

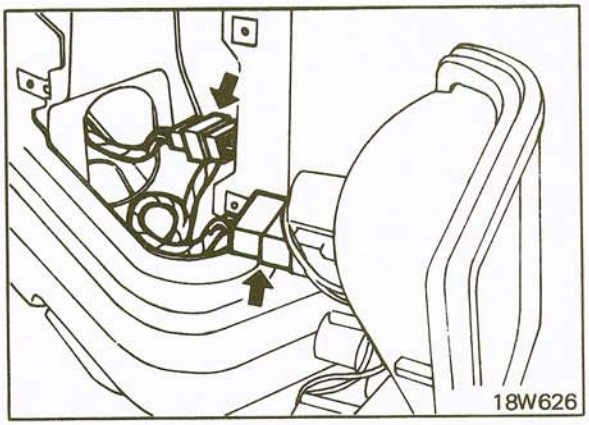
4. Drain the brake fluid and detach the brake pipe from the upper arm post. (Refer to GROUP 2.)
5. Disconnect the speedometer cable from the transmission.
6. Disconnect the backup light switch and 4WD indicator light switch connectors from the transmission.
7. Remove the fuel pipe mounting bolts. (18W624)


18W624

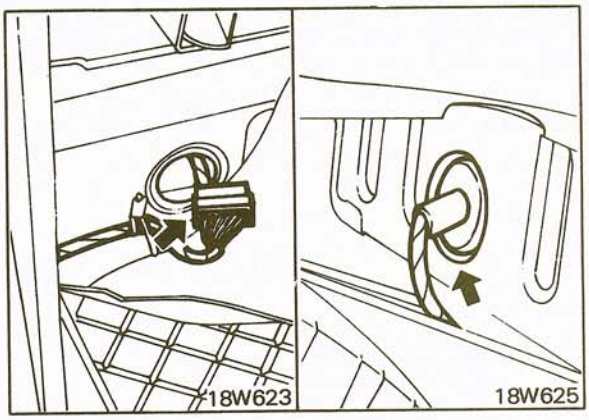
Remove the mud guards.

. Remove the filler hose protector and disconnect the 2-way valve from the vapor hose located on the back of the protector. (Refer to GROUP 14.)

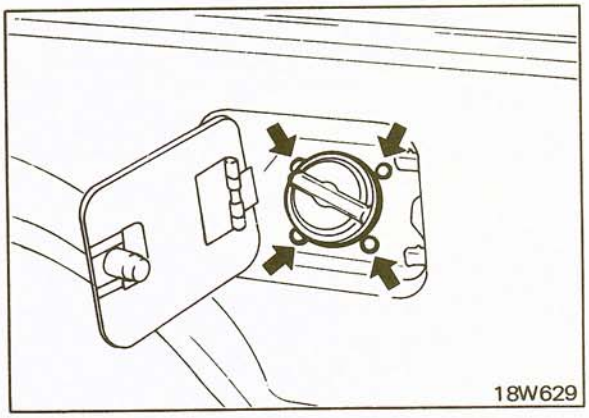
10. Remove the rear combination lights and disconnect the connectors. (18W626)
11. Push the grommets out downward.



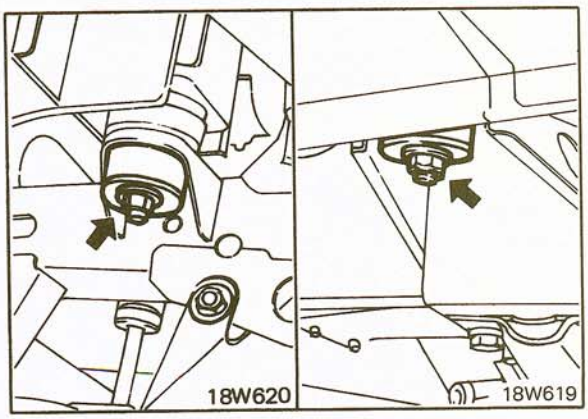
12. Disconnect the front harness and frame harness. (18W623)
13. Remove the frame harness grommet. (18W625)

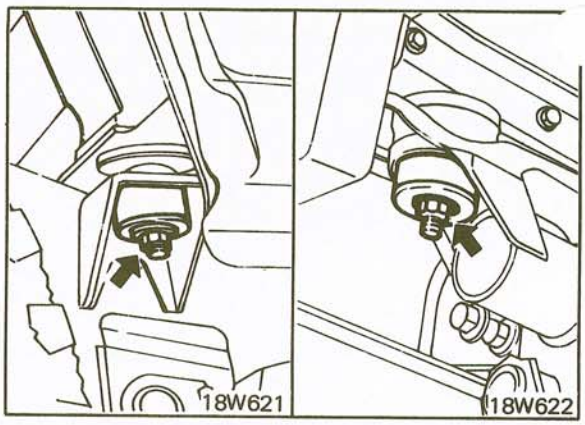


14. Remove the filler neck from the body.

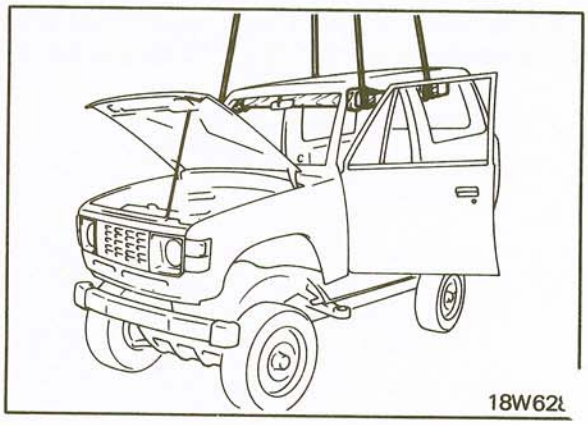


15. Remove the transmission gearshift lever and transfer gearshift lever. (Refer to GROUP 21.)
16. Disconnect the parking brake cable from the parking brake lever.
17. Remove the parking brake cable mounting bolts from the floor. (Refer to GROUP 5.)
18. Remove the body mounting bolts. (18W619, 18W620, 18W621, 18W622)





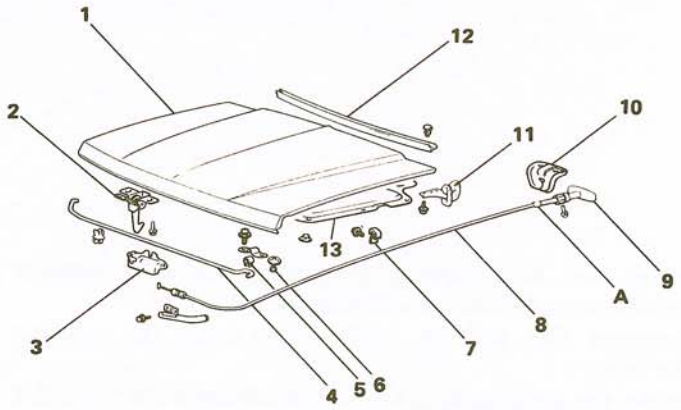
19. Remove the front and rear seats.
20. Remove the washer tank.
21. Insert wood blocks into the body and slowly lift with a crane. (18W628)



HOOD

COMPONENTS

1. Hood panel
2. Hood hook
3. Hood lock
4. Hood support rod
5. Rod bushing
6. Hood bumper
7. Hood damper
8. Hood release cable
9. Hood release knob
10. Release cable bracket
11. Hood hinge
12. Hood rear weatherstrip
13. Hood heat protector (metal-top vehicle)



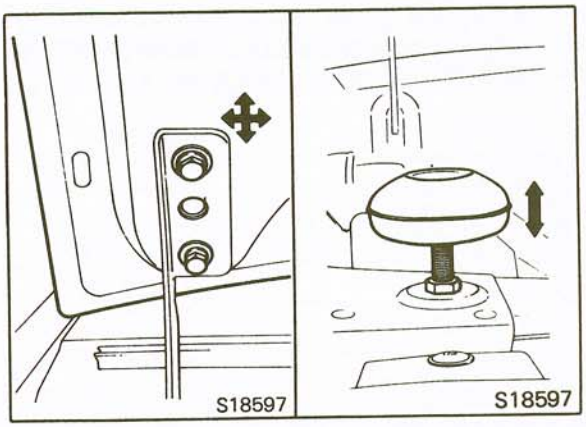
	Nm	ft.lbs.
A	3.5-4.0	2.5-2.9

18W611

ADJUSTMENT

Hood

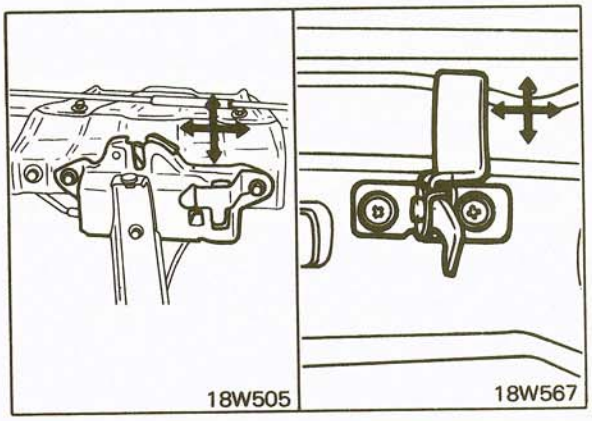
1. Adjust the longitudinal and lateral positions of the hood by utilizing the oblong holes in the hinges. (S18597)
2. Adjust the vertical position of the hood by adjusting the hood bumpers. (S18597)



Hood Lock and Hood Catch

1. Loosen the hood lock and hood catch stay mounting screws.
2. Adjust the position of the hood lock and hood catch so that they are in proper alignment with the hook. (18W505, 18W567)

NOTE
Apply chassis grease to the sliding part, the rotating part and the spring of the hood lock.



HOOD HINGE REPLACEMENT

To replace the hood hinges, use a hood hinge kit and follow these procedures:

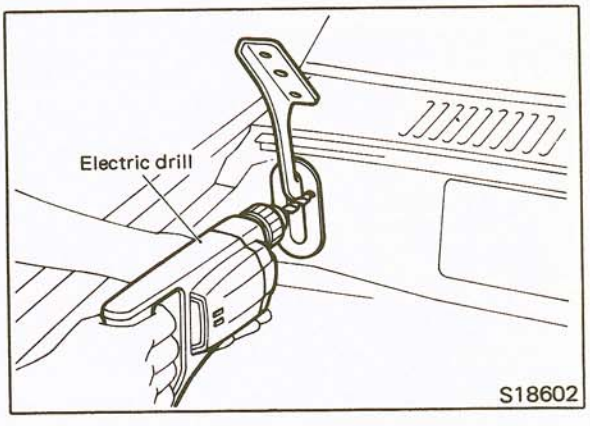
1. Remove the hood from the hood hinges.

Caution
Protect the front deck with a rag so that the hood protrusions do not damage it.

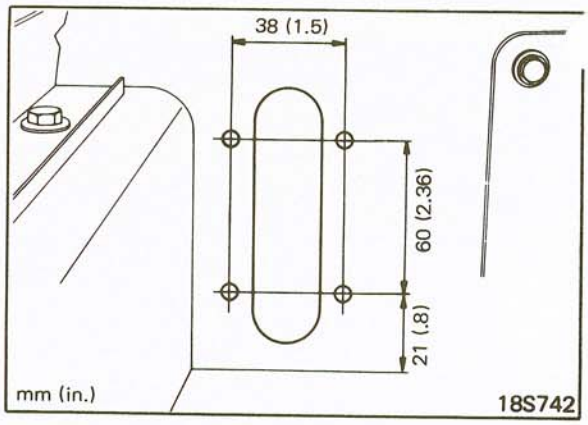
2. Remove the hood hinges. Use an 8 mm (.32 in.) drill to break the spot welds which fasten the hinges to the front deck.

Caution
Be careful not to drill holes in the deck panel.

NOTE
After removing the hinges, make sure that the hinge mounting surfaces on the front deck are flat and level.



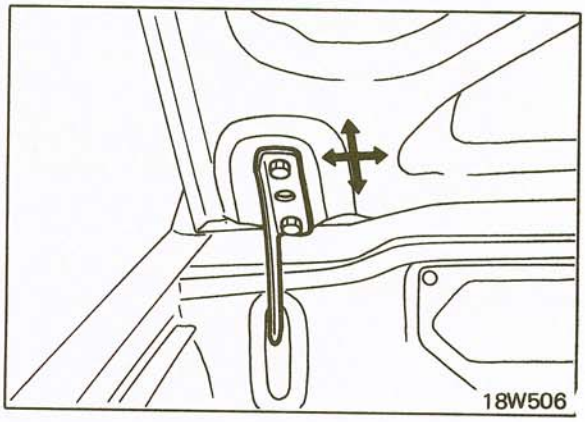
3. Mark the hinge mounting positions on the front deck with a center punch as illustrated. (18S742)
4. Drill the holes, using an 8 mm (.32 in.) drill.



5. Remove the access hole cover and the wiper motor. (Refer to GROUP 8.)
   Insert the brackets from the inside of the front deck, install the hinges, and loosely install the nuts.

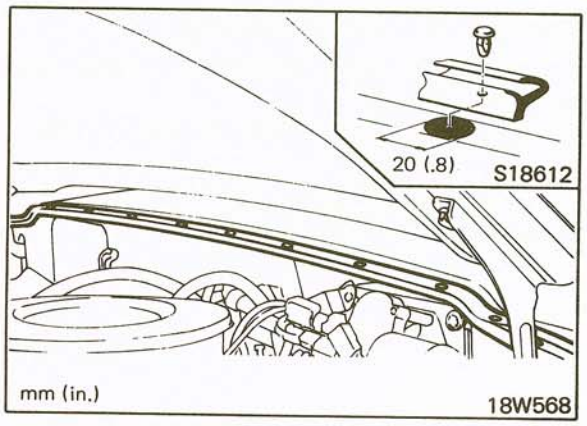
NOTE
Hinge installation will be facilitated if adhesive, 3M Super Weatherstrip Adhesive 8001 is applied to the surfaces of the brackets in contact with the front deck.

6. Install the hood.
7. Adjust the hood alignment. (18W506)



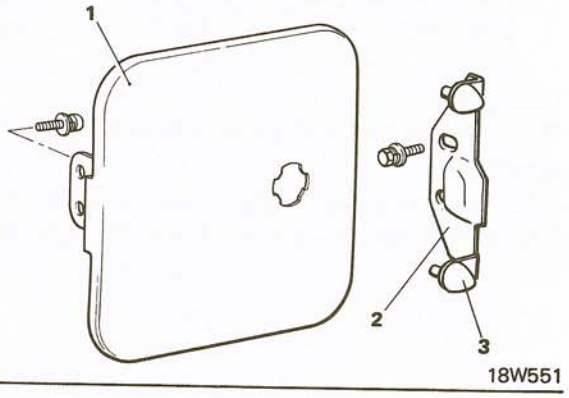
HOOD REAR WEATHERSTRIP REPLACEMENT

1. Remove the hood rear weatherstrip mounting clips.
2. Remove the hood rear weatherstrip.
3. Apply a drying sealant to and around the two hood rear weatherstrip mounting holes at the right and left ends of the front deck. (18W568)
4. Install the hood rear weatherstrip..



FUEL FILLER DOOR

COMPONENTS

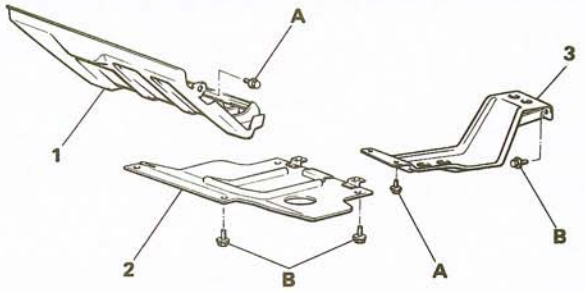


1. Fuel filler door panel
2. Fuel filler door hook
3. Damper

COMPONENTS

1. Under skid plate
2. Under cover
3. Transfer case protector

	Nm	ft.lbs.
A	18-25	13-18
B	10-13	7-9

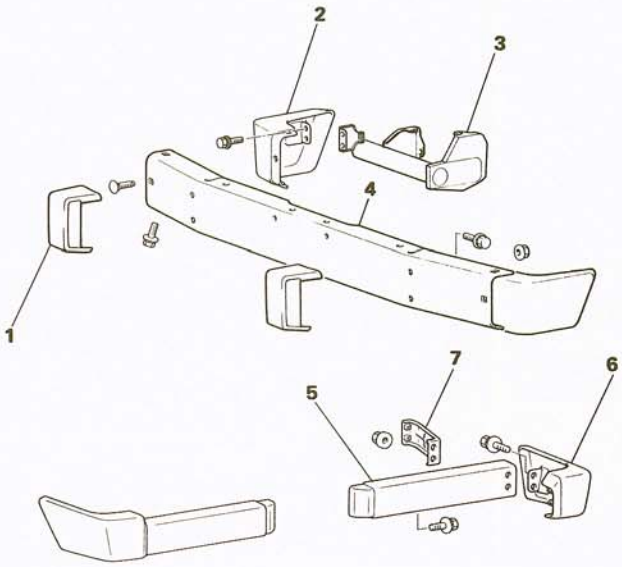


18W654

BUMPERS

COMPONENTS

1. Bumper guard
2. Front bumper side
3. Bumper stay assembly
4. Front bumper center
5. Rear bumper center
6. Rear bumper side
7. Rear bumper side support

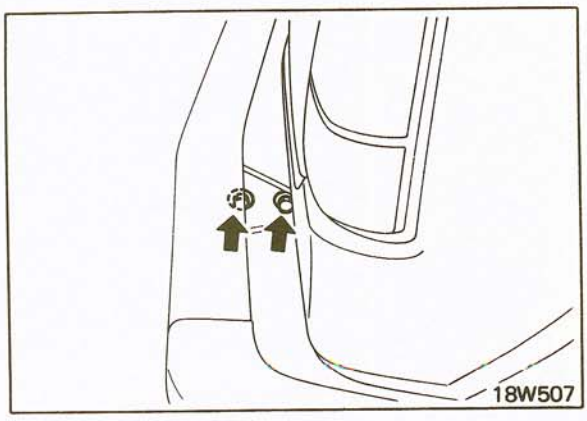


18W662

REMOVAL

Front Bumper

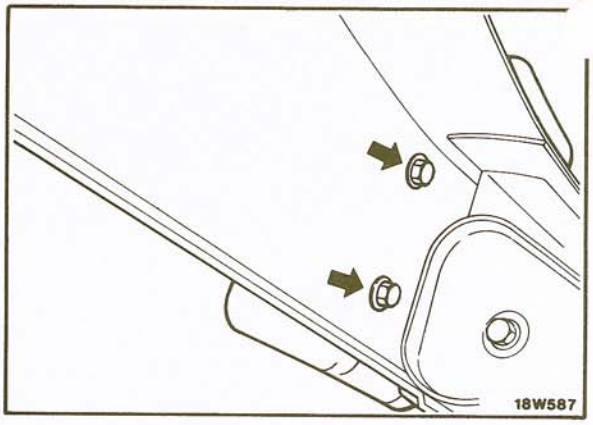
Remove the front bumper from the frame.



18W507

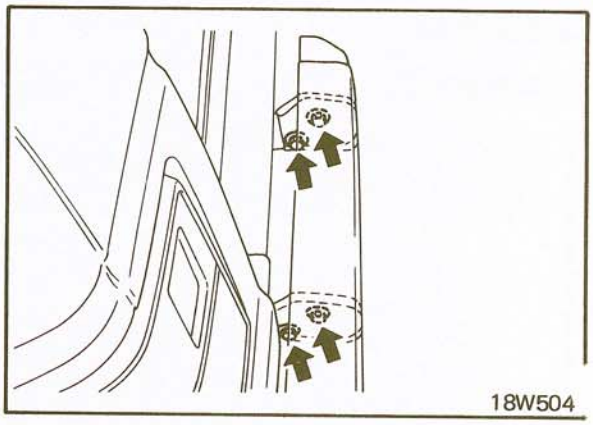
Bumper Guard

Remove the bumper guard from the center of the front bumper.

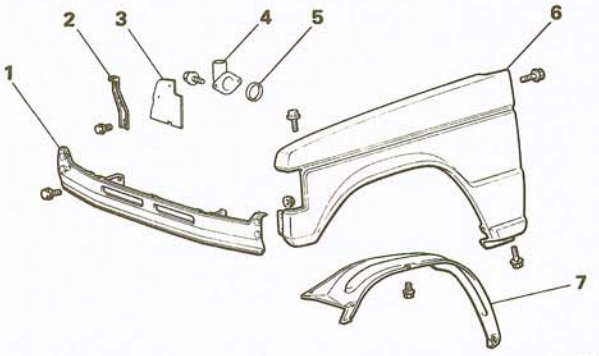


Rear Bumper

Remove the rear bumper from the frame.



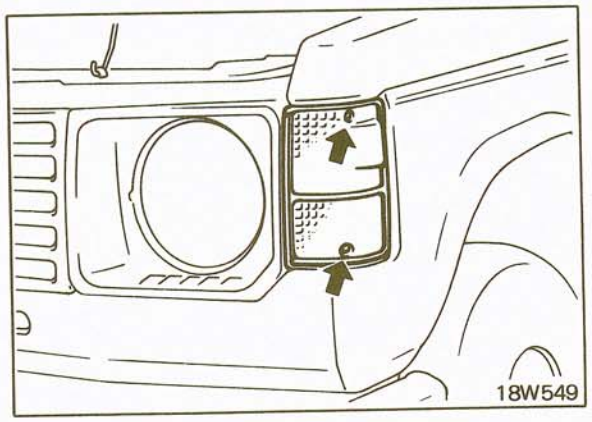
COMPONENTS



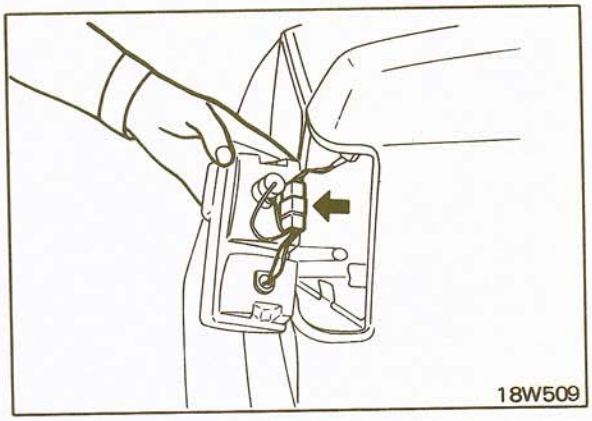
1. Grille filler panel
2. Hood catch stay
3. Waterproof pad
4. Air duct
5. Rubber packing
6. Front fender
7. Splash shield

REMOVAL

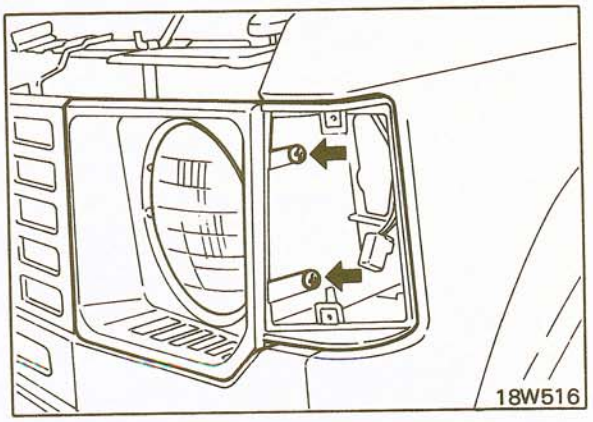
1. Remove the front combination light mounting screws.



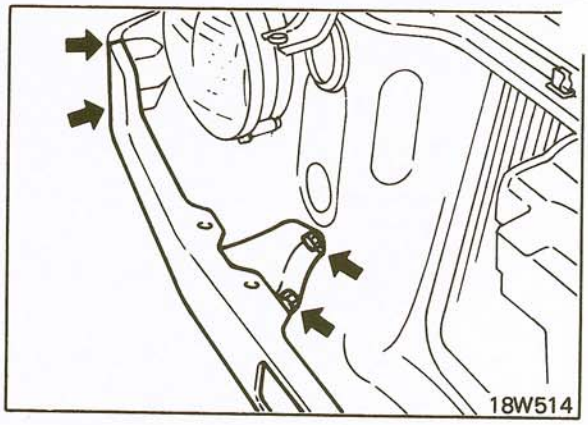
2. Disconnect the front combination light connector and remove the front combination light.



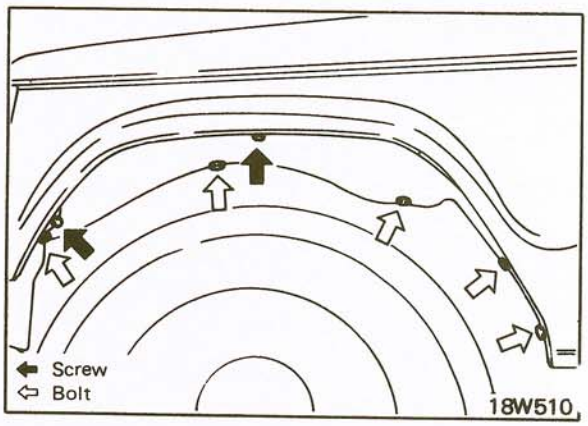
3. Remove the headlight bezel.



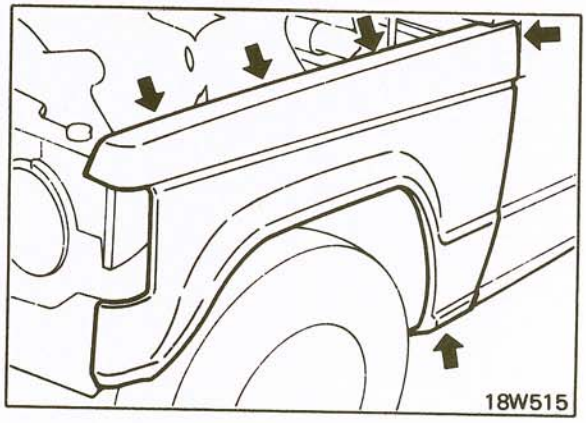
4. Remove the radiator grille. (Refer to p. 23-21.)
5. Remove the grille filler panel. (18W514)



6. Remove the mud guard.
7. Remove the splash shield. (18W510)

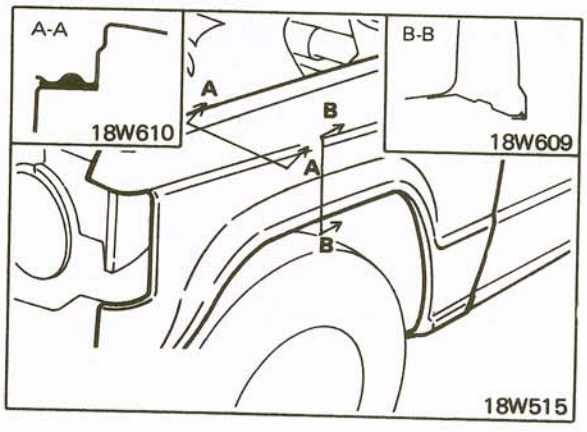


8. Remove the hood damper.
9. Remove the front fender. (18W515)



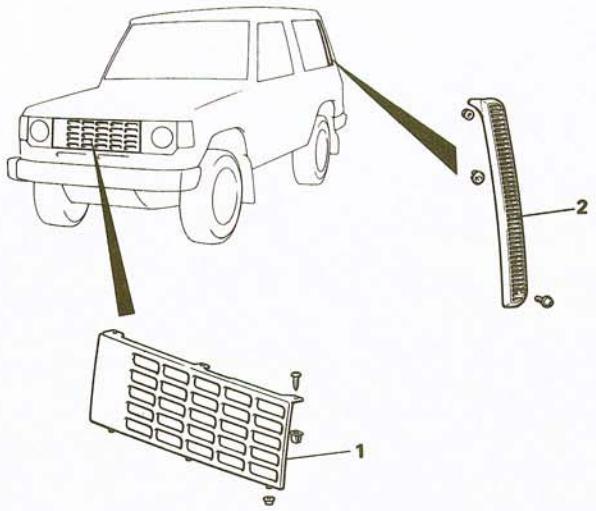
INSTALLATION

1. Apply a non-drying sealant to the flange part of the fender when installing the splash shield. (18W515)
2. Apply a non-drying sealant to the entire top part of fender. (18W515)
3. Mount the fender temporarily in position, make sure that clearance is uniform at all points, and then tighten it securely.



›MPONENTS

1. Radiator grille
2. Air outlet garnish

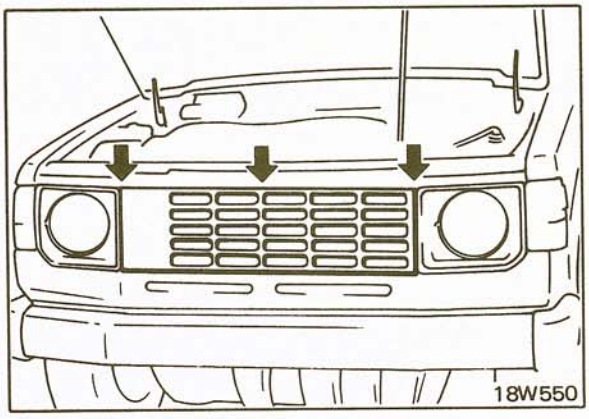


18W577
18W633

REMOVAL

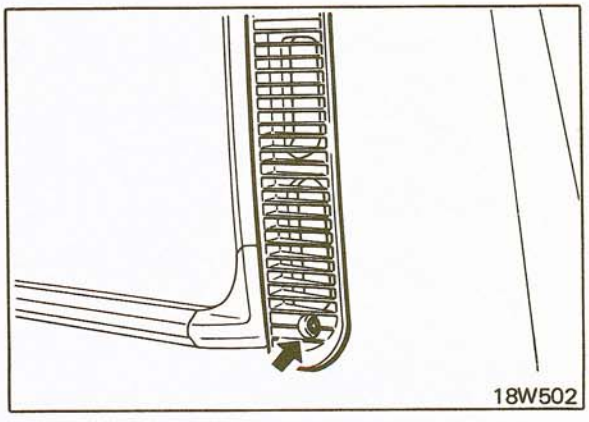
Radiator Grille

Remove the radiator grille mounting screws, and then remove the radiator grille upward.

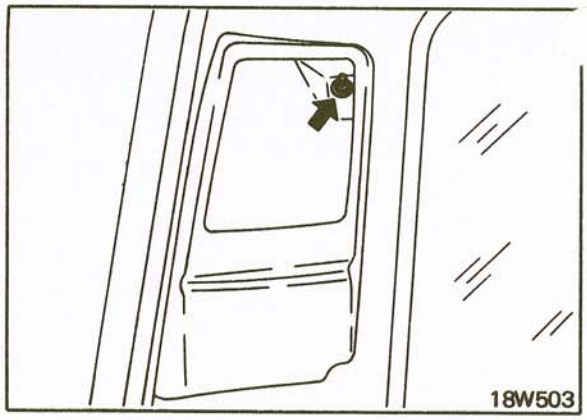


Air Outlet Garnish

1. Remove the air outlet garnish mounting screws. (18W502)
2. Remove the rear pillar trim. (Refer to p. 23-59.)

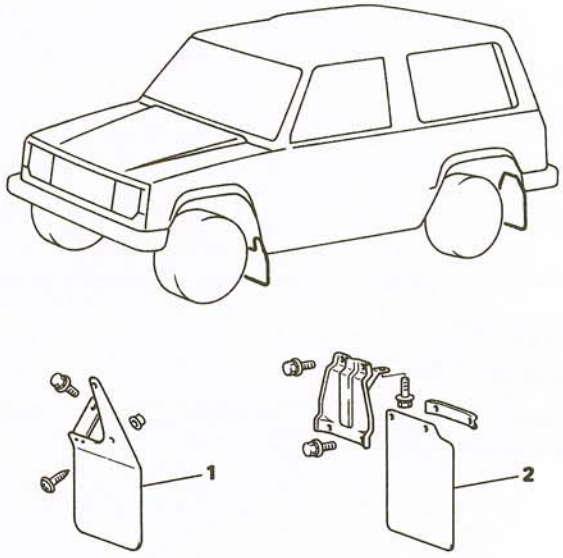


3. Remove the air outlet garnish mounting nuts, and then remove the air outlet garnish.



MUD GUARD

COMPONENTS

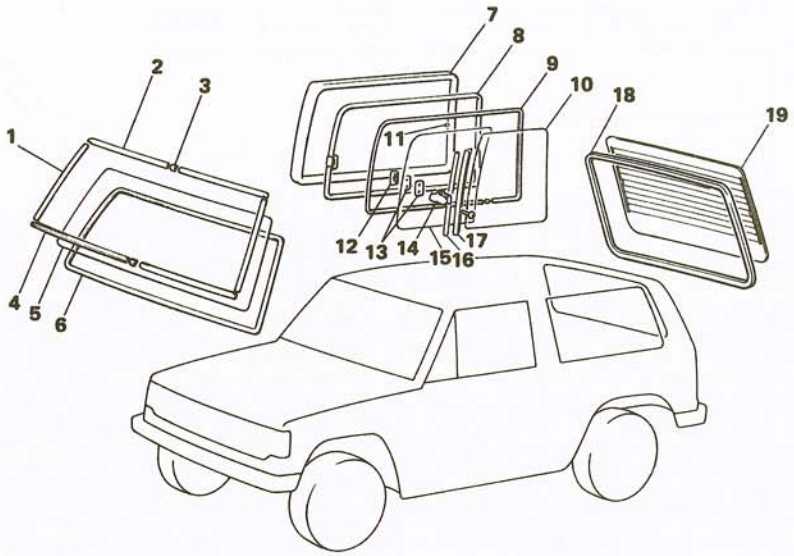


1. Front mud guard
2. Rear mud guard

18W664
18W640

COMPONENTS

1. Side moulding
2. Upper moulding
3. Moulding joint
4. Lower moulding
5. Windshield glass
6. Windshield weatherstrip
7. Quarter window weatherstrip
8. Quarter window sash
9. Quarter window runchannel
10. Quarter window glass, rear
11. Stopper
12. Connector
13. Packing
14. Side glass lock
15. Quarter window glass, front
16. Holder
17. Rear door window rubber seal
18. Back door window weatherstrip
19. Back door window glass

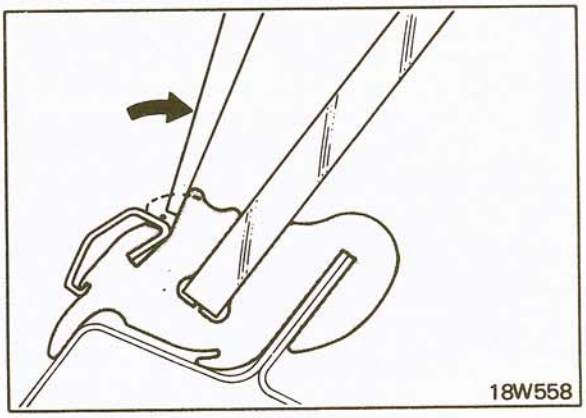


18W636

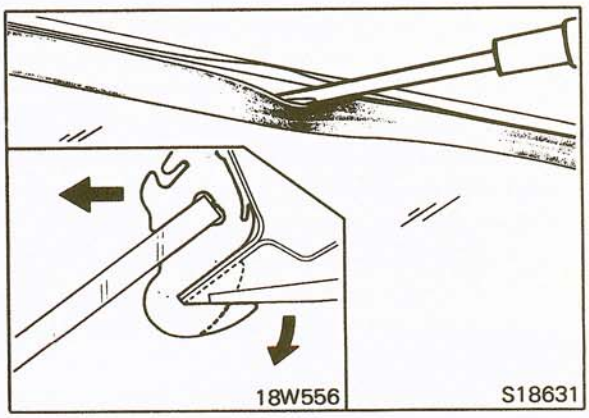
WINDSHIELD GLASS

Removal

1. Remove the wiper arms, dome light and sun visors.
2. Using a screwdriver, push the upper moulding joint to the right or left until the moulding ends appear.
3. Insert the screwdriver between the jointed ends of the moulding and pry them out of the weatherstrip. Then remove the moulding by hand. (18W558)



4. Insert the screwdriver in weatherstrip lip, slide the screwdriver along the lip, and push the windshield glass outward. (18W556, S18631)



Inspection

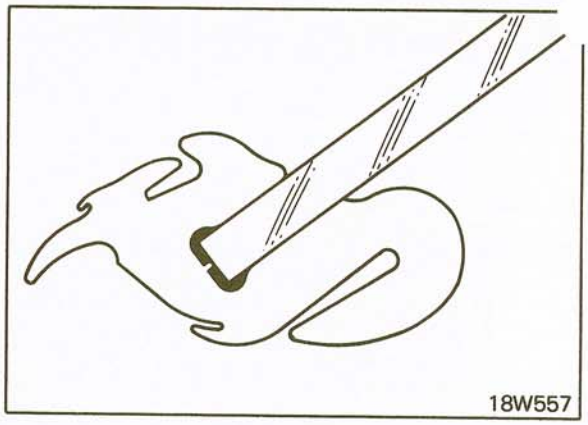
Check for deformation of body flange.

Installation

1. Coat the weatherstrip with recommended adhesive and fit it onto the windshield glass.

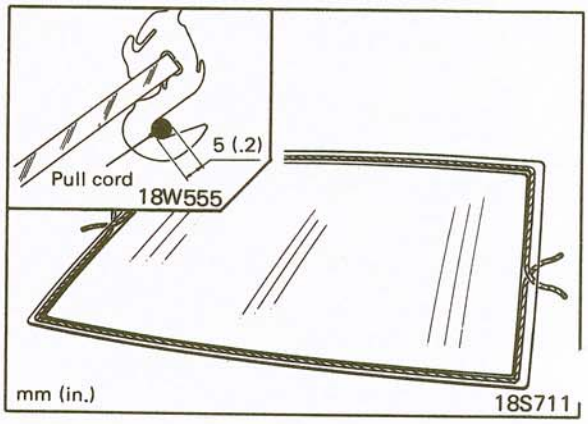
Recommended adhesive .....
3M Super Weatherstrip Adhesive 8001 or equivalent

NOTE
Be sure to use new weatherstrip.

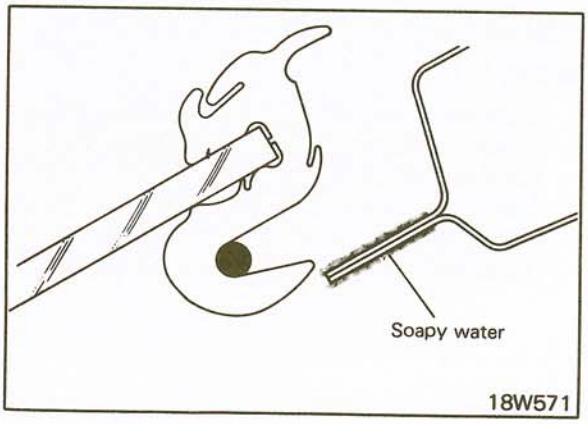


2. Insert a pull cord into the weatherstrip groove.

NOTE
Make certain that the cords overlap each other at both ends.



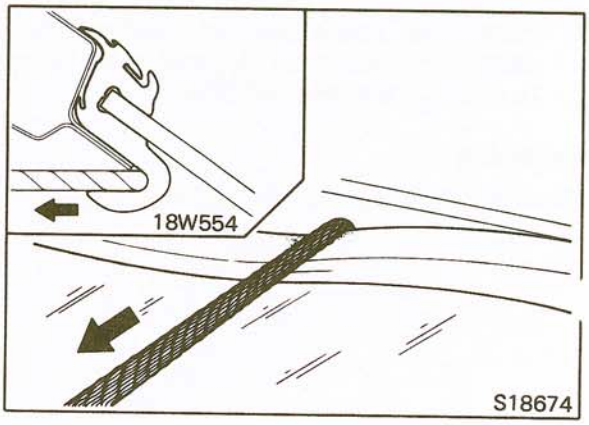
3. Apply soapy water to the entire periphery of the body flange.
4. Place the glass in position from outside with the cords placed inside the passenger compartment.



5. With the aid of an assistant to push the glass from outside, slowly pull one end of the cord at right angles to the windshield glass and fit the lips of the weatherstrip correctly on the windshield flange.

NOTE
Pull the cords, working from both sides of the glass toward the center and tapping the glass.

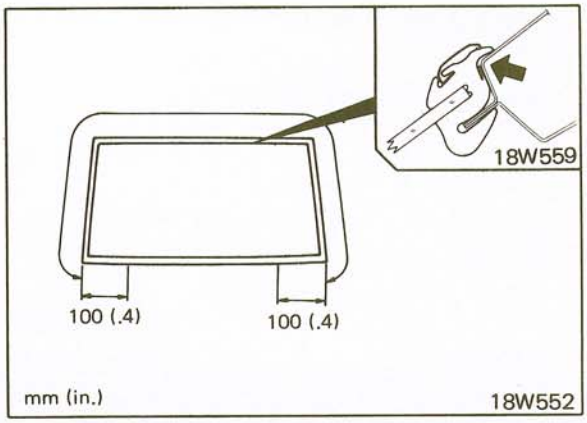
Caution
Tap the glass repeatedly until it is lightly held against the body flange surface.



Apply recommended adhesive generously between the weatherstrip and body flange.

Recommended adhesive .....
3M Super Weatherstrip Adhesive 8001 or equivalent

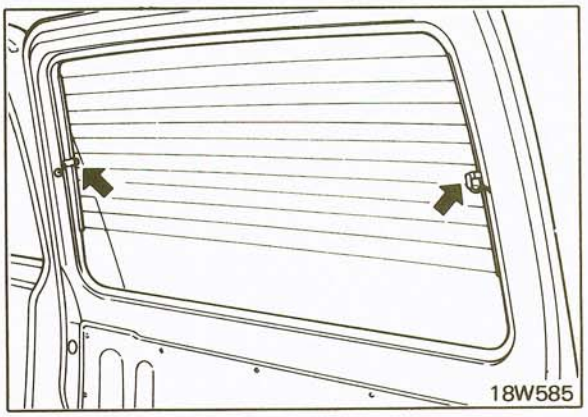
7. Mount the mouldings and the moulding joints onto the weatherstrip.



BACK DOOR WINDOW GLASS

Removal

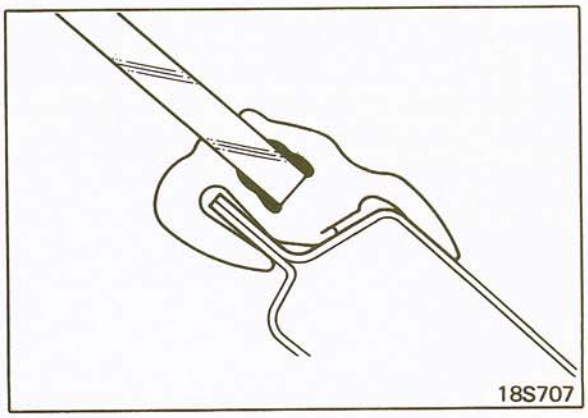
1. Remove the defogger terminal. (18W585)
2. Remove the rear wiper arm. (Refer to GROUP 8.)
3. Remove the weatherstrip and then remove the window glass.



Installation

Apply recommended adhesive to the weatherstrip.

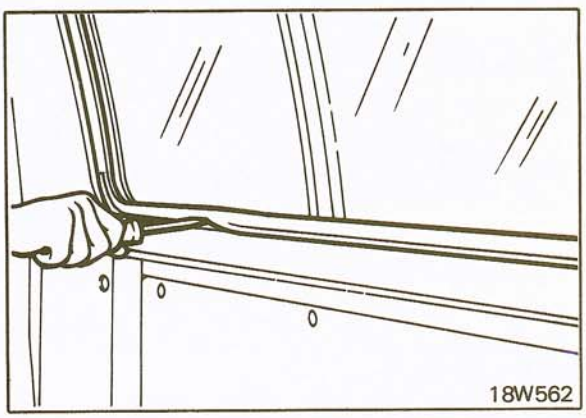
Recommended adhesive .....
3M Super Weatherstrip Adhesive 8001 or equivalent



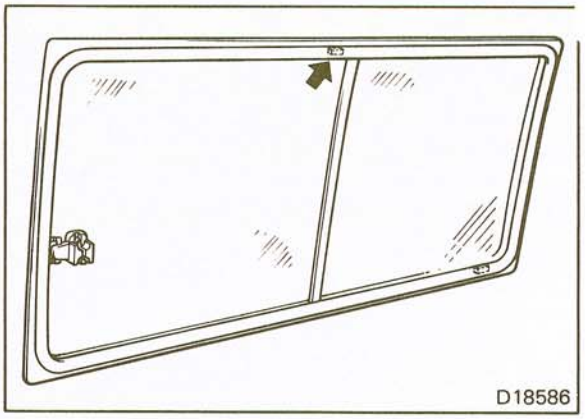
QUARTER WINDOW GLASS

Removal

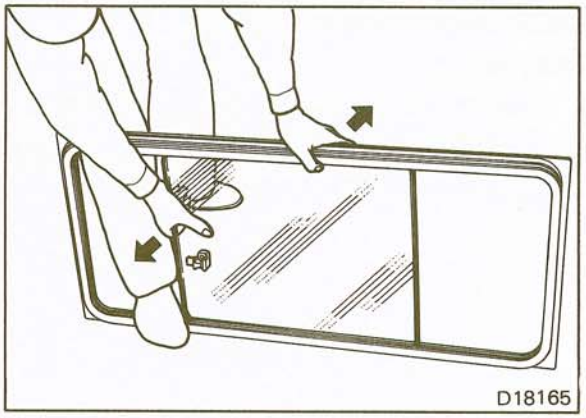
1. With the glass in position, push the quarter window assembly outward while raising the lip of the weatherstrip along the periphery.



2. Remove the stopper.

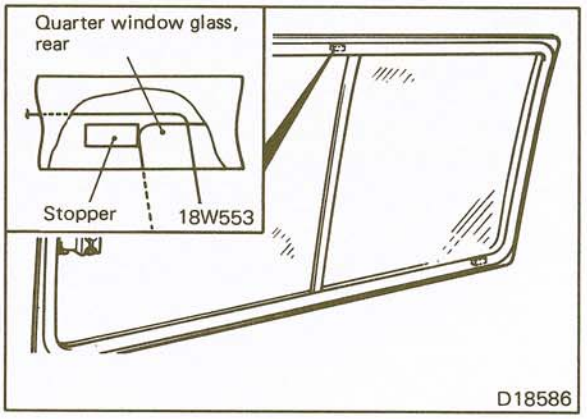


3. Move the quarter window glass to the middle position and remove it after removing the weatherstrip.



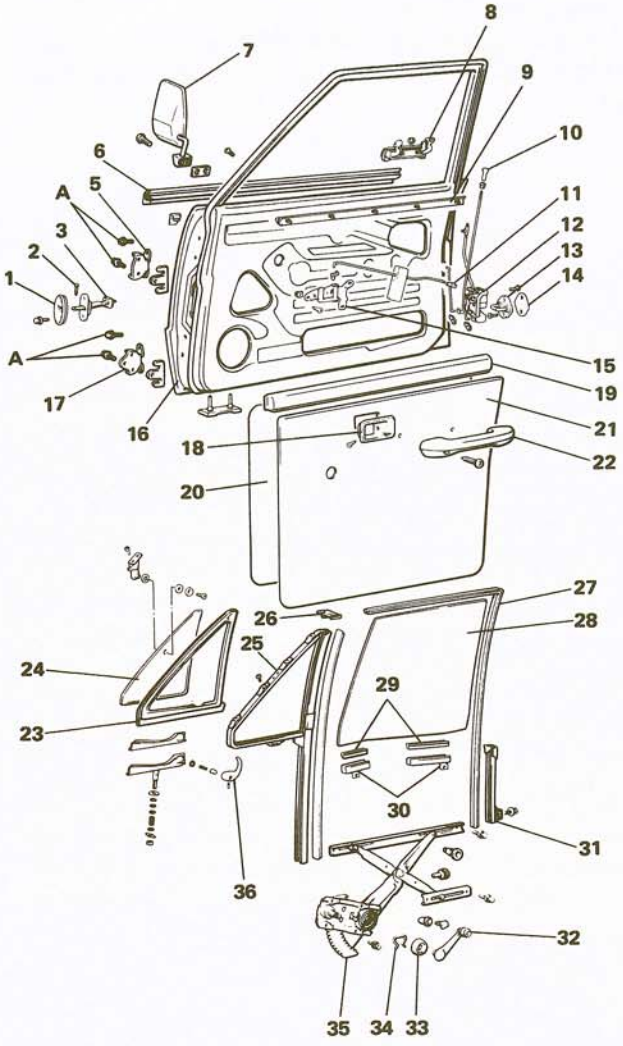
Installation

1. After the quarter window rear glass has been installed, install the stopper by applying a drying type adhesive.
2. Follow the same installation procedure as for the windshield glass. (Refer to p. 23-24 and p. 23-25.)



OMPONENTS

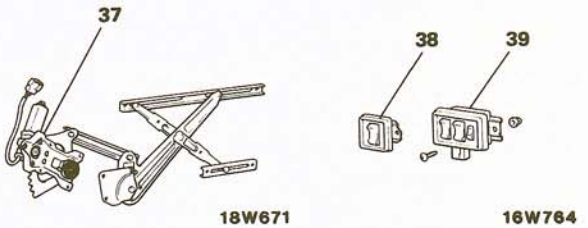
1. Door check cover
2. Spring pin
3. Door check
4. Door hinge shim
5. Door upper hinge
6. Weatherstrip, outer
7. Door mirror
8. Outside handle
9. Weatherstrip, inner
10. Inside lock knob
11. Inside handle rod
12. Door latch
13. Striker
14. Striker shim
15. Inside handle
16. Door panel
17. Door lower hinge
18. Inside handle cover
19. Door upper trim (metal-top vehicle)
20. Waterproof film
21. Door trim
22. Armrest
23. Ventilator window weatherstrip
24. Ventilator window glass
25. Ventilator sash
26. Center sash protector
27. Window glass runchannel
28. Window glass
29. Door glass pad
30. Glass holder
31. Door lower sash
32. Regulator handle
33. Escutcheon
34. Clip
35. Window regulator
36. Lock handle
37. Power window regulator
38. Sub switch (R.H.)
39. Main switch (L.H.)



18W673

	Nm	ft.lbs.
A	30-40	22-29

Vehicles equipped with power windows

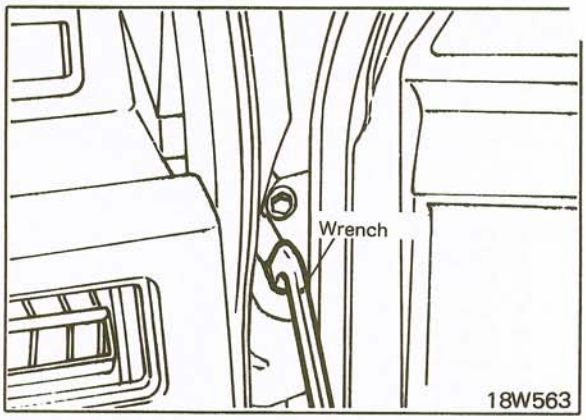


18W671 16W764

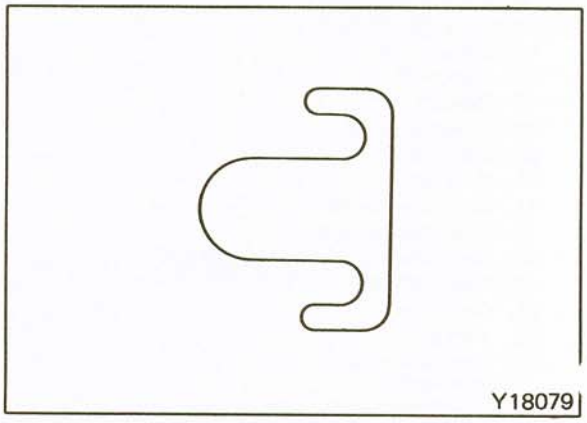
ADJUSTMENT

Door Adjustment

1. Using wrench, loosen the bolts that fasten the door hinges to the body. (18W563)
2. Move the door up and down and back and forth so that the clearance between the door and the body is uniform all around.

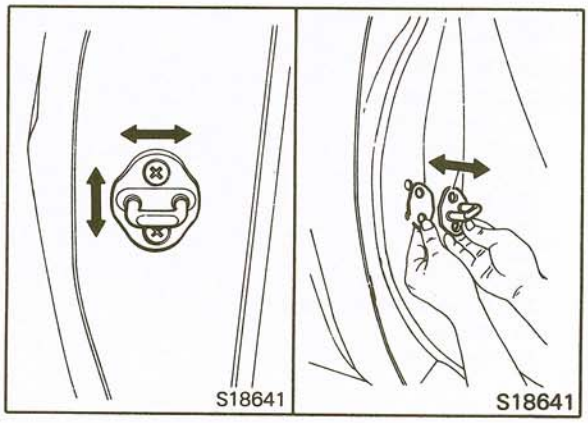


3. Position the door flush with the fender by increasing or decreasing the number of shim(s).



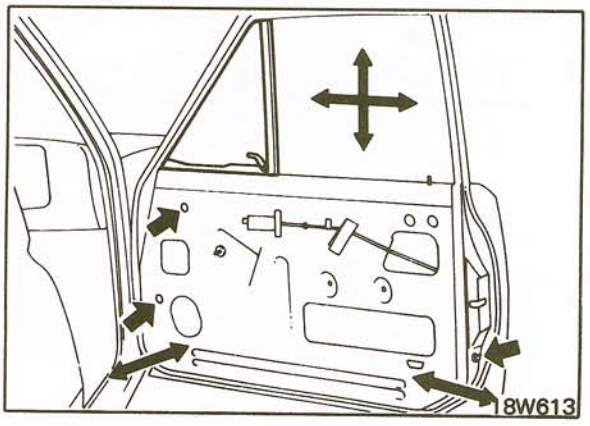
Door Striker Adjustment

1. Adjust the vertical and lateral positions of the door striker by moving the striker itself. (S18641)
2. Insert shim(s) as necessary to adjust the longitudinal position of the striker. (S18641)



Door Glass Adjustment

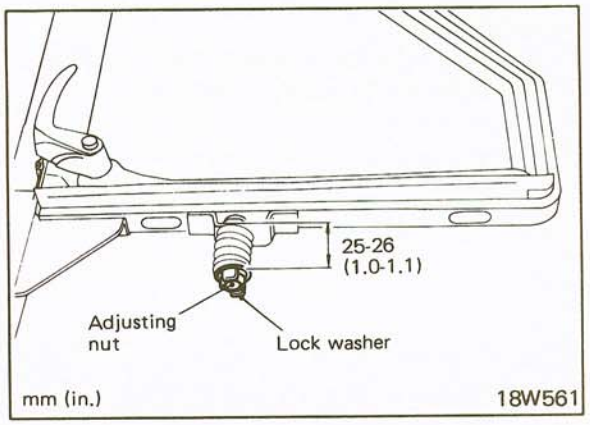
1. Remove the door trim and the waterproof film from the door. (Refer to p. 23-30.)
2. Loosen the screws and/or bolts which secure the ventilator window and rear lower sash.
3. With the door glass closed completely, move the ventilator window, rear lower sash and the sub roller guide to adjust the door glass position. (18W613)



/entilator Window Adjustment

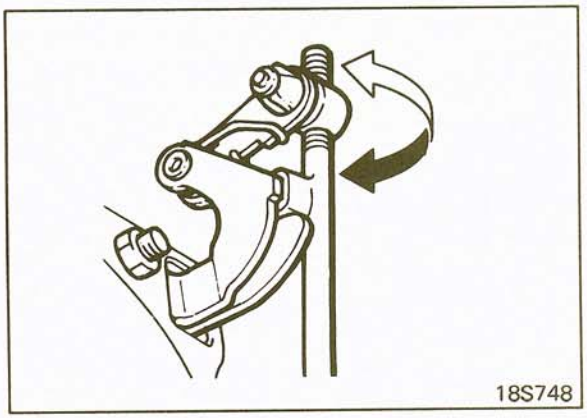
1. Remove the ventilator window assembly. (Refer to p. 23-32.)
2. Adjust the ventialtor window by turning the adjusting nut so that the ventilator window can be operated smoothly.

NOTE
Lock the adjusting nut by bending the tabs of the lock washer after the adjustment.



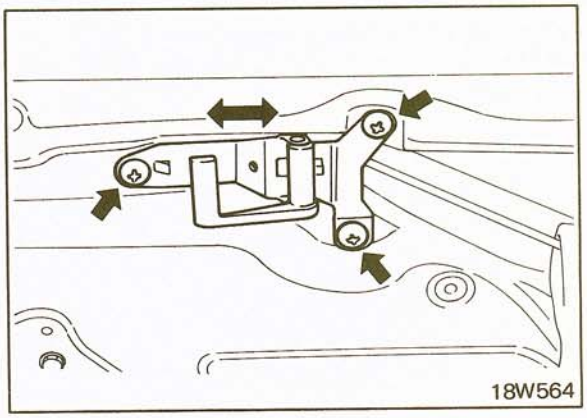
Outside Handle Adjustment

Disconnect the outside handle from the outside handle rod, and then turn it right or left to adjust the play.



Inside Handle Adjustment

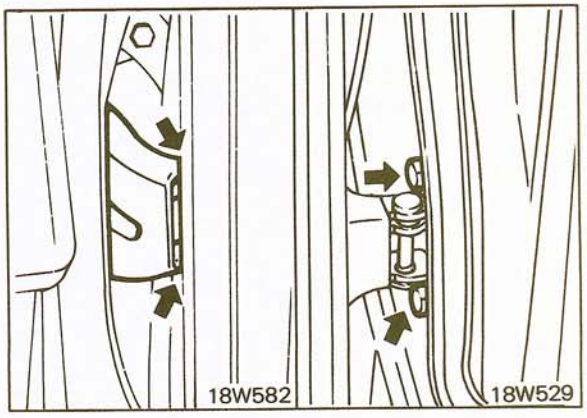
Move the inside handle to the right or left in order to adjust the play.



REMOVAL

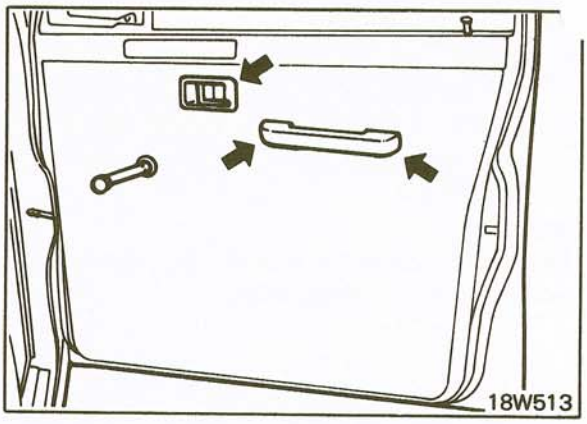
Door Assembly

1. Remove the spring pin from the door check.
2. Position a jack beneath the door at the center to support it.
3. For vehicles equipped with power windows, disconnect the front harness and door harness, and then remove the door harness from the direction of the body.
4. Remove the door hinge mounting bolts from the door. (18W582, 18W529)
5. Remove the door assembly.

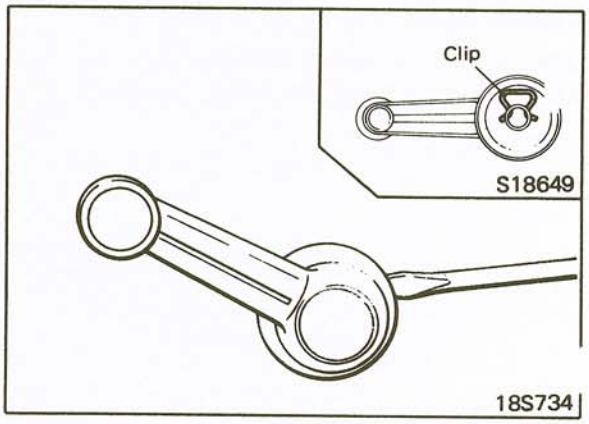


Door Trim

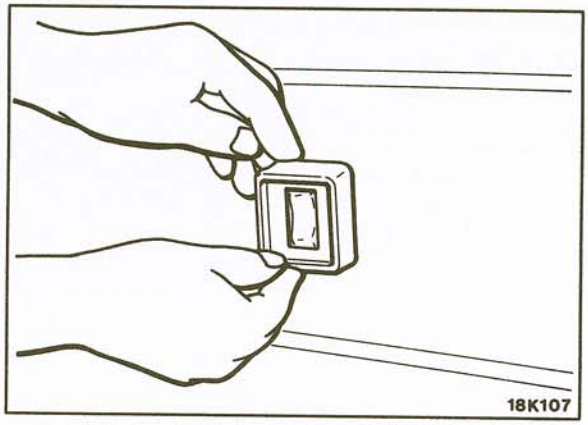
1. Remove the inside handle cover. (18W513)
2. Remove the armrest. (18W513)



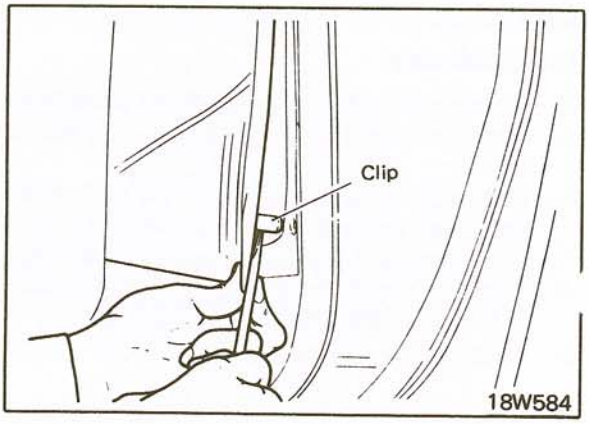
3. Insert the tip of a screwdriver between the window regulator and the door trim, and remove the clip. (18S734)
4. Remove the regulator handle.



5. For vehicles equipped with power windows, remove the switch cover.

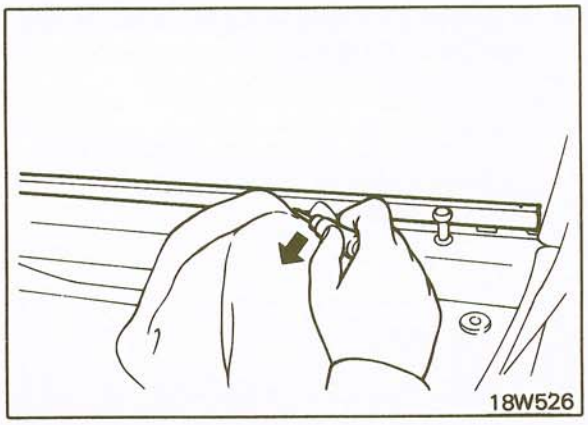


6. Using a screwdirver, pry up and detach the door trim clips. (18W584)
7. Remove the door trim.

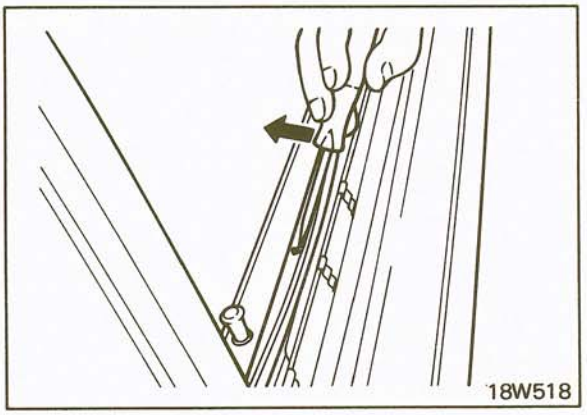


)oor Glass and Regulator

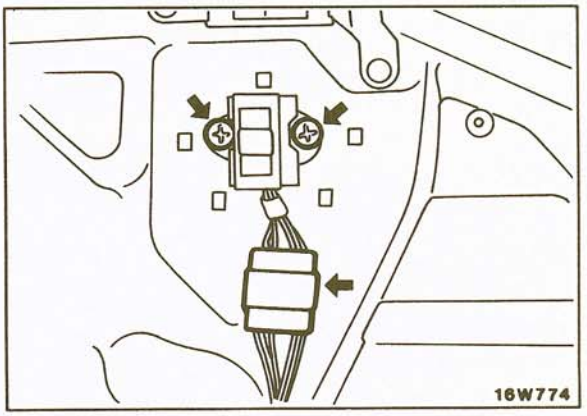
1. Remove the outer weatherstrip from the retaining clips by prying upward with a screwdriver. (18W526)
2. Remove the outer weatherstrip toward the rear.



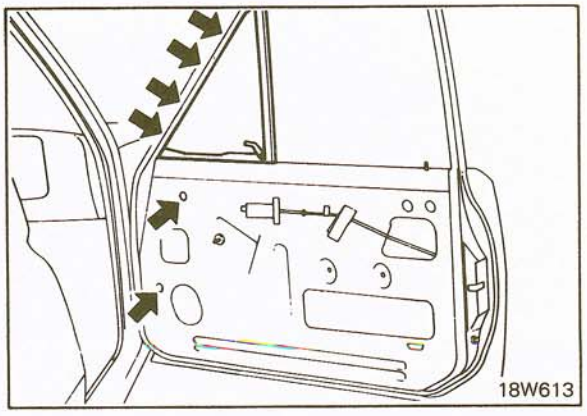
3. Remove the inner weatherstrip with a screwdriver.



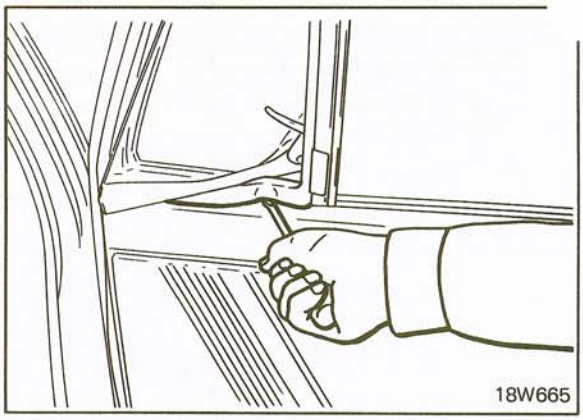
4. Lower the door glass to the access hole position.
5. For vehicles equipped with power windows, remove the power window switches. (16W774)
6. Peel the waterproof film off carefully to avoid damaging it.



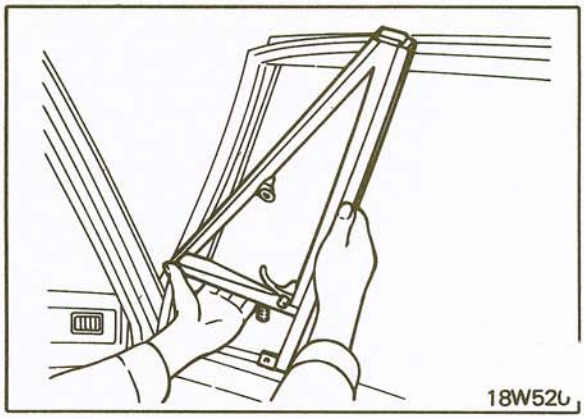
7. Remove the retaining screws and bolts from the ventilator window.



8. Remove any weatherstrip which is still attached to the ventilator window.

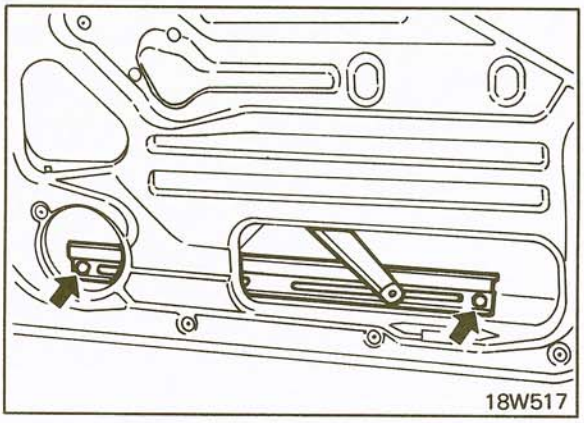


9. Remove the ventilator window by pulling upward.

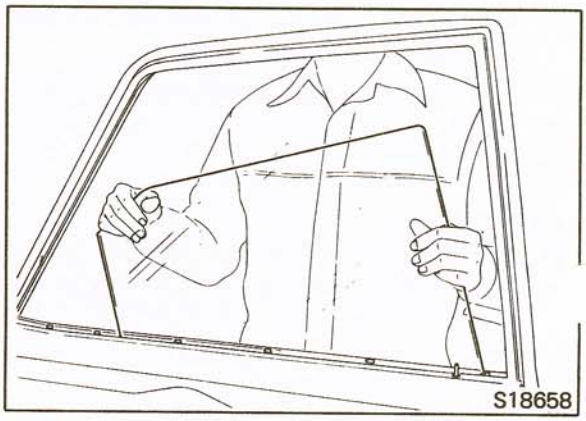


10. Remove the glass mounting bolts from the glass holder. (18W517)

NOTE
When removing the glass mounting bolts, support the glass to prevent it from falling.

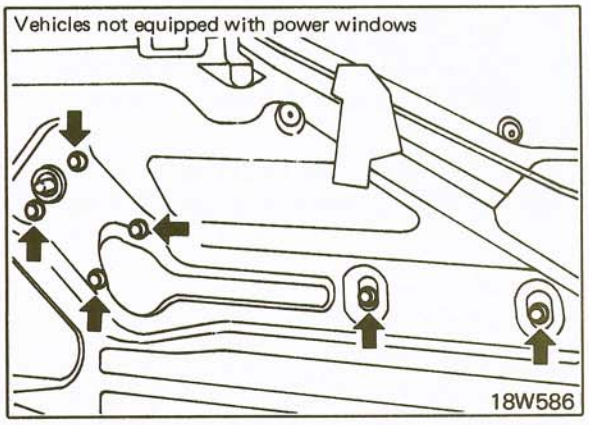


11. Gently remove the door glass upward while tilting it.



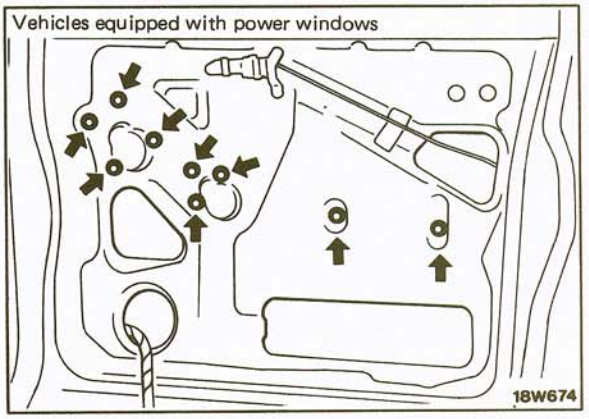
2. For vehicles not equipped with power windows, remove the regulator assembly mounting bolts.

NOTE
Hold the regulator assembly so that it does not fall when the bolts are removed.

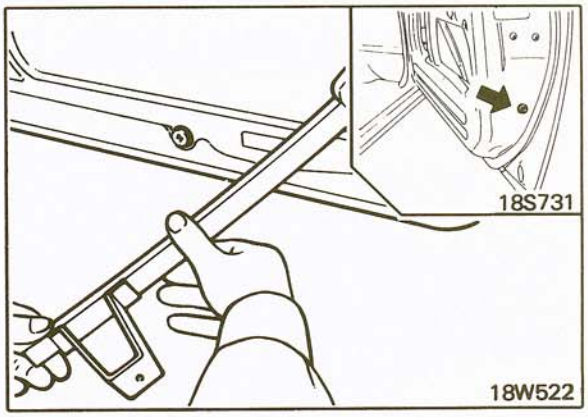


13. For vehicles equipped with power windows, disconnect the power window motor connector from the door harness, and then remove the power window regulator mounting bolts.

NOTE
Hold the regulator assembly so that it does not fall when bolts are removed.



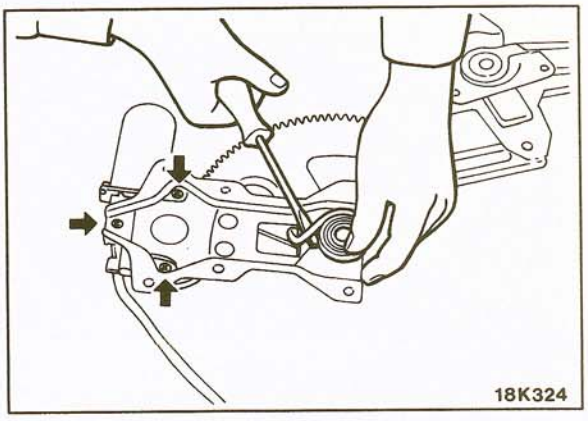
14. Remove the regulator assembly through the access hole.
15. Remove the mounting bolts and remove the lower sash through the access hole. (18S731, 18W522)



Power Window Motor (vehicles equipped with power windows only)

Remove the power window motor from the window regulator.

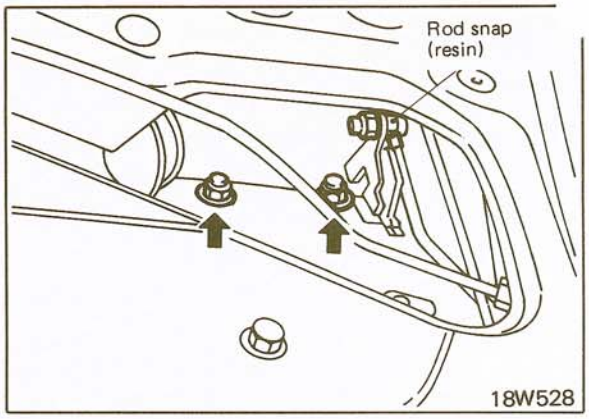
Caution
Because the force of the regulator spring may cause the regulator arm to jump up when the screws attaching the motor to the window regulator are removed, remove the regulator spring before removing the screws.



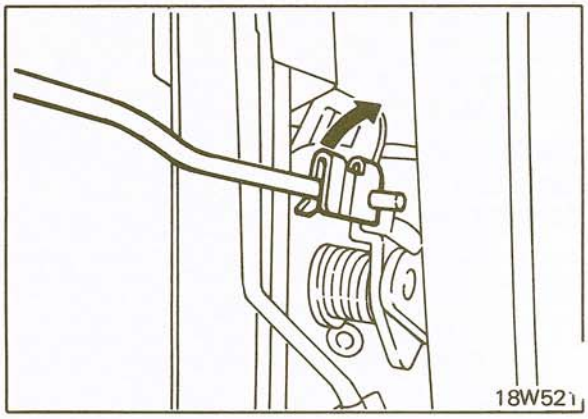
Door Handle and Door Latch

1. Disconnect the outside handle rod from the handle, and then remove the outside handle.

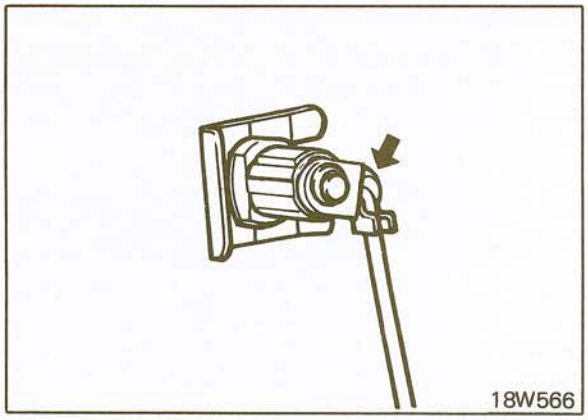
Caution
If the outside handle rod is removed, the rod snap must be replaced with a new one when the handle rod is reinstalled.



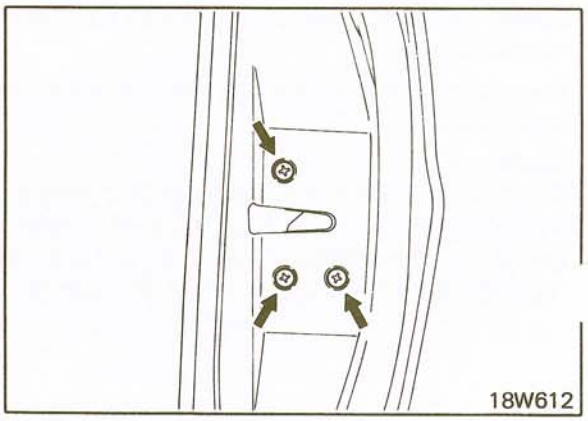
2. Disconnect the inside handle rod from the latch, and then remove it with the inside handle.



3. Disconnect the outside lock rod from the lock cylinder. (18W566)
4. Remove the lock cylinder retainer, and the lock cylinder.

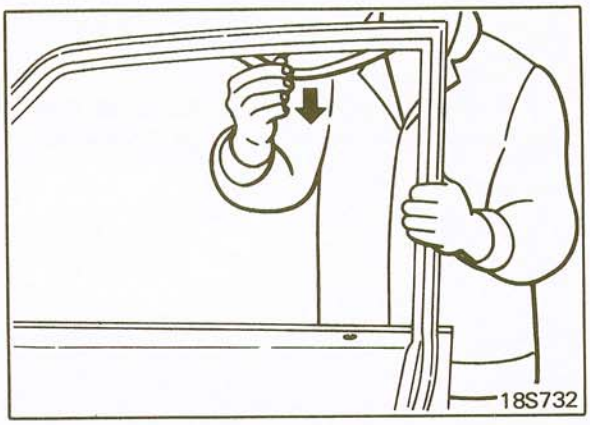


5. Remove the door latch assembly and rods.



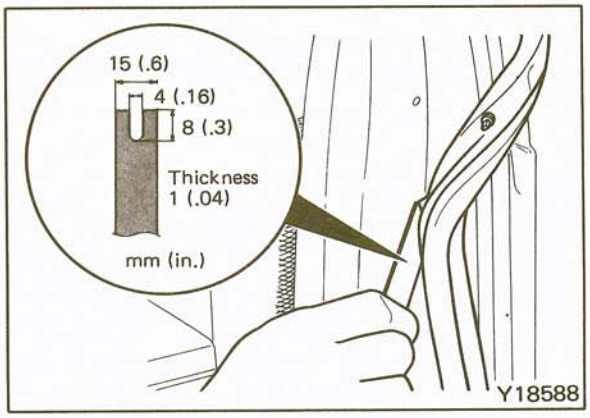
oor Glass Runchannel

Remove the window glass runchannel by pressing both sides with your fingers.



Door Opening Weatherstrip

Remove the door opening weatherstrip with the tool shown in the illustration.



INSPECTION

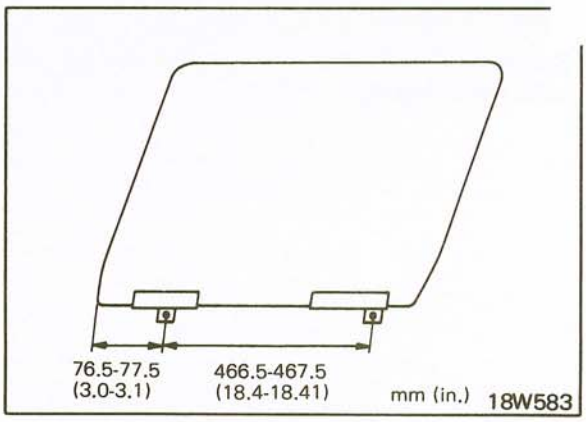
1. Check door hinges for cracks, damage, or abnormal noise.
2. Check door hinge attaching bolts for looseness.
3. Check mouldings for cracks or damage.
4. Check door panel for damage or deformation.
5. Check door regulator for wear or damage.
6. Check door glass runchannel for wear, damage, or deformation.
7. Check door inside handle and latch for wear, damage, or malfunction.

NOTE
For the inspection procedure for the power window motor and switch, refer to GROUP 8.

INSTALLATION

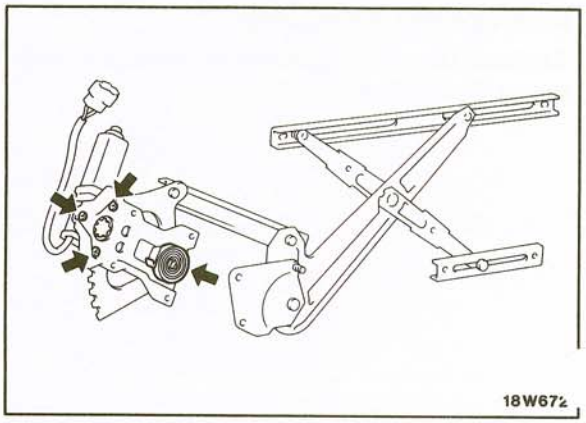
Window Glass

If the window glass has been removed from the glass holder, reinstall it in the position shown in illustration.



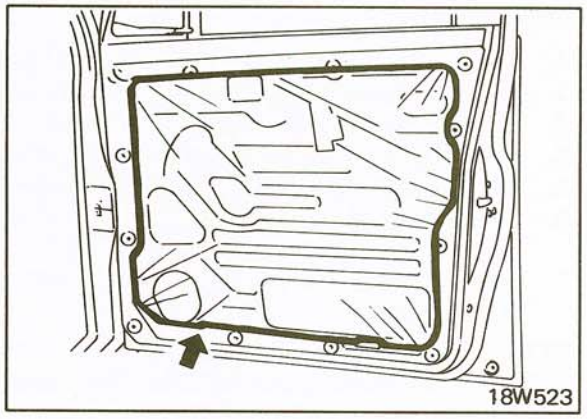
Power Window Regulator Motor (Vehicles equipped with power window only)

When assemblying the window regulator on vehicles equipped with power windows, first install the regulator spring, and then proceed with the assembly.



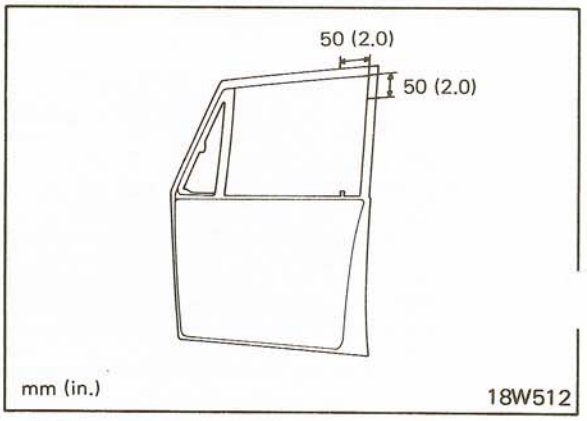
Waterproof Film

Apply non-drying adhesive as shown in the illustration, and then attach the waterproof film.



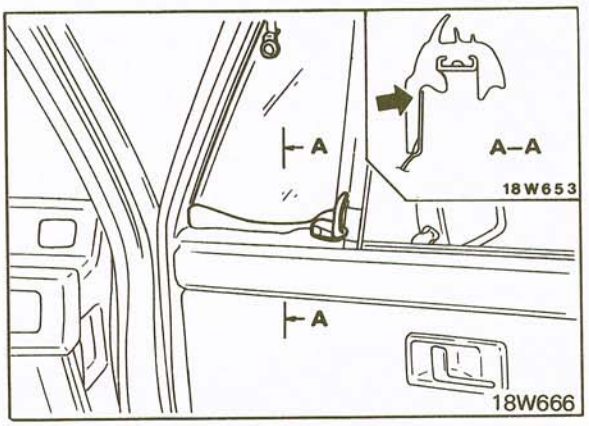
Door Runchannel

Apply a drying adhesive to the positions shown in illustration and install the door runchannel.



entilator Window Weatherstrip

Apply non-drying sealant to the ventilator window weatherstrip and then mount it onto the ventilator window.



Door Hinges

Apply chassis grease to the sliding parts of the door hinges.

Door Regulator

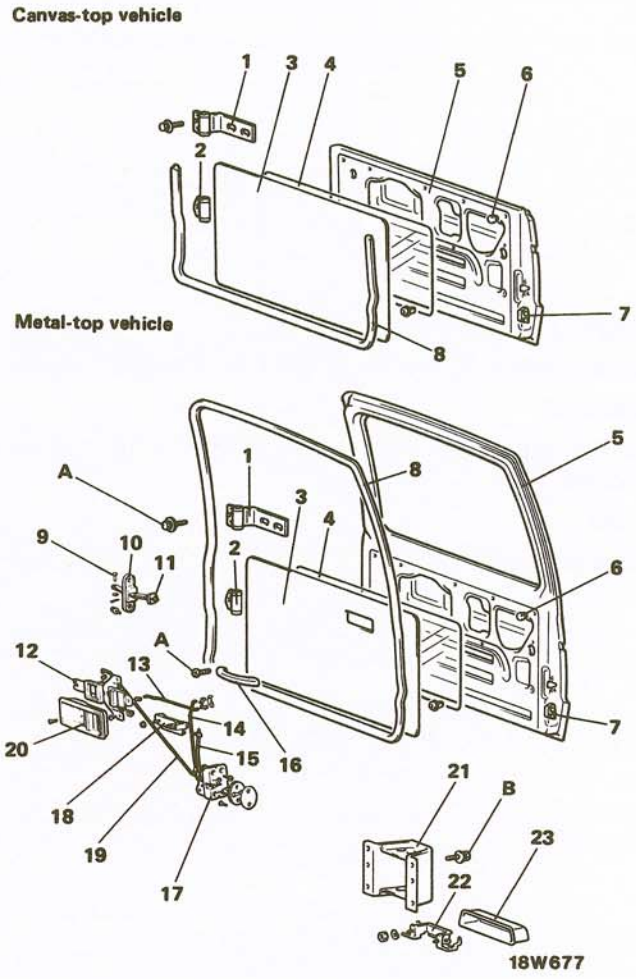
Apply chassis grease to the sliding parts and rotating parts of the door regulator.

Door Latch

Apply chassis grease to the sliding parts of the door latch.

COMPONENTS

1. Door upper hinge
2. Door lower hinge
3. Door trim
4. Waterproof film
5. Door panel
6. Cushion rubber
7. Bumper rubber
8. Door opening weatherstrip
9. Clevis pin
10. Door check cover
11. Door check
12. Inside handle
13. Inside lock rod
14. Outside lock rod
15. Outside handle rod
16. Door pull handle
17. Latch
18. Outside handle
19. Inside handle rod
20. Inside handle cover
21. Spare tire carrier
22. Back door garnish bracket
23. Back door garnish



	Nm	ft.lbs.
A	30-40	22-29
B	8-10	5.8-7.0

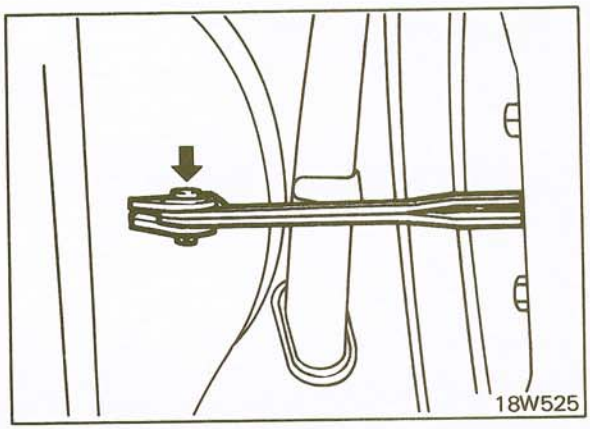
ADJUSTMENT

1. Adjust the door fit by adjusting the position of the door striker and/or increasing or reducing the number of shims. (Refer to p. 23-28.)
2. Adjust the inside handle play by moving the inside handle to the left or right. (Refer to p. 23-29.)

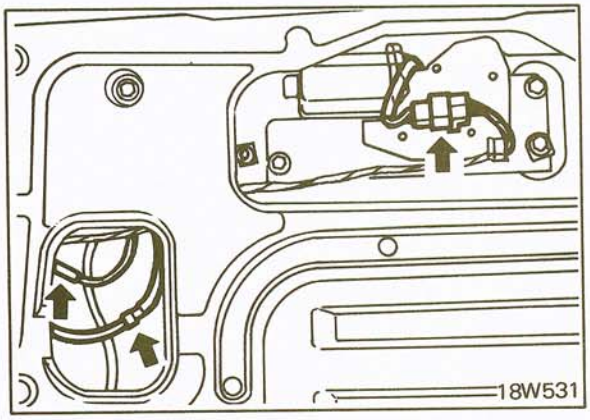
EMOVAL

Back Door and Hinge

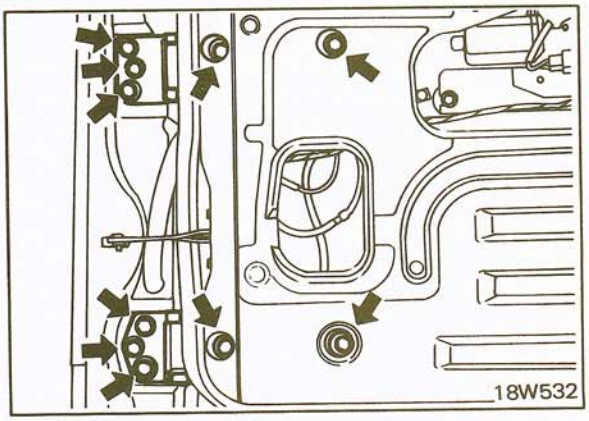
1. Remove the cotter pin from the clevis pin, and then remove the clevis pin upward.



2. Remove the back door trim. (Refer to p. 23-40.)
3. Peel the waterproof film off carefully to avoid damaging it.
4. Disconnect the following points. (18W531)
   (1) Defogger connector
   (2) Rear washer tube joint
   (3) Rear wiper connector

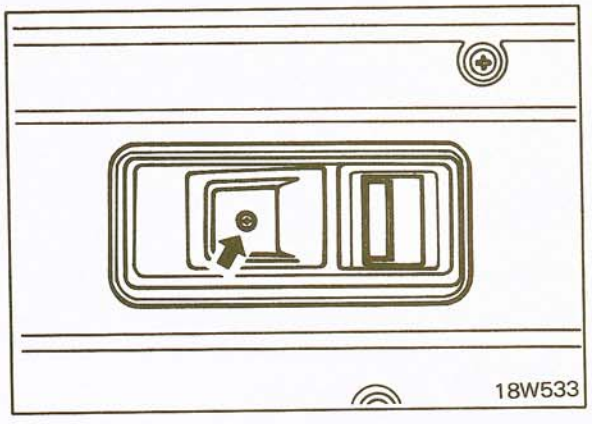


5. Remove the back door hinge mounting bolts, and then remove the back door. (18W532)
6. Remove the hinge mounting bolts from the body, and then remove the hinges. (18W532)

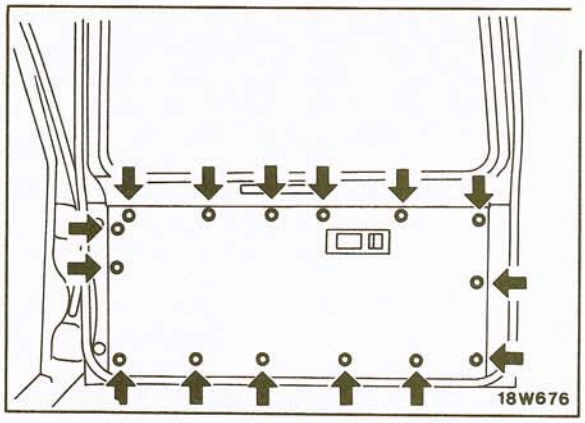


Door Trim

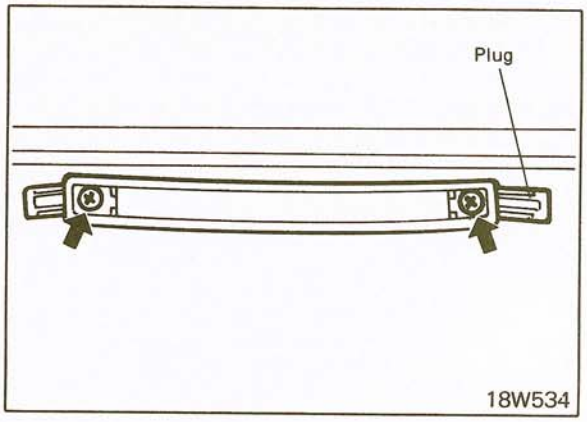
1. Remove the inside handle cover.



2. Remove the door trim.

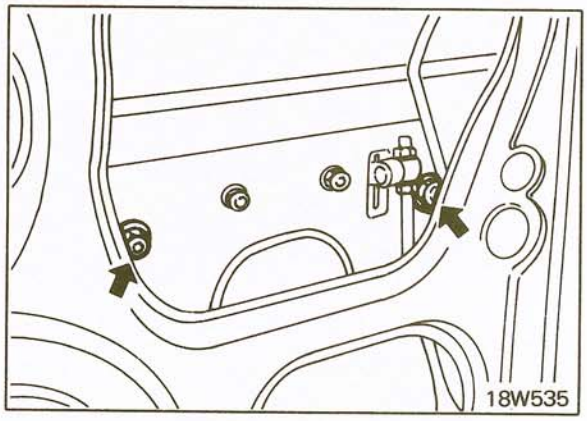


3. Open the door pull handle plug and remove the door pull handle.

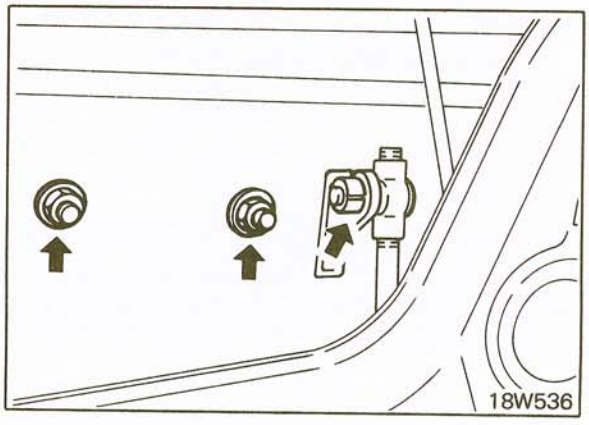


Door Handle and Door Latch

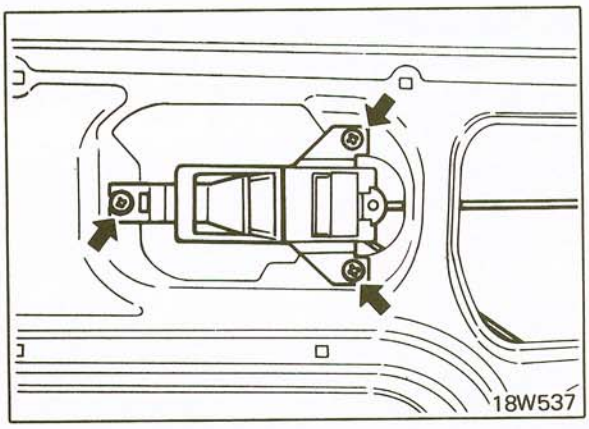
1. Remove the door trim and the waterproof film.
2. Remove the back door garnish. (18W535)



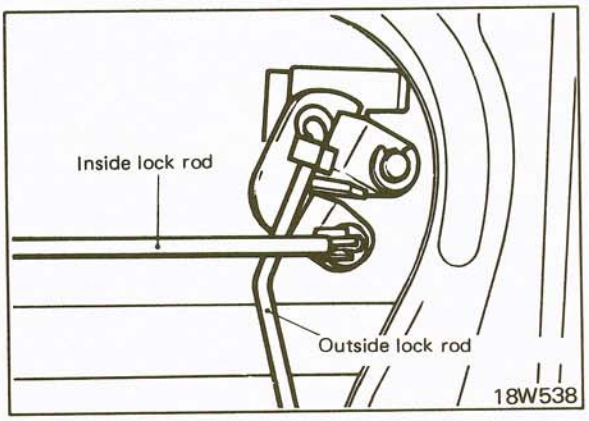
3. Disconnect the outside handle rod from the outside handle, and then remove the outside handle.



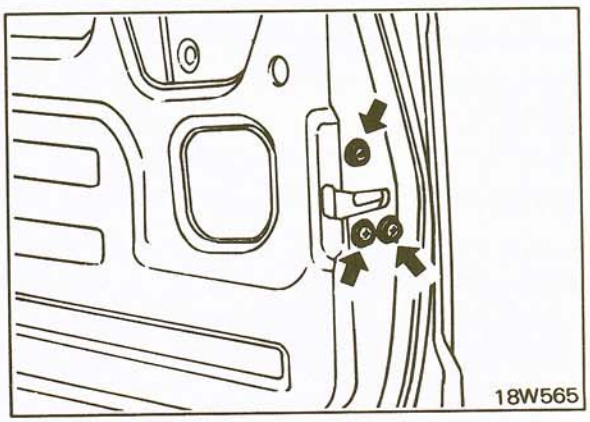
Remove the inside handle mounting screws, and then disconnect the inside lock rod and the inside handle rod from the inside handle.



5. Disconnect the outside lock rod and the inside lock rod from the lock cylinder. (18W538)
6. Remove the lock cylinder retainer, and the lock cylinder.

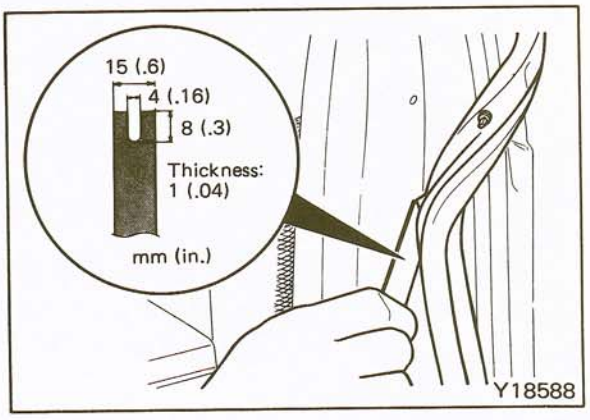


7. Remove the door latch assembly together with the rods.



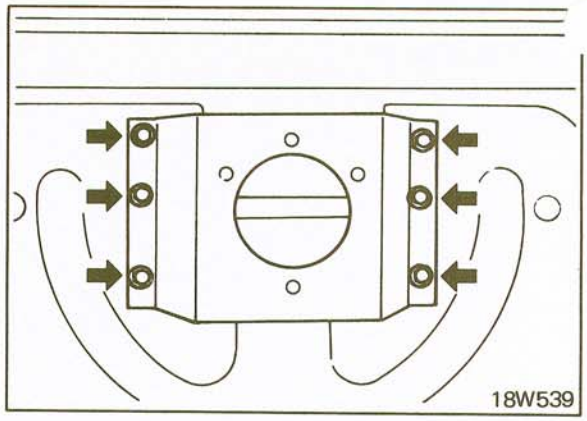
Door Opening Weatherstrip

Remove the door opening weatherstrip with the tool shown in the illustration.



Spare Tire Carrier

1. Remove the spare tire from the spare tire carrier.
2. Remove the spare tire carrier from the back door. (18W539)



INSPECTION

(1) Check door hinges for cracks, damage, or abnormal noise.
(2) Check door hinge attaching bolts for looseness.
(3) Check door panel for damage or deformation.
(4) Check door inside handle and latch for wear, damage, or malfunction.

INSTALLATION

Waterproof Film

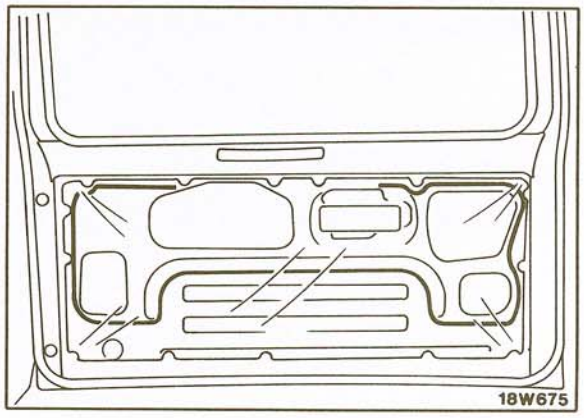
Apply non-drying adhesive at the positions shown in the illustration, and then attach the waterproof film. (18W675)

Door Hinges

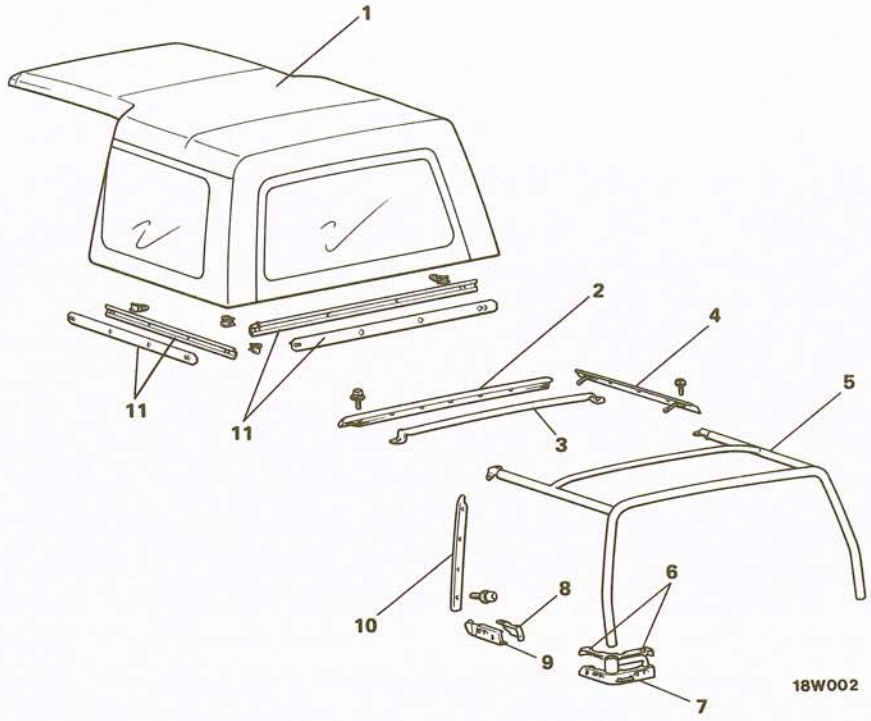
Apply chassis grease to the sliding parts of the door hinges.

Door Latch

Apply chassis grease to the sliding parts of the door latch.



COMPONENTS



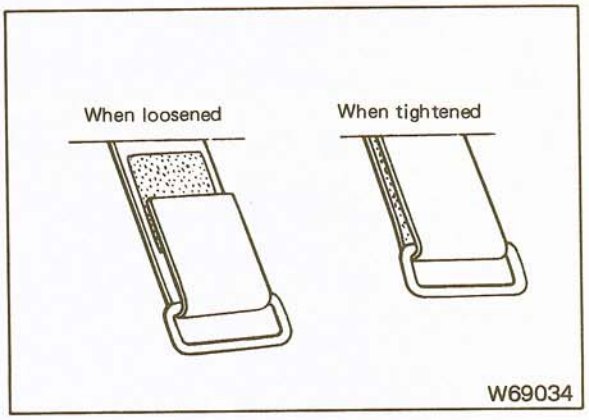
1. Roof cover
2. Roof cover retainer, front
3. Roof cover bow
4. Side cover retainer
5. Roof cover frame
6. Rear cover
7. Rear cover bracket
8. Side cover
9. Side cover bracket
10. Roof cover retainer
11. Plate

ADJUSTMENT

Perform roof cover tension adjustment by the following procedures.

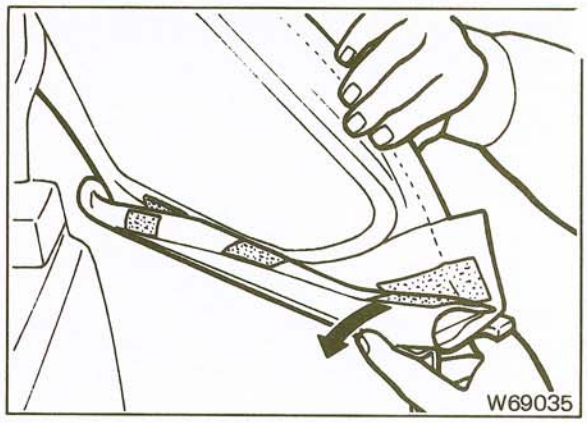
Side Rail

Release the tape of the fixing band of the side rail and adjust tension by changing the length of the band. (W69034)

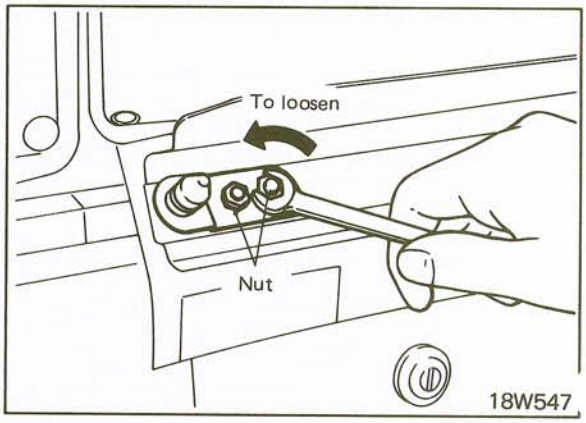


Rear and Side Curtains

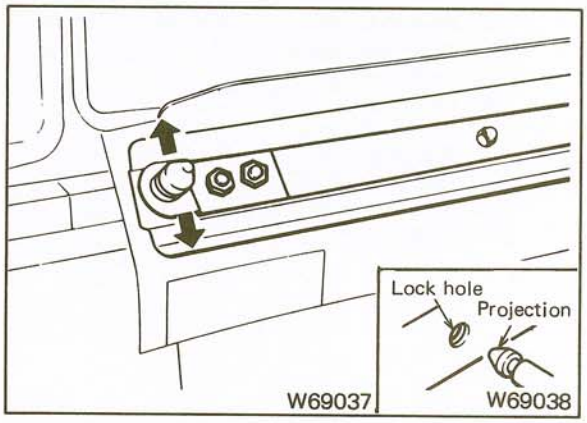
1. Release the fixing tape of the rear and side curtains.



2. Loosen the nuts attaching the side and rear curtains to the plate.



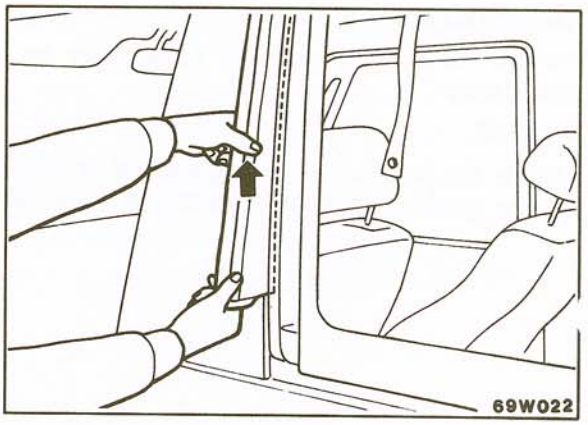
3. To make sure that the lock pin of the plate fits in the lock hole, adjust tension by moving the plate up and down.



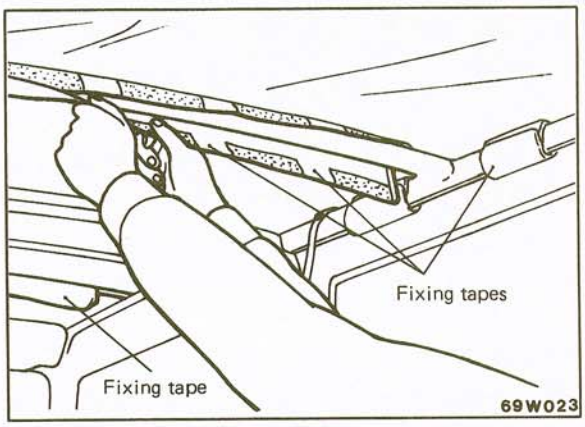
REMOVAL

Roof Cover Assembly

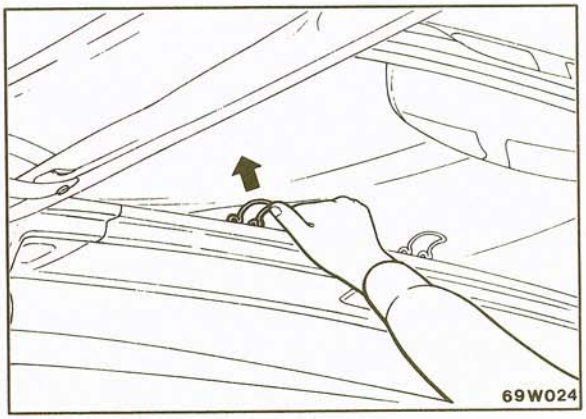
1. Remove fasteners and fixed portions of the rear and side curtains.
2. Pull the roof cover upward from the side rail. (69W022)



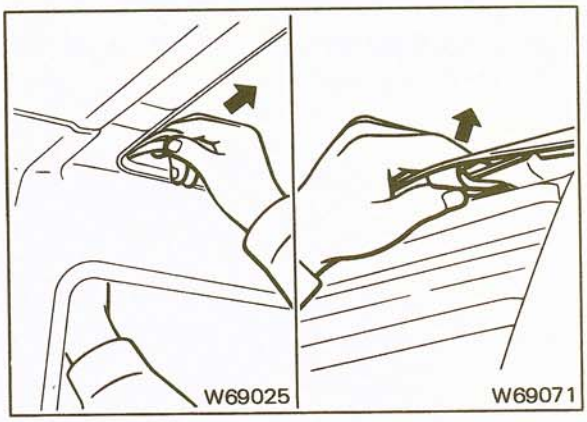
Undo the fasteners and fixing of the rear and side curtains.
Pull the roof cover upward to remove it from the side rail.



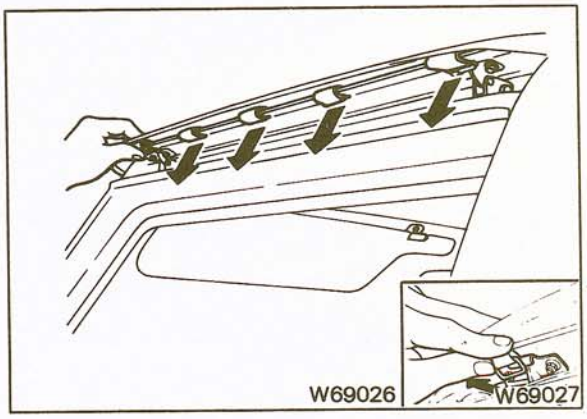
4. Undo the fixing tapes of roof cover from inside the room.



5. First pull the band on the rear side of the roof cover retainer. While holding the roof cover retainer up, pull the band on the front side of the roof cover retainer.

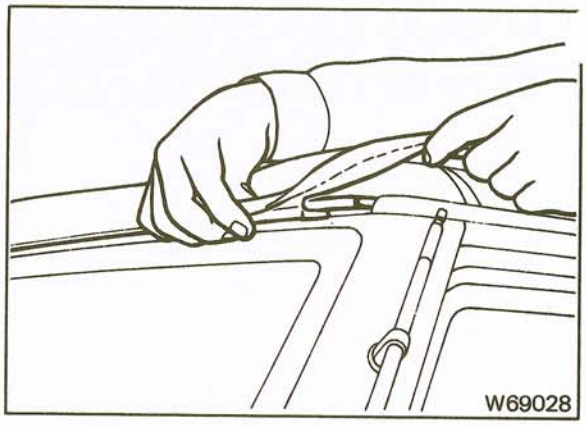


6. Raise the roof cover retainer and remove the fastening band.



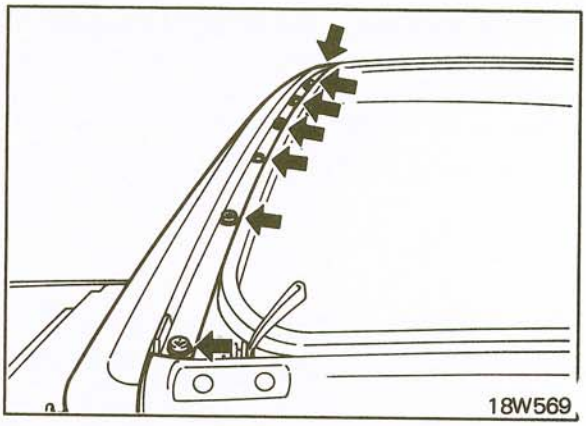
7. Remove the roof cover forward from the roof cover front retainer. (W69028)
8. Remove the roof cover assembly from the vehicle.

Caution
When the roof cover assembly is removed, use care not to allow the attaching metal fittings, etc. to strike the body.



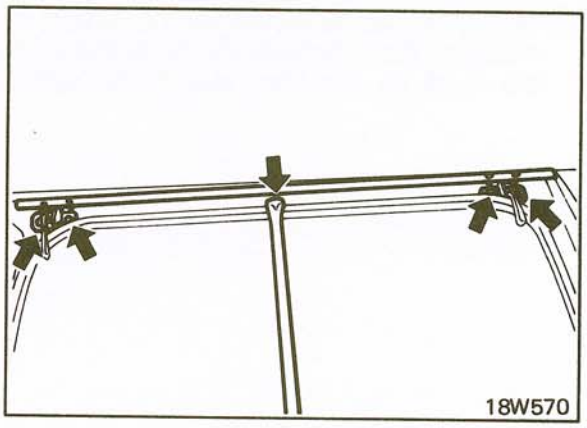
Roof Cover Front Retainer

Remove the roof cover front retainer from the roof.



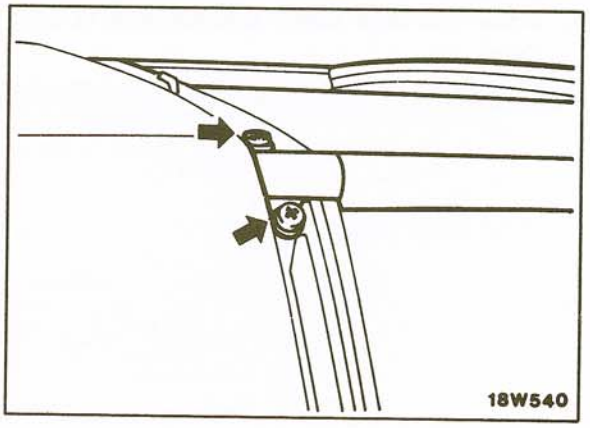
Roof Cover Retainer and Roof Cover Bow

1. Remove the roof cover lock attaching screws and remove the roof cover retainer. (18W570)
2. Remove the roof cover bow. (18W570)



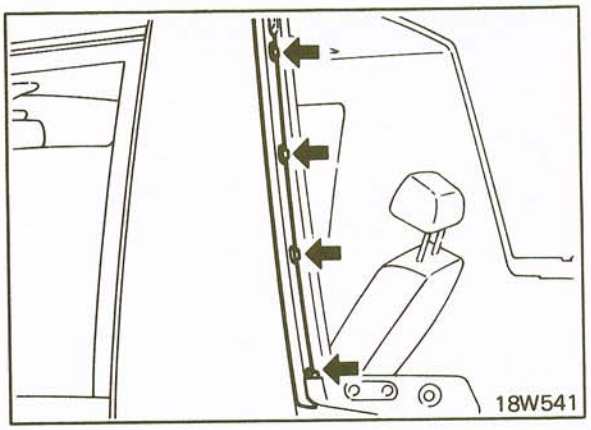
Roof Cover Frame

1. Detach the roof cover frame from the center pillar. (18W540)
2. Pull the rear of roof cover frame upward to remove it from the rear cover bracket.



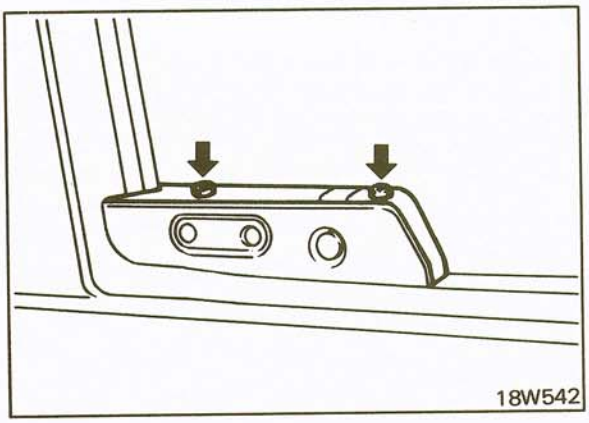
'de Cover Retainer

Remove the side cover retainer.

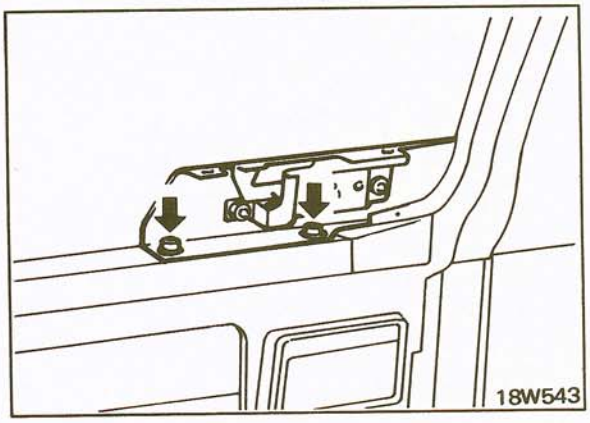


Side Cover Bracket

1. Remove the side cover.

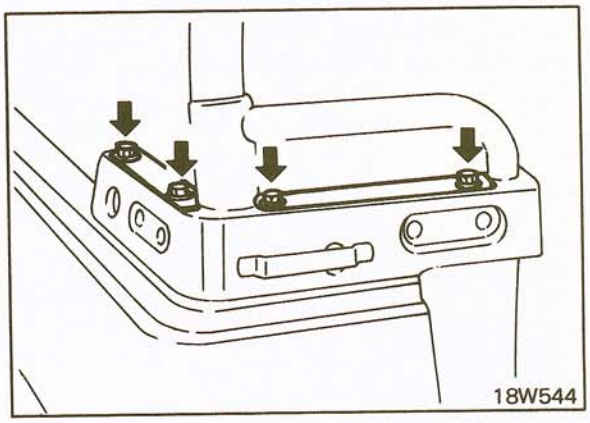


2. Remove the side cover bracket.

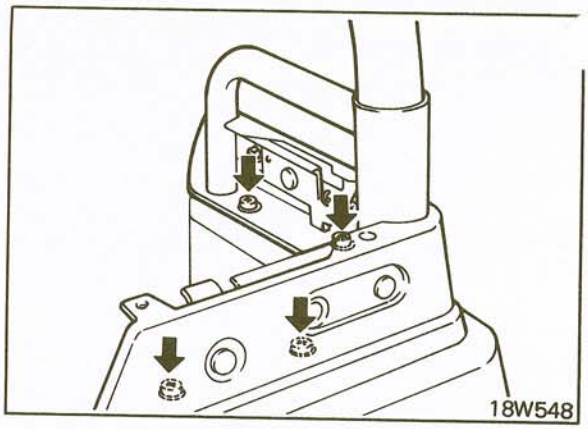


Rear Cover Bracket

1. Remove the rear cover.



2. Remove the rear cover bracket.



INSPECTION

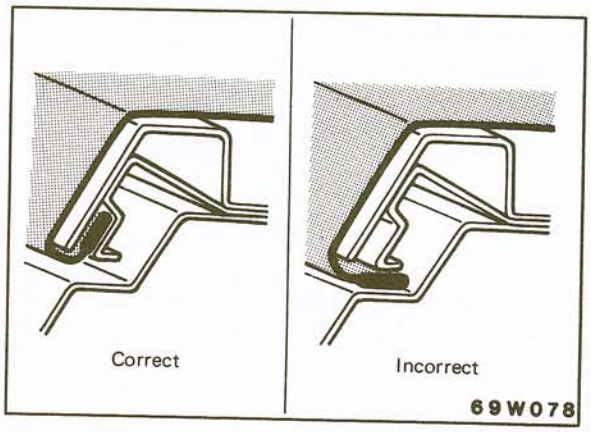
1. Check the roof cover for damage.
2. Check the roof cover retainer for deformation or damage.
3. Check the roof cover lock for faulty operation.
4. Check the roof cover bows for bending.
5. Check the roof cover lock pin mounting nuts for looseness.
6. Check the roof cover frame for deformation and damage.

INSTALLATION

Mount the roof cover securely so that it is neither too loose nor too tight.

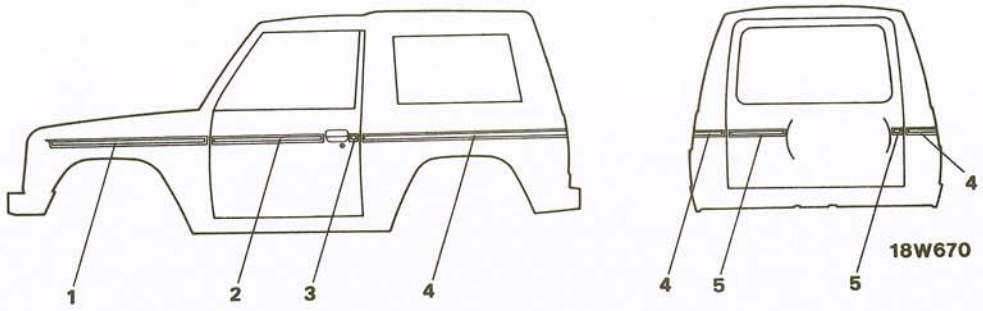
Caution

Be sure that the roof cover is securely connected to the vehicle body and to the top frame.
When installing the cover to the front rail, be sure to fit it in correctly as shown in the illustration.

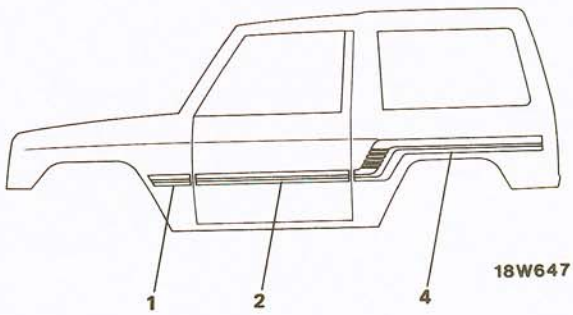


COMPONENTS

Type 1
(Vehicles with a P-line only)



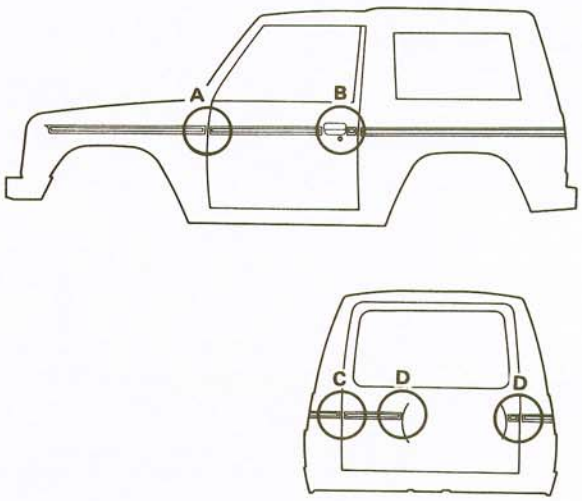
Type 2
(Metal-top vehicles with a P-line only)



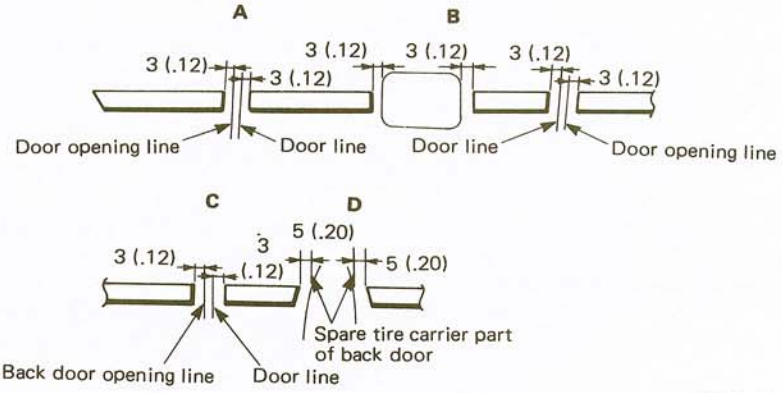
1. Fender tape
2. Front door tape
3. Rear door tape
4. Quarter tape
5. Back door tape

INSTALLATION

Type 1

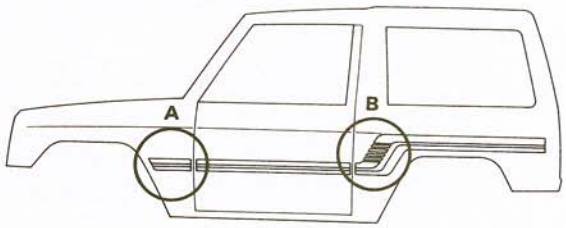


18W670



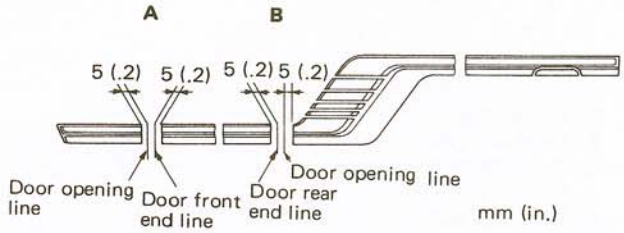
18W048

Type 2



18W647

NOTE
Using a rag soaked in unleaded gasoline, wipe any grease from the body surfaces where the tapes are to be attached.

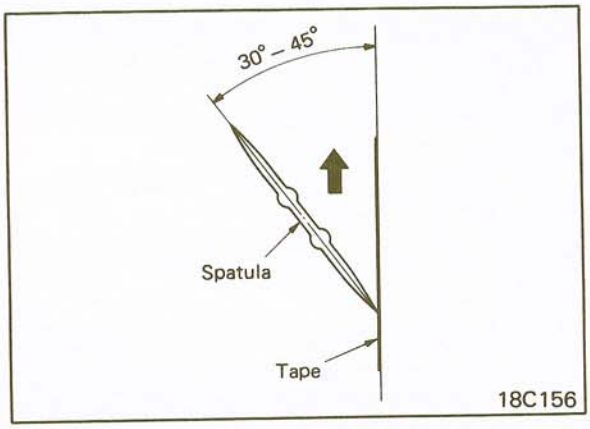


18W648

Peel the paper off the back of the stripe tape to apply it. Begin application at the front of the doors and then proceed to the fender or quarter panel.

Cautions

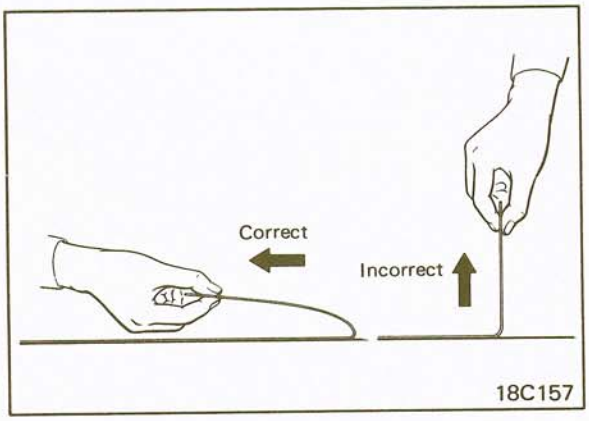
1. **The application should be done in a place with little or no dust, and at an ambient temperature of 20° – 40°C (70° – 100°F).**
2. **If the ambient temperature is less than 20°C (70°F), warm both the tape and the body (application surfaces) to within 20° – 40°C (70° – 100°F).**
2. Use the spatula to press on the tape, beginning at the center and moving evenly to both the top and bottom, in order to remove any trapped air bubbles. (C18156)



Caution

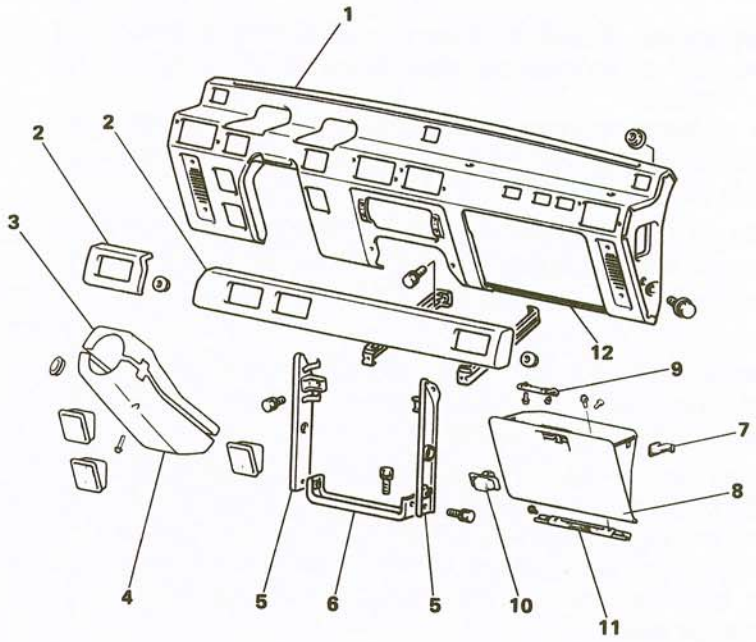
If the spatula is slid to the side there will be slack at the end of the tape, causing wrinkles, and the tape may deviate from the correct application position.

3. If the tape is not applied properly it may come off later; pull the backing paper off straight and slowly. (18C157)
4. If there are any air bubbles in the tape after the application is finished, use a sewing needle to make small holes in the bubbles, and use the corners of the spatula to press the air out.



COMPONENTS

1. Instrument panel
2. Instrument pad
3. Column cover, upper
4. Column cover, lower
5. Center reinforcement
6. Backbone bracket
7. Stopper
8. Glove box
9. Striker
10. Lock assembly
11. Glove box hinge
12. Glove box frame

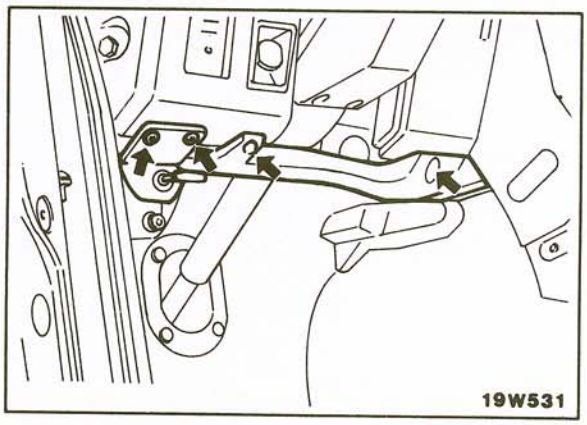


19W558

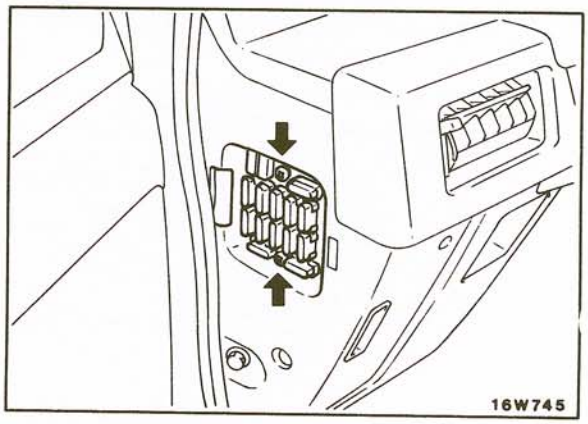
REMOVAL

Instrument Panel

1. Remove the steering wheel. (Refer to GROUP 19.)
2. Remove the center console. (Refer to p. 23-55.)
3. Remove the combination meter. (Refer to GROUP 8.)
4. Remove the combination gauge. (Refer to GROUP 8.)
5. Remove the lap heater ducts B and C and the release cable bracket. (19W531)
6. Remove the heater control assembly. (Refer to GROUP 24.)

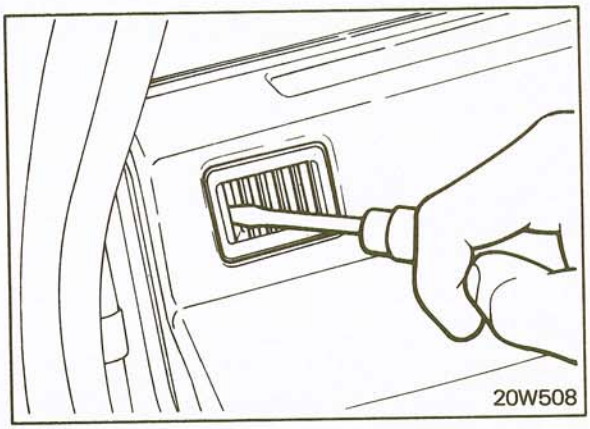


7. Remove the fuse cover and then the fuse block mounting screws. Push the fuse block into the instrument panel. (16W745)
8. For vehicles equipped with front speakers, disconnect the front harness from the front speakers.

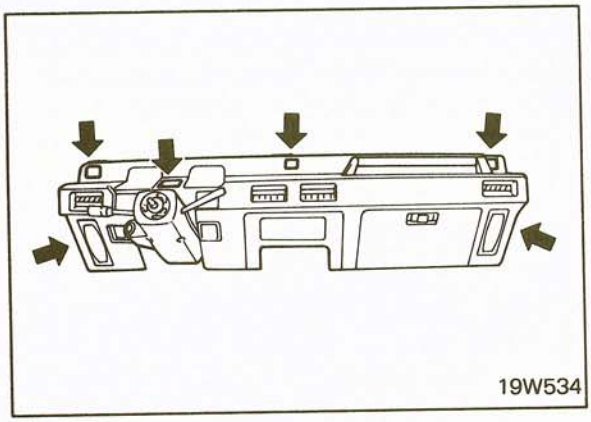


Remove the plug at the center of the instrument panel.
10. Remove the right and left demister grilles by prying up the mounting projections with a screwdriver. (20W508)

Caution
Be careful not to break the projections.

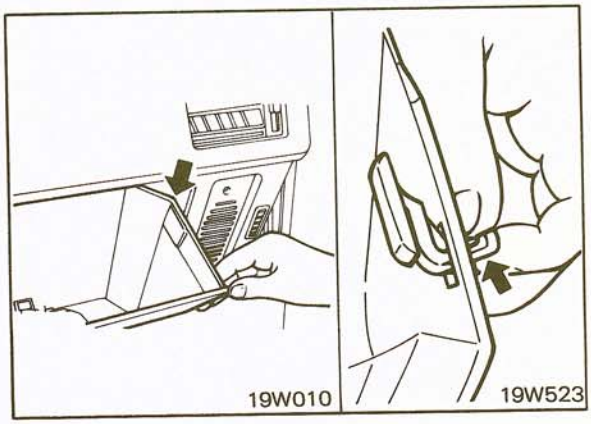

20W508

11. After the glove box stopper has been removed, pull the glove box toward you, and then disconnect the heater relay from the front wiring harness.
12. Remove the instrument panel mounting bolts and nuts and then remove the instrument panel. (19W534)

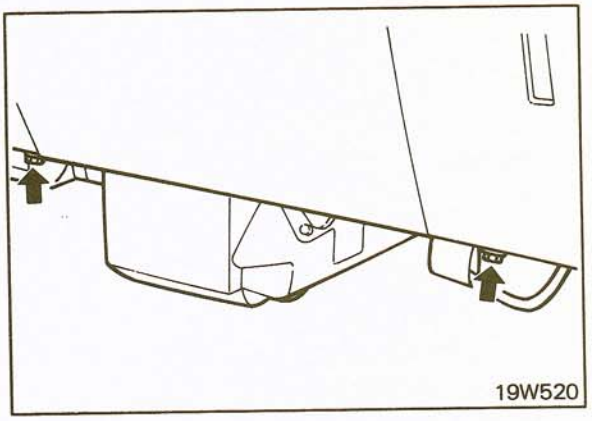

19W534

Glove Box

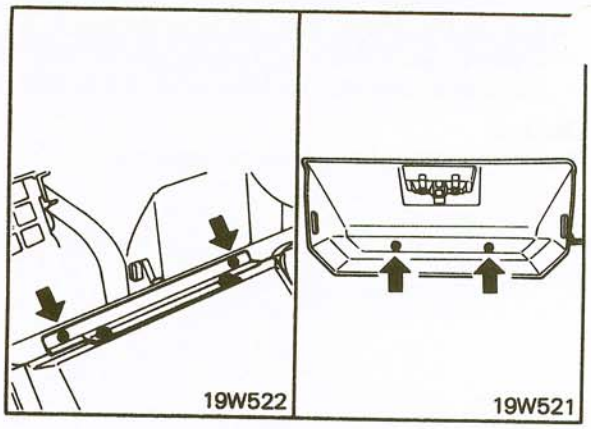
1. Remove the glove box stopper.


19W010 19W523

2. Remove side lap heater duct B on the passenger seat side. (Refer to GROUP 24.)
3. Remove the glove box frame mounting bolts from the instrument panel, and then remove the glove box. (19W520)

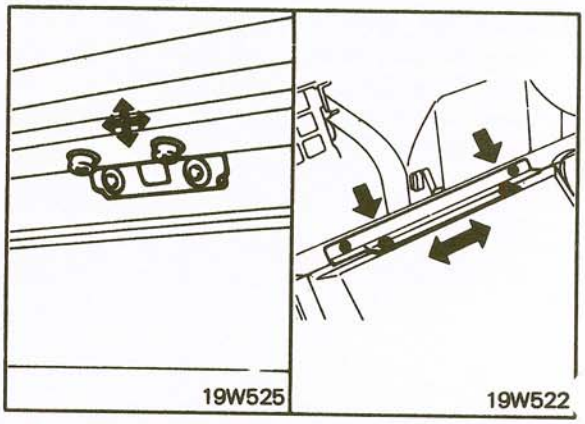

19W520

4. Remove the glove box frame and the glove box hinges from the glove box.



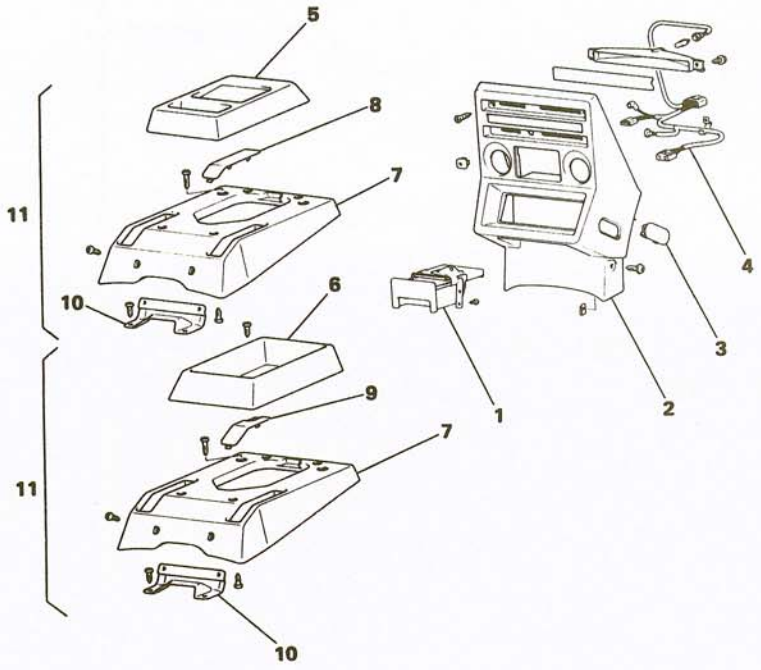
INSTALLATION

1. Connect all of the connectors securely.
2. Make sure that the wiring harnesses are not pinched.
3. Adjust the heater control wires. (Refer to GROUP 24.)
4. When installing the glove box, first temporarily tighten the screws, and then, after checking the top left and right clearances between the glove box lid and the instrument panel with the lid closed, tighten the screws. (19W525, 19W522)



COMPONENTS

1. Ashtray
2. Center panel
3. Plug
4. Center panel harness
5. Console
6. Tray
7. Floor console
8. Plate B
9. Plate A
10. Bracket
11. Floor console assembly

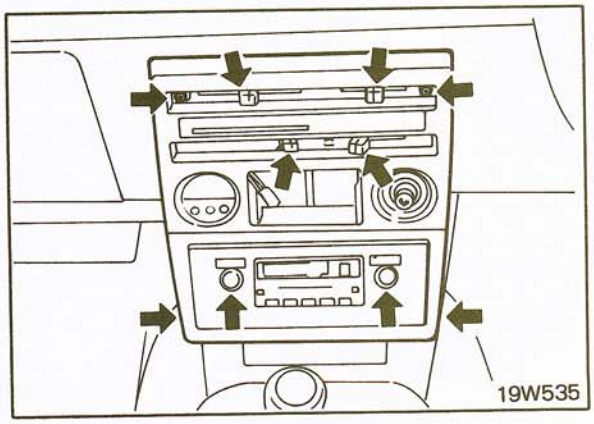


19W045

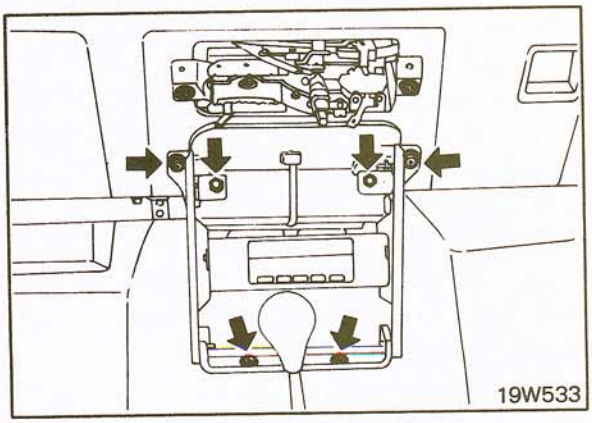
REMOVAL

Center Console

1. Remove the knobs of the heater control levers.
2. Remove the radio switch knobs and the radio panel.
3. Remove the center panel mounting screws.
4. Slightly pull off the center panel.
5. Disconnect the front harness to center panel harness connector and the antenna lead-wire.
6. Remove the center console assembly.

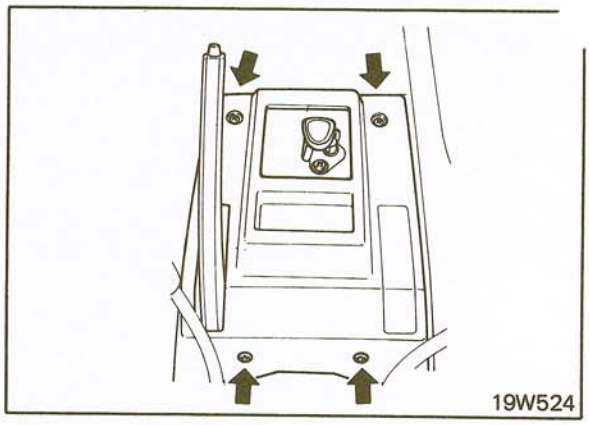


7. Disconnect the radio and car stereo player from the front harness.
8. Remove the center reinforcement and backbone bracket mounting screws.
9. Remove the center reinforcement, backbone bracket, radio and car stereo as a unit.

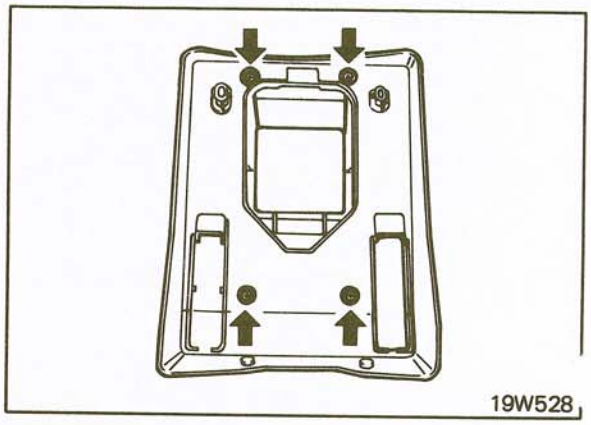


Floor Console

1. Remove the floor console.

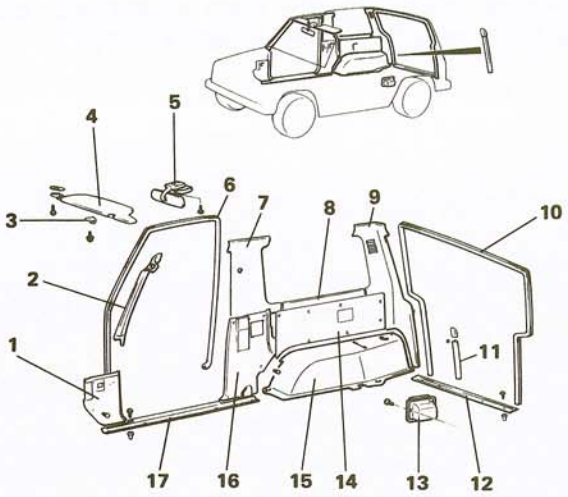


2. Remove the tray, plate A or the console and plate B from the floor console.



OMPONENTS

1. Cowl side trim
2. Front pillar trim (metal-top vehicle)
3. Sun visor holder
4. Sun visor
5. Rear-view mirror
6. Door opening trim
7. Center pillar upper trim (metal-top vehicle)
8. Quarter upper trim (metal-top vehicle)
9. Rear pillar trim (metal-top vehicle)
10. Rear opening trim (metal-top vehicle)
11. Rear opening trim (canvas-top vehicle)
12. Rear scuff plate
13. Quarter trim
14. Ashtray (left side only)
15. Rear wheelhouse trim
16. Center pillar lower trim
17. Rail cover



19W583

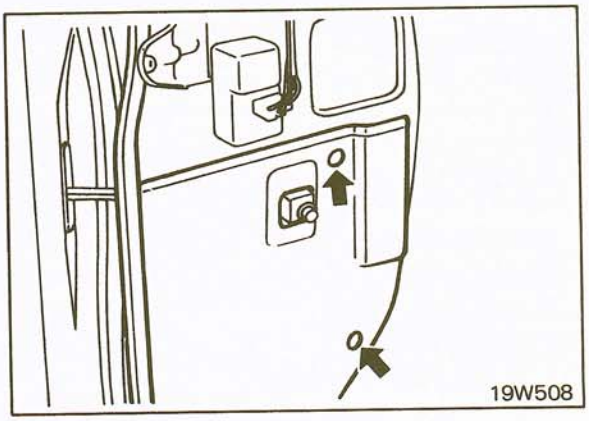
REMOVAL

Door Opening Trim

1. Remove the rail cover.
2. Remove the door opening trim.

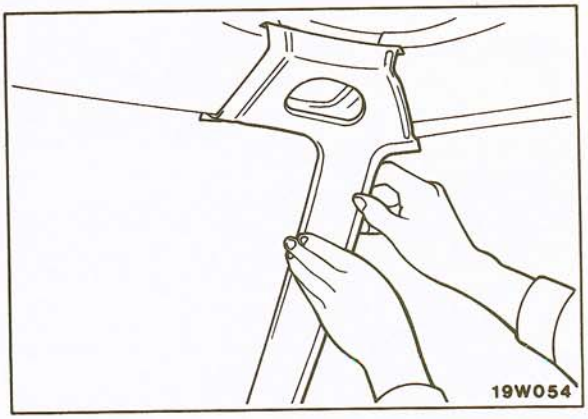
Cowl Side Trim

1. Remove the door opening trims.
2. Insert special tool (MB990784) under the cowl side trim and remove the clips. (19W508)
3. Remove the cowl side trim.



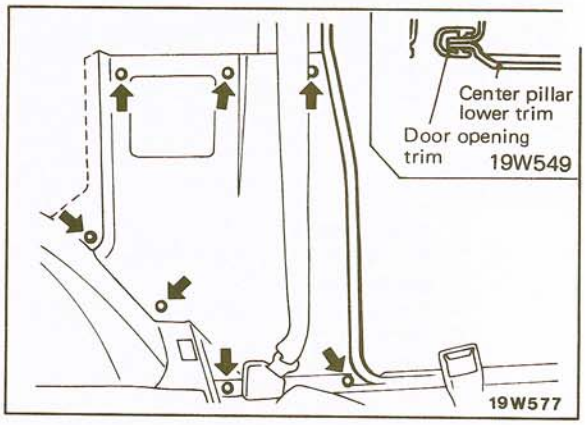
Front Pillar Trim

1. Remove the door opening trims.
2. Remove the sun visor. (Refer to P. 23-59.)
3. Remove the front pillar trim. (19W054)



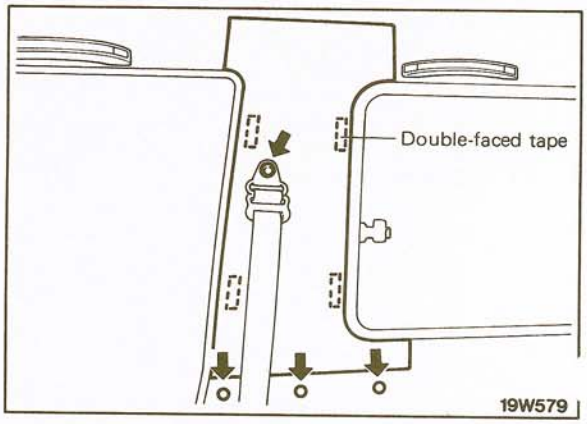
Center Pillar Lower Trim

1. Remove the door opening trim. (19W549)
2. Remove the rear speaker if the vehicle is so equipped. (Refer to GROUP 8.)
3. Insert special tool (MB990784) under the center pillar lower trim and remove the clips. Slowly raise the center pillar lower trim upward to remove. (19W577)



Center Pillar Upper Trim

1. Remove the door opening trim.
2. Remove the shoulder anchor plate of the front seat belt. (19W579)
3. Remove the three clips at the top part of the center pillar lower trim. (19W579)
4. Being careful of the double-faced tape, pull the center pillar upper trim out from the quarter window weather-strip. (19W579)



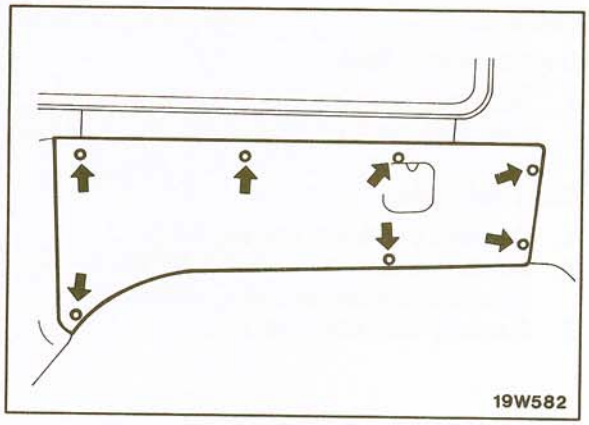
Quarter Trim

1. Remove the ashtray. (L. H.)
2. Insert special tool (MB990784) under the quarter trim and remove the clips. (19W582)
3. Remove the quarter trim.

Wheelhouse Trim

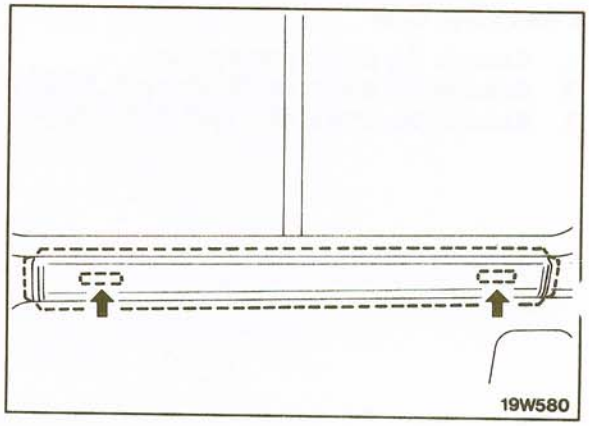
1. Remove the rear seat. (Refer to P. 23-68.)
2. Undo the hooks and remove the wheelhouse trim.

NOTE
When remounting the wheelhouse trim, it should be mounted with the cargo floor mat on top of it.



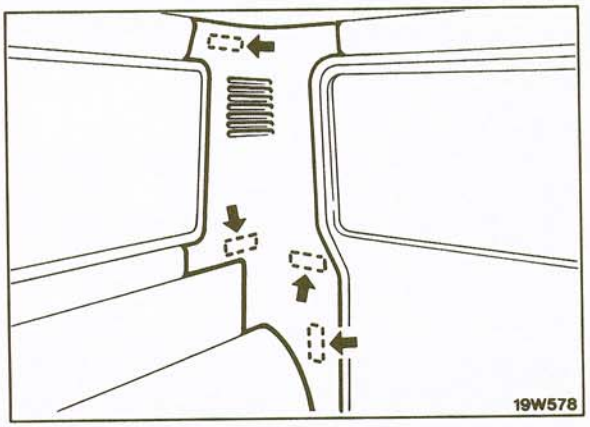
Quarter Upper Trim

1. Remove the quarter trim. (19W582)
2. Being careful of the double-faced tape on the back, pull the quarter upper trim out from the quarter window weatherstrip. (19W580)



ear Pillar Trim

1. Remove the rear opening trim.
2. Remove the quarter trim. (Refer to P. 23-58.)
3. Being careful of the double-faced tape on the back, pull the rear pillar trim out from the quarter window weatherstrip. (19W578)

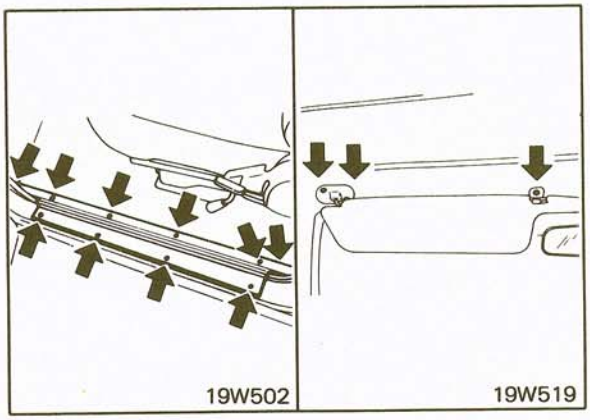


Rear Opening Trim

Remove the rear opening trim.

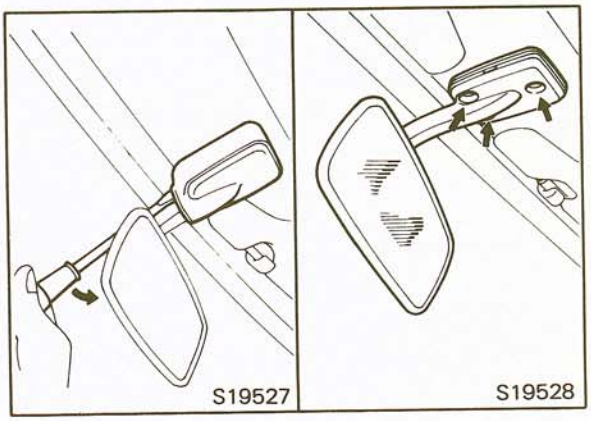
Rail Cover, Sun Visors

1. Remove the screws, and then remove the rail covers. (19W502)
2. Remove the screws, and then remove the sun visors and sun visor holders. (19W519)



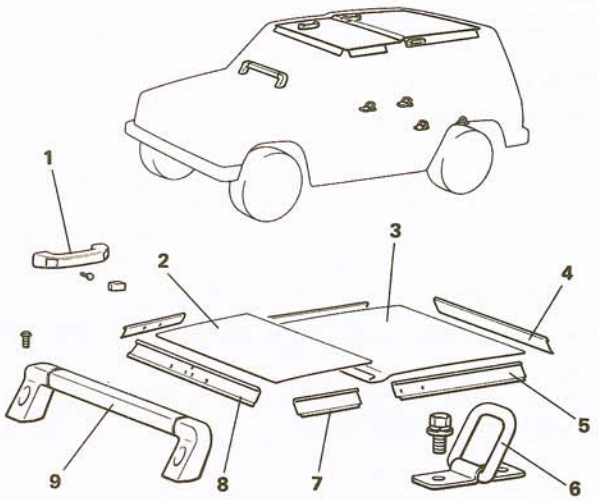
Rear-view Mirror

1. Remove the rear-view mirror cover. (S19527)
2. Remove the screws, and then remove the rear-view mirror. (S19528)



COMPONENTS

1. Assist strap
2. Front headlining (metal-top vehicles)
3. Rear headlining (metal-top vehicles)
4. Rear roof rail trim
5. Rear side roof rail trim
6. Hook
7. Front side roof rail trim
8. Front roof rail trim
9. Assist grip

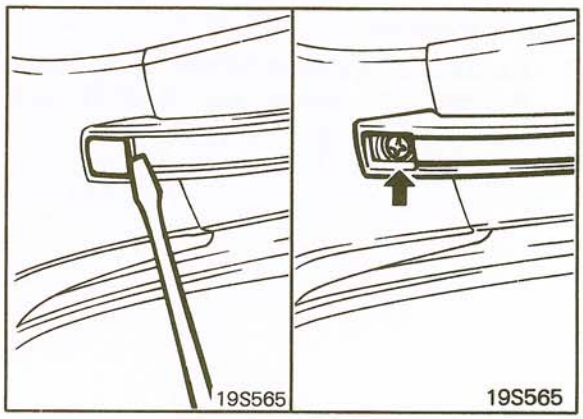


19W58.

REMOVAL

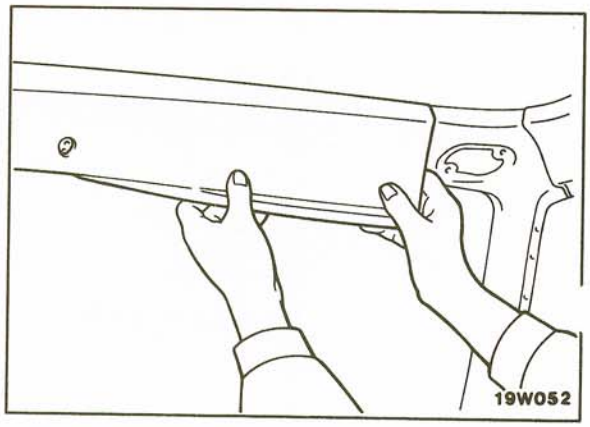
Assist Straps

1. Remove the assist strap caps. (19S565)
2. Remove the assist strap mounting screws, and then remove the assist straps. (19S565)



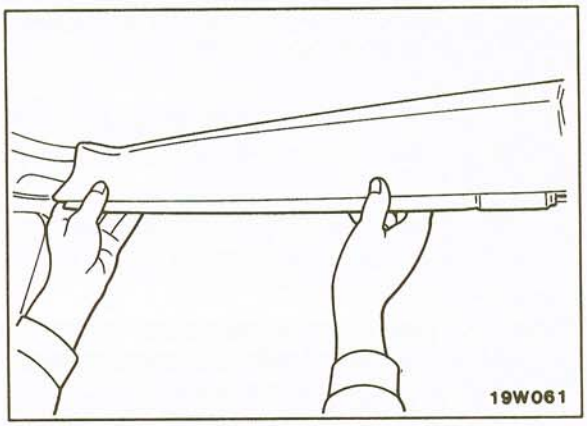
Front Rail Trim

1. Remove the front pillar trim. (Refer to P. 23-57.)
2. Remove the rear-view mirror. (Refer to P. 23-59.)
3. Remove the sun visor holders. (Refer to P. 23-59.)
4. Remove the front rail trim. (19W052)



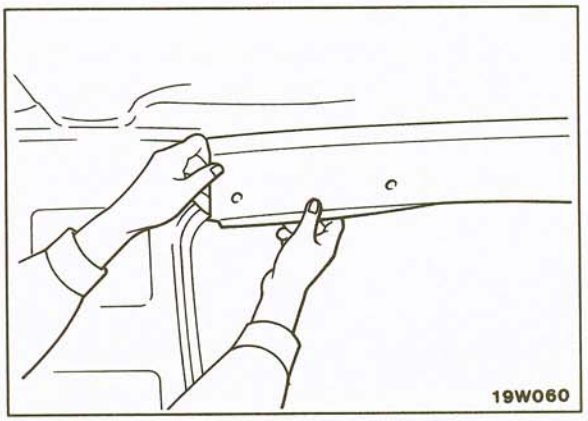
ront Side Roof Rail Trim

1. Remove the assist strap. (R. H.)
2. Remove the door opening trim.
3. Remove the front side roof rail trim. (19W061)



Rear Side Roof Rail Trim

1. Remove the assist strap.
2. Remove the center pillar upper trim. (Refer to P. 23-58.)
3. Pull the rear side roof rail trim out from the quarter window weatherstrip. (19W060)

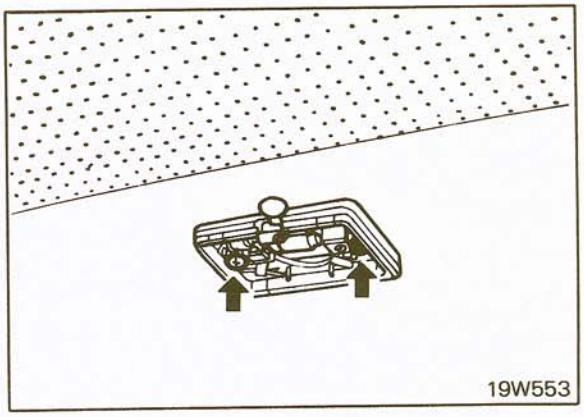


Rear Roof Rail Trim

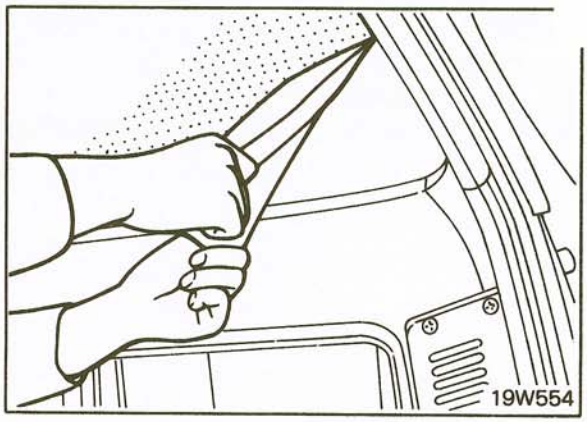
1. Remove the rear opening trim.
2. Remove the rear roof rail trim. (19W053)

Headlining

1. Remove the roof rail trim.
2. Remove the dome light mounting screws, and then remove the dome light. (19W553)



3. Slowly peel the headlining away, beginning with the corner of the roof panel. (19W554)



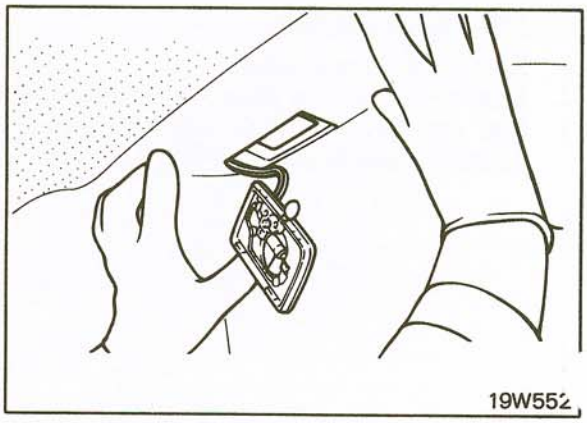
Caution
Make sure that the headlining is removed slowly; as the sponge portion of the headlining is left behind on the roof panel.

4. Thoroughly remove the drying sealant and sponge left behind on the roof panel by using a toluol solution, etc.

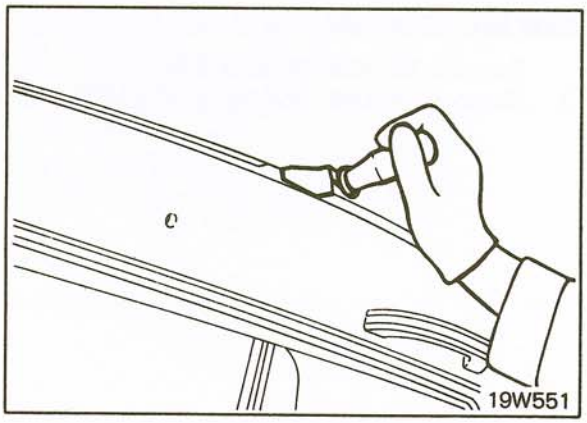
Caution
Make sure that all remaining sealant and sponge are thoroughly removed, as they produce uneven surfaces when the headlining is bonded to the roof panel.

INSTALLATION

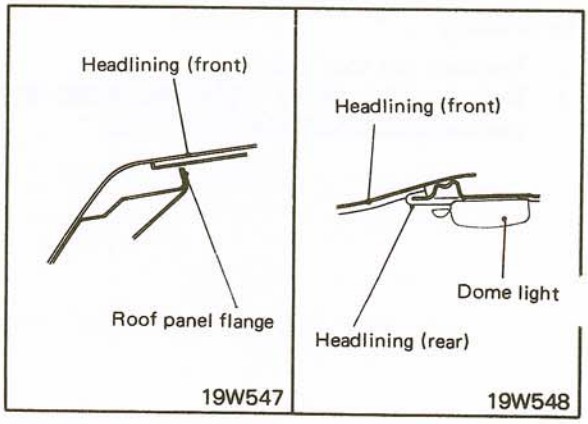
1. Evenly apply a drying sealant to the roof panel.
2. When installing the rear headlining, connect the dome light connector, pass it through the hole in the lining, and then bond the lining so that the hole matches the dome light mounting hole. (19W552)



3. Using care to prevent wrinkles and slackness, bond the headlining and insert the edges securely into the roof panel flange by using a spatula, etc.

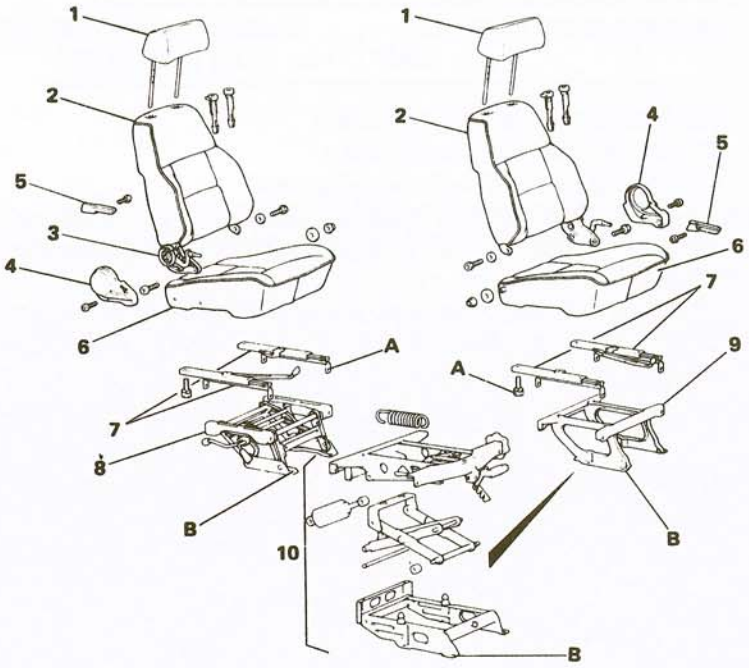


4. Bond the headlining edges as shown.



COMPONENTS

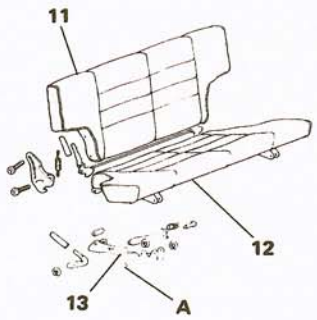
Front seats



1. Head restraint, front
2. Seatback, front
3. Reclining adjuster
4. Adjuster cover
5. Sliding lever
6. Seat cushion, front
7. Seat adjuster
8. Parallel link assembly
9. Seat support brakcet
10. Suspension assembly
11. Seatback, rear
12. Seat cushion, rear
13. Rear seat stopper

	Nm	ft.lbs.
A	10-14	7-10
B	32-49	23-35

Rear seat

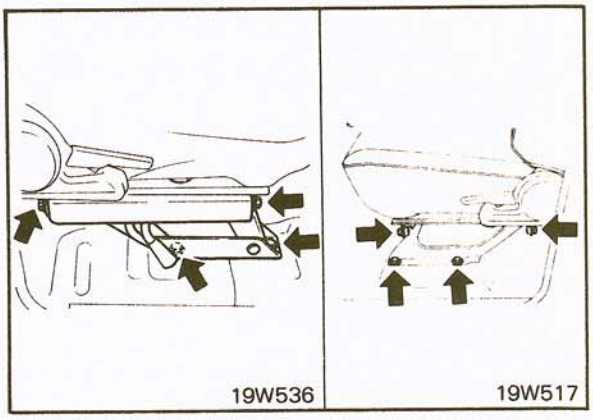


19W550

FRONT SEATS

Removal

1. Detach the seat from the floor panel and remove the seat assembly. (19W536, 19W517)
2. Detach and separate the seat cushion from the bracket of the seat assembly.



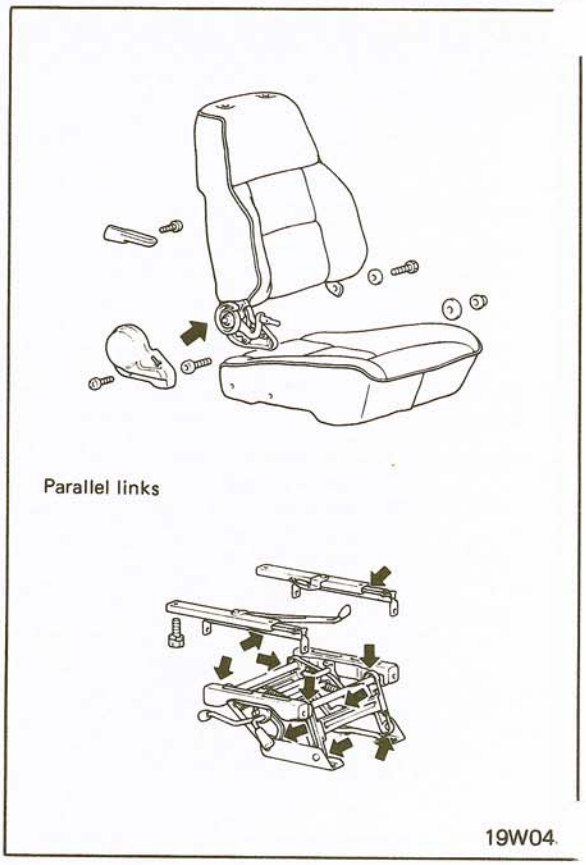
19W536 19W517

Installation

1. Apply multipurpose grease to the following points. (19W043)

Recommended grease	Multipurpose grease SAE J310a, NLGI grade #2EP

   (1) Sliding parts of seat adjusters
   (2) Sliding parts of parallel links
   (3) Sliding parts of reclining adjusters
2. After the seat has been installed, check to ensure that the seat adjusters lock at all lock positions when the seatback is moved slowly.
3. Check to ensure that the forward folding and return mechanisms of the parallel links operate smoothly and lock securely.



Parallel links

19W04

SUSPENSION SEAT

Outline

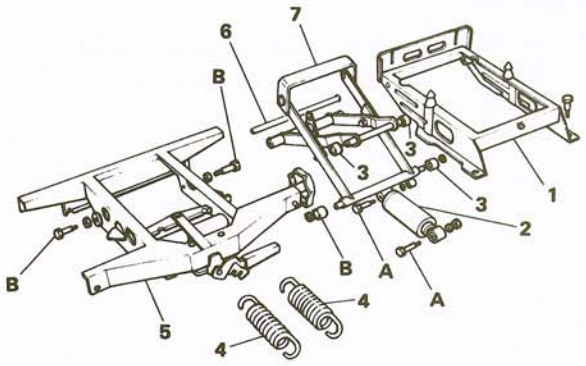
The suspension seat has a special suspension mechanism in the base frame and is installed on the driver's seat side. When the vehicle travels on an uneven ground surface or rough road, the seat absorbs the body vibration the vehicle takes from the road surface, reducing driver fatigue and assuring a more comfortable ride.
The seat offers the following features:
(1) Pantograph type link mechanism
(2) Optimum combination of coil spring and shock absorber
(3) More comfortable ride by adjust body weight meter to driver's weight
(4) Fixed position of seat can be adjusted in three height levels

The components of the suspension seat are as follows:

Suspension system

1. Lower bracket
2. Shock absorber
3. Roller
4. Coil spring
5. Upper bracket
6. Shaft
7. Link

	Nm	ft.lbs.
A	7-10	5-7
B	27-36	20-26

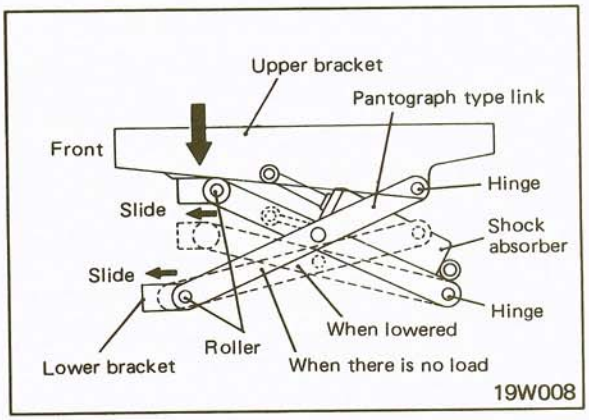


19W006

OPERATION

Suspension Mechanism

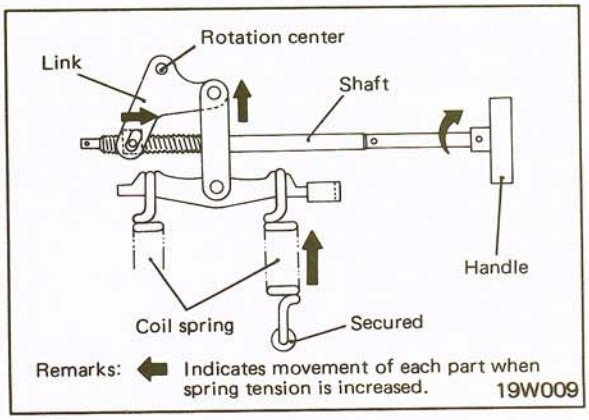
The suspension mechanism is constructed as shown.
The lower and upper brackets of the link are coupled by hinges at one end and by rollers at the other, allowing forward and backward sliding. If a force in the direction of the arrow is exerted to the link (pantograph), the upper bracket is moved downward, so the shock absorbers hinge-coupled to the lower and upper brackets absorb vibration.



19W008

Body Weight Adjusting Mechanism

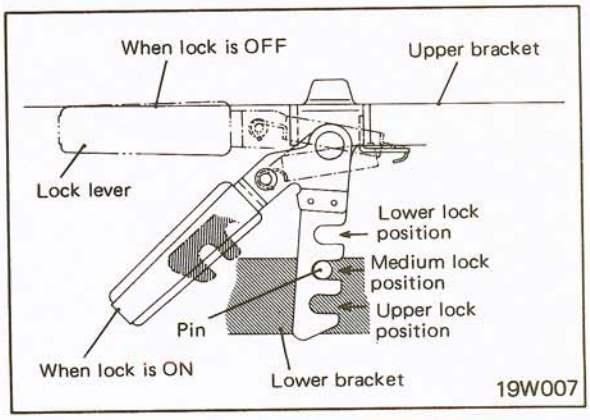
The body weight adjusting mechanism is constructed as shown in the illustration at right. When the handle is turned to match the driver's weight, the coil spring secured to the upper bracket at one end and mounted through a link at the other is displaced in the direction of the arrow by movement of the nut at the end of the shaft of the handle, so the spring tension changes. Clockwise rotation of the handle increases the spring tension, while counterclockwise rotation reduces the spring tension.



19W009

Suspension Lock Mechanism

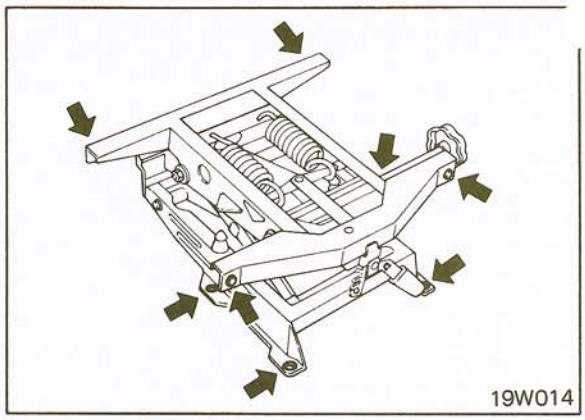
The suspension lock mechanism is constructed as shown in the illustration at right. The seat lock position can be selected in three levels by a lock lever.



19W007

REMOVAL

1. Remove the front seat mounting bolts.
2. Remove the lower bracket mounting bolts.

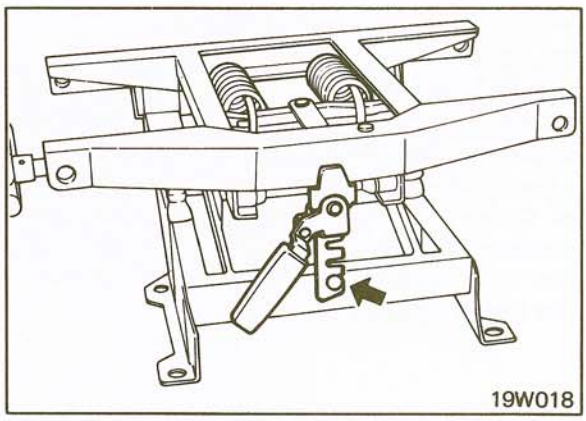


INSPECTION BEFORE DISASSEMBLY

(1) Check springs for damage and deterioration.
(2) Check shock absorber for noise and fluid leaks.
(3) Check all rightened points for looseness.
(4) Check rollers for noise and damage.
(5) Check links for cracks, bending or dents.
(6) Check body weight adjusting handle for bends, damage or looseness.
(7) Check lock lever for bends and damage.
(8) Check damper rubber for cracks and damage.

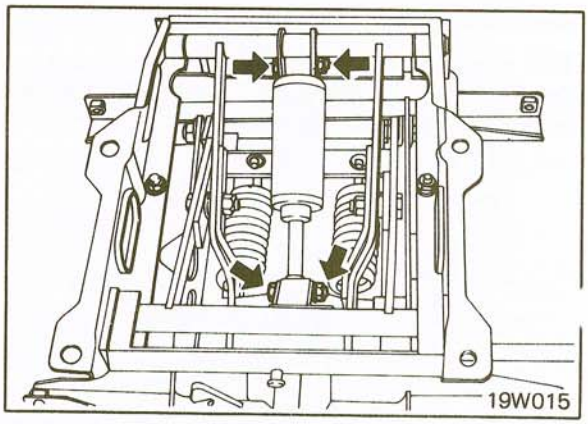
DISASSEMBLY

1. Turn the body weight adjusting handle counterclockwise all the way. (body weight scale reading should be less than 50 kg)
2. Lock the lock lever in the upper level position. (19W018)



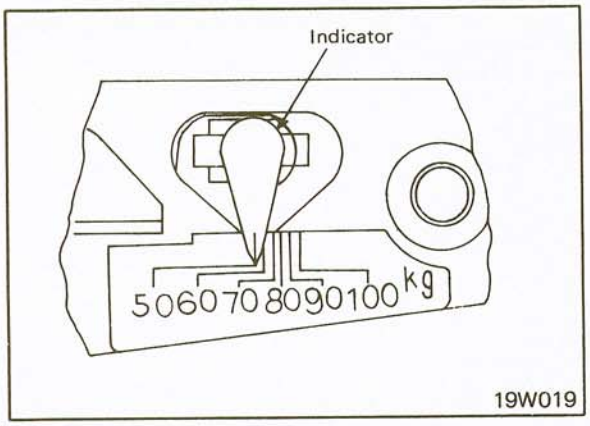
3. Turn the suspension mechanism upside down and remove the shock absorber.

Caution
The shock absorber must not be disassembled.

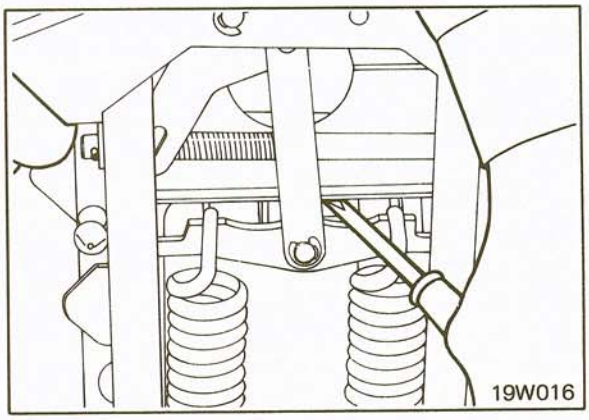


. Place the suspension mechanism on its side.
5. Remove the body weight scale indicator from the link. (19W019)

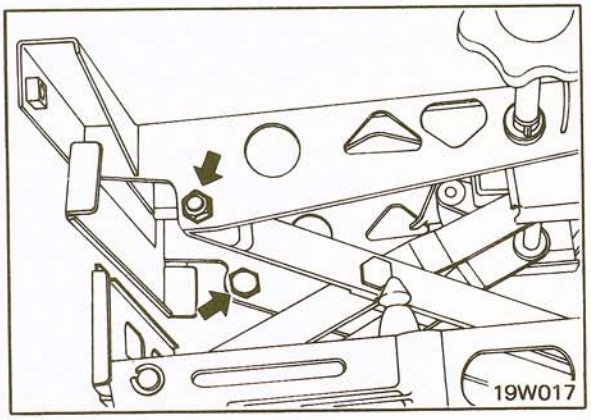
NOTE
Before removing the indicator, make note of its position for use during reassembly.



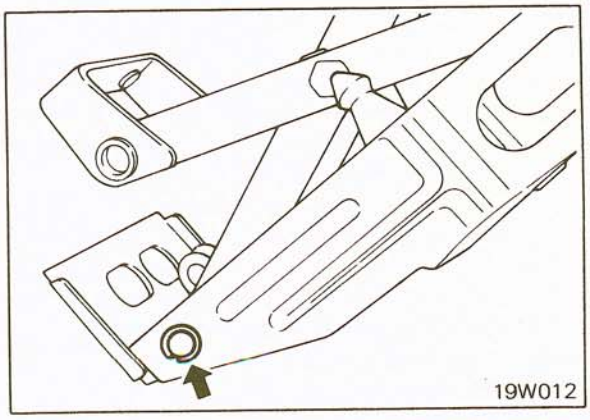
6. Using a screwdriver, remove the link side coil spring.



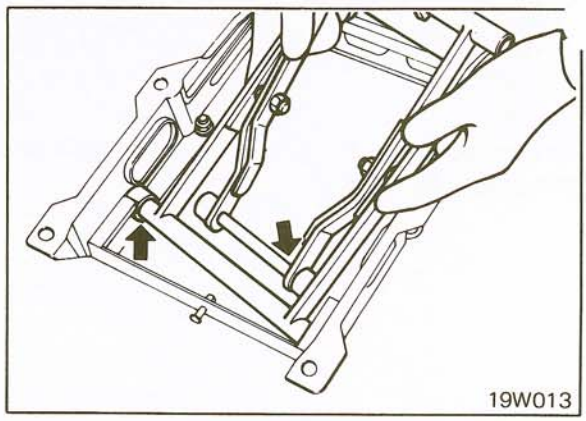
7. Remove the upper bracket side link mounting bolts and nuts.



8. Remove the lower bracket side link mounting snap ring, and then remove the shaft.



9. Remove the link from the lower bracket side, and then remove the roller.



REASSEMBLY

Apply recommended multipurpose grease to all sliding and rotating surfaces.

Recommended grease	Multipurpose grease SAE J310a, NLGI grade #2EP

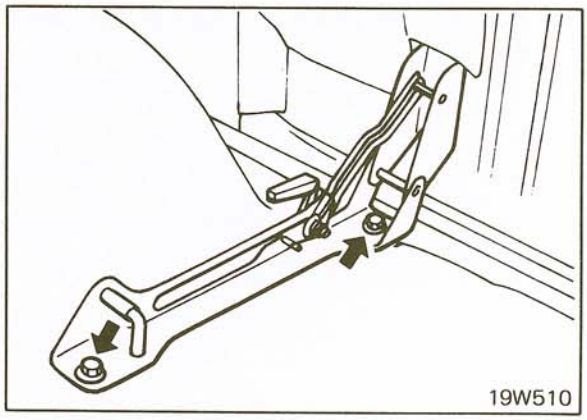
Caution

1. **When installing the shaft, be sure that the serrations are aligned.**
2. **The shock absorber and link mounting nuts are special nuts. Be sure to use new identical ones.**

REAR SEAT

Removal

Fold the seat cushion forward and down, remove the mounting bolts, and then remove the rear seat.

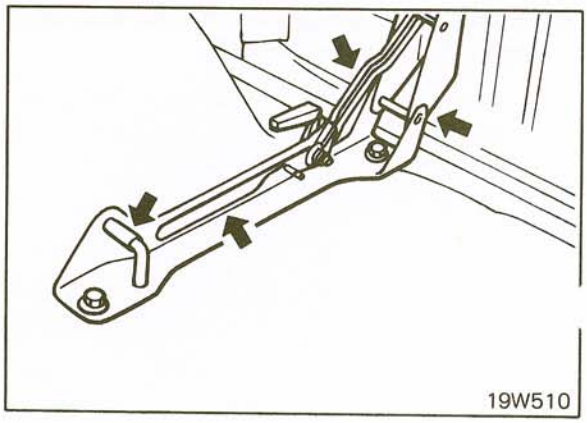


Installation

1. Apply recommended multipurpose grease to the following places. (19W510)

Recommended grease	Multipurpose grease SAE J310a, NLGI grade #2EP

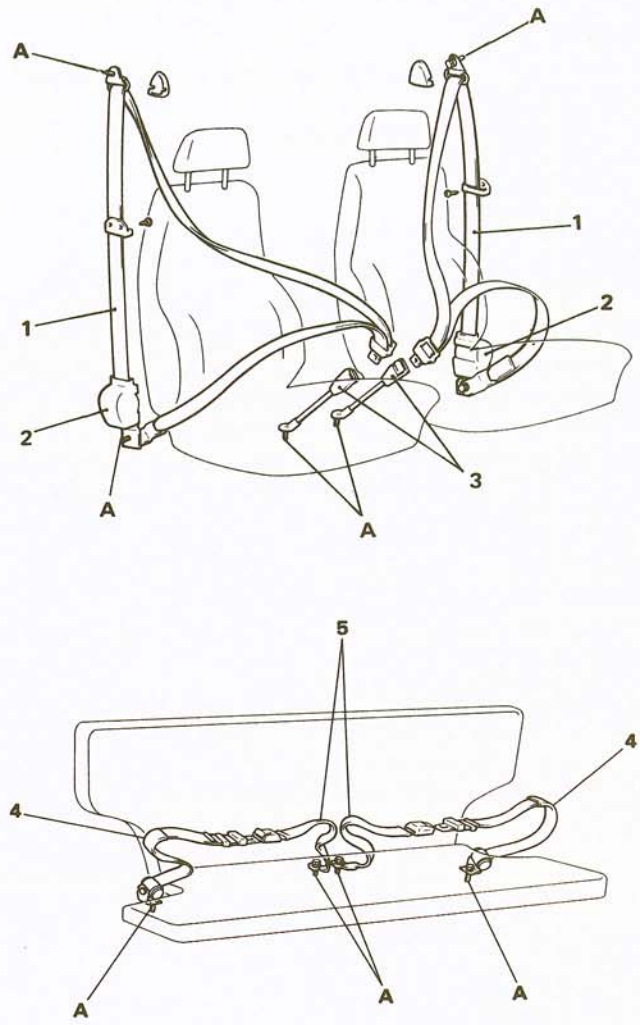
   (1) Sliding part of rear seat stopper
   (2) Contacting part of rear seat stopper striker
2. After the seat has been installed, check to ensure that the lock release, forward-down, folding and return mechanisms all operate smoothly.
3. Check to ensure that when the seat cushion is folded, the seat stoppers lock securely.



COMPONENTS

1. Front seat belt
2. Emergency locking retractor (E.L.R.)
3. Buckle stalk
4. Rear seat belt
5. Rear seat belt, inner

	Nm	ft.lbs.
A	23-65	17-47

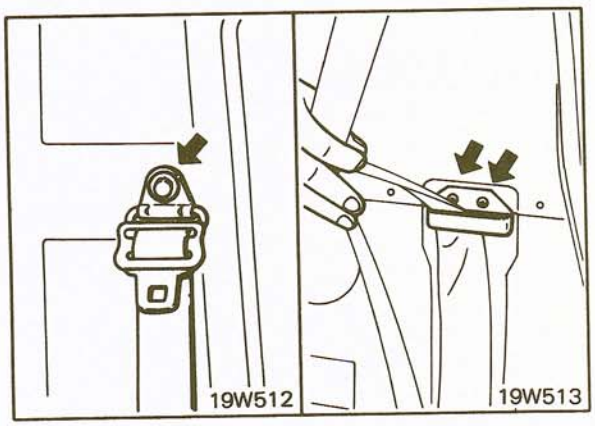


19W041
19W563

FRONT SEAT BELTS

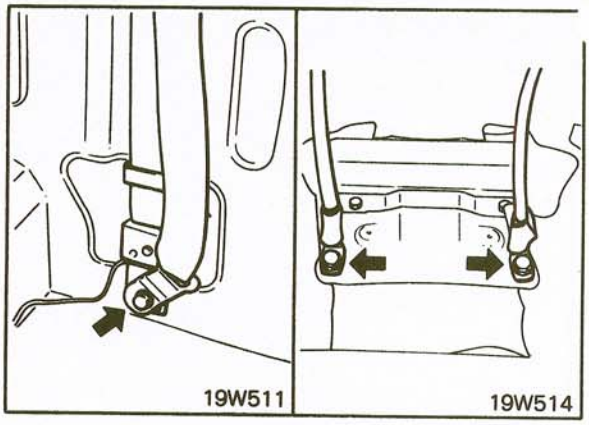
Removal

1. Remove the center pillar trim. (Refer to p. 23-58.)
2. Remove the shoulder anchor plate. (19W512)
3. Remove the screws of the seat belt guide located at the center of the belt. (19W513)



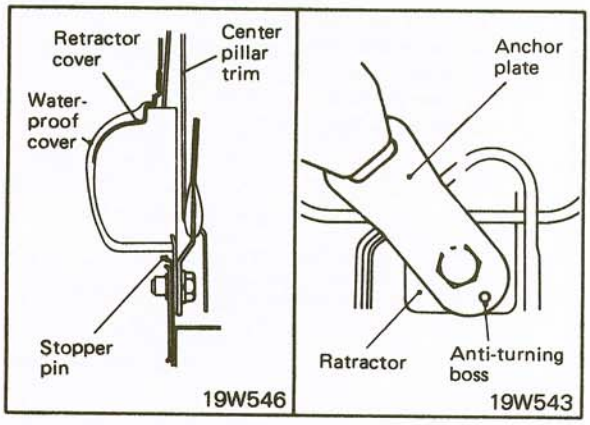
4. Disconnect the solenoid connectors and the seat belt switch connectors from the front harness.
5. Remove the retractor mounting bolts and remove the retractor. (19W511)
6. Remove the buckle stalk. (19W514)

Caution
Special bolts (1-in. bolts) are used for the seat belt mounting bolts.
Do not disassemble the retractor.



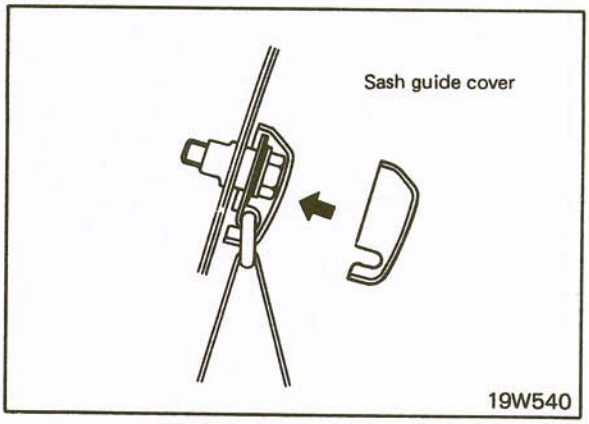
Installation

1. Fit the anti-rotation stopper pin of the webbing into the hole in the side sill. (19W546)
2. Fit the anchor plate anti-turning boss securely into the retractor side hole and jointly tighten the retractor and the anchor plate. (19W543)

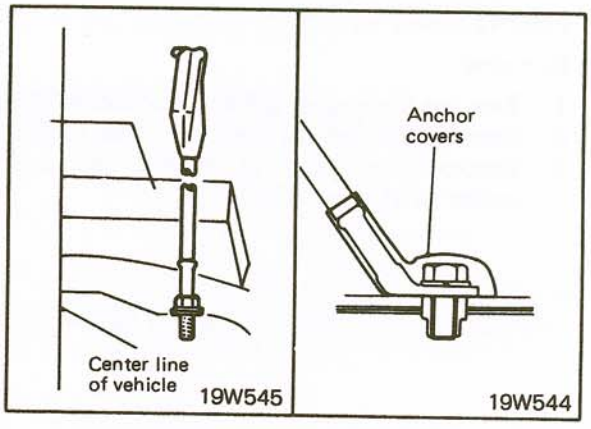


3. Install the shoulder anchor plate.
4. Install the seat belt guide.
5. Install the sash guide cover. (19W540)

NOTE
After installation, check to ensure that the sash guide rotates smoothly.



6. Install the seat belt buckle stalk parallel with the center line of the vehicle.

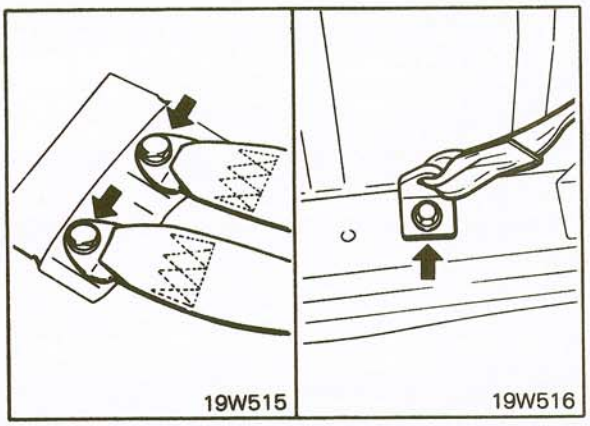


REAR SEAT BELTS

Removal

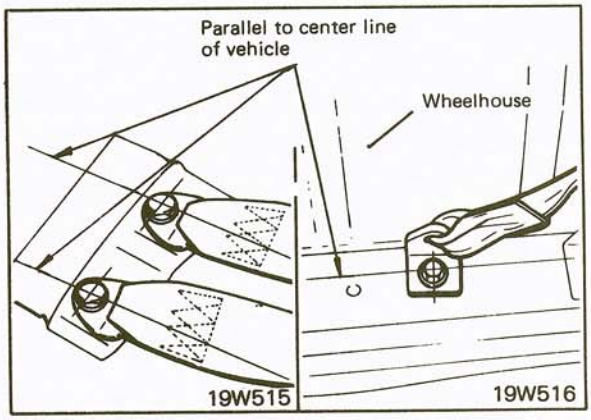
Remove the rear seat belts.

NOTE
Special bolts (1-in. bolts) are used for the seat belt mounting bolts.



Installation

Position the anchor plates at the center of the vehicle so that the belts are parallel to the vehicle center line, and then secure the plates with the bolts. (19W515, 19W516)



HEATERS AND AIR-CONDITIONING

CONTENTS

GENERAL SPECIFICATIONS

Front heater assembly	
Type	Selective recirculating, hot-water type (air-mix type)
Performance	4,884 kW/h (4,200 kcal/h)
Front heater relay	
Exciting coil rated current	0.2 A
Maximum contact current capacity	20 A
Rear heater assembly	
Type	Warm water type
Performance	2,326 kW/h (2,000 kcal/h)
Air conditioner	
Performance	4,070 kW/h (3,500 kcal/h)
Compressor	
Type	6P148
No. of cylinders and displacement	Inclined-plate type; 6,148 cc (9.03 cu.in.)
Maximum speed	6,000 rpm
Electromagnetic clutch	
Type	Dry, single-plate type
Voltage	12 V
Output	40 W
Condenser fan motor	
Air volume	800 m^3/h
Voltage	12 V
Output	96 W
Speed	2,350 rpm
Control	
Idle-up	850 to 950 rpm when cooler is ON
Icing prevention	1.0°C (22°F) when fin thermo is OFF 4.5°C (39°F) when fin thermo is ON
Quantity of refrigerant to be charged	R12 700^{+300}_{-100} g ($1.54^{+0.66}_{-0.22}$ lb.)

SERVICE SPECIFICATIONS

Heater assembly	
Water hose overlap length mm (in.)	25-30 (1.0-1.2)
Air-conditioning	
Drive belt deflection mm (in.)	17-20 (.7-.8)
Pressure plate to rotor clearance mm (in.)	0.4-0.7 (.02-.03)
Shaft rotating torque Nm (ft.lbs.)	5 (4) or less
Shaft starting torque Nm (ft.lbs.)	5 (4) or less

TORQUE SPECIFICATIONS

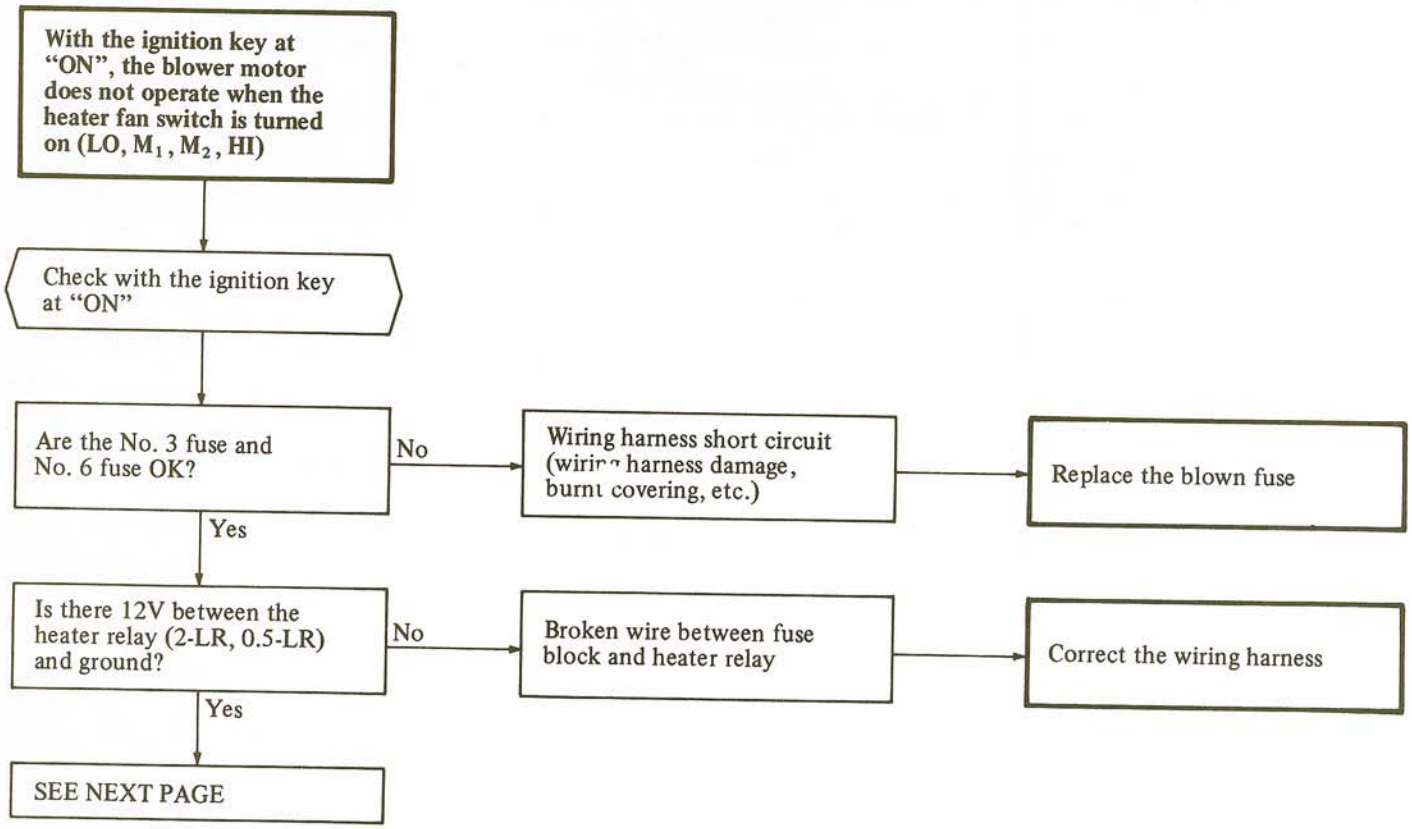
	Nm (ft.lbs.)
Heater assembly	
Water hose clamp bolts	1.3-1.8 (0.9-1.3)
Air conditioner	
Center piece securing nut	15-17 (11-13)
Discharge and suction service valve mounting bolts	25-26 (18-20)
Front housing through bolt	2.5-2.6 (1.8-2.0)

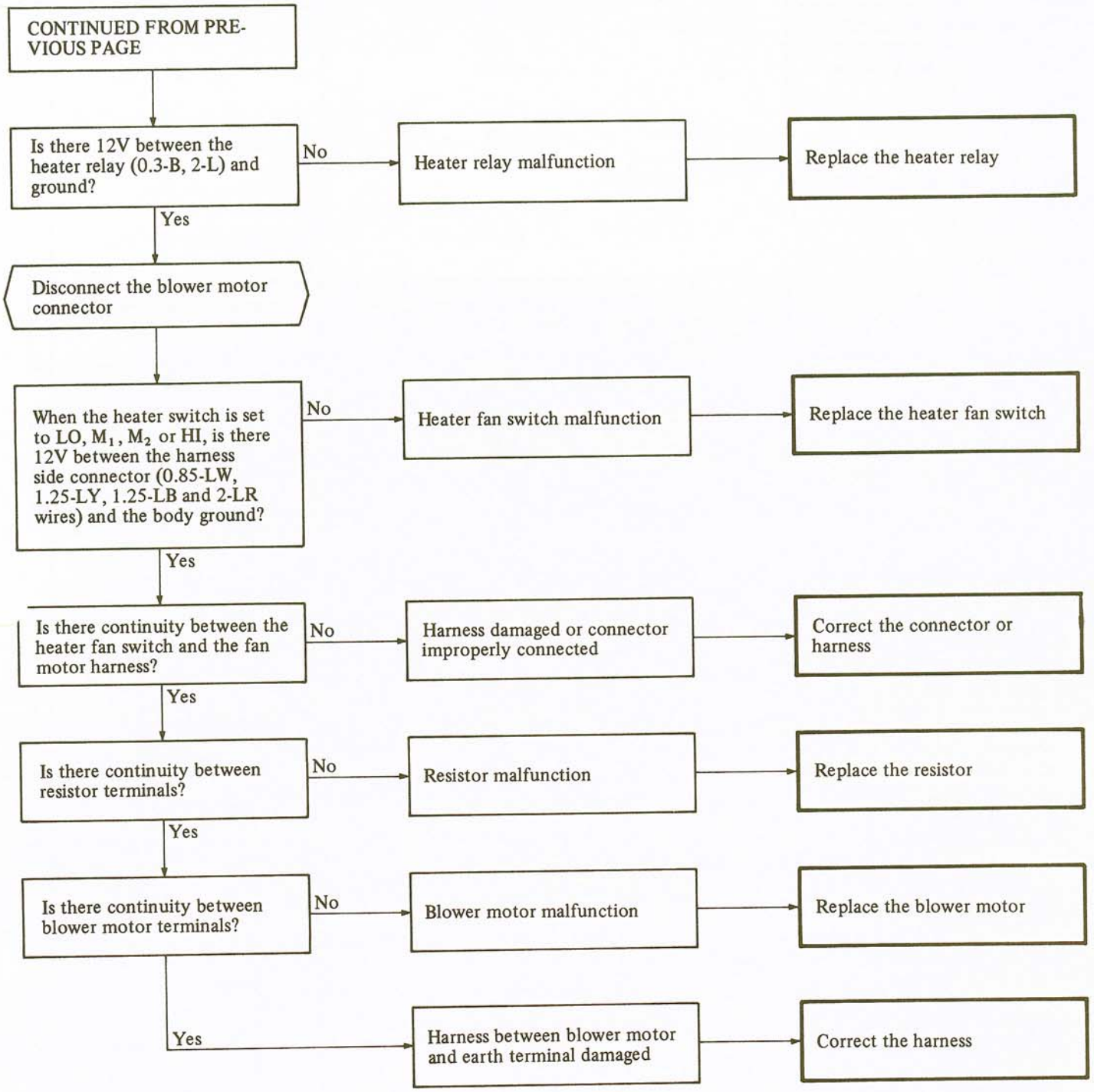
LUBRICANTS

	Specified lubricant	Quantity
Heater assembly		
Heater control lever	Multipurpose grease SAEJ310a, NLGI grade #2	As required
Air conditioner		
Compressor oil	DENSOIL 6 [SUNISO 5GS (VG100)] or equivalent	Total : approx. 170 ± 30 cc (10.37 ± 1.83 cu.in.)

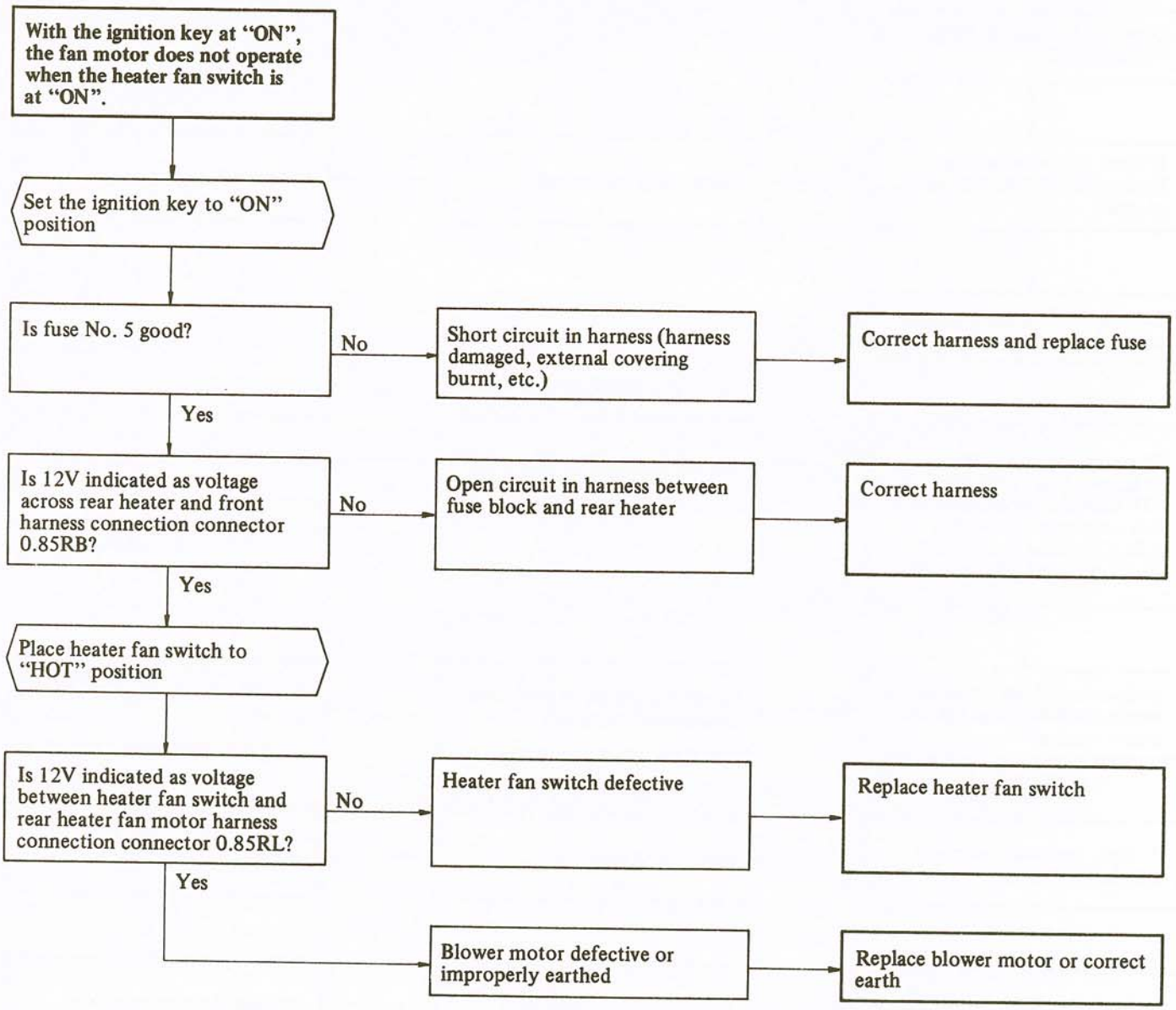
FRONT HEATER

Symptom	Probable cause	Remedy
The temperature cannot be regulated by operating the hot-water flow control lever	Clogged or stuck water valve	Repair or replace the water valve
	Incorrect installation of hot-water flow control cable	Adjust the hot-water flow control cable
	Incorrect adjustment of water valve link	Adjust the water valve link
No ventilation even when air outlet changeover lever is operated	Incorrect adjustment of changeover dampers	Adjust the air outlet changeover cable
	Loose duct connection	Connect the duct securely
Abnormal sound from blower motor	Foreign matter inside blower	Remove foreign matter
	Incorrect balance of blower motor or fan	Replace the blower motor or fan
	Damaged blower	Replace
Dust enters passenger compartment	Ventilator duct connection malfunction	Connect the duct securely or replace the packing
	Incorrect adjustment of recirculation/ fresh air changeover damper	Adjust the recirculation/fresh air changeover cable

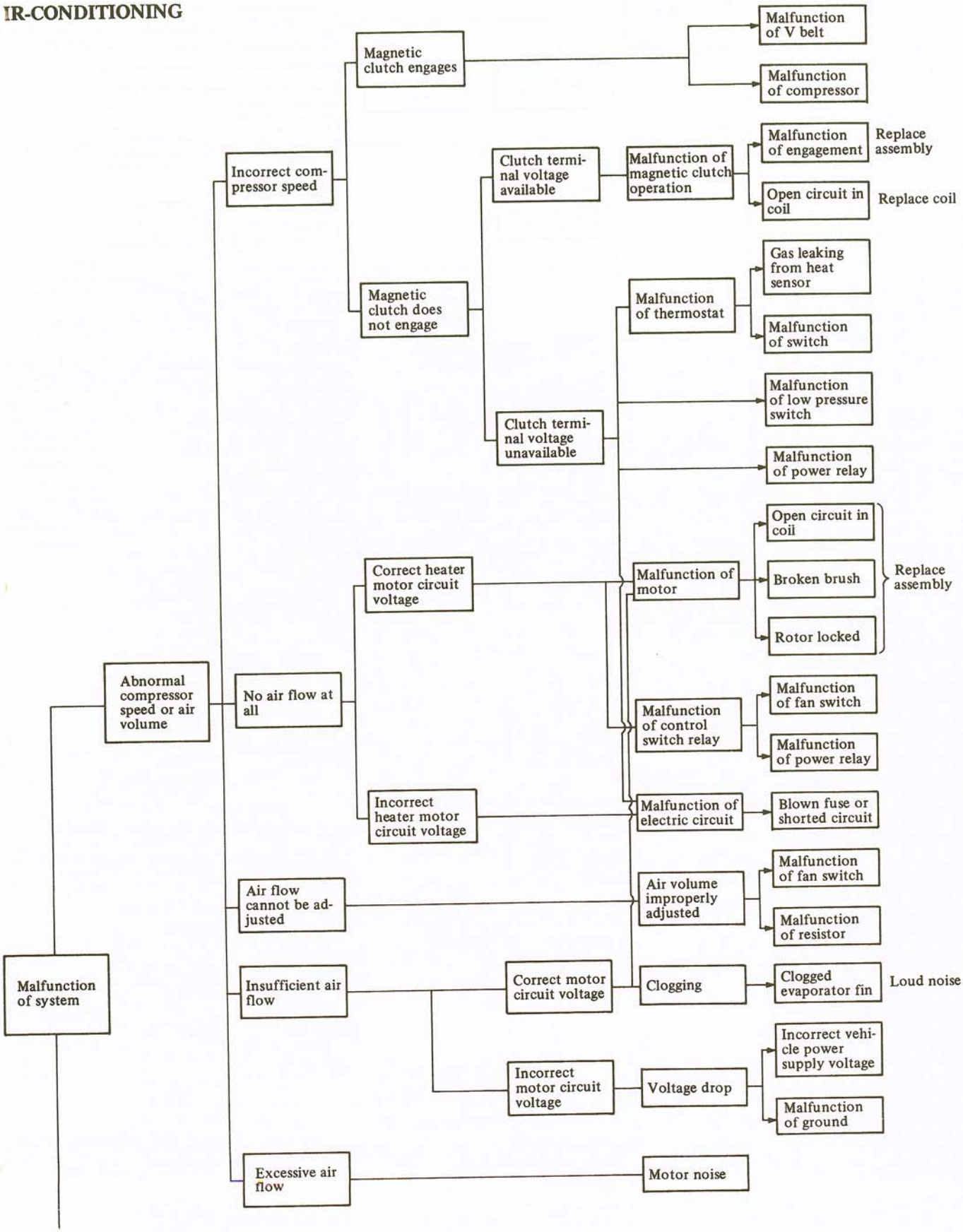


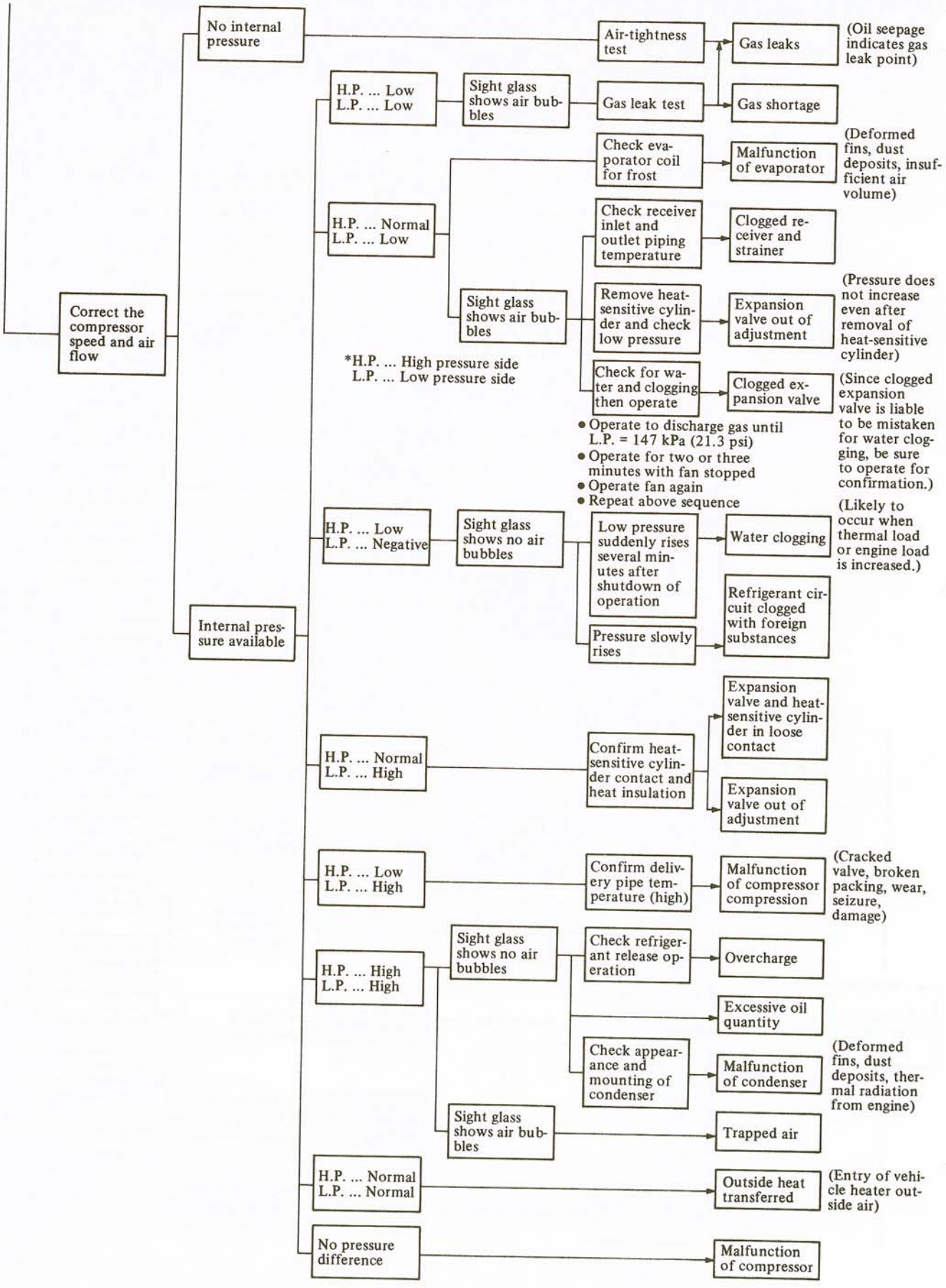

CONTINUED FROM PREVIOUS PAGE
Is there 12V between the heater relay (0.3-B, 2-L) and ground?
No
Heater relay malfunction
Replace the heater relay
Yes
Disconnect the blower motor connector
When the heater switch is set to LO, M1, M2 or HI, is there 12V between the harness side connector (0.85-LW, 1.25-LY, 1.25-LB and 2-LR wires) and the body ground?
No
Heater fan switch malfunction
Replace the heater fan switch
Yes
Is there continuity between the heater fan switch and the fan motor harness?
No
Harness damaged or connector improperly connected
Correct the connector or harness
Yes
Is there continuity between resistor terminals?
No
Resistor malfunction
Replace the resistor
Yes
Is there continuity between blower motor terminals?
No
Blower motor malfunction
Replace the blower motor
Yes
Harness between blower motor and earth terminal damaged
Correct the harness

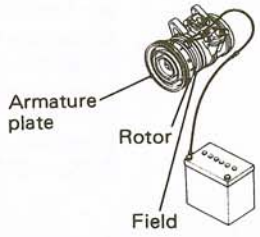
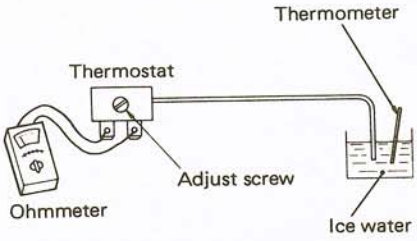
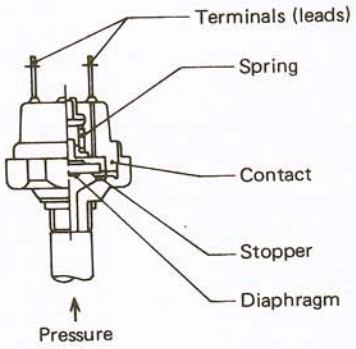
REAR HEATER

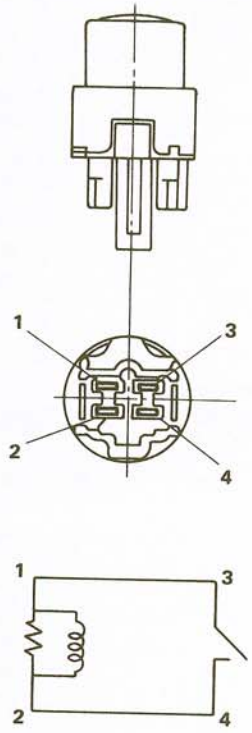
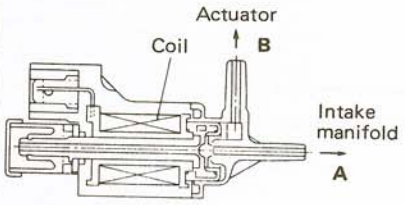

With the ignition key at "ON", the fan motor does not operate when the heater fan switch is at "ON".
Set the ignition key to "ON" position
Is fuse No. 5 good?
No
Short circuit in harness (harness damaged, external covering burnt, etc.)
Correct harness and replace fuse
Yes
Is 12V indicated as voltage across rear heater and front harness connection connector 0.85RB?
No
Open circuit in harness between fuse block and rear heater
Correct harness
Yes
Place heater fan switch to "HOT" position
Is 12V indicated as voltage between heater fan switch and rear heater fan motor harness connection connector 0.85RL?
No
Heater fan switch defective
Replace heater fan switch
Yes
Blower motor defective or improperly earthed
Replace blower motor or correct earth

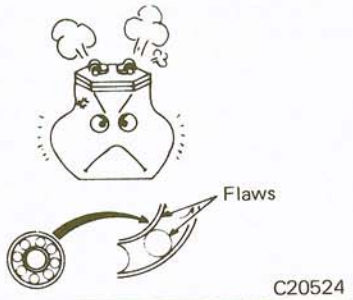
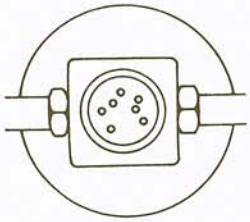
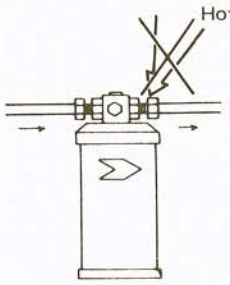
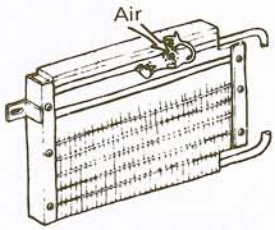
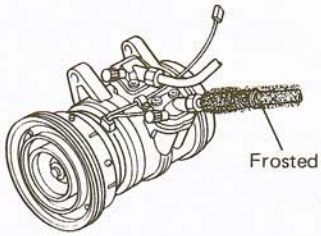
AIR-CONDITIONING

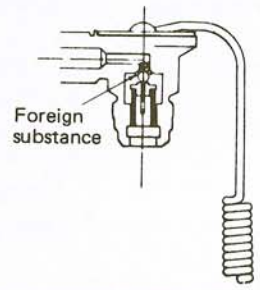
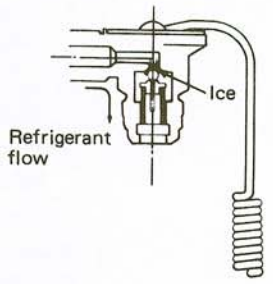
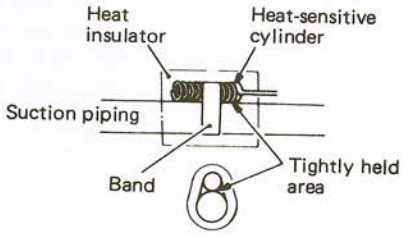
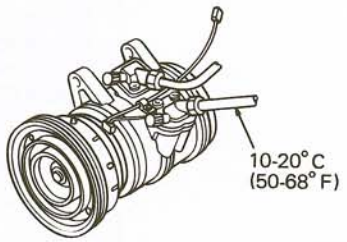
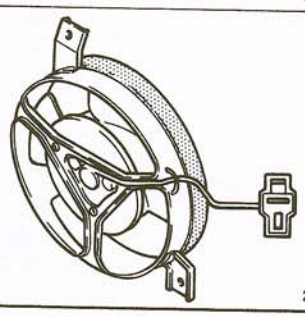



Correct the compressor speed and air flow
No internal pressure
Air-tightness test
Gas leaks
(Oil seepage indicates gas leak point)
Gas shortage
H.P. ... Low
L.P. ... Low
Sight glass shows air bubbles
Gas leak test
H.P. ... Normal
L.P. ... Low
Check evaporator coil for frost
Malfunction of evaporator
(Deformed fins, dust deposits, insufficient air volume)
Check receiver inlet and outlet piping temperature
Clogged receiver and strainer
Sight glass shows air bubbles
Remove heat-sensitive cylinder and check low pressure
Expansion valve out of adjustment
(Pressure does not increase even after removal of heat-sensitive cylinder)
*H.P. ... High pressure side
L.P. ... Low pressure side
Check for water and clogging then operate
Clogged expansion valve
(Since clogged expansion valve is liable to be mistaken for water clogging, be sure to operate for confirmation.)
• Operate to discharge gas until L.P. = 147 kPa (21.3 psi)
• Operate for two or three minutes with fan stopped
• Operate fan again
• Repeat above sequence
Internal pressure available
H.P. ... Low
L.P. ... Negative
Sight glass shows no air bubbles
Low pressure suddenly rises several minutes after shutdown of operation
Water clogging
(Likely to occur when thermal load or engine load is increased.)
Pressure slowly rises
Refrigerant circuit clogged with foreign substances
H.P. ... Normal
L.P. ... High
Confirm heat-sensitive cylinder contact and heat insulation
Expansion valve and heat-sensitive cylinder in loose contact
Expansion valve out of adjustment
H.P. ... Low
L.P. ... High
Confirm delivery pipe temperature (high)
Malfunction of compressor compression
(Cracked valve, broken packing, wear, seizure, damage)
H.P. ... High
L.P. ... High
Sight glass shows no air bubbles
Check refrigerant release operation
Overcharge
Excessive oil quantity
Check appearance and mounting of condenser
Malfunction of condenser
(Deformed fins, dust deposits, thermal radiation from engine)
Sight glass shows air bubbles
Trapped air
H.P. ... Normal
L.P. ... Normal
Outside heat transferred
(Entry of vehicle heater outside air)
No pressure difference
Malfunction of compressor

Probable cause	Diagnosis and correction	Remarks
Malfunction of magnetic clutch	[Diagnostic procedure] 1. Connect the lead to the (+) terminal of the battery to see if the clutch engages with a click. 2. Check for continuity between the lead and ground. (Check for open circuit in the coil.) 3. Check for noise during operation. (Check for malfunction of bearing and for slipping.) [Correction] 1. If there is an open circuit in the coil, replace the clutch. 2. If the bearing makes noise, replace it. 3. If slipping is evident, replace the clutch.	 20Y901
Fin thermostat	[Diagnostic procedure] 1. Immerse the heat-sensitive portion of the thermostat in ice water as shown. Check to ensure that when the temperature is lowered to 1.6°C (35°F), there is no continuity (OFF). If the thermostat is not OFF, it has a problem. 2. Gradually add lukewarm water into the water tank until the thermometer registers 4.6°C (40.28°F), and check to ensure that there is continuity (ON). If the thermostat is not ON, it has a problem. [Correction] 1. If there is anything wrong, slightly turn the adjust screw (clockwise for lower temperature setting and vice versa) and check by performing the above steps 1. and 2. 2. If this does not correct the problem, replace.	 20Y902
Low pressure switch	[Diagnostic procedure] 1. When the air conditioner is stationary, connect the gauge manifold to the service valve of the compressor. If there is a pressure of over 2.1 kg/cm²G (30 lb/in²G) in the system, connect an ohmmeter between terminals (leads) to verify that there is continuity (ON). OFF indicates a problem. 2. If the pressure in the system is lower than 2.1 kg/cm²G (30 lb/in²G), check to ensure that there is no continuity between terminals (leads) (OFF). ON indicates a problem. 3. If there is no continuity (OFF) in the above step (2), add refrigerant through the gauge manifold and check to ensure that when the pressure of the high pressure side rises to 2.35 kg/cm²G (33.5 lb/in²G), the switch becomes ON. If it does not become ON, there is a problem. [Correction] If there is a problem, replace.	 20Y903

Probable cause	Diagnosis and correction	Remarks
Power relay	[Diagnostic procedure] If there is continuity (ON) between the terminals (1) and (2) when a voltage is applied between the terminals (3) and (4), and if there is no continuity (OFF) when no voltage is applied across the terminals (3) and (4), the power relay is good. Otherwise the power relay is defective. [Correction] Replace if defective.	 20W703
Idle-up device solenoid valve	Checking Method 1. Confirm that the vacuum hoses are not damaged, and that they are connected properly. 2. Connect a voltage of 12V to the lead wire of the solenoid valve. (Connect it directly to the battery.) There should be a clear passage between (A) and (B). (Blow through the valve to check it.) Correction If the solenoid valve is malfunctioning, replace it with a new one.	 20K543
Malfunction of cooling performance	If the refrigerant level is low, the compressor oil can also be assumed to be low. Remove the compressor from the vehicle, check the amount of oil output from the compressor, and then replenish the oil so that there is approximately 90 cc. (5.5 cu. in.) If the cooling effectiveness is low even though the refrigerant level is correct, it is probably due to an excessive amount of compressor oil. Remove the compressor from the vehicle, check the amount of oil output from the compressor, and drain out enough oil so that there is approximately 90 cc. (5.5 cu. in.)	Check the refrigerant level visually in the sight glass at least once every three months.

Probable cause	Diagnosis and correction	Remarks
Malfunction of compressor	[Diagnostic procedure] 1. Check to see if the pulley can be turned by hand. (Check for seizure.) 2. Operation causes low pressure to increase and main body temperature to rise. (Broken packing, cracked valve) [Correction] Correct any malfunctions by replacing parts.	 C20524
Refrigerant leaks	[Diagnostic procedure] 1. Check superheated temperature of the compressor suction piping. If the superheated temperature is 10 to 20°C (50° to 68°F), the piping is good. If the temperature is lower, there is a malfunction of the piping. 2. If the sight glass shows air bubbles, the refrigerant is leaking. [Correction] Check to discover leaking points. Correct or recharge.	 C20525
Clogged strainer (receiver)	[Diagnostic procedure] If the temperature difference between the strainer intake and outlet pipes is more than 5°C (9°F), there is a malfunction of the strainer in the receiver. [Correction] Replace.	 C20526
Air in refrigerant circuit	[Diagnostic procedure] High pressure increases more than 98 kPa (14.2 psi) over saturation pressure which corresponds to the temperature of the refrigerant outlet piping of the condenser. [Correction] Evacuate the circuit and recharge refrigerant.	 C20527
Refrigerant overcharged	[Diagnostic procedure] 1. Both high and low pressures are high. 2. Compressor suction piping is frosted. [Correction] Remove refrigerant through the check valve. As a guide, make certain that the suction pipe superheating temperature just prior to appearance of air bubbles in the sight glass is 10 to 20°C (50 to 68°F).	 20Y905

Probable cause	Diagnosis and correction	Remarks
Clogging with foreign substance	[Diagnostic procedure] 1. High pressure increases and low pressure falls, and there is no cooling. 2. Clogging is not automatically corrected during shutdown. 3. Clogging usually occurs in the expansion valve. [Correction] Remove clogged parts and replace them.	 C20529
Clogging with water	[Diagnostic procedure] 1. Symptoms similar to clogging with a foreign substance appear. 2. The trouble is corrected after more than 30 minutes of shutdown, but it occurs again after resumption of operation. [Correction] Replace the receiver drier two or three times. (A new receiver allows operation for at least three hours.) The drier can be dehydrated by letting hot dry air pass through.	 C20530
Expansion valve heat-sensitive cylinder	[Diagnostic procedure] 1. Low pressure is high, although the interior is cool. 2. The suction piping is frosted. [Correction] Check and correct.	 C20531
Expansion valve out of adjustment	[Diagnostic procedure] 1. Check to see that the superheating temperature of the compressor suction piping is 10 to 20°C (50 to 68°F). 2. Removal of the heat-sensitive cylinder does not cause low pressure to increase. [Correction] Replace.	 20Y906
Condenser fan motor	[Diagnostic procedure] 1. Apply 12V battery voltage to the 2-p connector of the fan motor. 2. Confirm the smooth rotation of the motor within the specified current. Standard current: 8.0 ± 0.8 A [Correction] Replace if defective.	 20W728

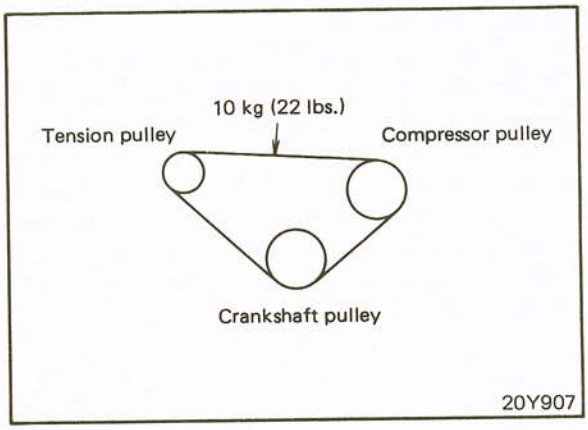
ECK AND ADJUSTMENT

After installation, check the following points and confirm that everything is in order, and then charge the gas, adjust the idle, make the adjustment, and carry out the performance and operation tests.

1. Check for any abnormal vehicle performance which might have been caused by installation of the A/C equipment.
2. Check operation of the magnetic clutch (without running the compressor).
3. Check for any parts left unmounted or any tools left behind in the vehicle.
4. Check the belt deflection. (20Y907)

Drive belt deflection	17-20 mm (.7-.8 in.) at 10 Nm (22 lbs.) of force

5. Readjust the belt deflection after two or three weeks to eliminate initial stretch of new belt.



AIR-TIGHTNESS TEST

After all piping work has been completed, conduct an air tightness test by the following procedure to check for leaks through the flare connections, etc., and then evacuate the system. If this air-tightness test is omitted and evacuation is immediately started, there is no way of detecting possible leaks. If there are leaks, the specified vacuum cannot be attained unless the test is made at the beginning. In order to avoid wasting time, therefore, be sure to conduct the air-tightness test before evacuation.

Air-Tightness Test Procedure

Correct gauge manifold to compressor check valve.
(Do not mix up the high-pressure and low-pressure sides.)

H.P. valve (closed) — L.P. valve (closed)

Attach service can to charge hose.

H.P. valve (open) — L.P. valve (open)

Charge refrigerant [196 kPa (28.4 psi) of gaseous refrigerant from the service can held in vertical position].

H.P. valve (closed) — L.P. valve (closed)

Replace service can with nitrogen cylinder.

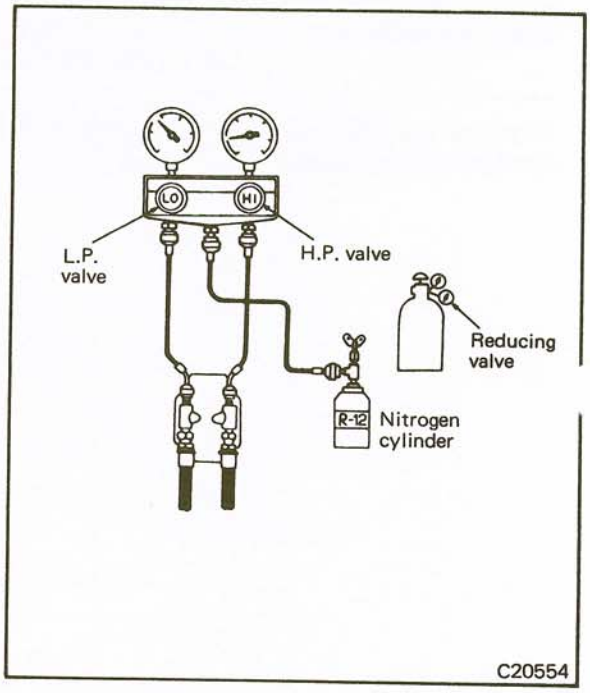
Charge nitrogen gas [883 kPa (127.8 psi)].

H.P. valve (open) — L.P. valve (open)

Let sit. (Check to be sure that the gauge reading does not change.)

Air-tightness test*

Discharge gas inside the system (slowly, from low-pressure side).



Gauge manifold
L.P. valve (open)

Reducing valve (open)

Set nitrogen gas to 883 kPa (127.8 psi) with the reducing valve.

*Air-tightness test method

Apply an aqueous solution of nekal to each flared joint to check for leakage. If there is leakage, a small gas bubble will form.

NOTE

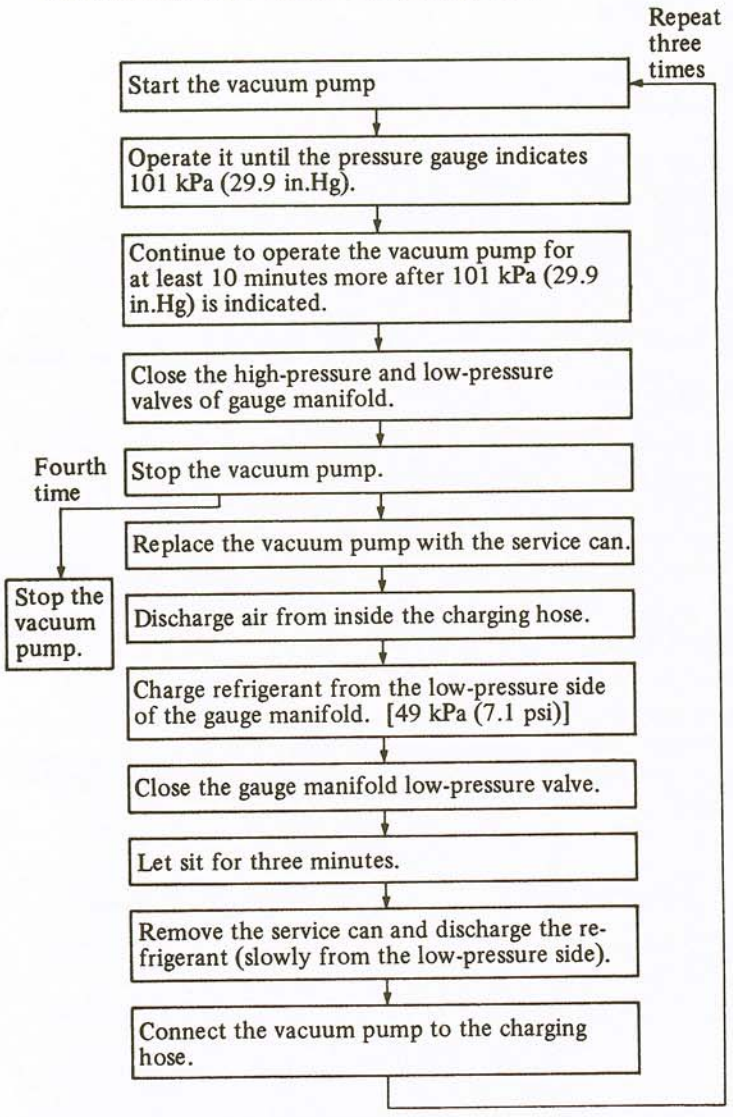
The aqueous solution of nekal is a kind of foaming solution specially designed for detection of gas leakage.

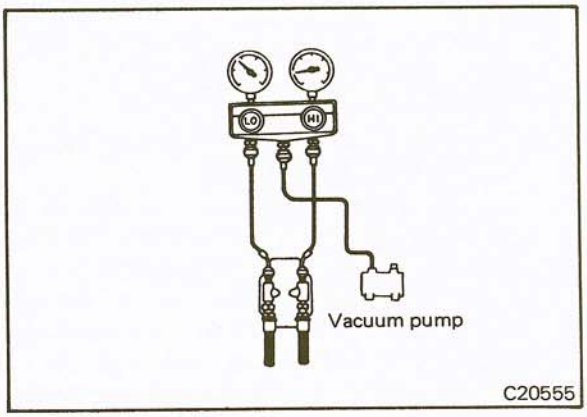
VACUATION

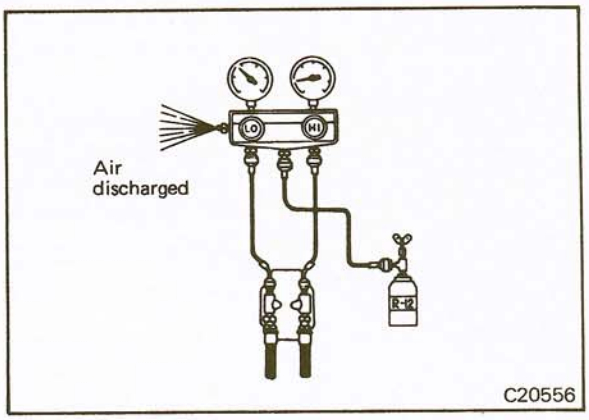
After the air-tightness test, evacuate the system as a preliminary step before charging the refrigerant in the system. With regard to the air-conditioner, the most important point to note is existence of non-condensing gas or water in the system. Since the refrigerant R12 is very insoluble in water, even a small amount of moisture left in the system will freeze, causing what is called "water clogging".

Evacuation Procedure

1. Check to ensure that there is no internal pressure in the system. If there is internal pressure, it should be relieved through the check valve.
2. Connect the charging hoses of the gauge manifold to the intake and outlet check valves of the compressor.
3. Connect a vacuum pump to the charging hose. Carry out the evacuation in the following sequence.







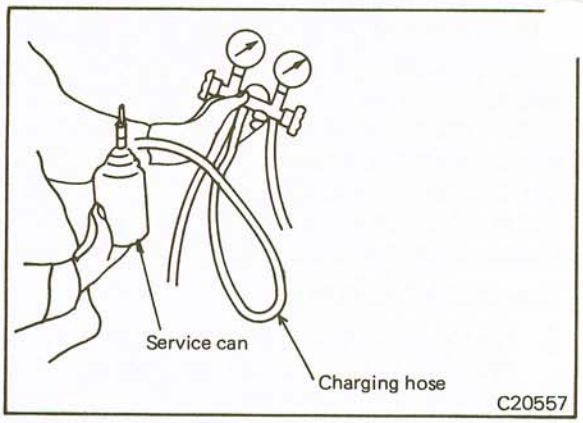
Notes
1. Do not use the refrigerant pressure to expel air.
2. Do not use the compressor for evacuation.
3. Do not operate the compressor in the vacuum condition; shaft seal leaks could occur.

GAS CHARGE

Charge gas immediately after evacuation.

Charging from Service Can

1. Connect the service can to the charging hose. (C20557)
2. Slightly loosen the flare nut at the gauge manifold to remove air (from inside the charging hose) with the refrigerant, and tighten the flare nut immediately after the removing air.
3. Hold the service can upright and loosen the low-pressure valve of the gauge manifold so that the gaseous refrigerant is drawn into the system.
4. When drawing of the gaseous refrigerant stops, start the engine and keep it running at approx. 1,100 rpm in order to charge the refrigerant into the system.
5. Touch the bottom of the service can. If it is no longer cool, it is empty; replace it with a new one.
6. When replacing the service can, close the low-pressure valve of the gauge manifold.
7. After a new service can has been connected, repeat steps 1 through 5 until the specified amount of refrigerant is charged.
8. After the specified amount of refrigerant has been charged, close the low-pressure valve of the gauge manifold and check the condition while observing the pressure gauge.
9. Close the service can valve and remove the gauge manifold.



Caution

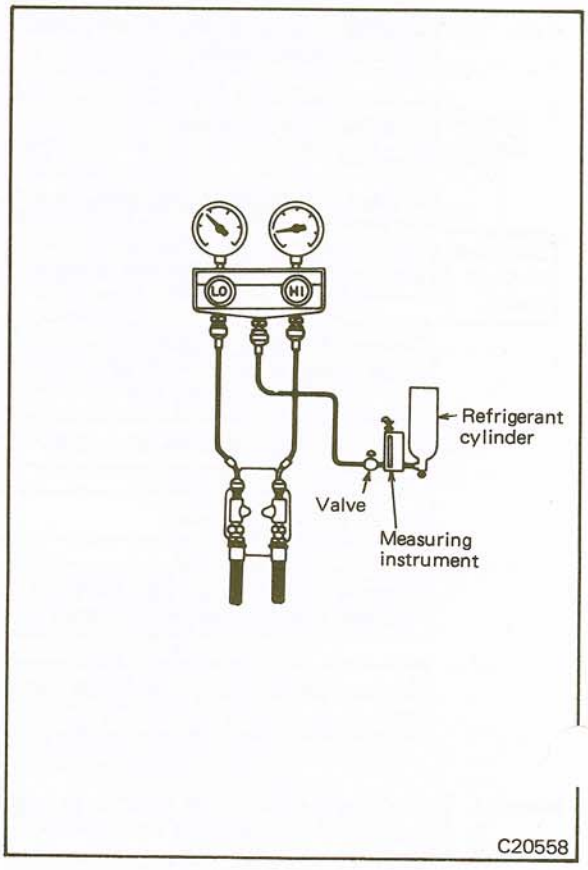
The service cans should always be kept below 40° C (104° F).

Charging from Refrigerant Cylinder

1. Connect the refrigerant cylinder and measuring instrument as shown. (C20558)
2. Let the specified amount of refrigerant flow into the measuring instrument, and check the indication.
3. Connect the measuring instrument to the charging hose.
4. Slightly loosen the flare nut at the gauge manifold to remove air (from inside the charging hose) with the gaseous refrigerant, and tighten the flare nut immediately after removing the air. Loosen the valve of the measuring instrument and charge the gaseous refrigerant in accordance with the procedures described in step 3 and subsequent steps of "Charging from Service Can".

Cautions

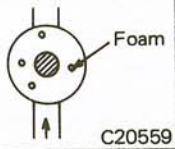
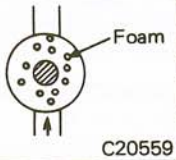
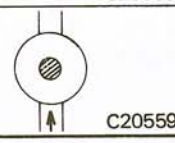
1. **If the high-pressure gauge registers more than 1,471 kPa (213 psi), such as on a hot summer day, stop charging for a while and allow the pressure to fall by spraying water on the compressor before charging is resumed.**
2. **Never overcharge the system.**



hecking the Refrigerant Level

When charging the refrigerant, use a measuring instrument for measuring. Use of a sight glass for checking and judging the proper refrigerant level requires considerable experience and proficiency. The charging procedure is as follows:

1. Operate the engine at approx. 1,100 rpm.
2. Adjust the high pressure to 1,177 to 1,373 kPa (170 to 200 psi).
3. Adjust the cooler intake temperature to 25°C (77°F) or higher.
4. Adjust for maximum cooling unit air output (HI).
5. Check the sight glass according to the following table.

Sight glass condition		Remarks
Proper refrigerant level	 C20559	1. Foam occasionally appears. 2. Foam disappears if speed is slightly increased.
Insufficient refrigerant	 C20559	Considerable foam appears. If the system is extremely short of refrigerant, the sight glass appears clear.
Excessive refrigerant	 C20559	1. No foam appears. 2. Slight foam appears if speed is decreased.

Cautions

1. **To check with the sight glass, start and stop the engine a few times.**
2. **When charging refrigerant at a low atmospheric temperature, such as in winter, foam may disappear before the specified level is reached. If so, cover the front of the condenser to increase the pressure to the specified level. The temperature of the passenger compartment should also be increased.**
3. **When charging at a very high atmospheric temperature, place the vehicle in a cool, well-ventilated area, and keep doors of the vehicle open. (Under such circumstances the system tends to be overcharged with refrigerant because of slower foam disappearance.)**

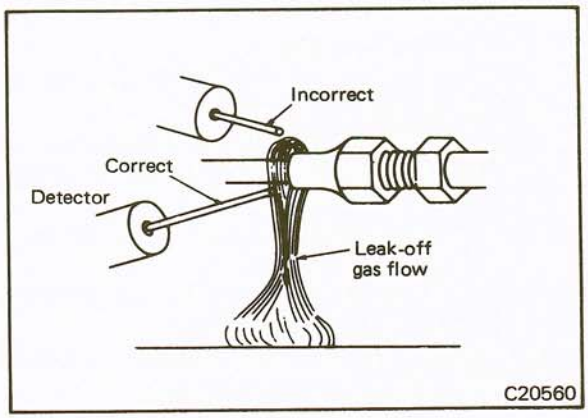
GAS LEAK TEST

Test Points

1. All flare joints of connection piping.
2. Shaft seal and check valve mountings on compressor and shaft.
3. Soldered piping joints of expansion valve and other parts.

Test Procedure

1. For gas leak test, the use of an electronic gas leak detector is recommended.
2. Perform the test in a windless area indoor, or under similar conditions.
3. Refrigerant is heavier than air. Leaks will be concentrated at the bottom of connections. Make certain that the tester tube is applied below the test point.
4. The test should be performed patiently. Make certain that the testing tube is moved slowly [approx. 10 mm/sec. (.4 in./sec.)].
5. The high-pressure side refrigerant circuit should be tested for gas leaks during operation. Those areas which are dangerous or hard to test during operation (including areas around the compressor and condenser) should be tested immediately after shutdown.
6. The low-pressure side refrigerant circuit should be tested during shutdown after the gas pressure has balanced.
7. The test should be performed on the basis of the following standards.



C20560

Gas Leak Test Standards

Test point / Instrument	Compressor shaft seal	Other parts
Electric gas leak detector	Pointer should not swing more than 0.1 mA at low sensitivity.	Pointer should not swing more than 0.1 mA at high sensitivity.

Caution
Smoking should be prohibited during gas leak detection.

PERFORMANCE TEST

Preparations

Reinstall all vehicle parts that were removed for installation of the air conditioner to their original positions, and adjust and test the following items.

1. Installation of grommets
   Install the specified grommets and seal off piping holes with sealant.
2. Heat insulation of piping in passenger compartment
   After the gas leak test, heat-insulate the cooling unit low-pressure pipe joint with a tacking sheet to prevent moisture condensed on the piping.
3. Adjustment of engine idle

Stationary Performance Test

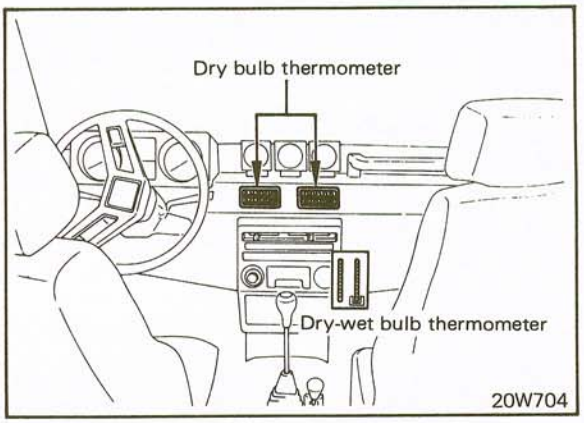
1. Operating conditions
   (1) Place the vehicle in the shade with all windows and doors open.
   (2) Keep the air conditioner intake air temperature between 25 to 30°C (77 to 86°F). (Adjust by opening and closing the doors.)
   (3) Set the air flow control knob to the maximum (HI) position.
   (4) Turn the knob of the thermo switch to the coldest position (fully clockwise).
   (5) Set the engine speed to approx. 2,000 rpm [top speed at 40 km/h (25 miles/h).]

Test procedure

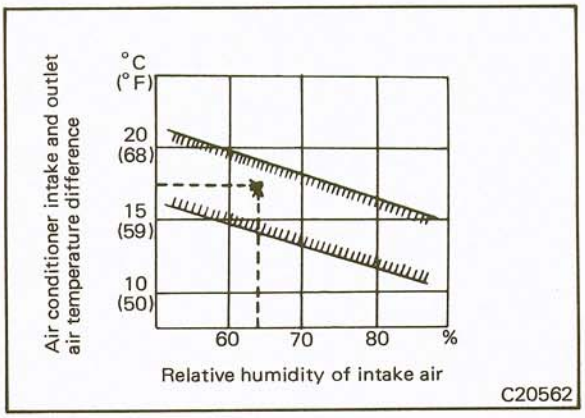
Operate the air conditioner for more than 10 minutes in the above operating conditions in order to stabilize high and low pressures. Then perform the test by the following procedure:

(1) Measure the outlet air temperature at the frame of the outlet grille.

(2) Measure the air conditioner intake air temperature, humidity, etc., and the items shown in the Table of Measuring Items at a position free from the effects of cool outlet air.

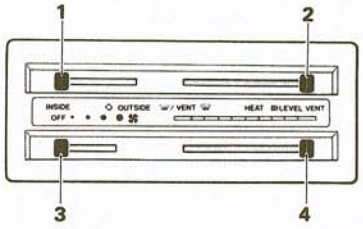


(3) The point at which the difference between the intake and outlet air temperatures intersects the relative humidity of the intake air should be within the shaded range in the illustration. (C20562)

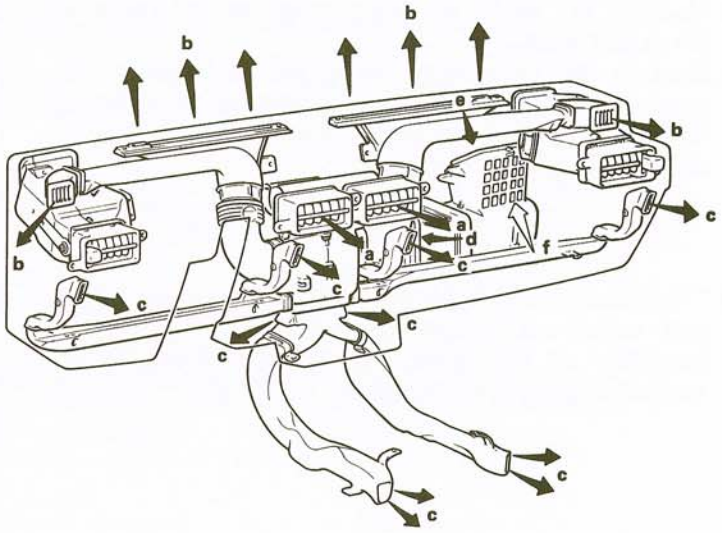


OPERATION

1. Recirculation/fresh air changeover lever
2. Air outlet changeover lever
3. Heater fan switch
4. Hot-water flow control lever



70W520

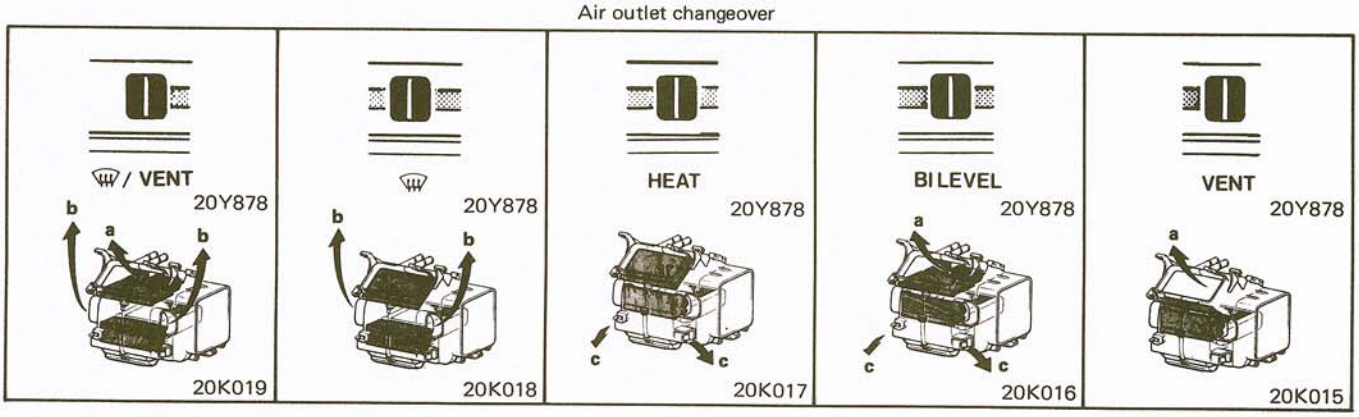


Fresh air

Recirculating air

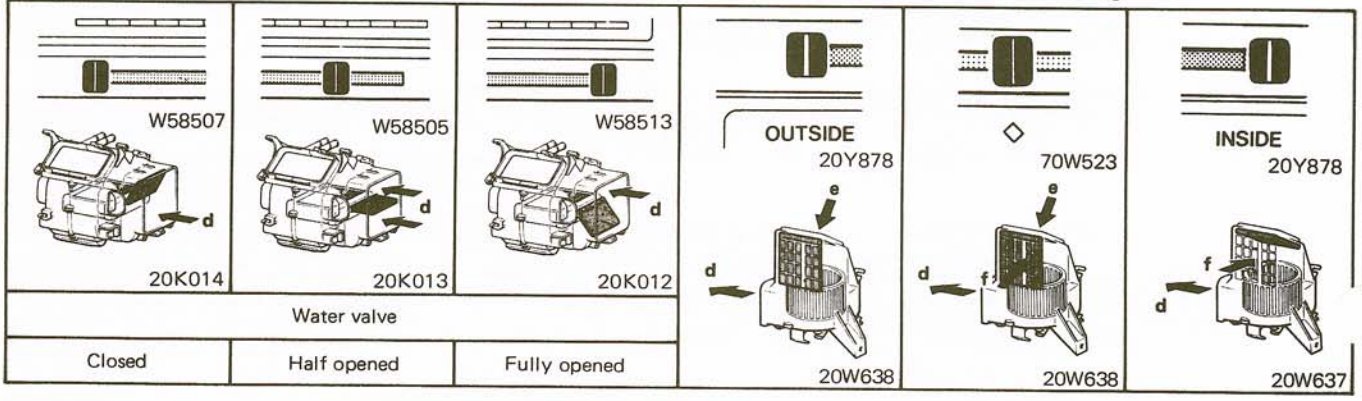
20W64

Air outlet changeover



Hot-water flow control (linked to damper)

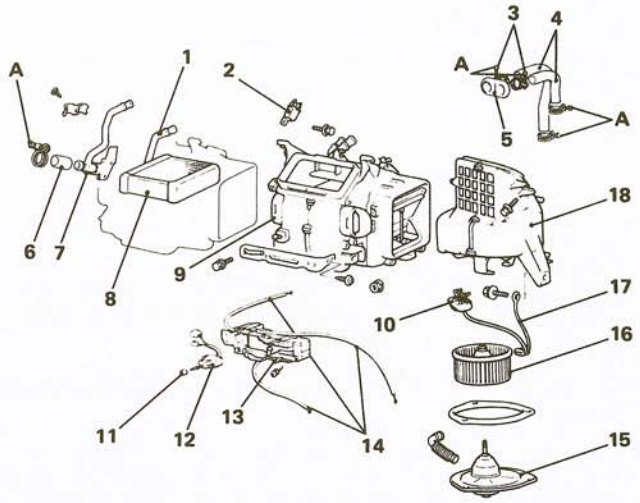
Recirculation/fresh air changeover



Water valve		
Closed	Half opened	Fully opened

COMPONENTS

1. Heater pipe
2. Heater relay
3. Clamp
4. Water hose
5. Grommet
6. Hose
7. Water valve
8. Heater core
9. Heater case
10. Resistor
11. Heater fan switch knob
12. Heater fan switch
13. Heater control lever
14. Heater control cable
15. Blower motor
16. Fan
17. Blower motor harness
18. Blower case

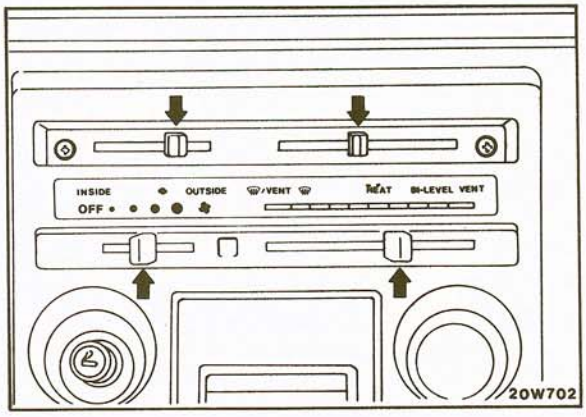


	Nm	ft.lbs.
A	1.3-1.8	.9-1.3

20W672

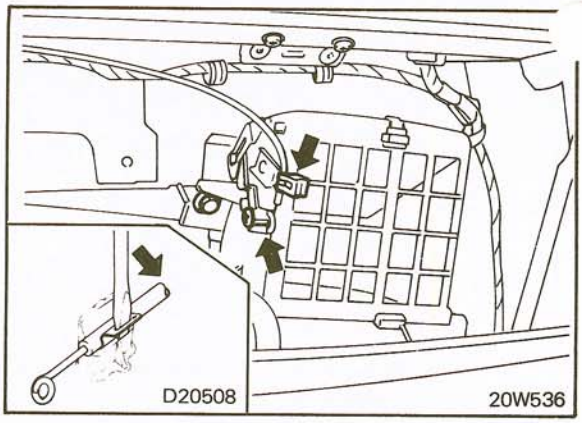
REMOVAL

1. Remove the heater control knob and heater fan switch knob. (20W702)
2. Remove the center console. (Refer to GROUP 23.)
3. Remove the defroster nozzle at the temperature control cable side.
4. Remove lap heater duct B and glove box stopper and push the glove box forward and down. (Refer to GROUP 23.)



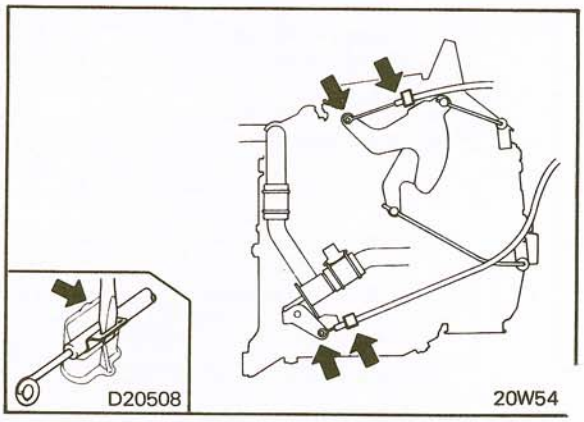
5. Disconnect the RECIRC-FRESH control cable from the blower assembly.

NOTE
Detach the control cables with a screwdriver as shown in the illustration.

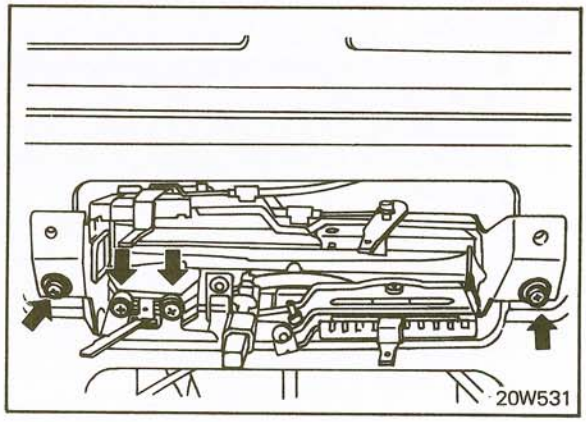


6. Disconnect the VENT-HEAT-DEF control cable and COOL-WARM control cable from the heater unit.

NOTE
Detach the control cables with a screwdriver as shown in the illustration.



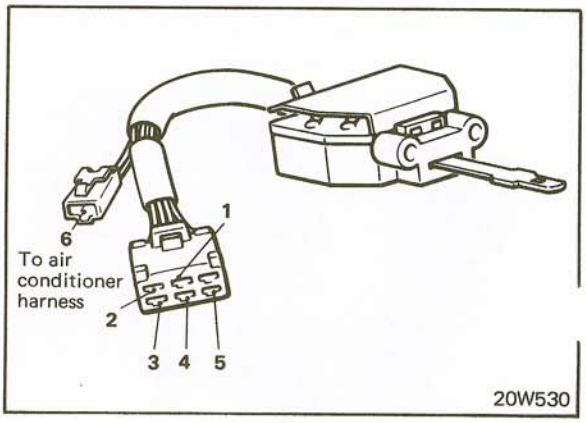
7. Remove the heater control assembly mounting screws and pull out the assembly slightly. (20W531)
8. Disconnect the heater fan switch harness connectors.
9. Remove the heater control assembly.
10. Remove the heater fan switch from the heater control assembly. (20W531)



INSPECTION

Operate the heater fan switch to check for continuity. (20W530)

Switch position OFF \ Terminal	1	2	3	4	5	6
OFF						
• (Low)	○	○				○
• (M_1)	○		○			○
• (M_2)	○			○		○
• (High)	○				○	○

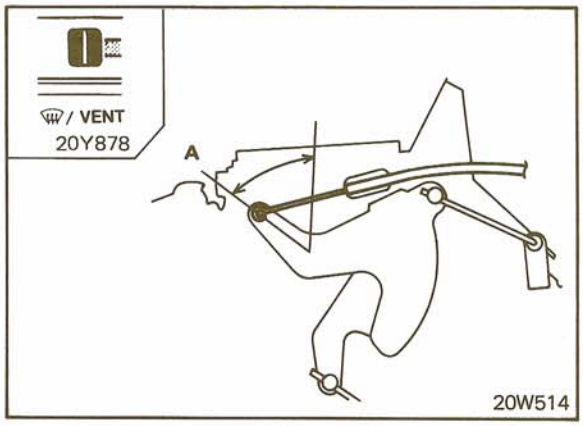


INSTALLATION

Connect each control cable and damper lever by using the following procedures.

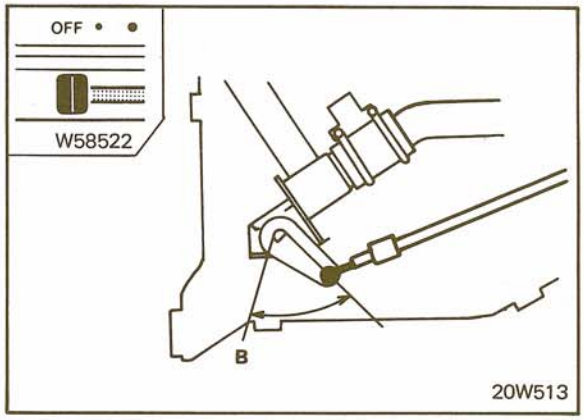
Air Outlet Changeover System

1. Place the air outlet changeover lever at the position as illustrated. (20Y878)
2. With the heater side air outlet changeover damper lever in position A, connect the inner cable to the lever and secure the cable casing with clips. (20W514)



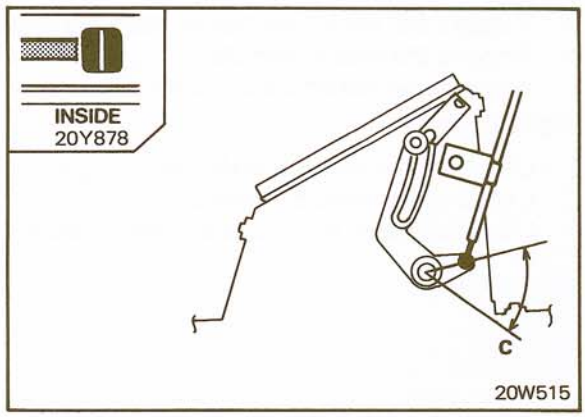
Warm Water Flow Control System

1. Place the warm water flow control lever at the off position. (W58522)
2. With the heater side water valve control lever in position B, connect the inner cable to the lever and secure the cable casing with clips. (20W513)



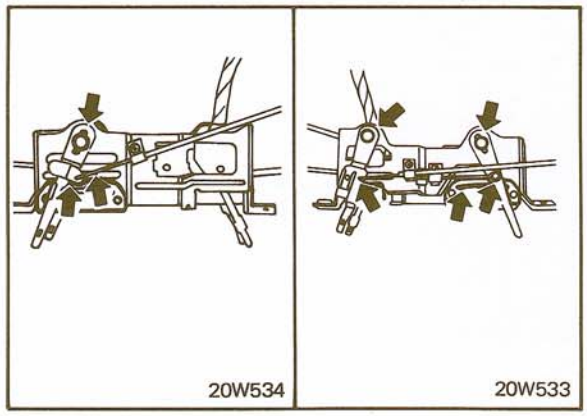
Recirculation/Fresh Air Changeover System

1. Place the recirculation/fresh air changeover lever at the "recirculation" position. (20Y878)
2. With the heater side recirculation/fresh air changeover damper lever in position C, connect the inner cable to the lever and secure the cable casing with clips. (20W515)
3. Set the control lever to each position to check for correct operation. If not correct, adjust by moving the outer wire at the clipped point.



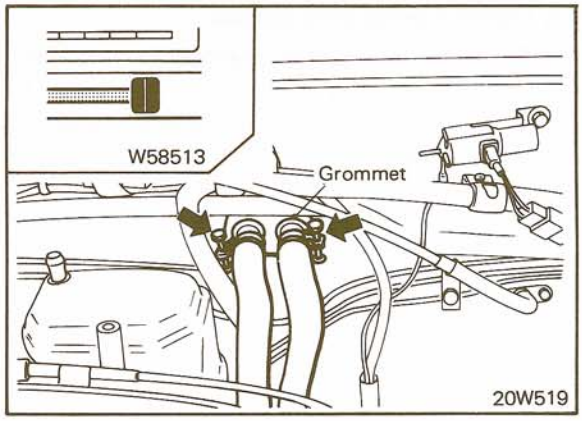
4. Check to make sure that each control lever moves smoothly. If there is any noise or stiff movement, apply the specified multipurpose grease to all moving parts.

NOTE
When mounting the heater control assembly to the instrument panel, tighten the upper bolts to the instrument panel so that they also secure the center panel.

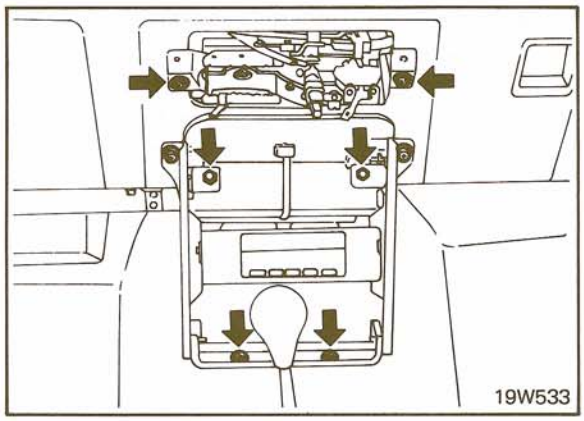


REMOVAL

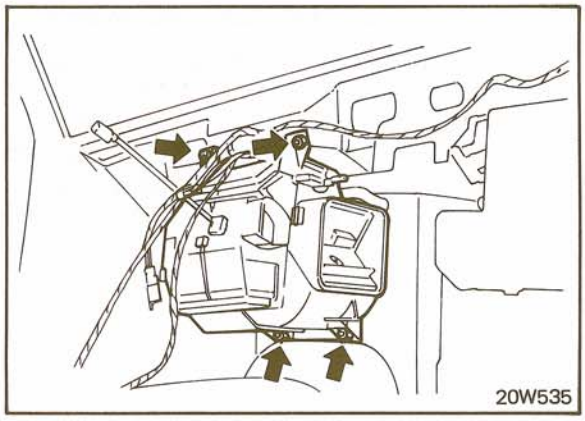
1. Move the hot-water flow control lever to the "hot" position. (W58513)
2. After the radiator cap has been removed, loosen the radiator drain plug and drain the coolant.
3. Disconnect the water hoses from the heater unit. (20W519)



4. Remove the instrument panel. (Refer to GROUP 23.) The center reinforcement, support bracket and radio should be removed together with the instrument panel.



5. Remove the center ventilator duct and defroster duct.
6. Remove the rear heater duct.
7. Remove the heater unit. (20W535)

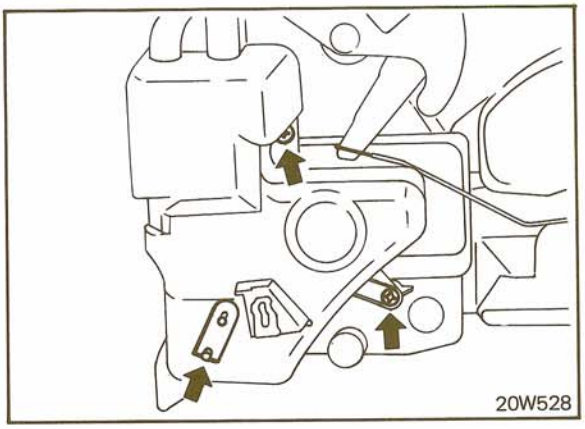


INSPECTION

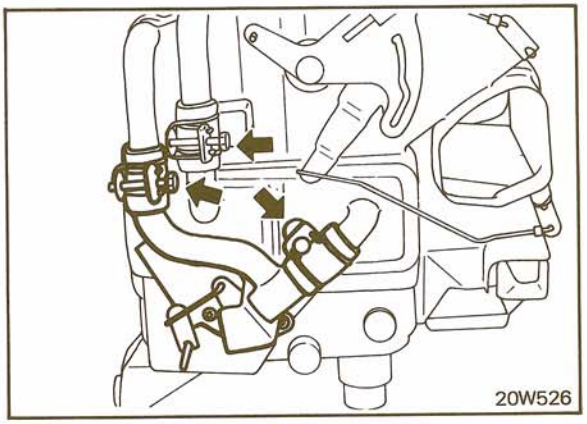
1. Check heater core for leaks, and clogging.
2. Check water valve for operation.
3. Check all hoses for cracks and deterioration.

HEATER CORE REPLACEMENT

1. Remove the heater control lever arm and remove the water valve cover.

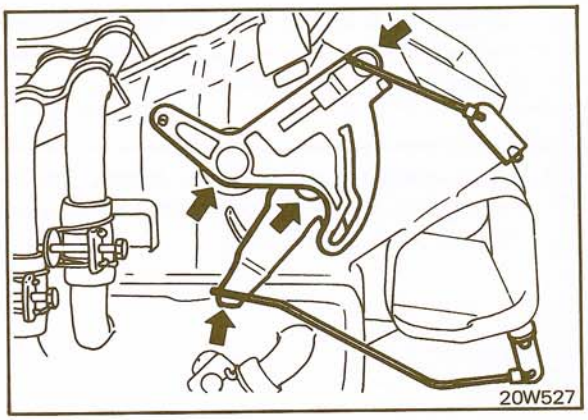


2. Remove the heater pipe and water valve.

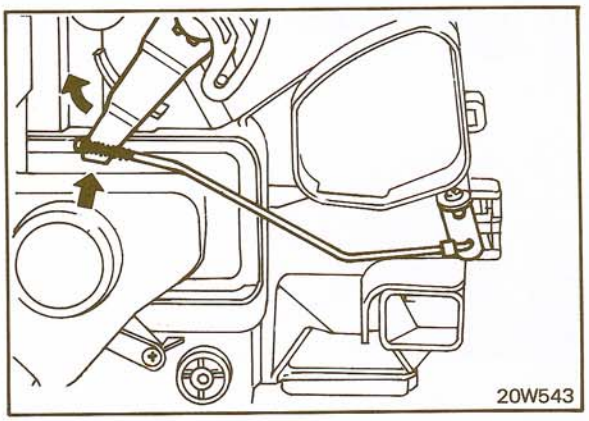


3. Disconnect the control arm linkage. (20W527)
4. Remove the control arm.
5. Remove the heater core by moving it sideways.

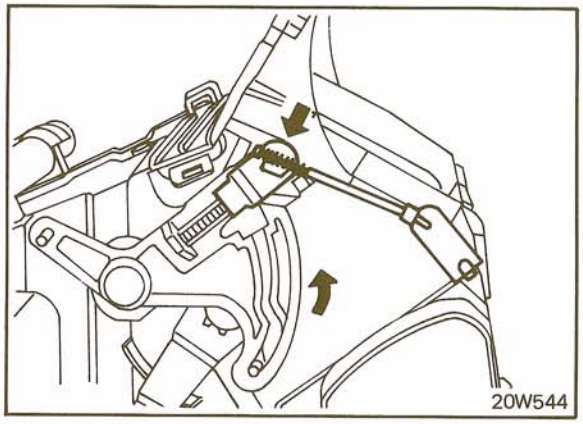
Caution
To prevent some substances invasion between the heater core and case, use care not to remove the heater core felt when removing the heater core.



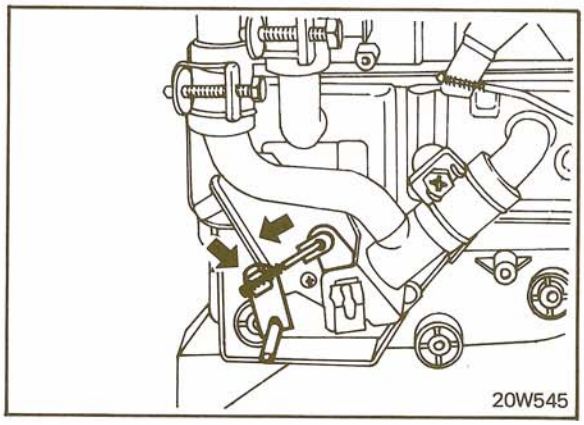
6. After the center ventilator open/close damper has been placed in the fully closed position, turn the arm fully clockwise, and then connect it to the link.



7. With the defroster/heater changeover damper in the fully closed defroster position, turn the arm fully counter-clockwise, and then connect it to the link.



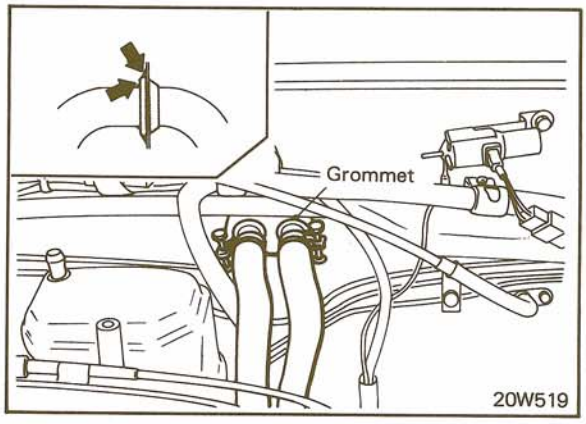
8. With the water valve fully closed and the air intake damper fully closed, connect the arm to the link.



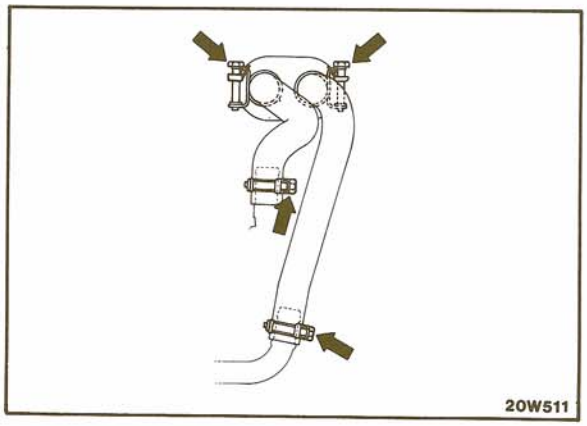
9. Connect each heater hose up to the specified length.

Heater hose overlap length	25-30 mm (1.0-1.2 in.)

10. When installing the water hoses, apply a coating of non-drying adhesive to the engine compartment side of the grommet. (20W519)

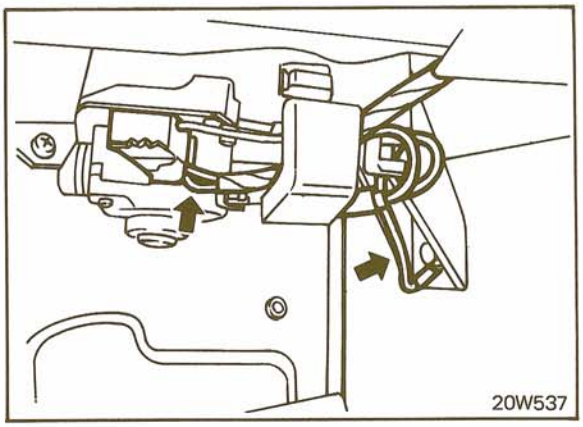


11. Tighten the clamps in the positions shown in the illustration.

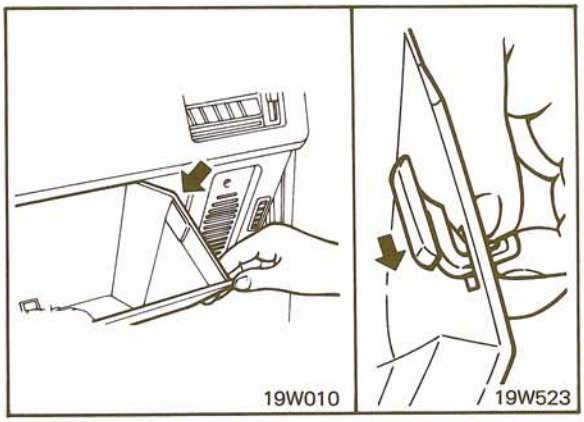


REMOVAL

1. Disconnect the front wiring harness and blower motor coupling connectors. (20W537)
2. Remove the lower mounting bolts of the blower assembly.
3. Remove lap heater duct B and duct.



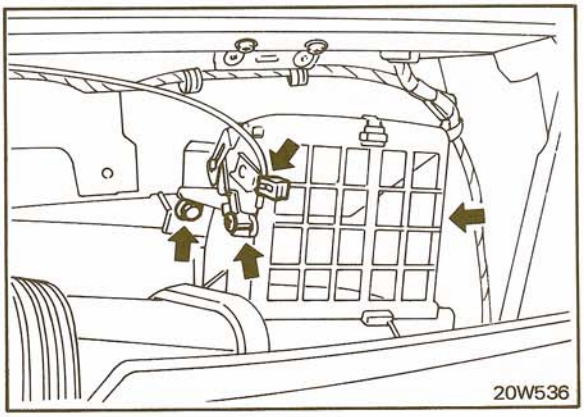
4. Remove the stopper of the glove box and push the glove box down.



5. Remove the RECIRC-FRESH control wire and blower assembly mounting bolts. (20W536)
6. Remove the blower assembly.

INSTALLATION

Tighten the lower mounting bolt of blower assembly which also secures the blower motor ground wire.



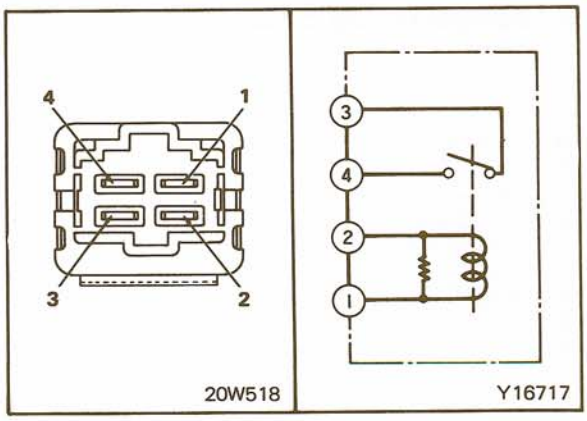
HEATER RELAY

REMOVAL

1. Remove the glove box stopper and remove the glove box by pulling it toward you.
2. Disconnect the heater relay connector and remove the heater relay.

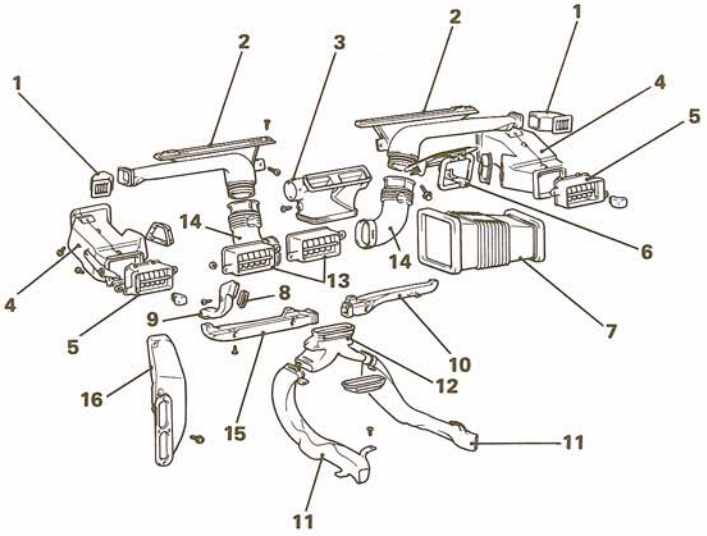
INSPECTION

1. Check continuity between terminals 1 and 2; there should be continuity.
2. Check continuity between terminals 3 and 4; there should not be continuity.
3. Check continuity between terminals 3 and 4 while applying battery voltage to terminals 1 and 2; there should be continuity.



COMPONENTS

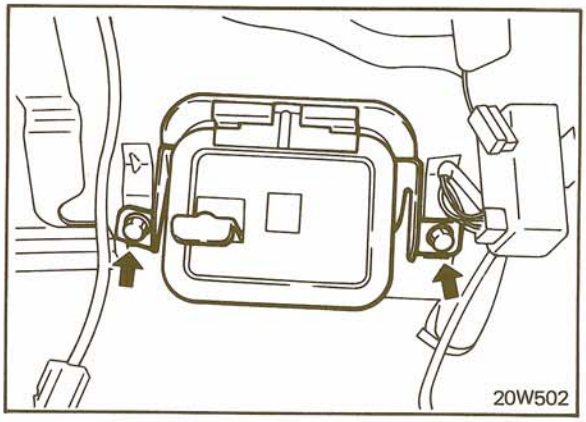
1. Demister grille
2. Defroster nozzle
3. Center ventilator duct
4. Deflector duct
5. Side air outlet
6. Front ventilation
7. Duct
8. Lap heater garnish
9. Lap heater duct (A)
10. Lap heater duct (C)
11. Rear heater duct (B)
12. Rear heater duct (A)
13. Center air outlet
14. Defroster duct
15. Lap heater duct (B)
16. Rear ventilator duct



20W542

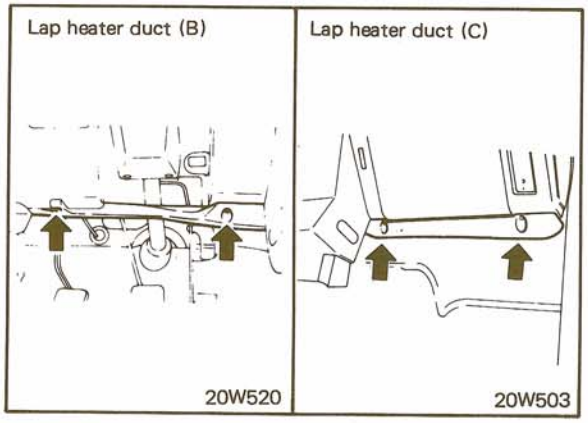
REMOVAL

1. Remove the mounting bolts and remove the front ventilation by moving it downward.



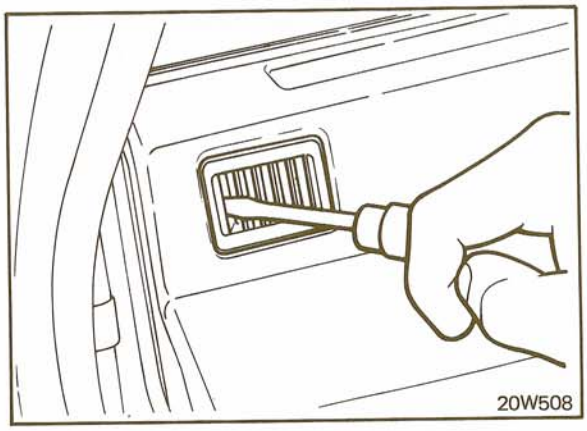
20W502

2. Remove the lap heater duct from under the instrument panel.

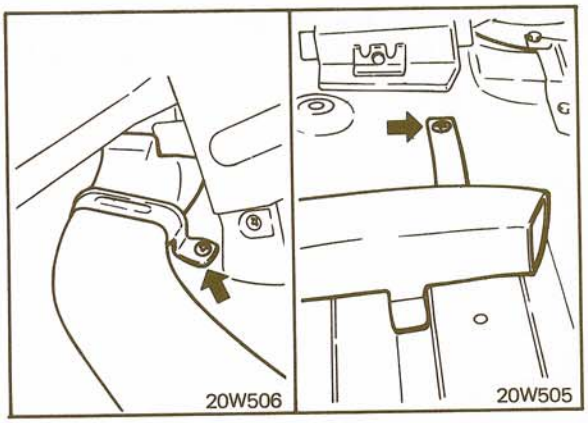


3. Using a screwdriver as shown, remove the demister grille.

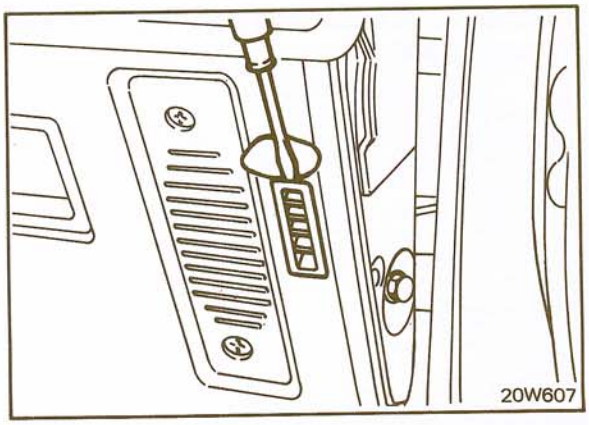
Caution
Use care not to break the projections for attaching the demister grille.



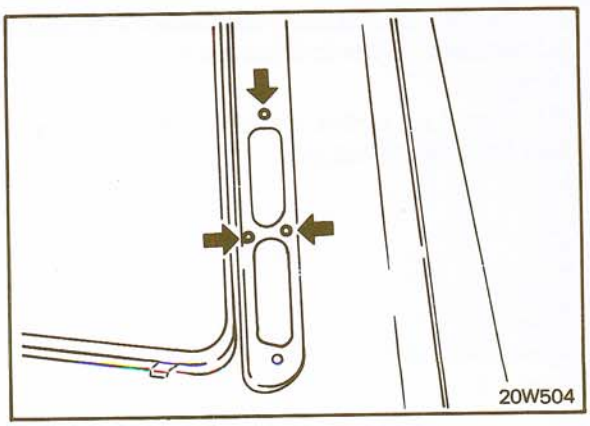
4. Remove the rear heater duct by detaching it from the floor panel.



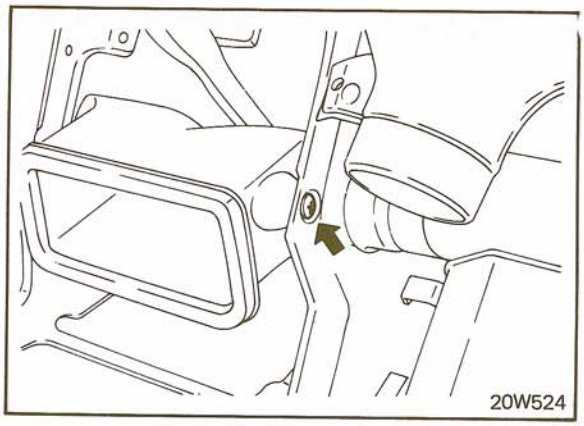
5. Remove the lap heater garnish by prying up the edges with a screwdriver.



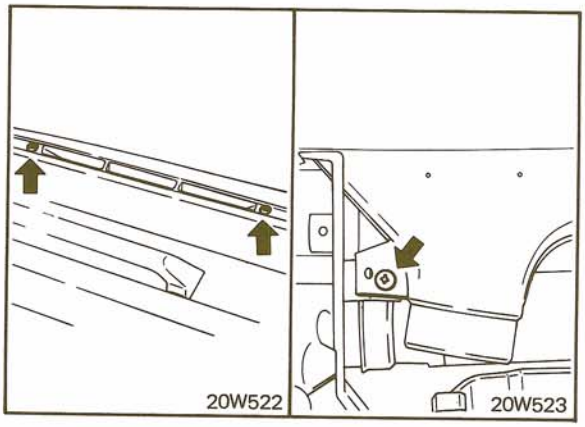
6. Remove the rear ventilator garnish. (Refer to GROUP 23.)
7. Remove the rear ventilator duct by moving it upward from inside the passenger compartment. (20W504)



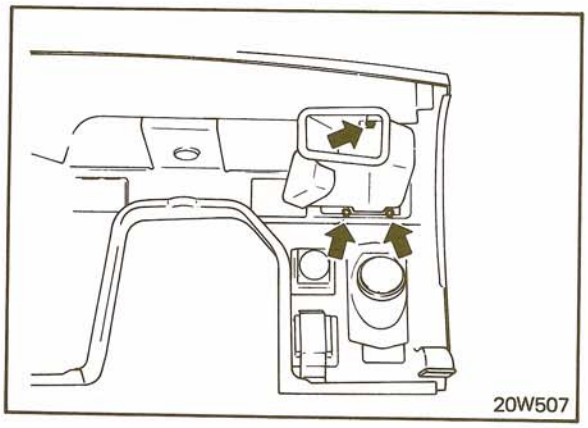
8. Remove the instrument panel. (Refer to GROUP 23.)
9. Remove the center ventilator duct from the reverse side of the instrument panel. (20W524)



10. Disconnect the demister grille and defroster duct and remove the defroster nozzle by moving it downward.

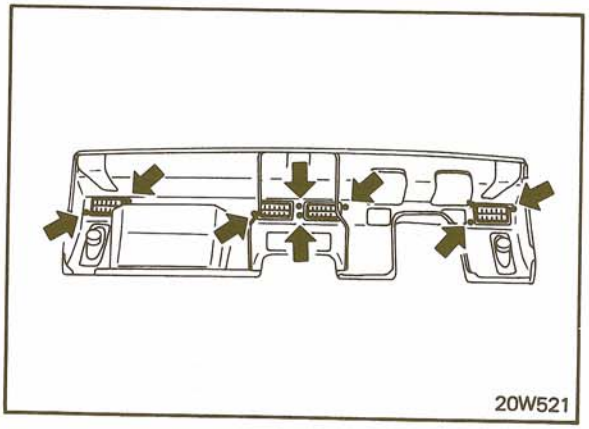


11. Remove the defroster duct from the back of the instrument panel.

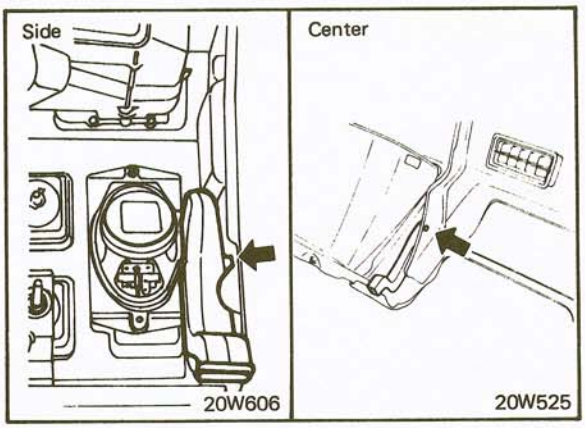


12. Remove the center air outlet and side air outlet from the back of the instrument panel.

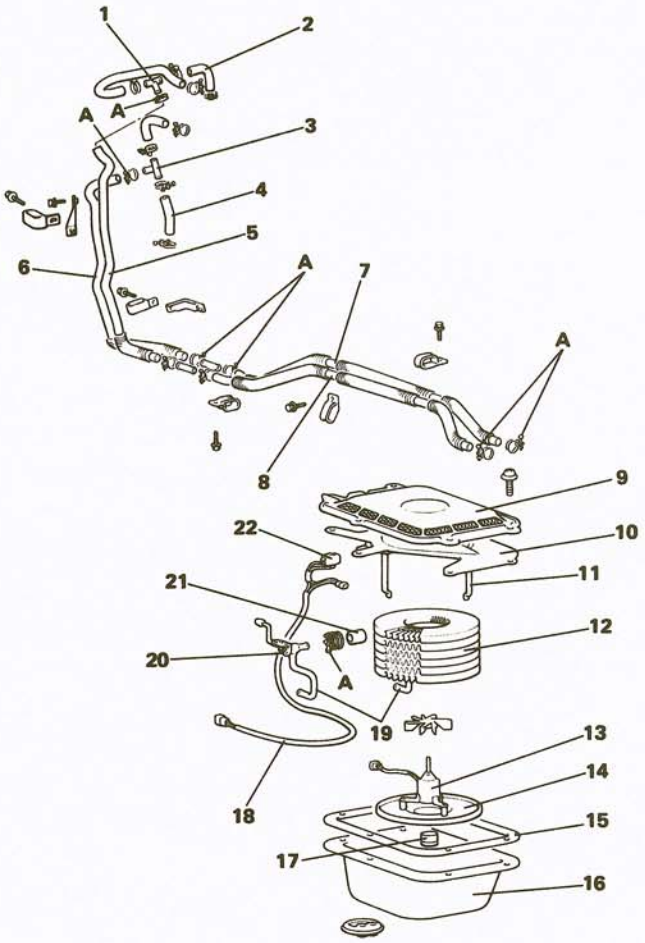
NOTE
The center air outlet and side air outlet are secured together with the instrument pad.



3. Remove the lap heater duct from the back of the instrument panel.



COMPONENTS



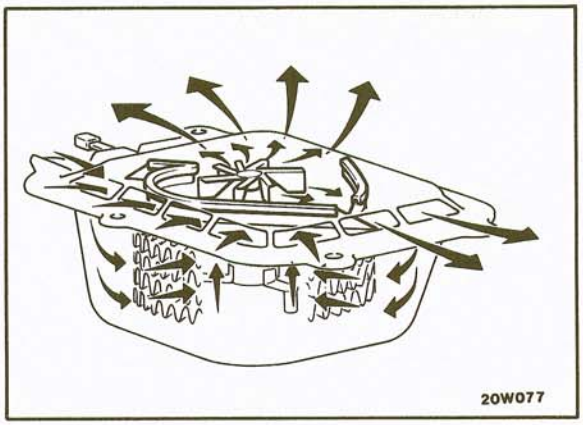
1. Joint (B)
2. Water hose (inlet side)
3. Joint (A)
4. Water hose (outlet side)
5. Water hose (C)
6. Water hose (D)
7. Water hose (B)
8. Water hose (A)
9. Cover
10. Heater nozzle
11. Clip
12. Heater core
13. Fan and motor assembly
14. Core cover
15. Secret box packing
16. Secret box
17. Rubber
18. Rear heater wiring harness
19. Piping
20. Water valve
21. Joint hose
22. Heater fan switch

	Ncm	in.lbs.
A	130-180	11-16

20W726

OPERATION

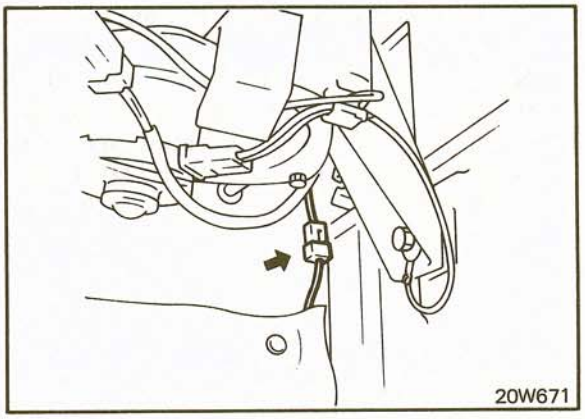
The rear heater blows off warm air in two directions, forward and backward, at properly distributed air flow rates for sufficient convection to provide comfortable heating.
The rear heater switch has a single lever which serves the combined purposes of the heater fan switch and warm water flow control lever.
Operation is only ON-OFF switching.



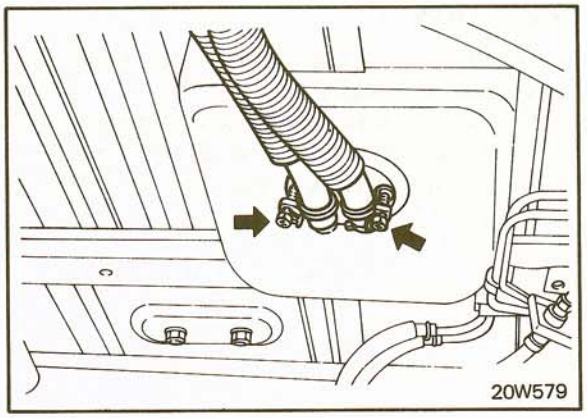
REAR HEATER

REMOVAL

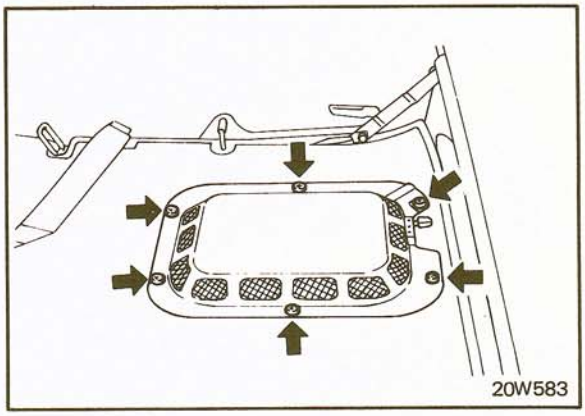
1. Remove coolant.
2. Disconnect the connector of rear heater wiring harness and front wiring harness. (20W671)



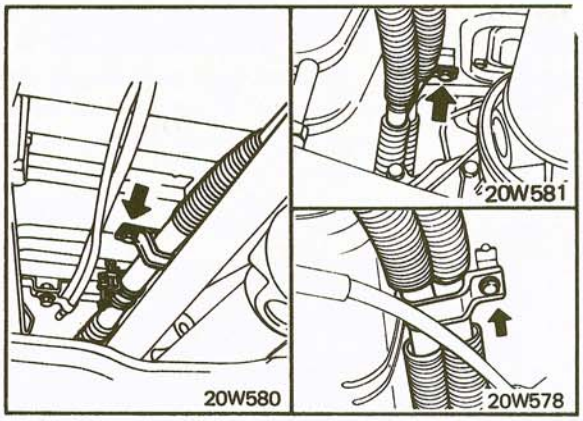
3. Disconnect the water hoses (A) and (B) from the piping. (20W579)
4. Remove the grommet upward.



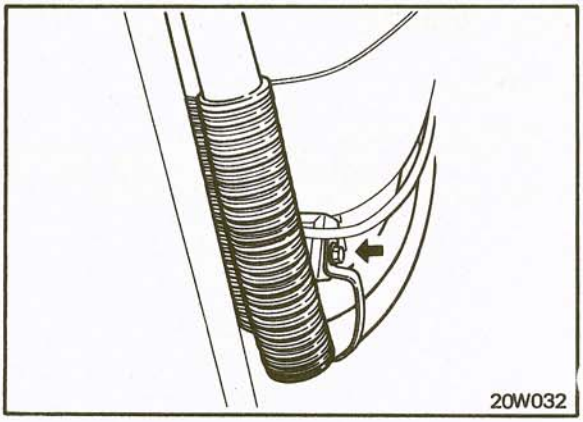
5. Remove the cover. (20W583)
6. Remove the rear heater assembly upward.



7. Remove the water hose (A) and (B) attaching clamps.



8. Remove the water hose (C) and (D) attaching clamps. (20W032)
9. Remove the clips attaching the joints to the water hoses (C) and (D) and remove the water hose assembly.
10. After the water hose assembly has been removed, disconnect the water hoses (A) and (B) from the water hoses (C) and (D).

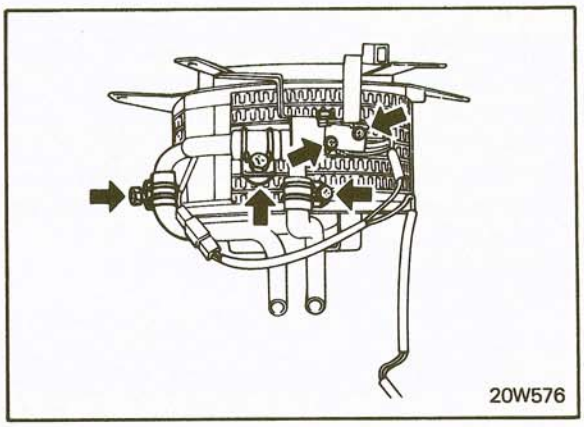


INSPECTION

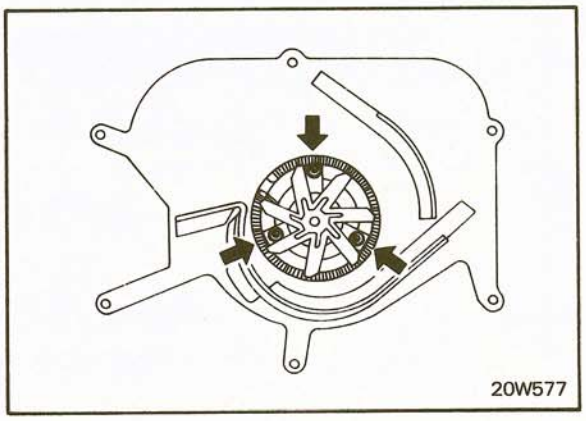
1. Check water hose and joint hose for deterioration, damage and leaks.
2. Check fan motor for noise and unsmooth rotation.
3. Check secret box for foreign substances.
4. Check rubber for deterioration and damage.

DISASSEMBLY

1. Disconnect the joint hoses and remove the water valve and pipings. (20W576)
2. Disconnect the connector of the fan switch harness and motor harness and remove the heater fan switch from the water valve. (20W576)

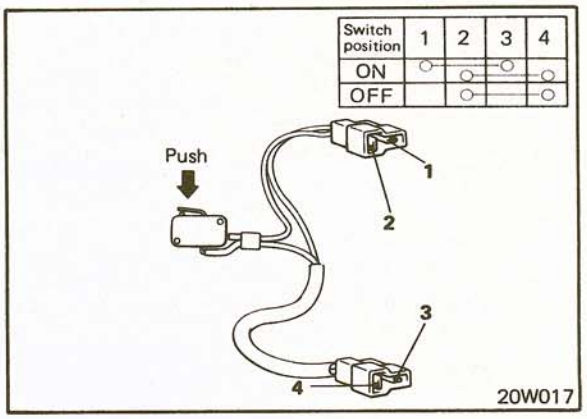


3. Remove the fan and motor assembly from the heater core. (20W577)
   Remove the clips and remove the heater nozzle, heater core and core cover in that order.



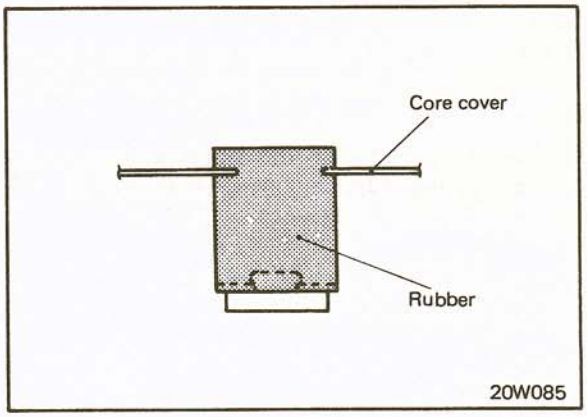
INSPECTION

1. Check water valve for faulty operation, clogging and leaks.
2. Check heater core for clogging, damage and leaks.
3. Check piping for damage.
4. Check heater fan switch for continuity.



REASSEMBLY

Securely install the rubber on the core cover.

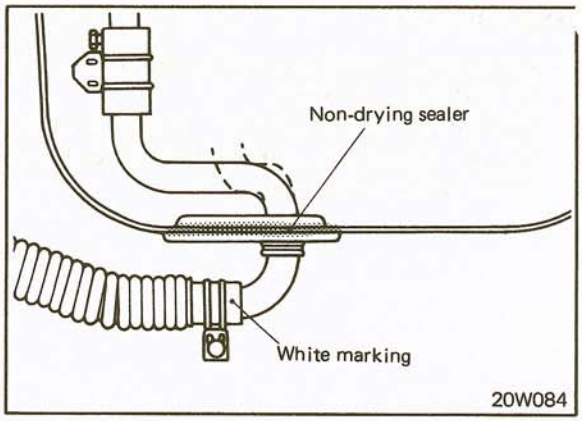


INSTALLATION

1. Apply non-drying sealer between the secret box and the grommet. (20W084)
2. Conncet the inlet side (white marking side) of piping to the inlet side of water hose. (20W084)
3. When the water hose is installed, use care to prevent its contact with other parts and sliding portions, its torsion and twisting.

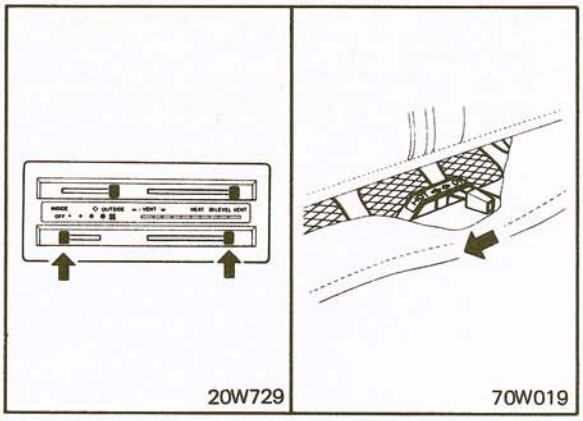
NOTE
Install the clip over the yellow marking of the hose and clamp.

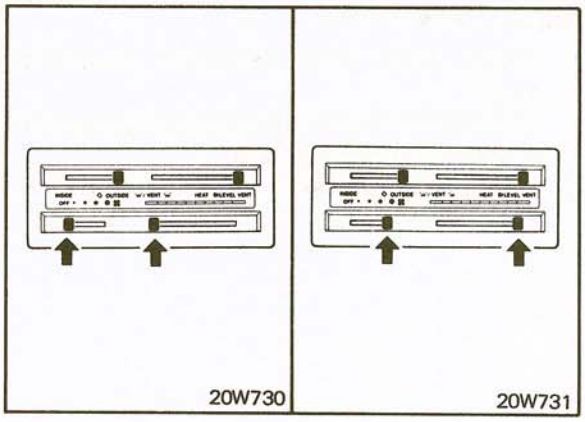
4. Install the rear heater wiring along the front wiring harness using care to prevent the wiring from being caught or gouged by other parts and avoid its contact with other parts.



BLEEDING OF REAR HEATER

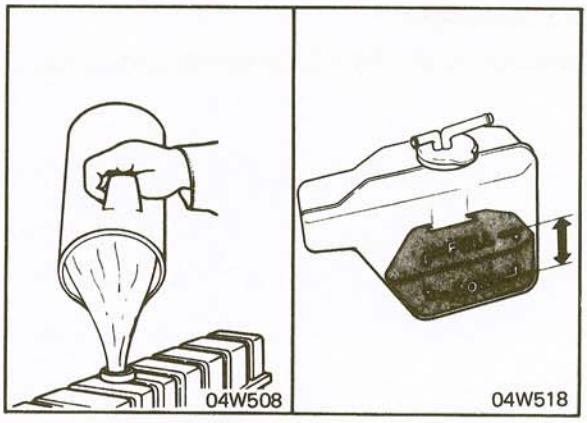
1. Place the hot water flow control lever of the front heater to HOT position, and set the heater fan switch to OFF position. (20W729)
2. Set the rear heater fan switch to HOT position. (70W019)
3. Remove the intake manifold heating water hose at the bottom of the carburetor.
4. Slowly fill the radiator with coolant up to the maximum level.
5. Check to ensure that coolant comes out from both the intake manifold and water hose and then install the hoses.
6. Allow the eingine to warm up, until coolant reaches a temperature of 50°C (122°F) or above.
7. After the engine has warmed up place the hot water flow control lever of the front heater to COLD position. (20W730)
8. Run the engine at speeds of 1,500 to 2,000 rpm (occasionally race the engine) until warm air flows out from the rear heater blow-off opening.
9. Place the hot water flow control lever of the front heater to HOT position and check to ensure that warm air flows out. (20W731)





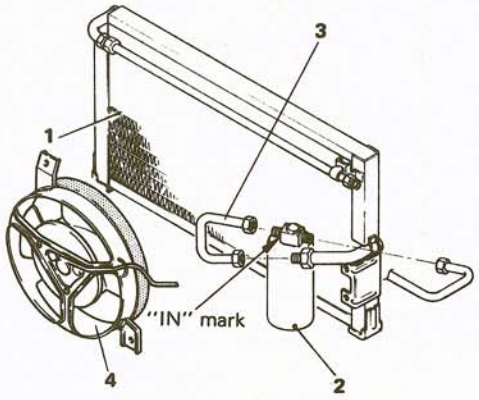
NOTE
If there is a large difference in blow-off temperature between the front heater and rear heater, perform bleeding operations again.

10. Refill the radiator and reservoir tank with coolant up to the specified level. (04W508, 04W518)

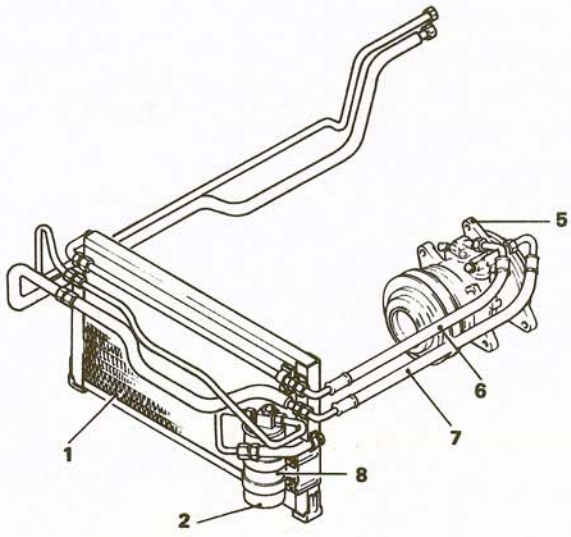


COMPONENTS

Piping

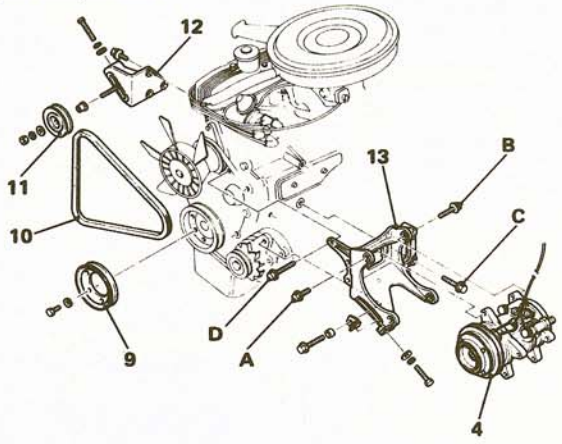


20W706



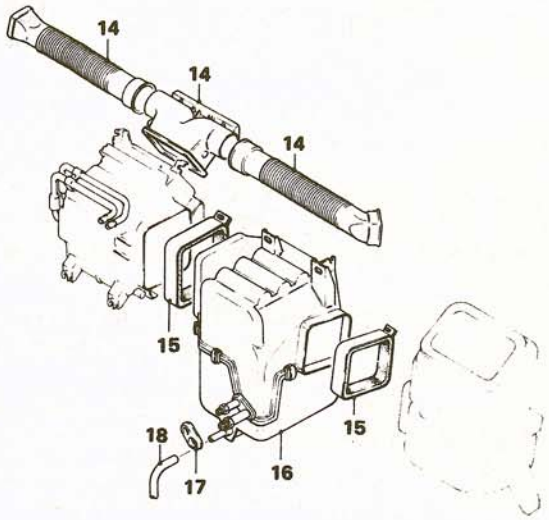
20W705

Engine compartment



20Y911

Passenger compartment



20W707

1. Condenser
2. Receiver
3. Pipe
4. Condenser fan motor
5. Compressor
6. High pressure hose
7. Low pressure hose
8. Receiver bracket
9. Crankshaft pulley
10. V-belt
11. Tension pulley
12. Tension pulley bracket
13. Compressor bracket
14. Air duct
15. Duct joint
16. Air-conditioning unit
17. Grommet
18. Drain hose

	Nm	ft.lbs.	O.D. x length mm (in.)
A	20-29	14-22	10 x 30 (1.2)
B	20-29	14-22	10 x 35 (1.4)
C	40-50	29-36	10 x 50 (2.0)
D	20-29	14-22	8 x 80 (3.1)

OPERATION

Air Selector Lever

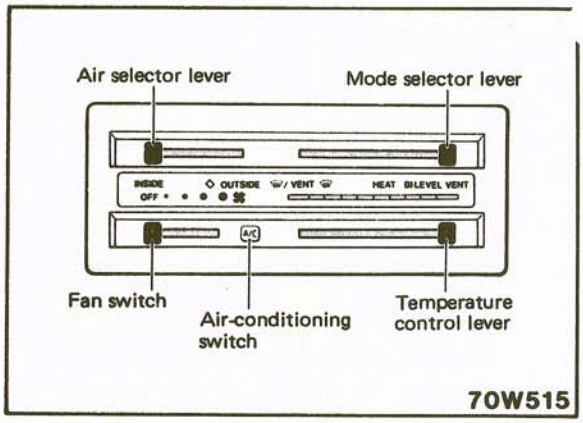
During normal operation, keep the lever at INSIDE. If inside air is contaminated, move the lever to OUTSIDE.

Blower Switch

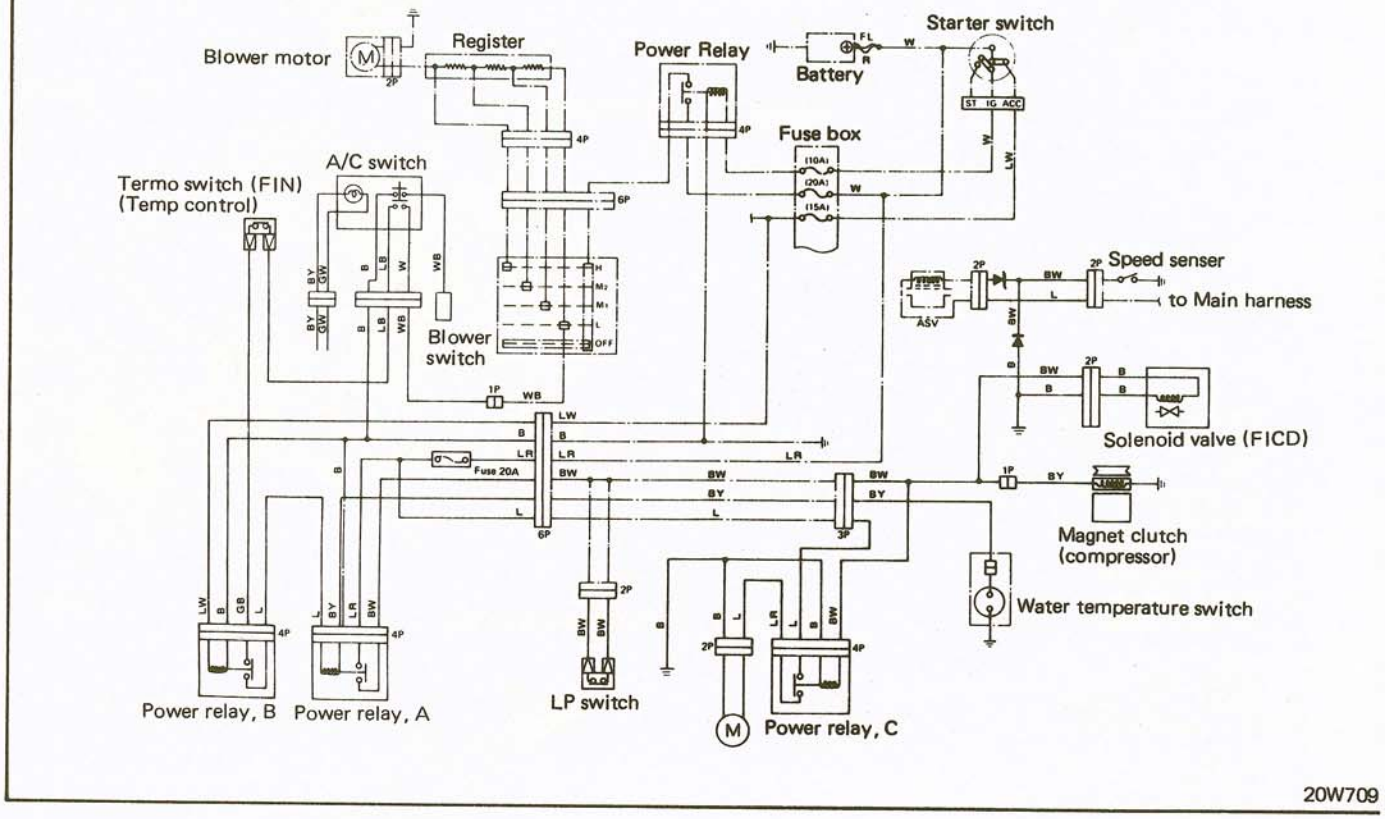
Controls the inside air flow rate in three steps.

Air-Conditioning Switch

Depress the button to operate the air conditioner. (The button is ON when pushed in and OFF when released out.)



ELECTRIC WIRING DIAGRAM



When the A/C switch is set to ON, the magnetic clutch is energized. The following components are used to control A/C compressor operation by deenergizing the magnetic clutch:

The thermostat prevents ice build up on the evaporator fins.

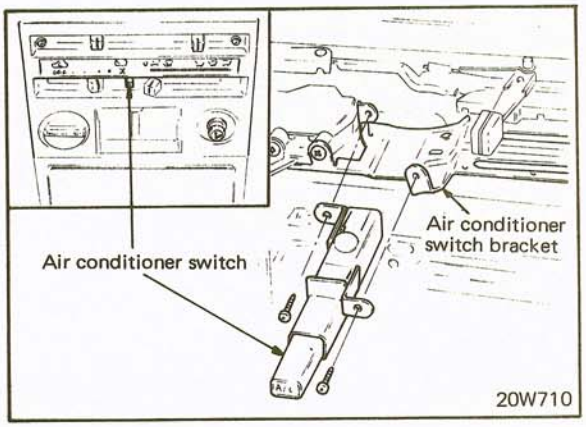
The low pressure switch protects the compressor in an excessive low freon charge condition.

The water temperature switch prevents engine overheating by sensing higher than normal engine operating temperature.

Also, an idle control system is used to maintain engine idle speed when the A/C magnetic clutch is energized.

REMOVAL

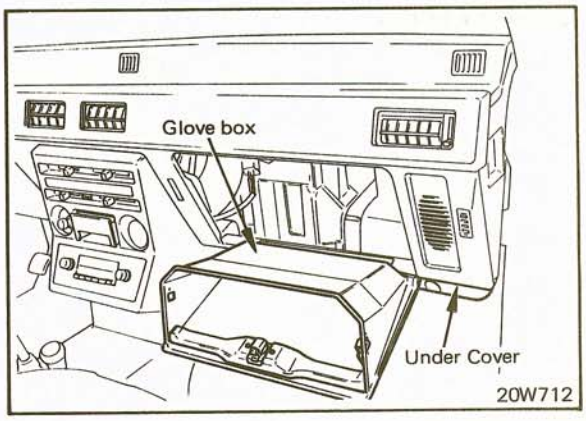
1. Remove the knob of the control lever.
2. Remove the control panel by pushing it from behind.
3. Remove the A/C switch attaching screws.
4. Disconnect the A/C switch harness.
5. Remove the A/C switch.



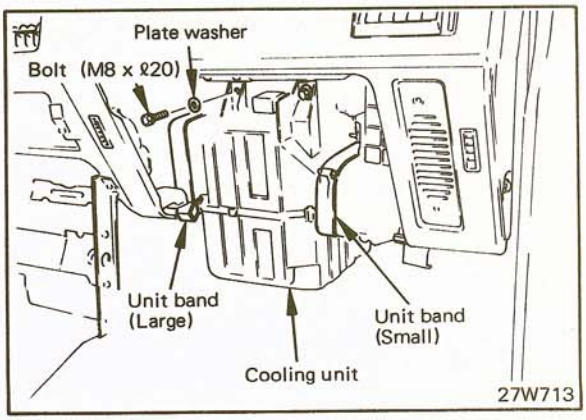
COOLING UNIT

REMOVAL

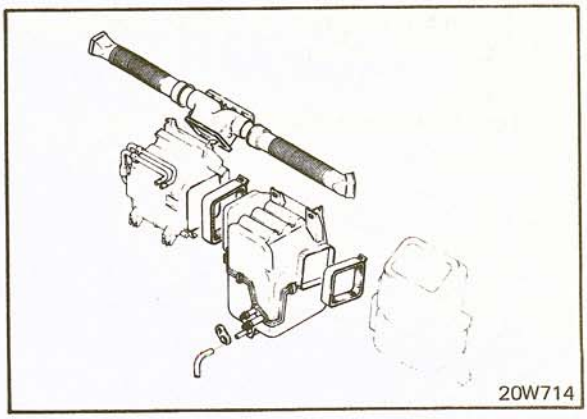
1. Remove the glove box. The glove box should be removed with the lower frame attached. (20W712)
2. Disconnect the glove box switch harness at the round topped terminal.
3. Remove the lap heater duct.
4. Remove the under tray stay.



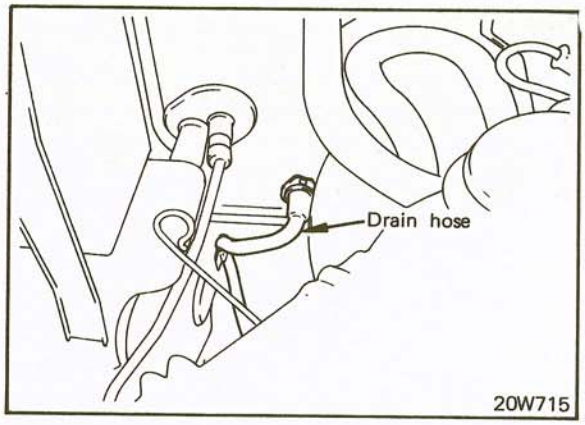
5. Disconnect the duct joint.
   Loosen the duct joint tightening bolt to free the duct joint. (Heater unit side, blower motor side)



6. Disconnect the A/C switch harness and air-conditioner harness.



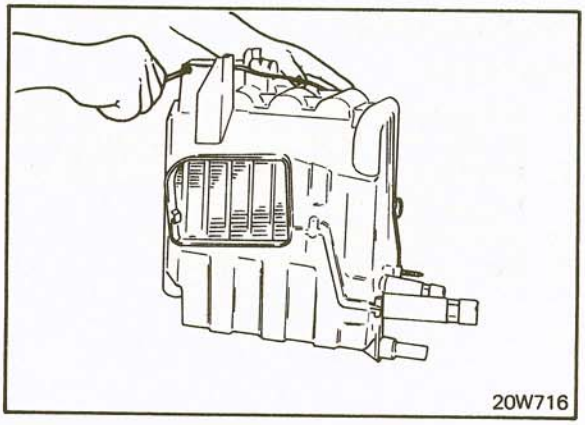
7. Disconnect the drain hose.
8. Disconnect the piping at the piping connection projecting from the firewall in the engine compartment. (20W715)
9. Remove the cooling unit attaching nuts.
10. Remove the cooling unit top attaching bolts in the passenger compartment.
11. Remove the cooling unit.



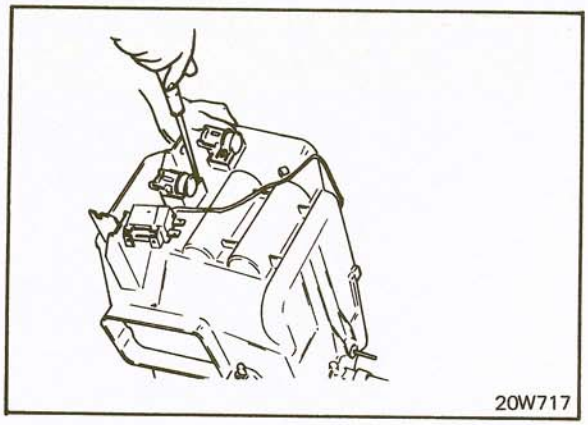
20W715

DISASSEMBLY

1. Disconnect the harness from the cooling case.

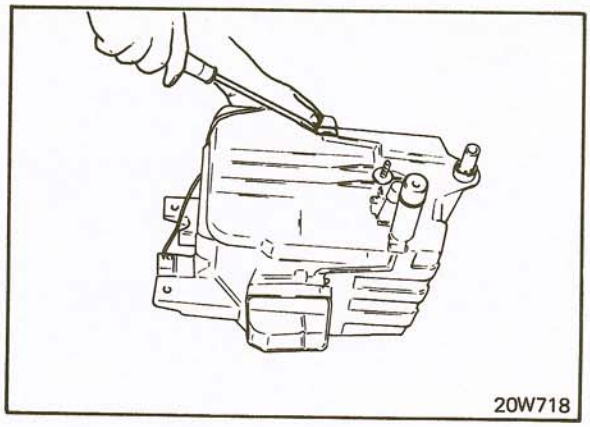

20W716

2. Remove the two power relays. Remove the tapping screws.

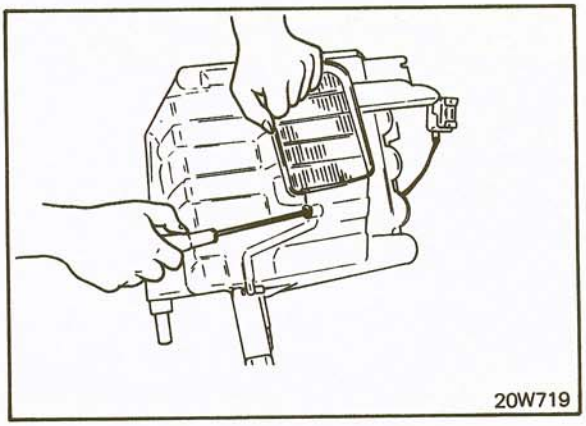

20W717

3. Remove the upper and lower cooling case attaching clips with a screwdriver.

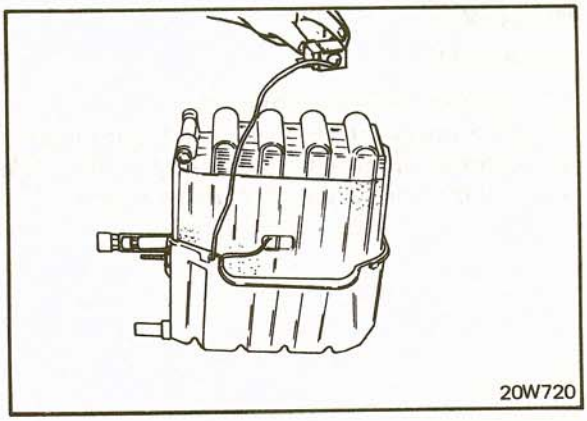
Caution
Use care to prevent the clips from flying off.


20W718

4. Remove the tapping screws.
5. Remove the upper cooling case. (20W719)

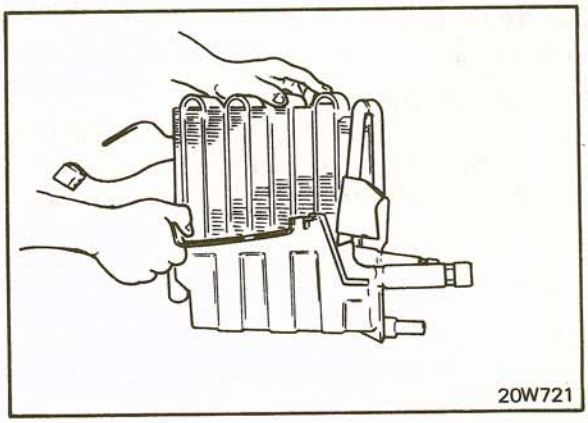

20W719

6. Remove the thermostat. Remove the heat-sensitive cylinder from inside the fins.

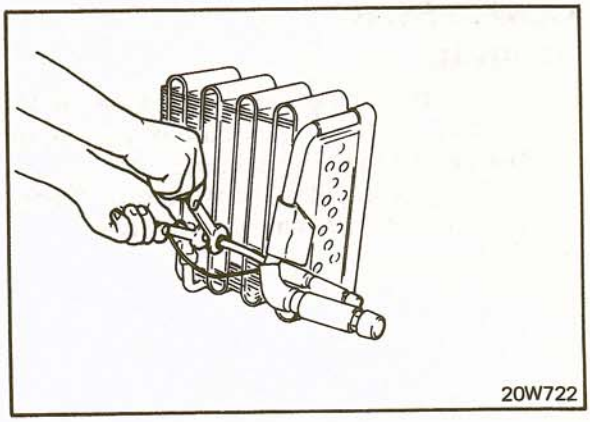

20W720

7. Remove the cooling unit by lifting it from the lower cooling case.

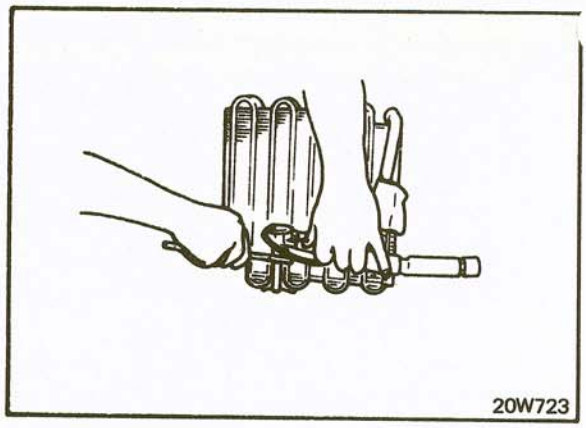
Caution
Hold the lower cooling case tightly when removing the cooling unit.


20W721

8. Remove the pipe assembly.


20W722

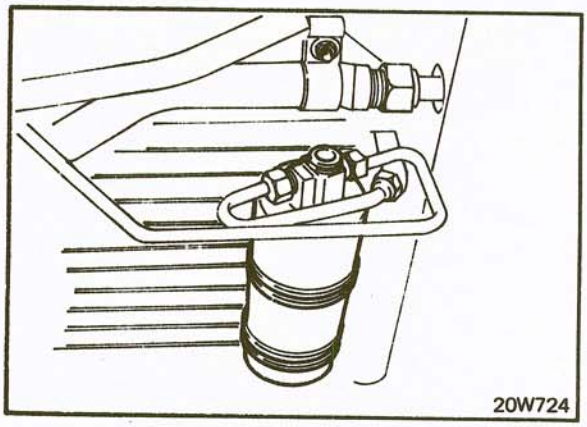
9. Remove the expansion valve.
10. Remove the tacking sheet. (20W723)


20W723

RECEIVER

REMOVAL

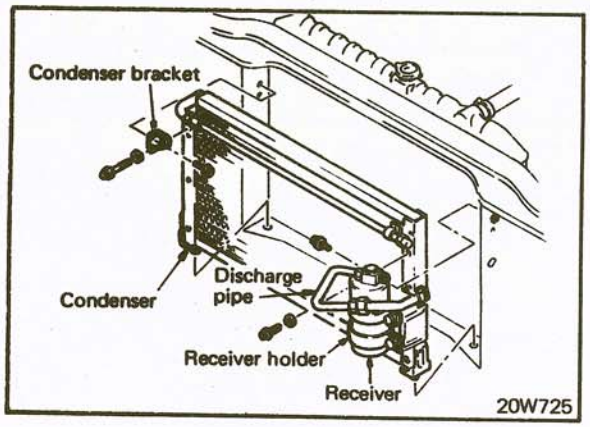
1. Remove the front grille.
2. Disconnect the receiver outlet and intake pipes.
3. Remove the receiver mounting bolts. (20W724)
4. Remove the receiver by lifting it upward.


20W724

CONDENSER

REMOVAL

1. Remove the center support.
2. Disconnect and plug the receiver outlet and intake pipes.
3. Remove the condenser mounting bolts. (20W725)
4. Remove the condenser from the vehicle.



20W725

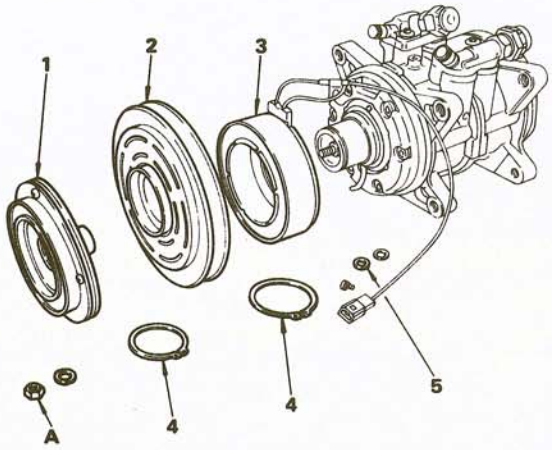
COMPRESSOR

REMOVAL

1. Loosen the idler pulley and remove the V-belt.
2. Disconnect the primary cord of the ignition coil.
3. Disconnect the magnet clutch harness.
4. Disconnect and plug the HP and LP hoses.
5. Remove the front and rear set bolts.
6. Remove the compressor.

COMPONENTS

1. Center piece
2. Clutch rotor assembly
3. Clutch stator
4. Snap ring
5. Shim

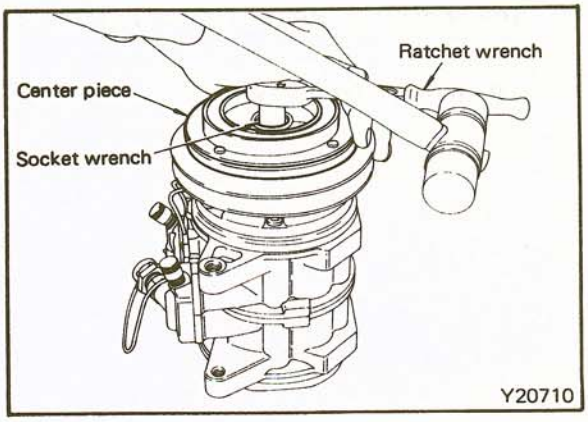


	Nm	ft.lbs.
A	15-17	11-13

Y20709

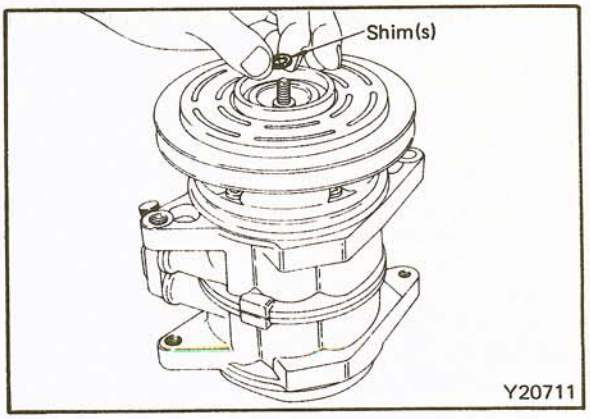
DISASSEMBLY

1. Hold the center piece and loosen the nut. (Y20710)
2. Remove the center piece.



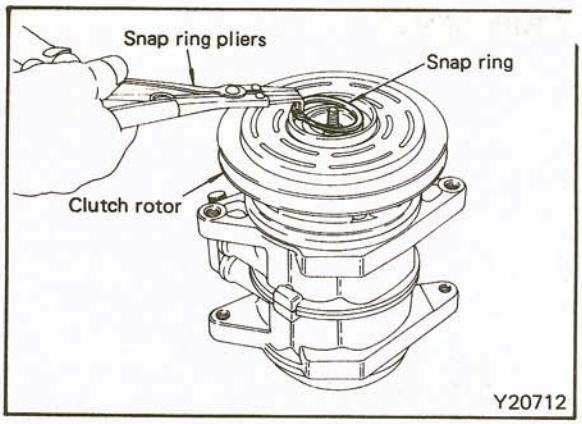
Y20710

3. Remove the clearance adjusting shim(s) located on the end of the compressor shaft.



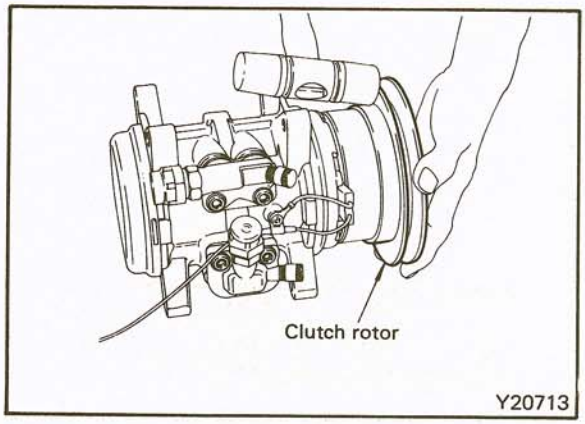
Y20711

4. Remove the snap ring which secures the clutch rotor.



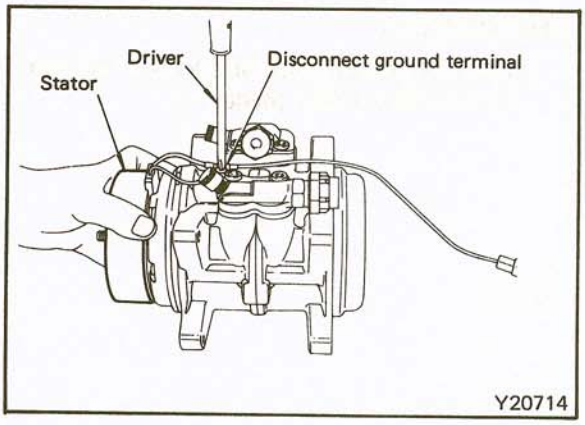
5. Pull the clutch rotor off of the compressor.

NOTE
It may be necessary to lightly tap the rotor with a plastic hammer.

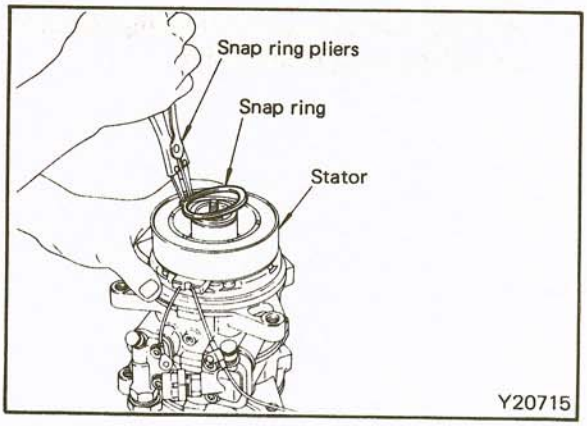


6. Disconnect the ground terminal for the stator coil.

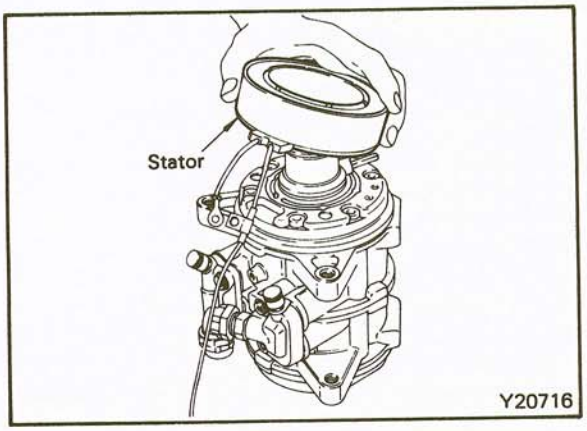
NOTE
Use an impact driver to remove the attaching screw.



7. Remove the snap ring which secures the stator.



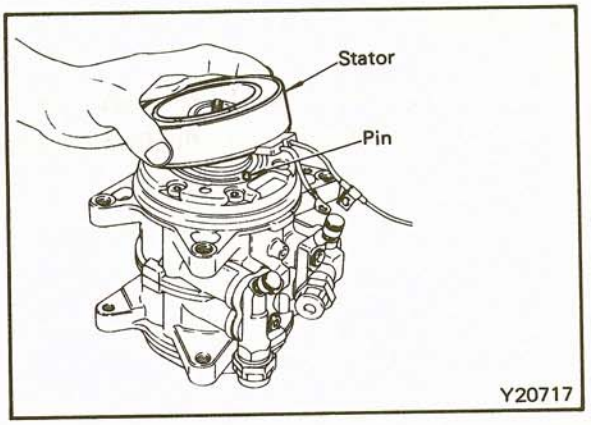
8. Pull the stator off of the compressor housing.



INSPECTION

1. Check the surface of the center piece for scoring or bluing.
2. Check the surface of the rotor for scoring or discoloration.
3. Measure the resistance of the stator coil. Resistance should be equal to the standard value.

Coil resistance [at ambient temperature 20° C (68° F)]	2.9 ± 0.2Ω



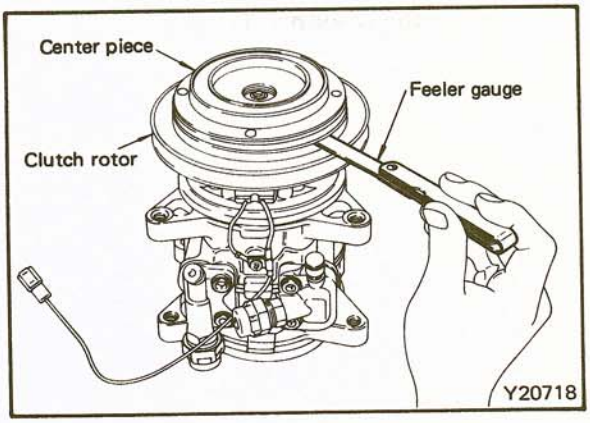
INSTALLATION

The stator must be aligned with the pin in the compression housing and center piece to stator clearance must be checked after installation.

MAGNETIC CLUTCH CLEARANCE INSPECTION

1. Tighten the clutch nut.
2. Check the clutch clearance as illustrated. (Y20718)

Pressure plate to rotor clearance	0.4-0.7 mm (.02-.03 in.)



NOTE
Remove clearance adjusting shims to decrease clutch clearance. Add shims selected from the following table to increase clutch clearance.

Clearance Adjustment Shims

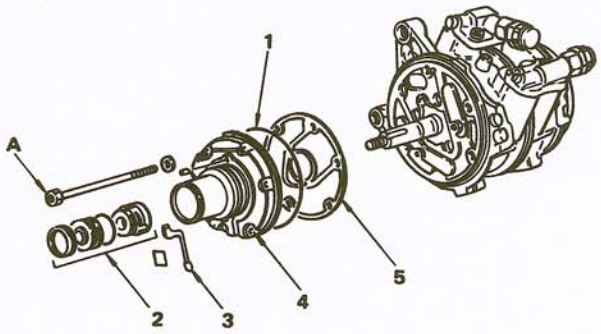
Part No.	Thickness
RS13023A	0.1 mm (.004 in.)
RS13023B	0.2 mm (.008 in.)
RS13024	0.5 mm (.020 in.)

3. Turn the rotor by hand to confirm that it rotates freely.

COMPONENTS

1. O-ring
2. Seals
3. Oil drain guide
4. Front housing
5. Gasket

	Nm	ft.lbs.
A	25-26	18-20

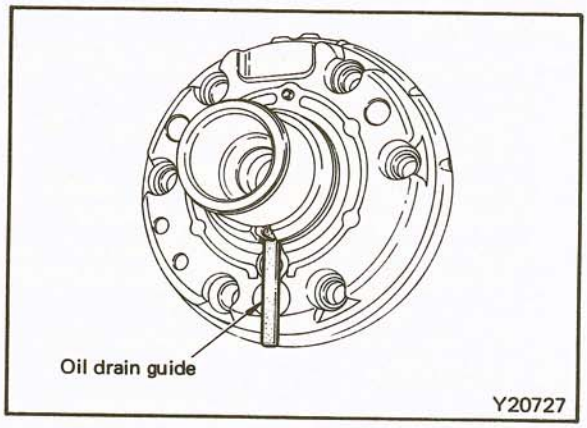


20Y947

REMOVAL

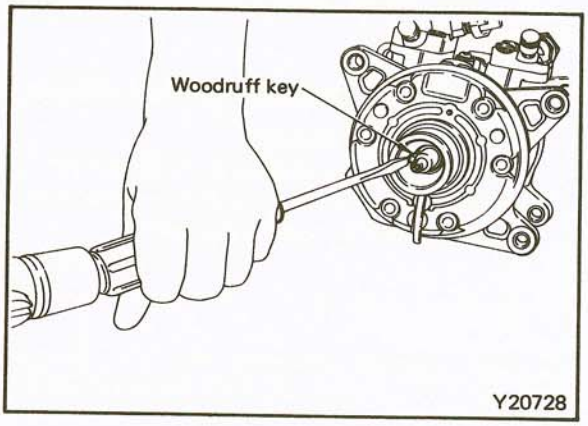
NOTE
The magnetic clutch must be removed. (Refer to p. 24-44.)

1. Remove the oil drain from the front housing.



Y20727

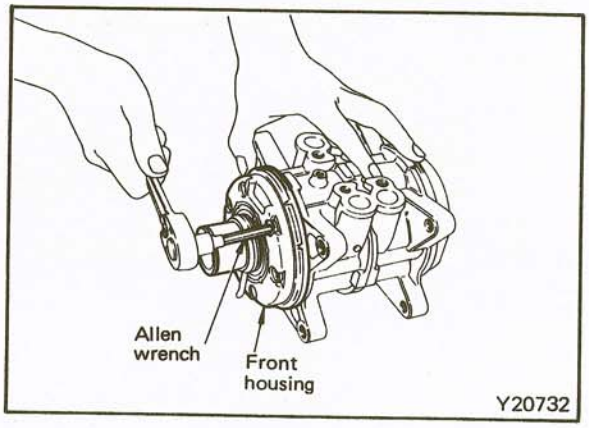
2. Remove the woodruff key.



Y20728

3. Remove the six compressor through bolts as illustrated.

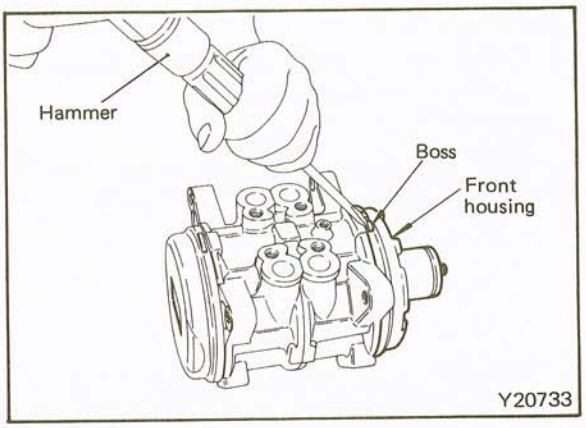
NOTE
Set the compressor on end to prevent any loss of oil during removal of the front housing.



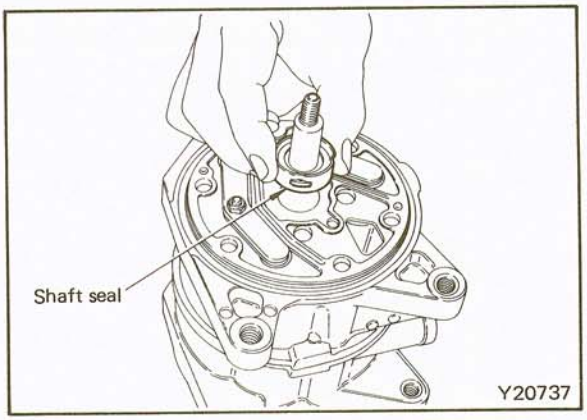
Y20732

. Using a hammer and punch, remove the front housing by tapping on the boss. Remove the front housing from the compressor.

NOTE
Do not damage the front housing.



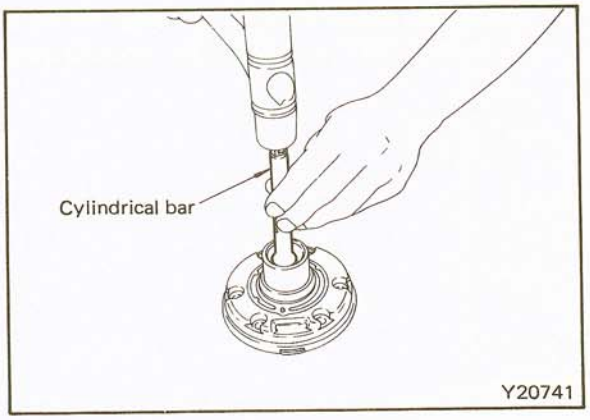
5. Remove the shaft seal.



6. Remove the seal plate from the front housing with a remover. (Y20741)

NOTE
Do not damage the inside surface of the front housing when removing and installing the seal plate.

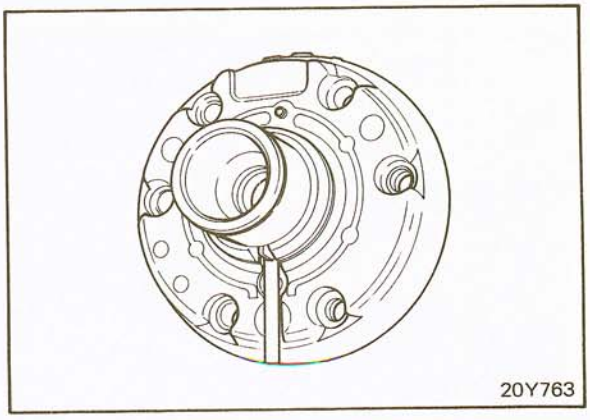
7. Carefully drain the oil from the compressor into a container.



8. Check the sealing surfaces for cracks, scratches or deformation. (20Y763)

INSPECTION

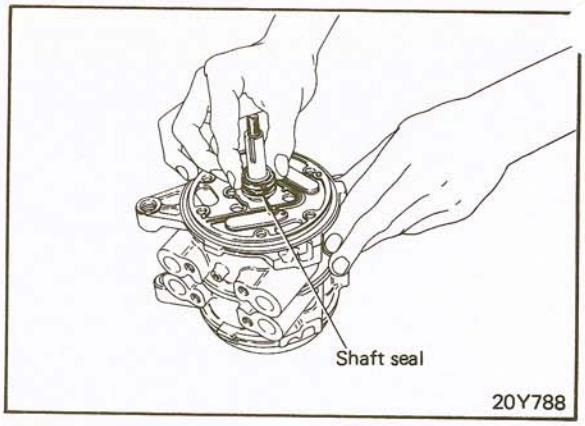
1. Check the front housing for cracks or scoring on the sealing surfaces.
2. Check the compressor shaft for scoring.



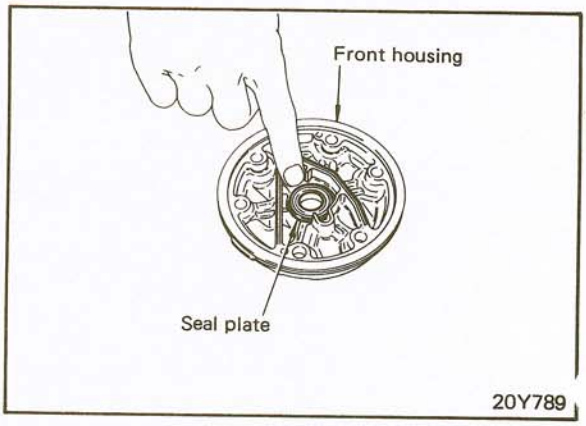
INSTALLATION

1. Lubricate the shaft seal with compressor oil. Install the shaft seal on the shaft.

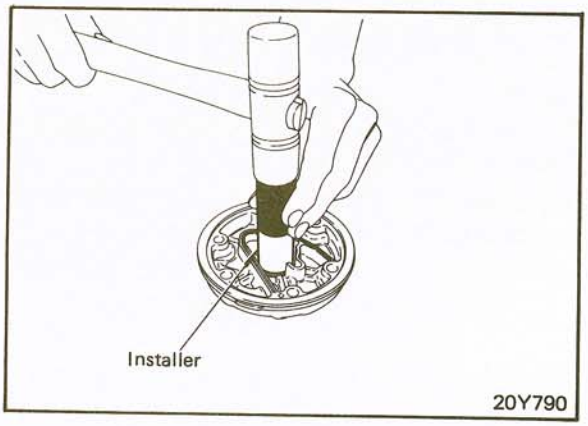
NOTE
Rotate the shaft seal lightly by hand to check that it is fitted into the notch on the compressor shaft.



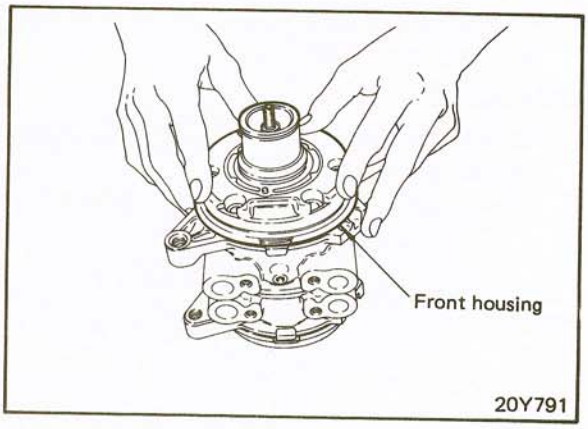
2. Lubricate the seal plate and a new O-ring with compressor oil. Push the seal plate and O-ring into the front housing.



3. Lubricate the new front housing O-ring with compressor oil and install it into the compressor housing.

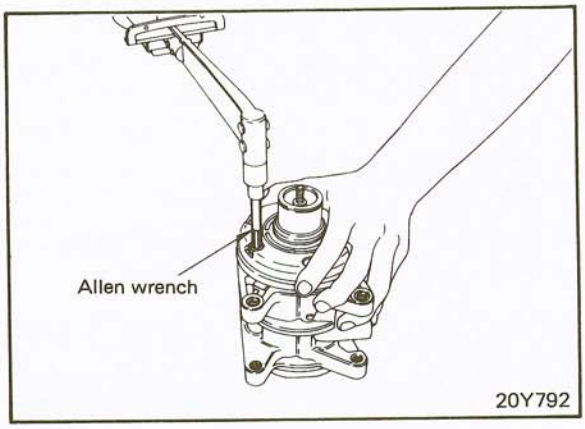


4. Install the front housing in position over the locating pins in the compressor.

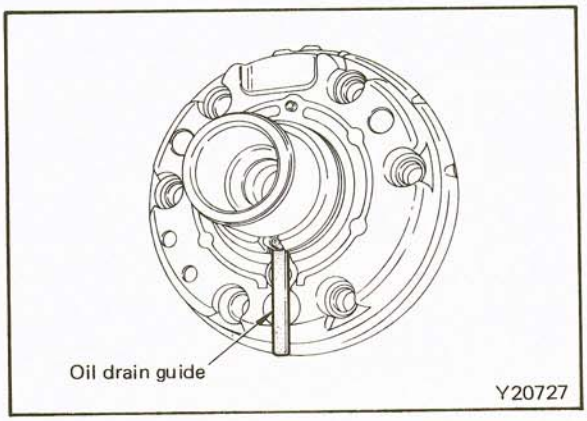


. Install the six compressor through bolts.

NOTE
New washers should be used on the six through bolts.

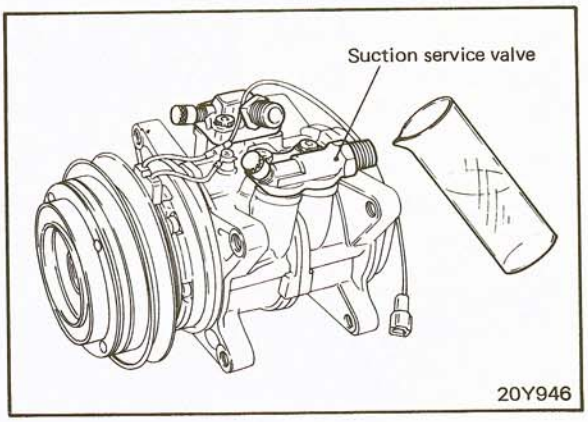


6. Install the woodruff key.
7. Insert a new oil drain guide in front of the seal plate on the front housing. (Y20727)



8. Pour the specified quantity of new compressor oil into the service valves.

Compressor oil	90 cc (5.5 cu.in.)



EMISSION CONTROL SYSTEMS

CONTENTS

EMISSION CONTROL SYSTEMS

Vehicles equipped with a gasoline engine present three potential sources of air pollution: engine crankcase emissions, fuel system evaporative emissions and engine exhaust emissions.

Emission Control System Specifications

	Federal (not available in California)	California (can also be sold in Federal States)
Crankcase Emission Control System		
Type of system	Closed	Closed
Control valve	P.C.V. valve	P.C.V. valve
Evaporative Emission Control System		
Canister	Single	Single
Bowl vent valve	X	X
Carbon element	X	X
Purge control valve	X	X
Fuel filler cap	With relief valve	With relief valve
Vapor separator tank	Vapor-liquid	Vapor-liquid
Overfill limiter (Two-way valve)	X	X
Fuel check valve	X	X
Exhaust Emission Control System		
Jet valve	X	X
Catalytic converter (c/c)	Dual oxidation type	Dual three way type
Secondary air supply system	Dual reed valve	Single reed valve
Exhaust gas recirculation system		
EGR valve	Dual + sub	Single + sub
Thermo valve	Single three-way type with conventional carburetor	Single two-way type with feed back carburetor
Heated air intake system	X	–
Deceleration device		
Coasting air valve	X	X
Air switching valve	X	X
Throttle opener for air conditioner	X	X
Tamper-proof (mixture, choke)	X	X
High-altitude compensation device	X	X
Fuel control system	Conventional carburetor	Feed back carburetor

X:available
–:not available

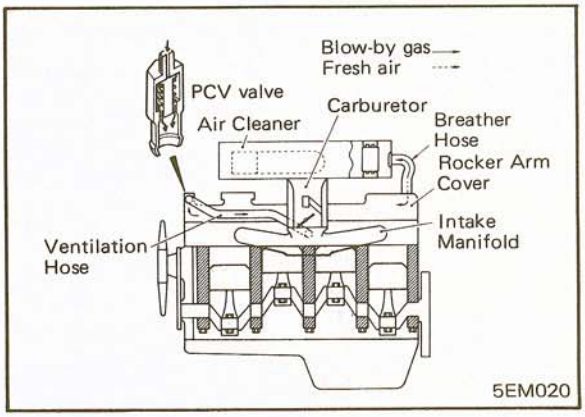
FUEL USAGE STATEMENT

Use gasoline having a minimum antiknock index (Octane value) of 87, or a gasoline classification number of ②
These designations are comparable to a Research Octane Number of 91.
All vehicles equipped with catalyst emission control systems have labels located on the instrument panel and on the back of fuel filler lid that state: "UNLEADED GASOLINE ONLY".
These vehicles also have fuel filler tubes especially designed to accept only the smaller-diameter unleaded gasoline dispensing nozzle only.

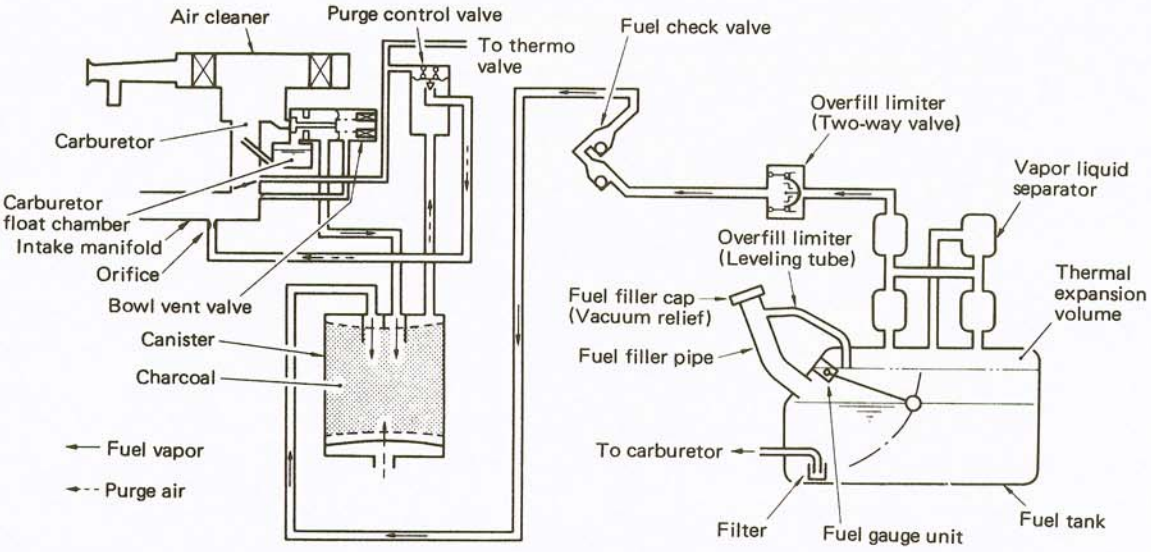
C51520

CRANKCASE EMISSION CONTROL SYSTEM

A closed-type crankcase ventilation system is utilized to prevent the blow-by gas from escaping into the atmosphere. This system has a positive crankcase vent valve (PCV valve) at the rocker arm cover.
This system supplies fresh air to the crankcase through the air cleaner. Inside the crankcase, the fresh air is mixed with blow-by gases, and this mixture passes through the PCV valve into the induction system.
The PCV valve has a metered orifice through which the mixture of fresh air and blow-by gases is drawn into the intake manifold in response to the intake manifold vacuum. The valve capacity is adequate for all normal driving conditions.
Under heavy acceleration or high-speed driving, there is less intake manifold vacuum available, and the blow-by gases exceed the PCV valve capacity. In this case, the blow-by gases back up into the air cleaner through the breather hose.



EVAPORATIVE EMISSION CONTROL SYSTEM

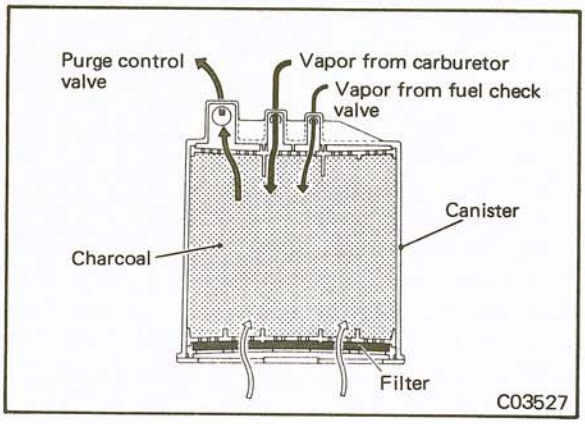


03W527

In order to prevent the loss of fuel vapor from the fuel system to the atmosphere, the evaporative emission-control system consists of a charcoal canister, a bowl vent valve, a purge-control vavle, and so on.

Canister

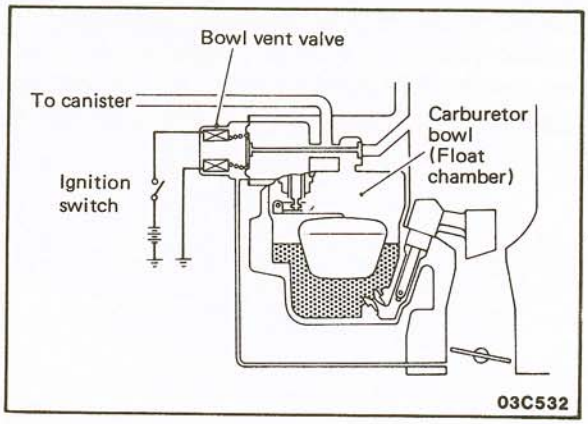
While the engine is inoperative, fuel vapors generated inside the fuel tank and the carburetor float chamber are absorbed and stored in the canister. When the engine is running, the fuel vapors absorbed in the canister are drawn into the intake manifold through the purge-control valve and an orifice. And the carburetor bowl vapors flow into the carburetor through the bowl vent valve.



C03527

Bowl Vent Valve

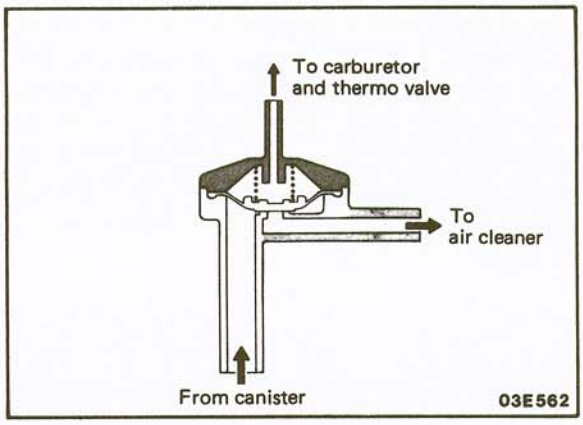
The bowl vent valve, which controls the carburetor bowl vapors, is opened when the intake manifold vacuum working on the diaphragm of the valve exceeds the pre-set value after the ignition key is turned on, and is kept being opened by the solenoid valve, even though the intake manifold vacuum becomes the atmospheric pressure during engine operation, once the ignition key has been turned on. When the engine is off, the valve is closed.



03C532

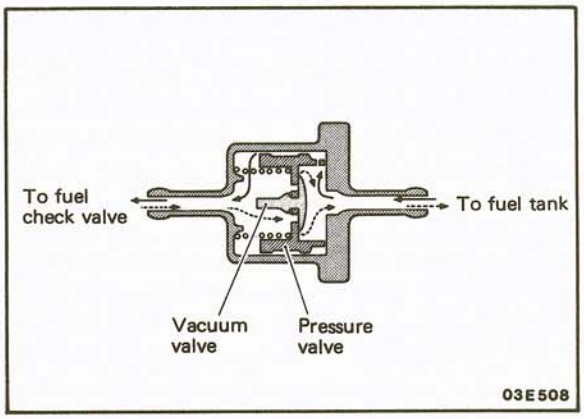
Purge Control Valve

The purge-control valve is kept closed during idling in order to prevent vaporized fuel from entering into the intake manifold for positive control of high idle-CO emissions, which is a particular problem under high ambient temperatures. When the carburetor vacuum working on the diaphragm of the valve exceeds the pre-set value, the purge-control valve is opened.



Overfill Limiter (Two-way Valve)

The overfill limiter consists of a pressure valve and a vacuum valve. The pressure valve is designed to open when the fuel tank internal pressure has increased over the normal pressure and the vacuum valve opens when a vacuum has been produced in the tank.

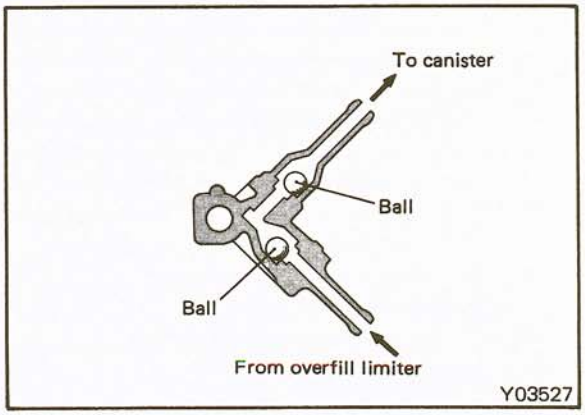


Thermo Valve

A thermo valve incorporated in this system (for sensing the coolant temperature at the intake manifold) closes the purge-control valve when the coolant temperature is lower than a pre-set value, in order to reduce CO and HC emissions under engine warm-up conditions, and opens the purge-control valve when the coolant temperature become above the pre-set temperature.
The thermo valve is deemed to be an acceptable AECD, according to the criteria defined in section.

Fuel Check Valve

The fuel check valve is used to prevent fuel leaks should the vehicle roll over. This valve is connected in the fuel vapor line (between canister and overfill limiter) and is mounted on the back of the filler hose protector.
The fuel check valve contains two balls as shown in the illustration. Under normal conditions, the gasoline vapor passage in the valve is opened, but if roll-over occurs, one of the balls closes the fuel passage, thus preventing fuel leaks.



EXHAUST EMISSION CONTROL SYSTEM

Exhaust emissions (carbon monoxide, hydrocarbons and nitrogen oxides) are controlled by a combination of engine modifications and the addition of special control components. These components have been integrated into a highly effective system which controls exhaust emissions while maintaining good performance.

Jet Air System

The combustion chamber is the same cross-flow type hemispherical combustion chamber as the conventional one. In addition to the intake valve and exhaust valve, a jet valve has been provided for drawing jet air (super-lean mixture or just air) into the combustion chamber. The jet valve assembly consists of the jet valve, jet body and spring, and is screwed into the jet piece which is press-fitted into the cylinder head with the jet opening toward the spark plug.

A jet air passage is provided in the carburetor, intake manifold and cylinder head. Air flows through the two intake openings provided near the primary throttle valve of the carburetor, goes through the passage in the intake manifold and cylinder head, and flows through the jet valve and the jet opening into the combustion chamber.

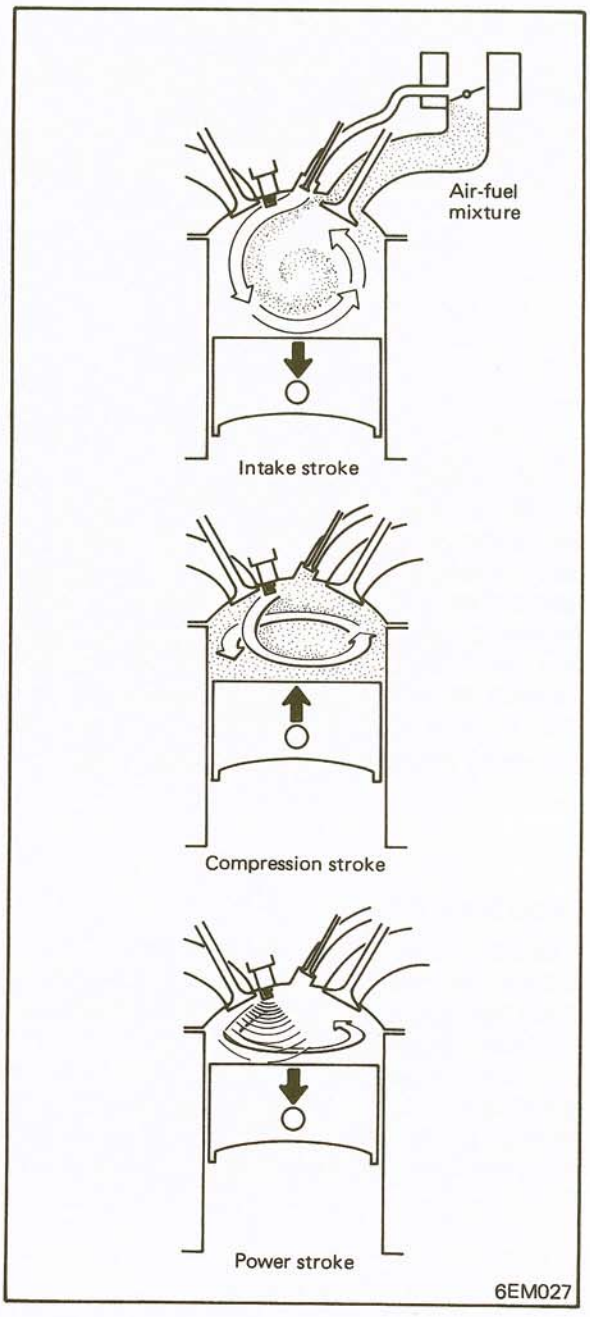
The jet valve is actuated by the same cam as the intake valve and by a common rocker arm so that the jet valve and intake valve open and close simultaneously.

On the intake stroke, the air-fuel mixture flows through the intake valve port into the combustion chamber. At the same time, jet air is forced into the combusion chamber because of the pressure difference produced between the two ends of the jet air passage (between the jet air intake openings in the carburetor throttle bore and the jet opening of the jet piece) as the piston moves downward.

When the throttle valve opening is small during idling or light load, a large pressure difference is produced as the piston moves downward, causing jet air to flow into the combustion chamber rapidly. The jet air flowing out of the jet opening scavenges the residual gases around the spark plug and creates a good ignition condition. It also produces a strong swirl in the combustion chamber which continues throughout the compression stroke and improves flame propagation after ignition, assuring high combustion efficiency.

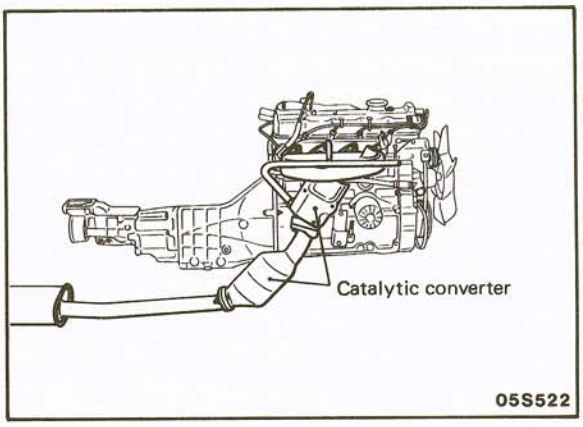
When the throttle valve opening is increased, more air-fuel mixture is drawn in from the intake valve port so that the pressure difference is reduced and less jet air forced in.

The jet air swirl dwindles with increase of the throttle valve opening, but the intensified inflow of normal intake air-fuel mixture can satisfactorily promote combustion.



Catalytic Converter

The catalytic converter requires the use of unleaded gasoline only.
Leaded gasoline will destroy the effectiveness of the catalyst as an emissions-control device.
Under normal operating conditions the catalytic converter will not require maintenance. However, it is important to keep the engine properly tuned. If the engine is not kept properly tuned, engine misfiring may cause overheating of the catalyst. This may cause heat damage to the converter or vehicle components. This situation can also occur during diagnostic testing if any spark plug cables are disconnected and the engine is allowed to idle for a prolonged period of time.



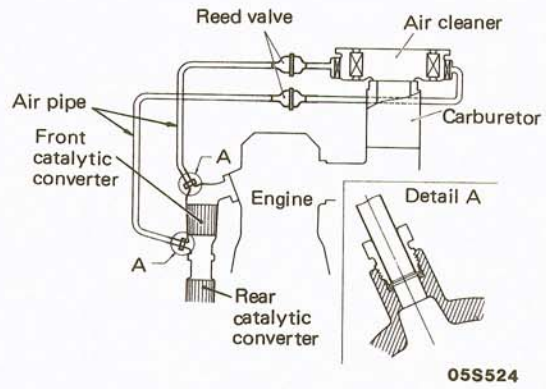
Caution

1. **Operation of any type, including idling, should be avoided if engine misfiring occurs. Under this condition, the exhaust system will operate at abnormally high temperature, which may cause damage to the catalyst or underbody parts of the vehicle.**
2. **Alteration or deterioration of ignition or fuel system or any type of operating condition which results in engine misfiring must be corrected to avoid overheating the catalytic converter.**
3. **Proper maintenance and engine tune-ups according to manufacturer's specifications should be made to correct any improper operating conditions as soon as possible. Interrupting the ignition at high speeds with the transmission in gear will result in a catalyst overheat condition.**

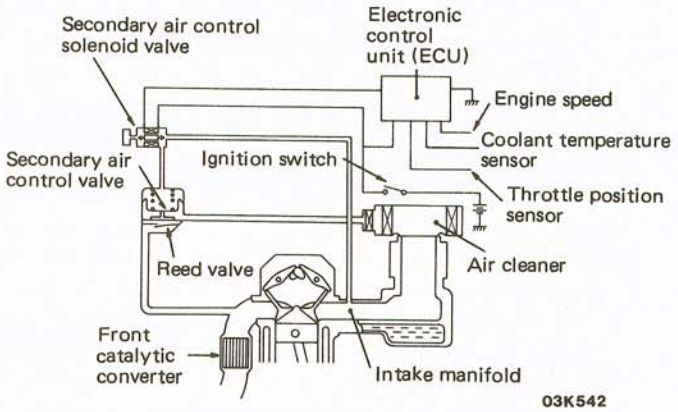
Secondary Air Supply System

The air injection system consists of a reed valve with a secondary air control valve, and a solenoid valve.

For Federal



For California

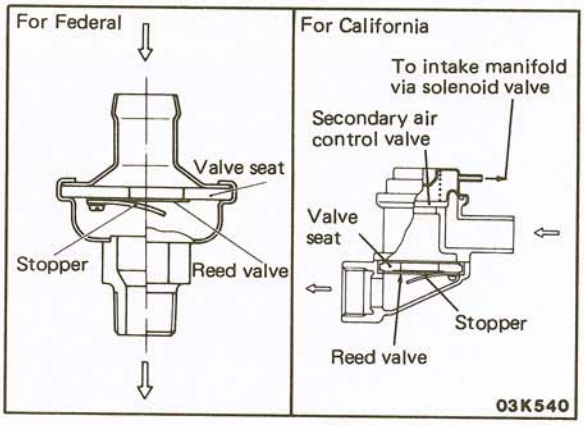


REED VALVE

The reed valve supplies secondary air into the front catalytic converter for the purpose of promoting oxidation of exhaust emissions during the engine warm-up operation and the vehicle deceleration.

The reed valve is actuated by exhaust vacuum being generated from pulsation in the exhaust manifold, and extra air is supplied into the exhaust manifold through the secondary air control valve.

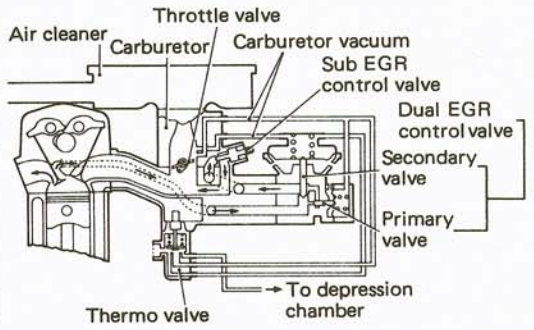
The secondary air control valve is opened by the intake manifold pressure when the solenoid valve is energized by the ECU based on the information on coolant temperature, engine speed, and idle position.



Exhaust Gas Recirculation (EGR) System

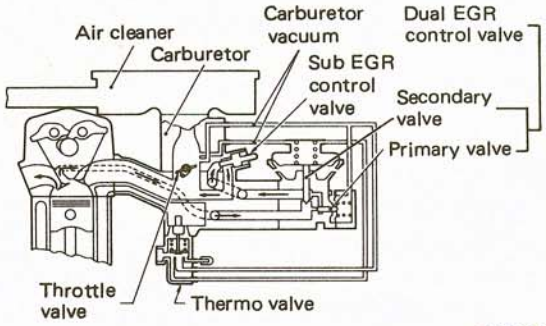
An Exhaust Gas Recirculation (EGR) system is utilized to reduce nitrogen oxides in the exhaust. In this system, the exhaust gas is partially recirculated from a cylinder head exhaust port into a port located at the intake manifold below the carburetor. The EGR flow is controlled by the EGR control valve and the thermo valve.

For Federal
–Manual transmission



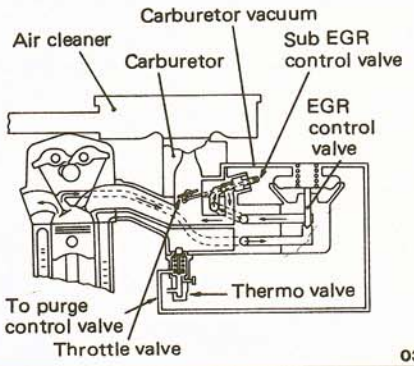
5EM023

For Federal
–Automatic transmission



03W528

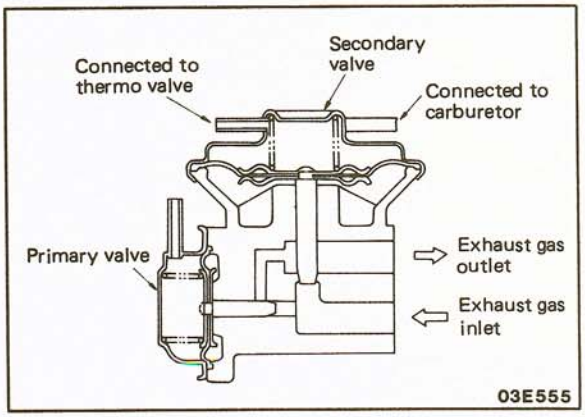
For California



03K533

DUAL EGR CONTROL VALVE

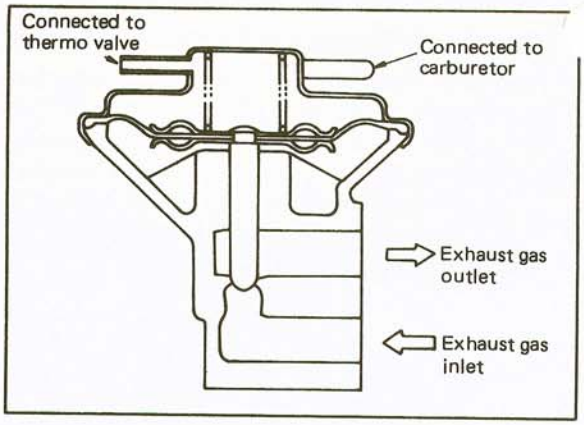
The dual EGR control valve consists of primary and secondary valves which are controlled by different carburetor vacuums in response to the throttle valve openings, while the EGR flow is suspended at idle and WOT operation. The primary valve controls EGR flow for vehicle operation with relatively narrow throttle valve openings, while the secondary control valve allows the recirculation of exhaust gas into the intake mixture when the throttle valve is further opened. The vacuum applied on the dual EGR control valve is controlled by a thermo valve as described in next section.



03E555

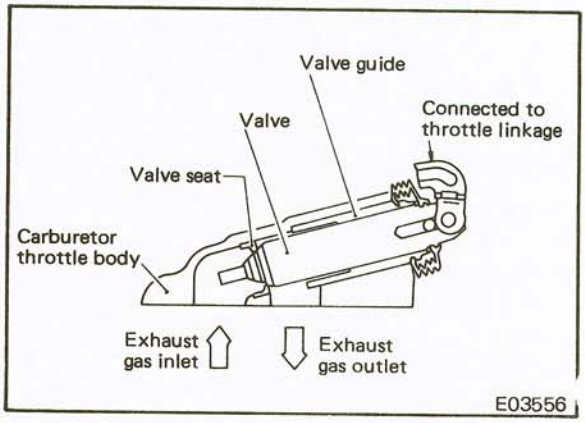
EGR CONTROL VALVE

The EGR control valve, which is a conventional type, is controlled by carburetor vacuum in response to the throttle valve opening, while the EGR flow is suspended at idle and WOT operations.
The vacuum to be applied on the EGR control valve is controlled by a thermo valve as described in next section.



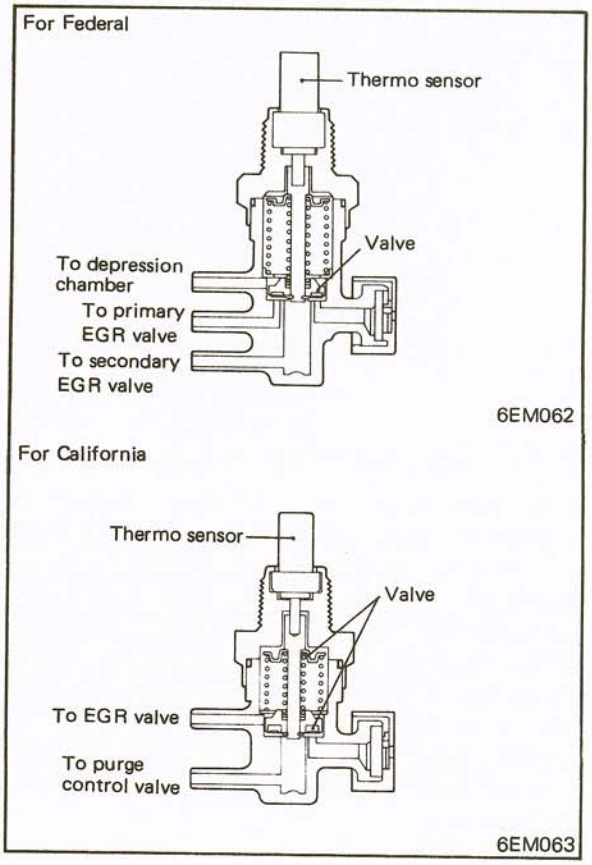
SUB EGR CONTROL VALVE

The sub EGR control valve is directly opened and closed with the motion of the throttle valve through a linkage in response to the throttle valve opening in order to closely modulate the EGR flow which is controlled by the EGR control valve.



THERMO VALVE

A thermo valve incorporated in the EGR system for sensing the coolant temperature at the intake manifold closes the EGR control valve when the coolant temperature is lower than a pre-set value. This prevents deterioration of vehicle driveability and startability during initial starting and opens the EGR control valve when the coolant temperature exceeds the pre-set temperature. Once the engine is stopped and the coolant temperature again becomes lower than the pre-set value, the thermo valve once again closes the EGR control valve.

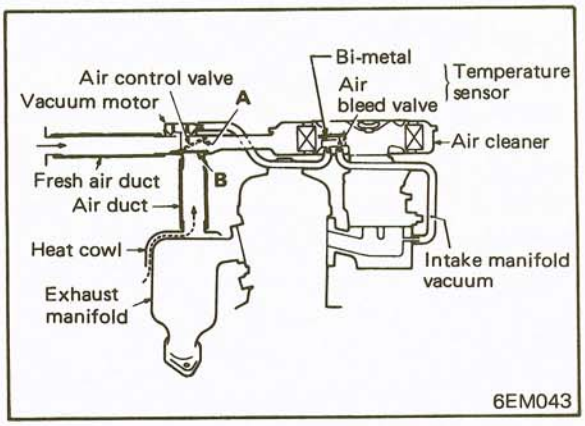


Heated Air Intake System (Conventional Carburetor only)

All vehicles are equipped with a temperature regulated air cleaner so that the carburetor can be calibrated leaner to reduce CO and HC emissions, and so that improved engine warm-up characteristics and minimized carburetor icing can be attained. The air cleaner is provided with an air control valve, inside the snorkel, to modulate the temperature of carburetor intake air. The air control valve is controlled by a vacuum motor and temperature sensor combination system which responds to the intake manifold vacuum and temperature inside the air cleaner. When the bi-metal senses a temperature inside air cleaner of below about 29°C (84°F), the air bleed valve of the temperature sensor assembly remains closed. The intake manifold vacuum is then applied to the diaphragm of the vacuum motor, which in turn opens air control valve (A) so as to let the pre-heated intake air flow through the heat cowl and air duct into the air cleaner.

When the bi-metal senses a temperature inside air cleaner of above about 45°C (113°F), the air bleed valve is fully opened. As a result, the intake air to the carburetor comes directly through the fresh air duct since the air control valve is positioned at (B), regardless of the intake manifold vacuum.

At intermediate temperatures the air entering the carburetor is a blend of fresh air and pre-heated air as regulated by the thermostatically actuated air control valve.

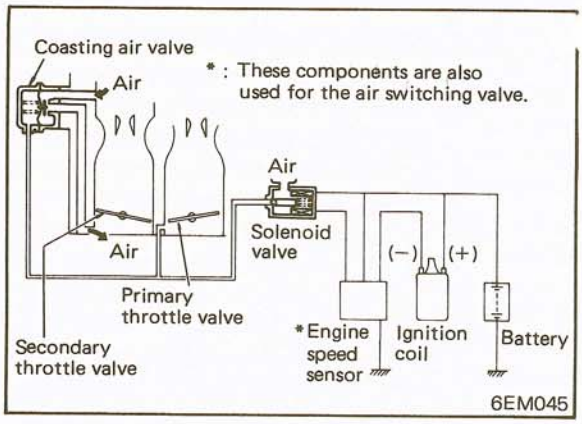


Deceleration Devices

These deceleration devices are used to decrease HC emissions during vehicle deceleration. They include the coasting air valve (CAV) system, the air switching valve (ASV) system and the dashpot. The CAV, ASV, and dashpot are all installed on the carburetor.

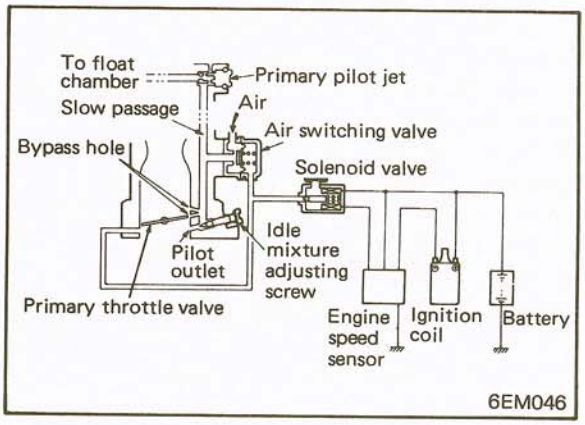
COASTING AIR VALVE (CAV) SYSTEM

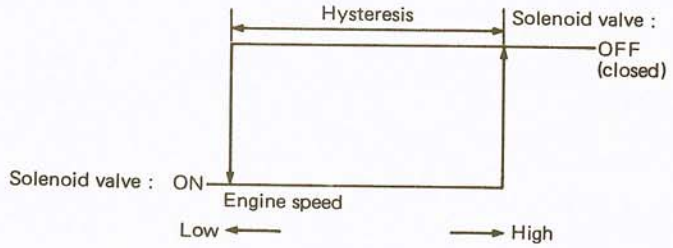
In order to decrease HC emissions emitted during vehicle deceleration, the coasting air valve (CAV), which is activated by carburetor ported vacuum, supplies additional air into the intake manifold. The activation of the CAV is suspended by the opening of the solenoid valve when the engine speed sensor detects engine speeds at or below the specified value in order to maintain smooth vehicle operation in transient phase to help prevent engine stalling. The solenoid valve and the engine speed sensor are also used for the air switching valve system.



AIR SWITCHING VALVE (ASV) SYSTEM

In order to improve fuel economy as well as reduce HC emissions during vehicle deceleration, the air switching valve, which is activated by carburetor ported vacuum, cuts off the fuel flow to the bypass holes and pilot outlet by supplying additional air into the slow passage. The activation of the air switching valve is suspended by opening the solenoid valve when the engine speed sensor detects engine speeds at or below the specified value in order to maintain smooth vehicle operation in transient phase to help prevent engine stalling.



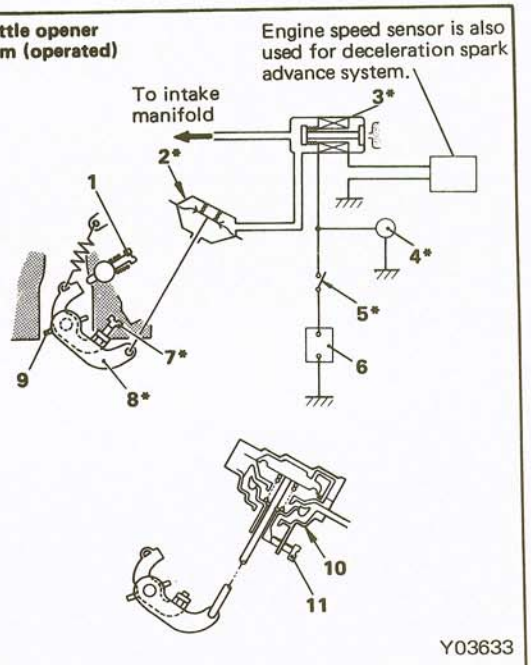


Throttle Opener System (for air conditioner only)

This system consists of a throttle opener assembly, a solenoid valve, an engine speed sensor and the air conditioner compressor switch. When the compressor switch is turned on and when the engine speed sensor detects engine speeds at or below the specified value, the solenoid valve is opened so as to transfer the intake manifold vacuum to the throttle opener, the throttle valve is slightly opened by the throttle opener via the throttle opener lever which moves on the throttle valve shaft. Consequently the engine runs at a speed determined by the new throttle valve opening to offset the compressor load. When the compressor switch is turned off, the throttle opener system stops working.

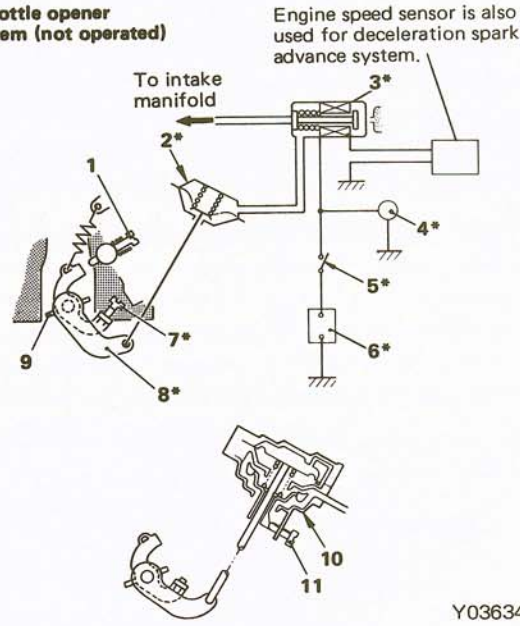
The engine speed sensor used in the deceleration spark advance system is also used in this throttle opener system. When the sensor detects engine speeds at or below the specified value, the deceleration spark advance system does not operate and when the engine speed is above the specified value, the deceleration spark advance system functions as designed. Therefore, the engine speed sensor does not cause this throttle opener system violate the regulations of the Clean Air Act.

Throttle opener system (operated)



Y03633

Throttle opener system (not operated)



Y03634

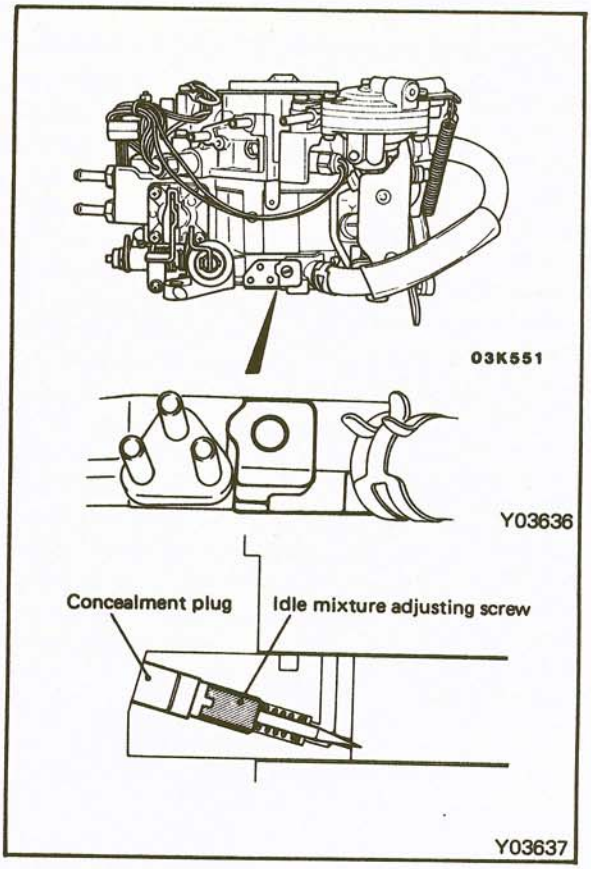
* : Parts with the asterisks are included in the air-conditioning unit.

1. Idle speed adjusting screw
2. Throttle opener for vehicles with automatic transmission
3. Solenoid valve
4. Compressor
5. Compressor switch
6. Battery
7. Throttle opener setting screw
8. Throttle opener lever
9. Throttle valve
10. Throttle opener for vehicles with manual transmission for California
11. Throttle opener setting screw

Tamper-proof

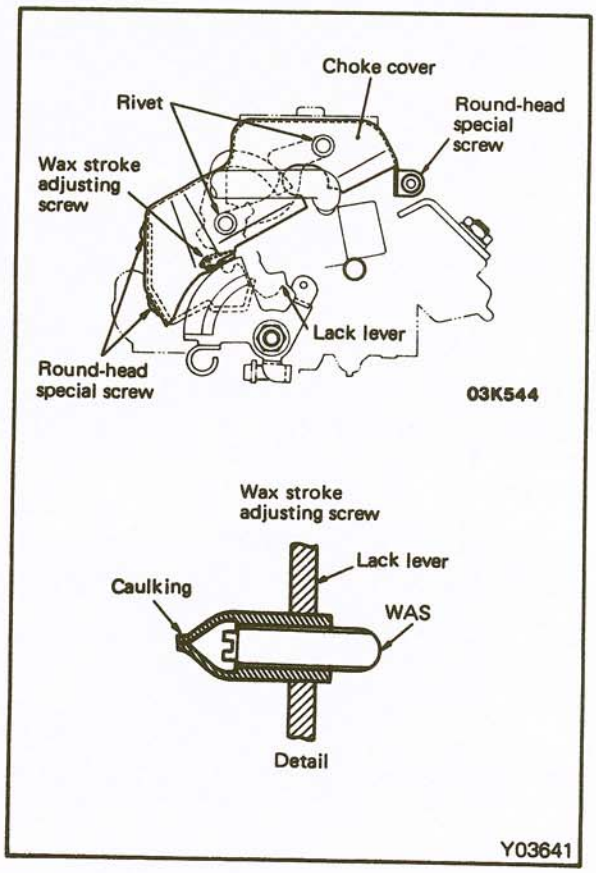
TAMPER-RESISTANT FOR IDLE MIXTURE ADJUSTMENT

All carburetors have tamper-resistant idle mixture adjustment. The CO setting has been adjusted at the factory. Neither removal of the plug nor tampering with the mixture screw is required in service except during a major carburetor overhaul or throttle body replacement, or when high-idle CO adjustments are required by state or local regulations.



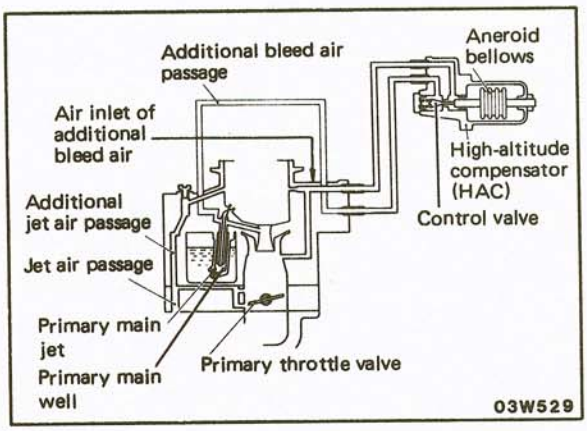
TAMPER-PROOF AUTOMATIC CHOKE

All carburetors also have tamper-proof choke. The choke-related parts are factory adjusted. Neither removal of the choke cover, nor tampering with W.A.S., (wax-stroke adjusting screw) is required in service except during a major carburetor overhaul, or when adjustment of choke-calibration-related parts is required by state or local regulations.



High Altitude Compensation System
–For Federal (not available in California)

In order to comply with the Federal high altitude requirements, the Federal vehicles are equipped with high altitude compensation system, which consists of dual catalytic converters, two reed valves, a high altitude compensator (HAC), and passages for additional bleed air and additional jet air.



HAC

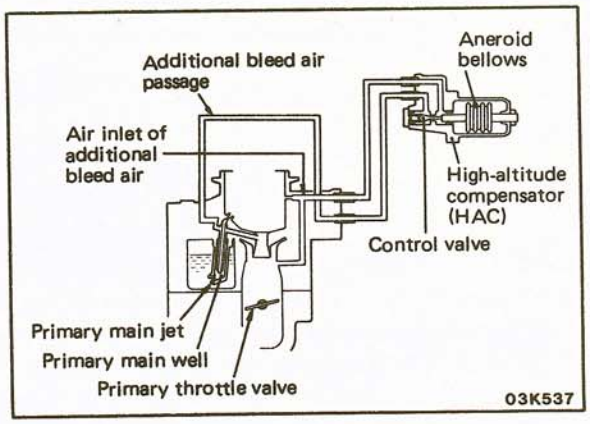
With the aid of those high altitude compensation systems, the air/fuel ratios at high altitude are maintained to approximately the same degree as at sea level.

ADDITIONAL JET AIR

In order to further compensate the air/fuel ratio for engine idling and light load operation, additional air is supplied into the jet air passage for the Jet Valve System.

High Altitude Compensation System
–For California (can also be sold in Federal States)

In order to meet the requirements at all altitudes, all the feedback carburetor vehicles for california are equipped with high altitude compensation system in addition to feedback carburetor system. High altitude compensation system consists of a high altitude compensator (HAC), and passages for additional bleed air.



HAC

The air/fuel ratios at high altitude are maintained by the HAC to approximately the same degree as at sea level, by supplying additional bleed air into the primary main well through a control valve controlled by an aneroid bellows of the HAC.
Then the air/fuel ratios are controlled precisely by feedback carburetor with high altitude compensation system to comply with the applicable emissions standards at all altitudes.

FUEL CONTROL SYSTEM (FBC SYSTEM)

Feedback carburetor system provides the capability to perform closed loop fuel control. It also provides the capability to control the secondary air system, the deceleration spark control system and throttle opener system.
The basic functions of this system are depicted below. Input signals from a variety of sensors are fed to a microprocessor based Electronic Control Unit (ECU). The ECU then generates output signals for all of the controlled functions.
This feedback carburetor is a 2-barrel, downdraft carburetor designed for Closed Loop System.
When used with the Closed Loop System of mixture control, this carburetor includes special design features for optimum air/fuel mixtures during all ranges of engine operation.
Fuel metering is accomplished through the use of three solenoid- operated on/off valves (jet mixture, enrichment and deceleration solenoids) adding or reducing fuel to the engine. The activation of the on/off valve is controlled by the length of time current supplied to the solenoid. The solenoid operates at a fixed frequency. By varying the amount of time the solenoid is energized during each cycle (defined as duty cycle) the air/fuel mixture delivered to the engine can be precisely controlled. The duty cycle to the solenoid is controlled by the electronic control unit (ECU) in response to signals from the exhaust oxygen sensor, throttle position sensor and so on.
Incorporated in the feedback carburetor are 8 basic systems of operation: fuel inlet, primary metering, secondary metering, accelerating pump, choke, jet mixture, enrichment and fuel cut-off. The former 5 systems are substantially the same as the conventional carburetor.
The latter 3 systems, which are unique to this feedback carburetor, are described as follows.

1. **Sensor**

   (1) Exhaust oxygen sensor

   The oxygen sensor is mounted in the exhaust manifold. The output signal from this sensor, which varies with oxygen content of the exhaust gas stream, is provided to the ECU for use in controlling closed loop compensation of fuel delivery.

   (2) Coolant temperature sensor

   The coolant temperature sensor is installed in the intake manifold. This sensor provides data to the ECU for use in controlling fuel delivery, secondary air management.

(3) **Engine speed sensor**

The engine speed signal comes from the ignition coil. Electric signals are sent to the ECU where the time between these pulses is used to calculate engine speed, which is used in controlling fuel delivery, secondary air management, deceleration spark and throttle opener managements.

(4) **Throttle position sensor (TPS)**

This is a potentiometer mounted to the carburetor. The TPS provides throttle angle information to the ECU to be used in controlling the fuel delivery and secondary air management.

(5) **Vacuum switch**

This switch is installed on the toe board or the fender and is turned "ON" when the throttle valve is at the closed (idling) position. Information from this switch is provided to the ECU for use in controlling fuel delivery and secondary air management.

(6) **Intake air temperature sensor**

The intake air temperature sensor is installed in the air cleaner. This sensor measures the temperature of the intake air in the air cleaner and provides this information to the ECU for use in controlling fuel delivery.

2. **Electronic Control Unit (ECU)**

The Electronic Control Unit is mounted in the passenger compartment and consists of a printed circuit board mounted in a protective metal box.
It receives analog inputs from the sensors and converts them into digital signals. These digital signals and various discrete inputs are processed and used by the ECU in controlling the fuel delivery, secondary air, deceleration spark and throttle opener managements.

3. **Electronically Controlled System**

(1) **Feed back Carburetor A/F Control**

The feedback carburetor A/F is controlled by the ECU. The ECU monitors the throttle position, engine speed, coolant temperature, intake air temperature and exhaust oxygen concentration to calculate the fuel flow required to yield the desired A/F ratios for all operating conditions.
Closed loop control is used to adjust the fuel flow to yield a near stoichiometric A/F ratio when required. The fuel flow is modified to account for special operating conditions such as cold/hot starts, acceleration and deceleration.

(2) Adaptive Memory Control

During the closed loop operation, the ECU controls the duty cycle of the jet mixture control solenoid valve based on the output voltage signal from the exhaust oxygen sensor.

The mean values of the duty cycle are stored in a RAM (Random Access Memory) and the last ones are stored even if the ignition switch is turned off.

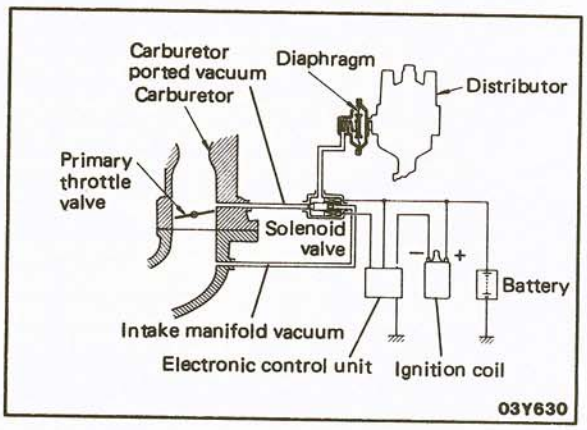
(3) Secondary Air Control

A solenoid is used to control the air control valve signal vacuum. The solenoid is controlled by the ECU based on engine speed, idle position and coolant temperature. This valve sends air to the exhaust manifold.

(4) Deceleration Spark Control

In order to decrease HC emissions emitted during vehicle deceleration, ignition timing is advanced by the solenoid-operated vacuum valve on the distributor, changing the vacuum supplied to the valve from the carburetor ported vacuum to intake manifold vacuum.

The solenoid valve is controlled by the ECU based on engine speed.



(5) Throttle Opener Control

When the air conditioner switch is "ON", or the accessory switch such as instrument panel light and power steering switch is "ON" (in families where applicable), the engine idle speed is increased by changing the throttle valve opening. In order to decrease HC emissions emitted during vehicle deceleration and to improve engine-brake performance, ECU deenergizes the solenoid valve which supplies the manifold vacuum to the throttle opener at or above the preset engine speed and then the throttle opener operation is suspended.

(6) Air Conditoner Control

In order to get good vehicle performance the ECU renders inoperative the air conditioner at or above pre-set throttle opening.

et Mixture System

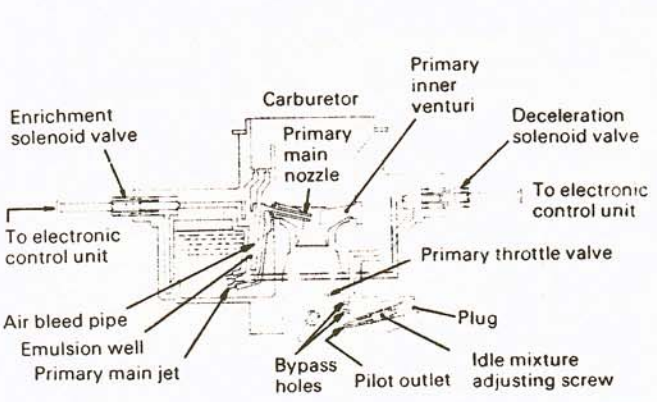
The jet mixture system supplies fuel to the engine through jet mixture passages and jet valves for optimum air/fuel mixtures. This system is calibrated by jet mixture solenoid which is responding to an electrical impulse from the electronic control unit (ECU).
If the exhaust oxygen sensor detects a lean condition, the ECU energizes the solenoid at increasing duty cycles to enrich the mixture. If the exhaust sensor detects a rich condition, the solenoid receives a signal from the ECU at decreasing duty cycle to lean out the mixture. Thus, the solenoid is constantly responding to an electrical signal from the ECU to provide efficient control of air/fuel mixtures.

Enrichment System

Enrichment system consists of metering jet and an enrichment solenoid-operated on/off valve which provides additional fuel for main metering system. The activation of the on/off valve is controlled by the length of time current supplied to the solenoid.
When additional fuel is required such as heavy acceleration, heavy engine loads, cold start or warm-up operation, the ECU energizes the solenoid at the pre-set duty cycles.

Fuel Cut-Off system

When the ignition key is turned off, the deceleration solenoid valve cuts off the fuel flow to prevent engine "run-on" (dieseling).
During certain deceleration, the deceleration solenoid valve reduces the fuel flow in order to decrease HC emissions and improve fuel economy.
Under normal engine operation, the needle valve is drawn by the solenoid to provide the necessary fuel flow for smooth engine operation.



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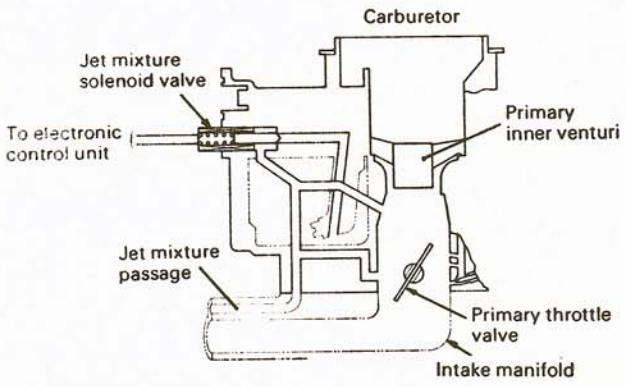


03K538

CANISTER

Removal

1. Disconnect all hoses and detach all clamps.
2. Unhook the canister band tightening clamp.

Installation

When installing the canister, observe the following items:
(1) Securely tighten each clamp.
(2) Confirm correct hose routing to ensure proper engine performance.
(3) Check surface of hoses for cracks and replace if defective.

Inspection and Maintenance

1. Clogging or damage of the fuel vapor vent line will cause discharge of fuel vapor into the atmosphere and destroy the effectiveness of the system. Disconnect both ends of the line and inspect it by blowing air through it.
2. If the canister is used over a long period, the interior filter will become clogged, which decreases the quantity of purge air and lowers the capacity of the canister. Replace it with a new one at the specified period. Also, because rubber and vinyl hoses will deteriorate with normal use, replace them with new ones when replacing the canister.

PURGE CONTROL VALVE

Inspection

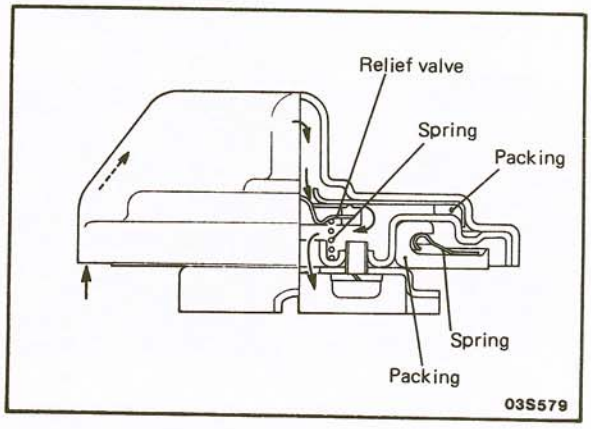
1. Make sure that the cooling water is at temperatures between 80 and 90°C (176 and 194°F).
2. Disconnect the purge hose from the air cleaner and blow into the purge hose. If the valve is not open, its operation is normal. Then, start the engine and increase the engine speed to 1,500 to 2,000 rpm and blow into the purge hose. If the valve is open, it is normal. If the valve is not open, check for clogged or broken vacuum hose, or malfunctioning thermo valve.

FUEL FILLER CAP

1. Fuel filler cap is equipped with relief valve to prevent the escape of fuel vapor into the atmosphere. (03S579)
2. If the pressure in the tank drops below the specified negative pressure, the valve will open to adjust the pressure.

Negative-pressure Valve Performance

Valve opening pressure	−4.413 ± 1.275 kPa (−.640 ± .185 psi)
Open valve flow (at −33.1 mmHg)	1 liter/min. minimum (1.06 U.S.qt./min. minimum), (.88 Imp.qt./min. minimum)



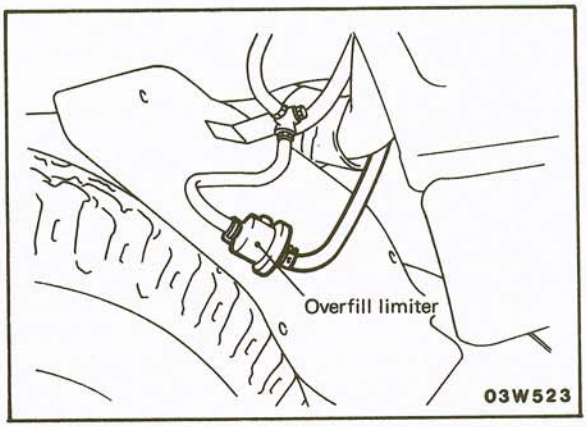
)VERFILL LIMITER (Two-way Valve)

Removal

1. Remove the filler hose protector. (Refer to GROUP 14.)
2. Disconnect the vapor hoses from the overfill limiter, and then remove the overfill limiter mounting bolts. (03W523)

Inspection

Check the overfill limiter body for cracks, leaks, malfunctions; replace it if defective. Inspection of overfill limiter requires a measuring instrument. A simple way of inspection, however, is to remove it and lightly blow air into either the intake or outlet ports. If the air passes after a slight resistance, the overfill limiter is in good condition.



FUEL CHECK VALVE

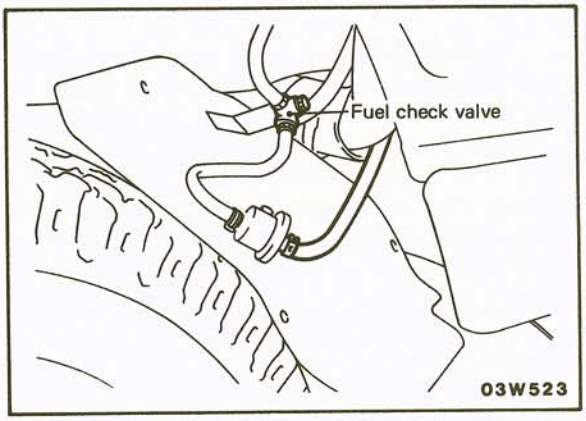
Removal

1. Remove the filler hose protector. (Refer to GROUP 14.)
2. Remove the fuel check valve mounting bolt. (03W523)
3. Remove the hose attaching clamps and disconnect the hoses from the check valve.

Installation

When installing the fuel check valve, observe the following items:

1. Securely tighten each hose clamp.
2. Replace hoses if they have cracks.
3. Securely tighten the valve mounting bolt.



EXHAUST EMISSION CONTROL SYSTEM

CATALYTIC CONVERTER

Removal

Caution

Before removing or inspecting the exhaust system, ensure that the exhaust system is cool enough.

1. Remove the air cleaner.
2. Remove the air duct and heat cowl.
3. Disconnect the front exhaust pipe at exhaust manifold and secondary air supply pipe.
4. Remove stud nuts attaching the exhaust manifold to the cylinder head. Slide manifold off studs and away from cylinder head.
5. Remove bolts tightening the exhaust manifold to the catalyst case assembly.

Installation

To replace the interior parts of front catalytic converter: Place a new cushion on the catalyst. Be sure the cushion is not deformed. Place a new stainless steel gasket on the catalyst case. Be sure the gasket fits the inside diameter of the cushion.

1. Combine the exhaust manifold and the catalyst case assembly and evenly tighten the bolts to the specified torque.

Tightening torque .....
Exhaust manifold-to-catalyst case tightening bolts 30 to 34 Nm (22 to 25 ft.lbs.)

2. After installing the exhaust manifold gasket to the cylinder head, install the exhaust manifold assembly and tighten the nuts to the specified torque. If the gasket is to be reused, check both sides of the gasket for damage. The gasket may be reused if there are no signs of damage.

Tightening torque .....
Exhaust manifold assembly mounting nuts 15 to 19 Nm (11 to 14 ft.lbs.)

3. Install the heat cowl.
4. Install the air duct.
5. Install the air cleaner.

SECONDARY AIR SUPPLY SYSTEM

Inspection

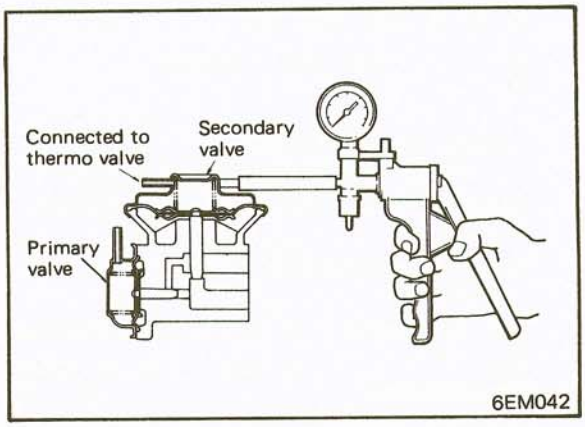
1. Check the air hoses and air pipes for damage or cracks; replace if necessary.
2. Check the air pipe connections for leakage.
3. Start and run the engine at idle.
4. Disconnect the air hose from the reed valve.
5. Put your hand lightly on the intake port of reed valve. If you feel suction, the reed valve is good. Check to ensure that no exhaust emission is blown back. Replace if defective.

EGR SYSTEM

Test

1. Check the vacuum hose routing and installation.
2. Cold start and run the engine at idle speed.
3. Check to ensure that increasing engine rpm (idle to 2,500 rpm) does not cause the secondary EGR valve to operate. If the secondary EGR valve operates, replace the thermo valve.
4. Warm up the engine until the coolant temperature exceeds 55°C (131°F).
5. Check to ensure that when engine speed is increased as described in step 3, the secondary valve operates. If it does not operate, inspect the EGR control valve and the thermo valve.

6. Disconnect the green stripe hose from the thermo valve.
7. Connect a vacuum pump to the thermo valve and apply vacuum. If no vacuum is available, the thermo valve is good. (6EM042)
8. Disconnect the green stripe hose from the nipple of carburetor.
9. Connect a vacuum pump to the green stripe hose.
10. While opening the sub EGR valve by pulling it by hand, apply −20 kPa (−5.9 in. Hg.) vacuum with the vacuum pump.
11. If the idling speed becomes unstable, the secondary valve is operating properly. If the idling speed remains unchanged, the valve is not operating. Replace the EGR valve.



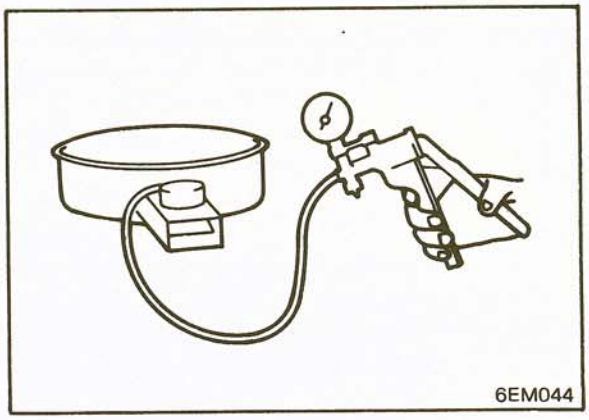
SUB EGR VALVE

1. Check to ensure that when the sub EGR valve is pulled by hand, it moves smoothly. If the valve is hard to move, remove the sub EGR valve and check it for carbon, dust or other deposits. If necessary, clean with a solvent and apply a slight amount of oil. If the valve is still hard to move, replace it.
2. If it is difficult to remove the sub EGR valve, spray it with a solvent so that it can be turned easily.

HEATED AIR INTAKE SYSTEM

Inspection

1. Make sure all vacuum hoses and the heat cowl to air cleaner air duct are properly attached and are in good condition.
2. With a cold engine and ambient temperature less than 30°C (86°F), the air control valve in the snorkel should be in the up or heat-on position.
3. With the engine warmed up and running, check the temperature of the air entering the snorkel or at the sensor. When the temperature of the air entering the outer end of snorkel is 45°C (113°F) or higher, the valve should be in the down position (heat off).
4. Remove the air cleaner from the engine and allow the air cleaner to cool down to 30°C (84°F). With 49.4 kPa. (15 in. Hg.) vacuum applied to the sensor, the valve should be in the up (heat on) position. Should the valve not rise to the heat-on position, check the vacuum motor for proper operation.
5. To test the vacuum motor, apply 32.5 kPa. (10 in. Hg.) of vacuum using vacuum pump. (6EM044) The valve should be in the full up position. Should the vacuum motor not perform adequately, replace air cleaner body assembly.



DECELERATION DEVICE

Air Switching Valve (ASV) System

TEST

1. Run the engine at idle.
2. Disconnect the solenoid valve connector to turn off the solenoid valve (manifold vacuum will act on the air switching valve, causing the valve to open). If the idle speed falls excessively or the engine stalls, the air switching valve and solenoid valve are good. If the idle speed does not change, check the vacuum passage for clogging and check the condition of the air switching valve and solenoid valve.
3. With the engine at idle, the battery voltage should be present at the solenoid valve connector. If no voltage is present, either the electrical wiring or engine speed sensor is defective.
4. Increase the engine speed to 1,500 rpm. Check to ensure that voltage is present at the solenoid valve connector. If there is no voltage, the engine speed sensor is defective.
5. Increase the engine speed to 2,500 rpm. Check to ensure that no voltage is present at the solenoid valve connector. If there is voltage, the engine speed sensor is defective.

TAMPER PROOF

Adjustment

When mixture adjustment is required, clean the carburetor as follows.

1. Remove any parts connected to the carburetor in preparation for breaking the tamper prevention plug.
2. Remove the carburetor from the engine.
3. Before attempting to remove the concealment plug, secure the carburetor in a vice.
4. Clean the carburetor by using compressed air.
5. Reinstall carburetor without the concealment plug and replace the parts removed above.

ALPHABETICAL INDEX

MSSP-004B-84

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