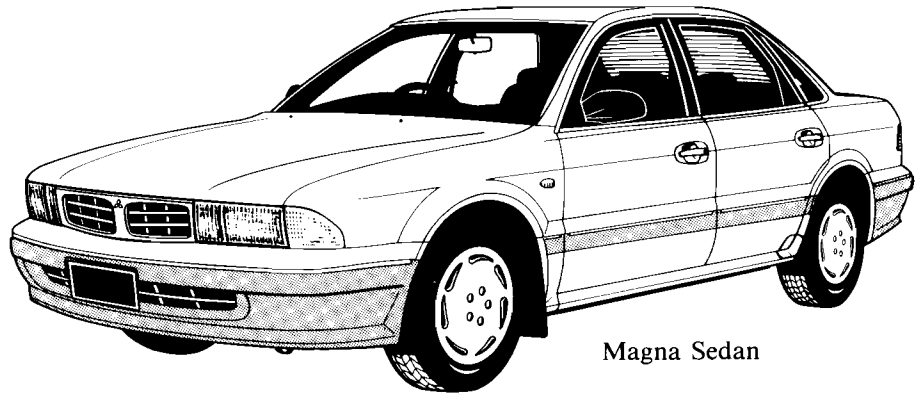
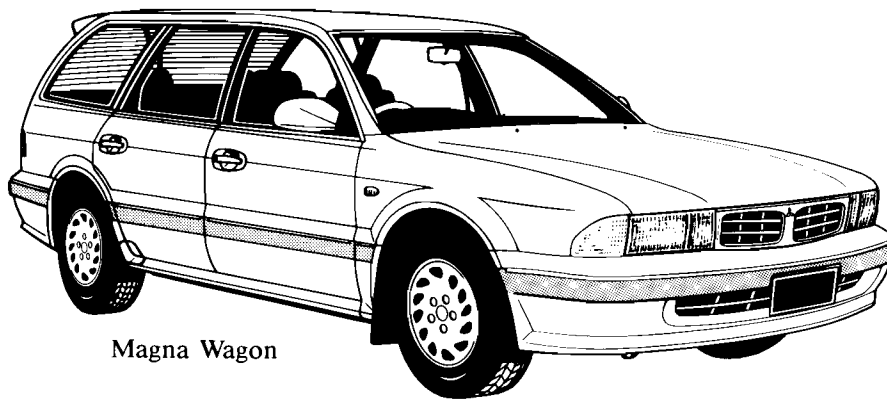


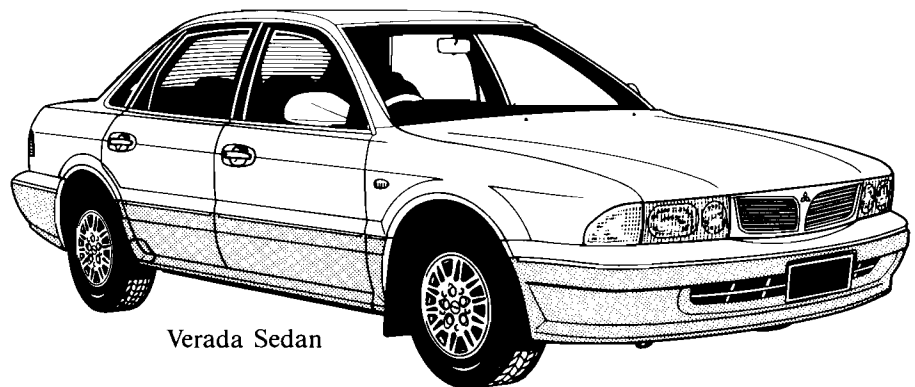
SECTION 2 — VEHICLE SPECIFICATIONS <S Series>



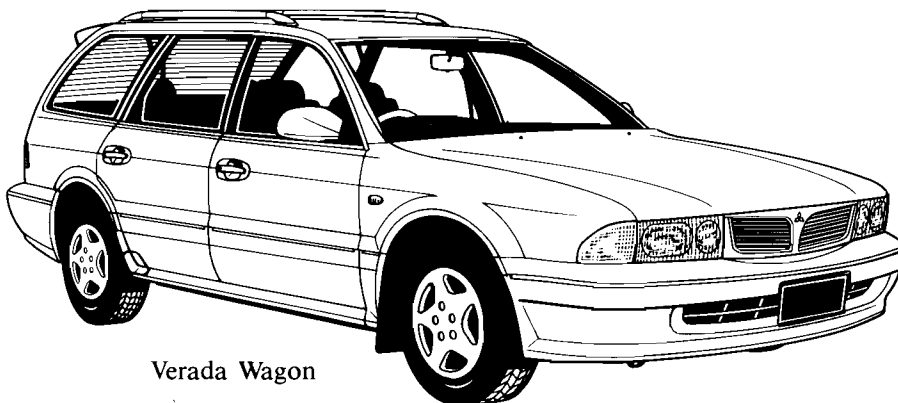
Magna Sedan



Magna Wagon





Verada Sedan



Verada Wagon

COMPLIANCE PLATE

APPROVAL No.	CATEGORY MA
MITSUBISHI MOTORS AUST. LTD.	
 GVM	MAGNA TR
VIN	SEATS 
THIS VEHICLE WAS MANUFACTURED TO COMPLY WITH THE MOTOR VEHICLE STANDARDS ACT 1989	

All vehicles are manufactured to conform to specific safety environmental or consumer protective requirements as defined by the Australian Design Rules (ADR).

NOTE: The Compliance Plate is attached to the right hand side of the plenum chamber in the engine compartment and must never be removed from the vehicle.

AUSTRALIAN DESIGN RULES

Australian Design Rules require the manufacturer of components and/or a complete vehicle to conform to specific safety, environmental or consumer protective requirements as defined by that particular rule.

There is legislation that requires, amongst other things, that no modifications be made to a vehicle that would cause that vehicle not to comply with the Design Rules of that vehicle (parts replacement using approved M.M.A.L. components is permissible). Before interchanging or adding optional equipment it is recommended that advice be sought from an Authorised M.M.A.L. Dealer or from a M.M.A.L. Regional Office, because it is possible to inadvertently cause a vehicle not to comply with a Design Rule.

VEHICLE DIMENSIONS

	Magna		Verada		V3000 (NZ)	
	Sedan	Wagon	Sedan	Wagon	Sedan	Wagon
Wheelbase	2722mm	2722mm	2722mm	2722mm	2722mm	2722mm
Overall length < R series >	4746mm	4790mm	4831mm	4888mm	4746mm	4790mm
Overall length < S series >	4746mm	4790mm	4786mm	4843mm	4746mm	4843mm
Overall width	1775mm	1775mm	1775mm	1775mm	1775mm	1775mm
Overall height	1450mm	1470mm	1449mm	1446mm	1449mm	1446mm
Front track	1535mm	1535mm	1535mm	1535mm	1535mm	1535mm
Rear track	1525mm	1505mm	1525mm	1505mm	1525mm	1505mm
Ground clearance	112mm	122mm	112V6Eimm	132mm	139mm	137mm
— minimum @ GVM			147V6Ximm			
Turning circle						
— kerb to kerb — RHS	11.0 m	11.0 m	11.0 m	11.0 m	11.0 m	11.0 m
— LHS	11.4 m	11.4 m	11.4 m	11.4 m	11.4 m	11.4 m

SECTION 4 — LUBRICANTS

GENERAL INFORMATION

Lubricant recommendations have been determined to maintain maximum performance and provide optimum vehicle protection under various operating conditions. The information contained in this section should, therefore, be used as a guide to ensure that the correct lubricant is selected.

While, in most cases, no particular brand of lubricant is recommended, lubricants manufactured by a reputable oil company should always be used.

It is important that the material used meets the classification requirements stated in this manual.

NOTE: The M.M.A.L. lubricant specifications stated in this manual are the result of considerable development work, and have been established to ensure that materials used meet all the requirements of a specific application.

Lubricants and coolants which meet these specifications are formulated with the optimum quantities of a carefully balanced combination of selected additives, and are suitable for use in vehicles marketed by M.M.A.L. Any arbitrary addition of proprietary materials may disrupt the balance of these additives and destroy the essential properties of the lubricant or coolant, resulting in failure of the mechanical assembly.

Furthermore the addition of proprietary materials is an unnecessary and expensive penalty to vehicle operating costs.

Classification of Lubricants

Engine Oils

Two designations, SAE and API, are used to match engine oils to service requirements. Generally, designations will be found on the oil container.

The SAE grade number indicates engine oil viscosity or fluidity. For example SAE 30 is a single viscosity oil. Most engine oils have multiple viscosity grades such as SAE 10W 30, with a low viscosity when cold. These multigrade oils have a more constant viscosity than single grade oils for the same temperature rise.

The API classification indicates oil performance or quality and ranges from "SA" to "SG" depending on service requirements.

Gear Oils

Gear oil performance level, or quality, is shown by its API classification. The classification range for gear oils is from "GL-1" to "GL-5 (plus)" depending on application.

Automatic Transaxle Fluid

Mitsubishi Magna ELC-4-SP Automatic Transmission Fluid. Use of MMAL specified fluid is mandatory to ensure correct operation of the transmission.

Grease

Semi-solid lubricants specified for chassis and similar applications should meet NLGI Multi-purpose, non-melt type No. 2 specifications except where otherwise stated.

Points NOT Requiring Lubrication

- The bearings listed below are permanently lubricated and require only inspection and/or replacement when a complete component overhaul is performed.

- (i) Starter motor bushes
- (ii) Clutch release bearing (man. trans.)
- (iii) Alternator bearings

- The rubber bushings used at the points listed below are designed to grip the contacting metal parts firmly and act as a flexible medium between metal parts. **The use of any lubricant on these bushes will reduce the friction required for correct operation and result in premature failure of the bushing.**

- (i) Rear axle arm bushings
- (ii) Front suspension bushings
- (iii) Engine drive belts

- The application of any lubricant to the air cleaner element will destroy the effectiveness of the element.

Engine Oil Change Frequency

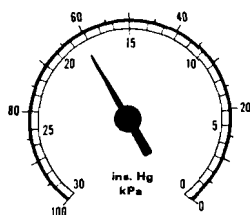
Regular oil changing is essential for efficient running and long engine life.

Under normal operating conditions, i.e. good roads in temperate climates, engine oil change intervals should be 10,000 km or six months (whichever occurs first).

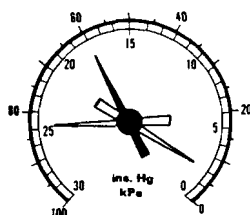
Changing the oil every six months regardless of distance travelled, will minimize the harmful effects of any condensation or sludge that may form in the engine when most trips are of short duration at slow speeds, such as city traffic type driving.

If a vehicle is operated under unusual or severe conditions, such as those listed below, the protective life of the oil can be significantly reduced, necessitating oil changes at 5,000 km intervals.

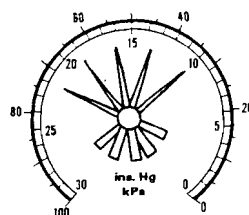
- Frequent towing of trailers, boats, etc.,
- Continuous operation at higher than normal loadings,
- Operating in dusty or sandy terrain,
- Extremely short run operation,



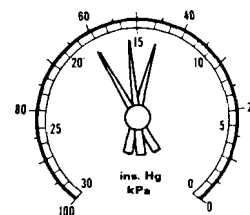
1
NORMAL ENGINE



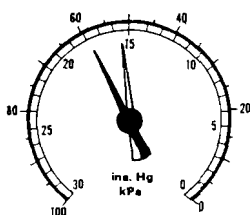
2
NORMAL ENGINE



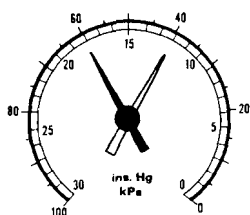
3
VALVE SPRINGS
WEAK



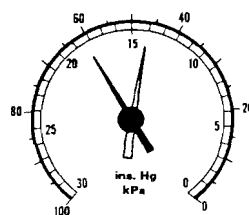
4
VALVE GUIDES
WORN



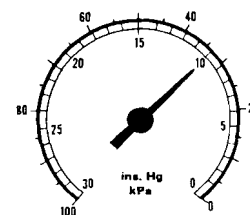
5
VALVE LEAKING



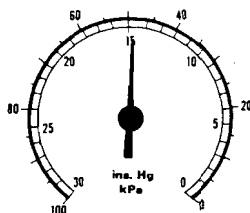
6
VALVE BURNT



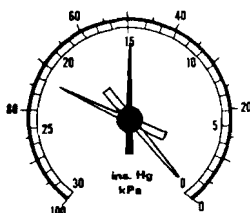
7
VALVE STICKING



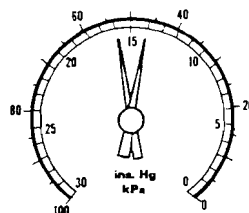
8
VALVE TIMING
LATE



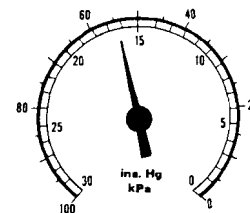
9
WORN RINGS



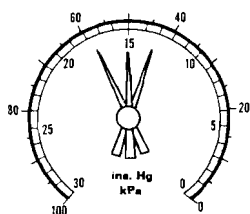
10
WORN RINGS OR
INFERIOR LUBRICANT



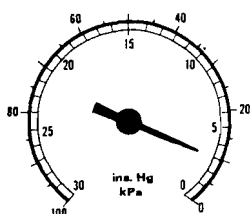
11
IGNITION DEFECTIVE



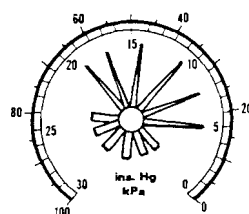
12
IGNITION RETARDED



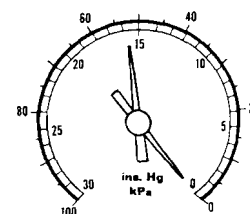
13
CARBURETTOR
ADJUSTMENT



14
LEAKING INTAKE
SYSTEM



15
LEAKING HEAD
GASKET
(between cylinders)



16
BLOCKED EXHAUST
SYSTEM

Readings — ins.Hg (kPa)

1. With the engine idling, the hand is steady between 17 and 21 (57 to 71).
2. With a rapid opening and closing of the throttle, the hand will fall to 2 (6.5) and swing back to 24 or 25 (81 to 84), settling on normal idle reading. Rings and valves indicated OK.
3. With fast running engine, the hand reads between 10 and 22 (34 to 74). Increase speed increases hand fluctuations.
4. With engine idling, hand vibrates rapidly between 14 and 19 (47 to 64).
5. When valve should close, hand drops two or three points.
6. At idle, the hand drops consistantly a few points.
7. At idle, the hand sometimes drops around four points.
8. At fast idle, the hand reads steady from 8 to 15 (27 to 50).
9. At idle the hand reads steady but lower than normal. Inferior lubricant may also be indicated.
10. With rapid opening and closing of the throttle, the hand falls to 0 and rises to 23 (78) or less.
11. With a slowly fluctuating hand between 14 and 16 (47 to 54), check ignition system for faults.
12. At fast idle, a steady reading between 14 and 17 (47 to 58) is registered.
13. Check idle mixture if hand moves slowly between 13 and 17 (44 to 57).
14. At idle or fast idle, hand reads between 3 and 5 (10 and 17). Check gaskets.
15. Hand moves consistantly between 5 and 19 (17 and 64).
16. High reading at start reducing to 1 (3) or 0 and increases to 15 to 16 (51 to 54).

SECTION 4 — ENGINE OVERHAUL

GENERAL INFORMATION

The procedures outlined in this section cover the major overhaul of the engine. The engine may be either in or out of the vehicle depending on the amount of reconditioning required.

CAUTION: On fuel injection models, the residual fuel pressure and amount of fuel remaining in the fuel lines, make it essential that care is taken when disconnecting fuel lines. Use suitable containers and/or rags to contain fuel spillage.

NOTE: Chloro-Fluro-Carbons.

Legislation in various states, prohibits the release of C.F.C.'s to atmosphere. Therefore a C.F.C. recovery unit will be required to contain spent gases if the air conditioning hoses are disconnected.

Check your relevant state government authority in regards to the relevant legislation.

ENGINE

Engine (Automatic Models) or Engine and Transaxle (Manual Models) Removal

- (1) Drain engine coolant.
- (2) Remove engine hood.
- (3) Disconnect battery.
- (4) Remove coolant recovery bottle.
- (5) Remove air cleaner assembly.
- (6) Disconnect wiring from the alternator, starter motor, carburettor, distributor, oil pressure switch and the injection control loom (ECI-Multi models).
- (7) Disconnect the earth strap at the intake manifold (carburettor models) or the surge tank (ECI-Multi models).
- (8) Disconnect accelerator cable.
- (9) Disconnect radiator and heater hoses from engine.
- (10) Disconnect all vacuum hoses and label for easy installation.
- (11) Disconnect the fuel bowl vapour hose of the intake manifold (carburettor models).
- (12) Disconnect the fuel supply and return hoses.
- (13) Remove the starter motor.

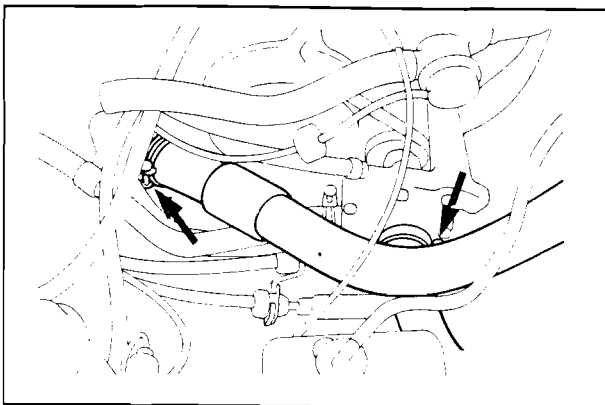


Fig. 1—Disconnecting radiator hoses

For automatic models proceed as follows:

- (14) Remove the torque converter lower cover plate.
- (15) Remove the torque converter to drive plate attaching bolts and push the torque converter towards the transaxle.
- (16) Remove the drive shaft centre bearing to cylinder block bolts and support the drive shaft.
- (17) Disconnect the front exhaust pipe from the manifold and remove the exhaust pipe stay strap.
- (18) Position a suitable support under the transaxle to support the weight of the transaxle.
- (19) Attach a suitable lifting bracket to the engine and, using a hoist, support the weight of the engine.
- (20) Remove the transaxle to engine attaching bolts.
- (21) Remove the front roll stopper through bolt and damper to engine bracket bolt.
- (22) Remove the rear roll stopper through bolt and remove the roll stopper from the cross-member.
- (23) Remove the engine mount through bolt and remove the engine mount from the engine mount bracket.
- (24) Separate the engine from the transaxle and lift the engine out of the vehicle.

For manual models proceed as follows:

- (14) Disconnect wiring from the reverse light switch.
- (15) Disconnect the clutch hydraulic line.
- (16) Disconnect gear shift control cables.
- (17) Disconnect the engine earth cable at the transaxle.
- (18) Disconnect the speedometer from the transaxle.
- (19) Drain transaxle oil.
- (20) Raise the front of the vehicle and support on jack stands.

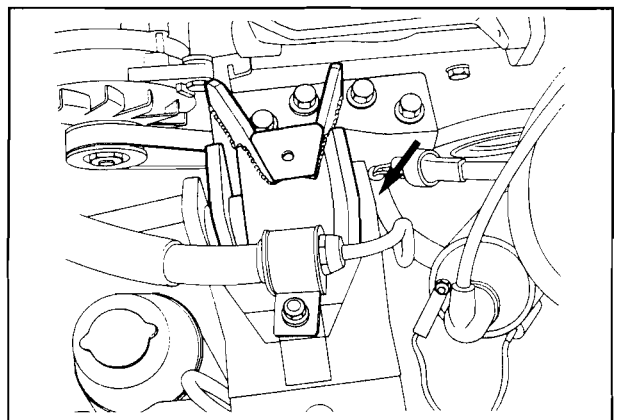


Fig. 2—Front engine mount

- (21) Disconnect the drive shafts from the transaxle, refer Group 26, and support to avoid damaging the joints.
- (22) Disconnect the exhaust pipe from the manifold and remove the exhaust pipe stay strap.
- (23) Attach a suitable lifting bracket to the engine and, using a hoist, support the weight of the engine.
- (24) Remove the front and rear roll stopper through bolts.

- (4) Remove oil filter and oil filter bracket.
- (5) Remove oil pan, using tool No. MD998727, knock it deep between the oil pan and cylinder block, then hitting side of special tool, work around oil pan, refer Fig. 4.

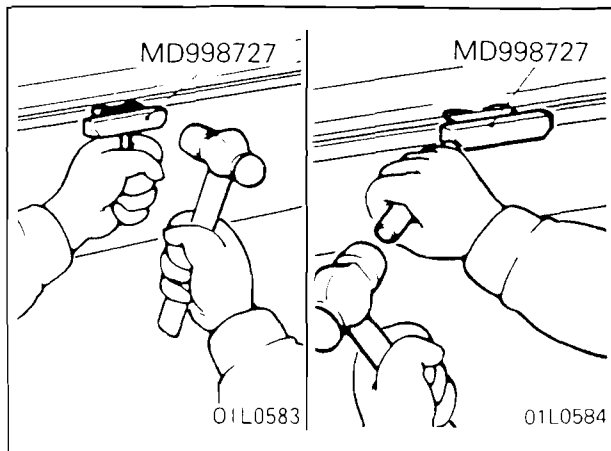


Fig. 4 — Removing oil pan

- (6) Remove oil screen.
- (7) Remove oil pump case assembly.

NOTE: Oil pump case mounting bolts are of different length.

- (8) Remove relief plug and withdraw spring and relief valve from case.
- (9) Remove oil pump cover.
- (10) Remove inner and outer rotors.

Inspection

Clean all disassembled parts with suitable solvent and replace any defective parts after performing the following checks.

Oil Pump Case

Check the entire case for cracks, damage and abnormal wear.

Check the oil holes and orifices for clogging, blow out deposits with compressed air.

Check the pump cover gear contacting surface for ridge wear. A badly worn cover should be replaced.

Clearances

Assemble inner and outer rotors in oil pump case. Place a straight edge across the case, insert a feeler gauge to check clearance, refer Fig. 5.

Badly worn parts should be replaced.

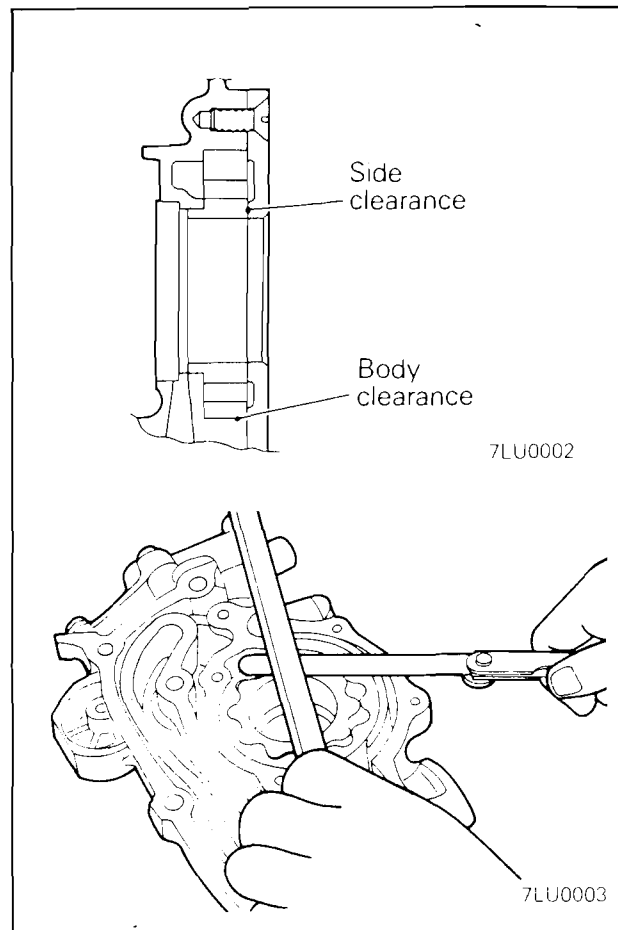


Fig. 5 — Oil pump clearances

Oil Filter Bracket

Check that there are no cracks on the oil filter bracket and that the oil filter installation surface is not damaged.

Relief Valve and Spring

Insert the valve into the pump case and check for smooth operation in the bore. Check the valve for scoring and wear. Check the relief valve spring for damage.

Assembly

(1) Lubricate the inner and outer rotors and install them into the pump case, ensure they rotate smoothly, install oil pump cover.

(2) Lubricate relief valve and install the valve (with the solid end of the valve towards the pump case) and spring into the bore. Install the plug and tighten to specified torque.

(3) Install the oil pump case assembly to the block, refer Fig. 6.

CAUTION: When installing snap ring onto input shaft take care not to over stretch NEW snap ring.

NOTE: When the 5th speed sleeve has been installed onto the input shaft, make sure the snap ring does not prevent the sleeve from seating against the bearing.

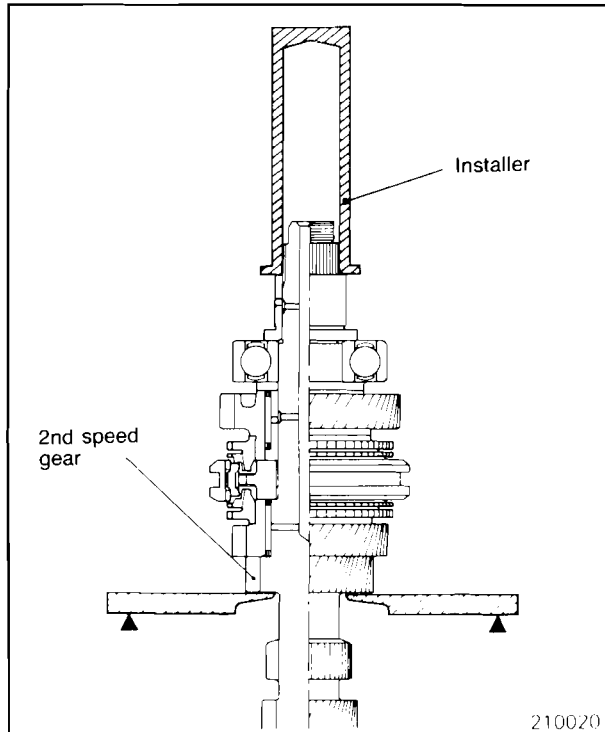


Fig. 39—Rear input shaft bearing sleeve installation

(10) Install the front input shaft bearing over the input shaft using a suitable installer, refer Fig. 40.

NOTE: When installing bearing, push the inner race only.

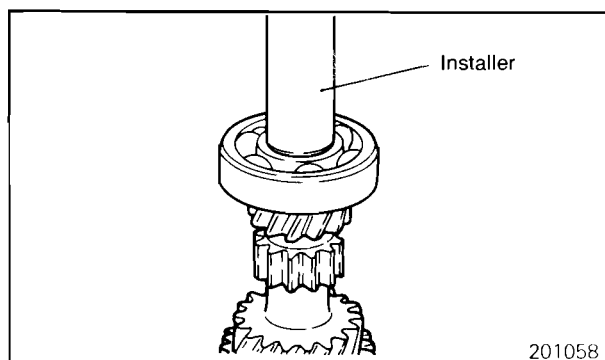


Fig. 40—Input shaft bearing installation

(11) Install input shaft bearing snap ring, refer Fig. 41, (F5M31 only).

NOTE: Snap rings are available in different thicknesses. Select the thickest one that fits in the snap ring groove. Do not cause damage to the input shaft oil seal contacting surface.

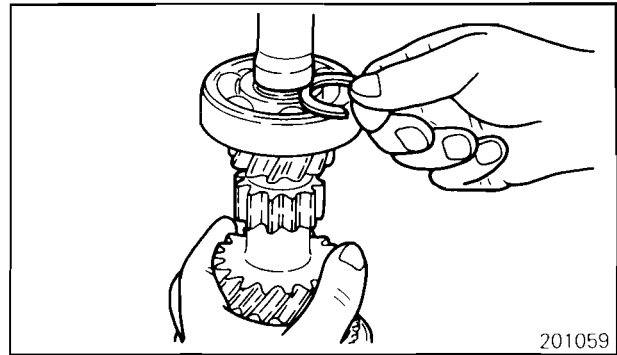


Fig. 41—Input shaft snap ring installation (F5M31)

INTERMEDIATE GEAR ASSEMBLY

Disassembly

- (1) Remove intermediate gear front bearing snap ring.
- (2) Using suitable press plates remove the front taper bearing, 1st speed gear and bearing sleeve, refer Fig. 42.

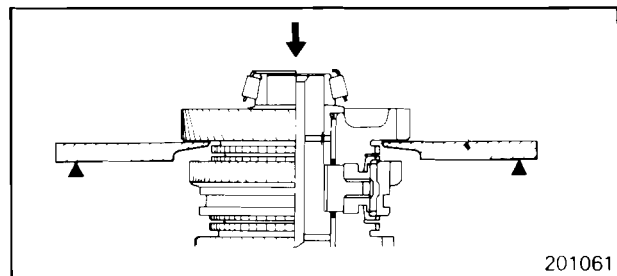


Fig. 42—1st gear bearing removal

- (3) Remove the synchronizer ring.
- (4) Using suitable press plates, remove the 1st - 2nd speed synchronizer hub and sleeve, refer Fig. 43.

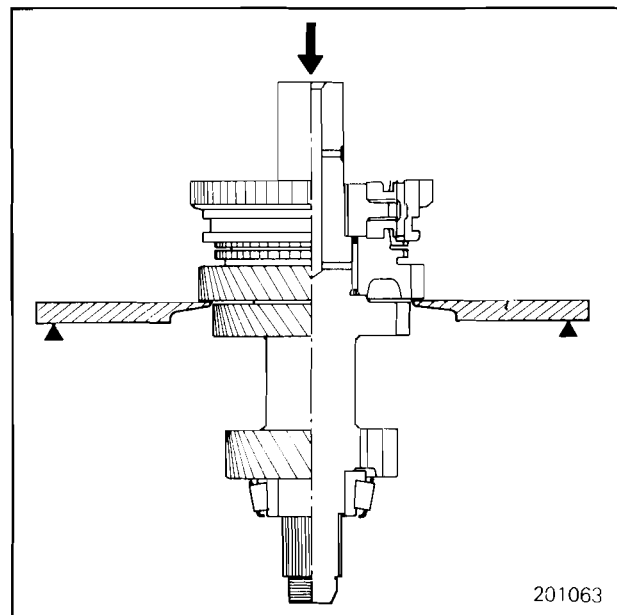


Fig. 43—1st - 2nd synchronizer removal

- (5) Remove 2nd speed gear and needle bearing.
- (6) Using special tool E1673 B20 remove the rear intermediate bearing, refer Fig. 44.

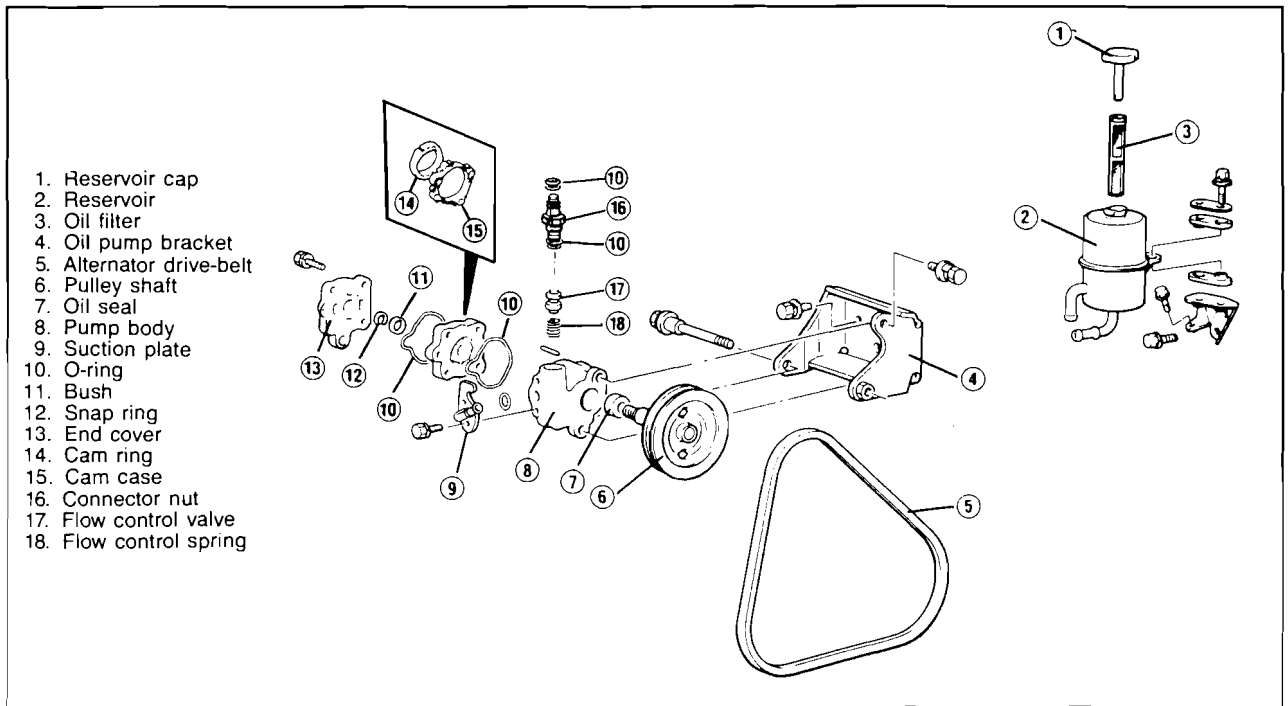


Fig. 6—Power steering oil pump components

(3) Remove the cam case and remove the O-rings from the cam case. Lift off the cam ring from the rotor.

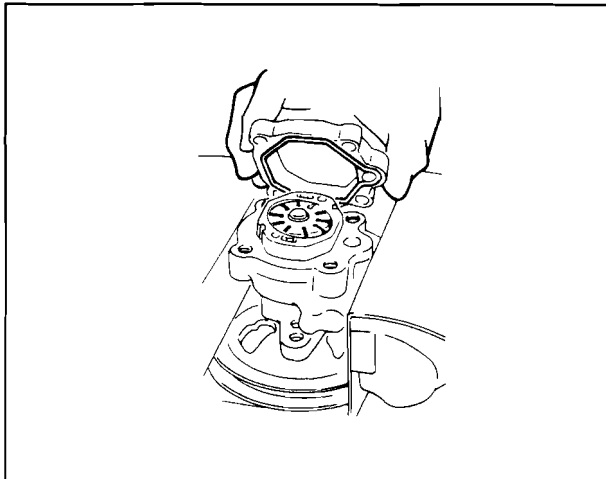


Fig. 7—Removing cam ring

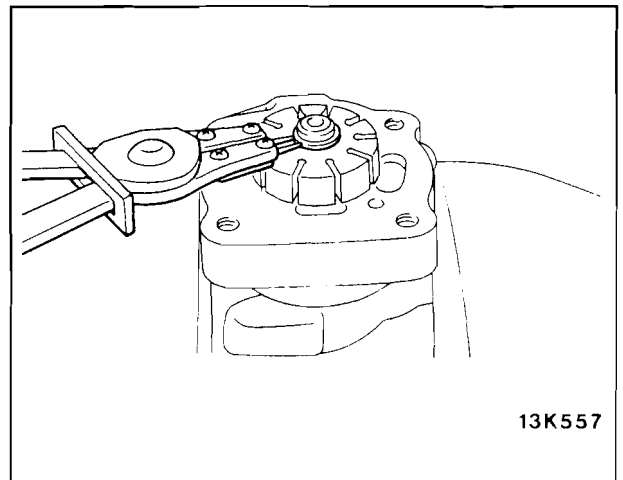


Fig. 8—Snap ring removal

- (4) Carefully remove the vanes from the rotor.
 (5) Remove the snap ring from the shaft and remove the rotor assembly, refer Fig. 8.
 (6) Tapping the rotor side of the shaft lightly with a plastic hammer, remove the pulley shaft assembly, refer Fig. 9.

NOTE: The pulley is press fitted to the shaft, do not attempt to disassemble the pulley from the shaft.

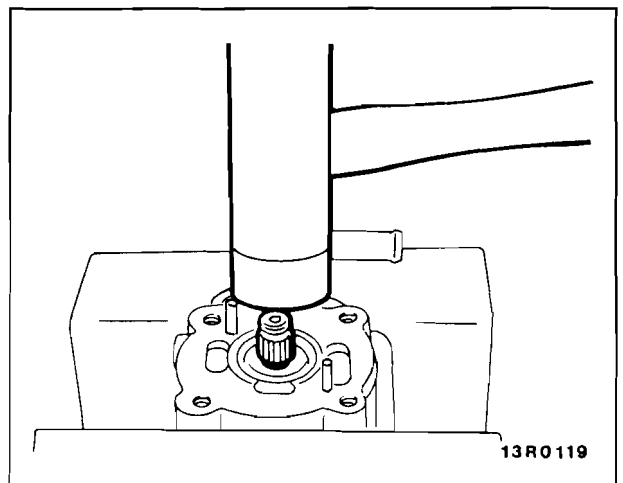


Fig. 9—Removing the pulley shaft assembly

CONTINUED FROM PREVIOUS PAGE

Is the SRS warning light operation normal?

No

Malfunction of the SDU.

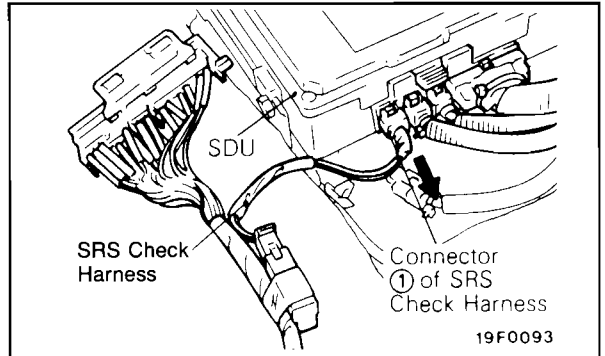
Replace the SDU.

Yes

- (1) Turn the ignition key to the "LOCK" position, disconnect the negative battery cable and tape the cable terminal.

CAUTION: Wait at least 60 seconds after disconnecting the battery cable before doing any further work. (Refer to Service Precautions.)

- (2) Disconnect the red 2-pin connector ① of the SRS Check Harness from the SDU, refer to figure.

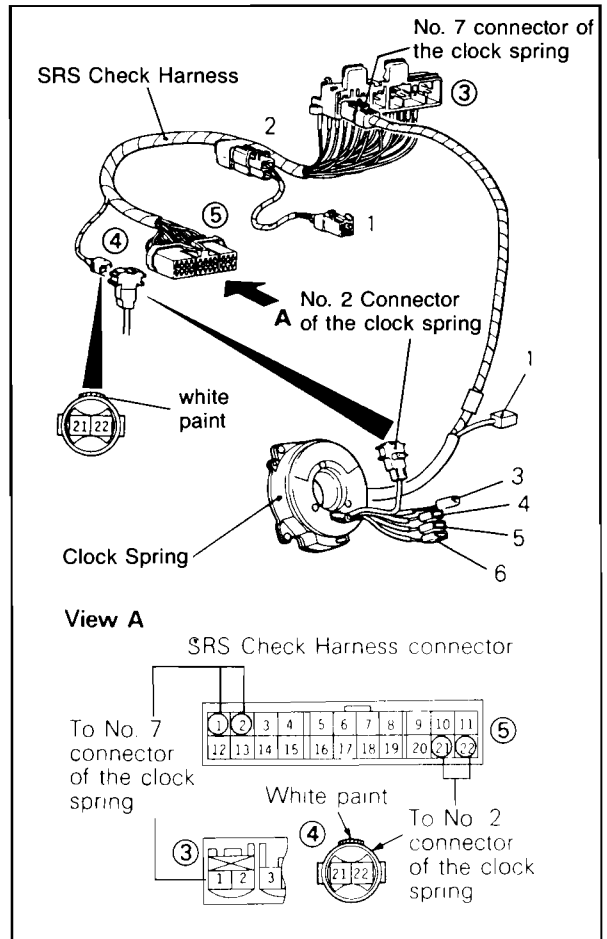


- (1) Remove the air bag module.
(2) Join the No. 2 and No. 7 connectors of the clock spring to SRS Check Harness connector ④ and SRS Check Harness connector ③, respectively.

NOTE: When joining SRS Check Harness connector ④, align its white paint with the hollow portion of the No. 2 connector of the clock spring.

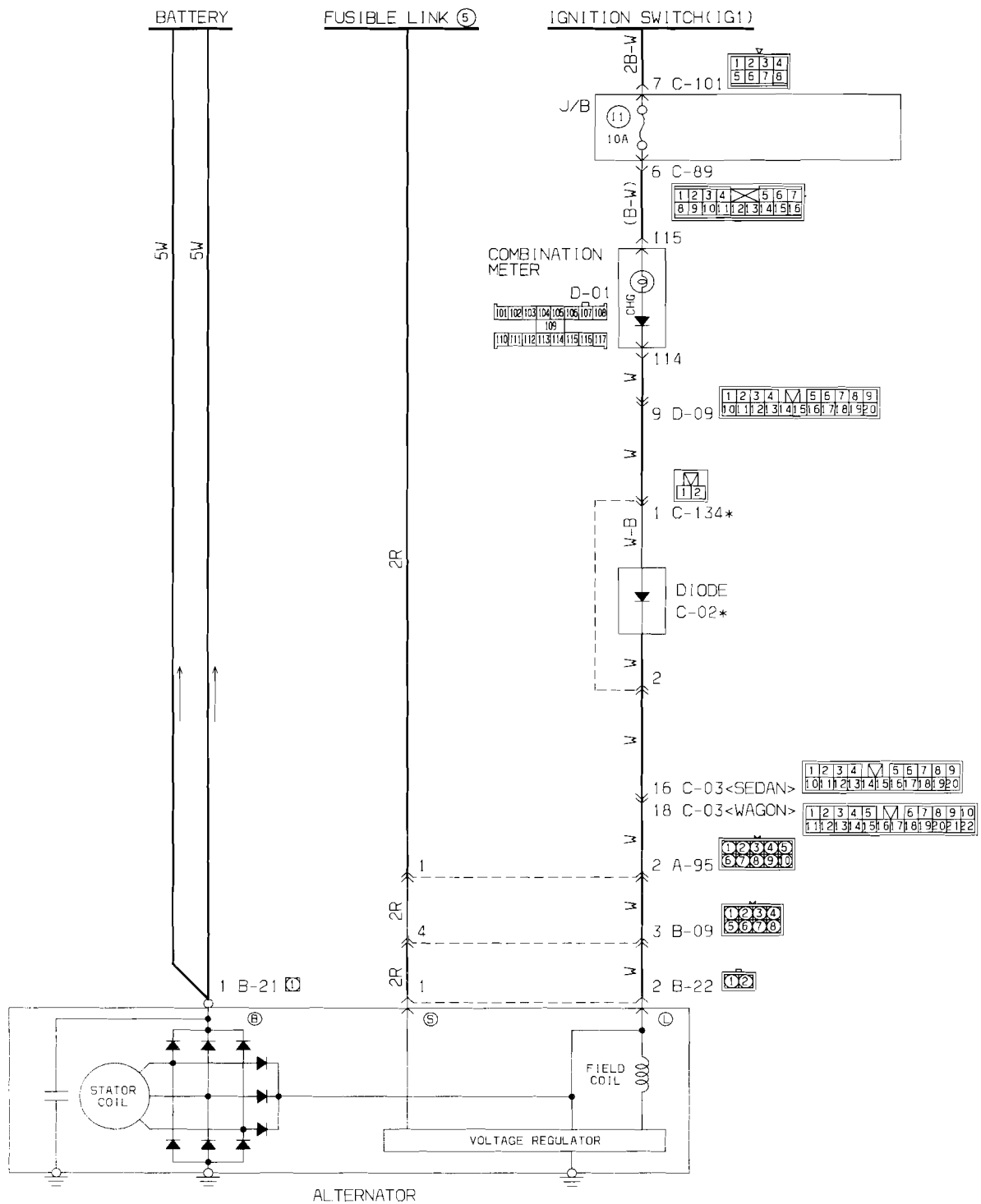
- (3) Is the resistance between terminal 1 and terminal 21 of SRS Check Harness connector ⑤, and between terminal 2 and terminal 22 of SRS Check Harness connector ⑤ normal?

Standard value: less than 0.4Ω



CONTINUED ON NEXT PAGE

CIRCUIT DIAGRAM – Charging system circuit (6 cyl) <1992-1994 Models>

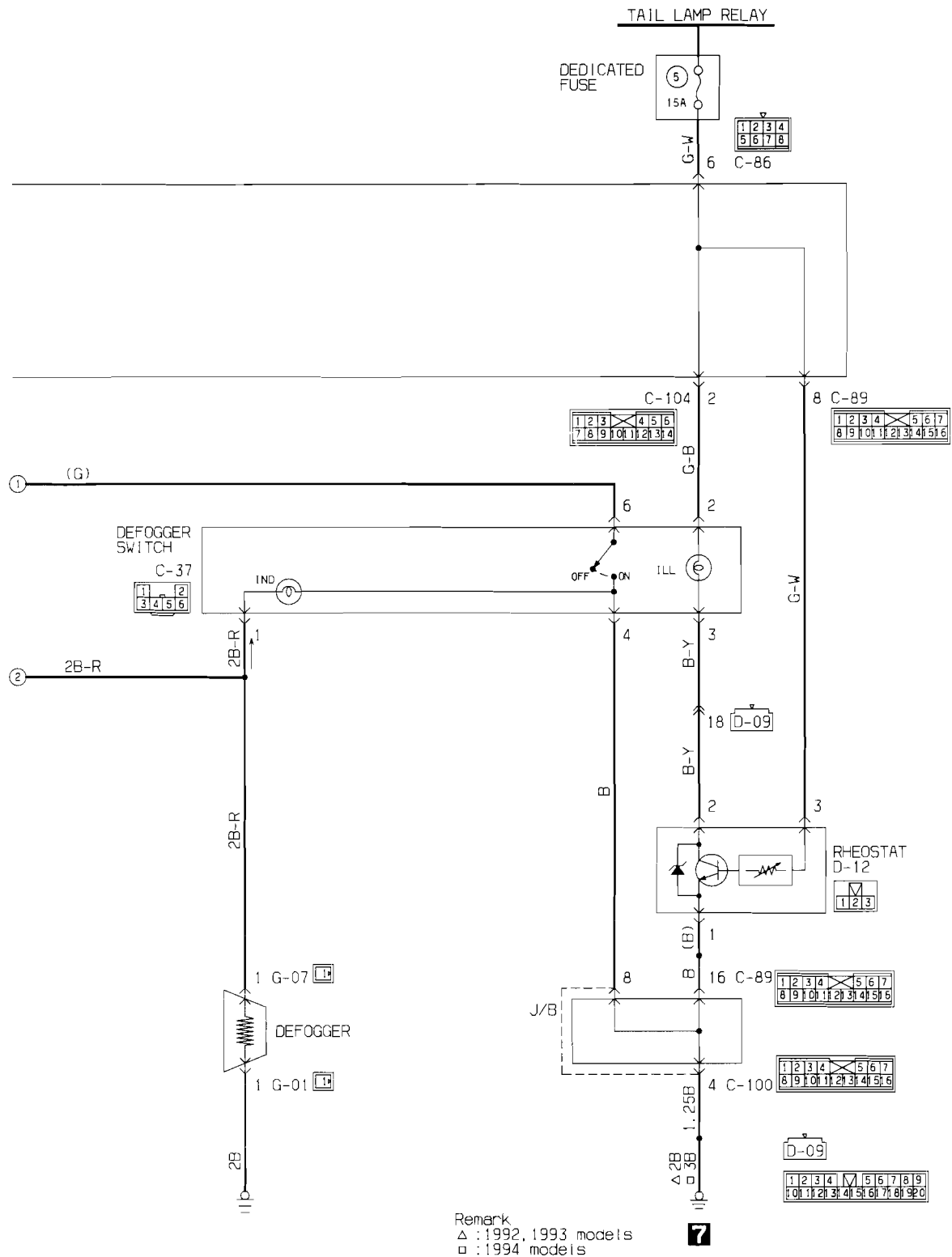


Remark
* : 1992, 1993 models with ABS

93-157

Wire colour code

B: Black	LG: Light Green	G: Green	L: Blue	W: White	Y: Yellow
BR: Brown	GR: Grey	O: Orange	P: Pink	R: Red	LI: Light Blue

CIRCUIT DIAGRAM – Defogger circuit (91-94 model 'X' line) Cont;**Wire colour code**

B: Black	LG: Light Green	G: Green	L: Blue	W: White	Y: Yellow
BR: Brown	GR: Grey	O: Orange	P: Pink	R: Red	LI: Light Blue

Terminal No.		1	2	3	4	5	6	7	8	11	12
Switch position											
AUDIO	ACC		○				○				
	SIGNAL			○					○		
	EARTH					○					○
AUTO-CRUISE					○					○	
HORN		○							○		

Fig. 11A — Slip ring continuity (continued)

Terminal No.		1	2	3	4	5	6	7	9	11	13	14
Switch position												
AUDIO OR A/C	ACC				○							○
	SIGNAL				○						○	
	EARTH	○							○			
AUTO-CRUISE	ACC				○		○					
	SIGNAL		○					○				
HORN						○						○

Fig. 12A — Steering harness continuity

- (1) Remove the driver side lower panel, refer Group 52.
- (2) Remove the column switch and slip ring assembly connector.
- (3) Remove the horn pad.
- (4) Remove the steering harness and slip ring assembly connector.
- (5) Check for continuity between each of the terminals, refer Fig. 11.
- (6) ○—○ indicates that there is continuity between the terminals.
- (7) Check that there is no change in the continuity when the steering wheel is turned.

Steering Harness

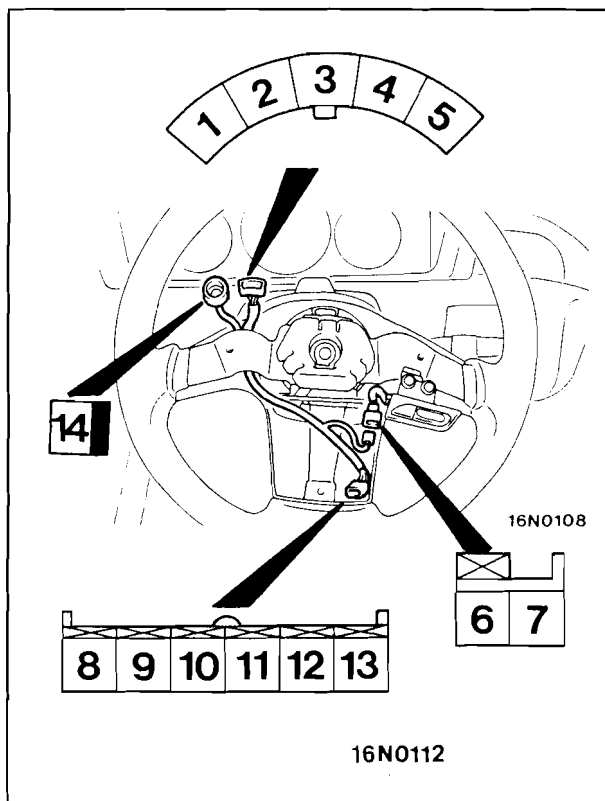


Fig. 12 — Steering harness connectors

- (1) Remove the horn pad.
- (2) Remove the slip ring and steering harness assembly connector.
- (3) Disconnect the connector for each switch assembly.

POWER SEAT SWITCHES

Seat switch

Removal

- (1) Gently pry the adjusting knobs from the seat switch.
- (2) Gently lever the seat switch panel from the seat, using a screwdriver or similar wrapped in a cloth.
- (3) To remove the switch assembly, remove the two retaining screws and uncouple the loom.

Inspection

Operate the power seat switch and check for continuity between the terminals, refer Fig. 14.

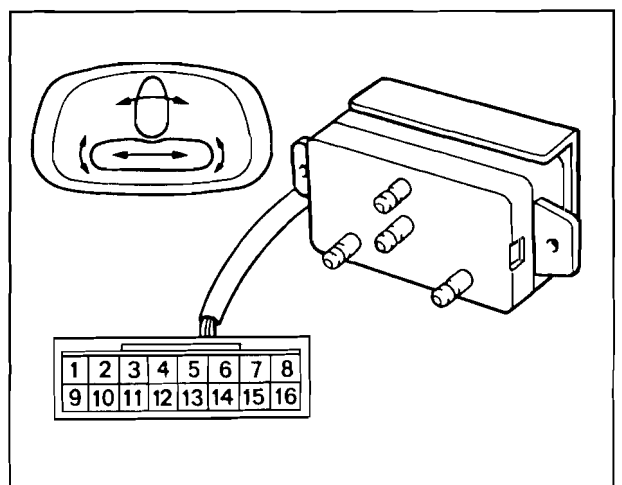


Fig. 13 — Seat switch and connector

SECTION 8 — WINDSHIELD WIPERS AND WASHERS

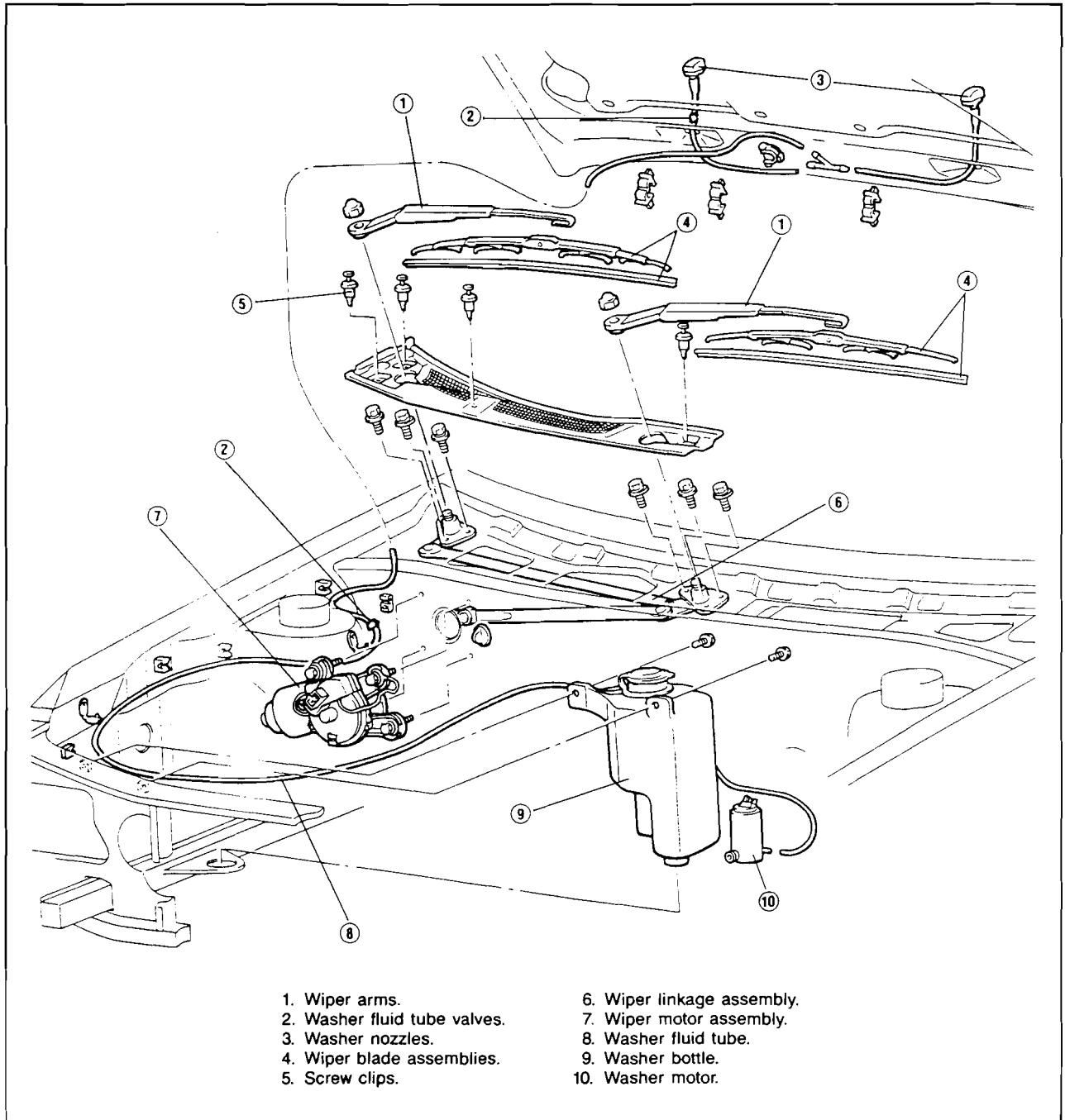


Fig. 1 — Wiper/Washer part location

GENERAL INFORMATION

The wiper motor is a two speed permanent magnet type and incorporates a parking switch which is activated when the wipers are switched off.

The windscreen washer bottle is located in the engine compartment in front of the left hand strut housing. The washer pump, a centrifugal type driven by a DC ferrite magnet type motor is mounted in the washer bottle.

Control switches for high speed, low speed, intermittent operation and the windscreen washers are mounted on the steering column.

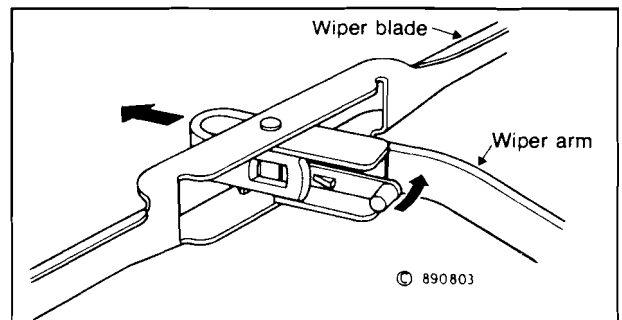


Fig. 2 — Wiper blade removal

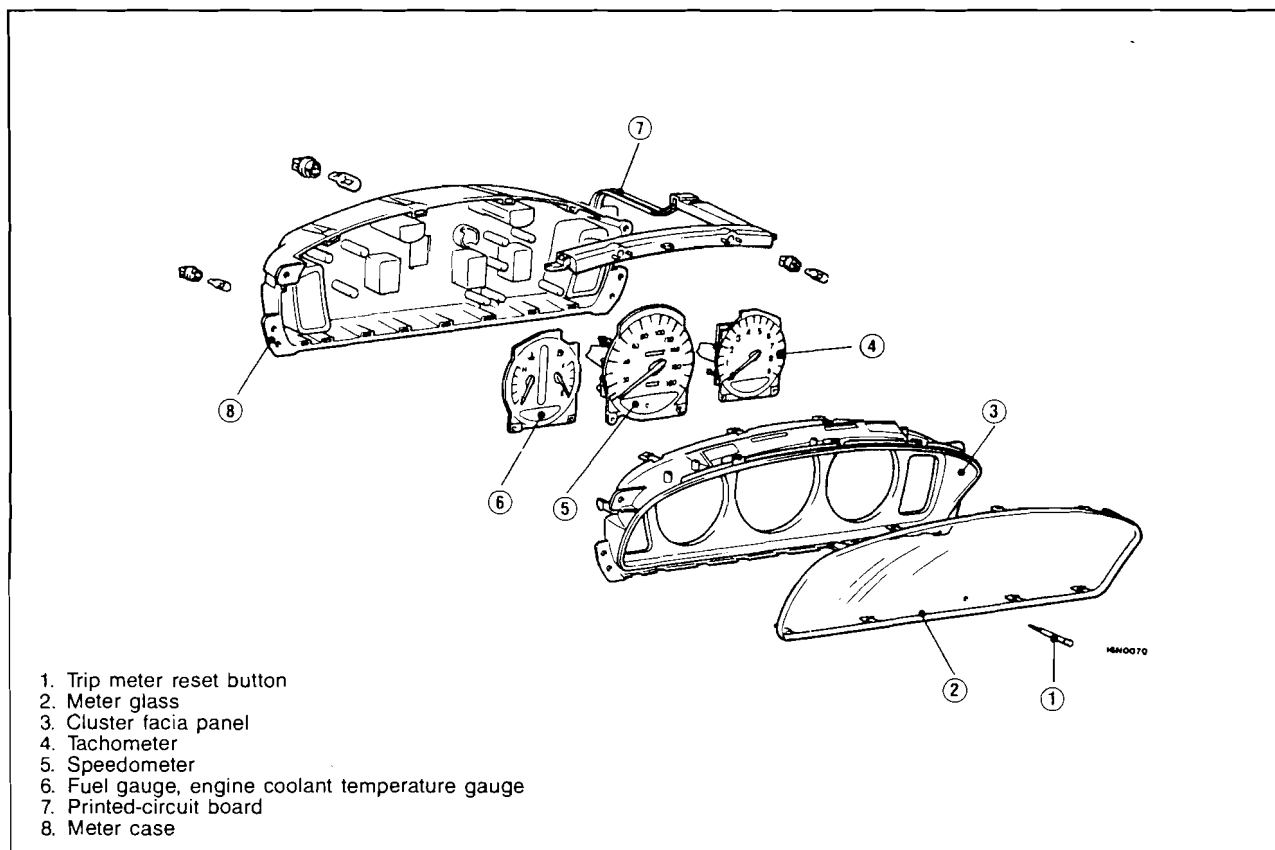


Fig. 1 — Instrument cluster components

INSTRUMENT CLUSTER**Removal**

CAUTION: THE INSTRUMENT CLUSTER MUST NOT BE ALLOWED TO FACE DOWN AT ANY TIME. THE TACHO MECHANISM USED HAS A SILICONE DAMPENING DEVICE WHICH WILL LEAK.

NOTE: When removing the instrument hood, be careful not to damage the trip meter reset switch.

(1) Set the steering column height adjuster on its lowest setting.

(2) Remove the two instrument hood retaining screws, refer Fig. 2, and carefully remove the hood.

(3) Remove the four instrument cluster retaining screws, refer Fig 3, and gently pull the cluster forward and out.

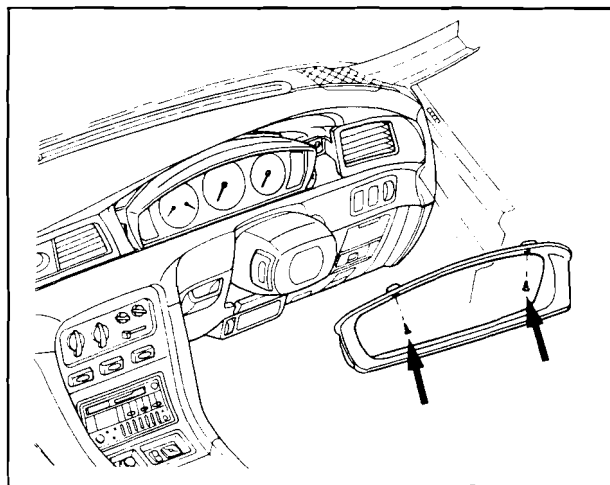


Fig. 2 — Instrument hood removal

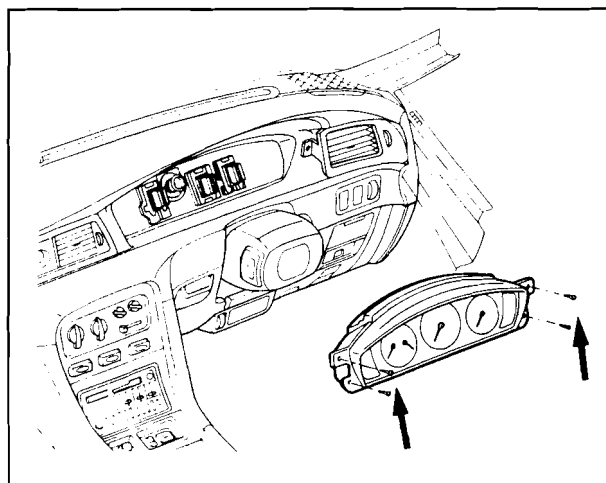


Fig. 3 — Instrument cluster removal

Installation

Install by reversing the removal procedure, ensuring that all instrument cluster lights are operative and speedometer is functioning correctly.