

**DATSUN**

**Model S110 Series**

**SECTION**

**LC**

# **ENGINE LUBRICATION & COOLING SYSTEM**

**LC**

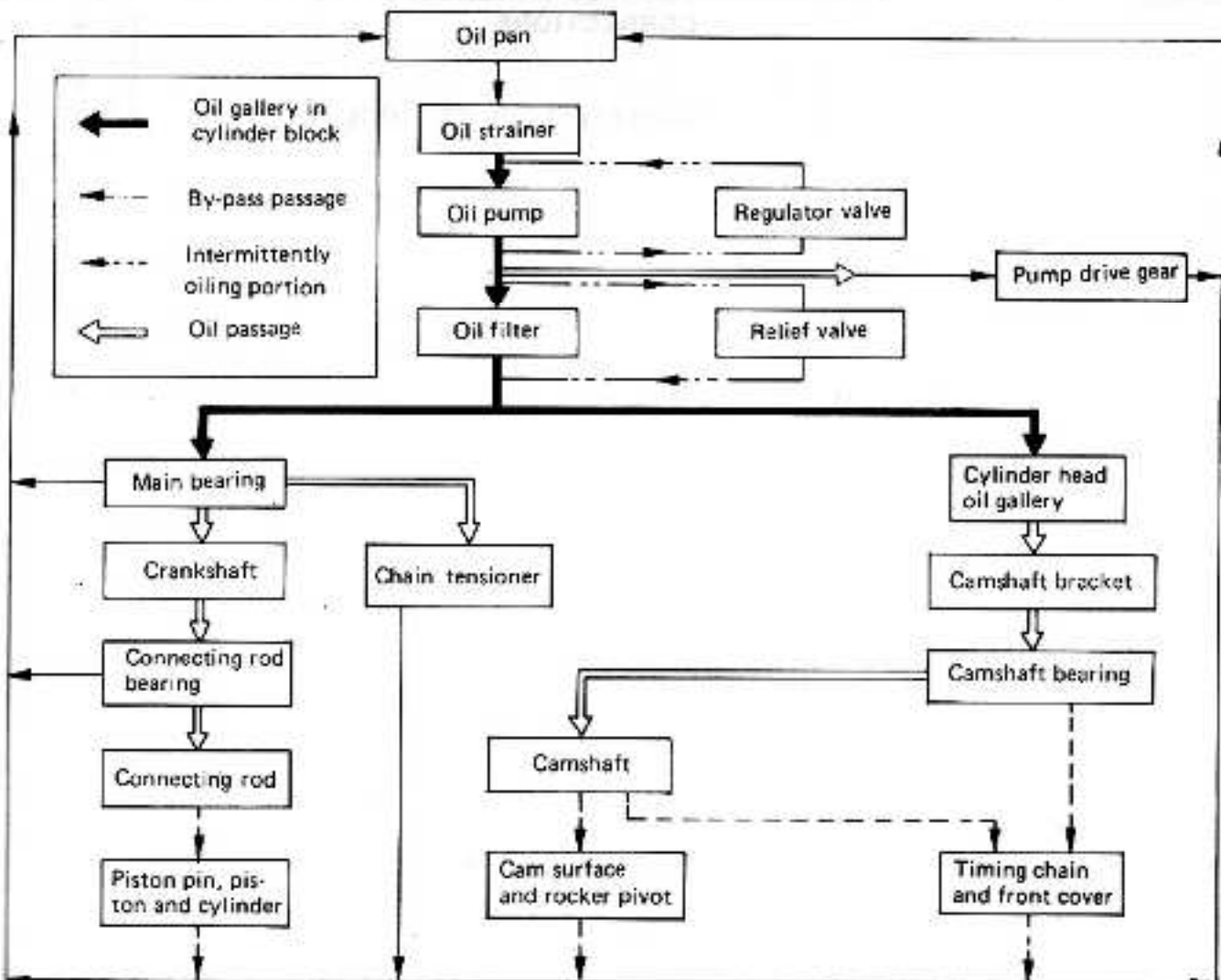
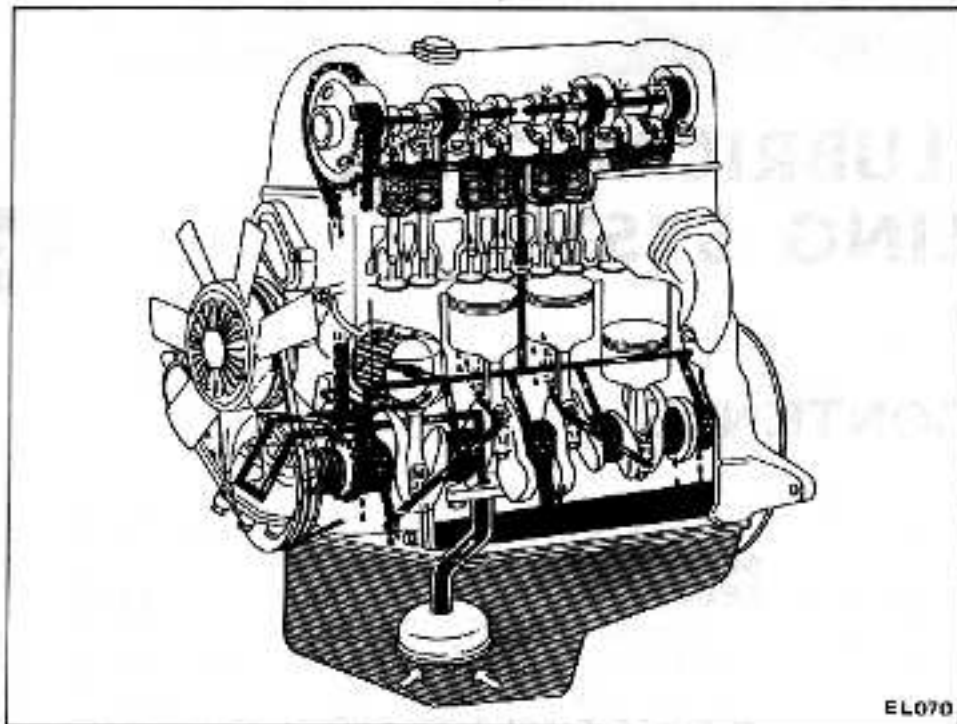
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# ENGINE LUBRICATION SYSTEM

## LUBRICATION CIRCUIT

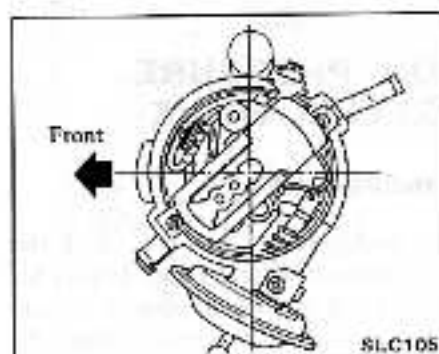


## OIL PUMP

### REMOVAL

1. Remove distributor cap.
2. Turn crankshaft so that No. 1 piston is at T.D.C. on its compression stroke by ascertaining the position of distributor head rotor and timing mark on crank pulley.

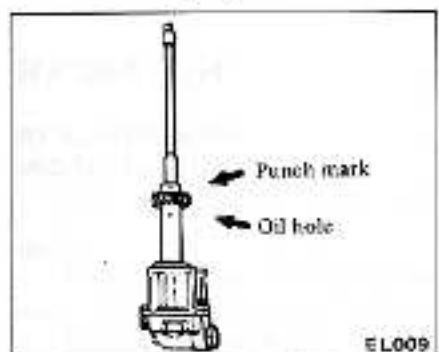
Remember position of head rotor under above condition.



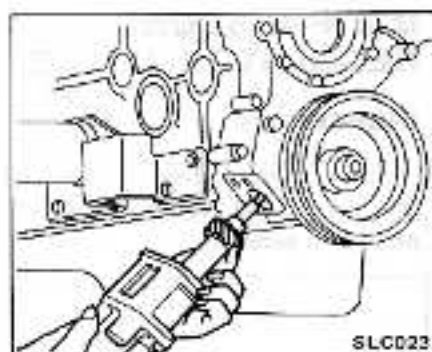
3. Remove oil pump body with drive spindle assembly.

### INSTALLATION

1. Make sure that distributor head rotor is in the same position as it was before removal of oil pump.
2. Fill pump housing with engine oil, then align punch mark of drive spindle with hole in oil pump.



3. Using a new gasket, install oil pump and drive spindle assembly.

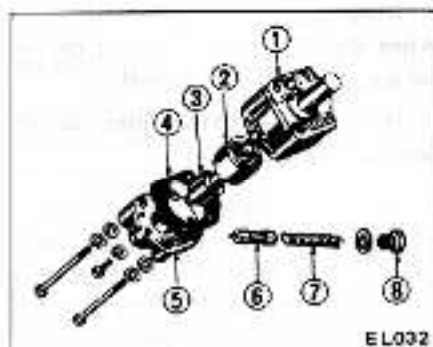


4. Make sure that the tip of the drive spindle fits distributor fitting hole securely.
5. Tighten bolts securing oil pump to front cover.

Ⓣ: Oil pump mounting bolts  
 11 - 15 N·m  
 (1.1 - 1.5 kg-m,  
 8 - 11 ft-lb)

6. Install distributor cap.

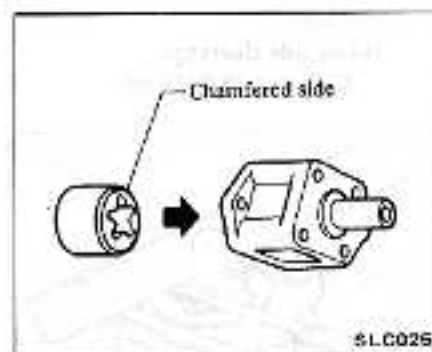
### DISASSEMBLY AND ASSEMBLY



- |                         |                    |
|-------------------------|--------------------|
| 1 Oil pump body         | 5 Oil pump cover   |
| 2 Outer rotor           | 6 Regulator valve  |
| 3 Inner rotor and shaft | 7 Regulator spring |
| 4 Gasket                | 8 Regulator cap    |

Ⓣ: Oil pump cover bolts  
 6.9 - 9.8 N·m  
 (0.7 - 1.0 kg-m,  
 5.1 - 7.2 ft-lb)

- Always replace with a new gasket.
- Outer rotor should be assembled so that the chamfered side faces to oil pump body.

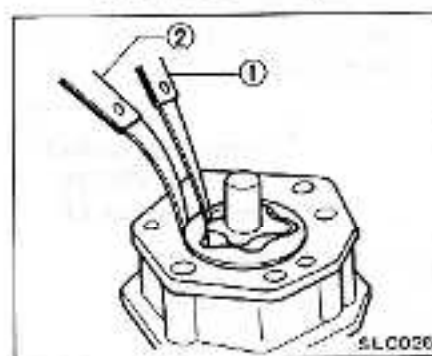


### INSPECTION

1. Inspect the following for wear or damage.
  - Pump body and cover
  - Pump rotors and rotor shaft
2. Using a feeler gauge, check the following clearances.

Wear limit:

- Rotor tip clearance ①  
 0.20 mm (0.0079 in)  
 Outer rotor to  
 body clearance ②  
 0.50 mm (0.0197 in)



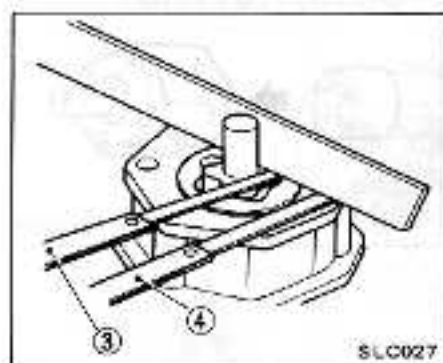
3. Using a feeler gauge and a straight edge, check the following gap, ③ or ④ without gasket.

- Rotor to straight edge ③:  
 Less than  
 0.06 mm (0.0024 in)  
 Oil pump body to straight edge ④:  
 Less than  
 0.03 mm (0.0012 in)

The rotor side clearance (rotor to bottom cover clearance) with gasket should satisfy the following specification.

Wear limit:

Rotor side clearance  
0.20 mm (0.0079 in)

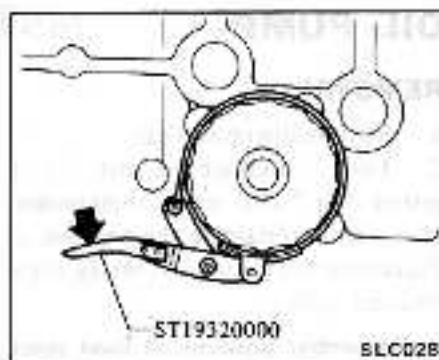
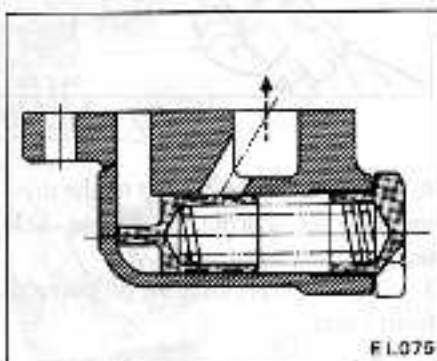


Pump rotors and body are not serviced separately. If pump rotors or body are damaged or worn, replace pump rotor set or entire oil pump assembly.

## OIL PRESSURE REGULATOR VALVE

### INSPECTION

Check valve sliding surface and valve spring, and replace entire valve assembly if necessary.



## OIL PRESSURE RELIEF VALVE

### INSPECTION

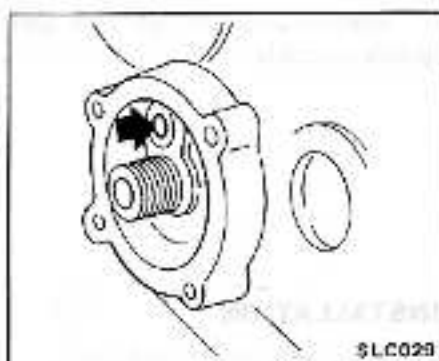
With oil filter removed, check the condition of the valve unit. Inspect for a cracked or broken valve. If replacement is necessary, remove valve by prying it out with a screwdriver. Install a new valve in place by tapping it.

## OIL FILTER

### REMOVAL AND INSTALLATION

When removing oil filter, use Tool. When installing it, lightly coat oil on oil seal and fasten it by hand.

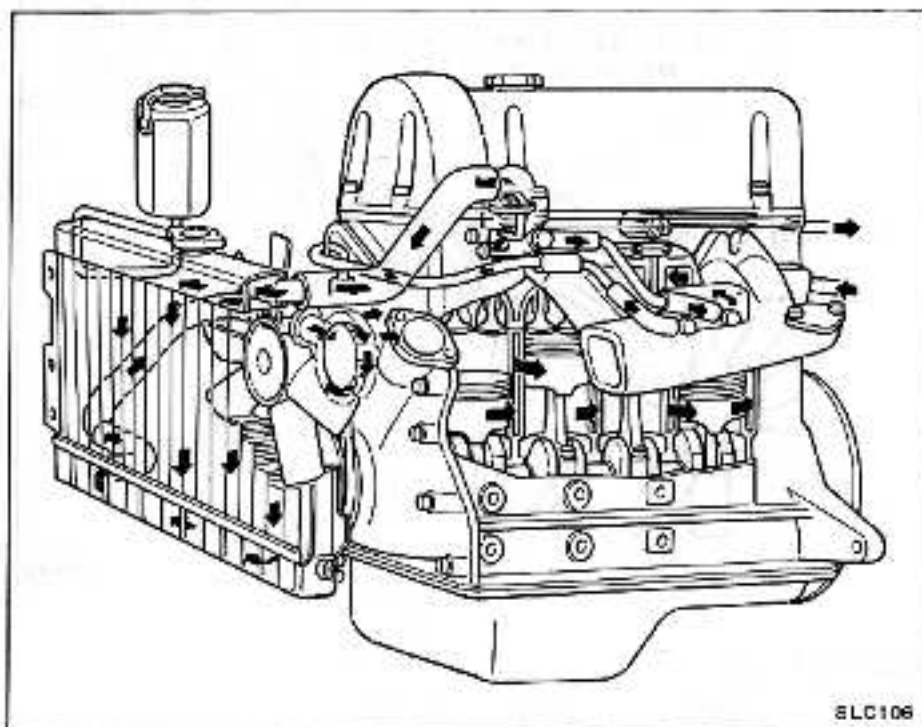
Do not overtighten filter, or oil leakage may occur.



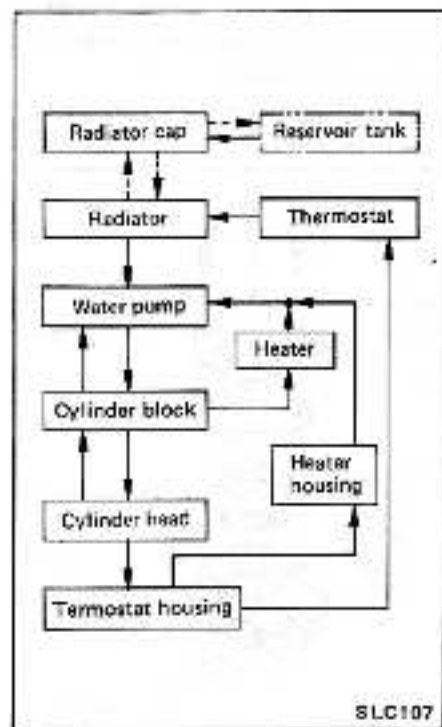
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## COOLING SYSTEM

## COOLING CIRCUIT



SLC106



SLC107

**WARNING:**

To avoid serious personal injury, never remove radiator cap quickly when engine is hot. Sudden release of cooling system pressure is very dangerous.

If it is necessary to remove radiator cap when radiator is hot, turn cap slowly counterclockwise to the first stop. After all pressure in the cooling system is released, turn cap passing the stop and remove it.

**RADIATOR****REMOVAL AND INSTALLATION**

1. Drain coolant into a clean container.
2. Disconnect radiator upper and lower hoses, and reservoir tank hose.
3. Remove radiator shroud.
4. On cars with automatic transmission, disconnect cooler inlet and outlet lines from radiator.
5. Remove radiator.
6. Install radiator in the reverse

order of removal and refill cooling system with coolant to specified level. (Refer to Section MA.)

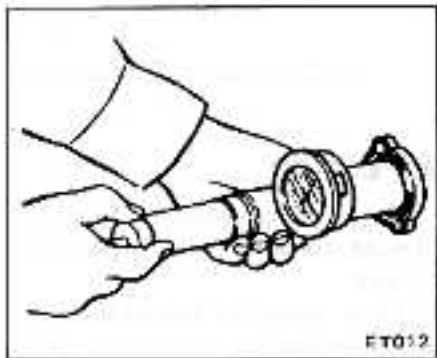
**INSPECTION**

Inspect radiator cap and water leakage using cap tester.

1. Inspection of radiator cap.

First, check rubber seal on cap for tears, cracks or deterioration after cleaning it. Then, install radiator cap on a tester. If cap does not hold or will not release at the specified pressure, replace cap.

Cap relief pressure:  
88 kPa (0.88 bar,  
0.9 kg/cm<sup>2</sup>, 13 psi)



FT012

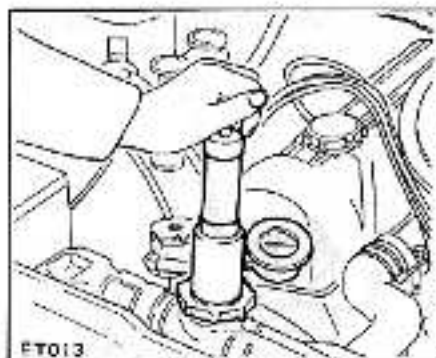
2. Inspection of water leakage.

With radiator cap removed, apply test pressure to radiator on the car.

If leakage is detected, repair or replace radiator.

Leakage test pressure:

157 kPa (1.57 bar,  
1.6 kg/cm<sup>2</sup>, 23 psi)



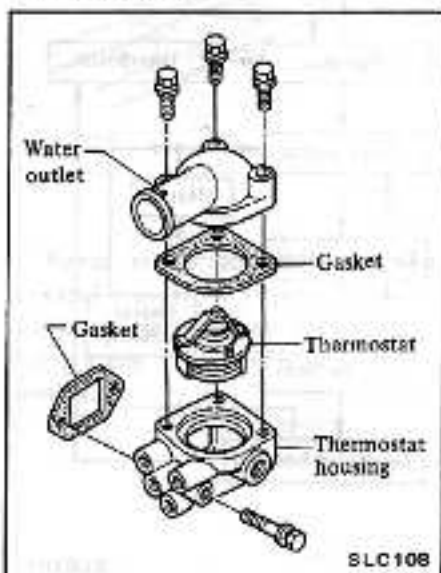
FT013



## THERMOSTAT

### REMOVAL AND INSTALLATION

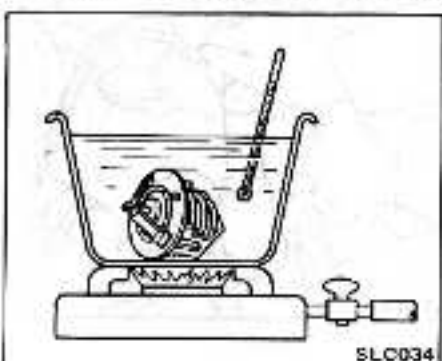
1. When removing, drain coolant partially and disconnect upper radiator hose at water outlet.
2. Install thermostat and water outlet as illustrated.



### INSPECTION

Inspect thermostat for the following and replace if necessary.

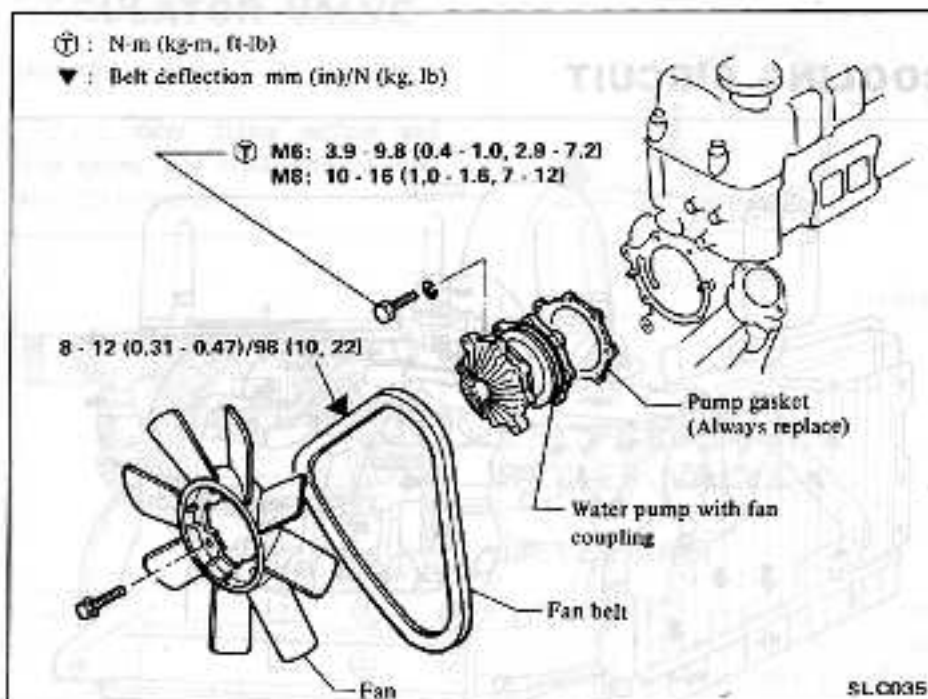
1. Valve seating condition at ordinary temperature. It should seat tightly.
2. Valve opening temperature and maximum valve lift. (Refer to S.D.S.)



3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

It is necessary to check a new thermostat before installing it in engine.

## WATER PUMP

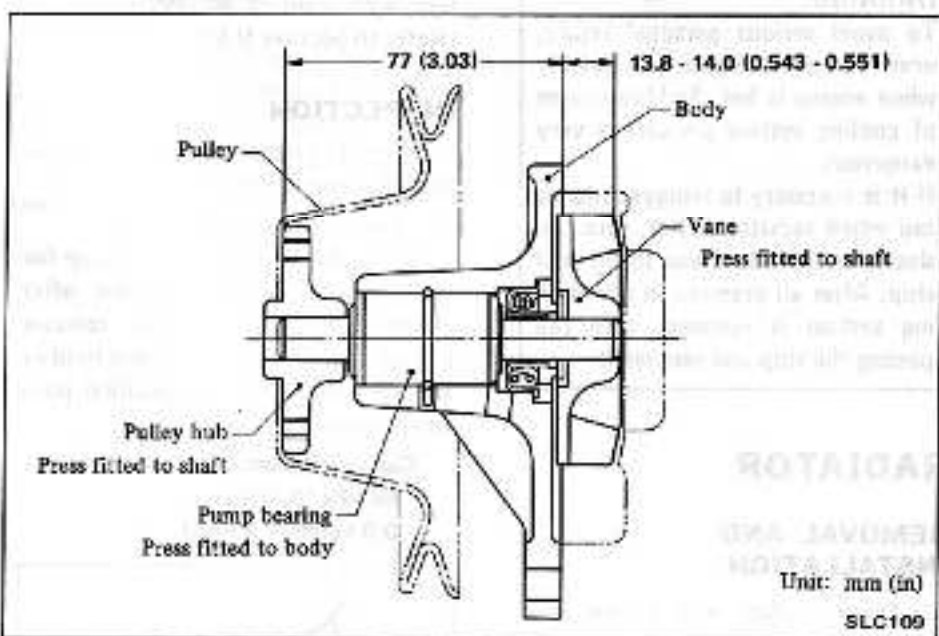


### DISASSEMBLY

The water pump is made of aluminum and its bearing outer race is of a press fit type. For this reason, water pump should not be disassembled for

the best.

If the pump were to be disassembled, use suitable tools not to give damage to the bearing.



### INSPECTION

Inspect pump assembly for the following conditions and replace if necessary.

1. Badly rusted or corroded body assembly and vane.

2. Excessive end play or roughness of bearings in operation.

If excessive mechanical seal squeak occurs when engine is running, use suitable water pump seal lubricant to prevent squeak.

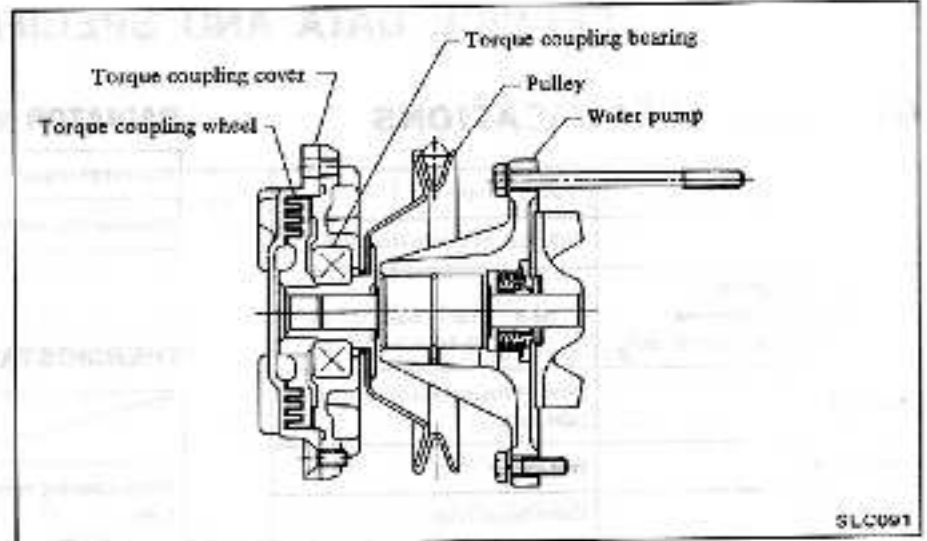
## TORQUE COUPLING

### DISASSEMBLY

The coupling is so designed that it cannot be disassembled.

### INSPECTION

Inspect the coupling for oil leakage or bend of bimetal. If necessary, replace as a pump assembly.



SLC091

ITEM NO.	DESCRIPTION	QTY	UNIT
1	Torque coupling cover	1	PC
2	Torque coupling wheel	1	PC
3	Torque coupling bearing	1	PC
4	Pulley	1	PC
5	Water pump	1	PC

## INSPECTION AND ADJUSTMENT

ITEM NO.	DESCRIPTION	QTY	UNIT
1	Water pump	1	PC
2	Torque coupling	1	PC
3	Water pump pulley	1	PC
4	Water pump bearing	1	PC

## COOLING SYSTEM

### TIGHTENING TORQUE

ITEM NO.	DESCRIPTION	TIGHTENING TORQUE (N·m)	TIGHTENING TORQUE (kgf·m)
1	Water pump pulley	10-15	1.0-1.5
2	Water pump bearing	10-15	1.0-1.5
3	Torque coupling	10-15	1.0-1.5
4	Water pump	10-15	1.0-1.5

### PRESSURE REGULATOR VALVE

ITEM NO.	DESCRIPTION	QTY	UNIT
1	Pressure regulator valve	1	PC
2	Water pump pulley	1	PC
3	Water pump bearing	1	PC
4	Torque coupling	1	PC
5	Water pump	1	PC

## SERVICE DATA AND SPECIFICATIONS

## GENERAL SPECIFICATIONS

Oil pump	Trochoid type
Oil filter	Full flow and cartridge type
Oil pressure relief valve Valve opening pressure kPa (bar, kg/cm <sup>2</sup> , psi)	58.8 - 73.6 (0.588 - 0.736, 0.60 - 0.75, 8.5 - 10.7)
Radiator	Down flow, corrugated fin and tube type
Thermostat	Wax type
Water pump	Centrifugal type
Torque coupling Fan speed (at water pump speed 4,000 rpm) rpm	1,800

## RADIATOR

Cap relief pressure	kPa (bar, kg/cm <sup>2</sup> , psi)	88 (0.88, 0.9, 13)
Leakage test pressure	kPa (bar, kg/cm <sup>2</sup> , psi)	157 (1.57, 1.6, 23)

## THERMOSTAT

	Standard	Frigid type	Tropical type
Valve opening tempera- ture °C (°F)	82 (180)	88 (190)	76.5 (170)
Max. valve lift mm/°C (in/°F)	8/95 (0.31/203)	8/100 (0.31/212)	8/90 (0.31/194)

## INSPECTION AND ADJUSTMENT

## OIL PUMP

Unit: mm (in)

	Standard	Wear limit
Rotor tip clearance	Less than 0.12 (0.0047)	0.20 (0.0079)
Outer rotor-to-body clearance	0.15 - 0.21 (0.0059 - 0.0083)	0.50 (0.197)
Rotor side clearance (rotor to bottom cover)	0.04 - 0.06 (0.0016 - 0.0031)	0.20 (0.0079)

## OIL PRESSURE REGULATOR VALVE

Regulator valve spring	Free length mm (in)	52.5 (2.067)
	Installed length/ load mm/N (kg), (in/lb)	34.8/77.5 - 85.3 (7.9 - 8.7) (1.370/17.4 - 19.2)
Regulator valve opening pressure kPa (bar, kg/cm <sup>2</sup> , psi)/rpm		343 - 412 (3.43 - 4.12, 3.5 - 4.2, 50 - 60)/3,000

## WATER PUMP

Fan belt deflection	mm (in)/N (kg, lb)	8 - 12 (0.31 - 0.47)/ 98 (10, 22)
---------------------	--------------------	--------------------------------------

## TIGHTENING TORQUE

Unit	N·m	kg·m	ft·lb
Oil pump mounting bolt	11 - 15	1.1 - 1.5	8 - 11
Oil pump cover bolt	6.8 - 9.8	0.7 - 1.0	5.1 - 7.2
Regulator valve cap	28 - 49	4 - 6	28 - 36
Water pump securing bolt	M6	3.9 - 9.8	0.4 - 1.0
	M8	10 - 16	1.0 - 1.6

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## TROUBLE DIAGNOSES AND CORRECTIONS

### LUBRICATION SYSTEM

Condition	Probable cause	Corrective action
Oil leakage	Damaged or cracked pump body cover. Oil leakage from gasket and oil seal. Oil leakage from regulator valve. Oil leakage from blind plug.	Replace. Replace. Tighten or replace. Replace.
Decreased oil pressure	Lack of oil in engine oil pan. Dirty oil strainer. Damaged or worn pump rotors. Malfunctioning regulator. Use of poor quality engine oil.	Correct. Clean or replace. Replace. Replace. Replace.
Warning light remains "on" with engine running	Decreased oil pressure. Oil pressure switch unserviceable. Electrical fault.	Previously mentioned. Replace. Check circuit.
Noise	Excessive backlash in pump rotors.	Replace.

### COOLING SYSTEM

Condition	Probable cause	Corrective action
Water leakage	Damaged radiator seams. Leaks from heater connections or plugs. Leak from water pump shaft seal. Leak from water temperature gauge. Leaks from gaskets or small cracks.  Loose joints. Damaged cylinder head gasket.	Repair. Repair. Replace as pump assembly. Tighten. Tighten or use Nissan Cooling System Sealer or equivalent. Tighten. Replace. Check engine oil for contamination and refill as necessary.
Water leakage	Cracked cylinder block.  Cracked cylinder head. Loose cylinder head bolts.	Replace. Check engine oil in crankcase for mixing with water by pulling oil level gauge. Replace. Tighten.

**Special Service Tool – ENGINE LUBRICATION & COOLING SYSTEM**

Condition	Probable cause	Corrective action
Poor circulation	Restriction in system. Insufficient coolant. Inoperative water pump. Loose fan belt. Inoperative thermostat.	Check hoses for crimps, and clear the system of rust and sludge by flushing radiator. Replenish. Replace. Adjust. Replace.
Corrosion	Excessive impurities in water. Infrequent flushing and draining of system.	Use soft, clean water. (rain water is satisfactory). Cooling system should be drained and flushed thoroughly at least twice a year. Permanent anti-freeze (Ethylene glycol base) can be used throughout the year.
Overheating	Malfunctioning thermostat, radiator cap and fan coupling. Radiator fin choked with mud, chaff, etc. Incorrect ignition and valve timing. Dirty oil and sludge in engine. Inoperative water pump. Loose fan belt. Restricted radiator. Inaccurate temperature gauge. Impurities in water.	Replace. Clean out air passage thoroughly by using air pressure from engine side of radiator. Adjust. Refill. Replace. Adjust. Flush radiator. Replace. Use soft, clean water.
Overcooling	Malfunctioning thermostat. Inaccurate temperature gauge.	Replace. Replace.
Noise	Squeak at water pump mechanical seal. Damaged or worn water pump bearing.	Use suitable water pump seal lubricant or replace as pump assembly. Replace as pump assembly.

**SPECIAL SERVICE TOOL**

Tool number	Tool name
ST19320000	Oil filter wrench



SLC036

**DATSUN**

**Model S110 Series**

# SECTION **ER**

## **ENGINE REMOVAL & INSTALLATION**

### **CONTENTS**

**ER**

#### **ENGINE REMOVAL AND INSTALLATION**

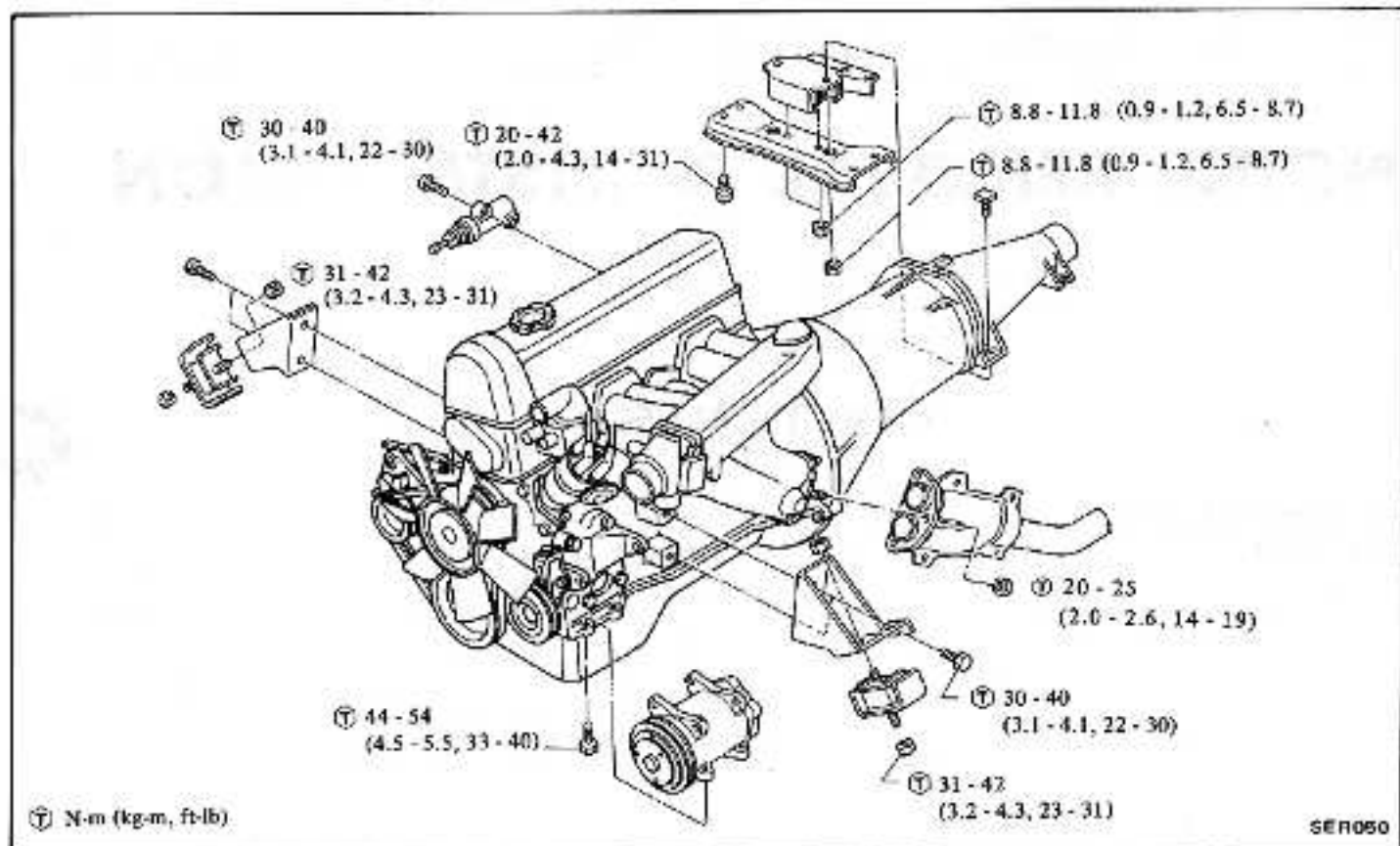
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INSTALLATION .....	ER-4
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## ENGINE REMOVAL AND INSTALLATION

### CONSTRUCTION



### REMOVAL

It is much easier to remove engine and transmission as a single unit than to remove them separately. After removal, engine can be separated from transmission assembly.

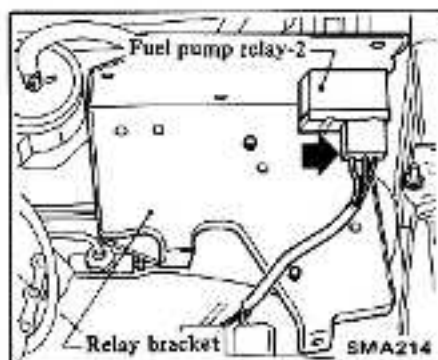
#### WARNING:

- Place wheel chocks in front of front wheels and in rear of rear wheel.
- Be sure to hoist engine and jack up transmission in a safe manner.
- You should not remove the engine until the exhaust system has completely cooled off. Otherwise, you may burn yourself and/or fire may break out in fuel line.

#### CAUTION:

Before disconnecting fuel hose, release fuel pressure from fuel line to eliminate danger.

- Start the engine.
- Disconnect the harness connector of fuel pump relay-2 while the engine is running.



- Turn the ignition switch OFF.
- Reconnect the harness connector of fuel pump relay-2.

Fender covers should be used to protect car body.

- Disconnect the negative battery cable.
- Drain engine coolant.
- Remove hood.

Mark the location of hood hinges on hood to facilitate correct reinstallation.

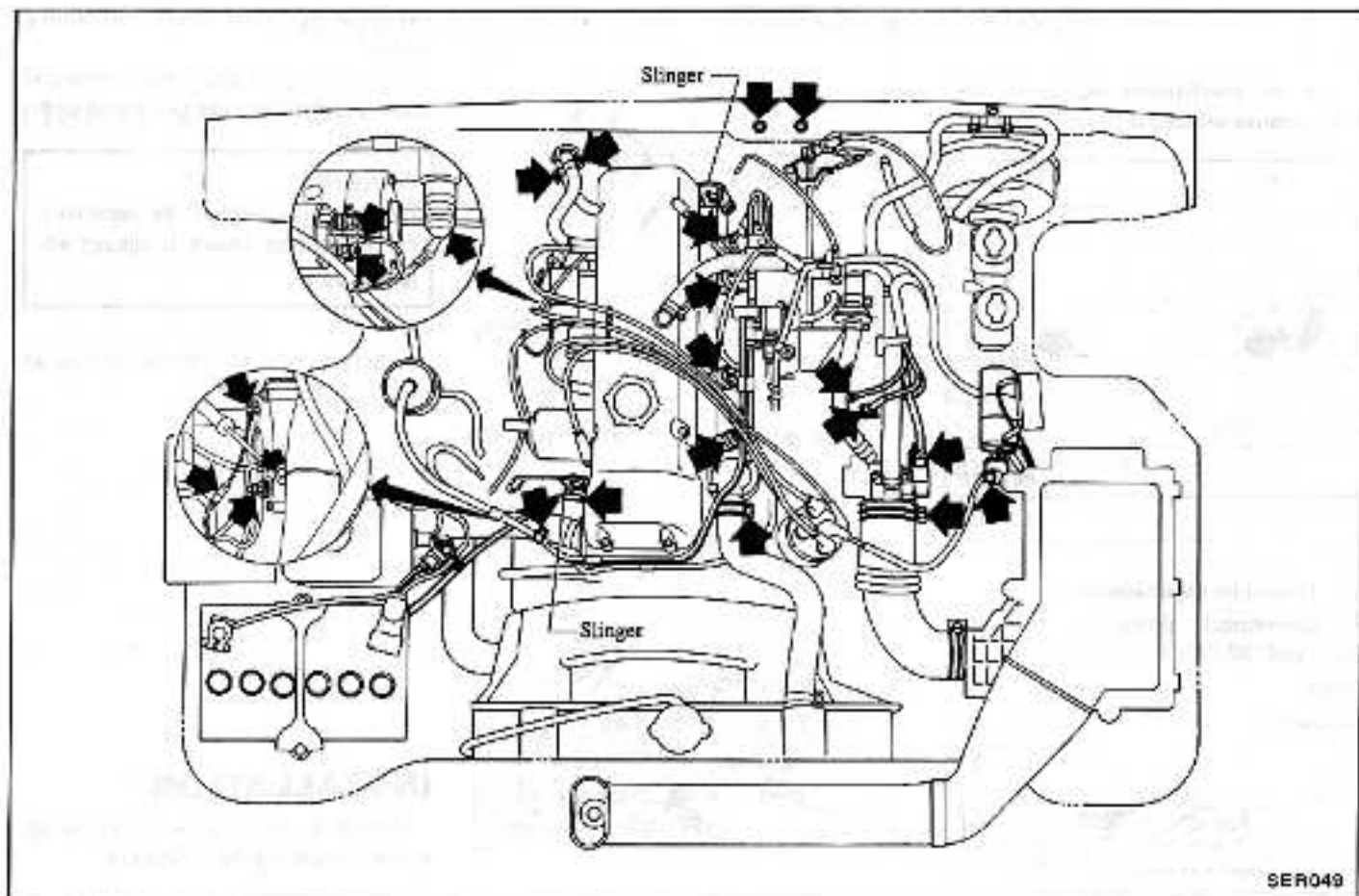
#### CAUTION:

Have an assistant help you so as to prevent damage to body.

- Remove all wires and hoses indicated by the arrows in the figure on the next page.

- Follow the procedure below to reduce fuel pressure to zero.

- After the engine stalls, crank the engine two or three times.

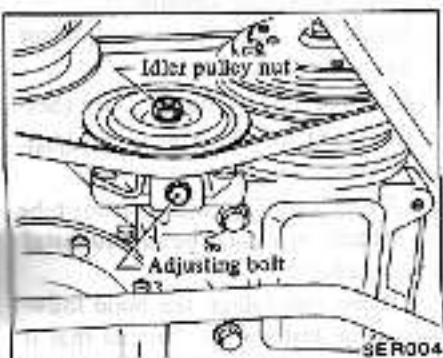


**Air conditioner equipped models**

Remove compressor following the procedures below:

(1) Remove compressor drive belt.

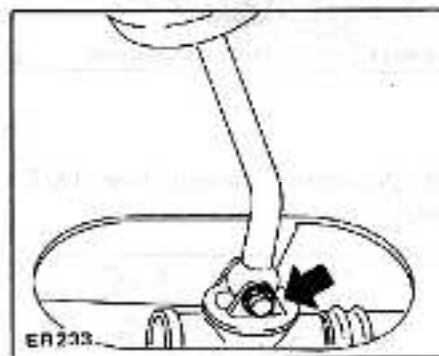
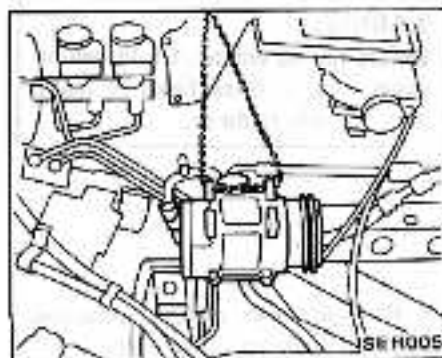
To remove this belt, loosen both idler pulley nut and adjusting bolt.



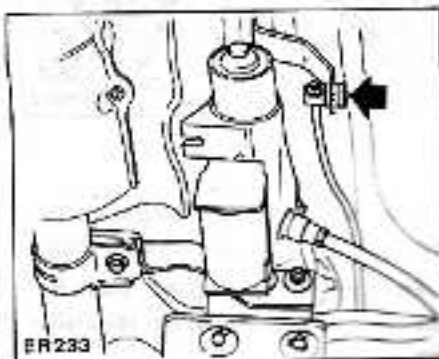
(2) Remove compressor.

Place removed compressor as shown in the following figure.

Never discharge gas from compressor while service/repair work is being performed.



(2) Automatic transmission



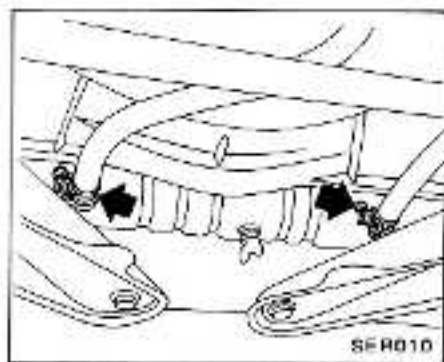
6. Remove transmission control linkage as follows:

(1) Manual transmission

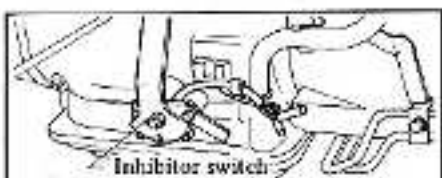


7. Remove radiator and radiator shroud.

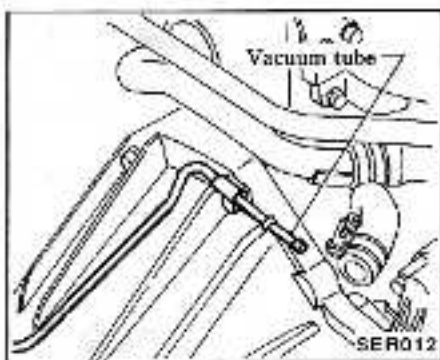
On air conditioner equipped models, remove oil cooler hose.



8. Disconnect speedometer cable.  
9. Disconnect downshift solenoid wire and inhibitor switch wire. (A/T only).

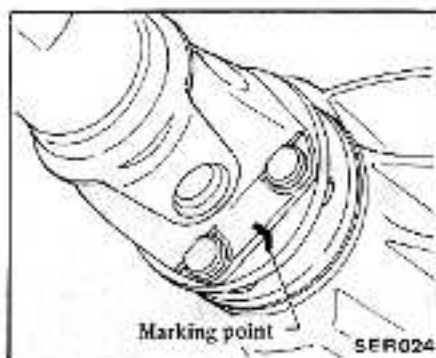


10. Disconnect vacuum hose (A/T only).

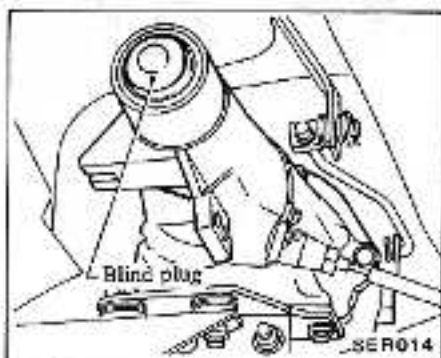


11. Remove clutch operating cylinder, front exhaust tube and propeller shaft.

Place marks on propeller shaft before removal to facilitate reinstallation.



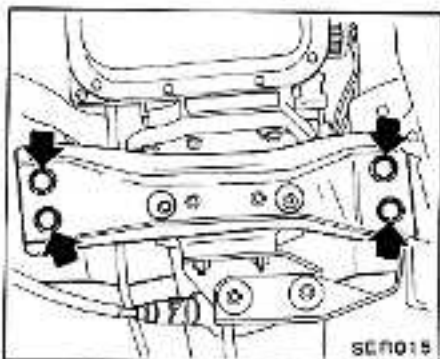
Plug open holes in rear extension housing as shown.



12. Attach suitable wires to engine slingers and raise engine using a hoist to take the weight off front and rear mount insulators.

**WARNING:**  
Before raising engine, try loosening wires two or three times to make sure it is safe to do so.

13. Remove rear engine mounting support-to-body attaching bolts.



14. Remove front engine mounting bolts.

15. Raise engine and transmission and remove them from car as a single unit.

**WARNING:**  
When raising engine, be especially careful not to knock it against adjacent parts.

16. Set engine and transmission on an engine stand.

## INSTALLATION

Install in the reverse order of removal, observing the following:

When installing, be sure to check that electrical harness are correctly connected.

1. When installing, first secure rear engine support bracket to rear mounting insulator.
2. Refer to pertinent section when installing and adjusting any parts.
  - Adjust accelerator control system. Refer to Engine Control System (Section FE) for adjustment.
  - Install air conditioner compressor and adjust belt. Refer to Engine Maintenance (Section MA) for checking and adjusting drive belts.
3. When installing exhaust front tube on exhaust manifold, be sure to install a new gasket.
4. When reinstalling the hood following engine installation, be sure that it is properly centered and that hood lock operates securely. Refer to Hood (Section BI) for adjustment.
5. Add the correct amount of engine coolant.
6. For automatic transmission models, add the same amount of automatic transmission fluid as was drained.

**SERVICE DATA AND SPECIFICATIONS****TIGHTENING TORQUE**

Unit	N·m	kg·m	ft·lb
Front engine support bracket to cylinder block	30 - 40	3.1 - 4.1	22 - 30
Front engine support bracket to mounting insulator	31 - 42	3.2 - 4.3	23 - 31
Front mounting insulator to body	31 - 42	3.2 - 4.3	23 - 31
Compressor to bracket	44 - 54	4.5 - 5.5	33 - 40
Rear mounting insulator to transmission	8.8 - 11.8	0.9 - 1.2	6.5 - 8.7
Rear mounting insulator to mounting member	8.8 - 11.8	0.9 - 1.2	6.5 - 8.7
Mounting member to body	20 - 42	2.0 - 4.3	14 - 31
Exhaust manifold to exhaust tube	20 - 25	2.0 - 2.6	14 - 19
Clutch operating cylinder to engine	30 - 40	3.1 - 4.1	22 - 30

