

# SERVICE MANUAL

DATSUN 260Z  
MODEL S30 SERIES

## SECTION CO

## COOLING SYSTEM

CO

COOLING SYSTEM	CO- 2
SPECIFICATIONS	CO- 7
TROUBLE DIAGNOSES AND CORRECTIONS	CO- 8



**NISSAN MOTOR CO., LTD.**  
TOKYO, JAPAN



# COOLING SYSTEM

## CONTENTS

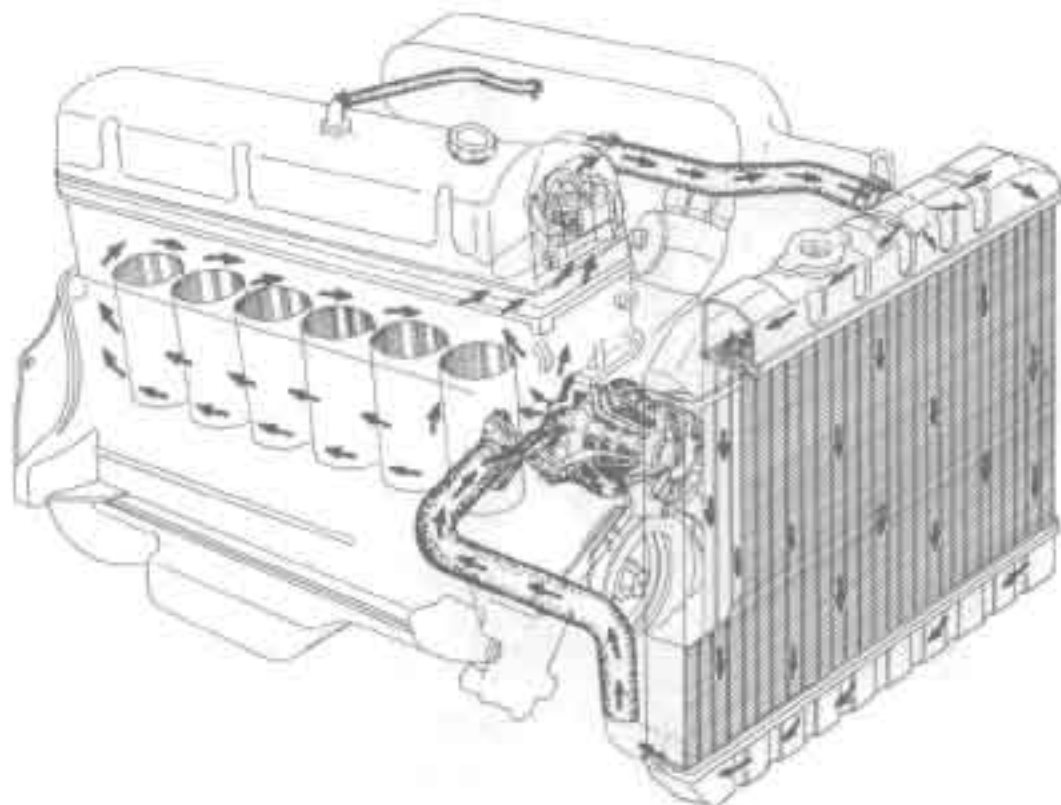
DESCRIPTION .....	CO-2	TEMPERATURE COUPLING .....	CO-4
COOLANT LEVEL .....	CO-3	INSPECTION .....	CO-5
DRAINING AND FLUSHING THE COOLING SYSTEM .....	CO-3	THERMOSTAT .....	CO-6
WATER PUMP .....	CO-3	REMOVAL AND INSTALLATION .....	CO-5
REMOVAL AND INSTALLATION .....	CO-3	INSPECTION .....	CO-5
DISASSEMBLY .....	CO-3	RADIATOR .....	CO-5
INSPECTION AND ADJUSTMENT .....	CO-3	REMOVAL AND INSTALLATION .....	CO-6
		INSPECTION .....	CO-6

## DESCRIPTION

The cooling system is of the conventional pressure type. A centrifugal pump built in the front cover of the engine serves to circulate the coolant. The pressure type radiator filler cup

installed on the radiator operates the cooling system at higher than atmospheric pressure. The higher pressure raises the boiling point of the coolant and increases the cooling efficiency of the radiator. When the thermostat is

closed, the coolant remains in the cylinder head and block for swift warming up of the engine. After it reaches the normal operating temperature, the coolant circulates through the radiator.



CO027

Fig. CO-1 Cooling system

## COOLANT LEVEL

The coolant level should be checked and maintained as follows:

About 40 mm (1.575 in) below the bottom of filler neck.

**CAUTION:** 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.

## DRAINING AND FLUSHING THE COOLING SYSTEM

To drain the cooling system remove radiator cap, release drain cock at the bottom of radiator and drain plug on the side of cylinder block. If heater system is installed, set heater temperature control valve to open position. After the coolant is drained completely, close drain cock and plug and refill the system with clean soft water.

## WATER PUMP

The water pump is of a centrifugal type, which is mounted on the engine front cover. The fan and pulley are bolted at the pulley hub. The pump shaft is supported by a double row of ball bearings press fit in an aluminum die cast pump body. The bearings are permanently lubricated and sealed to prevent loss of lubricant and entry of dirt.

The pump contains an impeller that turns on a steel shaft which rotates in the ball bearings, and the volute chamber is built in the front cover assembly. The inlet of the pump is connected to the radiator's lower tank by a hose.

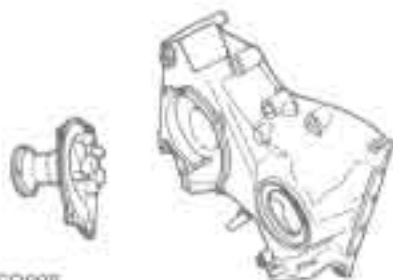


Fig. CO-2 Water pump and front cover

## REMOVAL AND INSTALLATION

### Removal

1. Drain coolant into a clean container.
2. Loosen bolts retaining fan shroud to radiator and remove shroud.
3. Loosen belt, then remove fan blade and pulley from hub.
4. Remove pump assembly and gasket from front cover.

**Note:** Prior to removing water pump, clean the cooling system with NISSAN CSC (Cooling System Cleaner).



Fig. CO-3 Removing water pump

### Installation

1. Be sure to clean the gasket surfaces in contact with pump and front cover. Always use new gaskets when installing pump assembly. Be sure to tighten bolts.
2. Fill cooling system and check for leaks at pump.
3. Install fan pulley and fan blade, and tighten fixing bolts securely. Install belt and adjust for proper tension.

## DISASSEMBLY

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.

## INSPECTION AND ADJUSTMENT

### 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.

**Note:** If excessive mechanical seal squeak occurs when engine is running, use NPSL (Nissan water pump seal lubricant) to prevent squeak.

### Adjustment

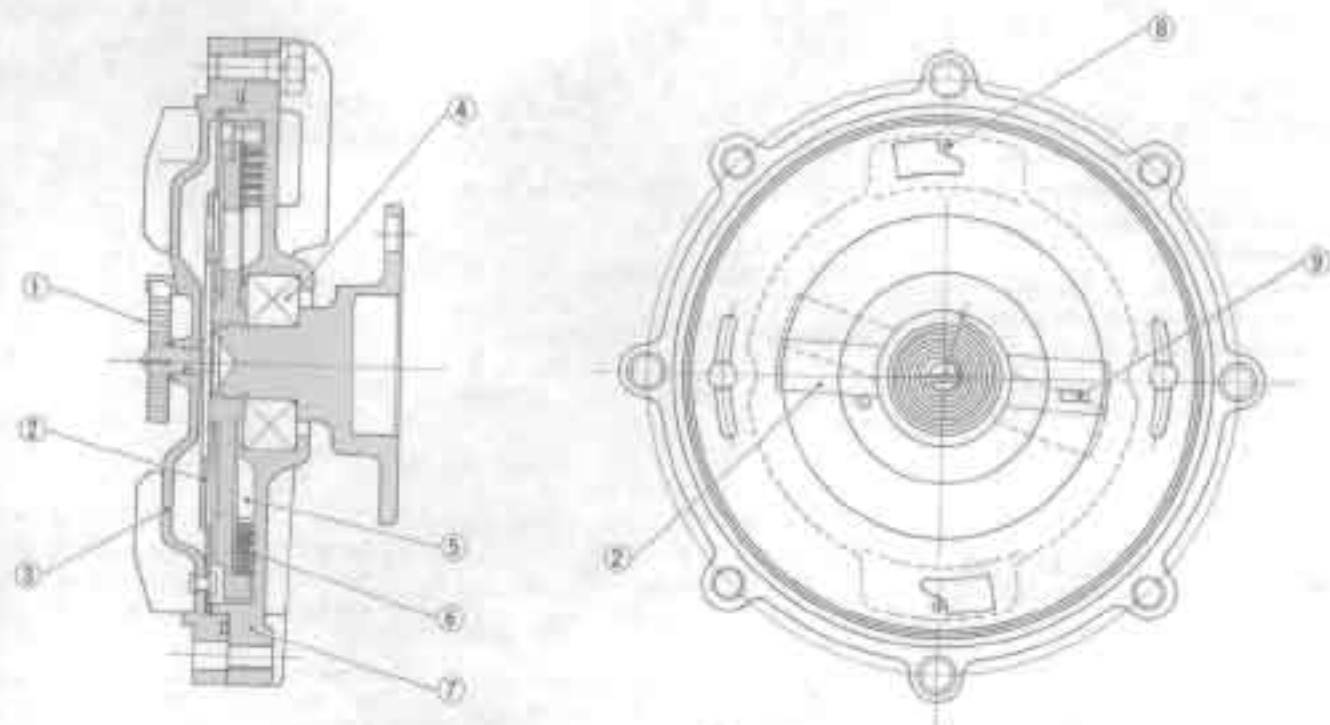
Fan belt should be properly adjusted at all times. A tight belt causes wear of alternator and water pump bearings. A loose belt brings about improper cooling fan, water pump, and alternator operation.

Check the belt slack between alternator and fan pulley by force of 10 kg (22 lb).

Slackness of fan belt:  
8 to 12 mm  
(0.315 to 0.472 in)

If adjustment is necessary, loosen bolt retaining alternator adjusting bar to alternator. Move alternator toward or away from engine until the correct tension is obtained.

## TEM-COUPLING



- |                             |                             |
|-----------------------------|-----------------------------|
| 1 Bi-metal thermostat       | 6 Coupling part (labyrinth) |
| 2 Slide valve               | 7 Driven part               |
| 3 Reserve chamber for "OFF" | 8 Pump unit oil outlet      |
| 4 Bearing                   | 9 Oil inlet                 |
| 5 Driving chamber           |                             |

CO040

Fig. CO-4 Cross-sectional view of Tem-coupling

Tem-coupling is a type of fan coupling which is provided with a temperature control system.

The conventional coupling always slips the fan at a high speed under a constant ratio regardless of the engine cooling requirement.

The slipping ratio of the Tem-coupling, however, is properly changed with the cooling requirement.

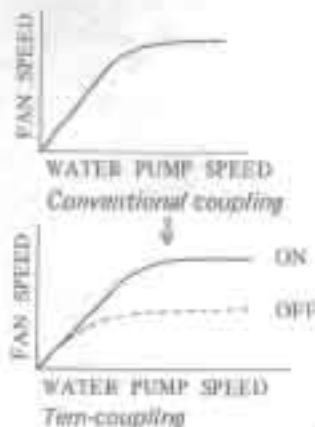
"ON" denotes that cooling is required and the fan operates up to about 2,450 rpm. When high cooling is not required (during cold season, with the engine warmed up, etc.), the operation is placed under "OFF" condition and the fan slips at about 1,600 rpm.

The coiled bi-metal thermostat installed on the front center portion of the Tem-coupling detects temperature

of air passing through the radiator (The air temperature is directly relative to the engine coolant temperature.) and the inside slide valve is opened or closed as required, and thus, the ON-OFF control is performed. When the air temperature rises, the bi-metal is expanded, and the valve is opened, silicon oil is forwarded to the groove that transmits torque, and the system is placed under "ON" condition.

When the valve closes, silicon oil is not supplied to the groove, oil in the groove is accumulated on the Tem-coupling periphery due to the centrifugal force, and led into the reserve chamber. Now, oil is eliminated from the groove, and the system is placed under "OFF" condition.

With this system, when fan cooling is not required, the output loss is minimized and noise can be far reduced.



CO029

Fig. CO-5 Characteristic of Tem-coupling

## INSPECTION

Check Term-coupling for oil leakage or bend of bimetal

If the above symptoms are found, replace it with a new one as an assembly

## THERMOSTAT

A wax pellet type thermostat is mounted in the thermostat housing at the cylinder head water outlet.

The function of the thermostat is to control the flow of coolant, facilitating fast engine warm up and regulating coolant temperature. The thermostat is designed to open and close at predetermined temperatures and if not operating properly should be removed and tested as described below.

## REMOVAL AND INSTALLATION

1. Drain coolant partially.
2. Disconnect upper radiator hose at water outlet.
3. Loosen two securing nuts and remove water outlet, gasket, and thermostat from thermostat housing.
4. After checking thermostat,

reinstall, replacing with a new honing gasket.

5. Reinstall water outlet and tighten securing nuts.

6. Replenish coolant and check for leaks.

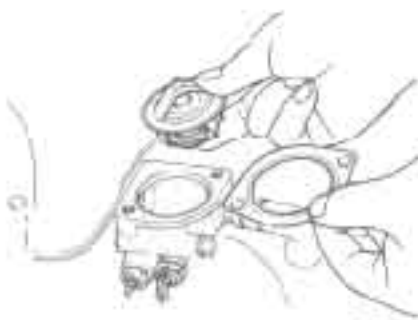


Fig. CO-6 Removing thermostat

## INSPECTION

A sticking thermostat will prevent the cooling system from functioning properly. If the thermostat sticks in the open position, the engine warms up very slowly. If the thermostat sticks in the closed position, overheating will result. Therefore, the thermostat should be inspected to make sure that it is in good condition.

1. Submerge thermostat in hot water 5°C (9°F) above the temperature specified in the following table.

2. After preparing for the marked screwdriver at about 8 mm (0.315 in) from the tip, inspect the lift height of valve by inserting it.

3. Now, place thermostat in water 5°C (9°F) below the specified temperature.

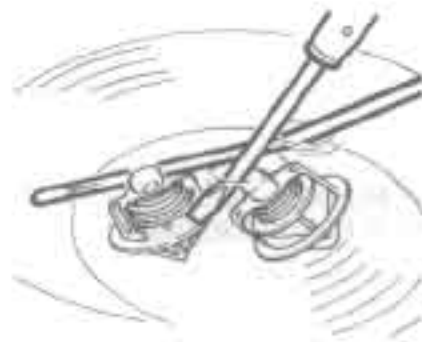


Fig. CO-7 Inspecting thermostat

If thermostat does not operate at the above specified temperature, it must be replaced because it cannot be repaired.

	Standard	For cold areas	For tropical areas
Valve opening temperature	82°C (180°F)	88°C (190°F)	76.5°C (170°F)
Max. valve lift	above 8 mm at 95°C (0.315 in at 203°F)	above 8 mm at 100°C (0.315 in at 212°F)	above 8 mm at 90°C (0.315 in at 194°F)

**Note:** It is necessary to check a new thermostat before installing it in the engine.

## RADIATOR

The radiator is a conventional down flow type having top and bottom tanks to distribute the coolant flow uniformly through the vertical tube of radiator core. The radiator shroud improves fan performance (only for the model equipped with air conditioner).

The radiator filler cap is designed to

maintain a pre-set pressure [0.9 kg/cm<sup>2</sup> (13 psi) above atmospheric pressure.

The relief valve consisting of a blow-off valve and a vacuum valve, helps to prevent the coolant from boiling by giving pressure to it. However, when the pressure is reduced below atmospheric pressure, the vacuum valve allows air to re-enter the radiator preventing the formation of a vacuum in the cooling system. The bottom tank on cars equipped with automatic transmission incorporates an oil cooler for the transmission fluid.

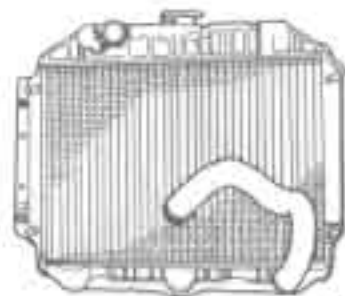


Fig. CO-8 Radiator for manual transmission

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.

Also, inspect radiator for water leakage using cap tester and applying a pressure of 1.6 kg/cm<sup>2</sup> (22.8 psi).

If a defect is detected, repair or replace radiator.



CO036

*Fig. CO-9 Radiator shroud  
(for the model equipped  
with air conditioner)*

### REMOVAL AND INSTALLATION

1. Drain coolant into a clean container.
2. Disconnect radiator's upper and lower hoses.
3. Remove radiator lower shroud attaching bolts and then remove lower shroud downward (for the model equipped with air conditioner).
4. On a car with automatic transmission, disconnect cooler inlet and outlet lines from radiator.
5. Remove radiator retaining bolts and then remove radiator upward.

On a car with air conditioner, remove radiator along with upper shroud upward.

6. Install radiator in the reverse sequence of removal.

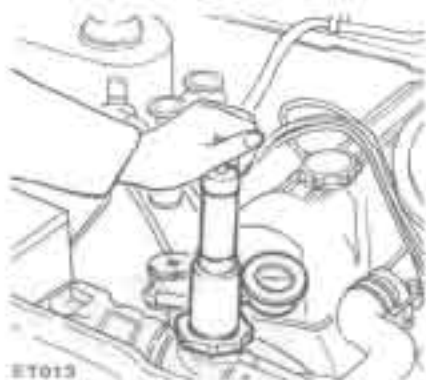
### INSPECTION

Radiator cap should be checked for working pressure at regular tune up intervals. First, check rubber seal on



ET012

*Fig. CO-10 Testing radiator cap*



ET013

*Fig. CO-11 Testing cooling system  
pressure*



- 1 Radiator
- 2 Oil cooler
- 3 Water pump
- 4 Cap for water supply

CO028

*Fig. CO-12 Structural view of cooling system*



# SPECIFICATIONS

Engine .....		L26
Radiator:		
Dimension of core (Height x Width x Thickness)	mm (in) .....	350 x 600 x 49 (13.8 x 23.6 x 1.9)
Type .....		Corrugated fin and tube
Pin pitch	mm (in) .....	2.9 (0.114)
Cap working pressure	kg/cm <sup>2</sup> (psi) .....	0.9 (13)
Testing pressure	kg/cm <sup>2</sup> (psi) .....	1.6 (23)
Water capacity (including engine)	liter (U.S. qt, Imp.qt) .....	9.4 (10, 8%)
Fan		
Tem-patrol .....		Installed
No. of blades x outer diameter	mm (in) .....	8 x 450 (17.72)



## TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Loss of water	<p>Damaged radiator seams.</p> <p>Leaks at heater connections or plugs.</p> <p>Leak at water temperature gauge.</p> <p>Loose joints.</p> <p>Damaged cylinder head gasket.</p> <p>Cracked cylinder block.</p> <p>Cracked cylinder head.</p> <p>Loose cylinder head bolts.</p>	<p>Repair.</p> <p>Repair.</p> <p>Tighten.</p> <p>Tighten.</p> <p>Replace.</p> <p>Check engine oil for contamination and refill as necessary.</p> <p>Replace.</p> <p>Check engine oil in crankcase for mixing with water by pulling oil level gauge.</p> <p>Replace.</p> <p>Tighten.</p>
Poor circulation	<p>Restriction in system.</p> <p>Insufficient coolant.</p> <p>Inoperative water pump.</p> <p>Loose fan belt.</p> <p>Inoperative thermostat.</p>	<p>Check hoses for crimps, and clear the system of rust and sludge by flushing radiator.</p> <p>Replenish.</p> <p>Replace.</p> <p>Adjust.</p> <p>Replace.</p>
Corrosion	<p>Excessive impurity in water.</p> <p>Infrequent flushing and draining of system.</p>	<p>Use soft, clean water. (rain water is satisfactory).</p> <p>Cooling system should be drained and flushed thoroughly at least twice a year. Permanent antifreeze (Ethylene glycol base) can be used throughout the seasons of a year.</p>
Overheating	<p>Malfunctioning thermostat.</p> <p>Radiator fin choked with mud, chaff, etc.</p> <p>Incorrect ignition and valve timing.</p> <p>Dirty oil and sludge in engine.</p> <p>Inoperative water pump.</p> <p>Loose fan belt.</p> <p>Restricted radiator.</p> <p>Inaccurate temperature gauge.</p> <p>Impurity in water.</p>	<p>Replace.</p> <p>Clean out air passage thoroughly by using air pressure from engine side of radiator.</p> <p>Adjust.</p> <p>Refill.</p> <p>Replace.</p> <p>Adjust.</p> <p>Flush radiator.</p> <p>Replace.</p> <p>Use soft, clean water.</p>
Overcooling	<p>Malfunctioning thermostat.</p> <p>Inaccurate temperature gauge.</p>	<p>Replace.</p> <p>Replace.</p>