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NOT FOR RESALE

COOLING

1. General

- The engine cooling system consists of a down-flow radiator featuring high heat-dissipation performance, an electric-motor-driven fan, a water pump, a thermostat, and an engine coolant temperature sensor.
- The reservoir tank is designed to eliminate the need for replenishing coolant.
- The ECM controls the operation of the radiator main fan and sub fan depending on the signals from the engine coolant temperature sensor, vehicle speed sensor, A/C switch and A/C mid pressure switch.

2. Cooling Circuits

The cooling system operates in three different phases depending on the temperature of the engine coolant.

- 1st phase (thermostat closed)

When the engine coolant temperature is below 80°C (176°F), the thermostat remains closed. The coolant flows through the bypass and heater circuits.

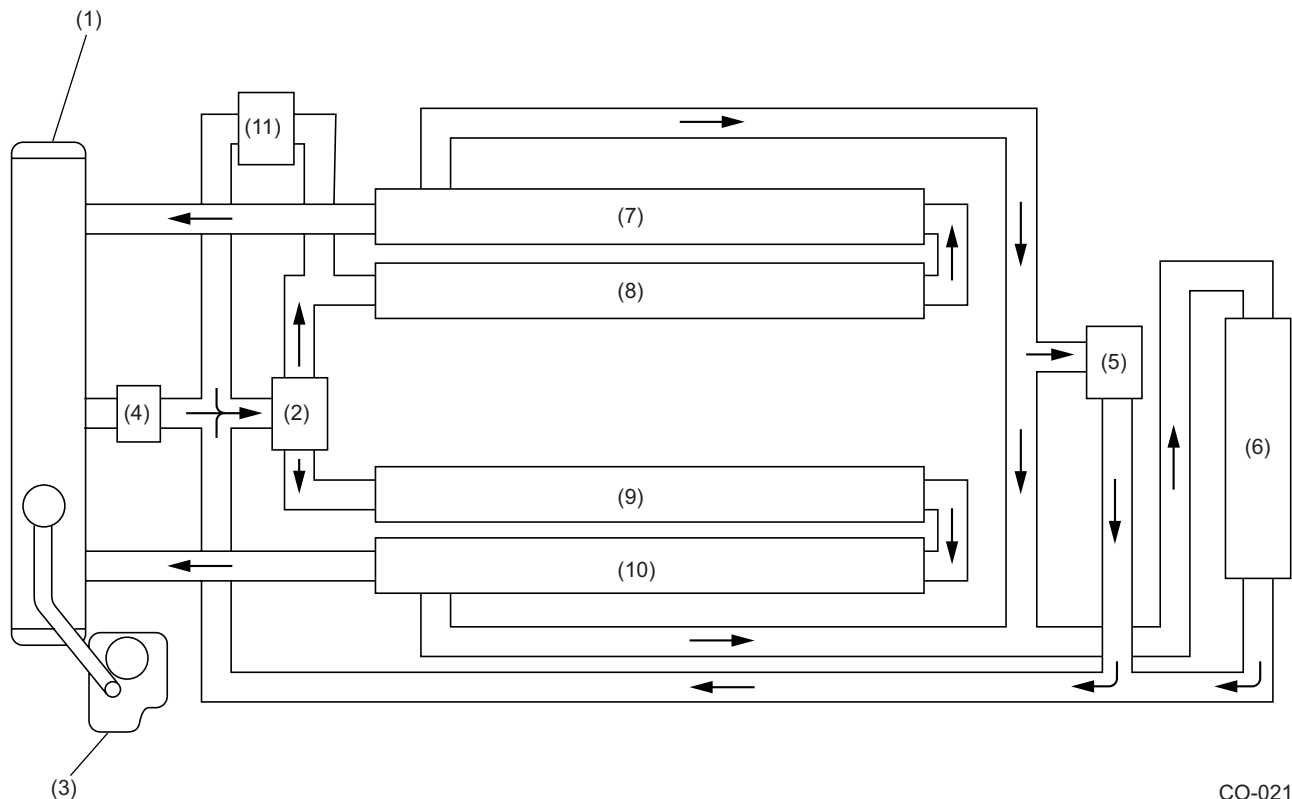
This permits the engine to warm up quickly.

- 2nd phase (thermostat open)

When the engine coolant temperature is above 80 — 84°C (176 — 183.2°F), the thermostat opens. The coolant flows through the radiator where it is cooled.

- 3rd phase (thermostat open and radiator fan operating)

When the engine coolant temperature sensor sends a signal indicating a temperature above 91°C (196°F) to the ECM, it causes the radiator fan (or fans) to operate.



CO-02106

- | | |
|-----------------------------------|-----------------------|
| (1) Radiator | (7) Cylinder head RH |
| (2) Water pump | (8) Cylinder block RH |
| (3) Engine coolant reservoir tank | (9) Cylinder block LH |
| (4) Thermostat | (10) Cylinder head LH |
| (5) Throttle body | (11) Oil cooler |
| (6) Heater core | |

WATER PUMP

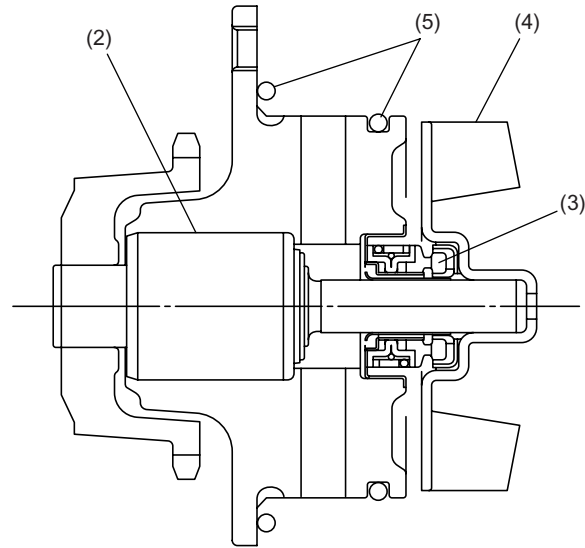
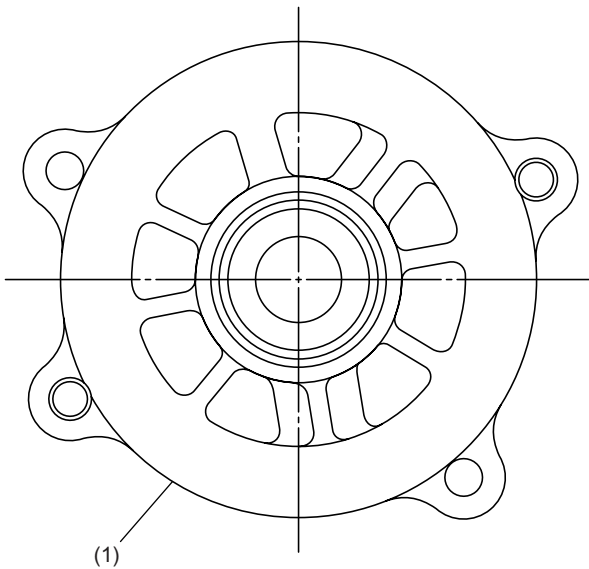
COOLING

3. Water Pump

The water pump is fitted in a housing formed in the rear chain cover using an O-ring as a seal between the pump case and the housing. The pump is driven by the timing chain through a sprocket and rotation of the impeller in a volute chamber creates flow of coolant toward the cylinder block.

The pump case is made of aluminum die-casting and the impeller is made of steel sheet. The impeller shaft is supported by a ball bearing and a roller bearing. Its end exposed to coolant is sealed by a mechanical seal and the other end exposed to engine oil is sealed by an oil seal.

The volute chamber is formed by the rear chain cover and the oil pan upper. A metal gasket is used at the joint between the chain cover and oil pan upper.



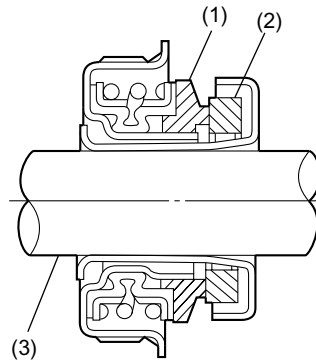
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- (1) Pump case
- (2) Bearing
- (3) Mechanical seal

- (4) Impeller
- (5) O-ring

4. Mechanical Seal

The mechanical seal has its seat tightly fitted on the water pump shaft. Since it is a hermetic seal forming an integral part of the water pump, the water pump cannot be disassembled.



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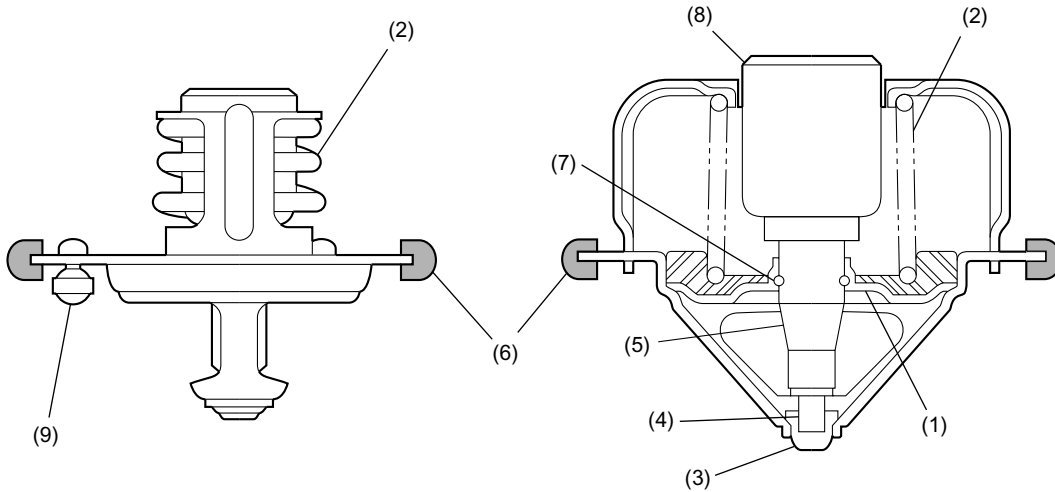
- (1) Carbon seal
- (2) Ceramics seat
- (3) Water pump shaft

THERMOSTAT

COOLING

5. Thermostat

The thermostat has a totally enclosed wax pellet, which expands as the coolant temperature increases. It opens and closes accurately at the preset temperatures and features high durability.



CO-00059

- (1) Valve
- (2) Spring
- (3) Stopper

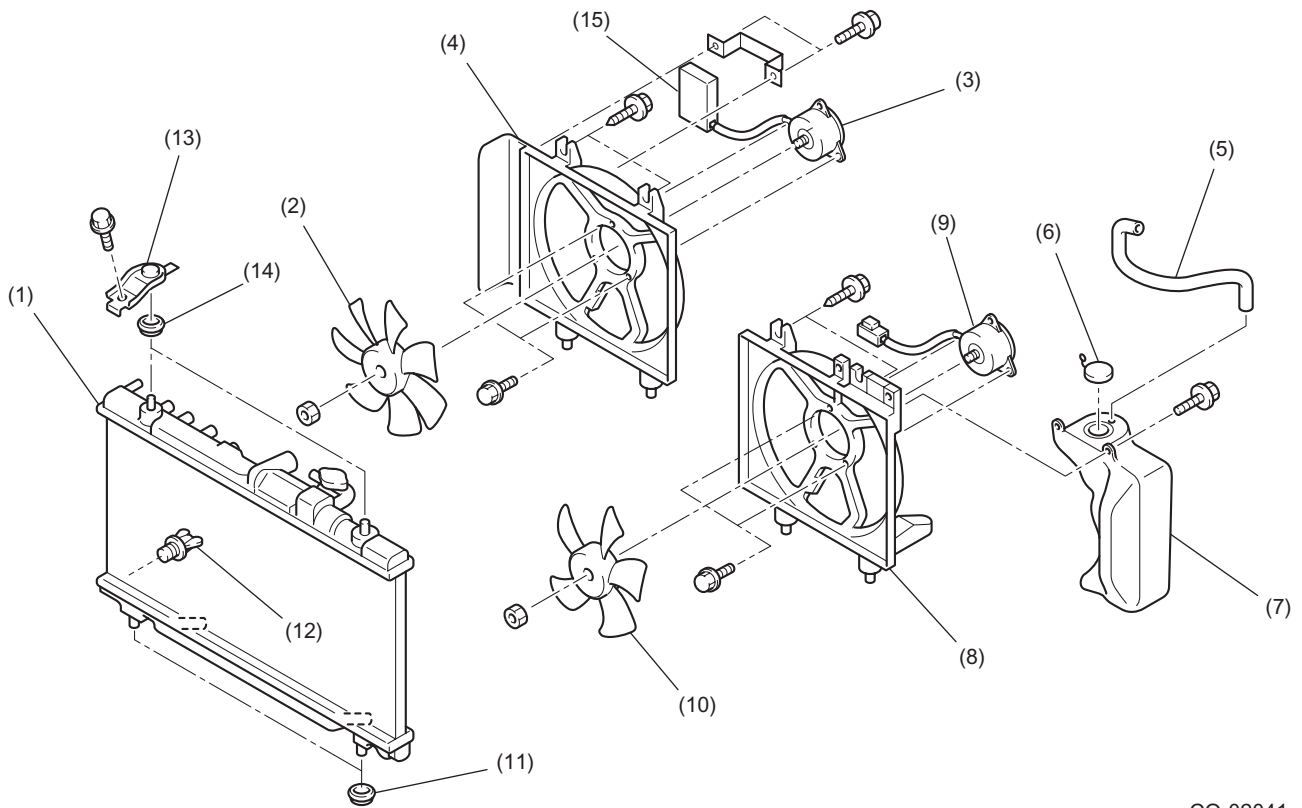
- (4) Piston
- (5) Guide
- (6) Rubber packing

- (7) Stop ring
- (8) Wax element
- (9) Jiggle valve

6. Radiator Fan

A: DESCRIPTION

Each radiator fan is made of plastic. It is driven by an electric motor, which is retained on a shroud.



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- | | |
|-----------------------------|--------------------------------|
| (1) Radiator | (8) Radiator main fan shroud |
| (2) Radiator sub fan | (9) Radiator main fan motor |
| (3) Radiator sub fan motor | (10) Radiator main fan |
| (4) Radiator sub fan shroud | (11) Lower cushion |
| (5) Overflow hose | (12) Drain plug |
| (6) Reservoir tank cap | (13) Upper bracket |
| (7) Reservoir tank | (14) Upper cushion |
| | (15) Radiator fan control unit |

RADIATOR FAN

COOLING

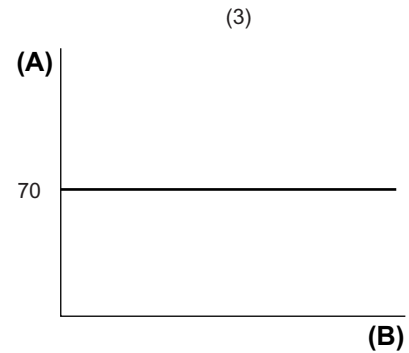
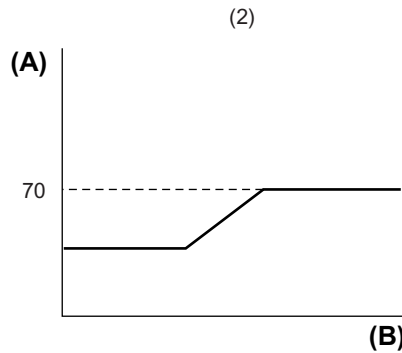
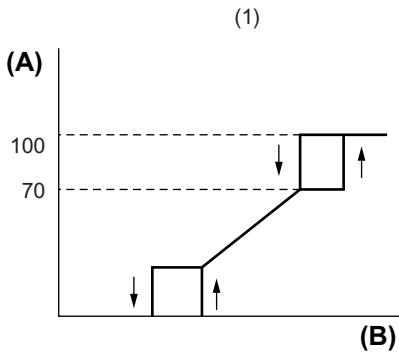
B: FUNCTION

The operation of the radiator fan is controlled by the ECM, depending on the signals from the engine coolant temperature sensor, vehicle speed sensor, A/C switch, and A/C mid pressure switch.

NOTE:

Refer to the Service Manual for operation of each model.

A/C compressor	A/C mid pressure switch	Engine coolant temperature		
		Rising: below 95°C (203°F) Lowering: below 93°C (199°F)	Rising: between 95 and 101°C (203 and 214°F) Lowering: between 93 and 99°C (199 and 210°F)	Rising: over 102°C (216°F) Lowering: over 100°C (212°F)
OFF	OFF	0%	See figure (1)	100%
ON	OFF	See figure (2)		100%
	ON	See figure (3)		100%



CO-02042

(1) A/C OFF control

(2) A/C ON control (A/C mid pressure switch OFF)

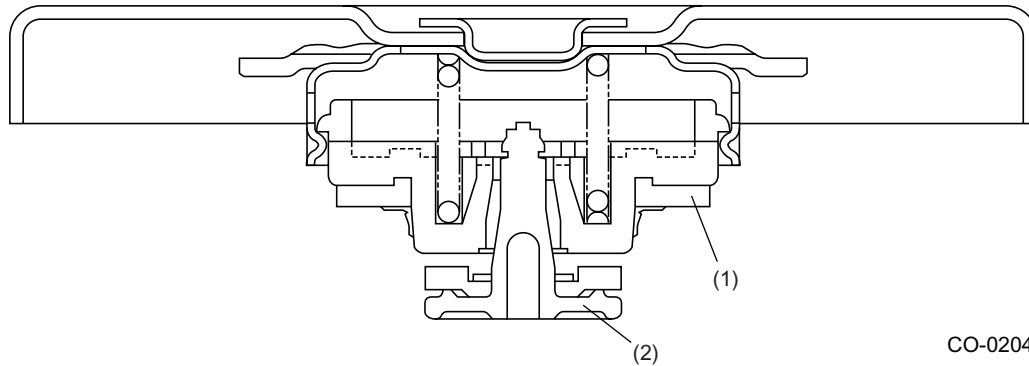
(3) A/C ON control (A/C mid pressure switch ON)

(A) Fan speed (%)

(B) Coolant temperature

7. Radiator Cap

The radiator cap has a pressure valve and a vacuum valve. When the radiator inner pressure becomes higher than specified, the pressure valve opens to send coolant to the reservoir tank. Also, when the radiator inner pressure becomes lower than the atmospheric pressure during the cooling down phase, the vacuum valve opens to send back coolant from the reservoir tank to the radiator. These functions prevent damage to the radiator components.



CO-02043

- (1) Pressure valve
- (2) Vacuum valve