

Power Unit Cooling System

General Description

Water Cooling System Description

ZAJ6111601001

The cooling system uses a displacement type flexible vane impeller to supply cooling water to the powerhead assembly.

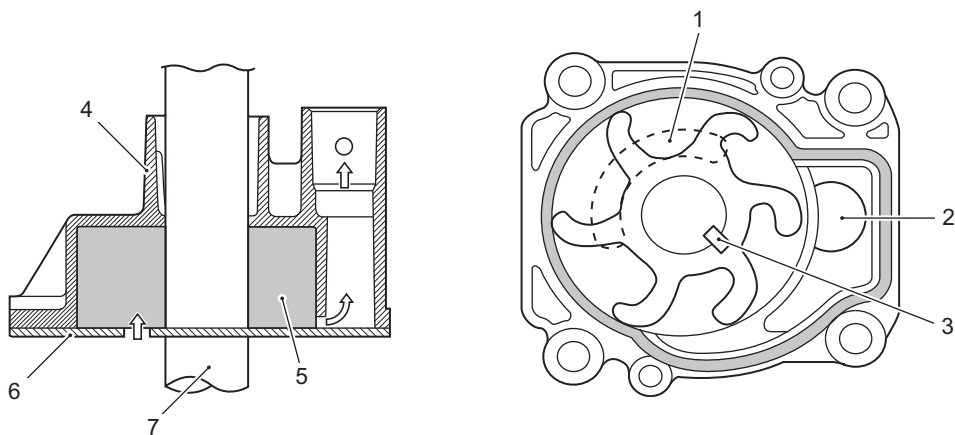
To prevent incomplete combustion due to an overcooled engine, and to ensure proper water flow during cold engine operation, there is a thermostat in the cylinder block.

Motor temperature and cooling system efficiency are monitored by cylinder temp. sensor in the cylinder. If temperature higher than normal is detected by a sensor, an advance caution of overheat condition is provided.

Displacement Type Water Pump Description

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In this displacement type water pump, the water pressure is increased by the change in volume between the impeller and the pump case. As a result, the increased water pressure enables the water pump to circulate the cooling water.



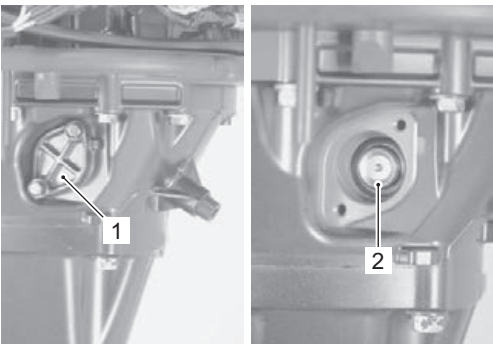
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1. Water inlet	3. Key	5. Water pump impeller	7. Driveshaft
2. Water outlet	4. Water pump case	6. Under panel	

Water Pressure Valve Description

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If cylinder water pressure is high when thermostat is closed, the valve will open to relieve the pressure.



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1. Water pressure valve cover	2. Water pressure valve
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Schematic and Routing Diagram

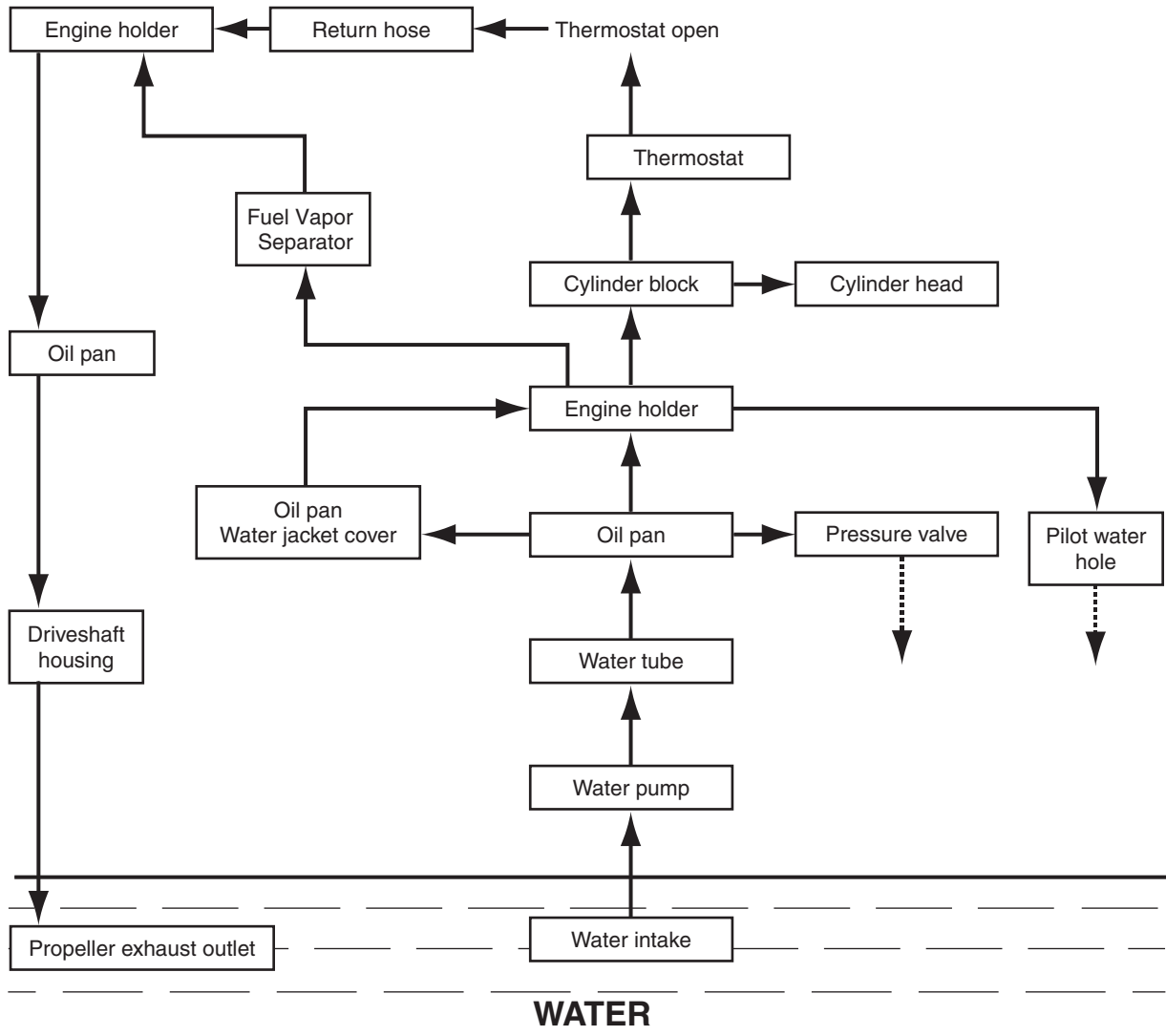
Cooling Water Circulation Chart

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The water cooling system includes the lower unit water pump, lower unit to power unit water supply tube, oil pan water pressure valve, power unit water passages and thermostat.

This system cools both the power unit and exhaust and is shown in schematic form below.

If overheating occurs, the components of the cooling system must be inspected for blockage, corrosion build-up or component damage.



Diagnostic Information and Procedures

Powerhead Cooling System Diagnosis

ZAJ6111604001

Condition	Possible cause	Correction / Reference Item
Overheating powerhead	Water inlet screen obstructed.	Clean.
	Water passage obstructed.	Clean or replace.
	Pump plate not sealing.	Check and repair.
	Water pump impeller damage.	Replace.
	Water pump housing and/or plate worn.	Replace.
	Water pump housing seal worn.	Replace.
	Water tube grommet damaged.	Replace.
	Thermostat damaged / defective.	Replace.
	Water pressure valve damaged / defective.	Replace.
	Water tube obstructed.	Clean.
	Water tube defective.	Replace.
Overcooling powerhead	Thermostat damaged / defective.	Replace.

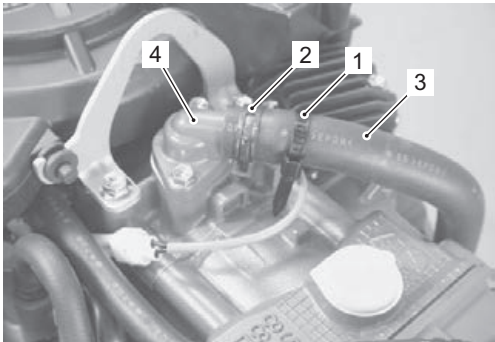
Service Instructions

Thermostat Removal and Installation

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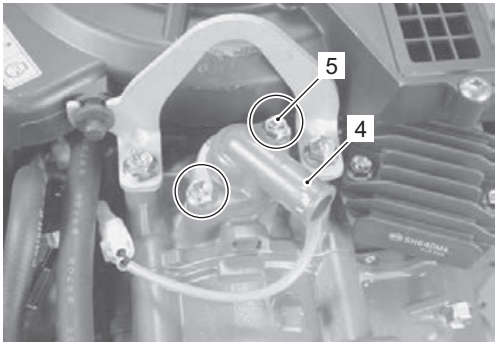
Removal

- 1) Unfasten the cable tie (1).
- 2) Loosen the clip (2) and remove the water return hose (3) from thermostat cover (4).



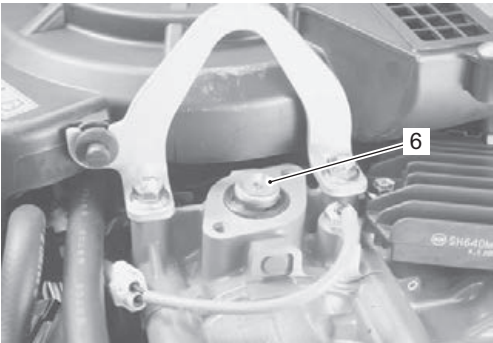
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- 3) Remove the two bolts (5) securing the thermostat cover (4), then remove the cover.



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- 4) Remove the thermostat (6).



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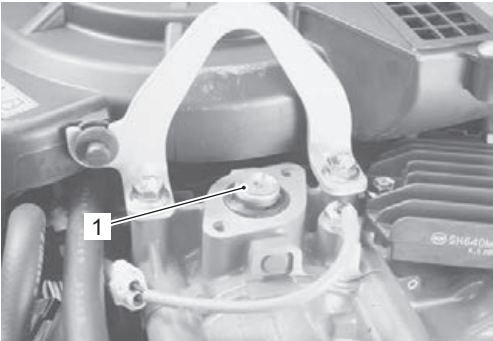
Installation

Installation is reverse order of removal with special attention to the following steps.

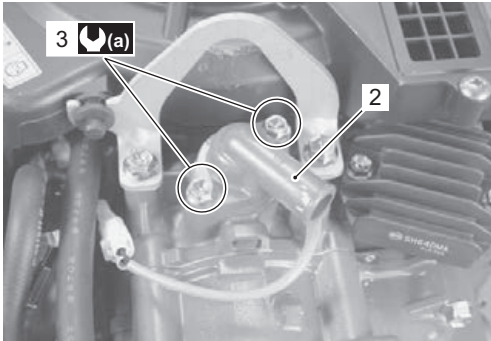
- Assemble thermostat (1) and thermostat cover (2) to cylinder block and secure with the bolts (3).

Tightening torque

Thermostat cover bolt (a): 10 N·m (1.0 kgf-m, 7.2 lbf-ft)



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- Check to ensure that all removed parts are back in place.

Thermostat Inspection

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Inspect the thermostat in the following procedures:

- 1) Remove the thermostat.
Refer to "Thermostat Removal and Installation" (Page 1F-3).
- 2) Inspect the thermostat.
If salt deposits, corrosion, wear or other damage is found, clean or replace.

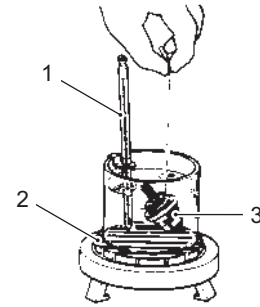


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- 3) Check thermostat opening temperature as follows:
 - a) Insert a length of thread between thermostat valve / body and suspend thermostat in a container filled with water.
 - b) Place thermometer in container and heat water. Observe water temperature when thermostat valve opens and releases thread.

Thermostat operating temperature

Standard: 58 – 62 °C (136 – 144 °F)



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1. Thermometer	3. Thermostat
2. Heater	

- 4) Install the thermostat.

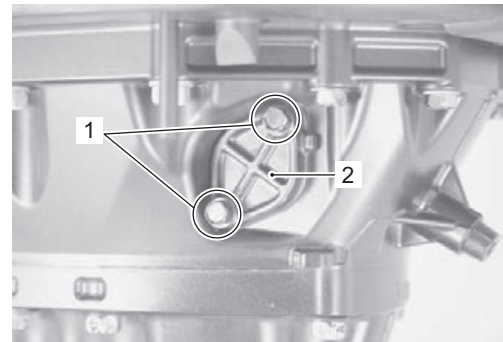
Refer to "Thermostat Removal and Installation" (Page 1F-3).

Water Pressure Valve Removal and Installation

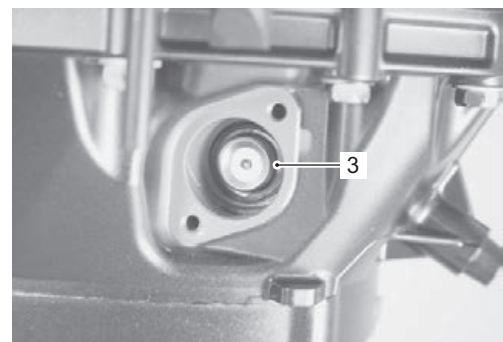
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Removal

- 1) Remove lower side cover.
Refer to "Lower Side Cover Removal and Installation" in Section 2A (Page 2A-3).
- 2) Remove two bolts (1), pressure valve cover (2) and water pressure valve (3).



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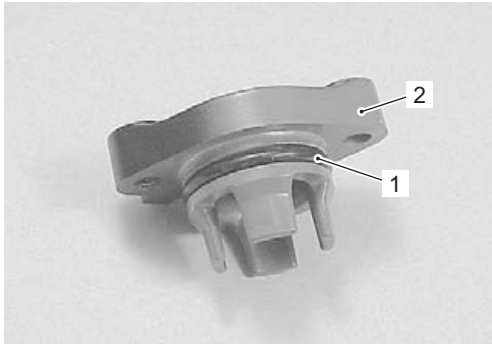


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1F-5 Power Unit Cooling System:

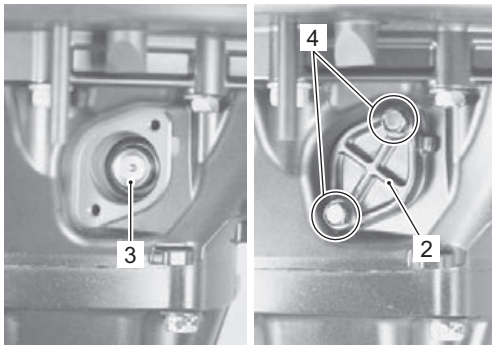
Installation

- 1) Install O-ring (1) to pressure valve cover (2).



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- 2) Install pressure valve (3) and pressure valve cover (2) to oil pan and secure with bolts (4).



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- 3) Install lower side cover.
Refer to "Lower Side Cover Removal and Installation" in Section 2A (Page 2A-3).

Water Pressure Valve Related Item Inspection

ZAJ6111606004

Inspect the water pressure valve in the following procedures:

- 1) Remove the water pressure valve.
Refer to "Water Pressure Valve Removal and Installation" (Page 1F-4).

- 2) Inspect the water pressure valve.
If salt deposits, corrosion, wear or other damage is found, clean or replace.
Inspect O-ring. Replace if nicked, cut or torn.



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- 3) Install the water pressure valve.
Refer to "Water Pressure Valve Removal and Installation" (Page 1F-4).

Water Pump Removal and Installation

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Refer to "Water Pump Removal and Installation" in Section 3A (Page 3A-6).

Water Pump Related Item Inspection

ZAJ6111606006

Refer to "Water Pump and Related Items Inspection" in Section 3A (Page 3A-8).

Water Tube Removal and Installation

ZAJ6111606007

Removal

Refer to "Engine Holder / Oil Pan / Driveshaft Housing / Mounts Disassembly" in Section 2A (Page 2A-13).

Installation

Refer to "Engine Holder / Oil Pan / Driveshaft Housing / Mounts Assembly" in Section 2A (Page 2A-15).

Water Tube Related Item Inspection

ZAJ6111606008

Refer to "Engine Holder / Oil Pan / Driveshaft Housing / Mounts Related Component Inspection" in Section 2A (Page 2A-19).