008-013 Coolant Thermostat

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General Information

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The thermostat controls the coolant temperature. When the coolant temperature is below operating temperature, coolant is bypassed to the inlet of the water pump. When the coolant temperature reaches the operating range, the thermostat opens, seals off the bypass, and forces coolant to flow to the radiator or the keel cooler on QSL9 marine engines. The thermostat begins opening at 82°C [180°F].

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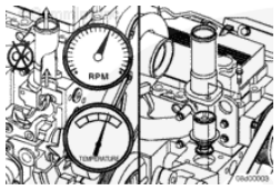

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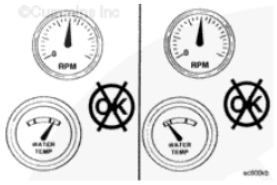
CAUTION

Never operate the engine without a thermostat. Without a thermostat, the path of least resistance for the coolant is through the bypass to the pump inlet. This will cause the engine to overheat.

An incorrect or malfunctioning thermostat can cause the engine to run too hot or too cold.



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Leak Test

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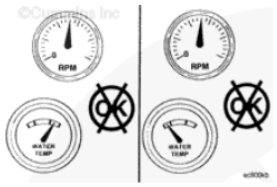
The engine thermostat and thermostat seal **must** operate properly in order for the engine to operate in the most efficient heat range. Overheating or overcooling will shorten engine life.



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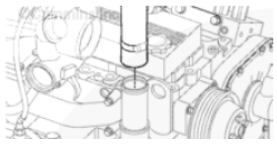
WARNING

Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50°C [120°F] before removing the pressure cap. Heated coolant spray or steam can



cause personal injury.

WARNING

Coolant is toxic. Keep away from children and pets. If not reused, dispose of in accordance with local environmental regulations.

Drain the coolant. Refer to Procedure 008-018 in Section 8.

Remove the radiator hose from the water outlet connection.

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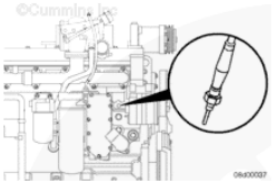
Use an electronic service tool to monitor the coolant temperature, or install a thermocouple or temperature gauge, which is known to be accurate, in the cylinder block on the engine side of the thermostat.



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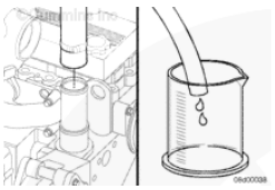
Install a hose of the same size on the water outlet connection. It must be long enough to reach a remote, dry container used to collect coolant.

Install and tighten a hose clamp on the housing outlet.

Place the other end of the hose in a dry container.



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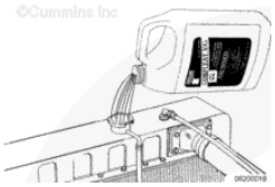
Fill the cooling system. Refer to Procedure 008-018 in Section 8.



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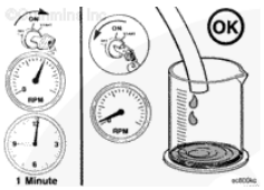
NOTE: The engine coolant temperature must be below the thermostat opening temperature to perform this test.

Operate the engine at rated speed for 1 minute.

Shut the engine OFF and measure the amount of coolant collected in the container.

The amount of coolant collected **must not** be more than 100 cc [3.3 fl oz].



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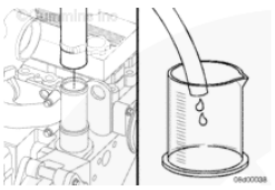
If more than 100 cc [3.3 fl oz] of coolant is collected, the thermostat is leaking and **must** be replaced.



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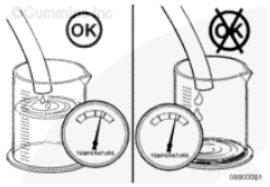
Complete the following test in-chassis to determine the thermostat opening temperature.

Start the engine and monitor the coolant temperature with INSITE™ electronic service tool or a gauge. Keep the engine speed below 1500 rpm during the test.

Thermostat Initial Opening Temperature

celsius		fahrenheit
81	MIN	178
83	MAX	182



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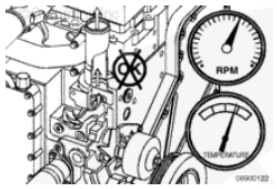
Shut the engine OFF when the coolant starts to flow.

If coolant does **not** start flowing into the container during the initial opening temperature range, the thermostat **must** be replaced.



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Preparatory Steps

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WARNING

Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To reduce the possibility of arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

WARNING

Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50°C [120°F] before removing the pressure cap. Heated coolant spray or steam can cause personal injury.

WARNING

Coolant is toxic. Keep away from children and pets. If not reused, dispose of in accordance with local environmental regulations.

- Disconnect the batteries. Refer to the OEM service manual.
- Drain the coolant. Refer to Procedure 008-018 in Section 8.
- Remove the radiator hose from the water outlet connection.

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Remove

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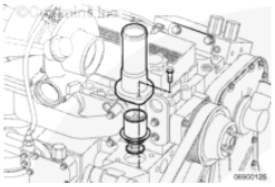
Remove the water outlet connection capscrews and water outlet connection.

Remove the thermostat.



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Clean and Inspect for Reuse

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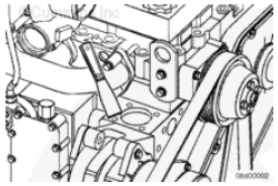
Clean all of the mating surfaces.

NOTE: Do not let any debris fall into the thermostat cavity when cleaning the surfaces.



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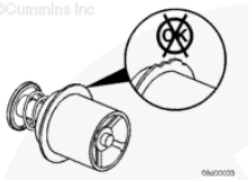
Inspect the thermostat for damage.

Inspect the thermostat gasket for damage. If the gasket is damaged, it **must** be replaced.



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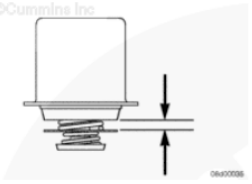
The nominal operating temperature is stamped on the thermostat. The thermostat **must** meet the following criteria:

- The thermostat **must** begin to open within 1°C or 2°F of this nominal temperature.
- The thermostat **must** be fully open within 12°C or 22°F of this nominal temperature.

The fully open distance between the thermostat flange and housing is 9.4 mm [0.370 in].



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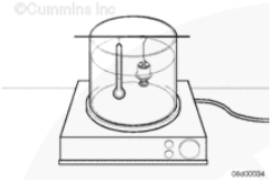
Heat the water and check the thermostat as follows:

- Suspend the thermostat and a 100°C [212°F] thermometer in a container of water.
- Do **not** allow the thermostat or the thermometer to touch the sides of the container.



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Install

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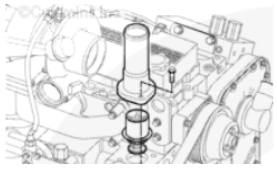
Install the new thermostat into the water outlet connection. Make sure the top and bottom o-rings are in place. If the o-rings are damaged, replace with new o-rings.

Install the water outlet connection and mounting capscrews.

Torque Value: 24 n.m [212 in-lb]



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Finishing Steps

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WARNING

Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To reduce the possibility of arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

- Fill the cooling system. Refer to Procedure 008-018 in Section 8.
- Connect the batteries. Refer to the OEM service manual.
- Operate the engine and check for leaks.

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Last Modified: 08-May-2012

Feedback / Help