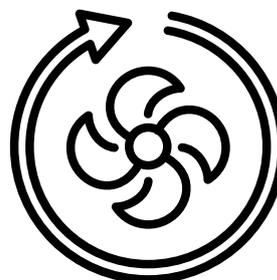


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FOCUS

Thermal systems



FOCUS
Thermal systems



In modern vehicles, thermal systems play a fundamental role in **managing the temperature of the engine, transmission, and cabin**, ensuring **mechanical efficiency, component longevity, and driver comfort**. These systems include:

Engine cooling circuit

Cabin heating (HVAC)

Thermal management of the automatic transmission

Battery thermal management in electric/hybrid vehicles

A key component to monitor in the cooling circuit is the coolant control valve.

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Main Function

The coolant control valve regulates the flow of coolant between different branches of the circuit. It can be used to:

- Divert the fluid toward the radiator to dissipate heat
- Direct the coolant to the cabin heat exchanger (for interior heating)
- Temporarily bypass the radiator to promote faster engine warm-up (warm-up phase)



Types

Mechanical (thermostatic)

Opens/closes based on coolant temperature.

Electronic (actuated)

Controlled by an ECU, dynamically regulates flow using an electromechanical actuator.

Operation

In the case of an electronic valve, possible malfunctions include:

- Mechanical blockage (scale, deposits, coolant residue)
- Electrical failure of the actuator or connector
- ECU failure or incorrect sensor signals
- Coolant leaks at the valve seals

Consequences

Engine overheating

Inefficient cabin heating

Increased fuel consumption

Long-term damage to seals and cylinder head



Possible Error Codes

A malfunctioning valve may lead to various issues, including **engine overheating**, **insufficient cabin heating**, and **increased fuel consumption**. Related OBD-II error codes include:



P26xx: Series of codes related to the coolant control valve.

(es. P2681 - coolant valve regulation – implausible value)

P0597/P0598/P0599: Electronic thermostat heater control circuit – detected electrical fault.

P0128: Coolant temperature too low – may indicate valve stuck open.

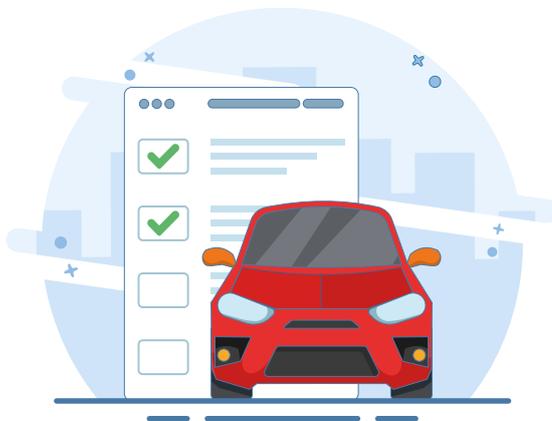
P0597: Thermostat heater control circuit – fault.

P0598: Thermostat heater control circuit – short to ground.

P0599: Thermostat heater control circuit – short to power.

Diagnostic Procedure

- 1** ECU scan with a diagnostic tool;
- 2** Actuator functionality check (active test);
- 3** Visual inspection for leaks or damage;
- 4** Electrical continuity and voltage check at connectors;
- 5** Real-time analysis of temperature sensor data;
- 6** System reset: After repairs, reset the system via diagnostic tool to clear error codes and restore system functionality using a manufacturer-specified relearning procedure.





Related Products



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