



Coolant temperature sensor

General

The coolant temperature sensor provides information for air/fuel mixture preparation by recording the operating temperature of the engine. The ECU adapts the injection time and the ignition angle to the operating conditions dependent on the sensor information. The Cool temperature sensor is a temperature sensor with negative temperature coefficient that means that the internal resistance increases as temperature reduces.



Function

The resistance of the temperature sensor is dependent on the coolant temperature change. The resistance reduces as increases temperature and the voltage decreases at the sensor. The ECU evaluates these voltage results since they are in direct relation to the coolant temperature. Low temperatures produce high and high temperatures produce low voltage results at the sensor.

Effects of failure

A faulty coolant temperature sensor can show itself through an error fault code or a substitute valve being used.

Causes of failure:

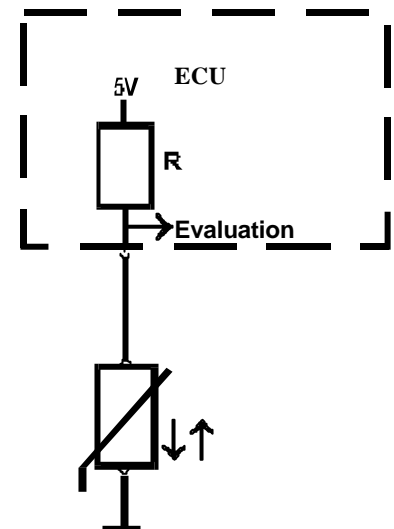
- high idle speed
- higher fuel consumption
- starting difficulties

Oxygen sensor emission control problems through increased CO results during emission testing.

The following entries can be stored in the fault memory of the ECU:

- Ground short-circuit in the wiring or short/open-circuit in the sensor
- Erratic signal changes (signal jump)
- Engine doesn't reach the minimum operating temperature

The last error code can appear with a faulty coolant thermostat.





Diagnostics

- read out the fault memory
- check the electrical connection of the sensor line,
plug and sensor for right connection, break and corrosion

The check is carried out with a multi meter.

step 1:

The internal resistance of the sensor is determined. The resistance is temperature-dependent, with cold engine high-impedance and in a warm condition low-impedance. Depending on manufacturer:

25°C

80°C

Take note of manufacturers specification.

step 2:

Check the wiring to the ECU by checking every single line to the ECU plug, feed and ground.

Connect the Ohmmeter between the temperature sensor plug and the disconnected ECU plug (circuit diagram needed for pin definition). Reading: < 1 Ohm

Check respective pins at the sensor plug with disconnected ECU plug against ground. Reading: > 30 M Ohm

Check the supply voltage with the voltmeter at the removed sensor plug. This happens at ECU connected and ignition switched on.

Reading : approx. 5 V

If the voltage value isn't reached, the supply voltage of the ECU has to be checked, including ground after wiring diagram.



Resistance at warm engine



Resistance of the sensor plug to ECU



Tension supply at the sensor plug