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Coolant Temperature Sensor Explained

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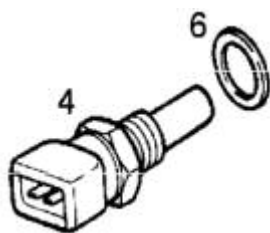


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Revision 2

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Typical 2-pin CTS.



Thermostat located on 2L 16v C20XE engine.



CTS located on 2L 16v C20XE engine.



Closer view of CTS located on 2L 16v C20XE engine.

What is a 'Coolant Temperature Sensor'?

The coolant temperature sensor (CTS) is commonly found on modern injection engines. It measures the coolant (water) temperature in the engine itself, it is not to be confused with the thermostat as found on car radiators. The Engine Control Unit (ECU) uses the CTS value to calculate the ignition timing and injector pulse duration.

How does a CTS work?

The CTS is a thermistor that measures the temperature and sends a signal back to the ECU. They are typically 2 pin devices. The CTS is immersed in the engine coolant and contains a variable resistor that usually operates on the NTC (Negative Temperature Coefficient) principle.

When the engine is cold the resistance increases. As the engine warms up, so too does the coolant and the resistance of the CTS decreases. This in turn returns a variable voltage signal (analogue) to the ECU based upon the coolant temperature.

The open circuit supply to the sensor is a 5v reference level and this voltage reduces to a value dependent upon the resistance of the CTS resistor. Normal operating temperature is between 80°C to 100°C.

Where is the CTS located on the engine?

Depends on what model of engine it is. Common locations are as follows:-

1. In the end of the thermostat housing on the inlet side of the engine.
2. In the thermostat housing itself on the exhaust side of the engine.
3. Located near the DIS unit alongside the temperature gauge sender on the transmission end of the cylinder head.

Some are very easy to find, just look for 2 pin plug in the area. The colour of the connector is irrelevant (some may be blue, yellow or black). It usually sits beside the temperature gauge sender (1-pin spade) sensor. This gives the temperature readout on your dash and is NOT the CTS. Or consult the Haynes book for your car to find the location of the sensor.

How do test the operation of the CTS?

Read the maintenance guide as shown [here](#).

Article based on text in the [Haynes Books](#) series and peoples personal experiences.



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