Nissens: Coolant Temperature Sensor – Troubleshooting

The sensor is a vital part of the engine management system, ensuring proper working parameters for the engine and protecting it against overheating. A faulty sensor can provoke various symptoms related to the engine operation and performance and can lead to an impaired operation of other engine equipment.

The coolant temperature sensor facilitates the maintenance of proper parameters within the engine cooling system by monitoring and controlling the coolant's temperature.

The sensor's signal is used to control the operation of the cooling fan for the radiator. Additionally, modern engines utilize the sensor's output signal for various adjustments of the engine, e.g.:

- adjust the fuel injection
- regulate the charge pressure
- set the exhaust gas recirculation quantity
- switch between cooling circuits (small- and full circuit)
- switch or control the main or auxiliary cooling pumps
- activate/deactivate the start-stop system

The signal may also be used by other control units e.g., the HVAC-control unit, and is applied to control the operation of different devices, such as the AC compressor, that may influence the engine load.

The sensor function utilizes the device's electrical resistance to measure the coolant's temperature. There are two main types of resistor-based coolant sensors. The most popular is the NTC-type sensor (negative temperature coefficient) – their resistance and the generated voltage signal decrease when the temperature increases. Older applications may use PTC-type sensors (positive temperature coefficient) – their resistance and the generated voltage signal increase when the temperature increases.

The readout voltage signal generated by the sensor is forwarded to the ECU (Engine Control Unit), which can then adapt needed adjustments to the engine's and related systems' performance. Depending on the car's design, there may be more than one sensor applied by the engine. Typically, the sensor is mounted on the coolant inlet on the engine block or the cylinder head.

Symptoms of a Malfunctioning EC sensor

- Check engine or service light
- Engine in limp mode
- EC system-related fault codes stored by ECU
- Increased fuel consumption
- Increased engine emissions / smoking
- Uneven/improper idling
- Lowered engine performance
- Engine stalling / start issues
- Engine overheating
- Radiator fan does not start/ stop
- AC Compressor does not