3.8 Engine Coolant Temperature Sensor

3.8.1 Description

1. Diagnostic Trouble Codes:

Engine Coolant Temperature Sensor - Low out of range	P0117
Engine Coolant Temperature Sensor - High out of range	P0118
Engine Coolant Temperature Sensor - Warm up time fault	P0125
Engine Coolant Temperature Sensor - Falling temperature fault	P0116

2. Monitoring Procedure

Problems with the engine coolant temperature sensor will be detected using a number of tests. A range check will test for input values outside expected limits. A time to warm-up test will check that the sensor is responding to the rise in engine coolant temperature caused by the engine running. The engine coolant temperature in stall is used to index a map of expected warm-up times. This checks that the engine has gone into closed loop fuelling within a given time, (the engine coolant information is the only sensor it depends upon). A falling temperature test will check for abnormal falls in temperature once a temperature rise has been detected. This test uses a tracker which follows the normal engine coolant temperature rise but at a lower temperature. The tracker is not allowed to decrease and is limited at a maximum value. If the measure engine coolant temperature falls below the tracker a fault is flagged. If the range tested is not passed then the appropriate fault count will be incremented, otherwise it will be decremented. If the count reaches a given threshold then a fault is present.

3. Primary Detection Parameter

Engine Coolant Temperature - measured in Volts, the outcome of a potential divider calculation.

4. Fault Criteria Limits

Engine Coolant Temperature - Low out of range	0.059 V - equivalent to 145°C
Engine Coolant Temperature - High out of range	4.922 V - equivalent to –40°C
Engine Coolant Temperature - Warm up time limit, [closed loop fuel]	typically 90 seconds at 20°C start temperature
Engine Coolant Temperature - Falling temperature tracking limit	65^{0}C
Engine Coolant Temperature - Warm up temperature	18^{0}C
Engine Coolant Temperature -Tracker Lag	25^{0}C

5. Monitoring Conditions

The range check will take place whenever there is power to the ECM.
The warm-up time test will start each time the condition 'Engine_Running' is true.
The falling temperature test will start each time the condition 'Engine_Running' is true.

6. Monitoring Time Length / Frequency of Checks

The frequency of the Engine Coolant Thermistor diagnostic is 2Hz.

7. Criteria for Storing a Diagnostic Trouble Code

Two successive trips where the Engine Coolant Thermistor diagnostic indicates a failed water temperature sensor.