

DX: Engine Coolant Temperature (ECT) Sensor

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DX1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0116, P0117, P0118, P0119, P0125, P0128, P0217, P1116, or P1117 present?

Yes	No
For continuous memory DTC P0116, GO to DX14 . For KOEO and KOER DTC P0117, GO to DX12 . For continuous memory DTCs P0117, P0118, P0119, or P1117, GO to DX16 . For KOEO and KOER DTC P0118, GO to DX8 . For continuous memory DTCs P0125, or P0128, GO to DX19 . For DTC P0217, GO to DX21 . For KOEO and KOER DTC P1116, GO to DX2 .	For all others, GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .

DX2 DTC P1116: CHECK THE COOLING SYSTEM



WARNING: TO AVOID PERSONAL INJURY DO NOT UNSCREW THE COOLANT PRESSURE RELIEF CAP WHILE THE ENGINE IS OPERATING OR HOT. THE COOLING SYSTEM IS UNDER PRESSURE. STEAM AND HOT LIQUID CAN COME OUT FORCEFULLY WHEN THE CAP IS LOOSENED SLIGHTLY. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

- The DTC indicates the temperature sensor is out of self-test range. The engine is not at normal operating temperature.
- Check the vehicle coolant level.

Is the cooling system OK?

Yes	No
GO to DX3 .	REFER to the Workshop Manual Section 303-03, Engine Cooling, for loss of coolant diagnosis. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.

DX3 CHECK IF THE VEHICLE ENGINE STARTS

- Attempt to start the engine.

Does the engine start and run normally?

Yes	No
GO to DX6 .	GO to DX4 .

DX4 CHECK THE RESISTANCE OF THE ECT SENSOR WITH THE ENGINE OFF

Note: Refer to the chart at the beginning of this test for the resistance specifications.

- Ignition OFF.
- ECT Sensor connector disconnected.
- Measure the resistance between:

(+) ECT Sensor Connector, Component Side	(-) ECT Sensor Connector, Component Side
ECT - Pin 1	SIGRTN - Pin 2

Is the resistance within specification?

Yes	No
GO to DX5 .	<p>INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls.</p> <p>CLEAR the DTCs. REPEAT the self-test.</p>

DX5 CHECK THE CIRCUIT FROM THE MODULE TO THE COMPONENT

Note: Refer to the chart at the beginning of this test for the resistance specifications.

- ECT Sensor connector connected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the ECT PID.
- Using the data collected from the previous step, compare temperature resistance measured at the sensor to the PID temperature voltage measured at the PCM.

Does the measured value at the sensor agree with the measured PID voltage value at the PCM?

Yes	No
RETURN to Section 3 , Symptom Charts for further direction.	GO to DX10 .

DX6 CHECK THE ECT SENSOR OPERATION

- Run the engine until the engine temperature stabilizes.
- Verify the upper radiator hose is hot and the cooling system is pressurized.
- Repeat the KOER self-test.

Is DTC P1116 present?

Yes	No
GO to DX7 .	The engine temperature was not stabilized. REPAIR any other DTCs as necessary.

DX7 CHECK THE RESISTANCE OF THE ECT SENSOR

Note: Refer to the chart at the beginning of this test for the resistance specifications.

- The vehicle must be at normal operating temperature.
- Ignition OFF.
- ECT Sensor connector disconnected.
- Measure the resistance between:

(+) ECT Sensor Connector, Component Side	(-) ECT Sensor Connector, Component Side
ECT - Pin 1	SIGRTN - Pin 2

Is the resistance within specification?

Yes	No
GO to DX25 .	INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

DX8 DTC P0118: CHECK THE ECT SIGNAL CIRCUIT

- The DTC indicates the sensor signal is greater than the self-test maximum.
- ECT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) ECT Sensor Connector, Harness Side	(-) ECT Sensor Connector, Harness Side
ECT - Pin 1	SIGRTN - Pin 2

Is the voltage between 4.5 - 5.5 V?

Yes	No
GO to DX9 .	GO to DX10 .

DX9 CHECK THE RESISTANCE OF THE ECT SENSOR WITH THE ENGINE OFF

Note: Refer to the chart at the beginning of this test for the resistance specifications.

- Ignition OFF.
- ECT Sensor connector disconnected.
- Measure the resistance between:

(+) ECT Sensor Connector, Component Side	(-) ECT Sensor Connector, Component Side
ECT - Pin 1	SIGRTN - Pin 2

Is the resistance within specification?

Yes	No
	INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic

GO to [DX11](#).

Engine Controls.

CLEAR the DTCs. REPEAT the self-test.

DX10 CHECK THE SIGNAL AND SIGRTN CIRCUITS FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) ECT Sensor Connector, Harness Side
ECT	ECT - Pin 1
SIGRTN	SIGRTN - Pin 2

Are the resistances less than 5 ohms?

Yes	No
GO to DX25 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DX11 CHECK THE SENSOR SIGNAL FOR A SHORT TO VREF

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) PCM Connector, Harness Side
ECT	VREF

Is the resistance greater than 10K ohms?

Yes	No
GO to DX25 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DX12 DTC P0117: SIMULATE AN OPPOSITE SIGNAL TO THE PCM

- The DTC indicates the sensor signal is less than the self-test minimum.
- Possible causes:
 - grounded circuit in the harness
 - incorrect harness connections
 - damaged sensor
 - damaged PCM
- ECT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the ECT PID.

Is the voltage greater than 4.2 V?

Yes	No

INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls.

CLEAR the DTCs. REPEAT the self-test.

GO to [DX13](#).

DX13 CHECK THE SENSOR SIGNAL FOR A SHORT TO GROUND

- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) PCM Connector, Harness Side
ECT	SIGRTN

- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) 12 Volt Vehicle Battery
ECT	Negative terminal

Is the resistance greater than 10K ohms?

Yes	No
GO to DX25 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DX14 DTC P0116: CHECK THE RESISTANCE OF THE ECT SENSOR WITH THE ENGINE OFF

Note: Verify the engine temperature is at ambient room temperature before continuing with this test. A soak period of 6 hours may be required. Refer to Section 4, [Diagnostic Trouble Code \(DTC\) Charts and Descriptions](#) for information concerning P0116.

Note: Refer to the chart at the beginning of this test for the resistance specifications.

- Ignition OFF.
- ECT Sensor connector disconnected.
- Measure the resistance between:

(+) ECT Sensor Connector, Component Side	(-) ECT Sensor Connector, Component Side
ECT - Pin 1	SIGRTN - Pin 2

Is the resistance within specification?

Yes	No
GO to DX15 .	INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

DX15 DTC P0116: CHECK THE RESISTANCE OF THE ECT SENSOR

Note: Refer to the chart at the beginning of this test for the resistance specifications.

Note: Verify the engine is at operating temperature before taking the ECT reading.

- ECT Sensor connector connected.
- Run the engine until the engine temperature stabilizes.
- Ignition OFF.
- ECT Sensor connector disconnected.
- Measure the resistance between:

(+) ECT Sensor Connector, Component Side	(-) ECT Sensor Connector, Component Side
ECT - Pin 1	SIGRTN - Pin 2

Is the resistance within specification?

Yes	No
The concern is not present at this time. CARRY OUT the OBD drive cycle to determine if fuel, HO2S, catalyst and misfire monitors can be executed. REFER to Section 2, On Board Diagnostic (OBD) Drive Cycle .	INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

DX16 DTCS P0117, P0118, P0119 OR P1117: INTERMITTENT CHECK

- Ignition ON, engine OFF.
- Access the PCM and monitor the ECT PID.
- While observing the PID, carry out the following:
 - Tap on the sensor to simulate road shock
 - Wiggle the sensor connector

Is there a large change in the voltage reading?

Yes	No
DISCONNECT and INSPECT the connector. If OK, INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.	GO to DX17 .

DX17 CHECK THE ELECTRONIC ENGINE CONTROL (EEC) WIRING HARNESS

- Access the PCM and monitor the ECT PID.
- While observing the PID, wiggle, shake, and bend small sections of the wiring harness while working from the sensor to the PCM.

Is there a large change in the voltage reading?

Yes	No
ISOLATE the concern. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DX18 .

DX18 CHECK THE PCM AND VEHICLE HARNESS CONNECTORS

- Ignition OFF.
- PCM connector disconnected.
- ECT Sensor connector disconnected.

Are the connectors and terminals OK?

Yes	No
The concern is not present at this time. DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .	REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.

DX19 DTCS P0125 OR P0128: CHECK THE ENGINE COOLANT LEVEL



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- The DTC indicates the engine coolant temperature has not achieved the required engine operation temperature level, since start-up within a specified amount of time.
- Possible causes:
 - insufficient warm up time
 - leaking or stuck-open thermostat
 - low engine coolant
- Check the engine coolant level.

Is the engine coolant fill level correct?

Yes	No
GO to DX20 .	REFER to the Workshop Manual Section 303-03, Engine Cooling, for loss of coolant diagnosis. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.

DX20 CHECK THE SENSOR OPERATION

- Run the engine until the engine temperature stabilizes.
- Verify the radiator hoses are hot and the cooling system is pressurized.
- Access the PCM and monitor the ECT PID.

Is the temperature greater than 77°C (170.6°F)?

Yes	No
The test is complete. DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .	REFER to the Workshop Manual Section 303-03, Engine Cooling for cooling system diagnosis. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.

DX21 DTC P0217: INDICATES AN ENGINE OVERHEAT CONDITION



WARNING: TO AVOID PERSONAL INJURY DO NOT UNSCREW THE COOLANT PRESSURE RELIEF CAP WHILE THE ENGINE IS OPERATING OR HOT. THE COOLING SYSTEM IS UNDER PRESSURE. STEAM AND HOT LIQUID CAN COME OUT FORCEFULLY WHEN THE CAP IS LOOSENED SLIGHTLY. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

- Check the engine coolant level.

Is the engine coolant fill level correct?

Yes	No
REFER to the Workshop Manual Section 303-03, Engine Cooling, to DIAGNOSE the overheating condition. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	REFER to the Workshop Manual Section 303-03, Engine Cooling, to DIAGNOSE the loss of coolant. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.

DX22 DTC P0298: ENGINE OIL OVER TEMPERATURE CONDITION

Note: The engine oil temperature protection strategy in the PCM is activated. This protects the engine against mechanical damage due to overheating.

- Check for an overheating condition and base engine concerns.

Are there any overheating or base engine concerns?

Yes	No
ISOLATE the concern. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DX23 .

DX23 CHECK FOR ECT DTCS

- Carry out the self-test.

Are DTCs P0117, P0118, P1116 or P1117 present?

Yes	No
DISREGARD the engine oil temperature (EOT) diagnostic trouble code (DTC) at this time. ADDRESS the next DTC. GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .	GO to DX24 .

DX24 ROAD TEST THE VEHICLE AND MONITOR FOR ENGINE OVER TEMPERATURE

- Access the freeze frame data (if available) and record the DTC concern conditions.
- Access the PCM and monitor the ECT PID.
- Test drive the vehicle and allow the engine to reach normal operating temperature.
- Observe the ECT PID.

Does the engine overheat?

Yes	No
REFER to the Workshop Manual Section 303-03, Engine Cooling, to DIAGNOSE the overheat symptom. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	Unable to duplicate or identify the concern at this time. CLEAR the DTCs. REPEAT the self-test.

DX25 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
 - pushed out pins
 - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test and verify the concern is still present.

Is the concern still present?

Yes	No
INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) , Programming the VID Block for a Replacement PCM.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
