PPT DX: Engine Coolant Temperature (ECT) Sensor - Gasoline Engines (Powertrain Diagnostics)

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2012 PCED Gasoline Engines	SECTION 5: Pinpoint Tests
	Procedure revision date: 03/19/2013

DX: Engine Coolant Temperature (ECT) Sensor	DX: Introduction

DX1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0116, P0117, P0118, P0119, P011E, P0125, P0128, P1116, or P1117 present?

Yes	No
For DTCs P0116, P0117, P0118, P0119, P011E, P0125, P0128, P1116 or P1117, GO to DX2 .	For all others, GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions.

DX2 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.

Note: Verify cooling fan operation before proceeding with this test.

- 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 cooling system diagnosis. Clear the PCM DTCs. REPEAT the self-test.

DX3 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 DX4 .	INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM), REFER to Section 2, Resetting The Keep Alive Memory (KAM). REPEAT the self-test.

DX4 CHECK FOR AN OPEN

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

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

- Measure the resistance between:

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

Are the resistances less than 5 ohms?

Yes	No
GO to DX5 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DX5 CHECK FOR A SHORT BETWEEN CIRCUITS

- Measure the resistance between:

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

- Measure the resistance between:

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

Are the resistances greater than 10K ohms?

Yes	No
GO to DX6 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DX6 CHECK FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:

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

Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	GO to DX7 .

DX7 INTERMITTENT CHECK

- Ignition OFF.
- PCM connector connected.
- ECT Sensor connector connected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the ECT (VOLT) PID.
- While observing the PID, wiggle, shake, and bend small sections of the wiring harness while working from the sensor to the PCM.
- Lightly tap on the ECT sensor and wiggle the harness and connector to simulate road shock.

Does the ECT PID reading change?

Yes	No

REPAIR as necessary or INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM), REFER to Section 2, Resetting The Keep Alive Memory (KAM). REPEAT the self-test.	GO to DX8 .

DX8 CHECK ENGINE COOLANT TEMPERATURE AND AMBIENT AIR TEMPERATURE CORRELATION

Note: Check temperature values while engine is at ambient temperature, cold soak the engine for a minimum of 8 hours if necessary. Make sure the vehicle has not been in direct sun light.

- Access the PCM and monitor the ECT (TEMP) PID.
- For Fiesta,
- Access the PCM and monitor the OUTDR_TMP (TEMP) PID.
- For all others,
- Access the PCM and monitor the AAT (TEMP) PID.

Are the temperature readings within 18°C (64.4°F) of each other?

Yes	No
GO to DX9 .	INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM), REFER to Section 2, Resetting The Keep Alive Memory (KAM). REPEAT the self-test.

DX9 CHECK THE ECT CIRCUIT VOLTAGE CYCLING INTEGRITY

- Ignition OFF.
- ECT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the ECT (VOLT) PID.
- Record the ECT PID value.
- Connect a 5 amp fused jumper wire between the following:

Point A ECT Sensor Connector, Harness Side	Point B ECT Sensor Connector, Harness Side
ECT - Pin 1	SIGRTN

- Record the ECT PID value.

Does the ECT PID change from greater than 3.0 volts to less than 0.20 volt when the jumper is connected?

Yes	No

INSTALL a new ECT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM), REFER to Section 2, Resetting The Keep Alive Memory (KAM). REPEAT the self-test.	GO to DX10 .

DX10 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.
- 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.