

Computers and Control Systems: Pinpoint Tests

DE - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)

Pinpoint Test

DE

Note

You should enter this Pinpoint Test only when a Service Code 21, 51 or 61 is received in Quick Test Step 3.0, 5.0 or 6.0.

Remember

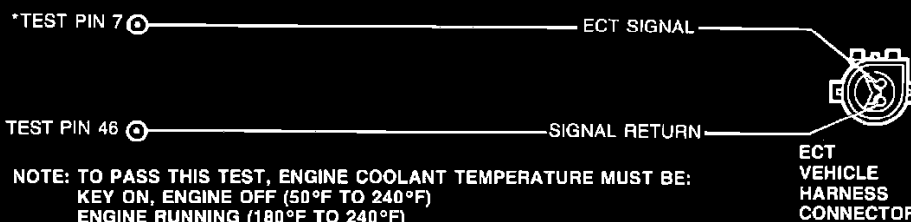
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Coolant level.
- Oil level.
- Blocked or obstructed airflow.
- Engine not at normal operating temperature.
- Electro drive cooling fan.
- Open thermostat.

This Pinpoint Test is intended to diagnose only the following:

- ECT sensor.
- Harness sensor circuits: ECT and SIGNAL RETURN.
- Processor assembly.

Pinpoint Test Schematic



TYPICAL RESISTANCE BETWEEN TEST PINS 7 & 46	58,750 ohms	40,500 ohms	3600 ohms	1840 ohms
AT TEMPERATURE	50°F	65°F	180°F	220°F

*TEST PINS LOCATED ON BREAKOUT BOX.
 ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.

Pinpoint Test DE - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
DE1	SERVICE CODE 21: CHECK ENGINE OPERATING TEMPERATURE		
<ul style="list-style-type: none"> • Run engine for 2 minutes at 2,000 rpm. • Check that upper radiator hose is hot and pressurized. • Rerun Quick Test. • Is Code 21 present? 		Vehicle stalls ▶ Yes ▶ No ▶	Do not service Code 21 at this time. REFER to Diagnostic by Symptoms. GO to DE2 . SERVICE other codes as necessary.
DE2	CHECK FOR VREF AT THROTTLE POSITION SENSOR		
<ul style="list-style-type: none"> • Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts? 		Yes ▶ No ▶	RECONNECT TP sensor, GO to DE3 . GO to Pinpoint Test Step C1 .
DE3	CHECK RESISTANCE OF ECT SENSOR		
<p>NOTE: Engine may have cooled down. Always warm engine before taking ECT resistance measurement. Check for open thermostat.</p> <ul style="list-style-type: none"> • Key off, wait 10 seconds. • Disconnect harness from ECT sensor. • DVOM on 200,000 ohm scale. • Measure resistance of the ECT sensor. • Is resistance: <ul style="list-style-type: none"> — 1300 ohms (240°F) to 7700 ohms (140°F) for engine off? — 1550 ohms (230°F) to 4550 ohms (170°F) for engine running? 		Yes ▶ No ▶	REPLACE processor. RECONNECT harness to ECT sensor. RERUN Quick Test. REPLACE ECT sensor. RECONNECT harness to ECT sensor. RERUN Quick Test.

Pinpoint Test DE1 Thru DE3 - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
DE10	SERVICE CODE 51: ATTEMPT TO GENERATE CODE 61		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Disconnect vehicle harness from ECT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Insert a jumper wire at the ECT sensor vehicle harness connector between ECT SIGNAL and SIGNAL RETURN. • Run Key On Engine Off Self-Test. • Is Code 61 present? 		<p>Yes ▶</p> <p>No ▶</p>	<p>REPLACE ECT sensor. REMOVE jumper wire. RECONNECT ECT sensor. RERUN Quick Test.</p> <p>REMOVE jumper wire. GO to DE11.</p>
DE11	CHECK CONTINUITY OF ECT SIGNAL AND SIGNAL RETURN		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Harness disconnected from ECT sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between ECT SIGNAL at the ECT vehicle harness connector and Test Pin 7 at the breakout box. • Measure resistance between SIGNAL RETURN at the ECT sensor vehicle harness connector, and Test Pin 46 at the breakout box. • Are both resistances less than 5 ohms? 		<p>Yes ▶</p> <p>No ▶</p>	<p>REPLACE processor. REMOVE breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.</p> <p>SERVICE open circuit(s). REMOVE breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.</p>

Pinpoint Test DE10 & DE11 - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
DE20	SERVICE CODE 61: ATTEMPT TO GENERATE CODE 51		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Disconnect vehicle harness from ECT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • Is Code 51 present? 		<p>Yes ▶</p> <p>No ▶</p>	<p>REPLACE ECT sensor. RECONNECT ECT sensor. RERUN Quick Test.</p> <p>GO to DE21.</p>
DE21	CHECK FOR VREF AT THROTTLE POSITION SENSOR		
<ul style="list-style-type: none"> • Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts? 		<p>Yes ▶</p> <p>No ▶</p>	<p>RECONNECT TP sensor, GO to DE22.</p> <p>GO to Pinpoint Test Step C1.</p>
DE22	CHECK ECT SIGNAL FOR SHORT TO GROUND		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Harness disconnected from ECT sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 7 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms? 		<p>Yes ▶</p> <p>No ▶</p>	<p>REPLACE processor. REMOVE breakout box. RECONNECT processor and ECT harness. RERUN Quick Test.</p> <p>SERVICE short circuit. REMOVE breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.</p>


Pinpoint Test DE20 Thru DE22 - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
DE90	CONTINUOUS MEMORY CODE 21: TEST DRIVE VEHICLE		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Clear Continuous Memory Code 21. Refer to Appendix in Section 16. • Disconnect all Self-Test equipment and prepare vehicle for test drive. • Drive vehicle. Try to simulate different drive modes or mode in which drive complaint is noticed. Attempt to maintain drive complaint mode for one minute or more, if possible. • Upon completion of drive evaluation, rerun Key On Engine Off Self-Test. • Is Code 21 present in the continuous test results? 		<p>Yes</p> <p>No</p>	<p>VERIFY thermostat operating properly. If OK, REPLACE ECT sensor. CLEAR Continuous Memory Code 21. RERUN Quick Test.</p> <p>Unable to duplicate fault. Code 21 testing complete.</p>
DE91	CONTINUOUS MEMORY CODE 51: CHECK ECT SENSOR		
<ul style="list-style-type: none"> • Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: <ul style="list-style-type: none"> — Lightly tap on ECT sensor (simulate road shock). — Wiggle ECT connector. • Is a fault indicated? 		<p>Yes</p> <p>No</p>	<p>DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. CLEAR Continuous Memory Code 51. RERUN Quick Test.</p> <p>GO to DE92.</p>
<p style="text-align: center;">POWER OR VREF CIRCUIT</p> <p style="text-align: center;">ECT SIG. SIG. RTN.</p> <p style="text-align: center;">PROCESSOR HARNESS ECT SENSOR</p>			

Pinpoint Test DE90 & DE91 - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
DE92	CHECK EEC-IV HARNESS		
<ul style="list-style-type: none"> • Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: <ul style="list-style-type: none"> — Referring to the illustration in Step DE91, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor. • Is a fault indicated? 		<p>Yes ▶</p> <p>No ▶</p>	<p>ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 51.</p> <p>RERUN Quick Test.</p> <p>GO to DE93.</p>
DE93	CHECK PROCESSOR AND HARNESS CONNECTORS		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK? 		<p>No ▶</p> <p>Yes ▶</p>	<p>SERVICE as necessary. CLEAR Continuous Memory Code 51.</p> <p>RERUN Quick Test.</p> <p>Unable to duplicate fault at this time. CLEAR Continuous Memory Code 51. Continuous Code 51 testing complete.</p>

Pinpoint Test DE92 & DE93 - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP	RESULT	ACTION TO TAKE	
<p>DE94 CONTINUOUS MEMORY CODE 61: CHECK ECT SENSOR</p> <ul style="list-style-type: none"> Enter Key On Engine Off Continuous Monitor mode. Observe VOM or STAR LED for indication of a fault while performing the following: <ul style="list-style-type: none"> Lightly tap on ECT sensor (simulate road shock). Wiggle ECT connector. Is a fault indicated? 	<p>Yes</p> <p>No</p>	<p>DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. CLEAR Continuous Memory Code 61.</p> <p>RERUN Quick Test.</p> <p>GO to DE95.</p>	
<p>DE95 CHECK EEC-IV HARNESS</p> <ul style="list-style-type: none"> Still in Key On Engine Off Continuous Monitor mode. Observe VOM or STAR LED for a fault indication while performing the following: <ul style="list-style-type: none"> Referring to the illustration in Step DE94, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor. Is a fault indicated? 	<p>Yes</p> <p>No</p>	<p>ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 61.</p> <p>RERUN Quick Test.</p> <p>GO to DE96.</p>	

Pinpoint Test DE94 & DE95 - Engine Coolant Temperature Sensor (ECT)

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
DE96	CHECK PROCESSOR AND HARNESS CONNECTORS		
<ul style="list-style-type: none"> • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK? 		No	SERVICE as necessary. CLEAR Continuous Memory Code 61. RERUN Quick Test.
		Yes	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 61. Continuous Code 61 testing complete.

Pinpoint Test DE96 - Engine Coolant Temperature Sensor (ECT)