



5-19-87

5-8-87  
\*SS 1375-6E

## CODE 15

### COOLANT TEMPERATURE SENSOR CIRCUIT (LOW TEMPERATURE INDICATED) 2.8L "P" SERIES (PORT)

#### Circuit Description:

The coolant temperature sensor uses a thermistor to control the signal voltage to the ECM. The ECM applies a voltage on CKT 410 to the sensor. When the engine is cold, the sensor (thermistor) resistance is high, therefore the ECM will see high signal voltage.

As the engine warms, the sensor resistance becomes less, and the voltage drops. At normal engine operating temperature (85°C to 95°C) the voltage will measure about 1.5 to 2.0 volts at the ECM.

**Test Description:** Numbers below refer to circled numbers on the diagnostic chart.

1. Code 15 will set if:
  - Ignition "ON" engine not running
  - Coolant temperature less than -30°C (-22°F), for 3 seconds
  - No Code 23
  - MAT temperature indicated above -25°C (-13°F)
  - or
  - Engine running longer than 1 min
  - Signal voltage indicates a coolant temp. less than -30°C (-22°F) for 3 seconds
2. This test simulates a Code 14. If the ECM recognizes the low signal voltage (high temp.) and the "Scan" reads 130°C or above, the ECM and wiring are OK.
3. This test will determine if CKT 410 is open. There should be 5 volts present at sensor connector if measured with a DVOM.

#### Diagnostic Aids:

A "Scan" tool reads engine temperature in degrees centigrade. After engine is started, the temperature should rise steadily to about 90°C, then stabilize when thermostat opens.

If Code 21 is also set, check CKT 452 for faulty wiring or connections. Check terminals at sensor for good contact.

Refer to Intermittents in Section "B".

| TEST POINT | VOLTS     | REMARKS           |
|------------|-----------|-------------------|
| 410        | 5.0       | 5V supply         |
| 452        | 0.0       | Ground            |
| ECM        | 1.5 - 2.0 | Signal voltage    |
| TPS        | 0.5 - 4.5 | Throttle position |
| SENSOR     | 1.5 - 2.0 | At normal temp    |
| SENSOR     | 5.0       | At cold temp      |
| SENSOR     | 0.0       | At hot temp       |

**CODE 15**  
**COOLANT TEMPERATURE SENSOR CIRCUIT**  
**(LOW TEMPERATURE INDICATED)**  
**2.8L "P" SERIES (PORT)**

1 DOES "SCAN" DISPLAY COOLANT -30°C OR COLDER?

YES

NO

2

- DISCONNECT SENSOR
- JUMPER HARNESS TERMINALS TOGETHER "SCAN" SHOULD DISPLAY 130°C OR MORE. DOES IT?

CODE 15 IS INTERMITTENT. IF NO ADDITIONAL CODES WERE STORED, REFER TO "DIAGNOSTIC AIDS" ON FACING PAGE.

YES

NO

FAULTY CONNECTION OR SENSOR.

3

- JUMPER CKT 410 TO GROUND. "SCAN" SHOULD DISPLAY OVER 130°C. DOES IT?

YES

NO

OPEN SENSOR GROUND CIRCUIT, FAULTY CONNECTION OR FAULTY ECM.

OPEN CKT 410, FAULTY CONNECTION AT ECM, OR FAULTY ECM.

DIAGNOSTIC AID

| COOLANT SENSOR                                 |     |         |
|--|-----|---------|
| TEMPERATURE TO RESISTANCE VALUES (APPROXIMATE) |     |         |
| °F   | °C  | OHMS    |
| 210  | 100 | 185     |
| 160  | 70  | 450     |
| 100  | 38  | 1,800   |
| 70   | 20  | 3,400   |
| 40   | 4   | 7,500   |
| 20   | -7  | 13,500  |
| 0  | -18 | 25,000  |
| -40  | -40 | 100,700 |

CLEAR CODES AND CONFIRM "CLOSED LOOP" OPERATION AND NO "SERVICE ENGINE SOON" LIGHT.

2-11-87

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