AX

DTC	P0710	**Transmission Fluid Temperature Sensor "A" Circuit**

DTC	P0712	**Transmission Fluid Temperature Sensor "A" Circuit Low Input**

DTC	P0713	**Transmission Fluid Temperature Sensor "A" Circuit High Input**

DESCRIPTION

The Automatic Transmission Fluid (ATF) temperature sensor converts the ATF temperature into a resistance value which is input into the ECM.
The ECM applies a voltage to the temperature sensor through ECM terminal THO1.
The sensor resistance changes with the ATF temperature.
One terminal of the sensor is grounded so that the sensor resistance and voltage decrease as the temperature becomes higher.
The ECM calculates the ATF based on the voltage signal.

DTC No.	DTC Detection Condition	Trouble Area
P0710	ATF temperature sensor resistance changes from (a) to (b) or from (b) to (a) in less than 0.5 sec., and P0712 and P0713 are not detected (1 trip detection logic): (a) ATF temperature sensor resistance is less than 79 Ω (b) ATF temperature sensor resistance is more than 156 kΩ	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • ECM
P0712	ATF temperature sensor resistance is less than 79 Ω for 0.5 sec. or more (1 trip detection logic)	• Short in ATF temperature sensor circuit • ATF temperature sensor • ECM
P0713	15 minutes or more after the engine start, ATF temperature sensor resistance is more than 156 kΩ for 0.5 sec. or more (1 trip detection logic)	• Open in ATF temperature sensor circuit • ATF temperature sensor • ECM

MONITOR DESCRIPTION

ATF temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature, and the ECM detects an open or short in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 79 Ω*1 or more than 156 kΩ*2, the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will illuminate the MIL and store the DTC.
HINT:
• *1: 150°C (302°F) or more is indicated regardless of the actual ATF temperature.
• *2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.
• The ATF temperature can be checked on the intelligent tester display.

MONITOR STRATEGY

Related DTCs	P0710: ATF temperature sensor/Range check (Chattering) P0712: ATF temperature sensor/Range check (Low resistance) P0713: ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor
Frequency of operation	Continuous
Duration	0.5 sec.

MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS
P0710, P0712: Range check (Chattering, Low resistance)

The monitor will run whenever the following DTCs are not present.	None
The typical enabling condition is not available.	-

P0713: Range check (High resistance)

The monitor will run whenever the following DTCs are not present.	None
Time after engine start	15 min. or more

TYPICAL MALFUNCTION THRESHOLDS
P0710: Range check (Chattering)

ATF temperature sensor resistance	Less than 79 Ω or more than 156 kΩ

P0712: Range check (Low resistance)

ATF temperature sensor resistance	Less than 79 Ω

P0713: Range check (High resistance)

ATF temperature sensor resistance	More than 156 kΩ

COMPONENT OPERATING RANGE

ATF temperature sensor	79 Ω to 156 kΩ

WIRING DIAGRAM

ATF Temperature Sensor
(in ECT Solenoid Valve)

ECM

THO

THO1

E2

ETHO

C131806E01
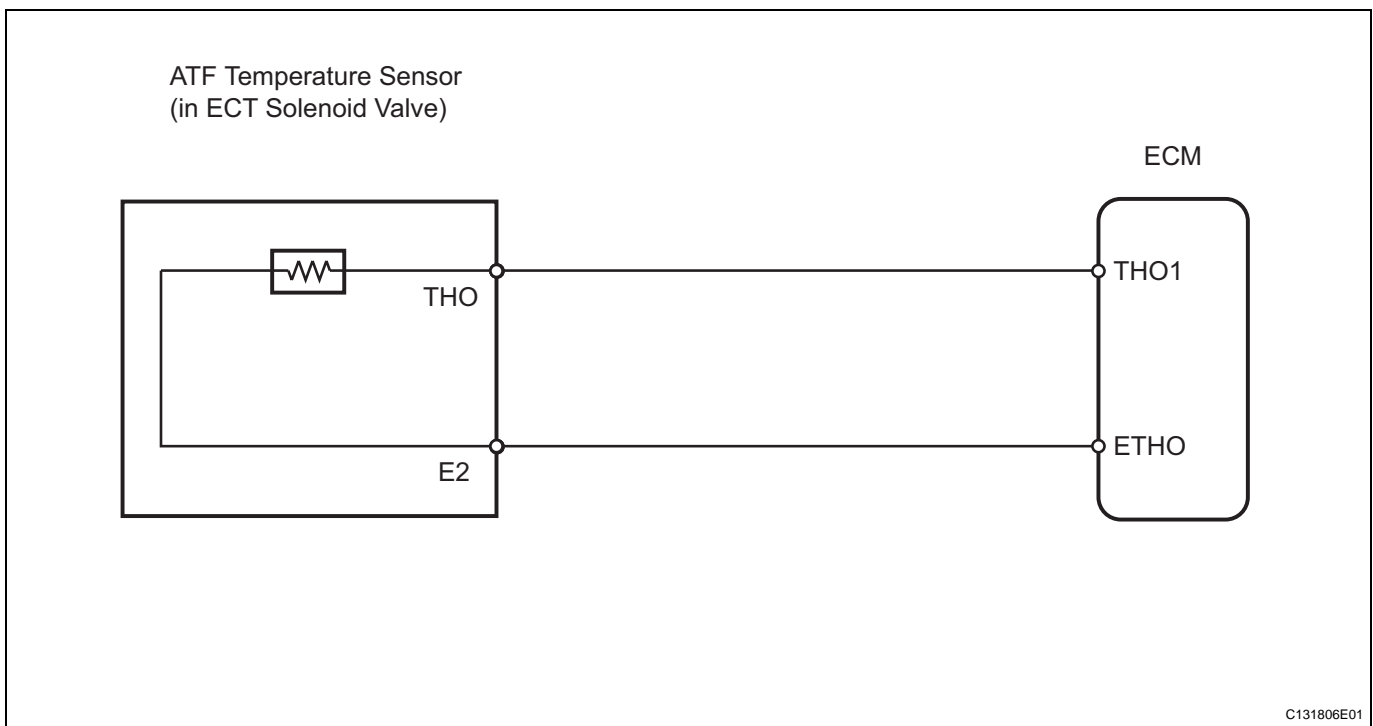
INSPECTION PROCEDURE

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

1. Warm up the engine.
2. Turn the ignition switch OFF.
3. Connect the intelligent tester to the CAN VIM. Then connect the CAN VIM to the DLC3.
4. Turn the ignition switch ON and turn the tester ON.
5. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
6. Follow the instructions on the tester and read the DATA LIST.

| Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
A/T OIL TEMP1	ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 215°C (419°F)	• After stall test: Approximately 80°C (176°F) • Equal to ambient temperature while engine is cold	If value is -40°C (-40°F) or "150°C (302°F) or more", ATF temperature sensor circuit is open or short circuited

HINT:

• When DTC P0712 is output and the tester output is 150°C (302°F) or more, there is a short circuit.
• When DTC P0713 is output and the tester output is -40°C (-40°F), there is an open circuit.
  Measure the resistance between terminal THO1 (THO) and the body ground.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

HINT:

If a circuit related to the ATF temperature sensor becomes open, P0713 is set in approximately 0.5 seconds. It is not necessary to inspect the circuit when P0711 is set.

1	**INSPECT TRANSMISSION WIRE (ATF TEMPERATURE SENSOR)**

THO

5 4 3 2 1
10 9 8 7 6

E2

C129039E01
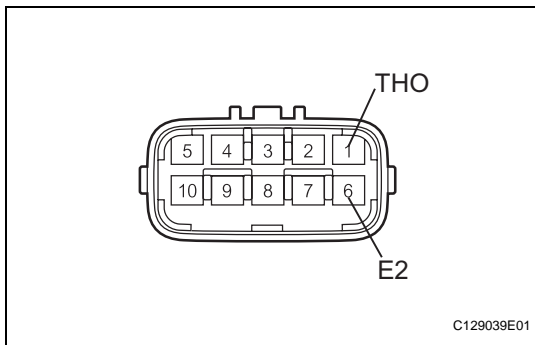
(a) Disconnect the B27 wire connector.
(b) Measure the resistance of the transmission wire.
    Standard resistance

Tester Connection	Specified Condition
1 (THO) - 6 (E2)	**90 Ω to 156 kΩ**
1 (THO) - Body ground	**1 MΩ or higher**
6 (E2) - Body ground	**1 MΩ or higher**

HINT:

If the resistance is out of the specified range of either of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.
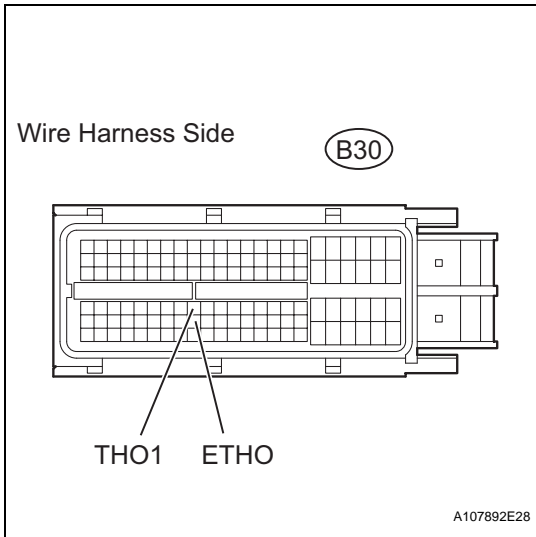
Standard resistance

ATF Temperature	Specified Condition
10°C (68°F)	**6.4 kΩ**
110°C (230°F)	**0.2 kΩ**

NG	**REPAIR OR REPLACE TRANSMISSION WIRE**

OK

| 2 | CHECK WIRE HARNESS (TRANSMISSION WIRE - ECM) |

(a) Disconnect the B30 ECM connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Wire Harness Side   (B30)

THO1   ETHO

A107892E28

Tester Connection	Specified Condition
B30-72 (THO1) - B30-95 (ETHO)	90 Ω to 156 kΩ
B30-72 (THO1) - Body ground	1 MΩ or higher
B30-95 (ETHO) - Body ground	1 MΩ or higher

NG ▷ | **REPAIR OR REPLACE HARNESS AND CONNECTOR** |

OK

| **REPLACE ECM** |