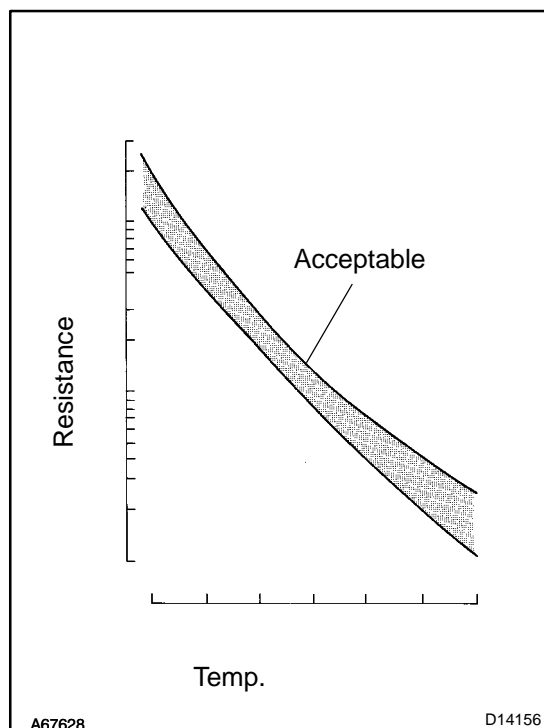


DTC	P0710	Transmission Fluid Temperature Sensor "A" Circuit
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DTC	P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input
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DTC	P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input
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CIRCUIT DESCRIPTION



The ATF (Automatic Transmission Fluid) temperature sensor converts the fluid 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 transmission fluid temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC No.	DTC Detection Condition	Trouble Area
P0710	(a) and (b) are detected momentarily within 0.5 sec. when neither P0712 nor P0713 is detected (1-trip detection logic) (a) ATF temperature sensor No.1 resistance is less than 79 Ω . (b) ATF temperature sensor No.1 resistance is more than 156 k Ω . HINT: Within 0.5 sec., the malfunction switches from (a) to (b) or from (b) to (a)	<ul style="list-style-type: none"> • Open or short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM
P0712	ATF temperature sensor No.1 resistance is less than 79 Ω for 0.5 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> • Short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM
P0713	ATF temperature No.1 sensor resistance is more than 156 k Ω when 15 minutes or more have elapsed after the engine start DTC is detected for 0.5 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> • Open in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the automatic transmission fluid (ATF) temperature sensor circuit. The automatic transmission fluid (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 156k Ω ^{*2}, the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will turn on the MIL and store the DTC.

*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.

HINT:

The ATF temperature can be checked on the OBD II scan tool or hand-held tester display.

MONITOR STRATEGY

Related DTCs	P0710	ATF temperature sensor/Range check (Fluttering)
	P0712	ATF temperature sensor/Range check (Low resistance)
	P0713	ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor (TFT sensor)	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever these DTCs are not present.	See page DI-1128	
Range check (Fluttering, Low resistance)		
The typical enabling condition is not available.	-	
Range check (High resistance)		
Time after engine start	15 min. or more	-

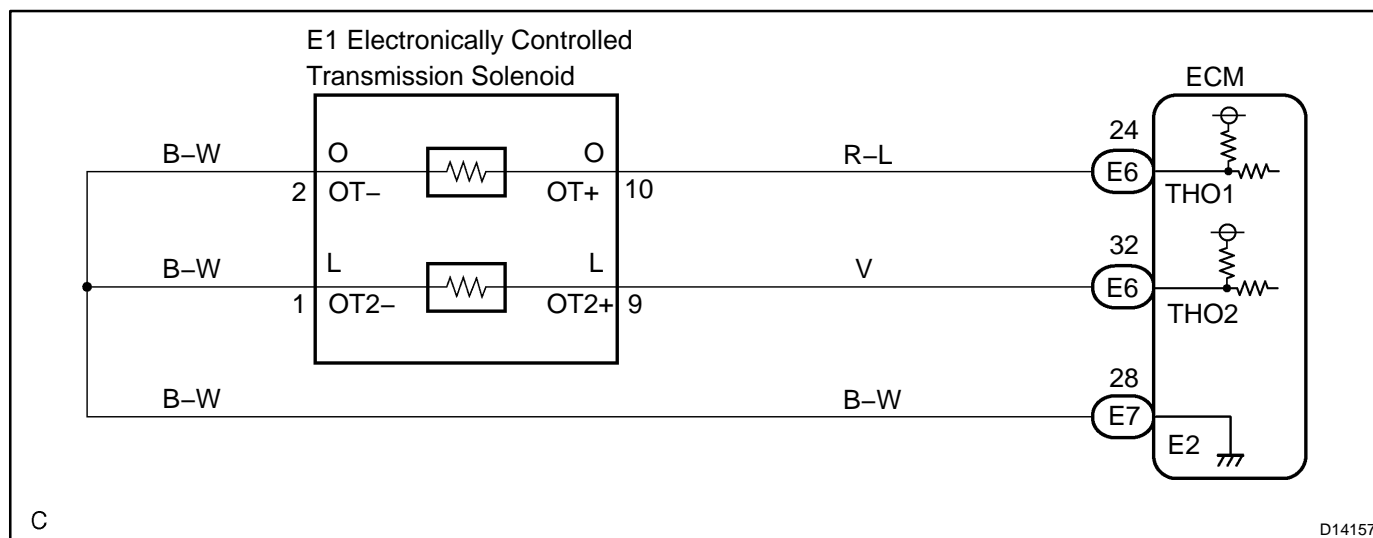
TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Range check (Fluttering)	
TFT (transmission fluid temperature) sensor resistance	Less than 79 Ω or More than 156 kΩ
Range check (Low resistance)	
TFT (transmission fluid temperature) sensor resistance	Less than 79 Ω
Range check (High resistance)	
TFT (transmission fluid temperature) sensor resistance	More than 156 kΩ

COMPONENT OPERATING RANGE

Parameter	Standard value
TFT (transmission fluid temperature) sensor	Atmospheric temperature to approx. 130°C (266°F)

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the OBD II scan tool or hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

- Warm up the engine.
- Turn the ignition switch off.
- Connect the OBD II scan tool or hand-held tester to the DLC3.
- Turn the ignition switch to the ON position.
- Push the "ON" button of the OBD II scan tool or the hand-held tester.
- When you use the hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition
AT FLUID TEMP 1	ATF Temp. Sensor Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> After Stall Test; Approx. 80°C (176°F) Equal to ambient temperature when cold soak

HINT:

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

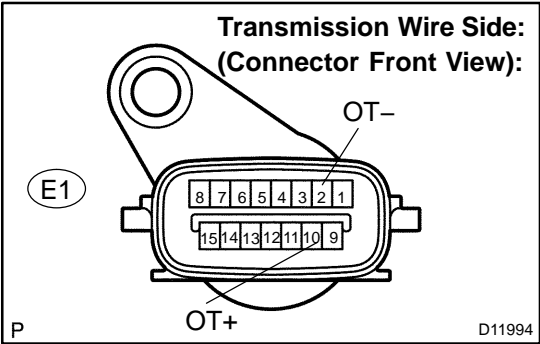
Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

HINT:

If a circuit related to the ATF temperature sensor becomes open, P0713 is immediately set (in 0.5 second).
When P0713 is set, P0711 cannot be detected.
It is not necessary to inspect the circuit when P0711 is set.

1

Inspect transmission wire (ATF temperature sensor No.1).



PREPARATION:

Disconnect the transmission wire connector from the transmission.

CHECK:

Measure the resistance according to the value(s) in the table below.

OK:

Tester Connection	Specified Condition
2 (OT-) – 10 (OT+)	79 Ω to 156 kΩ
2 (OT-) – Body ground	10 kΩ or higher
10 (OT+) – Body ground	10 kΩ or higher

HINT:

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

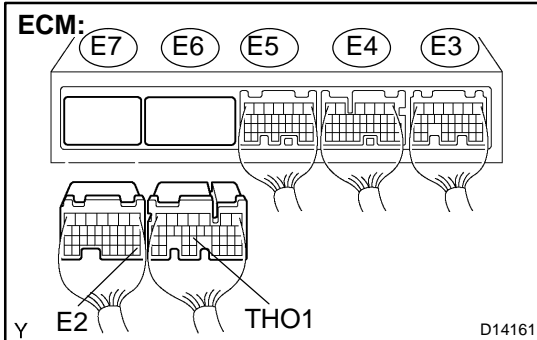
ATF Temperature	Specified Condition
20°C (68°F)	3 to 4 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

NG

Repair or replace the transmission wire (ATF temperature sensor No.1)
(See page [AT-9](#)).

OK

2 Check harness and connector (Transmission wire – ECM).



PREPARATION:

- Connect the transmission wire connector.
- Disconnect the connector of the ECM.

CHECK:

Measure the resistance according to the value(s) in the table below.

OK:

Tester Connection	Specified Condition
E6 – 24 (THO1) – E7 – 28 (E2)	79 Ω to 156 k Ω

CHECK:

Measure the resistance according to the value(s) in the table below.

OK:

Tester Connection	Specified Condition
E6 – 24 (THO1) – Body ground	10 k Ω or higher
E7 – 28 (E2) – Body ground	\uparrow

NG

Repair or replace the harness or connector (See page IN-30).

OK

Replace the ECM (See page SF-82).