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Service Category: Drivetrain	**Section:** Automatic Transmission/Transaxle	
Model Year: 2007	**Model:** 4Runner	**Doc ID:** RM0000012XR00XX
Title: A750E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2UZ-FE): P2740: Transmission Fluid Temperature Sensor "B" Circuit (2007 4Runner)		

DTC	**P2740**	**Transmission Fluid Temperature Sensor "B" Circuit**

DTC	**P2742**	**Transmission Fluid Temperature Sensor "B" Circuit Low Input**

DTC	**P2743**	**Transmission Fluid Temperature Sensor "B" Circuit High Input**

DESCRIPTION

The No. 2 ATF temperature sensor is on the transmission, just in front of the oil cooler inlet pipeline.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning light.

HINT:

- The temperature of ATF easily rises when towing, climbing hills and in traffic, etc.
- If the No. 2 ATF temperature sensor becomes short-circuited, the signal that indicates the ATF temperature is 150°C (302°F) or higher is input in ECM.

Vehicle conditions when the sensor is normal and when the sensor is short-circuited are indicated in the table below.

NO. 2 ATF TEMPERATURE SENSOR STATE	DETECTION CONDITION	SYMPTOM	RECOVERY CONDITION
Sensor is normal	ATF temperature more than 150°C (275°F)	A/T OIL TEMP warning light remains ON	ATF temperature less than 135°C (275°F)*2
	ATF temperature more than 130°C (266°F)	Shift point too high	ATF temperature less than 110°C (230°F)
	When the conditions (a) and (b) are satisfied. (a) ATF temperature more than 130°C (266°F) (b) Engine coolant temperature more than 95°C (203°F)	Lock-up at 3rd gear*1	ATF temperature less than 110°C (230°F)*2 and engine coolant temperature more than 95°C (203°F)

Sensor is short-circuited	Any conditions	• A/T OIL TEMP warning light remains ON • Shift point too high	Symptoms still occur
	Engine coolant temperature more than 95°C (203°F)	Lock-up at 3rd gear*1	Symptoms still occur

HINT:

***1: When ATF temperature is normal, transmission lock-up occurs in 5th gear with the shift lever in the D position, and 4th gear with the shift lever in the 4 position.**

***2: When ATF temperature is in the normal range, it decreases to less than 135°C (275°F) within 5 minutes with the shift lever in the P or N position in an idling state.**

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2740	(a) and (b) are detected momentarily within 0.5 seconds when neither P2742 or P2743 are detected. (1-trip detection logic) (a) No. 2 ATF temperature sensor resistance is less than 25 Ω (0.046 V). (b) No. 2 ATF temperature sensor resistance is more than 156 kΩ (4.915 V). **HINT:** **Within 0.5 seconds, the malfunction switches from (a) to (b) or from (b) to (a).**	• Open or short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor • ECM
P2742	No. 2 ATF temperature sensor resistance is less than 25 Ω (0.046 V) for 0.5 seconds or more. (1-trip detection logic)	• Short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor • ECM
P2743	No. 2 ATF temperature sensor resistance is more than 156 kΩ (4.915 V) when 15 minutes or more have passed after the engine start. DTC is detected for 0.5 seconds or more. (1-trip detection logic)	• Open in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor • ECM

MONITOR DESCRIPTION

ATF temperature sensor converts ATF temperature into 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 25 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	P2740: ATF temperature sensor/Range check (Fluttering) P2742: ATF temperature sensor/Range check (Low resistance) P2743: ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor
Frequency of operation	Continuous
Duration	0.5 seconds
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	None

P2740, P2742: Range check (Fluttering, Low voltage)

The typical enabling condition is not available.	-

P2743: Range check (High voltage)

Time after engine start	15 minutes or more

TYPICAL MALFUNCTION THRESHOLDS

P2740: Range check (Fluttering)

TFT (Transmission fluid temperature) sensor voltage	Less than 0.046 V or More than 4.915 V

P2742: Range check (Low voltage)

TFT (Transmission fluid temperature) sensor voltage	Less than 0.046 V

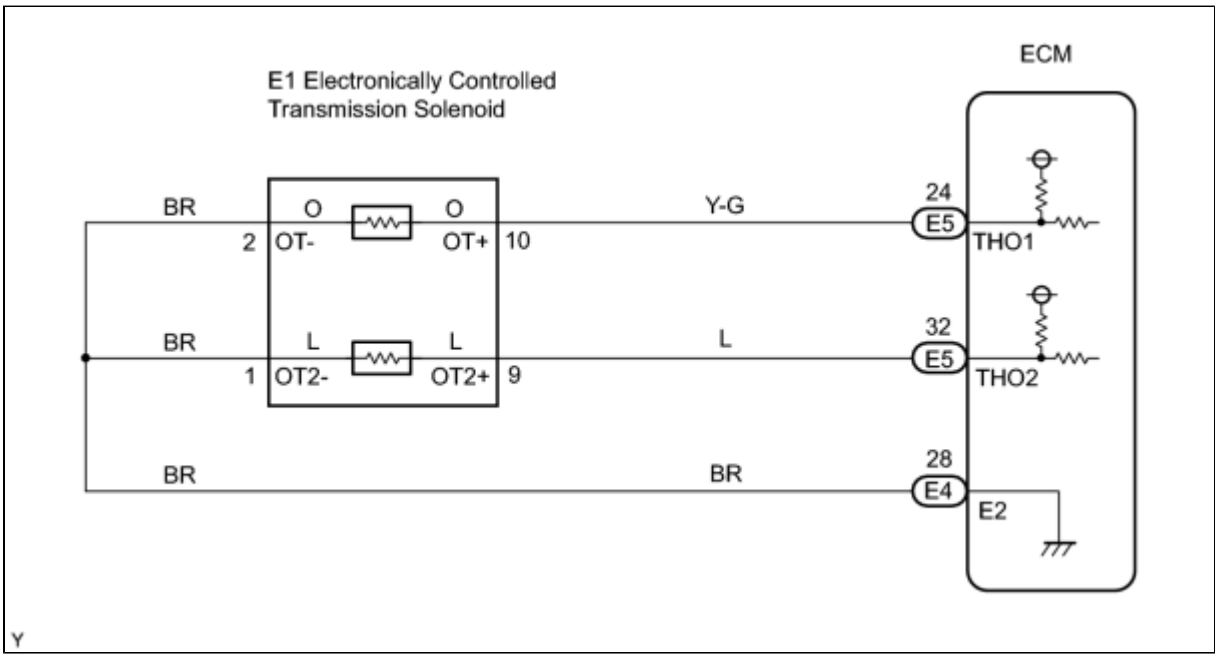
P2743: Range check (High voltage)

TFT (Transmission fluid temperature) sensor voltage	More than 4.915 V

COMPONENT OPERATING RANGE

TFT (Transmission fluid temperature) sensor	Atmospheric temperature up to approximately 130°C (266°F)

WIRING DIAGRAM



INSPECTION PROCEDURE

1. DATA LIST

HINT:

According to the DATA LIST displayed by the intelligent 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.

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 together with the CAN VIM (controller area network vehicle interface

module) to the DLC3.

4. Turn the ignition switch to the ON position.
5. Turn on the tester.
6. Select the item "DIAGNOSIS / OBD/MOBD / ECT / DATA LIST".
7. According to the display on tester, read the "DATA LIST".

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T OIL TEMP2	ATF temperature sensor No. 2 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 215°C (419°F), ATF temperature sensor No. 2 circuit is opened or short circuited

HINT:

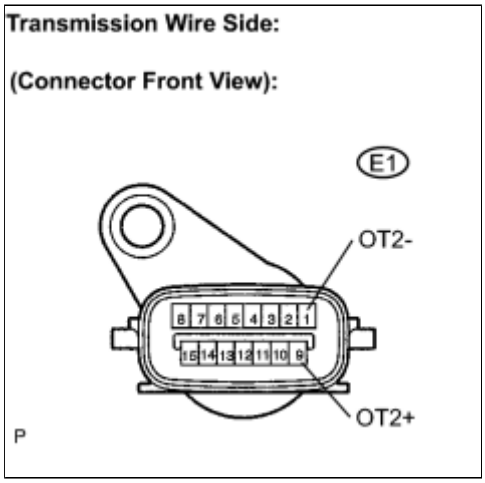
- When DTC P2742 is output and the intelligent tester output is 150°C (302°F) or more, there is a short circuit.
- When DTC P2743 is output and the intelligent tester output is -40°C (-40°F), there is an open circuit.

Measure the resistance between terminal THO2 (OT2) and the body ground.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

PROCEDURE

1.	INSPECT TRANSMISSION WIRE (NO. 2 ATF TEMPERATURE SENSOR)



(a) Disconnect the transmission wire connector.

(b) Measure the resistance.

Standard resistance:

TESTER CONNECTION	SPECIFIED CONDITION
1 (OT2-) - 9 (OT2+)	25 Ω to 156 kΩ
1 (OT2-) - Body ground	10 kΩ or higher
9 (OT2+) - Body ground	10 kΩ or higher

HINT:

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

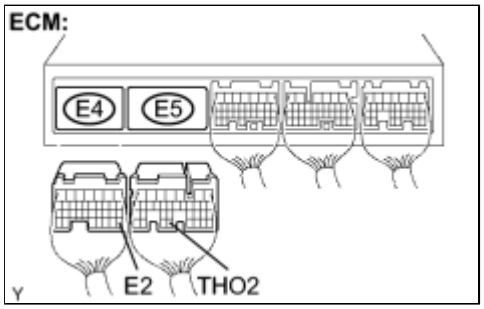
Standard resistance:

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 TRANSMISSION WIRE**

OK ▼

2.	CHECK WIRE HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector to the transmission.

(b) Disconnect the ECM connector.

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

Standard resistance:

TESTER CONNECTION	SPECIFIED CONDITION

E5-32 (THO2) - E4-28 (E2)	79 Ω to 156 kΩ

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

Standard resistance (Check or short):

TESTER CONNECTION	SPECIFIED CONDITION
E5-32 (THO2) - Body ground	10 kΩ or higher
E4-28 (E2) - Body ground	↑

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**