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

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 (THO).
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 resistance is less than 79 Ω. (b) ATF temperature sensor resistance is more than 156 kΩ. HINT: Within 0.5 sec., the malfunction switches from (a) to (b) or from (b) to (a)	• Open or short in ATF temperature sensor circuit • Transmission wire (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 • Transmission wire (ATF temperature sensor) • ECM
P0713	ATF temperature sensor resistance is more than 156 kΩ when 15 minutes or more have elapsed after the engine start DTC is detected for 0.5 sec. or more (1−trip detection logic)	• Open in ATF temperature sensor circuit • Transmission wire (ATF temperature sensor) • ECM

MONITOR DESCRIPTION

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 156 kΩ*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 (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: Range check (Chattering)

P0712: Range check (Low resistance)

The monitor will run whenever these DTCs are not present.	See page 05−1253
The typical enabling condition is not available.	−

P0713: Range check (High resistance)

The monitor will run whenever this DTC is not present.	See page 05−1253
Time after engine start	15 min. or more

TYPICAL MALFUNCTION THRESHOLDS

P0710: Range check (Chattering)

TFT (Transmission fluid temperature) sensor resistance	Less than 79 Ω or More than 156 kΩ

P0712: Range check (Low resistance)

TFT sensor resistance	Less than 79 Ω

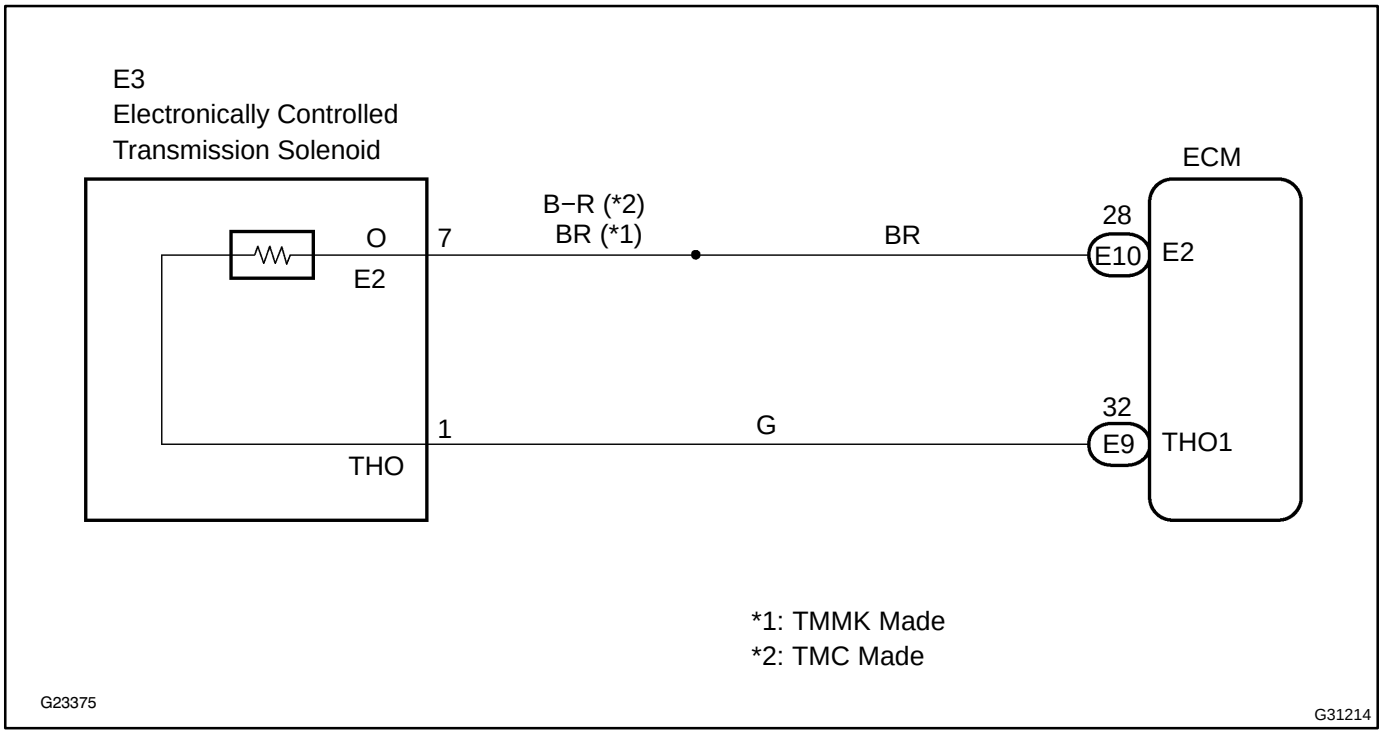
P0713: Range check (High resistance)

TFT sensor resistance	More than 156 kΩ

COMPONENT OPERATING RANGE

TFT 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.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the OBD II scan tool or hand−held tester to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Push the ”ON” button of the OBD II scan tool or the hand−held tester.
(f) When you use hand−held tester:
Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST”.
(g) According to the display on the tester, read the ”DATA LIST”.

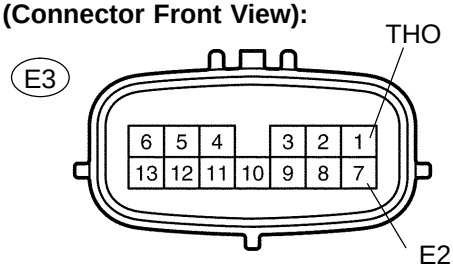
Item	Measurement Item/ Range (display)	Normal Condition
AT FLUID TEMP	ATF Temp. Sensor Value/ min.: −40°C (−40°F) max.: 215°C (419°F)	Approx. 80°C (176°F) (After Stall Test)

HINT:
When DTC P0712 is output and OBD II scan tool or hand−held tester output is 150°C (302°F), there is a short circuit.
Measure the resistance between THO1 (THO) and body ground.

Temperature Displayed	Malfunction
−40˚C (−40˚F)	Open circuit
150˚C (302˚F) or more	Short circuit

1 INSPECT TRANSMISSION WIRE(ATF TEMPERATURE SENSOR)

Transmission Wire Side:
(Connector Front View):



(a) Disconnect the transmission wire connector from the transaxle.
(b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester Connection	Specified Condition
1 (THO) − 7 (E2)	79 Ω to 156 kΩ

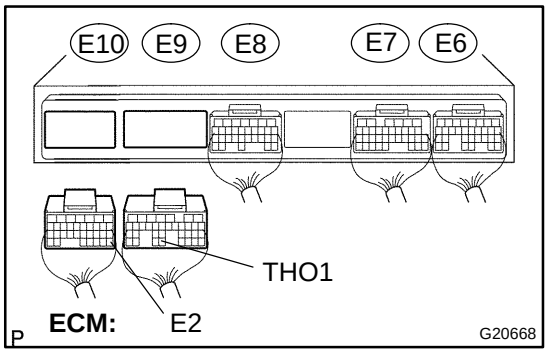
(c) Measure the resistance according to the value(s) in the table below.
Standard (Check for short):

Tester Connection	Specified Condition
1 (THO) − Body ground	10 kΩ or higher
7 (E2) − Body ground	↑

NG → **REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40−31)**

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE – ECM)



(a) Connect the transmission wire connector to the transaxle.
(b) Disconnect the ECM connectors.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
E9 – 32 (THO1) – E10 – 28 (E2)	79 Ω to 156 kΩ

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

Standard (Check for short):

Tester Connection	Specified Condition
E9 – 32 (THO1) – Body ground	10 kΩ or higher
E10 – 28 (E2) – Body ground	↑

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01–32)**

OK

REPLACE ECM (SEE PAGE 10–25)