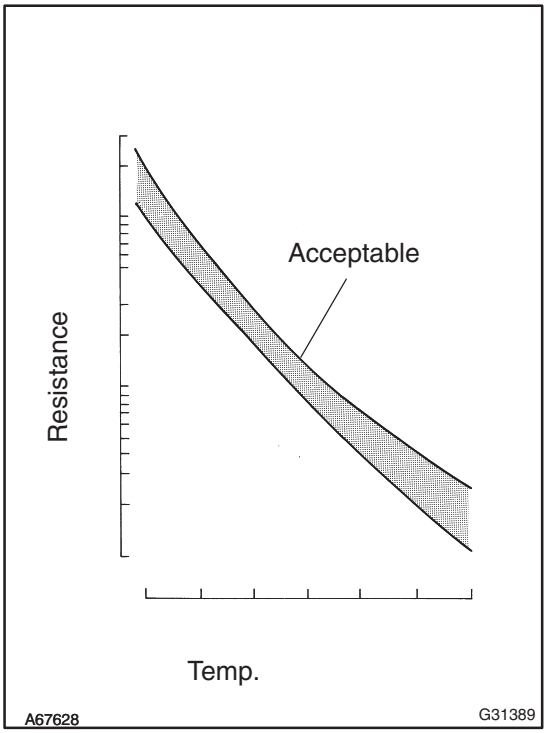
DTC	P0710/38	TRANSMISSION FLUID TEMPERATURE SENSOR ”A” CIRCUIT

DTC	P0712/38	TRANSMISSION FLUID TEMPERATURE SENSOR ”A” CIRCUIT LOW INPUT

DTC	P0713/38	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 TCM.
The TCM applies a voltage to the temperature sensor through TCM 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 TCM calculates the fluid temperature based on the voltage signal.

DTC No.	DTC Detection Condition	Trouble Area
P0710/38	(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 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 No.1 circuit • Transmission wire (ATF temperature sensor No.1) • TCM
P0712/38	ATF temperature sensor No.1 resistance is less than 79 Ω for 0.5 sec. or more (1–trip detection logic)	• Short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • TCM
P0713/38	ATF temperature No.1 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 No.1 circuit • Transmission wire (ATF temperature sensor No.1) • TCM

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 TCM determines the ATF temperature, and the TCM 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 TCM interprets this as a fault in the ATF sensor or wiring. The TCM will turn on the MIL and store the DTC.

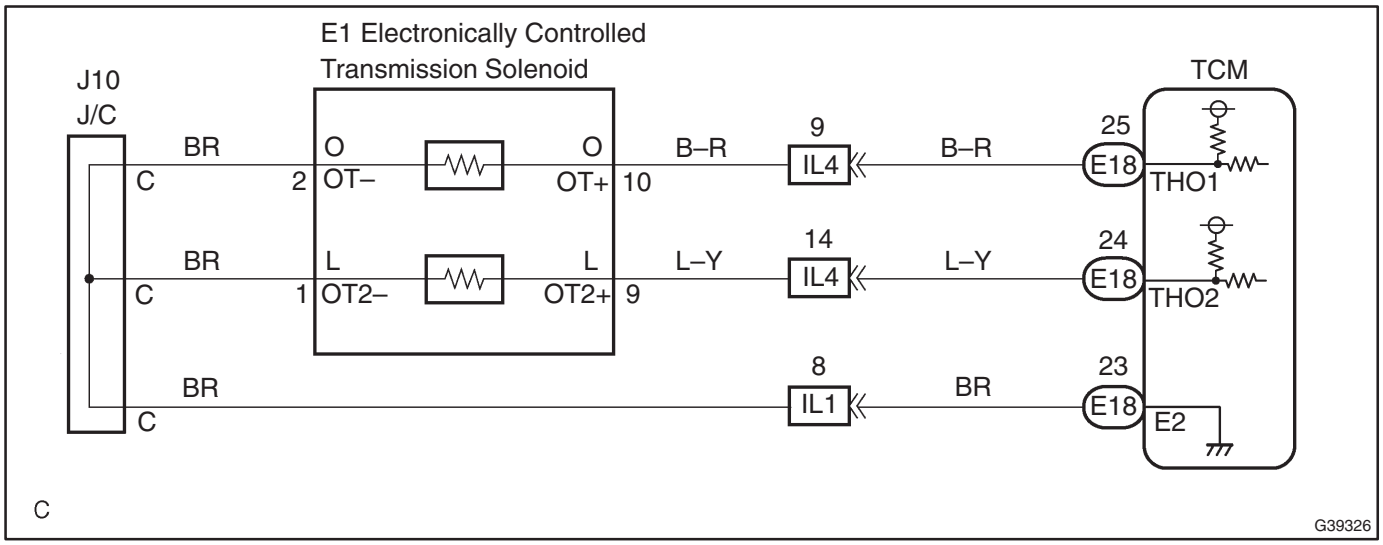
*1: 150°C (302°F) or more is indicated regardless of the actual ATF temperature.

*2: –40°C (–40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Intelligent Tester II display.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Using the Intelligent Tester II 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 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.
(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item ”Enter / Power train / ECT / Data List”.
(g) Follow the instructions on the tester and read the Data List.

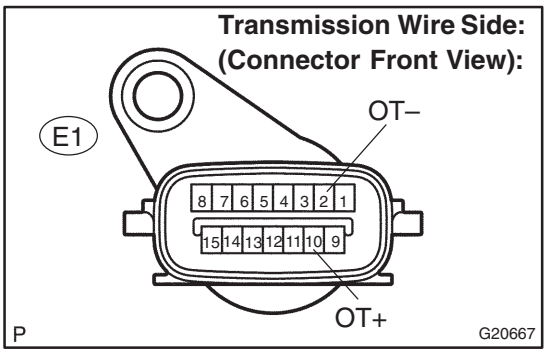
Item	Measurement Item/ Range (display)	Normal Condition
A/T Oil Temperature 1	ATF Temp. Sensor Value/ min.: –40°C (–40°F) max.: 215°C (419°F)	• After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak

HINT:
When DTC P0712 is output and Intelligent Tester II output is 150°C (302°F) or more, there is a short circuit.
When DTC P0713 is output and Intelligent Tester II 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)



(a) Disconnect the transmission wire connector from the transmission.

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

Standard:

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:

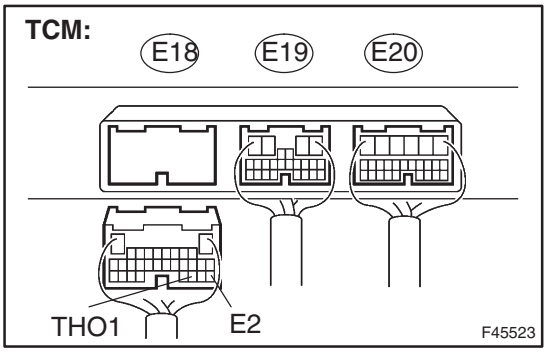
If the resistance is out of the specified range with either the ATF temperature shown in the table below, the driveability of the vehicle may decrease.

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 TRANSMISSION WIRE (SEE PAGE 40–68)**

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE – TCM)



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

(b) Disconnect the TCM connector.

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

Standard:

Tester Connection	Specified Condition
E18 – 25 (THO1) – E18 – 23 (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
E18 – 25 (THO1) – Body ground	10 kΩ or higher
E18 – 23 (E2) – Body ground	↑

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01–36)**

OK

REPLACE TCM