DTC	P0710/38	TRANSMISSION FLUID TEMPERATURE SENSOR 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 Automatic Transmission Fluid (ATF) temperature sensor converts the ATF temperature into a resistance value which is input into the Transmission Control Module (TCM).
The TCM applies voltage to the temperature sensor through the TCM terminal THOC.
The sensor resistance changes with the ATF temperature.
One terminal of the sensor is grounded so that the sensor resistance and voltage decreases as the temperature becomes higher.
The TCM calculates the ATF temperature based on the voltage signal.

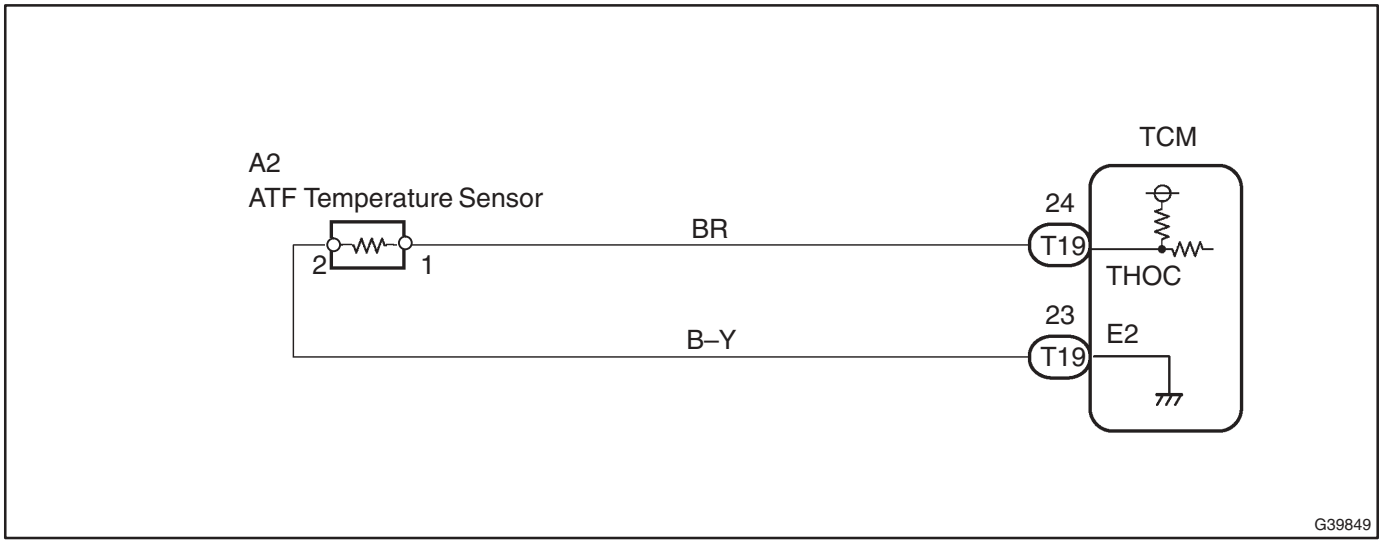
DTC No.	DTC Detection Condition	Trouble Area
P0710/38	ATF temperature sensor resistance changes from (a) to (b) or from (b) to (a) in less than 0.5 sec., and P0712/38 and P0713/38 are not detected (1 trip detection logic): (a) ATF temperature sensor resistance is less than 79 Ω (b) ATF temperature sensor resistance is more than 156 kΩ	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • TCM
P0712/38	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 • TCM
P0713/38	• ATF temperature sensor resistance is more than 156 kΩ for 15 minutes or more after engine starts • DTC is detected for 0.5 sec. or more (1 trip detection logic)	• Open in ATF temperature sensor circuit • ATF temperature sensor • TCM

MONITOR DESCRIPTION

The 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 opens or shorts 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 illuminate the MIL and store a 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 II display.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Using the intelligent tester II'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.

(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 ON and push the tester main switch ON.
(e) Enter the following menus: Powertrain / ECT / Data List.
(f) Follow the instructions on the tester and read the Data List.

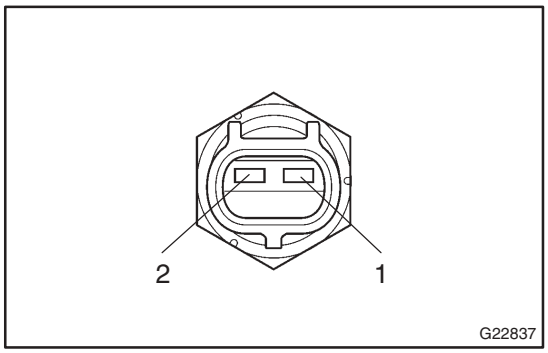
Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
A/T Oil Temperature 3	ATF temperature sensor value/ Min. : –40°C (–40°F) Max. : 150°C (302°F)	• After stall test: Approximately 80°C (176°F) • Equal to ambient temperature when engine is cold	If value is –40°C (–40°F) or 150°C (302°F), ATF temperature sensor circuit is open or short circuited

NOTICE:
In the table above, 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.
HINT:

- When DTC P0712/38 is output and the intelligent tester II output is 150°C (302°F) or more, there is a short circuit.
- When DTC P0713/38 is output and the intelligent tester II output is –40°C (–40°F), there is an open circuit.
  Measure the resistance between terminal THOC and body ground.

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

1 INSPECT ATF TEMPERATURE SENSOR



(a) Disconnect the A2 ATF temperature sensor connector from the transmission.

(b) Measure the resistance of the temperature sensor.

Standard:

Tester Connection	Specified Condition
1 – Body ground	1 MΩ or higher
2 – Body ground	1 MΩ or higher

HINT:

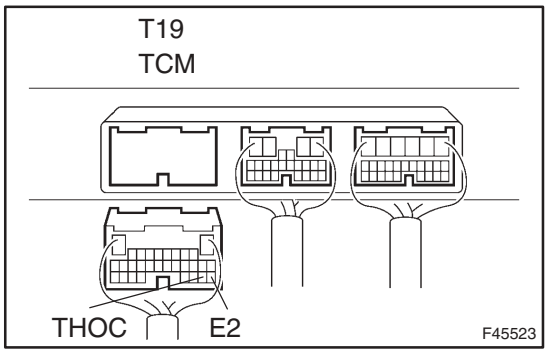
If the resistance is out of the specified range for either of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
20°C (68°F)	10.3 to 13.9 kΩ
110°C (230°F)	0.68 to 0.88 kΩ

NG → **REPLACE ATF TEMPERATURE SENSOR (See page 40–18)**

OK

2 CHECK WIRE HARNESS (ATF TEMPERATURE SENSOR – TCM)



(a) Disconnect the T19 TCM connector.

(b) Measure the resistance of the wire harness side connector.

Standard:

Tester Connection	Specified Condition
T19–24 (THOC) – T19–23 (E2)	79 Ω to 156 kΩ
T19–24 (THOC) – Body ground	10 kΩ or higher
T19–23 (E2) – Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (See page 01–29)**

OK

REPLACE TCM (See page 10–16)