

ELECTRONIC CONTROLLED AUTOMATIC TRANSAXLE[ECT]

0527H-03

HOW TO PROCEED WITH TROUBLESHOOTING

1	Vehicle Brought to Workshop
---	-----------------------------



2	Customer Problem Analysis (See page 05-387)
---	--



3	Connect the OBD II scan tool or hand-held tester to DLC3
---	--



4	Check and Clear DTC and Freeze Frame Data (See page 05-388)
---	--



5	Visual Inspection
---	-------------------



6	Setting the Check Mode Diagnosis (See page 05-388)
---	---



7	Problem Symptom Confirmation
---	------------------------------

➤	Symptom does not occur: Go to step 8
---	--------------------------------------

➤	Symptom occur: Go to step 9
---	-----------------------------

8	Symptom Simulation (See page 01-21)
---	--



9	DTC Check (See page 05-388)
---	--

➤	DTC is not output: Go to step 10
---	----------------------------------

➤	DTC is output: Go to step 17
---	------------------------------

10 Basic Inspection (See page 05-388)

NG Go to step 19

OK

11 Mechanical System Test (See page 05-388)

NG Go to step 16

OK

12 Manual Shifting Test (See page 05-388)

NG Go to step 14

OK

13 Problem Symptoms Table Chapter 1 (See page 05-406)

NG Go to step 18

OK

14 Problem Symptoms Table Chapter 2 (See page 05-406)

NG Go to step 16

OK

15 Problem Symptoms Table Chapter 3 (See page 05-406)

NG

16 Part Inspection

Go to step 19

17 DTC Chart (See page 05-400)

18 Circuit Inspection (See page 05-410)

19	Identification of Problem
----	---------------------------

20	Repair
----	--------

21	Confirmation Test
----	-------------------

End

CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transmission
System Check Sheet

Inspector's
Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

Date Problem Occurred	/ /
How Often Does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Vehicle does not move (☐ Any position ☐ particular position)
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → 4th ☐ 4th → 5th)
	☐ No down-shift (☐ 5th → 4th ☐ 4th → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)
	☐ Lock-up malfunction
	☐ Shift point too high or too low
	☐ Harsh engagement (☐ N → D ☐ Lock-up ☐ Any drive position)
	☐ Slip or shudder
	☐ No kick-down
	☐ Others ()

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains ON
------------	----------------------------	---

DTC Check	1st Time	☐ Normal code ☐ Malfunction code (DTC)
	2nd Time	☐ Normal code ☐ Malfunction code (DTC)

PRE-CHECK

1. DIAGNOSIS SYSTEM

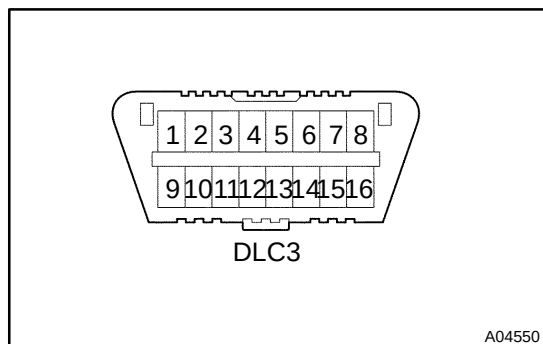
(a) Description

- (1) When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you need to connect an OBD II scan tool complying with SAE J1987 or a hand-held tester to the vehicle, and read off various data output from the vehicle's ECM.
- (2) OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in the drive system components which affect the vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page 05-5).



If the malfunction only occurs in 3 consecutive trips, the MIL goes off but the DTCs remain in the ECM memory.

- (3) To check the DTCs, connect OBD II scan tool or hand-held tester to the DLC3 of the vehicle. The OBD II scan tool or hand-held tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For instruction book).
- (4) The DTCs include SAE controlled codes and Manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by a manufacturer within the prescribed limits (See the DTC chart on page 05-400).
- (5) The diagnosis system operates in the normal mode during the normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2 trip detection logic(*) to prevent erroneous detection. By switching the ECM to the check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily. (hand-held tester).
- (6) *2 trip detection logic:
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the second test drive, this second detection causes the MIL to light up .



- (b) Inspect the DLC3.
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Tester connection	Condition	Specified condition
7 (Bus ⊕ Line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) - Body	Always	1 Ω or less
5 (Signal Ground) - Body	Always	1 Ω or less
16 (B+) - Body	Always	9 - 14 V

HINT:

If your display shows **UNABLE TO CONNECT TO VEHICLE** when you have connected the cable of the OBD II scan tool or hand-held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- If the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



**2. Normal Mode:
INSPECT DIAGNOSIS**

- (a) Check the MIL.
(1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

HINT:

If the MIL does not light up, troubleshoot the combination meter (See page 71-1).

- (2) When the engine is started, the MIL should go off. If the lamp remains on, it means that the diagnosis system has detected a malfunction or abnormality in the system.

- (b) Check the DTC.

NOTICE:

Hand-held tester only:

When the diagnostic system is switched from the normal mode to the check mode, all the DTCs and freeze frame data recorded in the normal mode will be erased. So before switching modes, always check the DTCs and freeze frame data, and note them down.

- (1) Prepare an OBD II scan tool (complying with SAE J1978) or hand-held tester.
- (2) Connect the OBD II scan tool or hand-held tester to the DLC3 at the lower of the instrument panel.
- (3) Turn the ignition switch ON and press the OBD II scan tool or hand-held tester switch ON.
- (4) Use the OBD II scan tool or hand-held tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).
- (5) See page 05-400 to confirm the details of the DTCs.

NOTICE:

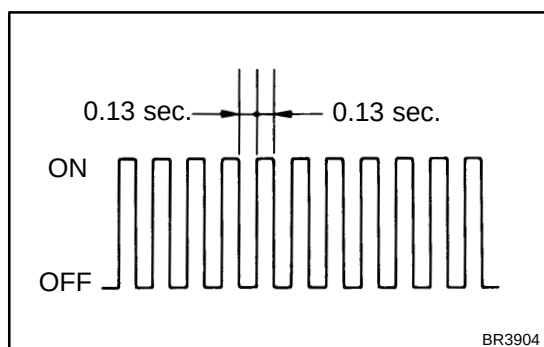
When simulating symptoms with an OBD II scan tool (excluding hand-held tester) to check the DTCs, use the normal mode. For codes on the DTCs chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated twice, the MIL is indicated on the instrument panel and DTCs are recorded in the ECM.

3. Check Mode:**INSPECT DIAGNOSIS****HINT:**

Hand-held tester only:

Compared to the normal mode, the check mode has more sensitive ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

- (a) Check the DTC.
 - (1) Check the initial conditions.
 - Battery positive voltage 11 V or more
 - Throttle valve fully closed
 - Transaxle in P position
 - A/C switched OFF
 - (2) Turn the ignition switch OFF.
 - (3) Prepare a hand-held tester.
 - (4) Connect the hand-held tester to the DLC3 at the lower of the instrument panel.
 - (5) Turn the ignition switch ON and push the hand-held tester ON.



- (6) Switch the hand-held tester from the normal mode to the check mode (Check that the MIL flashes).
- (7) Start the engine (MIL goes off after the engine starts).
- (8) Simulate the conditions of the malfunction described by the customer.

NOTICE:

Leave the ignition switch ON until you have checked the DTCs, etc.

- (9) After simulating the malfunction conditions, use the hand-held tester diagnosis selector to check the DTCs and freeze frame data, etc.

HINT:

Take care not to turn the ignition switch OFF, as turning it OFF switches the diagnosis system from the check mode to the normal mode, which erases all the DTCs, etc.

- (10) After checking the DTC, inspect the applicable circuit.
- (b) Clear the DTC.
- (1) When using OBD II scan tool or hand-held tester:
When operating an OBD II scan tool (complying with SAE J1978) or hand-held tester to erase the codes, the DTCs and freeze frame data will be erased. (See the OBD II scan tool's instruction book for operating instructions.)
 - (2) When not using OBD II scan tool or hand-held tester:
Remove the EFI and ETCS fuse from engine room J/B for 60 seconds or more.

4. DATA LIST**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 a first step of troubleshooting is one of the method to shorten the 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 ON.
- (e) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop light SW Status/ ON or OFF	• Brake Pedal is depressed: ON • Brake Pedal is released: OFF	←
SHIFT	Actual Gear Position/ 1st, 2nd, 3rd, 4th or 5th	Shift Lever Position is; • L: 1st • 2: 1st or 2nd • 3: 1st, 2nd or 3rd • 4: 1st, 2nd, 3rd or 4th • D: 1st, 2nd, 3rd, 4th or 5th	←
LOCK UP SOL	Lock Up Solenoid Status/ ON or OFF	• Lock Up: ON • Except Lock Up: OFF	←
PNP SW [NSW]	PNP SW Status/ ON or OFF	Shift lever position is; P or N: ON Except P or N: OFF	The shift lever position and these values are different, there are failures of the PNP switch or shift cable adjustment.
REVERSE	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	
5TH/DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; D and 4: ON Except D and 4: OFF	
4th	PNP SW Status/ ON or OFF	Shift lever position is; 4: ON Except 4: OFF	
3rd	PNP SW Status/ ON or OFF	Shift lever position is; 3: ON Except 3: OFF	
2ND	PNP SW Status/ ON or OFF	Shift lever position is; 2 and L: ON Except 2 and L: OFF	
LOW	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	
SOLENOID (SLT)	Shift Solenoid SLT Status/ ON or OFF	IG SW ON: ON	←
AT FLUID TEMP	ATF Temp. Sensor Value/ min.: -40 °C (-40 °F) max.: 225 °C (437 °F)	80 °C (176 °F) (After Stall Test)	If the value is "-40 °C (-40 °F)" or "225 °C (437 °F)", ATF temp. sensor circuit is opened or shorted.
SPD (NC)	Counter Gear Speed display: 50 r/min	D Position is warmed up, 3rd; Same as input shaft speed	←

5. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the OBD II scan tool or Hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the method to shorten the labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (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 ON.
- (e) According to the display on tester, perform the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] • Press → button: Shift up • Press ← button: Shift down	Possible to check the operation of the shift solenoid values.
LOCK UP	[Test Details] Control the shift solenoid DSL to set the ATM to the lock-up condition. [Vehicle Condition] Vehicle Speed: 58 km/h (36 mph) or more	Possible to check the DSL operation.
LINE PRESS UP	[Test Details] Operate the shift solenoid SLT and raise the line pressure. [Vehicle Condition] • Vehicle Stopped. • IDL: ON [Others] ON: Line pressure up. OFF: No action (normal operation)	-

6. PROBLEM SYMPTOM CONFIRMATION

- (a) Taking into consideration the results of the customer problem analysis, try to reproduce the symptoms of the trouble. If the problem is that the transaxle does not shift up, shift down, or the shift point is too high or too low conduct the following road test referring to the automatic shift schedule and simulate the problem symptoms.

7. ROAD TEST

NOTICE:

Perform the test at the ATF temperature 50 - 80°C (122 - 176°F) in the normal operation.

- (a) D position test:
Shift into the D position and fully depress the accelerator pedal and check the following points.
 - (1) Check up-shift operation.
Check to see that 1 → 2, 2 → 3, 3 → 4 and 4 → 5th up-shifts take place, and that the shift points conform to the automatic shift schedule (See page 03-38).

HINT:

- 5th Gear Up-shift Prohibition Control (1. Coolant temp. is 55 °C (128 °F) or less. 2. Vehicle speed is 51 km/h (32 mph) or less.)
- 5th Gear Lock-up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60 °C (140 °F) or less.)

- (2) Check for shift shock and slip.
Check for shock and slip at the 1 → 2, 2 → 3, 3 → 4 and 4 → 5th up-shifts.
- (3) Check for abnormal noises and vibration.
Drive in the D position lock-up or 5th gear and check for abnormal noises and vibration.

HINT:

The check for the cause of abnormal noises and vibration must be done very thoroughly as it could also be due to loss of balance in the differential, torque converter clutch, etc.

- (4) Check kick-down operation.
While running in the D position, 2nd, 3rd, 4th and 5th gears, check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2, 4 → 3 and 5th → 4 kick-downs conform to those indicated on the automatic shift schedule (See page 03-38).
- (5) Check abnormal shock and slip at kick-down.
- (6) Check the lock-up mechanism.
 - Drive in D position 5th gear, at a steady speed (lock-up ON).
 - Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, there is no lock-up.

(b) 4 position test:

Shift into the 4 position and fully depress the accelerator pedal and check the following points.

- (1) Check up-shift operation.
Check to see that the 1 → 2, 2 → 3 and 3 → 4 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page 03-38).

HINT:

There is no 5th up-shift in the 4 position.

- (2) Check engine braking.
While driving in the 4 position and 4th gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

(c) 3 position test:

Shift into the 3 position and fully depress the accelerator pedal and check the following points.

- (1) Check up-shift operation.
Check to see that the 1 → 2 and 2 → 3 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page 03-38).
- (2) Check engine braking.
While running in the 3 position and 3rd gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

(d) 2 position test:

Shift into the 2 position and fully depress the accelerator pedal and check the following points.

- (1) Check up-shift operation.
Check to see that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page 03-38).
- (2) Check engine braking.
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

- (e) L position test:
Shift into the L position and fully depress the accelerator pedal and check the following points.
- (1) Check no up-shift.
While running in the L position, check that there is no up-shift to 2nd gear.
 - (2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.
 - (3) Check for abnormal noises during acceleration and deceleration.
- (f) R position test:
Shift into the R position and fully depress the accelerator pedal and check for slipping.

CAUTION:

Before conducting this test ensure that the test area is free from people and obstruction.

- (g) P position test:
Stop the vehicle on a grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.
- (h) Up-grade/down-grade control function test:
- (1) Check that up-shifting to the 4th or higher gear cannot be made on up-grades.
 - (2) When brake is applied on down-grades, check that the gear is automatically down-shifted from the 5th to 4th, or from the 4th to 3rd gears.

8. MECHANICAL SYSTEM TESTS

- (a) Measure the stall speed.
The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- **Do the test at the normal operating fluid temperature of 50 - 80°C (122 - 176°F).**
 - **Do not continuously run this test longer than 5 seconds.**
 - **To ensure safety, conduct this test in a wide, clear and level area which provide good traction.**
 - **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**
- (1) Chock the 4 wheels.
 - (2) Fully apply the parking brake.
 - (3) Keep your left foot pressed firmly on the brake pedal.
 - (4) Start the engine.
 - (5) Shift into the D position. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 2,600 ± 150 rpm

Evaluation:

Problem	Possible cause
(a) Stall speed low in D and R positions	• Engine output may be insufficient • Stator one-way clutch is not operating properly HINT: If more than 600 rpm or below the specified value, the torque converter could be faulty.
(b) Stall speed high in D position	• Line pressure too low • Forward clutch slipping • U/D brake slipping • U/D one-way clutch not operating properly • No. 1 one-way clutch not operating properly

(c) Stall speed high in R position	• Line pressure too low • Reverse clutch slipping • 1st and reverse brake slipping • U/D brake slipping
(d) Stall speed high in D and R positions	• Line pressure too low • Improper fluid level

(b) Measure the time lag.

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the conditions of the U/D direct clutch, forward clutch, and 1st and reverse brake.

NOTICE:

- **Do the test at the normal operating fluid temperature of 50 - 80°C (122 - 176°F).**
- **Be sure to allow 1 minute interval between the tests.**
- **Take 3 measurements and take the average value.**
 - (1) Fully apply the parking brake.
 - (2) Start the engine and check idle speed.
Idle speed: 700 ± 50 rpm (In N position and A/C OFF)
 - (3) Shift the shift lever from the N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.
Measure the time lag of N → R in the same way.

Time lag:**N → D Less than 1.2 seconds****N → R Less than 1.5 seconds****Evaluation (If N → D time or N → R time lag is longer than specified):**

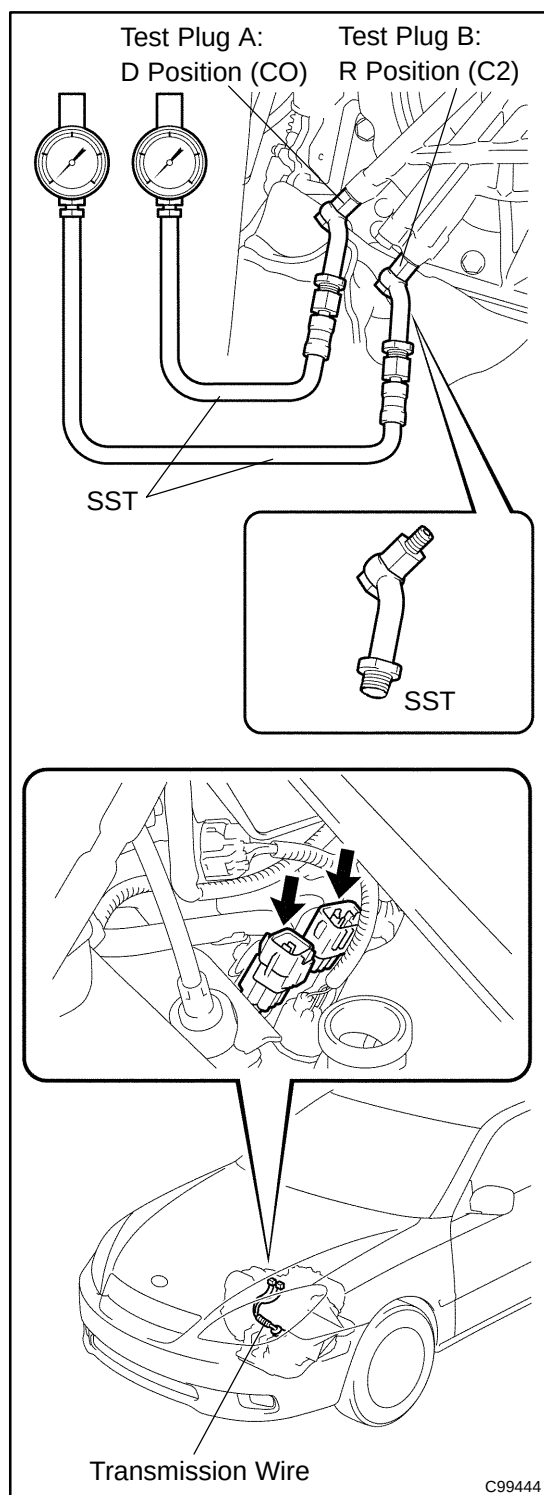
Problem	Possible cause
N → D time lag is longer	• Line pressure too low • Forward clutch worn • No. 1 one-way clutch not operating properly • U/D one-way clutch not operating • U/D brake worn
N → R time lag is longer	• Line pressure too low • Reverse clutch worn • 1st and reverse brake worn • U/D brake worn

9. HYDRAULIC TEST

(a) Measure the line pressure.

NOTICE:

- **Do the test at the normal operation fluid temperature the 50 - 80°C (122 - 176°F)**
- **The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**
- **Be careful to prevent SST's hose from interfering with the exhaust pipe.**
- **This check must be conducted after checking and adjusting engine.**
- **Do under condition that A/C is OFF.**
- **When being stalled, do not continue more than 10 seconds.**



- (1) Warm up the ATF.
- (2) Lift the vehicle up.
- (3) Remove 4 screws and 4 clips, and remove the engine under cover No.1.
- (4) Remove 2 bolts and 2 clips, and remove the front fender apron seal LH.
- (5) Remove 7 clips and remove radiator lower air deflector.
- (6) Remove 2 bolts off and remove the air cleaner inlet No.1.
- (7) Remove a bolt off and remove the air cleaner inlet No.1.

HINT:

Remove air cleaner, take 3 bolts off to raise the air cleaner case, and remove the air cleaner inlet No.1.

NOTICE:

Do not apply excessive force to the resonator.

- (8) Connect OBD II scan tool or hand-held tester to DLC3.
- (9) Remove the test plug A, install the SST and start engine.

SST 09992-00095 (09992- 00231, 09992-00271)

NOTICE:

There is a difference in installation point between D position and R position.

- (10) Using OBD II scan tool or hand-held tester, shift to D position and hold 3rd by active test, and measure the line pressure in idling.

Specified line pressure:

Condition	D position	kPa (kgf/cm ² , psi)
Idling	373 - 402	(3.8 - 4.1, 54 - 58)

- (11) Turn the ignition switch OFF.
- (12) Disconnect 2 connectors of transmission wire.

HINT:

Disconnect the 2 connectors only when performing the D position stall test.

- (13) Start engine.
- (14) Depress the brake pedal strongly, shift to D position, depress the accelerator pedal all the way down and check the line pressure in being stalled.

Specified line pressure:

Condition	D position	kPa (kgf/cm ² , psi)
Stall	931 - 1,030	(9.5 - 10.5, 135 - 149)

- (15) Turn the ignition switch OFF.
- (16) Remove the SST, install the test plug A.
- (17) Remove the test plug B, install the SST and start engine.

SST 09992-00095 (09992- 00231, 09992-00271)

- (18) Connect 2 connectors of transmission wire, depress the brake pedal strongly, shift to R position and check the line pressure in idling and being stalled.

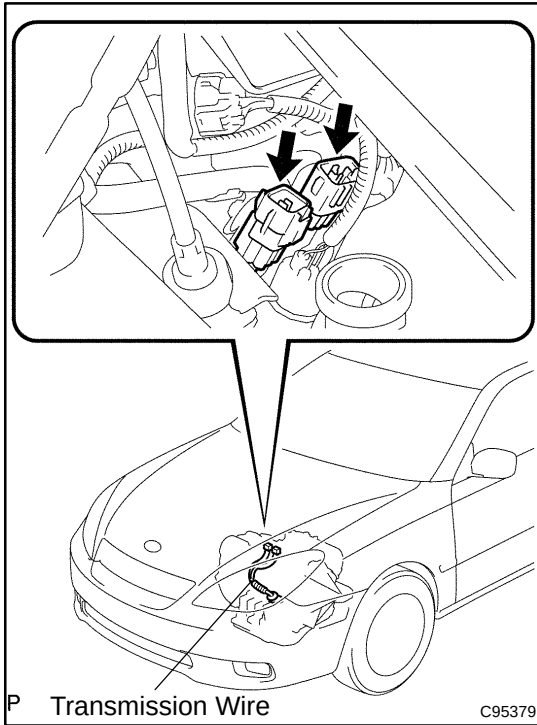
Specified line pressure:

Condition	R position kPa (kgf/cm ² , psi)
Idling	677 - 735 (6.9 - 7.5, 98 - 107)
Stall	1,775 - 1,961 (18.1 - 20.0, 257 - 284)

- (19) Remove the SST, install the test plug B.
(20) Clear the DTC.

Evaluation:

Problem	Possible cause
If the measured values at all position are higher	• Line pressure control solenoid (SLT) defective • Regulator valve defective
If the measured values at all position are lower	• Line pressure control solenoid (SLT) defective • Regulator valve defective • Oil pump defective • U/D direct clutch defective
If pressure is low in the D position only	• D position circuit fluid leak • Forward clutch defective
If pressure is low in the R position only	• R position circuit fluid leak • Reverse clutch defective • 1st and reverse brake defective



10. MANUAL SHIFTING TEST

HINT:

- With this test, it can be determined whether the trouble occurs in the electrical circuit or is a mechanical problem in the transaxle.
 - If any abnormalities are found in the following test, the problem is in the transaxle itself.
- (a) Disconnect 2 connectors of transmission wire.
- (b) Drive with the transmission wire disconnected.
- Shifting the shift lever in the order of L, 2, 3, 4 and D to check whether the shifting condition changes the table below.

Shift Position	Shifting Condition
L ⇔ 2	No Shift (Not Change)
2 ⇔ 3	Down Shift ⇔ Up Shift
3 ⇔ 4 ⇔ D	No Shift (Not Change)

HINT:

When driving with the transmission wire disconnected, the shift lever position is in L or 2, the gear position is held in 3rd and the shift lever position is in 3, 4 or D, the gear position is held in 4th. However, the shift position is in R or P, the operation is same as usual.

- (c) Connect 2 connectors of transmission wire.
- (d) Clear the DTC.

DIAGNOSTIC TROUBLE CODE CHART

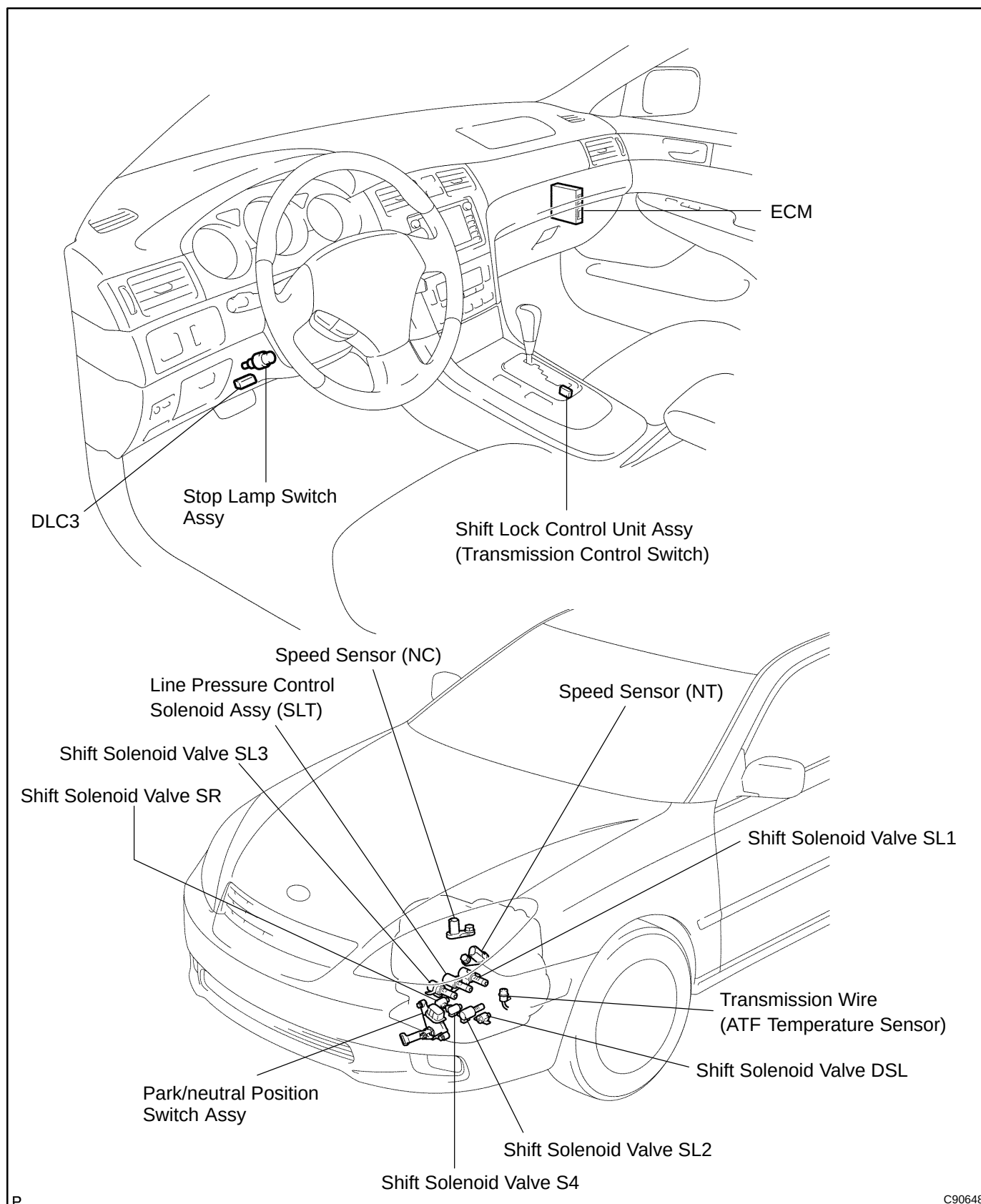
If a DTC is displayed during the DTC check, check the circuit listed in the table below and proceed to the page given.

* : - ... MIL does not light /● ... MIL light up

DTC No. (See Page)	Detection Item	Trouble Area	MIL *	Memory
P0500 (05-114)	Vehicle Speed Sensor Malfunction	- Combination meter - Open or short in vehicle speed sensor circuit - Vehicle speed sensor - Skid control ECU - ECM	●	○
P0710 (05-410)	Transmission Fluid Temp. Sensor Malfunction (ATF Temp. Sensor)	- Open in ATF temp. sensor circuit - ATF temp. sensor - ECM	●	○
P0711 (05-410)	Transmission Fluid Temp. Sensor Rnge/Performance problem	- Open or short in ATF temp. sensor circuit - ATF temp. sensor - ECM	●	○
P0750 (05-413)	Shift Solenoid A Malfunction (Shift Solenoid Valve SL1)	- Shift solenoid valve SL1 is stuck open or closed - Valve body is blocked or stuck - Torque converter clutch - Automatic transaxle	●	○
P0753 (05-420)	Shift Solenoid A Electrical Malfunction (Shift Solenoid Valve SL1)	- Open or short in shift solenoid valve SL1 circuit - Shift solenoid valve SL1 - ECM	●	○
P0755 (05-413)	Shift Solenoid B Malfunction (Shift Solenoid Valve SL2)	- Shift solenoid valve SL2 is stuck open or closed - Valve body is blocked or stuck - Torque converter clutch - Automatic transaxle	●	○
P0758 (05-420)	Shift Solenoid B Malfunction (Shift Solenoid Valve SL2)	- Open or short in shift solenoid valve SL2 circuit - Shift solenoid valve SL2 - ECM	●	○
P0760 (05-413)	Shift Solenoid C Malfunction (Shift Solenoid Valve SL3)	- Shift solenoid valve SL3 is stuck open or closed - Valve body is blocked or stuck - Torque converter clutch - Automatic transaxle	●	○
P0763 (05-420)	Shift Solenoid C Electrical Malfunction (Shift Solenoid Valve SL3)	- Open or short in shift solenoid valve SL3 circuit - Shift solenoid valve SL3 - ECM	●	○
P0765 (05-413)	Shift Solenoid D Malfunction (Shift Solenoid Valve S4)	- Shift solenoid valve S4 is stuck open or closed - Valve body is blocked or stuck - Torque converter clutch - Automatic transaxle	●	○
P0768 (05-420)	Shift Solenoid D Electrical Malfunction (Shift Solenoid Valve S4)	- Open or short in shift solenoid valve S4 circuit - Shift solenoid valve S4 - ECM	●	○
P0770 (05-429)	Shift Solenoid E Malfunction (Shift Solenoid Valve DSL)	- Open or short in shift solenoid valve DSL circuit - Shift solenoid valve DSL - Valve body is blocked or stuck - Lock-up clutch - ECM	●	○
P0773 (05-433)	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve DSL)	- Open or short in shift solenoid valve DSL circuit - Shift solenoid valve DSL - ECM	●	○

P1520 (05-436)	Stop Light Switch Circuit Malfunction	• Open or short in stop light switch circuit • Stop lamp switch assy • ECM	●	○
P1725 (05-438)	NT Revolution Sensor Circuit Malfunction (Input Turbine Speed Sensor)	• Open or short in input turbine speed sensor circuit • Speed sensor (NT) • ECM	●	○
P1730 (05-440)	NC Revolution Sensor Circuit Malfunction (Counter Gear Speed Sensor)	• Open or short in counter gear speed sensor circuit • Speed sensor (NC) • ECM	●	○
P1760 (05-443)	Linear Solenoid for Line Pressure Control Circuit Malfunction (Shift Solenoid Valve SLT)	• Open or short in line pressure control solenoid (SLT) circuit • Line pressure control solenoid (SLT) • ECM	●	○
P1780 (05-447)	Park/Neutral Position Switch Malfunction	• Park/neutral position switch circuit • Park/neutral position switch assy • ECM	●	○
P1815 (05-413)	SR Solenoid Valve Malfunction (Shift Solenoid Valve SR)	• Shift solenoid valve SR is stuck open or closed • Valve body is blocked or stuck	●	○
P1818 (05-420)	SR Solenoid Valve Electrical Malfunction (Shift Solenoid Valve SR)	• Open or short in shift solenoid valve SR circuit • Shift solenoid valve SR • ECM	●	○

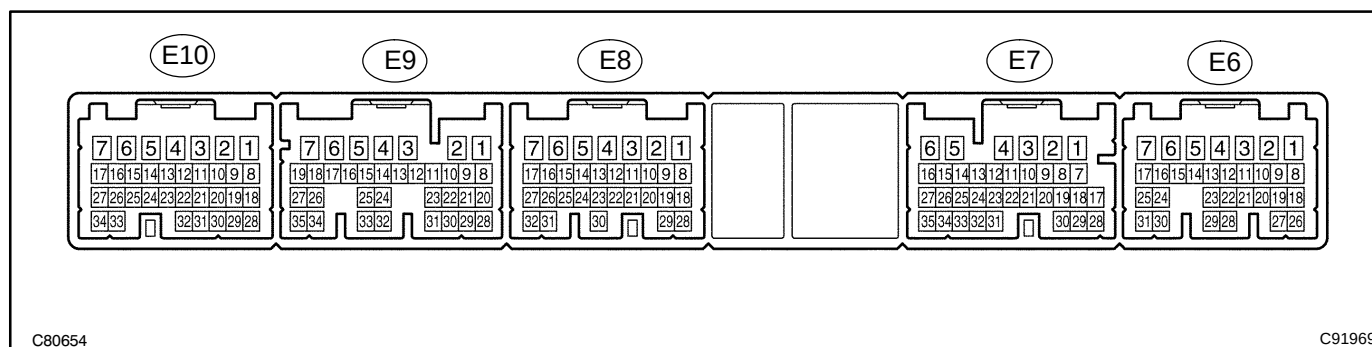
LOCATION



P

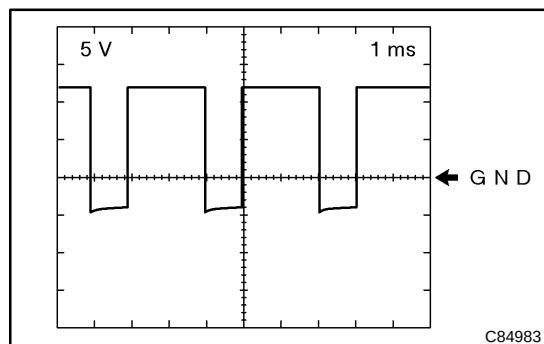
C90648

TERMINALS OF ECM



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
L (E7-8) ⇔ E1 (E8-1)	L-B ⇔ BR	IG switch ON Shift lever L position	10 - 14
		IG switch ON Shift lever other than L position	Below 1
2 (E7-9) ⇔ E1 (E8-1)	Y ⇔ BR	IG switch ON Shift lever 2 and L position	10 - 14
		IG switch ON Shift lever other than 2 and L position	Below 1
D (E7-10) ⇔ E1 (E8-1)	W-L ⇔ BR	IG switch ON Shift lever D and 4 position	10 - 14
		IG switch ON Shift lever other than D and 4 position	Below 1
R (E7-11) ⇔ E1 (E8-1)	R-B ⇔ BR	IG switch ON Shift lever R position	10 - 14
		IG switch ON Shift lever other than R position	Below 1
SPD (E7-17) ⇔ E1 (E8-1)	V-W ⇔ BR	Vehicle speed 20 km/h (12 mph)	Pulse generation 8 reference
3 (E7-20) ⇔ E1 (E8-1)	L-W ⇔ BR	IG switch ON Shift lever 3 position	10 - 14
		IG switch ON Shift lever other than 3 position	Below 1
4 (E7-23) ⇔ E1 (E8-1)	Y-B ⇔ BR	IG switch ON Shift lever 4 position	10 - 14
		IG switch ON Shift lever other than 4 position	Below 1
NSW (E9-8) ⇔ E1 (E8-1)	G-Y ⇔ BR	IG ON and shift lever P or N position	Below 1
		IG ON and shift lever other than P or N position	10 - 14
DSL (E9-11) ⇔ E1 (E8-1)	Y ⇔ BR	Vehicle speed 65 km/h (40 mph), lock-up (ON ⇔ OFF)	Pulse generation 2 reference
SR (E9-12) ⇔ E1 (E8-1)	GR ⇔ BR	IG switch ON	Below 1
		3rd, 4th or 5th gear	10 - 14
		1st or 2nd gear	Below 1
S4 (E9-13) ⇔ E1 (E8-1)	L ⇔ BR	IG switch ON	Below 1
		5th gear	10 - 14
		Except 5th gear	Below 1
SL3+ (E9-15) ⇔ SL3- (E9-14)	G-B ⇔ G-R	Engine idle speed	Pulse generation 3 reference
SL2+ (E9-17) ⇔ SL2- (E9-16)	L-Y ⇔ L-R	Engine idle speed	Pulse generation 4 reference
SL1+ (E9-19) ⇔ SL1- (E9-18)	R-B ⇔ B-W	Engine idle speed	Pulse generation 5 reference
NC+ (E9-26) ⇔ NC- (E9-34)	R ⇔ G	Vehicle speed 30 km/h (19 mph): (3rd gear) Engine speed 1,400 rpm	Pulse generation 6 reference
NT+ (E9-27) ⇔ NT- (E9-35)	L ⇔ LG	Vehicle speed 20 km/h (12 mph)	Pulse generation 7 reference

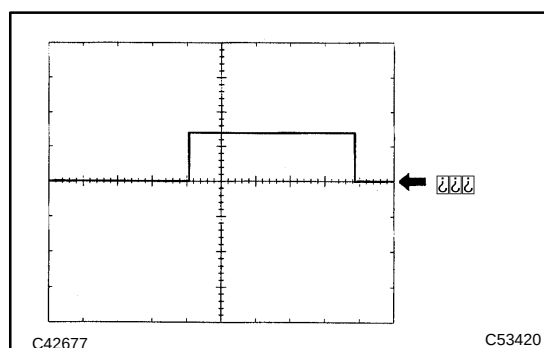
SLT+ (E10-17) ⇔ SLT- (E10-16)	Y-R ⇔ Y-B	Engine idle speed	Pulse generation 1 reference
THO (E10-30) ⇔ E2 (E10-28)	G ⇔ BR	ATF temperature: 115 °C (239 °F) or more	Below 1.5



Pulse generation 1

Reference:

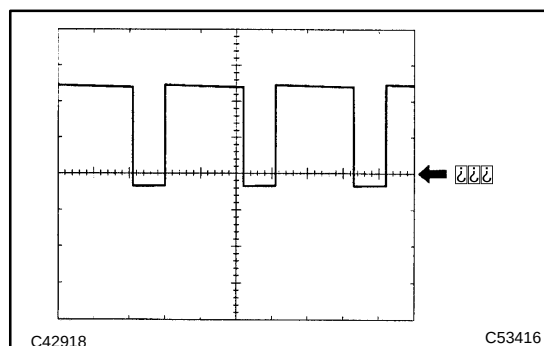
Irem	Condition
Terminal	SLT+ - SLT-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 2

Reference:

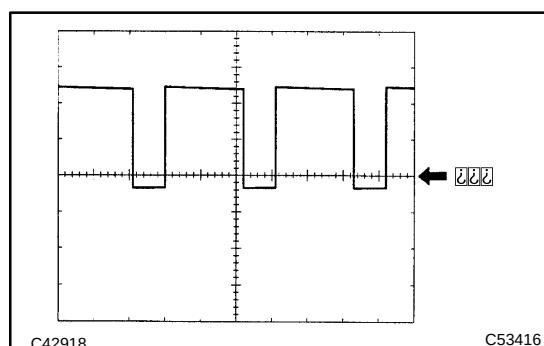
Irem	Condition
Terminal	DSL - E1
Tool setting	10V/DIV, 100ms/DIV
Vehicle condition	Vehicle speed 65 km/h (40 mph), lock-up (ON ⇔ OFF)



Pulse generation 3

Reference:

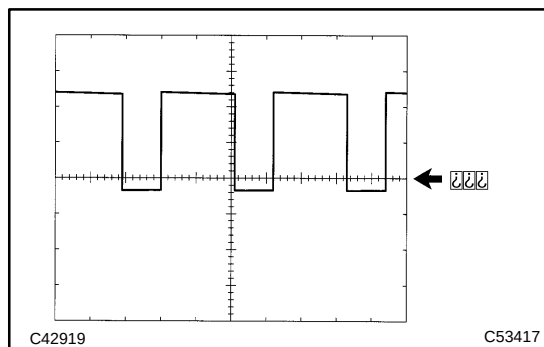
Irem	Condition
Terminal	SL3+ - SL3-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 4

Reference:

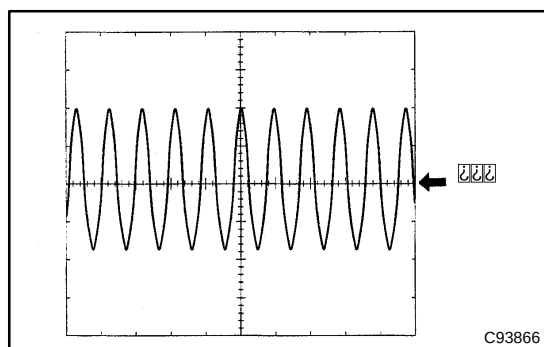
Irem	Condition
Terminal	SL2+ - SL2-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 5

Reference:

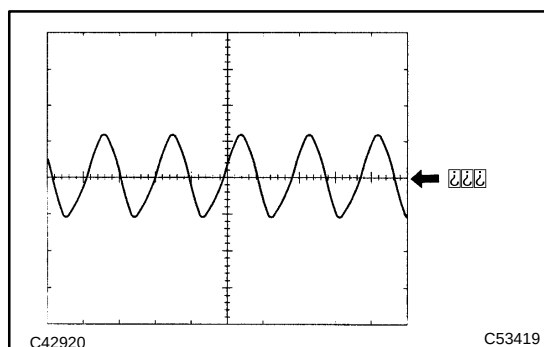
Irem	Condition
Terminal	SL1+ - SL1-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 6

Reference:

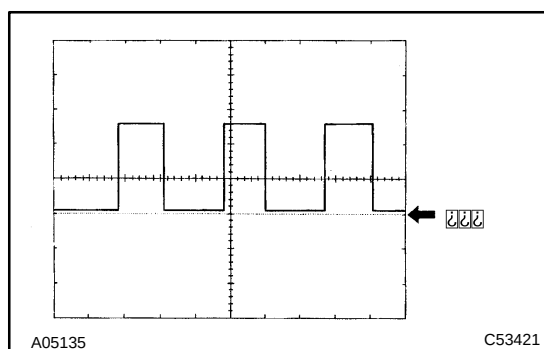
Irem	Condition
Terminal	NC+ - NC-
Tool setting	1V/DIV, 1ms/DIV
Vehicle condition	Vehicle speed 30 km/h (19 mph): (3rd gear) Engine speed 1,400 rpm



Pulse generation 7

Reference:

Irem	Condition
Terminal	NT+ - NT-
Tool setting	5V/DIV, 0.5ms/DIV
Vehicle condition	Vehicle speed 20 km/h (12 mph)



Pulse generation 8

Reference:

Irem	Condition
Terminal	SPD - E1
Tool setting	5V/DIV, 20ms/DIV
Vehicle condition	Vehicle speed 20 km/h (12 mph)

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the diagnostic trouble code check although the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

- If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart of each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still occurs even though there are no abnormalities in any of the other circuits, check and replace the ECM.

1. Chapter 1: Electronic Circuit Matrix Chart

Symptom	Suspect Area	See page
No down-shift (A particular gear, from 1st to 4th gear, is not up-shifted)	1. Shift solenoid valve (SL1, SL2, SL3, SR) circuit 2. ECM	05-420 01-31
No down-shift (5th → 4th)	1. Transmission control switch circuit 2. Shift solenoid valve (S4) circuit 3. ECM	05-450 05-420 01-31
No up-shift (A particular gear, from 1st to 4th gear, is not up-shifted)	1. Shift solenoid valve (SL1, SL2) circuit 2. ECM	05-420 01-31
No up-shift (4th → 5th)	1. Transmission control switch circuit 2. Shift solenoid valve (S4) circuit 3. ECM	05-450 05-420 01-31
No lock-up	1. Shift solenoid valve (DSL) circuit 2. ECM	05-433 01-31
No lock-up off	1. Shift solenoid valve (DSL) circuit 2. ECM	05-433 01-31
Shift point too high or too low	1. Throttle position sensor circuit 2. Shift solenoid valve (SLT) circuit 3. ECM	05-18 05-443 01-31
Up-shift to 5th from 4th while shift lever is 4 position	1. Transmission control switch circuit 2. ECM	05-450 01-31
Up-shift to 5th from 4th while engine is cold	1. Engine coolant temp. sensor circuit 2. ECM	05-18 01-31
Up-shift to 4th from 3rd while shift lever is 3 position	1. Park/neutral position switch circuit 2. ECM	05-450 01-31
Up-shift to 3rd from 2nd while shift lever is 2 position	1. Park/neutral position switch circuit 2. ECM	05-450 01-31
Up-shift to 2nd from 1st while shift lever is L position	1. Transmission control switch circuit 2. ECM	05-450 01-31
Harsh engagement (N → D)	1. Shift solenoid valve (SL1) circuit 2. ECM	05-420 01-31
Harsh engagement (Lock-up)	1. Shift solenoid valve (SL2) circuit 2. ECM	05-420 01-31
Harsh engagement (Any driving position)	1. Shift solenoid valve (SLT) circuit 2. ECM	05-443 01-31
Poor acceleration	1. Shift solenoid valve (SLT) circuit 2. ECM	05-443 01-31
No kick-down	ECM	01-31
Engine stalls when starting off or stopping	1. Shift solenoid valve (DSL) circuit 2. ECM	05-433 01-31

2. Chapter 2: On-Vehicle Repair

(★: U150E AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM913U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse positions	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
Vehicle does not move in R position	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No up-shift (1st → 2nd)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No up-shift (2nd → 3rd)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No up-shift (3rd → 4th)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No up-shift (4th → 5th)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No down-shift (5th → 4th)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No down-shift (4th → 3rd)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No down-shift (3rd → 2nd)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No down-shift (2nd → 1st)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
No lock-up or No lock-up off	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
Harsh engagement (N → D)	1. Valve body Assy 2. C ₁ accumulator 3. Off-vehicle repair matrix chart	40-23 ★ -
Harsh engagement (Lock-up)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
Harsh engagement (N → R)	1. Valve body Assy 2. C ₂ accumulator 3. Off-vehicle repair matrix chart	40-23 ★ -
Harsh engagement (1st → 2nd → 3rd → 4th → 5th)	Valve body Assy	40-23
Harsh engagement (1st → 2nd)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
Harsh engagement (2nd → 3rd)	1. Valve body Assy 2. C ₀ accumulator 3. Off-vehicle repair matrix chart	40-23 ★ -
Harsh engagement (3rd → 4th)	1. Valve body Assy 2. Off-vehicle repair matrix chart	40-23 -
Harsh engagement (4th → 5th)	1. Valve body Assy 2. C ₃ accumulator 3. Off-vehicle repair matrix chart	40-23 ★ -
Harsh engagement (5th → 4th)	1. Valve body Assy 3. B ₃ accumulator 4. Off-vehicle repair matrix chart	40-23 ★ -
Slip or shudder (Forward and reverse)	1. Valve body Assy 2. Oil strainer 3. Off-vehicle repair matrix chart	40-23 40-23 -

No engine braking (1st: L position)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-23 -
No engine braking (2nd: 2 position)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-23 -
No kick-down	Valve body assy	40-23

3. Chapter 3: Off-Vehicle Repair (★: U150E AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM913U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse positions	1. U/D brake (B ₃) 2. Torque converter clutch	★ 40-16
Vehicle does not move in R position	1. Reverse clutch (C ₂) 2. 1st & reverse brake (B ₂)	★ ★
No up-shift (1st → 2nd)	2nd & O/D brake (B ₁)	★
No up-shift (2nd → 3rd)	Direct and O/D clutch (C ₀)	★
No up-shift (3rd → 4th)	2nd & O/D brake (B ₁)	★
No up-shift (4th → 5th)	U/D clutch (C ₃)	★
No lock-up or No lock-up off	Torque converter clutch	40-16
Harsh engagement (N → D)	1. Forward clutch (C ₁) 2. One-way clutch No.1 (F ₁) 3. U/D one-way clutch (F ₂)	★ ★ ★
Harsh engagement (N → R)	1. Reverse clutch (C ₂) 2. 1st & reverse brake (B ₂)	★ ★
Harsh engagement (1 → 2)	2nd & O/D brake (B ₁)	★
Harsh engagement (2 → 3)	Direct and O/D clutch (C ₀)	★
Harsh engagement (3 → 4)	2nd & O/D brake (B ₁)	★
Harsh engagement (4 → 5th)	U/D clutch (C ₃)	★
Harsh engagement (Lock-up)	Torque converter clutch	40-16
Slip or shudder (Forward and reverse: After warm-up)	1. Direct and O/D clutch (C ₀) 2. Forward clutch (C ₁) 3. U/D clutch (C ₃) 4. 2nd & O/D brake (B ₁) 5. U/D brake (B ₃) 6. One-way clutch No.1 (F ₁) 7. U/D one-way clutch (F ₂) 8. Torque converter clutch	★ ★ ★ ★ ★ ★ ★ ★ 40-16
Slip or shudder (Particular position: Just after engine starts)	Torque converter clutch	40-16
Slip or shudder (R position)	1. Reverse clutch (C ₂) 2. 1st & reverse brake (B ₂)	★ ★
Slip or shudder (1st)	1. Forward clutch (C ₁) 2. One-way clutch No.1 (F ₁) 3. U/D one-way clutch (F ₂)	★ ★
Slip or shudder (2nd)	2nd & O/D brake (B ₁)	★
Slip or shudder (3rd)	Direct and O/D clutch (C ₀)	★
Slip or shudder (4th)	2nd & O/D brake (B ₁)	★
Slip or shudder (5th)	U/D clutch (C ₃)	★
No engine braking (1st – 4th: D position)	U/D brake (B ₃)	★
No engine braking (1st: L position)	1st & reverse brake (B ₂)	★
No engine braking (2nd: 2 position)	2nd & O/D brake (B ₁)	★
No engine braking (3rd: 3 position)	U/D brake (B ₃)	★
Poor acceleration (All positions)	Torque converter clutch	40-16
Poor acceleration (5th)	1. U/D clutch (C ₃) 2. U/D planetary gear unit	★ ★
Engine stalls when starting off or stopping	Torque converter clutch	40-16

DTC	P0710	TRANSMISSION FLUID TEMP. SENSOR MALFUNCTION
------------	--------------	--

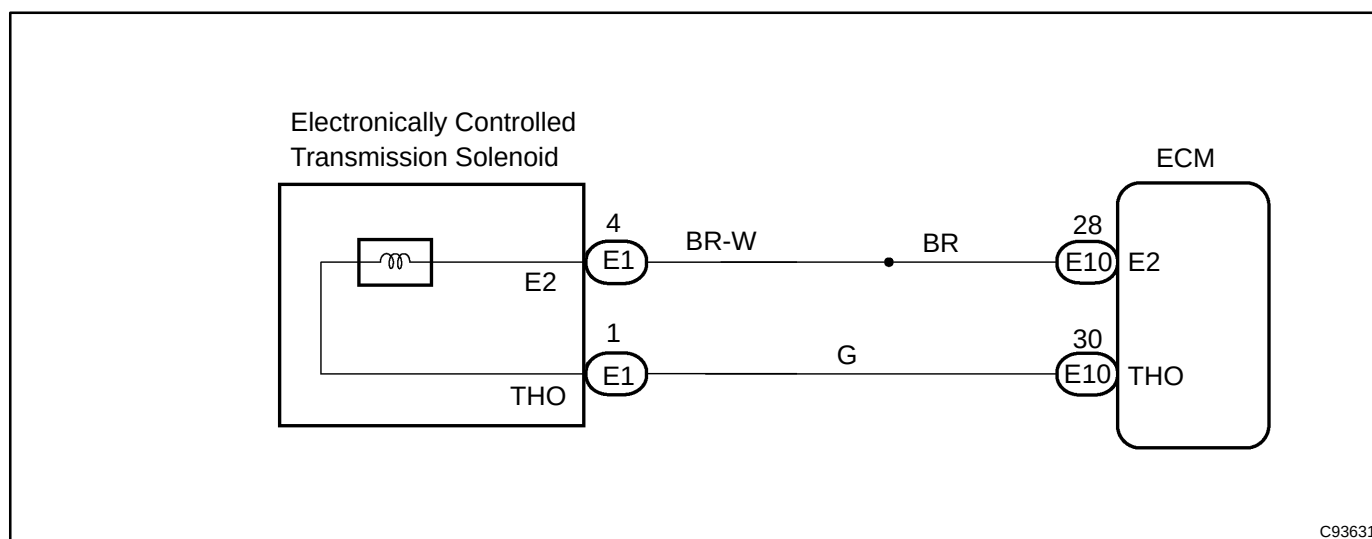
DTC	P0711	TRANSMISSION FLUID TEMP. CIRCUIT RANGE/PERFORMANCE PROBLEM
------------	--------------	---

CIRCUIT DESCRIPTION

The ATF temperature sensor converts the fluid temperature into a resistance value which is input into the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0710	Either (a) or (b) is detected for 0.5 sec. or more: (1 trip detection logic) (c) Temp. sensor resistance is less than 79 Ω (d) After engine has been operating for 15 min. or more, resistance at temp. sensor is more than 156 k Ω	• Open or short in ATF temp. sensor circuit • ATF temp. sensor • ECM
P0711	Both (a) and (b) are detected: (2 trip detection logic) (a) After 12 sec. of engine start, temp. of atmosphere and that of engine coolant is more than -10°C (b) After normal driving for over 20 min. and 10 km, ATF temp. is less than 10°C	• Open in ATF temp. sensor circuit • ATF temp. sensor • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF OBD II SCAN TOOL OR HAND-HELD TESTER(THO)

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "AT FLUID TEMP" in the DATALIST and read its value displayed on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

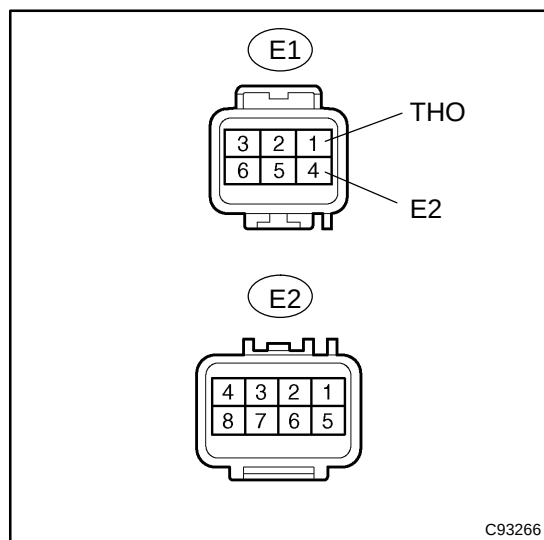
Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
AT FLUID TEMP	ATF Temp. Sensor Value/ min.: -40 °C (-40 °F) max.: 225 °C (437 °F)	80 °C (176 °F) (After Stall Test)	If the value is "-40 °C (-40 °F)" or "225 °C (437 °F)", ATF temp. sensor circuit is opened or shorted.

OK

CHECK AND REPLACE ECM(See page 01-31)

NG

2 INSPECT TRANSMISSION WIRE(ATF TEMPERATURE SENSOR)



- Disconnect the transmission wire connector (E1) from the transaxle.
- Measure the resistance between terminals THO and E2.

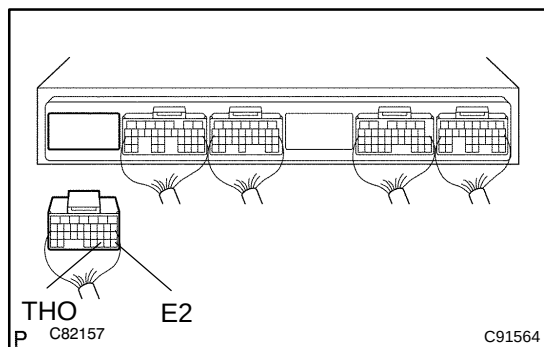
OK:

Temperature: °C (°F)	Resistance: kΩ
10 (50)	6.4
110 (230)	0.2

NG

REPAIR OR REPLACE TRANSMISSION WIRE(See page 40-20)

OK

3 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)

- (a) Connect the transmission wire connector (E1) from the transaxle.
- (b) Disconnect the ECM connector.
- (c) Measure resistance between terminals THO and E2.

OK:

Temperature: °C (°F)	Resistance: kΩ
10 (50)	6.4
110 (230)	0.2

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR(See page 01-31)****OK****CHECK AND REPLACE ECM(See page 01-31)**

DTC	P0750	SHIFT SOLENOID A MALFUNCTION
------------	--------------	-------------------------------------

DTC	P0755	SHIFT SOLENOID B MALFUNCTION
------------	--------------	-------------------------------------

DTC	P0760	SHIFT SOLENOID C MALFUNCTION
------------	--------------	-------------------------------------

DTC	P0765	SHIFT SOLENOID D MALFUNCTION
------------	--------------	-------------------------------------

DTC	P1815	SR SOLENOID VALVE MALFUNCTION
------------	--------------	--------------------------------------

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical troubles of the shift solenoid valves and valve body.

DTC No.	DTC Detection Condition	Trouble Area
P0750 P0755 P0760 P0765 P1815	During normal driving, gear required by ECM does not match the actual gear (2 trip detection logic)	• Shift solenoid valve SL1, SL2, SL3, S4 or SR is stuck open or closed • Valve body is blocked or stuck • Torque converter clutch • Automatic transaxle

HINT:

- Start the inspection from step 1 when DTC P0750 is output.
- Start the inspection from step 1 when DTC P0755 is output.
- Start the inspection from step 1 when DTC P0760 is output.
- Start the inspection from step 2 when DTC P0765 is output.
- Start the inspection from step 2 when DTC P1815 is output.

INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER

- (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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- (e) Select the item "SHIFT" in the ACTIVE TEST and operate the shift solenoid valves on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] • Press → button: Shift up • Press ← button: Shift down	Possible to check the operation of the shift solenoid values.

A	NG (SL1)
B	NG (SL2)
C	NG (SL3)

NG(A) Go to step 3

NG(B) Go to step 4

NG(C) Go to step 5

OK

CHECK AND REPLACE ECM(See page 01-31)

2 PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "SHIFT" in the ACTIVE TEST and operate the shift solenoid valves on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] • Press → button: Shift up • Press ← button: Shift down	Possible to check the operation of the shift solenoid valves.

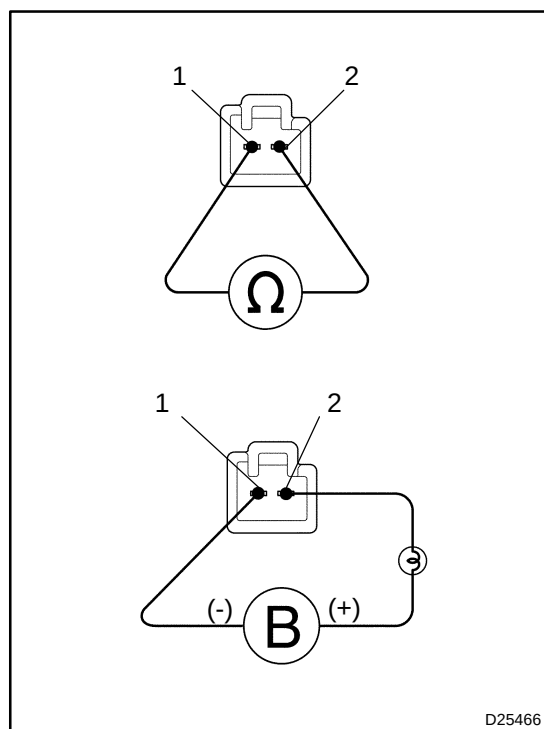
A	NG (S4)
B	NG (SR)

NG(A) Go to step 6

NG(B) Go to step 7

OK

CHECK AND REPLACE ECM(See page 01-31)

3 INSPECT SHIFT SOLENOID VALVE SL1

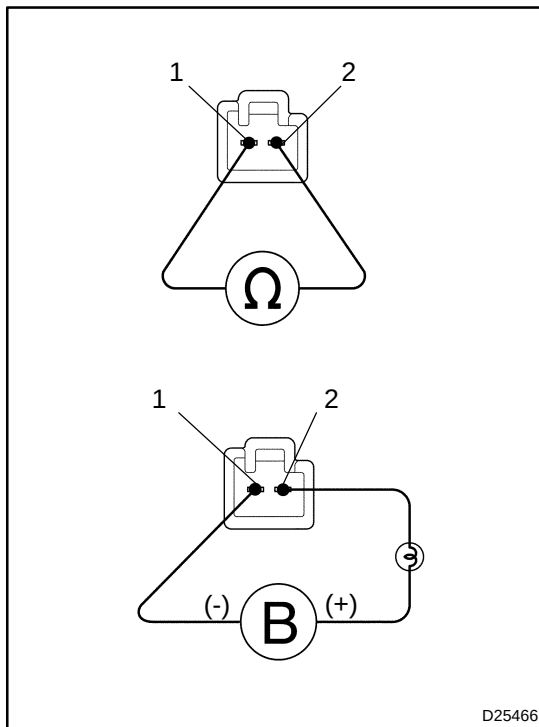
- (a) Remove the shift solenoid valve SL1.
 (b) Measure the resistance between terminals.

OK:**Resistance: 5.0 - 5.6 Ω at 20°C (68°F)**

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:**The solenoid makes an operating noise.****OK****Go to step 8****NG****REPLACE SHIFT SOLENOID VALVE SL1**

4 INSPECT SHIFT SOLENOID VALVE SL2



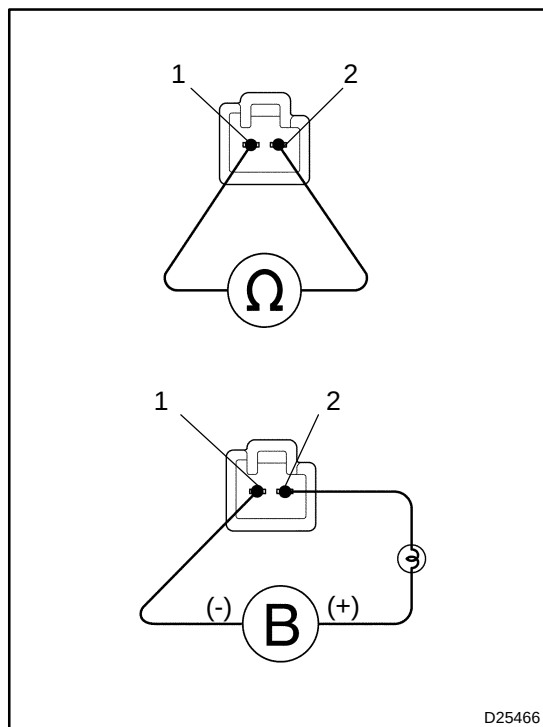
- (a) Remove the shift solenoid valve SL2.
- (b) Measure the resistance between terminals.
OK:
Resistance: 5.0 - 5.6 Ω at 20°C (68°F)
- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.
OK:
The solenoid makes an operating noise.

OK

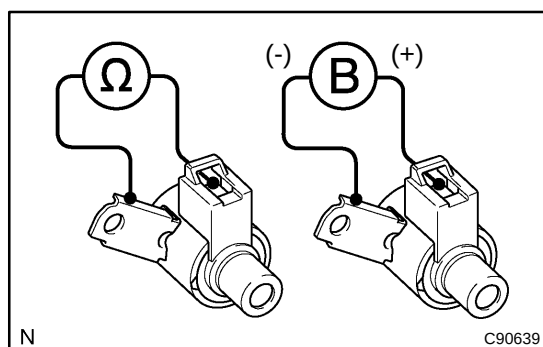
Go to step 8

NG

REPLACE SHIFT SOLENOID VALVE SL2

5 INSPECT SHIFT SOLENOID VALVE SL3

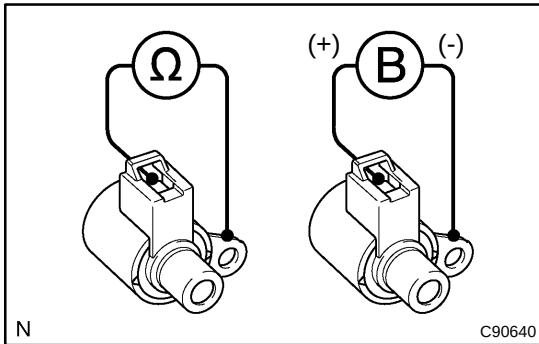
- (a) Remove the shift solenoid valve SL3.
- (b) Measure the resistance between terminals.
OK:
Resistance: 5.0 - 5.6 Ω at 20°C (68°F)
- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.
OK:
The solenoid makes an operating noise.

OK**Go to step 8****NG****REPLACE SHIFT SOLENOID VALVE SL3****6 INSPECT SHIFT SOLENOID VALVE S4**

- (a) Remove the shift solenoid valve S4.
- (b) Measure the resistance between the solenoid connector and the solenoid body.
OK:
Resistance: 11 - 15 Ω at 20°C (68°F)
- (c) Connector positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.
OK:
The solenoid makes an operating noise.

OK**Go to step 8****NG****REPLACE SHIFT SOLENOID VALVE S4**

7 INSPECT SHIFT SOLENOID VALVE SR



- (a) Remove the shift solenoid valve SR.
- (b) Measure the resistance between the solenoid connector and the solenoid body.

OK:

Resistance: 11 - 15 Ω at 20°C (68°F)

- (c) Connector positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating noise.

OK

Go to step 8

NG

REPLACE SHIFT SOLENOID VALVE SR

8 INSPECT TRANSMISSION VALVE BODY ASSY

NG

REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY(See page 40-23)

OK

9 INSPECT TORQUE CONVERTER CLUTCH ASSY(See page 40-16)

NG

REPLACE TORQUE CONVERTER CLUTCH ASSY

OK

REPAIR AUTOMATIC TRANSAXLE ASSY(See page 40-8)

DTC	P0753	SHIFT SOLENOID A ELECTRICAL MALFUNCTION
DTC	P0758	SHIFT SOLENOID B ELECTRICAL MALFUNCTION
DTC	P0763	SHIFT SOLENOID C ELECTRICAL MALFUNCTION
DTC	P0768	SHIFT SOLENOID D ELECTRICAL MALFUNCTION
DTC	P1818	SR SOLENOID VALVE ELECTRICAL MALFUNCTION

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with ON and OFF operation of the shift solenoid valves SL1, SL2, SL3, S4 and SR which is controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detection Condition	Trouble Area
P0753 P0758 P0763	ECM checks for an open or short circuit in shift solenoid valves SL1, SL2 and SL3: (a) When solenoid is energized, duty ratio exceed 75 % (b) When solenoid is not energized, duty ratio is less than 3 %	
P0768 P1818	ECM checks for an open or short circuit in shift solenoid valves S4 and SR circuit when it changes ECM records DTC P0768 and P1818 if condition (a) or (b) is detected: (a) When solenoid is energized, solenoid resistance is 8 Ω or less and it is counted (b) When solenoid is not energized, solenoid resistance is 100 kΩ or more and it is counted	• Open or short in shift solenoid valve SL1, SL2, SL3, S4 or SR circuit • Shift solenoid valve SL1, SL2, SL3, S4 or SR • ECM

HINT:

Check the shift solenoid valve SL1 when DTC P0753 is output, check the shift solenoid valve SL2 when DTC P0758 is output, check the shift solenoid valve SL3 when DTC P0763 is output, check the shift solenoid valve S4 when DTC P0768 is output and check the shift solenoid valve SR when DTC P1818 is output.

Fail safe function:

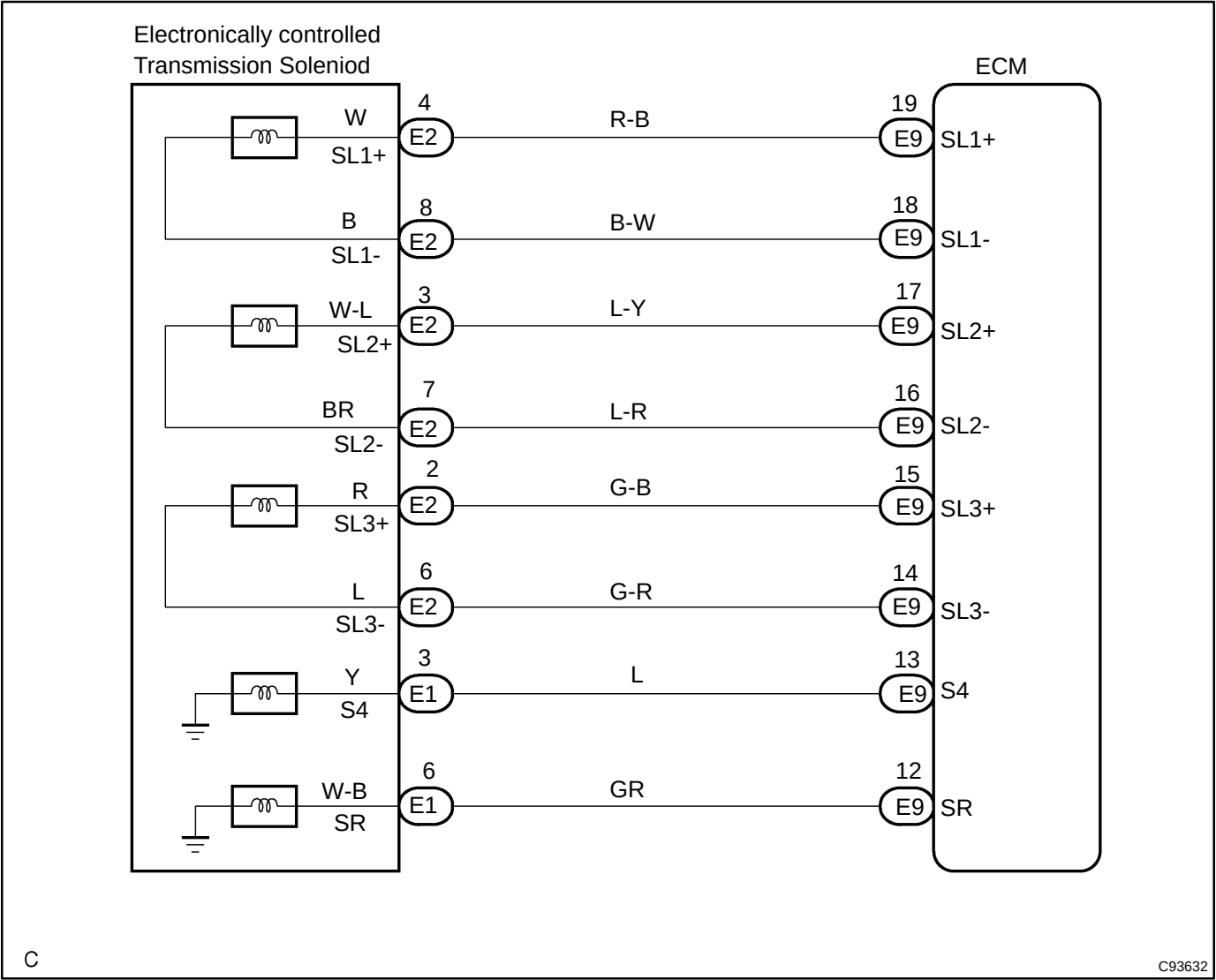
If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF in order to shift into the gear positions shown in the table below.

Manual shifting as shown in the following table must be done (In case of a short circuit, the ECM stops sending the current to the short circuit solenoid).

○ : ON △ : Lock-up ON × : OFF

Normal	Solenoid Valve	SL1	○	×	○	×	×
		SL2	○	○	△	△	△
		SL3	×	×	×	○	○
		S4	×	×	×	×	○
	Gear Position		1st	2nd	3rd	4th	5th
SL1 Malfunction (During driving at 1st or 2nd)	Solenoid Valve	SL1	×				
		SL2	○	○	△→○	△→○	△→○
		SL3	×	×	×	○→×	○→×
		S4	×	×	×	×	○→×
	Gear Position		1st → 2nd	2nd	3rd → 2nd	4th → 2nd	5th → 2nd
SL1 Malfunction (During driving at 3rd)	Solenoid Valve	SL1	×				
		SL2	○→△	○→△	△	△	△
		SL3	×	×	×	○→×	○→×
		S4	×	×	×	×	○
	Gear Position		1st → 4th	2nd → 4th	3rd → 4th	4th	5th → 4th
SL1 Malfunction (During driving at 4th or 5th)	Solenoid Valve	SL1	×				
		SL2	○→△	○→△	△	△	△
		SL3	×	×	×	○	○
		S4	×	×	×	×	○
	Gear Position		1st → 4th	2nd → 4th	3rd → 4th	4th	5th → 4th
SL2 Malfunction	Solenoid Valve	SL1	○	×	○	×	×
		SL2	×				
		SL3	×	×	×	○→×	○→×
		S4	×	×	×	×	○
	Gear Position		1st → 4th	2nd → 4th	3rd → 4th	4th	5th → 4th
SL3 Malfunction	Solenoid Valve	SL1	○	×	○	×	×
		SL2	○	○	△	△	△
		SL3	×				
		S4	×	×	×	×	○
	Gear Position		1st	2nd	3rd	4th	5th → 4th
SL4 Malfunction	Solenoid Valve	SL1	○	×	○	×	×
		SL2	○	○	△	△	△
		SL3	×	×	×	○	○
		S4	×				
	Gear Position		1st	2nd	3rd	4th	5th → 4th
SL1, SL2, SL3, and S4 Malfunction	Solenoid Valve	SL1	×				
		SL2	×				
		SL3	×				
		S4	×				
	Gear Position		1st → 4th	2nd → 4th	3rd → 4th	4th	5th → 4th

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "SHIFT" in the ACTIVE TEST and operate the shift solenoid valves on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

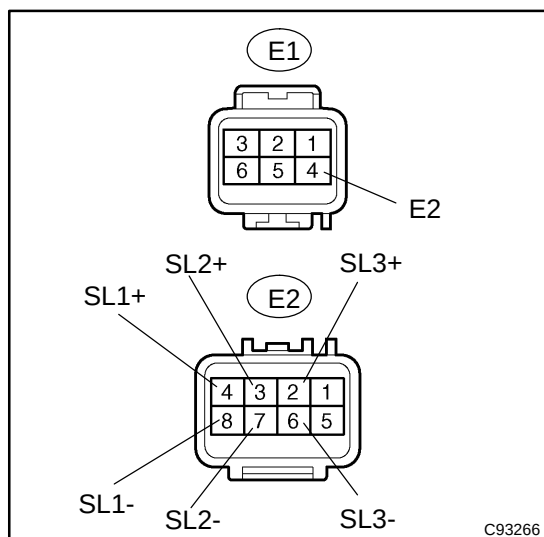
Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] - Press → button: Shift up - Press ← button: Shift down	Possible to check the operation of the shift solenoid values.

OK

CHECK AND REPLACE ECM(See age 01-31)

NG

2 INSPECT TRANSMISSION WIRE(SL1/SL2/SL3)



- Disconnect the 2 transmission wire connectors from the transaxle.
- Measure the resistance between terminals SL1+ and SL1-.

OK:

Resistance: 5.0 - 5.6 Ω at 20 °C (68 °F)

NG(A)

Go to step 5

- Measure the resistance between terminals SL2+ and SL2-.

OK:

Resistance: 5.0 - 5.6 Ω at 20 °C (68 °F)

NG(B)

Go to step 6

- Measure the resistance between terminals SL3+ and SL3-.

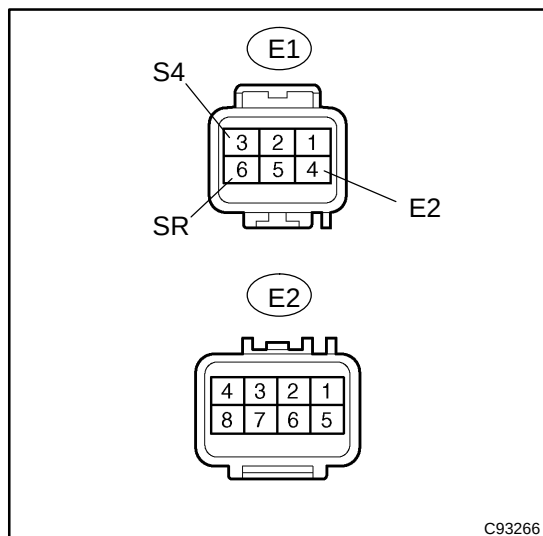
OK:

Resistance: 5.0 - 5.6 Ω at 20 °C (68 °F)

NG(C)

Go to step 7

OK

3 INSPECT TRANSMISSION WIRE(S4/SR)

- (a) Measure resistance between terminal S4 and body ground.

OK:

Resistance: 11 - 15 Ω at 20 °C (68 °F)

NG(A) Go to step 8

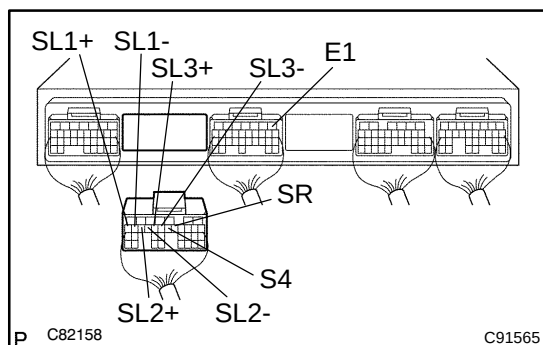
- (b) Measure resistance between terminal SR and body ground.

OK:

Resistance: 11 - 15 Ω at 20 °C (68 °F)

NG(B) Go to step 9

OK

4 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE-ECM)

- (a) Connect the 2 transmission connectors to the transaxle.
(b) Disconnect the connector from the ECM.
(c) Measure the resistance between terminals.

OK:

Resistance:

SL1+ - SL1-: 5.0 - 5.6 Ω at 20 °C (68 °F)

SL2+ - SL2-: 5.0 - 5.6 Ω at 20 °C (68 °F)

SL3+ - SL3-: 5.0 - 5.6 Ω at 20 °C (68 °F)

S4 - E1: 11 - 15 Ω at 20 °C (68 °F)

SR - E1: 11 - 15 Ω at 20 °C (68 °F)

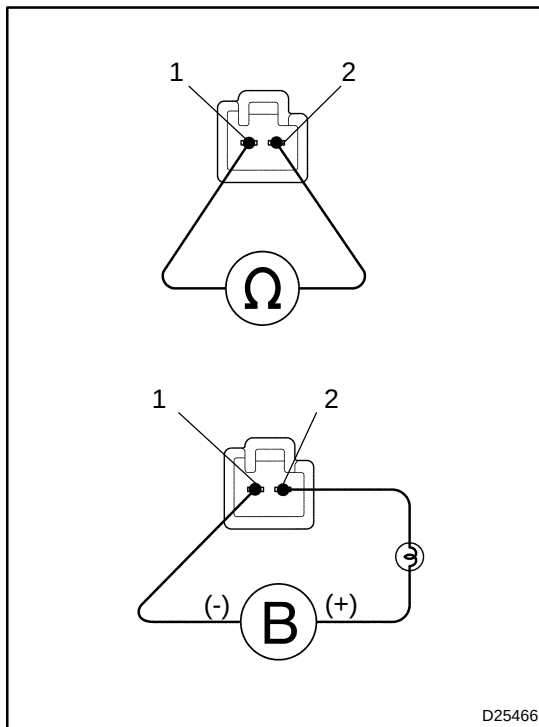
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)

OK

CHECK AND REPLACE ECM(See page 01-31)

5 INSPECT SHIFT SOLENOID VALVE SL1



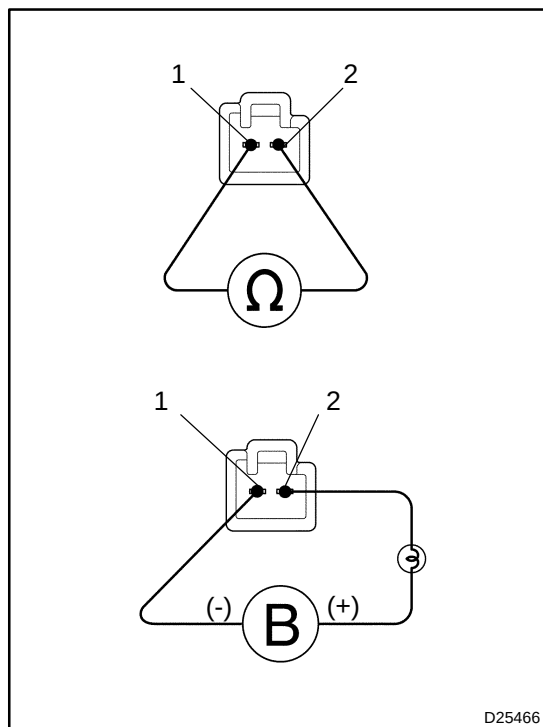
- (a) Remove the shift solenoid valve SL1.
- (b) Measure the resistance between terminals.
OK:
Resistance: 5.0 - 5.6 Ω at 20°C (68°F)
- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.
OK:
The solenoid makes an operating noise.

NG

REPLACE SHIFT SOLENOID VALVE SL1

OK

REPAIR OR REPLACE TRANSMISSION WIRE(See page [01-31](#))

6 INSPECT SHIFT SOLENOID VALVE SL2

- (a) Remove the shift solenoid valve SL2.
 (b) Measure the resistance between terminals.

OK:

Resistance: 5.0 - 5.6 Ω at 20°C (68°F)

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating noise.

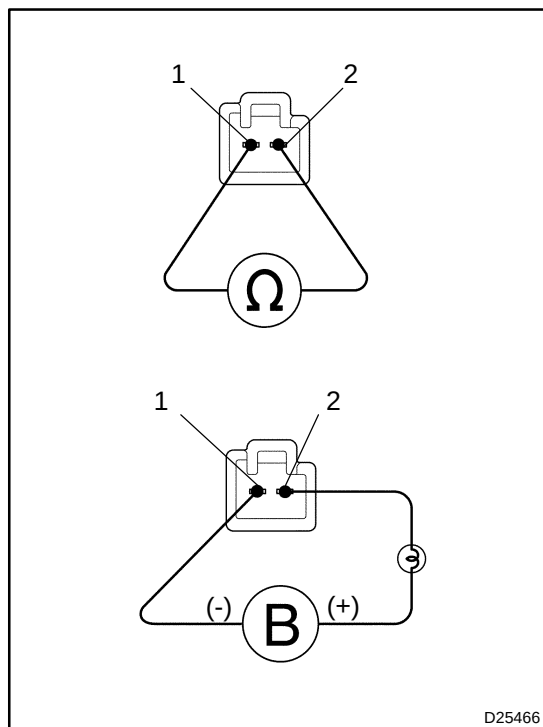
NG

REPLACE SHIFT SOLENOID VALVE SL2

OK

REPAIR OR REPLACE TRANSMISSION WIRE(See page [01-31](#))

7 INSPECT SHIFT SOLENOID VALVE SL3



- Remove the shift solenoid valve SL3.
- Measure the resistance between terminals.
OK:
Resistance: 5.0 - 5.6 Ω at 20°C (68°F)
- Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.
OK:
The solenoid makes an operating noise.

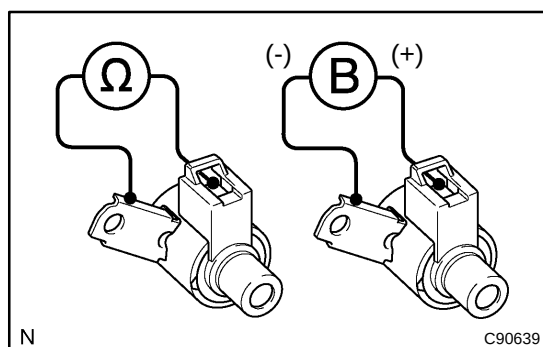
NG

REPLACE SHIFT SOLENOID VALVE SL3

OK

REPAIR OR REPLACE TRANSMISSION WIRE(See page 01-31)

8 INSPECT SHIFT SOLENOID VALVE S4



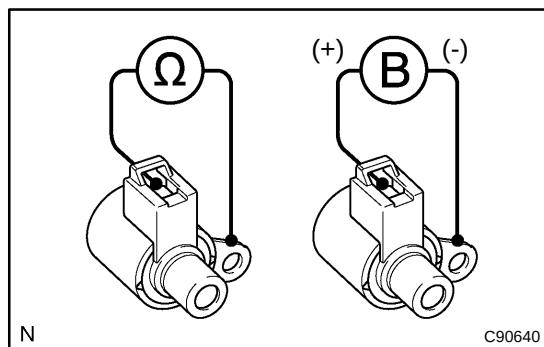
- Remove the shift solenoid valve S4.
- Measure the resistance between the solenoid connector and the solenoid body.
OK:
Resistance: 11 - 15 Ω at 20°C (68°F)
- Connector positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.
OK:
The solenoid makes an operating noise.

NG

REPLACE SHIFT SOLENOID VALVE S4

OK

REPAIR OR REPLACE TRANSMISSION WIRE(See page 01-31)

9 INSPECT SHIFT SOLENOID VALVE SR

- (a) Remove the shift solenoid valve SR.
- (b) Measure the resistance between the solenoid connector and the solenoid body.

OK:**Resistance: 11 - 15 Ω at 20°C (68°F)**

- (c) Connector positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:**The solenoid makes an operating noise.****NG****REPLACE SHIFT SOLENOID VALVE SR****OK****REPAIR OR REPLACE TRANSMISSION WIRE(See page [01-31](#))**

DTC	P0770	SHIFT SOLENOID E MALFUNCTION
------------	--------------	-------------------------------------

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, Air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect a mechanical trouble of the shift solenoid valve DSL, valve body and torque converter clutch.

DTC No.	DTC Detection Condition	Trouble Area
P0770	Lock-up does not occur when driving in lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in lock-up OFF range (2 trip detection logic)	• Open or short in shift solenoid valve DSL circuit • Shift solenoid valve DSL • Valve body blocked or stuck • Lock-up clutch • ECM

INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER
----------	--

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "LOCK UP" in the ACTIVE TEST and operate the Lock-up solenoid valves on the OBD II scan tool or Hand-held tester.

NOTICE:

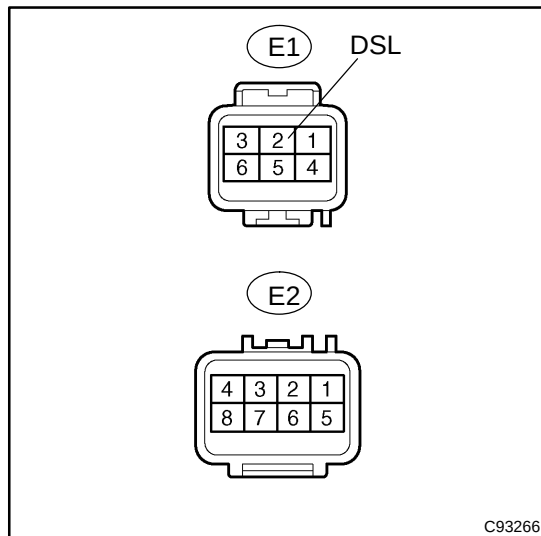
The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

Item	Test Details	Diagnostic Note
LOCK UP	[Test Details] Control the shift solenoid DSL to set the ATM to the lock-up condition. [Vehicle Condition] Vehicle Speed: 58 km/h (36 mph) or more	Possible to check the DSL operation.

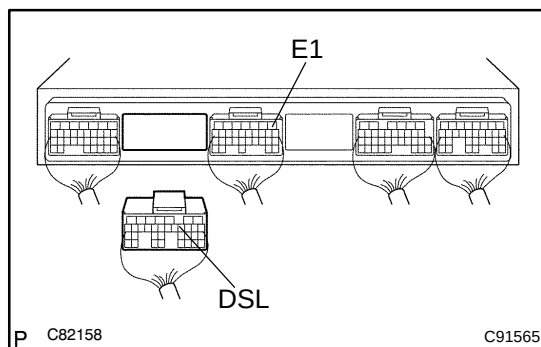
OK

CHECK AND REPLACE ECM(See page 01-31)

NG

2 INSPECT TRANSMISSION WIRE(DSL)

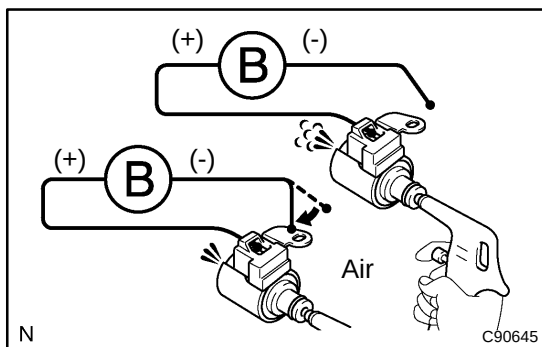
- Disconnect the transmission wire connector (E1) from the transaxle.
- Measure resistance between the terminal DSL and body ground.

OK:**Resistance: 11 - 13 Ω at 20 °C (68 °F)****NG****Go to step 4****OK****3 CHECK HARNESS AND CONNECTOR(TRANSMISSIONWIRE WIRE - ECM)**

- Connect the transmission wire connector.
- Disconnect the ECM connector.
- Measure the resistance between terminals DSL and E1.

OK:**Resistance: 11 - 13 Ω at 20 °C (68 °F)****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)****OK**

4 INSPECT SHIFT SOLENOID VALVE DSL



- (a) Remove the shift solenoid valve DSL.
- (b) Applying 490 kPa (5 kgf/cm², 71 psi) of compressed air, check that the solenoid valve does not leak the air.

OK:

Solenoid valve does not leak air.

- (c) When battery voltage is supplied to the shift solenoid valve, check that the valve opens.

OK:

Solenoid valve opens.

- (d) Measure the resistance between the terminal DSL of shift solenoid valve and the solenoid body.

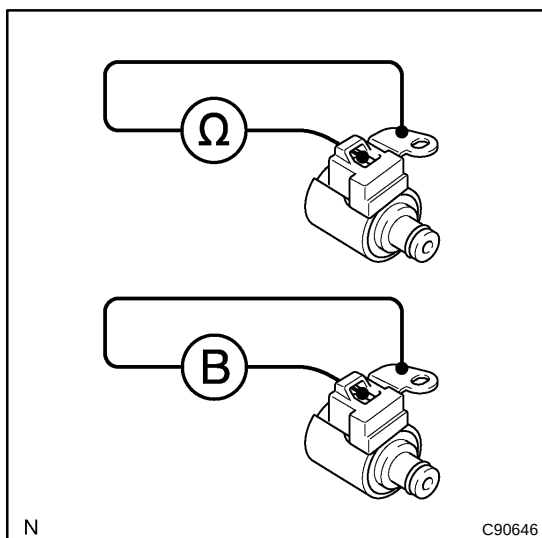
OK:

Resistance: 11 - 13 Ω at 20 °C (68 °F)

- (e) Connect positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

The solenoid valve makes an operationing noise.



NG

REPLACE SHIFT SOLENOID VALVE DSL

OK

5 CHECK TRANSMISSION WIRE(See page 01-31)

NG

REPAIR OR REPLACE TRANSMISSION WIRE(See page 40-20)

OK

6 INSPECT TRANSMISSION VALVE BODY ASSY

NG

REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY(See page 40-23)

OK

7	INSPECT TORQUE CONVERTER CLUTCH ASSY(See page 40-16)
---	---

NG

REPLACE TORQUE CONVERTER CLUTCH ASSY

OK

REPAIR AUTOMATIC TRANSAXLE ASSY(See page 40-8)

DTC	P0773	SHIFT SOLENOID E ELECTRICAL MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

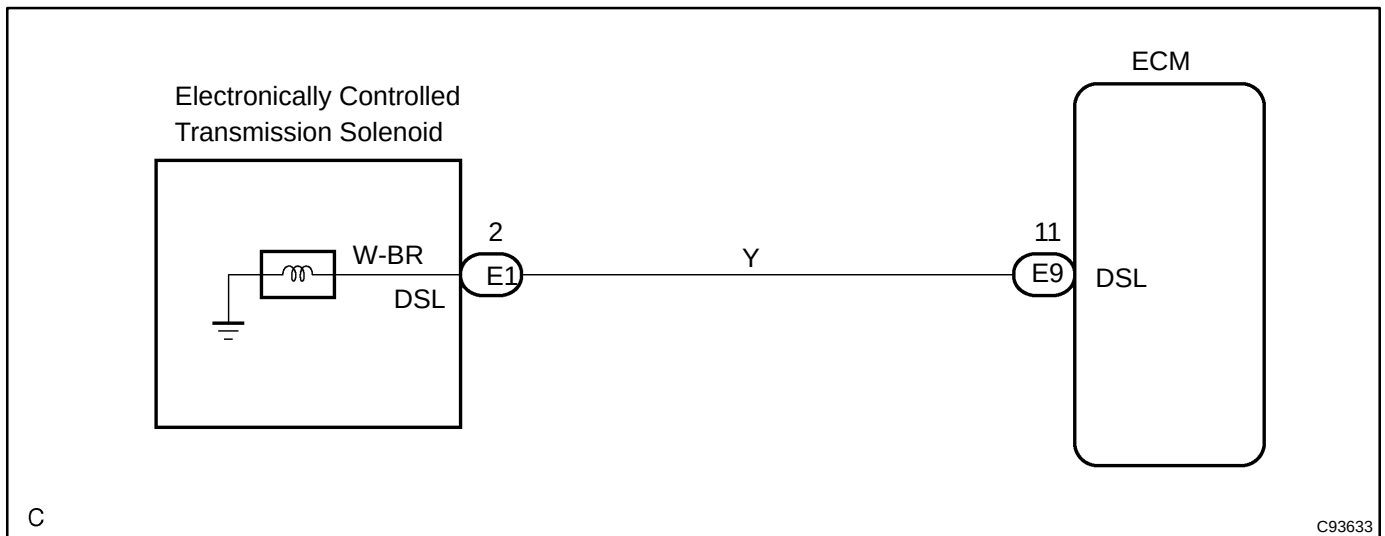
The shift solenoid valve DSL is turned ON and OFF by signals from the ECM in order to control the hydraulic pressure operation the lock-up relay valve, which then the controls operation of the lock-up clutch.

DTC No.	DTC Detection Condition	Trouble Area
P0773	Either (a) or (b) is detected at 1 time: (2 trip detection logic) (a) Solenoid resistance is 8 Ω or less short circuit when solenoid is energized (b) Solenoid resistance is 100 k Ω or more open circuit when solenoid is not energized	• Open or short in shift solenoid valve DSL circuit • Shift solenoid valve DSL • ECM

Fail safe function:

If the ECM detects a malfunction, it turns the shift solenoid valve DSL OFF.

WIRING DIAGRAM



INSPECTION PROCEDURE

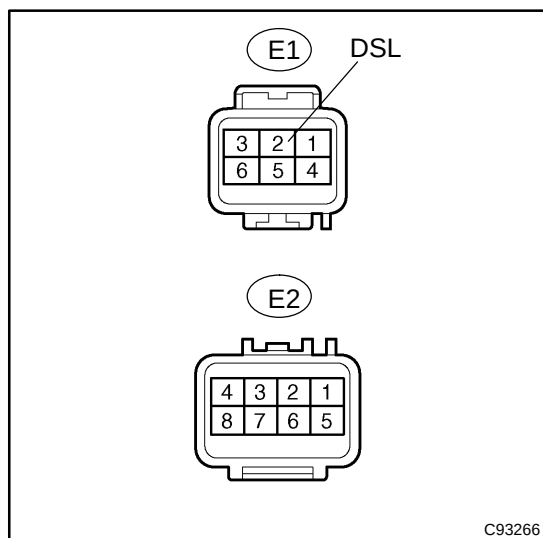
1 PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER

- (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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- (e) Select the item "LOCK UP" in the ACTIVE TEST and operate the Lock-up solenoid valves on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

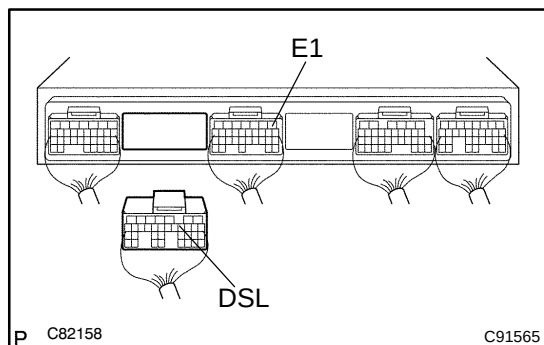
Item	Test Details	Diagnostic Note
LOCK UP	[Test Details] Control the shift solenoid DSL to set the ATM to the lock-up condition. [Vehicle Condition] Vehicle Speed: 58 km/h (36 mph) or more	Possible to check the DSL operation.

OK**CHECK AND REPLACE ECM(See page 01-31)****NG****2 INSPECT TRANSMISSION WIRE(DSL)**

- (a) Disconnect the transmission wire connector (E1) from the transaxle.
- (b) Measure resistance between the terminal DSL and body ground.

OK:**Resistance: 11 - 13 Ω at 20 °C (68 °F)****NG****Go to step 4****OK**

3 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- Connect the transmission wire connector.
- Disconnect the ECM connector.
- Measure the resistance between terminals DSL and E1.

OK:

Resistance: 11 - 13 Ω at 20 °C (68 °F)

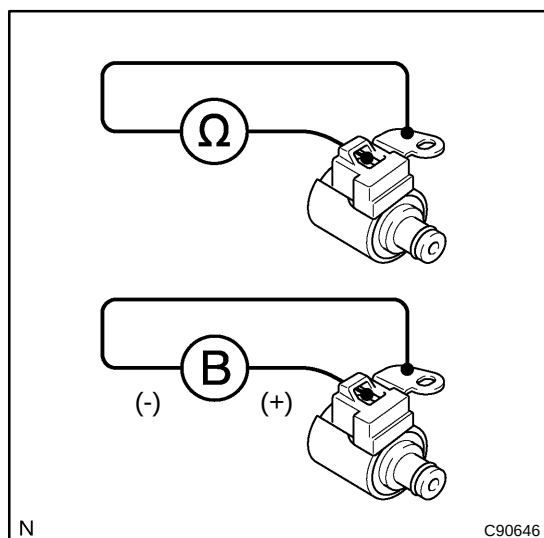
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)

OK

CHECK AND REPLACE ECM(See page 01-31)

4 INSPECT SHIFT SOLENOID VALVE DSL



- Remove the shift solenoid valve DSL.
- Measure the resistance between the terminal DSL of shift solenoid valve and the solenoid body.

OK:

Resistance: 11 - 13 Ω at 20 °C (68 °F)

- Connect positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

The solenoid valve makes an operationing noise.

NG

REPLACE SHIFT SOLENOID VALVE DSL

OK

REPAIR OR REPLACE TRANSMISSION WIRE(See page 01-31)

DTC	P1520	STOP LIGHT SWITCH MALFUNCTION
------------	--------------	--------------------------------------

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in lock-up condition, when brakes are suddenly applied.

When the brake pedal is depressed, this switch sends a signals to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detection Condition	Trouble Area
P1520	No stop light switch signal to ECM during driving (2 trip detection logic)	• Open or short in stop light switch circuit • Stop lamp switch assy • ECM

WIRING DIAGRAM

See page [05-159](#) .

INSPECTION PROCEDURE

1	READ VALUE OF OBD II SCAN TOOL OR HAND-HELD TESTER
----------	---

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "STOP LIGHT SW" in the DATALIST and read its value displayed on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop light SW Status/ ON or OFF	• Brake Pedal is depressed: ON • Brake Pedal is released: OFF	←

OK

REPAIR OR REPLACE ECM(See page [01-31](#))

NG

2	INSPECT STOP LAMP SWITCH ASSY(See page 05-268 or 05-359)
----------	--

NG

REPLACE STOP LAMP SWITCH ASSY

OK

3	CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH ASSY - ECM)
----------	---

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)
-----------	--

OK

REPAIR OR REPLACE ECM(See page 01-31)

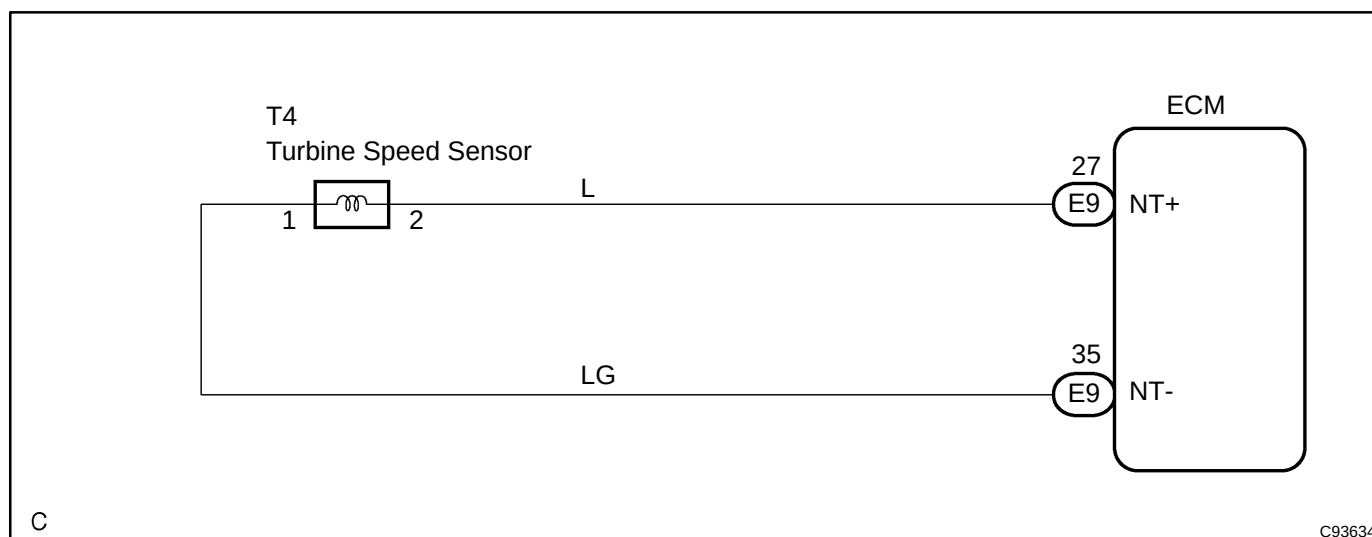
DTC	P1725	NT REVOLUTION SENSOR CIRCUIT MALFUNCTION
-----	-------	---

CIRCUIT DESCRIPTION

This sensor detects the rotation speed of the input turbine. By comparing the input turbine speed signal (NT) with the counter gear speed sensor signal (NC), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. Thus smooth gear shifting is performed.

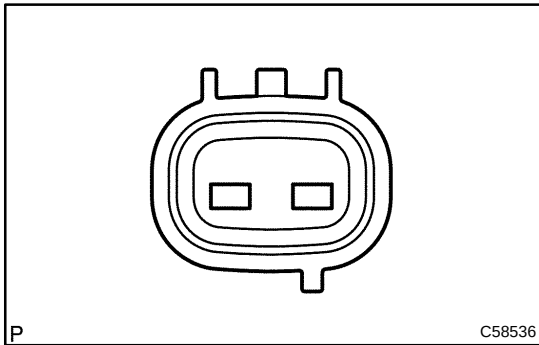
DTC No.	DTC Detection Condition	Trouble Area
P1725	ECM detects conditions (a), (b), (c) and (d) continuity for 5 sec. or more: (1 trip detection logic) (a) Vehicle speed: 50 km/h (20 mph) or more (b) Solenoid valves and park/neutral position switch are normal (c) NT < 300 rpm	• Open or short in turbine speed sensor circuit • Speed sensor (NT) • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT SPEED SENSOR(NT)



- Disconnect the speed sensor connector from the trans-axle.
- Measure the resistance between terminals of speed sensor.

OK:

Resistance:

TOYOTA made: 500 - 620 Ω at 20 °C (68 °F)

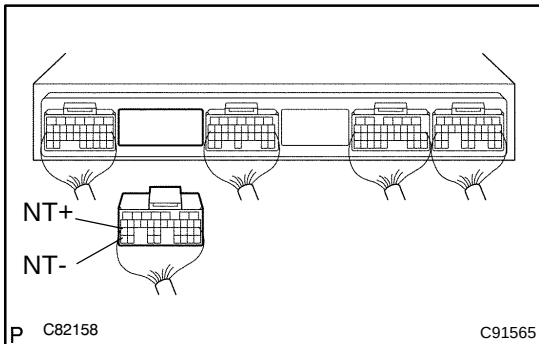
AISIN made: 560 - 680 Ω at 20 °C (68 °F)

NG

REPLACE SPEED SENSOR(NT)

OK

2 CHECK HARNESS AND CONNECTOR(SPEED SENSOR - ECM)



- Connect the speed sensor connector.
- Disconnect the ECM connector.
- Measure the resistance between terminals NT+ and NT-.

OK:

Resistance:

TOYOTA made: 500 - 620 Ω at 20 °C (68 °F)

AISIN made: 560 - 680 Ω at 20 °C (68 °F)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)

OK

CHECK AND REPLACE ECM(See page 01-31)

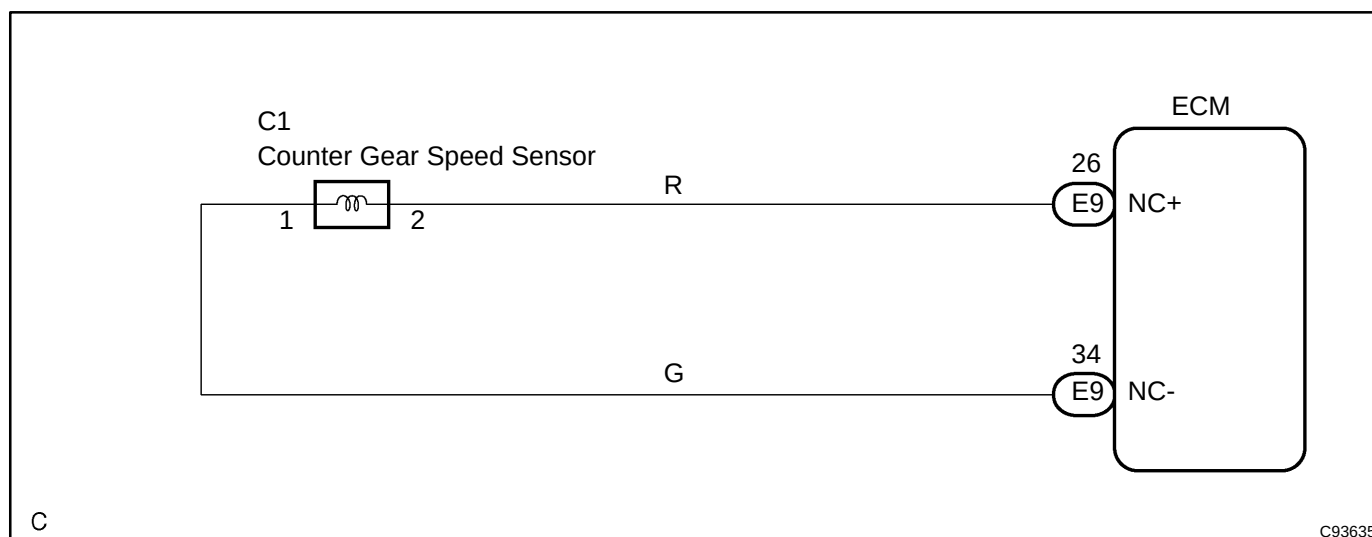
DTC	P1730	NC REVOLUTION SENSOR CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

This sensor detects the rotation speed of the counter gear. By comparing the counter gear speed signal (NC) with the direct clutch speed sensor signal (NT), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. Thus smooth gear shifting is performed.

DTC No.	DTC Detection Condition	Trouble Area
P1730	ECM detects conditions (a), (b), (c) and (d) continuity for 5 sec. or more: (1 trip detection logic) (a) Vehicle speed: 50 km/h (20 mph) or more (b) Solenoid valves and neutral start switch are normal (c) NC < 300 rpm	• Open or short in counter gear speed sensor circuit • Speed sensor (NC) • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF OBD II SCAN TOOL OR HAND-HELD TESTER

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "SPD (NC)" in the DATALIST and read its value displayed on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

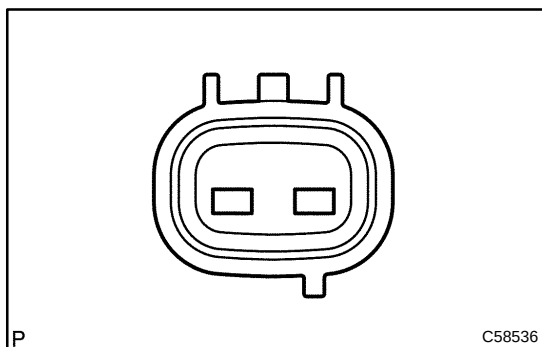
Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
SPD (NC)	Counter Gear Speed display: 50 r/min	D Position is warmed up, 3rd; Same as input shaft speed	←

OK

CHECK AND REPLACE ECM(See page 01-31)

NG

2 INSPECT SPEED SENSOR(NC)



- Disconnect the speed sensor connector from the trans-axle.
- Measure the resistance between terminals of speed sensor.

OK:

Resistance:

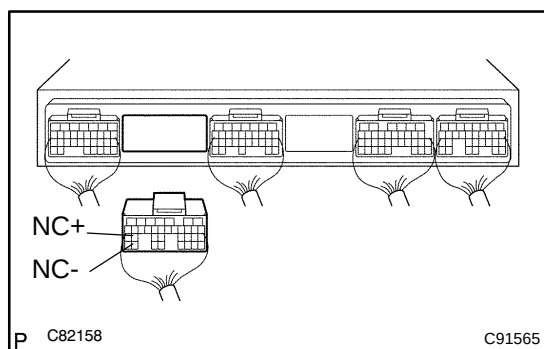
TOYOTA made: 500 - 620 Ω at 20 °C (68 °F)

AISIN made: 560 - 680 Ω at 20 °C (68 °F)

NG

REPLACE SPEED SENSOR(NC)

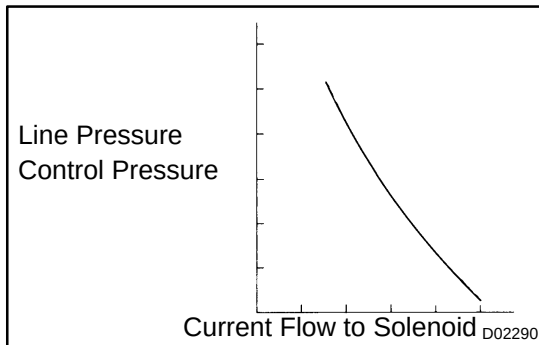
OK

3 CHECK HARNESS AND CONNECTOR(SPEED SENSOR - ECM)

- (a) Connect the speed sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance between terminals NC+ and NC-.

OK:**Resistance:****TOYOTA made: 500 - 620 Ω at 20 °C (68 °F)****AISIN made: 560 - 680 Ω at 20 °C (68 °F)****NG****REPAIR OR REPLACE HARNESS OR
CONNECTOR(See page 01-31)****OK****CHECK AND REPLACE ECM(See page 01-31)**

DTC	P1760	LINEAR SOLENOID FOF LINE PRESSURE CONTROL CIRCUIT MALFUNCTION
------------	--------------	--



CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates the line pressure) causes the solenoid valve SLT, under electronic control, to precisely and minutely modulate and generate the line pressure according the extent of the accelerator pedal depressed or the output of engine power.

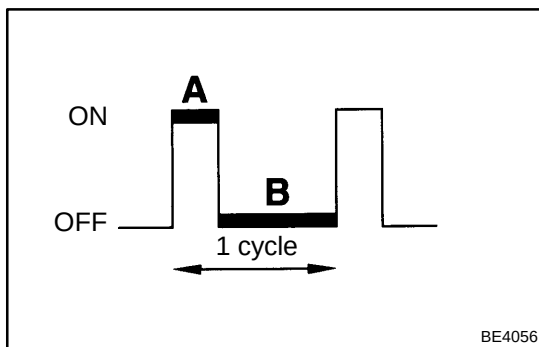
This reduces the function of the line pressure and provides smooth shifting.

Upon receiving a signal of the throttle valve opening angle, the ECM controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure and generating throttle pressure.

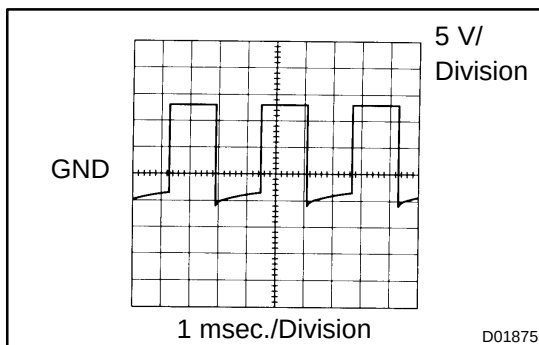
(*): Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

Duty Ratio = $A / (A + B) \times 100 (\%)$



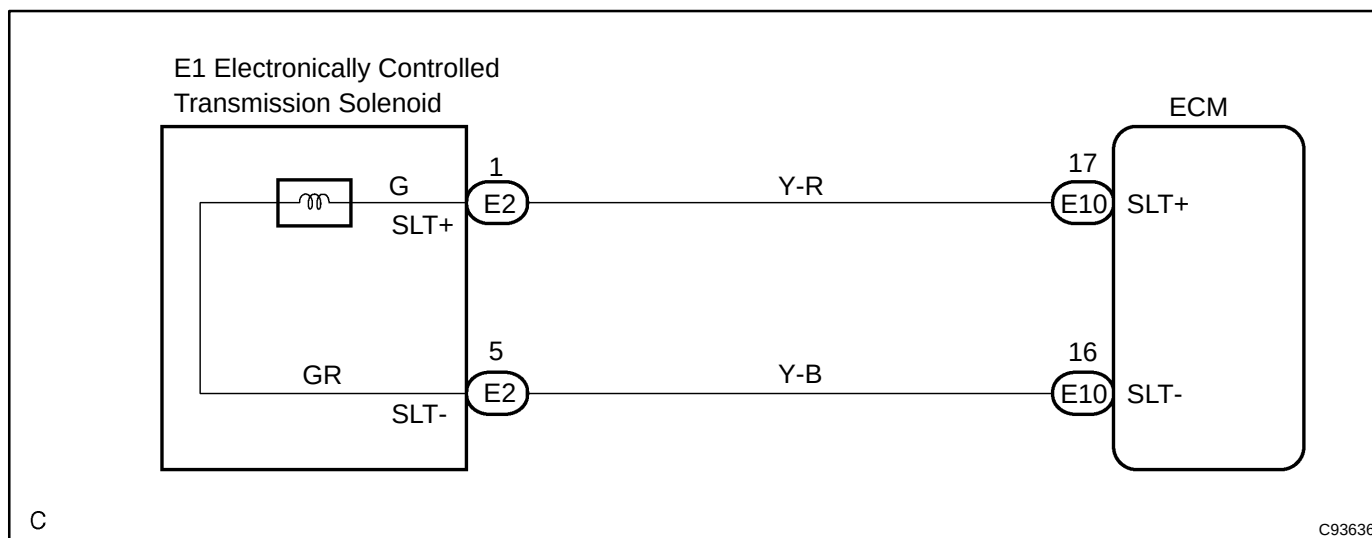
DTC No.	DTC Detection Condition	Trouble Area
P1760	Condition (a) or (b) below is detected 1 sec. or more: (a) SLT- terminal: 0V (b) SLT- terminal: 12V	• Open or short in line pressure control solenoid (SLT) circuit • Line pressure control solenoid (SLT) • ECM



Reference:

Check the waveform between terminals SLT+ and SLT- during the engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER

- 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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- Select the item "LINE PRESS UP" in the ACTIVE TEST and operate the shift solenoid SLT on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

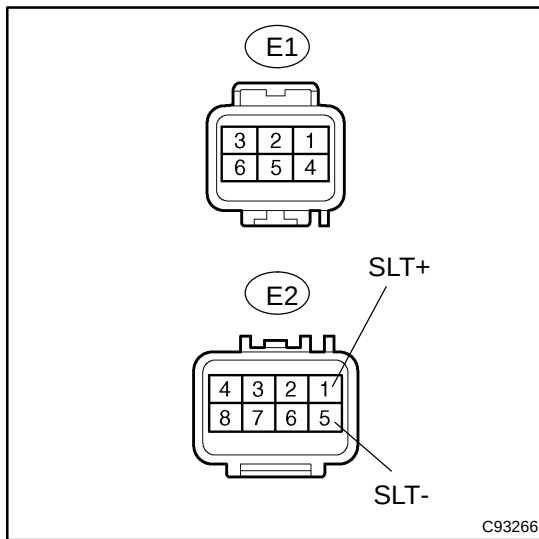
Item	Test Details	Diagnostic Note
LINE PRESS UP	[Test Details] Operate the shift solenoid SLT and raise the line pressure. [Vehicle Condition] • Vehicle Stopped. • IDL: ON [Others] ON: Line pressure up. OFF: No action (normal operation)	-

OK

CHECK AND REPLACE ECM(See page 01-31)

NG

2 INSPECT TRANSMISSION WIRE(SLT)



- (a) Disconnect the transmission wire connector (E2) from the transaxle.
- (c) Measure the resistance between the terminals SLT+ and SLT-.

OK:

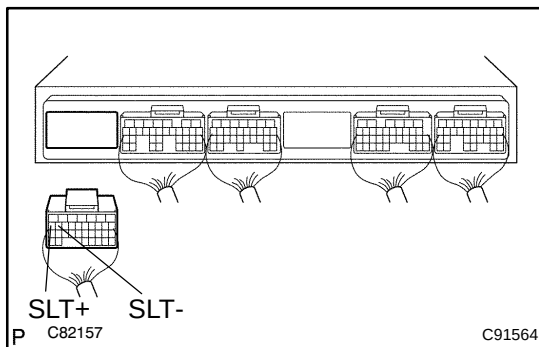
Resistance: 5.0 - 5.6 Ω at 20 °C (68 °F)

NG

Go to step 4

OK

3 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission wire connector to the transaxle.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance between terminals SLT+ and SLT- of ECM connector.

OK:

Resistance: 5.0 - 5.6 Ω at 20 °C (68 °F)

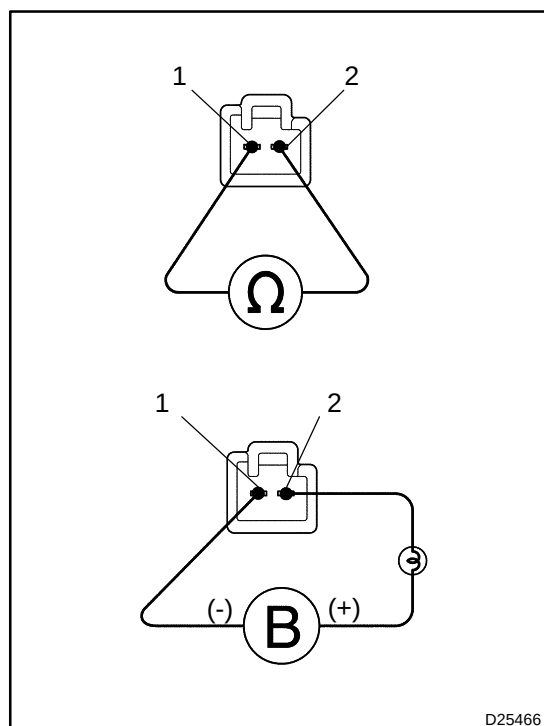
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)

OK

CHECK AND REPLACE ECM(See page 01-31)

4 INSPECT LINE PRESSURE CONTROL SOLENOID ASSY(SLT)



- (a) Remove the line pressure control solenoid (SLT).
 (b) Measure the resistance between terminals.

OK:

Resistance: 5.0 - 5.6 Ω at 20°C (68°F)

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating noise.

NG

REPLACE LINE PRESSURE CONTROL SOLENOID ASSY(SLT)

OK

REPAIR OR REPLACE TRANSMISSION WIRE(See page 01-31)

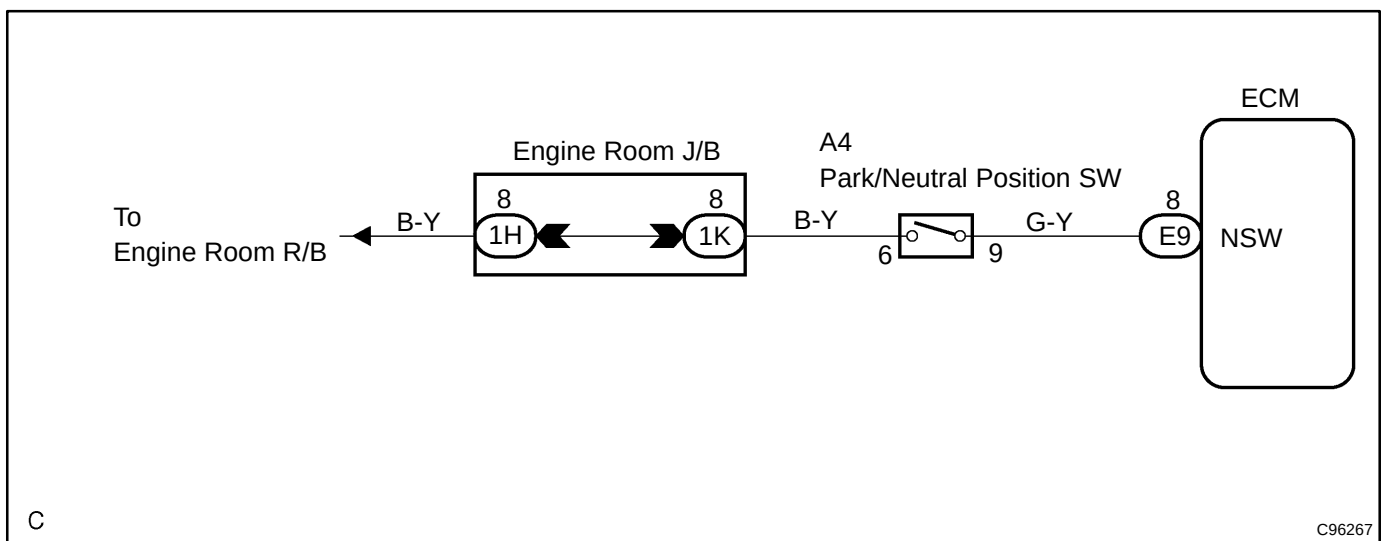
DTC	P1780	PARK/NEUTRAL POSITION SWITCH MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends the signals to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P1780	When driving under conditions (a) and (b) for 30 sec. or more, the park/neutral position switch is ON (P and N position). (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 - 2,500 rpm	• Park/neutral position switch circuit • Park/neutral position switch assy • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

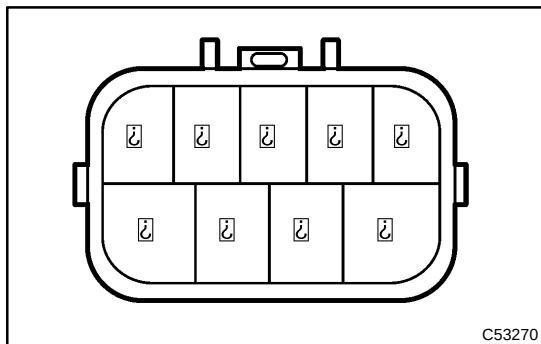
1 READ VALUE OF OBD II SCAN TOOL OR HAND-HELD TESTER

- (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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- (e) Shift the shift lever to the P and N positions, select the item "PNP SW (NSW)" in the DATALIST and read its value displayed on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

Item	Measurement Item/ Display (Position)	Normal Condition	Diagnostic Note
PNP SW [NSW]	PNP SW Status/ ON or OFF	Shift lever position is; P or N: ON Except P or N: OFF	The shift lever position and these values are different, there are failures of the PNP switch or shift cable adjustment.

OK**CHECK AND REPLACE ECM(See page 01-31)****NG****2 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY**

- (a) Disconnect the park/neutral position switch connector.
- (b) Check continuity between each terminal shown below when the shift lever is moved to each position.

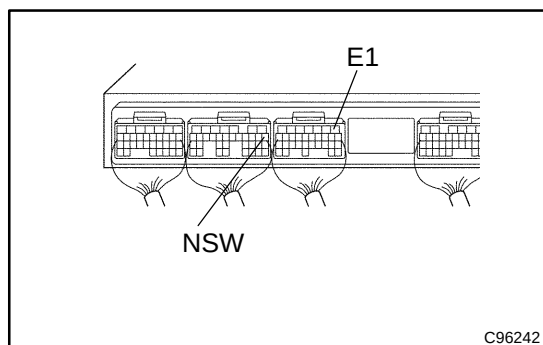
Shift Position	Terminal No. to continuity	
P	1 - 3	6 - 9
N	3 - 5	6 - 9

OK:

There is continuity.

NG**REPLACE PARK/NEUTRAL POSITION SWITCH ASSY(See page 40-3)****OK**

3 CHECK HARNESS AND CONNECTOR(PARK/NEUTRAL POSITION SWITCH - ECM)



- Connect the park/neutral position switch connector.
- Turn the IG switch ON and measure the voltage between terminals NSW of ECM and the E1 when the shift lever is shifted to the following position.

OK:

Shift Position	Terminal	Voltage (V)
P	NSW - E1	Below 1
N	NSW - E1	Below 1
Except P and N	NSW - E1	10 - 14

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)

OK

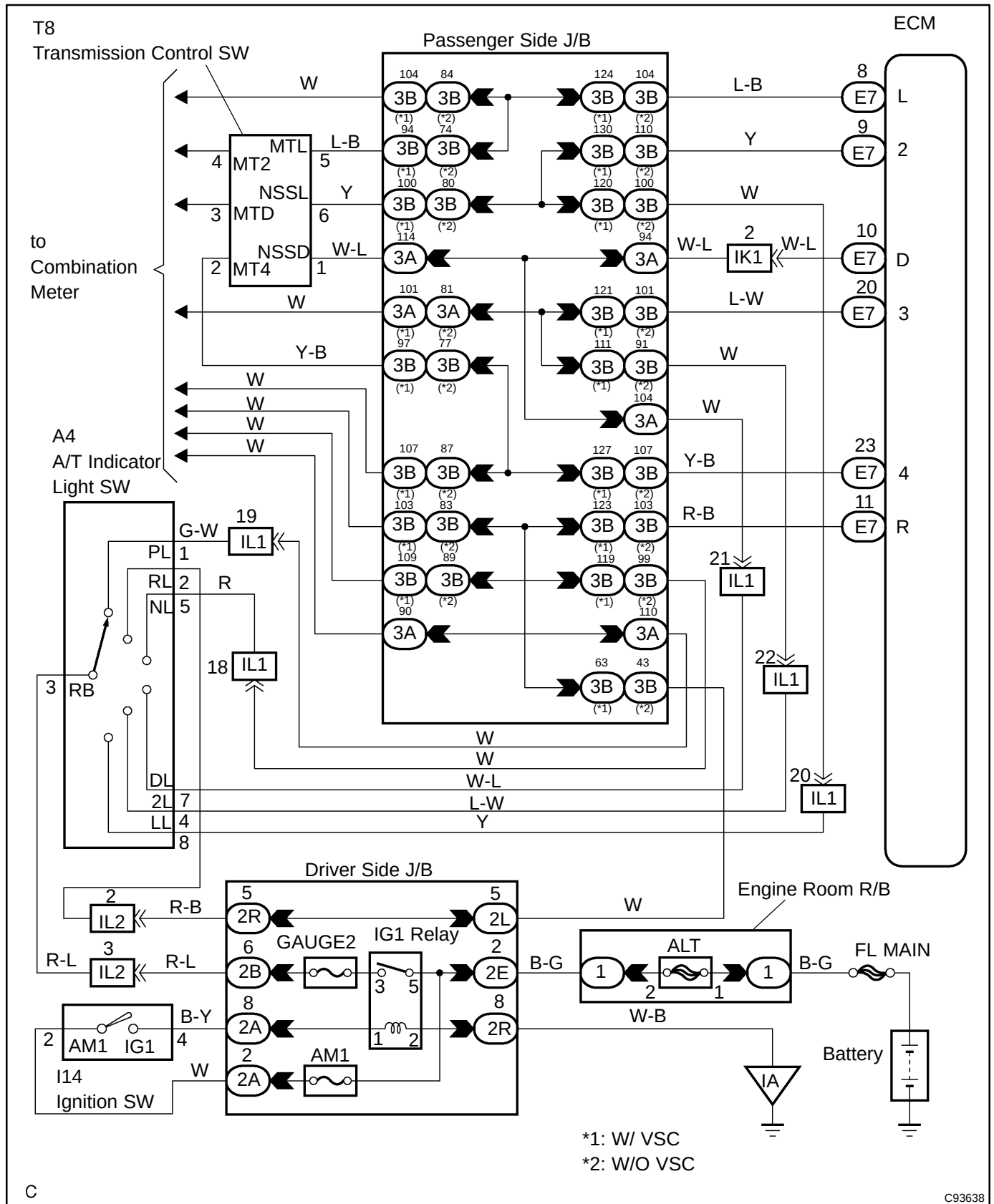
CHECK AND REPLACE ECM(See page 01-31)

PARK/NEUTRAL POSITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM. The ECM receives signals (R, D, 4, 3, 2 and L) from the park/neutral position switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF OBD II SCAN TOOL OR HAND-HELD TESTER
---	--

- (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 ON and push the OBD II scan tool or Hand-held tester main SW ON.
- (e) Shift the shift lever to the R, D, 4, 3, 2 and L positions, select the item "REVERSE", "5TH/DRIVE", "4TH", "3RD", "2ND" and "LOW" in the DATALIST and read its value displayed on the OBD II scan tool or Hand-held tester.

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value differs from those listed here. Do not depend solely on the "Normal Condition" here when deciding whether or not the part is faulty.

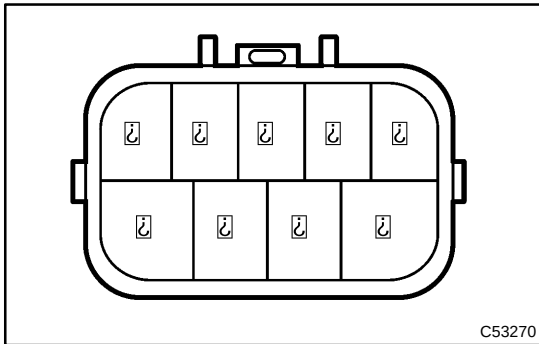
Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
REVERSE	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	The shift lever position and these values are different, there are failures of the PNP switch or shift cable adjustment.
5TH/DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; D and 4: ON Except D and 4: OFF	
4th	PNP SW Status/ ON or OFF	Shift lever position is; 4: ON Except 4: OFF	
3rd	PNP SW Status/ ON or OFF	Shift lever position is; 3: ON Except 3: OFF	
2ND	PNP SW Status/ ON or OFF	Shift lever position is; 2 and L: ON Except 2 and L: OFF	
LOW	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	

OK

CHECK AND REPLACE ECM(See page 01-31)

NG

2 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY



- Disconnect the park/neutral position switch connector.
- Check continuity between each terminal shown below when the shift lever is moved to each position.

Shift Position	Terminal No. to continuity	
P	1 - 3	6 - 9
R	2 - 3	-
N	3 - 5	6 - 9
D, 4	3 - 7	-
3	3 - 4	-
2, L	3 - 8	-

OK:

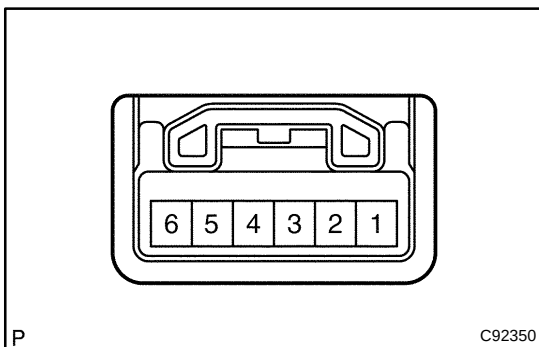
There is continuity.

NG

REPLACE PARK/NEUTRAL POSITION SWITCH ASSY(See page 40-3)

OK

3 INSPECT SHIFT LOCK CONTROL UNIT ASSY



- Connect the park/neutral position switch connector.
- Disconnect the transmission control switch connector.
- Check continuity between each terminal shown below when the shift lever is moved to each position.

Shift Position	Terminal No. to continuity	
P	4 - 6	1 - 3
R	4 - 6	1 - 3
N	4 - 6	1 - 3
D	4 - 6	1 - 3
4	4 - 6	1 - 2
3	4 - 6	1 - 2
2	4 - 6	1 - 3
L	5 - 6	1 - 3

OK:

There is continuity.

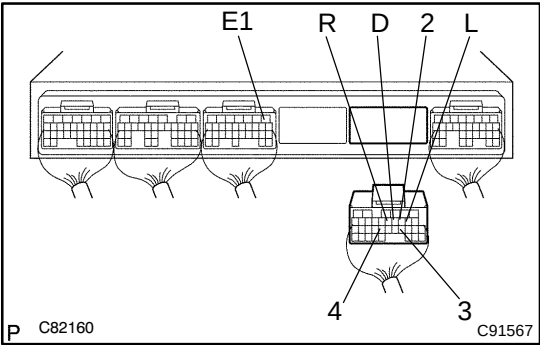
NG

REPLACE SHIFT LOCK CONTROL UNIT ASSY

OK

4

CHECK HARNESS AND CONNECTOR(PARK/NEUTRAL POSITION SWITCH - ECM)



- (a) Connect the transmission control switch connector.
- (b) Disconnect the ECM connector.
- (c) Turn the IG switch ON and measure the voltage between terminals R, D, 4, 3, 2, and L of ECM and the E1 when the shift lever is shifted to the following position.

OK:

Shift position	Terminal	Voltage (V)
R	R - E1	10 - 14
D, 4	D - E1	10 - 14
4	4 - E1	10 - 14
3	3 - E1	10 - 14
2, L	2 - E1	10 - 14
L	L - E1	10 - 14

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR(See page 01-31)

OK

CHECK AND REPLACE ECM(See page 01-31)