DI4U7-01

DTC	P0753, P0758	Shift Solenoid A/B Electrical Malfunction (Shift Solenoid Valve No.1/No.2)

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is done in combination with ON and OFF of the shift solenoid valves No.1 and No.2 controlled by 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 safely (Fail safe function).

Fail Safe Function:

If either of the shift solenoid valve circuits develops an open or a short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table below. The ECM also turns the shift solenoid valve SL OFF at the same time. If both solenoids are malfunction, hydraulic control cannot be done electronically so it must be done manually.

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

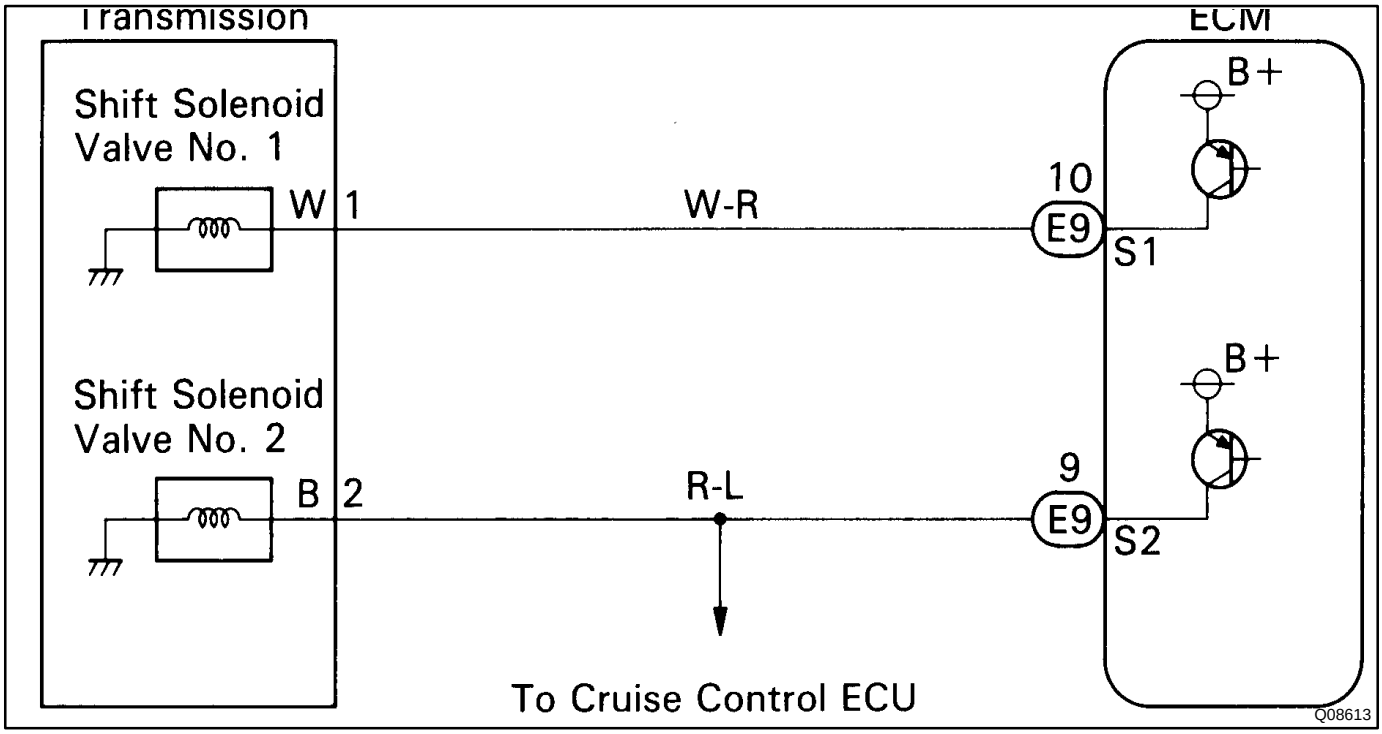
Position	NORMAL			SHIFT SOLENOID VALVE NO.1 MALFUNCTIONING			SHIFT SOLENOID VALVE NO.2 MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	No.1	No.2		No.1	No.2		No.1	No.2		
D	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	O/D
2	ON	OFF	1st	X	ON	3rd	ON	X	1st	3rd
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	3rd
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	3rd
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st

X: Malfunctions

Check the shift solenoid valve No.1 when DTC P0753 is output and check the shift solenoid valve No.2 when DTC P0758 is output.

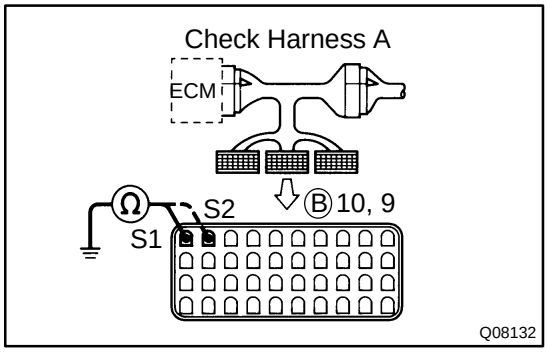
DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The ECM checks for an open or short circuit in the shift solenoid valves No.1 and No.2 circuit when it changes. The ECM records DTC P0753 or P0758 if condition (a) or (b) is detected once, but it does not light up the MIL. After ECM detects condition (a) or (b) continuously 2 times or more in one-trip, it causes the MIL light up until condition (a) or (b) disappears. After that, if the ECM detects condition (a) or (b) once, it starts lighting up the MIL again. (a) Solenoid resistance is 8 Ω or less short circuit when solenoid is energized (b) Solenoid resistance is 100 kΩ or more open circuit when solenoid is not energized	★Open or short in shift solenoid valve No.1/No.2 circuit ★Shift solenoid valve No.1/No.2 ★ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal S1 or S2 or ECM and body ground.**



PREPARATION:

(a) Disconnect the connector from ECM.

(b) Connect the check harness A to the harness side connector. (See page DI-20)

NOTICE:

Do not connect the check harness A to ECM.

CHECK:

Measure resistance between terminal S1 or S2 of check harness A connector and body ground.

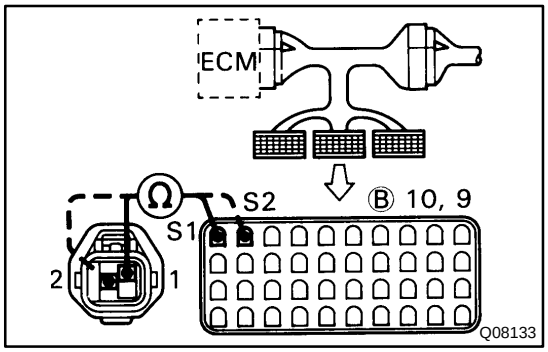
OK:

Resistance: 11 - 15 Ω

OK	**Check and replace ECM.**

NG

2	Check harness and connector between ECM and automatic transmission solenoid connector.



PREPARATION:

(a) Disconnect the connector from ECM.

(b) Connect the check harness A to the harness side connector. (See page DI-20)

(c) Disconnect the solenoid connector from the automatic transmission.

NOTICE:

Do not connect the check harness A to ECM.

CHECK:

Check harness and connector between terminal S1 or S2 of check harness A and terminal 1 or 2 of solenoid connector.

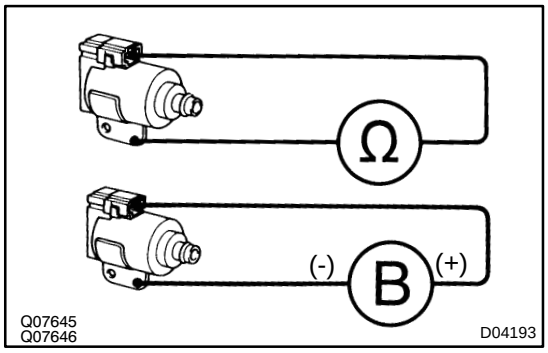
OK:

There is no open or short circuit.

NG	Repair or replace harness or connector.

OK

3	Check shift solenoid valve No.1 or No.2.



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the oil pan.

(c) Disconnect the solenoid connector.

(d) Remove the shift solenoid valve No.1 or No.2.

CHECK:

Measure resistance between solenoid connector and solenoid body.

OK:

Resistance: 11 - 15 Ω

CHECK:

Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

The solenoid makes an operating noise.

NG	Replace shift solenoid valve.

OK

Check and repair or replace solenoid wire.

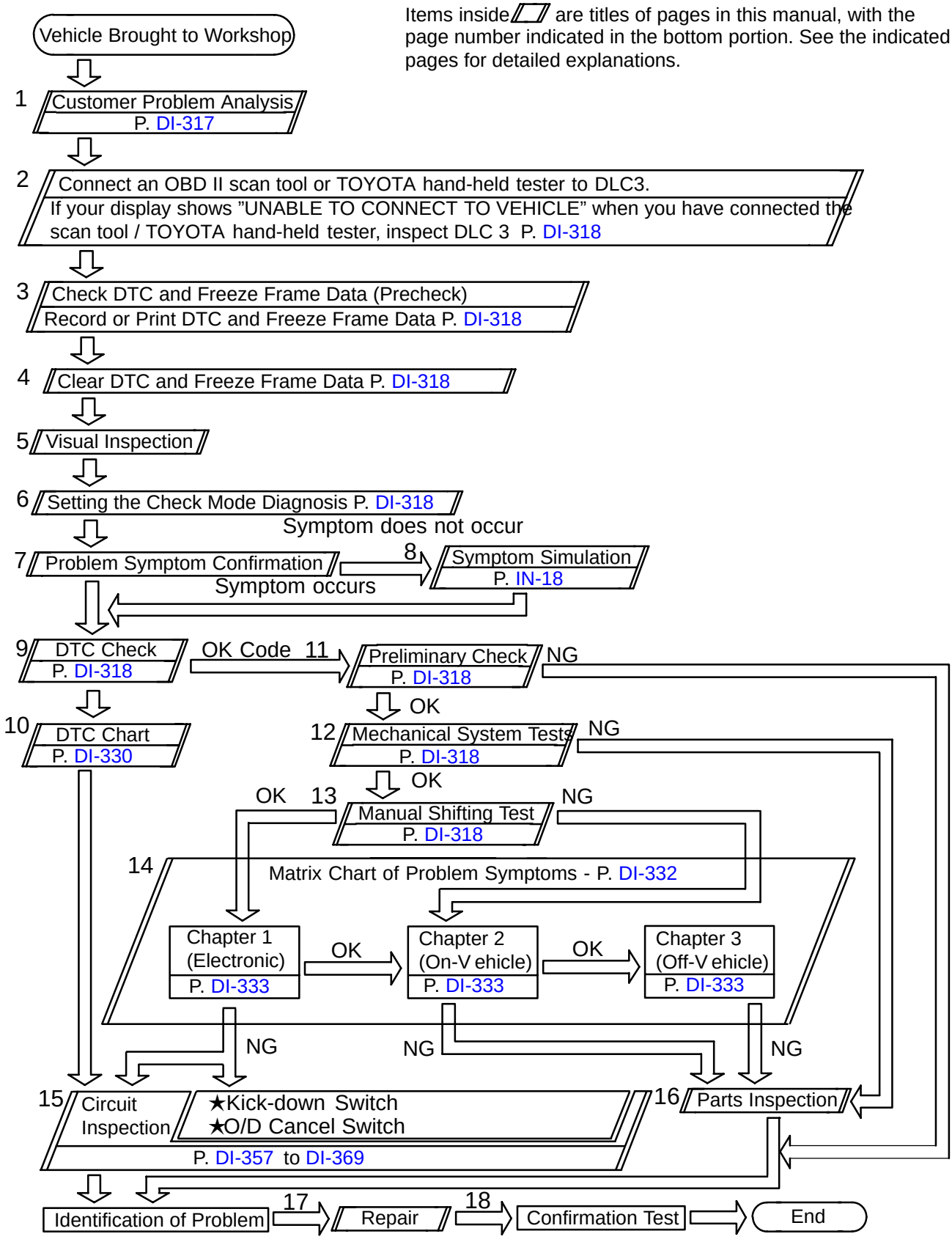
AUTOMATIC TRANSMISSION (2JZ-GE)

DI4TX-01

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following pages.

Items inside ▱ are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



DI4TY-01

CUSTOMER PROBLEM ANALYSIS CHECK

Electronically - controlled Automatic Transmission Check Sheet	Inspector's Name :

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

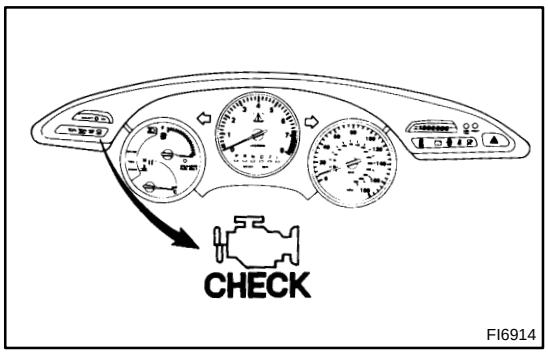
Date Problem Occurred	/ /
How Often Problem Occurs.	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Vehicle does not move (☐ Any position ☐ Particular position)
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → O/D)
	☐ No down-shift (☐ O/D → 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 (Code)
	2nd Time	☐ Normal code	☐ Malfunction code (Code)

DI4TZ-01



PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect the OBD II scan tool complying with SAE J1978 or TOYOTA hand-held tester to the vehicle, and read off various data output from the vehicle's ECM.

OBD II regulations require that the vehicle's on-board computer lights up the MIL on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect 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 DI-24)

If the malfunction does not reoccur in 3 trips, the MIL goes off but the DTCs remain recorded in the ECM memory.

To check the DTCs, connect the OBD II scan tool or TOYOTA hand-held tester to DLC3 on the vehicle. The OBD II scan tool or TOYOTA hand-held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the OBD II scan tool's instruction book.)

DTCs include SAE controlled codes and Manufacturer controlled codes.

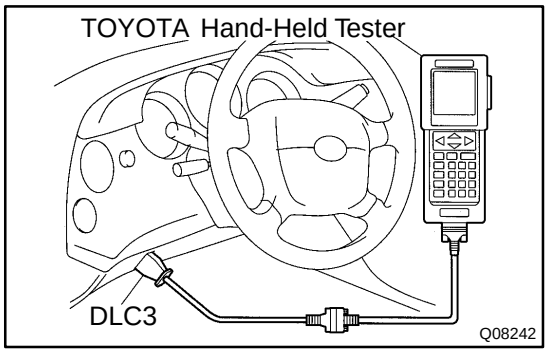
SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits.

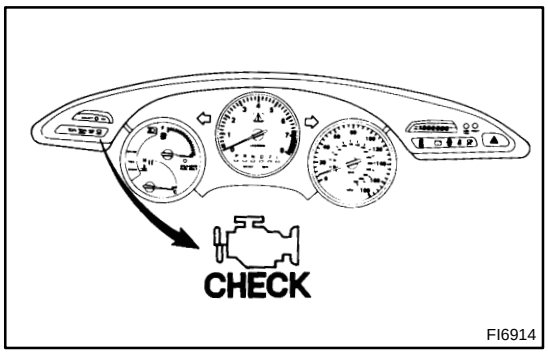
(See DTC chart on page DI-330)

The diagnosis system operates in normal mode during 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 check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily. (TOYOTA hand-held tester)

(See page DI-318)

*2 trip detection logic: When a logic 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.





2. INSPECT DIAGNOSIS (Normal mode)

(a) Check the MIL.

(1) The MIL lights up 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 BE-43).

(2) When the engine starts, the MIL should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(b) Check the DTC.

NOTICE:

(TOYOTA hand-held tester only): When the diagnostic system is switched from normal mode to check mode, it erases all DTCs and freezed frame data recorded in normal mode. So before switching modes, always check the DTCs and freezed frame data, and note them down.

(1) Prepare the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester.

(2) Connect the OBD II scan tool or TOYOTA hand-held tester to DLC3 at the lower of the instrument panel.

(3) Turn the ignition switch ON and turn the OBD II scan tool or TOYOTA hand-held tester switch ON.

(4) Use the OBD II scan tool or TOYOTA hand-held tester to check the DTCs and freezed frame data. Note them down. (For operating instructions, see the OBD II scan tool's instruction book.)

(5) See page DI-330 to confirm the details of the DTCs.

NOTICE:

When simulating symptoms with an OBD II scan tool (excluding TOYOTA hand-held tester) to check the DTCs, use normal mode. For codes on the DTC chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptoms have been simulated the for the first time. Then repeat the simulation process again. When the program has been simulated twice, the MIL lights up and the DTCs are recorded in the ECM.

3. INSPECT DIAGNOSIS (Check Mode)

TOYOTA hand-held tester only:

Compared to the normal mode, the check mode has high sensing 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) Initial conditions.

★ Battery positive voltage 11V or more.
★ Throttle valve fully closed.
★ Transmission in the PARK position.
★ Air conditioning switched off.

(2) Turn the ignition switch OFF.

(3) Prepare the TOYOTA hand-held tester.

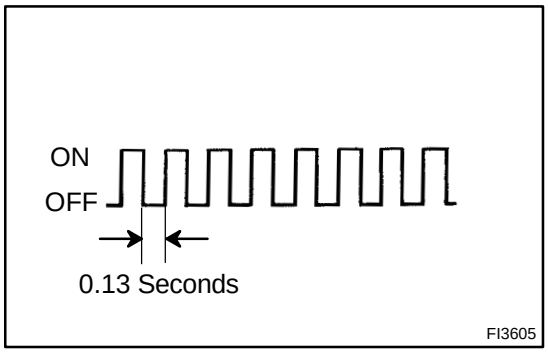
(4) Connect the TOYOTA hand-held tester to DLC3 at the lower of the instrument panel.

(5) Turn the ignition switch ON and switch the TOYOTA hand-held tester ON.

(6) Switch the TOYOTA hand-held tester from normal mode to check mode. (Check that the MIL flashes.)

(7) Start the engine. (The MIL goes off after the engine start.)

(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 TOYOTA hand-held tester diagnosis selector to check the DTCs and freezed frame data, etc.

HINT:

Take care not to turn the ignition switch OFF.

Turning the ignition switch off switches the diagnosis system from check mode to normal mode, so all DTCs, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

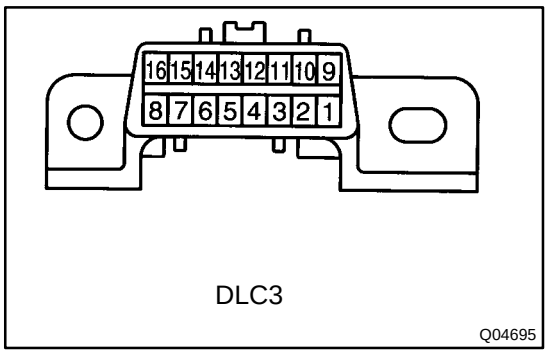
(b) Clear the DTC.

The following actions will erase the DTCs and freezed frame data.

Operating the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)

NOTICE:

If the TOYOTA hand-held tester switches the ECM from normal mode to check mode or vice-versa, or if the ignition switch is turned from ON to ACC or OFF during check mode, the DTCs and freezed frame data will be erased.



DLC3

(c) Inspect the DLC3.
The vehicle's ECM uses V.P.W. (Variable Pulse Width) for communication to comply with SAE J1850. The terminal arrangement of DLC3 complies with SAE J1962 and matches the V.P.W. format.

Terminal No.	Connection / Voltage or Resistance	Condition
2	Bus ⊕ Line / Pulse generation	During transmission
4	Chassis Ground / ↔ Body 1 Ω or less	Always
5	Signal Ground / ↔ Body 1 Ω or less	Always
16	Battery Positive / ↔ Body 1 Ω or less Battery Positive / ↔ Body 9 - 14 V	Always

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

★ If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.

★ If communication is still not possible 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.

4. CHECK FOR INTERMITTENT PROBLEMS

TOYOTA hand-held tester only:

By putting the vehicle's ECM in check mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuit is increased. This makes it easier to detect intermittent problems.

(1) Clear DTCs. (See page DI-318)
(2) Set check mode. (See page DI-318)
(3) Perform a simulation test. (See page IN-18)
(4) Connector connection and terminal inspection. (See page IN-28)
(5) Visual check and contact pressure check. (See page IN-28)
(6) Connector handling. (See page IN-28)

5. PROBLEM SYMPTOM CONFIRMATION

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

6. ROAD TEST

NOTICE:

Do the test at normal operating ATF temperature 50 - 80˚C (122 - 176˚F)

(a) D position test (normal pattern)

Shift into the D position and keep the accelerator pedal constant at the full throttle valve opening position, and check the following points:

(1) Check up- shift operation.

Check that 1 → 2, 2 → 3 and 3 → O/D up-shift takes place, at the shift point shown in the automatic shift schedule. (See page SS-42)

HINT:

★ O/D Gear Up-shift Prohibition Control (1. Coolant temperature is 60˚C (140˚F) or less. 2. If there is a 10km/h (6 mph) difference between the set cruise control speed and vehicle speed. 3. O/D main switch is pushed ON (During O/D OFF, indicator light lights up.))
★ O/D Gear Lock-up Position Control (1. Brake pedal is depressed. 2. Engine coolant temperature is 60˚C (140˚F) or less.)
★ Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up-shifts.

★ Check for abnormal noises and vibration.

Run at the D position lock-up or O/D gear and check for abnormal noises and vibration.

HINT:

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

(2) Check kick-down operation.

While running in the D position, 2nd, 3rd and O/D gears, check that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick-downs conform to those indicated on the automatic shift schedule. (See page SS-42)

(3) Check for abnormal shock and slip at kick-down.
(4) Check the lock-up mechanism.
★ Drive in D position, O/D gear, at a steady speed (lock-up ON) of about 61 km/h (38 mph).
★ Lightly depress the accelerator pedal and check that the RPM does not change abruptly.

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

(b) D position test (manu pattern)

Shift into the D position and hold the accelerator pedal constant at the full throttle valve opening position, and check the following points:

(1) Check up-shift operation.
2 → 3 and 3 → O/D up shifts should take place, and shift points should conform to those shown in the automatic shift schedule. (See page SS-42)

HINT:

★ O/D up-shift or lock-up will not occur when the engine coolant temperature is below 60˚C (140˚F) and speed is under 63 km/h (39 mph), or if there is a 10 km/h (6mph) difference between the set cruise control speed.
★ 3rd up-shift or lock-up will not occur when engine coolant temperature is 35˚C (95˚F) and speed is under 40 km/h (25 mph).
★ Check for shift shock and slip.
In the same manner, check the shock slip at the 2 → 3 and 3 → O/D up-shifts.
★ Check for abnormal noise and vibration.
Run at the D position lock-up or O/D gear and check for abnormal noise and vibration.

HINT:

The check for the cause of abnormal noise and vibration must be made with extreme care as it could also be due to loss of balance in the propeller shaft, differential, torque converter clutch, etc.

(2) Check kick-down operation.
While running in the D position, 2nd, 3rd and O/D gears, check that the possible kick-down vehicle speed limits for 3 → 2 and O/D → 3 kick-downs conform to those indicated on the automatic shift schedule. (See page SS-42)
(3) Check for abnormal shock slip at kick-down.
Check the lock-up mechanism.
★ Drive in D position, O/D gear, at a steady speed (lock-up ON) of about 172 km/h (107mph).
★ Lightly depress the accelerator pedal and check that the engine RPM does not change abruptly.

If there is big jump in the engine RPM there is no lock-up.

(c) 2 position test (norm pattern)
Shift into the 2 position and, while driving with the accelerator pedal held constantly at the full throttle valve opening position, check on the following points:
(1) Check up-shift operation.
Check that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule. (See page SS-42)

HINT:

There is no O/D up-shift and lock-up in the 2 position.

(2) Check engine braking.
While running in the 2nd gear of 2 position, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noise at acceleration and deceleration, and for shock at up-shift and down-shift.

(d) 2 position test (manu pattern)
Shift into the 2 position and while driving with the accelerator pedal held constantly at the full throttle valve opening position, push in one of the pattern selectors and check these points:
(1) Check no up-shift.
While running in the 2 position, check that there is no up-shift to 3rd gear.
(2) Check engine braking.
While running in the 2nd gear of 2 position, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noise during acceleration and deceleration.

(e) L position test

Shift into the L position and while driving with the accelerator pedal held constantly at the full throttle valve opening position, check these 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 while starting at full throttle, check for slipping.

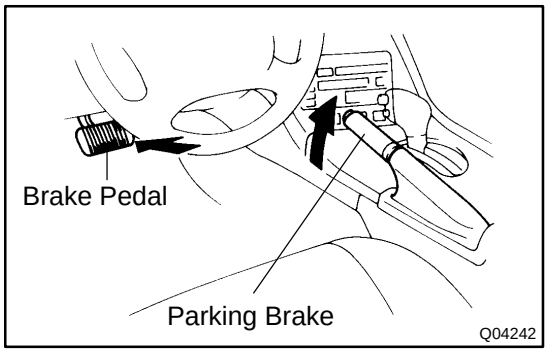
CAUTION:

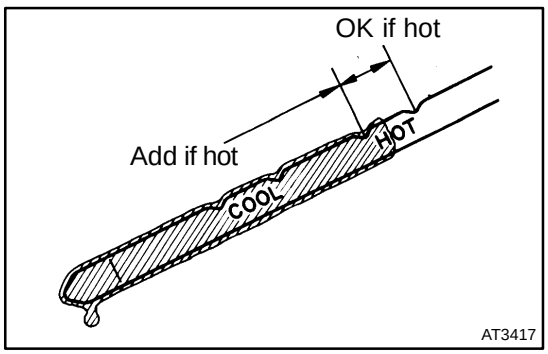
Before conducting this test, ensure that the test area is free from personnel and obstruction.

(g) P position test

Stop the vehicle on a gradient (more than 5˚) and after shifting into the P position, release the parking brake.

Then check that the parking lock pawl holds the vehicle in place.





7. BASIC INSPECTION

(a) Check the fluid level.

HINT:

★ Drive the vehicle so that the engine and transmission are at normal operating temperature.

Fluid temperature: 70 - 80˚C (158 - 176˚F)

★ Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.

(1) Park the vehicle on a level surface and set the parking brake.

(2) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from the P to L position and return to the P position.

(3) Pull out the transmission dipstick and wipe it clean.

(4) Push it back fully into the pipe.

(5) Pull it out and check that the fluid level is in the HOT range.

If the level is at the low side, add new fluid.

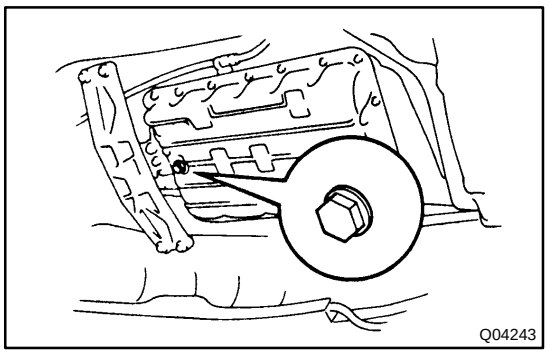
Fluid type: ATF D - II or DEXRON® III (DEXRON® II)

NOTICE:

Do not overfill.

(b) Check the fluid condition.

If the fluid smells burnt or is black, replace it.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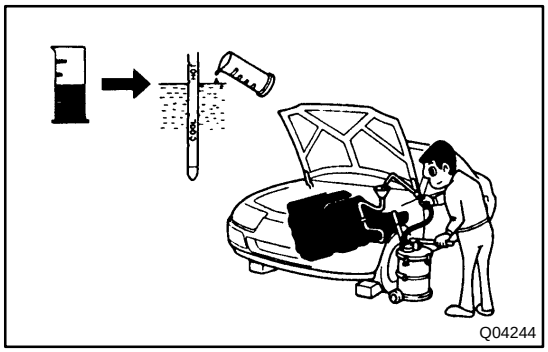
(c) Replace the ATF.
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.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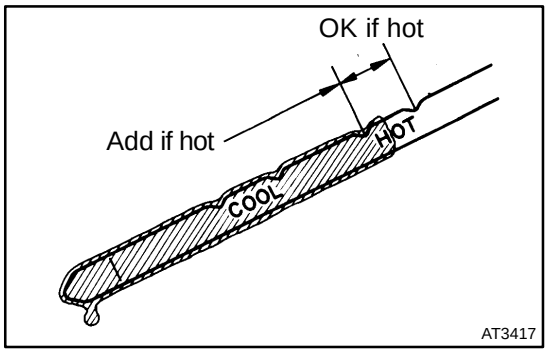
(3) With the engine OFF, add new fluid through the oil filler pipe.

Fluid type:
ATF D - II or DEXRON® III (DEXRON® II)
Capacity:
Drain and refill: 1.6 liters (1.7 US qts, 1.4 lmp. qts)

(4) Start the engine and shift the shift lever into all positions from the P to the L position and then shift into the P position.



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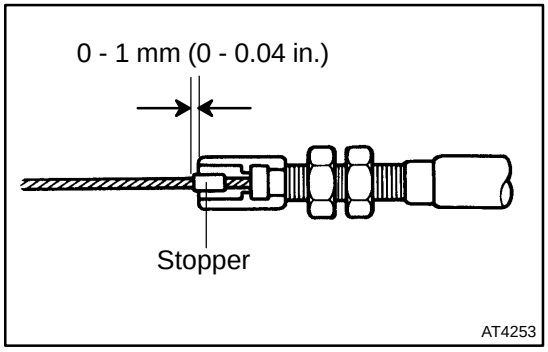
(5) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.
(6) Check the fluid level at the normal operating temperature 70 - 80˚C (158 - 176˚F), and add if necessary.

NOTICE:
Do not overfill.

(d) Check the fluid leaks.
Check for leaks in the transmission.

If there are leaks, it is necessary to replace O-rings, FIPG, oil seals, plugs or other parts.



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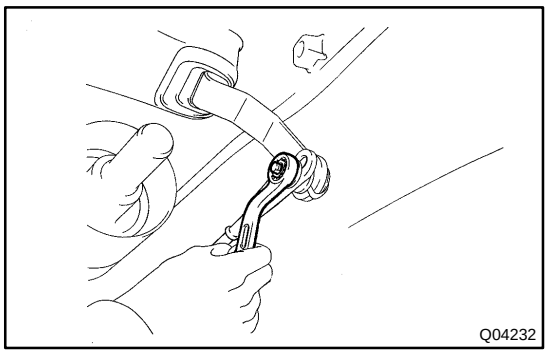
(e) Inspect and adjust the throttle cable.
(1) Check that the throttle valve is fully closed.
(2) Check that the inner cable is not slack.
(3) Measure the distance between the outer cable end and stopper on the cable.

Standard distance: 0 - 1 mm (0 - 0.04 in.)

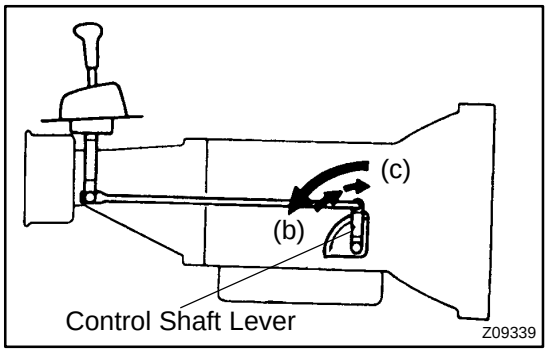
If the distance is not within the standard, adjust the cable by the adjusting nuts.


Q04232

(f) Inspect and adjust the shift lever position.
When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator correctly indicates the position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures:

(1) Loosen the nut on the shift lever subassembly.
(2) Push the control shaft lever fully rearward.



Z09339

(3) Return the control shaft lever 2 notches to the N position.
(4) Set the shift lever to the N position.
(5) While holding the shift lever lightly toward the R position side, tighten the nut.

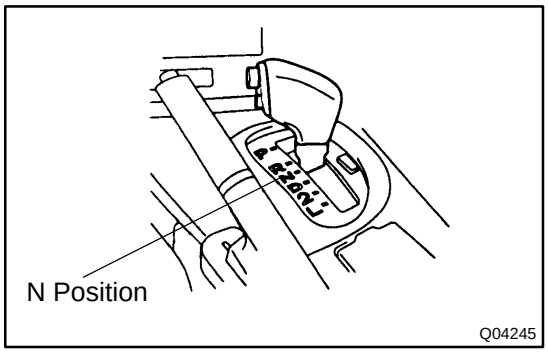
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(6) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverses when shifting it to the R position.

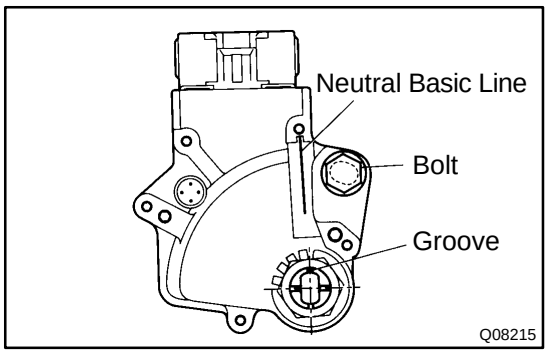
(g) Inspect and adjust the park/neutral position switch.
Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

If not as stated above, carry out these adjustment procedures:

(1) Loosen the park/neutral position switch bolt and set the shift lever to the N position.



Q04245



Q08215

(2) Align the groove and neutral basic line.
(3) Hold in position and tighten the bolt.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

For continuity inspection of the park/neutral position switch, see page DI-354 .

(h) Inspect the idle speed.

Idle speed: 700 ± 50 rpm
(In the N position and A/C OFF)

8. MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- ★ **Do the test at normal operating ATF temperature 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, level area which provides 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) Connect the OBDII scan tool or TOYOTA hand-held tester to DLC3.

(3) Fully apply the parking brake.

(4) Keep your left foot pressed firmly on the brake pedal.

(5) Start the engine.

(6) 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: 2,450 ± 150 rpm

(7) Do the same test in the R position.

Stall speed: 2,450 ± 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 600rpm below the specifies value, the torque converter clutch could be faulty.
(b) Stall speed high in D position.	★Line pressure too low ★Forward clutch slipping ★No.2 one-way clutch not operating properly ★O/D one-way clutch not operating properly
(c) Stall speed high in R position.	★Line pressure too low ★Direct clutch slipping ★1st and reverse brake slipping ★O/D one-way clutch not operating properly
(c) Stall speed high in D and R positions.	★Line pressure too low ★Improper fluid level ★O/D one-way clutch not operating properly

(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 condition of the O/D direct clutch, forward clutch, direct clutch, and 1st and reverse brake.

NOTICE:

- ★ **Do the test at normal operating ATF temperature 50 - 80˚C (122 - 176˚F).**
- ★ **Be sure to allow 1 minute interval between tests.**
- ★ **Take three 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 the N position and A/C OFF)
(3) Shift the shift lever from the N to the D position. Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.
In same way, measure the time lag for N → R.
Time lag: N → D Less than 1.2 seconds
Time lag: N → R Less than 1.5 seconds
Evaluation (If N → D or N → R time lag are longer than specified):

Problem	Possible cause
N → D time lag is longer	★Line pressure too low ★Forward clutch worn ★O/D one-way clutch not operating properly
N → R time lag is longer	★Line pressure too low ★Direct clutch worn ★1st and reverse brake worn ★O/D one-way clutch not operating properly

9. HYDRAULIC TEST

(a) Measure the line pressure.

NOTICE:

- ★ **Do the test at normal operating ATF temperature 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.**

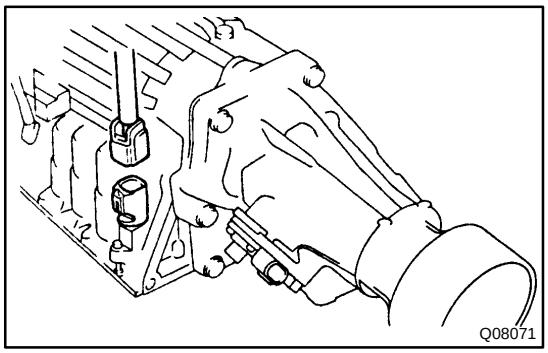
(1) Warm up the transmission fluid.
(2) Remove the test plug on the transmission case right side and connect SST.
SST 09992-00094 (09992-00150, 09992-00270)
(See page AT-19 for the location to connect SST)
(3) Fully apply the parking brake and chock the 4 wheels.
(4) Start the engine and check idling RPM.
(5) Keep your left foot pressed firmly on the brake pedal and shift into the D position.
(6) Measure the line pressure when the engine is idling.
(7) Press the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
(8) In the same way, do the teat in the R position.
SPECIFIED LINE PRESSURE:

Condition	D position kPa (kgf/cm^2, psi)	R position kPa (kgf/cm^2, psi)
Idling	363 - 422 (3.7 - 4.3, 53 - 61)	500 - 598 (5.1 - 6.1, 73 - 88)
Stall	902 - 1,147 (9.2 - 11.7, 131 - 166)	1,236 - 1,589 (12.6 - 16.2, 179 - 230)

If the measured pressures are not up to specified values, recheck the throttle cable adjustment and retest.

Evaluation:

Problem	Possible cause
If the measured value at all positions are higher.	★Throttle cable out of adjustment ★Throttle valve defective ★Regulator valve defective
If the measured value at all positions are lower.	★Throttle cable out of adjustment ★Throttle valve defective ★Regulator valve defective ★Oil pump defective ★O/D direct clutch defective
If pressure is low in the D position only.	★D position circuit fluid leakage ★Forward clutch defective
If pressure is low in the R position only.	★R position circuit fluid leakage ★Direct clutch defective ★1st and reverse brake defective



10. MANUAL SHIFTING TEST

HINT:

With this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transmission.

(a) Disconnect the solenoid wire.

(b) Inspect the manual driving operation.
Check that the shift and gear positions correspond with the table below.

Shift Position	Gear Position
D	O/D
2	3rd
L	1st
R	Reverse
P	Pawl Lock

HINT:

If the gear positions (L, 2 and D position) are difficult to distinguish, do the following road test.

★ While driving, shift through the L, 2 and D positions. Check that the gear change corresponds to the shift position.

★ If any abnormality is found in the above test, the problem is in the transmission itself.

(c) Connect the solenoid wire.

(d) Clear the DTC (See page DI-318).

DI4U0-01

DIAGNOSTIC TROUBLE CODE CHART

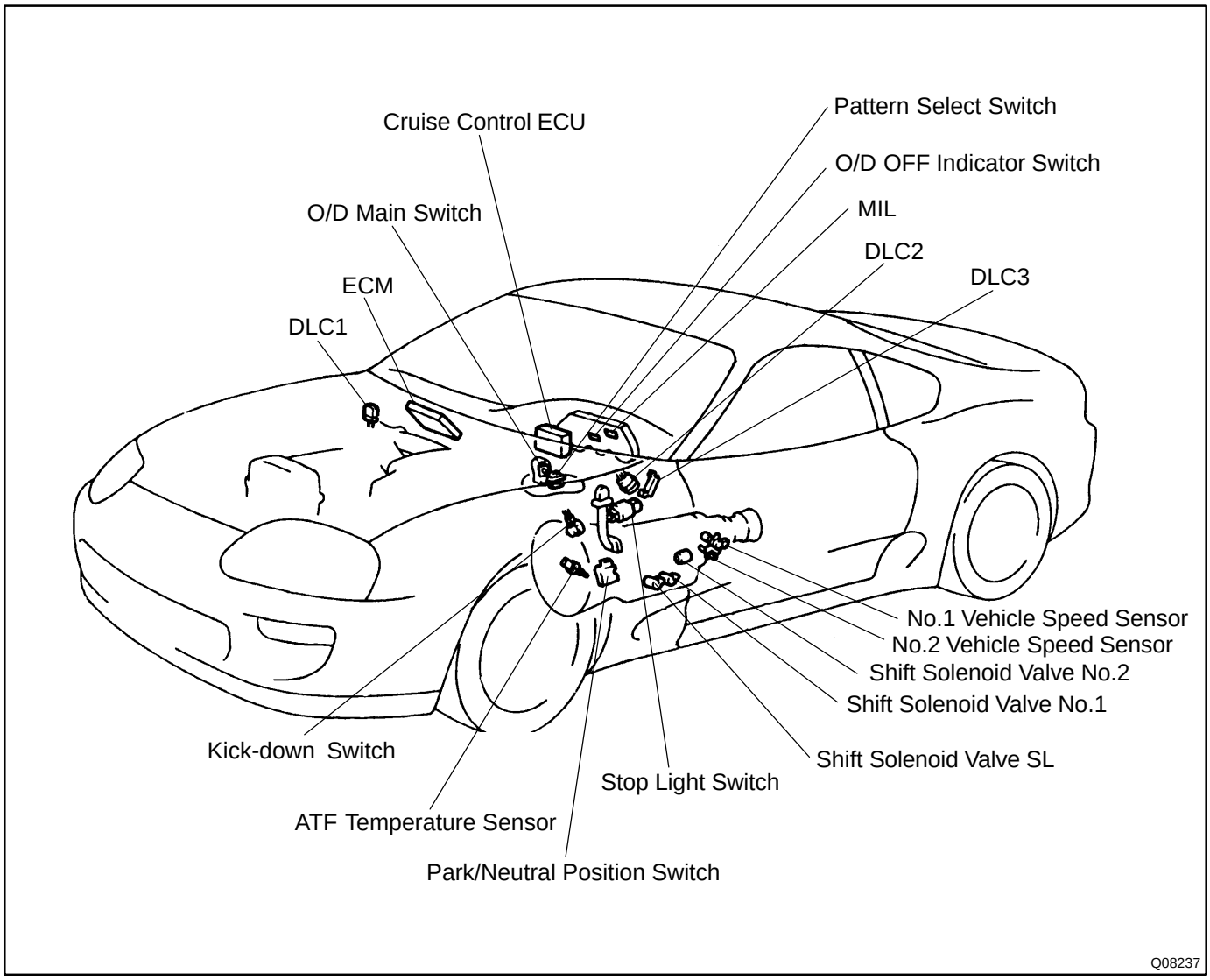
If a DTC is displayed during the DTC check, check the circuit listed in the table below and proceed to the page given.

DTC No. (See Page)	Detection Item	Trouble Area	MIL*	Memory
P0500 (DI-100)	Vehicle Speed Sensor Malfunction	□Open or short in No.1 vehicle speed sensor circuit □No.1 vehicle speed sensor □Combination meter □ECM	★	○
P0710 (DI-340)	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)	□Open or short in ATF temperature sensor circuit □ATF temperature sensor □ECM	★	○
P0750 (DI-341)	Shift Solenoid "A" Malfunction (Shift Solenoid Valve No.1)	□Shift solenoid valve No.1 is stuck open or closed □Valve body is blocked up or stuck	★	○
P0753 (DI-340)	Shift Solenoid "A" Electrical Malfunction (Shift Solenoid Valve No.1)	□Open or short in shift solenoid valve No.1 circuit □Shift solenoid valve No.1 □ECM	★	○
P0755 (DI-340)	Shift Solenoid "B" Malfunction (Shift Solenoid Valve No.2)	□Shift solenoid valve No.2 is stuck open or closed □Valve body is blocked up or stuck	★	○
P0758 (DI-341)	Shift Solenoid "B" Electrical Malfunction (Shift Solenoid Valve No.2)	□Open or short in shift solenoid valve No.2 circuit □Shift solenoid valve No.2 □ECM	★	○
P0770 (DI-344)	Shift Solenoid "E" Malfunction (Shift Solenoid Valve SL)	□Shift solenoid valve SL is stuck open or closed □Valve body is blocked up or stuck □Lock-up clutch	★	○
P0773 (DI-346)	Shift Solenoid "E" Electronical Malfunction (Shift Solenoid Valve SL)	□Open or short in shift solenoid valve SL circuit □Shift solenoid valve SL □ECM	★	○
P1520 (DI-349)	Stop Light Switch Circuit Malfunction	□Open or short in stop light switch signal circuit □Stop light switch □ECM	★	○
P1700 (DI-350)	Speed Sensor No.2 Circuit Malfunction (No.2 Vehicle Speed Sensor)	□Open or short in No.2 vehicle speed sensor circuit □No.2 vehicle speed sensor □ECM	★	○
P1780 (DI-354)	Park/Neutral Position Switch Malfunction	□Short in park/neutral position switch circuit □Park/neutral position switch □ECM	★	○

*: ★ ... MIL light up

DI4U1-01

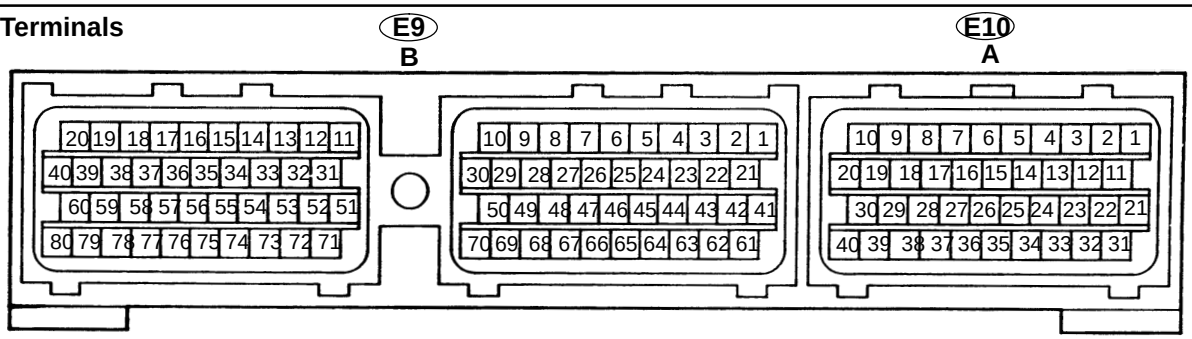
PARTS LOCATION



DI4U2-01

TERMINALS OF ECM

ECM Terminals



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S1 - E1 (B,10 - B,69)	W-R ↔ BR	IG OFF and disconnect ECM connector	11 - 15 Ω
		IG ON	9 - 14 V
		1st or 2nd gear	9 - 14 V
		3rd or O/D gear	Below 1.5 V
S2 - E1 (B,9 - B,69)	R-L ↔ BR	IG OFF and disconnect ECM connector	11 - 15 Ω
		IG ON	Below 1.5 V
		2nd or 3rd gear	9 - 14 V
		1st or O/D gear	Below 1.5 V
S3 - E1 (B,8 - B,69)	B-R ↔ BR	IG OFF and disconnect ECM connector	11 - 15 Ω
		IG ON	Below 1.5 V
		Vehicle driving under lock-up position	9 - 14 V
$SP2^+$ - $SP2^-$ (B,23 - B,3)	R ↔ G	IG OFF and disconnect ECM connector	560 - 680 Ω
		Turn one rear wheel slowly	Pulse signal is output Below 1.5 V ↔ 4-6 V
OD1 - E1 (A,12 - B,69)	LG-B ↔ BR	IG ON	4 - 6 V
OD2 - E1 (A,28 - B,69)	V ↔ BR	O/D main switch ON (O/D ON)	9 - 14 V
		O/D main switch OFF (O/D OFF)	Below 3 V
L - E1 (A,10 - B,69)	G-B ↔ BR	IG ON (Shift lever L position)	7.5 - 14 V
		IG ON (Shift lever other than L position)	Below 1.5 V
2 - E1 (A,9 - B,69)	L-Y ↔ BR	IG ON (Shift lever 2 position)	7.5 - 14 V
		IG ON (Shift lever other than 2 position)	Below 1.5 V
NSW - E1 (B,76 - B,69)	B-W ↔ BR	IG ON (Shift lever P or N position)	Below 3 V
		IG ON (Shift lever other than P and N position)	9 - 14 V
KD - E1 (A,3 - B,69)	Y ↔ BR	IG ON (Fully depressed (Kick-down switch is ON))	Below 3 V
		IG ON (Released (Kick-down switch is OFF))	9 - 14 V
M - E1 (A,18 - B,69)	G-Y ↔ BR	IG ON (Pattern select switch: MANU ON)	Below 3 V
		IG ON (Pattern select switch: MANU OFF)	9 - 14 V
MI - E1 (A,25 - B,69)	W-L ↔ BR	IG ON (Manual pattern mode)	Below 3 V
		IG ON (Normal pattern mode)	9 - 14 V
THO - E2 (B,24 - B,65)	L-B ↔ W-B	ATF temperature 110˚C (230˚F)	Below 1.5 V

DI4U3-01

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but 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 trouble-shooting.

The Matrix Chart is divided into 3 chapters.

Chapter 1: Electronic Circuit Matrix Chart
Chapter 2: On-Vehicle Repair Matrix Chart
Chapter 3: Off-Vehicle Repair Matrix Chart

When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to Chapter 2 or 3, proceed as instructed.

- ☐ If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for 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, then check or replace the ECM.

Chapter 1: Electronic Circuit

Symptom	Suspect Area	See page
No up-shift (A particular gear, from 1st to 3rd gear, is not up-shifted)	1. ECM	DI-332
No up-shift (3rd → O/D)	1. O/D Main Switch & O/D OFF Indicator Light Circuit 2. O/D Cancel Signal Circuit 3. ECM	DI-364 DI-369 DI-332
No down-shift (O/D → 3rd)	1. O/D Main Switch & O/D OFF Indicator Light Circuit 2. O/D Cancel Signal Circuit 3. ECM	DI-364 DI-369 DI-332
No down-shift (A particular gear, from 1st to 3rd gear, is not down-shifted)	1. ECM	DI-332
No lock-up	1. Kick-down Switch Circuit 2. ECM	DI-357 DI-332
No lock-up off	1. ECM	DI-332
Shift point too higher or too low	1. Pattern Select Switch Circuit 2. ECM	DI-360 DI-332
Up-shifts to O/D from 3rd while O/D main switch is OFF	1. O/D Main Switch & O/D OFF Indicator Light Circuit 2. ECM	DI-364 DI-332
Up-shifts to O/D from 3rd while engine is cold	1. ECM	DI-332
Poor acceleration	1. Kick-down Switch Circuit 2. ECM	DI-357 DI-332
No kick-down	1. Kick-down Switch Circuit 2. ECM	DI-357 DI-332
*No pattern select	1. Pattern Select Switch Circuit 2. ECM	DI-360 DI-332
Engine stalls when starting off or stopping	1. ECM	DI-332

*: The automatic transmission is not shifted into the manual mode when the ATF temperature is too high.

Chapter 2: On-Vehicle Repair
(★: A340E, A340F, A340H AUTOMATIC TRANSMISSION Repair Manual Pub.No. RM391U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Throttle cable 2. Transmission control rod 3. Manual valve 4. Primary regulator valve 5. Parking lock pawl 6. Off-vehicle repair matrix chart	DI-318 DI-318 ★ ★ AT-14 DI-333
Vehicle does not move in R position	1. Off-vehicle repair matrix chart	DI-333
Vehicle does not move in a particular positions or positions (except R position)	1. Off-vehicle repair matrix chart	DI-333
No up shift (1st → 2nd)	1. 1-2 shift valve 2. Off-vehicle repair matrix chart	★ DI-333
No up shift (2nd → 3rd)	1. 2-3 shift valve 2. Off-vehicle repair matrix chart	★ DI-333
No up shift (3rd → O/D)	1. 3-4 shift valve 2. Off-vehicle repair matrix chart	★ DI-333
No down shift (O/D → 3rd)	1. 3-4 shift valve	★
No down shift (3rd → 2nd)	1. 2-3 shift valve	★
No down shift (2nd → 1st)	1. 1-2 shift Valve 2. Off-vehicle repair matrix chart	★ DI-333
Lock-up does not engage or Lock-up does not disengage	1. Lock-up relay valve 2. Off-vehicle repair matrix chart	★ DI-333
Harsh engagement (N → D)	1. Accumulator control valve 2. Off-vehicle repair matrix chart	★ DI-333
Harsh engagement (Lock-up)	1. Lock-up relay valve 2. Off-vehicle repair matrix chart	★ DI-333
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Off-vehicle repair matrix chart	★ ★ DI-333
Harsh engagement (N → L)	1. Low coast modulator valve	★
Harsh engagement (1st → 2nd (D position))	1. Accumulator control valve 2. B_2 accumulator	★ ★
Harsh engagement (1st → 2nd (2 position))	1. Accumulator control valve 2. B_2 accumulator	★ ★
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Throttle valve 2. Accumulator control valve	★ ★
Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. C_2 accumulator 3. Off-vehicle repair matrix chart	★ ★ DI-333
Harsh engagement (3rd → O/D)	1. Accumulator control valve 2. B_0 accumulator 3. Off-vehicle repair matrix chart	★ ★ DI-333
Harsh engagement (O/D → 3rd)	1. Accumulator control valve 2. C_0 accumulator 3. Off-vehicle repair matrix chart	★ ★ DI-333
Slip or Shudder (Forward and Reverse)	1. Throttle cable 2. Trasmission control rod 3. Oil strainer 4. Pressure relief valve 5. Off-vehicle repair matrix chart	DI-318 DI-318 AT-10 ★ DI-333

Slip or Shudder (Particular position)	1. Throttle cable 2. Trasmission control rod 3. Off-vehicle repair matrix chart	DI-318 DI-318 DI-333
No engine braking (1st)	1. Low coast modulator valve 2. Off-vehicle repair matrix chart	★ DI-333
No engine braking (2nd)	1. 2nd coast modulator valve 2. Off-vehicle repair matrix chart	★ DI-333
No kick-down	1. 1-2 shift valve 2. 2-3 shift valve	★ ★

Chapter 3: Off-Vehicle Repair
(★: A341E, A340F, A340H AUTOMATIC TRANSMISSION Repair Manual Pub.No. RM391U)

SymptomSymptom	Suspect AreaSuspect Area	See page
Vehicle does not move in any forward position and reverse position	1. O/D One-Way Clutch (F_0) 2. O/D Brake (B_0) 3. O/D Direct Clutch (C_0) 4. O/D Planetary Gear Unit 5. Torque Converter Clutch	★ ★ ★ ★ AT-25
Vehicle does not move in R position	1. 2nd Coast Brake (B_1) 2. Front and Rear Planetary Gear Unit 3. Direct Clutch (C_2) 4. 1st and Reverse Brake (B_3) 5. O/D Direct Clutch (C_0)	★ ★ ★ ★ ★
Vehicle does not move in (D, 2 and L positions)	1. Forward Clutch (C_1)	★
Vehicle does not move in (D and 2 positions)	1. No.2 One-Way Clutch (F_2)	★
Vehicle does not move in (2 position)	1. 1st and Reverse Brake (B_3)	★
Vehicle does not move in (L position)	1. 2nd Brake (B_2) 2. 2nd Coast Brake (B_1) 3. Direct Clutch (C_2)	★ ★
No up-shift (1st → 2nd)	1. 2nd Brake (B_2) 2. No.1 One-way Clutch (F_1)	★ ★
No up-shift (2nd → 3rd)	1. Direct Clutch (C_2)	★
No up-shift (3rd → O/D)	1. O/D Brake (B_0)	★
No down shift (2nd → 1st)	1. 2nd Coast Brake (B_1) 2. 2nd Brake (B_2)	★ ★
Lock-up does not engage or Lock-up does not disengage	1. Torque Converter Clutch	AT-25
Harsh engagement (N → D)	1. Forward Clutch (C_1)	★
Harsh engagement (N → R)	1. Direct Clutch (C_2) 2. 1st and Reverse Brake (B_3)	★ ★
Harsh engagement (2nd → 3rd)	1. 2nd Coast Brake (B_1)	★
Harsh engagement (3rd → O/D)	1. O/D Direct Clutch (C_0) 2. O/D Brake (B_0) 3. O/D Planetary Gear Unit	★ ★ ★
Harsh engagement (O/D → 3rd)	1. O/D Brake (B_0)	★
Harsh engagement (Lock-up)	1. Torque Converter Clutch	AT-25
Slip or Shudder (Forward and Reverse (After warm-up))	1. Torque Converter Clutch 2. O/D One-Way Clutch (F_0) 3. O/D Direct Clutch (C_0)	AT-25 ★ ★
Slip or Shudder (Forward and Reverse (Just after engine starts))	1. Torque Converter Clutch	AT-25
Slip or Shudder (R position)	1. Direct Clutch (C_2) 2. 1st and Reverse Brake (B_3)	★ ★

Slip or Shudder (1st)	1. Forward Clutch (C_1) 2. No.2 One-Way Clutch (F_2)	★ ★
Slip or Shudder (2nd)	1. 2nd Brake (B_2) 2. 2nd Coast Brake (B_1) 3. No.1 One-way Clutch (F_1)	★ ★ ★
Slip or Shudder (3rd)	1. Direct Clutch (C_2)	★
Slip or Shudder (O/D)	1. O/D Brake (B_0)	★
No engine braking (1st ~ 3rd)	1. O/D Direct Clutch (C_0)	★
No engine braking (1st)	1. 1st and Reverse Brake (B_3)	★
No engine braking (2nd)	1. 2nd Coast Brake (B_1)	★
Poor acceleration (All positions)	1. Torque Converter Clutch	AT-25
Poor acceleration (O/D)	1. O/D Direct Clutch (C_0) 2. O/D Planetary Gear Unit	★ ★
Poor acceleration (Other than O/D)	1. O/D Brake (B_0)	★
Poor acceleration (Other than 2nd)	1. 2nd Coast Brake (B_1) 2. 2nd Brake (B_2)	★ ★
Poor acceleration (1st and 2nd)	1. Direct Clutch (C_2)	★
Poor acceleration (L and R positions)	1. 1st and Reverse Brake (B_3)	★
Poor acceleration (R position)	1. Forward Clutch (C_1)	★
Engine stalls when starting off or stopping	1. Torque Converter Clutch	AT-25

DI4U4-01

CIRCUIT INSPECTION

DTC	P0500	Vehicle Speed Sensor Malfunction

See page DI-100 .

DI4U5-01

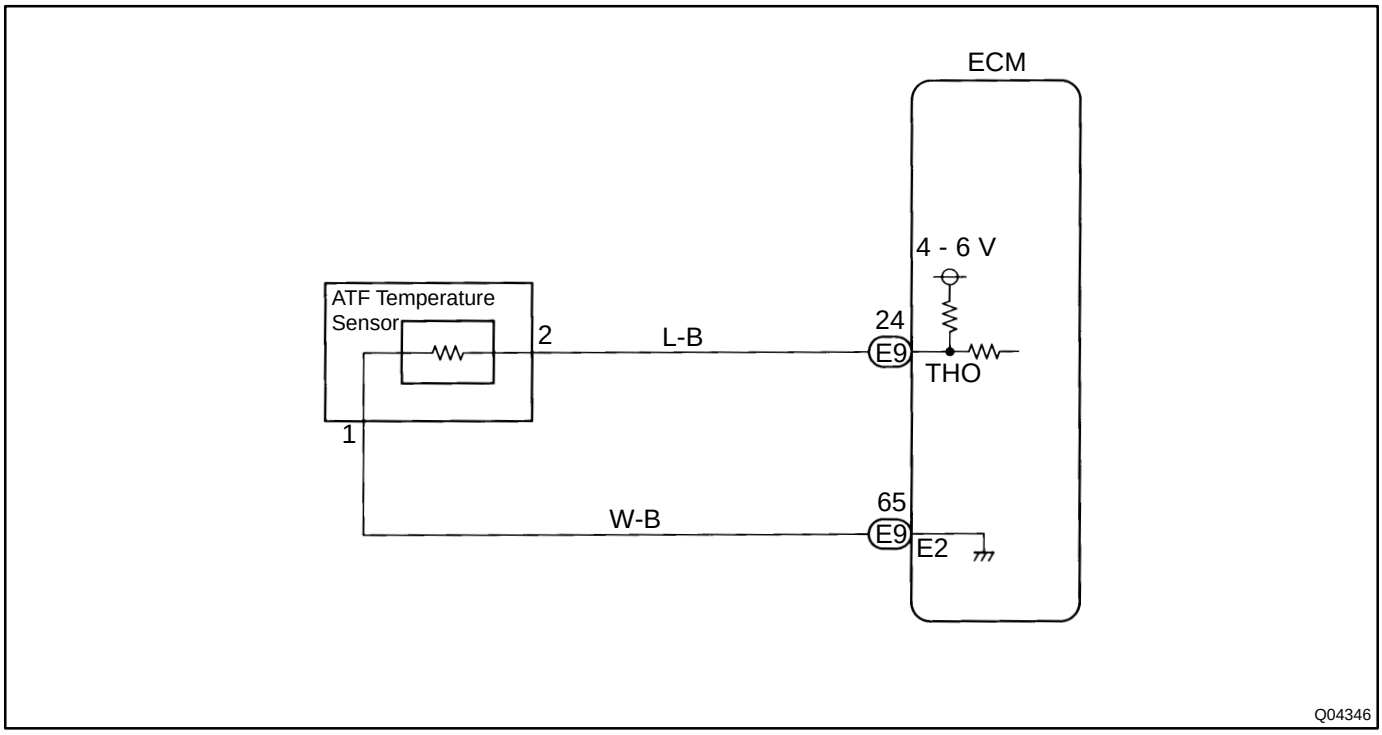
DTC	P0710	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)

CIRCUIT DESCRIPTION

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

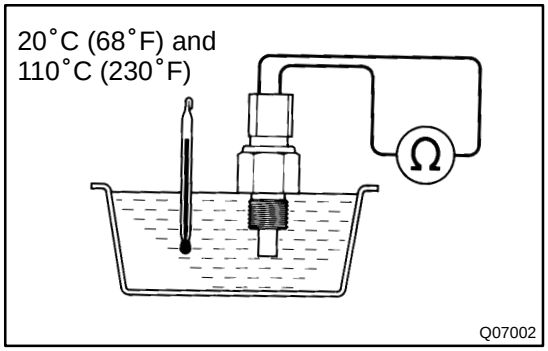
DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either (a) or (b) are detected for 0.5 sec. or more. (a) Temperature sensor resistance less than 79 Ω. (b) After the engine has been operating for 15 minutes or more, the resistance at the temperature sensor is more than 156 kΩ.	★Open or short in ATF temperature sensor circuit ★ATF temperature sensor ★ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ATF Temperature Sensor.**



PREPARATION:
Remove the ATF temperature sensor.
CHECK:
Measure resistance between terminals of ATF temperature sensor at 20˚C (68˚F) and 110˚C (230˚F).
OK:

Resistance:
20˚C (68˚F) : Approx. 12.08 kΩ
110˚C (230˚F) : Approx. 780 Ω

NG → **Replace ATF temperature sensor.**

OK

2	**Check harness and connector between ATF temperature sensor and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM.

DI4U6-01

DTC	P0750, P0755	Shift Solenoid "A"/"B" Malfunction (Shift Solenoid Valve No.1/No.2)

SYSTEM DESCRIPTION

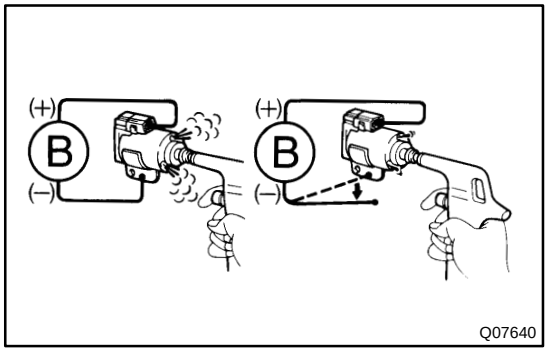
The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear). The ECM then compares the actual gear with the shift schedule in the ECM memory to detect mechanical trouble of the shift solenoid valves and valve body.

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the ECM does not match the actual gear. (2 trip detection logic)	★Shift solenoid valve No.1/No.2 is stuck open or closed. ★Valve body is blocked up or stuck.

Check the shift solenoid valve No.1 when DTC P0750 is output and check the shift solenoid valve when DTC P0755 is output.

INSPECTION PROCEDURE

1	Check shift solenoid valve No.1 or No.2 operation.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the shift solenoid valve No.1 or No.2.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the shift solenoid valves do not leak air.

(b) When battery positive voltage is supplied to the shift solenoid valves, check they open.

NG → **Replace shift solenoid valve No.1 or No.2.**

OK

2	Check valve body (See page AT-10).

NG → **Repair or replace valve body.**

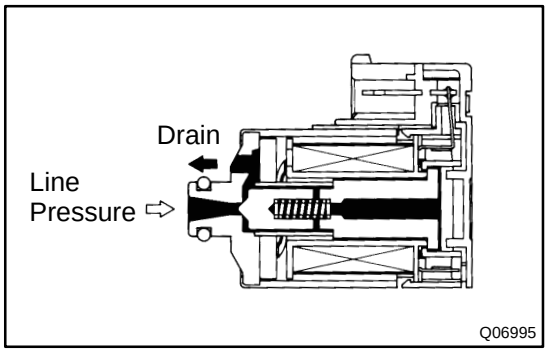
OK

Repair the transmission (See page AT-19).

DI4U8-01

DTC	P0770	Shift Solenoid ”E” Malfunction (Shift Solenoid Valve SL)

SYSTEM DESCRIPTION



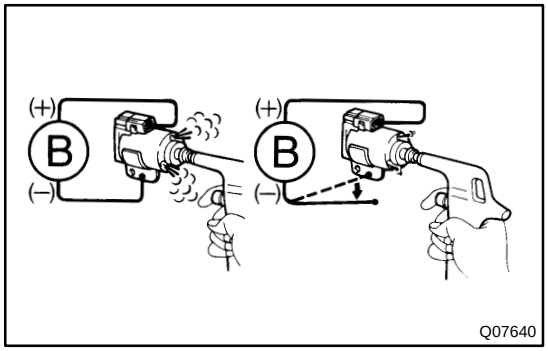
The ECM uses the signals from the throttle position sensor, air-flow meter and to monitor the engagement condition of the lock-up clutch.

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

DTC No.	DTC Detecting Condition	Trouble Area
P0770	Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h (50 mph)), or lock-up remains ON in the lock-up OFF range. (2 trip detection logic)	★Shift solenoid valve SL is stuck open or closed ★Valve body blocked up or stuck ★Lock-up clutch

INSPECTION PROCEDURE

1	Check shift solenoid valve SL operation.



PREPARATION:

Remove the shift solenoid valve SL from valve body.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.

(b) When battery positive voltage is supplied to the shift solenoid valve, check it opens.

NG → **Replace shift solenoid valve SL.**

OK

2	Check valve body (See page AT-10).

NG → Repair or replace valve body.

OK →

Replace torque converter clutch
(See page AT-19).

DI4U9-01

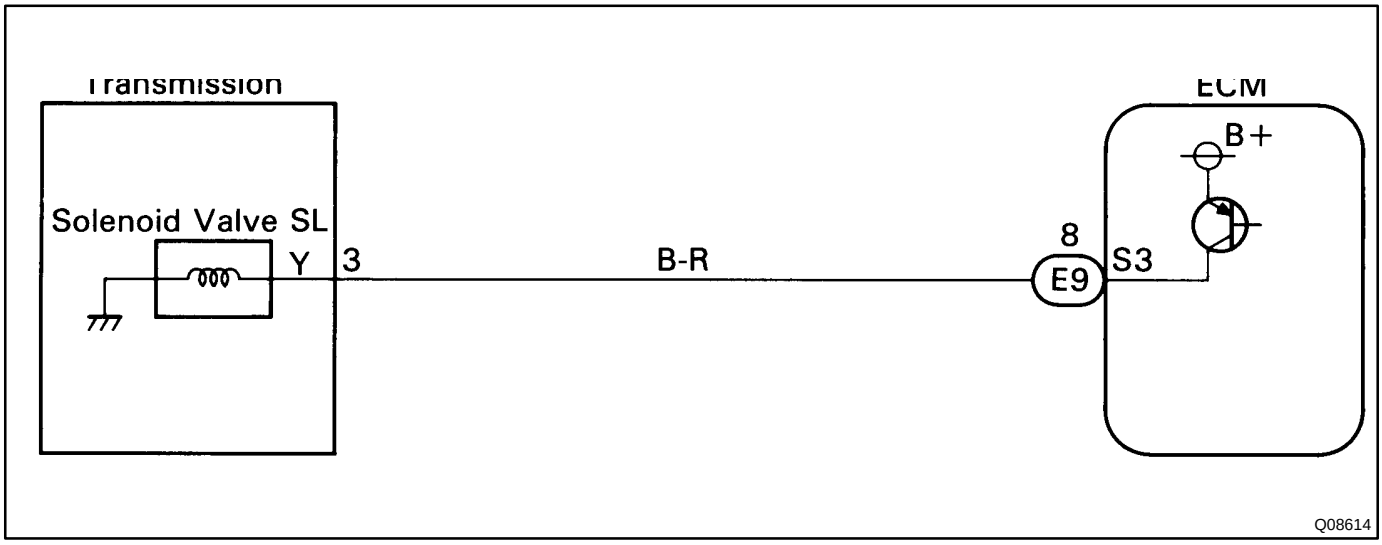
DTC	P0773	Shift Solenoid ”E” Eletrical Malfunction (Shift Solenoid Valve SL)

SYSTEM DESCRIPTION

The shift solenoid valve SL is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.
Fail safe Function:
If the ECM detects a malfunction, it turns the shift solenoid valve SL OFF.

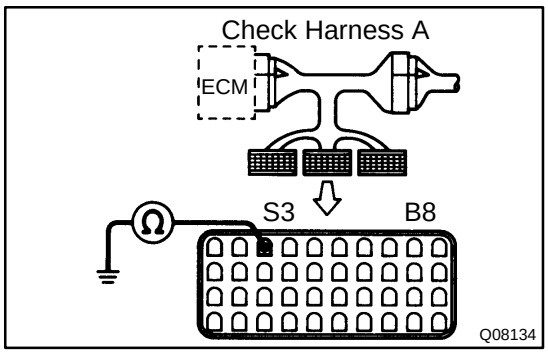
DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either (a) or (b) are detected for 1 time. (2 trip detection logic) (a) Solenoid resistance is 8 Ω or less short circuit when solenoid is energized (b) Solenoid resistance is 100 kΩ or more open circuit when solenoid is not energized	★Open or short in shift solenoid valve SL circuit ★Shift solenoid valve SL ★ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal SL of ECM and body ground.**



PREPARATION:

(a) Disconnect the connector from ECM.

(b) Connect the check harness A to the harness side connector. (See page DI-332)

NOTICE:

Do not connect the check harness A to ECM.

CHECK:

Measure resistance between terminal S3 or check harness A and body ground.

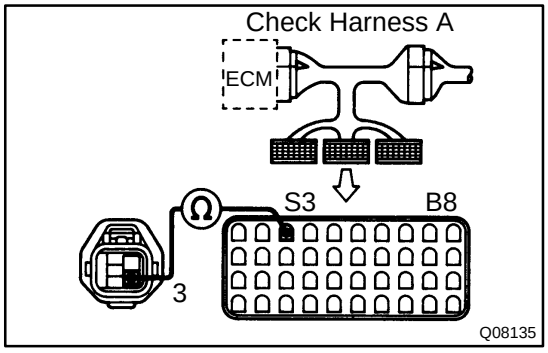
OK:

Resistance: 11 - 15 Ω

OK	**Check and replace ECM.**

NG

2	**Check harness and connector between ECM and automatic transmission solenoid connector.**



PREPARATION:

(a) Disconnect the connector from ECM.

(b) Connect the check harness A to the harness side connector. (See page DI-332)

(c) Disconnect the solenoid connector from the automatic transmission.

NOTICE:

Do not connect the check harness A to ECM.

CHECK:

Check harness and connector between terminal S3 of check harness A and terminal 3 of solenoid connector.

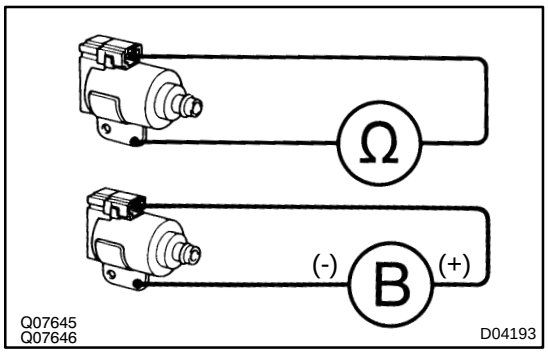
OK:

There is no open or short circuit.

NG	**Repair or replace harness or connector.**

OK

3	Check shift solenoid valve SL.



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the shift solenoid valve SL.

CHECK:

Measure resistance between solenoid connector and solenoid body.

OK:

Resistance: 11 - 15 Ω

CHECK:

Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

The solenoid makes operation noise.

NG → **Replace shift solenoid valve SL.**

OK

Check and replace or repair the solenoid wire.

DI4UA-01

DTC	P1520	Stop Light Switch Circuit 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 operated, this switch sends a signal to ECM. Then the ECM cancels operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P1520	The stop light switch does not turn off even once the vehicle is driven (2 trip detection logic)	★Short in stop light switch signal circuit ★Stop light switch ★ECM

WIRING DIAGRAM

See page DI-123

INSPECTION PROCEDURE

See page DI-123

DI4UB-01

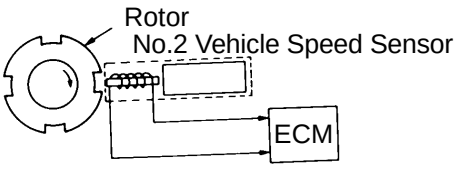
DTC	P1700	Speed Sensor No.2 Circuit Malfunction (No.2 Vehicle Speed Sensor)

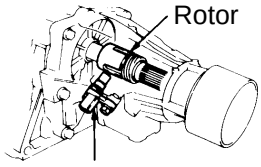
CIRCUIT DESCRIPTION

The No.2 vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. The ECM determines the vehicle speed based on the these signals. An AC voltage is generated in the No.2 vehicle speed senor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the ECM.

The gear shift point and lock-up timing are controlled by the ECM based on the signals from this vehicle speed sensor and the throttle position sensor signal.

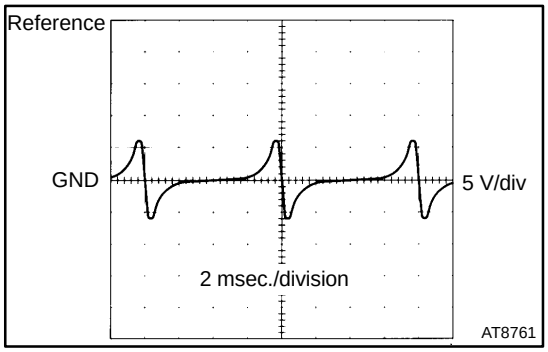
If the No.2 vehicle speed sensor malfunctions, the ECM uses input signals from the No.1 vehicle speed sensor as a back-up signal.





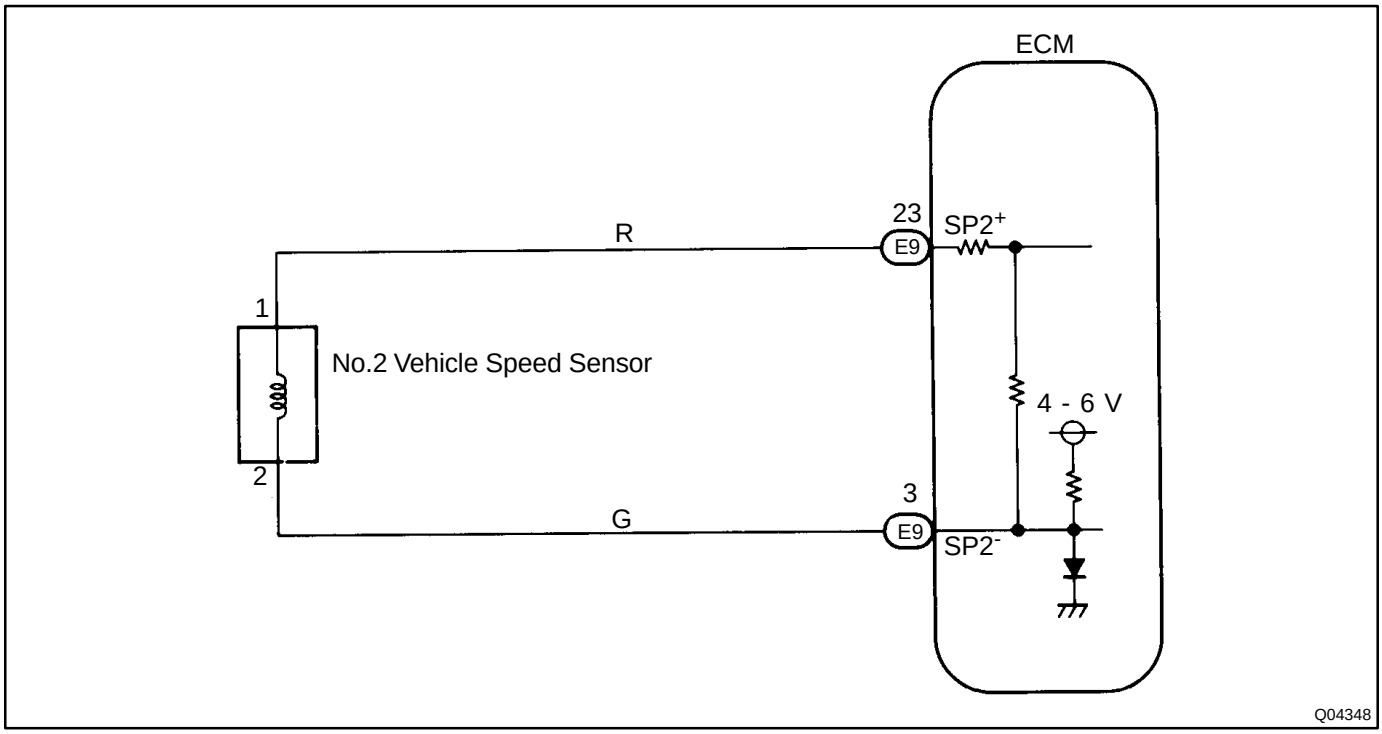
Q04812 Q04813 D04194

DTC No.	DTC Detecting Condition	Trouble Area
P1700	All conditions below are detected 500 times or more continuously. (2 trip detection logic) (a) No signal from No.2 vehicle speed sensor is input to ECM while 4 pulses of No.1 vehicle speed senor signal is sent. (b) Vehicle speed: 9 km/h (5.6 mph) or more for at least 4 secs. (c) Park/Neutral position switch: OFF (Other than P or N position)	★Open or short in No.2 vehicle speed sensor circuit ★No.2 vehicle speed sensor ★ECM



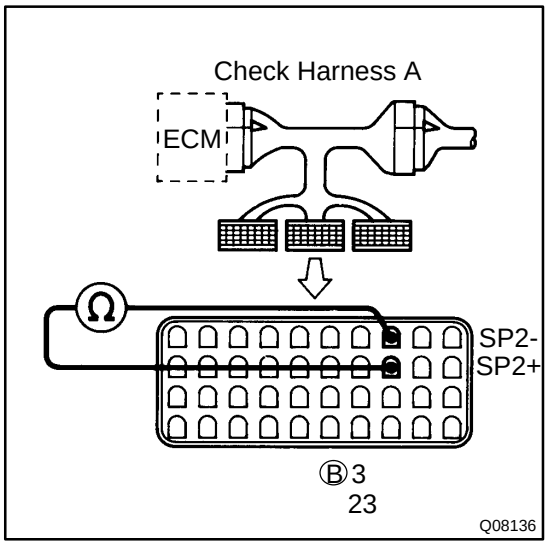
Waveform between terminals $SP2^+$ and $SP2^-$ when vehicle speed is approx. 60 km/h (37 mph).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check vehicle speed value or resistance between terminals $SP2^+$ and $SP2^-$ of ECM.**



When using OBDII scan tool or TOYOTA hand-held tester:

PREPARATION:

(a) Connect the OBDII scan tool or TOYOTA hand-held tester to the DLC3.

(b) Start the engine and OBDII scan tool or TOYOTA hand-held tester main switch ON.

CHECK:

Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value.

When not using OBDII scan tool or TOYOTA hand-held tester:

PREPARATION:

(a) Disconnect the connector from ECM.

(b) Connect the check harness A to the harness side connector. (See page DI-20)

NOTICE:

Do not connect the check harness A to ECM.

CHECK:

Check resistance between terminals $SP2^+$ and $SP2^-$ of check harness A.

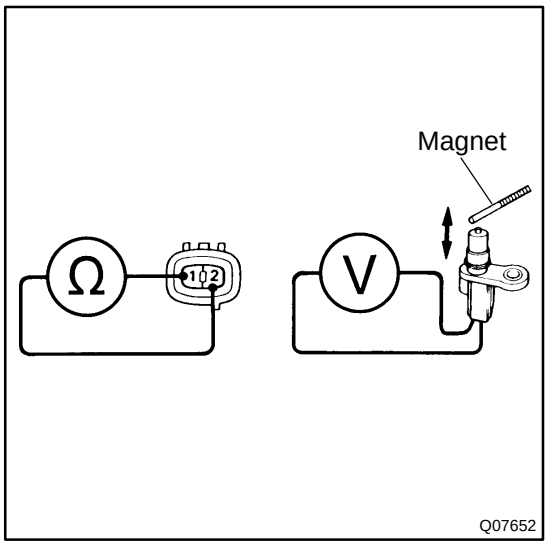
OK:

Resistance: 560 - 680 Ω

OK	**Check and replace ECM.**

NG

2	Check No.2 vehicle speed sensor.



PREPARATION:

Remove the No.2 vehicle speed sensor from transmission.

CHECK:

Measure resistance between terminals 1 and 2 of vehicle speed sensor.

OK:

Resistance: 560 - 680 Ω

Reference:

Check the vehicle speed sensor's function

CHECK:

Check voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to the front end of the vehicle speed sensor, then taken away quickly.

OK:

Voltage is generated intermittently.

HINT:

The generated voltage is extremely low.

NG → **Replace No.2 vehicle speed sensor.**

OK

Check and repair harness and connector between ECM and No.2 vehicle speed sensor (See page IN-28).

DI4UC-01

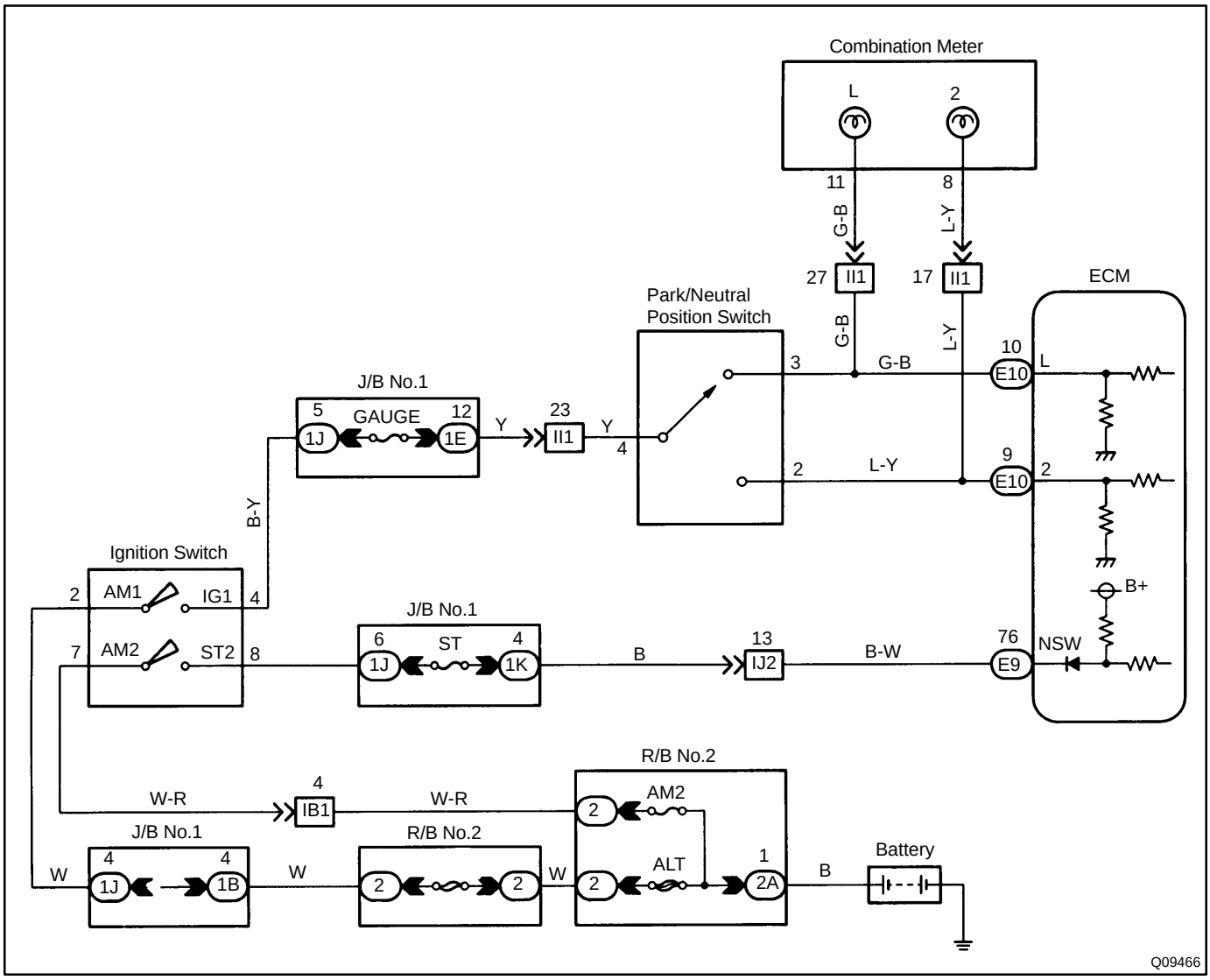
DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.
The ECM receives signals (NSW, 2 and L) from the park/neutral position switch. When the signal is not sent to the ECM from the park/neutral position switch, the ECM judges that the shift lever is in the D position.

DTC No.	DTC Detecting Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for "N", "2" or "L" position. (2 trip detection logic)	★Short in park/neutral position switch circuit ★Park/neutral position switch ★ECM
	When driving under conditions (a), (b) and (c) for 30 seconds or more, the park/neutral position switch is ON (N position). (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 2,000 ~ 2,500 rpm (c) Engine load: 0.7 g/rev	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check PNP SW, 2ND or LOW signal.**

When using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

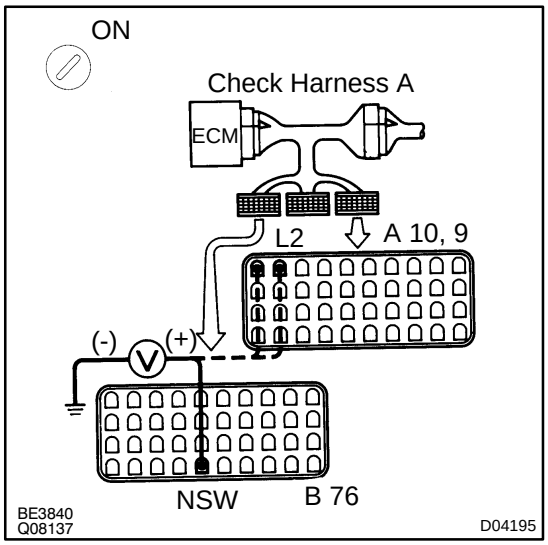
(b) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

Shift the shift lever to the P, N, 2, or L position, and read the PNP SW, 2ND or LOW signal on the TOYOTA hand-held tester.

OK:

Shift position	Signal
P, N	PNP SW ..... OFF → ON
2	2ND ..... OFF → ON
L	LOW ..... OFF → ON



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the check harness A to the ECM (See page DI-20).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals NSW, 2, L of check harness A and body ground when the shift lever is moved to the following positions.

OK:

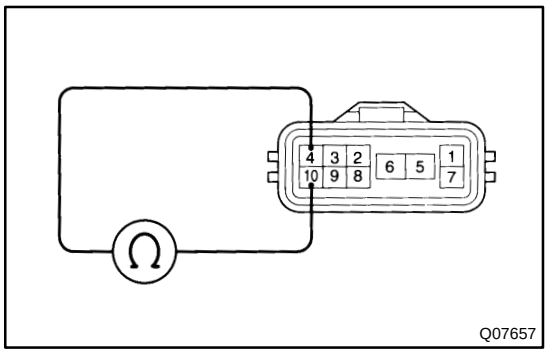
Position	NSW-body ground	2-body ground	L-body ground
P, N	0 V	0 V	0 V
R	9 - 14 V*	0 V	0 V
D	9 - 14 V	0 V	0 V
2	9 - 14 V	7.5 - 14 V	0 V
L	9 - 14 V	0 V	7.5 - 14 V

*: The voltage will drop slightly due to lighting up of the back up light.

OK → **Check and replace ECM.**

NG

2	Check park/neutral position switch.



PREPARATION:

(a) Jack up the vehicle.

(b) Disconnect the park/neutral position switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each position.

Shift position	Terminal No. to continuity	
P	4 - 7	5 - 6
R	4 - 8	
N	4 - 10	5 - 6
D	4 - 9	
2	4 - 2	
L	4 - 3	

NG → **Replace park/ neutral position switch.**

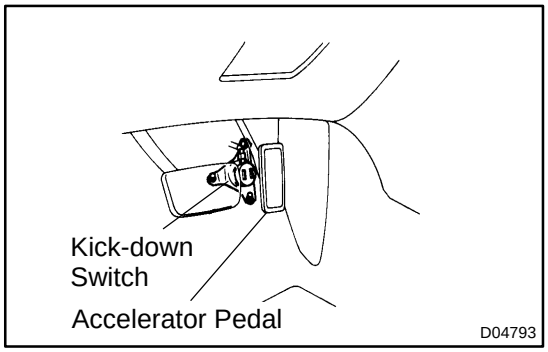
OK →

Repair or replace harness and connector between battery and park/neutral position switch, ECM and park/neutral position switch (See page IN-28).

DI4UD-01

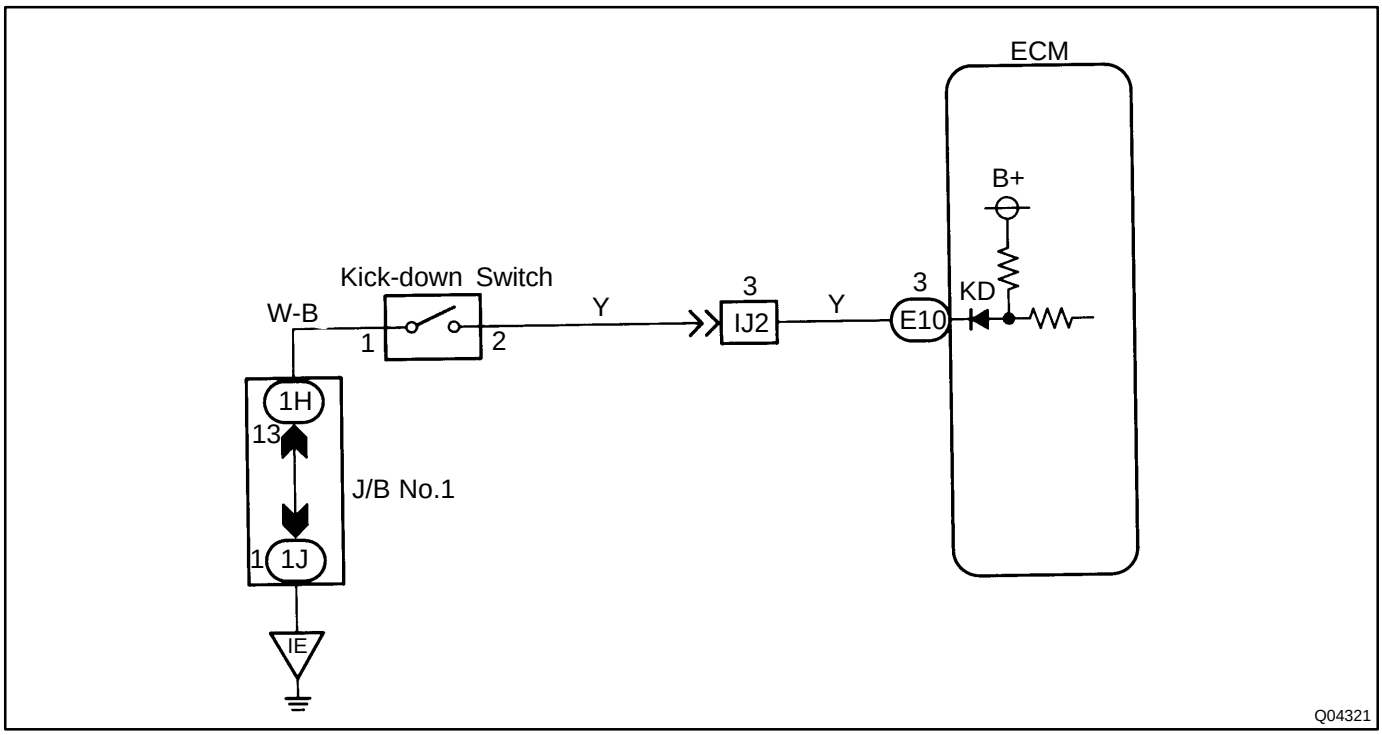
Kick-down Switch Circuit

CIRCUIT DESCRIPTION



The kick-down switch is turned on when the accelerator pedal is depressed beyond the full throttle opening and sends signals to ECM.
When the kick-down switch is turned on, the ECM controls gear shifting according to the programmed shift diagrams.
If a short circuit develops in the kick-down switch, the ECM disregards the kick-down signals and controls shifting at the normal shift points.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check KICK DOWN SW signal.**

When using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

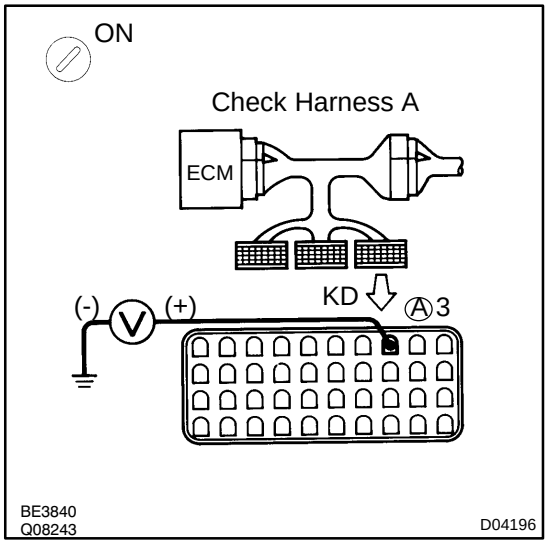
(b) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

Read the KICK DOWN SW signal on the TOYOTA hand-held tester.

OK:

Fully depressed
(Kick-down switch is ON): KICK DOWN SW ... ON
Released
(Kick-down switch is OFF): KICK DOWN SW ... OFF



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the Check Harness A to ECM
(See page DI-20).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal KD of check harness A and body ground when accel. pedal is fully depressed or not.

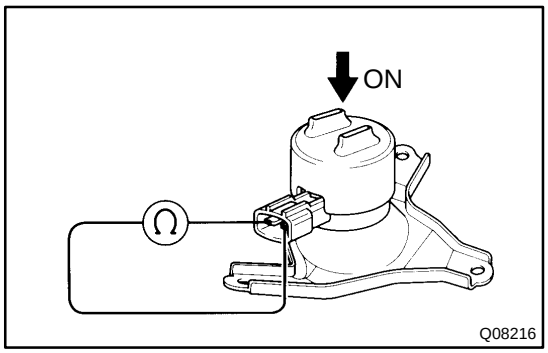
OK:

Accel. pedal	Voltage
Fully depressed (Kick-down switch is ON)	Below 3 V
Released (Kick-down switch is OFF)	9 - 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI-333).**

NG

2	Check kick-down switch.



CHECK:

(a) Disconnect the kick-down switch connector (See Page AT-9).

(b) Check continuity between terminals 1 and 2 of kick-down switch connector when kick-down switch is ON and OFF.

OK:

Kick-down switch	Specified condition
ON	Continuity
OFF	No continuity

NG → **Replace kick-down switch.**

OK

3	Check harness and connector between ECM and kick-down switch, kick-down switch and body ground (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM.

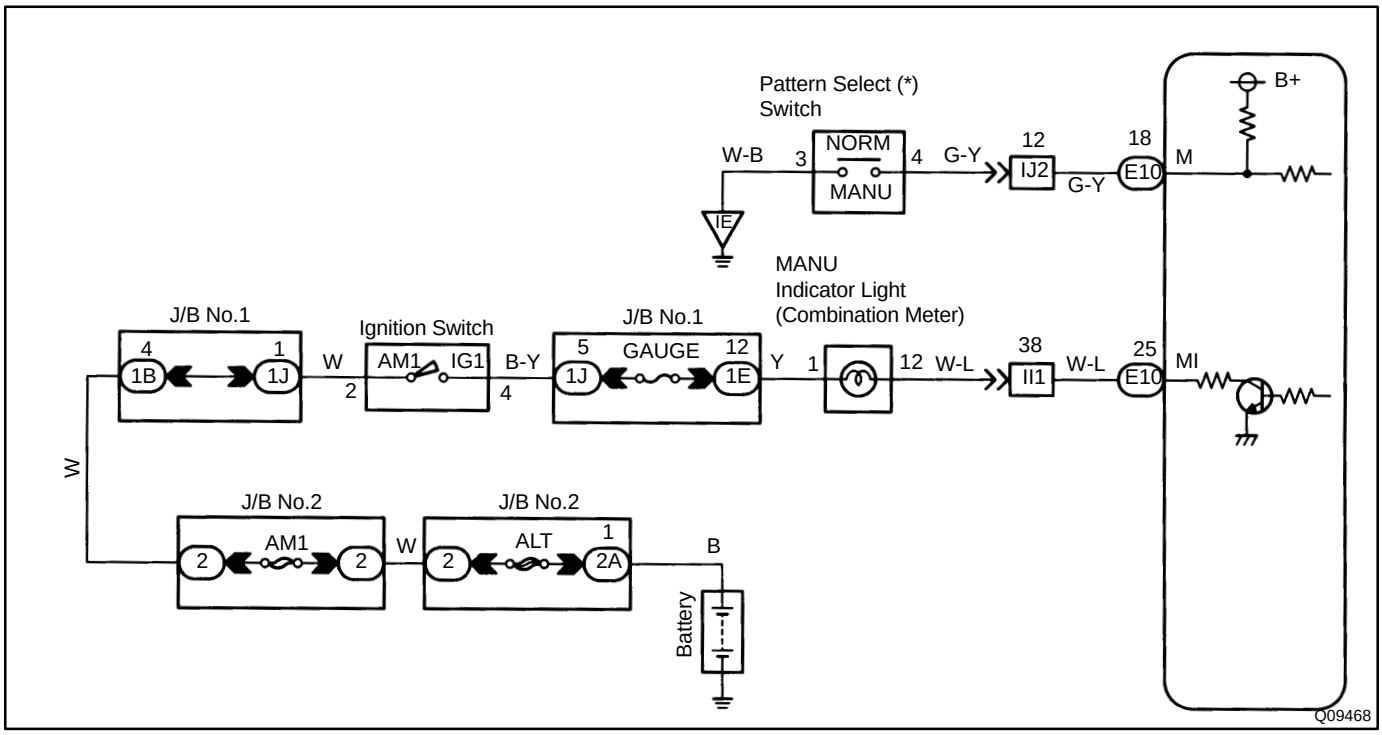
DI4UE-01

Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

The ECM memory contains the shift programs for the NORMAL and MANUAL patterns, 2 position, and L position and the lock-up patterns. Following the programs corresponding to the signals from the pattern select switch, the park/neutral position switch and other various sensors the ECM switches the solenoid valves ON and OFF, thereby controlling the transmission gear change and the lock-up clutch operation.

WIRING DIAGRAM



(*) Pattern Select Switch

When the pattern select switch is pushed, the switch is contacted and the MANUAL mode is selected. To cancel the MANUAL mode, push the pattern select switch once again.

The MANUAL mode is automatically cancelled out when the ignition switch is turned OFF.

INSPECTION PROCEDURE

"MANU" mode indicator light flashes for several seconds and goes off.

When ATF temperature becomes too hot, the "MANU" mode indicator light flashes for several seconds and goes off. The driving mode then automatically changes from Manual mode to the Normal mode. In case this sympton remains when the ATF temperature is lowered, check if DTC P0710 is displayed.

"MANU" mode indicator light dies not light up.

1	**Check operation of "MANU" indicator light.**

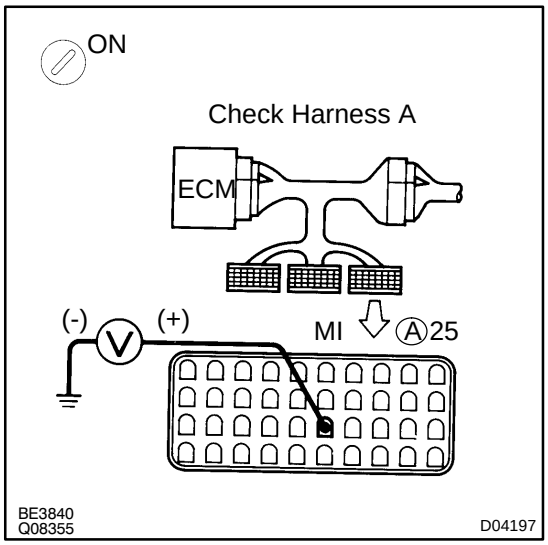
CHECK:

Check if the "MANU" indicator light normally when the pattern select switch is set to NORM and "MANU" position.

NG → **Check and repair "MANU" indicator light (See page BE-2).**

OK

2	**Check voltage between MI of ECM and body ground.**



PREPARATION:

(a) Connect the check harness A to ECM (See page DI-20).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal MI of check harness A and body ground.

OK:

Manual mode: Below 3 V

Normal mode: 9 - 14 V

OK → **Go to step 4.**

NG

3	**Check harness and connector between battery and combination meter, ECM and combination meter (See page IN-28).**

NG → **Replace or replace harness or connector.**

OK

4	**Check PATTERN SEL SW signal.**

When using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

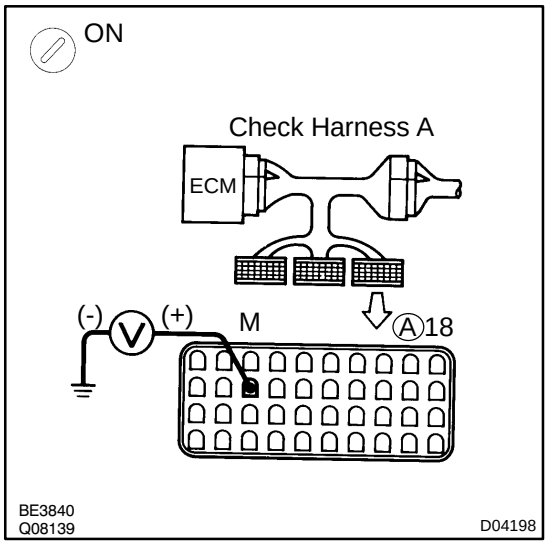
(b) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

Read the PATTERN SEL SW signal on the TOYOTA hand-held tester.

OK:

Pattern select switch pushed in:
PATTERN SEL SW .....ON
Pattern select switch pushed once again:
PATTERN SEL SW .....OFF



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the check harness A to ECM (See page DI-20).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal M of check harness A and body ground when the pattern select switch is set to the MANU (MANUAL) position and NORM (NORMAL) position.

OK:

Pattern select switch	Voltage
MANU	Below 3 V
NORM	9 ~ 14 V

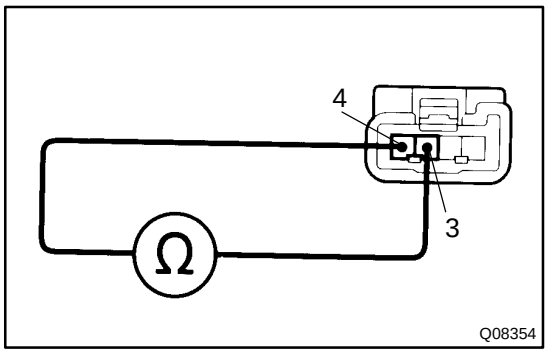
HINT:

The ECM uses the Normal pattern signal if the Manual signal is not input.

OK → **Check or replace ECM.**

NG

5	Check pattern select switch.



PREPARATION:

Disconnect the pattern select switch connector.

CHECK:

Check continuity between terminals 3 and 4 of the pattern select switch connector when the select switch is set to MANU and NORM positions.

OK:

Pattern	Specified condition
MANU	Continuity
NORM	No continuity

NG → **Replace pattern select switch.**

OK

6	Check harness and connector between pattern select switch and ECM (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI-333).

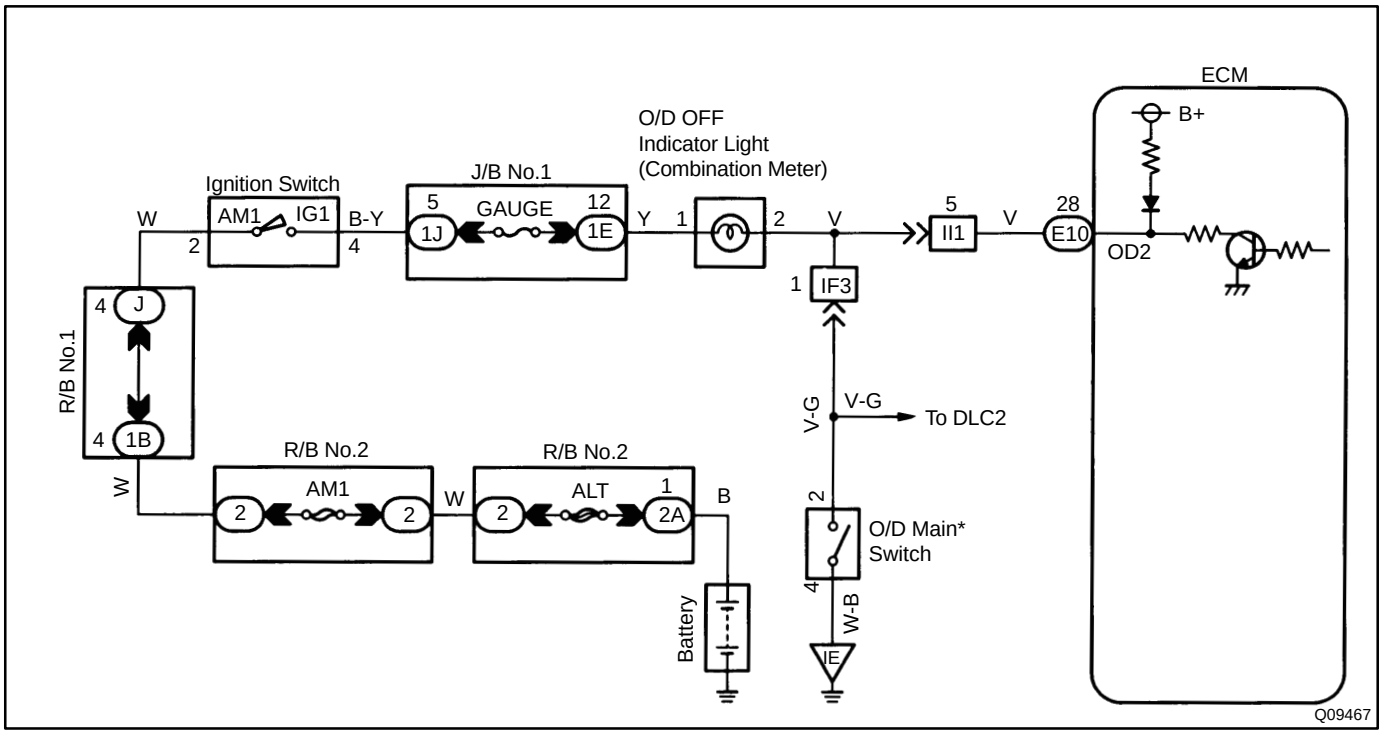
DI4UF-01

O/D Main Switch & O/D OFF Indicator Light Circuit

CIRCUIT DESCRIPTION

The O/D main switch contacts go open when the switch is pushed in and go closed when it is pushed once again.
In O/D main switch OFF position, the O/D OFF indicator lights up, and the ECM prohibits shifting to O/D.

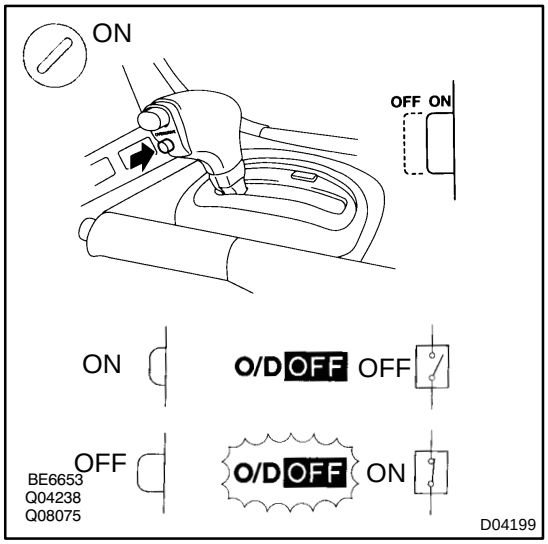
WIRING DIAGRAM



(*) O/D Main Switch
Contacts go open with switch pushed in.
Contacts go closed with switch pushed once again.

INSPECTION PROCEDURE
O/D OFF indicator light does not light up.

1	**Check operation of O/D Main Switch.**



CHECK:

(a) Turn the ignition switch ON.

(b) Check "O/D OFF" light when O/D main switch is pushed to ON.

OK:

"O/D OFF" light goes off.

(c) Check "O/D OFF" light when O/D main switch is pushed again, to OFF.

OK:

"O/D OFF" light lights up.

NG → **Go to step 4.**

OK

2	**Check OVERDRIVE CUT SW2 signal.**

When using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

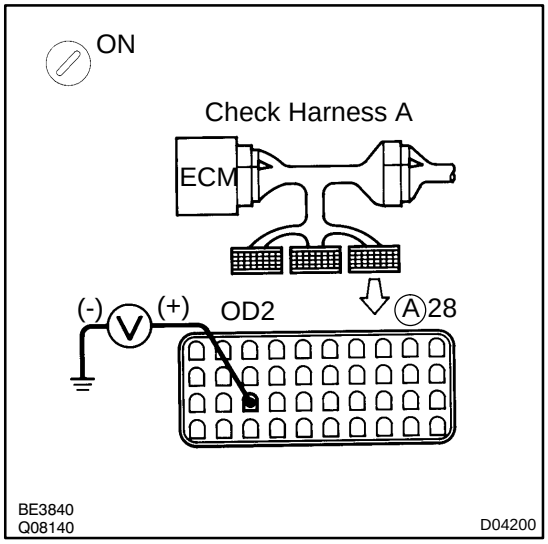
(b) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

Read the OVERDRIVE CUT SW2 signal on the TOYOTA hand-held tester.

OK:

O/D main switch pushed in:
OVERDRIVE CUT SW2 .....ON
O/D main switch pushed once again:
OVERDRIVE CUT SW2 .....OFF



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the check harness A to ECM (See page DI-20).

(b) Turn the ignition switch ON.

CHECK:

Check voltage between terminal OD2 of check harness A and body ground.

OK:

O/D Main Switch	Voltage
OFF	Below 3 V
ON	9 - 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI-333).**

NG

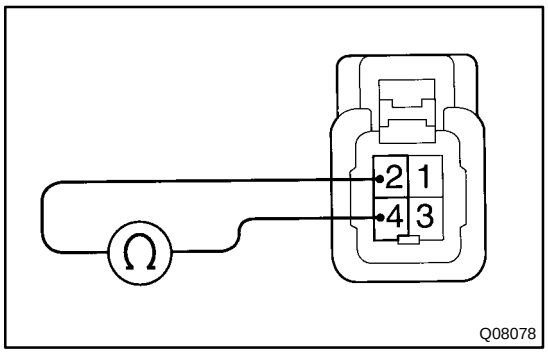
3	**Check harness and connector between O/D OFF indicator light and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM.

4	Check O/D Main Switch.



CHECK:

(a) Disconnect the O/D main switch connector.

(b) Check continuity between terminals 2 and 4 of O/D main switch connector.

OK:

O/D Main Switch	Spcified condition
ON	No continuity
OFF	Continuity

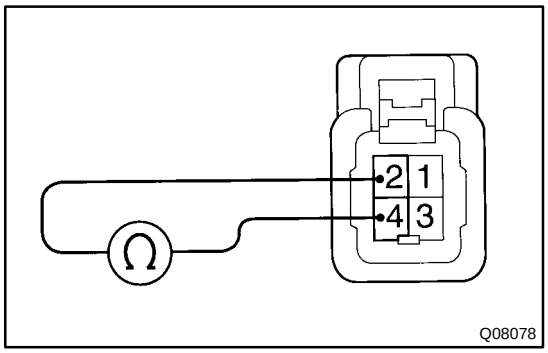
NG → **Replace O/D Main Switch.**

OK

Check and replace combination meter (See page BE-43).

O/D OFF indicator light remains ON.

1	Check O/D Main Switch.



CHECK:

(a) Disconnect the O/D main switch connector.

(b) Check continuity between terminals 2 and 4 of O/D main switch connector.

OK:

O/D Main Switch	Specified condition
ON	No continuity
OFF	Continuity

NG → **Replace O/D Main Switch.**

OK

2	**Check harness and connector between O/D OFF indicator light and O/D main switch, O/D OFF indicator light and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM.

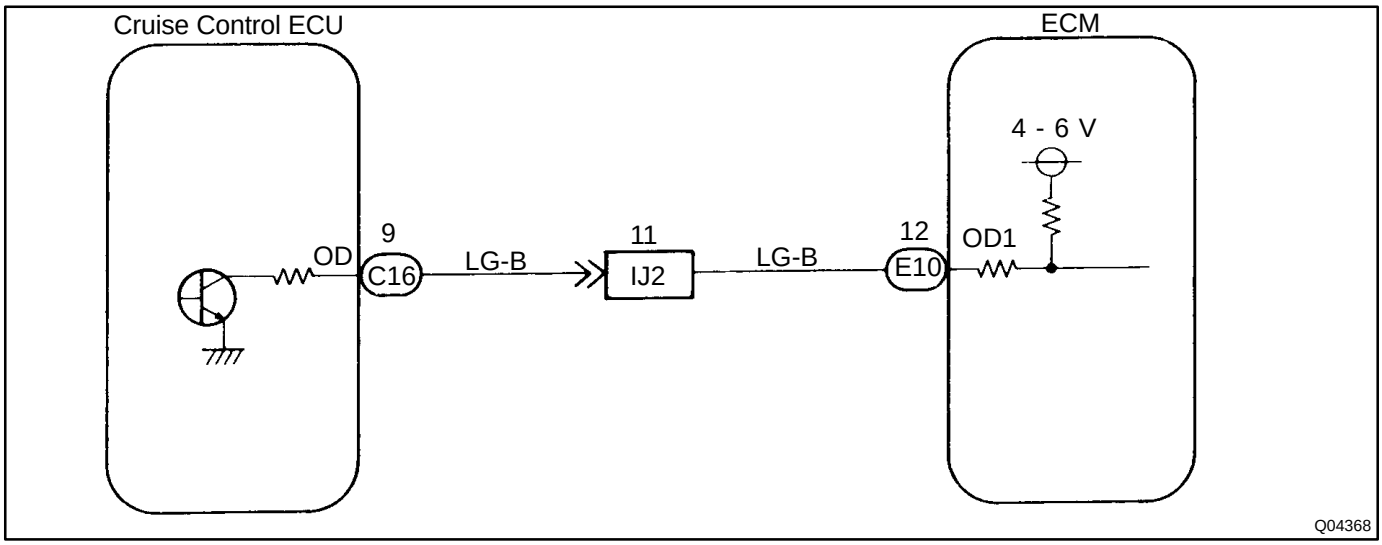
DI4UG-01

O/D Cancel Signal Circuit

CIRCUIT DESCRIPTION

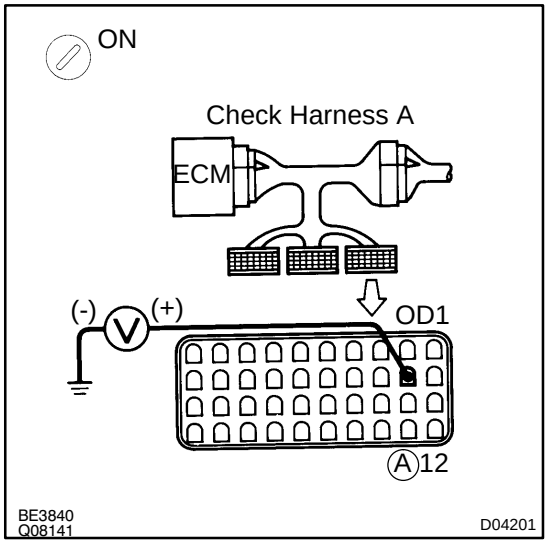
While driving uphill with cruise control activated, in order to minimize gear shifting and provide smooth cruising, O/D may be prohibited temporarily under some conditions.
The cruise control ECU sends O/D cut signals to the ECM as necessary and the ECM cancels O/D shifting until these signals are discontinued.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal OD1 of ECM and body ground.**



PREPARATION:

(a) Connect the check harness A to ECM
(See page DI-20).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal OD1 of check harness A and body ground.

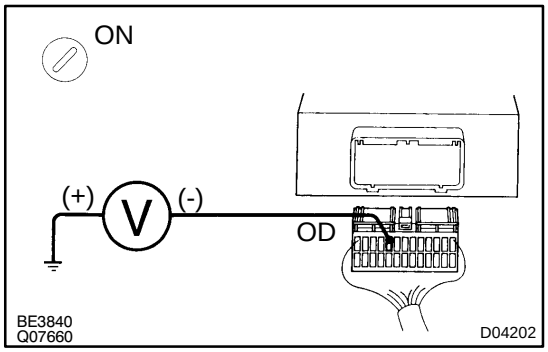
OK:

Voltage: 4 - 6 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI-333).**

NG

2	**Check voltage between terminal OD of cruise control ECU harness side connector and body ground.**



PREPARATION:

(a) Disconnect the cruise control ECU connector.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal OD of cruise control ECU harness side connector and body ground.

OK:

Voltage: 4 - 6 V

OK	**Check and replace cruise control ECU.**

3	**Check harness and connector between cruise control ECU and ECM (See page IN-28)**

NG	**Repair or replace harness or connector.**

OK

Check and replace ECM.