TOYOTA Service Bulletin

Section :	Chassis/ Power Train
Ref. No. :	CP−1026
Date :	Aug., 2001
Page :	1 of 43

Area Application : Europe, General
Model Name : LAND CRUISER
Model Code : UZJ100

Subject : REPAIR MANUAL SUPPLEMENT

This Service Bulletin is to inform you of the repair procedure for the A343F ATM due to the change from August, 2001.

The attached pages are to be used with the following manuals.

Pub. No.	Publication Name
RM616E	LAND CRUISER Chassis & Body Repair Manual

Production Effective :

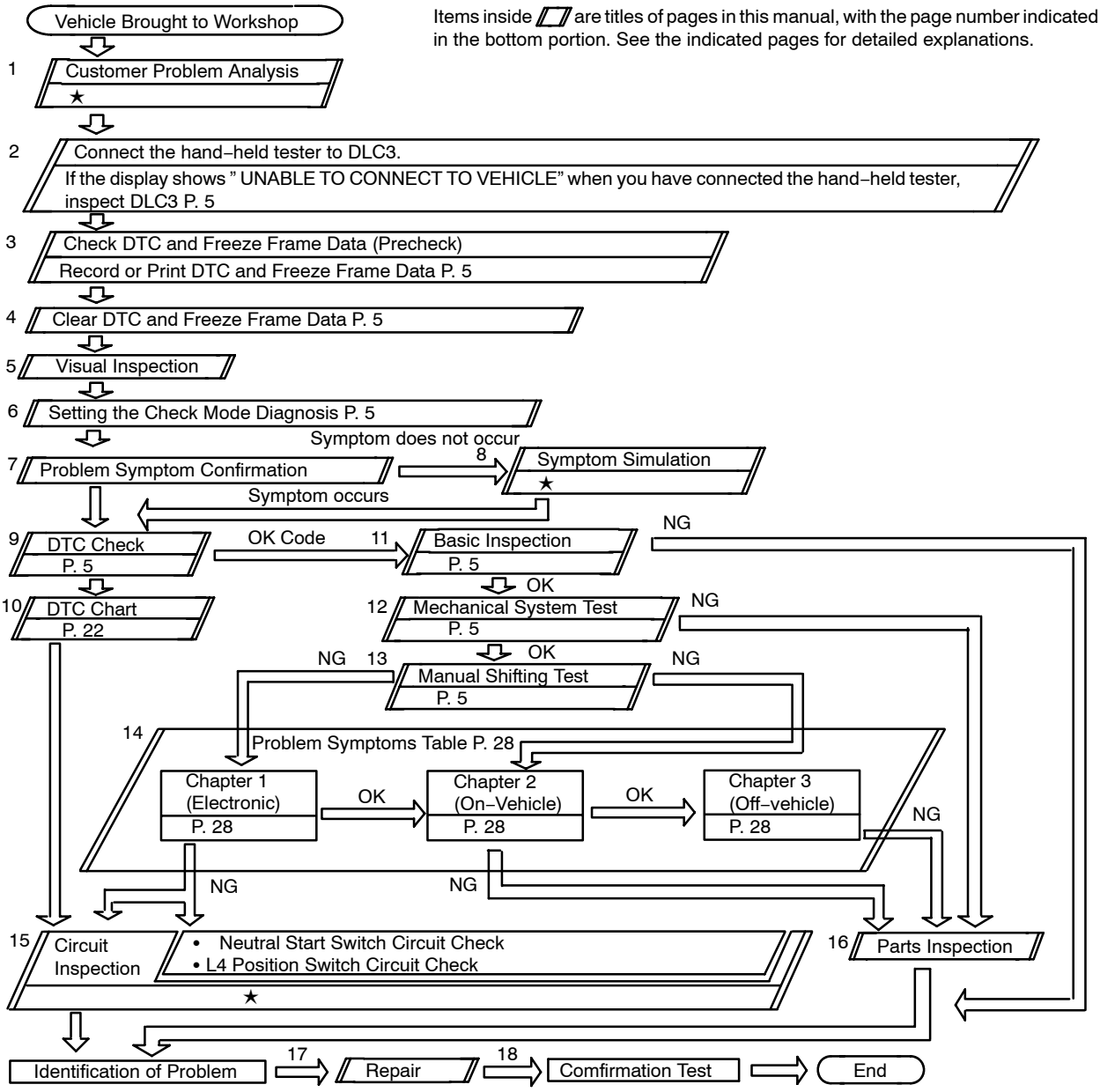
VIN	Production Date
−	From August, 2001

AUTOMATIC TRANSMISSION (A343F)

HOW TO PROCEED WITH TROUBLESHOOTING

When using hand–held tester, troubleshoot in accordance with the procedure on the following pages.

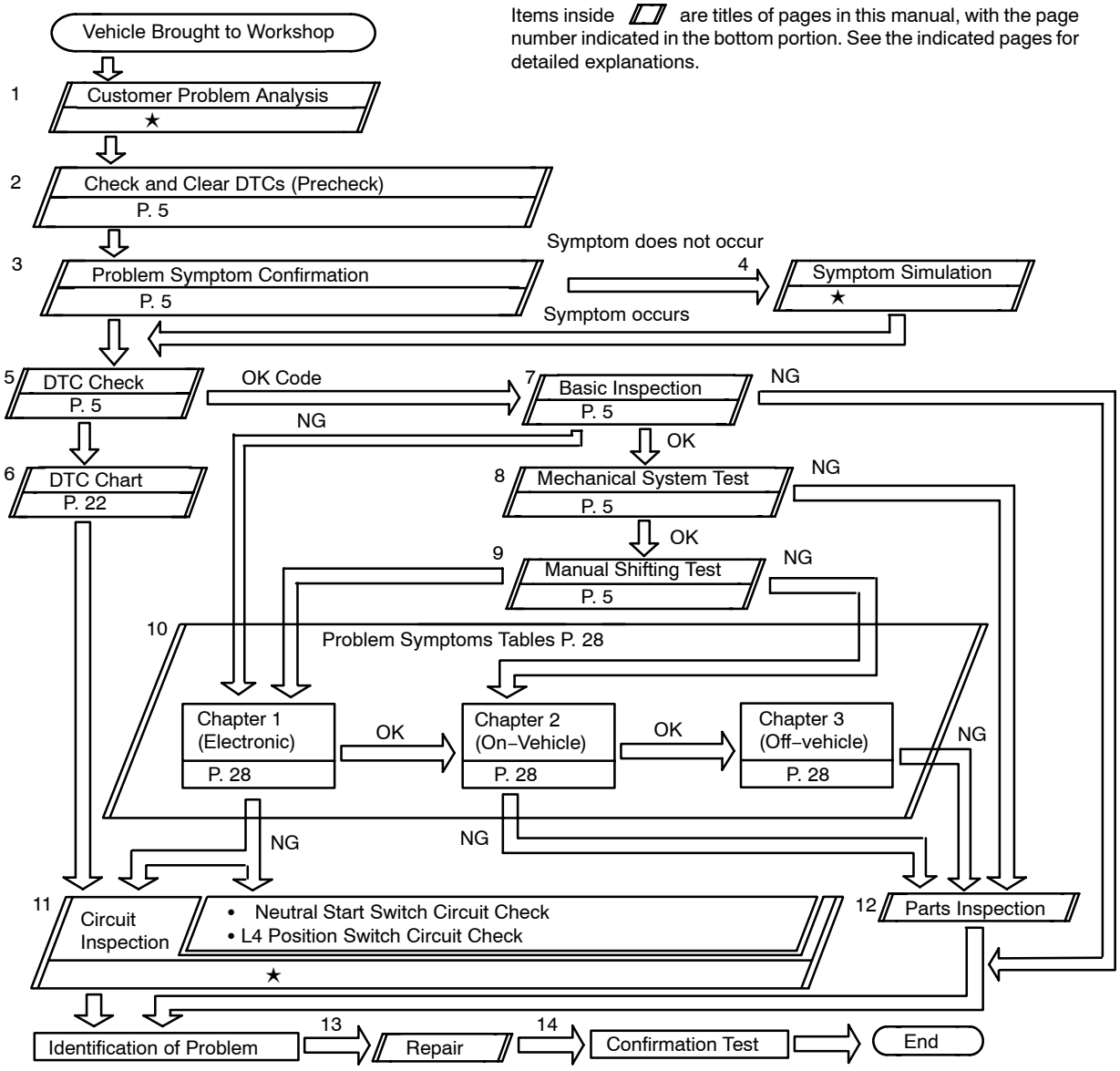
Items inside ▱ are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



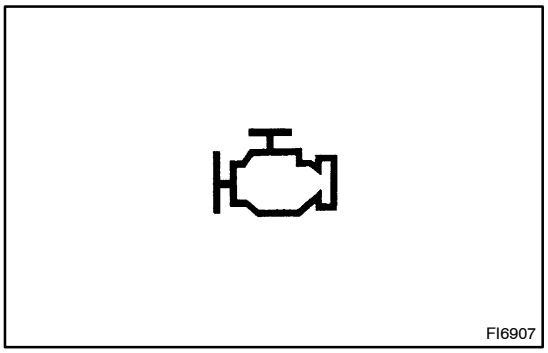
★: Refer LAND CRUISER Chassis and Body Repair Manual (Pub. No.RM616E).

When not using hand–held tester, 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.



★: Refer LAND CRUISER Chassis and Body Repair Manual (Pub. No.RM616E).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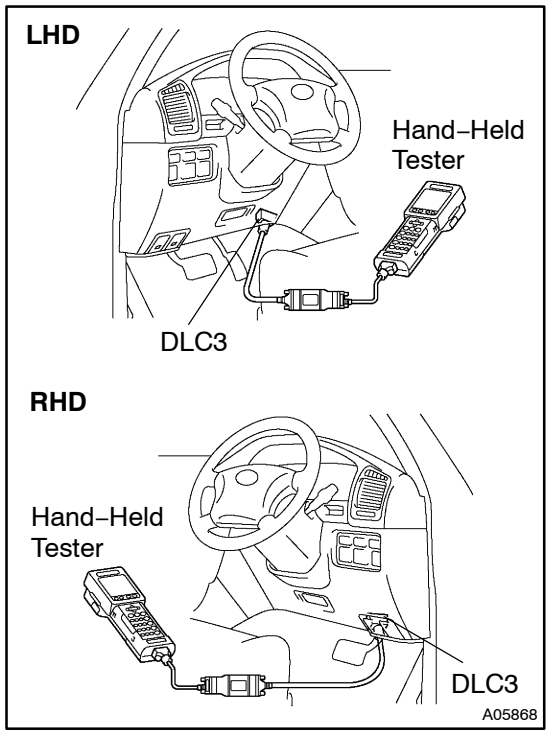
PRE–CHECK

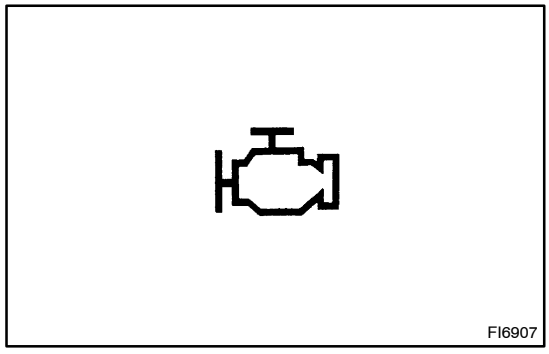
1. DIAGNOSIS SYSTEM

Description

- When troubleshooting Multiplex (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the hand–held tester to the vehicle, and read off various data output from the vehicle's Engine and ECT ECU.
  The vehicle's on– board computer lights up the check engine warning light on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components. In addition to the check engine warning light lighting up when a malfunction is detected, the applicable DTCs are recorded in the Engine and ECT ECU memory.
  If any malfunction does not occur in 3 trips, the check engine warning light goes off but the DTCs remain recorded in the Engine and ECT ECU memory.



- To check the DTCs, connect a hand–held tester to DLC3 on the vehicle or read the number of blinks of the check engine warning light when TC and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and activate the several actuators and check freeze frame data and various forms of engine data (For instruction book).
- The diagnosis system operates in normal mode during normal vehicle use, and also has a check (test) mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2–trip detection logic (*) to prevent erroneous detection and ensure thorough malfunction detection. By switching the Engine and ECT ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the check engine warning light lights up for a malfunction that is only detected once or momentarily.
- *2–trip detection logic:
  When a logic malfunction is first detected, the malfunction is temporarily stored in the Engine and ECT ECU memory.
  If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the check engine warning light to light up.



2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) Check the check engine warning light.

(1) The check engine warning light comes on when the ignition switch is turned ON and the engine is not running.

HINT:

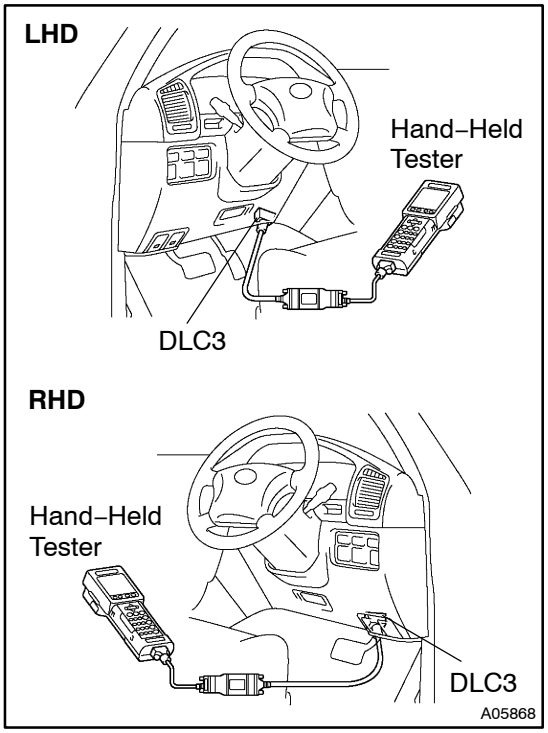
If the check engine warning light does no light up, troubleshoot the combination meter.

(2) When the engine is started, the check engine warning light should go off. If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

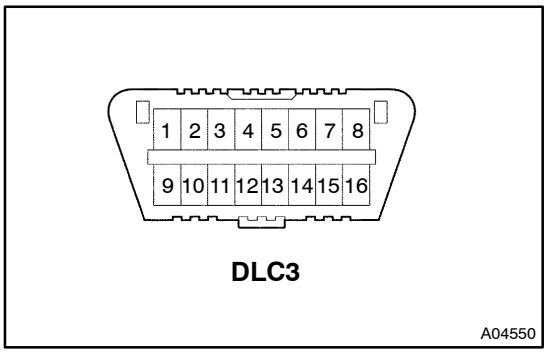
(b) Check the DTC (Using hand–held tester).

NOTICE:

When the diagnostic system is switched from normal mode to check (test) mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.

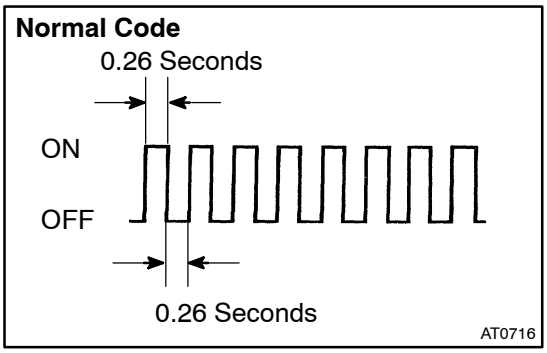


(1) Prepare hand–held tester.
(2) Connect the hand–held tester to DLC3 at the lower side of the instrument panel.
(3) Turn the ignition switch ON and turn the hand–held tester switch ON.
(4) Use the hand–held tester to check the DTCs and instructions, see the hand–held tester instruction book.
(5) See page 22 to confirm the details of the DTCs.



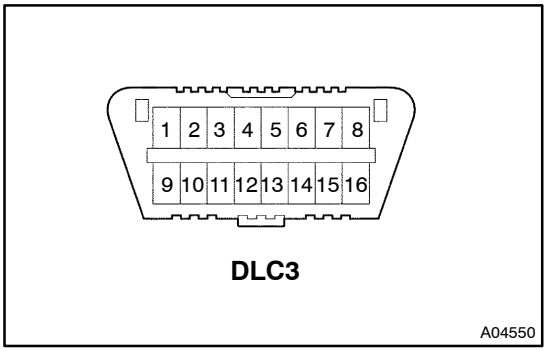
(c) Check the DTC (Not using hand–held tester).
(1) Turn the ignition switch ON, but do not start the engine.
(2) Using SST, connect terminals 13 (TC) and 4 (CG) of DLC3.

SST 09843–18040



(3) Read the DTC indicated by the number of times the check engine warning light blinks.

HINT:
If the system is operating normally, the light will blink 2 times per second.



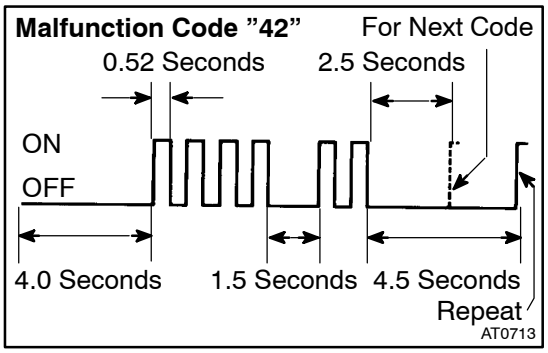
(d) Inspect the DLC3.

(1) The vehicle's Engine and ECT ECU uses ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

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

HINT:
If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of hand–held tester to DLC3, turned the ignition switch ON and operated the hand–held tester, 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.



(2) The malfunction code is indicated, as shown in the chart on the left (DTC ”42” is shown as an example).

HINT:

When 2 or more malfunction codes are stored in memory, the lower–numbered code is displayed first.

3. INSPECT DIAGNOSIS (CHECK MODE)

HINT:

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 Normal mode can also be detected in check mode.

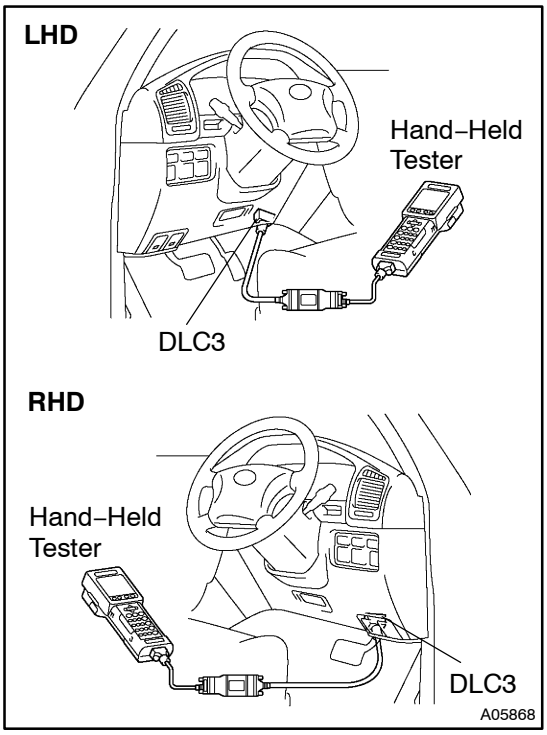
(a) Check DTC.

(1) Check the initial conditions.

- Battery positive voltage 11 V or more
- Throttle valve fully closed
- Transmission in P range
- Air conditioning switched off

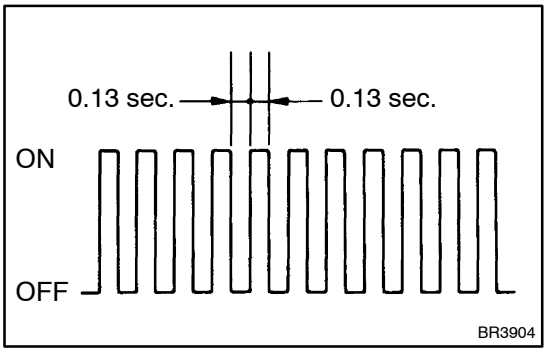
(2) Turn the ignition switch OFF.

(3) Prepare a hand–held tester.



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

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



(6) Switch the hand–held tester from Normal mode to Check mode (Check that the check engine warning light flashes).

(7) Start the engine (check engine warning light goes out 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 Check mode to Normal mode, so all DTCs etc. are erased.

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

(b) When using hand–held tester:
Clear the DTC.
The following operation will erase the DTC and freeze frame data. Operate a hand–held tester to erase the codes.

(c) When not using hand–held tester:
Clear the DTC.
Remove the EFI fuse from engine room J/B for 10 seconds or more.

4. 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 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.

5. ROAD TEST

NOTICE:

Conduct the test at normal operating ATF temperature 50 – 80 °C (122 – 176 °F).

(a) D range test (NORM and PWR pattern):
Shift into the D range and fully depress the accelerator pedal and check the following points.

(1) Check up–shift operation.
Check to see that 1 → 2, 2 → 3 and 3 → O/D up–shift takes place, and that the shift points conform to the automatic shift schedule (See Pub. No.RM616E on page SS–11).

HINT:

- O/D Gear Up–shift Prohibition Control (1. Coolant temp. is 55 °C (131 °F) or less. 2. If there is a 10 km/h (6 mph) difference between the set cruise control speed and vehicle speed.)
- O/D Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 55 °C (131 °F) or less.)
- When the 2nd start switch is ON, there is no 1 → 2 up–shift and 2 → 1 down–shift.

(2) Check for shift shock and slip.
Check for shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up–shifts.

(3) Check for abnormal noises and vibration.
Run at the D range 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 done very thoroughly as it could also be due to loss of balance in the differential, torque converter, etc.

(4) Check kick–down operation.
While running in the D range, 2nd, 3rd and O/D gears, check to see that the possible kick–down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick–downs conform to those indicated in the automatic shift schedule (See Pub. No.RM616E on page SS–11).

(5) Check abnormal shock and slip at kick–down.

(6) Check the lock–up mechanism.
- Drive in D range, O/D gear, at a steady speed (lock–up ON) of about 80 km/h (50 mph).
- 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) 2 range test:
Shift into the 2 range 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 Pub. No.RM616E on page SS–11).

(2) Check engine braking.
While running in the 2 range 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.

(c) L range test:
Shift into the L range and fully depress the accelerator pedal and check the following points.
(1) Check no up–shift.
While running in the L range, check that there is no up–shift to 2nd gear.

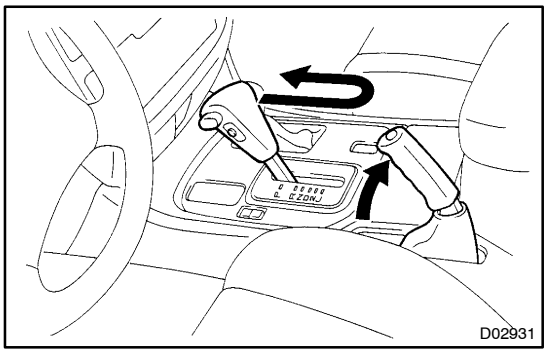
HINT:
- There is no O/D up–shift and lock–up in the 2 range.
- When the 2nd start switch in ON, there is 1 → 2 up–shift and 2 → 1 down–shift.

(2) Check engine braking.
While running in the L range, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noises during acceleration and deceleration.

(d) R range test:
Shift into the R range 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.

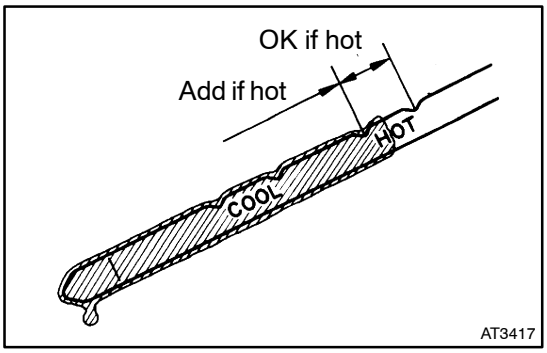
(e) P range test:
Stop the vehicle on a grade (more than 5°) and after shifting into the P range, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.



6. 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 ranges from P to L range and return to P range.
(3) Pull out the 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 not within the range, add new fluid.

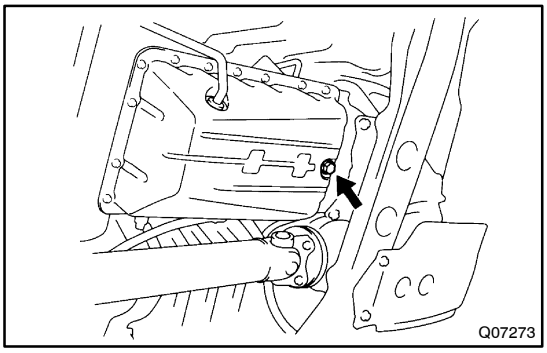
Fluid type: ATF D–II or DEXRON® III (DEXRON® II)

NOTICE:

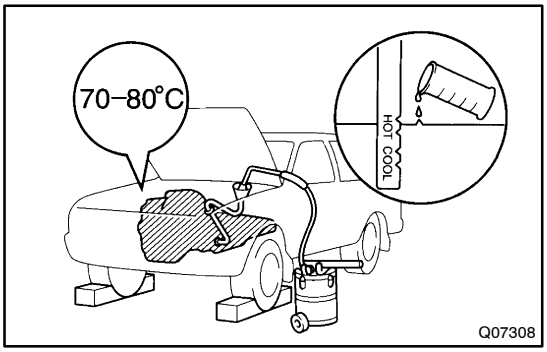
Do not overfill.

(b) Check the fluid condition.

If the fluid smells burnt or is black, replace it.



(c) Replace the ATF.
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.

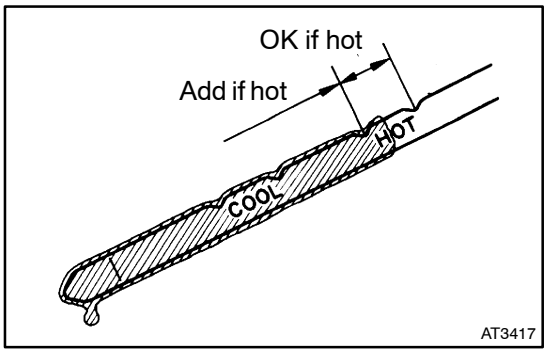


(3) With the engine OFF add new fluid through the oil filler pipe.

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

Capacity: 3.5 liters (3.7 US qts, 3.1 Imp.qts)

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



(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 as necessary.

NOTICE:

Do not overfill.

(d) Check the fluid leaks.

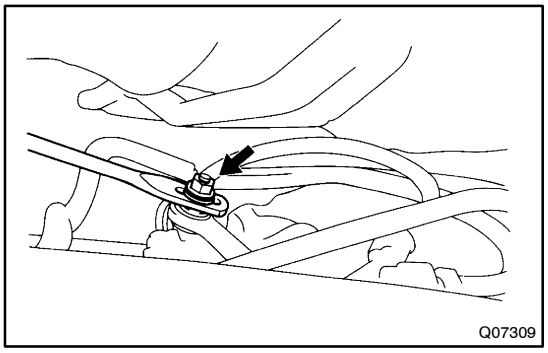
Check for leaks in the transmission.

If there are leaks, it is necessary to repair or replace O–rings, FIPGs, oil seals, plugs or other parts.

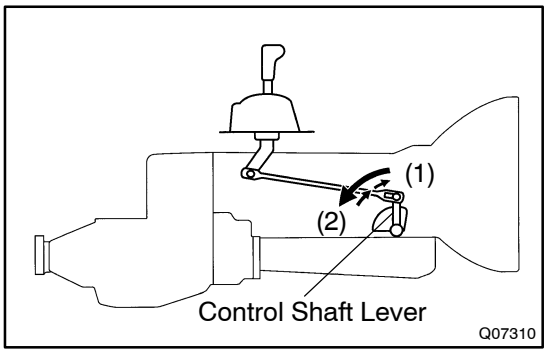
(e) Inspect and adjust the shift lever position.

- When shifting the shift lever from the N range to other ranges, check that the lever can be shifted smoothly and accurately to each range and that the position indicator is not aligned with the correct position.

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



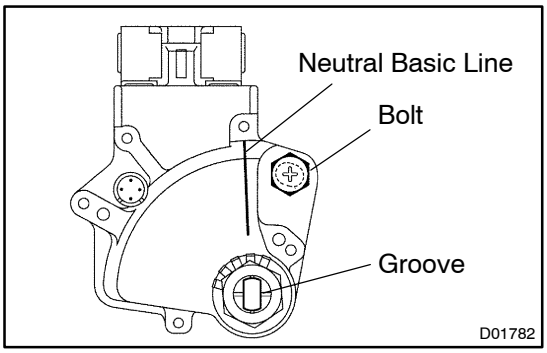
- Loosen the nut on the shift lever.
- Push the control shaft fully rearward.



- Return the control shaft lever 2 notches to N range.
- Set the shift lever to N range.
- While holding the shift lever lightly toward the R range side, tighten the shift lever nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

- Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D range and reverses when shifting it to the R range.



(f) Inspect and adjust the neutral start switch.
Check that the engine can be started with the shift lever only in the N or P range, but not in other ranges.

If it is not as stated above, carry out the following adjustment procedures.

- Loosen the neutral start switch bolt and set the shift lever to the N range.
- Align the groove and neutral basic line.
- Hold the switch in position and tighten the bolt.

Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

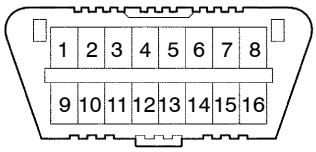
- For continuity inspection of the neutral start switch, See Pub. No.RM616E on page DI–51.

7. 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 range.

NOTICE:

- **Do the test at normal operating ATF temperature 50 – 80 °C (122 – 176 °F).**
- **Do not continuously run this test for longer than 5 seconds.**
- **To ensure safety, do 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.**



DLC3

A04550

- Chock the 2 wheels.
- Connect a hand–held tester to DLC3 or tachometer to terminal TAC (9) of DLC3 with SST.

SST 09843–18030

- Fully apply the parking brake.
- Keep your left foot pressing firmly on the brake pedal.
- Start the engine.
- Shift into the D range. Press all the way down on the accelerator pedal with your right foot.
  Quickly read the stall speed at this time.

Stall speed: 2,300 ± 150 rpm

- Do the same test in R range.

Stall speed: 2,300 ± 150 rpm

Evaluation:

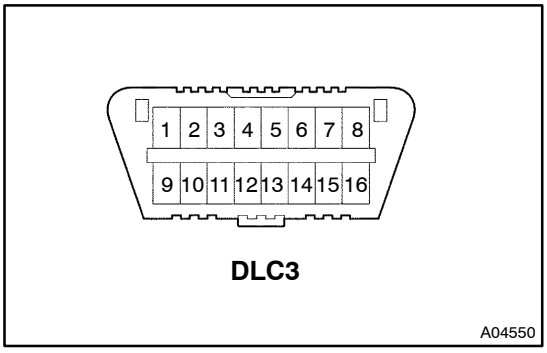
Problem	Possible cause
(a) Stall speed low in D range	• Engine output may be insufficient • Stator one–way clutch is operating properly HINT: If more than 600 rpm below the specified value, the torque converter could be faulty.
(b) Stall speed high in D range	• Line pressure too low • Forward clutch slipping • No.2 one–way clutch not operating properly • O/D one–way clutch not operating properly
(c) Stall speed high in R range	• Engine output may be insufficient • Stator one–way clutch is operating properly • 1st & reverse brake slipping • O/D one–way clutch not operating properly
(b) Stall speed high in D and R ranges	• 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, and 1st & 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 3 measurements and take the average value.**



DLC3

- Chock the 4 wheels.
- Connect a hand–held tester to DLC3 or tachometer to terminal TAC (9) of DLC3 with SST.

SST 09843–18030

- Start engine and check idle speed.

Idle speed: 750 ± 50 rpm (In N range and A/C OFF)

- Shift the lever from N to D range. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

Time lag: N → D less than 1.2 seconds

- In the same way, measure the time lag for N → R.

Time lag: N → R less than 1.5 seconds

Evaluation (If N → D or N → R time lag is longer than the 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 & reverse brake worn • O/D one–way clutch not operating properly

8. HYDRAULIC TEST

(a) Measure the line pressure.

NOTICE:

- **Do the test at normal operation 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 stopper 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 ATF.

(2) Remove the test plug on the left side of the transmission case and connect SST.
(See Pub. No. RM616E on page AT–29)

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

(3) Fully apply the parking brake and chock the 4 wheels.

(4) Connect a hand–held tester to DLC3.

(5) Start the engine and check idling speed.

(6) Keep your left foot pressing firmly on the brake pedal and shift into D range.

(7) Measure the line pressure when the engine is idling.

(8) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(9) In the same way, do the test in R range.

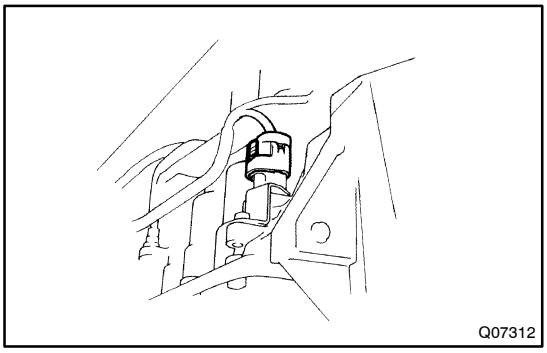
Specified line pressure:

Condition	D range kPa (kgf / cm^2, psi)	R range kPa (kgf / cm^2, psi)
Idling	480 – 539 (4.9 – 5.5, 70 – 78)	696 – 794 (7.1 – 8.1, 101 – 115)
Stall	1,294 – 1,432 (13.2 – 14.6, 188 – 208)	1,657 – 1,989 (16.9 – 20.3, 240 – 289)

If the measured pressure is not up to the specified value, recheck the throttle cable adjustment and retest.

Evaluation

Problem	Possible cause
If the measured values at all ranges are higher	• SLT solenoid valve defective • Throttle valve defective • Regulator valve detective
If the measured values at all ranges are lower	• SLT solenoid valve defective • Throttle valve defective • Regulator valve defect • Oil pump defect • O/D direct clutch defect
If pressure is low in the D range only	• D range circuit fluid leakage • Forward clutch defect
If pressure is low in the R range only	• R range circuit fluid leakage • Direct clutch defect • 1st & reverse brake defect


Q07312

9. MANUAL SHIFTING TEST

HINT:

By 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 to the table below.

While driving, shift through the L, 2 and D ranges.

Check that the gear change corresponds to the shift range.

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

HINT:
If the L, 2 and D range gear positions are difficult to distinguish, do the following read test.
If any abnormality is found in the above test, the problem is in the transmission ifself.

(c) Connect the solenoid wire.
(d) Cancel out DTC (See page 11)

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.

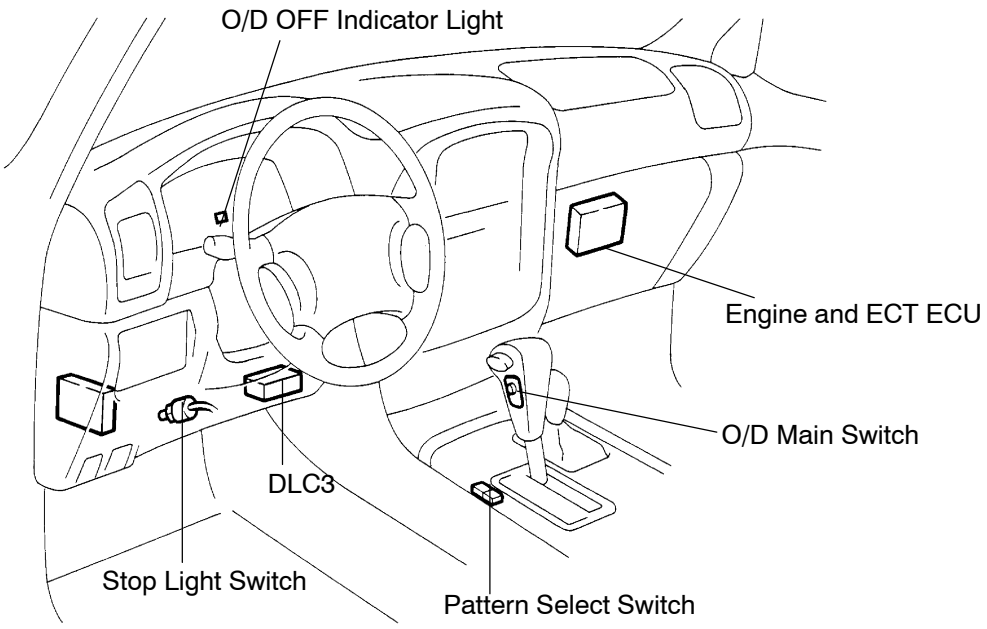
DTC No. (See Page)	Detection Item	Trouble Area	Check Engine Warning Light Light up	*1Memory
P0500/42 (★)	Vehicle Speed Sensor Malfunction (No.1 Speed Sensor)	• Open or short in No.1 speed sensor circuit • No.1 speed sensor • Combination meter • Engine and ECT ECU • Automatic Transmission Assembly	○	○
P0710/38 (★)	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor circuit • Engine and ECT ECU	○	○
P0715/67 (★)	Input / Turbine Speed Sensor Circuit Malfunction (O/D Direct Clutch Speed Sensor)	• Open or short in O/D direct clutch speed sensor circuit • O/D direct clutch speed sensor • Engine and ECT ECU • Automatic Transmission Assembly	○	○
P0753/62 (★)	Shift Solenoid ”A” Electrical Malfunction (No.1 Solenoid Valve)	• Open or short No.1 solenoid valve circuit • No.1 solenoid valve • Engine and ECT ECU	○	○
P0758/63 (★)	Shift Solenoid ”B” Electrical Malfunction (No.2 Solenoid Valve)	• Open or short No.2 solenoid valve circuit • No.2 solenoid valve • Engine and ECT ECU	○	○
P0773/64 (★)	Shift Solenoid ”E” Electrical Malfunction (SL Solenoid Valve)	• Open or short SL solenoid valve circuit • SL solenoid valve • Engine and ECT ECU	○	○
P1700/61 (★)	Speed Sensor No.2 Circuit Malfunction (No.2 Speed Sensor)	• Open or short in No.2 speed sensor circuit • No.2 speed sensor • Engine and ECT ECU	○	○
P1760/77 (★)	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU	○	○
P1782/97 (32)	Transfer L4 Switch Malfunction	• Short in transfer indicator switch (LOW switch) signal circuit • Indicator switch (LOW switch) • ECM	○	○
P1783/97 (36)	Transfer Neutral Switch Malfunction	• Short in transfer indicator switch (neutral switch) signal circuit • Indicator switch (neutral switch) • ECM	○	○

★: Refer LAND CRUISER Chassis and Body Repair Manual (Pub. No.RM616E).

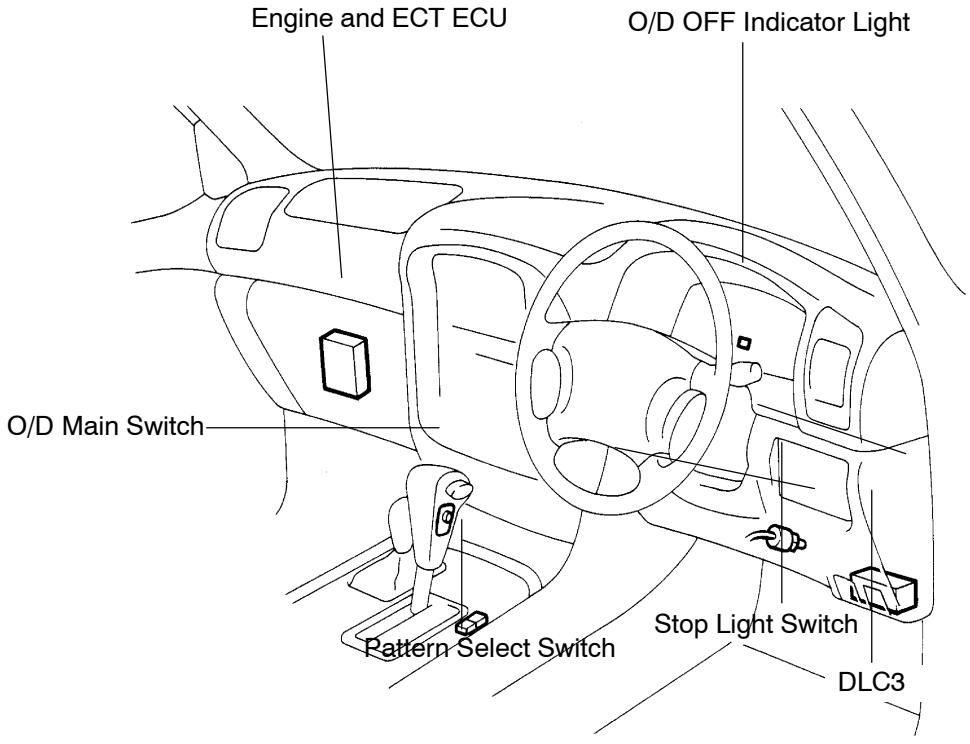
*1: "○" mark means Engine and ECT ECU memorizes the malfunction code if the Engine and ECT ECU detects the DTC detection condition.
HINT:
This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

PARTS LOCATION

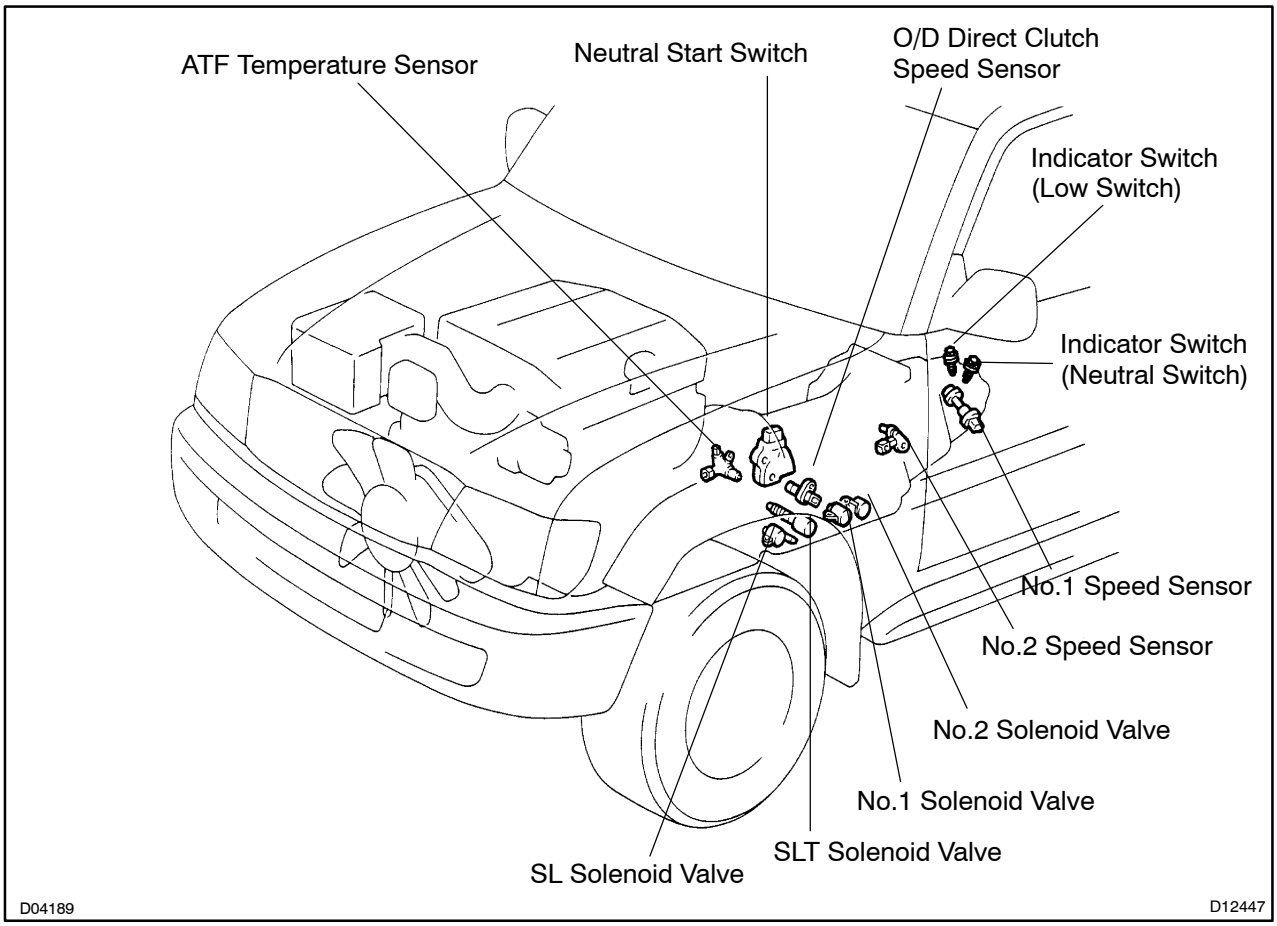
LHD:



RHD:

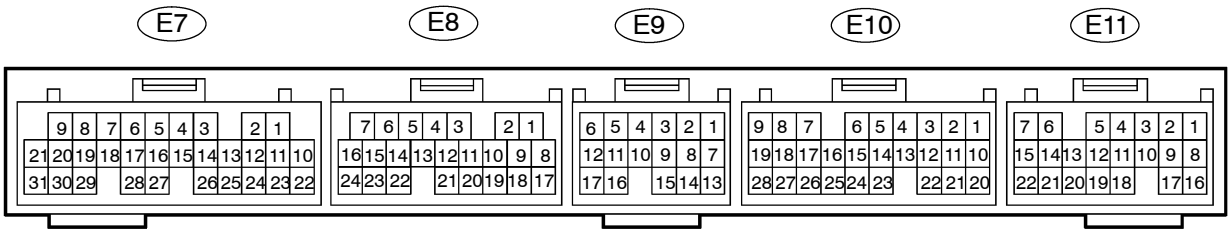


D04190


ATF Temperature Sensor
Neutral Start Switch
O/D Direct Clutch Speed Sensor
Indicator Switch (Low Switch)
Indicator Switch (Neutral Switch)
No.1 Speed Sensor
No.2 Speed Sensor
No.2 Solenoid Valve
No.1 Solenoid Valve
SLT Solenoid Valve
SL Solenoid Valve
D04189
D12447

TERMINALS OF ECU

Engine and ECT ECU Terminals



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S1 ↔ E1 (E9–1 ↔ E8–17)	R ↔ BR	IG ON	Below 1.5
		3rd or O/D gear	Below 1.5
		1st or 2nd gear	9.0 – 14
S2 ↔ E1 (E9–2 ↔ E8–17)	W ↔ BR	IG ON	Below 1.5
		1st or O/D gear	Below 1.5
		2nd or 3rd gear	9.0 – 14
SL ↔ E (E9–3 ↔ E8–17)	G ↔ BR	IG ON	Below 1.5
		Vehicle driving under lock–up position	9.0 – 14
NCO^+ ↔ NCO^- (E9–4 ↔ E9–10)	L–R ↔ L–W	Engine is idling	Pulse signal is output Below 1.5 ↔ 4 – 6
$SP2^+$ ↔ $SP2^-$ (E9–5 ↔ E9–11)	R ↔ G	Engine is idling	Pulse signal is output Below 1.5 ↔ 4 – 6
PWR ↔ E1 (E9–7 ↔ E8–17)	L–W ↔ BR	IG ON and Pattern select switch ”NORM”	9.0 – 14
		IG ON and Pattern select switch ”PWR”	Below 1.5
SLT^+ ↔ SLT^- (E9–9 ↔ E9–15)	G–W ↔ GB	IG ON	Below 3.0
		Engine is idling	Pulse signal is output Below 1.5 ↔ 9.0 – 14
SNWI ↔ E1 (E9–13 ↔ E8–17)	L–R ↔ BR	IG ON and 2nd start switch ON	Below 1.5
		IG ON and 2nd start switch OFF	9.0 – 14
SNWL ↔ E1 (E9–14 ↔ E8–17)	Y ↔ BR	IG ON and 2nd start mode	Below 1.5
		IG ON and Except 2nd start mode	9.0 – 14
OIL ↔ E2 (E9–17 ↔ E8–18)	G–Y ↔ BR–W	IG ON and ATF temperature 110 °C (176 °F)	Below 1.5
L ↔ E1 (E10–4 ↔ E8–17)	G–B ↔ BR	IG ON and shift lever range: L	9.0 – 14
		IG ON and shift lever range: except L	Below 1.5
2 ↔ E1 (E10–2 ↔ E8–17)	G ↔ BR	IG ON and shift lever range: 2	9.0 – 14
		IG ON and shift lever range: except 2	Below 1.5
R ↔ E1 (E10–3 ↔ E8–17)	R–B ↔ BR	IG ON and shift lever range: R	9.0 – 14
		IG ON and shift lever range: except R	Below 1.5

SPD ↔ E1 (E10–5↔E8–17)	V ↔ BR	IG ON and Vehicle stationary	Below 1.5
		IG ON and Turn one rear wheel slowly	Pulse signal is output Below 1.5 ↔ 4–6
TFN ↔ E1 (E10–6 ↔ E8–17)	Y–G ↔ BR	IG ON and Transfer shift lever N range	Below 1.5
		IG ON and Transfer shift lever other than N range	9.0 – 14
D ↔ E1 (E10–8 ↔ E8–17)	G–Y ↔ BR	IG ON and shift lever range: D	9.0 – 14
		IG ON and shift lever range: except D	Below 1.5
L4 ↔ E1 (E10–9 ↔ E8–17)	B–L ↔ BR	IG ON and Transfer shift lever L4 position	9.0 – 14
		IG ON and Transfer shift lever other than L4 position	Below 1.5
ODMS ↔ E1 (E10–15 ↔ E8–17)	B ↔ BR	IG ON	9 – 14
		IG ON and Press continuously O/D main switch	Below 1.5
ODLP ↔ E1 (E10–26 ↔ E8–17)	B ↔ BR	O/D main switch ON (O/D OFF)	Below 3
		O/D main switch OFF (O/D ON)	9 – 14
NSW ↔ E1 (E11–2 ↔ E8–17)	B–W ↔ BR	IG ON and shift lever range: P or N	9.0 – 14
		IG ON and shift lever range: except P or N	Below 1.5
STP ↔ E1 (E11–15 ↔ E8–17)	G–W ↔ BR	IG ON and brake pedal depressed	9.0 – 14
		IG ON and brake pedal released	Below 1.5

PROBLEM SYMPTOMS TABLE

HINT:

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 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 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 and replace the Engine and ECT ECU.

CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

★: Refer LAND CRUISER Chassis and Body Repair Manual (Pub. No.RM616E).

Symptom	Suspect Area	See page
No up–shift (A particular gear, from 1st to 3rd gear, is not –up shifted)	Engine and ECT ECU	★
No up–shift (3rd → O/D)	1. O/D main switch & O/D OFF indicator circuit 2. Engine and ECT ECU	39 ★
No down–shift (O/D → 3rd)	1. O/D main switch & O/D OFF indicator circuit 2. Engine and ECT ECU	39 ★
No down–shift (A particular gear, from 1st to 3rd gear, is not –down shifted)	Engine and ECT ECU	★
No lock–up	1. Stop light switch signal circuit 2. Engine and ECT ECU	★ ★
No lock–up off	Engine and ECT ECU	★
Shift point too high or too low	1. Pattern select switch circuit 2. L4 position switch circuit 3. Engine and ECT ECU	★ ★ ★
Up–shift to O/D from 3rd while O/D main switch is OFF	1. O/D main switch & O/D OFF indicator circuit 2. Engine and ECT ECU	39 ★
Up–shift to O/D from 3rd while engine is cold	Engine and ECT ECU	★
No kick–down	Engine and ECT ECU	★
Engine stalls when starting off or stopping	Engine and ECT ECU	★
No pattern select	1. Pattern select switch circuit 2. Engine and ECT ECU	★ ★
No 2nd start	1. Pattern select switch circuit 2. Engine and ECT ECU	★ ★
A/T.P. indicator light does not light up	1. A/T. P. indicator light circuit 2. Engine and ECT ECU	★ ★

CHAPTER 2: ON–VEHICLE REPAIR
(○: A343F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM528E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Transmission control rod 2. Manual valve 3. Parking lock pawl 4. Off–vehicle repair matrix chart	★ ○ ★ –
Vehicle does not move in R range	Off–vehicle repair matrix chart	–
Vehicle does not move in particular range or ranges (except R range)	Off–vehicle repair matrix chart	–
No up–shift (1st → 2nd)	1. 1–2 shift valve 2. Off–vehicle repair matrix chart	○ –
No up–shift (2nd → 3rd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	○ –
No up–shift (3rd → O/D)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	○ –
No down–shift (O/D → 3rd)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	○ –
No down–shift (3rd → 2nd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	○ –
No down–shift (2nd → 1st)	1. 1–2 shift valve 2. Off–vehicle repair matrix chart	○ –
No lock–up or No lock–up off	1. Lock–up control valve 2. Lock–up relay valve 3. Off–vehicle repair matrix chart	○ ○ –
Harsh engagement (N → D)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_1 accumulator 4. Orifice control valve 5. Off–vehicle repair matrix chart	○ ○ ○ ○ –
Harsh engagement (Lock–up)	1. Lock–up control valve 2. Lock–up relay valve 3. Solenoid relay valve 4. Off–vehicle repair matrix chart	○ ○ ○ –
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Solenoid modulator valve 4. Off–vehicle repair matrix chart	○ ○ ○ –
Harsh engagement (N → L)	Low coast modulator valve	○
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Accumulator control valve 2. Solenoid modulator valve	○ ○

Symptom	Suspect Area	See page
Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_2 accumulator 4. Off–vehicle repair matrix chart	○ ○ ○ –
Harsh engagement (3rd → O/D)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_0 accumulator 4. Off–vehicle repair matrix chart	○ ○ ○ –
Harsh engagement (O/D → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_0 accumulator 4. Off–vehicle repair matrix chart	○ ○ ○ –
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Pressure relief valve 4. Off–vehicle repair matrix chart	★ ★ ○ –
Slip or shudder (Particular range)	1. Transmission control rod 2. Off–vehicle repair matrix chart	★ –
No engine braking (1st: L range)	1. Low coast modulator valve 2. Off–vehicle repair matrix chart	○ –
No engine braking (2nd: 2 range)	1. 2nd coast modulator valve 2. Off–vehicle repair matrix chart	○ –
No kick–down	1. 1–2 shift valve 2. 2–3 shift valve	○ ○

CHAPTER 3: OFF–VEHICLE REPAIR
(○: A343F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM528E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. O/D one–way clutch (F_0) 2. O/D direct clutch (C_0) 3. O/D planetary gear unit 4. Torque converter	○ ○ ○ ★
Vehicle does not move in R range	1. Front and rear planetary gear unit 2. Direct clutch (C_2) 3. 1st & reverse brake (B_3) 4. O/D direct clutch (C_0)	○ ○ ○ ○
No up–shift (1st → 2nd)	1. 2nd brake (B_2) 2. No. 1 one–way clutch (F_1)	○ ○
No up–shift (2nd → 3rd)	Direct clutch (C_2)	○
No up–shift (3rd → O/D)	O/D brake (B_0)	○
No lock–up or No lock–up off	Torque converter	★
Harsh engagement (N → D)	1. Forward clutch (C_1) 2. O/D one–way clutch (F_0) 3. No. 2 one–way clutch (F_2)	○ ○ ○

Symptom	Suspect Area	See page
Harsh engagement (N → R)	1. Direct clutch (C_2) 2. 1st & reverse brake (B_3) 3. O/D one–way clutch (F_0)	○ ○ ○
Harsh engagement (N → 2)	1. Forward clutch (C_1) 2. O/D one–way clutch (F_0) 3. No. 2 one–way clutch (F_2)	○ ○ ○
Harsh engagement (N → L)	1. Forward clutch (C_1) 2. 1st & reverse brake (B_3) 3. O/D one–way clutch (F_0) 4. No. 2 one–way clutch (F_2)	○ ○ ○ ○
Harsh engagement (Lock–up)	Torque converter	★
Slip or shudder (Forward and reverse: After warm–up)	1. Torque converter 2. O/D one–way clutch (F_0) 3. O/D direct clutch (C_0)	★ ○ ○
Slip or shudder (Particular range: Just after engine starts)	Torque converter	★
Slip or shudder (R range)	1. Direct clutch (C_2) 2. 1st & 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)	Direct clutch (C_2)	○
Slip or shudder (O/D)	O/D brake (B_0)	○
No engine braking (1st – 3rd: D range)	2nd brake (B_2)	○
No engine braking (1st: L range)	1st & reverse brake (B_3)	○
No engine braking (2nd: 2 range)	2nd coast brake (B_1)	○
Poor acceleration (All range)	Torque converter	★
Poor acceleration (O/D)	1. O/D direct clutch (C_0) 2. O/D planetary gear unit	○ ○
Engine stalls when starting off or stopping	Torque converter	★

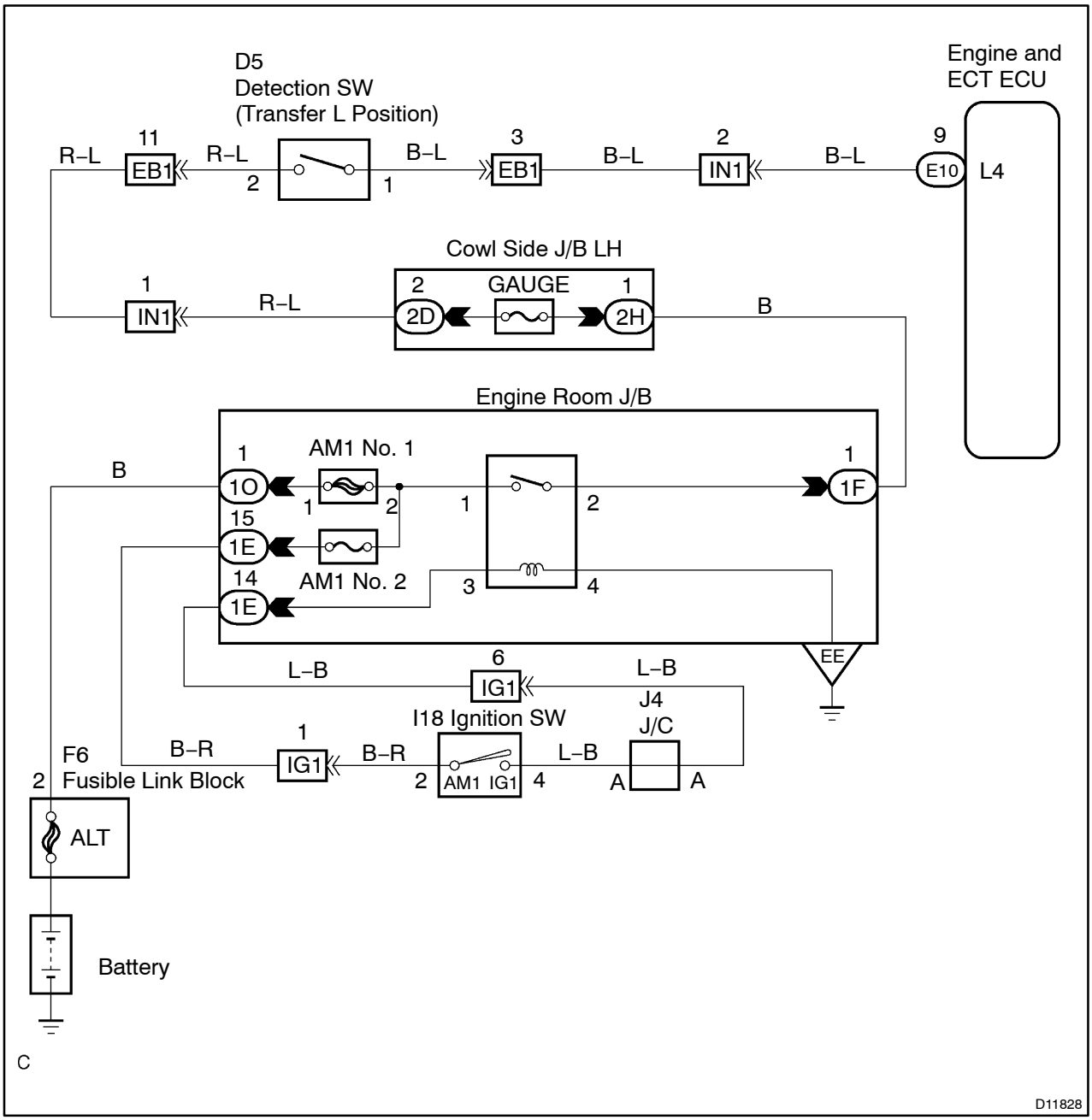
DTC	P1782/97	Transfer L4 Switch Malfunction

CIRCUIT DESCRIPTION

The ECM receive signal L4 from the indicator switch (LOW switch).

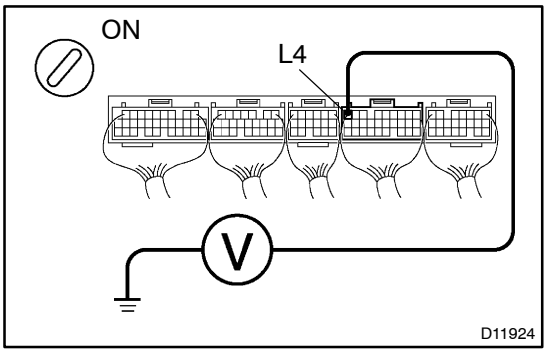
DTC No.	DTC Detecting Condition	Trouble Area
P1782/97	When driving under conditions (a) and (b) for 18 seconds or more, the indicator switch (LOW switch) is ON . (1–trip detection logic) (a) Output shaft speed 3000 rpm or less (b) Transfer shift range is H	• Short in indicator switch (LOW switch) signal circuit • Indicator switch (LOW switch) • Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Inspect terminal voltage



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal L4 of ECM and body ground when transfer shiftlever is shifted to the following range.

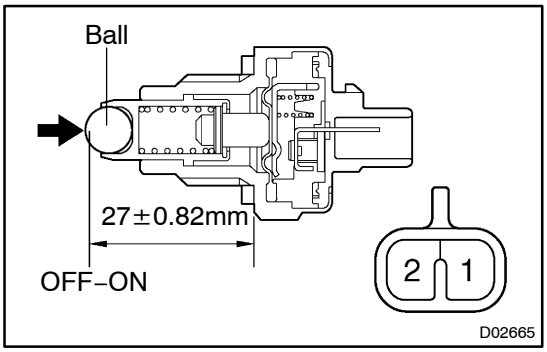
OK:

Transfer shift range	Voltage (V)
L	9 – 14
Except L	Below 1.5

OK → **Proceed to next circuit inspection shown on problem symptom table (See page 28).**

NG

2	Check indicator switch (LOW switch).



PREPARATION:

Remove the indicator switch (LOW switch) (See Pub. No.RM616E on page TR–9).

CHECK:

Check that continuity exists between terminals 1 and 2 when pushing the ball at the tip of the switch.

OK:

Switch range	Specified condition
Push	Continuity
Free	No continuity

NG → **Replace the indicator switch (LOW switch)**

OK

3	**Check harness and connector (See Pub. No.RM616E on page IN–35).**

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

OK

Check and replace the engine and ECT ECU (See Pub. No.RM616E on page IN–35).

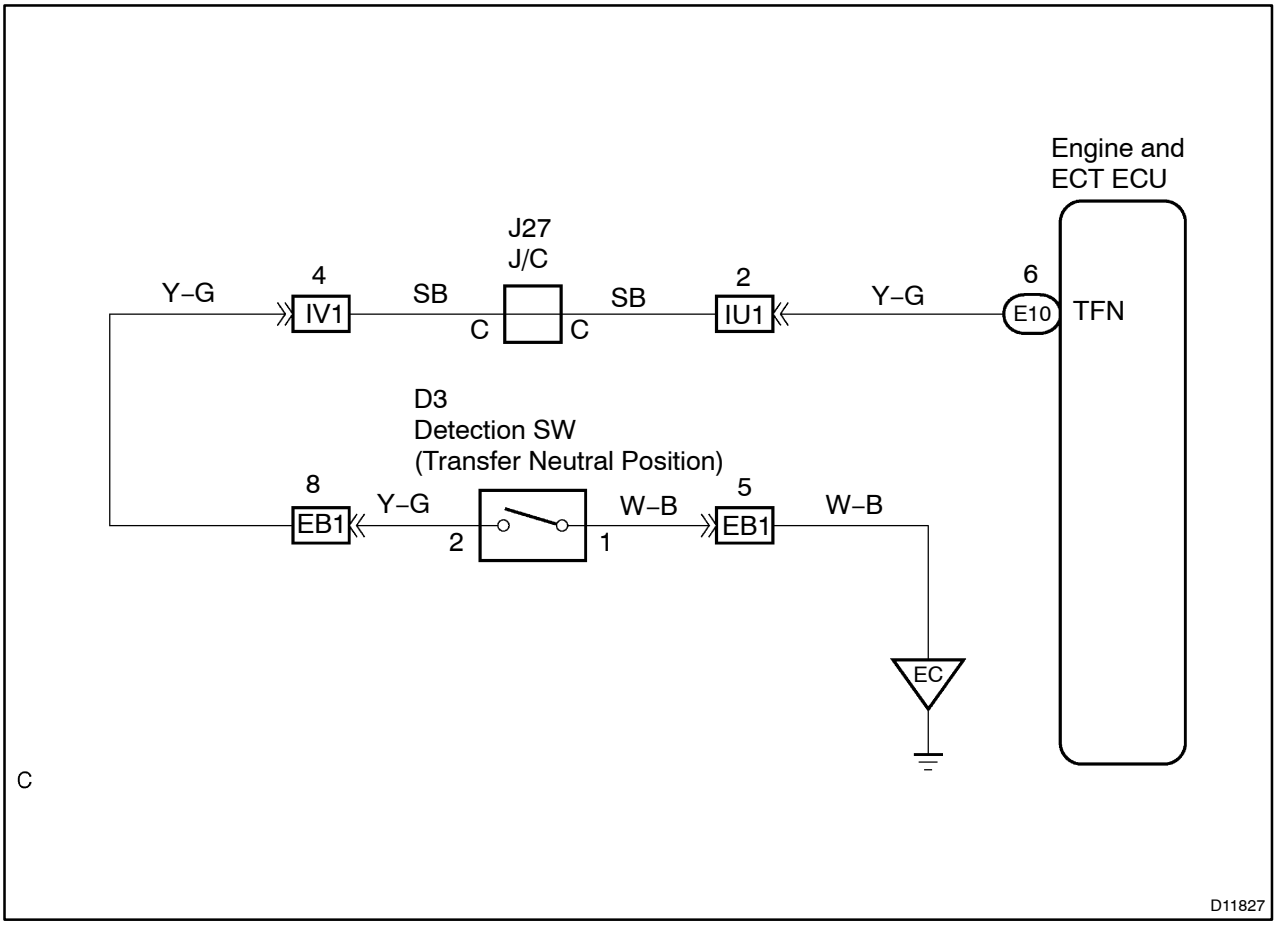
DTC	P1783/97	Transfer Neutral Switch Malfunction

CIRCUIT DESCRIPTION

The ECM receive signal TFN from the indicator switch (neutral switch).

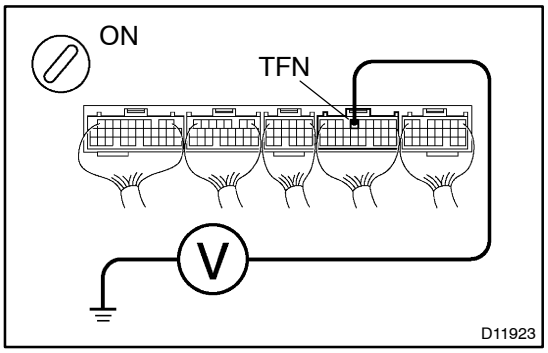
DTC No.	DTC Detecting Condition	Trouble Area
P1783/97	While driving under conditions (a) and (b) for 30 seconds or more, the indicator switch (neutral switch) is ON . (2–trip detection logic) (a) Vehicle speed: 25 km/h (16 mph) or more (b) Transfer shift range is H	• Short in indicator switch (neutral switch) signal circuit • Indicator switch (neutral switch) • Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Inspect terminal voltage



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal TFN of ECM and body ground when transfer shiftlever is shifted to the following range.

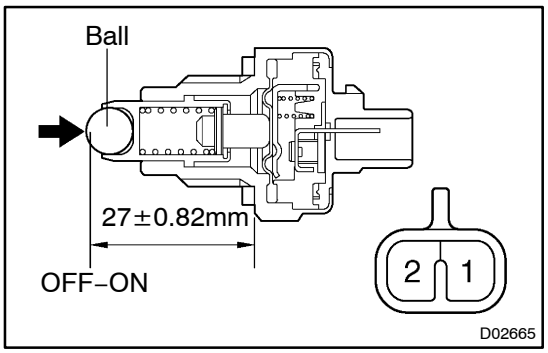
OK:

Transfer shift range	Voltage (V)
N	Below 1.5
Except N	9 – 14

OK → **Proceed to next circuit inspection shown on problem symptom table (See page 28).**

NG

2	Check indicator switch (neutral switch).



PREPARATION:

Remove the transfer indicator switch (neutral switch) (See Pub. No.RM616E on page TR–9).

CHECK:

Check that continuity exists between terminals 1 and 2 when pushing the ball at the tip of the switch.

OK:

Switch range	Specified condition
Push	Continuity
Free	No continuity

NG → **Replace the indicator switch (neutral switch)**

OK

3	**Check harness and connector (See Pub. No.RM616E on page IN–35).**

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

OK

Check and replace the engine and ECT ECU (See Pub. No.RM616E on page IN–5).

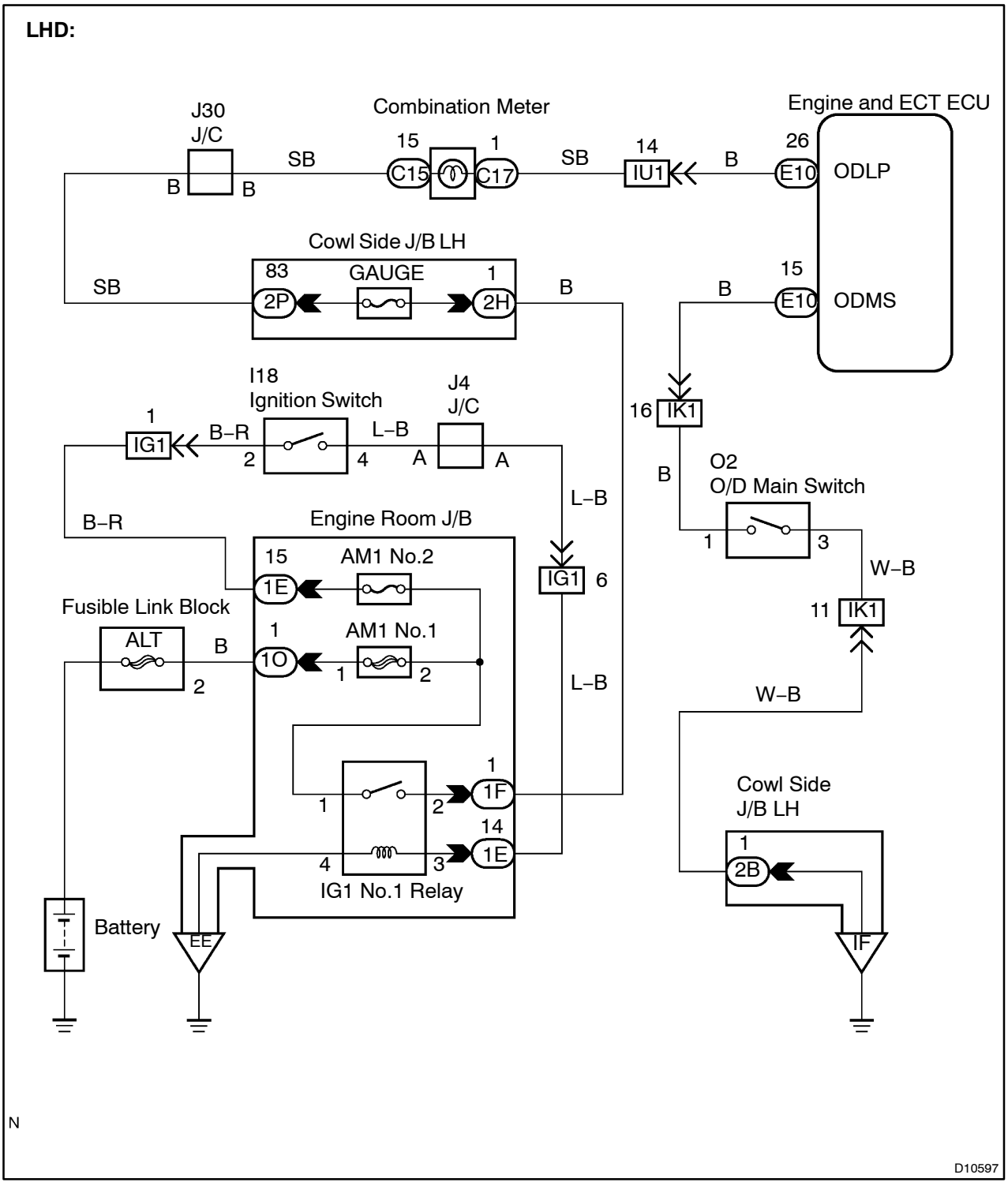
O/D Main Switch & O/D OFF Indicator Light Circuit

CIRCUIT DESCRIPTION

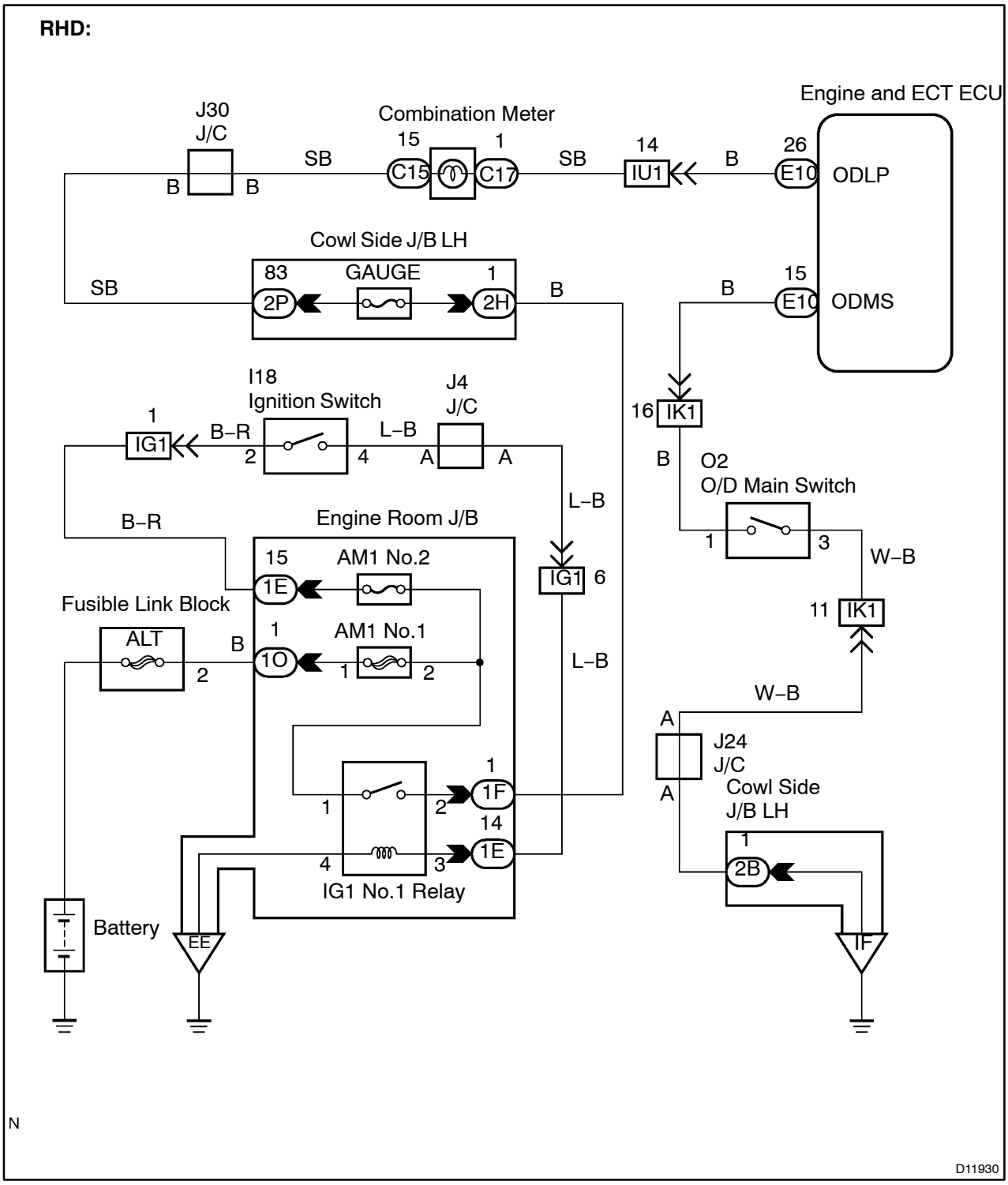
The O/D main switch is a momentary type switch. When pressing the O/D OFF main switch, the O/D OFF indicator light lights up and Engine and ECT ECU prohibits shifting to O/D, and when pressing it again, the O/D OFF indicator light goes off and Engine and ECT ECU allows shifting to O/D. Turning the IG switch OFF will reset the O/D OFF indicator light.

WIRING DIAGRAM

LHD:



RHD:


Engine and ECT ECU
J30
J/C
Combination Meter
15
1
C15
C17
SB
14
IU1
B
26
E10
ODLP
B
B
SB
Cowl Side J/B LH
83
GAUGE
1
2P
2H
SB
B
B
15
E10
ODMS
I18
Ignition Switch
J4
J/C
16
IK1
1
IG1
B–R
L–B
2
4
A
A
B
O2
O/D Main Switch
L–B
B–R
Engine Room J/B
1
3
W–B
15
AM1 No.2
1E
IG1
6
Fusible Link Block
11
IK1
ALT
B
1
AM1 No.1
1O
L–B
2
1
2
W–B
A
J24
J/C
1
1F
Cowl Side
J/B LH
A
1
2
14
1E
1
2B
4
3
IG1 No.1 Relay
Battery
EE
IF
N
D11930

INSPECTION PROCEDURE

1	**Check operation of O/D main switch.**

PREPARATION:

Turn the ignition switch ON.

CHECK:

(a) Check O/D OFF indicator light when O/D main switch is pushed in to ON.

(b) Check O/D OFF indicator light when O/D main switch is pushed again.

OK:

(a) O/D OFF indicator light lights up.

(b) O/D OFF indicator light goes off.

OK → **Proceed to next circuit inspection shown on problem symptom table (See page 28).**

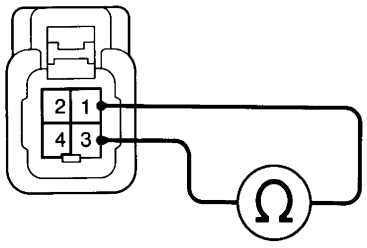
NG

2	**Check and replace the combination meter (See Pub. No.RM616E on page BE–2).**

NG → **Replace the combination meter.**

OK

3	Check O/D main switch.



D11929

PREPARATION:

Disconnect the O/D main switch connector.

CHECK:

Check continuity between terminals1 and 3 of O/D main switch connector.

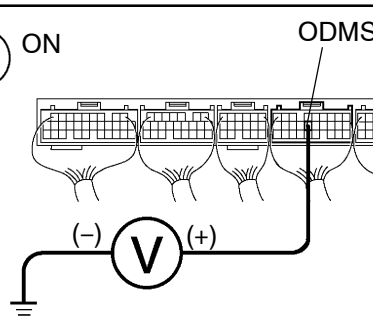
OK:

O/D main switch condition	Specified condition
Press continuously O/D main switch	Continuity
Release O/D main switch	No continuity

NG → **Replace and repair O/D main switch.**

OK ↓

4	Check voltage between terminal ODMS of Engine and ECT ECU and body ground.



D08199

PREPARATION:

Turn the ignition switch ON.

CHECK:

Check voltage between terminal ODMS of Engine and ECT ECU and body ground when O/D main switch is ON and OFF.

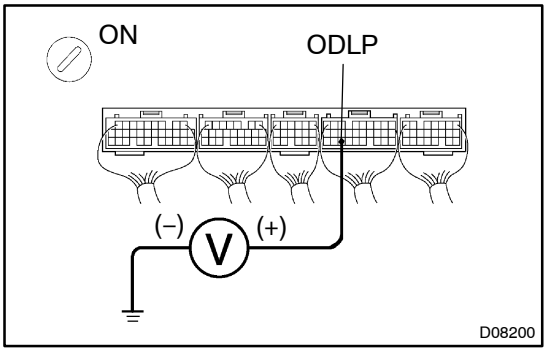
OK:

O/D main switch	Specified voltage
Press continuously O/D main switch	Below 1.0 V
Release O/D main switch	9 – 14 V

OK → **Check and replace the Engine and ECT ECU (See Pub. No.RM616E on page IN–35).**

NG ↓

5	**Check voltage between terminal ODLP of Engine and ECT ECU and body ground.**



PREPARATION:

(a) Disconnect the connector of Engine and ECT ECU.

(b) Turn the ignition switch ON.

CHECK:

Check voltage between terminal ODLP of Engine and ECT ECU and body ground.

OK:

Voltage: 9 – 14 V

OK → **Check and replace the Engine and ECT ECU (See Pub. No.RM616E IN–35).**

NG

Check and replace harness and connector between combination meter and Engine and ECT ECU, O/D main switch and Engine and ECT ECU, O/D main switch and body ground (See Pub. No.RM616E on page IN–35).