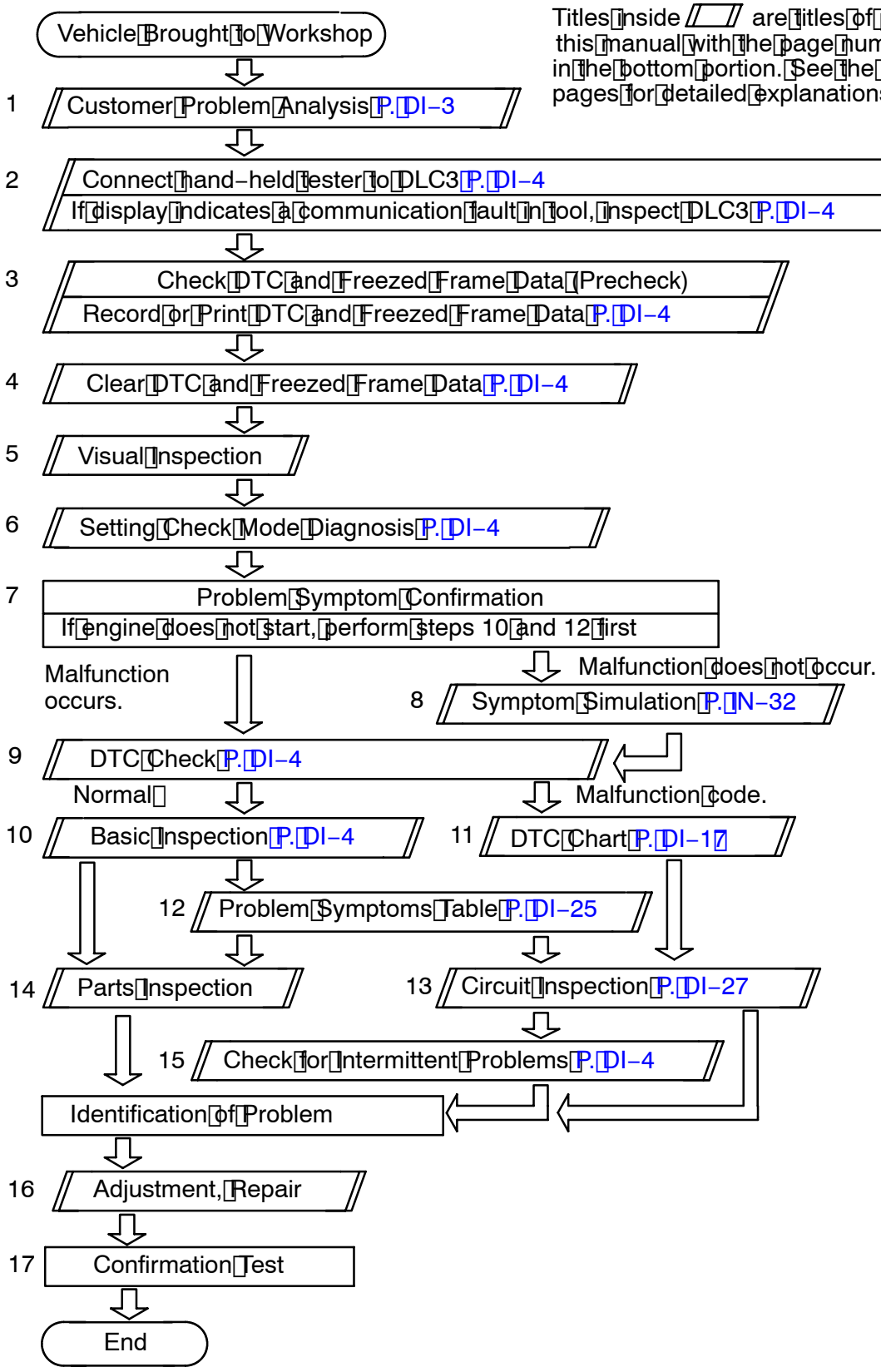
ENGINE

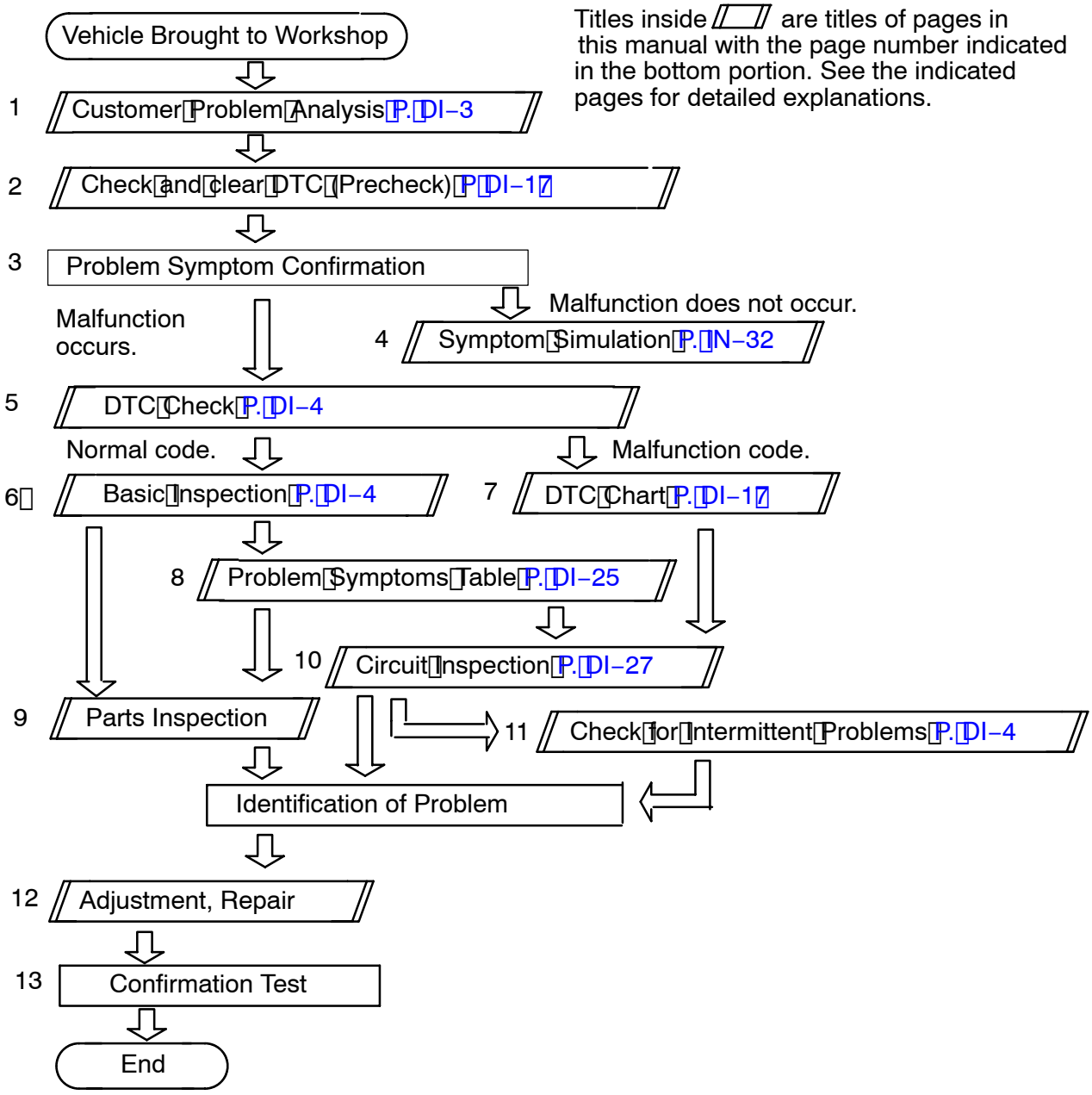
DI63H–01

HOW TO PROCEED WITH TROUBLESHOOTING

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



When not using hand–held tester, troubleshoot in accordance with the procedure on the following page.



DI63I–01

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

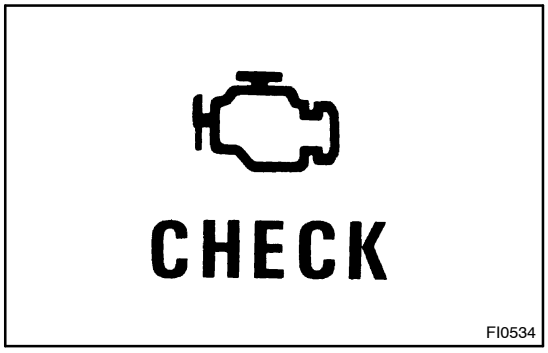
Inspector's Name _____

Customer's Name		Model and Model Year	
Driver's Name		Frame No.	
Date Vehicle Brought in		Engine Model	
License No.		Odometer Reading	km miles

Problem Symptoms	☐ Engine does not Start	☐ Engine does not crank ☐ No initial combustion ☐ No complete combustion
	☐ Difficult to Start	☐ Engine cranks slowly ☐ Other _____
	☐ Poor Idling	☐ Incorrect first idle ☐ Idling rpm is abnormal ☐ High (rpm) ☐ Low (rpm) ☐ Rough idling ☐ Other _____
	☐ Poor Driveability	☐ Hesitation ☐ Back fire ☐ Muffler explosion (after–fire) ☐ Surging ☐ Knocking ☐ Other _____
	☐ Engine Stall	☐ Soon after starting ☐ After accelerator pedal depressed ☐ After accelerator pedal released ☐ During A/C operation ☐ Shifting from N to D ☐ Other _____
	☐ Others	

Dates Problem Occurred		
Problem Frequency		☐ Constant ☐ Sometimes (times per day/month) ☐ Once only ☐ Other _____
Condition When Problem Occurs	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other _____
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (approx. ____ °F/____ °C)
	Place	☐ Highway ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Downhill ☐ Rough road ☐ Other _____
	Engine Temp.	☐ Cold ☐ Warming up ☐ After warming up ☐ Any temp. ☐ Other _____
	Engine Operation	☐ Starting ☐ Just after starting (min.) ☐ Idling ☐ Racing ☐ Driving ☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ A/C switch ON/OFF ☐ Other _____

DTC Inspection	Normal Mode (Precheck)	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )
	Check (Test) Mode	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )



DI63J–01

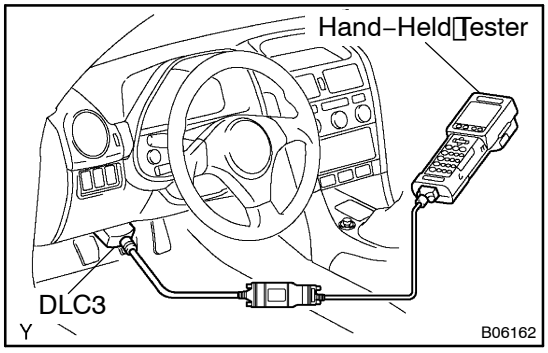
PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description for EURO–OBD (European spec.) (Include Taiwan))

- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's engine ECU.

  Euro–OBD regulations require that the vehicle's on–board computer lights up the check engine warning ignition on the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031–6 are recorded in the engine ECU memory (See page DI–17). If the malfunction does not repaired in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the engine ECU memory.



- To check the DTCs, connect the OBD scan tool or hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or 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 scan tool's instruction book.)

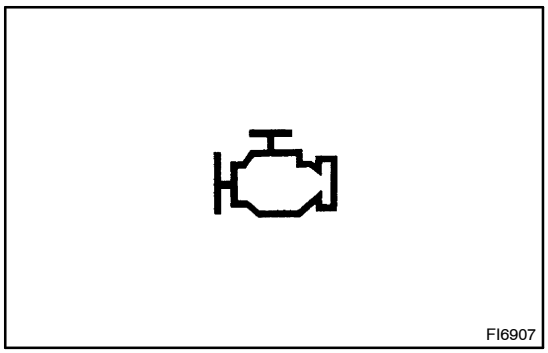
  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page DI–17)
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting,

the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2)

- *2 trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this second detection causes the (CHK ENG) to light up. (2nd trip)
  (However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.)
- Freeze frame data:
  Freeze frame data records the engine condition when a misfire (DTCs P0300 – P0306) or fuel trim malfunction (DTCs P0171 and P0172) or other malfunction (first malfunction only), is detected.
  Because freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting, it is useful to determine whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- Priorities for troubleshooting.

If troubleshooting priorities for multiple DTCs are given in the applicable DTC chart, these should be followed.
If no instructions are given, troubleshoot DTCs according to the following priorities.

(1) DTCs other than fuel trim malfunction (DTCs P0171 and P0172) and misfire (DTCs P0300 – P0306).
(2) Fuel trim malfunction (DTCs P0171 and P0172).
(3) Misfire (DTCs P0300 – P0306).

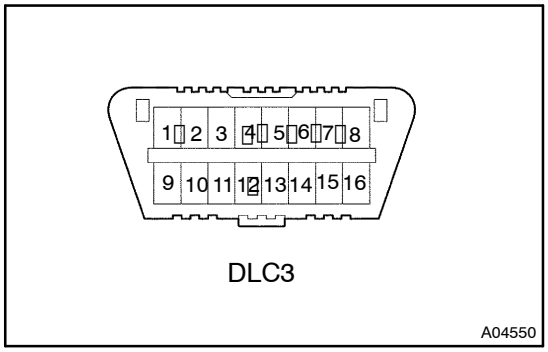

FI6907

(b) Description for M–OBD (Except European spec.)

- When troubleshooting Multiplex OBD (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the vehicle to the hand–held tester, and read off various data output from the vehicle's engine ECU.
- The vehicle's on–board computer indicates the check engine light (CHK ENG) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components.

In addition to an indication of the CHK ENG when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) recorded in the engine ECU memory (See page DI–17). When the malfunction does not reoccur, the CHK ENG is indicated until the ignition switch is turned off, and then the CHK ENG is not indicated when the ignition switch is turned on but the DTCs remain recorded in the engine ECU memory.

- To check the DTCs, connect the hand–held tester to Data Link Connector 3 (DLC3) on the vehicle or read the DTC which is indicated on the multi information display when TC and CG terminals on the DLC3 are connected. The 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 instruction book.)
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check (test) mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the CHK ENG on the light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2)
- * 2 trip detection logic
  When a logic malfunction is fist detected, the malfunction is temporally stored in the engine ECU memory. If the same malfunction is detected again during the second drive test, this second detection cases the CHK ENG to light up.
  The 2 trip repeats the same mode for 2 times. (However, the ignition switch must be turned OFF between the 1st trip and 2nd trip)
- Freeze frame data:
  Freeze frame data records the engine condition when malfunction is detected.
  Because freeze frame data records the engine conditions (fuel system, calculator load, water temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.



(c) Check the DLC3.
The vehicle's engine ECU uses the ISO 9141–2 (Euro–OBD)/ISO 14230 (M–OBD) communication protocol. The terminal arrangement of DLC3 complies with ISO 15031–3 and matches the ISO 9141–2/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:
Only for Euro–OBD:
If your display shows UNABLE TO CONNECT TO VEHICLE when you have connected the cable of the OBD scan tool or hand–held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.
If 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. INSPECT DIAGNOSIS (Normal Mode)

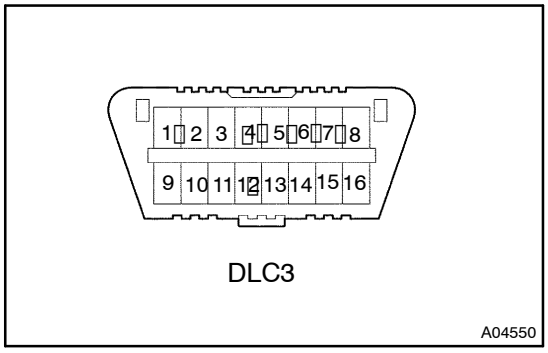
(a) Check the DTC using hand–held tester.

NOTICE:

Hand–held tester only:

When the diagnosis 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 hand–held tester.
(2) Connect the hand–held tester to DLC3.
(3) Turn the ignition switch ON and push the hand–held tester main switch ON.
(4) Use the hand–held tester to check the DTCs and freezed frame data, note them down. (For operating instructions, see the hand–held tester instruction book.)
(5) See page DI–17 to confirm the details of the DTCs.

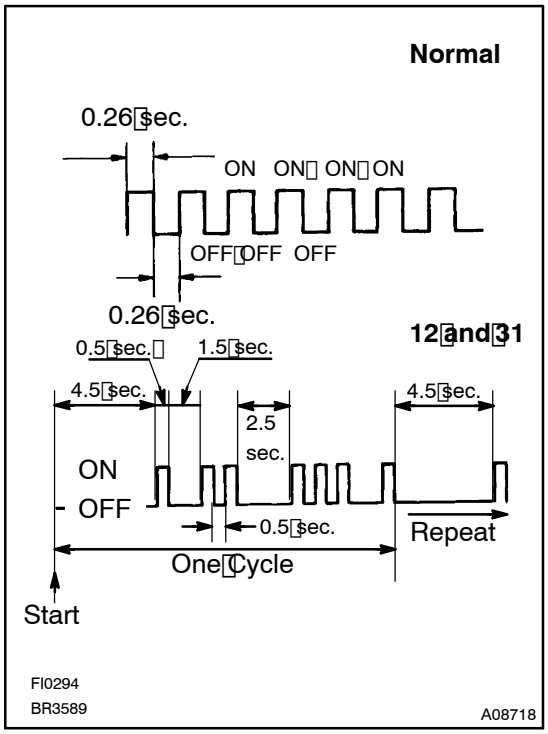


(b) Check the DTC when not using hand–held tester.

(1) Turn the ignition switch ON.

(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of the DLC3.

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(3) Read the DTC from the check engine warning light (CHK ENG).

As an example, the blinking patterns for codes, normal, 12 and 31 are as shown in the illustration.

(4) Check the details of the malfunction using the DTC chart on page.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.

HINT:

In the event of 2 or more malfunction cords, the indication will begin from the smaller numbered cord and continue in order to the larger.

(6) Push the function key of the steering switch until EFI will be displayed on the instrument panel.

(7) Read the DTC on the instrument panel.

HINT:

- If a DTC is not indicated, check the TC terminal circuit (See page DI–23).
- If a code No.89 is indicated, read the number of blinks of the ECT SNOW indication to get the DTC for the electric throttle control system (ETCS).

NOTICE:

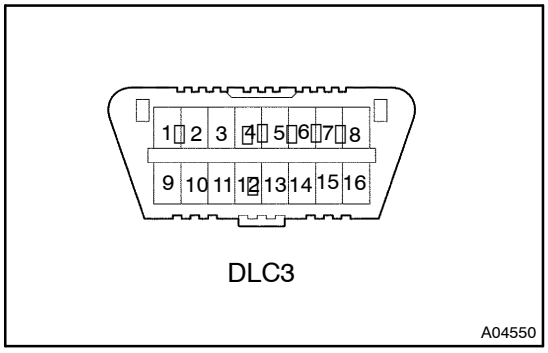
- **When simulating symptoms with out a hand–held tester to check the DTCs, use normal mode. For code on the DTC chart subject to ”2 trip detection logic”, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again. When the problem has been simulated twice, the CHECK ENG is indicated on the instrument panel and the DTCs are recorded in the engine ECU.**
- **Check the 1st trip DTC using Mode 7 for ISO 15031 (Continuous Test Results of Euro–OBD function in hand–held tester).**

(c) Check the DTC for ETCS

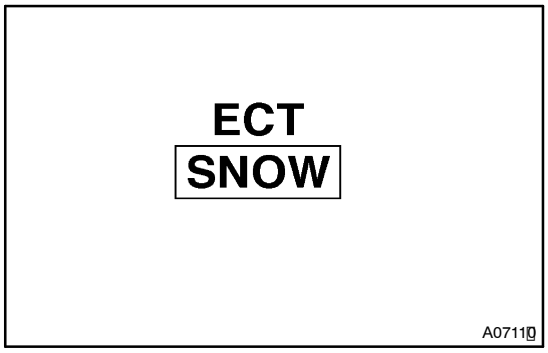
(1) Turn the ignition switch ON.

HINT:

If the ECT SNOW indicator does not light up, troubleshoot the combination meter (See page BE–75).



(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of the DLC3.
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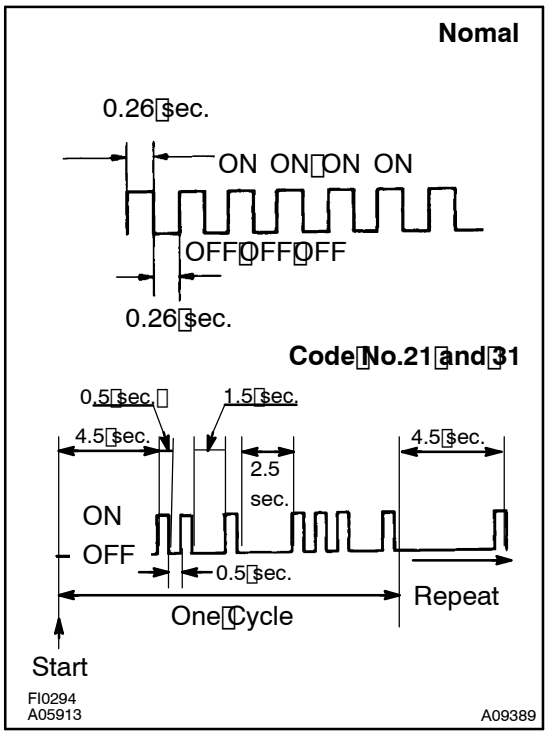


(3) Read the DTC from the ECT snow indicator the combination meter.

HINT:
If a DTC is not output, check the TC terminal circuit (See page DI–23).

(4) Check details of the malfunction using the DTC chart on page DI–17.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.



HINT:
In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the lager.

(d) Clear the DTC.
The DTCs and freezed frame data will be erased by either actions.

(1) Operating the hand–held tester to erase the codes. (See the hand–held tester's instruction book for operating instructions.)

(2) Disconnecting the battery terminals of EFI and ECTS fuses.

NOTICE:
If the hand–held tester switches the engine ECU 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.

3. INSPECT DIAGNOSIS (Check (Test) Mode)

HINT:
Hand–held tester only:
Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.
Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check (test) mode.

(a) Check the DTC.

(1) Initial conditions

- Battery voltage 11 V or more
- Throttle valve fully closed.
- Transmission in P or N position
- A/C switched OFF

(2) Turn the ignition switch OFF.
(3) Prepare the hand–held tester.
(4) Connect the hand–held tester to the DLC3.
(5) Turn the ignition switch ON and push the hand–held tester main switch ON.
(6) Switch the hand–held tester from the normal mode to the check (test) mode.

NOTICE:
If the hand–held tester switches the engine ECU 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.

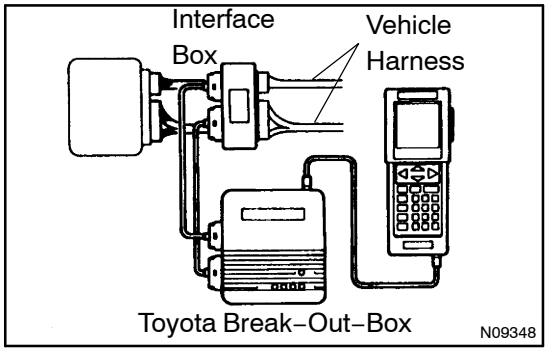
(7) Start the engine.
(8) Simulate the conditions of the malfunction described by the customer.

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 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 (test) mode to normal mode. so all DTCs, etc. are erased.

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



(b) Engine ECU Terminal Values Measurement Using Break–Out–Box and Hand–Held Tester
(1) Hook up the break–out–box and hand–held tester to the vehicle.
(2) Read the engine ECU input/output values by following the prompts on the tester screen.

HINT:
- Hand–held tester has a ”Snapshot” function.
  This records the measured values and is effective in the diagnosis of intermittent problems.
- Please refer to the hand–held tester/break–out–box operator’s manual for further details.

4. FAIL–SAFE CHART

If any of the following codes is recorded, the engine ECU enters fail–safe mode.

DTC No.	Fail–Safe Operation	Fail–Safe Deactivation Conditions
P0100/31	Ignition timing fixed at 5˚ BTDC	Returned to normal condition
P0110/24	Intake air temperature is fixed at 20˚C (68˚F)	Returned to normal condition
P0115/22	Water temperature is fixed at 80˚C (176˚F)	Returned to normal condition

P0120/41	VTA is fixed at 0°	The following condition must be repeated at least 2 times consecutively when closed throttle position switch is OFF: VTA ≧ 0.1 V and ≦ 0.95 V
P0135/21 P0141/21 P0155/28 P0161/28	The heater circuit in which an abnormality is detected is turned off	Ignition switch OFF
P0325/52 P0330/53	Max. timing retardation	Ignition switch OFF
P1300/14 P1305/15 P1310/14 P1315/14 P1320/14 P1325/14 P1330/14 P1340/14	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HINT:

Hand–held tester only:

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

(a) Clear the DTCs (See step 2).

(b) Set the check (Test) mode (See step 3).

(c) Perform a simulation test (See page IN–22).

(d) Check the connector and terminal (See page IN–32).

(e) Handle the connector (See page IN–32).

6. BASIC INSPECTION

When the malfunction code is not confirmed in the DTC check, troubleshooting should be performed in the order for all possible circuits to be considered as the causes of the problems. In many cases, by carrying out the basic engine check shown in the following flow chart, the location causing the problem can be found quickly and efficiently. Therefore, use of this check is essential in engine troubleshooting.

1	**Is battery voltage 11 V or more when engine is stopped?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked?**

NO → **Proceed to problems table on page DI–25.**

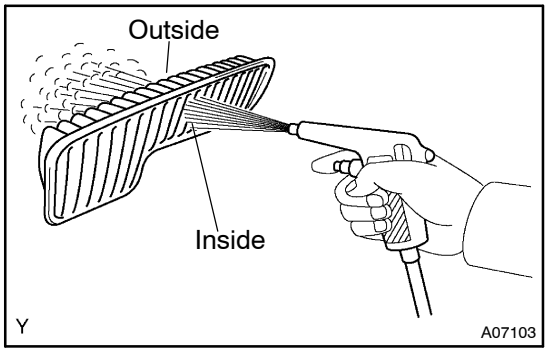
YES

3	**Does engine start?**

NO → **Go to step 7.**

YES

4	**Check air filter.**

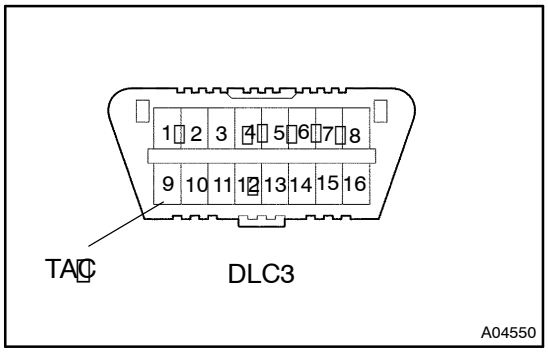


PREPARATION:
Remove the air filter.
CHECK:
Visually check that the air filter is not dirty or excessive oily.
HINT:
If necessary, clean the air filter with compressed air. First blow from inside thoroughly, then blow from outside of the air filter.

NG → **Repair or replace**

OK

5	**Check idle speed.**



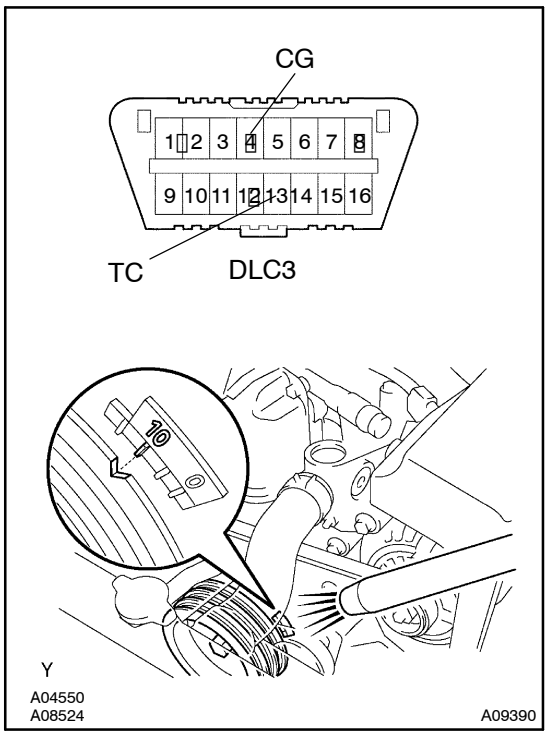
PREPARATION:
(a) Warm up the engine to normal operating temperature.
(b) Switch off all the accessories.
(c) Switch off the A/C.
(d) Shift the transmission into the N position.
(e) Connect the hand–held tester to the DLC3 on the vehicle.
(f) If you have no hand–held tester, connect tachometer test prove to terminal 9 (TAC) of the DLC3.
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NOTICE:
As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.
CHECK:
Check the idle speed.
OK:
Idle speed: 600 – 700 rpm

NG → **Proceed to problem symptoms table on page DI–25.**

OK

6	Check ignition timing.



PREPARATION:

(a) Warm up the engine to normal operating temperature.
(b) Shift the transmission into the N position.
(c) Keep the engine speed at idle.
(d) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843–18040
(e) Using a timing light, connect the tester to the ignition coil connector wire (See page EM–15).

CHECK:

Check the ignition timing.

OK:

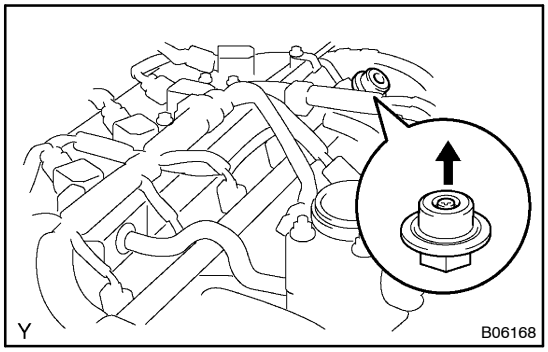
Ignition timing: 10° BTDC at idle

NG → **Proceed to page IG–1 and continue to trouble-shoot.**

OK

Proceed to problem symptoms table on page DI–25.

7	Check fuel pressure.



PREPARATION:

(a) Be sure that enough fuel is in the tank.
(b) Connect the hand–held tester to the DLC3.
(c) Turn the ignition switch ON and push hand–held tester main switch ON.
(d) Use the ACTIVE TEST mode to operate the fuel pump.
(e) Please refer to the hand–held tester operator's manual for further details.
(f) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page FI–6).

CHECK:

Check that pulsation damper screw rises up when fuel pump operates.

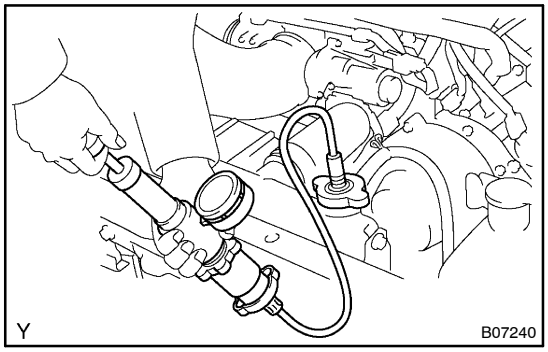
HINT:

At this time, you will hear a fuel flowing noise.

NG	**Proceed to page FI–6 and continue to trouble-shoot.**

OK

8	**Check for spark.**



PREPARATION:

(a) Remove the ignition coil from the spark plug.
(b) Remove the spark plug.
(c) Install the spark plug to the ignition coil.
(d) Disconnect the injector connector.
(e) Ground the spark plug.

CHECK:

Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being from injected from the injectors during this test, don't crank the engine for more than 5 – 10 seconds at a time.

NG	**Proceed to page IG–1 and continue to trouble-shoot.**

OK

Proceed to problem symptoms table on page DI–25.

7. ENGINE OPERATING CONDITION

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value varies differ from those listed here. So do not decide whether a part is faulty or not solely according to the "Normal Condition" here.

Hand–held tester display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1 OPEN: Air–fuel ratio feedback stopped CLOSED: Air–fuel ratio feedback operating	Idling after warming up: CLOSED

FUEL SYS #2	Fuel System Bank 2 OPEN: Air–fuel ratio feedback stopped CLOSED: Air–fuel ratio feedback operating	Idling after warming up: CLOSED
CALC LOAD	Calculator Load: Current intake air volume as a proportion of max. intake air volume	Idling: 25.7 – 46.4 % Racing without load (2,500rpm): 19.7 – 40.5 %
COOLANT TEMP	Water Temp. Sensor Value	After warming up: 80 – 95°C (176 – 203°F)
SHORT FT #1	Short–term Fuel Trim Bank 1	0 ± 20 %
LONG FT #1	Long–term Fuel Trim Bank 1	0 ± 20 %
SHORT FT #2	Short–term Fuel Trim Bank 2	0 ± 20 %
LONG FT #2	Long–term Fuel Trim Bank 2	0 ± 20 %
ENGINE SPD	Engine Speed	Idling: 700 – 800 rpm
VEHICLE SPD	Vehicle Speed	Vehicle stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No.1	Idling: BTDC 5 – 15°
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to ambient temp.
MAP	Absolute Pressure Inside Intake Manifold	Idling: 26 – 47 kPa. Racing without load (2,500 rpm): 20 – 41 kPa
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0 %, 5 V → 100 %	Throttle fully closed: 8 – 20 % Throttle fully open: 64 – 96 %
O2S B1 S1	Voltage Output of Oxygen Sensor Bank 1 Sensor 1	Idling: 0.1 – 0.9 V
O2S B1 S2	Voltage Output of Oxygen Sensor Bank 1 Sensor 2	Driving (50 km/h, 31 mph): 0.1 – 0.9 V
O2S B2 S1	Voltage Output of Oxygen Sensor Bank 2 Sensor 1	Idling: 0.1 – 0.9 V
O2FT B1 S1	Oxygen Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2FT B2 S1	Oxygen Sensor Fuel Trim Bank 2, Sensor 1 (Same as SHORT FT #2)	0 ± 20 %
MIL ON RUN DIST	Distance since activation of check engine warning light	When there is no DTC: 0 km/h (0 mph)
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.92 – 3.37 ms
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0: 0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0: 0 g/r
STARTER SIG	Starter Signal	Cranking: ON
A/C SIG	A/C Switch Signal	A/C ON: ON
PNP SW	Park/Neutral Position Switch Signal	P or N position: ON
ELCTRCL LOAD SIG	Electrical Load Signal	Defogger switch ON: ON
CTP	Closed Throttle Position	Throttle fully closed: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: ON
PS OIL PRESS SW	Power Steering Oil Pressure Switch Signal	Turn steering wheel: ON
FC IDL	Fuel Cut Idle: Fuel cut when throttle valve fully closed, during deceleration	Fuel cut operating: ON
FC TAU	Fuel Cut TAU: Fuel cut during very light load	Fuel cut operating: ON
CYL#1 – CYL#6	Abnormal revolution variation for each cylinder	0 %
IGNITION	Total number of ignition for every 1,000 revolutions	0 – 300
INTAKE CTRL VSV	Intake Air Control Valve VSV Signal	VSV operating: ON

A/C CUT SIG	A/C Cut Signal	A/C S/W OFF: ON
FUEL PUMP	Fuel Pump Signal	Idling: ON
EVAP (PURGE) VSV	EVAP VSV Signal	VSV operating: ON
THROTTLE POS #2	Throttle position sensor No.2 output voltage	Throttle fully closed: 2.0 – 2.9 V Throttle fully open: 4.6 – 5.0 V
ACCEL POS	Accelerator pedal position sensor No.1 output voltage	Accelerator pedal released: 0.25 – 0.9 V Accelerator pedal depressed: 3.2 – 4.8 V
ACCEL POS #2	Accelerator pedal position sensor No.2 output voltage	Accelerator pedal released: 1.8 – 2.7 V Accelerator pedal depressed: 4.7 – 5.0 V
THROTTLE TARGET POS	Target position of throttle valve	Idling: 0.4 – 1.1 V
THROTTLE OPEN DUTY	Throttle motor opening duty ratio	Throttle fully closed: 0 % When accelerator pedal is depressed, duty ratio is increased
THROTTLE CLOSE DUTY	Throttle motor closed duty ratio	Throttle fully closed: 0 % When accelerator pedal is quick released, duty ratio is increased
THROTTLE MOTOR CTL	Whether or not throttle motor control is permitted	Idling: ON
THROTTLE CLUTCH CTL	Whether or not magnetic clutch control is permitted	Idling: ON
+BM	Whether or not electric throttle control system power is inputted	Idling: ON
ACCEL IDL	Whether or not accelerator pedal position sensor is detecting idle	Idling: ON
THROTTLE IDL	Whether or not throttle position sensor is detecting idle	Idling: ON
FAIL #1	Whether or not fail safe function is executed	ETCS is failed: ON
FAIL #2	Whether or not fail safe function is executed	ETCS is failed: ON
THROTTLE LEAN VALUE	Throttle fully closed learning value	0.4 – 0.8 V
ACCEL LEAN VALUE	Accelerator fully closed learning value	0.4 – 0.8 V
THROTTLE MOTOR	Throttle motor control current	Idling: 0 – 3.0 A
ETCS MAG CLUTCH	Magnetic clutch control current	0.8 – 1.0 A
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.5 – 1.4
TOTAL FT B2	Total Fuel Trim Bank 2: Average value for fuel trim system of bank 2	Idling: 0.5 – 1.4
O2 LR B1 S1	Oxygen Sensor Lean Rich Bank 1 Sensor 1: Response time for oxygen sensor output to switch from lean to rich	Idling after warming up: 0 – 1,000 msec.
O2 LR B2 S1	Oxygen Sensor Lean Rich Bank 2 Sensor 1: Response time for oxygen sensor output to switch from lean to rich	Idling after warming up: 0 – 1,000 msec.
O2 RL B1 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warming up: 0 – 1,000 msec.
O2 RL B2 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warming up: 0 – 1,000 msec.

*: If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

DI63K–01

DIAGNOSTIC TROUBLE CODE CHART

HINT:

Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check in the check mode, check the circuit for the code listed in the table below. For details of each code, turn to the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

ENGINE TROUBLE CODES

DTC No. (See page)	Detection Item	Trouble Area	*1 CHK ENG (MIL)	Memory
P0105/31 (DI–27)	Vacuum Sensor Circuit Malfunction	• Open or short in vacuum sensor circuit • Vacuum sensor • Engine ECU	○	○
P0106/31 (DI–31)	Vacuum Sensor Circuit Range/ Performance Problem (European spec.)	• Vacuum Sensor • Vacuum Line	○	○
P0110/24 (DI–32)	Intake Air Temp. Circuit Malfunction	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU	○*3	○
P0115/22 (DI–37)	Water Temp. Circuit Malfunction	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU	○	○
P0120/41 (DI–42)	Throttle Position Sensor Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU	○	○
P0121/41 (DI–47)	Throttle Position Sensor Circuit Range/Performance Problem	• Throttle position sensor	○	○
P0125/91 (DI–48)	Insufficient Coolant Temp. for Closed Loop Fuel Control (European spec.)	• Open or short in oxygen sensor (bank 1, 2 sensor 1) circuit • Oxygen Sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU	○	○
P0130/21 (DI–53)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU	○*3	○
P0133/21 (DI–57)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1) (European spec.)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU	○	○
P0135/21 (DI–61)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU	○*3	○
P0136/27 (DI–63)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in oxygen sensor circuit • Oxygen sensor	○*3	○

P0141/21 (DI–53)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135/21	○*3	○
P0150/28 (DI–53)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0130/21	○*3	○
P0153/28 (DI–57)	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1) (European spec.)	• Same a DTC No. P0130/21	○	○
P0155/28 (DI–61)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0135/21	○*3	○
P0171/25 (DI–66)	System too Lean (A/F Lean Malfunction, Bank 1)	• Air induction system • Injector blockage • Vacuum Sensor • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank1, 2 sensor1) circuit • Oxygen sensor (bank1, 2 sensor1) • Engine ECU	○*3	○
P172/26 (DI–66)	System too Rich (A/F Rich Malfunction, Bank 1) (European spec.)	• Injector leak, blockage • Vacuum sensor • Water temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank1, 2 sensor1) circuit • Oxygen sensor (bank1, 2 sensor1) • Engine ECU	○	○
P0174/25 (DI–66)	System too Lean (A/F Lean Malfunction, Bank 2)	• Same as DTC No. P0171/25	○*3	○
P0175/26 (DI–66)	System too Rich (A/F Rich Malfunction, Bank 2) (European spec.)	• Same as DTC No. P0172/26	○	○
P0300/93 (DI–72)	Random/Multiple Cylinder Misfire Detected (European spec.)	• Open or short engine wire • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Vacuum sensor • Water temp. sensor • Compression pressure • Valve clearance • Valve timing • Engine ECU	○	○
P0301/93 (DI–72)	Cylinder 1 Misfire Detected (European spec.)			
P0302/93 (DI–72)	Cylinder 2 Misfire Detected (European spec.)			
P0303/93 (DI–72)	Cylinder 3 Misfire Detected (European spec.)			
P0304/93 (DI–72)	Cylinder 4 Misfire Detected (European spec.)			
P0305/93 (DI–72)	Cylinder 5 Misfire Detected (European spec.)			
P0306/93 (DI–72)	Cylinder 6 Misfire Detected (European spec.)			
P0325/52 (DI–78)	Knock Sensor 1 Circuit Malfunction (Bank 1)	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU	○	○
P0330/55 (DI–81)	Knock Sensor 2 Circuit Malfunction (Bank 2)	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU	○	○

P0335/12, 13 (DI–81)	Crankshaft Position Sensor Circuit Malfunction (NE Signal)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU	○	○
P0340/12 (DI–83)	Camshaft Position Sensor Circuit Malfunction (G Signal)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • Engine ECU	○	○
P0420/94 (DI–85)	Catalyst System Efficiency Below Threshold (Bank 1) (European spec. (Except Taiwan))	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter	○	○
P0443/94 (DI–88)	Evaporative Emission Control System Purge Control Vent Control Malfunction (European spec.)	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU	○	○
P0500/42 (DI–91)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine ECU	○	○
P0505/33 (DI–96)	Idle Control System Malfunction (European spec.)	• Air induction system • Electric throttle control system	○	○
P1120/19 (DI–97)	Accelerator Pedal Position Sensor Circuit Malfunction	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU	○	○
P1121/19 (DI–102)	Accelerator Pedal Position Sensor Range/Performance Problem	• Accelerator pedal position sensor	○	○
P1125/89*2 (DI–103)	Throttle Control Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU	○	○
P1126/89*2 (DI–106)	Magnetic Clutch Circuit Malfunction	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU	○	○
P1127/89*2 (DI–109)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • Engine ECU	○	○
P1128/89*2 (DI–111)	Throttle Control Motor Lock Malfunction	• Throttle control motor • Throttle body	○	○
P1129/89*2 (DI–113)	Electric Throttle Control System Malfunction	• Electric throttle control system • Engine ECU	○	○
P1300/14 (DI–114)	Igniter Circuit Malfunction (No.1)	• Ignition system • Open or short in IGF or IGT1 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1305/15 (DI–114)	Igniter Circuit Malfunction (No.2)	• Ignition system • Open or short in IGF or IGT2 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1310/14 (DI–114)	Igniter Circuit Malfunction (No.3)	• Ignition system • Open or short in IGF or IGT3 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1315/14 (DI–114)	Igniter Circuit Malfunction (No.4)	• Ignition system • Open or short in IGF or IGT4 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○

P1320/14 (DI–114)	Igniter Circuit Malfunction (No.5)	• Ignition system • Open or short in IGF or IGT5 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1325/14 (DI–114)	Igniter Circuit Malfunction (No.6)	• Ignition system • Open or short in IGF or IGT6 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1335/13 (DI–121)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU	–	○
P1346/18 (DI–122)	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • ECM	○	○
P1349/59 (DI–123)	VVT System Malfunction (Bank 1)	• Valve timing • OCV • VVT controller assembly • Engine ECU	○*3	○
P1600/96 (DI–130)	Engine ECU BATT Malfunction (European spec.)	• Open in back up power source circuit • Engine ECU	○	○
P1633/89*2 (DI–132)	Engine ECU Malfunction (ETCS Circuit)	• Engine ECU	○	○
P1645/82 (DI–133)	Body ECU Malfunction	• Body ECU • A/C ECU • Communication bus	–	○
P1651/96 (DI–134)	VSV for ACIS Circuit Malfunction (European spec.)	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU	○	○
P1656/39 (DI–138)	OCV Circuit Malfunction (Bank 1)	• Open or short in OCV circuit • OCV • Engine ECU	○	○
P1780/97*2 (DI–141)	Park/Neutral Position Switch Malfunction (A/T for European spec.)	• Short in neutral start switch circuit • Neutral start switch • Engine ECU	○	○
B2795/99 (DI–513)	Unmatch Key Code	• Key • Unregistered key inserted before?	–	○

*1: ○: CHK ENG is indicated. –: CHK ENG is not indicated.
*2: If the DTC No.89 is indicated on the check engine warning light, read the DTC for ETCS from ECT SNOW indicator to get the detail of the DTC No.89. If using the hand–held tester, the detail DTC for ETCS is displayed on the hand–held tester.
*3: European spec.

ETCS TROUBLE CODES (When not use hand–held tester)

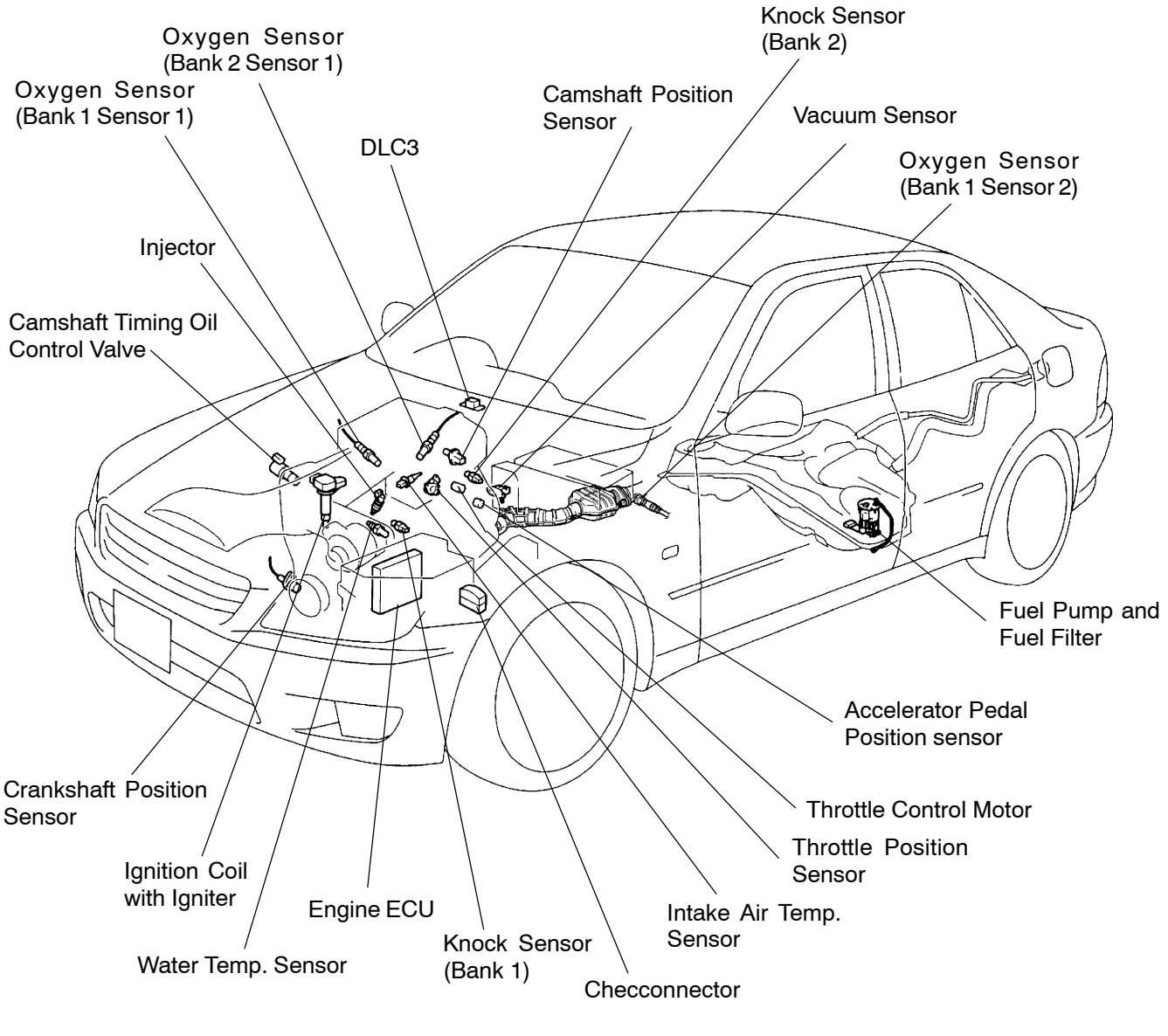
DTC No. (See page)	Detection Item	Trouble Area	* CHK ENG (MIL)	Memory
21 (DI–103)	Throttle Control Motor Circuit Malfunction	• Same as DTC No. P1125/89	○	○
22 (DI–106)	Magnetic Clutch Circuit Malfunction	• Same as DTC No. P1126/89	○	○
23 (DI–109)	ETCS Actuator Power Source Circuit Malfunction	• Same as DTC No. P1127/89	○	○

31 (DI–111)	Throttle Control Motor Lock Malfunction	• Same as DTC No. P1128/89	○	○
32 (DI–113)	Electric Throttle Control System Malfunction	• Same as DTC No. P1129/89	○	○
33 (DI–132)	ECU Malfunction (ETCS)	• Same as DTC No. P1633/89	○	○

*: ○ ... CHK ENG is indicated.

DI63L–01

PARTS LOCATION



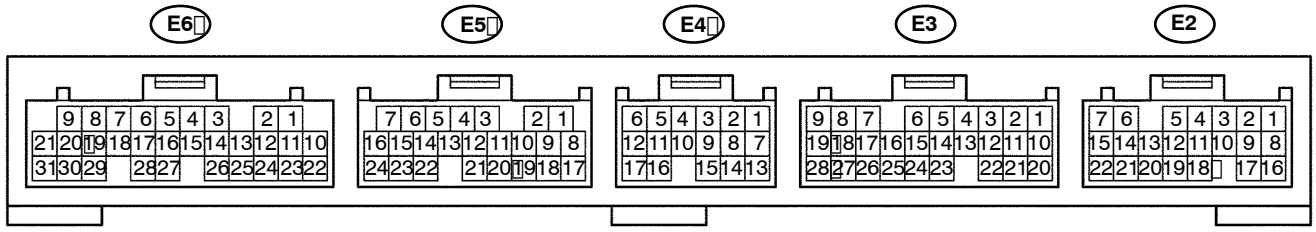
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DI63M–01

TERMINALS OF ECU

Engine ECU Terminals



A02508

A04997

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E2–1) – E1 (E5–17)	B–Y ↔ BR	Always	9 – 14
BM (E2–7) – E1 (E5–17)	L–W ↔ BR	Always	9 – 14
IGSW (E2–9) – E1 (E5–17)	B–O ↔ BR*1 B–R ↔ BR*2	IG switch ON	9 – 14
+B (E2–16) – E1 (E5–17)	B–R ↔ BR		
+B2 (E2–8) – E1 (E5–17)	B–R ↔ BR		
VC (E5–2) – E2 (E5–18)	L–Y ↔ BR	IG switch ON	4.5 – 5.5
VTA (E5–23) – E2 (E5–18)	W–R ↔ BR	IG switch ON, Accelerator pedal fully closed	0.4 – 1.0
		IG switch ON, Accelerator pedal fully open	3.2 – 4.8
VTA2 (E5–24) – E2 (E5–18)	R–B ↔ BR	IG switch ON, Accelerator pedal fully closed	2.0 – 2.9
		IG switch ON, Accelerator pedal fully open	4.6 – 5.1
VPA (E5–15) – E2 (E5–18)	LG–B ↔ BR	IG switch ON, Accelerator pedal fully closed	0.3 – 0.9
		IG switch ON, Accelerator pedal fully open	3.2 – 4.8
VPA2 (E5–16) – E2 (E5–18)	L–W ↔ BR	IG switch ON, Accelerator pedal fully closed	1.8 – 2.7
		IG switch ON, Accelerator pedal fully open	4.7 – 5.1
PIM (E5–9) – E2 (E5–18)	G–R ↔ BR	IG switch ON, Apply vacuum 26.7 Kpa (200 mmHg, 7.9 in.Hg)	3.3 – 3.9
THA (E5–22) – E2 (E5–18)	Y ↔ BR	Idling, Intake air temp. 20°C (68°F)	0.5 – 3.4
THW (E5–14) – E2 (E5–18)	R ↔ BR	Idling, Water temp. 80°C (176°F)	0.2 – 1.0
STA (E3–2) – E1 (E5–17)	B ↔ BR	Shift lever position P or N, Ignition switch START	6.0 or more
#10 (E5–5) – E01 (E6–21) #20 (E5–6) – E01 (E6–21) #30 (E6–1) – E01 (E6–21) #40 (E6–2) – E01 (E6–21) #50 (E6–3) – E01 (E6–21) #60 (E6–4) – E01 (E6–21)	R ↔ W–R L ↔ W–B G ↔ W–B R–W ↔ W–B L–R ↔ W–B B–W ↔ W–B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI–72)
IGT1 (E6–11) – E1 (E5–17) IGT2 (E6–12) – E1 (E5–17) IGT3 (E6–13) – E1 (E5–17) IGT4 (E6–14) – E1 (E5–17) IGT5 (E6–15) – E1 (E5–17) IGT6 (E6–16) – E1 (E5–17)	B–R ↔ BR Y–R ↔ BR G ↔ BR L–R ↔ BR L–Y ↔ BR W ↔ BR	Idling	Pulse generation (See page DI–114)
IGF (E6–25) – E1 (E5–17)	Y ↔ BR	IG switch ON	4.5 – 5.5
		Idling	Pulse generation (See page DI–114)
G2 (E6–10) – NE– (E5–22)	G ↔ L	Idling	Pulse generation (See page DI–81)
NE+ (E6–23) – NE– (E5–22)	B–W ↔ L		
MERL (E2–10) – E1 (E5–17)	B–O ↔ BR	IG switch ON	9 – 14

FC (E2–17) – E1 (E5–17)	G–Y ↔ BR	IG switch ON	9 – 14
STP (E3–6) – E1 (E5–17)	G–W ↔ BR	Brake pedal is depressed	7.5 – 14
		Brake pedal is released	Below 1.5
PRG (E5–7) – E1 (E5–17)	GR ↔ BR	IG switch ON	9 – 14
OX1A (E5–18) – E1 (E5–17) OX2A (E5–12) – E1 (E5–17) OX1B (E3–8) – E1 (E5–17)	W ↔ BR B ↔ BR W ↔ BR	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See page DI–53)
HT1A (E5–4) – E1 (E5–17) HT2A (E5–3) – E1 (E5–17) HT1B (E3–9) – E1 (E5–17)	LG ↔ BR G–B ↔ BR R–W ↔ BR	Idling	Below 3.0
		IG switch ON	9 – 14
KNK1 (E6–28) – E1 (E5–17)	B ↔ BR	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See page DI–78)
KNK2 (E6–27) – E1 (E5–17)	W ↔ BR*1 GR ↔ BR*2		
TC (E3–5) – E1 (E5–17)	R–W ↔ BR*1 Y–G ↔ BR*2	IG switch ON	9 – 14
W (E2–6) – E1 (E5–17)	R–L ↔ BR	Idling	9 – 14
		IG switch ON	Below 3.0
ACMG (E3–19) – E1 (E5–17)	L–W ↔ BR	A/C switch ON (At idling)	Below 3.0
		A/C switch OFF	9 – 14
ENG+ (E2–14) – ENG– (E2–21)	L ↔ P	Idling	Pulse generation
TRC+ (E2–13) – TRC– (E2–20)	R ↔ W		
OCV+ (E6–18) – OCV– (E6–17)	W–R ↔ Y–B	IG switch ON	Pulse generation (See page DI–123)
ACIS (E6–5) – E01 (E6–17)	Y–G ↔ W–B	IG switch ON	9 – 14
		Engine speed between 2,500 rpm and 4,000 rpm	Below 3.0
CL+ (E6–20) – CL– (E6–19)	R ↔ Y	Idling	Pulse generation (See page DI–103)
M+ (E6–8) – ME01 (E6–9) M– (E6–7) – ME01 (E6–9)	B–W ↔ BR L ↔ BR	Idling	Pulse generation (See page DI–103)
SIL (E3–23) – E1 (E5–17)	W ↔ BR		
SP2+ (E4–5) – SP2– (E4–11)	L–Y ↔ R–L	Vehicle is driving	Pulse generation (See page DI–91)

*1: LHD
*2: RHD

DI63N–01

PROBLEM SYMPTOMS TABLE

When the malfunction is not confirmed in the diagnostic trouble code check and the problem still can not be confirmed in the basic inspection, proceed to this problem symptoms table and troubleshoot according to the numbered order given below.

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST–6 ST–18
	2. Neutral start switch circuit	DI–141
	3. Body ECU	DI–549
No initial combustion (Does not start)	1. Engine ECU power source circuit	DI–149
	2. Ignition coil with igniter	DI–72
	3. Injector circuit	DI–72
No complete combustion (Does not start)	1. Ignition coil with igniter	DI–72
	2. Injector circuit	DI–72
Engine cranks normally (Difficult to start)	1. Starter signal circuit	DI–146
	2. Ignition coil with igniter	DI–114
	3. Spark plug	IG–1
	4. Compression	EM–3
	5. Injector circuit	DI–72
Cold engine (Difficult to start)	1. Starter signal circuit	DI–146
	2. Injector circuit	DI–72
	3. Ignition coil with igniter	DI–114
	4. Spark plug	IG–1
Hot engine (Difficult to start)	1. Starter signal circuit	DI–146
	2. Injector circuit	DI–72
	3. Ignition coil	IG–1
	4. Spark plug	IG–1
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–674
	2. Engine ECU power source circuit	DI–149
	3. Neutral start switch circuit	DI–141
	4. Back up power source circuit	DI–130
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–674
	2. Neutral start switch circuit	DI–141
	3. Injector circuit	DI–72
	4. Back up power source circuit	DI–130
Rough idling (Poor idling)	1. Vacuum sensor circuit	DI–27
	2. Injector circuit	DI–72
	3. Ignition coil with igniter	DI–114
	4. Compression	EM–3
	5. Back up power source circuit	DI–130
Hunting (Poor idling)	1. Vacuum sensor circuit	DI–27
	2. Engine ECU power source circuit	DI–149
Hesitation/Poor acceleration (Poor driveability)	1. Vacuum sensor circuit	DI–27
	2. Injector circuit	DI–72
	3. Ignition coil with igniter	DI–114
	4. A/T faulty	DI–175
Muffler explosion, after fire (Poor driveability)	1. Ignition coil	IG–1
	2. Spark plug	IG–1
	3. Injector circuit	DI–72
Surging (Poor driveability)	1. Spark plug	IG–1
	2. Injector circuit	DI–72
Engine stall (Soon after starting)	1. Vacuum sensor circuit	DI–27
Engine stall (After accelerator pedal depressed)	1. Vacuum sensor circuit	DI–27

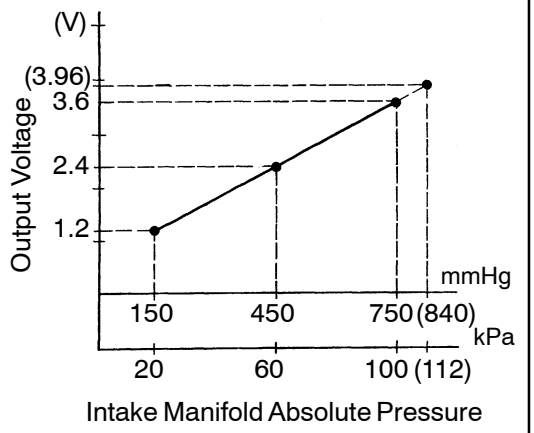
Engine stall (After accelerator pedal released)	1. Vacuum sensor circuit 2. Engine ECU	DI–27 IN–32
Engine stall (During A/C operation)	1. A/C signal circuit (Compressor circuit) 2. Engine ECU	DI–674 IN–32
Engine stall (When shifting N to D)	1. Neutral start switch circuit	DI–1241

DI63O–01

CIRCUIT INSPECTION

DTC	P0105/31	Vacuum Sensor Circuit Malfunction

CIRCUIT DESCRIPTION



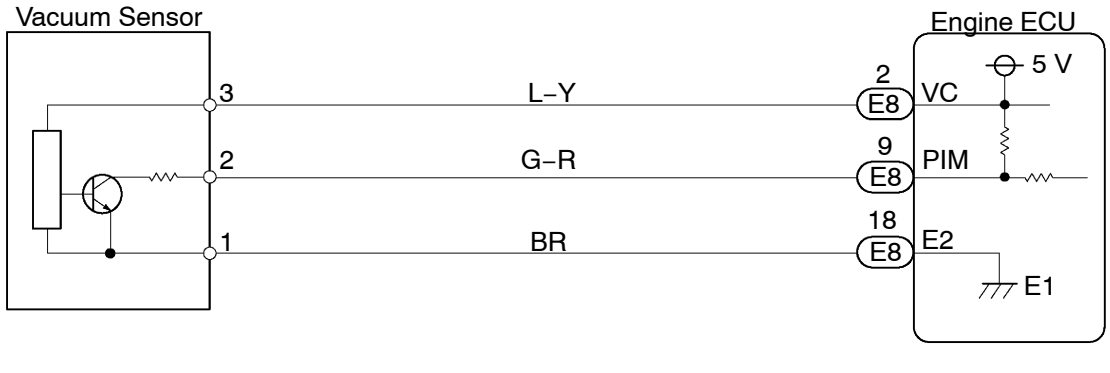
By a built–in sensor unit, the vacuum sensor detects the intake manifold pressure as a voltage. The engine ECU then determines the basic injection duration and basic ignition advance angle based on this voltage.
Since the vacuum sensor does not use the atmospheric pressure as a criterion, but senses the absolute pressure inside the intake manifold (the pressure in proportion to the preset absolute vacuum 0), it is not influenced by fluctuations in the atmospheric pressure due to high altitude and other factors. this permits it to control the air fuel ratio at the proper level under all conditions.

DTC No.	DTC Detecting Condition	Trouble Area
P0105/31	Open or short in vacuum sensor circuit	• Open or short in vacuum sensor circuit • Vacuum sensor • Engine ECU

HINT:
After confirming DTC P0105/31, use the hand–held tester to confirm the manifold absolute pressure from the CURRENT DATA.

Manifold Absolute Pressure (kPa)	Malfunction
Approx. 0	• PIM circuit short
130 or more	• VC circuit open or short • PIM circuit open • E2 circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of manifold absolute pressure.**

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the value of the manifold absolute pressure on the hand–held tester.

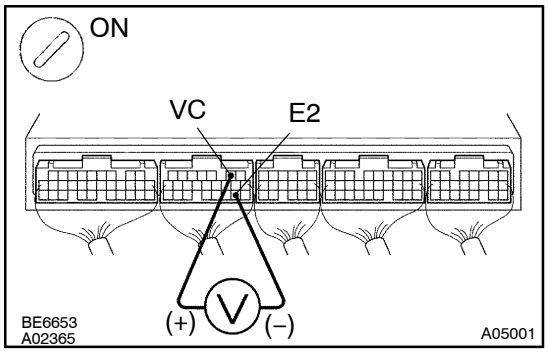
OK:

Same as atmospheric pressure.

OK → **Check for intermittent problems (See page DI–4).**

NG

2	**Check voltage between terminals VC and E2 of engine ECU Connector.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the engine ECU connector.

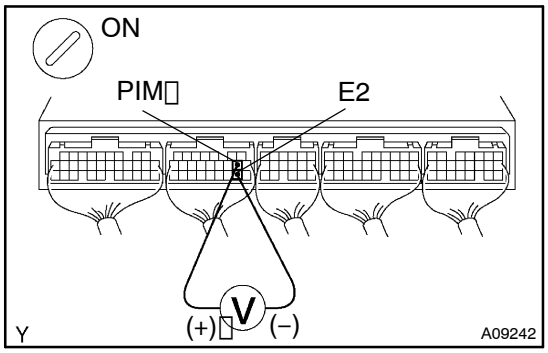
OK:

Voltage: 4.5 – 5.5 V

NG → **Check and replace engine ECU (See page IN–32).**

OK

3	Check voltage between terminals PIM and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals PIM and E2 of the engine ECU connector.
OK:
Voltage: 3.3 – 3.9 V

OK	Check and replace engine ECU (See page IN–32).

NG

4	Check for open and short in harness and connector between vacuum sensor and engine ECU.

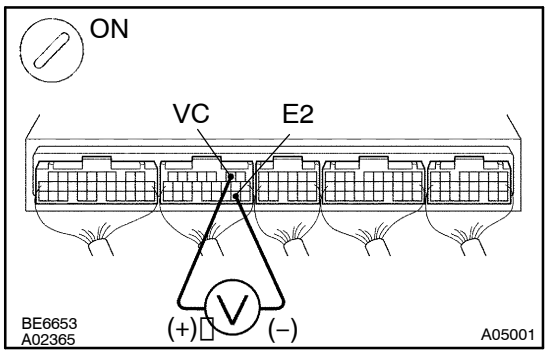
NG	Repair and replace harness or connector.

OK

Replace vacuum sensor (See page FI–60).

When not using hand–held tester:

1	Check voltage between terminals VC and E2 of engine ECU connector.

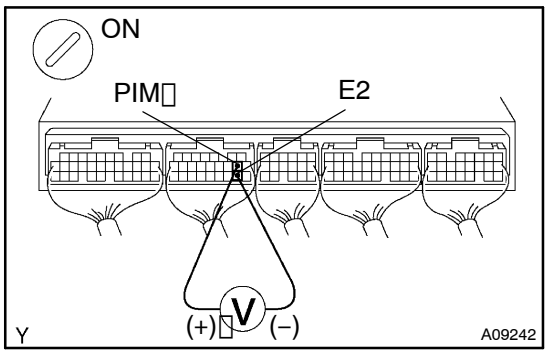


PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.
OK:
Voltage: 4.5 – 5.5 V

NG	Check and replace engine ECU (See page IN–32).

OK

2	Check voltage between terminals PIM and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals PIM and E2 of the engine ECU connector.

OK:

Voltage: 3.3 – 3.9 V

OK	Check and replace engine ECU (See page IN–32).

NG

3	Check for open and short in harness and connector between engine ECU and vacuum sensor (See page IN–32).

NG	Repair or replace harness or connector.

OK

Replace vacuum sensor.

DI63P–01

DTC	P0106/31	Vacuum Sensor Circuit Range/Performance Problem (European spec.)

CIRCUIT DESCRIPTION

Refer to DTC P0105/31 on page DI–27.

DTC No.	DTC Detecting Condition	Trouble Area
P0106/31	Conditions (a), (b), (c) and (d) continue with more than 10 seconds: (2 trip detection logic) (a) PIM > 3.3 V (b) Throttle position is closed (c) Engine speed is between 400 rpm and 1,000 rpm (d) THW ≧ 70°C (158°F)	• Vacuum sensor • Vacuum line
	Conditions (a), (b) and (c) continue with more than 10 second: (2 trip detection logic) (a) PIM < 1.5 V (b) Engine speed is 2,500 rpm (c) VTA ≧ 1 V	

INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0116/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0106/31) being output?

YES → Go to relevant DTC chart.

NO

2	Check vacuum sensor (See page FI–61).

NG → Replace vacuum sensor.

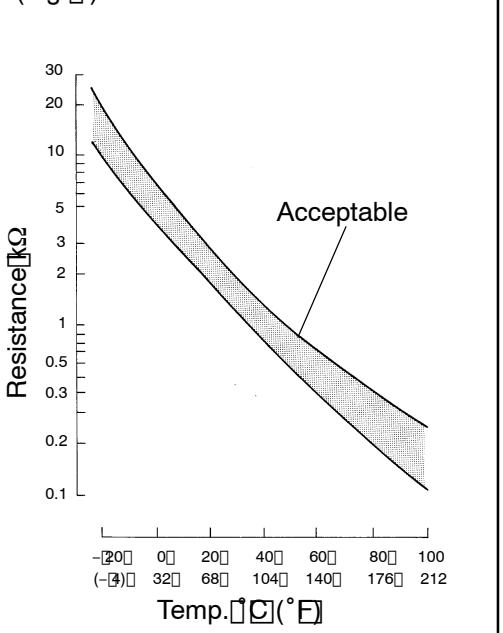
OK

Check vacuum line for vacuum sensor for blockage.

DI63Q-01

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION



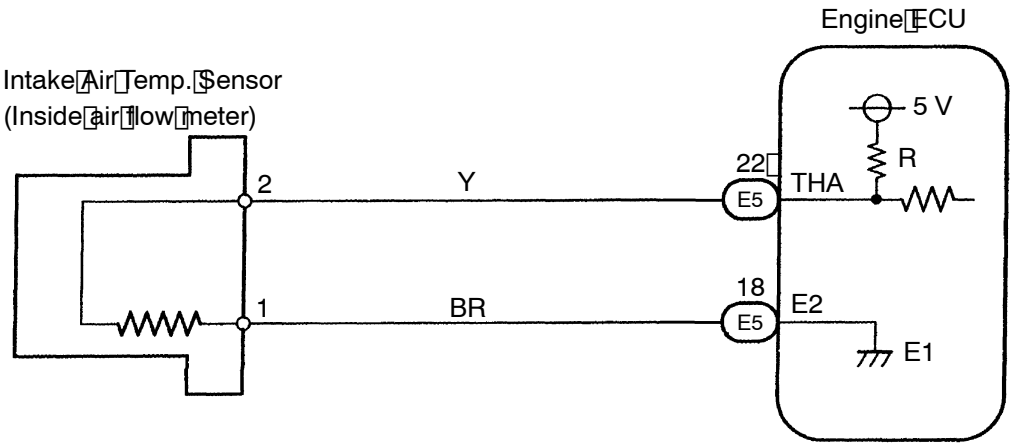
The intake air temperature sensor is built into the air cleaner and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).
The intake air temperature sensor is connected to the engine ECU (See below). The 5 V power source voltage in the engine ECU is applied to the intake air temp. sensor from terminal THA via resistor R.
That is, resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the engine ECU increases the fuel injection volume to improve driveability during cold engine operation.

DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU

HINT:
After confirming DTC P0110/24, use the hand–held tester to confirm the intake air temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140°C (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of intake air temperature.**

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Same as actual intake air temperature.

HINT:

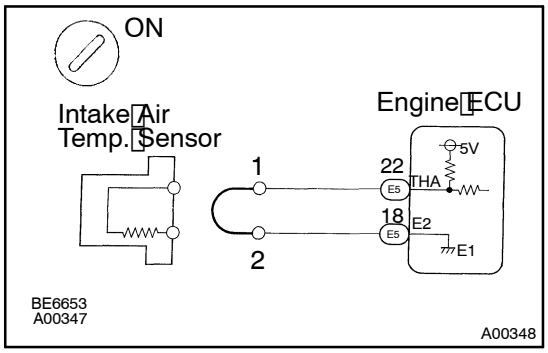
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

NG → **–40°C (–40°F) ... Go to step 2**
140°C (284°F) or more ... Go to step 4.

OK

Check for intermittent problems (See page DI–4).

2	Check for open in harness or engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

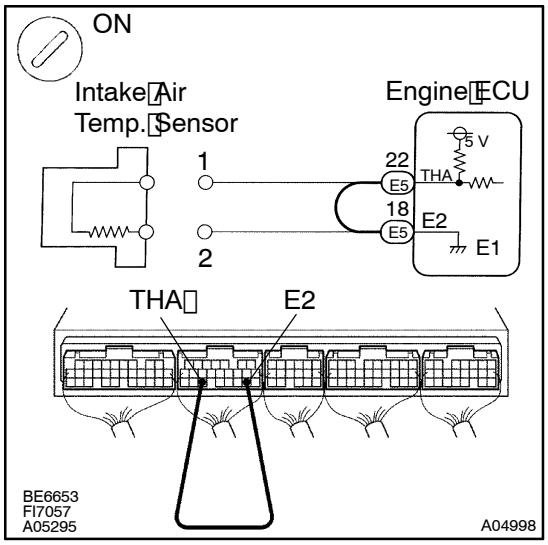
OK:

Temperature value: 140°C (284°F) or more

OK	Confirm good connection at sensor. If OK, replace intake air temperature sensor.

NG

3	Check for open in harness or engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.
(b) Connect between terminals THA and E2 of the engine ECU connector.

HINT:

The intake air temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–32).

CHECK:

Read the temperature value on the hand–held tester.

OK:

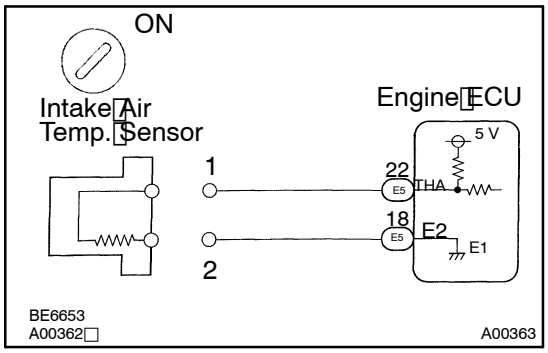
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THA, repair or replace harness.

NG

Confirm good connection at engine ECU. If OK, check and replace engine ECU (See page IN–32).

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

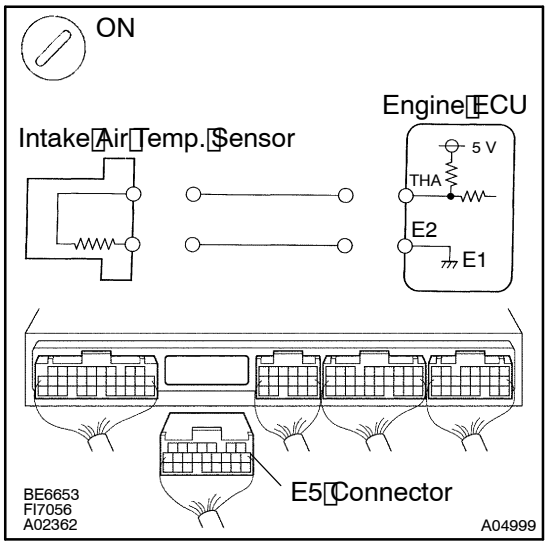
OK:

Temperature value: –40°C (–40°F)

OK	Replace intake air temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E5 connector from the engine ECU.

HINT:

The intake air temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

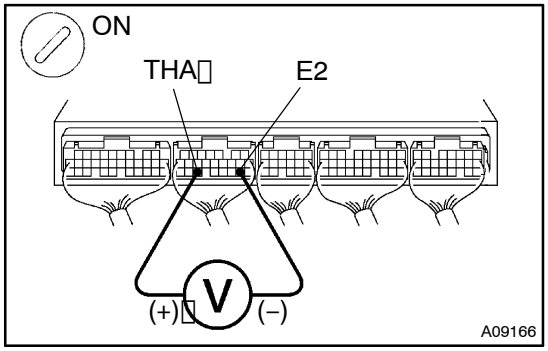
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–32).

When not using hand-held tester:

1	Check voltage between terminals THA and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THA and E2 of the engine ECU connector.

OK:

Intake Air Temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK → Check for intermittent problems (See page DI–17).

NG

2	Check intake air temperature sensor (See page FI–59).

NG → Replace intake air temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temperature sensor (See page DI–23).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

DI63R–01

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the water temperature sensor changes the resistance value according to the water temperature.

The structure of the sensor and connection to the engine ECU is the same as in the DTC P0110/24 shown on page DI–32.

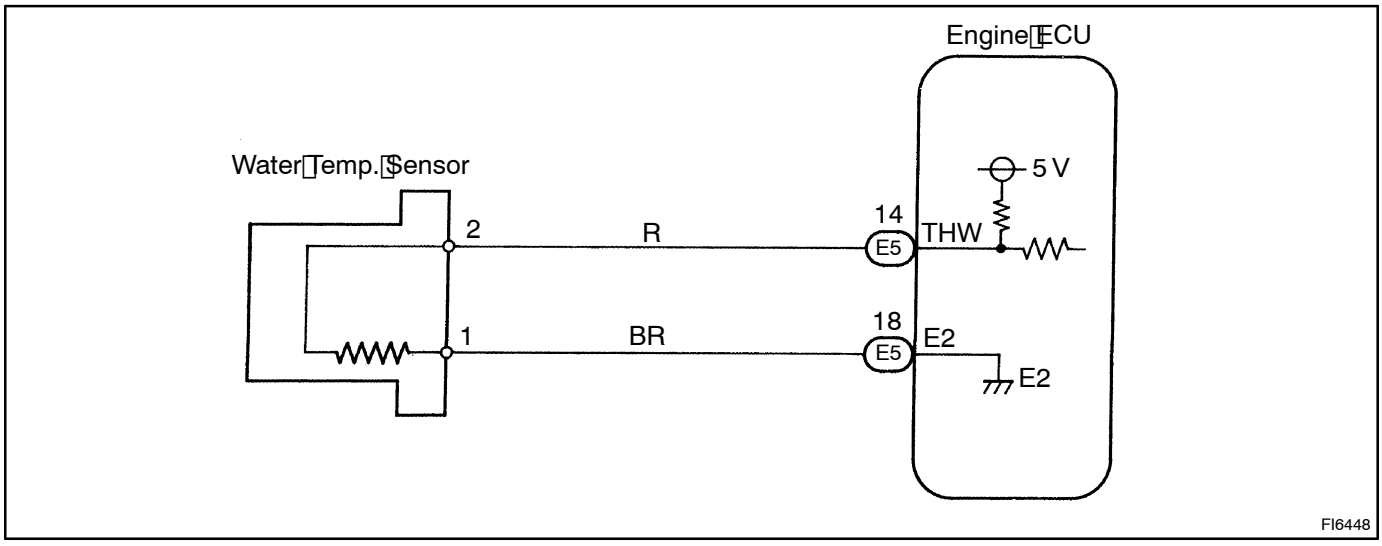
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU

HINT:

After confirming DTC P0115/22, use the hand–held tester to confirm the water temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140C° (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was Lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of water temperature.**

PREPARATION:

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

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

CHECK:

Read the temperature value on the hand–held tester.

OK:

Same as actual water temperature.

HINT:

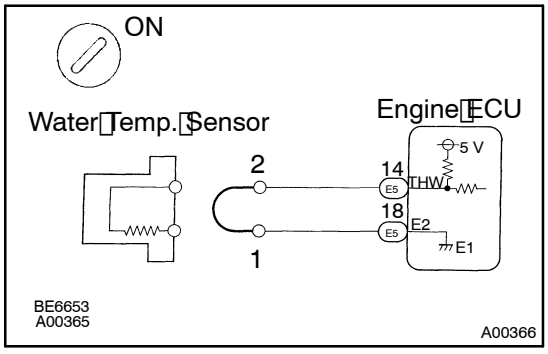
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

NG → **–40°C (–40°F) ... Go to step 2.**
140°C (284°F) or more ... Go to step 4.

OK

Check for intermittent problems (See page DI–4).

2	**Check for open in harness or engine ECU.**



PREPARATION:

(a) Disconnect the water temperature sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

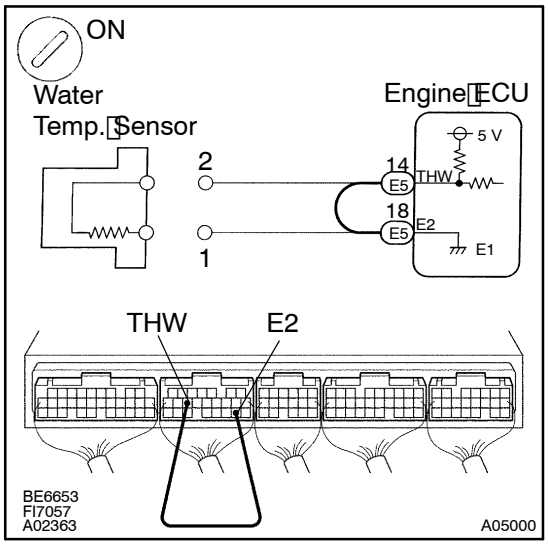
OK:

Temperature value: 140°C (284°F) or more

OK → **Confirm good connection at sensor. If OK, replace water temperature sensor.**

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Connect between terminals THW and E2 of the engine ECU connector.

HINT:

The water temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–32).

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

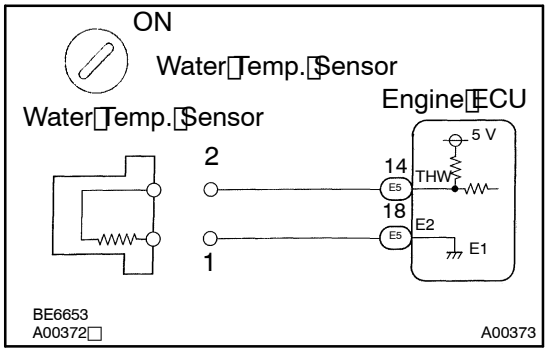
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THW, repair or replace harness.

NG

Confirm good connection at engine ECU. If OK, check and replace engine ECU (See page IN–32).

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the water temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

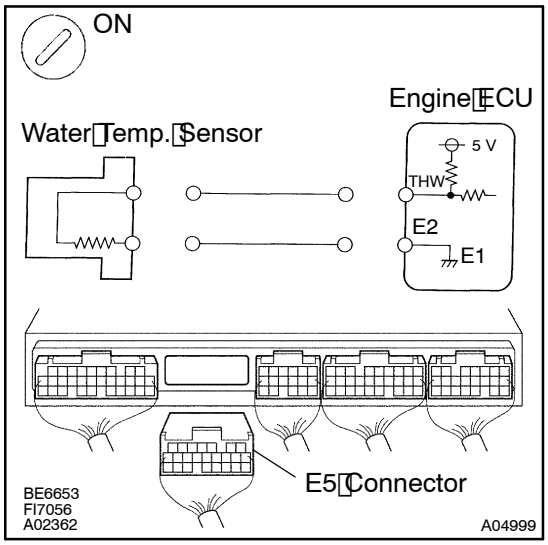
OK:

Temperature value: –40°C (–40°F)

OK	Replace water temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E5 connector from the engine ECU.

HINT:

The water temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand-held tester.

OK:

Temperature value: –40°C (–40°F)

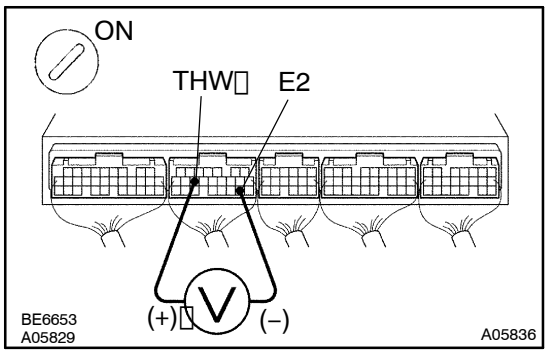
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–32).

When not using hand-held tester:

1	Check voltage between terminals THW and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THW and E2 of the engine ECU connector.

OK:

Water Temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK	Check for intermittent problems (See page DI–25).

NG

2	Check water temperature sensor (See page FI–57).

NG → Replace water temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and water temperature sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

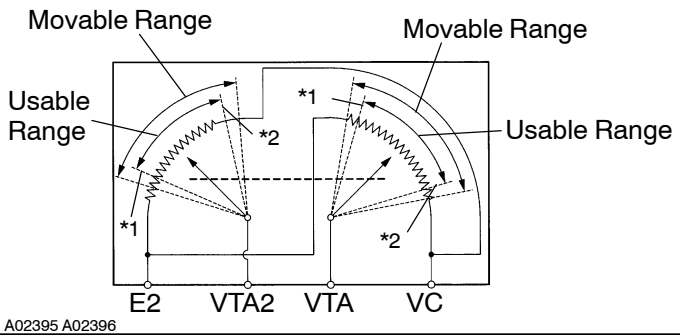
Check and replace engine ECU (See page IN–32).

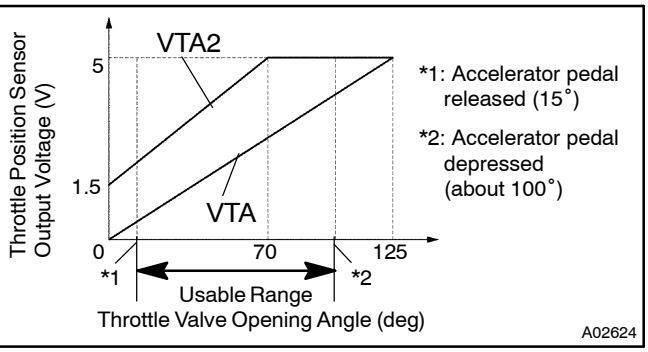
DI63S–01

DTC	P0120/41	Throttle Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Throttle position sensor is mounted on the throttle body and it have the 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor's own.
The voltage applied to the terminals VTA and VTA2 of the engine ECU changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.
The engine ECU judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the engine ECU controls the throttle motor to make the throttle valve angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the electromagnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.



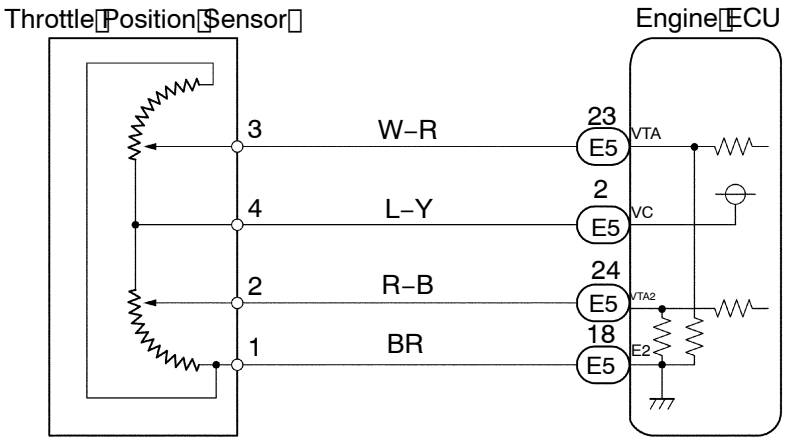


DTC No.	DTC Detecting Condition	Trouble Area
P0120/41	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (e) VTA–VTA2 ≦ 0.02 V	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU
	Condition (a) or (b) continues for 0.4 seconds: (a) VTA ≦ 0.2 V and VTA2 ≦ 0.5 V	

HINT:
After confirming DTC P0120/41, use the hand–held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Accelerator pedal position expressed as percentage and voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
THROTTLE POS	THROTTLE POS #2	THROTTLE POS	THROTTLE POS #2	
0 %	0 V	0 %	0 V	VC line open
0 %	2.0 – 2.9 V	0 %	4.6 – 5.1 V	VTA line open or grand short
8 – 20 %	0 V	64 – 96 %	0 V	VTA2 line open or grand short
100 %	5 V	100 %	5 V	E2 line open

WIRING DIAGRAM



A03843

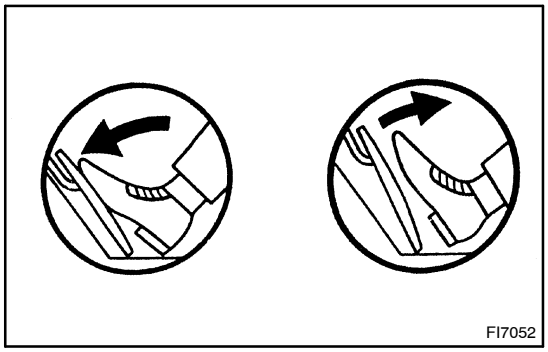
INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, read throttle valve opening percentage.**



FI7052

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the throttle valve opening percentage for the VTA circuit and read the voltage for the VTA2 circuit.

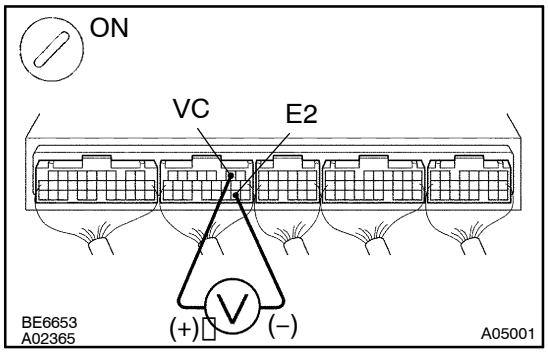
OK:

Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	8 – 20 %	2.0 – 2.9 V
Depressed	64 – 96 %	4.6 – 5.1 V

OK	**Check and replace engine ECU (See page IN–32).**

NG

2	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

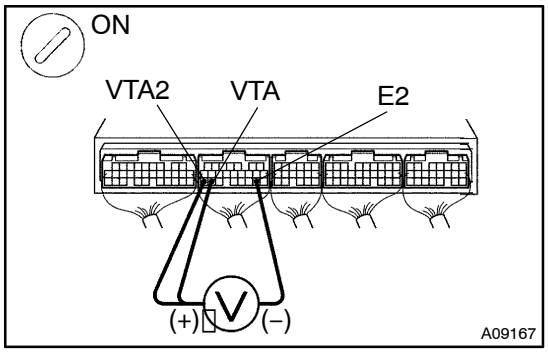
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG → Check and replace engine ECU (See page IN–32).

OK

3	Check voltage between terminals VTA, VTA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

OK → Check and replace engine ECU (See page IN–32).

NG

4	Check throttle position sensor (See page FI–32).

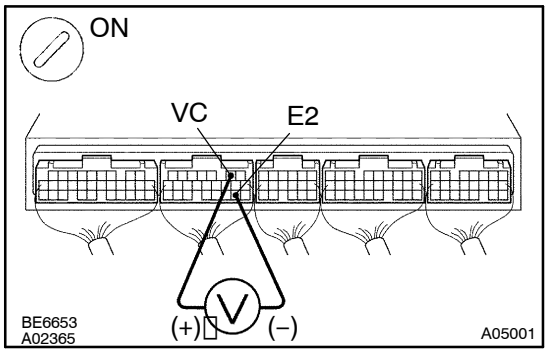
NG → Replace throttle position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between engine ECU and throttle position sensor (See page IN–32).

When not using hand–held tester:

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

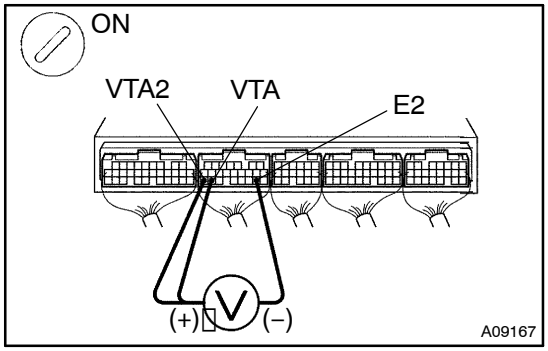
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG → Check and replace engine ECU (See page IN–32).

OK

2	Check voltage between terminals VTA and E2, and VTA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the engine ECU connector.

OK:

Accelerator Pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

OK → Check and replace engine ECU (See page IN–32).

NG

3	Check throttle position sensor (See page FI–32).

NG → Replace throttle position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between engine ECU and throttle position sensor (See page IN–32).

DI63T–01

DTC	P0121/41	Throttle Pedal Position Sensor Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0120/41 on page DI–42.

DTC No.	DTC Detecting Condition	Trouble Area
P0121/41	Condition (a) continue for 2.0 seconds: (a) Difference between VTA and VTA2 is out of threshold	• Throttle position sensor

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace throttle position sensor (See page FI–37).

DI63U–01

DTC	P0125/91	Insufficient Coolant Temp. for Closed Loop Fuel Control (European spec.)

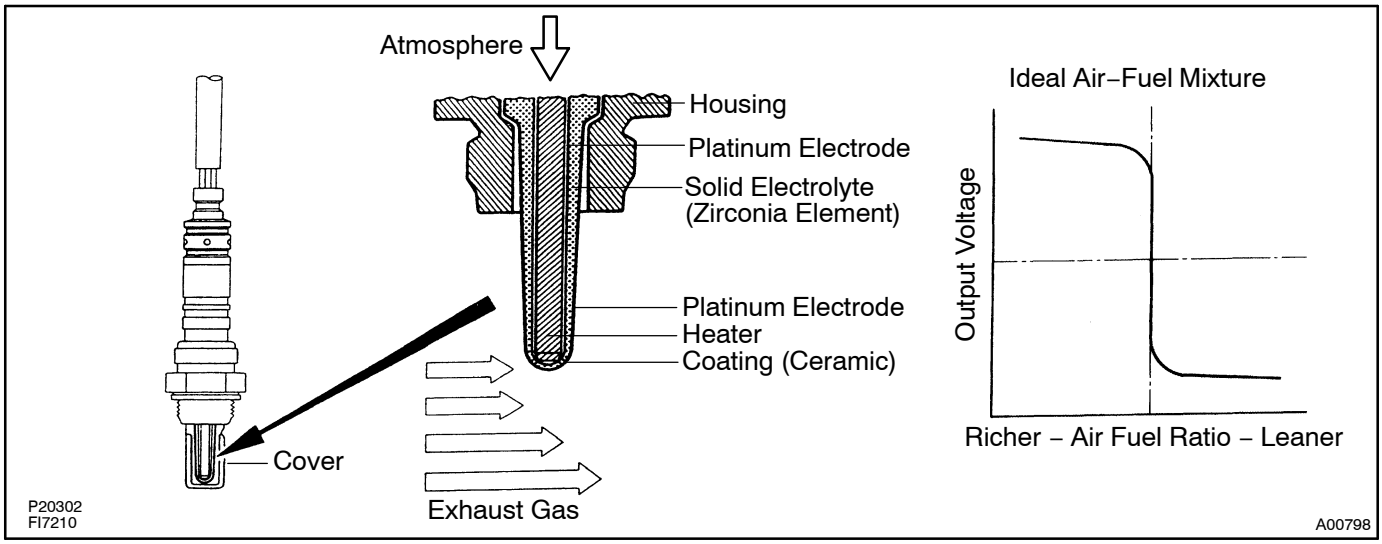
CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.

The oxygen sensor (bank 1, 2 sensor 1) has the characteristic which its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide the engine ECU with feedback to control of the air–fuel ratio.

When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the engine ECU of the LEAN condition (small electromotive force: < 0.45 V).

When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the engine ECU of the RICH condition (large electromotive force: > 0.45 V). The engine ECU judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the engine ECU is unable to perform accurate air–fuel ratio control. The oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the engine ECU. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.

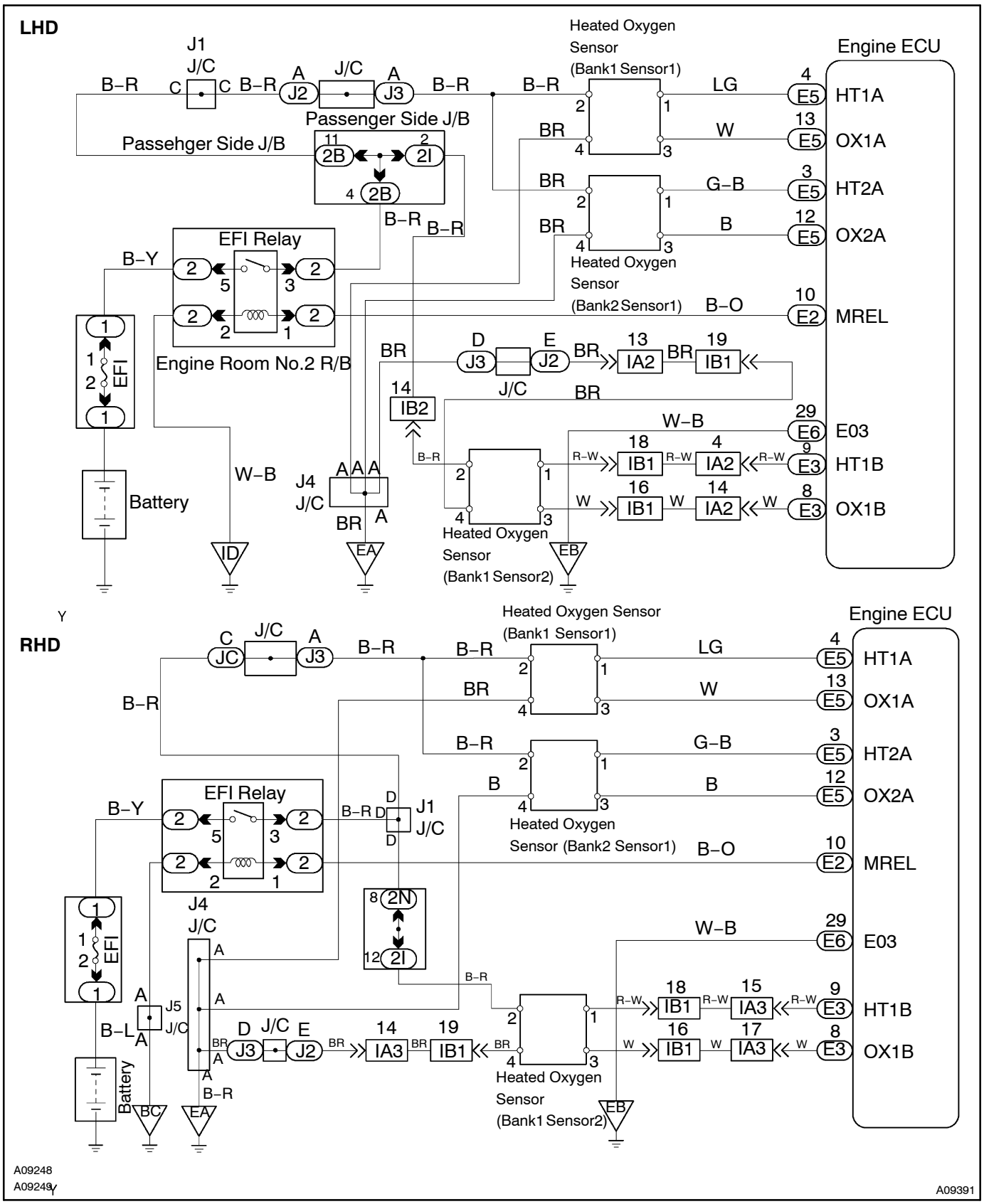


DTC No.	DTC Detecting Condition	Trouble Area
P0125/91	After engine is warmed up, heated oxygen sensors (bank 1, 2 sensor 1) output does not indicate RICH (≧0.45 V) even once when conditions (a), (b), (c) and (d) continue for at least 90 sec.: (b) Engine speed: 1,400 rpm or more (c) Vehicle speed: 40 – 100 km/h (25 – 62 mph) (d) Throttle valve does not fully closed (e) 180 sec. or more after starting engine	• Open or short in oxygen sensor (bank 1, 2 sensor 1) circuit • Oxygen sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU

HINT:

After confirming DTC P0125, use the hand–held tester to confirm voltage output of the oxygen sensor (bank 1, 2 sensor 1) from the CURRENT DATA. If voltage output of the oxygen sensor is less than 0.1 V, oxygen sensor circuit may be open or short.

WIRING DIAGRAM



INSPECTION PROCEDURE

When not using hand–held tester:

HINT:

- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0125 will be recorded. The CHE ENG (MIL) then comes on.

1	**Are there any other codes (besides DTC P0125) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	**Connect the hand–held tester, and read value for voltage output of oxygen sensors (bank 1, 2 sensor 1).**

PREPARATION:

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

(b) Warm up the engine to normal operating temperature (above 75°C (169°F)).

CHECK:

Read voltage output of the oxygen sensors when the engine is suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 times using the accelerator pedal.

OK:

Oxygen sensor output a RICH signal (0.45 V or more) at least once.

OK → **Go to step 9**

NG

3	**Check for open and short in harness and connector between engine ECU and oxygen sensors (bank 1, 2 sensor 1) (See page IN–32).**

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

OK

4	Check whether misfire is occurred or not by monitoring DTC and data list.

NG → Perform troubleshooting for misfire (See page DI–25).

OK

5	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

6	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–1).

OK

7	Check injector injection (See page FI–19).

NG → Replace injector.

OK

8	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Replace oxygen sensor (bank 1, 2 sensor 1).

9	Perform confirmation driving pattern (See page DI–53).

GO

10	Is there DTC P0125 being output again?

YES → Check and replace engine ECU (See page IN–32).

NO

11	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI–4).

YES

DTC P0125 is caused by running out of fuel.

When not using hand–held tester:

1	Are there any other codes (besides code 91) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor (bank 1, 2 sensor 1).

DI63V–01

DTC	P0130/21	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0150/28	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0130/21 P0150/28	Voltage output of heated oxygen sensor remains at 0.35 V or more, or 0.55 V or less, during idling after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU

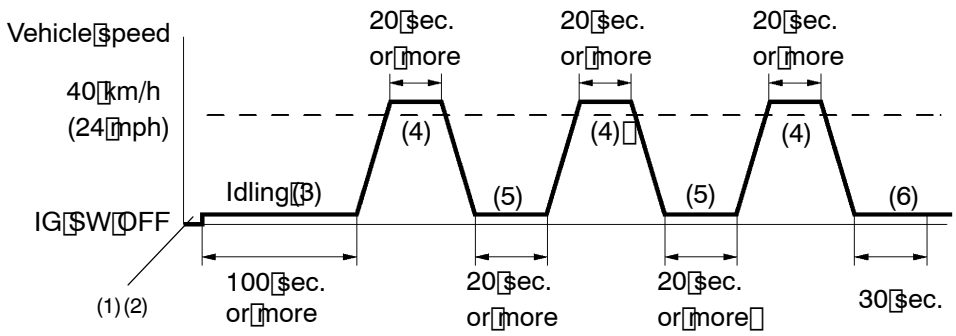
HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.
- The oxygen sensor's output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

CONFIRMATION DRIVING PATTERN



Y A09299

(1) Connect the hand–held tester to the DLC3.
(2) Switch the hand–held tester from the Normal mode to the Check (Test) Mode (See page DI–4).
(3) Start the engine and let the engine idle for 100 seconds or more.
(4) Drive the vehicle at 40 km/h (24 mph) or more for 20 seconds or more.

(5) Let the engine idle for 20 seconds or more.
(6) Let the engine idle for 30 seconds.

HINT:
If a malfunction exists, the CHK ENG (MIL) will be indicated on the multi information display during step (6).
NOTICE:
If the conditions in this test are not strictly followed, detection of the malfunction will not be possible. If you do not have a hand–held tester, turn the ignition switch OFF after performing steps (3) to (6), then perform steps (3) to (6) again.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

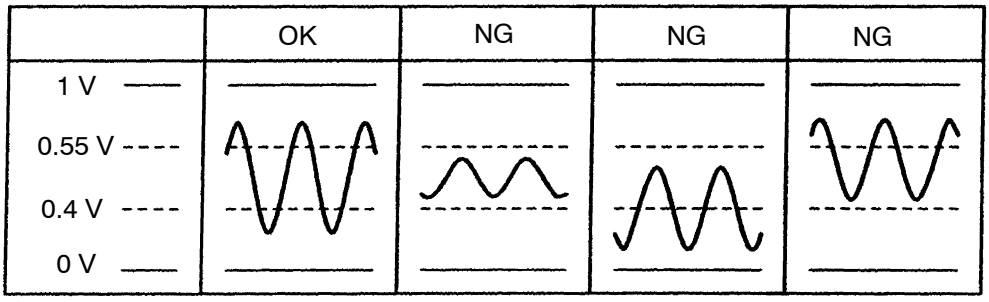
1	**Are there any other codes (besides DTC P0130 or P0150) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check output voltage of oxygen sensor during idling.**

PREPARATION:
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.
CHECK:
Use the hand–held tester to read the output voltage of the oxygen sensor during idling.
OK:
Oxygen sensor output voltage:
Alternates repeatedly between less than 0.35 V and more than 0.55 V (See the following table).



OK → Go to step 7.

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN-32).

NG → Repair or replace harness or connector.

OK

4	Check air induction system (See page FI-1).

NG → Repair or replace.

OK

5	Check fuel pressure (See page FI-6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI-1).

OK

6	Check injector injection (See page FI-19).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern.

Go

8	Is there DTC P0130 or P0150 being output again?

NO → Check for intermittent problems (See page DI–4).

YES

Check and replace engine ECU (See page IN–32).

When not using hand–held tester:

1	Are there any other codes (besides code 21 or 28) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI563–02

DTC	P0133/21	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1) (European spec.)

DTC	P0153/28	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1) (European spec.)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0133/21 P0153/28	Response time for oxygen sensor's voltage output to change from rich to lean, or from lean to rich, is 1.1 sec. or more during idling after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0133 or P0153) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	**Check output voltage of oxygen sensor during idling.**

PREPARATION:

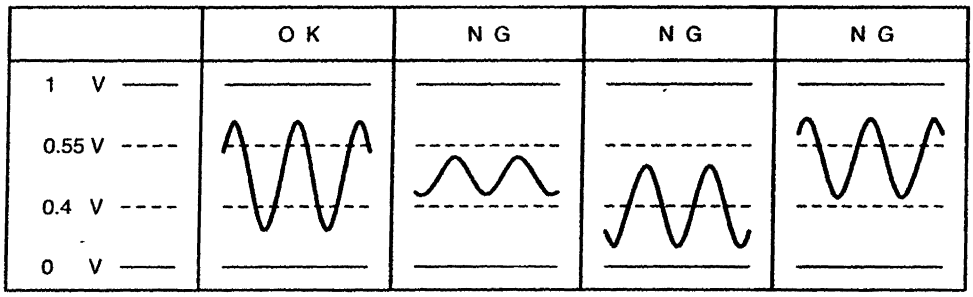
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Use the hand–held tester to read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



P18349

OK	Go to step 7

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–32).

NG	Repair or replace harness or connector.

OK

4	Check air induction system (See page FI–1).

NG	Repair or replace.

OK

5	Check fuel pressure (See page FI–6).

NG	Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–1).

OK

6	Check injector injection (See page FI–19).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern (See page DI–53).

GO

8	Is there DTC P0133 or P0153 being output again?

NO → Check for intermittent problems (See page DI–4).

YES

Check and replace engine ECU (See page IN–32).

When not using hand–held tester:

1	Are there any other codes (besides code 21 or 28) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI63W–01

DTC	P0135/21	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0141/27	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

DTC	P0155/28	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0135/21 P0141/21 P0155/28	When the heater operates, heater current exceeds 2 A (2 trip detection logic)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU
	Heater current of 0.2 A or less when the heater operates (2 trip detection logic)	

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.
- Sensor 2 refers to the sensor farther away from the engine body.

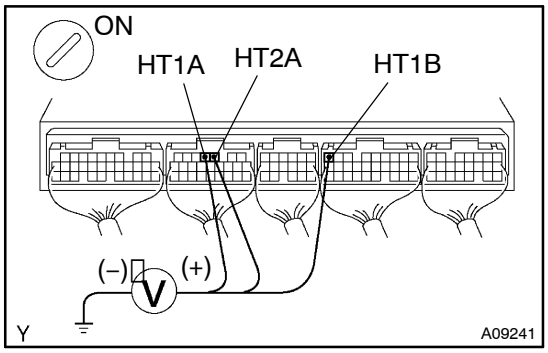
WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

INSPECTION PROCEDURE

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check voltage between terminals HT1A, HT2A, HT1B, of engine ECU connectors and body ground.**



LEXUS LS200 (RM684E)

PREPARATION:

(a) Remove engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals HT1A, HT2A, HT1B, of the engine ECU connectors and body ground.

HINT:

- Connect terminal HT1B to bank 2 sensor 1.
- Connect terminal HT1A to bank 1 sensor 1.

• Connect terminal HT2A to bank 1 sensor 2.

OK:

Voltage: 9 – 14 V

OK	Check and replace engine ECU (See page IN–32).

NG

2	Check resistance of oxygen sensor heater (See page FI–66).

NG	Replace oxygen sensor.

OK

Check and repair harness or connector between EFI main relay (Marking: EFI) and oxygen sensor, and oxygen sensor and engine ECU (See page IN–32).

DTC	P0136/27	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0136/27	Voltage output of heated oxygen sensor remains at 0.4 V or more or 0.5 V or less when vehicle is driven at 30 km/h (19 mph) or more after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor

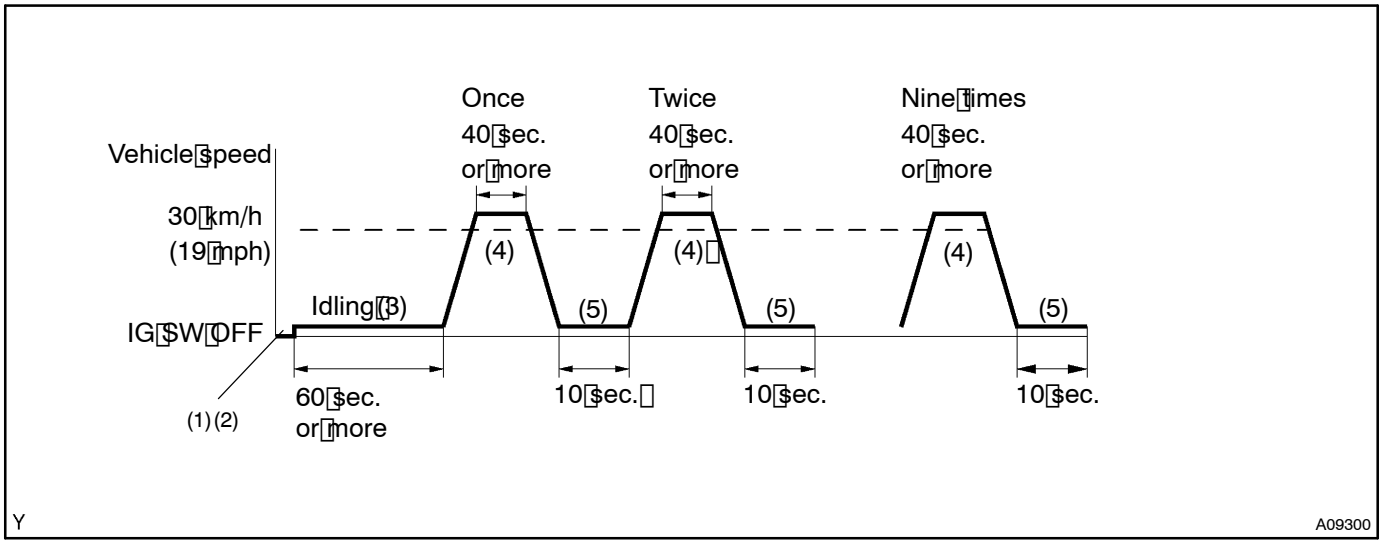
HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Sensor 2 refers to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

CONFIRMATION DRIVING PATTERN



(1) Connect the hand–held tester to the DLC3.
(2) Switch the hand–held tester from the Normal Mode to the Check (Test) Mode (See page DI–4).
(3) Start the engine and let the engine idle for 60 seconds or more.
(4) Drive the vehicle at 30 km/h (18 mph) or more for 40 seconds or more.
(5) Let the engine idle for 10 seconds or more.
(6) Preform steps (4) to (5) 9 times.

HINT:

If a malfunction exists, the CHK ENG (MIL) will be indicated on the multi information display during step (6).

NOTICE:

If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.
If you do not have a hand–held tester, turn the ignition switch OFF after performing steps (3) to (6), then perform steps (3) to (6) again.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0136) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

2	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

3	Check output voltage of oxygen sensor.

PREPARATION:

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

(b) After warming up the engine, race the engine at 2,500 rpm for 3 min.

CHECK:

Read the voltage output of the oxygen sensor when the engine is suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 min. using the accelerator pedal.

OK:

Oxygen sensor output voltage: Alternates from 0.4 V or less to 0.5 V or more.

OK → Check that each connector is properly connected.

NG

Replace oxygen sensor.

When not using hand-held tester:

1	Are there any other codes (besides code 27) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI63Y–01

DTC	P0171/25	System too Lean (A/F Lean Malfunction, Bank 1)

DTC	P0172/26	System too Rich (A/F Rich Malfunction, Bank 1) (European spec.)

DTC	P0174/25	System too Lean (A/F Lean Malfunction, Bank 2)

DTC	P0175/26	System too Rich (A/F Rich Malfunction, Bank 2) (European spec.)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared to the basic injection time. Fuel trim includes short–term fuel trim and long–term fuel trim.

Short–term fuel trim is the short–term fuel compensation used to maintain the air–fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air–fuel ratio is RICH or LEAN compared to the ideal theoretical value, triggering a reduction in fuel volume if the air–fuel ratio is rich, and an increase in fuel volume if it is lean.

Long–term fuel trim is overall fuel compensation carried out long–term to compensate for continual deviation of the short–term fuel trim form the central value due to individual engine differences, wear overtime and changes in the usage environment.

If both the short–term fuel trim and long–term fuel trim are LEAN or RICH beyond a certain value, it is detected as a malfunction and the CHK ENG on the multi information display.

DTC No.	DTC Detecting Condition	Trouble Area
P0171/25 P0174/25	When air–fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on LEAN side (2 trip detection logic)	• Air induction system • Injector blockage • Vacuum sensor • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank 1, 2 sensor 1) • Oxygen sensor (bank 1, 2 sensor 1) • Engine ECU
P0172/26 P0175/26	When air–fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on RICH side (2 trip detection logic)	• Injector leak, blockage • Vacuum sensor • Water temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank 1, 2 sensor 1) • Oxygen sensor (bank 1, 2 sensor 1) • Engine ECU

HINT:

- When the DTC P0171/25 or P0174/25 is recorded, the actual air–fuel ratio is on the LEAN side. When DTC P0172/26 or P0175/26 is recorded, the actual air–fuel ratio is on the RICH side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171/25 and P0174/25 is recorded. The CHK ENG then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ± 35%, the system is functioning normally.
- The oxygen sensor (bank 1 sensor 1) output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–48.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check air induction system (See page FI–1).**

NG → **Repair or replace.**

OK

2	**Check injector injection (See page FI–19).**

NG → **Replace injector.**

OK

3	**Check vacuum sensor (See page FI–61) and water temperature sensor (See page FI–57).**

NG → **Repair or replace.**

OK

4	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter.

OK

6	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

7	Check output voltage of oxygen sensor (bank 1, 2 sensor 1) during idling.

PREPARATION:

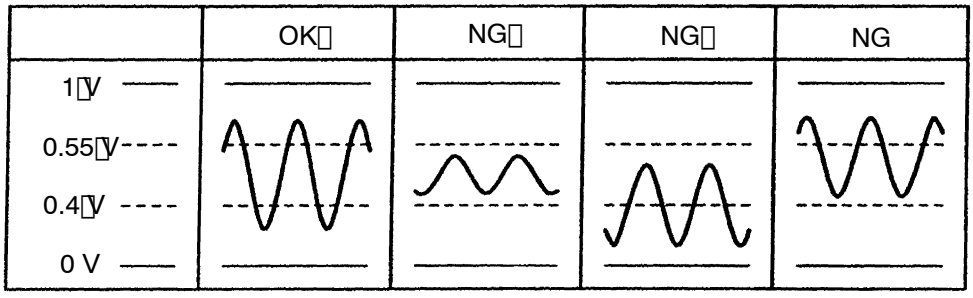
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Used the hand–held tester to read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.5 V (See the following table).



OK	Go to step 9.

NG

8	Check for open and short in harness and connector between engine ECU and oxygen sensor (bank 1, 2 sensor 1) (See page IN–32).

NG	Repair or replace harness or connector.

OK

Replace oxygen sensor.

9	Perform confirmation driving pattern (See page DI–53).

Go

10	Is there DTC P0171, P0172, P0174 or P0175 being output again?

YES	Check and replace engine ECU (See page IN–32).

NO

11	Did vehicle runs out of fuel in past?

NO	Check for intermittent problems (See page DI–25).

YES

DTC P0171, P0172, P0174, or P0175 is caused by running out of fuel.

When not using hand–held tester:

1	Check air induction system (See page FI–48).

NG → Repair or replace.

OK

2	Check fuel pressure (See page FI–1).

NG → Check and repair fuel pump, fuel pipe line and filter (See page FI–31).

OK

3	Check injector injection (See page FI–23).

NG → Replace injector.

OK

4	Check vacuum sensor (See page FI–61) and water temperature sensor (See page FI–57).

NG → Repair or replace.

OK

5	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

6	Does malfunction disappear when a good oxygen sensor (bank 1, 2 sensor 1) installed?

YES → Repair oxygen sensor.

NO

Check and replace engine ECU (See page IN–32).

DI63Z–01

DTC	P0300/93	Random/Multiple Cylinder Misfire Detected (European spec.)

DTC	P0301/93	Cylinder 1 Misfire Detected (European spec.)

DTC	P0302/93	Cylinder 2 Misfire Detected (European spec.)

DTC	P0303/93	Cylinder 3 Misfire Detected (European spec.)

DTC	P0304/93	Cylinder 4 Misfire Detected (European spec.)

DTC	P0305/93	Cylinder 5 Misfire Detected (European spec.)

DTC	P0306/93	Cylinder 6 Misfire Detected (European spec.)

CIRCUIT DESCRIPTION

Misfire: The engine ECU uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation for each cylinder.

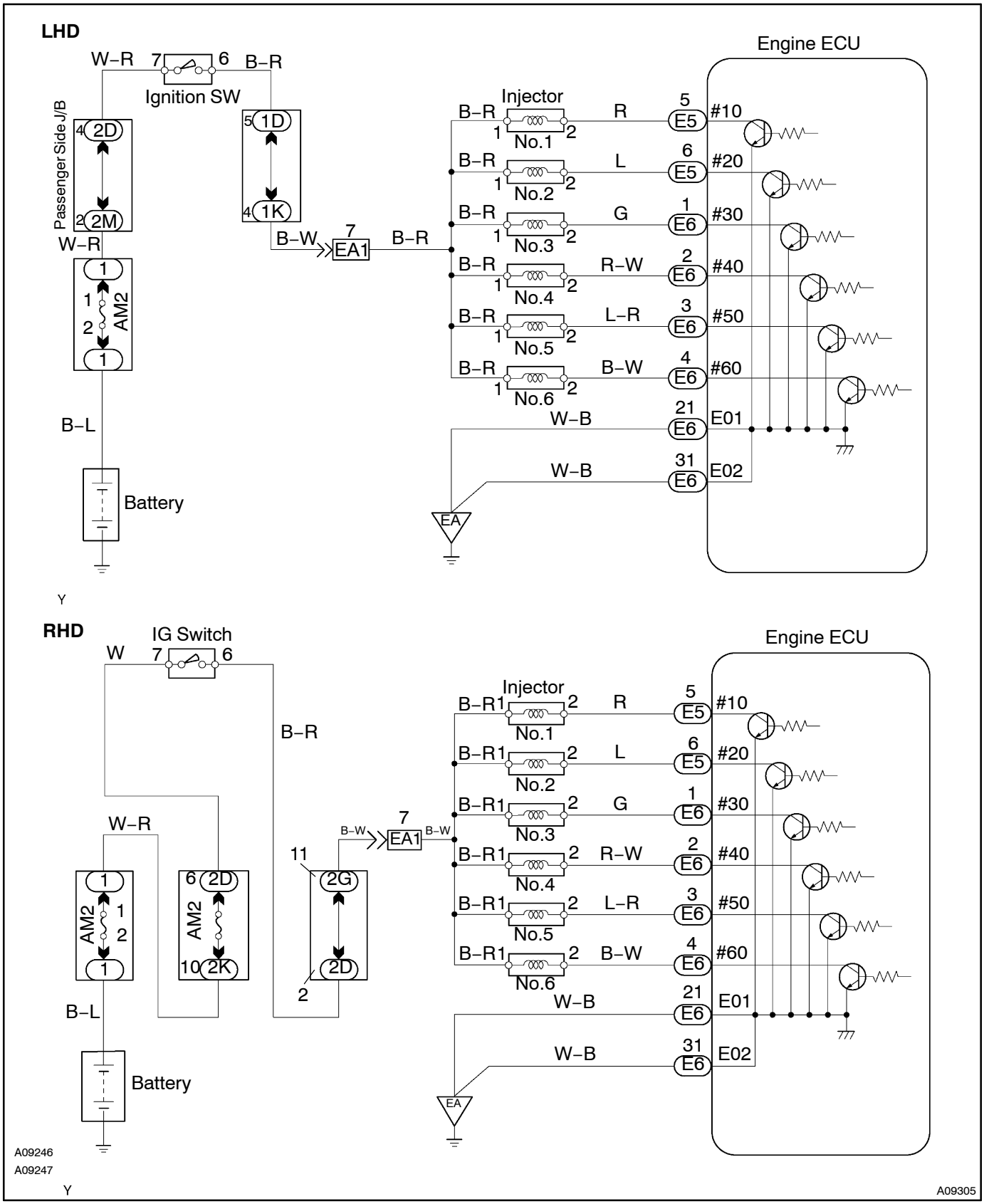
The engine ECU counts the number of times the engine speed change rate indicates that misfire has occurred. And when the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the CHK ENG lights up.

If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the CHK ENG blinks when misfiring occurs.

DTC No.	DTC Detecting Condition	Trouble Area
P0300/93	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions 1 trip detection logic: CHK ENG to brink 2 trip detection logic: CHK ENG to light up	• Open or short in engine wire • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Vacuum sensor • Water temp. sensor • Compression pressure • Valve clearance • Valve timing • Engine ECU
P0301/93 P0302/93 P0303/93 P0304/93 P0305/93 P0306/93	For any particular 200 revolutions of engine, misfiring is detected which can cause catalyst overheating (This causes CHK ENG to blink)	
	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emissions (2 trip detection logic)	

HINT:
When codes for a misfiring cylinder is recorded repeatedly but no random misfire code is recorded, it indicates that the misfires were detected and recorded at different times.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

(a) Connect the hand–held tester to the DLC3.
(b) Record DTC and the freeze frame data.
(c) Use the hand–held tester to set to the Check (Test) Mode (See page DI–4).
(d) Drive the vehicle several times with the engine speed, load and its surrounding ranges shown with ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the data list.

If you have no hand–held tester, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again.

HINT:

In order to memorize DTC of misfire, it is necessary to drive around MISFIRE RPM, MISFIRE LOAD in the data list for the following period of time.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

(e) Check whether there is misfire or not by monitoring DTC and the freeze frame data. After that, record them.
(f) Turn the ignition switch OFF and wait at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If it is the case that DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition of freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See confirmation driving pattern).
- When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is besides the range of ± 20 %, there is a possibility that the air–fuel ratio is inclining either to RICH (–20 % or less) or LEAN (+20 % or more).
- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility of misfire only during warmed up.
- In the case that misfire cannot be reproduced, the reason may be because of the driving with lack of fuel, the use of improper fuel, a stain of the ignition plug, and etc.

1	**Check wire harness, connector and vacuum hose in engine room.**

CHECK:

(a) Check the connection conditions of wire harness and connector.
(b) Check the disconnection, piping and break of vacuum hose.

NG	**Repair or replace, then confirm that there is no misfire (See confirmation driving pattern).**

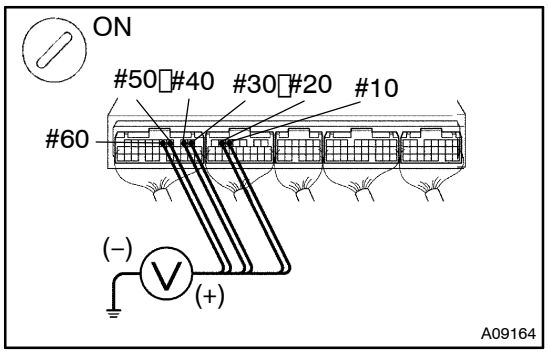
OK

2	Check spark plug and spark of misfiring cylinder (See page FI–19).

NG → Replace or check ignition system (See page IG–1).

OK

3	Check voltage of engine ECU terminals for injector of failed cylinder.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between applicable terminals #10 – #60 of the engine ECU connectors and body ground.

OK:

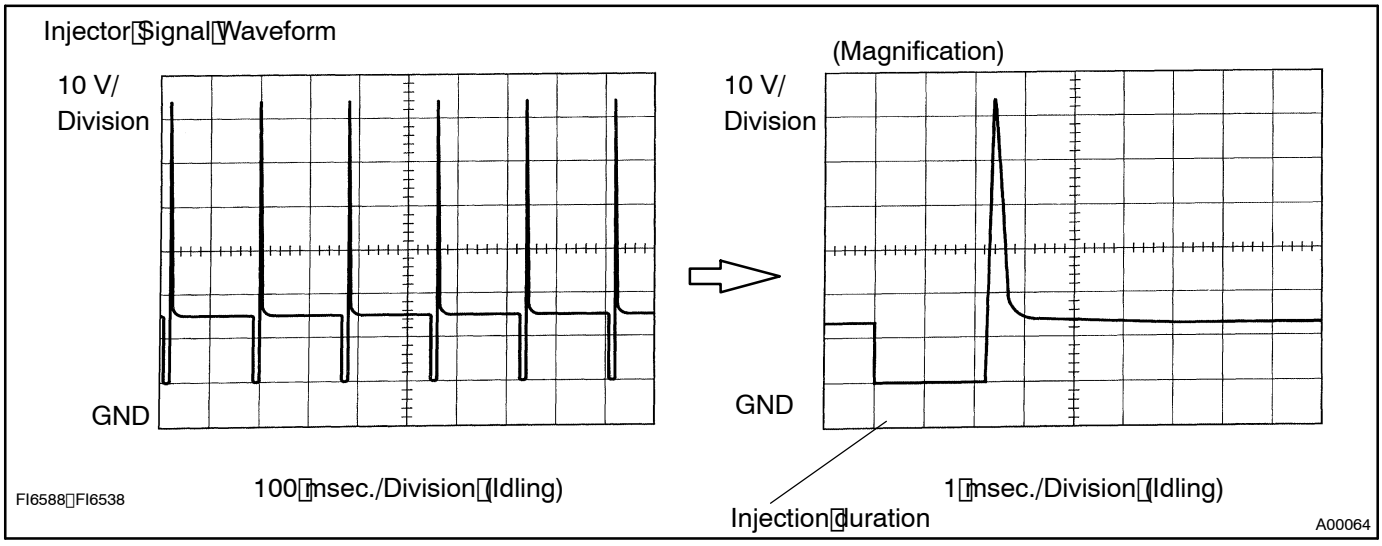
Voltage: 9 – 14 V

Reference: INSPECTION USING OSCILLOSCOPE

With the engine idling, check the waveform between terminals #10 – #60 and E01 of the engine ECU connectors.

HINT:

The correct waveform is as shown.



OK → Go to step 5.

NG

4	Check resistance of injector of misfiring cylinder (See page FI–19).

NG → Replace injector.

OK

Check for open and short in harness and connector between injector and engine ECU (See page IN–32).

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI–1).

OK

6	Check injector injection (See page FI–19).

NG → Replace injector.

OK

7	Check vacuum sensor (See page FI–61) and water temperature sensor (See page FI–57).

NG → Repair or replace.

OK

Check compression pressure (See page EM–3), valve clearance (See page EM–6) and valve timing (See page EM–25).

DI640–01

DTC	P0325/52	Knock Sensor 1 Circuit Malfunction (Bank 1)

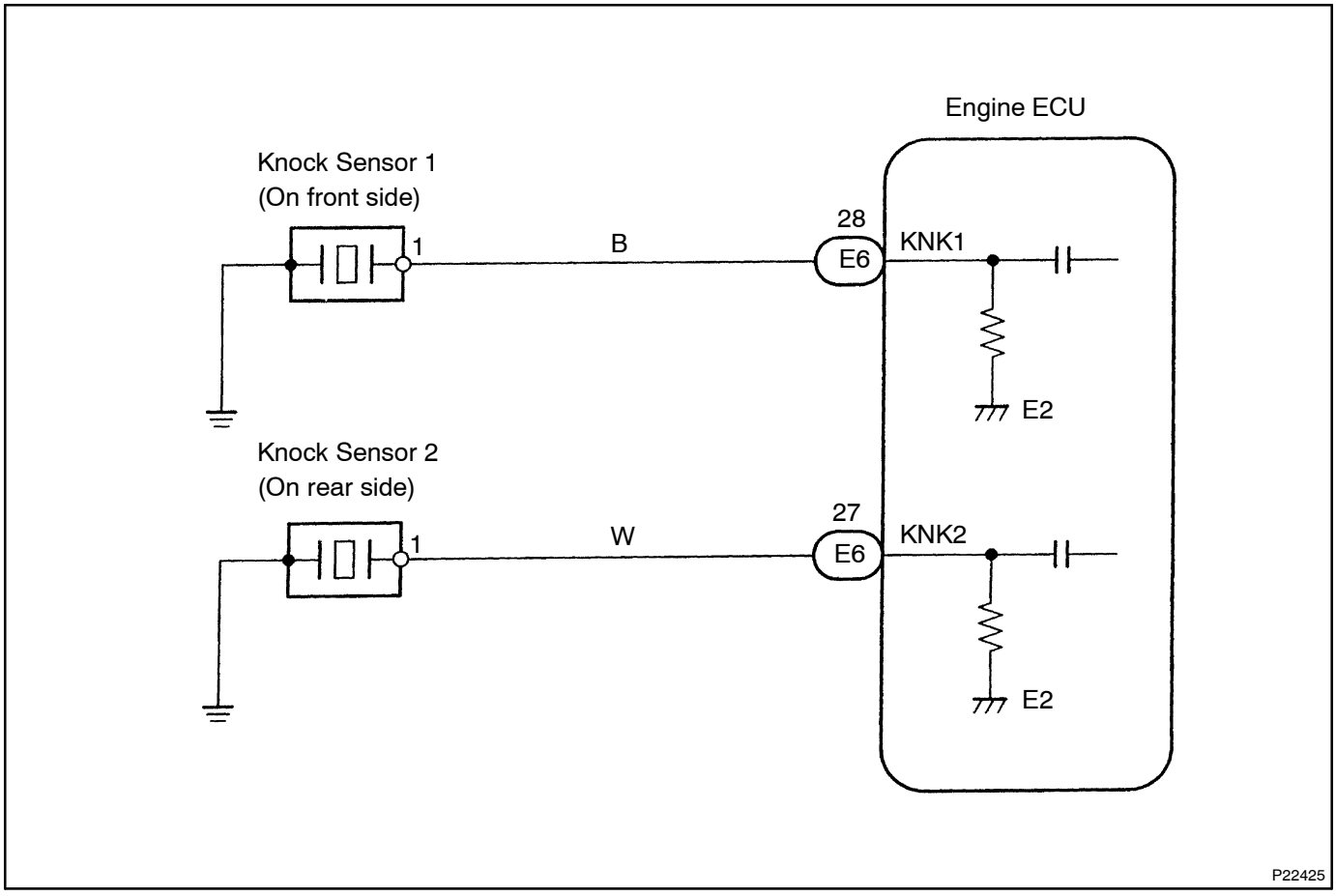
DTC	P0330/55	Knock Sensor 2 Circuit Malfunction (Bank 2)

CIRCUIT DESCRIPTION

Each of knock sensor is fitted one to the front and rear of the left side of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325/52	No knock sensor 1 signal to engine ECU with engine speed between 1,600 rpm and 5,200 rpm	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU
P0330/55	No knock sensor 2 signal to engine ECU with engine speed between 1,600 rpm and 5,200 rpm	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU

WIRING DIAGRAM

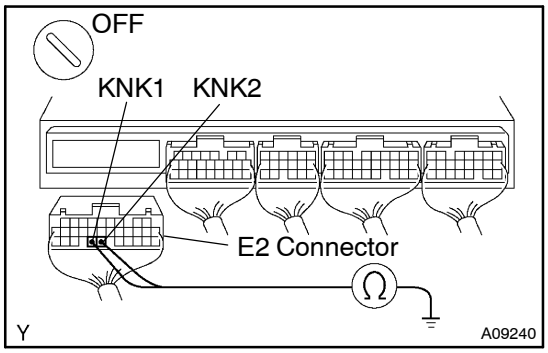


INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check continuity between terminal KNK1, KNK2 of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E2 connector from the engine ECU.

CHECK:

Measure the resistance between terminals KNK1, KNK2 of the engine ECU connector and body ground.

HINT:

- Connect terminal KNK1 to knock sensor 1.
- Connect terminal KNK2 to knock sensor 2.

OK:

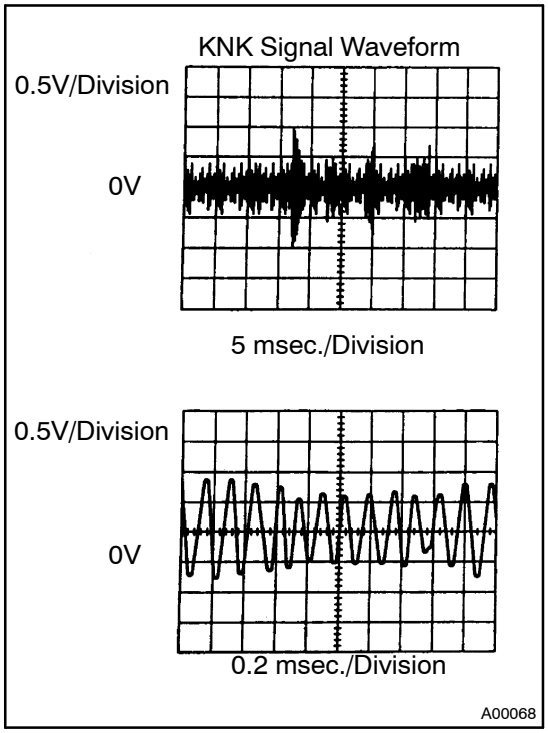
Resistance: 1 MΩ or higher

Reference: INSPECTION USING OSCILLOSCOPE

- With the engine racing (4,000 rpm), check the waveform between terminals KNK1, KNK2 of the engine ECU connector and body ground.

HINT:

The correct waveform is as shown.



- Spread the time on the horizontal axis, and confirm that period of the wave is 0.141msec.
  (Normal mode vibration frequency of knock sensor: 7.1 kHz)

HINT:

If normal mode vibration frequency is not 7.1 kHz, the sensor is malfunctioning.

OK	**Go to step 3.**

NG

2	Check knock sensor (See page FI–63).

NG → Replace knock sensor.

OK

3	Check for open and short in harness and connector between engine ECU and knock sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Does malfunction disappear when a good knock sensor is installed?

YES → Replace knock sensor.

NO

Check and replace engine ECU (See page IN–32).

DI641–01

DTC	P0335/12, 13	Crankshaft Position Sensor Circuit Malfunction (NE Signal)

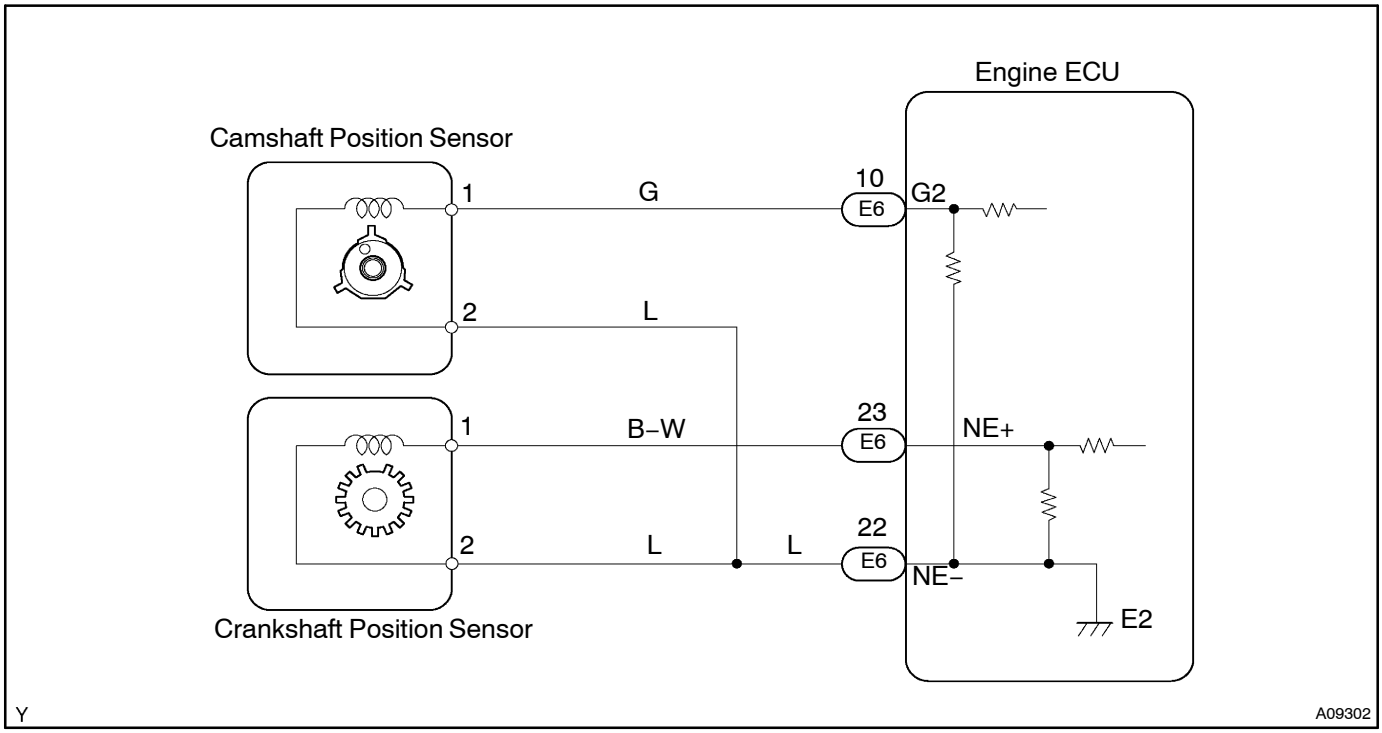
CIRCUIT DESCRIPTION

The crankshaft position sensor, which detects the engine speed and crankshaft angle signal (NE signal), has been installed on the oil pump body.

The NE signal plate of the crankshaft timing pulley has 34 teeth. The NE signal sensor generates 34 signals of every engine revolution. The engine ECU detects the standard crankshaft angle based on the G signal, and the actual crankshaft angle and the engine speed by the NE signal.

DTC No.	DTC Detecting Condition	Trouble Area
P0335/12, 13	No crankshaft position sensor signal to engine ECU during cranking (2 trip detection logic)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU
	No crankshaft position sensor signal to engine ECU with engine speed 600 rpm or more (2 trip detection logic)	

WIRING DIAGRAM

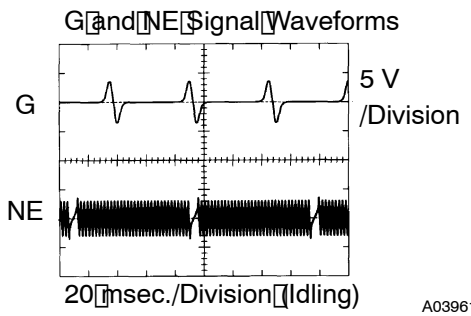


INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335/12, 13 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check resistance of crankshaft position sensor (See page IG–1).**



Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check the waveform between terminals G2 and NE–, and NE and NE– of the engine ECU connector.
HINT:
The correct waveforms are as shown.

NG → **Replace crankshaft position sensor.**

OK

2	**Check for open and short in harness and connector between engine ECU and crankshaft position sensor (See page IN–32).**

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

OK

3	**Inspect sensor installation and signal plate teeth of crankshaft timing pulley.**

NG → **Tighten sensor.**
Replace crankshaft timing pulley.

OK

Check and replace engine ECU (See page IN–32).

DI642–01

DTC	P0340/12	Camshaft Position Sensor Circuit Malfunction (G Signal)

CIRCUIT DESCRIPTION

Camshaft position sensor (G signal) consists of an iron core and pickup coil.
The G signal rotor has 3 teeth, and is installed on the intake camshaft.
When the camshaft rotates, the protrusion on the signal rotor and the air gap on the pickup coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.
The NE signal plate has 34 teeth and is installed on the crankshaft timing pulley. The NE signal sensor generates 34 signals for every engine revolution. The engine ECU detects the standard crankshaft angle based on the G2 signal and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0340/12	No camshaft position sensor signal to engine ECU during cranking (2 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • Engine ECU
	No camshaft position sensor signal to engine ECU with engine speed 600 rpm or more	

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–81.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check resistance of camshaft position sensor (See page IG–1).

Reference: INSPECTION USING OSCILLOSCOPE
Refer to DTC P0335/12, 13 on page DI–81.

NG → Replace camshaft position sensor.

OK

2	Check for open and short in harness and connector between engine ECU and camshaft position sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

3	Inspect sensor installation and signal rotor of the intake camshaft.

NG → Tighten sensor. Replace intake camshaft.

OK →

Check and replace engine ECU (See page IN–32).

DI643–01

DTC	P0420/94	Catalyst System Efficiency Below Threshold (Bank 1) (European spec. (Except Taiwan))

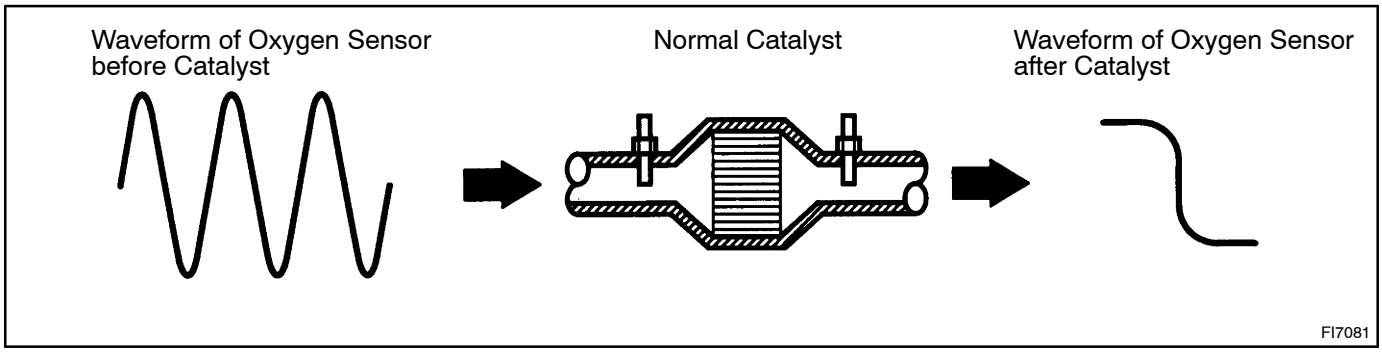
CIRCUIT DESCRIPTION

The engine ECU compares the waveform of the oxygen sensor located before the catalyst with the waveform of the oxygen sensor located after the catalyst to determine whether or not catalyst performance has deteriorated.

Air–fuel ratio feedback compensation keeps the waveform of the oxygen sensor before the catalyst repeatedly changing back and forth from rich to lean.

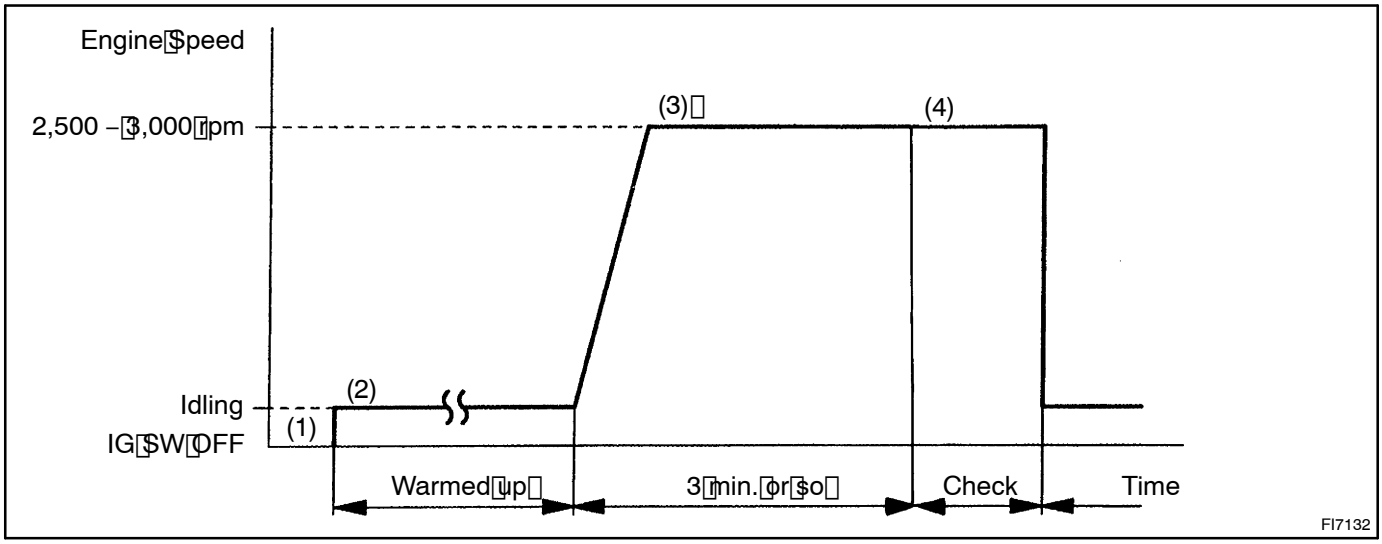
If the catalyst is functioning normally, the waveform of the oxygen sensor after the catalyst switches back and forth between rich and lean much more slowly than the waveform of the oxygen sensor before the catalyst.

But when both waveform change at a similar rate, it indicates that catalyst performance has deteriorated.

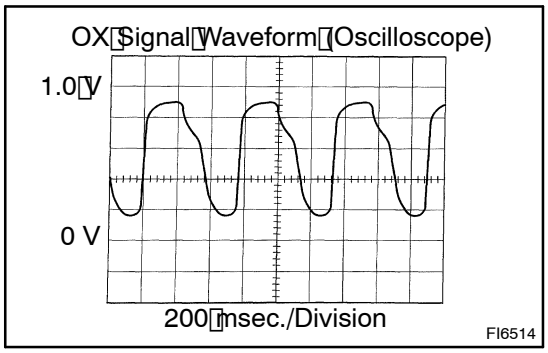


DTC No.	DTC Detecting Condition	Trouble Area
P0420/94	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of oxygen sensors have same amplitude (2 trip detection logic)	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the hand–held tester to the DLC3, or connect the probe of the oscilloscope between terminals OX1A, OX1B, OX2A, and E1 of the engine ECU connectors.
(2) Start the engine and warm it up with all the accessories switched OFF until engine coolant temperature is stable.
(3) Race the engine at 2,500 – 3,000 rpm for about 3 min.
(4) After confirming that the waveform of the oxygen sensor (bank 1, 2 sensor 1) (OX1A, OX2A), oscillate around 0.5 V during feedback to the engine ECU, check the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B).



HINT:
If there is a malfunction in the system, the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B) is almost the same as that of the oxygen sensor (bank 1, 2 sensor 1) (OX1A, OX2A) on the left.
There are some cases where, even though a malfunction exists, the CHK ENG may either light up or not light up.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides P0420/94) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

3	Check oxygen sensor (bank 1, 2 sensor 1) (See page FI–66).

NG → Repair or replace.

OK

4	Check oxygen sensor (bank 1 sensor 2) (See page FI–66).

NG → Repair or replace.

OK

Replace three–way catalytic converter.

DI644–01

DTC	P0443/94	Evaporative Emission Control System Purge Control Vent Control Malfunction*

***: European spec.**

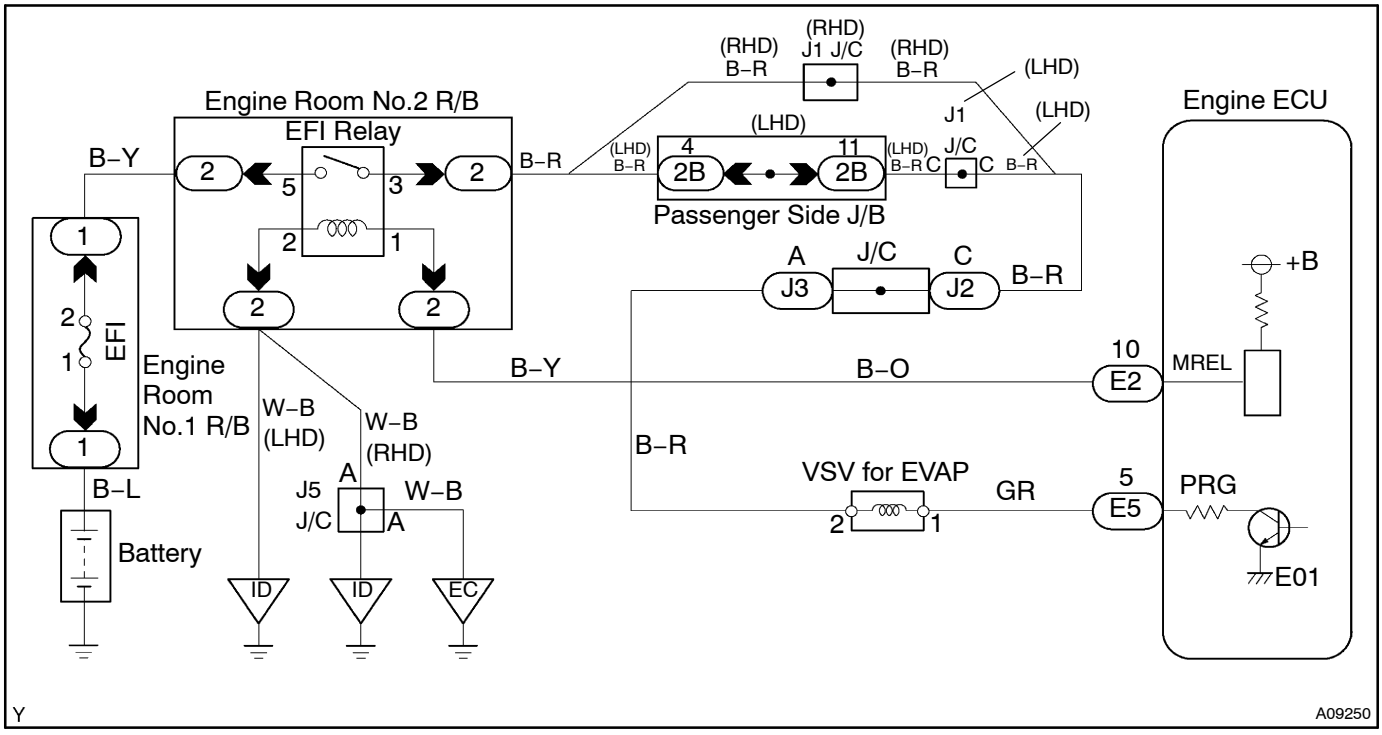
CIRCUIT DESCRIPTION

To reduce HC emissions, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.

The engine ECU changes the duty signal to the VSV for the EVAP so that the intake quantity of HC emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is wamed up.

DTC No.	DTC Detecting Condition	Trouble Area
P0443/94	Proper response to engine ECU command does not occur	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU

WIRING DIAGRAM



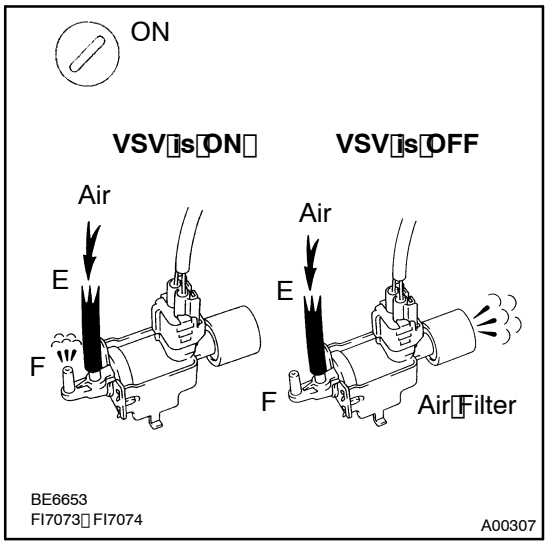
INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Connect hand–held tester and check operation of VSV for EVAP.



PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation of the VSV when the VSV is operated by the hand–held tester.

OK:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air from port E is flows out through the air filter.

OK	Check for intermittent problems (See page DI–4).

NG

2	Check VSV for EVAP (See page FI–48).

NG	Replace VSV for EVAP.

OK

3	Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–32).

NG	Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

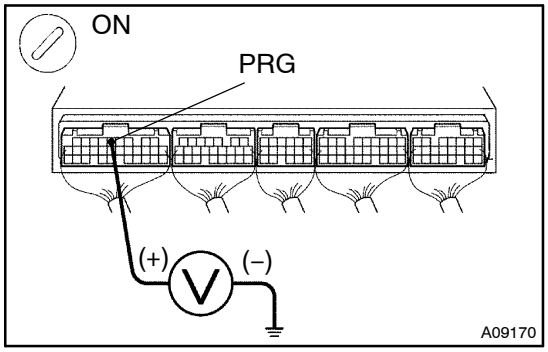
When not using hand–held tester:

1	Check VSV for EVAP (See page FI–48).

NG → Replace VSV for EVAP.

OK

2	Check voltage between terminal PRG of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal PRG of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–32).

OK

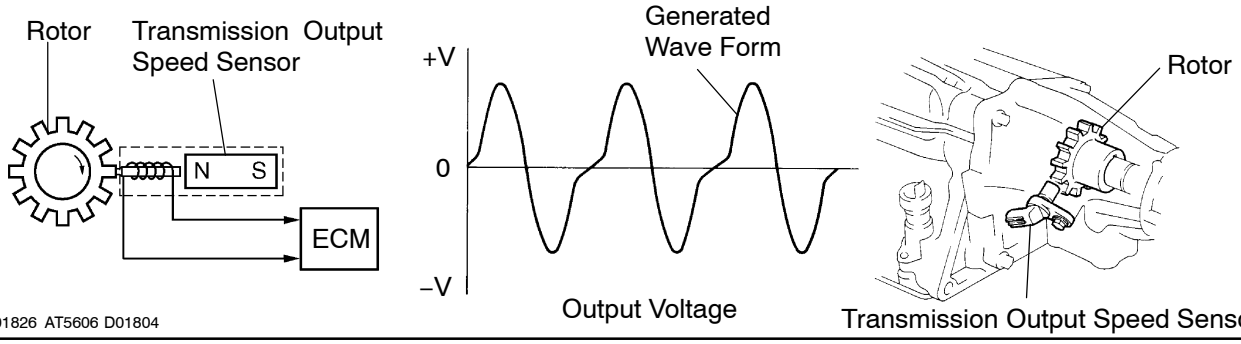
Check and replace engine ECU (See page IN–32).

DI645–01

DTC	P0500/42	Vehicle Speed Sensor Malfunction

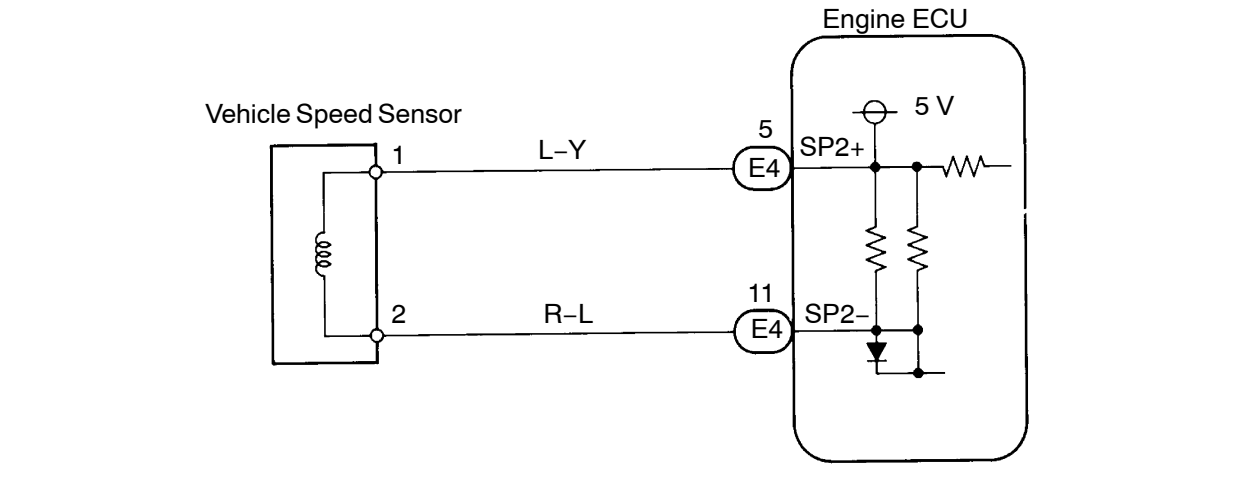
CIRCUIT DESCRIPTION

The vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the engine ECU. The engine ECU determines the vehicle speed based on these signals. An AC voltage is generated in the vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the engine ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	No vehicle speed sensor signal to engine ECU under conditions (a) and (b): (a) Park/neutral position switch is OFF (b) Vehicle is being driven	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester:

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and read value of vehicle speed value.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Start the engine and push the the hand–held tester main switch ON.

CHECK:
Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value.

OK → **Check and replace engine ECU (See page IN–32).**

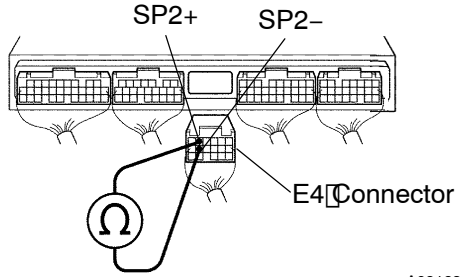
NG

2	**Check speedometer circuit (See page BE–83).**

NG → **Repair or replace speedometer circuit.**

OK

3	**Check resistance between terminals SP2+ and SP2– of engine ECU connector.**



PREPARATION:
(a) Remove the engine ECU hood.
(b) Disconnect the E4 connector from the engine ECU.

CHECK:
Check the resistance between terminals SP2+ and SP2– of the engine ECU connector.

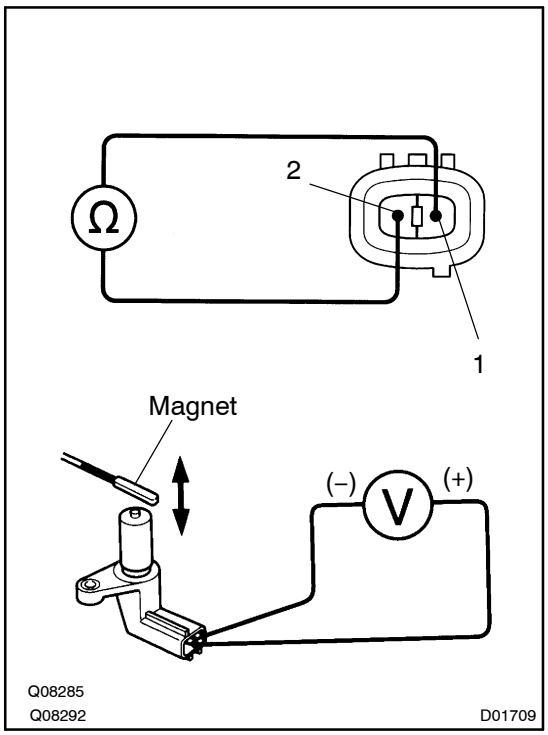
OK:

Resistance: 560 – 680 Ω

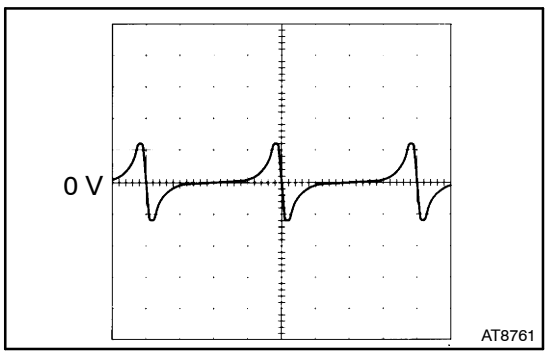
OK → **Check and replace engine ECU (See page IN–32).**

NG

4	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.
CHECK:
Measure the resistance between terminals 1 and 2 of the speed sensor.
OK:
Resistance: 560 – 680 Ω
Reference: CHECK VEHICLE SPEED SENSOR'S FUNCTION
CHECK:
Check the 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:
Voltage generated is extremely low.



Reference: INSPECTION USING OSCILLOSCOPE
Check the waveform between terminals SP2+ and SP2– when the vehicle speed is approx. 60 km/h (37 mph).

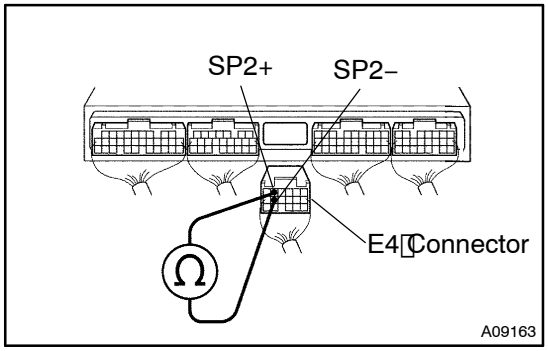
NG → **Replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page IN–32).

When not using hand-held tester:

1	Check resistance between terminals SP2+ and SP2– of engine ECU connector.

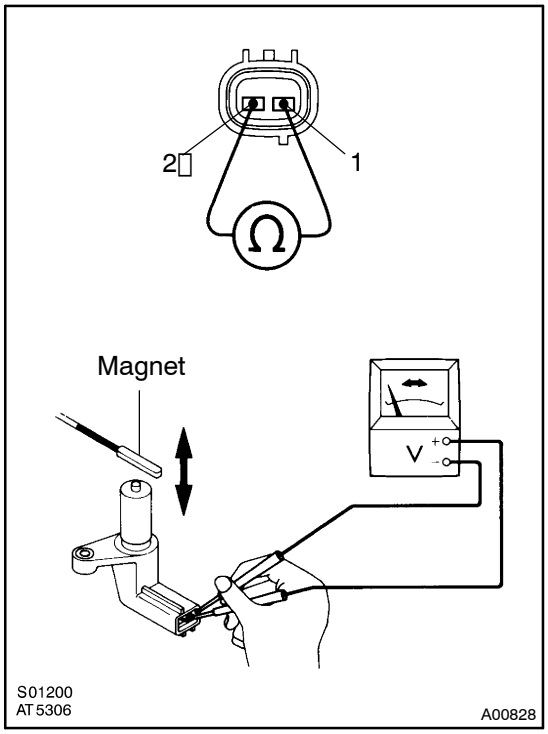


PREPARATION:
(a) Remove the engine ECU hood.
(b) Disconnect the E4 connector from the engine ECU.
CHECK:
Check the resistance between terminals SP2+ and SP2– of the engine ECU connector.
OK:
Resistance: 560 – 680 Ω

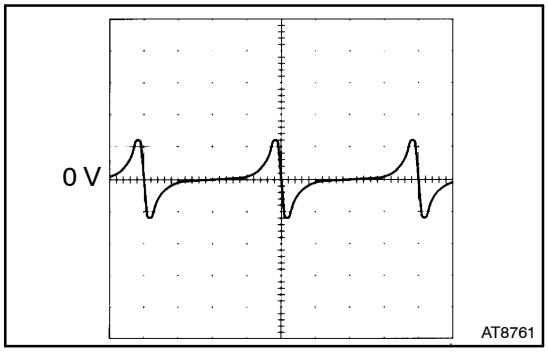
OK	Check and replace engine ECU (See page FI–67).

NG

2	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.
CHECK:
Measure the resistance between terminals 1 and 2 of the speed sensor.
OK:
Resistance: 560 – 680 Ω
Reference: CHECK VEHICLE SPEED SENSOR'S FUNCTION
CHECK:
Check the 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:
Voltage generated is extremely low.



Reference: INSPECTION USING OSCILLOSCOPE
Check the waveform between terminals SP2+ and SP2– when the vehicle speed is approx. 60 km/h (37 mph).

NG → **Replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page DI–91).

DI2P2–03

DTC	P0505/33	Idle Control System Malfunction (European spec.)

CIRCUIT DESCRIPTION

The idle speed is controlled by the Electric Throttle Control System (ETCS).
ETCS is composed of the throttle motor to operate the throttle valve, the magnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the engine ECU to control the ETCS and the one valve type throttle body.
The engine ECU controls the throttle motor to make the throttle valve opening angle properly for the target idle speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from target speed (2 trip detection logic)	• Air induction system • Electric throttle control system

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel was ratio lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides P0505/33) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

2	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

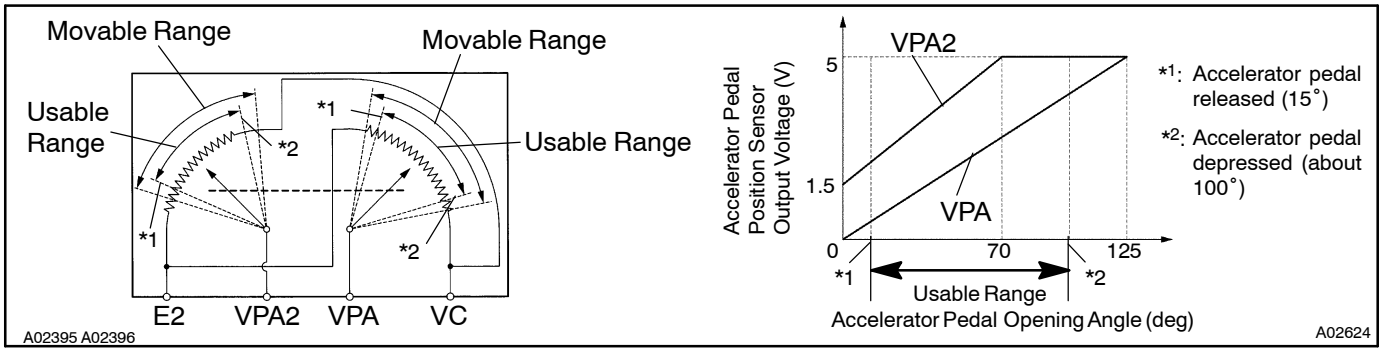
Check electric throttle control system (See page FI–32).

DI646–01

DTC	P1120/19	Accelerator Pedal Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Accelerator pedal position sensor is mounted on the throttle body and it have the 2 sensors to detects the accelerator position and a malfunction of the accelerator position's own.
The accelerator pedal position sensor is connected with the accelerator pedal by the accelerator wire and the voltage applied to the terminals VPA and VPA2 of the ECU changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal.
The engine ECU judges the current opening angle of the accelerator pedal from these signals input from terminals VPA and VPA2 and the engine ECU controls the throttle motor based on these signals.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

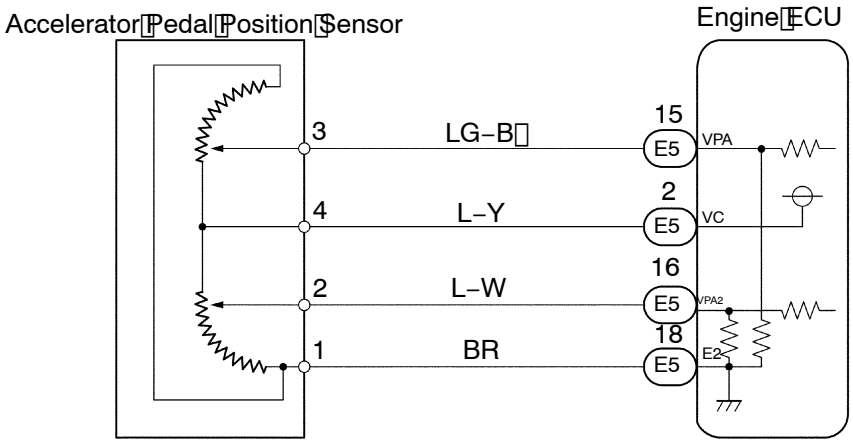


DTC No.	DTC Detecting Condition	Trouble Area
P1120/19	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VPA ≦ 0.2 V (b) VPA2 ≦ 0.5 V (c) VPA ≧ 4.8 V (d) When VPA ≧ 0.2 V and ≦ 1.8 V, and VPA2 ≧ 4.97 V (e) VPA–VPA2 ≦ 0.02 V	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU
	Condition (a) or (b) continues for 0.4 seconds: (a) VPA ≦ 0.2 V and VPA2 ≦ 1.5 V	

HINT:
After confirming DTC P1120/19, use the hand–held tester to confirm the accelerator pedal opening percentage.

Throttle valve position expressed as voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2	
0 V	0 V	0 V	0 V	VC line open
0 V	1.8 – 2.7 V	0 V	4.7 – 5.1 V	VPA line open or grand short
0.3 – 0.9 V	0 V	3.2 – 4.8 V	0 V	VPA2 line open or grand short
5 V	5 V	5 V	5 V	E2 line open

WIRING DIAGRAM



A03843

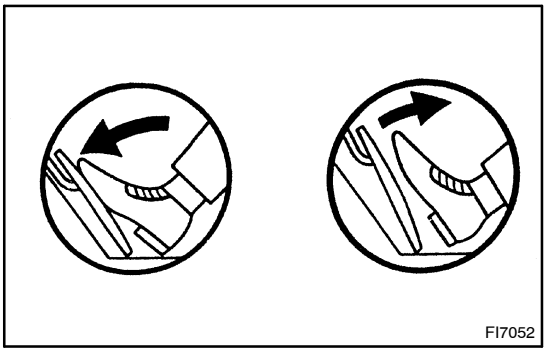
INSPECTION PROCEDURE

HINT:

- If DTC P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, read voltage for accelerator pedal position sensor data.**



FI7052

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the voltage for the accelerator pedal position sensor data.

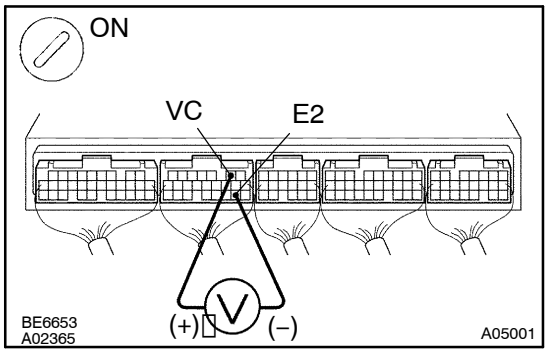
OK:

Accelerator Pedal	VPA	VPA2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK	**Check and replace engine ECU (See page IN–32).**

NG

2	Check voltage between terminals VC and E2 of engine ECU connector.

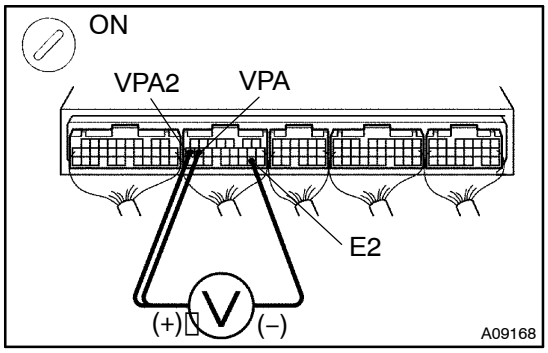


PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.
OK:
Voltage: 4.5 – 5.5 V

NG → **Check and replace engine ECU (See page IN–32).**

OK

3	Check voltage between terminals VPA, VPA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the engine ECU connector.
OK:

Accelerator pedal	Voltage	
	VPA – E2	VPA2 – E2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK → **Check and replace engine ECU (See page IN–32).**

NG

4	Check accelerator pedal position sensor (See page FI–32).

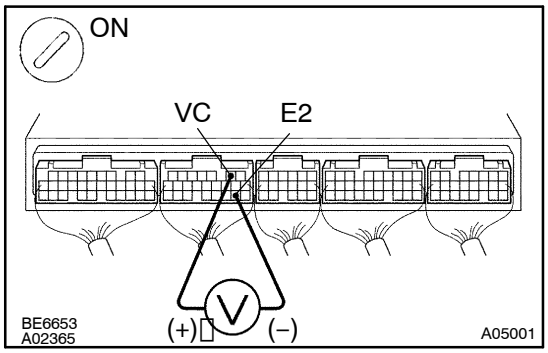
NG → **Replace accelerator pedal position sensor (See page FI–37).**

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between engine ECU and accelerator pedal position sensor (See page IN–32).

When not using hand–held tester:

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

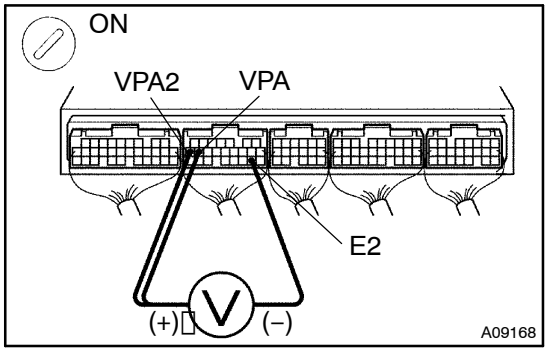
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG → Check and replace engine ECU (See page IN–32).

OK

2	Check voltage between terminals VPA, VPA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VPA – E2	VPA2 – E2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK → Check and replace engine ECU (See page IN–32).

NG

3	Check accelerator pedal position sensor (See page FI–32).

NG → Replace accelerator pedal position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between engine ECU and accelerator pedal position sensor (See page IN–32).

DI647–01

DTC	P1121/19	Accelerator Pedal Position Sensor Range/ Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P1120/19 on page DI–97.

DTC No.	DTC Detecting Condition	Trouble Area
P1121/19	Condition (a) continue for 2.0 seconds: (a) Difference between VPA and VPA2 is out of threshold	• Accelerator pedal position sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace accelerator pedal position sensor (See page FI–37).

DI648–01

DTC	P1125/89*	Throttle Control Motor Circuit Malfunction

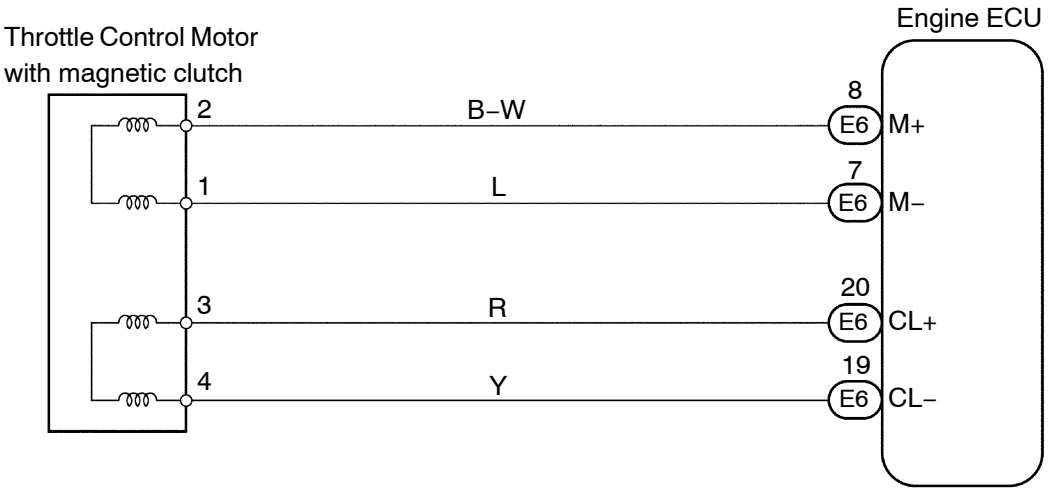
***: ETCS trouble code No. is 21.**

CIRCUIT DESCRIPTION

Throttle motor is operated by the engine ECU and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the engine ECU to control the throttle motor in order to the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1125/89*	Condition (a) and (b) continues for 0.5 seconds: (a) Throttle control motor output duty ≧ 80 % (b) Throttle control motor current < 0.5 A	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU
	Throttle control motor current ≧ 16 A	
	Under condition continue for 0.6 seconds: Throttle control motor current ≧ 7 A	

WIRING DIAGRAM

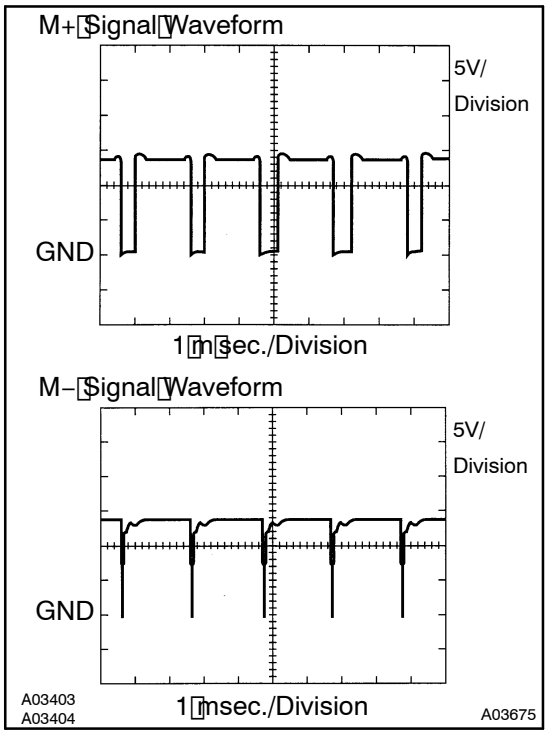


A02990

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check throttle control motor circuit.**



PREPARATION:

(a) Connect the oscilloscope between terminals M+ or M– and E1 of the engine ECU connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals M+ or M– and E1 of the engine ECU when the engine is idling.

OK:

The correct waveforms are as shown.

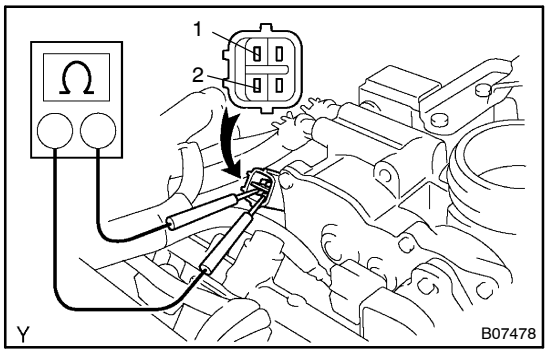
HINT:

The waveform frequency varies depending on the throttle opening.

OK	**Check and replace engine ECU (See page IN–32).**

NG

2	**Check throttle control motor.**



PREPARATION:

Disconnect the throttle control motor with the magnetic clutch connector.

CHECK:

Measure the resistance between terminals 1 and 2 of the throttle control motor with the magnetic clutch.

OK:

Resistance: 0.3 – 100 Ω at 20°C (68°F)

NG	**Replace throttle control motor (See page FI–37).**

OK

3	**Check for open and short in harness and connector between throttle control motor and engine ECU (See page IN–32).**

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–32).

DI649–01

DTC	P1126/89*	Magnetic Clutch Circuit Malfunction

*: ETCS trouble code No. is 22.

CIRCUIT DESCRIPTION

Magnetic clutch is mounted between the throttle motor and the valve, and it connects the throttle motor with the throttle valve.
Therefore, the throttle motor opens and closes the throttle valve through the magnetic clutch.
If the electric throttle control system has a malfunction, the magnetic clutch separates the throttle motor from the throttle valve in order not to operate the throttle valve by the throttle motor.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1126/89	Condition (a) continue for 0.8 seconds: (a) Magnetic clutch current ≧ 1.4 A or ≦ 0.4 A	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU
	Condition (a) continues for 1.5 seconds: (b) Magnetic clutch current ≧ 1.0 A or ≦ 0.8 A	

WIRING DIAGRAM

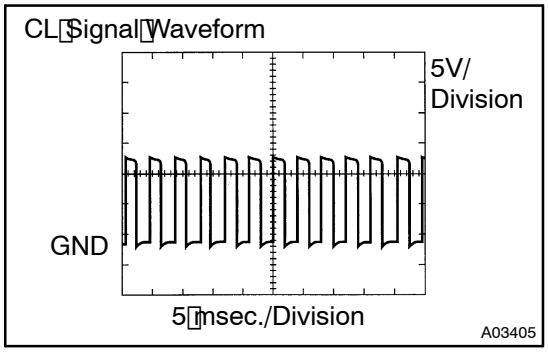
Refer to DTC P1125/89 on page DI–103.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check magnetic clutch circuit.**

When using hand–held tester:
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
CHECK:
Read the magnetic clutch current value on the hand–held tester.
OK:
Current: 0.8 – 1.0 A



When not using hand–held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals CL+ and CL– of the engine ECU connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals CL+ and CL– of the engine ECU when the engine is idling.

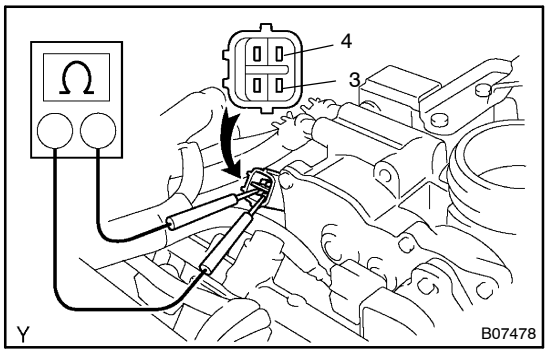
OK:

The correct waveform is as shown.

NG	**Go to step 4.**

OK

2	**Check magnetic clutch.**



PREPARATION:

Disconnect the throttle control motor with the magnetic clutch connector.

CHECK:

Measure the resistance between terminals 3 and 4 of the throttle control motor with the magnetic clutch.

OK:

Resistance: 4.2 – 5.2 Ω at 20°C (68°F)

NG	**Replace throttle control motor with magnetic clutch (See page FI–37).**

OK

3	**Check for open and short in harness and connector between magnetic clutch and engine ECU (See page IN–32).**

NG	**Repair or replace.**

OK

4	**Check operation of magnetic clutch.**

CHECK:

(a) Clear the DTC.

(b) Perform the following steps and check the DTC.

(1) Turn the ignition switch ON.

(2) Start the engine.

(3) Turn the ignition switch OFF and wait 3 seconds.

(4) Turn the ignition switch ON.

OK:

DTC 89 is not stored.

NG → **Replace throttle control motor (with magnetic clutch) (See page FI–37).**

OK

Check and replace engine ECU (See page IN–32).

DI64A–01

DTC	P1127/89*	ETCS Actuator Power Source Circuit Malfunction

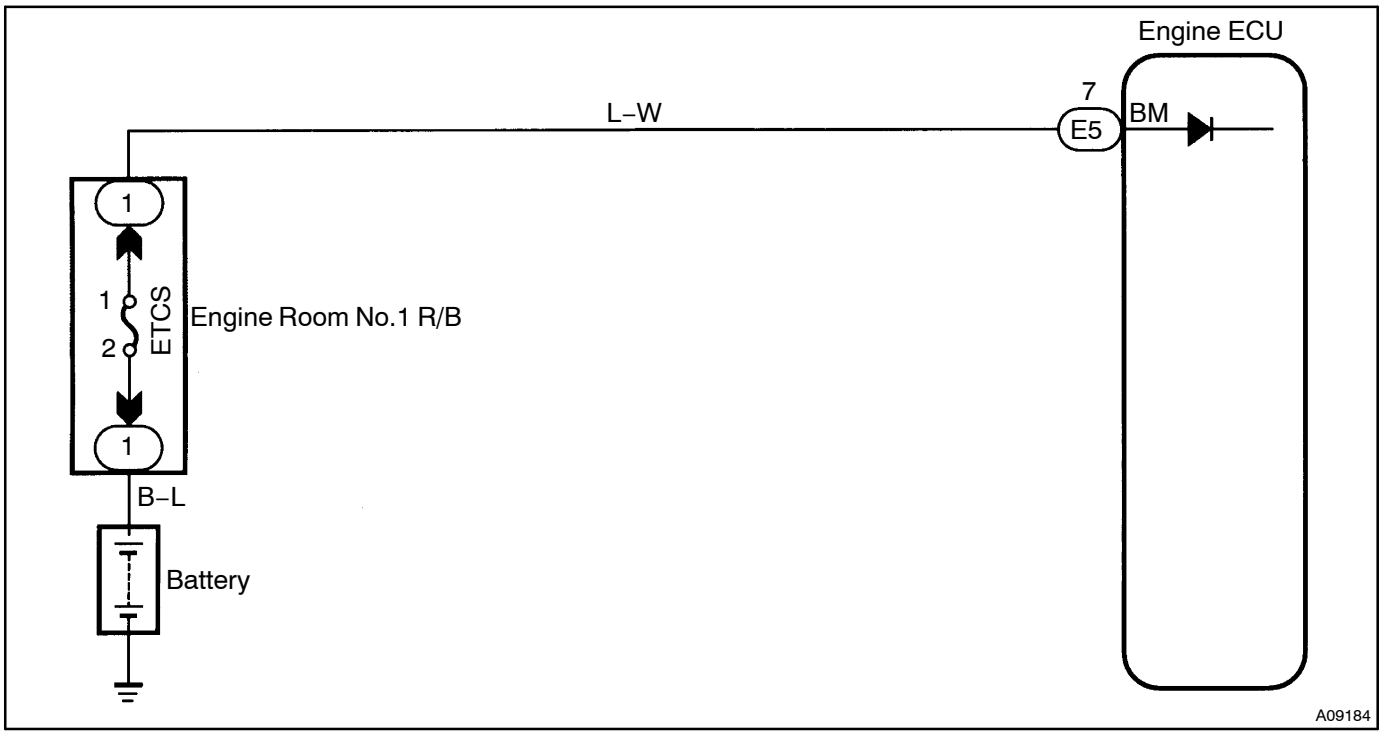
***: ETCS trouble code No. is 23.**

CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BM of the engine ECU even once when the ignition switch is OFF for the electric throttle control system.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1127/89	Open in ETCS power source circuit	• Open in ETCS power source circuit • Engine ECU

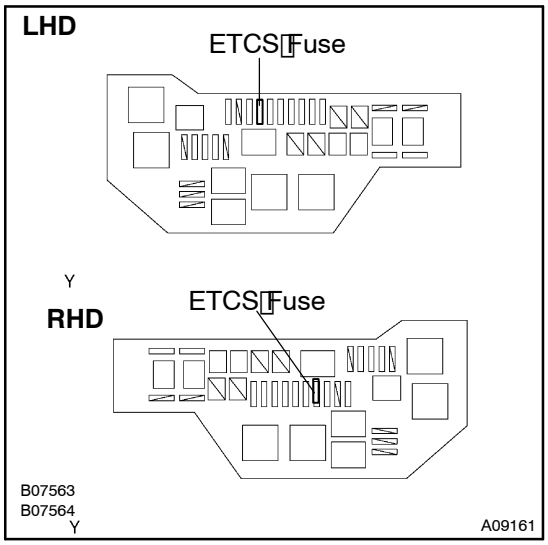
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check ETCS fuse.

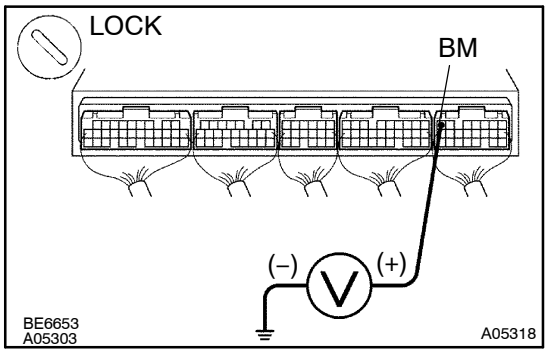


PREPARATION:
Remove the ETCS fuse from the engine room No.1 R/B.
CHECK:
Check the continuity of the ETCS fuse.
OK:
Continuity

NG → **Check for short in all harness and components connected to ETCS fuse.**

OK

2	Check voltage between terminal BM of engine ECU connector and body ground.



PREPARATION:
Remove the engine ECU hood.
CHECK:
Measure the voltage between terminal BM of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK → **Check and replace engine ECU (See page IN–32).**

NG

Check and repair harness or connector between battery and ETCS fuse, and ETCS fuse and engine ECU (See page IN–32).

DI64B–01

DTC	P1128/89*	Throttle Control Motor Lock Malfunction

*: ETCS trouble code No. is 31.

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECU and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the engine ECU to control the throttle motor in order the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1128/89	Lock throttle control motor during control throttle control motor	• Throttle control motor • Throttle body

INSPECTION PROCEDURE

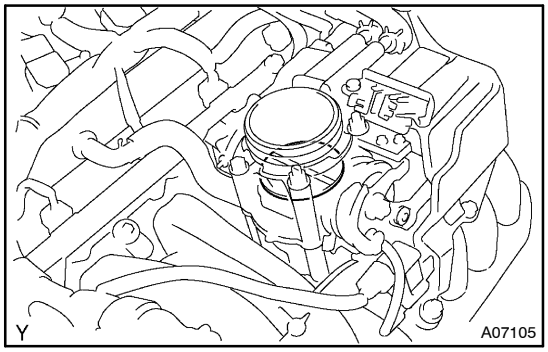
HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check throttle control motor (See page DI–103, step 2).**

NG → **Replace throttle control motor (See page FI–37).**

OK

2	**Visually check throttle valve.**



PREPARATION:
Remove the air cleaner.
CHECK:
Check whether or not a foreign body is caught between the throttle valve and the housing.

NG → **Remove a foreign body and clean throttle body.**

OK

Replace throttle body.

DI64C–01

DTC	P1129/89*	Electric Throttle Control System Malfunction

*: ETCS trouble code No. is 32.

CIRCUIT DESCRIPTION

Electric Throttle Control System (ETCS) is composed of the throttle motor to operate the throttle valve, the electromagnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the engine ECU to control the ETCS and the one valve type throttle body.
The engine ECU controls the throttle motor to make the throttle valve opening angle properly in response driving condition.
The throttle position sensor which is mounted on the throttle body detects the opening angle of the throttle valve, and it provides feedback to the engine ECU to control the throttle motor.
If the ETCS has a malfunction, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1129/89	Throttle opening angle continues to vary greatly from target throttle opening angle	• Electric throttle control system • Engine ECU

WIRING DIAGRAM

Refer to DTC P1125/89 on page DI–103.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P1129/89) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO →

Replace engine ECU, and clear DTC. If DTC P1129/89 is memorized again, and then replace throttle body.

DI64D–01

DTC	P1300/14	Igniter Circuit Malfunction (No.1)

DTC	P1305/15	Igniter Circuit Malfunction (No.2)

DTC	P1310/14	Igniter Circuit Malfunction (No.3)

DTC	P1315/14	Igniter Circuit Malfunction (No.4)

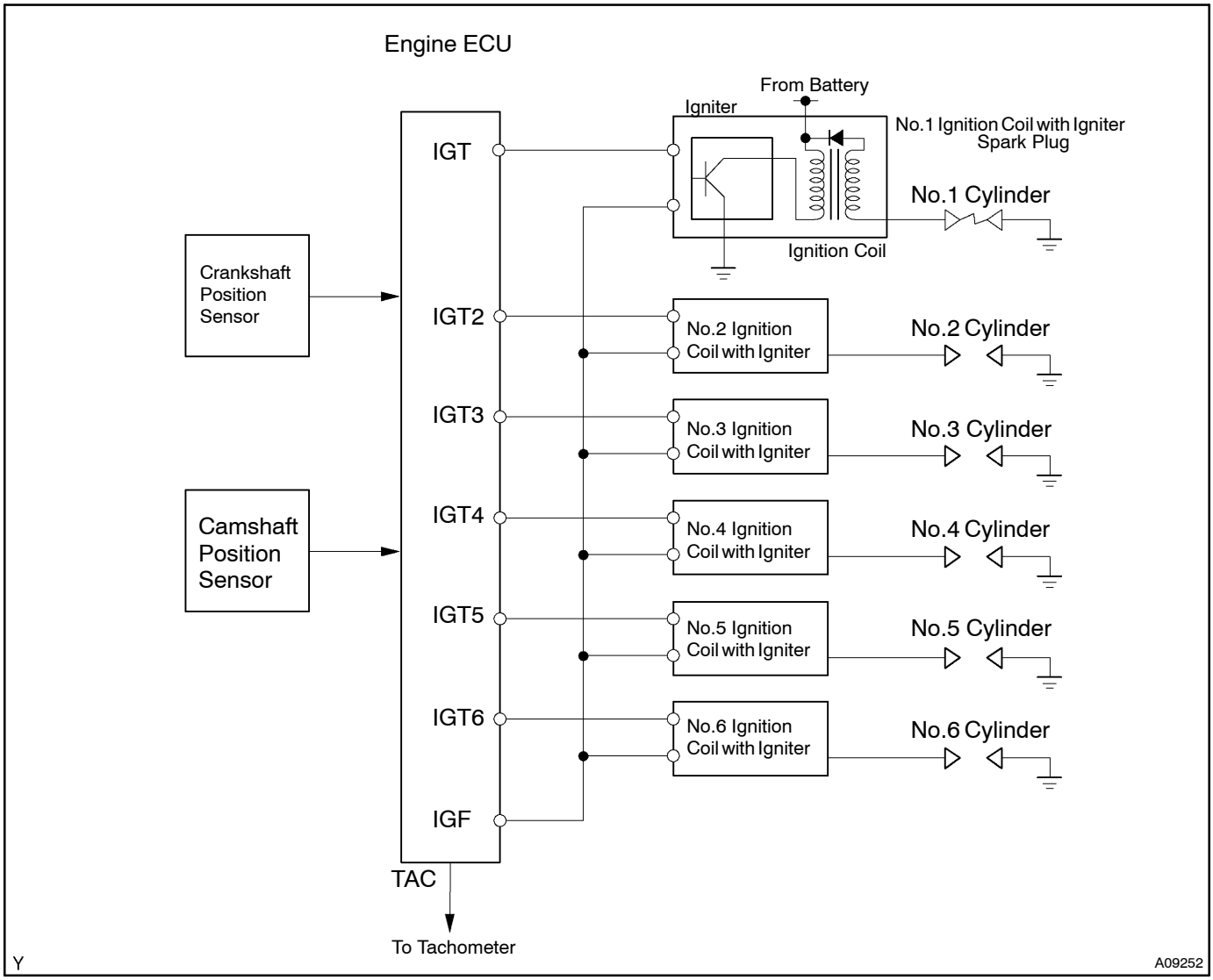
DTC	P1320/14	Igniter Circuit Malfunction (No.5)

DTC	P1325/14	Igniter Circuit Malfunction (No.6)

CIRCUIT DESCRIPTION

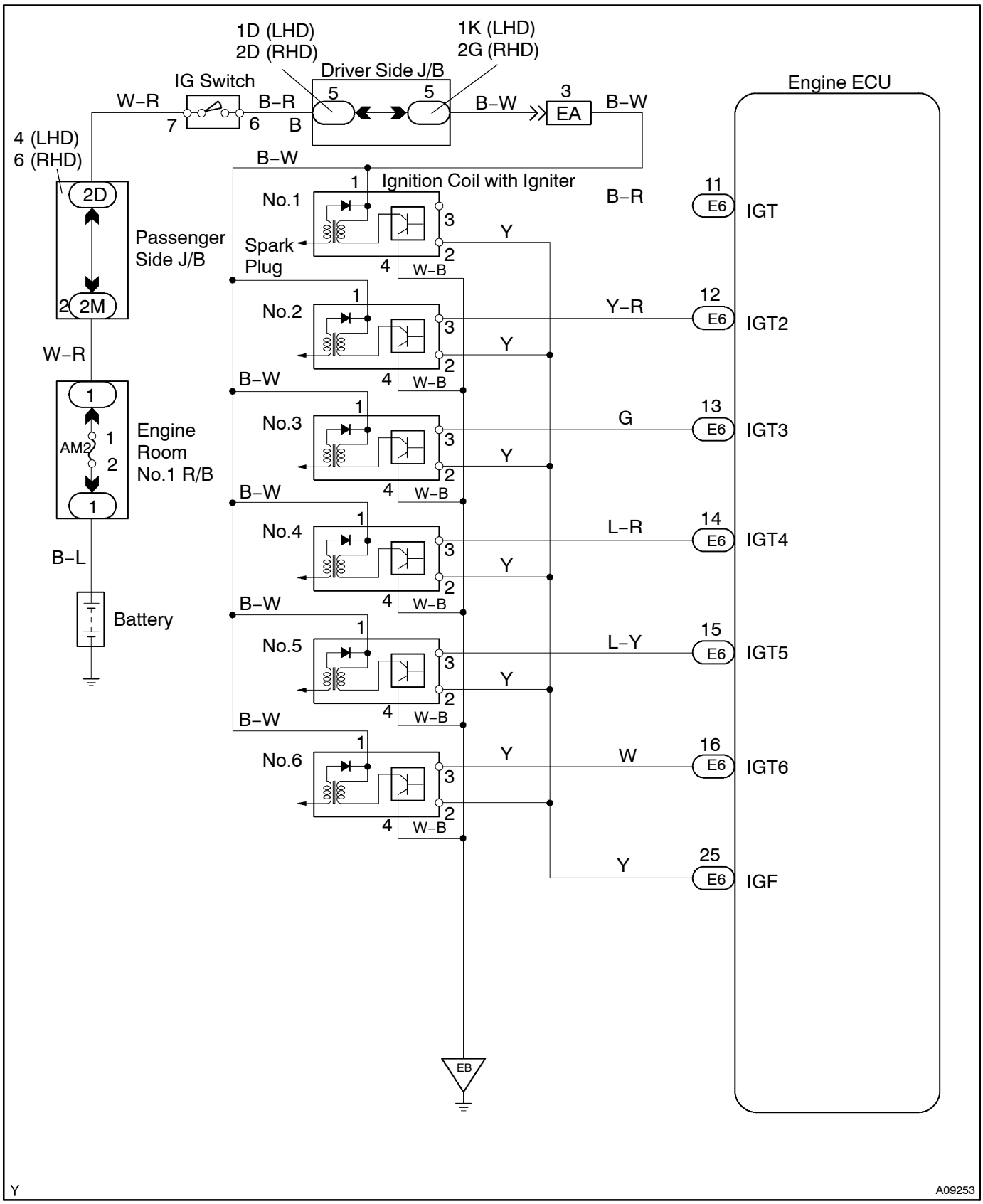
A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces high–voltage loss, and enhances the the overall reliability of the ignition system by eliminating the distributor. The DIS is a 1–cylinder ignition system which ignites one cylinder with one ignition coil. In the 1–cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug pass from the center electrode to the ground electrode.

The engine ECU determines ignition timing and outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the power transistors in the igniter cuts off the current to the primary coil in the ignition coil is supplied to the spark plug that are connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail–safe measure to the engine ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P1300/14 P1305/15 P1310/14 P1315/14 P1320/14 P1325/14	No IGF signal to engine ECU while engine is running	• Ignition system • Open or short in IGF and IGT1 – IGT6 circuit from ignition coil with igniter to engine ECU • No.1 – No.6 ignition coil with igniter • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1300/14 is displayed, check No.1 ignition coil with igniter circuit.
- If DTC P1305/15 is displayed, check No.2 ignition coil with igniter circuit.
- If DTC P1310/14 is displayed, check No.3 ignition coil with igniter circuit.
- If DTC P1315/14 is displayed, check No.4 ignition coil with igniter circuit.
- If DTC P1320/14 is displayed, check No.5 ignition coil with igniter circuit.
- If DTC P1325/14 is displayed, check No.6 ignition coil with igniter circuit.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check spark plug and spark (See page IG–1).**

NG → **Go to step 4.**

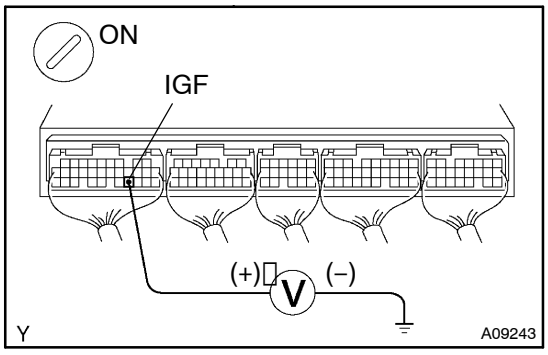
OK

2	**Check for open and short in harness and connector in IGF and IGT signal circuit between engine ECU and ignition coil with igniter (See page IN–32).**

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

OK

3	**Disconnect ignition coil with igniter connector, and check voltage between terminals IGF of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU hood.
(b) Disconnect the ignition coil with the igniter connector.
(c) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals IGF of the engine ECU connector and body ground.

OK:

Voltage: 4.5 – 5.5 V

OK → **Replace ignition coil with igniter.**

NG

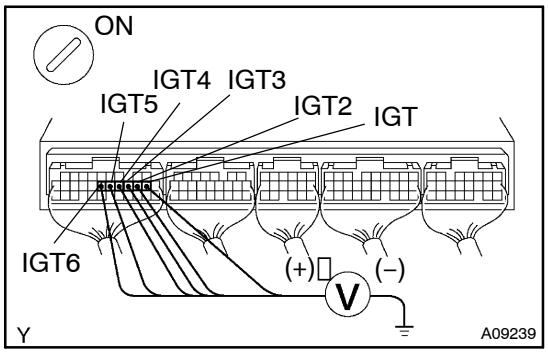
Check and replace engine ECU (See page IN–32).

4	Check for open and short in harness and connector in IGT signal circuit between engine ECU and ignition coil with igniter (See page IN–32).

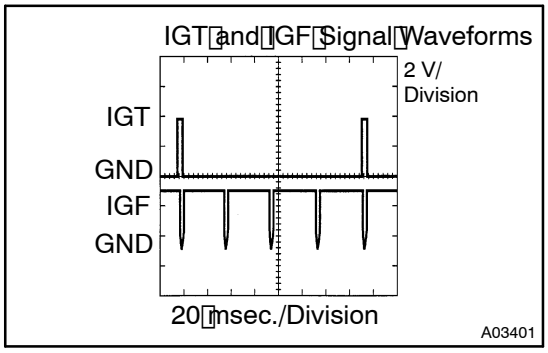
NG → Repair or replace harness or connector.

OK

5	Check voltage between terminals IGT – IGT6 of engine ECU connector and body ground.



PREPARATION:
Remove the engine ECU hood.
CHECK:
Measure the voltage between terminals IGT – IGT6 of the engine ECU connector and body ground when the engine is cranked.
OK:
Voltage: More than 0.1 V and less than 4.5 V

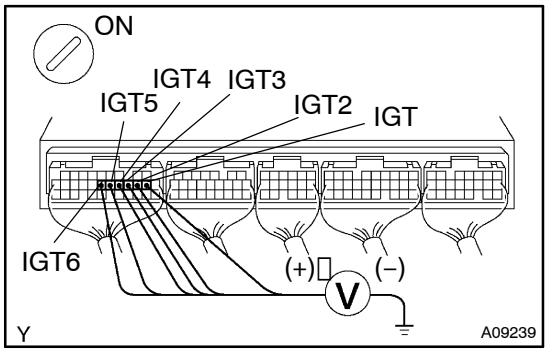


Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check the waveforms between terminals IGT – IGT6 and E1, and IGF and E1 of the engine ECU connector.
HINT:
Correct waveform appears as shown, with rectangle waves.

NG → Check and replace engine ECU (See page IN–32).

OK

6	Disconnect ignition coil with igniter connector and check voltage between terminals IGT – IGT6 of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the ignition coil with the igniter connector.

CHECK:

Measure the voltage between terminals IGT – IGT6 of the engine ECU connector and body ground when the engine is cranked.

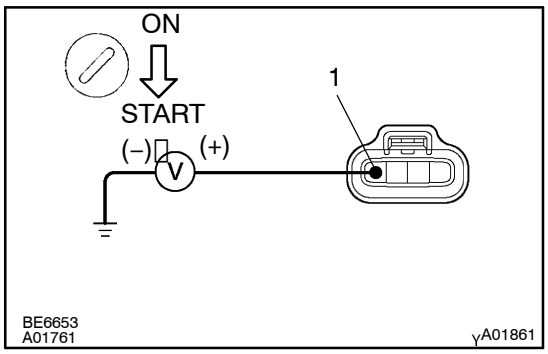
OK:

Voltage: More than 0.1 V and less than 4.5 V

NG	Check and replace engine ECU (See page IN–32).

OK

7	Check ignition coil with igniter power source circuit.



PREPARATION:

Disconnect the ignition coil with the igniter connector.

CHECK:

Measure the voltage between terminal 1 of the ignition coil with the igniter connector and body ground when the ignition switch is turned to ON and START position.

OK:

Voltage: 9 – 14 V

OK	Repair ignition coil with igniter power source circuit.

NG

8	Check for open and short in harness and connector between ignition switch and ignition coil with igniter (See page IN–32).

NG	Repair or replace harness or connector.

OK

Replace ignition coil with igniter.

DI64E–01

DTC	P1335/12,13	Crankshaft Position Sensor Circuit Malfunction (During engine running)

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 on page DI–81.

DTC No.	DTC Detecting Condition	Trouble Area
P1335/13	No crankshaft position sensor signal to engine ECU with engine speed 1,000 rpm or more	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–81.

INSPECTION PROCEDURE

HINT:

Refer to DTC P0335/12, 13 on page DI–81.

DI64F–01

DTC	P1346/18	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 on page DI–81.

DTC No.	DTC Detecting Condition	Trouble Area
P1346	Deviation in crankshaft position sensor signal and camshaft position sensor signal (2 trip detection logic)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–81.

INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335/12, 13 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check valve timing (Check for loose and jumping teeth of timing belt) (See page EM–25).**

NG → **Adjust valve timing (Repair or replace timing belt).**

OK

Check and replace engine ECU (See page IN–32).

DI64G-01

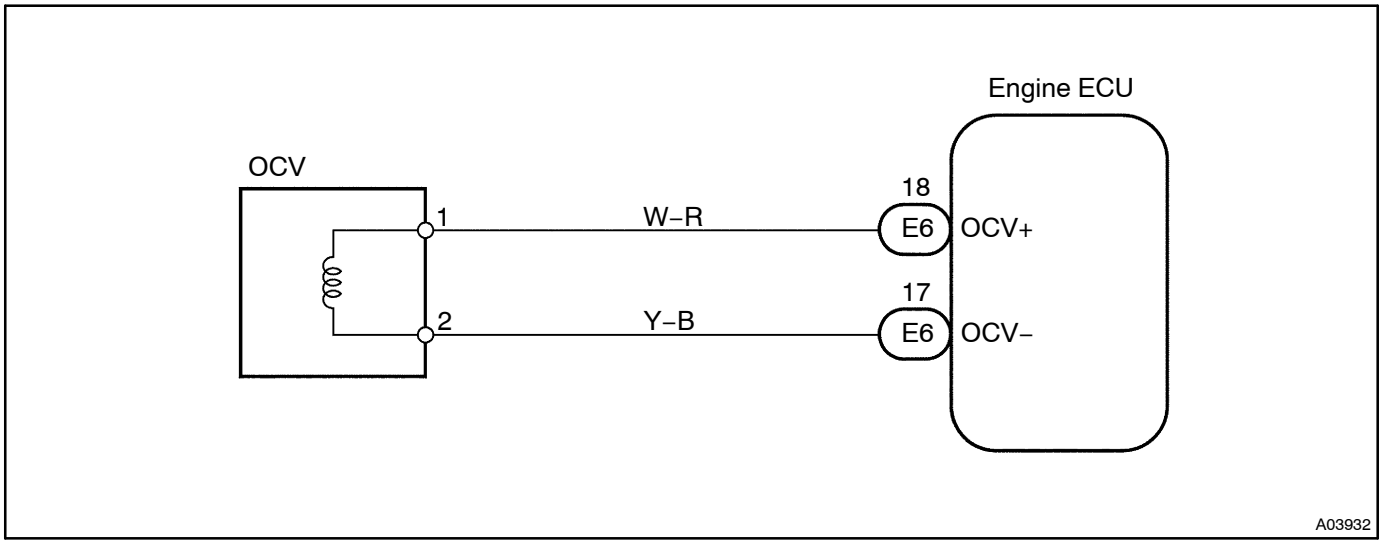
DTC	P1349/59	VVT System Malfunction (Bank 1)

CIRCUIT DESCRIPTION

VVT system controls the intake valve timing to proper timing in response to driving condition.
ECU controls OCV (Oil Control Valve) to make the intake valve timing properly, and, oil pressure controlled with OCV is supplied to the VVT controller, and then, VVT controller changes relative position between the camshaft and the crankshaft.

DTC No.	DTC Detecting Condition	Trouble Area
P1349/59	Condition (a) or (b) continues for after the engine is warmed up and engine speeded 400 – 4,000 rpm: (a) Valve timing does not change from of current valve timing (b) Current valve timing is fixed	• Valve timing • OCV • VVT controller assembly • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1349/59 is displayed, check left bank VVT system circuit.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Perform confirmation test.**

PREPARATION:
Start the engine.
CHECK:
Check whether or not rough idle or engine stall is occurred.
OK:
Normal engine speed (rough idle or engine stall is not occurred.)

NG → Go to step 5.

OK

2	Check operation of OCV.

PREPARATION:

(a) Start the engine and warmed it up.

(b) Connect the hand–held tester and select the VVT from the ACTIVE TEST menu.

CHECK:

Check the engine speed when the VVT active test is enabled.

OK:

VVT active test is in the OFF state: Normal engine speed

VVT active test is in the ON state: Rough idle or engine stall

OK → **VVT system is OK.***

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

3	Check whether or not DTC P1349 is stored.

PREPARATION:

(a) Clear the DTC (See page DI–17).

(b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI–123).

OK:

DTC P1349 is not stored.

OK → **VVT system is OK.***

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

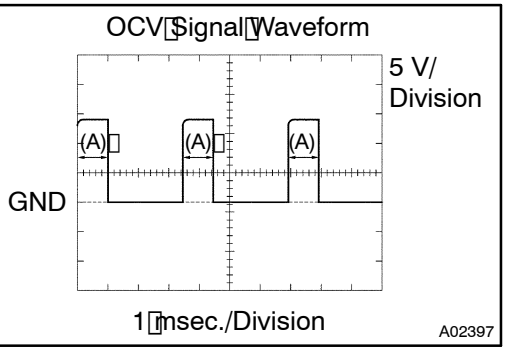
NG

4	Check valve timing (See page EM–20).

NG → Repair valve timing.

OK

5	Check voltage between terminals OCV+ and OCV– of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, and check the waveform between terminals OCV+ and OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG → Check and replace engine ECU (See page IN–32).

OK

6	Check OCV (See page FI–42).

NG → Replace OCV, and then go to step 7.

OK

7	Check camshaft timing gear (VVT–i) (See page EM–44).

NG → Replace

OK

8	**Check blockage of OCV, oil check valve and oil pipe No.1.**

NG → **Repair or replace.**

OK

9	**Check whether or not DTC P1349 is stored.**

NG → **Replace engine ECU.**

OK

VVT system is OK.*

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

When not using hand–held tester:

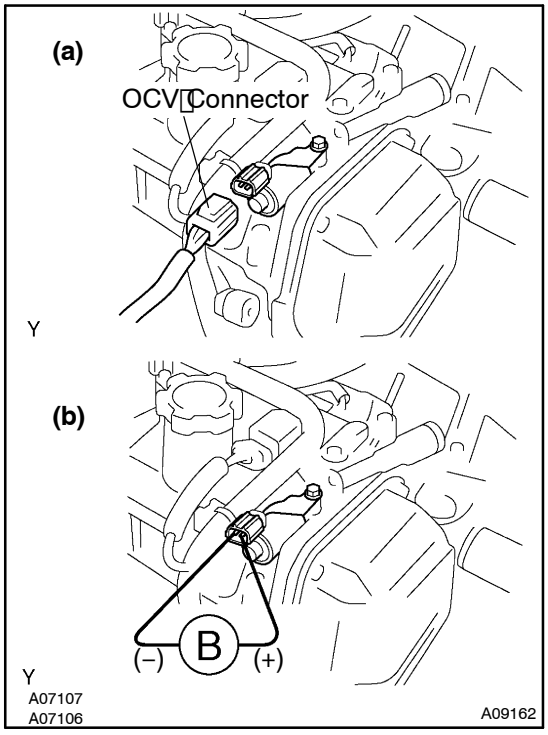
1	**Perform confirmation test.**

PREPARATION:
Start the engine.
CHECK:
Check whether or not rough idle or engine stall is occurred.
OK:
Normal engine speed (rough idle or engine stall is not occurred.)

NG → **Go to step 5.**

OK

2	**Check operation of OCV.**



PREPARATION:

Start the engine.

CHECK:

(a) Check the engine speed when disconnecting the OCV connector.

(b) Check the engine speed when apply battery voltage between the terminals of the OCV.

RESULT:

Result	Check (a)	Check (b)
1	Normal engine speed	Rough idle or engine stall
2	Except 1	

2	**Go to step 6.**

1

3	**Check whether or not DTC 59 is stored.**

PREPARATION:

(a) Clear the DTC (See page DI–17).

(b) Perform simulation test.

CHECK:

Check whether or not DTC 59 is stored (See page DI–123).

OK:

DTC 59 is not stored.

OK	**VVT system is OK.***

*: DTC 59 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the ECV controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the for foreign object in the engine oil.

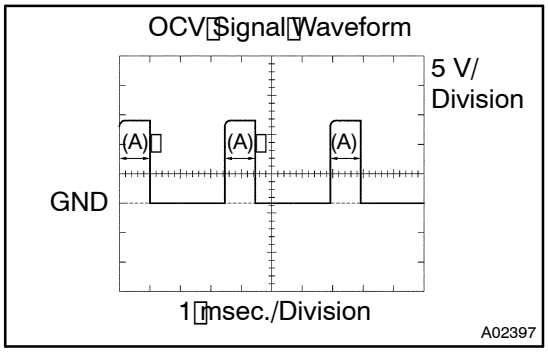
NG

4	**Check valve timing (See page EM–20).**

NG → Repair valve timing.

NG

5 Check voltage between terminals OCV+ and OCV– of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, and check the waveform between terminals OCV+ OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG → Check and replace engine ECU (See page IN–32).

OK

6 Check OCV (See page FI–42).

NG → Replace OCV, and then go to step 7.

OK

7 Check for open and short in harness and connector in OCV circuit.

NG → Repair or replace.

OK

8 Check camshaft timing gear (VVT–i) (See page EM–44).

NG → Replace.

OK

9	**Check blockage of OCV, oil check valve and oil pipe No.1.**

NG → **Repair or replace.**

OK

10	**Check whether or not DTC 59 is stored.**

NG → **Replace engine ECU.**

OK

VVT system is OK.*

*: DTC 59 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

DI64H–01

DTC	P1600/96	Engine ECU BATT Malfunction (European spec.)

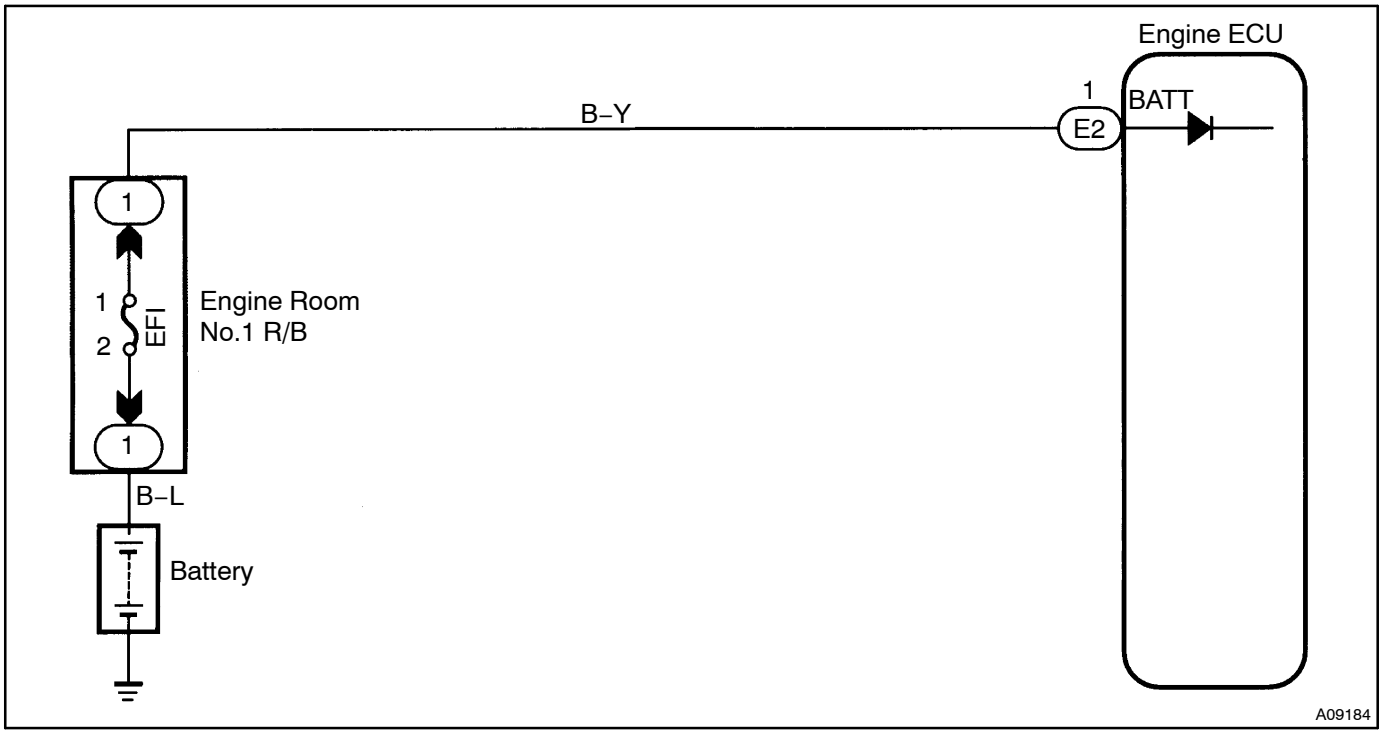
CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BATT of the engine ECU even when the ignition switch is OFF for use by the DTC memory and air–fuel ratio adaptive control value memory, etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1600/96	Open in back up power source circuit	• Open in back up power source circuit • Engine ECU

HINT:
If DTC P1600/96 appear, the engine ECU does not store another DTC.

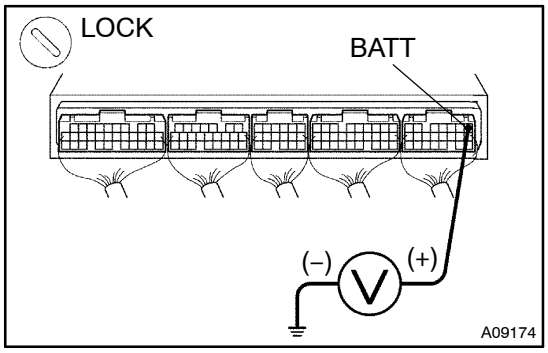
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

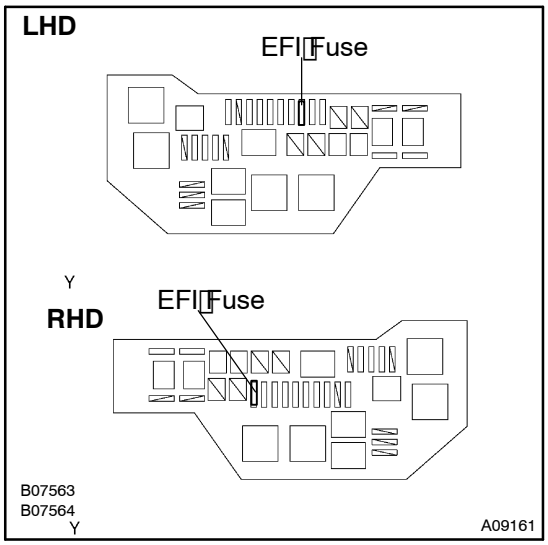
1	**Check voltage between terminal BATT of engine ECU connector and body ground.**



PREPARATION:
Remove the engine ECU hood.
CHECK:
Measure the voltage between terminal BATT of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–32).**
NG	

2	**Check EFI fuse of engine rooom R/B.**



PREPARATION:
Remove the EFI fuse from the engine room R/B.
CHECK:
Check the continuity of the EFI fuse.
OK:
Continuity

NG	**Check for short in all harness and components connected to EFI fuse.**
OK	

Check and repair harness or connector between battery and EFI fuse, and EFI fuse and engine ECU.

DI64I–01

DTC	P1633/89*	Engine ECU Malfunction (ETCS Circuit)

*: ETCS trouble code No. is 22.

CIRCUIT DESCRIPTION

Refer to DTC P1129 on page DI–47.

DTC No.	DTC Detecting Condition	Trouble Area
P1633/89	Engine ECU malfunction	• Engine ECU

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace engine ECU.

DI64J–01

DTC	P1645/82	Body ECU Malfunction

CIRCUIT DESCRIPTION

ECU receives the operating condition (ON/OFF) of A/C from A/C ECU and it also receives the electrical load information from the body ECU.
ECU uses these information to control the engine (idle up, etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P1645/82	Condition (a) or (b) continues for 5.0 seconds or more: (a) No communication from body ECU (b) No communication from A/C ECU	• Body ECU • A/C ECU • Communication bus

INSPECTION PROCEDURE

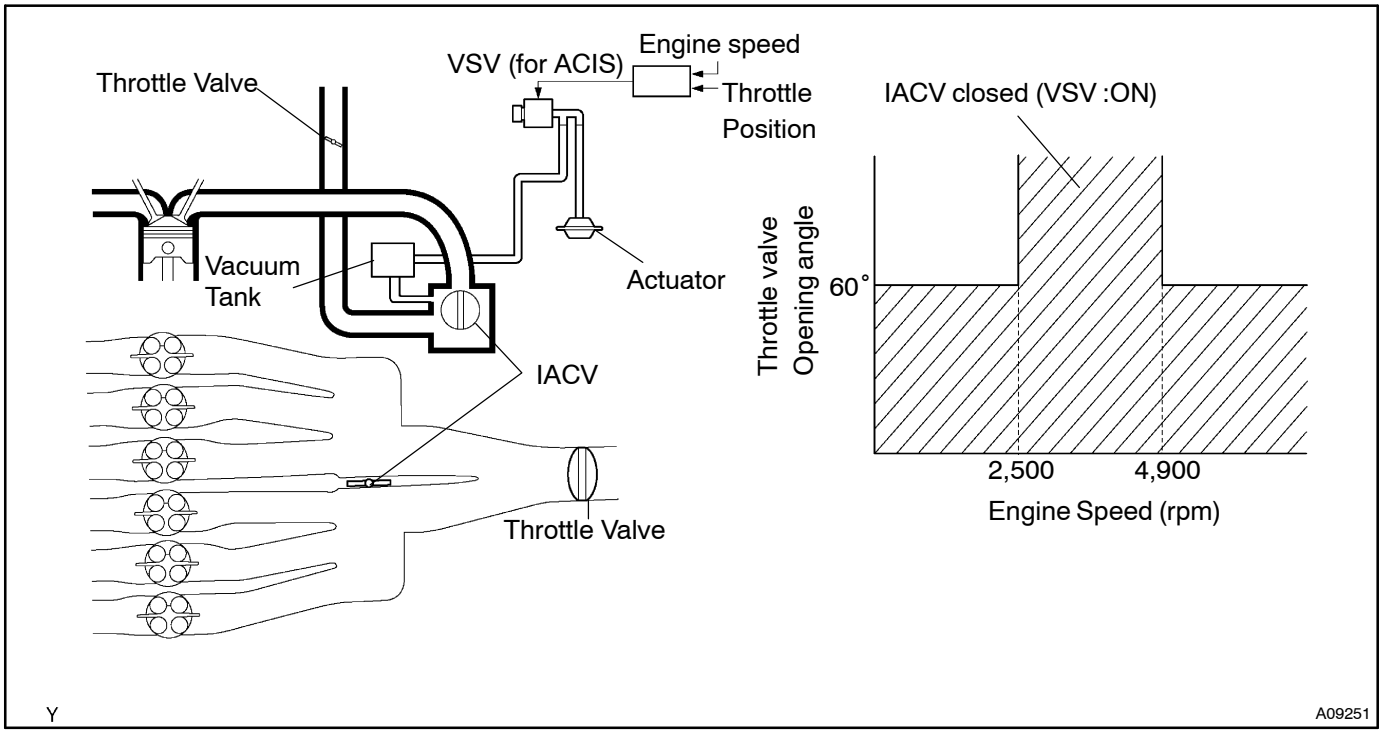
Perform troubleshooting the Multiplex Communication System (See page DI–618).

DI64K–01

DTC	P1651/96	VSV for ACIS Circuit Malfunction (European spec.)

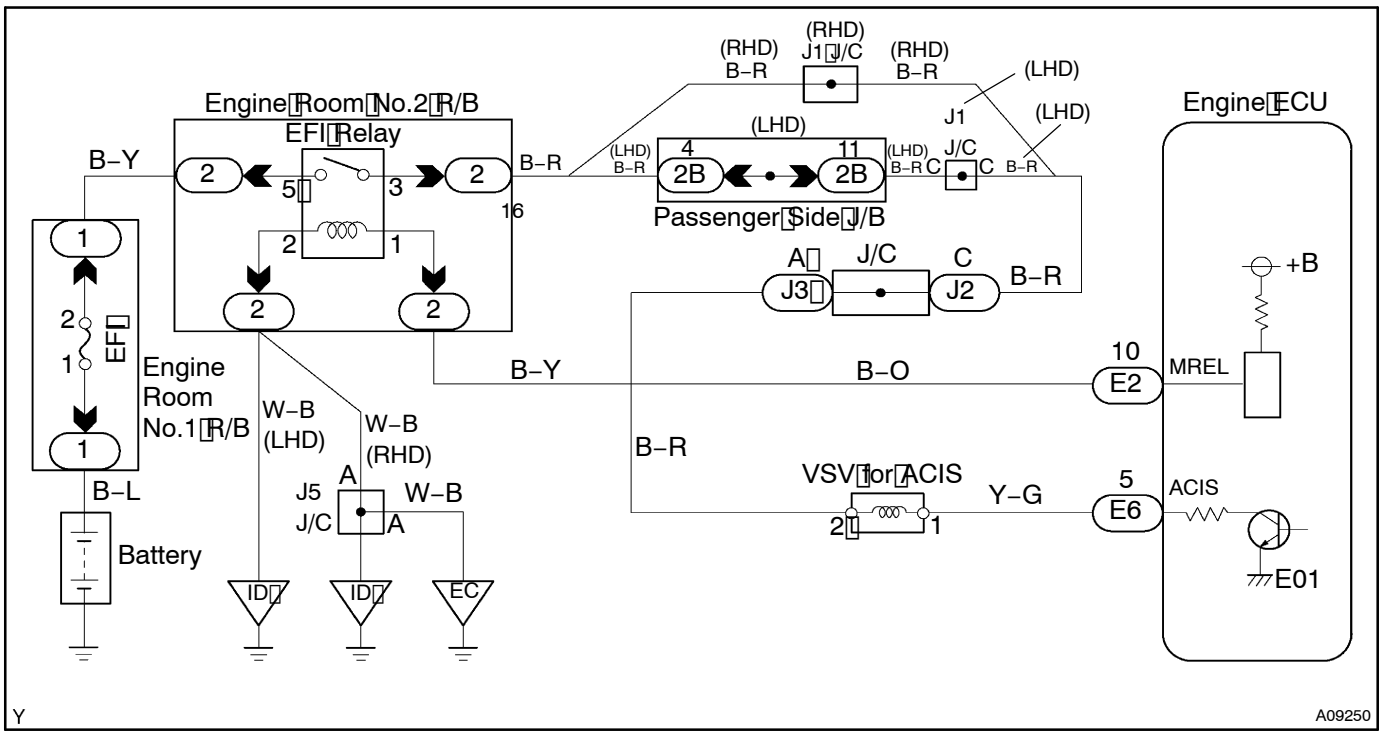
CIRCUIT DESCRIPTION

This circuit opens and closes the IACV (Intake Air Control Valve) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).
When the engine speed is 4,900 rpm or less and the throttle valve opening angle is 60˚ or more, the engine ECU turns the VSV ON and closes the IACV. At all other times, the VSV is OFF, so the IACV is open.



DTC No.	DTC Detecting Condition	Trouble Area
P1651/96	Proper response to engine ECU command does not occur (2 trip detection logic)	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU

WIRING DIAGRAM



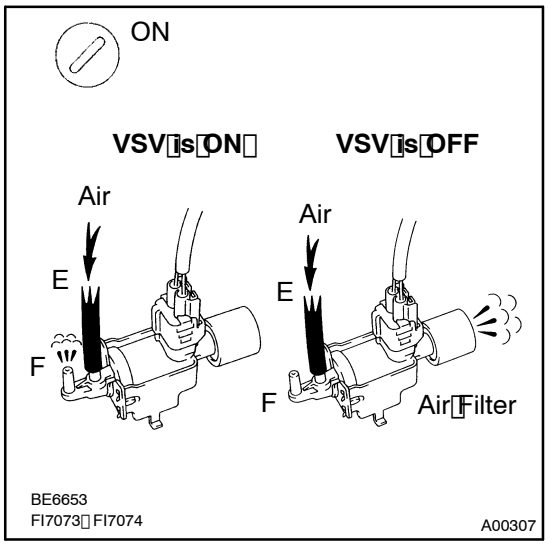
INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and check operation of VSV for ACIS.**



PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check operation of the VSV when VSV is operated by the hand–held tester.

OK:

VSV is ON:

Air from port E flows out through port F.

VSV is OFF:

Air from port E flows out the air filter.

OK	**Check for vacuum tank (See page FI–48).**

NG

2	Check VSV for ACIS (See page FI–48).

NG → Replace VSV for ACIS.

OK

3	Check for open and short in harness and connector between EFI main relay and (Marking: EFI) engine ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

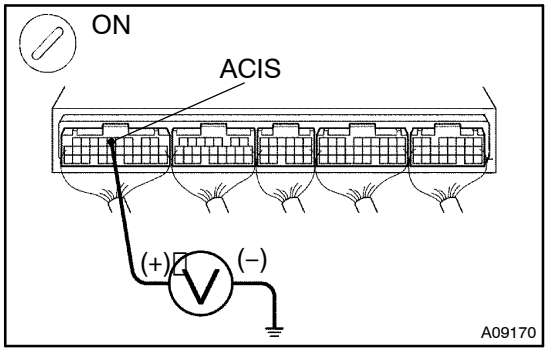
When not using hand–held tester:

1	Check VSV for ACIS (See page FI–48).

NG → Replace VSV for ACIS.

OK

2	Check voltage between terminal ACIS of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal ACIS of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay (Marking: EFI) and engine ECU (See page IN–32).

OK

Check and replace engine ECU (See page IN–32).

DI64L–01

DTC	P1656/39	OCV Circuit Malfunction (Bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P1349/39 on page DI–123.

DTC No.	DTC Detecting Condition	Trouble Area
P1656/39	Open or short in oil control valve circuit	• Open or short in OCV circuit • OCV • Engine ECU

WIRING DIAGRAM

Refer to DTC P1349/39 on page DI–123.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check OCV circuit.**

PREPARATION:

(a) Start the engine and warmed it up.

(b) Connect the hand–held tester and select the VVT from the ACTIVE TEST menu.

CHECK:

Check the engine speed when operate the OCV by the hand–held tester.

OK:

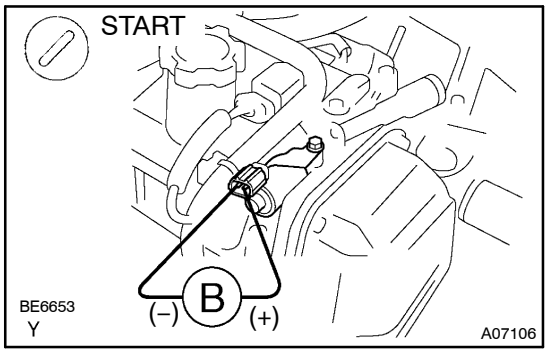
VVT system is OFF (OCV is OFF): Normal engine speed

VVT system is ON (OCV is ON): Rough idle or engine stalled

OK → **Check for intermittent problems (See page DI–4).**

NG

2	Check operation of OCV.



PREPARATION:

(a) Start the engine and warmed it up.
(b) Disconnect the OCV connector.
(c) Apply battery voltage between terminals of the OCV.

CHECK:

Check the engine speed.

OK:

Rough idle or engine stalled.

NG → Replace OCV.

OK

3	Check voltage between terminals OCV+ and OCV– of engine ECU connector (See page DI–123, step 3).

NG → Check and replace engine ECU (See page IN–32).

OK

4	Check for open and short in harness and connector between OCV and engine ECU (See page IN–32).

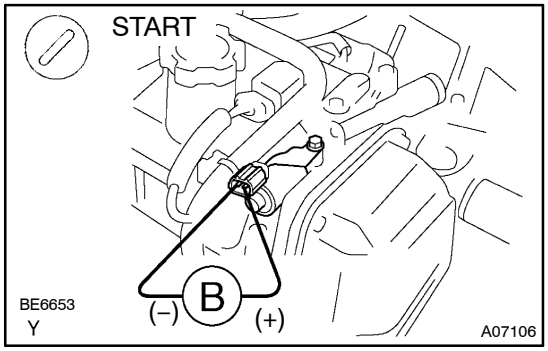
NG → Repair or replace.

OK

Check for intermittent problems (See page DI–4).

When not using hand-held tester:

1	Check operation of OCV.



PREPARATION:
(a) Start the engine and warmed it up.
(b) Disconnect the OCV connector.
(c) Apply battery voltage between terminals of the OCV.

CHECK:
Check the engine speed.

OK:
Rough idle or engine stalled.

NG → Replace OCV.

OK

2	Check voltage between terminals OCV+ and OCV– of engine ECU connector (See page DI–123, step 3).

NG → Check and replace engine ECU (See page IN–32).

OK

3	Check for open and short in harness and connector between OCV and engine ECU (See page IN–32).

NG → Repair or replace.

OK

Check for intermittent problems (See page DI–4).

DI64M–01

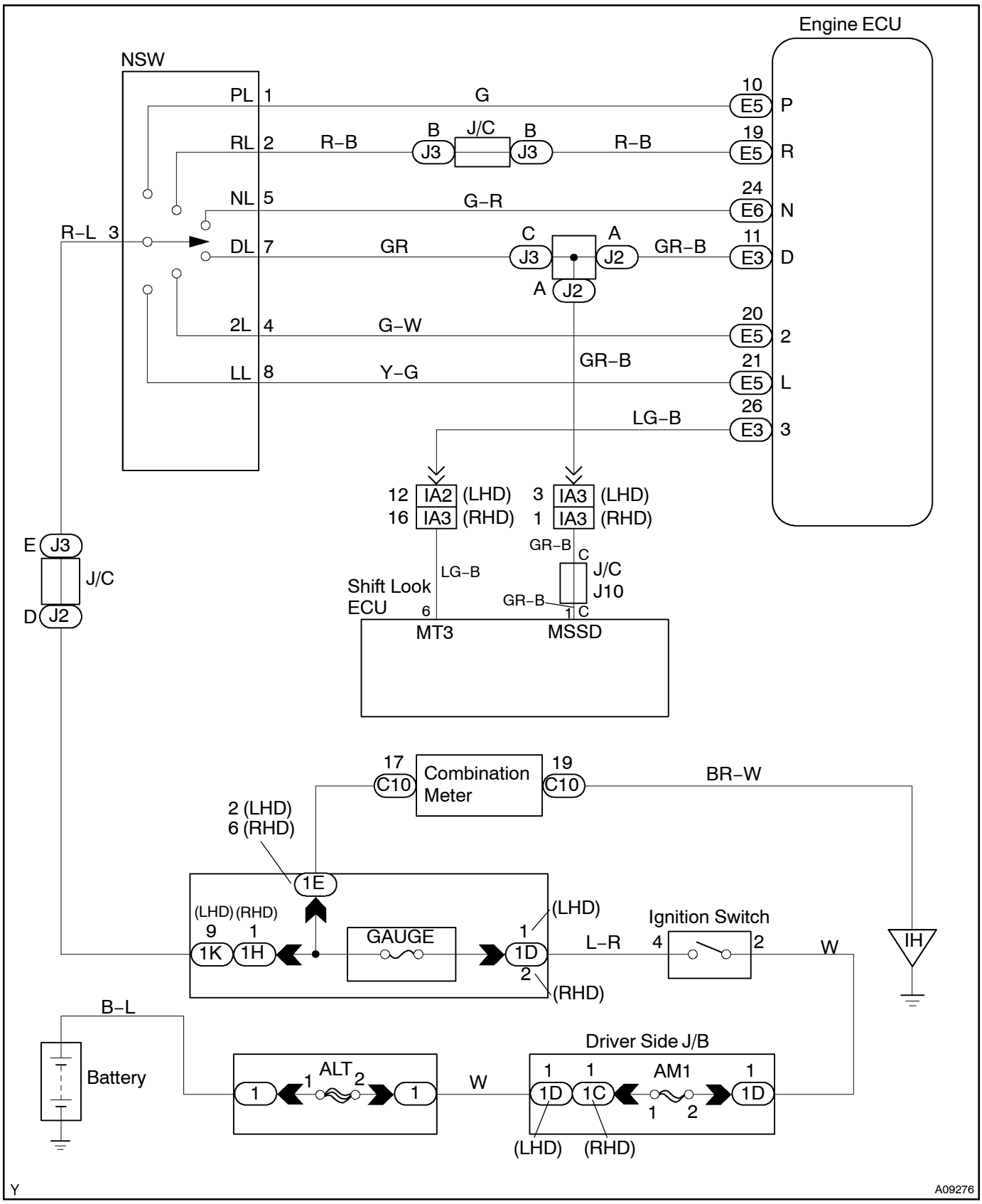
DTC	P1780/97	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever range and sends signals to the engine ECU.
The engine ECU receives signals (NSW, R, 3, 2 and L) from the neutral start switch. When the signal is not sent to the engine ECU from the neutral start switch, the engine ECU judges that the shift lever is in D range.

DTC No.	DTC Detection Condition	Trouble Area
P1780/97	2 or more switches are ON simultaneously for R, N, 3, 2 and L ranges (2 trip detection logic)	• Short in neutral start switch circuit • Neutral start switch • Engine ECU
	When driving under conditions (a) and (b) for 30 seconds or more, neutral start switch is ON (N position): (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 – 2,500 rpm	

WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Read PNP, REVERSE, DRIVE, 3RD, 2ND and LOW signals.**

RESULT:

(a) Remove the DLC3 cover.

(b) Connect the hand–held tester to the DLC3.

(c) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Shift lever into the P, N, R, D, 3, 2 and L ranges, and read the PNP, REVERSE, DRIVE, 3RD, 2ND and LOW signals on the hand–held tester.

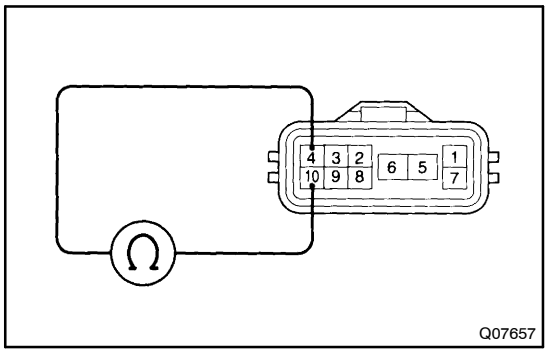
OK:

Shift range	Signal
P, N	PNP: OFF → ON
R	REVERSE: OFF → ON
D	DRIVE: OFF → ON
3	3RD: OFF → ON
2	2ND: OFF → ON
L	LOW: OFF → ON

OK → **Check and replace the engine ECU (See page IN–32).**

NG

2	**Check neutral start switch.**



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the neutral start switch connector.

CHECK:

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

OK:

Shift Range	Terminal No. to continuity	Terminal No. to continuity
P	3 – 7	1 – 2
R	3 – 5	–
N	3 – 5	1 – 2
D	3 – 9	–
2	3 – 4	–
L	3 – 8	–

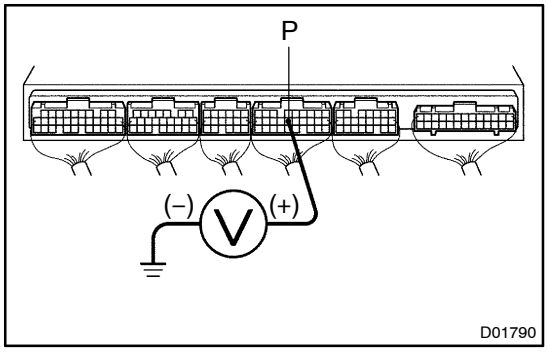
NG → **Replace neutral start switch.**

OK →

Repair or replace harness and connector between battery and neutral start switch, and neutral start switch and engine ECU (See page IN–32).

When not using hand–held tester:

1	**Measure voltage between each terminals of P, R, N, D, 3, 2, and L of engine ECU and body ground.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure the voltage between each terminals P, R, N, D, 3, 2 and L of the engine ECU and body ground when the shift lever is shifted to the following positions.

OK:

Tester Connection	Condition	Specified Condition
P– Body ground	Shift lever range: P	Battery voltage
R – Body ground	Shift lever range: R	Battery voltage*
N – Body ground	Shift lever range: N	Battery voltage
D – Body ground	Shift lever range: D Transmission control SW (for D and 3) : OFF	Battery voltage

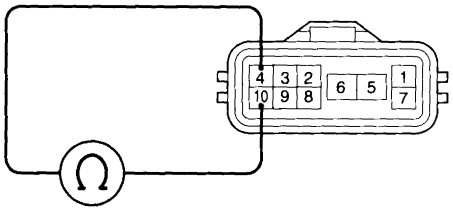
3 – Body ground	Shift lever range: 3	Battery voltage
2 – Body ground	Shift lever range: 2 Transmission control SW (for 2 and L) : OFF	Battery voltage
L – Body ground	Shift lever range: L Transmission control SW (for 2 and L) : ON	Battery voltage

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

OK → **Check and replace engine ECU (See page IN–32).**

NG

2 Check neutral start switch.



Q07657

PREPARATION:
(a) Jack up the vehicle.
(b) Remove the neutral start switch connector.

CHECK:
Check the continuity between each terminal shown below when the shift lever is moved to each range.

OK:

Shift Range	Terminal No. to continuity	Terminal No. to continuity
P	3 – 7	1 – 2
R	3 – 5	–
N	3 – 5	1 – 2
D	3 – 9	–
2	3 – 4	–
L	3 – 8	–

NG → **Replace neutral start switch.**

OK

Repair or replace harness and connector between battery and neutral start switch, and neutral start switch and engine ECU (See page IN–32).

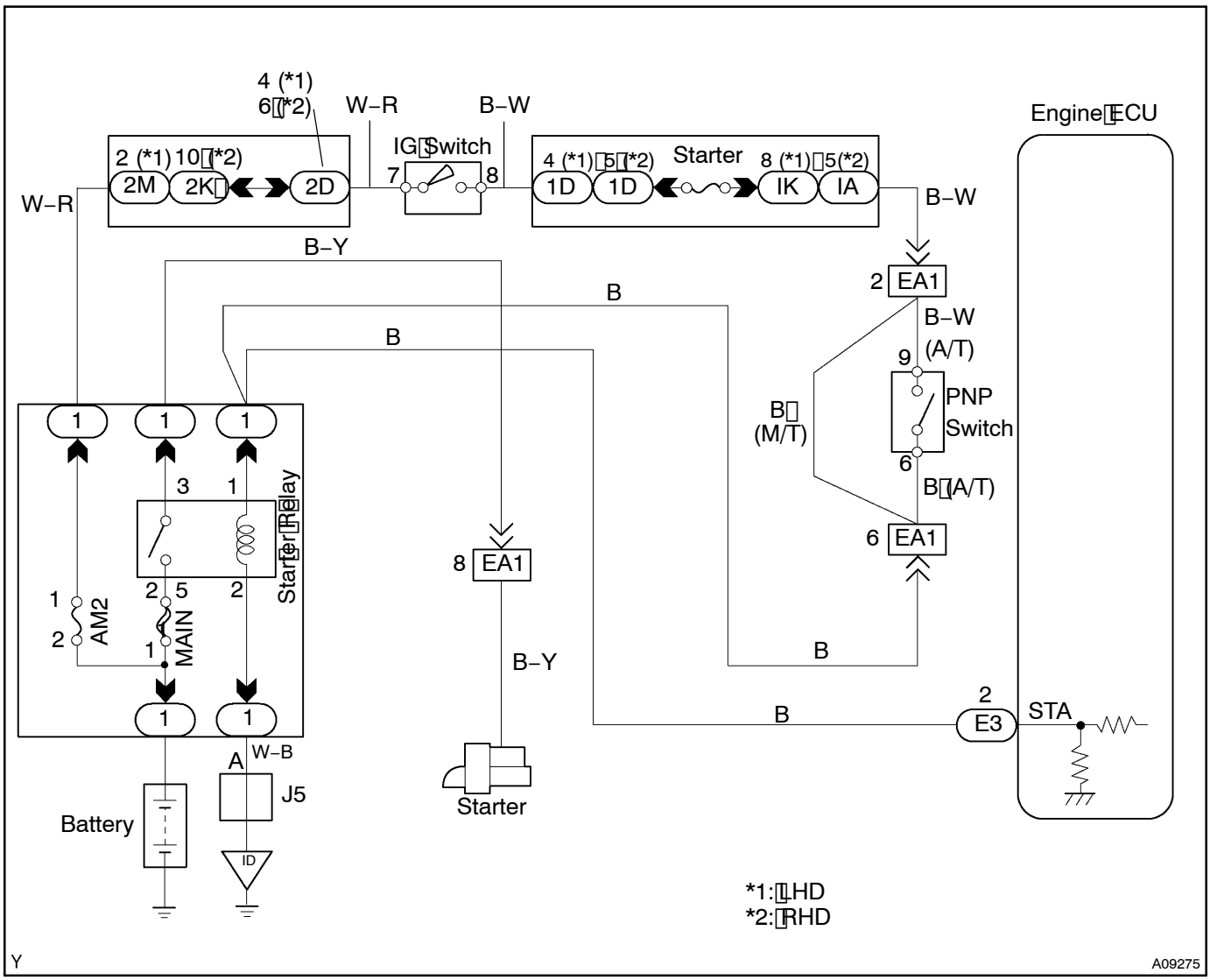
DI64N–01

Starter Signal Circuit

CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the engine ECU. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after–start injection control.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page DI–25.

When using hand–held tester:

1	Check STA signal.

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the STA signal on the hand–held tester while the starter operates.

OK:

Ignition Switch Position	ON	START
STA signal	OFF	ON

OK: Proceed to next circuit inspection shown on problem symptoms table (See page DI–25).

NG

2	Check for open in harness and connector between engine ECU and starter relay (Marking: ST) (See page IN–32).

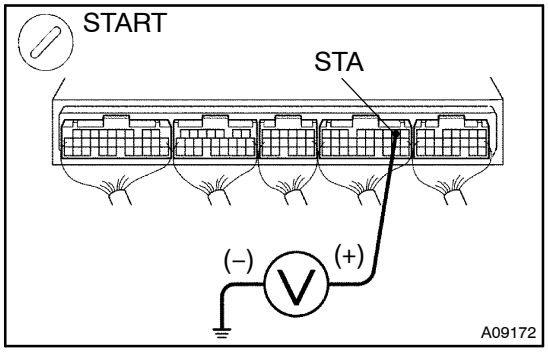
NG: Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

When not using hand–held tester:

1	Check voltage between terminal STA of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal STA of the engine ECU connector and body ground, during the engine cranking.

OK:

Voltage: 6 V or more

OK: Proceed to next circuit inspection shown on problem symptoms table (See page DI–25).

NG

2	Check for open in harness and connector between engine ECU and starter relay (Marking: ST) (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

DI64O-01

ECU Power Source Circuit

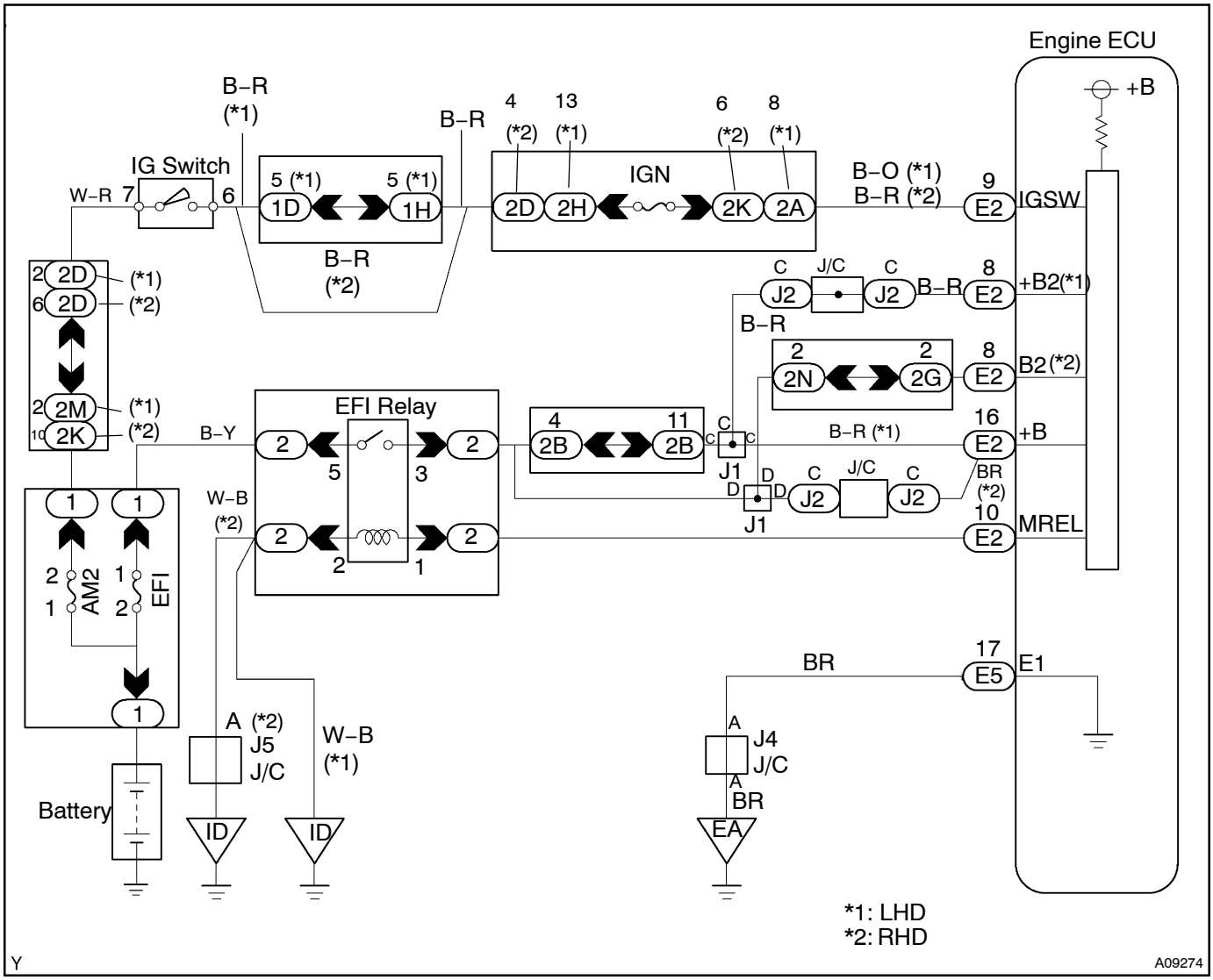
CIRCUIT DESCRIPTION

When the ignition switch is turned ON, battery positive voltage is applied to terminal IGSW of the engine ECU and the EFI main relay (Marking: EFI) control circuit in the engine ECU sends a signal to the terminal MREL of the engine ECU switching on the EFI main relay.

This signal causes current to flow to the coil, closing the contacts of the EFI main relay and supplying power to terminals +B of the engine ECU.

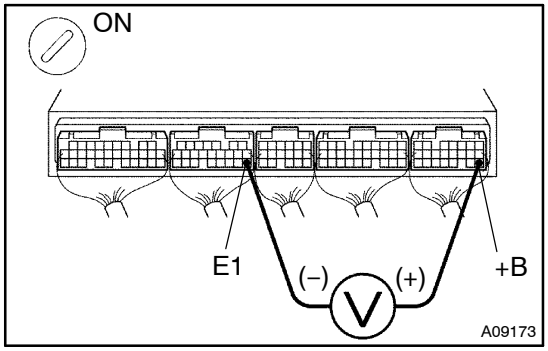
If the ignition switch is turned off, the engine ECU continues to switch on the EFI main relay for a maximum of 2 seconds for the initial setting of the ISC valve.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals +B and E1 of engine ECU connectors.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals +B and E1 of the engine ECU connectors.

OK:
Voltage: 9 – 14 V

OK	Proceed to next circuit inspection shown on Problem symptoms table (See page DI–25).

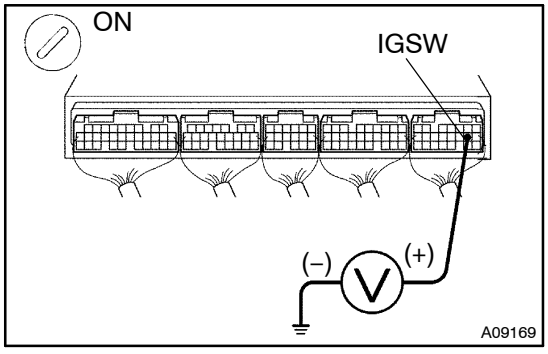
NG

2	Check for open in harness and connector between terminal E1 of engine ECU and body ground (See page IN–32).

NG	Repair or replace harness or connector.

OK

3	Check voltage between terminal IGSW of engine ECU connector and body ground.



PREPARATION:
Turn the ignition switch ON.

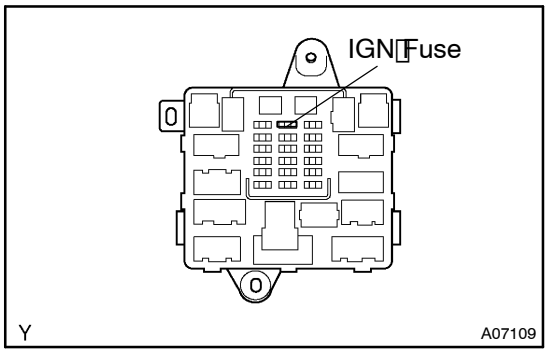
CHECK:
Measure the voltage between terminal IGSW of the engine ECU connector and body ground.

OK:
Voltage: 9 – 14 V

OK	Go to step 6.

NG

4	Check IGN fuse.



PREPARATION:
Remove the IGN fuse from the driver side J/B.
CHECK:
Check the continuity of the IGN fuse.
OK:
Continuity

NG → Check for short in all harness and components connected to IGN fuse.

OK

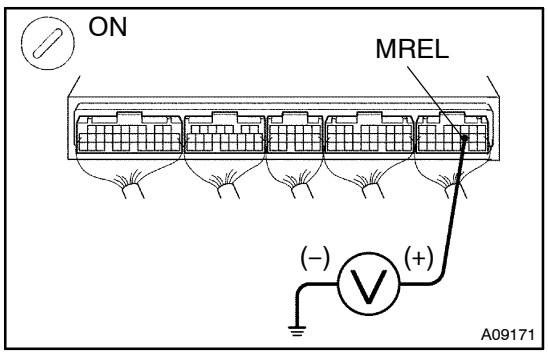
5	Check ignition switch (See page BE–23).

NG → Replace ignition switch.

OK

Check and repair harness and connector between battery and ignition switch, and ignition switch and engine ECU.

6	Check voltage between terminal MREL of engine ECU connector and body ground.



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminal MREL of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

NG → Check and replace engine ECU (See page IN–32).

OK

7	Check EFI fuse of engine room J/B (See page DI–149).

NG → Check for short in all harness and components connected to EFI fuse.

OK ↓

8	Check EFI main relay (Marking: EFI) (See page FI–50).

NG → Replace EFI main relay.

OK ↓

9	Check for open and short in harness and connector between terminal MREL of engine ECU and body ground (See page IN–32).

NG → Repair and replace harness or connector.

OK ↓

Check and repair harness or connector between EFI fuse and battery.

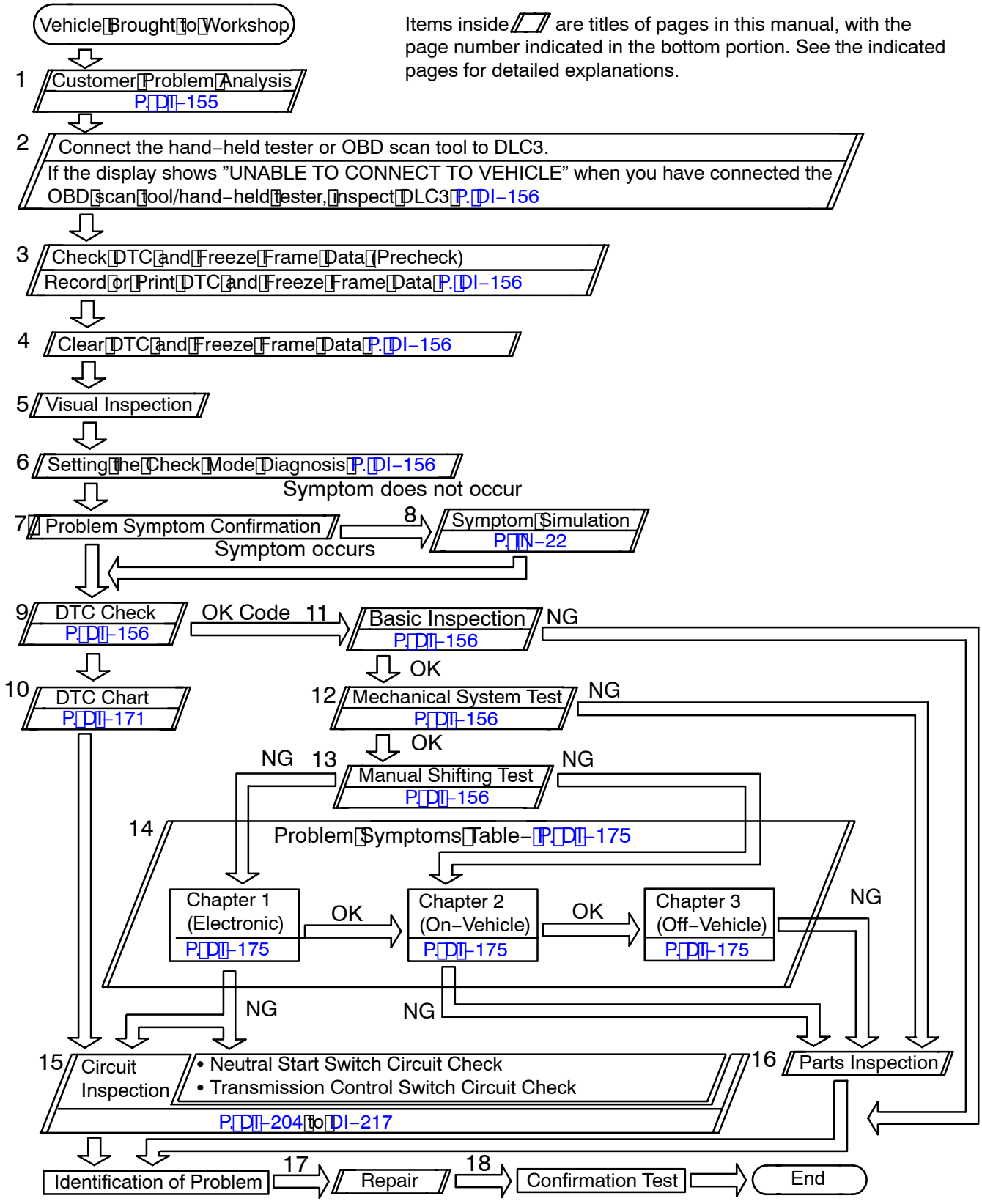
AUTOMATIC TRANSMISSION

HOW TO PROCEED WITH TROUBLESHOOTING

DI61K–02

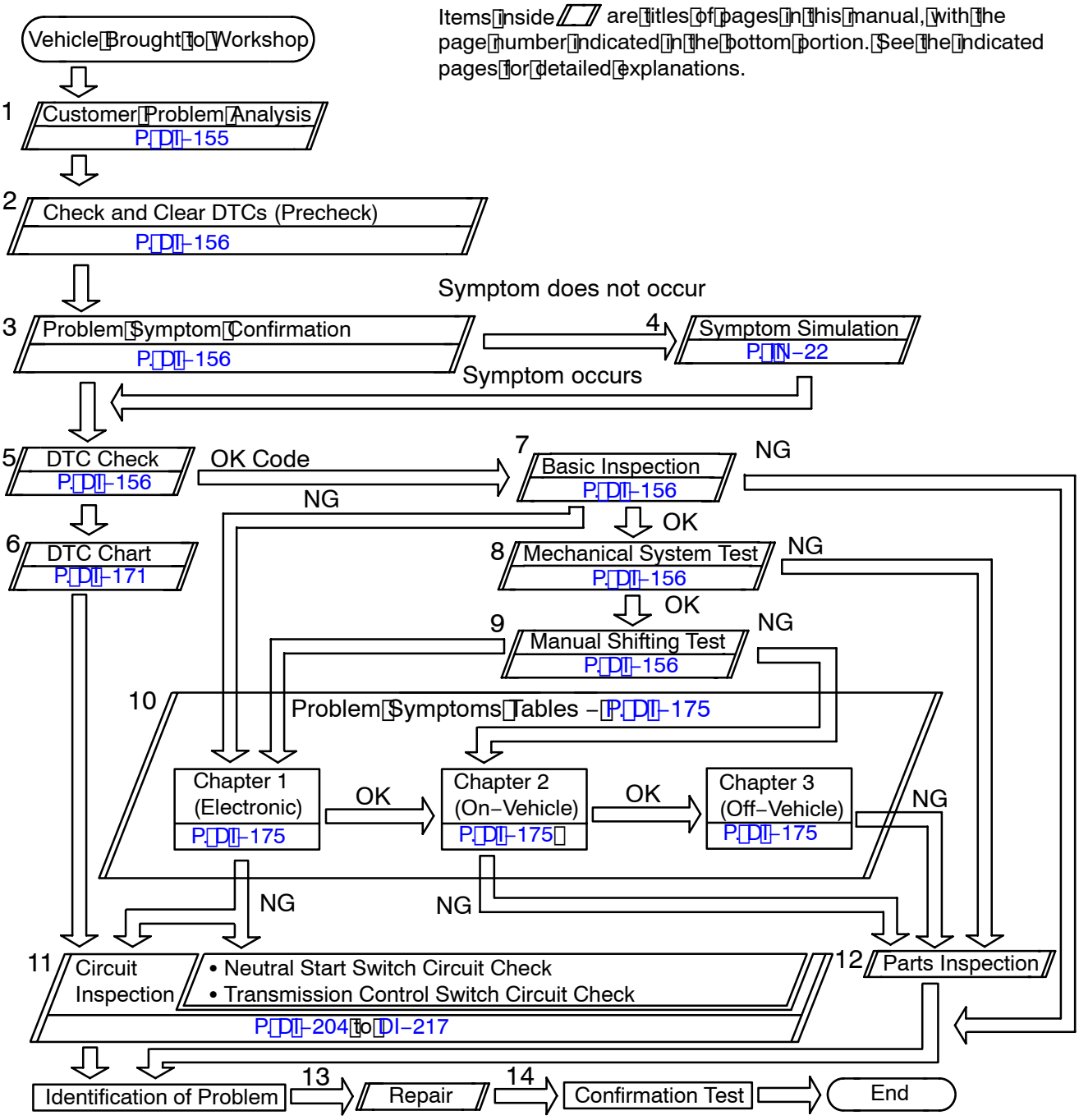
When using hand–held tester, troubleshoot in accordance with the procedure on the following pages.

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.



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.



DI61L–01

CUSTOMER PROBLEM ANALYSIS CHECK

Transmission Control System Check Sheet	Inspector's Name :

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

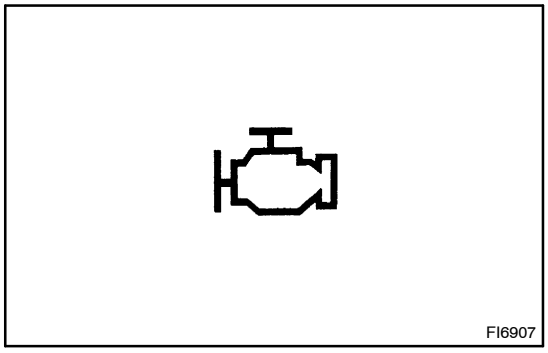
Date Problem Occurred	/ /
How Often Does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

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

Check Item	Indicator Light	☐ Normal ☐ Remains ON

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

DI61M–02

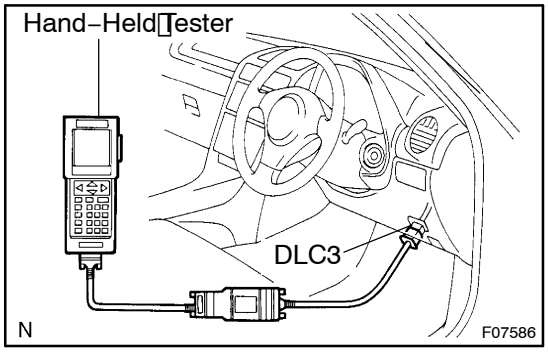

FI6907

PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description for EURO–OBD (European spec.) (Including Taiwan))

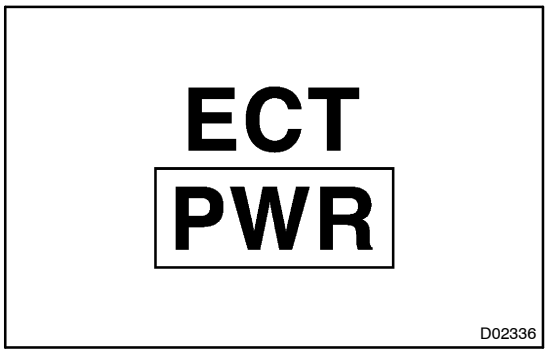
- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's engine ECU.
  Euro–OBD regulations require that 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 emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031–6 are recorded in the engine ECU memory (See page DI–171). If the malfunction does not reoccur in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the engine ECU memory.



- To check the DTCs, connect the OBD scan tool or hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or 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 scan tool's instruction book.)
  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page DI–171)
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting,

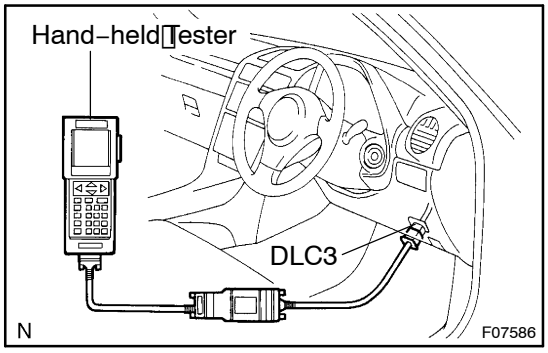
the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2)

- *2 Trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this second detection causes the (CHK ENG) to light up. (2nd trip)
  (However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.)

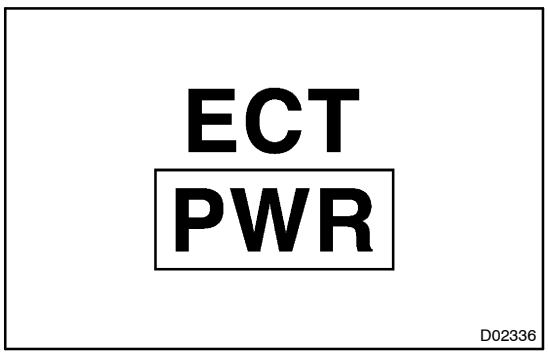


(b) Description for M–OBD (Except European spec.)

- 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 PWR Indicator Light on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components. In addition to the PWR indicator light lighting up when a malfunction is detected, the applicable DTCs are recorded in the Engine and ECT ECU memory (See page DI–171).
  If the malfunction only occurs in 3 trips, the PWR indicator light goes off but the DTCs remain recorded in the Engine and ECT ECU memory.



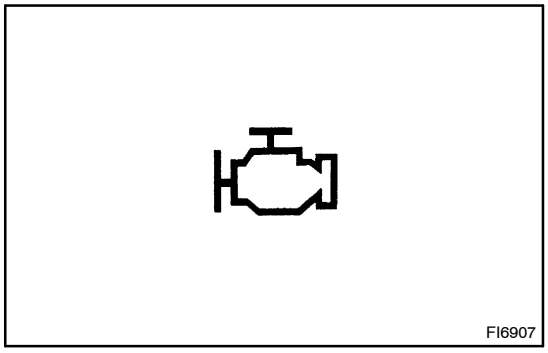
- To check the DTCs, connect a hand–held tester to DLC3 on the vehicle or read the number of blinks of the PWR indicator light when TC and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and activate the several actuators and check freeze frame data and 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 PWR indicator light to light 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 PWR indicator light to light up.



2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) M–OBD only:
Check the PWR indicator light.
(1) Turn the ignition switch ON.
(2) Check that the PWR indicator lights light up when the pattern select switch is selected to PWR and goes off when the pattern select switch is selected to SNOW.

HINT:
- If the PWR indicator light does not light up or stay on all the time, carry out the check for "Pattern Select Switch Circuit" on page DI–212.
- If the PWR indicator light blinks, a malfunction code is stored in the ECU memory.


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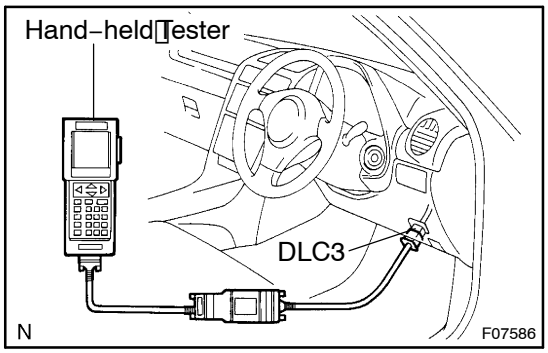
(b) Euro–OBD only:
Check the CHK ENG.
(1) The CHK ENG comes on when the ignition switch is turned ON and the engine is not running.

HINT:
If the CHK ENG does not light up, troubleshoot the combination meter (See page BE–2).

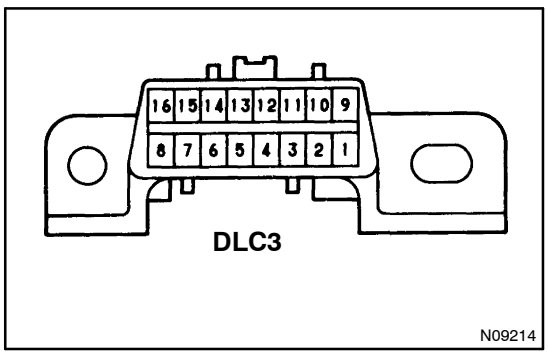
(2) When the engine is started, the CHK ENG should go off. If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

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

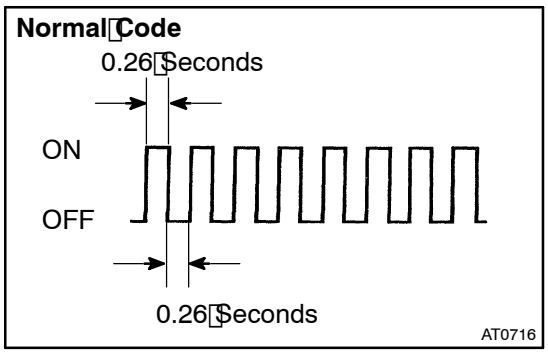
NOTICE:
When the diagnostic system is switched from normal mode to check (test) mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.



(1) Prepare hand–held tester.
(2) Connect the hand–held tester to DLC3 at the lower part 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 DI–156 to confirm the details of the DTCs.

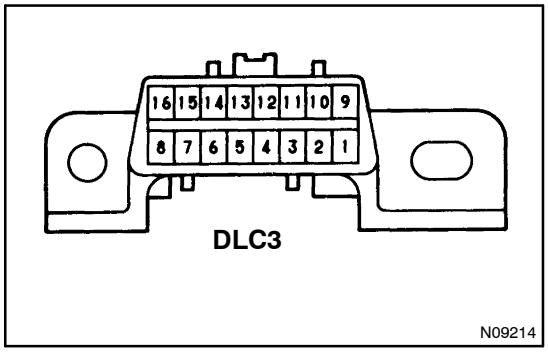


(d) M–OBD only:
Check the DTC (Not using hand–held tester).
(1) Turn the ignition switch ON, but do not start the engine.
(2) Select the pattern select switch to NORM.
(3) Using SST, connect terminals 13 (TC) and 4 (CG) of DLC3.
SST 09843–18040



(4) Read the DTC indicated by the number of times the PWR indicator light blinks.

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



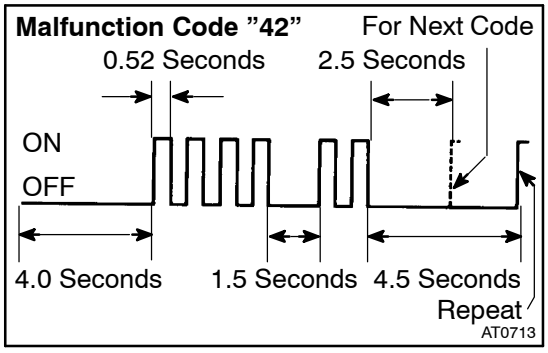
(e) Inspect the DLC3.

(1) The vehicle's Engine and ECT ECU uses ISO 9141–2 (Euro–OBD)/ISO 14230 (M–OBD) for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141–2/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:
Only for Euro–OBD:
If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the OBD scan tool or 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.



(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)

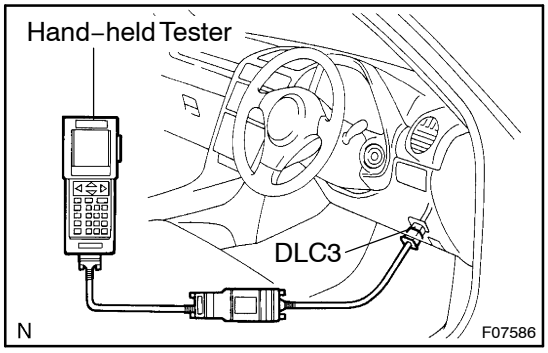
HINT:
Hand–held tester only: Compared to the Normal mode, the Check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in normal mode can also be detected in Check mode.

(a) Check the DTC.

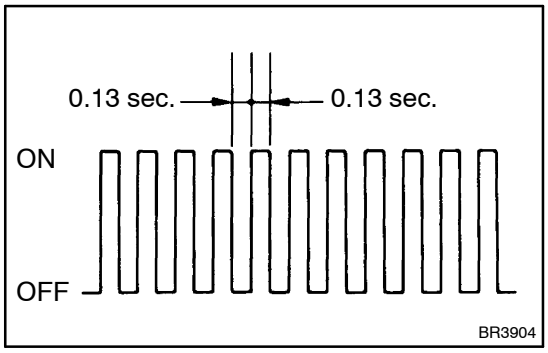
(1) Check the initial conditions.
- Battery positive voltage 11 V or more
- Throttle valve fully closed
- Transmission in P range
- Air conditioning switched off

(2) Turn the ignition switch OFF.

(3) Prepare a hand–held tester.



(4) Connect the hand–held tester to DLC3 at the lower part 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 PWR indicator light flashes).
(7) Start the engine (PWR indicator 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.

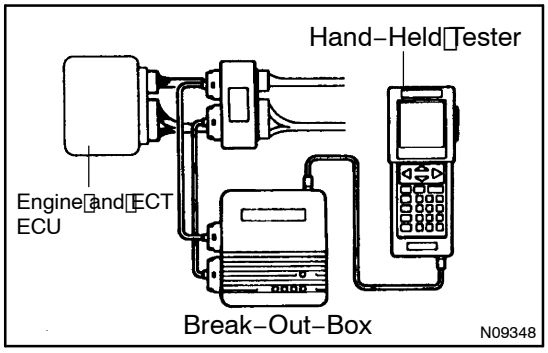
HINT:

Take care not to turn the ignition switch OFF, as turning it off switches the diagnosis system from Check mode to Normal mode, 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 actions 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. ENGINE AND ECT ECU OR ECT ECU STANDARD VALUES MEASUREMENT USING BREAK–OUT–BOX AND HAND–HELD TESTER

(a) Hook up the break–out–box and hand–held tester to the vehicle.

(b) Read the Engine and ECT ECU input/output values by following the prompts on the tester screen.

HINT:

Hand–held tester has "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems. Please refer to the hand–held tester/break–out–box operator's manual for further details.

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 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.

6. ROAD TEST

NOTICE:

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

(a) D range test

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 → 4 up–shift takes place, and that the shift points conform to the automatic shift schedule (See page SS–28).

HINT:

- 4th Gear Up–shift Prohibition Control (1. Water temp. is 60°C (140°F) less than. 2. Vehicle speed is 63 km/h less than.)
- 4th Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Water temp. is 60°C (140°F) less than.)
- 4th Gear Flex Lock–up Prohibition Control (1. Brake pedal is depressed. 2. ATF temp. is 50°C (122°F) less than.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → 4 up–shift.

(3) Check for abnormal noises and vibration.

Drive in D range lock–up or 4th 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 4th gears, check to see that the possible kick–down vehicle speed limits for 2 → 1, 3 → 2 and 4 → 3 kick–downs conform to those indicated in the automatic shift schedule (See page SS–28).

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

(6) Check the lock–up mechanism.

- Drive in D range 4th gear, at a steady speed (lock–up ON) of about 60 km/h (37 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) 3 range test

Shift into the 3 range and fully depress the accelerator pedal and check the following points:

(1) Check up–shift operation.

Check to see that 1 → 2 and 2 → 3 up–shift takes place, and that the shift points conform to the automatic shift schedule (See page SS–28).

HINT:

- 3rd Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Water temp. is 60°C (140°F) less than.)
- Australia only:

3rd Gear Flex Lock–up Prohibition Control (1. Brake pedal is depressed. 2. ATF temp. is 50°C (122°F) less than.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2 and 2 → 3 up–shift.

(3) Check for abnormal noises and vibration.

Drive in 3 range lock–up or 3rd 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 3 range, 2nd and 3rd gears, check to see that the possible kick–down vehicle speed limits for 2 → 1 and 3 → 2 kick–downs conform to those indicated in the automatic shift schedule (See page SS–28).

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

(6) Check the lock–up mechanism.

- Drive in 3 range 3rd gear, at a steady speed (lock–up ON) of about 70 km/h (43 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.

(c) 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 page SS–28).

HINT:

- There is no 3rd gear up–shift and lock–up in the 2 range.
- There is no 1st gear down–shift in the 2 range (SNOW mode).

(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.

(d) 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.

(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.

(e) R range test

Shift into the R range and fully depress the accelerator pedal and check for slipping.

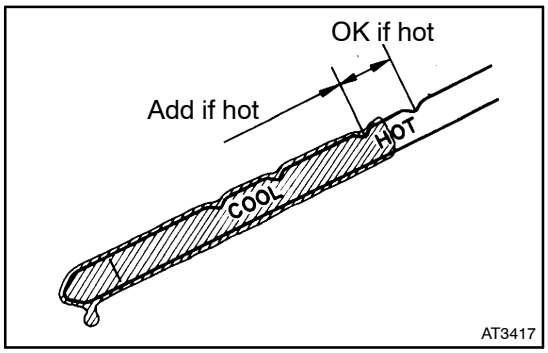
CAUTION:
Before conducting this test ensure that the test area is free from people and obstruction.

(f) 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.

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)

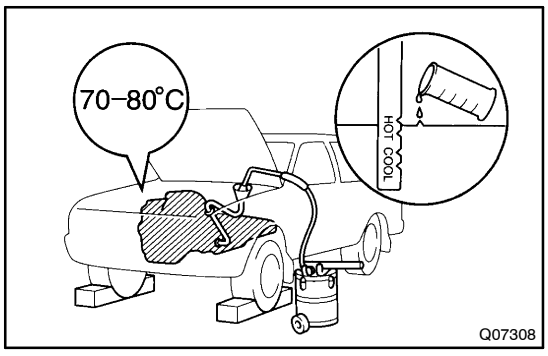


(1) Park the vehicle on a level surface and set the parking brake.
(2) With the engine idling and the brake pedal depressed, shift the shift lever into all ranges from P to L range and return to P range.
(3) Pull out the dipstick and wipe it clean.
(4) Push it back fully into the pipe.
(5) Pull it out and check that the fluid level is in the HOT range.

If the level is not within the range, add new fluid.
Fluid type: TYPE T–IV or equivalent
NOTICE:
Do not overfill.

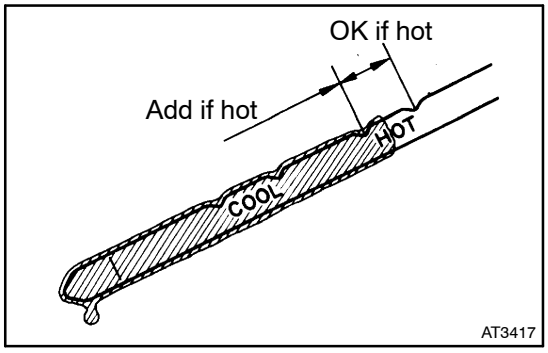
(b) Check the fluid condition.
If the fluid smells burnt or is black, replace it.

(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: TYPE T–IV or equivalent
Capacity: 2.4 liters (2.5 US qts, 2.1 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.

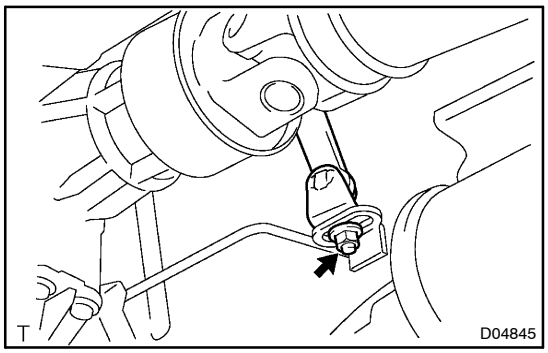
NOTICE:

Do not overfill.

(d) Check the fluid leaks.

Check for leaks in the transmission.

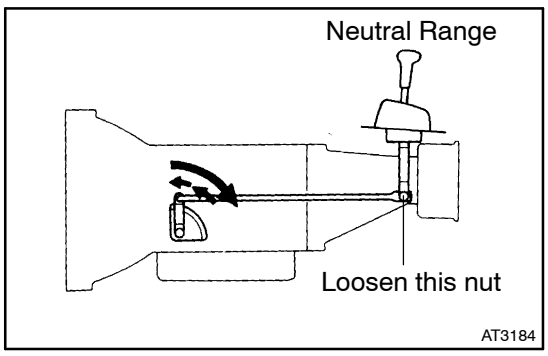
If there are leaks, it is necessary to repair or replace O–rings, gasket, oil seals, plugs or other parts.



(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 aligned with the correct 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.

(2) Push the control shaft fully rearward.

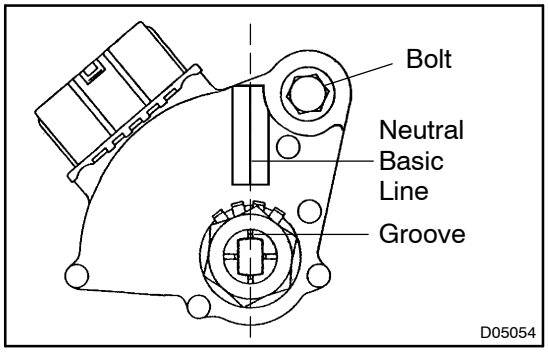
(3) Return the control shaft lever 2 notches to N range.

(4) Set the shift lever to N range.

(5) 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)

(6) 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.

(1) Loosen the neutral start switch bolt and set the shift lever to the N range.
(2) Align the groove with neutral basic line.
(3) Hold the switch in position and tighten the bolt.

Torque: 5.4 N·m (55 kgf·cm, 4 ft·lbf)

For continuity inspection of the neutral start switch, see page DI–204.

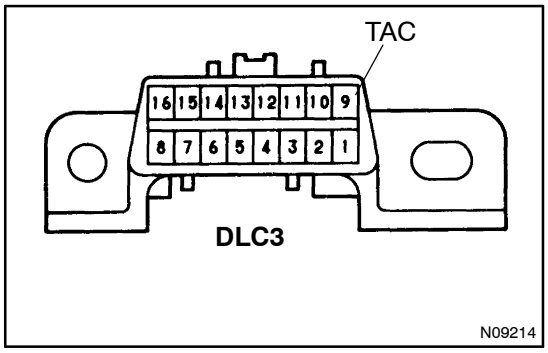
8. MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

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

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.**



(1) Chock the 2 wheels.

(2) Connect a hand–held tester to DLC3 or tachometer to terminal TAC of DLC3 with SST.

SST 09843–18030

(3) Fully apply the parking brake.

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

(5) Start the engine.

(6) Shift into the D range. Depress all the way down on the accelerator pedal with your right foot.
Quickly read the stall speed at this time.

Stall speed: 2,500 ± 150 rpm

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

Stall speed: 2,500 ± 150 rpm

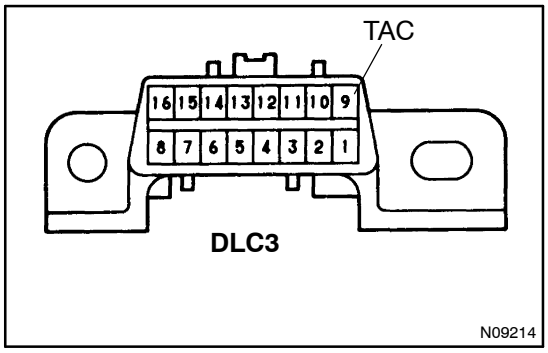
Evaluation:

Problem	Possible cause
(a) Stall speed low in D and R ranges	• 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	• Line pressure too low • Direct clutch slipping • 1st & reverse brake slipping • O/D one–way clutch not operating properly
(d) 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.**



(1) Chock the 2 wheels.
(2) Connect a hand–held tester to DLC3 or tachometer to terminal TAC of DLC3 with SST.
SST 09843–18030
(3) Start engine and check idle speed.
Idle speed (In N range and A/C OFF): 750 ± 50 rpm
(4) 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 • U/D one–way clutch not operating properly

9. HYDRAULIC TEST

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 page AT–28 for the location to connect SST)

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

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

(4) Start the engine and check idling speed.

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

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

(7) Depress 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 test in R range.

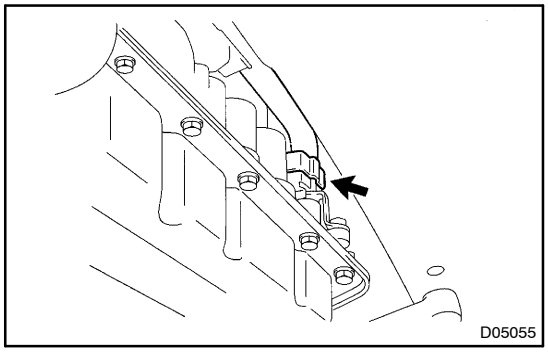
Specified line pressure:

Condition	D range kPa (kgf / cm², psi)	R range kPa (kgf / cm², psi)
Idling	395 – 455 (4.0 – 4.6, 57 – 65)	570 – 650 (5.8 – 6.6, 83 – 94)
Stall	1,150 –1,400 (11.7 – 14.2, 166 – 202)	1,530 – 1,880 (15.6 – 19.2, 222 – 273)

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 defect • Regulator valve detective
If the measured values at all ranges are lower	• SLT solenoid valve defective • Throttle valve defect • 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



10. 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	4th
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 above read test.

If any abnormality is found in the above test, the problem is in the transaxle ifself.

(c) Connect the solenoid wire.

(d) Cancel out DTC.

DI61N–02

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.

Except Europe:

DTC No. (See Page)	Detection Item	Trouble Area	*1 PWR Indicator Light Blink	*2 Memory
P0500/42 (DI–180)	Vehicle Speed Sensor Malfunction (Transmission Output Speed Sensor)	• Open or short in transmission output speed sensor circuit • Transmission output speed sensor • Combination meter • Engine and ECT ECU • Automatic Transmission Assembly	○	○
P0710/38 (DI–183)	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 (DI–185)	Input/Turbine Speed Sensor Circuit Malfunction (Transmission Input Speed Sensor)	• Open or short in transmission input speed sensor circuit • Transmission input speed sensor • Engine and ECT ECU • Automatic Transmission Assembly	○	○
P0753/62 (DI–190)	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 (DI–190)	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	○	○
P1755/68 (DI–198)	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU	X	○
P1760/77 (DI–200)	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	X	○

*1: ”○” mark means PWR indicator light blinks once every 2 seconds.
”X” mark means PWR indicator light never blinks.
*2: ”○” 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.

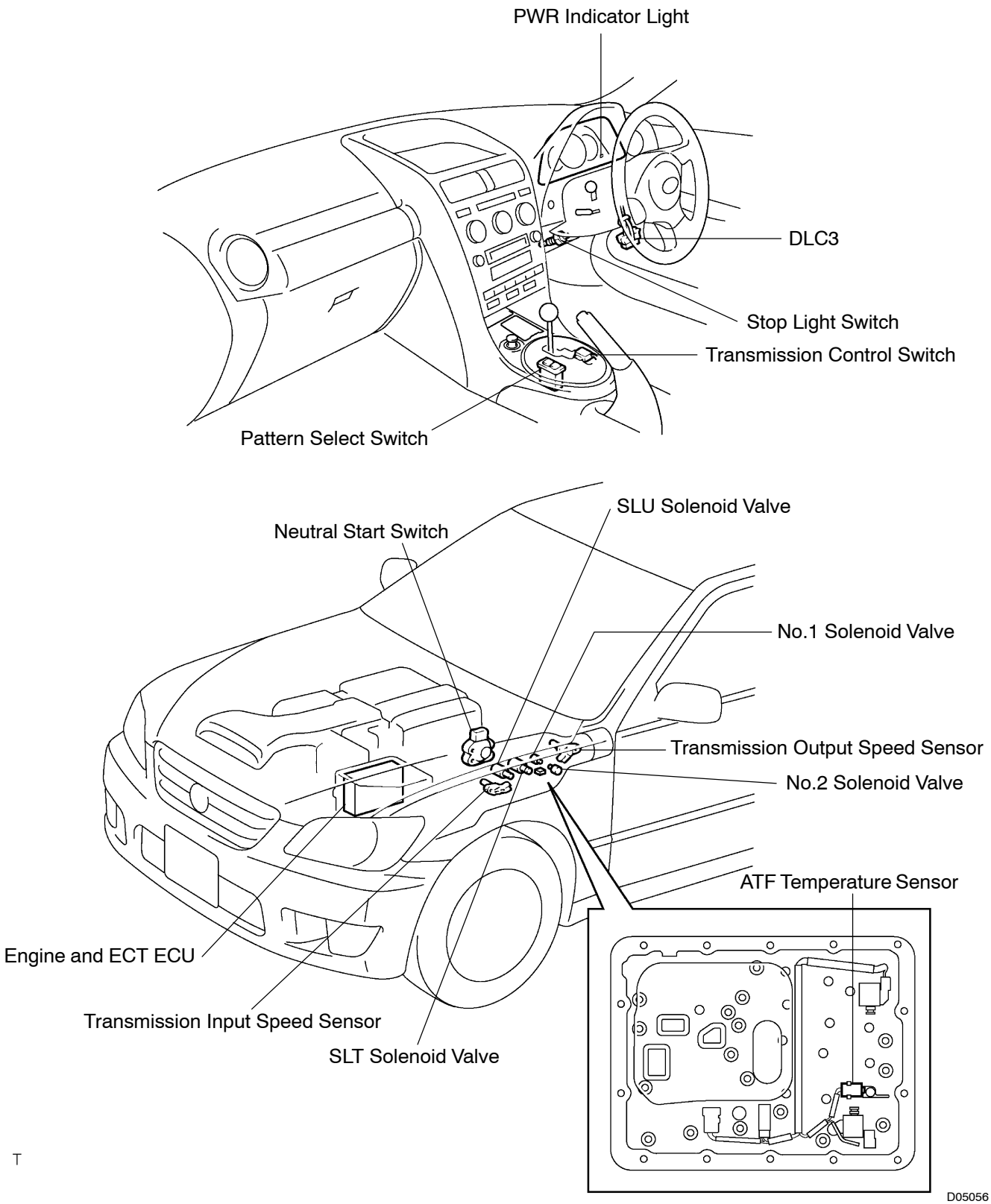
Europe:

DTC No. (See Page)	Detection Item	Trouble Area	Check engine warning light *1	Memory *2
P0500 (DI–180)	Vehicle Speed Sensor Malfunction (Transmission Output Speed Sensor)	• Open or short in transmission output speed sensor circuit • Vehicle speed sensor • Combination meter • Engine and ECT ECU • Automatic transaxle assembly	○	○
P0710 (DI–183)	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • Engine and ECT ECU	○	○
P0750 (DI–188)	Shift Solenoid ”A” Malfunction (No. 1 Solenoid Valve)	• No. 1 solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Automatic transmission assembly	○	○
P0753 (DI–190)	Shift Solenoid ”A” Electrical Malfunction (No. 1 Solenoid Valve)	• Open or short in No. 1 solenoid valve circuit • No. 1 solenoid valve • Engine and ECT ECU	○	○
P0755 (DI–188)	Shift Solenoid ”B” Malfunction (No. 2 Solenoid Valve)	• No. 2 solenoid valve is stuck open or closed • Valve body is blocked up or stuck	○	○
P0758 (DI–190)	Shift Solenoid ”B” Electrical Malfunction (No. 2 Solenoid Valve)	• Open or short in No. 2 solenoid valve circuit • No. 2 solenoid valve • Engine and ECT ECU	○	○
P0770 (DI–194)	Shift Solenoid ”C” Malfunction (SLU Solenoid Valve)	• SLU solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Lock–up clutch • Automatic transmission assembly	○	○
P1520 (DI–197)	Stop Light Switch Circuit	• Open or short in stop light switch circuit • Stop light switch • Engine and ECT ECU	○	○
P1755 (DI–198)	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU	○	○
P1760 (DI–200)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU	○	○
P1780 (DI–203)	Neutral Start Switch Circuit Malfunction	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU	○	○

*1: ”○” mark means Check engine warning light blinks once every 2 seconds.
”X” mark means PWR indicator light never blinks.
*2: ”○” 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.

DI61O–02

PARTS LOCATION

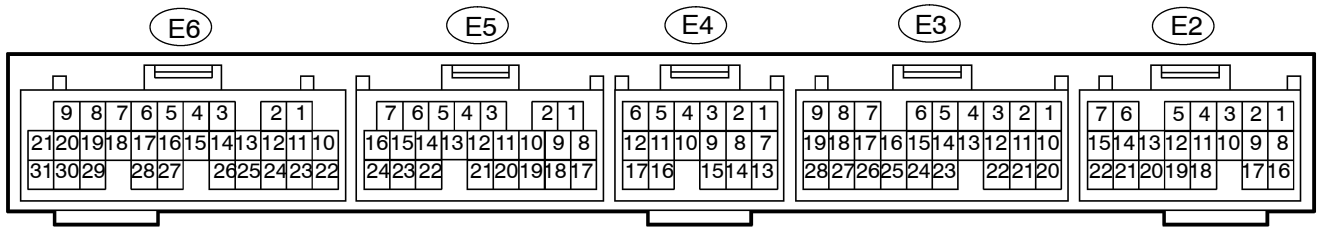


T

DI61P–02

TERMINALS OF ECU

Engine and ECT ECU Terminals



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
OIL – E2 (E4, 17 – E5, 18)	GR ↔ BR	ATF temperature: 115°C (239°F) or more	Below 1.5
S1 – E1 (E4, 1 – E5, 17)	L–Y ↔ BR	IG ON	9.0 – 14
		1st or 2nd gear	9.0 – 14
		3rd or 4th gear	Below 1.5
S2 – E1 (E4, 2 – E5, 17)	G–Y ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	9.0 – 14
		1st or 4th gear	Below 1.5
SLU^+ – SLU^- (E4, 7 – E4, 13)	G–W ↔ L–R	IG ON	Below 3.0
		Moving	Pulse signal is output Below 1.5 ↔ 4 – 6
$SP2^+$ – $SP2^-$ (E4, 5 – E4, 11)	L–Y ↔ R–L	Moving	Pulse signal is output Below 1.5 ↔ 4 – 6
L – E1 (E5, 21 – E5, 17)	Y–G ↔ BR	IG ON and Shift lever L range	9.0 – 14
		IG ON and Shift lever other than L range	Below 1.5
2 – E1 (E5, 20 – E5, 17)	G–W ↔ BR	IG ON and Shift lever 2 range	9.0 – 14
		IG ON and Shift lever other than 2 range	Below 1.5
D – E1 (E3, 11 – E5, 17)	GR–B ↔ BR	IG ON and Shift lever D range	9.0 – 14
		IG ON and Shift lever other than D range	Below 1.5
R – E1 (E5, 19 – E5, 17)	R–B ↔ BR	IG ON and Shift lever R range	9.0 – 14
		IG ON and Shift lever other than R range	Below 1.5
N – E1 (E6, 24 – E5, 17)	G–R ↔ BR	IG ON and Shift lever N range	9.0 – 14
		IG ON and Shift lever other than N range	Below 1.5
P – E1 (E5, 10 – E5, 17)	G ↔ BR	IG ON and Shift lever P range	9.0 – 14
		IG ON and Shift lever other than P range	Below 1.5
STP – E1 (E3, 6 – E5, 17)	G–W ↔ BR	IG ON and Brake pedal is depressed	7.5 ~ 14
		IG ON and Brake pedal is released	Below 1.5

DI61Q–02

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 trouble-shooting.

The Matrix Chart is divided into 3 chapters.

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 and replace the Engine and ECT ECU.

CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

Symptom	Suspect Area	See page
No up–shift (A particular gear, from 1st to 3rd gear, is not –up shifted)	Engine and ECT ECU	IN–32
No up–shift (3rd → 4th)	1. Transmission control switch 2. Engine and ECT ECU	DI–217 IN–32
No down–shift (4th → 3rd)	1. Transmission control switch 2. Engine and ECT ECU	DI–217 IN–32
No down–shift (A particular gear, from 1st to 3rd gear, is not –down shifted)	Engine and ECT ECU	IN–32
No lock–up	1. Stop light switch signal circuit 2. Engine and ECT ECU	DI–209 IN–32
No lock–up off	Engine and ECT ECU	IN–32
Shift point too high or too low	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–212 IN–32
Up–shift to 4th from 3rd while engine is cold	Engine and ECT ECU	IN–32
No kick–down	1. Kick–down switch circuit 2. Engine and ECT ECU	DI–214 IN–32
Engine stalls when starting off or stopping	1. Stop light switch signal circuit 2. Engine and ECT ECU	DI–209 IN–32
No pattern select	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–212 IN–32
No 2nd start	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–212 IN–32

CHAPTER 2: ON–VEHICLE REPAIR
(★: A45DE AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM690E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Transmission control rod 2. Manual valve 3. Off–vehicle repair matrix chart	DI–156 ★ –
Vehicle does not move in R range	1. Reverse control valve 2. 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 → 4th)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (4th → 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 signal valve 2. Lock–up control valve 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (N → D)	1. Accumulator control valve 2. C_1 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (Lock–up)	Off–vehicle repair matrix chart	–
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (N → L)	1. Accumulator control valve 2. C_1 accumulator 3. C_2 accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (1st → 2nd / D range)	1. Accumulator control valve 2. B_1 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (1st → 2nd / 2 range)	1. Accumulator control valve 2. B_2 accumulator 3. C_1 accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (1st → 2nd → 3rd → 4th)	1. Accumulator control valve 2. Check ball 3. Throttle valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. C_2 accumulator 3. 2–3 shift timing valve 4. Off–vehicle repair matrix chart	★ ★ ★ –

Harsh engagement (3rd → 4th)	1. Accumulator control valve 2. B_0 accumulator 3. Check ball 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (4th → 3rd)	1. Accumulator control valve 2. B_0 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Off–vehicle repair matrix chart	DI–156 ★ –
Slip or shudder (Particular range)	1. Transmission control rod 2. Off–vehicle repair matrix chart	DI–156 –
No engine braking (1st / L range)	1. Low coast modulator valve 2. Modulator valve 3. Off–vehicle repair matrix chart	★ ★ –
No engine braking (2nd / 2 range)	Off–vehicle repair matrix chart	–
No kick–down	1. 1–2 shift valve 2. 2–3 shift valve 3. 3–4 shift valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Poor acceleration	1. C_0 exhaust valve 2. Off–vehicle repair matrix chart	★ –
Engine stall when starting off or stopping	Off–vehicle repair matrix chart	–

CHAPTER 3: OFF–VEHICLE REPAIR
(★: A45DE AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM690E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Torque converter 2. Oil pump 3. O/D direct clutch (C_0) 4. Front clutch (C_1) 5. Rear clutch (C_2) 6. O/D one–way clutch (F_0) 7. O/D planetary gear unit	AT–33 ★ ★ ★ ★ ★ ★
Vehicle does not move in R range	1. O/D direct clutch (C_0) 2. Rear clutch (C_2) 3. 1st & reverse brake (B_3)	★ ★ ★
Vehicle does not move in D, 2 and 1 ranges	1. O/D direct clutch (C_0) 2. Front clutch (C_1)	★ ★
Vehicle does not move in D, 2 ranges	Front clutch (C_1)	★
Vehicle does not move in 2 range	2nd brake (B_2)	★
Vehicle does not move in 1 range	1st & reverse brake (B_3)	★
No up–shift (1st → 2nd)	1. O/D direct clutch (C_0) 2. 2nd brake (B_2)	★ ★
No up–shift (2nd → 3rd)	Direct clutch (C_2)	★
No up–shift (3rd → 4th)	1. O/D brake (B_0) 2. O/D direct clutch (C_0) 3. O/D one–way clutch (F_0)	★ ★ ★
No down–shift (2nd → 1st)	1. 2nd brake (B_2) 2. 1st & reverse brake (B_3) 3. No.1 one–way clutch (F_1)	★ ★ ★
No lock–up or No lock–up off	Torque converter	AT–33
Harsh engagement (N → D)	1. Front clutch (C_1) 2. No.1 one–way clutch (F_1)	★ ★
Harsh engagement (N → R)	1. Rear clutch (C_2) 2. 1st & reverse brake (B_3)	★ ★
Harsh engagement (2nd → 3rd)	1. O/D direct clutch (C_0) 2. Rear clutch (C_2)	★ ★
Harsh engagement (3rd → 4th)	O/D brake (B_0)	★
Harsh engagement (4th → 3rd)	1. O/D brake (B_0) 2. O/D one–way clutch (F_0)	★ ★
Harsh engagement (Lock–up)	Torque converter	AT–33
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 (Forward and reverse / Just after engine starts)	Torque converter	AT–33
Slip or shudder (R range)	1. 2nd brake (B_2) 2. Rear clutch (C_2)	★ ★
Slip or shudder (1st)	1. 1st & reverse brake (B_3) 2. No. 1 one–way clutch (F_1)	★ ★
Slip or shudder (2nd)	1. 2nd brake (B_2) 2. Front clutch (C_1)	★ ★
Slip or shudder (3rd)	1. Front clutch (C_1) 2. Rear clutch (C_2)	★ ★

Slip or shudder (4th)	1. O/D brake (B_0) 2. Front clutch (C_1) 3. Rear clutch (C_2)	★ ★ ★
No engine braking (1st – 3rd: D range)	1. O/D direct clutch (C_0) 2. O/D one–way (F_0)	★ ★
No engine braking (1st: L range)	1st & reverse brake (B_3)	★
No engine braking (2nd: 2 range)	O/D direct clutch (C_1)	★
Poor acceleration (All range)	Torque converter	AT–33
Poor acceleration (4th)	1. O/D direct clutch (C_0) 2. O/D planetary gear unit	★ ★
Poor acceleration (other than 4th)	O/D brake (B_0)	★
Poor acceleration (other than 2nd)	2nd brake (B_2)	★
Poor acceleration (1st and 2nd)	Direct clutch (C_2)	★
Poor acceleration (L and R ranges)	1. 1st & reverse brake (B_3) 2. O/D brake (B_0) 3. Rear clutch (C_2)	★ ★ ★
Poor acceleration (R range)	Forward clutch (C_1)	★
Engine stalls when starting off or stopping	Torque converter	AT–33

DI61R–02

CIRCUIT INSPECTION

DTC	P0500/42	Vehicle Speed Sensor Malfunction (Transmission Output Speed Sensor)

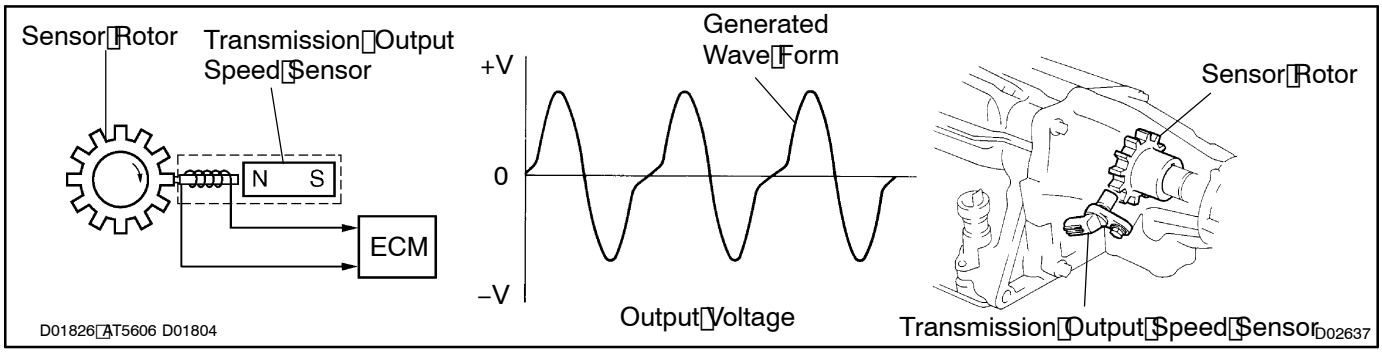
CIRCUIT DESCRIPTION

The transmission output speed sensor detects the rotation speed of the transmission output shaft and sends signals to the Engine and ECT ECU. The Engine and ECT ECU determines the vehicle speed based on these signals.

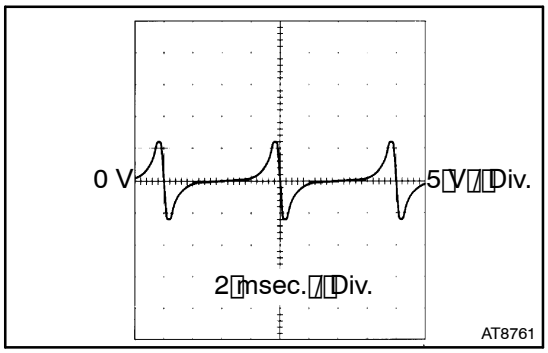
An AC voltage is generated in the transmission output speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the Engine and ECT ECU.

The gear shift point and lock–up timing are controlled by the Engine and ECT ECU based on the signals from this transmission output speed sensor and the throttle position sensor signal.

If the vehicle speed sensor malfunctions, the Engine and ECT ECU uses input signals from the transmission input speed sensor as a back–up signal.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	All conditions below are detected 8 secs. or more. (1–trip detection logic) (a) No signal from transmission output speed sensor are input to Engine and ECT ECU. (b) Neutral start switch: OFF (Other than P or N)	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine and ECT ECU • Automatic transmission (clutch, brake or gear etc.)
	Clutch or brake slips or gear is broken	



HINT:

Refer to the chart for the wave form between terminals $SP2^{+}$ and $SP2^{-}$ when vehicle speed is approx. 60 km/h (37 mph).

WIRING DIAGRAM

See page DI–91.

INSPECTION PROCEDURE

1	Check operation of speedometer.

PREPARATION:

(a) Connect hand–held tester to DLC3.

(b) Start engine and hand–held tester main switch ON.

CHECK:

HINT:

Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

OK:

Vehicle speed matches tester speed value.

OK → Check and replace Engine and ECT ECU (See page IN–32).

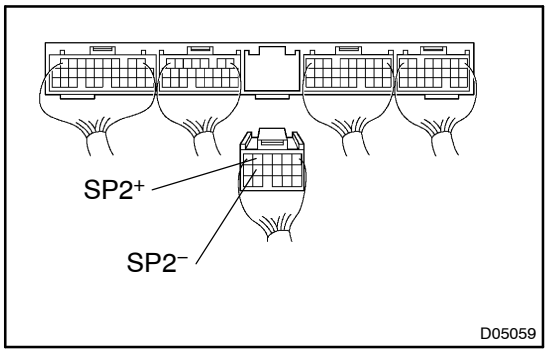
NG

2	Check speedometer circuit (See page BE–83).

NG → Repair or replace speedometer circuit.

OK

3	Check resistance between terminals SP2+ and SP2– of Engine and ECT ECU.



PREPARATION:

Disconnect the connector from Engine and ECT ECU.

CHECK:

Check resistance between terminals SP2+ and SP2– of Engine and ECT ECU.

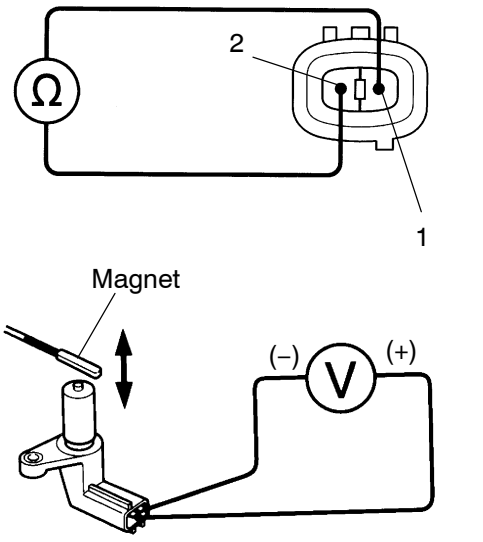
OK:

Resistance: 560 – 680 Ω at 20°C (68°F)

OK → Check and replace the Engine and ECT ECU (See page IN–32).

NG

4	Check transmission output speed sensor.



Q08285
Q08292 D01709

PREPARATION:

Remove the transmission output speed sensor from the transmission.

CHECK:

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

(b) Check voltage between terminals 1 and 2 of transmission output speed sensor when a magnet is put close to the front end of the transmission output speed sensor then taken away quickly.

OK:

(a) Resistance: 560 – 680 Ω at 20°C (68°F)

(b) Voltage is generated intermittently.

HINT:

The generated voltage is extremely low.

NG → **Replace the transmission output speed sensor.**

OK

Check and repair the harness and connector between Engine and ECT ECU and transmission output speed sensor (See page IN–32).

DI61S–02

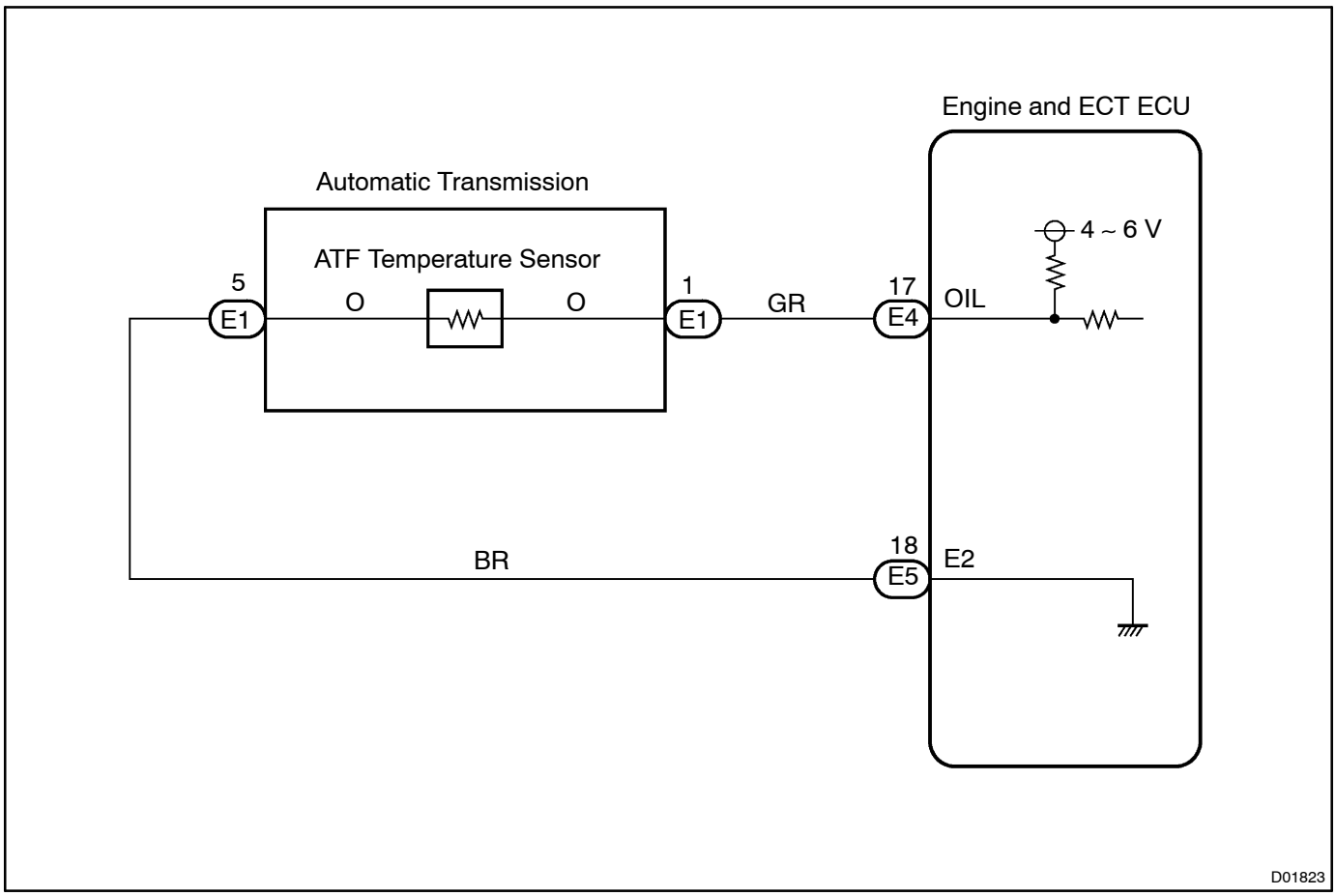
DTC	P0710/38	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the Engine and ECT ECU.

DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either (a) or (b) is detected for 0.5 sec. or more. (a) Temp. sensor resistance is less than 79 Ω (b) After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	• Open or short in ATF temp. sensor circuit • ATF temp. sensor • Engine and ECT ECU

WIRING DIAGRAM



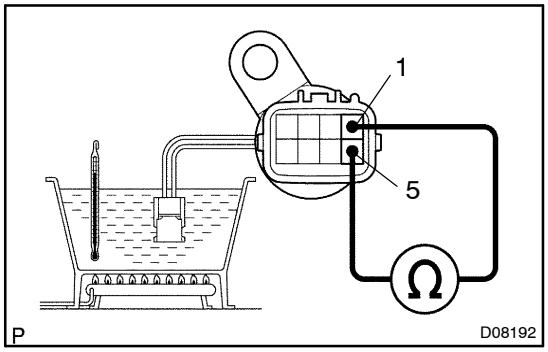
INSPECTION PROCEDURE

1	Check harness and connector between ATF temperature sensor and Engine and ECT ECU (See page IN–32).

NG → Repair or replace the harness or connector.

OK

2	Check ATF Temperature Sensor.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the solenoid wiring.

Remove the ATF temperature sensor.

CHECK:

Measure resistance between terminals 1 and 5 of solenoid wiring connector at 10°C (50°F) and 110°C (230°F).

OK:

Resistance:

10°C (50°F): 6.5 kΩ

110°C (230°F): 200 – 300 Ω

NG → Replace solenoid wiring.

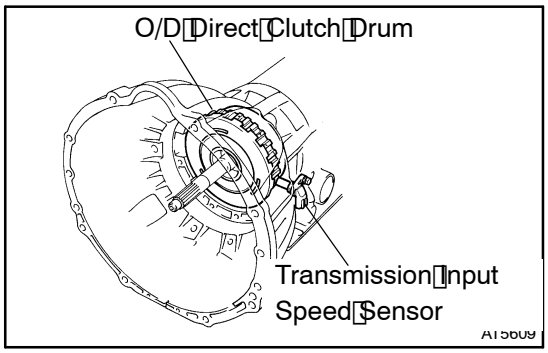
OK

Check and replace the Engine and ECT ECU (See page IN–32).

DI61T–02

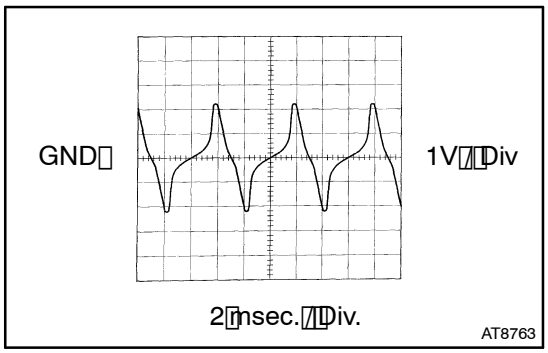
DTC	P0715/67	Input/Turbine Speed Sensor Circuit Malfunction (Transmission Input Speed Sensor)

CIRCUIT DESCRIPTION



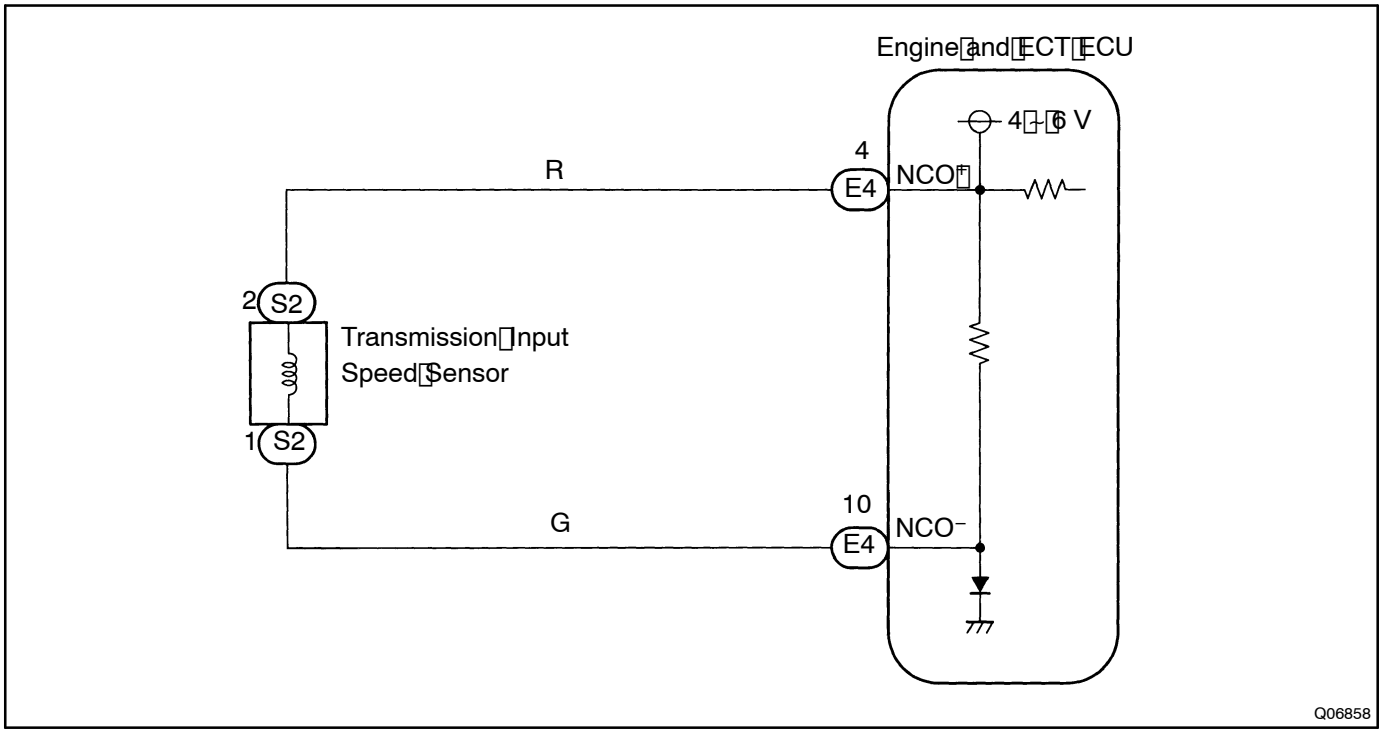
This sensor detects the rotation speed of the O/D input shaft from the rotation of the O/D direct clutch drum.
Its construction is the same as that of the transmission output speed sensor (See page DI–180).
By comparing the O/D direct clutch speed signal to the transmission output speed sensor signal, the Engine and ECT ECU detects the shift timing of the gear and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus performing smooth gear shift.

DTC No.	DTC Detection Condition	Trouble Area
P0715	All conditions below are detected for 5 secs. or more (1–trip detection logic) (a) Gear change not being performed (b) Gear position: 1st, 2nd or 3rd (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Park/neutral position switch: OFF (f) No. 1, No. 2, SLU solenoid valves and transmission output speed sensor are in normal operation	• Open or short in transmission input speed sensor circuit • Transmission input speed sensor • Engine and ECT ECU



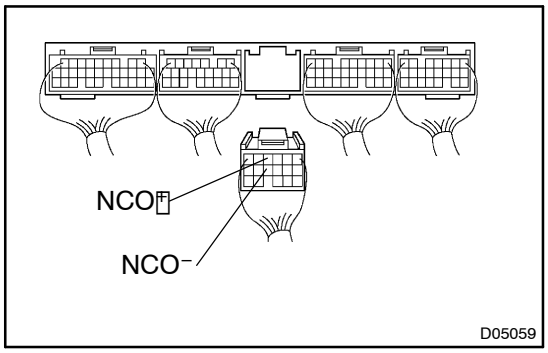
HINT:
Refer to the chart for the wave form between terminals NCO^{+} and NCO^{-} during engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check resistance between terminals NCO+ and NCO– of Engine and ECT ECU.

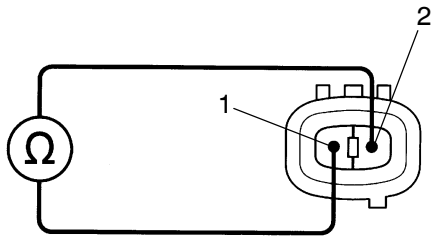


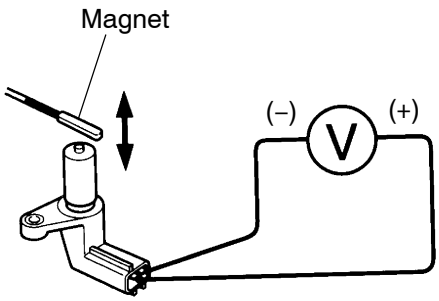
PREPARATION:
Disconnect the connector from Engine and ECT ECU.
CHECK:
Check resistance between terminals NCO+ and NCO– of Engine and ECT ECU.
OK:
Resistance: 560 – 680 Ω at 20°C (68°F)

OK	Check and replace the Engine and ECT ECU (See page IN–32).

NG

2	Check transmission input speed sensor.





Q08285
Q08292 D01709

PREPARATION:

Remove the transmission input speed sensor from the transmission.

CHECK:

(a) Measure resistance between terminals 1 and 2 of transmission input speed sensor.

(b) Check voltage between terminals 1 and 2 of the speed sensor when a magnet is put close to the front end of the speed sensor then kept away quickly.

OK:

(a) Resistance: 560 – 680 Ω at 20°C (68°F)

(b) Voltage is generated intermittently.

HINT:

The generated voltage is extremely low.

NG → **Replace the transmission input speed sensor.**

OK

Check and repair harness and connector between Engine and ECT ECU and transmission input speed sensor (See page IN–32).

DI7YN–01

DTC	P0750	Shift Solenoid ”A” Malfunction (No. 1 Solenoid Valve)

DTC	P0755	Shift Solenoid ”B” Malfunction (No. 2 Solenoid Valve)

SYSTEM DESCRIPTION

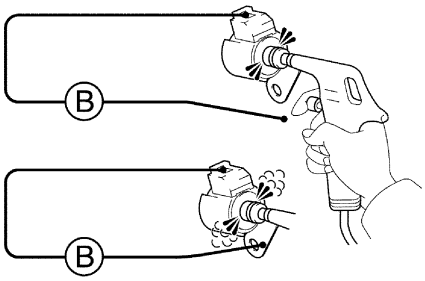
The Engine and ECT ECU uses signals from the vehicle speed sensor and input / turbine speed sensor to detect the actual gear position (1st, 2nd, 3rd or 4th gear). The Engine and ECT ECU then compares the actual gear with the shift schedule in the Engine and ECT ECU memory to detect mechanical trouble of the shift solenoid valves, valve body and automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the Engine and ECT ECU 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 • Automatic transmission assembly

Check the shift solenoid valve No.1 when DTC P0750 is output and check shift solenoid valve No.2 when DTC P0755 is output.

INSPECTION PROCEDURE

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



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the No. 1 or No. 2 solenoid valve.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valves do not leak air.
(b) When battery positive voltage is supplied to the solenoid valves, check that the solenoid valves are open.

OK:

(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

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

OK

2	Check valve body (See page DI–175).

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

OK

Replace the transmission (See page AT–28).

DI61U–02

DTC	P0753/62,P0758/63	Shift Solenoid A/B Electrical Malfunction (No.1 /No.2 Solenoid Valve)

CIRCUIT DESCRIPTION

Shifting from 1st to 4th is done in combination with ON and OFF of the No. 1 and No. 2 solenoid valves controlled by Engine and ECT ECU. If an open or short circuit occurs in either of the shift solenoid valves, the Engine and ECT ECU controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

Position	NORMAL			NO.1 SOLENOID MALFUNCTIONING			NO.2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS VALVE 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	4th
	ON	ON	2nd	X	ON	3rd	OFF	X	4th	4th
	OFF	ON	3rd	X	ON	3rd	OFF	X	4th	4th
	OFF	OFF	4th	X	OFF	4th	OFF	X	4th	4th
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

HINT:

Check the No.1 solenoid valve when DTC P0753/62 is output and check the No.2 solenoid valve when DTC P0758/63 is output.

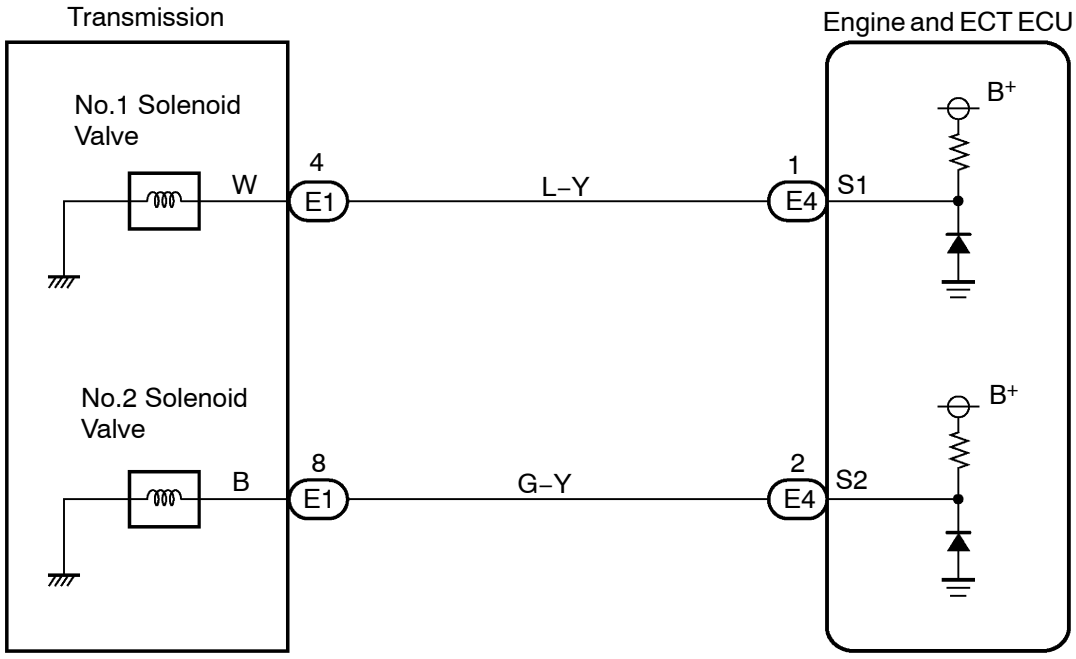
DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The Engine and ECT ECU checks for an open or short circuit in the No.1 and No.2 solenoid valve circuit when it changes gear positions. The Engine and ECT ECU records DTC P0753/62 or P0758/63 if condition (a) or (b) is detected once, but it does not light up PWR indicator light. After Engine and ECT ECU detects condition (a) or (b) continuously 2 times or more in 1–trip, it causes the PWR indicator light to light up until condition (a) or (b) disappears. After that, if the Engine and ECT ECU detects condition (a) or (b) once, it starts lighting up PWR indicator light again. (a) Solenoid resistance is 8 Ω or less (short circuit) when the solenoid is energized. (b) Solenoid resistance is 100 kΩ or more (open circuit) when the solenoid is not energized.	• Open or short in No.1/No.2 solenoid valve circuit • No.1/No.2 solenoid valve • Engine and ECT ECU

Fail Safe Function

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

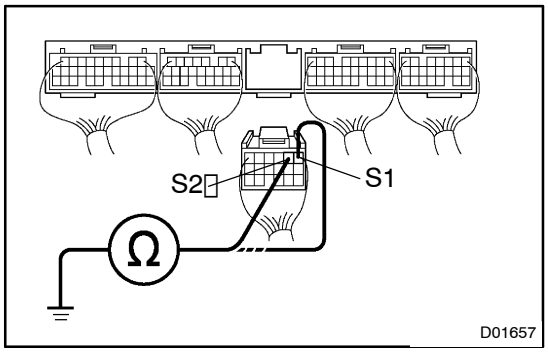
Manual shifting as shown in the above table must be done (In the case of a short circuit, the Engine and ECT ECU stops sending current to the short circuited solenoid).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal S1 or S2 of Engine and ECT ECU and body ground.**



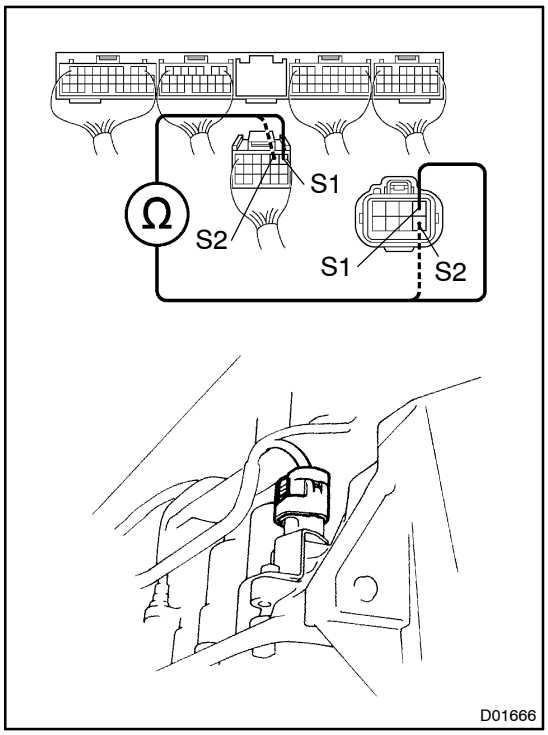
PREPARATION:
Disconnect the connector from Engine and ECT ECU.
CHECK:
Measure resistance between terminal S1 or S2 of Engine and ECT ECU and body ground.
OK:

Resistance: 11 – 15 Ω at 20°C (68°F)

OK	**Check and replace the Engine and ECT ECU (See page IN–32).**

NG

2	**Check harness and connector between Engine and ECT ECU and automatic transmission solenoid connector.**



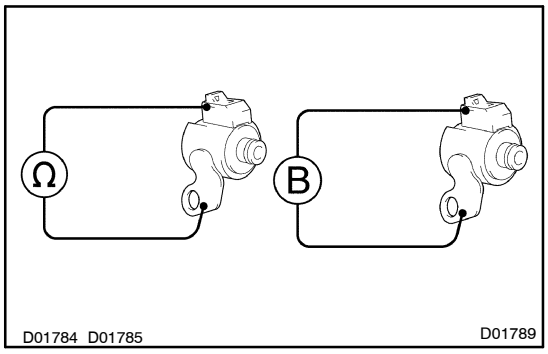
PREPARATION:
(a) Disconnect the connector from Engine and ECT ECU.
(b) Disconnect the solenoid connector from the automatic transmission.
CHECK:
Check the harness and connector between terminal S1 or S2 of Engine and ECT ECU and terminal S1 or S2 of solenoid connector.
OK:

There is no open and short circuit.

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

OK

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



Electrical Check:

PREPARATION:

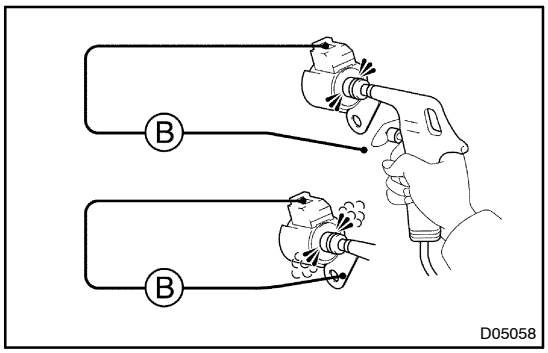
(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the No.1 or No.2 solenoid valve.

CHECK:

(a) Measure resistance between solenoid connector and body ground.
(b) Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

(a) Resistance: 11 – 15 Ω at 20 °C (68 °F)
(b) The solenoid makes an operating noise.



Mechanical Check:

PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the No.1 or No.2 solenoid valve.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valves do not leak air.
(b) When battery positive voltage is supplied to the solenoid valves, check that the solenoid valves open.

OK:

(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

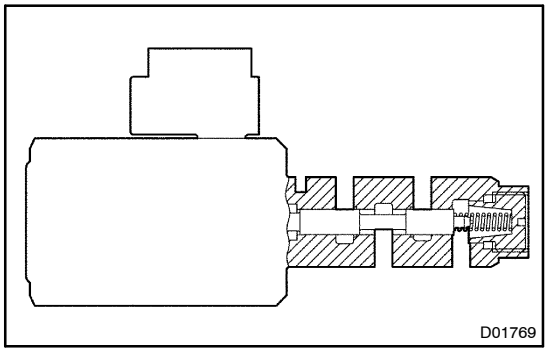
NG → **Replace the solenoid valve.**

OK

Repair or replace the solenoid wire.

DI7YO–01

DTC	P0770	Shift Solenoid ”C” Malfunction (SLU Solenoid Valve)



SYSTEM DESCRIPTION

The Engine and ECT ECU uses the signals from the Throttle Position Sensor and Air–flow Meter to monitor the engagement condition of the lock–up clutch.

Then the Engine and ECT ECU compares the engagement condition of the lock–up clutch with the lock–up schedule in the Engine and ECT ECU memory to detect mechanical trouble of the SLU solenoid valve, valve body, torque converter clutch and automatic transmission assembly (clutch, brake or gear etc.).

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)	• SLU solenoid valve is stuck open or closed • Valve body blocked up or stuck • Lock–up clutch • Automatic transmission assembly

INSPECTION PROCEDURE

HINT:

In case of using hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Active test.**

PREPARATION:

(a) Remove the DLC3 cover.
(b) Connect the hand–held tester.
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Using active test, check the lock–shift operation.

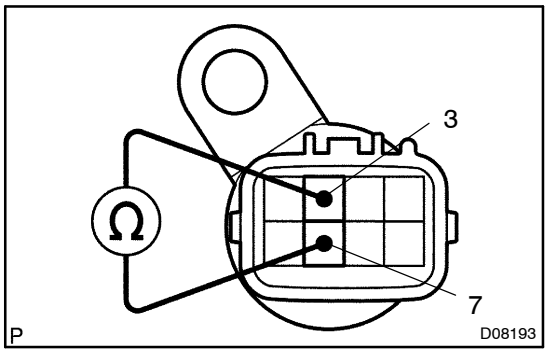
OK:

Lock–up ON

NG → **Replace the torque converter clutch.**

OK

2	Check SLU solenoid valve resistance.

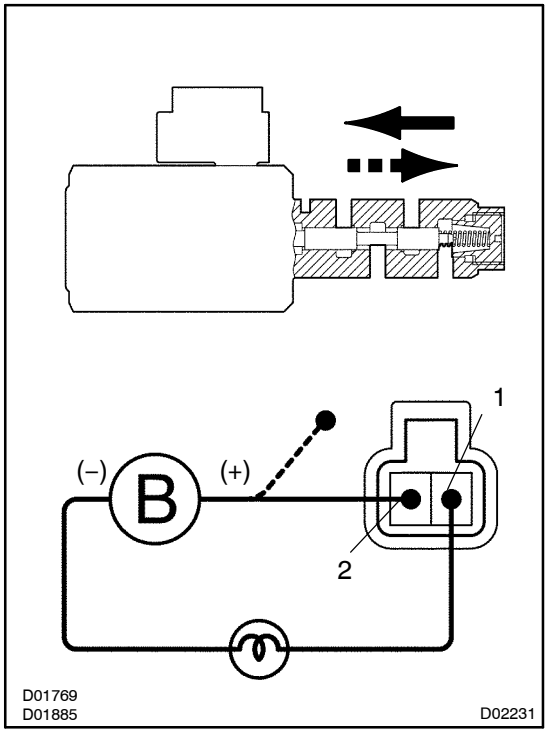


PREPARATION:
Disconnect the solenoid wire connector.
CHECK:
Measure the resistance between terminals 3 and 7 of solenoid connector.
OK:
Resistance: 5.0 ~ 5.6 Ω at 20 °C (68 °F)

NG → **Replace the SLU solenoid valve.**

OK

3	Check SLU solenoid valve operation.



PREPARATION:
(a) Remove the oil pan.
(b) Remove the SLU solenoid valve.
CHECK:
Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
OK:

When B^+ is applied.	Valve moves in ➡ direction in illustration on the left.
When B^+ is cut off.	Valve moves in ⬅ direction in illustration on the left.

NG → **Replace the SLU solenoid valve.**

OK

4	Check valve body.

NG → Repair or replace the valve body.

OK

Replace the torque converter clutch (See page AT–32).

DI7YP–01

DTC	P1520	Stop Light Switch Signal Malfunction

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling, while driving in lock–up condition, when brakes are suddenly applied.
When the brake pedal is depressed, this switch sends a signal to Engine and ECT ECU. Then the Engine and ECT ECU 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 • Engine and ECT ECU

WIRING DIAGRAM

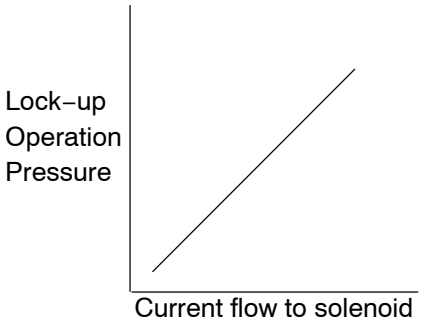
See page DI–209.

INSPECTION PROCEDURE

See page DI–209.

DI61V–02

DTC	P1755/68	Liner Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)

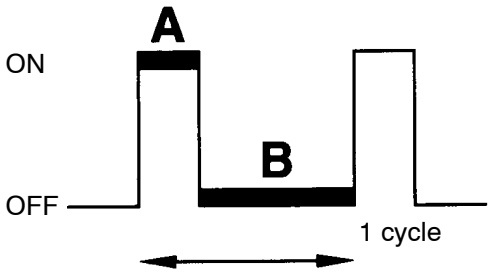


CIRCUIT DESCRIPTION

The amount of current flow to the solenoid is controlled by the (*) duty ratio of the Engine and ECT ECU output signal. The higher the duty ratio becomes, the higher the lock–up hydraulic pressure becomes during the lock–up operation.

(*) Duty Ratio

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



BE4056

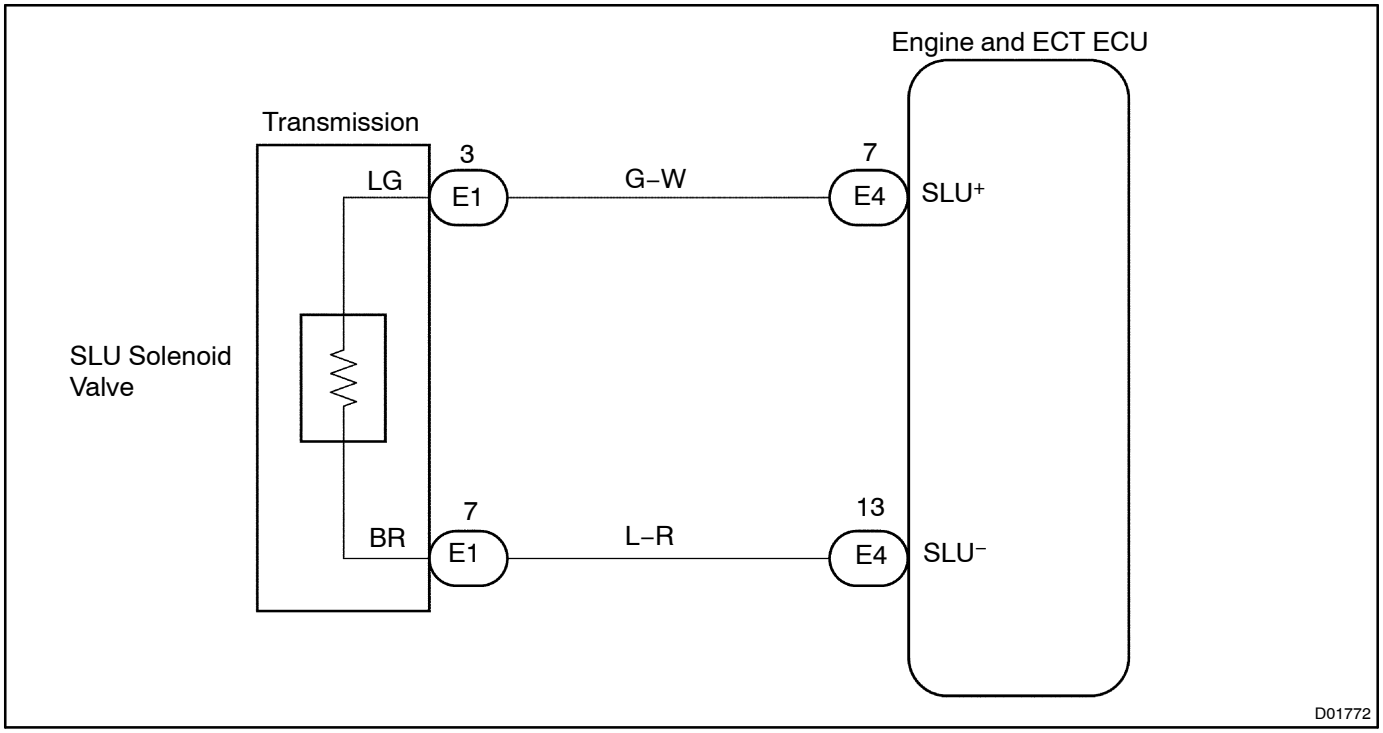
(*)

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

D00160

DTC No.	DTC detection condition	Trouble Area
P1755/68	The following condition is detected. Signal output from SLU is ON for 3.3 msecs. or more and duty ratio is at least 95 % for 1 second.	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU • Automatic transmission assembly

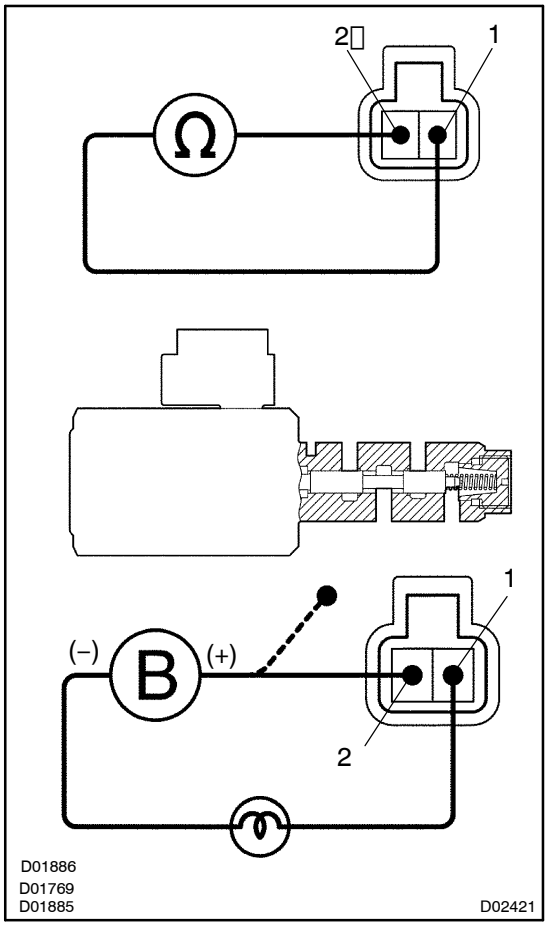
WIRING DIAGRAM



D01772

INSPECTION PROCEDURE

1	Check SLU solenoid valve.



PREPARATION:

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

CHECK:

Measure the resistance between terminals 1 and 2.

OK:

5.0 – 5.6 Ω at 20°C (68°F)

Check solenoid operation:

PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Remove the SLU solenoid valve.

CHECK:

Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 1.

OK:

When B^+ is applied.	Valve moves in ➡ direction in the illustration.
When B^+ is cut off.	Valve moves in ⬅ direction in the illustration.

NG → **Replace SLU solenoid valve.**

OK →

2	Check harness and connector between SLU solenoid valve and Engine and ECT ECU (See page IN–32).

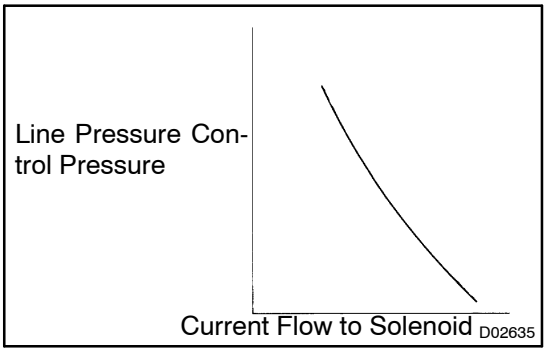
NG → **Repair or replace the harness or connector.**

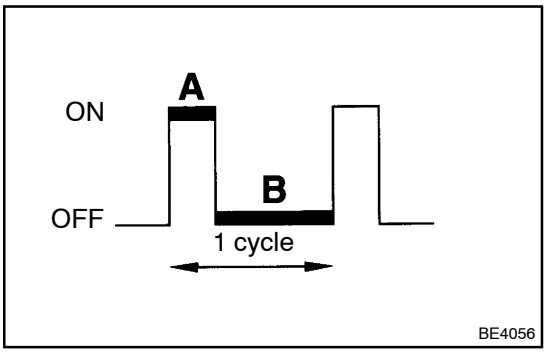
OK →

Check and replace the Engine and ECT ECU (See page IN–32).

DI61W–02

DTC	P1760/77	Linear Solenoid for Line Pressure Control Circuit malfunction (SLT Solenoid Valve)



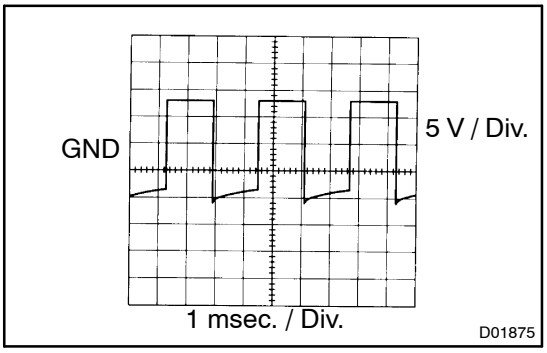


CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the SLT solenoid valve, under electronic control, to precisely and minutely modulates and generates line pressure according to the accelerator pedal effort, or engine power output detected.
This reduces the function of line pressure and provides smooth shifting characteristics.
Upon receiving the throttle valve opening angle signal, Engine and ECT ECU controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure, generating throttle pressure.
(*) Duty Ratio
The duty ratio is the ratio of the period of continuity in one cycle.
For example, if A is the period of continuity in one cycle, and B is the period of non–continuity, then

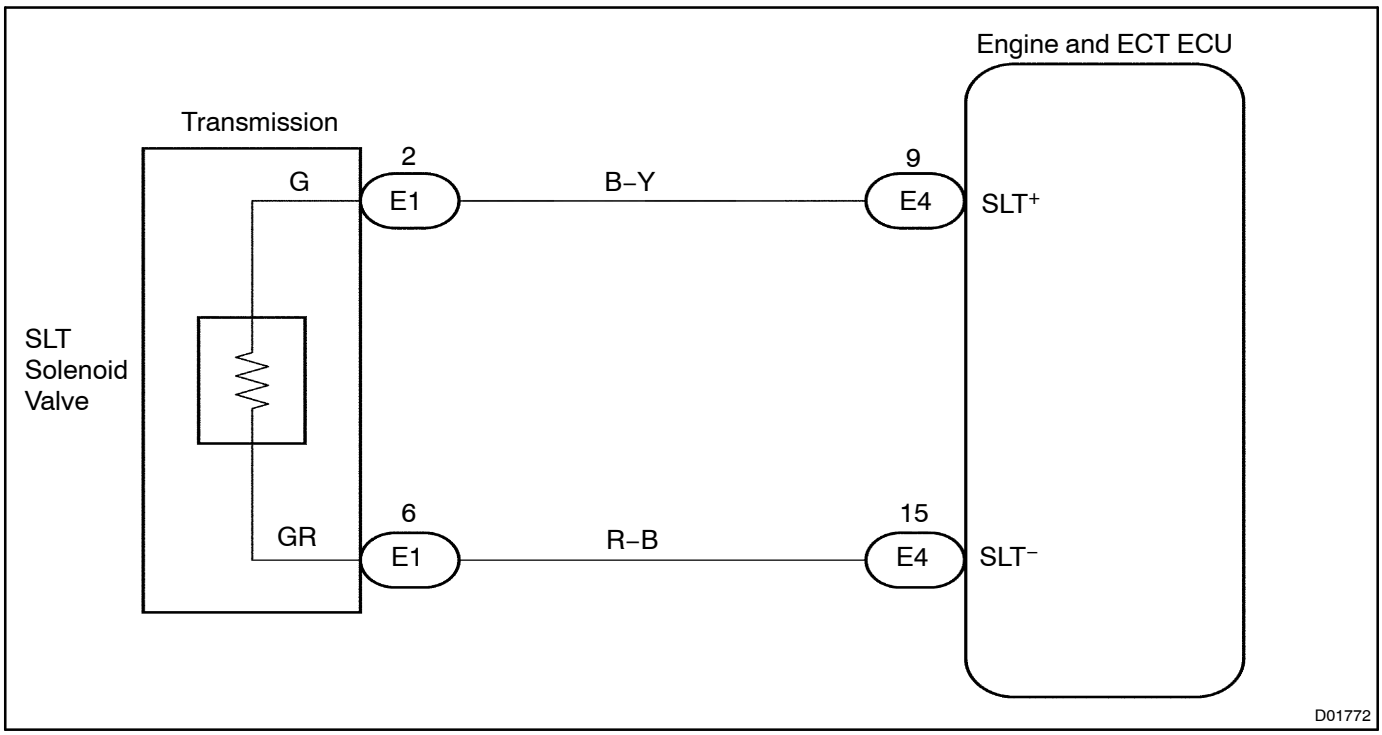
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

DTC No.	DTC Detecting Condition	Trouble Area
P1760/77	(a) or (b) condition below is detected for 1 second or more. (a) SLT⁻ terminal: 0V (b) SLT⁻ terminal: 12V	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU



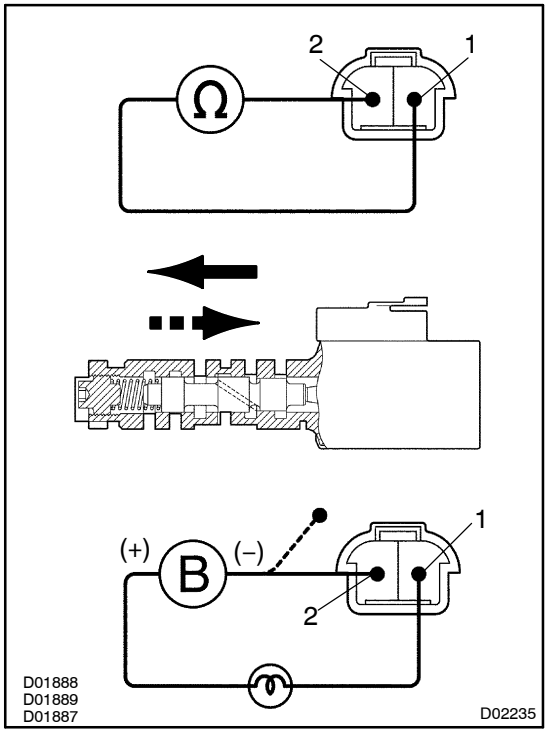
HINT:
Refer to the chart for the wave form between terminals SLT⁺ and SLT⁻ during engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check SLT solenoid valve.**



PREPARATION:

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

Check solenoid resistance:

CHECK:

Measure resistance between terminals 1 and 2 of solenoid connector.

OK:

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

Check solenoid operation:

CHECK:

Connect positive (+) lead with an 8 – 10 W bulb to terminal 1 of solenoid connector and negative (–) lead to terminal 2, then check the movement of the valve.

OK:

When battery positive voltage is applied.	Valve moves in ← direction in the illustration.
When battery positive voltage is cut off.	Valve moves in ■ ■ → direction in the illustration.

NG → **Replace SLT solenoid valve.**

OK

2	**Check harness and connector between SLT solenoid valve and Engine and ECT ECU (See page IN–32).**

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

OK

Check and replace Engine and ECT ECU (See page IN–32).

DI7YQ–01

DTC	P1780	Neutral Start Switch Circuit

CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever position and sends signals to the Engine and ECT ECU. The Engine and ECT ECU receives signals (NSW, R, 2 and L) from the neutral start switch. When the signal is not sent to the Engine and ECT ECU from the neutral start switch, the Engine and ECT ECU judges that the shift lever is in D range.

DTC No.	DTC Detection Condition	Trouble Area
P1780	2 or more switches are ON simultaneously (for R, N, 2 and L ranges. (2–trip detection logic)	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU
	When driving under conditions (a) and (b) for 30 seconds or more, the neutral start switch is OFF (N range). (2–trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 ~ 2,500 rpm	

WIRING DIAGRAM

See page DI–204.

INSPECTION PROCEDURE

See page DI–204.

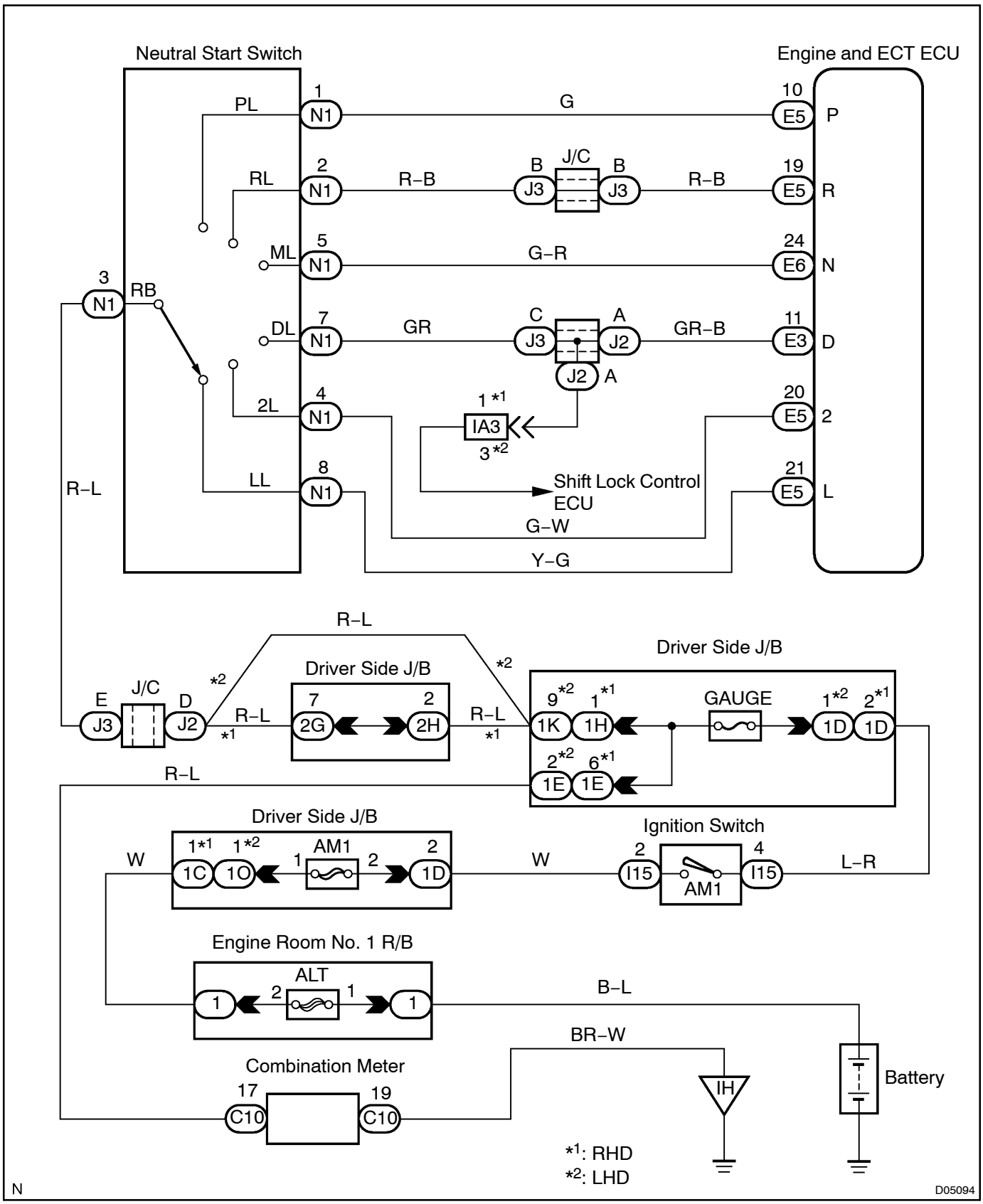
DI61X–02

Neutral Start Switch Circuit Malfunction

CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever range and sends signals to the Engine and ECT ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Read PNP, REVERSE, DRIVE, 2ND and LOW signals.**

PREPARATION:
(a) Remove the DLC3 cover.
(b) Connect a hand–held tester to the DLC3.
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:
Shift lever into the P, R, N, D, 2 and L ranges, and read the PNP, REVERSE, DRIVE, 2ND and LOW signals on the hand–held tester.

OK:

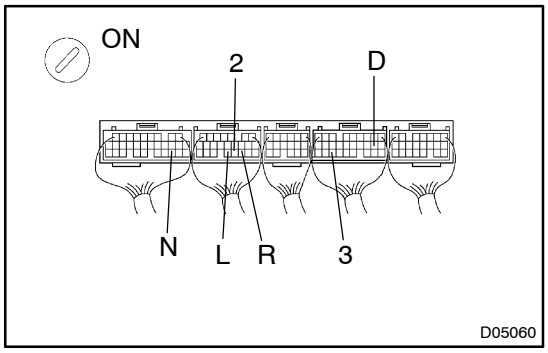
Shift range	Signal
P, N	PNP : OFF → ON
R	REVERSE : OFF → ON
D	DRIVE : OFF → ON
2	2ND : OFF → ON
L	LOW : OFF → ON

OK → **Check and replace the Engine and ECT ECU (See page IN–32).**

NG →

Go to step 3.

2	**Measure voltage between each terminals of P, R, N, D, 2 and L of Engine and ECT ECU and body ground.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between each terminals P, R, N, D, 2 and L of Engine and ECT ECU and body ground when the shift lever is shifted to the following positions.

OK:

Tester connection	Condition	Specified condition
P – Body ground	Shift lever range : P	Battery positive voltage
R – Body ground	Shift lever range : R	Battery positive voltage*
D – Body ground	Shift lever range : D	Battery positive voltage
N – Body ground	Shift lever range : N	Battery positive voltage
2 – Body ground	Shift lever range : 2	Battery positive voltage
L – Body ground	Shift lever range : L	Battery positive voltage

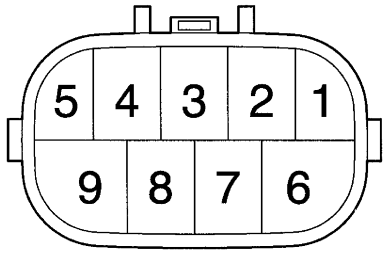
HINT:

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

OK → **Check and replace the Engine and ECT ECU (See page IN–32).**

NG

3	Check neutral start switch.



D05057

PREPARATION:

(a) Jack up the vehicle.

(b) Remove the neutral start switch connector.

CHECK:

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

OK:

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

NG → Replace the neutral start switch.

OK →

Repair or replace harness and connector between battery and neutral start switch, neutral start switch and Engine and ECT ECU (See page IN–32).

DI61Y–02

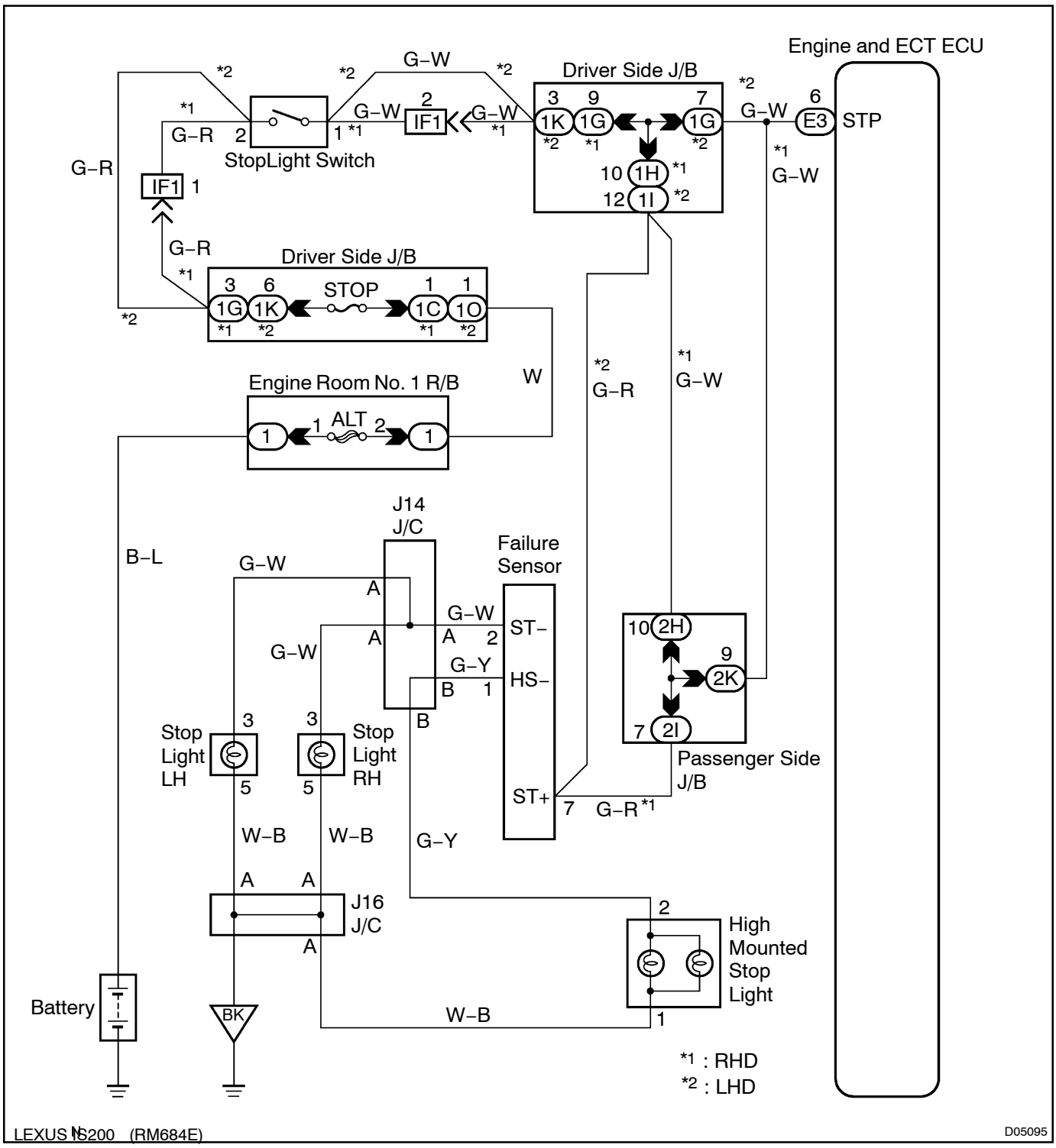
Stop Light Switch Signal Circuit

CIRCUIT DESCRIPTION

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

When the brake pedal is depressed, this switch sends a signal to Engine and ECT ECU. Then the Engine and ECT ECU cancels operation of the lock–up clutch while braking is in progress.

WIRING DIAGRAM



D05095

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

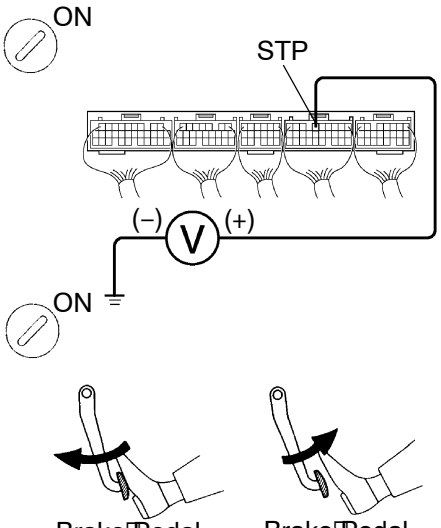
1	**Check operation of stop light.**

CHECK:
Check if the stop lights go on and off normally when the brake pedal is depressed and released.

NG → **Check and repair stop light circuit.**

OK

2	**Check STP signal.**



When using hand–held tester:
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and hand–held tester main switch ON.
CHECK:
Read the STP signal on the hand–held tester.
OK:
Brake pedal is depressed: STP...ON
Brake pedal is released: STP...OFF

When not using hand–held tester:
PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.
CHECK:
Check voltage between terminal STP of the Engine and ECT ECU and body ground.
OK:

Brake pedal	Voltage
Depressed	7.5 – 14 V
Released	Below 1.5 V

OK → **Check for intermittent problems (See page DI–4).**

NG

3	**Check harness and connector between Engine and ECT ECU and stop light switch (See page IN–32).**

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

OK

Check and replace Engine and ECT ECU (See page IN–32).

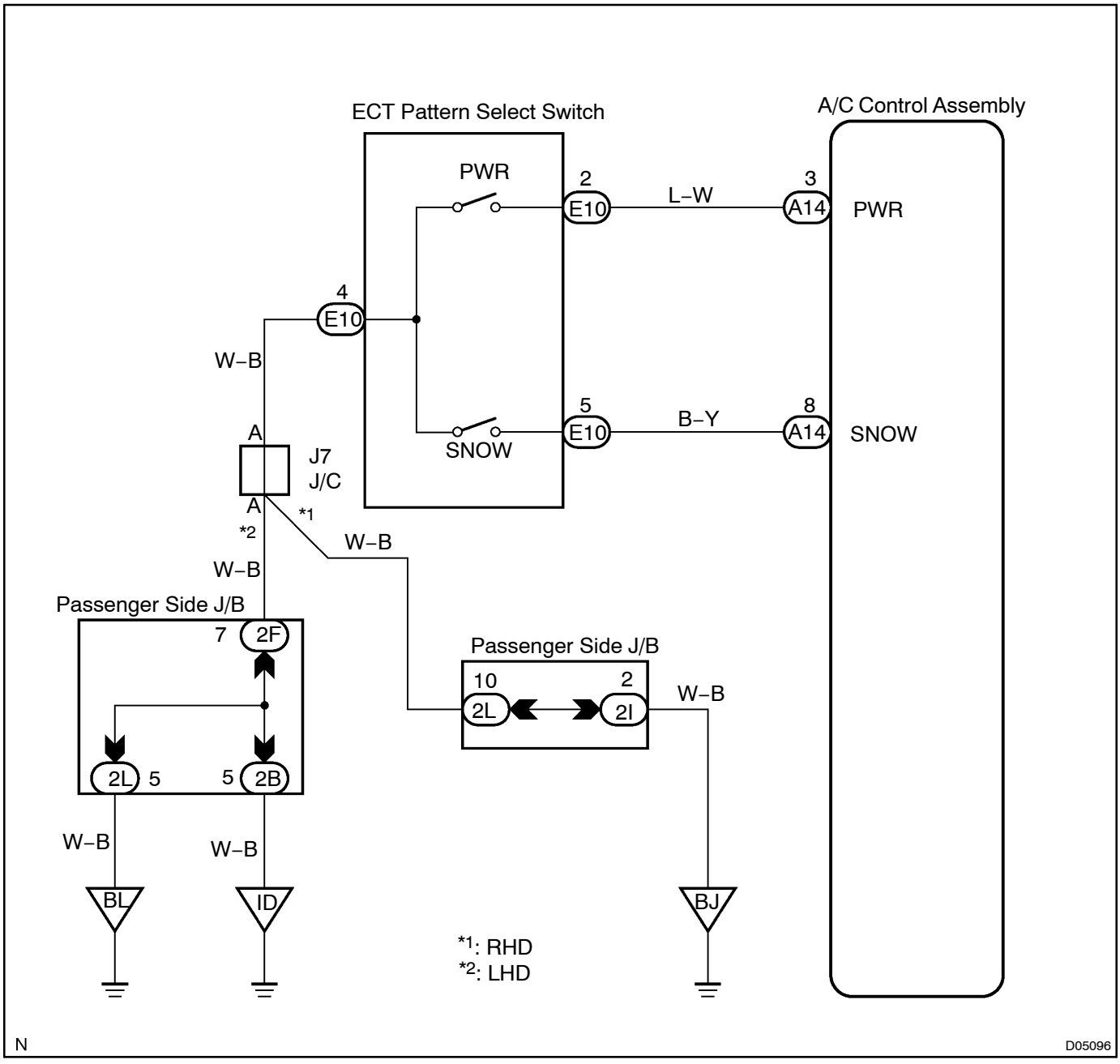
DI61Z–02

Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

The Engine & ECT ECU memory contains the shift programs for the NORMAL, POWER and SNOW patterns, 2 range, L range and the lock–up patterns. By following the programs corresponding to the signals from the pattern select switch, the neutral start switch and other various sensors, the Engine & ECT ECT switches the solenoid valves ON and OFF, and controls the transaxle gear change and the lock–up clutch operation.

WIRING DIAGRAM



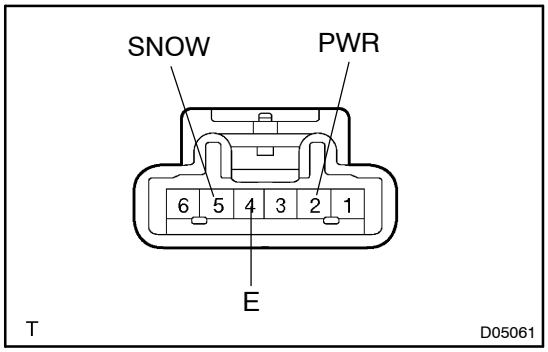
INSPECTION PROCEDURE

1	Check output voltage of A/C control assembly (See page DI–672).

NG → Check and replace the Engine and ECT ECU and A/C control assembly.

OK

2	Check Engine and ECT ECU pattern select switch.



PREPARATION:

Disconnect the pattern select switch connector.

CHECK:

Check continuity between terminals 2 and 4 (PWR), 4 and 5 (SNOW) of pattern select switch connector when the select switch is set to PWR, NORM and SNOW positions.

OK:

Switch position	Tester connection	Specified condition
PWR	2 – 4	Continuity
NORM	2 – 4, 4 – 5	No continuity
SNOW	4 – 5	Continuity

NG → Replace the pattern select switch.

OK

3	Repair or replace harness and connector between A/C control assembly and ECT pattern select switch, ECT pattern select switch and body earth.

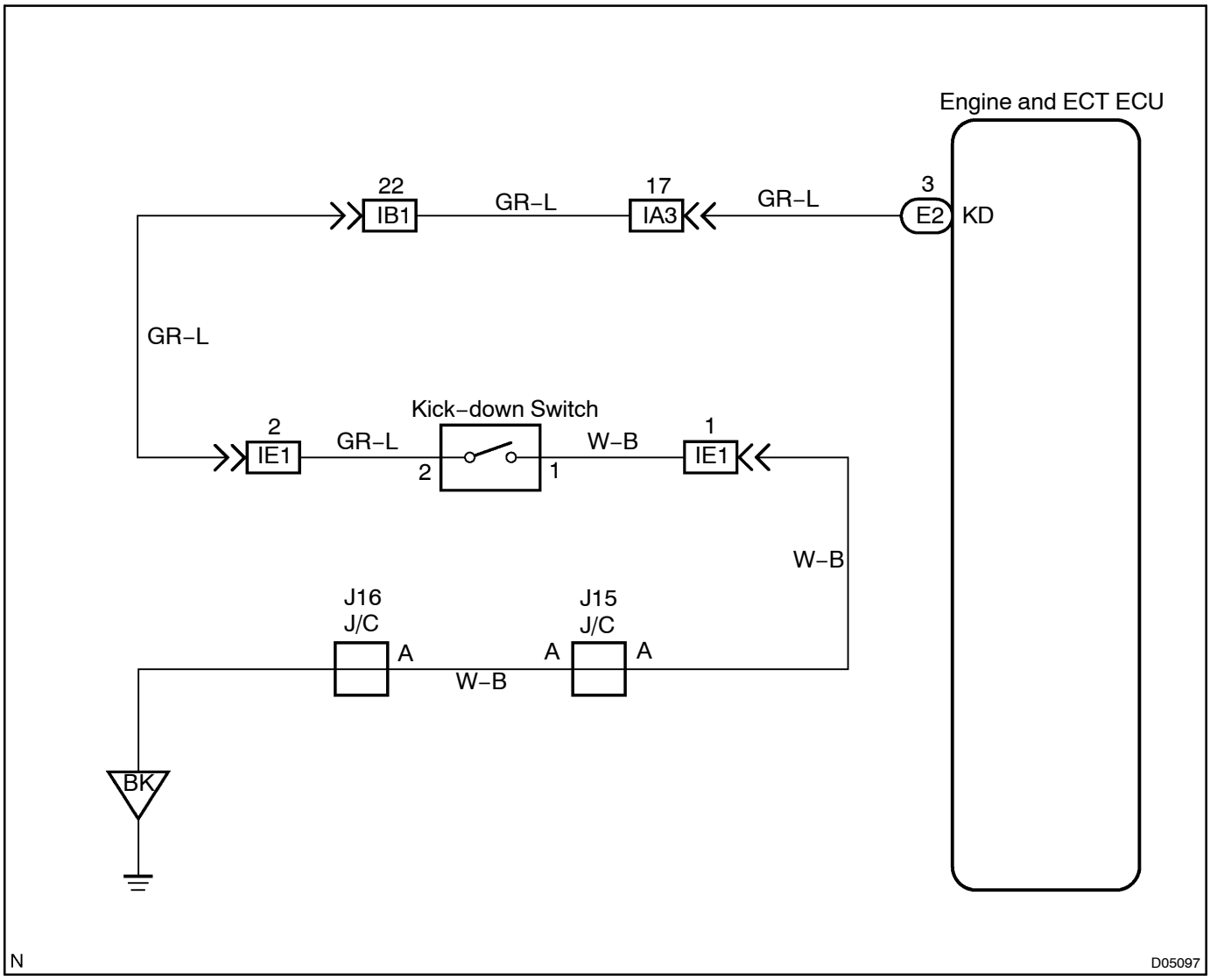
DI620–02

Kick–down Switch Circuit (LHD)

CIRCUIT DESCRIPTION

The kick–down switch is turned ON when the accelerator pedal is depressed to the full throttle and sends signals to Engine and ECT ECU.
When the kick–down switch is turned ON, the Engine and ECT ECU controls gear shifting according to the programmed shift diagrams.
If a short circuit develops in the kick–down switch, the Engine and ECT ECU 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 hannd–held tester:

PREPARATION:

(a) Remove the DLC3 cover.

(b) Connect a hand–held tester to the DLC3.

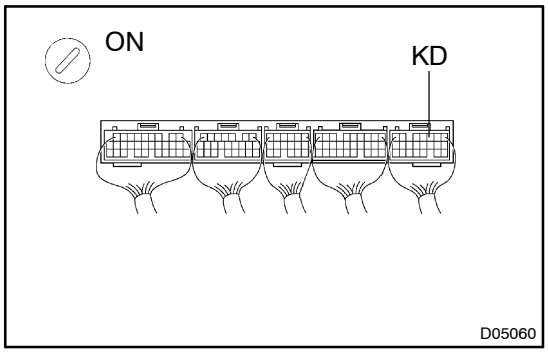
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Read the KICK DOWN SW signal on the hand–held tester.

OK:

Accelerator Pedal	KICK DOWN SW signal
Fully depressed (kick–down SW is ON)	ON
Released (kick–down SW is OFF)	OFF



When not using hand–held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal KD of Engine and ECT ECU connector and body ground when accelerator pedal is fully depressed or not.

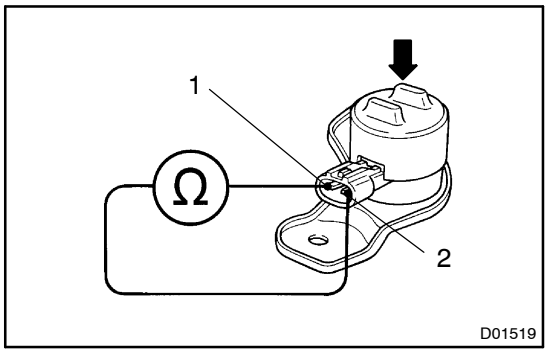
OK:

Accelerator Pedal	Voltage
Fully depressed (kick–down SW is ON)	Below 1 V
Released (kick–down SW is OFF)	10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symproms table (See page DI–175).**

NG

2	Check kick–down switch.



PREPARATION:
Disconnect the kick–down switch connector.
CHECK:
Check continuity at each terminal of kick–down switch connector.
OK:

Kick–down Switch	Specified condition
ON	No continuity
OFF	Continuity

NG → Replace kick–down switch

OK →

3	Check harness and connector between Engine and ECT ECU and kick–down switch, kick–down switch and body ground (See page IN–32).

NG → Repair or replace the harness or connector.

OK →

Check and replace Engine and ECT ECU (See page IN–32).

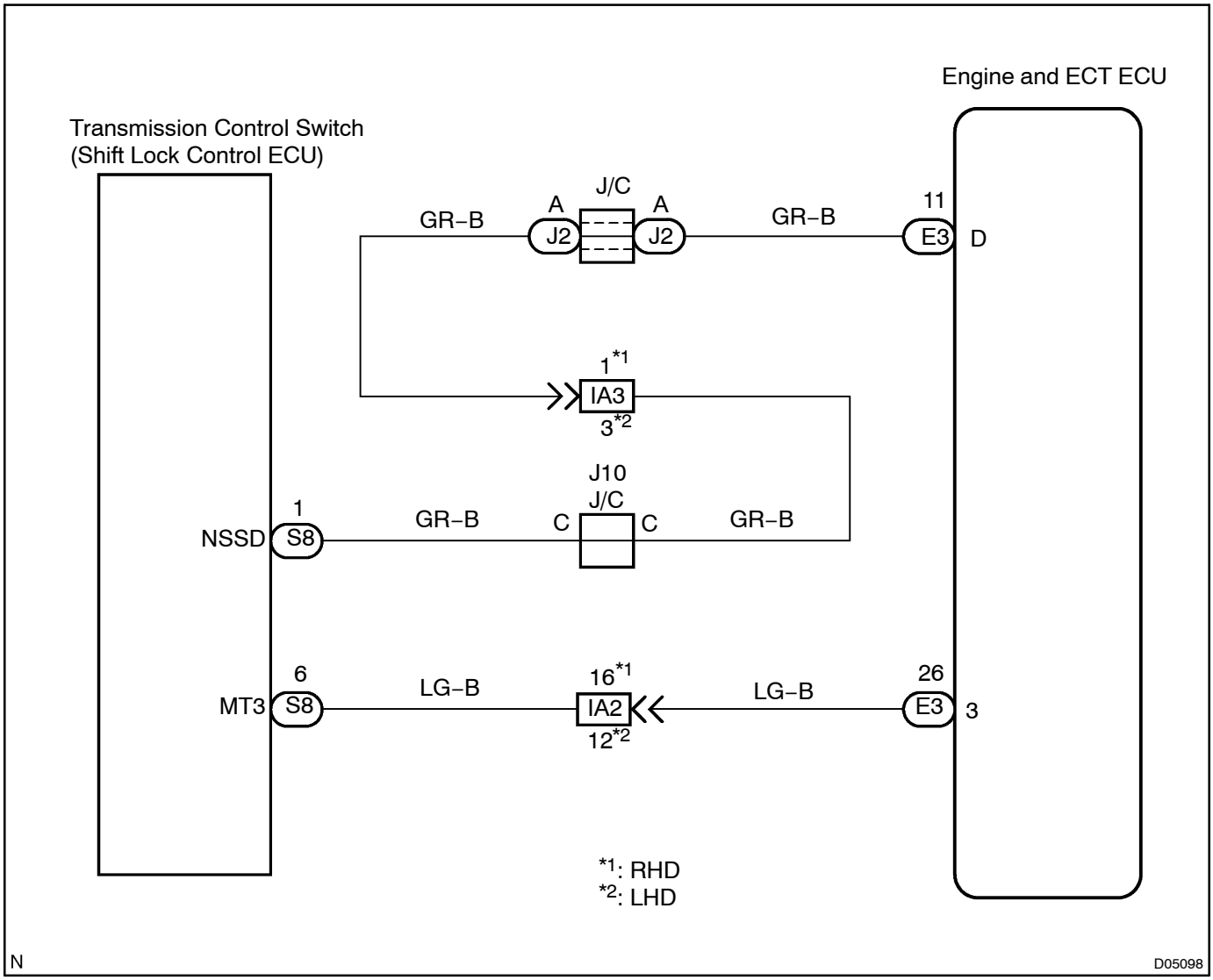
DI621–02

Transmission Control Switch Circuit

CIRCUIT DESCRIPTION

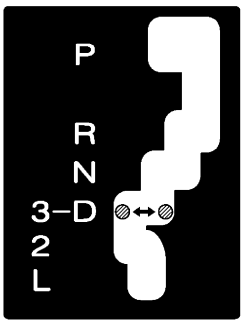
When the shift lever is in the 3 range (with transmission control switch for D and 3 is pressed), ”3” in the shift position indicator light will come on and when the shift lever is in the D range (with transmission control switch for D and 3 is released), ”D” in the shift position indicator light will come on.
When the shift lever is in 3 range, the Engine and ECT ECU prohibits shifting to 4th.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of transmission control switch.**



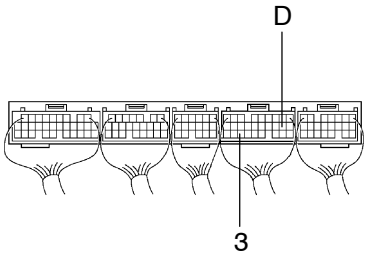
PREPARATION:
Turn the ignition switch ON.
CHECK:
Check the shift indicator light when the shift lever is in each position
OK:

Shift Lever Position	Specified Condition
D	"D" indicator light comes on
Except D	"D" indicator light goes off
3	"3" indicator light comes on
Except 3	"3" indicator light goes off

NG → **Go to step 4.**

OK

2	**Check voltage between each of terminals D, 3 of Engine and ECT ECU and body ground.**



PREPARATION:
Remove the Engine and ECT ECU with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Check voltage between terminal D and 3 of Engine and ECT ECU and body ground.
OK:

Tester connection	Shift lever position	Specified condition
D – Body ground	D or 4	9 – 14 V
	Except D and 4	Below 1.5 V
3 – Body ground	3	9 – 14 V
	Except 3	Below 1.5 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–175).**

NG

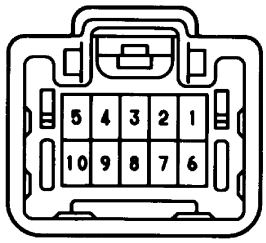
3	Check harness and connector between battery and Engine and ECT ECU, Engine and ECT ECU and shift indicator light (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace Engine and ECT ECU (See page IN–32).

4	Check transmission control switch.



D02199

CHECK:

(a) Disconnect the transmission control switch connector.

(b) Check continuity between each terminal of transmission control switch connector.

OK:

Shift position	Tester connection	Specified value
3	1 – 6	Continuity
Except 3	1 – 6	No continuity

NG → Replace transmission control switch.

OK →

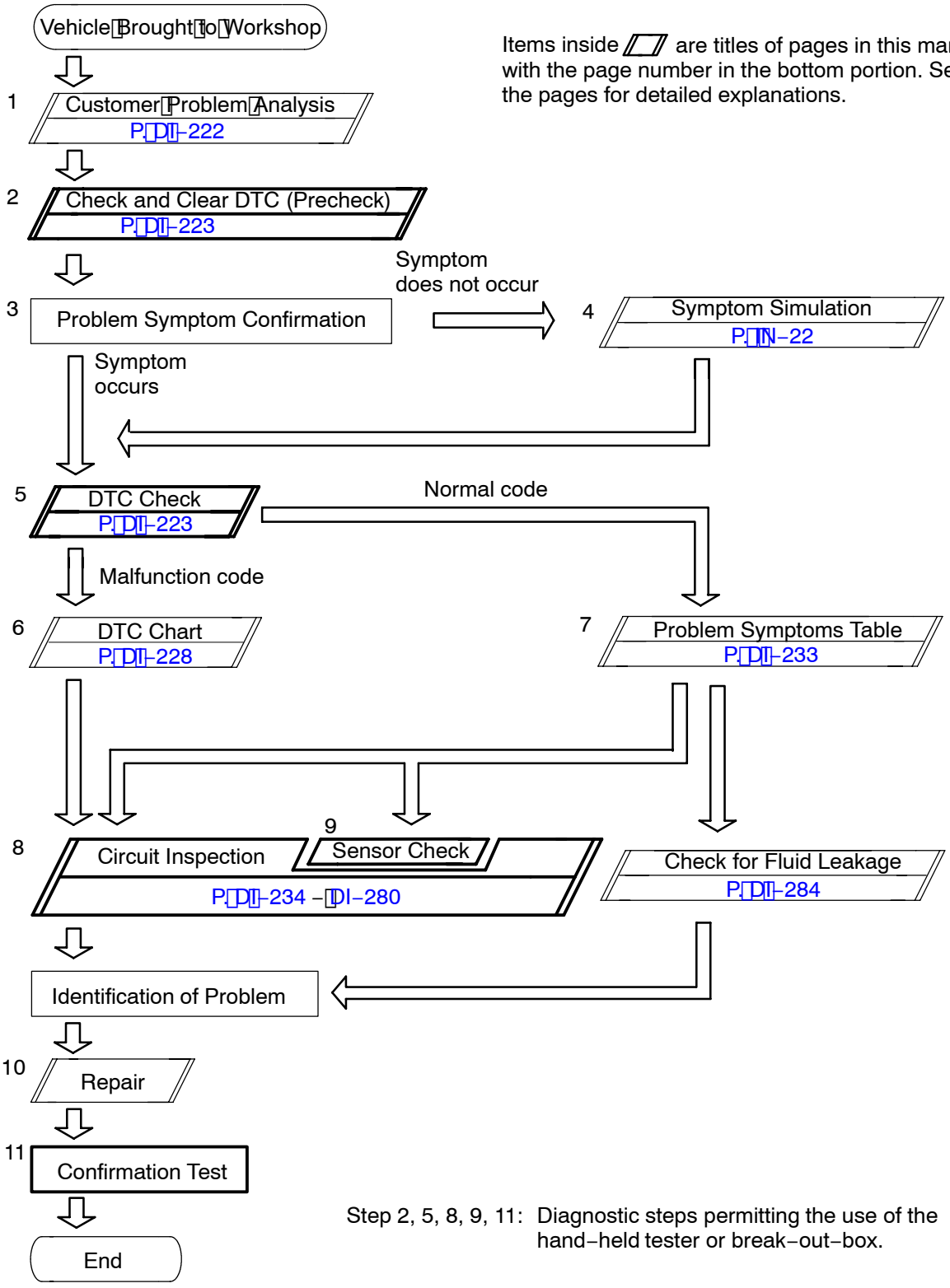
Check and replace combination meter (See combination meter troubleshooting section on page BE–1).

ABS & TRACTION CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI0BV–05

Troubleshoot in accordance with the procedure on the following pages.



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

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester or break–out–box.

DI0BW–04

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & TRC Check Sheet

Inspector's Name :

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

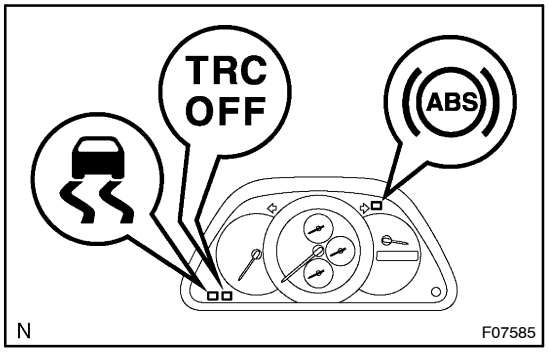
Date Problem First Occurred	/ /
Frequency the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ TRC does not operate. (Wheels spin when starting rapidly.)	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	TRC OFF Indicator Light Abnormal	☐ Remains ON ☐ Blinks ☐ Does not Light Up
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Light	☐ Normal ☐ Malfunction Code (Code)

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

DI600–01



PRE–CHECK

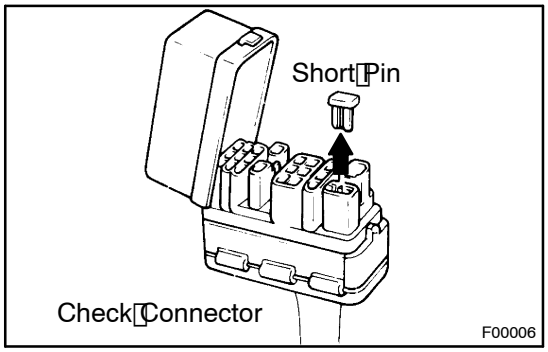
1. DIAGNOSIS SYSTEM

(a) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light, TRC OFF indicator light and SLIP indicator light go on for 3 seconds.

HINT:

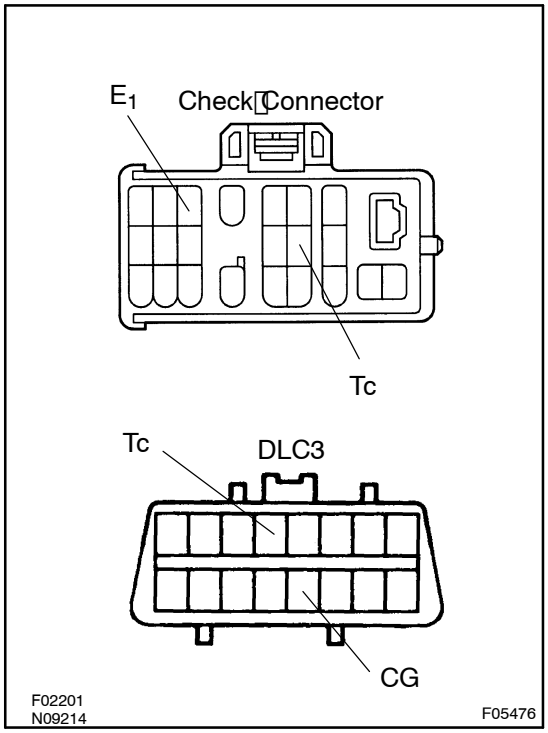
If the indicator check result is not normal, proceed to trouble-shooting for the ABS warning light circuit, TRC OFF indicator light circuit and SLIP indicator light circuit (See page DI–270, DI–275, DI–278).



(b) In case of not using hand–held tester:

Check the DTC.

(1) Disconnect the short pin from the check connector.



(2) Using SST, connect terminals Tc and E_1 of check connector or Tc and CG of DLC3.

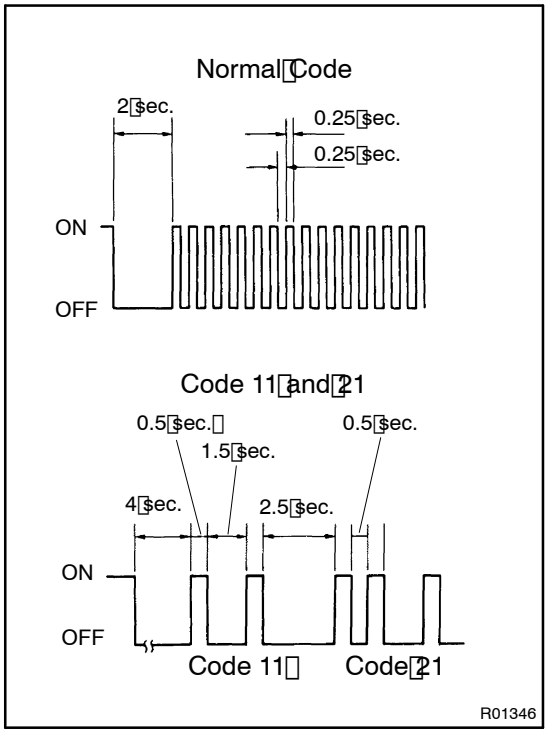
SST 09843–18020

(3) Turn the ignition switch ON.

(4) Read the DTC from the ABS warning light and TRC OFF indicator light on the combination meter.

HINT:

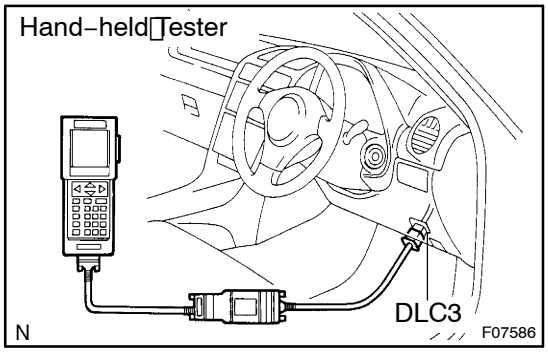
- If no code appears, inspect the diagnostic circuit, ABS warning light circuit or TRC OFF indicator light circuit (See page DI–270, DI–275, DI–280).



• As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(5) Codes are explained in the code table on page DI–228.

(6) After completing the check, disconnect terminals Tc and E_1 of check connector or Tc and CG of DLC3 and turn off the display.
If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.



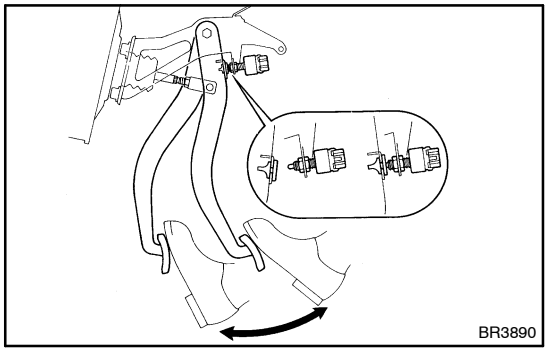
(c) In case of using hand–held tester:
Check the DTC.

(1) Hook up the hand–held tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.



(d) In case of not using hand–held tester:
Clear the DTC.

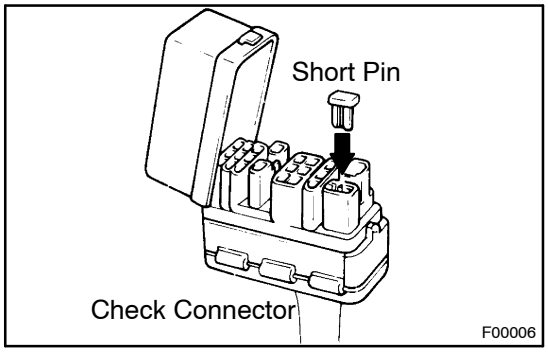
(1) Using SST, connect terminals Tc and E_1 of check connector or Tc and CG of DLC3 and remove the short pin from check connector.
SST 09843–18020

(2) Turn the ignition switch ON.

(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.

(4) Check that the warning light shows the normal code.

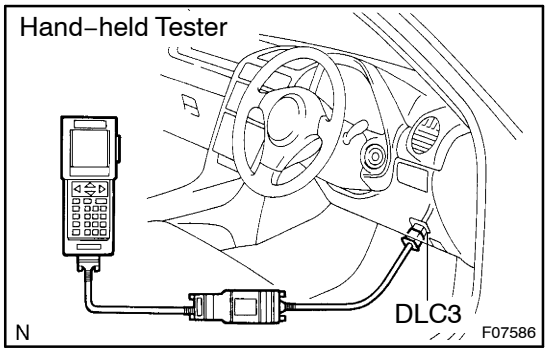
(5) Remove the SST from the terminals of check connector or DLC3.
SST 09843–18020



(6) Connect the short pin to check connector.

HINT:

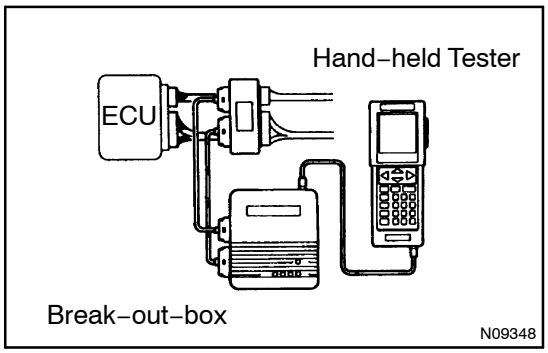
The DTC stored in the ECU will be erased when the battery terminal is disconnected for the troubleshooting.



(e) In case of using hand–held tester:

Clear the DTC.

(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes. (See hand–held tester operator's manual.)



(f) Refernce:

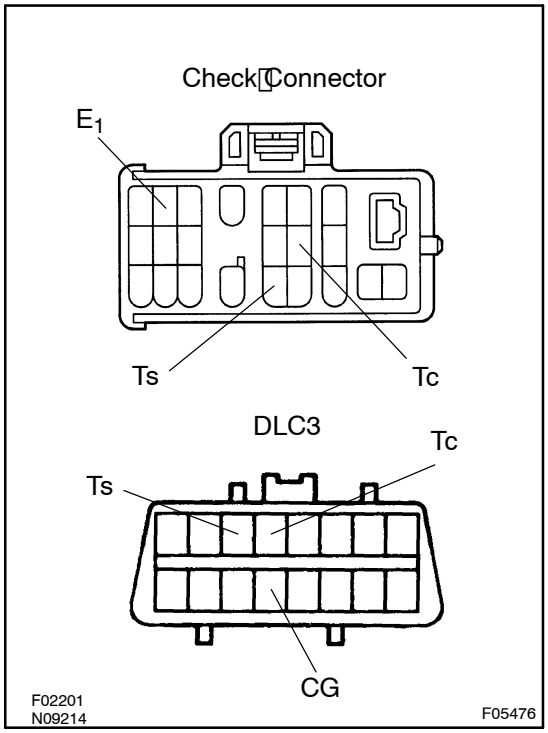
Using break–out–box and hand–held tester, measure the ECU terminal values.

(1) Hook up the hand–held tester and break–out–box to the vehicle.
(2) Turn the ignition switch ON.
(3) Read the ECU input/output values by following the prompts on the tester screen.

HINT:

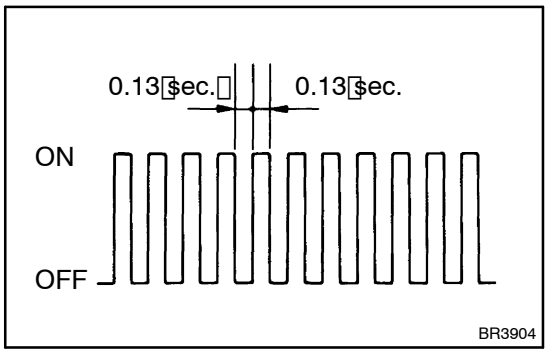
Hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.

Please refer to the hand–held tester/break–out–box operator's manual for further details.



2. SPEED SENSOR SIGNAL CHECK

(a) In case of not using hand–held tester:
Check the speed sensor signal.
(1) Turn the ignition switch OFF.
(2) Using SST, connect terminals Ts and E_1 of check connector or Ts and CG of DLC3.
SST 09843–18020
(3) Start the engine.

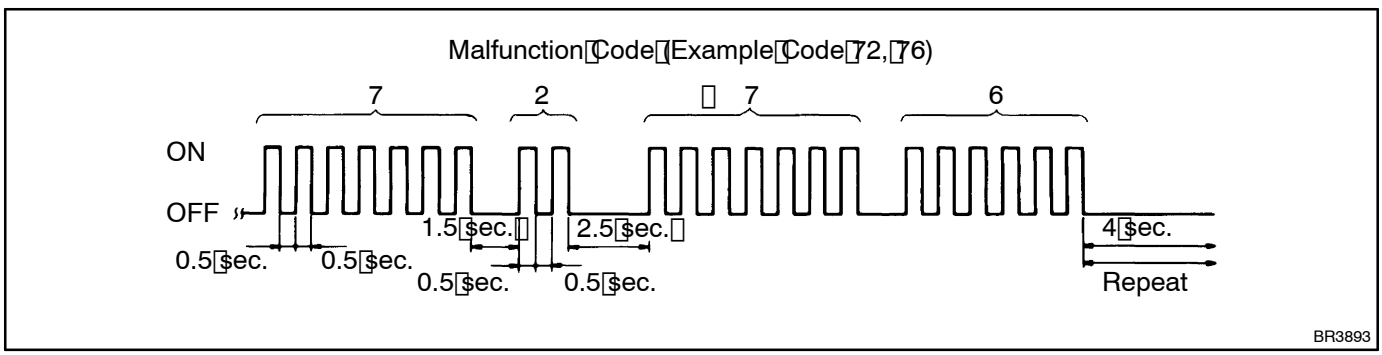


(4) Check that the ABS warning light blinks.

HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit (See page DI–270).

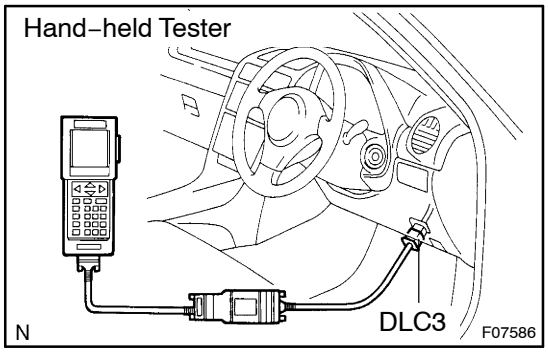
(5) Drive vehicle straight forward.
Drive vehicle faster than 45 km/h (28 mph) for several seconds.
(6) Stop the vehicle.
(7) Using SST, connect terminals Tc and E_1 of check connector or Tc and CG of DLC3.
SST 09843–18020
(8) Read the number of blinks of the ABS warning light.

HINT:
- See the list of DTC shown on the next page.
- If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



(9) After doing the check, disconnect the SST from terminals Ts and E_1, Tc and E_1 of check connector or Ts and CG, Tc and CG of DLC3, and turn ignition switch OFF.

SST 09843–18020



(b) In case of using and–held tester:
Check the speed sensor signal.
(1) Hook up the hand–held tester to the DLC3.
(2) Do step (3) to (6) on the previous page.
(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

DTC of speed sensor check function:

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Right front speed sensor rotor • Right front speed sensor circuit
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Left front speed sensor rotor • Left front speed sensor circuit
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Right rear speed sensor rotor • Right rear speed sensor circuit
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Left rear speed sensor rotor • Left rear speed sensor circuit
C1275/75	Abnormal change in output voltage of right front speed sensor	• Right front speed sensor rotor • Right front speed sensor
C1276/76	Abnormal change in output voltage of left front speed sensor	• Left front speed sensor rotor • Left front speed sensor
C1277/77	Abnormal change in output voltage of right rear speed sensor	• Right rear speed sensor rotor • Right rear speed sensor
C1278/78	Abnormal change in output voltage of left rear speed sensor	• Left rear speed sensor rotor • Left rear speed sensor

DI0BY–04

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843–18020, connect the terminals Tc and E_1 of check connector or Tc and CG of DLC3, and remove the short pin.
- If any abnormality is not found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed for the code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

DTC chart of anti–lock brake system:

DTC No. (See Page)	Detection Item	Trouble Area
C0278/11 (DI–247)	Open circuit of ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit • ABS & TRC ECU
C0279/12 (DI–247)	Short circuit of ABS solenoid relay circuit	
C0273/13 (DI–243)	Open circuit of ABS motor relay circuit	• ABS motor relay • ABS motor relay circuit • ABS & TRC ECU
C0274/14 (DI–243)	Short circuit of ABS motor relay circuit	
C0226/21 (DI–240)	Open or short circuit of right front solenoid circuit	• ABS & TRC actuator • SFRR or SFRH circuit • ABS & TRC ECU
C0236/22 (DI–240)	Open or short circuit of left front solenoid circuit	• ABS & TRC actuator • SFLR or SFLH circuit • ABS & TRC ECU
C0246/23 (DI–240)	Open or short circuit of right rear solenoid circuit	• ABS & TRC actuator • SRRR or SRRH circuit • ABS & TRC ECU
C0256/24 (DI–240)	Open or short circuit of left rear solenoid circuit	• ABS & TRC actuator • SRLR or SRLH circuit • ABS & TRC ECU
C1225/25 (DI–240)	Open or short circuit of SMC circuit	• ABS & TRC actuator • SMC circuit • ABS & TRC ECU
C1226/26 (DI–240)	Open or short circuit of SPC circuit	• ABS & TRC actuator • SPC circuit • ABS & TRC ECU
C1227/27 (DI–240)	Open or short circuit of SRC circuit	• ABS & TRC actuator • SRC circuit • ABS & TRC ECU
C0200/31 (DI–234)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • ABS & TRC ECU
C0205/32 (DI–234)	Left front wheel speed sensor signal malfunction	
C0210/33 (DI–234)	Right rear wheel speed sensor signal malfunction	
C0215/34 (DI–234)	Left rear wheel speed sensor signal malfunction	

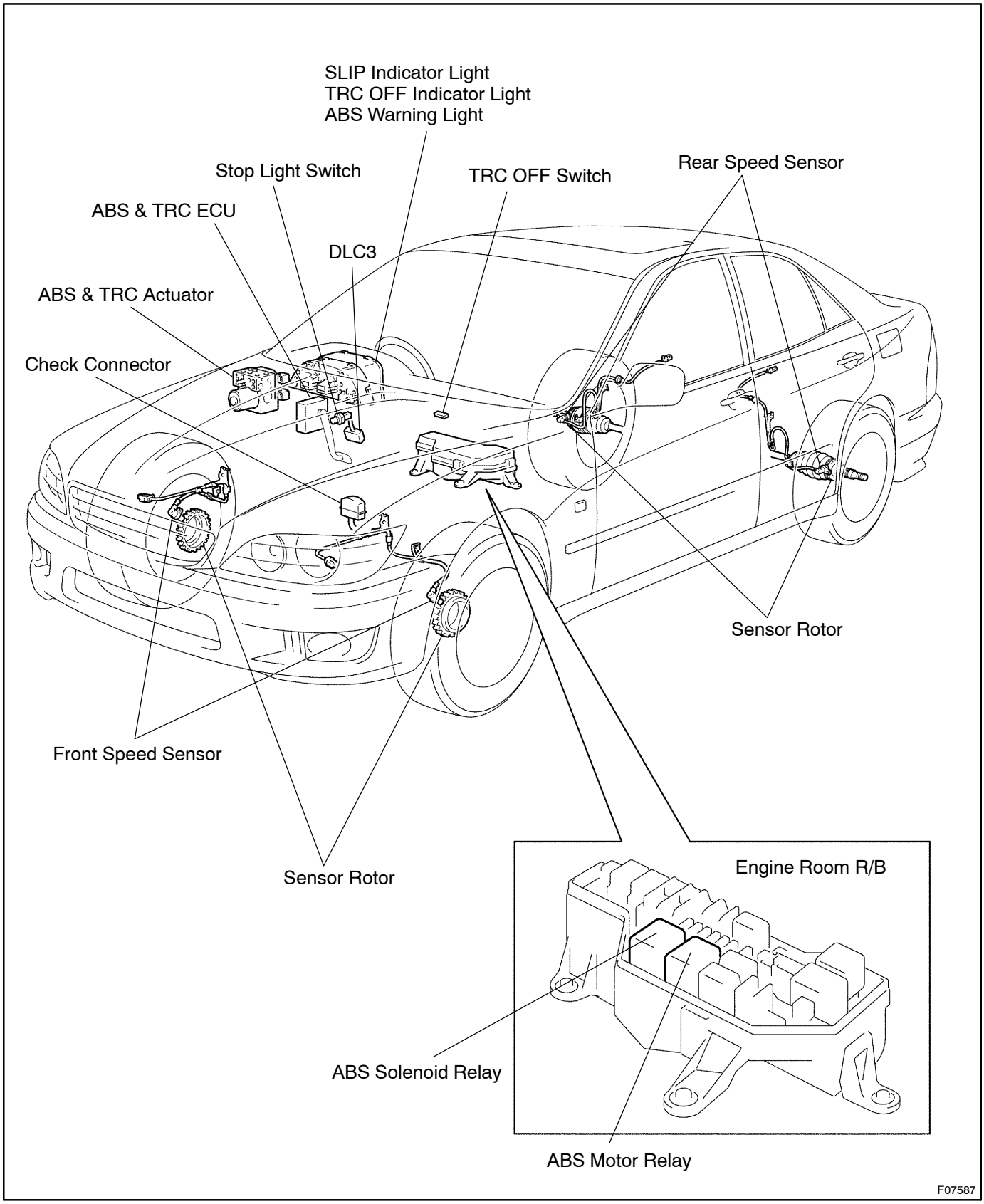
C1241/41 (DI–259)	Low battery voltage or abnormally high battery voltage	• Battery • Charging system • Power source circuit • ABS & TRC ECU
C1249/49 (DI–263)	Open circuit of stop light switch circuit	• Stop light switch • Stop light switch circuit • ABS & TRC ECU
C1251/51 (DI–266)	Pump motor is locked	• ABS & TRC Actuator • ABS & TRC Actuator circuit
Always ON (DI–268)	Malfunction in ECU	• ABS & TRC ECU

DTC chart of traction control system:

C1223/43 (DI–256)	Malfunction in ABS control system	• ABS control system
C1224/44 (DI–257)	Open or short circuit of NE signal circuit	• NEO circuit • Engine and ECT ECU • ABS & TRC ECU
C1201/51 (DI–251)	Malfunction in engine control system	• Engine control system
C1202/52 (DI–252)	Brake fluid level low Open circuit in brake fluid level warning switch circuit	• Brake fluid level • Brake fluid warning switch • Brake fluid level warning switch circuit • ABS & TRC ECU
C1203/53 (DI–254)	Malfunction in ECM communication circuit	• TRC+ or TRC – circuit • EFI+ or EFI– circuit • Engine and ECT ECU • ABS & TRC ECU

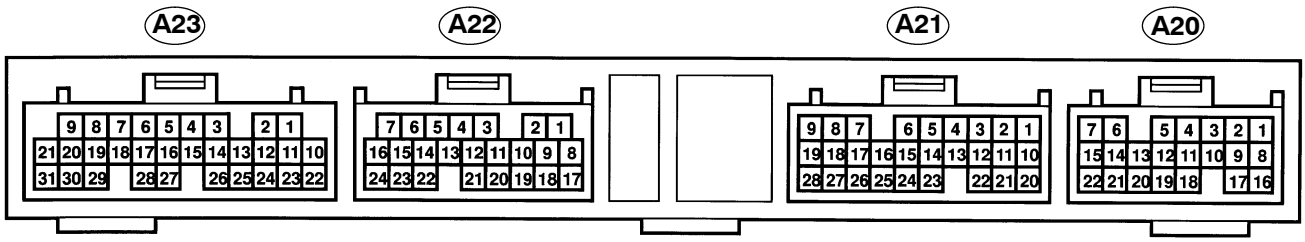
DI0BZ–05

PARTS LOCATION



DI1AE–04

TERMINALS OF ECU



F02094

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SPC (A23 – 4) – GND (A22 – 8, 17, A23 – 31)	LG ↔ W–B	IG switch ON, TRC OFF indicator light OFF	10 – 14
SFLR (A23 – 7) – GND (A22 – 8, 17, A23 – 31)	W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRH (A23 – 8) – GND (A22 – 8, 17, A23 – 31)	R–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRR (A23 – 9) – GND (A22 – 8, 17, A23 – 31)	W–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
FR+ (A23 – 14) – FR– (A23 – 13)	O ↔ B	IG switch ON, slowly turn right front wheel	AC generation
FL+ (A23 – 16) – FL– (A23 – 15)	LG ↔ V	IG switch ON, slowly turn left front wheel	AC generation
SR (A23 – 19) – R+ (A23 – 1)	L–R ↔ L–B	IG switch ON, ABS warning light OFF	Below 1.5
SFLH (A23 – 21) – GND (A22 – 8, 17, A23 – 31)	W–G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
MT (A23 – 28) – GND (A22 – 8, 17, A23 – 31)	L–Y ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
MR (A23 – 29) – GND (A22 – 8, 17, A23 – 31)	R–Y ↔ W–B	IG switch ON, ABS motor stops	10 – 14
Tc (A22 – 3) – GND (A22 – 8, 17, A23 – 31)	R–W ↔ W–B	IG switch ON	10 – 14
Ts (A22 – 4) – GND (A22 – 8, 17, A23 – 31)	W–L ↔ W–B	IG switch ON	10 – 14
IG1 (A22 – 6) – GND (A22 – 8, 17, A23 – 31)	B–R ↔ W–B	IG switch ON	10 – 14
NEO (A22 – 7) – GND (A22 – 8, 17, A23 – 31)	G ↔ W–B	Engine idling	Pulse generation
RR+ (A22 – 11) – RR– (A22 – 12)	W ↔ B	IG switch ON, slowly turn right rear wheel	AC generation
ENG+ (A22 – 14) – ENG– (A22 – 22)	L ↔ B	IG switch ON, Engine idling	Pulse generation
RL+ (A22 – 19) – RL– (A22 – 20)	R ↔ L	IG switch ON, slowly turn left rear wheel	AC generation
TRC+ (A22 – 24) – TRC– (A22 – 16)	R ↔ W	IG switch ON, Engine idling	Pulse generation
LBL+ (A21 – 1) – GND (A22 – 8, 17, A23 – 31)	Y–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level and pasrking brake switch is OFF (Brake warning light is OFF)	10 – 14

WA (A21 – 5) – GND (A22 – 8, 17, A23 – 31)	W–G ↔ W–B	IG switch ON, ABS warning light ON	Below 2.0
		IG switch ON, ABS warning light OFF	10 – 14
IND (A21 – 6) – GND (A22 – 8, 17, A23 – 31)	LG–B ↔ W–B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
STP (A21 – 7) – GND (A22 – 8, 17, A23 – 31)	G–W ↔ W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
LBL– (A21 – 11) – GND (A22 – 8, 17, A23 – 31)	Y–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level	About 4 – 8
WT (A21 – 13) – GND (A22 – 8, 17, A23 – 31)	LG ↔ W–B	IG switch ON, TRC OFF indicator light ON	Below 2.0
		IG switch ON, TRC OFF indicator light OFF	10 – 14
SP1 (A21 – 16) – GND (A22 – 8, 17, A23 – 31)	R–B ↔ W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
D/G (A21 – 25) – GND (A22 – 8, 17, A23 – 31)	W ↔ W–B	IG switch ON	10 – 14
CSW (A21 – 26) – GND (A22 – 8, 17, A23 – 31)	LG–R ↔ W–B	IG switch ON, TRC cut switch pushed in	Below 1.5
		IG switch ON, TRC cut switch released	10 –14
SRLR (A20 – 1) – GND (A22 – 8, 17, A23 – 31)	R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
AST (A20 – 6) – GND (A22 – 8, 17, A23 – 31)	Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRLH (A20 – 7) – GND (A22 – 8, 17, A23 – 31)	G–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (A20 – 8) – GND (A22 – 8, 17, A23 – 31)	G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRC (A20 – 15) – GND (A22 – 8, 17, A23 – 31)	L–W ↔ W–B	IG switch ON, TRC OFF Indicator light OFF	10 – 14
SFRH (A20 – 16) – GND (A22 – 8, 17, A23 – 31)	W–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SMC (A20 – 22) – GND (A22 – 8, 17, A23 – 31)	P ↔ W–B	IG switch ON, TRC OFF indicator light OFF	10 – 14

DI0C1–04

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

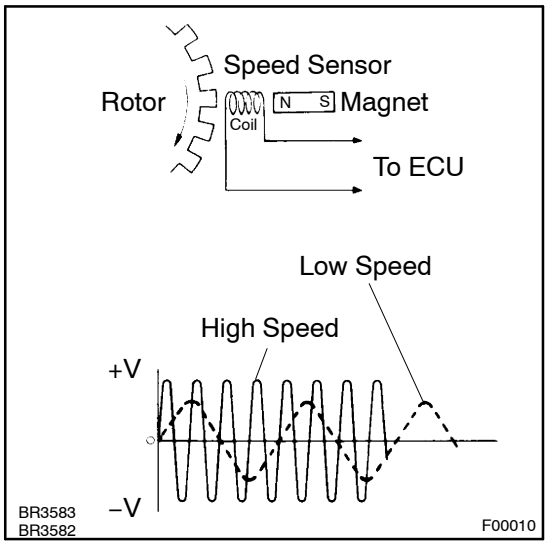
Symptom	Suspect Area	See page
ABS does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit 3. Speed sensor circuit 4. Check the ABS & TRC actuator with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–284).	 DI–223 DI–259 DI–234 BR–45
ABS does not operate efficiently	Only when 1. to 4. are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. Check the DTC reconfirming that the normal code is output 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the ABS & TRC actuator with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–284).	 DI–223 DI–234 DI–263 BR–45
ABS warning light abnormal	1. ABS warning light circuit 2. ABS & TRC ECU	DI–270 DI–268
DTC check cannot be done	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. ABS warning light circuit 2. TRC OFF indicator light circuit 3. Tc terminal circuit	 DI–270 DI–275 DI–280
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. ABS & TRC ECU	DI–282 DI–268
TRC does not operate	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	 DI–223 DI–259 BR–45 DI–234
SLIP indicator light abnormal	SLIP indicator light circuit	DI–278
TRC OFF indicator light abnormal	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. TRC OFF indicator light circuit 2. TRC cut switch circuit	 DI–275 DI–275

DI1GH–03

CIRCUIT INSPECTION

DTC	C0200 / 31 – C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS & TRC control system. The front and rear rotors each have 48 serrations.

When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 4.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. (When RL and RR wheels are fauly for 200 sec.) 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. Continuous noise occurs in to the speed sensor signals with the vehicle speed at 20 km/h (12 mph) or more continues for 5 sec or more. 4. The speed sensor signal circuit is open circuit continues for 0.5 sec. or more.	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • ABS & TRC ECU

HINT:

DTC No. C0200 / 31 is for the right front speed sensor.

DTC No. C0205 / 32 is for the left front speed sensor.

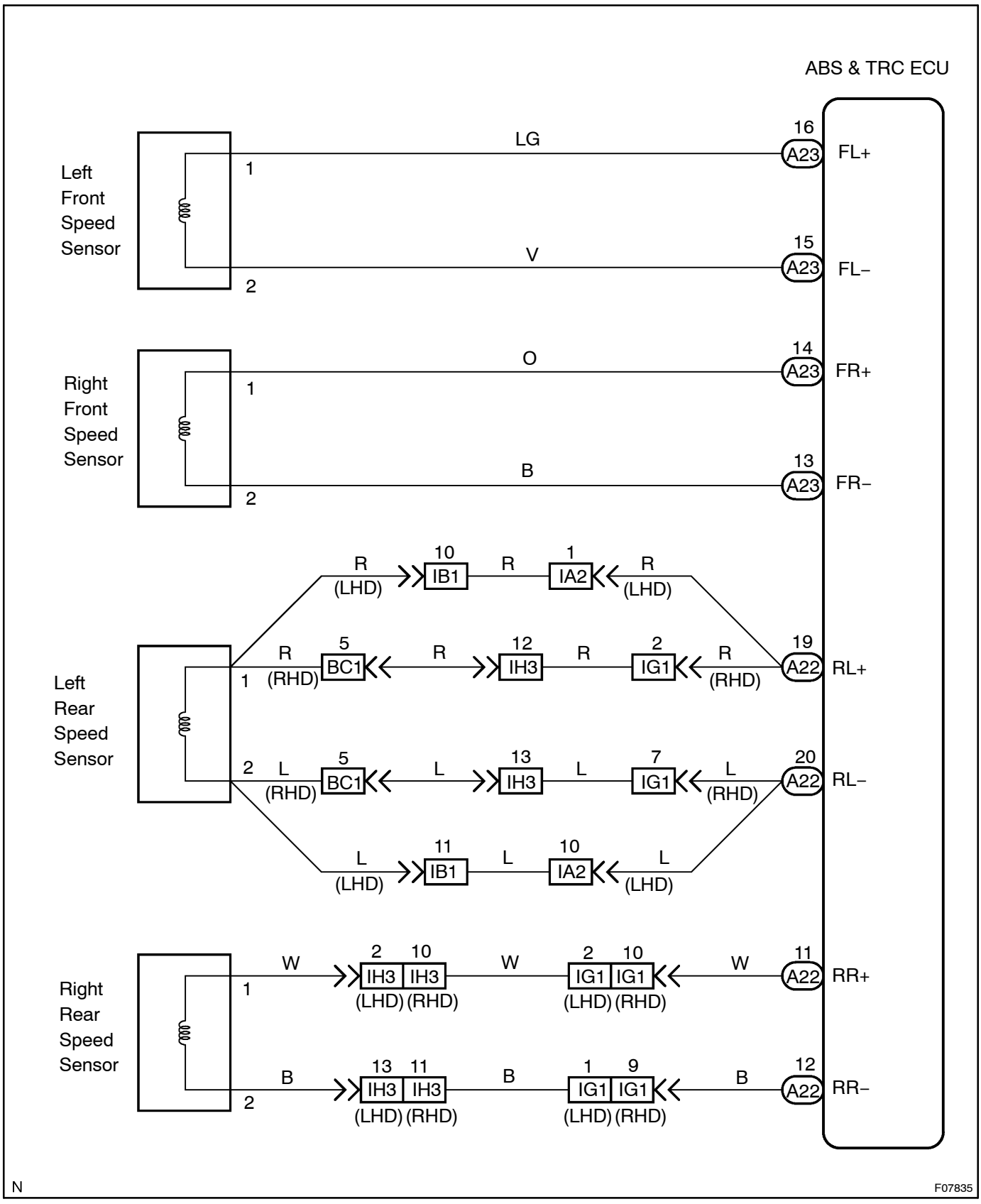
DTC No. C0210 / 33 is for the right rear speed sensor.

DTC No. C0215 / 34 is for the left rear speed sensor.

Fail safe function:

If any trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of speed sensor.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:
Check that there is no difference between the speed value output from the speed sensor displayed by the hand–held tester and the speed value displayed by the speedometer when driving the vehicle.

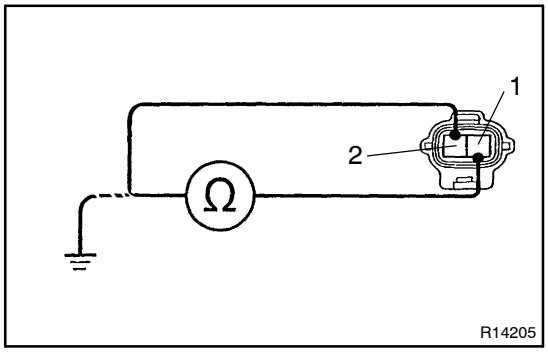
OK:

There is almost no difference from the displayed speed value.

OK → **Check and replace ABS & TRC ECU.**

NG

2	**Check speed sensor.**



Front:

PREPARATION:
(a) Remove the front fender liner.
(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
(c) Disconnect the speed sensor connector.

CHECK:
Measure resistance between terminals 1 and 2 of speed sensor connector.

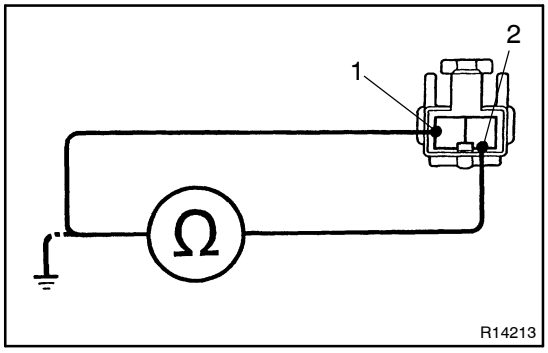
OK:

Resistance: 1.4 – 1.8 kΩ at 20 °C

CHECK:
Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 10 MΩ or higher



Rear:

PREPARATION:

(a) Remove the seat cushion and seatback.

(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(c) Disconnect the speed sensor connector.

CHECK:

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

OK:

Resistance: 0.9 – 1.3 kΩ at 25 ± 5°C

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG	**Replace speed sensor.**

NOTICE:

Check the speed sensor signal first (See page DI–223).

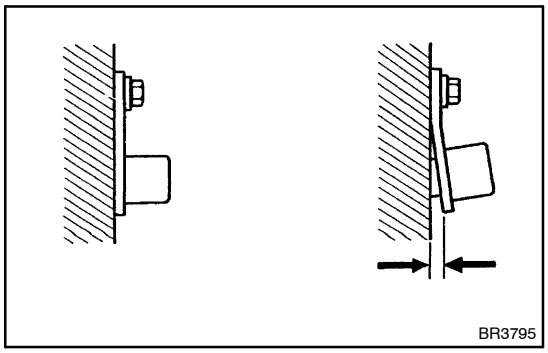
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and ABS & TRC ECU (See page IN–32).**

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

OK

4	Check sensor installation.



CHECK:

Check the speed sensor installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.

NG	Replace speed sensor.

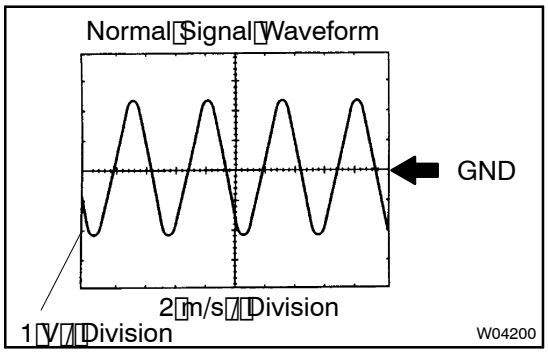
NOTICE:

Check the speed sensor signal last (See page DI–223).

OK

5	Check speed sensor and sensor rotor serrations.

(REFERENCE) INSPECTION USING OSCILLOSCOPE



PREPARATION:

(a) Remove the ABS & TRC ECU with connectors still connected.

(b) Connect the oscilloscope to the terminals FR+, FL+, RR+ or RL+ and GND of the ABS & TRC ECU.

CHECK:

Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

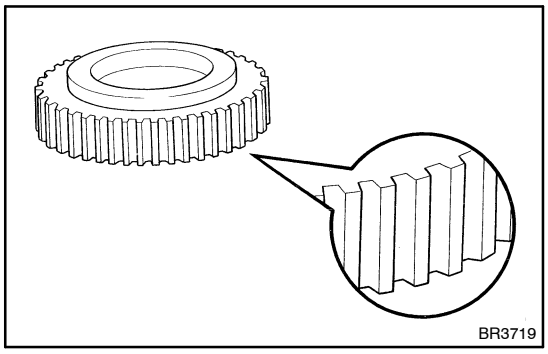
HINT:

Check the stuck of the foreign objects on the sensor tip in case of noise occurrence.

OK	Check and replace ABS & TRC ECU.

NG

6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove front speed sensor rotor (See page SA–13).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

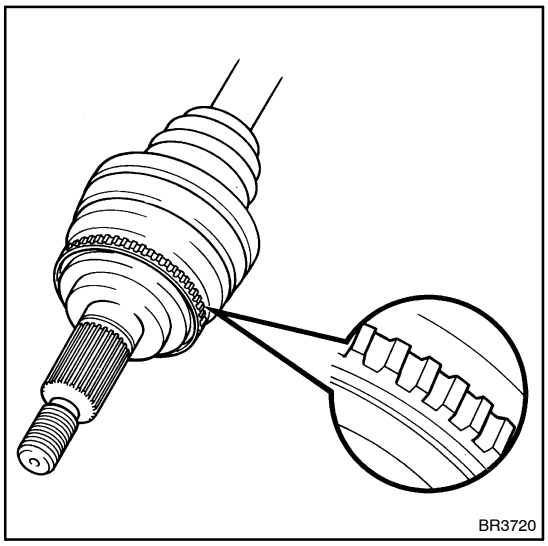
Remove the front speed sensor (See page BR–54).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.



Rear:

PREPARATION:

Remove the drive shaft (See page SA–56).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove rear speed sensor (See page BR–57).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal first (See page DI–223).

OK

Check and replace ABS & TRC ECU.

DI601–01

DTC	C0226 / 21 – C1227 / 27	ABS & TRC Solenoid Circuit

CIRCUIT DESCRIPTION

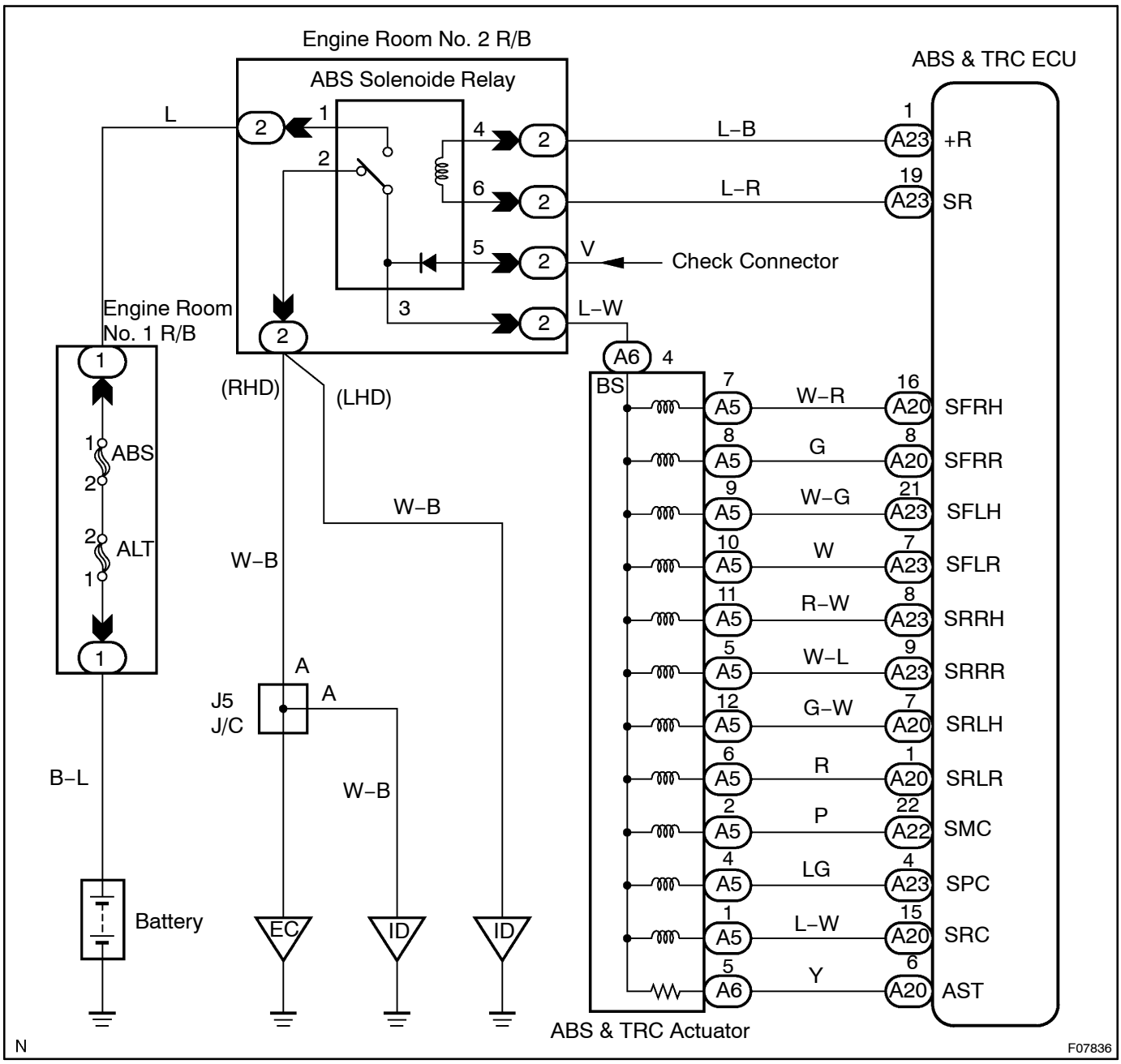
This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit for SFRH or SFRR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SFRH or SFRR circuit • ABS & TRC ECU
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SFLH or SFLR circuit • ABS & TRC ECU
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SRRH or SRRR circuit • ABS & TRC ECU
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SRLH or SRLR circuit • ABS & TRC ECU
C1225/25	Open or short circuit for SMC circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SMC circuit • ABS & TRC ECU
C1226/26	Open or short circuit for SPC circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SPC circuit • ABS & TRC ECU
C1227/27	Open or short circuit for SRC circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SRC circuit • ABS & TRC ECU

Fail safe function:

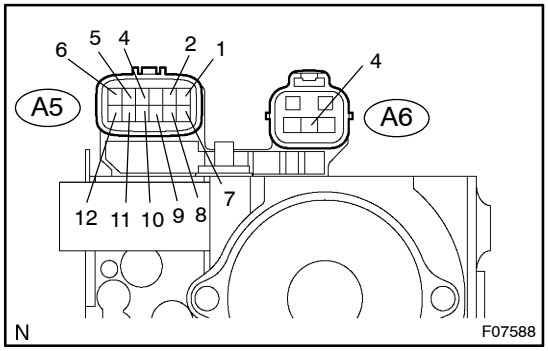
If any trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ABS & TRC actuator solenoid.



PREPARATION:
Disconnect the 2 connectors from the ABS & TRC actuator.
CHECK:
Check continuity between terminals A6 – 4 and A5 – 1, 2, 4, 5, 6, 7, 8, 9, 10, 11 and 12 of ABS & TRC actuator.
OK:

Continuity

HINT:
(Reference)
Resistance of each solenoid
SFRH, SFLH, SRRH, SRLH, SMC: 8.3 – 9.3 Ω
SFRR, SFLR, SRRR, SRLR: 4.0 – 4.6 Ω
SRC: 8.1 – 9.1 Ω
SPC: 3.7 – 4.3 Ω

NG → Replace ABS & TRC actuator.

OK

2	Check for open and short circuit in harness and connector between ABS & TRC ECU and ABS & TRC actuator (See page IN–32).

NG → Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GJ–03

DTC	C0273 / 13, C0274 / 14	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

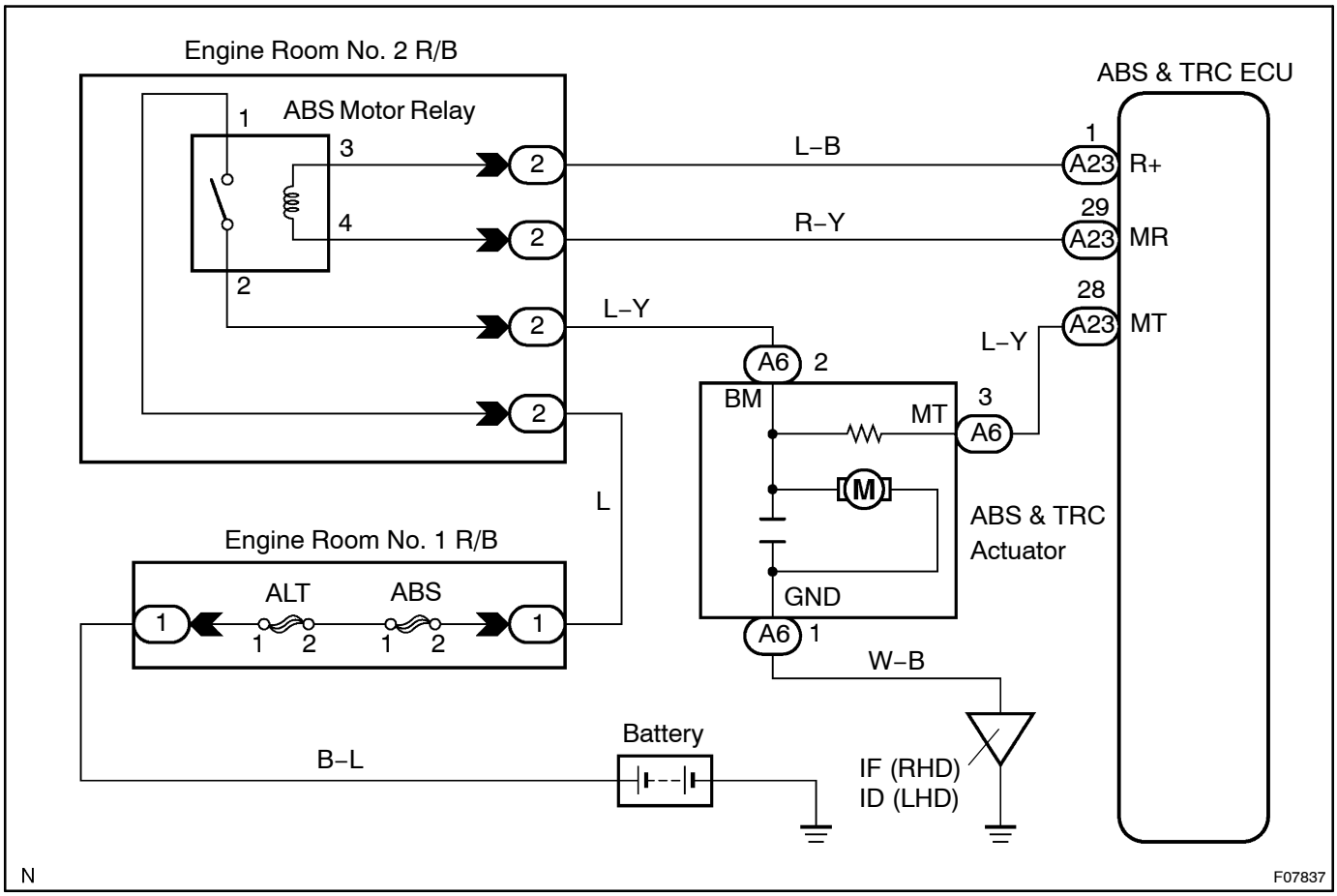
The ABS motor relay supplies power to the ABS pump motor. While the ABS & TRC are activated, the ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. and 2. continued for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V in the initial check or ABS, TRC are in operation, and when the motor relay is ON, however, the contact point of the motor relay is OFF. 2. ECU terminal IG1 is 9.5 V or less, and when the motor relay is ON, but the contact point of the motor relay does not become ON.	• ABS motor relay • ABS motor relay circuit • ABS & TRC ECU
C0274 / 14	When the motor relay is OFF, the condition that the contact point of motor relay is ON continues for 4 sec. or more.	

Fail safe function:

If any trouble occurs in the ABS motor relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

1	**Check ABS motor relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

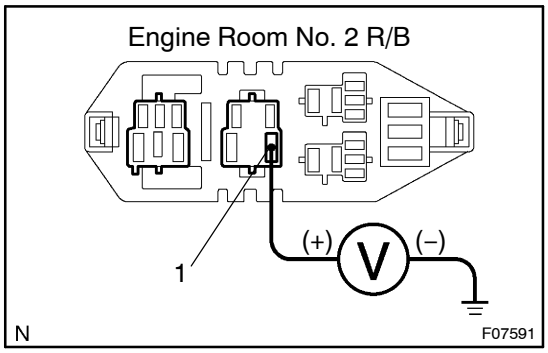
CHECK:
Check the operation sound of the ABS motor relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS motor relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.**



PREPARATION:
Remove the ABS motor relay from the engine room No. 2 R/B.

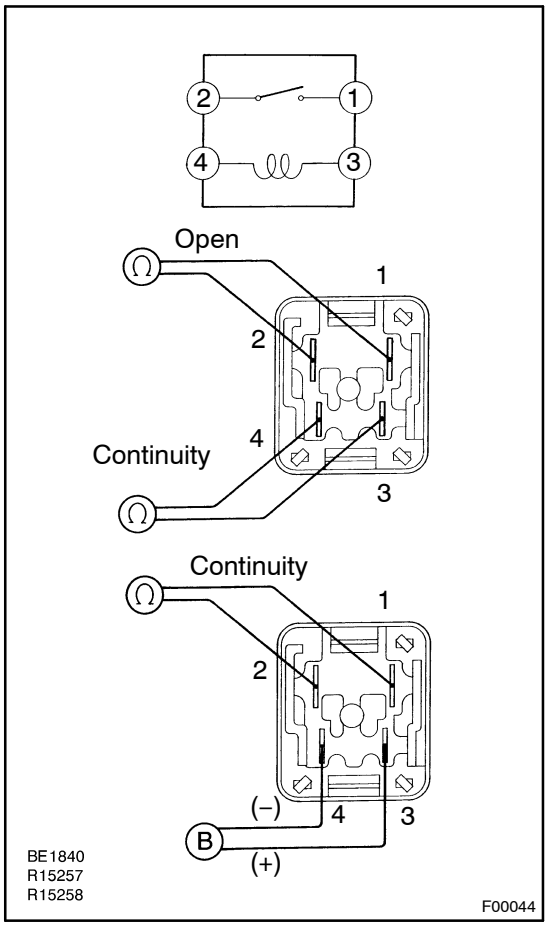
CHECK:
Measure voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS motor relay.



CHECK:

Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

(a) Apply battery voltage between terminals 3 and 4.

(b) Check continuity between terminals.

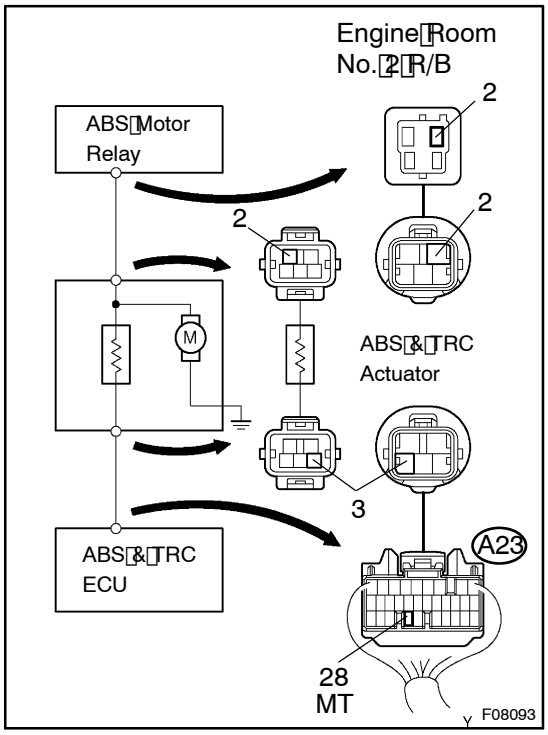
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS motor relay.**

OK

4	**Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT of ABS & TRC ECU.**



CHECK:

Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT (A23 – 28) of ABS & TRC ECU.

OK:

Continuity

HINT:

There is a resistance of 26 – 40 Ω between terminals 2 and 3 of ABS & TRC actuator.

NG	**Repair or replace harness or ABS & TRC actuator.**

OK

5	**Check for open and short circuit in harness and connector between ABS motor relay and ABS & TRC ECU (See page IN–32).**

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

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GK–03

DTC	C0278 / 11, C0279 / 12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

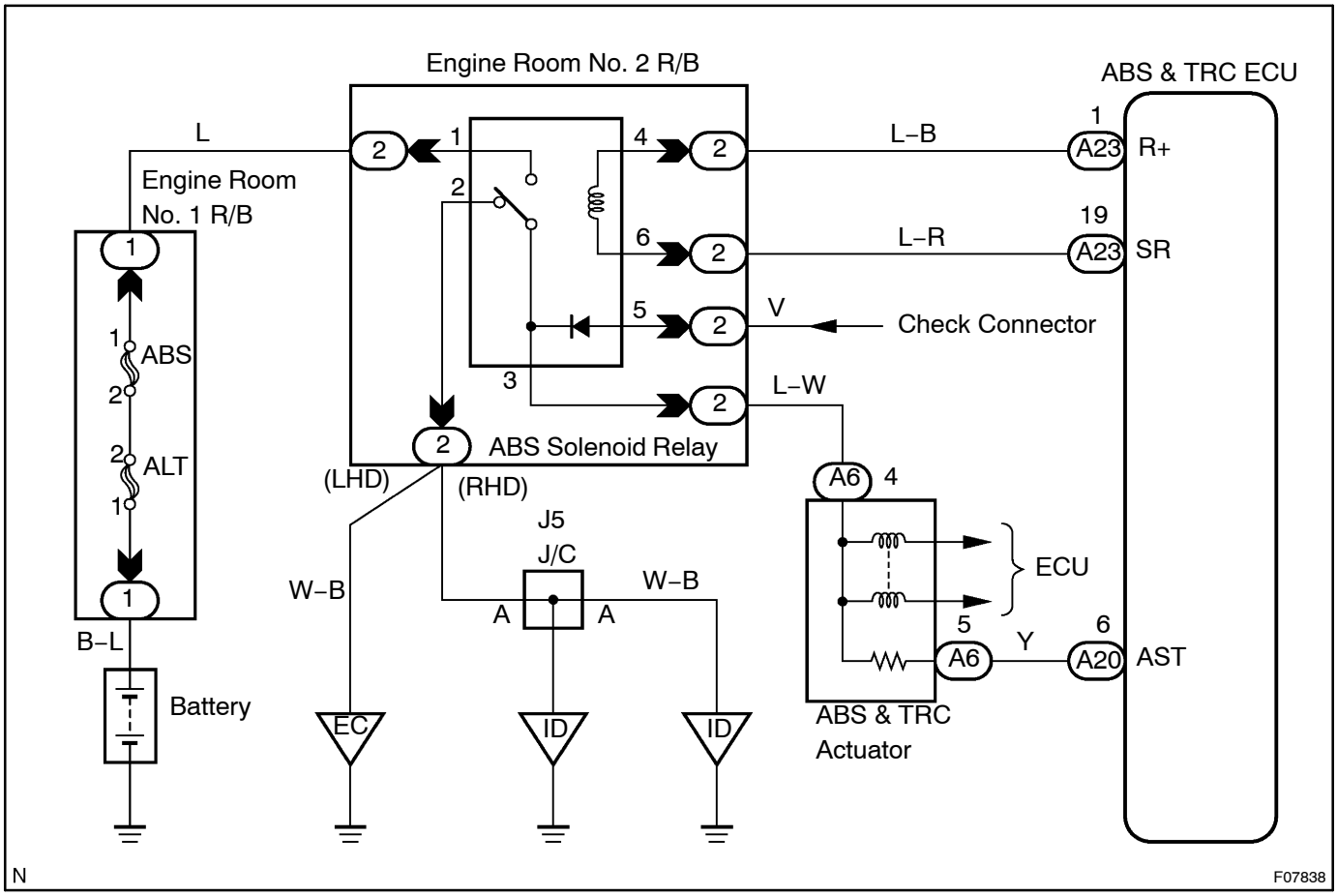
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. 2. With solenoid relay ON driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	• ABS solenoid relay • ABS solenoid relay circuit • ABS &TRC ECU
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the contact point of the solenoid relay is ON continues for 0.2 sec. or more.	

Fail safe function:

If any trouble occurs in the ABS solenoid relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



N F07838

INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check ABS solenoid relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

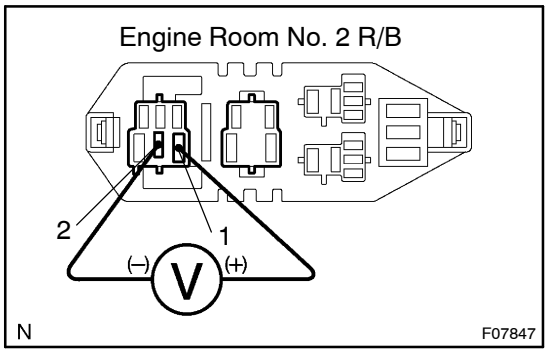
CHECK:
Check the operation sound of the ABS solenoid relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS solenoid relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).**



PREPARATION:
Remove the ABS solenoid relay from the engine room No. 2 R/B.

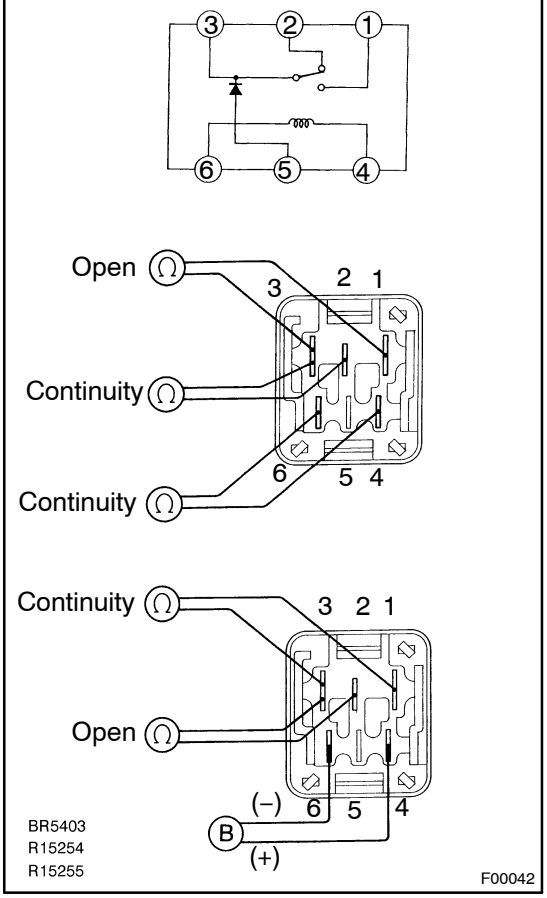
CHECK:
Measure the voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS solenoid relay.



CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

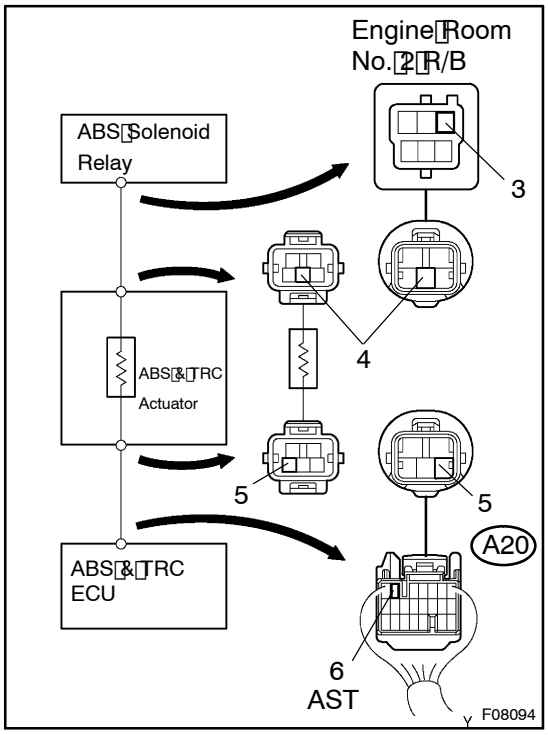
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST of ABS & TRC ECU.



CHECK:

Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST (A20 – 6) of ABS & TRC ECU

OK:

Continuity

HINT:

There is a resistance of 26 – 40 Ω between terminals 4 and 5 of ABS & TRC actuator.

NG	Repair or replace harness or ABS & TRC actuator.

OK

5	Check for open and short circuit in harness and connector between ABS solenoid relay and ABS & TRC ECU (See page IN–32).

NG	Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GY-05

CIRCUIT INSPECTION

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If any trouble occurs in the engine control system, the ECU prohibits TRC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	• Engine control system

INSPECTION PROCEDURE

1	Check the DTC for the engine (See page DI–4).

*1 → Repair engine control system according to the code output.

*2

Check for engine and ECT ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI1GZ–06

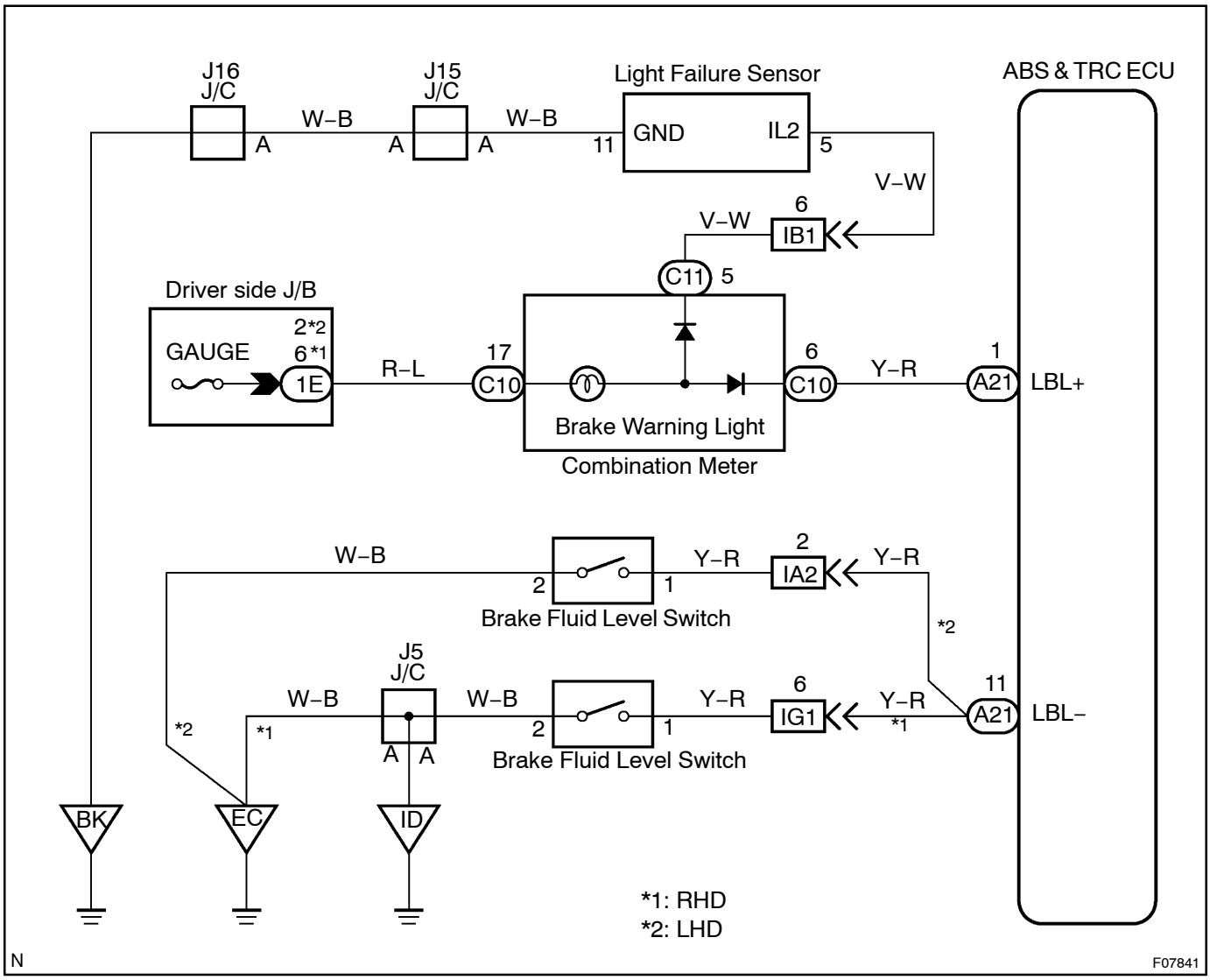
DTC	C1202 / 52	Brake Fluid Warning Switch Circuit

CIRCUIT DESCRIPTION

The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.
HINT:
Pull the parking brake lever also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

DTC No.	DTC Detecting Condition	Trouble Area
C1202 / 52	When any of the following 1. or 2. is detected: 1. Low fluid level condition in the brake master cylinder reservoir tank continues for 10 sec. or more. 2. With ECU terminal IG1 voltage is 9.5 V to 17.2 V and open circuit for the brake fluid level warning switch circuit continues for 2 sec. or more.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit • ABS & TRC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check brake fluid level.

CHECK:

Check the amount of fluid in the brake reservoir.

NG → Check and repair brake fluid leakage and add fluid.

OK

2	Check brake fluid level warning switch (See page BE–83).

NG → Replace brake fluid level warning switch.

OK

3	Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC ECU.

DI1H0–06

DTC	C1203 / 53	ECM Communication Circuit Malfunction

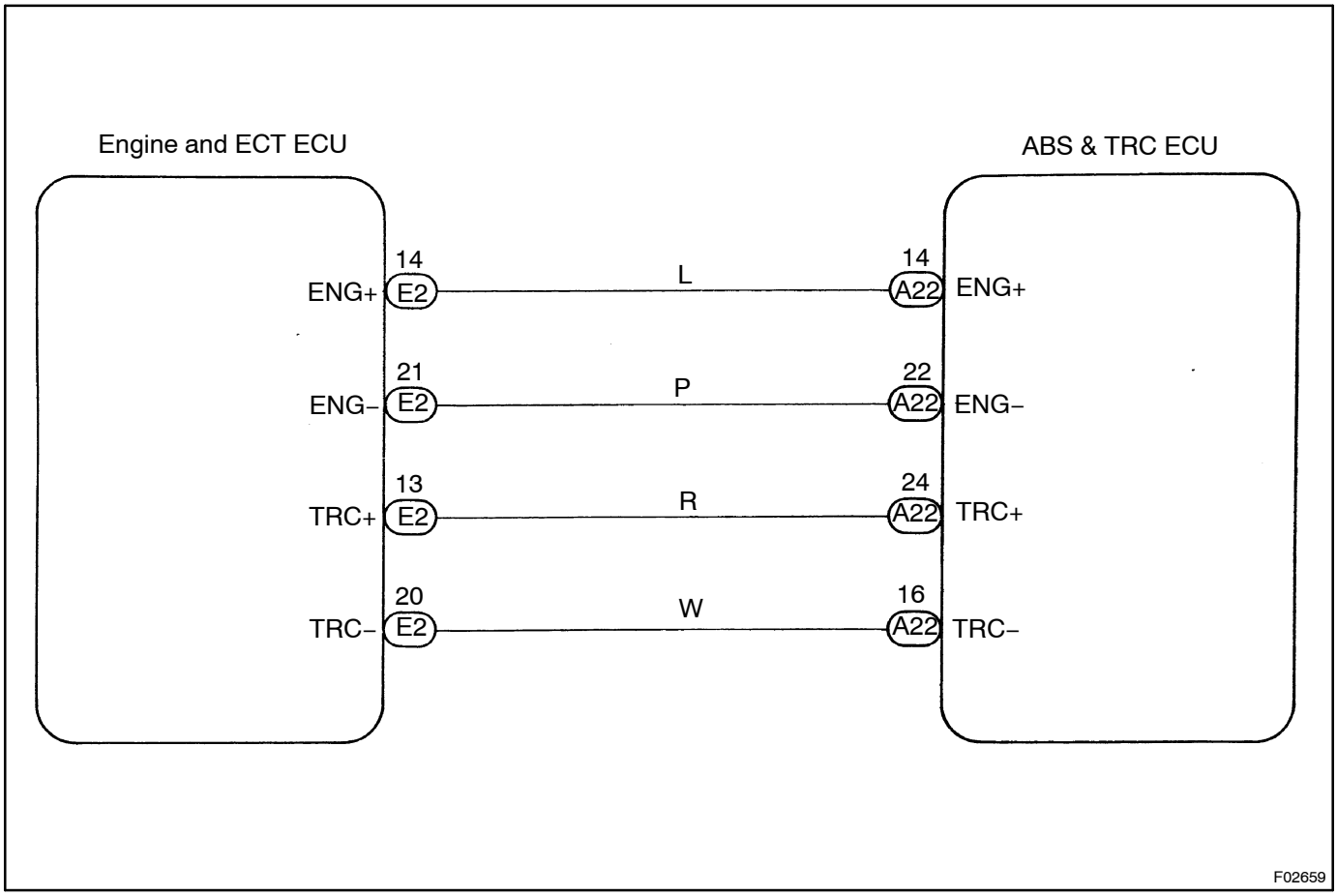
CIRCUIT DESCRIPTION

The circuit is used to send TRC control information from the ABS & TRC ECU to the engine and ECT ECU (TRC+, TRC–), and engine control information from the engine and ECT ECU to the ABS & TRC ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either of the following 1., 2. or 3. continues for 5 sec.: 1. When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to engine and ECT ECU continues for more than 5 sec. 2. When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500 rpm or more and data receipt from engine and ECT ECU is impossible. 3. The condition that the data sent from engine and ECT ECU becomes repeatedly normal and abnormal occurs 10 times or more for 60 sec.	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine and ECT ECU • ABS & TRC ECU

Fail safe function:
If any trouble occurs in the engine and ECT ECU communication circuit, the ECU prohibits TRC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals ENG+, ENG–, TRC+, TRC– of ABS & TRC ECU and engine and ECT ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace engine and ECT ECU or ABS & TRC ECU.

DI1H3-05

DTC	C1223/43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223/43	ABS control system is abnormal.	• ABS control system

INSPECTION PROCEDURE

1	Check the DTC for the ABS (See page DI–223).

*1 → Repair ABS control system according to the code output.

*2

Check for ECU connected to malfunction indicator lamp.

*1: Output NG code
*2: Malfunction indicator lamp remains ON

DI1H4–06

DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

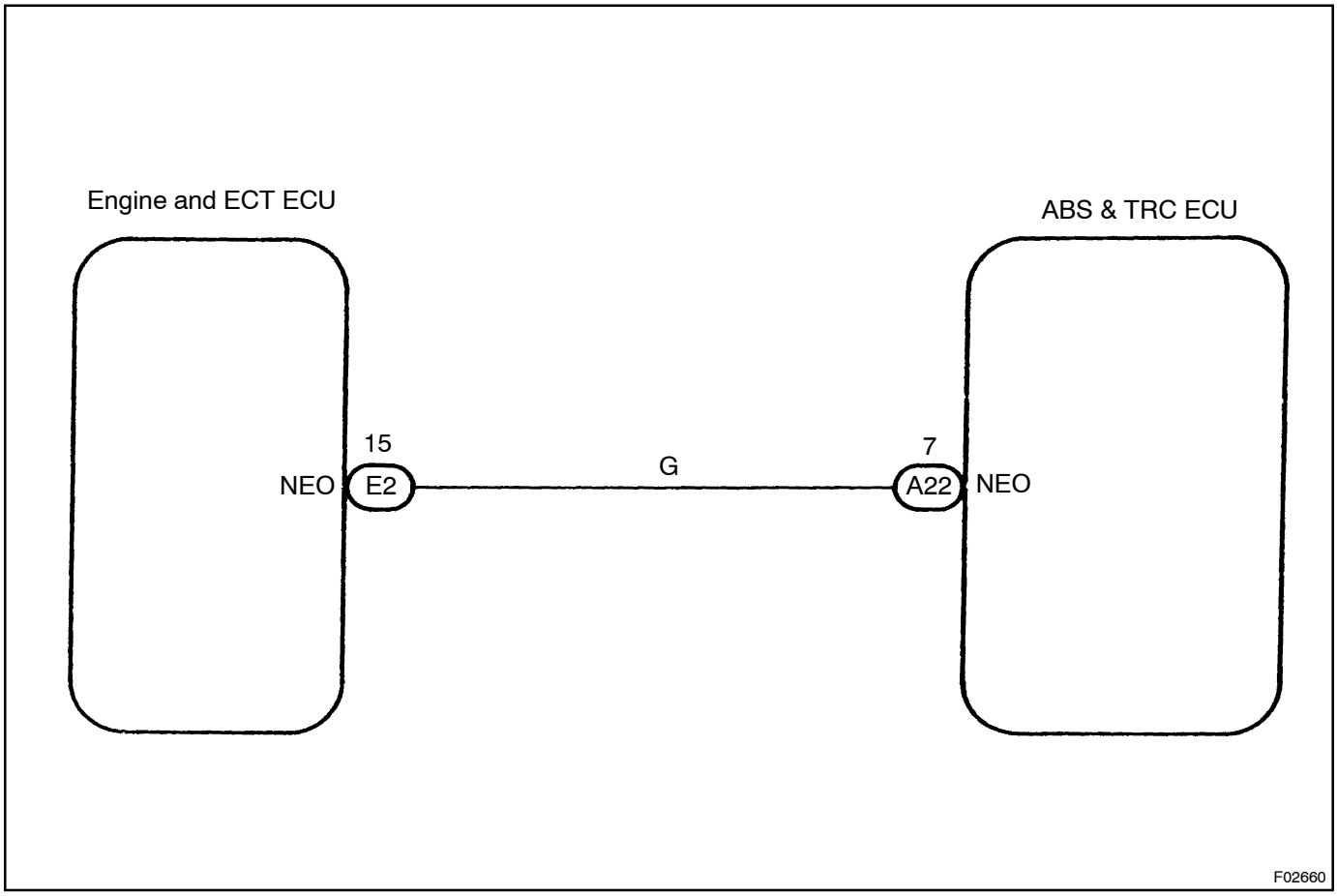
The ABS & TRC ECU receives engine revolution speed signals (NE signals) from the engine and ECT ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When any of the following 1. through 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data receiving from the engine and ECT ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRC is operating and when open or short circuit for engine revolution signal circuit continues for 0.24 sec. or more.	• NEO circuit • Engine and ECT ECU • ABS & TRC ECU

Fail safe function:

If any trouble occurs in the NE signal circuit, the ECU prohibits TRC controls.

WIRING DIAGRAM



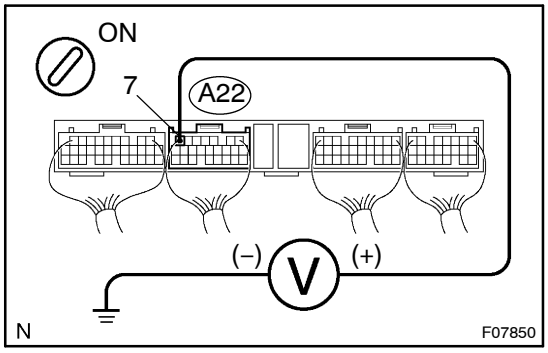
INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals NEO of ABS & TRC ECU and terminal NEO of engine and ECT ECU (See page IN–32).

NG → Repair or replace harness and connector.

OK

2	Check voltage between terminals NEO of ABS & TRC ECU and body ground.



PREPARATION:

(a) Remove the ABS & TRC ECU with connectors still connected.

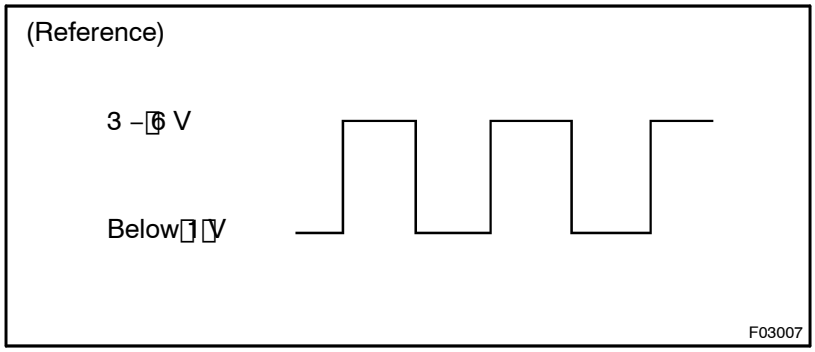
(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal NEO (A22 – 7) of ABS & TRC ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	3 – 6 V ↔ below 1 V (Pulse)



NG → Check and replace ABS & TRC ECU or engine and ECT ECU.

OK

If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

DI0WV–06

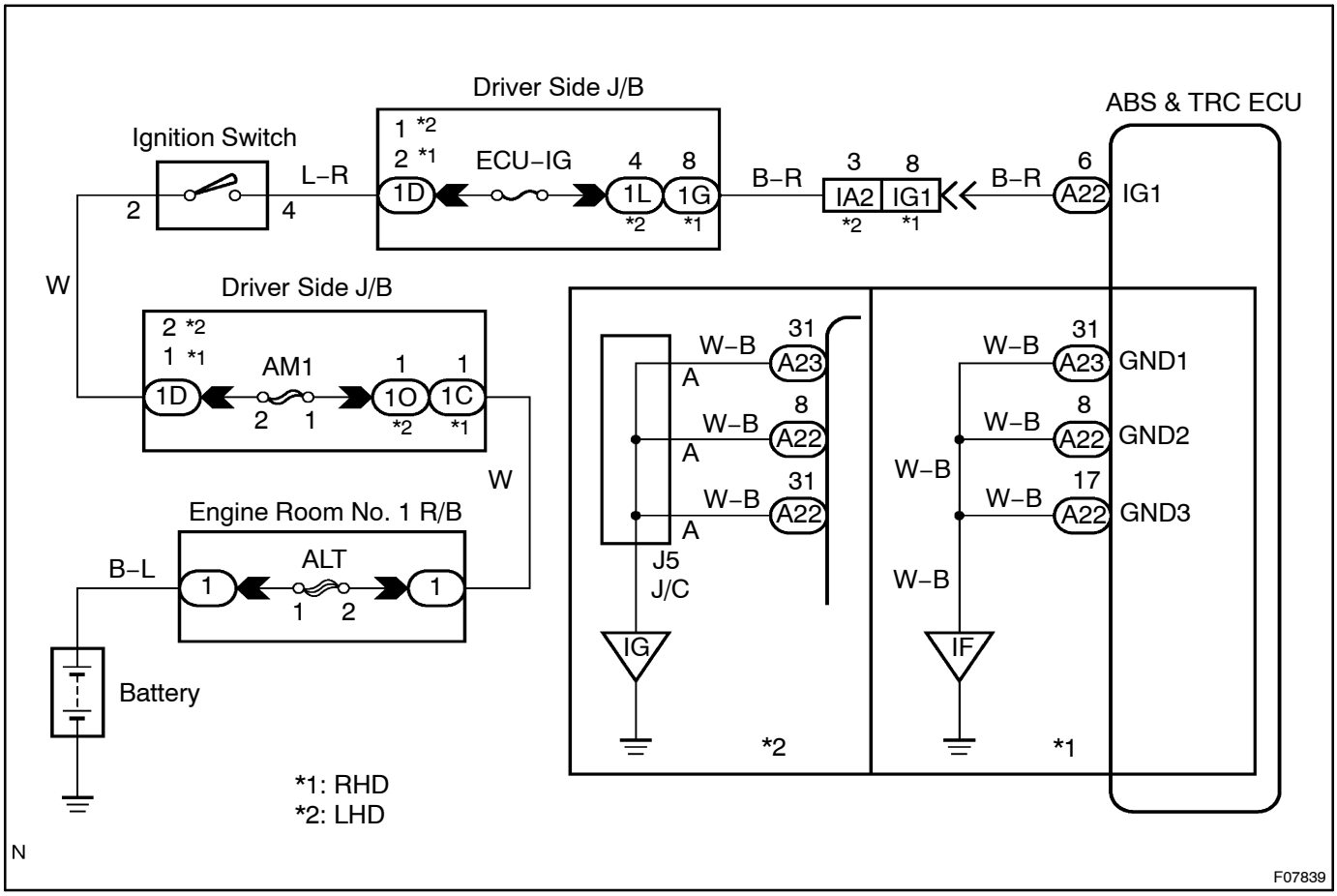
DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. through 4.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains at below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more. 3. The condition that ECU terminal IG1 voltage is more than 17.2 V continues for 1.2 sec ore more. 4. While the solenoid relay outputs ON signal, ECU terminal IG1 voltage becomes more than 17.2 V, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit • ABS & TRC ECU

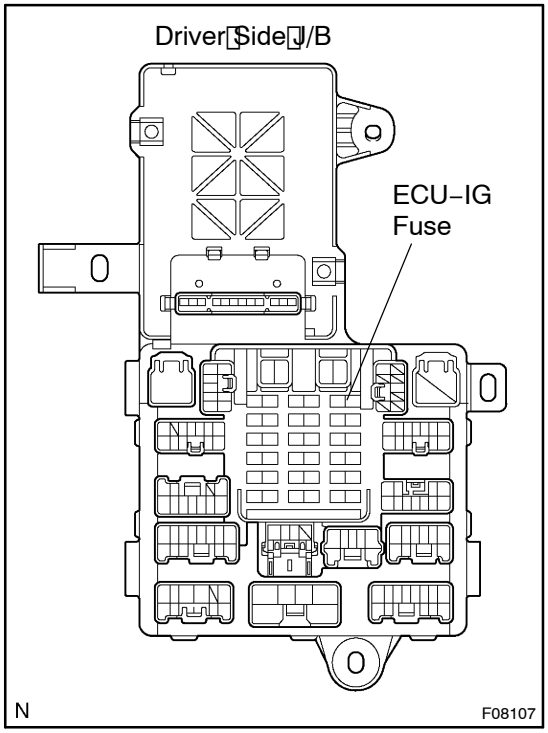
Fail safe function:
If any trouble occurs in the power source circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:
Remove ECU–IG fuse from driver side J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page CH–1).**

OK

3	**Check voltage of the ECU IG power souce.**

In case of using the hand–held tester.

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the DATALIST mode on the hand–held tester.

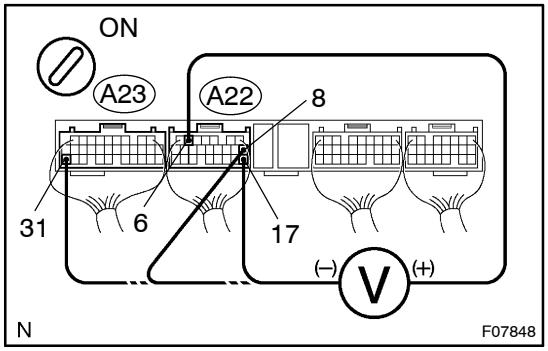
CHECK:

Check the voltage condition output from the ECU displayed by the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove the ABS & TRC ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 (A22 – 6) and GND (A23 – 31, A22 – 8, 17) of ABS & TRC ECU.

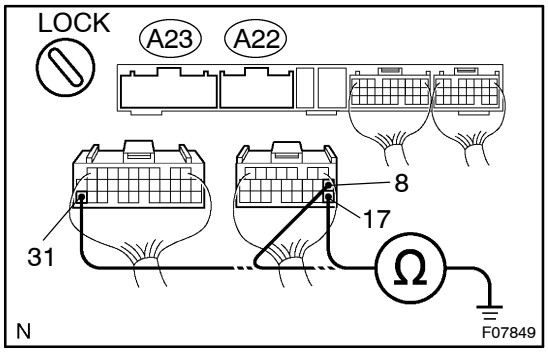
OK:

Voltage: 10 – 14 V

OK → **Ignition switch OFF, check and replace ABS & TRC ECU.**

NG

4	**Check continuity between terminal GND of ABS & TRC ECU connector and body ground.**



CHECK:

(a) Disconnect the 2 connectors (A22, A23) from the ABS & TRC ECU.

(b) Measure resistance between terminal GND (A22 – 8, 17, A23 – 31) of ABS & TRC ECU connector and body ground.

OK:

Resistance: 1 Ω or less

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

OK

Check for open circuit in harness and connector between ABS & TRC ECU and battery (See page IN–32).

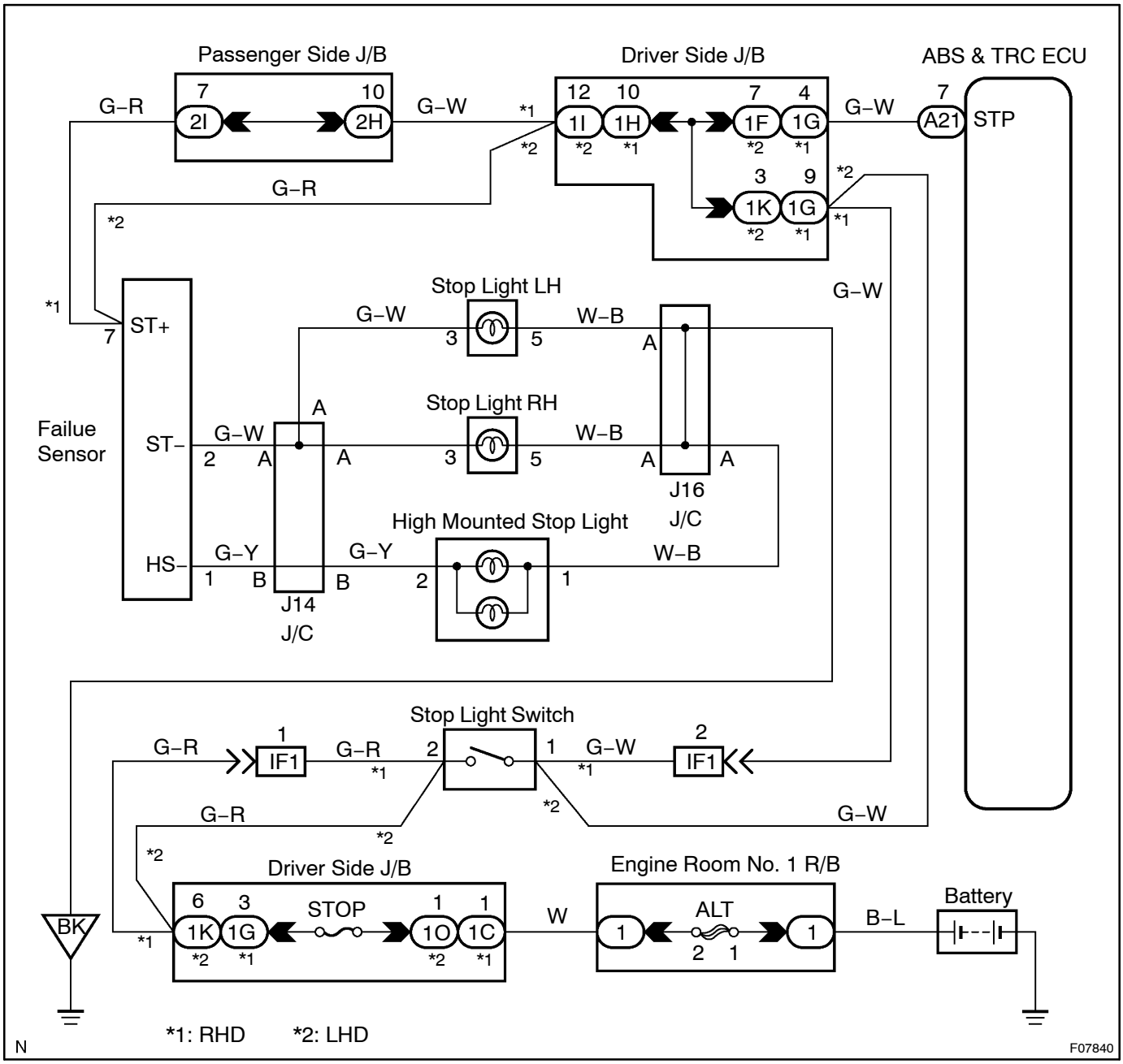
DI0WX–07

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non–operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	• Stop light switch • Stop light switch circuit • ABS &TRC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of the stop light switch.

CHECK:
Check that the stop light lights up when brake pedal is depressed and turns off when the brake pedal is released.

OK → Go to step 3.

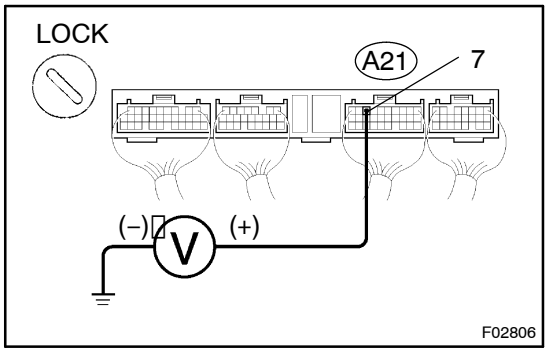
NG

2	Check stop light circuit (See page BE–65).

NG → Repair or replace stop light circuit.

OK

3	Check voltage between terminal STP of ABS & TRC ECU and body ground.



PREPARATION:
Remove ABS & TRC ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP (A21 – 7) of ABS & TRC ECU and body ground when brake pedal is depressed.
OK:
Voltage: 8 – 14 V

OK → Check and replace ABS & TRC ECU.

NG

4	Check for open circuit in harness and connector between ABS & TRC ECU and stop light switch (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table (See page DI–233).

DI1GO–04

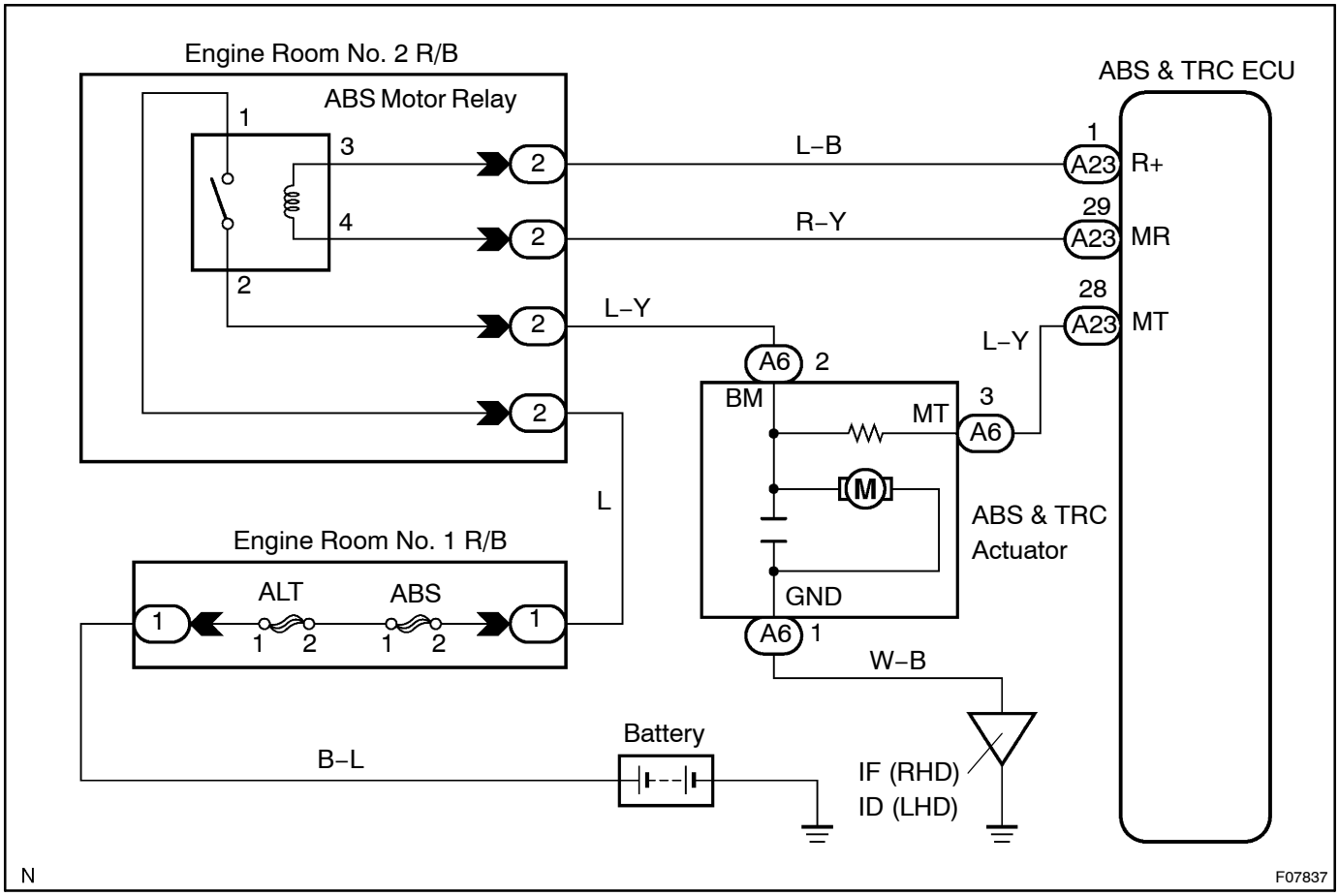
DTC	C1251 / 51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. Actuator drive motor is not operating normally. 2. Open circuit condition of actuator drive motor continues for 2 sec. or more.	• ABS & TRC Actuator • ABS & TRC Actuator Circuit

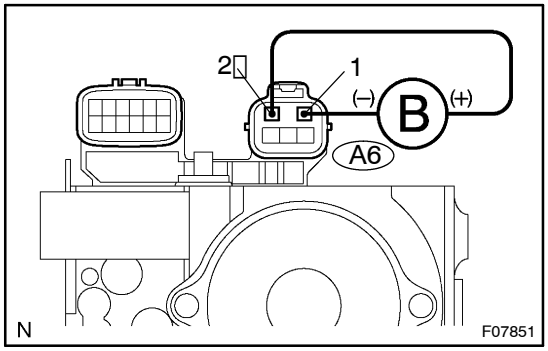
Fail safe function:
If any trouble occurs in the ABS pump motor, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of pump motor.**



PREPARATION:

Disconnect the connector from the ABS & TRC actuator.

CHECK:

Connect positive ⊕ lead to BM (A6 – 2) terminal and negative ⊖ lead to GND (A6 – 1) terminal of the ABS & TRC actuator, check that the pump motor is operated.

OK:

The running sound of the pump motor should be heard.

OK	**Check for open circuit in harness and connector between ABS motor relay, ABS & TRC actuator and ABS & TRC ECU (See page IN–32).**

NG

Replace ABS & TRC actuator.

DI0CG–04

DTC	Always ON	ABS & TRC ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	ABS & TRC ECU internal malfunction is detected.	• ABS & TRC ECU

Fail safe function:
If any trouble occurs in the ECU, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control and TRC control.

INSPECTION PROCEDURE

1	Is DTC output?

Check DTC on page DI–223.

YES → **Repair circuit indicated by the code output.**

NO

2	Is normal code displayed?

YES → **Check solenoid relay. Check for short circuit in harness and connector between solenoid relay and check connector (See page IN–32).**

NO

3	Does ABS warning light go off?

YES → **Check for open or short circuit in harness and connector between ECU–IG fuse and ABS & TRC ECU (See page IN–32).**

NO

4	**Check battery voltage.**

CHECK:

Check the battery voltage.

OK:

10 – 14 V

NG → **Check and repair the charging system (See page CH–1).**

OK

5	**Check ABS warning light.**

PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the connector from the ABS & TRC ECU.

(c) Turn the ignition switch ON.

CHECK:

Check the ABS warning light goes off.

OK → **Check and replace ABS & TRC ECU.**

NG

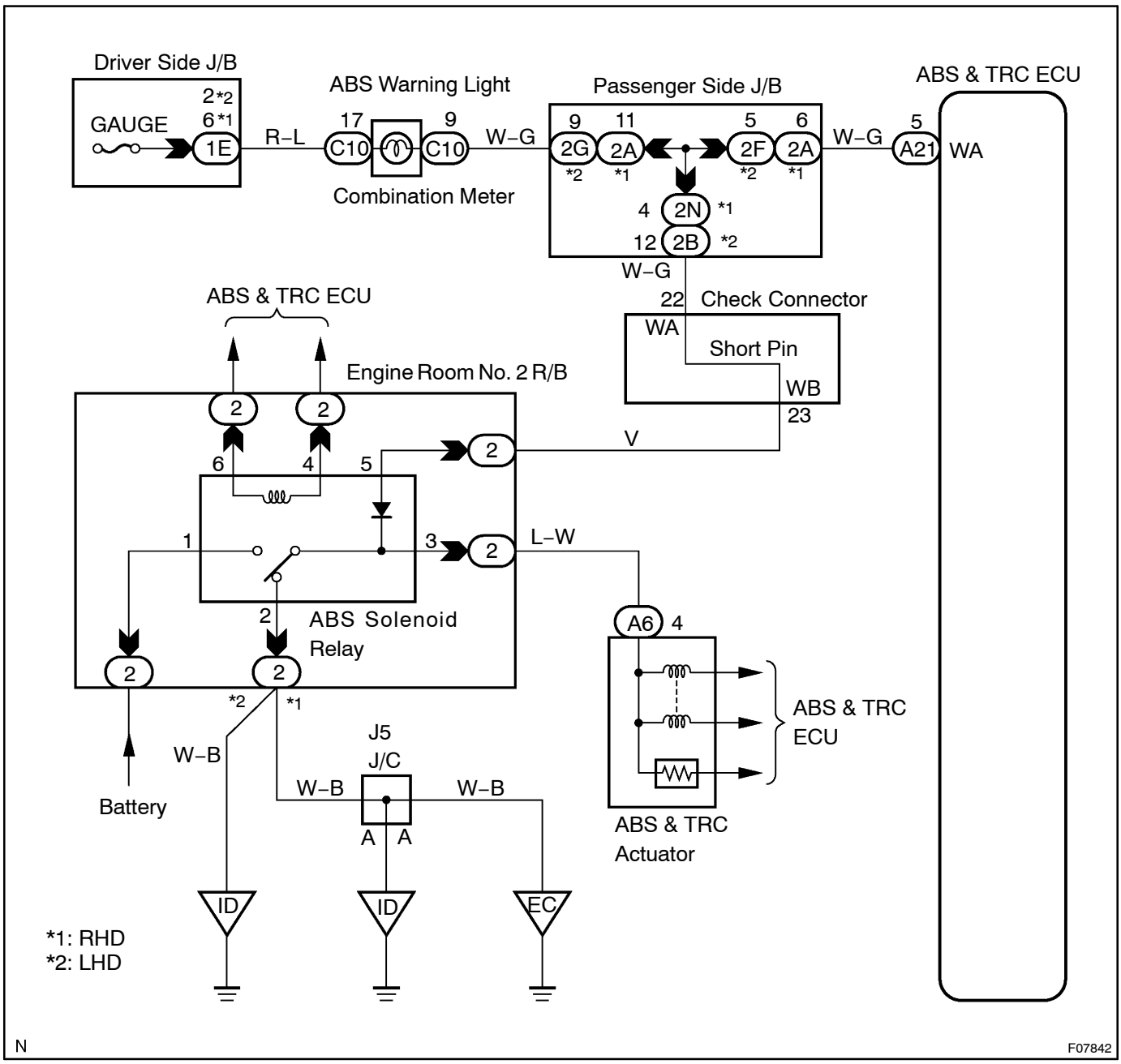
Check for short circuit in harness and connector between ABS warning light, check connector, DLC3 and ABS & TRC ECU (See page IN–32).

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects a trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.
Connect terminals Tc and E_1 of the check connector or DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	*1
ABS warning light remains on	*2

*1: Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

*2: After inspection with step 4, start the inspection from step 5 in case of using the hand–held tester and start from step 6 in case of not using hand–held tester.

1	**Check operation of the ABS warning light.**

PREPARATION:

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

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the hand–held tester.

OK → **Check and replace ABS & TRC ECU.**

NG

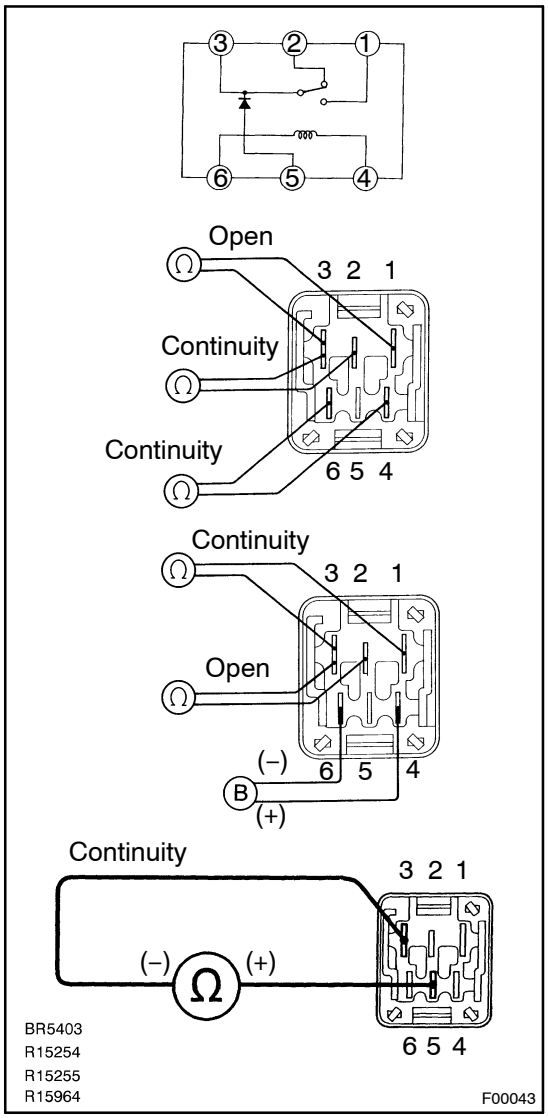
2	**Check ABS warning light.**

See combination meter troubleshooting (See page BE–2).

NG → **Repair bulb or combination meter assembly (See page BE–80).**

OK

3	Check ABS solenoid relay.



PREPARATION:

Remove ABS solenoid relay from engine room No. 2 R/B.

CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 30 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

CHECK:

Connect the ⊕ test lead to terminal 5 and the ⊖ lead to terminal 3. Check continuity between the terminals.

OK:

Continuity

If no continuity exists, connect the ⊖ test lead to terminal 5 and the ⊕ lead to terminal 3. Recheck continuity between terminals.

NG → **Ignition switch OFF, replace ABS solenoid relay.**

OK

Repair or replace and check for open circuit in harness and connector between check connector and ABS solenoid relay and body ground (See page IN–32).

4	Check that the ABS & TRC ECU connectors are securely connected to the ABS & TRC ECU.

NO → Connect the connector to the ABS & TRC ECU.

YES

5	Check operation of the ABS warning light (See step 1).

OK → Check and replace ABS & TRC ECU.

NG

6	Is DTC output?

Check DTC on page DI–223.

YES → Repair circuit indicated by the output code.

NO

7	Does ABS warning light go off if short pin is removed?

NO → Check for short circuit in harness and connector between warning light and check connector and ABS & TRC ECU (See page IN–32).

YES

8	Check ABS solenoid relay (See step 3).

NG → Ignition switch OFF, replace ABS solenoid relay.

OK

Check for short circuit in harness and connector between check connector and ABS solenoid relay (See page IN–32).

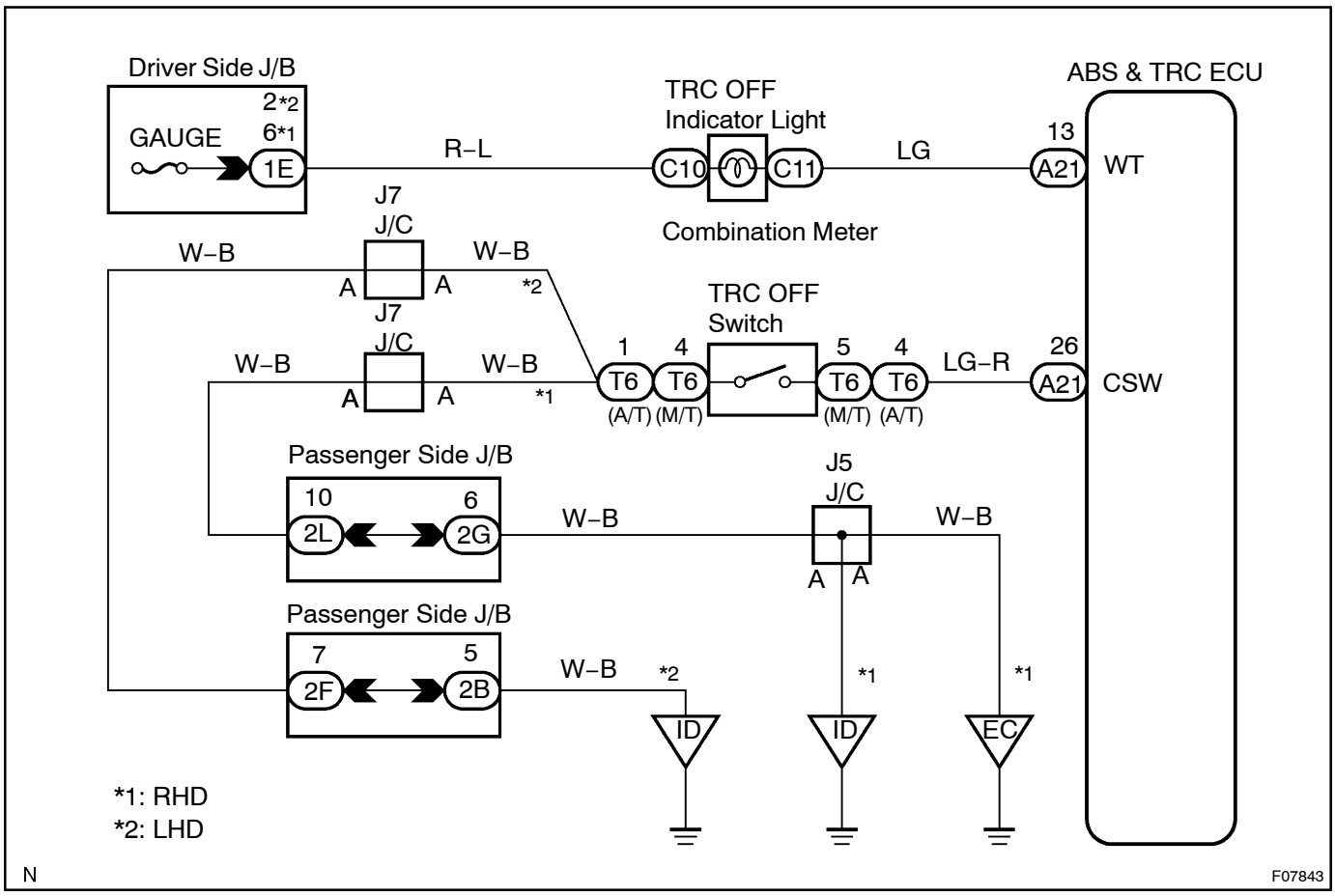
DI559–02

TRC OFF Indicator, TRC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRC control main switch. When the TRC cut switch is pushed on, TRC control goes off and the TRC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the TRC OFF indicator light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

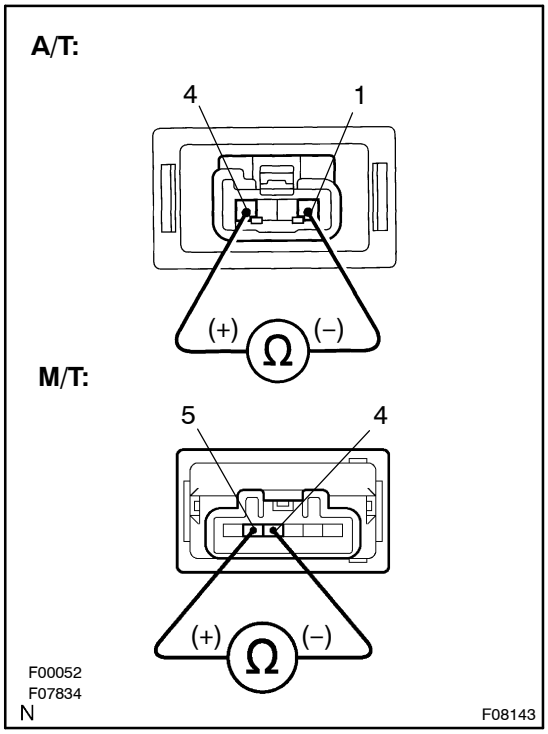
CHECK:

Check that ”ON” and ”OFF” of the TRC OFF indicator light can be shown on the combination meter by the hand–held tester.

NG → **Go to step 4.**

OK

2	**Check TRC OFF switch.**



PREPARATION:

Remove the TRC OFF switch and disconnect the connector from the TRC OFF switch.

CHECK:

Measure resistance between terminals 1 and 4 (A/T) or 4 and 5 (M/T) of TRC OFF switch when TRC OFF switch is on and off.

OK:

TRC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRC OFF switch.**

OK

3	Check for open and short circuit in harness and connector between terminal CSW of ABS & TRC ECU and TRC OFF switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check TRC OFF indicator light.

See combination meter troubleshooting on page BE–2.

NG → Repair bulb or combination meter assembly (See page BE–80).

OK

5	Check for open and short circuit in harness and connector between terminal WT of ABS & TRC ECU and TRC OFF indicator light (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC ECU.

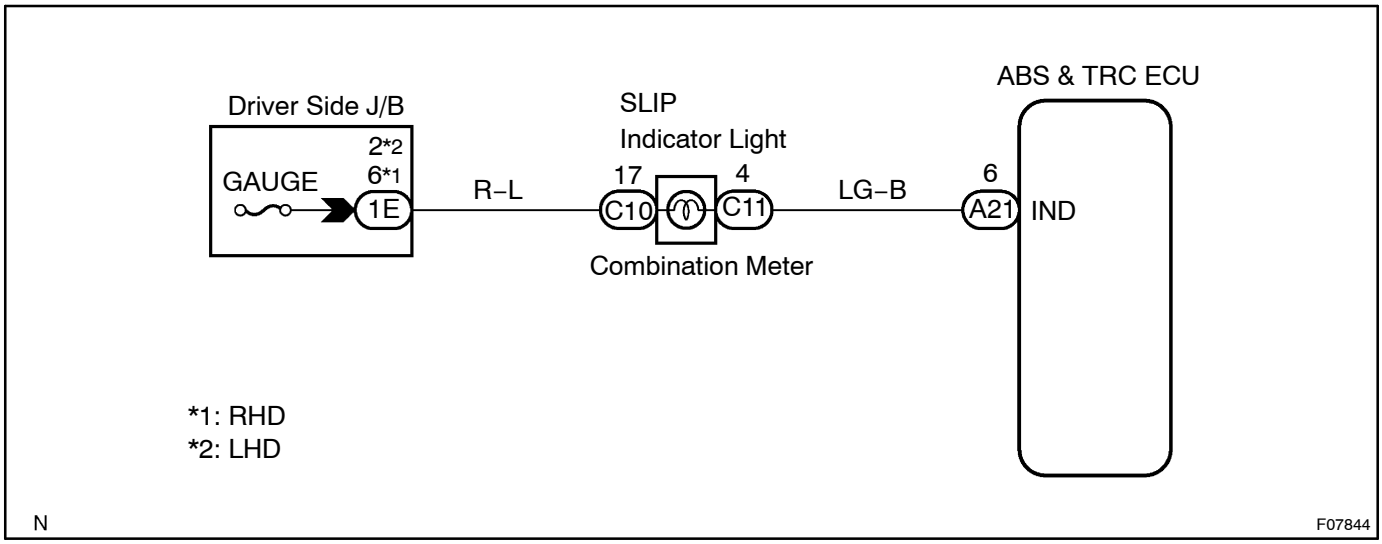
DI55A–02

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the SLIP indicator light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the SLIP indicator light can be shown on the combination meter by the hand–held tester.

OK → **Go to step 4.**

NG

2	Check that the SLIP indicator light is ON for 3 seconds soon after ignition switch is turned ON.

OK → Check and replace ABS & TRC ECU.

NG

3	Check SLIP indicator light.

See combination meter troubleshooting on page BE–2.

NG → Repair bulb or combination meter assembly (See page BE–80).

OK

4	Check for open and short circuit in harness and connector between ABS & TRC ECU and SLIP indicator light (See page IN–32).

NG → Repair or replace harness or connector.

OK

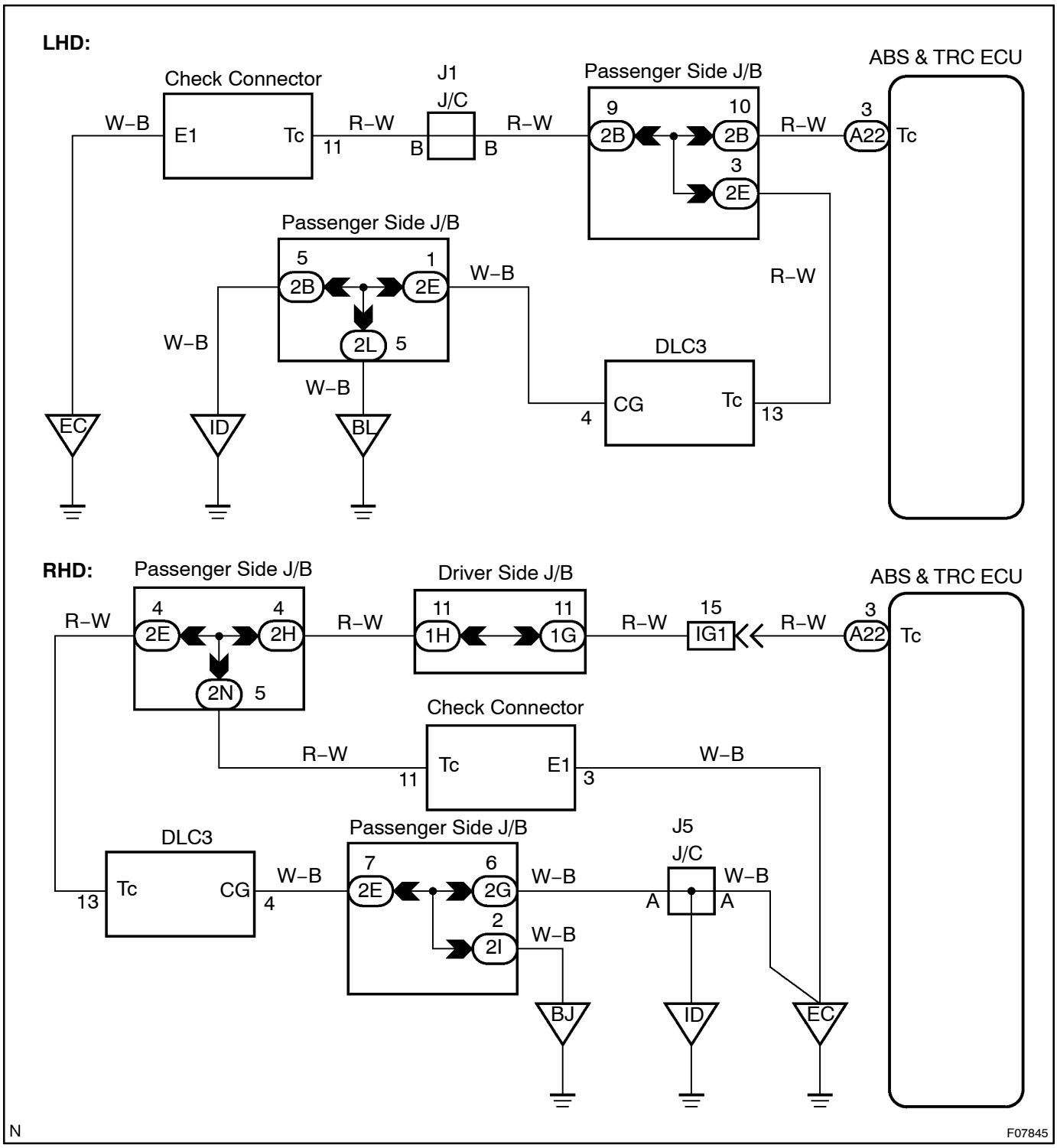
Check and replace ABS & TRC ECU.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

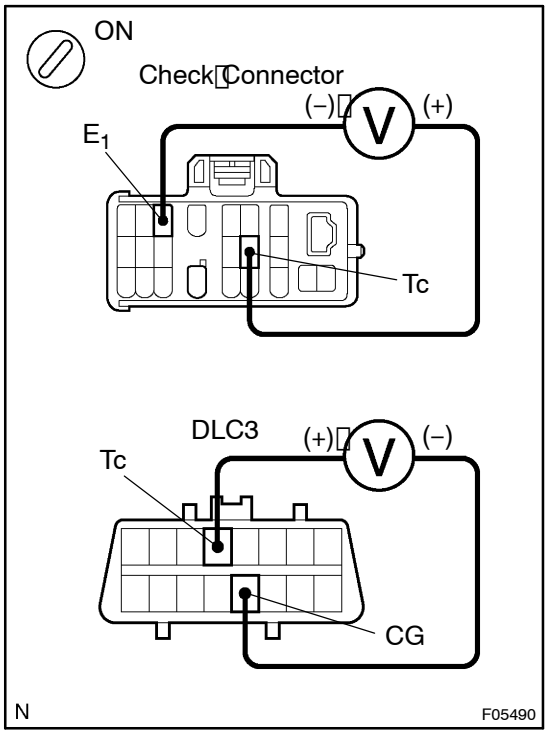
Connecting between terminals Tc and E_1 of the check connector or Tc and CG of the DLC3 causes the ECU to display the DTC by blinking the ABS warning light and TRC OFF indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E_1 of check connector or Tc and CG of DLC3.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Tc and E_1 of check connector or Tc and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK	If ABS warning light does not blink even after Tc and E_1 or Tc and CG have been connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & TRC ECU and check connector or DLC3, check connector or DLC3 and body ground (See page IN–32).

NG	Repair or replace harness or connector.

OK

Check and replace ABS & TRC ECU.

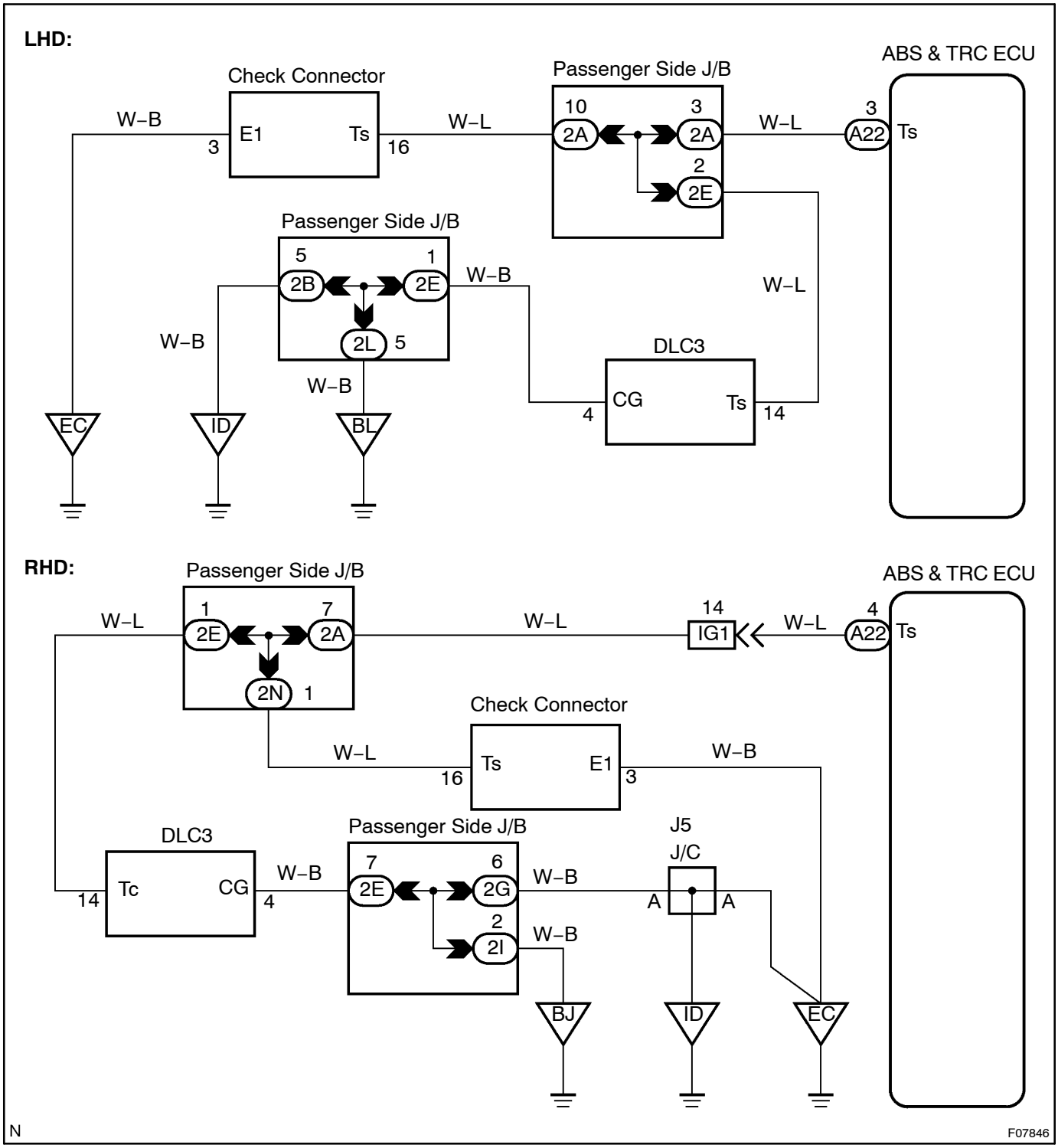
DI0CM–04

Ts Terminal Circuit

CIRCUIT DESCRIPTION

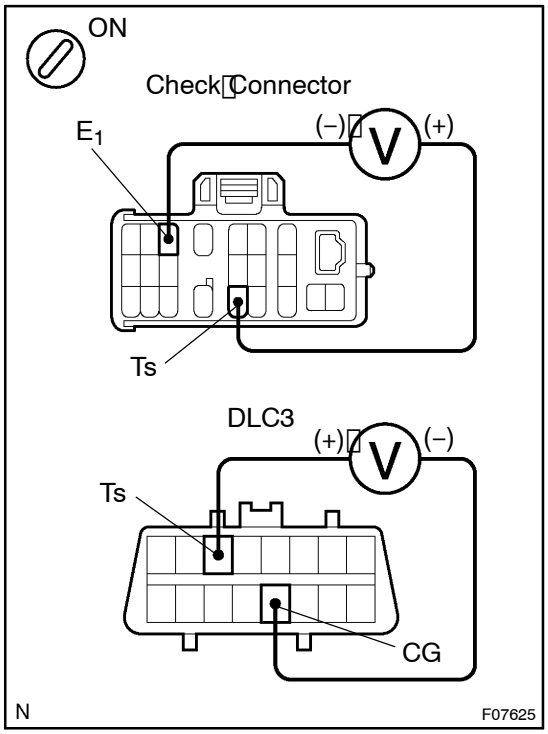
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check. Connecting terminals Ts and E_1 of the check connector or Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and E_1 of check connector or Ts and CG of DLC3.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and E_1 of check connector or Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK	If ABS warning light does not blink even after Ts and E_1 or Ts and CG have been connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & TRC ECU and check connector or DLC3, check connector or DLC3 and body ground (See page IN–32).

NG	Repair or replace harness or connector.

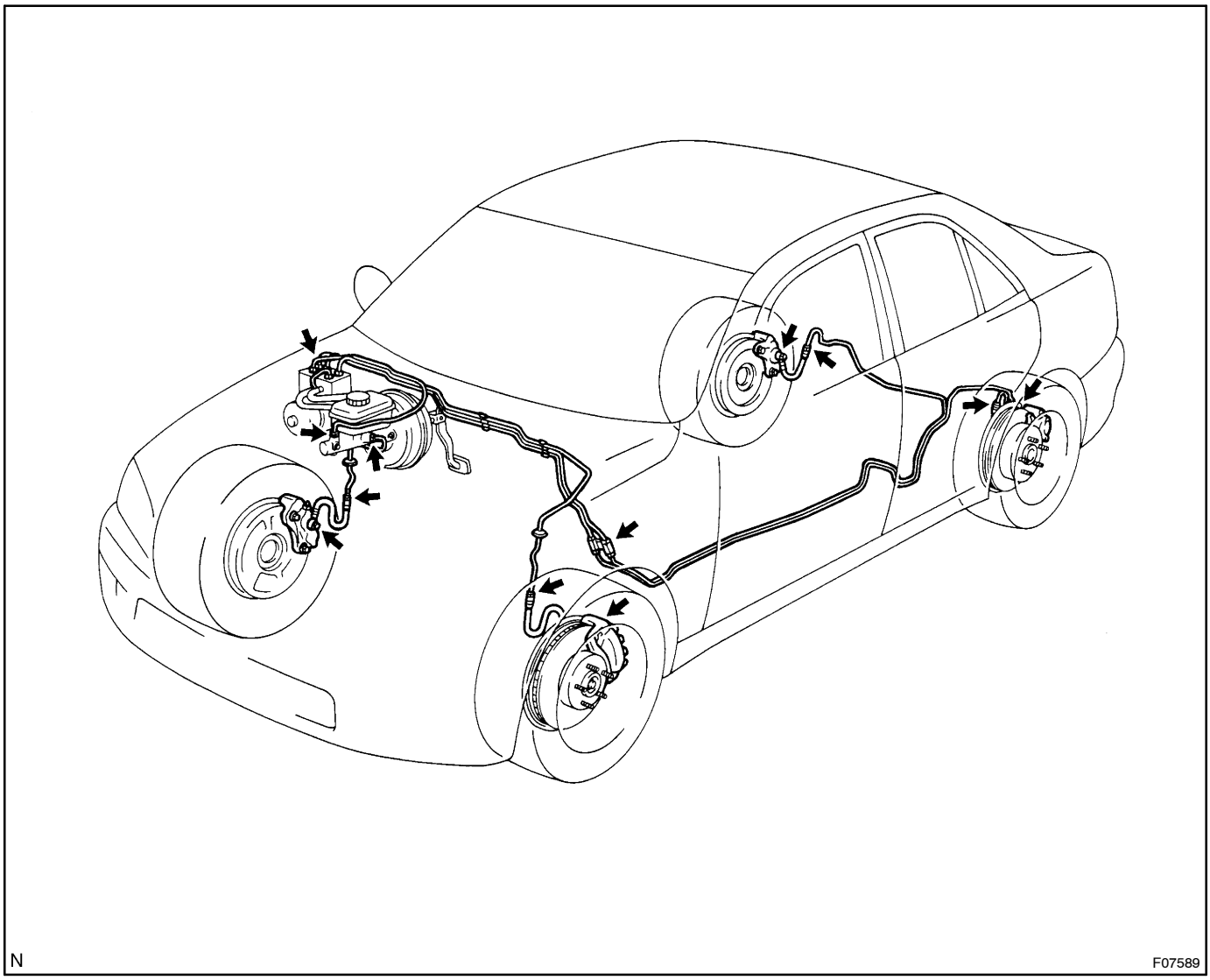
OK

Check and replace ABS & TRC ECU.

DI0CR–04

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



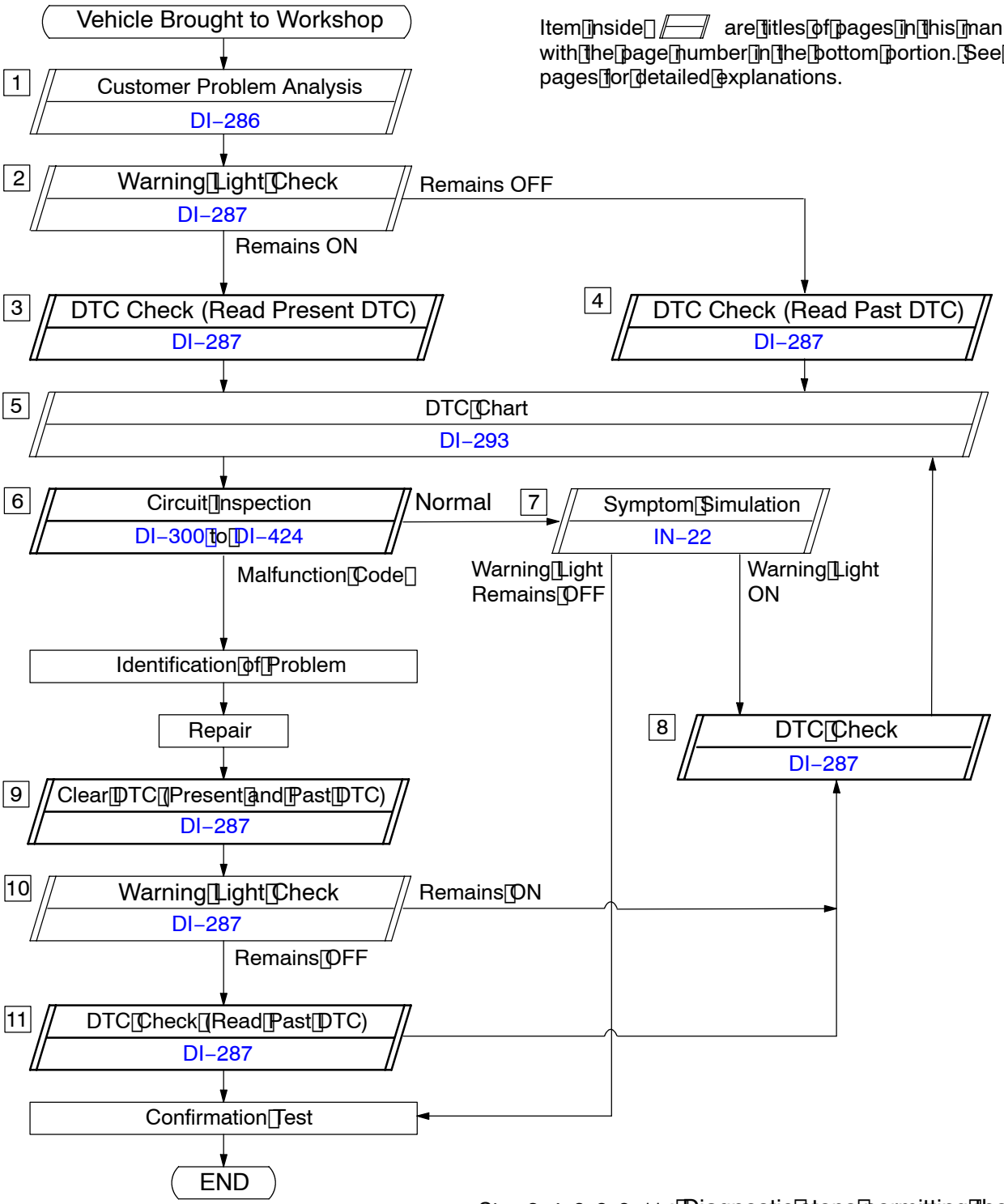
N

F07589

SUPPLEMENTAL RESTRAINT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI4Z2–02



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

Step 3, 4, 6, 8, 9, 11 : Diagnostic steps permitting the use of the hand–held tester.

DI15Z–07

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

Inspector's Name _____

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

Date Problem Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	**Approx.**

Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

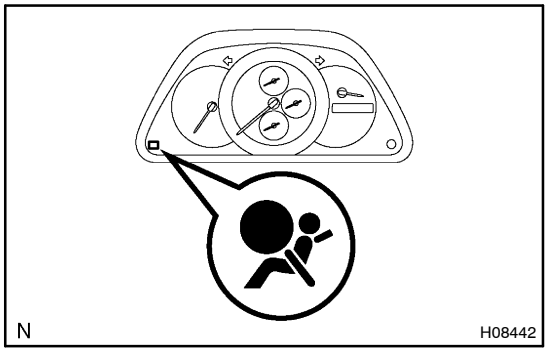
Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	**1st Time**	☐ Remains ON ☐ Sometimes Light Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Light Up ☐ Does Not Light Up
DTC Inspection	**1st Time**	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

DI4L1–04

PRE–CHECK



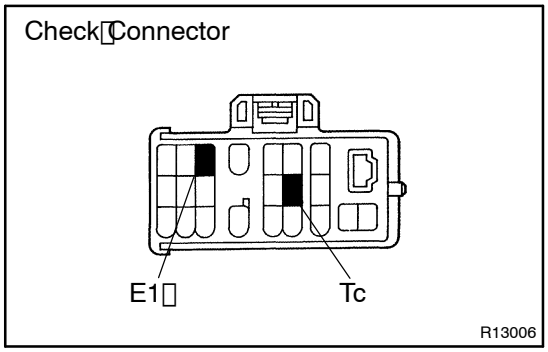
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ACC or ON position and check that the SRS warning light lights up.

(b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the SRS warning light remains on or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on page DI–419.



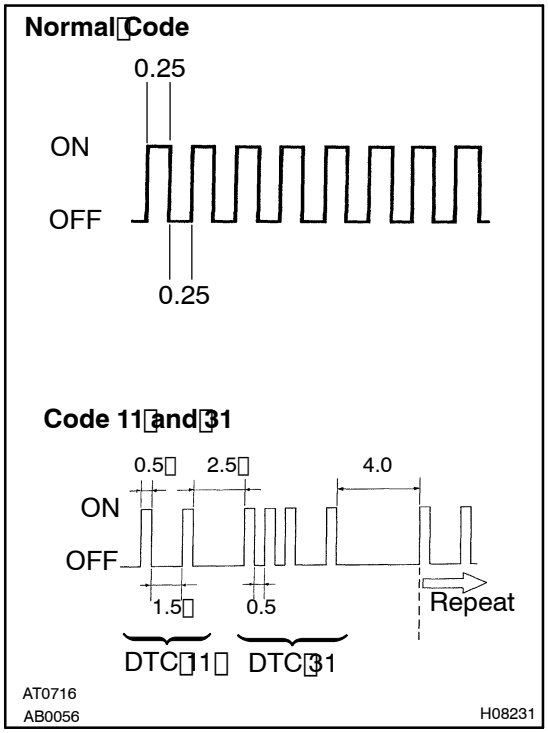
2. DTC CHECK (Using diagnosis check wire)

(a) Present troubles codes:
Output the DTC.
(1) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.
(2) Using SST, connect terminals Tc and E1 of the check connector.
SST 09843–18020

NOTICE:
Pay due attention to the terminal connecting position to avoid a malfunction.

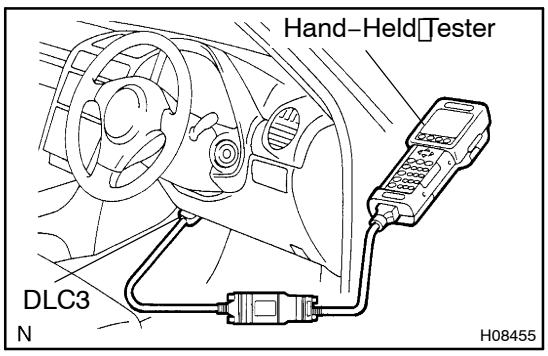
(b) Past troubles codes:
Output the DTC.
(1) Using a service wire, connect Terminals Tc and E1 of the check connector.
SST 09843–18020
(2) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

NOTICE:
Pay due attention to the terminal connecting position to avoid a malfunction.



(c) Read the DTC.
Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.
- Normal code indication
  The light will blink 2 times per second.
- Malfunction code indication
  The first blinking output indicates the first digit of a 2–digit DTC. After a 1.5–second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5–second pause between each code. After all the codes have been output, there will be a 4.0–second pause and they will all be repeated.
HINT:
- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page DI–424.



3. DTC CHECK (Using hand–held tester)

(a) Hook up the hand–held tester to the DLC3.
(b) Read the DTCs by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

4. DTC CLEARANCE (Not using service wire)

When the ignition switch is turned off, the diagnostic trouble code is cleared.
HINT:
DTC might not be cleared by turning the ignition switch OFF. In this case, proceed to the next step.

5. DTC CLEARANCE (Using service wire)

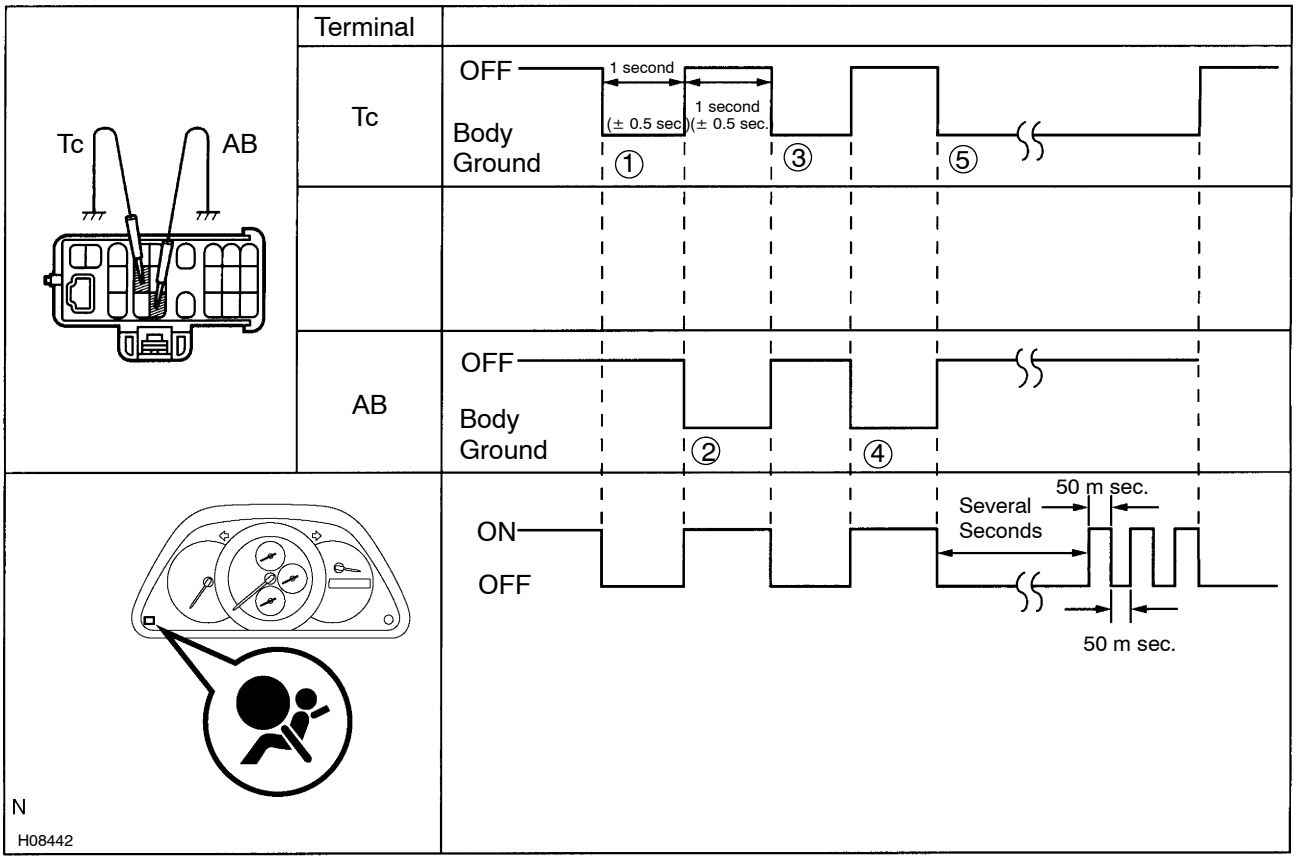
(a) Connect the 2 service wires to terminals Tc and AB of check connector.
(b) Turn the ignition switch to ACC or ON and wait for approx. 6 seconds.

(c) Starting with the Tc terminal, ground alternately terminal Tc and terminal AB twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remains grounded.

HINT:

When alternately grounding terminals Tc and AB, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

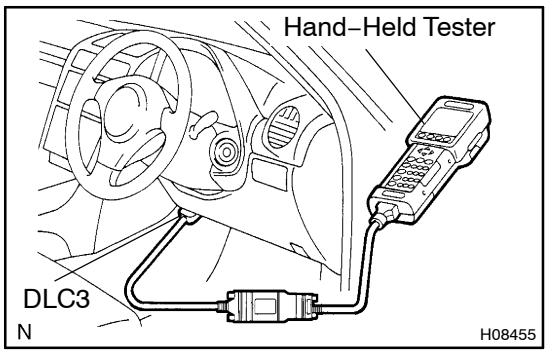
If DTCs are not cleared, repeat the above procedure until the codes are cleared.



H01461

H08501

(d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 m sec. cycle to indicate the codes which have been cleared.



6. DTC CLEARANCE (Using hand–held tester)

(a) Hook up the hand–held tester to the DLC3.

(b) Clear the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the hand–held tester operation's manual for further details.

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

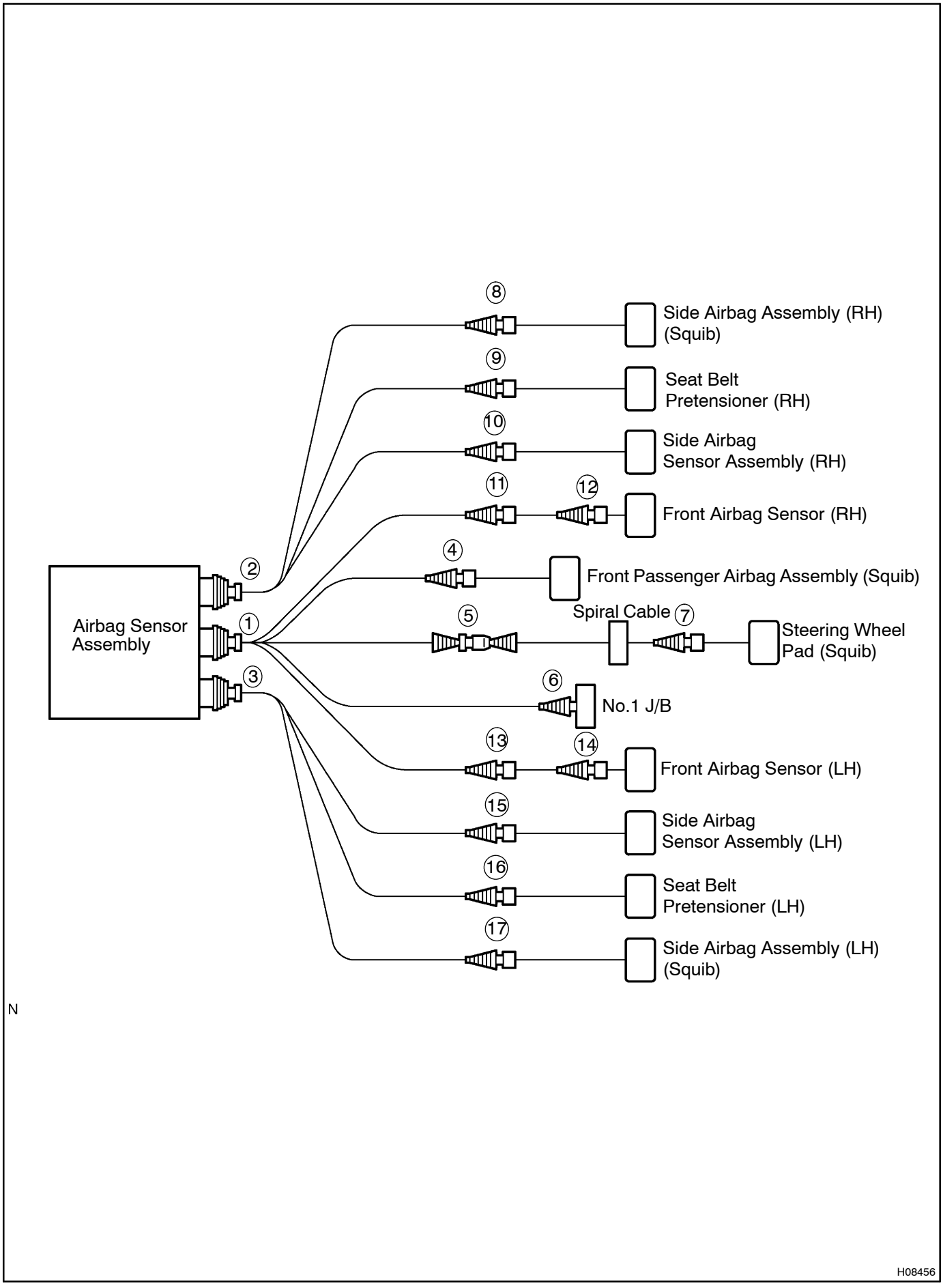
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure as shown in the illustration of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

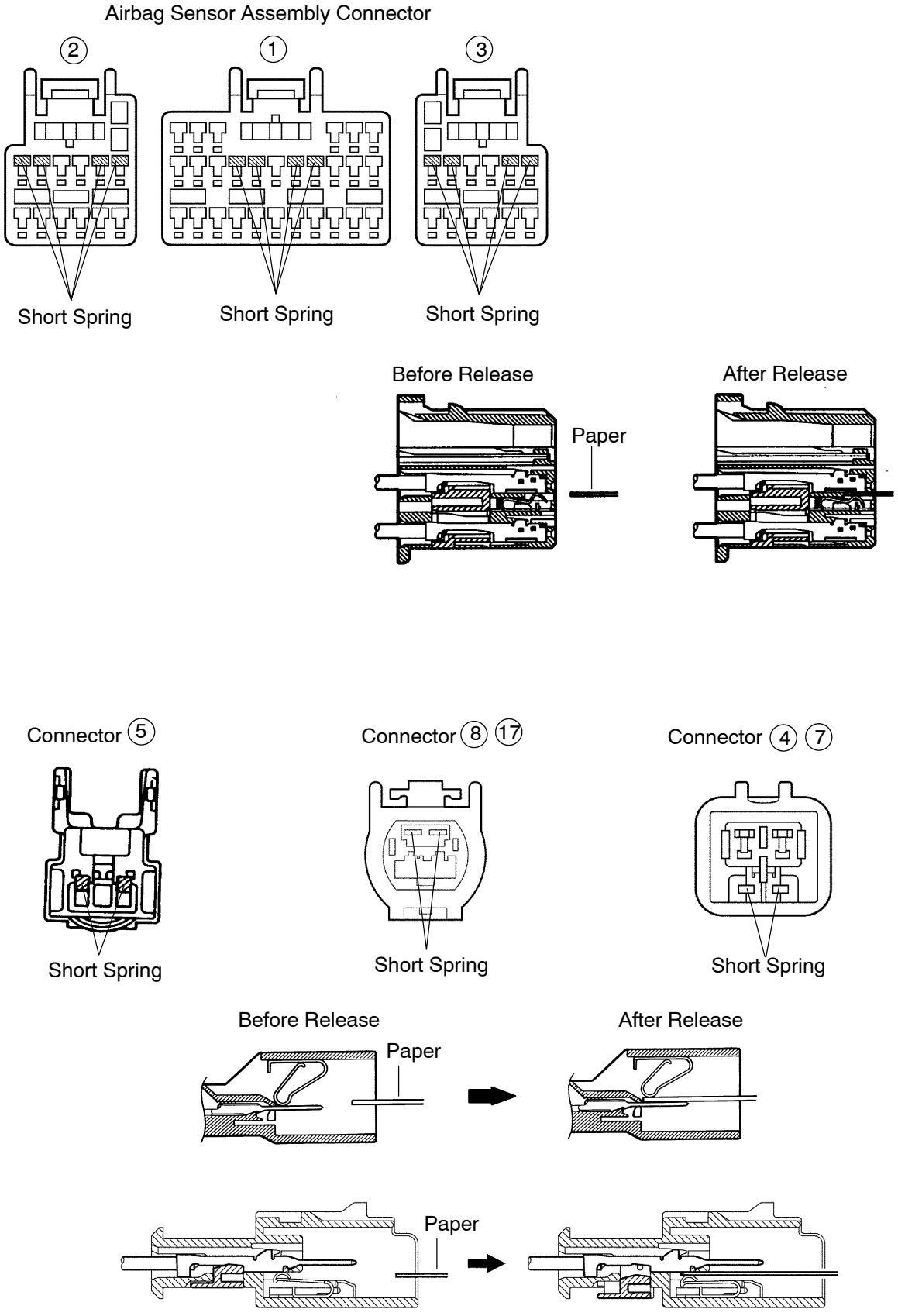
CAUTION:

Never release the airbag activation prevention mechanism on the steering wheel pad connector.

NOTICE:

- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.**


Airbag Sensor Assembly
1
2
3
8
Side Airbag Assembly (RH) (Squib)
9
Seat Belt Pretensioner (RH)
10
Side Airbag Sensor Assembly (RH)
11
12
Front Airbag Sensor (RH)
4
Front Passenger Airbag Assembly (Squib)
5
Spiral Cable 7
Steering Wheel Pad (Squib)
6
No.1 J/B
13
14
Front Airbag Sensor (LH)
15
Side Airbag Sensor Assembly (LH)
16
Seat Belt Pretensioner (LH)
17
Side Airbag Assembly (LH) (Squib)
N
H08456


Airbag Sensor Assembly Connector
2
1
3
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Connector 5
Connector 8 17
Connector 4 7
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Paper
H01356
H01233
AB0130
H00992
AB0045
AB0046
H02249
H02248
H01358

DI1AZ–08

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below. (Proceed to the page given for that circuit.).

DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI–300)	• Short in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI–305)	• Open in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI–309)	• Short in D squib circuit (to Ground)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI–313)	• Short in D squib circuit (to B+)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI–317)	• Short in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI–321)	• Open in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0107/51 (DI–324)	• Short in P squib circuit (to Ground)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0108/52 (DI–327)	• Short in P squib circuit (to B+)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0110/43 (DI–330)	• Short in side squib (RH) circuit	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0111/44 (DI–334)	• Open in side squib (RH) circuit	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0112/41 (DI–337)	• Short in side squib (RH) circuit (to Ground)	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0113/42 (DI–340)	• Short in side squib (RH) circuit (to B+)	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0115/47 (DI–343)	• Short in side squib (LH) circuit	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0116/48 (DI–347)	• Open in side squib (LH) circuit	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink

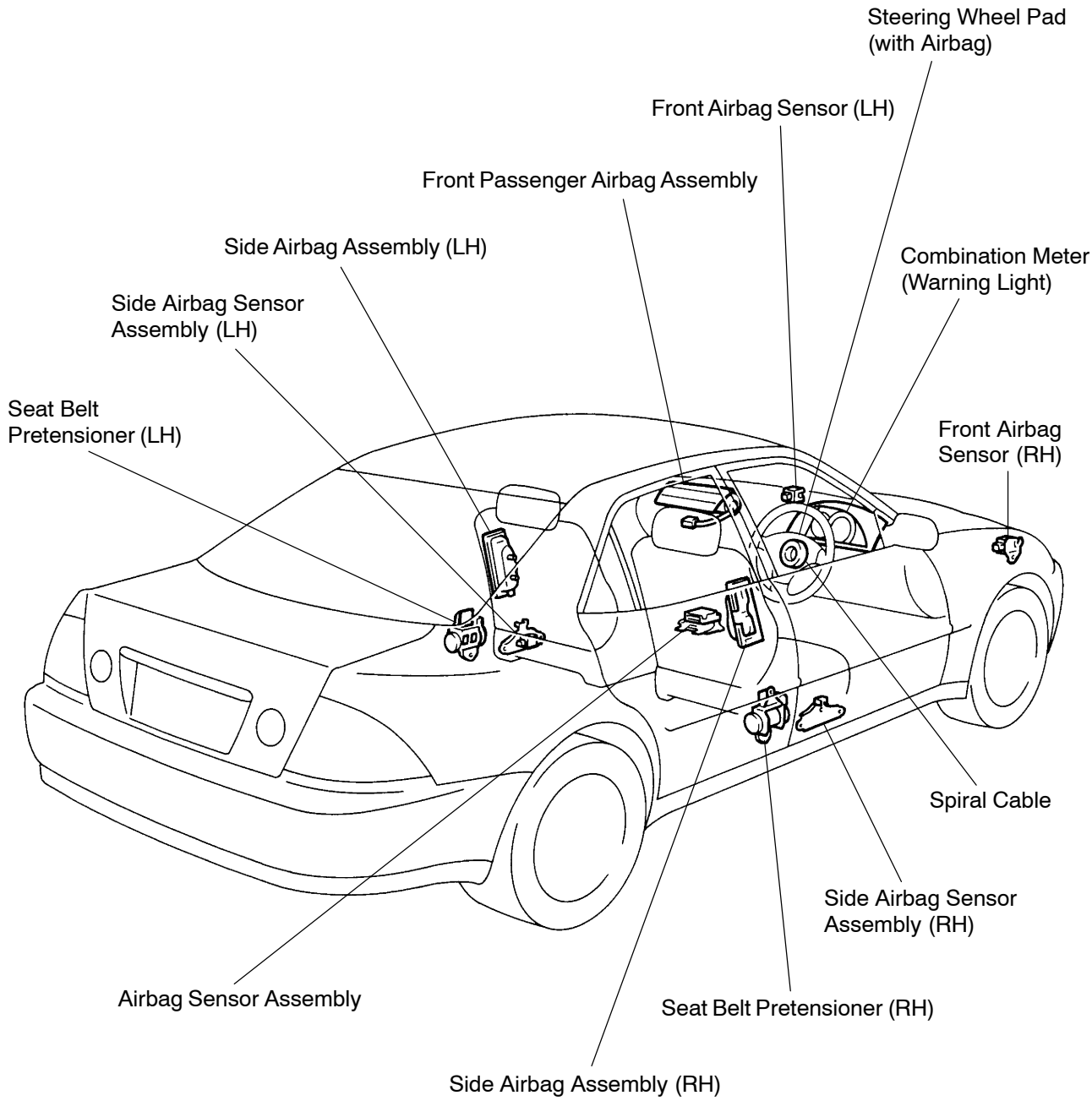
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0117/45 (DI–350)	• Short in side squib (LH) circuit (to Ground)	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0118/46 (DI–353)	• Short in side squib (LH) circuit (to B+)	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0130/63 (DI–356)	• Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0131/64 (DI–360)	• Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0132/61 (DI–363)	• Short in P/T squib (RH) circuit (to Ground)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0133/62 (DI–366)	• Short in P/T squib (RH) circuit (to B+)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0135/73 (DI–369)	• Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0136/74 (DI–373)	• Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0137/71 (DI–376)	• Short in P/T squib (LH) circuit (to Ground)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0138/72 (DI–379)	• Short in P/T squib (LH) circuit (to B+)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B1100/31 (DI–382)	• Airbag sensor assembly malfunction	• Airbag sensor assembly	ON
B1140/32 (DI–384)	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly (RH) • Airbag sensor assembly • Wire harness	Blink
B1141/33 (DI–392)	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly (LH) • Airbag sensor assembly • Wire harness	Blink
B1156/B1157/15 (DI–400)	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Airbag sensor assembly • Wire harness • Engine room main wire haness	ON
B1158/B1159/16 (DI–408)	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Wire harness • Engine room main wire harness	ON
Normal (DI–416)	• System normal	–	OFF
	• Voltage source drop	• Battery • Airbag sensor assembly	ON

HINT:

- When the SRS warning light remains lit up and the DTC is the normal code, this means a voltage source drops.
  This malfunction is not stored in memory by the airbag sensor assembly and if the power source voltage returns to normal, the SRS warning light will automatically go out.
- When 2 or more codes are indicated, the codes will be displayed in numeral order starting from the lowest numbered code.
- If a code not listed on the chart is displayed, the airbag sensor assembly is faulty.

DI1B0–09

PARTS LOCATION

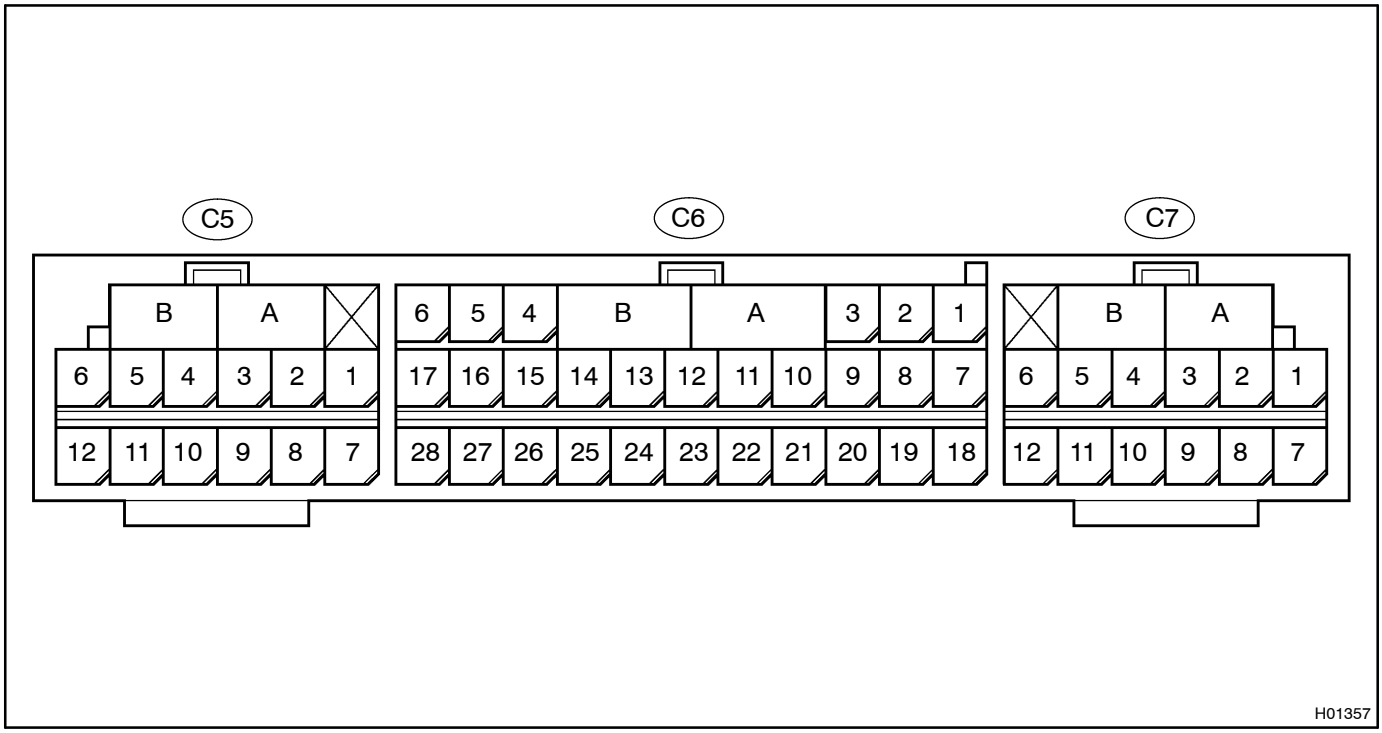


N

H08502

DI1B1–14

TERMINALS OF ECU



No.	Symbol	Terminal Name
A	–	Electrical Connector Check Mechanism
B	–	Electrical Connector Check Mechanism
C6 – 3	LA	SRS Warning Light
C6 – 5	IG2	Power Source (IGN Fuse)
C6 – 6	ACC	Power Source (CIG Fuse)
C6 – 9	SR+	Front Airbag Sensor (RH)
C6 – 10	P+	Squib (Passenger)
C6 – 11	P–	Squib (Passenger)
C6 – 12	SIL	Diagnosis
C6 – 13	D–	Squib (Driver)
C6 – 14	D+	Squib (Driver)
C6 – 15	SL+	Front Airbag Sensor (LH)
C6 – 19	Tc	Diagnosis
C6 – 20	SR–	Front Airbag Sensor (RH)
C6 – 26	SL–	Front Airbag Sensor (LH)
C6 – 27	E1	Ground
C6 – 28	E2	Ground
C5 – 1	PL–	Squib (Seat Belt Pretensioner, LH)
C5 – 2	PL+	Squib (Seat Belt Pretensioner, LH)
C5 – 5	SFL+	Squib (Side, LH)
C5 – 6	SFL–	Squib (Side, LH)
C5 – 7	VUPL	Side Airbag Sensor Assembly (LH)
C5 – 9	SSL	Side Airbag Sensor Assembly (LH)
C5 – 10	FSL	Side Airbag Sensor Assembly (LH)
C5 – 12	ESL	Side Airbag Sensor Assembly (LH)

No.	Symbol	Terminal Name
C7 – 1	SFR–	Squib (Side, RH)
C7 – 2	SFR+	Squib (Side, RH)
C7 – 5	PR+	Squib (Pretensioner, RH)
C7 – 6	PR–	Squib (Pretensioner, RH)
C7 – 7	ESR	Side Airbag Sensor Assembly (RH)
C7 – 9	FSR	Side Airbag Sensor Assembly (RH)
C7 – 10	SSR	Side Airbag Sensor Assembly (RH)
C7 – 12	VUPR	Side Airbag Sensor Assembly (RH)

DI164–24

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
• With the ignition switch in ACC or ON position, the SRS warning light sometimes lights up after approx. 60 seconds have elapsed. • SRS warning light is always lit up even when ignition switch is in the LOCK position.	• SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	DI–419
• With the ignition switch in ACC or ON position, the SRS warning light does not light up.	• SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	DI–419
• DTC is not displayed. • SRS warning light is always lit up at the time of DTC check procedure. • DTC is displayed without Tc and E1 terminal connection.	• Tc terminal circuit	DI–424

DI18Q–14

CIRCUIT INSPECTION

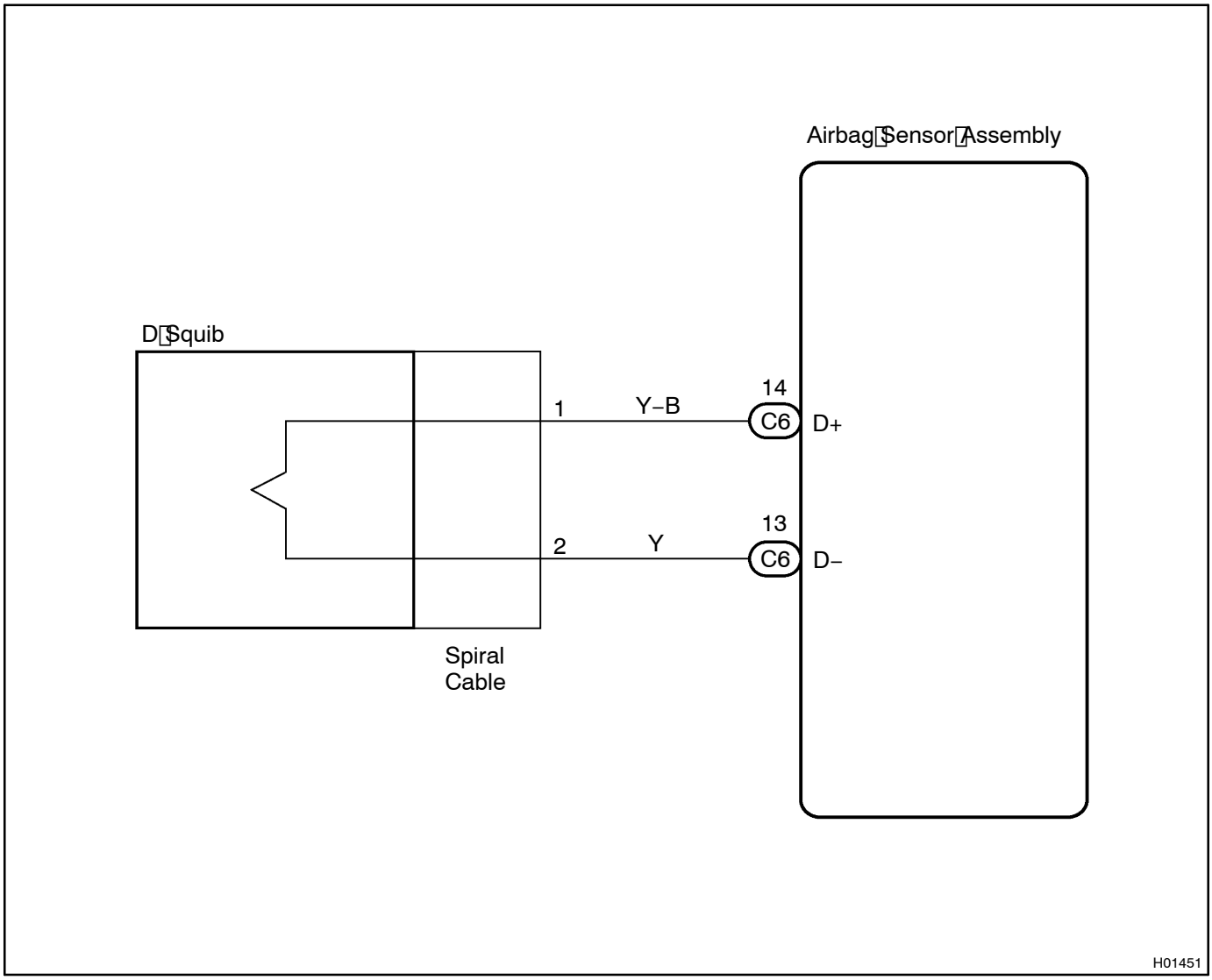
DTC	B0100/13	Short in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0100/13 is recorded when a short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	• Short circuit between D+ wire harness and D– wire harness of squib • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

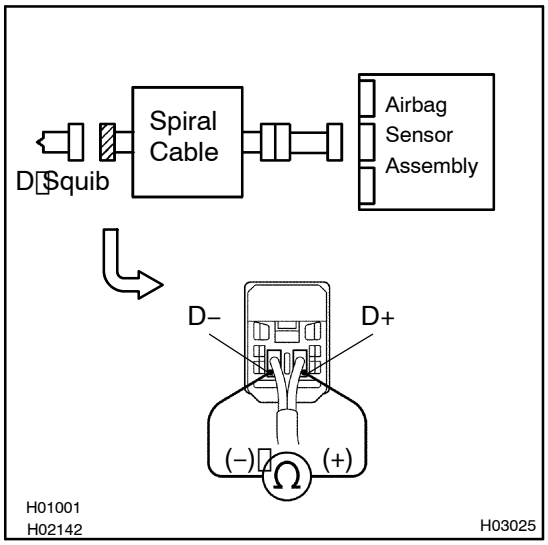
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable.
(See page DI–287)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

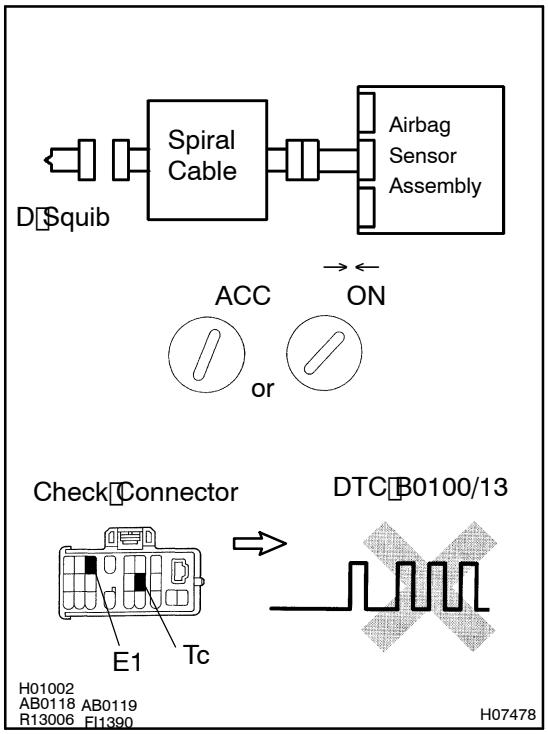
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 5.

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0100/13 is not output.

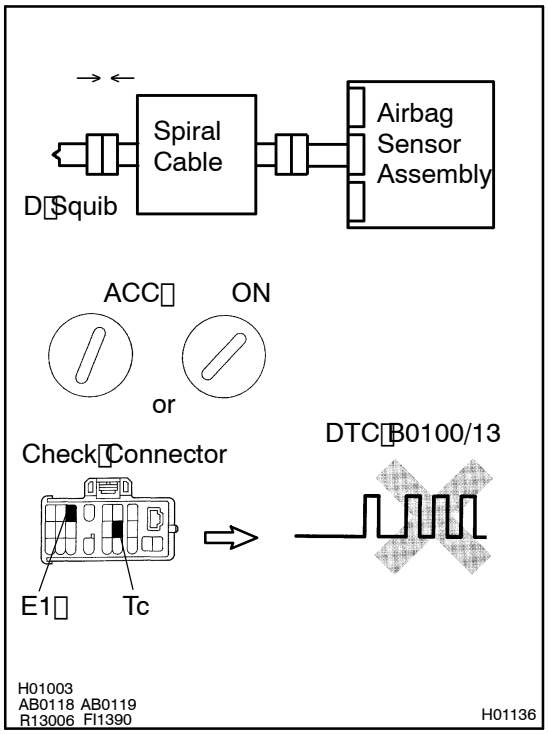
HINT:

Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0100/13 is not output.

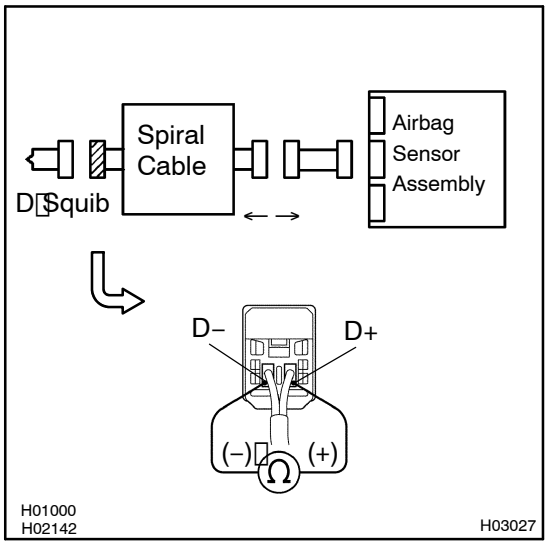
HINT:
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	Check spiral cable.



PREPARATION:

(a) Disconnect the connector between the airbag sensor assembly and the spiral cable.

(b) Release the airbag activation prevention mechanism of the spiral cable connector on the airbag sensor assembly side. (See page DI–287)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

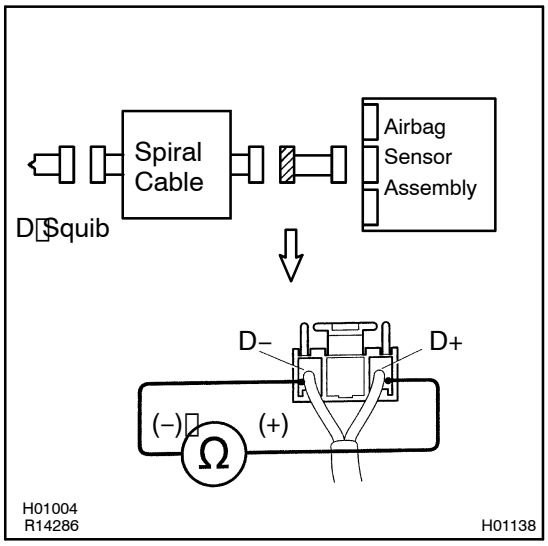
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable.
(See page DI–287)

CHECK:

For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI18R–22

DTC	B0101/14	Open in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0101/14 is recorded when an open is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	• Open circuit in D+ wire harness or D– wire harness of squib • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

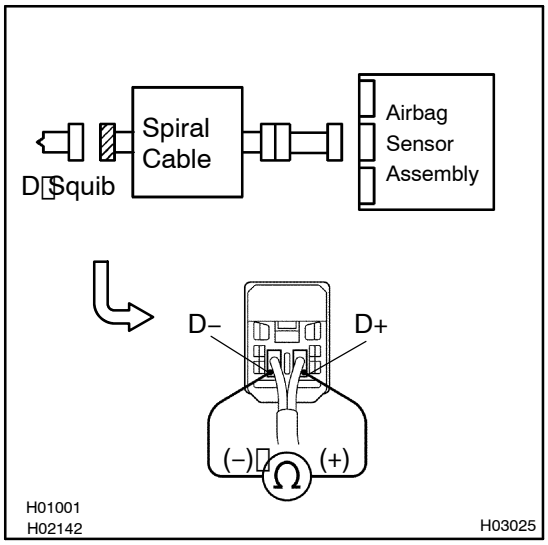
WIRING DIAGRAM

See page DI–300.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.

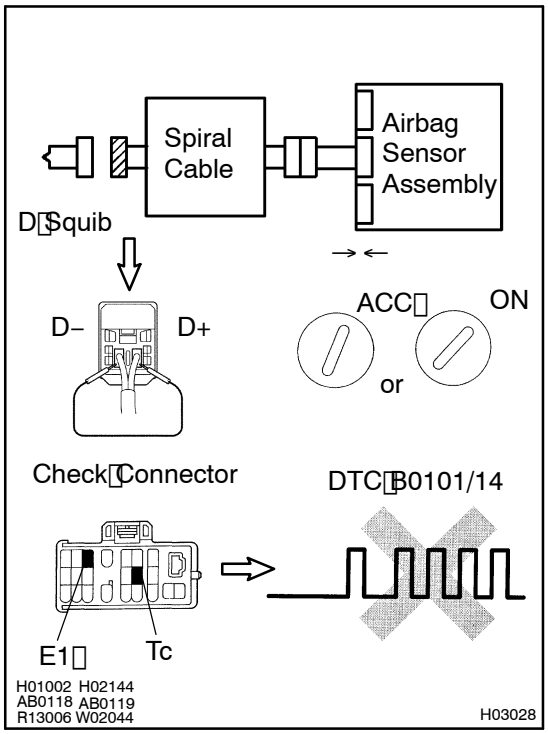


CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.
OK:
Resistance: Below 1 Ω

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0101/14 is not output.

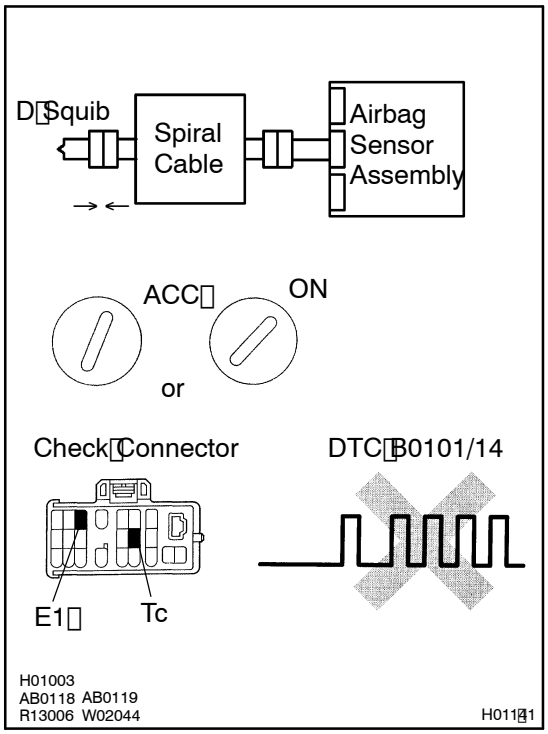
HINT:

Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check D Squib.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the steering wheel pad connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0101/14 is not output.

HINT:

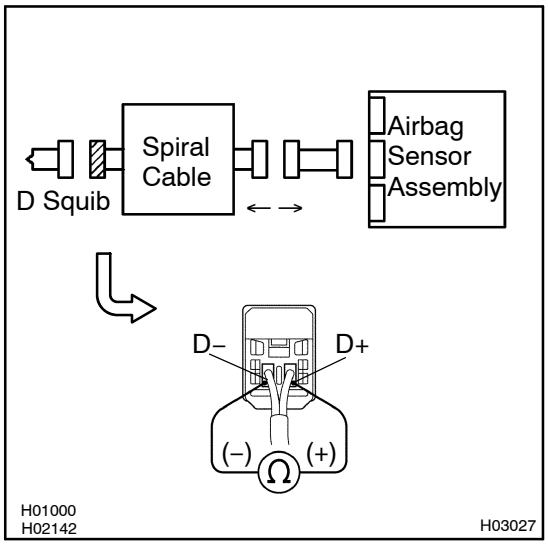
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	Check spiral cable.



PREPARATION:
Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

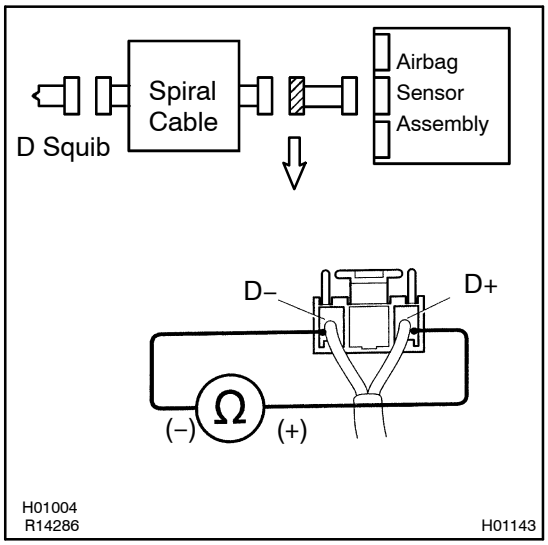
OK:

Resistance: Below 1 Ω

NG → **Repair or replace spiral cable.**

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:
For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI4L2-04

DTC	B0102/11	Short in D Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0102/11 is recorded when a ground short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	• Short circuit in D squib wire harness (to ground) • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

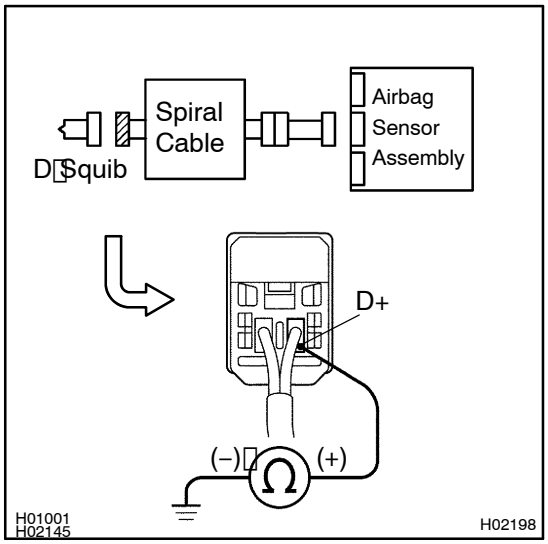
WIRING DIAGRAM

See page DI–300.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.

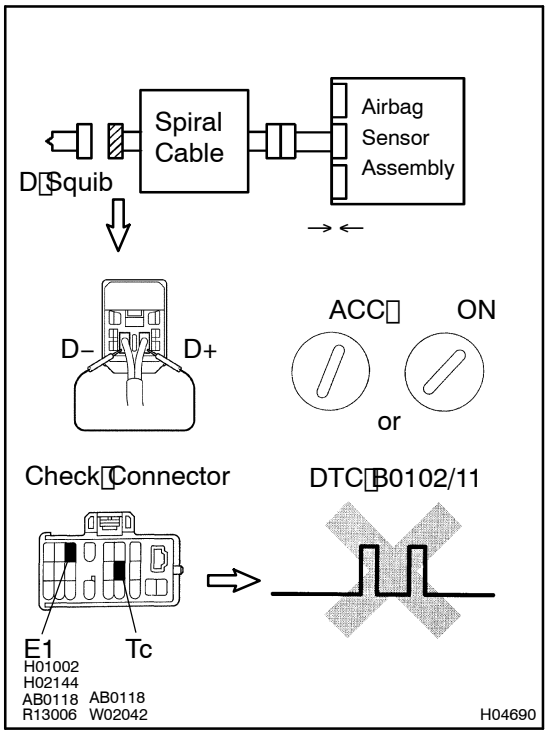


CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0102/11 is not output.

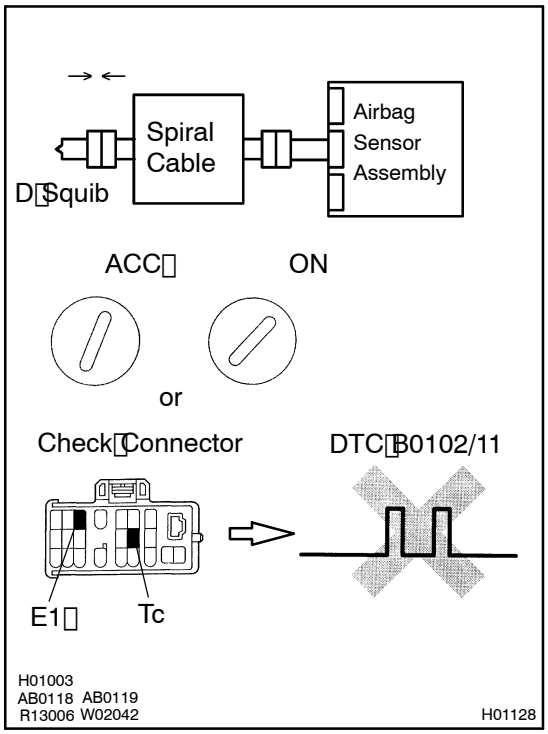
HINT:

Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check D Squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0102/11 is not output.

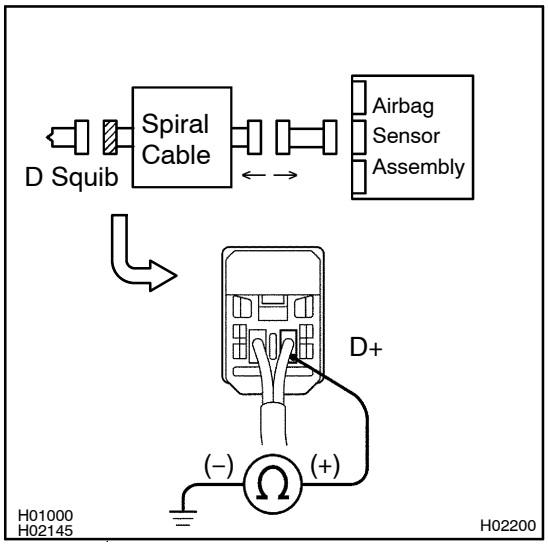
HINT:
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	Check spiral cable.



PREPARATION:

Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:

For the connector (on the spiral cable side) between the steering wheel pad and the spiral cable, measure the resistance between D+ and body ground.

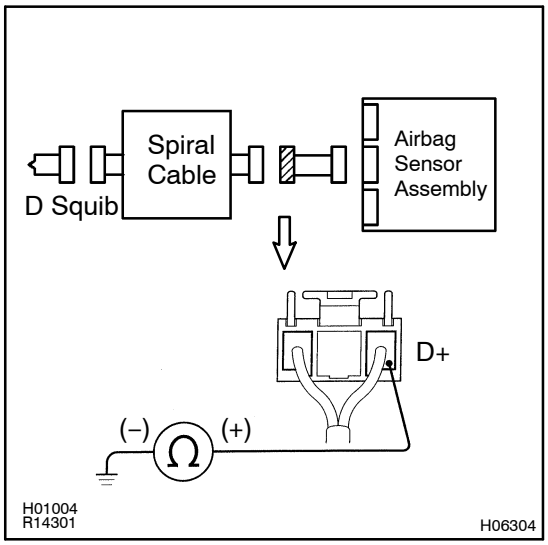
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the resistance between D+ and body ground.

OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI4L3–04

DTC	B0103/12	Short in D Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0103/12 is recorded when a B+ short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	• Short circuit in D squib wire harness (to B+) • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

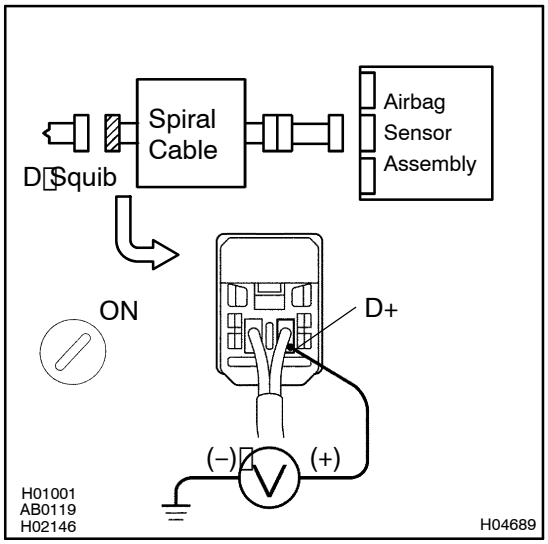
WIRING DIAGRAM

See page DI–300.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.



CHECK:

(a) Turn ignition switch to ON.
(b) For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

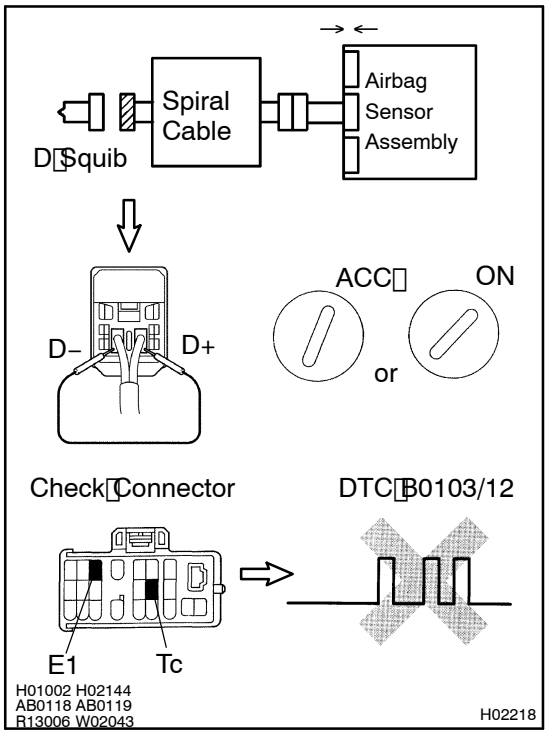
OK:

Voltage: 0 V

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0103/12 is not output.

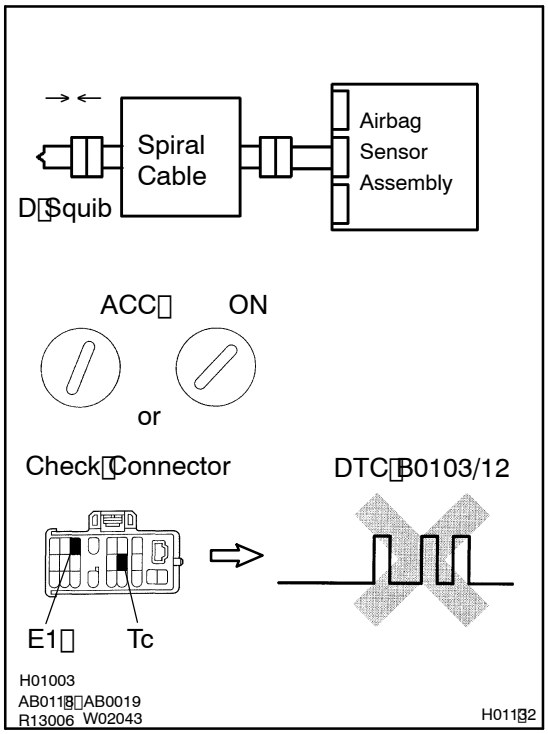
HINT:

Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0103/12 is not output.

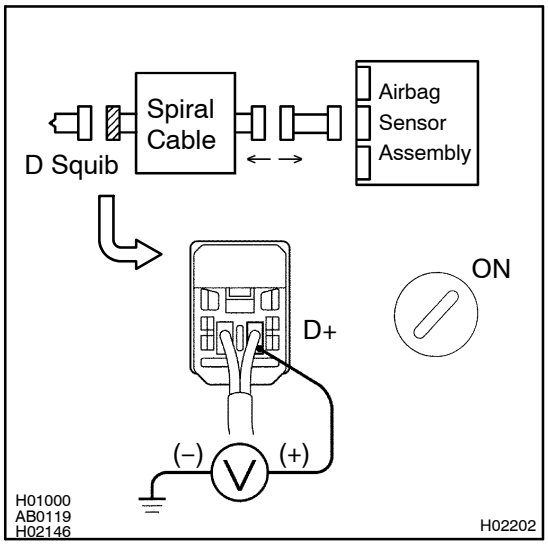
HINT:
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	Check spiral cable.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

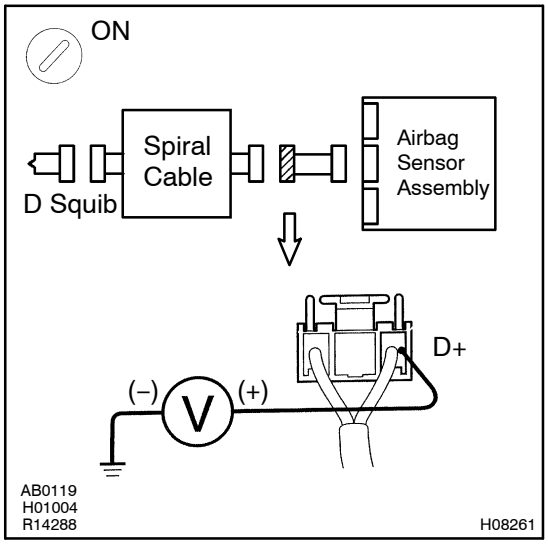
OK:

Voltage: 0 V

NG → **Repair or replace spiral cable.**

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the voltage between D+ and body ground.

OK:

Voltage: 0 V

NG → **Repair or replace harness between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1B6-19

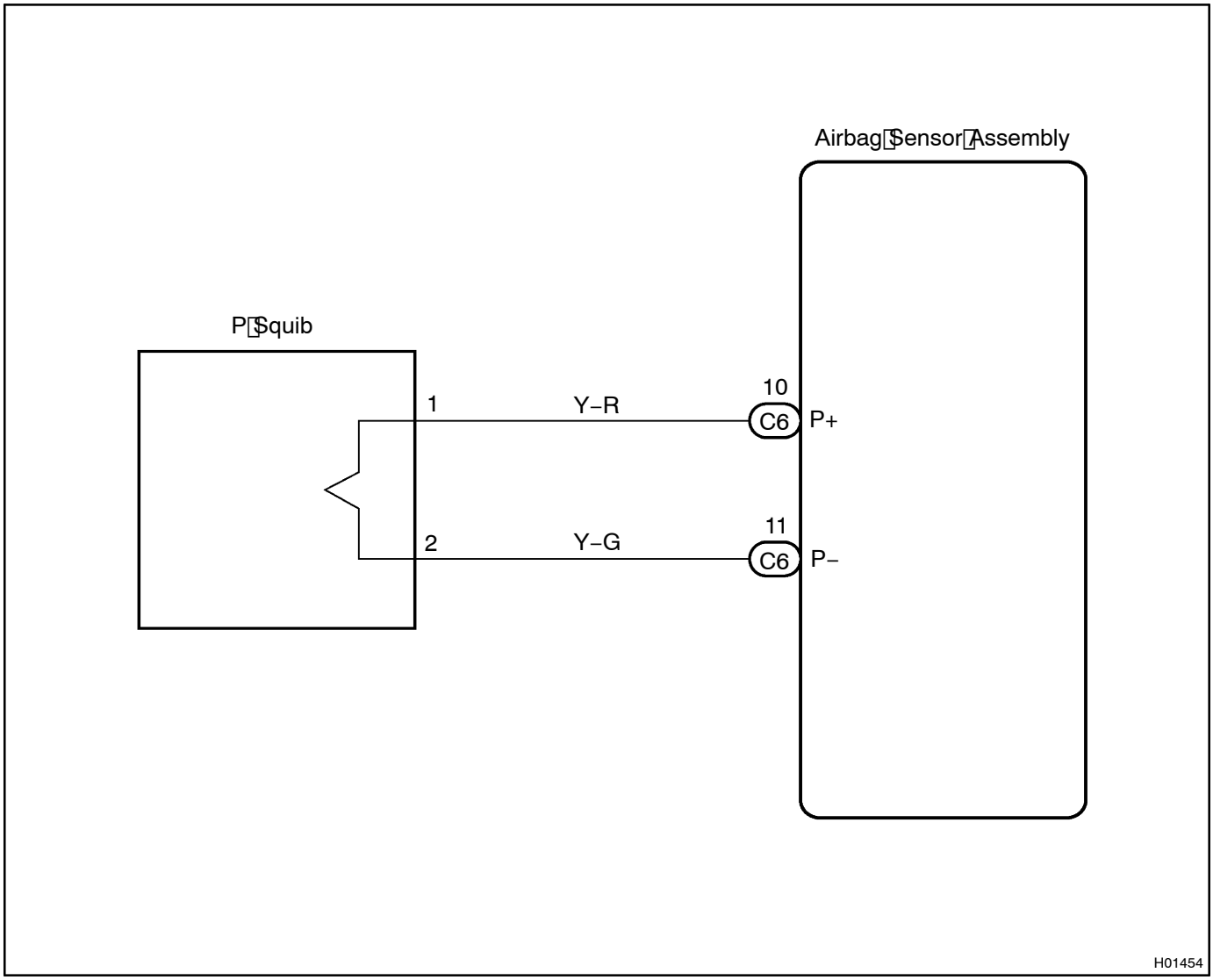
DTC	B0105/53	Short in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0105/53 is recorded when a short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	• Short circuit in P squib wire harness • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

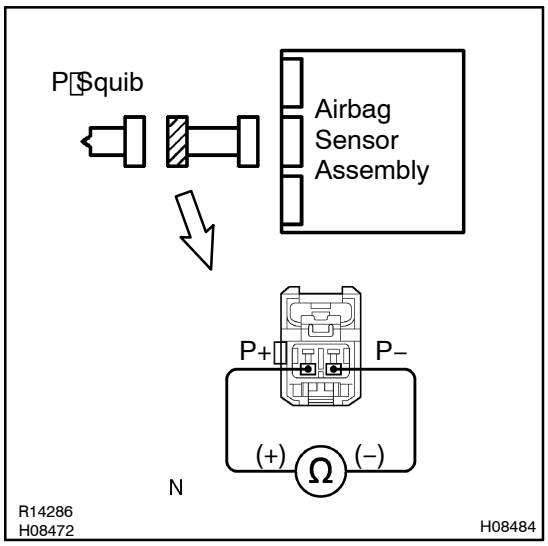
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the front passenger airbag assembly and the airbag sensor assembly. (See page DI–287)

CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

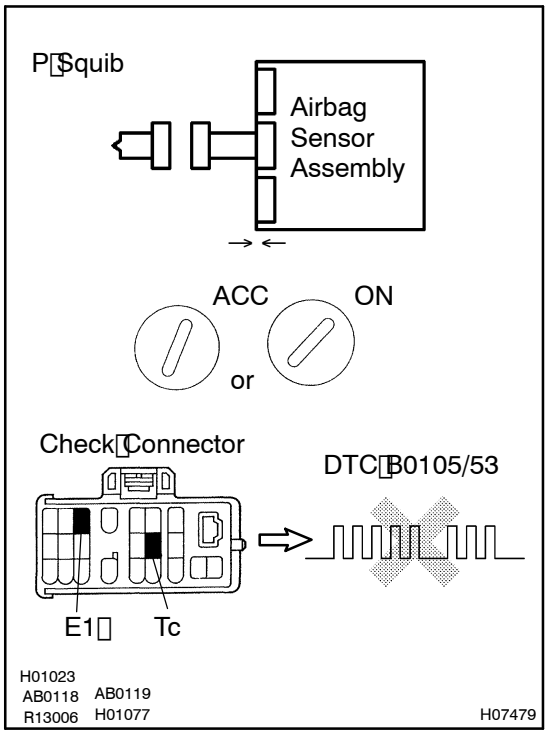
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0105/53 is not output.

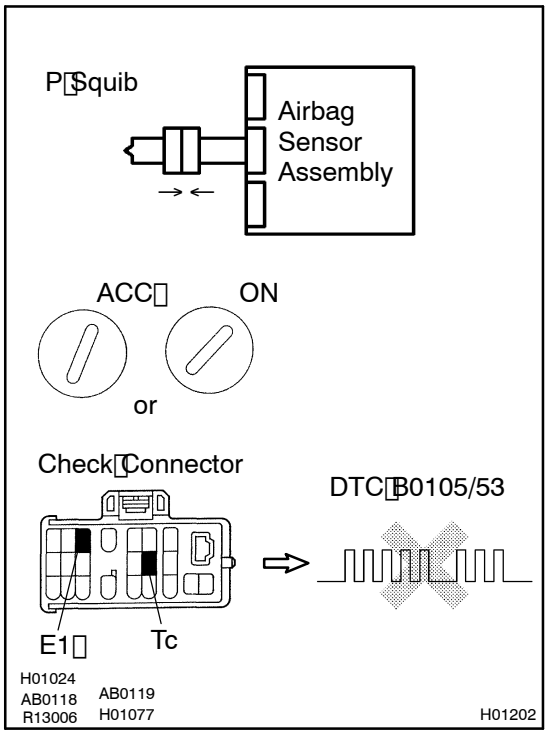
HINT:

Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0105/53 is not output.

HINT:
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG	Replace front passenger airbag assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1B7–24

DTC	B0106/54	Open in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0106/54 is recorded when an open is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	• Open circuit in P+ wire harness or P– wire harness of squib • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

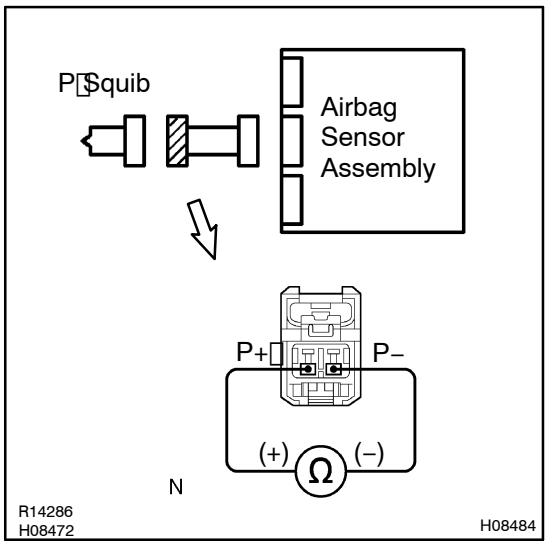
WIRING DIAGRAM

See page DI–317.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

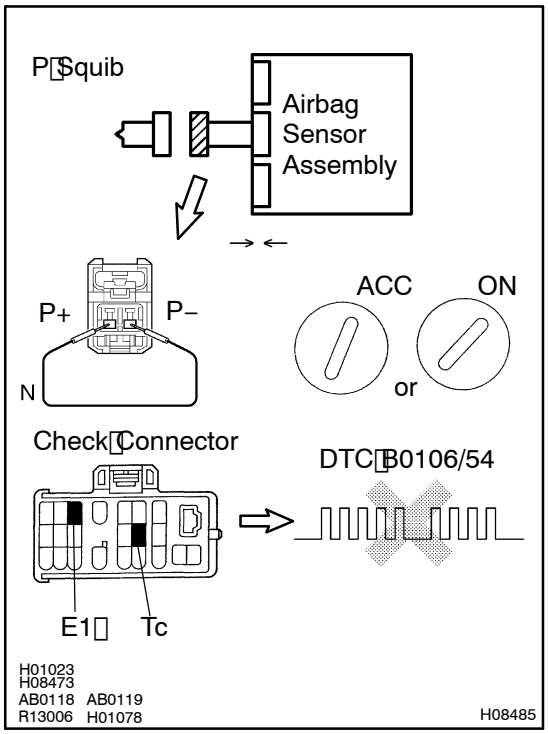
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0106/54 is not output.

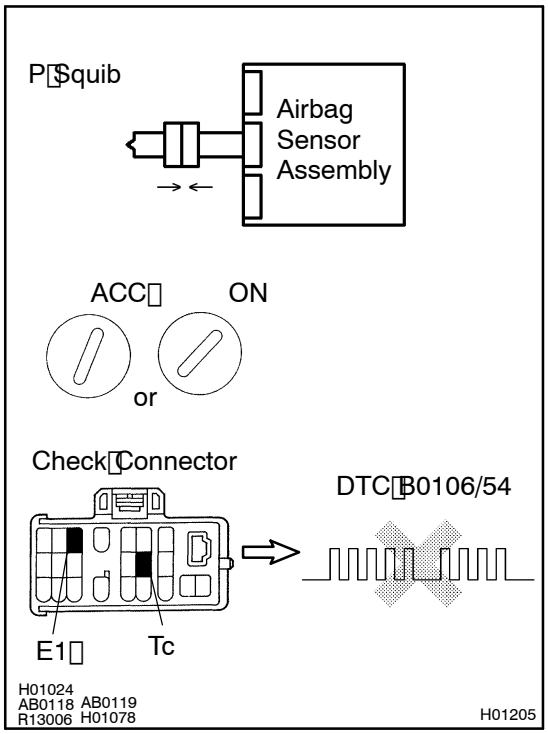
HINT:

Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0106/54 is not output.

HINT:

Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG	Replace front passenger airbag assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1B8–16

DTC	B0107/51	Short in P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0107/51 is recorded when a ground short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	• Short circuit in P squib wire harness (to ground) • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

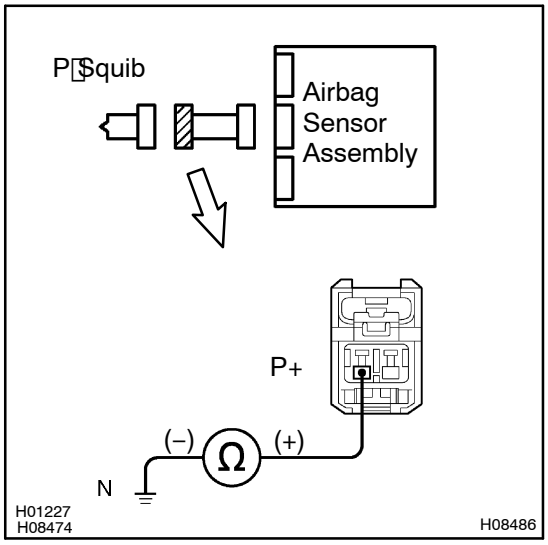
WIRING DIAGRAM

See page DI–317.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.

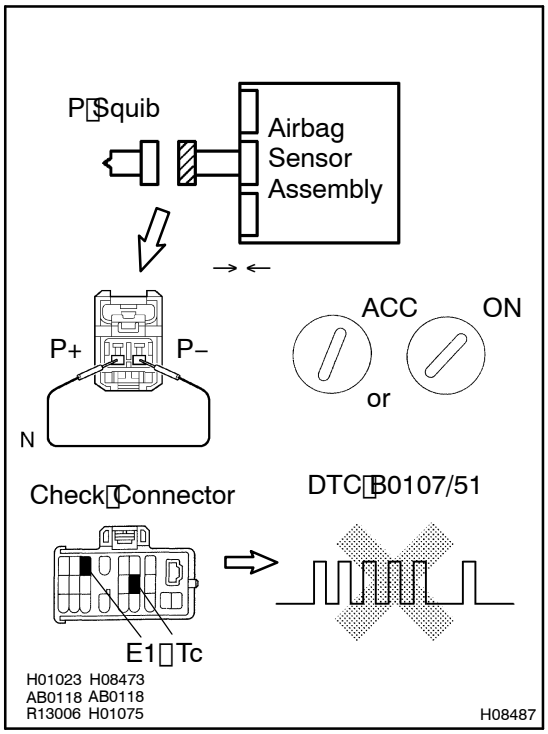


CHECK:
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0107/51 is not output.

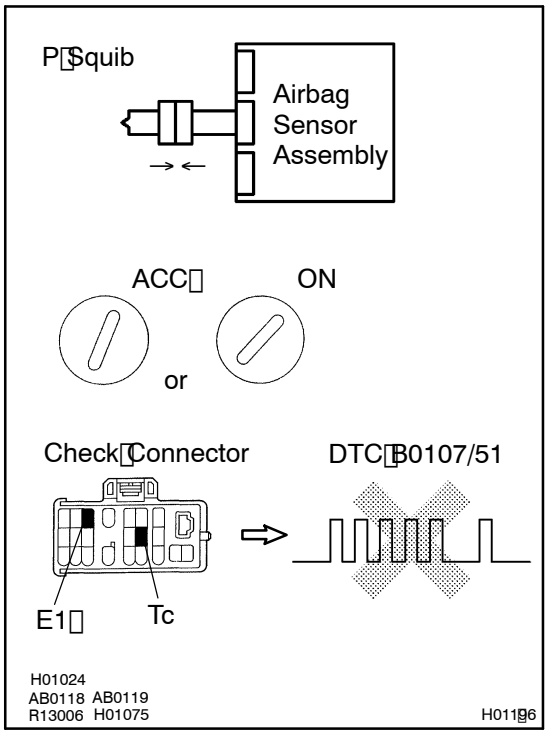
HINT:

Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0107/51 is not output.

HINT:
Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG	Replace front passenger airbag assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1B9-22

DTC	B0108/52	Short in P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	• Short circuit in P squib wire harness (to B+) • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

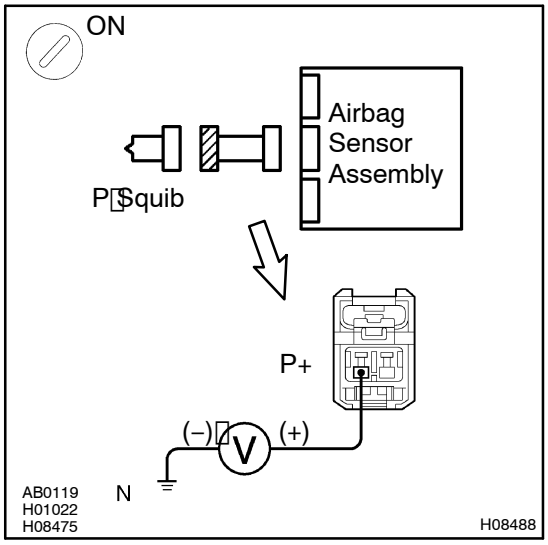
WIRING DIAGRAM

See page DI–317.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the voltage between the P+ and body ground.

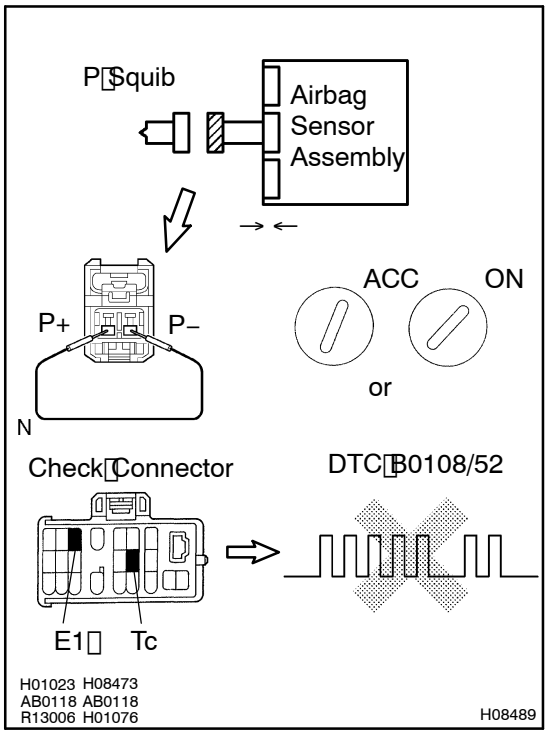
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0108/52 is not output.

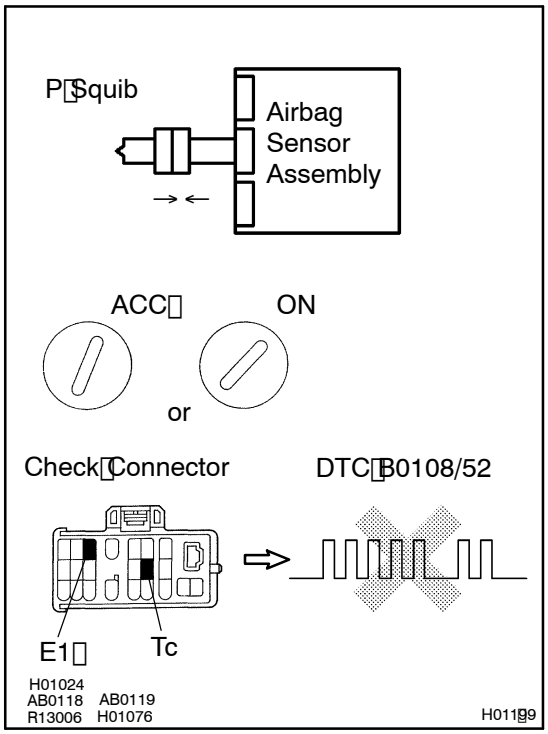
HINT:

Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0108/52 is not output.

HINT:
Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1NC–09

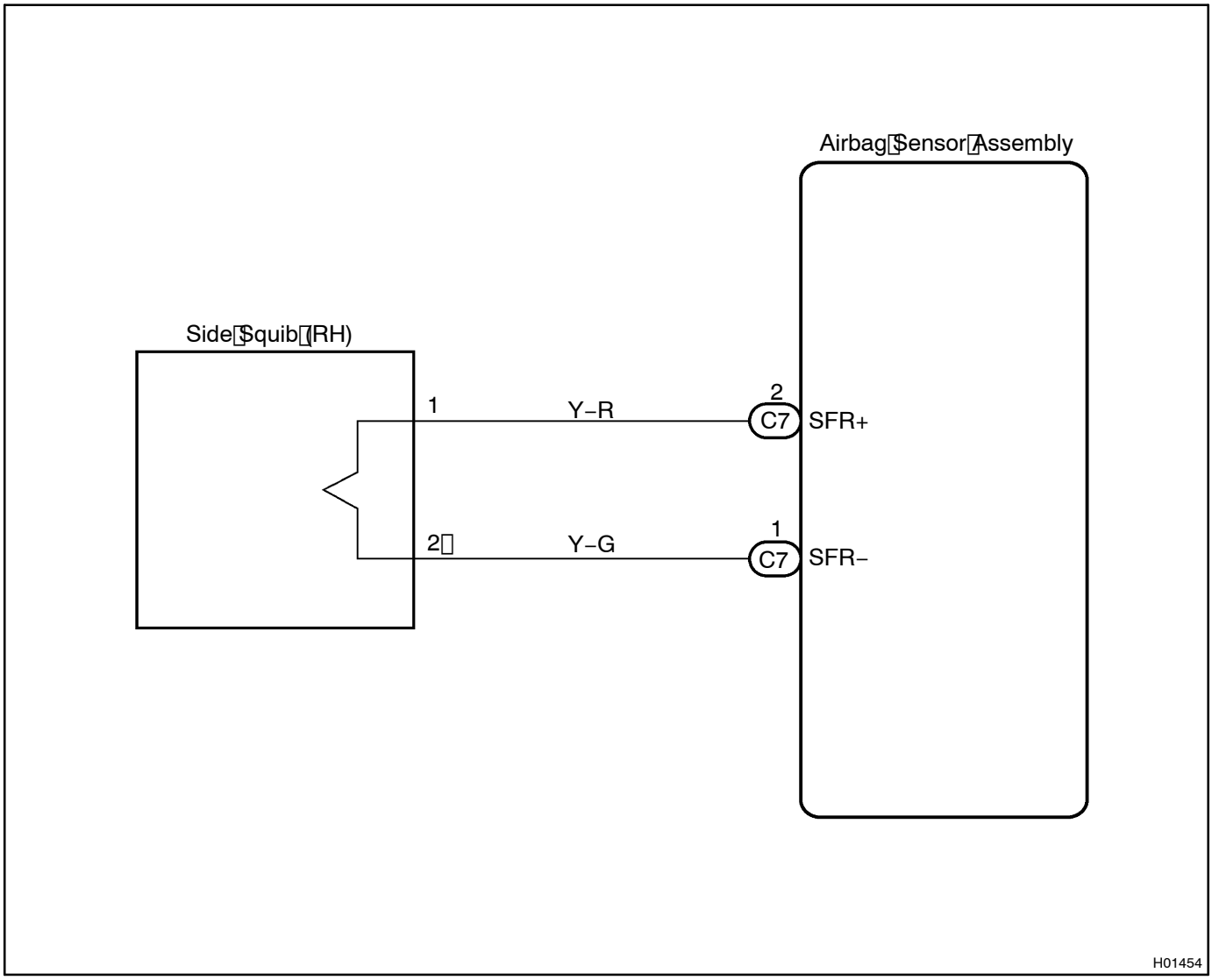
DTC	B0110/43	Short in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0110/43 is recorded when a short is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0110/43	• Short circuit between SFR+ wire harness and SFR– wire harness of squib • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

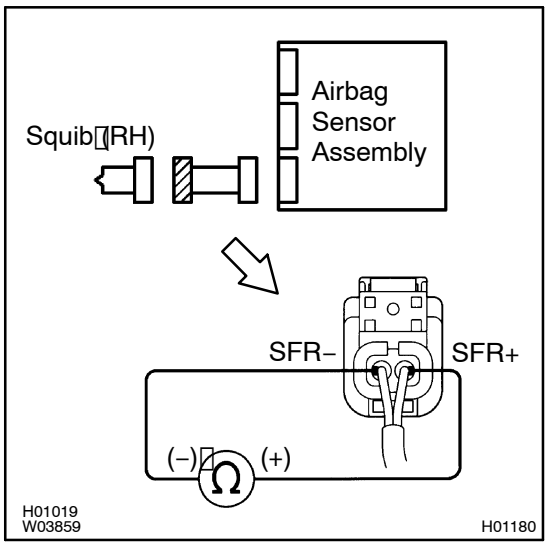
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the side airbag assembly (RH). (See page DI–287)

CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR–.

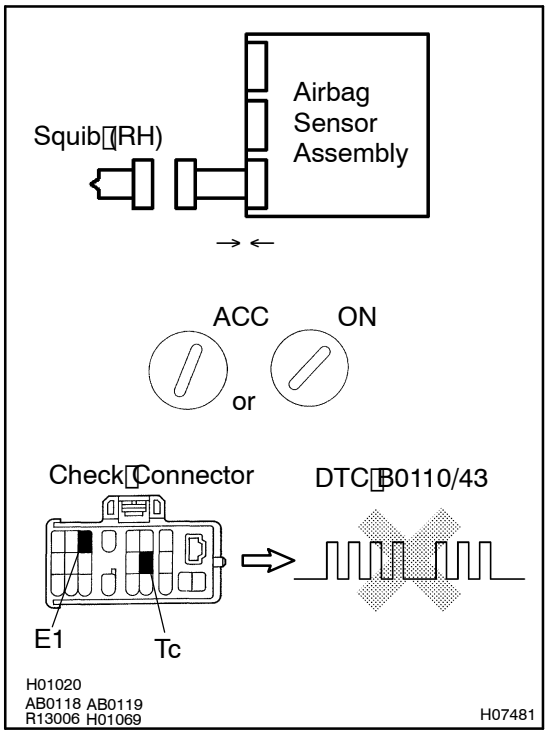
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0110/43 is not output.

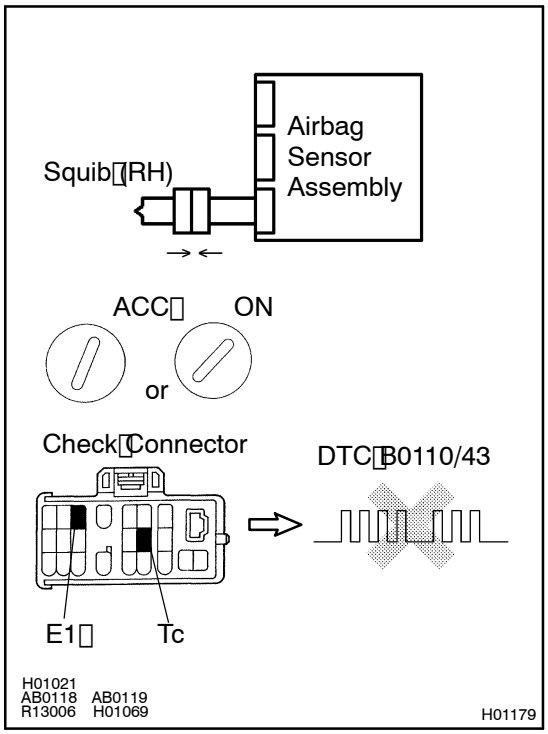
HINT:

Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.

(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(c) Clear DTC stored in memory. (See page DI–287)

(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(f) Check DTC. (See page DI–287)

OK:

DTC B0110/43 is not output.

HINT:

Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1ND–09

DTC	B0111/44	Open in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0111/44 is recorded when an open is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	• Open circuit in SFR+ wire harness or SFR– wire harness of squib • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

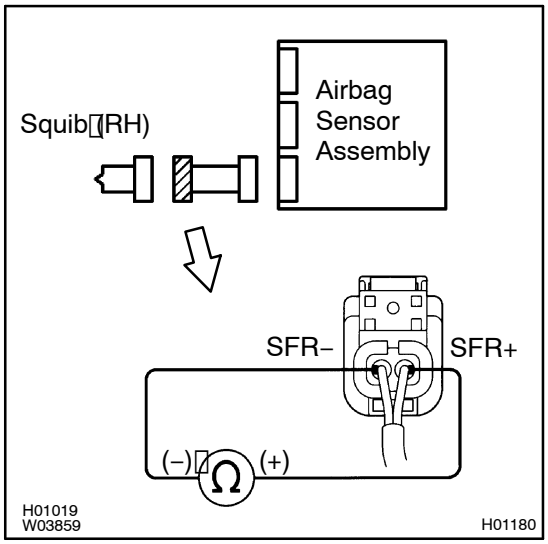
WIRING DIAGRAM

See page DI–330.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR–.

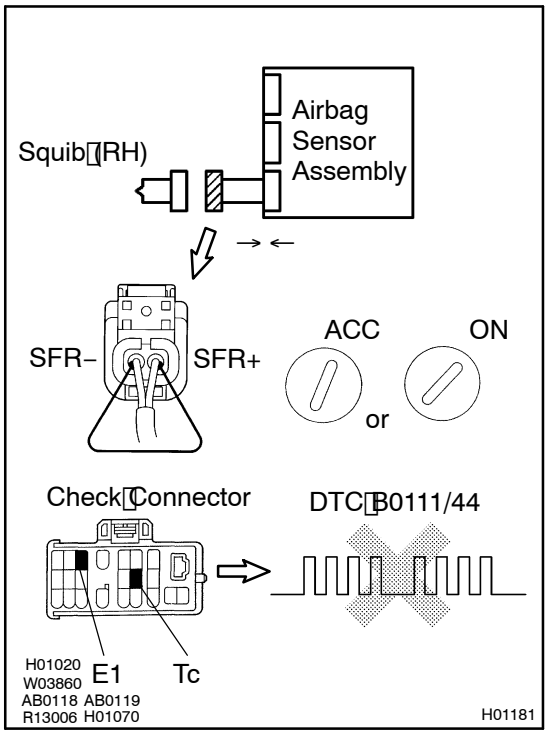
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0111/44 is not output.

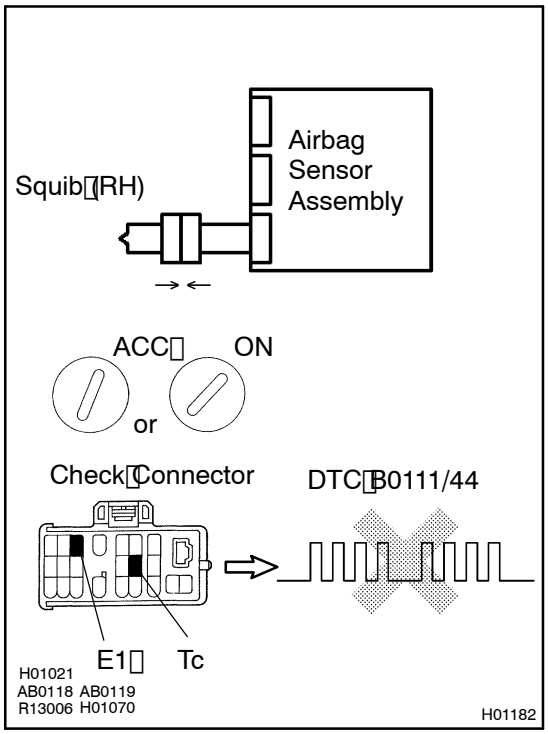
HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0111/44 is not output.

HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0112/41	Short in Side Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0112/41 is recorded when a ground short is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	• Short circuit in side squib (RH) wire harness (to ground) • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

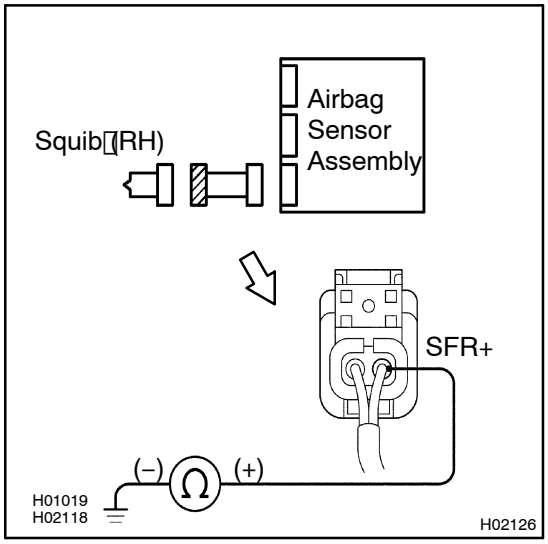
WIRING DIAGRAM

See page DI–330.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.

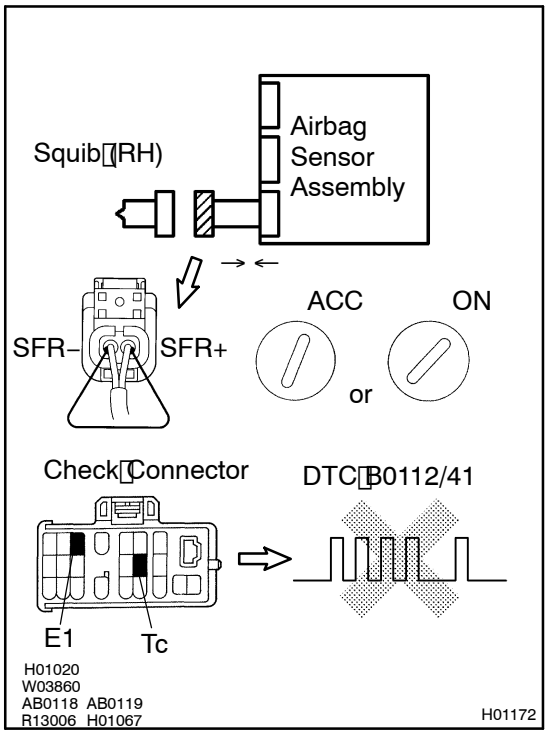


CHECK:
For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0112/41 is not output.

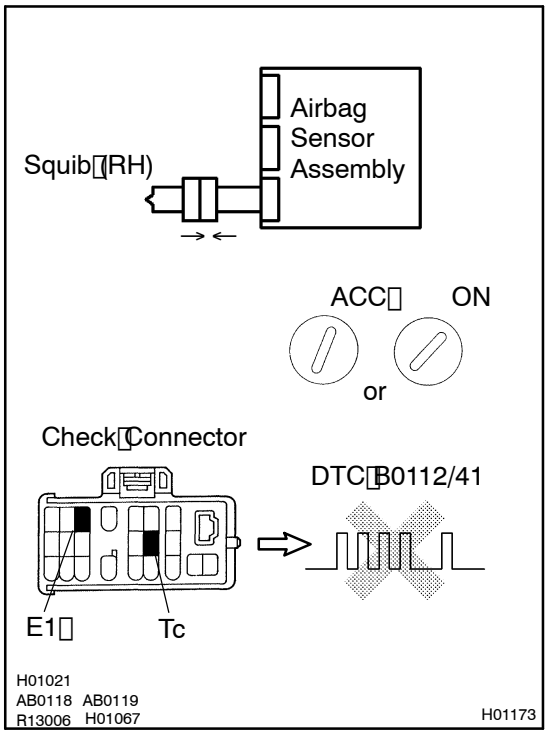
HINT:

Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0112/41 is not output.

HINT:

Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1NF–09

DTC	B0113/42	Short in Side Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0113/42 is recorded when a B+ short is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	• Short circuit in side squib (RH) wire harness (to B+) • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

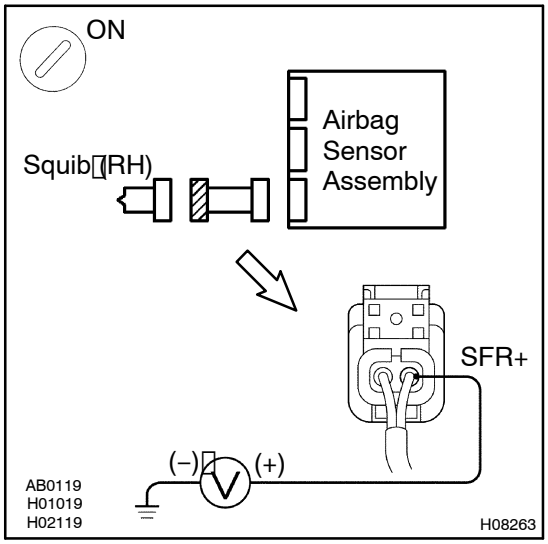
WIRING DIAGRAM

See page DI–330.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the voltage between SFR+ and body ground.

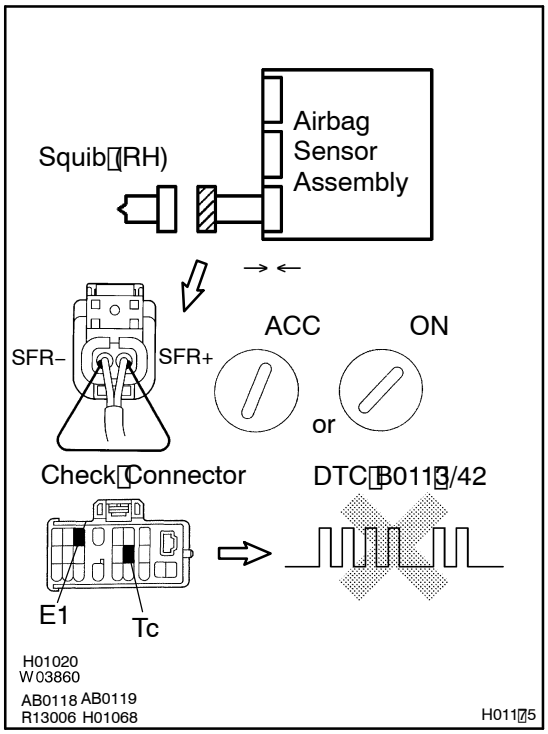
OK:

Voltage: 0 V

NG	Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0113/42 is not output.

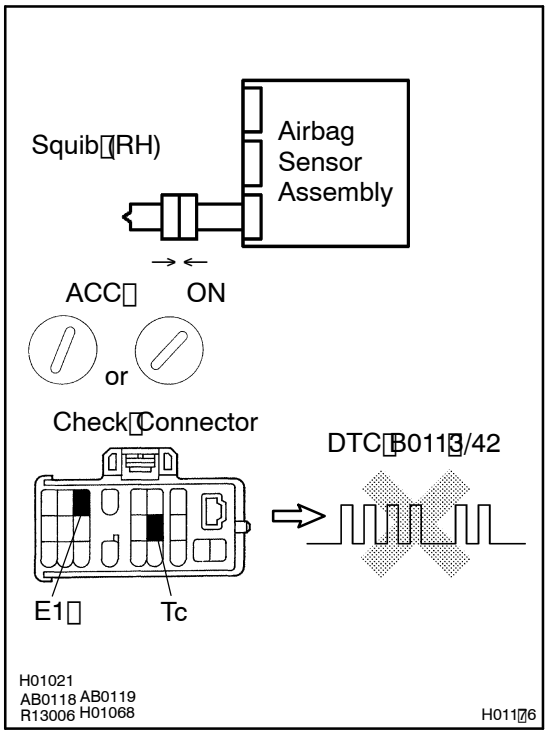
HINT:

Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0113/42 is not output.

HINT:

Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1NG–09

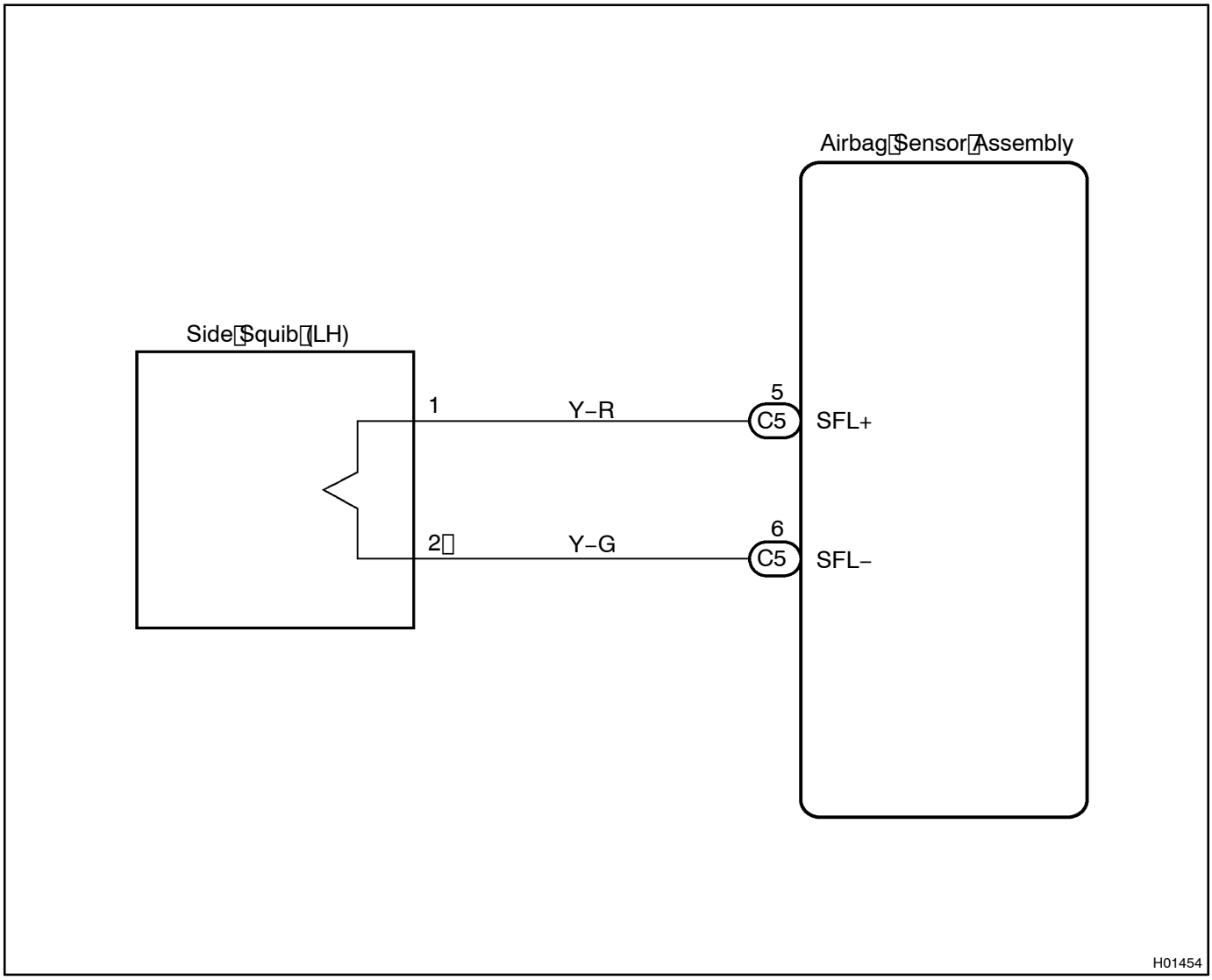
DTC	B0115/47	Short in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0115/47 is recorded when a short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0115/47	• Short circuit between SFL+ wire harness and SFL– wire harness of squib • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

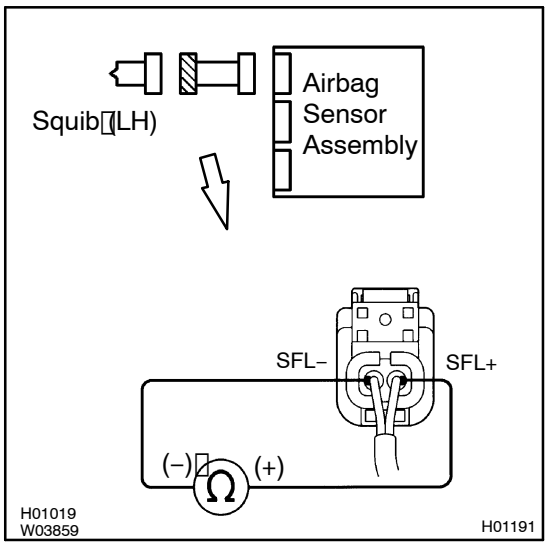
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the side airbag assembly (LH). (See page DI–287)

CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL–.

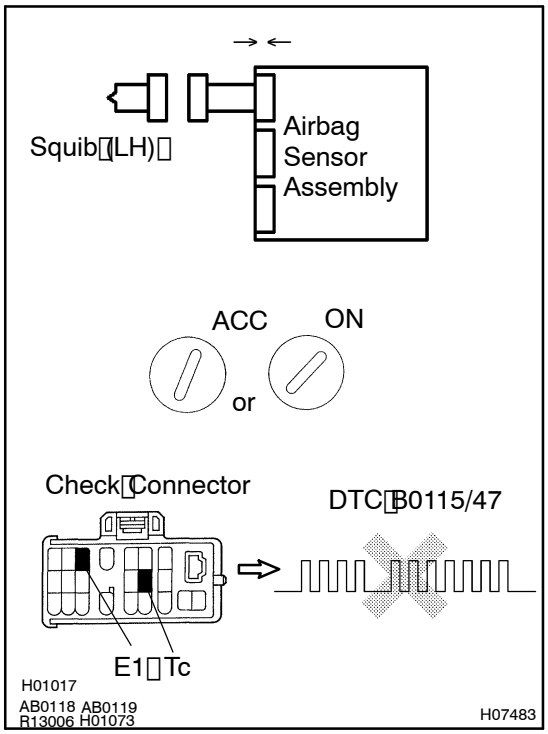
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0115/47 is not output.

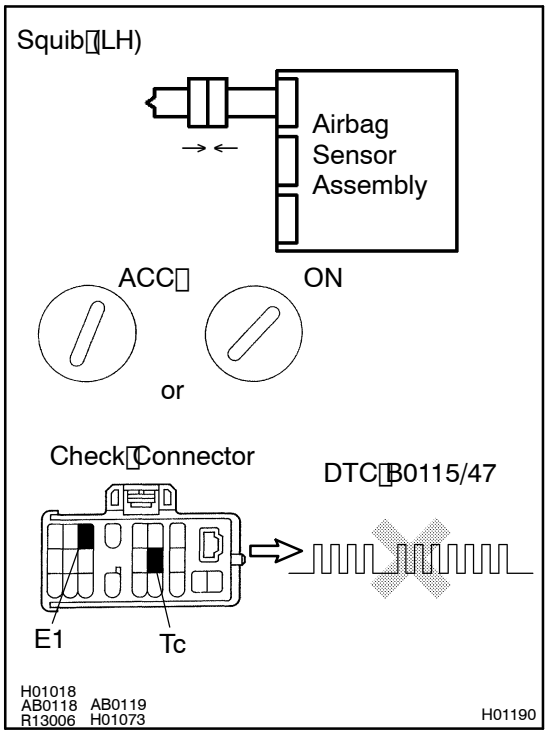
HINT:

Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0115/47 is not output.

HINT:
Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1NH–09

DTC	B0116/48	Open in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0116/48 is recorded when an open is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	• Open circuit in SFL+ wire harness or SFL– wire harness of squib • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

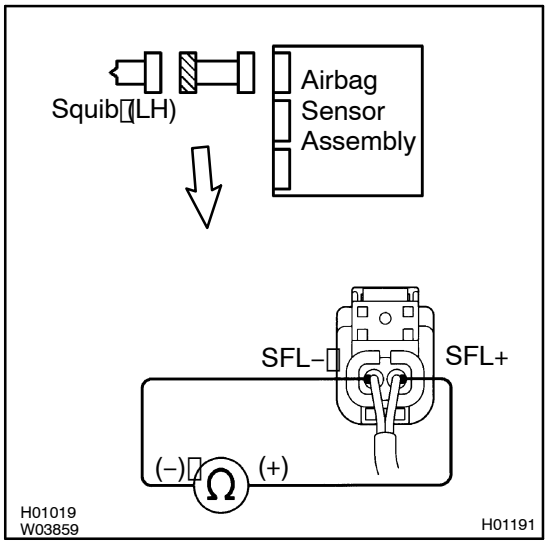
WIRING DIAGRAM

See page DI–343.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL–.

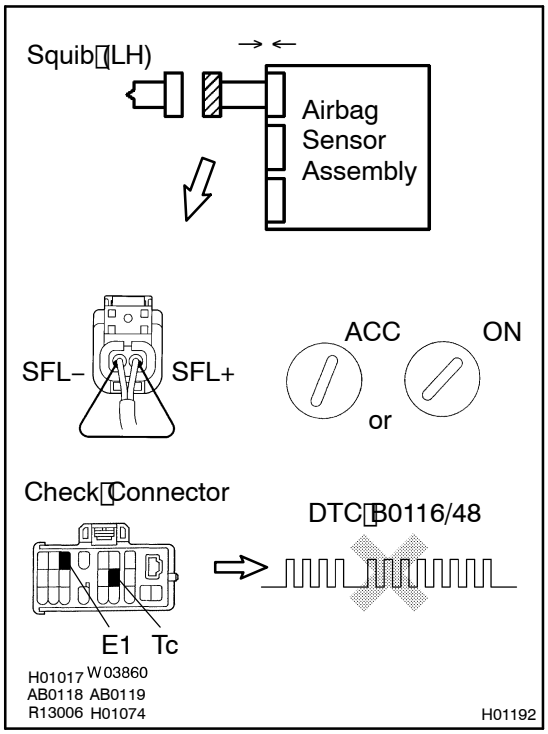
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFL+ and SFL– of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0116/48 is not output.

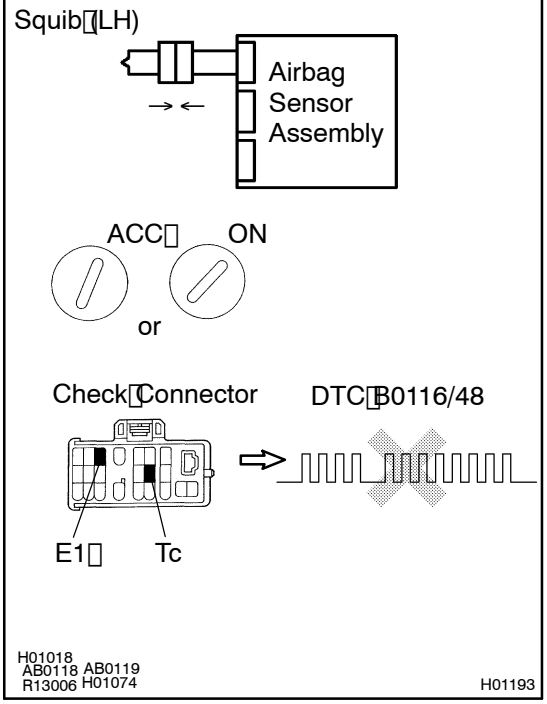
HINT:

Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0116/48 is not output.

HINT:

Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1NI–09

DTC	B0117/45	Short in Side Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0117/45 is recorded when a ground short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	• Short circuit in side squib (LH) wire harness (to ground) • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

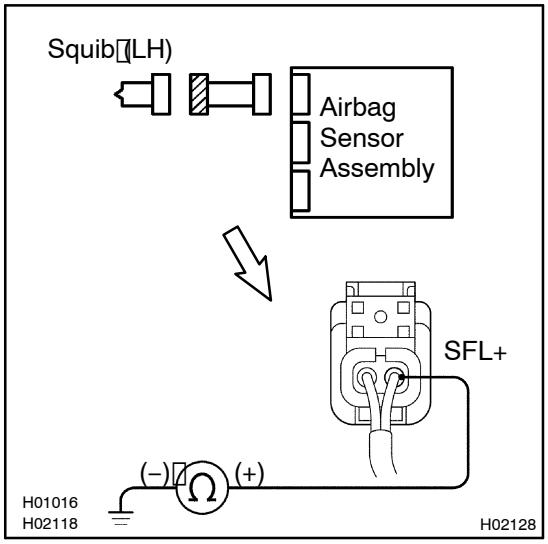
WIRING DIAGRAM

See page DI–343.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.

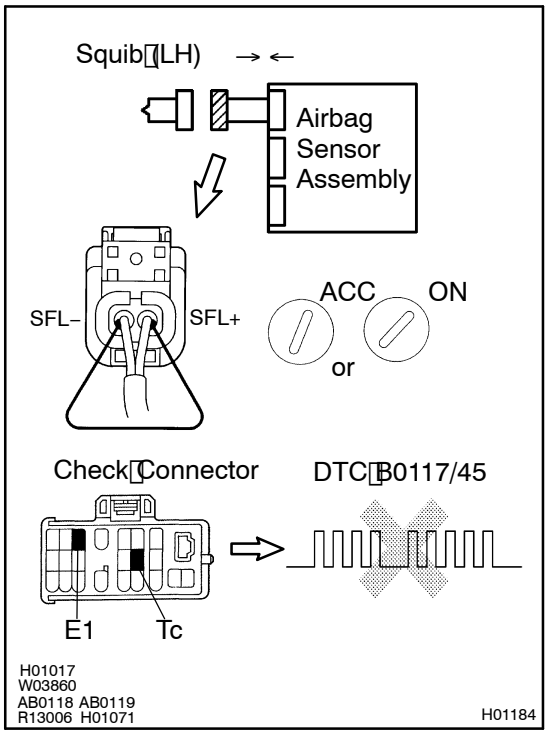


CHECK:
For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFL+ and SFL– of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0117/45 is not output.

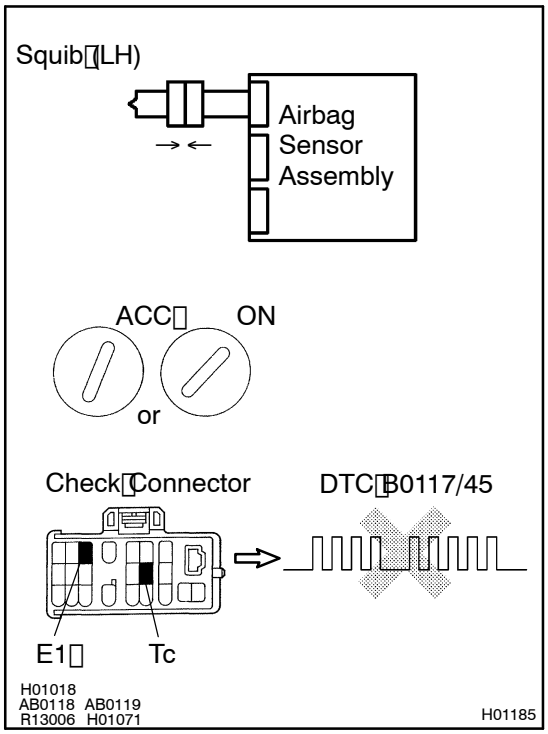
HINT:

Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0117/45 is not output.

HINT:
Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1NJ–09

DTC	B0118/46	Short in Side Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0118/46 is recorded when a B+ short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	• Short circuit in side squib (LH) wire harness (to B+) • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

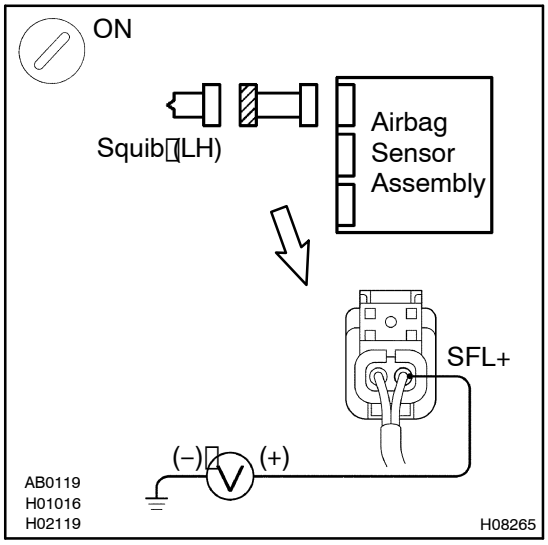
WIRING DIAGRAM

See page DI–343.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the voltage between SFL+ and body ground.

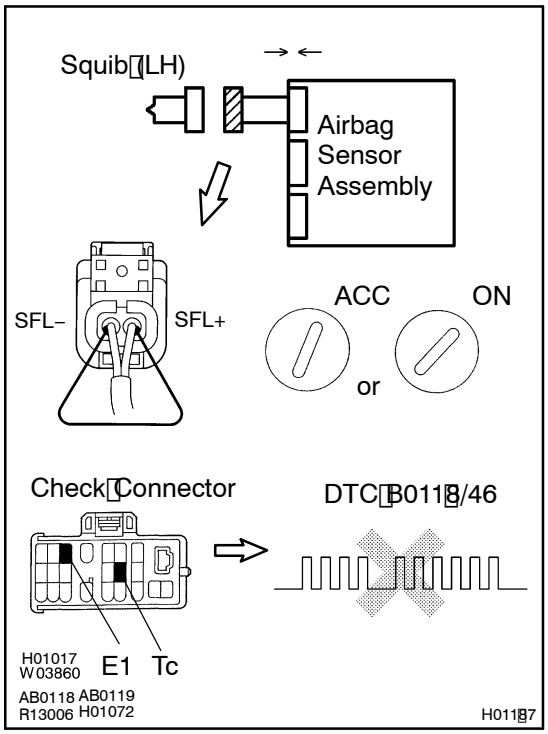
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFL+ and SFL– of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0118/46 is not output.

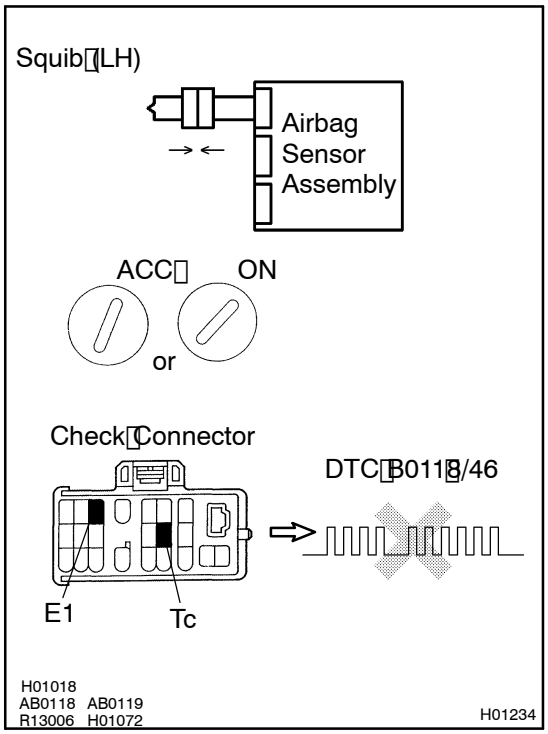
HINT:

Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (LH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0118/46 is not output.

HINT:

Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI16S–24

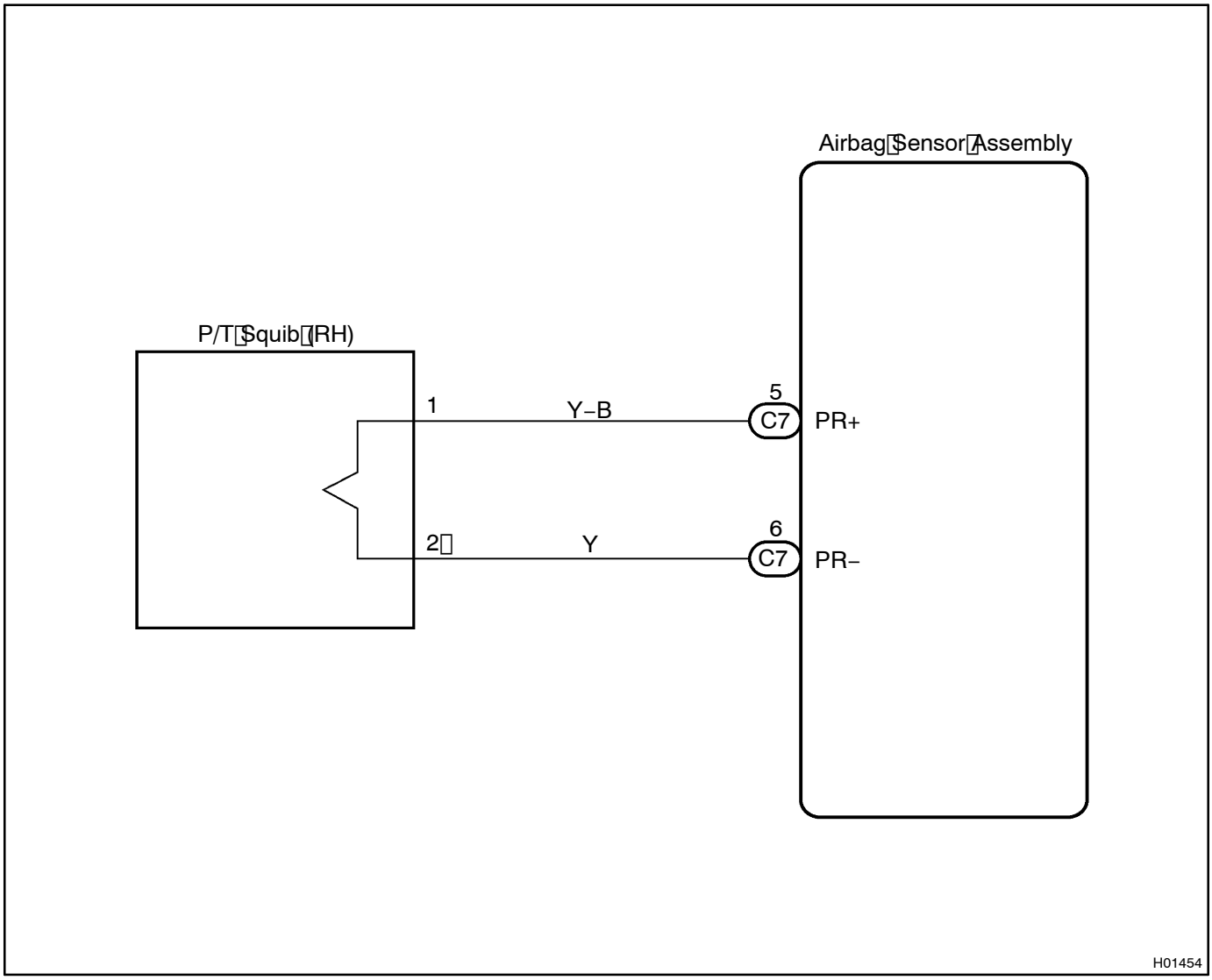
DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	• Short circuit between PR+ wire harness and PR– wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

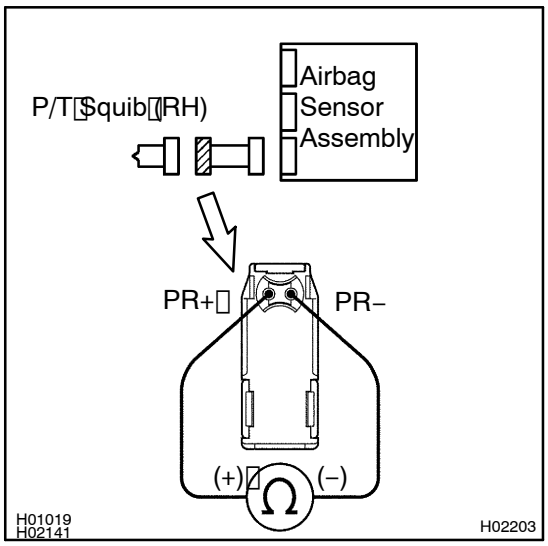
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (RH). (See page DI–287).

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR–.

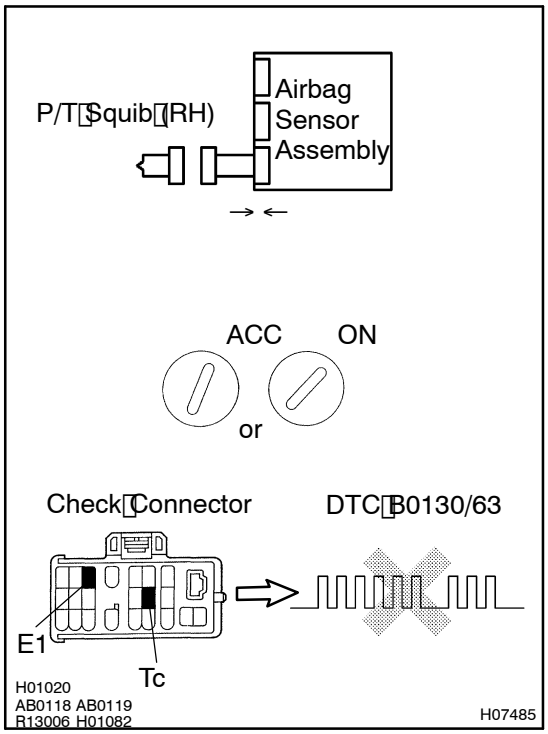
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0130/63 is not output.

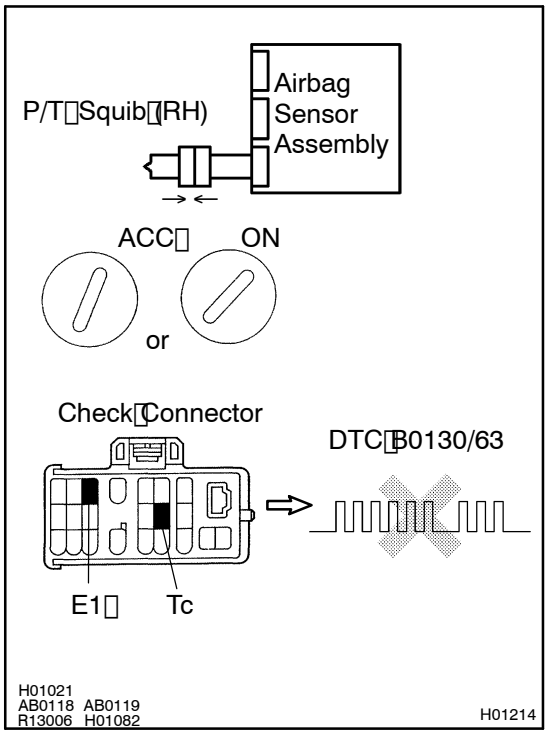
HINT:

Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0130/63 is not output.

HINT:
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1BG–19

DTC	B0131/64	Open in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (RH) consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	• Open circuit in PR+ wire harness or PR– wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

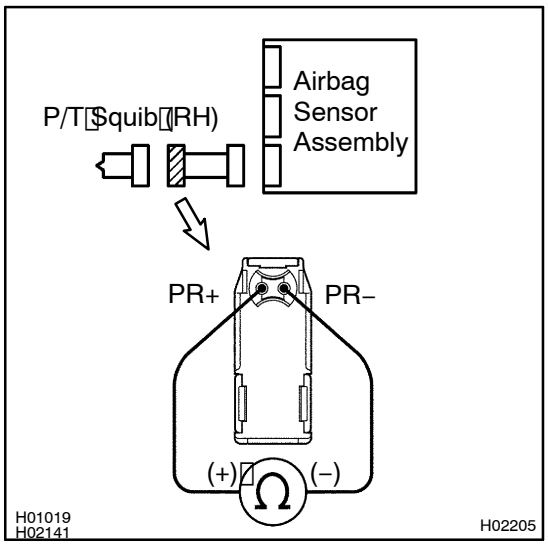
WIRING DIAGRAM

See page DI–356.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR–.

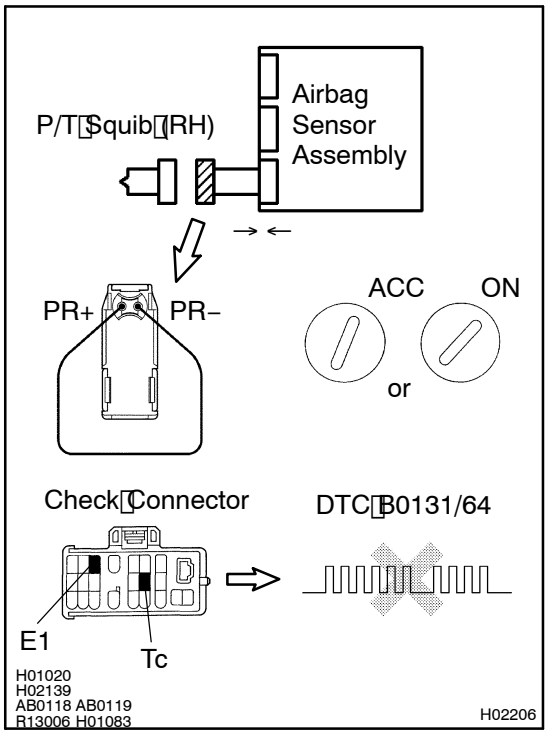
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0131/64 is not output.

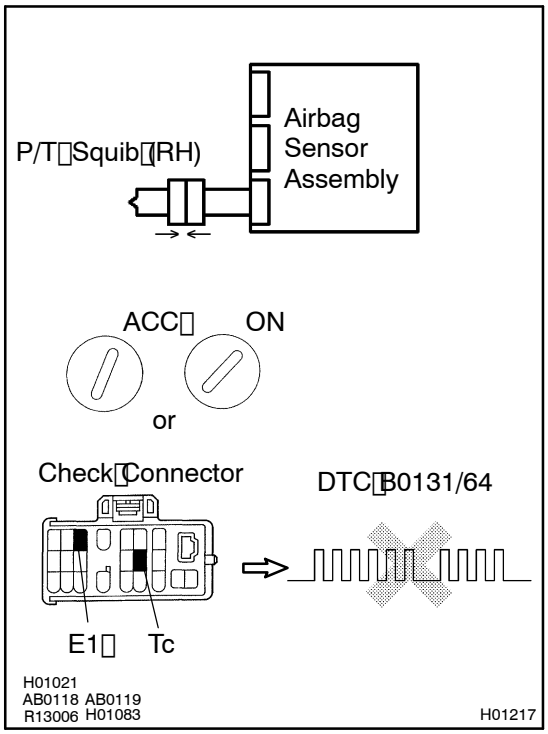
HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0131/64 is not output.

HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0132/61	Short in P/T Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0132/61 is recorded when a ground short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	• Short circuit in P/T squib (RH) wire harness (to ground) • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

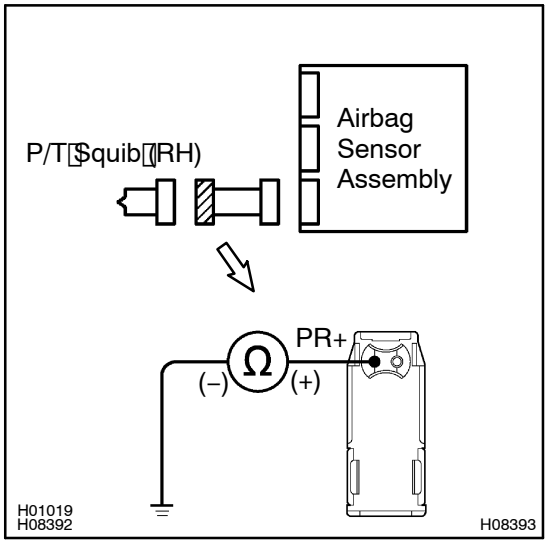
WIRING DIAGRAM

See page DI–356.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and body ground.

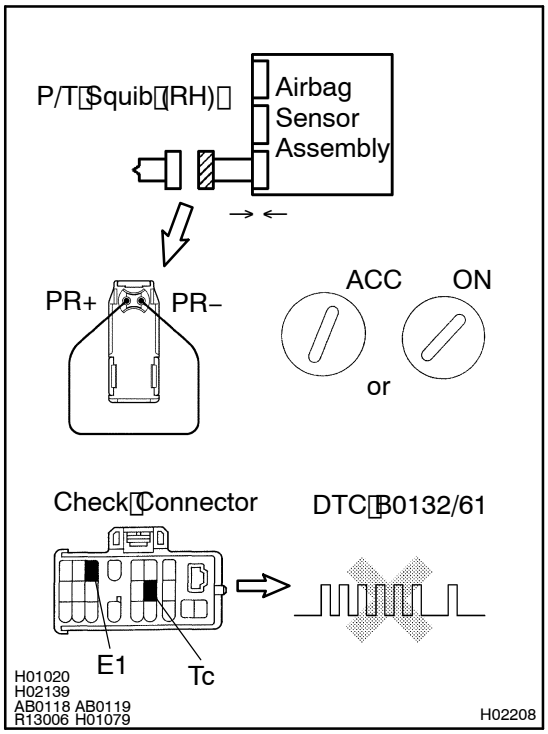
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0132/61 is not output.

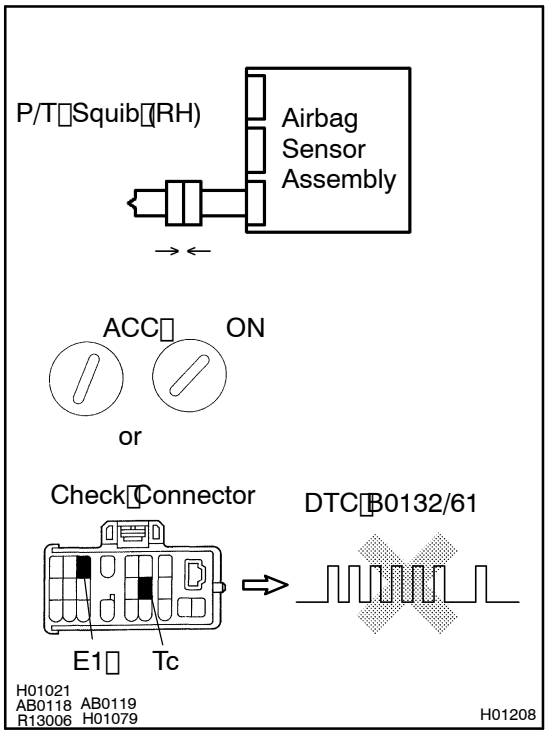
HINT:

Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0132/61 is not output.

HINT:
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1BI–18

DTC	B0133/62	Short in P/T Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0133/62 is recorded when a B+ short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	• Short circuit in seat belt pretensioner (RH) wire harness (to B+) • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

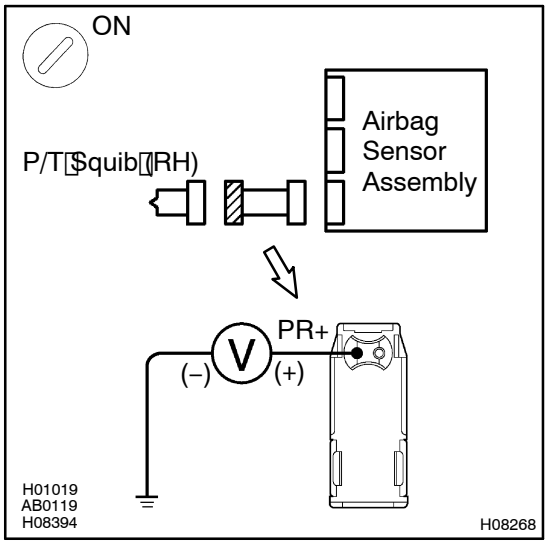
WIRING DIAGRAM

See page DI–356.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the voltage between PR+ and body ground.

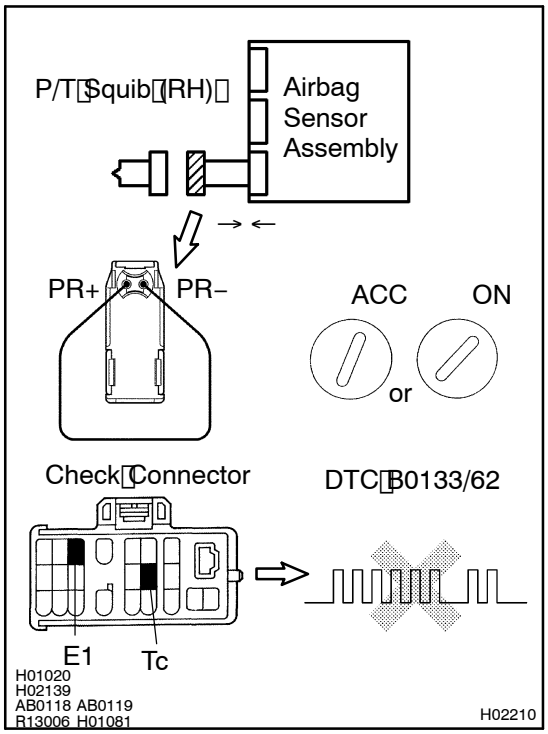
OK:

Voltage: 0 V

NG	Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0133/62 is not output.

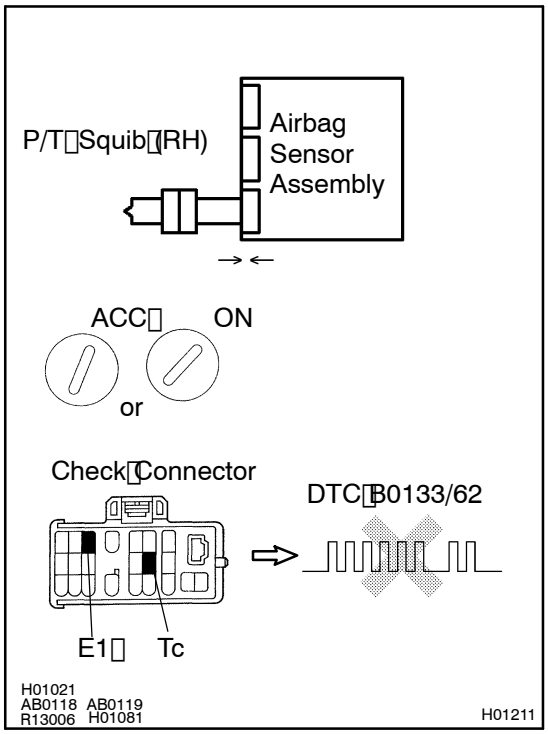
HINT:

Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0133/62 is not output.

HINT:
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI16W–24

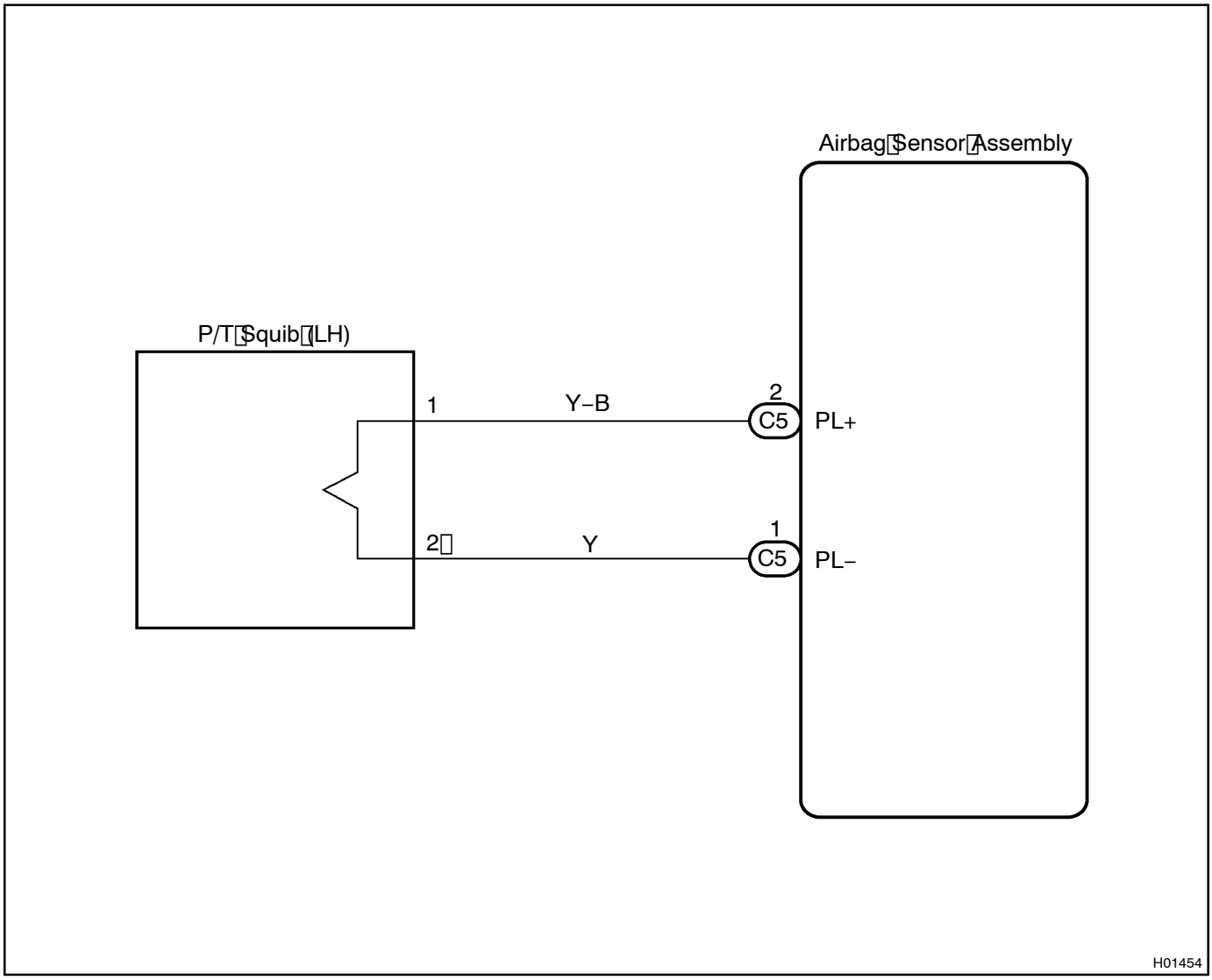
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	• Short circuit between PL+ wire harness and PL– wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

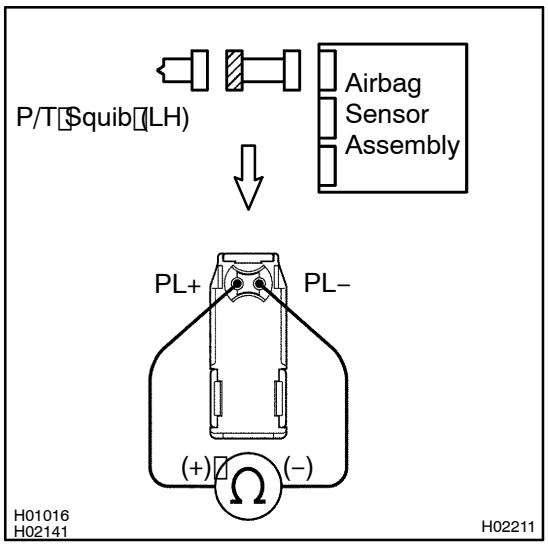
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (LH). (See page DI–287)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL–.

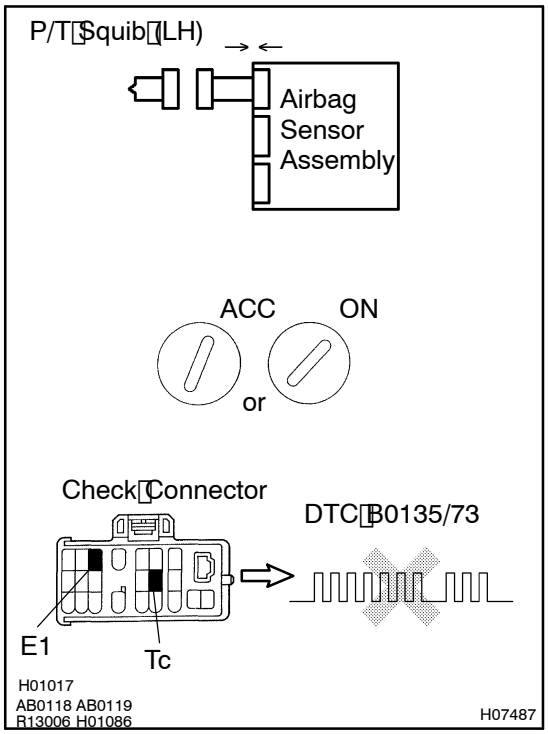
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0135/73 is not output.

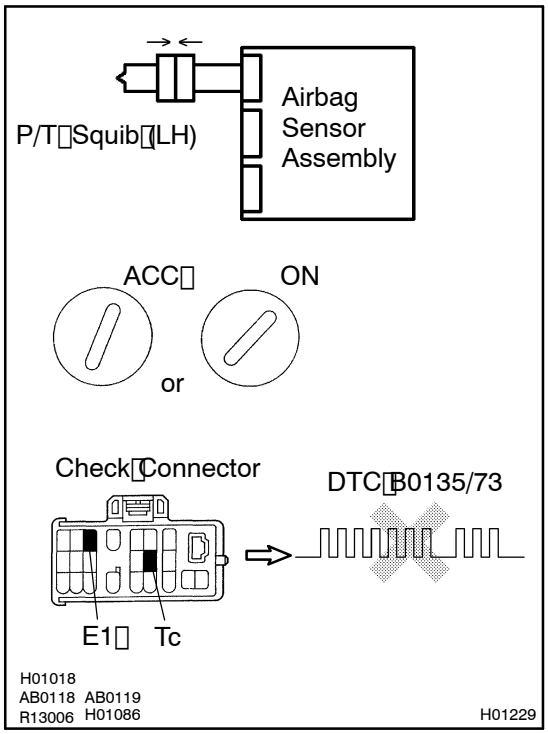
HINT:

Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0135/73 is not output.

HINT:
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1BJ–20

DTC	B0136/74	Open in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (LH) consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	• Open circuit in PL+ wire harness or PL– wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

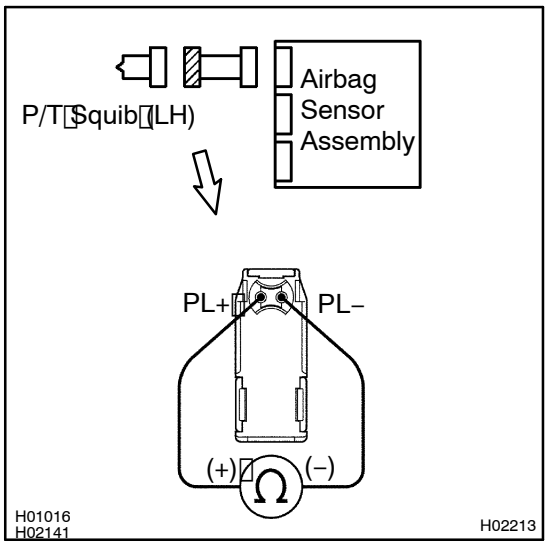
WIRING DIAGRAM

See page DI–369.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.

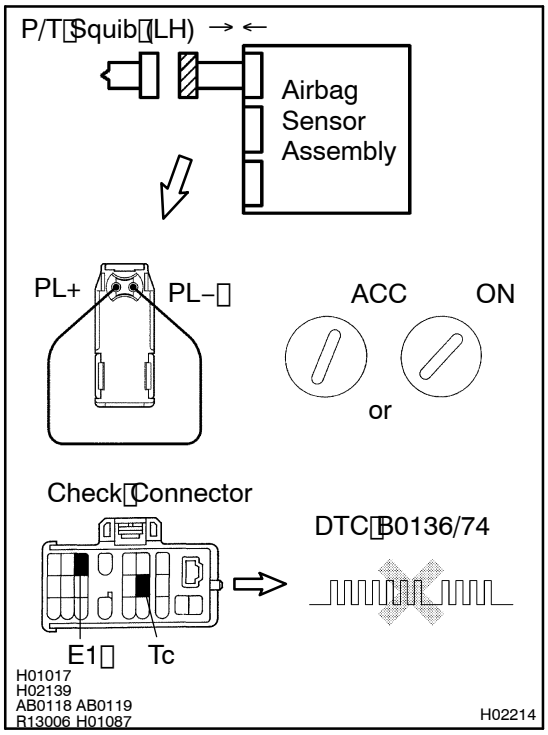


CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0136/74 is not output.

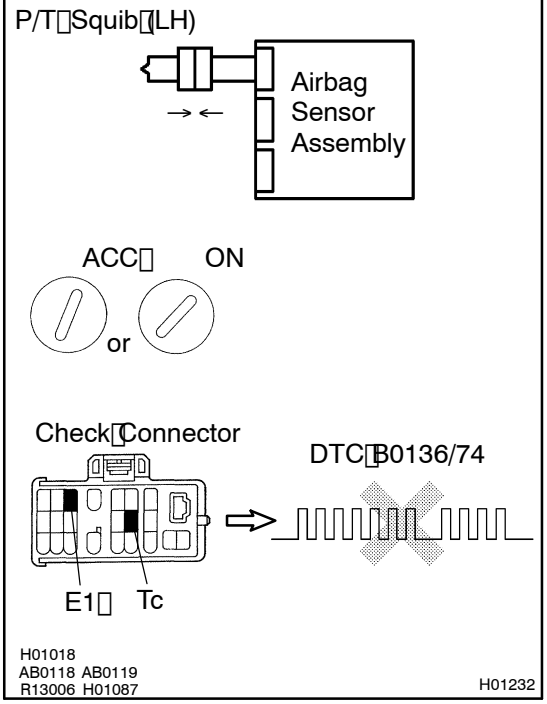
HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0136/74 is not output.

HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0137/71	Short in P/T Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0137/71 is recorded when a ground short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	• Short circuit in P/T squib (LH) wire harness (to ground) • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

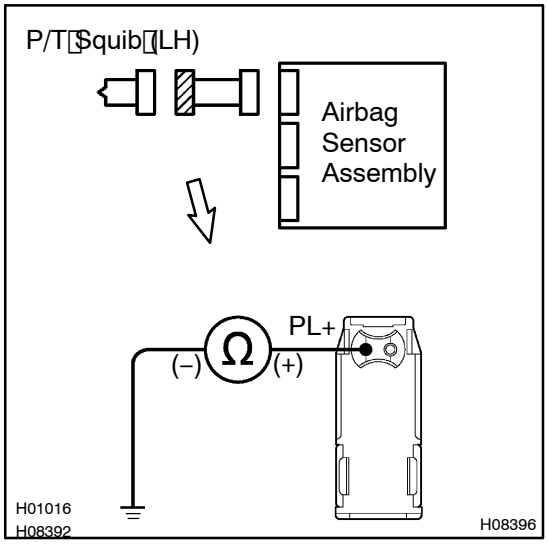
WIRING DIAGRAM

See page DI–369.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and body ground.

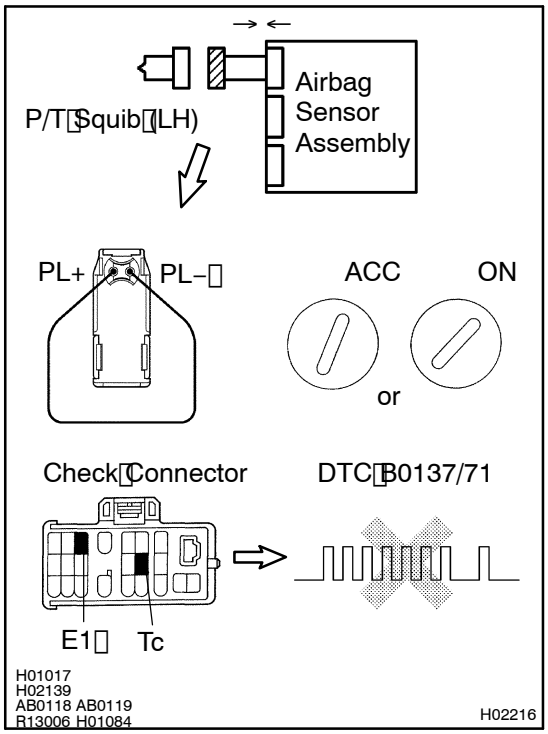
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0137/71 is not output.

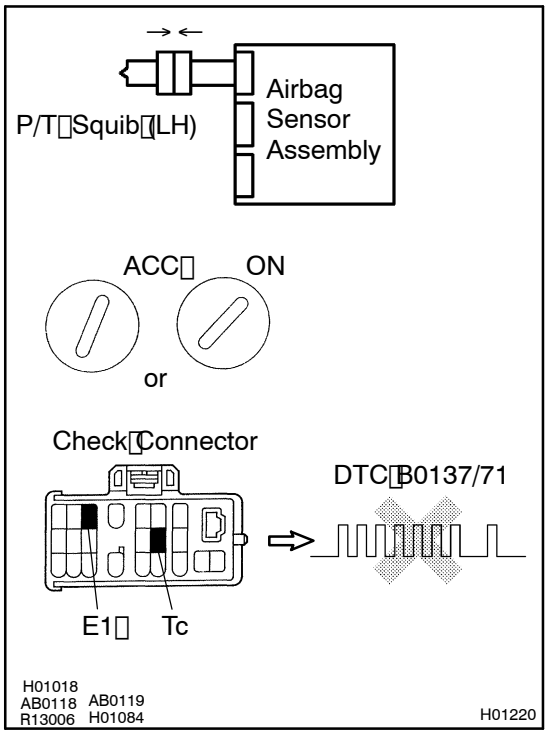
HINT:

Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0137/71 is not output.

HINT:
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1BL-19

DTC	B0138/72	Short in P/T Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0138/72 is recorded when a B+ short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	• Short circuit in seat belt pretensioner (LH) wire harness (to B+) • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

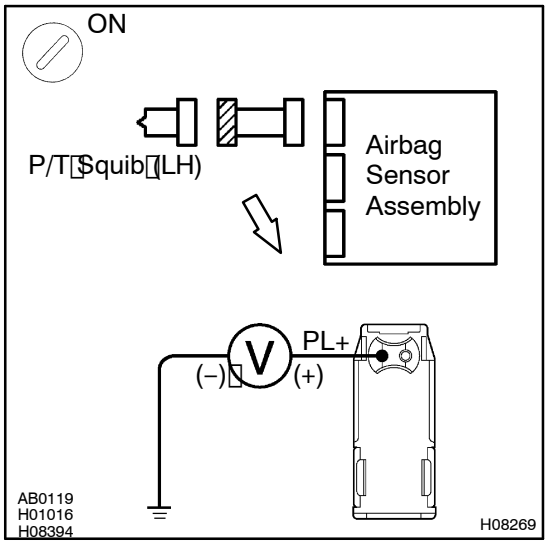
WIRING DIAGRAM

See page DI–369.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the voltage between PL+ and body ground.

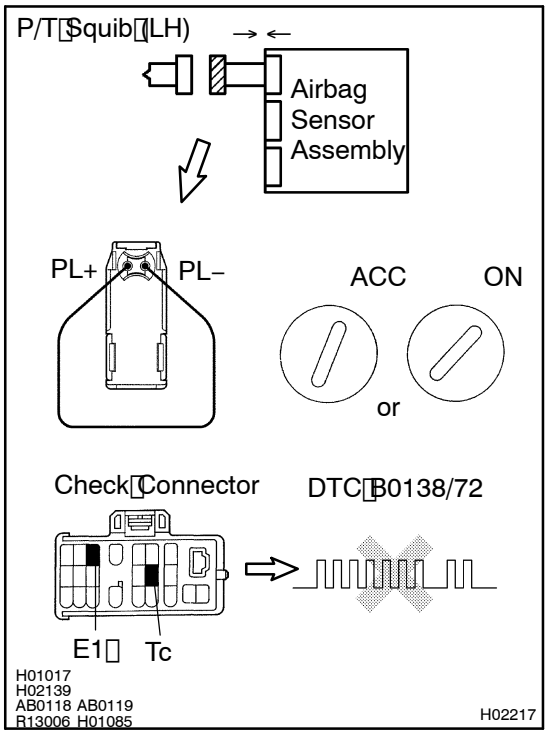
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0138/72 is not output.

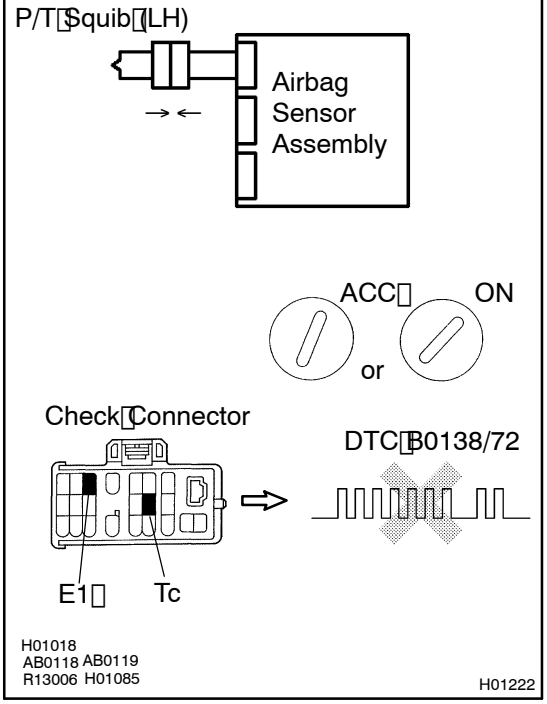
HINT:

Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0138/72 is not output.

HINT:
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B1100/31	Airbag Sensor Assembly Malfunction

CIRCUIT DESCRIPTION

The airbag sensor assembly consists of the airbag sensor, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.
It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.
DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

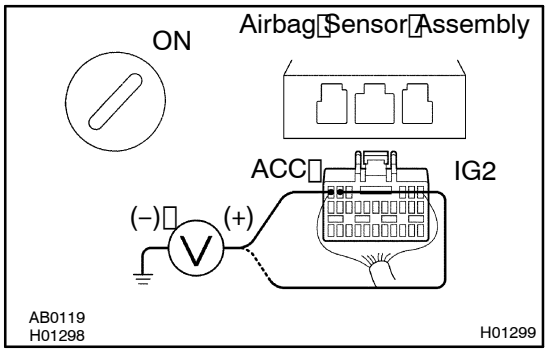
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

INSPECTION PROCEDURE

HINT:
When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check voltage at IG2 and ACC of airbag sensor assembly.



CHECK:

(a) Turn ignition switch to ON.
(b) Measure the voltage between body ground and each of IG2 and ACC terminals of the airbag sensor assembly connector.

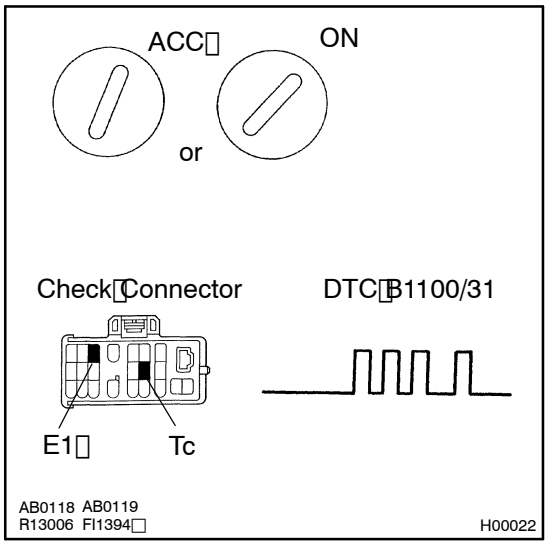
OK:

Voltage: 10 – 14 V

NG	Check that an abnormality occurs on the battery and charging system.

OK

3	Is DTC B1100/31 output again?



PREPARATION:

Clear DTC. (See step 5 on page DI–287)

CHECK:

(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(c) Repeat operation in step (a) and (b) at least 5 times.

(d) Check DTC. (See page DI–287)

HINT:

Codes other than code B1100/31 may be output at this time, but they are not relevant to this check.

NO → **Using simulation method, reproduce malfunction symptoms. (See page IN–22)**

YES

Replace airbag sensor assembly.

DI4L8–04

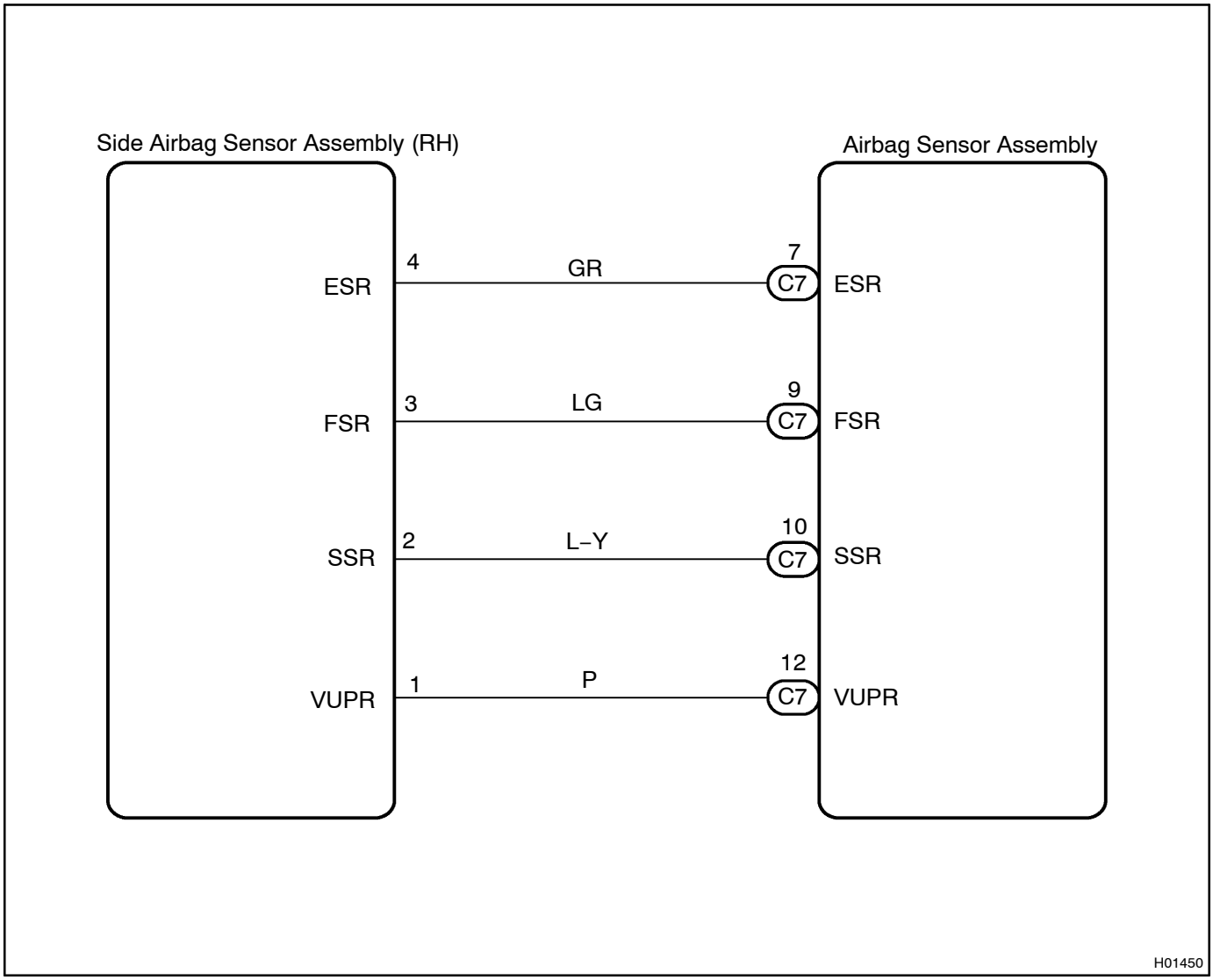
DTC	B1140/32	Side Airbag Sensor Assembly (RH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assembly (RH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.
It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and diagnosis system malfunction.
DTC B1140/32 is recorded when occurrence of a malfunction in the side airbag sensor assembly (RH) is detected.

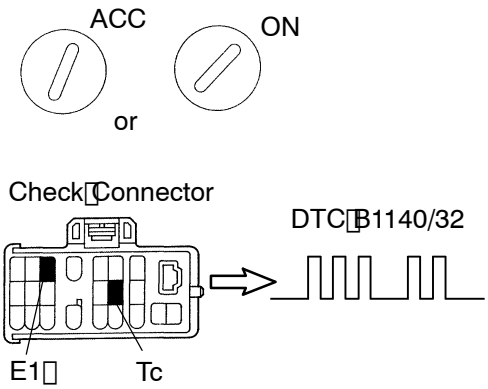
DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly (RH) • Wire harness • Airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC B1140/32 output?



CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

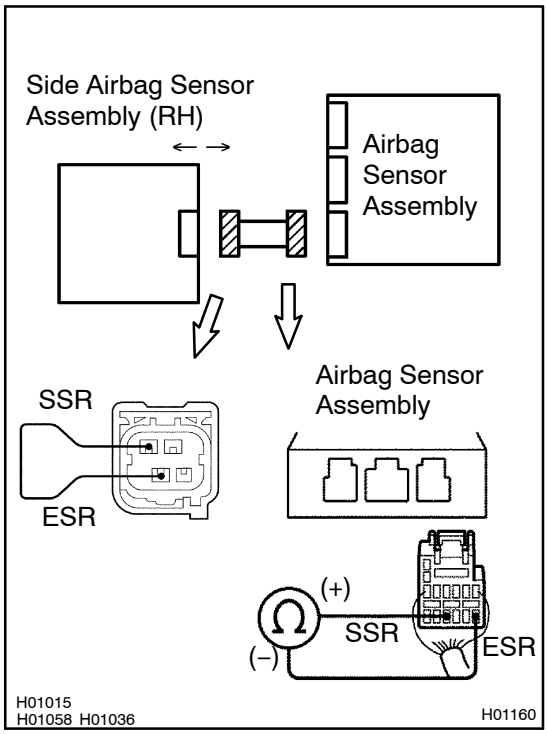
YES → **The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

NO

2	Is connector of side airbag sensor assembly (RH) properly connected?

3	Prepare for inspection. (See step 1 on DI–416)

4	**Check wire harness.**



PREPARATION:

(a) Disconnect the side airbag sensor assembly (RH) connector.

(b) Using a service wire, connect SSR and ESR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between SSR and ESR.

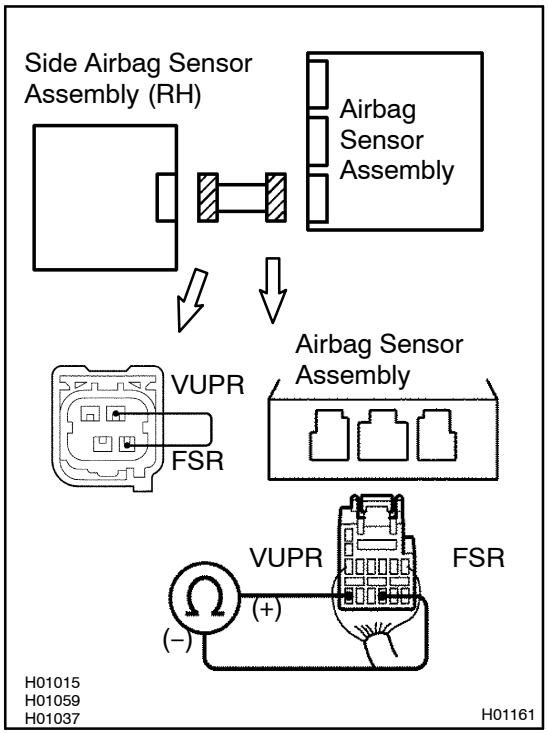
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect VUPR and FSR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between VUPR and FSR.

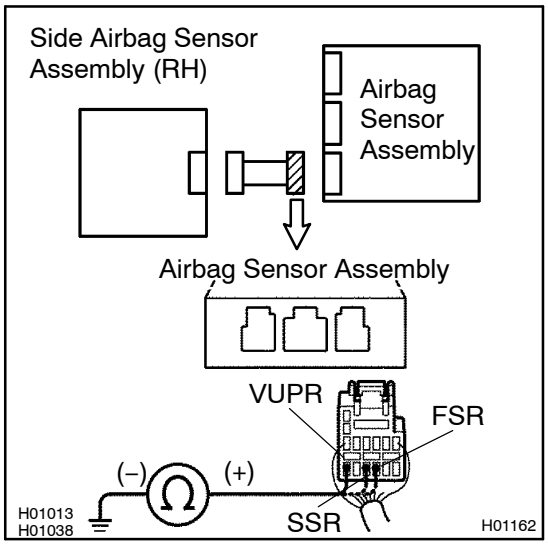
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

6	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SSR, VUPR and FSR.

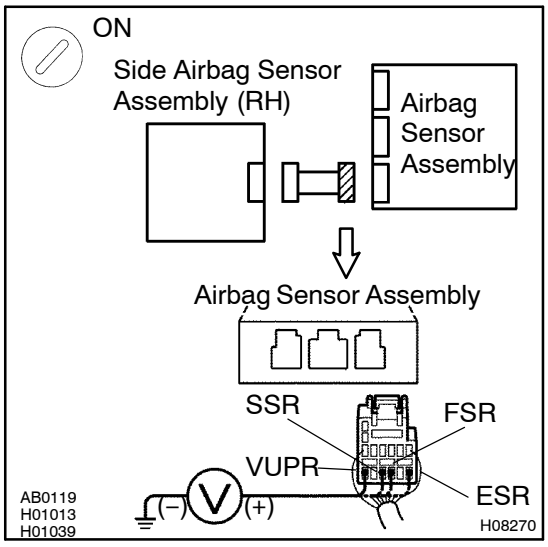
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

7	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the voltage between the body ground and each of SSR, VUPR, ESR and FSR.

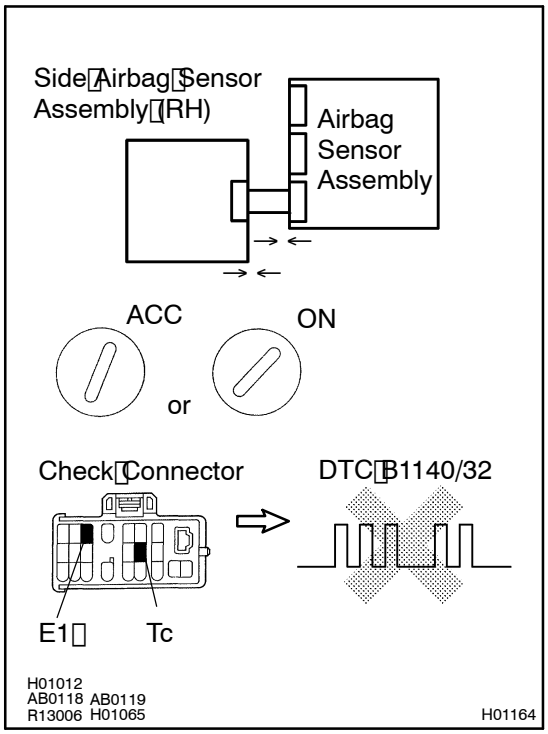
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

8	Is DTC B1140/32 output again?



PREPARATION:

(a) Connect the connector to the side airbag sensor assembly (RH).

(b) Connect the connector to the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1140/32 is not output.

HINT:

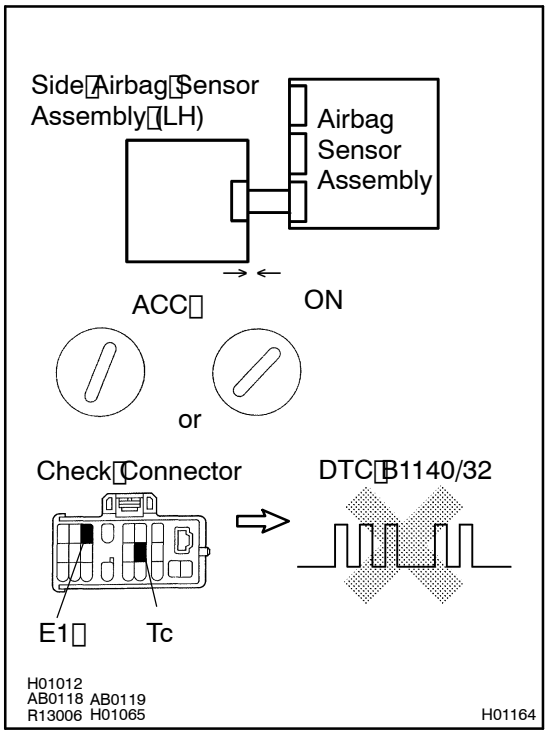
Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG	Go to step 9.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

9	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the side airbag sensor (RH) from the connector and connect the side airbag sensor (LH) to the connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1140/32 is not output.

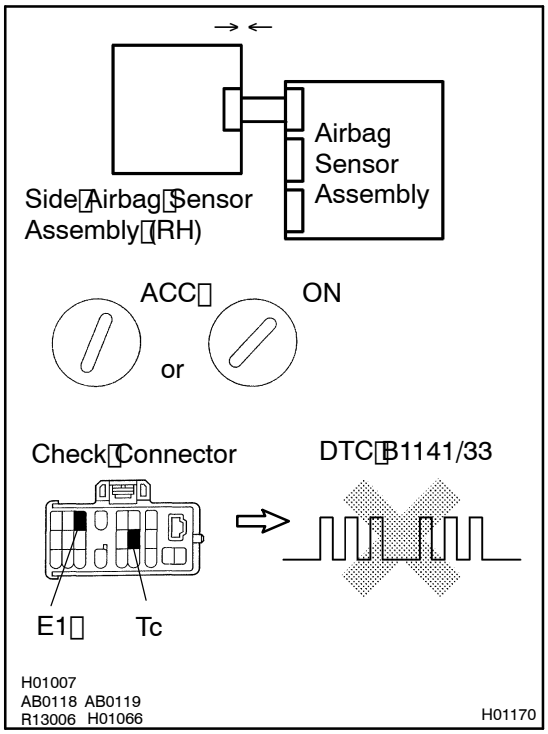
HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

10	Check side airbag sensor assembly (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag sensor (RH) to the connector that the side airbag sensor (LH) was connected to.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1141/33 is not output.

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NG → **Replace side airbag sensor assembly (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI4L9–04

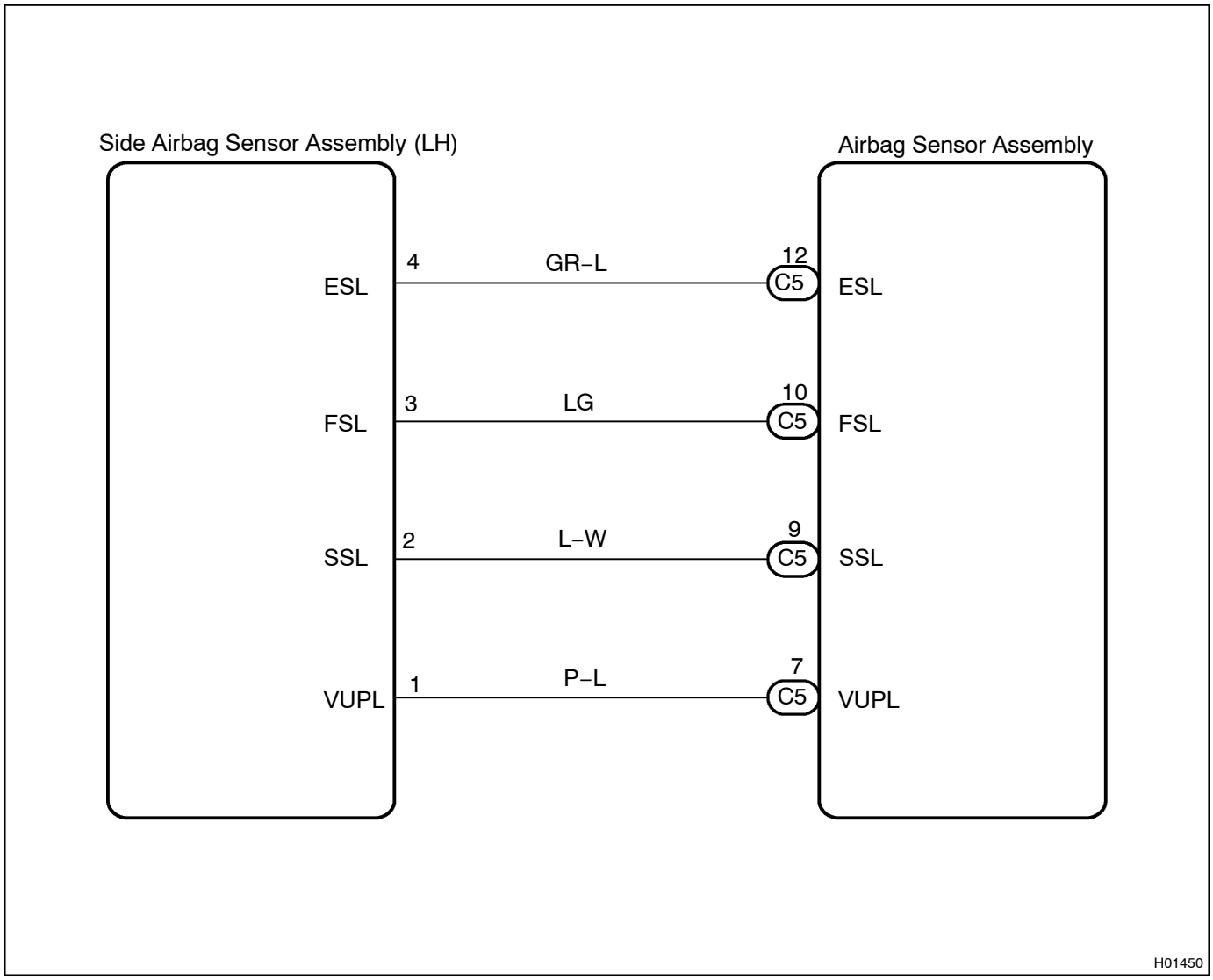
DTC	B1141/33	Side Airbag Sensor Assembly (LH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assembly (LH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.
It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.
DTC B1141/33 is recorded when occurrence of a malfunction in the side airbag sensor assembly (LH) is detected.

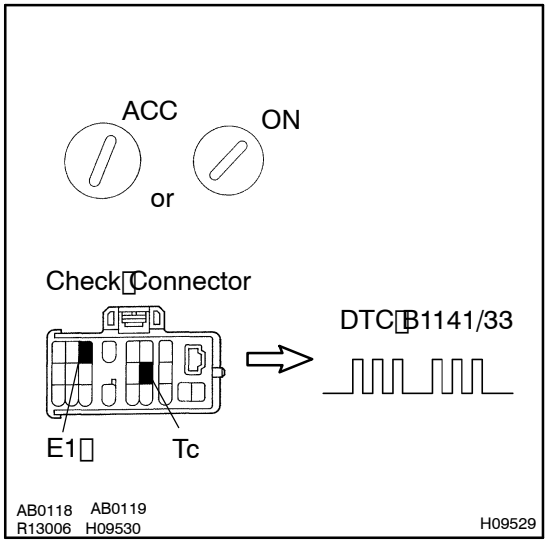
DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly (LH) • Wire harness • Airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC B1141/33 output?



CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

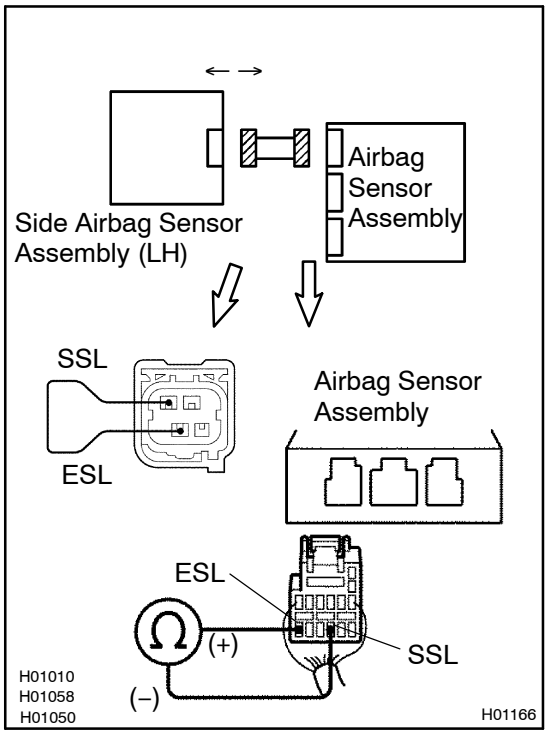
YES	The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

NO

2	Is connector of side airbag sensor assembly (LH) properly connected?

3	Prepare for inspection. (See step 1 on page DI–416)

4	**Check wire harness.**



PREPARATION:

(a) Disconnect the side airbag sensor assembly connector (LH).

(b) Using a service wire, connect SSL and ESL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between SSL and ESL.

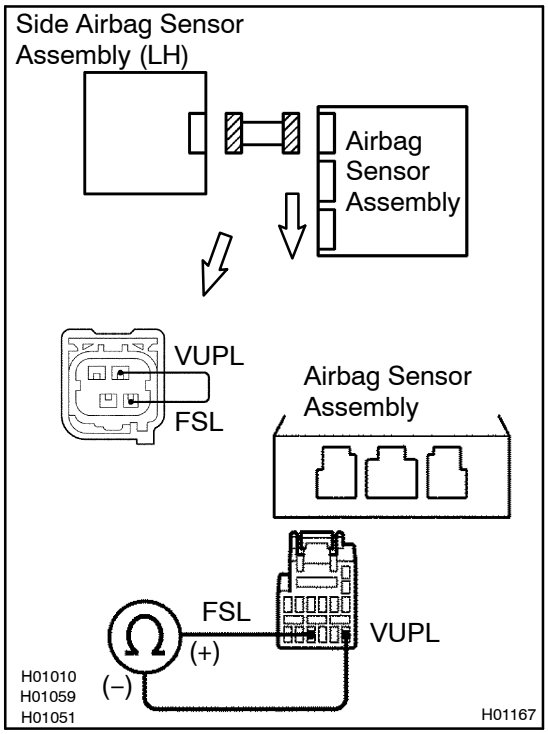
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect VUPL and FSL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between VUPL and FSL.

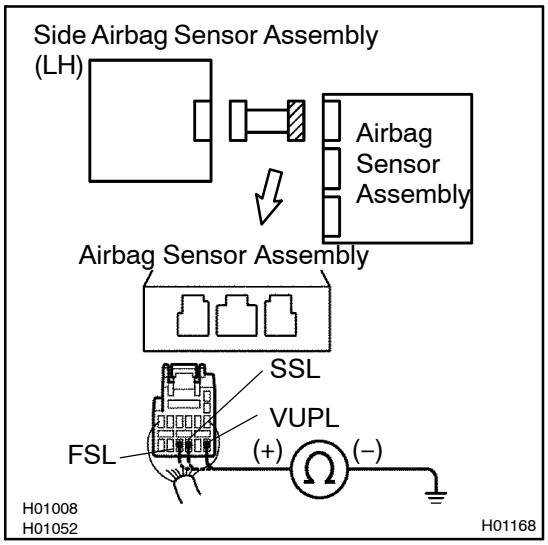
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

6	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SSL, VUPL and FSL.

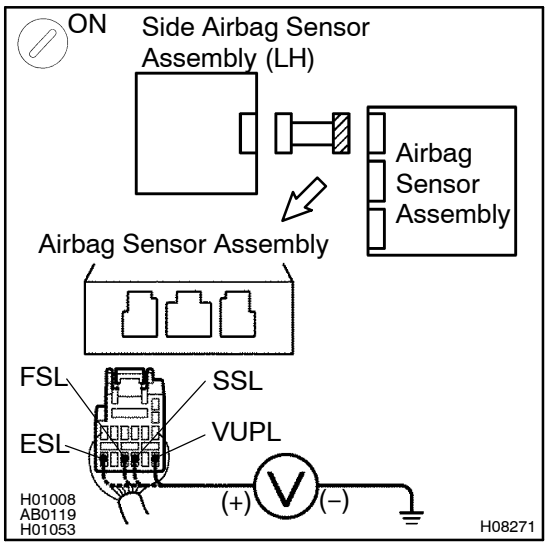
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

7	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SSL, ESL, VUPL and FSL.

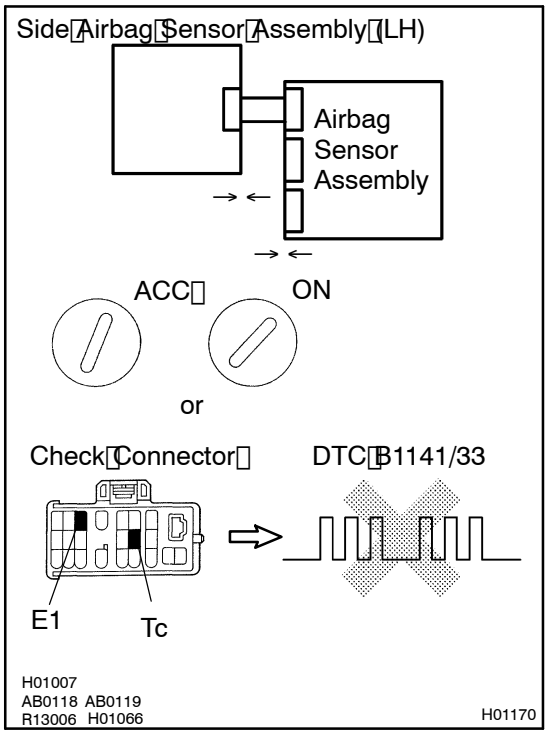
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

8	Is DTC B1141/33 output again?



PREPARATION:

(a) Connect the connector to the side airbag sensor assembly (LH).

(b) Connect the connector to the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1141/33 is not output.

HINT:

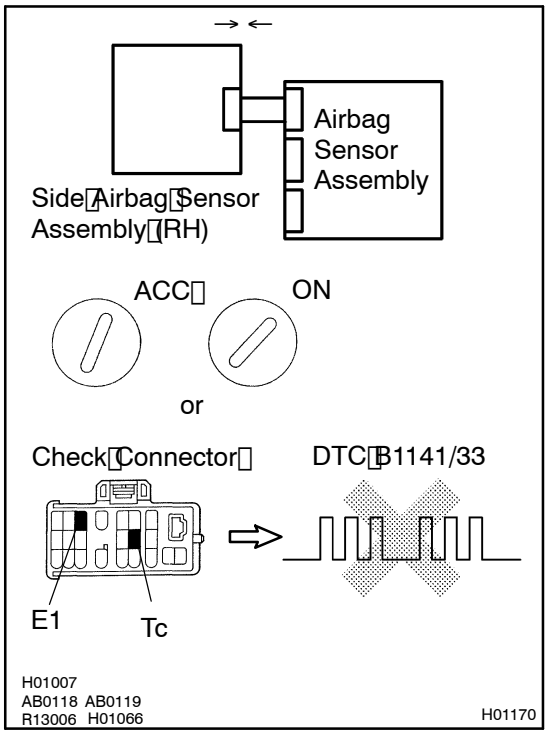
Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NO	Go to step 9.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

9	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the side airbag sensor (LH) from the connector and connect the side airbag sensor (RH) to the connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1141/33 is not output.

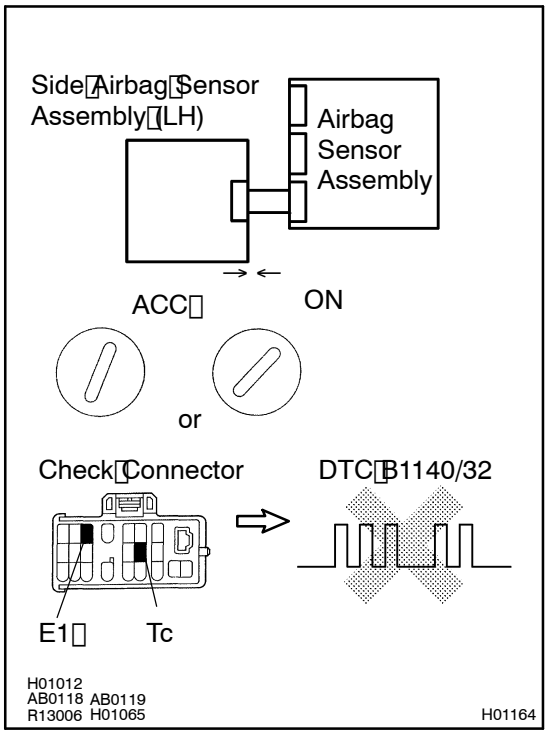
HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

10	Check side airbag sensor assembly (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag sensor (LH) to the connector that the side airbag sensor (RH) was connected to.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1140/32 is not output.

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG → **Replace side airbag sensor assembly (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI4LA–03

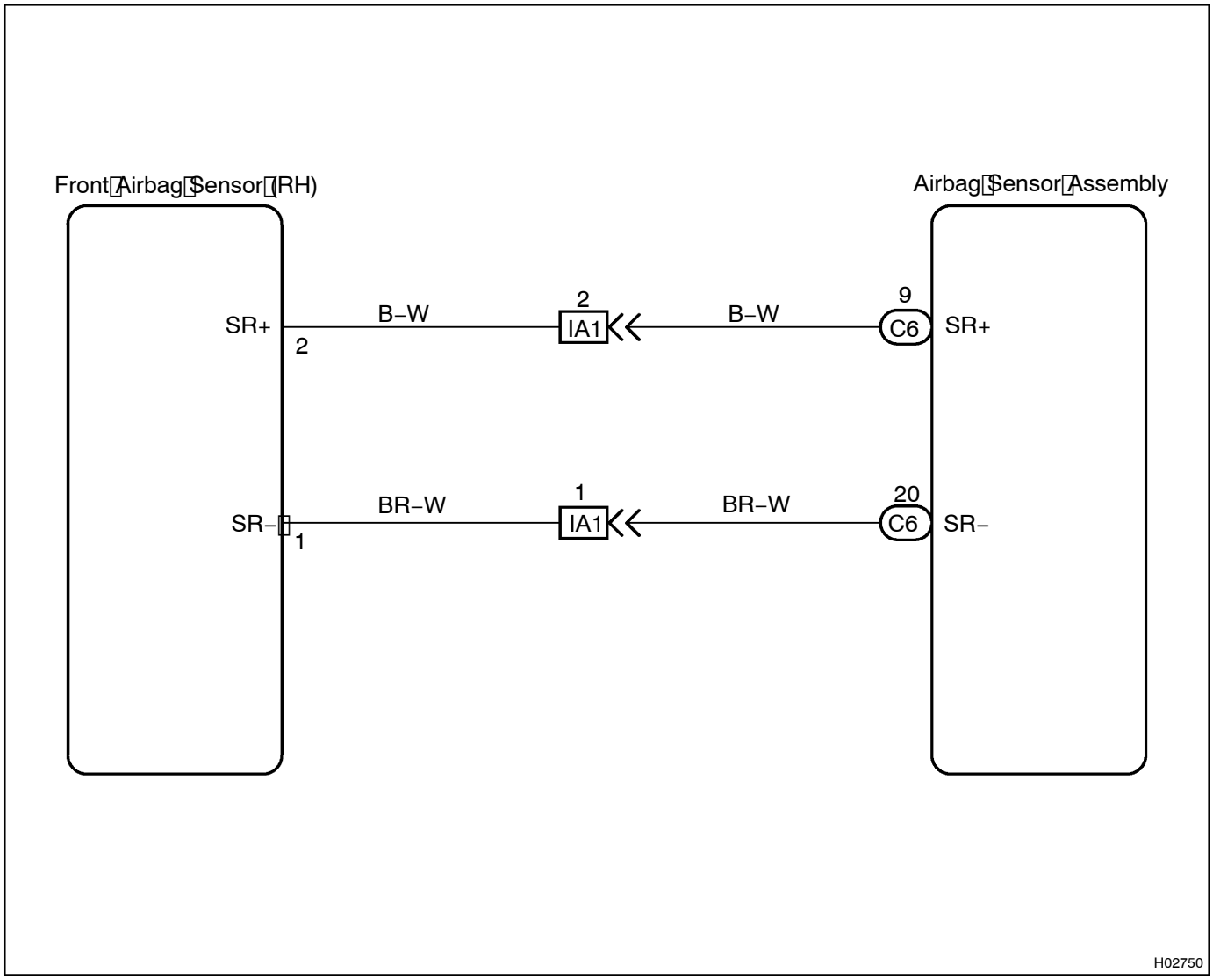
DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1156/B1157/15 is recorded when malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Wire harness • Engine room main wire harness • Airbag sensor assembly

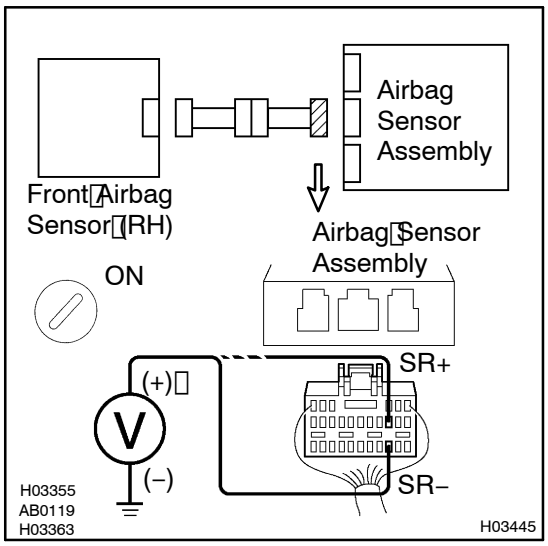
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of SR+ and SR–.

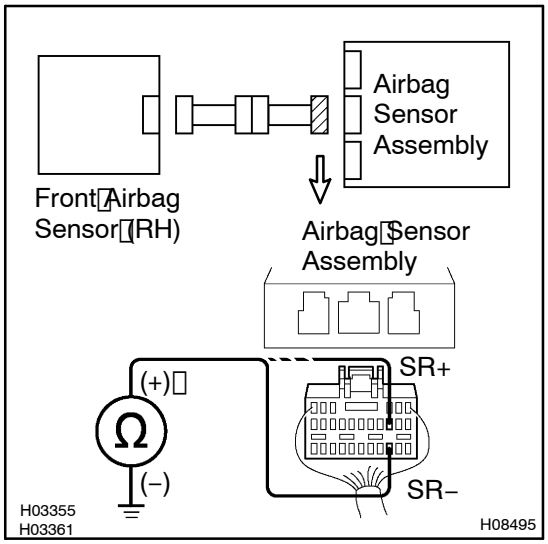
OK:

Voltage: Below 1 V

NG	Go to step 8.

OK

3	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SR+ and SR–.

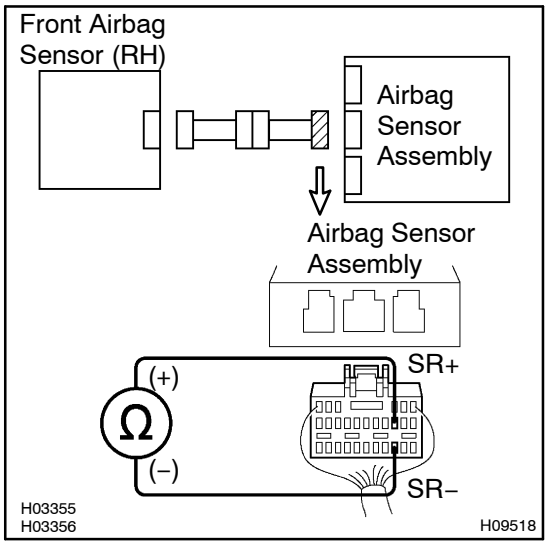
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 9.

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR–.

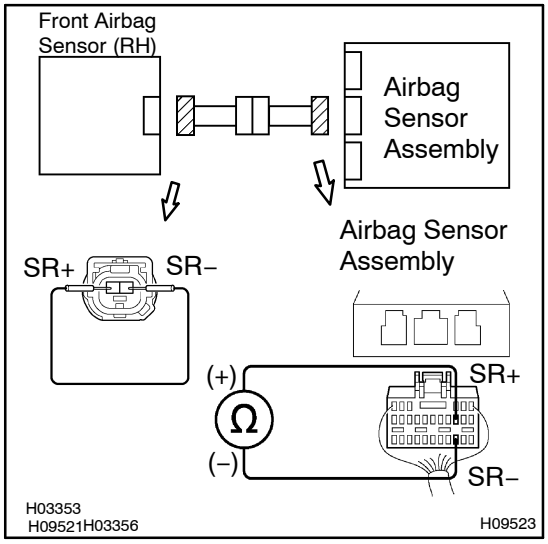
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 10.**

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect SR+ and SR– of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR–.

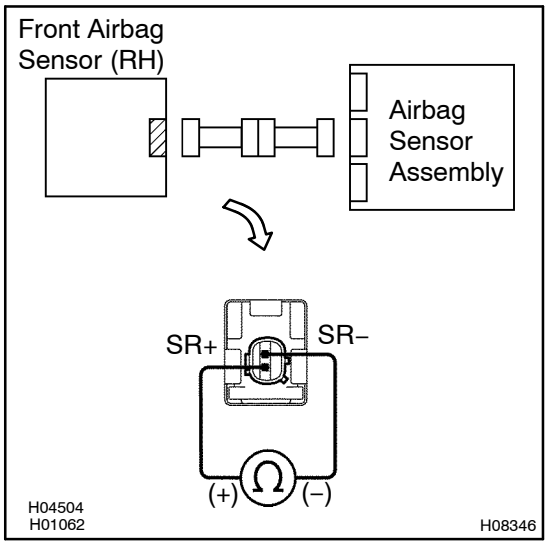
OK:

Resistance: Below 1 Ω

NG → **Go to step 11.**

OK

6	**Check front airbag sensor (RH).**



CHECK:

For the connector of the front airbag sensor (RH), measure the resistance between SR+ and SR–.

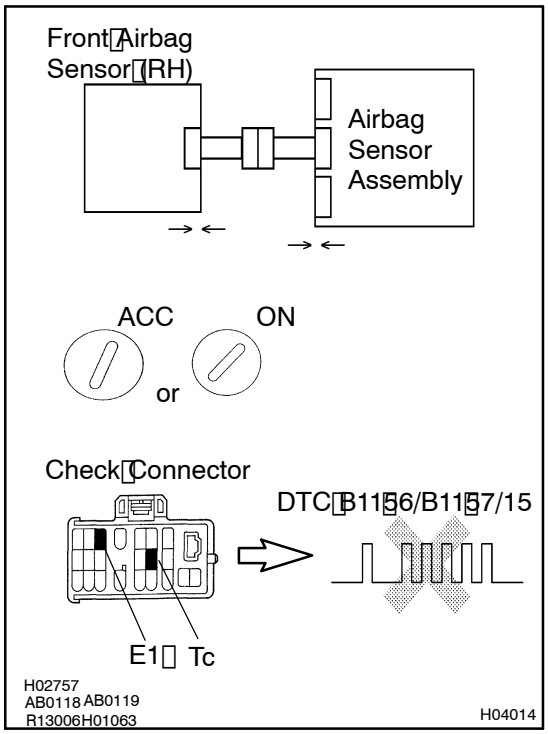
OK:

Resistance: 300 – 1500 Ω

NG → **Replace front airbag sensor (RH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front airbag sensor (RH) connector and airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1156/B1157/15 is not output.

HINT:

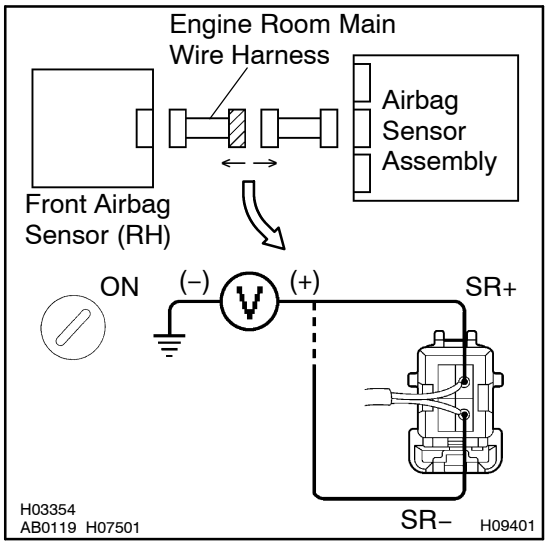
Codes other than code B1156/B1157/15 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8	Check engine room main wire harness (to B+).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the RH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SR+ and SR–.

OK:

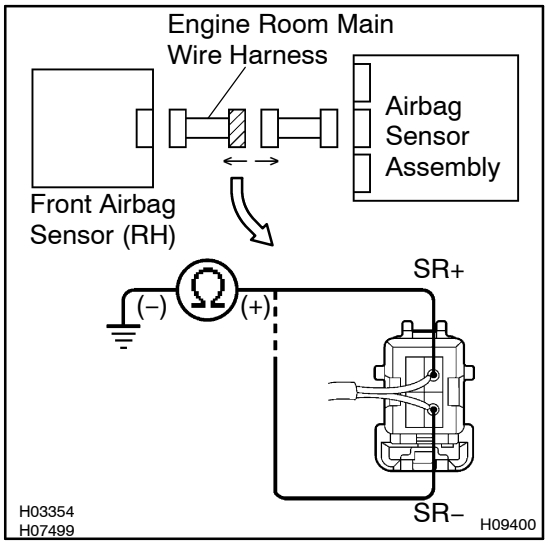
Voltage: Below 1 V

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	Check engine room main wire harness (to ground).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SR+ and SR–.

OK:

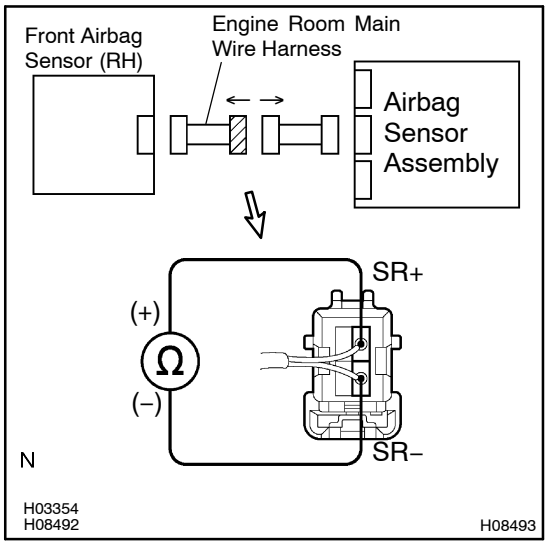
Resistance: 1 MΩ or Higher

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SR+ and SR–.

OK:

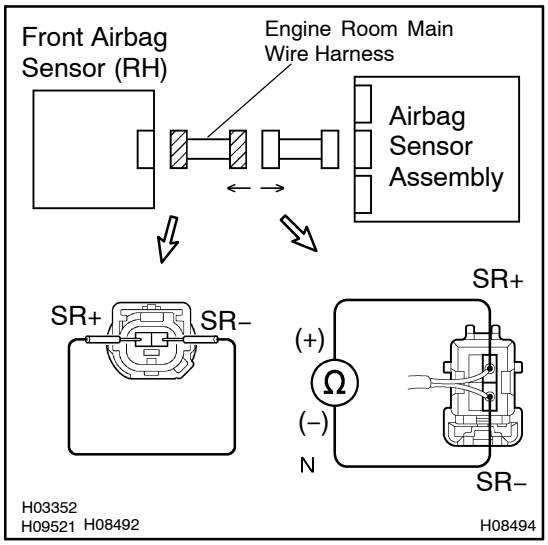
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect SR+ and SR– of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (RH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SR+ and SR–.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI58Q-02

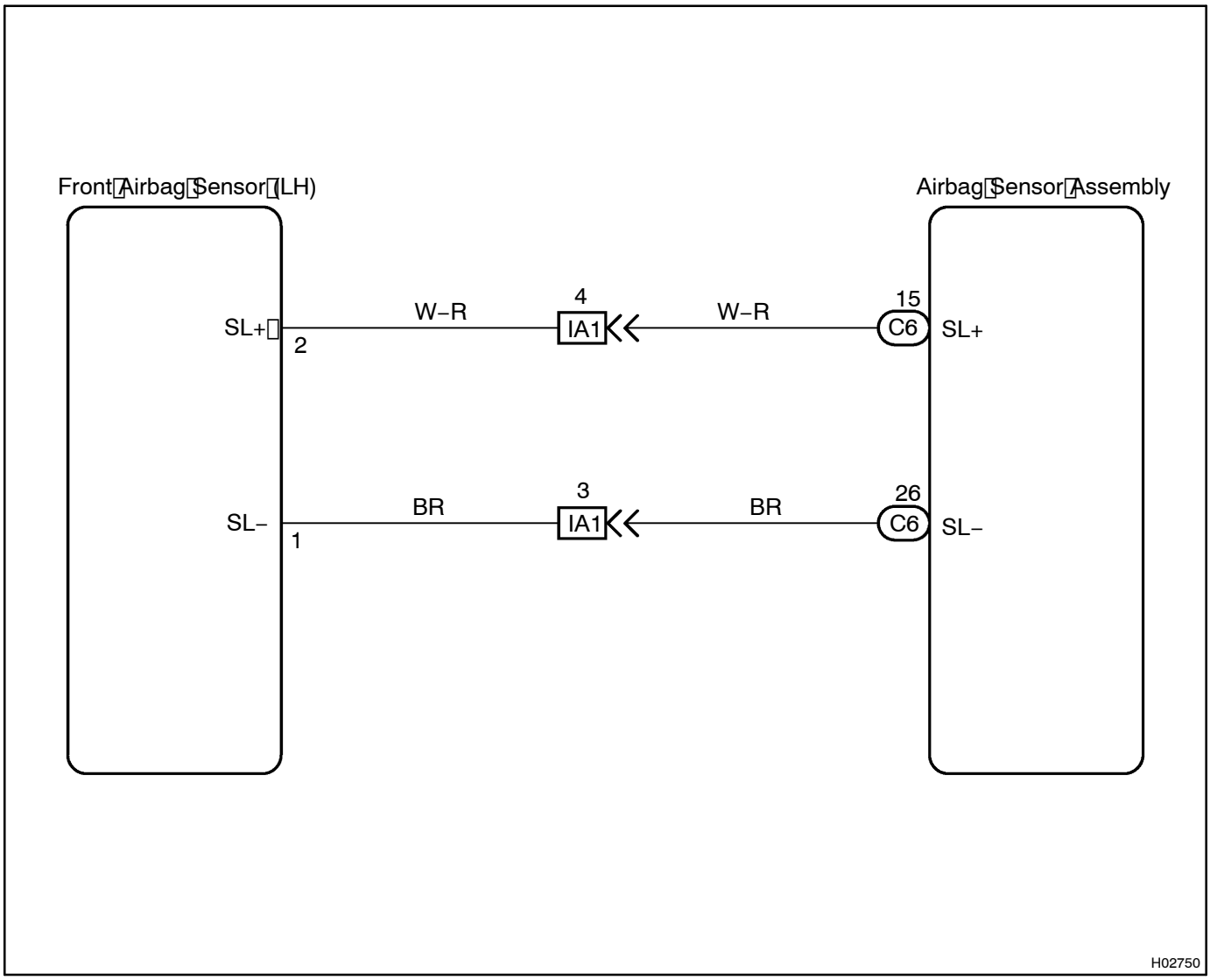
DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (LH) circuit consists of the airbag sensor assembly and front airbag sensor (LH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1158/B1159/16 is recorded when malfunction is detected in the front airbag sensor (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/B1159/16	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Wire harness • Engine room main wire harness

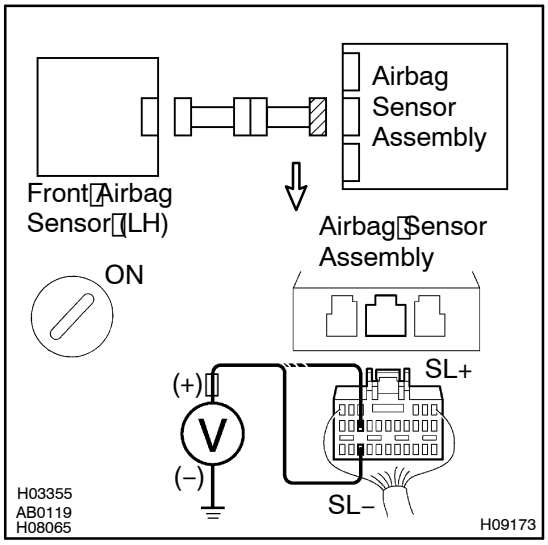
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SL+ and SL–.

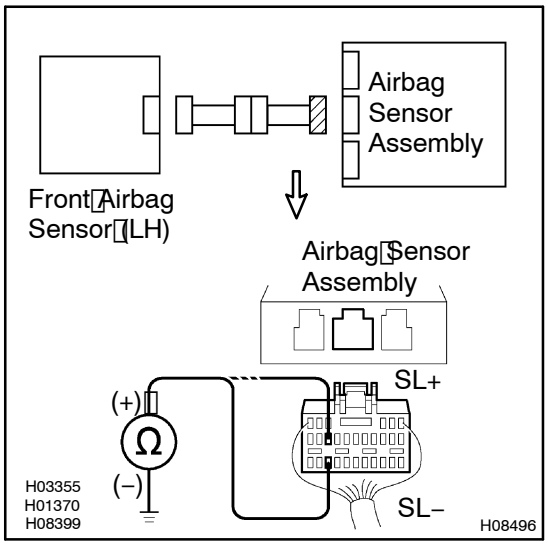
OK:

Voltage: Below 1 V

NG	Go to step 8.

OK

3	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SL+ and SL–.

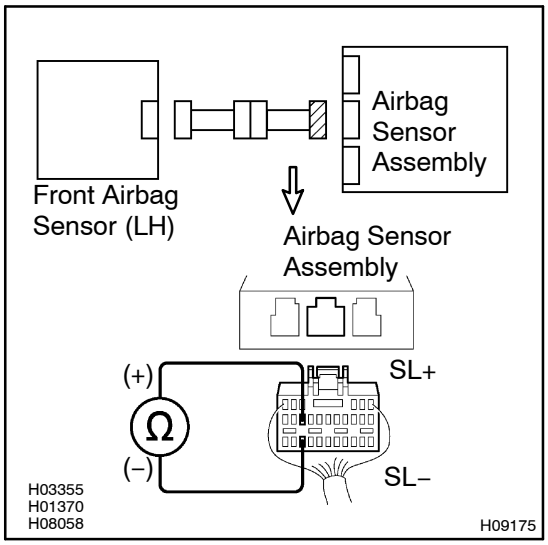
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 9.

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL–.

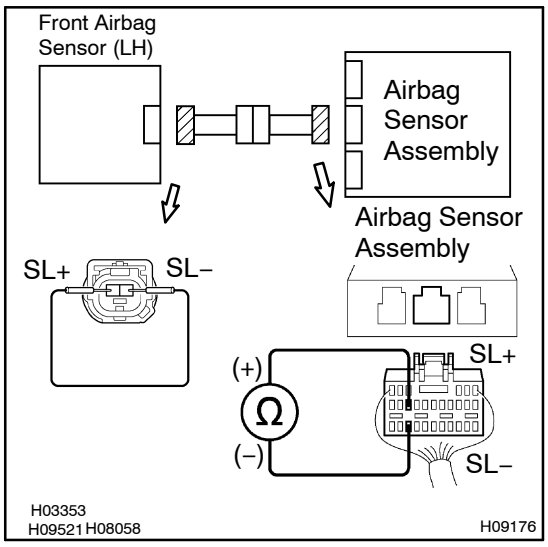
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 10.

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect SL+ and SL– of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL–.

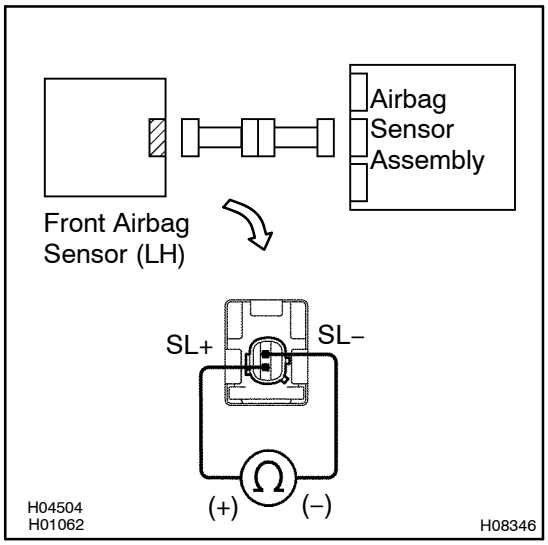
OK:

Resistance: Below 1 Ω

NG	Go to step 11.

OK

6	**Check front airbag sensor (LH).**



CHECK:

For the connector of the front airbag sensor (LH), measure the resistance between SL+ and SL–.

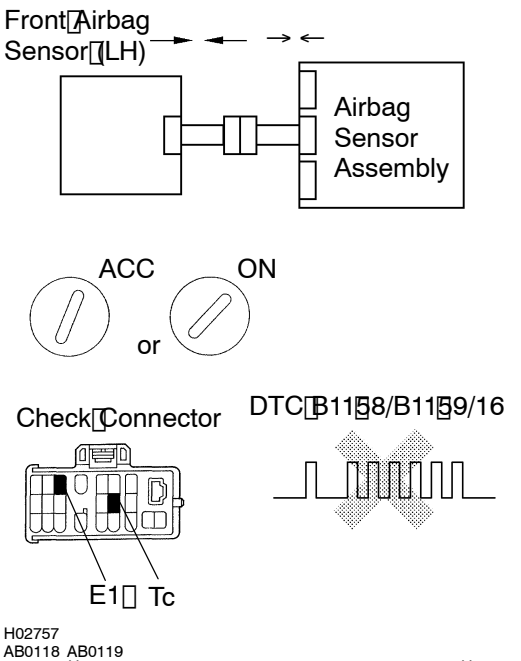
OK:

Resistance: 300 – 1500 Ω

NG → **Replace front airbag sensor (LH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1158/B1159/16 is not output.

HINT:

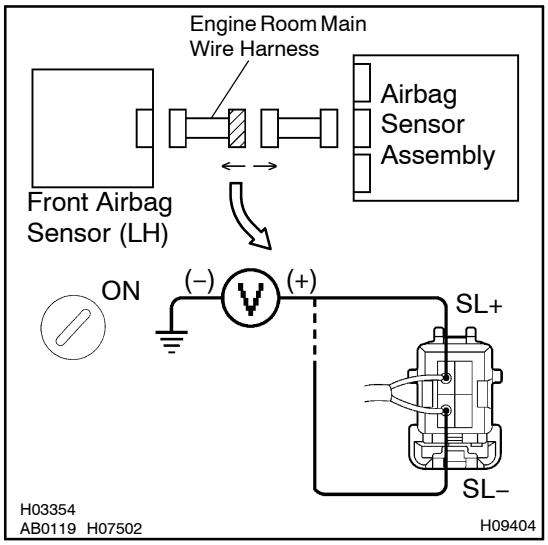
Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8	Check engine room main wire harness (to B+).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SL+ and SL–.

OK:

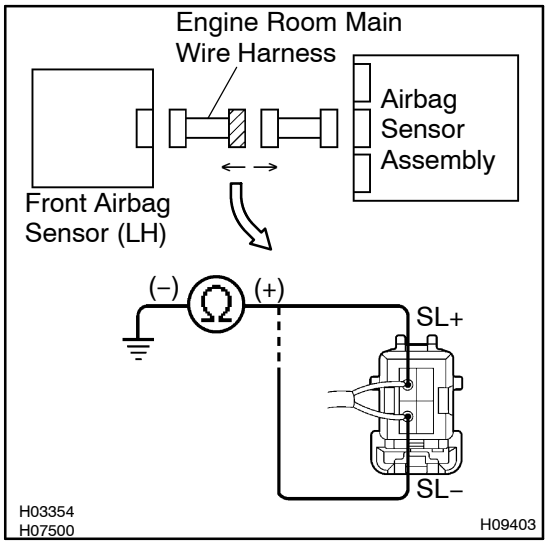
Voltage: Below 1 V

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	Check engine room main wire harness (to ground).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SL+ and SL–.

OK:

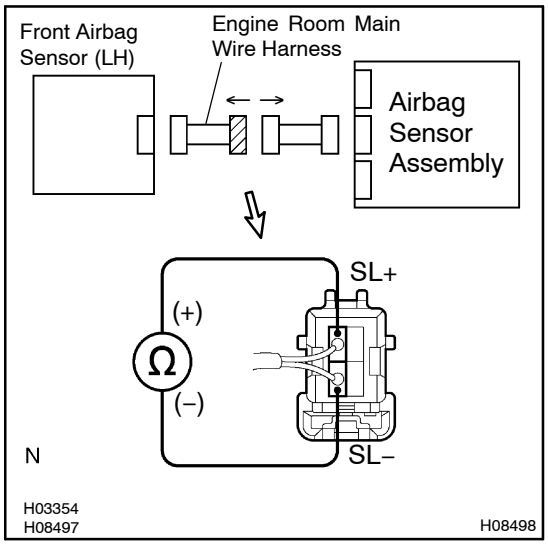
Resistance: 1 MΩ or Higher

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL–.

OK:

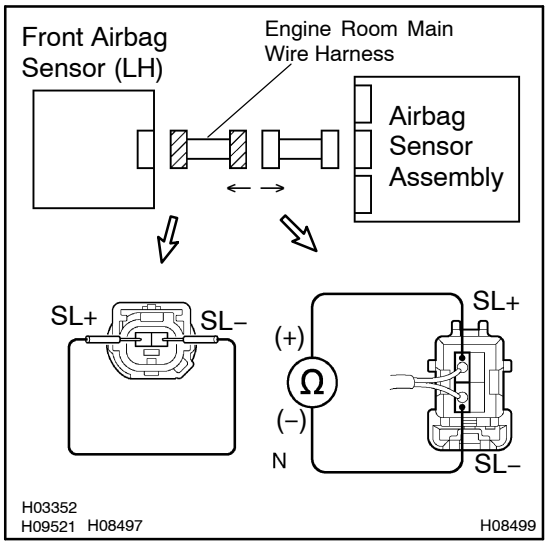
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect SL+ and SL– of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL–.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI1BN–11

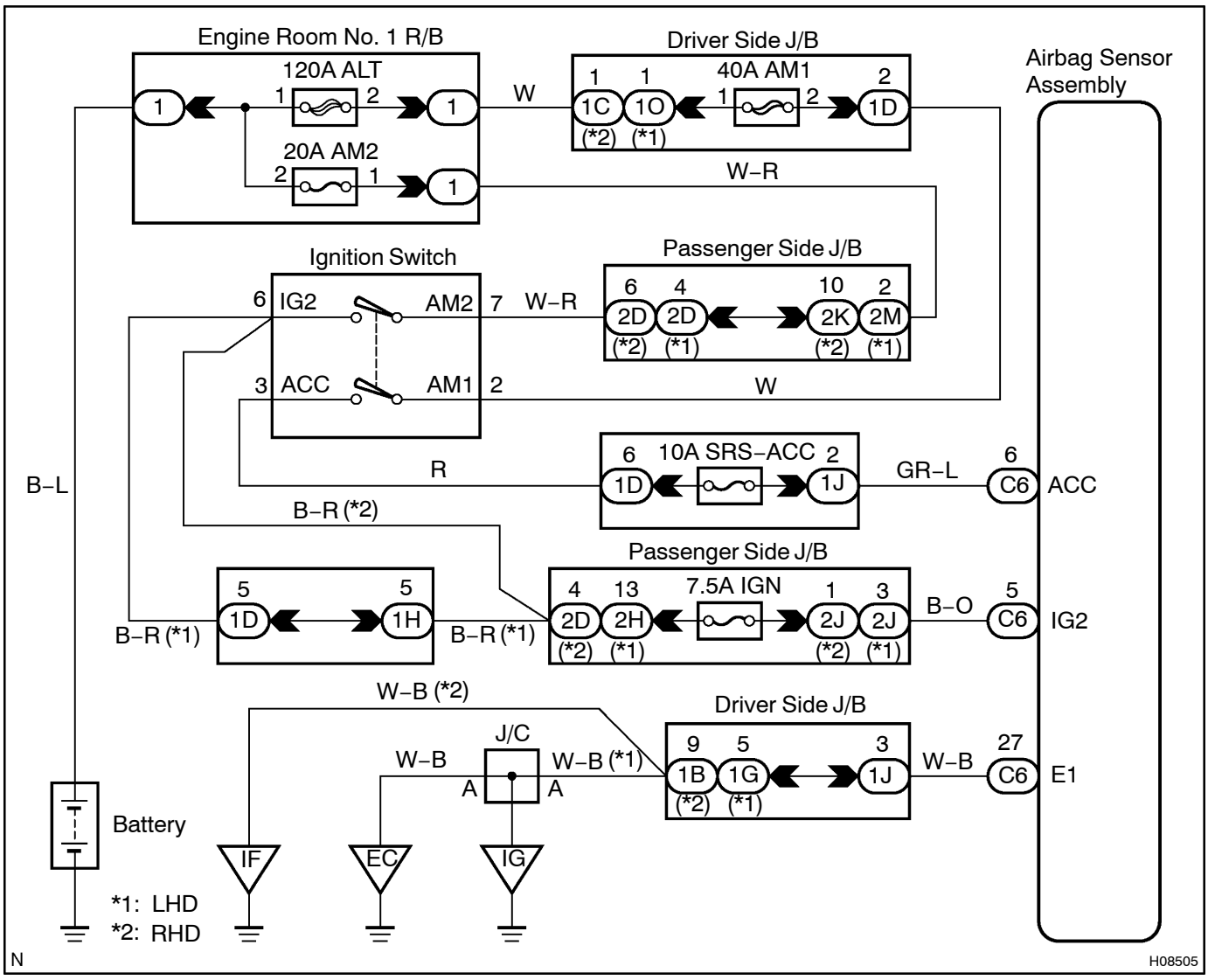
DTC	Normal	Source Voltage Drop

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage–increase circuit (DC–DC converter) in the airbag sensor assembly in case the source voltage drops.
When the battery voltage drops, the voltage–increase circuit (DC–DC converter) functions to increase the voltage of the SRS to normal voltage.
The diagnosis system malfunction display for this circuit is different from other circuits that is when the SRS warning light remains lit up and the DTC is a normal code, source voltage drop is indicated.
Malfunction in this circuit is not recorded in the airbag sensor assembly, and the source voltage returns to normal, the SRS warning light automatically goes off.

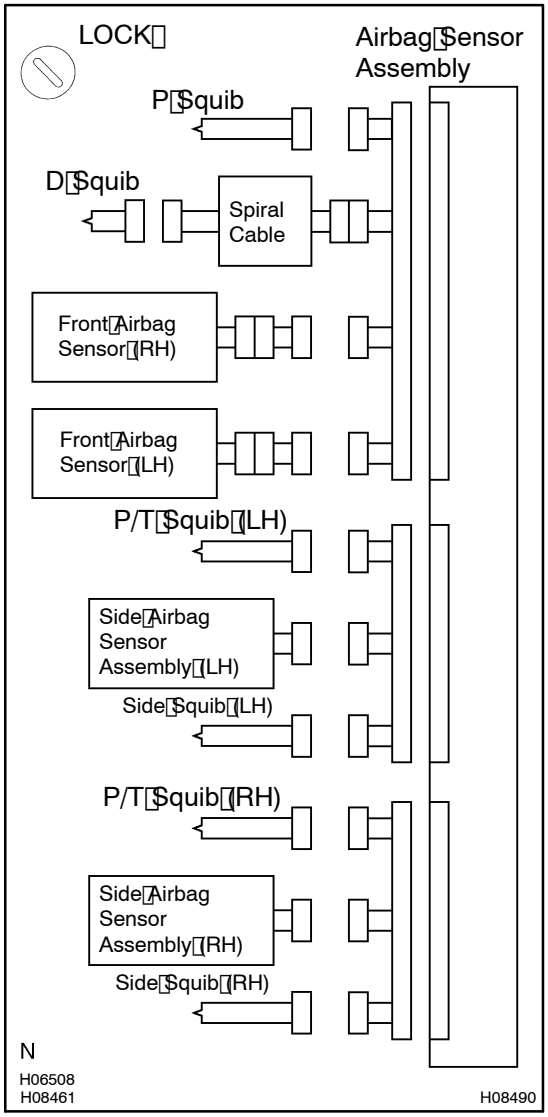
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection.**



PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(b) Remove the steering wheel pad. (See page SR–12)

(c) Disconnect the connector of the front passenger airbag assembly. (See page RS–27)

(d) Disconnect the connectors of the side airbag assembly RH and LH. (See page RS–39)

(e) Disconnect the connectors of the seat belt pretensioner RH and LH. (See page BO–150)

(f) Disconnect the connectors of the airbag sensor assembly. (See page RS–54)

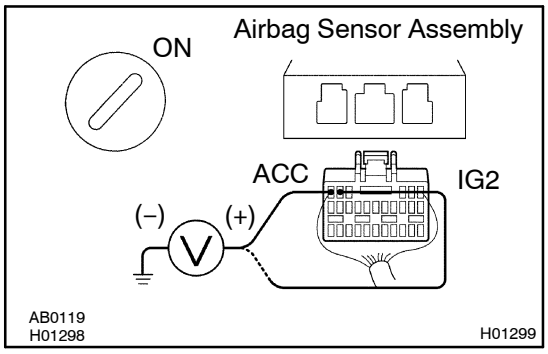
(g) Disconnect the connectors of the front airbag sensor RH and LH. (See page RS–59)

(h) Disconnect the connectors of the side airbag sensor assembly RH and LH. (See page RS–64)

CAUTION:

Store the steering wheel pad, front passenger airbag assembly and seatback assembly (with side airbag assembly) with the front surface facing upward.

2	Check source voltage.



PREPARATION:

Connect negative (–) terminal cable to the battery.

CHECK:

(a) Turn ignition switch ON.

(b) Measure the voltage of each of IG2 and ACC on the sensor and operate electric system. (defogger, wiper, headlight, heater blower, etc.)

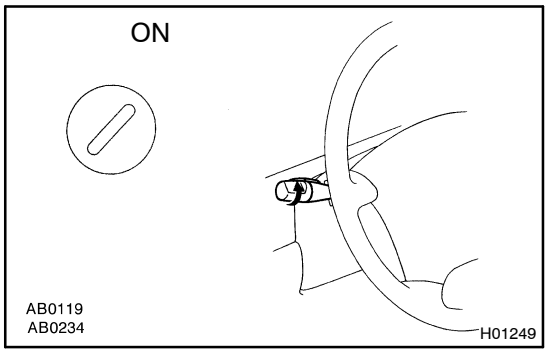
OK:

Voltage: 10 – 14 V

NG	Check harness between battery and airbag sensor assembly, and check battery and charging system.

OK

3	Does SRS warning light turn OFF?



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Connect the steering wheel pad connector.

(c) Connect the front passenger airbag assembly connector.

(d) Connect the airbag sensor assembly connectors.

(e) Connect the side airbag assembly connectors.

(f) Connect the seat belt pretensioner connectors.

(g) Connect the side airbag sensor assembly connectors.

(h) Connect the front airbag sensor connectors.

(i) Turn ignition switch to ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO	Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

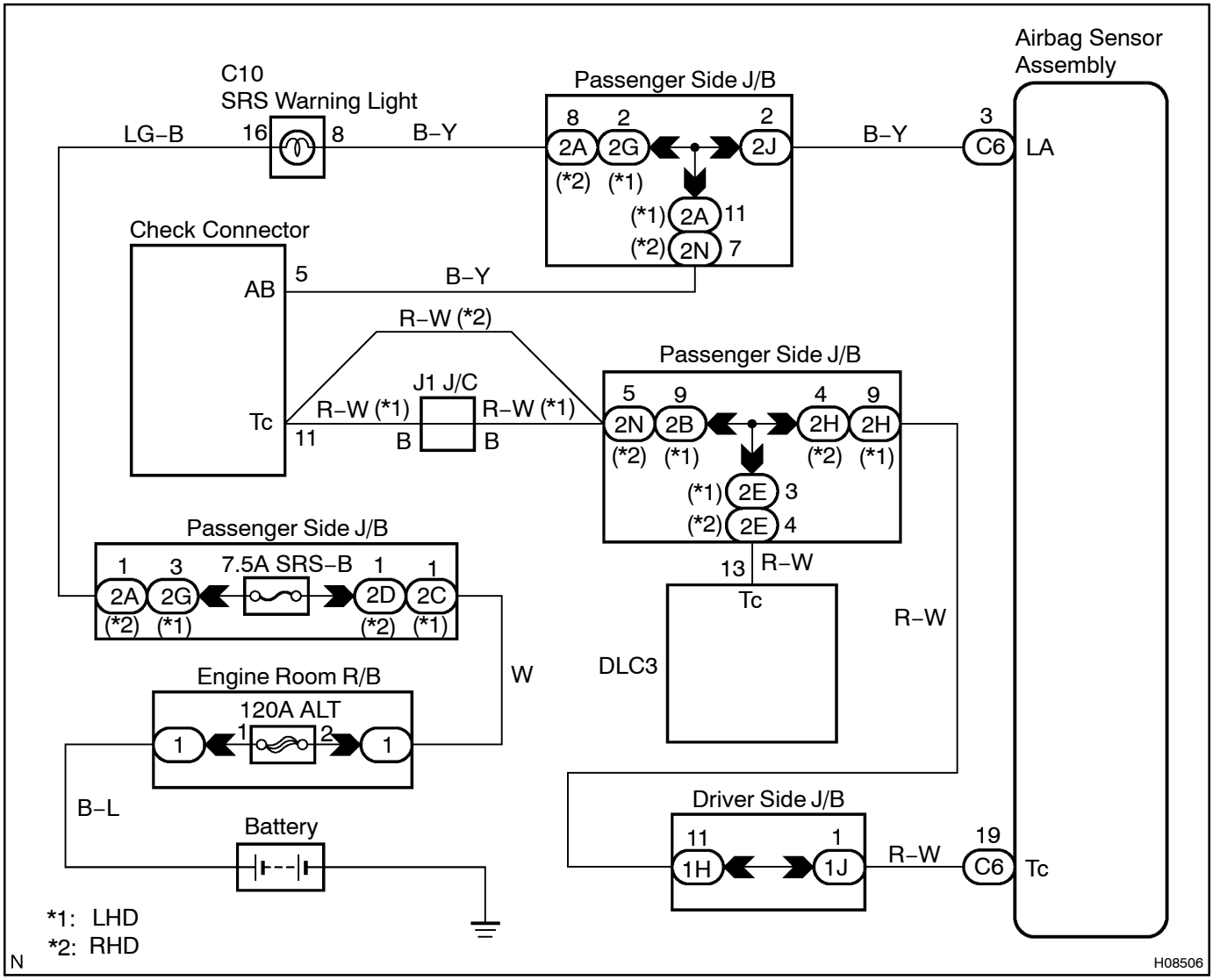
DI56Q–02

SRS Warning Light Circuit Malfunction

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to ACC or ON position, and then turns OFF automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality.
When terminals Tc and E1 of the check connector are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

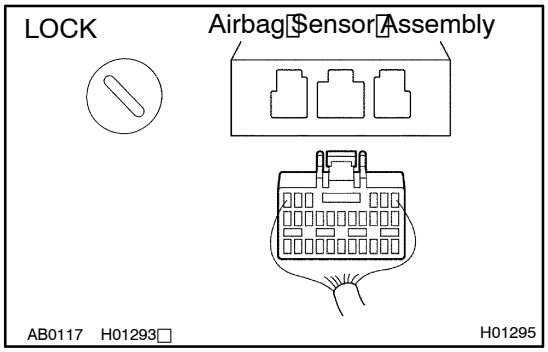


INSPECTION PROCEDURE

Always lights up, when ignition switch is in LOCK position

1	Prepare for inspection. (See step 1 on page DI–416)

2	Does SRS warning light turn OFF?



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.
(d) Connect negative (–) terminal cable to the battery.

CHECK:

Check operation of the SRS warning light.

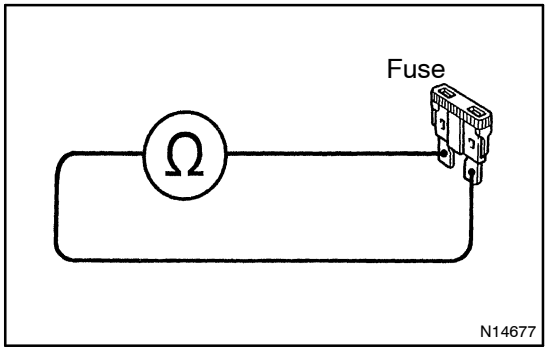
NO → **Check SRS warning light circuit or terminal AB circuit of check connector.**

YES

Replace airbag sensor assembly.

Does not light up, when ignition switch is turned to ACC or ON

1	Check SRS–B Fuse.



PREPARATION:
Remove SRS–B fuse.
CHECK:
Check continuity of SRS–B fuse.
OK:

Continuity

HINT:

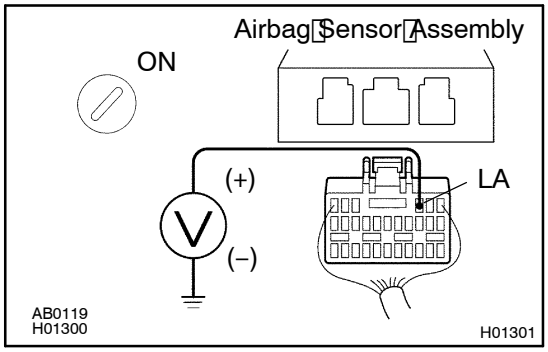
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG	Go to step 5.

OK

2	Prepare for inspection. (See step 1 on page DI–416)

3	Check SRS warning light circuit.



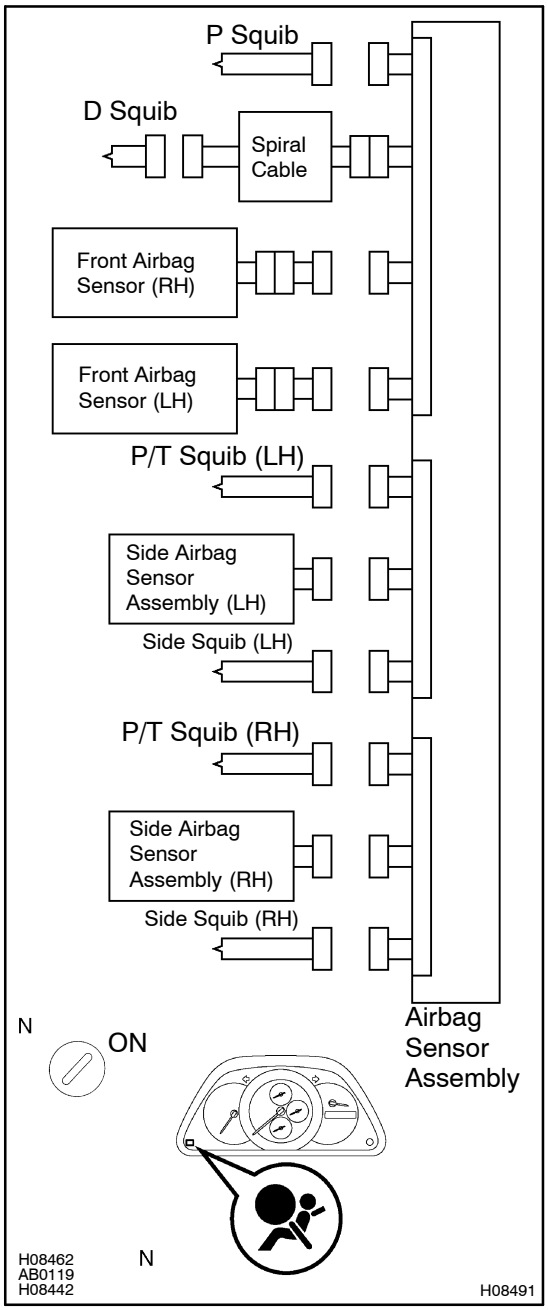
PREPARATION:
(a) Connect negative (–) terminal cable to the battery.
(b) Turn ignition switch to ACC or ON.
CHECK:
Measure the voltage LA terminal of the harness side connector of the airbag sensor assembly.
OK:

Voltage: 10 – 14 V

NG	**Check SRS warning light bulb or repair SRS warning light circuit.**

OK

4	Does SRS warning light come on?



PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery.
(b) Connect the airbag sensor assembly connectors.
(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.
(d) Turn ignition switch to ACC or ON.

CHECK:

Check operation of the SRS warning light.

NO → **Check terminal LA of airbag sensor assembly. If normal, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

5	Is new SRS–B fuse burnt out again?

NO → Using simulation method, reproduce malfunction symptoms. (See page IN–22)

YES

Check harness between SRS–B fuse and SRS warning light.

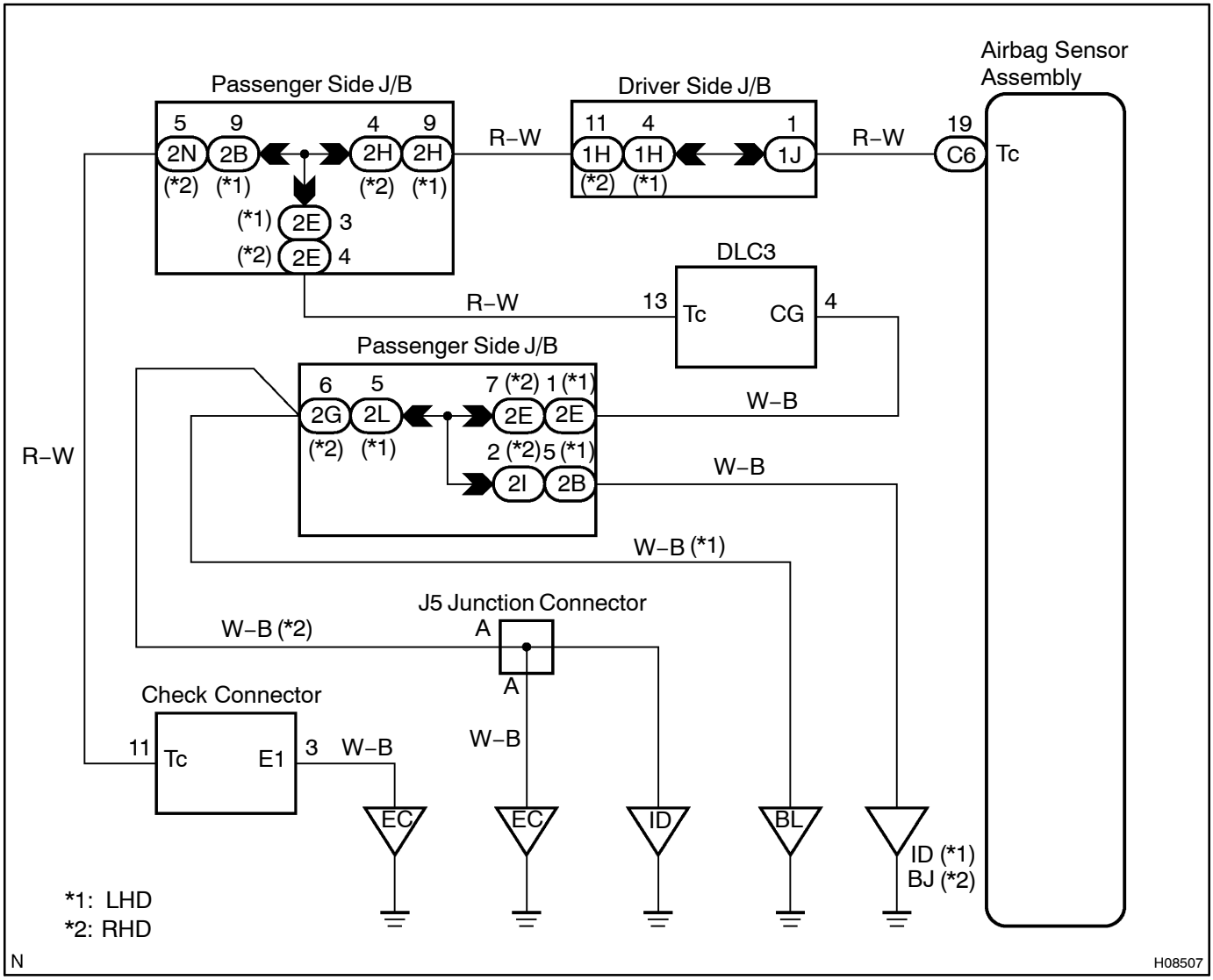
DI1BQ–11

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E1 of the check connector the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

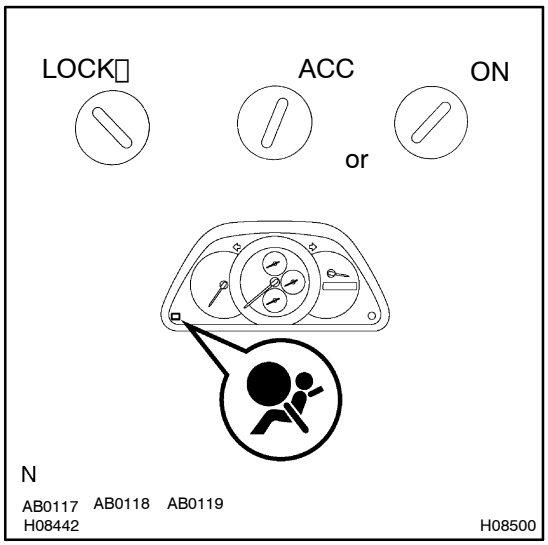
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	**Does SRS warning light light up for approx. 6 seconds?**



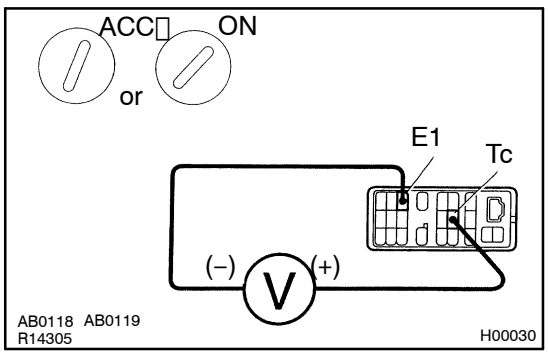
PREPARATION:

Check operation of the SRS warning light after the ignition switch is turned from LOCK position to ACC or ON position.

NO → **Check SRS warning light system. (See page DI–287)**

YES

2	**Check voltage between terminals Tc and E1 of check connector.**



PREPARATION:

Turn ignition switch to ACC or ON.

CHECK:

Measure the voltage between terminals Tc and E1 of check connector.

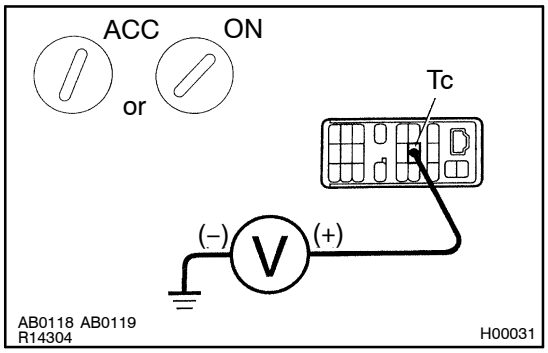
OK:

Voltage: 10 – 14 V

OK → **Go to step 4.**

NG

3	Check voltage between terminal Tc of check connector and body ground.



CHECK:

Measure the voltage between terminal Tc of check connector and body ground.

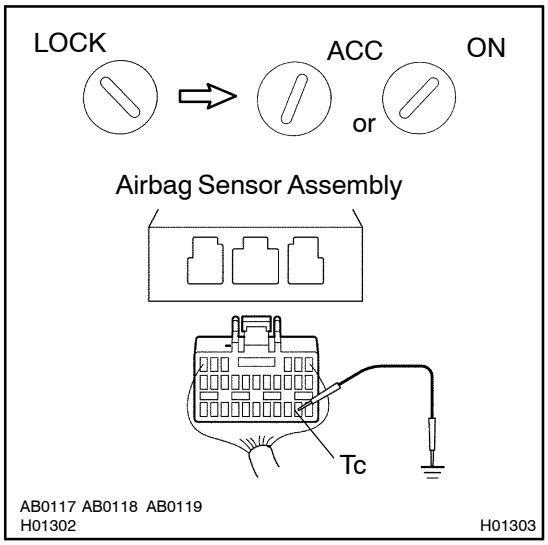
OK:

Voltage: 10 – 14 V

OK	Check harness between terminal E1 of check connector and body ground.

NG

4	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.
(d) Insert a service wire into terminal Tc from back side as shown in the illustration.
(e) Connect the airbag sensor assembly connector with a service wire.
(f) Connect negative (–) terminal cable to the battery.
(g) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(h) Connect a service wire of terminal Tc to body ground.

CHECK:

Check operation of the SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

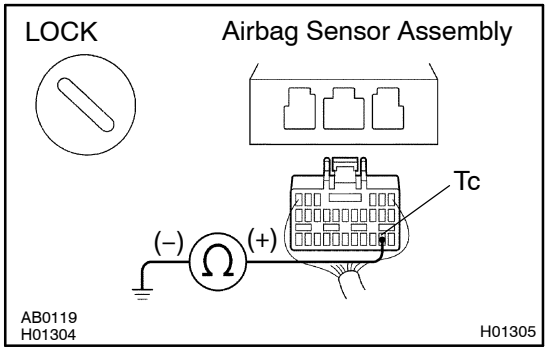
OK	Check harness between the airbag sensor assembly and check connector.

NG

Replace airbag sensor assembly.

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

1	**Check resistance between terminal Tc of airbag sensor assembly and body ground.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.

CHECK:

Check resistance between terminal Tc of the airbag sensor assembly connector and body ground.

OK:

Resistance: 1 MΩ or Higher

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

OK

Replace airbag sensor assembly.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI611–01

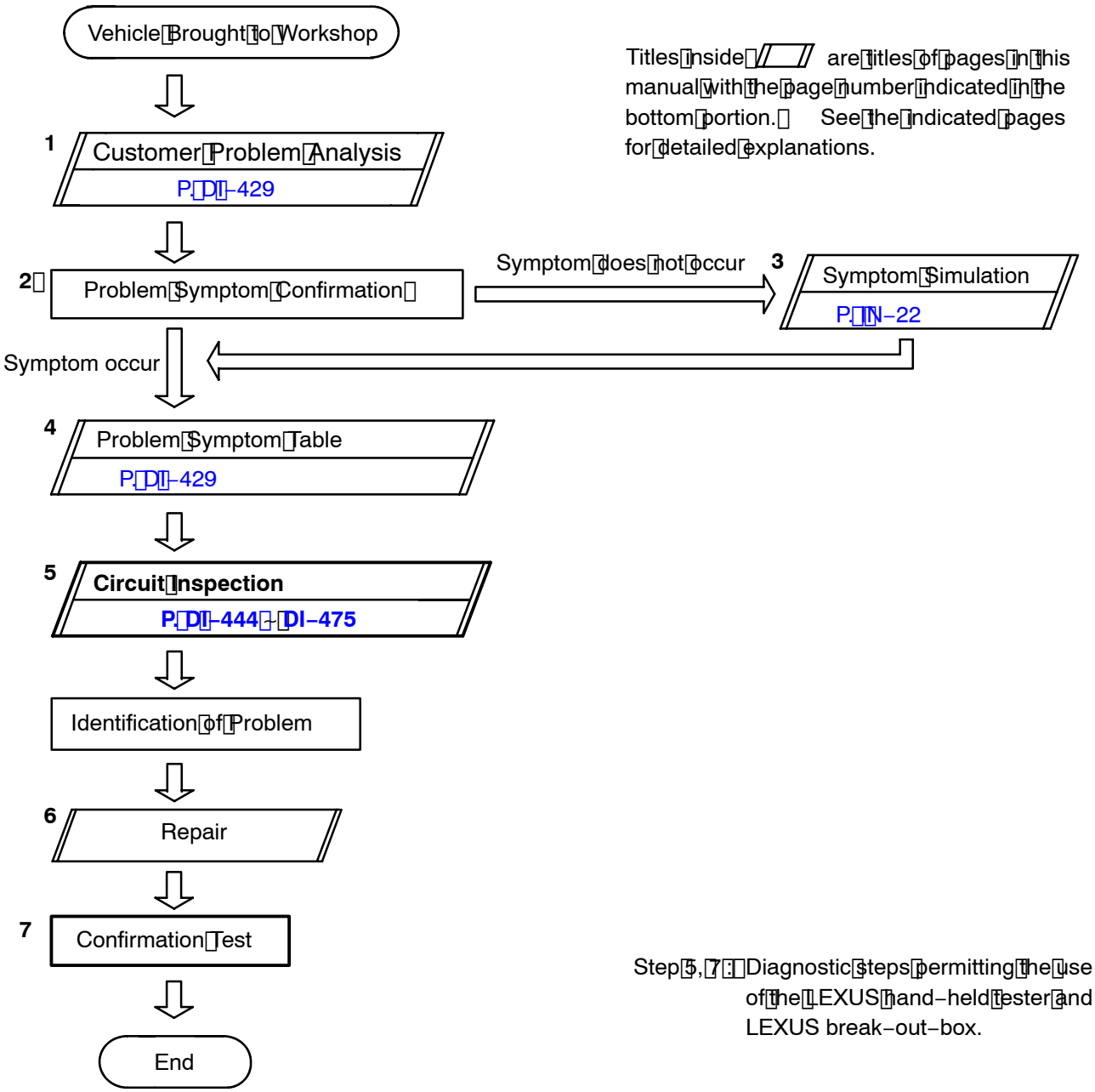
HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

For troubleshooting use a volt/ohm meter.

Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.



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

Step 5, 7: Diagnostic steps permitting the use of the LEXUS hand–held tester and LEXUS break–out–box.

DI612–01

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom

☐ Theft deterrent system cannot be set.		
☐ Indicator light does not flash when the theft deterrent system is set. (It stays ON or does not light at all.)		
☐ Theft deterrent system does not operate.	☐ When unlocked using the door lock knob. ☐ When the engine hood is opened.	Malfunction ☐ Horns only ☐ Theft deterrent horn only ☐ Headlights only ☐ Taillights only ☐ Door lock operation only
☐ System cannot be canceled once set.	☐ When door is unlocked using key or wireless door lock control system. ☐ When the key is inserted in the ignition key cylinder and turned to ACC or ON position. (However, only when the system has never operated) ☐ When the luggage compartment door is opened with the key.	
☐ System cannot be canceled during warning operation.	☐ When door is unlocked using key or wireless door lock control system. ☐ When the key is inserted in the ignition key cylinder and turned to ACC or ON position.	
☐ Warning operation starts when the system is set and the door or luggage compartment door is opened with the key.		
☐ Others.		

DI613–01

PRE–CHECK

1. OUT LINE OF THEFT DETERRENT SYSTEM

When the theft deterrent system detects any theft, it informs people around with flashing lights and sound.

The performance of the theft deterrent system has been improved by adding the lights (HAZARDS) to the existing system(for EUROPE model).

There are 2 modes in this system, which are active mode and passive mode.

Except Europe Models:

All initial setting are performed in active mode. It can be switched to passive mode.

2. PARTIAL CHANGE OF SYSTEM SETTING METHOD

There are 4 conditions in this system which are disarmed state, arming preparation, armed state and alarm sounding.

(1) Disarmed state
- When the alarming function does not operate.
- When theft deterrent function is not performed.

(2) Arming preparation
- Time until transferring to armed state.
- Theft deterrent function is not performed.

(3) Armed state
When theft deterrent function is possible.

(4) Alarm sounding:
In this condition, once theft is detected, it is informed using light and sound to people around the vehicle.
Refer to the table for alarming method or time.

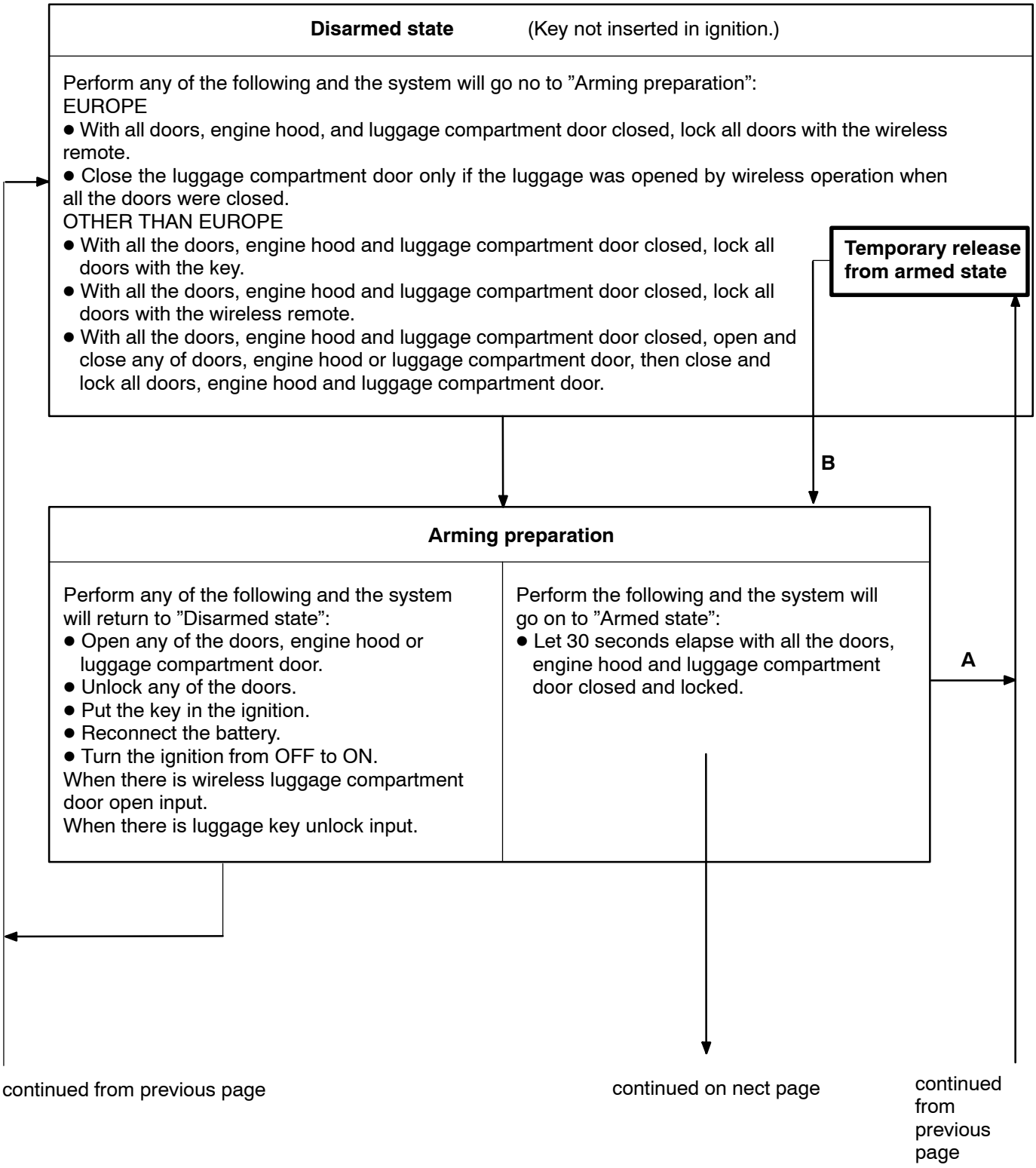
Alarming method	Horn	Europe, Australia
	Security horn	Europe, Australia
	Headlight	Australia
	Taillight	Australia
	Hazard	Europe, Australia
Alarming time	30 seconds	
Alarming output	(Except hazard flashing) Continuous 0.25 secs.: (ON) 0.25 secs.: (OFF)	

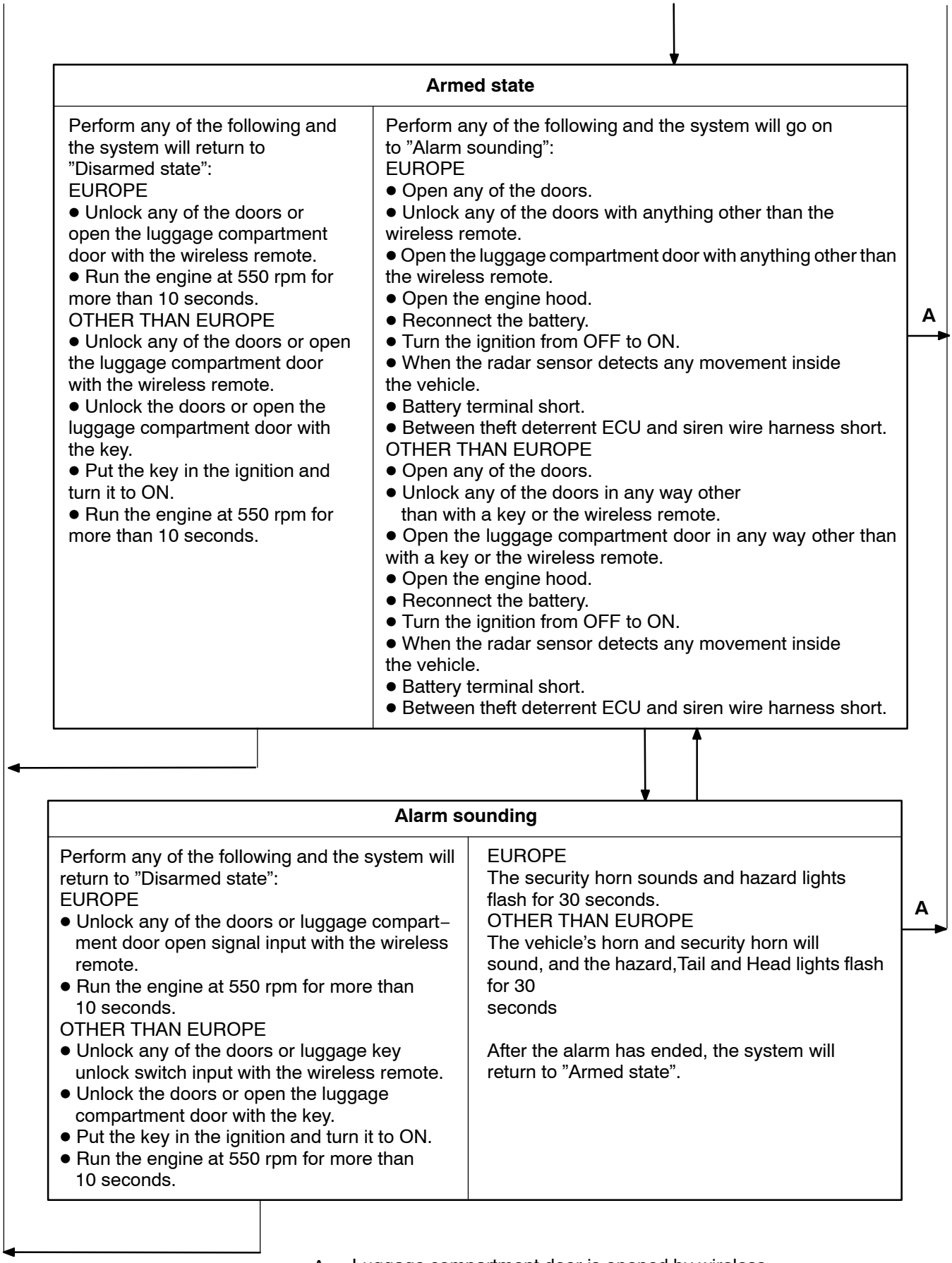
HINT:

Alarming output for hazard is same as the one for the hazard on the vehicle.

In the arming condition when either of doors is unlocked with key not in the key cylinder, force lock signal is output.

3. ACTIVE ARMING MODE





A: Luggage compartment door is opened by wireless.

B: Luggage compartment door is closed.

(a) Indicator light output:

Condition		Output by alarm system	Output by immobilizer	Output by checking visually
Disarming condition	With Key	Goes off	Goes off	Goes off
	Without key		Blinks	Blinks
Disarming preparation condition		Lights up	Blinks	Lights up
Arming condition		Goes off	Blinks	Blinks
Alarming condition		Lights up	Blinks	Lights up

HINT:
The indicator light might blink even under the disarming condition. (This is caused by output from the immobilizer)
The indicator always blink by output from the immobilizer at any time under the arming condition.
Blinking frequency 0.75 (S): ON 1.25 (S): OFF

(b) Answer back and ON/OFF function of radar sensor:
HINT:
Radar sensor si switched ON/OFF while synchronizing with a change in set/un–set condition of the alarm system described below. It is also switched ON/OFF by the method described in (2).

(1) Radar sensor operation condition:

Sensor operation starts:	When the condition for arming preparation condition is met.
Sensor operation stops:	When the condition is transformed to the disarming condition.

(2) Radar sensor ON/OFF switching function:
Every time the button of the wireless door lock system is pressed under the arming preparation condition, sensor is switched ON/OFF.

(3) Answer back:
When the sensor is switched OFF, hazard warning light blinks 5 times as "Answer back". When the sensor is switched ON, the hazard warning light blinks once in the same manner as a normal answer back of the wireless door lock system.

(c) Compulsion door lock function.

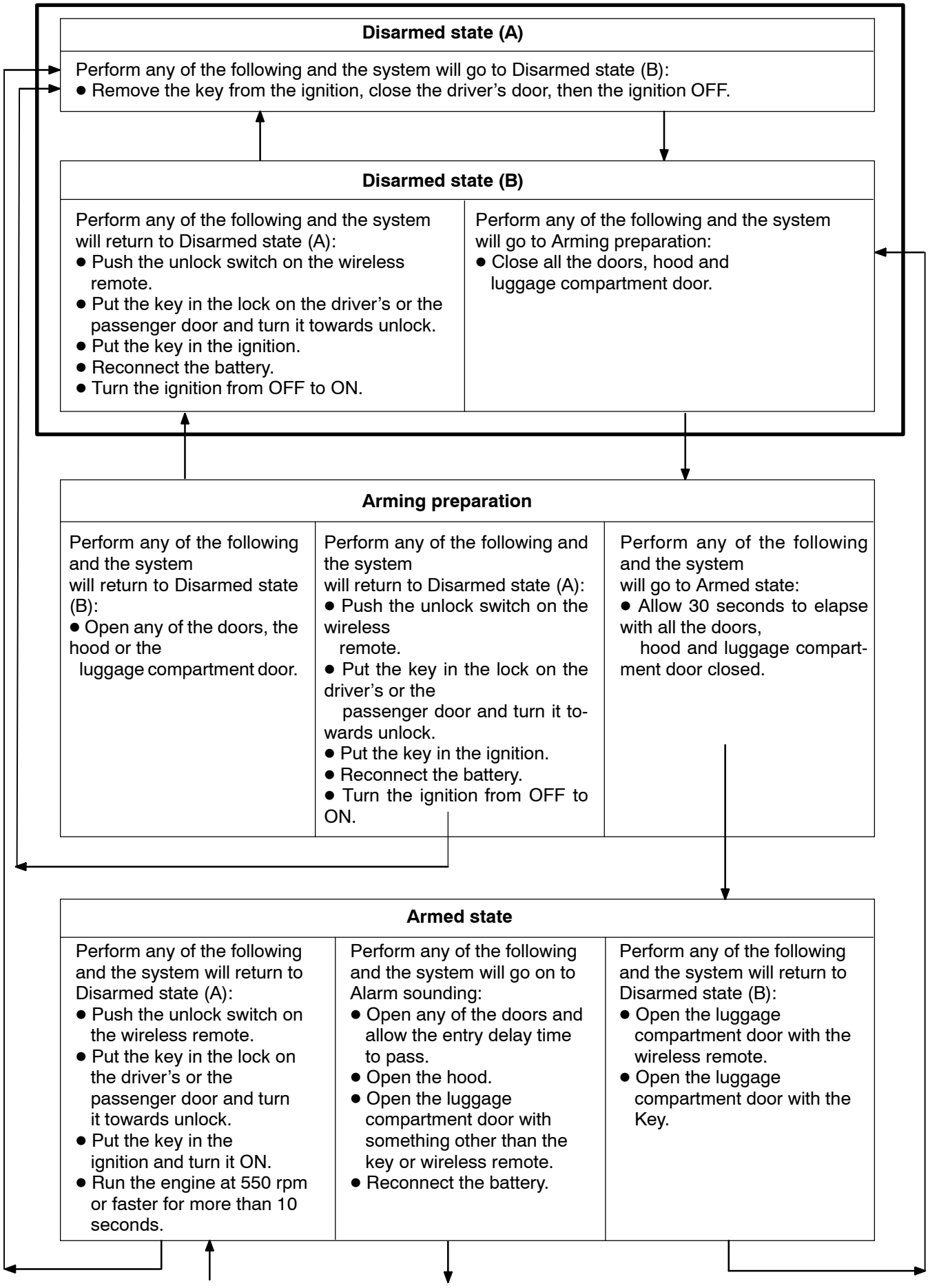
(1) This is a control function to lock a door forcibly to prevent someone from invading in the vehicle when the inner door lock knob is unlocked under the arming condition, that is, when the alarming starts.
In Europe, when a door is locked with a key the alarm sounds, however doors are not locked forcibly.

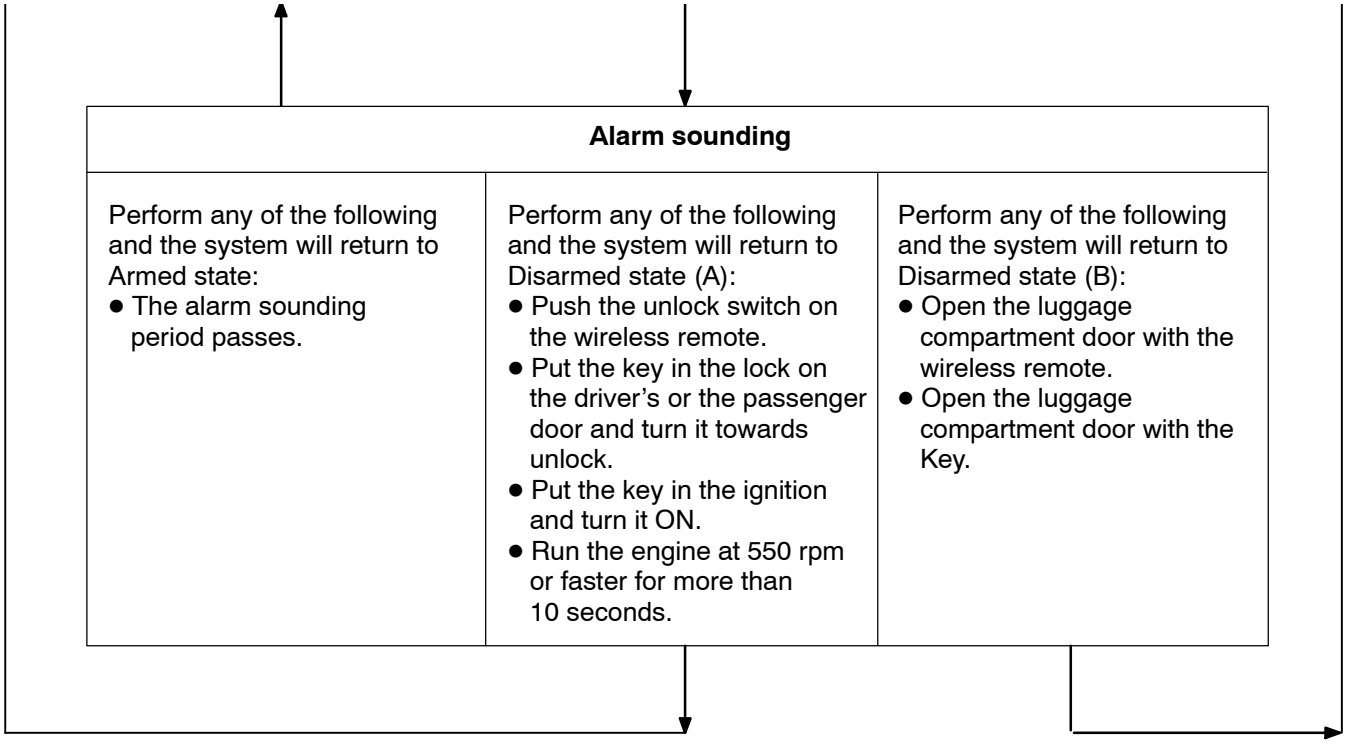
(2) The setting specifications of the compulsion door lock function change as follows according to whether the double lock system is available or not.

Destination		Double lock	Compulsion door lock
Europe	RHD	○	X
		X	○
	LHD	X	○
Australia / General countries		X	○

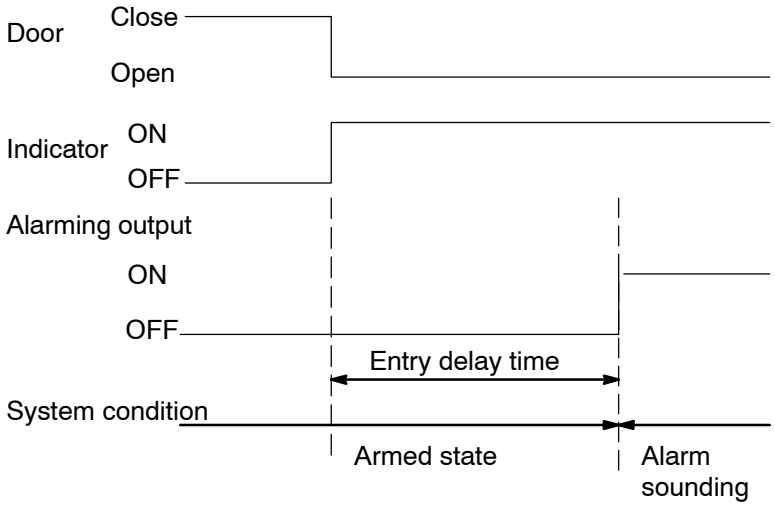
4. PASSIVE ARMING MODE (Except Europe Models)

- This mode can be switched according to the specified operation.
- All initially set modes (when shipped from factory) are active mode. (No passive mode)


Disarmed state (A)
Perform any of the following and the system will go to Disarmed state (B):
● Remove the key from the ignition, close the driver's door, then the ignition OFF.
Disarmed state (B)
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition.
● Reconnect the battery.
● Turn the ignition from OFF to ON.
Perform any of the following and the system will go to Arming preparation:
● Close all the doors, hood and luggage compartment door.
Arming preparation
Perform any of the following and the system will return to Disarmed state (B):
● Open any of the doors, the hood or the luggage compartment door.
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition.
● Reconnect the battery.
● Turn the ignition from OFF to ON.
Perform any of the following and the system will go to Armed state:
● Allow 30 seconds to elapse with all the doors, hood and luggage compartment door closed.
Armed state
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition and turn it ON.
● Run the engine at 550 rpm or faster for more than 10 seconds.
Perform any of the following and the system will go on to Alarm sounding:
● Open any of the doors and allow the entry delay time to pass.
● Open the hood.
● Open the luggage compartment door with something other than the key or wireless remote.
● Reconnect the battery.
Perform any of the following and the system will return to Disarmed state (B):
● Open the luggage compartment door with the wireless remote.
● Open the luggage compartment door with the Key.


Alarm sounding
Perform any of the following and the system will return to Armed state:
● The alarm sounding period passes.
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition and turn it ON.
● Run the engine at 550 rpm or faster for more than 10 seconds.
Perform any of the following and the system will return to Disarmed state (B):
● Open the luggage compartment door with the wireless remote.
● Open the luggage compartment door with the Key.

HINT:
In armed state either closed door is opened, entry delay occurs. (15 secs.)
During this time, the mode transfers to disarmed state when the condition described above * is met.
When the condition is not met, the system judges theft occurs, the mode transfers to alarm sounding.



(a) Indiatcor light output

Condition		Output by alarm system	Output by immobilizer	Output by checking visually
Disarming condition	With Key	Goes off	Goes off	Goes off
	Without key		Blinks	Blinks
Disarming preparation condition		Lights up	Blinks	Lights up
Arming condition		Goes off	Blinks	Blinks
Alarming condition		Lights up	Blinks	Lights up

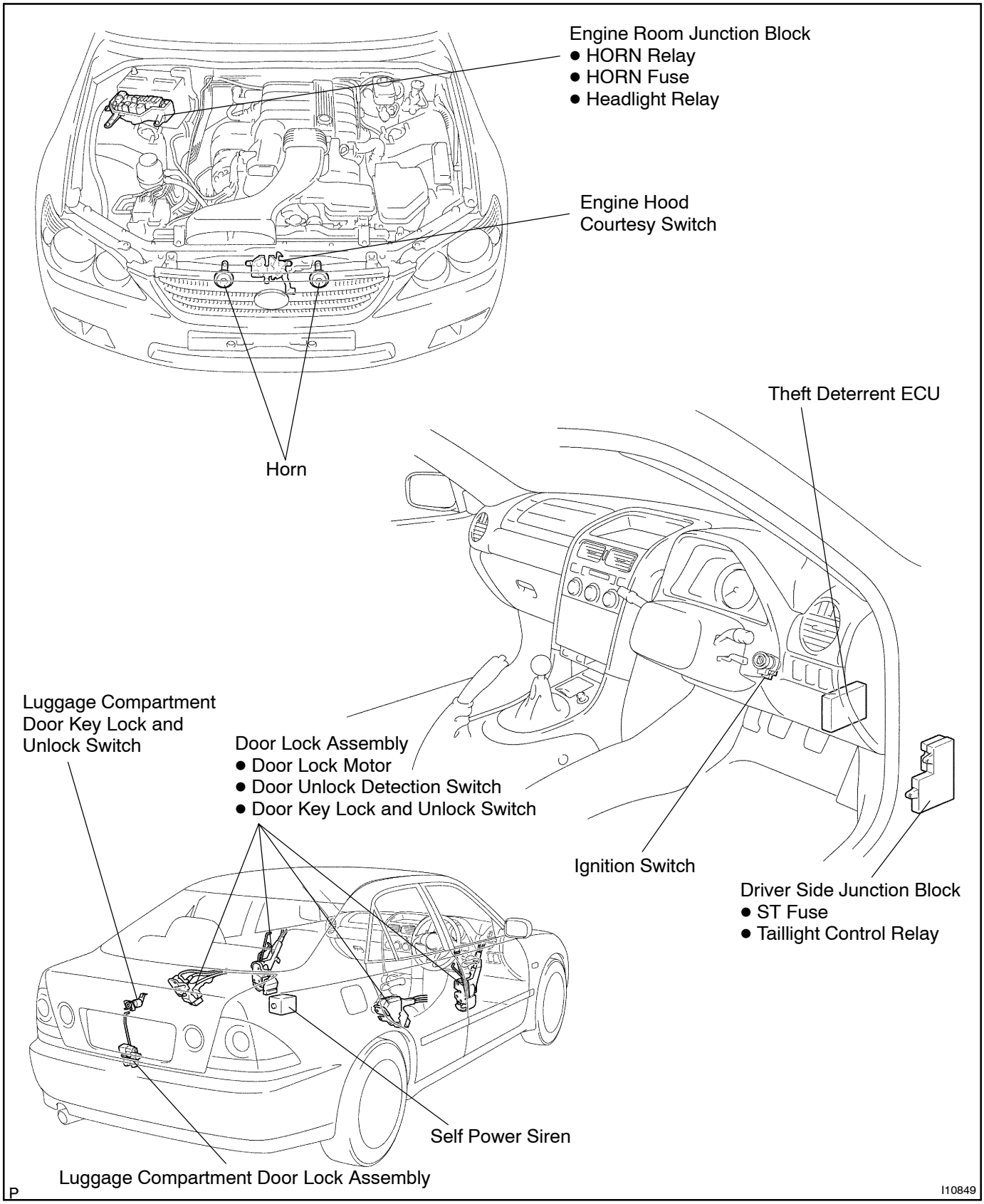
HINT:
The indicator light might blink even under the disarming condition. (This is caused by output from the immobilizer)
The indicator always blink by output from the immobilizer at any time under the arming condition.
Blinking frequency 0.75 (S): ON 1.25 (S): OFF

(b) Transfer to active mode:
In each passive mode, when "disarmed state of active mode → arming preparation transfer condition" is met, the active mode transfers to each condition. In this case, active mode continues till disarmed state.

Passive mode when transfer condition is met.	Active mode transfer condition
Disarmed state	Arming preparation condition
Arming preparation condition	Arming preparation condition
Armed state (During entry delay time)	Arming condition (After alarming time has elapsed, arming condition)
Alarm sounding	After alarming time has elapsed, arming condition

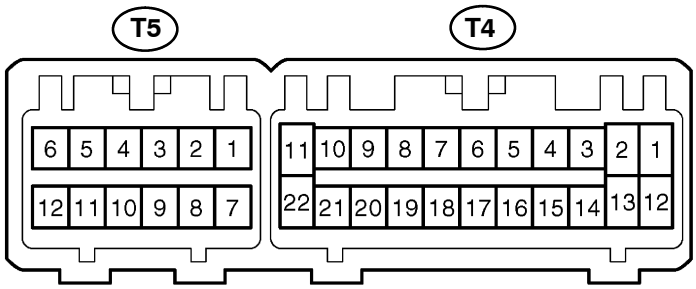
DI614–01

PARTS LOCATION



DI615–01

TERMINALS OF ECU



I01920

Symbols (Terminals No.)	Wiring Color	Condition	STD Value
HEAD ↔ E (T4–1 ↔ T4–22)	R–B ↔ W–B	Light control switch position is HEAD.	Below 1 V
		Light control switch position is OFF or TAIL.	10 – 14 V
TAIL ↔ E (T4–2 ↔ T4–22)	R–W ↔ W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
DSWH ↔ E (T4–4 ↔ T4–22)	L–R ↔ W–B	Engine hood courtesy switch position is OFF. (Engine hood closed)	Below 1 V
		Engine hood courtesy switch position is ON. (Engine hood opened)	10 – 14 V
LUG ↔ E (T4–5 ↔ T4–22)	B–W ↔ W–B	Luggage compartment door key lock and unlock switch position is ON.	Below 1 V
		Luggage compartment door key lock and unlock switch position is OFF.	10 – 14 V
S+B ↔ E (T4–8 ↔ T4–22)	G ↔ W–B	Constant	10 – 14 V
CLTB ↔ E (T4–9 ↔ T4–22)	R ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
IG ↔ E (T4–10 ↔ T4–22)	B–R ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
+B1 ↔ E (T4–11 ↔ T4–22)	W–R ↔ W–B	Constant	10 – 14 V
H ↔ E (T4–12 ↔ T4–22)	R–Y ↔ W–B	Light control switch position is HEAD.	Below 1 V
		Light control switch position is OFF or TAIL.	10 – 14 V
T ↔ E (T4–13 ↔ T4–22)	R ↔ W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
A ↔ E (T4–14 ↔ T4–22)	G–Y ↔ W–B	Light control switch position is AUTO.	Below 1 V
		Light control switch position is OFF, TAIL or HEAD.	10 – 14 V
FOG ↔ E (T4–17 ↔ T4–22)	W–R ↔ W–B	Fog light switch position is ON.	Below 1 V
		Fog light switch position is OFF.	10 – 14 V
TOUT ↔ E (T4–18 ↔ T4–22)	G–O ↔ W–B	Radar sensor detection invader	Below 1 V
		Constant	10 – 14 V
KSW ↔ E (T4–19 ↔ T4–22)	B–Y ↔ W–B	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
CLTS ↔ E (T4–20 ↔ T4–22)	Y ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
CLTE ↔ E (T4–21 ↔ T4–22)	BR ↔ W–B	Constant	Below 1 V

E ↔ Body ground (T4–22 ↔ Body ground)	W–B ↔ Body ground	Constant	Below 1 V
+B2 ↔ E (T5–1 ↔ T4–22)	R–Y ↔ W–B	Constant	10 – 14 V
HORN ↔ E (T5–4 ↔ T4–22)	G–W ↔ W–B	Horn switch position is ON.	Below 1 V
		Horn switch position is OFF.	10 – 14 V
CLTS ↔ E (T5–9 ↔ T4–22)	L–Y ↔ W–B	Theft deterrent sylstem change condition.	One time
		Contstant	10 – 14 V
TRIG ↔ E (T5–10 ↔ T4–22)	L–O ↔ W–B	I¥Theft deterrent system is alarming contidion.	Below 1 V
		Constant	10 – 14 V
IND ↔ E (T5–12 ↔ T4–22)	L–B ↔ W–B	During set preparation.	3 – 5 V

DI616–01

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and trouble-shoot for each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Symptom	Suspect Area	See page
The theft deterrent system cannot be set	1. Indicator light circuit 2. ECU power source circuit 3. Key unlock warning switch circuit 4. Luggage compartment door key lock and unlock switch circuit 5. Luggage compartment door courtesy switch circuit 6. Door key lock and unlock switch circuit 7. Door courtesy switch circuit 8. Door unlock detection switch circuit 9. Engine hood courtesy switch circuit	DI–444 DI–446 DI–465 DI–467 DI–586 DI–598 DI–583 DI–595 DI–475
The indicator light does not blink when system is set.	Indicator light circuit	DI–444
When the system is set (The system does not operate when the rear door is unlocked).	Door unlock detection switch circuit	DI–595
When the system is set (The system does not operate when the luggage compartment door is opened by a method other than the key).	Luggage compartment door courtesy switch circuit	DI–586
When the system is set (The system does not operate when the engine hood is opened).	Engine hood courtesy switch circuit	DI–475
When the system is set (It is not canceled when the ignition key is turned to ACC or ON position (Except Europe Models)).	Ignition switch circuit	DI–449
When the system is set (It still operates when the luggage compartment door is opened with the key (Except Europe Models)).	Luggage compartment door key lock and unlock switch circuit	DI–467
When the system is set (The system does not operate when after 30 seconds put your hand through the window and shake it near the sensor).	Radar sensor circuit	DI–473
While the system is in warning operation (Horns do not sound).	Horn relay circuit	DI–451
While the system is in warning operation (Siren does not sound).	Self power siren circuit	DI–470
While the system is in warning operation (When the siren does not sound or stops soon after it starts).	Self power siren battery	BE–124
While the system is in warning operation (Headlights do not flash).	Headlight control relay circuit	DI–459
While the system is in warning operation (Taillights do not flash).	Taillight control relay circuit	DI–462
While the system is in warning operation (Hazard lights do not flash).	Hazard switch circuit	DI–568
While the system is in warning operation (The door lock is not locked).	Door unlock detection switch circuit	DI–595
System is still set even when a rear door is open	Door courtesy switch circuit	DI–583
Even when the system is not set (Horns sound).	Horn relay circuit	DI–451

Even when the system is not set (Siren sounds).	Self power siren circuit	DI–470
Even when the system is not set (when the siren does not sound or stops soon after it starts).	Self power siren battery	BE–124
Even when the system is not set (Headlights stay on).	Headlight control relay circuit	DI–459
Even when the system is not set (Taillights stay on).	Taillight control relay circuit	DI–462
Even when the system is not set (Hazard lights do not flash).	Hazard switch circuit	DI–568

DI617–01

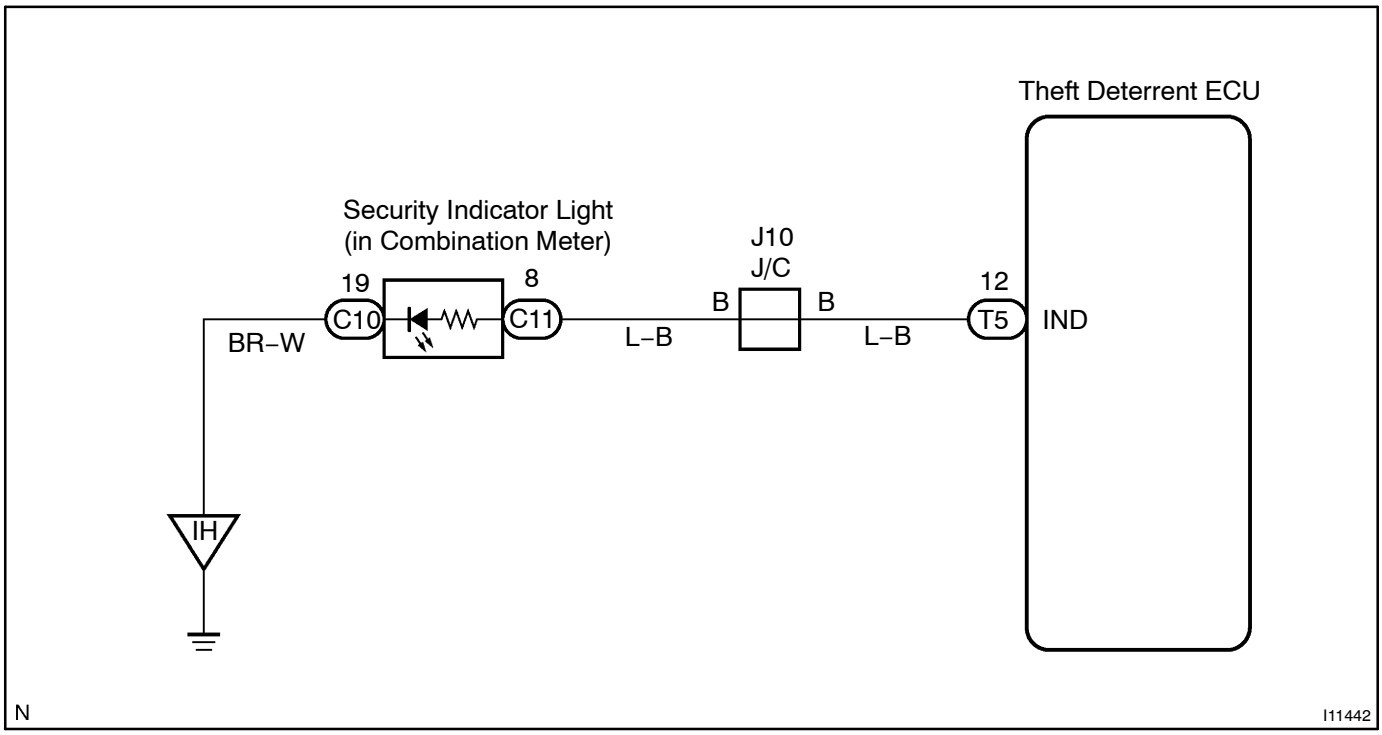
CIRCUIT INSPECTION

Indicator Light Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light ON for 1 second and turns it OFF for 1 second, thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check theft deterrent indicator using LEXUS hand–held tester.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Connect terminals Tc and E1 of DLC1.
CHECK:
Check that the theft deterrent indicator can light in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check indicator light (See page BE–124).**

NG → **Replace the bulb or meter wire harness.**

OK

3	**Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN–32).**

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

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–442).

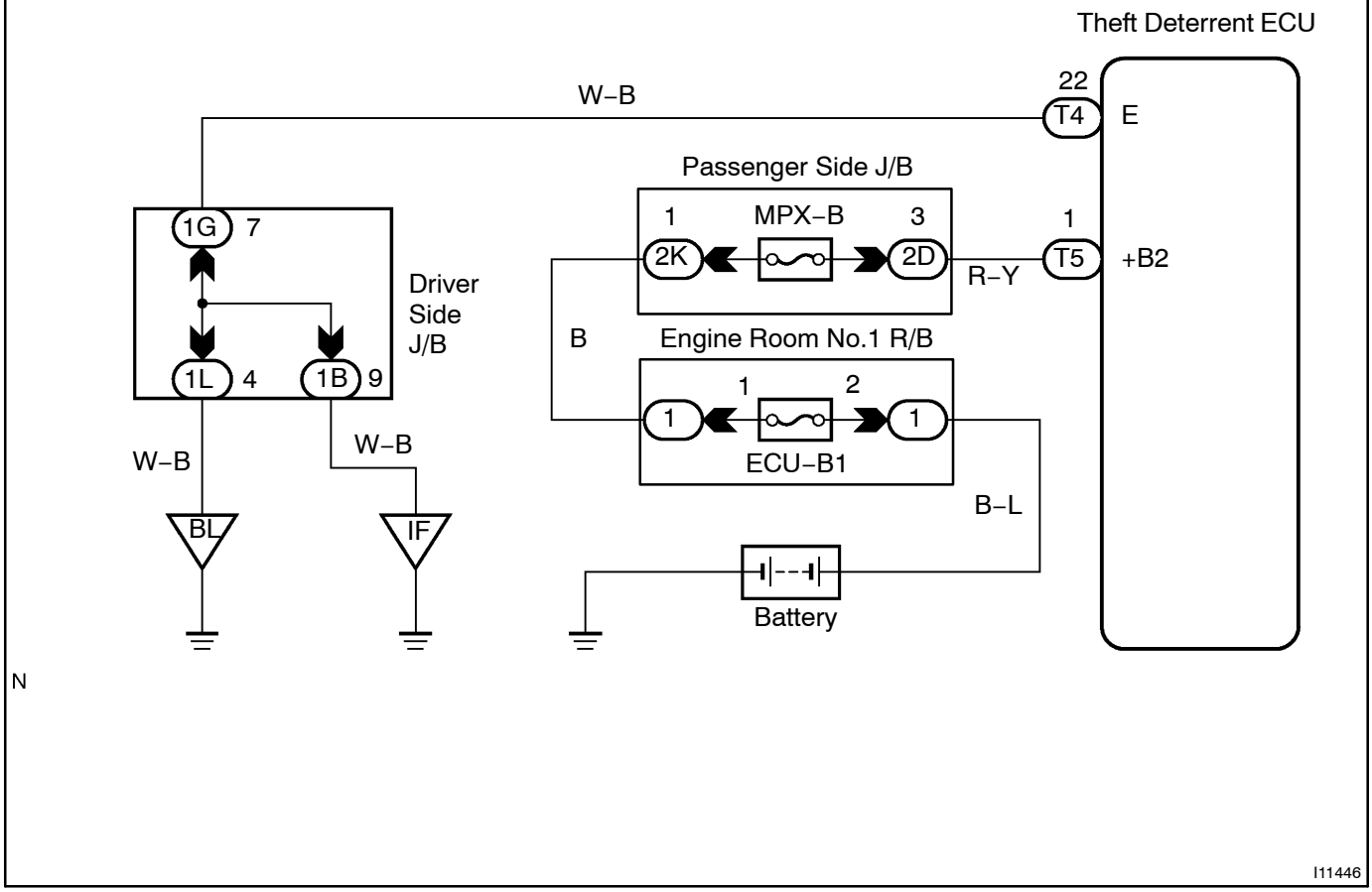
DI618–01

ECU Power Source Circuit

CIRCUIT DESCRIPTION

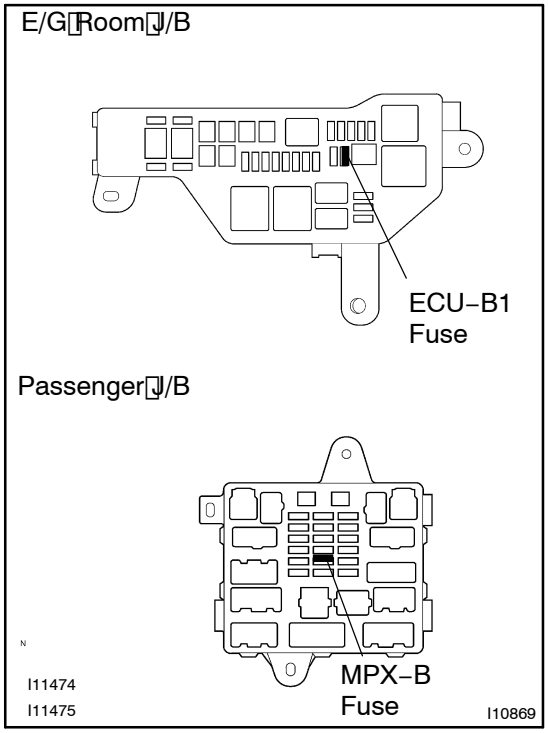
This circuit provides power to operate the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check MPX–B and ECU–B1

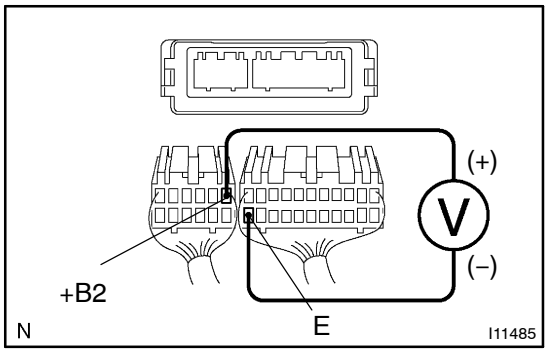


PREPARATION:
Remove MPX–B and ECU–B1 fuse from engine room junction block No.2.
CHECK:
Check continuity of MPX–B and ECU–B1 fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to the MPX–B and ECU–B1 fuse (See attached wiring diagram).**

OK

2	Check voltage between terminals +B2 and E of theft deterrent ECU connector.



PREPARATION:
Disconnect the theft deterrent ECU connector.
CHECK:
Measure voltage between terminals +B2 and E of theft deterrent ECU connector.
OK:
Voltage: 10~14V

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–442).**

NG

3	Check for open in harness and connector between ECU and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.

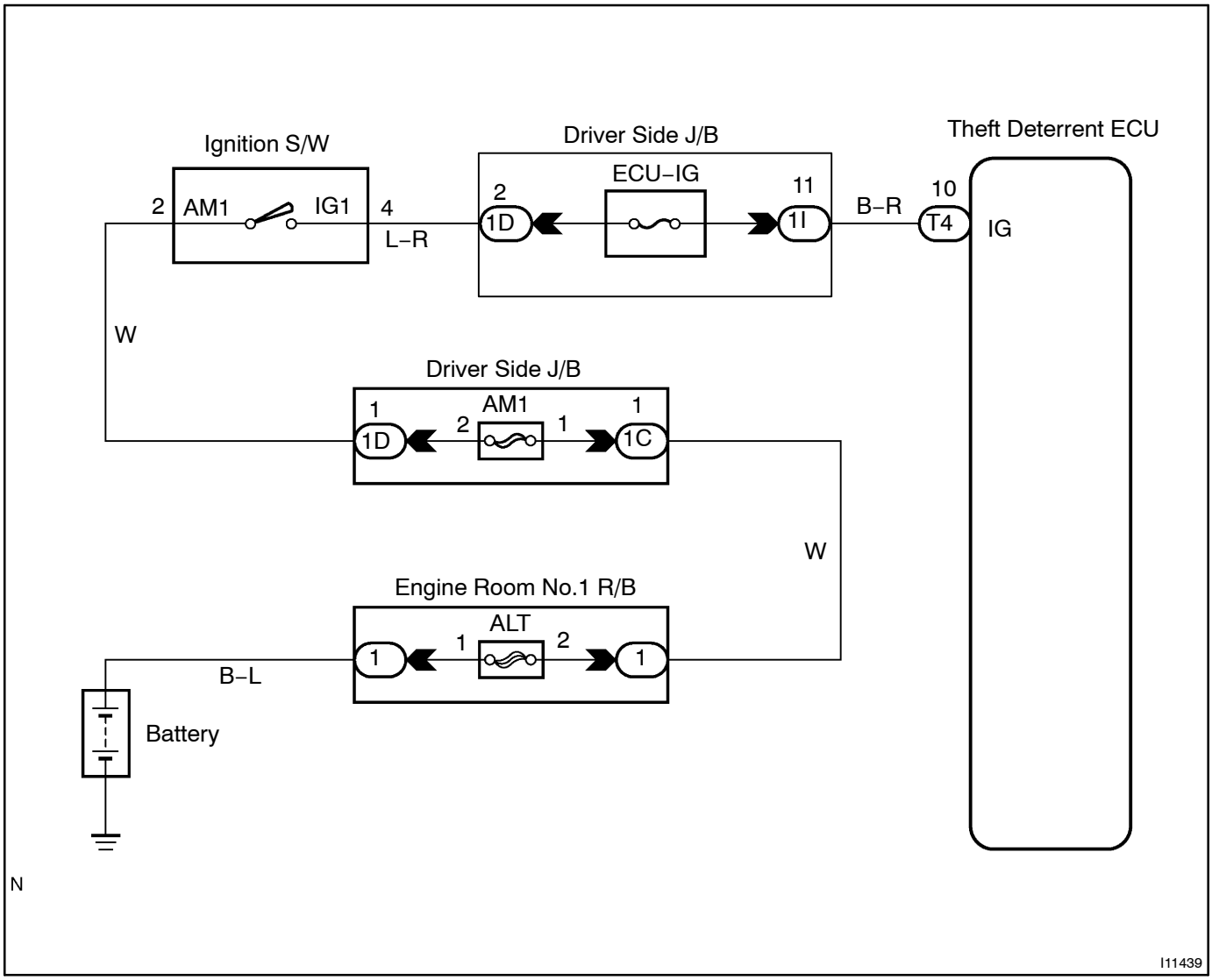
DI619–01

Ignition Switch Circuit

CIRCUIT DESCRIPTION

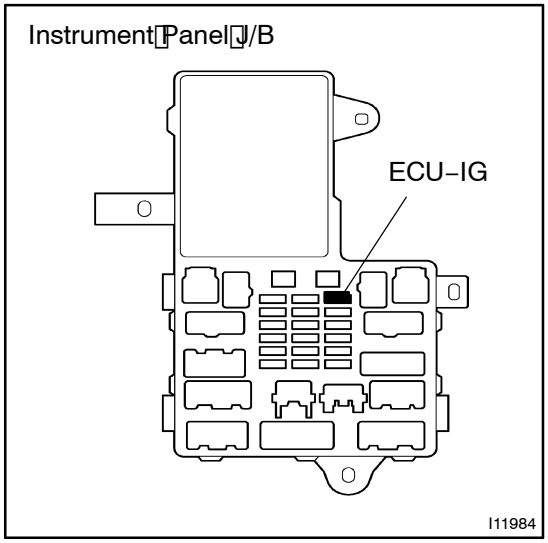
When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU. Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU. When the battery positive voltage is applied to the terminal ACC of the ECU while the theft deterrent system is activated, the warning stops. Furthermore, power supplied from the terminals ACC and IG of the ECU is used as power for the door courtesy switch, and position switch, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:

(a) Remove the fuse box opening cover.

(b) Remove ECU–IG fuse from instrument panel junction block.

CHECK:

Check continuity of ECU–IG fuses.

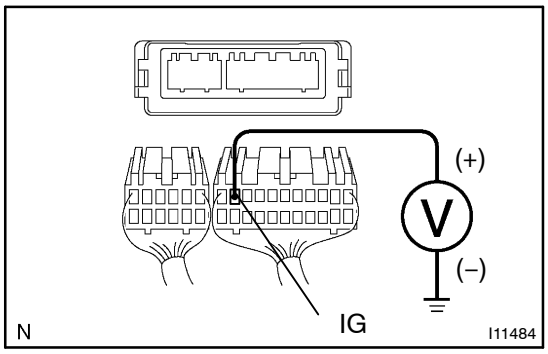
OK:

Continuity

NG → **Check for short in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check voltage between terminals IG of theft deterrent ECU and body ground.**



PREPARATION:

(a) Disconnect the theft deterrent ECU connectors.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals IG of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and battery (See page IN–32).**

OK

Check and replace theft deterrent ECU.

DI61A–01

Horn Relay Circuit

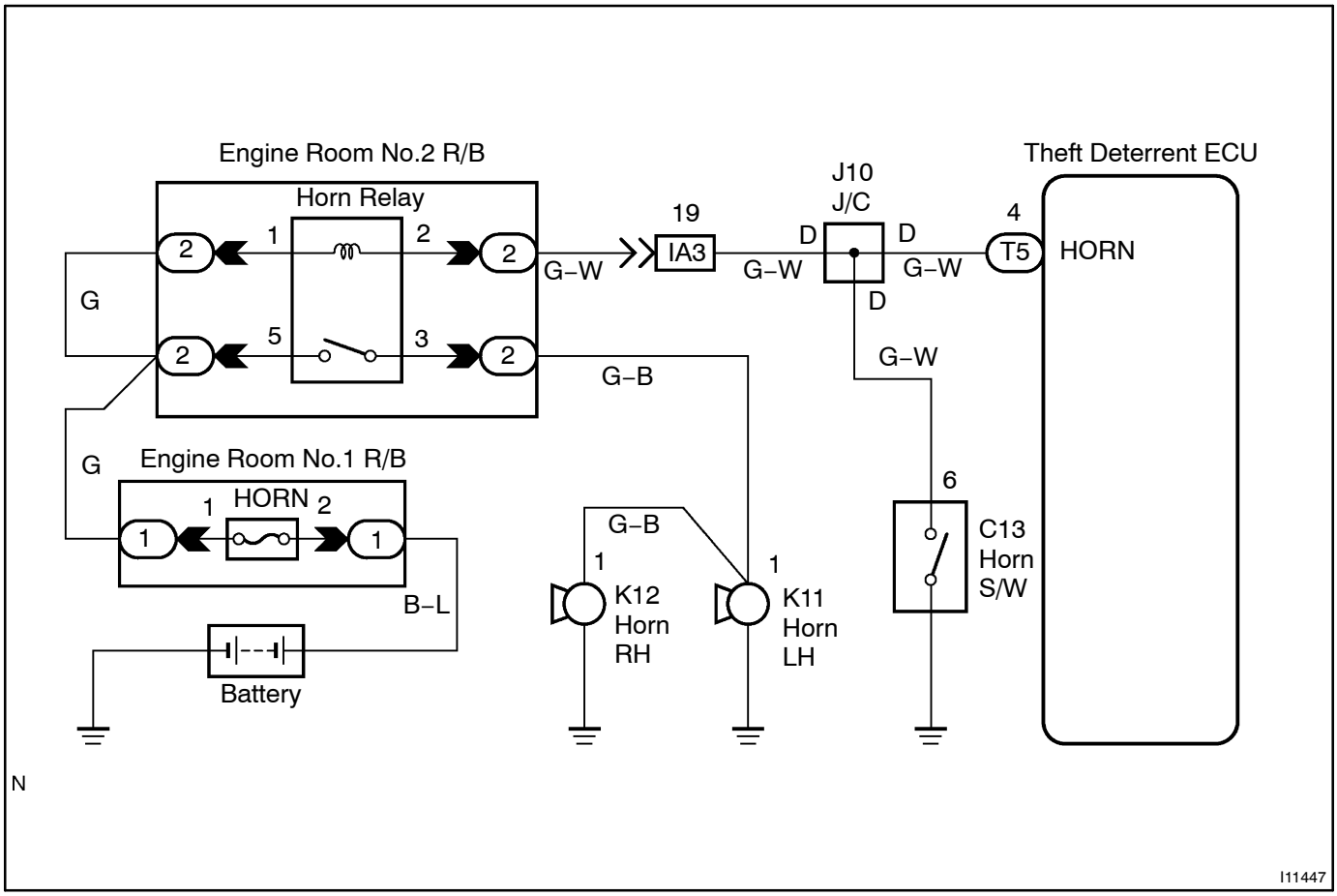
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF in approximately 0.4 sec. cycles. This switches the horn relay ON and OFF, thus the horns blow (See the wiring diagram below).

In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the horn relay switches OFF, thus stopping the horns from blowing:

(1) Unlock the front LH or RH door with key. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 seconds.

WIRING DIAGRAM

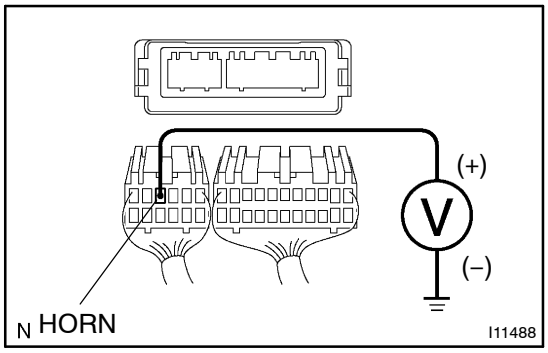


INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the horns blow normally whenever the horn switch is operated. If horn operation is not normal when the horn switch is operated, check the horn switch.

1	**Check voltage between terminal HORN of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connectors.

CHECK:

Measure voltage between terminal HORN of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and horn relay (See page IN–32).**

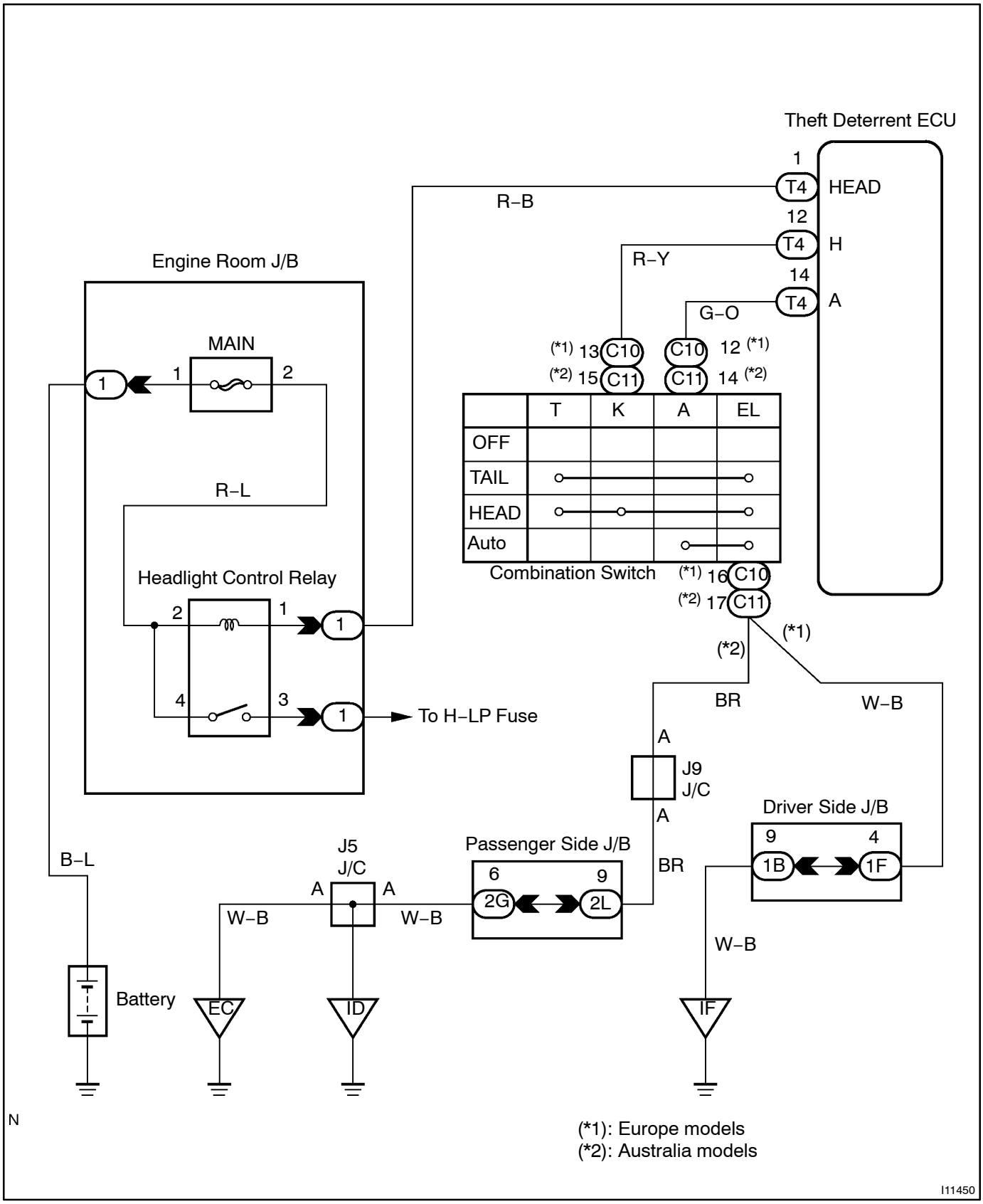
OK

Check and replace theft deterrent ECU (See page IN–32).

DI61B–01

Light control switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check headlight control switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the headlight control switch using DATA LIST.
OK:

Terminal (tester display) / Switch position	Headlight Switch (Tail)	Headlight Switch (Head)	Auto light switch
OFF	OFF	OFF	OFF
TAIL	ON	OFF	OFF
HEAD	ON	ON	OFF
AUTO	OFF	OFF	ON

OK → **Proceed to next circuit inspection shown in problem symptoms table.(See page DI–442).**

NG

2	**Check headlight control switch (See page BE–30).**

NG → **Replace the headlight control switch.**

OK

3	Check wireharness and connector between headlight control switch and Body ECU (See page IN–32).

NG → Repair or replace wireharness or connector.

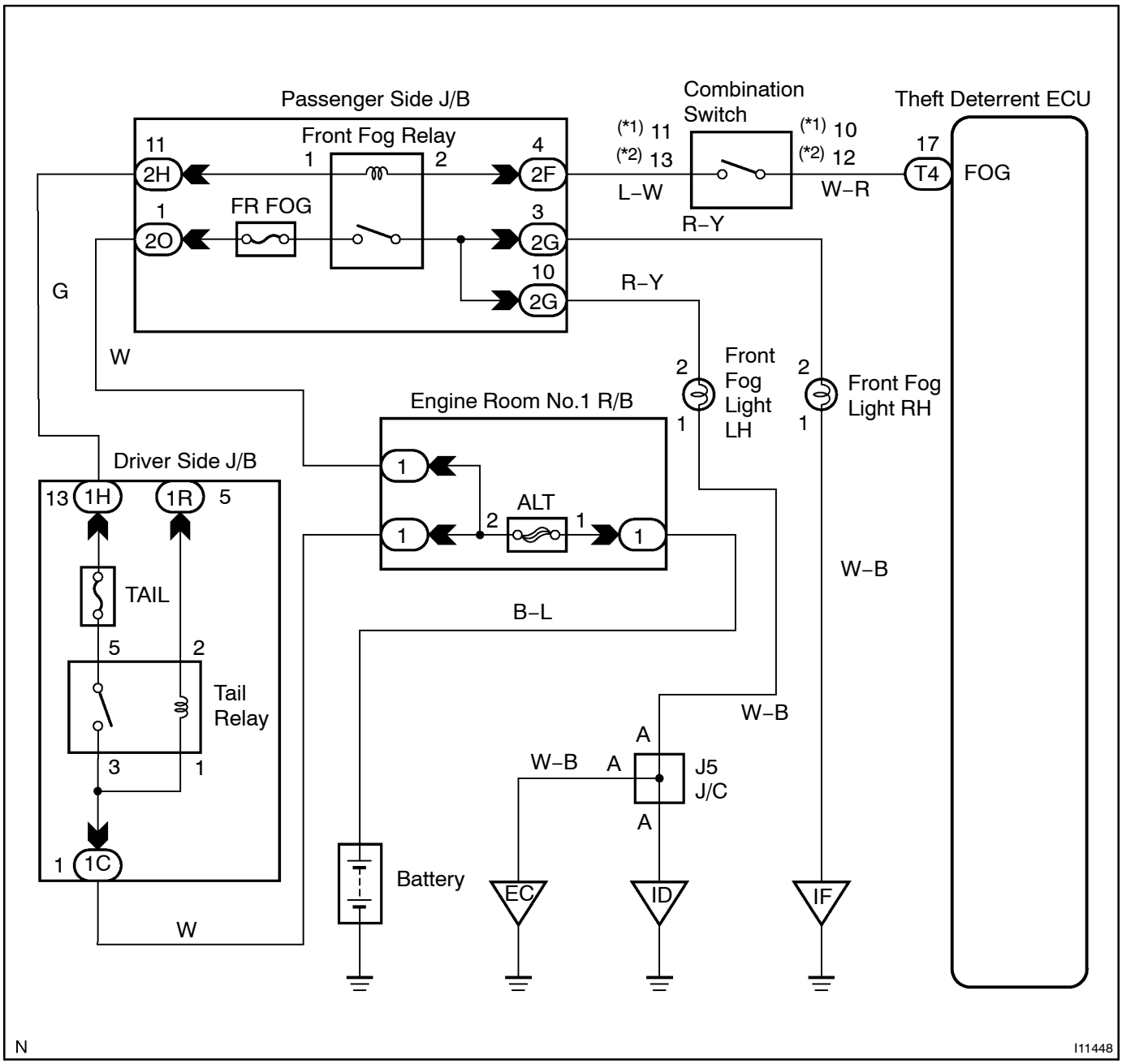
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–442).

DI61C–01

Front fog light switch and relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check front fog light relay using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the front fog light relay can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check front fog light relay (See page BE–45).**

NG → **Replace the front fog light relay.**

OK

3	**Check front fog light switch (See page BE–45).**

NG → **Replace the front fog light switch.**

OK

4	**Check wire harness and connector between front fog light relay and theft deterrent ECU, battery and front fog light relay (See page IN–32).**

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

OK

5	Check wire harness and connector between front fog light switch and theft deterrent ECU, battery and front fog light switch (See page IN–32).

NG → Repair or replace wire harness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table (See page DI–442).

DI61D–01

Headlight Control Relay Circuit

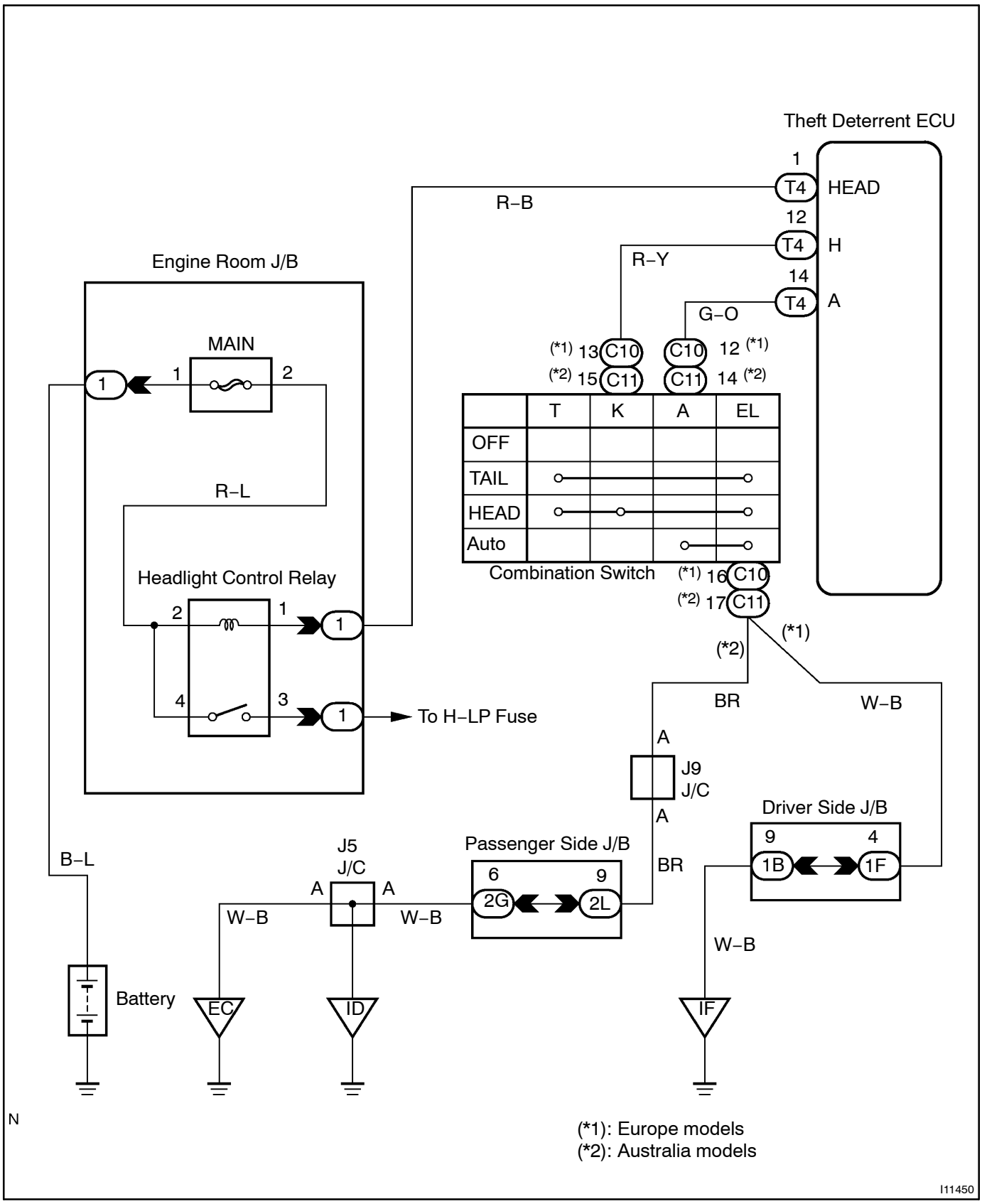
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF at approximately 0.25 sec. intervals. This switches the headlight control relay ON and OFF, thus flashing the headlights (See the wiring diagram below).

In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the headlight control relay switches OFF, thus stopping the headlights flashing:

(1) Unlock the front LH or RH door with a key. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the headlights light up normally whenever the light control switch is operated. If headlight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check headlight relay using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC 3.

CHECK:

Check that the headlight relay can operate in an ACTIVE TEST.

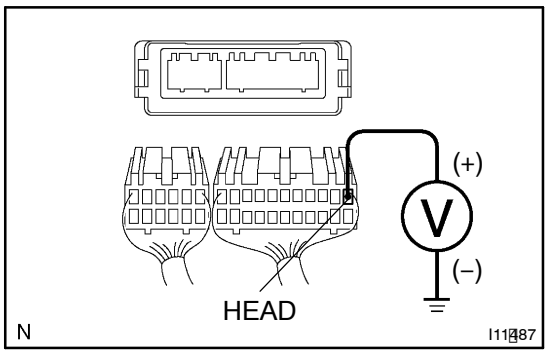
HINT:

If the headlight relay is normal, the headlight comes ”ON”. In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check voltage between terminal HEAD of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal HEAD of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and headlight control relay (See page IN–32).**

OK

Check and replace theft deterrent ECU (See page IN–32).

DI61D–01

Headlight Control Relay Circuit

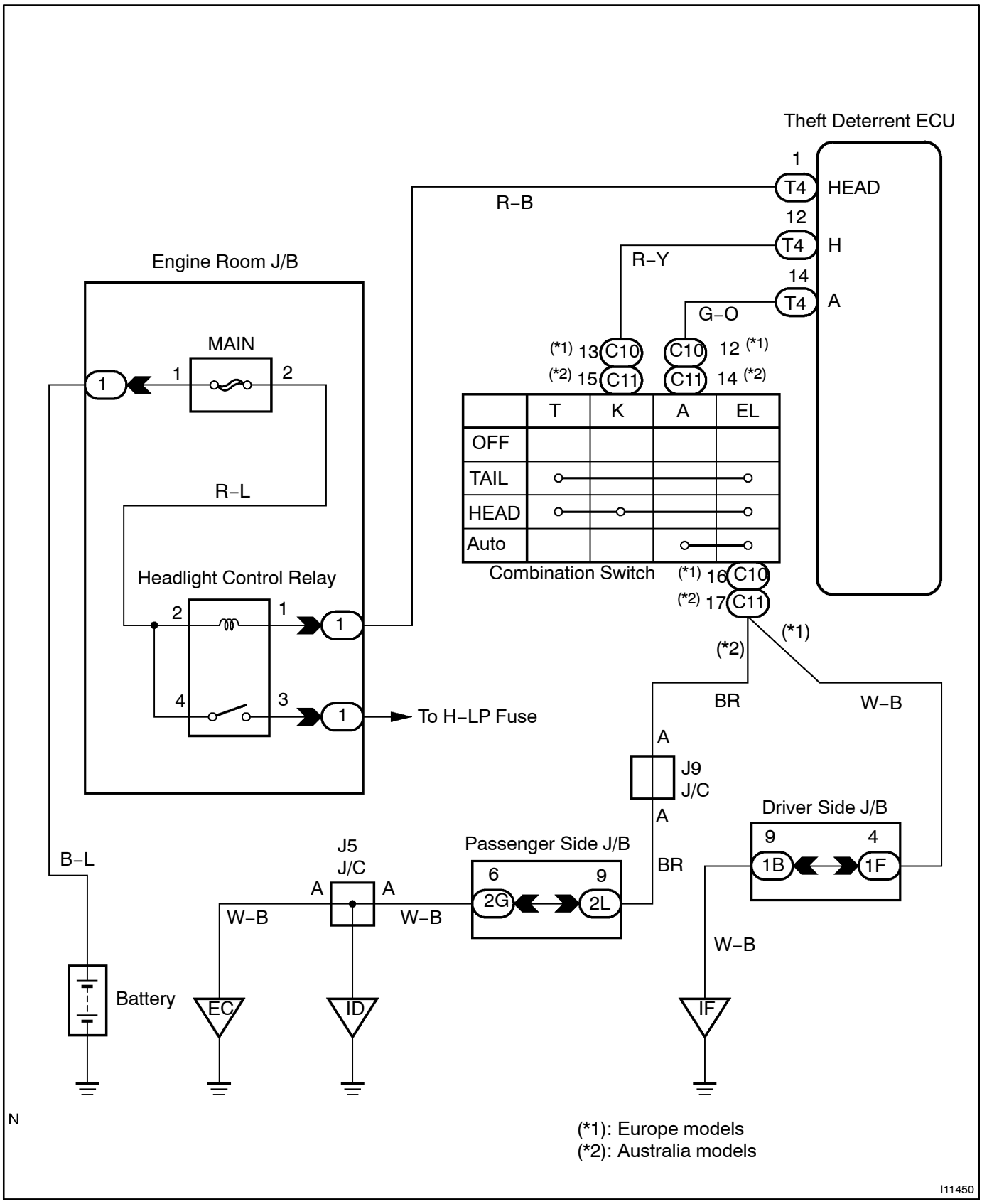
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF at approximately 0.25 sec. intervals. This switches the headlight control relay ON and OFF, thus flashing the headlights (See the wiring diagram below).

In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the headlight control relay switches OFF, thus stopping the headlights flashing:

(1) Unlock the front LH or RH door with a key. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the headlights light up normally whenever the light control switch is operated. If headlight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check headlight relay using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC 3.

CHECK:

Check that the headlight relay can operate in an ACTIVE TEST.

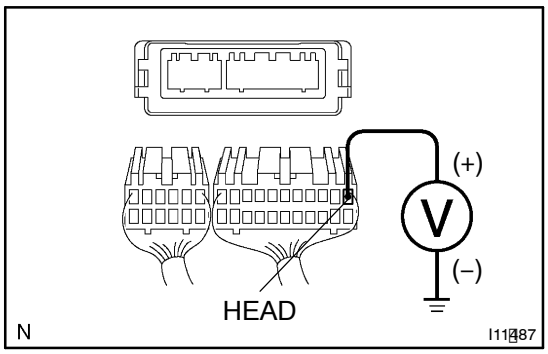
HINT:

If the headlight relay is normal, the headlight comes ”ON”. In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check voltage between terminal HEAD of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal HEAD of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and headlight control relay (See page IN–32).**

OK

Check and replace theft deterrent ECU (See page IN–32).

DI61E–01

Taillight Control Relay Circuit

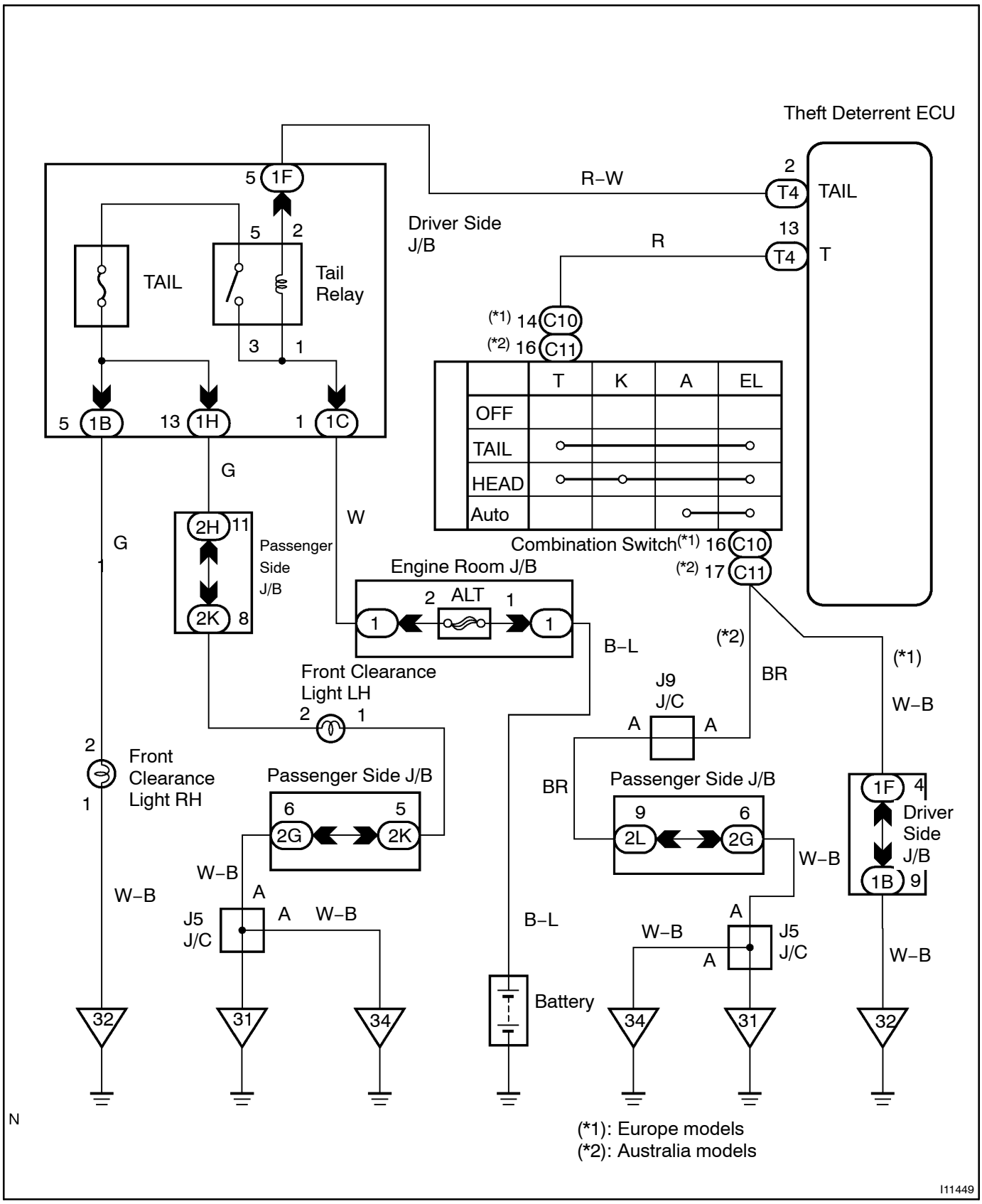
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF at approximately 0.4 sec. intervals. This switches the taillight control relay ON and OFF, thus flashing the taillights (See the wiring diagram below).

In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the taillight control relay switches OFF, thus stopping the taillights flashing:

(1) Unlock the front LH or RH door with a key. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the taillights light up normally whenever the light control switch is operated. If taillight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check tail light relay using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC 3.

CHECK:

Check that the tail light relay can operate in an ACTIVE TEST.

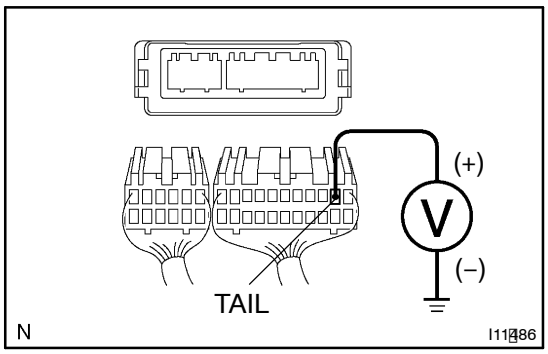
HINT:

If the headlight relay is normal, the headlight comes ”ON”. In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check voltage between terminal TAIL of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal TAIL of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and taillight control relay (See page IN–32).**

OK

Check and replace theft deterrent ECU (See page IN–32).

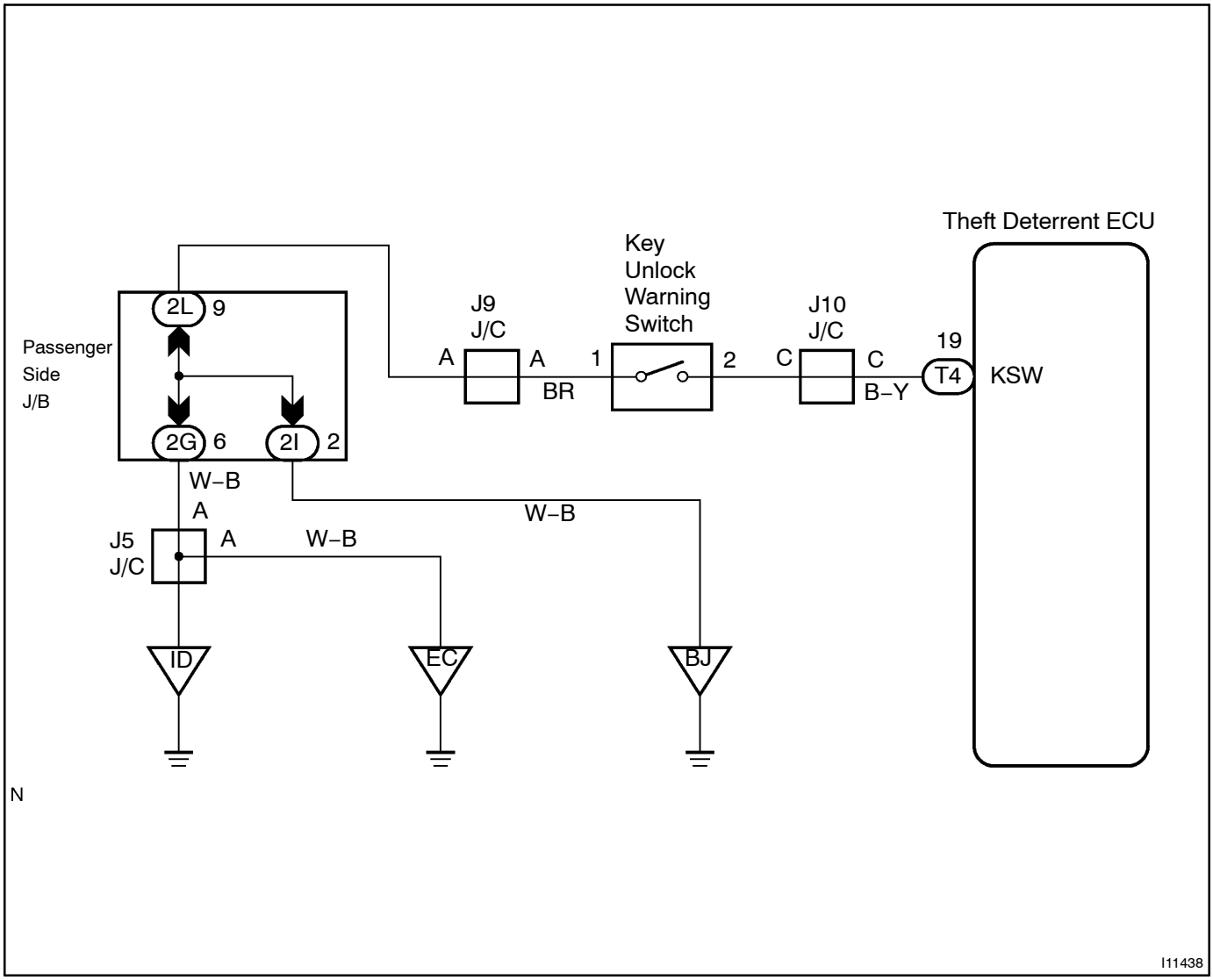
DI61F–01

Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

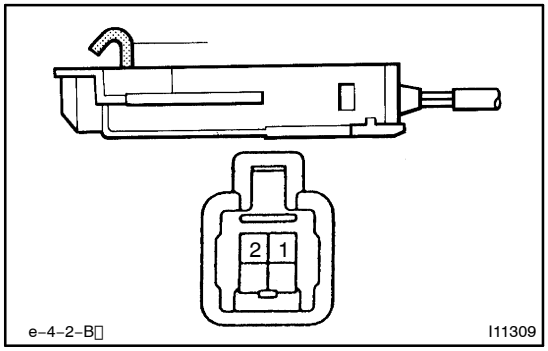
The key unlock warning switch goes ON when the ignition key is inserted in the key cylinder and goes OFF when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check key unlock warning switch.



PREPARATION:
Disconnect key unlock warning switch connector.
CHECK:
Check continuity between terminal 1 and 2 of key unlock warning switch connector, when the key is inserted into the key cylinder or removed.
OK:

Switch position	Tester connection	Specified condition
ON (Key inserted)	1 – 2	Continuity
OFF (Key removed)	–	No continuity

NG → Replace key unlock warning switch.

OK

2	Check harness and connectors between ECU and key unlock warning switch, key unlock warning switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–442).

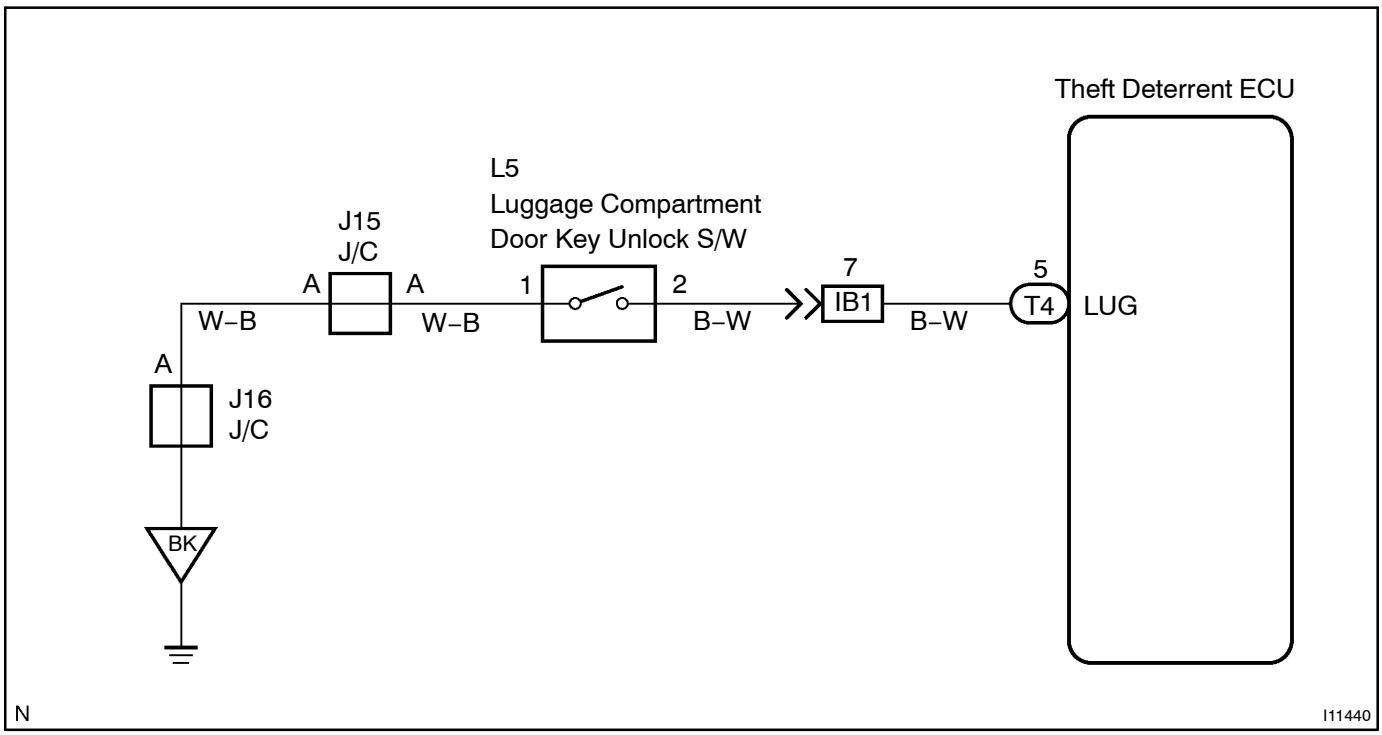
DI61G-01

Luggage Compartment Door Key Lock and Unlock Switch Circuit (Except Europe Models)

CIRCUIT DESCRIPTION

The luggage compartment door key lock and unlock switch goes ON when the luggage compartment door key cylinder is turned to the unlock side with the key.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

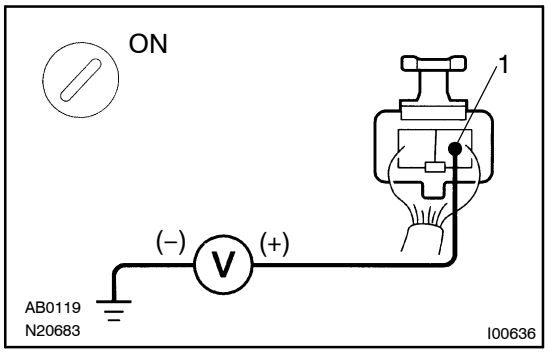
1	**Check luggage compartment door lock and unlock switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC 3.
CHECK:
Check the luggage compartment door lock and unlock switch using DATA LIST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground.**



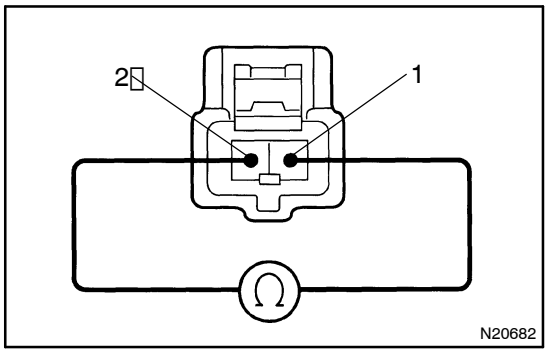
PREPARATION:
(a) Remove luggage compartment door trim.
(b) Turn ignition switch ON.
CHECK:
Measure voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground, when the key is turned to the unlock side and not turned.
OK:

Key operation	Voltage
Turned to the unlock side	0 V
Not turned	Battery positive voltage

OK → **Check and replace theft deterrent ECU.*1**

NG

3	**Check luggage compartment door key lock and unlock switch.**



PREPARATION:

Disconnect luggage compartment door key lock and unlock switch connector.

CHECK:

Check continuity between terminals 1 and 2, when the key is turned to the unlock side and not turned.

OK:

Key operation	Tester connection	Specified condition
Turned to unlock	1 – 2	Continuity
Not turned	–	No continuity

NG → **Repair or replace luggage compartment door key lock and unlock switch.**

OK

4	**Check harness and connector between theft deterrent ECU and key lock and unlock switch, key lock and unlock switch and body ground (See page IN–32).**

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

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–442).

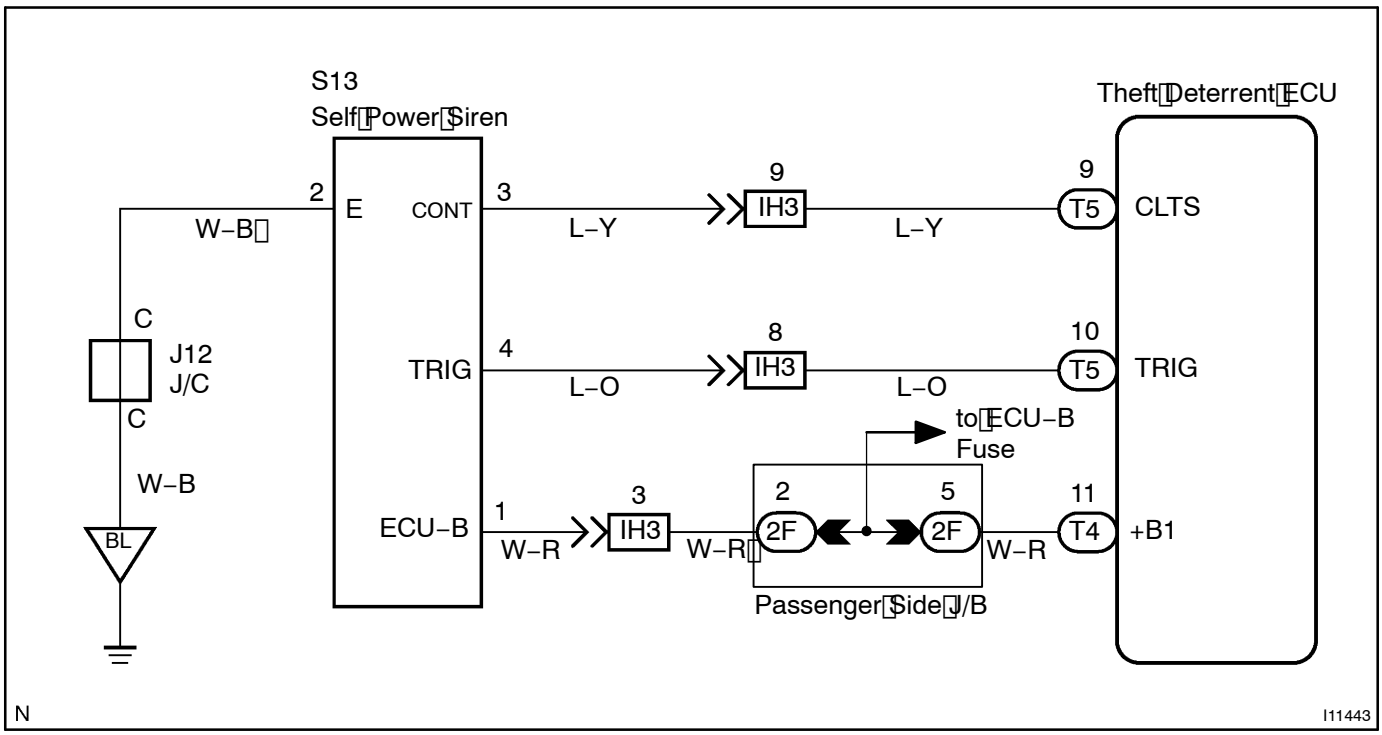
DI61I–01

Self Power Siren

CIRCUIT DESCRIPTION

A radio transmitter is integrated into the dome light.
This creates a spherical electric field inside the vehicle, detects intrusion using the Doppler effect caused by movement of an object in the vehicle, and outputs a warning trigger signal to the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check self power siren using LEXUS hand–held tester.**

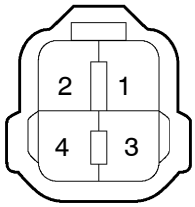
PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the self power alarm can operated in an ACTIVE TEST.
OK:
The self power alarm should sound.

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	Check self power siren.

Connector connected



N I11492

PREPARATION:

(a) Remove the self power siren.
(b) Disconnect the self power siren connector.

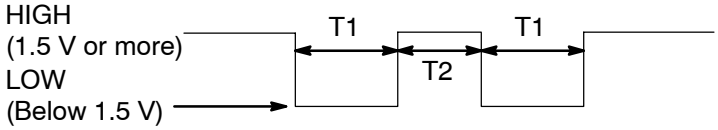
CHECK:

(a) Case 1:
Check terminal 3 in case of the system set signal is not input to the siren.
(b) Case 2:
Check terminal 4 in case of the siren drive signal is not input when the alarm is triggered.

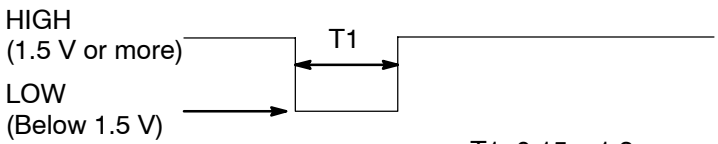
OK:

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery voltage
2 – Ground	Constant	No voltage
3 – Ground	When transforming from armed or arming preparation state to disarmed state.	Using an oscilloscope *1
	When transforming from the arming preparation state to armed state.	Using an oscilloscope *2
	Normal condition	Approx. 1.4 V
4 – Ground	Normal condition	Battery voltage
	Arming condition	Below 1 V

*1: wave pattern



*2: wave pattern



T1: 0.15 – 1.3 secs
T2: 0.15 – 0.25 secs

OK → **Replace self power siren.**

NG

3	Check harness and connector between ECU and alarm, alarm and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Proceed to next circuit inspection shown in problem symptom table (See page DI–442).

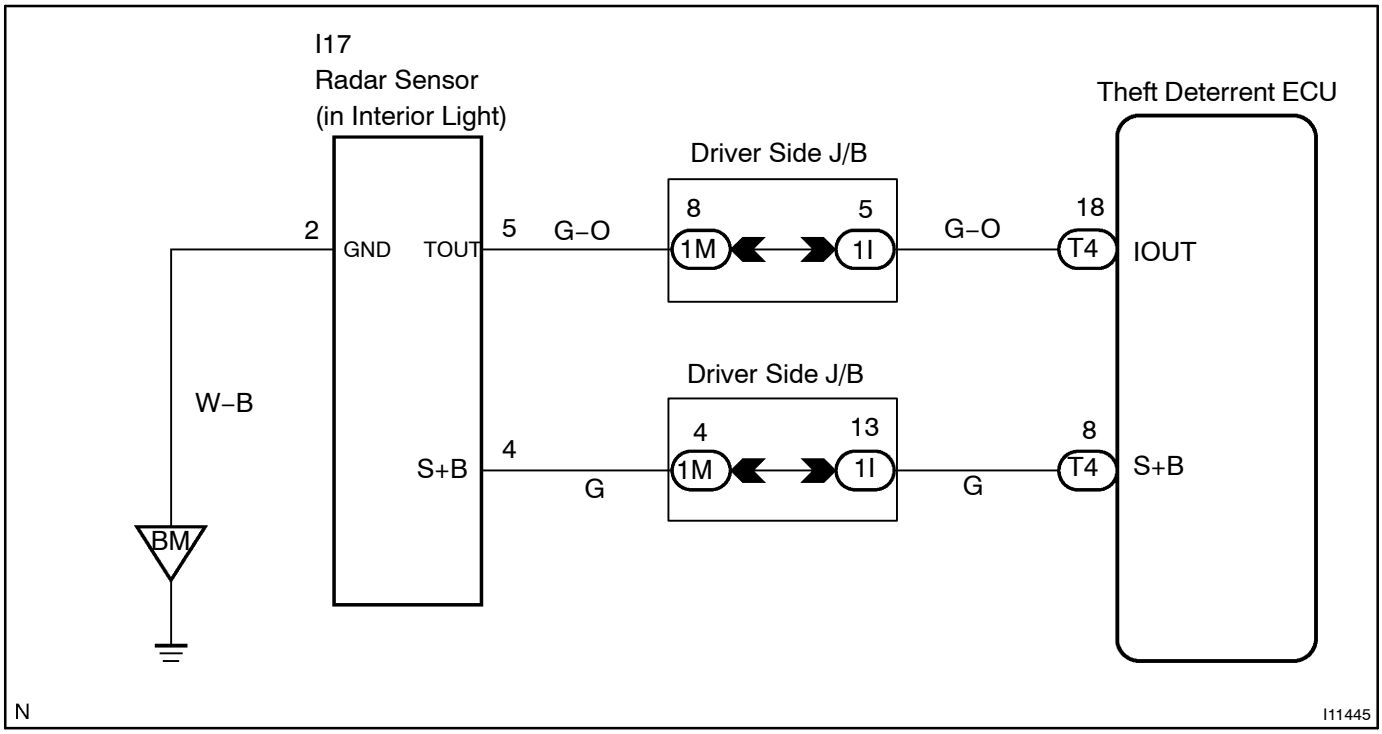
DI61J–01

Radar Sensor (Except Singapore)

CIRCUIT DESCRIPTION

Based on the alarm sounding state input from the theft deterrent ECU (to the TRIG terminal) an alarm is issued.
However, the armed/disarmed state is determined by the CONT terminal, which monitors vehicle status, and input to the TRIG terminal is only accepted from the ECU while armed state is ON.
Moreover, open circuit detection is only carried out while armed state is ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check radar sensor operation.**

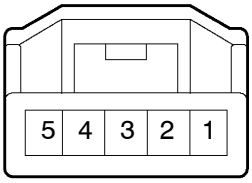
CHECK:
Set the system with a window open, and after 30 seconds put your hand through the window and shake it near the sensor to check if the alarm is triggered.

OK	**No problem.**

NG

2	Check radar sensor.

Connector connected



N I11491

PREPARATION:
Remove the room light assembly.
CHECK:
Measure the voltage and continuity terminals.
OK:

Tester connection	Condition	Specified condition
1 – Ground	Arming preparation state or armed state.	Battery voltage
	Disarmed state.	Below 1 V
2 – Ground	When the sensor does not detect any movement.	6.8 V ± 2 V
	When the sensor detects movement when in arming preparation or armed state.	Below 1 V
4 – Ground	Constant	Continuity

NG → Replace radar sensor. (in Room light assembly)

OK

3	Check harness and connector between ECU and sensor, sensor and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–442).

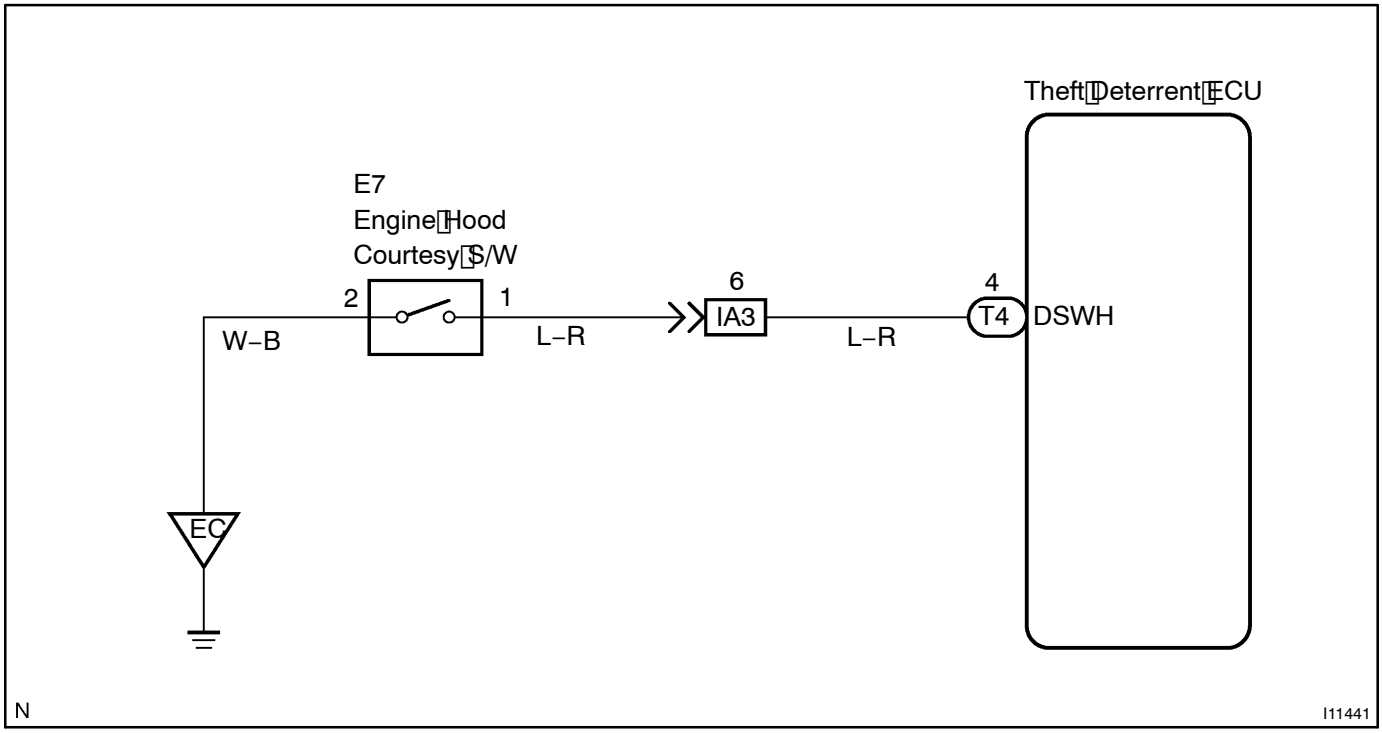
DI61H–01

Engine Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The engine hood courtesy switch is built into the engine hood lock assembly and goes ON when the engine hood is opened and goes OFF when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check hood courtesy switch using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

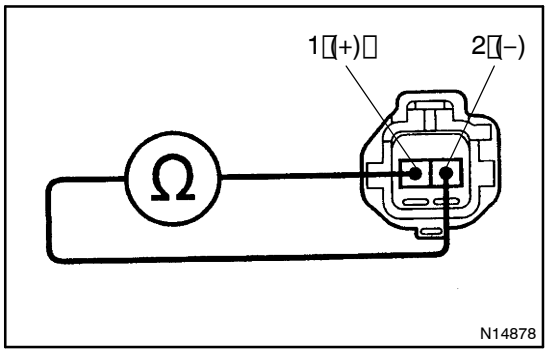
Check the hood courtesy switch using DATA LIST.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).

NG

2	Check engine hood courtesy switch.



PREPARATION:

(a) Remove engine hood lock assembly.

(b) Disconnect engine hood courtesy switch connector.

CHECK:

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK:

Engine hood lock	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

NG → Replace engine hood courtesy switch.

OK

3	Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

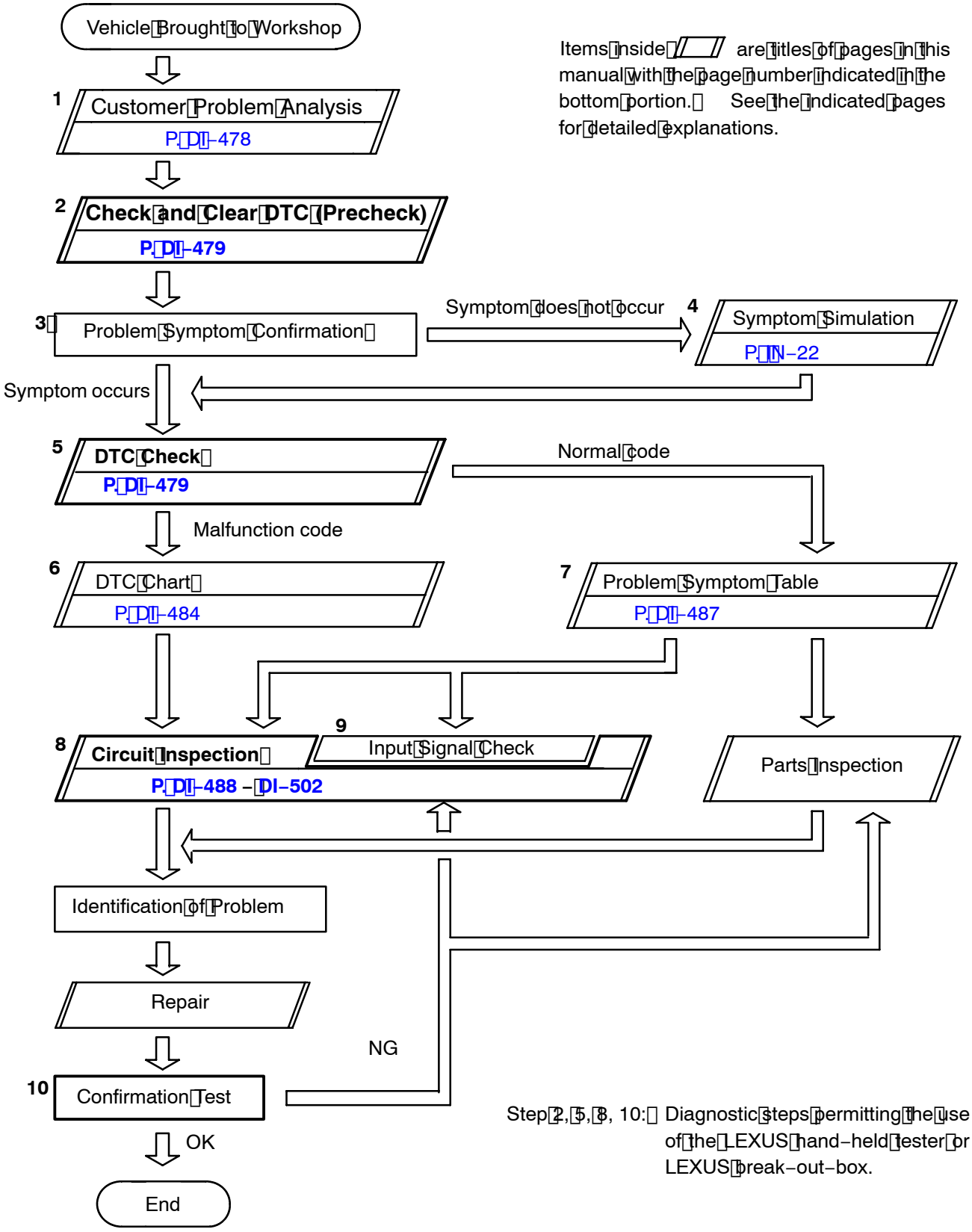
Check and replace theft deterrent ECU (See page IN–32).

CRUISE CONTROL SYSTEM

DI26R–11

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



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.

Step 2, 5, 8, 10: Diagnostic steps permitting the use of the LEXUS hand–held tester or LEXUS break–out–box.

DI26S–10

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

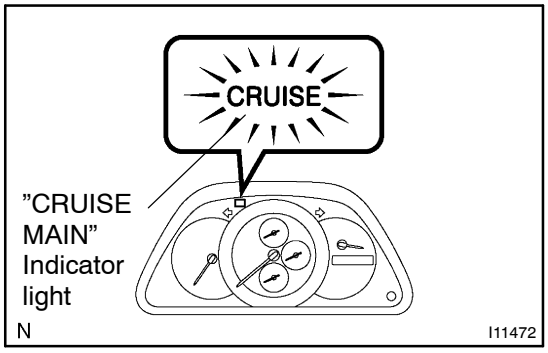
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Condition of Problem Occurrence	**Date of Problem Occurrence**	/ /
	Frequency Problem Occurs?	☐ Continuous ☐ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	**km Mile**

Symptoms	☐ Auto cancel occurs	● Driving condition ☐ City driving ☐ Freeway ☐ Up hill ☐ Down hill ● After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ With brake ON ☐ Except D position shift ☐ When control SW turns to CANCEL position
	☐ Cruise control malfunction	☐ Slip to acceleration side ☐ Slip to deceleration side ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ ACCEL ☐ COAST ☐ RESUME ☐ CANCEL
	☐	☐ Remains ON ☐ Does not light up ☐ Blinks

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

DI26T–12



PRE–CHECK

1. DIAGNOSIS SYSTEM

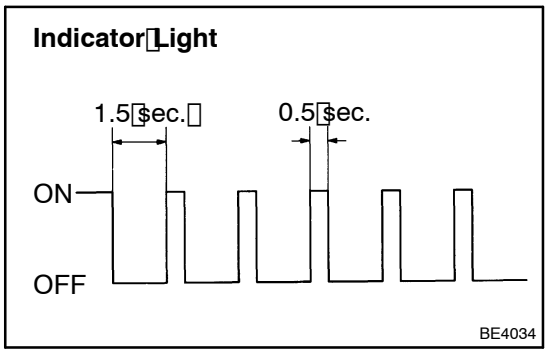
(a) Check the indicator.

(1) Turn the ignition switch to ON.

(2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned ON, and that the indicator light goes off when the main switch is turned OFF.

HINT:

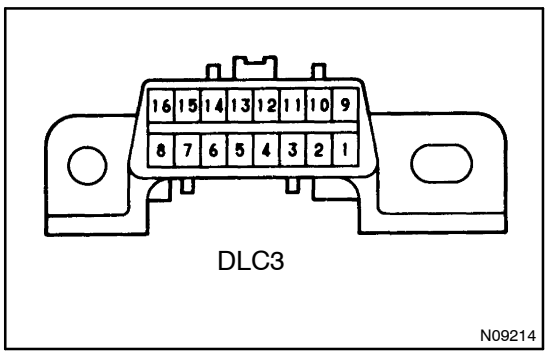
If the indicator check result is not normal, proceed to trouble-shooting (See page BE–2) for the combination meter section.



(b) Check the DTC.

HINT:

If a malfunction occurs in the speed sensor or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns ON and OFF the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



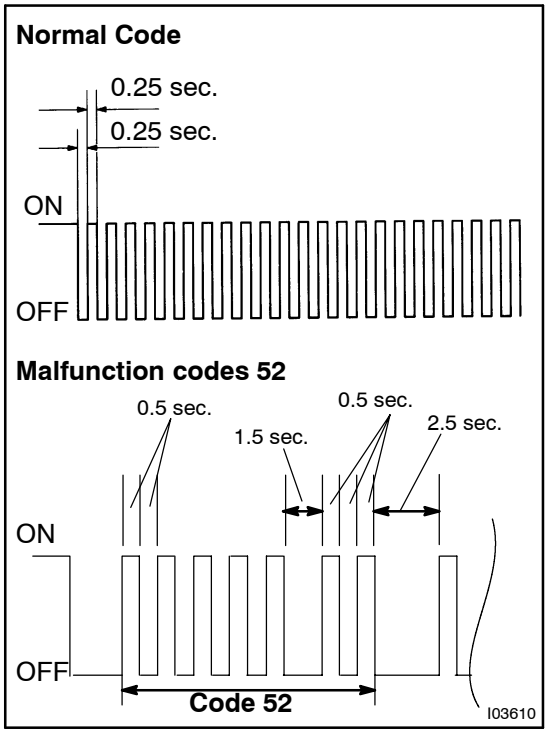
(c) Output DTC using diagnosis check wire.

(1) Turn the ignition switch ON.

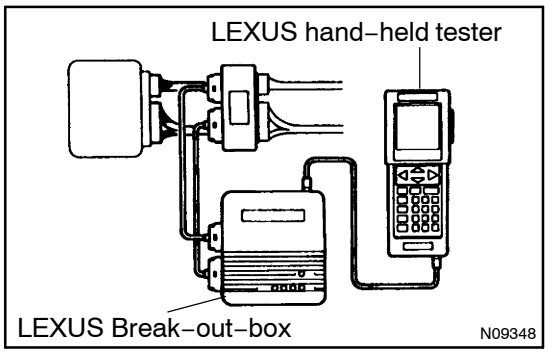
(2) Using SST, connect terminals Tc and E_1 of DLC3.

SST 09843–18020

(3) Read the DTC on the CRUISE MAIN indicator light.

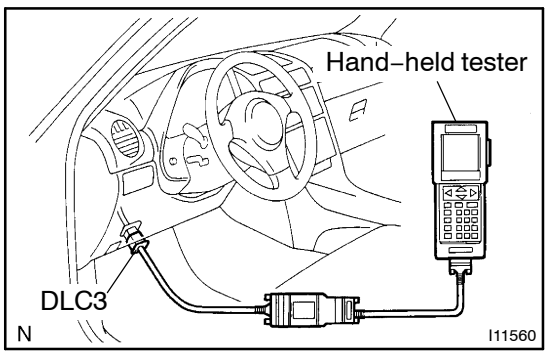


HINT:
If the DTC is not output, inspect the diagnosis circuit.
As an example, the blinking patterns for codes; normal 52 are shown in the illustration.



2. ECU TERMINAL VALUES MEASUREMENT BY USING LEXUS BREAK–OUT–BOX AND LEXUS HAND–HELD TESTER

(a) Hook up the LEXUS break–out–box and LEXUS hand–held tester to the vehicle.
(b) Read the ECU input/output values by following the prompts on the tester screen.
(c) Please refer to the LEXUS hand–held tester has a "Snapshot" function. This records the measured data and is effective in the diagnosis of intermittent problems.



3. USING LEXUS HAND–HELD TESTER

(a) Hook up the LEXUS hand–held tester to the DLC3.
(b) Monitor the ECU data by following the prompts on the tester screen.

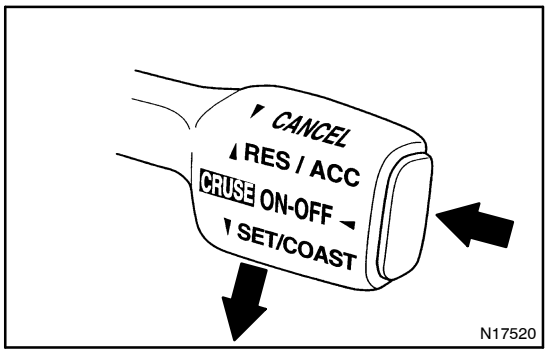
HINT:
LEXUS hand–held tester has a "Snapshot" function which records the monitored data.
Please refer to the LEXUS hand–held tester operator's manual for further details.

4. DTC CLEARANCE

(a) The following actions will erase the DTCs and freeze frame data.
  (1) Operating the OBD II scan tool (complying with SAEJ1978) or LEXUS hand–held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
  (2) Disconnecting the battery terminals or EFI fuse.

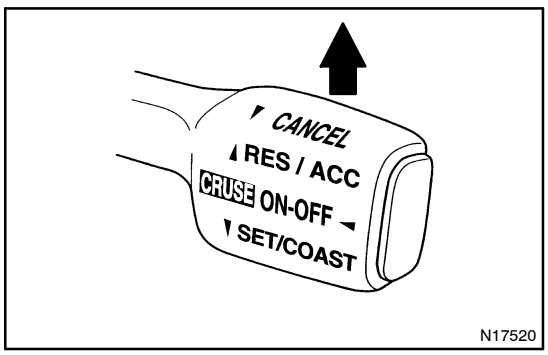
(b) After completing repairs, the DTC retained in memory can be cleared by removing the ECU–B fuse for 10 seconds or more with the ignition switch off.

(c) Check that the normal code is displayed after connecting the fuse.

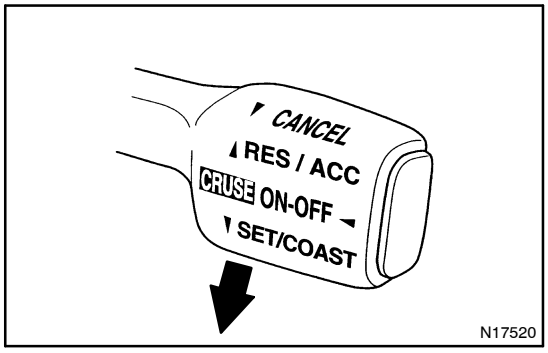


5. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

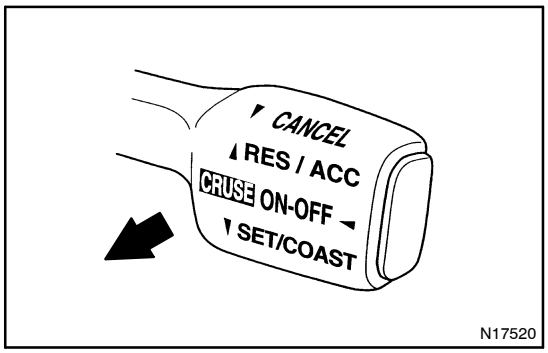
(a) Inspect the SET switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Press the control switch to the SET/COAST.
  (4) After releasing the switch, check that the vehicle cruises at the desired speed.



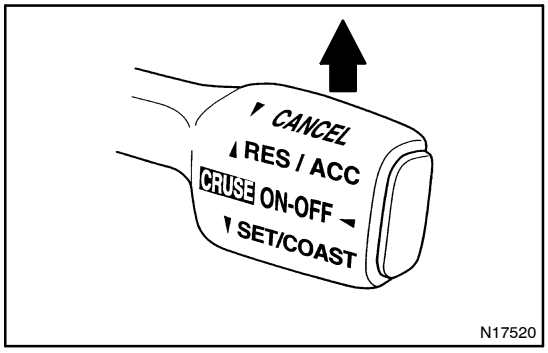
(b) Inspect the ACCEL switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed increases while the control switch is turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
  (4) Momentarily press the control switch upward in the RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap–up function).



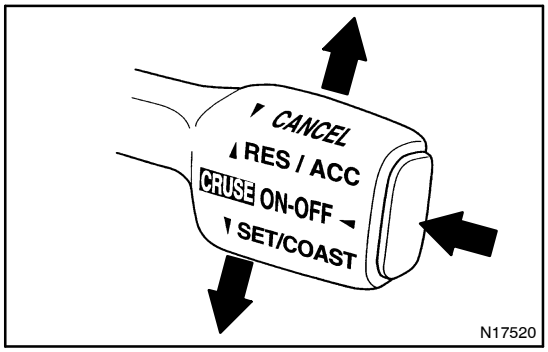
(c) Inspect the COAST switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
  (4) Momentarily press the control switch is turned to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap–down function).



(d) Inspect the CANCEL switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
    - Depress the brake pedal
    - Shift to except D range (A/T)
    - Push the main switch OFF
    - Pull the cruise control switch to CANCEL



(e) Inspect the RESUME switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
    • Depress the brake pedal
    • Shift to except D range (A/T)
    • Pull the cruise control switch to CANCEL
  (4) After the control switch is turned to RES/ACC at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.



6. INPUT SIGNAL CHECK
(Using LEXUS hand–held tester)

(a) Connect the LEXUS hand–held tester to DLC3
(b) Check the control switch (MAIN, CANCEL, SET/COAST, RES/ACC)

DI26U–11

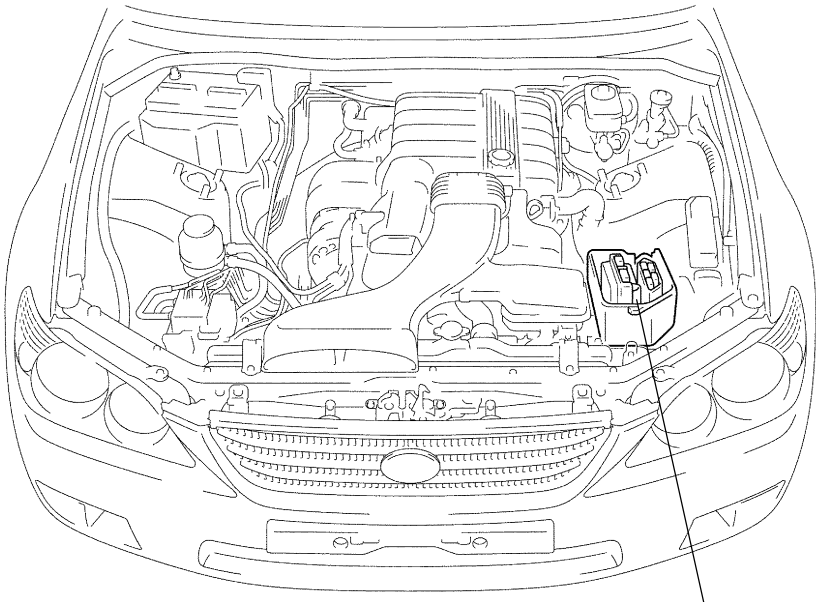
DIAGNOSTIC TROUBLE CODE CHART

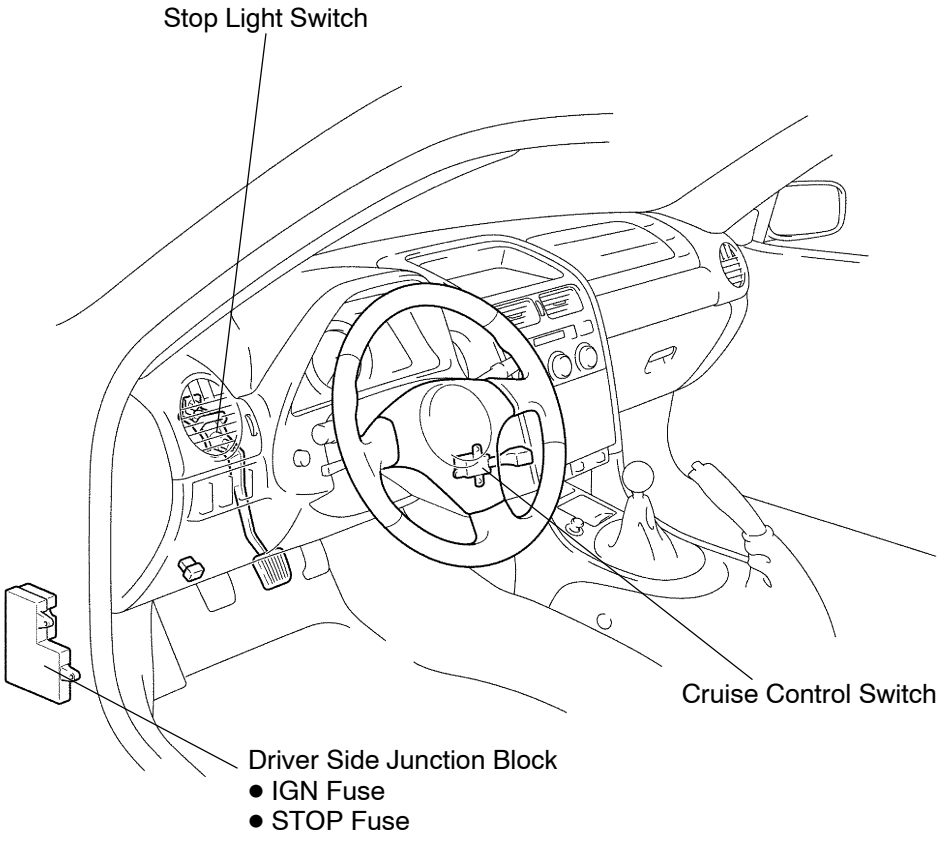
If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See Page)	Circuit Inspection	Trouble Area
P0500/ 21,23 (DI–488)	Vehicle Speed Sensor malfunction	• Harness or connector between Engine and ECT ECU and vehicle speed sensor • Vehicle speed sensor • Engine and ECT ECU
P1520/ 52 (DI–489)	Stop Light Switch Circuit malfunction	• Stop light switch • Harness or connector between Engine and ECT ECU and stop light switch circuit • Engine and ECT ECU
P1566/ 54 (DI–494)	Input Signal Circuit	• Engine and ECT ECU

DI622–01

PARTS LOCATION



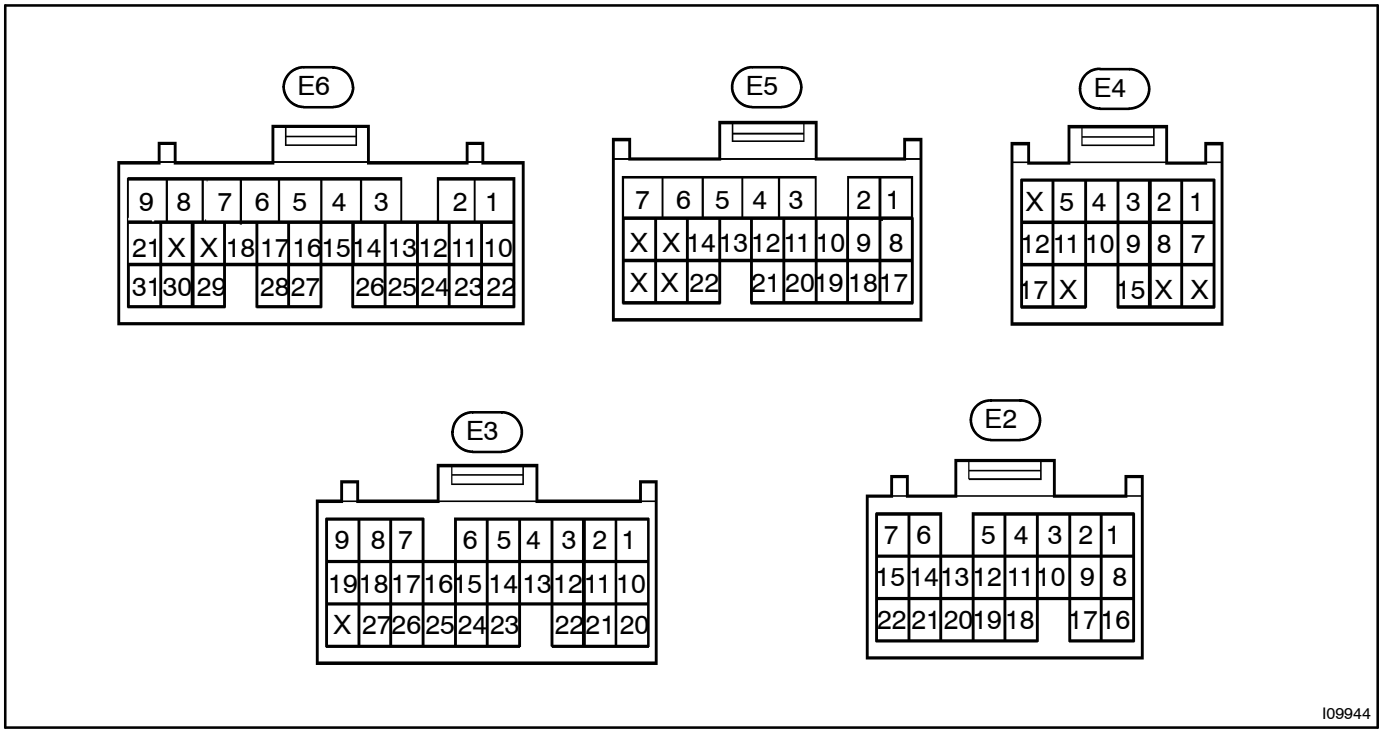


P

I10856

DI3MK–03

TERMINALS OF ECU



I09944

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ E1 (E3–6 ↔ E5–17)	G–W ↔ BR	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
CCS ↔ E1 (E3–22 ↔ E5–17)	L–R ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch hold ON	6.9 – 9.8 V
		Ignition switch ON SET/COAST switch hold ON	4.7 – 6.9 V
		Ignition switch ON RES/ACC switch hold ON	2.4 – 3.8 V
		Ignition switch ON MAIN switch hold ON	Below 1 V
ST1– ↔ E1 (E3–12 ↔ E5–17)	B–L ↔ BR	Depress brake pedal	Below 1 V
		Release brake pedal	10 – 14 V

DI26X–11

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Input Signal Circuit 2. Vehicle Speed Sensor Circuit 3. Stop Light Switch Circuit 4. Neutral Start Switch Circuit 5. Engine and ECT ECU	DI–494 DI–488 DI–489 DI–204 IN–32
SET not occurring or CANCEL occurring. (DTC is not output)	1. Engine and ECT ECU	IN–32
Actual vehicle speed deviates above or below the set speed.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–494 IN–32
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road. (Hurting)	1. Engine and ECT ECU	IN–32
Cruise control not cancelled, even when brake pedal is depressed.	1. Stop Light Switch Circuit 2. Engine and ECT ECU	DI–489 IN–32
Cruise control not cancelled, even when transmission is shifted to ”N” position.	1. Neutral Start Switch Circuit 2. Engine and ECT ECU	DI–204 IN–32
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Switch Circuit 2. Engine and ECT ECU	DI–498 IN–32
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–494 IN–32
Poor response is ACCEL and RESUME modes.	1. Engine and ECT ECU	IN–32
O/D does not resume, even though the road is not uphill.	1. Engine and ECT ECU	IN–32
DTC memory is erased.	1. Engine and ECT ECU	IN–32
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Engine and ECT ECU	– IN–32
Cruise MAIN indicator light remains ON or falls to light up.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–494 IN–32

DI3CI–04

CIRCUIT INSPECTION

DTC	P0500/21,23	Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

See page DI–91.

DTC No.	Detection Item	Trouble Area
P0500/21,23	Speed signal is not input to the Engine and ECT ECU while cruise control is set.	• Combination meter • Harness or connector between Engine and ECT ECU and vehicle speed sensor • Vehicle speed sensor • Engine and ECT ECU

WIRING DIAGRAM

See page DI–91.

INSPECTION PROCEDURE

See page DI–91.

DI623–01

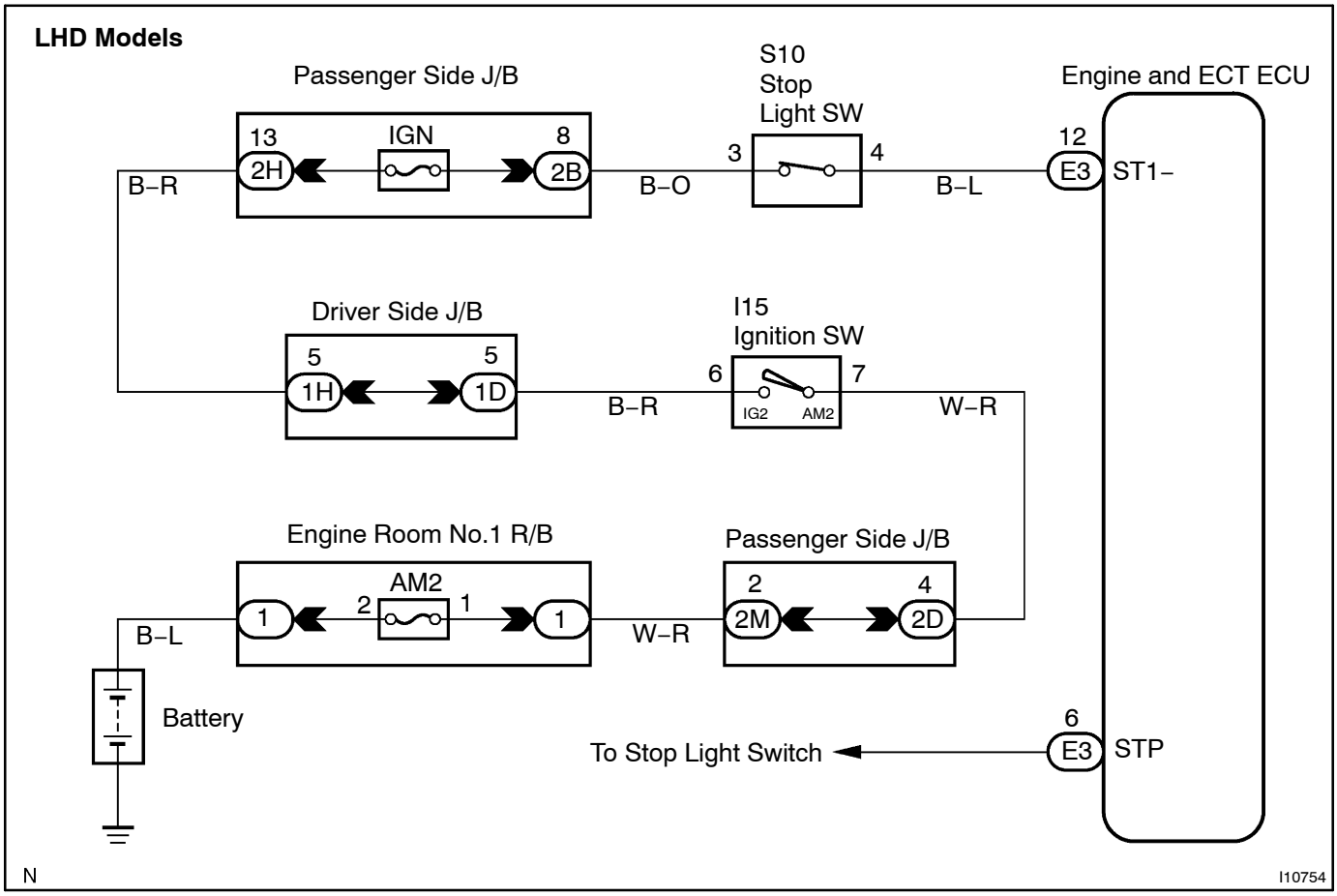
DTC	P1520/52	Stop light switch circuit

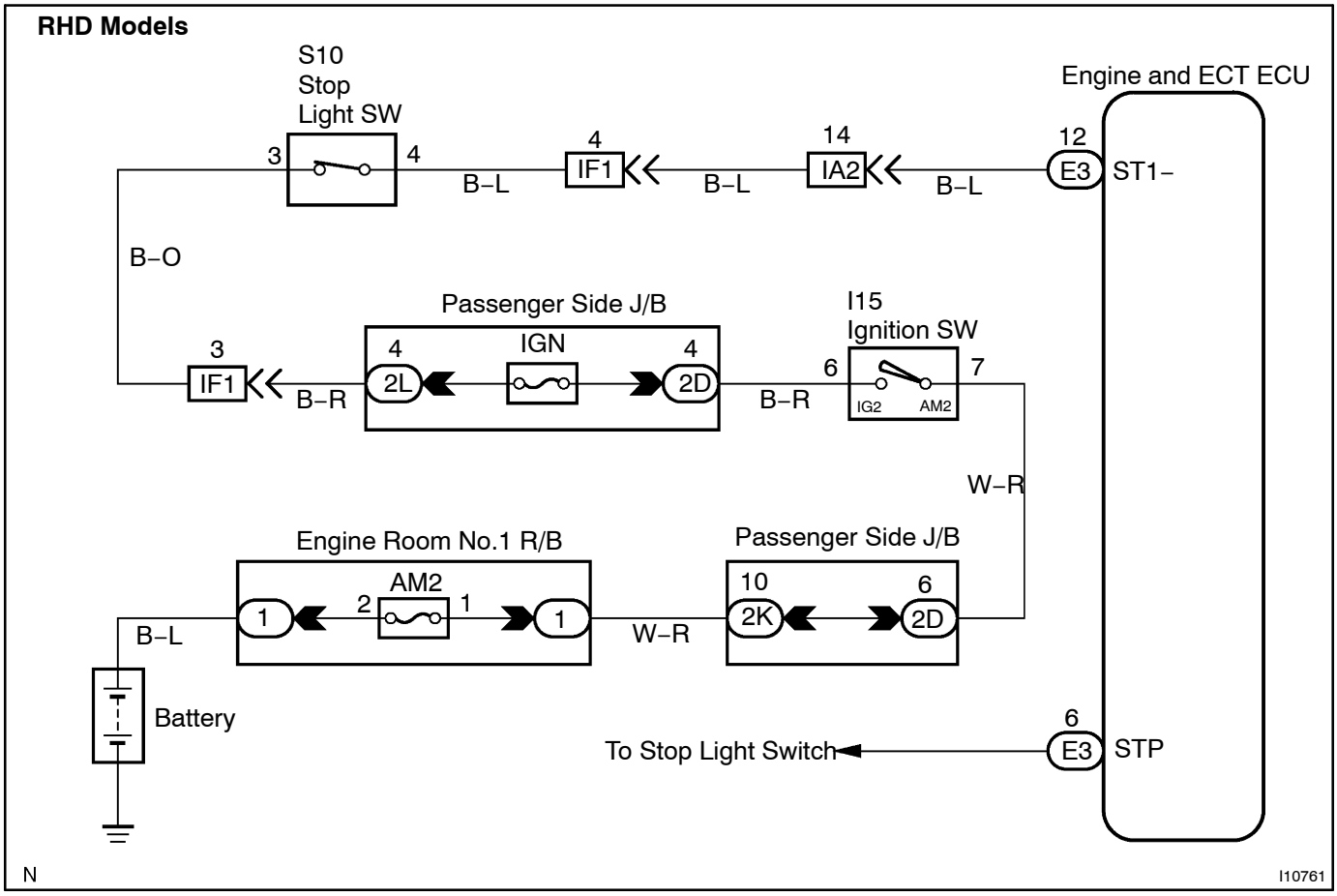
CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the Engine and ECT ECU. When the Engine and ECT ECU receives this signal, it cancels the cruise control.
A fail–safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.
The cancel condition is that battery voltage is supplied to terminal STP.
When the brake is on, battery voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the Engine and ECT ECU, and the Engine and ECT ECU turns the cruise control OFF.
If the harness connected to terminal STP has an open circuit, terminal STP will have battery voltage and the cruise control will be turned OFF.

DTC No.	Detection Item	Trouble Area
52	Stop light switch circuit.	• Stop light switch • Harness or connector between Engine and ECT ECU and stop light switch circuit • Engine and ECT ECU

WIRING DIAGRAM




RHD Models
S10
Stop
Light SW
3
4
B–L
4
IF1
B–L
14
IA2
B–L
12
E3
ST1–
Engine and ECT ECU
B–O
Passenger Side J/B
3
IF1
B–R
4
2L
IGN
4
2D
B–R
I15
Ignition SW
6
7
IG2
AM2
W–R
Engine Room No.1 R/B
AM2
2
1
1
1
B–L
Passenger Side J/B
10
2K
6
2D
W–R
Battery
6
E3
STP
To Stop Light Switch
N
I10761

INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1, and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check stop light switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the stop light switch using DATALIST.
OK:

Condition	Stop light switch 1 (Sub CPU)	Stop light switch 2 (Sub CPU)	Stop light switch 2 (Main CPU)
Depressed	ON	ON	ON
Released	OFF	OFF	OFF

HINT:
- Stop light SW 1 has a function to disconnect the connection (OFF) when depressing the pedal, however, Engine and ECT ECU controls by the logic rivers, so with the LEXUS hand–held tester, it displays ON.
- Stop light SW 1 indicates the input of ST1–terminal and Stop light SW 2 indicates the input of STP terminal.

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–487).**

NG

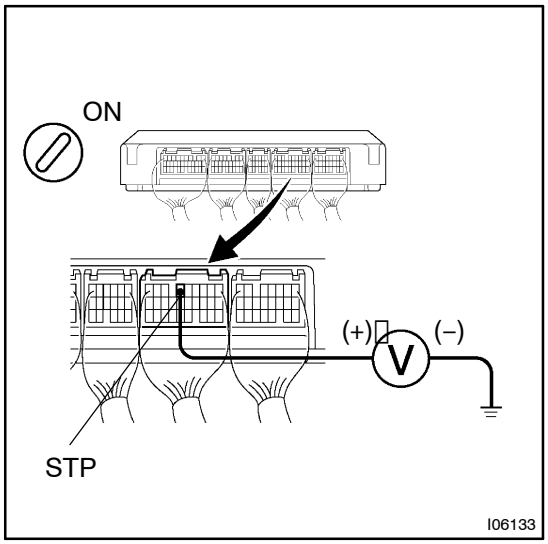
2	**Check operation of stop light.**

CHECK:
Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

NG → **Check stop light system (See page BE–65).**

OK

3	**Check voltage between terminal STP of Engine and ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine and ECT ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal STP of Engine and ECT ECU connector and body ground, when the brake pedal is depressed and released.

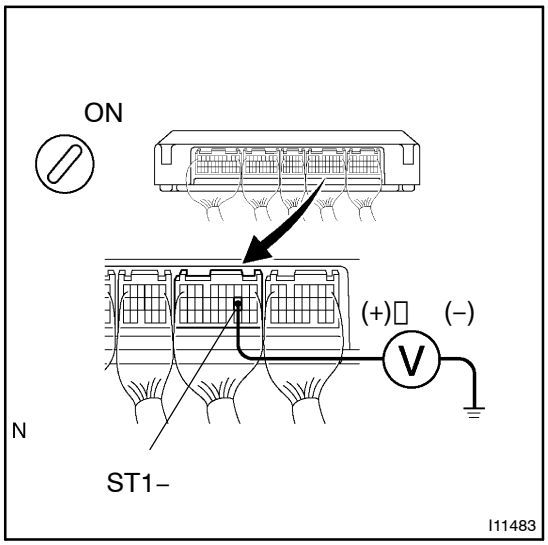
OK:

Depressed	10 – 14 V
Released	Below 1 V

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–487).**

NG

4	**Check voltage between terminal ST1– of Engine and ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine and ECT ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal ST1– of Engine and ECT ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Depressed	Below 1 V
Released	10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–487).**

NG

5	Check wire harness and connector between terminal STP of Engine and ECT ECU and stop light switch, and terminal ST1– of Engine and ECT ECU and stop light switch (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace Engine and ECT ECU (See page IN–32).

DI3CL–04

DTC	P1566/54	Input Signal Circuit abnormal

CIRCUIT DESCRIPTION

DTC No.	Detection Item	Trouble Area
P1566/54	• Stop light switch input signal circuit abnormal.	• Engine and ECT ECU

INSPECTION PROCEDURE

Check and replace Engine and ECT ECU (See page IN–32).

DI624–01

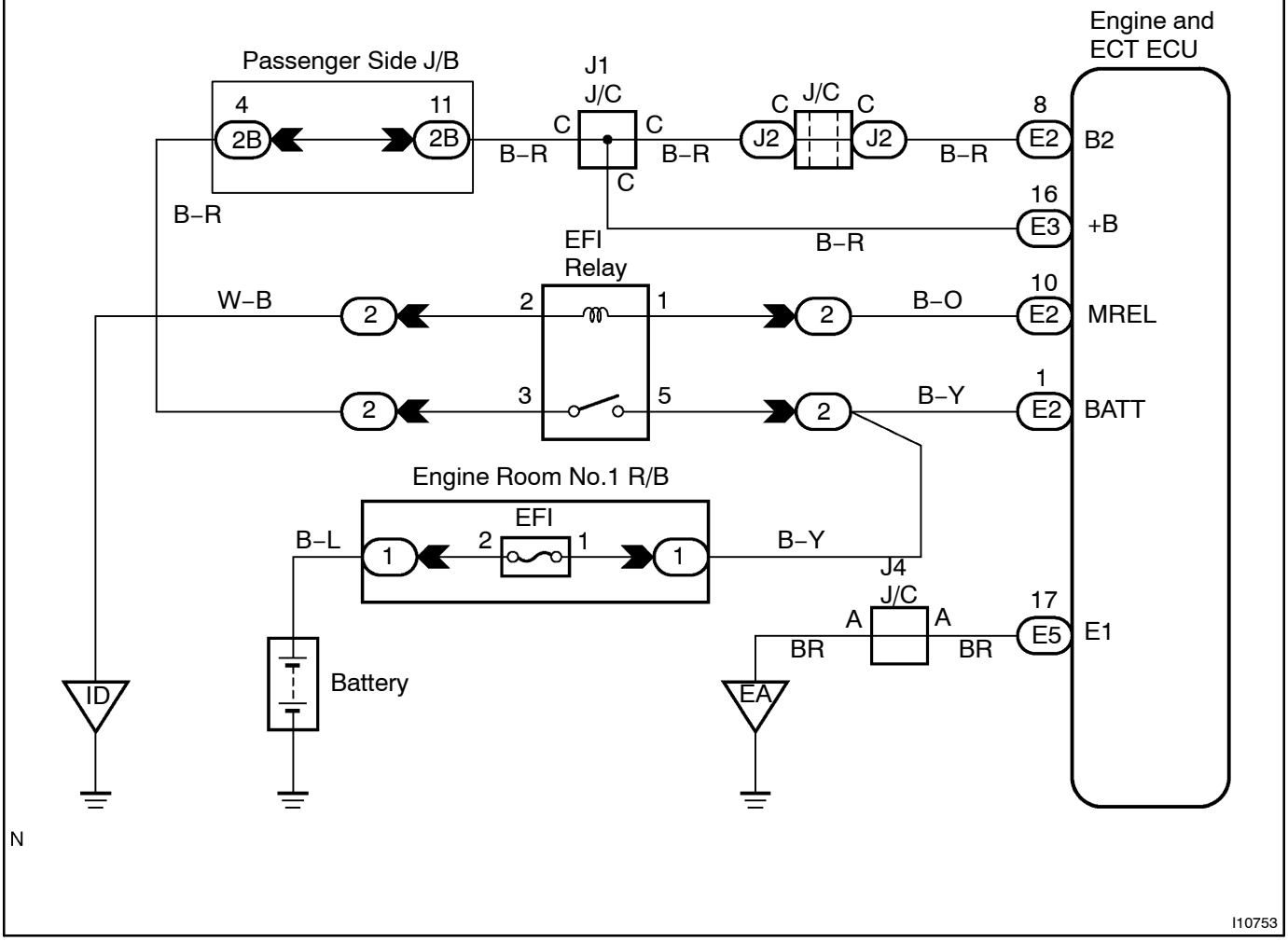
Power source circuit

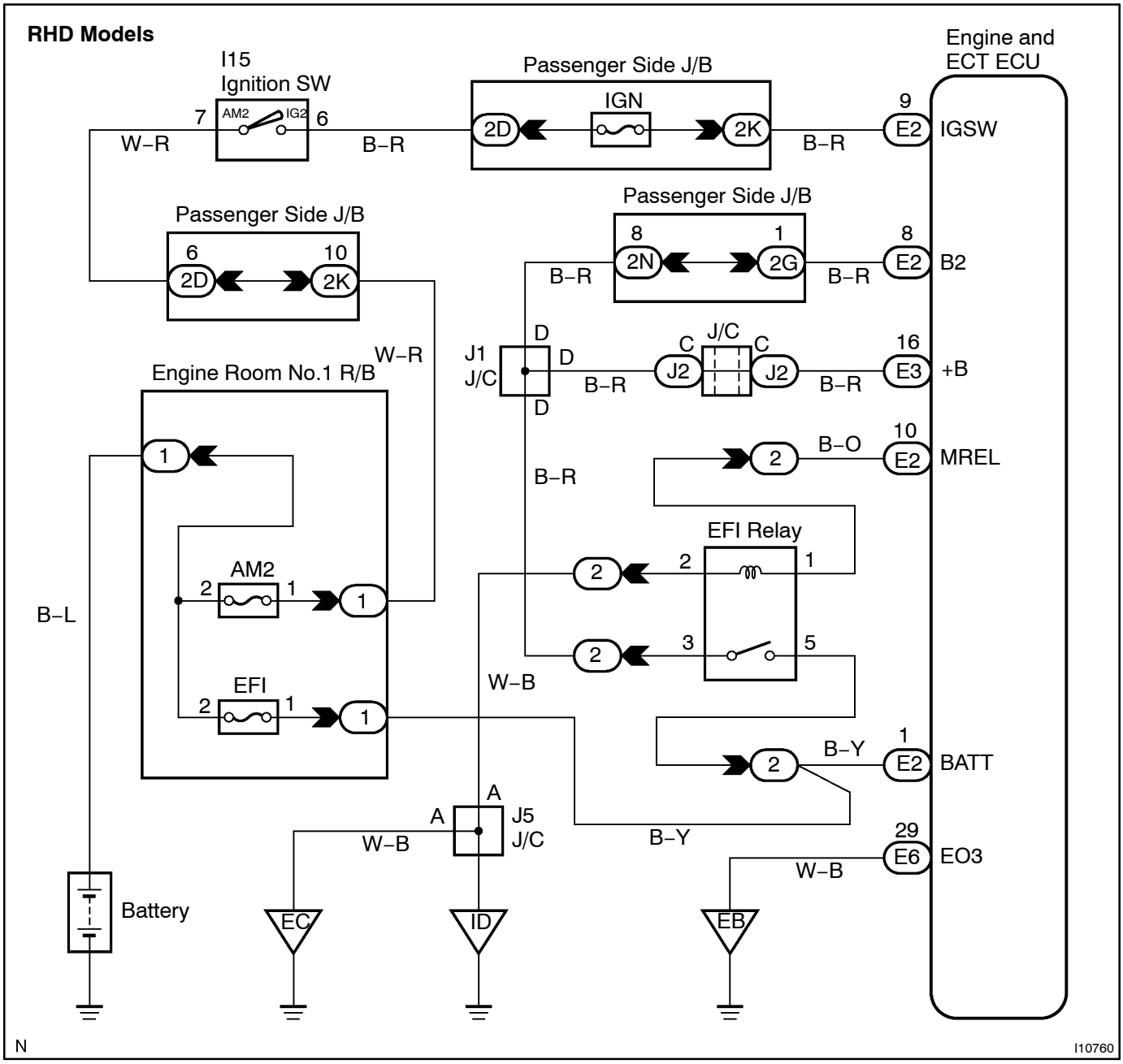
CIRCUIT DESCRIPTION

This circuit provides power to operate the Engine and ECT ECU.

WIRING DIAGRAM

LHD Models




RHD Models
I15
Ignition SW
AM2
IG2
7
6
W–R
B–R
Passenger Side J/B
IGN
2D
2K
B–R
9
E2
IGSW
Engine and
ECT ECU
Passenger Side J/B
6
10
2D
2K
Passenger Side J/B
8
1
2N
2G
B–R
B–R
8
E2
B2
W–R
J1
J/C
D
D
D
B–R
J/C
C
C
J2
J2
B–R
16
E3
+B
Engine Room No.1 R/B
1
B–O
10
E2
MREL
2
B–R
EFI Relay
AM2
2
1
1
2
2
1
B–L
2
3
5
W–B
EFI
2
1
1
B–Y
1
E2
BATT
2
A
A
J5
J/C
W–B
B–Y
29
E6
EO3
W–B
Battery
EC
ID
EB
N
I10760

INSPECTION PROCEDURE

1	**Check IGN and EFI fuse.**

CHECK:
Check continuity of IGN and EFI fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals IGSW, BATT and GND of Engine and ECT ECU connector (See page IN–32).**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Engine and ECT ECU connector.
CHECK:
Measure voltage between terminals IGSW, BATT and GND
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–487).**

NG ↓

3	**Check wireharness and connector between Engine and ECT ECU and body ground (See page IN–32).**

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

OK ↓

Check and repair wireharness and connector between Engine and ECT ECU and battery (See page IN–32).

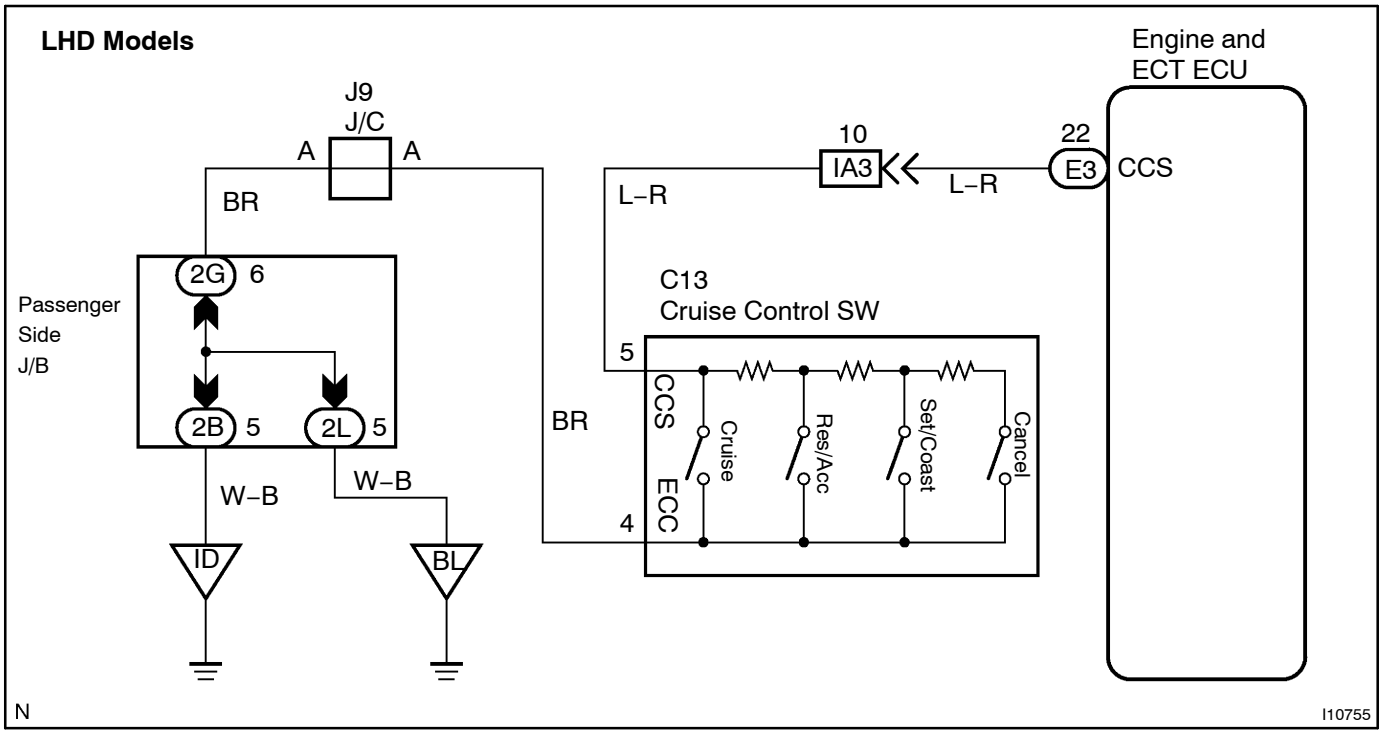
DI625–01

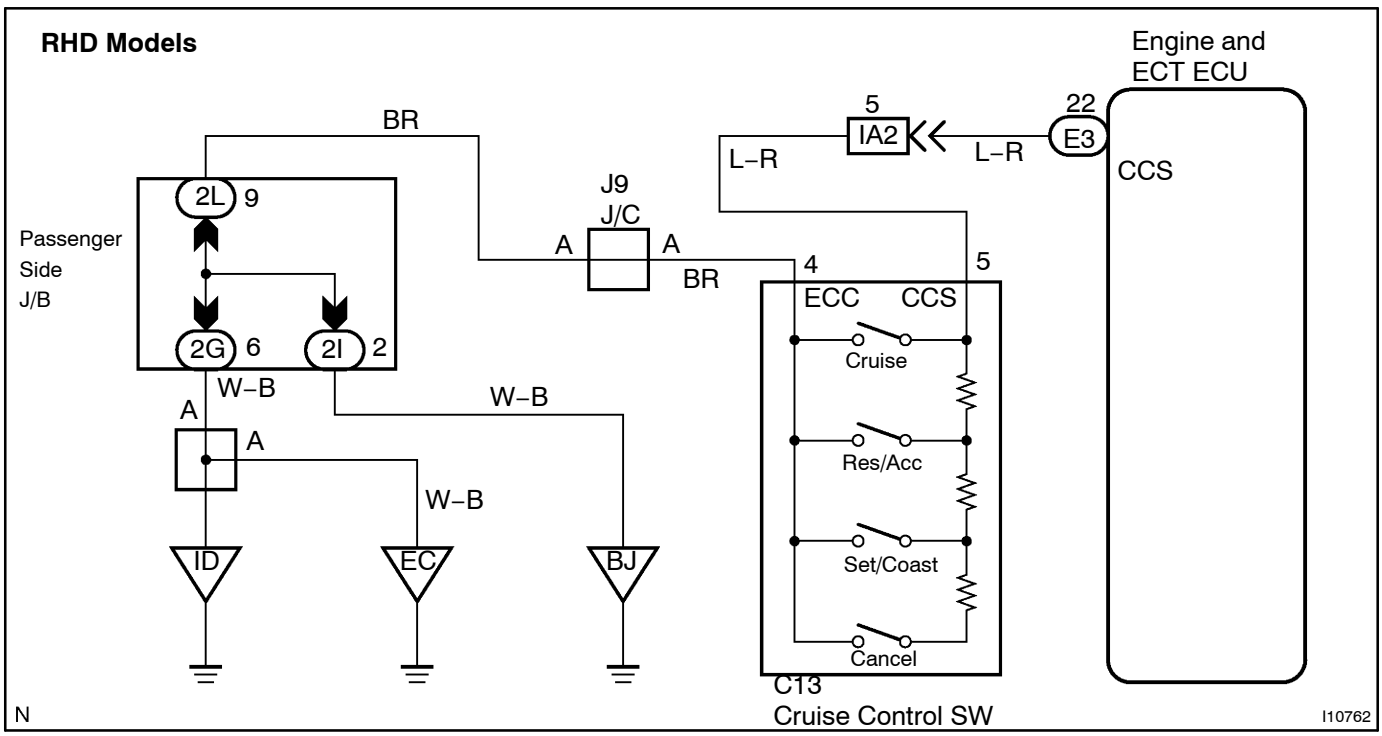
Cruise Control Switch Circuit

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signal (each voltage) to the ECU.

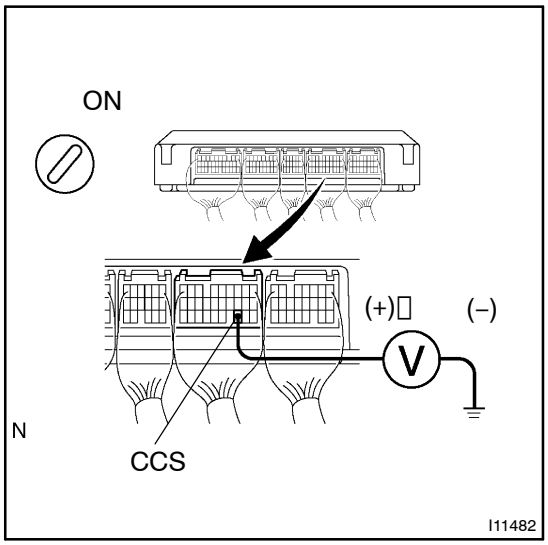
WIRING DIAGRAM





INSPECTION PROCEDURE

1	**Check voltage between terminals CCS of Engine & ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine & ECT ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

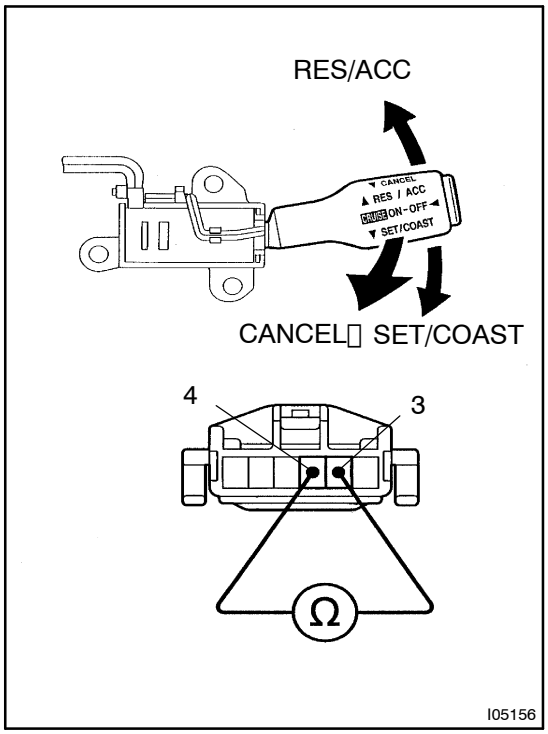
Measure voltage between terminals CCS of Engine & ECT ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 – 16 V
RES/ACC	2.4 – 3.8 V
SET/COAST	4.7 – 6.9 V
CANCEL	6.9 – 9.8 V

NG → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–487).**

OK

2	Check control switch continuity.



PREPARATION:

(a) Remove steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

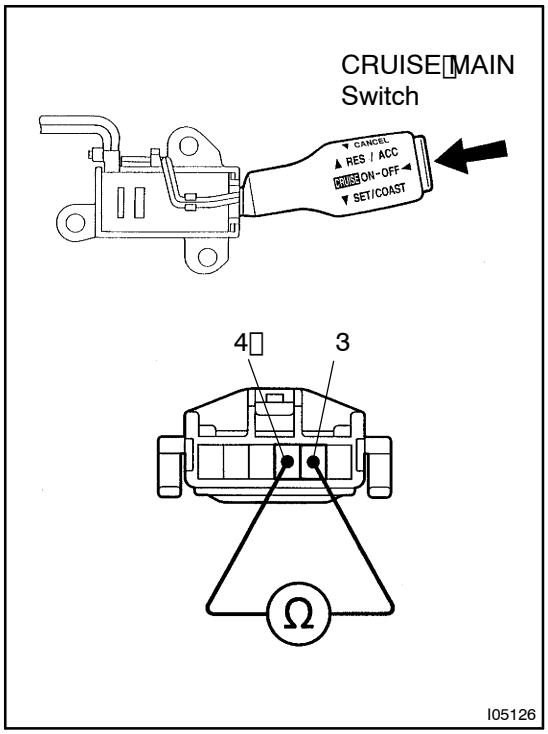
Measure resistance between terminals 4 and 5 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
RES/ACC	220 – 260
SET/COAST	600 – 660
CANCEL	1,500 – 1,600

NG → **Replace control switch.**

OK

3	Check main switch continuity.



PREPARATION:

(a) Remove steering wheel center pad. (See page SR–12)

(b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 4 and 5 of control switch connector when main switch is held ON and OFF.

OK:

Switch position	Tester connection	Specified condition
OFF	–	No continuity
Hold ON	4 – 5	Continuity

NG → **Replace control switch.**

OK

4	Check harness and connector between Engine & ECT ECU and cruise control switch, cruise control switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

5	Check cruise control indicator light (See combination meter).

NG → Replace combination meter.

OK

Check and replace Engine and ECT ECU (See page IN–32).

DI090–19

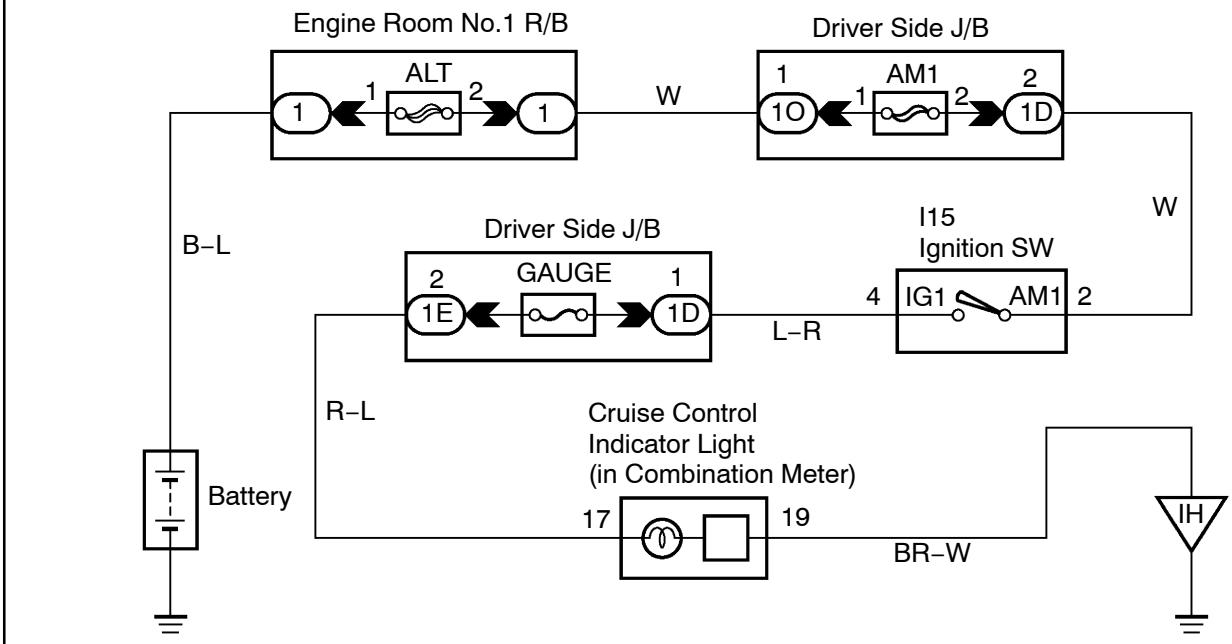
CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM

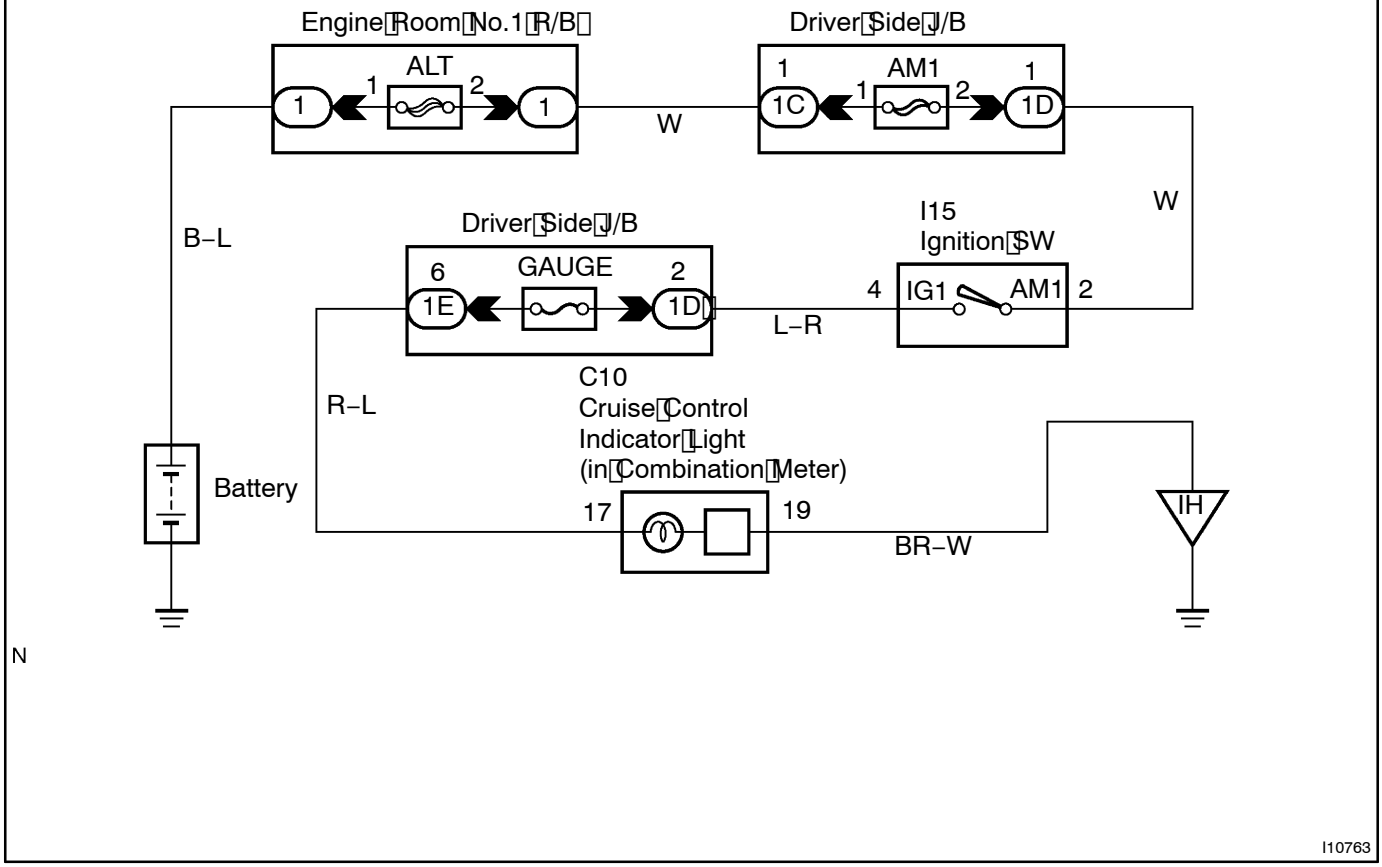
LHD Models



N

I10752

RHD Models



I10763

INSPECTION PROCEDURE

1	Check combination meter (See page BE–2).

NG → Replace combination meter.

OK →

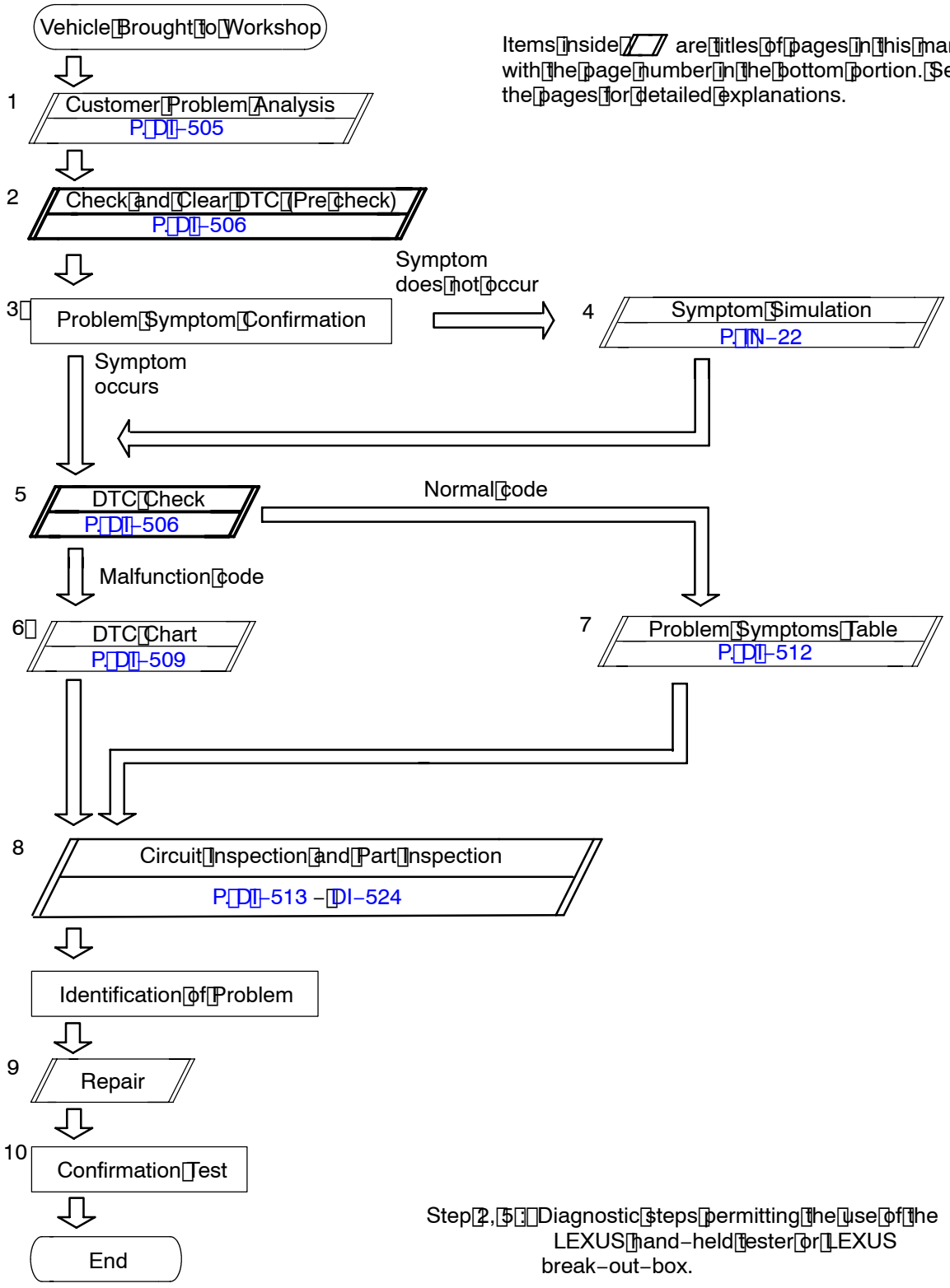
Check and replace Engine and ECT ECU (See page IN–32).

ENGINE IMMOBILISER SYSTEM

DI1AJ–15

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 in the bottom portion. See the pages for detailed explanations.

Step 2, 5: Diagnostic steps permitting the use of the LEXUS hand–held tester or LEXUS break–out–box.

DI1AK–11

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBLISER Check Sheet

Inspector's Name :

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

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

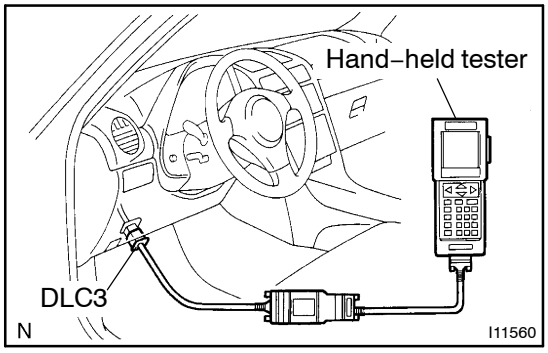
Symptoms	☐ Immobiliser is not set. (Engine starts with key codes other than the registered key code.)
	☐ Engine does not start.

Check Item	**Malfunction Indicator Lamp**	☐ Normal ☐ Remains ON ☐ Does not Light Up

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

DI1AL–16

PRE–CHECK



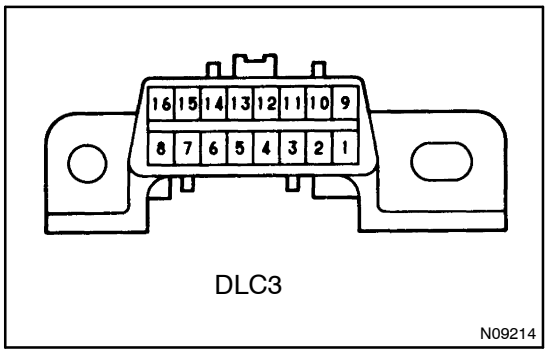
1. DIAGNOSIS SYSTEM

(a) Description

Engine and ECT ECU controls the function of immobiliser on this vehicle.

Data of the immobiliser or DTC can be read form DLC3 of the vehicle. When a trouble occurs on immobiliser, check engine warning light does not light up but DTC inspection is performed.

Therefore when there seems to be a trouble on immobiliser, use LEXUS hand–held tester or SST to check and troubleshoot it.



(b) Check the DLC3.

The vehicle's engine & 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 the 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. INSPECT DIAGNOSIS (Normal Mode)

(a) Check the DTC using hand–held tester.

NOTICE:

Hand–held tester only: When the diagnosis 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.

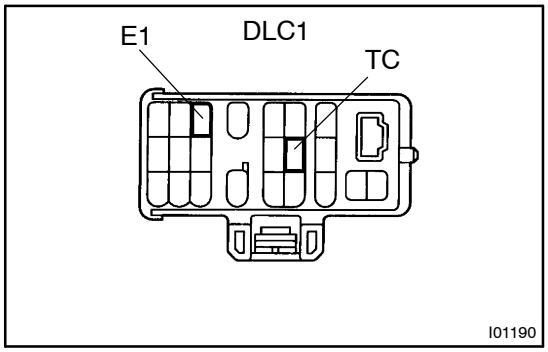
(1) Prepare the hand–held tester.

(2) Connect the hand–held tester to DLC3.

(3) Turn the ignition switch ON and push the hand–held tester main switch ON.

(4) Use the hand–held tester to check the DTCs and freezed frame data, note them down. (For operating instructions, see the hand–held tester instruction book.)

(5) See page DI–17 to confirm the details of the DTCs.



(b) Check the DTC (Using diagnosis check wire)

(1) Turn ignition switch ON.

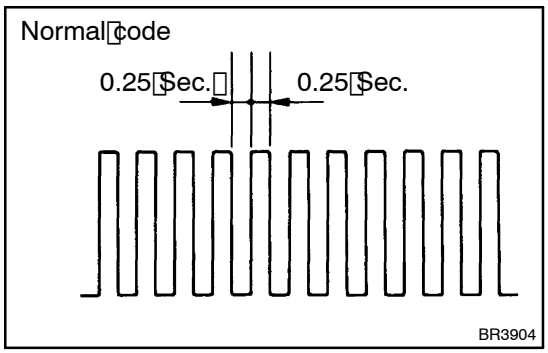
(2) Using SST, connect between terminals 11 (TC) and 3 (E1) of DLC1.

SST 09843–18040

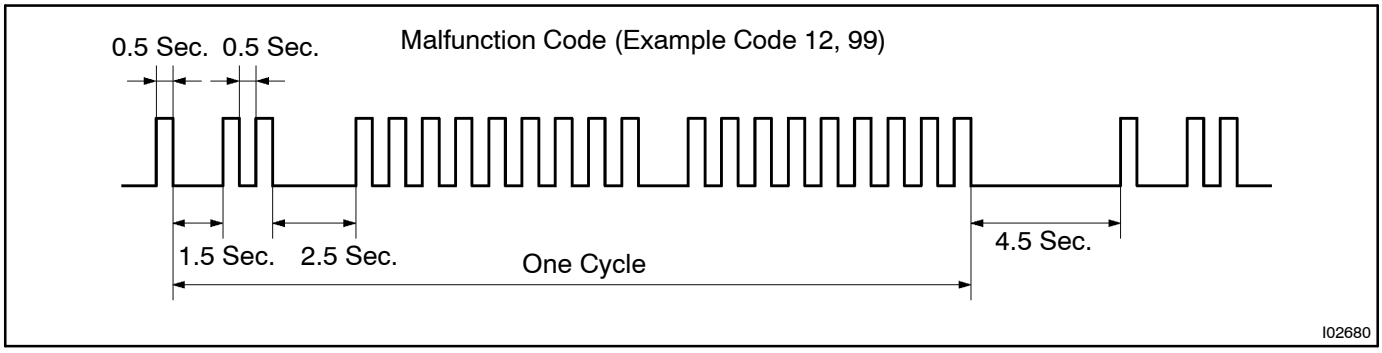
(3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit.
- Engine & ECT ECU controls the immobiliser function on this vehicle, DTC is out put with engine data.



As an example, the blinking patterns for codes; normal, 12 and 99 are shown in the charts.



(4) When DTC ”99” is output, there is a trouble of immobiliser. Start troubleshooting referring to PROBLEM SYMPTOMS TABLE.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.

HINT:

In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the larger.

(c) Clear the DTC.

The following operations will erase the DTCs and freeze frame data.

(1) Operating the OBD ll scam tool (complying with SAEJ1978) or LEXUS hand–held tester to erase the codes. (See the OBD ll scan tool’s instruction book for operating instructions.)

(2) Disconnecting the battery terminals or EFI fuse.

DI626–01

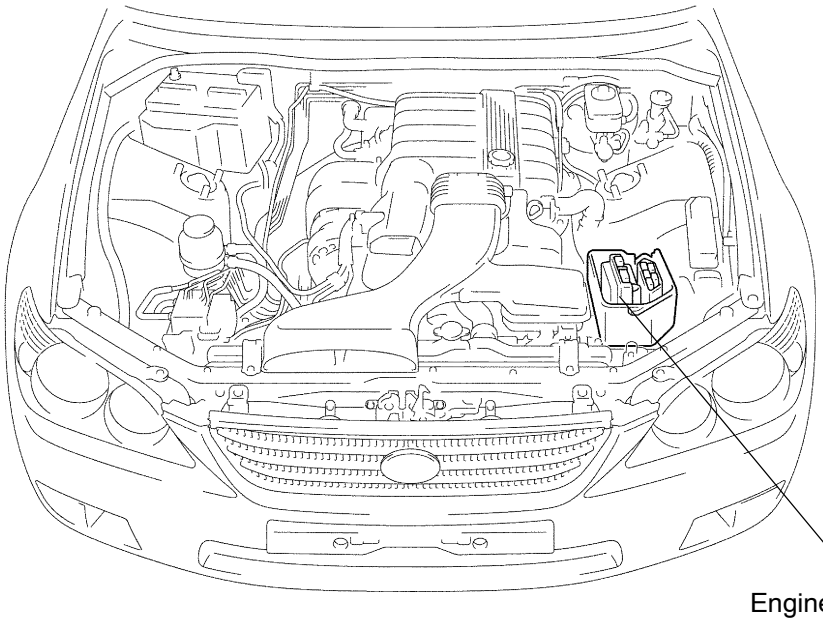
DIAGNOSTIC TROUBLE CODE CHART

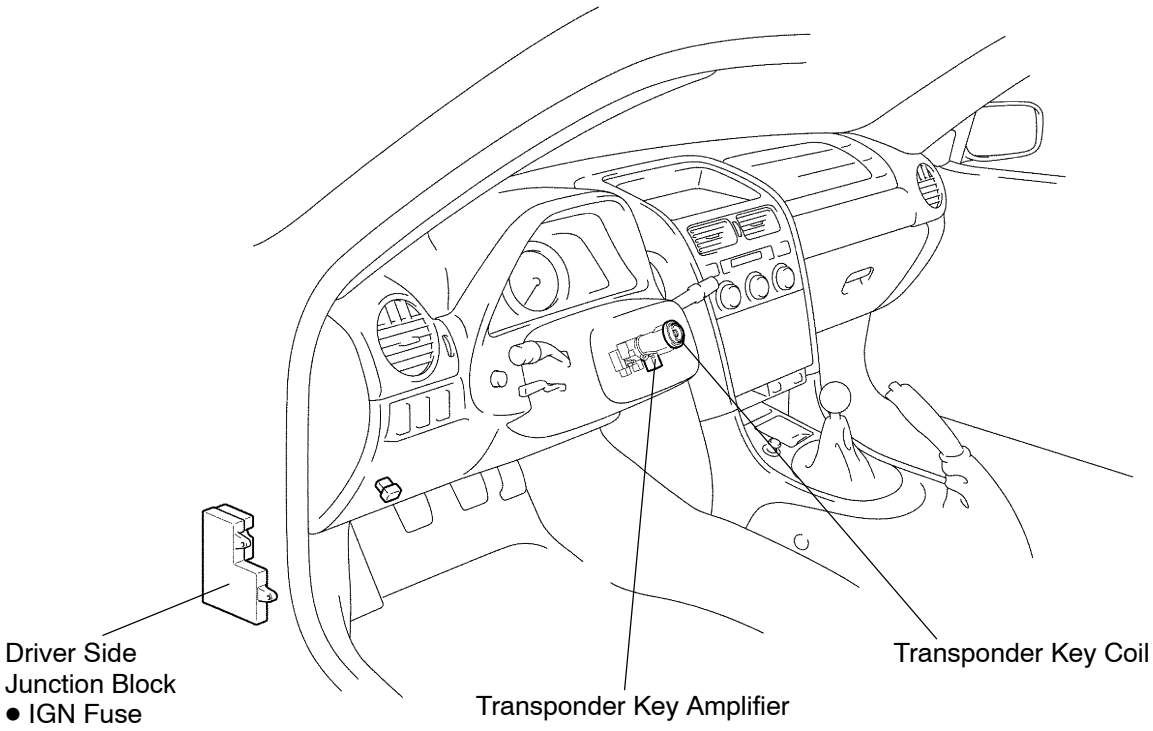
DTC No. (See Page)	Detection Item	Trouble Area
B2795 (DI–513)	Unmatched key code	• Key • Unregistered key inserted before
B2796 (DI–514)	No communication in immobiliser system	• Key • Transponder key coil • Amplifier • Wirehaness • Engine & ECT ECU
B2797 (DI–518)	Communication malfunction No.1	• Communication contents • Unregistered key inserted before
B2798 (DI–524)	Communication malfunction No.2	• Key • Transponder key coil • Amplifier • Wire haness • Engine & ECT ECU

HINT:
To reduce the unnecessary exchange of Engine & ECT ECU, check that a trouble occurs with the original Engine & ECT ECU at the time of excanging Engine & ECT ECU and the trouble will disappear with a new Engine & ECT ECU.

DI627–01

PARTS LOCATION



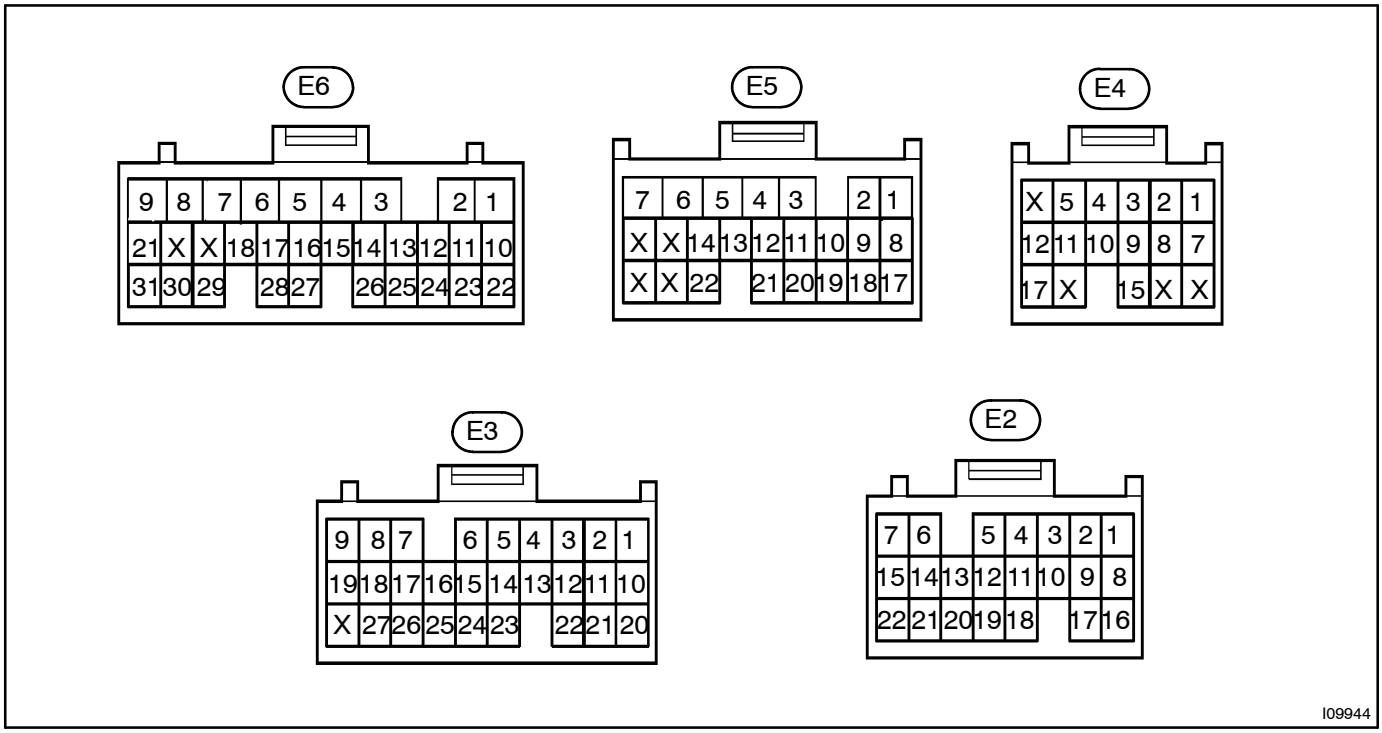


P

I10857

DI3ML–03

TERMINALS OF ECU



I09944

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TXCT – E1 (E3 – 19 ↔ E5 – 17)	P ↔ BR	Ignition Switch ON	10 – 14
CODE – E1 (E3 – 14 ↔ E5 – 17)	G ↔ BR	Ignition Switch ON	10 – 14
RXCK – E1 (E3 – 18 ↔ E5 – 17)	V ↔ BR	Ignition Switch ON	10 – 14

DI1AP–14

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Immobiliser is not set. (Engine starts with key codes other than the registered key code.)	1. Engine and ECT ECU	IN–32
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. Engine and ECT ECU	*1 IN–32 BE–201 IN–32
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. Engine and ECT ECU	*2 IN–32 IN–32
Security indicator is always ON. (Although code has been registered in the automatic registration mode, indicator is not OFF.)	1. Wire harness 2 Transponder key coil 3. Amplifier 4. Engine and ECT ECU	IN–32 BE–201 IN–32
Security indicator is OFF. (When DTC of immobiliser is output)	1. Wire harness 2 Transponder key coil 3. Amplifier 4. Engine and ECT ECU	IN–32 BE–201 IN–32
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. Engine and ECT ECU	IN–32 IN–32
Security indicator is abnormally blinking.	1. Wire harness 2. Engine and ECT ECU	IN–32 IN–32

*1 : Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key.

*2 : Finish the automatic registration mode because the mode might still remain.

DI1AS–15

CIRCUIT INSPECTION

DTC	B2795/99	Unmatched Key Code

This DTC is output when an unregistered key is inserted. When this DTC is output, delete DTC and insert the key that a customer keeps to check that B2795 is output.
When a key that outputs B2795 is found, register this key. when B2795 is not output, there is a possibility that the unregistered key has been inserted before. (Engine and ECT ECU is normal.)
Inquire a customer the condition of using the system to find the cause of the trouble.
(Example: Another key has been inserted, etc..)

DTC No.	DTC Detecting Condition	Trouble Area
B2795/99	No communication	• Key

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

HINT:
When inserting the key that does not start the engine, DTC (B 2795) is stored in memory.

RESULT:

OK	All keys starts the engine.
NG	A specific key does not start the engine.

OK → **No problem.**

HINT:
If the result is ”OK”, please confirm whether or not customers have ever inserted the unregistered key or the immobiliser key (with transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

NG

Register the key that does not start the engine.

DI628–01

DTC	B2796/99	No Communication in Immobiliser system

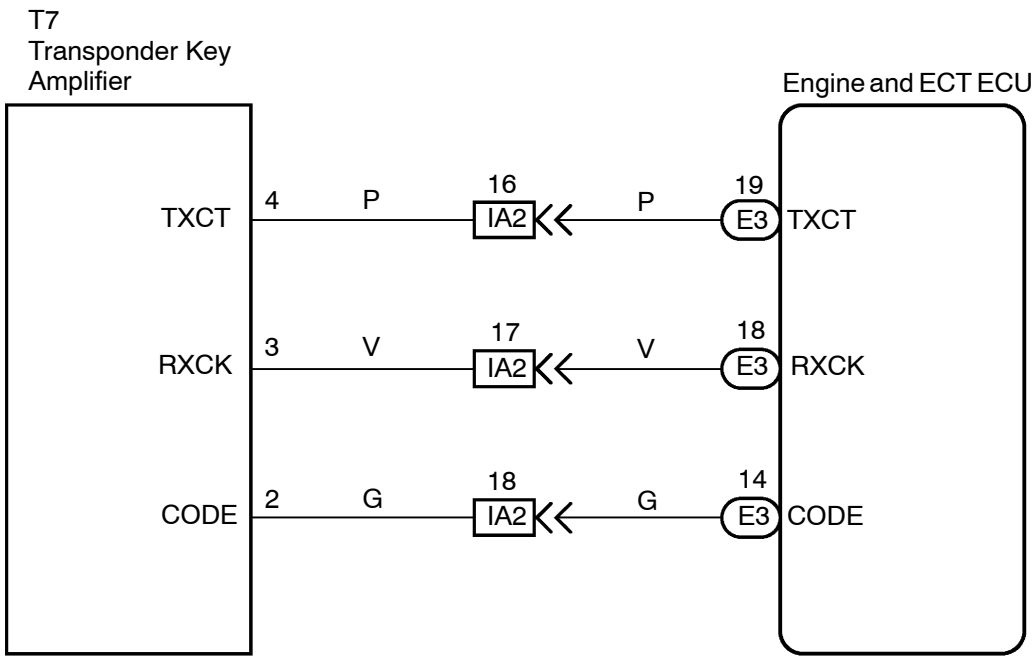
CIRCUIT DESCRIPTION

This code is stored in memory when inserting the key that does not have a transponder chip or if communication between the key and Engine and ECT ECU is impossible.

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	• Key • Transponder Key Coil • Transponder Key Amplifier • Wire harness • Engine and ECT ECU

WIRING DIAGRAM

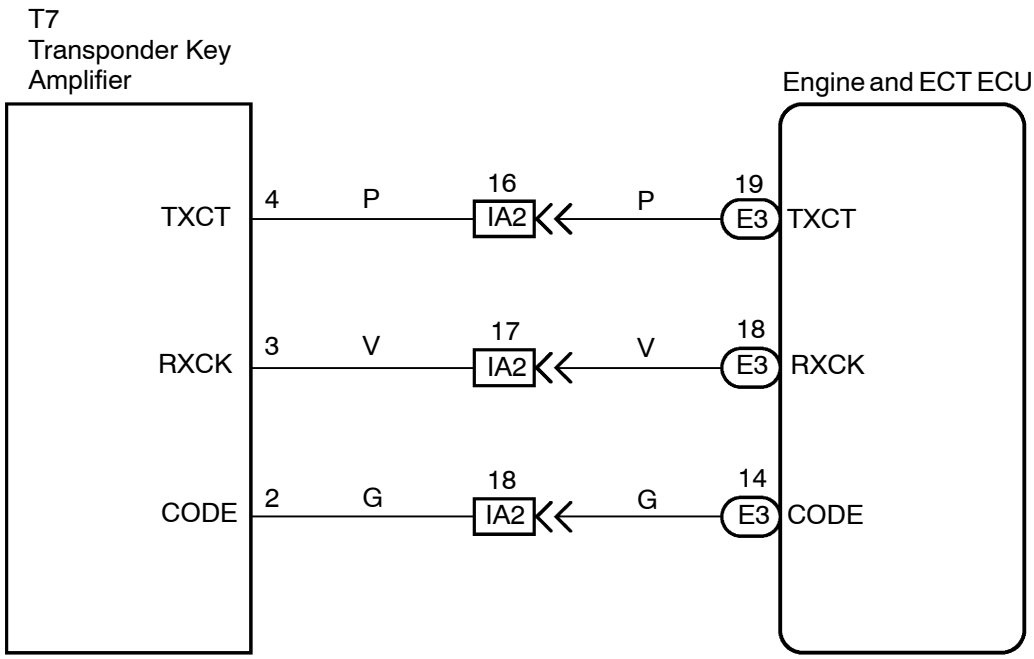
LHD Models



N

I10750

RHD Models



N

I10759

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

RESULT:

A	All keys start the engine.
B	A specific key does not start the engine. In this case, DTC (B2796) is stored in memory.
C	All keys do not start the engine. In this case, DTC (B2796) is stored in memory.

A → **No problem at this time.**

HINT:
If the result is "A", please confirm whether or not customers have ever inserted the key (without transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

B → **The transponder chip of a specific key is defective. Replace the key.**

C

2	**Check transponder key coil (See page BE–201).**

NG → **Replace transponder key coil.**

OK

3	**Check harness and connector between transponder key amplifier and Engine and ECT ECU.**

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

OK

4	**Does it operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace Engine and ECT ECU.

DI629–01

DTC	B2797/99	Communication Malfunction No.1

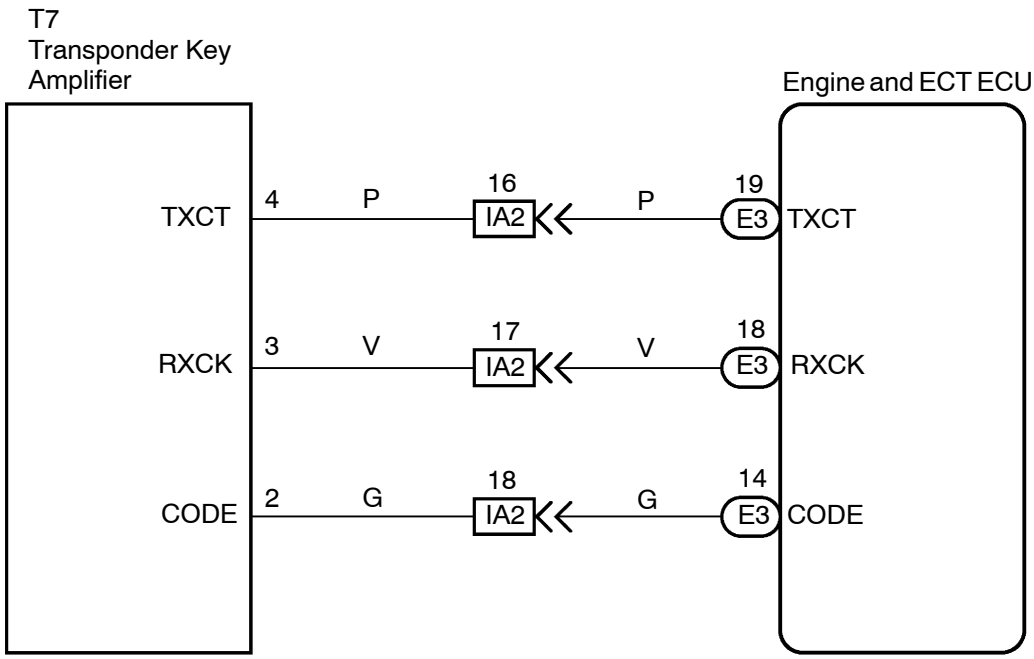
CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs. (Example. Some noise is included in communication line.)

DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	• Wire Harness • Transponder Key Amplifier • Engine and ECT ECU

WIRING DIAGRAM

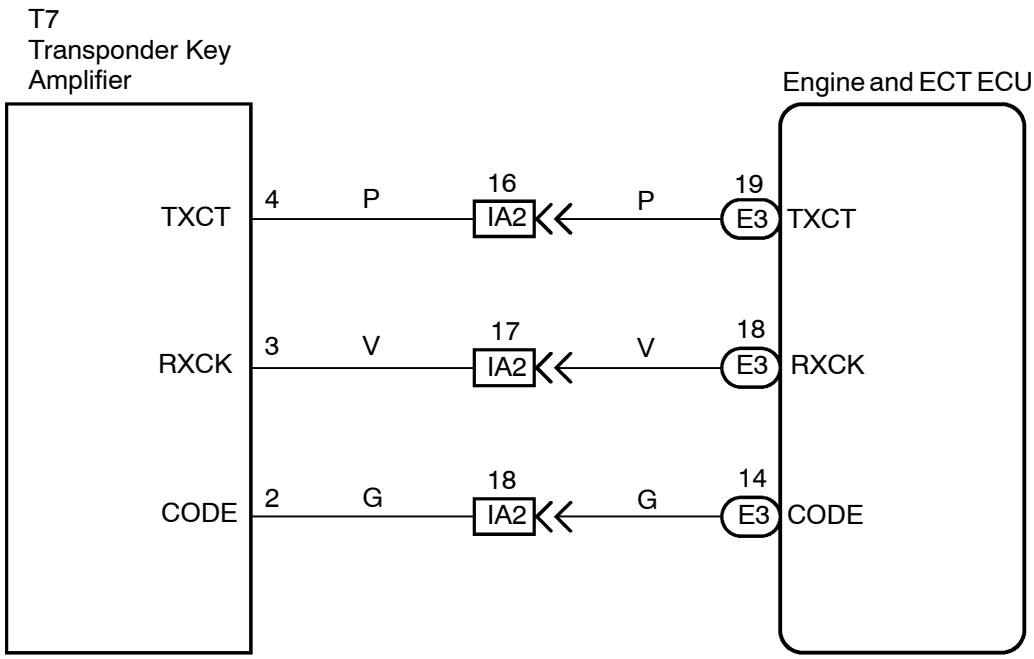
LHD Models



N

I10750

RHD Models

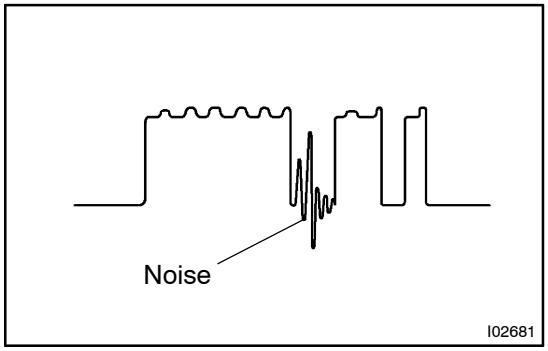


N

I10759

INSPECTION PROCEDURE

1	**Noise check**



PREPARATION:
Insert the already registered master key in the key cylinder.
CHECK:
Using an oscilloscope or TOYOTA hand–held tester, check that noise is included in the signals sent to the CODE terminal of Engine and ECT ECU.
OK:
No noise is detected.

NG → **Try to find the cause of the noise and remove it.**

OK

2	**Does the system operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace Engine and ECT ECU.

DI62A–01

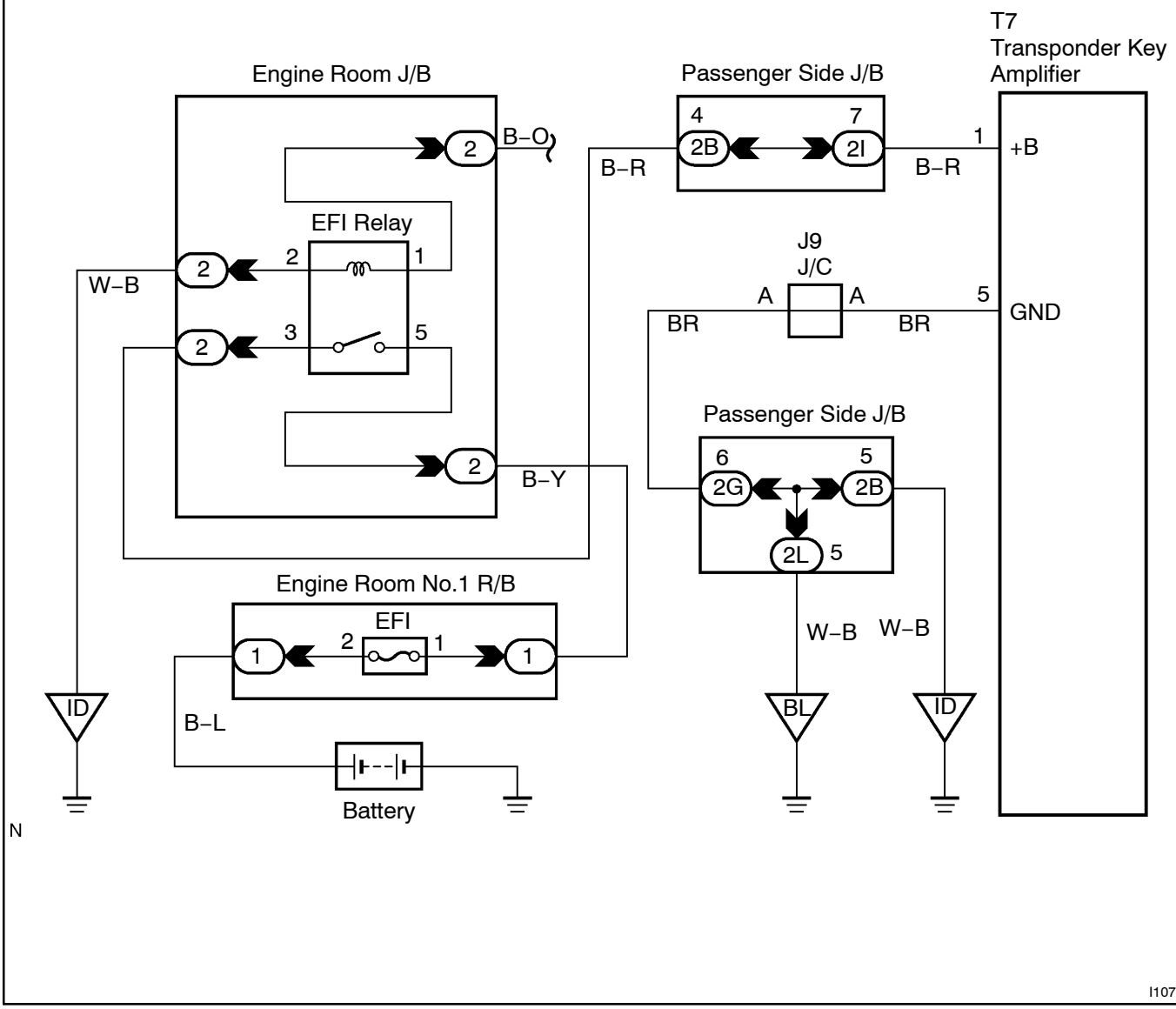
Power source circuit

CIRCUIT DESCRIPTION

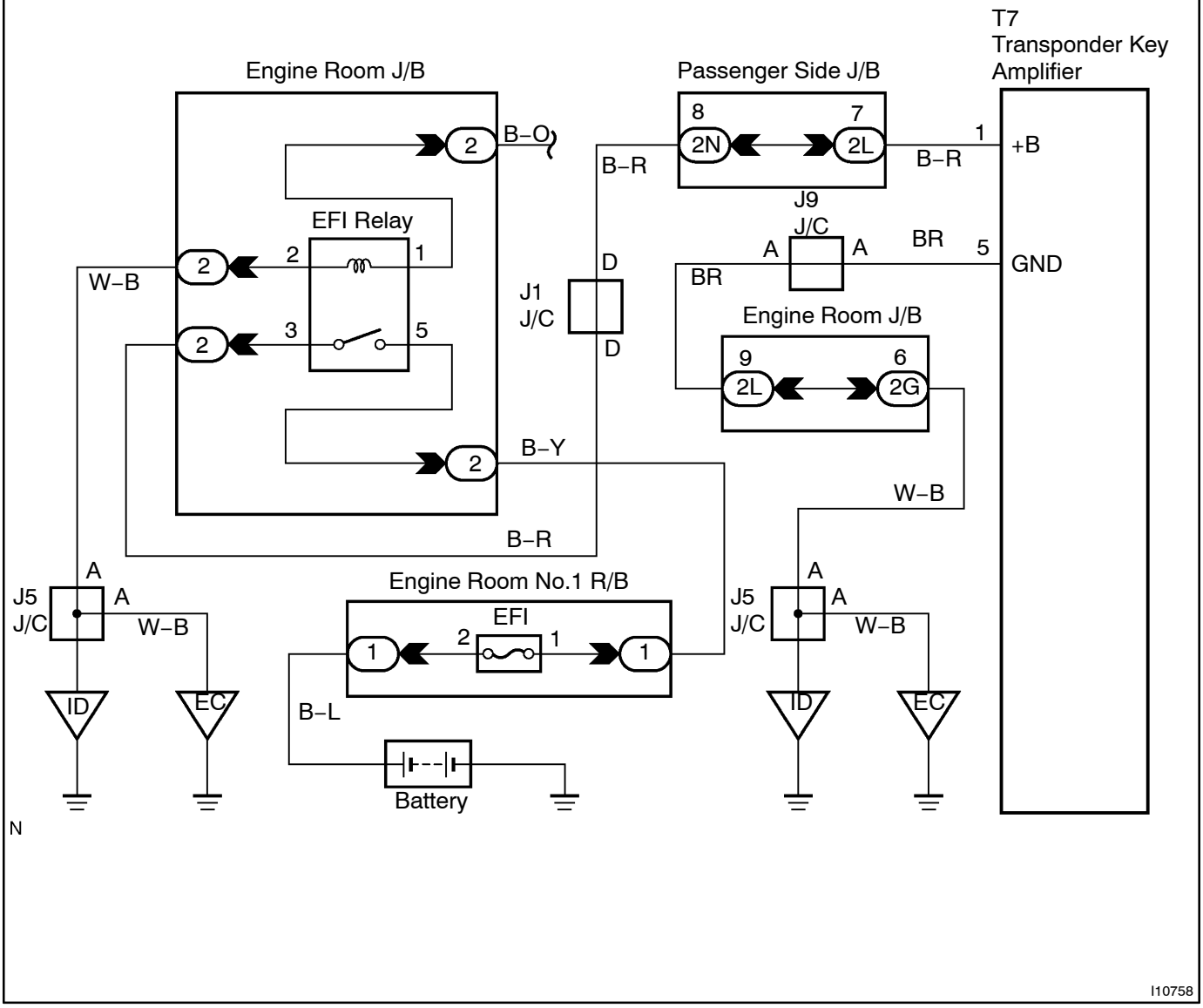
This circuit provides power to operate the Transponder Key ECU

WIRING DIAGRAM

LHD Models



RHD Models


T7
Transponder Key
Amplifier
Engine Room J/B
Passenger Side J/B
8
7
2N
2L
1
+B
B–R
B–O
2
B–R
J9
J/C
A
A
BR
5
GND
BR
EFI Relay
2
1
3
5
W–B
D
J1
J/C
D
Engine Room J/B
9
6
2L
2G
B–Y
W–B
B–R
A
J5
J/C
A
W–B
Engine Room No.1 R/B
EFI
2
1
1
1
B–L
ID
EC
Battery
N
I10758

INSPECTION PROCEDURE

1	**Check EFI fuse.**

CHECK:
Check continuity of EFI fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals EFI and GND of Transponder Key ECU connector.**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Transponder Key ECU connector.
CHECK:
Measure voltage between terminals +B and GND.
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–512).**

NG

3	**Check wireharness and connector between Transponder Key ECU and body ground.**

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

OK

Check and repair wirehareness and connector between Transponder Key ECU and Battery.

DI62B–01

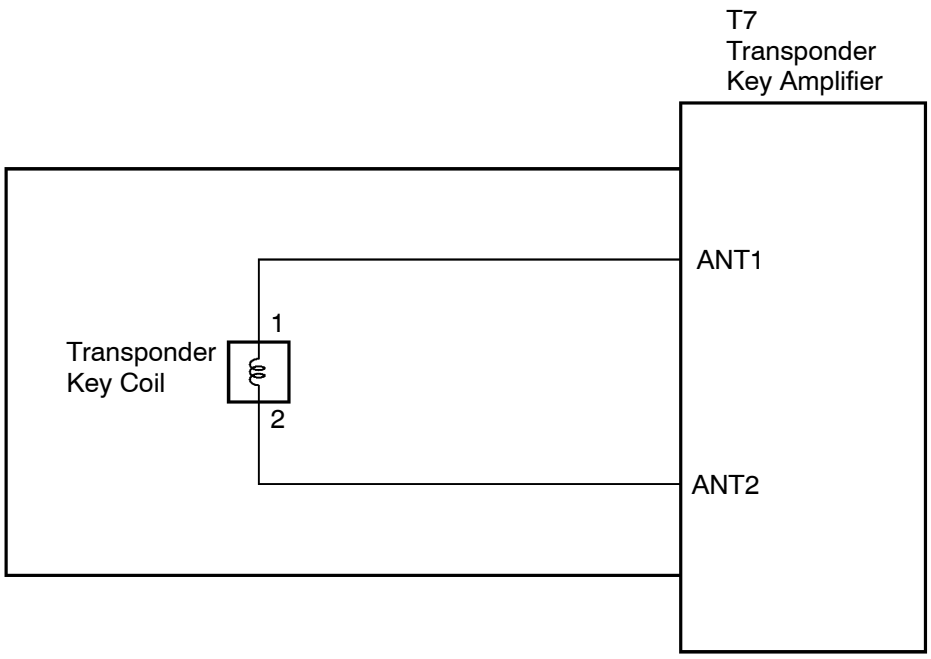
Transponder key coil circuit

CIRCUIT DESCRIPTION

DTC No. (See Page)	Detection Item	Trouble Area
B2798/99	Communication error	• Key • Transponder Key Coil • Transponder Key Amplifier • Wire harness • Engine & ECT ECU

WIRING DIAGRAM

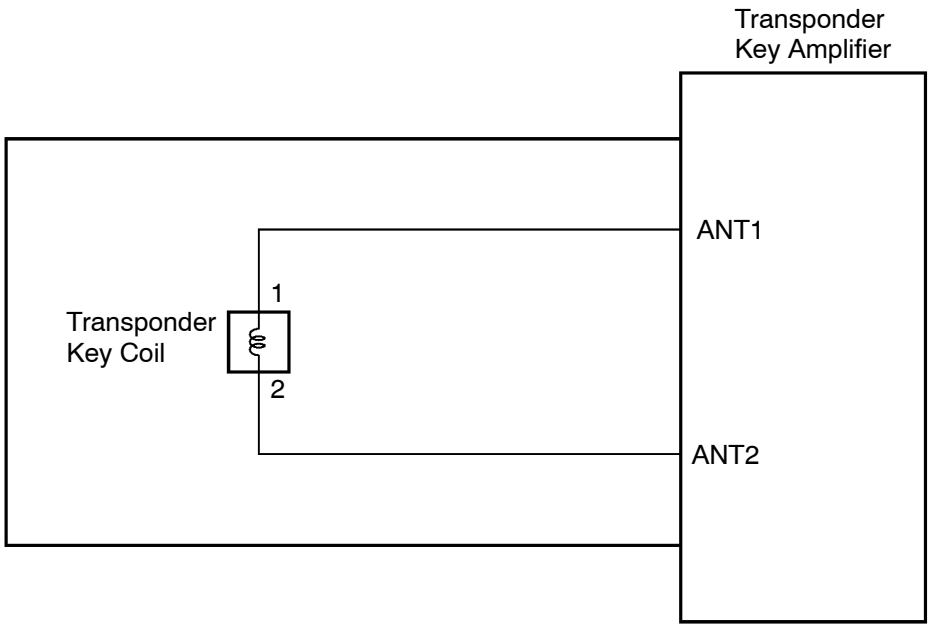
LHD Models



N

I10749

RHD Models



N

I10749

INSPECTION PROCEDURE

1	Check transponder key coil (See page BE–201).

NG → Replace transponder key coil

OK

2	Check harness and connector between transponder key amplifier and Engine & ECT ECU.

NG → Repair of replace harness and connector

OK

3	Does the system operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

Replace Engine & ECT ECU

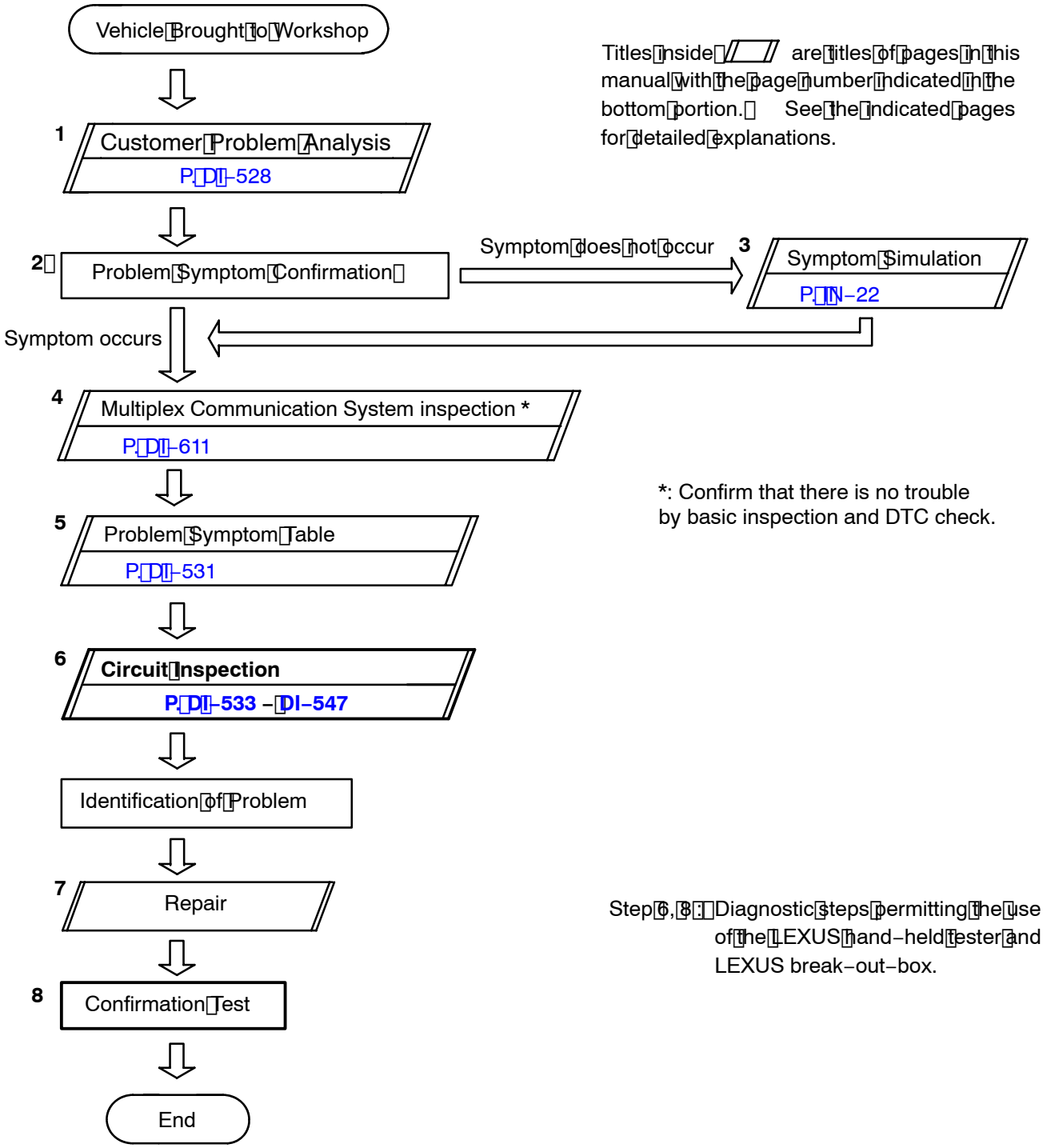
COMBINATION METER SYSTEM

DI60O–01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



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

*: Confirm that there is no trouble by basic inspection and DTC check.

Step 6, 8: Diagnostic steps permitting the use of the LEXUS hand–held tester and LEXUS break–out–box.

DI60P–01

CUSTOMER PROBLEM ANALYSIS CHECK

COMBINATION METER SYSTEM Check Sheet

Inspector's name: _____

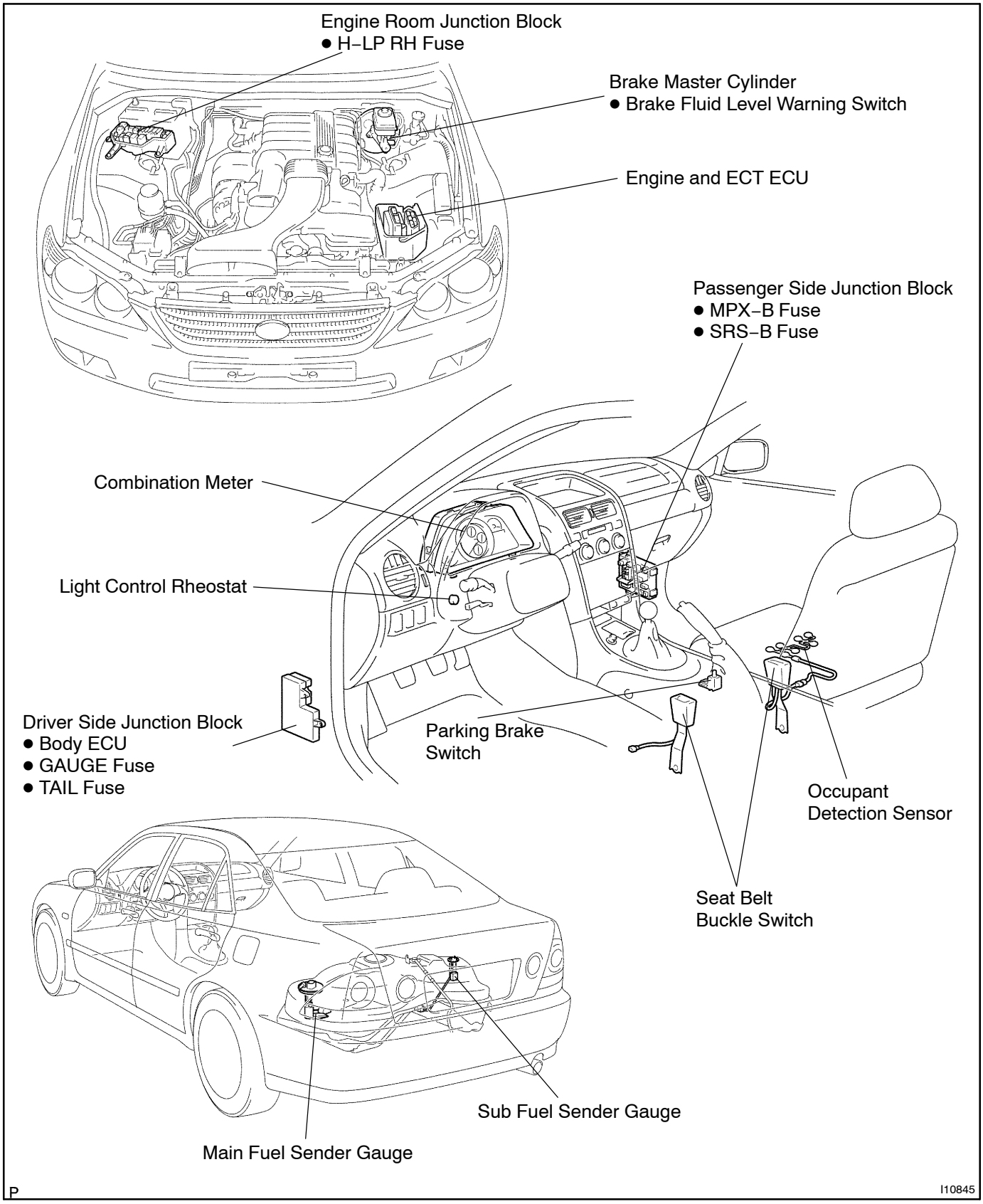
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought In	/ /	**Odometer Reading**	**km Mile**

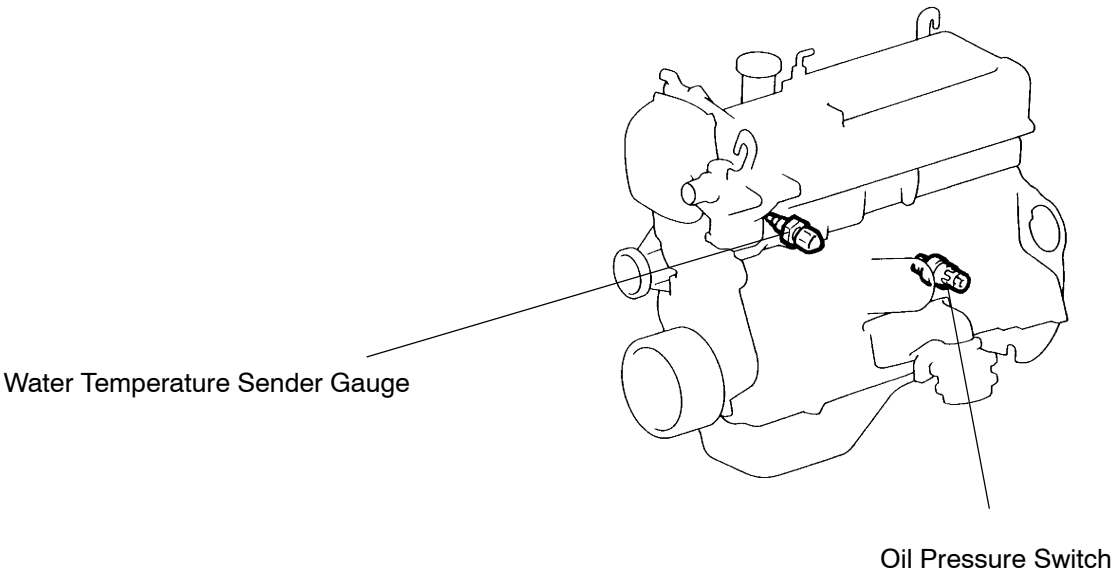
Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom	**Gauge**	☐ Speedometer does not operate or operates abnormally.
		☐ Tachometer does not operate or operates abnormally.
		☐ Fuel Gauge does not operate or operates abnormally.
		☐ Water Temperature Gauge does not operate or operates abnormally.
		☐ Voltmeter does not operate operates abnormally.
		☐ Specific Fuel Consumption Gauge does not operate or operates abnormally.
	Indicator Light and Warning Light	☐ Shift indicator light does not light up.
		☐ Open door warning light does not light up.
		☐ Driver seat belt warning does not light up.
		☐ Low oil pressure warning light does not light up.
		☐ Discharge warning does not light up.
		☐ Brake warning light does not light up.
		☐ CRUISE MAIN indicator light does not light up.
		☐ SNOW indicator light does not light up.
		☐ ECT PWR indicator light does not light up.
		☐ Engine Oil Level Warning light does not light up.
		☐ Others.

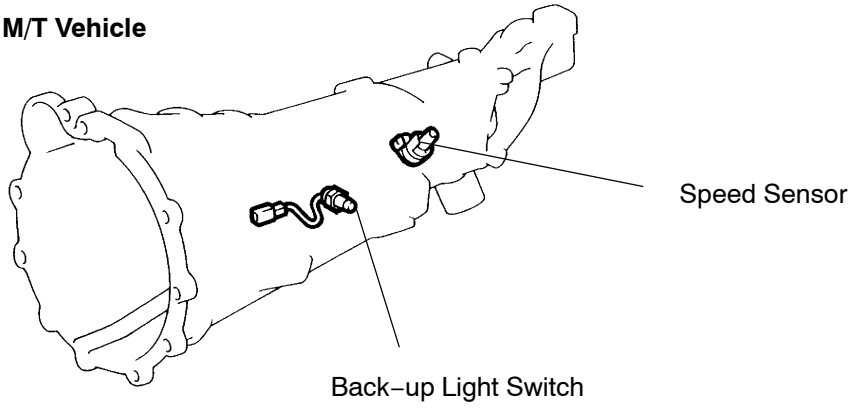
DI60Q–01

PARTS LOCATION

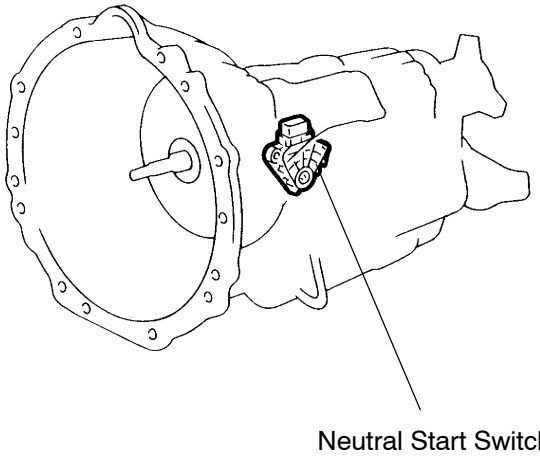




M/T Vehicle



A/T Vehicle



N

I11340

DI60R–01

PROBLEM SYMPTOMS TABLE

GAUGE:

Symptom	Suspect Area	See page
Speedometer does not operate or operates abnormally.	1. Speedometer 2. Speed Sensor Circuit	DI–533 DI–541
Tachometer does not operate or operates abnormally.	1. Tachometer 2. Igniter Signal Circuit	DI–534 DI–543
Fuel Gauge does not operate or operates abnormally.	1. Fuel Receiver Gauge 2. Fuel Sender Gauge 3. Wire Harness 4. Combination Meter 5. Body ECU	DI–535 BE–83 – BE–77 DI–549
Water Temperature Gauge does not operate.	1. Water Temperature Receiver Gauge 2. Water Temperature Sender Gauge 3. WIre Harness 4. Combination Meter 5. Engine and ECT ECU	DI–537 BE–83 – BE–77 DI–1

INDICATOR LIGHT AND WARNING LIGHT:

Symptom	Suspect Area	See page
Shift indicator light does not light up.	1. Bulb circuit 2. A/T shift indicator light switch 3. Transmission control switch 4. Engine and ECT ECU	DI–545 DI–217 DI–1
Open door warning light does not light up.	1. Bulb circuit 2. Door courtesy switch 3. Body ECU	DI–545 BE–57 DI–549
Driver seat belt warning light does not light up.	1. Bulb Circuit 2. Driver Buckle Switch CIrcuit 3. Meter Circuit Plate 4. Wire Harness 5. Body ECU	DI–545 BE–83 BE–77 – DI–549
Low oil pressure warning light does not light up.	1. Bulb Circuit 2. Low oil pressure warning switch 3. Engine and ECT ECU	DI–545 BE–83 DI–1
Discharge warning light does not light up.	1. Bulb circuit 2. Alternator 3. Engine and ECT ECU	DI–545 CH–9 DI–1
Brake warning light does not light up.	1. Bulb circuit 2. Parking brake switch 3. Brake fluid level warning switch 4. Combination meter 5. A/C ECU	DI–545 BE–83 BE–83 BE–77 DI–667
CRUISE MAIN indicator light does not light up.	1. Bulb circuit 2. Cruise control switch 3. Combination meter 4. A/C ECU 5. Engine and ECT ECU	DI–545 DI–498 BE–77 DI–667 DI–1
ECT SNOW indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter 4. A/C ECU 5. Engine and ECT ECU	DI–545 DI–212 BE–77 DI–667 DI–1

ECT PWR indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter 4. Engine and ECT ECU	DI–545 DI–212 BE–77 DI–1
Engine oil level warning light does not light up.	1. Bulb circuit 2. Engine oil level warning sensor 3. Combination meter	DI–545 BE–83 BE–77
Any of indicator lights does not light up.	1. Bulb circuit 2. Combination meter ECU power source circuit 3. Combination meter	DI–545 DI–547 BE–77

DI60S–01

CIRCUIT INSPECTION

Speedometer

INSPECTION PROCEDURE

HINT:

If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:

Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:

The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check speedometer (See page BE–83).**

NG → **Replace speedometer.**

OK

3	**Check circuit plate (See page BE–83).**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60T–01

Tachometer

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check tachometer (See page BE–83).**

NG → **Replace tachometer.**

OK

3	**Check circuit plate (See page BE–83).**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60U–01

Fuel gauge

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table. (See page DI–531).**

NG

2	**Check fuel receiver gauge (See page BE–83).**

NG → **Replace fuel receiver gauge.**

OK

3	**Check fuel sender gauge (See page BE–83).**

NG → **Replace fuel sender gauge.**

OK

4	Check circuit plate (See page BE–83).

NG → Replace circuit plate.

OK →

Check and replace combination meter (See page BE–77).

DI60V–01

Water Temperature Gauge

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table. (See page DI–531).**

NG

2	**Check water temperature receiver gauge (See page BE–83).**

NG → **Replace speedometer assembly.**

OK

3	**Check water temperature sender gauge (See page BE–83).**

NG → **Replace water temperature sender gauge.**

OK

4	Check circuit plate (See page BE–83).

NG → Replace circuit plate.

OK →

Check and replace combination meter (See page BE–77).

Voltmeter

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check voltmeter (See page BE–83).**

NG → **Replace speedometer assembly.**

OK

3	**Check circuit plate (See page BE–83).**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60X–01

Specific Fuel Consumption Gauge

INSPECTION PROCEDURE

HINT:

If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:

Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:

The probe operates normally.

OK ⇒ **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check specific fuel consumption gauge (See page BE–83).**

NG ⇒ **Replace speedometer assembly.**

OK

3	**Check circuit plate (See page BE–83).**

NG ⇒ **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60Y–01

Speed Sensor Circuit

INSPECTION PROCEDURE

When using LEXUS hand–held tester:

1	**Check speedometer value.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the DATALIST mode on the LEXUS hand–held tester.

CHECK:

When driving the vehicle, check that patameter value of "Speedometer" changes on the screen of the LEXUS hand held tester.

NOTICE:

- **Be sure to safely route all cables when driving with the tester connected to the vehicle (i.e., keep cables away from feet, pedals, steering wheel and shift lever).**
- **2 persons are required when test driving with the tester: 1 person to drive the vehicle, and 1 person to operate the tester.**

OK:

The speed displayed on the screen of the tester changes as the vehicle speed chages.

OK → **Replace combination meter.**

NG

2	**Check harness and connector between combination meter and ABS ECU (See page IN–32).**

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

OK

Check speed sensor circuit and ABS ECU (See page DI–221).

When not using LEXUS hand-held tester:

1	Check ENGINE TROUBLESHOOTING on page DTC P0500.

OK → Replace combination meter.

NG

2	Check harness and connector between combination meter and ABS ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check speed sensor circuit and ABS ECU (See page DI–221).

DI60Z–01

Igniter Signal Circuit

INSPECTION PROCEDURE

When using LEXUS hand–held tester:

1	Check tachometer value.

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the DATALIST mode on the LEXUS hand–held tester.

CHECK:

When running the engine, check that parameter value of "Tachometer" changes on the screen of the LEXUS hand held tester.

OK:

The revolutions displayed on the screen of the tester changes as the engine rotates.

OK → Replace combination meter.

NG

2	Check harness and connector between combination meter and Engine and ECT ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check igniter circuit (See page DI–53).

When not using LEXUS hand–held tester:

1	Check ENGINE TROUBLESHOOTING on page DTC P1300.

OK → Replace combination meter.

NG

2	Check harness and connector between combination meter and Engine and ECT ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check igniter circuit (See page DI–53).

Bulb Circuit

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

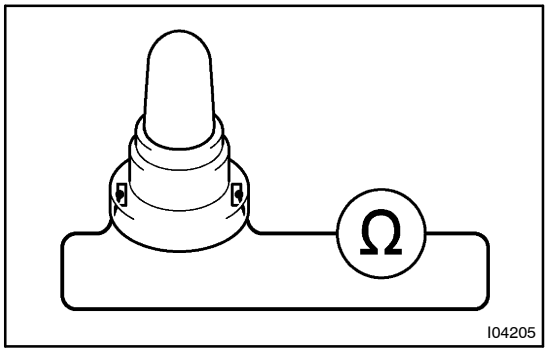
CHECK:
Check that light turns ON or OFF as the LEXUS hand–held tester directs.
HINT:
All lights flush except shift indicator.

OK:
The light operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check bulb.**



CHECK:
Apply the tester as shown to test for continuity.

OK:
Continuity

NG → **Replace bulb.**

OK

3	Check circuit plate (See page BE–83).

NG → Replace circuit plate.

OK

Check and replace combination meter (See page BE–77).

DI610-01

Combination Meter ECU Power Source Circuit

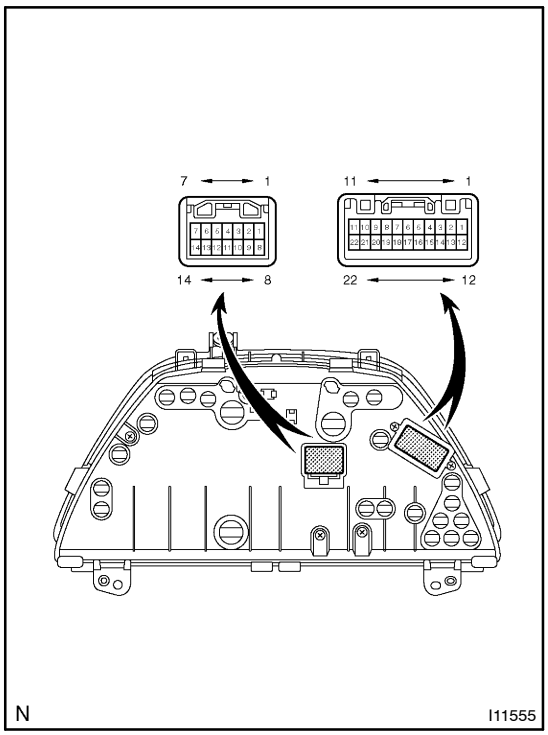
INSPECTION PROCEDURE

1	Check fuses (GAUGE, MPX–B and DOME fuse).

NG → Replace fuse.

OK

2	Check voltage between terminals A15 and A19 of combination meter connector.



PREPARATION:

(a) Remove combination meter.

(b) Disconnect the combination meter connector.

CHECK:

Measure voltage between terminals A15 and A19 of combination meter connector.

OK:

Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).

NG

3	Check for open in harness and connector between terminal GND of combination meter and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connetor between combination meter and battery.

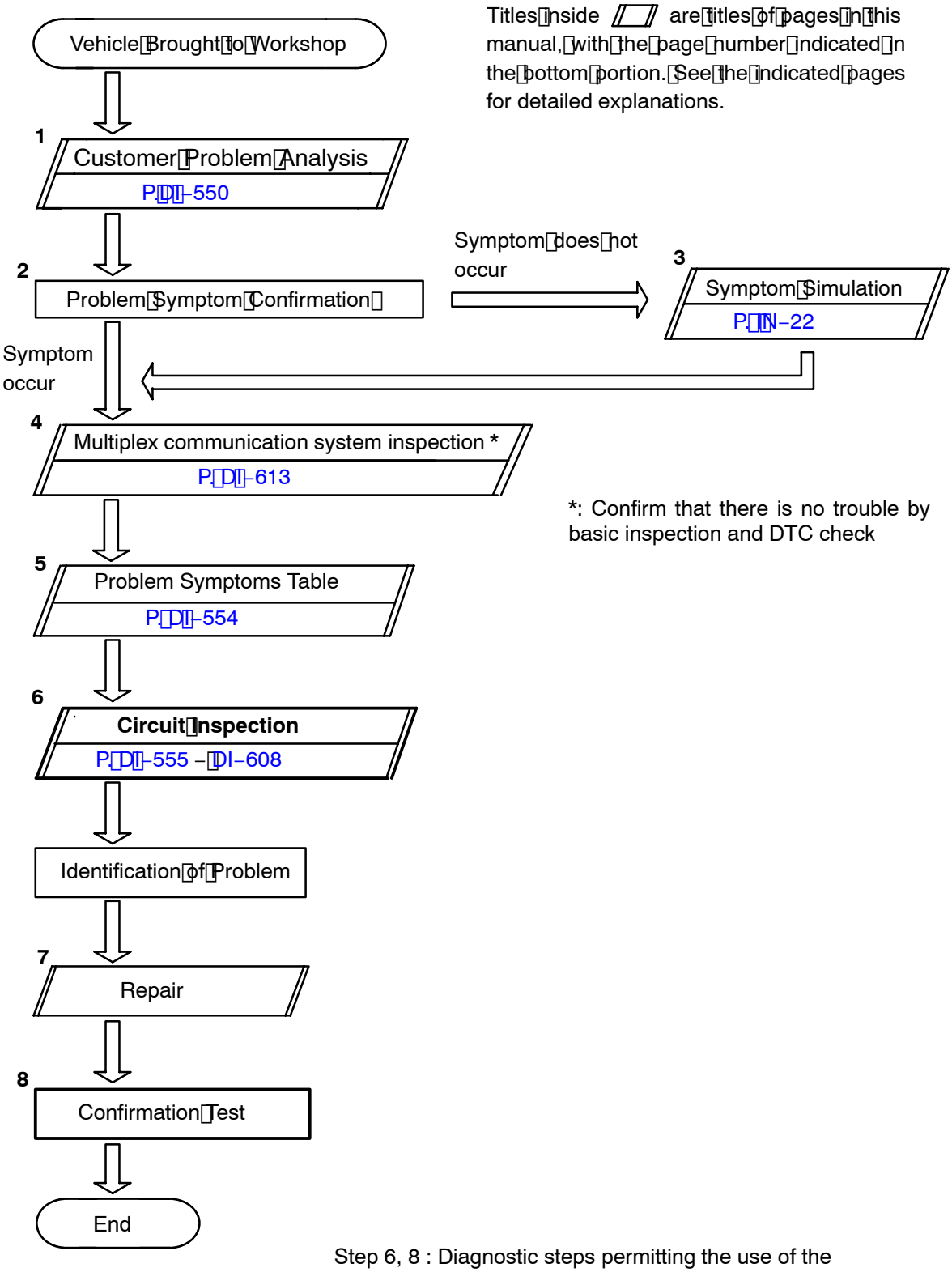
BODY CONTROL SYSTEM

DI62C–01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the trouble shooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester .

DI62D–01

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

Inspector's name: _____

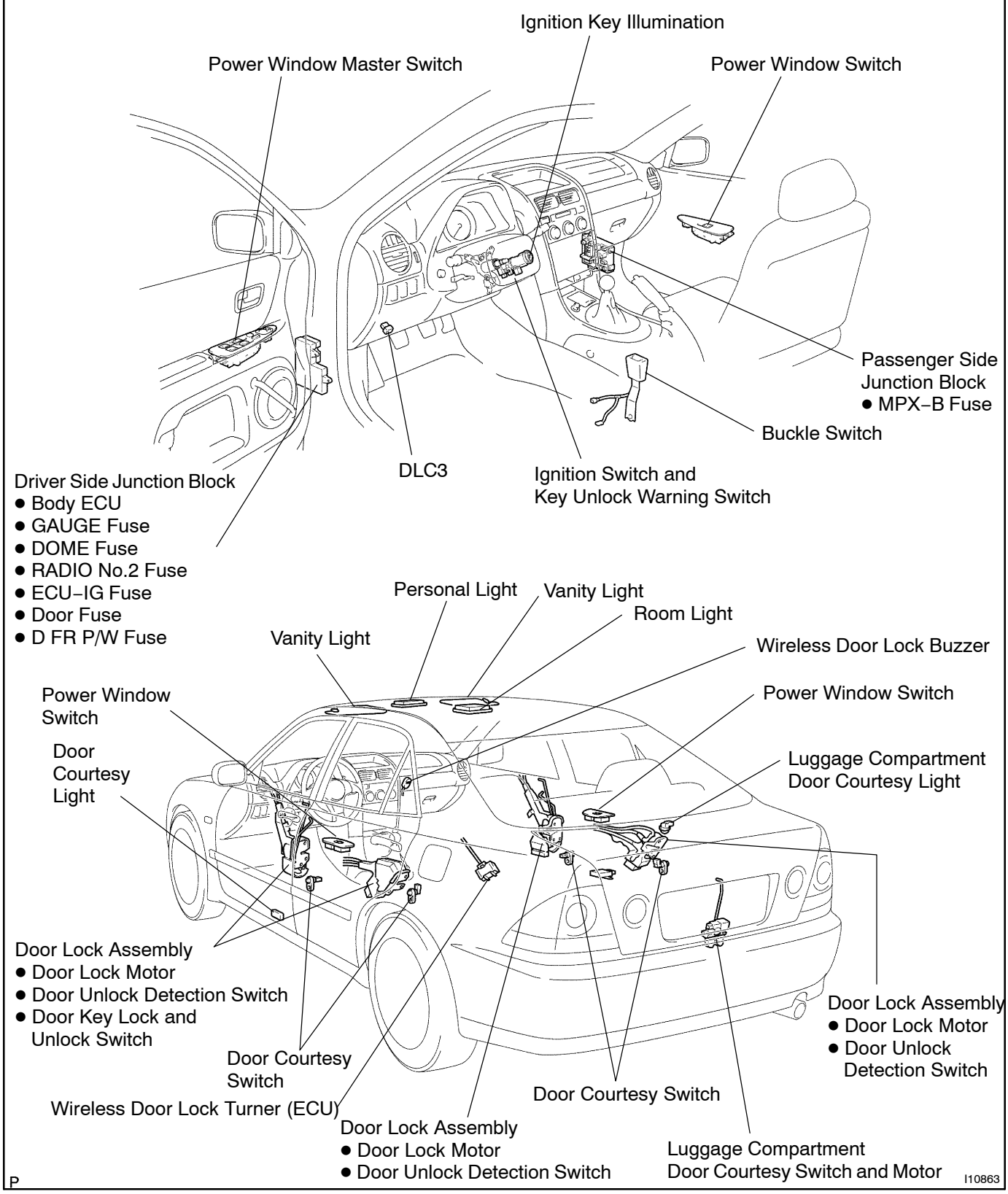
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Malfunction System	☐ Key Reminder System
	☐ Light Control System
	☐ Illuminated Entry System
	☐ Seat Belt Warning
	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Wireless Door Lock Control System
	☐ Others

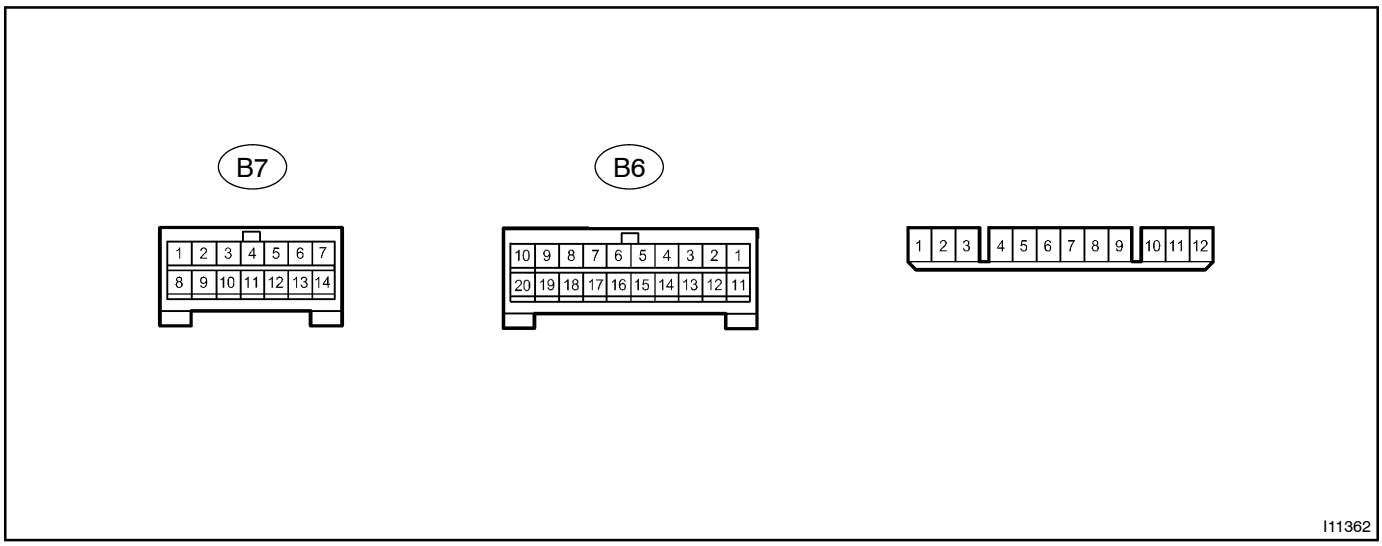
DI62E–01

PARTS LOCATION



DI62F–01

TERMINALS OF ECU



Symbols (Terminal No.)	Wring Color	Condition	STD Voltage (V)
BSUB – GND (1 – 12)	–	Constant	10 – 14 V
BECU – GND (2 – 12)	–	Constant	10 – 14 V
IG – GND (3 – 12)	–	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
ACC – GND (4 – 12)	–	Ignition switch position is LOCK.	Below 1 V
		Ignition switch position is ACC.	10 – 14 V
DEF – GND (5 – 12)	–	Defogger switch position is ON.	Below 1 V
MPX3 (6)	–	Multiplex communication circuit.	–
MPX1 – MPX2 (7 – B6–5)	L	Multiplex communication circuit.	–
ILE – GND (8 – 12)	–	Each interior light switch ON.	Below 1 V
ACT+ – ACT– (9 – 10)	–	Door lock operating.	10 – 14 V
DCTY – GND (11 – 12)	–	Driver door opened.	Below 1 V
		Driver door closed.	10 – 14 V
GND1 – Body ground (12 – Body ground)	–	Constant	Below 1 V
RLD – GND2 (B6–1 – B6–19)	G–B – BR	Rear Left side power window DOWN operation.	Below 1 V
TAIL – GND2 (B6–2 – B6–19)	G – BR	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
KSW – GND2 (B6–6 – B6–19)	B–Y – BR	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
DCLP – GND2 (B6–7 – B6–19)	R–W – BR	Each interior light switch ON.	Below 1 V
PCTY – GND2 (B6–8 – B6–19)	R–B – BR	Passenger door opened.	Below 1 V
		Passenger door closed.	10 – 14 V

PCLP – GND2 (B6–9 – B6–19)	R–G – BR	Each interior light switch ON.	Below 1 V
HAZ – GND2 (B6–10 – B6–19)	G–W – BR	Hazard warning switch position is ON.	Below 1 V
RLU – GND2 (B6–11 – B6–19)	R – BR	Rear Left side power window UP operation.	Below 1 V
OBD2 – GND2 (B6–14 – B6–19)	W – BR	OBD2 communication circuit.	–
PU – GND2 (B6–17 – B6–19)	Y–B – BR	Front Left side power window UP operation.	Below 1 V
PD – GND2 (B6–18 – B6–19)	L–W – BR	Front Left side power window DOWN operation.	Below 1 V
GND2 – Body ground (B6–19 – Body ground)	BR – Body ground	Constant	Below 1 V
PRG – RDA (B7–1 – B7–2)	LG – R–L	Wireless door lock receiver communication circuit.	–
DBKL – GND2 (B7–3 – B6–19)	P–G – BR	With seat belt ON.	Below 1 V
		No seat belt ON.	10 – 14 V
LSWP – GND2 (B7–4 – B6–19)	L–R – BR	Except driver's door is unlocked.	Below 1 V
		Except driver's door is locked.	10 – 14 V
RCTY – GND2 (B7–5 – B6–19)	R–L – BR	Rear door opened.	Below 1 V
		Rear door closed.	10 – 14 V
DCTY – GND2 (B7–6 – B6–19)	R–G – BR	Driver door opened.	Below 1 V
		Driver door closed.	10 – 14 V
LCTY – GND2 (B7–7 – B6–19)	R–L – BR	Luggage compartment door opened.	Below 1 V
		Luggage compartment door closed.	10 – 14 V
TR+ – GND2 (B7–8 – B6–19)	L–W – BR	Luggage compartment door opener switch is operated.	Below 1 V
		Luggage compartment door opener switch is not operated.	10 – 14 V
RRU – GND2 (B7–11 – B6–19)	R–W – BR	Rear Right side power window UP operation.	Below 1 V
RRD – GND2 (B7–12 – B6–19)	G – BR	Rear Right side power window DOWN operation.	Below 1 V
FE – GND2 (B7–13 – B6–19)	BR–W – BR	Constant	Below 1 V
FR – GND2 (B7–14 – B6–19)	Y–R – BR	Ignition switch position ON and fuel sender gauge position float UP.	Approx. o.5 V
		Ignition switch position ON and fuel sender gauge position float DOWN.	Approx. o.5 V

DI62G–01

PROBLEM SYMPTOMS TABLE

LIGHT CONTROL:

Symptom	Suspect Area	See page
Auto turn–off does not operate	1. Door courtesy switch circuit (Driver side) 2. Ignition switch 3. Body ECU 4. Theft deterrent ECU	DI–583 DI–558 – –

DOOR LOCK CONTROL:

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control S/W.	1. Door lock control switch circuit 2. Body ECU 3. Power window master switch	DI–598 – –
Door key linked function does not operate.	1. Door key lock and unlock switch circuit 2. Body ECU 3. Power window master switch	DI–598 – –
Key confinement prevention function does not operate.	1. Key unlock switch circuit 2. Body ECU 3. Power window master switch	DI–575 – –

WIRELESS DOOR LOCK CONTROL:

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate.	1. Transmitter 2. Key unlock warning switch circuit 3. Wireless door lock ECU 4. Body ECU	BE–132 DI–575 BE–132 –
Lock (or unlock) function does not operate.	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Body ECU	DI–598 DI–595 –
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system .	1. Door courtesy switch circuit 2. Body ECU	DI–583 –

OTHERS:

Symptom	Suspect Area	See page
Does not operate the illuminated entry	1. Illumination circuit 2. Body ECU	DI–564 –
Key remainder system does not operate.	1. Key unlock warning switch circuit 2. Body ECU	DI–575 –
Seat belt warning does not operate.	1. Driver buckle switch circuit 2. Body ECU 3. Combination meter	DI–578 – BE–2

DI62H–01

CIRCUIT INSPECTION

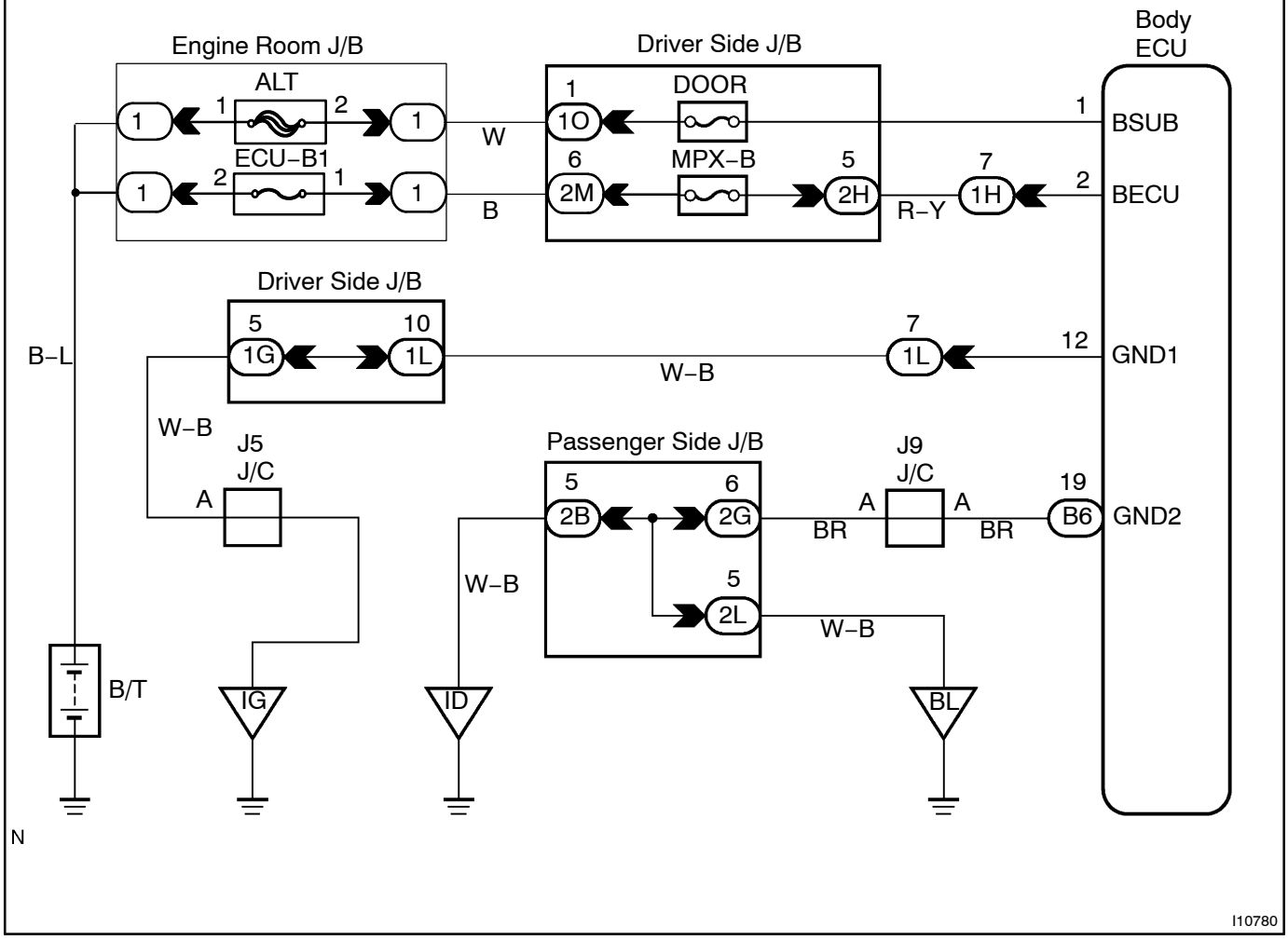
Power source circuit

CIRCUIT DESCRIPTION

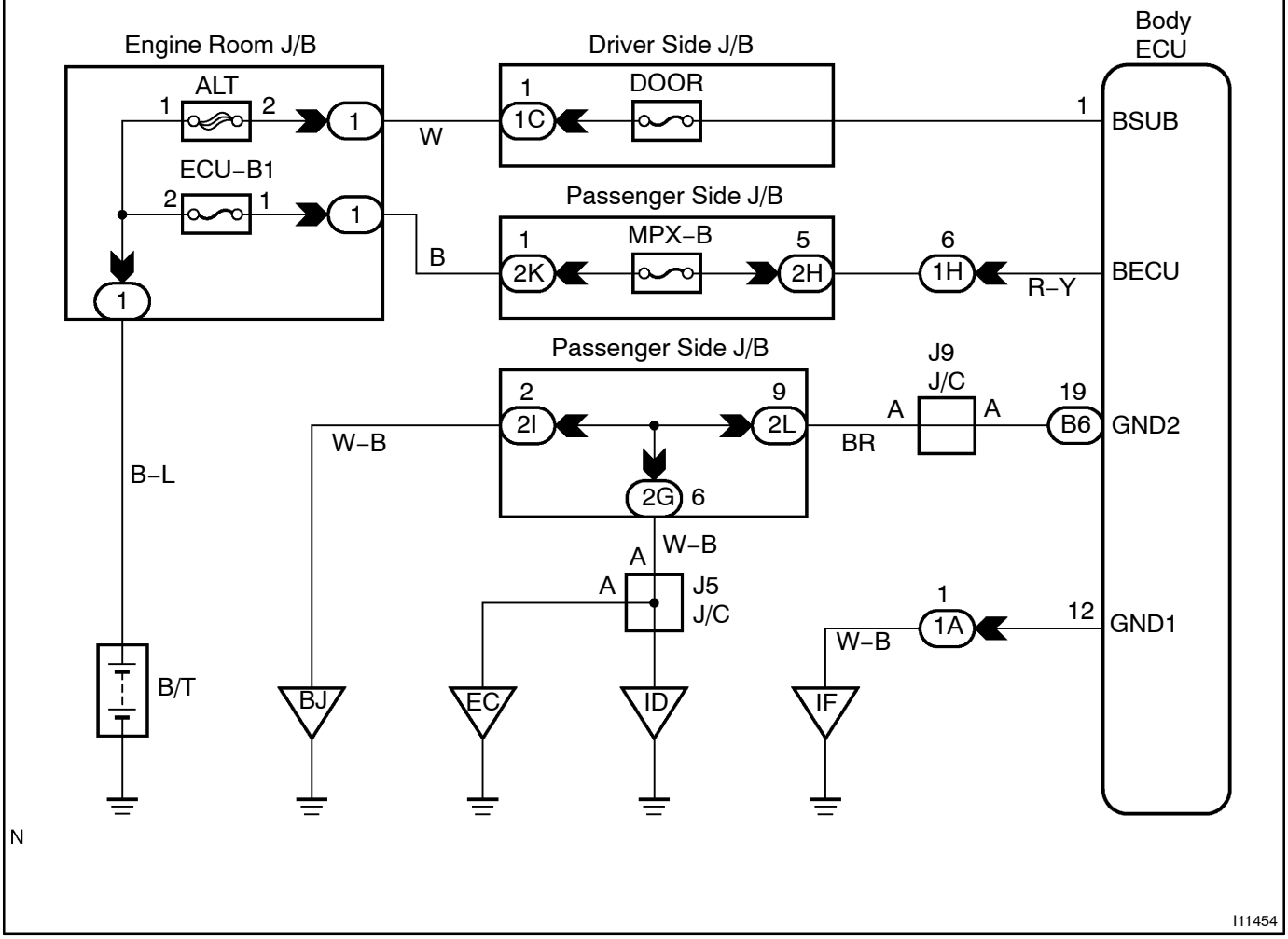
This circuit provides power to operate the Body ECU.

WIRING DIAGRAM

LHD Models



RHD Models


Engine Room J/B
Driver Side J/B
Body ECU
ALT
ECU–B1
DOOR
MPX–B
Passenger Side J/B
Passenger Side J/B
J9 J/C
J5 J/C
W
B
R–Y
W–B
B–L
BR
B/T
BJ
EC
ID
IF
BSUB
BECU
GND2
GND1
N
I11454

INSPECTION PROCEDURE

1	**Check MPX–B and DOOR fuse.**

CHECK:

Check continuity of MPX–B and DOOR fuse.

OK:

Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals BECU, BSUB and GND, GND2 of Body ECU connector.**

PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the Body ECU connector.

CHECK:

Measure voltage between terminals BECU, BSUB and GND, GND2.

OK:

Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table.** (See page DI–554)

NG

3	**Check wireharness and connector between Body ECU and body ground.**

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

OK

Check and repair wireharness and connector between Body ECU and battery.

DI62I–01

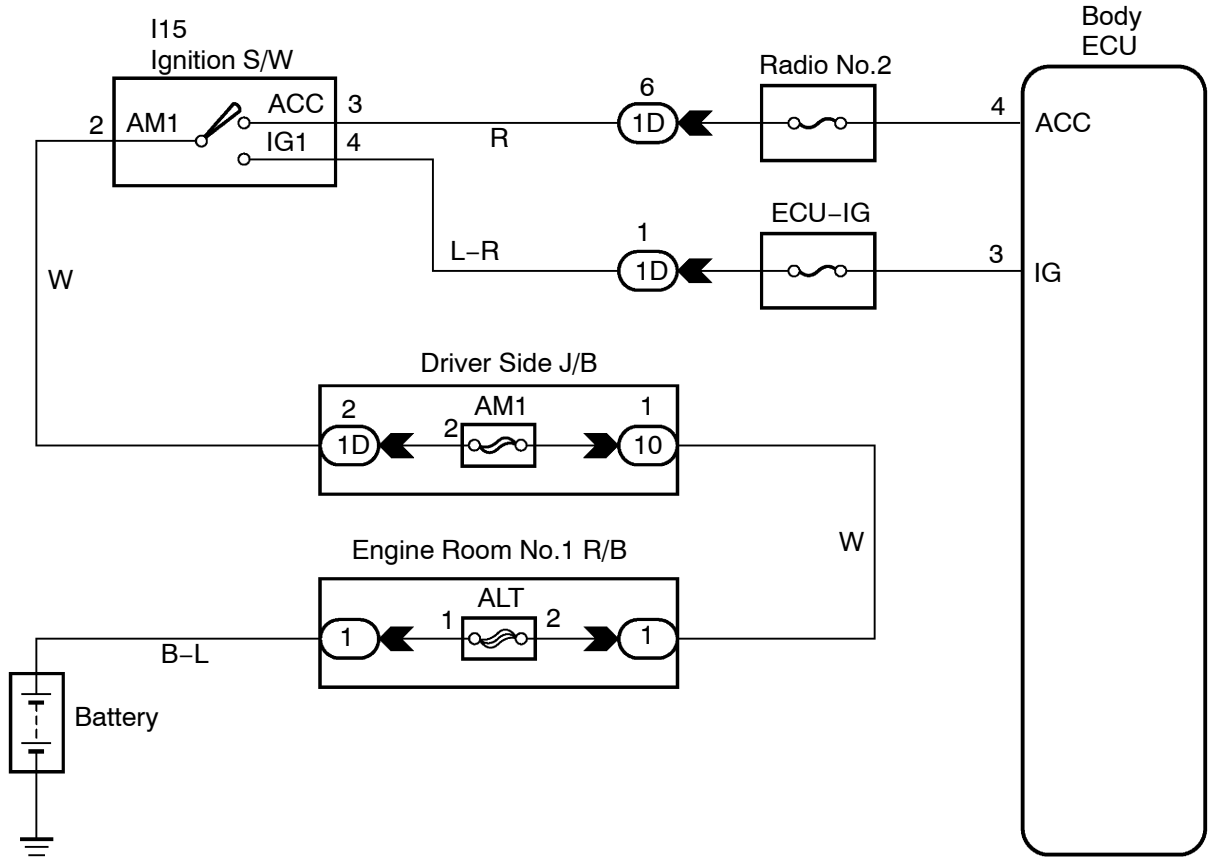
Ignition switch power source circuit

CIRCUIT DESCRIPTION

When the ignition switch is turned to the ACC position, battery voltage is applied to the terminal ACC of the ECU and when the ignition switch is turned to the ON position, battery voltage is applied to the terminal IG of the ECU.

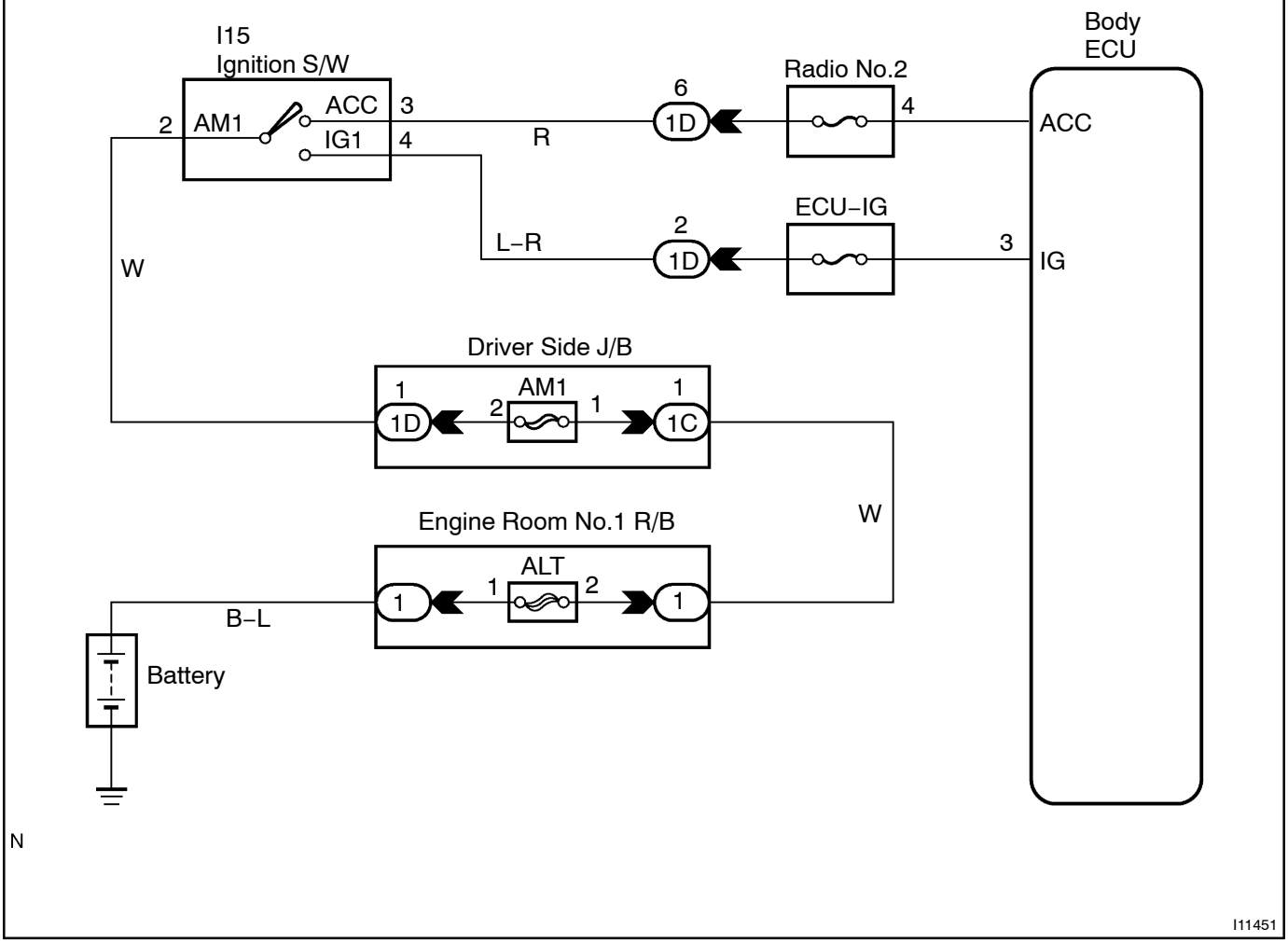
WIRING DIAGRAM

LHD Models



I10779

RHD Models


I15
Ignition S/W
2
AM1
ACC
IG1
3
4
R
6
1D
Radio No.2
4
Body
ECU
ACC
W
L–R
2
1D
ECU–IG
3
IG
Driver Side J/B
1
1D
AM1
2
1
1
1C
W
Engine Room No.1 R/B
ALT
1
1
2
1
B–L
Battery
N
I11451

INSPECTION PROCEDURE

1	Check ECU–IG and RADIO No.2 fuse.

CHECK:
Check continuity of ECU–IG and RADIO No.2 fuse.
OK:
Continuity

NG → Replace the failure fuse.

OK

2	Check voltage between terminals ACC, IG and GND of Body ECU connector.

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals ACC, IG, and GND.
OK:
Voltage: 10 – 14V

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

NG

3	Check wireharness and connector between Body ECU and body ground.

NG → Repair or replace wireharness or connector.

OK

Check and repair wireharness and connector between Body ECU and battery.

DI62J–01

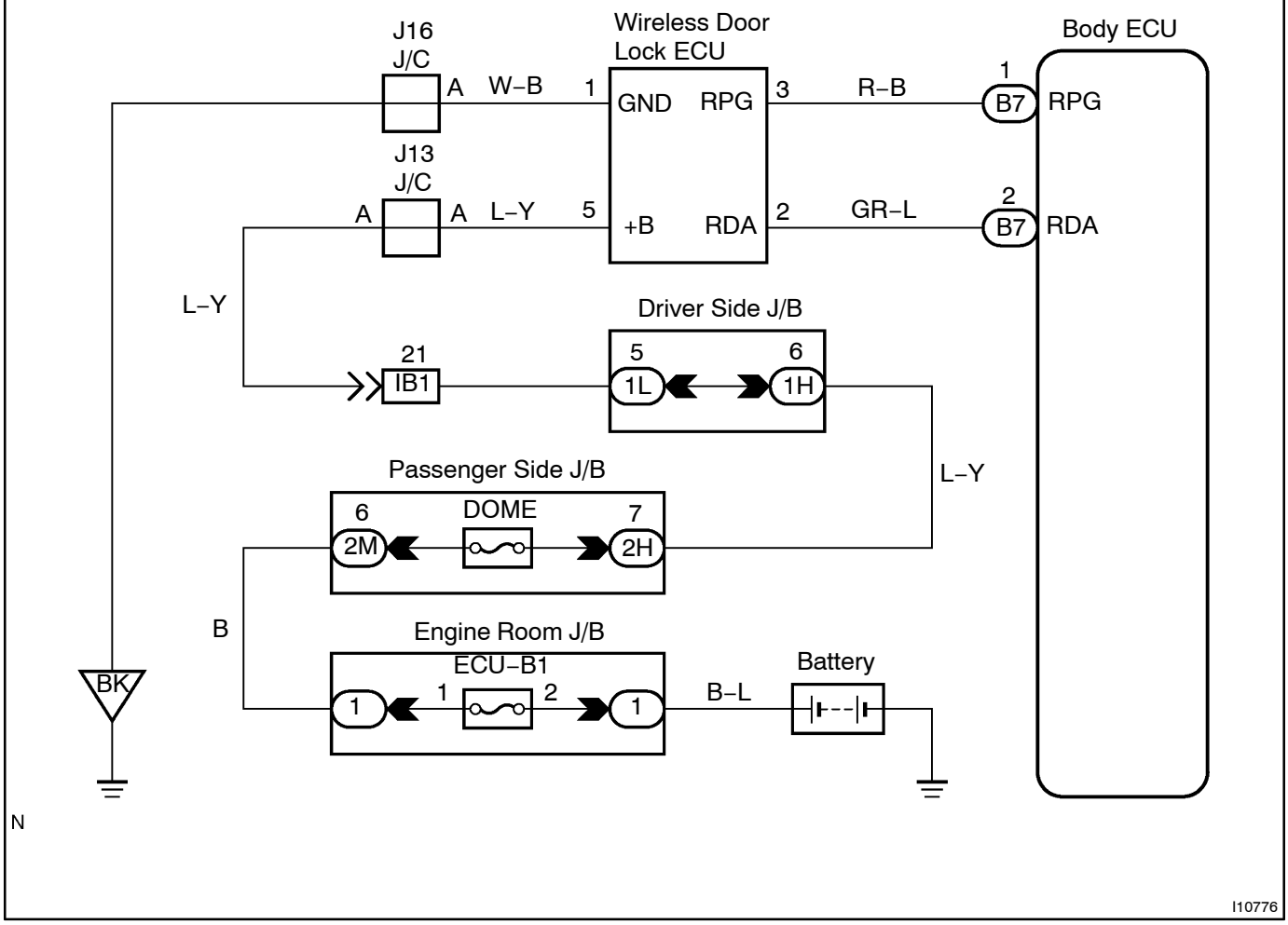
Wireless door lock tuner circuit

CIRCUIT DESCRIPTION

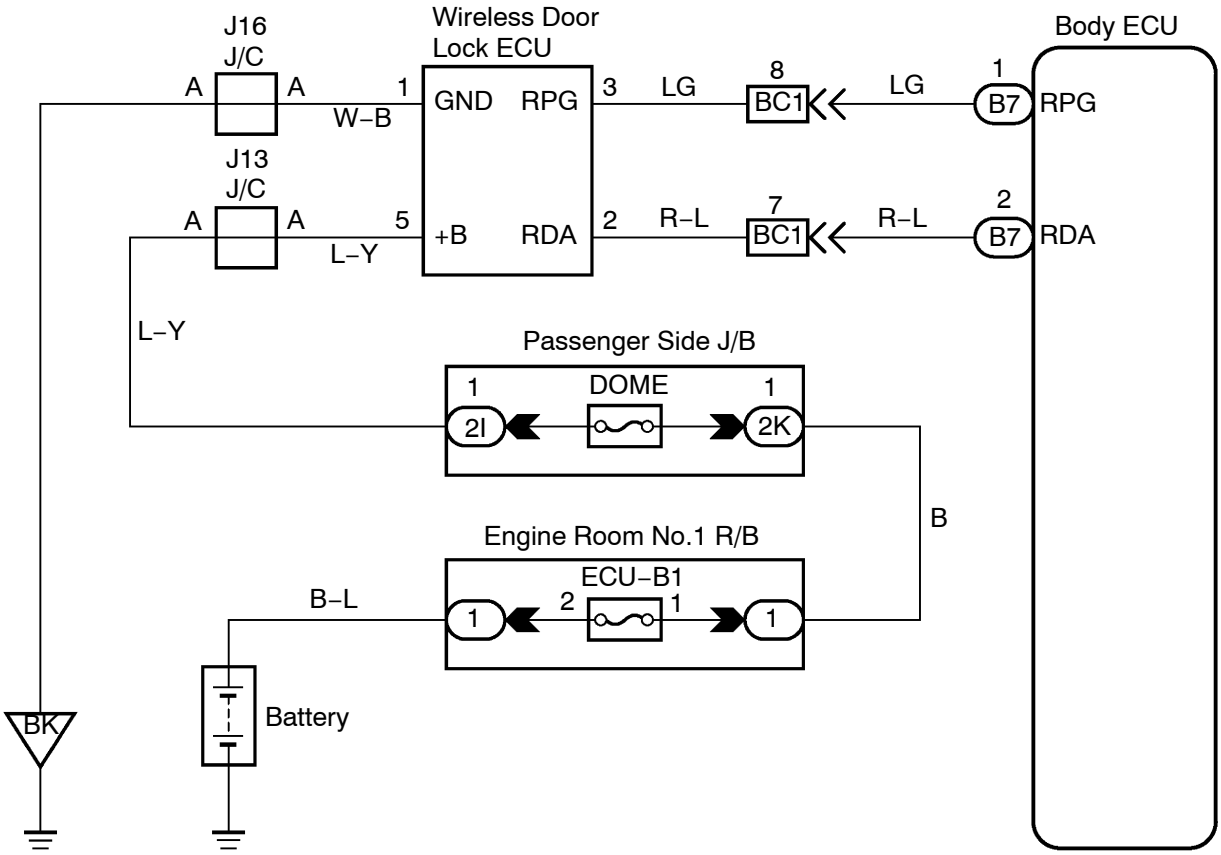
The signal from the transmitter will be input to the body ECU through RDA line. RDA line is diagnosed by the Body ECU, so check DTC also in case of the failure of the wireless function.

WIRING DIAGRAM

LHD Models



RHD Models


J16
J/C
A
A
1
W–B
Wireless Door
Lock ECU
GND
RPG
3
LG
8
BC1
LG
1
B7
RPG
Body ECU
J13
J/C
A
A
5
L–Y
+B
RDA
2
R–L
7
BC1
R–L
2
B7
RDA
L–Y
Passenger Side J/B
1
DOME
1
2I
2K
B
Engine Room No.1 R/B
ECU–B1
B–L
2
1
1
1
BK
Battery
N
I11460

INSPECTION PROCEDURE

1	Check that DTC 42 is not output

NG → Check the RDA line.

OK

2	Check wireharness

PREPARATION:
Disconnect connectors of wireless door lock tuner and Body ECU.
CHECK:
Check continuity between terminals PRG of wireless door lock tuner and PRG of Body ECU.
OK:
Continuity

NG → Repair or replace wireharness

OK

3	Check the wireless door lock tuner

CHECK:
Replace the wireless door lock tuner and check if it recovers normally.
OK:
Must be recovered normally.

NG → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

OK

Failure of the original wireless door lock tuner.

D162K–01

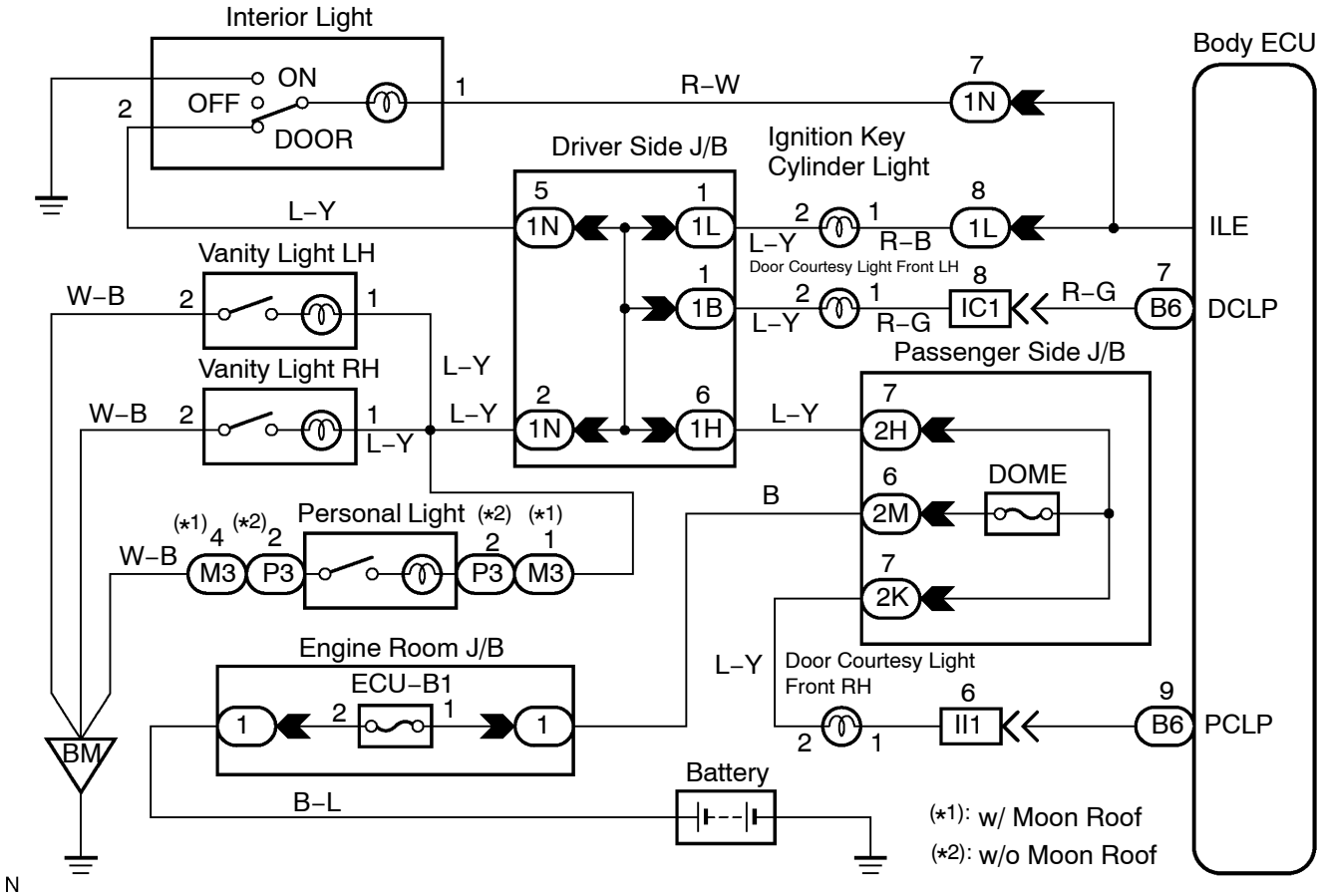
Illumination circuit

CIRCUIT DESCRIPTION

Receiving the courtesy signal from the Body ECU will make the interior light, ignition light, and courtesy light come on.

WIRING DIAGRAM

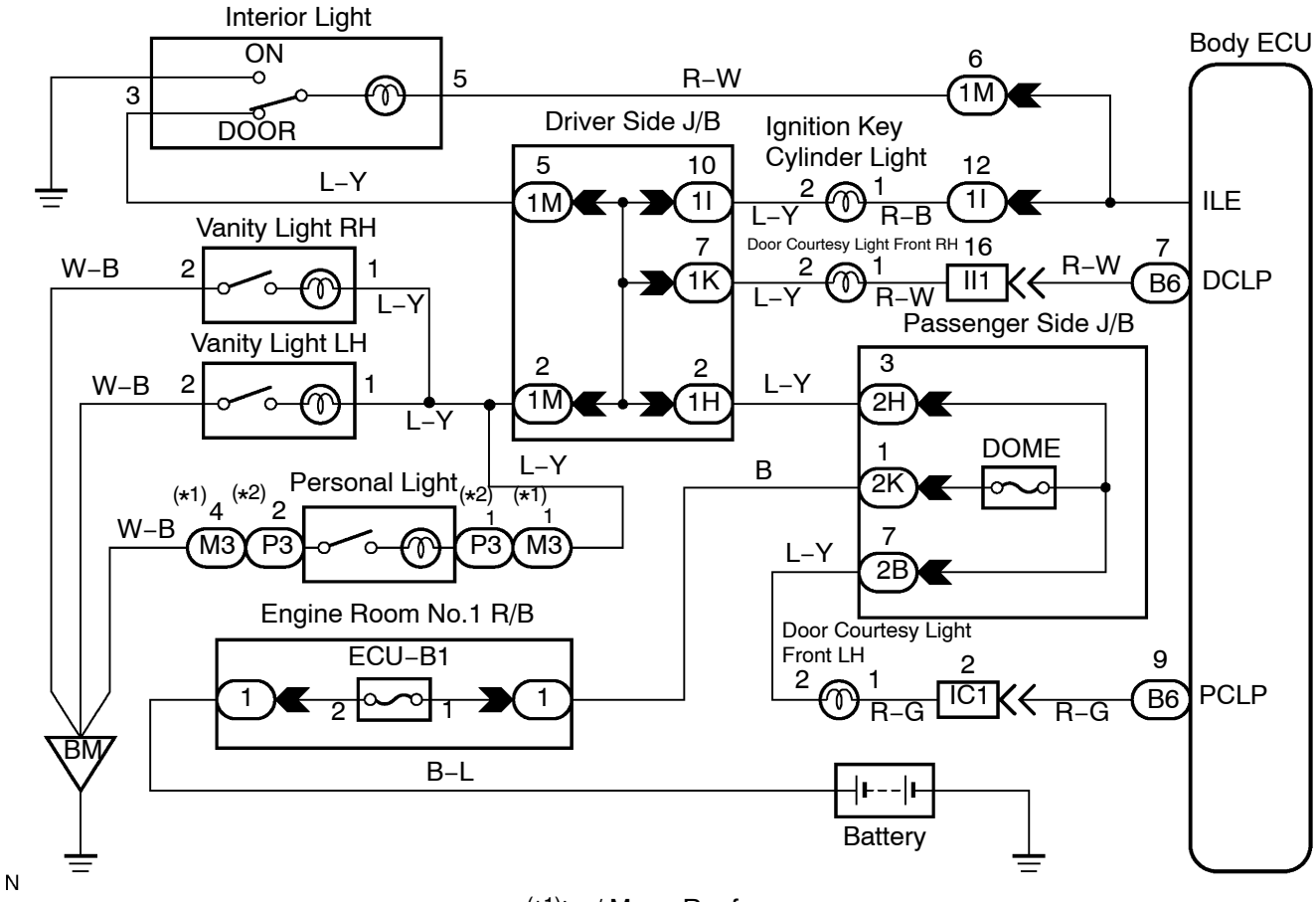
LHD Models



N

I10775

RHD Models



N

(*1): w/ Moon Roof

(*2): w/o Moon Roof

I11458

INSPECTION PROCEDURE

1	Check DOME fuse.

NG → Replace the fuse.

OK

2	Check illumination light.

NG → Replace the failure light.

OK

3	Check wireharness and connector between each illumination light and Body ECU, battery and each illumination light.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

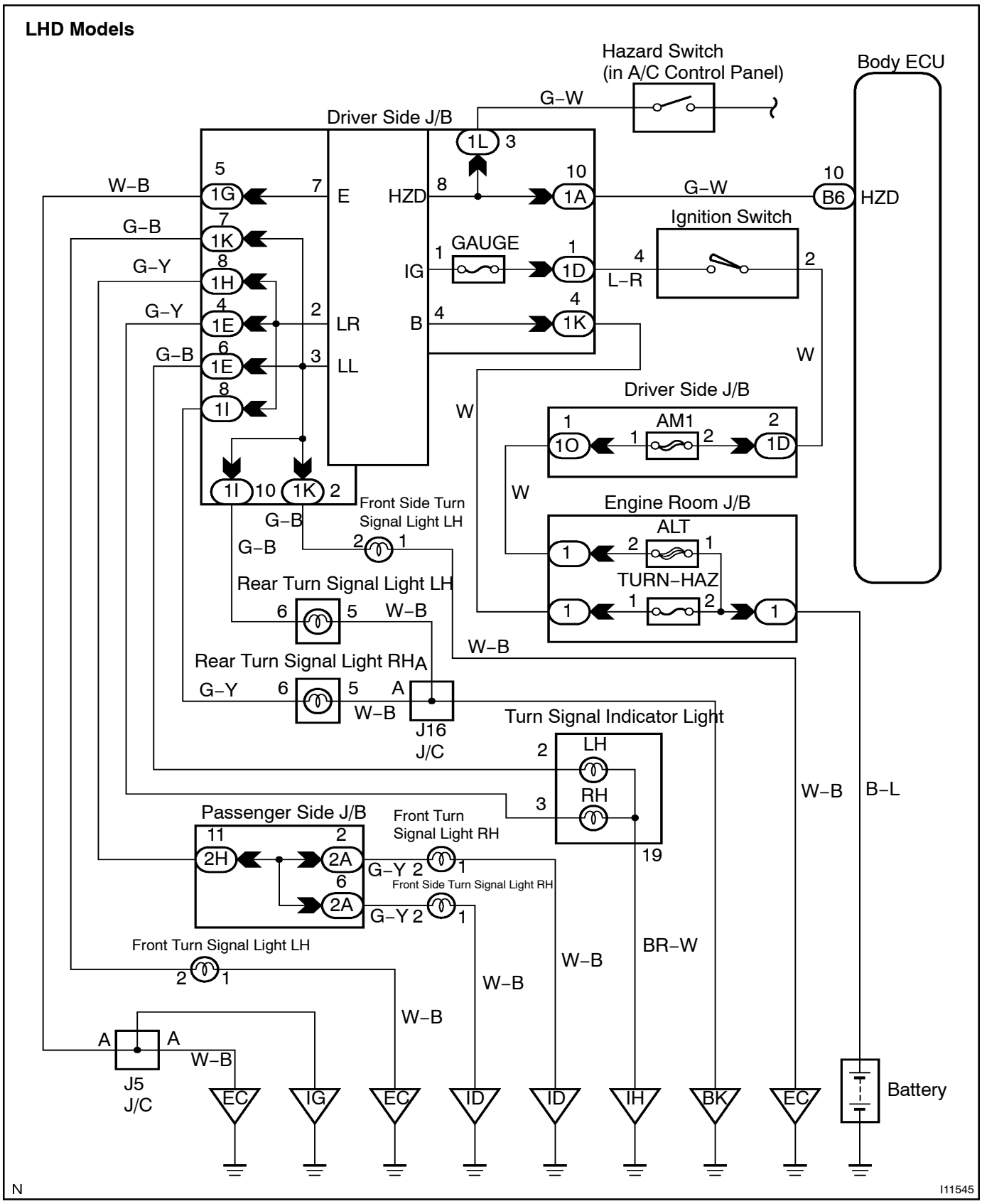
DI62L–01

Hazard switch circuit

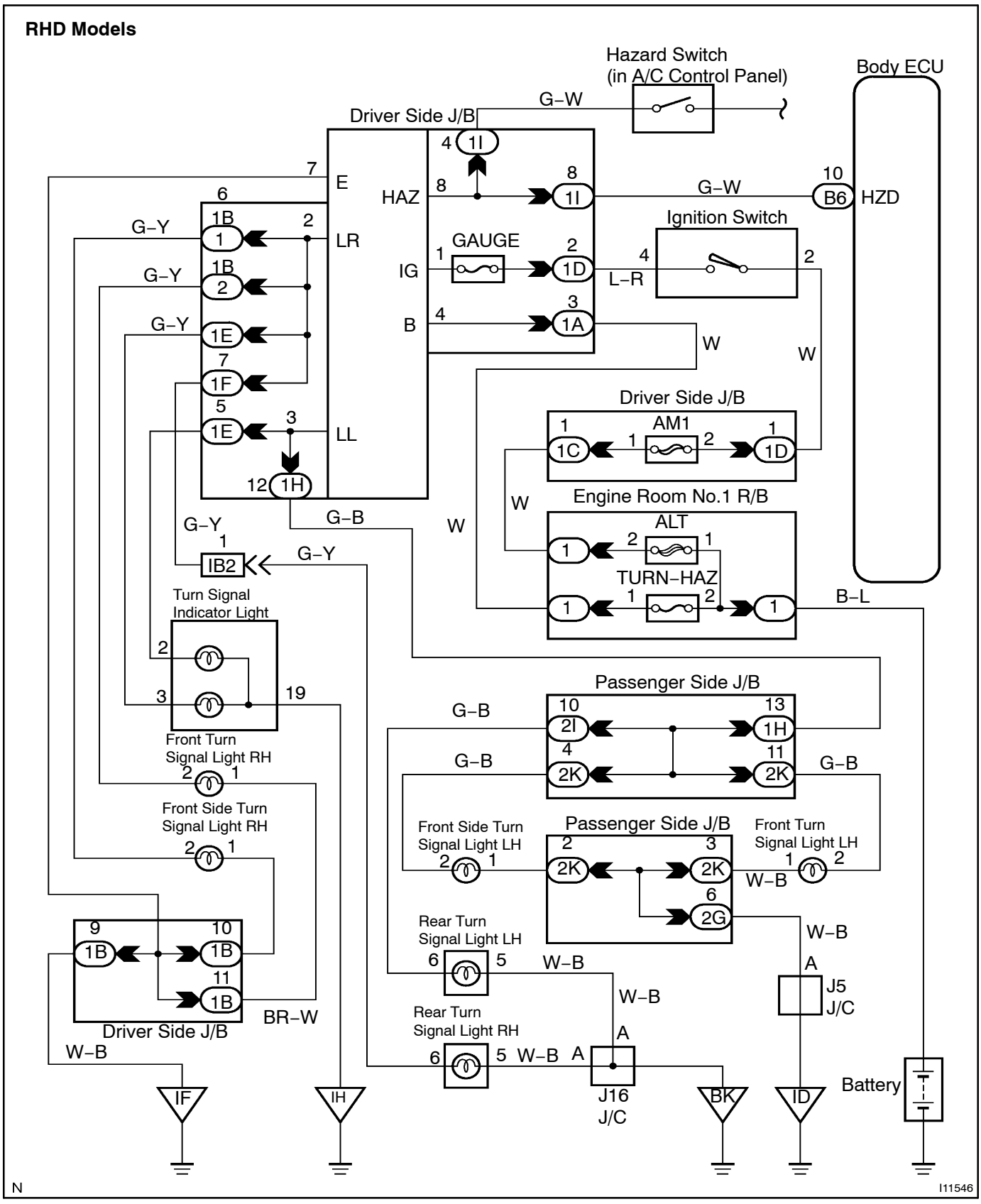
CIRCUIT DESCRIPTION

Body ECU activates the flasher relay during warning of the theft deterrent system and flashers the hazard. When the security operates, body ECU activates the flasher relay, however when the normal hazard switch operates, the hazard switch activates the flasher relay.

WIRING DIAGRAM



RHD Models


Hazard Switch
(in A/C Control Panel)
Body ECU
G–W
Driver Side J/B
4
1I
7
E
6
1B
2
LR
G–Y
1
1B
2
G–Y
G–Y
1E
7
1F
5
1E
3
LL
12
1H
HAZ
8
8
1I
10
B6
HZD
G–W
Ignition Switch
IG
1
GAUGE
2
1D
4
L–R
2
B
4
3
1A
W
W
Driver Side J/B
1
AM1
1
1C
1
2
1D
W
Engine Room No.1 R/B
ALT
2
1
1
TURN–HAZ
1
2
1
1
B–L
G–Y
1
IB2
G–Y
G–B
W
Turn Signal
Indicator Light
2
3
19
Front Turn
Signal Light RH
2
1
Front Side Turn
Signal Light RH
2
1
Passenger Side J/B
10
2I
13
1H
G–B
4
2K
11
2K
G–B
G–B
Front Side Turn
Signal Light LH
2
1
Passenger Side J/B
2
2K
3
2K
6
2G
Front Turn
Signal Light LH
1
2
W–B
W–B
Rear Turn
Signal Light LH
6
5
W–B
W–B
A
J5
J/C
9
1B
10
1B
11
1B
BR–W
Driver Side J/B
W–B
Rear Turn
Signal Light RH
6
5
W–B
A
A
J16
J/C
IF
IH
BK
ID
Battery
N
I11546

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check hazard operation using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC 3.
CHECK:
Check that the hazard can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check hazard switch (See page DI–667).**

NG → **Replace the hazard switch.**

OK

3	**Check wire harness and connector between hazard switch and Body ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

DI62M–01

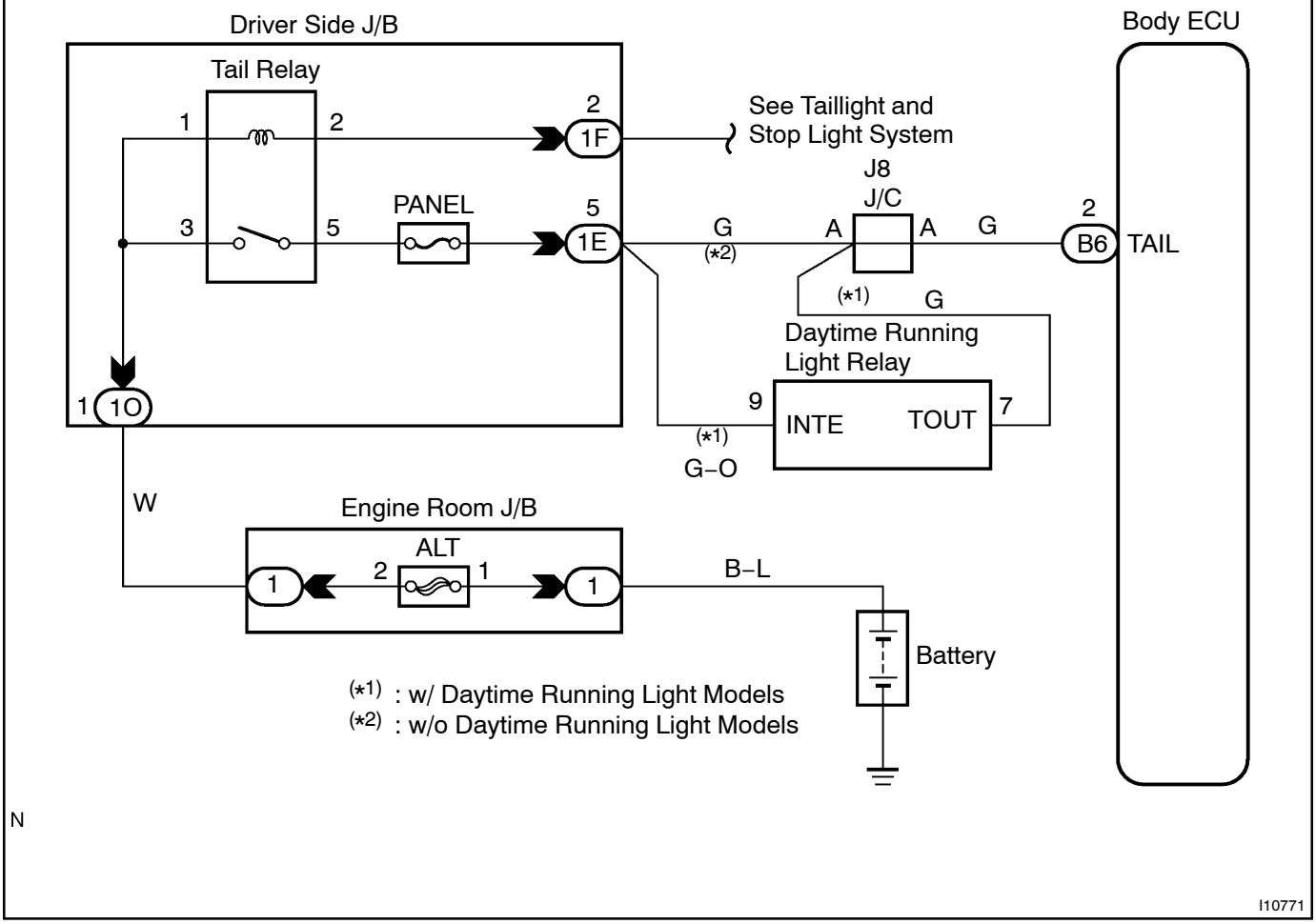
Taillight relay circuit

CIRCUIT DESCRIPTION

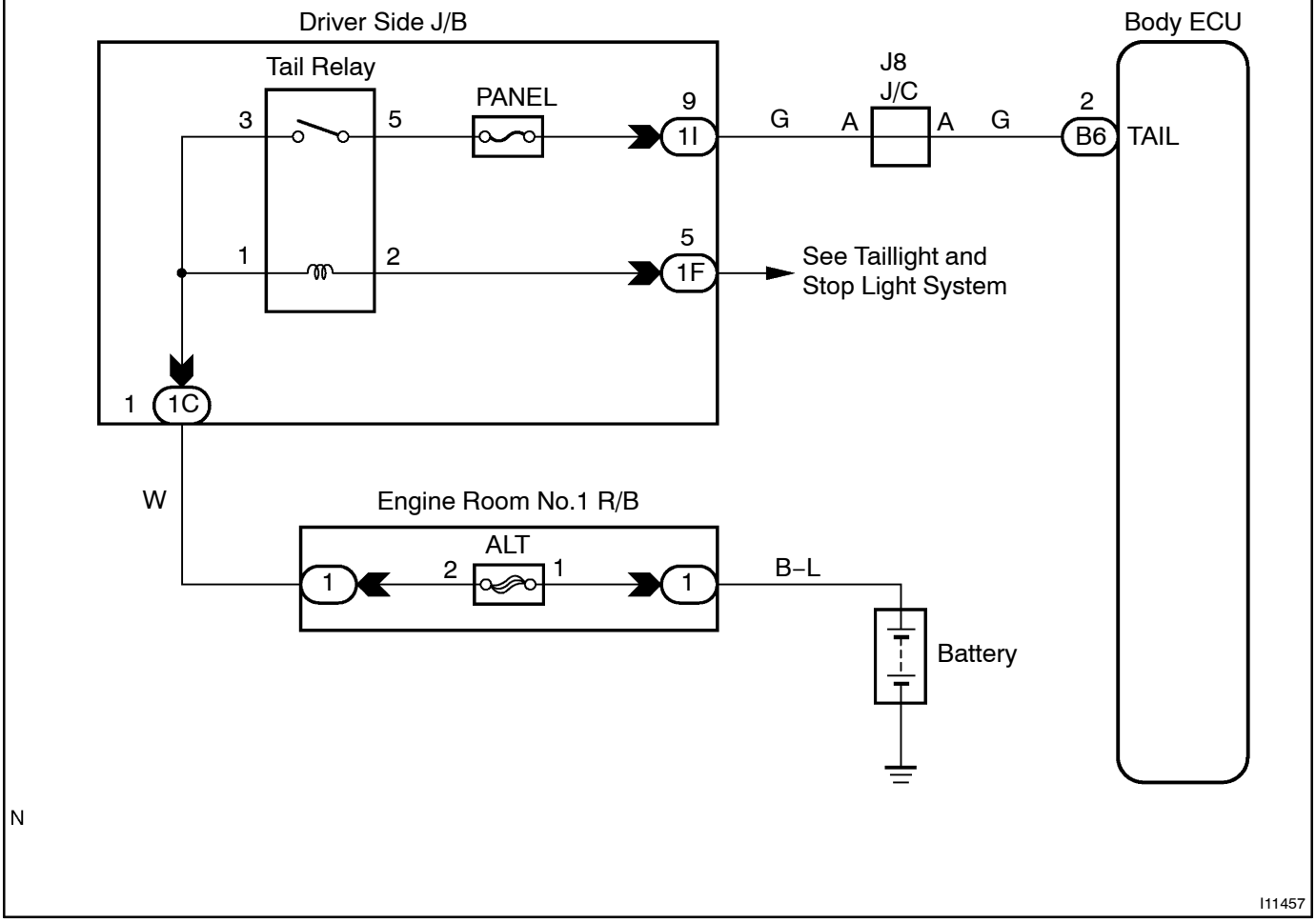
Taillight relay will be ”ON” by operating the taillight switch. The transistor which activates the tail light relay has two sorts: one activates by the tail light switch for fail safe and the other activates by CPU.

WIRING DIAGRAM

LHD Models



RHD Models


Driver Side J/B
Tail Relay
PANEL
3
5
9
1I
G
J8
J/C
A
A
G
2
B6
TAIL
Body ECU
1
2
5
1F
See Taillight and
Stop Light System
1
1C
W
Engine Room No.1 R/B
ALT
1
2
1
1
B–L
Battery
N
I11457

INSPECTION PROCEDURE

1	Check taillight relay (See page BE–30).

NG → Replace the taillight relay.

OK

2	Check wireharness and connector between taillight relay and Body ECU, battery and taillight relay.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62N–01

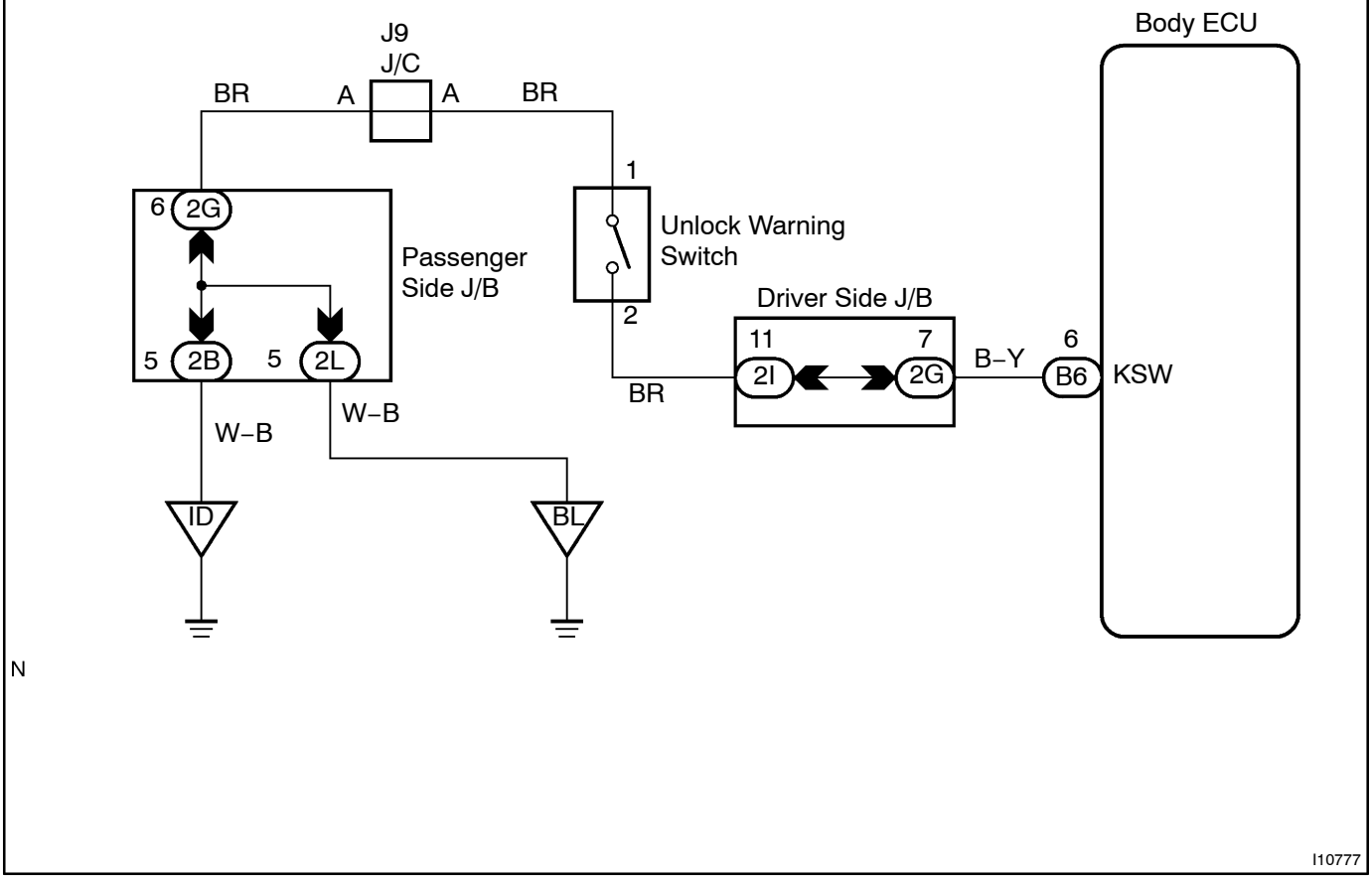
Key unlock warning switch circuit

CIRCUIT DESCRIPTION

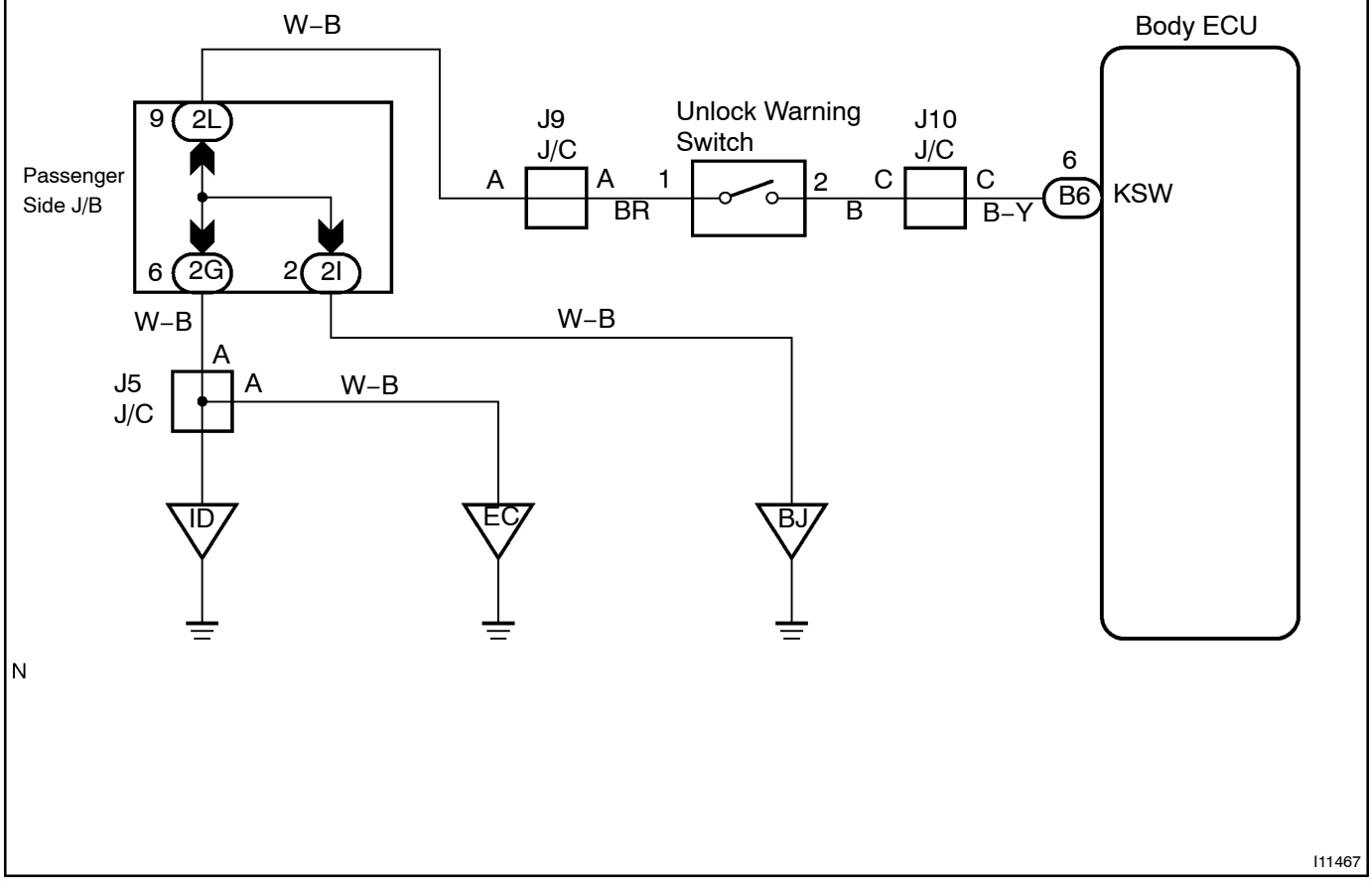
The key unlock warning switch goes on when the ignition key is inserted in the key cylinder and goes off when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is on.

WIRING DIAGRAM

LHD Models



RHD Models


W–B
Body ECU
9
2L
Passenger
Side J/B
6
2G
2
2I
J9
J/C
A
A
BR
1
Unlock Warning
Switch
2
B
J10
J/C
C
C
B–Y
6
B6
KSW
W–B
W–B
A
J5
J/C
A
W–B
ID
EC
BJ
N
I11467

INSPECTION PROCEDURE

1	Check key unlock warning switch (See page BE–23).

NG → Replace the key unlock warning switch.

OK

2	Check wireharness and connector between key unlock warning switch and Body ECU.

NG → Repair or replace wireharness or connector.

OK

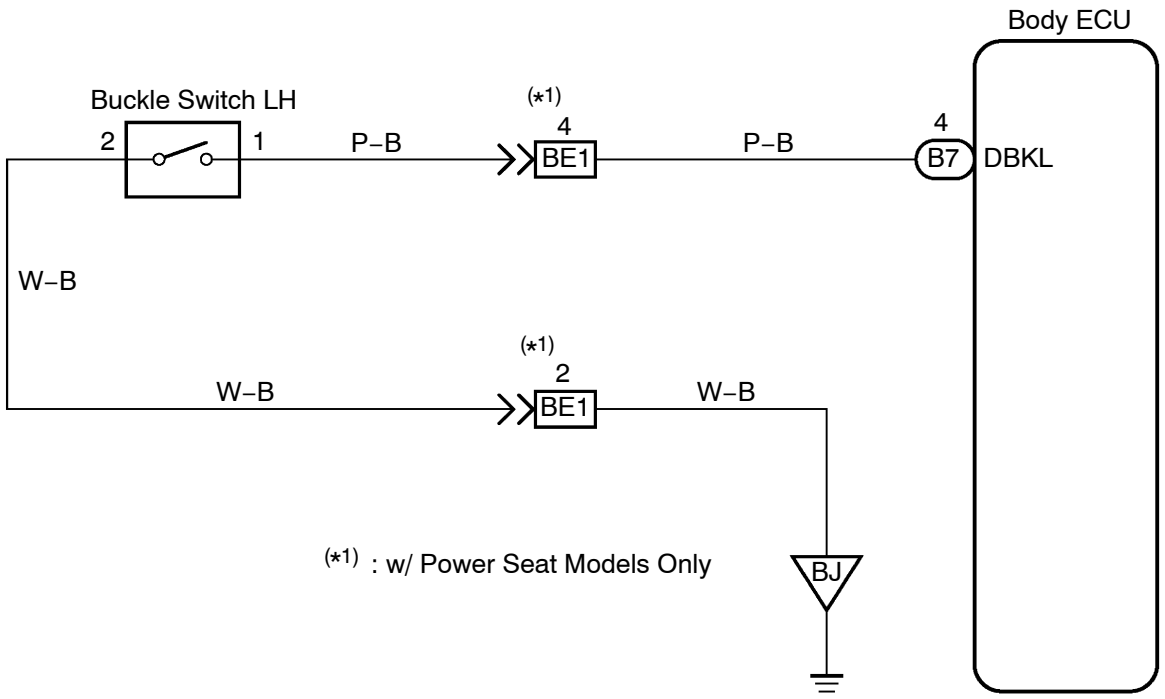
Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62O-01

Driver buckle switch circuit

WIRING DIAGRAM

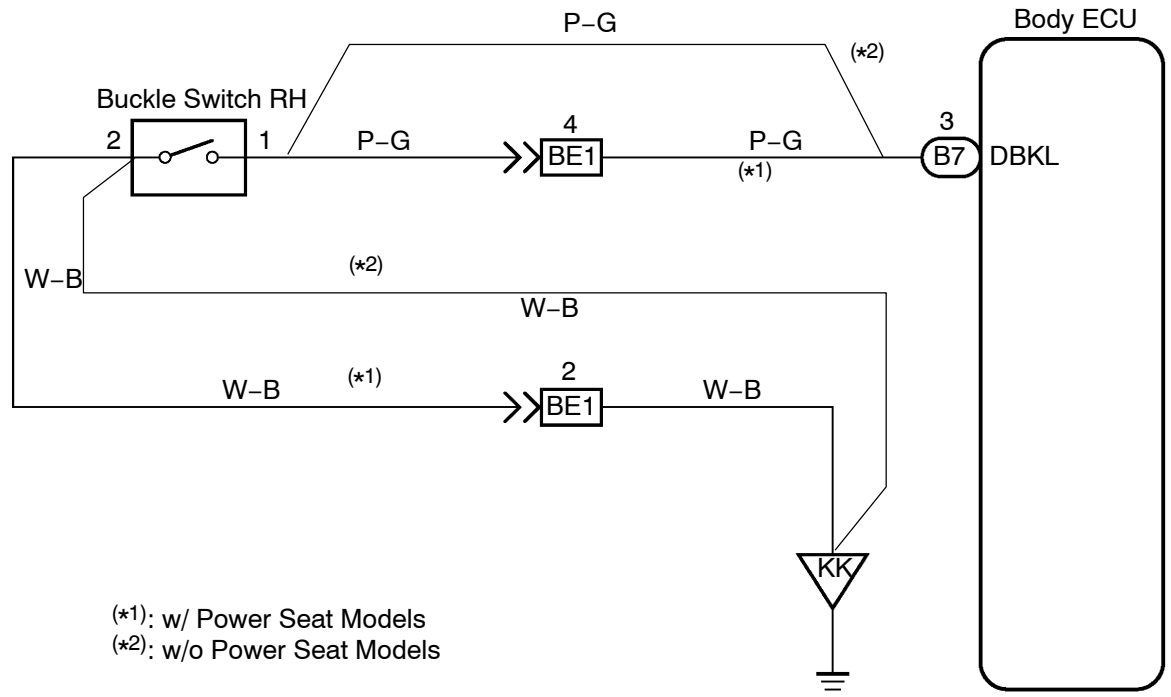
LHD Models



N

I10770

RHD Models



N

I11453

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check driver buckle switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the driver buckle switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check driver buckle switch. (See page BE–83)**

NG → **Replace the driver buckle switch.**

OK

3	**Check wire harness and connector between driver buckle switch and body ground.**

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

OK

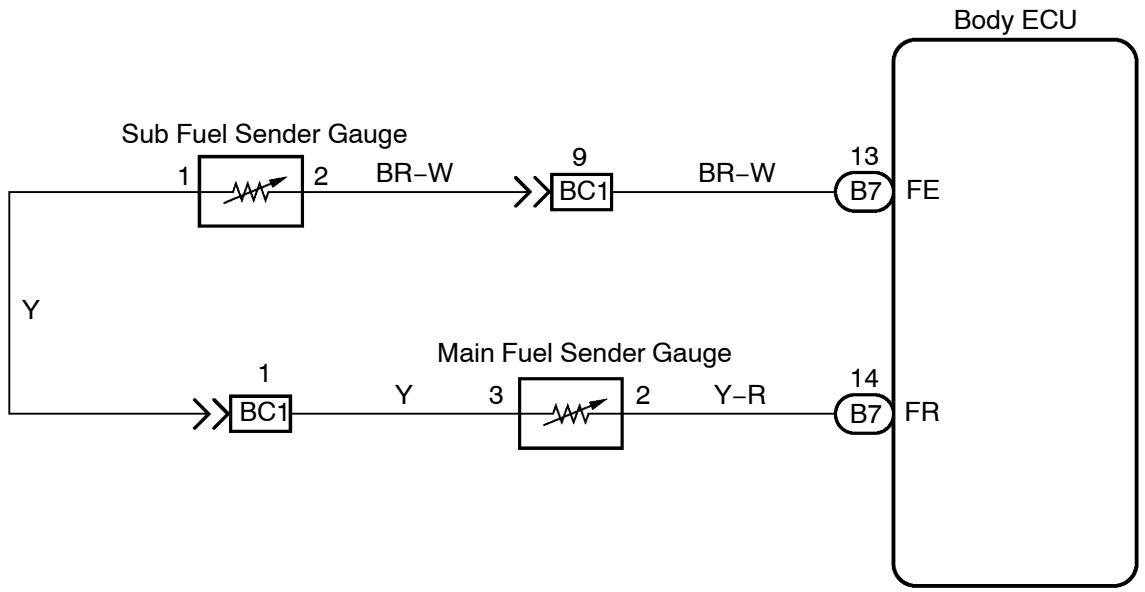
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

DI62P–01

Fuel Sender gauge circuit

WIRING DIAGRAM

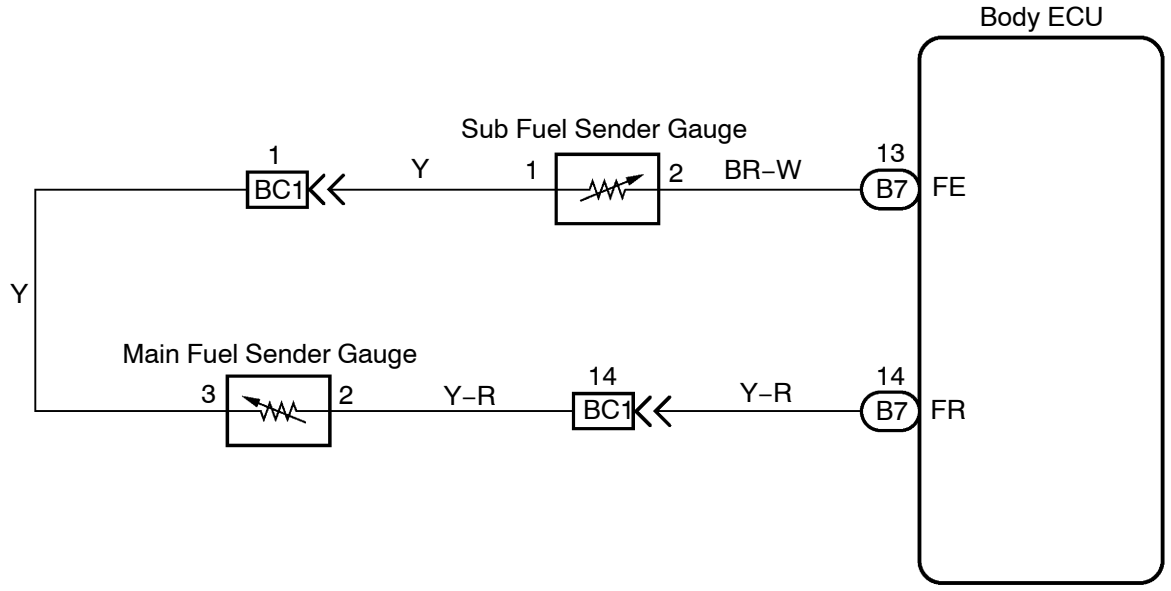
LHD Models



N

I10768

RHD Models



N

I11465

INSPECTION PROCEDURE

1	Check fuel sender gauge (See page BE–83).

NG → Replace the fuel sender gauge.

OK

2	Check wireharness and connector between fuel sender gauge and Body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62Q-01

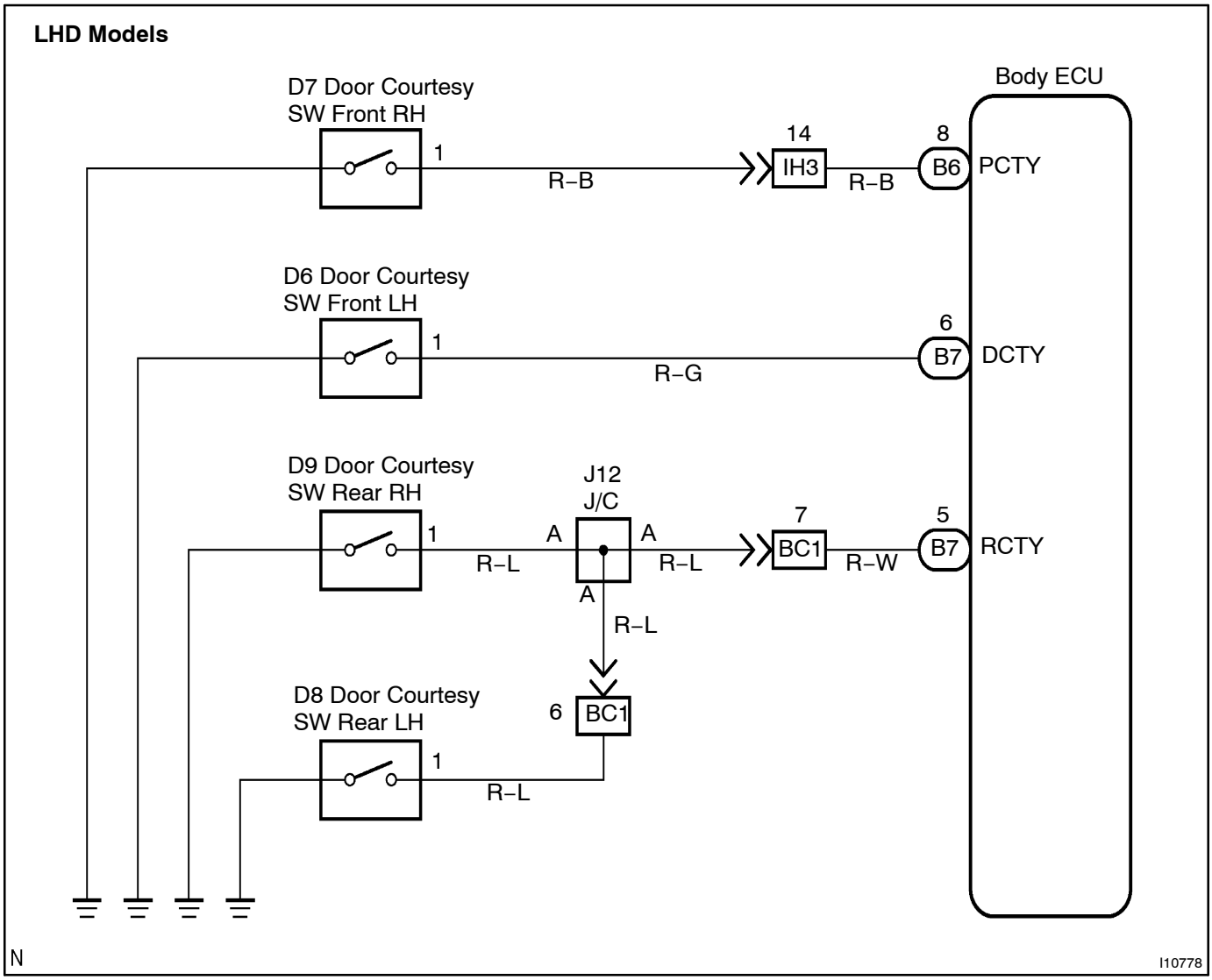
Door courtesy switch circuit

CIRCUIT DESCRIPTION

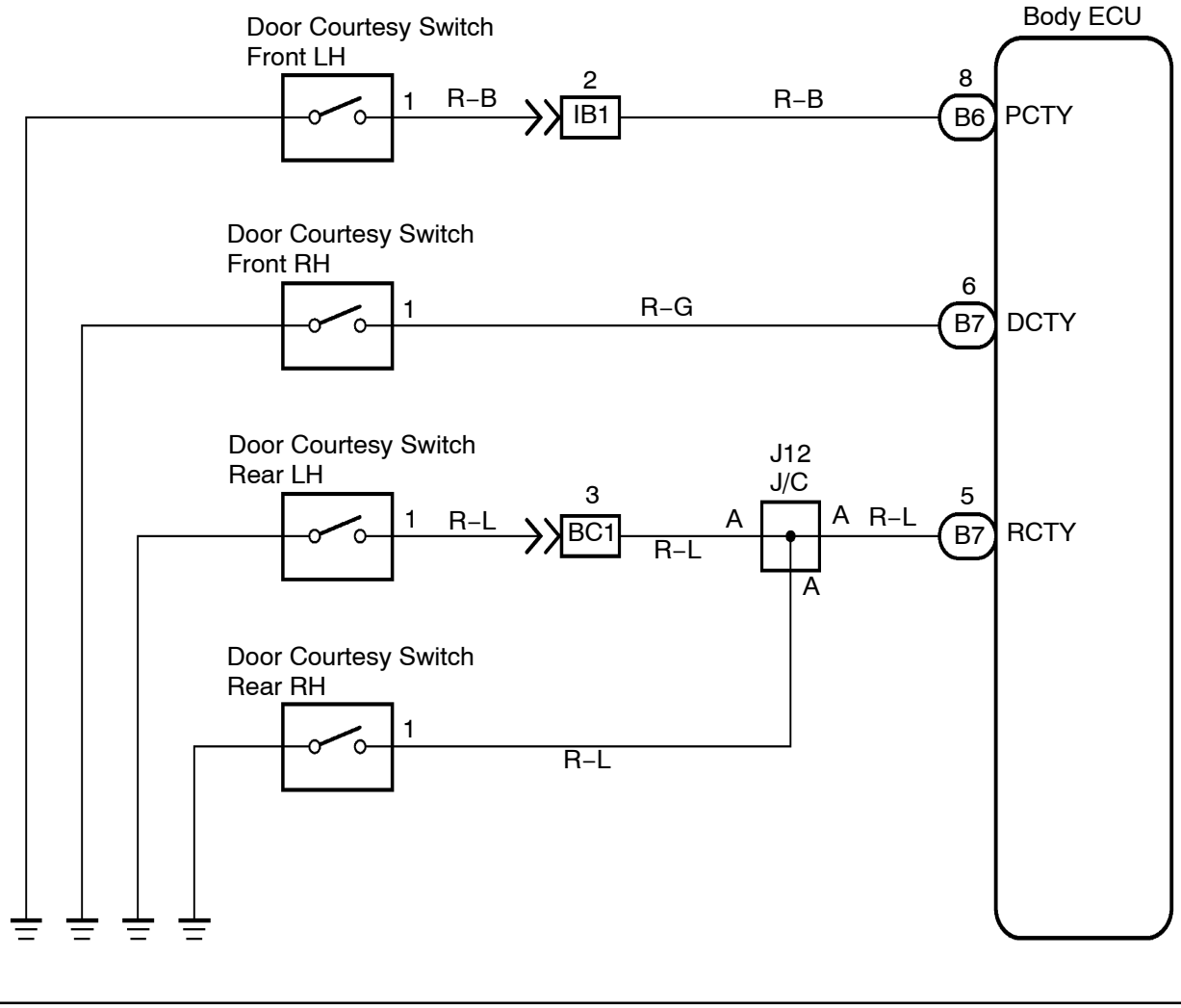
The door courtesy switch goes on when the door is opened and goes off when door is closed.

WIRING DIAGRAM

LHD Models



RHD Models


Body ECU
Door Courtesy Switch
Front LH
1
R–B
2
IB1
R–B
8
B6
PCTY
Door Courtesy Switch
Front RH
1
R–G
6
B7
DCTY
Door Courtesy Switch
Rear LH
1
R–L
3
BC1
R–L
J12
J/C
A
A
R–L
5
B7
RCTY
A
Door Courtesy Switch
Rear RH
1
R–L
N
I11452

INSPECTION PROCEDURE

1	Check courtesy switch (See page BE–57).

NG → Replace the courtesy switch.

OK

2	Check that there is a grounding malfunction caused by looseness of the tighten screw.

NG → Install screw.

OK

3	Check wireharness and connector between courtesy light and body ECU, courtesy switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

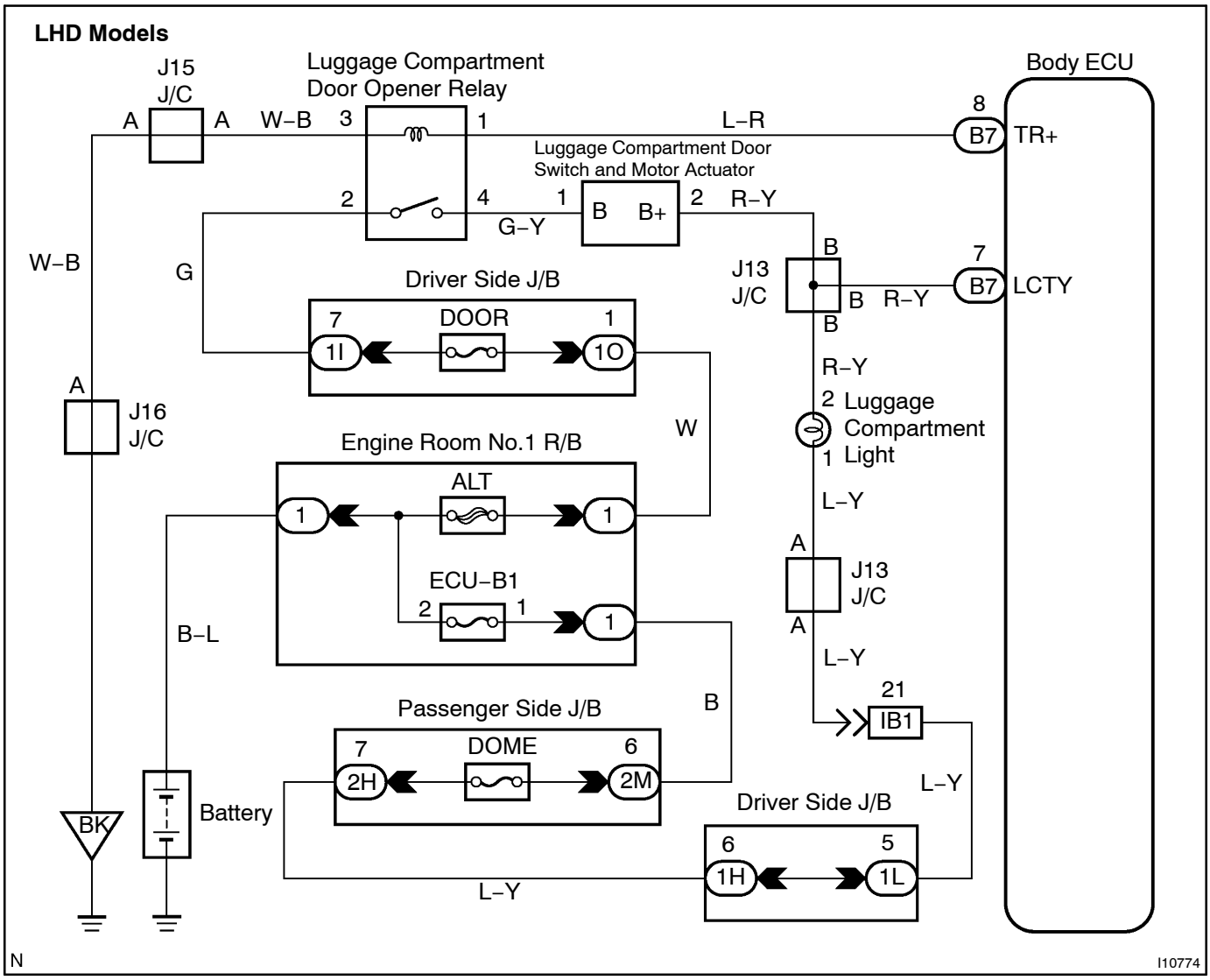
DI62R–01

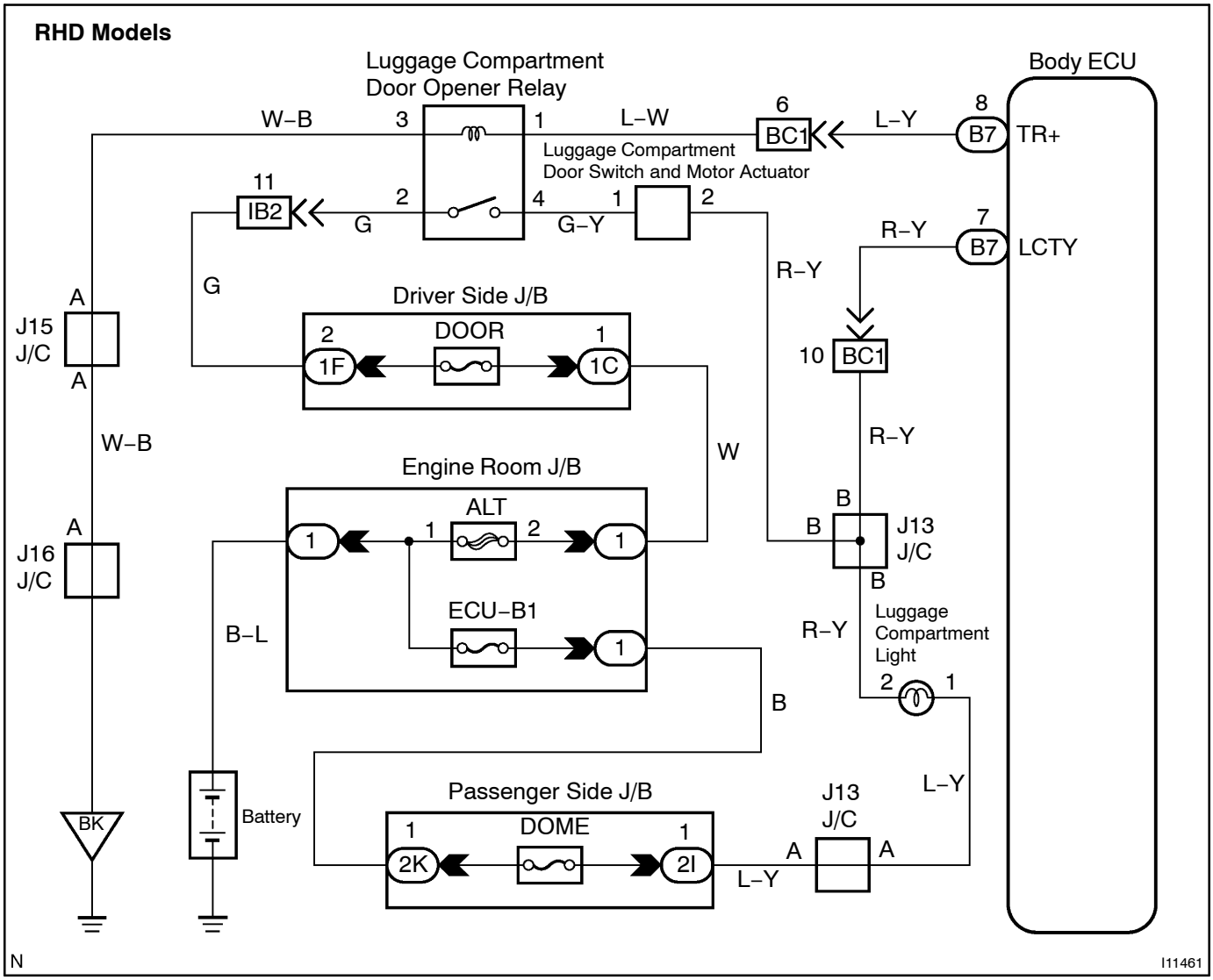
Luggage courtesy switch circuit

CIRCUIT DESCRIPTION

The luggage courtesy switch goes on when luggage compartment door is opened and goes off when luggage compartment door is closed.

WIRING DIAGRAM




RHD Models
Luggage Compartment
Door Opener Relay
Body ECU
W–B
3
1
L–W
6
BC1
L–Y
8
B7
TR+
Luggage Compartment
Door Switch and Motor Actuator
11
IB2
2
G
4
G–Y
1
2
R–Y
7
B7
LCTY
G
R–Y
A
J15
J/C
A
Driver Side J/B
2
DOOR
1
1F
1C
10
BC1
W–B
W
R–Y
Engine Room J/B
ALT
A
J16
J/C
1
1
2
1
B
B
J13
J/C
B
ECU–B1
B–L
R–Y
Luggage
Compartment
Light
2
1
1
B
L–Y
Passenger Side J/B
J13
J/C
Battery
BK
1
DOME
1
2K
2I
A
A
L–Y
N
I11461

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check luggage courtesy switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the luggage courtesy switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check luggage courtesy switch (See page BE–57).**

NG → **Replace the luggage courtesy switch.**

OK

3	**Check wire harness and connector between luggage courtesy switch and Body ECU.**

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

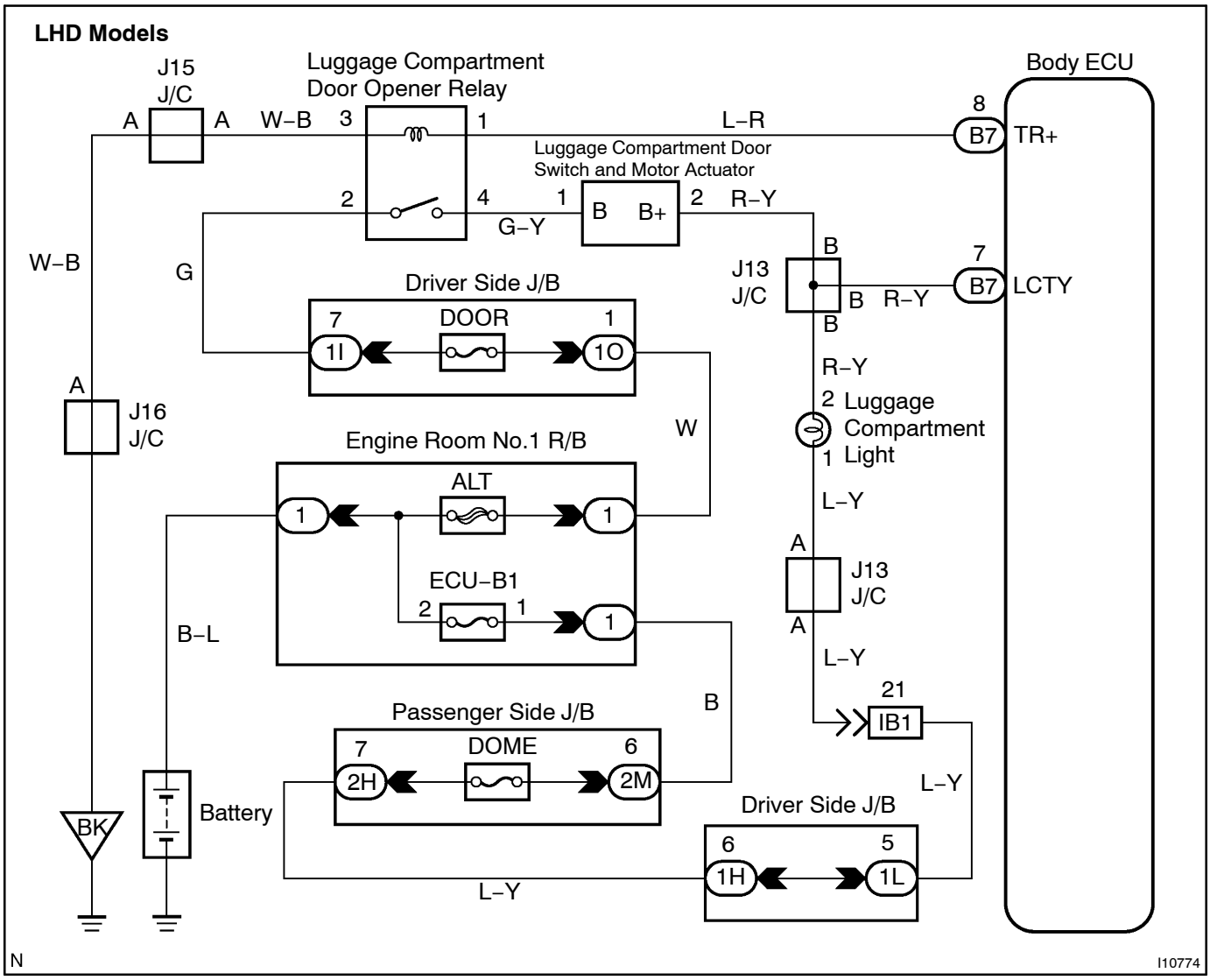
OK

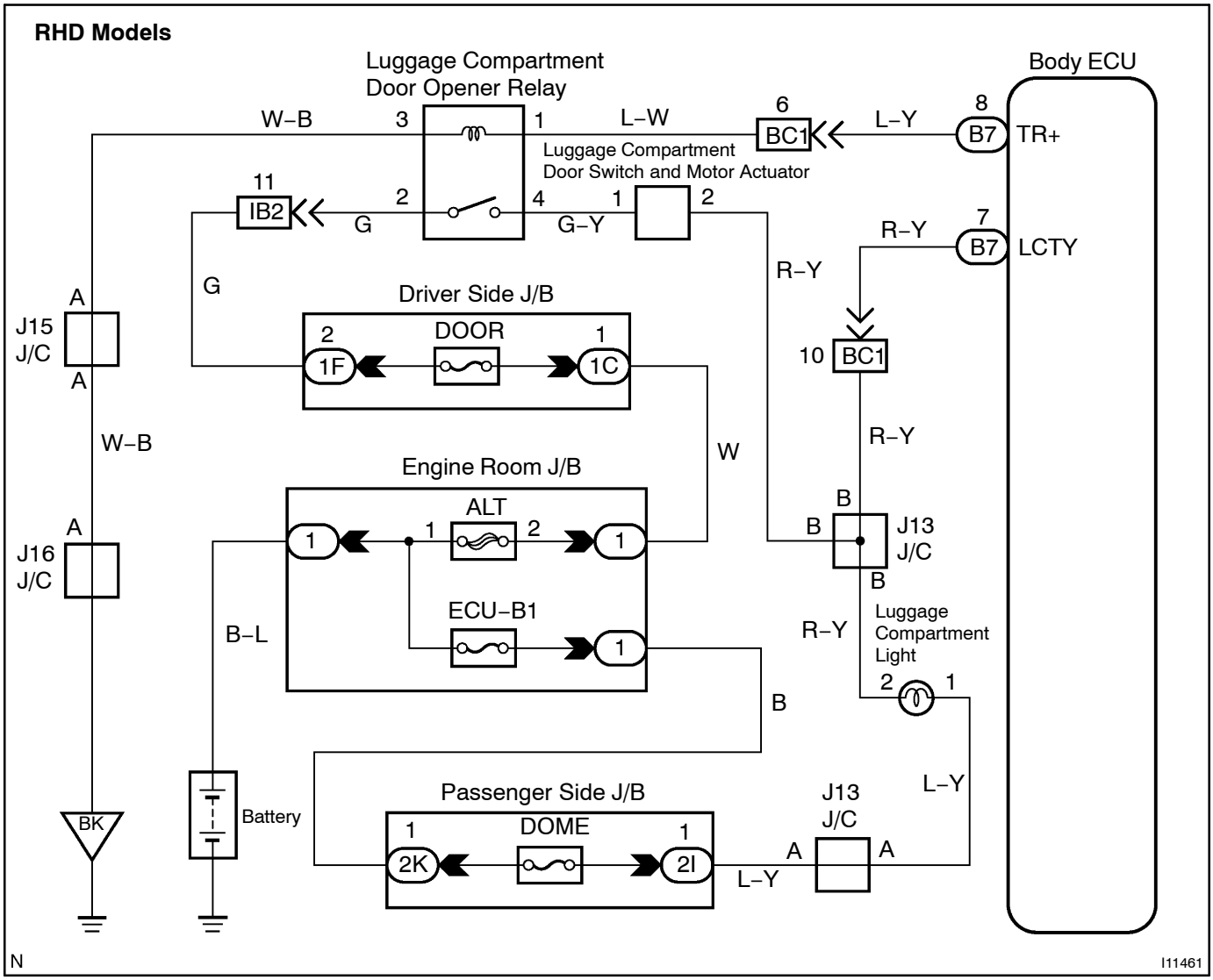
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

DI62S–01

Luggage opener relay and motor

WIRING DIAGRAM




RHD Models
Luggage Compartment
Door Opener Relay
Body ECU
W–B
3
1
L–W
6
BC1
L–Y
8
B7
TR+
Luggage Compartment
Door Switch and Motor Actuator
11
IB2
2
G
4
G–Y
1
2
R–Y
7
B7
LCTY
G
R–Y
A
J15
J/C
A
Driver Side J/B
2
DOOR
1
1F
1C
10
BC1
W–B
R–Y
W
Engine Room J/B
ALT
B
A
J16
J/C
1
1
2
1
B
J13
J/C
B
ECU–B1
B–L
R–Y
Luggage
Compartment
Light
2
1
1
B
L–Y
Passenger Side J/B
J13
J/C
BK
Battery
1
DOME
1
2K
2I
A
A
L–Y
N
I11461

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check luggage opener motor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the luggage opener motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check luggage opener motor. (See page BE–114)**

NG → **Replace the luggage opener motor.**

OK

3	**Check wire harness and connector between luggage opener motor and Body ECU, and luggage opener relay and Body ECU.**

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

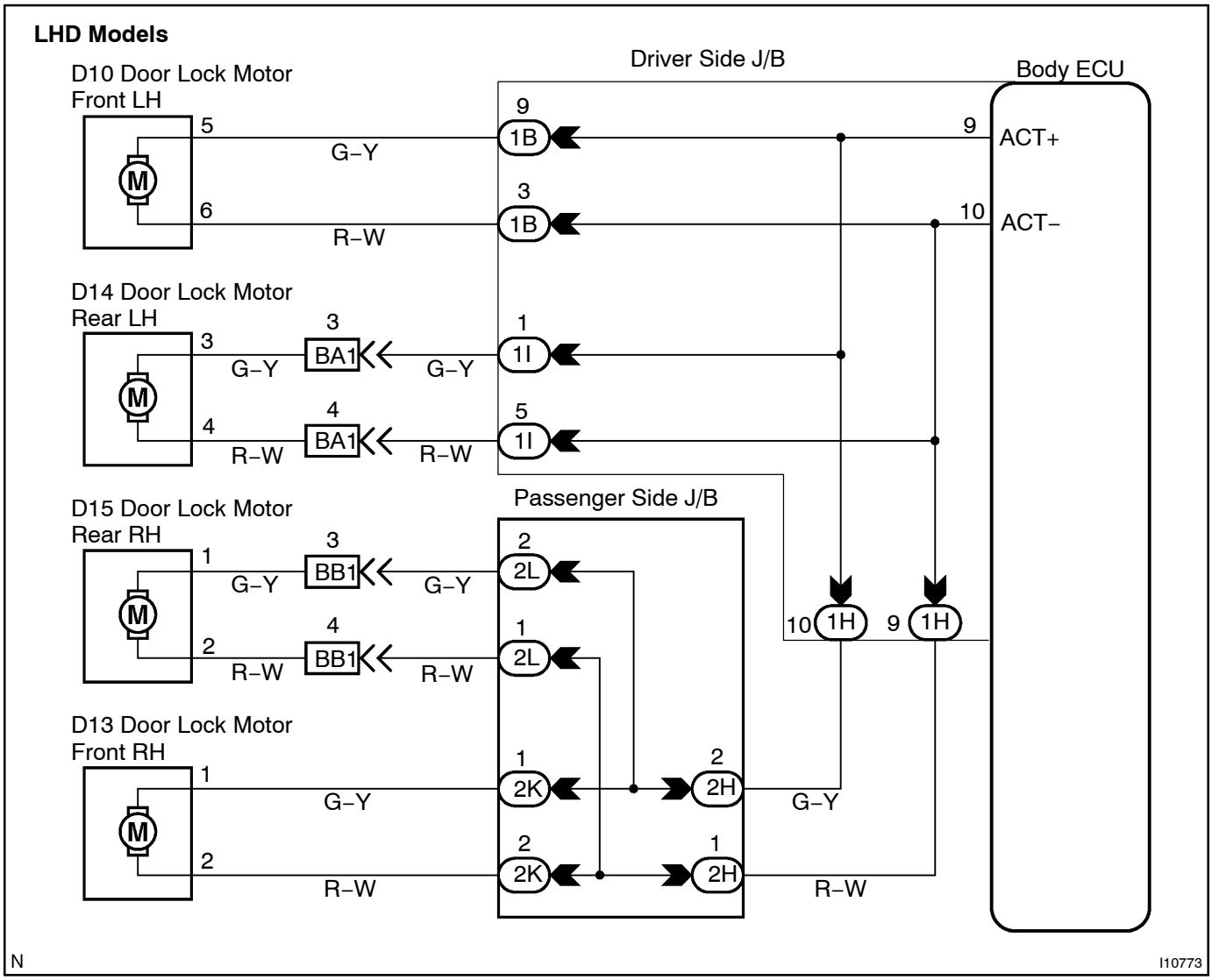
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

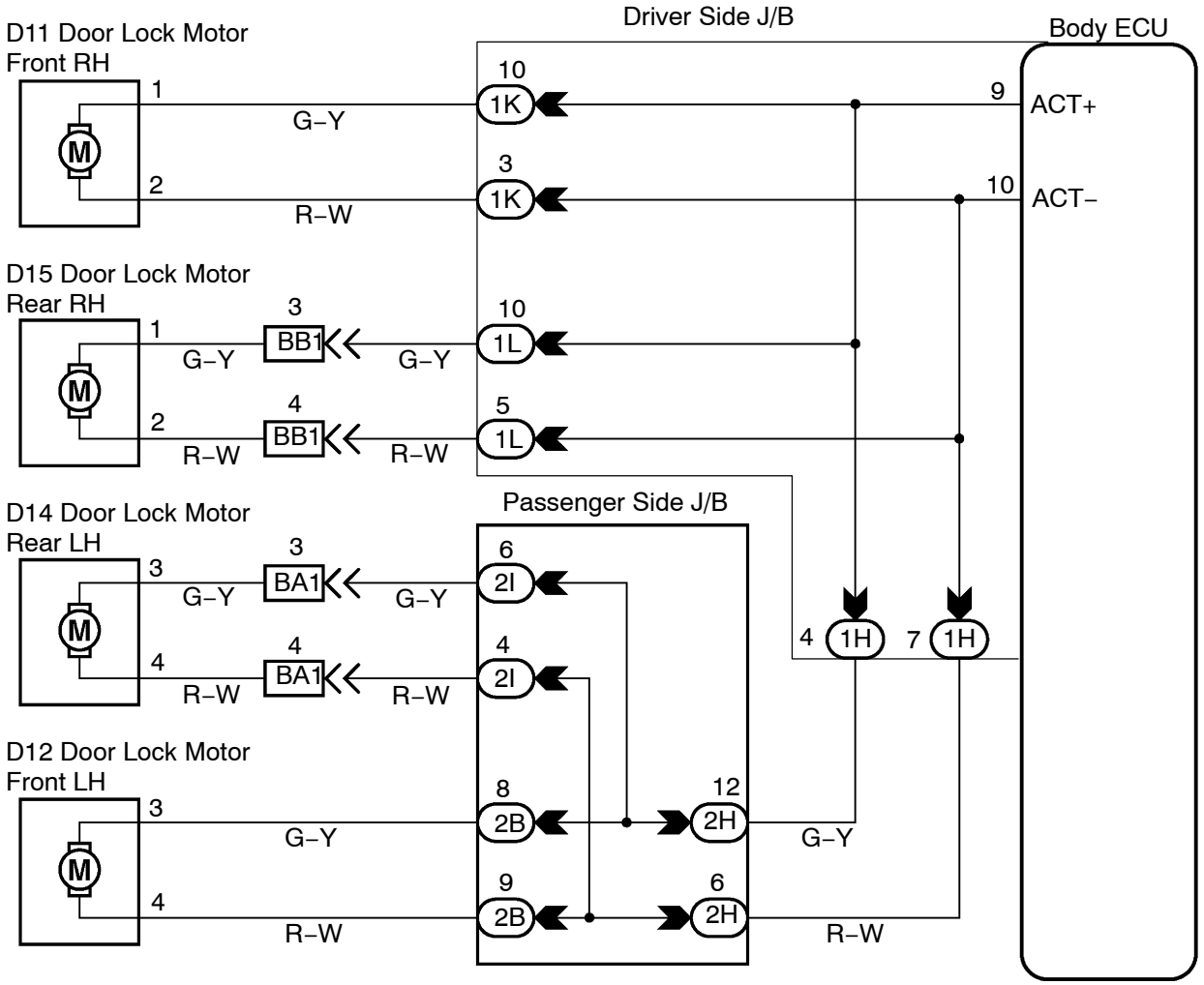
DI62T–01

Door lock motor circuit

WIRING DIAGRAM



RHD Models


D11 Door Lock Motor
Front RH
D15 Door Lock Motor
Rear RH
D14 Door Lock Motor
Rear LH
D12 Door Lock Motor
Front LH
Driver Side J/B
Passenger Side J/B
Body ECU
ACT+
ACT–
G–Y
R–W
BB1
BA1
1K
1L
2I
2B
1H
2H
N
I11459

INSPECTION PROCEDURE

1	Check door lock motor (See page BE–114).

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door lock motor and body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

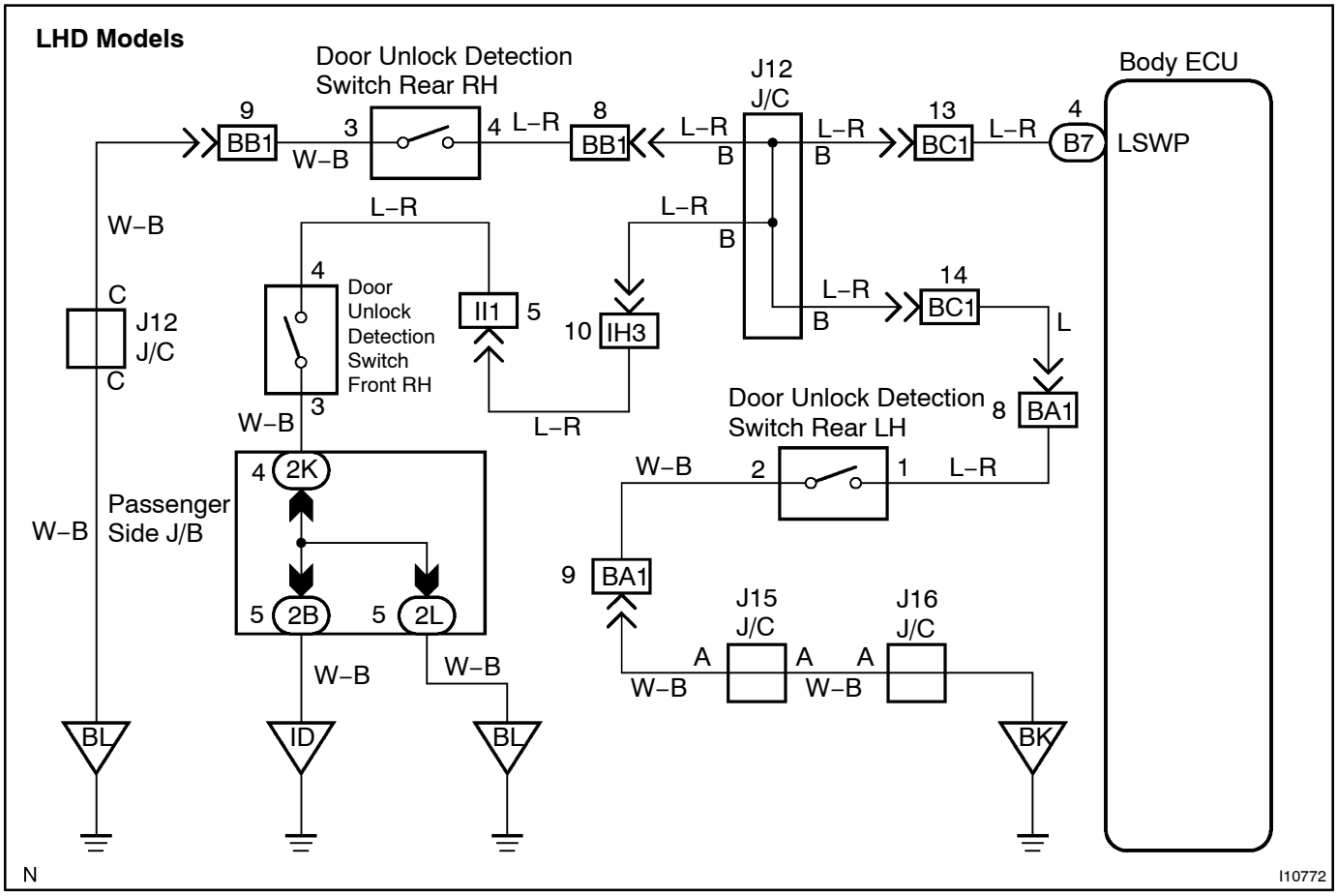
DI62U–01

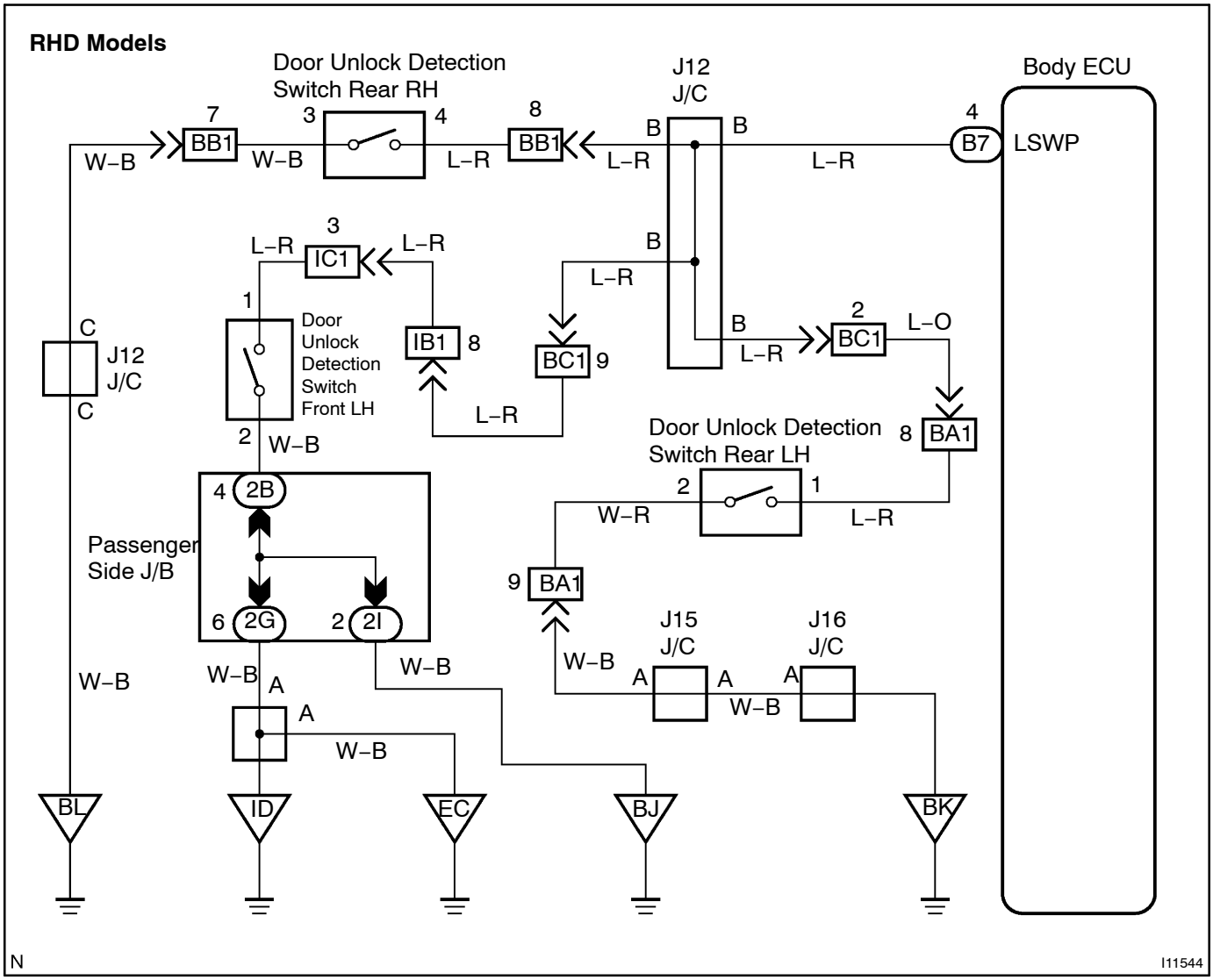
Door unlock detection switch circuit

CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function.

WIRING DIAGRAM




RHD Models
Door Unlock Detection Switch Rear RH
J12 J/C
Body ECU
7
BB1
3
4
8
BB1
B
B
4
B7
LSWP
W–B
W–B
L–R
L–R
L–R
3
L–R
IC1
L–R
B
L–R
1
Door Unlock Detection Switch Front LH
IB1
8
BC1
9
B
2
BC1
L–O
C
J12 J/C
C
L–R
2
W–B
Door Unlock Detection Switch Rear LH
8
BA1
4
2B
2
1
W–R
L–R
Passenger Side J/B
9
BA1
6
2G
2
2I
J15 J/C
J16 J/C
W–B
W–B
W–B
A
A
A
A
W–B
W–B
BL
ID
EC
BJ
BK
N
I11544

INSPECTION PROCEDURE

1	Check door unlock detection switch (See page BE–114).

NG → Replace the door unlock detection switch.

OK

2	Check wireharness and connector between door unlock detection switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

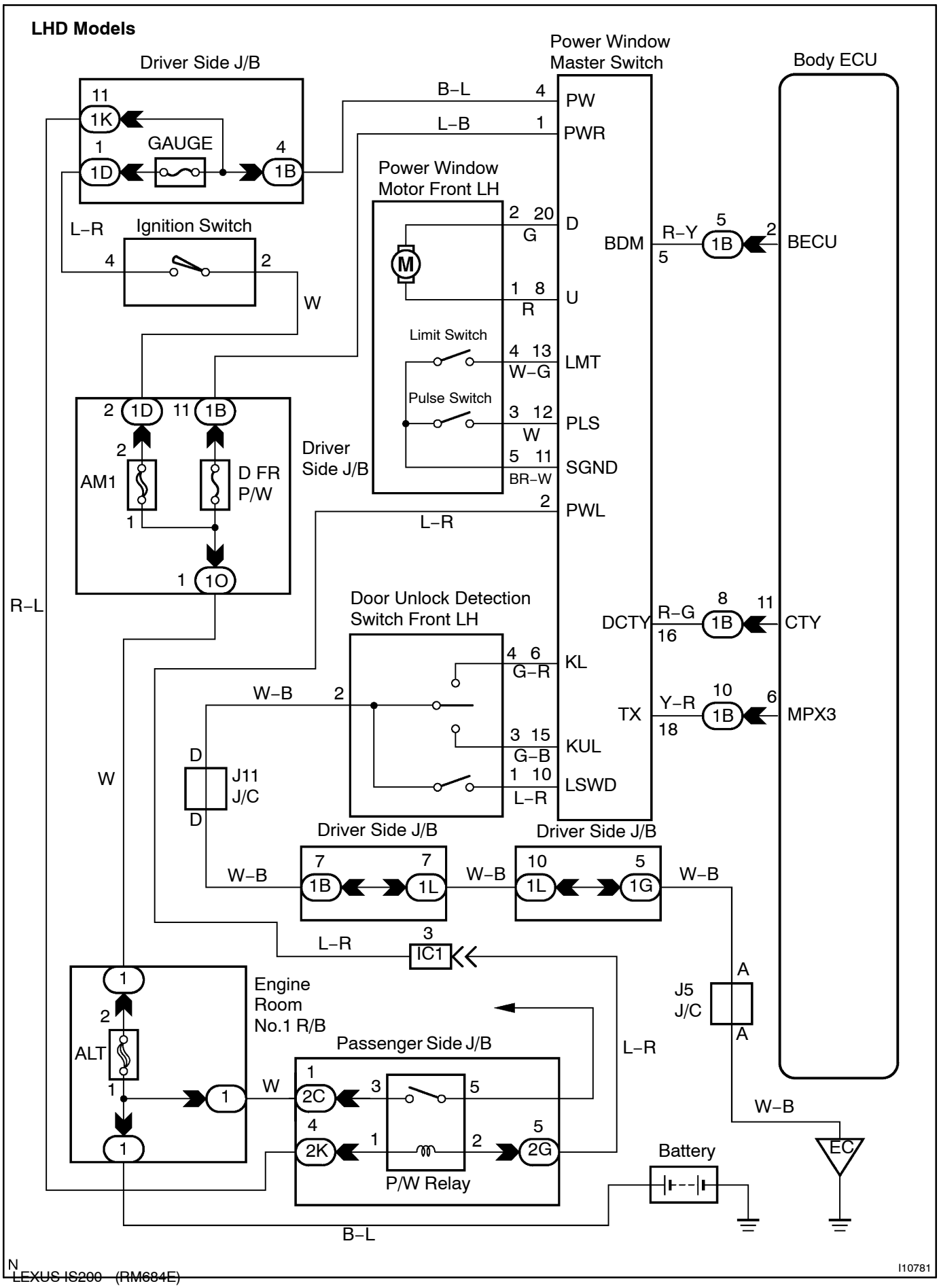
DI62V–01

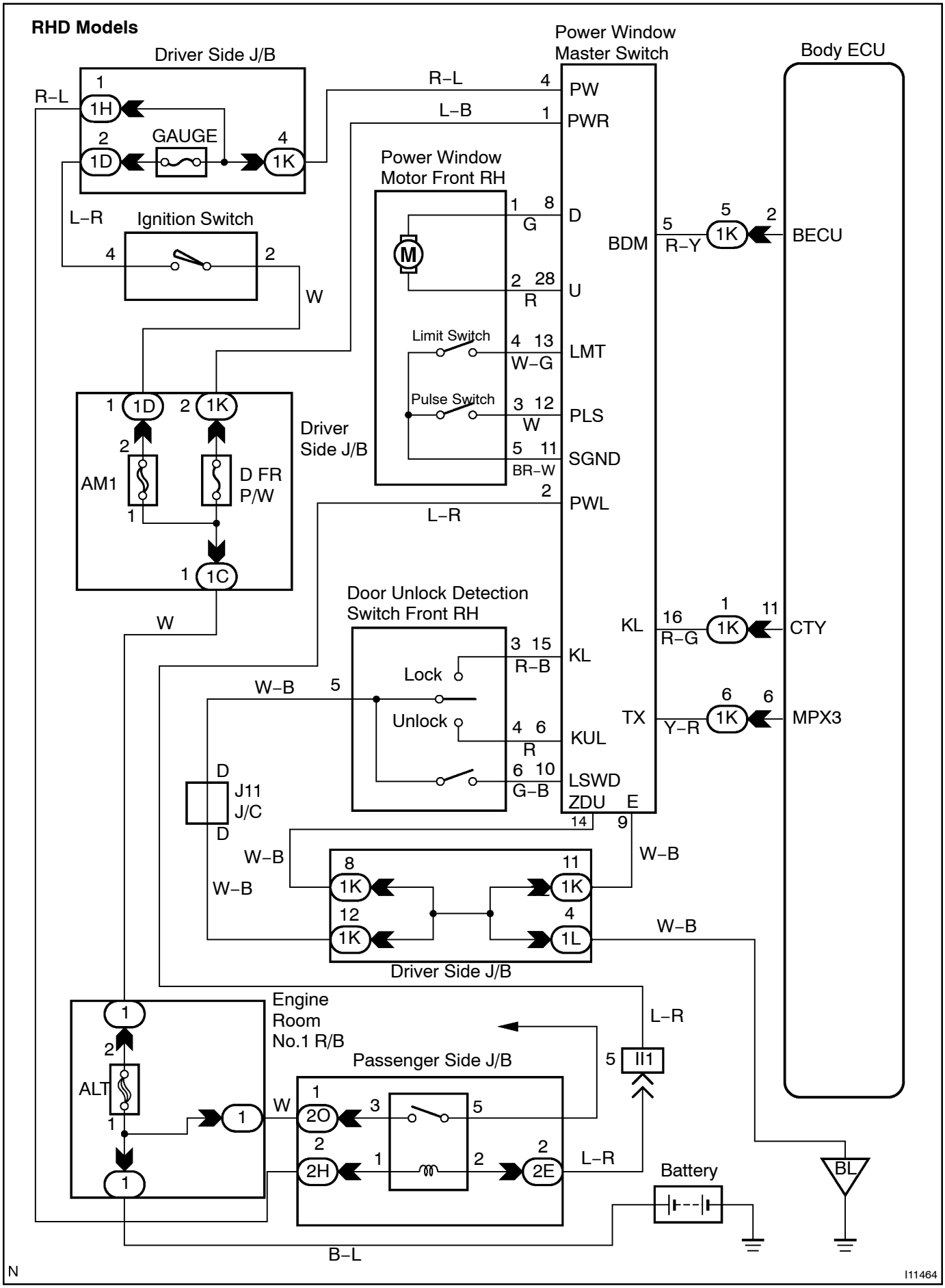
Power window master switch circuit

CIRCUIT DESCRIPTION

Power window master switch circuit can be checked using DTC check. (See page DI–622)

WIRING DIAGRAM




RHD Models
Driver Side J/B
Power Window Master Switch
Body ECU
R–L
1H
GAUGE
1D
1K
L–B
PW
PWR
Power Window Motor Front RH
D
G
U
R
Limit Switch
LMT
W–G
Pulse Switch
PLS
W
SGND
BR–W
PWL
L–R
BDM
R–Y
BECU
Ignition Switch
L–R
W
AM1
D FR P/W
1C
Driver Side J/B
Door Unlock Detection Switch Front RH
Lock
Unlock
KL
R–B
KUL
LSWD
ZDU
E
W–B
J11 J/C
CTY
R–G
TX
Y–R
MPX3
Driver Side J/B
Engine Room No.1 R/B
Passenger Side J/B
ALT
2O
2H
2E
II1
L–R
Battery
BL
B–L
N
I11464

INSPECTION PROCEDURE

1	Check the power window master switch circuit using DTC check (See page DI–622).

OK → Proceed to next circuit inspection shown on problem symptom table (See page DI–554).

OK

2	Check the power window master switch. (See page BE–109)

NG → Replace the power window master switch.

OK

3	Check wireharness and connector between power window master switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

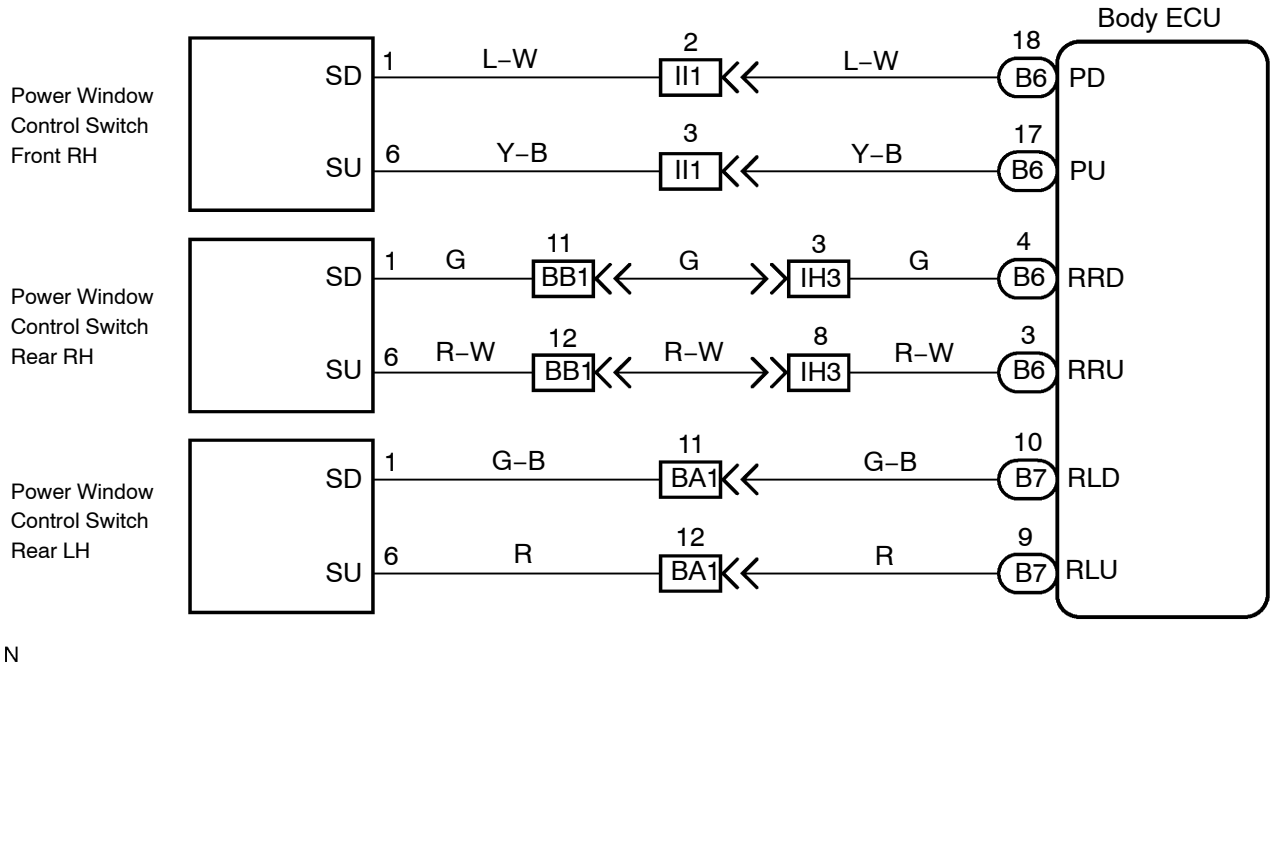
Proceed to next circuit inspection shown on problem symptom table (See page DI–554).

DI62W–01

Power window switch circuit

WIRING DIAGRAM

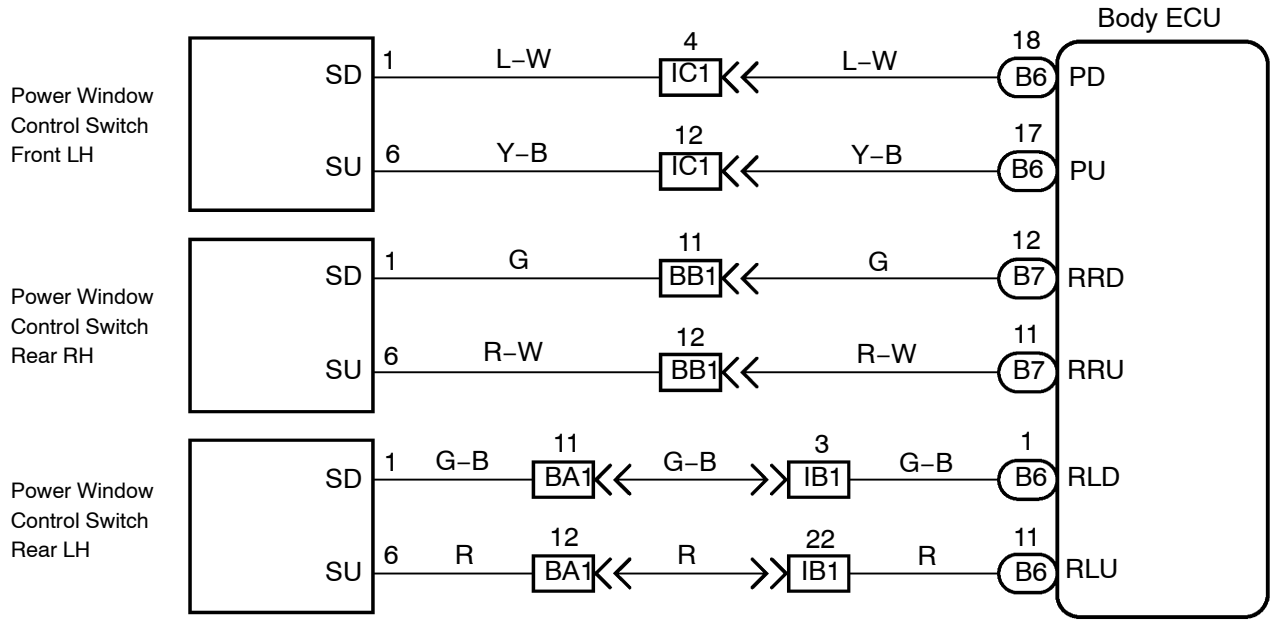
LHD Models



N

I10769

RHD Models



N

I11462

INSPECTION PROCEDURE

1	Check the power window switch. (See page BE–109)

NG → Replace the power window switch.

OK

2	Check wireharness and connector between power window switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

3	Check wireharness and connector between power window switch and body ground.

NG → Repair or replace wireharness or connector.

OK

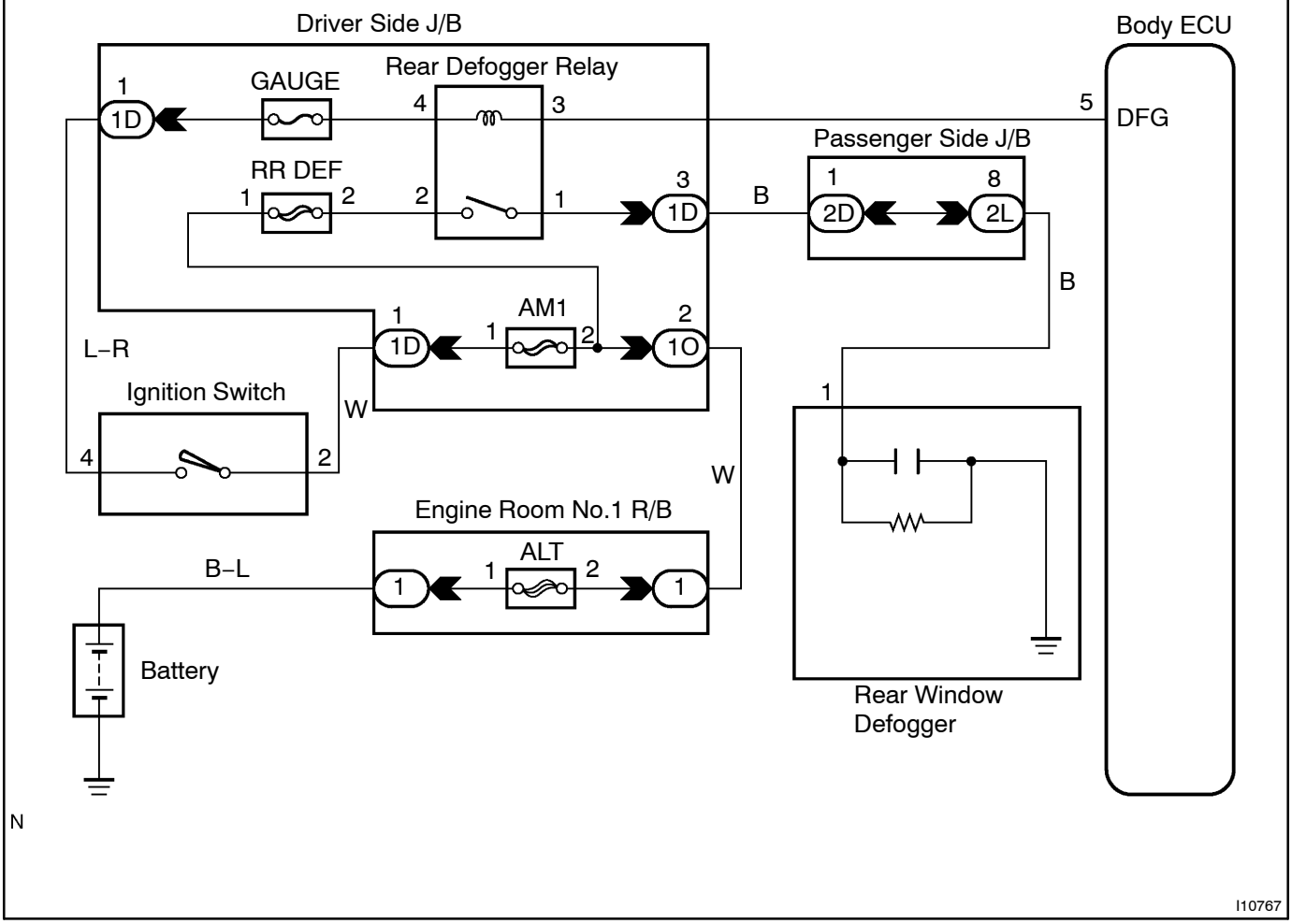
Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62X–01

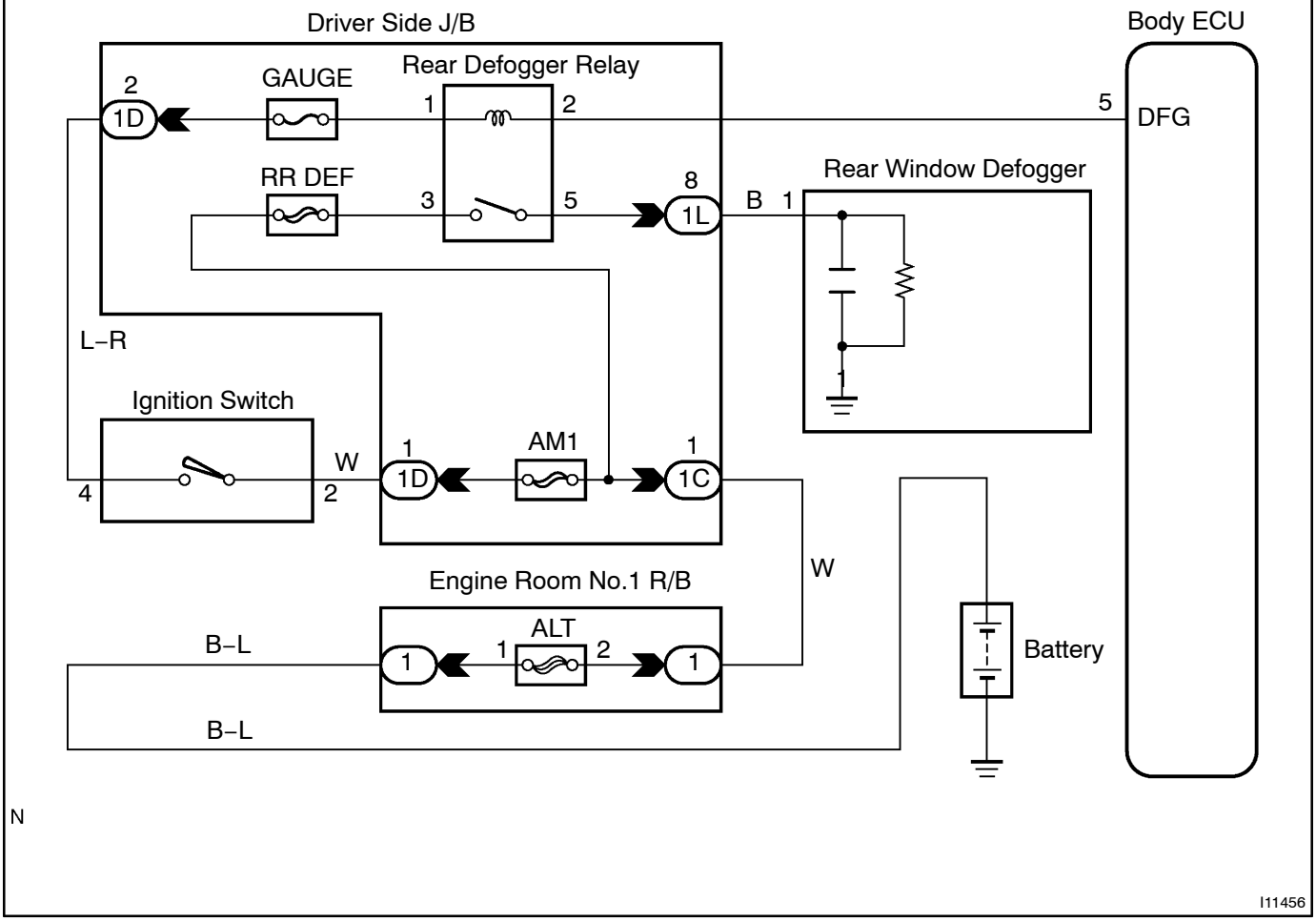
Front Deicer and Rear defogger relay circuit

WIRING DIAGRAM

LHD Models



RHD Models


Driver Side J/B
Body ECU
GAUGE
Rear Defogger Relay
2
1D
1
2
5
DFG
RR DEF
3
5
8
1L
B
1
Rear Window Defogger
L–R
Ignition Switch
W
1
AM1
1
4
2
1D
1C
W
Engine Room No.1 R/B
ALT
B–L
1
1
2
1
Battery
B–L
N
I11456

INSPECTION PROCEDURE

1	Check rear defogger relay (See page BE–96).

NG → Replace the rear defogger relay.

OK

2	Check front defogger relay (See page BE–96).

NG → Replace the rear defogger relay.

OK

3	Check wire harness and connector between rear defogger relay and body ECU, front defogger relay and body ECU.

NG → Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62Y–01

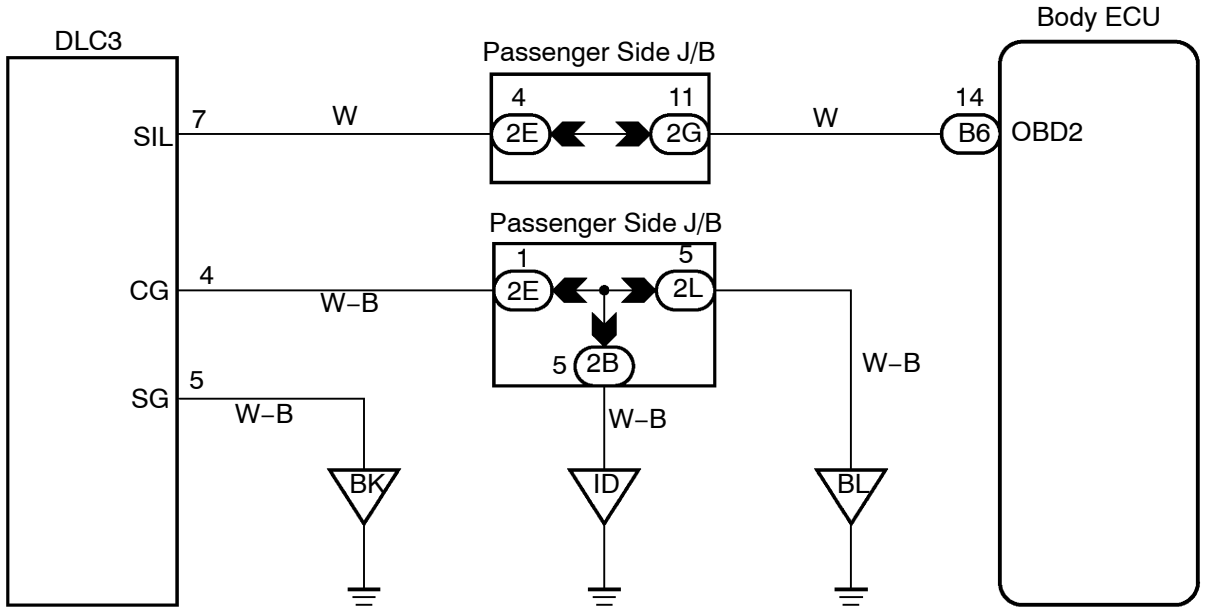
Diagnosis Circuit

CIRCUIT DESCRIPTION

This circuit sends a signal to the ECU that DTC output is required.

WIRING DIAGRAM

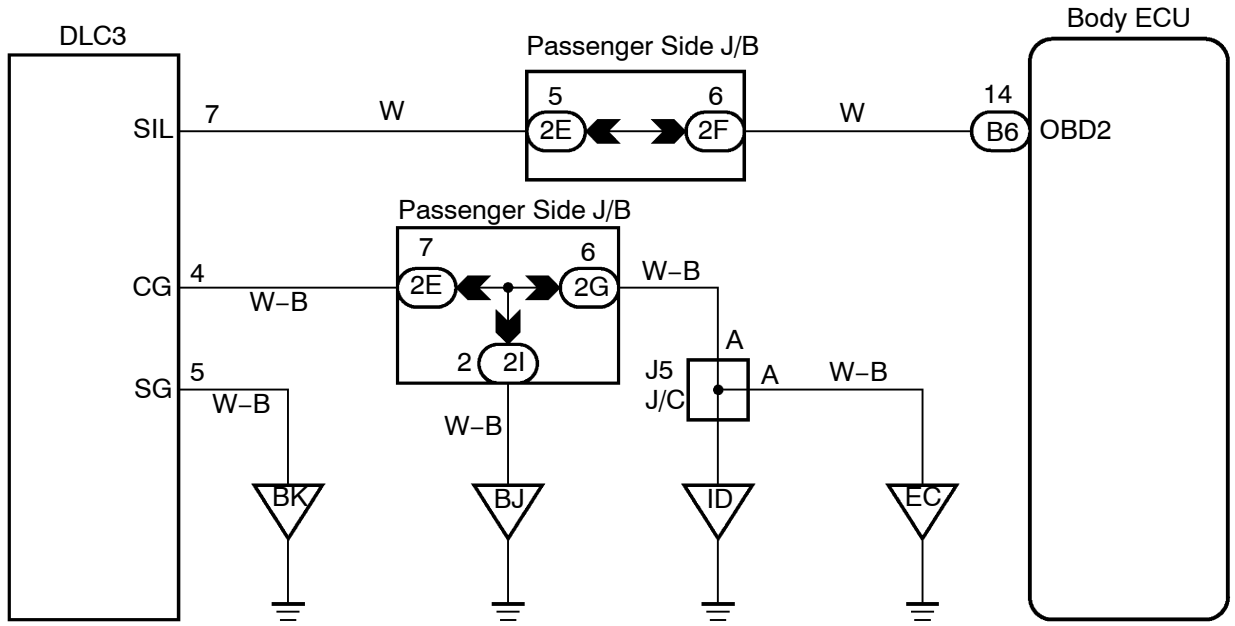
LHD Models



N

I11541

RHD Models

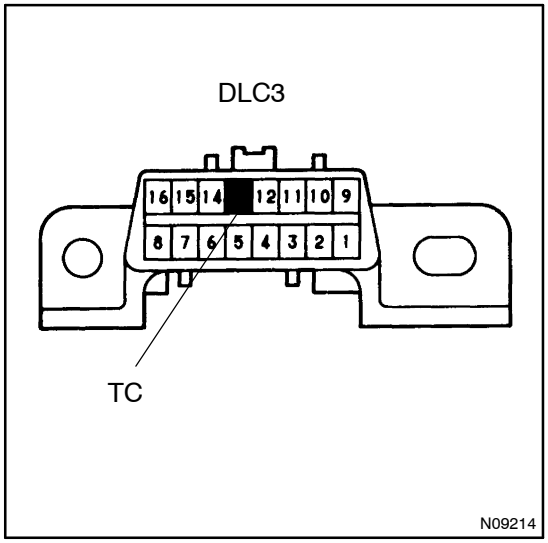


N

I11542

INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E_1 of DLC3.



PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals Tc and E_1 of DLC3.
OK:
Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptom table (See page DI–554).

NG

2	Check harness and connector between body ECU and DLC3, DLC3 and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

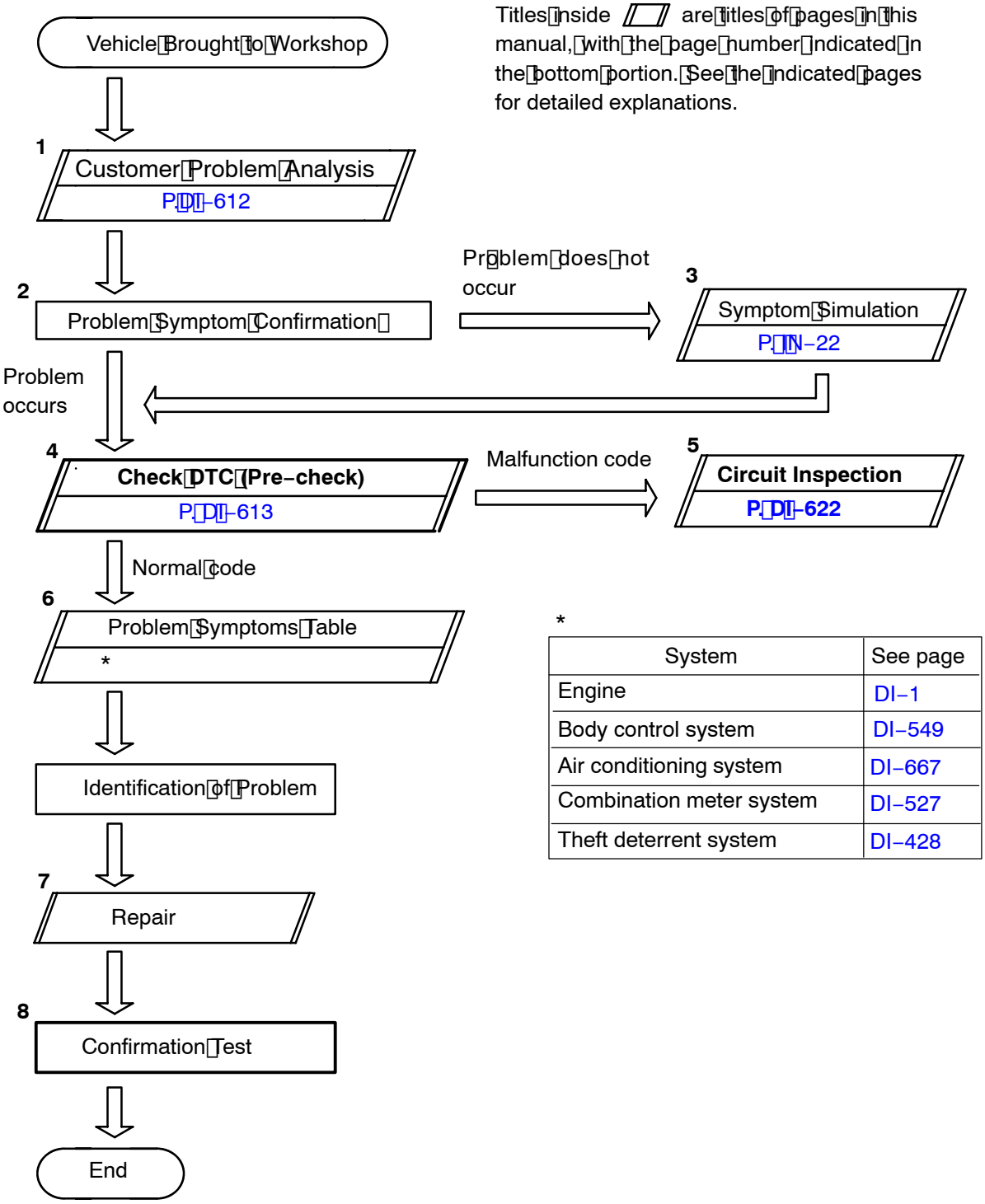
Check and replace Body ECU (See page IN–32).

MULTIPLEX COMMUNICATION SYSTEM

DI62Z–01

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



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

*

System	See page
Engine	DI–1
Body control system	DI–549
Air conditioning system	DI–667
Combination meter system	DI–527
Theft deterrent system	DI–428

Step 4, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI630–01

CUSTOMER PROBLEM ANALYSIS CHECK

MULTIPLEX COMMUNICATION SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

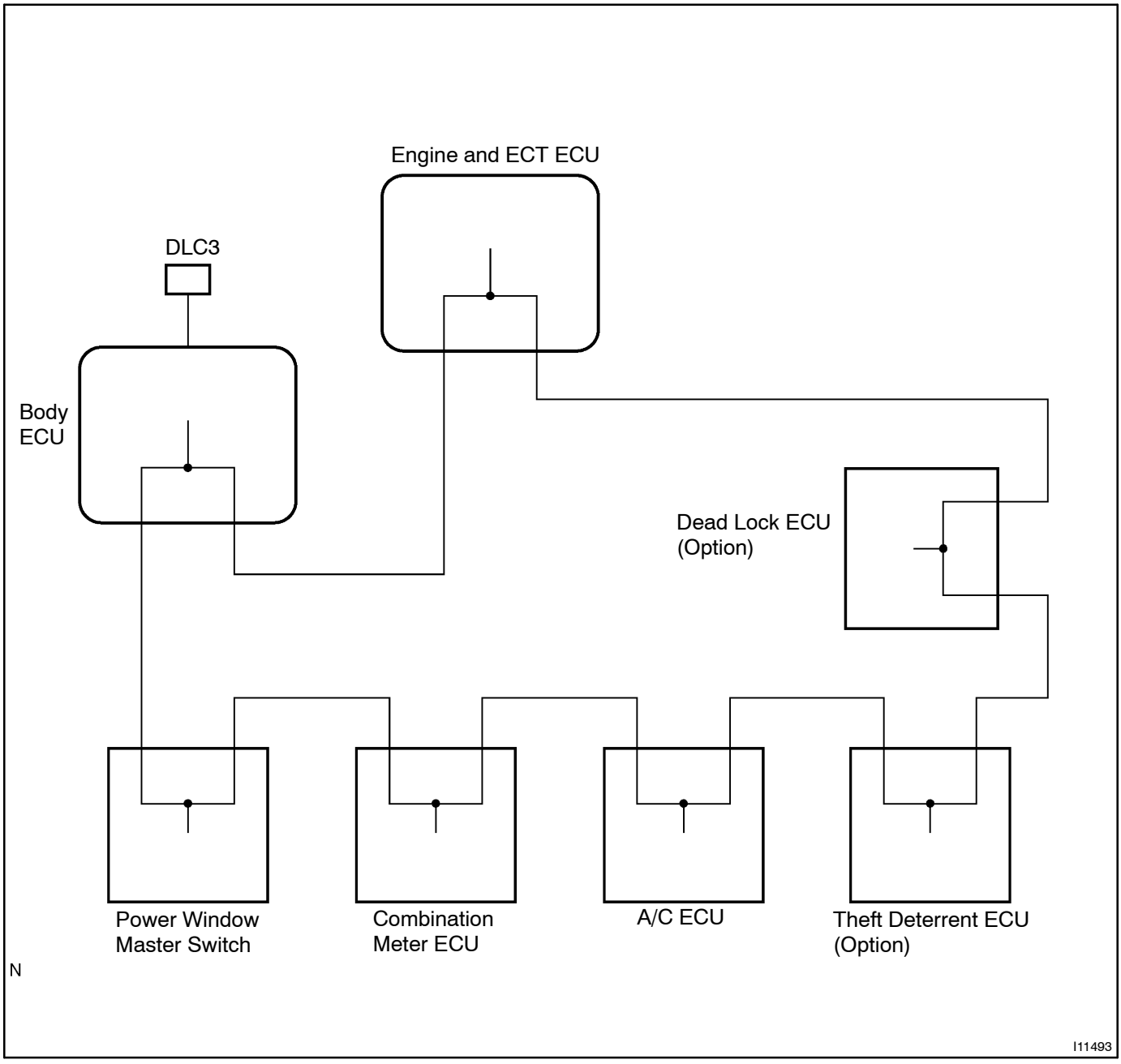
Malfunction System	☐ Engine
	☐ Body Control System
	☐ Air Conditioning System
	☐ Combination Meter System
	☐ Theft Deterrent System

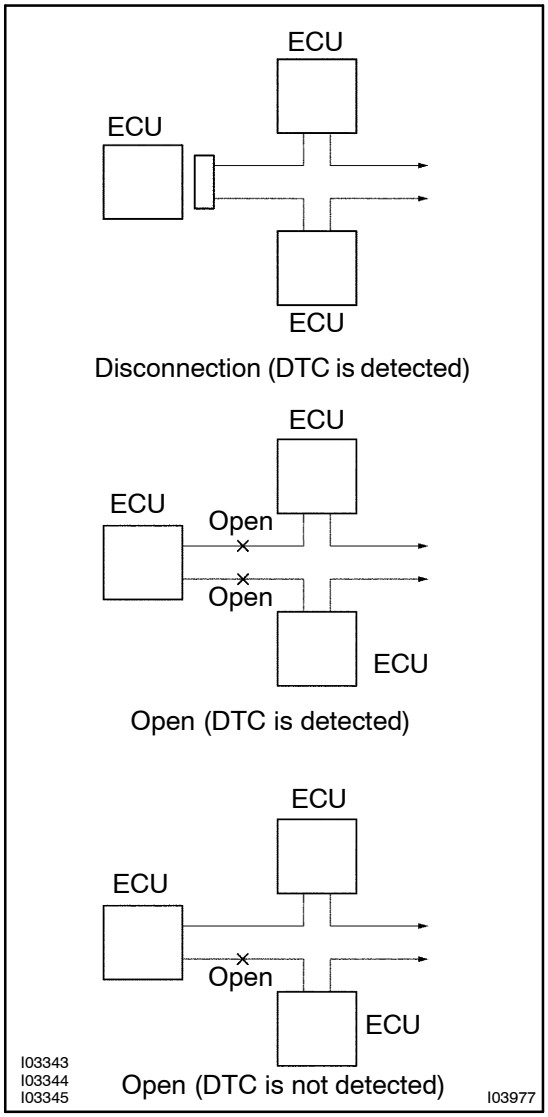
DI631–01

PRE–CHECK

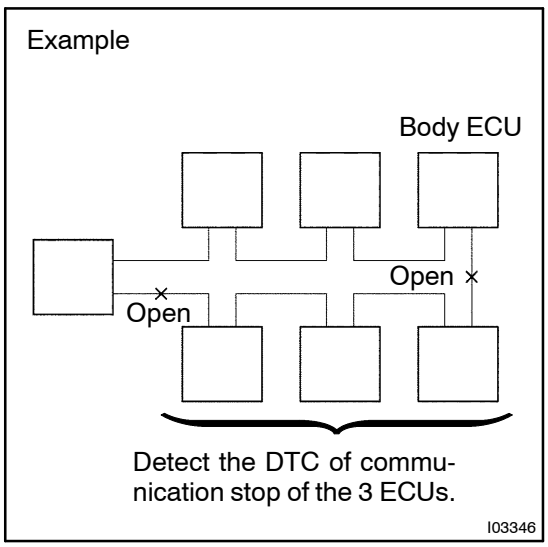
1. DIAGNOSIS SYSTEM

(a) As shown in the following illustration, each ECU of this vehicle is connected by communication bus and it transmits each signal by communication. This communication bus is self–diagnosed by Body ECU and it memorizes DTC when it detects communication stop to ECU or communication bus +B short or GND short. There is a possibility that Body ECU cannot self–diagnose accurately unless it doesn't work normal. So, please note that the troubleshooting of Body Electrical System should be done after confirming if Body ECU and Open door indicator works normal by 2 "BASIC INSPECTION" described later.





(b) If DTC of ECU communication stop is output, there is a possibility of connector disconnection or 2 communication buses open. It will not become abnormal with only 1 communication bus open.



(c) If 2 communication buses are open at the position as shown in the illustration, DTC of ECU communication stop between those 2 buses is output.

2. BASIC INSPECTION

INSPECT BODY ECU

1	**Check Body ECU operation.**

HINT:
With this inspection Body ECU CPU can be diagnosed if it works normal or not.

CHECK:

Check if the luggage compartment door opener works normal.

OK → **Go to next step "OPEN DOOR INDICATOR LIGHT INSPECTION".**

NG

2	**Check luggage compartment door opener system (Except Body ECU).** **(See page BE–114)**

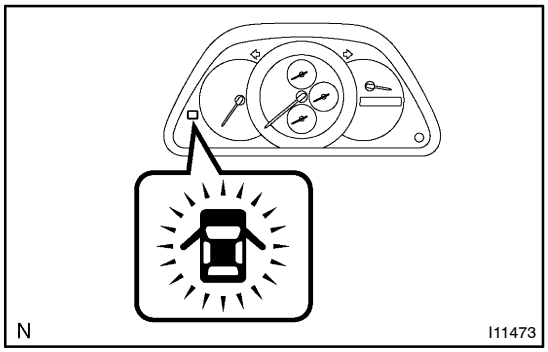
OK → **Replace the Body ECU.**

NG

Repair of replace malfunction part.

INSPECT OPEN DOOR INDICATOR LIGHT.

1	**Check open door indicator light.**



CHECK:

Check if open door indicator light is turned on when either door open.

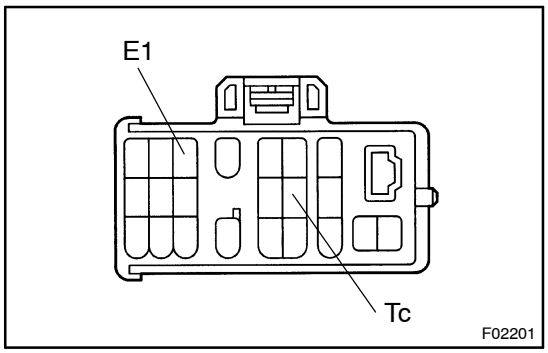
HINT:

If open door indicator light is not turned on, DTC will not be output.

OK	**Go to step 3. "DTC CHECK".**

NG

Repair the open door indicator light.
(See page BE–83)

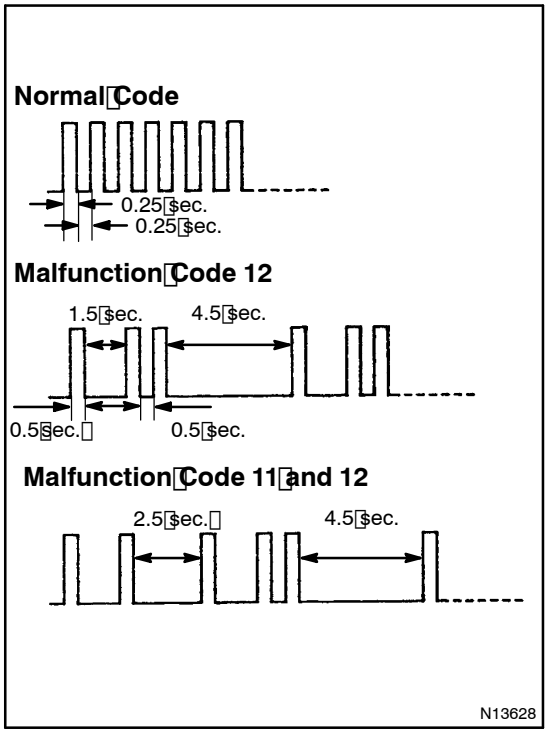


3. DTC CHECK (Using diagnosis check wire)

(a) Using SST, connect terminals Tc and E1 of DLC1.
SST 09843–18020

(b) Turn the ignition switch ON.

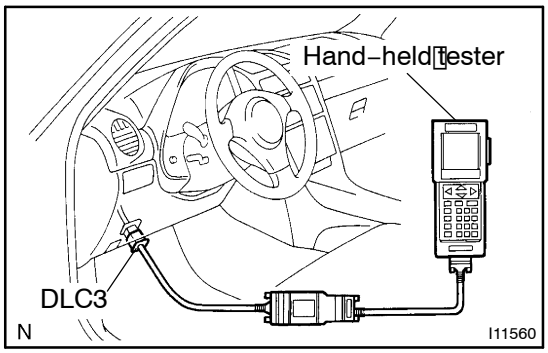
(c) Read the DTC on the open door indicator light.



As an example, the blinking patterns for codes; normal, 12, and 11 and 12 are shown in the illustration.

(d) Check for the problem using the DTC table on the next page.

(e) After completing the check, turn the ignition switch off, and disconnect terminals Tc and E1.



4. DTC CHECK (Using LEXUS hand–held tester)

(a) Prepare the hand–held tester.

(b) Connect the hand–held tester to DLC3.

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

(d) Use the hand–held tester to check the DTCs, note them down. (For opening instructions, see the hand–held tester's instruction book.)

(e) See page DI–618 to confirm the details of the DTCs.

5. DTC CLEARANCE

DTC will be cleared when the troble output to DTC is recovered normally.

DI632–01

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

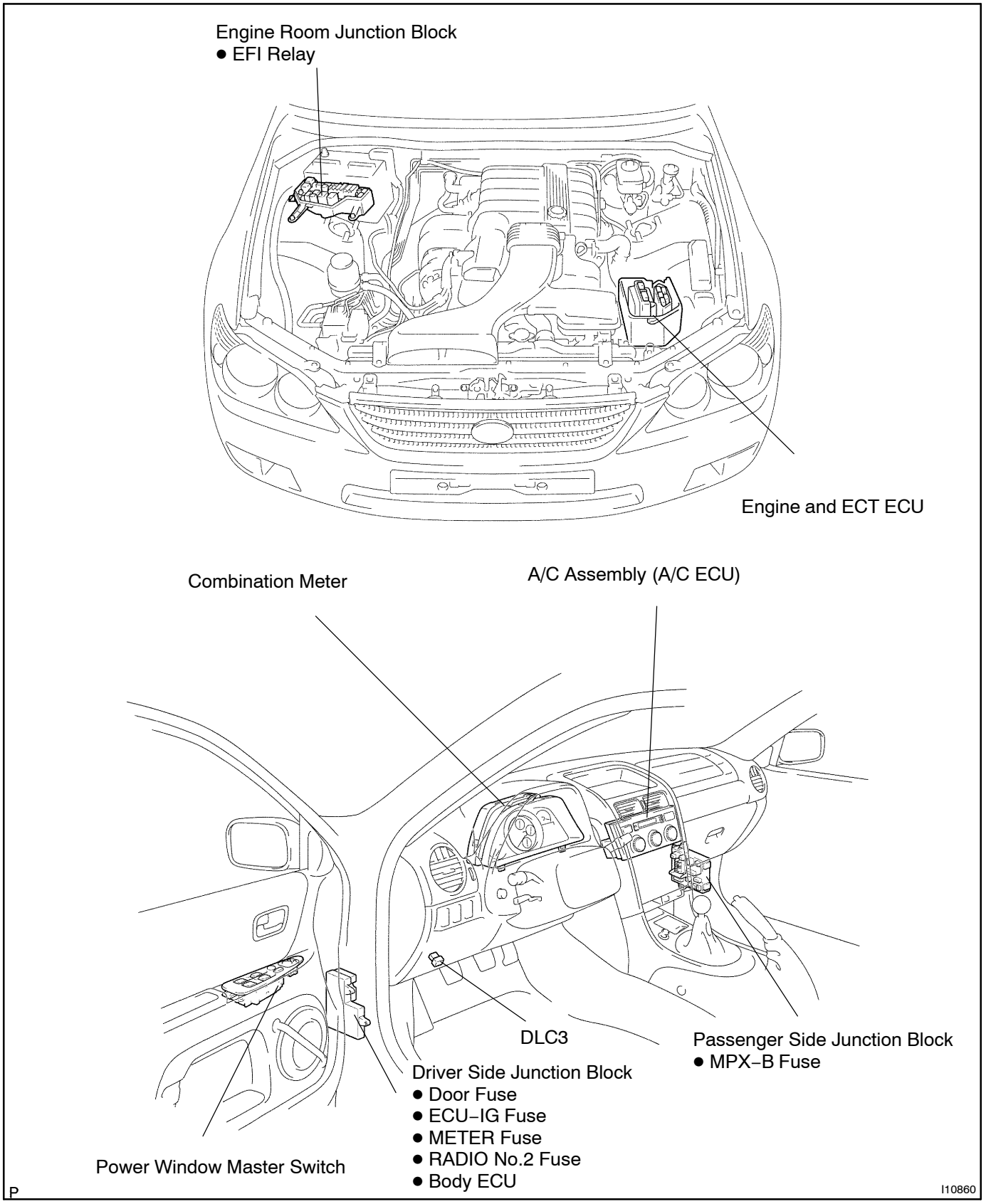
DTC No. (See Page)	Detection Item	Trouble Area
B1211/11 (DI–622)	Power window master switch ECU communication stop	• Wireharness • Power window master switch ECU
B1214/14 B1215/15 (DI–626)	Communication bus malfunction (+B short)	• Wireharness • ECU
	Communication bus malfunction (GND short)	
B1241/41 (DI–629)	Power window master switch ECU switch circuit diagnosis	• Power window master switch
B1242/42 (DI–630)	Wireless door lock tuner circuit malfunction	• Wireharness • Wireless door lock tuner
B1244/44 (DI–632)	Light sensor circuit malfunction	• Light sensor • Wireharness
B1261/61 (DI–634)	Engine and ECT ECU communication stop	• Wireharness • Engine and ECT ECU
B1262/62 (DI–636)	A/C ECU communication stop	• Wireharness • A/C ECU
B1269/69 (DI–638)	Theft deterrent ECU communication stop	• Wireharness • Theft deterrent ECU
B1271/71 (DI–640)	Combination meter ECU communication stop	• Wireharness • Combination meter ECU

HINT:

- DTC 71 are not output through open door warning light on meter because of system itself.
- When some of the DTC 14, 15 is output, the DTC of other ECU communication stop is also output. In this case, please repair DTC 14, 15 first. The following shows DTCs which are output when +B or GND short occurs on communication bus.

DI633–01

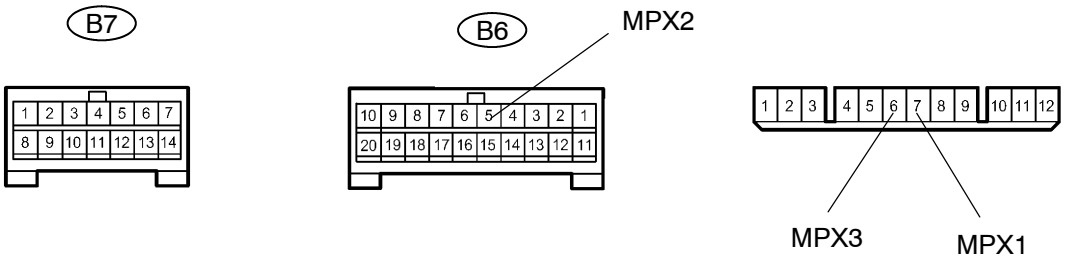
PARTS LOCATION



DI634–01

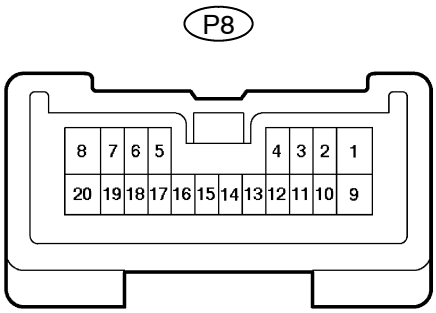
TERMINALS OF ECU

BODY CONTROL ECU



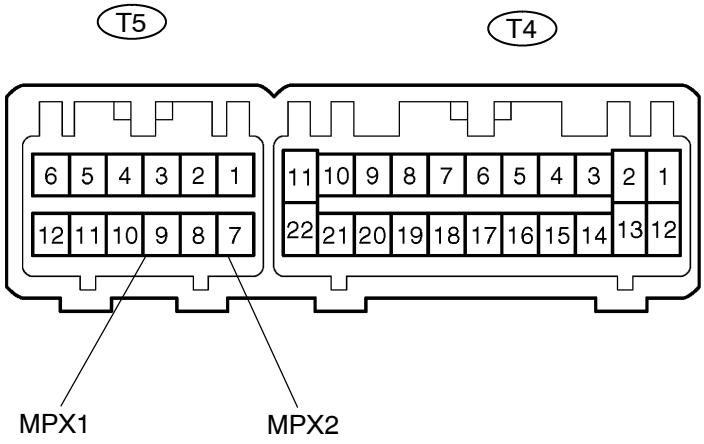
I11362

POWER WINDOW MASTER SWITCH



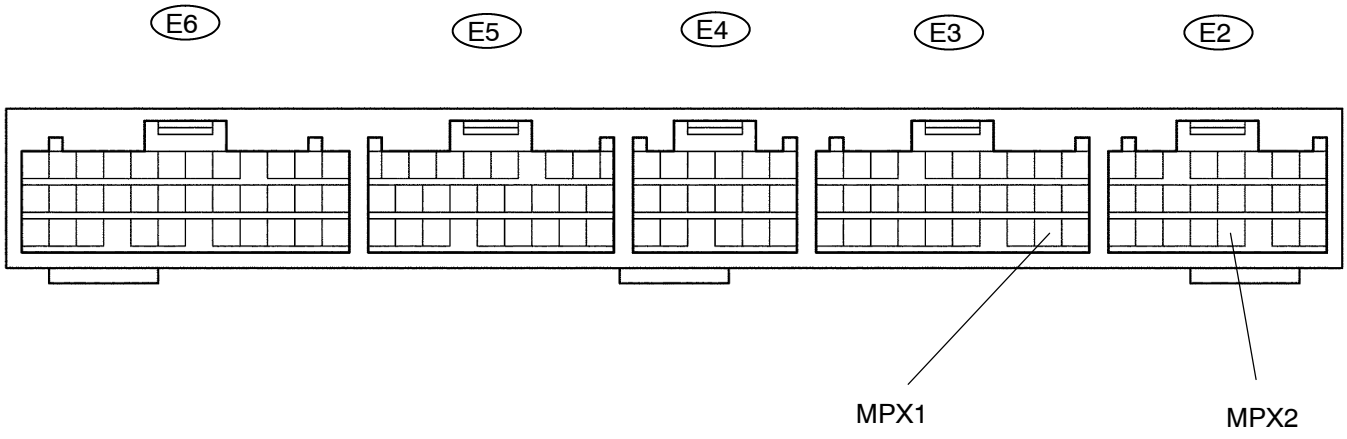
I11502

THEFT DETERRENT ECU

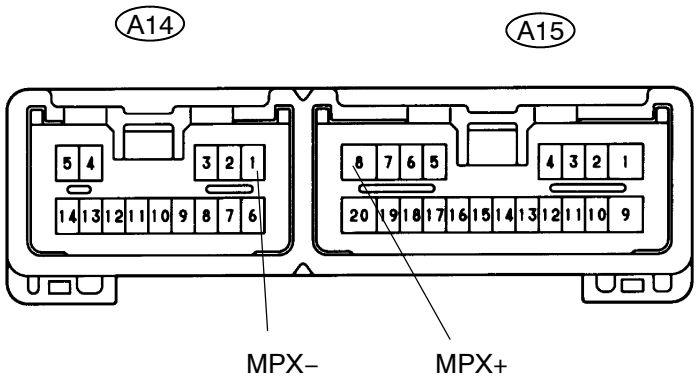


I01920

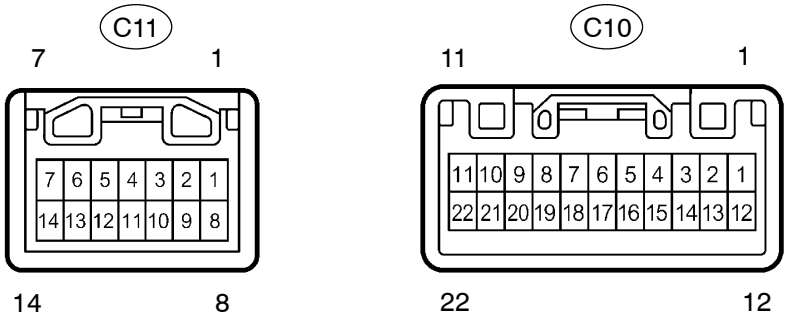
ENGINE AND ECT ECU



A/C ECU



COMBINATION METER ECU



DI635–01

CIRCUIT INSPECTION

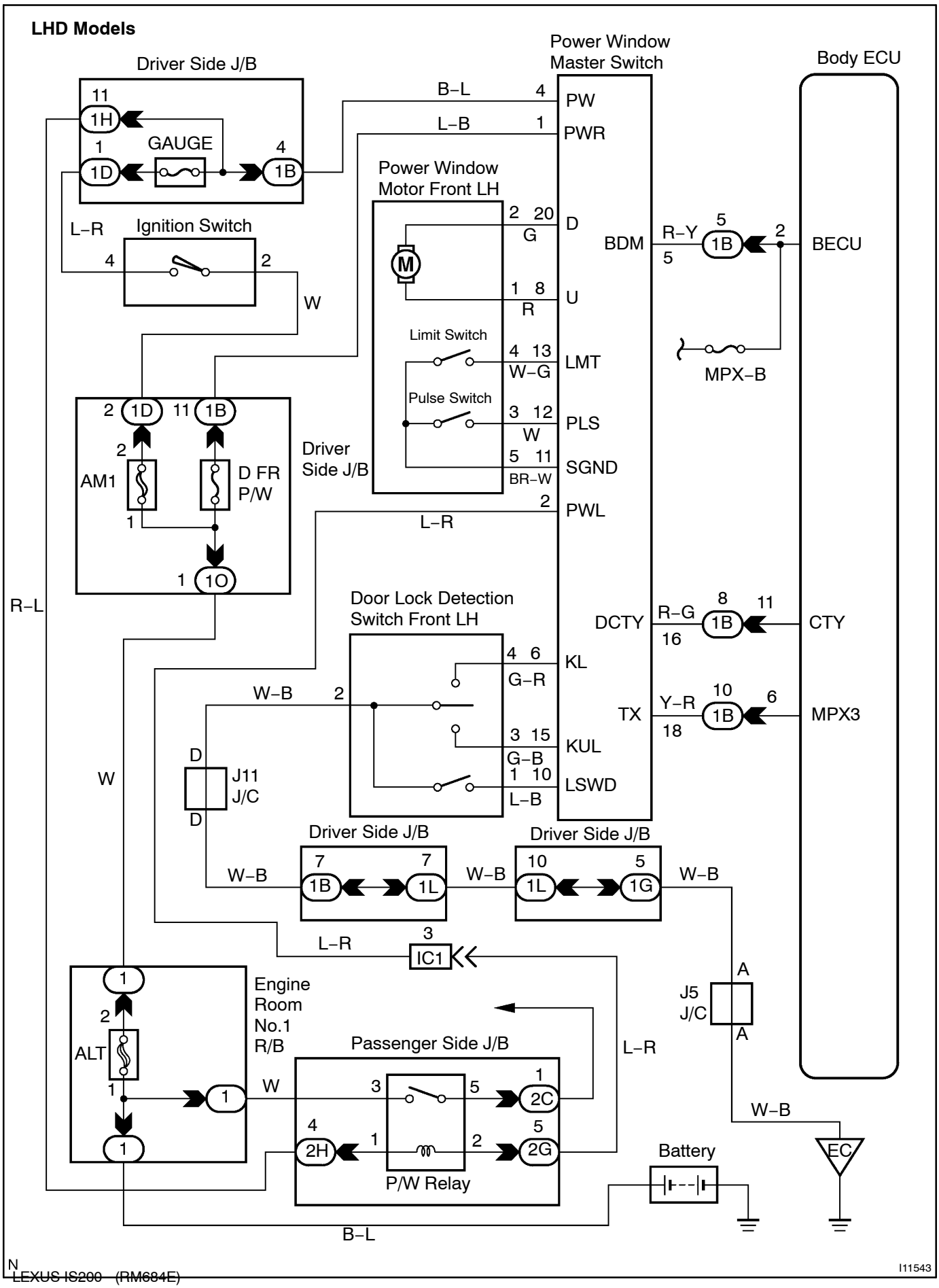
DTC	B1211 / 11	Power window master switch ECU communication stop

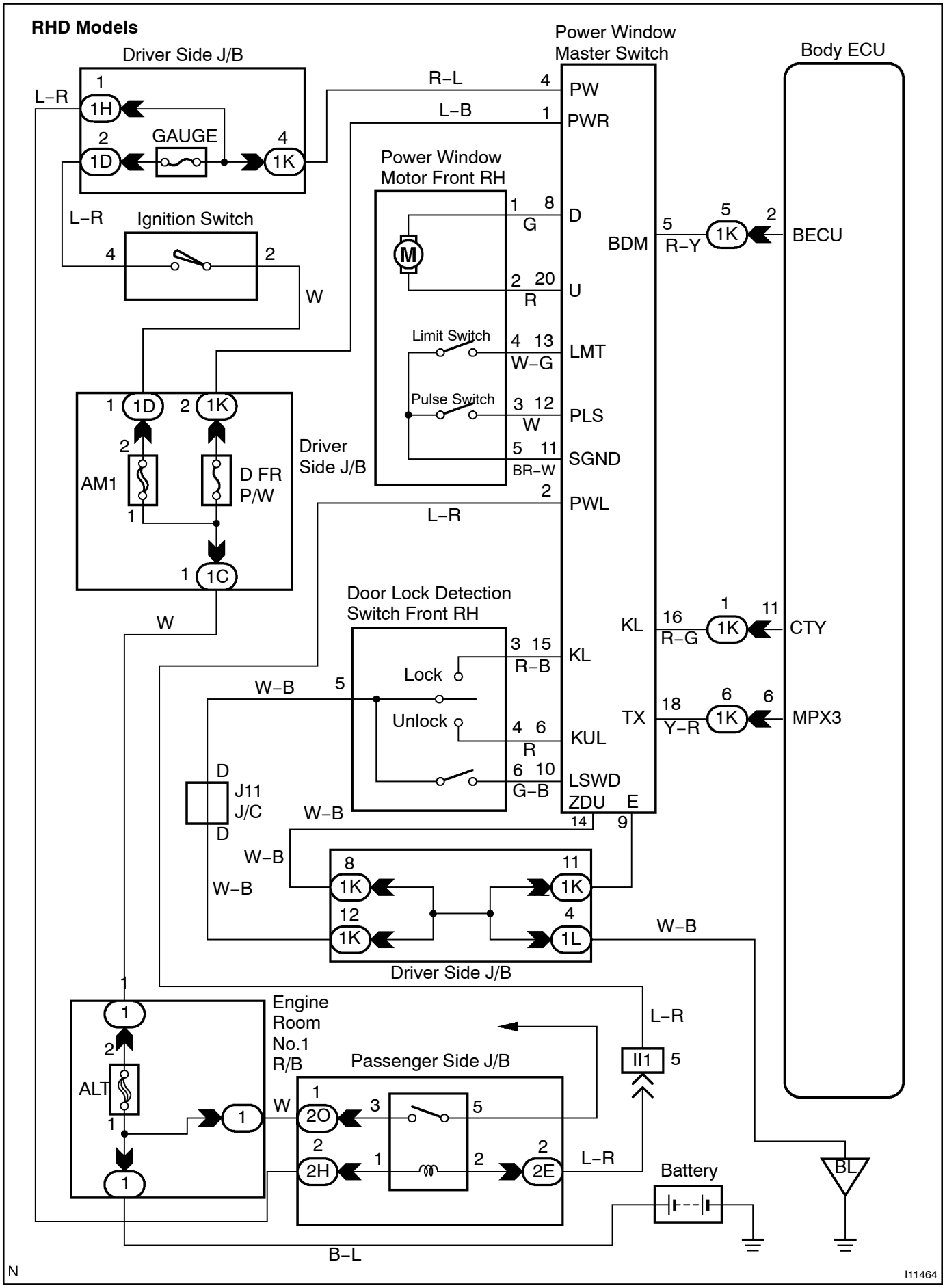
CIRCUIT DESCRIPTION

This DTC is output when communication stops between power window master switch ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1211/11	No communication from power window master switch ECU more than 10 seconds.	• Power window master switch ECU • Wireharness

WIRING DIAGRAM




RHD Models
Driver Side J/B
Power Window Master Switch
Body ECU
L–R
1H
GAUGE
1D
1K
R–L
L–B
PW
PWR
Power Window Motor Front RH
Ignition Switch
W
D
G
U
R
BDM
R–Y
BECU
Limit Switch
LMT
W–G
Pulse Switch
PLS
W
SGND
BR–W
PWL
AM1
D FR P/W
1C
Door Lock Detection Switch Front RH
KL
R–B
Lock
Unlock
KUL
LSWD
ZDU
E
W–B
J11 J/C
Driver Side J/B
TX
Y–R
MPX3
CTY
R–G
Engine Room No.1 R/B
ALT
Passenger Side J/B
2O
2H
2E
II1
L–R
Battery
BL
B–L
N
I11464

INSPECTION PROCEDURE

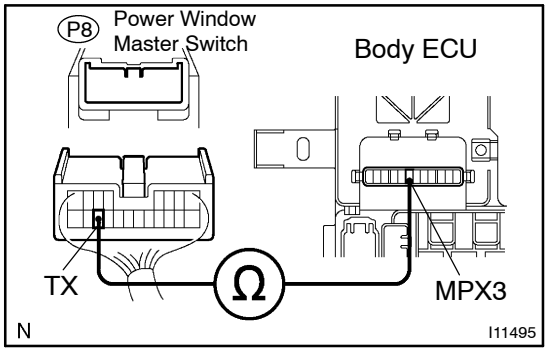
1	**Check power window master switch ECU.**

CHECK:
Check if the driver door window glass auto up.
HINT:
With this inspection, power window master switch CPU can be diagnosed if it works normally or not.

NG → **Replace the power window master switch.**

OK

2	**Check wireharness.**



PREPARATION:
Disconnect connector of body ECU and ”P8” of power window master switch.
CHECK:
Check continuity between terminals MPX3 of body ECU and TX of power window master switch.
OK:
There is a continuity in wireharness.
HINT:
If there is OPEN in wireharness, please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the power window master switch.

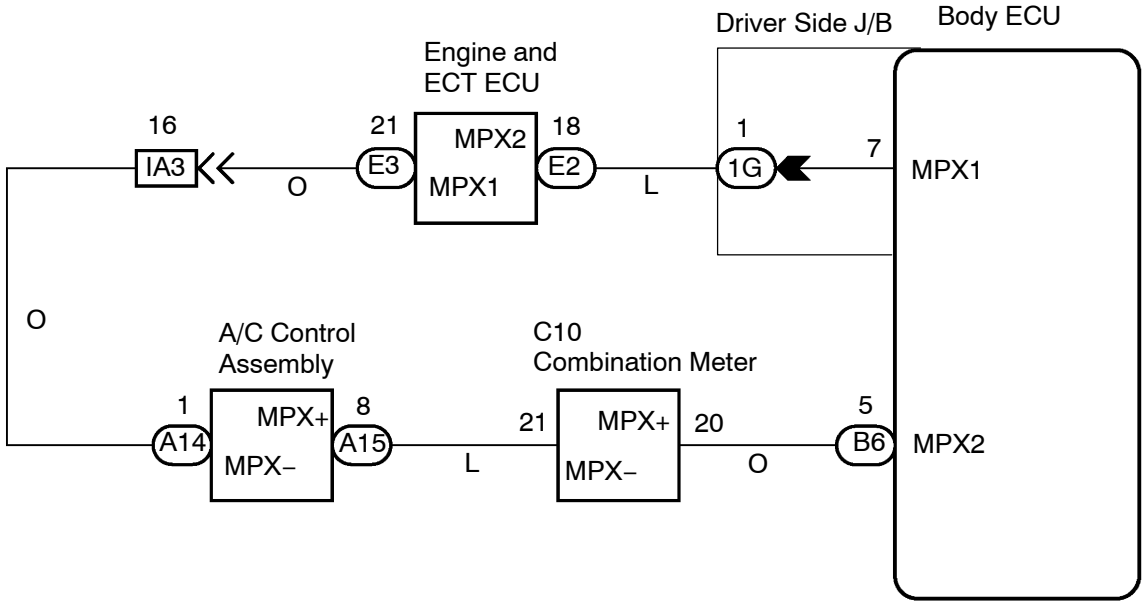
DI636–01

DTC	B1214 / 14	Communication bus malfunction (+B short)

DTC	B1215 / 15	Communication bus malfunction (GND short)

WIRING DIAGRAM

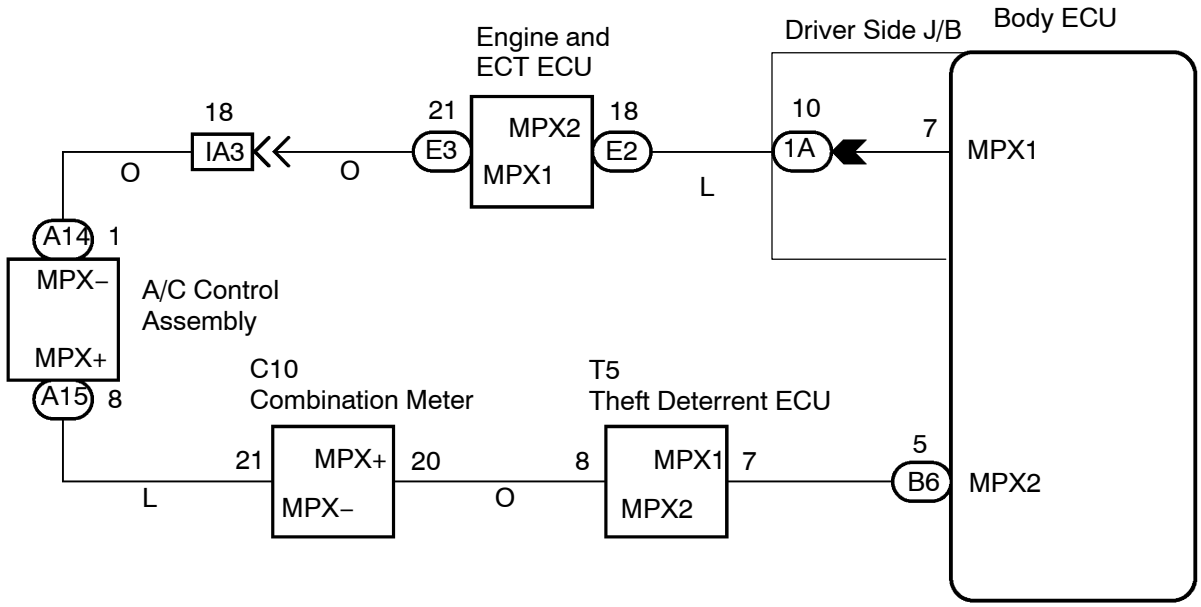
LHD Models



N

I10747

RHD Models

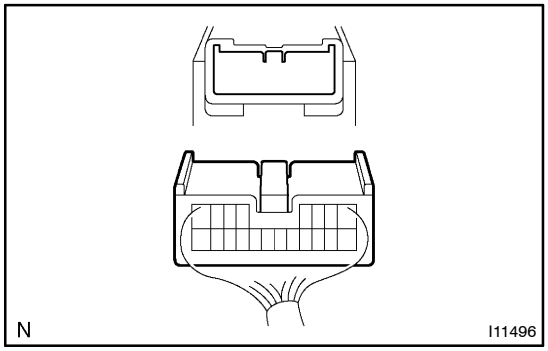


N

I10764

INSPECTION PROCEDURE

1	**Check the communication circuit inside power window master switch ECU.**

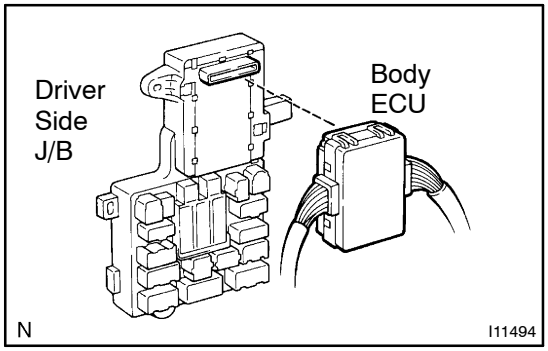


PREPARATION:
Disconnect the connector ”P8” of power window master switch.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	**Replace the power window master switch.**

NG

2	**Check for short circuit between power window master switch and body ECU.**



PREPARATION:
(a) Connect the connector ”P8” of power window master switch.
(b) Disconnect the connector of body ECU.
HINT:
Connector is disconnected by removing Body ECU from driver side junction block.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	**Repair or replace the wireharness between power window master switch and body ECU.**

NG

Replace the body ECU.

DI637–01

DTC	B1241 / 41	Body ECU switch circuit diagnosis

CIRCUIT DESCRIPTION

These DTC notify how switch works as follows:
If DTC is not output when operating switch, it means failure of switch contact. If DTC is output when not operating switch, it means stick of switch. When something wrong is found by this diagnosis, inspect each switch. Then, replace the switch if there is a problem, or check the wireharness if there is no problem.

DTC No.	DTC Detecting Condition	Trouble Area
B1241/41	Stick of switch	• Power window master switch

HINT:
Please refer to BE section for switch inspection, and to each door system of DI section for wireharness inspection.

DI638–01

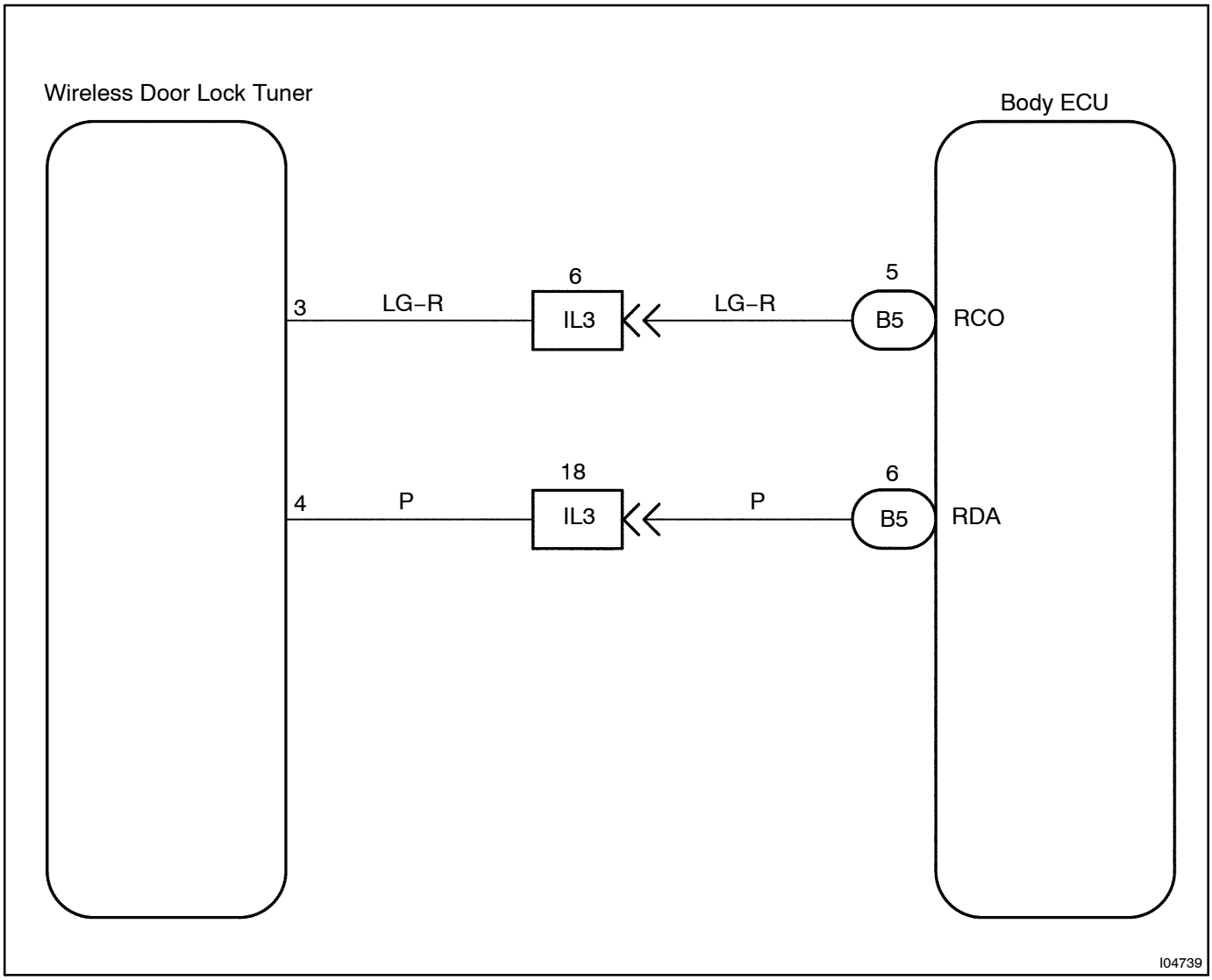
DTC	B1242 / 42	Wireless door lock tuner circuit malfunction

CIRCUIT DESCRIPTION

This DTC is output when GND short of RDA terminal is detected.

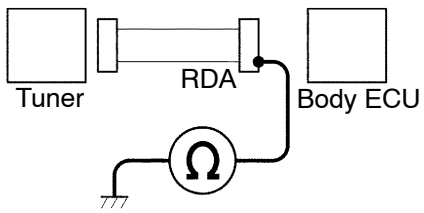
DTC No.	DTC Detecting Condition	Trouble Area
B1242/42	GND short of RDA terminal	• Wireharness • Wireless door lock tuner • Body ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wireharness.**

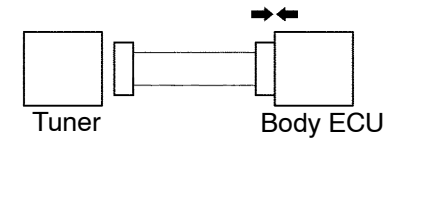


PREPARATION:
Disconnect the connector of tuner and body ECU.
CHECK:
Check the continuity between wireharness and body ground.
OK:
No continuity.

NG → **Repair or replace the wireharness.**

OK

2	**Check body ECU.**



PREPARATION:
Connect the connector of body ECU.
CHECK:
Check the DTC.
OK:
B1242/42 is not output.

NG → **Replace the body ECU.**

OK

Replace the tuner.

DI639–01

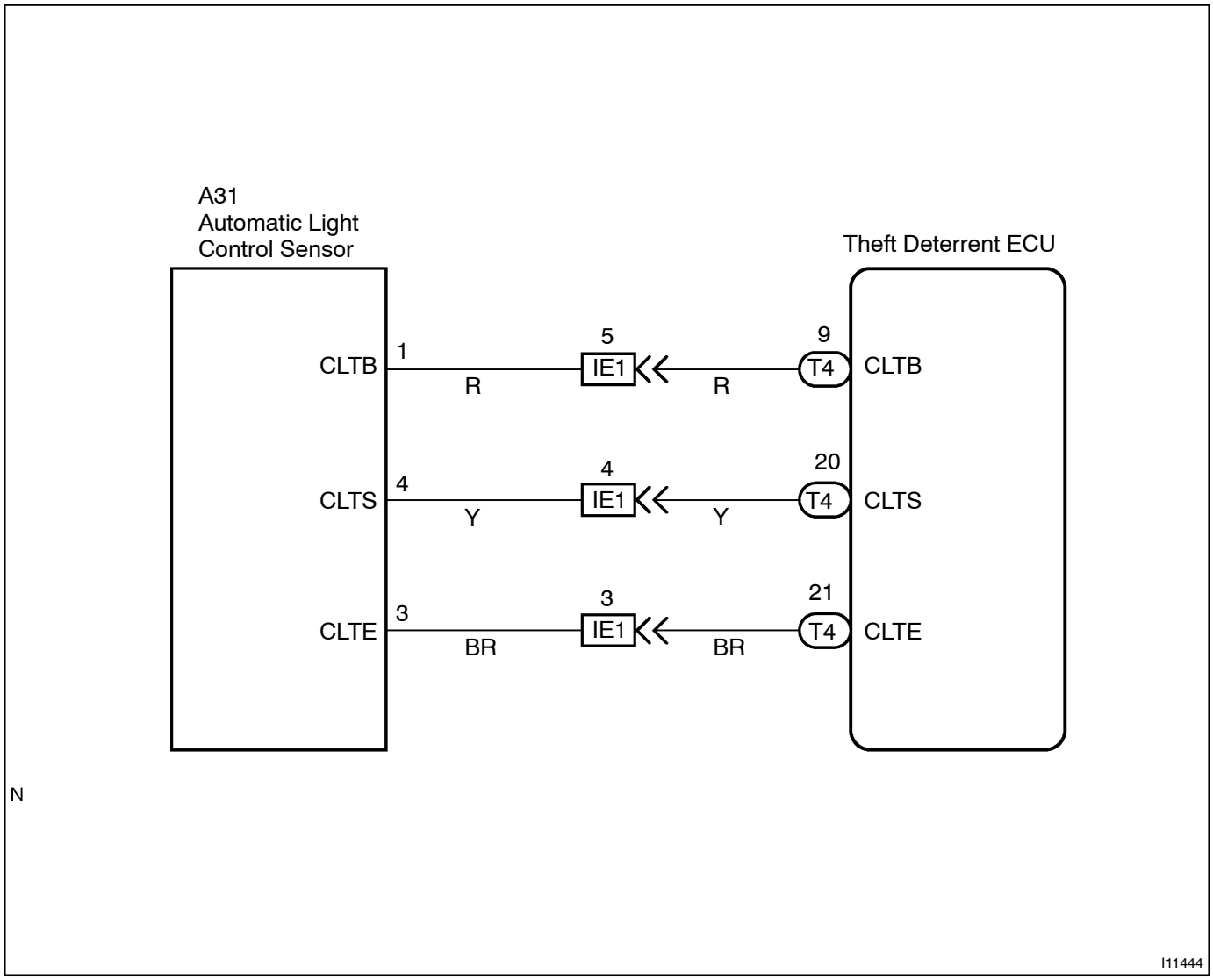
DTC	B1244 / 44	Light sensor circuit malfunction

CIRCUIT DESCRIPTION

This DTC is output when failure of light sensor circuit is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1244/44	• Malfunction of light sensor • Open or short of light sensor circuit	• Light sensor • Wireharness • Theft deterrent ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check light sensor (See page BE–30).

NG → Replace the light sensor.

OK

2	Check wireharness and connector between light sensor and theft deterrent ECU.

NG → Repair or replace wireharness or connector.

OK

Replace the theft deterrent ECU.

DI63A–01

DTC	B1261/61	Engine and ECT ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between Engine and ECT ECU and Body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1261/61	No communication from Engine and ECT ECU more than 10 seconds.	• Engine and ECT ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

INSPECTION PROCEDURE

1	**Check Engine and ECT ECU.**

CHECK:

Check that the engine starts normally.

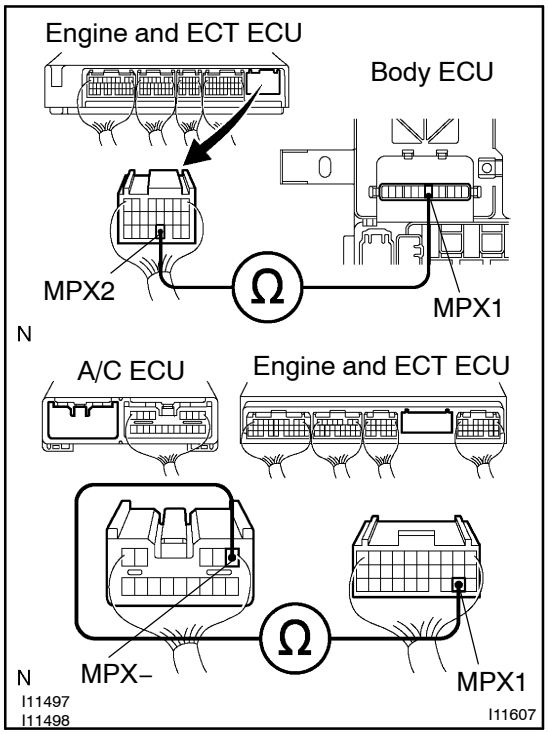
HINT:

With this inspection, Engine and ECT ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the Engine and ECT ECU.**

OK

2	Check wireharness



PREPARATION:

Disconnect connector "B6" of body ECU, "E2"(or "E3")of Engine and ECT ECU and "A14 (or A15)" of A/C ECU.

CHECK:

(a) Check continuity between terminals MPX1 of body ECU and MPX2 of Engine and ECT ECU.

(b) Check continuity between terminals MPX1 of Engine and ECT ECU and MPX– of A/C ECU.

OK:

There is a continuity in wireharness of both (a) and (b), or either (a) or (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the Engine and ECT ECU.

DI63B–01

DTC	B1262 / 62	A/C ECU communication stop

CIRCUIT DESCRIPTION

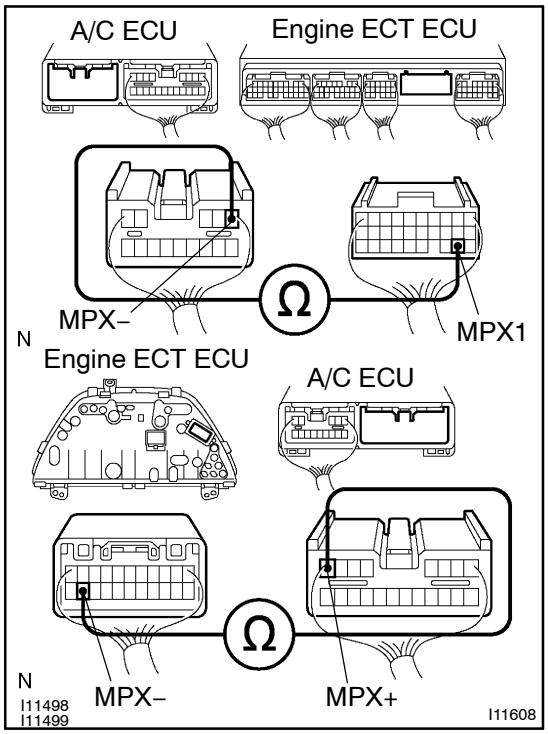
This DTC is output when communication stops between Engine and ECT ECU and Body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1262/62	No communication from ECU more than 10 seconds.	• A/C ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

1	**Check wireharness**



PREPARATION:

Disconnect connector of ”C10” of combination meter ”A14” or ”A15” of A/C ECU and ”E3” of Engine and ECT ECU.

CHECK:

(a) Check continuity between terminals MPX– of A/C ECU and MPX1 of Engine and ECT ECU.

(b) Check continuity between terminals MPX– of combination meter and MPX+ of A/C ECU.

OK:

There is a continuity in wireharness of both (a) and (b), (a) or either (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the A/C ECU.

DI63C–01

DTC	B1269 / 69	Theft deterrent ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between theft deterrent ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1273/73	No communication from theft deterrent ECU more than 10 seconds.	• Theft deterrent ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

INSPECTION PROCEDURE

1	Check theft deterrent ECU.

CHECK:

Check that the operation of the theft deterrent function is normal.

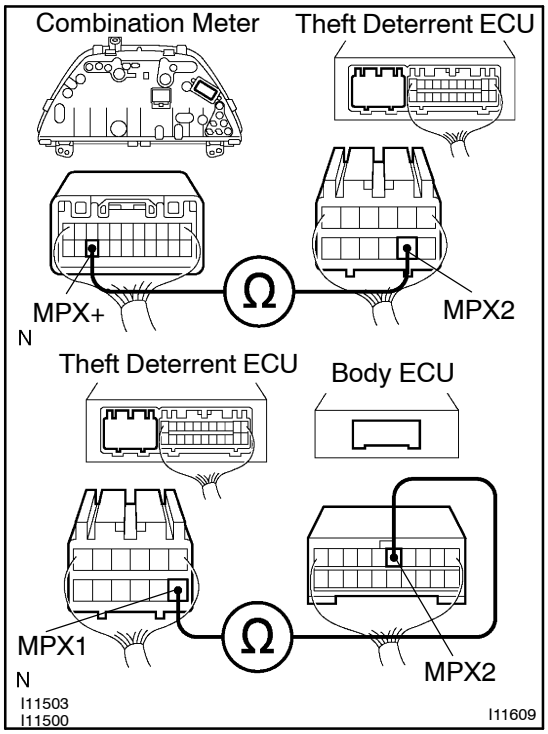
HINT:

With this inspection, the theft deterrent ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the theft deterrent ECU.**

OK

2	Check wireharness



PREPARATION:

Disconnect connector ”B6” of body ECU, ”C10” of combination meter ECU and ”T5” of theft deterrent ECU.

CHECK:

(a) Check continuity between terminals MPX2 of theft deterrent ECU and MPX+ of combination meter ECU.

(b) Check continuity between terminals MPX2 of body ECU and MPX1 of theft deterrent ECU.

OK:

There is a continuity in wireharness of both (a) and (b), or either (a) or (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the theft deterrent ECU.

DI63D–01

DTC	B1271/71	Combination meter ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between combination meter ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1271/71	No communication from Combination meter ECU more than 10 seconds.	• Combination meter ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

INSPECTION PROCEDURE

1	Check combination meter ECU.

CHECK:

Start the engine and check that the speed meter and tacometer operate normally.

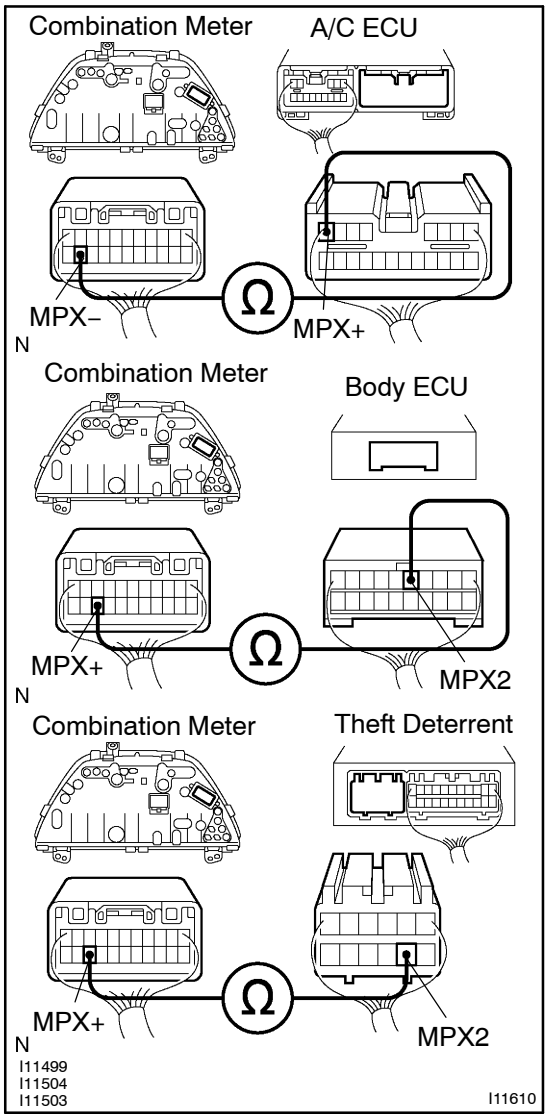
HINT:

With this inspection, the combination meter ECU CPU can be diagnosed if it works normally or not.

NG → Replace the combination meter ECU.

OK

2	**Check wireharness**



PREPARATION:

Disconnect connector ”A15” of A/C ECU, ”C10” of combination meter ECU ”B6” of body ECU and ”T5” of theft deterrent ECU.

CHECK:

(a) Check continuity between terminals MPX+ of A/C ECU and MPX– of combination meter ECU.

(b) w/o Theft Deterrent System:
Check continuity between terminals MPX+ of combination meter and MPX2 of body ECU.
w/ Theft Deterrent System:
Check continuity between terminals MPX+ of combination meter and MPX2 of theft deterrent ECU.

OK:

There is a continuity in wireharness of both (a) and (b), or either (a) or (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the combination meter ECU.

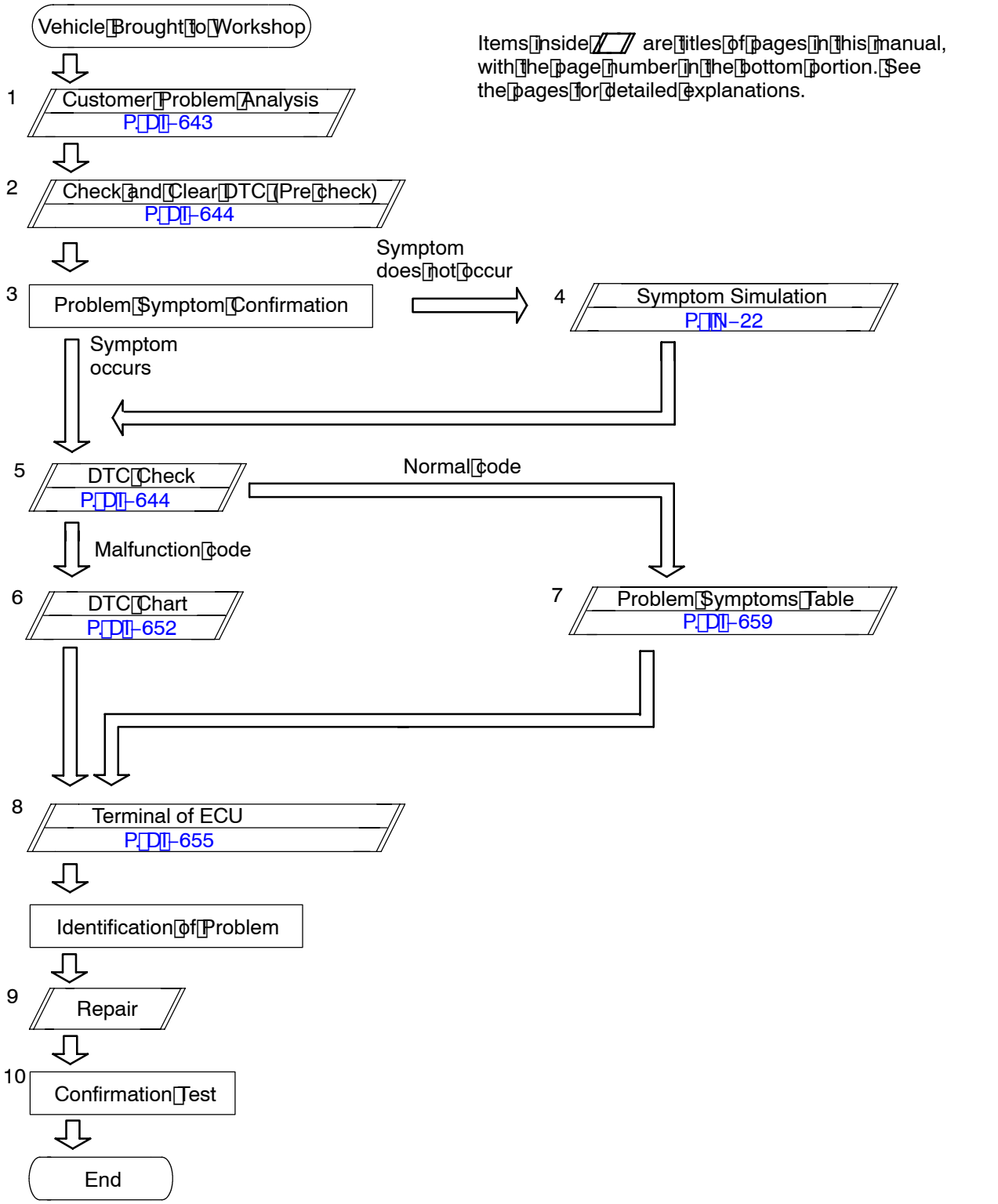
LEXUS NAVIGATION SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI27W–04

HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



DI27X–04

CUSTOMER PROBLEM ANALYSIS CHECK

LEXUS NAVIGATION SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Constant ☐ Intermittent (Times a day)

Problem Symptom	**Navigation malfunction**	☐ Cursor movement is defective.
		☐ Cursor does not move.
		☐ GPS mark does not appear.
		☐ Map is not displayed.
		☐ Others ( )
	Display malfunction	☐ Screen is dark.
		☐ Screen is white.
		☐ Color is not uniform.
		☐ Screen is in disorder.
		☐ Others ( )
	Control Switch malfunction	☐ Can not operate with panel switches.
		☐ Can not operate with touch switches.
		☐ Others ( )

	Parts name	**1st time malfunction code.**	**2nd time malfunction code.**
DTC Check	Navigation ECU		
	Multi Display		
	Radio receiver assembly		
	Power amplifier		

DI63E–01

PRE–CHECK

1. DIAGNOSIS SYSTEM DESCRIPTION

HINT:

There are several diagnosis functions in the LEXUS Navigation System.

Though each operation procedure is explained on the following pages, the outline is as follows.

(a) SYSTEM CHECK
In this mode, communication circuit is inspected and self diagnosis is conduced in each system (Navigation ECU, Multi display, radio receiver, power amplifier and CD auto changer). The result is displayed on the screen.
At the bottom of the screen the map area is displayed.

(b) DISPLAY CHECK
In this mode, images and touch switches on the screen are inspected.

(c) VEHICLE SIGNAL DISPLAY CHECK
In this mode, 2 items of vehicle signal conditions input in the navigation ECU are displayed at the real time (renewed every approx. 1 sec.).

(d) INTERNAL COEFFICIENT SET
This sets time and data of calender and compensation coefficient to improve the accuracy of navigation system.
It is not always necessary to adjust the compensation coefficient, however when the error is excessive due to replacement of tires etc., reset the coefficient again.

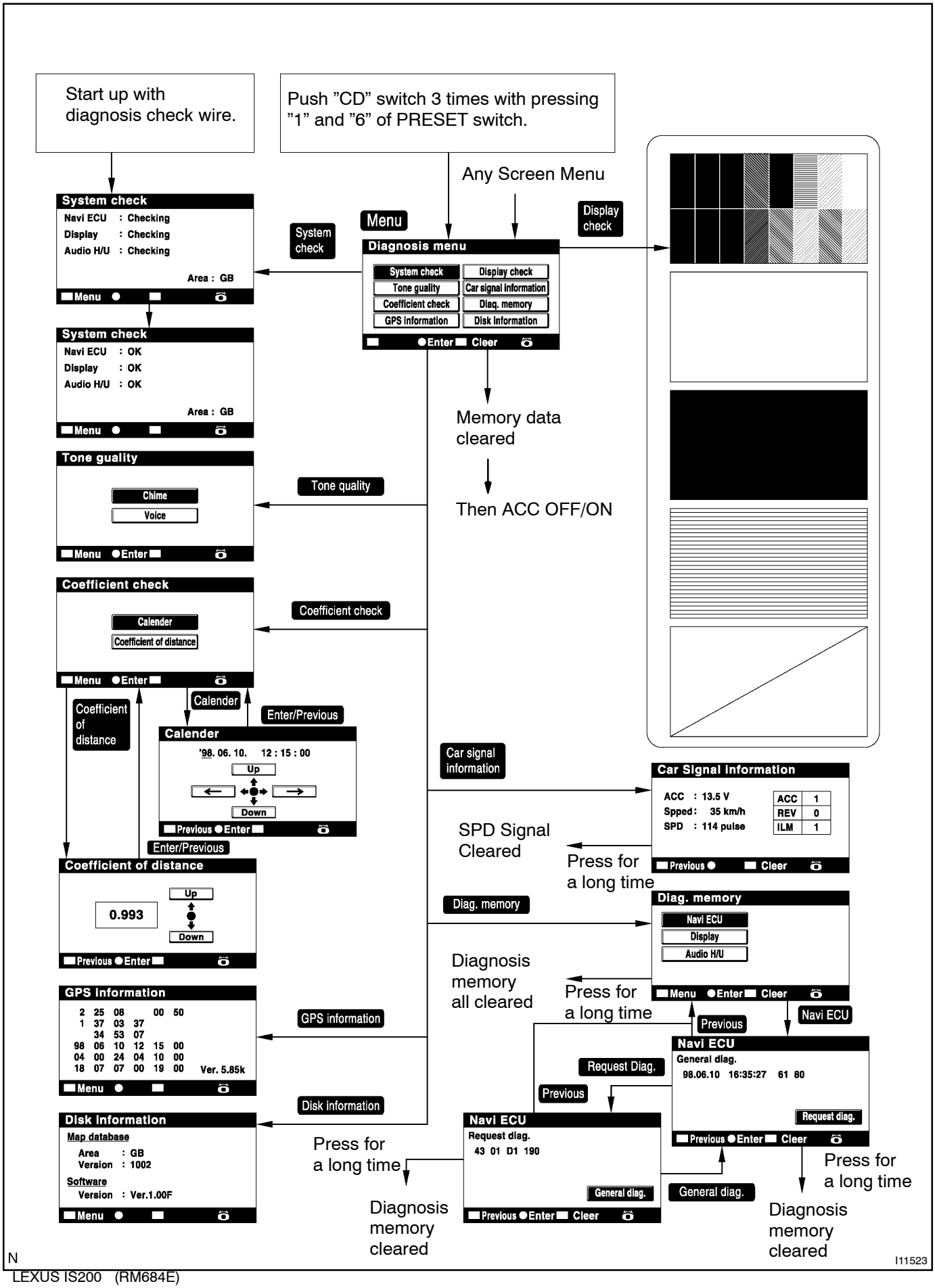
(e) DIAGNOSIS MEMORY
Information is stored in the diagnosis memory when an error occurs in the communication of the system and the system.

(f) GPS INFORMATION
GPS information receiving condition is displayed.

(g) TONE QUALITY CHECK
Chime or navigation voice recorded in CD–ROM can be heard when necessary.

(h) DISK INFORMATION
Area and version No. of map data base and version No. of navigation soft are displayed.

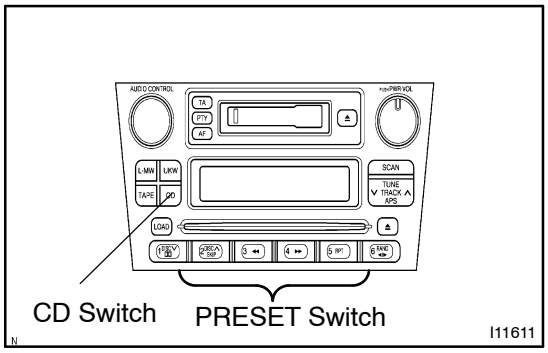
2. DIAGNOSIS CHECK



(a) DIAGNOSIS START–UP

HINT:

There are two ways to startup diagnosis menu, one is using the diagnosis check wire and the other is using the switch.

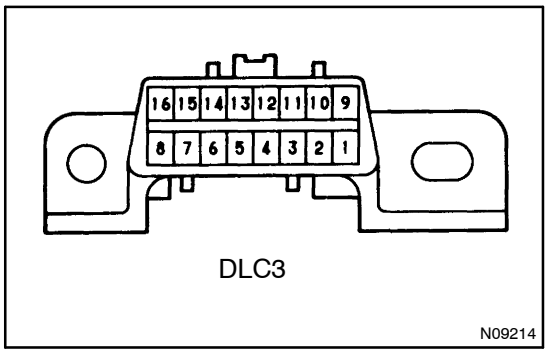


(b) START–UP BY SWITCH OPERATION

For shifting to diagnosis mode, push ”CD” switch 3 times with pressing ”1” and ”6” of PRESET switch at the same time while the audio power is OFF and ACC is ON.

NOTICE:

On the screen with LEXUS mark displayed at the time of starting up, do not perform the transmitting operation to the diagnosis mode.



(c) START–UP WITH DIAGNOSIS CHECK WIRE

With the ignition switch in ACC or ON position or engine running, the system is started up by connecting TC and CG terminals of DLC3 to SST.

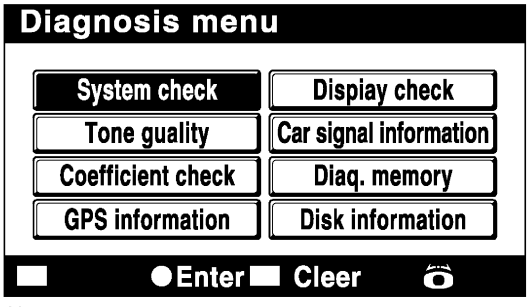
SST 09843–18020

(d) SYSTEM STARTING

It takes approximately 30 seconds to check the system.

(e) FINISHING

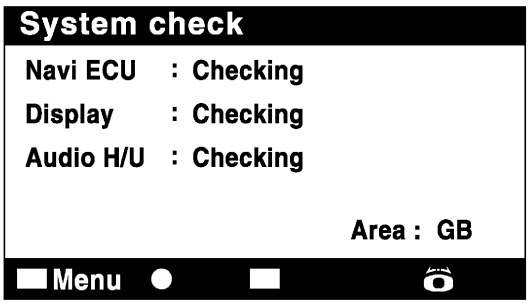
Diagnosis mode finishes by turning the ignition switch ACC or OFF.



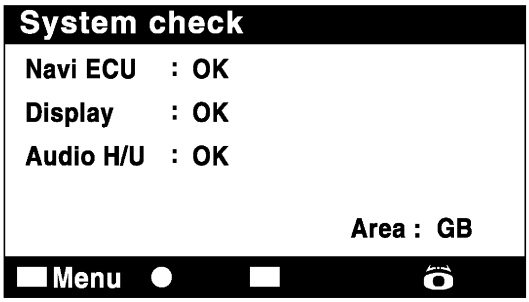
(f) DIAGNOSIS MENU DISPLAY

When starting up by switch operation the top menu is displayed on the screen.

Each diagnosis function can be performed by touching switches on this screen.



N I11505



N I11506

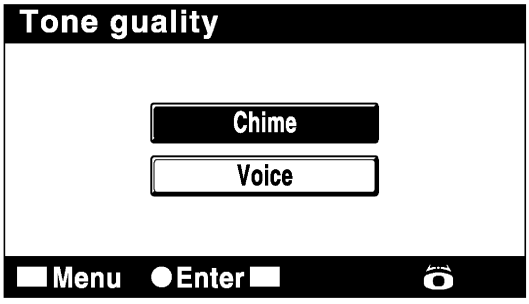
(g) SYSTEM CHECK SCREEN

- This screen performs the system inspection.
- After the system inspection completes, when pressing ”MENU”, screen returns to the diagnosis menu screen.
  (In diagnosis mode, the every screen can return to the diagnosis menu screen by pressing ”MENU”.)
- On ”SYSTEM CHECK” screen, up to 3 logical addresses and 3 diagnosis codes of the equipment are displayed.
  In the case of normal condition, ”O.K.” is displayed.
- On a screen, up to 3 diagnosis codes for each equipment are displayed.
  When diagnosis codes are more than 4, the screen is switched to another screen and returned every 3 seconds.

HINT:

*: Logical address refers to the codes allotted to each part of objected equipment which has been subdivided.

- When an objected equipment is not connected, ”–D0” of the diagnosis code is displayed.
- Diagnosis codes are displayed orderly when diagnosis completes.
- If the same diagnosis code is received several times, only 1 code is displayed.



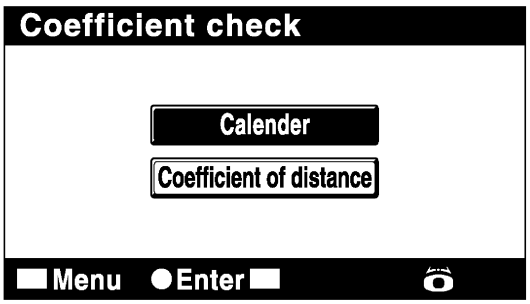
N I11507

(h) TONE QUALITY CHECK

- On the diagnosis menu screen, when pressing ”TONE QUALITY CHECK”, the screen turns to the screen shown in the illustration.
- Tone check is performed by pressing the menu displayed on this screen.
- When pressing ”CHIME”, chime of ”poop” sounds 1 times.
- When pressing ”VOICE”, the voice saying ”Please proceed to the highlighted route. Then the route guideance will start.” sounds 1 time.

HINT:

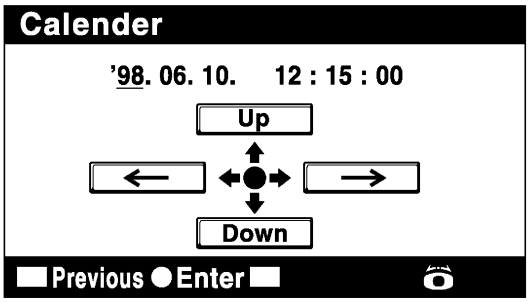
No sound and voice appear without map CD ROM.



N I11508

(i) COEFFICIENT SCREEN

- When pressing ”COEFFICIENT CHECK” on the diagnosis menu screen, the screen turns to the screen shown in the illustration.
- On this screen, selection of year, date, and item of speed compensation coefficient can be performed.



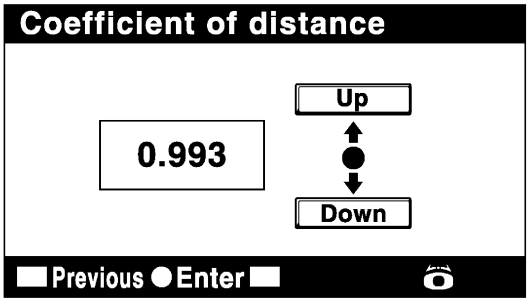
N I11509

(j) CALENDER SCREEN

- When pressing ”CALENDER” on the internal coefficient set screen turns to calender screen.
- When the screen turns to this screen, GPS time that the Navigation ECU currently sets is displayed.

HINT:
This GPS clock is used for calculation to clarify the present site.

- In GPS information, year and date are included, when GPS information is received, automatically year and date are modified.
- On this screen GPS time inside Navigation ECU is modified.
- By pressing ”NEXT”, the year or date to be changed can be selected, pressing triangularity mark, setting can be changed and pressing ”SET”, setting completes.



N I11510

(k) SPEED COMPENSATION COEFFICIENT SCREEN

- When pressing ”COEFFICIENT OF DISTANCE” on the internal coefficient set screen, the screen turns to the speed compensation coefficient screen.

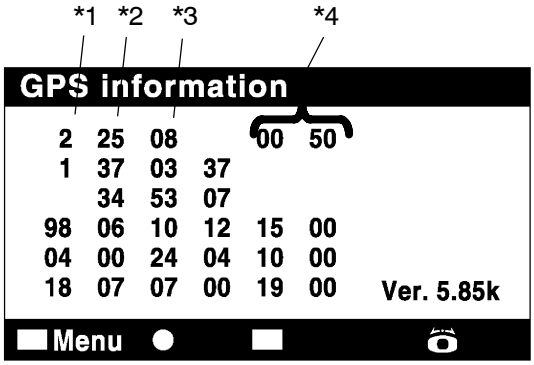
HINT:
Navigation ECU compensates automatically the error between the distance calculated by ECU and actually measured and performs map–matching. Accordingly it is not necessary for a driver to compensate the error.

- This screen sets the value of how far the vehicle should go or should delay, when the present site on the map directed by a cursor does not match the real site because of tire replacement etc., This value is called speed compensation coefficient.

HINT:
After matching the present site directed by a cursor on the map with the real site correctly the vehicle is driven on the straight road for 5 Km. When the site on the map is 50 M (1 %) ahead of the real site, the value is 0.990, when 50 M behind, the value is 1.010.

- By pressing triangularity mark, the value is changes, by pressing ”SET”, setting completes.

<Example>



N

*1: Two–measurement satellite is caught

*2: 25 satellites available for navigation

*3: 6 satellites that GPS antenna receives the signals from

*4: Height +50 M

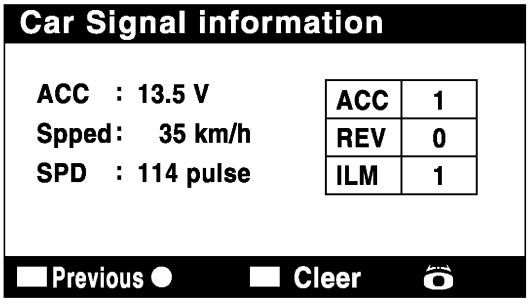
*5: East longitude
137 degree, 2 minutes, 37 seconds

*6: North altitude
34 degree, 53 minutes, 7 seconds

*7: 97 years, 6 months, 11 days,
17 times, 22 minutes, 00 seconds

*8: ID number of satellite

I11511 I12198



N I11519

(l) GPS INFORMATION SCREEN

- On the diagnosis menu screen, when pressing ”GPS INFORMATION”, the screen turns to the screen shown in the illustration.
- The displayed contents on this screen are as follows.

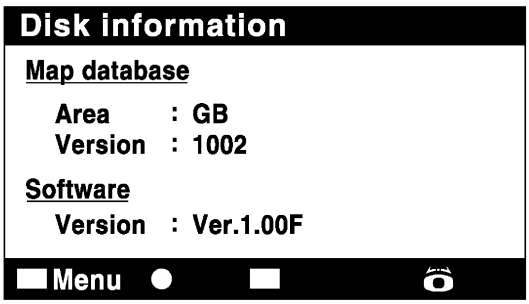
*1: Measurement conditions on present site
0: No measurement satellite is caught.
1: One measurement satellite is caught.
2: Two–measurement satellites are caught.
3: Two–dimensional measurement
4: Three dimensional measurement
F: Receiver disorder
*2: Number of satellites available for navigation.
*3: Number of satellites that GPS antenna receives the signals from
*4: Height (M)
*5: Longitude (degree; minute; second)
(In the case of west longitude, ”–” is displayed on the column of first letter, in the case of east longitude, nothing is displayed.)
*6: Altitude (degree; minute; second)
(In the case of south altitude, ”–” is displayed on the column of first letter, in the case of north altitude, nothing is displayed.)
*7: Year, date
(Year: month: day: time: minute: second)
*8: ID of satellite that GPS antenna receives radio wave from setellitry.

(m) CAR SIGNAL INFORMATION SCREEN

- When pressing ”CAR SIGNAL INFO.” the screen turns to the screen shown in the illustration.
- This screen inspects whether the following signals are received or send normally.

SPEED: This displays the current vehicle speed.
(The displayed unit is the unit currently set.)
SPD: This displays the count of pulse. Pulse is added as the vehicle runs.

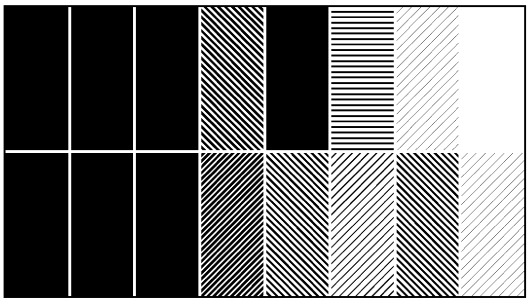
- If touching ”CLEAR”, the value of SPD turns to ”0”.
- Each signal is renewed every 1 seconds.



N I11512

(n) DISC INFORMATION

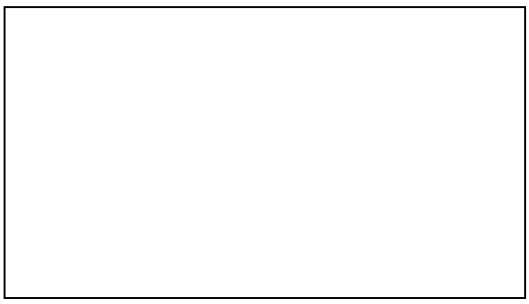
- On the diagnosis menu screen when pressing ”DISK INFORMATION”, the screen turns to the screen shown in the illustration.
- This screen displays the information MAP DATABASE and NAVIGATION SOFT.



N I11514

(o) DISPLAY CHECK SCREEN

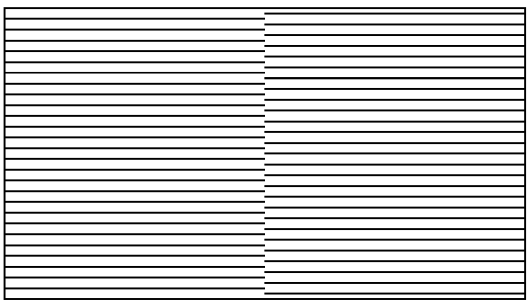
- On the diagnosis menu screen when pressing ”DISPLAY CHECK”, the screen turns to the screen shown in the illustration.
- On this screen when pressing ”BASE/SPRITE” or ”ON SCREEN”, the screen changes to the one shown in the illustration, this screen displays a color bar.
- On this screen when ”–” displayed on the screen is touched, the touched part is deleted.
- If the screen is left untouched for 10 seconds, it turns to display check screen.



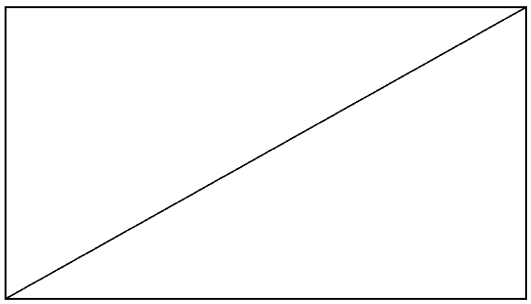
N I11515



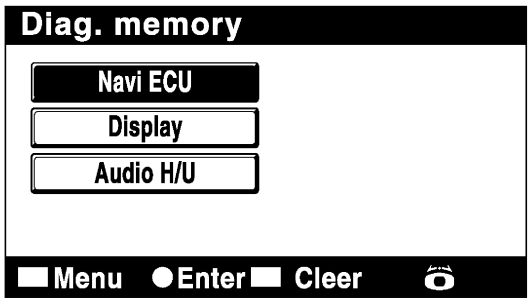
N I11516



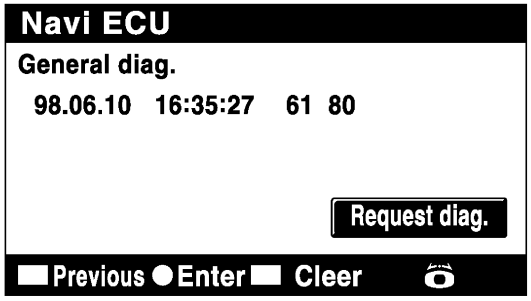
N I11517



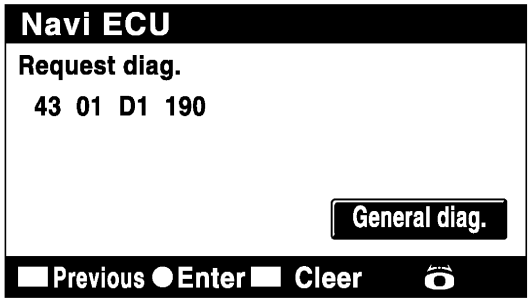
N I11518



N I11520



N I11521



N I11522

(p) DIAGNOSIS MEMORY SCREEN

- On the diagnosis menu screen when pressing ”DIAG. MEMORY” the screen turns to the screen shown in the illustration.
- Up to 6 diagnosis codes per an equipment are displayed. If more than 6 diagnosis codes are displayed, oldest diagnosis code will be deleted orderly.
- If the same diagnosis code occurred, the date when the code occurred is renewed.
- When the same diagnosis code occurs, the data when it occurred is renewed.
- All the diagnosis codes will be cleared by pressing the clear button for several seconds.
- All the general diag. codes of each ECU will be cleared by pressing the clear button for several seconds on the ”general diag.” screen.
- All the request diag. codes of each ECU will be cleared by pressing the clear button for several seconds on the ”request diag.” screen.
- There are2 kinds of diagnosis codes, ”General diag”. and ”Request diag”. which are detected by equipment except ECU.
- ”General diag.” displays the date of occurrence and diagnosis code when an occurrence of diagnosis code is notified from the navigation ECU to another equipment by general diag. notification.
- ”Request diag.” displays connection confirmation number and diagnosis code when a diagnosis code is gained from diagnosis memory response.

DI27Z–04

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- *: Logical address refers to the code allotted to each part of objected equipment which has been subdivided.
- Must have DTC judgement for the items with the making of a circle (○) in the system check at the time of system checking. (See page DI–644)
- Diagnosis memory can be memorized when detecting DTC under the usual using condition. (See page DI–644)
- In case that DTC D1, D2 and D4 of each unit are detected, check the wire harness of AVC–LAN, then change each unit.
- In case that DTC other than DTC D1 D2 or D4 of each unit is detected, change the parts specified.

1. NAVIGATION ECU

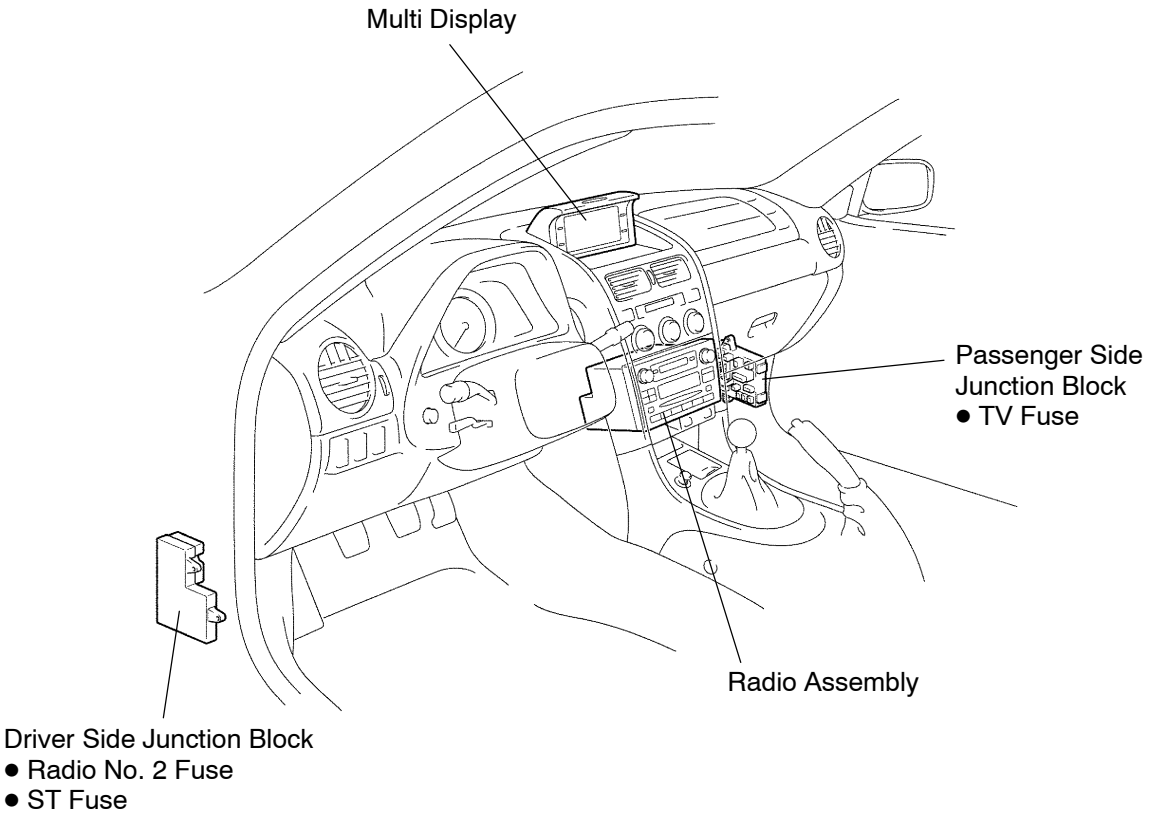
*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
21	01	ROM error	There is an error on internal ROM.	● Navigation ECU	○	X
58	40	Navigation ECU error	When GYRO error is detected.	● Navigation ECU	○	○
96	51	CD–ROM not inserted	CD–ROM is not inserted	● Insert the CD–ROM	○	X
96	52	Different disk	The inserted CD–ROM is not in compliance with the standard.	● Replace the CD–ROM	X	○
96	53	Not readable disk	The data in CD–ROM can not read properly.	● Inspect the CD–ROM	○	○
80	63	GPS error	There is an error on the GPS receiver.	● Navigation ECU	○	○
80	62	GPS antenna power source error	There is an error on the power source circuit to GPS antennas.	● Inspect the antenna cable ● Replace GPS antenna	○	○
80	61	GPS antenna not connected	GPS antenna is not connected.	● Connect GPS antenna	○	○
58	71	SPD signal not connected	Conditions that GPS speed is more than 16 mph and SPD signal remains "0" continue for more than 10 seconds.	● Wire harness and connector	X	○

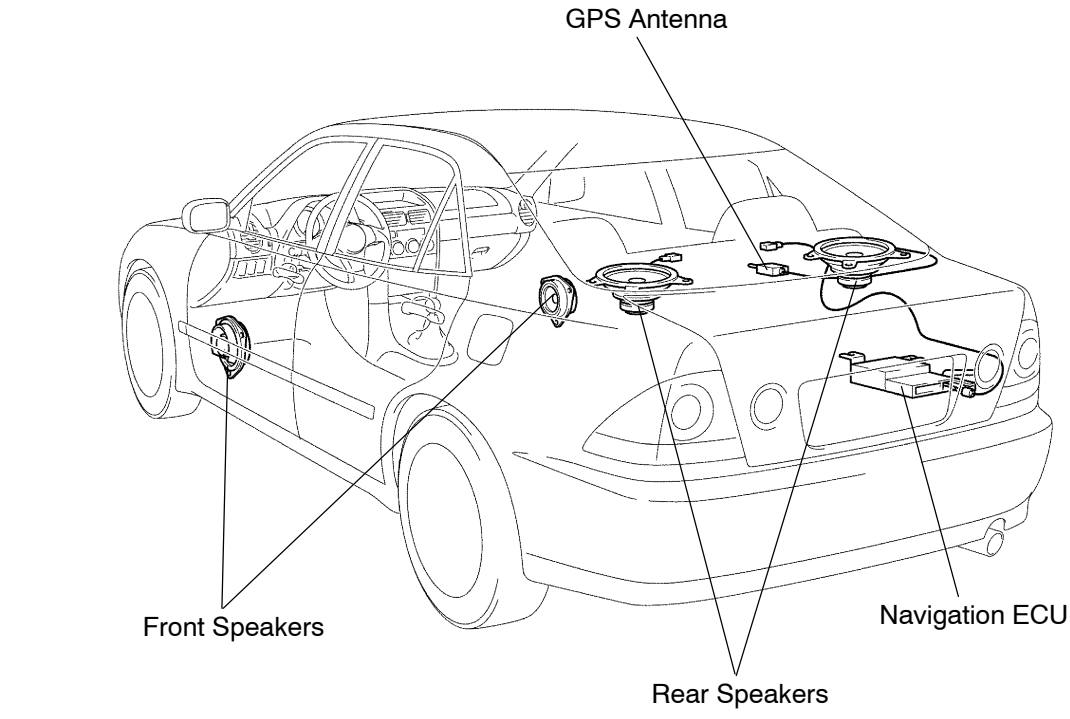
2. DISPLAY ECU

*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
01	21	ROM error	There is an error on internal ROM.	● Display ECU	○	X
01	22	RAM error	There is an error on internal RAM.	● Display ECU	○	X

DI280–04

PARTS LOCATION





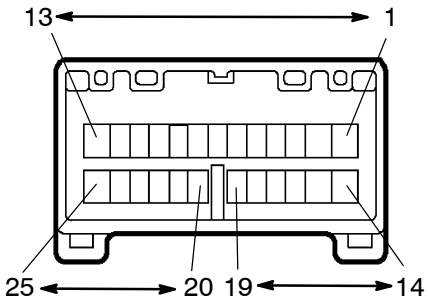
P

I10859

DI63F–01

TERMINALS OF ECU

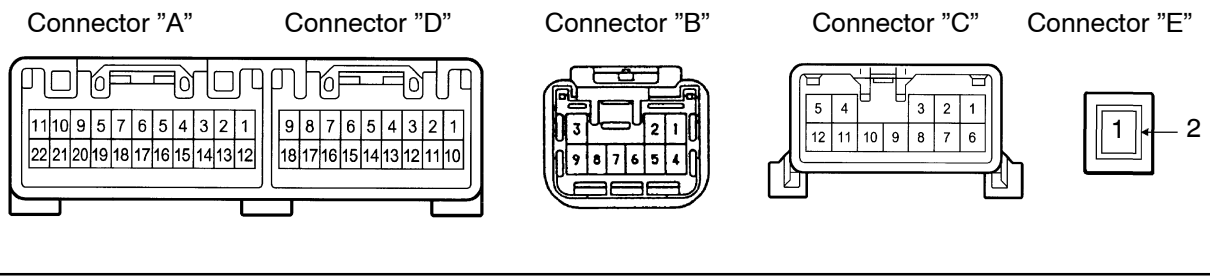
1. MULTI DISPLAY



I11419

Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit is detected. / Problem symptom when short circuit is detected.
+B – GND1 (1 – 22)	Constant	Battery voltage	Screen is in disorder.
ST1 – GND1 (3 – 22)	Ignition switch position START	Battery voltage	–
G – GND1 (4 – 22)	Diagnosis display check screen is white.	Using an oscilloscope *2	Screen color turns to pink.
SYNC – GND1 (5 – 22)	Navigation screen is display.	Using an oscilloscope *1	Screen noise or other types of noise occur.
VG – GND1 (6 – 22)	Constant	Continuity	Normal.
DTX+ – Body ground (9 – Body ground)	Ignition switch position ACC	Approx. 2.5 V	Screen is in display. / Navigation system does not operate.
RE1 – GND1 (10 – 22)	Ignition switch position ACC	Approx. 3 V	Controller does not operate.
SGD1 – Body ground (12 – Body ground)	Constant	Continuity	Normal.
ACC – GND1 (14 – 22)	Ignition switch position ACC	Battery voltage	Screen is in disorder / Fuse is blown.
R – GND1 (16 – 22)	Diagnosis display check screen is white.	Using an oscilloscope *2	Screen color turns to light blue.
B – GND1 (17 – 22)	Ignition switch position ACC	Using an oscilloscope *2	Screen color turns to yellow.
VR – GND1 (18 – 22)	Constant	Approx. 2.5 V	Screen is in disorder. / Navigation system does not operate.
GND1 – Body ground (22 – Body ground)	Diagnosis display check screen is white.	Continuity	Normal.
RE2 – GND1 (24 – 22)	Constant	0 V	Screen is in disorder.
BGND – Body ground (25 – Body ground)	Constant	Continuity	Normal.

2. NAVIGATION ECU

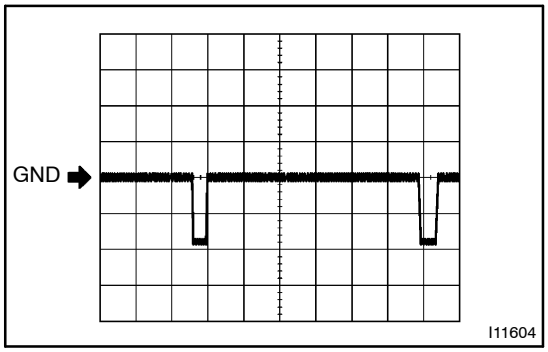


Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit / Problem symptom when short circuit
A1 – B6 (B–TV – GND1)	Constant	Battery voltage	Screen is in disorder. / Fuse is blown.
A2 – B6 (ILL – GND1)	Light control switch position TAIL or HEAD	Battery voltage	OPEN/TILT switch and control switch illumination does not light up. / Fuse is blown.
A3 – B6 (G – GND1)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to pink.
A4 – B6 (SYNC – GND1)	Diagnosis display check screen is while	Using an oscilloscope *1	Screen is in disorder.
A5 – Body ground (VG – GND1)	Constant	Continuity	Normal
A8 – Body ground (DTX+ – GND1)	Ignition switch position ACC.	Approx. 2.5 V	Screen noise or other types of noise occur. / Navigation system does not operate.
A11 – Body ground (GND2 – Body ground)	Constant	Continuity	Normal.
A13 – B6 (R – GND1)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to light blue.
A14 – B6 (B – GND1)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to light yellow.
A15 – Body ground (VR – Body ground)	Constant	Continuity	Normal
A19 – Body ground (DTX– – Body ground)	Ignition switch position ACC.	Approx. 2.5 V	Screen noise or other types of noise occur. / Navigation system does not operate.
A22 – B6 (RE2 – GND1)	Diagnosis display check screen is while	0 V	Screen is in disorder.
B2 – B6 (TC – GND1)	Ignition switch position OFF and connect terminals TC and CG of DLC3.	Continuity	Screen ins in disorder. / Constant screen is normal.
B3 – B6 (+B – GND1)	Constant	Battery voltage	Screen is in disorder. / Fuse is blown.

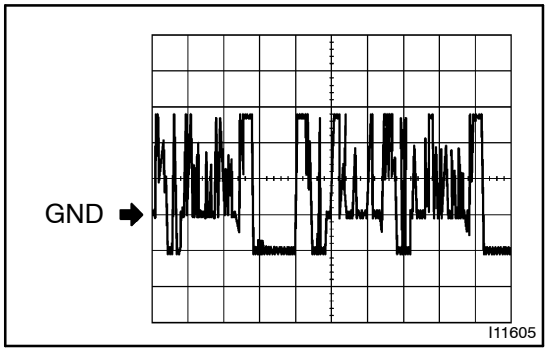
B6 – Body ground (GND1 – Body ground)	Constant	Continuity	Normal.
B7 (SPD)	Input signal displayed	–	Navigation operation is available during driving, or a cursor on present site does not move.
B9 – B6 (ACC – GND1)	Ignition switch position ACC.	Battery voltage	Screen is in disorder.
			Fuse is blown.
C1 – B6 (AUO+ – GND1)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C2 – B6 (AUI– – GND1)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C6 – B6 (AUO– – GND1)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C7 – B6 (AUI– – GND1)	Speaker sounding.	5 – 7 V	Diver side speaker does not sound.
C9 (MUTE)	Speaker sounding.	–	Screen noise or other types of noise occur.
			Driver side speaker does not sound.
C10 (REV)	Input signal display.	–	–
D4 (TX5+)	System checking	–	Screen is in disorder.
			Navigation system does not operate.
D13 (TX5–)	System checking	–	Screen is in disorder.
			Navigation system does not operate.

3. NAVIGATION CONTROLLER HOLDER

Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit / Problem symptom when short circuit
GND – Body ground (1 – Body ground)	Constant	Continuity	Normal.
TX– – Body ground (2 – Body ground)	Constant	Continuity	Normal.
TX+ – TX– (3 – 2)	Ignition switch position ACC	Approx. 3 V	Controller does not operate.
ILL+ – GND (4 – 1)	Light control switch position FLASH or HI	Battery voltage	Illumination light does not light up. / Fuse is blown.
ACC – GND (5 – 1)	Ignition switch position ACC	Battery voltage	Controller does not operate. / Fuse is blown.



Oscilloscope
Wave *1
HINT:
- Terminal SYNC, EXSYNG ↔ GND1
- Gauge set 500 mV/DIV 10 μs/DIV
- Condition: Screen is display



Wave *2
HINT:
- Terminal R, G, B, E*–R, E*–G, EX–B ↔ GND1
- Gauge set 200 mV/DIV 10 μs/DIV
- Condition: Screen changing

DI282–04

PROBLEM SYMPTOMS TABLE

HINT:
Inspect the input/output voltage of the terminals which are described in the column of Terminal in the table.
Inspect other terminals which are not described referring to "Terminal of ECU".

Symptom	Suspect Area	See page
The screen is dark, nothing shines on the screen.	1. Multi display (connector "A") 2. Wire harness and connector	DI–655 IN–32
Nothing appears on the screen. (Back light lights up.)	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector B terminal ACC, +B Connector A terminal R, G,B) 3. Wire harness and connector	 DI–655 DI–655 DI–655 IN–32
The screen is white.	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector A terminal R, G,B) 3. Wire harness and connector	 DI–655 DI–655 IN–32
The screen is in disorder. (Synchronizing disorderly.)	1. Multi display (Terminal SYNC) 2. Navigation ECU (Connector A terminal SYNC) 3. Wire harness and connector	 DI–655 DI–655 IN–32
The color on the screen is unusual.	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector A terminal R, G,B) 3. Wire harness and connector	 DI–655 DI–655 IN–32
Remote control switch does not work.	1. Remote controller 2. Cradle 3. Display ECU 4. WIre harness	– – DI–655 IN–32
GPS mark does not appear at any time and at any place.	1. Navigation ECU (Diagnosis check) 2. Wire harness and connector	 DI–655 IN–32
A cursor on present site does not move.	1. Navigation ECU (SPD signal is checked on the "CAR SIGNAL INFORMATION" during diagnosis check.) 2. Wire harness and connector	 DI–655 IN–32
Movement of cursor on present site is always unusual.	1. Navigation ECU	DI–655
Even though the battery has not been removed, the route and destination are not displayed.	1. Navigation ECU (Connector B terminal "+B") 2. Wire harness and connector	 DI–655 IN–32
Navigation voice can not be heard at all from the driver's side speaker.	1. Navigation ECU (Volume adjustment)	 DI–655
No sound except the navigation voice can be heard at all from the driver's side speaker.	1. Power amplifier (Connector A terminal FL+, FL–) 2. Navigation ECU (Connector "C" terminal "AUI+" , "AUI–", "AUO+", "AUO–") 3 Wire harness and connector	 DI–655 DI–655 IN–32
No sound can be heard at all from the driver's side speaker.	1. Driver's side speaker 2. Wire harness and connector	– IN–32

No sound can be heard from any speakers.	1. See "AUDIO SYSTEM"	BE–158
No map is Multi displayed on the screen.	1. Navigation ECU (Diagnosis check)	DI–655

DI63G–01

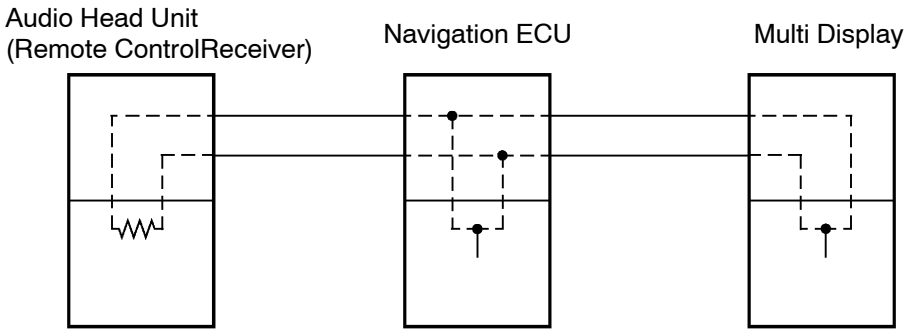
CIRCUIT INSPECTION

AVC–LAN (Communication bus) Circuit

CIRCUIT DESCRIPTION

Each unit of LEXUS navigation system connected with AVC–LAN (communication bus) transfers the signal of each switch by communication.
When +B short and GND short occur in this AVC–LAN, LEXUS navigation system will not function normally as the communication is discontinued.
In this AVC–LAN, Navigation ECU becomes the master of the communication, and the audio head unit has a resistance necessary for transmitting the communication.
Multi Display is connected between Navigation ECU and Audio head unit, LEXUS navigation system has the structure that makes communication impossible without Navigation ECU, Multi Display or Audio head unit.

AVC–LAN

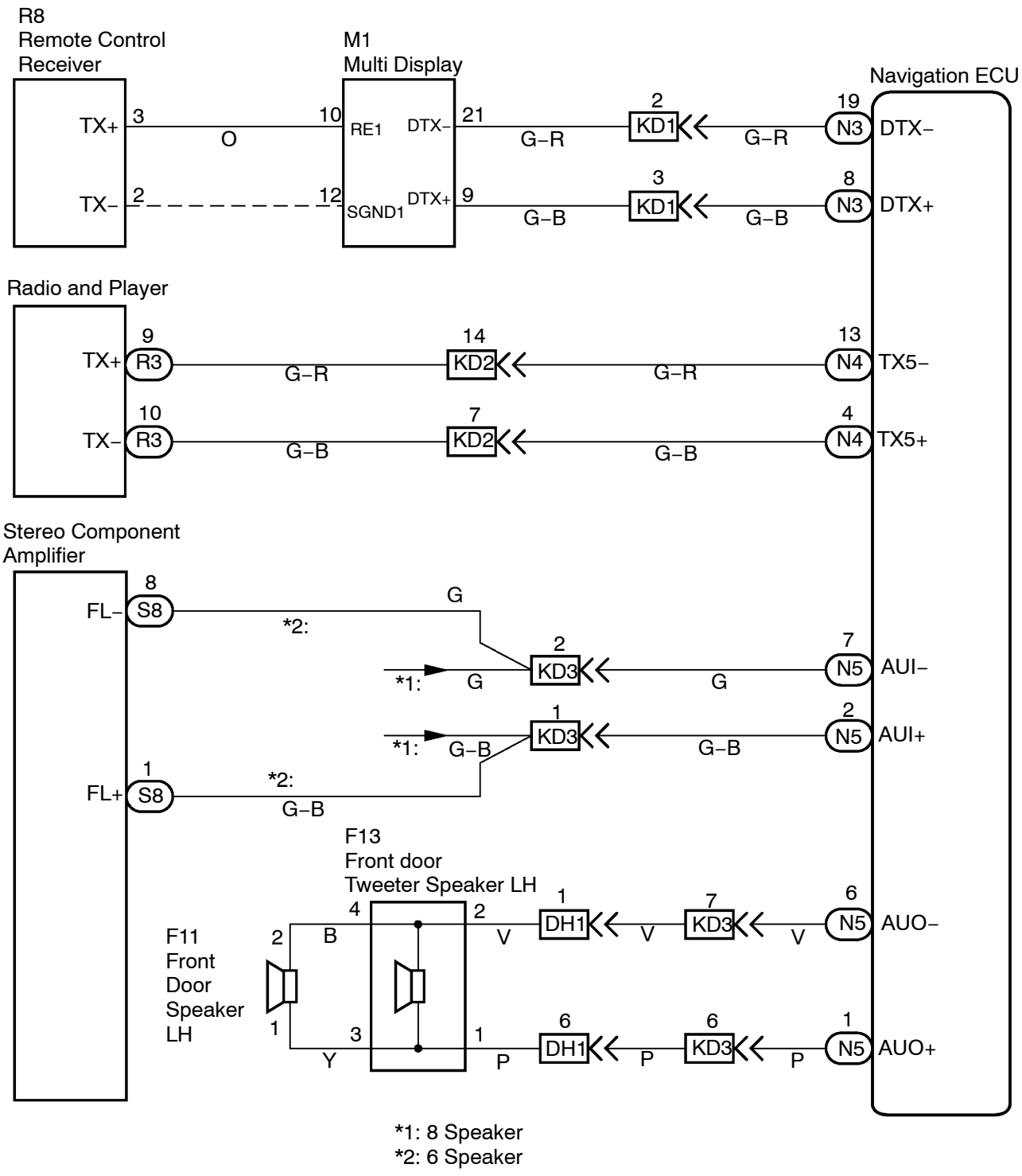


N

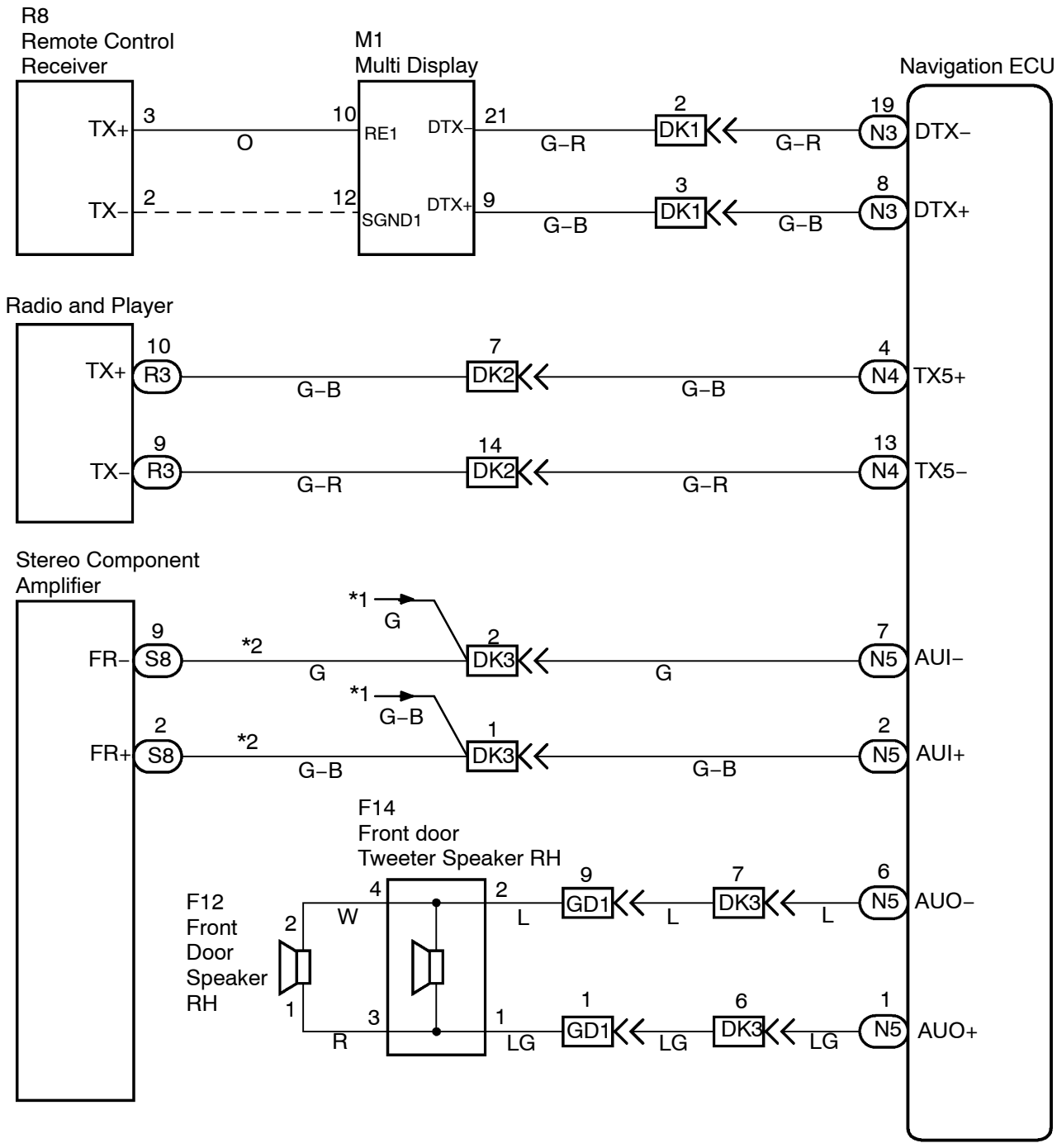
I11572

WIRING DIAGRAM

LHD Models



RHD Models



N

*1: 8 Speakers
*2: 6 Speakers

I10756

INSPECTION PROCEDURE

1	Disconnect the connector "S8" of power amplifier and check if AVC–LAN will be recovered normally.

CHECK:
Check that the display will change by pressing either of the Panel switch or Touch switch on the display.
HINT:
It can be judged that AVC–LAN is recovered if the display is changed.

OK	Replace the power amplifier

NG

2	Check wire harness and connector between radio and player and Navigation ECU. (See page IN–32)

NG	Repair or replace wire harness or connector between radio and player and Navigation ECU.

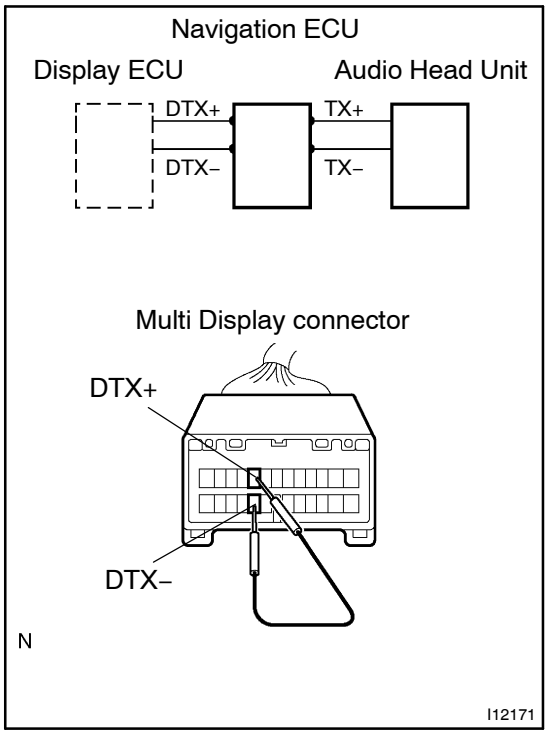
OK

3	Check wire harness and connector between Multi Display and Navigation ECU. (See page IN–32)

NG	Repair or replace wire harness or connector between Multi Display and Navigation ECU.

OK

4	Skip Display ECU and check AVC–LAN.



PREPARATION:

(a) Connect all the connectors except ”M1” of the Multi Display.

(b) Using 2 SSTs (Diagnosis check wire P/N 09893–12040), connect the terminal DTX+ of connector ”M1” and DTX+ of connector ”M1” of Multi Display.

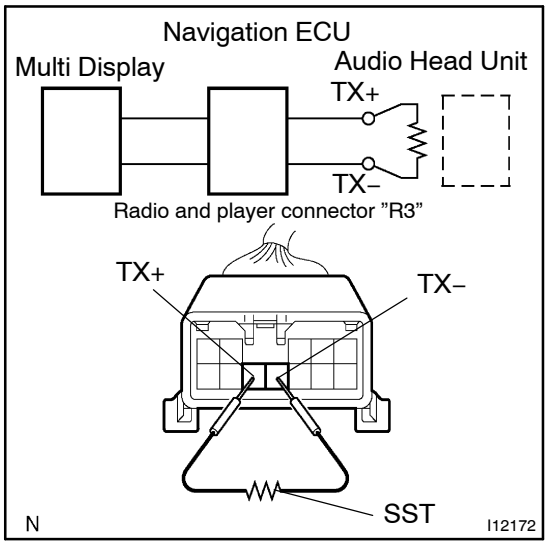
CHECK:

Operate radio and player (CD, Cassette tape, etc.) and check that the sound comes out from the speaker.
(Check that AVC–LAN is recovered.)

OK → **Replace the Multi Display.**

NG

5	Skip radio and player and check AVC–LAN.



PREPARATION:

(a) Connect Multi Display connector.
(b) Disconnect radio and player "F" connector.
(c) Using SST (Navigation Check Wire P/N 09843–18050), connect the terminal TX+ to terminal TX– of "F" connector of radio and player.

CHECK:

Operate the panel switch and the touch switch of the display and check that the navigation functions.
(Check that AVC–LAN is recovered.)

OK → **Replace the radio and player.**

NG

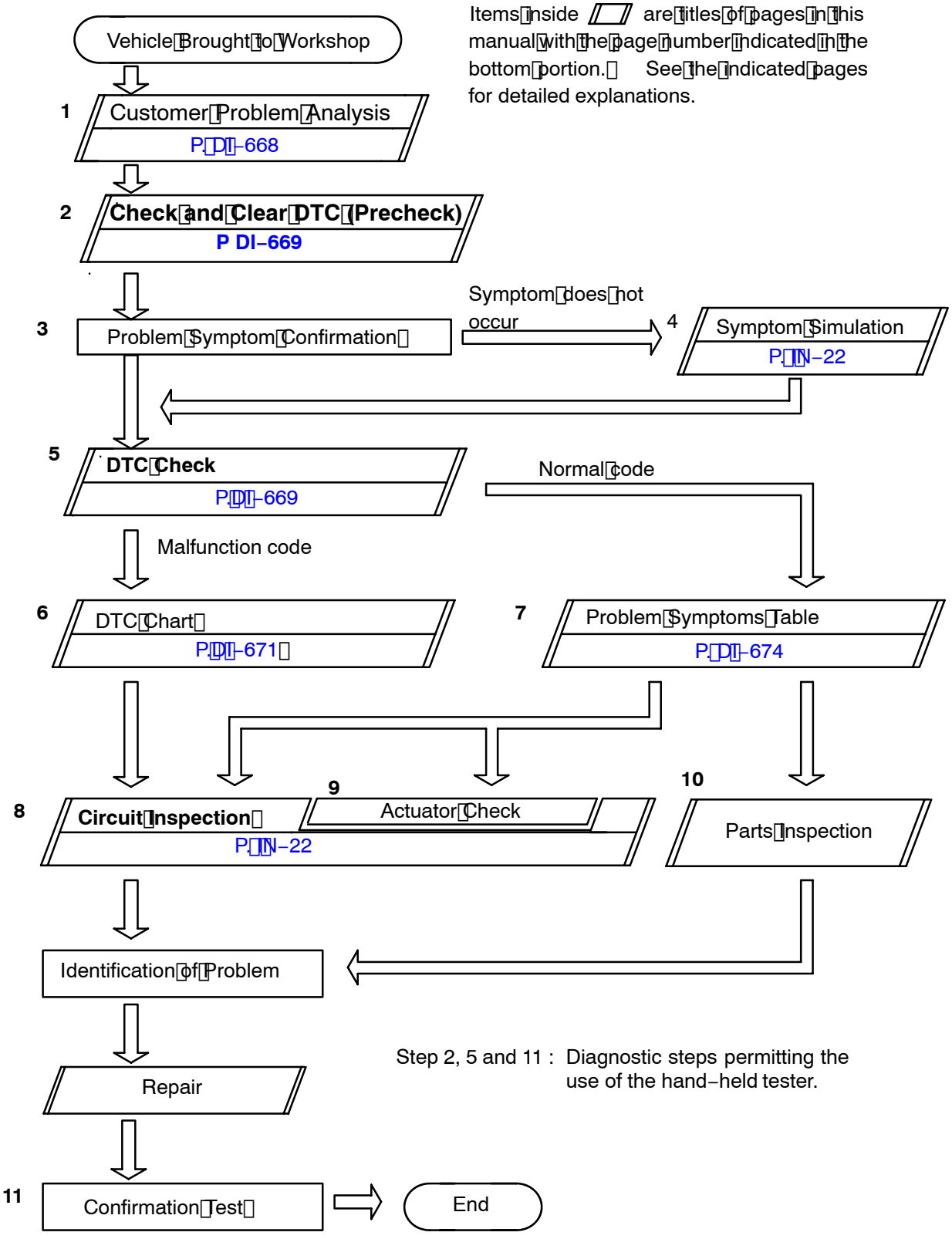
Replace the Navigation ECU.

AIR CONDITIONING SYSTEM

DI602–01

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



DI603–01

CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

Inspector's name:

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

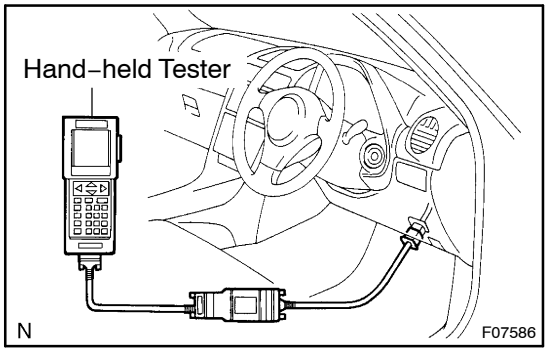
Date of Problem Occurrence	/ /
How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)
Weather	☐ Fine ☐ Cloudy ☐ Snowy ☐ Various / Other
Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F °C)

Symptoms	**Air Flow Control is Faulty**	☐ Blower motor does not operation ☐ Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	☐ Cabin temperature does not go down ☐ Cabin temperature does not rise ☐ Response is slow
	Air Inlet Control is Faulty	☐ Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Vent Control is Faulty	☐ Mode will not chage ☐ Will not enter the desired mode

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

DI604–01

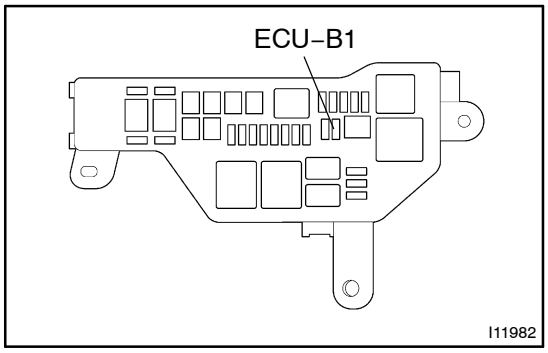
PRE–CHECK



1. DTC CHECK USING HAND–HELD TESTER

(a) Hook up the hand–held tester to the DLC3.

(b) Read the diagnostic trouble codes by following the prompts on the tester screen.
Please refer to the hand–held tester operator's manual for further details.



2. CLEARING DTC

(a) Pull out the ECU–B1 fuse in engin room J/B for 10 sec. or longer to clear diagnostic the DTC's memory.

(b) After reinserting the fuse, check that the normal code is output.

3. ACTUATOR CHECK

(a) Connect the hand–held tester to the DLC 3.
(b) Turn the ignition switch to ON and hand held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.
(d) Check the temperature and air flow visual and by hand.

Step No.	Pattern No.	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnetic clutch	Air mix damper
1	0	OFF	FACE	FRESH	OFF	Cool side (–10% open)
2	1	1	↑	↑	↑	↑
3	2	17	↑	↑	ON	↑
4	3	↑	↑	RECIRC	↑	↑
5	4	↑	↑	↑	↑	Cool / Hot (50% open)
6	5	↑	BI–LEVEL	↑	↑	↑
7	6	↑	FOOT*1	↑	↑	Hot side (110% open)
8	7	↑	FOOT*2	↑	↑	↑
9	8	↑	FOOT/DEF	↑	↑	↑
10	9	31	DEF	↑	↑	↑

(*1): There is leakage from defroster.
(*2): There is no leakage from defroster.

DI605–01

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit.)

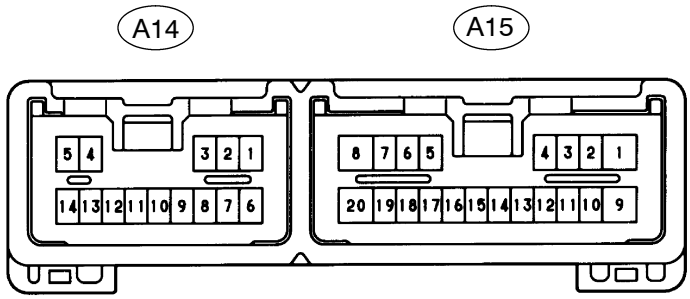
DTC No. (See page)	Detection Item	Trouble Area	Memory
B1400	Normal	–	–
B1411 (DI–676)	Room temperature sensor circuit	• Room temp. sensor • Harness or connector between room temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
B1412 (DI–679)	Ambient temperature sensor circuit	• Ambient temp. sensor • Harness or connector between ambient temp. sensor and engine (and ECT) ECU • Harness or connector between engine (and ECT) ECU and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
B1413 (DI–682)	Evaporator temperature sensor circuit	• Evaporator temp. sensor • Harness or connector between evaporator temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
B1421 *3 (DI–685)	Solar sensor circuit	• Solar sensor • Harness or connector between solar sensor and A/C control assembly • A/C control assembly	– ○ (8.5 min. or more)
B1423 (DI–688)	Open in pressure sensor circuit Abnormal refrigerant pressure [below 196 kPa (2.0 kgf/cm², 28 psi) over 3,140 kPa (32.0 kgf/cm², 455 psi)]	• Pressure switch • Harness or connector between pressure switch and engine (and ECT) ECU. • Harness or connector between engine (and ECT) ECU and A/C control assembly • Refrigerant pipe line • A/C control assembly • Compressor	–
B1431 (DI–691)	Air mix damper position sensor circuit	• Air mix damper position sensor • A/C control assembly • Harness or connector between air mix damper position sensor and A/C control assembly	○ (1 min. or more)
B1433 (DI–694)	Air outlet damper position sensor circuit	• Air outlet damper position sensor circuit • A/C control assembly • Harness or connector between air mix damper position sensor and A/C control assembly	○ (1 min. or more)

HINT:

- *1 If the room temp. is approx. –20°C (–4°F) or lower, DTC B1411 may be output even though the system is normal.
- *2 If the ambient temperature is approx. –50°C (–58°F) or lower, a DTC may be output even though the system is normal.
- *3 If the check is being performed in a dark place, DTC B1421 (solar sensor circuit abnormal) could be displayed. In this case, perform DTC check again while shining a light, such as an inspection light, on the solar sensor. If DTC B1421/21 is still displayed, there could be trouble in the solar sensor circuit.

DI606–01

TERMINALS OF ECU



I07266

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
MPX– ↔ GND (A14–1 ↔ A14–14)	O ↔ W–B	IG ON.	Pulse generation
PKB ↔ GND (A14–2 ↔ A14–14)	Y–R ↔ W–B	IG ON. Brake warning light: ON	Below 1.0 V
		IG ON. Brake warning light: OFF	10 – 14 V
PWR ↔ GND (A14–3 ↔ A14–14)	L–W ↔ W–B	IG ON. Pattern select switch: PWR	Below 1.0 V
		IG ON. Pattern select switch: Except PWR	10 – 14 V
ACC ↔ GND (A14–4 ↔ A14–14)	GR ↔ W–B	IG ACC.	10 – 14 V
		IG OFF.	Below 1.0 V
+B ↔ Body ground (A14–5 ↔ Body ground)	R–Y ↔ Body Ground	Always	10 – 14 V
HR ↔ Body Ground (A14–6 ↔ Body Ground)	L ↔ Body Ground	IG ON.	Below 1.0 V
		IG OFF.	10 – 14 V
BLW ↔ GND (A14–7 ↔ A14–14)	V ↔ W–B	IG ON. Operate blower motor	Pulse generation
SNOW ↔ GND (A14–8 ↔ A14–14)	B–Y ↔ W–B	IG ON. Pattern select switch: SNOW	Below 1.0 V
		IG ON. Pattern select switch: Except SNOW	10 – 14 V
P–S/B ↔ GND (A14–10 ↔ A14–14)	P–B ↔ W–B	IG ON. Passenger seat belt warning: Flash	Below 1.0 V
		IG ON. Passenger seat belt warning: OFF	10 – 14 V
ILL+ ↔ GND (A14–12 ↔ A14–14)	G ↔ W–B	Light control switch: ON	10 – 14 V
		Light control switch: OFF	Below 1.0 V
IG ↔ GND (A14–13 ↔ A14–14)	B–R ↔ W–B	IG ON.	10 – 14 V
		IG OFF.	Below 1.0 V
GND ↔ Body ground (A14–14 ↔ Body ground)	W–B ↔ Body Ground	Always	Continuity
HAZD ↔ GND (A15–1 ↔ A14–14)	G–W ↔ W–B	IG ON. Hazard switch: ON	Continuity
		IG ON. Hazard switch: OFF	No Continuity
FRS ↔ GND (A15–2 ↔ A14–14)	R–W ↔ W–B	IG ON. Air inlet selector: FRESH	Below 1.0 V
		IG ON. Air inlet selector: RECIRC	No voltage
AOD ↔ GND (A15–3 ↔ A14–14)	L–R ↔ W–B	IG ON. Mode selector: FACE	Below 1.0 V
		IG ON. Mode selector: DEF	10 – 14 V
AMH ↔ GND (A15–4 ↔ A14–14)	LG–R ↔ W–B	IG ON. Temperature control: Max. Hot	10 – 14 V
		IG ON. Temperature control: Max. Cool	Below 1.0 V
TE ↔ SG (A15–5 ↔ A15–18)	B–R ↔ BR–W	IG ON. Evaporator temp.: 0 °C (32 °F)	2.0 – 2.4 V
		IG ON. Evaporator temp.: 15 °C (59 °F)	1.4 – 1.8 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S5 ↔ SG (A15–6 ↔ A15–18)	GR–R ↔ BR–W	IG ON.	4.5 – 5.5 V
MPX+ ↔ GND (A15–8 ↔ A14–14)	L ↔ R–B	IG ON.	Pulse generation
MR/F ↔ GND (A15–9 ↔ A14–14)	*1 GR–R ↔W–B *2 GR–G ↔W–B	IG ON. Air inlet selector: FRESH	10 – 14 V
		IG ON. Air inlet selector: RECIRC	Below 1.0 V
REC ↔ GND (A15–10 ↔ A14–14)	Y–G ↔ W–B	IG ON. Air inlet selector: FRESH	Below 1.0 V
		IG ON. Air inlet selector: RECIRC	10 – 14 V
AOF ↔ GND (A15–11 ↔ A14–14)	P–L ↔ W–B	IG ON. Mode selector: FACE	10 – 14 V
		IG ON. Mode selector: DEF	Below 1.0 V
AMC ↔ GND (A15–12 ↔ A14–14)	P–B ↔ W–B	IG ON. Temperature control: Max. Hot	Below 1.0 V
		IG ON. Temperature control: Max. Cool	10 – 14 V
TS ↔ SG (A15–13 ↔ A15–18)	GR–L ↔ BR–W	IG ON. Solar sensor subject to electric light	0.8 – 4.3 V
		IG ON. Solar sensor is covered by a cloth	Below 0.8 V
TPM ↔ SG (A15–15 ↔ A15–18)	R–Y ↔ BR–W	IG ON. Mode selector: FACE	3.5 – 4.5 V
		IG ON. Mode selector: DEF	0.5 – 1.5 V
TP ↔ SG (A15–14 ↔ A15–18)	V–W ↔ BR–W	IG ON. Temperature control: Max. Hot	0.5 – 1.5 V
		IG ON. Temperature control: Max. Cool	3.5 – 4.5 V
TS ↔ SG (A15–13 ↔ A15–18)	GR–L ↔ BR–W	IG ON. Solar sensor subject to electric light	0.8 – 4.3 V
		IG ON. Solar sensor is covered by a cloth	Below 0.8 V
TR ↔ SG (A15–17 ↔ A15–18)	L–W ↔ BR–W	IG ON. Cabin temp.: 25 °C (77 °F)	1.8 – 2.2 V
		IG ON. Cabin temp.: 40 °C (104 °F)	1.2 – 1.6 V
SG ↔ Body Ground (A15–18 ↔ Body Ground)	BR–W ↔ Body Ground	Always	Continuity

*1:LHD models
*2:RHD models

DI607–01

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate	1. A/C control assembly 2. ACC power source circuit	IN–32 DI–712
Air Flow Control: No blower operation	1. ACC power source circuit 2. Heater main relay circuit 3. Blower motor circuit 4. A/C control assembly	DI–712 DI–715 DI–718 IN–32
Air Flow Control: No blower control	1. Heater main relay circuit 2. Blower motor circuit 3. A/C control assembly 4. Solar sensor circuit	DI–715 DI–718 IN–32 DI–685
Air Flow Control: Insufficient air flow	Blower motor circuit	DI–718
Temperature Control: No cool air comes out	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Compressor circuit 5. Pressure switch circuit 6. Air mix damper position sensor circuit 7. Air mix damper control servomotor circuit 8. Room temp. sensor circuit 9. Ambient temp. sensor circuit 10. A/C control assembly	AC–23 AC–16 AC–3 DI–721 DI–688 DI–691 DI–697 DI–676 DI–679 IN–32
Temperature Control: No warm air comes out	1. Air mix damper position sensor circuit 2. Air mix damper control servomotor circuit 3. Room temp. sensor circuit 4. Ambient temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C control assembly	DI–691 DI–697 DI–676 DI–679 DI–682 IN–32
Temperature Control: Output air is warmer or cooler that the set temperature or response is slow	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Cooling fan system 5. Solar sensor circuit 6. Room temp. sensor circuit 7. Ambient temp. sensor circuit 8. Evaporator temp. sensor circuit 9. Air mix damper position sensor circuit 10. Air mix damper control servomotor circuit 11. Air inlet damper control servomotor circuit 12. Condenser 13. Evaporator 14. Heater radiator 15. Expansion valve 16. A/C control assembly	AC–23 AC–16 AC–3 CO–22 DI–685 DI–676 DI–679 DI–682 DI–691 DI–697 DI–697 AC–48 AC–32 AC–32 AC–53 IN–32

Symptom	Suspect Area	See page
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Room temp. sensor circuit 2. Ambient temp. sensor circuit 3. Air mix damper position sensor circuit 4. Air mix damper control servomotor circuit 5. A/C control assembly	DI–676 DI–679 DI–691 DI–697 IN–32
No air inlet control	1. Air inlet damper control servomotor circuit 2. A/C control assembly	DI–700 IN–32
No air flow mode	1. Air outlet damper position sensor circuit 2. Air outlet damper control servomotor circuit 3. A/C control assembly	DI–694 DI–703 IN–32
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C control assembly	DI–721 IN–32
Set temp. value displayed does not change up with operation of temp. control switch.	A/C control assembly	IN–32
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back–up power source circuit 2. A/C control assembly	DI–706 IN–32

DI608–01

CIRCUIT INSPECTION

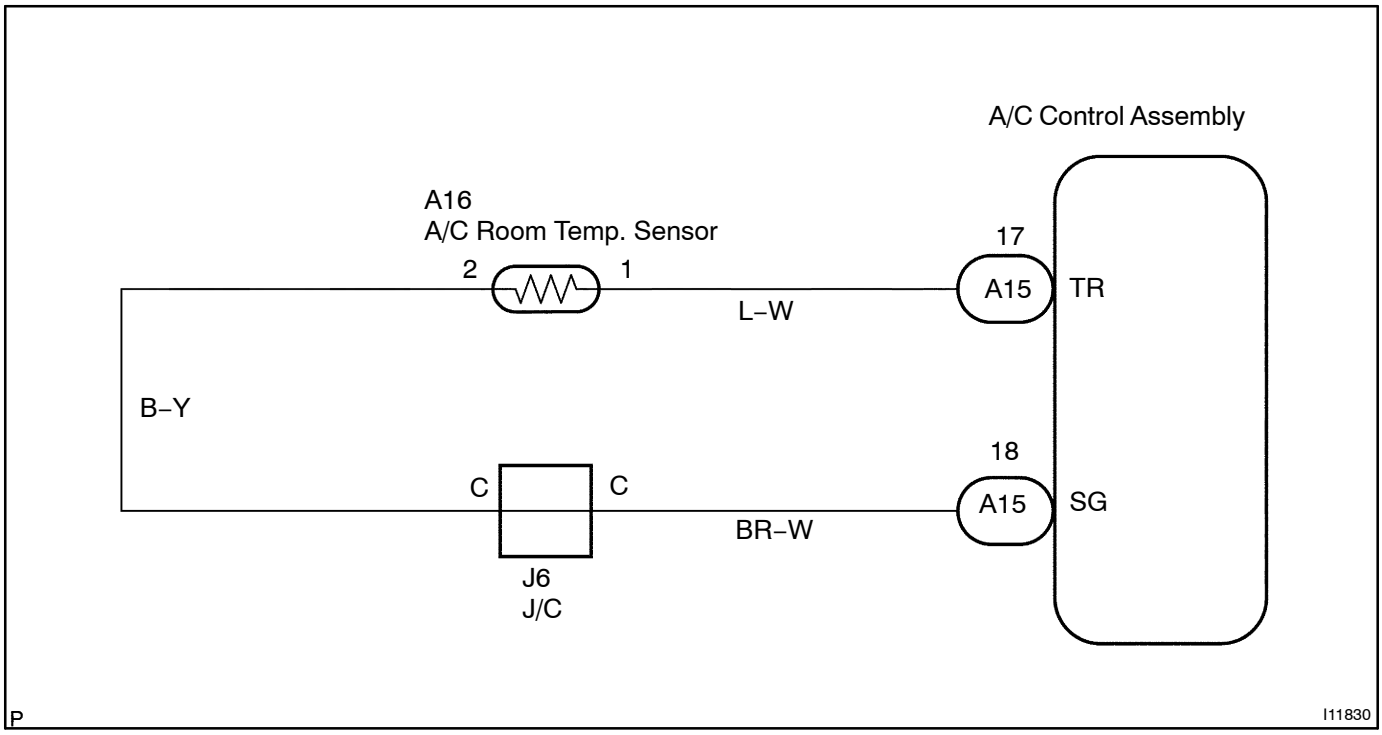
DTC	B1411	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1411	Open or short in room temperature sensor circuit.	• Room temperature sensor. • harness or connector between room temperature sensor and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

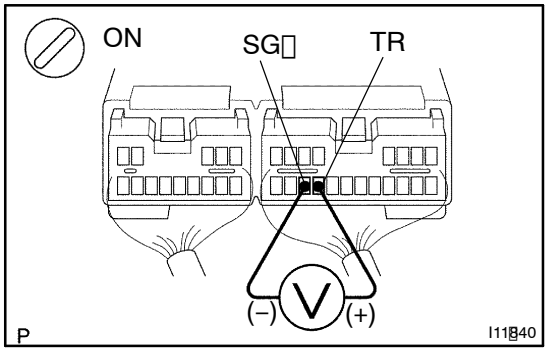
1	**Check room temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the room temp. sensor using DATA LIST.

OK ⇒ **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TR and SG of A/C control assembly connector.**



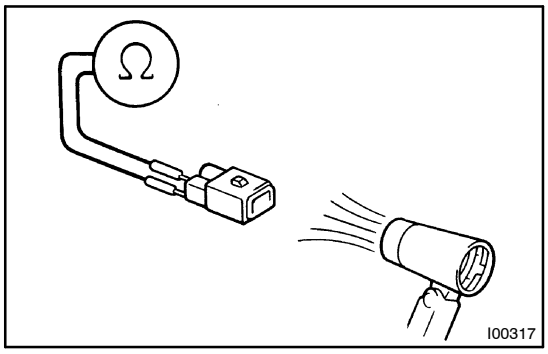
PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TR and SG of A/C control assembly connector at each temperature.
OK:
Voltage:
at 25°C (77°F): 1.8 – 2.2 V
at 40°C (104°F): 1.2 – 1.6 V
HINT:
As the temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1411 is displayed, check and replace A/C control assembly.

3	Check room temperature sensor.



PREPARATION:
Remove room temperature sensor (See page AC–66).
CHECK:
Measure resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.
OK:

Resistance:
at 25°C (77°F): 1.65 – 1.75 KΩ
at 50°C (122°F): 0.55 – 0.65 KΩ

HINT:
As the temperature increases, the resistance decreases.

NG → **Replace room temperature sensor.**

OK

4	Check harness and connector between A/C control assembly and room temperature sensor (See page IN–32).

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

OK

Check and replace A/C control assembly.

DI609–01

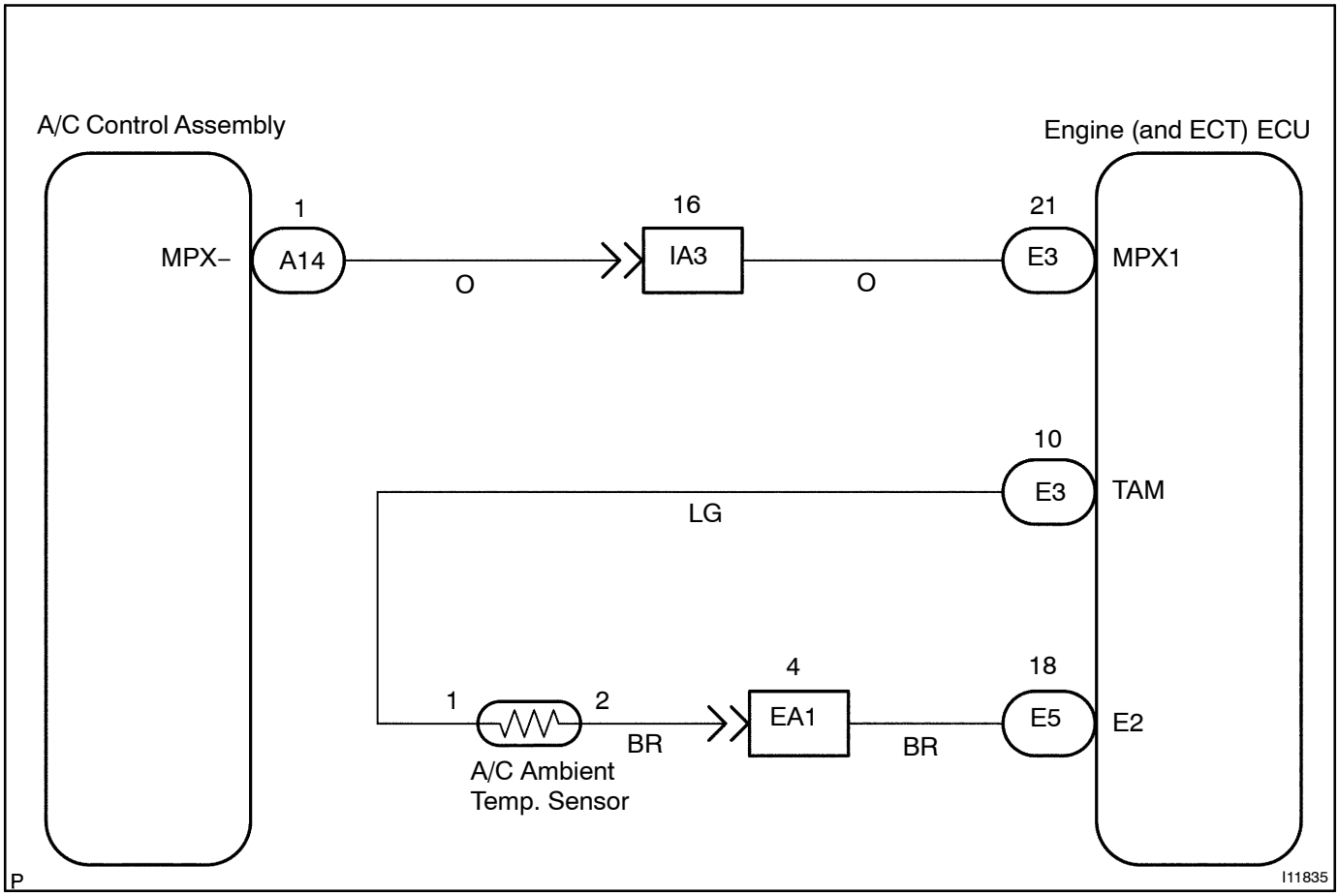
DTC	B1412	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1412	Open or short in ambient temperature sensor circuit.	• Ambient temperature sensor. • Harness or connector between ambient temperature sensor and engine (and ECT) ECU • Harness or connector between engine (and ECT) ECU and A/C control assembly • Engine (and ECT) ECU • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

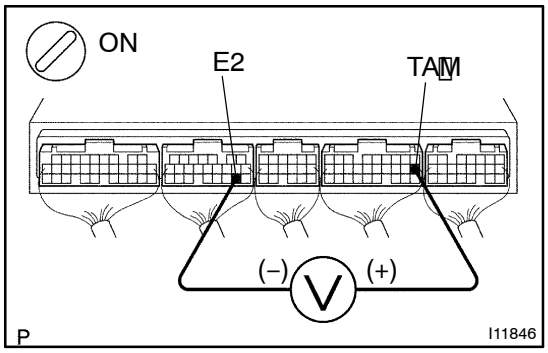
1	**Check ambient temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the ambient temp. sensor using DATA LIST.

OK ⇨ **Check and replace engine (and ECT) ECU.**

NG

2	**Check voltage between terminals TAM and E2 of engine (and ECT) ECU.**



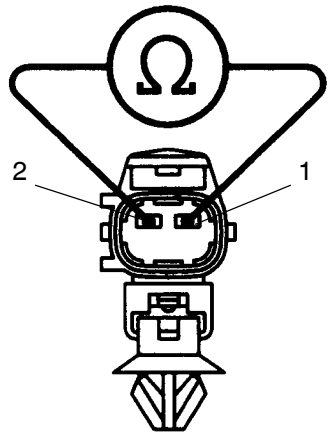
PREPARATION:
Remove engine (and ECT) ECU with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TAM and E2 of engine (and ECT) ECU connector at each temperature.
OK:
Voltage:
at 25°C (77°F): 1.35 – 1.75 V
at 40°C (104°F): 0.85 – 1.25 V
HINT:
As the temperature increases, the voltage decreases.

NG ⇨ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1412 is displayed, check and replace engine (and ECT) ECU and A/C control assembly.

3	Check ambient temperature sensor.



PREPARATION:
Disconnect ambient temperature sensor (See page AC–67).
CHECK:
Measure resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.
OK:

Resistance:
at 25°C (77°F): 1.6 – 1.8 kΩ
at 50°C (122°F): 0.5 – 0.7 kΩ

HINT:
As the temperature increases, the resistance decreases.
NOTICE:
When installing the ambient temperature sensor, be sure to connect the sensor connector before connecting the battery.

NG → **Replace ambient temperature sensor.**

OK

4	Check harness and connector between engine (and ECT) ECU and ambient temperature sensor (See page IN–32).

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

OK

5	Check harness and connector between engine (and ECT) ECU and A/C control assembly (See page IN–32).

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

OK

Check and replace engine (and ECT) ECU or A/C control assembly.

DI60A–01

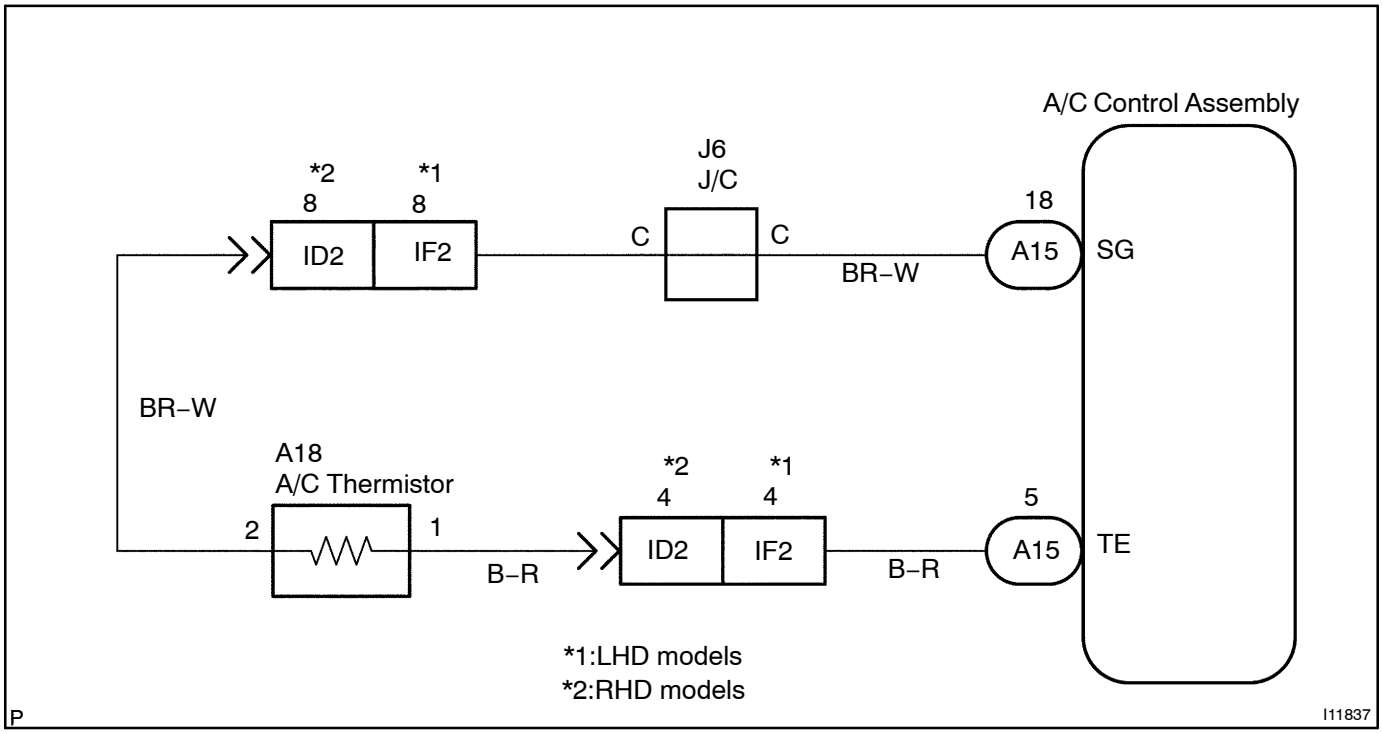
DTC	B1413	Evaporator Temperature Sensor circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the A/C unit and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1413	Open or short in evaporator temperature sensor circuit.	• Evaporator temperature sensor. • Harness or connector between evaporator temperature sensor and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

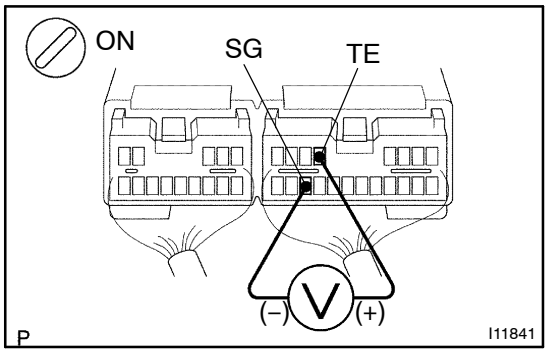
1	**Check evaporator temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the evaporator temp. sensor using DATA LIST.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TE and SG5 of A/C control assembly connector.**



PREPARATION:
Remove the A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TE and SG of A/C control assembly connector at each temperature.

OK:

Voltage:
at 0°C (32°F): 2.0 – 2.4 V
at 15°C (59°F): 1.4 – 1.8 V

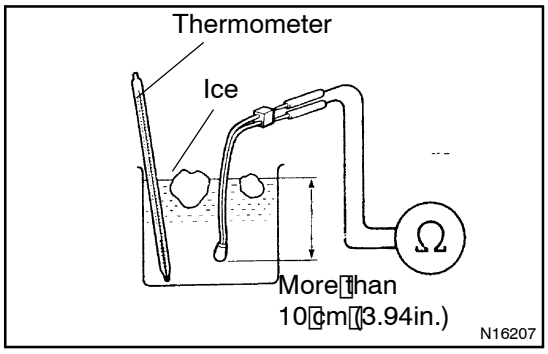
HINT:
As the temperature increases, the voltage decreases.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1413 is displayed, check and replace A/C control assembly.

3	**Check evaporator temperature sensor.**



PREPARATION:
Remove evaporator temperature sensor (See page AC–68).
CHECK:
Measure resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.
OK:

Resistance:
at 0°C (32°F): 4.5 – 5.2 kΩ
at 15°C (59°F): 2.0 – 2.7 kΩ

HINT:
As the temperature increases, the resistance decreases.

NG → **Replace evaporator temperature sensor.**

OK

4	**Check harness and connector between A/C control assembly and evaporator temperature sensor (See page IN–32).**

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

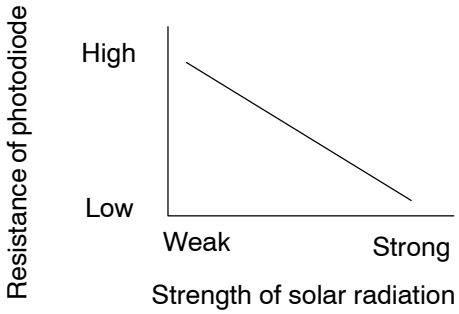
OK

Check and replace A/C control assembly.

DI60B–01

DTC	B1421	Solar Sensor Circuit

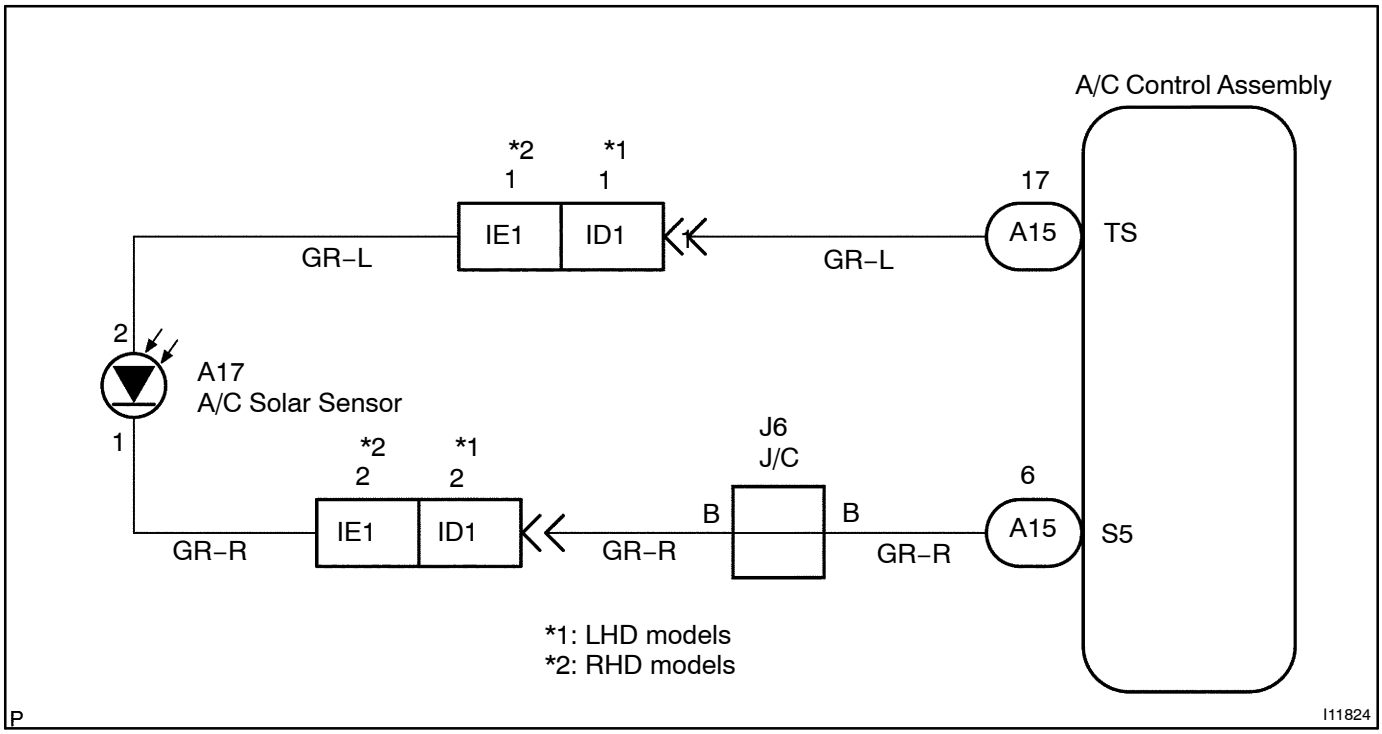
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1421	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code B1421 is not abnormal when the sensor is not receiving solar radiation.	• Solar sensor. • Harness or connector between solar sensor and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

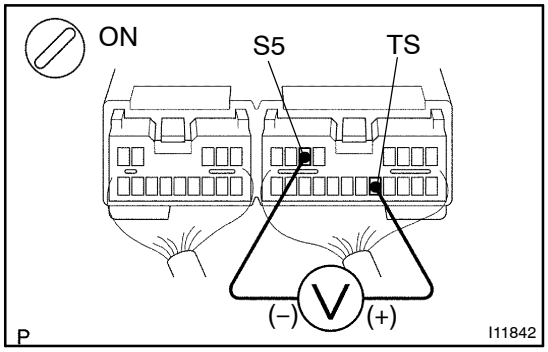
1	**Check solar sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the solar sensor using DATA LIST.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals S5 and TS of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals S5 and TS of A/C control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

OK:

Condition	Voltage
Sensor subjected to electric light	0.8 – 4.3 V
Sensor covered by a cloth	Below 0.8 V

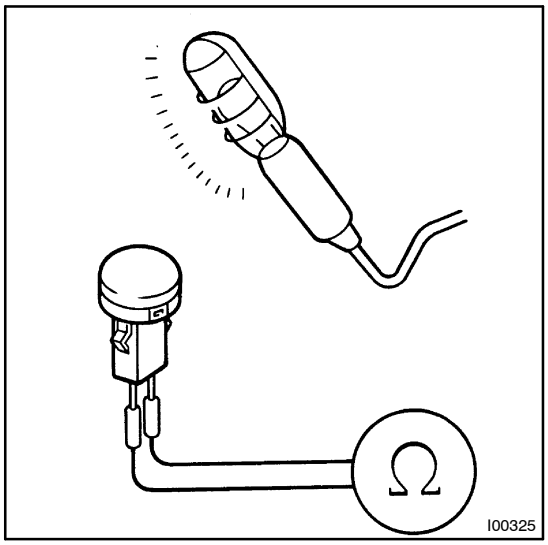
HINT:
As the inspection light is moved away from the sensor, the voltage increases.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1421 is displayed, check and replace A/C control assembly.

3	Check solar sensor.



PREPARATION:

Remove solar sensor (See page AC–65).

CHECK:

(a) Cover the sensor with a cloth.

(b) Measure resistance between terminals 1 and 2 of solar sensor connector.

HINT:

Connect positive (+) lead of ohmmeter to terminal 1 and negative (–) lead to terminal 2 of the solar sensor.

OK:

Resistance: ∞ Ω (no continuity)

PREPARATION:

(a) Remove the cloth from the solar sensor and subject the sensor to electric light.

(b) Measure resistance.

OK:

Resistance: Approx. 10 kΩ (continuity)

HINT:

As the electric light is moved away from the sensor, the resistance increases.

NG → **Replace solar sensor.**

OK

4	Check harness and connector between A/C control assembly and solar sensor (See page IN–32).

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

OK

Check and replace A/C control assembly.

DI60C–01

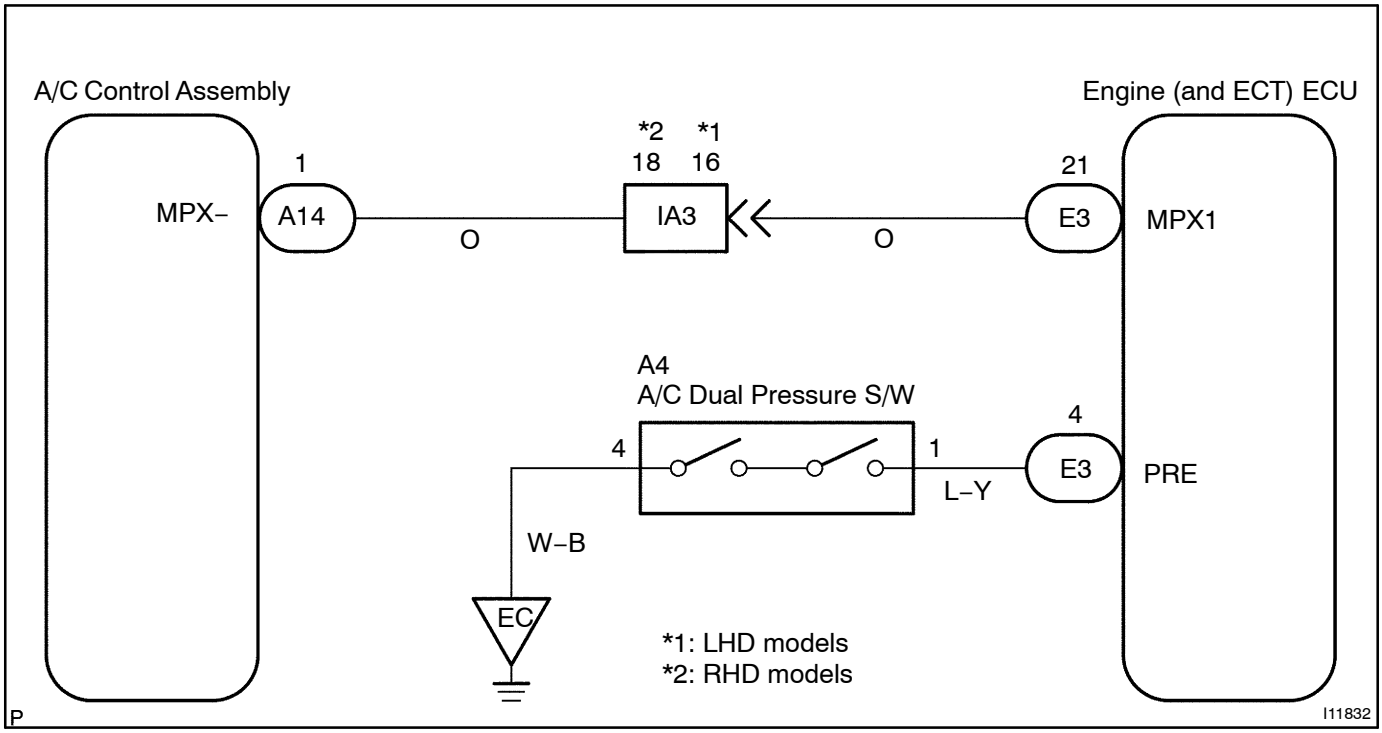
DTC	B1423	Pressure Switch Circuit

CIRCUIT DESCRIPTION

The pressure switch sends the appropriate signals to the engine (and ECT) ECU when the A/C refrigerant pressure drops too low or rises too high. When the engine (and ECT) ECU receives these signals, it outputs signals via the engine (and ECT) ECU to switch OFF the compressor relay and turns the magnetic clutch OFF.

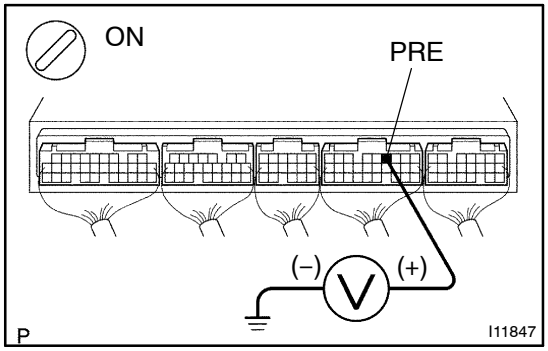
DTC No.	Detection Item	Trouble Area
B1423	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 181 kPa (2.0 kg/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)	• Pressure switch. • Harness or connector between pressure switch and engine (and ECT) ECU • Harness or connector engine (and ECT) ECU and A/C control assembly • Refrigerant pipe line. • Engine (and ECT) ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal PRE of engine (and ECT) ECU and body ground.



PREPARATION:

Install the manifold gauge set.

CHECK:

(a) Turn ignition switch to ON.

(b) Check voltage between terminal PRE of engine (and ECT) ECU connector and body ground when refrigerant pressure is changed.

OK:

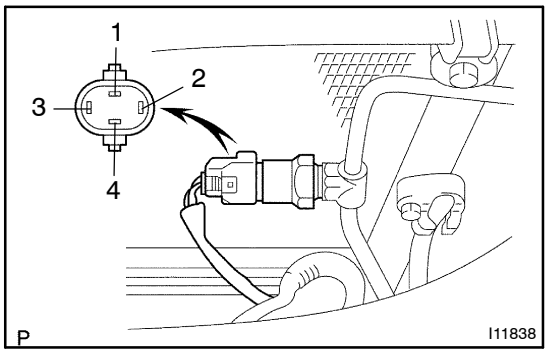
The voltage changes with refrigerant pressure, as shown in the diagram below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (10V) 225 kPa 196 kPa OFF (12V)	ON (10V) 2,550 kPa 3,140 kPa OFF (12V)

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	Check pressure switch.



PREPARATION:

Disconnect pressure switch connector.

CHECK:

(a) Turn ignition switch to ON.

(b) Check continuity between terminals 1 and 4 of pressure switch when refrigerant pressure is changed.

OK:

The continuity changes with refrigerant pressure as shown below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (continuity) 211 kPa 181 kPa OFF (continuity)	ON (continuity) 2,550 kPa 3,140 kPa OFF (continuity)

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

OK

3	Check harness and connector between engine (and ECT) ECU and pressure switch, pressure switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between engine (and ECT) ECU and A/C control assembly. (See page IN–32)

NG → Repair or replace harness or connector.

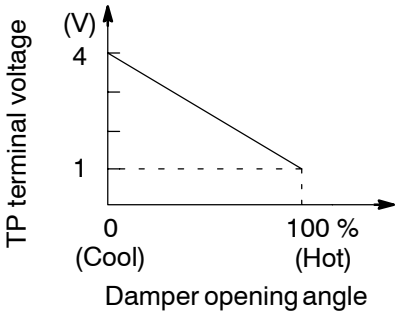
OK

Check and replace engine (and ECT) ECU.

DI60D–01

DTC	B1431	Air Mix Damper Position Sensor Circuit

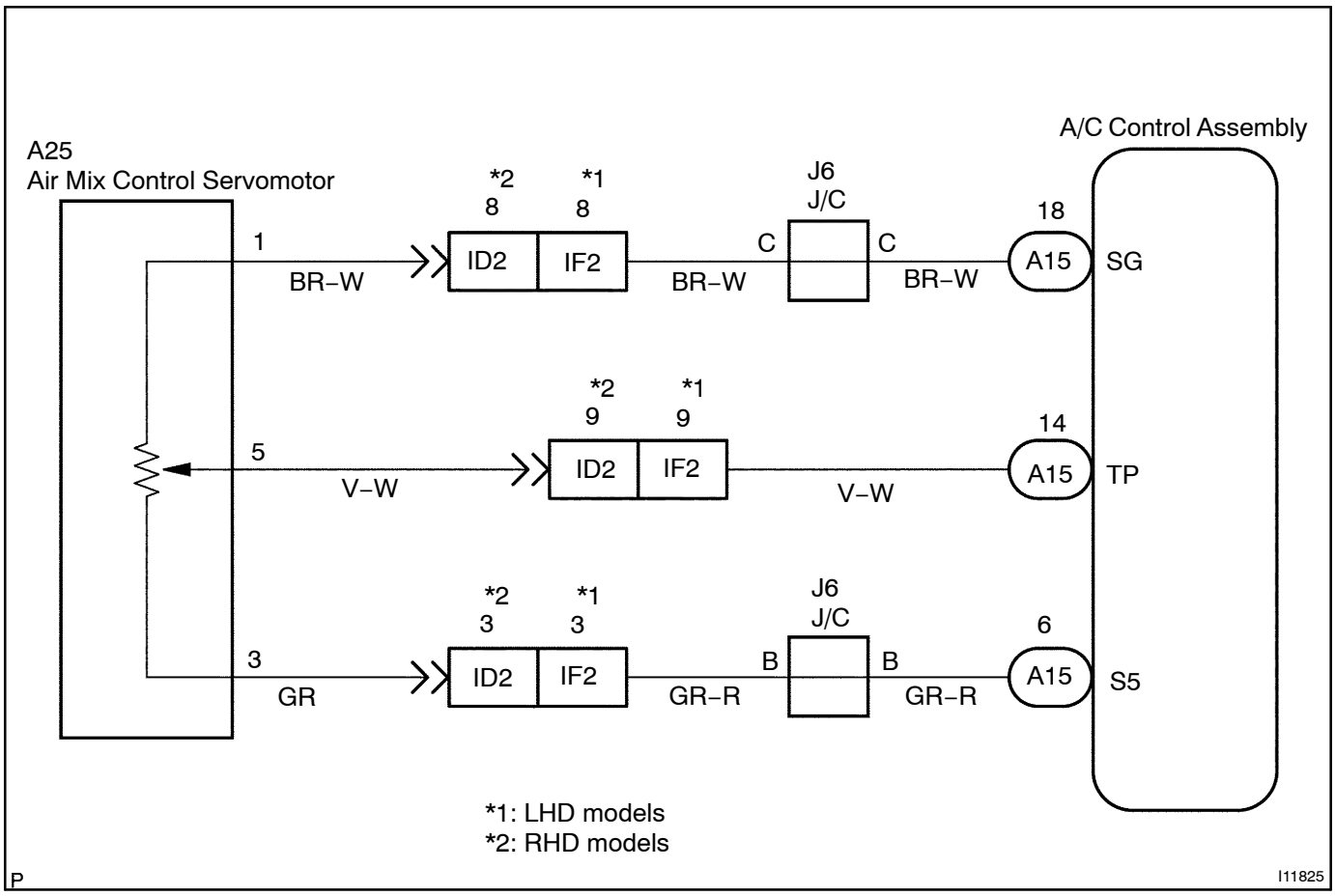
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C control assembly.
The position sensor is built into the air mix damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1431	Short to ground or power source circuit in air mix damper position sensor circuit.	• Air mix damper position sensor. • Harness or connector between air mix damper control servomotor assembly and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check air mix damper position using hand–held tester.**

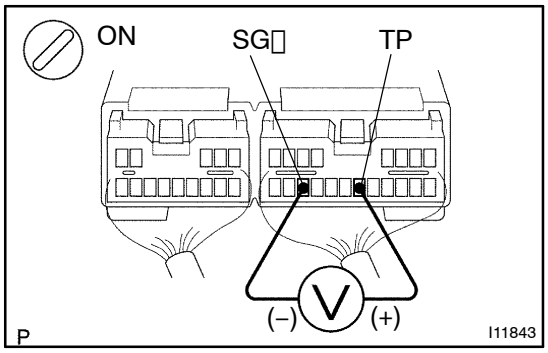
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air mix damper and the target position of air mix damper.
OK:

The current position and target position are almost similar.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TP and SG of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Change the set temperature to activate the air mix damper control servomotor, and measure the voltage between terminals TP and SG of A/C control assembly connector each time when the set temperature is changed.
OK:

Set Temperature	Voltage
Max. cool	3.5 – 4.5 V
Max. warm	0.5 – 1.5 V

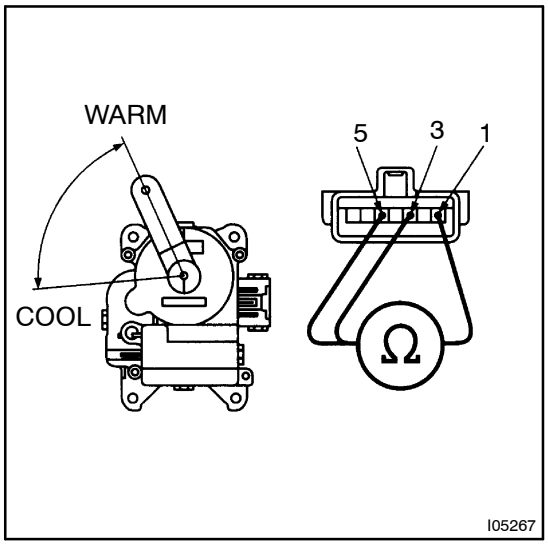
HINT:
As the set temperature increases, the voltage decreases.

NG → **Go to step 3.**

Ok

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1431 displayed, check and replace A/C control assembly.

3	Check air mix damper position sensor.



PREPARATION:
Remove the air mix damper control sevomotor.

CHECK:
Measure resistance between terminals 1 and 3 of air mix damper control servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:
While operating air mix damper control servomotor, following the procedure on page DI–697, measure resistance between terminals 1 and 5 of air mix damper control servomotor assembly connector.

OK:

Position	Resistance
Max. cool	3.6 – 6.8 kΩ
Max. warm	0.5 – 1.1 kΩ

HINT:
As the air mix damper control servomotor moves from cool side to hot side, the resistance decreases.

NG	Replace air mix damper control servomotor assembly.

OK

4	Check harness and connector between A/C control assembly and air mix damper control servomotor assembly (See page IN–32).

NG	Repair or replace harness or connector.

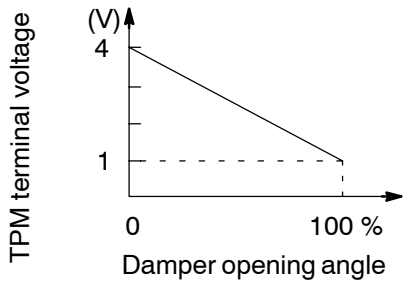
OK

Check and replace A/C control assembly.

DI60E–01

DTC	B1433	Air Outlet Damper Position Sensor Circuit

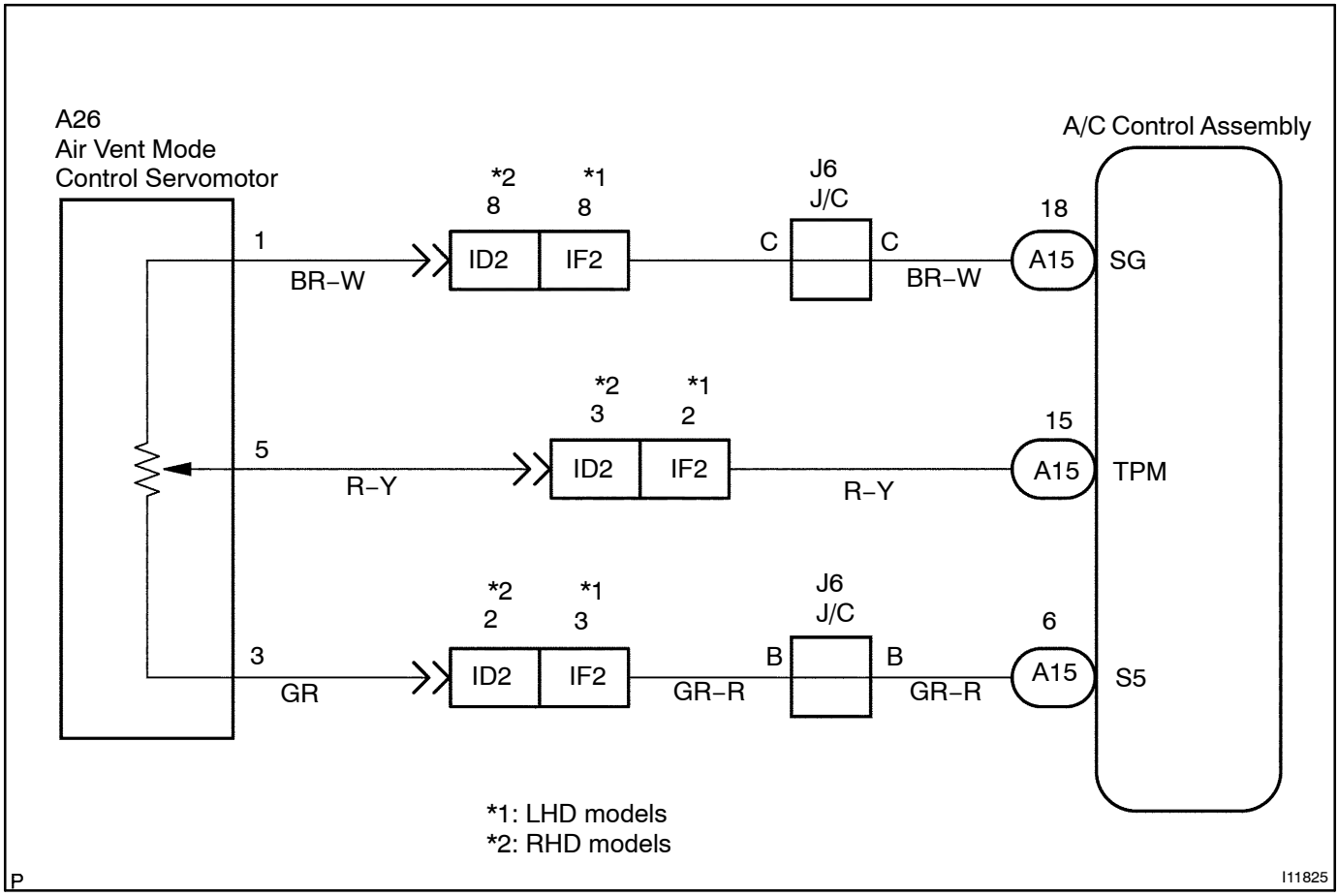
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C control assembly.
The position sensor is built into the air outlet damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1433	Short to ground or power source circuit in air outlet damper position sensor circuit.	• Air outlet damper position sensor. • Harness or connector between air outlet damper control servomotor assembly and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step1 and in case of not using the hand–held tester, start from step2.

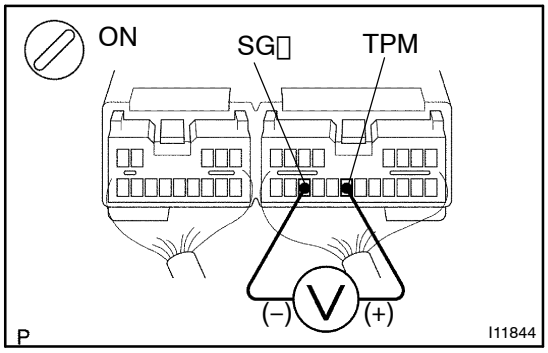
1	**Check air outlet damper position using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air outlet damper and the target position of air outlet damper.
OK:
The current position and target position are almost similar.

OK	**Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TPM and SG of A/C control assembly connector.**



PREPARATION:
(a) Remove A/C control assembly with connectors still connected.
(b) Turn ignition switch to ON.
CHECK:
Measure the voltage between terminals TPM and SG of A/C control assembly.
OK:

Mode selector	Voltage
FACE	3.5 – 4.5 V
DEF	0.5 – 1.5 V

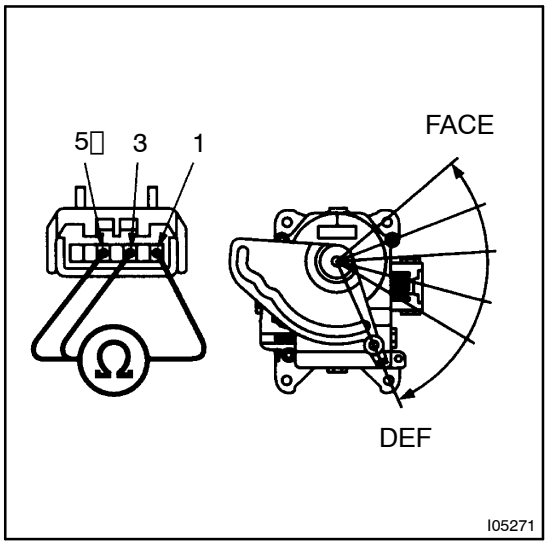
HINT:
As the air outlet damper control servomotor is moved from FACE side to DEF side, the voltage decreases gradually without interruption.

NG	**Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1434 is displayed, check and replace A/C control assembly.

3	**Check air outlet damper position sensor.**



PREPARATION:
Remove the air outlet servomotor.

CHECK:
Measure resistance between terminals 1 and 3 of air outlet servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:
While operating air outlet damper control servomotor as in the procedure on page DI–703, measure resistance between terminals 3 and 5 of air outlet damper control servomotor.

OK:

Resistance:

Damper Position	Resistance
DEF	0.5 – 1.1 kΩ
FACE	3.6 – 6.8 kΩ

HINT:
As the air outlet servomotor moves from DEF side to FACE side, the resistance decreases gradually without interruption.

NG	**Replace air outlet damper control servomotor assembly.**

OK

4	**Check harness and connector between A/C control assembly and air outlet damper control servomotor assembly (See page IN–32).**

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

OK

Check and replace A/C control assembly.

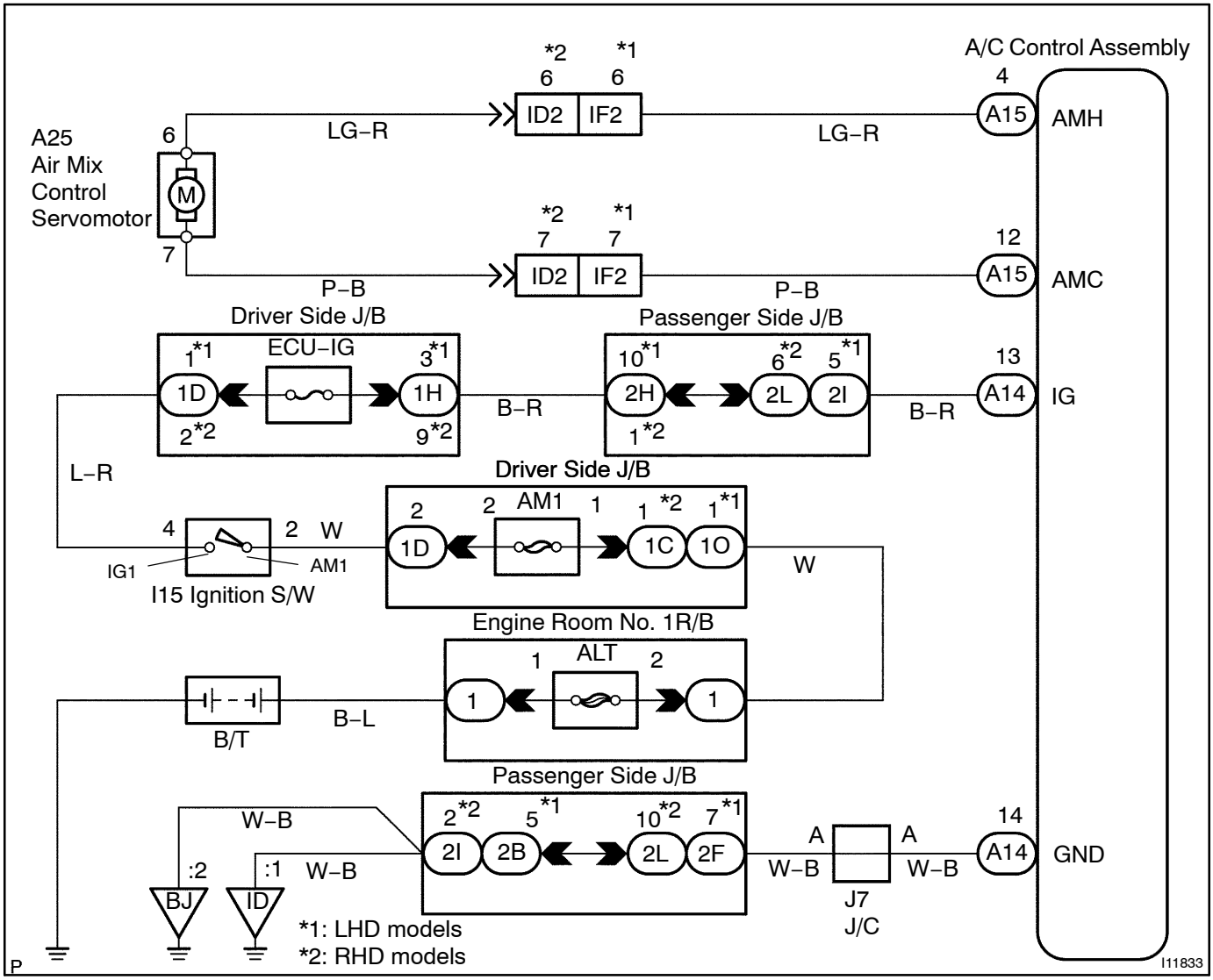
DI60F–01

Air Mix Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air mix damper control servomotor is controlled by the A/C control assembly and moves the air mix damper to the desired position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

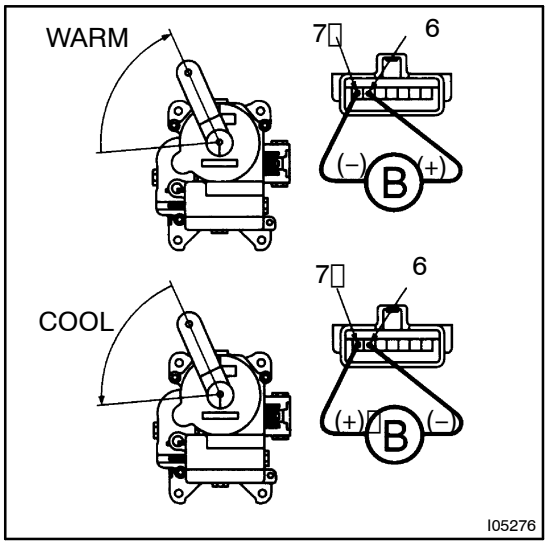
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
(a) Enter into ACTIVE TEST function of hand–held tester.
(b) Check air mix damper operates as hand–held tester directs.
OK:

Pattern No.	Air Mix Damper	Condition
0 – 3	0% (Fully closed)	Cool air comes out
4 – 5	50%	
6 – 9	100% (Fully opened)	Warm air comes out

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check air mix damper control servomotor.**



PREPARATION:
Remove air mix damper control servomotor.
CHECK:
Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.
OK:
The lever turns smoothly to Hot side.
CHECK:
Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.
OK:
The lever turns smoothly to Cool side.

NG	**Replace air mix damper control servomotor assembly.**

OK

3	Check harness and connector between A/C control assembly and air mix damper control servomotor assembly (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

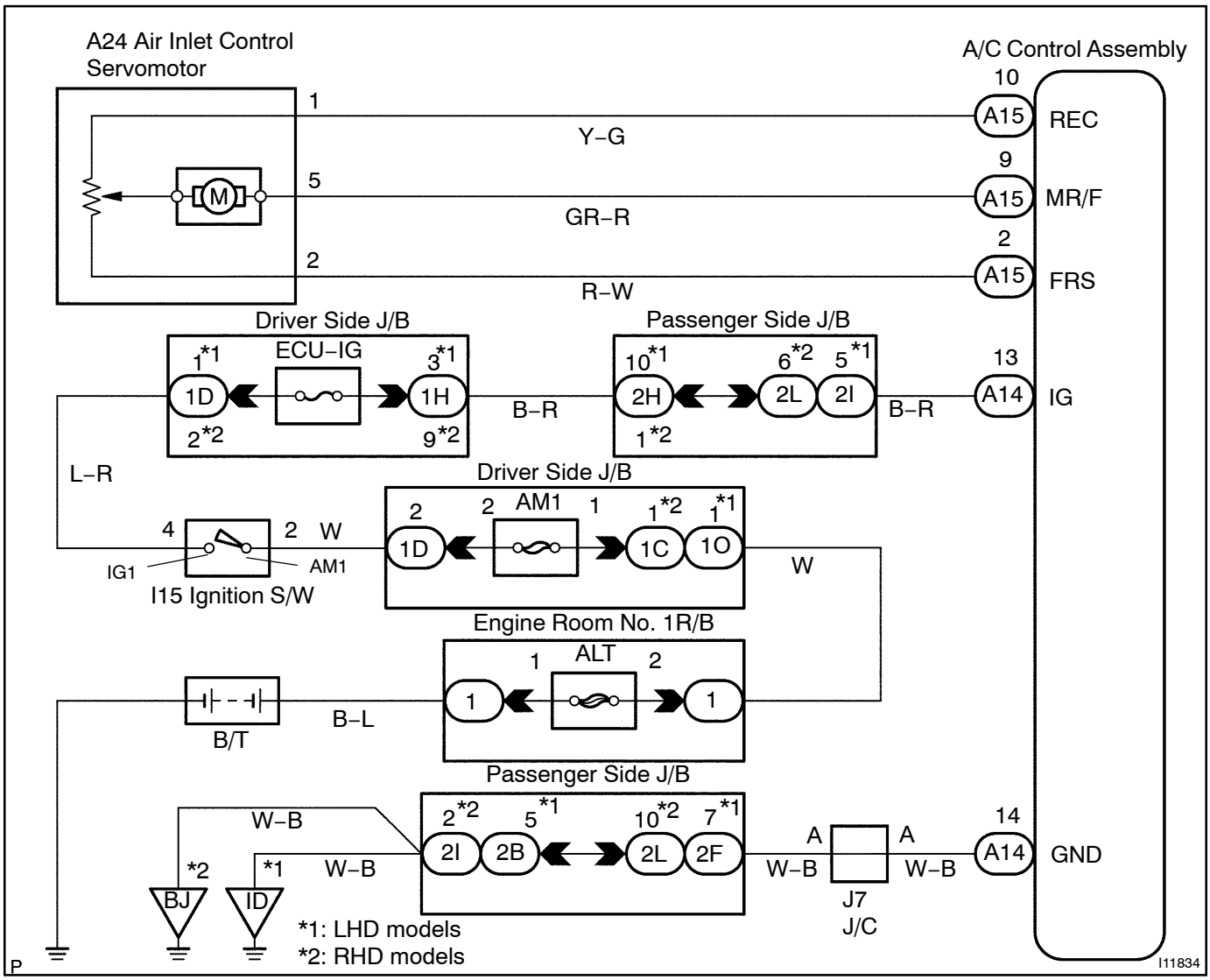
DI60G–01

Air Inlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

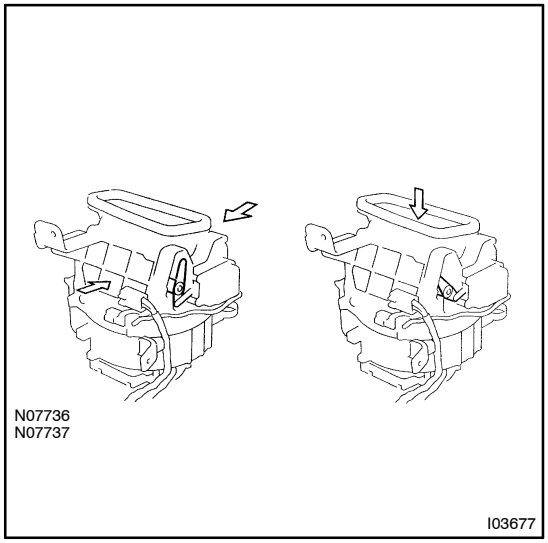
The air inlet damper control servomotor is controlled by the A/C control assembly and moves the air inlet damper to the desired position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



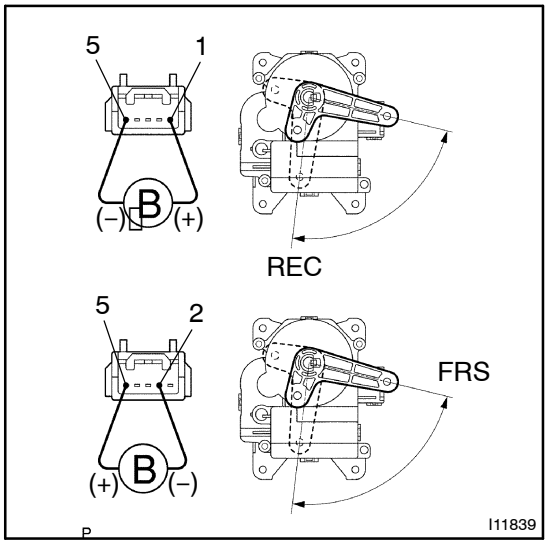
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
(a) Enter into ACTIVE TEST function of hand–held tester.
(b) Check air inlet damper operates as hand–held tester directs.
OK:

Pattern No.	Air Inlet Damper
0 – 3	FRS
4 – 9	REC

OK: **Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	Check air inlet damper control servomotor.



PREPARATION:
Remove the air inlet damper control servomotor.
CHECK:
Connect positive (+) lead to terminal 1 and negative (–) lead to terminal 5.
OK:
The lever moves smoothly to REC position.
CHECK:
Connect positive (+) lead to terminal 5 and negative (–) lead to terminal 2.
OK:
The lever moves smoothly to FRS position.

NG: **Replace air inlet damper control servomotor assembly.**

OK

3	Check harness and connector between A/C control assembly and air inlet damper control servomotor (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

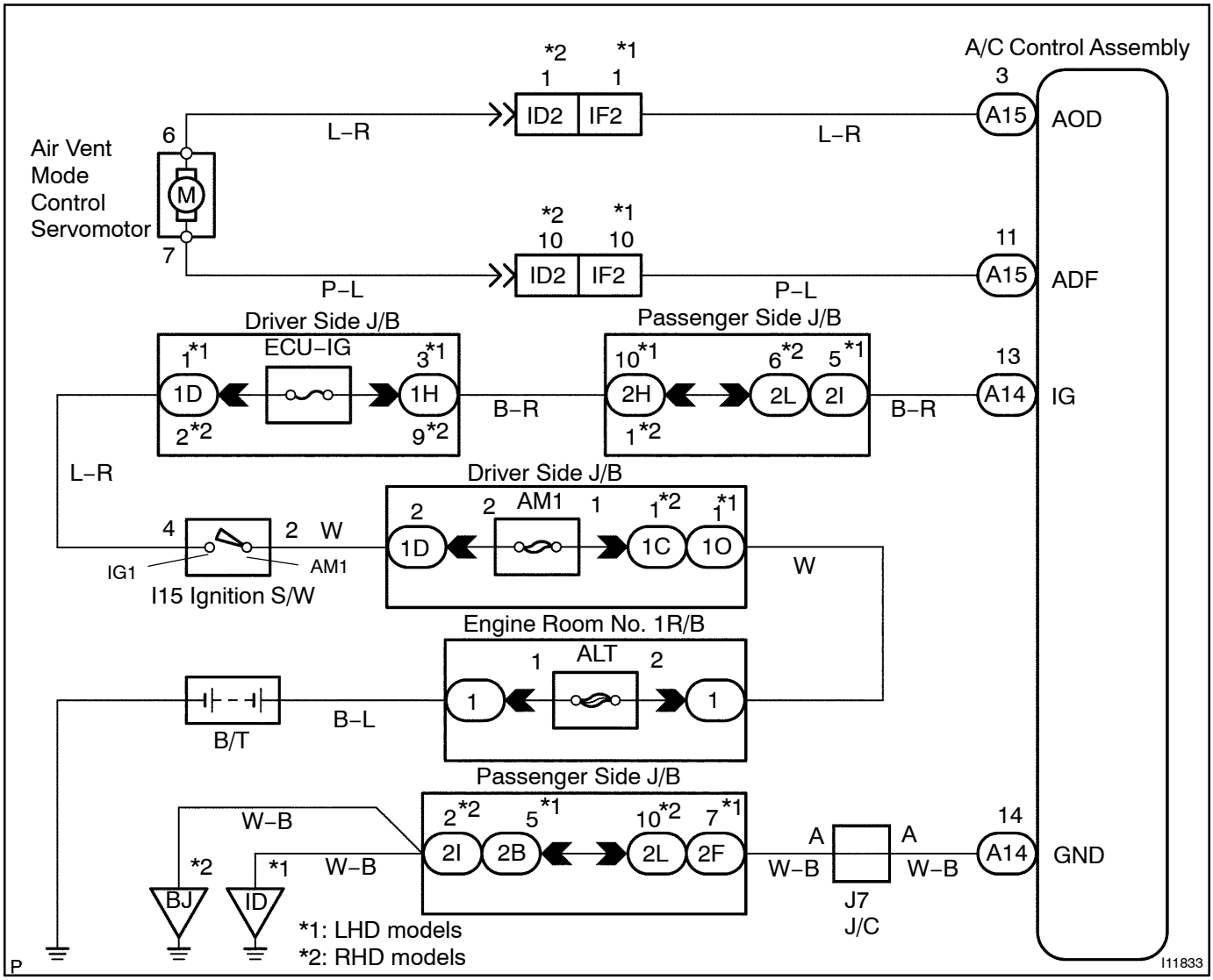
DI60H–01

Air Outlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by the signals from the A/C control assembly. When the AUTO switch is on, the A/C control assembly changes the mode automatically between (FACE), (BI–LEVEL) and (FOOT) according to the temperature setting.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

Pattern NO.	Air Flow
0 – 4	FACE
5	BI–LEVEL
6, 7	FOOT
8	FOOT/DEF
9	DEF

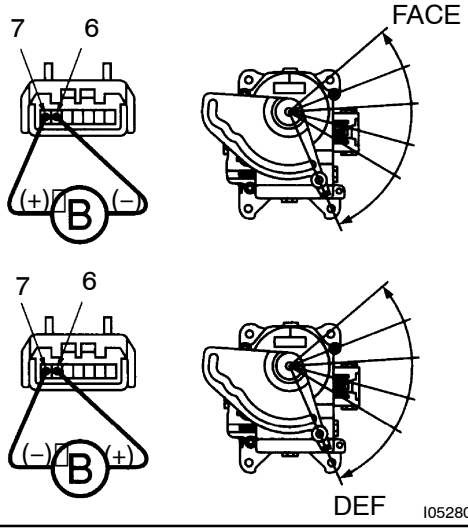
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
(a) Enter into ACTIVE TEST function of hand–held tester.
(b) Check mode damper operates as hand–held tester directs.
OK:

The mode changes with the change in the hand–held tester as shown in the table.

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check air outlet damper control servomotor.**



PREPARATION:
Remove the air outlet damper control servomotor.
CHECK:
Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.
OK:

The lever moves smoothly to FACE position.

CHECK:
Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.
OK:

The lever moves smoothly to DEF position.

NG	**Replace air outlet servomotor.**

OK

3	Check for open and short in harness and connector between A/C control assembly and outlet servomotor, outlet damper control servomotor and battery, outlet damper control servomotor and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace A/C control assembly.

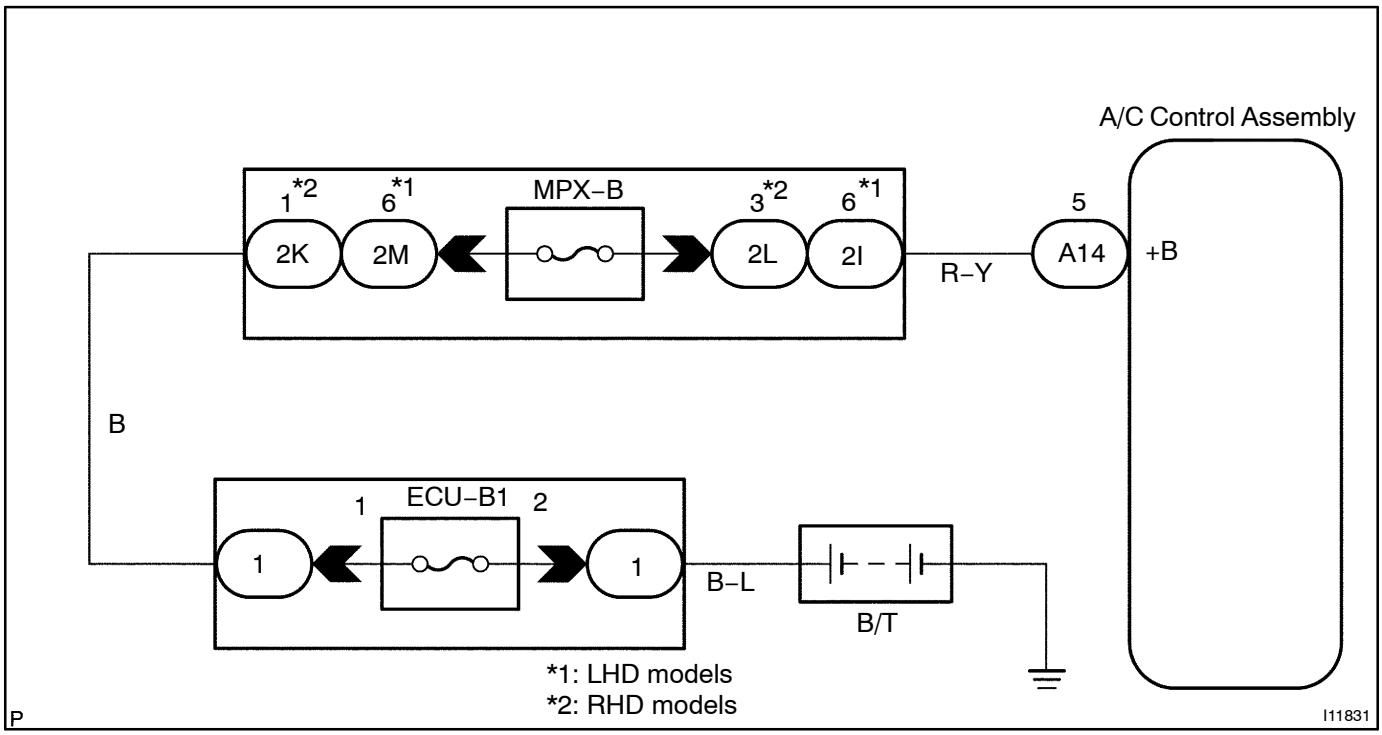
DI60I–01

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

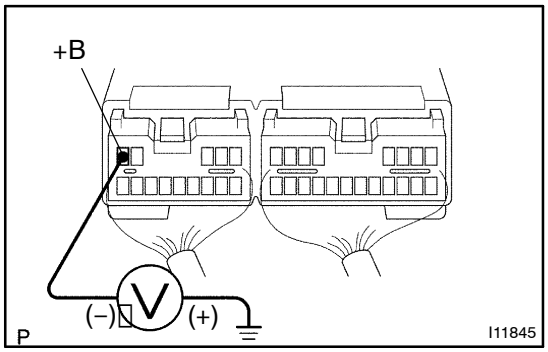
This is the back up poser source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal +B of A/C control assembly connector and body ground.**

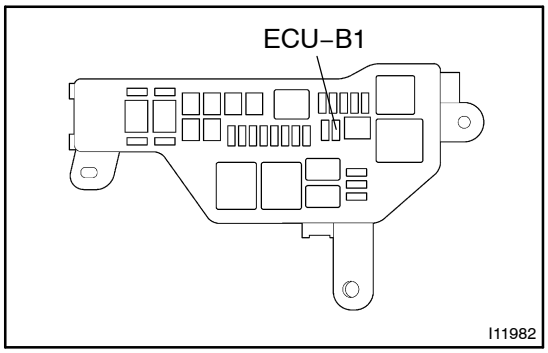


PREPARATION:
Remove the A/C control assembly with connector still connected.
CHECK:
Measure voltage between terminal +B of A/C control assembly connector and body ground.
OK:
Voltage: Battery voltage

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check ECU–B1 fuse.**

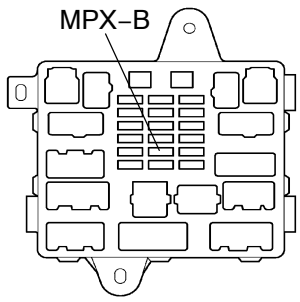


PREPARATION:
Remove ECU–B1 fuse from engine room J/B.
CHECK:
Check continuity of ECU–B1 fuse.
OK:
Continuity

NG	**Check for short in all the harness and components connected to the ECU–B1 fuse (See attached wiring diagram).**

OK

3	Check MPX–B fuse.



PREPARATION:

Remove MPX–B fuse from passenger side J/B.

CHECK:

Check continuity of MPX–B fuse.

OK:

Continuity

NG → **Check for short in all the harness and components connected to the MPX–B fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

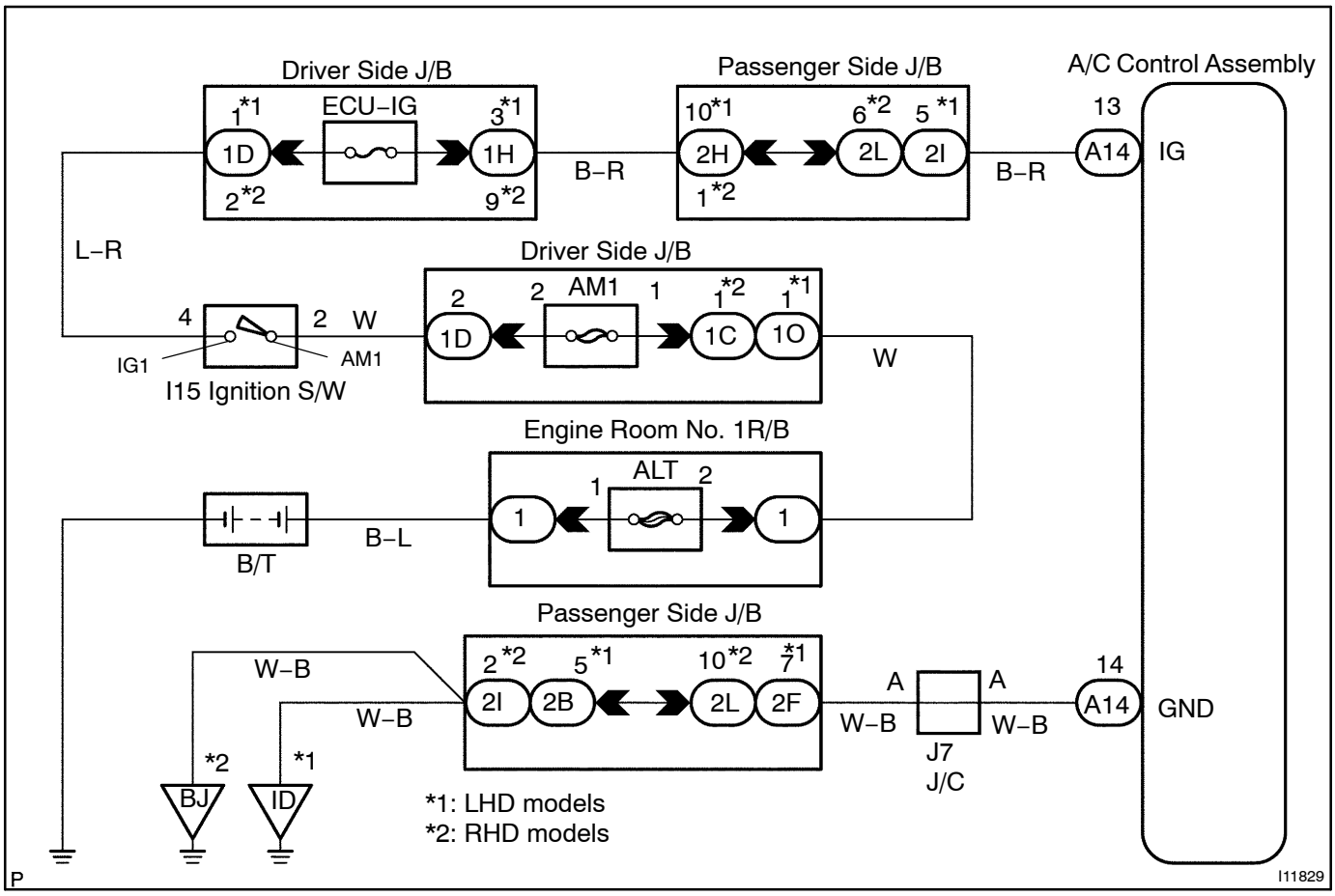
DI60J–01

IG Power Source Circuit

CIRCUIT DESCRIPTION

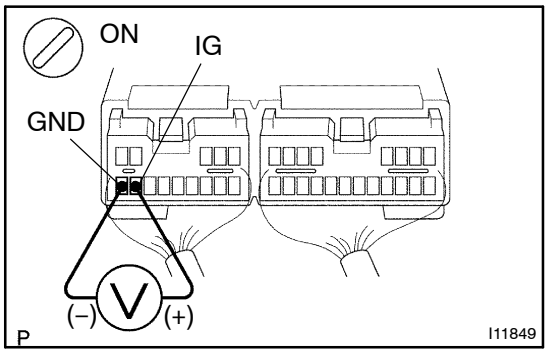
This is the power source for the A/C control assembly (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals IG and GND of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected.

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals IG and GND of A/C control assembly.

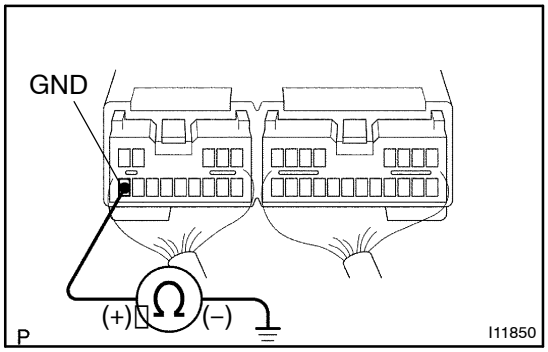
OK:

Voltage : 10 – 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check continuity between terminal GND of A/C control assembly and body ground.**



CHECK:

Measure resistance between terminal GND of A/C control assembly and body ground.

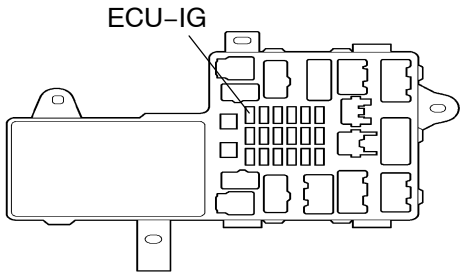
OK:

Resistance : 0 Ω (Continuity)

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

OK

3	Check ECU–IG fuse.



PREPARATION:

Remove ECU–IG fuse from driver side J/B.

CHECK:

Check continuity of ECU–IG fuse.

OK:

Continuity exists.

NG → **Check for shot in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

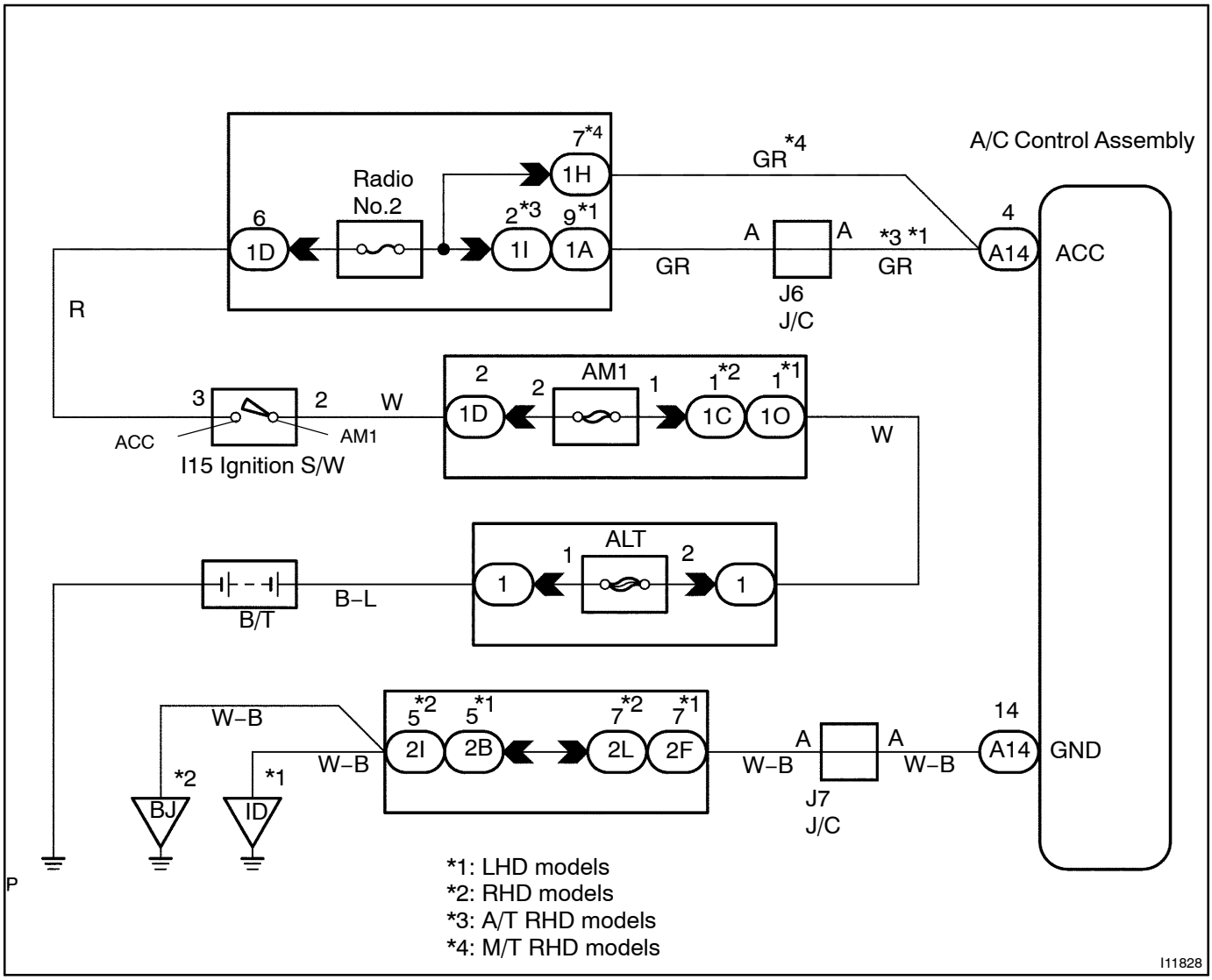
DI60K–01

ACC Power Source Circuit

CIRCUIT DESCRIPTION

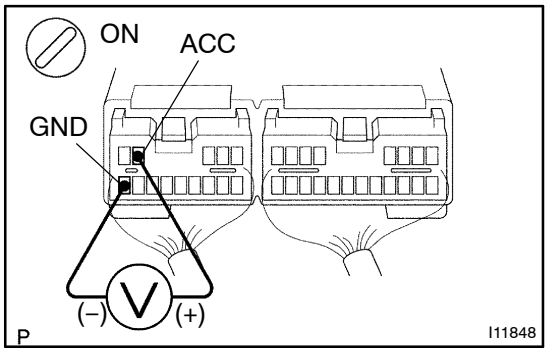
This is the power source for A/C control assembly and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals ACC and GND of A/C control assembly connector.**



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

(a) Turn ignition switch to ACC.

(b) Measure voltage between terminals ACC and GND of A/C control assembly.

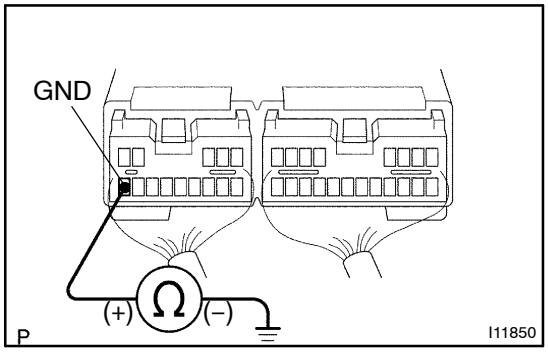
OK:

Voltage : Battery voltage

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check continuity between terminal GND of A/C control assembly and body ground.**



CHECK:

Measure resistance between terminal GND of A/C control assembly and body ground.

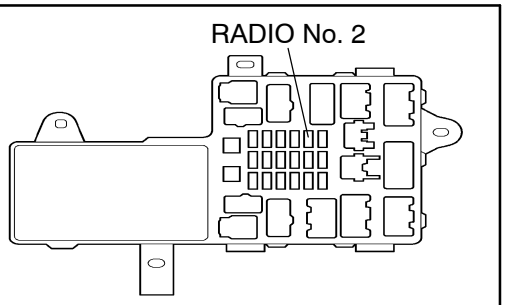
OK:

Resistance : 0 Ω (continuity)

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

OK

3	Check RADIO No.2 fuse.



PREPARATION:
Remove RADIO No.2 fuse from driver side J/B.
CHECK:
Check continuity of RADIO No.2.
OK:
Continuity

NG → **Check for short in all the harness and components connected to the RADIO No.2 fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

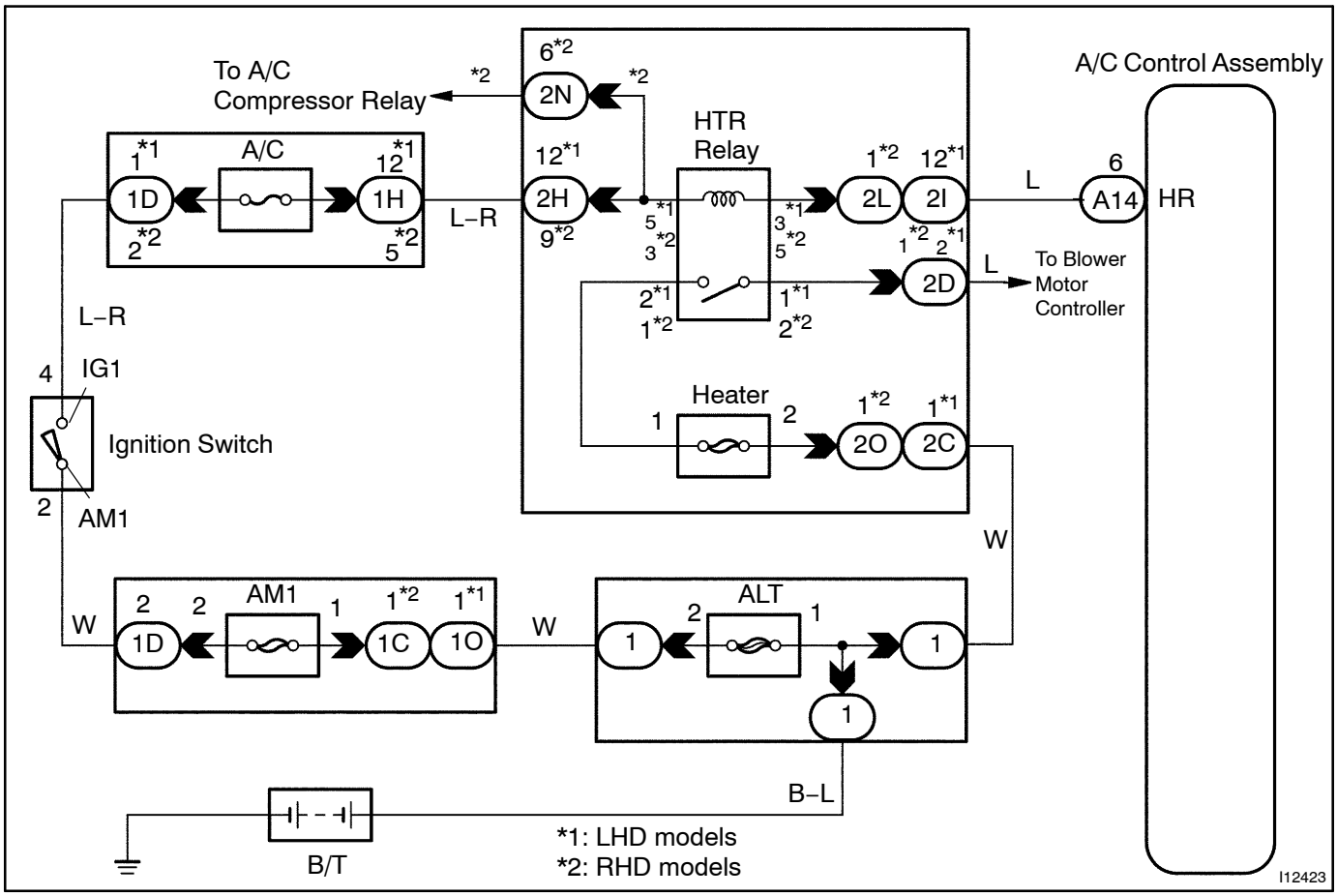
DI60L–01

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

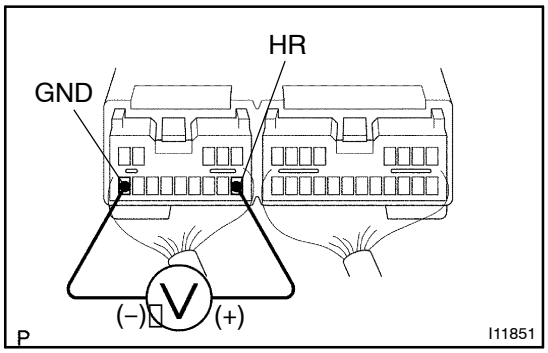
The heater main relay is switched on by signals from the A/C control assembly. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal HR of A/C control assembly connector and body ground.**



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

Measure voltage between terminal HR of A/C control assembly and body ground when ignition switch is ON and OFF.

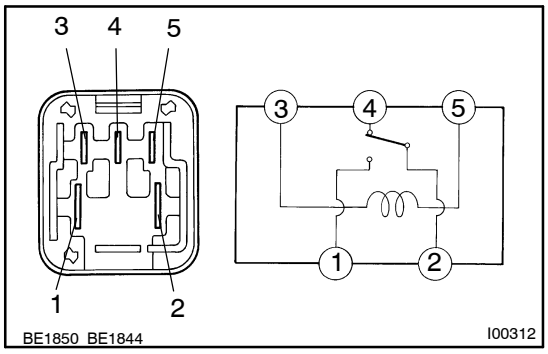
OK:

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	Check heater main relay.



PREPARATION:
Remove heater main relay from passenger side J/B.
CHECK:
Check continuity between each pair of terminals of heater main relay shown below.
OK:

Tester connection	Specified condition
1 – 4	No continuity
2 – 4	Continuity
3 – 5	62.5 – 90.9 Ω

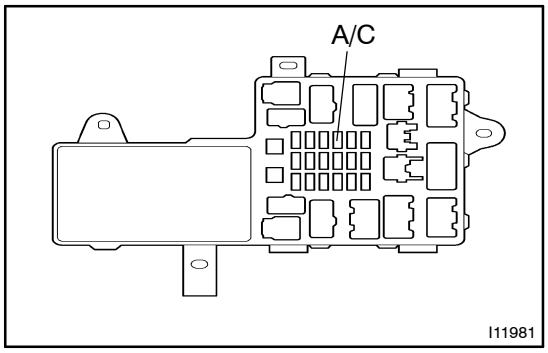
PREPARATION:
Apply battery positive voltage between terminals 3 and 5.
CHECK:
Check continuity between each pair of terminal shown below.
OK:

Tester connection	Specified condition
1 – 2	Continuity
2 – 4	No continuity

NG → **Replace hater main relay.**

OK

3	Check A/C fuse



PREPARATION:
Remove A/C fuse from driver side J/B.
CHECK:
Check continuity of A/C fuse.
OK:
Continuity exists.

NG → **Check for short in all the harness and components connected to the A/C fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

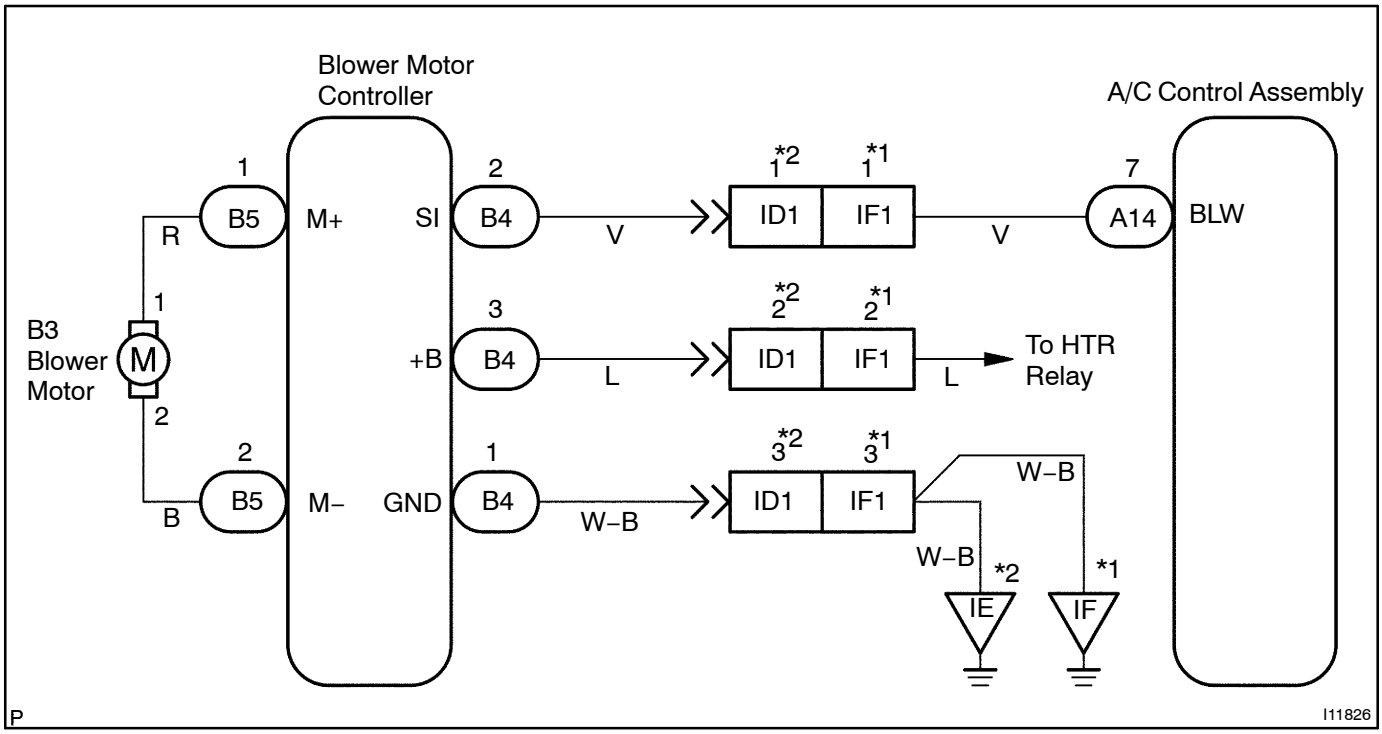
DI60M–01

Blower Motor Circuit

CIRCUIT DESCRIPTION

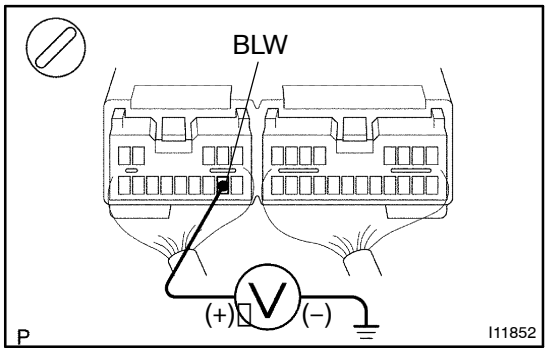
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal BLW of A/C control assembly connector and body ground.**

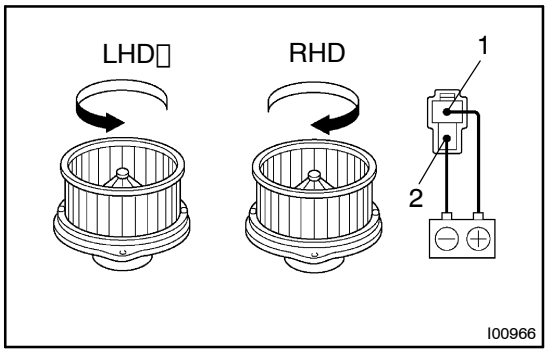


PREPARATION:
Remove the A/C control assembly with connector still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Operate blower motor.
(c) Measure voltage between terminal BLW of A/C control assembly and body ground.
OK:
Voltage: 1 – 3 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check blower motor.**

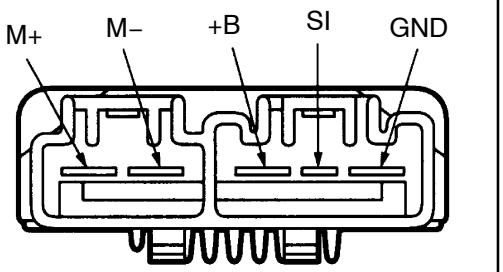


PREPARATION:
Remove blower motor.
CHECK:
Connect the positive (+) lead from the battery to terminal 1 of blower motor connector and the negative (–) lead to terminal 2.
OK:
Blower motor operates smoothly.

NG	**Replace blower motor.**

OK

3	Check blower motor control relay.



I05291

PREPARATION:

Remove blower motor control relay with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Operate blower motor (High blower speed).

OK:

Terminals	Standard Value
GND ↔ Body Ground	Continuity
+B ↔ Body Ground	Battery voltage
+M ↔ Body Ground	Battery voltage
M+ ↔ M–	Battery voltage
SI ↔ Body Ground	1 – 3 V

NG → **Replace blower motor relay.**

OK

Repair or replace harness or connector.

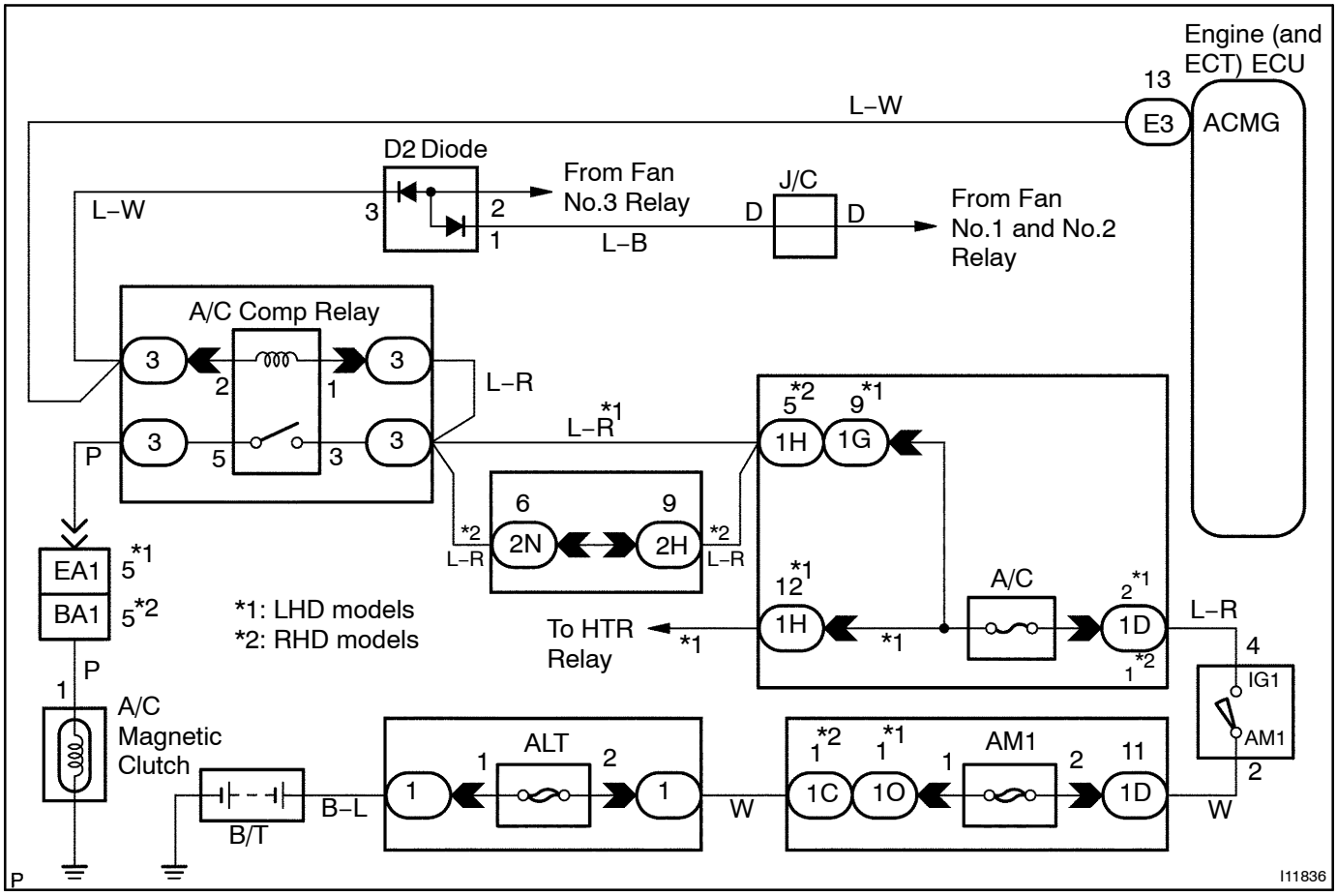
DI60N–01

Compressor Circuit

CIRCUIT DESCRIPTION

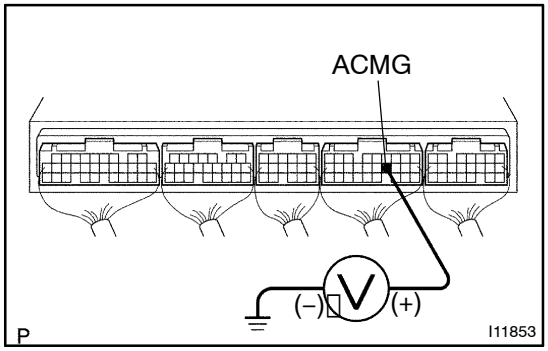
The A/C control assembly outputs the magnetic clutch ON signal from terminal MPX+ to the engine (and ECT) ECU. When the engine (and ECT) ECU receives this signal, it sends a signal from terminal ACMG and switches the A/C magnetic clutch relay ON, this turning the A/C compressor magnetic clutch ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal ACMG of engine (and ECT) ECU.



CHECK:

(a) Start engine.
(b) Push AUTO SW.
(c) Measure voltage between terminal ACMG of engine (and ECT) ECU connector and body ground when A/C switch is ON and OFF.

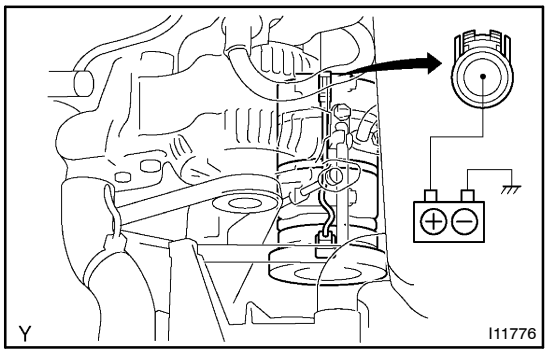
OK:

A/C switch	Voltage
ON	10 – 14 V
OFF	0 V

OK → Check and replace engine (and ECT) ECU and/or A/C control assembly.

NG

2	Check A/C compressor magnetic clutch.



PREPARATION:

Disconnect magnetic clutch connector.

CHECK:

Connect positive (+) lead connected to battery to magnetic clutch connector terminal.

OK:

Magnetic clutch is energized.

NG → Repair A/C compressor magnetic clutch.

OK

3	Check harness and connector between A/C compressor and compressor relay (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between compressor relay and engine (and ECT) ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

5	Check harness and connector between engine (and ECT) ECU and A/C control assembly (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace engine (and ECT) ECU and/or A/C control assembly.