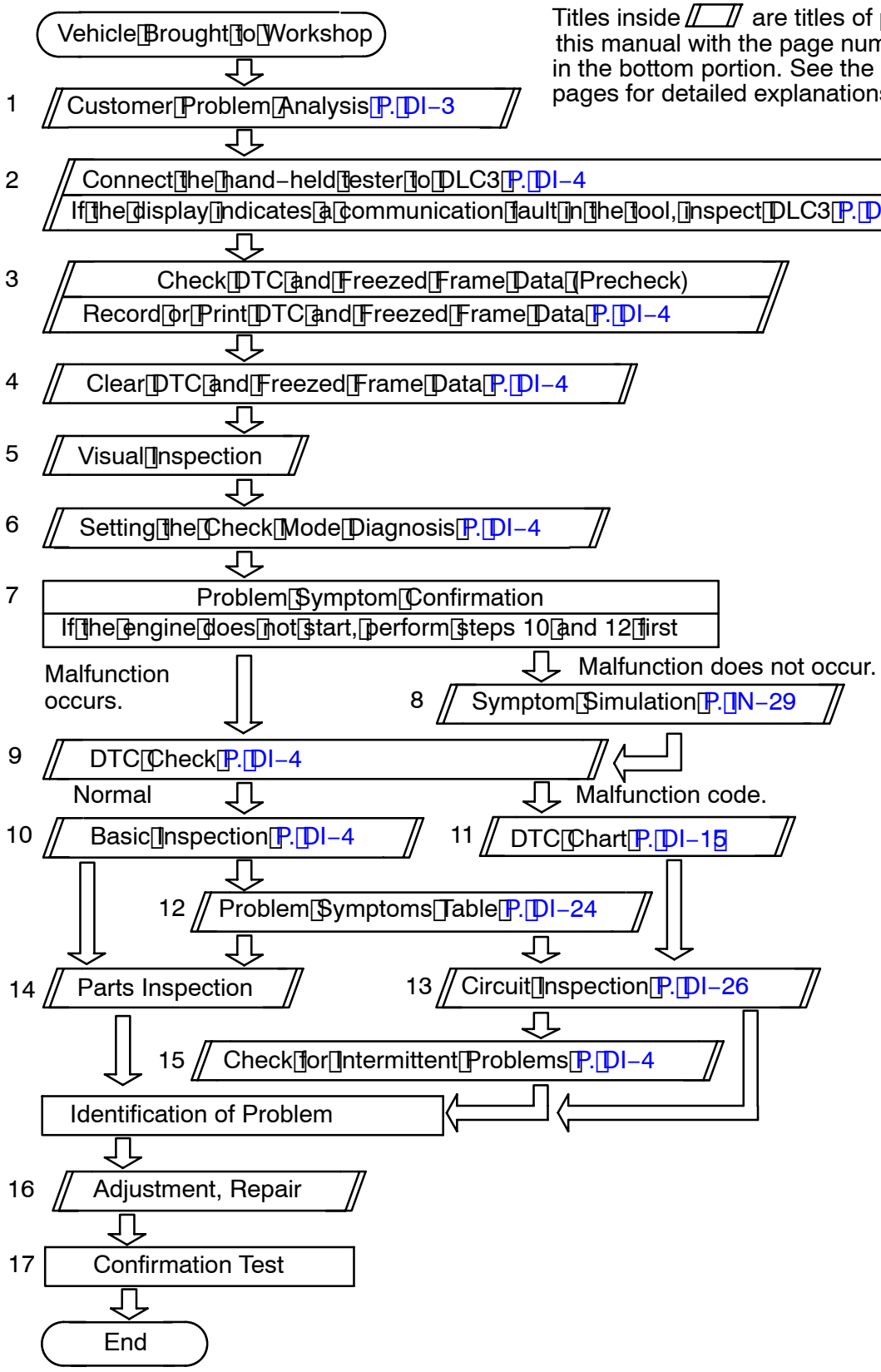
ENGINE

DI2RX-02

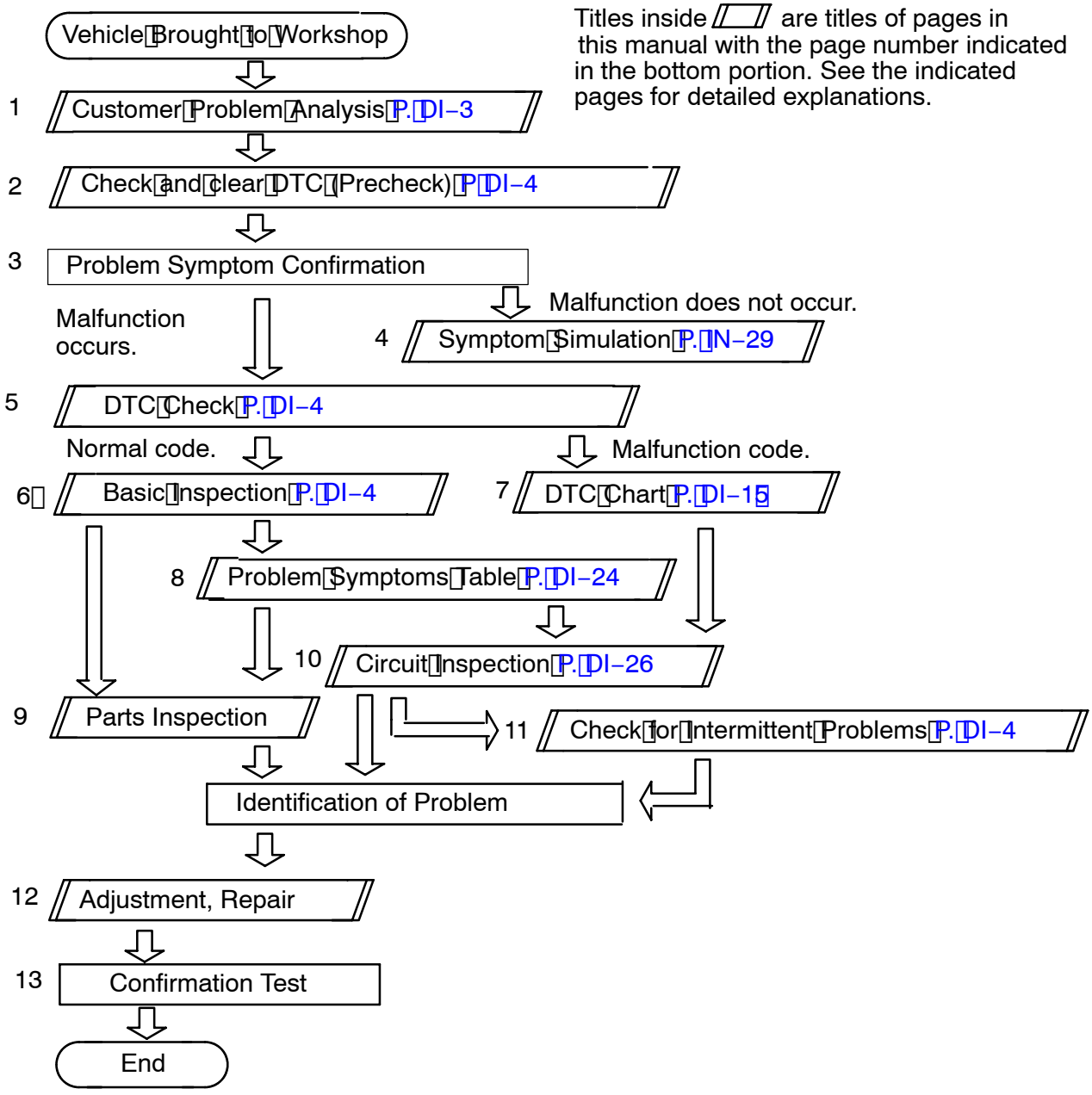
HOW TO PROCEED WITH TROUBLESHOOTING

When using hand–held tester, Troubleshoot 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.

When not using hand–held tester, Troubleshoot 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.

DI2RY–02

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

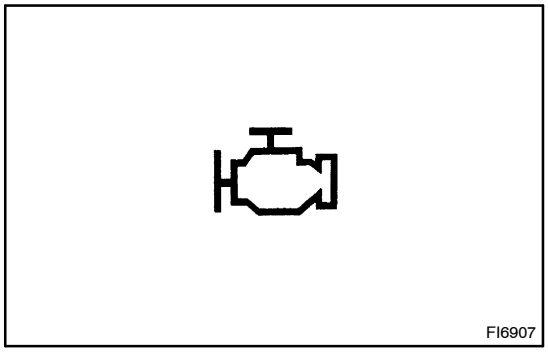
Customer's Name		Model and Model Year	
Driver's Name		Frame No.	
Date Vehicle Brought in		Engine Model	
License No.		Odometer Reading	km miles

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 ( )

DI2RZ–02

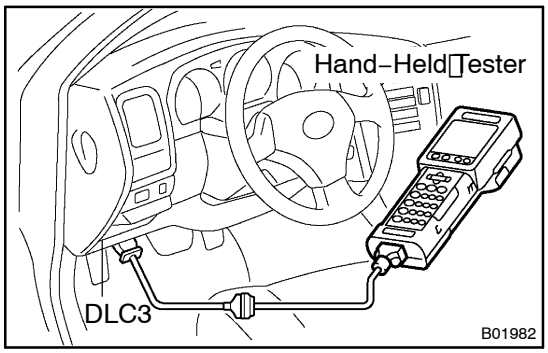

FI6907

PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description

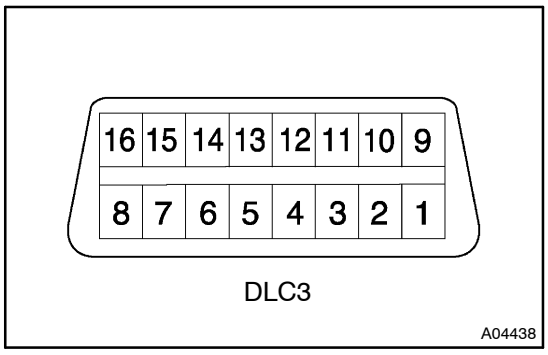
- When troubleshooting Multiplex OBD (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the hand–held tester to the vehicle, and read off various data output from the vehicle's engine ECU.
- The vehicle's on–board computer lights up the check engine warning 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 the check engine warning light lighting up when a malfunction is detected, the applicable Diagnosis Trouble Code (DTC) are recorded in the engine ECU memory.
  (See page DI–15)
  If the malfunction has been repaired, the check engine warning light goes off automatially but the DTCs remain recorded in the engine ECU memory.



B01982

- To check the DTCs, connect the hand–held tester to Data Link Connector 3 (DLC3) on the vehicle. or read the number of blinks of the check engine warning light when TC and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and activate the several actuaters and check freezed frame data and vaious forms of engine data (For operating instructions, see the hand–held
  tester instruction book.)
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check (test) mode for technicans 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 techinician can cause the check engine warning (CHK ENG) to light up for a malfunction that is only detected once or momentarily. (Hand–held tester only)
  (See step 3.)

- * 2 trip detection logic
  When a logic malfunction is fist detected, the malfunction is temporaily stored in the engine ECU memory. If the same malfunction is detected again during the second drive test, this second detection cases the check engine warning (CHK ENG) to light up.
  The 2 trip repeats the same mode for 2 times. (However, the IG 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

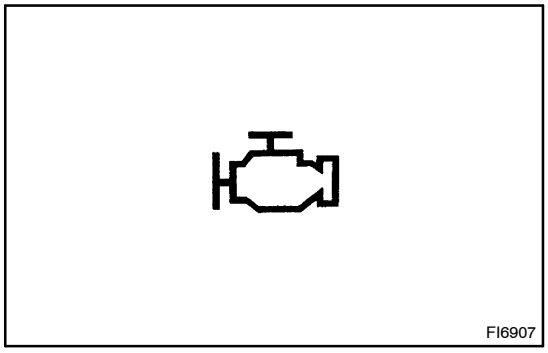


(b) Check the DLC3.
The vehicle's engine ECU uses the ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

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 is when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service deparment listed in the tool,s instruction manual.


FI6907

2. INSPECT DIAGNOSIS (Normal Mode)

(a) Check the check engine warning light.

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

HINT:

If the check engine warning (CHK ENG) does not light up, troubleshoot the combination meter.

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

(b) Check the DTC, using hand–held tester.

NOTICE:

(Hand–held tester only): When the diagnosis system is switched from normal mode to check (test) 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.

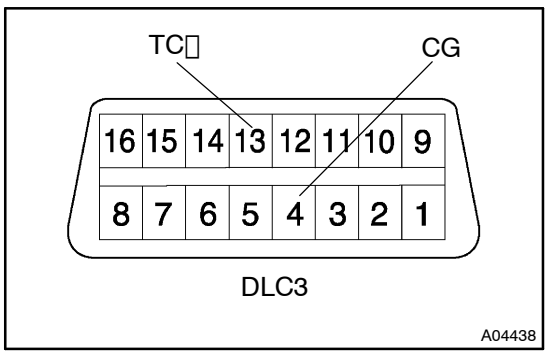
(1) Prepare the hand–held tester.

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

(3) Turn the ignition switch ON and switch 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,s instruction book.)

(5) See page DI–4 to confirm the details of the DTCs.



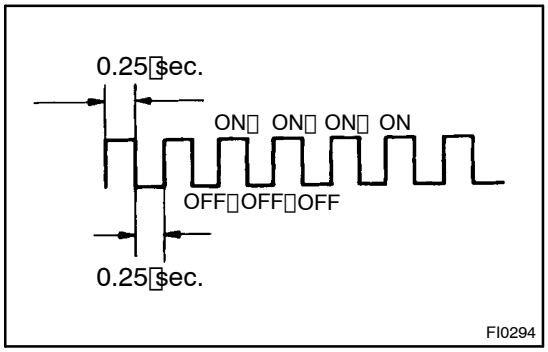
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(c) If you have no hand–held tester, perform the following step (1) to (6).

(1) Turn the ignition switch ON.

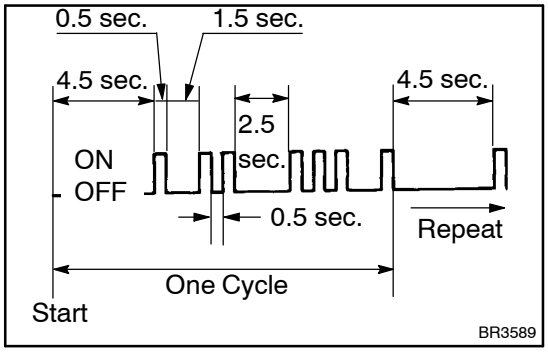
(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of DLC3.

SST 09843 – 18040



FI0294

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



(4) As an example, the blinking patterns for codes, normal, 12 and 31 are as shown on the illustration.
(5) Check the details of the malfunction using the DTC chart on page.
(6) 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, indication will begin from the smaller numbered cord and continue in order to the larger.

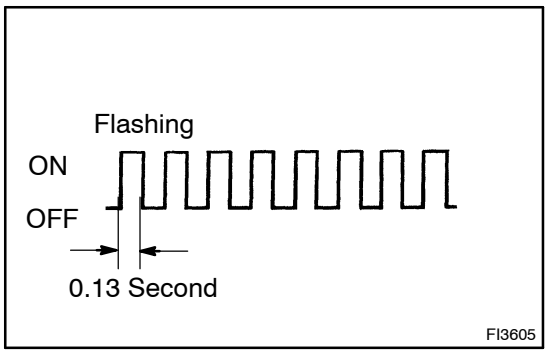
NOTICE:
When simulatiing symptoms without a hand–held tester to check the DTCs, use normal mode. For codes on the DTCs, chart subject to ”2 trip detection logic”, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again. When the problem has been simulated twice, the check engine warning light lights up and the DTCs, are recorded in the engine ECU

3. INSPECT DIAGNOSIS (Check (Test) Mode)

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 positive voltage 11V or more.
- Throttle valve fully closed.
- Transmission in ”P” or ”N” position.
- Air conditioning switched OFF.

(2) Turn ignition switch OFF.
(3) Prepare the hand–held tester.
(4) Connect the hand–held tester to DLC3 on the at the lower left of the instrument panel.
(5) Turn the ignition switch ON and switch the push the hand–held tester ON.



(6) Switch the hand–held tester normal mode to check (test) mode. (Check that the check engine warning light (CHK ENG) flashes.)
(7) Start the engine. (The check engine warning (CHK ENG) light goes out after the engine start.)
(8) Simulate the conditions of the malfunction described by the customer.

NOTICE:
Leave the ignition switch ON until you have checked the DTC, etc.

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

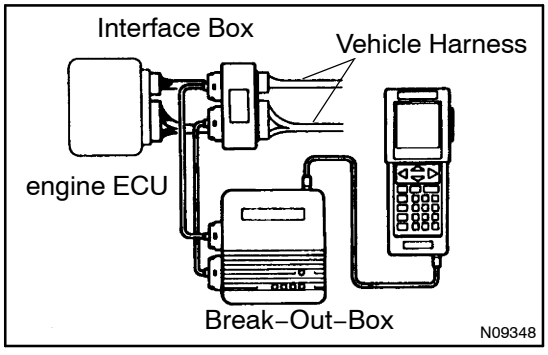
HINT:
Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check (test) mode to normal mode. so all DTCs, etc. are erased.

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

(b) Clear the DTC.
The following actions will erase the DTCs and freezed frame data.

- Operating the hand–held tester to erase the codes. (See the hand–held tester's instruction book for operating in structions.)
- Disconnecting the battery terminals or EFI and ETCS 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.



(c) 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 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
P0110/24	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
P0115/22	Water temp. 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 consengine ECUtively When closed throttle position switch is ON: 0.1 V ≤ VTA and 0.95 V
P0325/52	Max. timing retardation	IG switch OFF
P0500/42	High RPM fuel cut is prohibited ISC control prohibited	Returned to normal condition
P1300/14	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HAND–HELD TESTER only:

By putting the vehicle's engine ECU in 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.

(1) Clear the DTC (See step 3.).
(2) Set the check (test) mode (See step 3.).
(3) Perform a simulation test (See page IN–19).
(4) Check the connector and terminal (See page IN–29).
(5) Check the visual check and contact pressure (See page IN–29).
(6) Handle the connector (See page IN–29).

6. BASIC INSPECTION

When the malfunction code is not confirmed in the DTC check, troubleshooting should be carried out 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 positive voltage 11 V or more when engine is stopped ?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked ?**

NO → **Proceed to page ST–1, ST–34 and continue to troubleshoot.**

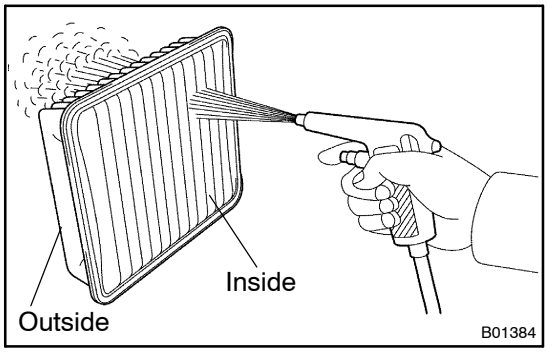
YES

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 excessively dirty or oily.
HINT:
If necessary, clean the filter with compressed air. First blow from inside thoroughly, then blow from outside of filter.

NG → **Repair or replace.**

OK

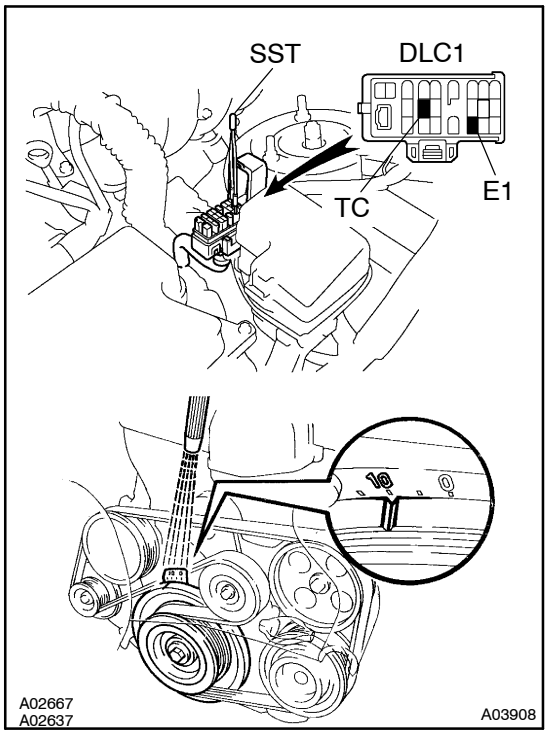
5	**Check engine idle speed.**

PREPARATION:
(a) Warm up engine to normal operating temperature.
(b) Switch off all accessories.
(c) Switch off air conditioning.
(d) Shift transmission into "N" position.
(e) Connect the hand–held tester to the DLC3 on the vehicle.
CHECK:
Use CURRENT DATA to check the idle speed.
OK:
Idle speed: 650 ~ 750 rpm

NG → **Proceed to problem symptoms table on page DI–24.**

OK

6	Check ignition timing.



PREPARATION:

(a) Warm up the engine to normal operating temperature.
(b) Shift transmission into "N" position.
(c) Keep the engine speed at idle.
(d) Using SST, connect terminals TC and E1 of the check connector.
SST 09843–18020
(e) Using a timing light, connect the tester to the No.1 high–tension cord.

CHECK:

Check ignition timing.

OK:

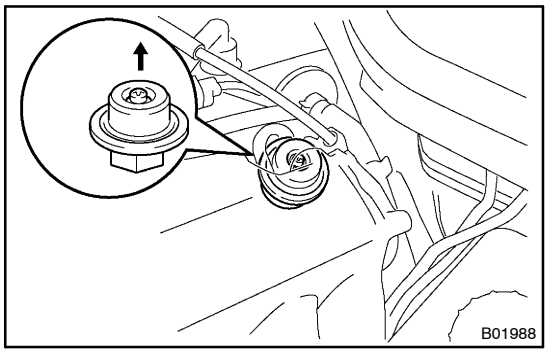
Ignition timing: 6 – 16° BTDC at idle

NG → **Proceed to page IG–1 and continue to troubleshoot.**

OK

Proceed to problem symptoms table on page DI–24.

7	Check fuel pressure.



PREPARATION:

(a) Be sure that enough fuel is in the tank.
(b) Turn the ignition switch ON.
(c) Connect the hand–held tester to the DLC3.
(d) Use ACTIVE TEST mode to operate the fuel pump.
(e) 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).

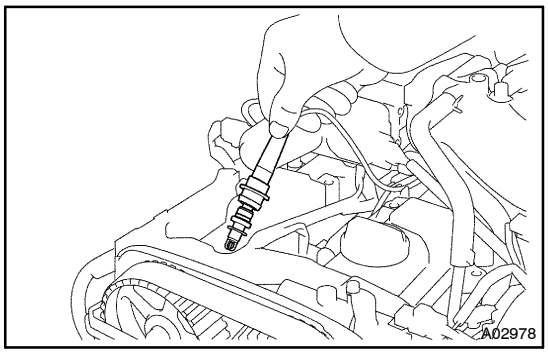
CHECK:

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

NG	Proceed to page FI–6 and continue to troubleshoot.

OK

8	Check for spark.



PREPARATION:

(a) Remove ignition coil.
(b) Remove the spark plug.
(c) Install the spark plug to the ignition coil, and connect the ignition coil connector.
(d) Hold the end about 12.5 mm (0.5 in.) from the ground.
(e) Disconnect the injector connector.

CHECK:

Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being 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–24.

7. ENGINE OPERATING CONDITION (Hand–held tester only)

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value 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: 13.9 ~ 19.7 % Racing without load (2,500rpm): 13.9~ 19.7 %
COOLANT TEMP.	Engine Coolant 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.
AFM	Air Flow Rate Through Mass Air Flow Meter	Idling: 4.0 ~ 5.6 gm/sec. Racing without load (2,500 rpm): 13.2 ~ 18.7 gm/sec.
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
O2S B2, S2	Voltage Output of Oxygen Sensor Bank 2, Sensor 2	Driving (50 km/h, 31 mph): 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 %

*: 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.

Hand–held tester display	Measurement Item	Normal Condition*
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.8 ~ 3.2 ms
STARTER SIG	Starter Signal	Cranking: ON
A/C SIG	A/C Switch Signal	A/C ON: ON
NSW	Neutral Start Switch Signal	P or N position: ON
IDL SIG	Closed Throttle Position	Throttle fully closed: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: 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
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

*: 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.

DI2T0-01

DIAGNOSTIC TROUBLE CODE CHART

1. Engine Trouble Codes

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 check mode, check the circuit for that 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.

DTC No. (See Page)	Detection Item	Trouble Area	CHECK ENG*1	Memory
P0100/31 (DI–26)	Air Flow Circuit Malfunction	• Open or short in air flow meter circuit • Air flow meter • Engine ECU	○	○
P0110/24 (DI–32)	Intake Air Temp. Circuit Malfunction	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (inside air flow meter) • Engine ECU	–	○
P0115/22 (DI–38)	Water Temp. Circuit Malfunction	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU	○	○
P0120/41 (DI–44)	Throttle Position Sensor Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU	○	○
P0121/41 (DI–50)	Throttle Position Sensor Circuit Range/Performance Problem	• Throttle position sensor • Engine ECU	○	○
P0130/21*2 (DI–51)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Oxygen sensor • Fuel trim malfunction	–	○
P0135/21*2 (DI–56)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU	–	○
P0136/27*2 (DI–56)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Oxygen sensor	–	○
P0141/21*2 (DI–58)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135/21	–	○
P0150/28*2 (DI–58)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0130/21	–	○

*1: ○ • • • CHECK ENG is indicated

– • • • CHECK ENG is not indicated

2: Except GCC countries

DTC No. (See Page)	Detection Item	Trouble Area	CHECK ENG*1	Memory
P0155/28*2 (DI–56)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0135/21	–	○
P0156/29*2 (DI–56)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)	• Same as DTC No. P0136/27	–	○
P0161/28*2 (DI–56)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 2)	• Same as DTC No. P0135/21	–	○
P0171/25*2 (DI–60)	Fuel Trim System too Lean (Air–Fuel Ratio Lean Malfunction, Bank 1)	• Air intake (hose loose) • Fuel line pressure • Injector blockage • Oxygen sensor (bank1,2sensor1) malfunction • Air flow meter • Water temp. sensor	–	○
P0174/25*2 (DI–60)	Fuel Trim System too Rich (Air–Fuel Ratio Lean Malfunction, Bank 2)			
P0325/52 (DI–65)	Knock Sensor 1 Circuit Malfunction	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU	○	○
P0330/55 (DI–65)	Knock Sensor 2 Circuit Malfunction	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU	○	○
P0335/12, 13 (DI–68)	Crankshaft Position Sensor Circuit Malfunction	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Starter • Engine ECU	○	○
P0340/12 (DI–70)	Camshaft Position Sensor Circuit Malfunction	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Starter • Engine ECU	○	○

*1: ○ • • • CHECK ENG is indicated
– • • • CHECK ENG is not indicated
2: Except GCC countries

DTC No. (See Page)	Detection Item	Trouble Area	CHECK ENG*1	Memory
P0500/42 (DI–72)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Engine ECU	–	○
P1120/19 (DI–78)	Accelerator Pedal Position Sensor Circuit Malfunction	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU	○	○
P1121/19 (DI–84)	Accelerator Pedal Position Sensor Range/Performance Problem	• Accelerator pedal position sensor • Engine ECU	○	○
P1125/89*2 (DI–85)	Throttle Control Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU	○	○
P1126/89*2 (DI–88)	Magnetic Clutch Circuit Malfunction	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU	○	○
P1127/89*2 (DI–91)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • Engine ECU	○	○
P1128/89*2 (DI–93)	Throttle Control Motor Lock Malfunction	• Throttle control motor • Throttle body • Engine ECU	○	○
P1129/89*2 (DI–95)	Electric Throttle Control System Malfunction	• Electric throttle control system • Engine ECU	○	○
P1200/78 (DI–96)	Fuel Pump Relay/Engine ECU Circuit Malfunction	• Open or short in fuel pump relay circuit. • Fuel pump relay • Engine ECU	–	○
P1300/14 (DI–100)	Igniter Circuit Malfunction	• Open or short in IGF or IGT circuit from igniter to Engine ECU • Igniter • Engine ECU	○	○
P1335/13 (DI–105)	Crankshaft Position Sensor Circuit Malfunction (during engine running)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Starter • Engine ECU	–	○

*: ○ • • • CHECK ENG is indicated.
– • • • CHECK 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 (Except G.C.C.)/ ETCS indicator (only for G.C.C.) to get detail of the DTC No.89. If use the hand–held tester, the detail DTC for ETCS are displayed by the hand–held tester

DTC No. (See Page)	Detection Item	Trouble Area	CHECK ENG*1	Memory
P1349/59 (DI–106)	VVT System Malfunction	• Valve timing • Oil control valve • VVT controller assembly • Engine ECU	–	○
P1565 (DI–546)	Cruise Control Main Switch Circuit Malfunction	• Open or short in cruise control switch circuit • Cruise control switch • ECU	○ *2	○
P1633/89*2 (DI–113)	Engine ECU Malfunction (ETCS Circuit)	• Engine ECU	○	○
P1645/82 (DI–114)	Body ECU Malfunction	• Body ECU • A/C ECU • Communication bus	–	○
P1656/39 (DI–114)	OCV Circuit Malfunction (Bank1)	• Open or short in oil control valve circuit (bank 1) • Oil control valve (bank 1) • Engine ECU	○	○

*: ○ • • • CHECK ENG is indicated.
– • • • CHECK 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 (Except G.C.C.)/ ETCS indicator (only for G.C.C.) to get detail of the DTC No.89. If use the hand–held tester, the detail DTC for ETCS are displayed by the hand–held tester

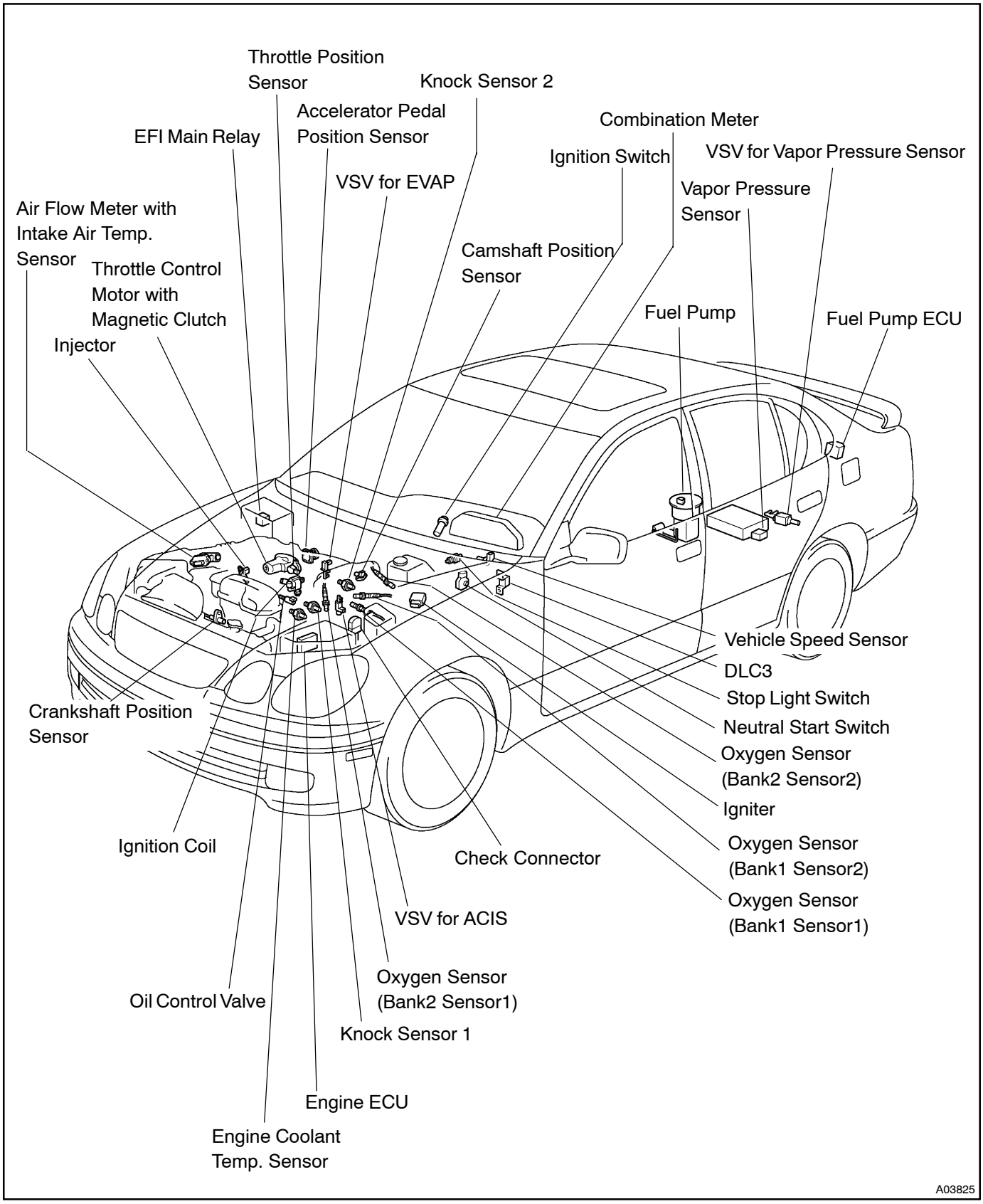
2. ETCS Trouble Codes (When not use hand–held tester)

DTC No. (See Page)	Detection Item	Trouble Area	*1 *2	Memory
21 (DI–85)	Throttle Control Motor Circuit Malfunction	• Some as DTC No. P1125/89	○	○
22 (DI–88)	Magnetic Clutch Circuit Malfunction	• Some as DTC No. P1126/89	○	○
23 (DI–91)	ETCS Actuator Power Source Circuit Malfunction	• Some as DTC No. P1127/89	○	○
31 (DI–93)	Throttle Control Motor Lock Malfunction	• Some as DTC No. P1128/89	○	○
32 (DI–95)	Electric Throttle Control System Malfunction	• Some as DTC No. P1129/89	○	○
33 (DI–113)	Engine ECU Malfunction (ETCS)	• Some as DTC No. P1633/89	○	○

*1: ECTS SNOW indicater(Except G.C.C)
*2:ECTS indicater(Only for G.C.C)

DI2S0–02

PARTS LOCATION

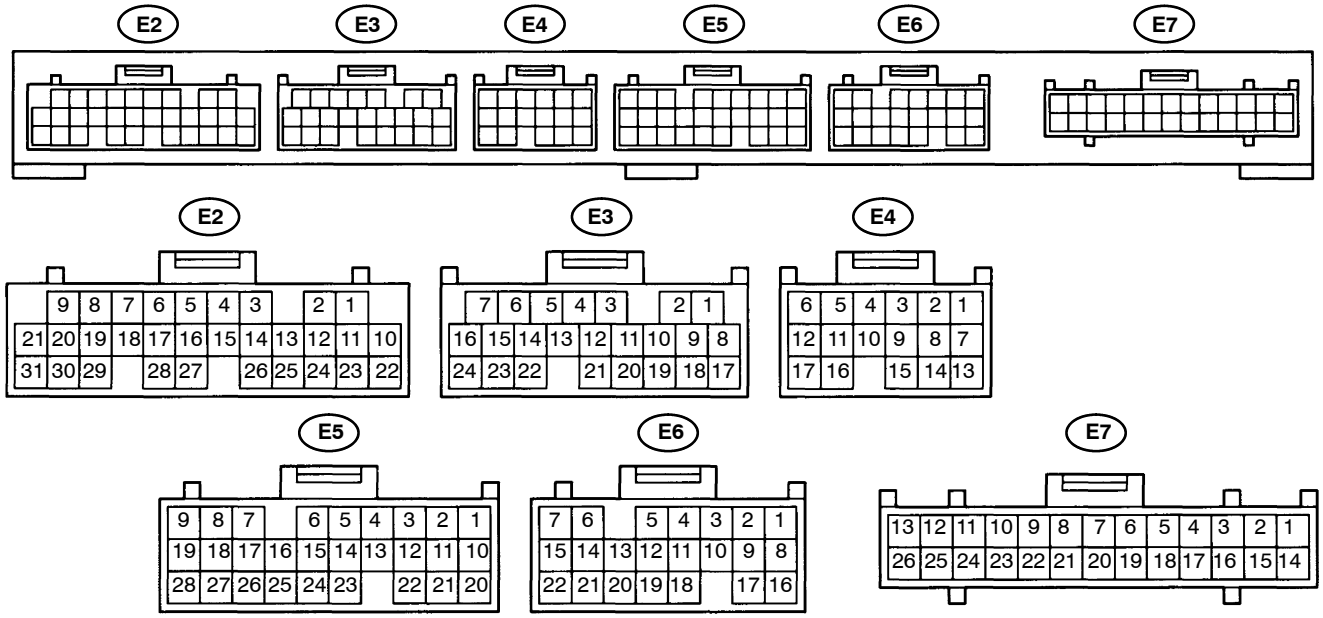


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DI2S1–02

TERMINALS OF ECU

ENGINE ECU Terminals



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E6–1) – E1 (E3–17)	B–Y ↔ BR	Always	9 ~ 14
+BM (E6–7) – E1 (E3–17)	V–Y ↔ BR		
IGSW (E6–9) – E1 (E3–17)	B –O ↔ BR	IG switch ON	9 ~ 14
+B (E6–16) – E1 (E3–17)	B–R ↔ BR		
+B2 (E6–8) – E1 (E3–17)	B–R ↔ BR		
VC (E3–2) – E2 (E3–18)	L–Y ↔ BR	IG switch ON	4.5 ~ 5.5
VTA (E3–23) – E2 (E3–18)	Y–G ↔ BR	IG switch ON Accelerator pedal released	0.4 ~ 1.0
		IG switch ON Accelerator pedal depressed	3.2 ~ 4.8
VTA2 (E3–24) – E2 (E3–18)	Y–R ↔ BR	IG switch ON Accelerator pedal released	2.0 ~ 2.9
		IG switch ON Accelerator pedal depressed	4.6 ~ 5.1
VPA (E3–15) – E2 (E3–18)	L ↔ BR	IG switch ON Accelerator pedal released	0.3 ~ 0.9
		IG switch ON Accelerator pedal depressed	3.2 ~ 4.8
VPA2 (E3–16) – E2 (E3–18)	L–R ↔ BR	IG switch ON Accelerator pedal released	1.8 ~ 2.7
		IG switch ON Accelerator pedal depressed	4.7 ~ 5.1
VG (E3–10) – EVG (E3–19)	R–L ↔ GR	Idling, P or N position, A/C switch OFF	1.1 ~ 1.5
THA (E3–22) – E2 (E3–18)	W–R ↔ BR	Idling, Intake air temp. 20˚C (68˚F)	0.5 ~ 3.4
THW (E3–14) – E2 (E3–18)	B–R ↔ BR	Idling, Engine coolant temp. 80˚C (176˚F)	0.2 ~ 1.0
STA (E5–2) – E1 (E3–17)	B ↔ BR	Shift lever position P or N position, ignition switch START	9 ~ 14

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
#10 (E3-5) – E01 (E2-21) #20 (E3-6) – E01 (E2-21) #30 (E2-1) – E01 (E2-21) #40 (E2-2) – E01 (E2-21) #50 (E2-3) – E01 (E2-21) #60 (E2-4) – E01 (E2-21)	Y ↔ W-B B-W ↔ W-B L ↔ W-B R ↔ W-B W ↔ W-B R-L ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-125)
IGT1 (E2-11) – E1 (E3-17) IGT2 (E2-12) – E1 (E3-17) IGT3 (E2-13) – E1 (E3-17)	Y ↔ BR G-B ↔ BR R-W ↔ BR	Idling	Pulse generation (See page DI-100)
IGF (E2-25) – E1 (E3-17)	R-Y ↔ BR	IG switch ON	4.5 – 5.5
		Idling	Pulse generation (See page DI-113)
G2 (E2-10) – NE- (E2-22)	Y ↔ L	Idling	Pulse generation (See page DI-65)
NE (E2-23) – NE- (E2-22)	W ↔ L		
M-REL (E6-10) – E1 (E3-17)	B-Y ↔ BR	IG switch ON	9 – 14
FPC (E6-5) – E1 (E3-17)	B-L ↔ BR	IG switch ON	Below 1.5
		Idling	Pulse generation (0 and 4.5 – 5.5)
DI (E6-4) – E1 (E3-17)	B-R ↔ BR	Idling	7.0 or more
STP (E5-6) – E1 (E3-17)	G-W ↔ BR	Brake pedal is depressed	7.5 – 14
		Brake pedal is released	Below 1.5
PRG (E3-7) – E01 (E2-21)	B-R ↔ W-B	IG switch ON	9 – 14
TPC (E7-13) – E01 (E2-21)	W-R ↔ W-B	IG switch ON	9 – 14
PTNK (E5-18) – E2 (E3-18)	L-Y ↔ BR	Ignition switch ON	2.9 – 3.7
		Apply vacuum 4.0 kPa (30 mmHg, 1.2 in. Hg)	Below 0.5
OX1A (E3-12) – E2 (E3-18) OX1B (E5-8) – E2 (E3-18) OX2A (E3-11) – E2 (E3-18) OX2B (E7-24) – E2 (E3-18)	B ↔ BR W ↔ BR W ↔ BR R ↔ BR	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See page DI-38)
HT1A (E3-4) – E01 (E2-21) HT1B (E7-26) – E01 (E2-21) HT2A (E3-3) – E01 (E2-21) HT2B (E7-25) – E01 (E2-21)	R ↔ W-B G ↔ W-B Y ↔ W-B GR-B ↔ W-B	Idling	Below 3.0
		IG switch ON	9 – 14
KNK1 (E2-28) – E1 (E3-17)	B ↔ BR	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See page DI-65)
KNK2 (E2-27) – E1 (E3-17)	GR ↔ BR		
TC (E5-5) – E1 (E3-17)	P-B ↔ BR	IG switch ON	9 – 14
W (E6-6) – E01 (E2-21)	GR-R ↔ W-B	Idling	9 – 14
		IG switch ON	Below 3.0
ACMG (E5-13) – E01 (E2-21)	L-O ↔ W-B	A/C switch ON (At Idling)	Below 3.0
		A/C switch OFF	9 – 14
OCV+ (E2-18) – OCV– (E2-17)	W-R ↔ Y-B	IG switch ON	Pulse generation (See page DI-106)
ACIS (E2-5) – E01 (E2-21)	B-L ↔ W-B	IG switch ON	9 ~ 14
		Engine speed between 2.500 and 4,000 rpm	Below 3.0
CL+ (E2-20) – CL– (E2-19)	G-R ↔ Y-R	Idling	Pulse generation (See page DI-88)

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
M+ (E2–8) – ME01 (E2–9) M– (E2–7) – ME01 (E2–9)	W ↔ BR R ↔ BR	Idling	Pulse generation (See page DI–50)
SIL (E6–11) – E1 (E3–17)	W ↔ BR	IG switch ON	9 ~ 14
SP2+ (E4–5) – SP2– (E4–11)	L–Y ↔ R–L	Vehicle is driving	Pulse generation (See page DI–72)

DI2T1–01

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 matrix chart 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–34
	2. Neutral start switch circuit	DI–192
	3. Body ECU	DI–24
No initial combustion (Does not start)	1. Engine ECU power source circuit	DI–121
	2. Ignition coil with igniter	DI–100
	3. Fuel pump control circuit	DI–96
	4. Injector circuit	DI–125
No complete combustion (Does not start)	1. Fuel pump control circuit	DI–96
	2. Ignition coil with igniter	DI–100
	3. Injector circuit	DI–125
Engine cranks normally (Difficult to start)	1. Starter signal circuit	DI–118
	2. Fuel pump control circuit	DI–96
	3. Ignition coil with igniter	DI–100
	4. Spark plug	IG–1
	5. Compression	EM–5
	6. Injector circuit	DI–125
Cold engine (Difficult to start)	1. Starter signal circuit	DI–118
	2. Fuel pump control circuit	DI–96
	3. Injector circuit	DI–125
	4. Ignition coil with igniter	DI–100
	5. Spark plug	IG–1
Hot engine (Difficult to start)	1. Starter signal circuit	DI–118
	2. Fuel pump control circuit	DI–96
	3. Injector circuit	DI–125
	4. Ignition coil	IG–1
	5. Spark plug	IG–1
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–161
	2. Engine ECU power source circuit	DI–121
	3. Neutral start switch circuit	DI–192
	4. Back up power source circuit	DI–139
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–161
	2. Neutral start switch circuit	DI–192
	3. Fuel pump control circuit	DI–96
	4. Injector circuit	DI–125
	5. Air flow meter circuit	DI–26
	6. Back up power source circuit	DI–139
Rough idling (Poor idling)	1. Air flow meter circuit	DI–26
	2. Injector circuit	DI–125
	3. Variable resistor circuit	DI–130
	4. Ignition coil with igniter	DI–100
	5. Compression	EM–5
	6. Fuel pump control circuit	DI–96
	7. Back up power source circuit	DI–139
Hunting (Poor idling)	1. Air flow meter circuit	DI–26
	2. Engine ECU power source circuit	DI–121
	3. Fuel pump control circuit	DI–96

Hesitation/Poor acceleration (Poor driveability)	1. Air flow meter circuit 2. Injector circuit 3. Fuel pump control circuit 4. Variable resistor circuit 5. Ignition coil with igniter 6. A/T faulty	DI–26 DI–125 DI–96 DI–130 DI–100 DI–161
Muffler explosion, after fire (Poor driveability)	1. Ignition coil 2. Spark plug 3. Injection circuit 4. Variable resistor circuit	IG–1 IG–1 DI–125 DI–130
Surging (Poor driveability)	1. Fuel pump connector circuit 2. Variable resistor circuit 3. Spark plug 4. Injection circuit	DI–96 DI–130 IG–1 DI–125
Engine stall (Soon after starting)	1. Fuel pump connector circuit 2. Air flow meter circuit	DI–96 DI–26
Engine stall (After accelerator pedal depressed)	1. Air flow meter circuit	DI–26
Engine stall (After accelerator pedal released)	1. Air flow meter circuit 2. Engine ECU	DI–26 IN–29
Engine stall (During A/C operation)	1. A/C signal circuit (Compressor circuit) 2. Engine ECU	DI–161 IN–29
Engine stall (When shifting N to D)	1. Neutral start switch circuit	DI–192

DI2S2-02

CIRCUIT INSPECTION

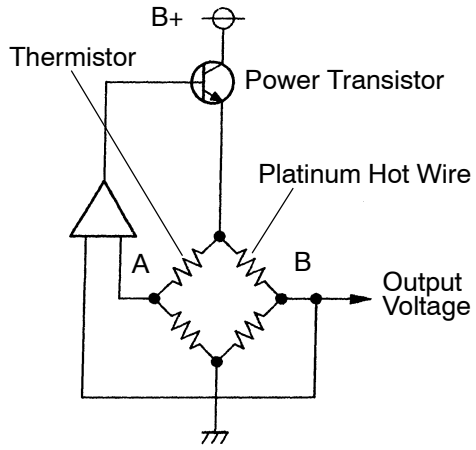
DTC	P0100/31	Air Flow Circuit Malfunction

CIRCUIT DESCRIPTION

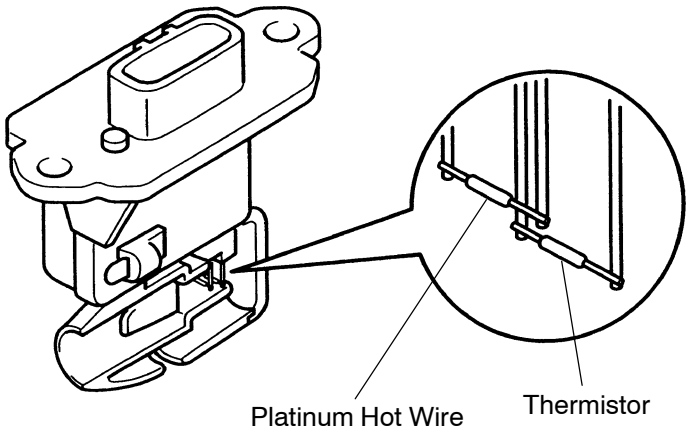
The air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, thermistor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and thermistor located in the intake air bypass of the housing detect any changes in the intake air temperature.

The hot wire is maintained at the set temperature by controlling the current flow through the hot wire. This current flow is ten measured as the output voltage of the air flow meter.

The circuit is constructed so that the platinum hot wire and thermistor provide a bridge circuit, with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



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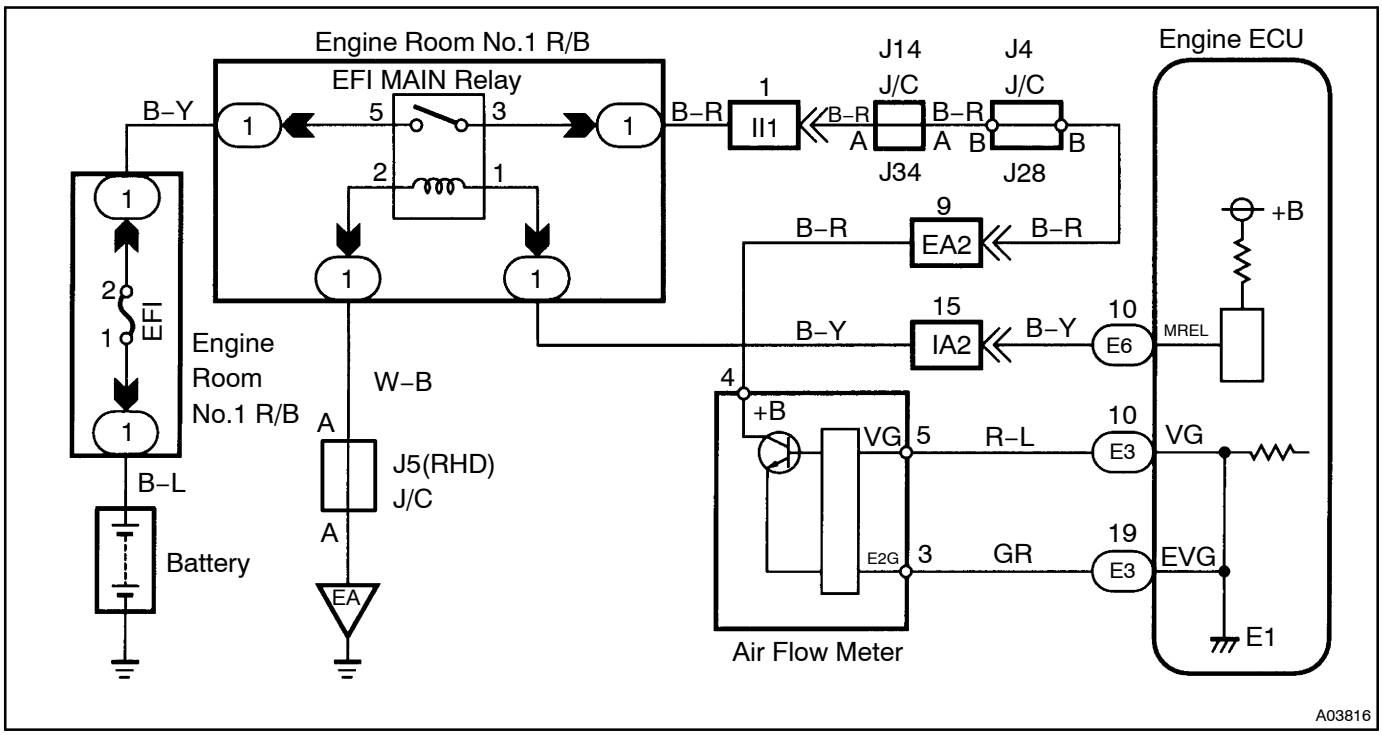
DTC No.	DTC Detecting Condition	Trouble Area
P0100/31	Open or short in air flow meter circuit with more than 3 sec. engine speed 4,000 rpm or less	• Open or short in air flow meter circuit • Air flow meter • Engine ECU
	Open or short in air flow meter circuit with more than 3 sec. engine speed 4,000 rpm or more (2 trip detection logic)	

HINT:

After confirming DTC P0100/31 use the hand–held tester to confirm the air flow ratio from CURRENT DATA.

Air Flow Value (gm/sec.)	Malfunction
Approx. 0.0	• Air flow meter power source circuit open • VG circuit open or short
271.0 or more	• EVG circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–heit 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester, and read value of air flow rate.**

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) Start the engine.

CHECK:

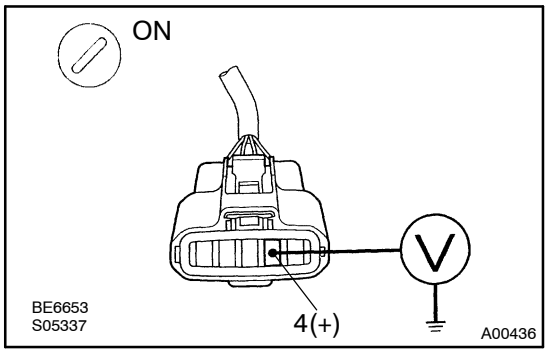
Read air flow rate on the hand–held tester.

RESULT:

	Type I	Type II
Air flow rata (gm/sec.)	0.0	271.0 or more

Type I	**Go to step 2.**
Type II	**Go to step 5.**

2	**Check voltage of air flow meter power source.**



PREPARATION:

(a) Disconnect the air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal 4 of the air flow meter connector and body ground.

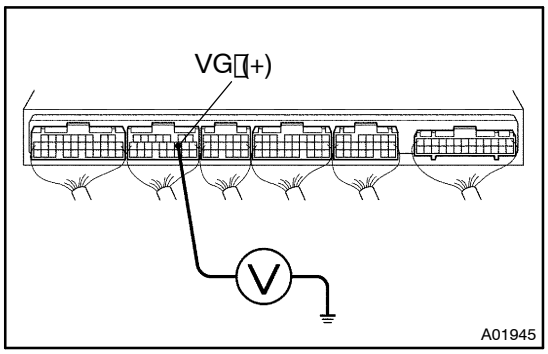
OK:

Voltage: 9 ~ 14 V

NG → **Check for open in harness and connector between EFI main relay and mass air flow meter (See page IN–29).**

OK

3	**Check voltage between terminals VG of engine engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Start the engine.

CHECK:

Measure voltage between terminal VG of the engine ECU connector and body ground while engine is idling.

OK:

Voltage:

1.1 ~ 1.5 V (P or N position and A/C switch OFF)

OK → **Check and replace engine ECU (See page IN–29).**

NG

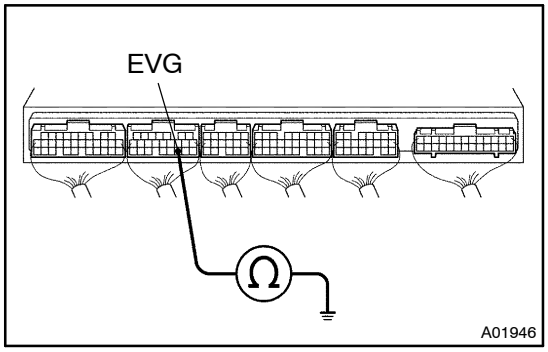
4	Check for open and short in harness and connector between air flow meter and engine ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK →

Replace air flow meter.

5	Check continuity between terminal EVG of engine ECU connector and body ground.



PREPARATION:
Remove the engine room engine ECU hood and cover.
CHECK:
Check continuity between terminal EVG of the engine ECU connector and body ground.
OK:
Continuity (1 Ω or less)

NG → Check and replace engine ECU (See page IN–29).

OK →

6	Check for open in harness and connector between air flow meter and engine ECU (See page IN–29).

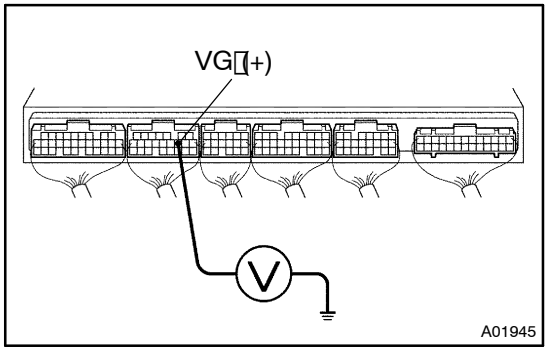
NG → Repair or replace harness or connector.

OK →

Replace air flow meter.

When not using hand-held tester

1	Check voltage between terminals VG of engine ECU connector and body ground.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Start the engine.

CHECK:
Measure voltage between terminal VG of the engine ECU connector and body ground while engine is idling.

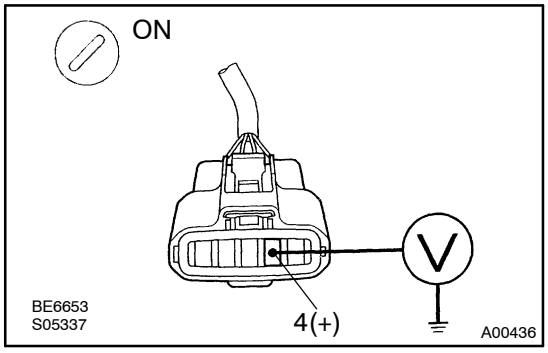
OK:

Voltage:
1.1 ~ 1.5 V (P or N position and A/C switch OFF)

OK	Check and replace engine ECU (See page IN–29).

NG

2	Check voltage of air flow meter power source.



PREPARATION:
(a) Disconnect the air flow meter connector.
(b) Turn the ignition switch ON.

CHECK:
Measure voltage between terminal 4 of the air flow meter connector and body ground.

OK:

Voltage: 9 ~ 14 V

NG	Check for open in harness and connector between EFI main relay and mass air flow meter (See page IN–29).

OK

3	Check for open in harness and connector between air flow meter and engine engine ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK →

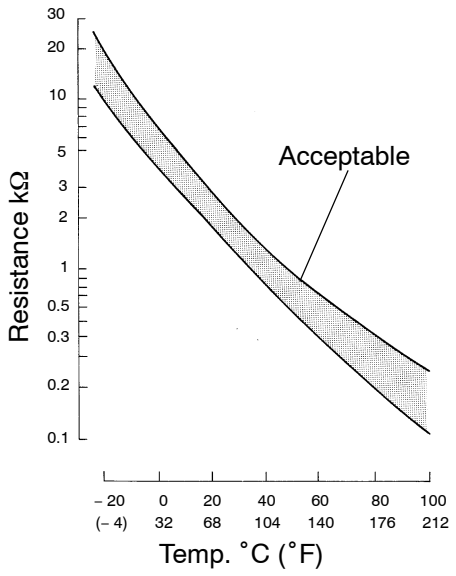
Replace air flow meter.

DI2S3–02

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

(fig. 1)



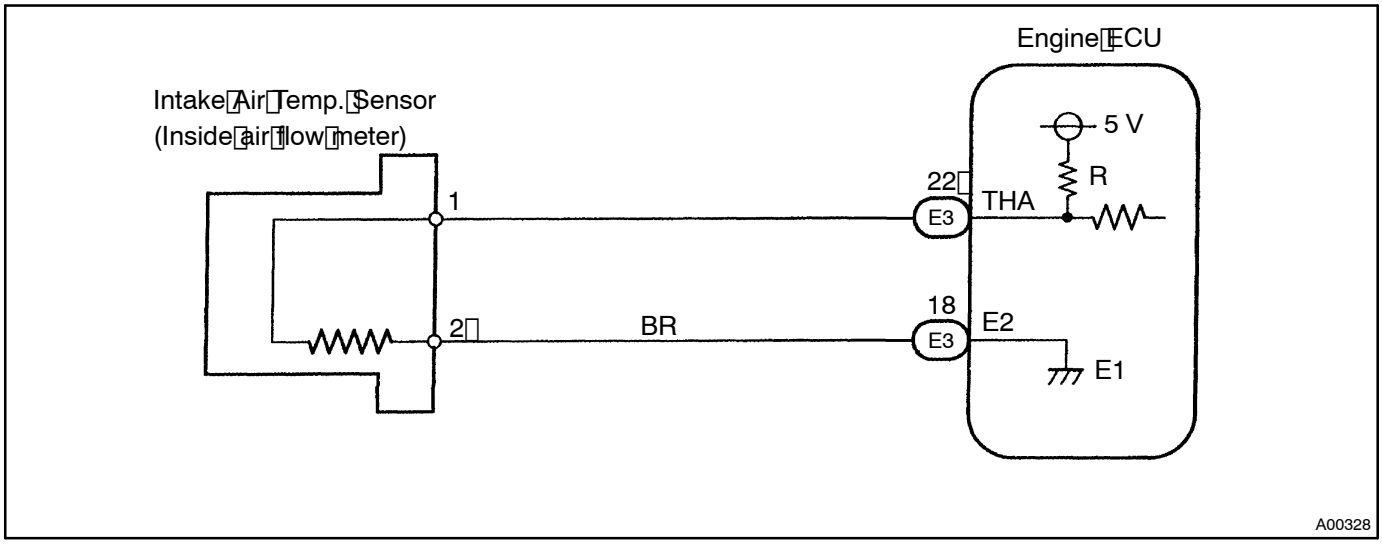
The intake air temp. sensor is built into the air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See fig. 1).
The intake air temp. 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 the terminal THA via resistor R.
That is, the resistor R and the intake air temp. sensor are connected in series. When the resistance value of the intake air temp. 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 (inside air flow meter) • Engine ECU

HINT:
After confirming DTC P0110/24 use the hand–held tester to confirm the intake air temperature from 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 DTC P0110/24 (Intake Air Temp. Circuit Malfunction), P0115/22 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) 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 warmed up or not, the air–fuel ratio 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 temperature value on the hand–held tester.

OK:

Same as actual intake air temperature

HINT:

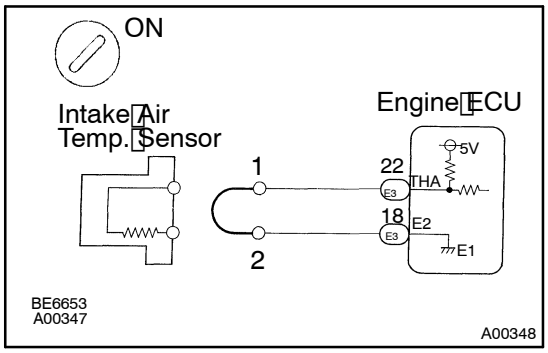
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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 air flow meter connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

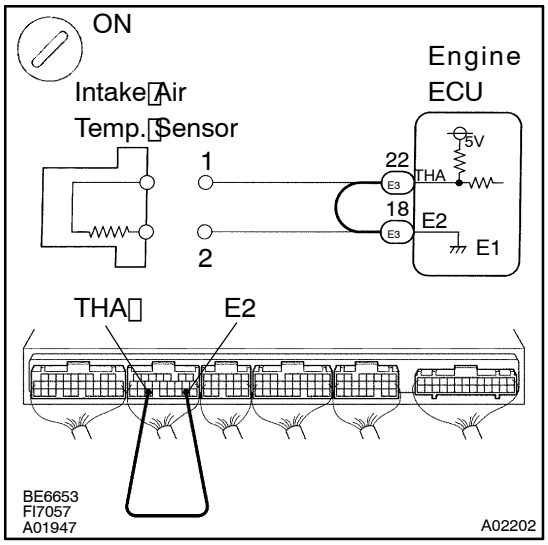
OK:

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

OK	Confirm good connection at sensor. If OK, replace air flow meter.

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

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

HINT:

Air flow meter connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–29).

CHECK:

Read temperature value on the hand–held tester.

OK:

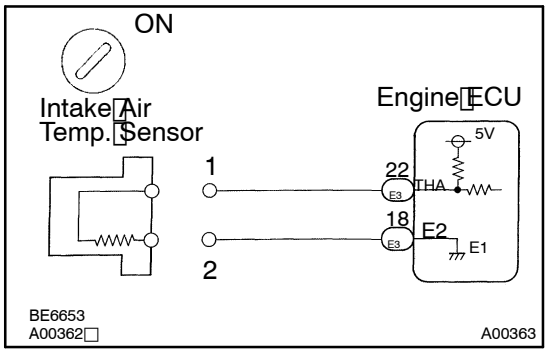
Temperature value: 140°C (284°F) or more

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–29)**

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

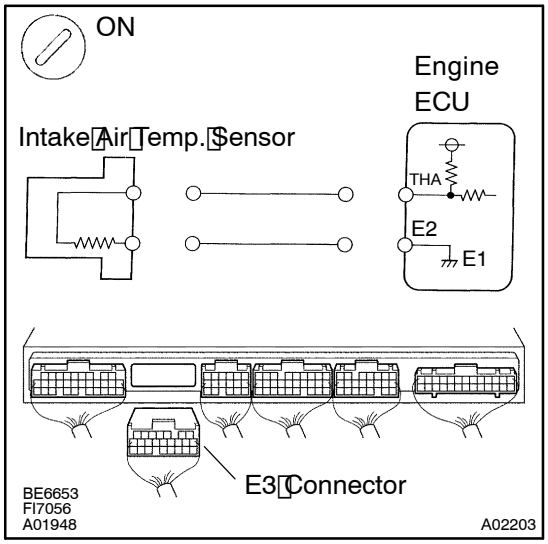
OK:

Temperature value: –40°C (–40°F)

OK	Replace air flow meter.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Disconnect the J4 connector of the engine ECU.

HINT:

Air flow meter connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

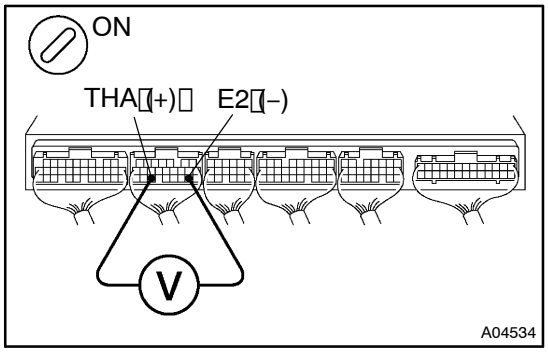
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–29).

When not using hand-held tester

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn ignition switch ON.

CHECK:

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

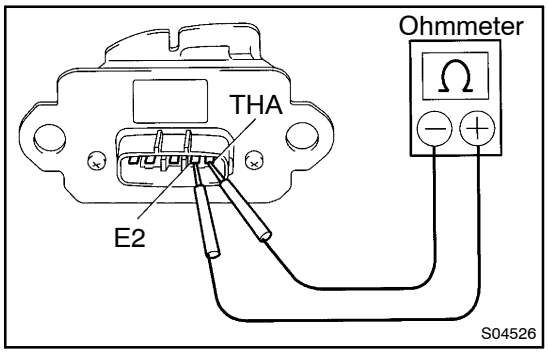
OK:

Intake air temp. °C (°F)	Voltage
20 (68)	0.5 – 3.4 V
60 (140)	0.2 – 1.0 V

OK	Check for intermittent problems (See page DI–15).

NG

2	Check intake air temp. sensor.



PREPARATION:

Disconnect the air flow meter connector.

CHECK:

Measure resistance between terminals THA and E2 of air flow meter connector.

OK:

Resistance is within acceptable zone on chart.

Intake air Temp.	Resistance
20°C (68°F)	2 – 3 kΩ
80°C (176°F)	0.2 – 0.4 kΩ

NG	Replace air flow meter.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temp. sensor (See page DI–21).

NG → Repair or replace harness or connector.

OK →

Check and replace engine ECU.

DI2S4–02

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the water temp. 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 (Intake Air Temp. Circuit Malfunction) shown on page DI–32.

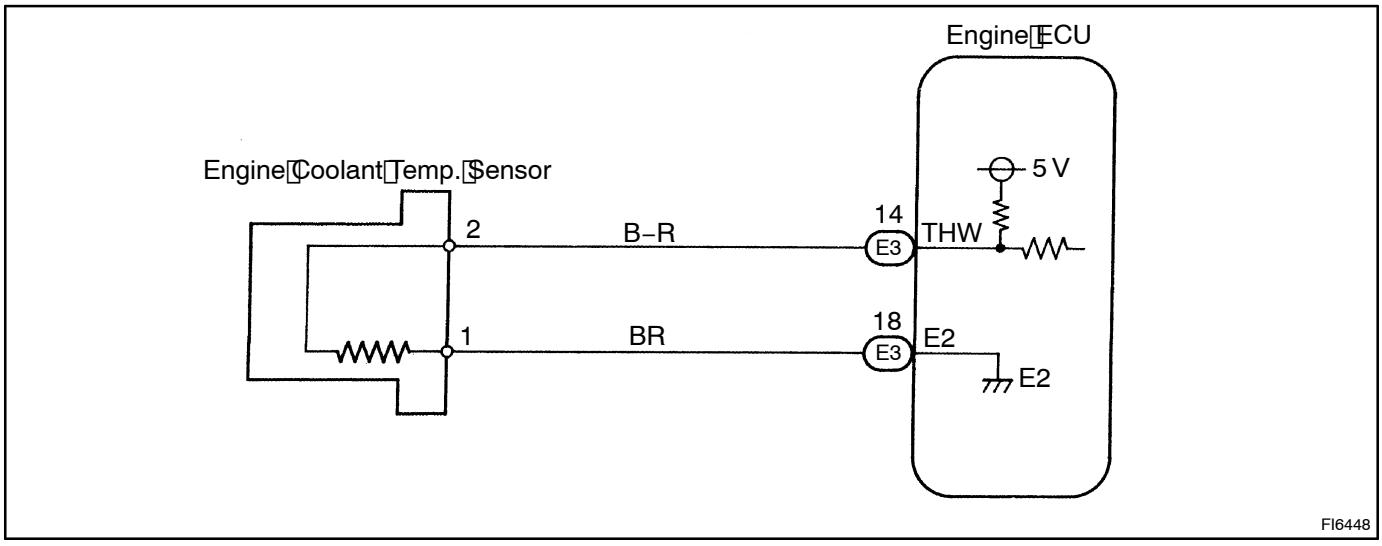
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU

HINT:

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

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P0110/24 (Intake Air Temp. Circuit Malfunction), P0115/22 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) 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 warmed up or not, the air–fuel ratio 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 temperature value on the hand–held tester.

OK:

Same as actual water temperature

HINT:

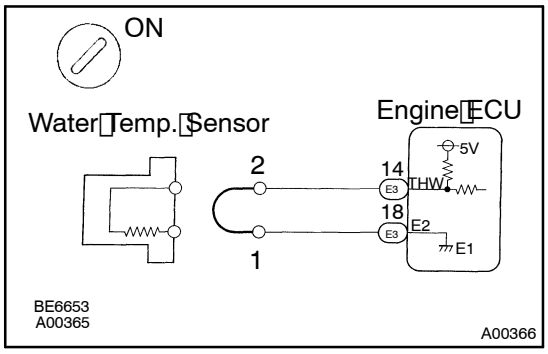
- If there is open circuit, Hand–held tester indicates –40°C (–40°F).
- If there is short circuit, Hand–held tester indicates 140°C (284°F) or more.

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 temp. sensor connector.

(b) Connect sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

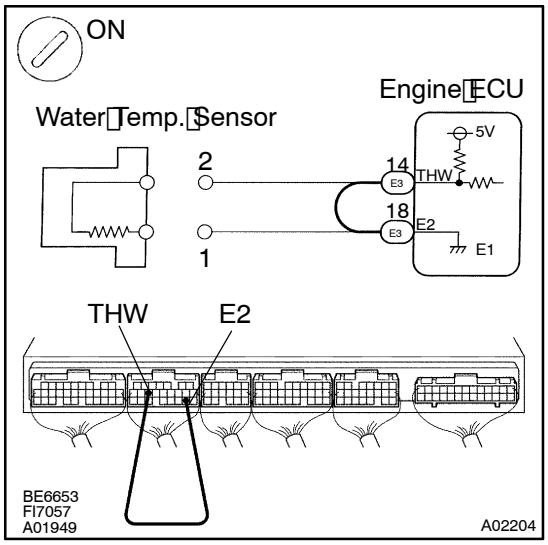
OK:

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

OK	Confirm good connection at sensor. If OK, replace water temp. sensor.

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

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

HINT:

Water temp. sensor connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–29).

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

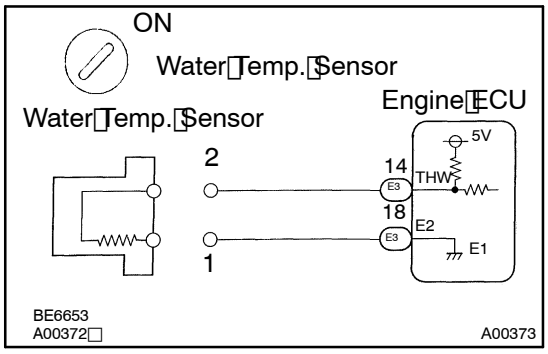
Temperature value: 140°C (284°F) or more

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–29)**

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the water temp. sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

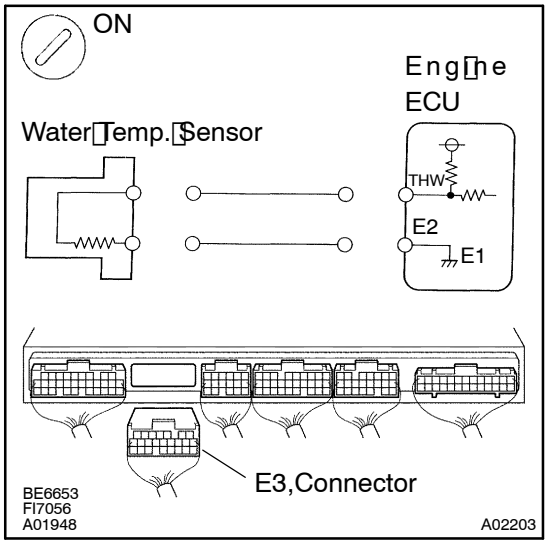
OK:

Temperature value: –40°C (–40°F)

OK	Replace water temp. sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Disconnect the E9 connector of the engine ECU.

HINT:

Water temp. sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

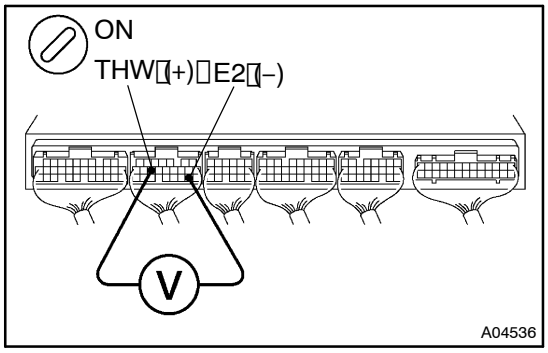
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–29).

When not using hand-held tester

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



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

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

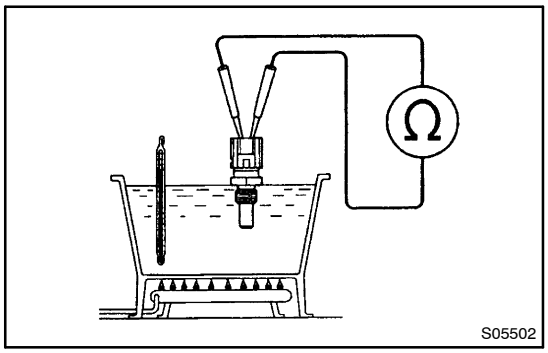
OK:

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

OK → **Check for intermittent problems (See page DI–24).**

NG

2	Check water temp. sensor.



PREPARATION:
Disconnect the water temp. sensor connector.

CHECK:
Measure resistance between terminals.

OK:
Resistance is within acceptable zone on chart.

Water Temp.	Resistance
20°C (68°F)	2 – 3 kΩ
80°C (176°F)	0.2 – 0.4 kΩ

NG → **Replace water temp. sensor.**

OK

3	Check for open and short in harness and connector between engine ECU and water temp. sensor (See page CO–29).

NG → Repair or replace harness or connector.

OK →

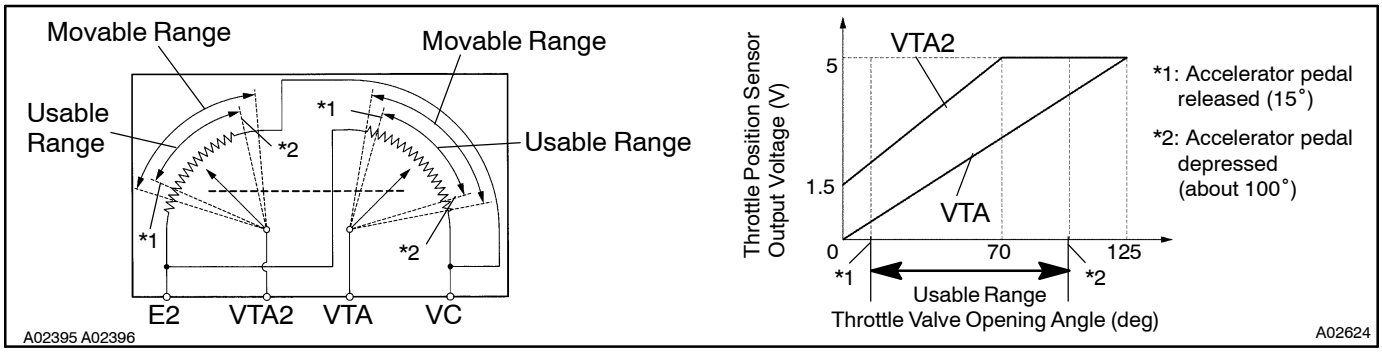
Check and replace engine ECU.

DI2S5–02

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.

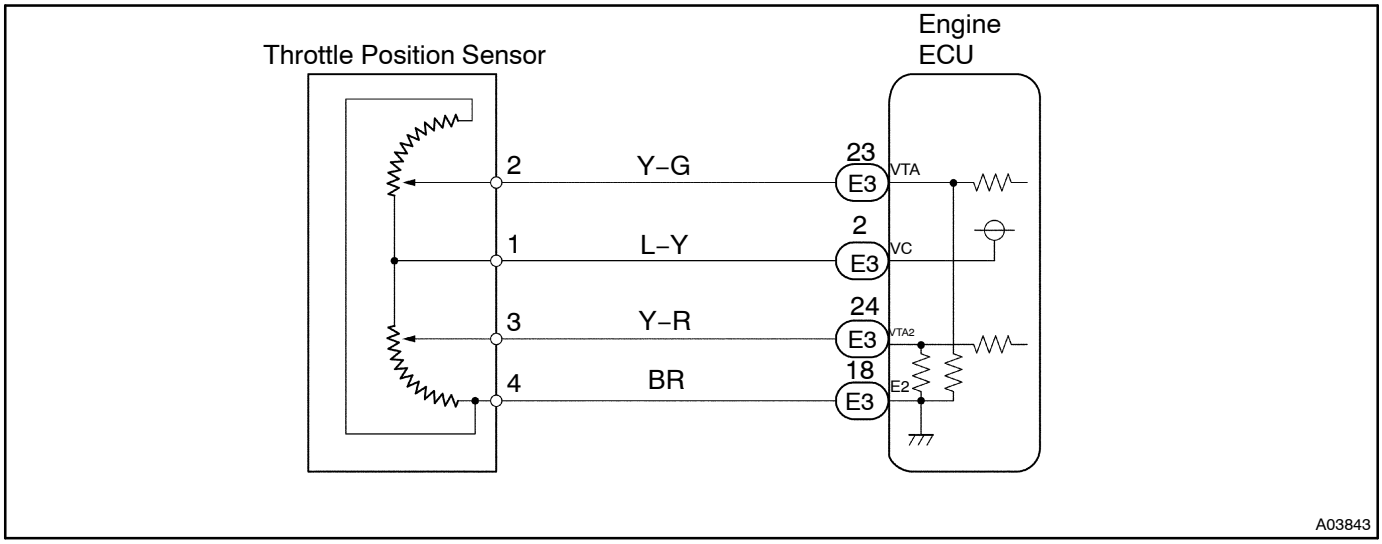


DTC No.	DTC Detecting Condition	Trouble Area
P0120/41	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (b) VTA–VTA2 ≦ 0.02 V	• Open or short in throttle position sensor circuit • Throttle position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



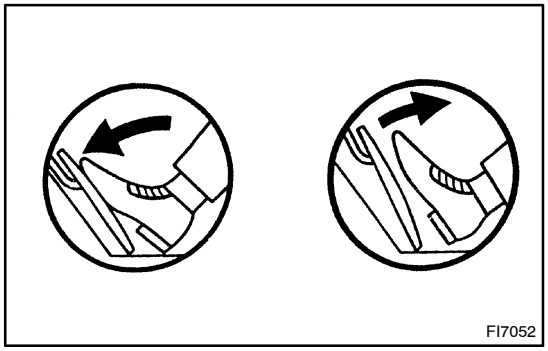
INSPECTION PROCEDURE

HINT:

- If DTC P0110/24 (Intake Air Temp. Circuit Malfunction), P0115/22 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) 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 warmed up or not, the air–fuel ratio 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.



PREPARATION:

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

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

CHECK:

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

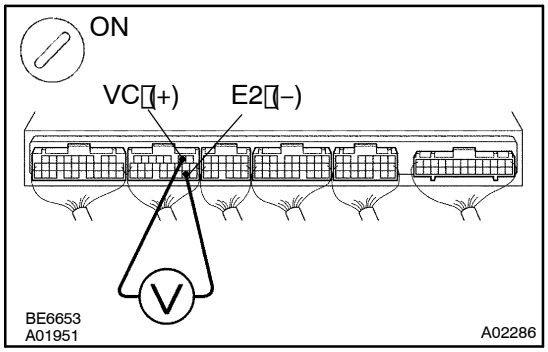
OK:

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–29).

NG

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

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

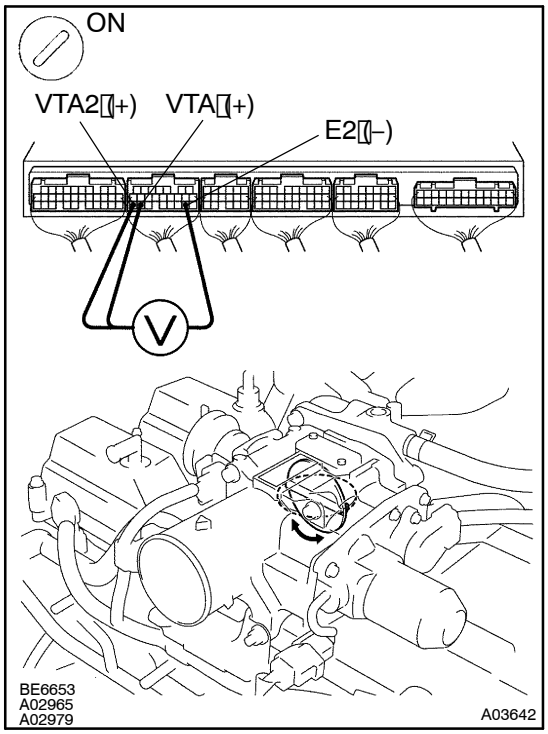
OK:

Voltage: 4.5 – 5.5 V

NG → Check and replace engine ECU (See page IN–29).

OK

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

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

OK:

Accelerator pedal	Voltage	
	VTA	VTA2
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–29).

NG

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

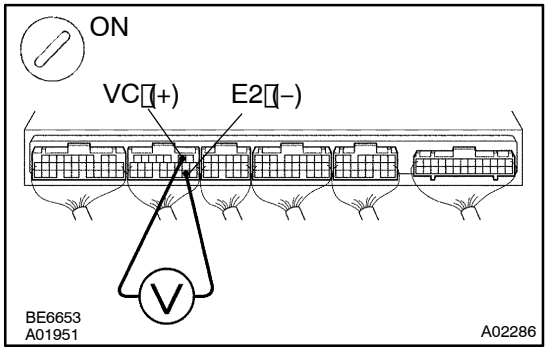
NG → Replace throttle position sensor (See page FI–36).

OK

Check for open and short in harness and connector between engine ECU and throttle position sensor (VC, VTA, VTA2, E2 line) (See page IN–29).

When not using hand-held tester

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



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

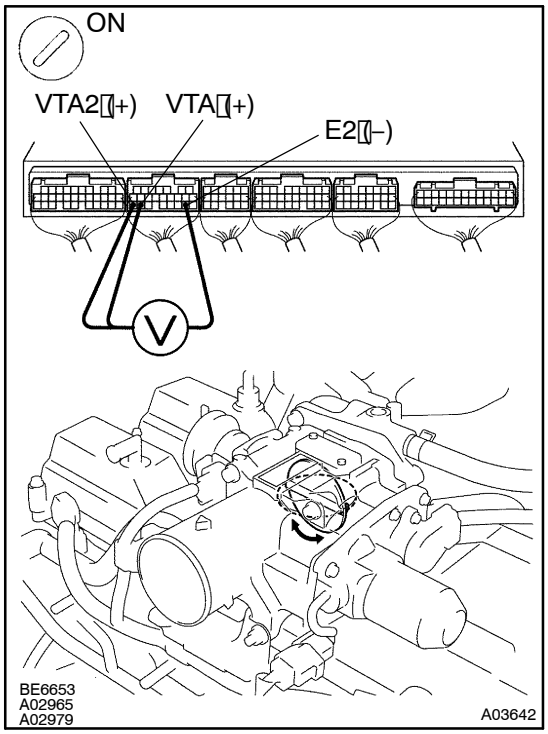
CHECK:
Measure voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG	Check and replace engine ECU (See page IN–29).

OK

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



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

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

OK:

Accelerator pedal	Voltage	
	VTA	VTA2
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–29).

NG

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

NG → Replace throttle position sensor (See page FI–36).

OK →

Check for open and short in harness and connector between engine ECU and throttle position sensor (VC, VTA, VTA2, E2 line) (See page IN–29).

DI2T2–01

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

CIRCUIT DESCRIPTION

Refer to DTC P0120/41 (Throttle Position Sensor Circuit Malfunction) on page DI–44.

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 • 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

Replace throttle position sensor (See page FI–36).

DI2S6–02

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

DTC	P0150/58	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

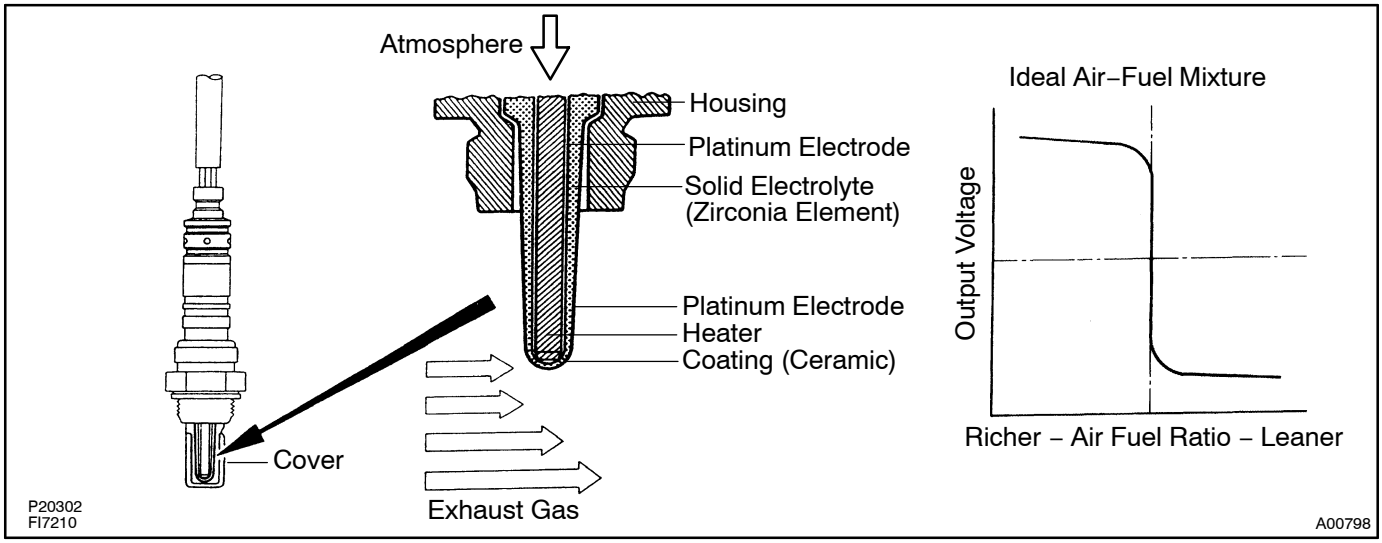
To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel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

The oxygen sensor has the characteristic whereby 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 feedback to the computer for 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 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: 1 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.

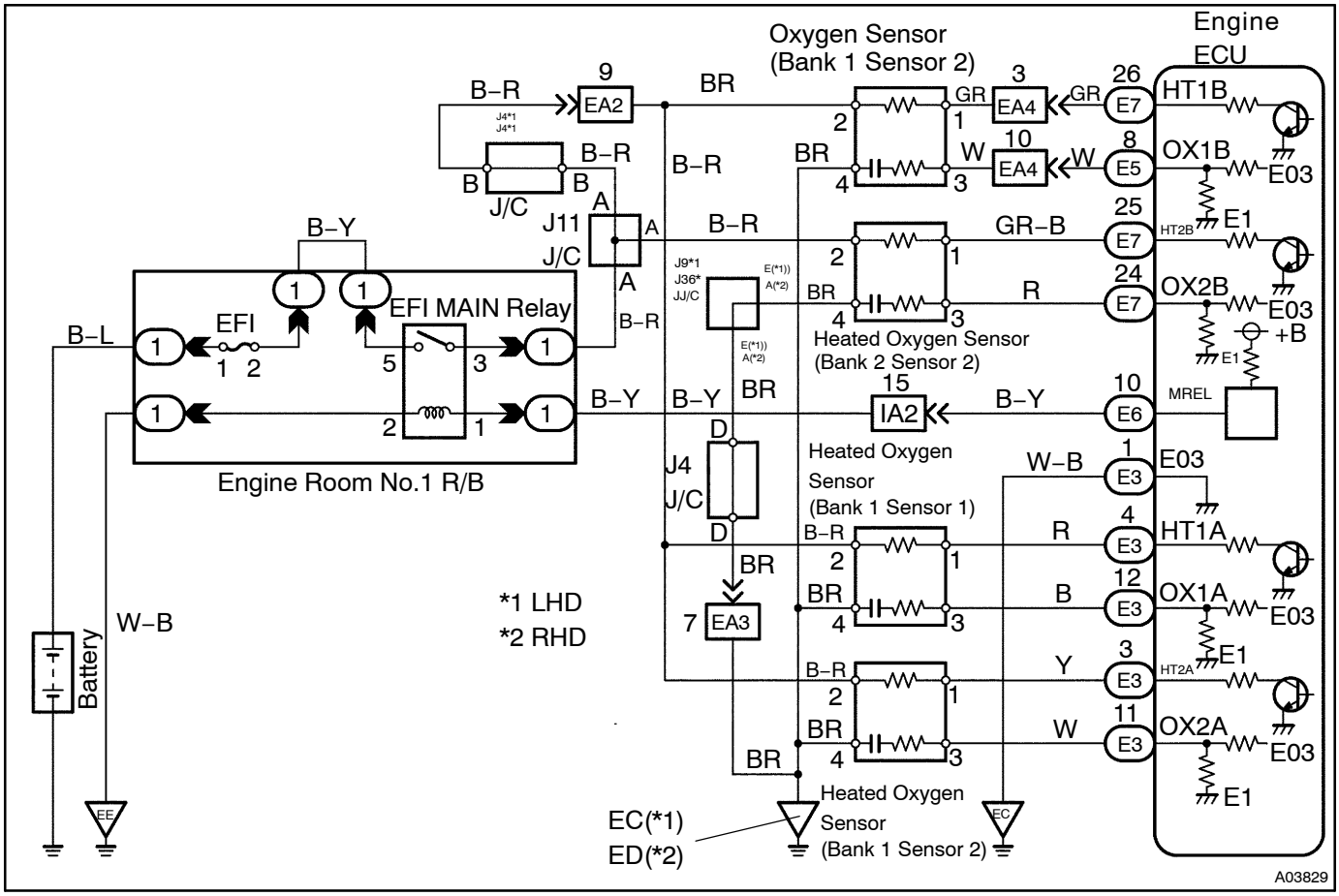
The oxygen sensors include a heater which heats the Zirconia element. The heater is controlled by the engine ECU. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.



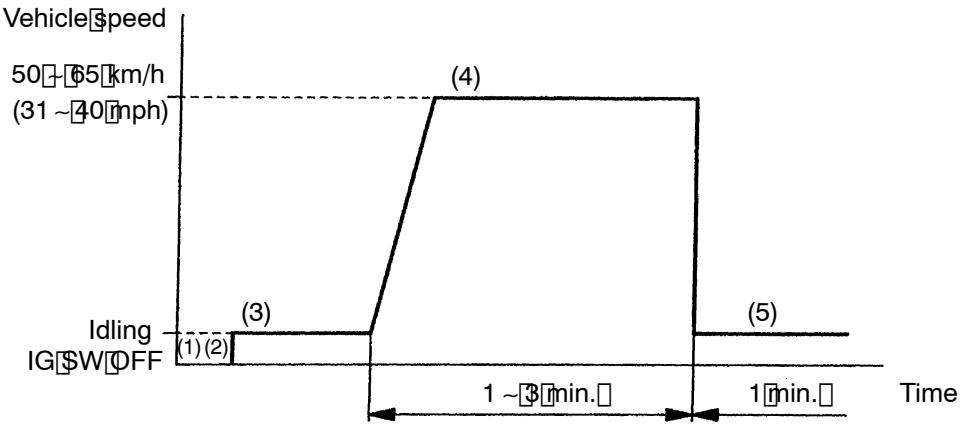
DTC No.	DTC Detecting Condition	Trouble Area
P0130/21 P0150/28	Oxygen sensor signal voltage is reduced to between 0.35 V and 0.70 V for 60 sec. under conditions (a) ~ (d) (2 trip detection logic) 75˚C or more (a) Water temp. (b) Engine speed: 4,000 rpm or less (c) Load driving A/C ON, Flat road 80 km/h (45 mph) (d) Oxygen sensor signal voltage: After racing above and below 0.45 V	• Oxygen sensor • Fuel trim malfunction

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



CONFIRMATION DRIVING PATTERN



(1) Connect the hand–held tester to the DLC3.
(2) Switch the hand–held tester from normal mode to check (test) mode (See page DI–4).
(3) Start the engine and warm it up with all accessory switches OFF.
(4) Drive the vehicle at 50 ~ 65 km/h (31 ~ 40 mph) for 1 ~ 3 min. to warm up the heated oxygen sensor.
(5) Let the engine idle for 1 min.
(6) Perfom steps (3) to (5) three times.
HINT:
If a malfunction exists, the CHECK ENG 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–29).**

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

OK

2	**Check for oxygen sensor data.**

PREPARATION:

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

(b) Warm up the engine to normal operating temp.

CHECK:

Read the oxygen sensor output voltage and short–term fuel trim.

RESULT:

Pattern	Heated oxygen sensor output voltage	Short–term fuel trim
1	Lean condition (Changes at 0.55 V or less)	Changes at about +20%
2	Rich condition (Changes at 0.35 V or more)	Changes at about –20%
3	Except 1 and 2	

1, 2	**Check fuel trim system (See page DI–60).**

3

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

PREPARATION:

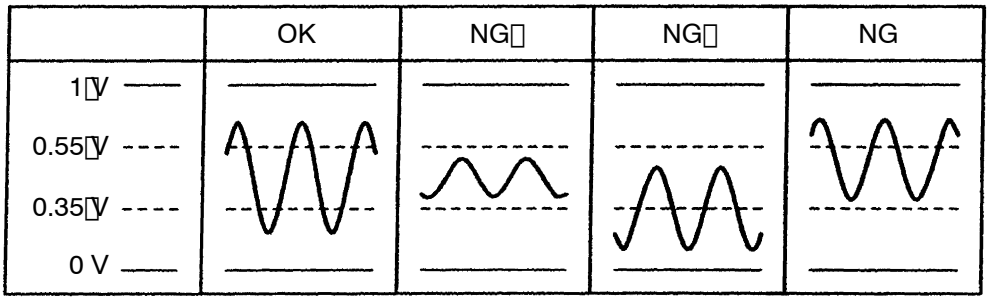
Warm up the oxygen sensor with the engine at 2,500 rpm for approx. 90 sec.

CHECK:

Use the hand–held tester 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).



A00292

OK	**Perform confirmation driving pattern.**

NG

Replace oxygen sensor.

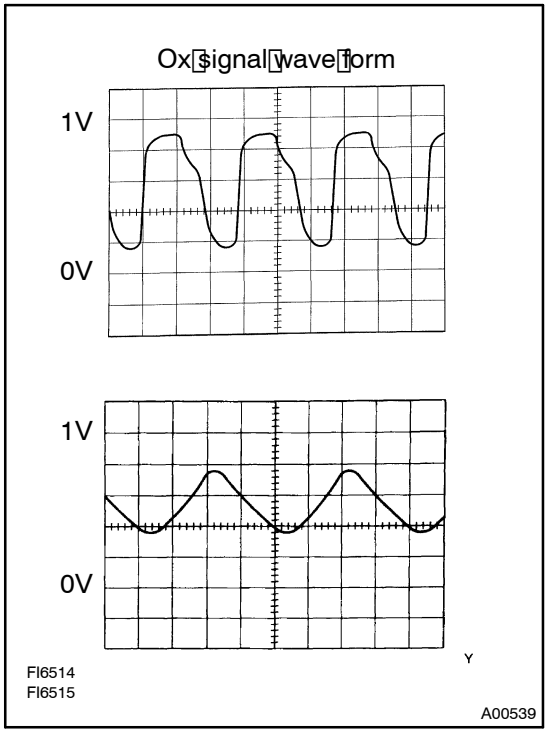
When not using hand-held tester

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

YES → Go to relevant diagnostic trouble code chart (See page DI-15).

NO

Replace heated oxygen sensor.



Reference: INSPECTION USING OSCILLOSCOPE

With the engine racing (4,000 rpm) measure waveform between terminals OXL1 and E1 of engine ECU.

HINT:

- The correct waveform is as shown oscillating between approx. 0.1 V and 0.9 V.
- If the oxygen sensor has deteriorated, the amplitude of the voltage will be reduced as shown on the left.

DI2S7–02

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

DTC	P0156/29	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0130

DTC No.	DTC Detecting Condition	Trouble Area
P0136/27 P0156/29	Voltage output of the heated oxygen sensor (bank 1 sensor 2, bank 2 sensor 2) remains at 0.4 V or more or 0.5 V or less when the vehicle is driven at 30 km/h (19 mph) or more after the engine is warmed up. (2 trip detection logic)	• Heated oxygen sensor

HINT:

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

WIRING DIAGRAM

Refer to on page DI–51 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

When using hand–held tester

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	**Are there any other codes (besides DTC P0136 or P0156) being output?**

YES → **Go to relevant DTC chart (See page DI–15).**

NO

2	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–29).

NG → Repair or replace harness or connector.

OK

3	Check the output voltage of oxygen sensor (bank 1, 2 sensor 2).

PREPARATION:

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

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

CHECK:

Read voltage output of oxygen sensor (bank 1 sensor 2, bank 2 sensor 2) when engine suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 min. using 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 or 29) being output?

YES → Go to relevant diagnostic trouble code chart (See page DI–15).

NO

Replace oxygen sensor.

DI2S8–02

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

DTC	P0141/21	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

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

DTC	P0161/28	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 2)

CIRCUIT DESCRIPTION

Refer to Oxygen Sensor Circuit Malfunction on page DI–105.

DTC No.	DTC Detecting Condition	Trouble Area
P0135/21 P0141/21 P0155/28 P0161/28	When the heater operates, heater current exceeds 2 A (2 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated 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.

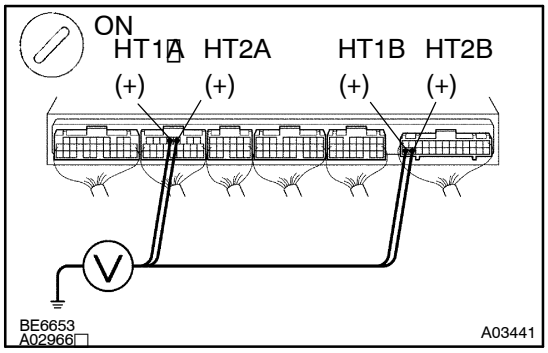
WIRING DIAGRAM

Refer to Oxygen Sensor Circuit Malfunction on page DI–511 for the WIRING DIAGRAM.

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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check voltage between terminals HT1A, HT2A, HT1B, HT2B of engine ECU connector and body ground.**



PREPARATION:

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

CHECK:

Measure voltage between terminals HT1A, HT2A, HT1B, HT2B of the engine ECU connector and body ground.

- Connect terminal HT1B to bank 2 sensor 1.
- Connect terminal HT2B to bank 2 sensor 2.
- Connect terminal HT1A to bank 1 sensor 1.
- Connect terminal HT2A to bank 1 sensor 2.

HINT:

OK:

Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–29).**

NG

2	**Check resistance of oxygen sensor heater (See page FI–63).**

NG	**Replace oxygen sensor.**

OK

Check and repair harness or connector between main relay and oxygen sensor and engine ECU (See page IN–29).

DI2S9–02

DTC	P0171/25	Fuel Trim System too Lean (Air – Fuel Ratio Lean Malfunction, Bank1)

DTC	P0174/25	Fuel Trim System too Lean (Air – Fuel Ratio Lean Malfunction, Bank2)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared against 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 over time 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 CHECK ENG on the multi information display.

DTC No.	DTC Detecting Condition	Trouble Area
P0171/25	When the air fuel ratio feedback is stable after engine warming up, the fuel trim is considerably in error on the RICH side. (2 trip detection logic) Main oxygen sensor voltage is 0.45 or less (lean) for 90 sec under condition (a) and (b)	• Gas leakage on exhaust system • Air intake (hose loose) • Fuel line pressure • Injector blockage • Oxygen sensor (bank1 sensor1) malfunction • Air flow meter • Water temp. sensor
P0174/25		• Gas leakage on exhaust system • Fuel line pressure • Injector leak, blockage • Oxygen sensor (bank 2 sensor 1) malfunction • Air flow meter • Water temp. sensor

HINT:

- When DTC P0171/25 and DTC P0174/25 is recorded, the actual air–fuel ratio is on the LEAN side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171/25 and DTC P0174/25 is recorded. The CHECK ENG then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ± 25 %, the system is functioning normally.

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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Ask customer whether vehicles runs out of fuel.**

YES → **DTC P0171 or P0174 was recorded because the vehicle runs out of fuel.**

NO

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

NG → **Repair or replace.**

OK

3	**Check for oxygen sensor (bank 1, 2 sensor 1) data.**

PREPARATION:

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

(b) Warm up the engine to normal operating temperature.

CHECK:

Read the oxygen sensor (bank 1, 2 sensor 1) output voltage and short–term fuel trim.

HINT:

Read the values for the same bank.

RESULT:

Pattern	Oxygen sensor output voltage	Short–term fuel trim
1	Lean condition (Changes at 0.55 V or less)	Changes at about +20%
2	Rich condition (Changes at 0.35 V or more)	Changes at about –20%
3	Except 1 and 2	

3 → **Check for oxygen sensor (bank 1, 2 sensor 1) (See page DI–60).**

1, 2

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

NG → Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–29).

OK

5	Check injector injection (See page FI–22).

NG → Replace injector.

OK

6	Check air flow meter and water temp. sensor (See page FI–31 and CO–29).

NG → Repair or replace.

OK

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

NG → Repair or replace.

OK

8	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–29).

When not using hand–held tester

1	Check air induction system (See page FI–47).

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–29).

OK

3	Check injector injection (See page FI–22).

NG → Replace injector.

OK

4	Check air flow meter (See page FI–31).

NG → Repair or replace.

OK

5	Check water temp. sensor (See page CO–29).

NG → Repair or replace.

OK

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

NG → Repair or replace.

OK

7	Does malfunction disappear when a good oxygen sensor installed?

YES → Repair oxygen sensor.

NO

Check and replace engine ECU.

DI2SA–02

DTC	P0325/52	Knock Sensor 1 Circuit Malfunction

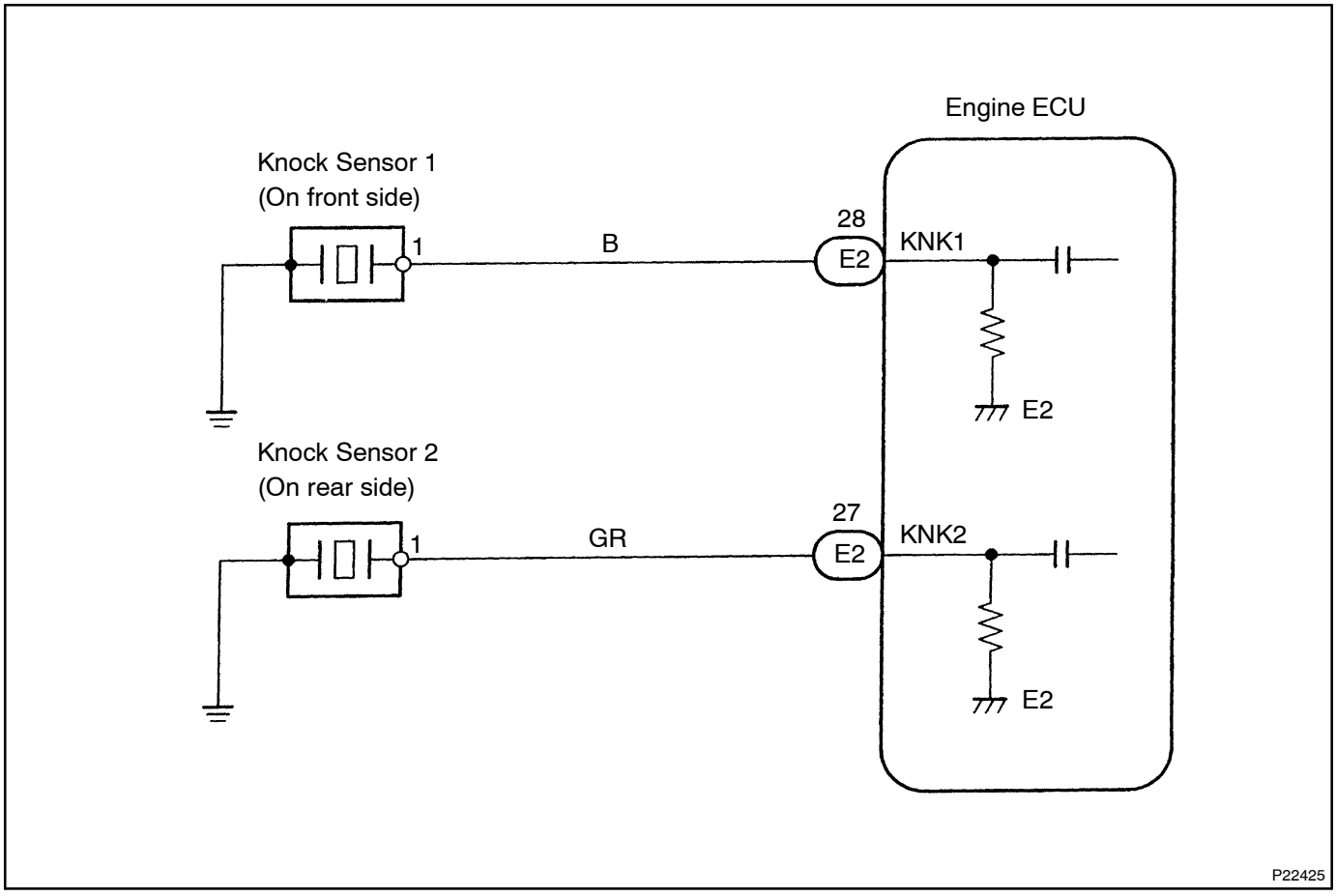
DTC	P0330/55	Knock Sensor 2 Circuit Malfunction

CIRCUIT DESCRIPTION

Knock sensors are fitted one to the right bank and left bank 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

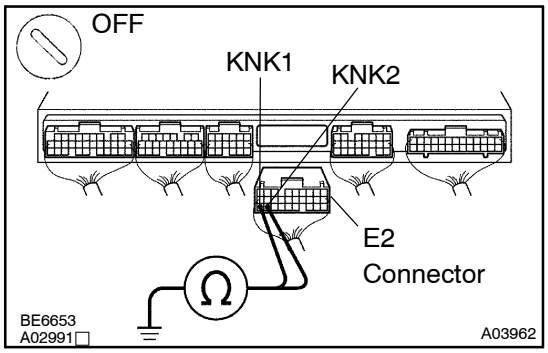


INSPECTION PROCEDURE

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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

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

CHECK:

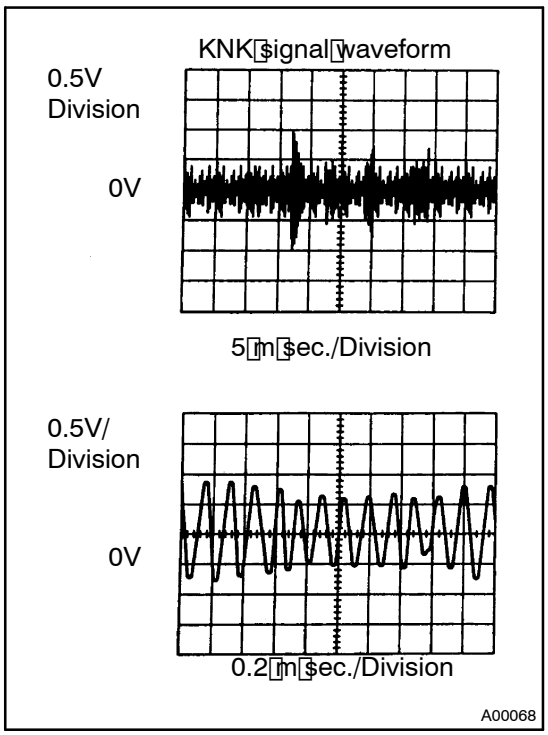
Measure resistance between terminal KNK1, KNK2 of the engine ECU and body ground.

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) measure between terminal KNK1, KNK2 of the engine ECU connector and body ground.

HINT:

The correct waveforms are as shown.

- Spread the time on the horizontal axis, and confirm that period of the wave is 0.141 m sec.
  (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–59).**

NG → Replace knock sensor.

OK

3	Check for open and short in harness and connector between engine ECU and knock sensor (See page IN–29).

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–29).

DI2SB–02

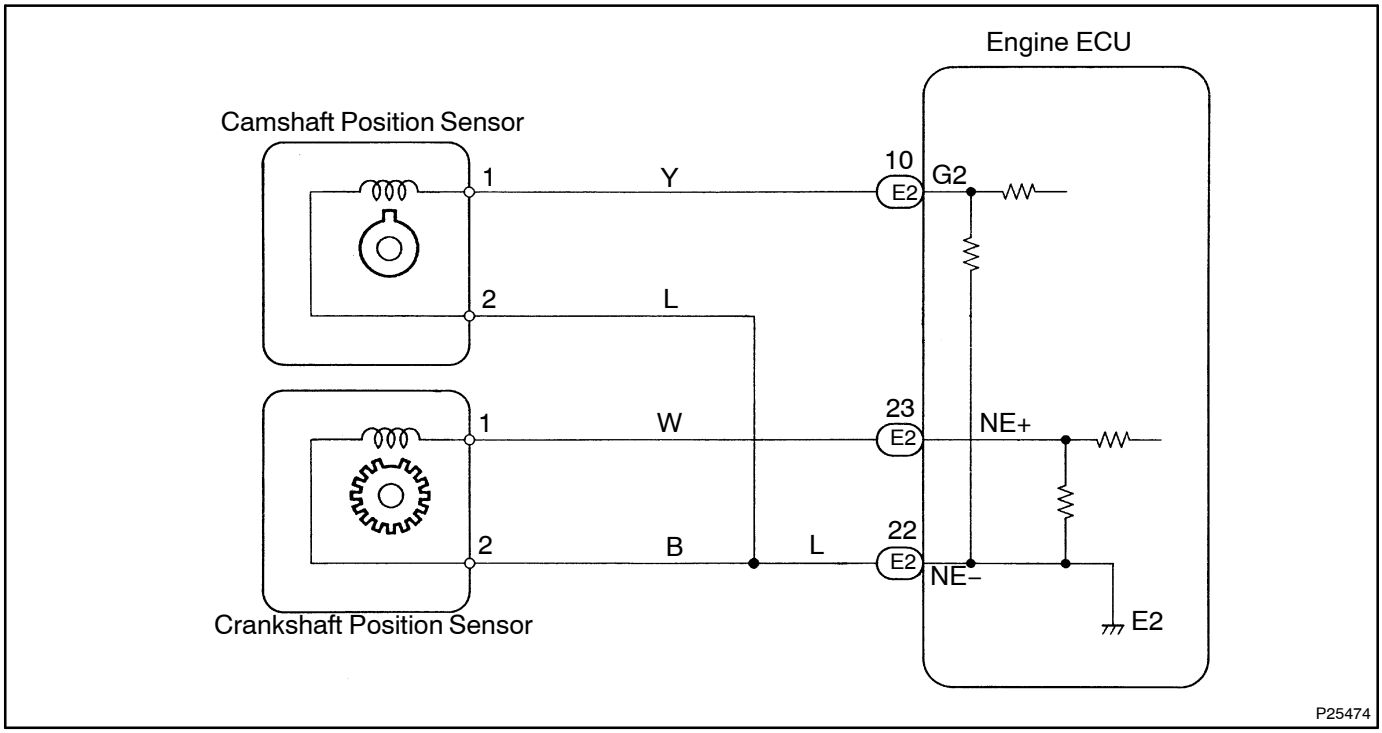
DTC	P0335/12, 13	Crankshaft Position Sensor Circuit Malfunction

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 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 G2 signals, and the actual crankshaft angle and the engine speed by the NE signals.

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 • Starter • Engine ECU
	No crankshaft position sensor signal to engine ECU with engine speed 600 rpm or more (2 trip detection logic)	

WIRING DIAGRAM

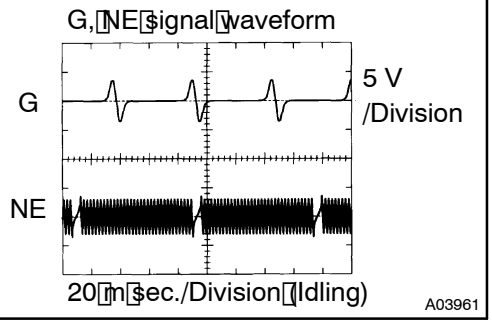


INSPECTION PROCEDURE

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 warmed up or not, the air–fuel ratio 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 between terminals G2 and NE–, 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–29).

NG → Repair or replace harness or connector.

OK

3 Inspect sensor installation and teeth of signal plate.

NG → Tighten sensor. Replace signal plate.

OK

Check and replace engine ECU (See page IN–29).

DI2SC–02

DTC	P0340/12	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft position sensor (G2 signal) consist of a signal plate and pickup coil.
The G2 signal plate has 1 tooth, on its outer circumference and is mounted on the left bank camshafts.
When the camshafts rotate, the protrusion on the signal plate 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 mounted on the crankshaft. 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 • Starter • 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 (Crankshaft Positio Sensor Circuit Malfunction) on page DI–68 for the 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 warmed up or not, the air–fuel ratio 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 (Crankshaft Position Sensor Circuit Malfunction) on page DI–68 for the Reference: INSPECTION USING OSCILLOSCOPE.

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–29).

NG → Repair or replace harness or connector.

OK

3	Inspect sensor installation.

NG → Tighten sensor.

OK

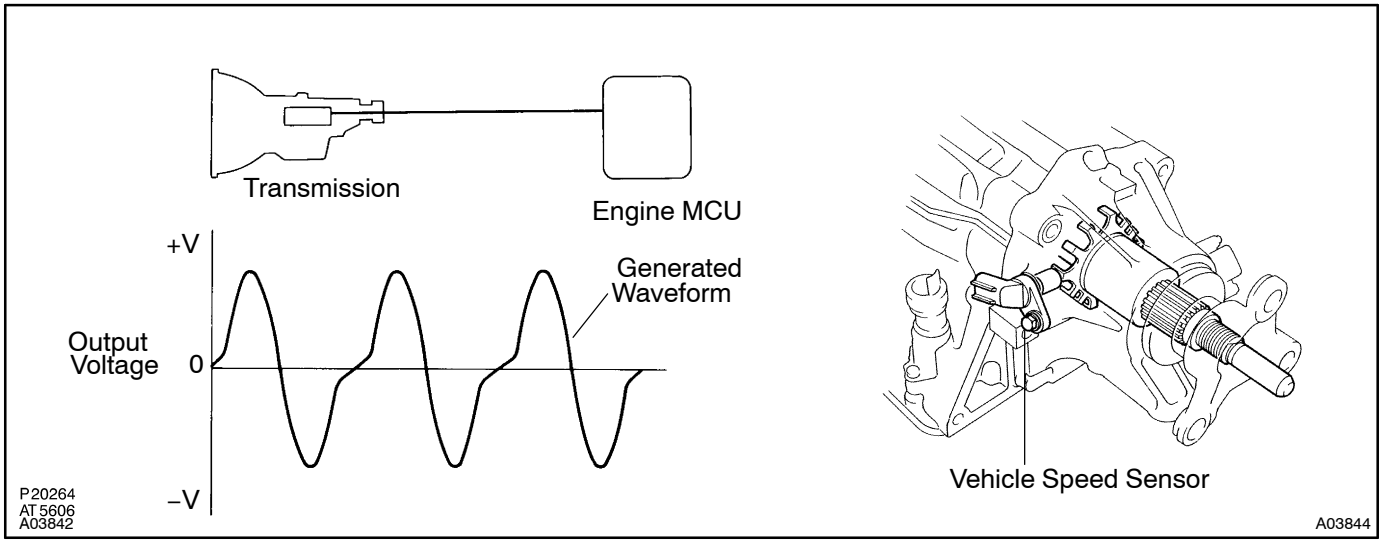
Check and replace engine ECU (See page IN–29).

DI2SD–02

DTC	P0500/42	Vehicle Speed Sensor Malfunction

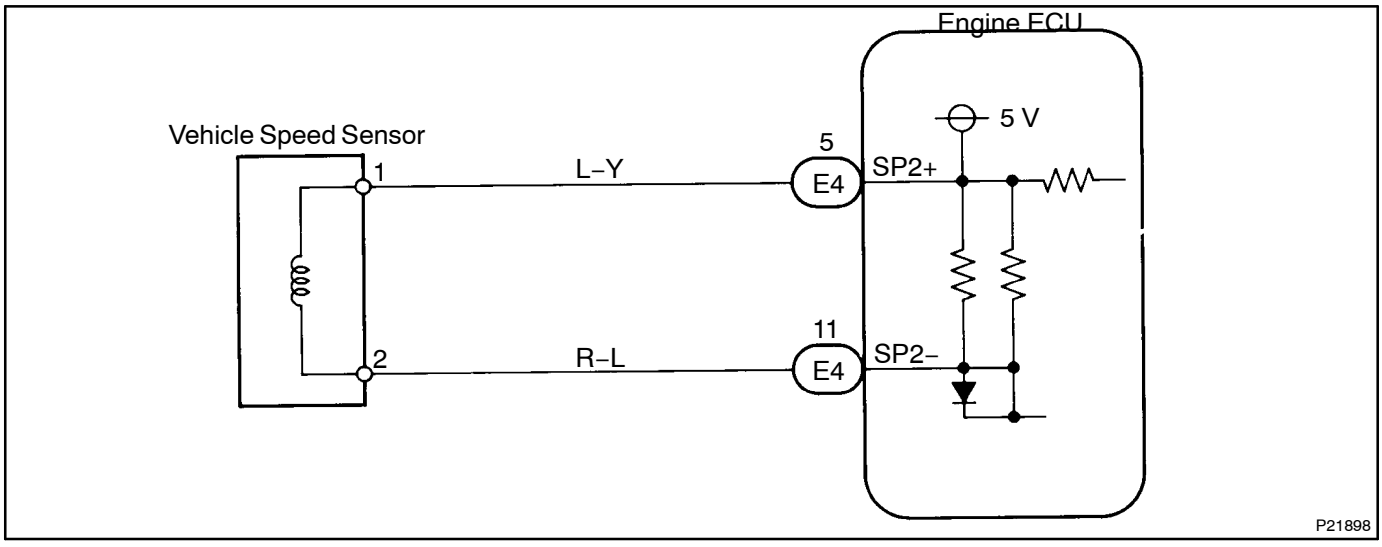
CIRCUIT DESCRIPTION

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 • Vehicle 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 warmed up or not, the air–fuel ratio 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 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–29).**

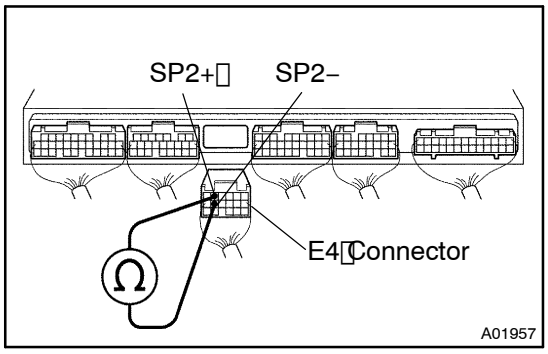
NG

2	**Check speedometer circuit (See page BE–105).**

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

OK

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



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Disconnect the E4 connector of the engine ECU.

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

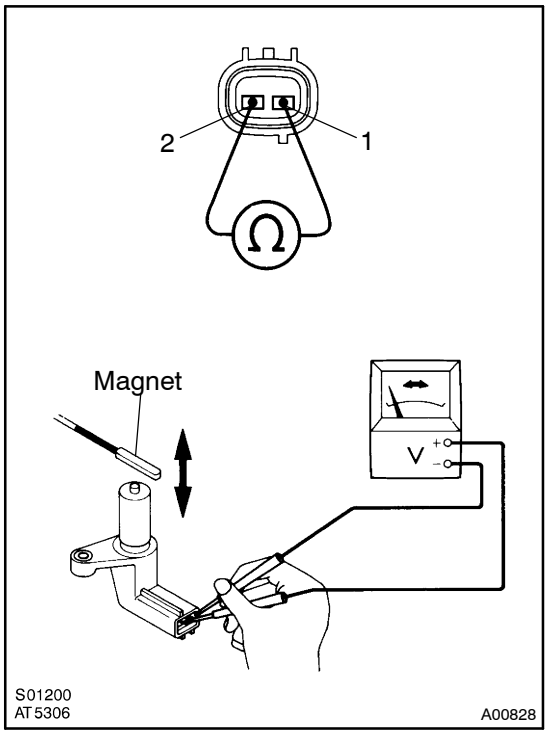
OK:

Resistance: 560 – 680 Ω

OK	**Check and replace engine ECU (See page IN–29).**

NG

4	**Check vehicle speed sensor.**



PREPARATION:
Remove the vehicle speed sensor from the transmission.

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor.

OK:

Resistance: 560 ~ 680 Ω

Reference

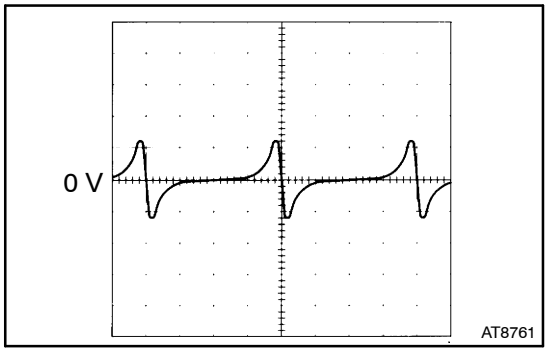
Check vehicle speed sensor's function

CHECK:
Check voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to 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
Waveform between terminals SP2+ and SP2– When the vehicle speed is approx. 60 km/h (37 mph).

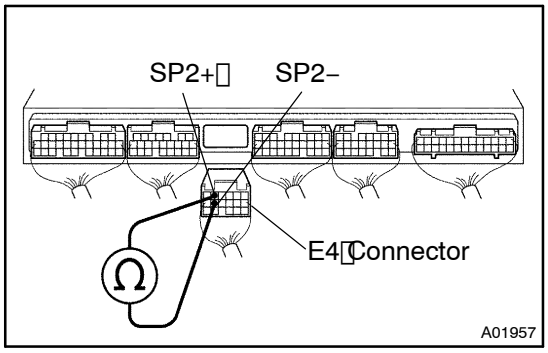
NG → **Replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page IN–29).

When not using hand-held tester

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



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Disconnect the E4 connector of the engine ECU.

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

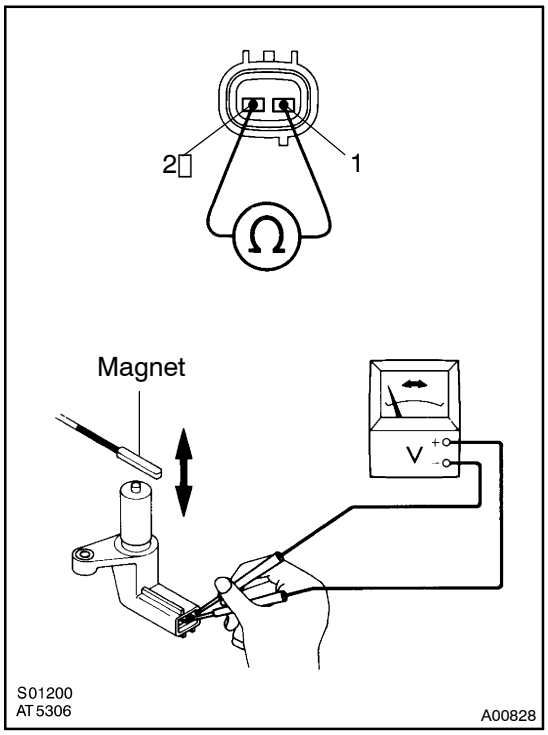
OK:

Resistance: 560 – 680 Ω

OK	Check and replace engine ECU (See page FI–66).

NG

2	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor.

OK:

Resistance: 560 ~ 680 Ω

Reference

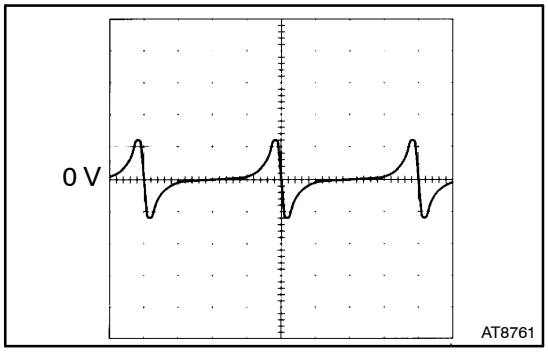
Check vehicle speed sensor's function

CHECK:
Check voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to 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
Waveform between terminals SP2+ and SP2– When the vehicle speed is approx. 60 km/h (37 mph).

NG → **replace vehicle speed sensor.**

OK

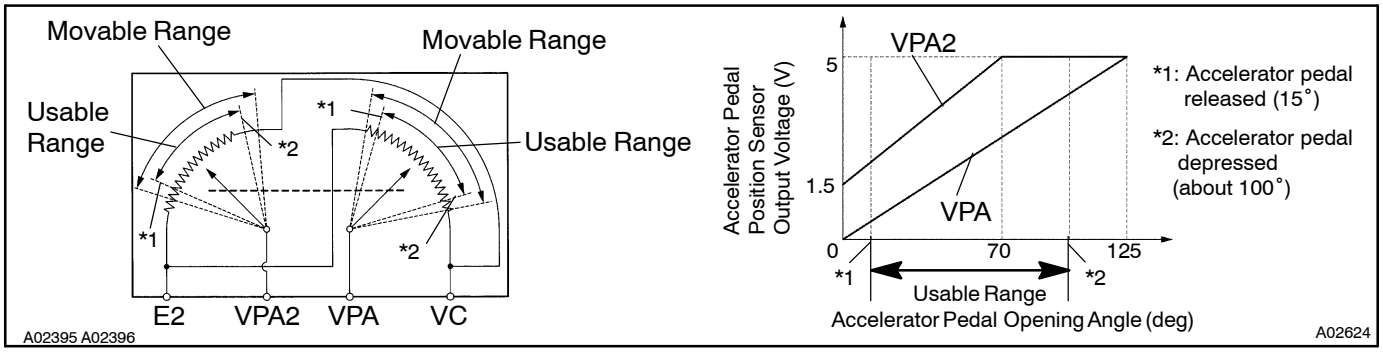
Check and repair harness and connector between engine ECU and vehicle speed sensor (See page DI–72).

DI2SE–02

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.

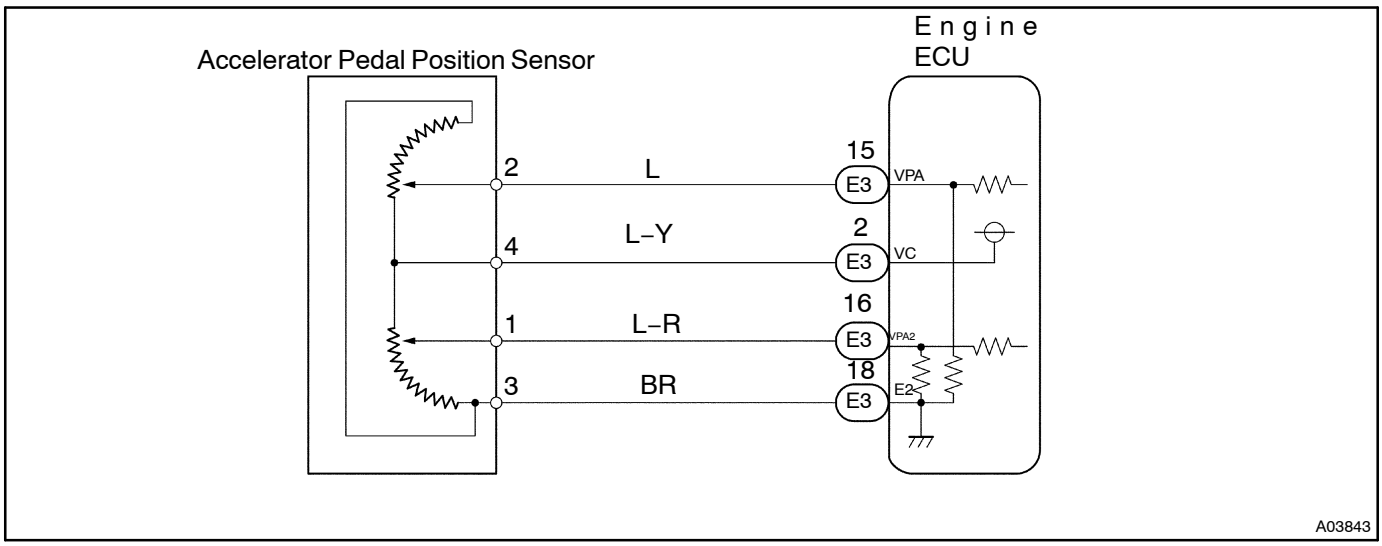


DTC No.	DTC Detecting Condition	Trouble Area
P1120/19	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VPA ≦ 0.2 V (b) VPA2 ≦ 0.5 V (c) VPA ≧ 4.8 V (d) When VPA ≧ 0.2 V and ≦ 1.8 V, and VPA2 ≧ 4.97 V (e) VPA–VPA2 ≦ 0.02 V	• Open or short in accelerator pedal position sensor circuit • Accelerator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



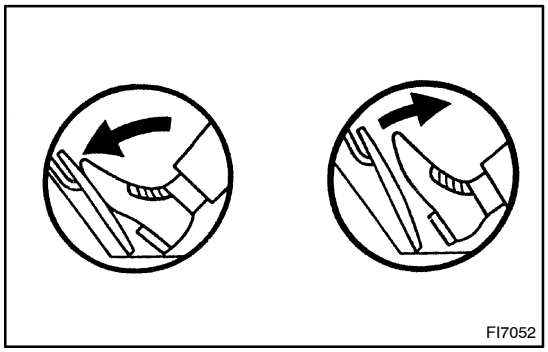
INSPECTION PROCEDURE

HINT:

- If DTC P0110/31 (Intake Air Temp. Circuit Malfunction), P0115/122 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

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



PREPARATION:

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

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

CHECK:

Read the voltage for the accelerator pedal position sensor data.

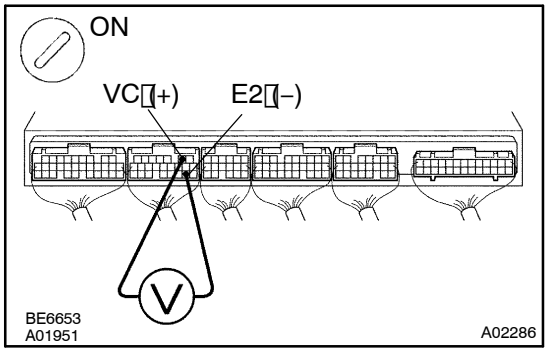
OK:

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–29).**

NG

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

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

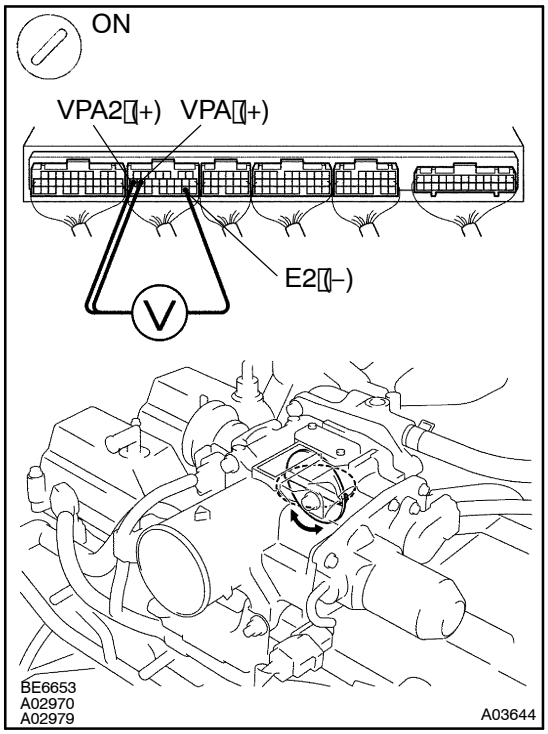
OK:

Voltage: 4.5 – 5.5 V

NG → **Check and replace engine ECU (See page IN–29).**

OK

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

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

OK:

Accelerator pedal	Voltage	
	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–29).

NG

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

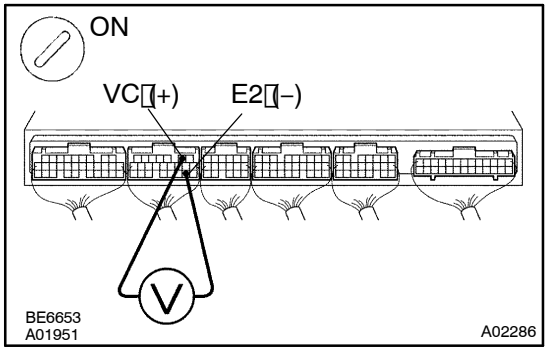
NG → Replace accelerator pedal position sensor (See page FI–36).

OK

Check for open and short in harness and connector between engine ECU and accelerator pedal position sensor (VC, VPA, VPA2, E2 line) (See page IN–29).

When not using hand-held tester

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



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

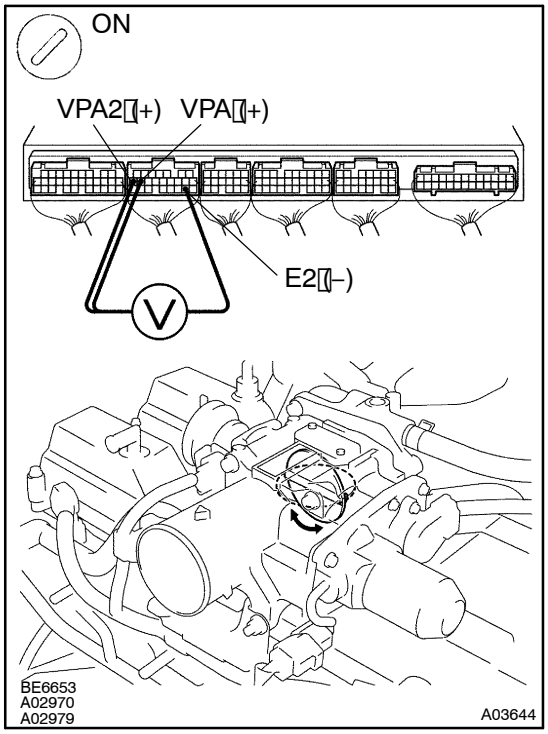
CHECK:
Measure voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG → **Check and replace engine ECU (See page IN–29).**

OK

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



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

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

OK:

Accelerator pedal	Voltage	
	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–29).**

NG

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

NG → Replace accelerator pedal position sensor (See page FI–36).

OK

Check for open and short in harness and connector between engine ECU and accelerator pedal position sensor (VC, VPA, VPA2, E2 line) (See page IN–29).

DI2T3–01

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

CIRCUIT DESCRIPTION

Refer to DTC P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) on page DI–78.

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 • Engine ECU

WIRING DIAGRAM

Refer to DTC P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) on page DI–78.

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.

Replace accelerator pedal position sensor (See page FI–36).

DI2SF–02

DTC	P1125/89*	Throttle Control Motor Circuit Malfunction

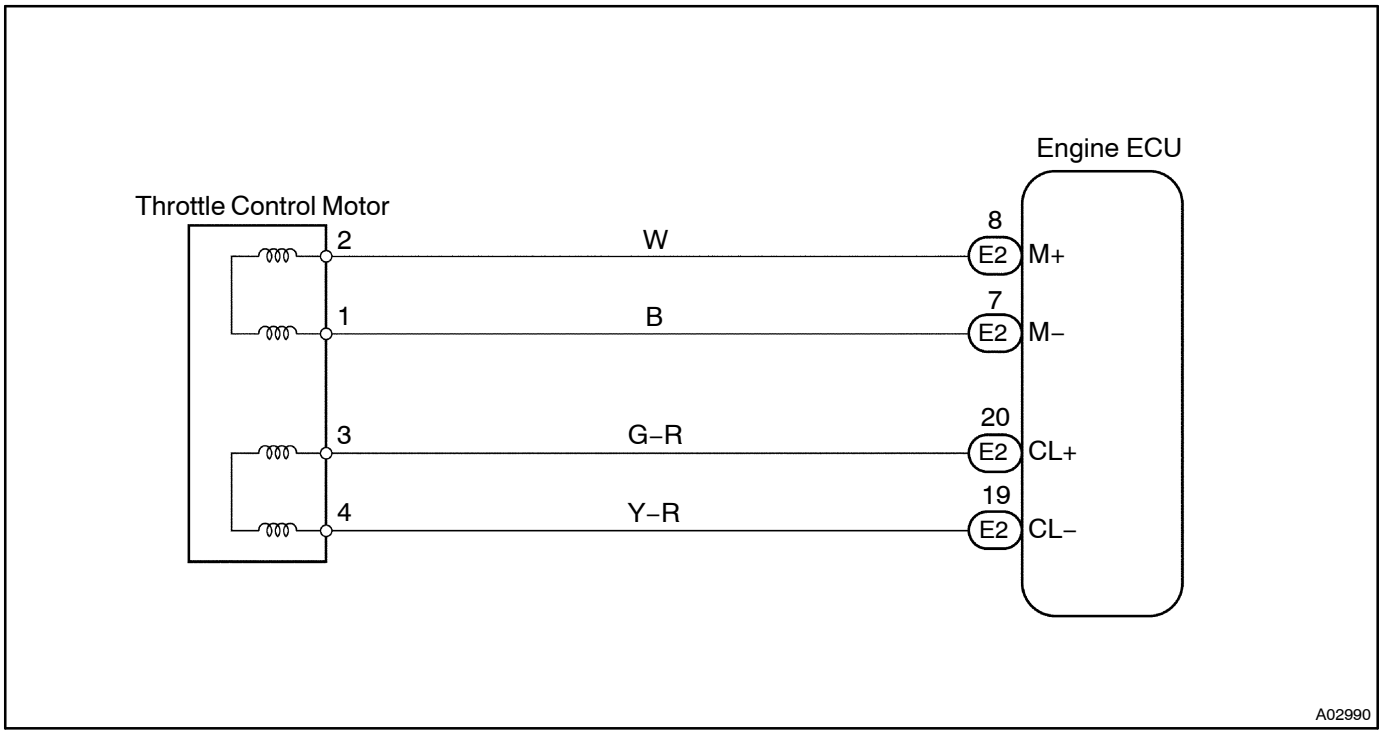
*: ETCS trouble code No. is 21.

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	

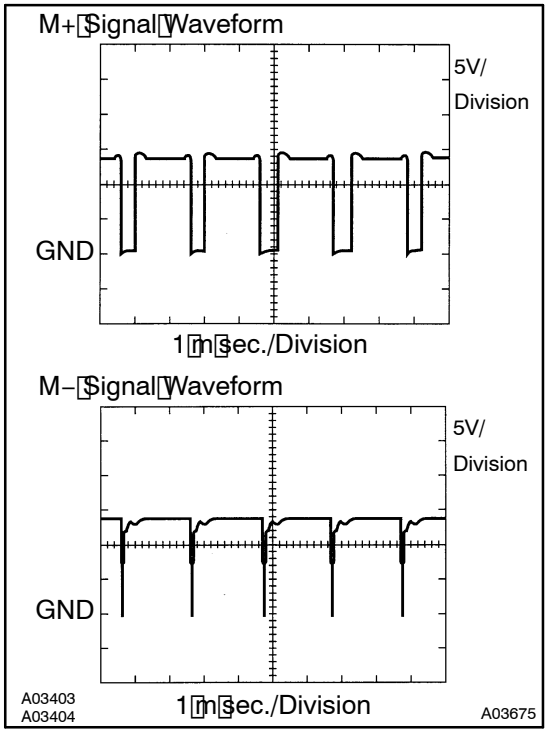
WIRING DIAGRAM



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 throttle control motor circuit.**



PREPARATION:

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

(b) Start the engine.

CHECK:

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

OK:

The correct waveforms are as shown.

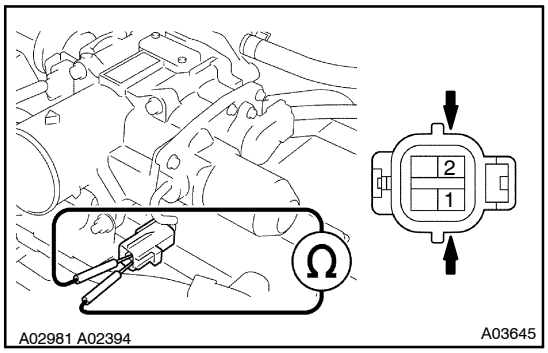
HINT:

The waveform frequency varies depending on the throttle opening.

OK	**Check and replace engine ECU (See page IN–29).**

NG

2	Check throttle control motor.



PREPARATION:
Disconnect the throttle control motor and magnetic clutch connector.

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

OK:

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

NG → Replace throttle control motor (See page FI–36).

OK

3	Check for open and short in harness and connector between throttle control motor and engine ECU (See page IN–29).

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–29).

DI2SG–02

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: (a) Magnetic clutch current ≧ 1.0 A or ≦ 0.8 A	

WIRING DIAGRAM

Refer to DTC P1125/89 (Throttle Control Motor Circuit Malfunction) on page DI–85 for the 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check magnetic clutch circuit.**

When using hand–held tester:

PREPARATION:

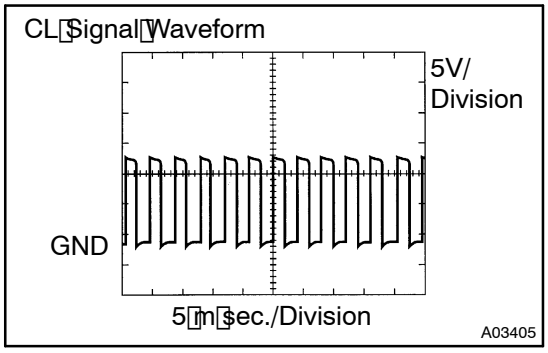
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and hand–held tester main switch ON.

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.

(b) Start the engine.

CHECK:

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

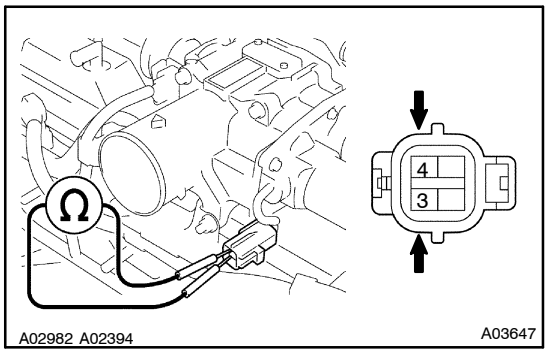
OK:

The correct waveform is as shown.

NG	**Go to step 4.**

OK

2	**Check magnetic clutch.**



PREPARATION:

Disconnect the throttle control motor and magnetic clutch connector.

CHECK:

Measure resistance between terminals 3 and 4 of the throttle control motor and 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–36).**

OK

3	**Check for open and short in harness and connector between magnetic clutch and engine ECU (See page IN–29).**

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 P1126/89 is not stored

NG → **Replace throttle control motor (with magnetic clutch) (See page FI–36).**

OK

Check and replace engine ECU (See page IN–29).

DTC	P1127/89*	ETCS Actuator Power Source Circuit Malfunction

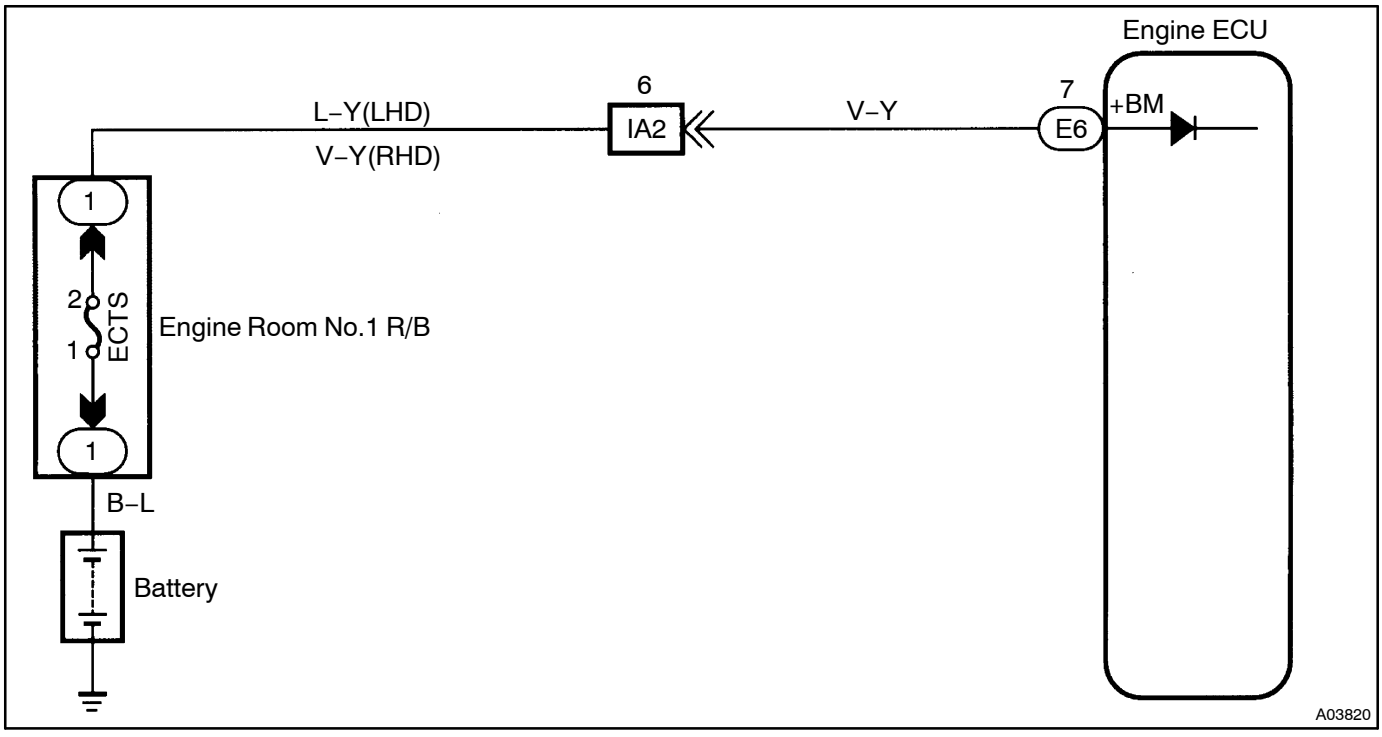
*: ETCS trouble code No. is 23.

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

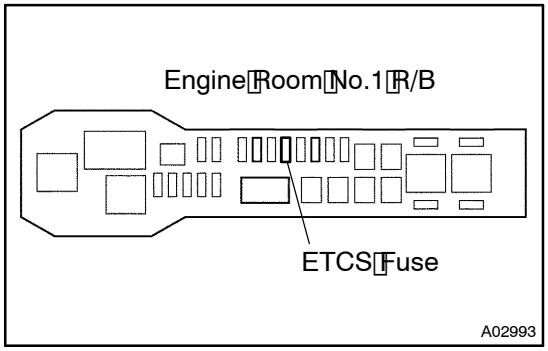
WIRING DIAGRAM



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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check ETCS fuse.**



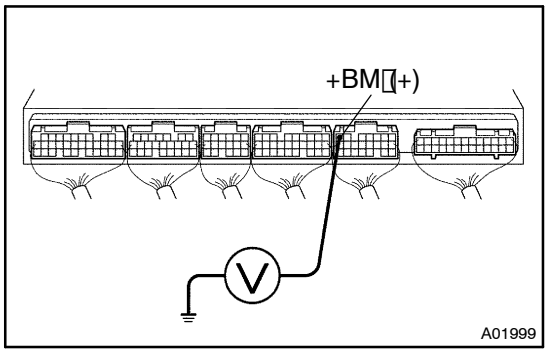
PREPARATION:
Remove the ETCS fuse from the engine room No.1 R/B.
CHECK:
Check continuity of the ETCS fuse.
OK:

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 room engine ECU hood and cover.
CHECK:
Measure 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–29).**

NG

Check and repair harness or connector between battery and ETCS fuse and engine ECU (See page IN–29).

DI2SI–02

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 ECM 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 ECM 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 • Engine ECM

WIRING DIAGRAM

Refer to DTC P1125/89 (Throttle Control Motor Circuit Malfunction) on page DI–85 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

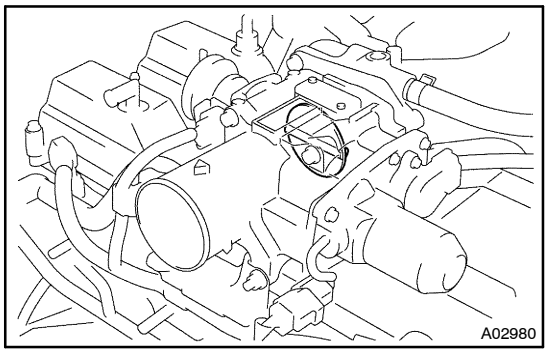
HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at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

1	**Check throttle control motor (See page DI–85, step 2).**

NG → **Replace throttle control motor (See page FI–36).**

OK

2	**Visualy check throttle valve.**



PREPARATION:
Remove the intake air duct.
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.

DI2SJ–02

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 great from target throttle opening angle	• Electric throttle control system • Engine ECU

WIRING DIAGRAM

Refer to DTC P1125/89 (Throttle Control Motor Circuit Malfunction) on page DI–85 for the 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

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

YES → **Go to relevant DTC chart (See page DI–15).**

NO

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

DI2SK–02

DTC	P1200/78	Fuel Pump Relay/ECU Circuit Malfunction

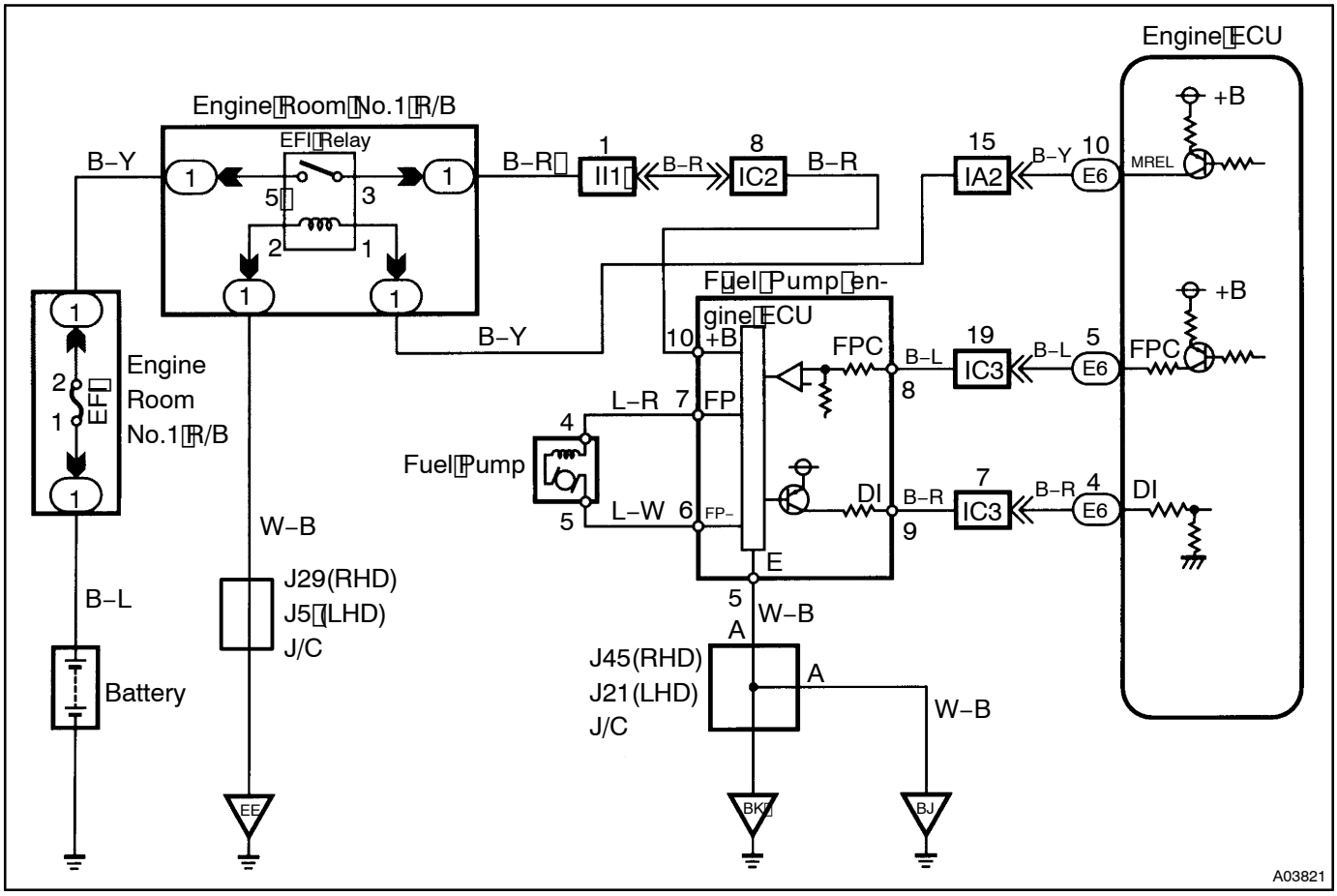
CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay coil and also current flows to terminal STA of the engine ECU (STA signal).
When the STA signal and NE signal are input to the engine ECU, Tr1 is turned ON, current flows to coil of the circuit opening relay, the relay switches on, power is supplied to the fuel pump and the fuel pump operates.
While the NE signal is generated (engine running), the engine ECU keeps Tr1 ON (circuit opening relay ON) and the fuel pump also keeps operating.
The fuel pump speed is controlled at two levels (high speed or low speed) by the condition of the engine (starting, light load, heavy load). When the engine starts (STA ON), Tr2 in the engine ECU is OFF, so the fuel pump relay closes and battery voltage is applied directly to the fuel pump. Fuel pump operates at high speed.
After the engine starts during idling or light loads, since Tr2 goes ON, power is supplied to the fuel pump via the fuel pump resistor.
Fuel pump operates at low speed.

DTC No.	DTC Detecting Condition	Trouble Area
P1200/78	Open or short in fuel pump relay circuit	• Open or short in fuel pump relay circuit • Fuel pump relay • Engine ECU

HINT:
This diagnostic chart is based on premise that engine is started. If the engine is not started, proceed to problem symptoms table on DI–24.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

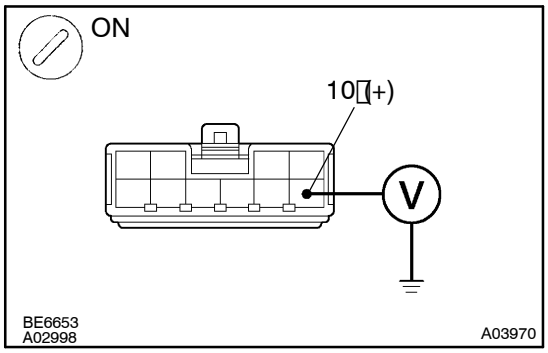
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time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

1	**Connect hand–held tester and check operation of fuel pump (See page FI–6).**

OK → **Go to step 7.**

NG

2	Check voltage of fuel pump engine ECU power source.



PREPARATION:

(a) Remove the enigne room engine ECU hood and cover.

(b) Disconnect the fuel pump engine ECU connector.

(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal 10 of fuel pump engine ECU connector and body ground.

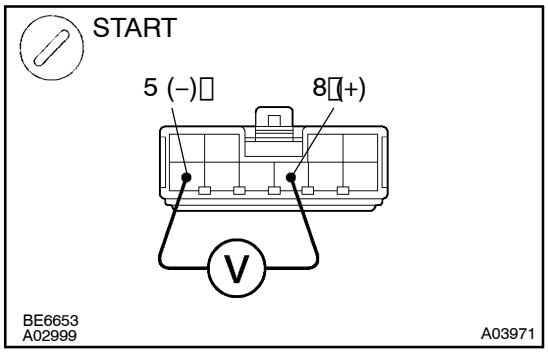
OK:

Voltage: 9 ~ 14 V

NG	Check for open and short in harness and connector between EFI main relay and fuel pump engine ECU (See page IN–29).

OK

3	Check voltage between terminals 5 and 8 of fuel pump engine ECU connector.



PREPARATION:

(a) Remove the luggage compartment trim cover (See page FI–9).

(b) Disconnect the fuel pump engine ECU connector.

CHECK:

Measure voltage between terminals 5 and 8 of fuel pump engine ECU connector when ignition switch is turned to start.

OK:

Voltage: 3.3 ~ 4.3 V

OK	Go to step 5.

NG

4	Check for open and short in harness and connector between terminals FPC of engine ECU and 8 of fuel pump engine ECU, terminal 5 of fuel pump engine ECU and body ground (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–29).

5	Check fuel pump (See page FI–6).

NG → Repair or replace fuel pump.

OK

6	Check for open and short in harness and connector between terminal 7 of fuel pump engine ECU and fuel pump and terminal 6 of fuel pump engine ECU and fuel pump (See page IN–29).

NG → Repair or replace harness or connector.

OK

7	Check for open and short in harness and connector between terminals DI of engine ECU and 9 of fuel pump engine ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–29).

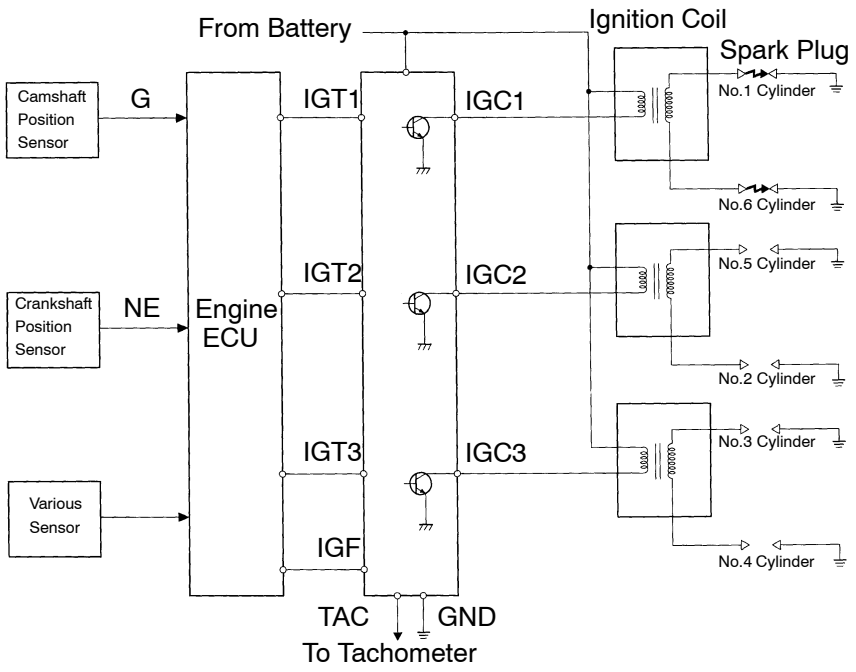
DI2SL–02

DTC	P1300/14	Igniter Circuit Malfunction

CIRCUIT DESCRIPTION

A DIS (Direct Ignition System) 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 elecrtode to the ground electrode.

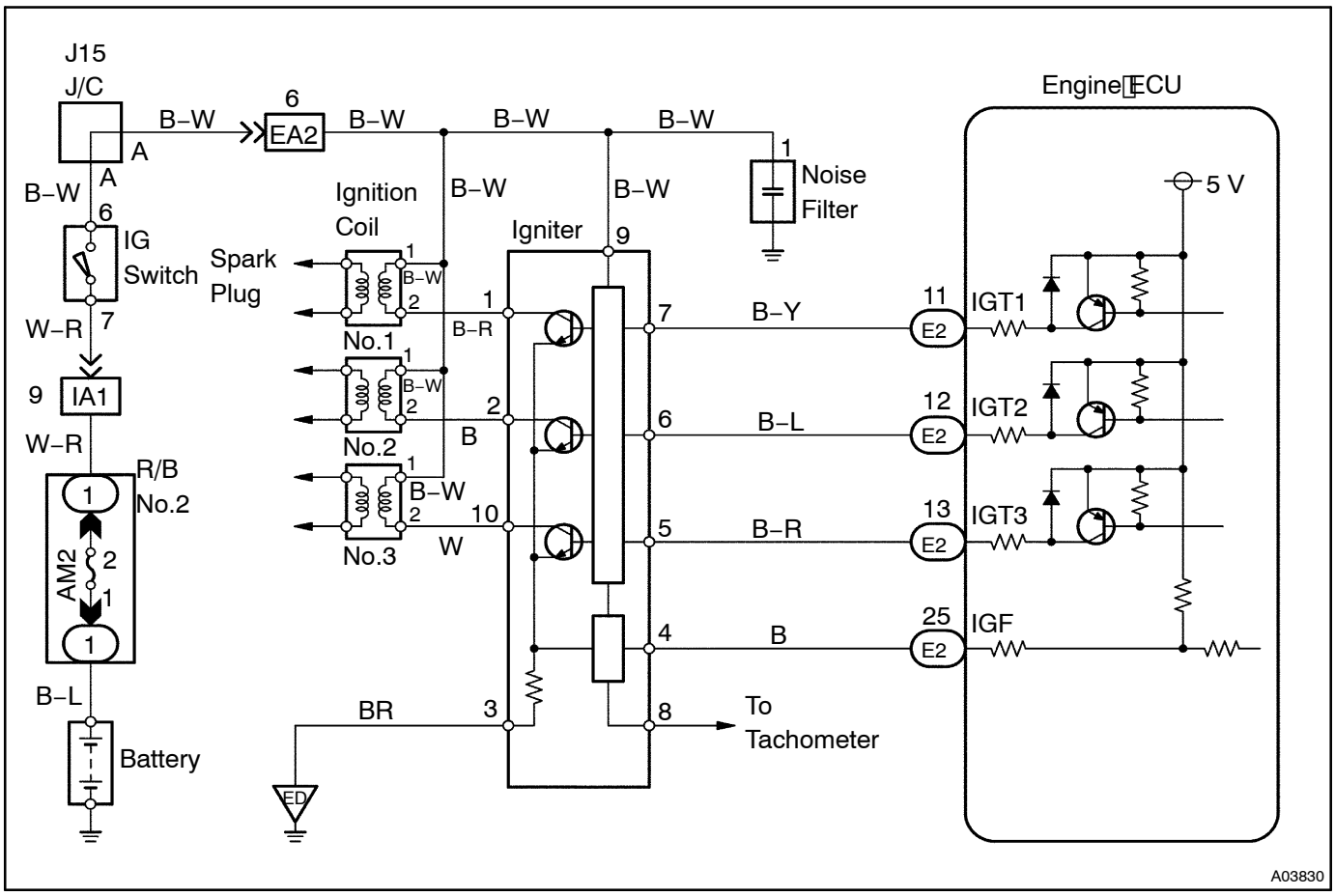
The engine ECU determines ignition timing and outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the power transistors in the igniter cuts off the current to the primary coil in the ignition coil is supplied to the spark plug that are connected to the end of the secondary coil.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



S00251

DTC No.	DTC Detecting Condition	Trouble Area
P1300/14	Condition (a) is repeated 3 times consengine ECUtively during 6 consecutively IGT signals while engine is running (a) IGF signal is not input to engine ECU for 2 or more ignitions	• Open or short in IGF or IGT circuit from igniter to engine ECU • Igniter • 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 warmed up or not, the air–fuel ratio 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.**

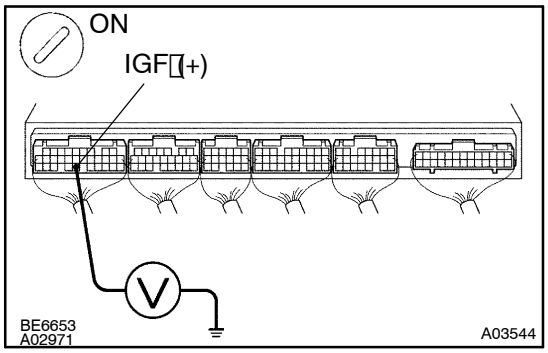
OK

2	Check for open and short in harness and connector in IGF signal circuit between engine ECU and ignition coil with igniter (See page IN–29).

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) Disconnect the igniter connector.
(b) Remove the enigne room engine ECU hood and cover.
(c) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 4.5 – 5.5 V

OK → Replace igniter.

NG

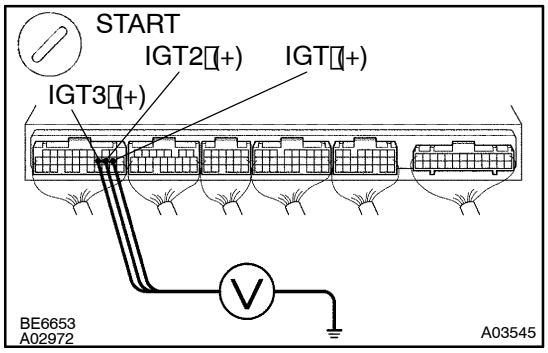
Check and replace engine ECU (See page IN–29).

4	Check for open and short in harness and connector in IGT1 ~ 3 signal circuit between engine ECU and ignition coil with igniter (See page IN–29).

NG → Repair or replace harness or connector.

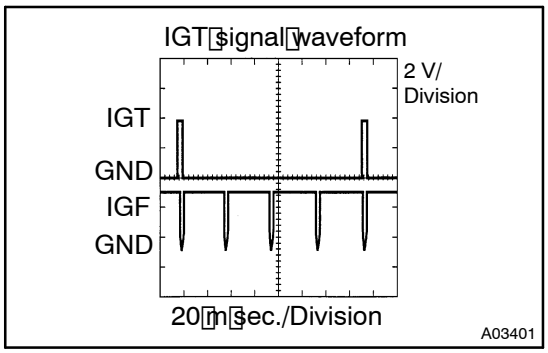
OK

5	**Check voltage between terminals IGT1 ~ 3 of engine ECU connector and body ground.**



PREPARATION:
Remove the engine room engine ECU hood and cover.
CHECK:
Measure voltage between terminals IGT1 ~ 3 of the engine ECU connector and body ground when engine is cranked.
OK:

Voltage: More than 0.1 V and less than 4.5 V

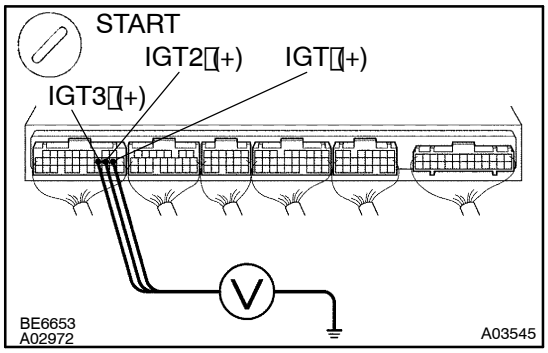


Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check waveform between terminals IGT1 ~ 3 and E1 of the engine ECU connector.
HINT:
Correct waveform appears as sohwn, with rectangle waves.

NG	**Check and replace engine ECU (See page IN–29).**

OK

6	**Disconnect connector and check voltage between terminals IGT1 ~ 3 of engine ECU connector and body ground.**



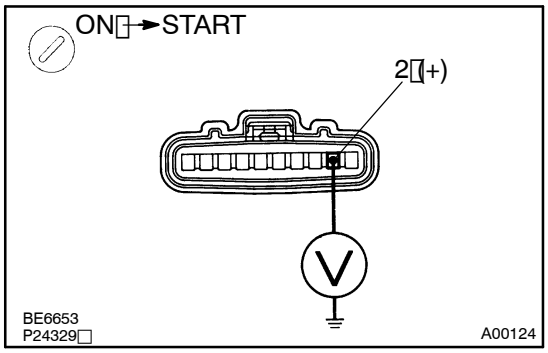
PREPARATION:
(a) Remove the engine room engine ECU hood and cover..
(b) Disconnect the igniter connector.
CHECK:
Measure voltage between terminals IGT1 ~ 3 of the engine ECU connector and body ground when engine is cranked.
OK:

Voltage: More than 0.1 V and less than 4.5 V

NG	**Check and replace engine ECU (See page IN–29).**

OK

7	Check voltage between terminal 2 of igniter connector and body ground.



PREPARATION:
Disconnect the igniter connector.
CHECK:
Measure voltage between terminal 1 of igniter connector and body ground, when ignition switch is turned to "ON" and "START" position.
OK:
Voltage: 9 – 14 V

OK	Repair igniter power source circuit.

NG

8	Check for open and short in harness and connector between ignition switch and igniter (See page IN–29).

NG	Repair or replace harness or connector.

OK

9	Check EFI main relay (Marking: EFI) (See page FI–49).

NG	Replace EFI main relay (marking: EFI).

OK

Replace igniter.

DI2SM–02

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

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–68.

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 • Starter • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–68 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:

Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–68.

DI2SN–02

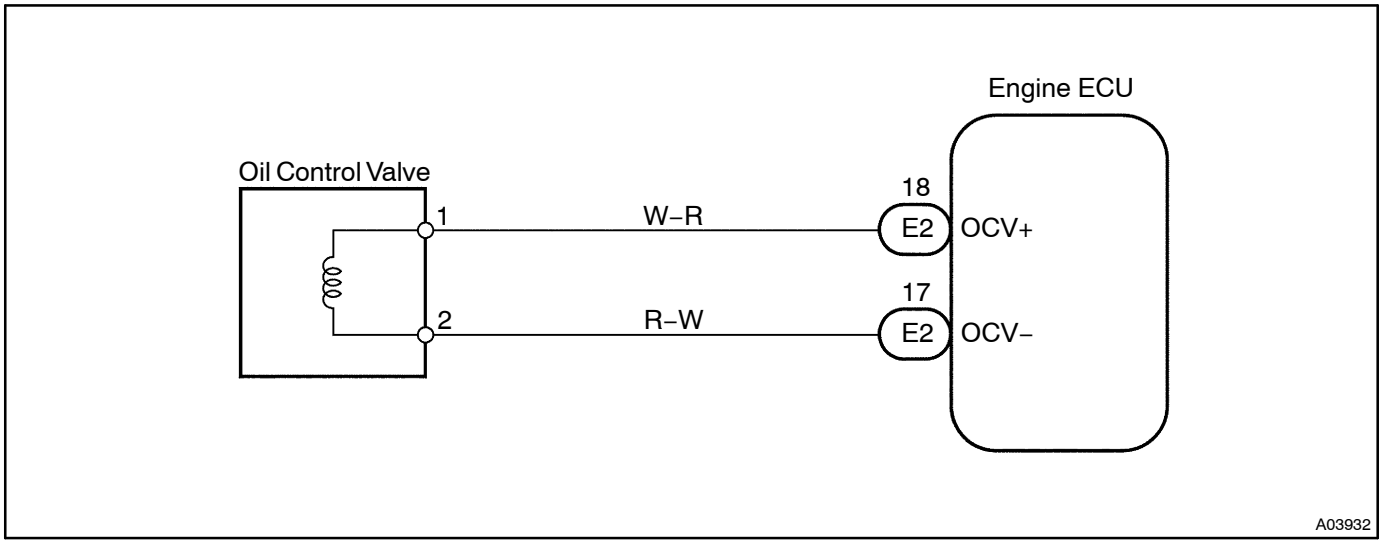
DTC	P1349/59	VVT System Malfunction

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 speedat 400 ~ 4,000 rpm : (a) Valve timing does not change from of current valve timing (b) Current valve timing is fixed.	• Valve timing • Oil control valve • 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	Check valve timing (See page EM–17).

NG → Repair valve timing.

OK

2	Check operation of OCV.

PREPARATION:

(a) Start the engine and warmed it up.

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

CHECK:

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

OK:

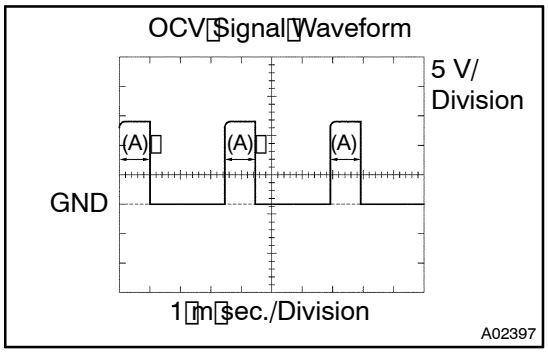
OCV is OFF:
Normal engine speed
OCV is ON:
Rough idle or engine stall

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 engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

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

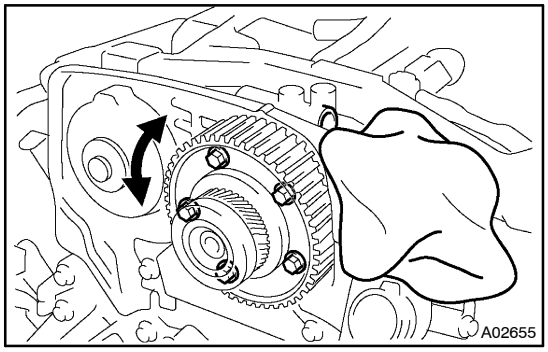


Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, check waveform between terminals OCV+ and OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG → Check and replace engine ECU (See page IN–29).

OK

4	Check VVT controller assembly.



PREPARATION:
(a) Remove the timing belt cover.
(b) Remove the timing belt (See page EM–17).
(c) Remove the oil control valve.
(d) Drain oil into the VVT controller assembly (See page EM–17).

CHECK:
Check whether the oil into VVT controller assembly is drained or not.

OK:
The oil into VVT controller assembly is drained.

NG → Replace VVT controller assembly, and then go to step 5.

OK

5	Check oil control valve (See page EM–39).

NG → Replace oil control valve, and then go to step 6.

OK

6	Check blockage of oil control valve, oil check valve and oil pipe No.1.

NG → Repair or replace.

OK

7	Check whether or not DTC P1349 is stored.

PREPARATION:

(a) Clear the DTC (See page DI–4).

(b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI–4).

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 engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Replace engine ECU

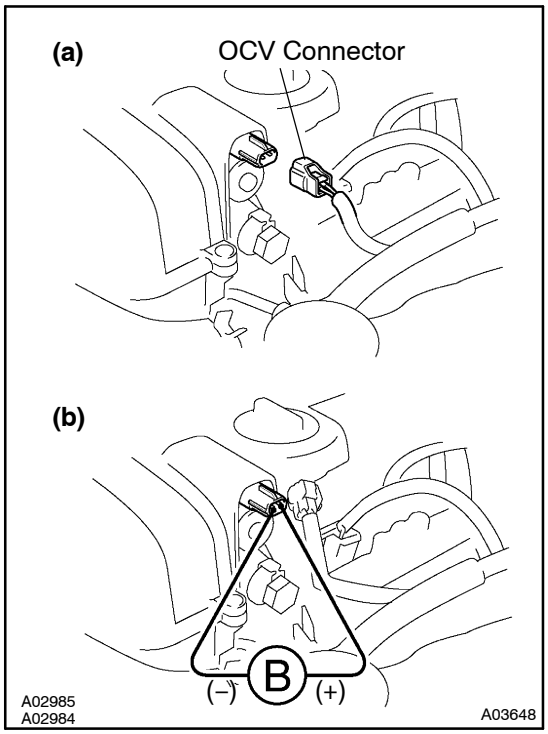
When not using hand–held tester

1	Check valve timing (See page EM–17).

NG → Repair valve timing.

OK

2	**Check operation of OCV.**



PREPARATION:

Start the engine.

CHECK:

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

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

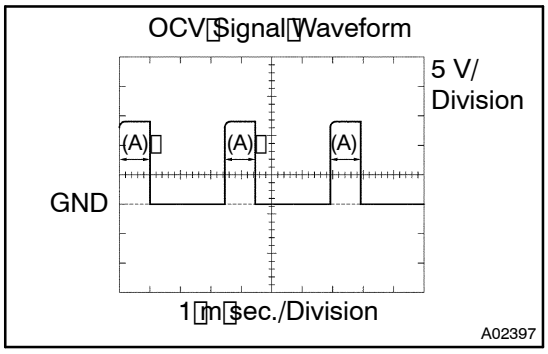
RESULT:

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

2	**Go to step 4.**

1

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



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, check 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.

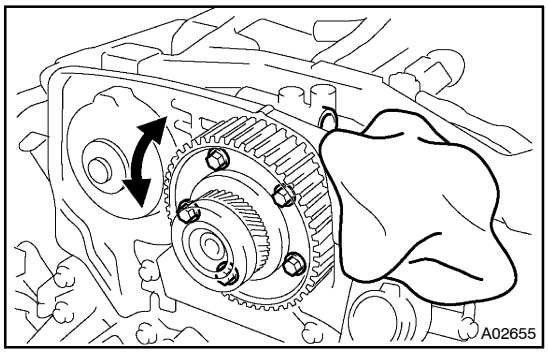
OK	VVT system is OK.*

*: DTC P1349 are 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 engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Check and replace engine ECU (See page IN–29).

4	Check VVT controller assembly.



PREPARATION:
(a) Remove the timing belt cover.
(b) Remove the timing belt (See page EM–17).
(c) Remove the oil control valve.
(d) Drain oil into the VVT controller assembly (See page EM–17).

CHECK:
Check whether the oil into VVT controller assembly is drained or not.

OK:
The oil into VVT controller assembly is drained.

NG	Replace VVT controller assembly, and then go to step 5.

OK

5	Check oil control valve (See page EM–21).

NG → Replace oil control valve, and then go to step 6.

OK

6	Check blockage of oil control valve, oil check valve and oil pipe No.1.

NG → Repair or replace.

OK

7	Check whether or not DTC P1349 is stored.

PREPARATION:

(a) Clear the DTC (See page DI–4).

(b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI–4).

OK:

DTC 59 is not stored

OK → VVT system is OK.*

*: DTC P1349 are 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 engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Replace engine ECU

DI2SO–02

DTC	P1633/89	ECU Malfunction (ETCS Circuit)

CIRCUIT DESCRIPTION

Refer to DTC P1129 (Electric Throttle Control System Malfunction) on page DI–50.

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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

Replace engine ECU.

DI2SP–02

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	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–808).

DI2SQ–02

DTC	P1656/39	OCV Circuit Malfunction (bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P1349/39 (VVT System Malfunction) on page DI–106.

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

WIRING DIAGRAM

Refer to DTC P1349/39 (VVT System Malfunction) on page for the DI–106
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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	Check OCV circuit.

PREPARATION:

(a) Start the engine and warmed it up.
(b) Connect the hand–held tester and select VVT from ACTIVE TEST menu.

CHECK:

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

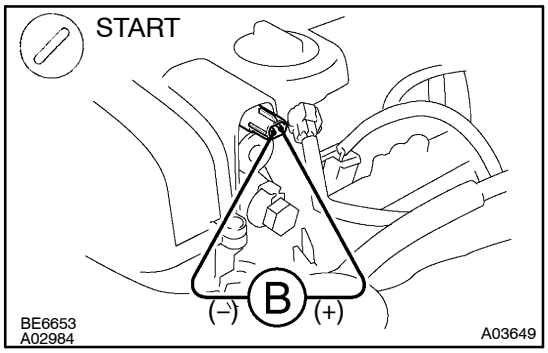
OK:

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 positive 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–106, step 3).

NG → Check and replace engine ECU (See page IN–29).

OK

4	Check for open and short in harness and connector between OCV and engine ECU (See page IN–29).

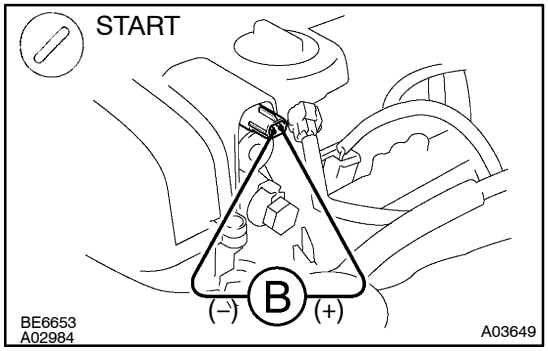
NG → Repair or replace.

OK

Check for intermitent 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 positive 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–106, step 3).

NG → Check and replace engine ECU (See page IN–29).

OK

3	Check for open and short in harness and connector between OCV and engine ECU (See page IN–29).

NG → Repair or replace.

OK

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

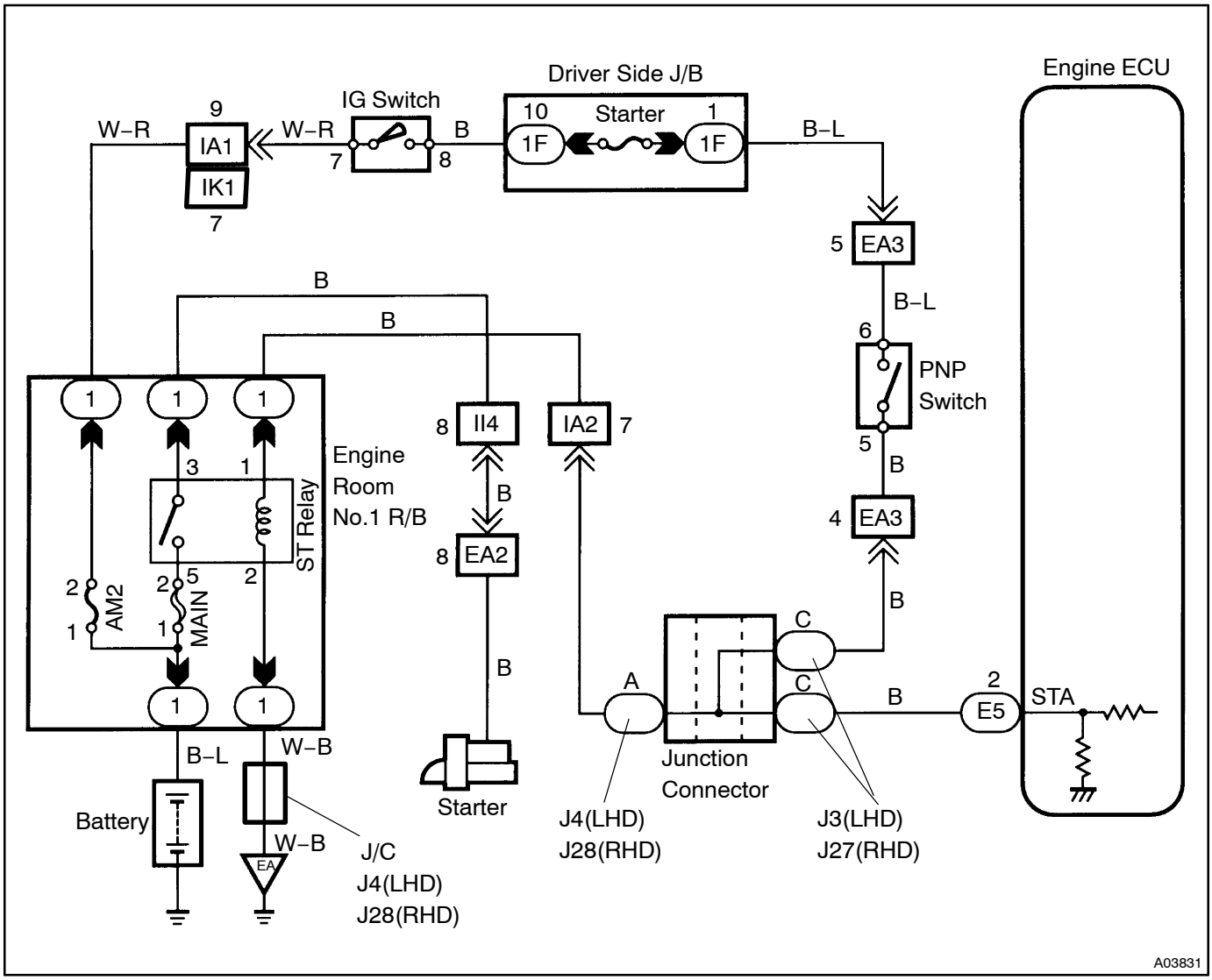
DI2SR–02

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 id 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–24.

When using hand–held tester

1	**Connect hand–held tester and 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 STA signal on the hand–held tester while 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–24).**

NG

2	**Check for open in harness and connector between engine ECU and starter relay (Marking: STARTER) (See page IN–29).**

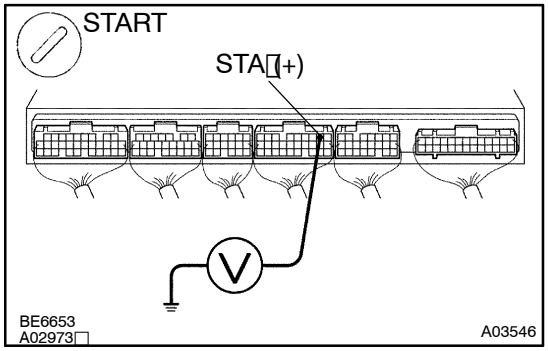
NG → **Repair or replace harness or connector.**

OK

Check and replace engine ECU (See page IN–29).

When not using hand–held tester

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 6 V or more

OK ⇒ Proceed to next circuit inspection shown on problem symptoms table (See page DI–24).

NG

2	Check for open in harness and connector between engine ECU and starter relay (See page IN–29).

NG ⇒ Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–29).

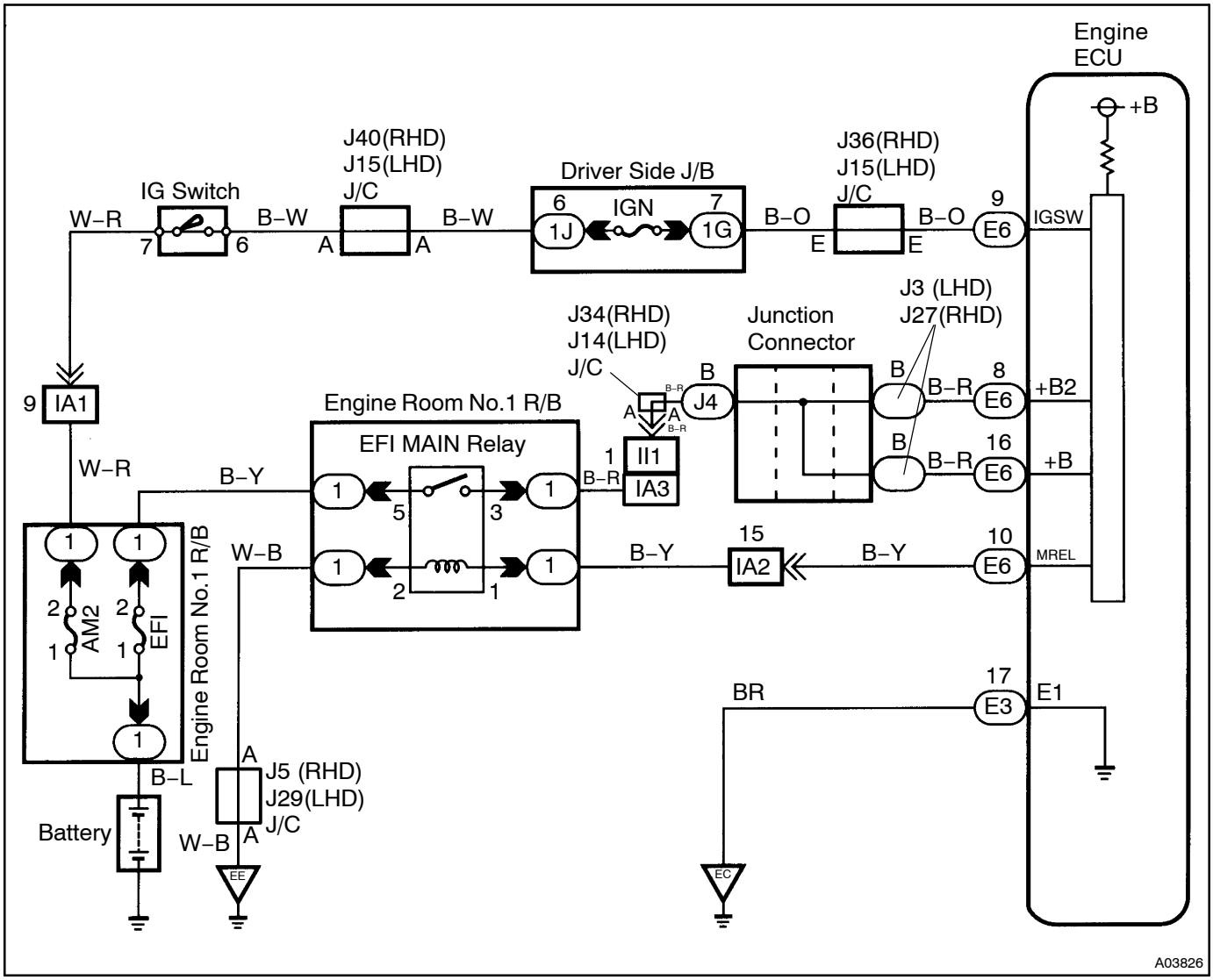
DI2SS–02

ECU Power Source Circuit

CIRCUIT DESCRIPTION

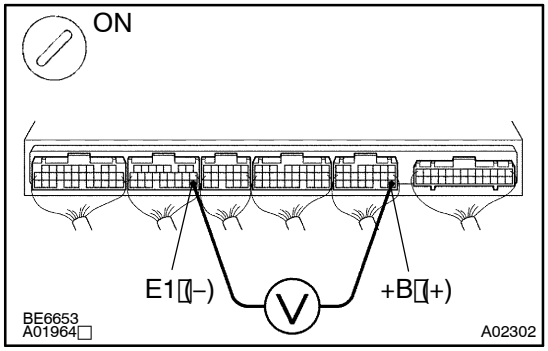
When the ignition switch is turned ON, battery positive voltage is applied to the terminal IGSW of the engine ECU and the EFI main relay (Making: EFI) control circuit in the engine ECU sends a signal to the terminal MREL of the engine ECU switching on the EFI main relay.
This signal causes current to flow to the coil, closing the contacts of the EFI main relay and supplying power to the 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 connector.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals +B and E1 of the engine ECU connector.

OK:

Voltage: 9 ~ 14 V

OK	Proceed to next circuit inspection shown on Problem symptoms table (See page DI–24).

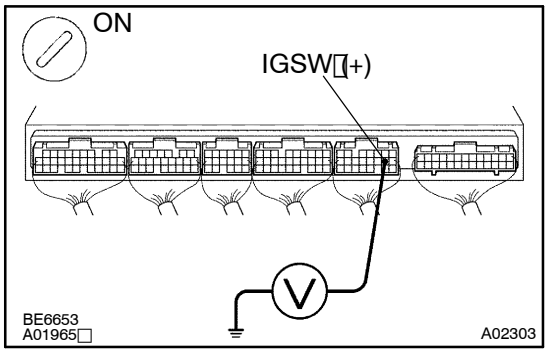
NG

2	Check for open in harness and connector between terminal E1 of engine ECU and body ground (See page IN–29).

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 voltage between terminal IGSW of the engine ECU and body ground.

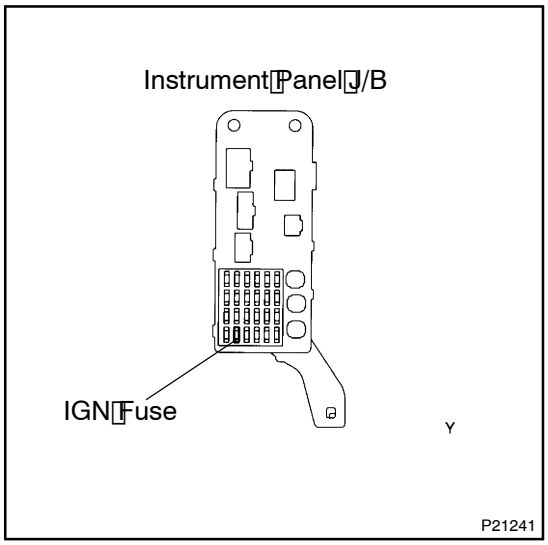
OK:

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 continuity of the IGN fuse.
OK:
Continuity

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

OK

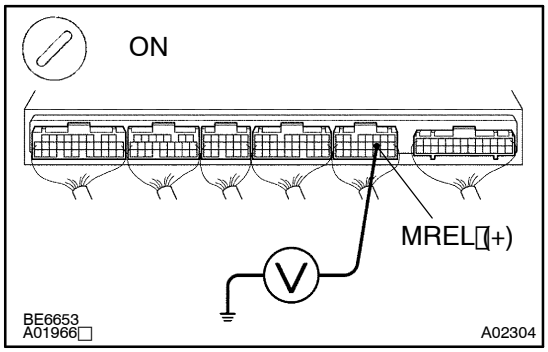
5	Check ignition switch (See page BE–31).

NG → **Replace ignition switch.**

OK

Check and repair harness and connector between battery and ignition switch, 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 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–29).

OK

7	Check EFI fuse of engine room J/B (See page DI–121).

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

OK

8	Check EFI main relay (See page FI–49).

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–29).

NG → Repair and replace harness or connector.

OK

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

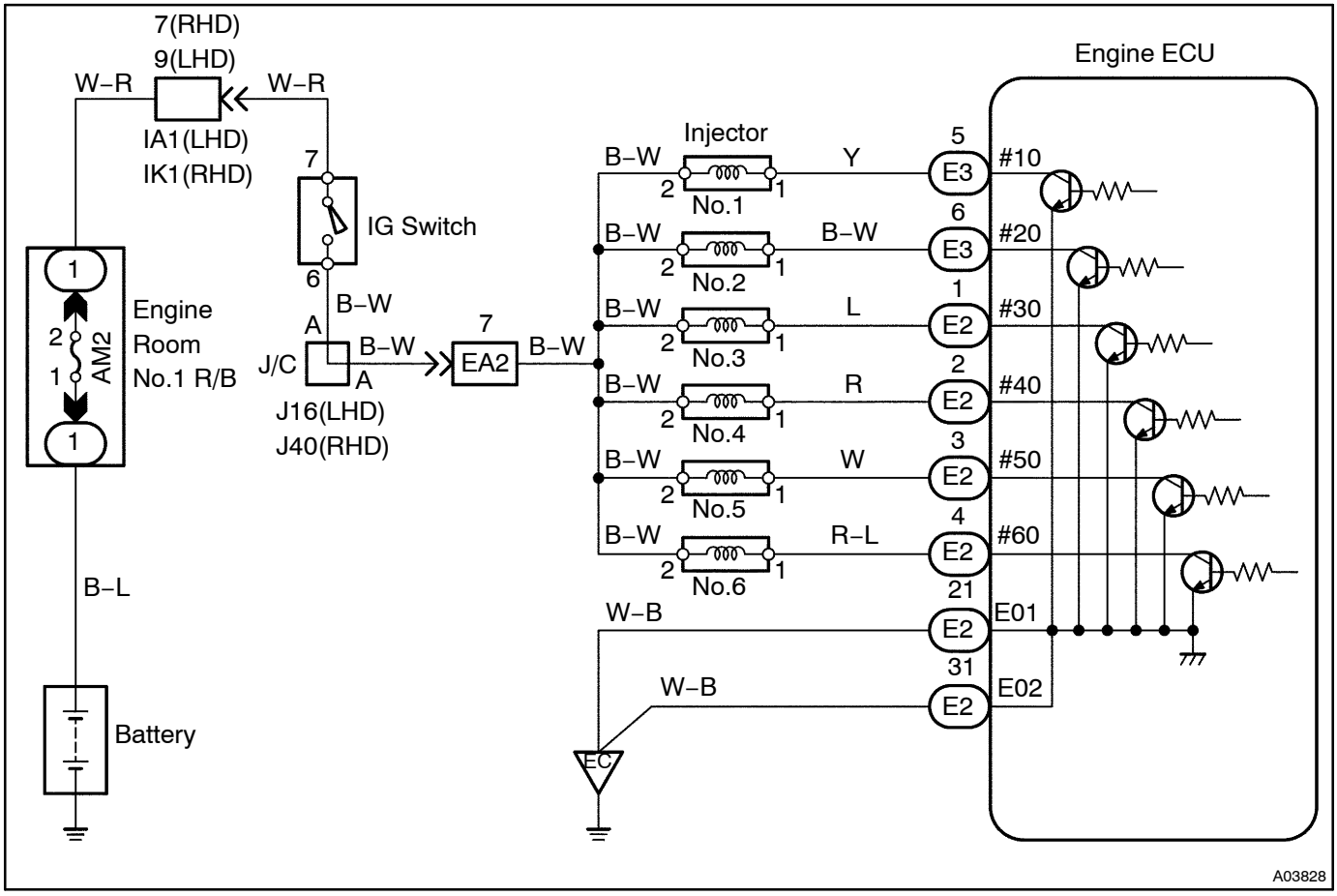
DI2ST–02

Injector Circuit

CIRCUIT DESCRIPTION

The injectors are provided to the intake manifold. They inject fuel into the cylinders based on the signals from engine ECU.

WIRING DIAGRAM

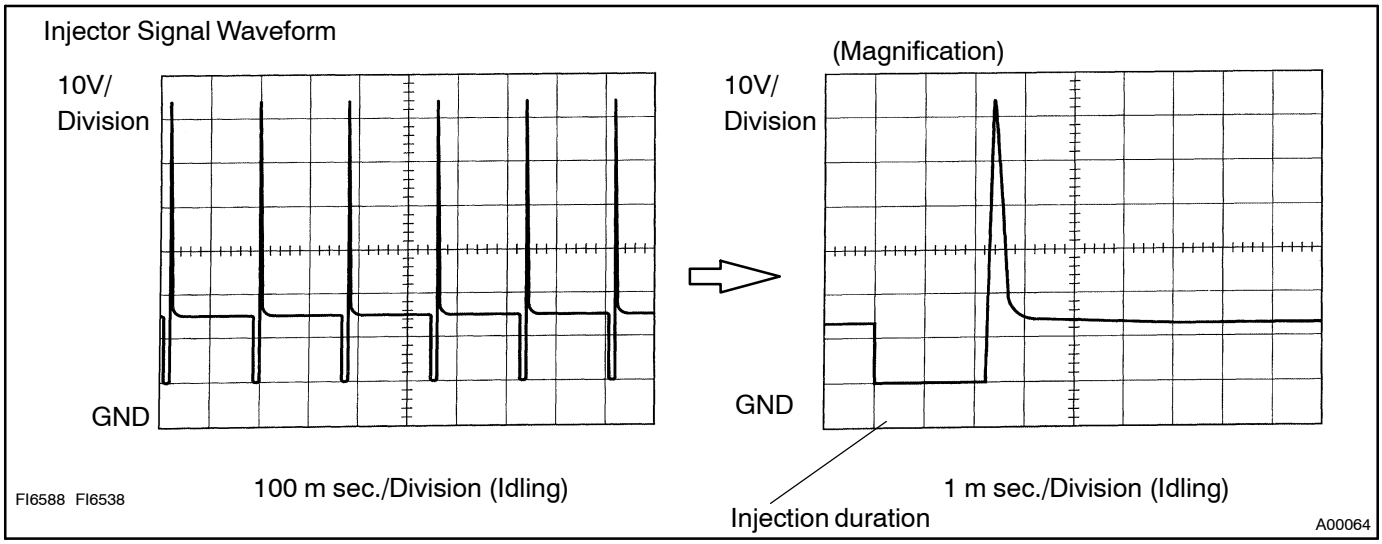


Reference INSPECTION USING OSCILLOSCOPE

With the engine idling, measure between terminals #1 ~ #6 and E01 of the engine ECU connector.

HINT:

The correct waveforms are as shown.



INSPECTION PROCEDURE

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

CHECK:

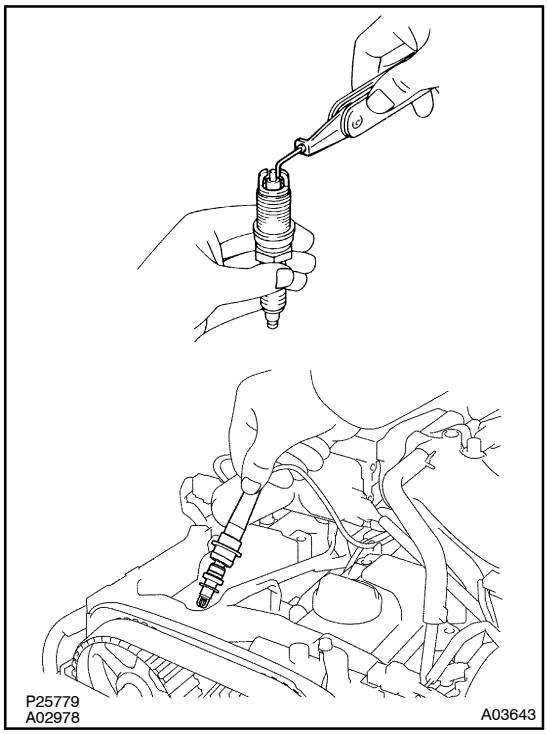
(a) Check the connection conditions of wire harness and connector.

(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.**



PREPARATION:

(a) Disconnect the high–tension cord or ignition coil (See page IG–7).

(b) Remove the spark plug.

CHECK:

(a) Check the spark plug type.

(b) Check the carbon deposits electrode.

(c) Check electrode gap.

OK:

(a) Twin ground electrodes type
Recommended spark plug:
DENSO Made PK16TR11
NGK Made BKR5EKPB11
(b) No large carbon deposit present
Not wet with gasoline or oil
(c) Electrode gap: 1.1 ~ 1.3 mm (0.043 ~ 0.051 in.)

PREPARATION:

(a) Install the spark plug to the high–tension cord or ignition coil.

(b) Disconnect the injector connector.

(c) Hold the end about 12.5 mm (0.5 in.) from the ground.

CHECK:

Check if spark occurs while the engine is being cranked.

NOTICE:

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

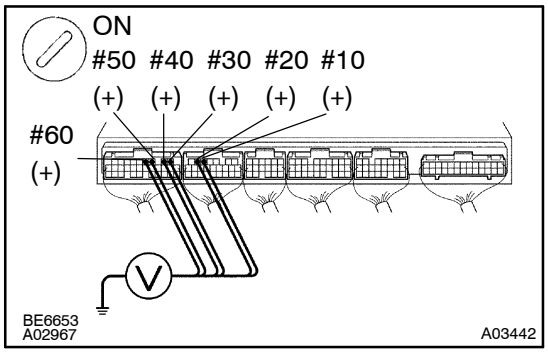
OK:

Spark jumps across electrode gap.

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

OK

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

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

OK:

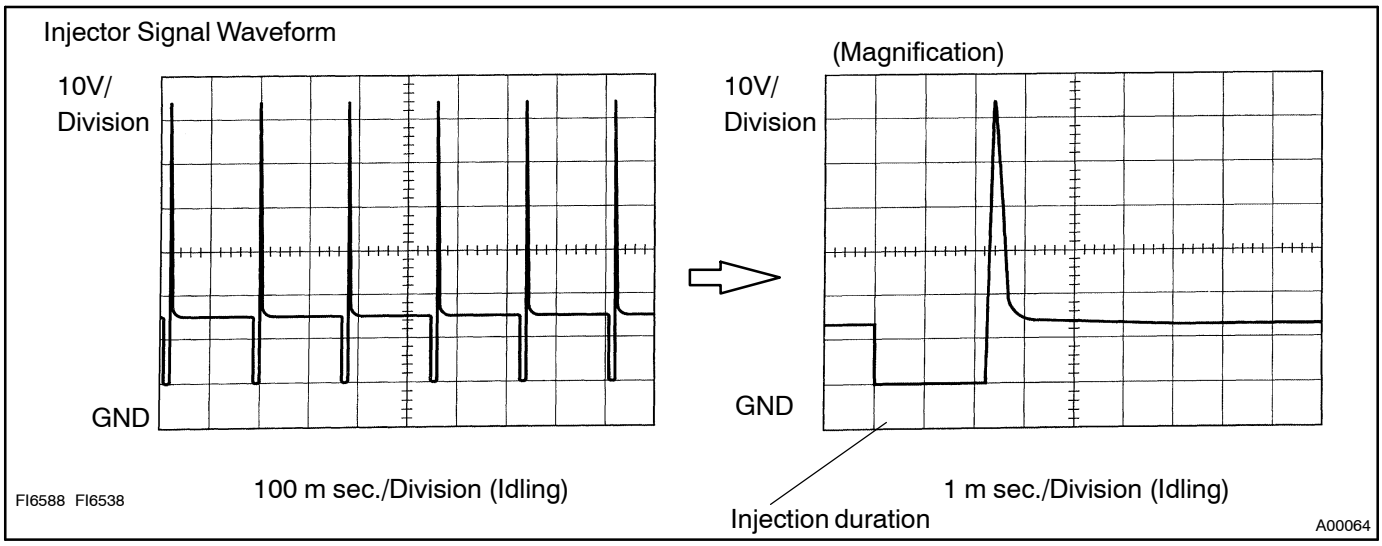
Voltage: 9 ~ 14 V

Reference INSPECTION USING OSCILLOSCOPE

With the engine idling, measure between terminals #10 ~ #60 and E01 of the engine ECU connector.

HINT:

The correct waveforms are 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–29).

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

NG → Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–6).

OK

6	Check injector injection (See page FI–22).

NG → Replace injector.

OK

7	Check mass air flow meter and engine coolant temp. sensor (See page FI–31 and CO–29).

NG → Repair or replace.

OK

Check compression pressure (See page EM–5), valve clearance (See page EM–6) and valve timing (See page EM–21).

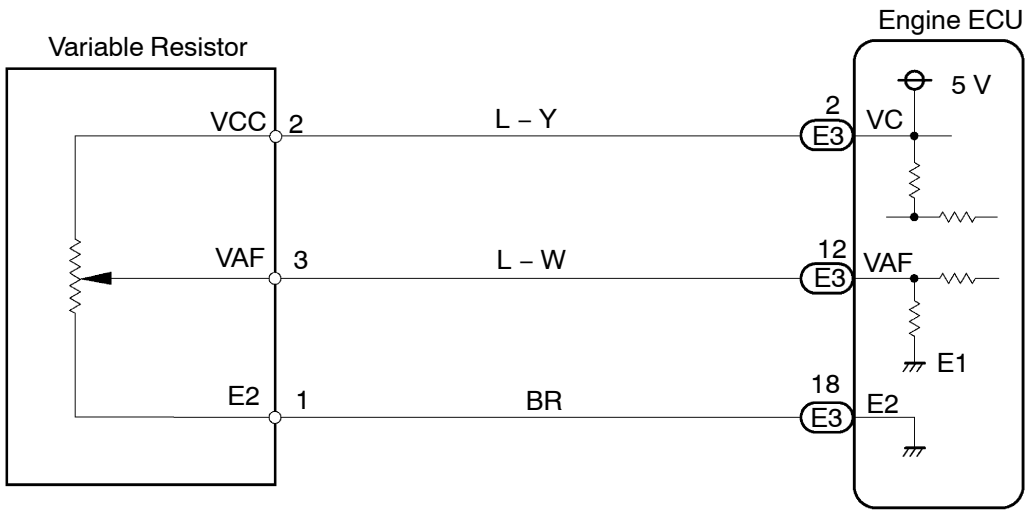
DI2SV–02

Variable Resistor Circuit (Only for vehicles w/o TWC)

CIRCUIT DESCRIPTION

This resistor is used to change the air–fuel ratio of the air–fuel mixture.
The idle mixture is adjusted using this resistor.
Turning the idle mixture adjusting screw clockwise moves the contacts inside the resistor, raising terminal VAF voltage. Conversely, turning the screw counterclockwise lowers the terminal VAF voltage.
When the terminal VAF voltage rises, the engine ECU increases the injection volume slightly, making the air–fuel
mixture a little richer.

WIRING DIAGRAM



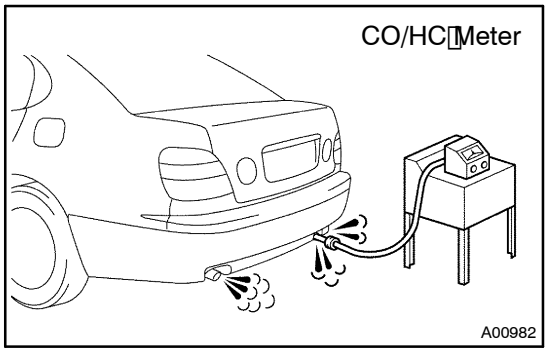
A04441

INSPECTION PROCEDURE

NOTICE:

Always use a CO meter when adjusting the idle mixture. If a CO meter is not available, DO NOT ATTEMPT TO ADJUST IDLE MIXTURE.

1	**Check CO concentration.**



PREPARATION:

(a) Warm up engine to normal operating temperature.
(b) All accessories switched OFF.
(c) All vacuum lines properly connected.
(d) Transmission in "N" position.
(e) Connect the tachometer.
(f) Ignition timing check correctly.
(g) Idle speed check correctly.
(h) Check that the CO meter is properly calibrated.
(i) Race the engine at 2,500 rpm about 2 minutes.

CHECK:

Insert a tester probe at least 40 cm (1.3 ft) into the tailpipe.
Measure the concentration with 1 – 3 minutes after racing the engine to allow the the concentration to stabilize.

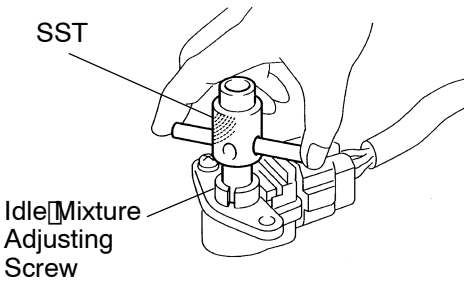
OK:

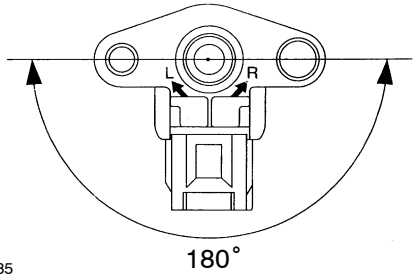
Idle CO concentration: 1.0 – 2.0 %

OK	**CO concentration is normal. Proceed to next circuit inspection shown problem symptom tables (See page DI–24).**

NG

2	Adjust CO concentration.





A01435
A01434
A01431

PREPARATION:

Same condition as step 1 of this chart.

CHECK:

Using SST, adjust the mixture by turning the idle mixture adjusting screw in the variable resistor.

SST 09243 – 00020

RESULT:

OK	CO concentration: 1.0 ± 0.5
NG (type I)	Change in CO concentration
NG (type II)	No change in CO concentration

HINT:

Always check idle speed after turning the idle mixture adjusting screw. If it is incorrect, readjust idle speed.

Adjustable range of the idle mixture adjust to turn this screw is 260 degrees. Do not turn this screw more than it.

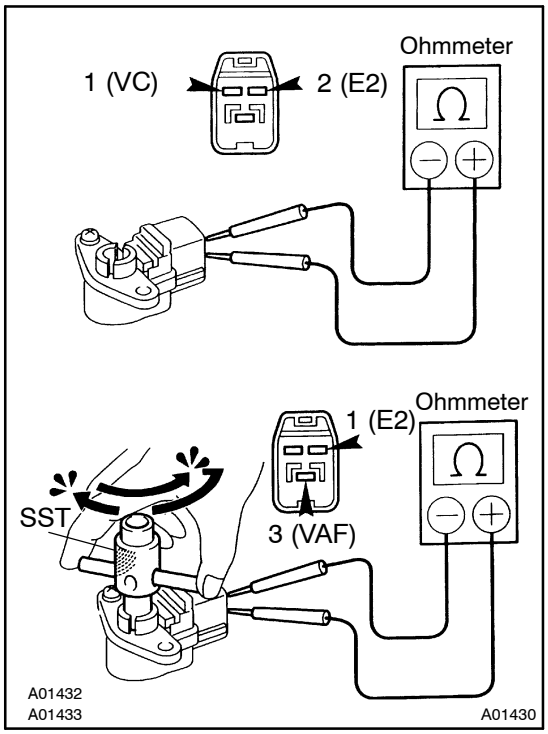
Type I → **See page EM–1 and go on troubleshooting.**

Type II → **Go to step 3.**

OK

Adjustment is complete.

3	Check resistance of variable resistor.



Check Resistance Between 1 and 2:

PREPARATION:

Disconnect the variable resistor connector.

CHECK:

Measure resistance between terminals 1 and 2 of the variable resistor.

OK:

Resistance: 4 – 6 kΩ

Check Resistance Between 1 and 3:

CHECK:

Measure resistance between terminals 1 and 3 when turning the idle mixture adjusting screw fully clockwise and counter-clockwise using SST.

SST 09243 – 00020

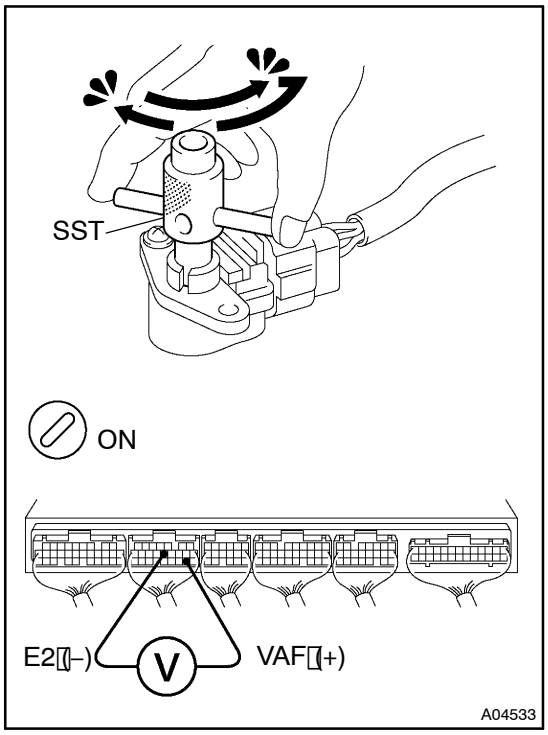
OK:

Resistance: Change from about 5 kΩ to 0 kΩ accordingly

NG → **Replace variable resister.**

OK

4	Check voltage between terminals VAF and E2 of engine ECU connector.



PREPARATION:

(a) Reconnect the variable resistor connector.
(b) Remove the console box.
(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals VAF and E2 of engine ECU connector while slowly turning the idle mixture adjusting screw first fully counterclockwise, and then fully clockwise, using SST.

SST 09243 – 00020

OK:

Voltage changes smoothly from 0 V to about 5 V; i.e., does not suddenly jump up to 5 V or down to 0 V.

OK	Check and replace engine ECU.

NG

5	Check for open and short in harness and connector between variable resistor and engine ECU (See page IN–29).

NG	Repair or replace harness or connector.

NG

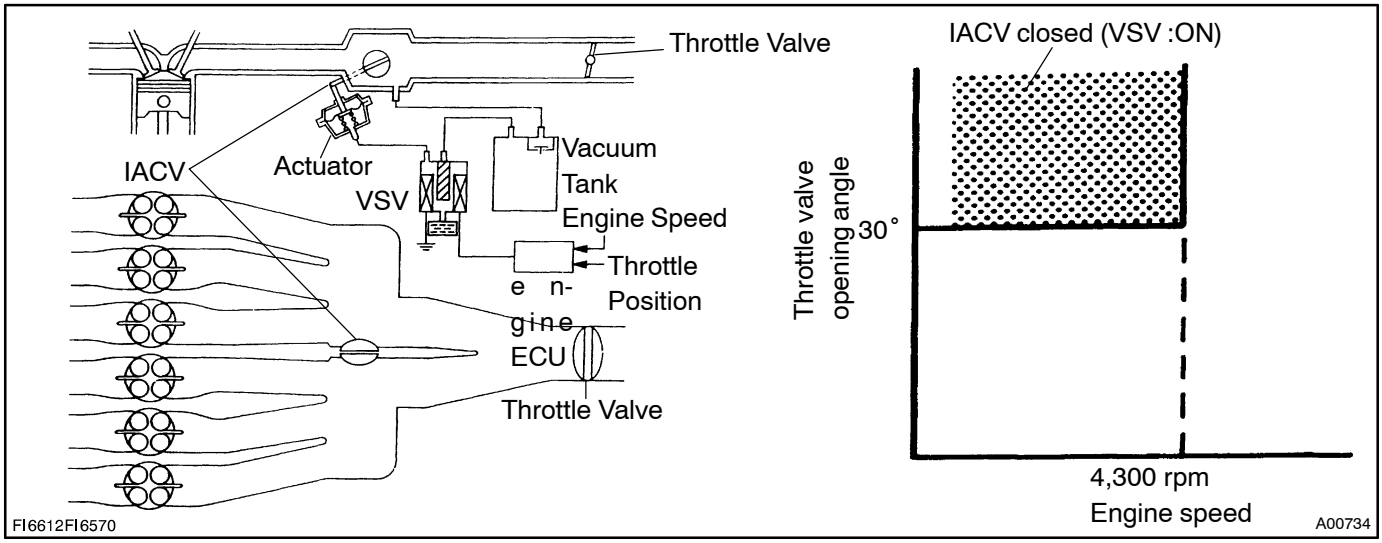
Check and replace engine ECU.

DI2SU–02

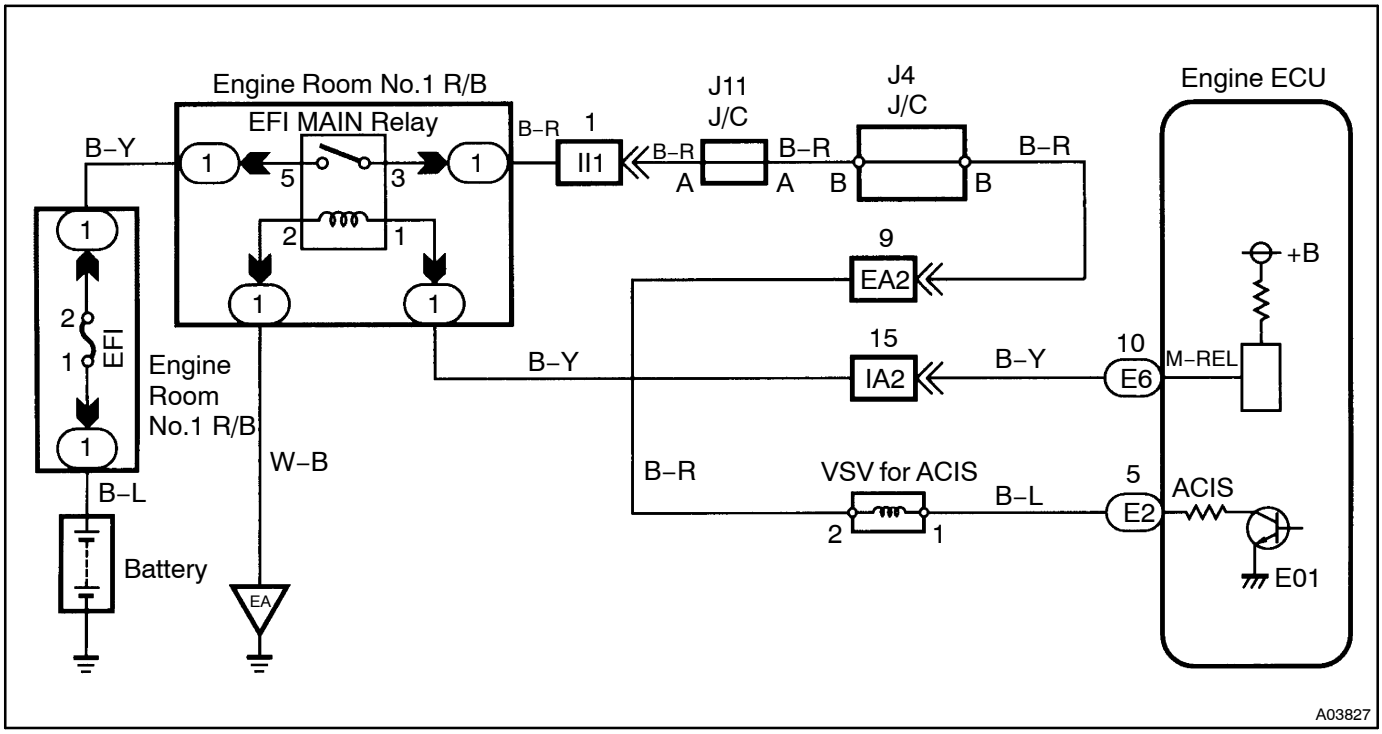
IACV Control VSV Circuit

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 4,300 rpm or less and the throttle valve opening angle is 30˚ 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.



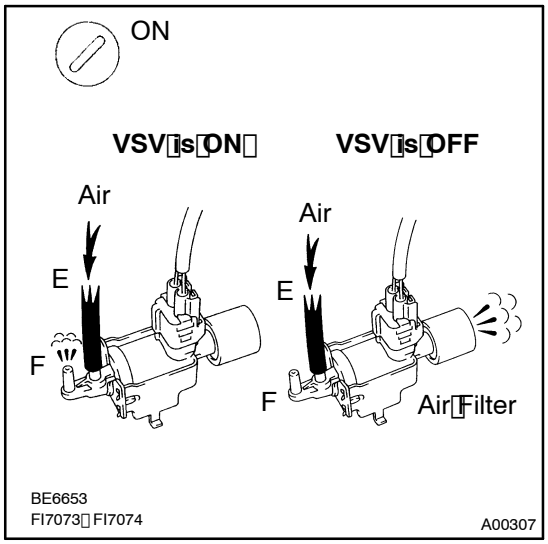
WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester

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 hand–held tester main switch ON.

(c) Select 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 pipe E is flowing out through pipe F.
VSV is OFF:
Air from pipe E is flowing out through the air filter.

OK	Check for vacuum tank (See page FI–47).

NG

2	Check VSV for ACIS (See page FI–47).

NG	Replace VSV for ACIS.

OK

3	Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–29).

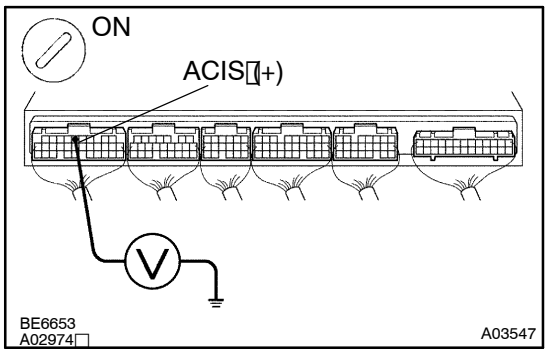
When not using hand–held tester

1	Check VSV for ACIS (See page FI–47).

NG → Replace VSV for ACIS.

OK

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



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure 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 and engine ECU (See page IN–29).

OK

3	Check for vacuum tank (See page FI–47).

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–29).

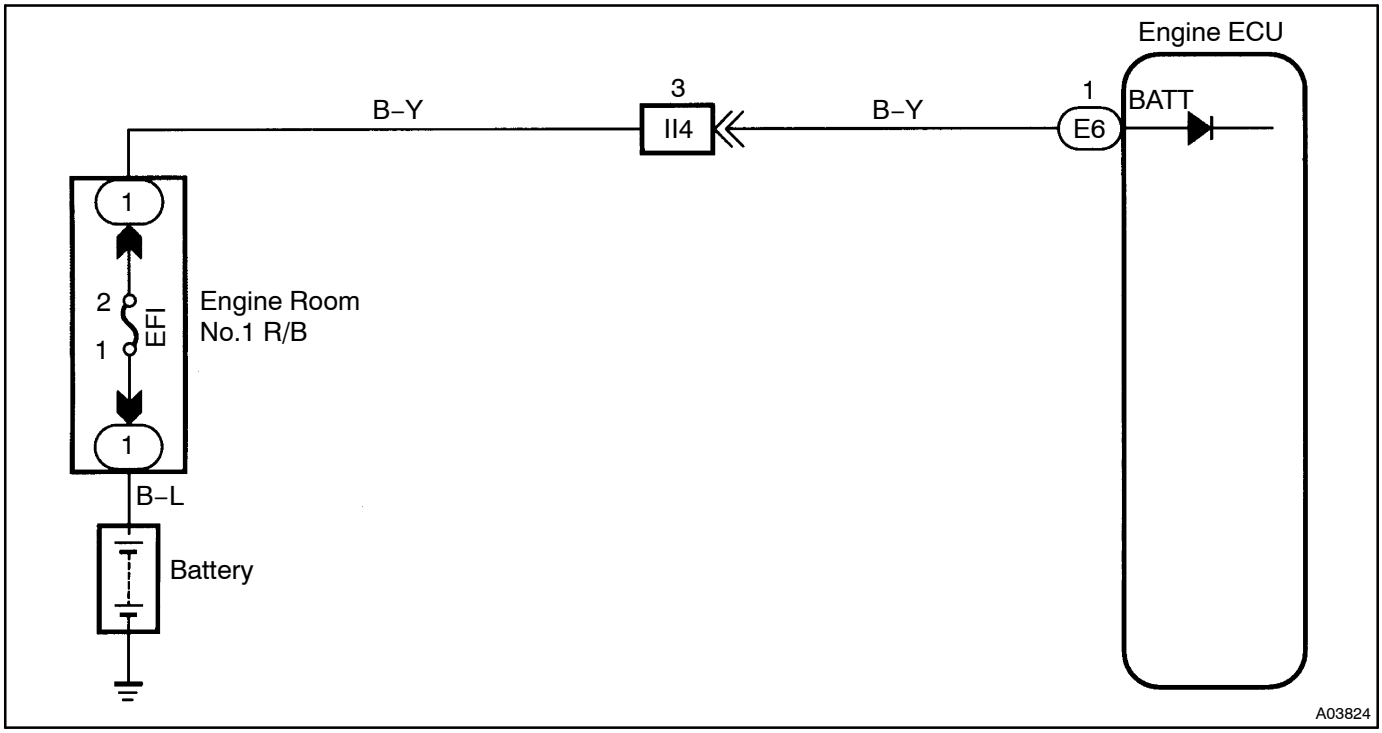
DI2SW–02

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

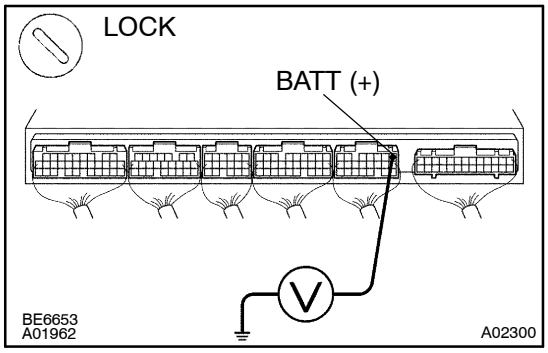
Battery positive voltage is supplied to terminal BATT of the engine ECU even when the ignition switch is OFF for use by the diagnostic trouble code memory, air–fuel ratio adaptive control value memory, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

Remove the engine room engine ECU hood and cover.

CHECK:

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

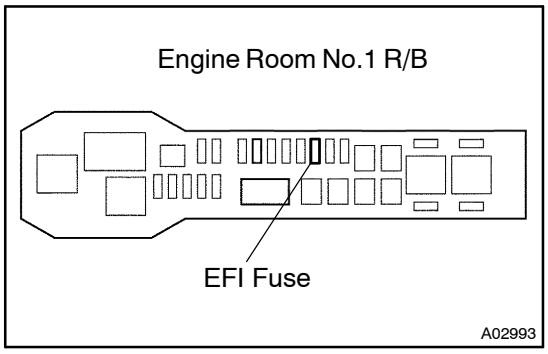
OK:

Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–29).**

NG

2	**Check EFI fuse of engine rooom No.1 R/B.**



PREPARATION:
Remove the EFI fuse from the engine room No.1 JRB.
CHECK:
Check continuity of EFI fuse.
OK:
Continuity

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

OK

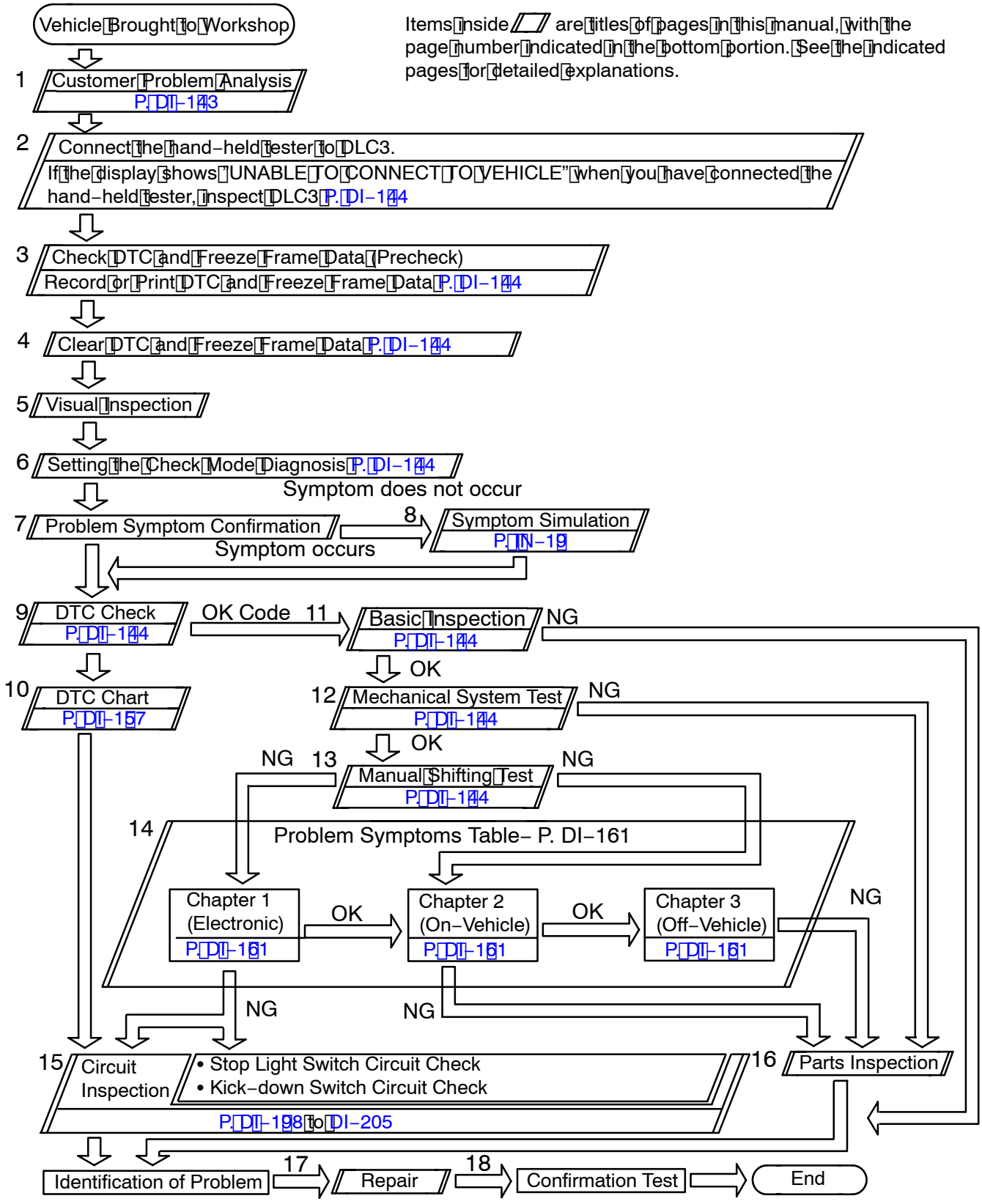
Check and repair harness or connector between battery, EFI fuse and engine ECU.

AUTOMATIC TRANSMISSION

HOW TO PROCEED WITH TROUBLESHOOTING

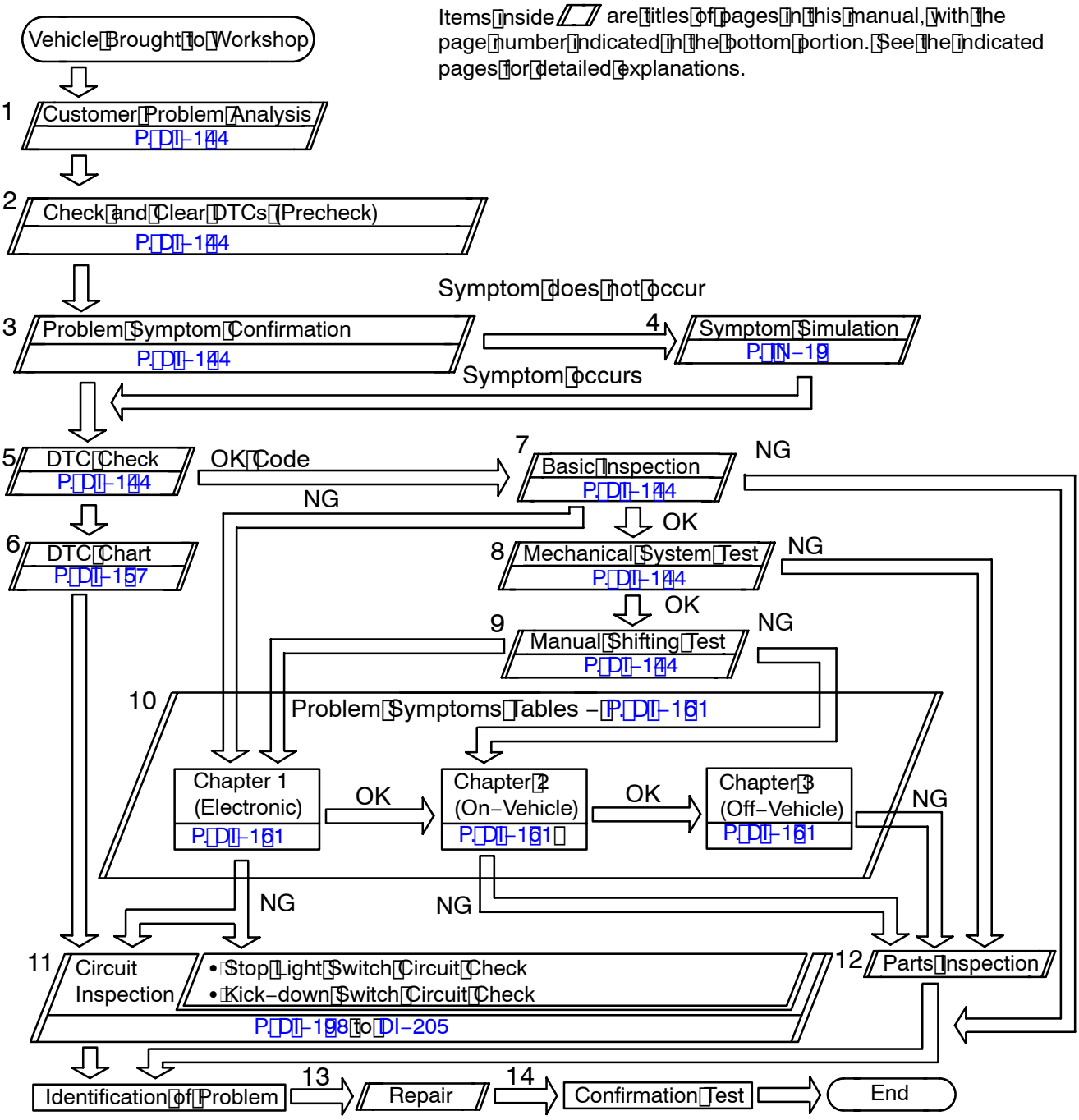
DI2L4–01

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



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.



DI2L5–01

CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transmission System Check Sheet

Inspector's Name :

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

Date Problem Occurred	/ /
Frequency Problem Occurs?	☐ Continuous ☐ Intermittent (times a day)

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

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains ON

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

DI2LJ–01

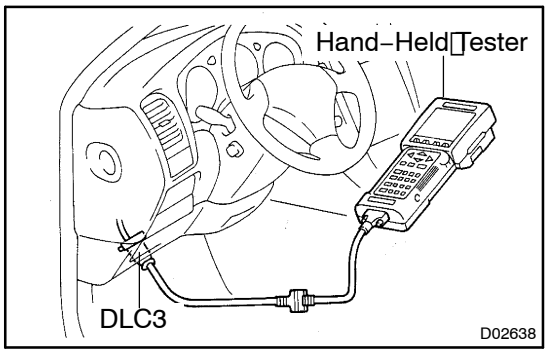
ECT
PWR
D02336

PRE–CHECK

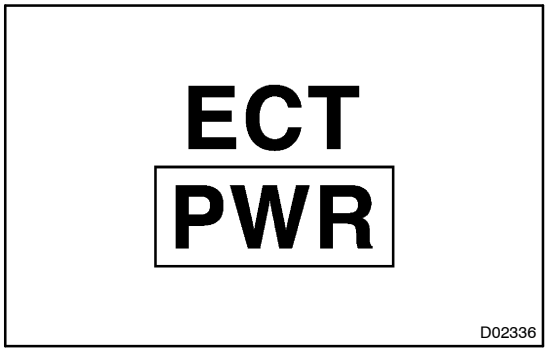
1. DIAGNOSIS SYSTEM

Description

- When troubleshooting Multiplex (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the hand–held tester to the vehicle, and read off various data output from the vehicle's Engine & 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 & ECT ECU memory
  (See page DI–15).
  If any malfunction does not occur in 3 trips, the PWR indicator light goes off but the DTCs remain recorded in the Engine & 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 & ECT ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the PWR indicator light lights up for a malfunction that is only detected once or momentarily.
- *2–trip detection logic:
  When a logic malfunction is first detected, the malfunction is temporarily stored in the Engine & 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)

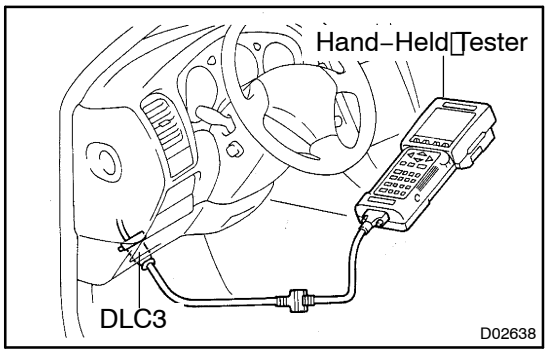
(a) Check the PWR indicator light.

(1) Turn the ignition switch ON.

(2) Check that the PWR indicator light lights up when the pattern select switch is selected to PWR and goes off when the pattern select switch is selected to NORM.

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–201.
- If the PWR indicator light blinks, a malfunction code is stored in the ECU memory.



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

NOTICE:

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

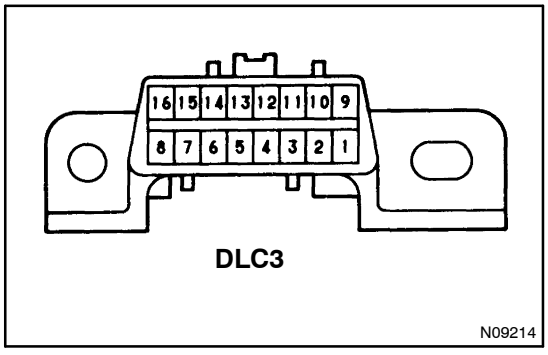
(1) Prepare hand–held tester.

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

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

(4) Use the hand–held tester to check the DTCs and instructions, see the hand–held tester instruction book.

(5) See page DI–144 to confirm the details of the DTCs.



(c) Check the DTC (Not using hand–held tester).

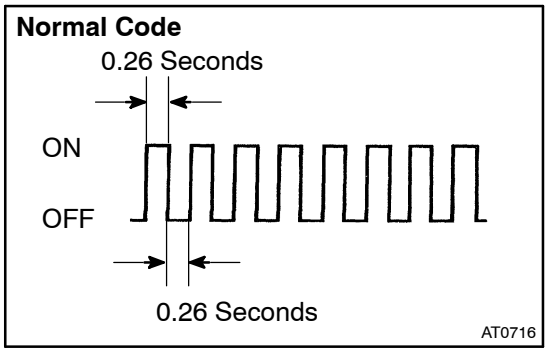
(1) Turn the ignition switch ON, but do not start the engine.

(2) Select the pattern select switch to NORM.

HINT:

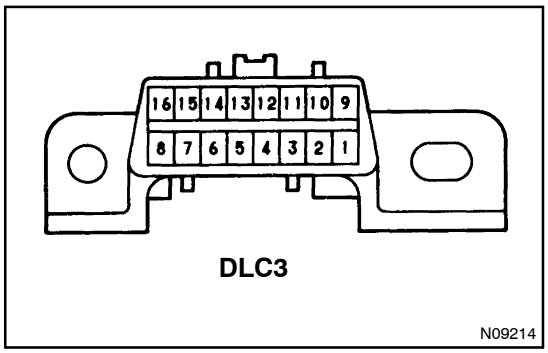
Warning and DTCs can be read only when the pattern select switch is NORM. If it is PWR, the PWR indicator light will light up continuously and will not blink.

(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.

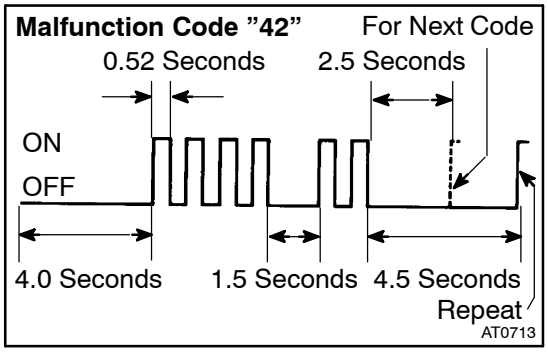


(d) Inspect the DLC3.
(1) The vehicle's Engine & ECT ECU uses ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

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 hand–held tester to DLC3, turned the ignition switch ON and operated the hand–held tester, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



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

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

3. INSPECT DIAGNOSIS (CHECK MODE)

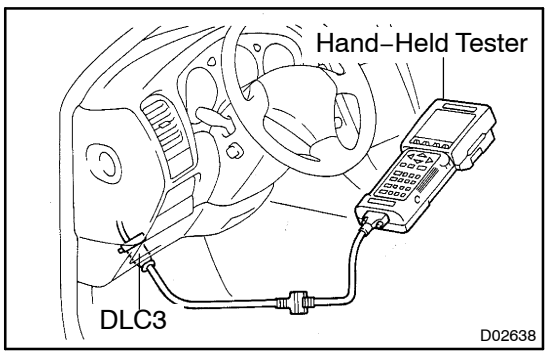
HINT:
Hand–held tester only: Compared to the normal mode, the check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in Normal mode can also be detected in check mode.

(a) Check DTC.

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

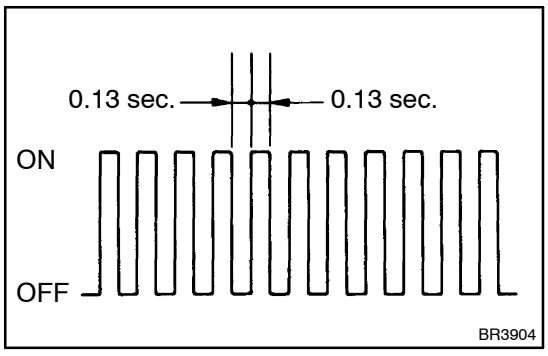
(2) Turn the ignition switch OFF.

(3) Prepare a hand–held tester.



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

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



(6) Switch the hand–held tester from Normal mode to Check mode (Check that the 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.

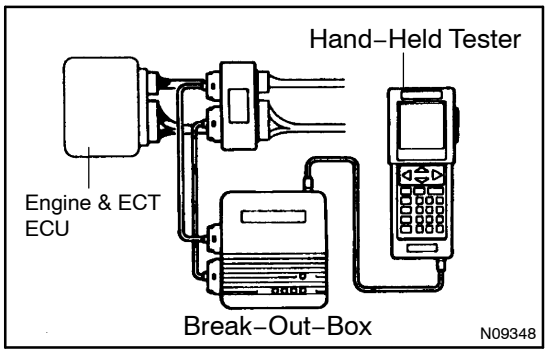
HINT:

Take care not to turn the ignition switch OFF, as turning it OFF switches the diagnosis system from Check mode to Normal mode, so all DTCs etc. are erased.

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

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

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



4. ENGINE & 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 & 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:

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

(a) D range test (NORM and PWR pattern):

Shift into the D range and fully depress the accelerator pedal and check the following points.

(1) Check up–shift operation.

Check to see that 1 → 2, 2 → 3, 3 → 4 and 4 → 5 up–shift takes place, and that the shift points conform to the automatic shift schedule (See page SS–22).

HINT:

- 5th Gear Up–shift Prohibition Control (1. Coolant temp. is 60°C (140°F) or less. 2. If there is a 10 km/h (6 mph) difference between the set cruise control speed and vehicle speed.)
- 5th Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60°C (140°F) or less.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3, 3 → 4 and 4 → 5 up–shifts.

(3) Check for abnormal noises and vibration.

Run at the D range lock–up or 5th gear and check for abnormal noises and vibration.

HINT:

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

(4) Check kick–down operation.

While running in the D range, 2nd, 3rd and 5th gears, check to see that the possible kick–down vehicle speed limits for 2 → 1, 3 → 2, 4 → 3 and 5 → 4 kick–downs conform to those indicated in the automatic shift schedule (See page SS–22).

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

(6) Check the lock–up mechanism.

- Drive in D range, 5th 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.

(b) 4 range test:

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

(1) Check up–shift operation.

Check to see that the 1 → 4 up–shift takes place and that the shift point conforms to the automatic shift schedule (See page SS–22).

HINT:

There is no 5th up–shift in the 4 range.

(2) Check engine braking.

While running in the 4 range and 4th gear, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration, and for shock at up–shift and down–shift.

(c) 3 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 the 1 → 3 up–shift takes place and that the shift point conforms to the automatic shift schedule (See page SS–22).
(2) Check engine braking.
While running in the 3 range and 3rd gear, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noises during acceleration and deceleration, and for shock at up–shift and down–shift.

(d) 2 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–22).
(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.

(e) 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.

(f) 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.

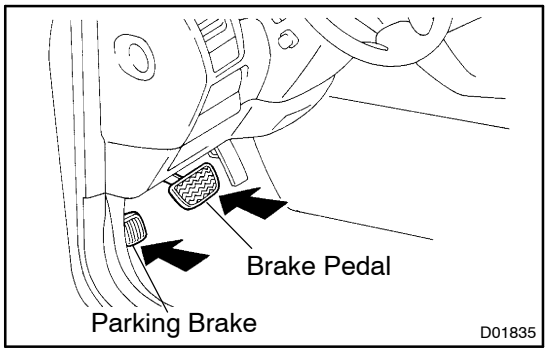
(g) P range test:
Stop the vehicle on a grade (more than 5°) and after shifting into the P range, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.

7. ACTIVE TEST

You are able to set the A/T gear position as you like by operating each solenoid valve forcibly using hand–held tester.

However, the condition that you can set the gear position differs in the setting gear position, so conduct the ACTIVE TEST following the table below.

No.	Indication Gear Condition	Starting Condition	Canceling Condition
1	1st, 2nd	Vehicle speed: 0 km/h (0 mph)	Vehicle speed: 0 km/h (0 mph)
2	3rd	Vehicle speed: 0 km/h (0 mph) or vehicle running at 4th or 5th gear	Vehicle speed: less than 50 km/h (31 mph)
3	4th	• Vehicle running at 3rd or 5th gear • Vehicle speed: 50 km/h (31 mph)	Vehicle speed: less than 50 km/h (31 mph)
4	5th	• Vehicle speed: more than 60 km/h (37 mph) • Vehicle running at 4th gear • Throttle valve opening angle: less than 50 %	• Vehicle speed: less than 60 km/h (37 mph) • Throttle valve opening angle: more than 50 %



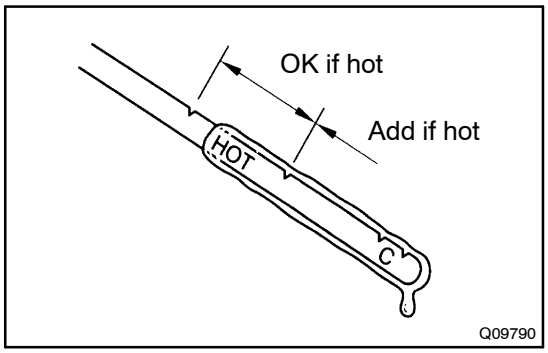
8. BASIC INSPECTION

(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.

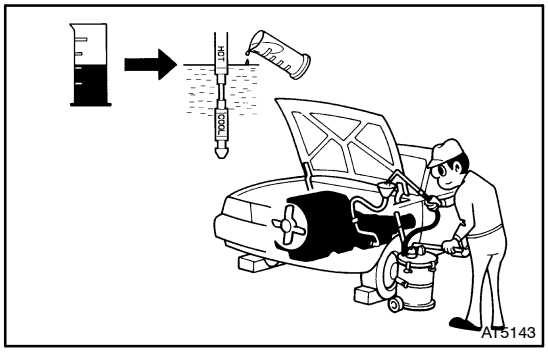
Fluid type: ATF TYPE T–IV or equivalent

NOTICE:

Do not overfill.

(b) Check the fluid condition.

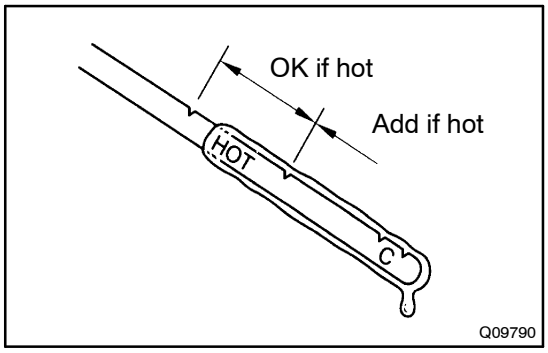
If the fluid smells burnt or is black, replace it.



(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: ATF TYPE T–IV or equivalent
Capacity: 1.9 liters (2.0 US qts, 1.7 Imp.qts)

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

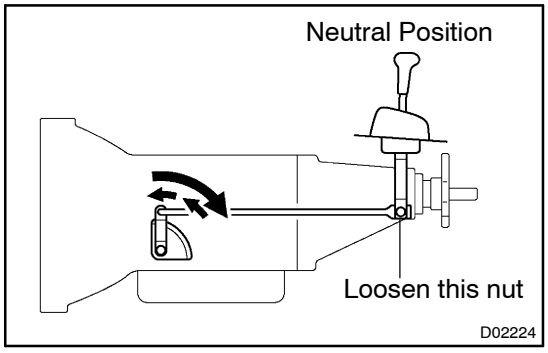


(5) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.
(6) Check the fluid level at the normal operating temperature, 70 – 80 °C (158 – 176 °F), and add as necessary.

NOTICE:
Do not overfill.

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

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

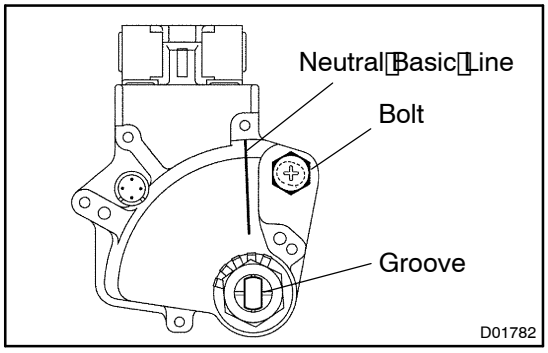


(e) Inspect and adjust the shift lever position.
- When shifting the shift lever from the N range to other ranges, check that the lever can be shifted smoothly and accurately to each range and that the position indicator is not aligned with the correct position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures.
- Loosen the nut on the shift lever.
- Push the control shaft fully rearward.
- Return the control shaft lever 2 notches to N range.
- Set the shift lever to N range.
- While holding the shift lever lightly toward the R range side, tighten the shift lever nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

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



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

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

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

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

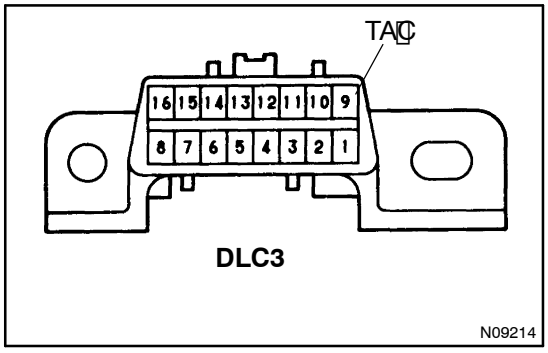
- For continuity inspection of the neutral start switch, see page DI–192.

9. MECHANICAL SYSTEM TESTS

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

NOTICE:

- **Do the test at normal operating ATF temperature: 50 – 80°C (122 – 176°F).**
- **Do not continuously run this test for longer than 5 seconds.**
- **To ensure safety, do this test in a wide, clear level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**



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

SST 09843–18030

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

Stall speed: 2,700 ± 150 rpm

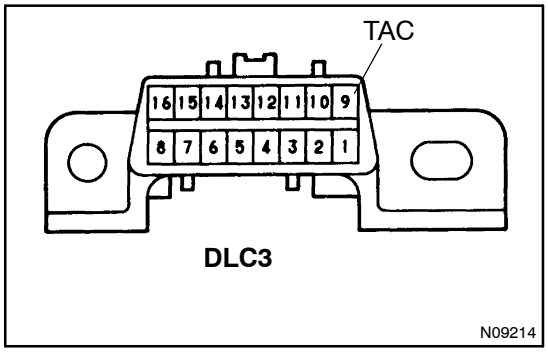
Evaluation:

Problem	Possible cause
(a) Stall speed low in D range	• Engine output may be insufficient • Stator one–way clutch is operating properly HINT: If more than 600 rpm below the specified value, the torque converter could be faulty.
(b) Stall speed high in D range	• Line pressure too low • Forward clutch slipping • No.2 one–way clutch not operating properly • O/D one–way clutch not operating properly

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

NOTICE:

- **Do the test at normal operating ATF temperature 50 – 80 °C (122 – 176 °F).**
- **Be sure to allow 1 minute interval between tests.**
- **Take 3 measurements and take the average value.**



DLC3

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

SST 09843–18030

- Start engine and check idle speed.

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

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

Time lag: N → D less than 1.2 seconds

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

Time lag: N → R less than 1.5 seconds

Evaluation (If N → D or N → R time lag is longer than the specified):

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

10. HYDRAULIC TEST

(a) Measure the line pressure.

NOTICE:

- **Do the test at normal operation ATF temperature 50 – 80°C (122 – 176°F).**
- **The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stopper outside the vehicle while the other is doing the test.**
- **Be careful to prevent SST's hose from interfering with the exhaust pipe.**

(1) Warm up the ATF.

(2) Remove the test plug on the right 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) Connect a hand–held tester to DLC3.

(5) Start the engine and check idling speed.

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

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

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

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

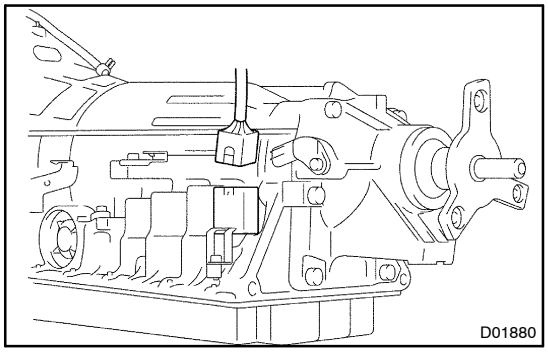
Specified line pressure:

Condition	D range kPa (kgf / cm^2, psi)	R range kPa (kgf / cm^2, psi)
Idling	395 – 455 (4.0 – 4.6, 57 – 65)	0
Stall	1,200 – 1,360 (12.2 – 13.8, 174 – 196)	1,655 – 1,960 (16.9 – 20.0, 240 – 282)

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



11. 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, 3, 4 and D ranges.

Check that the gear change corresponds to the shift range.

Shift range	Gear position
D	5th
4	5th
3	4th
2	3rd
L	3rd
R	Reverse
P	Pawl Lock

HINT:

If the L, 2, 3, 4 and D range gear positions are difficult to distinguish, do the following read test.

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

(c) Connect the solenoid wire.

(d) Cancel out DTC.

DI2L6–01

DIAGNOSTIC TROUBLE CODE CHART

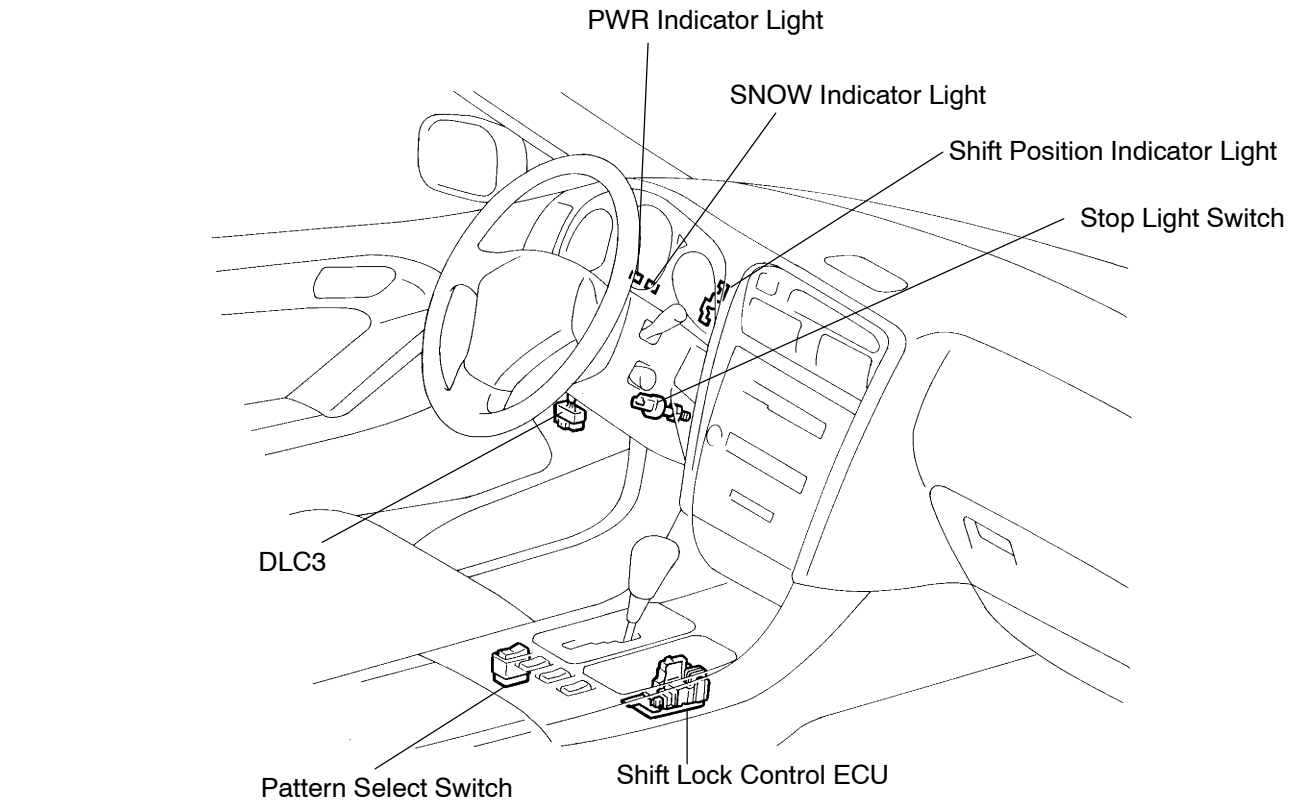
If a DTC is displayed during the DTC check, check the circuit listed in the table below and proceed to the page given.

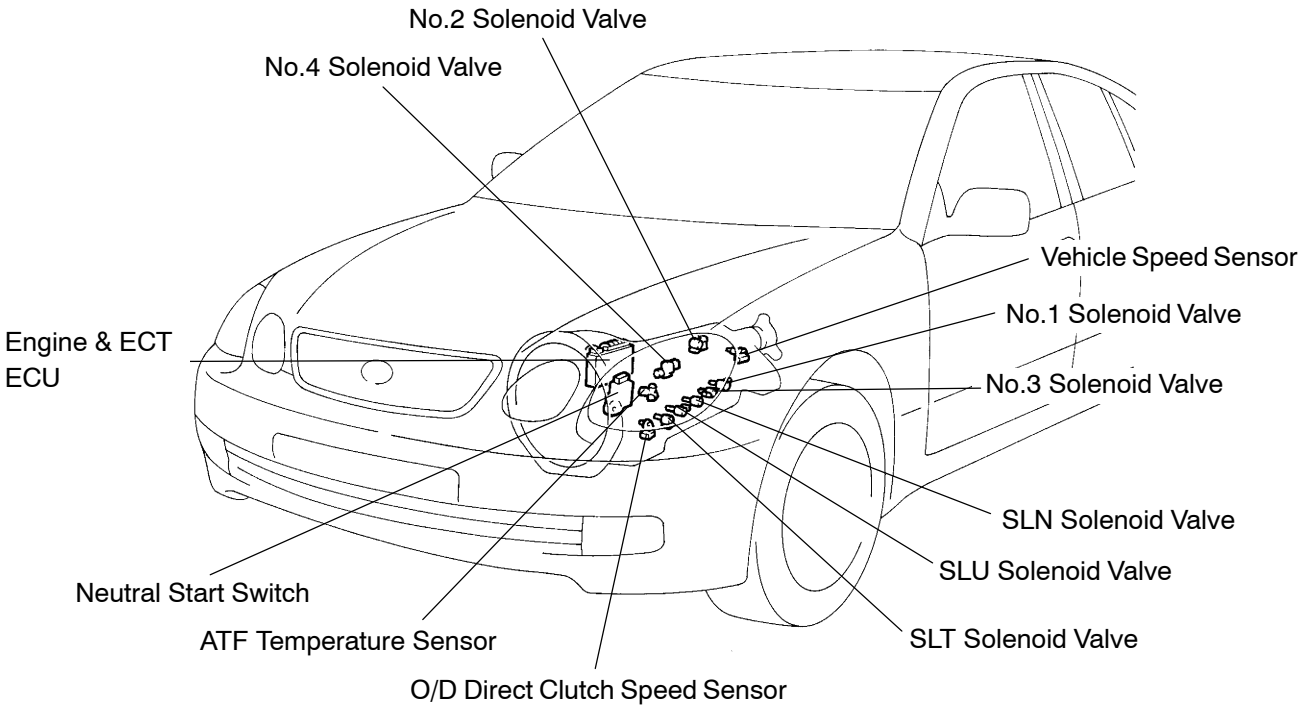
DTC No. (See Page)	Detection Item	Trouble Area	*1PWR Indicator Light Blink	*2Memory
P0500/42 (DI–166)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Combination meter • Engine & ECT ECU • Automatic Transmission Assembly	○	○
P0710/38 (DI–170)	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor circuit • Engine & ECT ECU	○	○
P0715/67 (DI–172)	Input/Turbine Speed Sensor Circuit Malfunction (O/D Direct Clutch Speed Sensor)	• Open or short in O/D direct clutch speed sensor circuit • O/D direct clutch speed sensor • Engine & ECT ECU • Automatic Transmission Assembly	○	○
P0753/62 (DI–175)	Shift Solenoid ”A” Electrical Malfunction (No.1 Solenoid Valve)	• Open or short No.1 solenoid valve circuit • No.1 solenoid valve • Engine & ECT ECU	○	○
P0758/63 (DI–175)	Shift Solenoid ”B” Electrical Malfunction (No.2 Solenoid Valve)	• Open or short No.2 solenoid valve circuit • No.2 solenoid valve • Engine & ECT ECU	○	○
P0763/76 (DI–175)	Shift Solenoid ”C” Electrical Malfunction (No.3 Solenoid Valve)	• Open or short No.3 solenoid valve circuit • No.3 solenoid valve • Engine & ECT ECU	○	○
P0768/65 (DI–181)	Shift Solenoid ”D” Electrical Malfunction (No.4 Solenoid Valve)	• Open or short No.4 solenoid valve circuit • No.4 solenoid valve • Engine & ECT ECU	○	○
P1755/68 (DI–184)	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine & ECT ECU	X	○
P1760/77 (DI–186)	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine & ECT ECU	X	○
P1765/46 (DI–189)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLN Solenoid Valve)	• Open or short in SLN solenoid valve circuit • SLN solenoid valve • Engine & ECT ECU	X	○
P1780/97 (DI–192)	Park/Neutral Position Switch Malfunction (Neutral Start Switch)	• Short in neutral start switch circuit • Neutral start switch • Engine & ECT ECU	○	○

*1: ”○” mark means PWR indicator light blinks once every 2 seconds.
”X” mark means PWR indicator light never blinks.
*2: ”○” mark means Engine & ECT ECU memorizes the malfunction code if the Engine & 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.

DI2LK–01

PARTS LOCATION



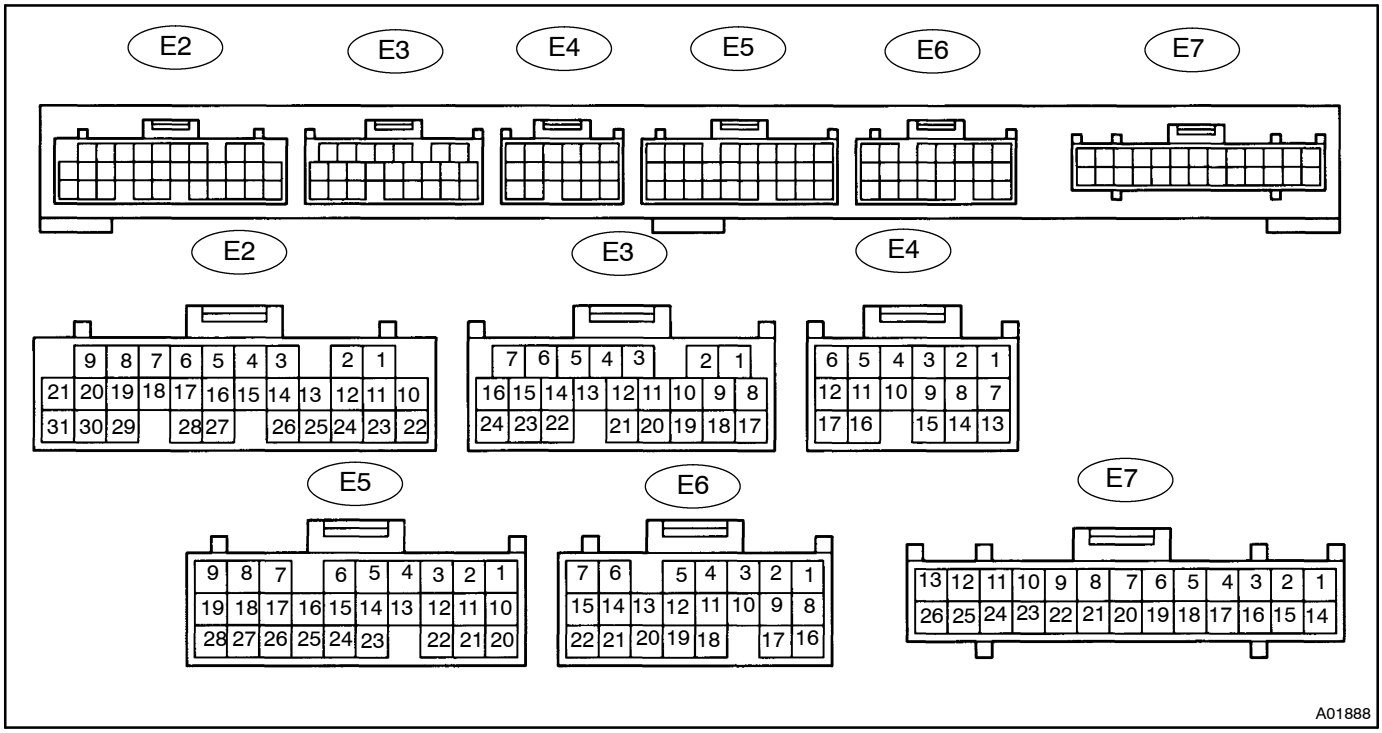


D02435
D02357

D02639

DI2LL–01

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S1 ↔ E1 (E4–1 ↔ E3–17)	L–Y ↔ BR	IG ON	Below 1.5
		3rd, 4th or 5th gear	Below 1.5
		1st or 2nd gear	9.0 ~ 14
S2 ↔ E1 (E4–2 ↔ E3–17)	G–Y ↔ BR	IG ON	Below 1.5
		1st, 4th or 5th gear	Below 1.5
		2nd or 3rd gear	9.0 ~ 14
S3 ↔ E1 (E4–3 ↔ E3–17)	Y–G ↔ BR	IG ON	Below 1.5
		1st, 2nd, 3rd or 5th gear	Below 1.5
		4th gear	9.0 ~ 14
S4 ↔ E1 (E4–6 ↔ E3–17)	G–R ↔ BR	IG ON	Below 1.5
		1st, 2nd, 3rd or 4th gear	Below 1.5
		5th gear	9.0 ~ 14
SLU^+ ↔ SLU^- (E4–7 ↔ E4–13)	G–W ↔ L–R	IG ON	Below 3.0
		Engine is idling	Pulse signal is output below 1.5 ↔ 9 ~ 14
SLN^+ ↔ SLN^- (E4–8 ↔ E4–14)	P ↔ L–B	IG ON	Below 3.0
		Engine is idling	Pulse signal is output below 1.5 ↔ 9 ~ 14
SLT^+ ↔ SLT^- (E4–9 ↔ E4–15)	G–B ↔ R–B	IG ON	Below 3.0
		Engine is idling	Pulse signal is output below 1.5 ↔ 9 ~ 14
$SP2^+$ ↔ $SP2^-$ (E4–5 ↔ E4–11)	L–Y ↔ R–L	Engine is idling	Pulse signal is output below 1.5 ↔ 4 ~ 6
NCO^+ ↔ NCO^- (E4–4 ↔ E4–10)	R ↔ G	Engine is idling	Pulse signal is output below 1.5 ↔ 4 ~ 6

OIL ↔ E2 (E4–17 ↔ E4–18)	G–R ↔ BR	IG ON and ATF temperature 110 °C (176 °F)	Below 1.0
P ↔ E1 (E5–26 ↔ E3–17)	R–W ↔ BR	IG ON and shift lever position: P	7.5 ~ 14
		IG ON and shift lever position: except P	Below 1.5
R ↔ E1 (E5–16 ↔ E3–17)	R–B ↔ BR	IG ON and shift lever position: R	7.5 ~ 14
		IG ON and shift lever position: except R	Below 1.5
N ↔ E1 (E3–13 ↔ E3–17)	G–R ↔ BR	IG ON and shift lever position: N	7.5 ~ 14
		IG ON and shift lever position: except N	Below 1.5
D ↔ E1 (E5–17 ↔ E3–17)	Y–B ↔ BR	IG ON and shift lever position: D or 4	7.5 ~ 14
		IG ON and shift lever position: except D and 4	Below 1.5
4 ↔ E1 (E5–7 ↔ E3–17)	Y–G ↔ BR	IG ON and shift lever position: 4	7.5 ~ 14
		IG ON and shift lever position: except 4	Below 1.5
3 ↔ E1 (E3–20 ↔ E3–17)	G ↔ BR	IG ON and shift lever position: 3	7.5 ~ 14
		IG ON and shift lever position: except 3	Below 1.5
2 ↔ E1 (E3–21 ↔ E3–17)	G–B ↔ BR	IG ON and shift lever position: 2 or L	7.5 ~ 14
		IG ON and shift lever position: except 2 and L	Below 1.5
L ↔ E1 (E2–14 ↔ E3–17)	R–Y ↔ BR	IG ON and shift lever position: L	7.5 ~ 14
		IG ON and shift lever position: except L	Below 1.5
STP ↔ E1 (E5–6 ↔ E3–17)	G–W ↔ BR	IG ON and brake pedal depressed	9.0 ~ 14
		IG ON and brake pedal released	Below 1.5
KD ↔ E1 (E5–5 ↔ E3–17)	Y–R ↔ BR	IG ON and accelerator pedal depressed	9.0 ~ 14
		IG ON and accelerator pedal released	Below 1.5

DI2L7–01

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.

- 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 & ECT ECU.

1. CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

Symptom	Suspect Area	See page
No up–shift (A particular gear, from 1st to 4th gear, is not up–shifted)	Engine & ECT ECU	IN–29
No up–shift (4th → 5th)	1. Transmission control switch 2. Engine & ECT ECU	DI–202 IN–29
No down–shift (5th → 4th)	1. Transmission control switch 2. Engine & ECT ECU	DI–202 IN–29
No down–shift (A particular gear, from 1st to 4th gear, is not up–shifted)	Engine & ECT ECU	IN–29
No lock–up	1. Stop light switch signal circuit 2. Engine & ECT ECU	DI–198 IN–29
No lock–up off	Engine & ECT ECU	IN–29
Shift point too high or too low	1. Pattern select switch circuit 2. Engine & ECT ECU	DI–201 IN–29
Up–shift to 5th from 4th while engine is cold	Engine & ECT ECU	IN–29
No kick–down	1. Kick–down switch circuit 2. Engine & ECT ECU	DI–205 IN–29
No pattern select	1. Pattern select switch circuit 2. Engine & ECT ECU	DI–201 IN–29
Engine stalls when starting off or stopping	1. Stop light switch signal circuit 2. Engine & ECT ECU	DI–198 IN–29

2. CHAPTER 2: ON–VEHICLE REPAIR (★: A650E AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM579U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Transmission control rod 2. Manual valve 3. Parking lock pawl 4. Off–vehicle repair matrix chart	DI–1744 ★ ★ –
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 up–shift (4th → 5th)	1. 4–5 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (5th → 4th)	1. 4–5 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 control valve 2. Lock–up relay valve 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (N → D)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_1 accumulator 4. Orifice control valve 5. Off–vehicle repair matrix chart	★ ★ ★ ★ –
Harsh engagement (Lock–up)	1. Lock–up control valve 2. Lock–up relay valve 3. Solenoid relay valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Solenoid modulator valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (2 → L)	Coast brake control valve	★
Harsh engagement (2nd → 3rd → 4th → 5th)	1. Accumulator control valve 2. Solenoid modulator valve	★ ★
Harsh engagement (1st → 2nd)	1. Solenoid modulator valve 2. B_3 control valve 3. B_2 release control valve 4. Solenoid relay valve 5. Off–vehicle repair matrix chart	★ ★ ★ ★ –

Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_{2R} accumulator 4. B_{3} control valve 5. B_{2} release control valve 6. Solenoid relay valve 7. Off–vehicle repair matrix chart	★ ★ ★ ★ ★ ★ –
Harsh engagement (3rd → 4th)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_{2R} accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (4th → 5th)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_{0R} accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (5th → 4th)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_{0R} accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Pressure relief valve 4. Off–vehicle repair matrix chart	DI–164 ★ ★ –
Slip or shudder (Particular range)	1. Transmission control rod 2. Off–vehicle repair matrix chart	DI–164 –
No engine braking (1st: L range)	1. Coast brake control valve 2. Off–vehicle repair matrix chart	★ –
No engine braking (2nd: 2 range)	1. Coast brake control valve 2. Off–vehicle repair matrix chart	★ –
No kick–down	1. 1–2 shift valve 2. 2–3 shift valve 3. 3–4 shift valve	★ ★ ★

3. CHAPTER 3: OFF–VEHICLE REPAIR (★: A650E AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM579U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. O/D one–way clutch (F_0) 2. O/D direct clutch (C_0) 3. O/D planetary gear unit 4. Torque converter	★ ★ ★ AT–34
Vehicle does not move in R range	1. Center and rear planetary gear unit 2. Direct clutch (C_2) 3. 1st & reverse brake (B_4) 4. O/D brake (B_0)	★ ★ ★ ★
No up–shift (1st → 2nd)	2nd brake (B_3)	★
No up–shift (2nd → 3rd)	1. 3rd brake (B_2) 2. One–way clutch No.1 (F_1)	★ ★
No up–shift (3rd → 4th)	Direct clutch	★
No up–shift (4th → 5th)	O/D brake (B_0)	★
No lock–up or No lock–up off	Torque converter	AT–34
Harsh engagement (N → D)	1. Forward clutch (C_1) 2. O/D one–way clutch (F_0) 3. One–way clutch No.2 (F_2)	★ ★ ★
Harsh engagement (N → R)	1. Direct clutch (C_2) 2. O/D brake (B_0) 3. 1st & reverse brake (B_4)	★ ★ ★
Harsh engagement (1st → 2nd)	2nd brake (B_3)	★
Harsh engagement (2nd → 3rd)	1. 3rd brake (B_2) 2. 2nd brake (B_3) 3. One–way clutch No.1 (F_1)	★ ★ ★
Harsh engagement (3rd → 4th)	Direct clutch (C_2)	★
Harsh engagement (4th → 5th)	1. O/D brake (B_0) 2. O/D direct clutch (C_0)	★ ★
Harsh engagement (Lock–up)	Torque converter	AT–34
Slip or shudder (Forward and reverse: After warm–up)	1. Torque converter 2. O/D one–way clutch (F_0) 3. O/D direct clutch (C_0)	 ★ ★
Slip or shudder (Particular range: Just after engine starts)	Torque converter	AT–34
Slip or shudder (R range)	1. Direct clutch (C_2) 2. O/D brake (B_0) 2. 1st & reverse brake (B_4)	★ ★ ★
Slip or shudder (1st)	1. Forward clutch (C_1) 2. No. 2 one–way clutch (F_2)	★ ★
Slip or shudder (2nd)	2nd brake (B_3)	★
Slip or shudder (3rd)	1. 3rd coast brake (B_1) 2. 3rd brake (B_2) 3. One–way clutch No.1 (F_1)	★ ★ ★
Slip or shudder (4th)	Direct clutch	★
Slip or shudder (5th)	O/D brake (B_0)	★
No engine braking (1st ~ 4th: D range)	O/C direct clutch (C_0)	★
No engine braking (1st: L range)	1st & reverse brake (B_4)	★
No engine braking (2nd: 2 range)	2nd brake (B_3)	★
No engine braking (3rd: 3 range)	3rd coast brake (B_1)	★

Poor acceleration (All ranges)	Torque converter	AT–34
Poor acceleration (5th)	1. O/D brake (B_0) 2. O/D planetary gear unit	★ ★
Engine stalls when starting off or stopping	Torque converter	AT–34

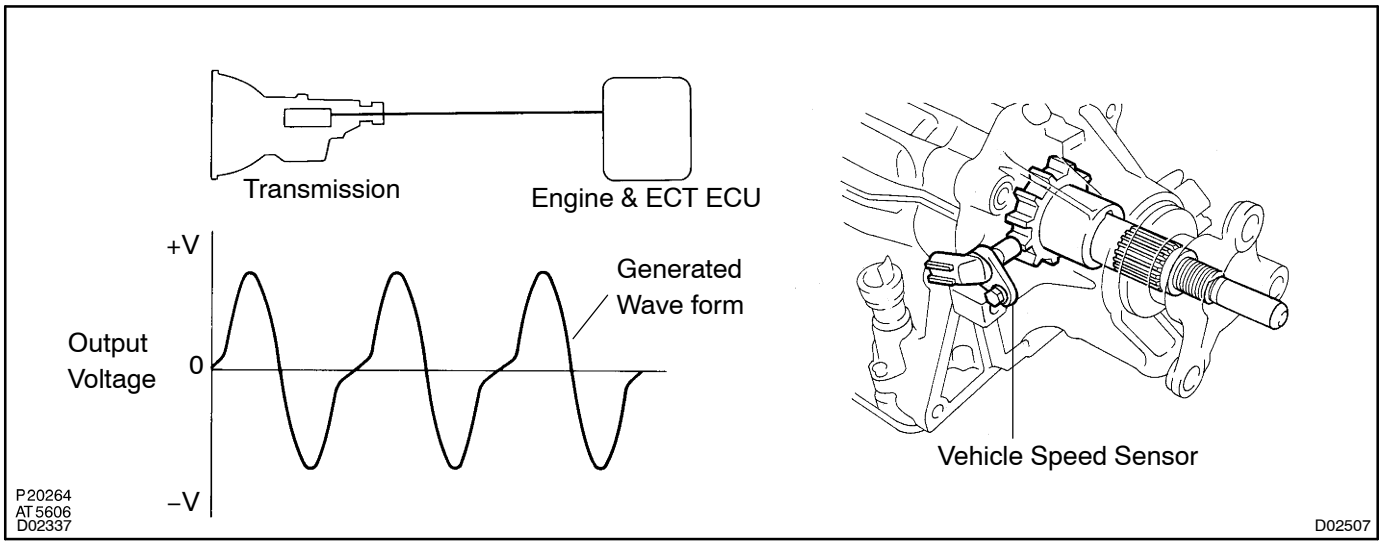
DI2L8–02

CIRCUIT INSPECTION

DTC	P0500/42	Vehicle Speed Sensor Malfunction

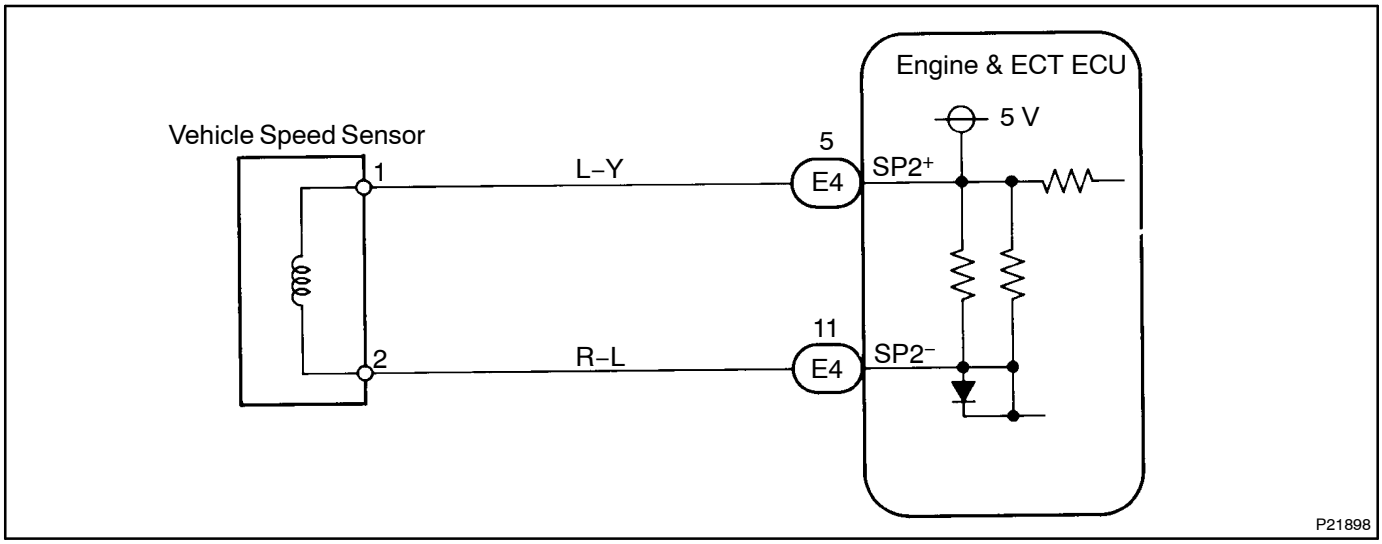
CIRCUIT DESCRIPTION

The vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the Engine & ECT ECU. The Engine & ECT 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 & ECT ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	No vehicle speed sensor signal to Engine & ECT ECU under conditions (a) and (b): (a) Neutral start switch is OFF (b) Vehicle is being driven	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Engine & ECT ECU • Automatic transmission assembly
	Clutch or brake slips or gear broken	

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 warmed up or not, the air–fuel ratio 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 the hand–held tester main switch ON.

CHECK:

Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value

NG → **Check and replace Engine & ECT ECU (See page IN–29).**

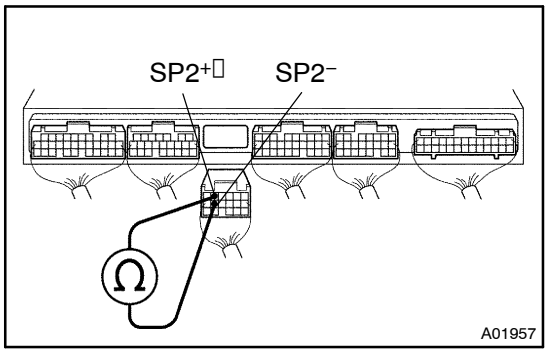
OK

2	**Check speedometer circuit (See page BE–3).**

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

OK

3	Check resistance between terminals SP2+ and SP2– of Engine & ECT connector.



PREPARATION:
(a) Remove the instrument panel under cover.
(b) Disconnect the connector of the Engine & ECT ECU.

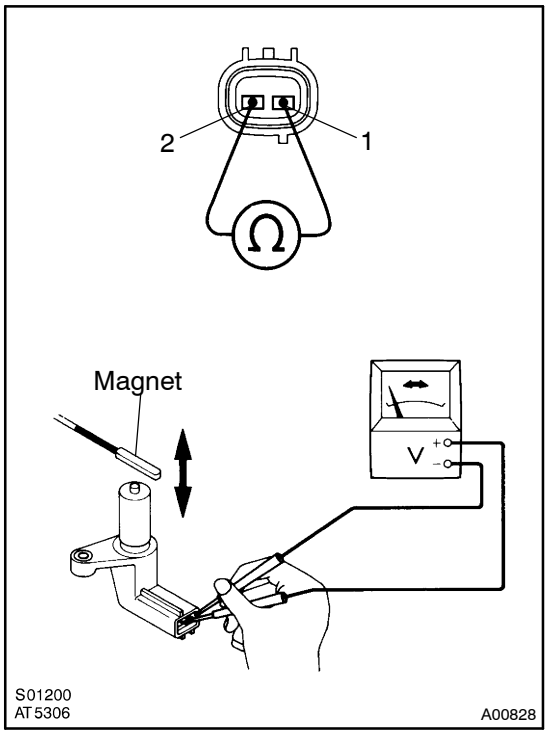
CHECK:
Check resistance between terminals SP2+ and SP2– of the Engine & ECT ECU connector.

OK:
Resistance: 560 ~ 680 Ω at 20 °C (68 °F)

OK	Check and replace Engine & ECT ECU (See page IN–29).

NG

4	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor.

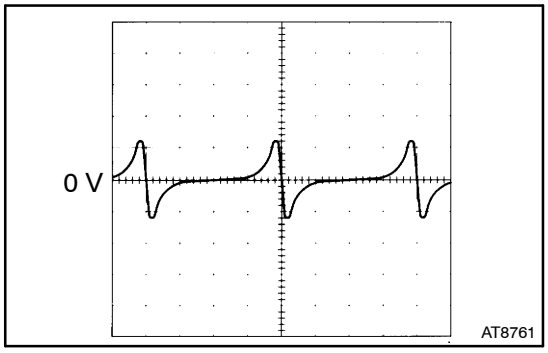
OK:
Resistance: 560 ~ 680 Ω at 20 °C (68 °F)

Reference:
Check vehicle speed sensor's function

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

OK:
Voltage is generated intermittently

HINT:
The generated voltage is extremely low.



Reference: INSPECTION USING OSCILLOSCOPE
Refer to the chart for waveform between terminals SP2+ and SP2– When the vehicle speed is approx. 60 km/h (37 mph).

NG → **Replace vehicle speed sensor.**

OK

5	**Check and repair harness and connector between Engine & ECT ECU and vehicle speed sensor (See page IN–29)**

NG → **Replace or repair wire harness or connector.**

OK

Check and repair the transmission (clutch, brake or gear etc.).

DI2L9–01

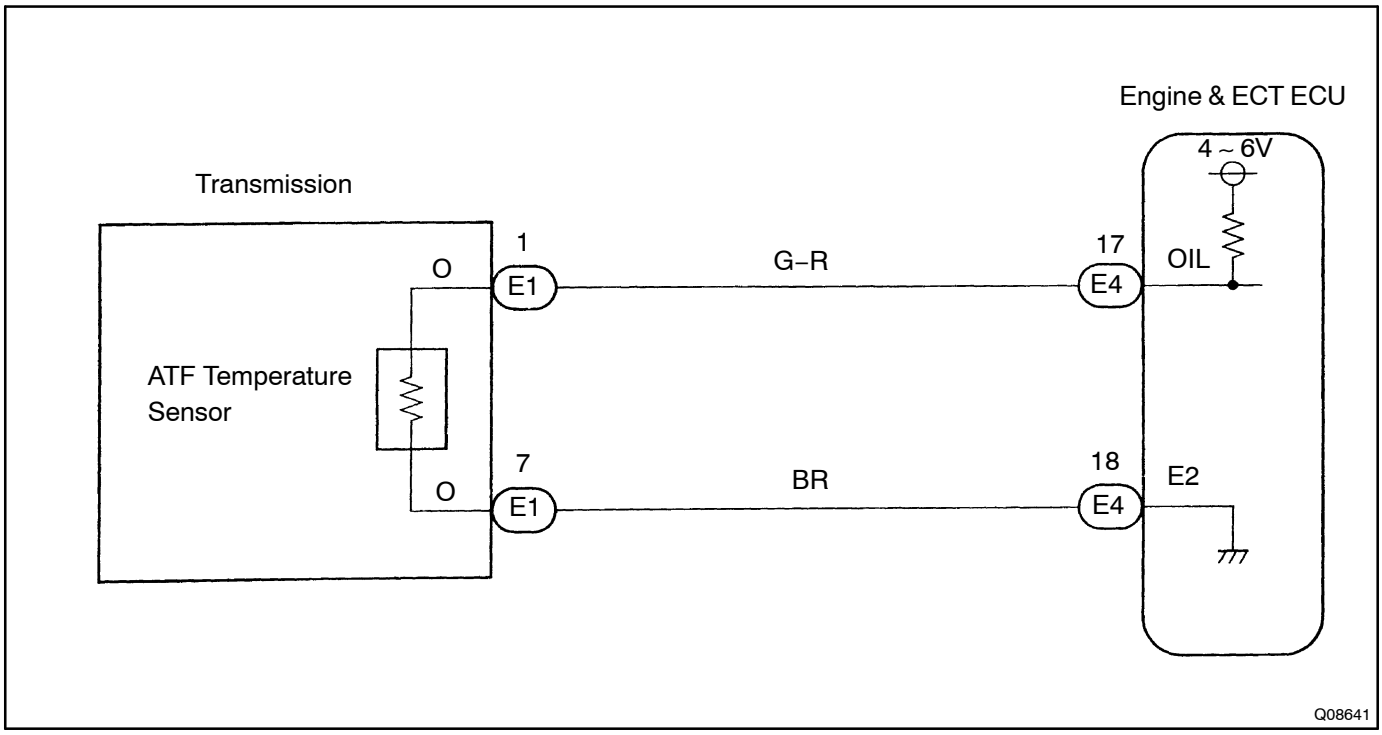
DTC	P0710/38	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the Engine & ECT ECU.

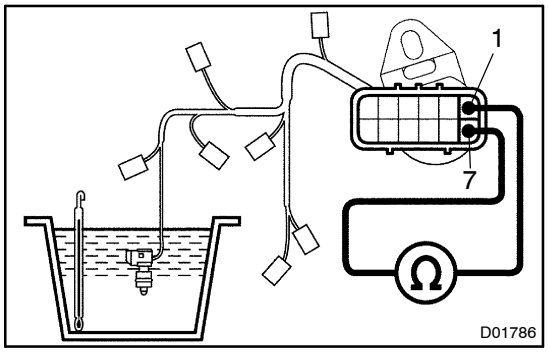
DTC No.	DTC Detecting Condition	Trouble Area
P0710/38	Either (a) or (b) is detected for 0.5 sec. or more. (2–trip detection logic) (a) Temperature sensor resistance is less than 79 Ω (b) After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	• Open or short in ATF temperature sensor • ATF temperature sensor • Engine & ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ATF temperature sensor.



PREPARATION:

(a) Disconnect the solenoid wire connector.
(b) Remove the oil pan.
(c) Disconnect all solenoid valve connectors.
(d) Remove transmission wire harness.

CHECK:

Measure resistance between terminals 1 and 7 of solenoid connector at 25°C (77°F) and 110°C (230°F).

OK:

Resistance (Approx.):
25°C (77°F): 3.5 kΩ
110°C (230°F): 231 – 263 Ω

NG → Replace the ATF temperature sensor (transmission wire).

OK

2	Check harness and connector between ATF temperature sensor and Engine & ECT ECU (See page IN–29).

NG → Repair or replace the harness or connector.

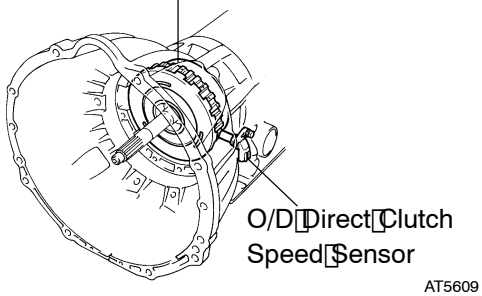
OK

Check and replace the Engine & ECT ECU (See page IN–29).

DI2LA–01

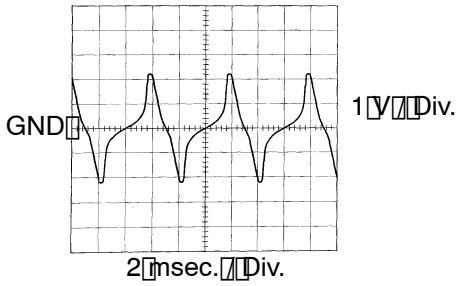
DTC	P0715/67	Input/Turbine Speed Sensor Circuit Malfunction (O/D Direct Clutch Speed Sensor)

CIRCUIT DESCRIPTION



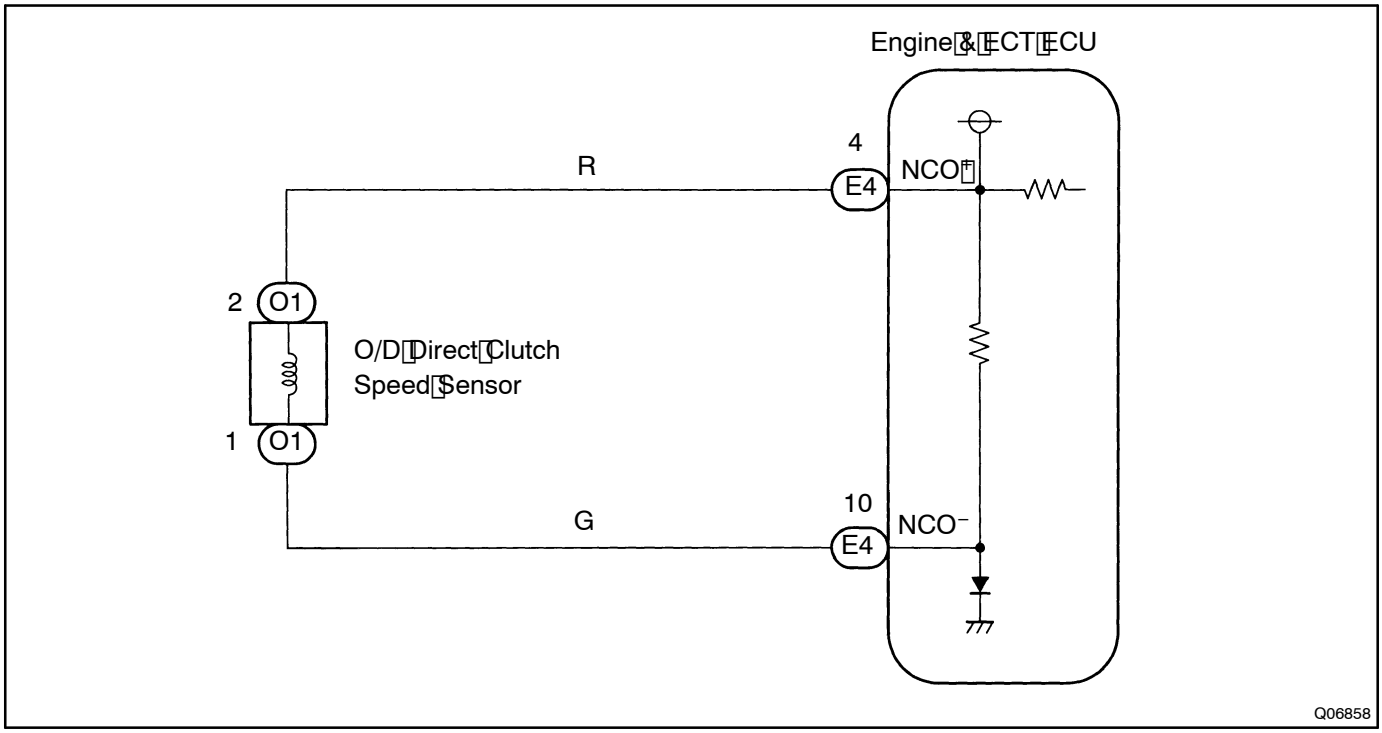
This sensor detects the rotation speed of the O/D input shaft from the rotation of the O/D direct clutch drum.
Its construction is the same as that of the vehicle speed sensor (See page DI–166).
By comparing the O/D direct clutch speed signal and vehicle speed sensor signal, the Engine & ECT ECU detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus doing smooth gear shift.

DTC No.	DTC Detection Condition	Trouble Area
P0715/67	All conditions below are detected for 5 secs. or more (2–trip detection logic) (a) Gear change not being performed (b) Gear position: 1st, 2nd, 3rd or 4th (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Neutral start switch: OFF (f) No.1, No.2, No.3, No.4, SLU solenoid valves and vehicle speed sensor are in normal operation	• Open or short in O/D direct clutch speed sensor circuit • O/D direct clutch speed sensor • Engine & ECT ECU • Automatic transmission assembly



Refer to the chart for the wave form between terminals NCO^+ and NCO^- during engine idling.

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	**Using hand–held tester, check O/D direct clutch speed signal.**

PREPARATION:
(a) Remove the DLC3 cover.
(b) Connect a hand–held tester to the DLC3.
(c) Start the engine (Shift range: P).
(d) Turn the hand–held tester main switch ON.

CHECK:
Read O/D direct clutch speed at engine idling.

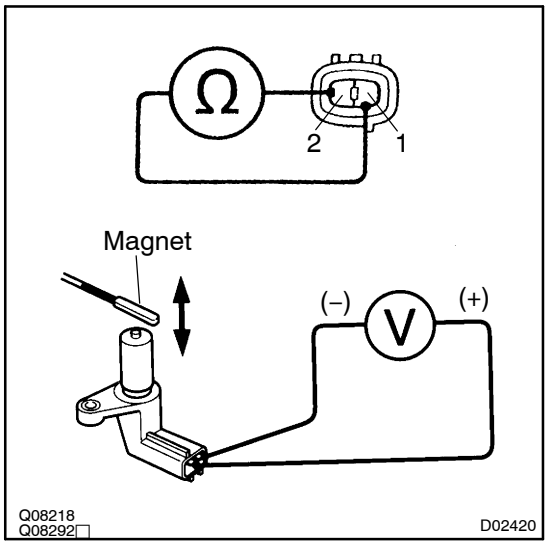
OK:
700 ± 50 rpm at engine idling

NG	**Go to step 2.**

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–151). However, when DTC P0715/67 is displayed, check and replace Engine & ECT ECU (See page IN–29).

2	Check O/D direct clutch speed sensor.



PREPARATION:

Remove the O/D direct clutch speed sensor from the transmission.

CHECK:

(a) Measure resistance between terminals 1 and 2 of O/D direct clutch 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): Voltage is generated intermittently

(b): Resistance: 560 – 680 Ω at 20°C (68°F)

HINT:

The generated voltage is extremely low.

NG	Replace the O/D direct clutch speed sensor.

OK

Check and repair harness and connector between Engine & ECT ECU and O/D direct clutch speed sensor (See page IN–29).

DI2LB–01

DTC	P0753/62	Shift Solenoid A Electrical Malfunction (No.1 Solenoid Valve)

DTC	P0758/63	Shift Solenoid B Electrical Malfunction (No.2 Solenoid Valve)

DTC	P0763/76	Shift Solenoid C Electrical Malfunction (No.3 Solenoid Valve)

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with ON and OFF of the No.1, No.2 and No.3 solenoid valves controlled by Engine & ECT ECU. If an open or short circuit occurs in either of the solenoid valves, the Engine & ECT ECU controls the remaining normal solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).
HINT:
Check the No.1 solenoid valve when DTC P0753/62 is output, check the No.2 solenoid valve when DTC P0758/63 is output and check the No.3 solenoid valve when DTC P0763/76 is output.

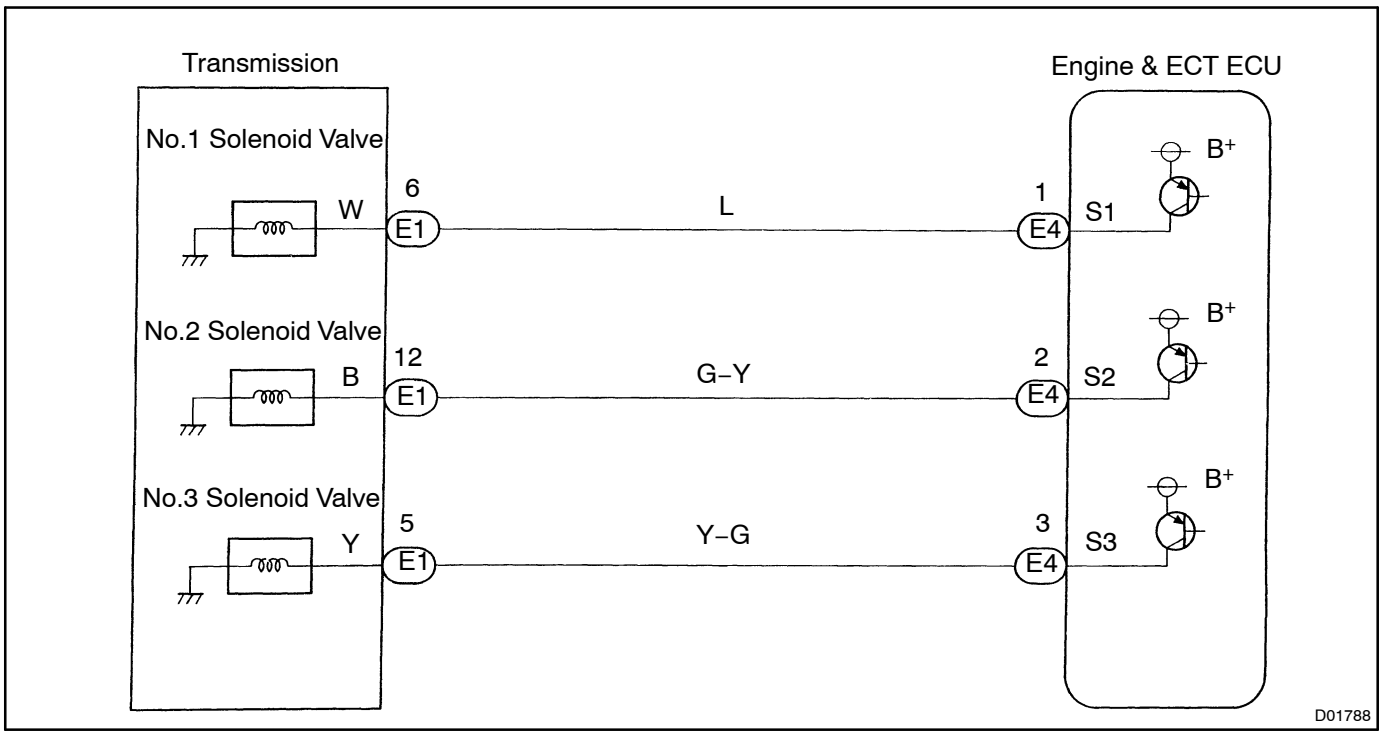
DTC No.	DTC Detecting Condition	Trouble Area
P0753/62 P0758/63 P0763/76	The Engine & ECT ECU checks for an open or short circuit in the No.1, No.2 or No.3 solenoid valve circuit when it changes. The Engine & ECT ECU records DTC P0753/62, P0758/63 or P0763/76 if condition (a) or (b) is detected once, but it does not light up PWR indicator light. After Engine & ECT ECU detects condition (a) or (b) continuously 8 times or more in 1 trip, it causes the PWR indicator light lights up until condition (a) or (b) disappears. After that, if the Engine & 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/No.3 solenoid valve circuit • No.1/No.2/No.3 solenoid valve • Engine & ECT ECU

Fail Safe Function:
If either of the shift solenoid valve circuits develops an open or short, the Engine & ECT ECU turns the other solenoid valve ON and OFF to shift to the gear positions shown in the table below. The Engine & ECT ECU also turns the SLU solenoid valve OFF at the same time. If both solenoids are malfunctioning, hydraulic control cannot be performed electronically and must be done manually.
Manual shifting as shown in the following table must be done (In the case of a short circuit, the Engine & ECT ECU stops sending current to the short circuited solenoid).

Range	Normal				No.1 Solenoid Valve Malfunction				No.2 Solenoid Valve Malfunction				No.3 Solenoid Valve Malfunction			
	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear
	No.1	No.2	No.3		No.1	No.2	No.3		No.1	No.2	No.3		No.1	No.2	No.3	
D	ON	OFF	OFF	1	X	OFF→ON	OFF	5→3	ON	X	OFF	1	ON	OFF	X	1
	OFF	ON	OFF	3	X	ON	OFF	3	OFF	X	OFF→ON	5→4	OFF	ON	X	3
	OFF	OFF	ON	4	X	OFF	ON	4	OFF	X	ON	4	OFF	OFF	X	5
	OFF	OFF	OFF	5	X	OFF	OFF	5	OFF	X	OFF	5	OFF	OFF	X	5
4	ON	OFF	OFF	1	X	OFF→ON	OFF	5→3	ON	X	OFF	1	ON	OFF	X	1
	OFF	ON	OFF	3	X	ON	OFF	3	OFF	X	OFF→ON	5→4	OFF	ON	X	3
	OFF	OFF	ON	4	X	OFF	ON	4	OFF	X	ON	4	OFF	OFF	X	5
3	ON	OFF	OFF	1	X	OFF→ON	OFF→ON	4→3	ON	X	OFF	1	ON	OFF	X	1
	OFF	ON	ON	3	X	ON	ON	3	OFF	X	ON	4	OFF	ON	X	3
	OFF	OFF	ON	4	X	OFF	ON	4	OFF	X	ON	4	OFF	OFF	X	4
2	ON	OFF	ON	1	X	OFF	ON	3	ON	X	ON	1	ON	OFF	X	1
	OFF	ON	ON	3	X	ON	ON	3	OFF	X	ON	3	OFF	ON	X	3
L	ON	OFF	OFF	1	X	OFF	OFF	3	ON	X	OFF	1	ON	OFF	X	1

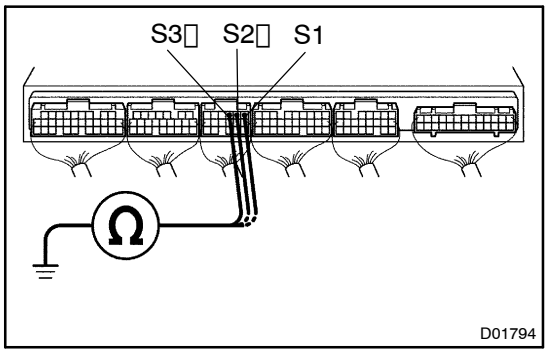
Range	No.1 and No.2 Solenoid Valve Malfunction				No.1 and No.3 Solenoid Valve Malfunction				No.2 and No.3 Solenoid Valve Malfunction				No.1, No.2 and No.3 Solenoid Valve Malfunction			
	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear
	No.1	No.2	No.3		No.1	No.2	No.3		No.1	No.2	No.3		No.1	No.2	No.3	
D	X	X	OFF→ON	5→4	X	OFF→ON	X	5→3	ON	X	X	1	X	X	X	5
	X	X	OFF→ON	5→4	X	ON	X	3	OFF	X	X	5	X	X	X	5
	X	X	ON	4	X	OFF	X	5	OFF	X	X	5	X	X	X	5
	X	X	OFF	5	X	OFF	X	5	OFF	X	X	5	X	X	X	5
4	X	X	OFF→ON	5→4	X	OFF→ON	X	5→3	ON	X	X	1	X	X	X	5
	X	X	OFF→ON	5→4	X	ON	X	3	OFF	X	X	5	X	X	X	5
	X	X	ON	4	X	OFF	X	5	OFF	X	X	5	X	X	X	5
3	X	X	OFF	4	X	OFF→ON	X	4→3	ON	X	X	1	X	X	X	4
	X	X	ON	4	X	ON	X	3	OFF	X	X	4	X	X	X	4
	X	X	ON	4	X	OFF	X	4	OFF	X	X	4	X	X	X	4
2	X	X	OFF	3	X	OFF	X	3	ON	X	X	1	X	X	X	3
	X	X	ON	3	X	ON	X	3	OFF	X	X	3	X	X	X	3
L	X	X	OFF	3	X	OFF	X	3	ON	X	X	1	X	X	X	3

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal S1, S2 or S3 of Engine & ECT ECU and body ground.**



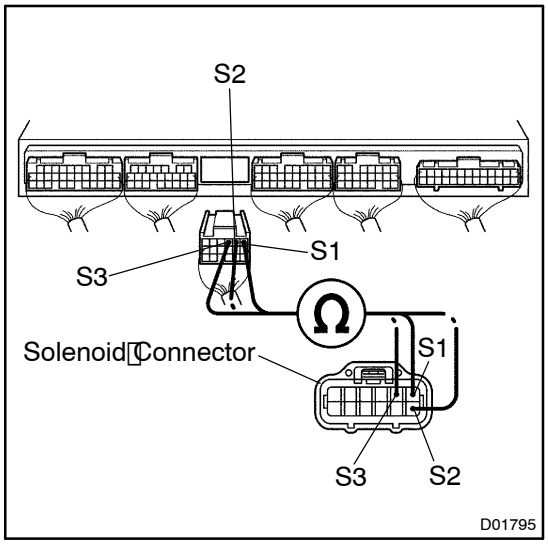
PREPARATION:
Disconnect the connector from Engine & ECT ECU.
CHECK:
Measure resistance between terminal S1, S2 or S3 of Engine & ECT ECU and body ground.
OK:

Resistance: 11 ~ 15 Ω at 20°C (68°F)

OK	**Check and replace the Engine & ECT ECU (See page IN–29).**

NG

2	**Check harness and connector between Engine ECT ECU and automatic transmission solenoid connector.**



PREPARATION:
Disconnect the solenoid connector from the automatic transmission.
CHECK:
Check the harness and connector between terminal S1, S2 or S3 of Engine & ECT ECU and terminal S1, S2 or S3 of solenoid connector.
OK:

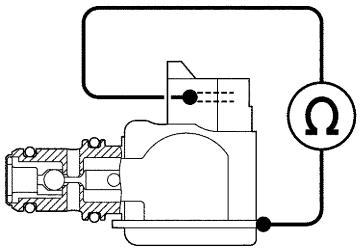
There is no open and no short circuit.

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

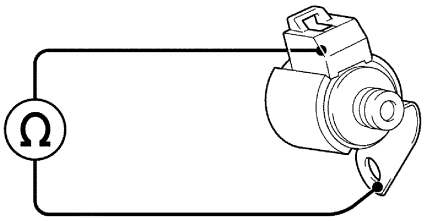
OK

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

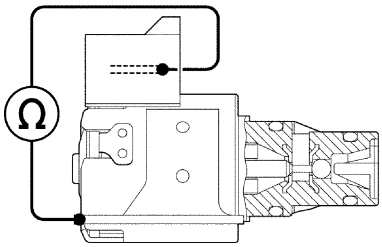
No.1 Solenoid Valve



No.2 Solenoid Valve



No.3 Solenoid Valve



D01882
D01890
D01884

D02236

Electrical Check:

PREPARATION:

(a) Remove the oil pan.

(b) Remove the No.1, No.2 or No.3 solenoid valve.

CHECK:

(a) Measure resistance between solenoid connector and body ground.

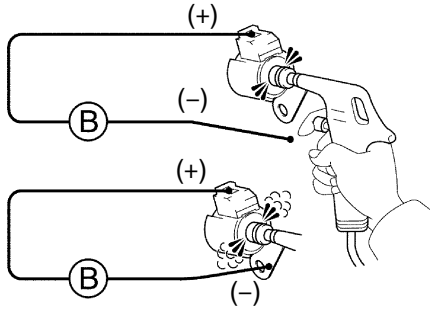
(b) Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

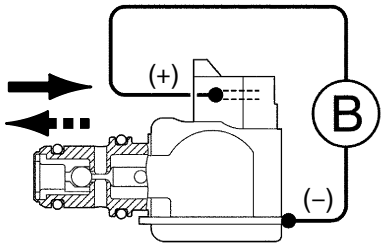
(a) Resistance: 11 ~ 15 Ω at 20 °C (68 °F)

(b) The solenoid makes an operating noise.

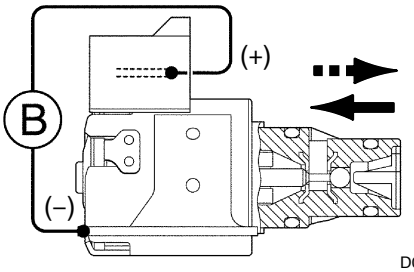
No.2 Solenoid Valve



No.1 Solenoid Valve



No.3 Solenoid Valve



D01777
D01881
D01883

D02230

Mechanical Check:

PREPARATION:

(a) Remove the oil pan.

(b) Remove the No.1, No.2 or No.3 solenoid valve.

CHECK:

1. No.2 solenoid valve:

(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 shift solenoid valves, check that the solenoid valves open.

2. No.1 and No.3 solenoid valves:

Connect the positive (+) lead with 8 ~ 10 W bulb to terminal 2 and the negative (–) lead to terminal 1, then check the movement of the valve.

OK:

When B$^+$ is applied.	Valve moves in ◀ direction in the illustration on the left.
When B$^+$ is cut off.	Valve moves in ■■■▶ direction in the illustration on the left.

NG → **Replace the solenoid valve.**

OK

Repair or replace the solenoid wire.

DI2LC–01

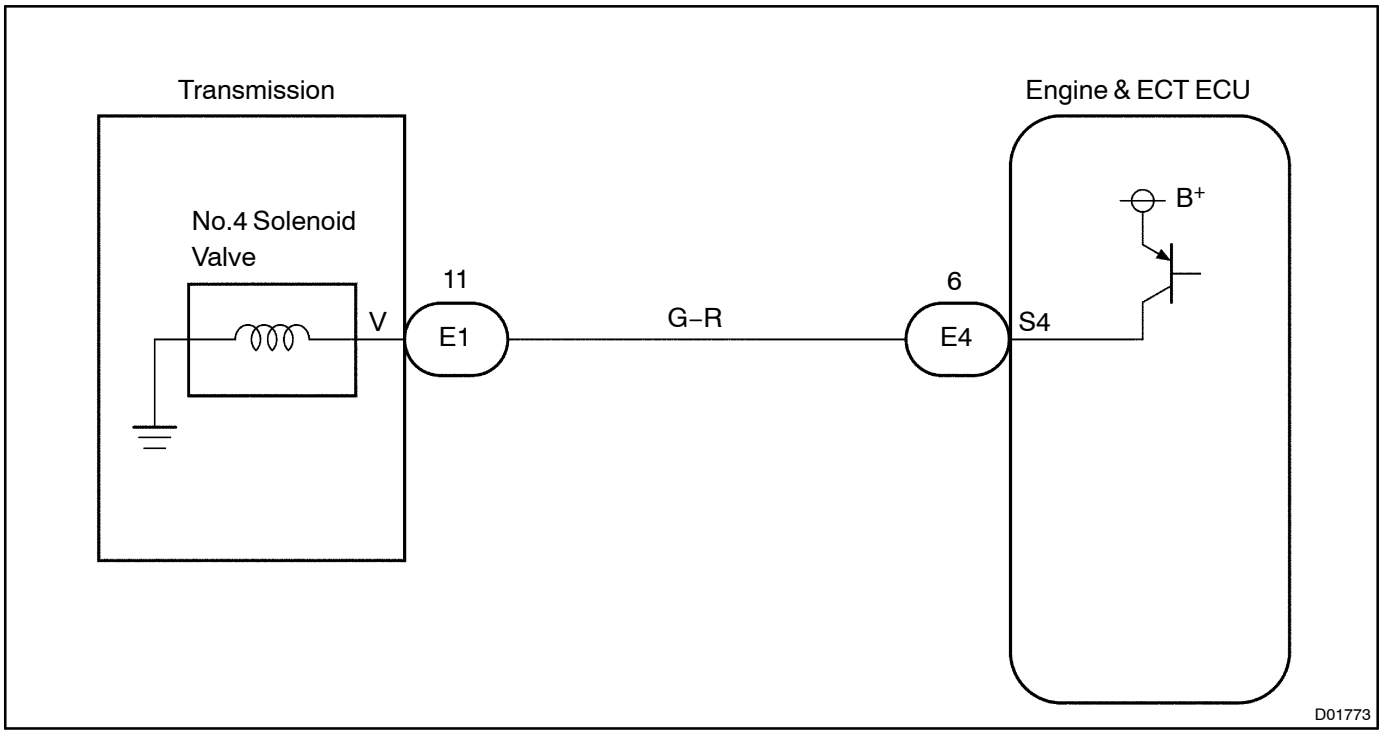
DTC	P0768/65	Shift Solenoid D Electrical Malfunction (No.4 Solenoid Valve)

CIRCUIT DESCRIPTION

No.4 solenoid valve is controlled by Engine & ECT ECU and it switches ON and OFF of the O/D direct switch.

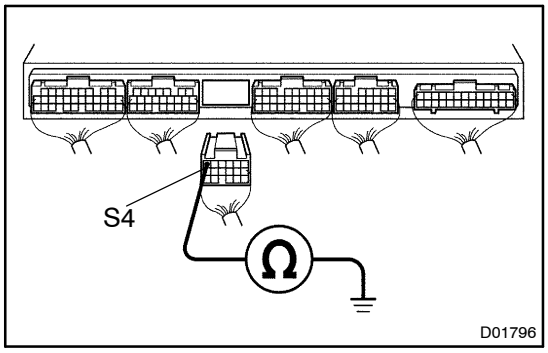
DTC No.	DTC Detecting Condition	Trouble Area
P0768/65	The Engine & ECT ECU checks for an open or short circuit in the No.4 solenoid valve circuit when it changes. The Engine & ECT ECU records DTC P0768/65 if condition (a) or (b) is detected once, but it does not light up PWR indicator light. After Engine & ECT ECU detects condition (a) or (b) continuously 8 times or more in 1 trip, it causes the PWR indicator light lights up until condition (a) or (b) disappears. After that, if the Engine & 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.4 solenoid valve circuit • No.4 solenoid valve • Engine & ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check resistance between terminals S4 of Engine & ECT ECU and body ground.

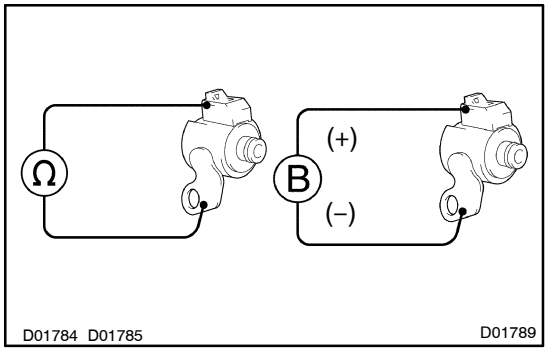


PREPARATION:
Disconnect the connector from Engine & ECT ECU.
CHECK:
Measure resistance between terminals S4 and body ground.
OK:
Resistance: 11 ~ 15 Ω at 20°C (68°F)

OK	Check and replace the Engine & ECT ECU (See page IN–29).

NG

2	Check No.4 solenoid valve.

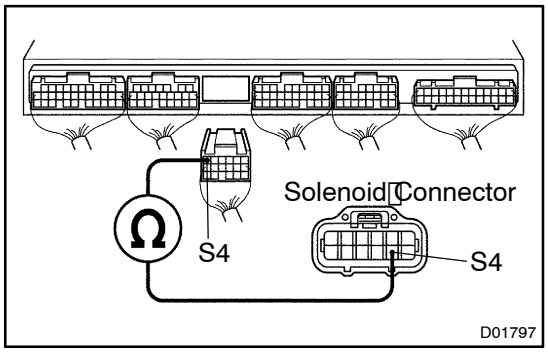


PREPARATION:
(a) Remove the oil pan.
(b) Remove the No.4 solenoid valve.
CHECK:
(a) Measure resistance between terminal and solenoid body.
(b) Connect positive (+) lead to terminal of solenoid connector and negative (–) lead to solenoid body.
OK:
(a) Resistance: 11 ~ 15 Ω at 20°C (68°F)
(b) The solenoid makes an operating noise.

NG	Replace No.4 solenoid valve.

OK

3	**Check harness and connector between Engine & ECT ECU and automatic transmission solenoid connector.**



PREPARATION:

Disconnect the solenoid connector from the automatic transmission.

CHECK:

Check the harness and connector between terminal S4 of Engine & ECT ECU and terminal S4 solenoid connector.

OK:

There is open and no short circuit.

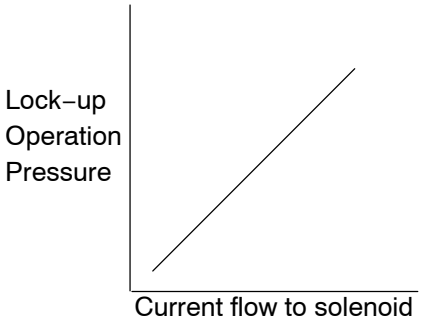
NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–151). However, when DTC P0768/65 is displayed, check and replace Engine & ECT ECU (See page IN–29).

DI2LD–01

DTC	P1755/68	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)

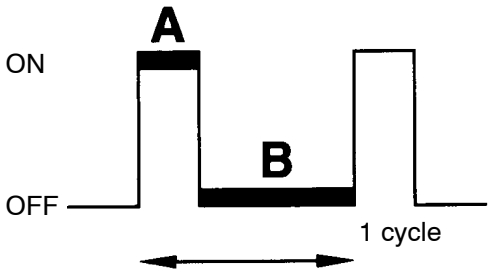


CIRCUIT DESCRIPTION

The amount of current flow to the solenoid is controlled by the (*) duty ratio of the Engine & 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

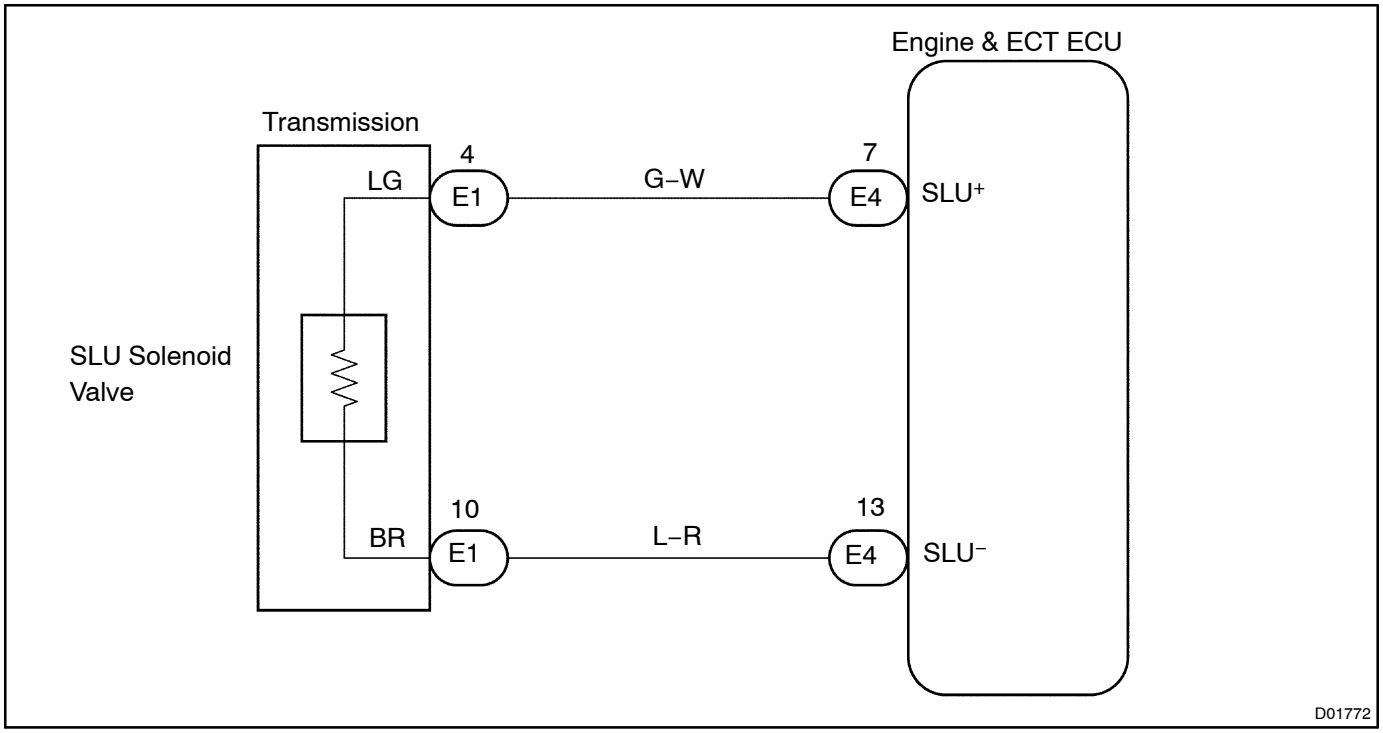
(*)

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

D00160

DTC No.	DTC detection condition	Trouble Area
P1755/68	The following condition is detected. (2–trip detection logic) 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 & ECT ECU • Automatic transmission assembly

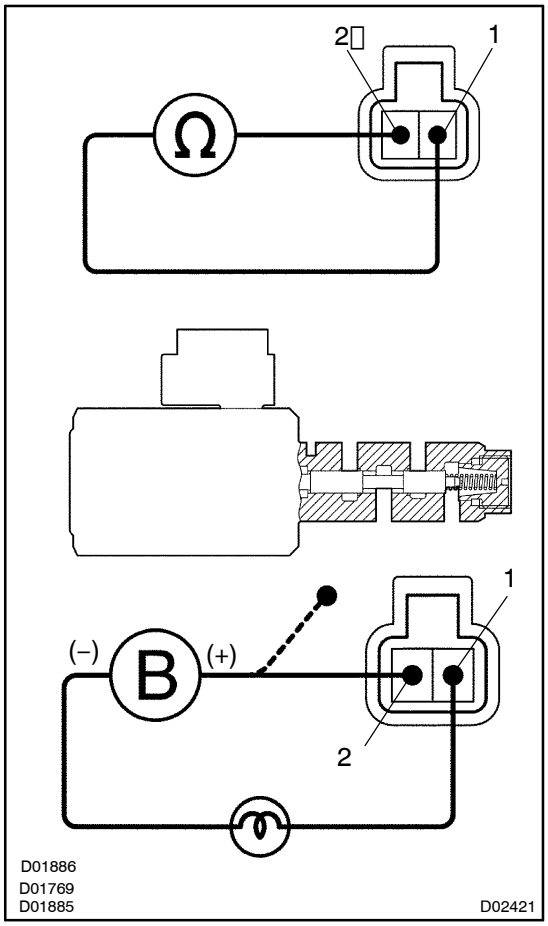
WIRING DIAGRAM



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 on the left.
When B+ is cut off.	Valve moves in ⬅ direction in the illustration on the left.

NG → **Replace SLU solenoid valve.**

OK

2	Check harness and connector between SLU solenoid valve and Engine & ECT ECU (See page IN–29).

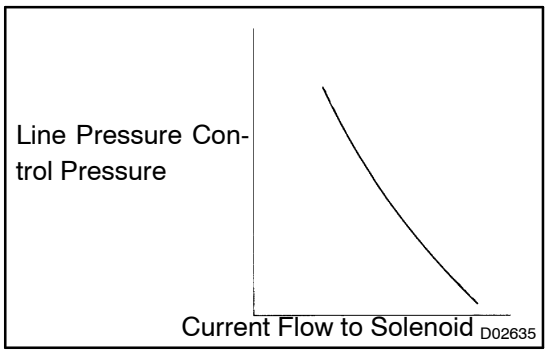
NG → **Repair or replace the harness or connector.**

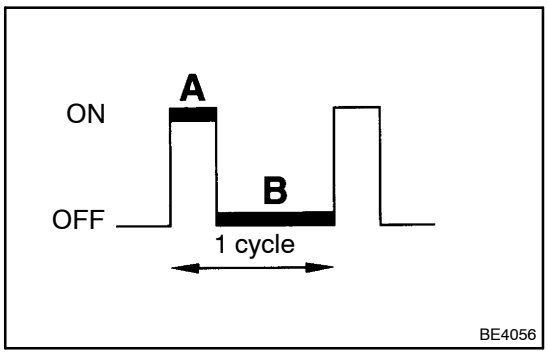
OK

Check and replace the Engine & ECT ECU (See page IN–29).

DI2LE–01

DTC	P1760/77	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)



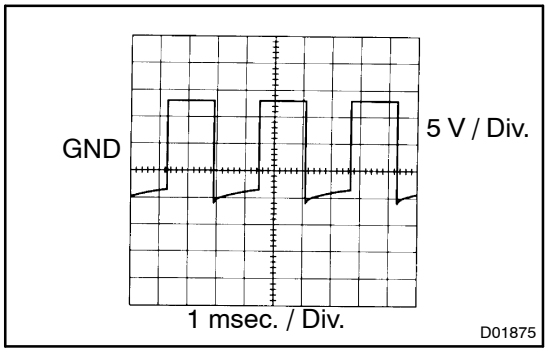


CIRCUIT DESCRIPTION

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 & 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

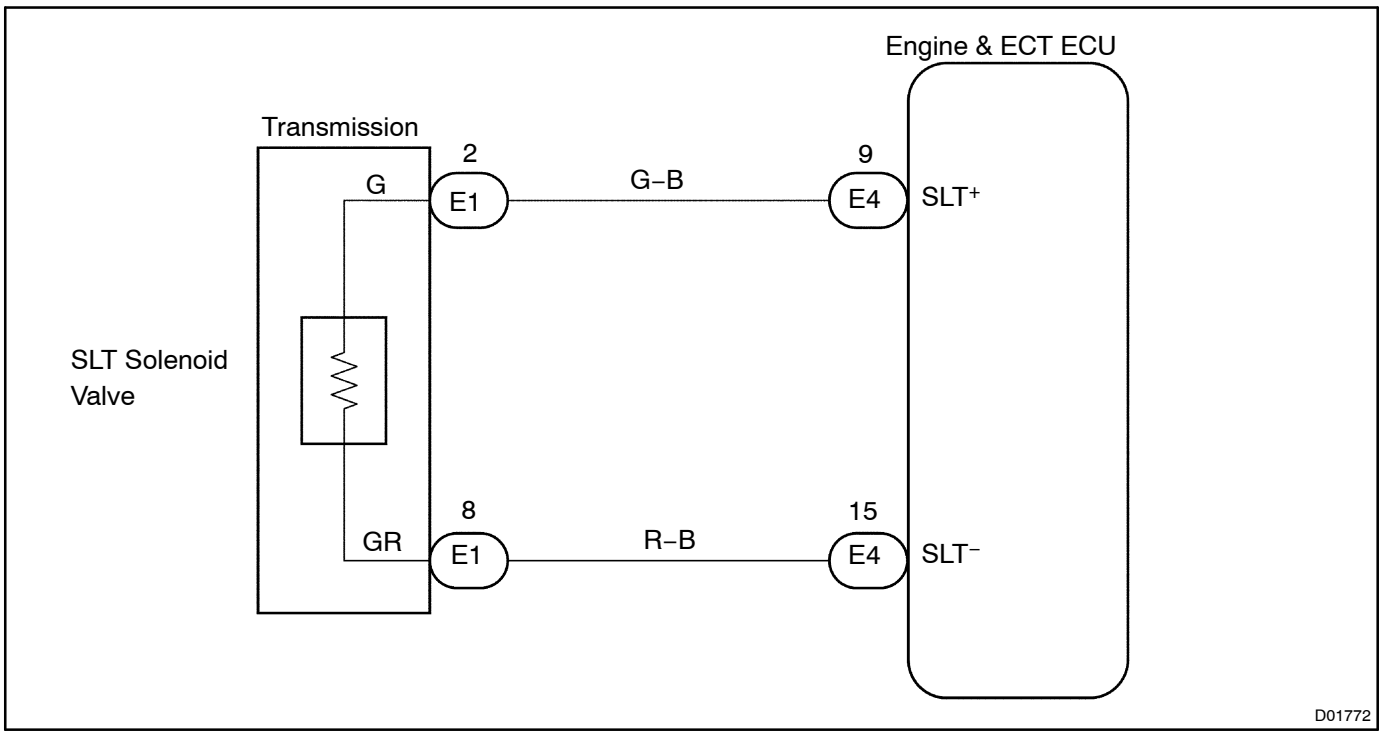
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

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 & ECT ECU



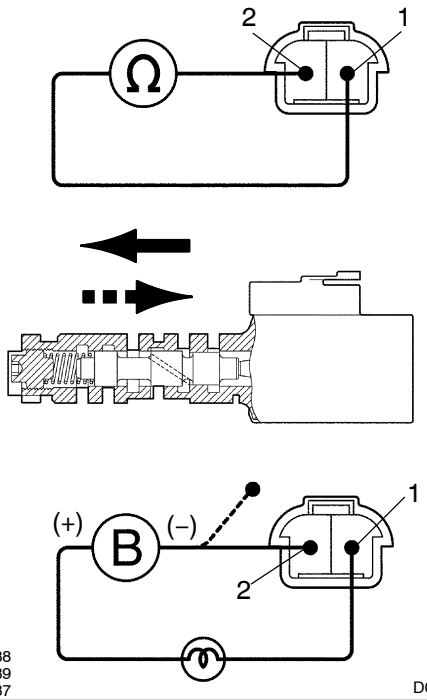
Reference
Refer to the chart for the wave form between terminals SLT+ and SLT–during engine idling.

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 on the left.
When battery positive voltage is cut off.	Valve moves in → direction in the illustration on the left.

NG → **Replace SLT solenoid valve.**

OK

2	Check harness and connector between SLT solenoid valve and Engine & ECT ECU (See page IN–29).

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

OK

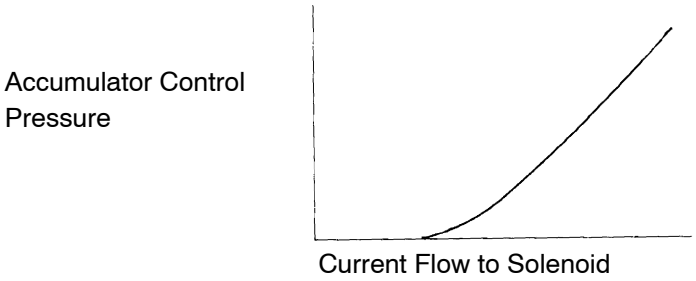
Check and replace Engine & ECT ECU (See page IN–29).

DI2LF–01

DTC	P1765/46	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLN Solenoid)

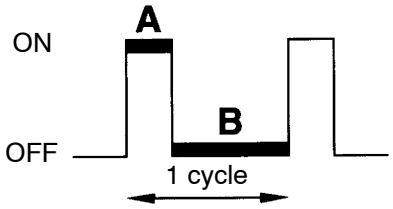
CIRCUIT DESCRIPTION

The SLN solenoid valve controls the hydraulic pressure acting on the accumulator control valve when gears are shifted and performs smooth gear shifting. The Engine & ECT ECU determines optimum operating pressure according to the signals from the throttle position sensor, vehicle speed sensor and O/D direct clutch speed sensor and controls the volume of current flow to the solenoid valve. The amount of current to the solenoid is controlled by the (*) duty ratio of Engine & ECT ECU output signals, causing a momentary charge to the hydraulic pressure acting on the clutches during gear shifting.
When the duty ratio is high, the hydraulic pressure acting on the clutches is low.



D02636

(*) 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

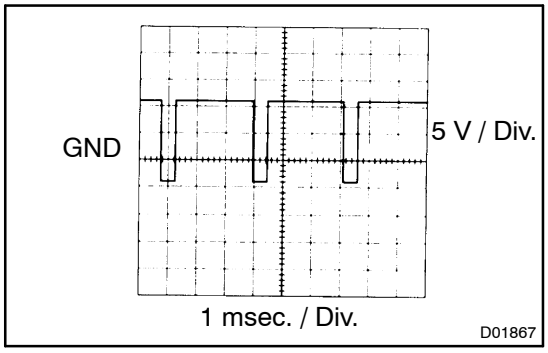


$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

BE4056

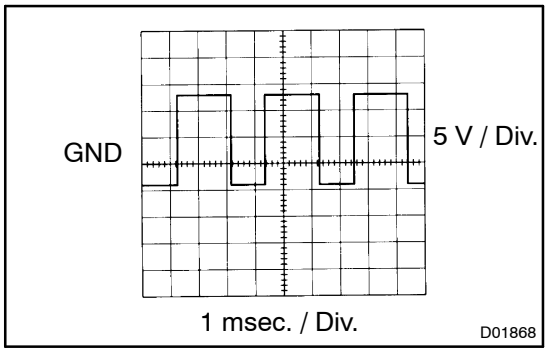
D02292

DTC No	DTC Detecting Condition	Trouble Area
P1765/46	All conditions below are detected for 1 second or more. (2–trip detection logic) (a) Engine & ECT ECU outputs duty signal to SLN solenoid valve at 90 % or higher duty ratio (b) Current to shift solenoid valve SLN: 230 ~ 430 mA or less	• Open or short in SLN solenoid valve circuit • SLN solenoid valve • Engine & ECT ECU



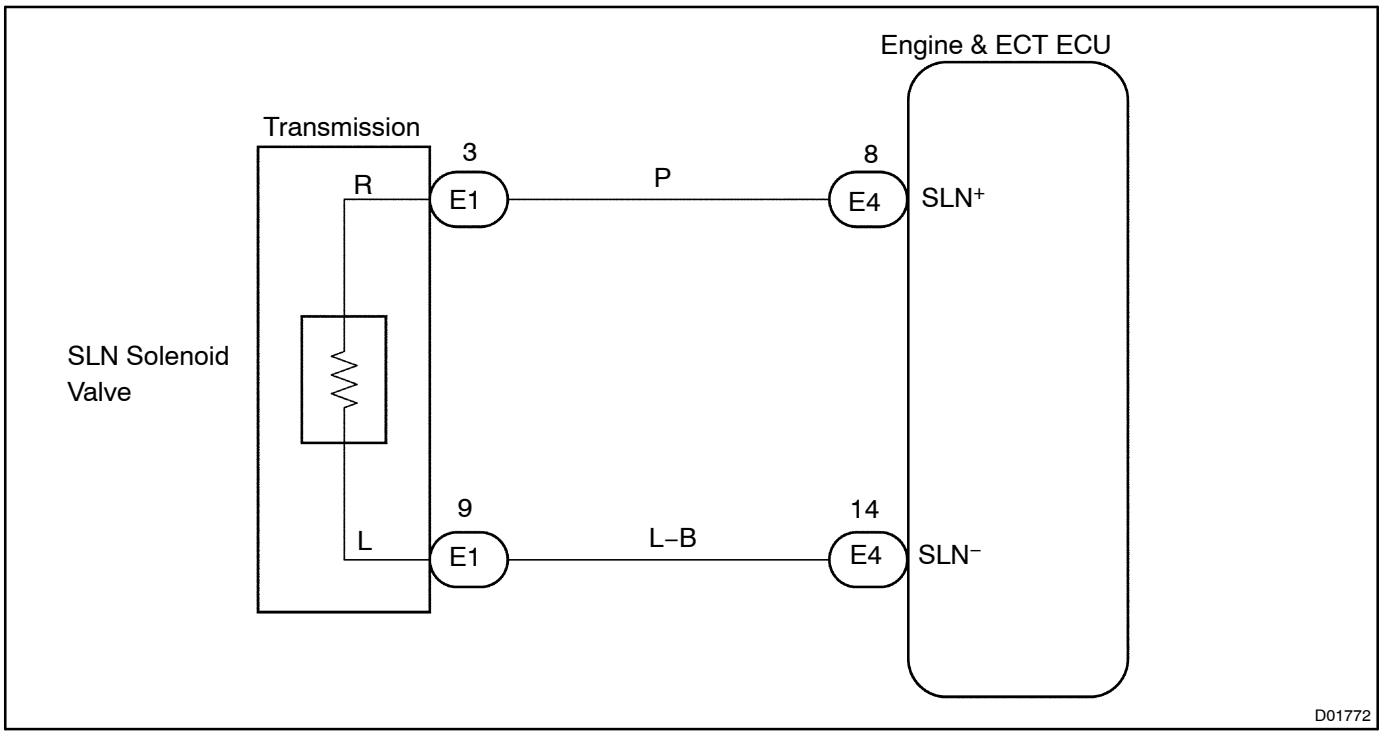
Reference

Refer to the chart for the wave form between terminals SLN– and E1 when engine is idling.



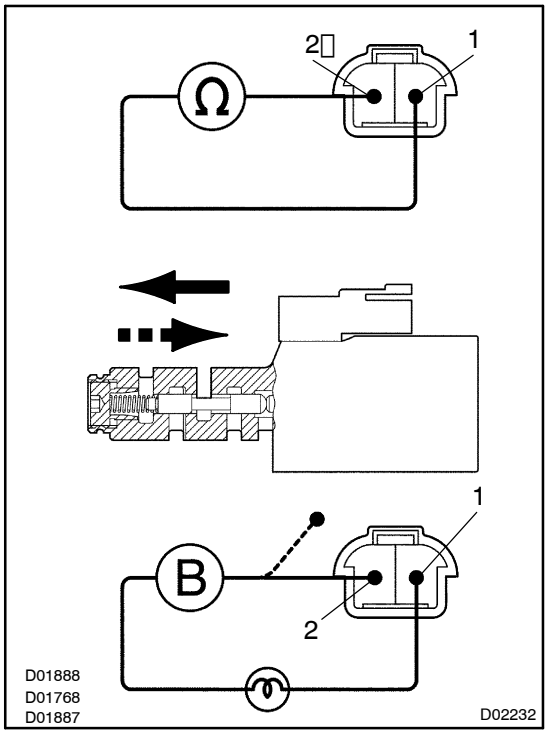
Refer to the chart for the wave form between terminals SLN– and E1 during shift change.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check SLN 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 on the left.
When battery positive voltage is cut off.	Valve moves in ■■► direction in the illustration on the left.

NG → **Replace SLN solenoid valve.**

OK

2	Check harness and connector between SLN solenoid valve and Engine & ECT ECU (See page IN–29).

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

OK

Check and replace Engine & ECT ECU (See page IN–29).

DI2LM–01

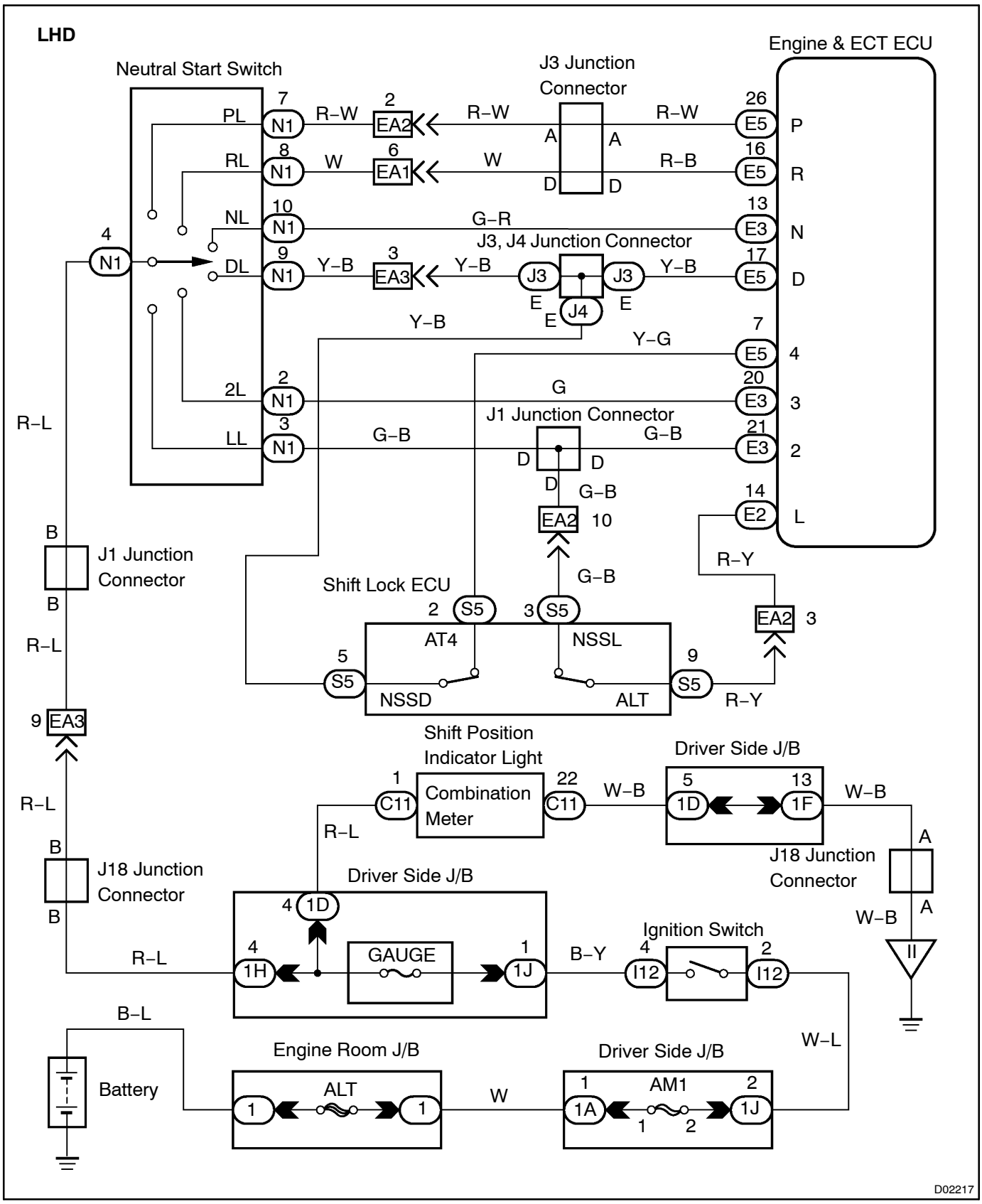
DTC	P1780/97	Park/Neutral Position Switch Circuit (Neutral Start Switch)

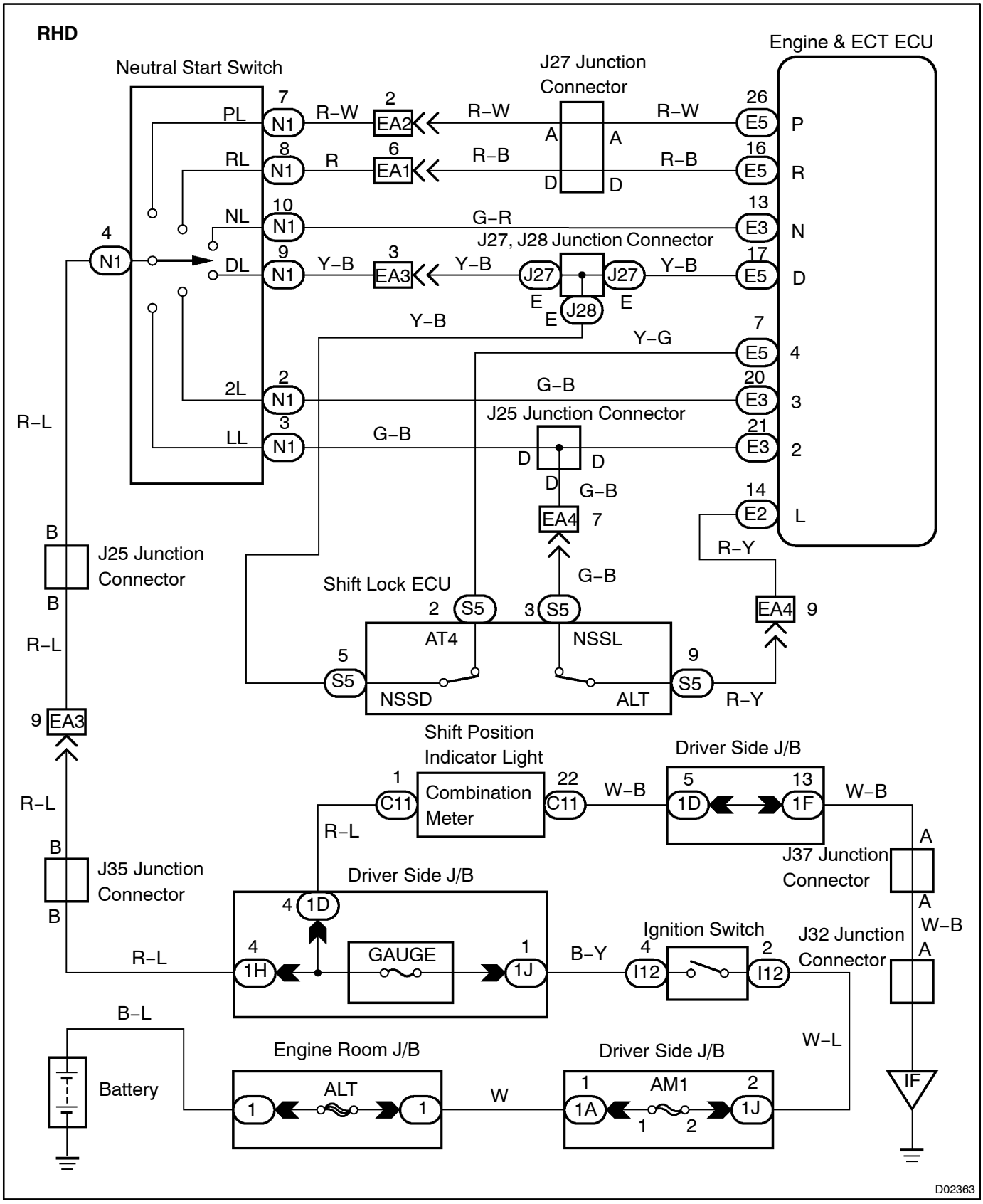
CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever range and sends signals to the Engine & ECT ECU.
The Engine & ECT ECU receives signals (NSW, R, 2 and L) from the neutral start switch. When the signal is not sent to the Engine & ECT ECU from the neutral start switch, the Engine & ECT 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, 2 and L ranges. (2–trip detection logic)	• Short in neutral start switch circuit • Neutral start switch • Engine & ECT ECU
	When driving under conditions (a) and (b) for 30 seconds or more, the 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




RHD
Engine & ECT ECU
Neutral Start Switch
J27 Junction Connector
PL
RL
NL
DL
2L
LL
R–W
R
Y–B
G–R
G–B
R–B
Y–G
R–L
J27, J28 Junction Connector
J25 Junction Connector
J35 Junction Connector
Shift Lock ECU
AT4
NSSL
NSSD
ALT
Shift Position Indicator Light
Combination Meter
Driver Side J/B
J37 Junction Connector
J32 Junction Connector
Ignition Switch
GAUGE
B–Y
W–B
W–L
B–L
Battery
Engine Room J/B
ALT
W
Driver Side J/B
AM1
IF
D02363

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, 4TH, 3RD, 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, 4, 3, 2 and L ranges, and read the PNP, REVERSE, 2ND and LOW signals on the hand–held tester.

OK:

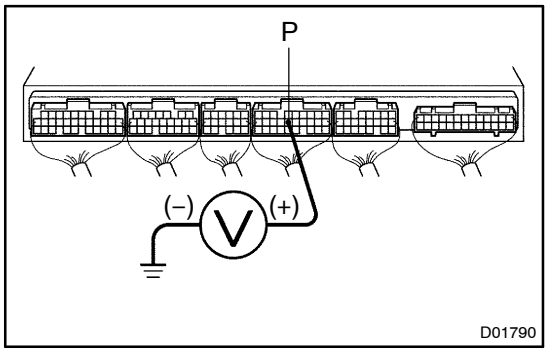
Shift range	Signal
P, N	PNP : OFF → ON
R	REVERSE : OFF → ON
D	DRIVE : OFF → ON
4	4TH : OFF → ON
3	3RD : OFF → ON
2	2ND : OFF → ON
L	LOW : OFF → ON

OK → **Check and replace the Engine & ECT ECU (See page IN–29).**

NG

Go to step 3.

2	**Measure voltage between each terminals of P, R, N, D, 4, 3, 2, and L of Engine & ECT ECU and body ground.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between each terminals P, R, N, D, 4, 3, 2 and L of Engine 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*
N – Body ground	Shift lever range N	Battery positive voltage
D – Body ground	Shift lever range D Transmission control SW (for D and 4) OFF	Battery positive voltage
4 – Body ground	Shift lever range 4 Transmission control SW (for D and 4) ON	Battery positive voltage
3 – Body ground	Shift lever range 3	Battery positive voltage
2 – Body ground	Shift lever range 2 Transmission control SW (for 2 and L) OFF	Battery positive voltage
L – Body ground	Shift lever range L Transmission control SW (for 2 and L) ON	Battery positive voltage

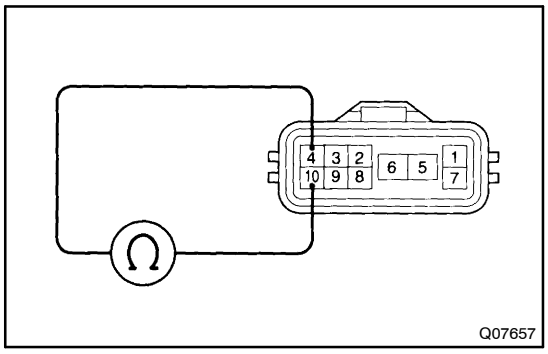
HINT:

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

OK	**Check and replace the Engine & ECT ECU (See page IN–29).**

NG

3	Check neutral start switch.



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	4 – 7	5 – 6
R	4 – 8	–
N	4 – 10	5 – 6
D, 4	4 – 9	–
3	2 – 4	–
2, L	3 – 4	–

NG → Replace the neutral start switch.

OK →

Repair or replace harness and connector between battery and neutral start switch, neutral start switch and Engine & ECT ECU (See page IN–29).

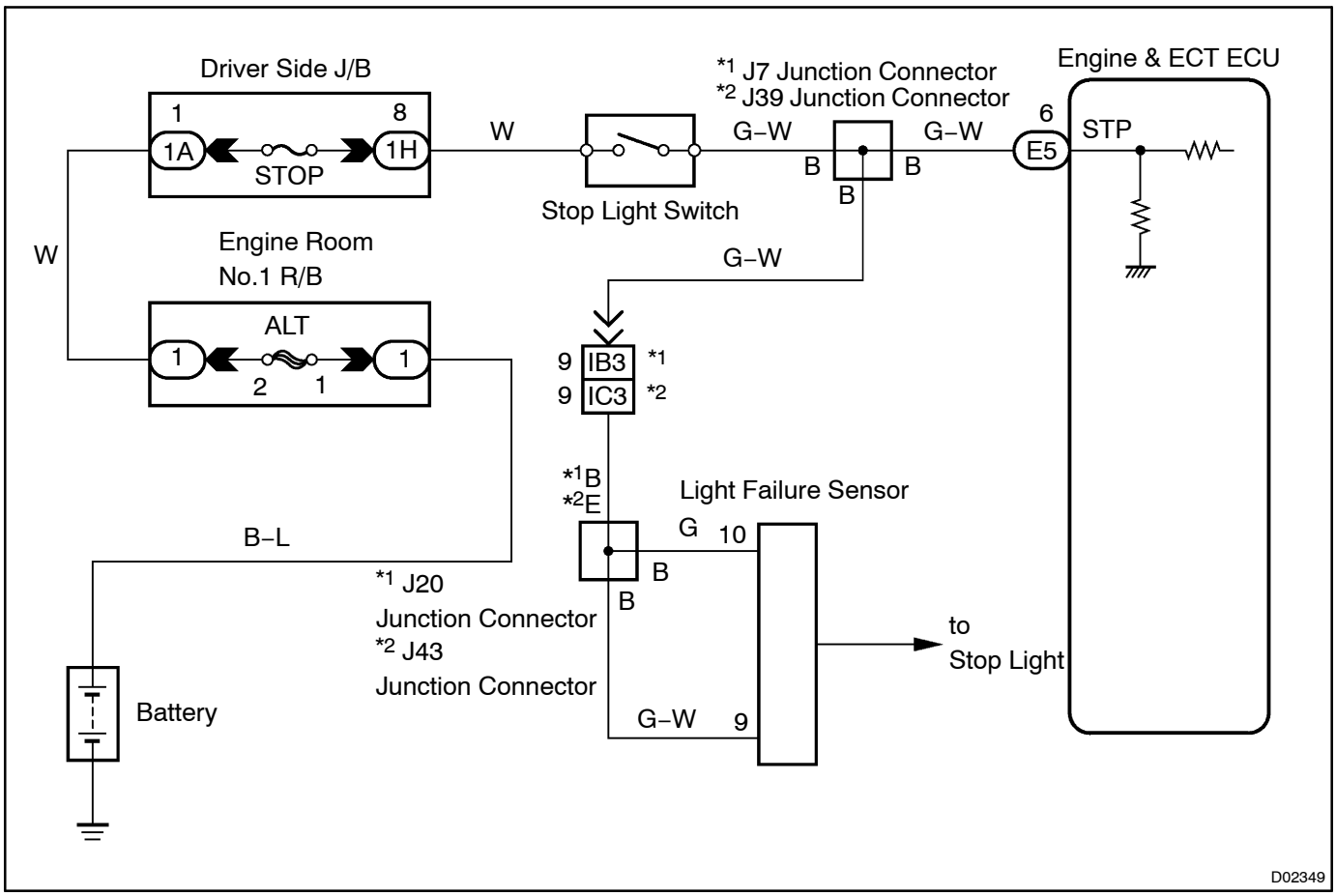
DI2LN–01

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 & ECT ECU. Then the Engine & ECT ECU cancels operation of the lock–up clutch while braking is in progress.

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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

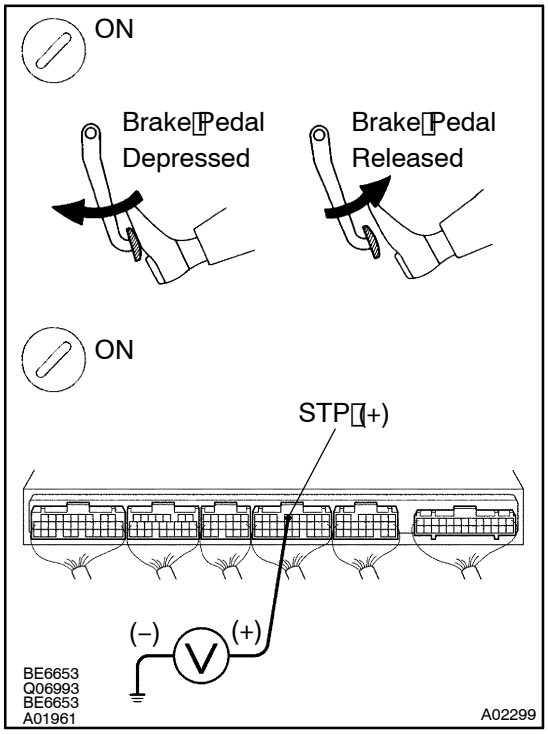
1	**Check operation of stop light.**

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 instrument panel under cover.
(b) Turn the ignition switch ON.
CHECK:
Check voltage between terminal STP of the Engine & 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 & ECT ECU and stop light switch (See page IN–29).

NG → Repair or replace harness or connector.

OK →

Check and replace Engine & ECT ECU (See page IN–29).

DI2OB–01

Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

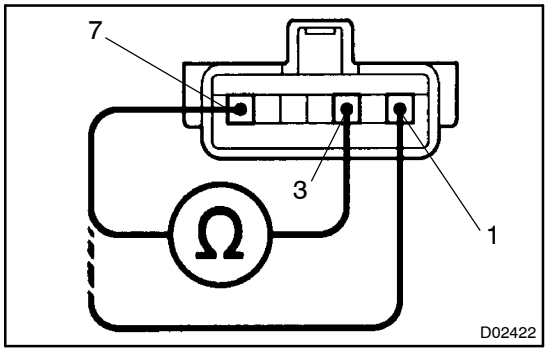
The ECM memory contains the shift programs for the NORMAL, POWER and SNOW patterns, 2 position, L position and the lock–up patterns. By following the programs corresponding to the signals from the pattern select switch, the park/neutral position and other various sensors, the ECM switches the solenoid valves ON and OFF, and controls the transmission gear change and the lock–up clutch operation.

WIRING DIAGRAM

See page DI–634.

INSPECTION PROCEDURE

1	**Check pattern select switch.**



PREPARATION:

Disconnect the pattern select switch connector.

CHECK:

Check continuity between each terminal of pattern select switch connector when the select switch is set to PWR, NORM or SNOW positions.

OK:

Switch condition	Tester connection	Specified condition
PWR	3 – 7	Continuity
NORM	1 – 3, 3 – 7	No continuity
SNOW	1 – 3	Continuity

If the continuity is not as specified, replace the switch.

DI2LG–01

Transmission Control Switch Circuit

CIRCUIT DESCRIPTION

When the shift lever is in the 4 range (with transmission control switch for D and 4 pressed), "4" 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 4 released), "D" in the shift position indicator light will come on.
When the shift lever is in the L range (with transmission control switch for 2 and L pressed), "L" in the shift position indicator light will come on and when the shift lever is in the 2 range (with transmission control switch for 2 and L released), "2" in the shift position indicator light will come on.
When the shift lever is in 4 range, the Engine & ECT ECU prohibits shifting to 5th.

WIRING DIAGRAM

See page DI–1992.

INSPECTION PROCEDURE

1	**Check operation of transmission control switch.**

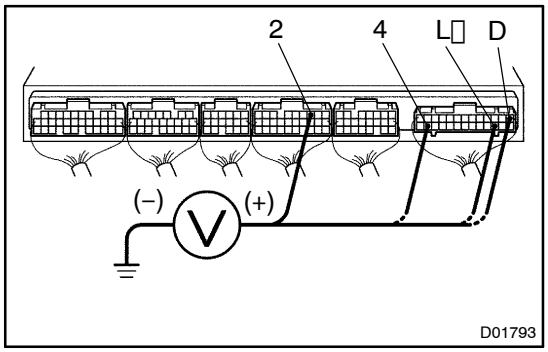
PREPARATION:
Turn ignition switch ON.
CHECK:
Check shift indicator light when the shift lever is in the each range.
OK:

Shift lever range	Specified condition
D	"D" indicator light comes on
Except D	"D" indicator light goes off
4	"4" indicator light comes on
Except 4	"4" indicator light goes off
2	"2" indicator light comes on
Except 2	"2" indicator light goes off
L	"L" indicator light comes on
Except L	"L" indicator light goes off

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–1561).**

NG

2	**Check voltage between each terminals of D, 4, 2 and L of Engine & ECT ECU and body ground.**



PREPARATION:

Remove the Engine & ECT ECU with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Check voltage between each terminals of D, 4, 2 and L of Engine & ECT ECU and body ground.

OK:

Tester connection	Shift lever range	Specified condition
D – Body ground	D or 4	9 – 14 V
	Except D and 4	Below 1.5 V
4 – Body ground	4	9 – 14 V
	Except 4	Below 1.5 V
2 – Body ground	2 or L	9 – 14 V
	Except 2 and L	Below 1.5 V
L – Body ground	L	9 – 14 V
	Except L	Below 1.5 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–151).**

NG

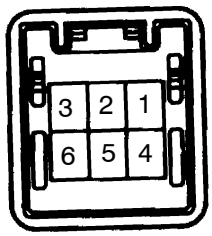
3	**Check harness and connector between battery and Engine & ECT ECU, Engine & ECT ECU and shift indicator light (See page IN–29).**

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

OK

Check and replace Engine & ECT ECU (See page IN–29).

4	**Check transmission control switch.**



D02237

CHECK:

(a) Disconnect the transmission control switch connector.

(b) Check continuity between each terminal of transmission control switch connector.

OK:

Shift range	Tester condition	Specified value
D	1 – 2	No continuity
4	1 – 2	Continuity
2	4 – 5	No continuity
L	4 – 5	Continuity

NG → **Replace transmission control switch.**

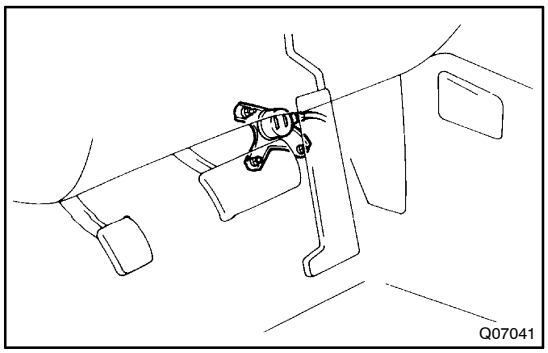
OK

Check and replace combination meter (See combination meter troubleshooting section on page BE–3).

DI2LH–01

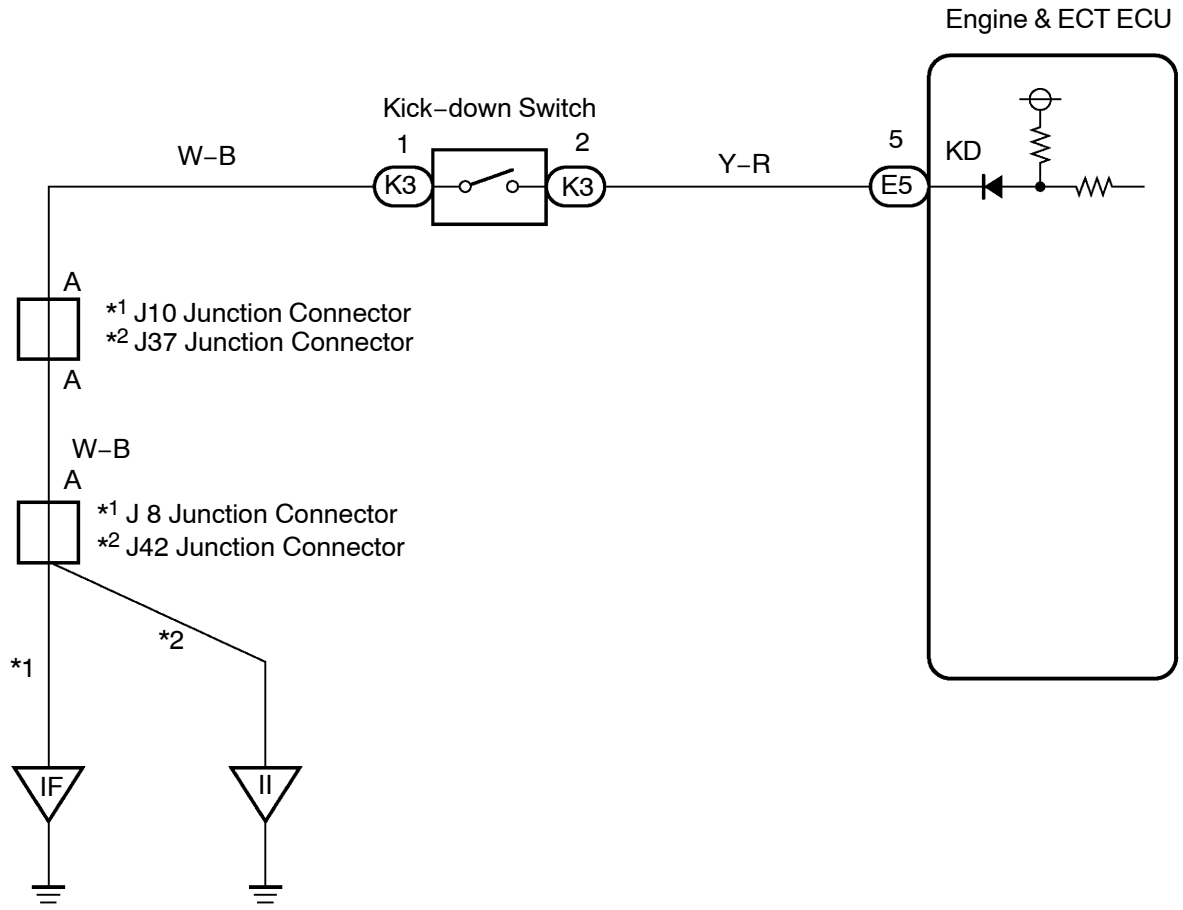
Kick–down Switch Circuit

CIRCUIT DESCRIPTION



The kick–sown switch is turned ON when the accelerator pedal is depressed to the full throttle and sends signals to Engine & ECT ECU.
When the kick–down switch is turned ON, the Engine & ECT ECU controls gear shifting according to the programmed shift diagrams.
If a short circuit develops in the kick–down switch, the Engine & ECT ECU disregards the kick–down signals and controls shifting at the normal shift points.

WIRING DIAGRAM

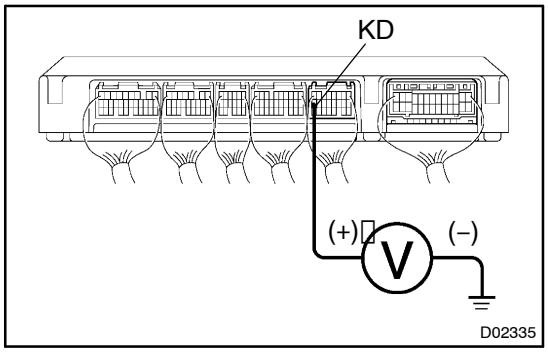


*1: LHD
*2: RHD

D02351

INSPECTION PROCEDURE

1	Check voltage between terminal KD of Engine & ECT ECU and body ground.



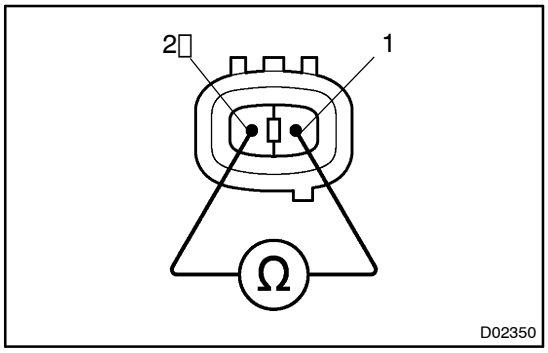
PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal KD of Engine & ECT ECU and body ground when accelerator pedal is fully depressed or not.
OK:

Accelerator pedal	Voltage
Fully depressed (Kick–down switch is ON)	Below 1 V
Released (Kick–down switch is OFF)	10 – 14 V

OK	Proceed to next circuit inspection shown in problem symptoms table (See page DI–151).

NG

2	Check kick–down switch.



PREPARATION:
Disconnect the kick–down switch connector.
CHECK:
Measure continuity between terminals 1 and 2 of the kick–down switch connector when kick–down switch is ON and OFF.
OK:

Kick–down switch	Continuity
ON	Continuity
OFF	No continuity

NG	Replace the kick–down switch.

OK

3	Check harness and connector between Engine & ECT ECU and kick–down switch, kick–down switch and body ground (See page IN–29).

NG → Repair or replace harness or connector.

OK →

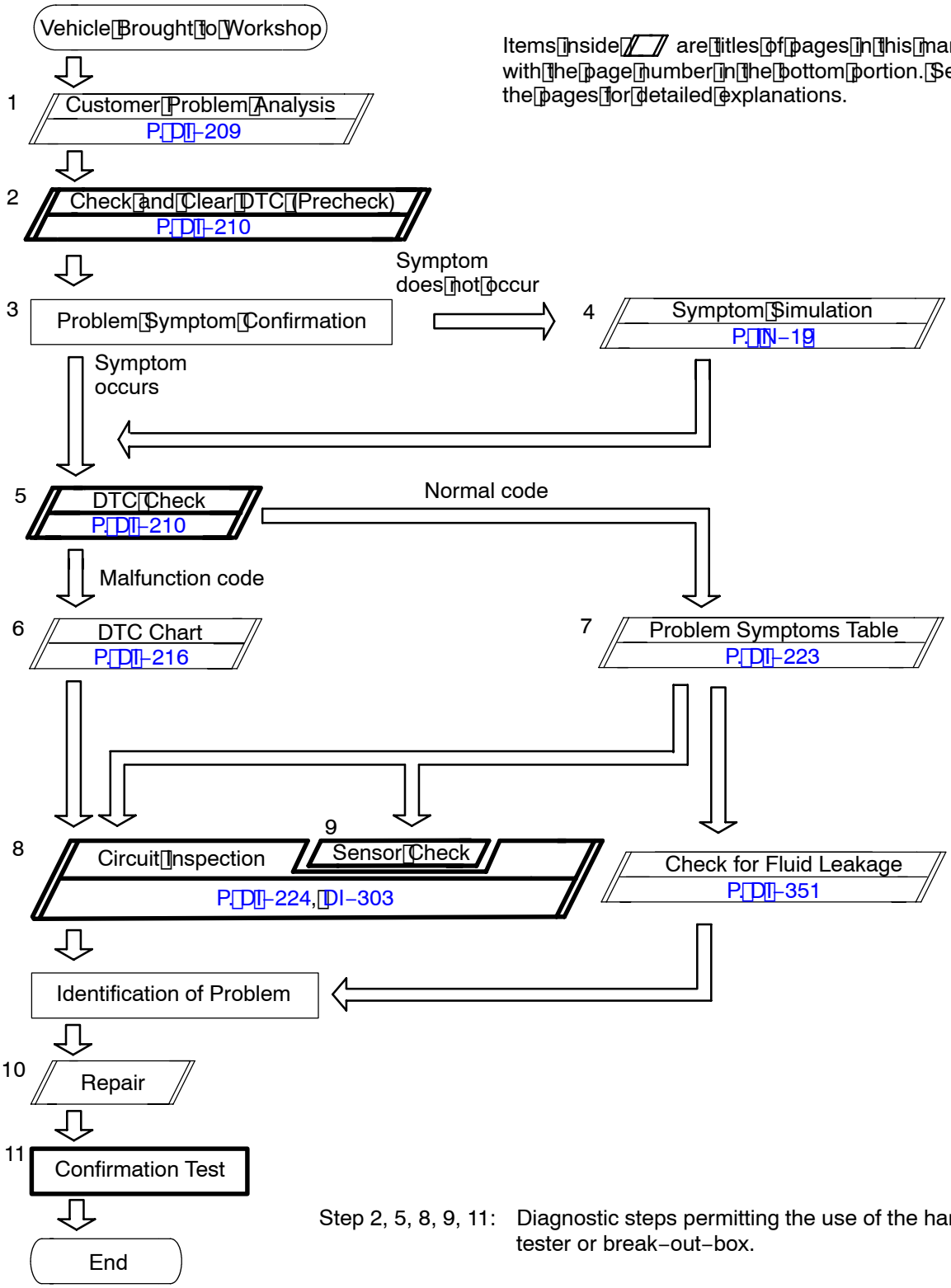
Check and replace Engine & ECT ECU (See page IN–29).

ABS & HYDRAULIC BRAKE BOOSTER POWER SUPPLY SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI284–03

Troubleshooting 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.

DI28S–02

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & Hydraulic Brake Booster Power Supply System

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	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Light Abnormal (PKB released)	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Buzzer Abnormal	☐ Sounds ☐ Does not sounds

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

DI28T–02

PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Check the warning lights and buzzer.

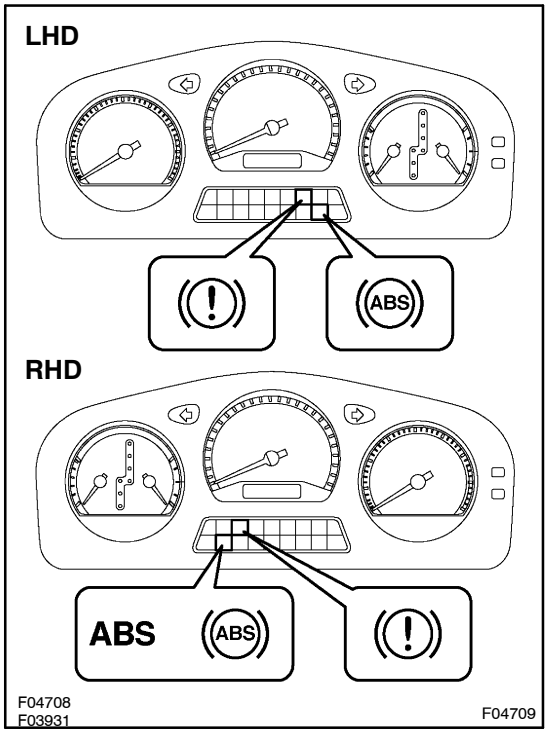
(1) Release parking brake pedal.

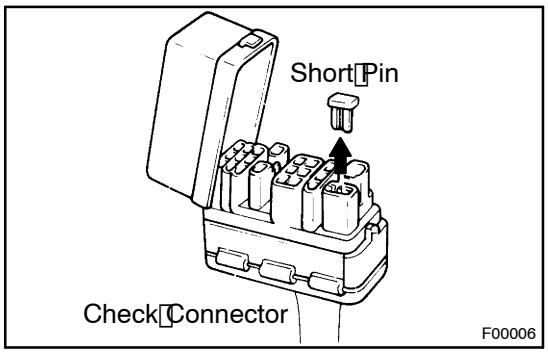
(2) When the ignition switch is turned ON, check that the ABS and BRAKE warning lights goes on for 3 seconds.

(3) When depressing the brake pedal repeatedly it may turn on the warning lights and buzzer.

HINT:

If the indicator check result is not normal, proceed to trouble-shooting for the ABS warning light circuit (See page DI–292).





(b) In case of not using hand–held tester:
Check the DTC.

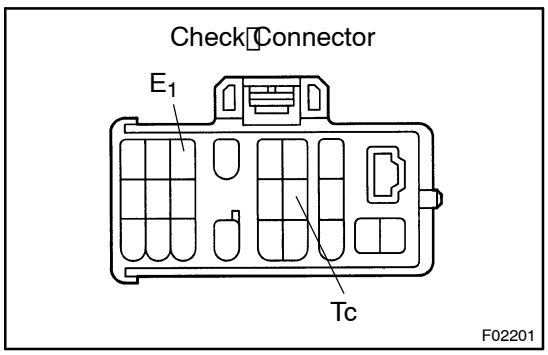
(1) Disconnect the short pin from check connector.

(2) Using SST, connect terminals Tc and E_1 of check connector.

SST 09843 – 18020

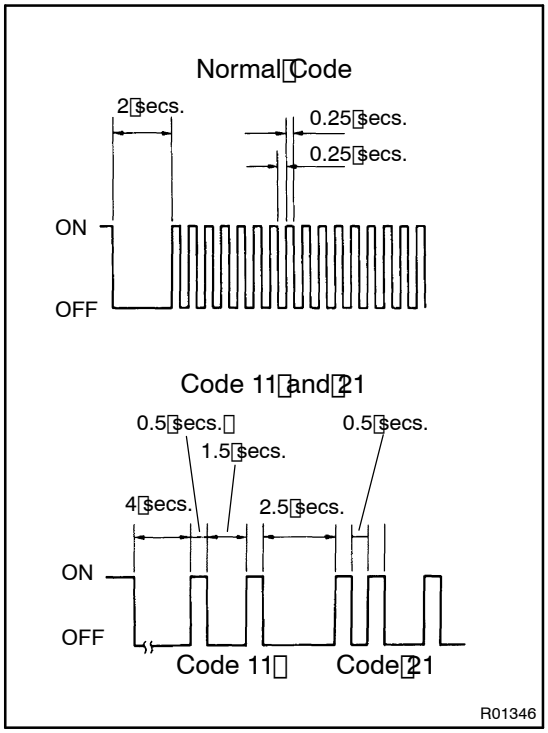
(3) Turn the ignition switch ON.

(4) Read the DTC from the ABS warning light on the combination meter.



HINT:

- If no code appears, inspect the diagnostic circuit or ABS warning light circuit (See page DI–301 or DI–292).

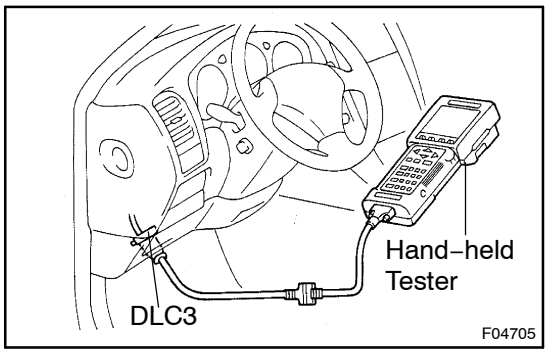


• As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(5) Codes are explained in the code table on page DI–216.

(6) After completing the check, disconnect terminals Tc and E_1, and turn off the display.

If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.



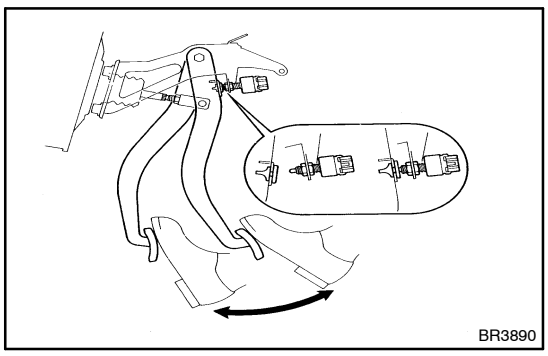
(c) In case of not using hand–held tester:
Check the DTC.

(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.



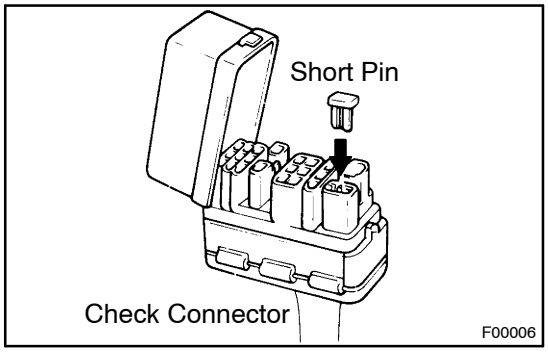
(d) In case of not using hand–held tester:
Clear the DTC.

(1) Using SST, connect terminals Tc and E_1 of check connector and remove the short pin from check connector.
SST 09843 – 18020

(2) Turn the ignition switch ON.

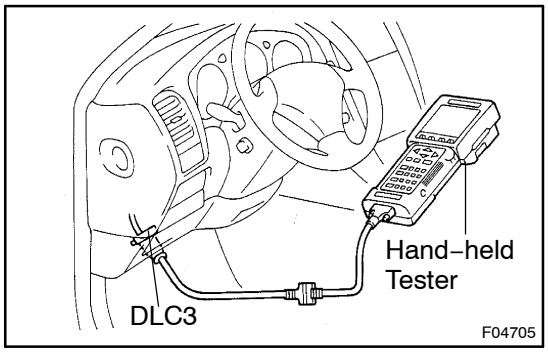
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.

(4) Check that the warning light shows the normal code.

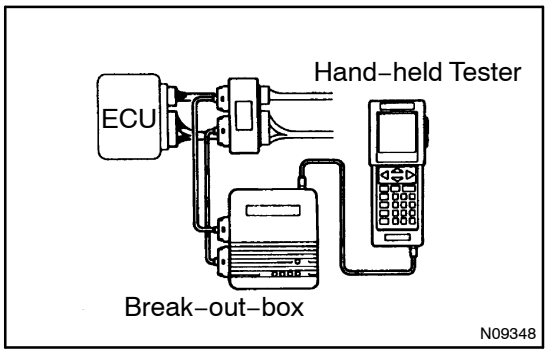


(5) Remove the SST from the terminals of check connector.
SST 09843 – 18020
(6) Connect the short pin to check connector.

HINT:
Disconcerting the battery cable during repairs will not erase the DTC in the ECU.

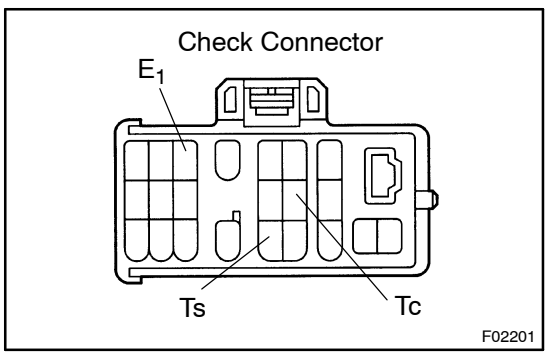


(e) In case of using hand–held tester:
Clear the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes. (See hand–held tester operator's manual.)



(f) (Reference):
Using break–out–box and hand–held tester, measure the ECU terminal values.
(1) Turn the ignition switch OFF.
(2) Hook up the break–out–box and hand–held tester to the vehicle.
(3) Turn the ignition switch ON.
(4) Read the ECU input/output values by following the prompts on the tester screen.

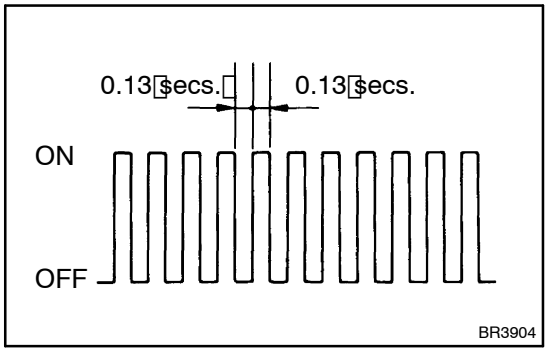
HINT:
- Hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
- Please refer to the hand–held tester/break–out–box operator's manual for further details.



2. SENSOR SIGNAL CHECK (TEST MODE)

HINT:
If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.

(a) In case of not using hand–held tester:
Check the sensor signal.
(1) Turn the ignition switch OFF.
(2) Using SST, connect terminals Ts and E_1 of check connector.
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 and Ts circuit (See page DI–292, DI–303).

(5) Keep the vehicle in the stationary condition on the flat place for 1 sec. or more.

(6) Leaving the vehicle in the stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with 98 N (10 kgf, 22 lbf) of force or more for 1 sec. or more.

(7) Leaving the vehicle in the stationary condition, depress the brake pedal with 980 N (100 kgf, 221 lbf) of force or more quickly.

HINT:

At this time, the ABS warning light comes on for 3 secs.

(8) Drive vehicle straightforward.
When driving the vehicle with the speed faster than 45 km/h (28 mph) for several seconds, check that the ABS warning light comes off.

HINT:

There is a case that the sensor check is not completed if the vehicle has its rear wheels spun or its steering wheel steered during this check.

(9) Stop the vehicle.

(10) Using SST, connect terminals Tc and E_1 of check connector.

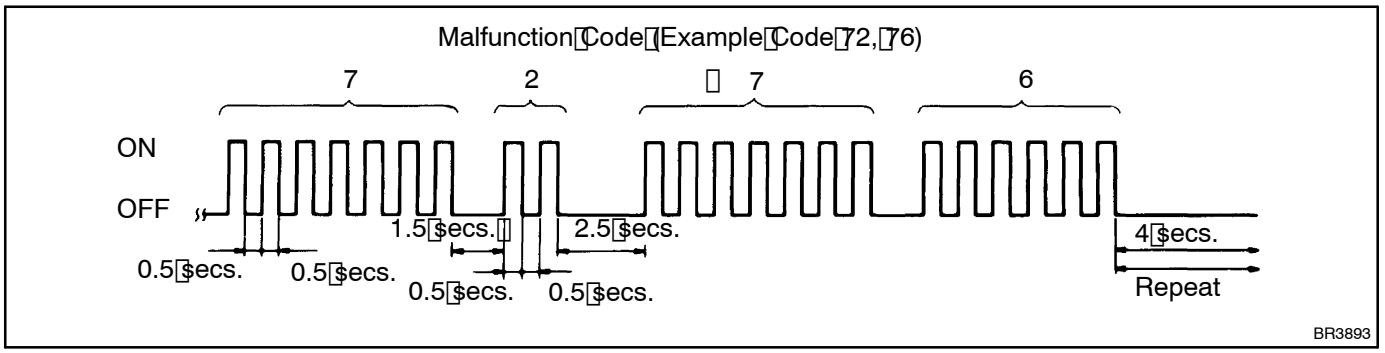
SST 09843 – 18020

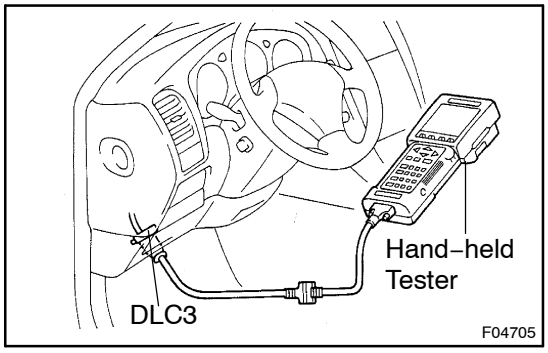
(11) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC on next page.
- If every sensor is normal, a normal code is output (A cycle of 0.25 secs. ON and 0.25 secs. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.

(12) After doing the check, disconnect terminals Ts and E_1, Tc and E_1 of check connector, and turn the ignition switch OFF.





(b) In case of using hand–held tester:
Check the sensor signal.
(1) Hook up the hand–held tester to the DLC3.
(2) Do step (3) to (9) on the previous page.
(3) Read the DTC by following the prompts on the tester screen.

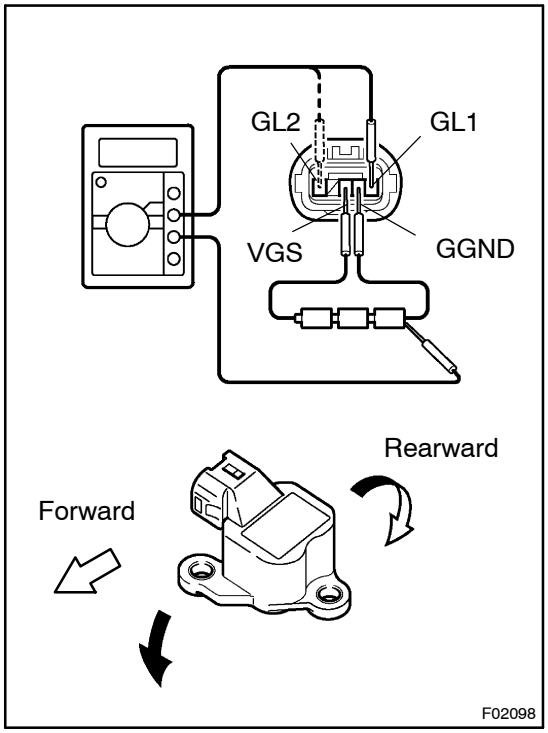
HINT:
Please refer to the hand–held tester operator's manual for further details.

Check the DTC of the sensor function.

Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Sensor rotor
C1272 / 72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Sensor rotor
C1273 / 73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Sensor rotor
C1274 / 74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	• Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of left front speed sensor	• Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	• Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of left rear speed sensor	• Left rear speed sensor rotor
C1279 / 79	Deceleration sensor is faulty	• Deceleration sensor • Sensor installation
C1281 / 81	Master cylinder pressure sensor output signal is faulty	• Master cylinder pressure sensor

3. DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM

CAUTION:
While checking the deceleration sensor operating diagnosis system, ABS does not work and brake system works as a conventional brake system.



4. DECELERATION SENSOR CHECK

(a) Connect 3 dry batteries of 1.5 V in series.

(b) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (–) terminal, apply about 4.5 V between VGS and GGND terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VGS and GGND.

(c) Check the output voltage of GL1 and GL2 terminals.

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean forward	0.4 V – about 2.3 V
GL1	Lean rearward	About 2.3 V – 4.1 V
GL2	Horizontal	About 2.3 V
GL2	Lean forward	About 2.3 V – 4.1 v
GL2	Lean rearward	0.4 V – about 2.3 V

HINT:

- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.

DI28U–02

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

When removing the part, turn the ignition switch OFF.

HINT:

- Using SST 09843 – 18020, connect the terminals Tc and E_1, 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 that 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 No. (See Page)	Detection Item	Trouble Area
C0278 / 11*1 (DI–233)	Open or short circuit in ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit
C0279 / 12*1 (DI–233)	B+ short circuit in ABS solenoid relay circuit	
C0226 / 21*1 (DI–230)	Open or short circuit in hydraulic brake booster solenoid circuit (SFR circuit)	• Hydraulic brake booster • SFRR or SFRH circuit
C0236 / 22*1 (DI–230)	Open or short circuit in hydraulic brake booster solenoid circuit (SFL circuit)	• Hydraulic brake booster • SFLR or SFLH circuit
C0246 / 23*1 (DI–230)	Open or short circuit in hydraulic brake booster solenoid circuit (SRR circuit)	• Hydraulic brake booster • SRRR or SRRH circuit
C0256 / 24*1 (DI–230)	Open or short circuit in hydraulic brake booster solenoid circuit (SRL circuit)	• Hydraulic brake booster • SRLR or SRLH circuit
C1225 / 25*1 (DI–238)	Open or short circuit in hydraulic brake booster solenoid circuit (SA1 circuit)	• Hydraulic brake booster • SA1 circuit
C1226 / 26*1 (DI–238)	Open or short circuit in hydraulic brake booster solenoid circuit (SA2 circuit)	• Hydraulic brake booster • SA2 circuit
C1227 / 27*1 (DI–238)	Open or short circuit in hydraulic brake booster solenoid circuit (SA3 circuit)	• Hydraulic brake booster • SA3 circuit
C1228 / 28*1 (DI–238)	Open or short circuit in hydraulic brake booster solenoid circuit (STR circuit)	• Hydraulic brake booster • STR circuit
C0200 / 31*1 (DI–224)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Sensor rotor
C0205 / 32*1 (DI–224)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI–224)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI–224)	Left rear wheel speed sensor signal malfunction	
C1241 / 41 (DI–241)	Low battery voltage or abnormally high battery voltage	• Battery • IC regulator • Power source circuit
C1242 / 42*1 (DI–244)	Open circuit in IG2 circuit	• Battery • IC regulator • Power source circuit
C1243 / 43*1 (DI–247)	Malfunction in deceleration sensor (constant output)	• Deceleration sensor • Wire harness for deceleration sensor system
C1244 / 44*1 (DI–249)	Open or short circuit in deceleration sensor circuit	• Deceleration sensor • Deceleration sensor circuit

C1245/45*1 (DI–247)	Malfunction in deceleration sensor	• Deceleration sensor • Wire harness for deceleration sensor sytem
C1246/46*1 (DI–251)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249/49*1 (DI–254)	Open circuit in stop light switch circuit	• Stop light switch circuit
C1251/51*2 (DI–257)	Pump motor is locked Open circuit in pump motor ground	• Hydraulic brake booster pump motor
C1252/52*2 (DI–262)	Hydraulic brake booster pump motor malfunction	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)
C1253/53*2 (DI–269)	Hydraulic brake booster pump motor relay malfunction	• ABS or TRC motor relay • ABS or TRC motor relay circuit • Hydraulic brake booster pump motor circuit
C1254/54*2 (DI–276)	Pressure switch malfunction	• Pressure switch (PH or PL) • Pressure switch circuit
C1256/56*2 (DI–280)	Accumulator low pressure malfunction	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor
C1257/57*2 (DI–286)	Power supply drive circuit malfunction	• Battery • Power Source circuit • ABS & TRC & VSC ECU
Always ON (DI–289)	Malfunction in ABS & TRC & VSC ECU	• Battery • IC regulator • Power source circuit • ABS & TRC & VSC ECU

*1: As the DTC cannot be erased by replacing parts alone, clear DTC (See page DI–210).

*2: Using the following table, troubled parts can be specified. When replacing parts, clear DTCs.

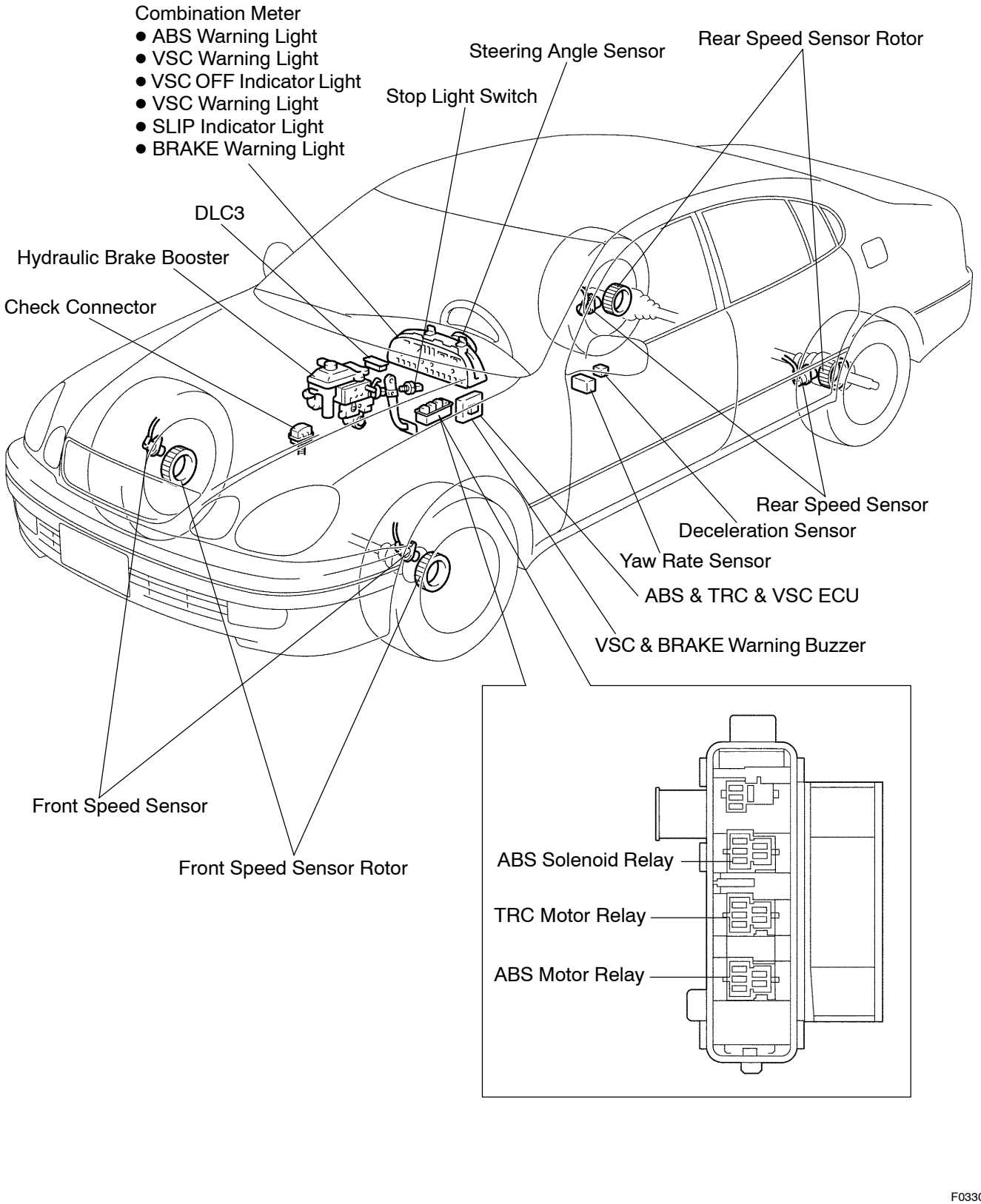
DTC		42		51		52		53		54		56		57	
BRAKE warning light and buzzer		Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer
Pressure switch	PH					○	○			○		○	○		
	PL					○	○			○		○	○		
Pump motor circuit	Pump motor			○	○	○	○					○	○		
	MTT wire harness					○	○	○							
	MT+ wire harness			○											
	MT– wire harness			○											
Accumulator malfanction												○	○		
Motor relay circuit	MR1 open circuit							○							
	MR2 open circuit							○							
	MR1 welded contact					○	○	○							
	MR2 welded contact					○	○	○							
Hydraulic brake booster	Pressure leaks					○	○					○	○		
Power souce*	IG2 open circuit	○													
ECU	Power supply circuit													○	

*: When IG1 circuit is open, ABS warning light and BRAKE warning light come on.

DI2QX–01

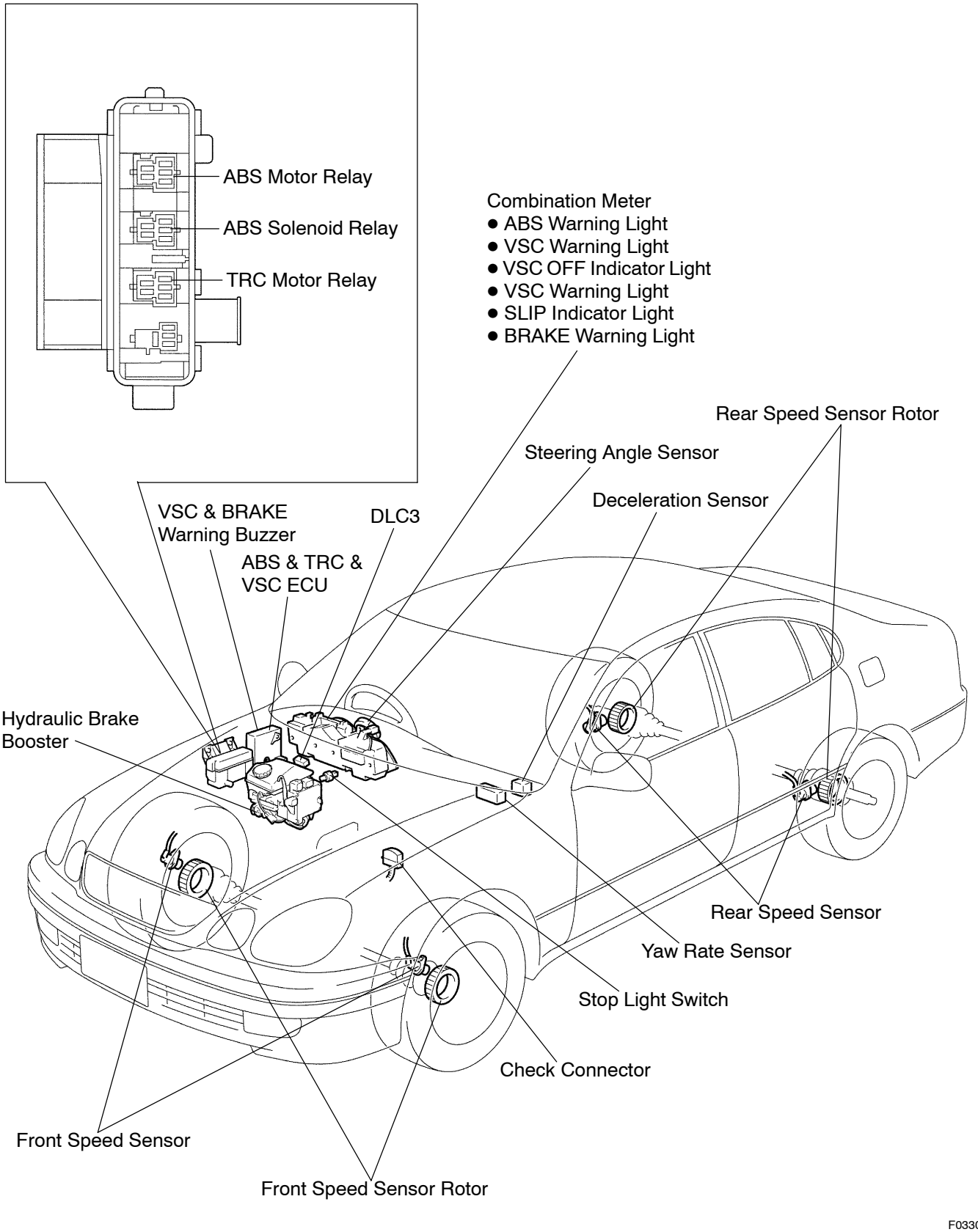
PARTS LOCATION

LHD



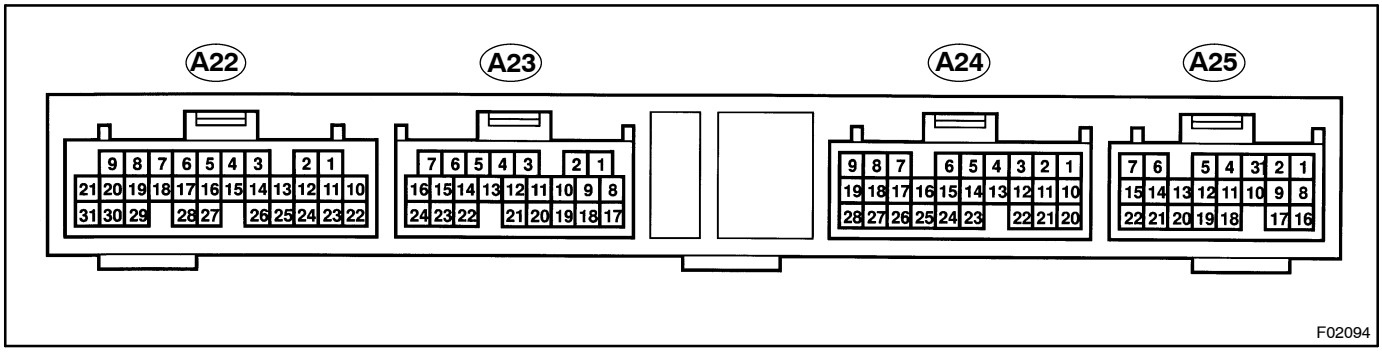
F03306

RHD


ABS Motor Relay
ABS Solenoid Relay
TRC Motor Relay
Combination Meter
● ABS Warning Light
● VSC Warning Light
● VSC OFF Indicator Light
● VSC Warning Light
● SLIP Indicator Light
● BRAKE Warning Light
Rear Speed Sensor Rotor
Steering Angle Sensor
Deceleration Sensor
VSC & BRAKE Warning Buzzer
DLC3
ABS & TRC & VSC ECU
Hydraulic Brake Booster
Rear Speed Sensor
Yaw Rate Sensor
Stop Light Switch
Check Connector
Front Speed Sensor
Front Speed Sensor Rotor
F03307

DI28W–03

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SA1 (A22 – 2) – GND (A22 – 6, 31, A23 – 8, 17)	*1R–G ↔ W–B *2R–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SA2 (A22 – 3) – GND (A22 – 6, 31, A23 –8, 17)	R–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SA3 (A22 – 4) – GND (A22 – 6, 31, A23 – 8, 17)	R–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
STR (A22 – 5) – GND (A22 – 6, 31, A23 – 8, 17)	*1GR–B ↔ W–B *2B–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFLR (A22 – 7) – GND (A22 – 6, 31, A23 – 8, 17)	*2G ↔ W–B *3G–O ↔ W–B *4G–B ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRH (A22 – 8) – GND (A22 – 6, 31, A23 – 8, 17)	Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRR (A22 – 9) – GND (A22 – 6, 31, A23 – 8, 17)	Y–G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
VCM (A22 – 10) – GND (A22 – 6, 31, A23 – 8, 17)	B ↔ W–B	IG switch ON	4.5 – 5.5
PH (A22 – 11) – GND (A22 – 6, 31, A23 – 8, 17)	B–W ↔ W–B	IG switch ON, pressure switch (PH) ON	Below 0.9
		IG switch ON, pressure switch (PH) OFF	5 – 8
FR+ (A22 – 14) – FR– (A22 – 13)	*4G–W ↔ BR *5P ↔ V	IG switch ON, slowly turn right front wheel	AC generation
FL+ (A22 – 16) – FL– (A22 – 15)	*4P ↔ L *5LG ↔ L	IG switch ON, slowly turn left front wheel	AC generation
SR (A22 – 19) – R1+ (A22 – 1)	O ↔ LG–B	IG switch ON, ABS warning light OFF	10 – 14
SFLH (A22 – 21) – GND (A22 – 6, 31, A23 – 8, 17)	W–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
PMC (A22 – 22) – E2 (A22 – 23)	R ↔ W	IG switch ON, stop light switch OFF	0.3 – 0.7
E2 (A22 – 23) – GND (A22 – 6, 31, A23 – 8)	W ↔ W–B	IG switch OFF	Continuity
MTT (A22 – 27) – GND (A22 – 6, 31, A23 – 8, 17)	R–B ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
MT+ (A22 – 28) – MT– (A22 – 18)	*4GR–G↔GR–R *5L–Y ↔ GR	IG switch ON	Pulse generation
MR1 (A22 – 29) – R1+ (A22 – 1)	G–O ↔ LG–B	IG switch ON, hydraulic brake booster pump motor stops	Below 1.0

VGS (A23 – 1) – GGND (A23 – 10)	B ↔ G	IG switch ON	4.5 – 5.5
GL1 (A23 – 2) – GGND (A23 – 10)	W ↔ G	IG switch ON, vehicle is placed on the horizontal surface	2.0 – 3.0
Tc (A23 – 3) – GND (A22 – 6, 31, A23 – 8, 17)	P – B ↔ W – B	IG switch ON and terminals Tc – E_1 of check connector connected	Below 1.0
		IG switch ON and terminals Tc – E_1 of check connector not connected	10 – 14
Ts (A23 – 4) – GND (A22 – 6, 31, A23 – 8, 17)	B – W ↔ W – B	IG switch ON and terminals Ts – E_1 of check connector connected	Below 1.0
		IG switch ON and terminals Ts – E_1 of check connector not connected	10 – 14
IG1 (A23 – 6) – GND (A22 – 6, 31, A23 – 8, 17)	B – R ↔ W – B	IG switch ON	10 – 14
NEO (A23 – 7) – GND (A22 – 6, 31, A23 – 8, 17)	G – R ↔ W – B	Engine idling	Pulse generation
GL2 (A23 – 9) – GGND (A23 – 10)	R ↔ G	IG switch ON, vehicle is placed on the horizontal surface	2.0 – 3.0
GGND (A23 – 10) – GND (A22 – 6, 31, A23 – 8)	G ↔ W – B	IG switch OFF	Below 0.3
RR+ (A23 – 11) – RR– (A23 – 12)	L – W ↔ O	IG switch ON, slowly turn right rear wheel	AC generation
ENG+ (A23 – 14) – ENG– (A23 – 22)	LG ↔ L	IG switch ON	Pulse generation
RL+ (A23 – 19) – RL– (A23 – 20)	BR ↔ BR	IG switch ON, slowly turn left rear wheel	AC generation
TRC+ (A23 – 24) – TRC– (A23 – 16)	P ↔ V	IG switch ON	Pulse generation
IG2 (A24 – 1) – GND (A22 – 6, 31, A23 – 8, 17)	B – O ↔ W – B	IG switch ON	10 – 14
FLO (A24 – 3) – GND (A22 – 6, 31, A23 – 8, 17)	L – Y ↔ W – B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
VSCW (A24 – 4) – GND (A22 – 6, 31, A23 – 8, 17)	L – O ↔ W – B	IG switch ON, VSC warning light ON	Below 2.0
		IG switch ON, VSC warning light OFF	10 – 14
WA (A24 – 5) – GND (A22 – 6, 31, A23 – 8, 17)	LG – B ↔ W – B	IG switch ON, ABS warning light ON	Below 2.0
		IG switch ON, ABS warning light OFF	10 – 14
IND (A24 – 6) – GND (A22 – 6, 31, A23 – 8, 17)	V – R ↔ W – B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
STP (A24 – 7) – GND (A22 – 6, 31, A23 – 8)	G – W ↔ W – B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
SS1+ (A24 – 8) – SS1– (A24 – 18)	L ↔ LG	Engine idling, slowly turn steering wheel	Pulse generation (See page DI–328)
VYS (A24 – 9) – GYAW (A24 – 27)	B ↔ W	IG switch ON	4.5 – 5.5
WT (A24 – 13) – GND (A22 – 6, 31, A23 – 8, 17)	LG – R ↔ W – B	IG switch ON, VSC OFF indicator light ON	Below 2.0
		IG switch ON, VSC OFF indicator light OFF	10 – 14
R (A24 – 15) – GND (A22 – 6, 31, A23 – 8, 17)	R – B ↔ W – B	IG switch ON, shift lever is in R range	8 – 14
		IG switch ON, shift lever is in other than R range	Below 1.5

SP1 (A24 – 16) – GND (A22 – 6, 31, A23 – 8, 17)	V ↔ W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
YD (A24 – 19) – GND (A22 – 6, 31, A23 – 8, 17)	GR–L ↔ W–B	Approx. 1 sec. after IG switch ON	4.5 – 5.5
BRL (A23 – 5) – GND (A19 – 6, 31, A20 – 8, 17)	R–G ↔ W–B	IG switch ON, BRAKE warning light ON	Below 2.0
		IG switch ON, BRAKE warning light OFF	10 – 14
BZ (A24 – 20) – GND (A22 – 6, 31, A23 – 8, 17)	W–R ↔ W–B	IG switch ON, VSC buzzer is sounded	Below 1.5
		IG switch ON, VSC buzzer is not sounded	10 – 14
P (A24 – 24) – GND (A22 – 6, 31, A23 – 8, 17)	R–W ↔ W–B	IG switch ON, shift lever is in P range	8 – 14
		IG switch ON, shift lever is in other P range	Below 1.5
D/G (A24 – 25) – GND (A22 – 6, 31, A23 – 8, 17)	W–G ↔ W–B	IG switch ON	10 – 14
CSW (A24 – 28) – GND (A22 – 6, 31, A23 – 8, 17)	Y ↔ W–B	IG switch ON, VSC OFF switch pushed in	Below 1.5
		IG switch ON, VSC OFF switch released	8 –14
GYAW (A24 – 27) – GND (A22 – 6, 31, A23 – 8, 17)	W ↔ W–B	IG switch OFF	Continuity
YAW (A24 – 28) – GYAW (A24 – 27)	R ↔ W	IG switch ON, vehicle is in stationary condition	2 – 3
SRLR (A25 – 1) – GND (A22 – 6, 31, A23 – 8, 17)	L–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
MR2 (A25 – 2) – R2+ (A25 – 3)	*4V–R ↔ G–Y *5G–O ↔ G–Y	IG switch ON, hydraulic brake booster pump motor stops	Below 1.0
AST (A25 – 6) – GND (A22 – 6, 31, A23 – 8, 17)	Y–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRLH (A25 – 7) – GND (A22 – 6, 31, A23 – 8, 17)	L–B ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (A25 – 8) – GND (A22 – 6, 31, A23 – 8, 17)	W–G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
PL (A25 – 9) – GND (A22 – 6, 31, A23 – 8, 17)	*1GR–L ↔ W–B *2LG ↔ W–B	IG switch ON, pressure switch ON	3 – 5
		IG switch ON, pressure switch OFF	7 – 11
SFRH (A25 – 16) – GND (A22 – 6, 31, A23 – 8, 17)	W–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14

*1: LHD, Australia
*2: RHD Europe
*3: Australia
*4: LHD
*5: RHD

DI28X–02

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.

NOTICE:

When replacing ABS & TRC & VSC ECU, sensor or etc., turn the ignition switch OFF.

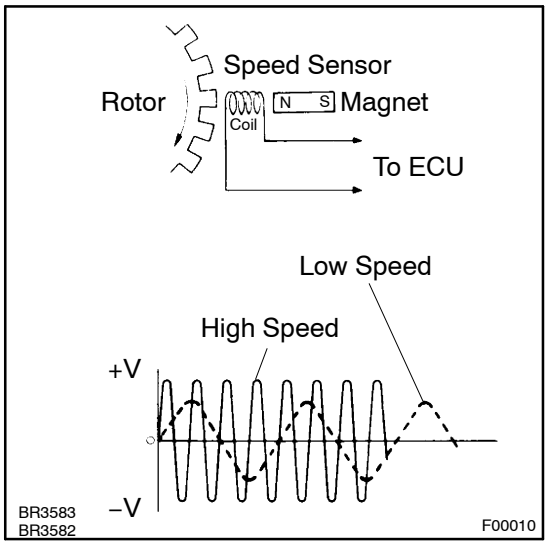
Symptom	Suspect Area	See page
ABS does not operate.	Only when 1. - 4. are all normal and the problem is still occurring, replace the ABS & TRC & VSC ECU. 1. Reconfirm the DTC and check that the normal code is output. 2. IG power source circuit. 3. Speed sensor circuit. 4. Check the hydraulic brake booster with a checker or hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–351).	 DI–210 DI–241 DI–224 BR–38
ABS does not operate efficiently.	Only when 1. - 4. are all normal and the problem is still occurring, replace the ABS & TRC & VSC ECU. 1. Reconfirm the DTC and check that the normal code is output. 2. Speed sensor circuit. 3. Stop light switch circuit. 4. Check the hydraulic brake booster with a checker or hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–351).	 DI–210 DI–224 DI–254 BR–38
ABS warning light abnormal.	1. ABS warning light circuit. 2. ABS & TRC & VSC ECU.	DI–292 IN–29
DTC check cannot be done.	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS & TRC & VSC ECU. 1. ABS warning light circuit. 2. Tc terminal circuit.	 DI–292 DI–301
Speed sensor signal check cannot be done.	1. Ts terminal circuit. 2. ABS & TRC & VSC ECU.	DI–303 IN–29

DI28Y–03

CIRCUIT INSPECTION

DTC	C0200 / 31 to C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION

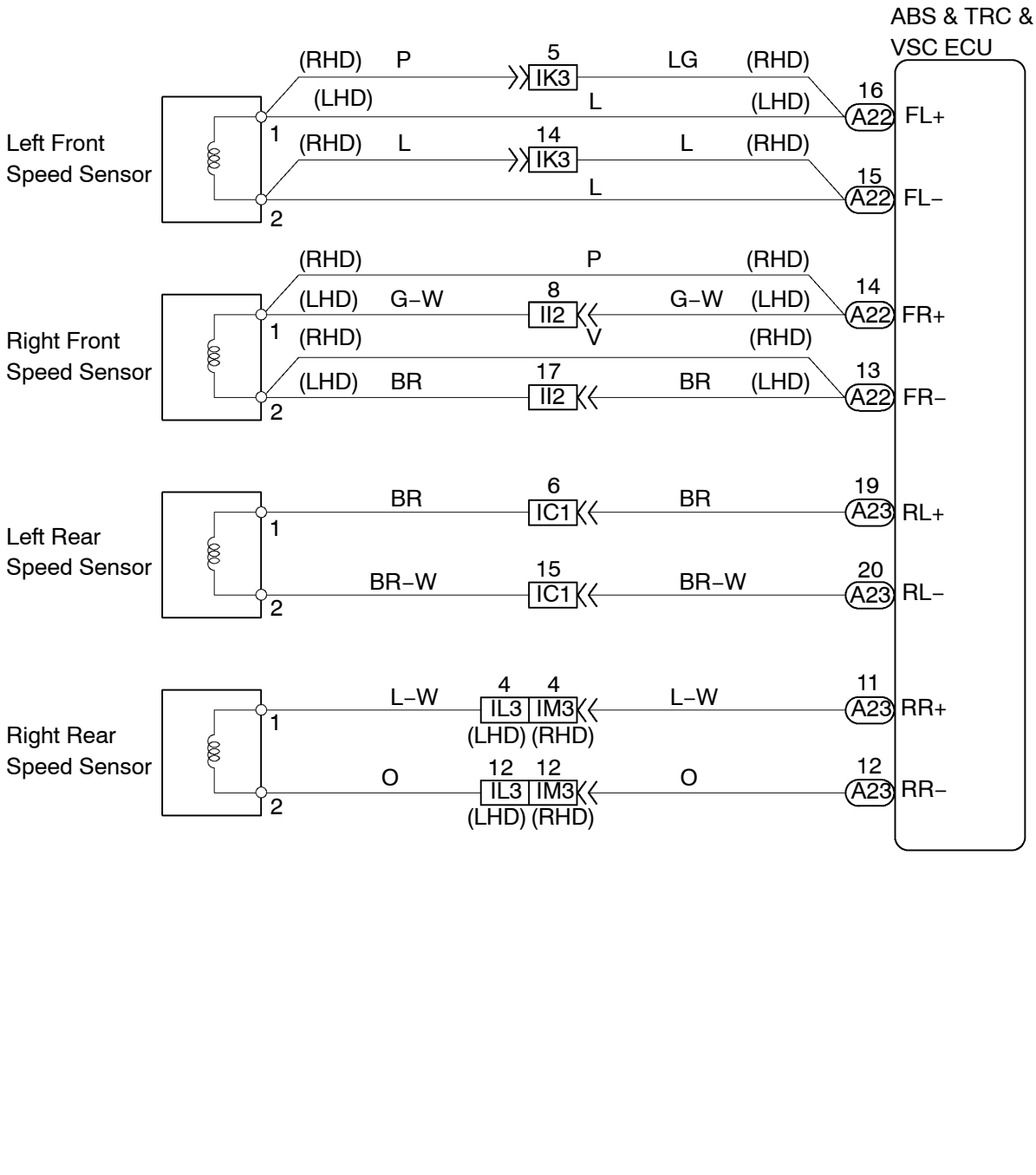


The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS & TRC & VSC control system. The front and rear rotors each have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed 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 secs. (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 into the speed sensor signals with the vehicle speed at 20 km/h (12 mph) or more. (4) The condition that the speed sensor signal circuit is open continues for 0.12 secs. or more.	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Sensor rotor

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 trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

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 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 on the hand–held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is almost no difference from the displayed speed value.

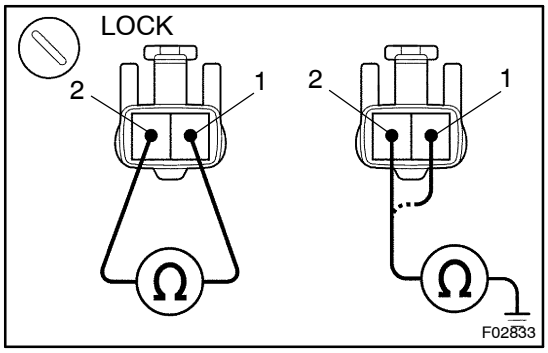
HINT:

There is tolerance of ± 10 % in the speedometer indication.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

2	**Check speed sensor.**



Front:

PREPARATION:

(a) Remove front fender liner.
(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
(c) Disconnect speed sensor connector.

CHECK:

Measure resistance between each of terminals 1 and 2 of speed sensor connector.

OK:

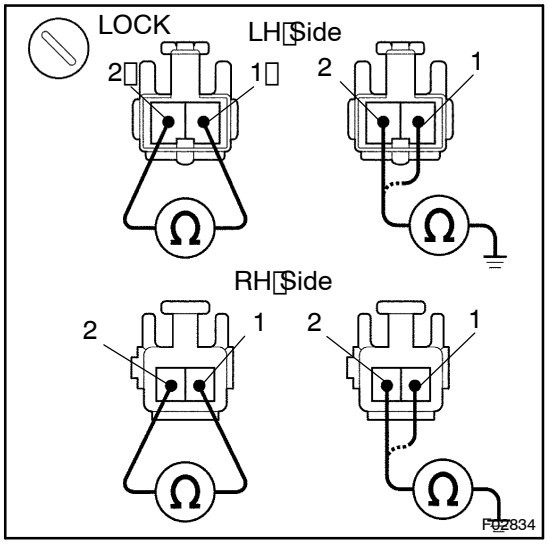
Resistance: 1.4 – 1.8 kΩ

CHECK:

Measure resistance between terminal 1 or 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher



Rear:

PREPARATION:

(a) Remove rear seatback and seat cushion.

(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(c) Disconnect speed sensor connector.

CHECK:

Measure resistance between each of terminals 1 and 2 of speed sensor connector.

OK:

Resistance: 0.9 – 1.3 kΩ

CHECK:

Measure resistance between terminal 1 or 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG	**Replace speed sensor.**

NOTICE:

Check the speed sensor signal (See page DI–210).

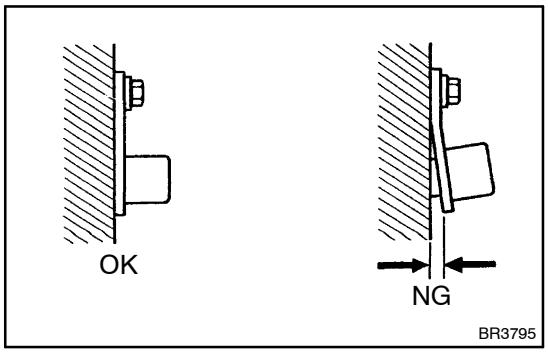
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and ECU (See page IN–29).**

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.

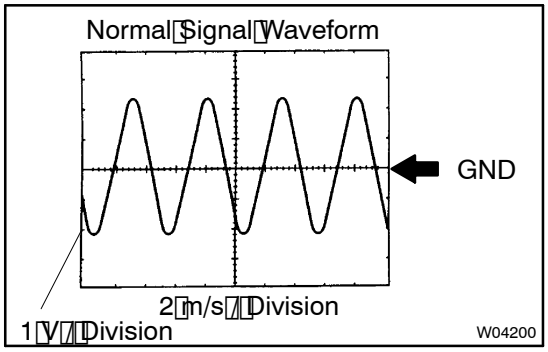
NOTICE:

Check the speed sensor signal last (See page DI–210).

OK

5	Check speed sensor and sensor rotor serrations.

(REFERENCE) INSPECTION USING OSCILLOSCOPE



PREPARATION:

(a) Remove the ABS & TRC & VSC ECU.

(b) Connect the oscilloscope to the each of terminals FR+, FL+, RR+ or RL+ and GND of the ABS & TRC & VSC ECU.

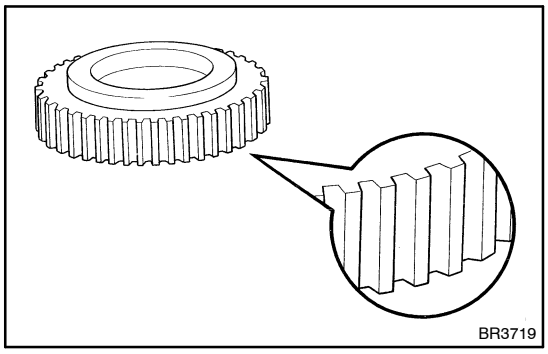
CHECK:

Drive the vehicle at about 20 km/h (12 mph), and check the signal waveform.

OK	Check and replace ABS & TRC & VSC ECU.

NG

6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove front speed sensor rotor (See page SA–12).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

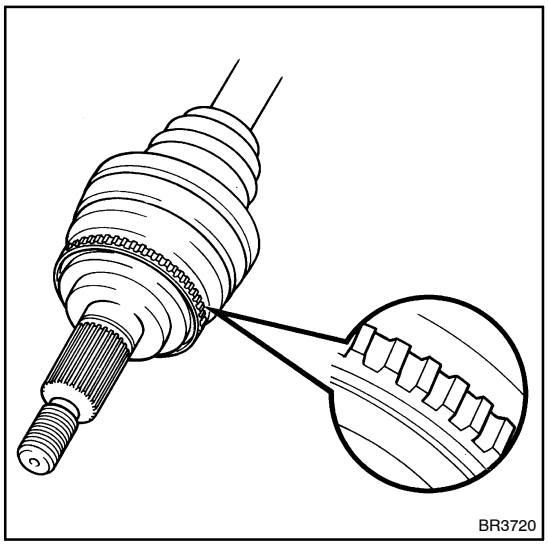
Remove front speed sensor (See page BR–58).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.



Rear:

PREPARATION:

Remove the drive shaft (See page SA–52).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove rear speed sensor (See page BR–61).

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 last (See page DI–210).

OK

Check and replace ABS & TRC & VSC ECU.

DI28Z–03

DTC	C0226 / 21 to C0256 / 24	ABS Solenoid Circuit

CIRCUIT DESCRIPTION

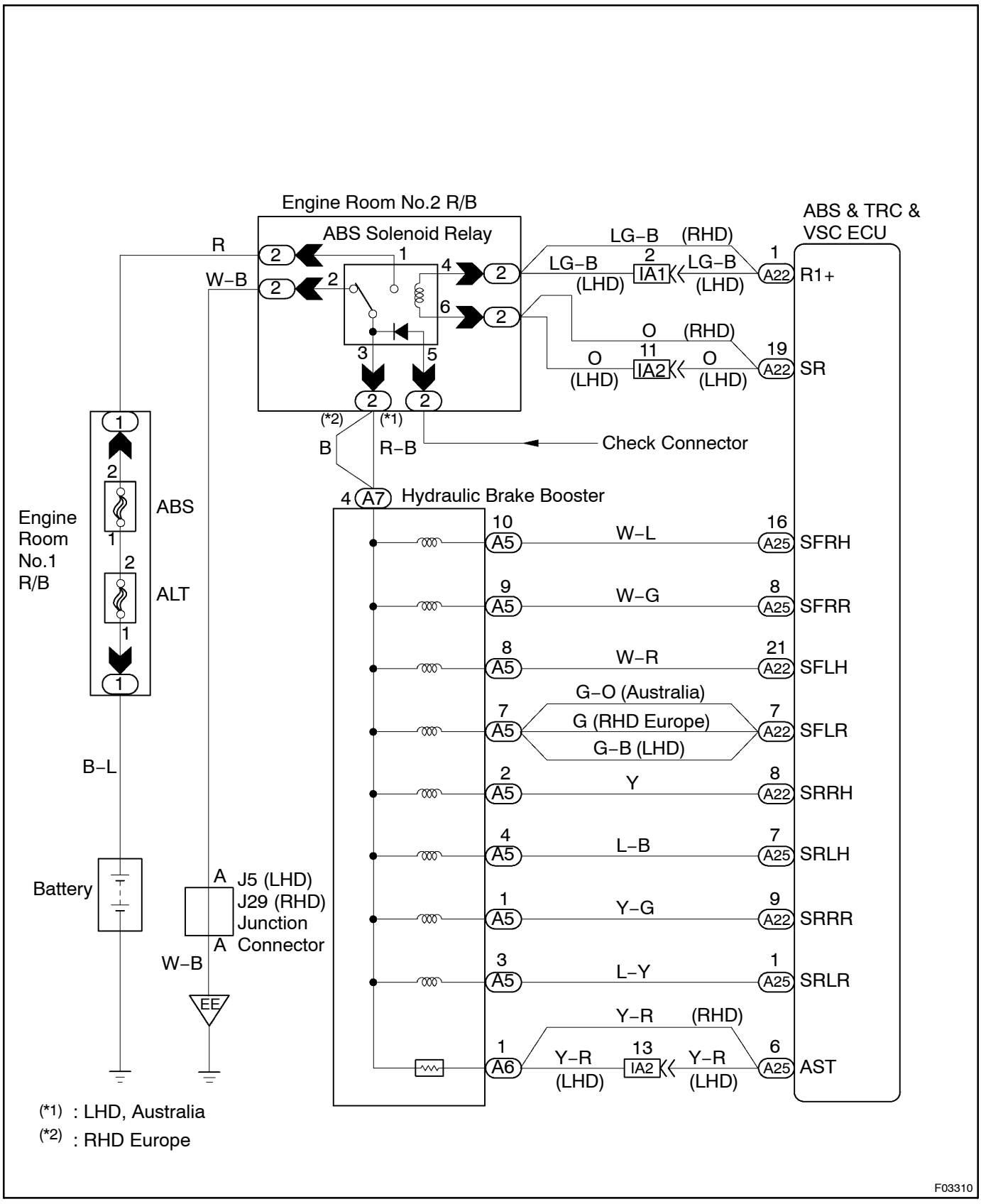
This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit in SFRH or SFRR circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SFRH or SFRR circuit
C0236 / 22	Open or short circuit in SFLH or SFLR circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SFLH or SFLR circuit
C0246 / 23	Open or short circuit in SRRH or SRRR circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SRRH or SRRR circuit
C0256 / 24	Open or short circuit in SRLH or SRLR circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SRLH or SRLR circuit

Fail safe function:

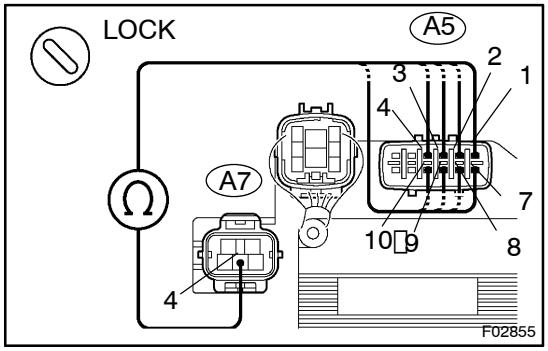
If trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check hydraulic brake booster solenoid.



PREPARATION:

Disconnect the 2 connectors from hydraulic brake booster.

CHECK:

Check continuity between each of terminals A7 – 4 and A5 – 1, 2, 3, 4, 7, 8, 9 and 10 of hydraulic brake booster connector.

OK:

Continuity

HINT:

Resistance of each solenoid at 20°C (68°F)

SFRH, SFLH, SRRH, SRLH: 4.75 – 5.25 Ω

SFRR, SFLR, SRRR, SRLR: 2.00 – 2.40 Ω

NG → Replace hydraulic brake booster.

OK

2	Check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and actuator (See page IN–29).

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.

DI290–03

DTC	C0278 / 11, C0279 / 12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

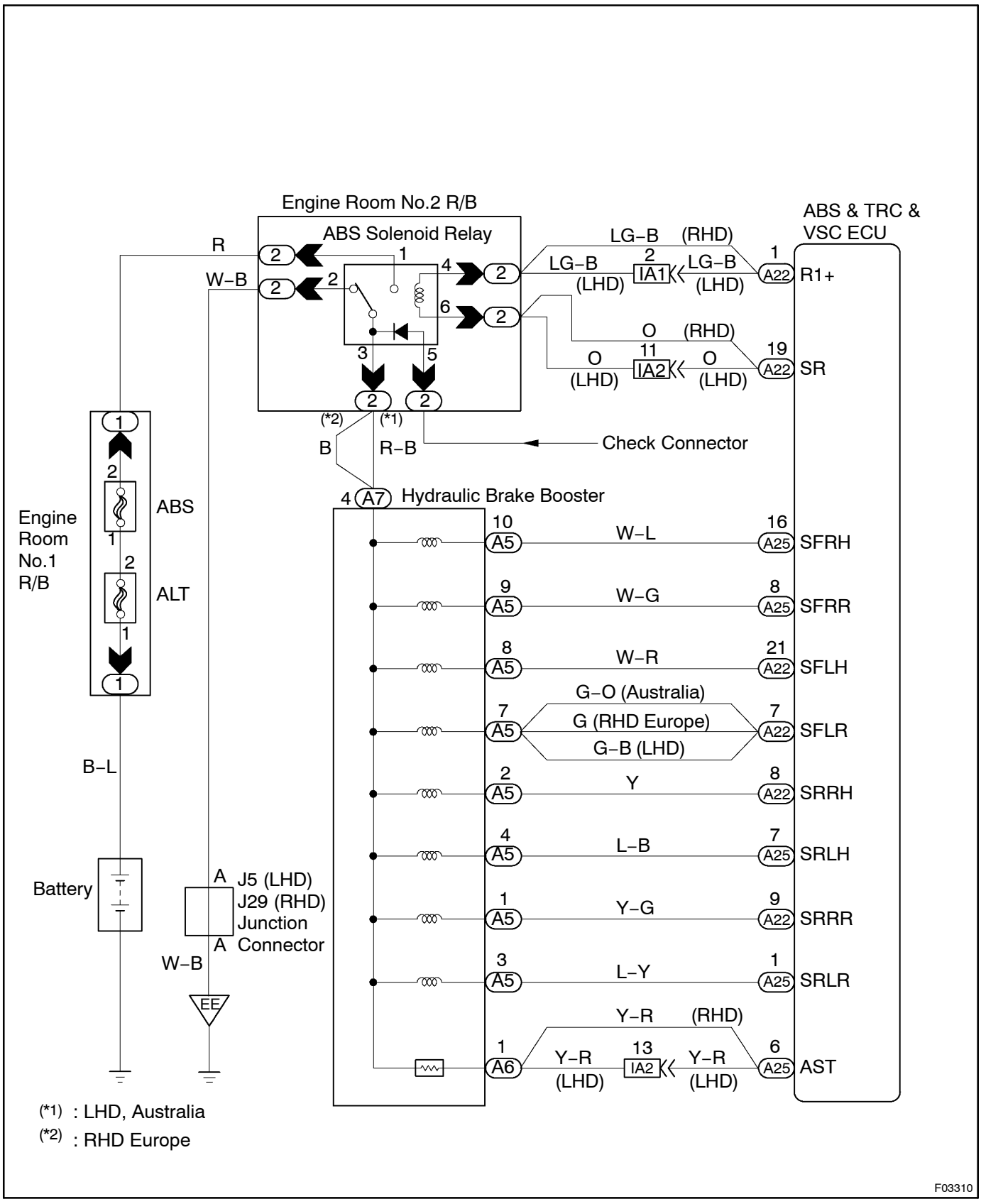
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278/11	Conditions (1) and (2) continue for 0.2 secs. or more: (1) ECU terminal IG1 voltage is 9.5 V to 17.0 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. (2) With solenoid relay ON, 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
C0279/12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the solenoid relay due to the contact point is ON continues for 0.2 secs. or more.	

Fail safe function:

If trouble in the ABS solenoid relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

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 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.

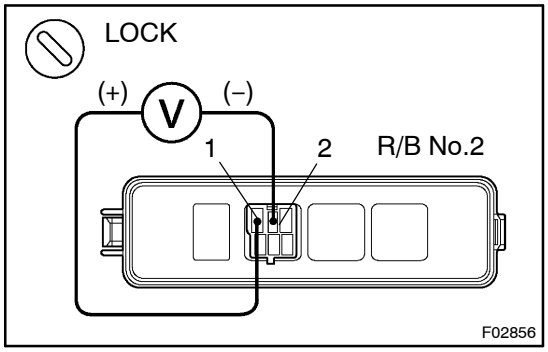
OK:

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 R/B No.2 (for ABS solenoid relay).**



PREPARATION:

Remove ABS solenoid relay from Engine Room R/B No.2.

CHECK:

Measure the voltage between terminals 1 and 2 of Engine Room R/B No.2 (for ABS solenoid relay).

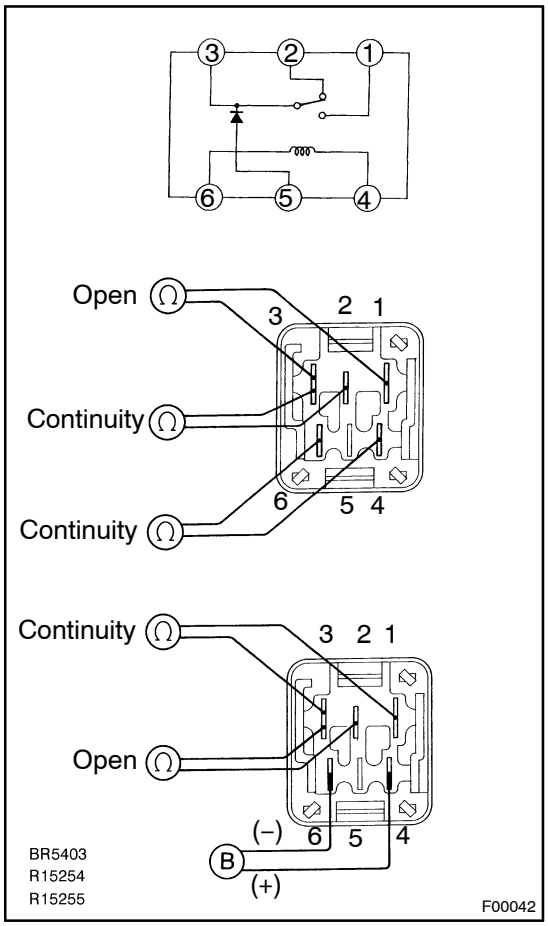
OK:

Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS solenoid relay.



PREPARATION:

Remove ABS solenoid relay from Engine Room R/B No.2.

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.

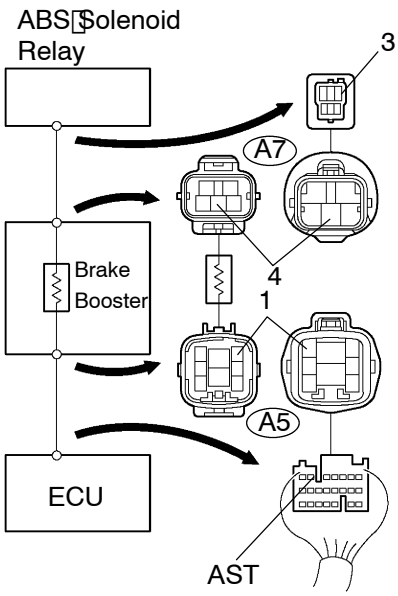
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	**Check continuity between terminals 3 of ABS solenoid relay and terminal AST of ABS & TRC & VSC ECU.**



PREPARATION:

Disconnect the 2 connectors from hydraulic brake booster.

CHECK:

Check continuity between terminal 3 of ABS solenoid relay and terminal AST of ABS & TRC & VSC ECU.

OK:

Continuity

HINT:

There is a resistance of 30 – 36 Ω between terminals A7 – 4 of and A5 – 1.

NG → **Repair or replace harness or hydraulic brake booster.**

OK

5	**Check for open and short circuit in harness and connector between ABS solenoid relay and ABS & TRC & VSC ECU (See page IN–29).**

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.

DI2QY–01

DTC	C1225 / 25 to C1228 / 28	TRC & VSC Solenoid Circuit

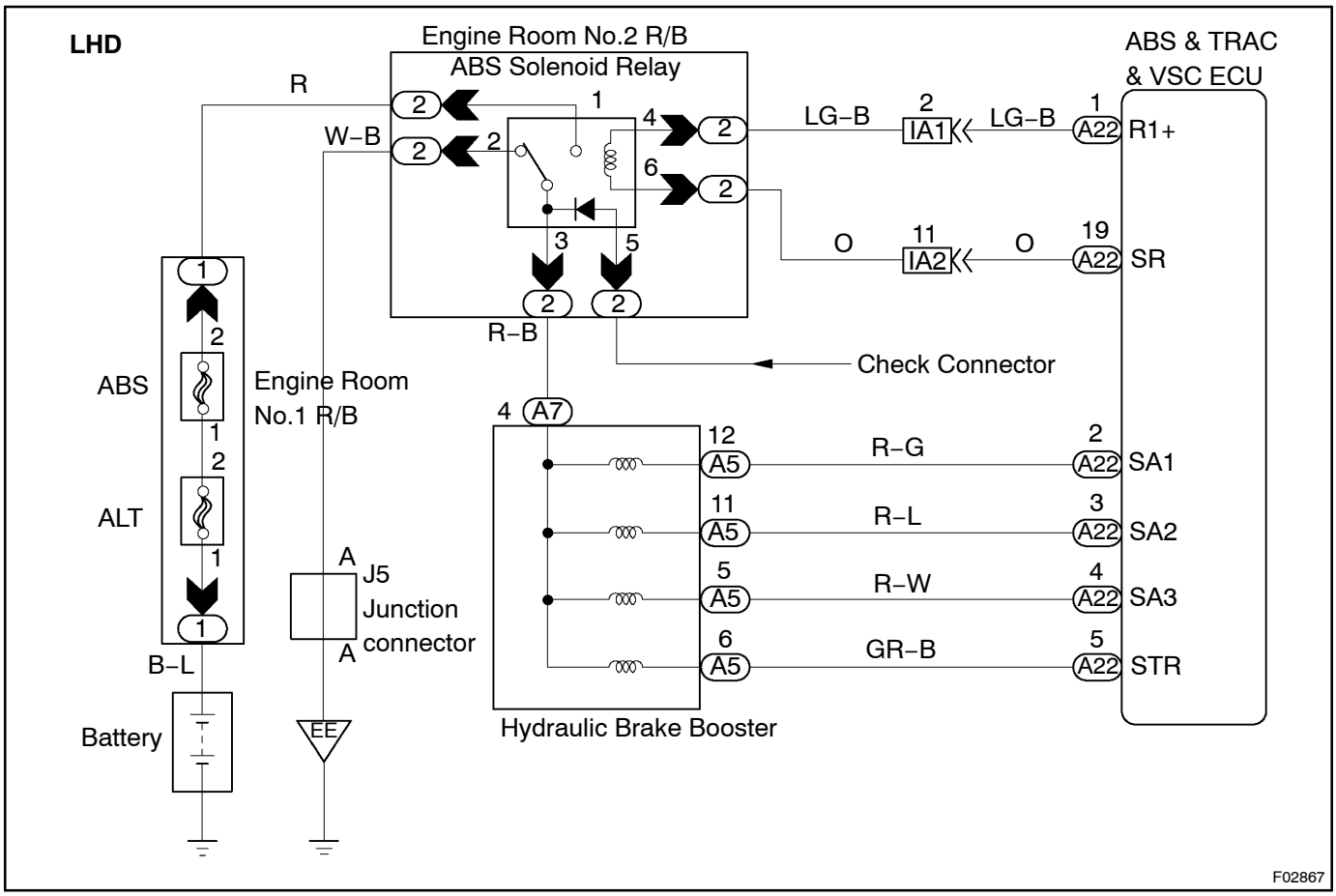
CIRCUIT DESCRIPTION

The TRC & VSC solenoid operates in accordance with signals from the ECU and raises the fluid pressure in and releases it from the brake cylinders.

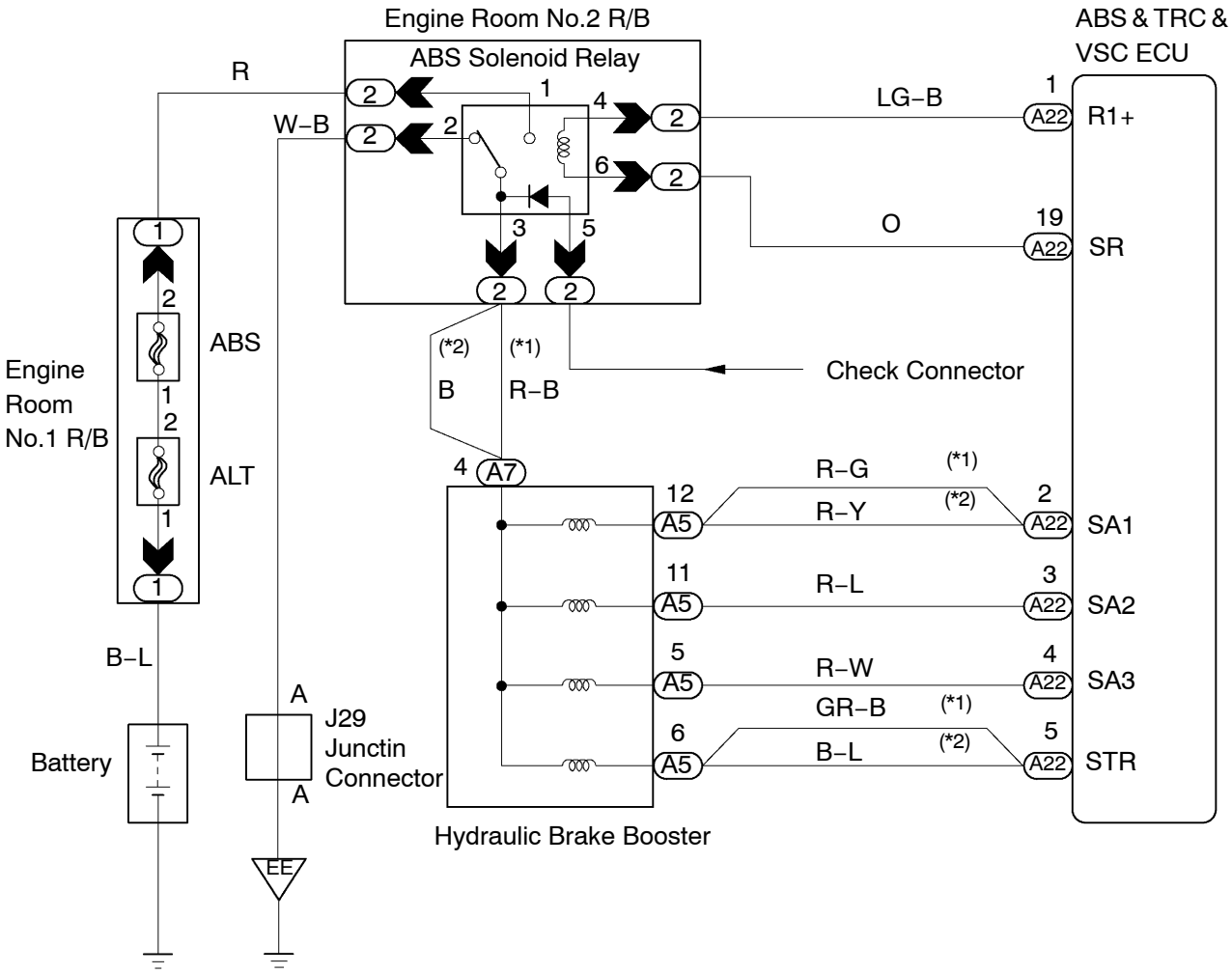
C1225 / 25	Open or short circuit for SA1 circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SA1 circuit
C1226 / 26	Open or short circuit for SA2 circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SA2 circuit
C1227 / 27	Open or short circuit for SA3 circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • SA3 circuit
C1228 / 28	Open or short circuit for STR circuit continues for 0.05 secs. or more.	• Hydraulic brake booster • STR circuit

Fail safe function:
If trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



RHD

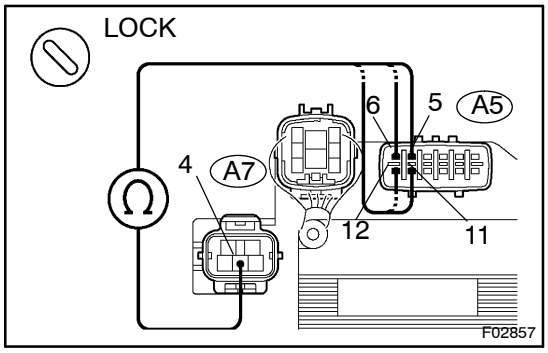


(*1) : Australia
(*2) : Europe

F03314

INSPECTION PROCEDURE

1	Check TRC & VSC solenoid.



PREPARATION:

Disconnect the 2 connectors from hydraulic brake booster.

CHECK:

Check continuity between terminals A7 – 4 and A5 – 5, 6, 11 and 12 of hydraulic brake booster.

OK:

Continuity

HINT:

Resistance of each solenoid at 20°C (68°F)

SA1, SA2, STR: 3.5 – 3.9 Ω

SA3: 4.75 – 5.25 Ω

NG	Replace hydraulic brake booster.

OK

2	Check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and hydraulic brake booster (See page IN–29).

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.

DI292–02

DTC	C1241 / 41	IG Power Source Circuit

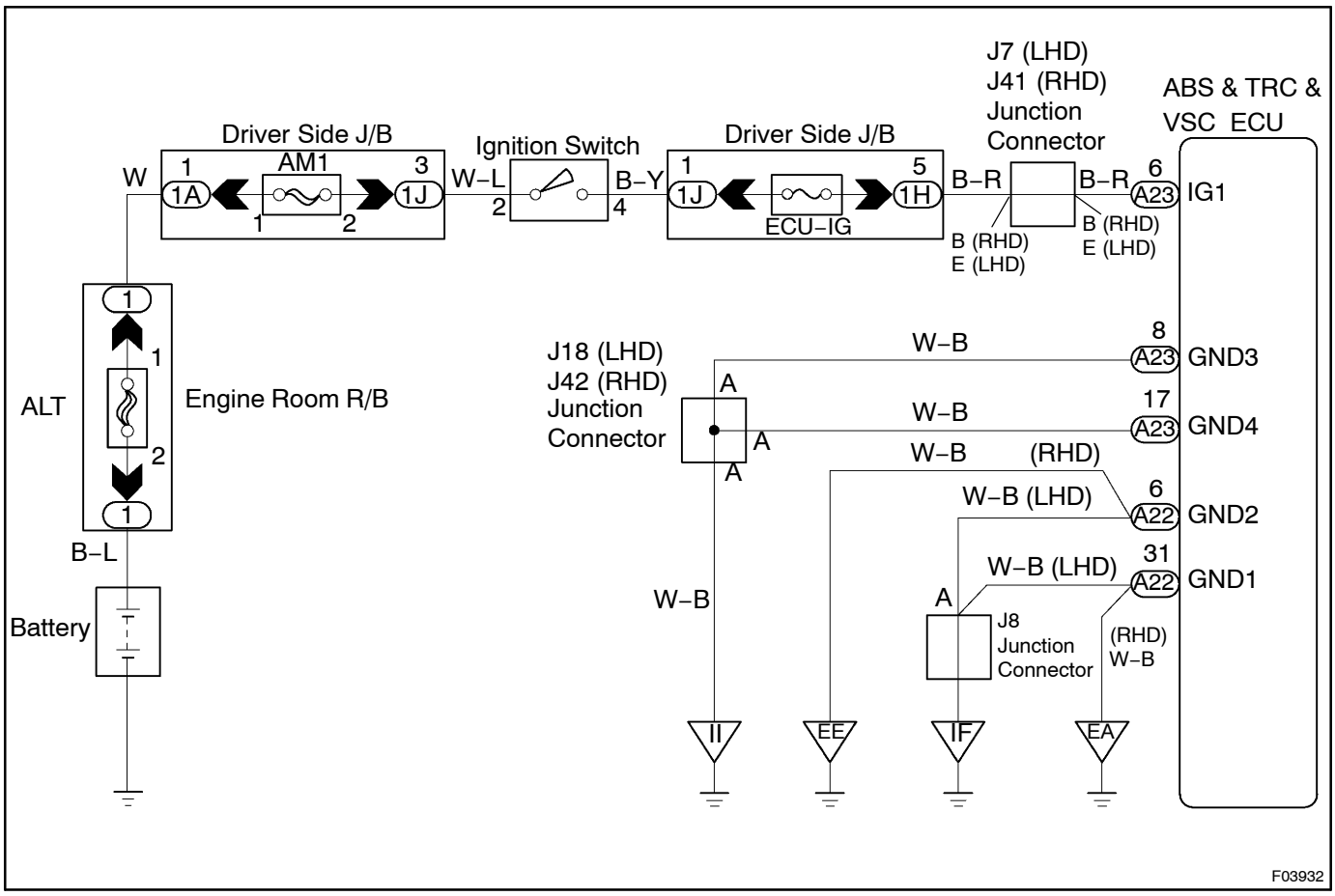
CIRCUIT DESCRIPTION

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 secs. (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 secs. or more. (3) The condition that ECU terminal IG1 voltage is more than 17.0 V continues for 1.2 secs. or more. (4) While the solenoid relay outputs ON signal, ECU terminal IG1 voltage becomes more than 17.0 V, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 secs. or more.	• Battery • IC regulator • Power source circuit

Fail safe function:

If trouble occurs in the power source circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery voltage.**

OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system.**

OK

2	**Check voltage of the ECU IG power source.**

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.

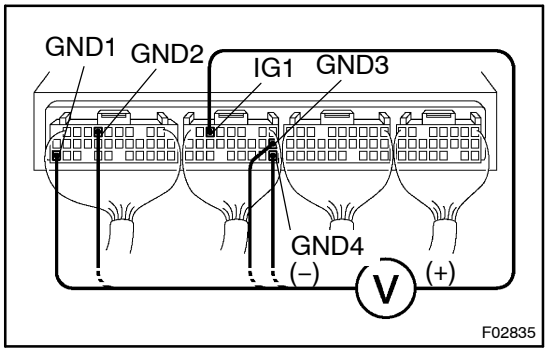
CHECK:

Check the voltage condition output from the ECU displayed on the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove ABS & TRC & VSC ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 and GND of ABS & TRC & VSC ECU connector.

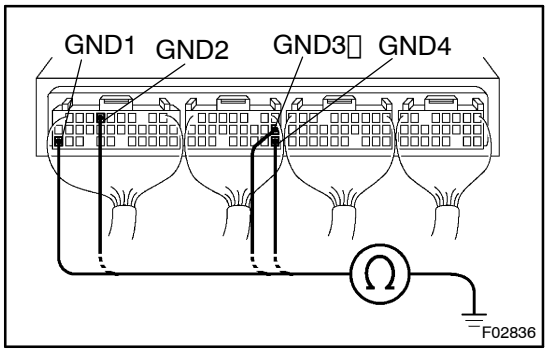
OK:

Voltage: 10 – 14 V

OK → **Ignition switch OFF, check and replace ABS & TRC & VSC ECU.**

NG

3	**Check continuity between terminal GND of ABS & TRC & VSC ECU connector and body ground.**



CHECK:

Measure resistance between terminal GND of ABS & TRC & VSC ECU connector and body ground.

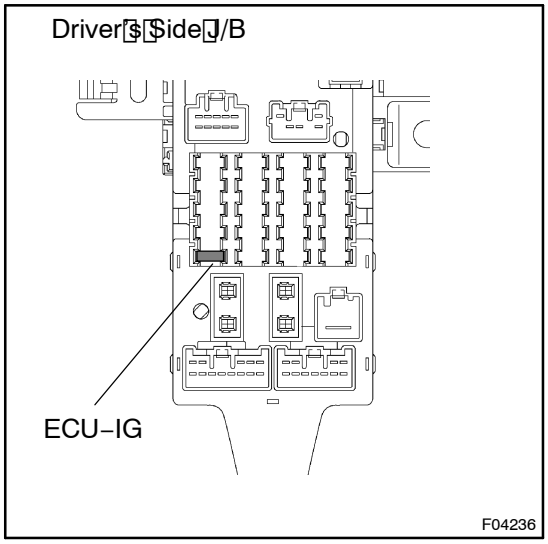
OK:

Resistance: 1 Ω or less

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

OK

4	**Check ECU–IG fuse.**



PREPARATION:

Remove ECU–IG fuse from driver's 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

Check for open circuit in harness and connector between ABS & TRC & VSC ECU and battery (See page IN–29).

DI293–02

DTC	C1242 / 42	IG2 Power Source Circuit

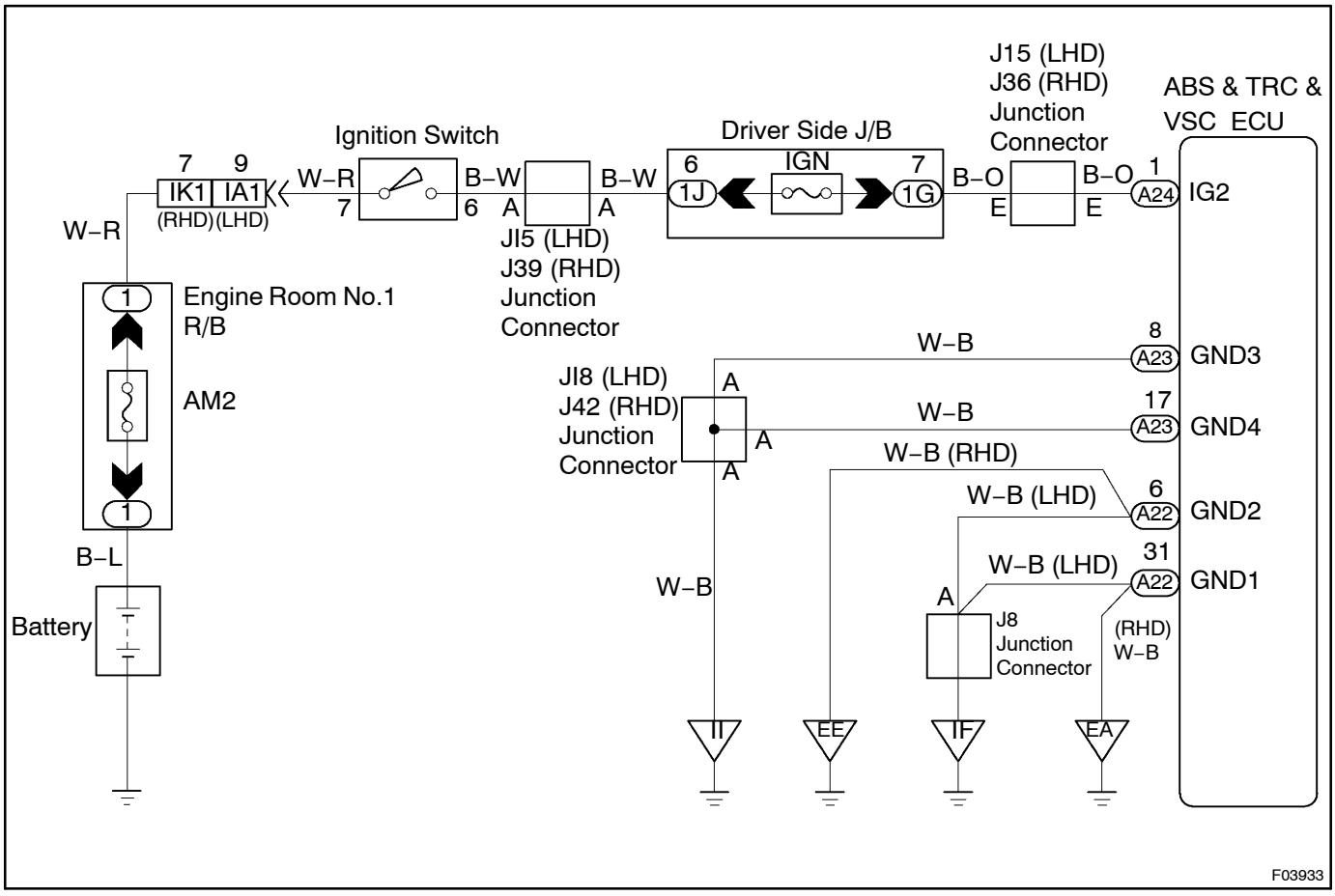
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1242 / 42	With the vehicle running, open circuit in IG2 is detected for more than 7 secs.	• Battery • IC regulator • Power source circuit

Fail safe function:

If trouble occurs in the power source circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery voltage.**

OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system.**

OK

2	**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.

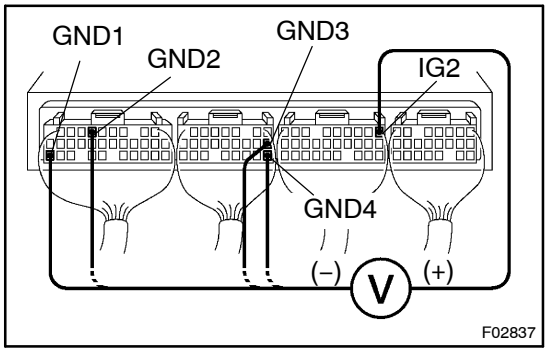
CHECK:

Check the voltage condition output from the ECU displayed on the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove ABS & TRC & VSC ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG2 and GND of ABS & TRC & VSC ECU connector.

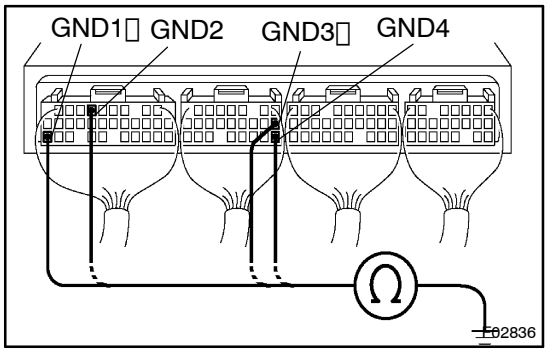
OK:

Voltage: 10 – 14 V

OK → **Ignition switch OFF, check and replace ABS & TRC & VSC ECU.**

NG

3	**Check continuity between terminal GND of ABS & TRC & VSC ECU connector and body ground.**



CHECK:

Measure resistance between terminal GND of ABS & TRC & VSC ECU connector and body ground.

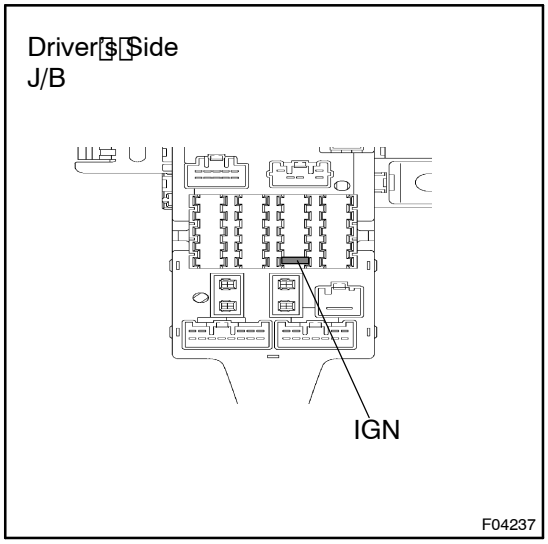
OK:

Resistance: 1 Ω or less

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

OK

4	**Check IGN fuse.**



PREPARATION:

Remove IGN fuse from driver's side J/B.

CHECK:

Check continuity of IGN fuse.

OK:

Continuity

NG	**Check for short circuit in all the harness and components connected to IGN fuse (See attached wiring diagram).**

OK

Check for open circuit in harness and connector between ABS & TRC & VSC ECU and battery (See page IN–29).

DI294–02

DTC	C1243/43, C1245/45	Malfunction in Deceleration Sensor

CIRCUIT DESCRIPTIONT

DTC No.	DTC Detecting Condition	Trouble Area
C1243/43	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph), and the condition that GL1 and GL2 signals of ECU terminals did not change 40 mV or less continued in a sequence 16 times.	• Deceleration sensor • Wire harness for deceleration sensor system
C1245/45	At the vehicle speed of 30 km/h (18 mph) or more, and the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 secs. or more.	

Fail safe function:
If trouble occurs in the deceleration sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

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 output value of the deceleration 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 DATA LIST mode on the hand–held tester.

CHECK:

Check that the deceleration value of the deceleration sensor displayed on the hand–held tester is changing when tilting the vehicle.

OK:

Deceleration value must be changing.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

2	Check deceleration sensor (See page DI–210).

NG → **Replace deceleration sensor.**

OK

3	Check for open or short circuit in harness and connector between deceleration sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU.

DI295–02

DTC	C1244 / 44	Deceleration Sensor Circuit

CIRCUIT DESCRIPTION

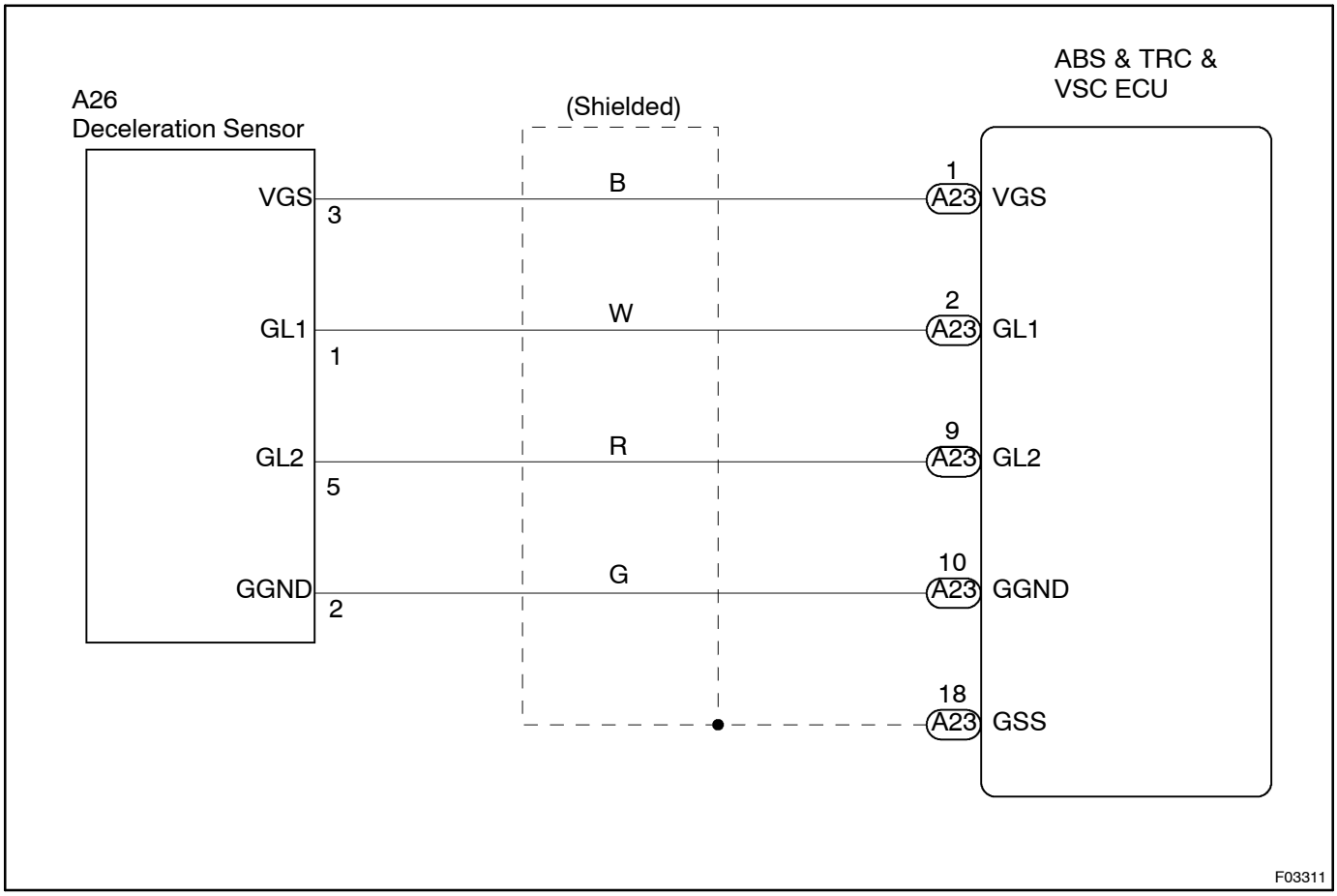
This sensor detects deceleration on the vehicle. The sensor signal is used in ABS & TRC & VSC control. If the sensor functions abnormally, the ABS warning light comes on.

DTC No.	DTC Detecting Condition	Trouble Area
C1244/44	Either of the following (1), (2), (3) or (4) is detected: (1) The condition that ECU terminals GL1 and GL2 values are –1.5 G or less or 1.5 G or more continues for 1.2 secs. or more. (2) The condition that the deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 V or more continues for 1.2 secs. or more. (3) At the vehicle speed of 0 km/h (0 mph), after the difference of output value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, and the condition that does not become 0.4 G or less continues for 60 secs. or more. (4) Deceleration sensor signal momentary open occurs for 7 times or more.	• Deceleration sensor • Deceleration sensor circuit

Fail safe function:

If trouble occurs in the deceleration sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between deceleration sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

2	Check deceleration sensor (See page DI–210).

NG → Replace deceleration sensor.

OK

Check and replace ABS & TRC & VSC ECU.

DI296–03

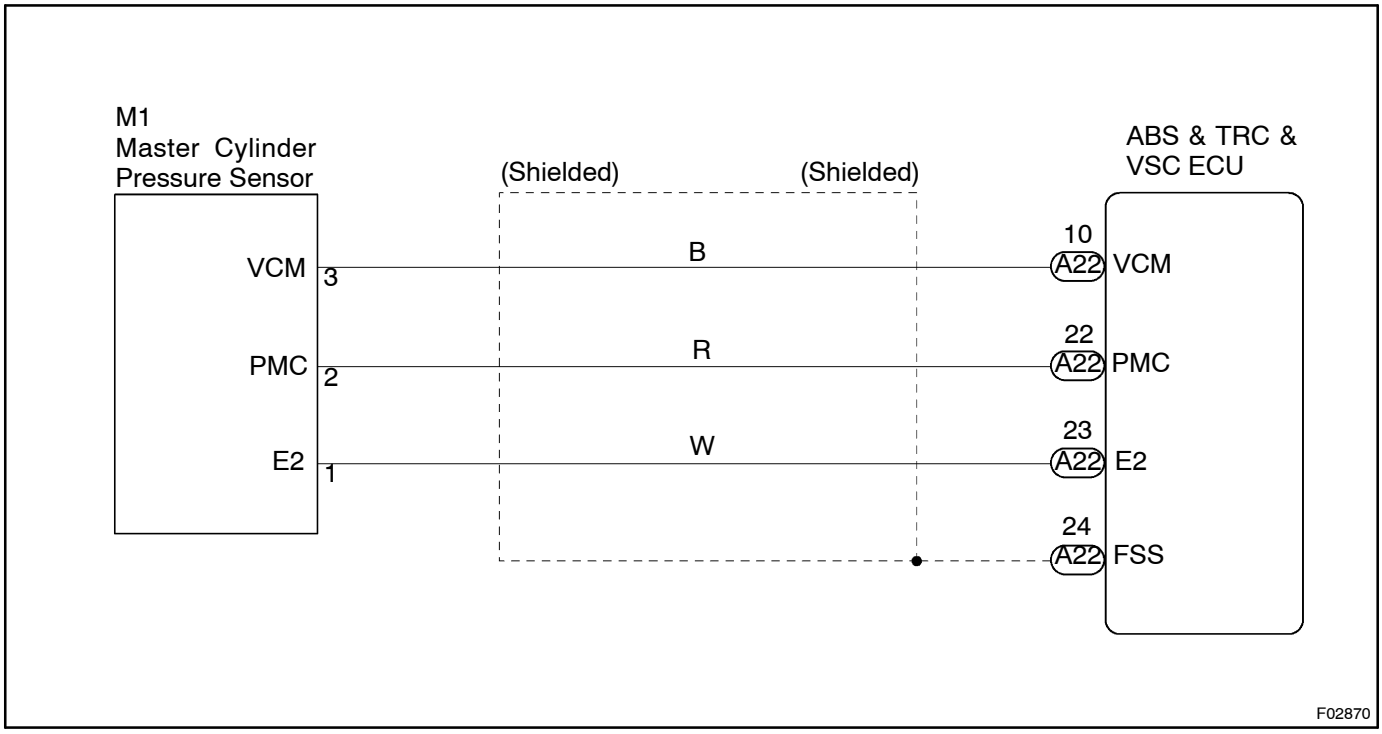
DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Either of the following (1), (2), (3), (4) or (5) is detected: (1) At the vehicle speed of 7 km/h (4 mph) or more, ECU terminal PMC voltage becomes more than 0.86 V and the condition that 0.01 V or less does not change continues for 30 secs. (2) Interference occurs to ECU terminal PMC 7 times or more for 5 sec. (3) ECU terminal STP is OFF, and the condition that terminal PMC voltage becomes more than 0.86 V or less than 0.3 V continues for 5 secs. or more. (4) The condition that ECU terminal IG1 voltage is 9.5 V to 17.0 V, and terminal VCM voltage other than the range from 4.4 V to 5.6 V continues for 1.2 secs. or more. (5) The condition that ECU terminal VCM voltage is 4.4 V to 5.6 V, and terminal PMC voltage other than the range from 0.14 V to 4.85 V continues for 1.2 secs. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit

Fail safe function:
If trouble occurs in the master cylinder pressure sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

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 output value of the master cylinder pressure 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 the brake fluid pressure value of the master cylinder pressure sensor displayed on the hand–held tester is changing when depressing the brake pedal.

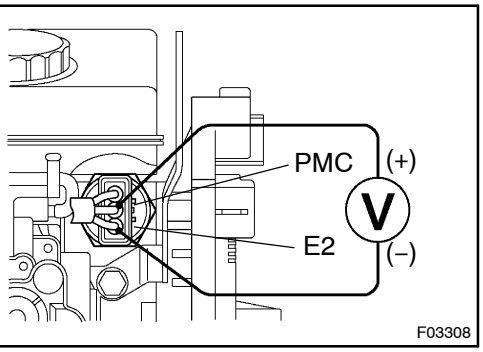
OK:

Brake fluid pressure value must be changing.

OK → **Go to step 4.**

NG

2	**Check master cylinder pressure sensor.**



PREPARATION:

(a) Install LSPV gauge to the front caliper bleeder plug portion, and bleed LSPV gauge.
SST 09709–29018
(b) Remove air cleaner inlet and battery clamp cover.

CHECK:

Start the engine and depress the brake pedal, then check the relation between the fluid pressure and voltage of PMC and E2 terminals of the master cylinder pressure sensor with connector still connected.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kgf/cm^2, 0 psi)	0.37 – 0.63 V
5,883 kPa (60 kgf/cm^2, 853 psi)	1.57 – 1.83 V
11,768 kPa (120 kgf/cm^2, 1,706 psi)	2.77 – 3.03 V

HINT:

Voltage of between terminals VCM and E2: 4.7 – 5.3 V.

NG → **Replace master cylinder pressure sensor.**

OK

3	Check for open and short circuit in harness and connector between master cylinder pressure sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK ↓

4	Check whether or not the ECU terminal STP input voltage is changed when the stop light switch is turned on and off.

NO → Check the stop light switch circuit (See page DI–223).

YES ↓

Check and replace ABS & TRC & VSC ECU.

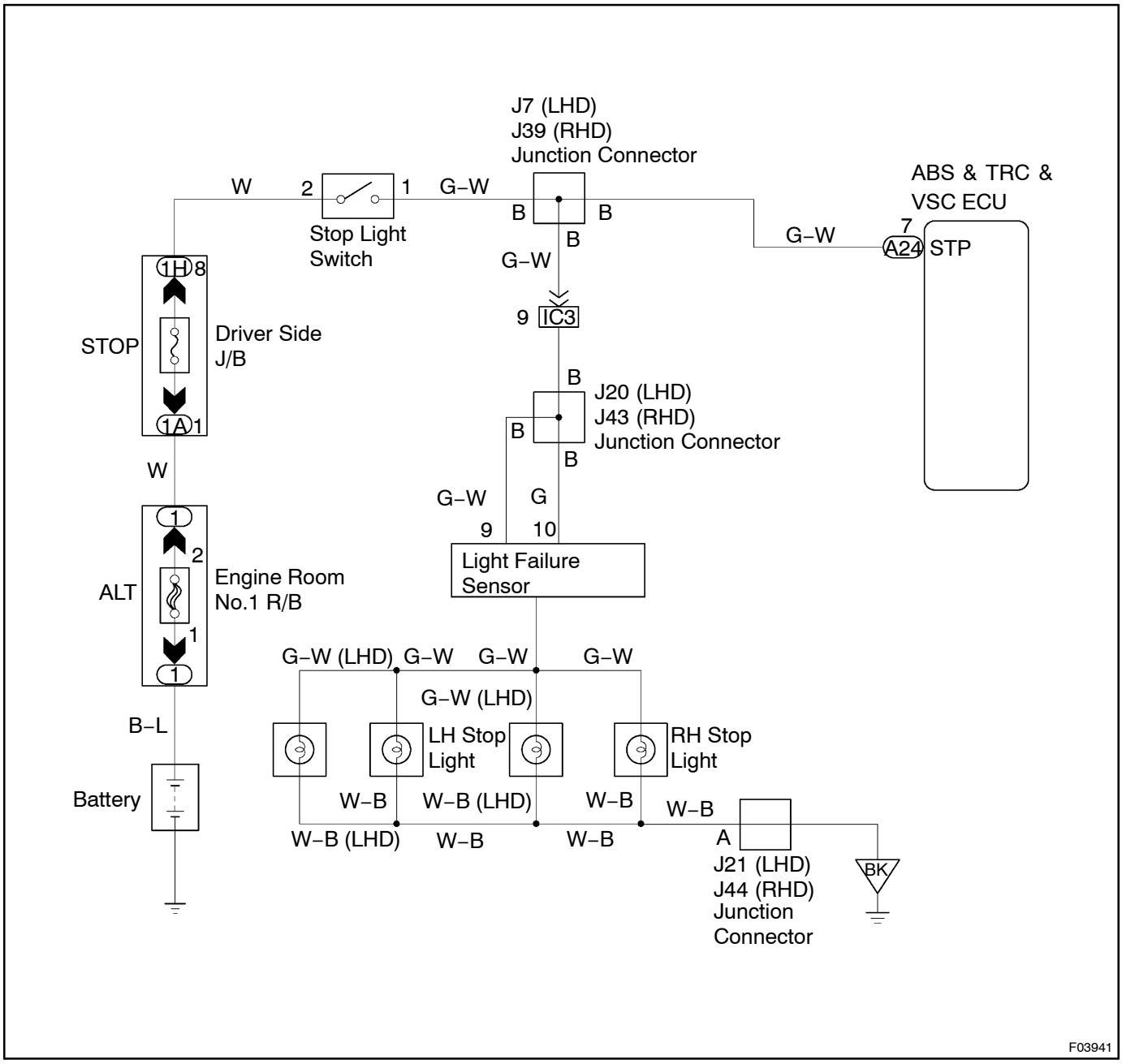
DI297–03

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 in stop light switch circuit continues for 1 sec. or more.	• Stop light switch circuit

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.

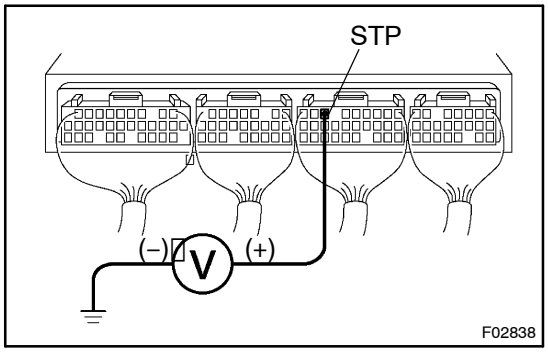
NG

2	Check stop light circuit (See page BE–76).

NG → Repair or replace stop light circuit.

OK

3	Check voltage between terminal STP of ABS & TRC & VSC ECU and body ground.



PREPARATION:

Remove ABS & TRC & VSC ECU with connectors still connected.

CHECK:

Measure voltage between terminal STP of ABS & TRC & VSC ECU and body ground when brake pedal is depressed.

OK:

Voltage: 8 – 14 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–223).

NG

4	Check for open circuit in harness and connector between ABS & TRC & VSC ECU and stop light switch (See page N–29).

NG → Repair or replace harness or connector.

OK →

Check and replace ABS & TRC & VSC ECU.

DI2V1–01

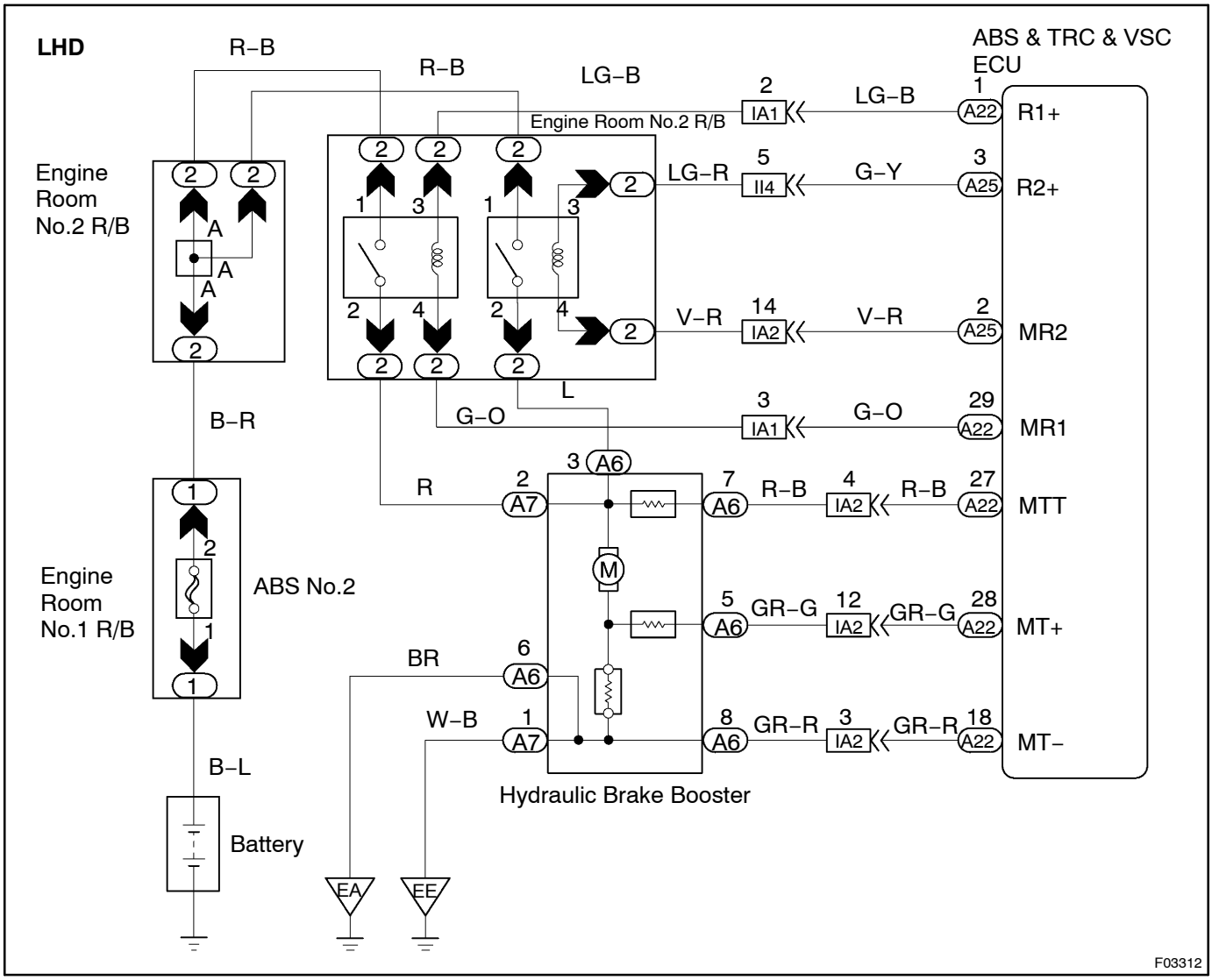
DTC	C1251 / 51	Hydraulic Brake Booster Pump Motor Malfunction

CIRCUIT DESCRIPTION

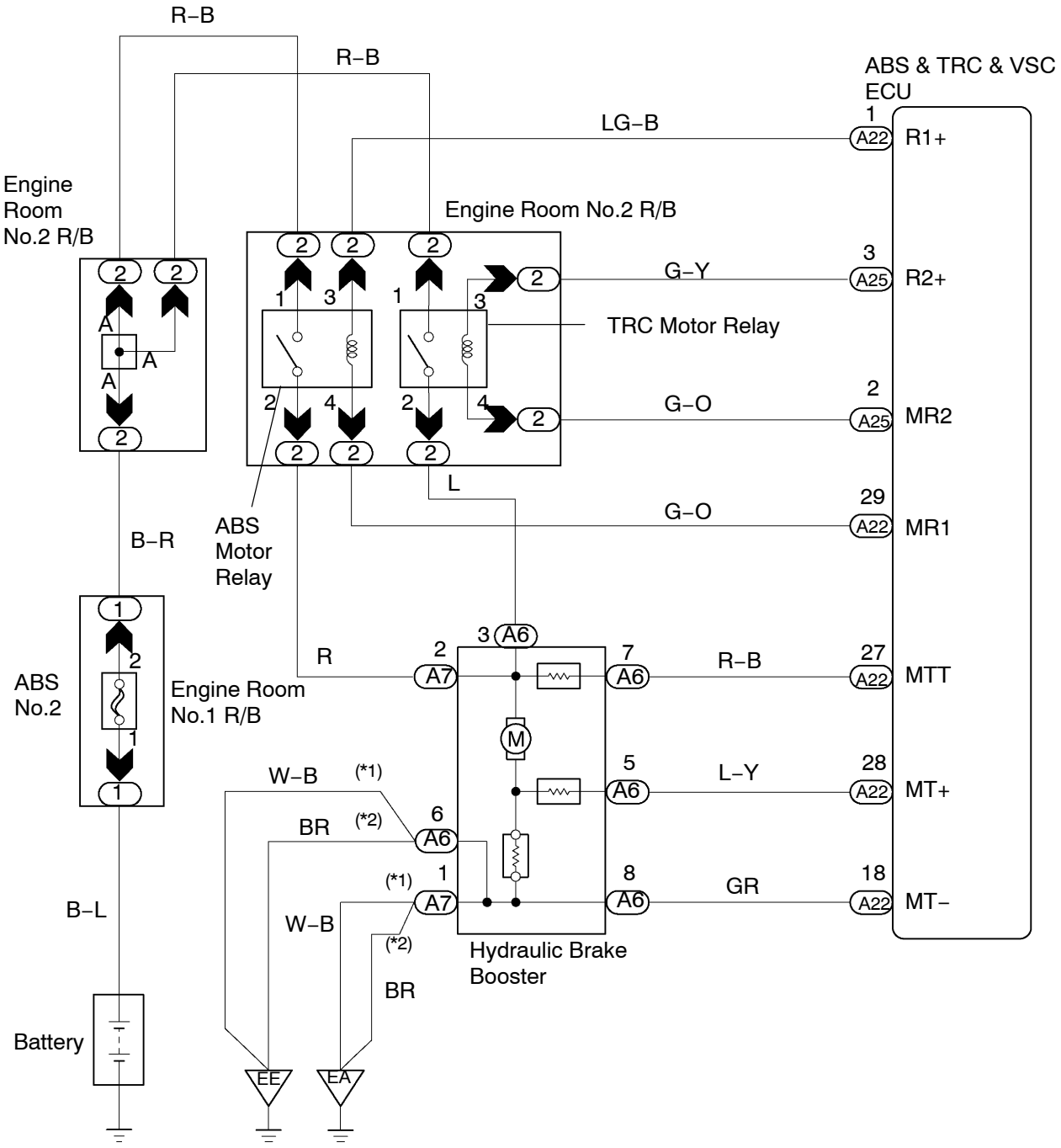
DTC No.	DTC Detecting Condition	Trouble Area
C1251/51	Either of the following (1) or (2) is detected: (1) After turning the ignition switch ON, the current of more than 28 A flows to the motor for more than 1 sec. (2) After turning the ignition switch ON, less than 7 A change in current is detected more than 3 times in a row when the motor is ON.	• Hydraulic brake booster pump motor

Fail safe function:
If trouble occurs in the pump motor, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM

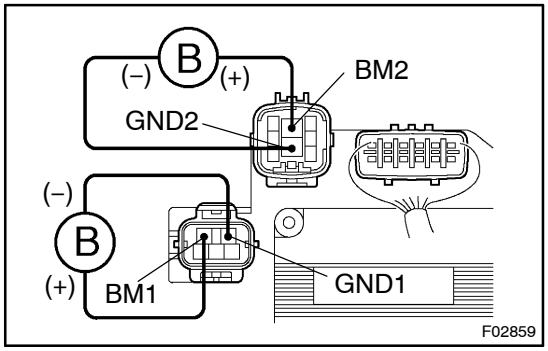


RHD


R–B
R–B
ABS & TRC & VSC ECU
LG–B
1
A22
R1+
Engine Room No.2 R/B
Engine Room No.2 R/B
G–Y
3
A25
R2+
TRC Motor Relay
G–O
2
A25
MR2
L
G–O
29
A22
MR1
B–R
ABS Motor Relay
ABS No.2
Engine Room No.1 R/B
R
3 A6
2 A7
7 A6
R–B
27
A22
MTT
M
W–B (*1)
5 A6
L–Y
28
A22
MT+
BR (*2)
6 A6
(*1) 1 A7
8 A6
GR
18
A22
MT–
B–L
W–B
(*2)
BR
Hydraulic Brake Booster
Battery
EE
EA
(*1) : Australia
(*2) : Europe
F03313

INSPECTION PROCEDURE

1	**Check operation of hydraulic brake booster pump motor.**



PREPARATION:

Disconnect the 2 connectors from the hydraulic brake booster.

CHECK:

Connect battery positive ⊕ lead to BM1 or BM2 terminal and battery negative ⊖ lead to GND1 or GND2 terminal of the hydraulic brake booster (pump motor) connector.

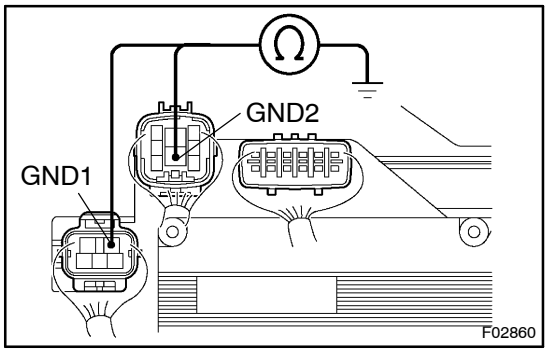
OK:

The operation sound of the pump motor should be heard.

OK	**Go to step 3.**

NG

2	Check continuity between GND terminal of hydraulic brake booster (pump motor) connector and body ground.



CHECK:

Check continuity between each of GND1 and GND2 terminals of hydraulic brake booster (pump motor) connector and body ground.

OK:

Continuity

NG → Repair or replace harness or connector.

OK

Replace hydraulic brake booster pump motor.

3	Check for open circuit in harness and connector between hydraulic brake booster (pump motor) and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

4	Check for open or short circuit in harness and connector between pressure switch and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU.

DI2R0–01

DTC	C1252 / 52	Hydraulic brake booster Pump Motor ON Time Abnormally Long

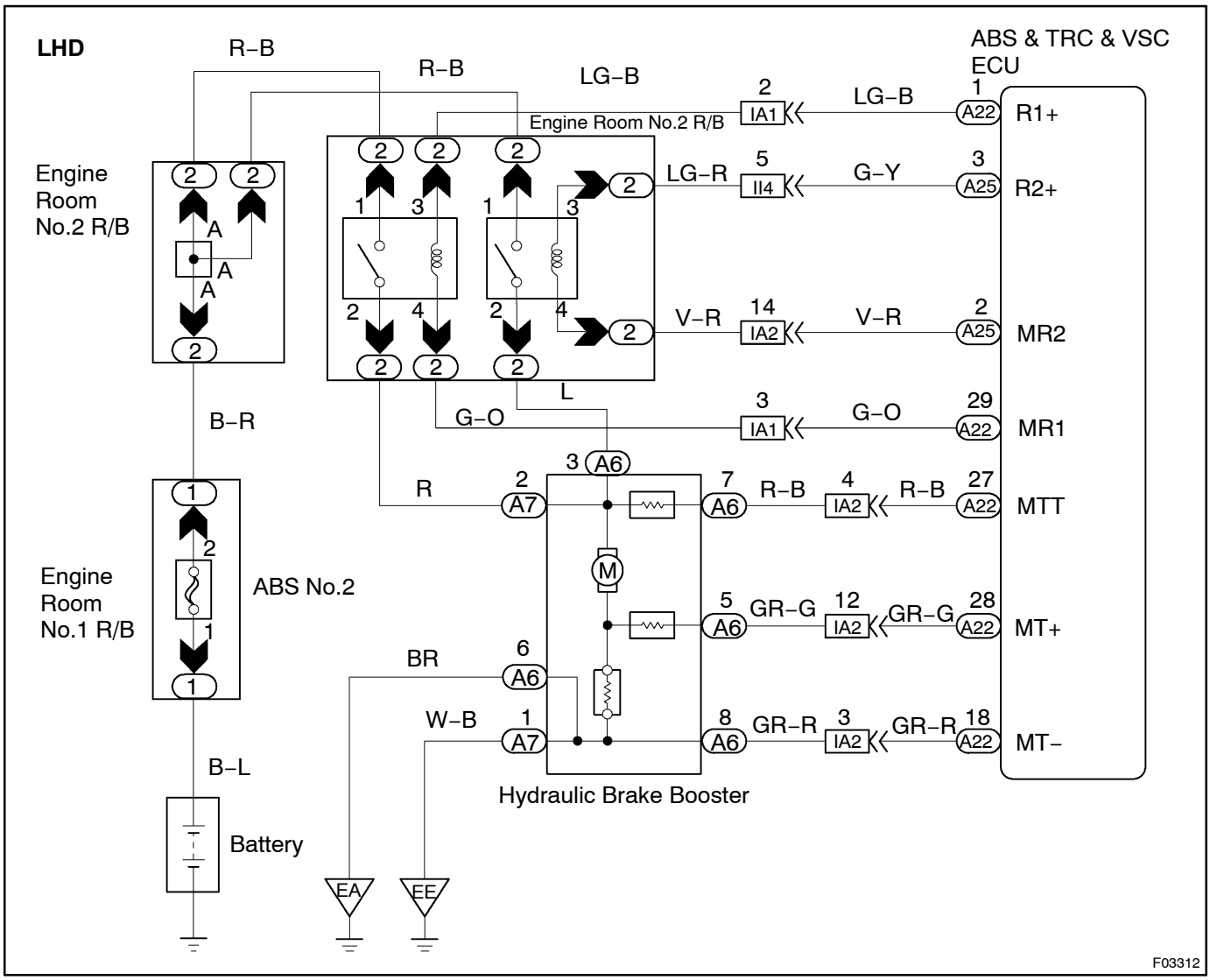
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1252 / 52	After the ignition switch has been turned ON, when the power is supplied to the pump motor for more than 5 minutes.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)

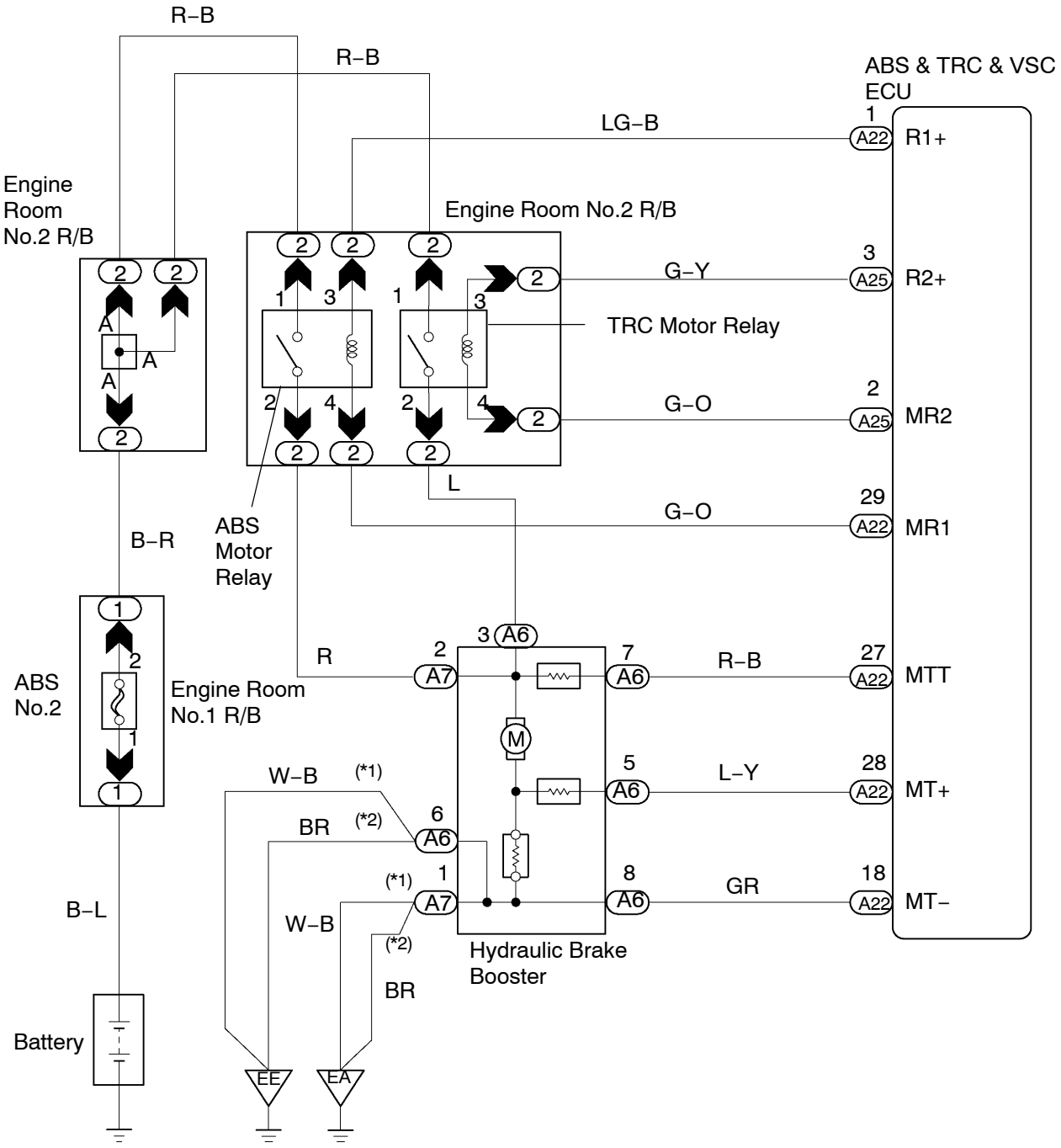
Fail safe function:

If trouble occurs in the pump motor, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



RHD

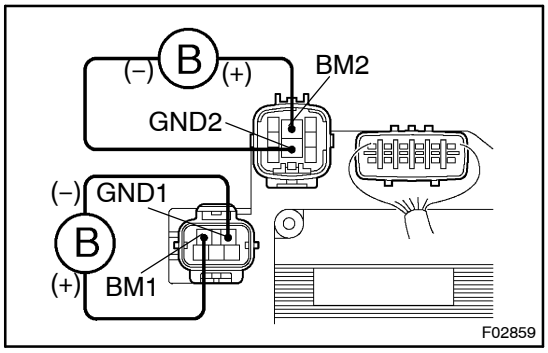


(*1) : Australia
(*2) : Europe

F03313

INSPECTION PROCEDURE

1	**Check operation of hydraulic brake booster pump motor.**



PREPARATION:

Disconnect the 2 connectors from hydraulic brake booster connector.

CHECK:

Connect positive ⊕ lead to BM1 or BM2 terminal and negative ⊖ lead to GND1 or GND2 terminal of the hydraulic brake booster (pump motor) connector.

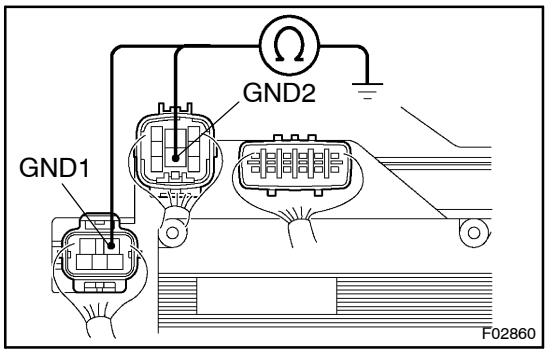
OK:

The operation sound of the pump motor should be heard.

OK	**Go to step 3.**

NG

2	**Check continuity between GND terminal of hydraulic brake booster (pump motor) connector and body ground.**



CHECK:

Check continuity between GND1 or GND2 terminal of hydraulic brake booster (pump motor) connector and body ground.

OK:

Continuity

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

OK

Replace hydraulic brake booster pump motor.

3	Check for short circuit in harness and connector between hydraulic brake booster (pump motor) and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK ↓

4	Check for short circuit (to B+) in harness and connector between MTT of hydraulic brake booster and ABS& TRC & VSC ECU (See page).

OK → Check and replace ABS & TRC & VSC ECU.

NG ↓

5	Check pressure switch (PH).

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:

Depress the brake pedal more than 40 times with the ignition switch OFF, then turn the ignition switch ON and check the pressure switch (PH) condition.

OK:

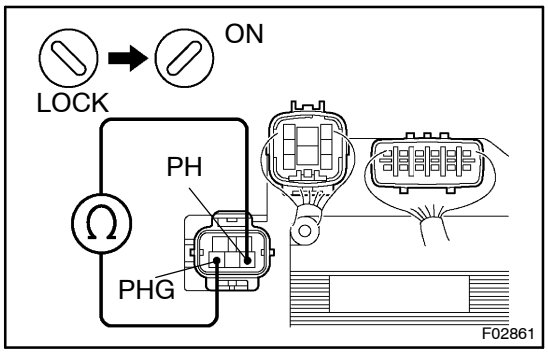
"OFF" turns to "ON".

HINT:

OFF: Low pressure

ON: High pressure

In case of not using the hand–held tester.



PREPARATION:

(a) Disconnect the connector from the hydraulic brake booster.

(b) With ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

CHECK:

Measure resistance between terminals PH and PHG of hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

PREPARATION:

(a) Connect the connector to the hydraulic brake booster.

(b) Disconnect the connector after ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PH and PHG of hydraulic brake booster connector.

OK:

Resistance: 0 Ω

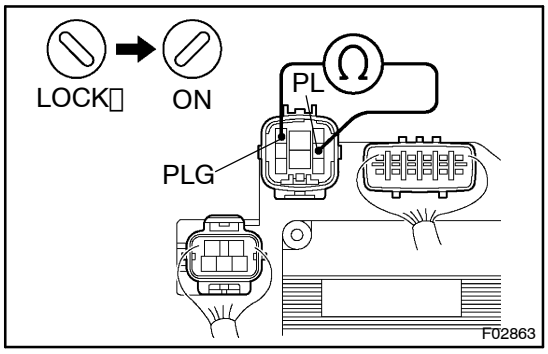
HINT:

After inspection, clear the DTC (See page DI–210).

NG	Replace hydraulic brake booster.

OK

6	Check pressure switch (PL).



PREPARATION:

(a) Disconnect the connector from the hydraulic brake booster.

(b) With ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

CHECK:

Measure resistance between terminals PL and PLG of hydraulic brake booster connector.

OK:

Resistance: 5.7 kΩ

PREPARATION:

(a) Connect the connector to the hydraulic brake booster.

(b) Disconnect the connector after ignition switch has been ON and the pump motor has been stopped.

CHECK:

Measure resistance between terminals PL and PLG of hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

HINT:

After inspection, clear the DTC (See page DI–210).

NG	Replace hydraulic brake booster.

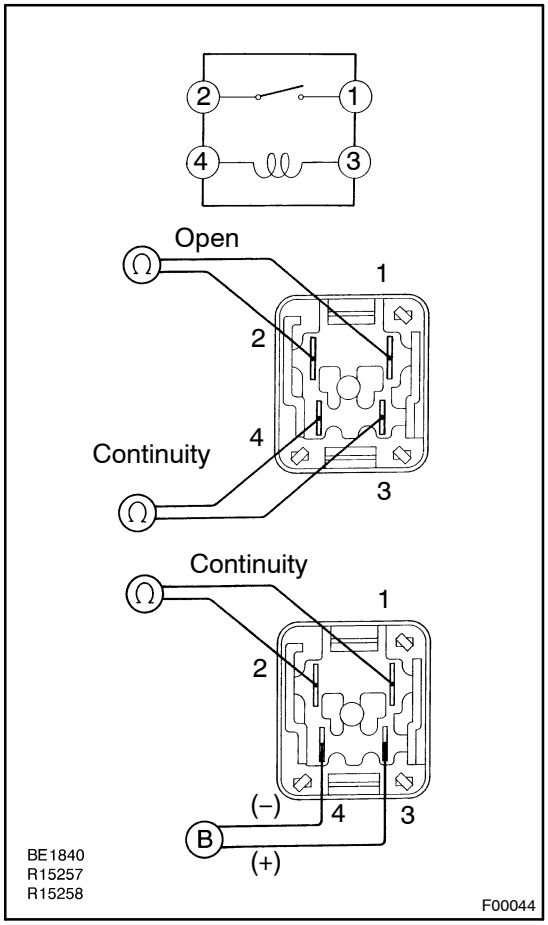
OK

7	Check for open and short circuit in harness and connector between pressure switch and ABS & TRC & VSC ECU (See page IN–29).

NG	Repair or replace harness or connector.

OK

8	Check ABS and TRC motor relay.



PREPARATION:

Remove ABS and TRC motor relay from Engine Room R/B No.2.

CHECK:

Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

*1: ABS motor relay 62 Ω
TRC motor relay 54 Ω

CHECK:

(a) Apply battery voltage between terminals 3 and 4.

(b) Check continuity between terminals.

OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS or TRC motor relay.**

OK ↓

9	Check for short circuit in harness and connector between ABS or TRC motor relay and ABS & TRC & VSC ECU (See page IN–29).

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

OK ↓

Check and replace ABS & TRC & VSC ECU.

DI2R1–01

DTC	C1253 / 53	Motor Relay Circuit

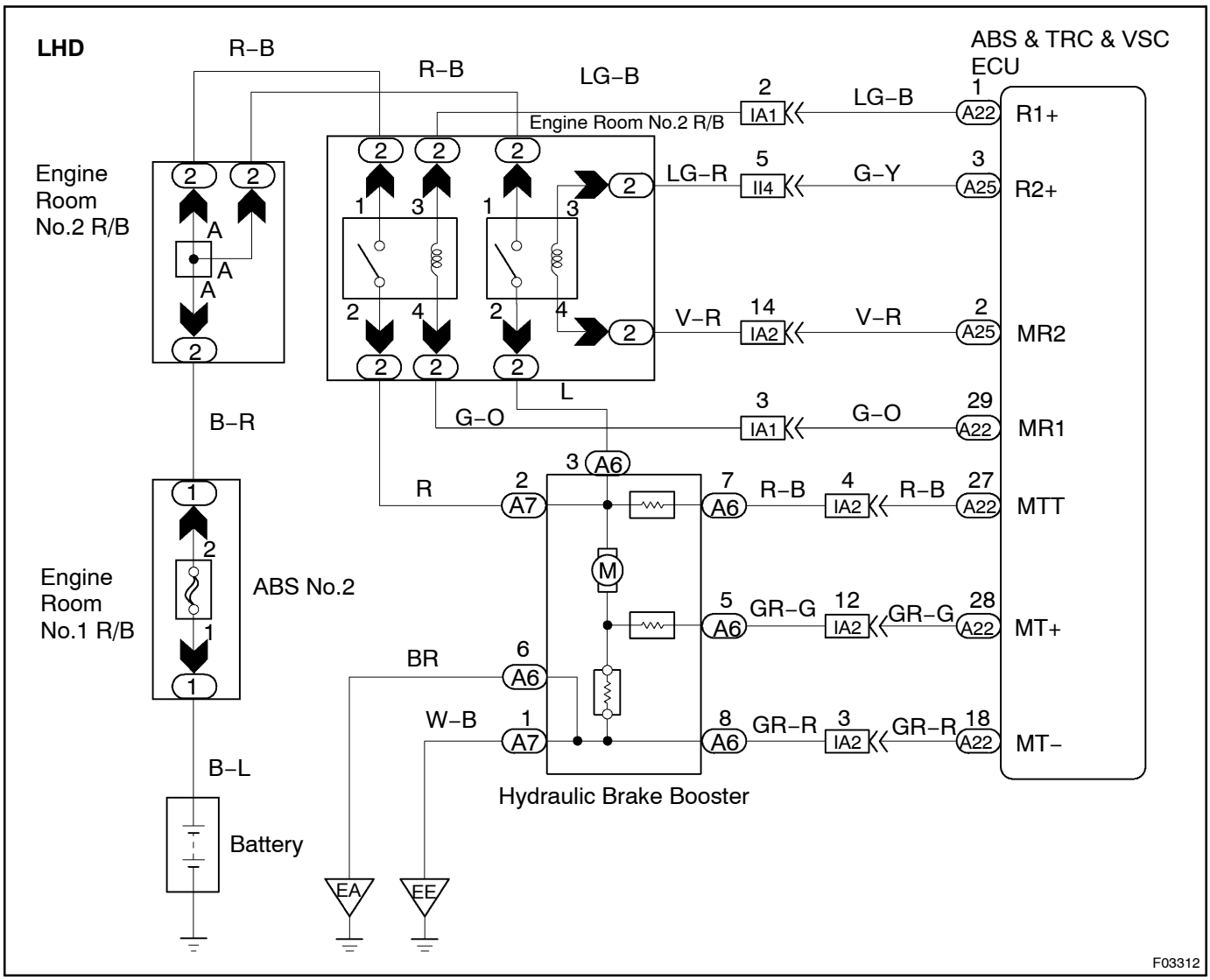
CIRCUIT DESCRIPTION

The ABS and TRC motor relay supplies power to the hydraulic brake booster pump motor. While the ABS & TRC & VSC are activated, the ECU switches the motor relay ON and operates the hydraulic brake booster pump motor.

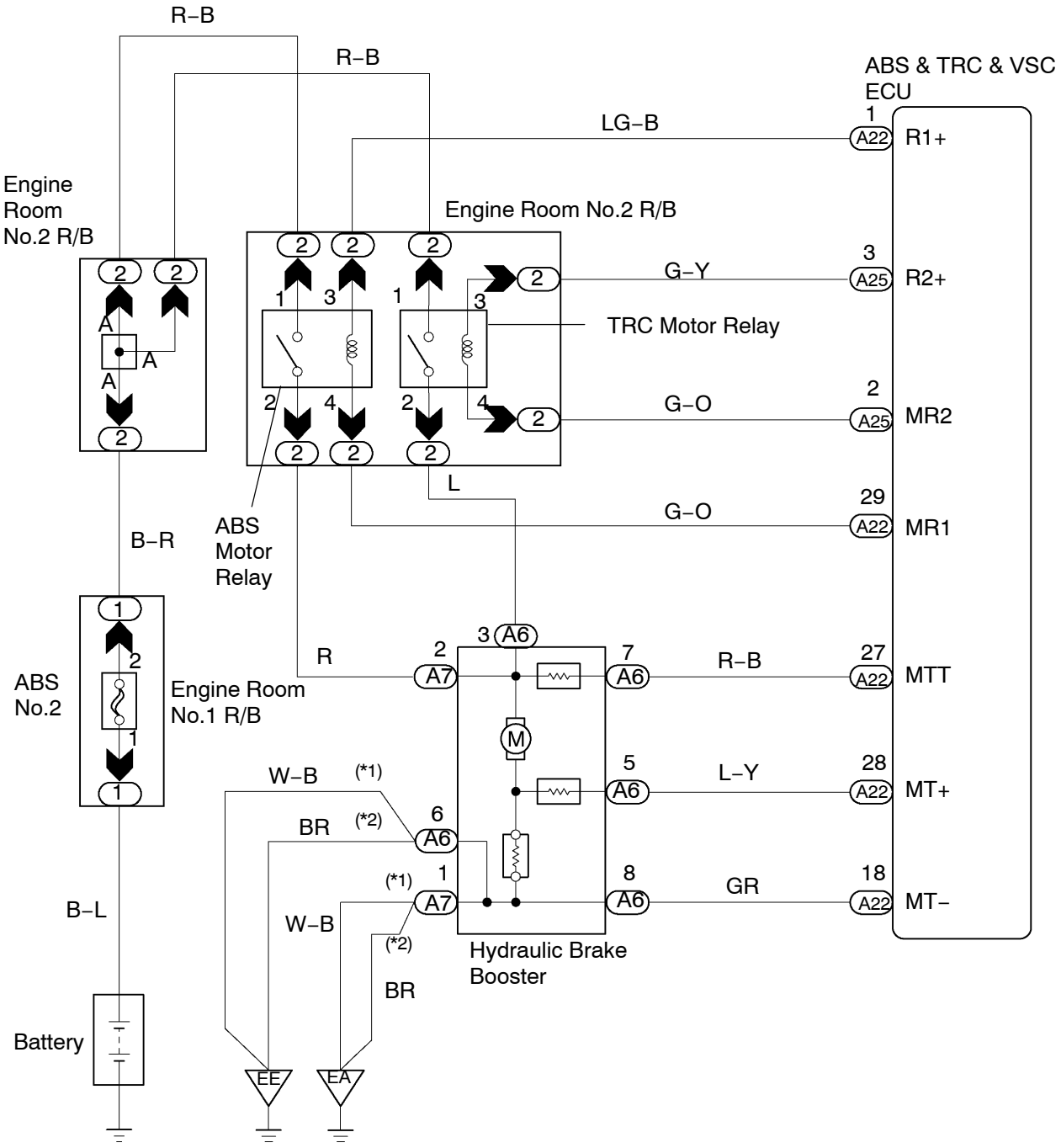
DTC No.	DTC Detecting Condition	Trouble Area
C1253 / 53	When any of the following (1) through (4) is detected: (1) After turning the ignition switch ON, open circuit in the relay coil is detected for more than 1 sec. (2) When the pressure switch does not control motor driving, the status that the motor relay is always ON continues for more than 1 sec. due to short circuit. (3) When the pressure switch (PH) detects the low pressure or while the pump motor operates to increase the pressure, the status that the motor relay does not turn ON continues for more than 0.2 secs. (4) When pressure switch does not control motor driving, the status that the motor relay is always ON due to the welded contact continues for more than 2 secs.	• ABS or TRC motor relay • ABS or TRC motor relay circuit • Hydraulic brake booster pump motor circuit

Fail safe function:
If trouble occurs in the ABS and TRC motor relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



RHD



(*1) : Australia
(*2) : Europe

F03313

INSPECTION PROCEDURE

Start the inspection from step 1 in case of using the hand–held tester and start from step 3 in case of not using hand–held tester.

1	**Check ABS and TRC 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 and TRC motor relays individually when operating it with the hand–held tester.

OK:

The operation sound of the ABS and TRC motor relay should be heard.

NG → **Go to step 3.**

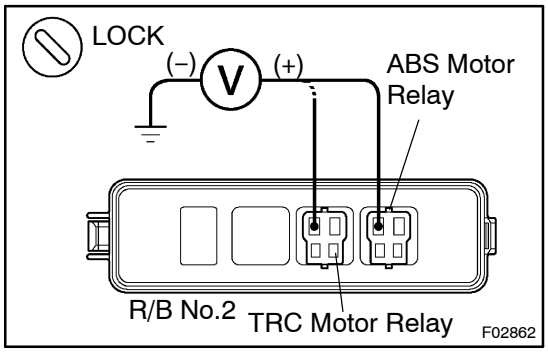
OK

2	**Check for short circuit (to B+) in harness and connector between MTT of hydraulic brake booster and ABS & TRC & VSC ECU (See page IN–29).**

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

3	**Check voltage between terminal 1 of Engine Room R/B No.2 (for ABS and TRC motor relay) and body ground.**



PREPARATION:

Remove ABS and TRC motor relay from Engine Room R/B No.2.

CHECK:

Measure voltage between terminal 1 of Engine Room R/B No.2 (for ABS and TRC motor relay) and body ground.

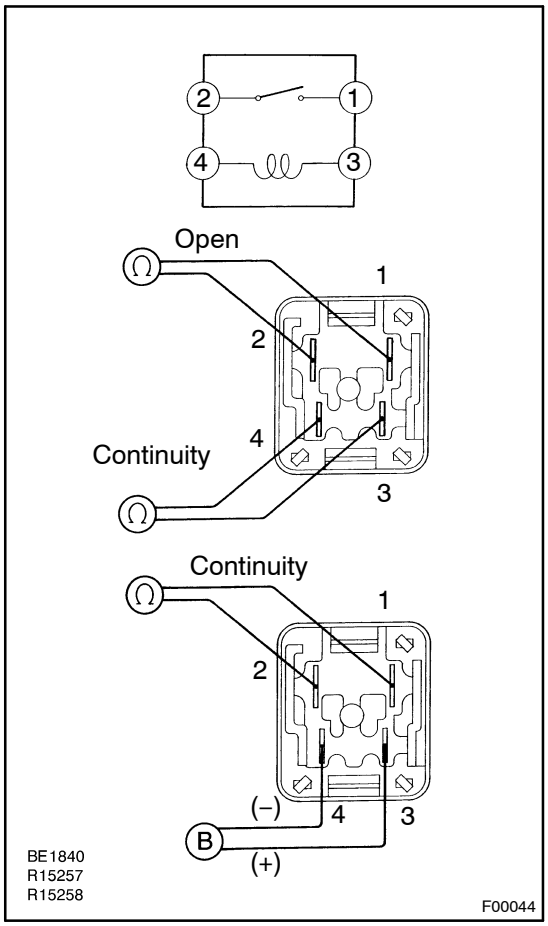
OK:

Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

4	**Check ABS and TRC motor relay.**



PREPARATION:

Remove ABS and TRC motor relay from Engine Room R/B No.2.

CHECK:

Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

*1: ABS motor relay 62 Ω
TRC motor relay 54 Ω

CHECK:

(a) Apply battery voltage between terminals 3 and 4.
(b) Check continuity between terminals.

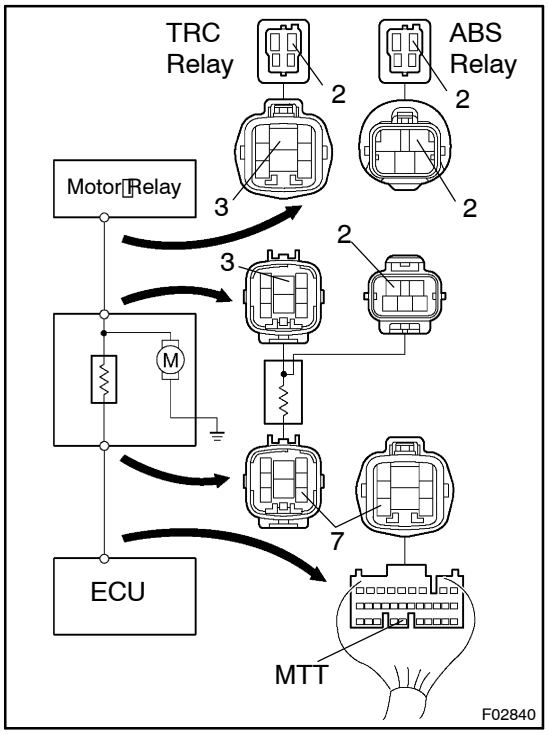
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS or TRC motor relay.**

OK

5	**Check continuity between each terminal (BM1 and BM2) and terminal MTT of ABS & TRC & VSC ECU.**



PREPARATION:

Disconnect the 2 connectors from the hydraulic brake booster.

CHECK:

(a) Check continuity between terminal 2 of ABS motor relay and terminal MTT of ABS & TRC & VSC ECU.

(b) Check continuity between terminal 2 of TRC motor relay and terminal MTT of ABS & TRC & VSC ECU.

OK:

Continuity

HINT:

There is resistance of 33 ± 3 Ω between terminals A6 – 3 or A7 – 2 and A6 – 7 of the hydraulic brake booster.

NG	**Repair or replace harness or hydraulic brake booster.**

OK

6	**Check for open and short circuit in harness and connector between ABS and TRC motor relay and ABS & TRC & VSC ECU (See page IN–29).**

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.

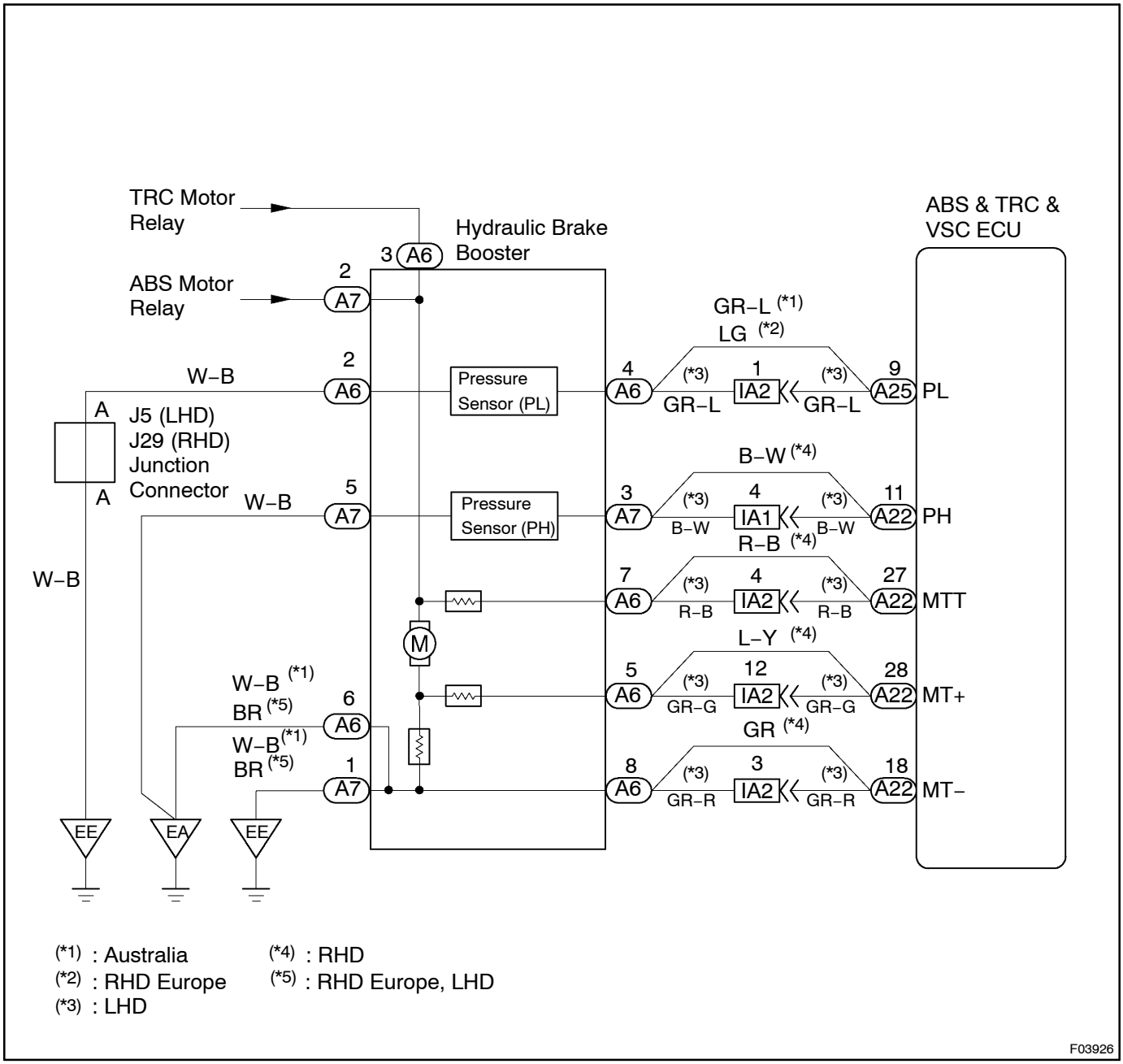
DI29B–02

DTC	C1254 / 54	Pressure Switch Circuit

CIRCUIT DESCRIPTION

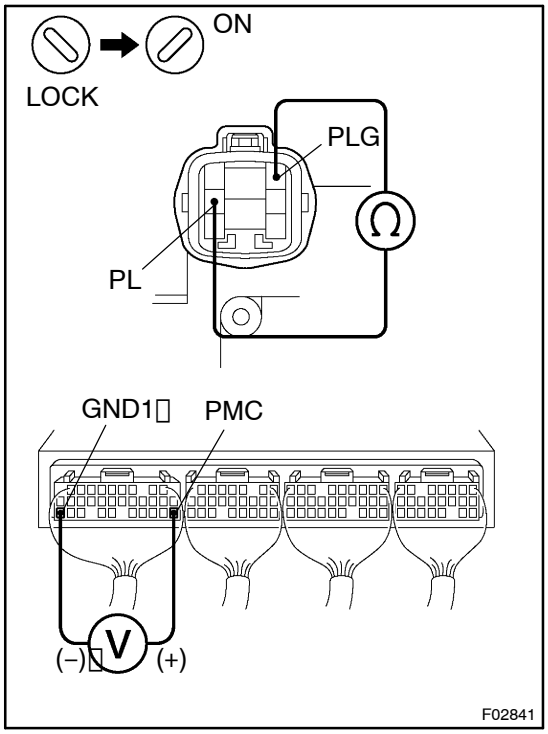
DTC No.	DTC Detecting Condition	Trouble Area
C1254 / 54	Either of the following (1) or (2) is detected: (1) After turning the ignition switch ON, short or open circuit in pressure switch (PL) continued for more than 1 sec. (2) After turning the ignition switch ON, open circuit in pressure switch (PH) continued for more than 1 sec.	• Pressure switch (PH or PL) • Pressure switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check pressure switch (PL) operation.**



PREPARATION:

(a) Remove ABS & TRC & VSC ECU with connectors still connected.

(b) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

(c) Disconnect the connector from the hydraulic brake booster.

CHECK:

While checking the resistance between terminals PL and PLG of hydraulic brake booster, depress the brake pedal with force of more than 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the voltage between terminals PMC and GND of ECU when the resistance changes from 5.7 kΩ to 1.0 kΩ.

OK:

2.3 – 3.7 V

PREPARATION:

(a) Turn the ignition switch OFF and disconnect the connector from the hydraulic brake booster.

(b) Turn the ignition switch ON.

CHECK:

While checking the resistance between terminals PL and PLG of hydraulic brake booster, depress the brake pedal changing the force in the range of 197 N (20 kgf, 44 lbf) to 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the voltage between terminals PMC and GND of ECU when resistance changes from 1.0 kΩ to 5.7 kΩ.

OK:

2.2 – 3.3 V

HINT:

After inspection, clear the DTC (See page DI–210).

OK	**Go to step 3.**

NG

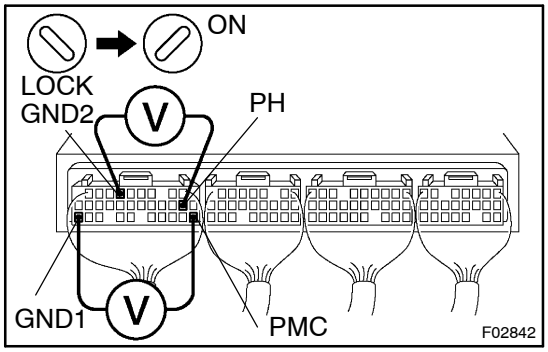
2	Check for short circuit in harness and connector between master cylinder pressure sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Replace hydraulic brake booster.

3	Check pressure switch (PH) operation.



PREPARATION:

(a) Remove ABS & TRC & VSC ECU with connectors still connected.

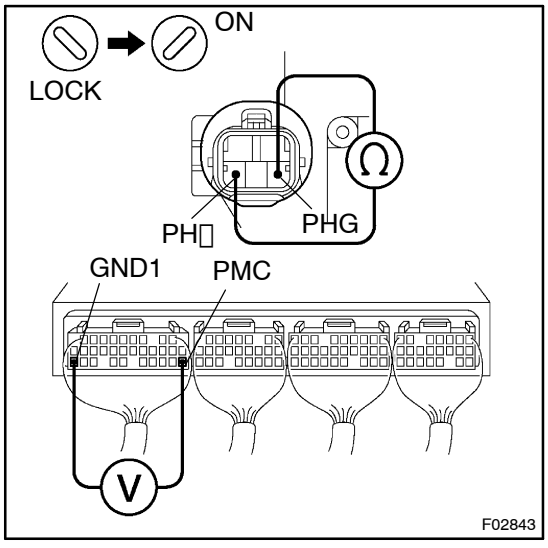
(b) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

CHECK:

While checking the voltage between terminals PH and GND of ECU, depress the brake pedal with force of more than 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the voltage between terminals PMC and GND of ECU when voltage changes from 6 V to 0 V.

OK:

3.0 – 4.7 V



PREPARATION:

(a) Turn the ignition switch OFF and disconnect the connector from the hydraulic brake booster.

(b) Turn the ignition switch ON.

CHECK:

While checking the resistance between terminals PH and PHG, depress the brake pedal changing the force in the range of 197 N (20 kgf, 44 lbf) to 294 N (30 kgf, 66 lbf) and check the resistance between terminals PMC and GND of ECU when resistance changes from 0 kΩ to 1 kΩ.

OK:

2.9 – 4.3 V

HINT:

After inspection, clear the DTC (See page DI–210).

OK → Go to step 5.

NG

4	Check for short circuit in harness and connector between master cylinder pressure sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Replace hydraulic brake booster.

5	Check for open and short circuit in harness and connector between pressure switch and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU.

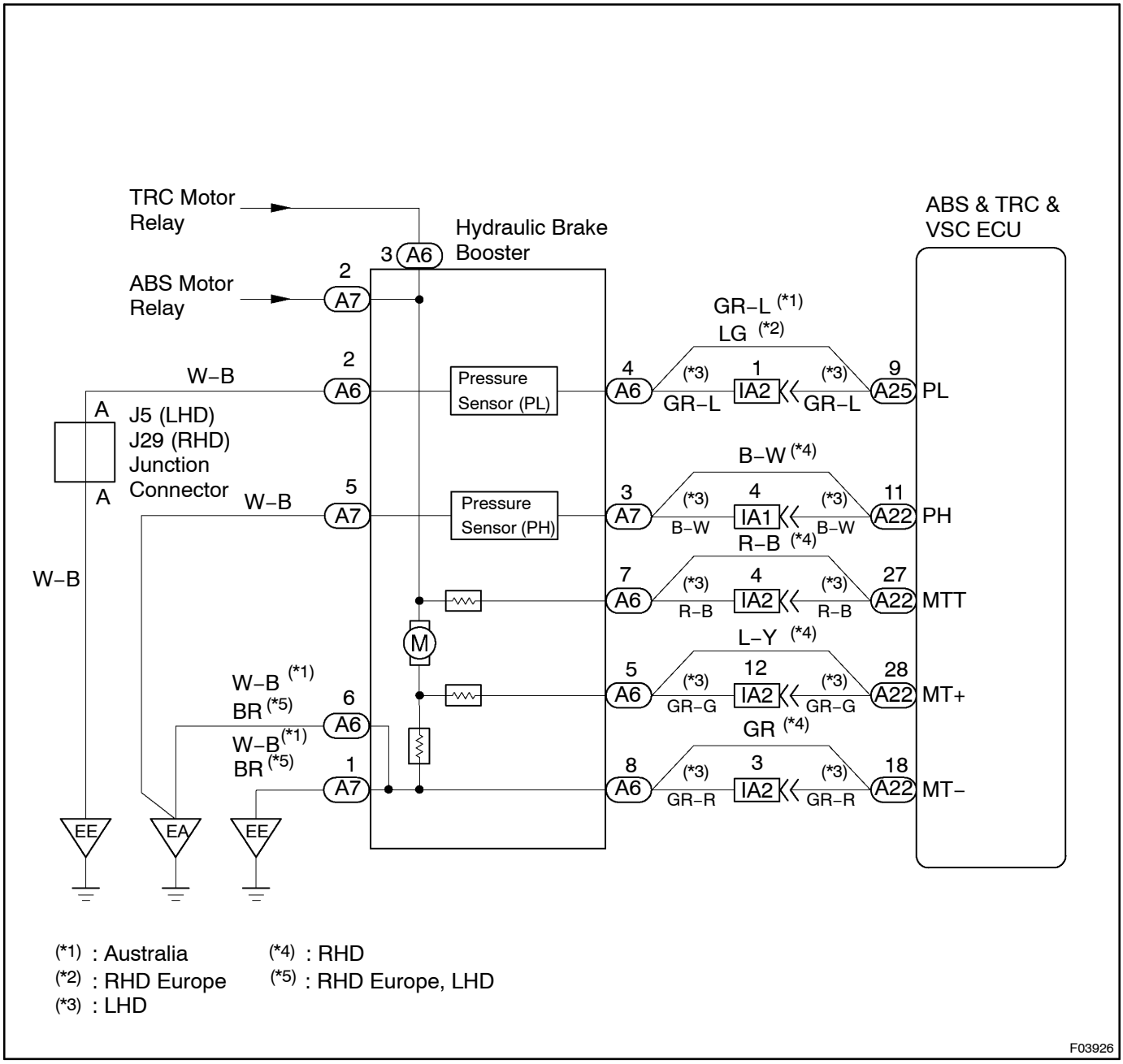
DI29C–02

DTC	C1256 / 56	Accumulator Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1256 / 56	Either of the following (1) through (3) is detected: (1) With the vehicle running, when the pressure switch (PL) detects high pressure, although ABS, TRC or VSC does not control, the pressure switch (PL) detects low pressure for more than 1.4 secs. (2) With the vehicle running, when the pressure switch (PL) detects high pressure, although ABS, TRC or VSC controls, the pressure switch (PL) detects low pressure for more than 0.2 secs. (3) After the ignition switch is turned ON, the pressure switch (PL) detects low pressure for more than 60 secs. (4) With the vehicle running, after ignition switch has been ON, the pressure switch (PL) detects low pressure for more than 0.2 secs. although ABS, TRC or VSC does not control and when the pressure switch is ON and stuck under high pressure. (5) With the vehicle running, after ignition switch is ON, the pressure switch (PL) detects low pressure for more than 0.2 secs. when ABS, TRC or VSC controls, the pressure switch is ON and stuck under high pressure. (6) With the vehicle running, after ignition switch is ON, the pressure switch (PL) is stuck to under low pressure although ABS, TRC or VSC does not control for more than 1.4 secs. (7) With the vehicle running, after ignition switch is ON, the pressure switch (PL) is stuck under low pressure when ABS, TRC or VSC controls for more than 0.2 secs.	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor

WIRING DIAGRAM

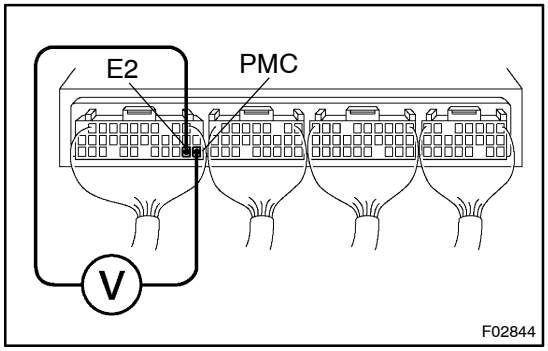


(*1) : Australia
(*2) : RHD Europe
(*3) : LHD
(*4) : RHD
(*5) : RHD Europe, LHD

F03926

INSPECTION PROCEDURE

1	Check accumulator operation.



PREPARATION:

(a) Remove ABS & TRC & VSC ECU with connectors still connected.

(b) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

CHECK:

While checking the voltage between terminals PMC and E2 of ECU, depress the brake pedal with force of more than 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the PMC voltage when increase of voltage changes from accurately to mildly.

OK:

1.6 – 3.0 V at 20 °C (68 °F)

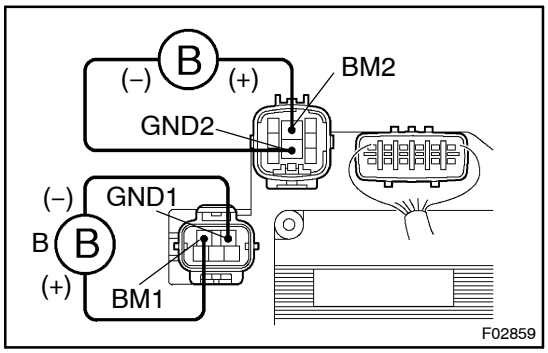
HINT:

If the value is not within the standard, cool the engine room and check it again.

NG	Replace accumulator.

OK

2	Check operation of hydraulic brake booster pump motor.



PREPARATION:

Disconnect hydraulic brake booster connector.

CHECK:

Connect battery positive ⊕ lead to BM1 or BM2 terminal and battery negative ⊖ lead to GND1 or GND2 terminal of the hydraulic brake booster (pump motor) connector.

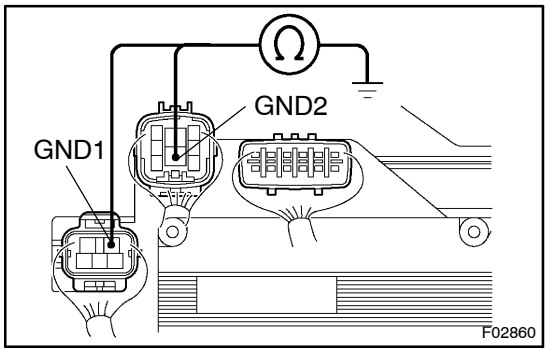
OK:

The operation sound of the pump motor should be heard.

OK	Go to step 4.

NG

3	**Check continuity between GND terminal of brake actuator & hydraulic brake booster (pump motor) connector and body ground.**



CHECK:

Check continuity between GND1 or GND2 terminal of hydraulic brake booster (pump motor) connector and body ground.

OK:

Continuity

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

OK

Replace hydraulic brake booster pump motor.

4	**Check pressure switch (PH).**

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:

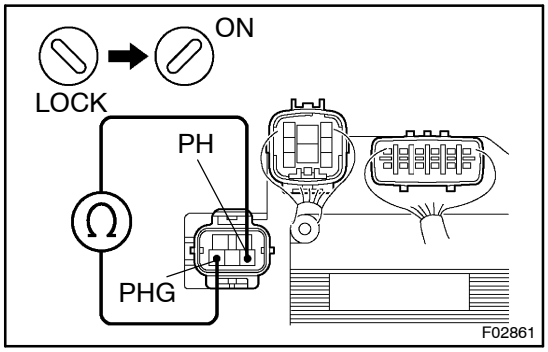
Depress the brake pedal more than 40 times with the ignition switch OFF then turn the ignition switch ON and check the pressure switch (PH) condition.

OK:

”OFF” turns to ”ON”.

HINT:
OFF: Low pressure
ON: High pressure

In case of not using the hand–held tester.



PREPARATION:

(a) Disconnect the connector from the hydraulic brake booster.

(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

CHECK:

Measure resistance between terminals PH and PHG of hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

PREPARATION:

(a) Connect the connector to the hydraulic brake booster.

(b) Disconnect the connector after ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PH and PHG of hydraulic brake booster connector.

OK:

Resistance: 0 Ω

HINT:

After inspection, clear the DTC (See page DI–210).

OK	**Go to step 6.**

NG

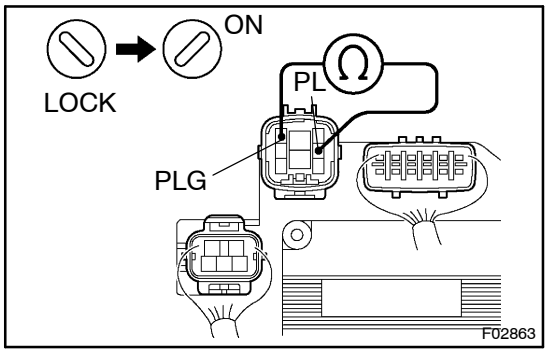
5	**Check for short circuit in harness and connector between pressure switch and ABS & TRC & VSC ECU (See page IN–29).**

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

OK

Replace hydraulic brake booster.

6	Check pressure switch (PL).



PREPARATION:

(a) Disconnect the connector from the hydraulic brake booster.

(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

CHECK:

Measure resistance between terminals PL and PLG of hydraulic brake booster connector.

OK:

Resistance: 5.7 kΩ

PREPARATION:

(a) Connect the connector to the hydraulic brake booster.

(b) Disconnect the connector after ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PL and PLG of hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

HINT:

After inspection, clear the DTC (See page DI–210).

NG → **Replace hydraulic brake booster.**

OK →

Check and replace ABS & TRC & VSC ECU.

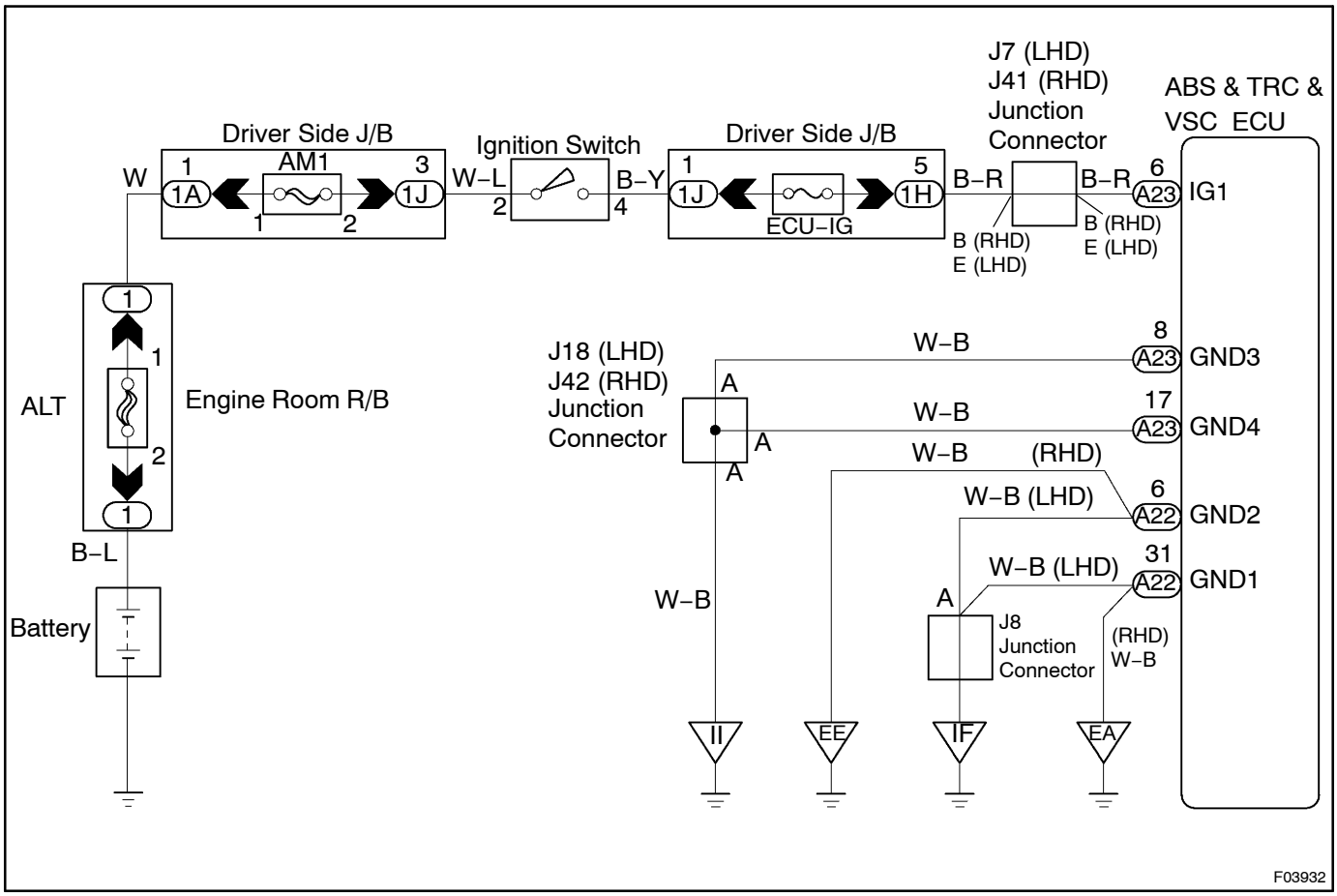
DI29D–02

DTC	C1257 / 57	Power Supply Drive Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1257 / 57	After the ignition switch has been turned ON, open or short circuit in circuit of power supply drive system inside ECU continues for more than 1.5 secs.	• Battery • Power source circuit • ABS & TRC & VSC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery voltage.**

OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system.**

OK

2	**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.

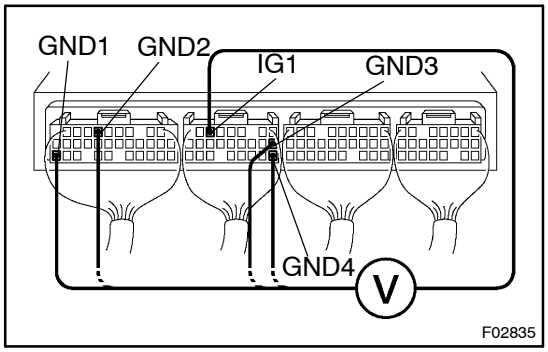
CHECK:

Check the voltage condition output from the ECU displayed on the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove ABS & TRC & VSC ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 and GND of ABS & TRC & VSC ECU connector.

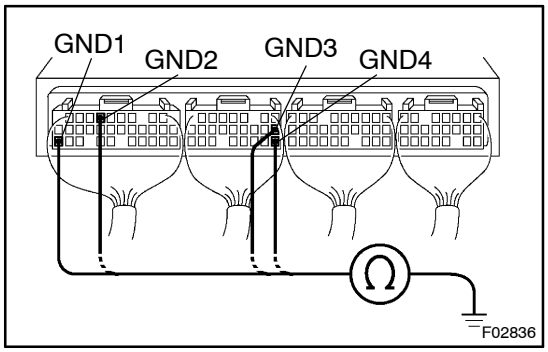
OK:

Voltage: 10 – 14 V

OK → **Ignition switch OFF, check and replace ABS & TRC & VSC ECU.**

NG

3	**Check continuity between terminal GND of ABS & TRC & VSC ECU connector and body ground.**



CHECK:

Measure resistance between terminal GND of ABS & TRC & VSC ECU connector and body ground.

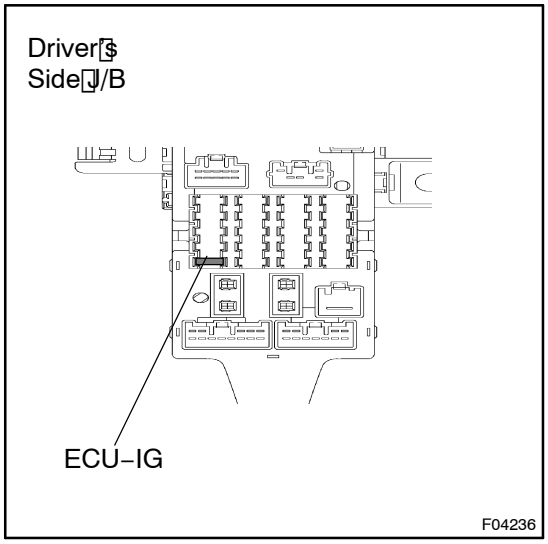
OK:

Resistance: 1 Ω or less

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

OK

4	**Check ECU–IG fuse.**



PREPARATION:

Remove ECU–IG fuse from the driver's side J/B.

CHECK:

Check continuity of ECU–IG fuse.

OK:

Continuity

NG	**Check for short in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

Check for open circuit in harness and connector between ABS & TRC & VSC ECU and battery (See page IN–29).

DI29E–02

DTC	Always ON	Malfunction in ECU

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following (1) or (2) is detected: (1) The ECU connectors are OFF from the ECU. (2) There is a malfunction in the ECU internal circuit.	• Battery • IC regulator • Power source circuit • ABS & TRC & VSC ECU

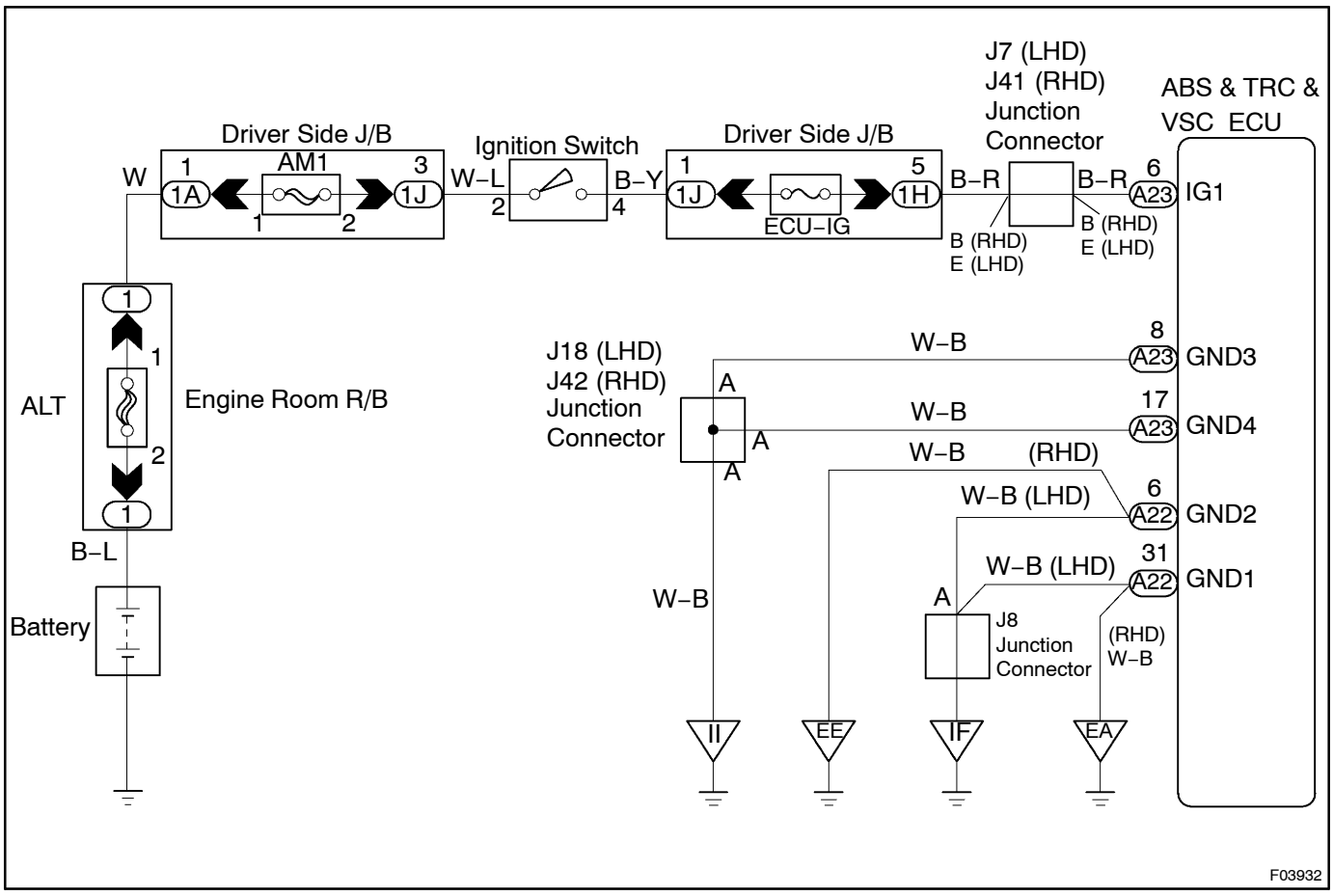
HINT:

There is a case that hand–held tester cannot be used when ECU is abnormal.

Fail safe function:

If trouble occurs in the ECU, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC &VSC controls and the brake system becomes normal. When fail safe function in ABS system is activated, ”VSC” warning light and ”VSC OFF” indicator light tight up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that the ECU connectors are securely connected to the ECU.

NO → Connect the connector to the ECU.

YES

2	Is DTC output?

Check DTC on page DI–210.

YES → Repair circuit indicated by the output code.

NO

3	Is normal code displayed?

NO → GO to step 4.

YES

Check ABS solenoid relay. Check for short circuit in harness and connector between ABS solenoid relay and check connector (See page IN–29).

4	Does ABS warning light go off?

YES → Check for open or short circuit in harness and connector between ECU–IG fuse and ECU (See page IN–29).

NO

5	Check battery voltage.

PREPARATION:
Start the engine.
CHECK:
Check the battery voltage.
OK:
Voltage: 10 – 16 V

NG → **Check and repair the charging system.**

OK

6	Check operation of the ABS warning light.

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 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.
In case of not using the hand–held tester.
PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the ABS & TRC & VSC ECU.
(c) Turn the ignition switch ON.
CHECK:
Check the ABS warning light condition when pulling in and out the short pin from the check connector.
OK:
When the short pin is pulled out: ABS warning light goes off
When the short pin is pulled in: ABS warning light goes on

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

Check for short circuit in harness and connector between combination meter and ABS & TRC & VSC ECU, combination meter and check connector (See page IN–29).
Check ABS solenoid relay circuit (See page DI–233).

DI29F–03

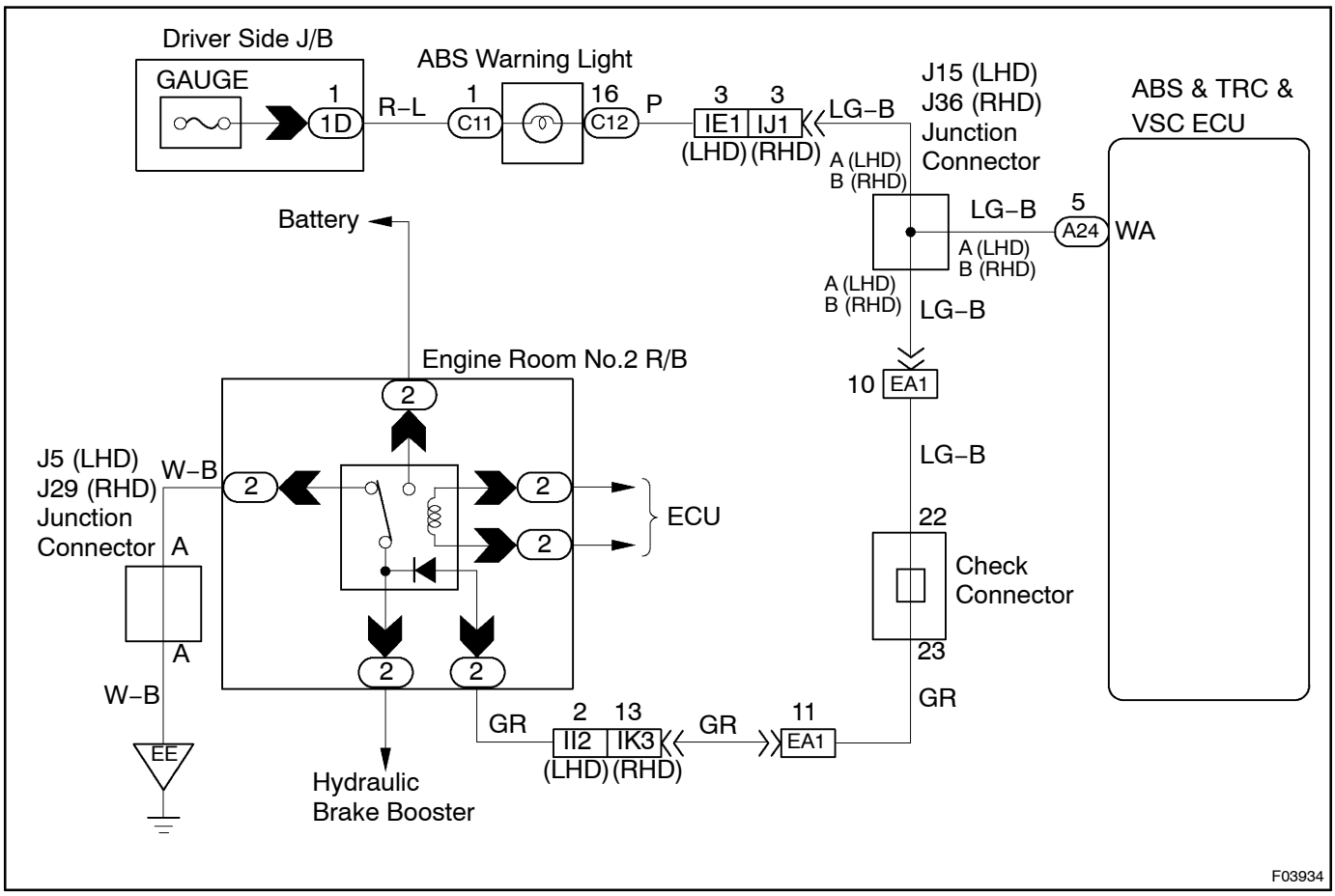
ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects 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.

After removing the short pin of the check connector, connect terminals Tc and E_1 of the check connector to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshoot 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 on the hand–held tester.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

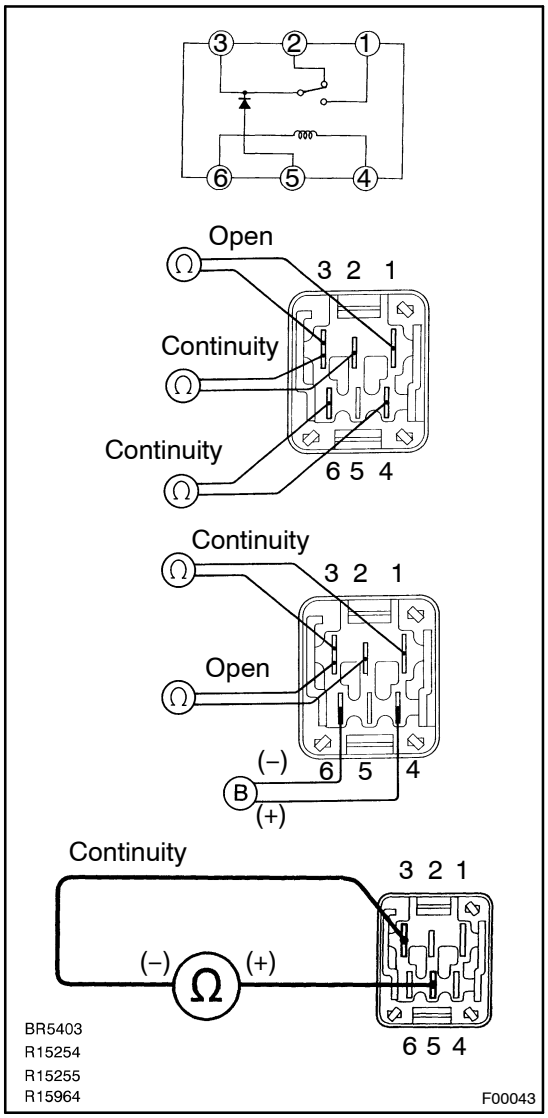
2	**Check ABS warning light.**

See Combination Meter Troubleshooting on page BE–3.

NG → **Repair bulb or combination meter assembly.**

OK

3	Check ABS solenoid relay.



PREPARATION:

Remove ABS solenoid relay from Engine Room R/B No.2.

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 there is no continuity, connect the ⊖ test lead to terminal 5 and the ⊕ lead to terminal 3. Recheck continuity between terminals.

NG → **Turn the IG 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–29).

4	Check that the ECU connectors are securely connected to the ECU.

NO → Connect the connector to the ECU.

YES

5	Check operation of the ABS warning light (See step 1).

OK → Check and replace ABS & TRC & VSC ECU.

NG

6	Is DTC output?

Check DTC on page DI–210.

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 ECU (See page IN–29).

YES

8	Check ABS solenoid relay (See step 3).

NG → Turn the IG 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–29).

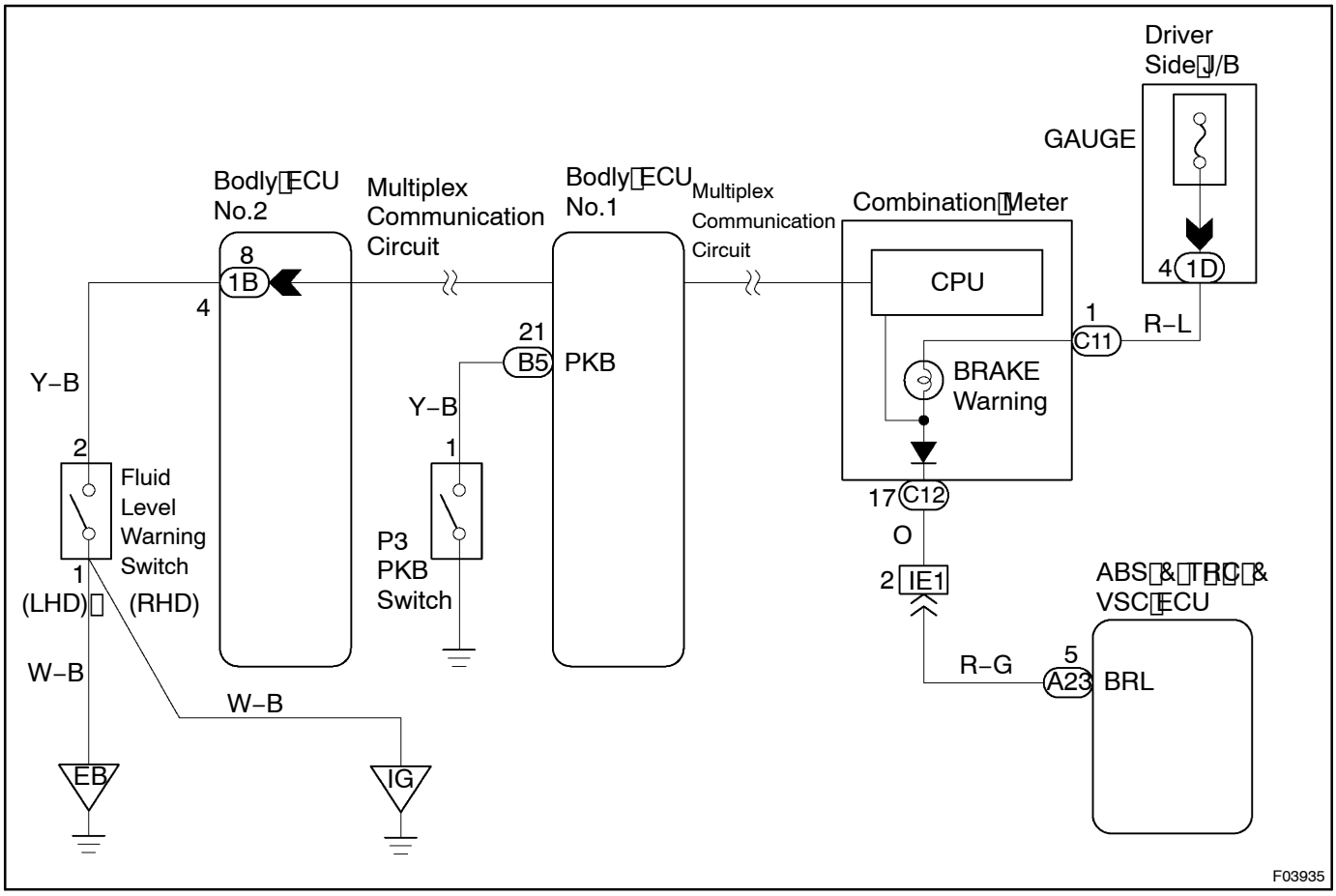
DI29G–03

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

The BRAKE warning light light up while the brake fluid is insufficient and the accumulator is abnormally low.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check parking brake switch circuit (See page DI–632).

NG → Repair or replace parking brake switch circuit.

OK

2	Check brake fluid level warning switch circuit (See page DI–671).

NG → Repair or replace brake fluid level warning switch circuit.

OK

3	Is DTC output for ABS?

Yes → Repair circuit indicated by the output code.

No

4	Check BRAKE warning light.

See combination meter troubleshooting on page BE–3.

NG → Repair or replace combination meter.

OK

5	Check multiplex communication system (See page DI–803).

NG → Repair or replace multiplex communication circuit.

OK

Check and replace ABS & TRC & VSC ECU.

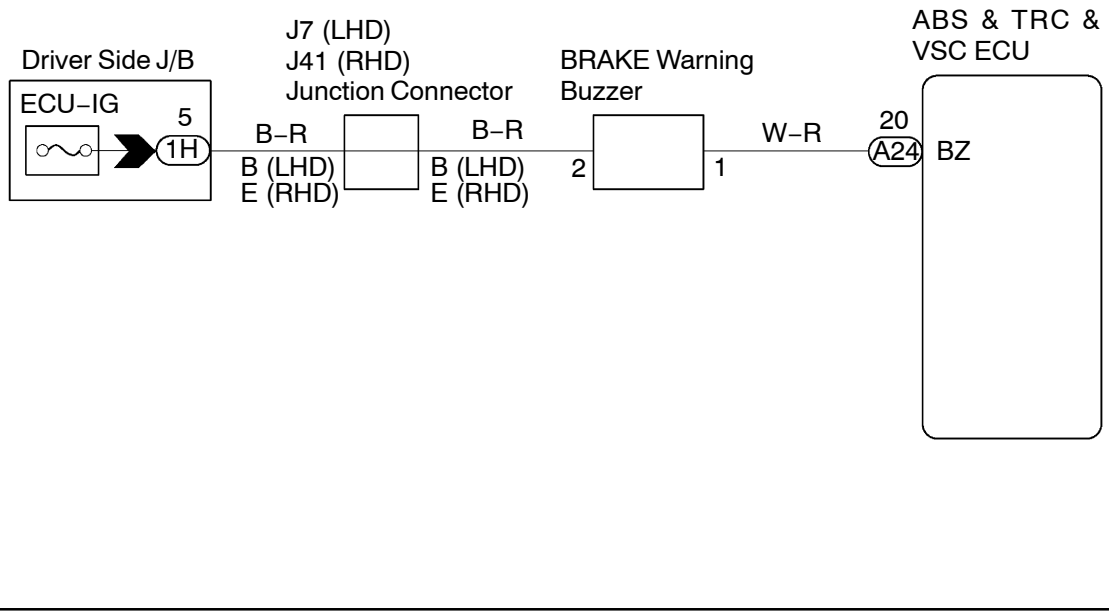
DI29H–02

BRAKE Warning Buzzer Circuit

CIRCUIT DESCRIPTION

The BRAKE warning buzzer sounds while the accumulator pressure is abnormally low or VSC is activated.

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 BRAKE warning buzzer.**

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.

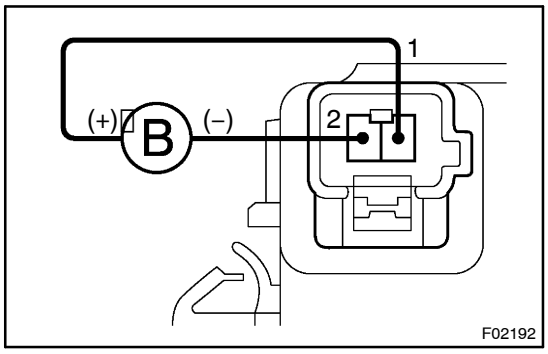
CHECK:

Check that BRAKE warning buzzer sounds ”ON” and ”OFF” with the hand–held tester.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

2	Check BRAKE warning buzzer.



PREPARATION:

Disconnect the BRAKE warning buzzer connector.

CHECK:

Apply battery voltage to the terminals 1 and 2 of BRAKE warning buzzer connector, check that the BRAKE warning buzzer sounds.

NG → Replace BRAKE warning buzzer.

OK ↓

3	Check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and BRAKE warning buzzer (See page IN–29).

NG → Repair or replace harness or connector.

OK ↓

Check and replace ABS & TRC & VSC ECU.

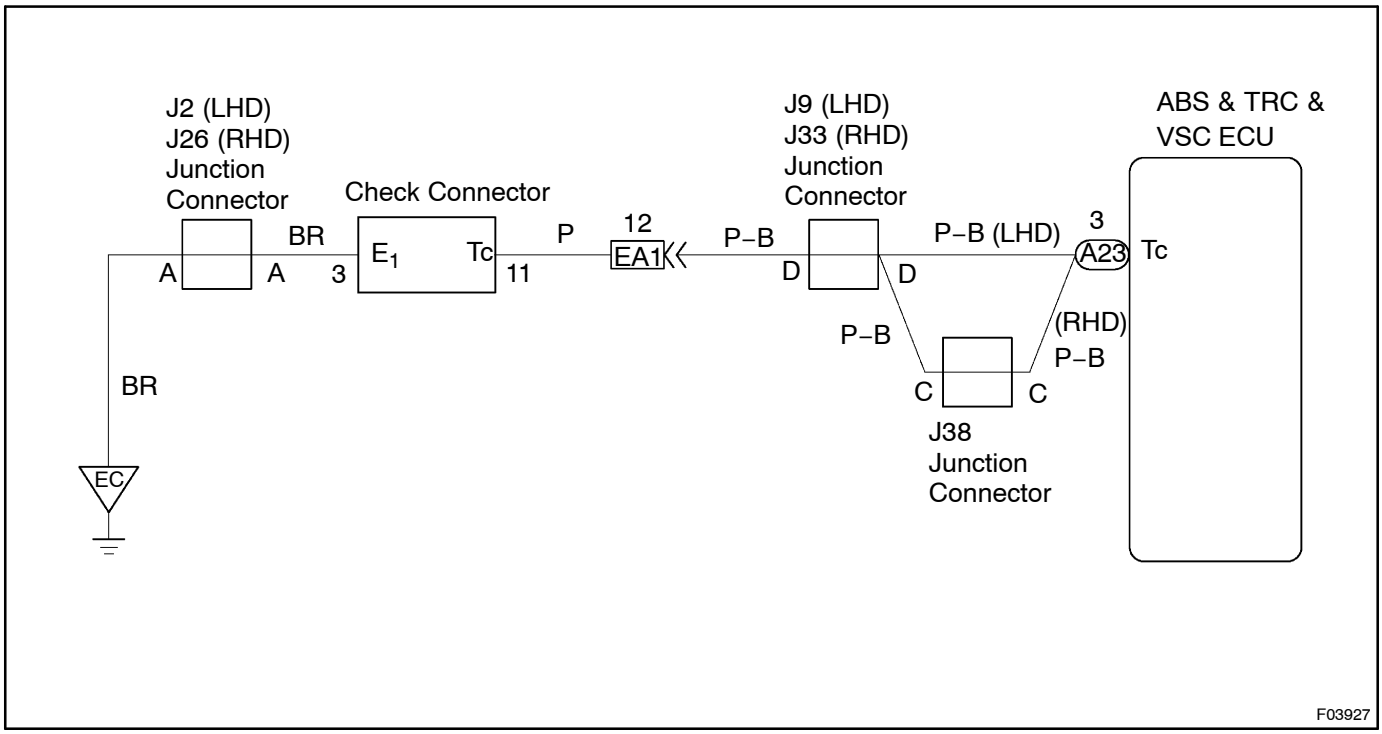
DI29I–02

Tc Terminal Circuit

CIRCUIT DESCRIPTION

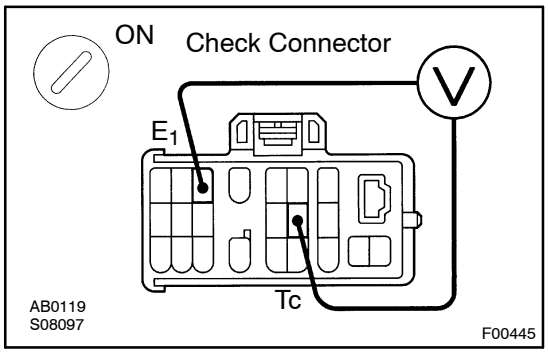
Connecting terminals Tc and E_1 of the check connector causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and E_1 of check connector.**



PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminal Tc and E1 of check connector.

OK:

Voltage: 10 – 14 V

OK	**If ABS warning light does not blink even after Tc and E_1 are connected, the ECU may be defective.**

NG

2	Turn the IG switch OFF, and check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and check connector, check connector and body ground (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU.

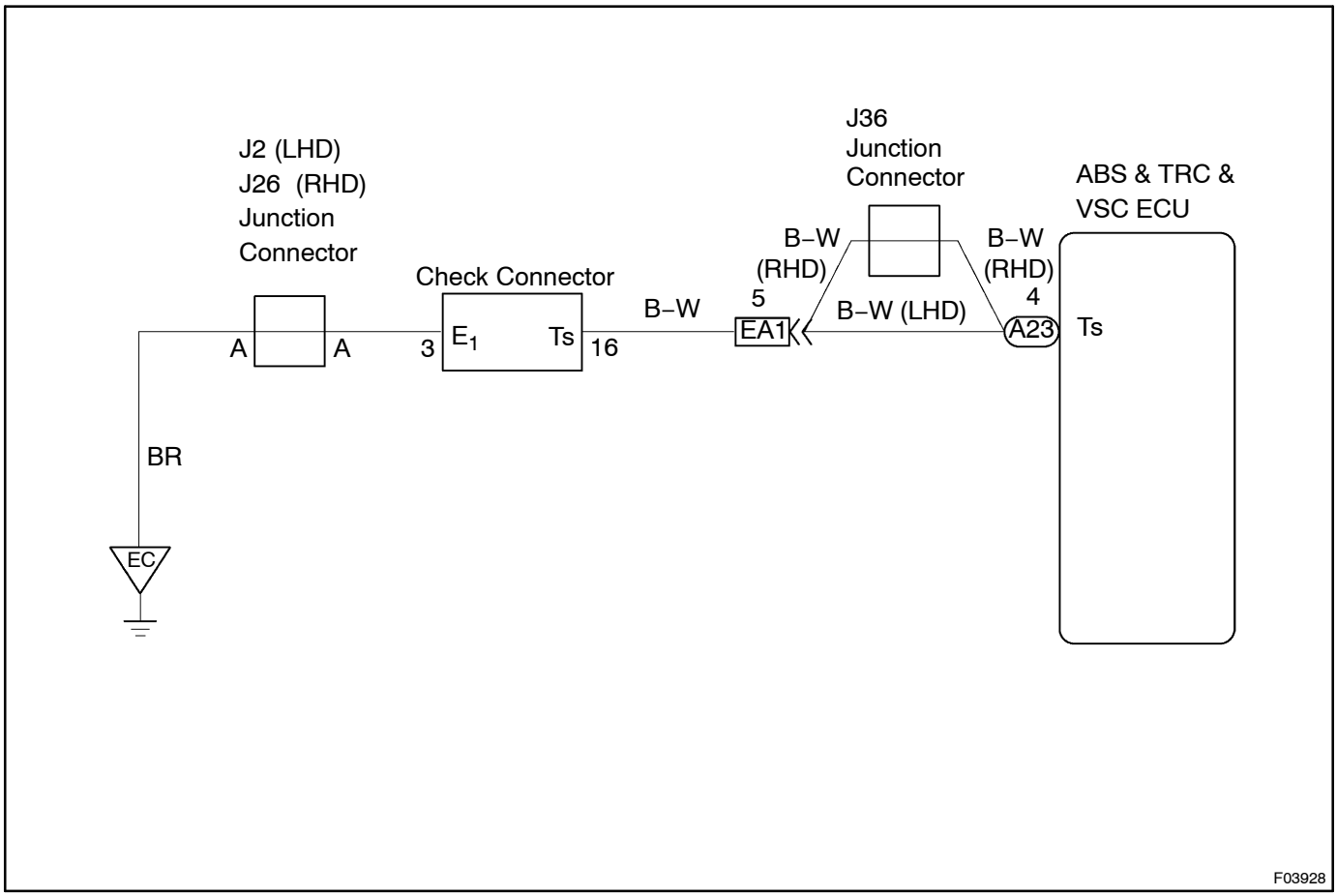
DI29J–02

Ts Terminal Circuit

CIRCUIT DESCRIPTION

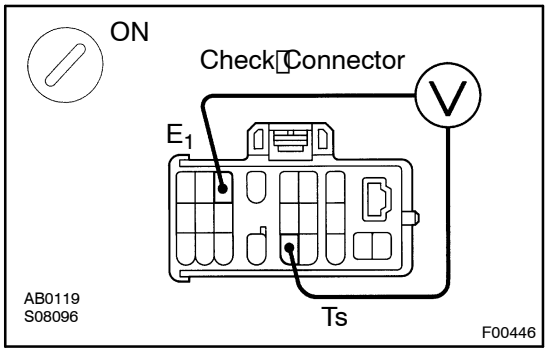
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected by the DTC check.
Connecting terminals Ts and E_1 of the check connector in the engine compartment starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and E_1 of check connector.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and E_1 of check connector.

OK:

Voltage: 10 – 14 V

OK	If ABS warning light does not blink even after Ts and E_1 are connected, the ECU may be defective.

NG

2	Turn the IG switch OFF, and check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and check connector, check connector and body ground (See page IN–29).

NG	Repair or replace harness or connector.

OK

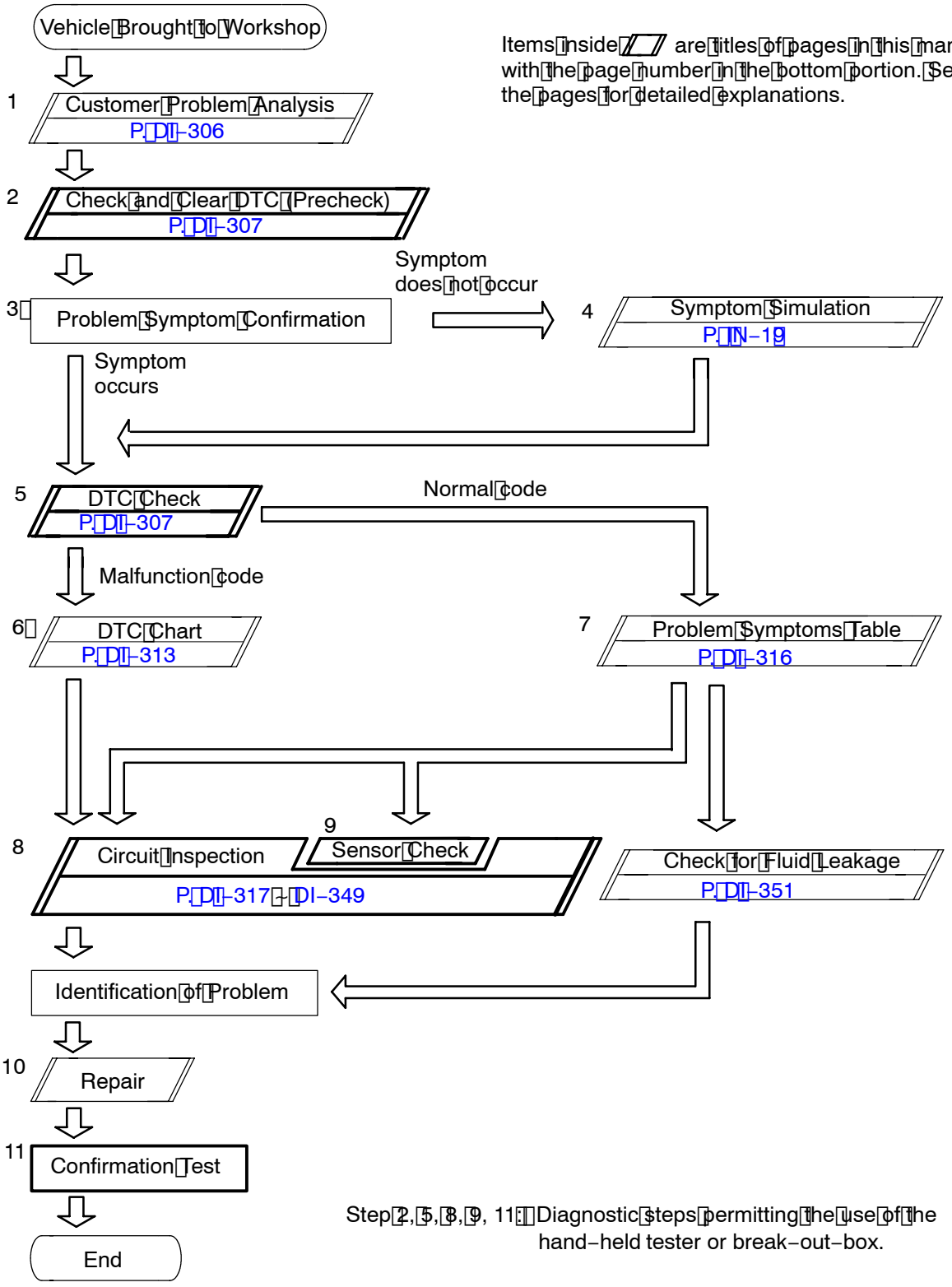
Check and replace ABS & TRC & VSC ECU.

VEHICLE STABILITY CONTROL (VSC) SYSTEM

DI285–03

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshooot in accordance with the procedure on the following pages.



DI286–02

CUSTOMER PROBLEM ANALYSIS CHECK

TRC & VSC 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	☐ TRC does not operate. (Wheels spin when starting rapidly.)	
	☐ VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	VSC OFF Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC Warning Light Abnormal	☐ Remains ON ☐ 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 Lamp	☐ Normal ☐ Malfunction Code (Code)
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not LIght Up
	BRAKE Warning Buzzer Abnormal	☐ Sounds ☐ Does not Sounds

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

DI287–02

PRE–CHECK

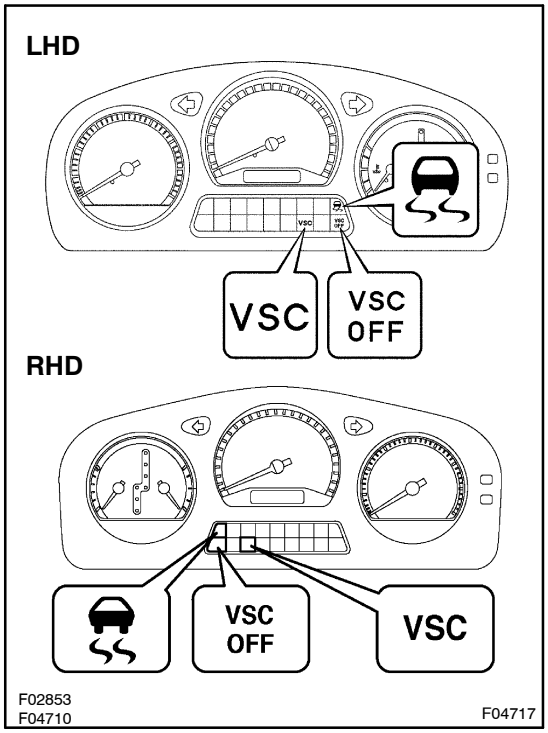
1. DIAGNOSIS SYSTEM

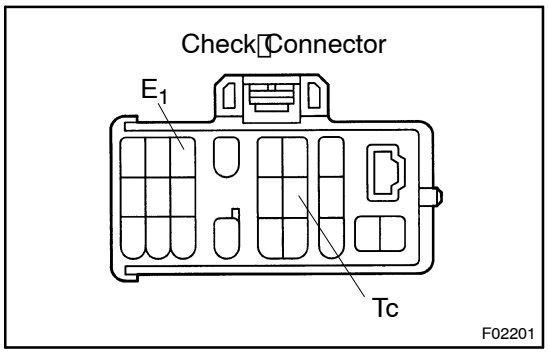
(a) Check the indicator.

When the ignition switch is turned ON, check that the VSC warning light, VSC OFF indicator light and SLIP indicator light goes ON for 3 seconds.

HINT:

- If the ECU stores DTC, VSC warning light and VSC OFF indicator light is ON.
- If the indicator check result is not normal, proceed to troubleshooting for the VSC warning light circuit, VSC OFF indicator light circuit, and SLIP indicator light circuit (See page DI–342, DI–344, DI–347).





(b) In case of not using hand–held tester:

Check the DTC

(1) Using SST, connect terminals Tc and E_1 of check connector.

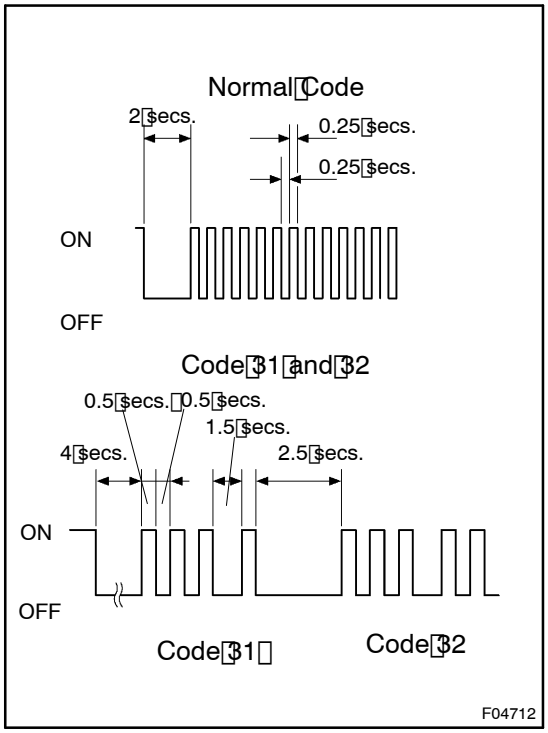
SST 09843 – 18020

(2) Turn the ignition switch ON.

(3) Read the DTC from the VSC warning light on the combination meter.

HINT:

- If no code appears, inspect the diagnostic circuit or VSC warning light circuit (See page DI–301 or DI–342).

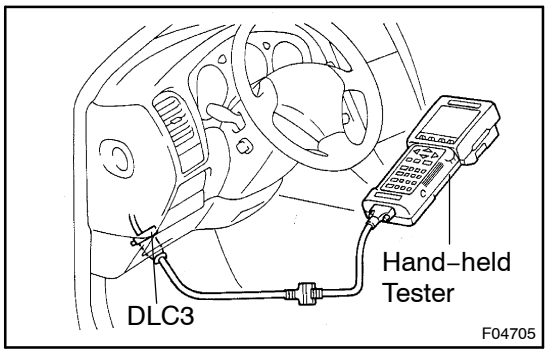


• As an example, the blinking patterns for normal code and code 31 and 32 are shown on the left.

(4) Codes are explained in the code table on page DI–313.

(5) After completing the check, disconnect terminals Tc and E_1, and turn OFF the display.

If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC will be displayed 1st.



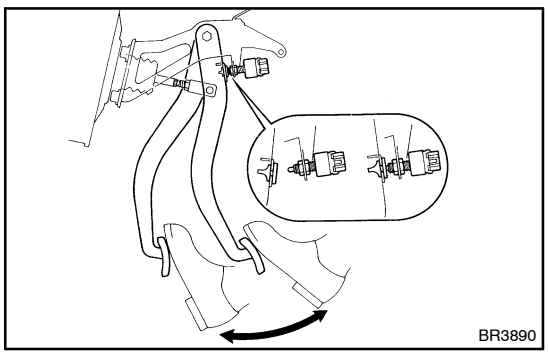
(c) In case of using hand–held tester:
Check the DTC.

(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.

SST 09843 – 18020

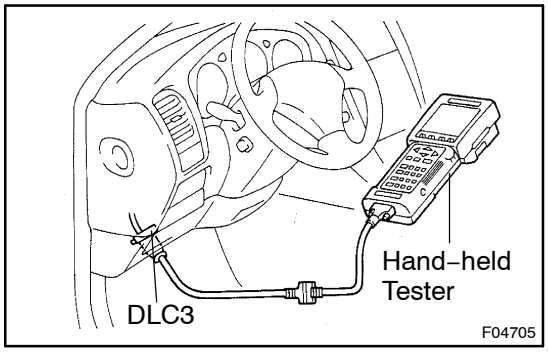
(2) Turn the ignition switch ON.

(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.

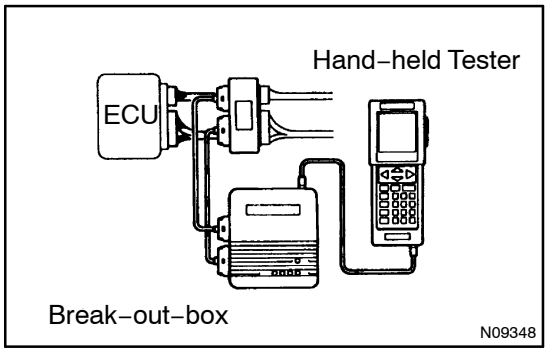
(4) Check that the warning light shows the normal code.

(5) Remove the SST from the terminals of check connector.

SST 09843 – 18020

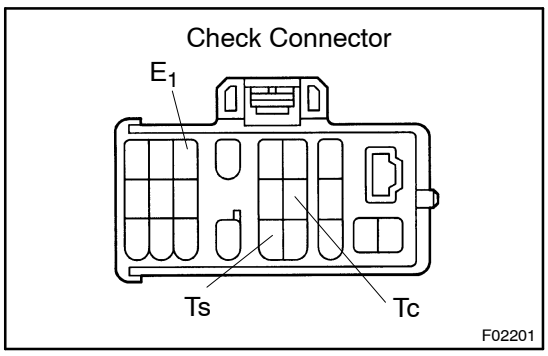


(e) In case of using hand–held tester:
Clear the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes. (See hand–held tester operator's manual.)



(f) (Reference):
Using break–out–box and hand–held tester, measure the ECU terminal values.
(1) Turn the ignition switch OFF.
(2) Hook up the break–out–box and hand–held tester to the vehicle.
(3) Turn the ignition switch ON.
(4) Read the ECU input/output values by following the prompts on the tester screen.

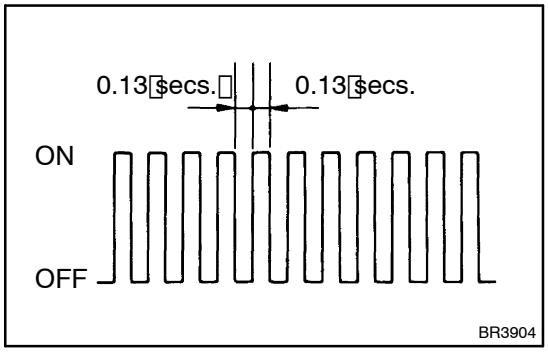
HINT:
- Hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
- Please refer to the hand–held tester/break–out–box operator's manual for further details.



2. VSC SENSOR CHECK (TEST MODE)

HINT:
If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.

(a) In case of not using hand–held tester :
Check the VSC sensor signal.
(1) Turn the ignition switch OFF.
(2) Check that the shift lever position is at P range, turn the steering wheel to the neutral position.
(3) Using SST, connect terminals Ts and E_1 of check connector.
SST 09843 – 18020
(4) Start the engine.

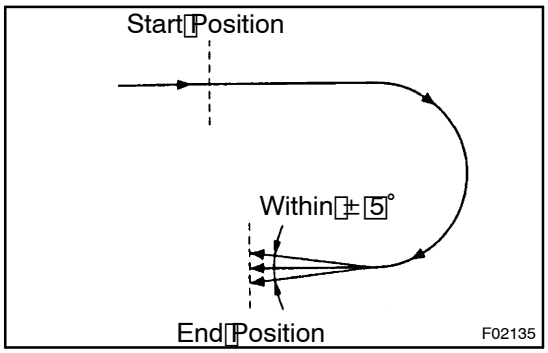


(5) Check that the VSC warning light blinks.

HINT:
If the VSC warning light does not blink, inspect the VSC warning light circuit and Ts terminal circuit.
(See page DI–303, DI–303)

(6) After a new ECU installed, the first time only:
Start the engine and keep the vehicle in the stationary condition on the flat place for 3 sec. or more, and check the zero point calibration of the yaw rate sensor.

(7) Check the steering angle sensor.
Turn the steering wheel either to left or right for 450° or more from the vehicle stationary condition, and turn back the steering wheel to the straight ahead position.



(8) Check the yaw rate sensor.
Shift the shift lever to the D range and drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to left or right for 90° or more, and maintain 180° circular drive for the vehicle.
Stop the vehicle and shift the shift lever to the P range, check that the VSC buzzer sounds for 3 secs.

- If the VSC buzzer sounded, the sensor check is in normal completion.
- If the VSC buzzer does not sound, do the sensor check again.
- If the VSC buzzer still won't sound, there is malfunction in the VSC sensor, so check the DTC.

HINT:

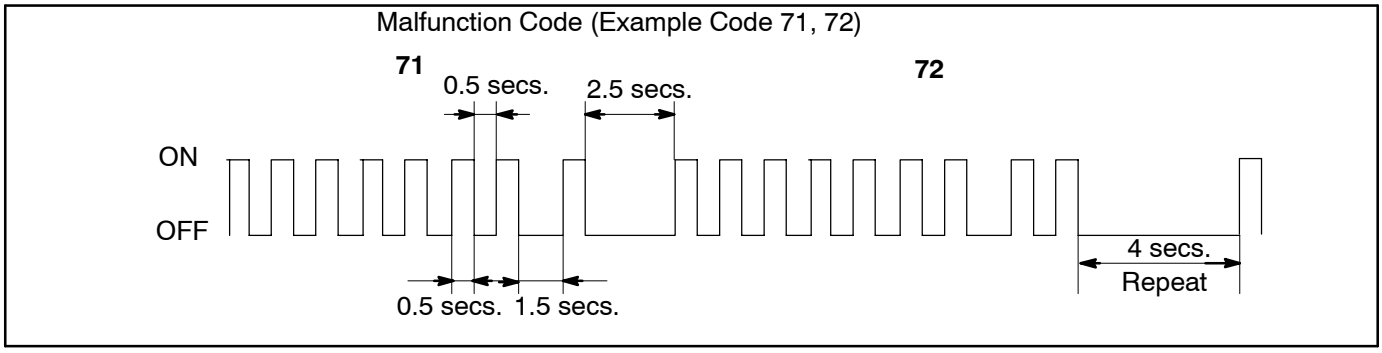
- Drive the vehicle circularly by 180°. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- Do not spin the rear wheels.

(9) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843 – 18020

(10) Read the number of blinks of the VSC warning light.

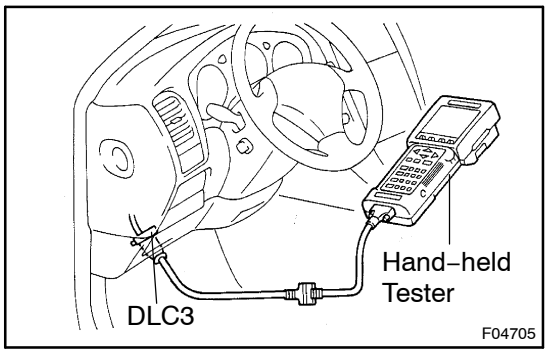
HINT:

- See the list of DTC shown on step the next page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 secs. ON and 0.25 secs. OFF is repeated.)
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



(11) After doing the check, disconnect the SST from terminals Ts and E_1, Tc and E_1 of check connector, and turn ignition switch OFF.

SST 09843 – 18020



(b) In case of using hand–held tester:
Check the VSC sensor signal.
(1) Hook up the hand–held tester to the DLC3.
(2) Do steps (2) and (4)~ (8) (See 2 pages before).
(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 the VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371 / 71	Yaw rate sensor output signal malfunction	• Yaw rate sensor • Yaw rate sensor circuit
C1208 / 72	Steering position sensor output signal malfunction	• Steering position sensor • Steering position sensor circuit

3. YAW RATE SENSOR ZERO POINT CALIBRATION

HINT:
When replacing the yaw rate sensor or ECU, make sure to perform yaw rate sensor zero point calibration.

(a) When replacing the ECU:
After replacing ECU, shift the shift lever in P position and turn the ignition switch ON. Do not move the vehicle for 15 seconds or more.

HINT:
At this time, VSC warning light and VSC OFF indicator light are on for 15 seconds and go off.

(b) When replacing the yaw rate sensor:
Shift the shift lever in P position and turn the ignition switch ON, repeat connecting and releasing Ts and E1 terminals of check connector 4 times or more for 8 secs. After that do not move the vehicle for 15 secs. or more.

HINT:
When the operation (b) is performed, DTC is deleted.
At this time, ABS warning light flushes. VSC OFF light lights up for 15 secs., then goes off. VSC warning light lights up for approx. 15 secs., then flushes to indicate DTC.

DI288–03

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843–18020, connect the terminals Tc and E_1.
- 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 that code. For details of each code, turn to the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
C1231 / 31 (DI–328)	Malfunction in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1232 / 32 (DI–332)	Malfunction in deceleration sensor	• Deceleration sensor • Deceleration sensor circuit
C1233 / 33 (DI–334)	Open or short circuit in yaw rate sensor circuit	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34 (DI–334)	Malfunction in yaw rate sensor	• Yaw rate sensor • Yaw rate sensor circuit
C1210 / 36 (DI–322)	Zero point calibration of yaw rate sensor undone	• Yaw rate sensor • Yaw rate sensor circuit • P range switch circuit
C1207 / 37 (DI–320)	Malfunction in P/R range switch	• P/R range switch • P/R range switch circuit
C1223 / 43 (DI–325)	Malfunction in ABS control system	• ABS control system
C1224 / 44 (DI–326)	Open or short circuit in NE signal circuit	• NEO circuit • Engine and ECT ECU • ABS & TRC & VSC ECU
C1201 / 51 (DI–317)	Engine and ECT ECU system malfunction	• Engine control system
C1203 / 53 (DI–318)	Engine and ECT ECU communication circuit malfunction	• TRC+ or TRC– circuit • ENG+or ENG– circuit • Engine and ECT ECU
Always ON (DI–338)	Malfunction in ABS & TRC & VSC ECU Open circuit in VSC warning indicator circuit	• Power source circuit • VSC warning light circuit

HINT:

There is a case that hand–held tester cannot be used when VSC warning light is always on.

DI289–02

PARTS LOCATION

See page DI–218.

DI28A–02

TERMINALS OF ECU

See page DI–220.

DI28B–03

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.

NOTICE:

When replacing ABS & TRC & VSC ECU, sensor or etc., turn the IG switch OFF.

Symptom	Suspect Area	See page
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 & VSC 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–307 DI–241 DI–351 DI–224
VSC does not operate.	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC & VSC 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. 5. Deceleration sensor circuit. 6. Yaw rate sensor circuit. 7. Steering angle sensor circuit.	 DI–307 DI–241 DI–351 DI–224 DI–332 DI–334 DI–328
VSC warning light abnormal.	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC & VSC ECU. 1. VSC warning light circuit. 2. ABS & TRC & VSC ECU.	 DI–342 IN–29
SLIP indicator light abnormal.	SLIP indicator light circuit.	DI–347
VSC OFF indicator abnormal.	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC & VSC ECU. 1. VSC OFF indicator light circuit. 2. VSC OFF switch circuit.	 DI–344 DI–344
DTC check cannot be done.	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC & VSC ECU. 1. VSC warning light circuit. 2. Tc terminal circuit.	 DI–342 DI–301

DI28C–03

CIRCUIT INSPECTION

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If trouble occurs in the engine control system, the ECU prohibits TRC and VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions (1) and (2) continue for 5 secs.: (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 output code.

*1: Output NG code

DI28D–02

DTC	C1203 / 53	Engine and ECT ECU Communication Circuit Malfunction

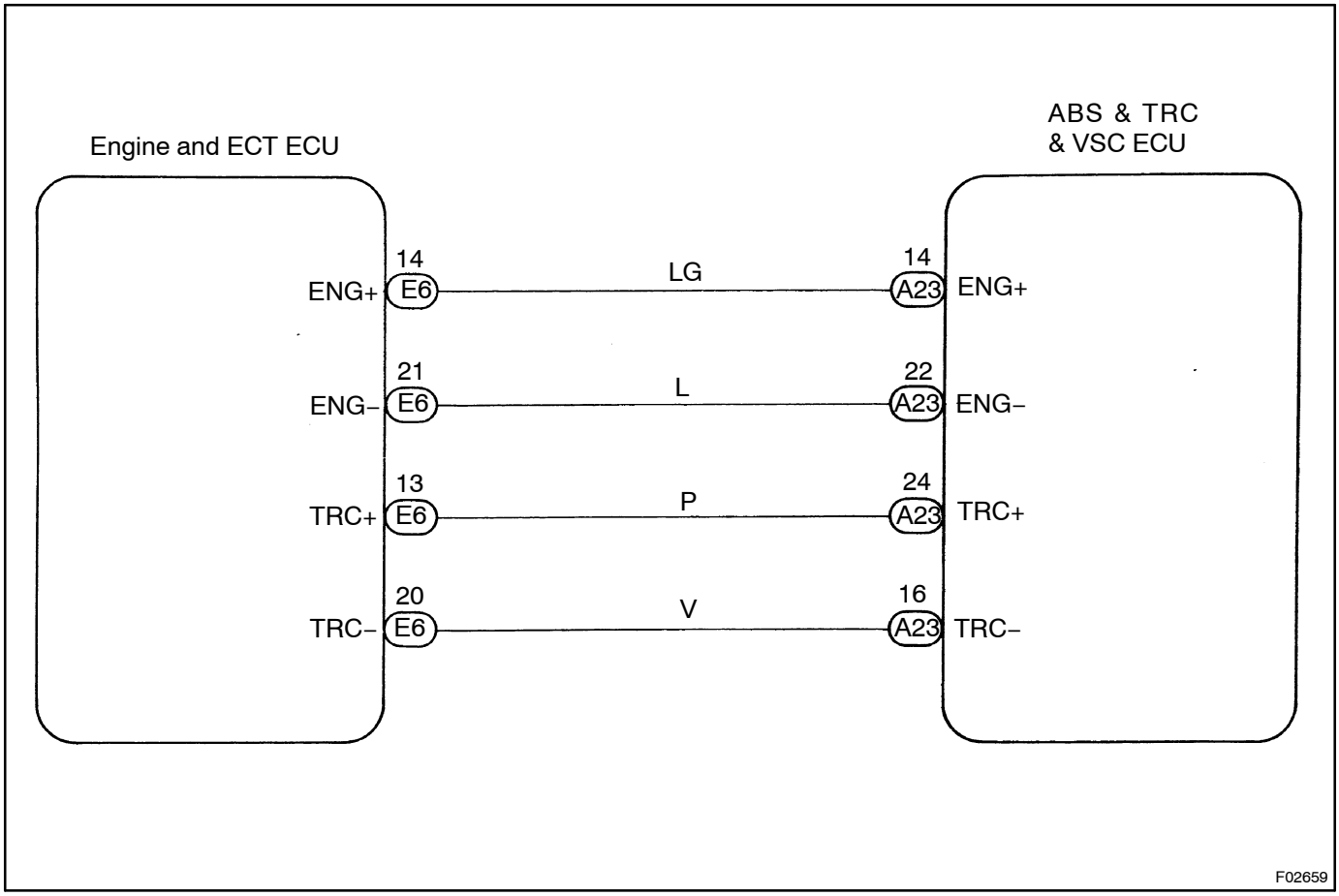
CIRCUIT DESCRIPTION

The circuit is used to send TRC & VSC control information from the ABS & TRC & VSC ECU to the ECM (TRC+, TRC–), and engine control information from the ECM to the ABS & TRC & VSC ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203/53	Either of the following (1) or (2) continues for 5 secs.: (1) ECU IG1 terminal voltage is 9.5 V to 17.0 V and data transmission to the engine and ECT ECU is impossible. (2) ECU IG1 terminal voltage is 9.5 V to 17.0 V, engine speed is 500rpm or more or vehicle speed is 60 km/h (36 mph) or more and data receiving from the engine and ECT ECU is impossible.	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine and ECT ECU

Fail safe function:
If trouble occurs in the engine and ECT ECU communication circuit, the ECU prohibits TRC & VSC control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between each of terminals ENG+, ENG–, TRC+, TRC– of ABS & TRC & VSC ECU and engine and ECT ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK →

Check and replace engine and ECT ECU or ABS & TRC & VSC ECU

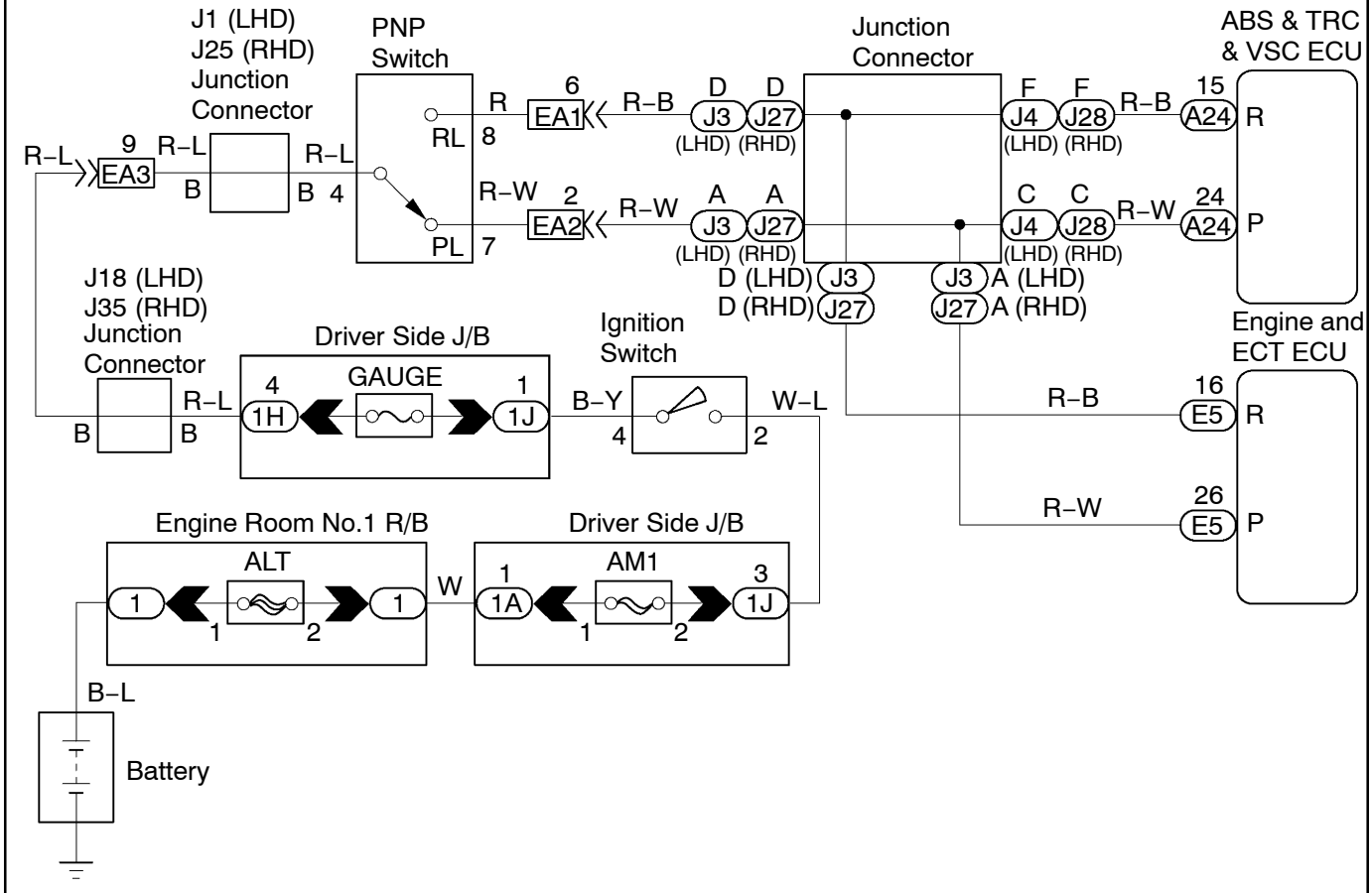
DI28E–03

DTC	C1207 / 37	P/R Range Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1207 / 37	When any of the following (1) through (3) is detected: (1) At vehicle speed of 15 km/h (9 mph) or less and the conditions that open circuit signal of P signal circuit of park/neutral position switch is ON and the voltage of IG1 terminal is 9.5 to17 V continue for 5 secs. or more. (2) At vehicle speed of 15 km/h (9 mph) or more, and when the condition that P signal from park/neutral position switch is ON, and the the shift lever position information from the ECM is other than in P or N range continues for 60 secs. or more. (3) At vehicle speed of 15 km/h (9 mph) or less and the conditions that open circuit signal of R signal circuit of park/neutral position switch is ON and the voltage of IG1 terminal is 9.5 to 17 V continue for 2 secs. or more.	• P/R range switch • P/R range switch circuit

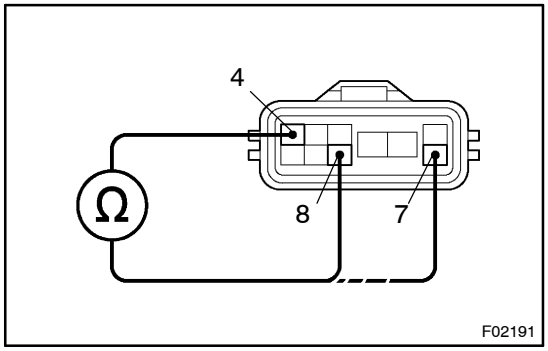
WIRING DIAGRAM



F03936

INSPECTION PROCEDURE

1	Check park/neutral position switch (P/R range switch).



PREPARATION:

(a) Jack up the vehicle.

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

CHECK:

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

OK:

P range switch	Terminals 4 – 7	Continuity
R range switch	Terminals 4 – 8	Continuity

NG → Replace park/neutral position switch (P/R range switch).

OK

2	Check for open and short circuit in harness and connector between terminals P and R of ABS & TRC & VSC ECU and battery (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU or engine and ECT ECU.

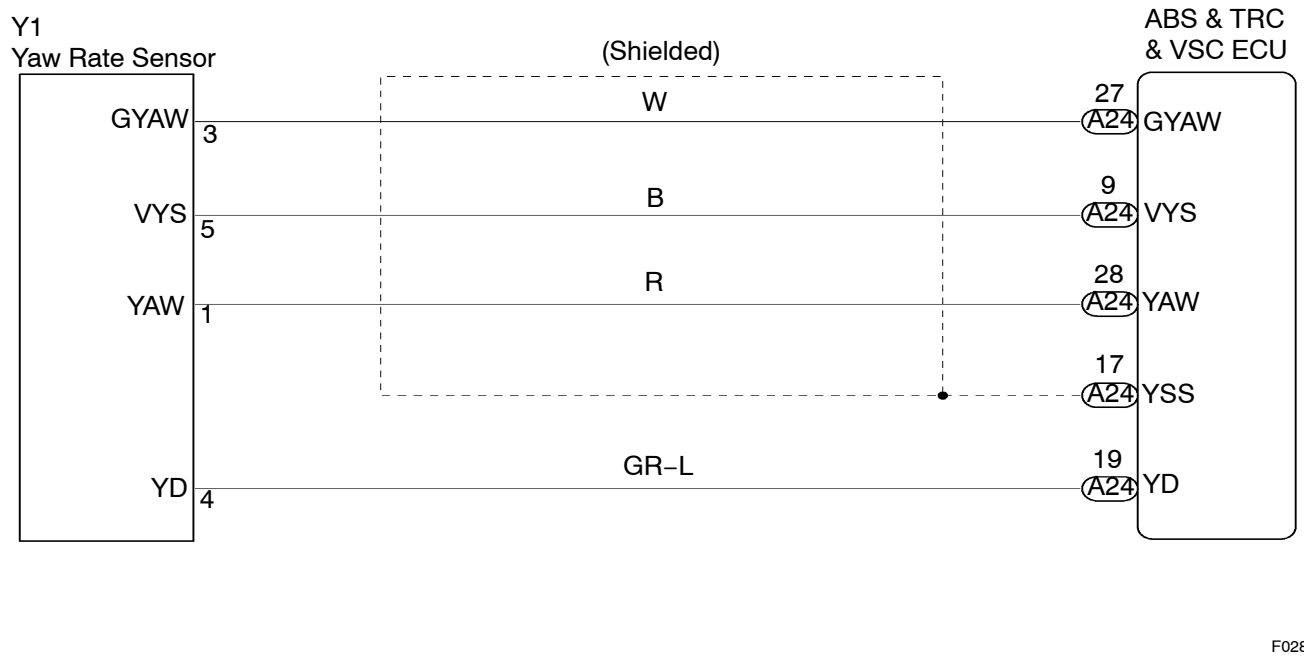
DI28F–03

DTC	C1210 / 36	Zero Point Calibration of Yaw Rate Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1210 / 36	When any of following (1) through (2) is detected: (1) After battery terminal was connected, when the shift lever was moved other than to P range within 15 secs. soon after ECU terminal IG1 become ON for the first time. (2) When the yaw rate sensor zero point recorded in ECU is deleted.	• Yaw rate sensor • Yaw rate sensor circuit • P range switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check whether zero point calibration of yaw rate sensor has been done or not.

PREPARATION:

Shift the lever in P position and turn the ignition switch ON, repeat connecting and releasing TS and E1 terminals of check connector 4 times or more for 8 secs. After that do not move the vehicle for 15 secs. or more.

CHECK:

Check that the "VSC" warning light and "VSC OFF" indicator light up for 15 secs.

After that, VSC warning light starts to flush to indicate the normal DTC.

HINT:

This operation clears the DTCs.

YES → No problem.

NO

2	Check for open and short circuit in harness and connector between P range switch and ABS & TRC & VSC ECU and engine and ECT ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

3	Check for open and short circuit in harness and connector between yaw rate sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK

4	Check yaw rate sensor (See page DI–307).

NG → Replace yaw rate sensor.

OK →

Check and replace ABS & TRC & VSC ECU.

DI28G-02

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–210).

*1	Repair ABS control system according to the code output.

*1: Output NG code

DI28H–02

DTC	C1224 / 44	NE Signal Circuit

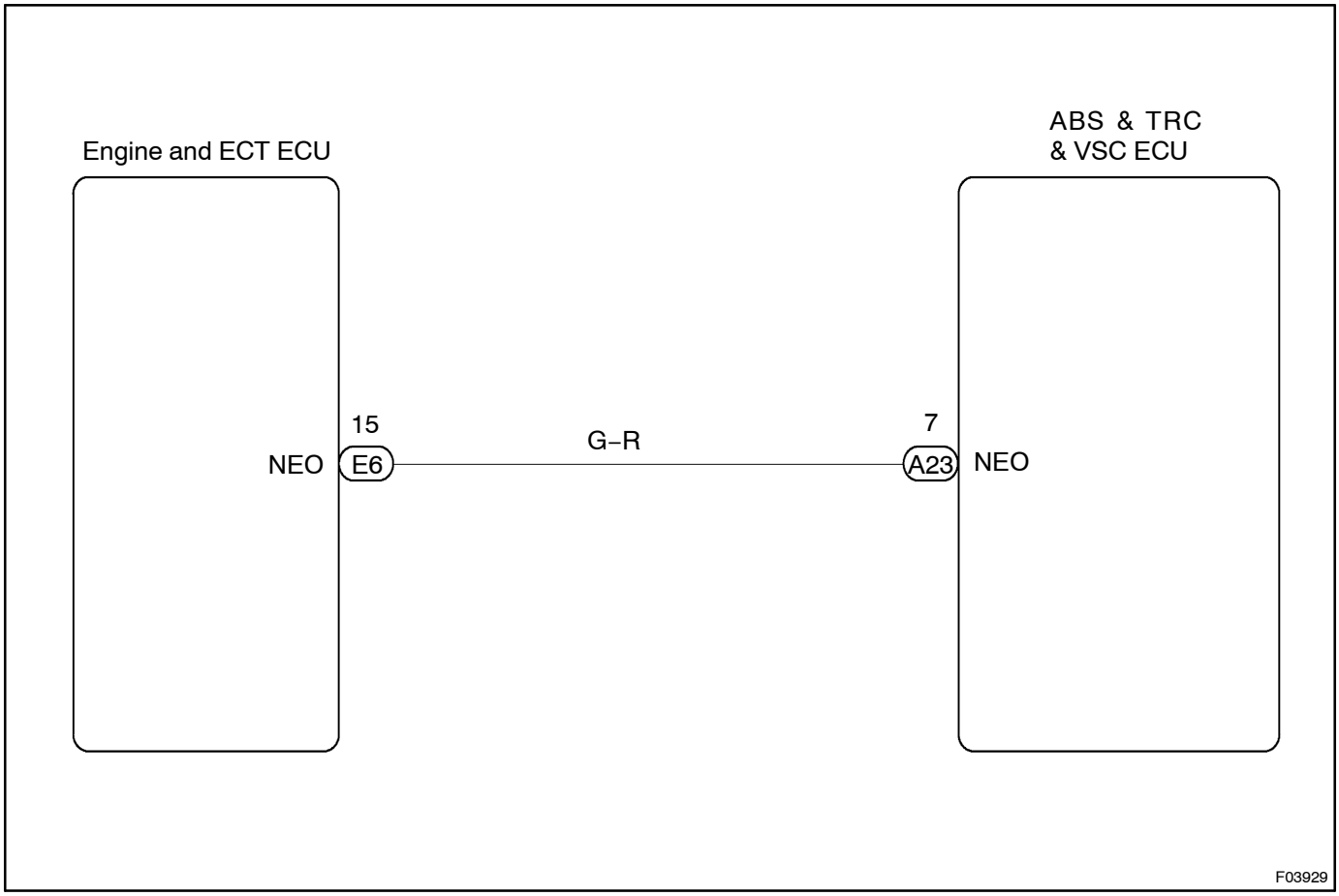
CIRCUIT DESCRIPTION

The ABS & TRC & VSC 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 received from the engine and ECT ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 secs. or more. (2) While TRC is operating, the conditions that open or short circuit in engine revolution signal circuit is detected, main throttle opening degree is 0 and IDL switch is OFF continue for 0.24 sec. or more.	• NEO circuit • Engine and ECT ECU • ABS & TRC & VSC ECU

Fail safe function:
If trouble occurs in the NE signal circuit, the ECU prohibits TRC & VSC controls.

WIRING DIAGRAM



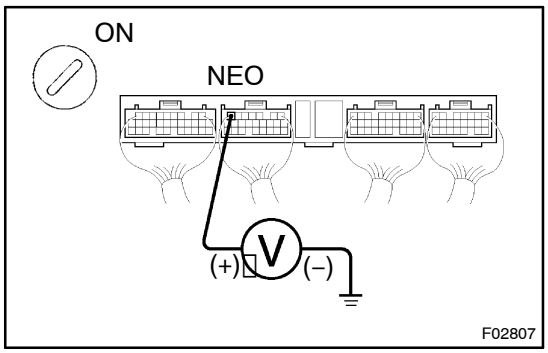
INSPECTION PROCEDURE

1	**Check for open and short circuit in harness and connector between terminal NEO of ABS & TRC & VSC ECU and terminal NEO of engine and ECT ECU (See page IN–29).**

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

OK

2	**Check voltage between terminal NEO of ABS & TRC & VSC ECU and body ground.**



PREPARATION:

(a) Remove ABS & TRC & VSC ECU with connectors still connected.

(b) Turn ignition switch ON.

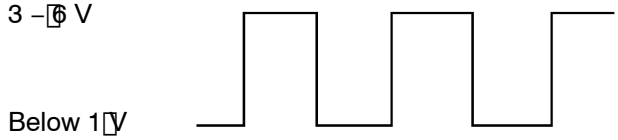
CHECK:

Measure voltage between terminal NEO of ABS & TRC & VSC 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)

(Reference)



NG → **Check and replace ABS & TRC & VSC 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.

DI28I–02

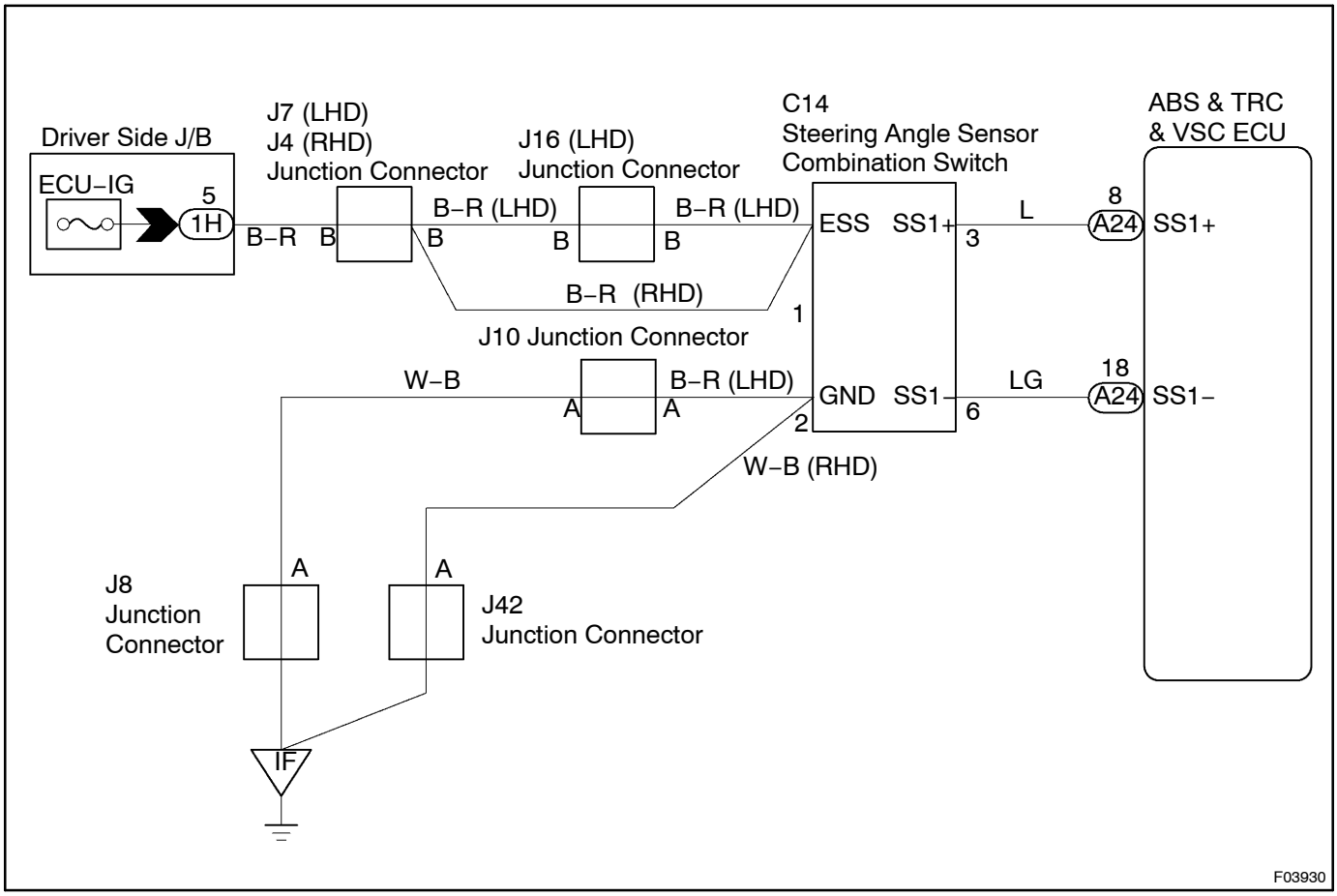
DTC	C1231 / 31	Steering Angle Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	Detection of any of conditions (1) through (3): (1) When the condition that ECU terminal IG1 voltage is 9.5 V or more, and does not receive a data from steering angle sensor continues for 1 sec. or more. (2) When the steering angle sensor value changes by 360° or more with SSC signal from steering angle sensor remaining ON or OFF. (3) When the condition that difference between the steering angle value at edge occurring in SSC signal and the value at edge occurring in SSC signal after turning the steering wheel one–turn is out of the renge from 355.5° – 364.5 ° occurs 10 times or more.	• Steering angle sensor • Steering angle sensor circuit

Fail safe function:
If trouble occurs in the steering angle sensor circuit, the ECU prohibits TRC & VSC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 3 in case of not using the hand–held tester.

1	**Check output value of the steering angle 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 the steering wheel turning angle value of the steering angle position sensor displayed on the hand–held tester is changing when turning the steering wheel.

OK:
Steering wheel turning angle value must be changing.

OK → **Go to step 3.**

NG

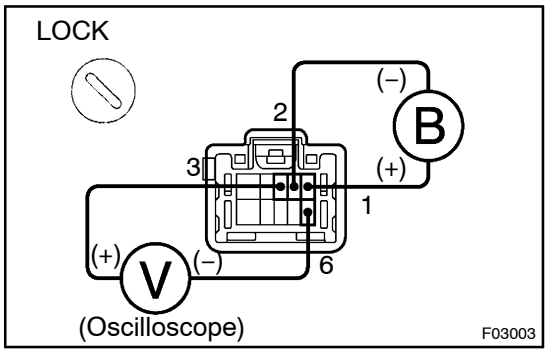
2	**Replace the ECU and check whether or not the trouble occurs again.**

YES → **Replace steering angle sensor.**

NO

END

3	Check steering angle sensor.



PREPARATION:

(a) Remove the steering wheel lower No. 2 and No. 3 covers, steering wheel pad, steering wheel column upper and lower covers (See page SR–12).

(b) Disconnect the combination switch connector (for steering angle sensor).

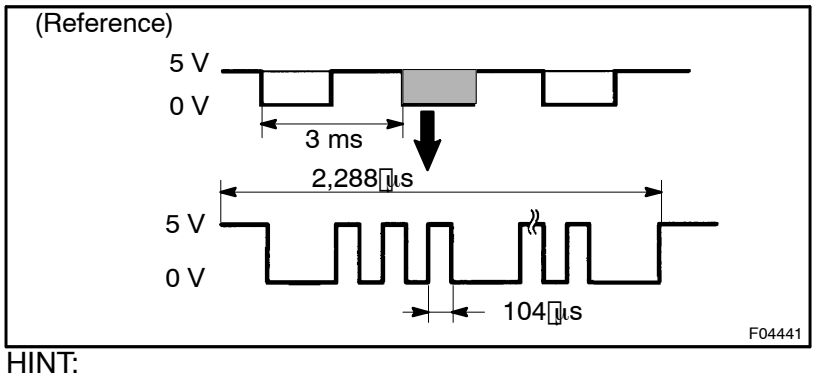
(c) Connect the oscilloscope to the terminals 3 and 6 of the combination switch connector (for steering angle sensor).

(d) Apply battery voltage between terminals 1 and 2.

CHECK:

Turns the steering wheel slowly and check the signal waveform.

OK:



HINT:

The above signal wave form does not repeat ON and OFF regularly and this combination canges case by case according to the data.

NG → **Replace steering angle sensor.**

OK

4	Check that slits of the steering angle sensor disc are clogged up.

NG → **Repair or replace steering angle sensor disc.**

OK

5	Check for open and short circuit in harness and connector between steering angle sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness or connector.

OK →

Check and replace ABS & TRC & VSC ECU.

DI28J–03

DTC	C1232 / 32	Deceleration Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1232 / 32	Detection of either of conditions (1) and (2): (1) At the vehicle speed of 10 km/h (6 mph) or more, when the condition that ECU terminal GL1 signal change range is less than 20 mV, and ECU terminal GL2 signal change range swings by 468 mV or more occurs for 30 secs. or more. (2) At the vehicle speed of 10 km/h (6 mph) or more, when the condition that ECU terminal GL2 signal change range is less than 20 mV, and ECU terminal GL1 signal change range swings by 468 mV or more occurs for 30 secs. or more.	• Deceleration sensor • Deceleration sensor circuit

Fail safe function:
If trouble occurs in the deceleration sensor circuit, the ECU prohibits TRC & VSC controls.

INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 3 in case of not using the hand–held tester.

1	**Check output value of the deceleration 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 the deceleration value of the deceleration sensor displayed on the hand–held tester is changing when tilting the vehicle.

OK:

Deceleration value must be changing.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

2	Check deceleration sensor (See page DI–307).

NG → Replace deceleration sensor.

OK

3	Check for open or short circuit in harness and connector between deceleration sensor and ABS & TRC & VSC ECU (See page IN–29).

NG → Repair or replace harness and connector.

OK

Check and replace ABS & TRC & VSC ECU.

DI28K–02

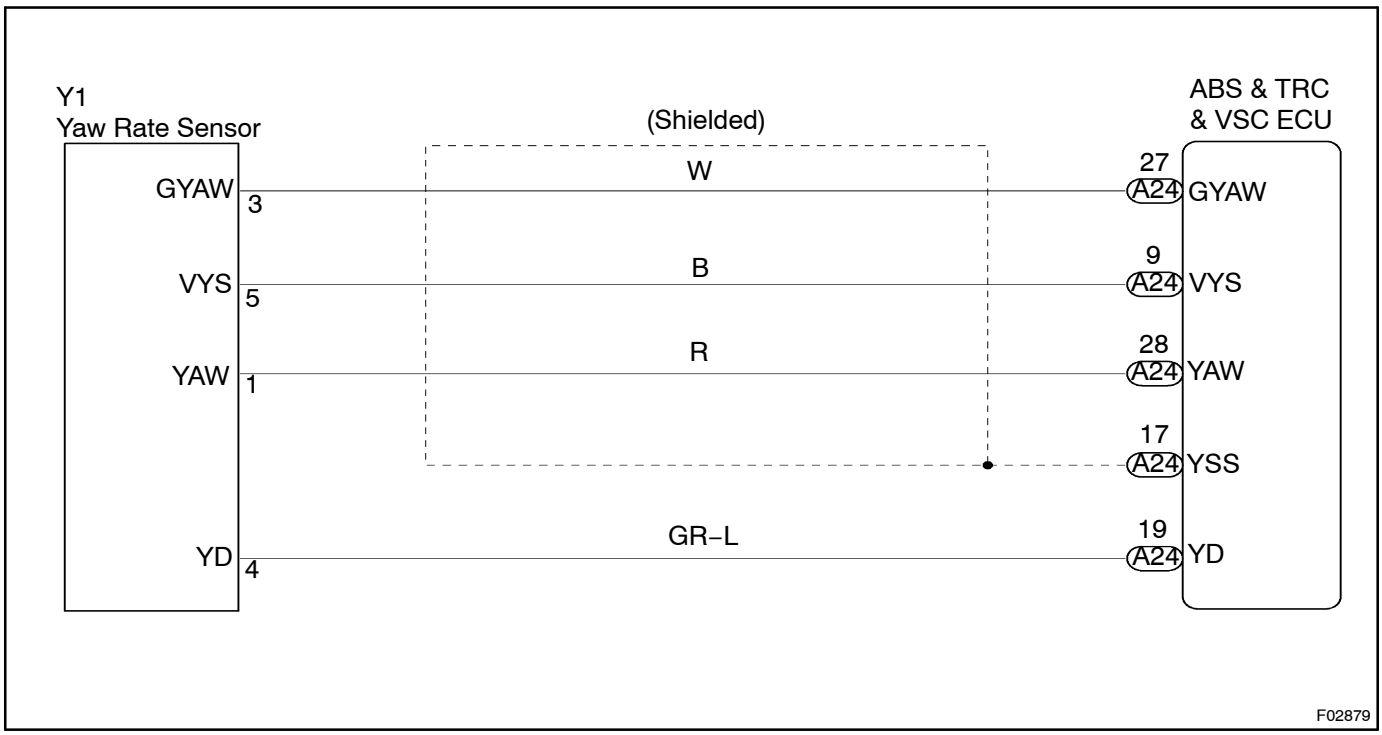
DTC	C1233 / 33, C1234 / 34	Yaw Rate Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	When any of the following (1) through (4) is detected: (1) ECU terminal IG1 voltage is 9.5 V to 17.0 V, and the condition that yaw rate sensor voltage is out of the range from 0.25 V to 4.75 V continued for 1 sec. or more. (2) The conditions that yaw rate sensor open detect circuit signal is ON and the voltage of ECU terminal IG1 is 9.5 to 17 V continued for 1 sec. or more. (3) The conditions that yaw rate sensor power source voltage is out of the range from 4.4 V to 5.6 V and the voltage of ECU terminal IG1 is 9.5 to 17 V continued for 1 sec. or more. (4) When the condition that yaw rate sensor signal is momentarily open circuit occurs 10 times or more and the voltage of ECU terminal IG1 is 9.5 to 17 V.	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34	Condition (1) or (2) is detected: (1) When the condition that yaw rate sensor VYS terminal voltage is 4.75 V to 5.25 V and YD malfunction signal of yaw rate sensor is ON continued for 5 secs. or more. (2) Shift lever position is in P range and output voltage of yaw rate sensor is out of the range from 2.4 V to 2.6 V or after the difference from zero point calibration voltage of yaw rate sensor has become 0.08 V or more and when the condition that the vehicle speed exceeds more than 15 km/h (9 mph) while output condition of yaw rate sensor has been repeated.	

Fail safe function:
If trouble occurs in the yaw rate sensor circuit, the ECU prohibits TRC & VSC controls.

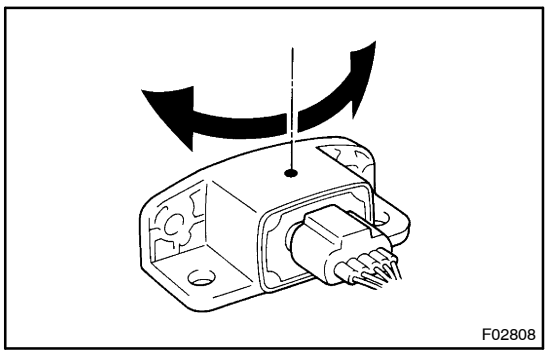
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 3 in case of not using the hand–held tester.

1	**Check output value of the yaw rate sensor.**



PREPARATION:

(a) Remove the 2 bolts and yaw rate sensor with connector still connected.
(b) Connect the hand–held tester to the DLC3.
(c) Turn the ignition switch ON and push the hand–held tester main switch ON.
(d) Select the DATALIST mode on the hand–held tester.

CHECK:

Check that the yaw rate value of the yaw rate sensor displayed on the hand–held tester is changing : Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.

OK	**Go to step 4.**

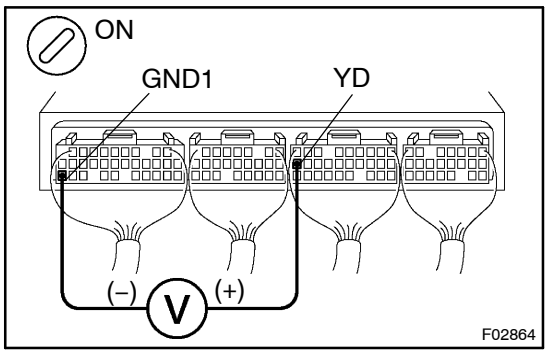
NG

2	**Check whether continuity exists between terminal YD of yaw rate sensor and terminal YD of ABS & TRC & VSC ECU.**

NO → **Repair or replace harness or connector.**

YES

3	**Check voltage between terminals YD and GND of ABS & TRC & VSC ECU.**



PREPARATION:

Remove ABS & TRC & VSC ECU with connector still connected.

CHECK:

(a) Turn the IG switch ON.

(b) Measure voltage between terminals YD and GND of ABS & TRC & VSC ECU.

OK:

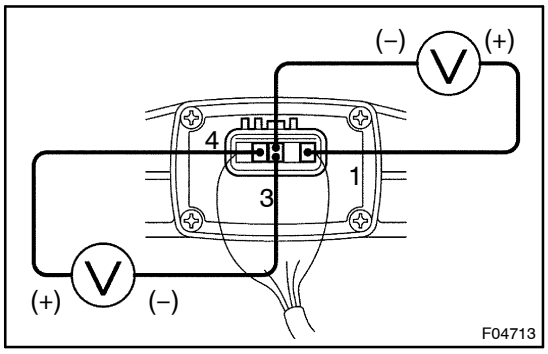
Voltage: 4.5 – 5.3 V

NG → **Replace yaw rate sensor.**

OK

Check and replace ABS & TRC & VSC ECU.

4	Check yaw rate sensor.



CHECK:

(a) Turn the IG switch ON.

(b) Measure voltage between terminals 1 and 3, 3 and 4 of the yaw rate sensor with connector still connected.

OK:

Terminals 1 and 3 (YAW – GYAW)	Approx. 2.5 V
Terminals 3 and 4 (GYAW – YD)	Approx. 4.5 V – 5.3 V

NG → **Replace yaw rate sensor.**

OK

5	Check for open and short circuit in harness and connector between yaw rate sensor and ABS & TRC & VSC ECU (See page IN–29).

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

OK

Check and replace ABS & TRC & VSC ECU.

DI2R2–02

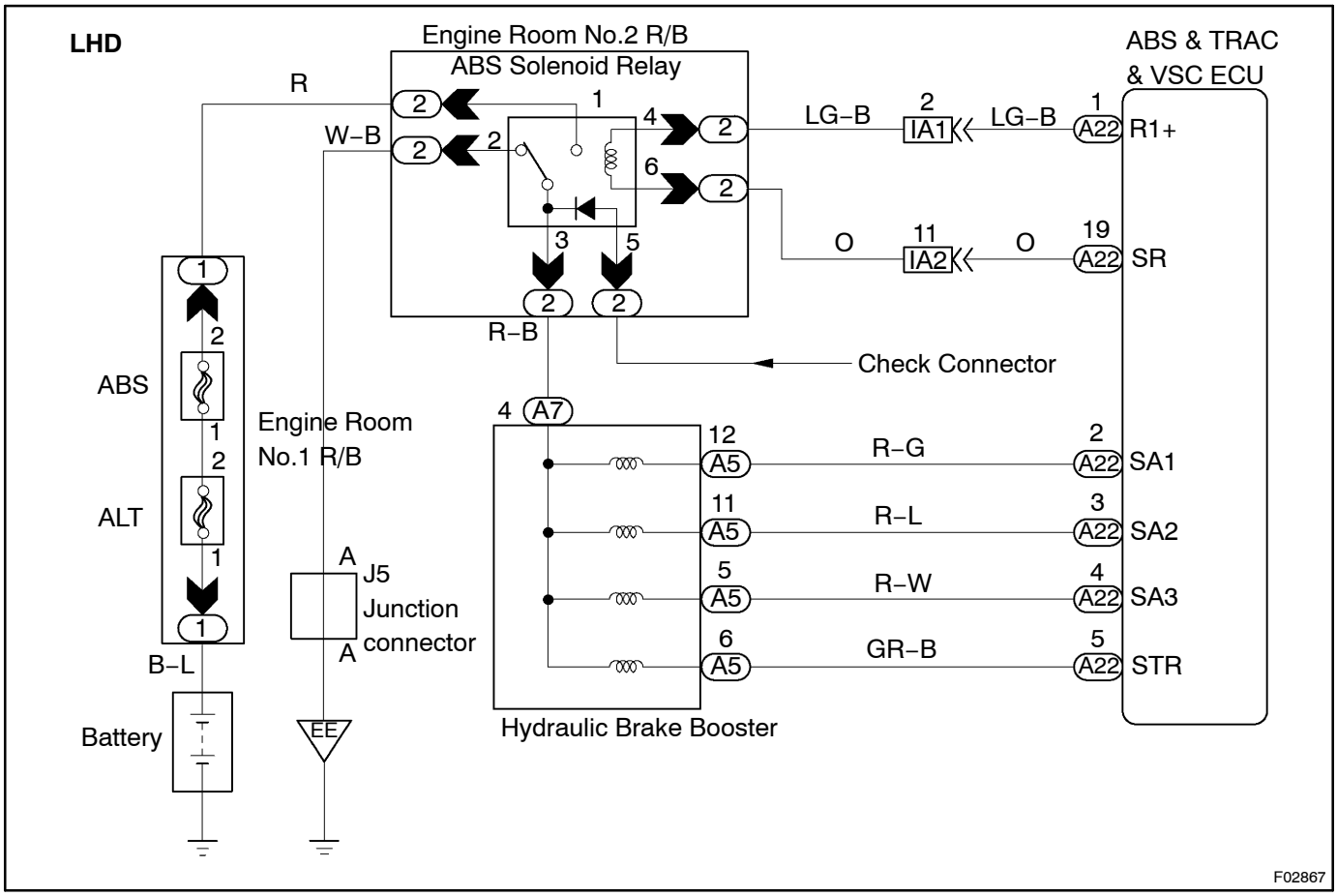
DTC	Always ON	Malfunction in ECU VSC Warning Light Circuit

CIRCUIT DESCRIPTION

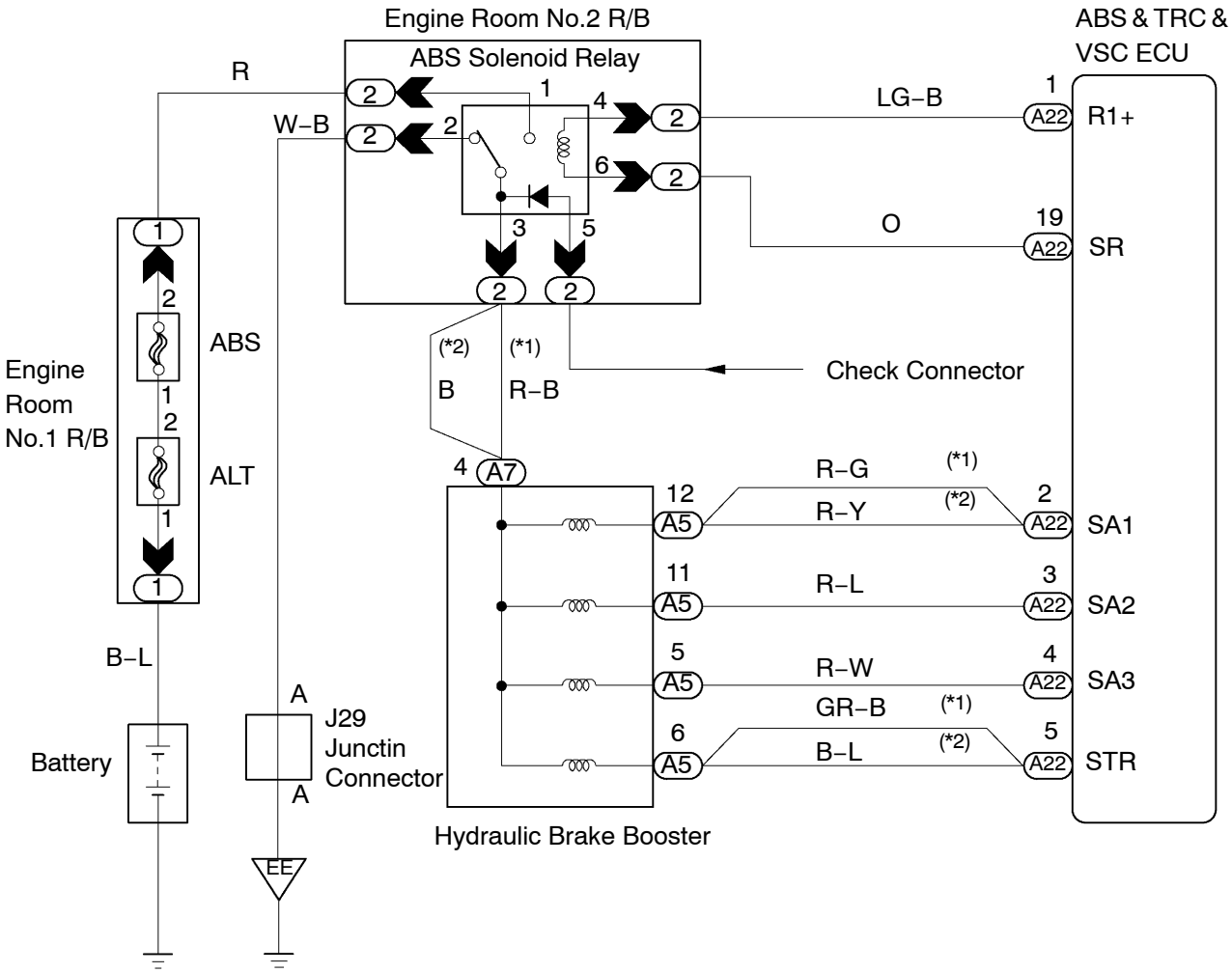
DTC No.	DTC Detecting Condition	Trouble Area
Always ON	There is a malfunction in the ECU internal circuit.	• Power source circuit • VSC warning light circuit • ABS & TRC & VSC ECU

Fail safe function:
If trouble occurs in the ECU, the ECU prohibits ABS & TRC & VSC controls and the brake system becomes normal.
HINT:
If fail safe function is activated in VSC system, ”VSC OFF” indicator light lights up.

WIRING DIAGRAM



RHD



(*1) : Australia
(*2) : Europe

F03314

INSPECTION PROCEDURE

1	Is DTC output for VSC?

Check DTC on page DI–307.

YES → Repair circuit indicated by the output code.

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–29).

NO

3	Does VSC warning light go off?

YES → Check for open or short circuit in harness and connector between ECU–IG fuse and ECU (See page IN–29).

NO

4	Check battery voltage.

PREPARATION:
Start the engine.
CHECK:
Check the battery voltage.
OK:
Voltage: 10 – 16 V

NG → Check and repair the charging system.

OK

5	**Check operation of the VSC warning light.**

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 ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter with the hand–held tester.

In case of not using the hand–held tester.

PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the connector from the ABS & TRC & VSC ECU.

(c) Turn the ignition switch ON.

CHECK:

Check the VSC warning light goes off.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

Check for short circuit in harness and connector between combination meter and ABS & TRC & VSC ECU, combination meter and check connector (See page IN–29).

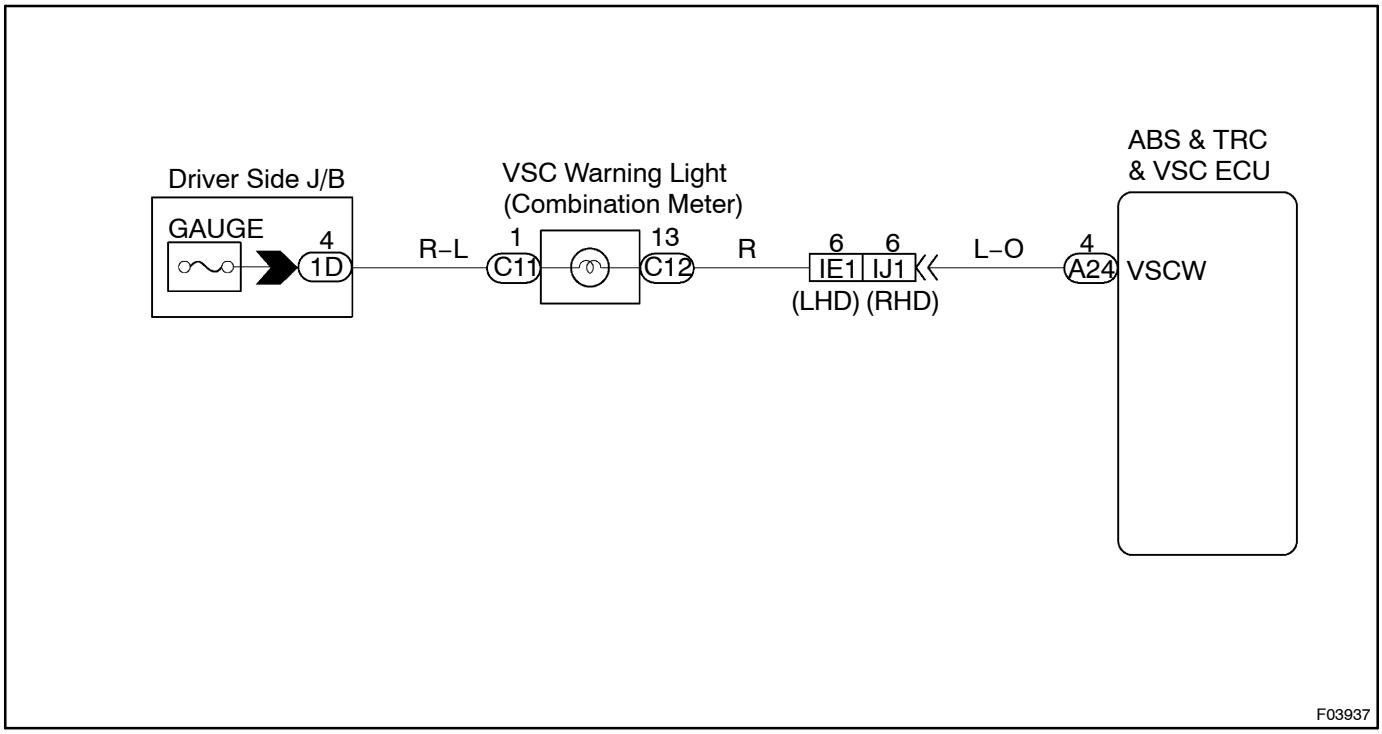
DI28M–03

VSC Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU stores DTC, the VSC warning light lights on the combination meter.

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 VSC warning indicator.**

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 VSC warning light can be shown on the combination meter with the hand–held tester.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

2	Is DTC output for VSC?

YES → Repair circuit indicated by the output code.

NO

3	Check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and VSC warning light (See page IN–29).

NG → Repair or replace harness or connector.

OK

4	Check VSC warning light.

See combination meter troubleshooting on page BE–3.

NG → Repair or replace combination meter.

OK

Check and replace ABS & TRC & VSC ECU.

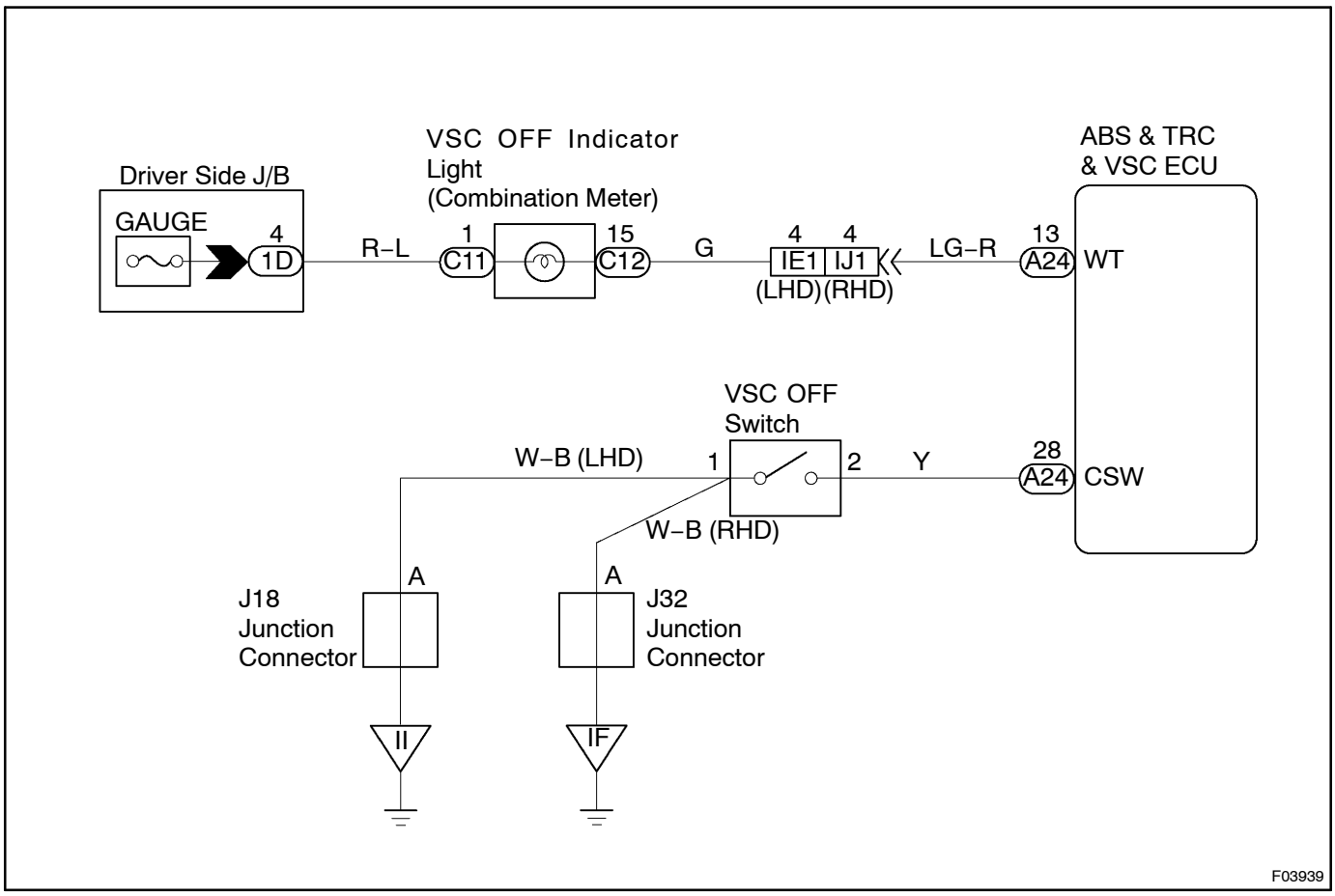
DI28N–03

VSC OFF Indicator Light, VSC OFF Switch Circuit

CIRCUIT DESCRIPTION

This is the TRC & VSC control main switch. When the VSC OFF switch is pushed on, TRC & VSC control goes off and the VSC OFF indicator lights up. Also, light the VSC OFF indicator light is ”ON” when the VSC system is at the fail safe control. Turn the ignition switch OFF, TRC & VSC control surely comes on when the ignition switch turns ON next time.

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 LEXUS hand–held tester.

1	**Check operation of the VSC OFF indicator light.**

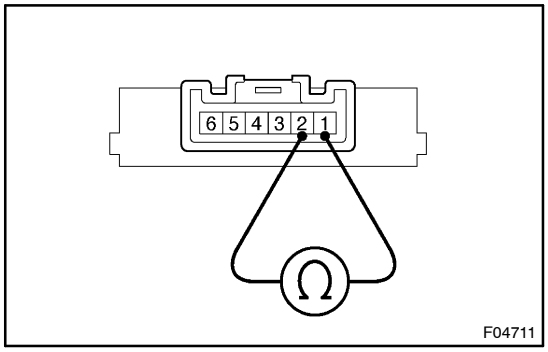
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check that ”ON” and ”OFF” of the VSC OFF indicator light can be shown on the combination meter with the hand–held tester.

NG → **Go to step 4.**

OK

2	**Check VSC OFF switch.**



PREPARATION:
(a) Remove VSC OFF switch.
(b) Disconnect VSC OFF switch connector.

CHECK:
Measure resistance between terminals 1 and 2 of the VSC OFF switch when the VSC OFF switch is ON and OFF.

OK:

VSC OFF switch	Resistance
Pushed in	Continuity
Released	1MΩ or higher

NG → **Replace VSC OFF switch.**

OK

3	Check for open and short circuit in harness and connector between terminal CSW of ABS & TRC & VSC ECU and VSC OFF switch and body ground (See page IN–29).

NG → Repair or replace harness or connector.

OK

4	Check VSC OFF indicator light.

See combination meter troubleshooting on page BE–3.

NG → Repair or replace combination meter.

OK

5	Check for open and short circuit in harness and connector between terminal WT of ABS & TRC & VSC ECU and VSC OFF indicator light (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU.

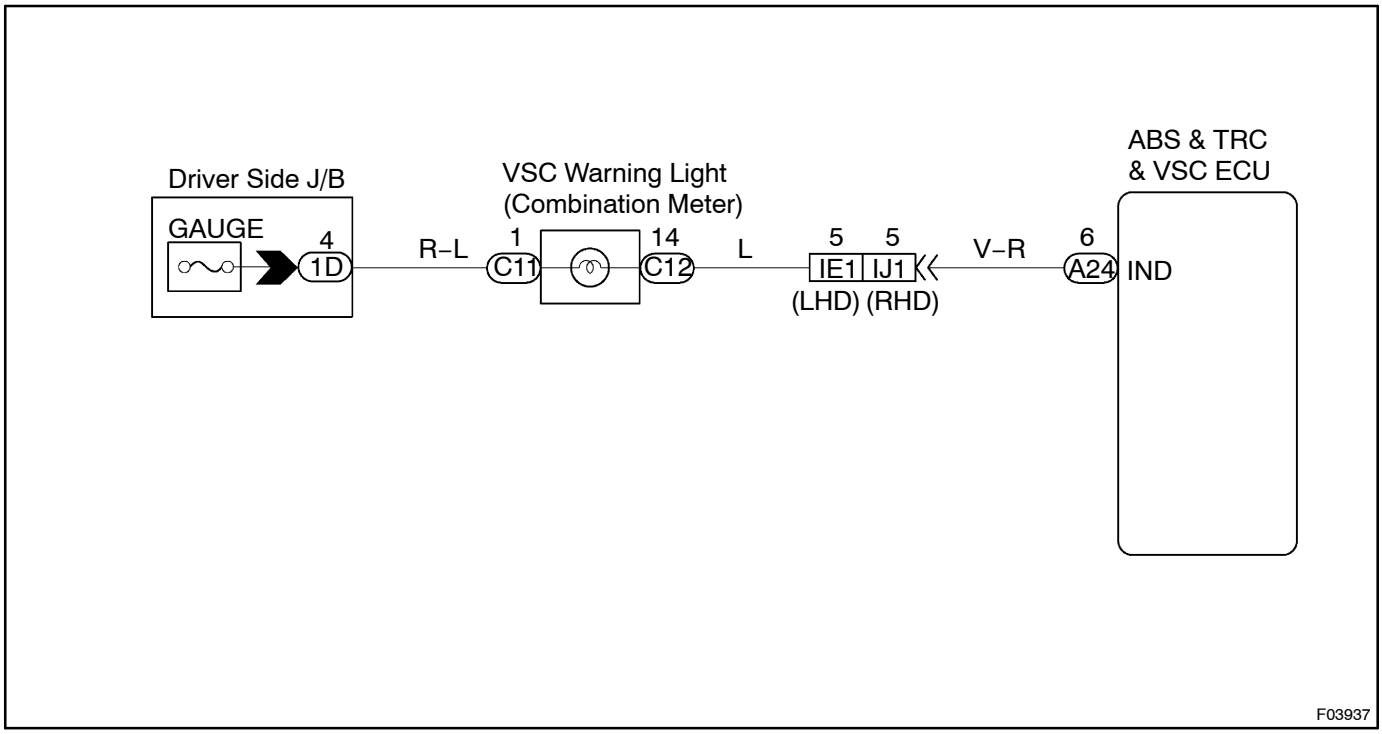
DI28O–03

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC & VSC operation.

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 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 with 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 & VSC ECU.

NG

3	Check SLIP indicator light.

See Combination Meter Troubleshooting on page BE–3.

NG → Repair or replace combination meter. Check and replace ABS & TRC & VSC ECU.

OK

4	Check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and SLIP indicator light (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC & VSC ECU.

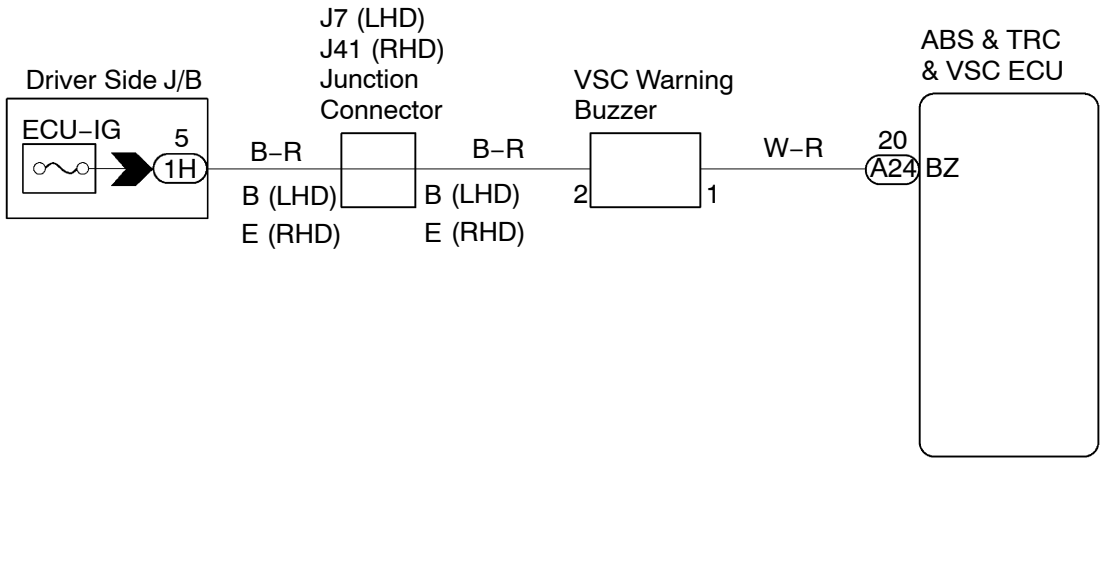
DI28P–02

VSC Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC buzzer sounds during VSC 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 VSC buzzer.**

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.

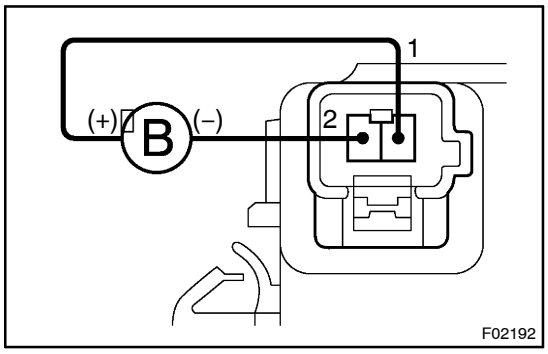
CHECK:

Check that VSC buzzer sounds ”ON” and ”OFF” with the hand–held tester.

OK → **Check and replace ABS & TRC & VSC ECU.**

NG

2	Check VSC buzzer.



PREPARATION:
Disconnect the VSC buzzer connector.
CHECK:
Apply battery voltage to the terminals 1 and 2 of VSC buzzer connector, check that the VSC buzzer sounds.

NG → Replace VSC buzzer.

OK

3	Check for open and short circuit in harness and connector between ABS & TRC & VSC ECU and VSC buzzer (See page IN–29).

NG → Repair or replace harness or connector.

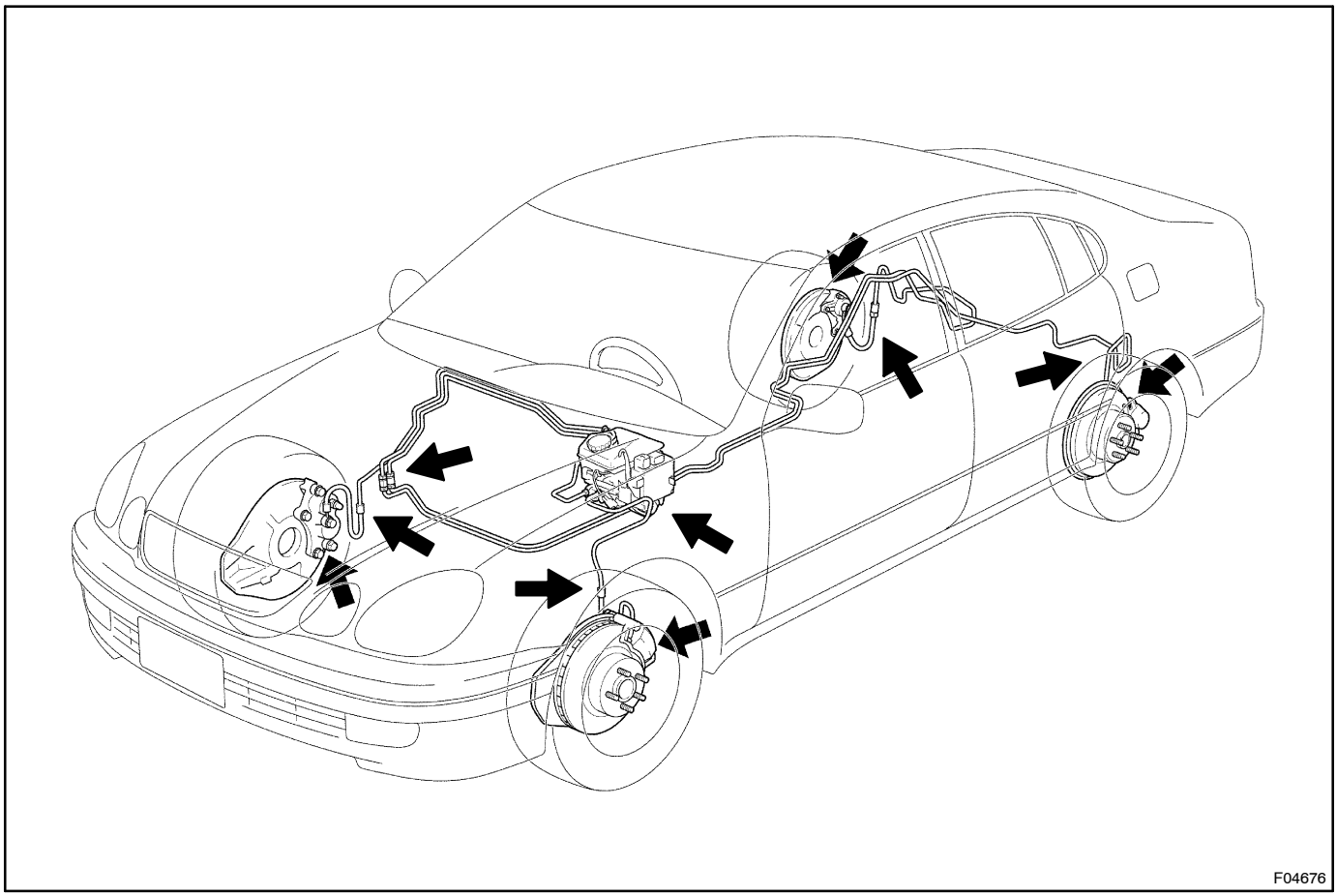
OK

Check and replace ABS & TRC & VSC ECU.

DI28Q–02

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



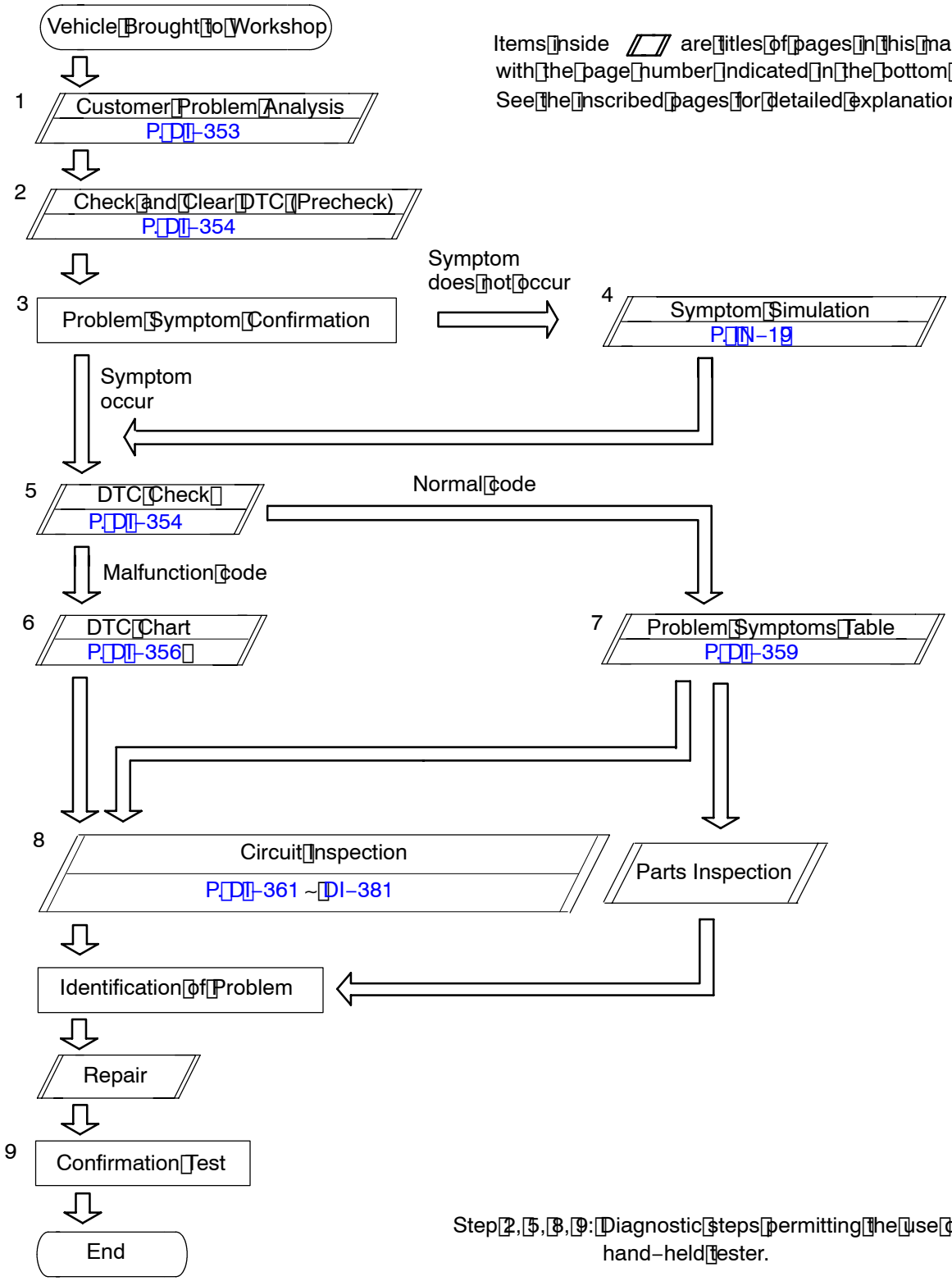
F04676

POWER TILT AND POWER TELESCOPIC STEERING COLUMN

DI237–02

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting 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 inscribed pages for detailed explanations.

Step 2, 5, 8, 9: Diagnostic steps permitting the use of the hand–held tester.

DI238–02

CUSTOMER PROBLEM ANALYSIS CHECK

POWER TILT AND POWER TELESCOPIC STEERING SYSTEM CHECK SHEET

Inspector's Name :

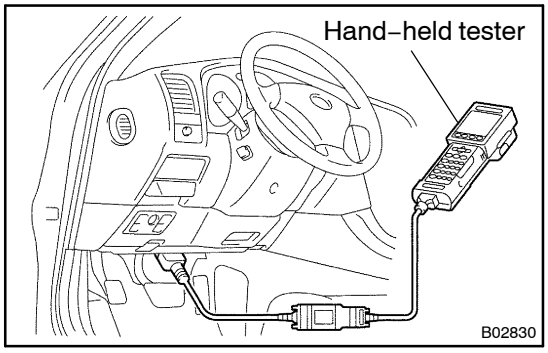
Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	Manual Function does not Operate	☐ Both Tilt and Telescopic ☐ Tilt only ☐ Telescopic only
	Auto Away/Return Function does not Operate	☐ Both Auto Away and Auto Return ☐ Auto Away only ☐ Auto Return only
	☐ Memory Function does not Operate	

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

DI239–02



PRE–CHECK

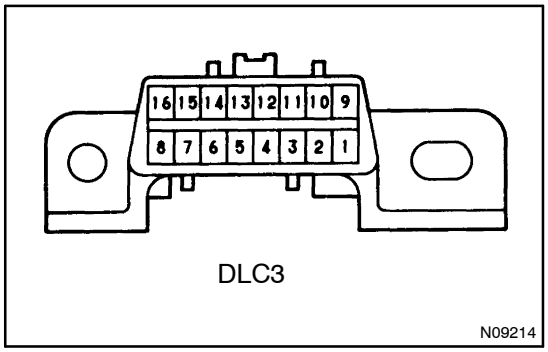
1. DESCRIPTION

(a) DIAGNOSIS SYSTEM

When troubleshooting Multiplex OBD (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the hand–held tester to vehicle, and read off various data output from the vehicle's Power Tilt and Telescopic Steering ECU.

The Power Tilt and Telescopic Steering ECU records the applicable DTCs when the computer detects a malfunction in the computer itself or its circuit.

To check the DTCs, connect a hand–held tester to DLC3 on the vehicle. The hand–held tester enables you to erase the DTCs and activate the several actuators and check freeze frame data and various forms on steering data.



(b) DATA LINK CONNECTOR 3 (DLC3)

The Power Tilt and Telescopic Steering ECU uses ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

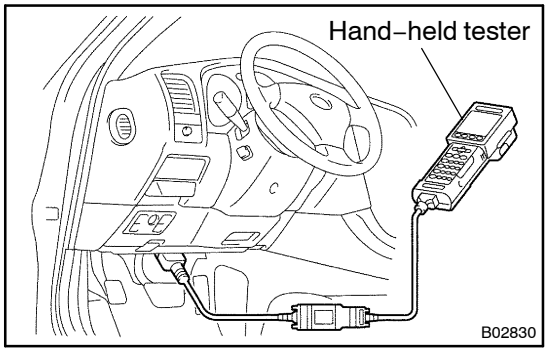
Terminal No.	Connection	Voltage or Resistance	Condition
7	Bus + Line	Pulse generation	During transmission
4	Chassis Ground	↔ Body Ground 1 Ω or less	Always
16	Battery Positive	↔ Body Ground 9 – 14 V	Always

HINT:

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

(1) If communication is normal when the tester is connected to another vehicle, inspect DLC3 on the original vehicle.

(2) If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself, so consult the Service Department listed in the tester's Operator's Manual.



2. DIAGNOSIS INSPECTION

(a) Check the DTC

(1) Prepare the hand–held tester

(2) Connect the hand–held tester to DLC3 at the lower 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 freeze frame data, note or print them (See the Operator's Manual for operating instructions.).

(5) See page DI–xx to confirm the details of the DTC.

(b) Clear the DTC

The following actions will erase the DTC and freeze frame data.

- When using the hand–held tester:
  Operating the hand–held tester to erase the DTCs (See the Operator's Manual for operating instructions.).
- When not using the hand–held tester :
  Disconnecting the battery terminals.

DI23A–02

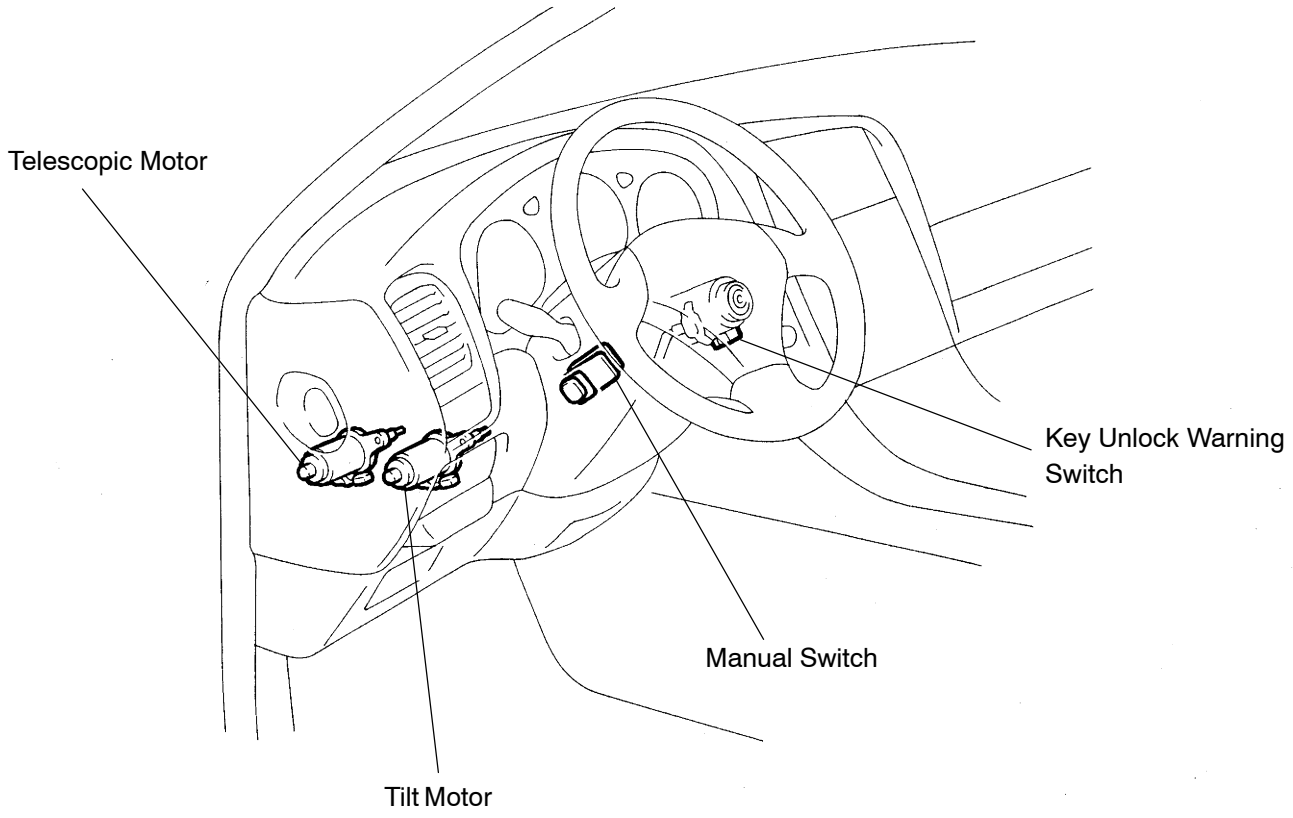
DIAGNOSTIC TROUBLE CODE CHART

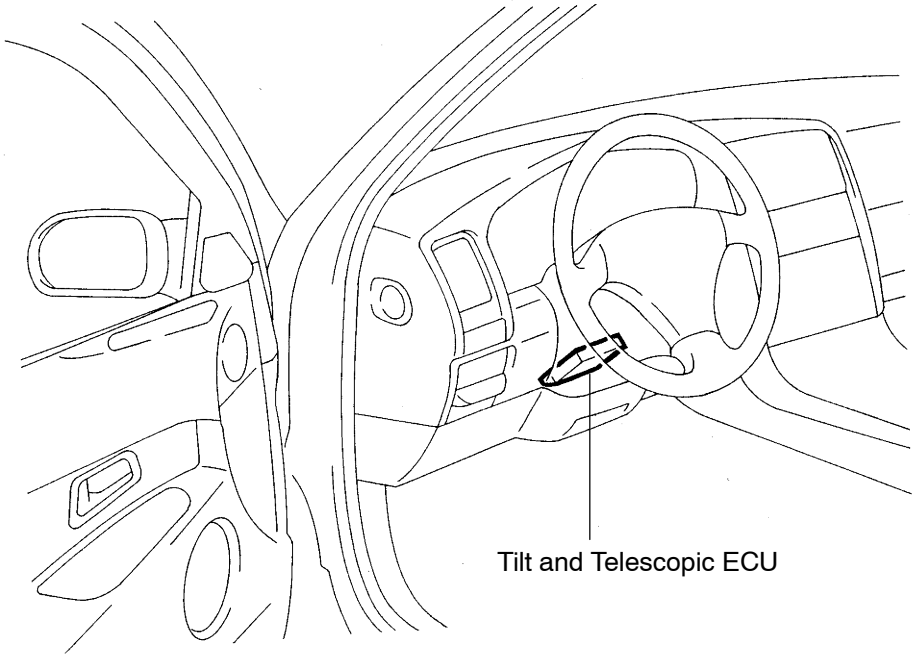
If a DTC is displayed during the DTC check, check the circuit for that code listed in the table below. For details of each code, turn the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
B2602 (DI–361)	Key unlock warning switch malfunction	• Key Unlock Warning switch
B2603 (DI–362)	Tilt and telescopic manual switch malfunction	• Tilt and Telescopic Manual switch circuit • Tilt and Telescopic ECU
B2610 (DI–364)	Tilt Position Sensor or Tilt Motor Malfunction	• Actuator Power Source circuit • Tilt Motor circuit • Tilt and Telescopic ECU
B2611 (DI–366)	Telescopic Position Sensor or Telescopic Motor Malfunction	• Actuator Power Source circuit • Telescopic Motor circuit • Tilt and Telescopic ECU
B2620 (DI–368)	ECU Power Source circuit Malfunction	• Battery • ECU Power Source Circuit • Tilt and Telescopic ECU
B2621 (DI–370)	Communication Interruption	• Multiplex Communication system • Tilt and Telescopic ECU

DI23B–02

PARTS LOCATION

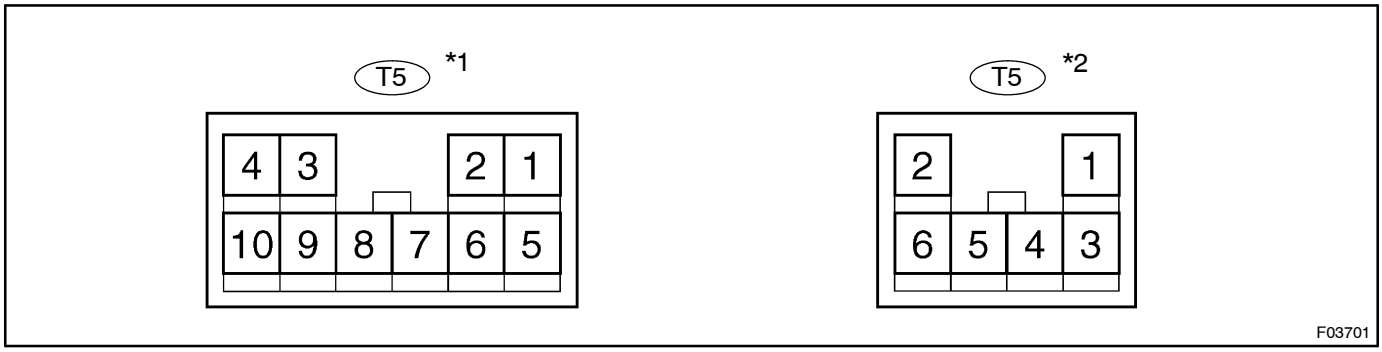




F03697

DI23C–02

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IG – GND (T5–2 – T5–4) *1	B–R – W–B	IG switch ON	10 – 16
		IG switch LOCK	Below 1
VC – ECUE (T5–3 – T5–1) *1	Y–R – W–B	IG switch ON	4.5 – 5.5
GND Body Ground (T5–4 – Body Ground) *1	W–B – Body Ground	Always	Below 1
ECUB – Body Ground (T5–5 – Body Ground) *1	W–B – Body Ground	Always	10 – 16
ECUB – ECUE (T5–5 – T5–1) *1	G–W – W–B	Always	10 – 16
MSW – ECUE (T5–8 – T5–1) *1	Y – W–B	IG switch ON, tilt up by manual switch	1.30 – 1.70
		IG switch ON, tilt down by manual switch	0.30 – 0.50
		IG switch ON, telescopic extended by manual switch	2.05 – 2.75
		IG switch ON, telescopic contracted by manual switch	0.65 – 0.95
		Manual switch is not operating	Below 0.20
+B – GND (T5–10 – T5–4) *1	L – W–B	Always	10 – 16
TIM– – GND (T5–3*2 – T5–4*1)	R–L – W–B	Key unlock warning switch ON, tilt down	10 – 16
		Tilt is not operating	Below 1
TEM+ – GND (T5–6*2 –T5–4*1)	L–B – W–B	Key unlock warning switch ON, telescopic contracted	10 – 16
		Telescopic is not operating	Below 1
TIM+ – GND (T5–4*2 – T5–4*1)	R–B – W–B	Key unlock warning switch ON, tilt up	10 – 16
		Tilt is not operating	Below 1
TEM– – GND (T5–5*2 – T5–4*1)	L–O – W–B	Key unlock warning switch ON, telescopic extended	10 – 16
		Telescopic is not operating	Below 1

*1: 10 pin connector

*2: 6 pin connector

DI23D–02

PROBLEM SYMPTOMS TABLE

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

The table below will be useful for you in troubleshooting these electrical systems. The most likely causes of the malfunction are shown in the order of their probability. Inspect each part in the order shown, and replace the part when it is found to be faulty.

- If the instruction "Proceed to next circuit inspection shown on the 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 problem still occurs even though there are no abnormalities in any of the other circuits, then check and replace ECU.

Symptom	Suspect Area	See page
Both tilt and telescopic: Manual, Auto away/return and Memory functions • Do not operate • Stop part way • Do not stop	1. Multiplex Communication system 2. ECU Power Source circuit 3. Key Unlock Warning switch 4. BODY ECU 5. Actuator Power Source circuit 6. Tilt and Telescopic ECU	DI–801 DI–371 BE–31 DI–612 DI–656 DI–373 IN–29
Tilt only: Manual, Auto away/return and Memory functions • Do not operate • Stop part way • Do not stop	1. Multiplex Communication system 2. Tilt Motor circuit 3. Tilt and Telescopic ECU	DI–801 DI–375 IN–29
Telescopic only: Manual, Auto away/return and Memory functions • Do not operate • Stop part way • Do not stop	1. Multiplex Communication system 2. Telescopic Motor circuit 3. Tilt and Telescopic ECU	DI–801 DI–378 IN–29
Both tilt and telescopic: Only Tilt and Telescopic Manual switch function does not operate	1. Multiplex Communication system 2. Tilt and Telescopic Manual switch circuit 3. Tilt and Telescopic ECU	DI–801 DI–381 IN–29
Tilt only: Only Tilt and Telescopic Manual switch function does not operate	1. Multiplex Communication system 2. Tilt and Telescopic Manual switch circuit 3. Tilt and Telescopic ECU	DI–801 DI–381 IN–29
Telescopic only: Only Tilt and Telescopic Manual switch function does not operate	1. Multiplex Communication system 2. Tilt and Telescopic Manual switch circuit 3. Tilt and Telescopic ECU	DI–801 DI–381 IN–29
Both away and return: Only Auto away/return function does not operate	1. Check status of auto away function using hand–held tester 2. Multiplex Communication system 3. Ignition switch 4. Key Unlock Warning switch 5. Tilt and Telescopic ECU	– DI–801 BE–31 BE–31 IN–29
Only away: Only Auto away/return function does not operate	1. Multiplex Communication system 2. Key Unlock Warning switch 3. Ignition switch 4. Tilt and Telescopic ECU	DI–801 BE–31 BE–31 IN–29

Only Return: Only Auto away/return function does not operate	1. Multiplex Communication System 2. Key Unlock Warning Switch 3. Ignition Switch 4. Tilt and Telescopic ECU	DI–801 BE–31 BE–31 IN–29
Only Memory function does not operate	1. Multiplex Communication System 2. Driver DOOR ECU 3. SEAT ECU 4. Tilt and Telescopic ECU	DI–801 DI–700 DI–517 IN–29

DI23E–02

CIRCUIT INSPECTION

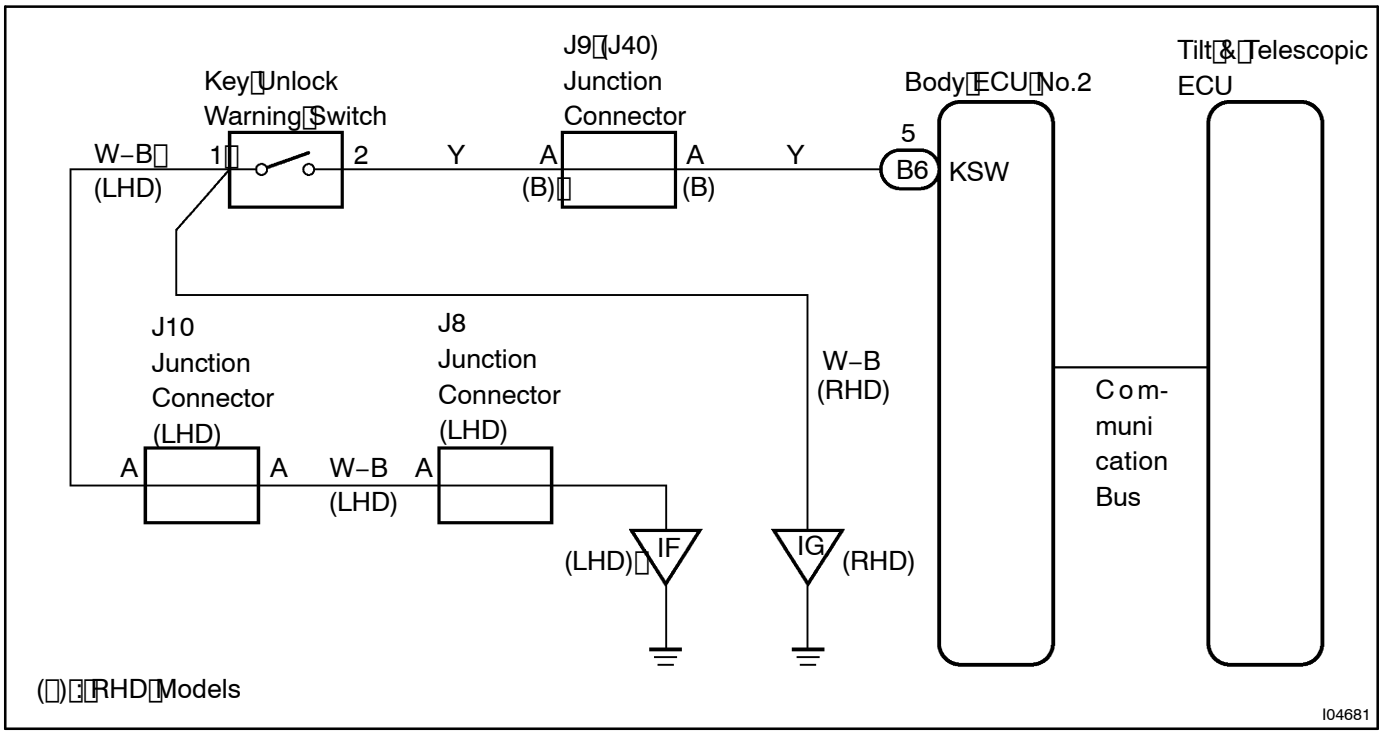
DTC	B2602	Key Unlock Warning Switch Circuit Malfunction

CIRCUIT DESCRIPTION

The different signal (ON or OFF) is sent from Body ECU to Tilt and Telescopic ECU through the communication bus when the ignition key is inserted into the key cylinder. Tilt and Telescopic ECU uses this signal to operate the Auto Away Function or Auto Return Function.

DTC No. (See Page)	Detection Item	Trouble Area
B2602	The signal (OFF) is sent to Tilt and Telescopic ECU when the ignition switch is turned to ACC, ON or START position.	• Key Unlock Warning switch

WIRING DIAGRAM



INSPECTION PROCEDURE

Check the Key Unlock Warning Switch. (See page BE–31)

DI23F–02

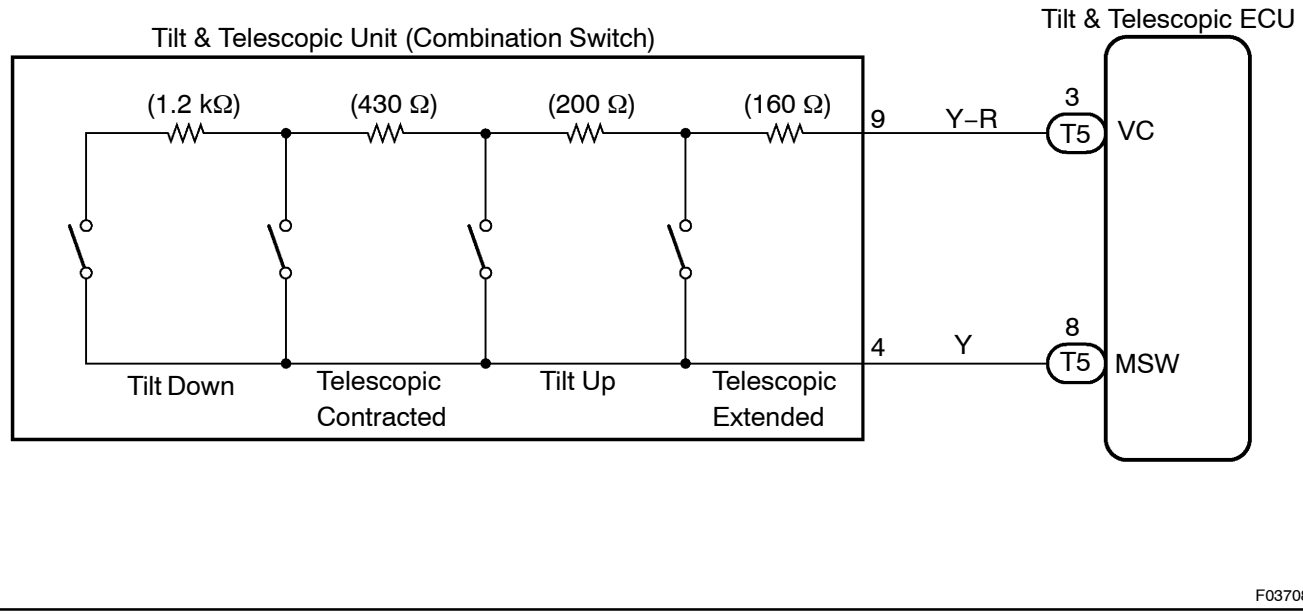
DTC	B2603	Tilt and Telescopic Manual switch circuit Malfunction

CIRCUIT DESCRIPTION

The different voltage value is input to Tilt and Telescopic ECU by operating the manual switch. Then Tilt and Telescopic ECU judges which motor and which direction Tilt motor or Telescopic motor should be moved based on the voltage value.

DTC No. (See Page)	Detection Item	Trouble Area
B2603	The abnormal voltage value which is not within the specification is input to Tilt and Telescopic ECU when being operated with the manual switch.	• Tilt and Telescopic Manual switch circuit • Tilt and Telescopic ECU

WIRING DIAGRAM



F03708

INSPECTION PROCEDURE

1	Check Tilt and Telescopic Manual switch circuit. (See page DI–381)

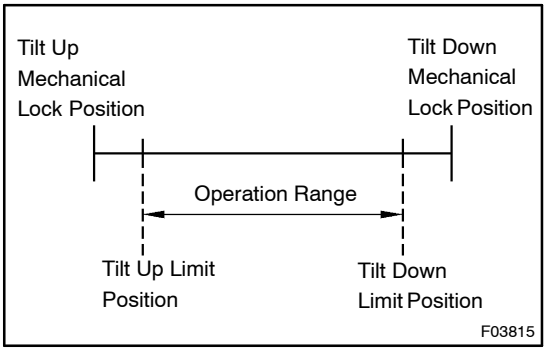
NG → Repair or replace.

OK →

Check and replace the Tilt and Telescopic ECU.

DI23G–02

DTC	B2610	Tilt Position Sensor or Tilt Motor circuit Malfunction



CIRCUIT DESCRIPTION

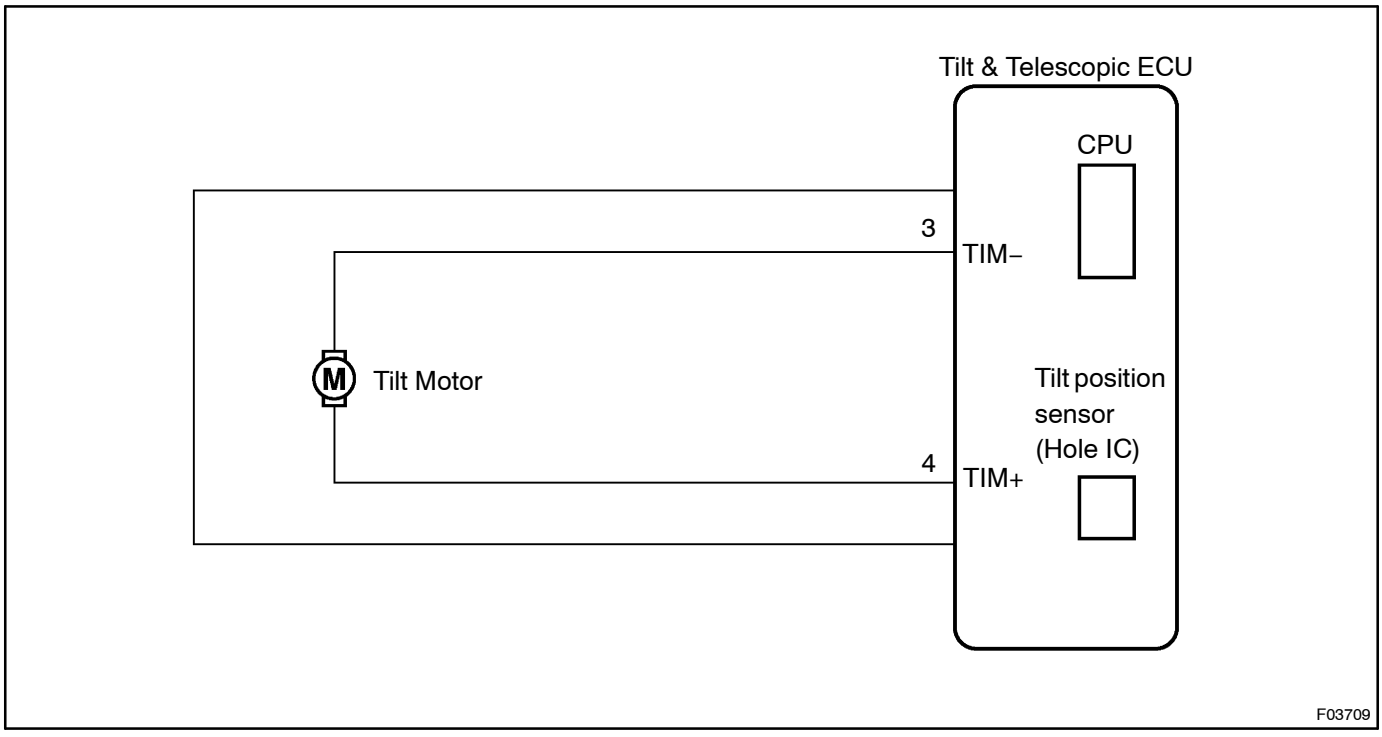
Tilt Motor is operated by the Power voltage supplied from Tilt and Telescopic ECU and makes the steering column tilt upward and downward. Tilt Position Sensor (Hole IC) in the Tilt and Telescopic ECU detects the tilt of the steering column and outputs the signal to the CPU in response to that tilt.

HINT:

Limit positions can be confirmed on the screen of the hand–held tester.

DTC No. (See Page)	Detection Item	Trouble Area
B2610	During tilt function operation, tilt operation stops within the operation range.	• Actuator Power Source circuit • Tilt Motor circuit • Tilt and Telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check Actuator Power Source circuit. (See page DI–373)

NG → Repair or replace.

OK

2	Check Tilt Motor circuit. (See page DI–375)

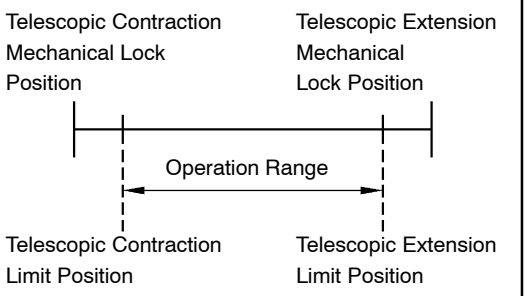
NG → Repair or replace.

OK

Check and replace the Tilt and Telescopic ECU.

DI23H–02

DTC	B2611	Telescopic Position Sensor or Telescopic Motor Circuit Malfunction



CIRCUIT DESCRIPTION

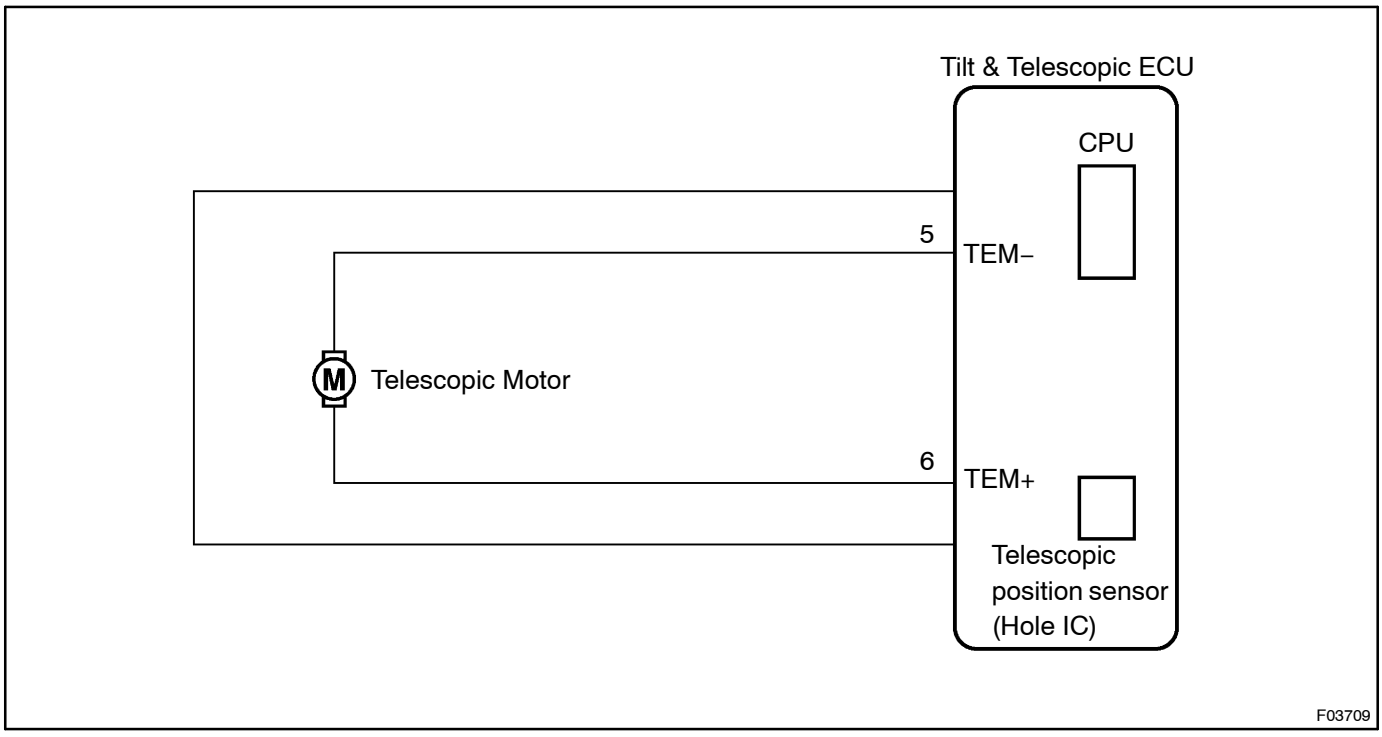
Telescopic Motor is operated by the Power voltage supplied from Tilt and Telescopic ECU and makes the steering column slide forward and rearward. Telescopic Position Sensor (Hole IC) in the Tilt and Telescopic ECU detects the sliding position of the forward and rearward direction of the steering column and outputs the signal to the CPU in response to that sliding amount.

HINT:

Limit positions can be confirmed on the screen of the hand–held tester.

DTC No. (See Page)	Detection Item	Trouble Area
B2611	During telescopic function operation, telescopic operation stops within the operation range.	• Actuator Power Source circuit • Telescopic Motor circuit • Tilt and Telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check Actuator Power Source circuit. (See page DI–373)

NG → Repair or replace.

OK

2	Check Telescopic Motor circuit. (See page DI–378)

NG → Repair or replace.

OK

Check and replace the Tilt and Telescopic ECU.

DI23I–02

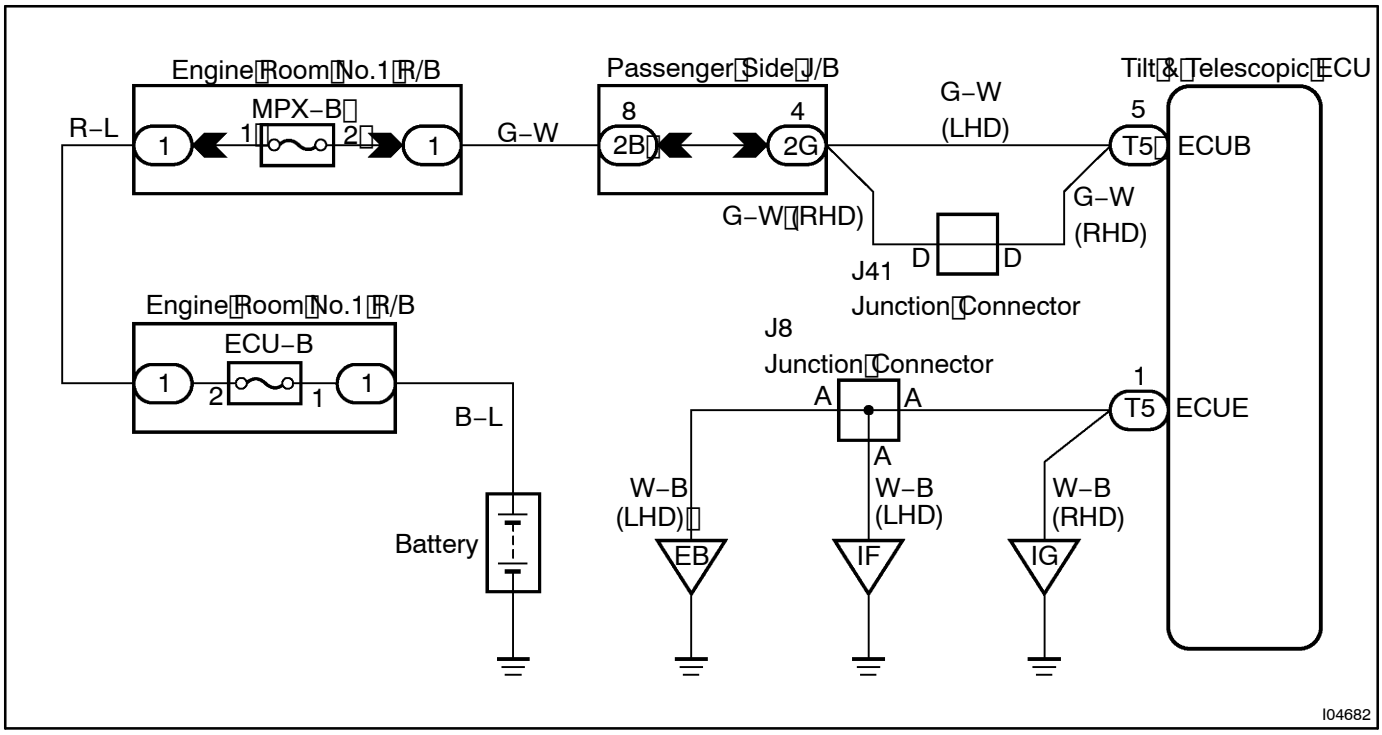
DTC	B2620	ECU Power Source Circuit Malfunction

CIRCUIT DESCRIPTION

ECU Power Source circuit supply the battery voltage to Tilt and Telescopic ECU.

DTC No. (See Page)	Detection Item	Trouble Area
B2620	The condition that the voltage of the ECU Power Source circuit drop to be 8V or less continues for 10 seconds or more	• Battery • ECU Power source circuit • Tilt and Telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that the battery voltage is 11V or more when engine is stopped.

NG → Charge or replace battery.

OK

2	Check ECU Power Source circuit. (See page DI–371)

NG → **Repair or replace.**

OK

Check and replace the Tilt and Telescopic ECU.

DI23J–02

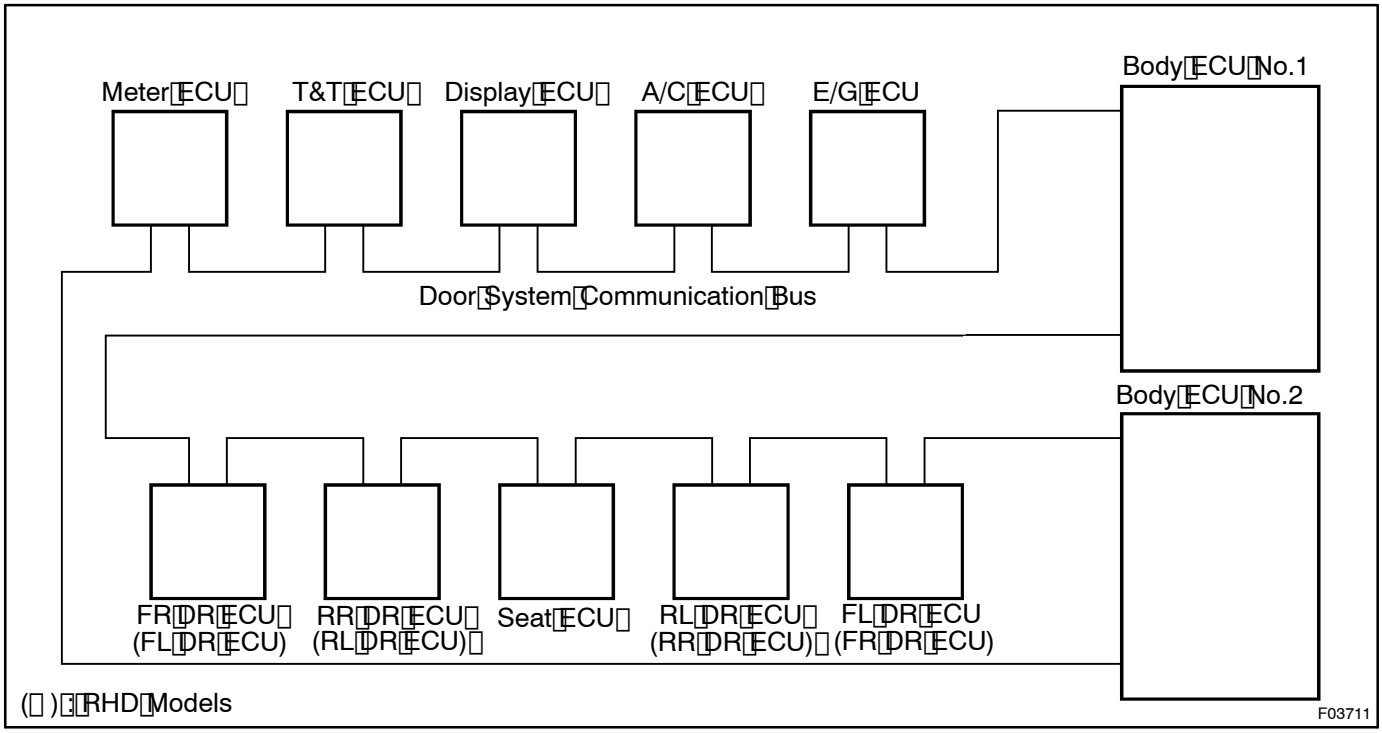
DTC	B2621	Communication Interruption

CIRCUIT DESCRIPTION

Tilt and Telescopic ECU forms the network with ECU of other systems through communication bus. Each ECU informs to other ECU of the connection of itself to the network by outputting the specified signal (periodical signal) on to the communication bus with every fixed period of time. Tilt and Telescopic ECU detects the connected condition of each ECU based on the signal.

DTC No. (See Page)	Detection Item	Trouble Area
B2621	• Periodical signal from the specified ECU has stopped. • Periodical signals from the ECU have stopped.	• Multiplex Communication system • Tilt and Telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check Multiplex Communication system. (See page DI–801)

NG → Repair or replace.

OK

Check and replace the Tilt and Telescopic ECU.

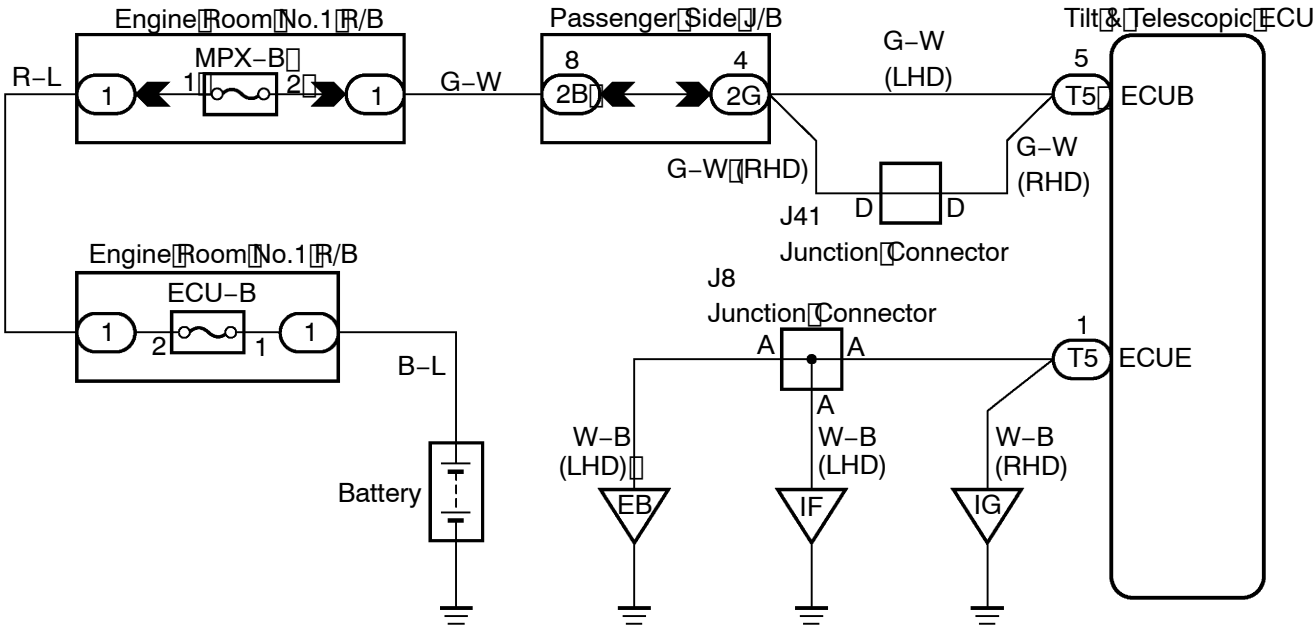
DI23K–02

ECU Power Source circuit

CIRCUIT DESCRIPTION

The ECU Power Source supplies power to the CPU and sensors, etc. Power is supplied to the ECU even when the ignition switch is in lock position.

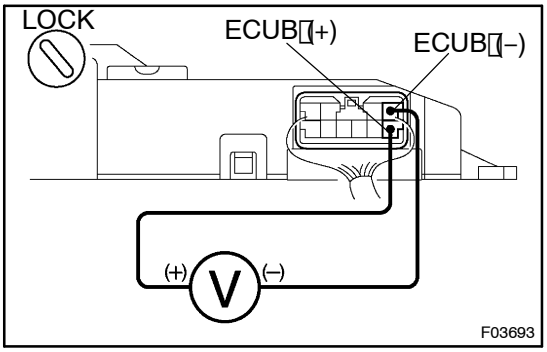
WIRING DIAGRAM



I04682

INSPECTION PROCEDURE

1	Check voltage between terminals ECUB and ECUE of ECU connector



F03693

PREPARATION:

Remove ECU with connectors still connected.

CHECK:

Measure voltage between terminals ECUB and ECUE of ECU connector.

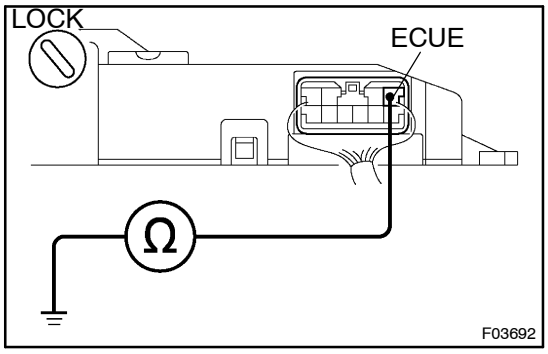
OK:

Voltage: 10 – 16 V

OK	Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

NG

2	Check continuity between terminal ECUE of ECU connector and body ground.



CHECK:

Measure resistance between terminal ECUE of ECU connector and body ground.

OK:

Resistance: 1 kΩ or less

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

OK

3	Check MPX–B fuse.

PREPARATION:

Remove MPX–B fuse from engine room R/B.

CHECK:

Check continuity of MPX–B fuse.

OK:

Continuity

NG → **Check for short in harness and all components connected to MPX–B fuse.**

OK

Check for open in harness and connector between ECU and battery. (See page IN–29)

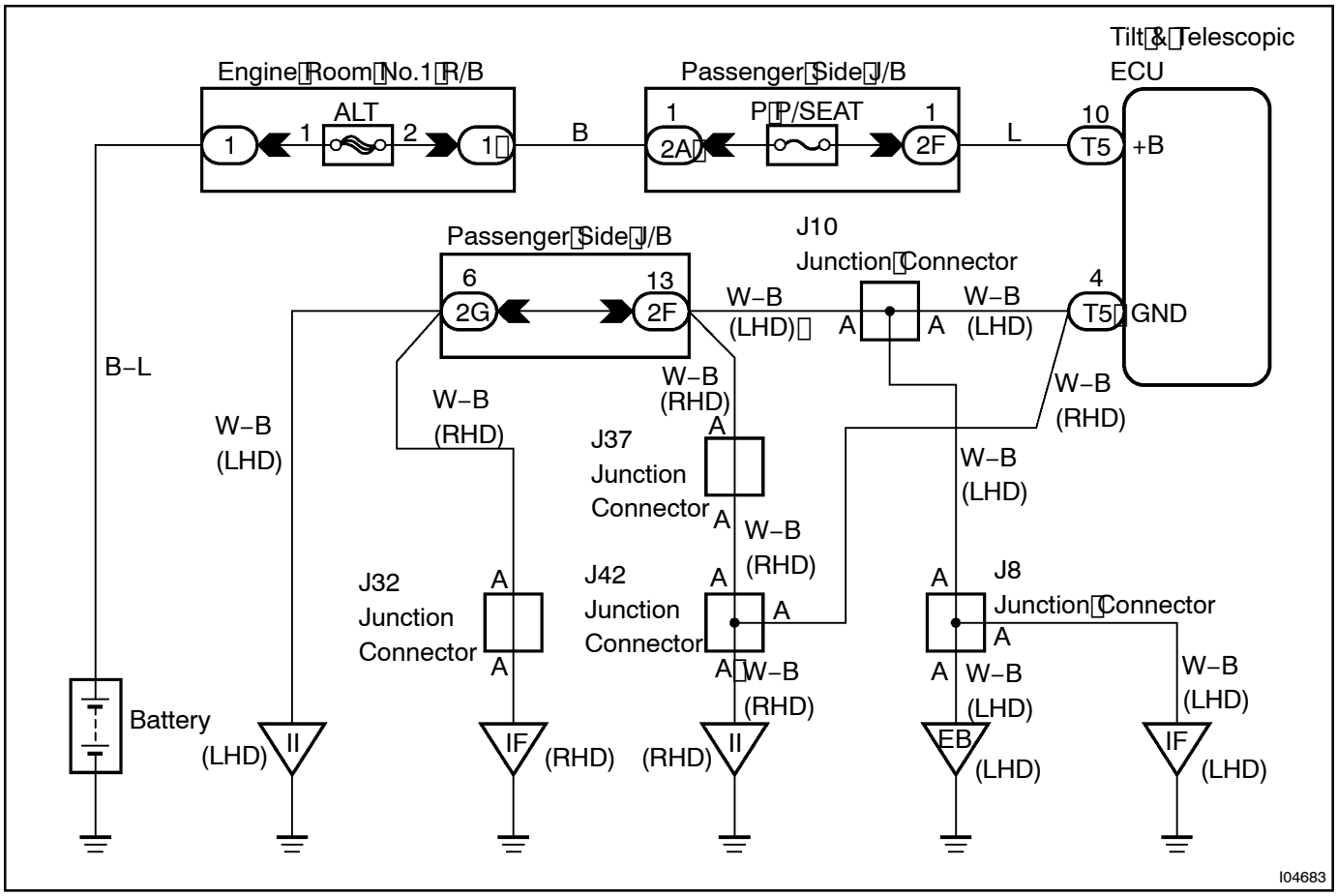
DI23L–02

Actuator Power Source circuit

CIRCUIT DESCRIPTION

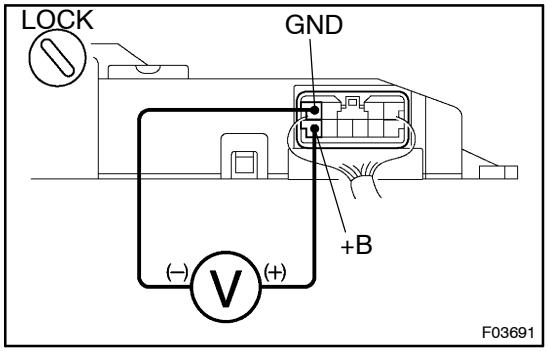
This is the Power Source for the motors.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals +B and GND of ECU connector



PREPARATION:

Remove ECU with connectors still connected.

CHECK:

Measure voltage between terminals +B and GND of ECU connector.

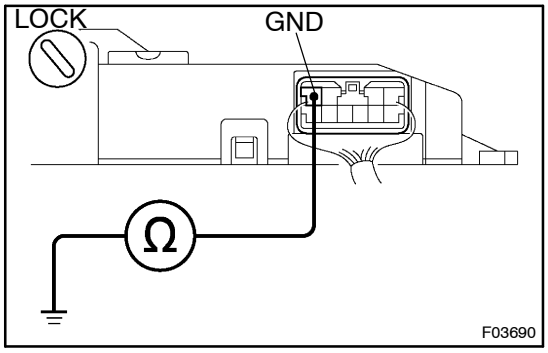
OK:

Voltage: 10 – 16 V

OK	Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

NG

2	Check continuity between terminal GND of ECU connector and body ground.



CHECK:

Measure resistance between terminal GND of ECU connector and body ground.

OK:

Resistance: 1 kΩ or less

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

OK

3	Check P/SEAT fuse.

PREPARATION:

Remove P/SEAT fuse from passenger side J/B.

CHECK:

Check continuity of P/SEAT fuse.

OK:

Continuity

NG → **Check for short in harness and all components connected to P/SEAT fuse.**

OK

Check for open in harness and connector between ECU and battery. (See page IN–29)

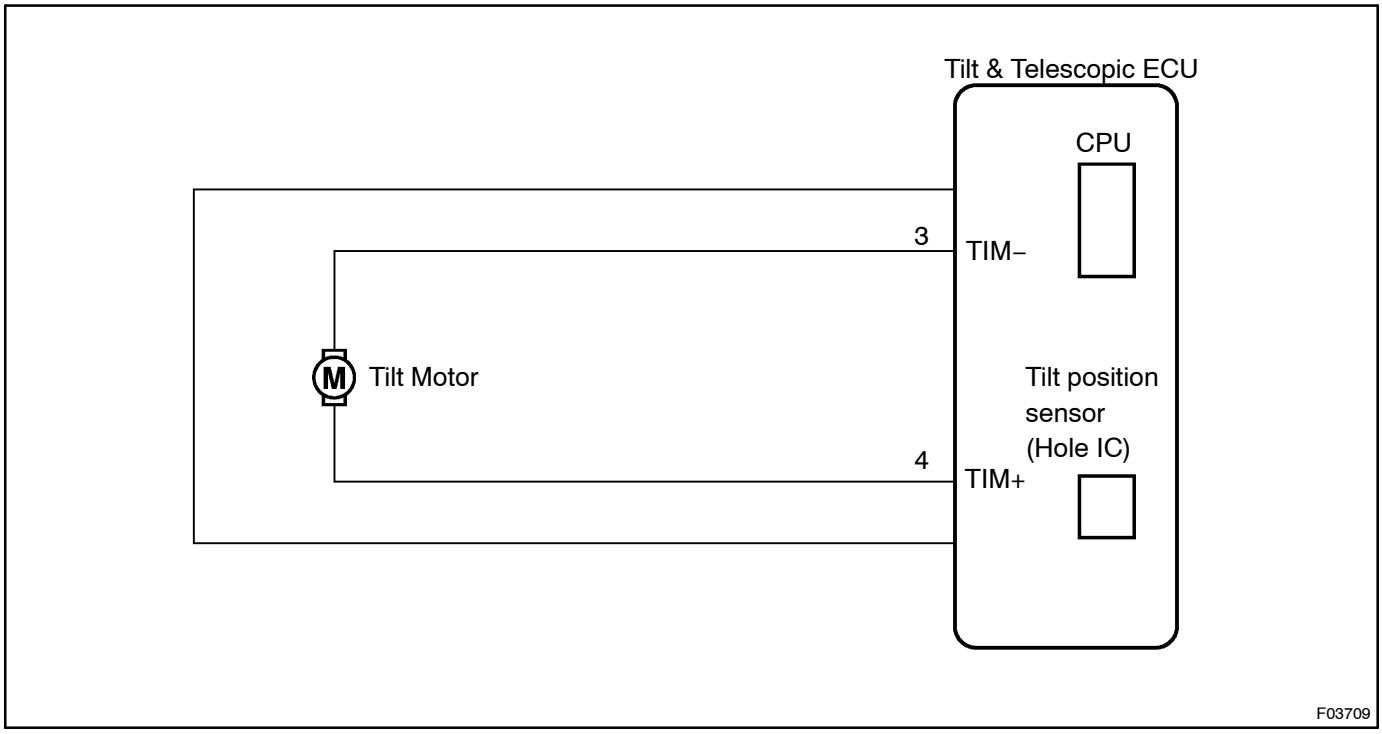
DI23M–02

Tilt Motor circuit

CIRCUIT DESCRIPTION

The ECU provided both +B and ground for the tilt motor.
Reversing polarity of the applied voltage reverses the motor.

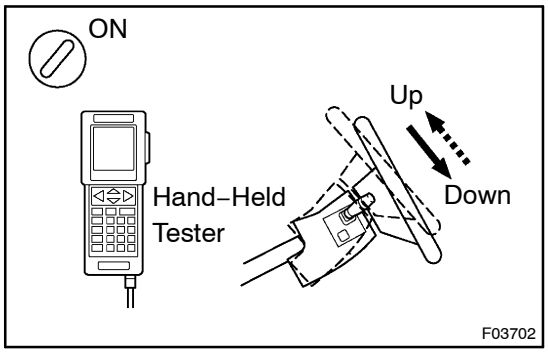
WIRING DIAGRAM



INSPECTION PROCEDURE

In case of using hand–held tester, start inspection from step 1.
In case of not using hand–held tester, start inspection from step 2.

1	Check Tilt Motor operation using hand–held tester.



PREPARATION:

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

(b) Turn 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 the steering wheel tilt up (down) when the ACTIVE TEST carried out.

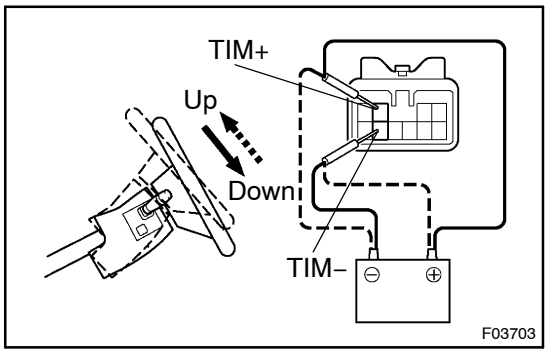
OK:

Steering wheel must be moved upward (downward).

OK	Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

NG

2	Check Tilt Motor.



PREPARATION:

Disconnect tilt motor connector.

CHECK:

Connect positive ⊕ (negative ⊖) terminal to terminal TIM + of the tilt motor connector and negative ⊖ (positive ⊕) terminal to terminal TIM –. Then confirm that steering wheel tilt up (down).

	TIM+	TIM–
Tilt UP	⊕	⊖
Tilt DOWN	⊖	⊕

NG	Replace tilt motor.

OK

3	Check harness and connector between Tilt and Telescopic ECU and Tilt Motor. (See page IN–29)

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

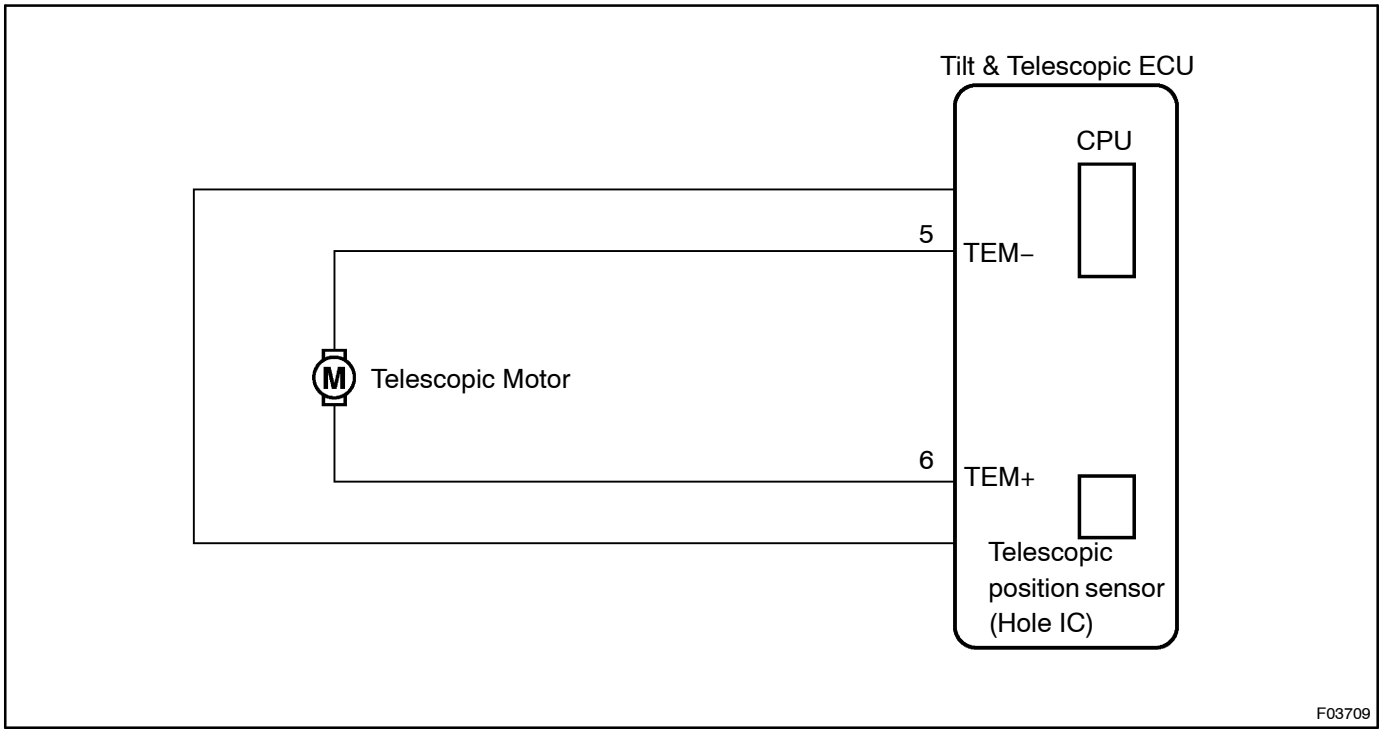
DI23N–02

Telescopic Motor circuit

CIRCUIT DESCRIPTION

The ECU provides both +B and ground for the Telescopic motor.
Reversing polarity of the applied voltage reverses the motor.

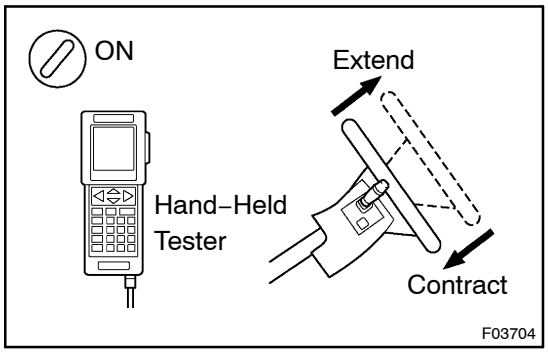
WIRING DIAGRAM



INSPECTION PROCEDURE

In case of using hand–held tester, start inspection from step 1.
In case of not using hand–held tester, start inspection from step 2.

1	Check Telescopic Motor operation using hand–held tester.



PREPARATION:

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

(b) Turn 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 the steering column length become short (long) when the ACTIVE TEST carried out.

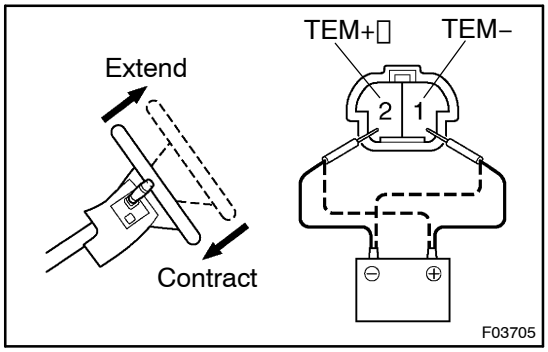
OK:

Steering column length must be short (long).

OK	Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

NG

2	Check Telescopic Motor.



PREPARATION:

Disconnect Telescopic motor connector.

CHECK:

Connect positive ⊕ (negative ⊖) terminal to terminal TEM + of the Telescopic motor connector and negative ⊖ (positive ⊕) terminal to terminal TEM –.Then confirm that steering column length become short (long).

	TEM+	TEM–
Telescopic Contracted	⊕	⊖
Telescopic Extended	⊖	⊕

NG	Replace Telescopic motor.

OK

3	Check harness and connector between Tilt and Telescopic ECU and Telescopic Motor. (See page IN–29)

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

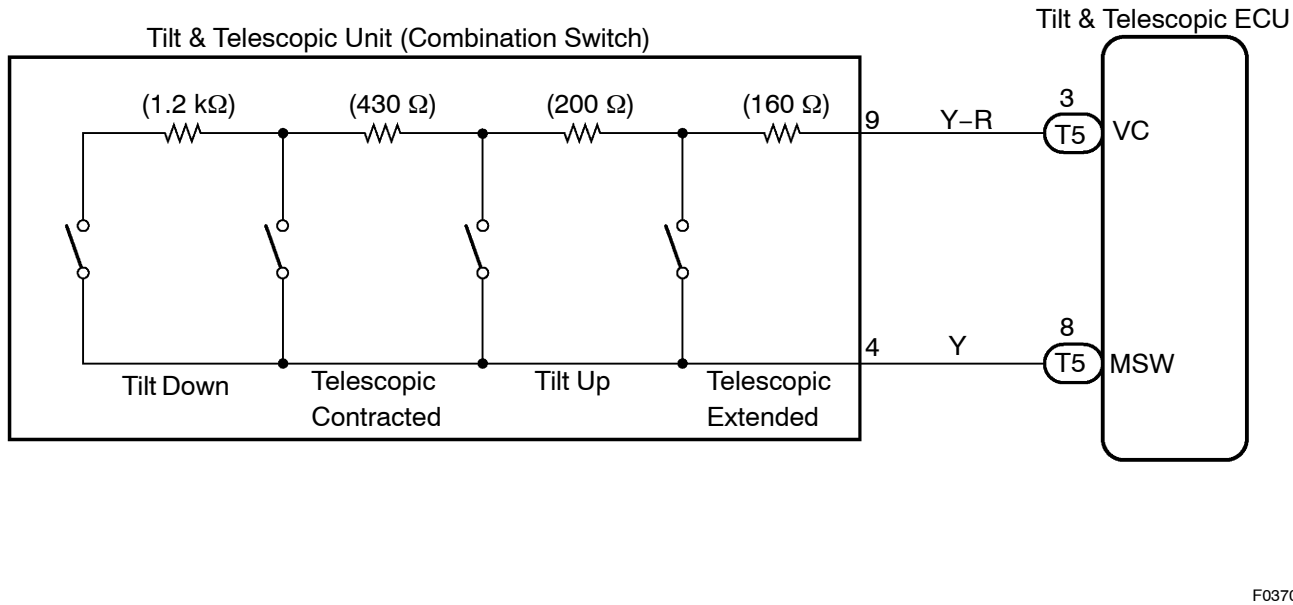
DI23O–02

Tilt and Telescopic Manual switch circuit

CIRCUIT DESCRIPTION

The different voltage signals which are occurred by operating the manual switch are sent to the Tilt and Telescopic ECU.

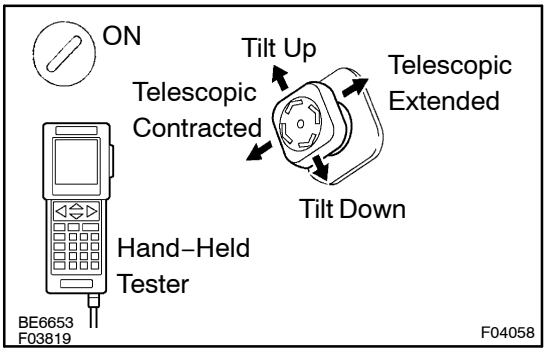
WIRING DIAGRAM



F03708

INSPECTION PROCEDURE

1	**Check Tilt and Telescopic Manual switch Voltage.**



When using hand–held tester

PREPARATION:

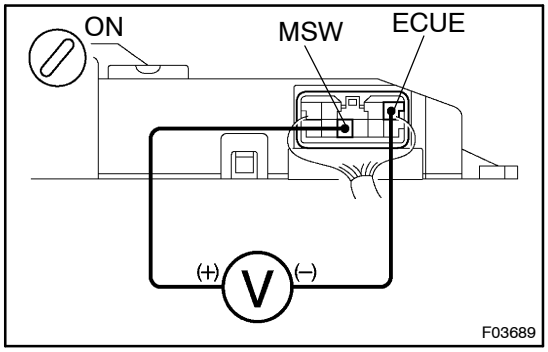
(a) Connect the hand–held tester to the DLC3

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

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

CHECK:

Read the voltages on the tester screen when operating the manual switch.



When not using hand–held tester

PREPARATION:

Remove Tilt and Telescopic ECU with connectors still connected.

CHECK:

Measure voltage between terminals MSW and ECUE of ECU connector when operating the manual switch.

OK:

Manual switch position	Standard voltage
Neutral position	0.00 – 0.20 V
Tilt UP	1.30 – 1.70 V
Tilt DOWN	0.30 – 0.50 V
Telescopic Contracted	0.65 – 0.95 V
Telescopic Extended	2.05 – 2.75 V

RESULT:

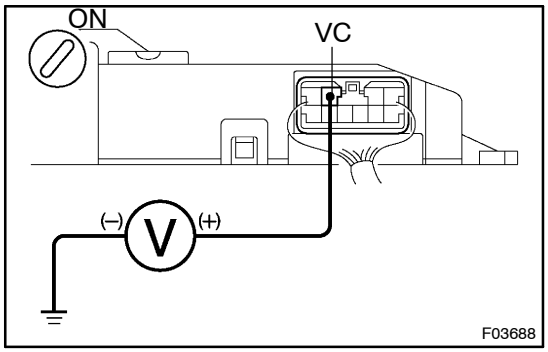
A	Switch voltages in all directions are within the standard.
B	Switch voltage in a certain direction is out of the standard.
C	Switch voltages in all directions are out of the standard.

A → **Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)**

B → **Replace the manual switch.**

C

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



PREPARATION:

Remove ECU with connectors still connected.

CHECK:

Measure voltage between terminal VC of ECU and body ground.

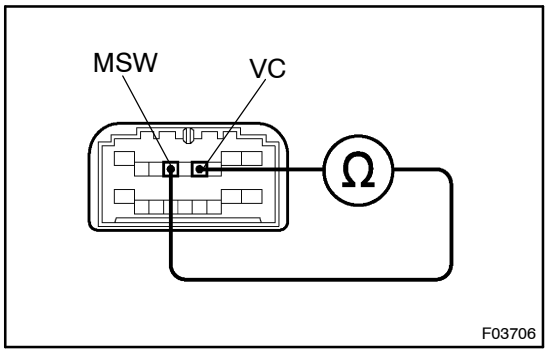
OK:

Voltage: 4.5 ~ 5.5 V

NG → **Go to step 4**

OK

3	Check Tilt and Telescopic Manual switch



PREPARATION:

Disconnect combination switch connector.

CHECK:

Measure resistance between terminals VC and MSW of combination switch connector when operating the manual switch.

OK:

Switch position	Resistance
Tilt UP	360 Ω
Tilt DOWN	1,990 Ω
Telescopic Contracted	790 Ω
Telescopic Extended	160 Ω

NG → **Replace the manual switch.**

OK

4	Check harness and connector between Tilt and Telescopic ECU and manual switch. (See page IN–29)

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

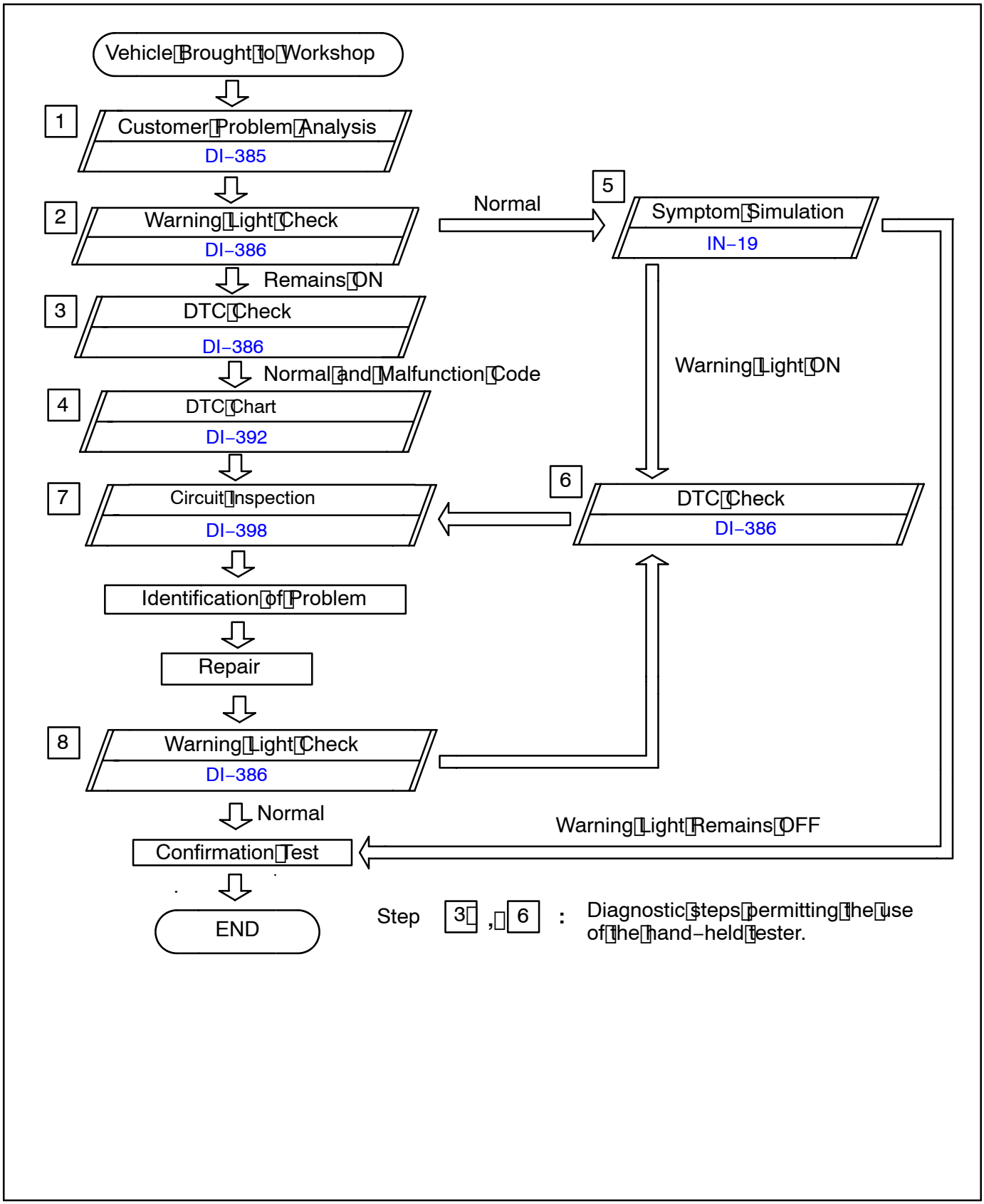
OK

Proceed to next circuit inspection shown on the Problem Symptom Table. (See page DI–359)

SUPPLEMENTAL RESTRAINT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI15Y–04



DI15Z–03

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	

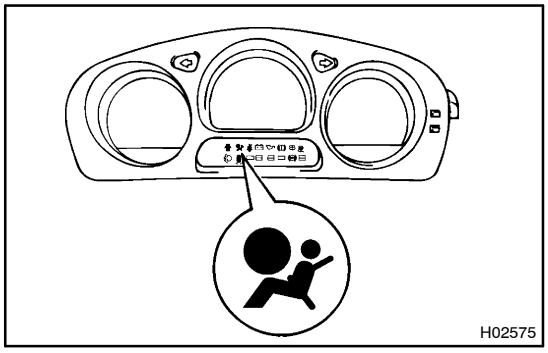
Vehicle Inspection, Repair History Prior to Occurrence of Malfunction(Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	**1st Time**	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
DTC Inspection	**1st Time**	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

DI160–05

PRE–CHECK


H02575

HINT:

The illustration of connector shown below represents other illustrations. Though the shapes of some connectors are different, terminals alignment is same.

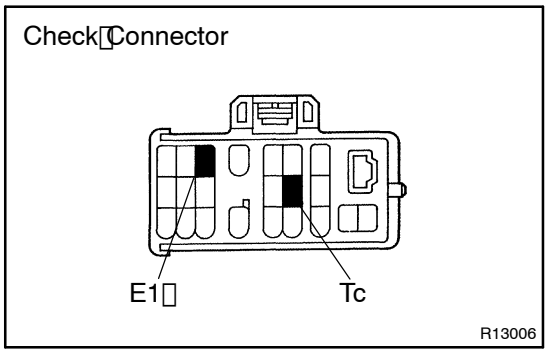
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to ACC or ON 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–506.



R13006

2. DTC CHECK (Using diagnosis check wire)

(a) Present Trouble Codes:

Output the DTC.

(1) Turn the ignition switch to the ACC or ON position and wait approx. 20 seconds.

(2) Using SST, connect terminals Tc and E1 of the check connector.

SST 09843–18020

NOTICE:

Pay enough attention to the terminal connecting position as this will cause a malfunction.

(b) Past Trouble Codes:

Output the DTC

(1) Using service wire, connect Terminals Tc and E1 on the check connector.

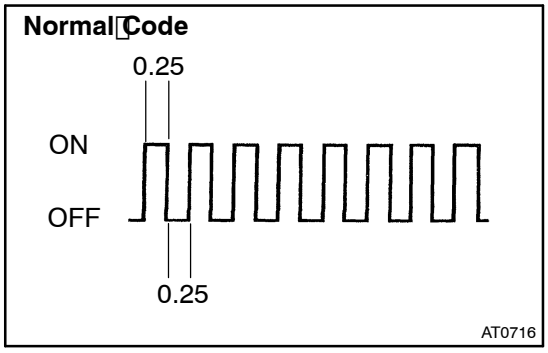
(2) Turn the ignition switch to the ACC or ON position and wait approx. 20 seconds.

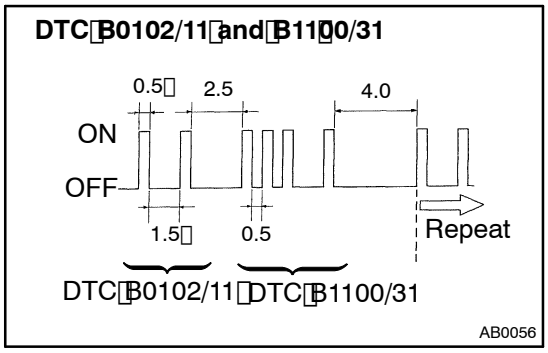
(3) Using SST, connect terminals Tc and E1 of the check connector.

SST 09843–18020

NOTICE:

Pay enough attention to the terminal connecting position as this will cause a malfunction.





(c) READ DTC

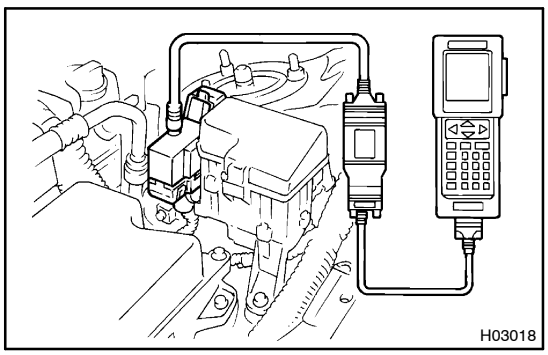
Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, B0102/11 and B1100/31 are as shown in the illustration.

- 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–512.



3. DTC CHECK (Using hand–held tester)

(a) Hook up the LEXUS hand–held tester to the check connector.

(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.

5. DTC CLEARANCE (Using service wire)

(a) Connect the 2 service wires to terminal Tc and AB of check connector.

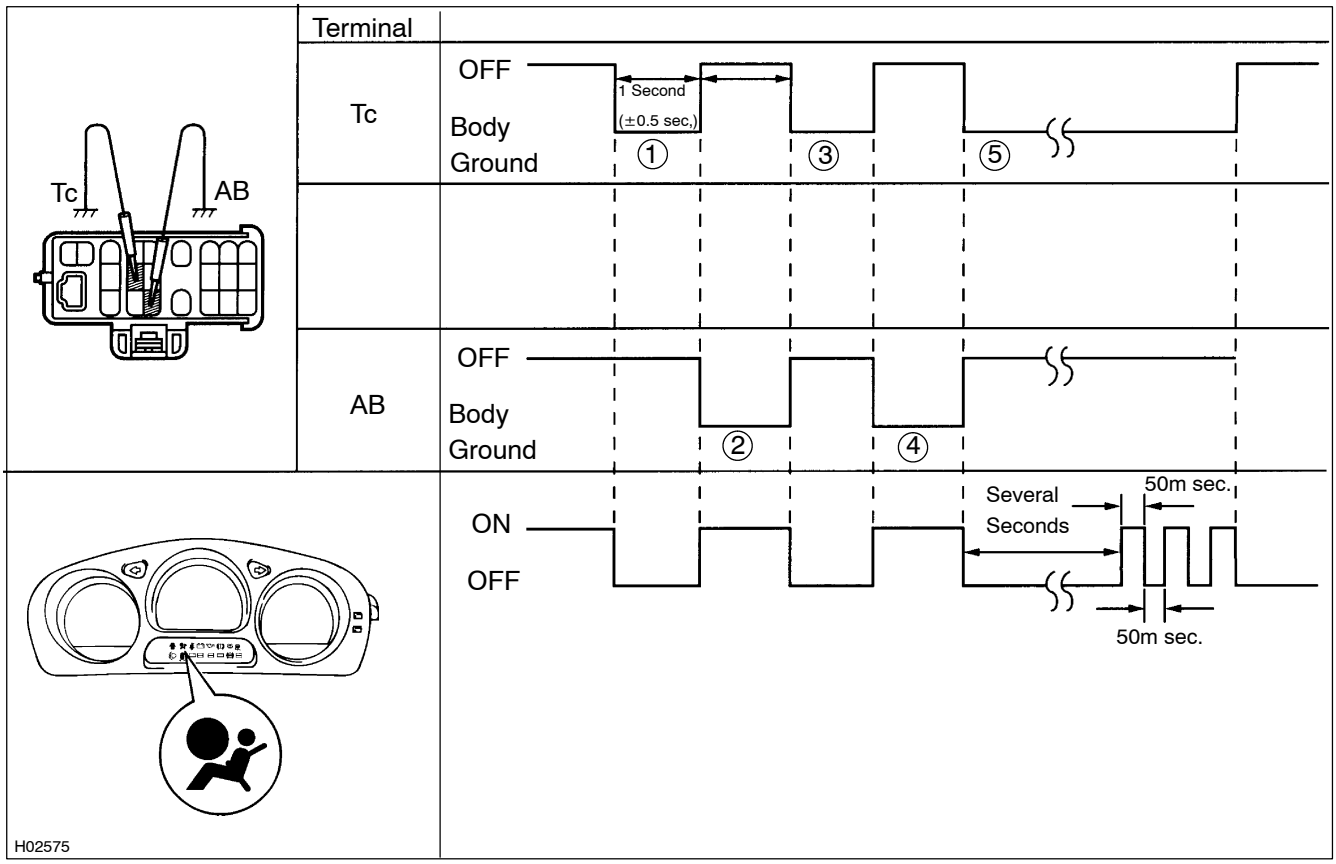
(b) Turn the ignition switch to ACC or ON and wait approx. 6 seconds.

(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. Finally, cenure that 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.



H00934

H03055

(d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 m sec. cycle to indicate the codes have been cleared.

6. Past Trouble Codes:
DTC CLEARANCE
(See step 5.)

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

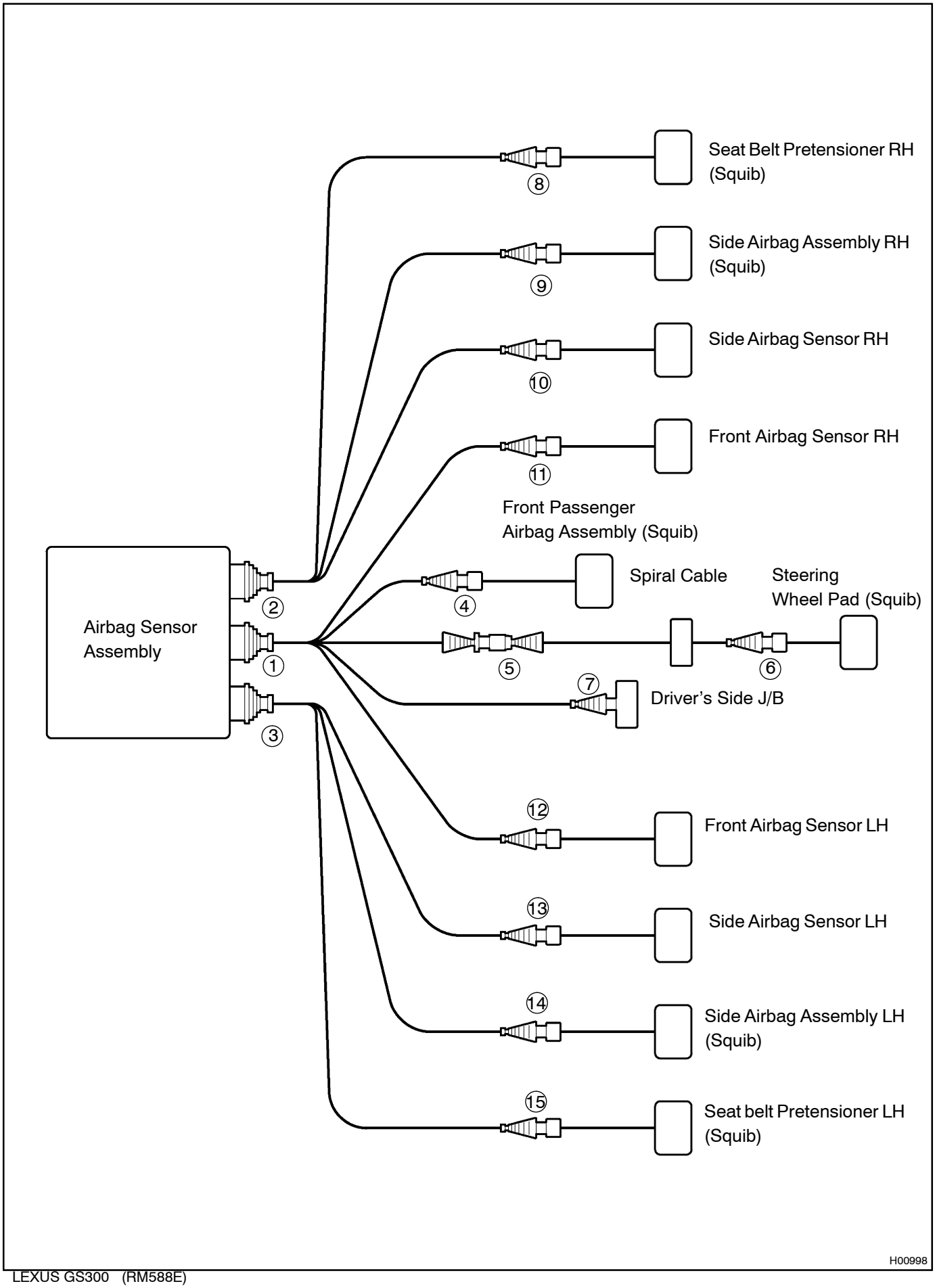
An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

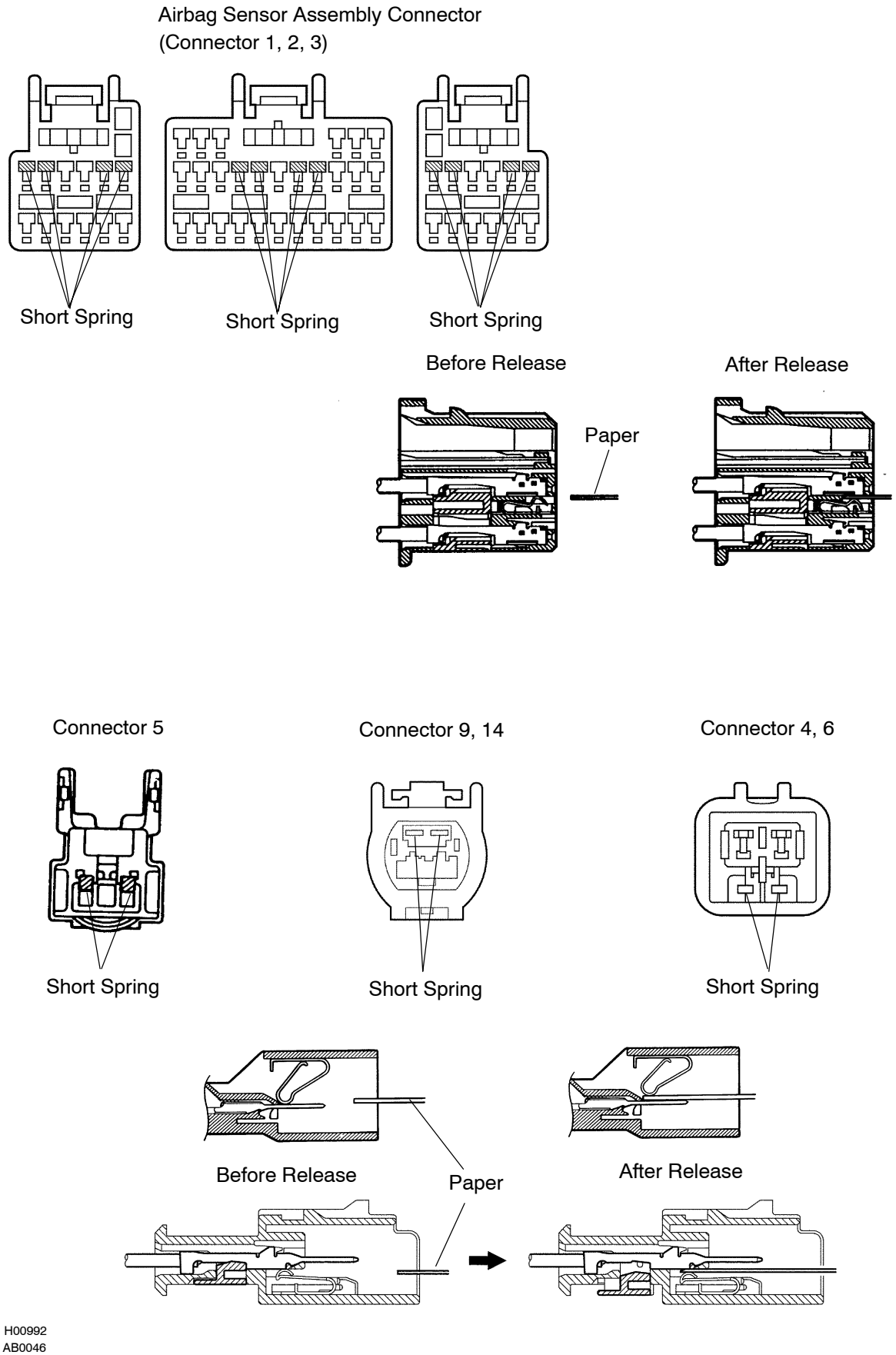
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors "1", "2", "3", "4", "5", "6", "8", "9", "14" and "15" on the next page, insert paper which has the same thickness as the male terminal, between the terminal 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.**


Seat Belt Pretensioner RH (Squib)
8
Side Airbag Assembly RH (Squib)
9
Side Airbag Sensor RH
10
Front Airbag Sensor RH
11
Front Passenger Airbag Assembly (Squib)
Airbag Sensor Assembly
2
1
3
4
Spiral Cable
Steering Wheel Pad (Squib)
5
6
7
Driver's Side J/B
12
Front Airbag Sensor LH
13
Side Airbag Sensor LH
14
Side Airbag Assembly LH (Squib)
15
Seat belt Pretensioner LH (Squib)
H00998


Airbag Sensor Assembly Connector
(Connector 1, 2, 3)
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Connector 5
Connector 9, 14
Connector 4, 6
Short Spring
Short Spring
Short Spring
Before Release
Paper
After Release
H01356
H01233
AB0130
H00992
AB0045
AB0046
H02249
H02248
H01358

DI23P–02

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–398)	• Short in D squib circuit	• Steering wheel pad (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI–403)	• Open in D squib circuit	• Steering wheel pad (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI–407)	• Short in D and P squib circuits (to ground)	• Steering wheel pad (Squib) • Front passenger airbag assembly (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI–414)	• Short in D and P squib circuits (to B+)	• Steering wheel pad (Squib) • Front passenger airbag assembly (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI–420)	• Short in P squib circuit	• Front Passenger airbag assembly (Squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI–424)	• Open in P squib circuit	• Front Passenger airbag assembly (Squib) • Airbag sensor assembly • Wire harness	ON
B0110/43 (DI–427)	• Short in side squib (RH) circuit	• Side airbag assembly RH (Squib) • Airbag sensor assembly • Wire harness	ON
B0111/44 (DI–431)	• Open in side squib (RH) circuit	• Side airbag assembly RH (Squib) • Airbag sensor assembly • Wire harness	ON
B0112/41 (DI–434)	• Short in side squib (RH) circuit (to ground)	• Side airbag assembly RH (Squib) • Airbag sensor assembly • Wire harness	ON
B0113/42 (DI–437)	• Short in side squib (RH) circuit (to B+)	• Side airbag assembly RH (Squib) • Airbag sensor assembly • Wire harness	ON
B0115/47 (DI–440)	• Short in side squib (LH) circuit	• Side airbag assembly LH (Squib) • Airbag sensor assembly • Wire harness	ON
B0116/48 (DI–444)	• Open in side squib (LH) circuit	• Side airbag assembly LH (Squib) • Airbag sensor assembly • Wire harness	ON
B0117/45 (DI–447)	• Short in side squib (LH) circuit (to ground)	• Side airbag assembly LH (Squib) • Airbag sensor assembly • Wire harness	ON
B0118/46 (DI–450)	• Short in side squib (LH) circuit (to B+)	• Side airbag assembly LH (Squib) • Airbag sensor assembly • Wire harness	ON

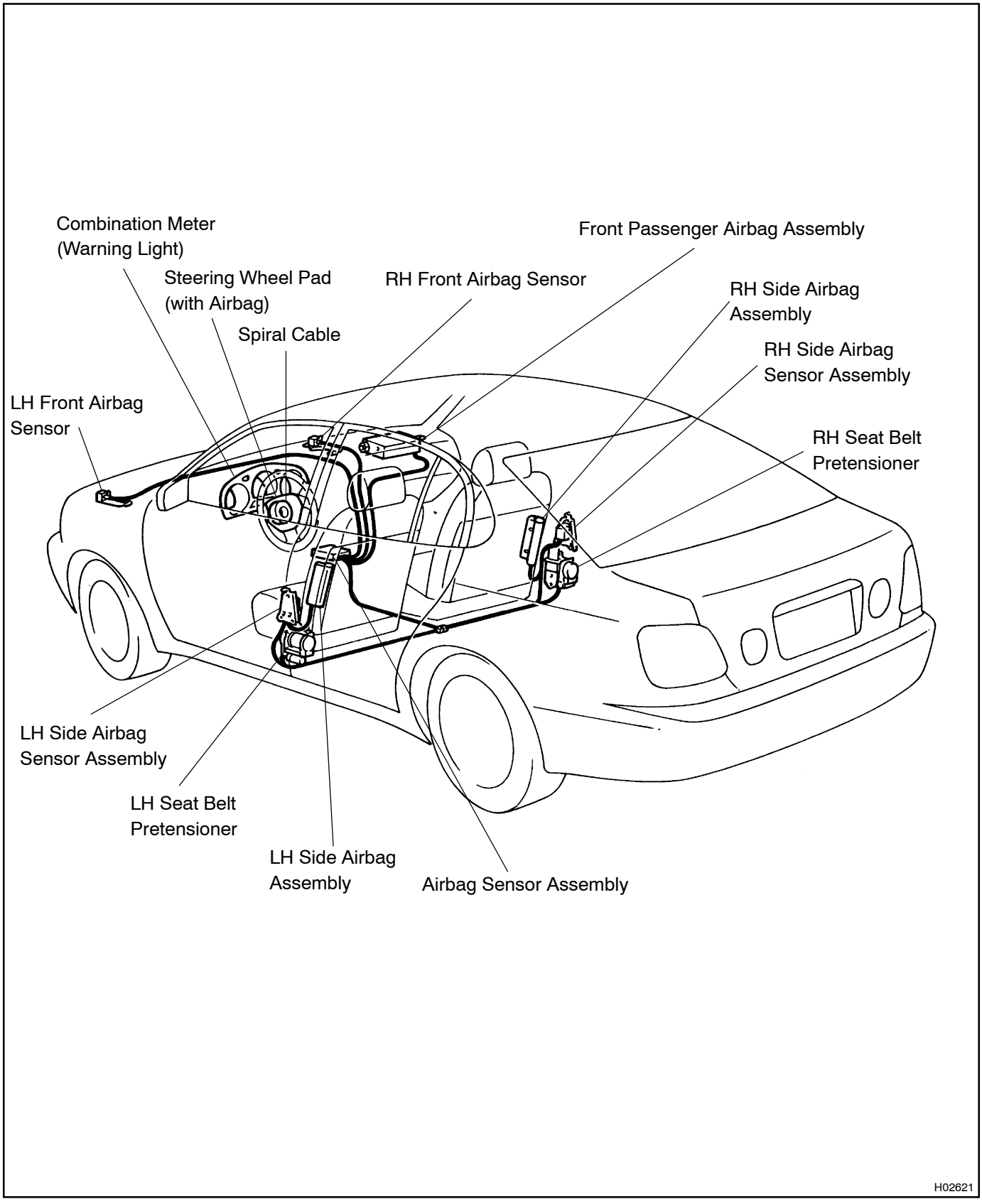
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0130/63 (DI–453)	• Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (Squib) • Airbag sensor assembly • Wire harness	ON
B0131/64 (DI–457)	• Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (Squib) • Airbag sensor assembly • Wire harness	ON
B0133/62 (DI–460)	• Short in D, P, side and P/T squib circuits (to B+)	• Steering wheel pad (Squib) • Front passenger airbag assembly (Squib) • Side airbag assemblies (Squib) • Seat belt pretensioners (Squib) • Airbag sensor assembly	ON
B0135/73 (DI–466)	• Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (Squib) • Airbag sensor assembly • Wire harness	ON
B0136/74 (DI–470)	• Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (Squib) • Airbag sensor assembly • Wire harness	ON
B0137/61 (DI–473)	• Short in P/T squib circuit (to ground)	• Seat belt pretensioner (Squib) • Airbag sensor assembly • Wire harness	ON
B1100/31 (DI–478)	• Airbag sensor assembly malfunction	• Airbag sensor assembly	ON
B1140/32 (DI–480)	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly RH • Wire harness	ON
B1141/33 (DI–486)	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly LH • Wire harness	ON
B1156/15 (DI–492)	• Front airbag sensor assembly (RH) malfunction	• Front airbag sensor assembly RH • Airbag sensor assembly • Wire harness	ON
B1157/15 (DI–492)			
B1158/16 (DI–496)	• Front airbag sensor assembly (LH) malfunction	• Front airbag sensor assembly LH • Airbag sensor assembly • Wire harness	ON
B1159/16 (DI–496)			
Normal (DI–503)	• 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 source voltage drops.
  This malfunction is not stored in memory by the center airbag sensor assembly and If the power source voltage returns to normal, after approx. 10 seconds the SRS warning light will automatically go out.
- When 2 or more codes are indicated, the lowest numbered code will appear first.
- If a code not listed in the chart is displayed, the center airbag sensor assembly is faulty.

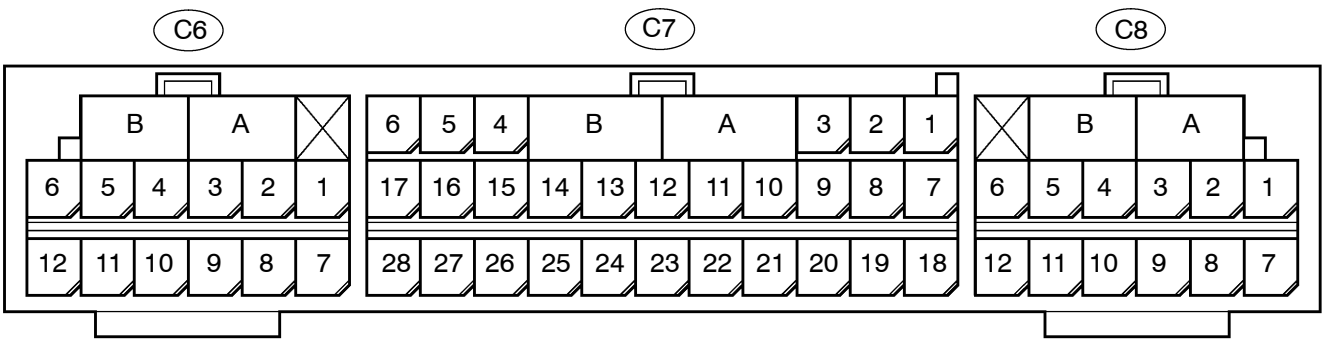
DI23Q–01

PARTS LOCATION



DI1B1–05

TERMINALS OF ECU



H01357

No.	Symbol	Terminal Name
A	–	Electrical Connector Check Mechanism
B	–	Electrical Connector Check Mechanism
C7 – 3	LA	SRS Warning Light
C7 – 5	IG2	Power Source (IGN Fuse)
C7 – 6	ACC	Power Source (SRS–ACC Fuse)
C7 – 9	SR+	Front Airbag Sensor (RH)
C7 – 10	P+	Squib (Passenger)
C7 – 11	P–	Squib (Passenger)
C7 – 12	SIL	Diagnosis
C7 – 13	D–	Squib (Driver)
C7 – 14	D+	Squib (Driver)
C7 – 15	SL+	Front Airbag Sensor (LH)
C7 – 19	Tc	Diagnosis
C7 – 20	SR–	Front Airbag Sensor (RH)
C7 – 26	SL–	Front Airbag Sensor (LH)
C7 – 27	E1	Ground
C7 – 28	E2	Ground
C6 – 1	PL–	Squib (Seat Belt Pretensioner, LH)
C6 – 2	PL+	Squib (Seat Belt Pretensioner, LH)
C6 – 5	SFL+	Squib (Side, LH)
C6 – 6	SFL–	Squib (Side, LH)
C6 – 7	VUPL	Side Airbag Sensor (LH)
C6 – 9	SSL+	Side Airbag Sensor (LH)
C6 – 10	FSL	Side Airbag Sensor (LH)
C6 – 12	ESL	Side Airbag Sensor (LH)

No.	Symbol	Terminal Name
C8 – 1	SFR–	Squib (Side, RH)
C8 – 2	SFR+	Squib (Side, RH)
C8 – 5	PR+	Squib (Pretensioner, RH)
C8 – 6	PR–	Squib (Pretensioner, RH)
C8 – 7	ESR	Side Airbag Sensor (RH)
C8 – 9	FSR	Side Airbag Sensor (RH)
C8 – 10	SSR+	Side Airbag Sensor (RH)
C8 – 12	VUPR	Side Airbag Sensor (RH)

DI164–06

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 always lights 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–506
• 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–508
• DTC is not displayed. • SRS warning light always lights up at the time of DTC check procedure. • DTC is displayed without Tc and E1 terminal connection.	• Tc terminal circuit	DI–512

DI167–05

CIRCUIT INSPECTION

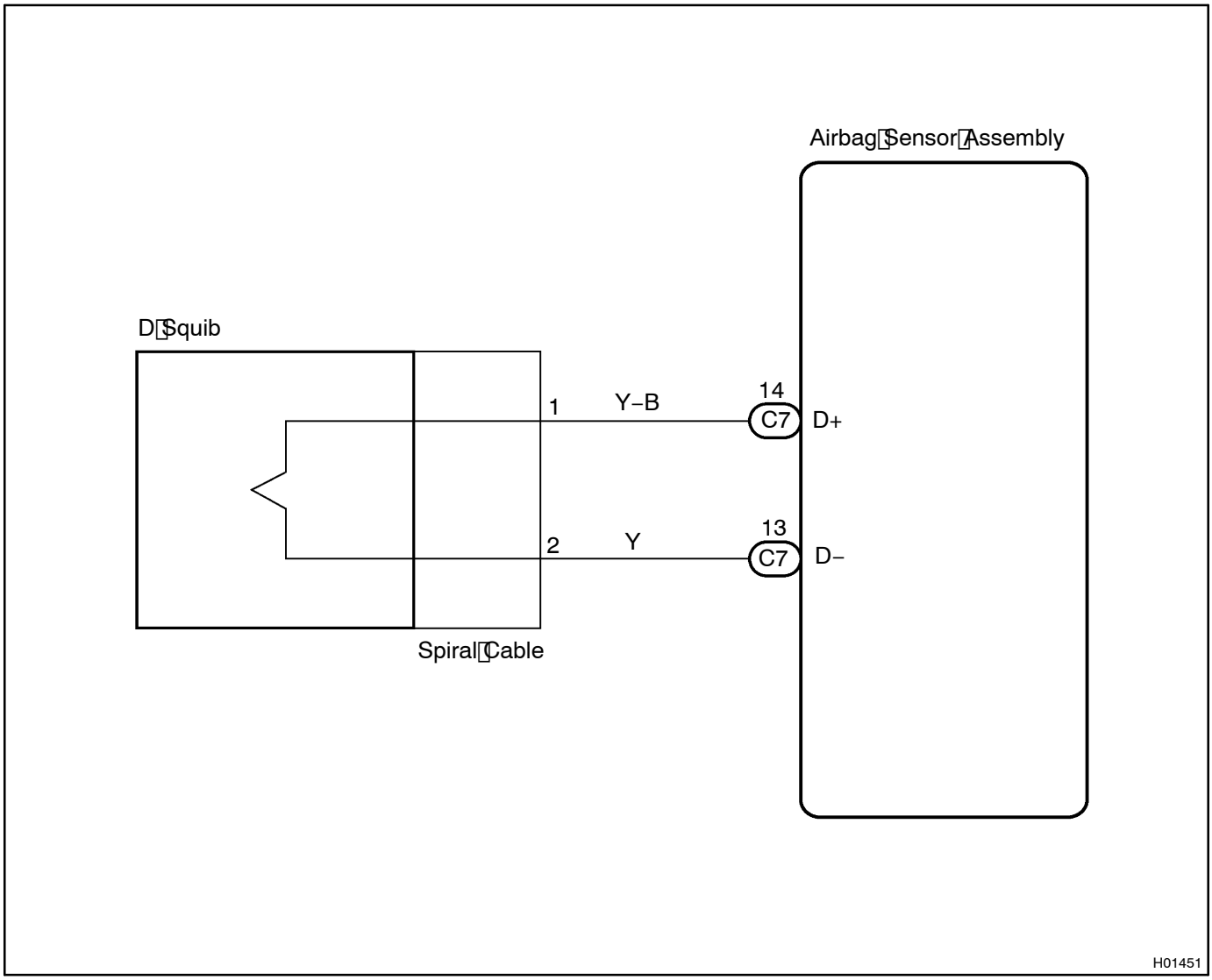
DTC	B0100/13	Short in D Squib Circuit

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

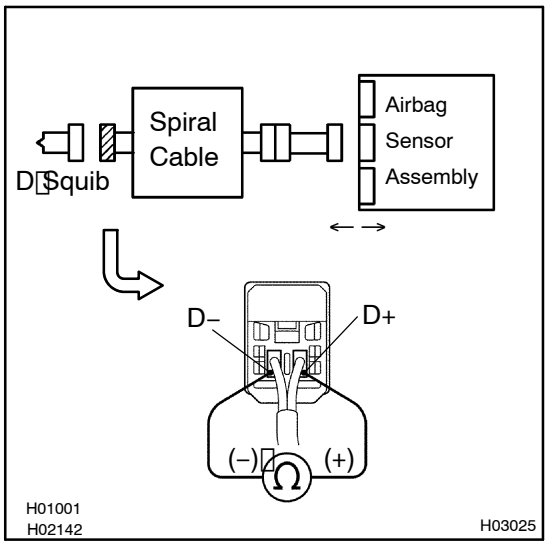
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check D squib circuit.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and spiral cable.
(See page DI–386).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

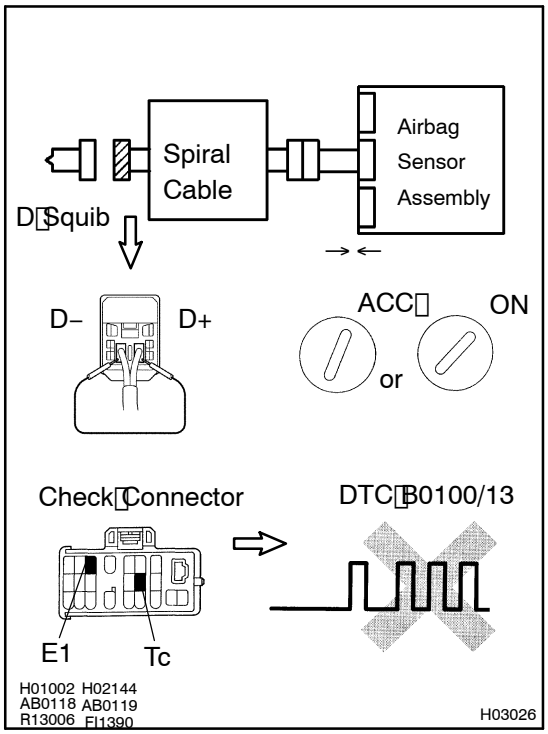
OK:

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) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and 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–386)

(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–386)

OK:

DTC B0100/13 is not output.

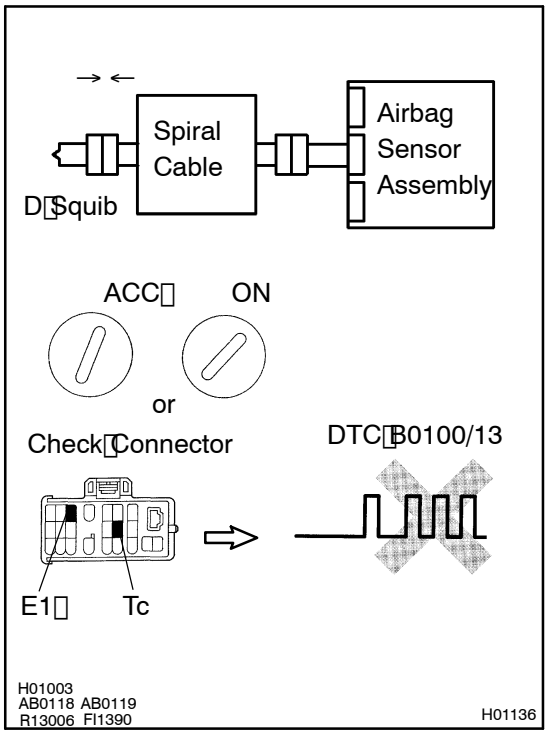
HINT:

Codes other than DTC 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–386)

(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–386)

OK:

DTC B0100/13 is not output.

HINT:

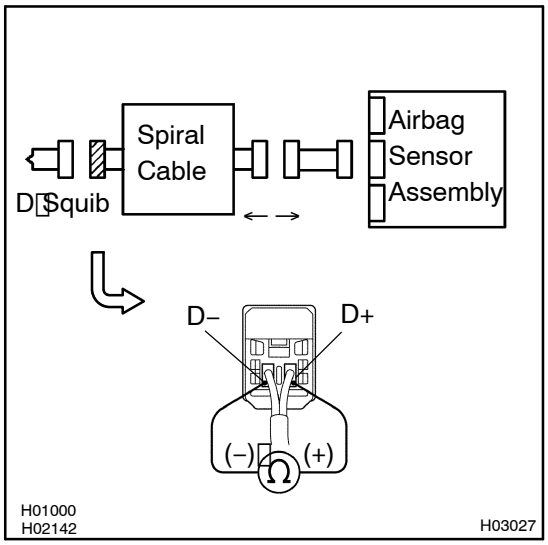
Codes other than DTC B0100/13 may be output at this time, but they are not relevant to this check.

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 spiral cable.

(b) Release airbag activation prevention mechanism of the spiral cable connector (on the airbag sensor assembly side). (See page DI–386)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

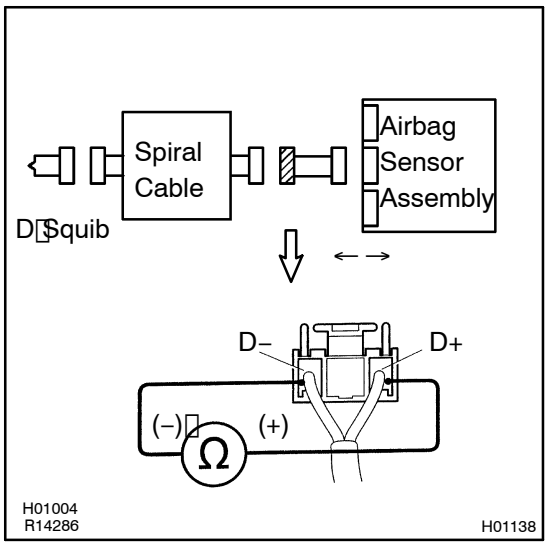
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and spiral cable.
(See page DI–386)

CHECK:

For the connector (on the spiral cable side) between the airbag sensor assembly and spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between the 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.

DI23R–02

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

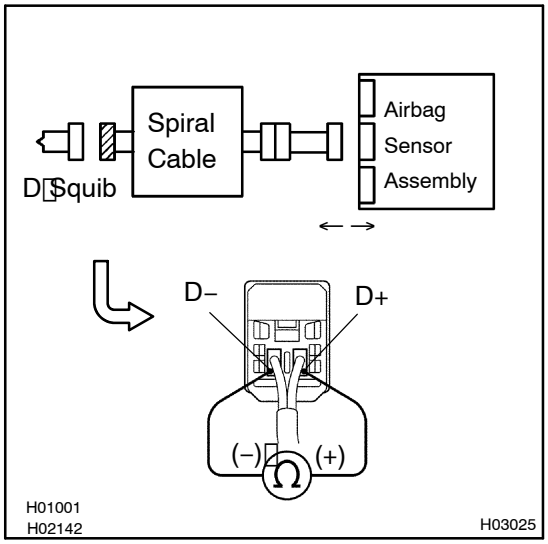
WIRING DIAGRAM

See page DI–398.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check D squib circuit.

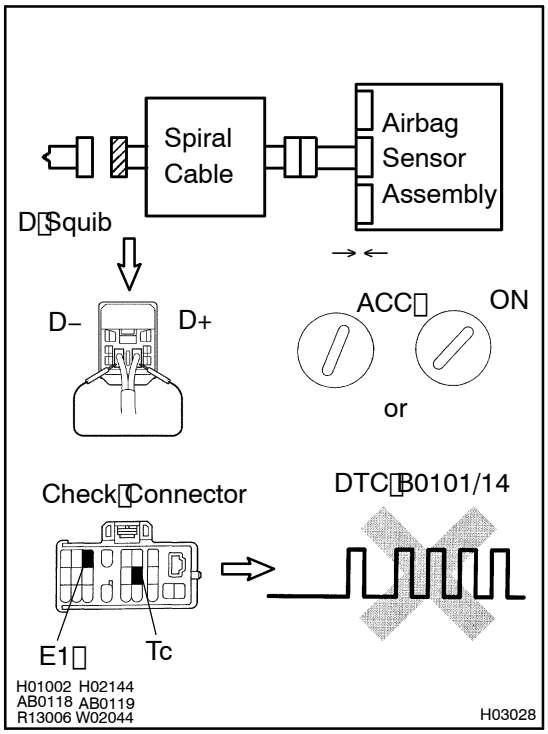


CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.
OK:
Resistance: Below 1 Ω

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 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–386)

(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–386)

OK:

DTC B0101/14 is not output.

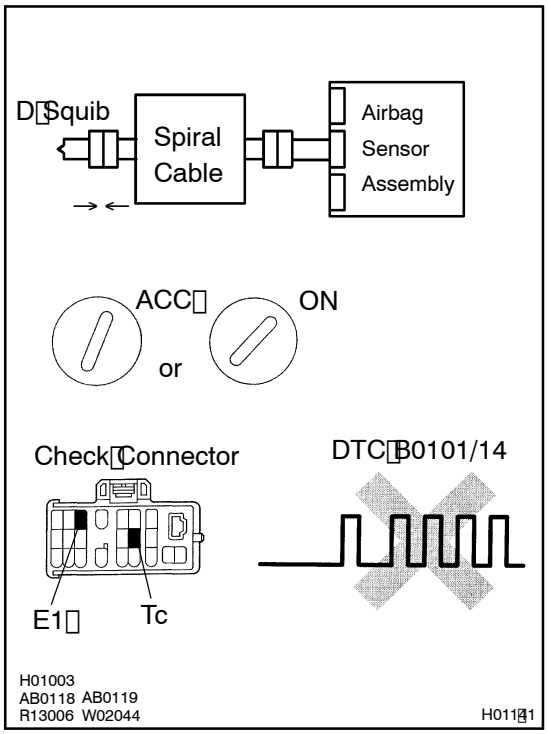
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0101/14 is not output.

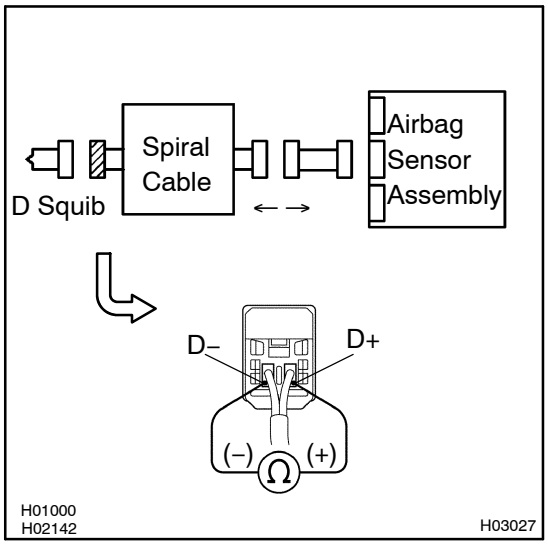
HINT:
Codes other than DTC B0101/14 may be output at this time, but they are not relevant to this check.

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 spiral cable.

CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

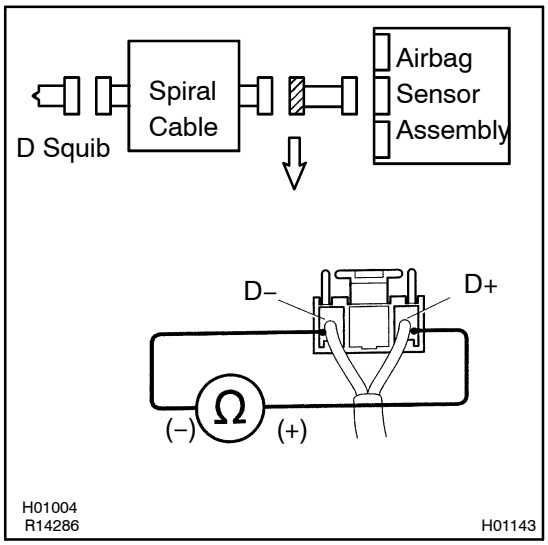
OK:

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 spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: Below 1 Ω

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

DI23S–02

CIRCUIT INSPECTION

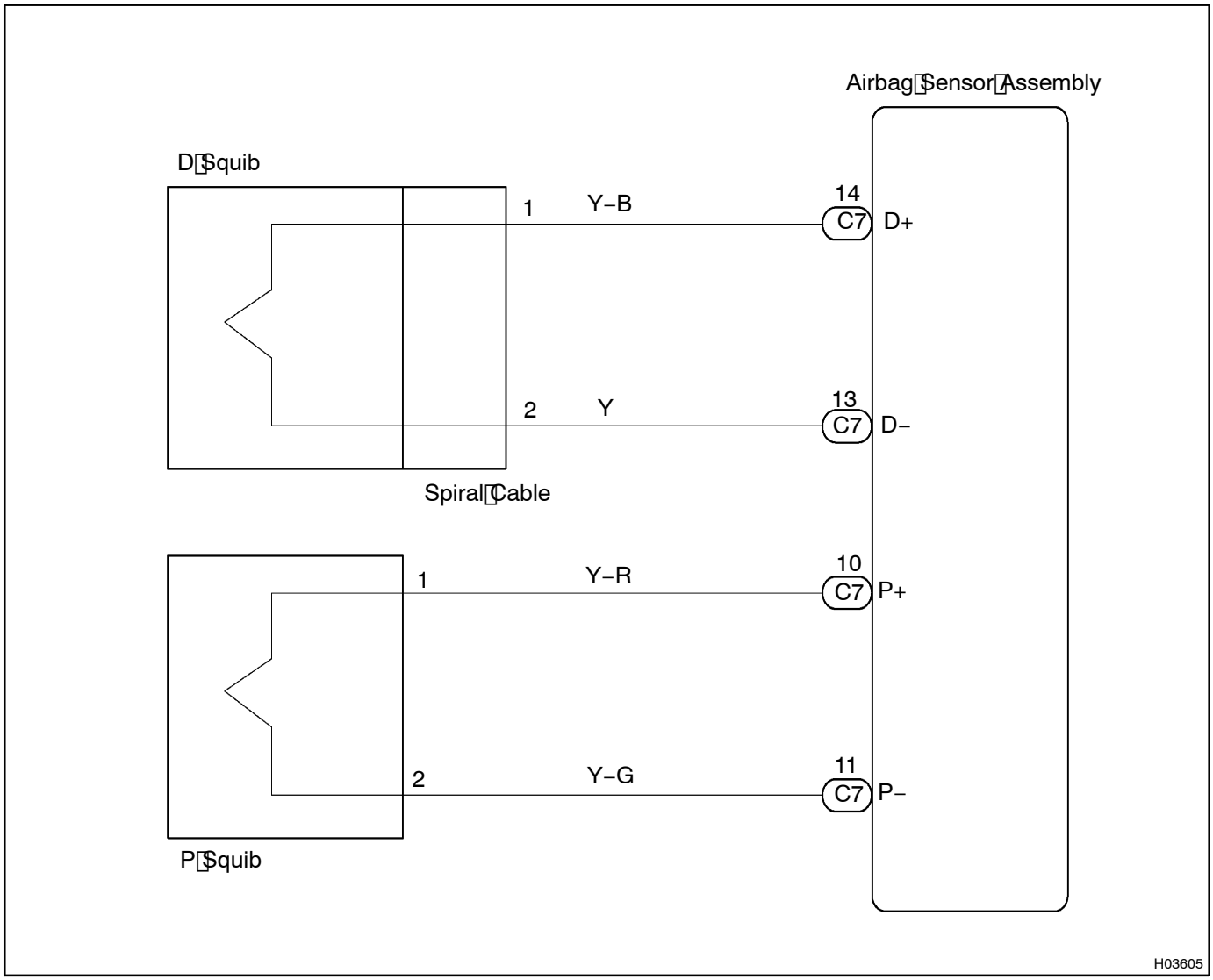
DTC	B0102/11	Short in D and P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D and P squib circuits consist of the airbag sensor assembly, spiral cable, steering wheel pad 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 B0102/11 is recorded when ground short is detected in the D and P squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	• Short circuit in D squib wire harness (to ground) • Short circuit in P squib wire harness (to ground) • D squib malfunction • P squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Front passenger airbag assembly (P squib) • Spiral cable • Airbag sensor assembly • Wire harness

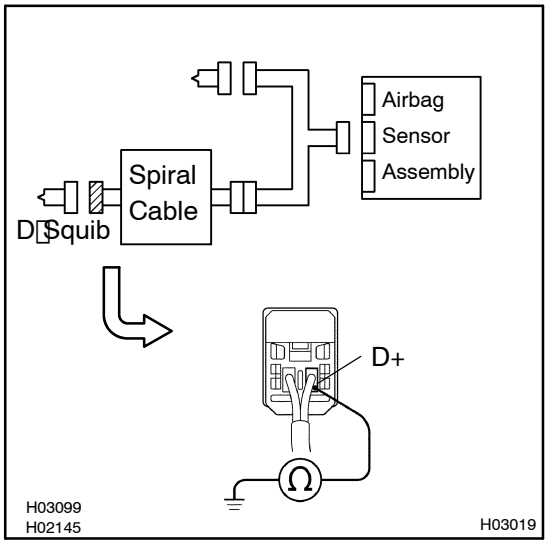
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check D squib circuit.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and body ground.

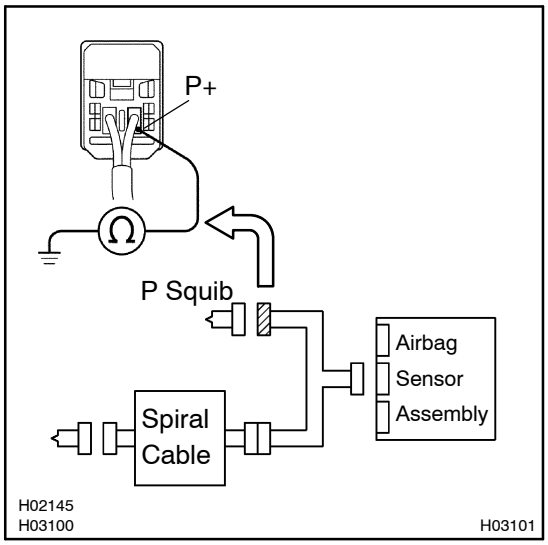
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 7.**

OK

3	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the resistance between P+ and body ground.

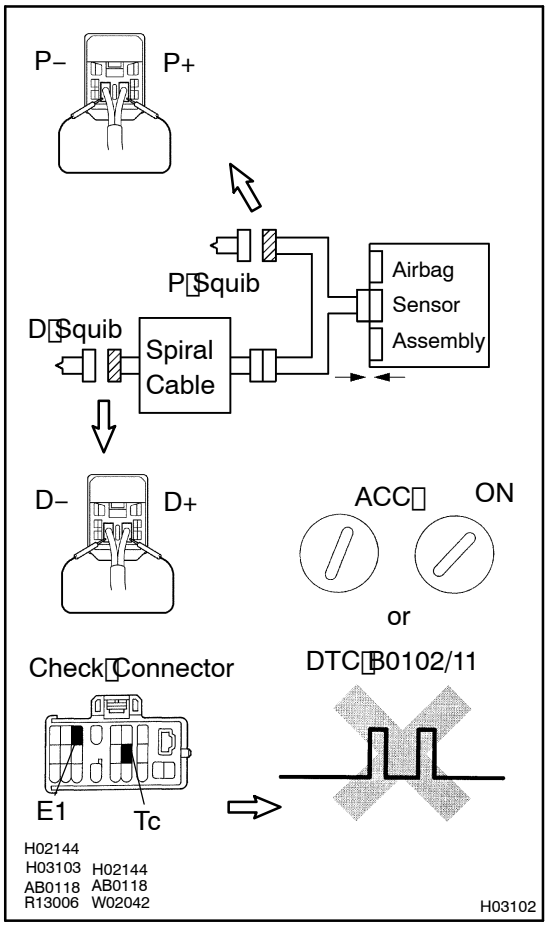
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

4	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 steering wheel pad.

(c) 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 airbag sensor assembly.

(d) Connect negative (–) terminal cable to the battery, and wait at least 1 or 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–386)

(c) Turn ignition switch to LOCK, and wait at least 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.

(e) Check DTC.
(See page DI–386)

OK:

DTC B0102/11 is not output.

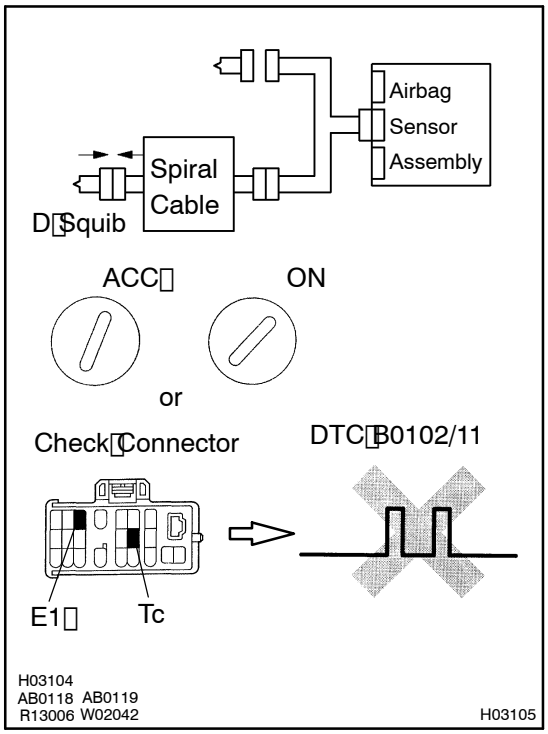
HINT:

Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	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–386)
(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–386)

OK:

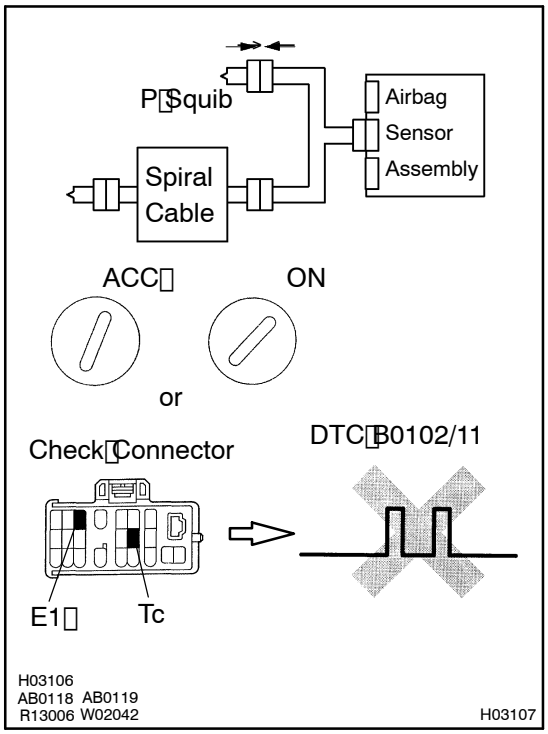
DTC B0102/11 is not output.

HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

6	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–386)
(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–386)

OK:

DTC B0102/11 is not output.

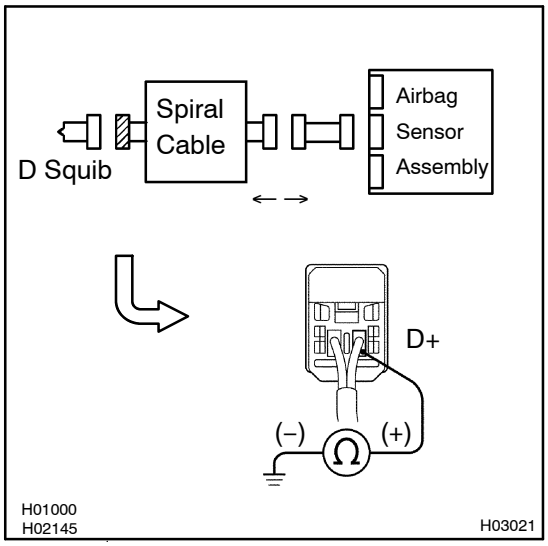
HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

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.

7	Check spiral cable.



PREPARATION:

Disconnect the connector between the airbag sensor assembly and spiral cable.

CHECK:

For the connector (on the spiral cable side) between the steering wheel pad and spiral cable, measure the resistance between D+ and body ground.

OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace spiral cable.**

OK

Repair or replace harness or connector between the airbag sensor assembly and spiral cable.

DI23T–02

DTC	B0103/12	Short in D and P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D and P squib circuits consist of the airbag sensor assembly, spiral cable, steering wheel pad 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 page OPERATION on page RS–2.
DTC B0103/12 is recorded when B+ short is detected in the D and P squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	• Short circuit in D squib wire harness (to B+) • Short circuit in P squib wire harness (to B+) • D squib malfunction • P squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Front passenger airbag assembly (P squib) • Spiral cable • Airbag sensor assembly • Wire harness

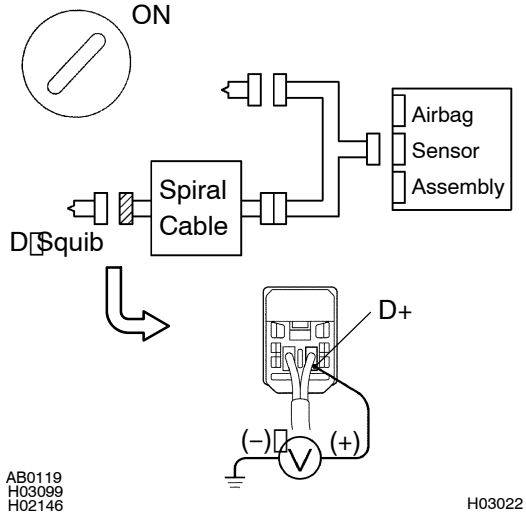
WIRING DIAGRAM

See page DI–407.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check D squib circuit.

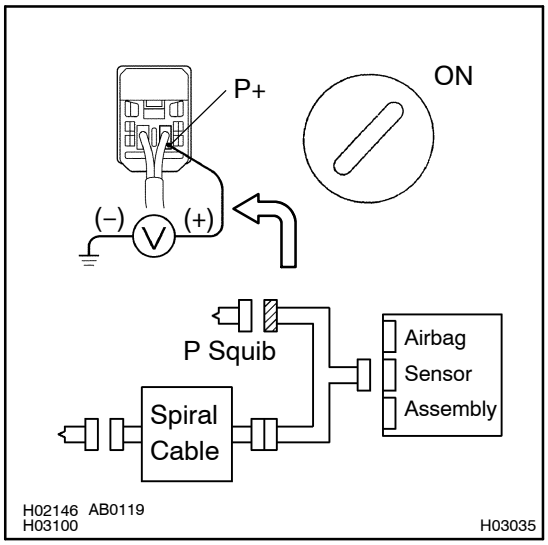


PREPARATION:
Turn ignition switch ON.
CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.
OK:
Voltage: Below 1 V

NG	Go to step 7.

OK

3	Check P squib circuit.



PREPARATION:

Turn ignition switch ON.

CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the voltage between P+ and body ground.

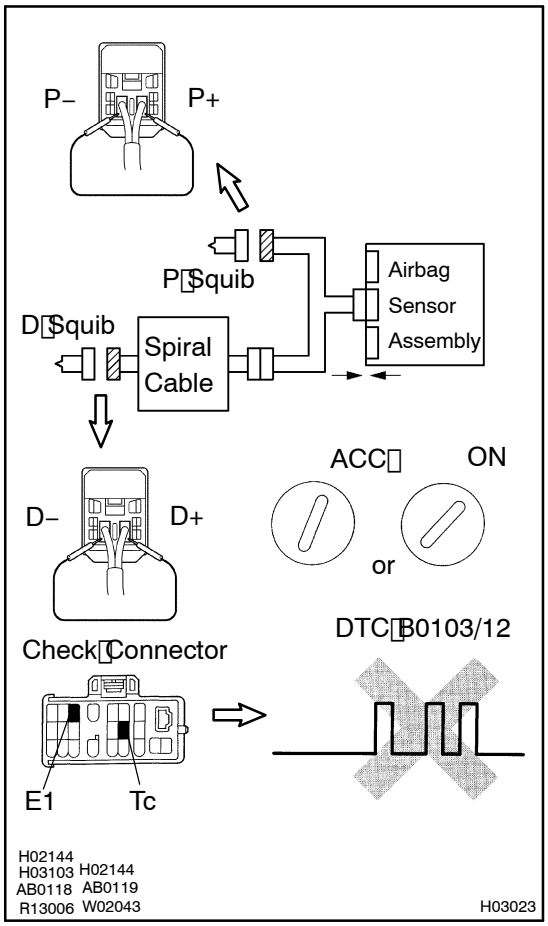
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

4	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 steering wheel pad.

(c) 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 airbag sensor.

(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–386)

(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–386)

OK:

DTC B0103/12 is not output.

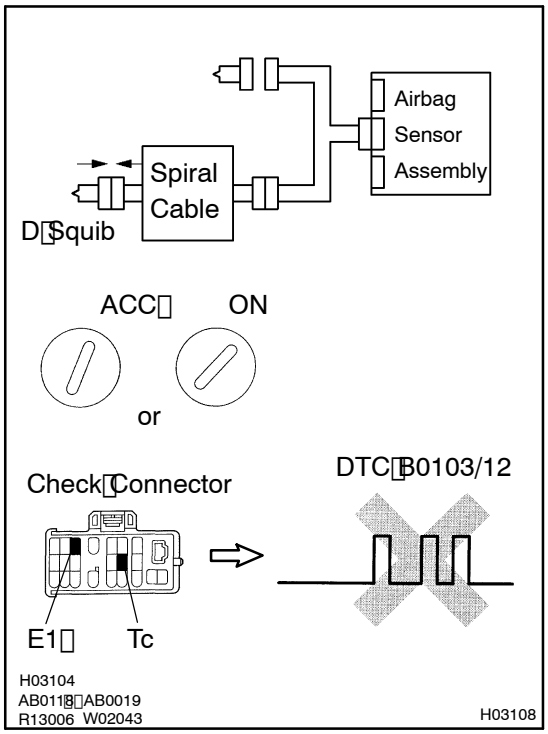
HINT:

Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	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–386)
(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–386)

OK:

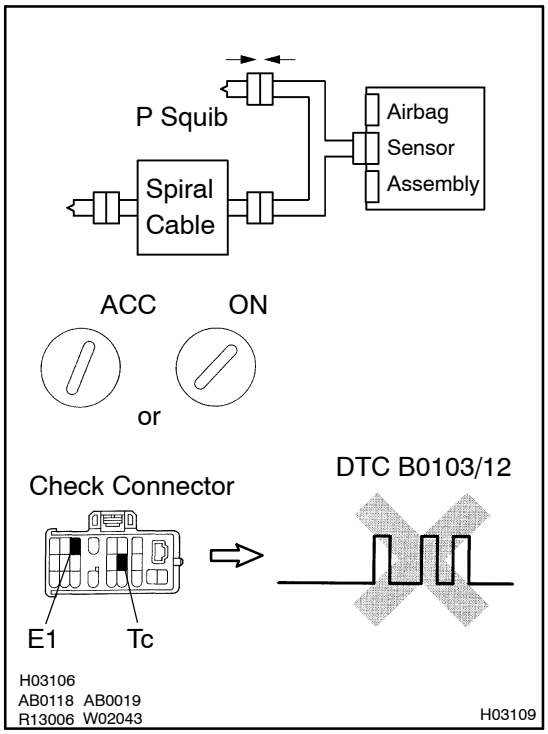
DTC B0103/12 is not output.

HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

6	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 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–386)
(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–386)

OK:

DTC B0103/12 is not output.

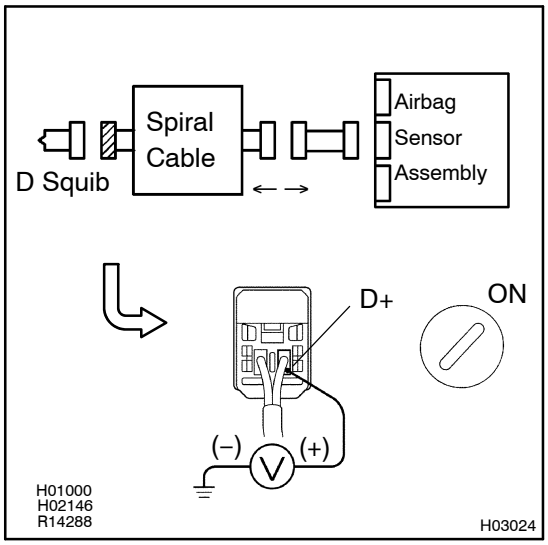
HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

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.

7	Check spiral cable.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect the connector between the airbag sensor assembly and spiral cable.
(c) Turn ignition switch ON.

CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.

OK:

Voltage: Below 1 V

NG → **Repair or replace spiral cable.**

OK

Repair or replace harness or connector between the airbag sensor assembly and spiral cable.

DI16O–05

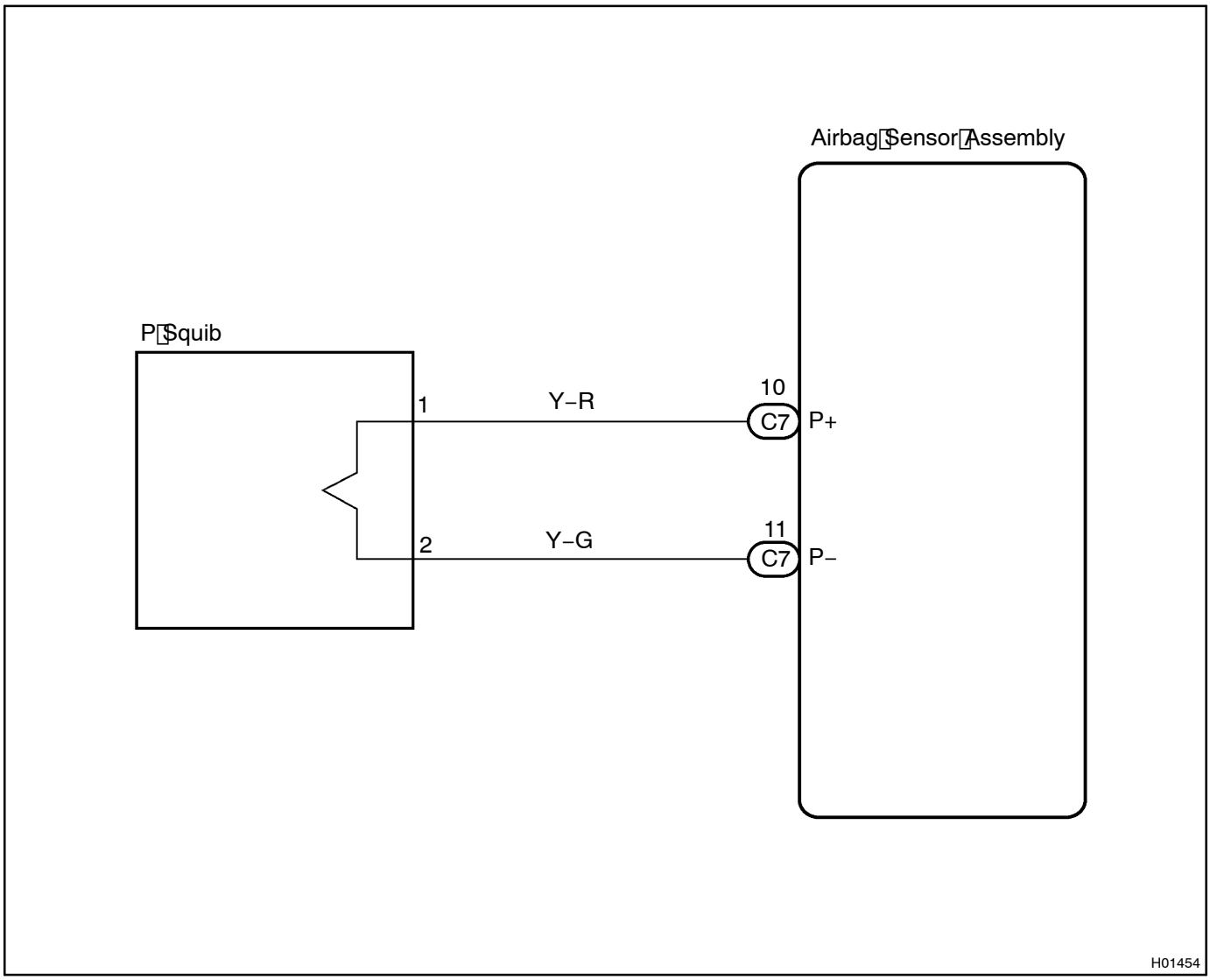
DTC	B0105/53	Short in P Squib Circuit

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 between P+ wire harness and P– wire harness of squib • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

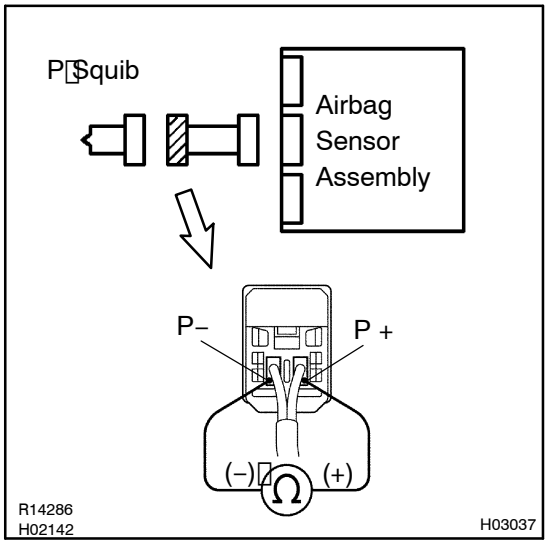
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P squib circuit.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and front passenger airbag assembly. (See page DI–386)

CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the resistance between P+and P–.

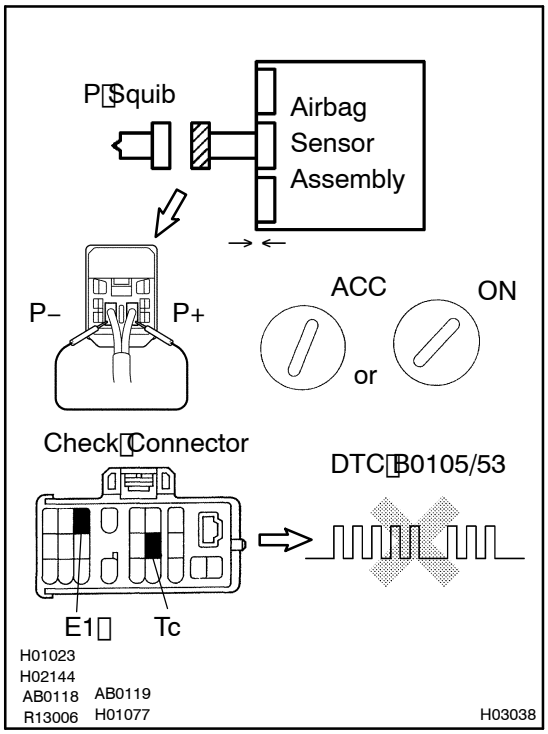
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between the 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 airbag sensor assembly and front passenger airbag 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–386)

(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–386)

OK:

DTC B0105/53 is not output.

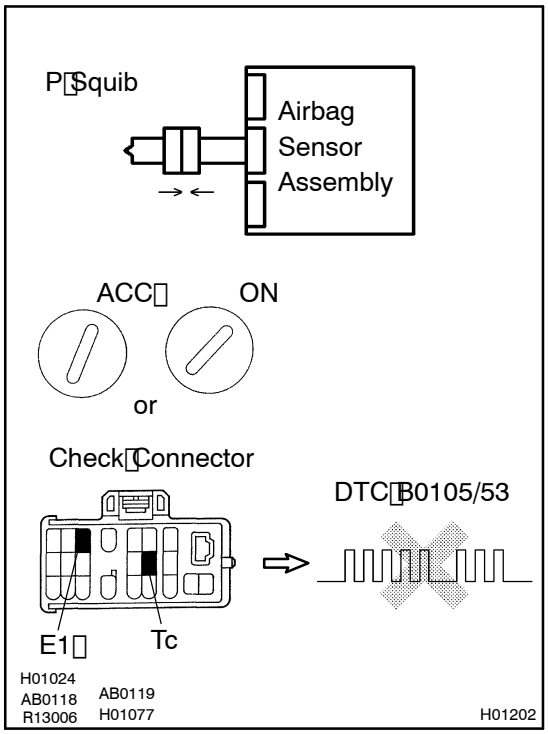
HINT:

Codes other than DTC 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–386)

(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–386)

OK:

DTC B0105/53 is not output.

HINT:

Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI23U–02

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. If 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 squib 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

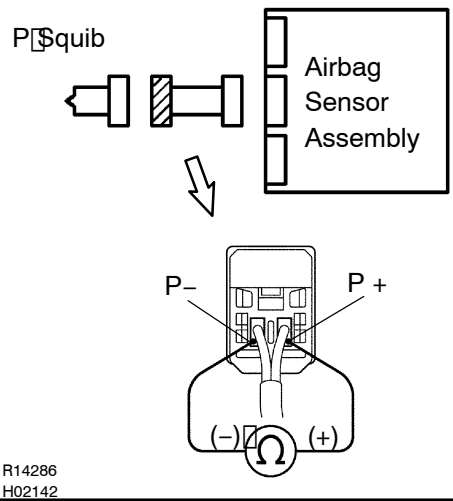
WIRING DIAGRAM

See page DI–420.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P squib circuit.

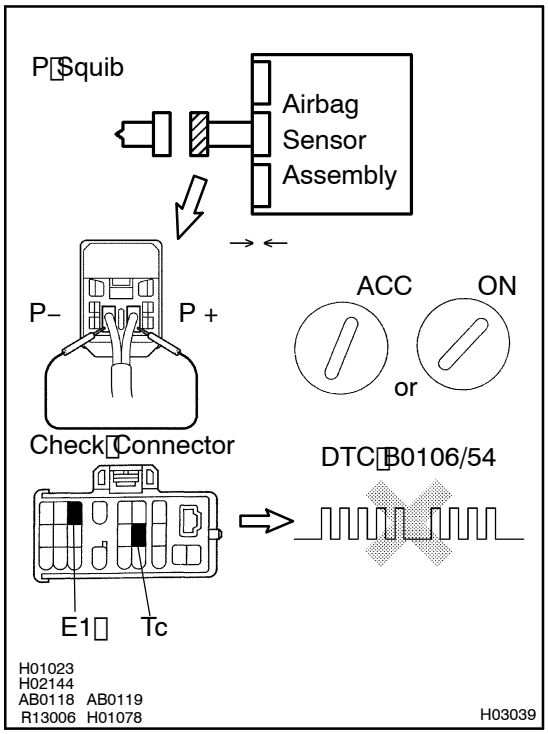


CHECK:
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the resistance between P+ and P–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0106/54 is not output.

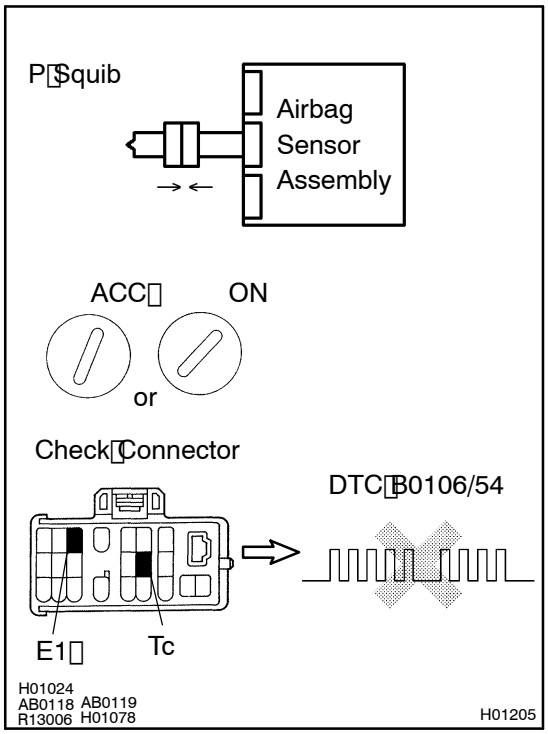
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0106/54 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI16G–06

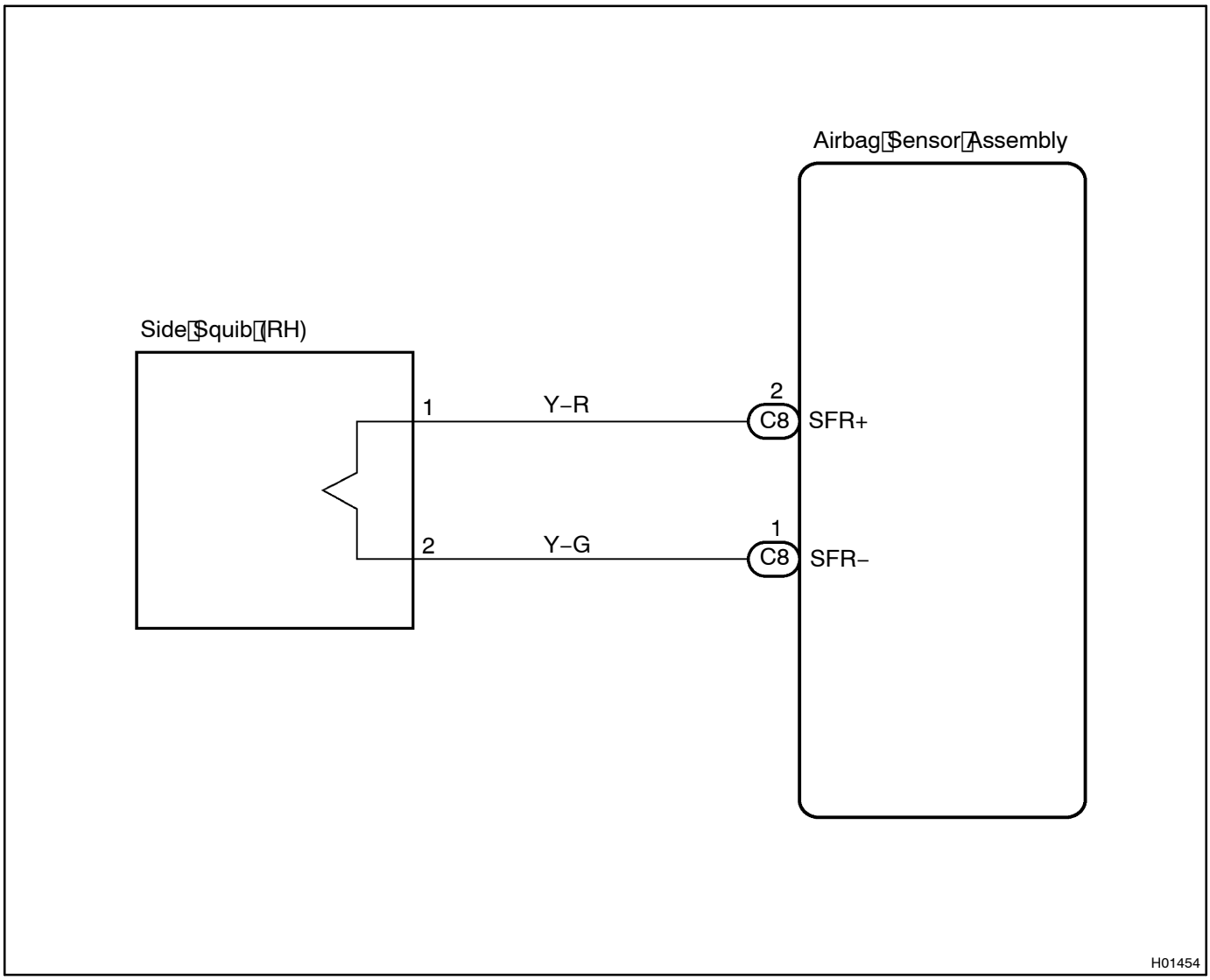
DTC	B0110/43	Short in Side Squib (RH) Circuit

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

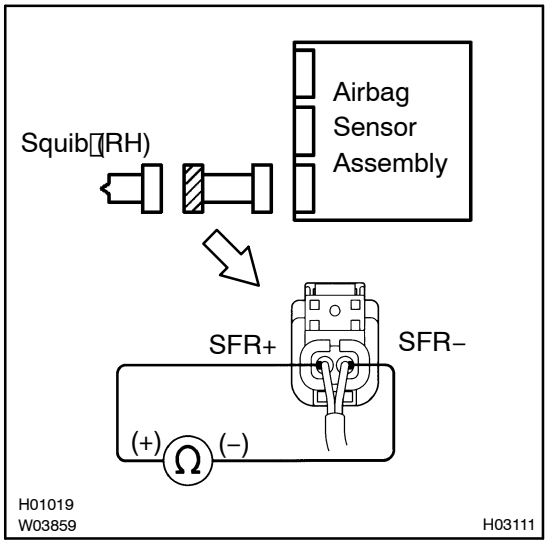
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (RH) circuit.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and side airbag assembly (RH). (See page DI–386)

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and airbag sensor assembly, measure the resistance between SFR+ and SFR–.

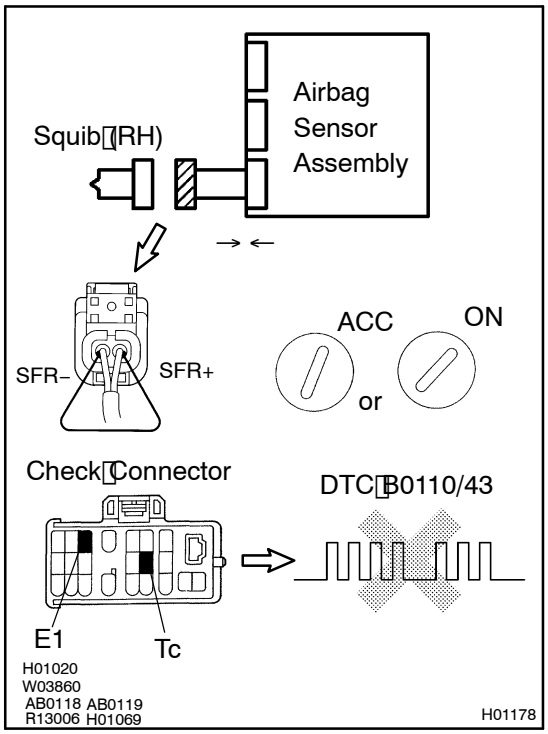
OK:

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.

(c) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the airbag sensor assembly and side airbag assembly (RH).

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–386)

(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–386)

OK:

DTC B0110/43 is not output.

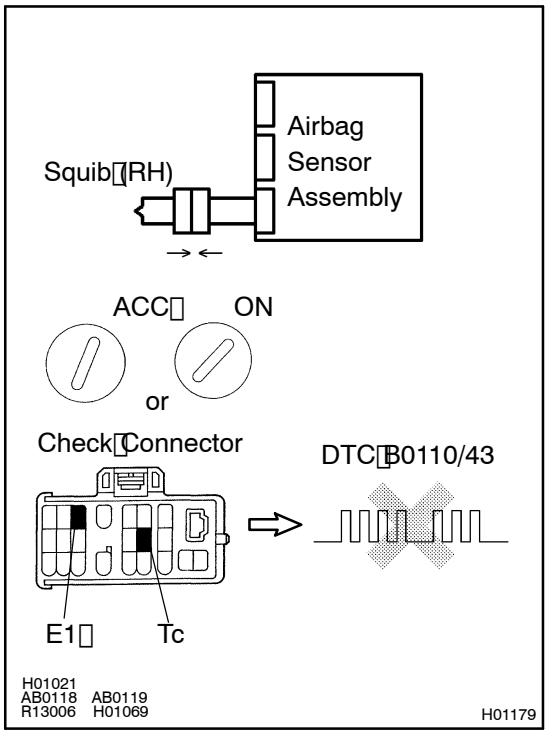
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0110/43 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI23V–02

DTC	B0111/44	Open in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib 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

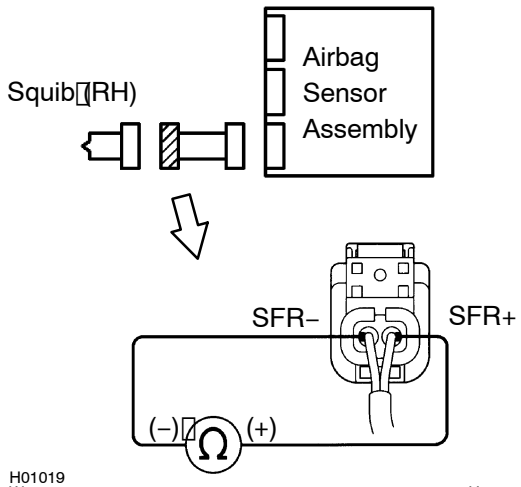
WIRING DIAGRAM

See page DI–427.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (RH) circuit.



CHECK:
For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and airbag sensor assembly, measure the resistance between SFR+ and SFR–.

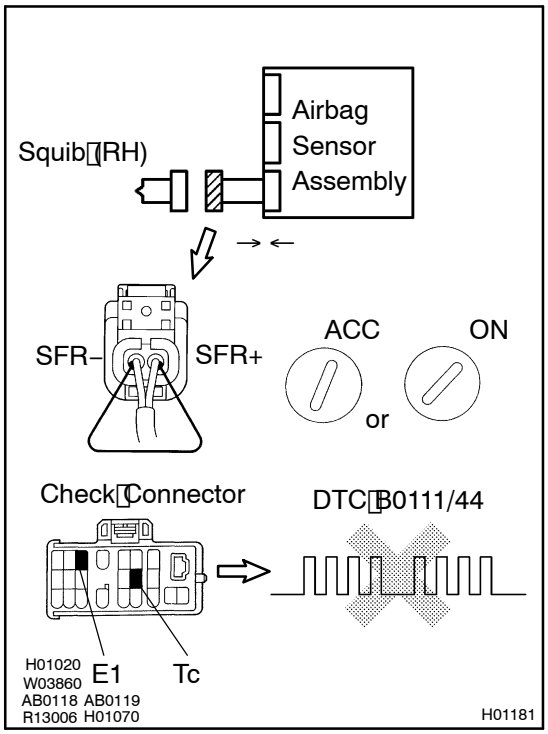
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0111/44 is not output.

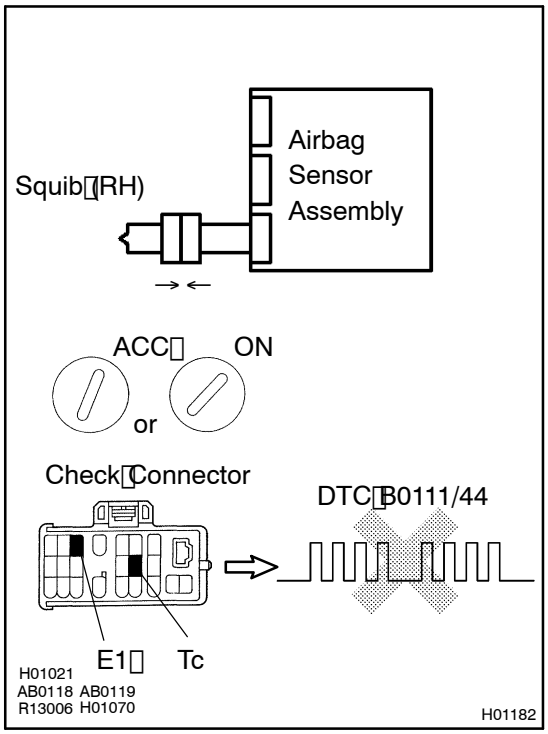
HINT:

Codes other than DTC 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–386)

(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–386)

OK:

DTC B0111/44 is not output.

HINT:

Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI23W–02

DTC	B0112/41	Short in Side Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib 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 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

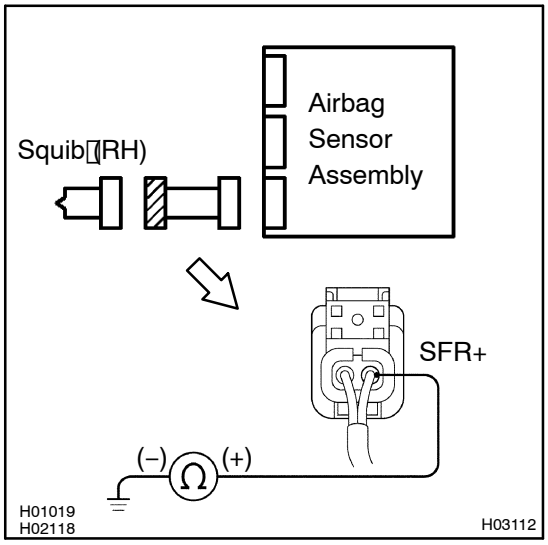
WIRING DIAGRAM

See page DI–427.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (RH) circuit.

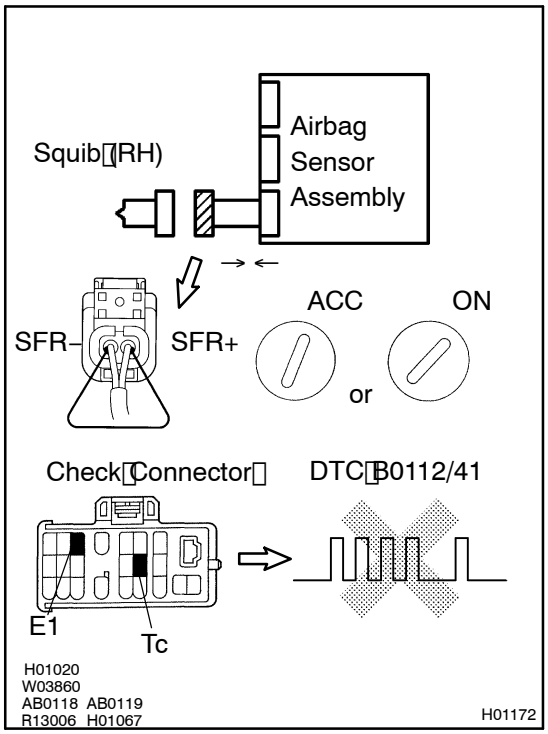


CHECK:
For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and airbag sensor assembly, measure the resistance between SFR+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0112/41 is not output.

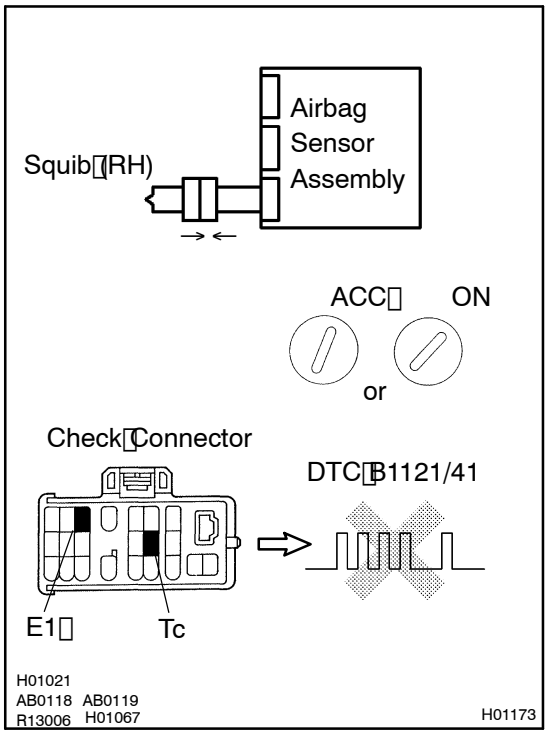
HINT:

Codes other than DTC 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 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–386)
(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–386)

OK:

DTC B0112/41 is not output.

HINT:
Codes other than DTC 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.

DI23X–02

DTC	B0113/42	Short in Side Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib 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 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

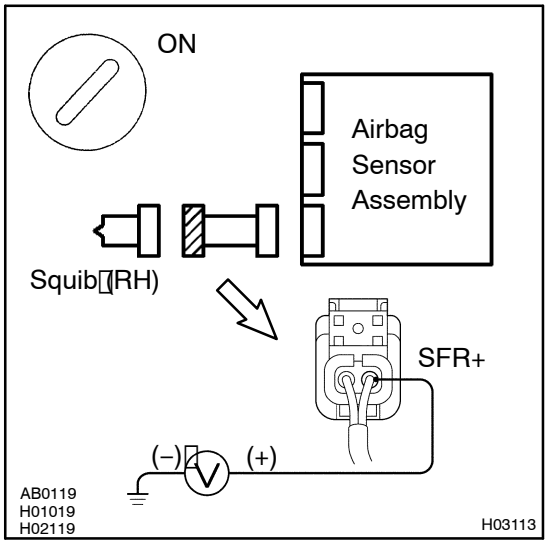
WIRING DIAGRAM

See page DI–427.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (RH) circuit.



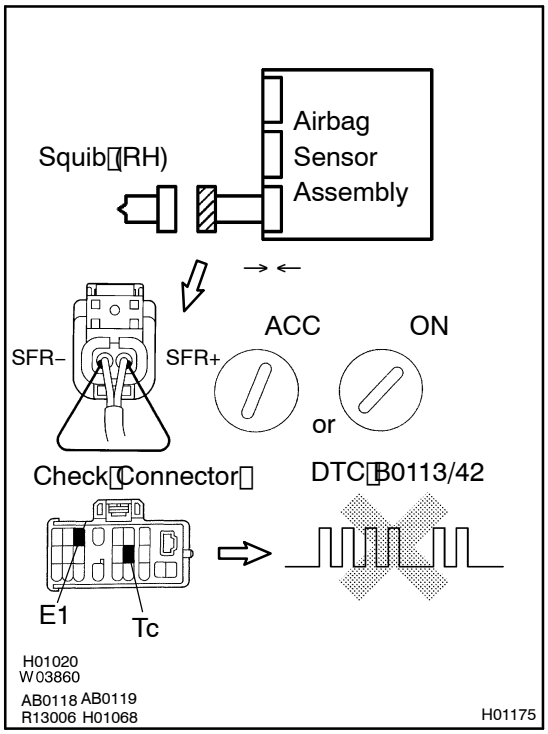
PREPARATION:
Turn ignition switch ON.
CHECK:
For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and airbag sensor assembly, measure the voltage between SFR+ and body ground.
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0113/42 is not output.

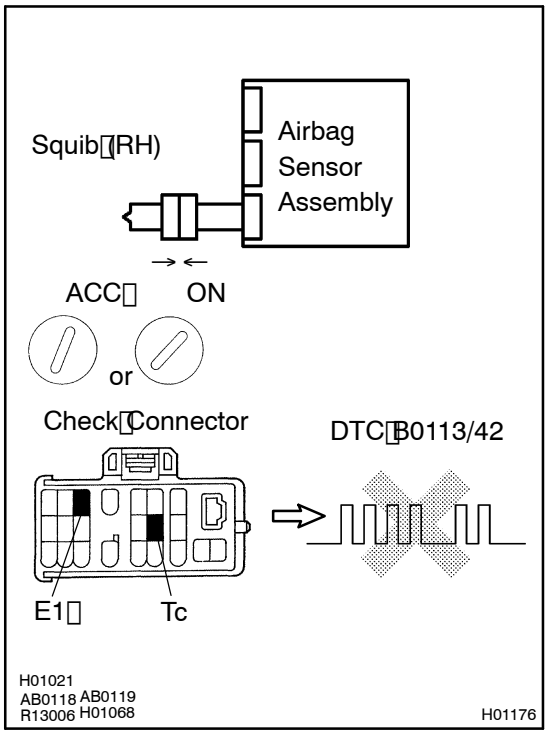
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0113/42 is not output.

HINT:
Codes other than DTC 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.

DI16K–06

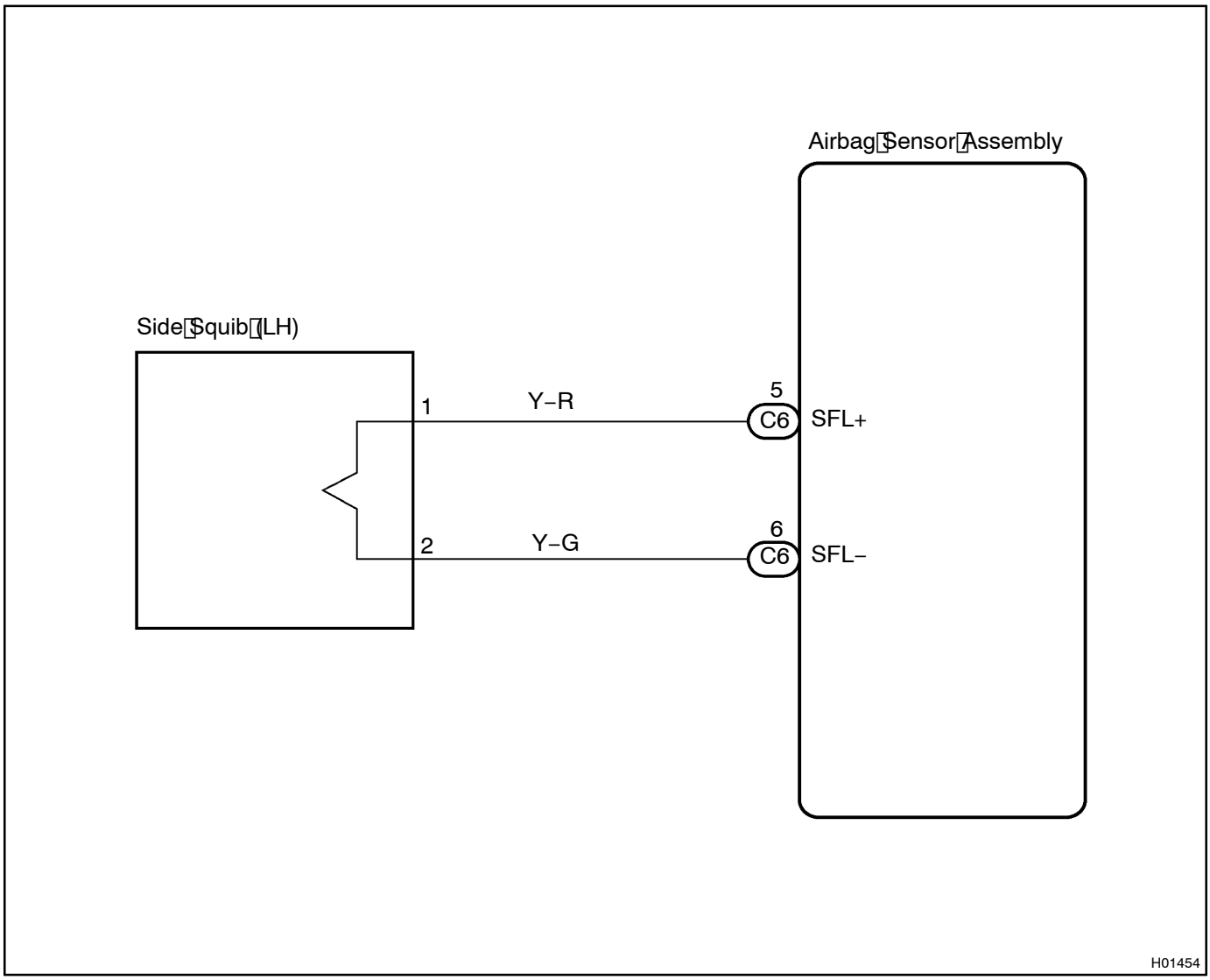
DTC	B0115/47	Short in Side Squib (LH) Circuit

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

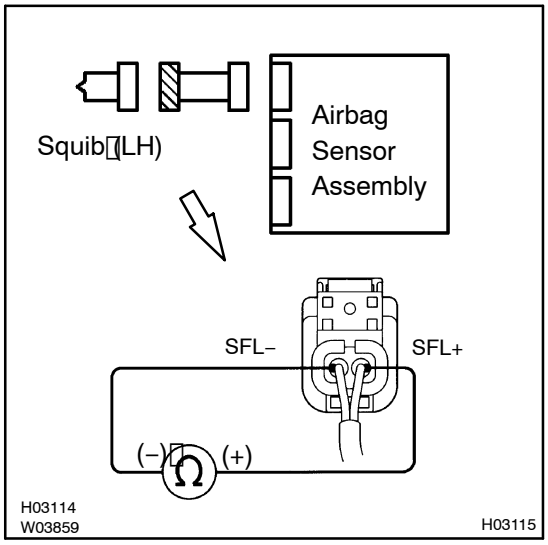
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (LH) circuit.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and side airbag assembly (LH). (See page DI–386)

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag assembly (LH) and airbag sensor assembly, measure the resistance between SFL+ and SFL–.

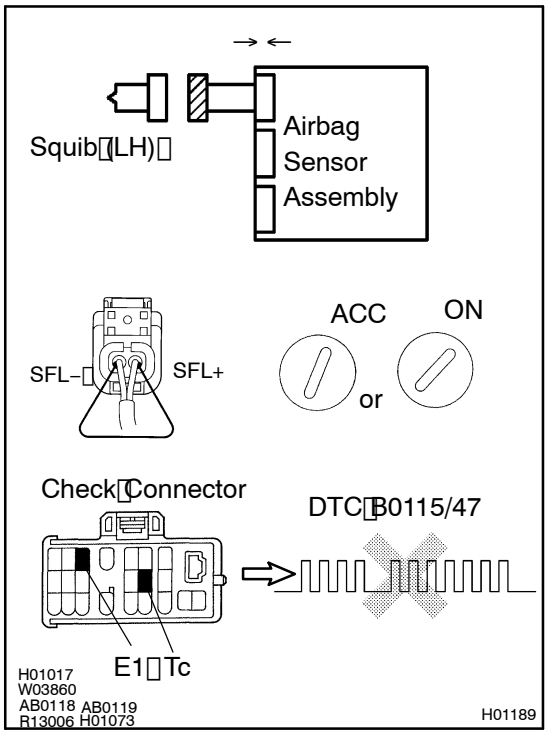
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between the 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 airbag sensor assembly and side airbag assembly (LH).

(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 code stored in memory.
(See page DI–386)

(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–386)

OK:

DTC B0115/47 is not output.

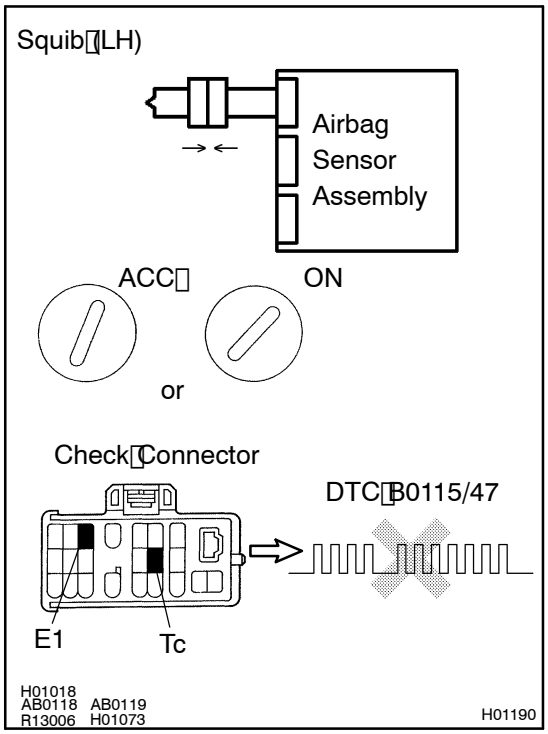
HINT:

Codes other than DTC 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 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–386)
(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–386)

OK:

DTC B0115/47 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI23Y–02

DTC	B0116/48	Open in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib 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

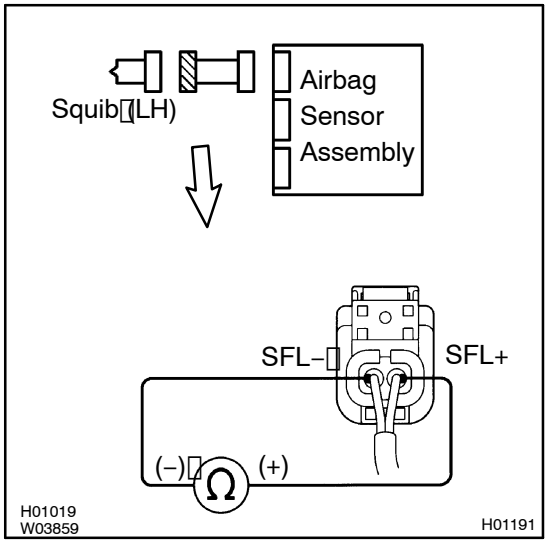
WIRING DIAGRAM

See page DI–440.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (LH) circuit.



CHECK:
For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and airbag sensor assembly, measure the resistance between SFL+ and SFL–.

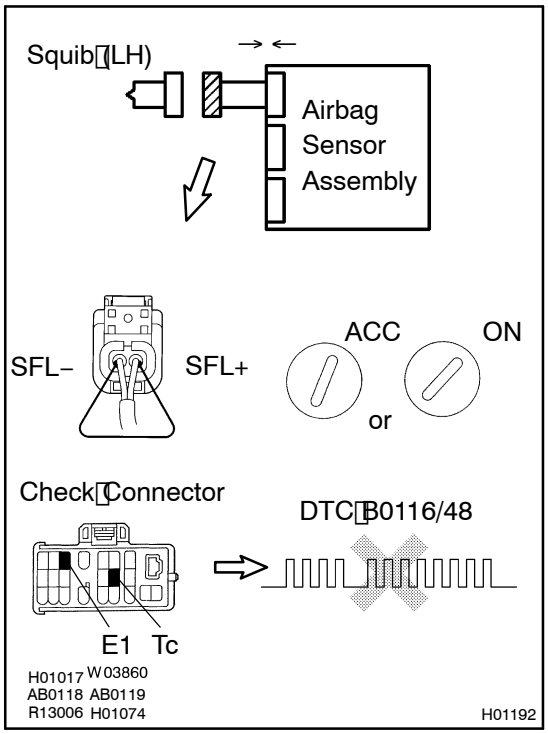
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the 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 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–386)

(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–386)

OK:

DTC B0116/48 is not output.

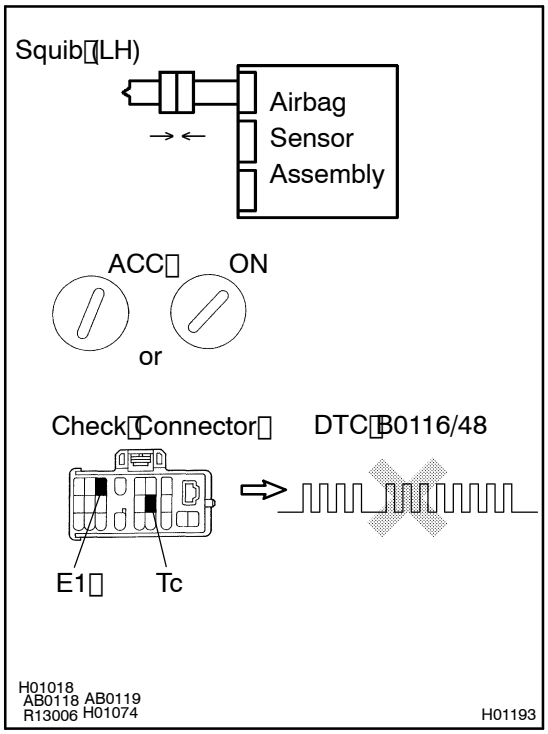
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0116/48 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI23Z–02

DTC	B0117/45	Short in Side Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib 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 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

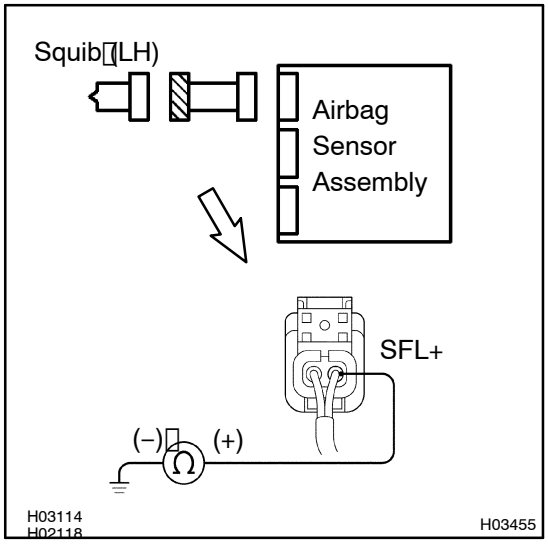
WIRING DIAGRAM

See page DI–440.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (LH) circuit.



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag assembly (LH) and airbag sensor assembly, measure the resistance between SFL+ and body ground.

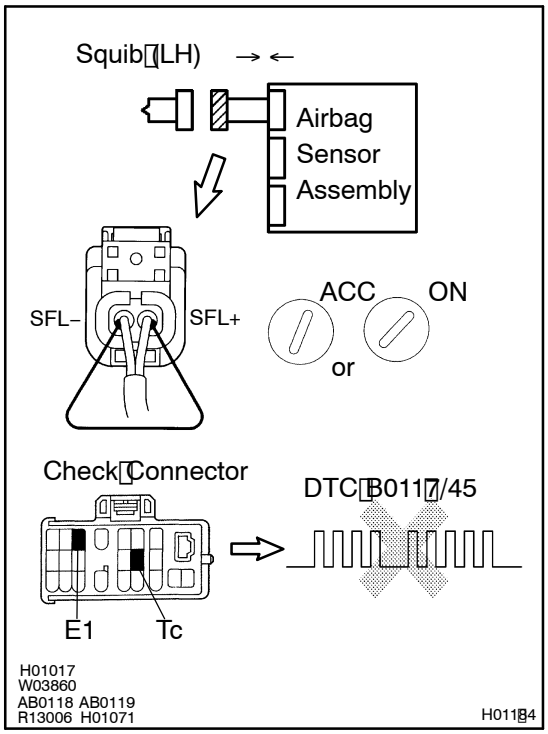
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0117/45 is not output.

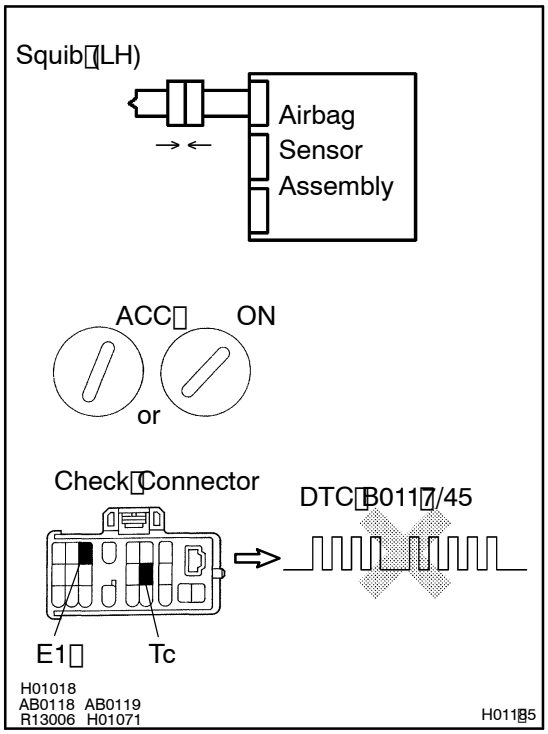
HINT:

Codes other than DTC 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–386)

(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–386)

OK:

DTC B0117/45 is not output.

HINT:

Codes other than DTC 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.

DI240-02

DTC	B0118/46	Short in Side Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib 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 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

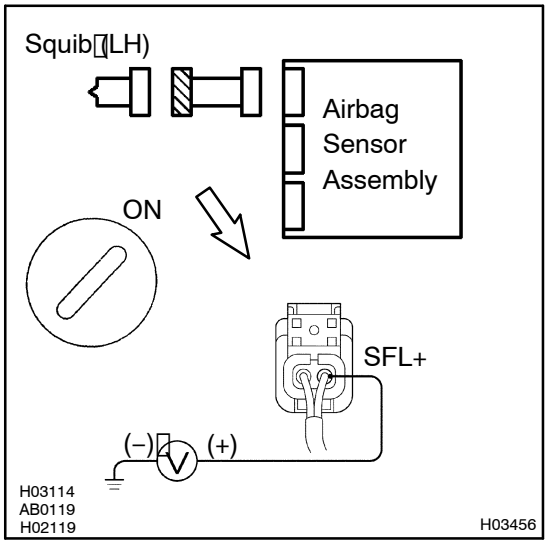
WIRING DIAGRAM

See page DI–440.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check side squib (LH) circuit.

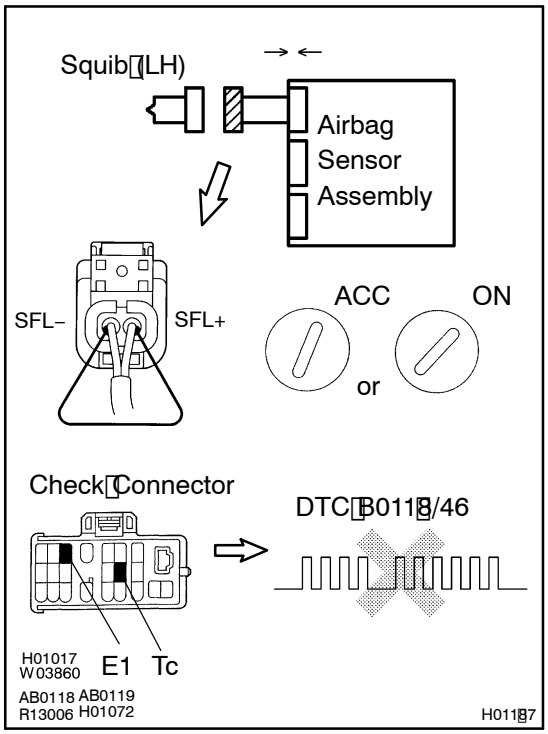


PREPARATION:
Turn ignition switch ON.
CHECK:
For the connector (on the airbag sensor assembly side) between the side airbag assembly (LH) and airbag sensor assembly, measure the voltage between SFL+ and body ground.
OK:
Voltage: Below 1 V

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0118/46 is not output.

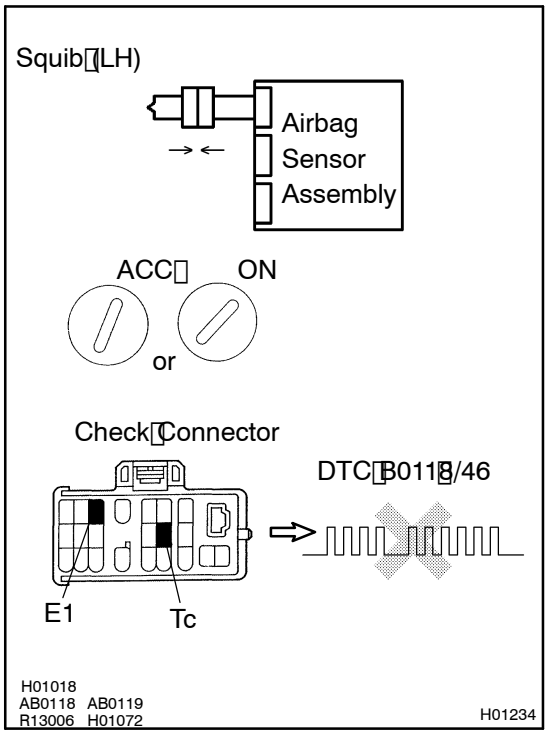
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0118/46 is not output.

HINT:
Codes other than DTC 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–09

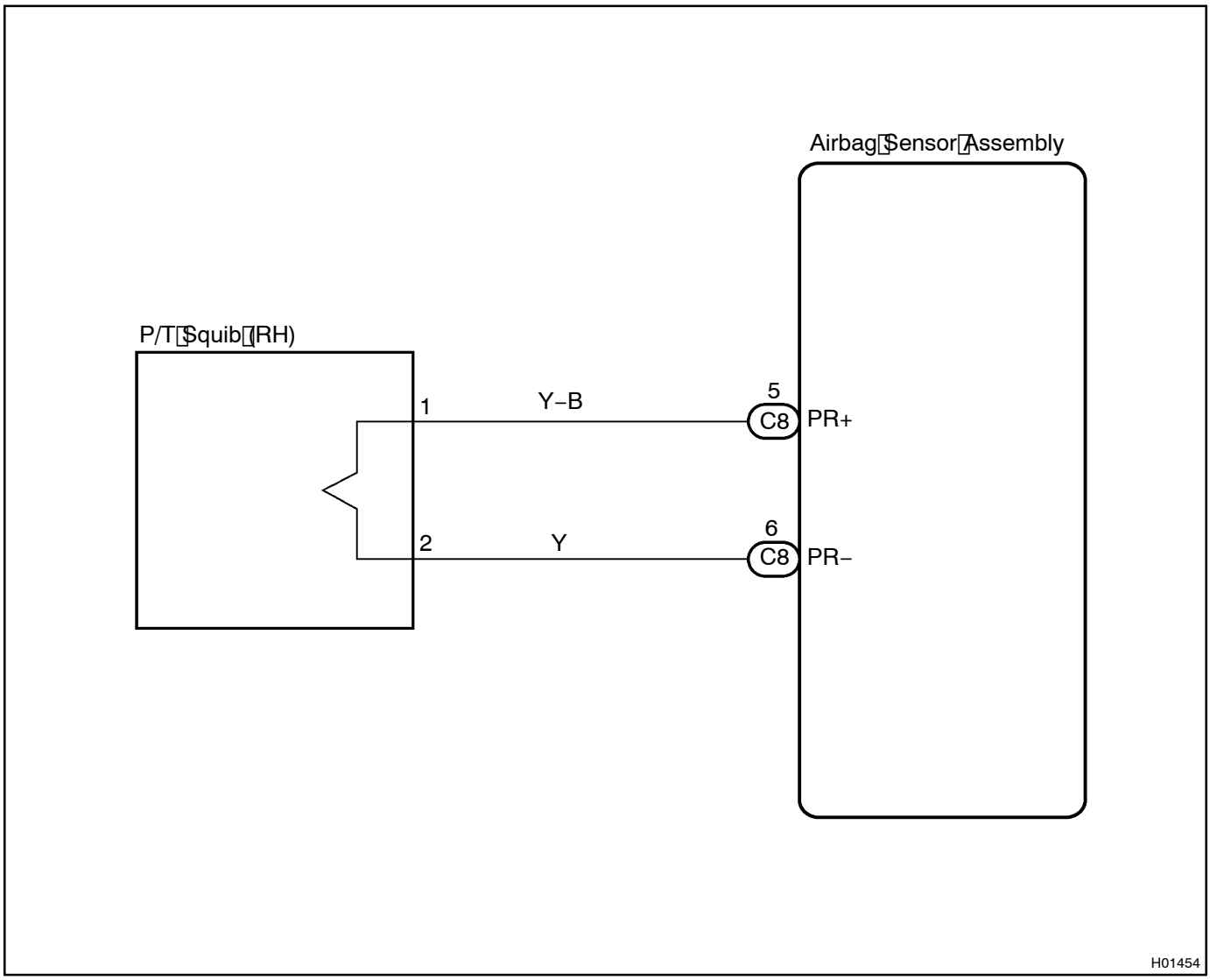
DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the pretensioner to activate when the pretensioner activation 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

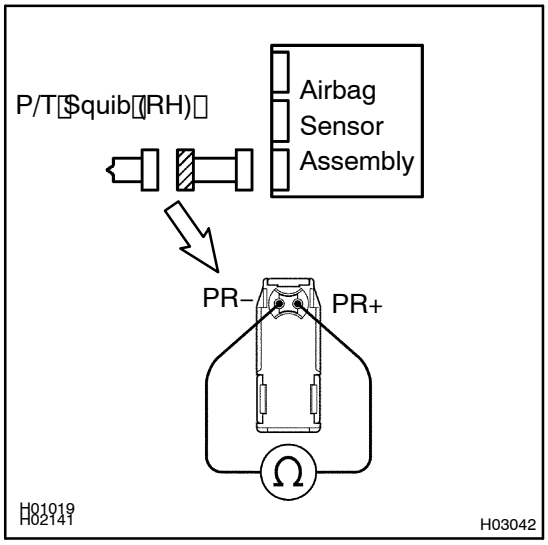
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P/T squib (RH) circuit.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and seat belt pretensioner (RH). (See page DI–386).

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly, measure the resistance between PR+ and PR–.

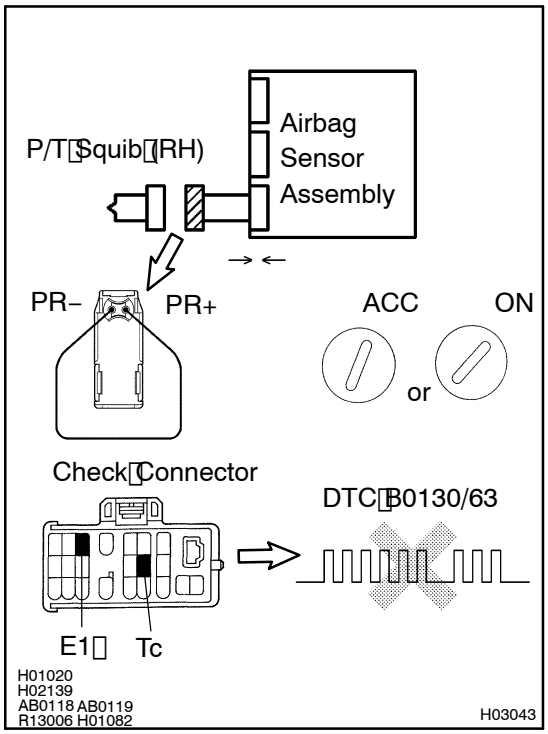
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between the 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 airbag sensor assembly and seat belt pretensioner (RH).

(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–386)

(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–386)

OK:

DTC B0130/63 is not output.

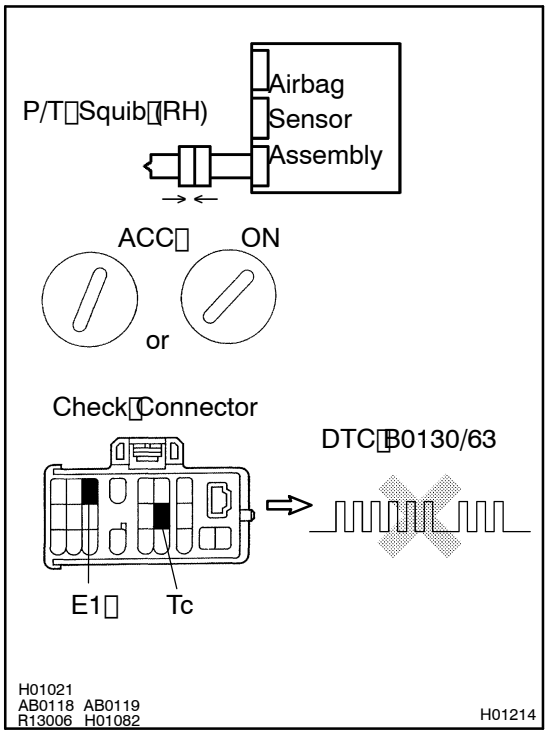
HINT:

Codes other than DTC 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 side airbag assembly (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least the 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and at least the 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least the 20 seconds.
(c) Clear DTC stored in memory.
(See page DI–386)
(d) Turn ignition switch to LOCK, and wait at least the 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least the 20 seconds.
(f) Check DTC.
(See page DI–386)

OK:

DTC B0130/63 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI241-02

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 pretensioner to activate when the pretensioner activation 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

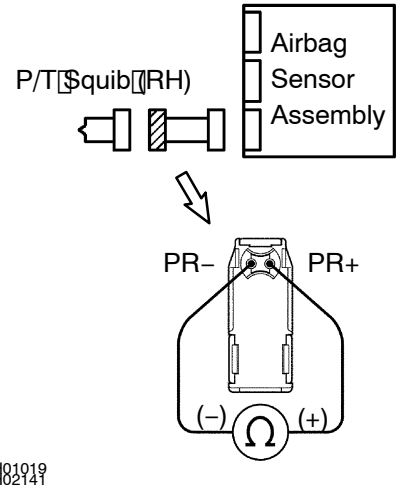
WIRING DIAGRAM

See page DI–453.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P/T squib (RH) circuit.

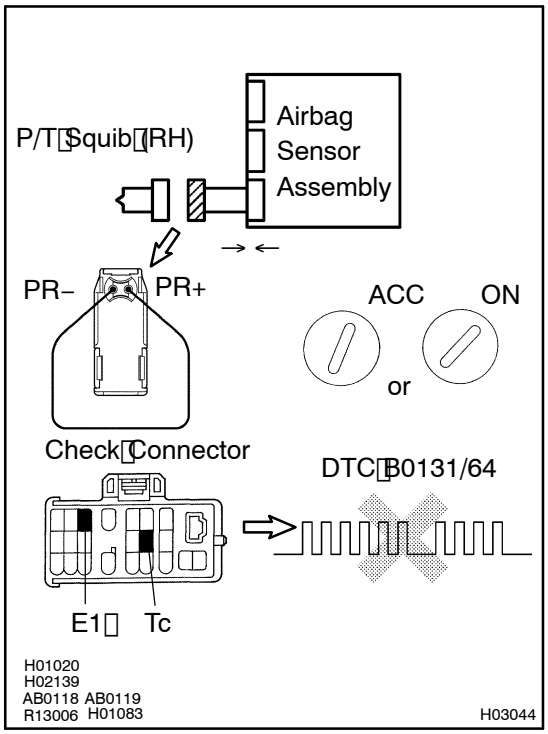


CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly, measure the resistance between PR+ and PR–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 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–386)

(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–386)

OK:

DTC B0131/64 is not output.

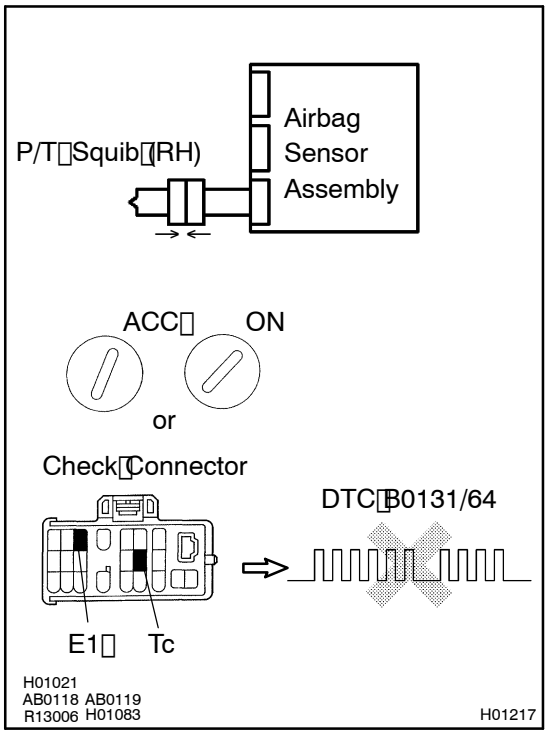
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0131/64 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI242–02

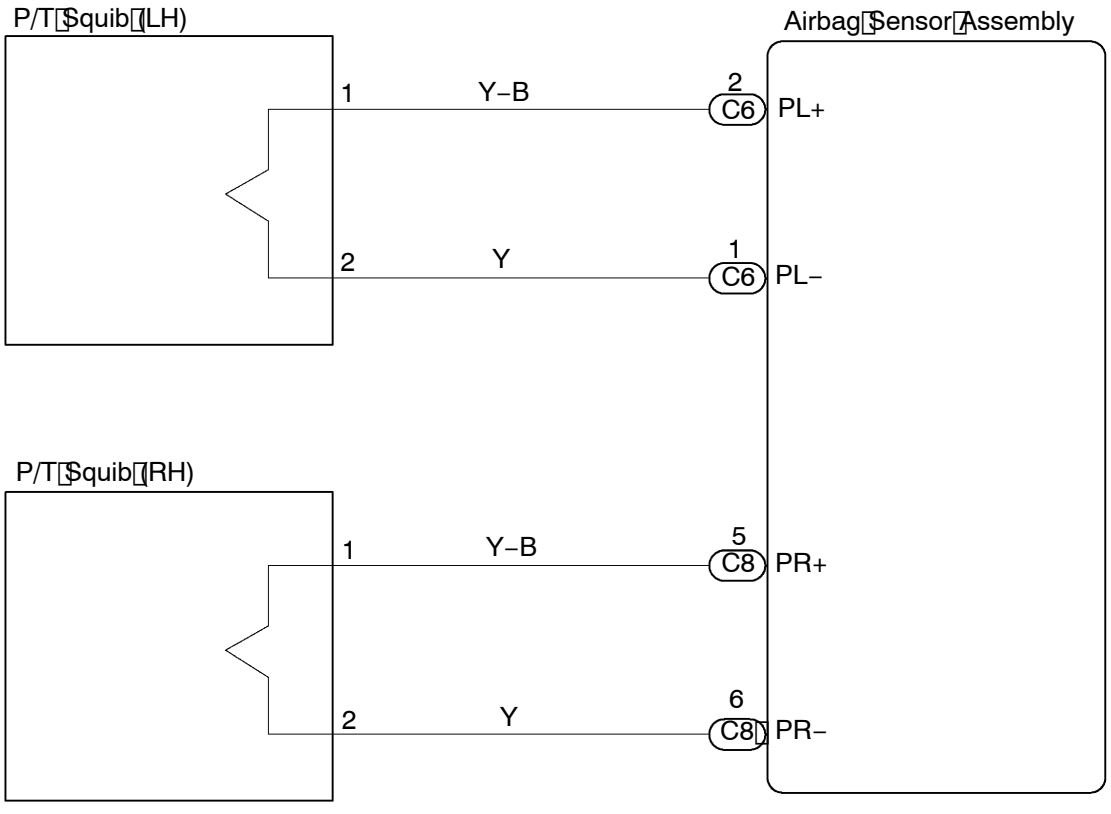
DTC	B0133/62	Short in LH and RH P/T Squib Circuits (to B+)

CIRCUIT DESCRIPTION

The LH and RH P/T squib circuits consist of the airbag sensor assembly and LH and RH seat belt pretensioners.
It causes the pretensioner to activate when the pretensioner activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0133/62 is recorded when B+ is detected in the LH and RH P/T squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	• Short circuit in seat belt pretensioner (LH) wire harness (to B+) • Short circuit in seat belt pretensioner (RH) wire harness (to B+) • P/T squib (LH) malfunction • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

WIRING DIAGRAM

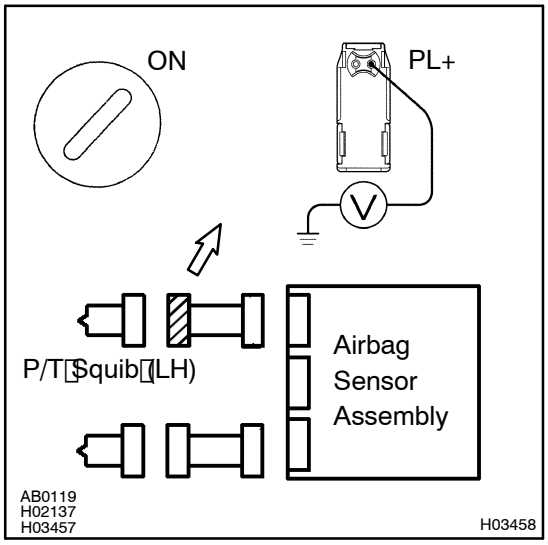


H03606

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P/T squib (LH) circuit.



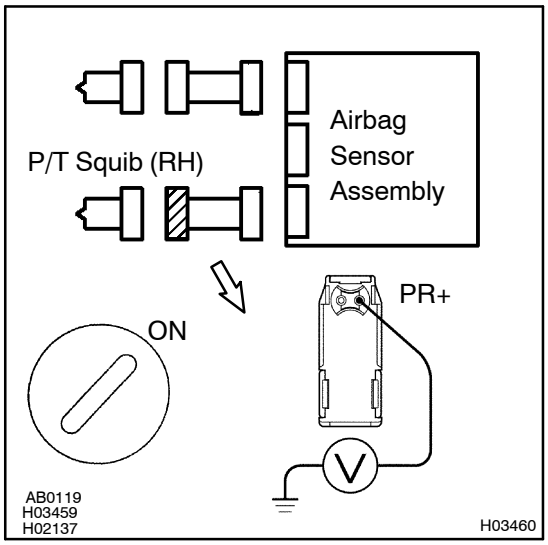
PREPARATION:
Turn ignition switch ON.
CHECK:
For the connector (on the airbag sensor assembly side) between the seat belt pretensioner (LH) and airbag sensor assembly, measure the voltage between PL+ and body ground.
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check P/T squib (RH) circuit.



PREPARATION:

Turn ignition switch ON.

CHECK:

For the connector (on the airbag sensor assembly side) between the seat belt pretensioner (RH) and airbag sensor assembly, measure the voltage between PR+ and body ground.

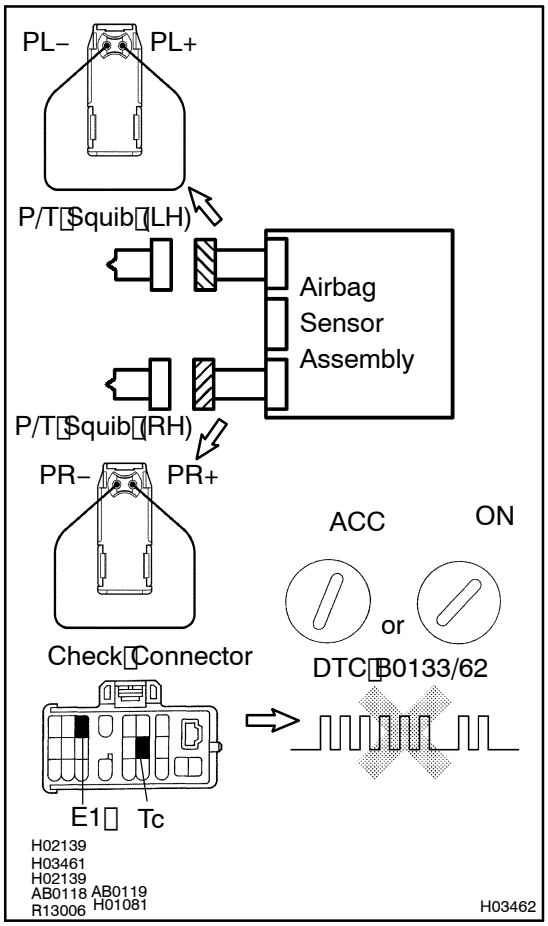
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

4	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 pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly.

(c) Using a service wire, connect PR+ and PR– of the connector (on the pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly.

(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–386)

(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–386)

OK:

DTC B0133/62 is not output.

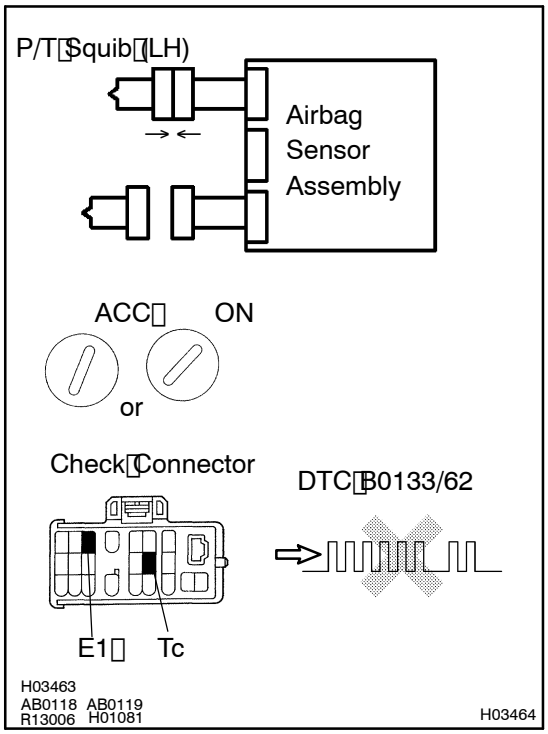
HINT:

Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	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–386)
(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–386)

OK:

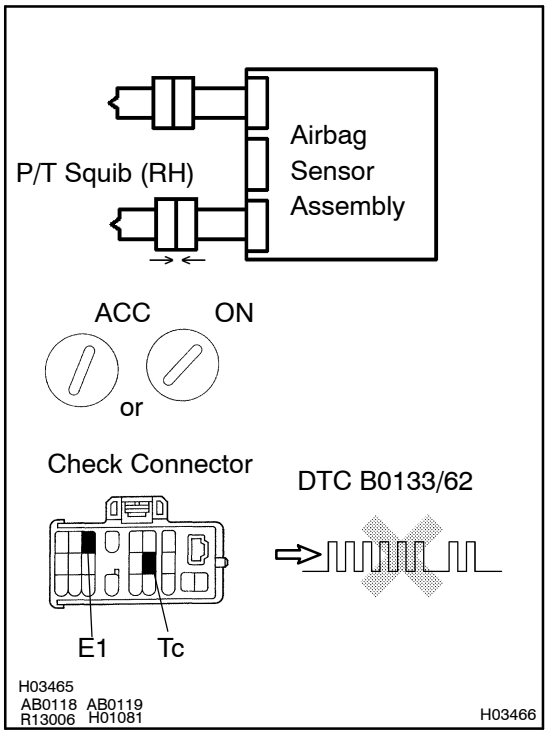
DTC B0133/62 is not output.

HINT:
Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG → **There is possibility that D, P and side airbags except for pretensioner are damaged, so check DTC B0103/12, B0113/42 and B0118/46.**

OK

6	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–386)
(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–386)

OK:

DTC B0133/62 is not output.

HINT:
Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG → **There is possibility that D, P and side airbags except for pretensioner are damaged, so check DTC B0103/12, B0113/42 and B0118/46.**

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–09

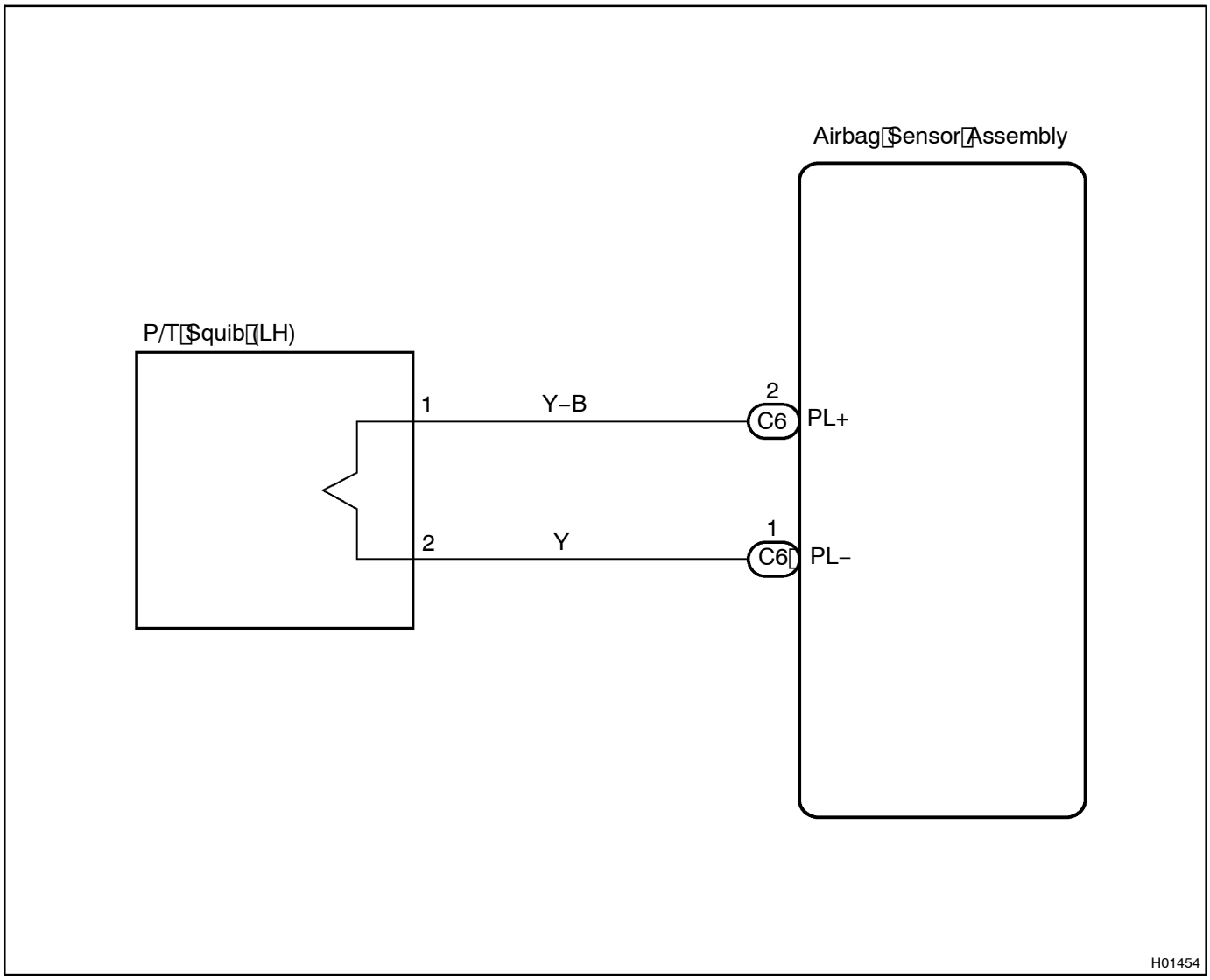
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the pretensioner to activate when the pretensioner activation 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

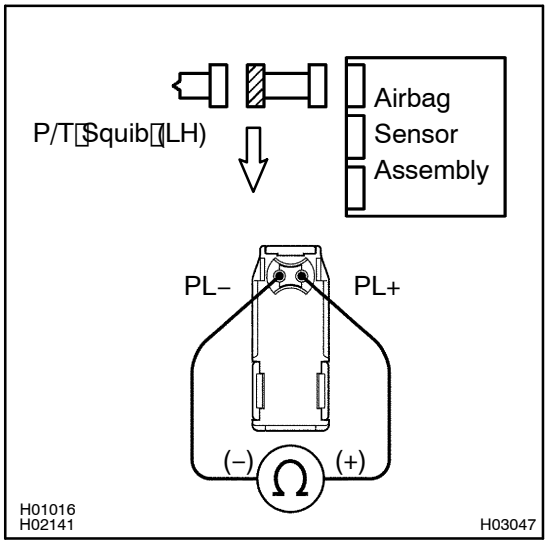
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P/T squib (LH) circuit.



PREPARATION:

Release airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and seat belt pretensioner (LH). (See page DI–386)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly, measure the resistance between PL+ and PL–.

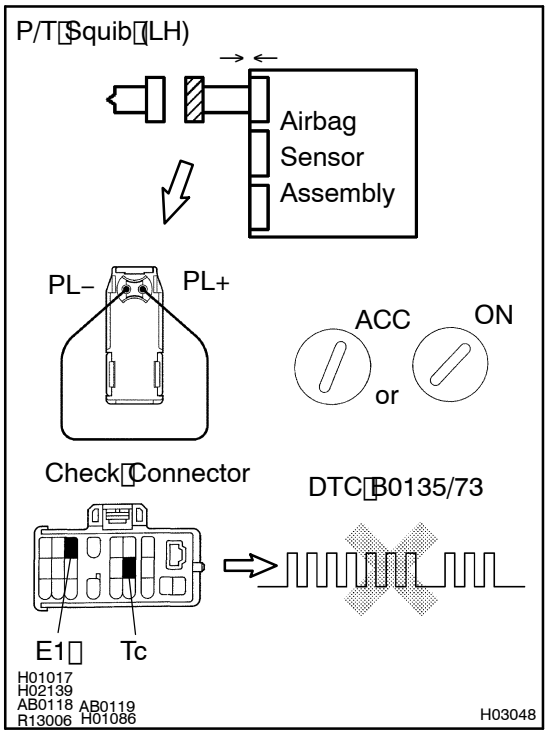
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the 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 airbag sensor assembly and seat belt pretensioner (LH).

(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–386)

(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–386)

OK:

DTC B0135/73 is not output.

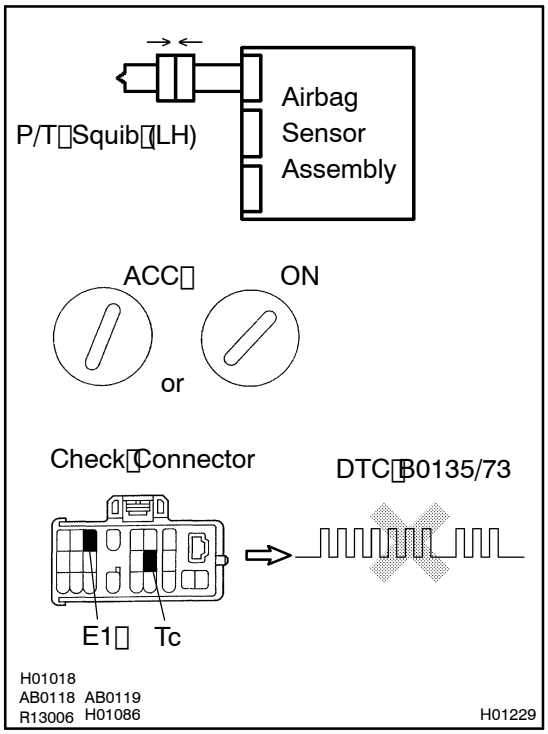
HINT:

Codes other than DTC 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 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 LOCK, and 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–386)
(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–386)

OK:

DTC B0135/73 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI243–02

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 pretensioner to activate when the pretensioner activation 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

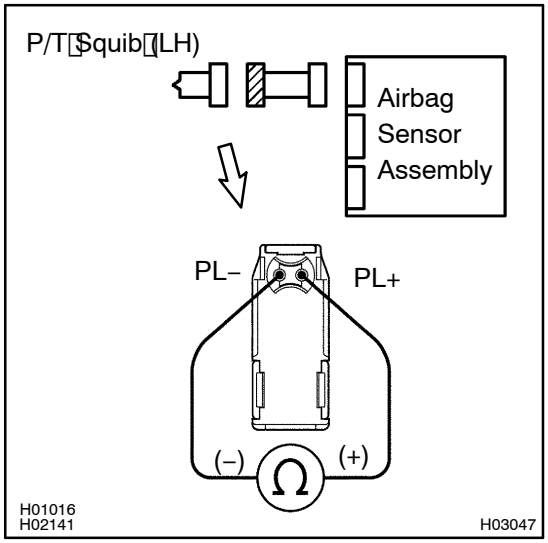
WIRING DIAGRAM

See page DI–466.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P/T squib (LH) circuit.

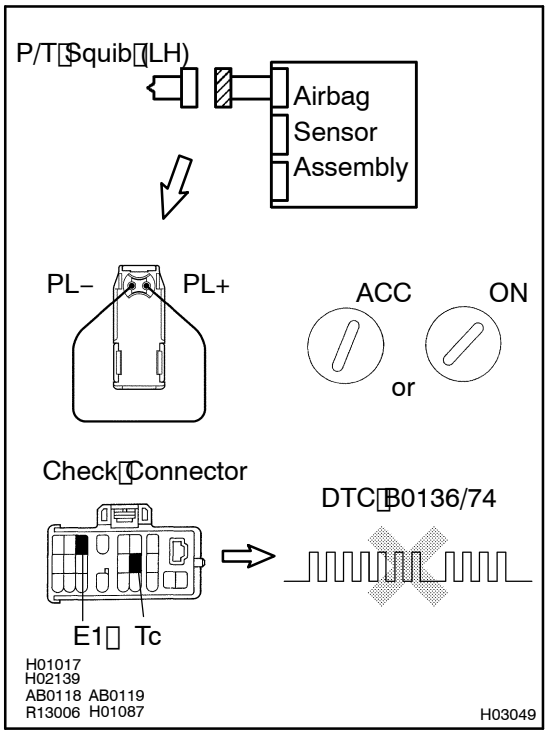


CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly, measure the resistance between PL+ and PL–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to 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 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–386)

(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–386)

OK:

DTC B0136/74 is not output.

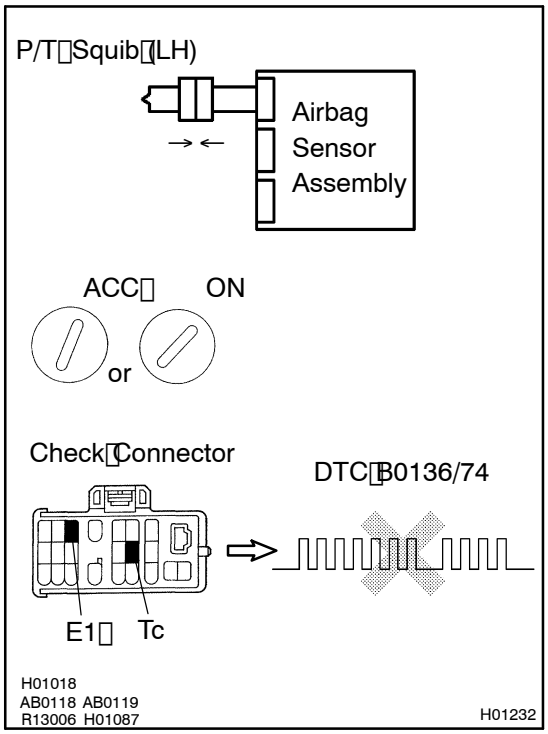
HINT:

Codes other than DTC 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–386)
(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–386)

OK:

DTC B0136/74 is not output.

HINT:
Codes other than DTC 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B0137/61	Short in LH and RH P/T Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The LH and RH P/T squib circuits consist of the airbag sensor assembly and LH and RH seat belt pretensioners.
It causes the pretensioner to activate when the pretensioner activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0137/61 is recorded when ground short is detected in the LH and RH P/T squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0137/61	• Short circuit in P/T squib (LH) wire harness (to ground) • Short circuit in P/T squib (RH) wire harness (to ground) • P/T squib (RH) malfunction • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

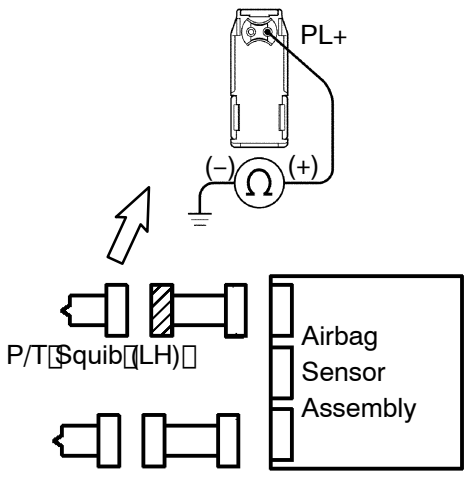
WIRING DIAGRAM

See page DI–460.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check P/T squib (LH) circuit.

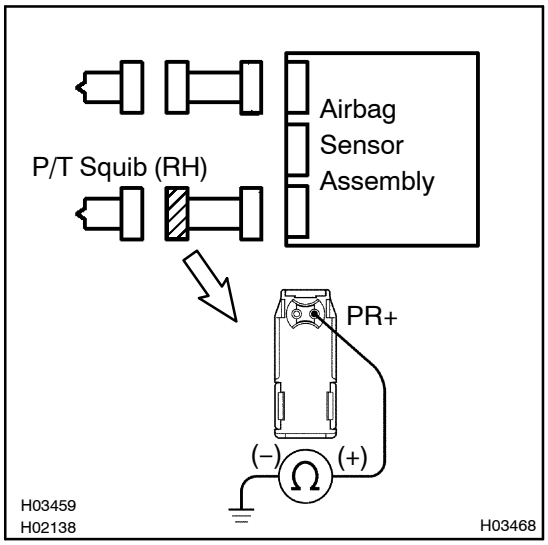


CHECK:
For the connector (on the airbag sensor assembly side) between the seat belt pretensioner and airbag sensor assembly, measure the resistance between PL+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the airbag sensor assembly side) between the seat belt pretensioner and airbag sensor assembly, measure the resistance between PR+ and body ground.

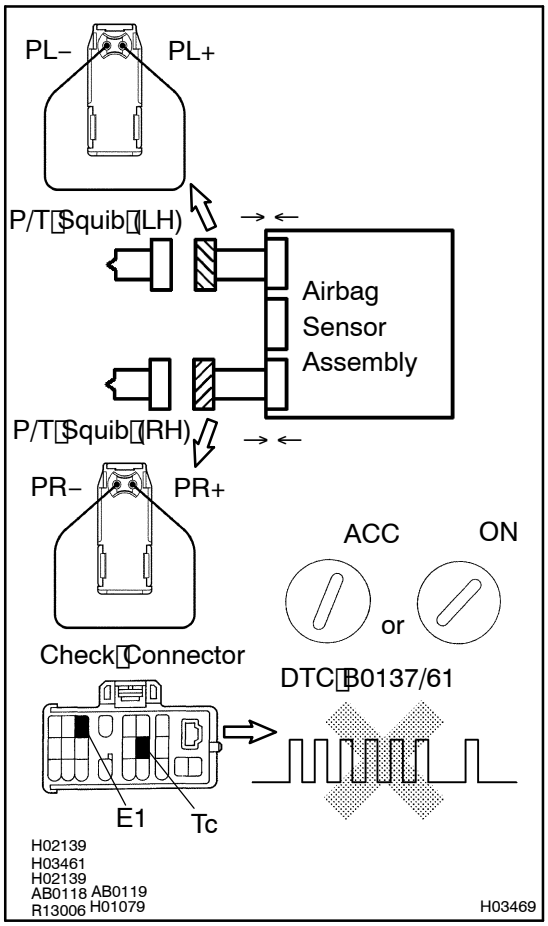
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

4	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connectors 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 airbag sensor assembly.

(c) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly.

(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–386)

(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–386)

OK:

DTC B0137/61 is not output.

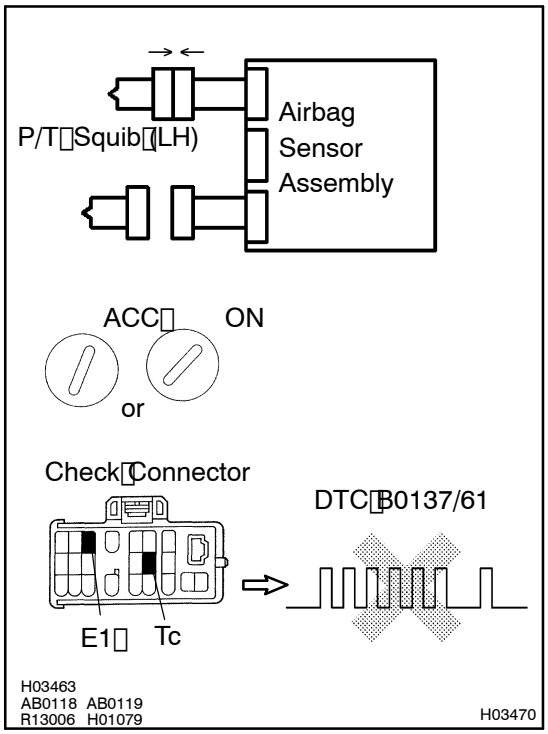
HINT:

Codes other than DTC B0137/61 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	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–386)
(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–386)

OK:

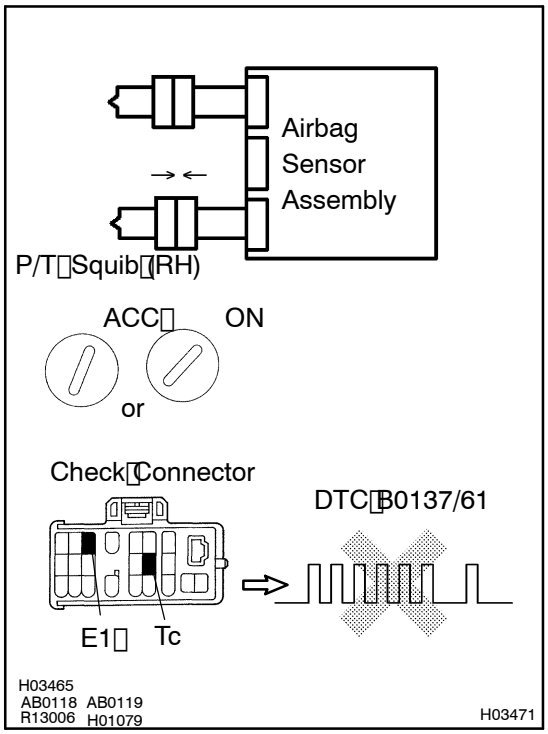
DTC B0137/61 is not output.

HINT:
Codes other than DTC B0137/61 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

OK

6	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 (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–386)
(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–386)

OK:

DTC B0137/61 is not output.

HINT:
Codes other than DTC B0137/61 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.

DI16B–05

DTC	B1100/31	Airbag Sensor Assembly Malfunction

CIRCUIT DESCRIPTION

The airbag sensor assembly consists of a 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 deployed, and detects diagnosis system malfunction.
DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

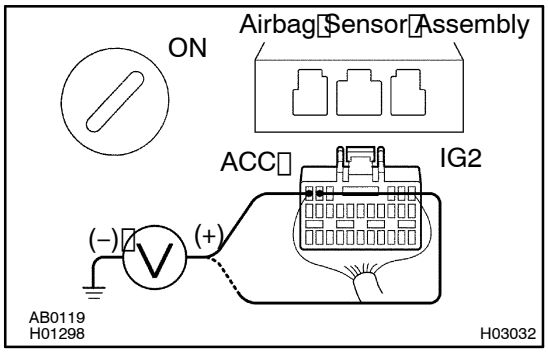
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

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–503)

2	Check voltage at IG2 and ACC of airbag sensor assembly.

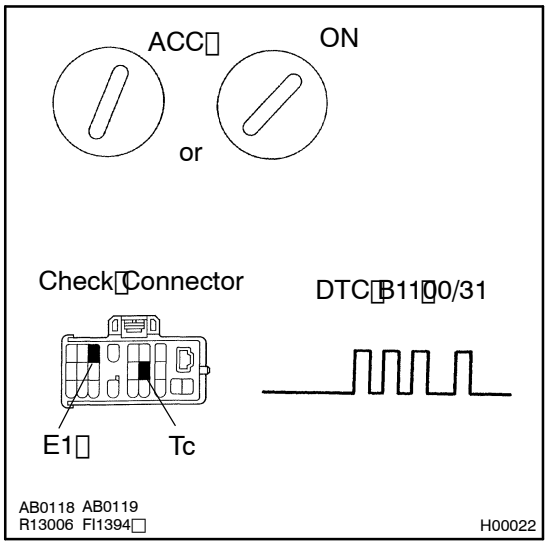


PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals IG2 and ACC of airbag sensor assembly and body ground.
OK:
Voltage: Below 16 V

NG → **Check that an abnormality occurs in the battery and charging system.**

OK

3	Is DTC B1100/31 output again?



PREPARATION:

Clear DTC.

(See step 5 on page DI–386)

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–386)

NO → **Using simulation method, reproduce malfunction symptoms. (See page IN–19)**

YES

Replace airbag sensor assembly.

DI16C–06

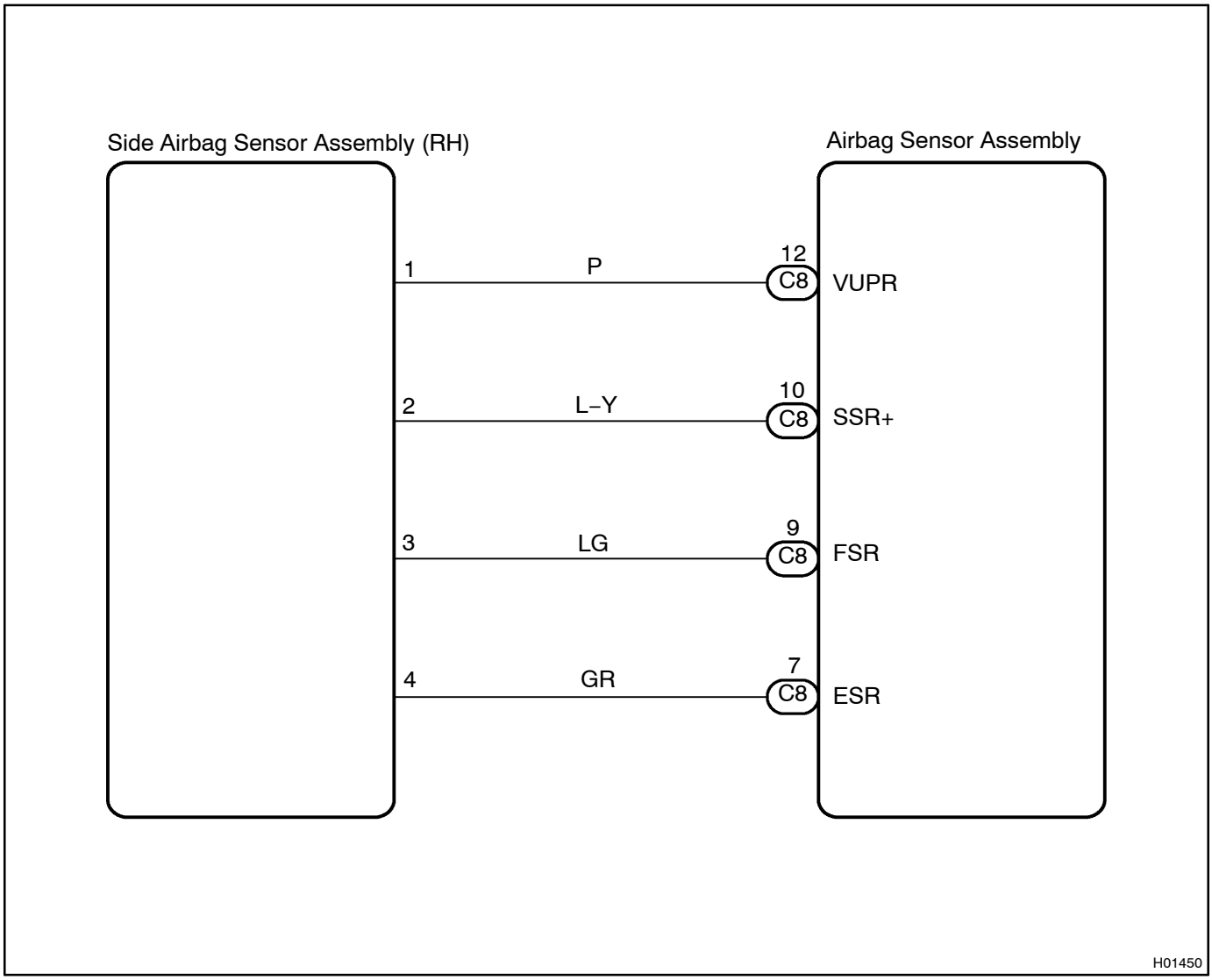
DTC	B1140/32	Side Airbag Sensor Assembly (RH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assembly (RH) consists of the airbag 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 malfunction in the side airbag sensor assembly (RH) is detected.

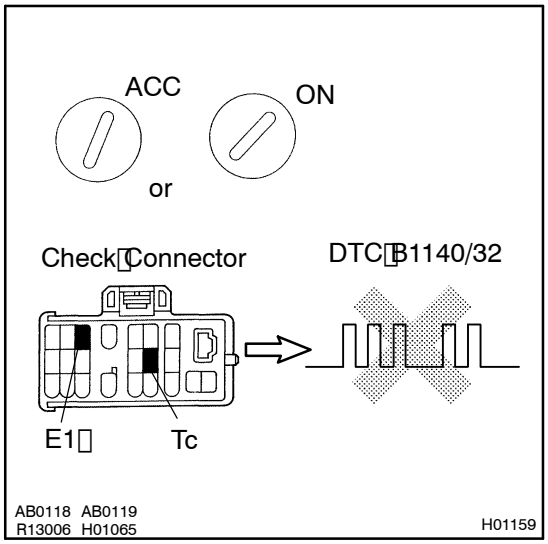
DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly (RH) • Wire harness

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 page DI–386)

(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–386)

OK:

DTC B1140/32 is not output.

HINT:

Codes other than DTC B1140/32 may be output at this time, but they are not relevant to this check.

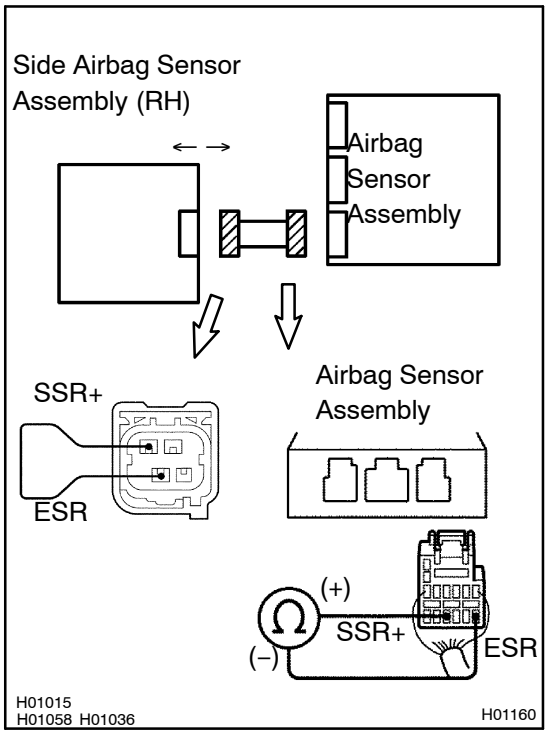
OK	Go to step 3.

NG

2	Is connector of side airbag sensor assembly (RH) properly connected?

3	Prepare for inspection. (See step 1 on DI–503).

4	**Check wire harness.**



PREPARATION:

(a) Disconnect side airbag sensor assembly (RH).

(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 airbag sensor assembly, measure the resistance between SSR+ and ESR.

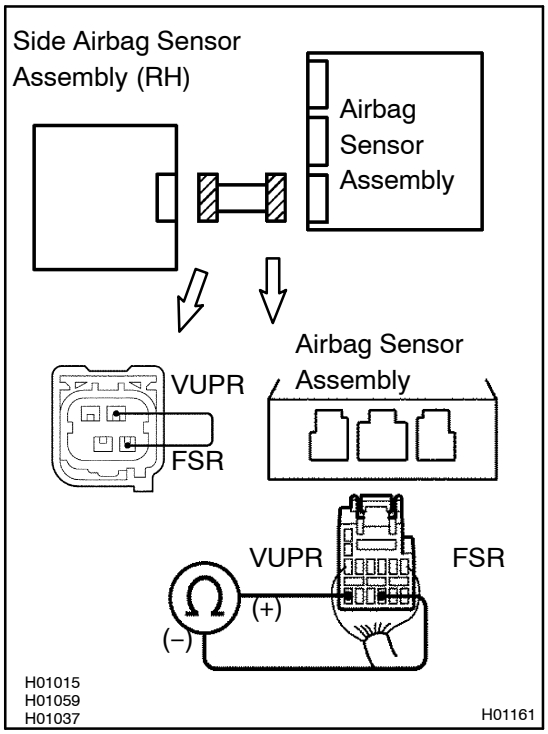
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 airbag sensor assembly, measure the resistance between VUPR and FSR.

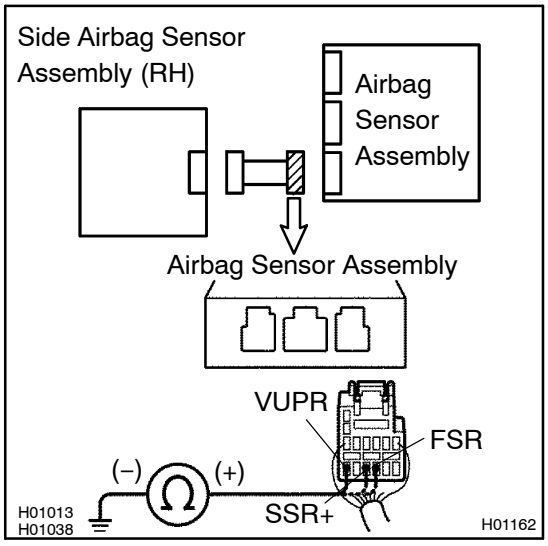
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 airbag sensor assembly, measure the resistance between the body ground and each of SSR+, VUPR and FSR.

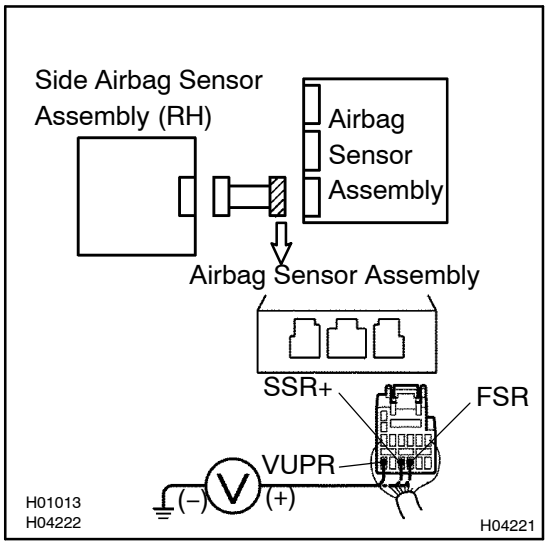
OK:

Resistance: 10 kΩ or Higher

NG → **Repair or replace harness or connector between the side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

7	Check wire harness (to B+).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly, measure the voltage between the body ground and each of SSR+, VUPR and FSR.

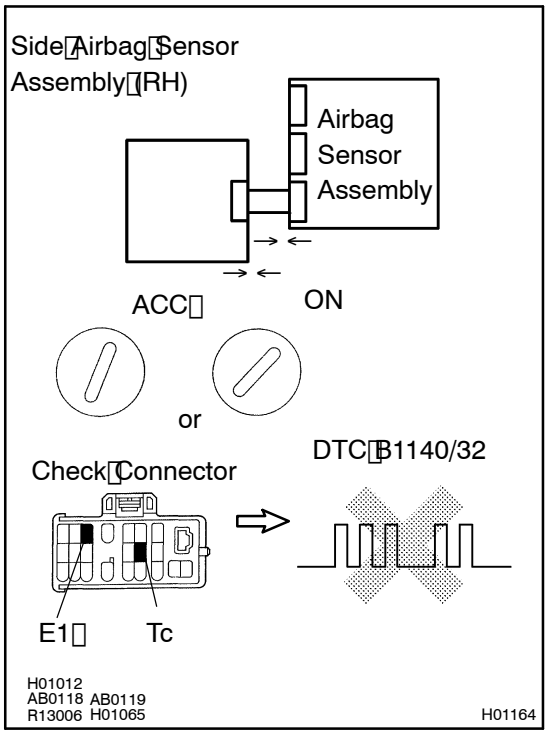
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

8	Is DTC B1140/32 output again?



PREPARATION:

(a) Connect 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–386)
(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–386)

OK:

DTC B1140/32 is not output.

HINT:

Codes other than DTC B1140/32 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI245–02

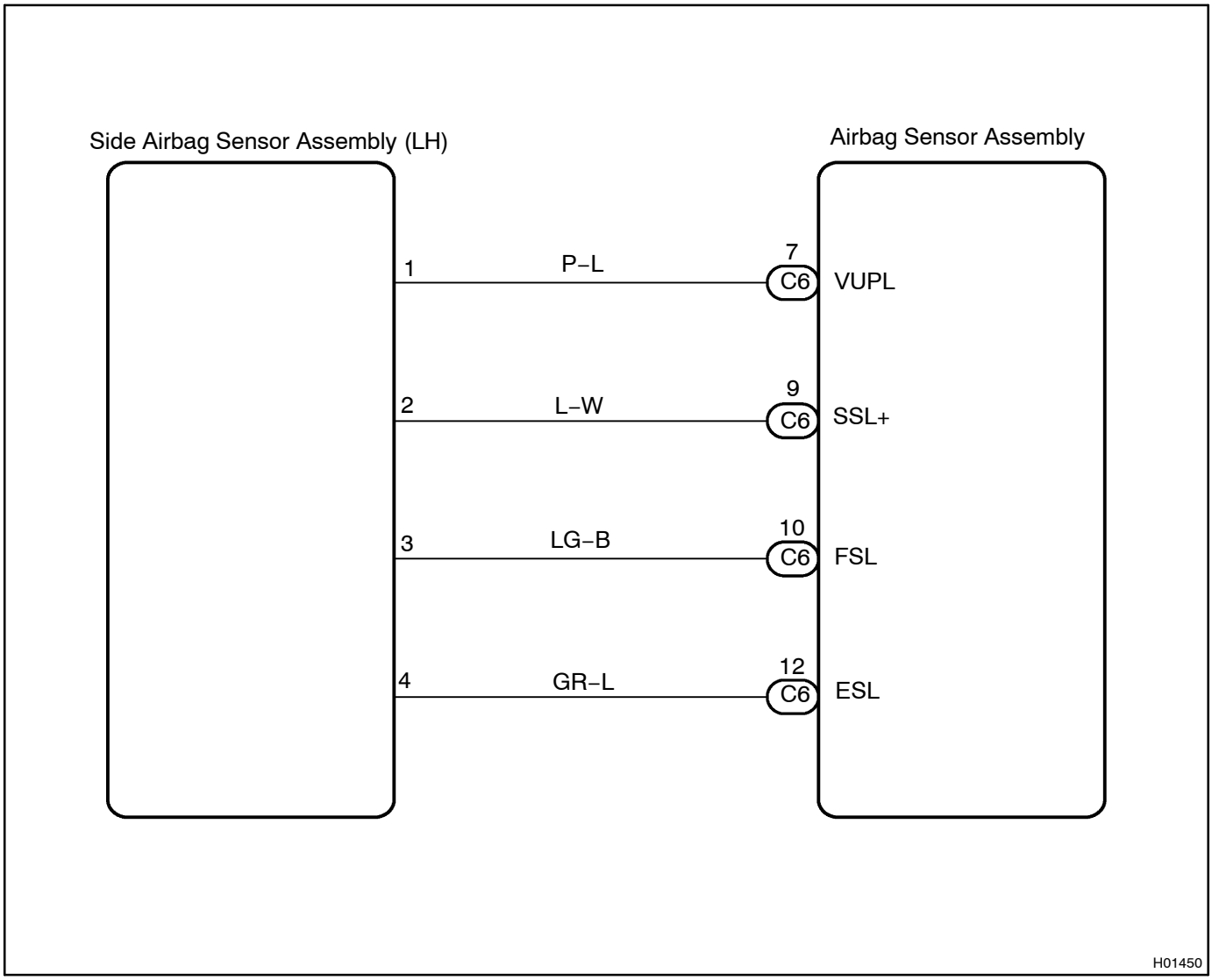
DTC	B1141/33	Side Airbag Sensor Assembly (LH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assembly (LH) consists of the airbag 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 malfunction is the side airbag sensor assembly (LH) is detected.

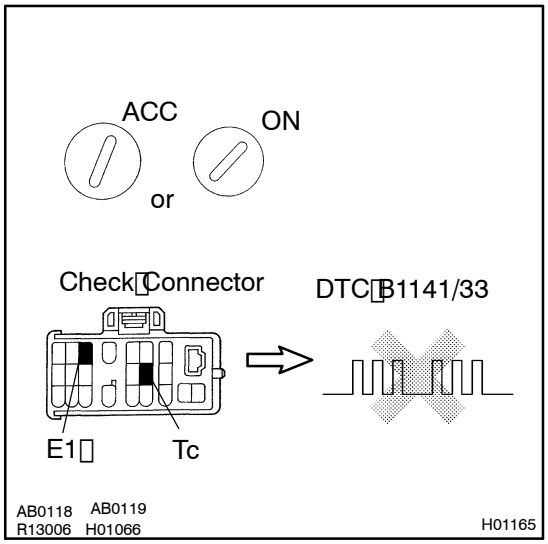
DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly (LH) • Wire harness

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–386)

(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–386)

OK:

DTC B1141/33 is not output.

HINT:

Codes other than DTC B1141/33 may be output at this time, but they are not relevant to this check.

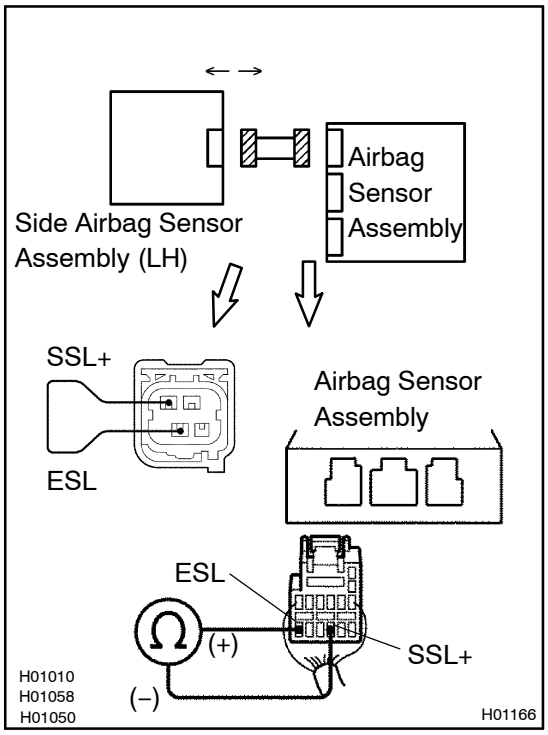
OK	Go to step 3.

NG

2	Are connector of side airbag sensor assembly (LH) properly connected?

3	Prepare for inspection. (See step 1 on page DI–503)

4	**Check wire harness.**



PREPARATION:

(a) Disconnect side airbag sensor assembly (LH).

(b) Using a service wire, connect SSL+ and ESL of the connector (on the side airbag sensor assembly (RH) 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 (LH) and airbag sensor assembly, measure the resistance between SSL+ and ESL.

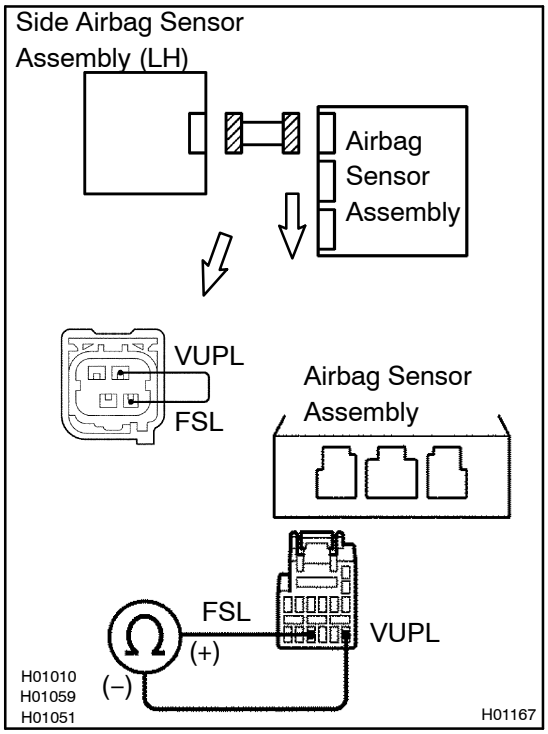
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and airbag sensor assembly, measure the resistance between VUPL and FSL.

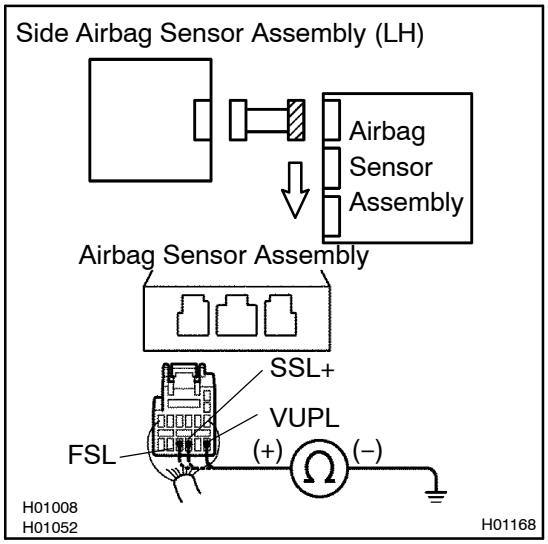
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between the 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 airbag sensor assembly, measure the resistance between the body ground and each of SSL+, VUPL and FSL.

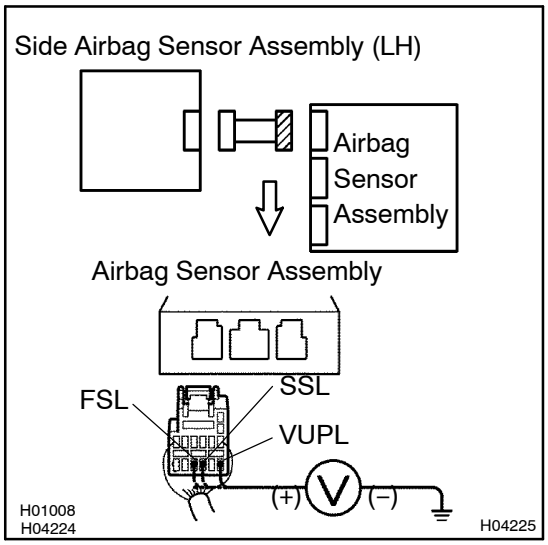
OK:

Resistance: 10 kΩ or Higher

NG → **Repair or replace harness or connector between the side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

7	**Check wire harness (to B+).**



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and airbag sensor assembly, measure the voltage between the body ground and each of SSL+, VUPL and FSL.

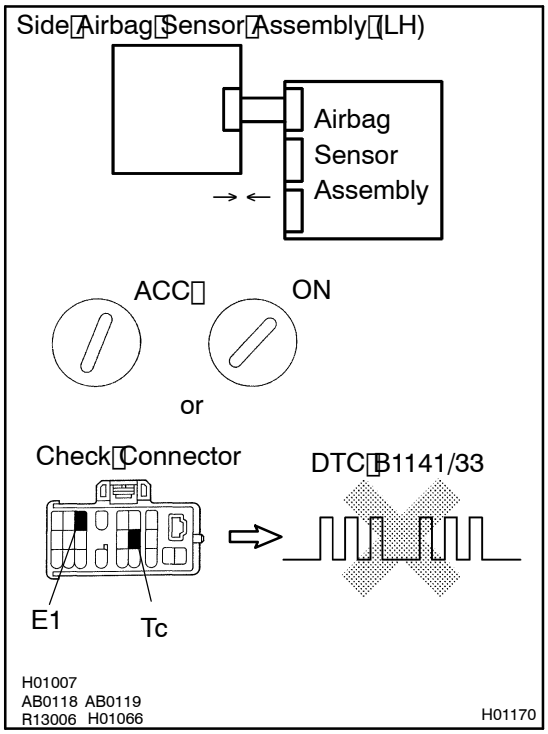
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

8	Is DTC B1141/33 output again?



PREPARATION:

(a) Connect 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–386)
(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–386)

OK:

DTC B1141/33 is not output.

HINT:

Codes other than DTC B1141/33 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI246–02

DTC	B1156/15	Front Airbag Sensor Assembly (RH) Malfunction

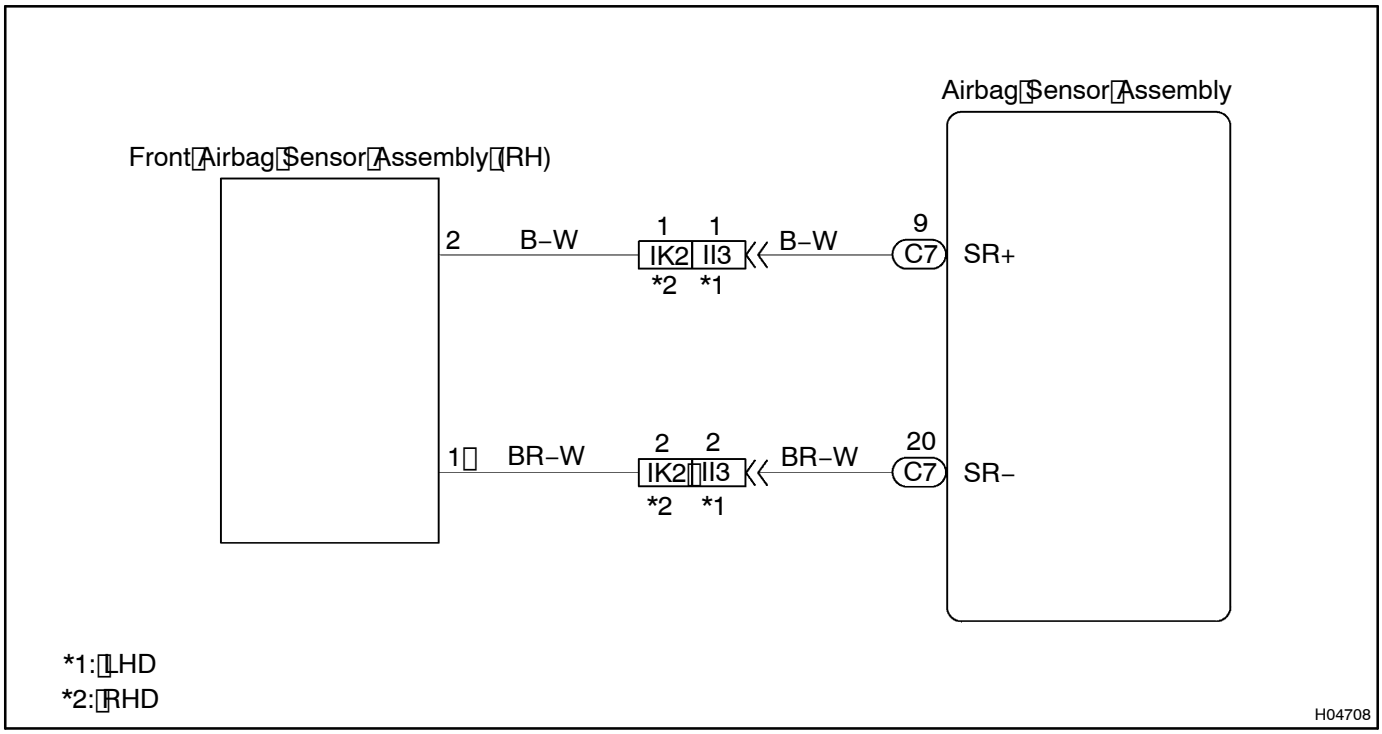
DTC	B1157/15	Front Airbag Sensor Assembly (RH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor assembly (RH) circuit consists of the airbag sensor assembly and front airbag sensor 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 B1156, B1157/15 is recorded when occurrence of a malfunction in the front airbag sensor assembly is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/15	• Open circuit between front sensor assembly (RH) and airbag sensor assembly • Short circuit in front sensor assembly (RH) (to B+) • Airbag sensor assembly malfunction	• Front airbag sensor assembly (RH) • Wire harness
B1157/15	• Short circuit between front sensor assembly (RH) and airbag sensor assembly • Short circuit between SR+ wire harness and SR– wire harness of squib • Airbag sensor assembly malfunction	• Front airbag sensor assembly (RH) • Wire harness

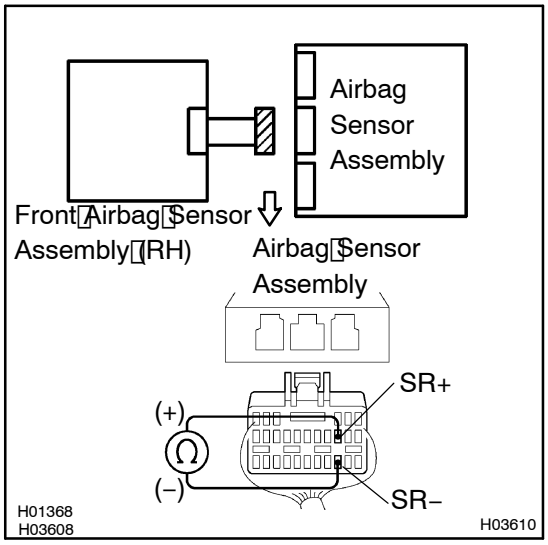
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check wire harness.



CHECK:

For the connector (on the airbag sensor side) between the front airbag sensor assembly (RH) and airbag sensor assembly, measure the resistance between SR+ and SR–.

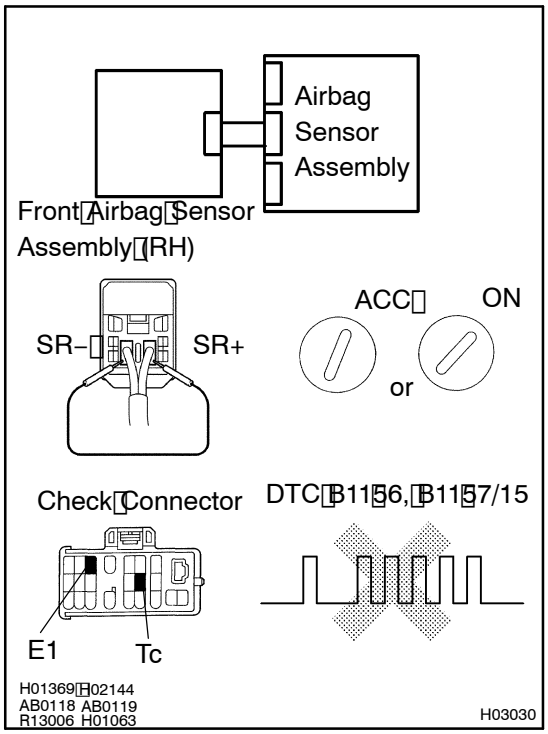
OK:

Resistance: 1MΩ or Higher

NG → **Repair or replace harness or connector between the front airbag sensor (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 SR+ and SR– on the connector (on the front airbag sensor assembly (RH)) between the front airbag sensor 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–386)

(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–386

OK:

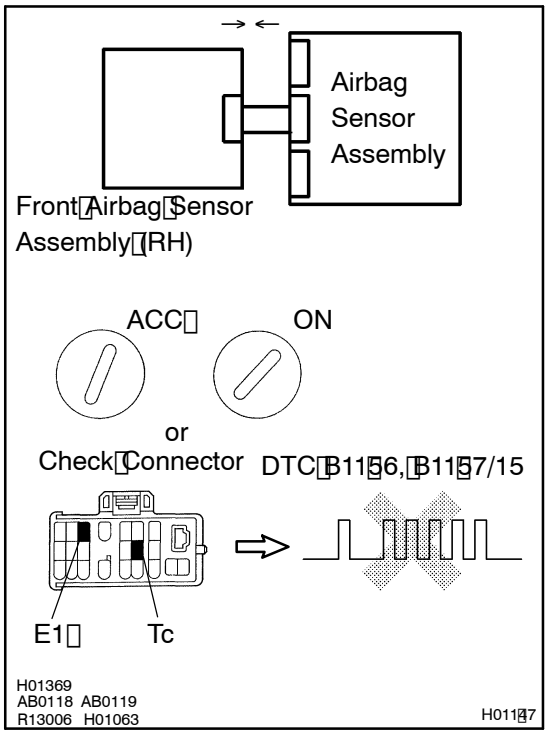
DTC B1156, B1157/15 is not output.

HINT:
Codes other than DTC B1156, B1157/15 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check front 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 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–386)

(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–386)

OK:

DTC B1156, B1157/15 is not output.

HINT:

Codes other than DTC B1156, B1157/15 may be output at this time, but they are not relevant to this check.

NG	Replace front 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI247–02

DTC	B1158/16	Front Airbag Sensor Assembly (LH) Malfunction

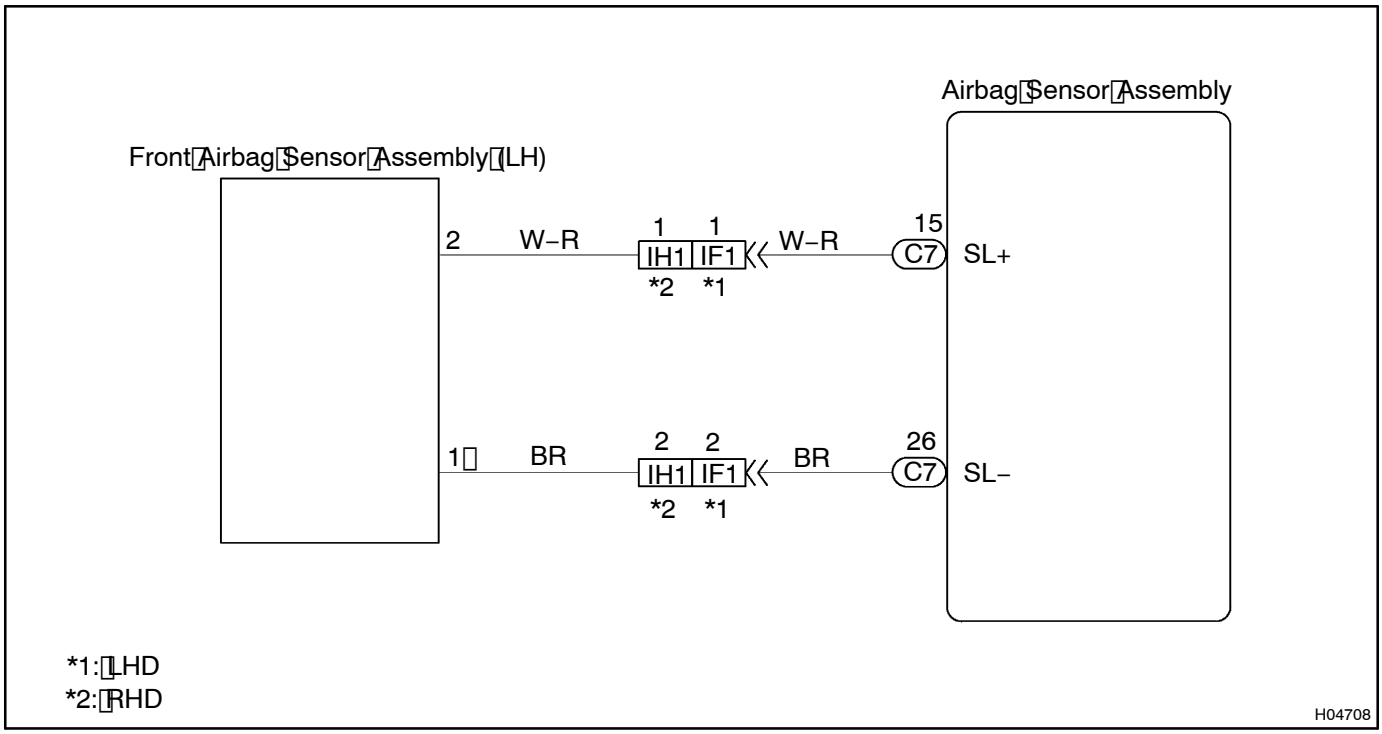
DTC	B1159/16	Front Airbag Sensor Assembly (LH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor assembly (LH) circuit consists of the airbag sensor assembly and front airbag sensor 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 B1158, B1159/16 is recorded when occurrence of a malfunction in the front airbag sensor assembly (LH) is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/16	• Open circuit between front sensor assembly (LH) and airbag sensor assembly • Short circuit in front sensor assembly (LH) (to B+) • Airbag sensor assembly malfunction	• Front airbag sensor assembly (LH) • Wire harness
B1159/16	• Short circuit between front sensor assembly (LH) and airbag sensor assembly • Short circuit between SL+ wire harness and SL– wire harness of squib • Airbag sensor assembly malfunction	• Front airbag sensor assembly (LH) • Wire harness

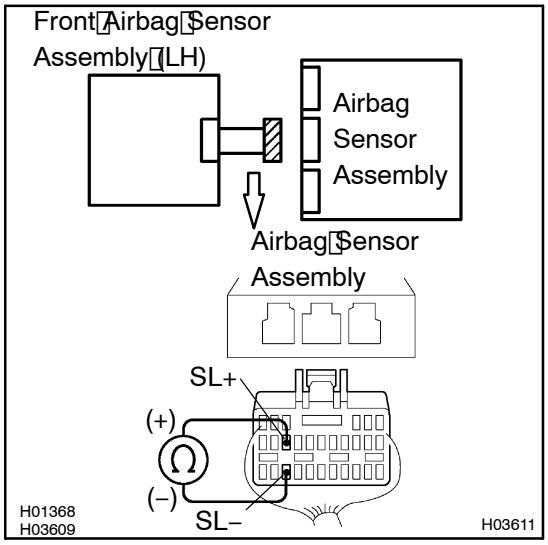
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

2	Check wire harness.



CHECK:

For the connector (on the airbag sensor side) between the front airbag sensor assembly (LH) and airbag sensor assembly, measure the resistance between SL+ and SL–.

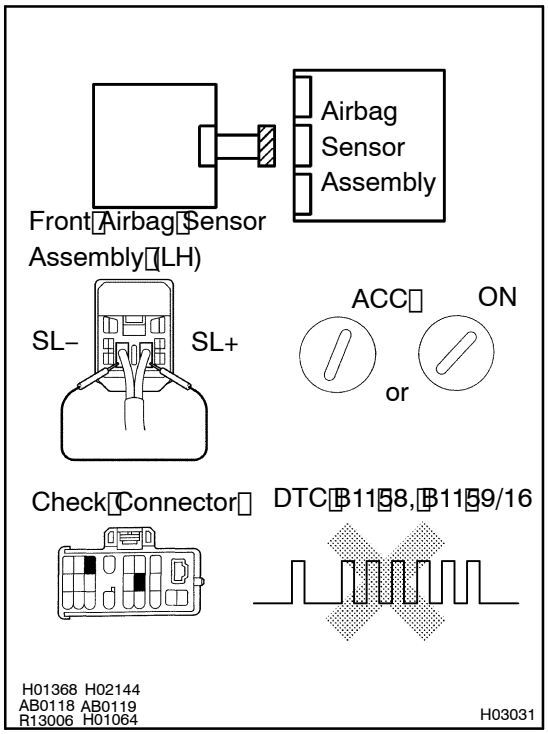
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between the front airbag sensor (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 SL+ and SL– of the connector (on the front airbag sensor assembly (LH)) between the front airbag sensor 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 page DI–386)

(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–386)

OK:

DTC B1158, B1159/16 is not output.

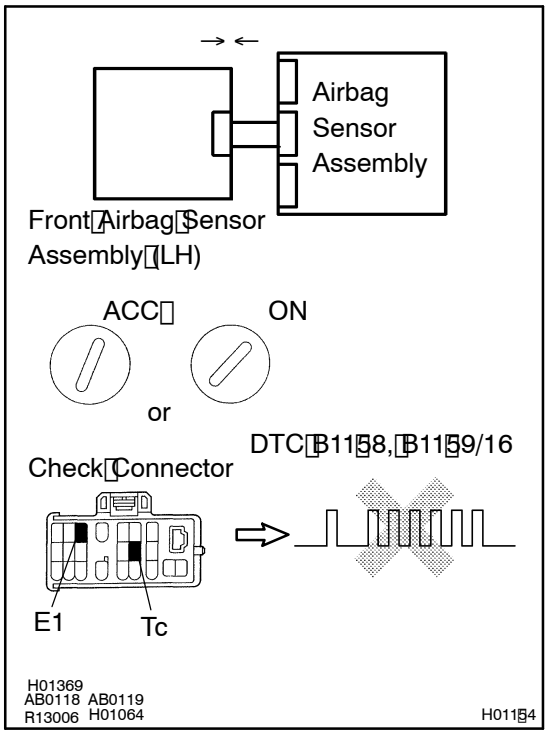
HINT:

Codes other then DTC B1158, B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check front 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 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–386)

(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–386)

OK:

DTC B1158, B1159/16 is not output.

HINT:

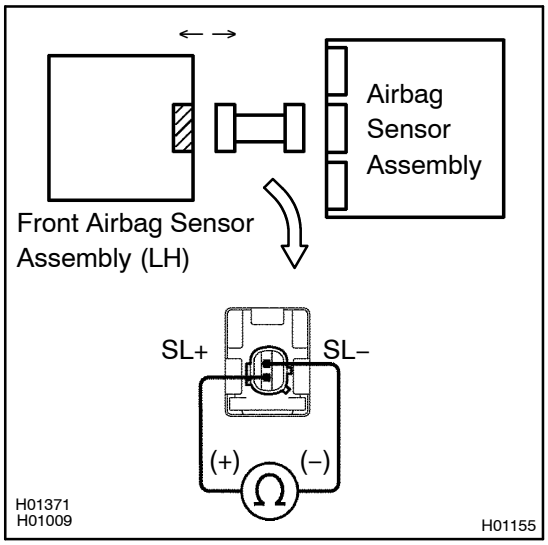
Codes other than DTC B1158, B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace front 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	Check front airbag sensor assembly (LH).



PREPARATION:

Disconnect front airbag sensor assembly (LH).

CHECK:

For connector (on the front airbag sensor side), measure the resistance between SL+ and SL–.

OK:

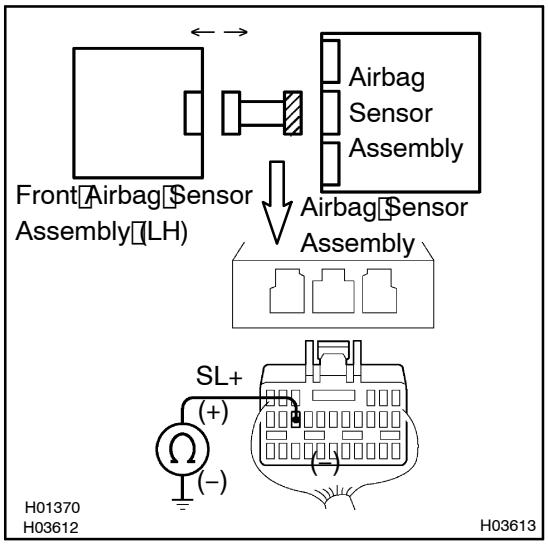
Resistance: 754 ~ 886 Ω

NG → **Replace front airbag sensor assembly (LH).**

OK

Repair or replace harness or connector between the front airbag sensor assembly (LH) and airbag sensor assembly.

6	Check wire harness (to ground).



PREPARATION:

(a) Disconnect front airbag sensor assembly (LH).

(b) Release airbag activation prevention mechanism on airbag sensor assembly side of connector between the airbag sensor assembly and front airbag sensor assembly (LH).

(See page DI–386)

CHECK:

For connector (on the airbag sensor side) between the front airbag sensor assembly (LH) and airbag sensor assembly, measure the resistance between SL+ and body ground.

OK:

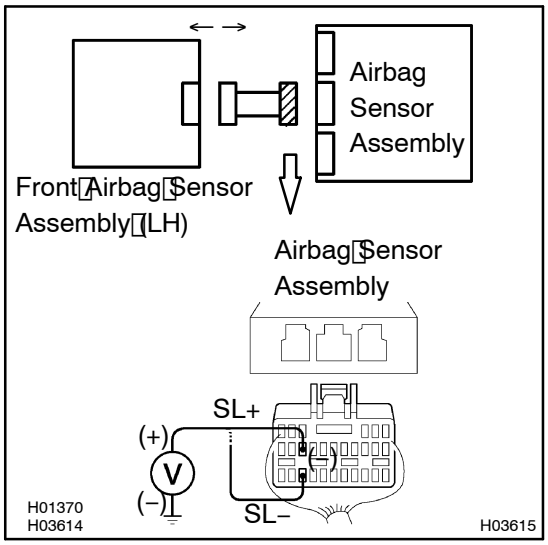
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the front airbag assembly (LH) and airbag assembly.**

OK →

Replace front airbag sensor assembly (LH).

7	Check wire harness (to B+).



PREPARATION:

(a) Disconnect front airbag sensor assembly (LH).

(b) Release airbag activation prevention mechanism on airbag sensor assembly side of connector between the airbag sensor assembly and front airbag sensor assembly (LH).
(See page DI–386)

CHECK:

For connector (on the airbag sensor side) between the front airbag sensor assembly (LH) and airbag sensor assembly, measure the voltage between each of SL+ and SL– and body ground.

OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the front airbag assembly (LH) and airbag assembly.**

OK

Replace front airbag sensor assembly (LH).

DI16Y–05

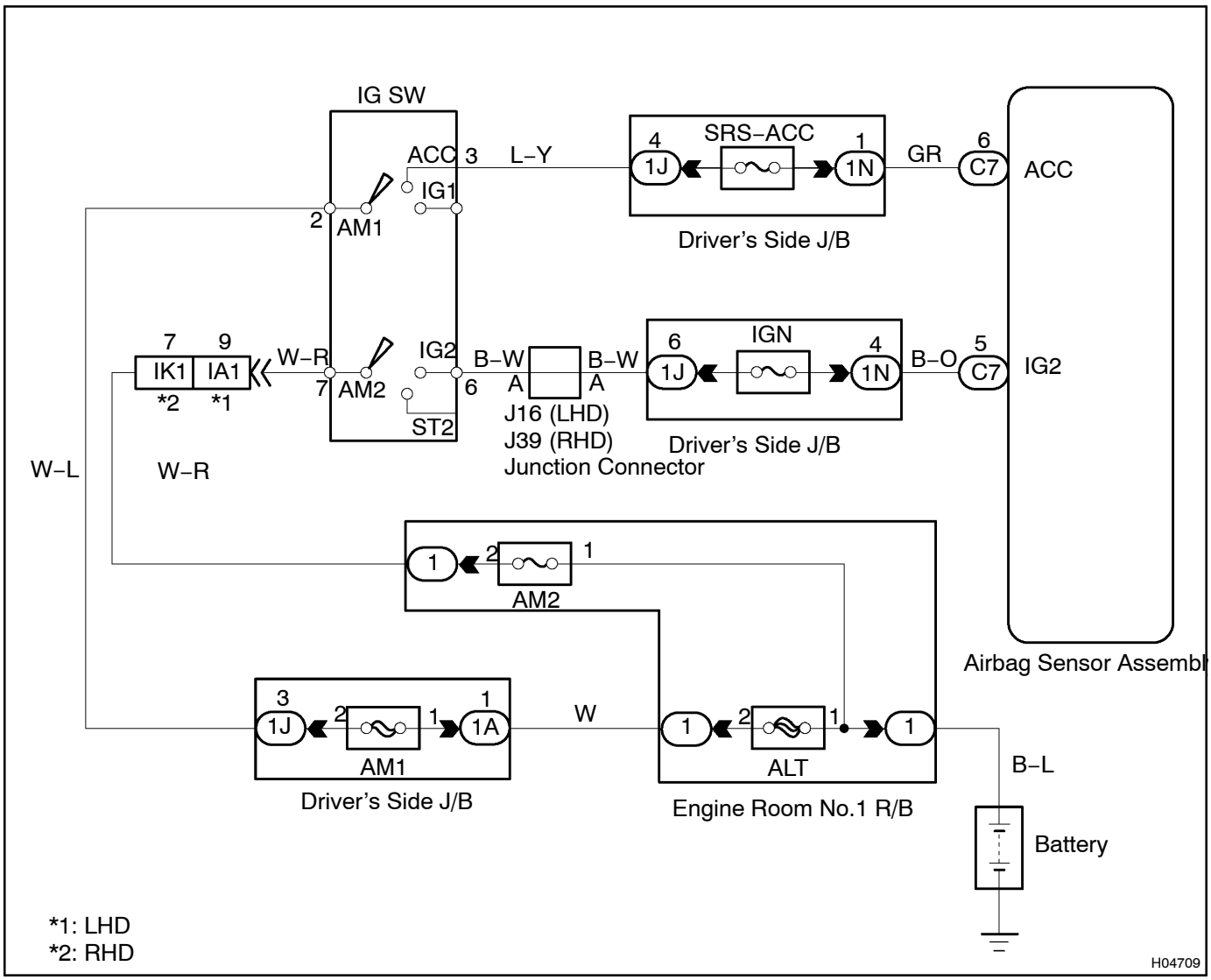
DTC	Normal	Source Voltage Drop

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.

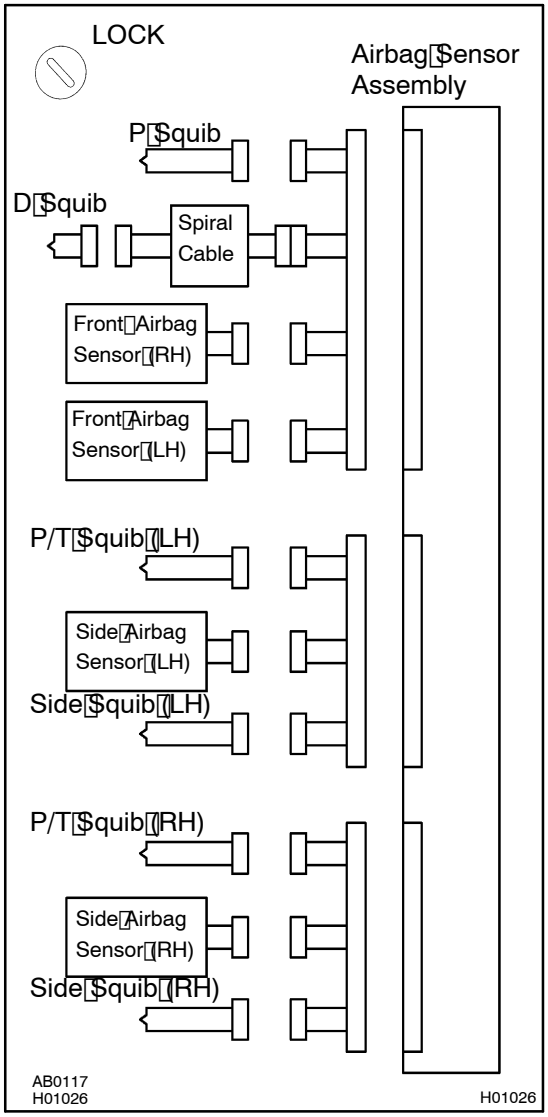
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Preparation.**



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–28)

(d) Disconnect the connectors of the airbag sensor assembly.
(See page RS–53)

(e) Disconnect the connectors of the front airbag sensor assembly LH and RH.
(See page RS–58)

(f) Disconnect the connectors of the seat belt pretensioner LH and RH.
(See page BO–124)

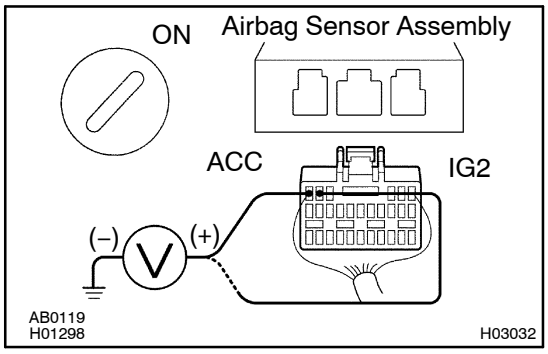
(g) Disconnect the connectors of the side airbag assembly LH and RH.
(See page RS–40)

(h) Disconnect the connectors of the side airbag sensor assembly LH and RH.
(See page RS–64)

CAUTION:

Store the steering wheel pad with the front surface facing upward.

2	Check source voltage.



PREPARATION:

(a) Connect negative (–) terminal cable to the battery.
(b) Turn ignition switch ON.

CHECK:

Measure voltage at IG2 and ACC on sensor connector while electric system (defogger, wiper, headlight, heater blower, etc.) is operated.

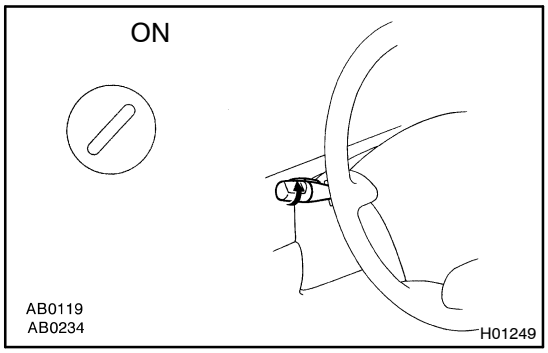
OK:

Voltage: 10 ~ 14 V

NG → **Check the harness between the battery and airbag sensor assembly, and check the 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 connector.
(e) Connect the connectors of side airbag assembly LH and RH.
(f) Connect the connectors of seat belt pretensioner LH and RH.
(g) Connect the connectors of side airbag sensor LH and RH.
(h) Turn ignition switch 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.

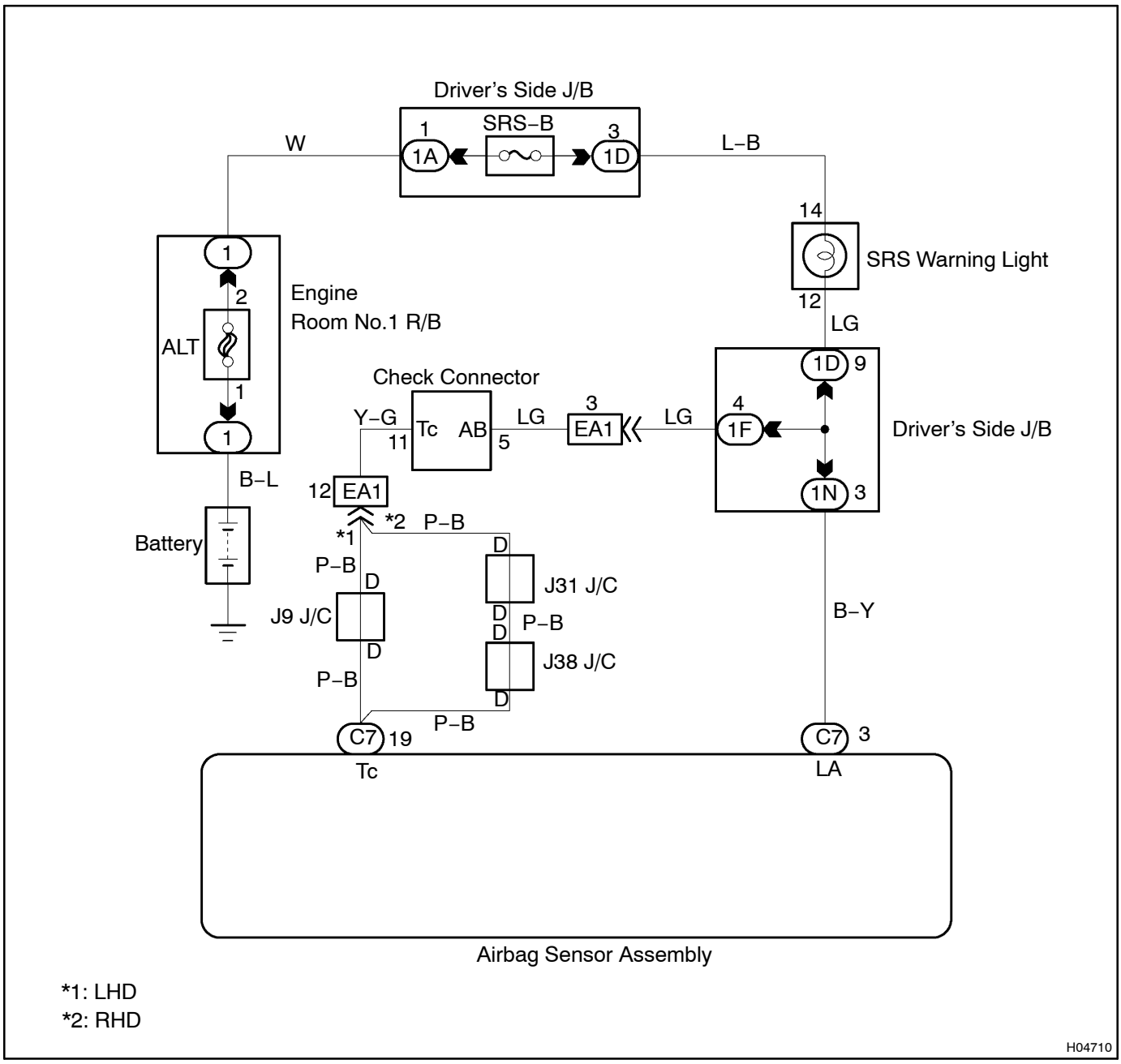
DI16Z–05

SRS Warning Light Circuit Malfunction (Always lights up, when ignition switch is in LOCK position.)

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 of the SRS warning light.

WIRING DIAGRAM



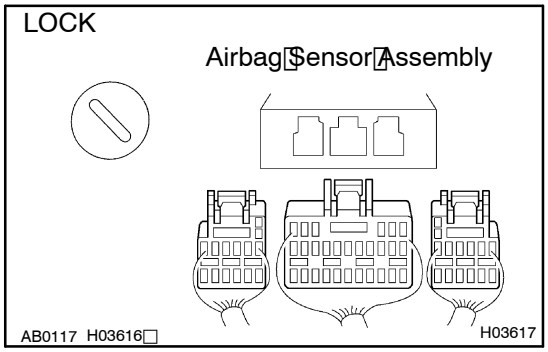
*1: LHD
*2: RHD

H04710

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–503)

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 connectors.
(d) Connect negative (–) terminal cable to the battery.

CHECK:

Check operation of SRS warning light.

NO → **Check SRS warning light circuit or terminal AB circuit of check connector.**

YES →

Replace airbag sensor assembly.

DI248–02

SRS Warning Light Circuit Malfunction (Does not light up, when ignition switch is turned to ACC or ON.)

CIRCUIT DESCRIPTION

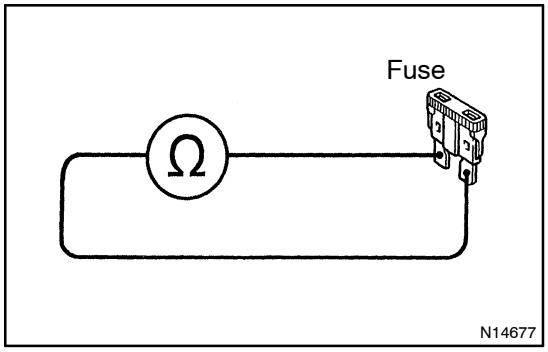
The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.
If there is a malfunction in the SRS, the SRS warning 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 of the SRS warning light.

WIRING DIAGRAM

See page DI–506.

INSPECTION PROCEDURE

1	**Check SRS–B Fuse.**



PREPARATION:
Remove SRS–B fuse of J/B.
CHECK:
Check continuity of SRS–B fuse.
OK:

Continuity

HINT:

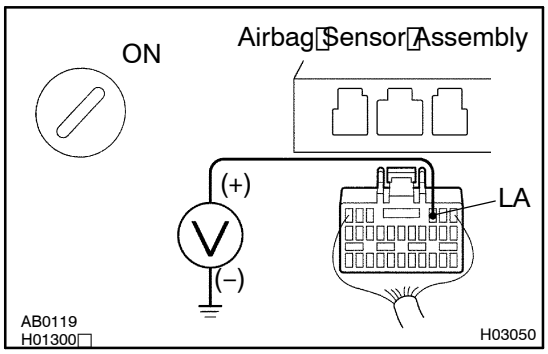
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG	**Go to step 5 .**

OK

2	Prepare for inspection. (See step 1 on page DI–503)

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 voltage between LA terminal of connector on harness side and body ground

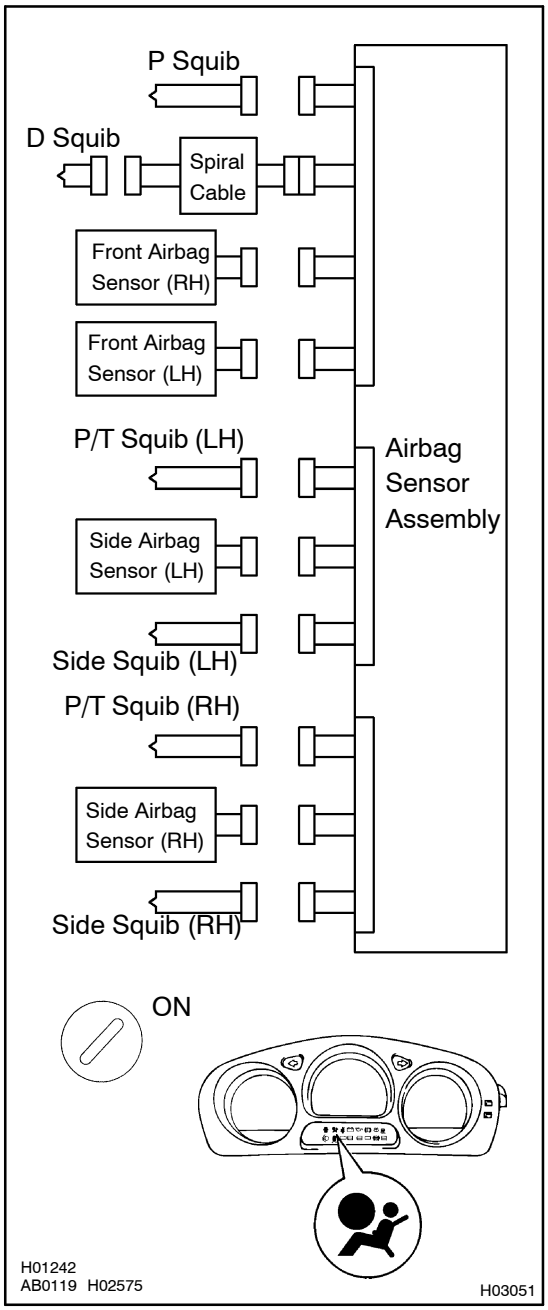
OK:

Voltage: 10 ~ 14 V

NG	Check SRS warning light bulb / 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 connector.
(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 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–19)

YES

Check harness between SRS fuse and SRS warning light.

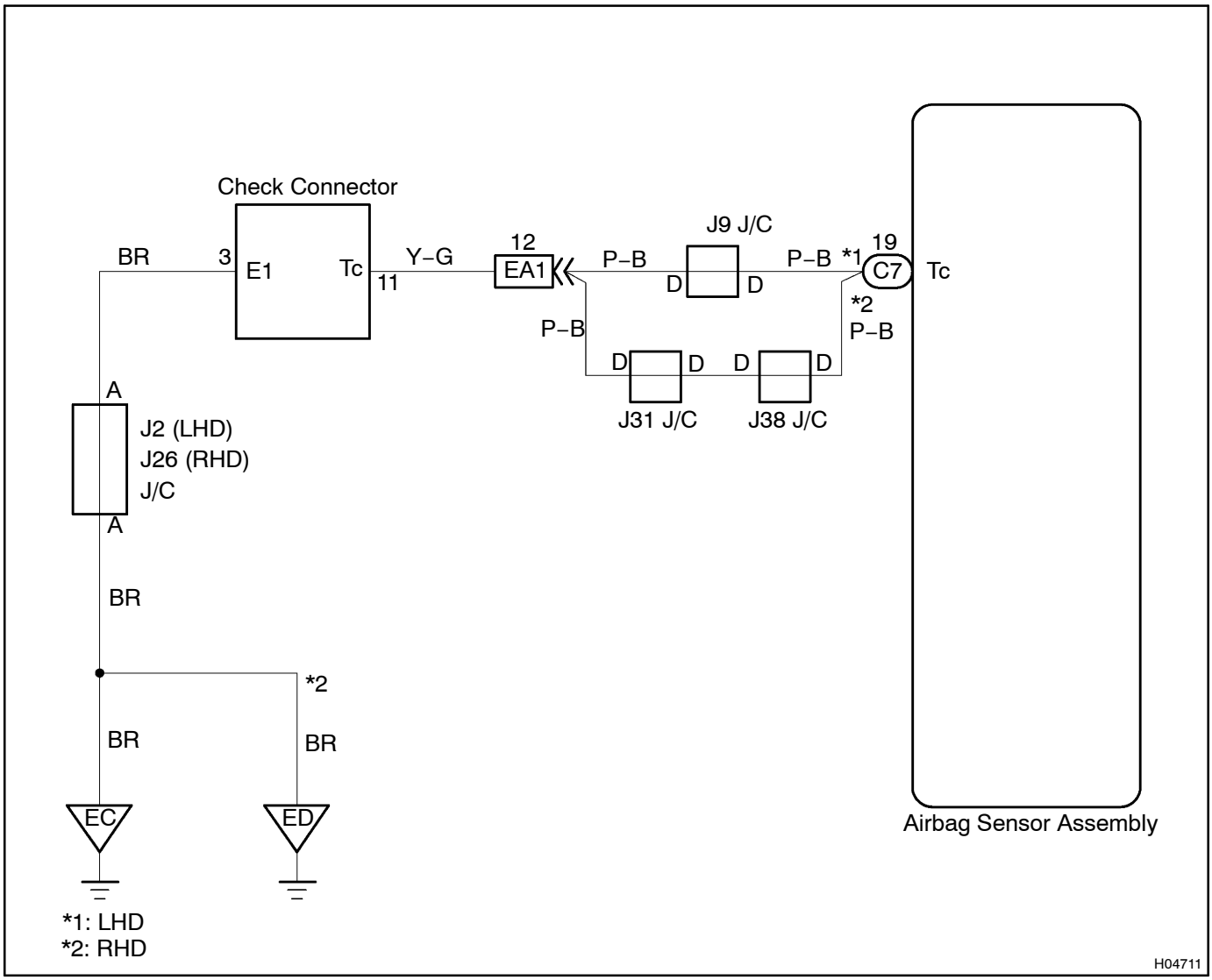
DI171–05

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 the blinking of SRS warning light.

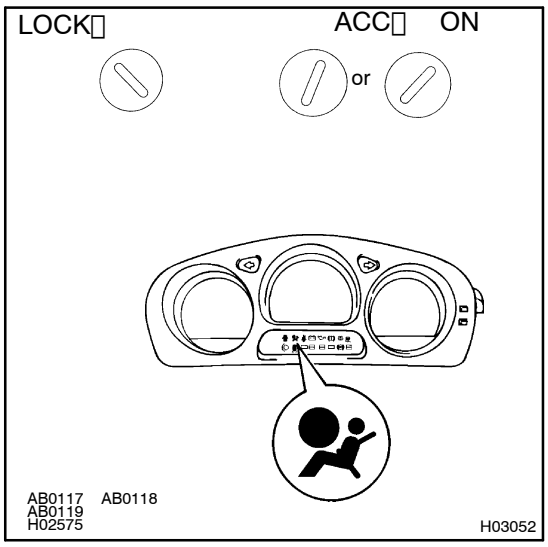
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	Does SRS warning light light up for approx. 6 seconds?

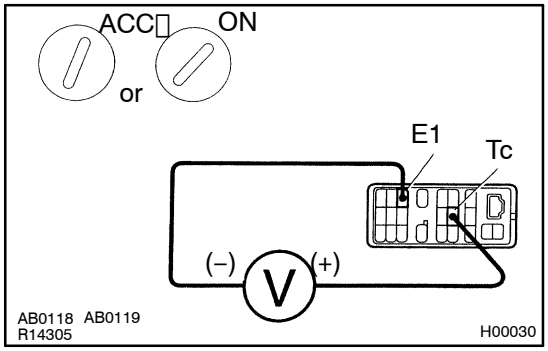


PREPARATION:
Check operation of the SRS warning light after ignition switch is turned from LOCK position to ACC or ON position.

NO	Check SRS warning light system. (See page DI–386)

YES

2	Check voltage between terminals Tc and E1 of check connector.

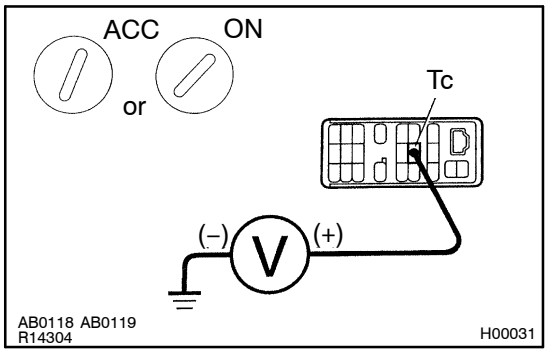


PREPARATION:
Turn ignition switch to ACC or ON.
CHECK:
Measure the voltage between terminals Tc and E1 of check connector.
OK:
Voltage; 10 ~ 14 V

OK	Go to step 4.

NG

3	Check voltage between terminals Tc of check connector and body ground



CHECK:

Measure voltage between terminal Tc of check connector and body ground.

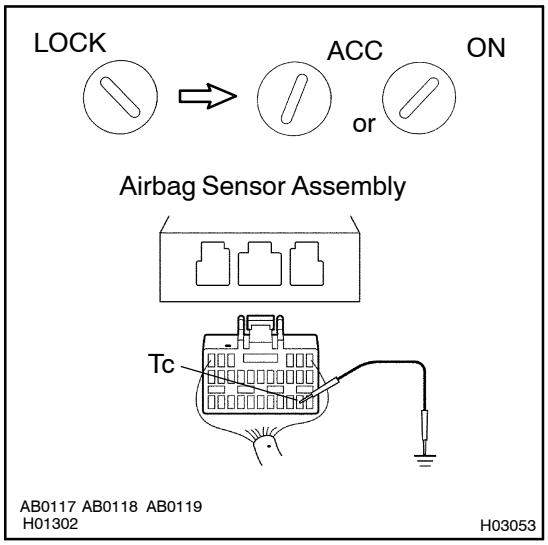
OK:

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 service wire into terminal Tc from the back side as shown.
(e) Connect the airbag sensor assembly connector with 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 service wire of terminal Tc to body ground.

CHECK:

Check operation of SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Take care not to mistake terminal connection position as this cause a malfunction.

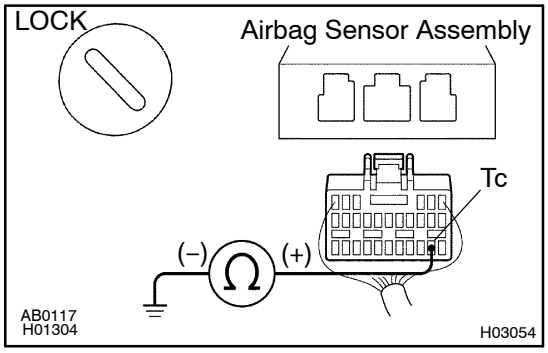
OK → **Check harness between the airbag sensor assembly and check connector.**

NG

Replace airbag sensor assembly.

If DTC is displayed without a DTC check procedure, perform following trouble-shooting

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.

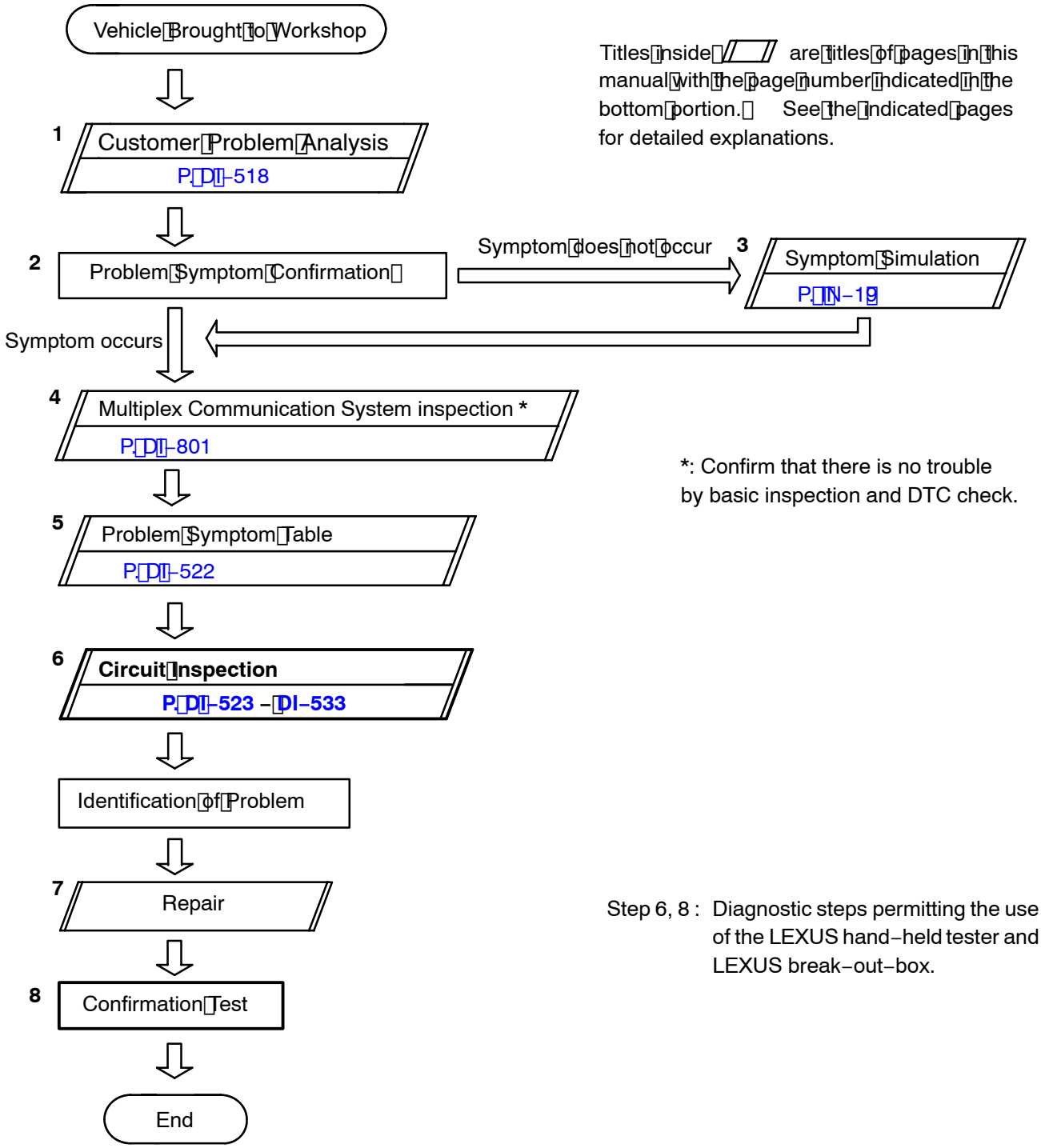
POWER SEAT CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI27M–02

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.

DI27N–02

CUSTOMER PROBLEM ANALYSIS CHECK

POWER SEAT CONTROL SYSTEM Check Sheet

Inspector's name: _____

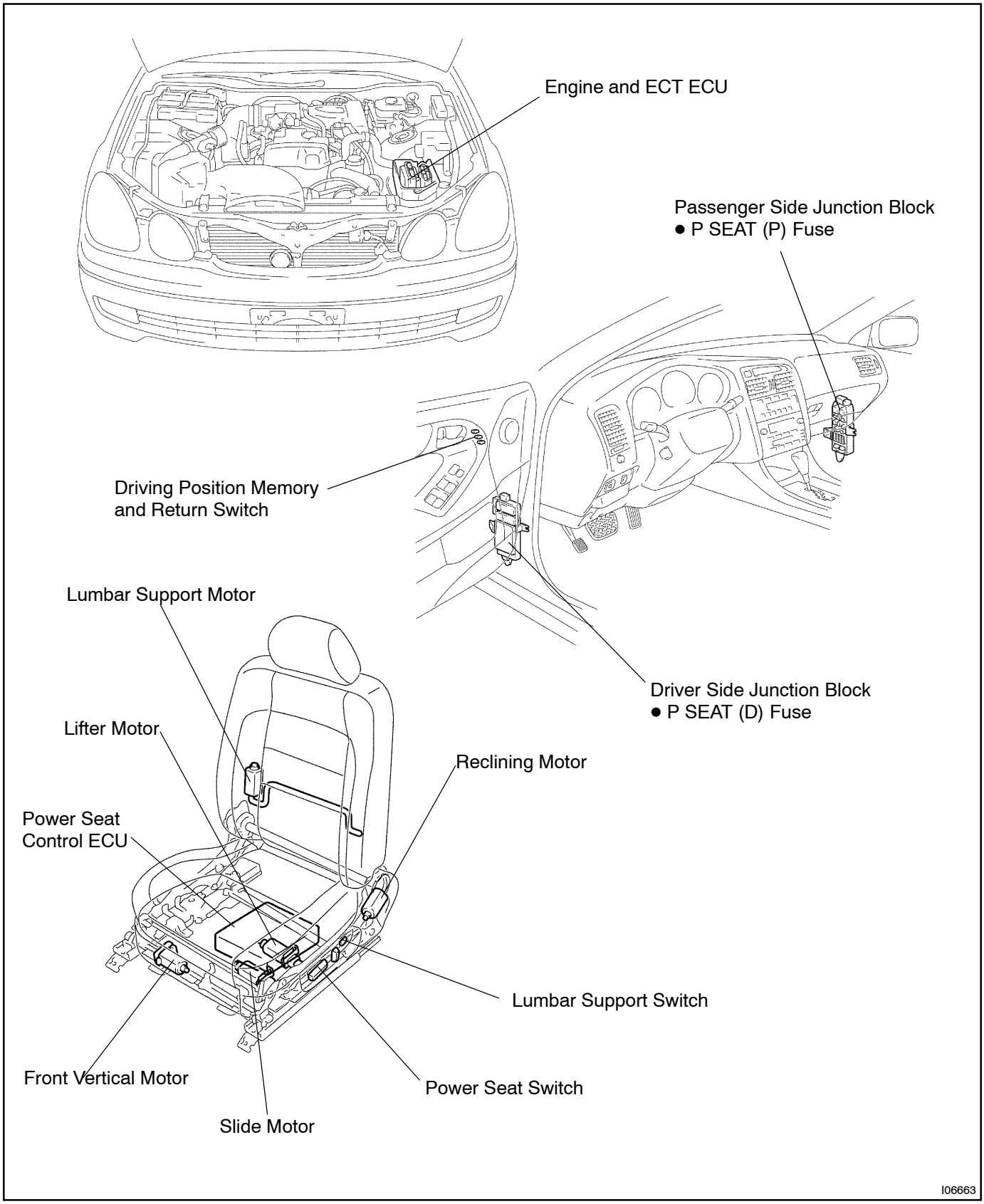
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	
	☐ All functions do not operate.
	☐ "Slide operation" does not operate.
	☐ "Reclining operation" does not operate.
	☐ "Front Vertical operation" does not operate.
	☐ "Rear Vertical operation" does not operate.
	☐ Memory return function does not operate.
	☐ Others.

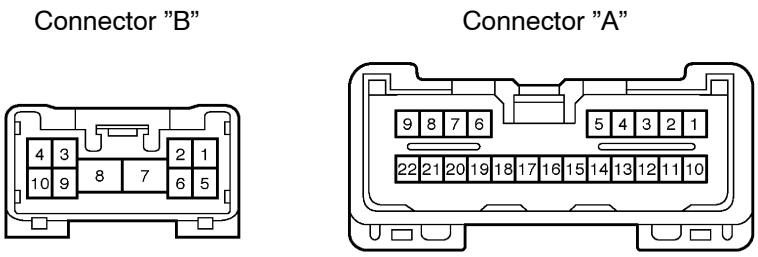
DI27O–02

PARTS LOCATION



DI27P–02

TERMINALS OF ECU



I04198

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SSFV ↔ SGND (A3 ↔ A13)	LG–R ↔ BR	Front vertical operation	0 V ↔ 8 V
SSRL ↔ SGND (A4 ↔ A13)	Y–G ↔ BR	Rear vertical operation	0 V ↔ 8 V
SSRR ↔ SGND (A5 ↔ A13)	V–W ↔ BR	Reclining operation	0 V ↔ 8 V
PVCC ↔ SGND (A6 ↔ A13)	V ↔ BR	Power seat operation	8 V
FDWN ↔ Body Ground (A7 ↔ Body Ground)	L–R	Seat lowered using front vertical SW	Below 1 V
		Others	10 – 14 V
IG ↔ Body Ground (A8 ↔ Body Ground)	B–R	Ignition SW ON	10 – 14 V
SYSB ↔ GND (A9 ↔ A13)	W–R ↔ BR	Always	10 – 14 V
MPX1 ↔ Body Ground (A10 ↔ Body Ground)	L–O	Multiplex communication circuit signals	0 V ↔ 12 V
		Others	Resistance (approx. 2.5 kΩ)
MPX2 ↔ Body Ground (A11 ↔ Body Ground)	O	Multiplex communication circuit signals	0 V ↔ 12 V
SGND ↔ Body Ground (A13 ↔ Body Ground)	BR	Always	Below 1 V
SSRS ↔ SGND (A14 ↔ A13)	LG ↔ BR	Slide operation	0 V ↔ 8 V
SLDF ↔ Body Ground (A15 ↔ Body Ground)	L	Seat moved forward using slide SW	Below 1 V
		Others	10 – 14 V
SLDR ↔ Body Ground (A16 ↔ Body Ground)	L–B	Seat moved to rear using slide SW	Below 1 V
		Others	10 – 14 V
LUP ↔ Body Ground (A17 ↔ Body Ground)	Y–G	Seat raised using rear vertical SW	Below 1 V
		Others	10 – 14 V
LDWN ↔ Body Ground (A18 ↔ Body Ground)	Y	Seat lowered using rear vertical SW	Below 1 V
		Others	10 – 14 V
FUP ↔ Body Ground (A19 ↔ Body Ground)	L–Y	Seat raised using front vertical SW	Below 1 V
		Others	10 – 14 V
RCLF ↔ Body Ground (A21 ↔ Body Ground)	Y–R	Seat moved forward using reclining SW	Below 1 V
		Others	10 – 14 V

RCLR ↔ Body Ground (A22 ↔ Body Ground)	Y–B	Seat moved to rear using reclining SW	Below 1 V
		Others	10 – 14 V
RCL– ↔ GND (B1 ↔ B7)	L ↔ W–B	Seat moved to rear using reclining SW	10 – 14 V
		Others	Below 1 V
RCL+ ↔ GND (B2 ↔ B7)	L–R ↔ W–B	Seat moved forward using reclining SW	10 – 14 V
		Others	Below 1 V
SLD– ↔ GND (B3 ↔ B7)	B–R ↔ W–B	Seat moved to rear using slide SW	10 – 14 V
		Others	Below 1 V
SLD+ ↔ GND (B4 ↔ B7)	B ↔ W–B	Seat moved forward using slide SW	10 – 14 V
		Others	Below 1 V
LFT– ↔ GND (B5 ↔ B7)	Y–R ↔ W–B	Seat lowered using rear vertical SW	10 – 14 V
		Others	Below 1 V
LFT+ ↔ GND (B6 ↔ B7)	Y–G ↔ W–B	Seat raised using rear vertical SW	10 – 14 V
		Others	Below 1 V
GND ↔ Body Ground (B7 ↔ Body Ground)	W–B	Always	Below 1 V
+B ↔ Body Ground (B8 ↔ Body Ground)	L–W	Always	10 – 14 V
FRV– ↔ GND (B9 ↔ B7)	W–G ↔ W–B	Seat lowered using front vertical SW	10 – 14 V
		Others	Below 1 V
FRV+ ↔ GND (B10 ↔ B7)	W–R ↔ W–B	Seat raised using front vertical SW	10 – 14 V
		Others	Below 1 V

DI27Q–02

PROBLEM SYMPTOMS TABLE

Perform troubleshooting of the circuits for the applicable problem in the order given in the chart below. Proceed to the page located for each circuit.

HINT:

- If the instruction "Proceed to next circuit inspection shown problem symptoms table" 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 reappears even though there are no abnormalities in any of the other circuits, then check and replace the Power Seat Position ECU as the last step.

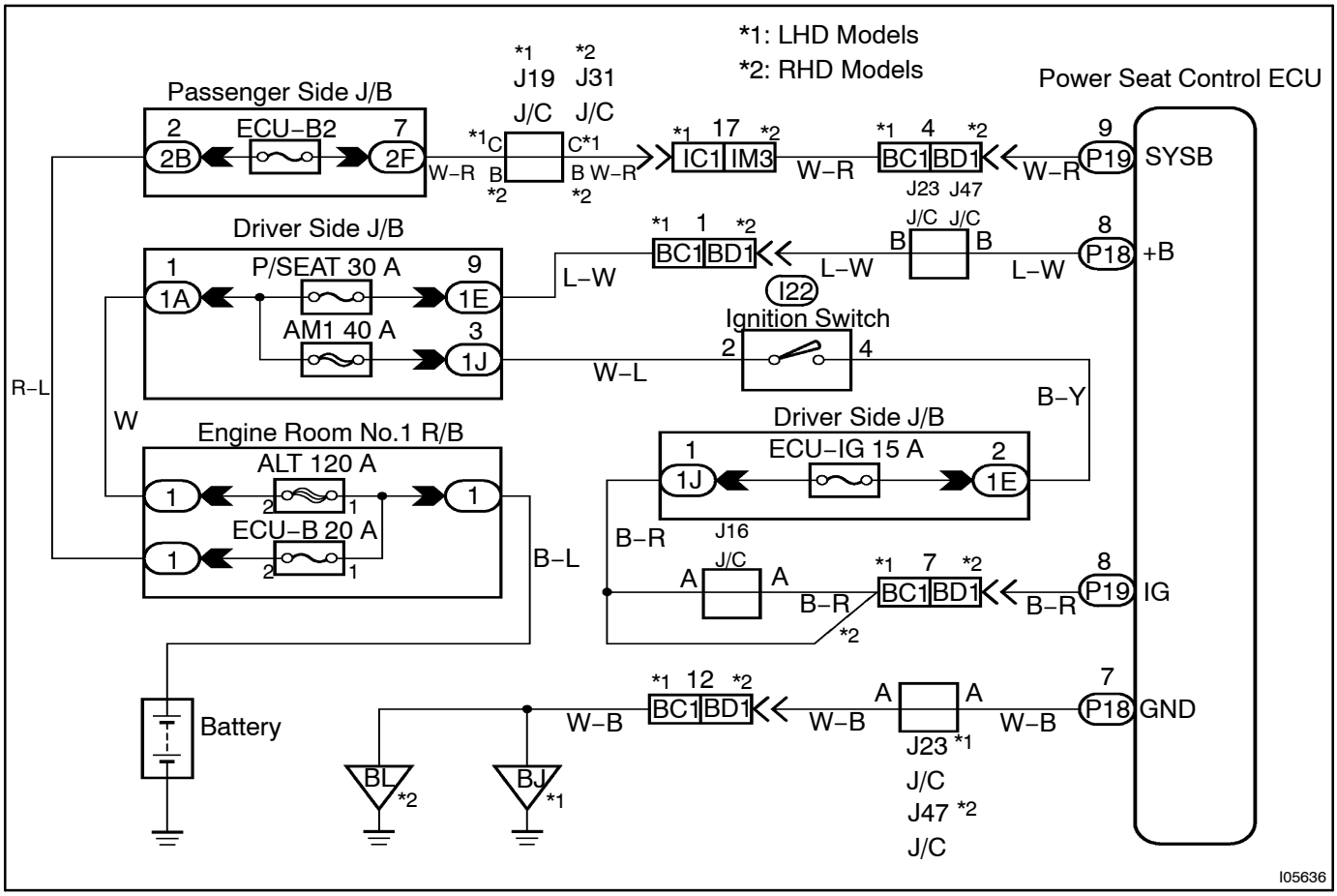
Symptom	Suspect Area	See page
All functions do not operate.	1. ECU Power Source Circuit 2. Power Seat Position ECU	DI–523 IN–29
"Slide operation" does not operate.	1. Slide Motor Circuit 2. Power Seat Switch Circuit 3. Power Seat Position ECU	DI–526 DI–528 IN–29
"Reclining operation" does not operate.	1. Reclining Motor Circuit 2. Power Seat Switch Circuit 3. Power Seat Position ECU	DI–526 DI–528 IN–29
"Front Vertical operation" does not operate.	1. Front Vertical Motor Circuit 2. Power Seat Switch Circuit 3. Power Seat Position ECU	DI–526 DI–528 IN–29
"Lifter operation" does not operate.	1. Lifter Motor Circuit 2. Power Seat Switch Circuit 3. Power Seat Position ECU	DI–526 DI–528 IN–29
Memory return function does not operate.	1. M1. M2 SET Switch Circuit 2. Power Seat Position ECU	DI–531 IN–29
Memory return function operates abnormally. (Power seat)	1. Seat Position Sensor Circuit 2. Power Seat Position ECU	DI–533 IN–29
Memory return function operates abnormally. (Mirror)	1. Mirror Position Sensor Circuit 2. Door ECU (Driver or Passenger)	DI–728 DI–700 DI–733

DI27R–02

CIRCUIT INSPECTION

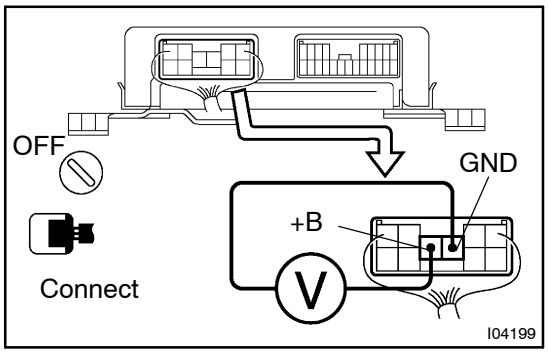
ECU Power Source Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals +B and GND of Power Seat Position ECU connector.**



PREPARATION:

Remove Power Seat Position ECU with connectors still connected.

CHECK:

Measure voltage between terminals +B and GND of Power Seat Position ECU connector.

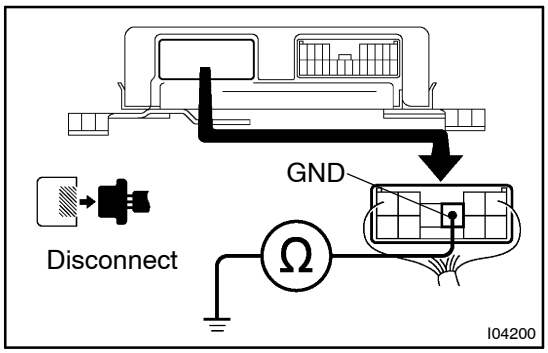
OK:

Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).

NG

2	Check continuity between terminal GND of Power Seat Position ECU connector and body ground.



CHECK:

Measure resistance between terminal GND of Power Seat Position ECU and body ground.

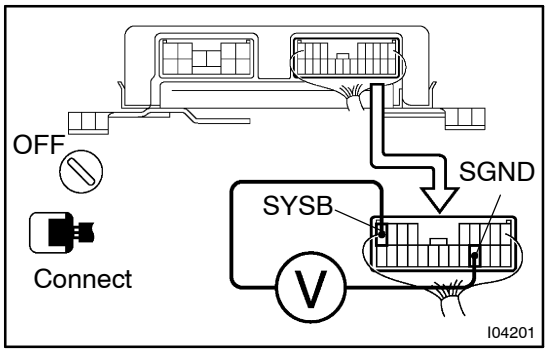
OK:

Resistance: Continuity (below 1 Ω)

NG → Repair or replace harness or connector.

OK

3	Check voltage between terminals SYSB and SGND of Power Seat Position ECU connector.



PREPARATION:

Remove Power Seat Position ECU with connectors still connected.

CHECK:

Measure voltage between terminals SYSB and SGND of Power Seat Position ECU connector.

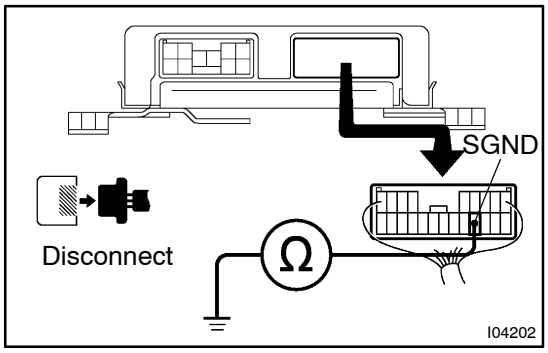
OK:

Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).

NG

4	Check continuity between terminal SGND of Power Seat Position ECU connector and body ground.



CHECK:

Measure resistance between terminals SGND of Power Seat Position ECU and body ground.

OK:

Resistance: Continuity (below 1 Ω)

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

OK

5	Check SEAT–FR and DOME Fuse.

NG → **Check for short in all the harness and components connected to SEAT–FR and DOME fuse, and repair them (See attached wiring diagram).**

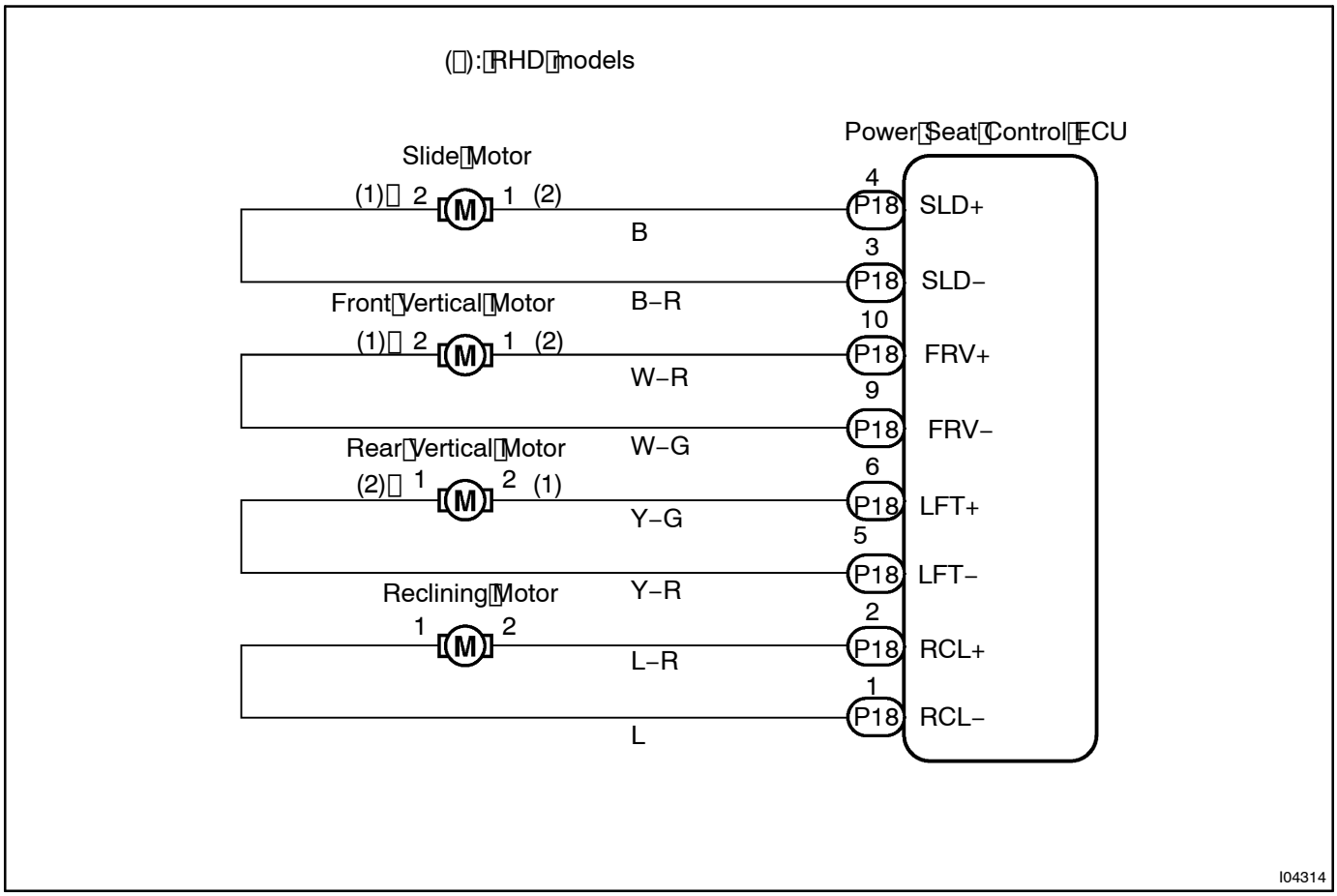
OK

Check and repair connector between Power Seat Position ECU and battery.

DI27S–02

Power Seat Motor

WIRING DIAGRAM



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 "Power seat motor" operates as the LEXUS hand–held tester directs.
OK:
The seat operates normally.

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).**

NG

2	Check power seat motor. (See page BE-181)

NG → Replace the motor.

OK

3	Check harness and connector between Power Seat Position ECU and motor (See page IN-19).

OK → Repair or replace harness or connctor.

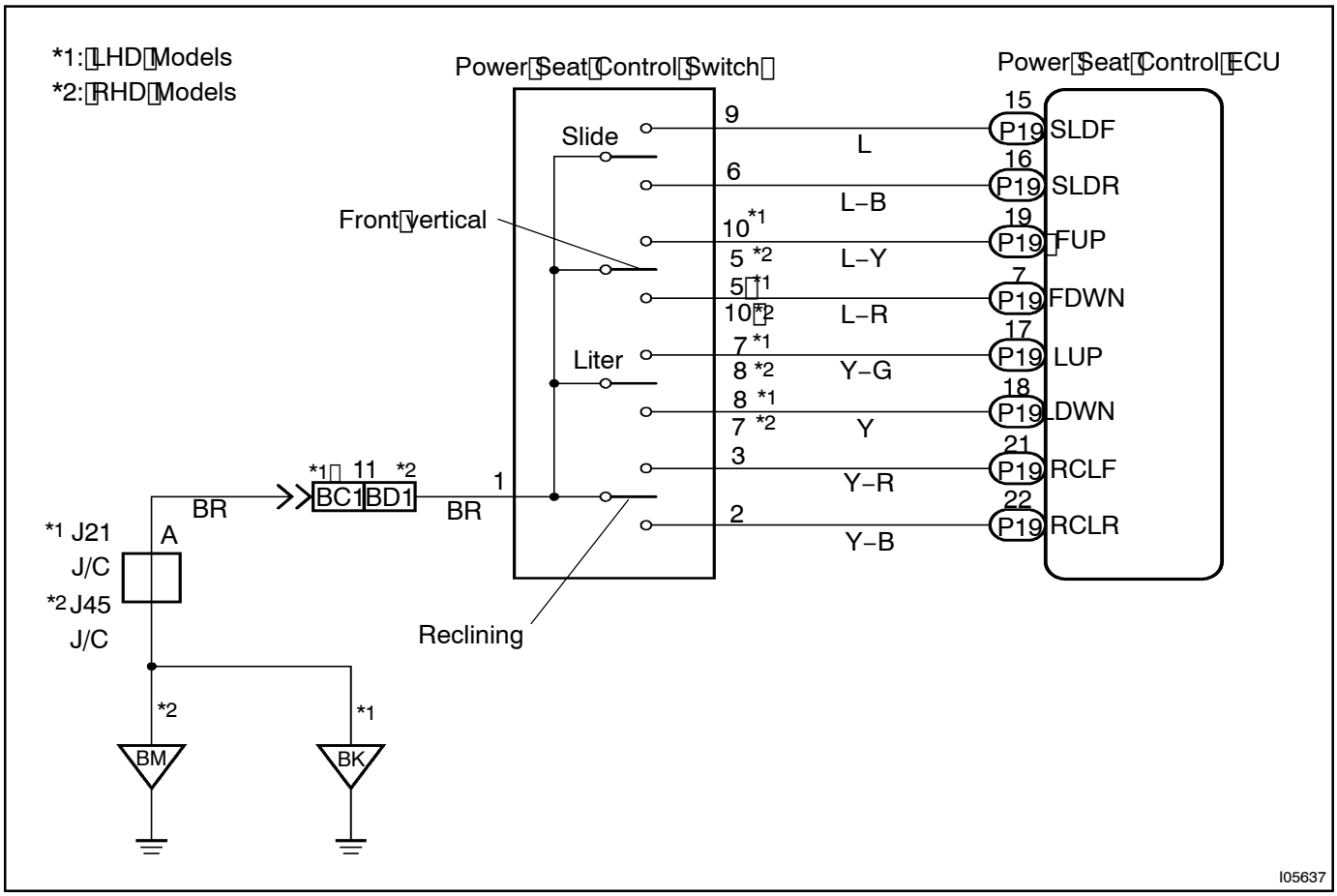
NG

Proceed to next circuit inspection shown in problem symptoms table (See page DI-522).

DI27T–02

Power Seat Control Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Check power seat control switch operation.**

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.

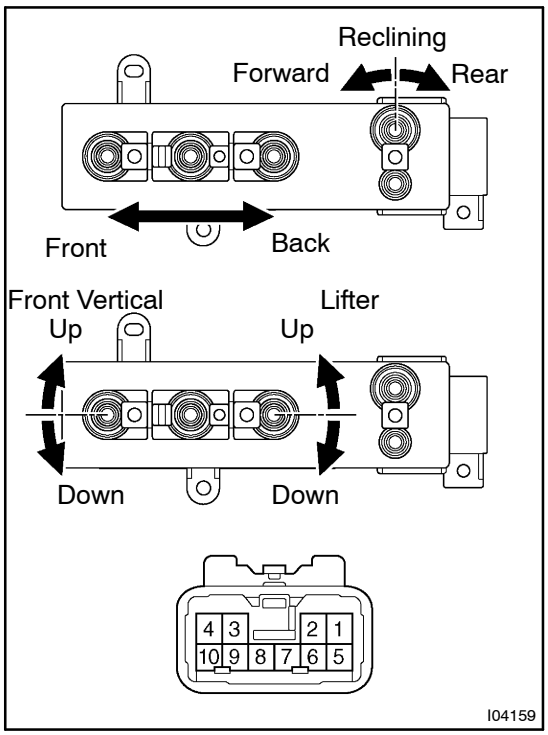
CHECK:
Check that switch status (ON/OFF) changes on the screen of LEXUS hand–held tester as the power seat control switch of the vehicle is turned.

OK:
The switch status changes in the same way as the vehicle switch operation.

OK	**Check and replace Power seat position ECU (See page IN–29).**

NG

2	Check power seat control switch.



PREPARATION:

(a) Remove seat.

(b) Disconnect power seat control switch.

CHECK:

Check continuity between terminals when switch operated.

OK:

( ): RHD Models:

Driver's seat slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 – 9	Continuity
BACK	1 – 6	Continuity

Driver's seat front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 – 5 (10)	Continuity
DOWN	1 – 10 (5)	Continuity

Driver's seat lifter switch:

Switch position	Tester connection	Specified condition
UP	1 – 8 (7)	Continuity
DOWN	1 – 7 (8)	Continuity

Driver's seat reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 3	Continuity
REAR	1 – 2	Continuity

Passenger's slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 – 9	Continuity
BACK	1 – 6	Continuity

Passenger's front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 – 10	Continuity
DOWN	1 – 5	Continuity

Passenger's lifter switch:

Switch position	Tester connection	Specified condition
UP	1 – 7 (8)	Continuity
DOWN	1 – 8 (7)	Continuity

Passenger's reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 3	Continuity
REAR	1 – 2	Continuity

NG → Replace power seat control switch.

OK

3	Check harness and connectors between power seat position ECU and power seat control switch (See page IN–29).

NG → Repair and replace harness or connector.

OK

Check and replace power seat position ECU. (See page IN–29).

DI27U–02

M1, M2 SET Switch Circuit

WIRING DIAGRAM

See page

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 3.

1	**Check M1, M2 SET switch operation.**

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:
Check that switch status (ON/OFF) changes on the screen of LEXUS hand–held tester as M1 and M2 SET switches of the vehicle are turned.
OK:
The switch status changes in the same way as the vehicle switch operation.

NG → **Go to step 3.**

OK

2	**Check power seat position memory function.**

PREPARATION:
(a) Disconnect the negative (–) terminal of the battery, after 5 minutes reconnect it.
HINT:
Reset the memory of power seat position ECU.
(b) Connect the LEXUS hand–held tester to the DLC3.
(c) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(d) Select the DATALIST mode on the LEXUS hand–held tester.
CHECK:
When driving position is recorded in memory by turning M1 and M2 switches of the vehicle, check that memory status changes from "Not memorized" to "Memorized" on the screen of the LEXUS hand–held tester.
OK:
The switch status changes in the same way as the vehicle switch operation.

NG → **Check and replace power seat position ECU (See page IN–29).**

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).

3	Check M1, M2 SET switch. (See page BE–192)

NG → Replace the M1, M2 and SET switches.

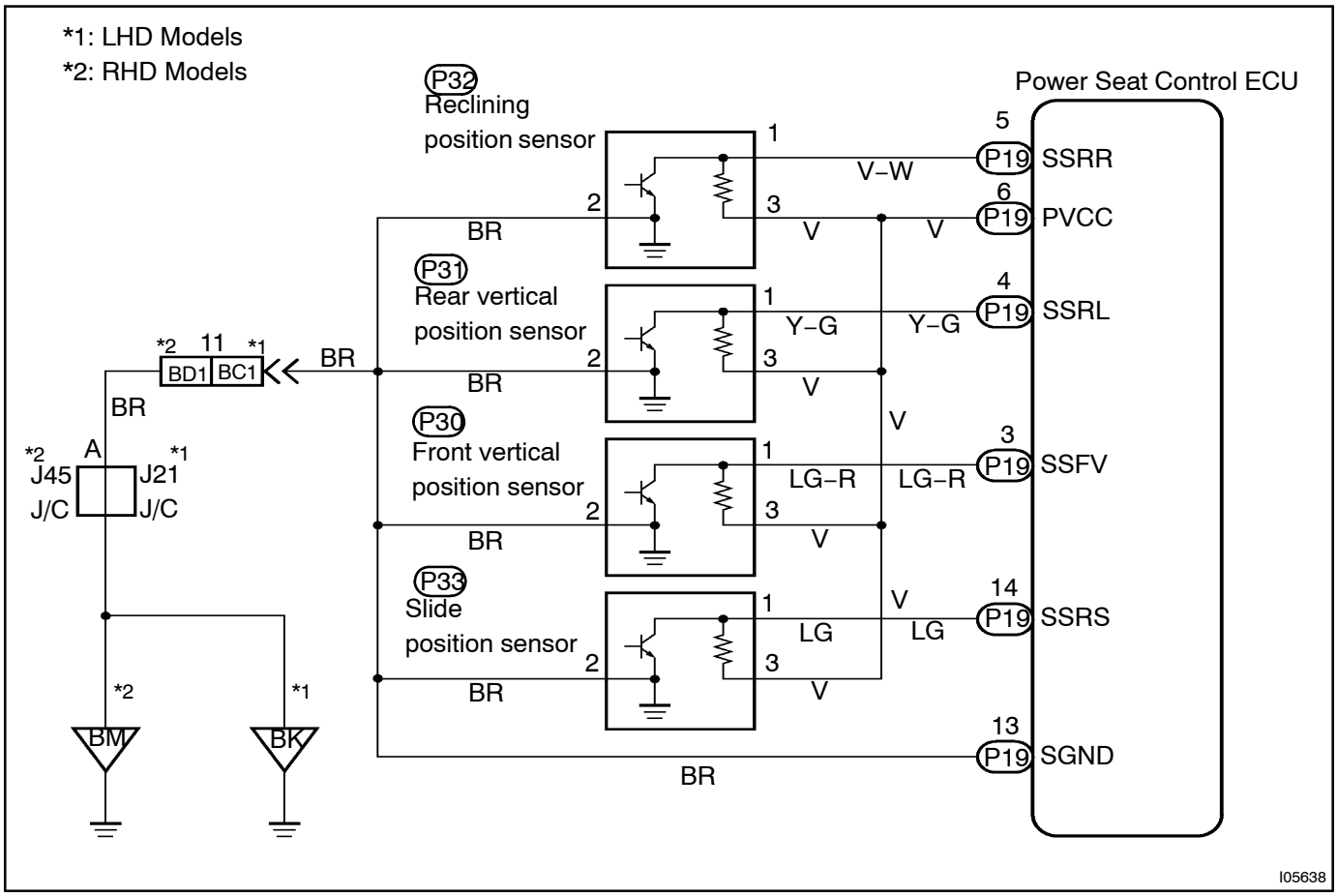
OK

Check and repair the harness or connector between driver door ECU and switch.

DI27V–02

Position sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Check position sensor signal.**

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:

(a) When operating each adjustment functioin of seat by turning the power seat control switch of the vehicle, check that ”Position sensor” value changes on the screen of LEXUS hand–held tester.
(b) When operating each adjustment function of seat by turning the power seat control switch of the vehicle, check that ”Motor status” changes from OFF to ON on the screen of LEXUS hand–held tester.

HINT:
When the seat is moved to the limit positions, ”Lock” is displayed in the column of ”Motor status” on the screen of LEXUS hand–held tester. At that time, if the power seat control switch is released, it turns OFF.

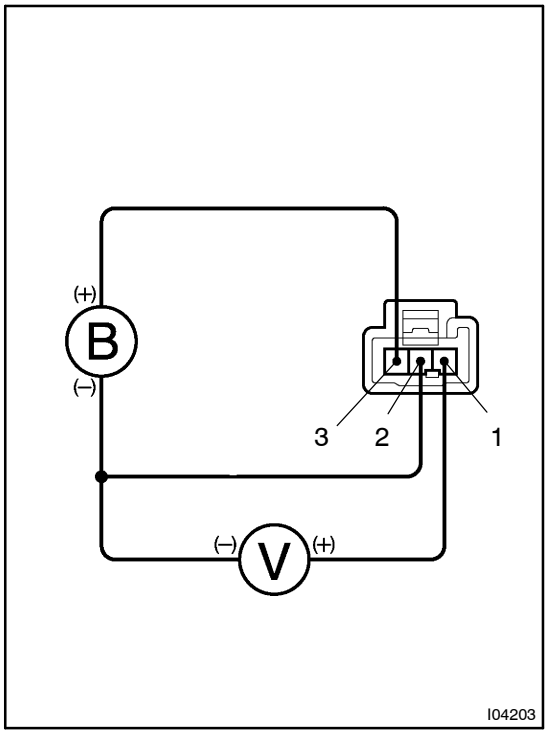
OK:

Both "Position sensor" value and "Motor status" are changing.

OK	Check and replace power seat position ECU (See page IN-19).

NG

2	Check position sensor.



PREPARATION:

Disconnect the connector of the sensor and the connector of the motor leading to the sensor.

CHECK:

(a) Connect positive (+) lead to terminal 3 of sensor and negative (–) lead to terminal 2.

(b) Measure voltage between terminal 1 of sensor and body ground when battery positive voltage is applied between terminals 1 and 2 of motor connector.

HINT:

When the battery positive voltage is applied to the motor connector terminals, (+) and (–) are interchangeable.

OK:

Condition	Voltage
Motor stopped (Check several times with the motor in a different position each time.)	0V or battery positive voltage according to stop position
Motor running	Half of battery positive voltage

NG	Replace power seat motor.

OK

3	Check harness and connectors between power seat position ECU and position sensors (See page IN-19).

NG	Repair or replace harness or connectors.

OK

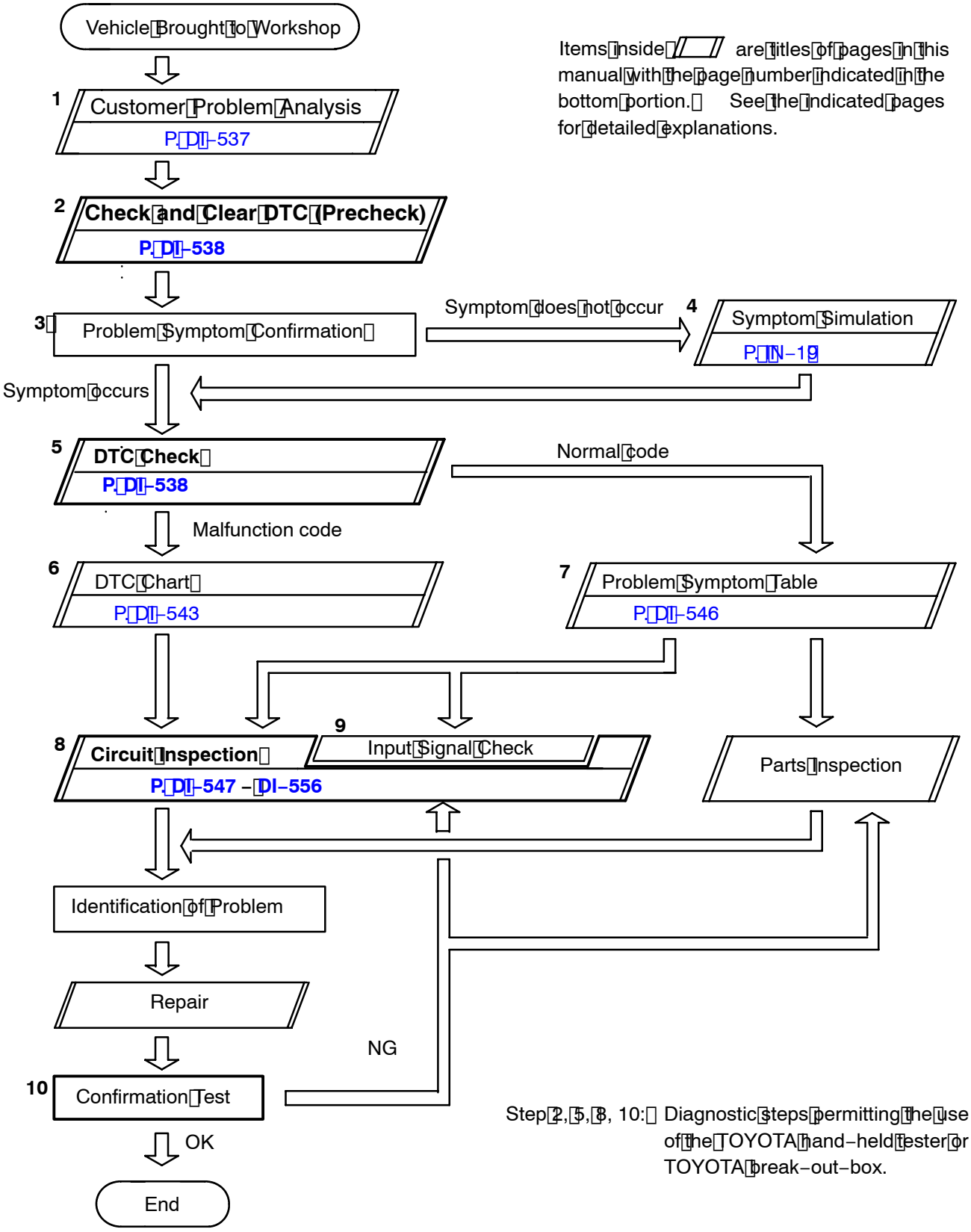
Check and replace power seat position ECU (See page IN–19).

CRUISE CONTROL SYSTEM

DI26R–03

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 TOYOTA hand–held tester or TOYOTA break–out–box.

DI26S–03

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)

DI2V2–01

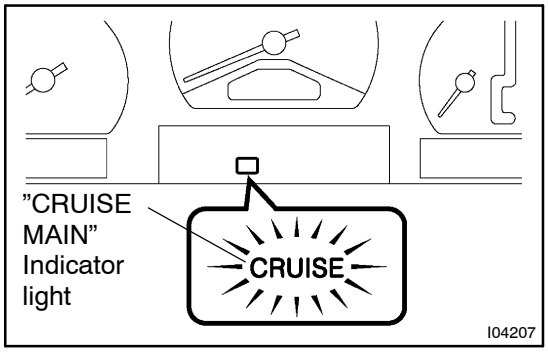
PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Check the indicator.

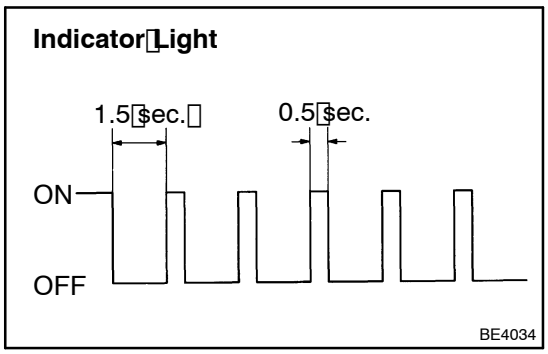
(1) Turn the ignition switch to ON.

(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:

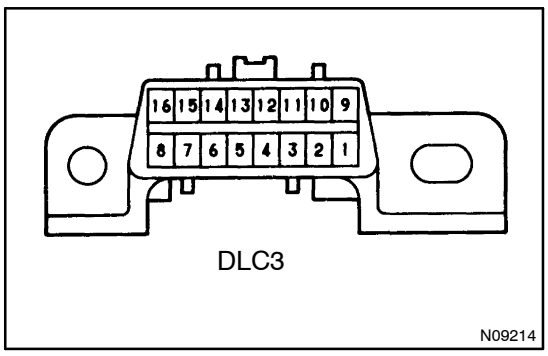
If the indicator check result is not normal, proceed to trouble-shooting (See page DI–584) for the combination meter section.



(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.



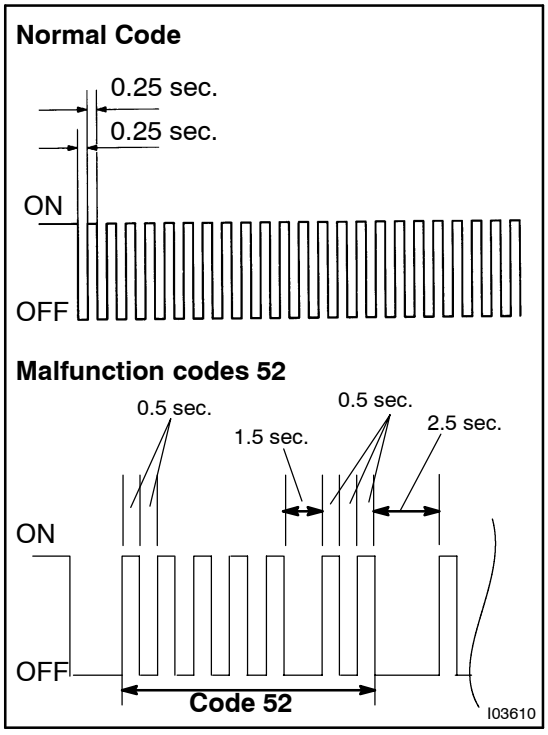
(c) Output DTC using diagnosis check wire.

(1) Turn the ignition switch ON.

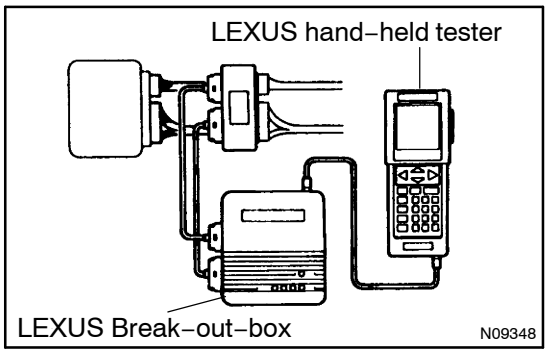
(2) Using SST, connect terminals Tc and E_1 of DLC3.

SST 09843–18020

(3) Read the DTC on the CRUISE MAIN indicator light.

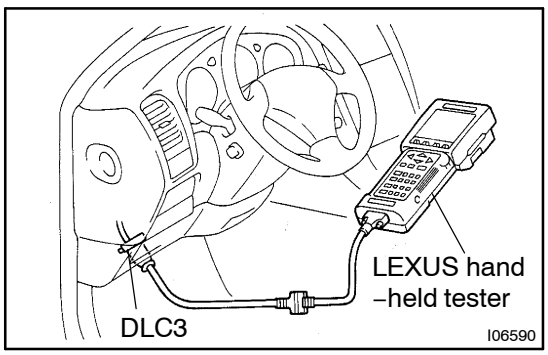


HINT:
If the DTC is not output, inspect the diagnosis circuit.
As an example, the blinking patterns for codes; normal 52 are shown in the illustration.



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

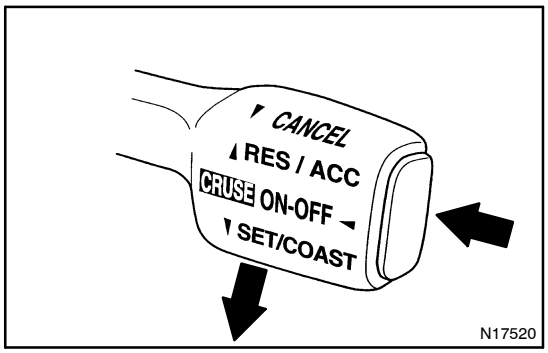
The following actions will erase the DTCs and freeze frame data.

(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.

(a) 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.

(b) Check that the normal code is displayed after connecting the fuse.



5. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

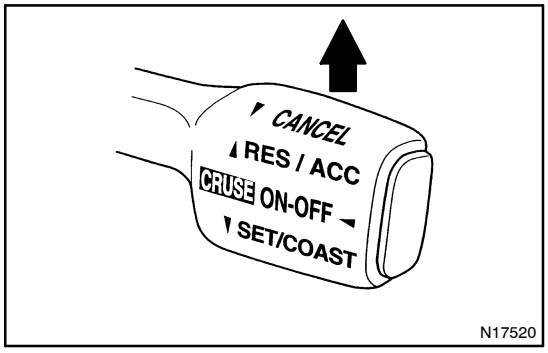
(a) Inspect the SET switch.

(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.



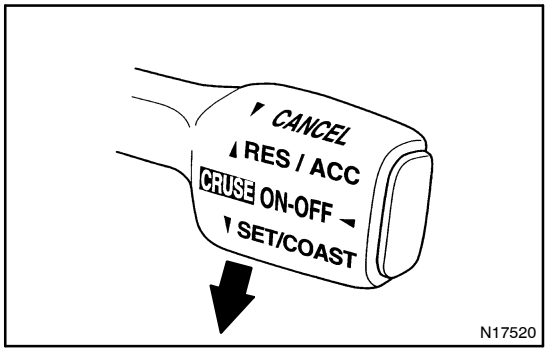
(b) Inspect the ACCEL switch.

(1) Push the main switch ON.

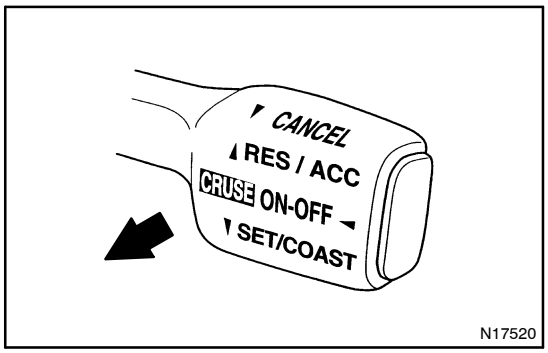
(2) Drive at a desired speed (40 km/h (25 mph) or higher).

(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.

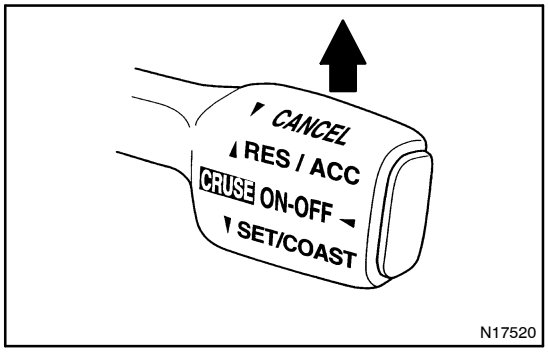
(4) Momentarily press the control switch upward in the RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap–up function).



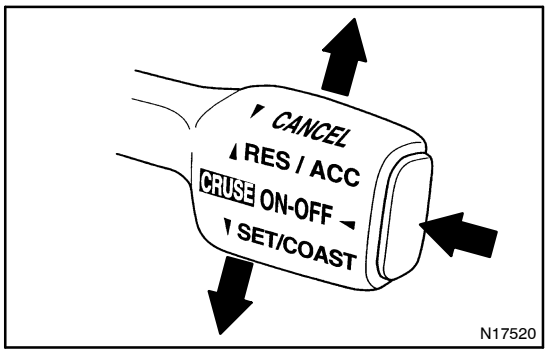
(c) Inspect the COAST switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
  (4) Momentarily 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–03

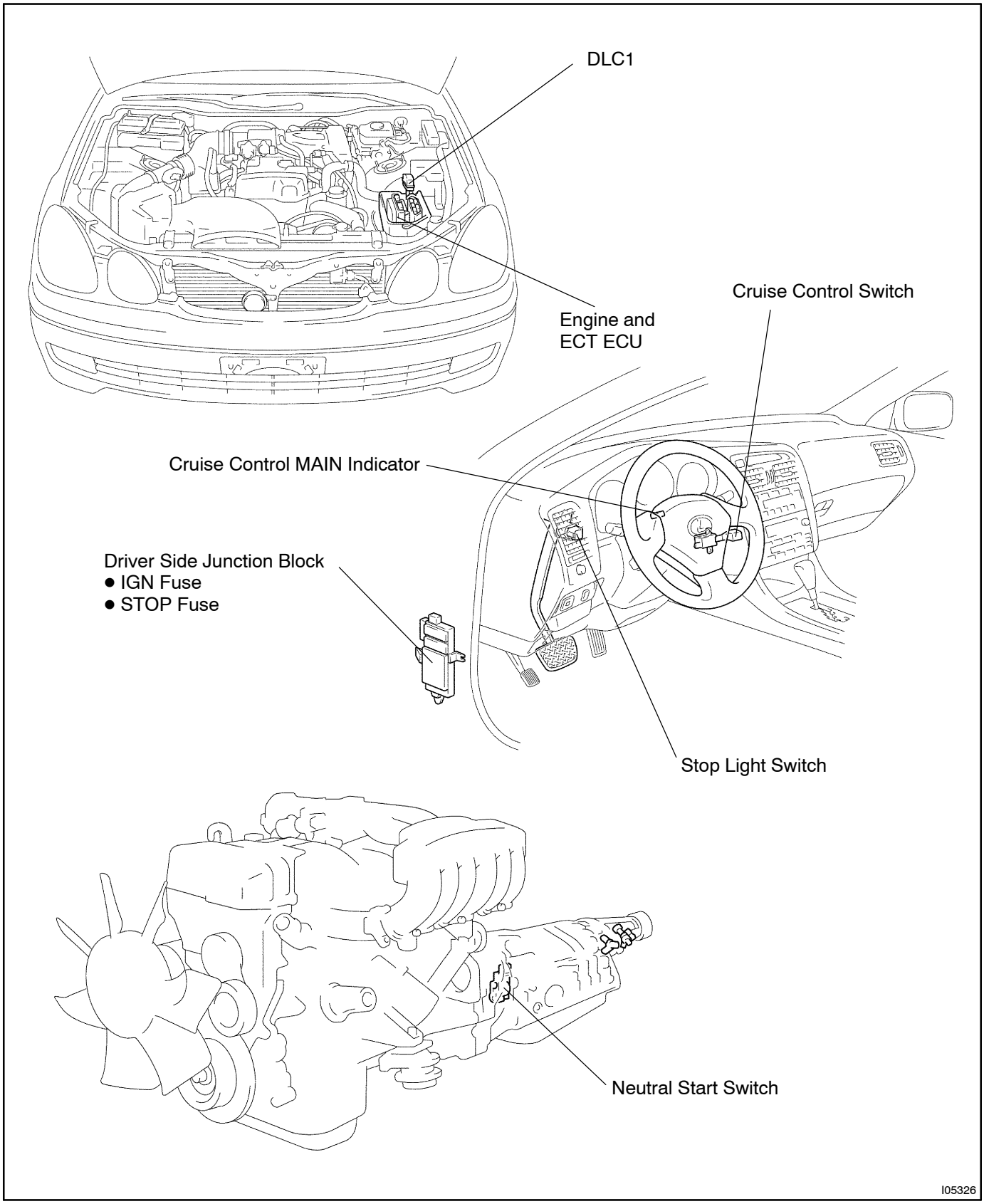
DIAGNOSTIC TROUBLE CODE CHART

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
P5001/ 21, 23 (DI–547)	Vehicle Speed Signal Abnormal	• Harness or connector between Engine and ECT ECU and vehicle speed sensor • Vehicle speed sensor • Engine and ECT ECU
P5201/ 52 (DI–548)	Short in Stop Light Switch Circuit	• Stop light switch • Harness or connector between Engine and ECT ECU and stop light switch circuit • Engine and ECT ECU
P5661/ 54 (DI–552)	Input Signal Circuit	• Engine and ECT ECU

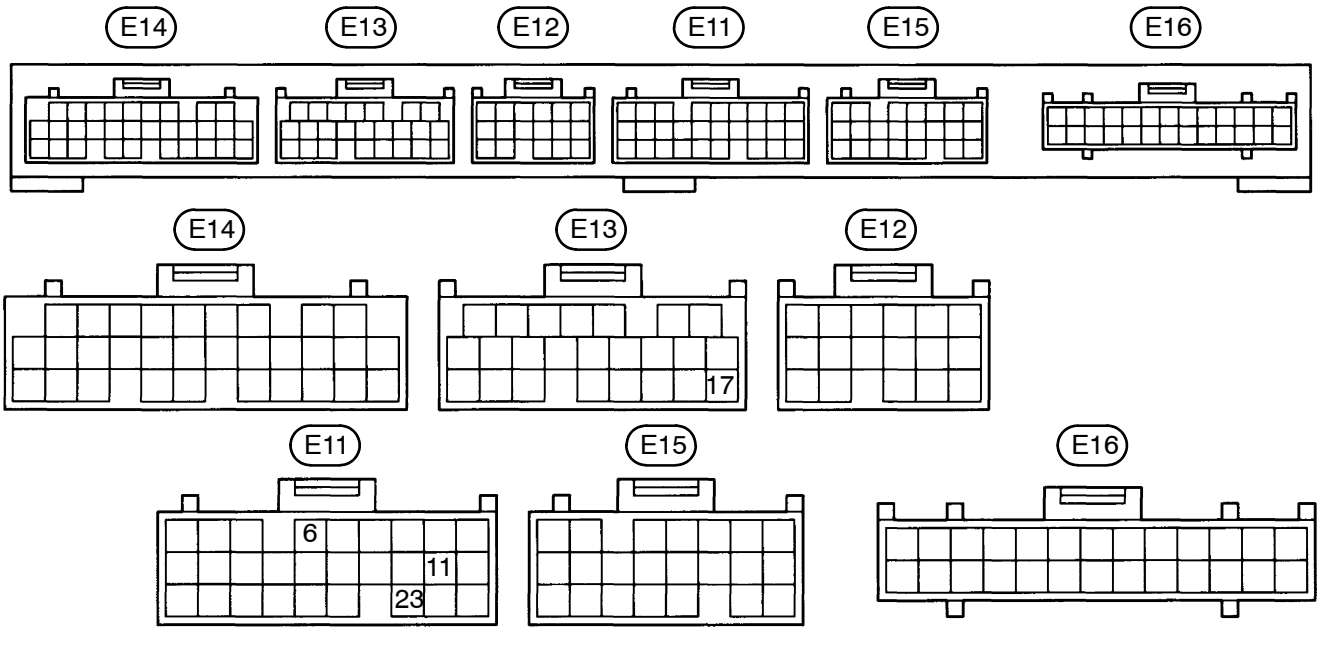
DI26V–03

PARTS LOCATION



DI2T6–01

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ E1 (E11 – 6 ↔ E13 – 17)	G–W ↔ BR	Ignition switch ON and Depress brake pedal	10 – 16 V
		Ignition switch OFF or Release brake pedal	Below 1 V
ST1– ↔ E1 (E11 – 11 ↔ E13 – 17)	B–L ↔ BR	Ignition switch ON and release brake pedal	10 – 16 V
		Ignition switch OFF or depress brake pedal	Below 1 V
CCS ↔ E1 (E11 – 23 ↔ E13 – 17)	R–Y ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch held ON	6.9 – 9.8 V
		Ignition switch ON SET/COAST switch held ON	4.7 – 6.9 V
		Ignition switch ON RES/ACC switch held ON	2.4 – 3.8 V

DI26X–02

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–552 DI–547 DI–548 DI–592 IN–29
SET not occurring or CANCEL occurring. (DTC is not output)	1. Engine and ECT ECU	IN–29
Actual vehicle speed deviates above or below the set speed.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–552 IN–29
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road. (Hurting)	1. Engine and ECT ECU	IN–29
Cruise control not cancelled, even when brake pedal is depressed.	1. Stop Light Switch Circuit 2. Engine and ECT ECU	DI–548 IN–29
Cruise control not cancelled, even when transmission is shifted to ”N” position.	1. Neutral Start Switch Circuit 2. Engine and ECT ECU	DI–592 IN–29
Cruise control not cancelled, even when clutch pedal is depressed.	1. Engine and ECT ECU	IN–29
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Input Signal Circuit 2. Engine and ECT ECU	DI–552 IN–29
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Throttle Cable 2. Input Signal Circuit 3. Engine and ECT ECU	 DI–552 IN–29
Poor response is ACCEL and RESUME modes.	1. Engine and ECT ECU	IN–29
O/D does not resume, even though the road is not uphill.	1. Engine and ECT ECU	IN–29
DTC memory is erased.	1. Engine and ECT ECU	IN–29
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Engine and ECT ECU	 IN–29
Cruise MAIN indicator light remains ON or falls to light up.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–552 IN–29

DI26Y–02

CIRCUIT INSPECTION

DTC	P0500/21,23	Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

See page DI–72.

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–72.

INSPECTION PROCEDURE

See page DI–72.

DI26Z–03

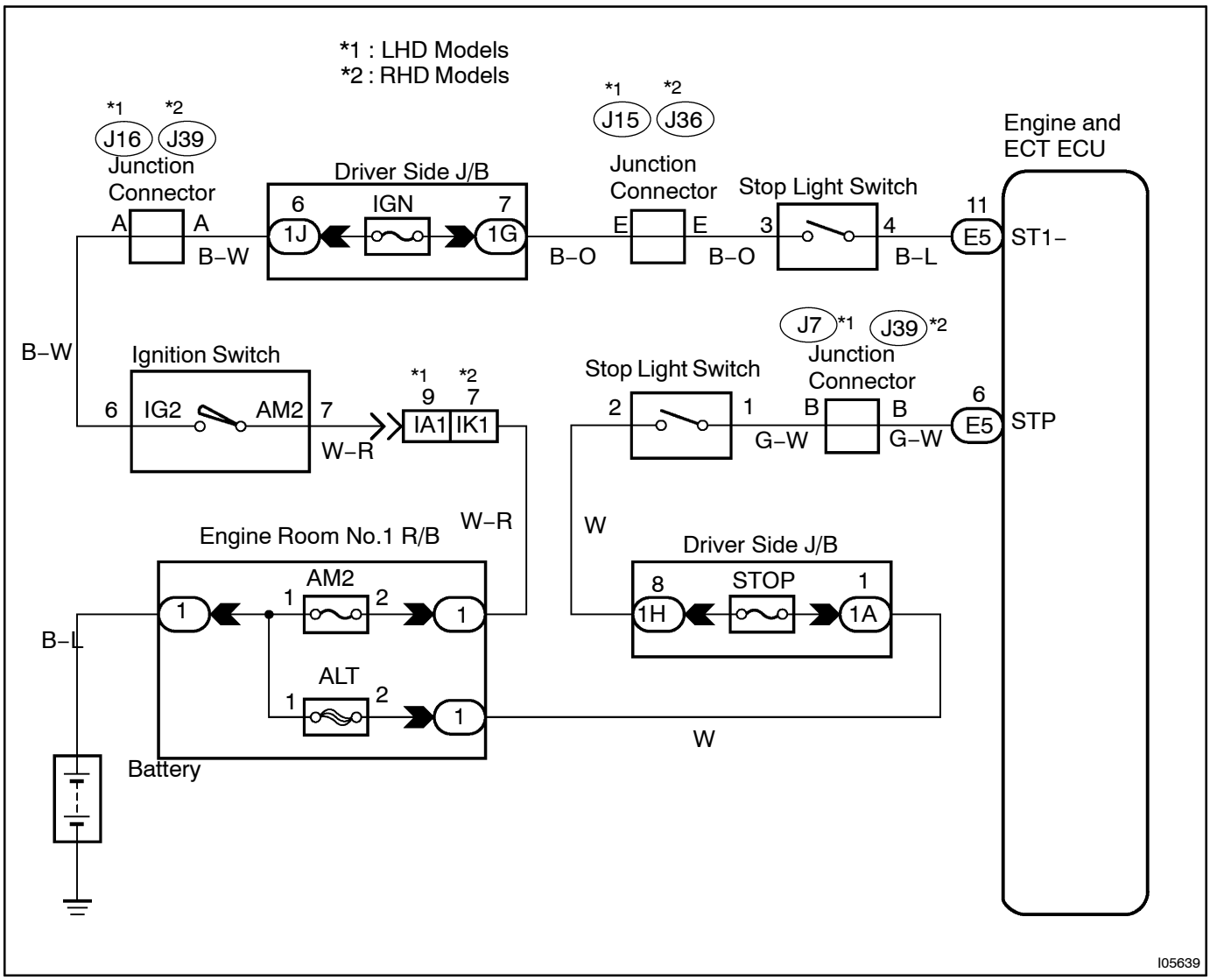
DTC	P1520/52	Stop light switch circuit

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 positive voltage is supplied to terminal STP.
When the brake is on, battery positive 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 positive 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



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, ECM 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–546).**

NG

2	**Check operation of stop light.**

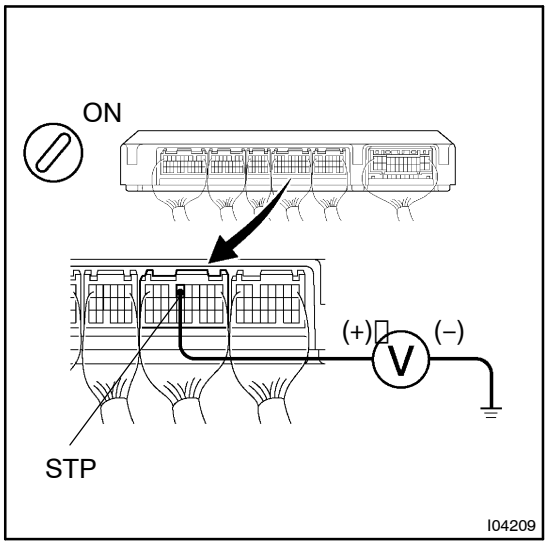
CHECK:

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–76).**

OK

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



PREPARATION:

(a) Remove the ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal STP of 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–546).

NG

4	Check wire harness and connector between terminal STP of ECU and stop light switch, and terminal ST1– of ECM and stop light switch (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ECU (See page IN–29).

DI270–03

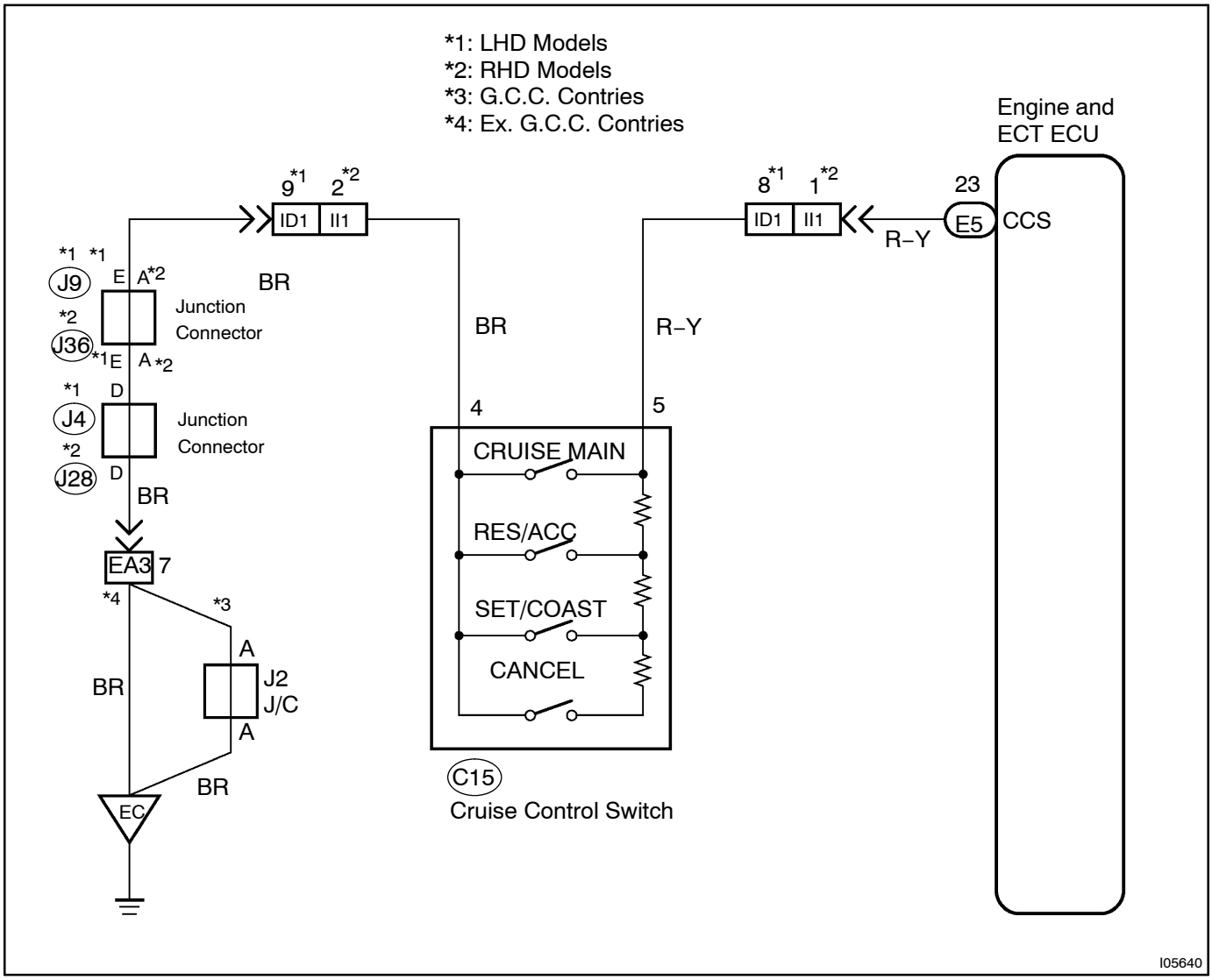
DTC	P1566/54	Input signal circuit abnormal

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signals (each voltage) to the ECU. and See page DTC52xxxx

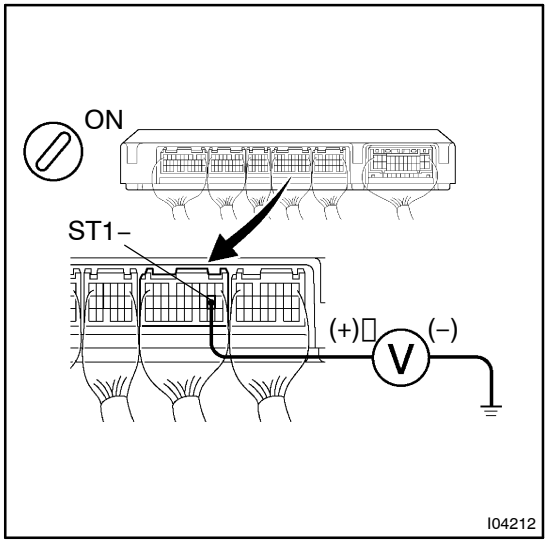
DTC No.	Detection Item	Trouble Area
54	• Stop light switch input signal abnormal. • Cruise control switch input signal abnormal.	• Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal ST1– of ECU connector and body ground.



PREPARATION:

(a) Remove the ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal ST1– of ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Released	10 – 14 V
Depressed	Below 1 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–546).

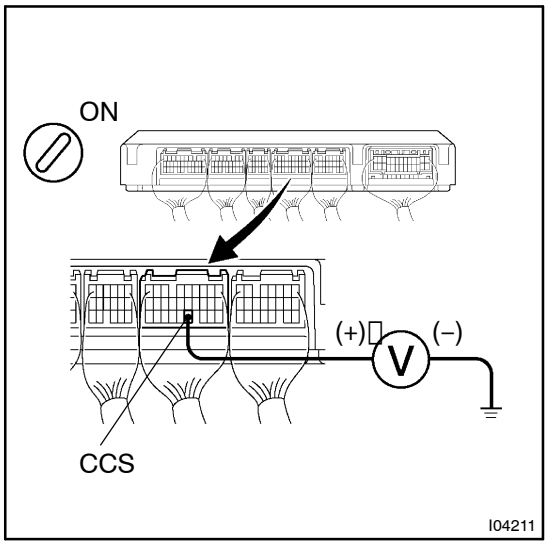
NG

2	Check for open in harness and connectors between terminal ST1– of ECU and stop light switch (See page IN–29).

NG → Repair or replace harness or connector.

OK

3	Check voltage between terminals CCS of ECU connector and body ground.



PREPARATION:

(a) Remove the ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

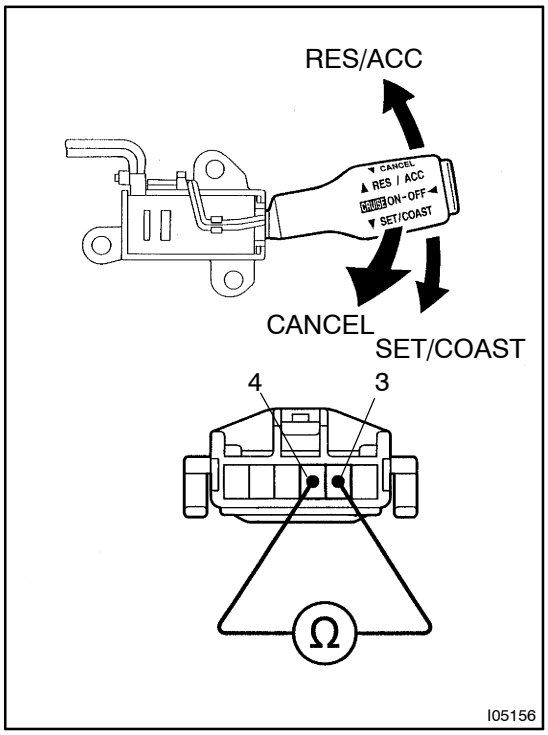
Measure voltage between terminals CCS of ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 – 16 V
RES/ACC	2.4 – 4.4 V
SET/COAST	4.7 – 7.6 V
CANCEL	6.9 – 11.2 V

NG → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–546)**

OK

4	Check control switch continuity.



PREPARATION:

(a) Remove steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

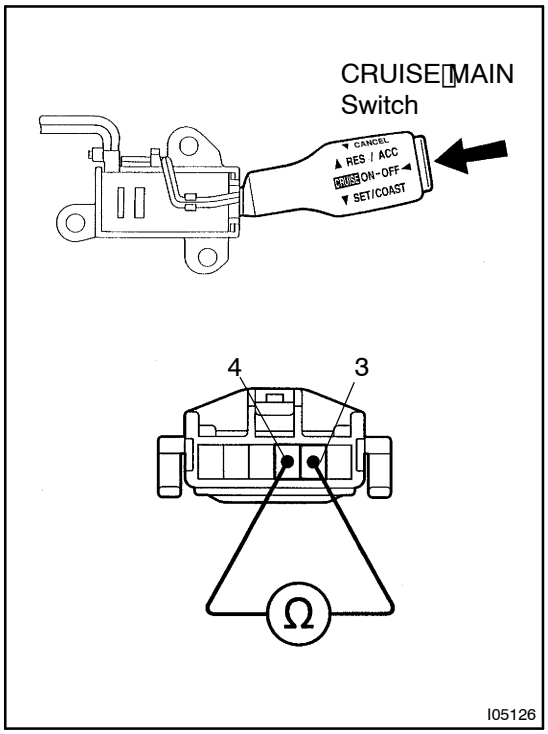
Measure resistance between terminals 4 and 5 of control switch connector when control switch is operated.

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

5	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

6	Check harness and connector between ECU and cruise control switch, cruise control switch and body ground (See page IN–29).

NG → Repair or replace harness or connector.

OK

7	Check cruise control indicator light. (See combination meter)

NG → Replace combination meter.

OK

Check and replace ECU (See page IN–29).

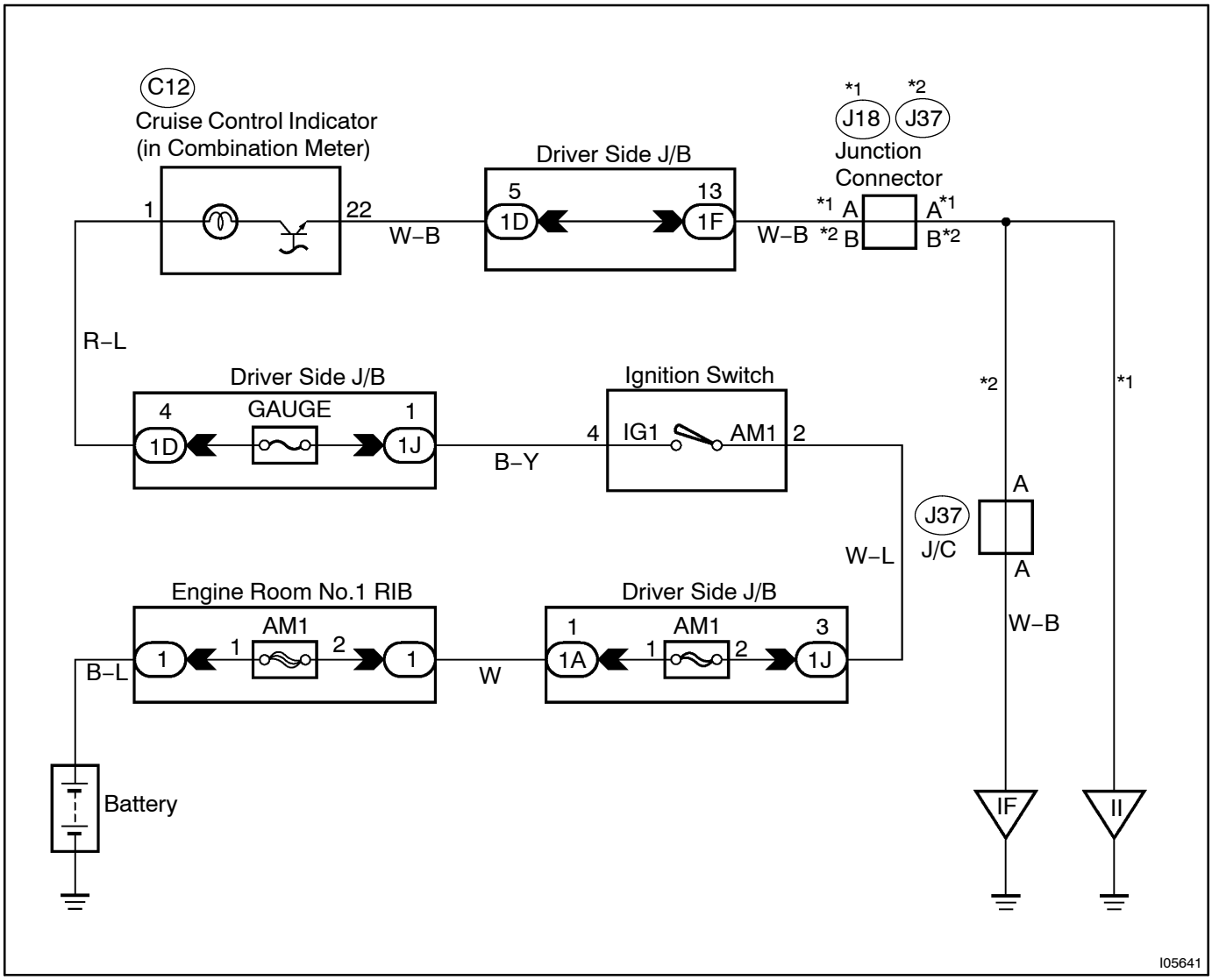
DI271–03

CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check combination meter (See page DI–584).

NG → Replace combination meter.

OK

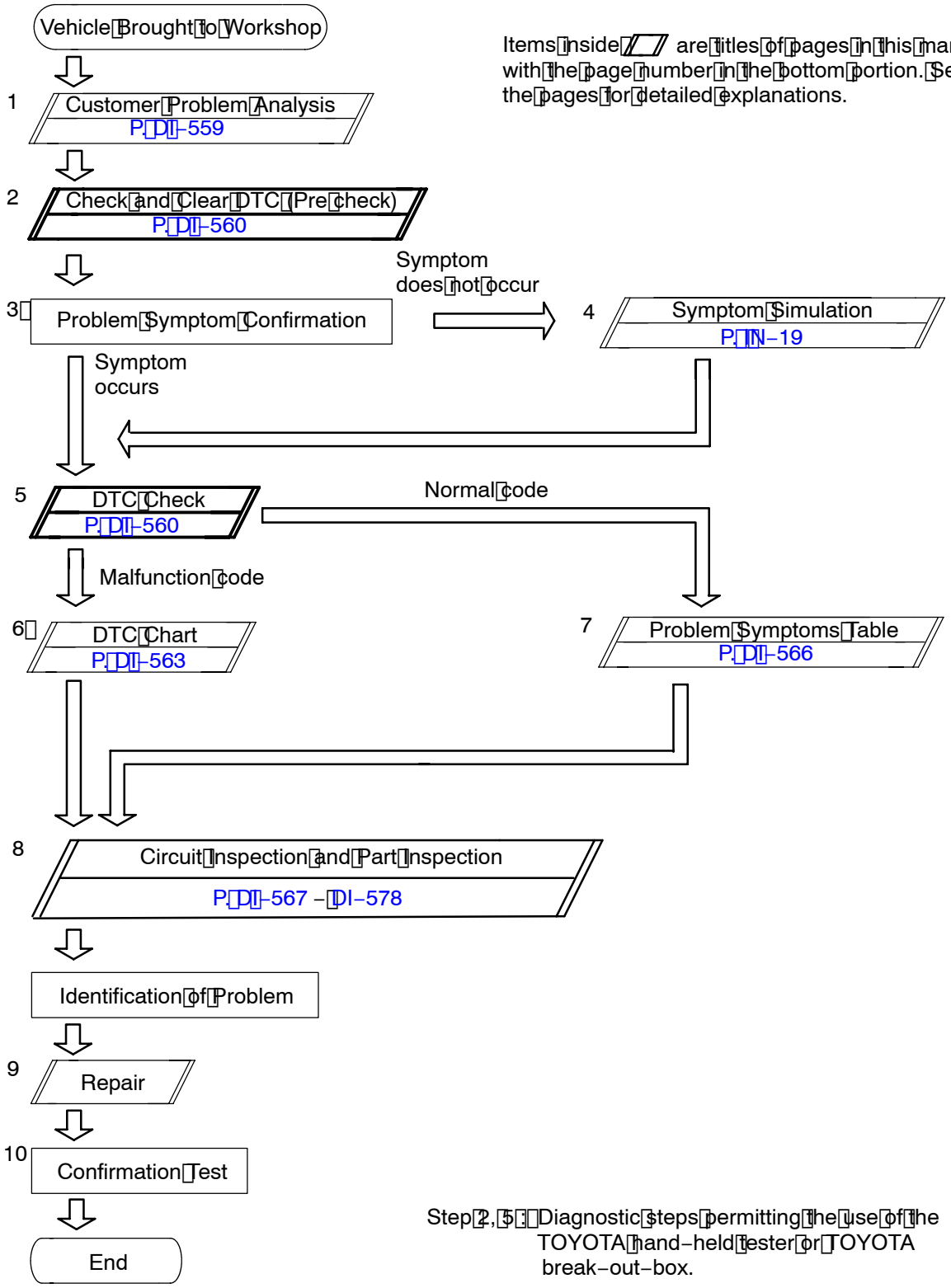
Check and replace ECU (See page IN–29).

ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1AJ–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: Diagnostic steps permitting the use of the TOYOTA hand–held tester or TOYOTA break–out–box.

DI1AK–05

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)

DI2SY–01

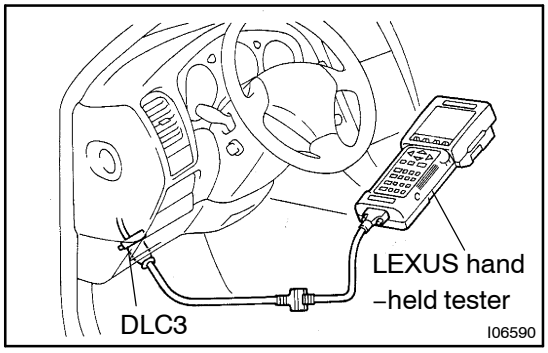
PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description

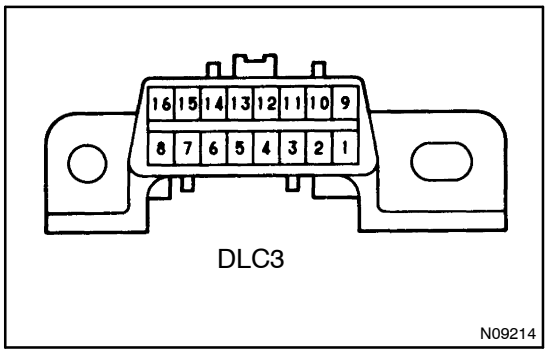
ECM controls the function of immobiliser on this vehicle. Data of the immobiliser or DTC can be read form DLC3 of the vehicle. When a trouble occurs on immobiliser, MIL does not light up but DTC inspection is performed.

Therefore when there seems to be a trouble on immobiliser, use LEXUS hand–held tester or SST to check and troubleshoot it.



(b) DLC3 INSPECTION

The vehicle's ECM uses ISO 9141–2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141–2 format.



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

HINT:

If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of OBD II scan tool or LEXUS 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.

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

(2) 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

(a) Check the DTC (Using LEXUS hand–held tester)

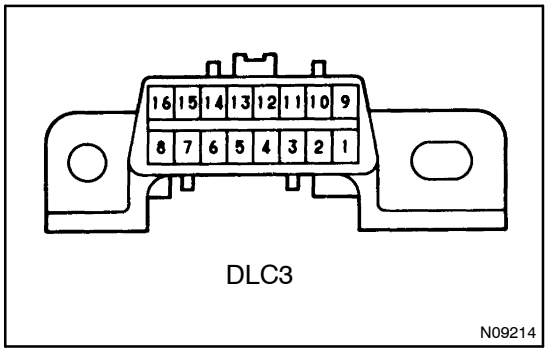
(1) Prepare the OBD II scan tool (complying with SAE J 1978) or LEXUS hand–held tester.

(2) Connect the OBD II scan tool or LEXUS hand–held tester to DLC3 under the instrument panel lower pad.

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

(4) Use the OBD II scan tool or LEXUS hand–held tester to check the DTCs and freeze frame data; note them down. (For operating instructions, see the OBD II scan tool's instruction book.)

(5) See page DI–563 to confirm the details of the DTCs.



(b) Check the DTC (Using diagnosis check wire)

(1) Turn ignition switch ON.

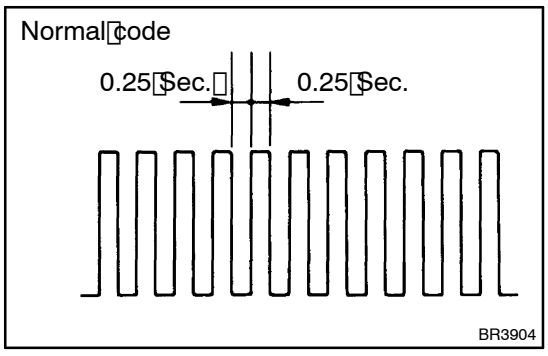
(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of DLC 3.

SST 09843–18040

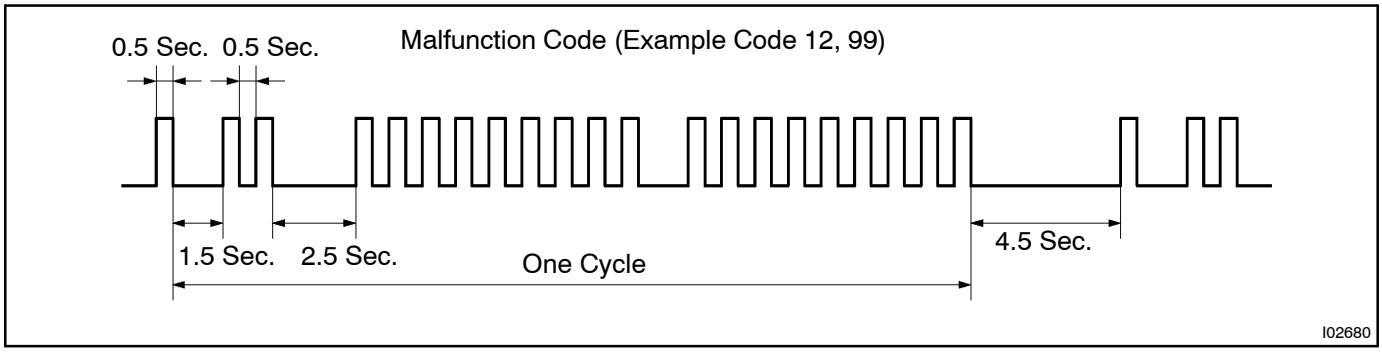
(3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit.
- ECM 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.

DI1AM–05

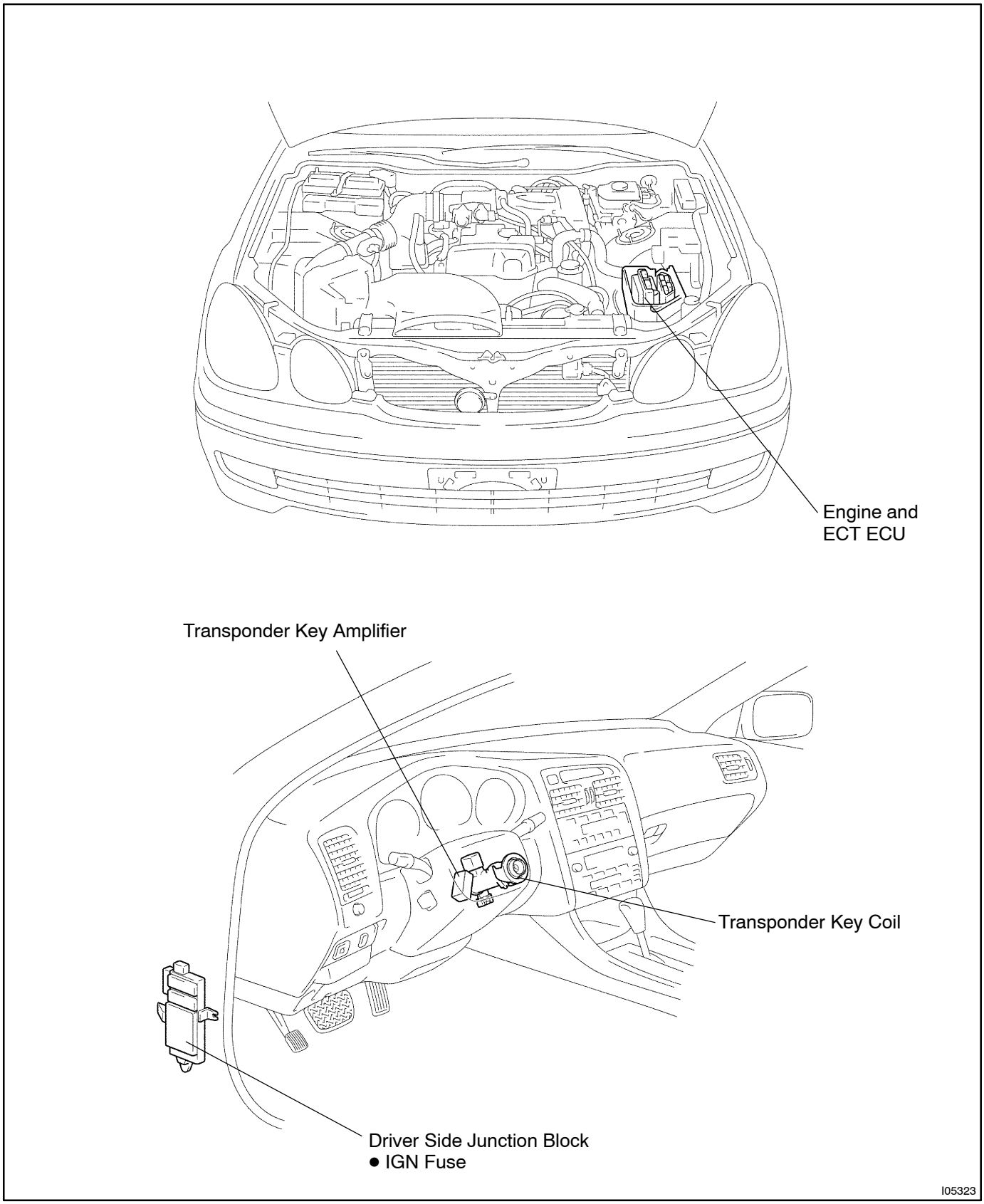
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See page)	Detection Item	Trouble Area
B2785 (DI–567)	Ignition switch ON malfunction	• Ignition Switch • Main Relay • Wireharness
B2786 (DI–567)	Ignition switch OFF malfunction	
B2791 (DI–571)	Key unlock warning switch OFF malfunction	• Key unlock warning switch • Main Relay • Wireharness
B2795 (DI–573)	Unmatched key code	• Key • Unregistered key inserted before
B2796 (DI–574)	No communication in immobiliser system	• Key • Transponder key coil • Amplifier • Wirehaness • Engine and ECT ECU
B2797 (DI–576)	Communication malfunction No.1	• Communication contents • Unregistered key inserted before
B2798 (DI–578)	Communication malfunction No.2	• Key • Transponder key coil • Amplifier • Wire haness • Engine and ECT ECU

HINT:
To reduce the unnecessary exchange of Engine and ECT ECU, check that a trouble occurs with the original Engine and ECT ECU at the time of exchanging Engine and ECT ECU and the trouble will disappear with a new Engine and ECT ECU.

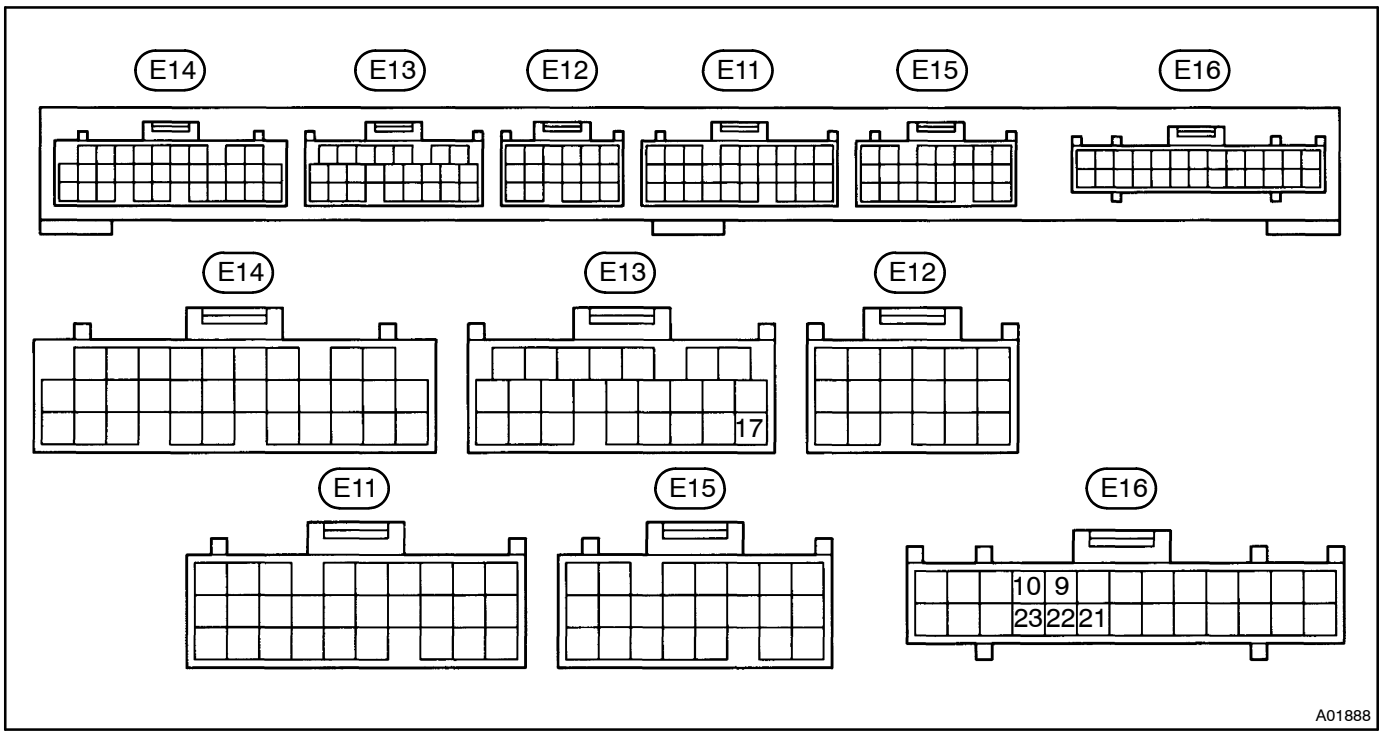
DI26P–02

PARTS LOCATION



DI2SZ–01

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CODE – E1 (E16 – 23 ↔ E13 – 17)	G–B ↔ BR	Ignition Switch ON	10 – 14
TXCT – E1 (E16 – 21 ↔ E13 – 17)	L–R ↔ BR	Ignition Switch ON	10 – 14
KSW – E1 (E16 – 10 ↔ E13 – 17)	Y ↔ BR	Ignition Switch ON	10 – 14
EOM – E1 (E16 – 9 ↔ E13 – 17)	W–B ↔ BR	Ignition Switch ON	4.5 – 5.5
RXCK – E1 (E16 – 22 ↔ E13 – 17)	B–W ↔ BR	Ignition Switch ON	10 – 14

DI1AP–05

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–29
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. Engine and ECT ECU	*1 IN–29 BE–253 IN–29
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. Engine and ECT ECU	*2 IN–29 IN–29
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–29 BE–253 IN–29
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–29 BE–253 IN–29
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. Engine and ECT ECU	IN–29 IN–29
Security indicator is abnormally blinking.	1. Wire harness 2. Engine and ECT ECU	IN–29 IN–29

*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.

DI1AQ-05

CIRCUIT INSPECTION

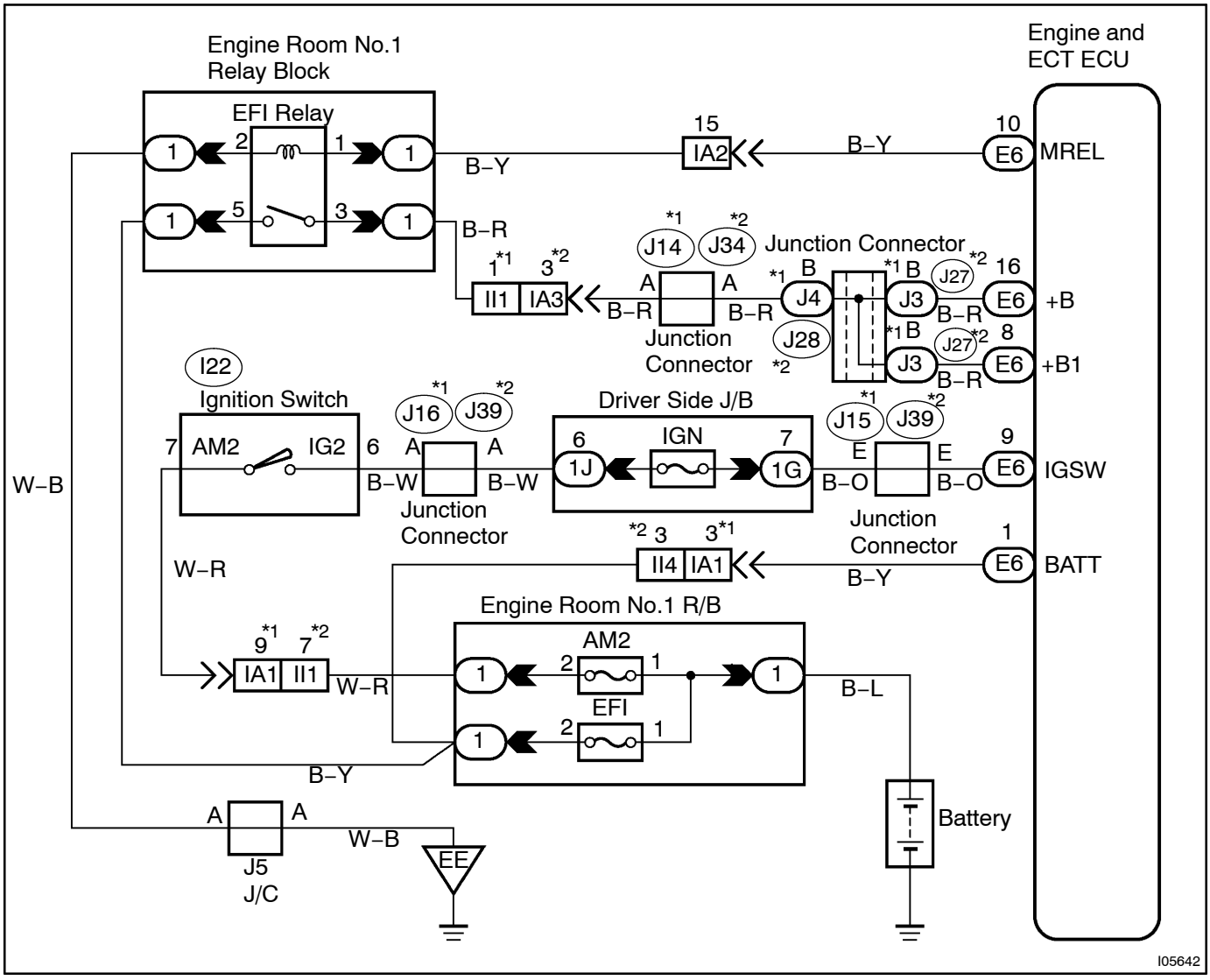
DTC	B2785/99	IG Switch ON Malfunction

DTC	B2786/99	IG Switch OFF Malfunction

CIRCUIT DESCRIPTION

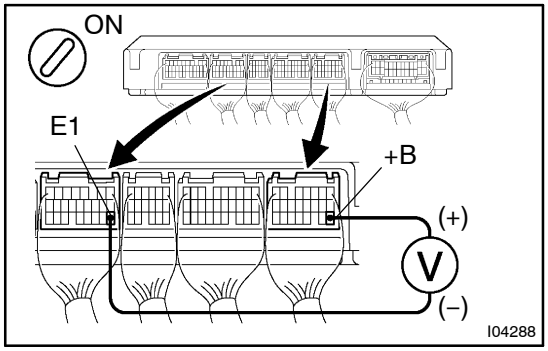
DTC No.	DTC Detecting Condition	Trouble Area
B2785/99	• Short circuit in IG switch circuit • IG switch adheres to ON position	• IG switch • EFI Main Relay • Wire harness
B2786/99	• Open circuit in IG switch circuit • IG switch adheres to OFF position	

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

(a) Remove the glove compartment.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals +B and E1 of ECU connectors.

OK:

Voltage: 9 – 14 V

OK	Proceed to next circuit inspection shown in problem symptoms table (See page DI–566).

NG

2	Check for open in harness and connector between terminal E1 of ECU and body ground (See page IN–29).

NG	Repair or replace harness or connector.

OK

3	Check EFI main relay (Marking: EFI) (See page FI–49).

NG	Replace EFI main relay.

OK

4	Check EFI fuse (See page DI–139).

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

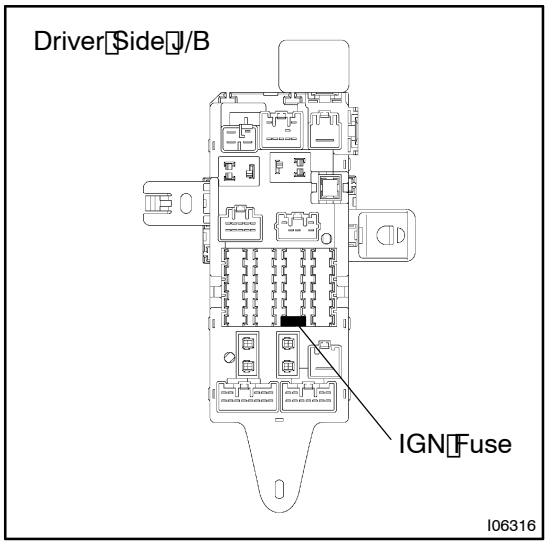
OK

5	Check for open in harness and connector between EFI main relay (Marking : EFI) and battery, EFI main relay (Marking : EFI) and ECM (See page IN–29).

NG → Repair or replace harness or connector.

OK

6	Check IGN fuse.



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

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

OK

7	Check ignition switch (See page BE–31).

NG → Replace ignition switch.

OK

8	Check for open circuit in harness and connector between IG switch and EFI main relay, EFI main relay and body ground (See page IN–29).

NG → Repair or replace wire harness and connector.

OK

Replace ECU.

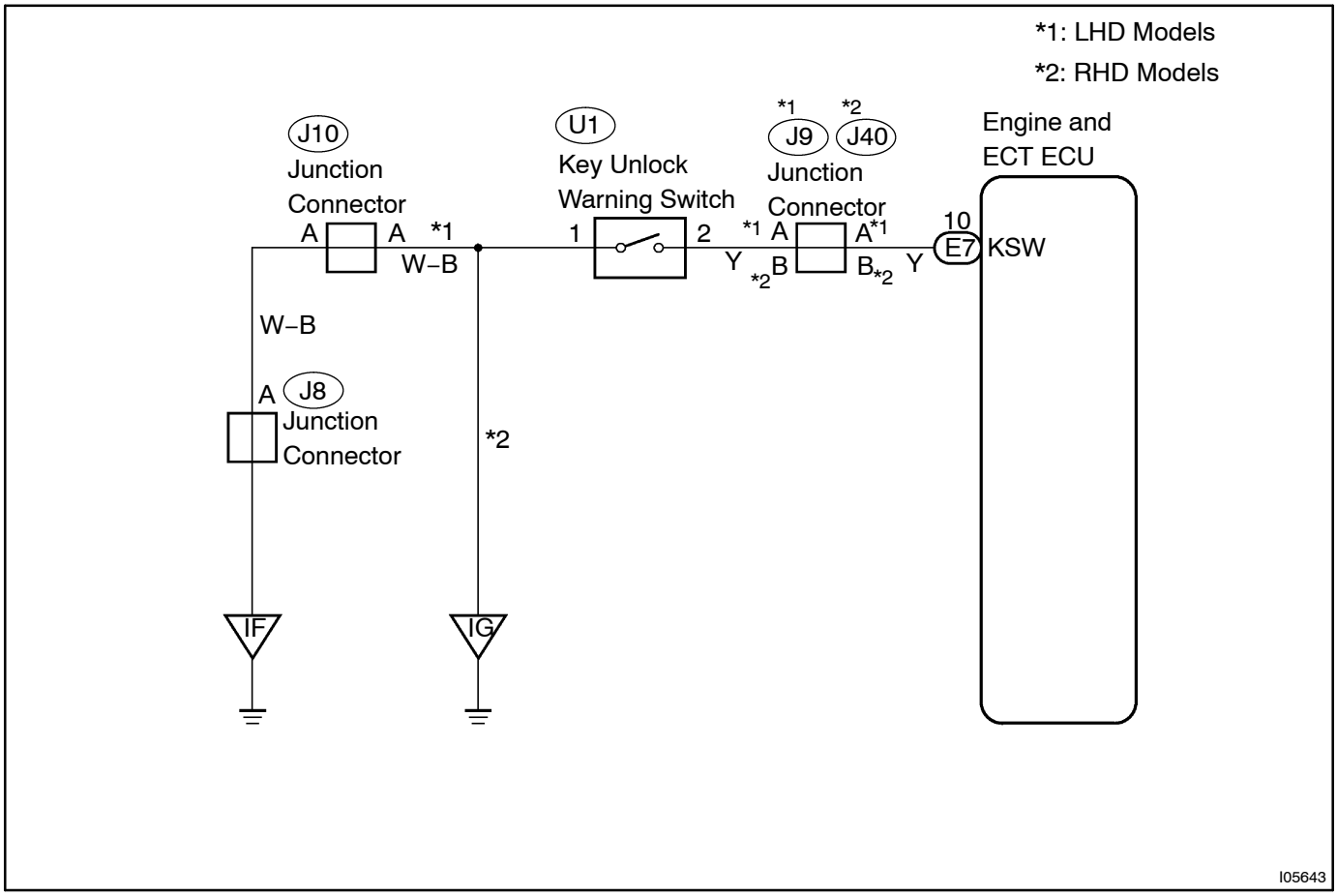
DI1AR–05

DTC	B2791/99	Key Unlock Warning SW OFF Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2791/99	• Open circuit in key unlock warning switch circuit. • Key unlock warning switch adheres to OFF position.	• Key unlock warning switch • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check key unlock warning switch (See page BE–31).

NG → Replace key unlock warning switch.

OK

2	Check harness and connector between key unlock warning switch and ECU.

NG → Repair or replace the harness or connector.

OK

Replace ECU.

DI1AS–05

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..)

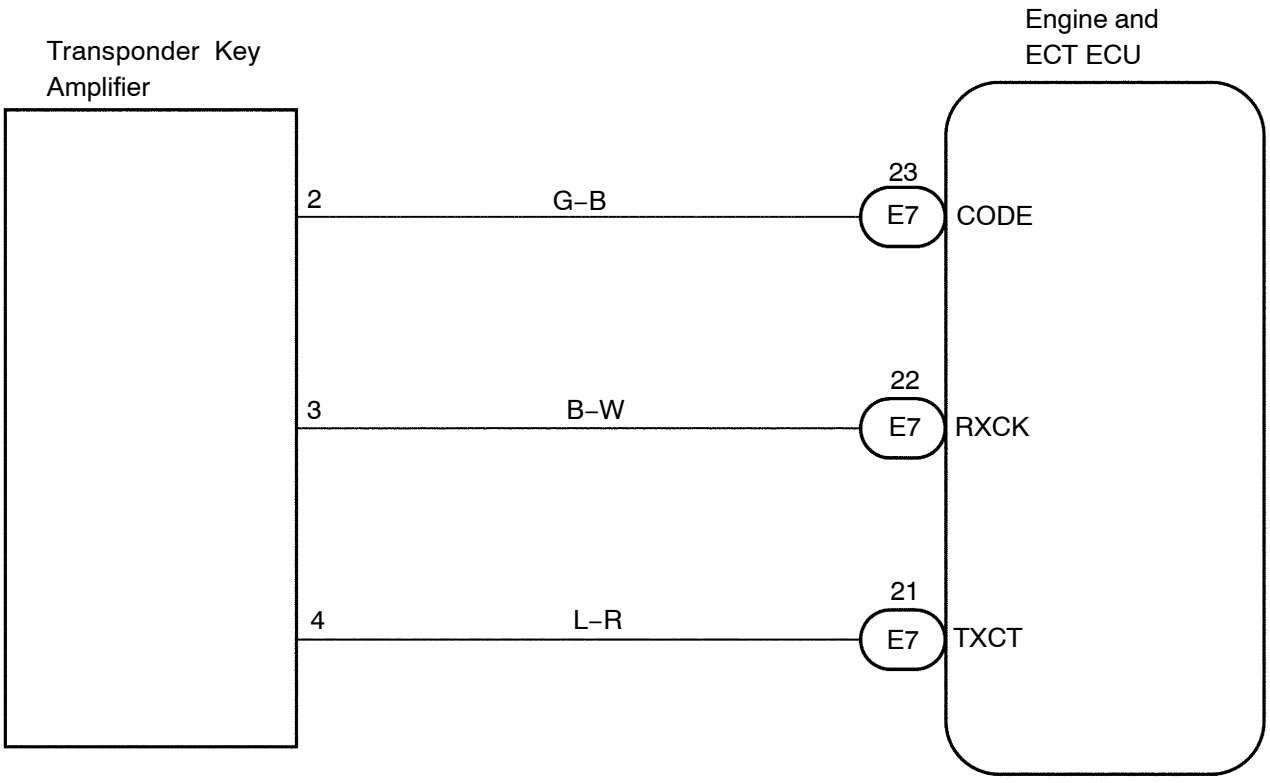
DI1AT–06

DTC	B2796/99	No Communication in Immobiliser system

CIRCUIT DESCRIPTION

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



INSPECTION PROCEDURE

1	Check transponder key coil (See page BE–253).

NG → Replace transponder key coil

OK

2	Check harness and connector between transponder key amplifier and ECU.

NG → Repair or replace harness and connector

OK

3	Does it operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

Replace ECU.

DI1AU–04

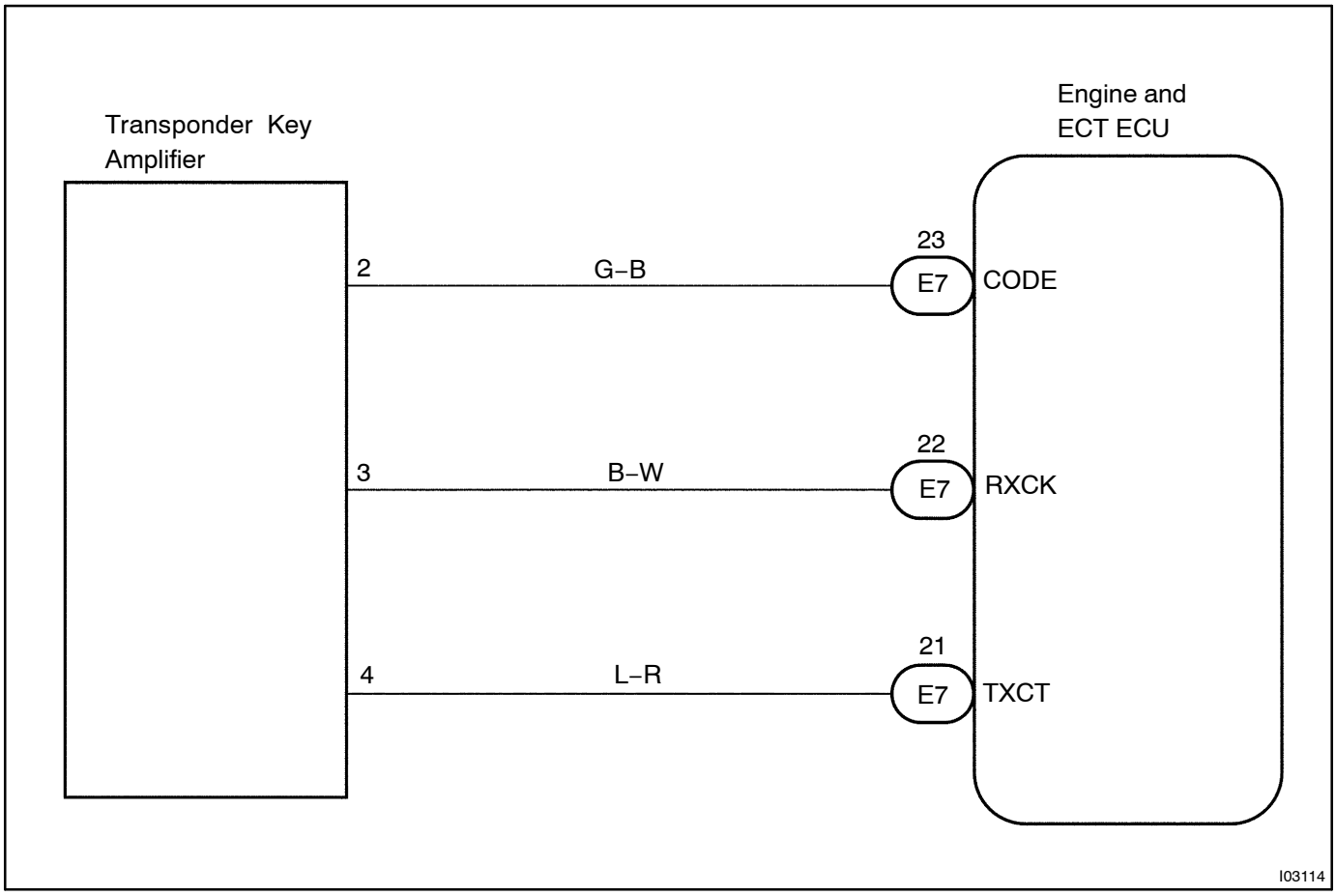
DTC	B2797/99	Communication Malfunction No.1

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.)

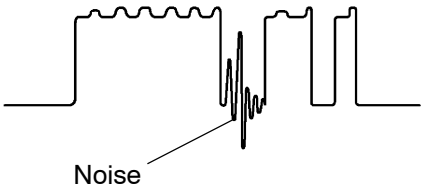
DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	• Wire Harness • Transponder Key Amplifier • Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Noise check**



PREPARATION:
Insert the already registered master key in the key cylinder.
CHECK:
Using an oscilloscope or LEXUS hand–held tester, check that noise is included in the signals sent to the CODE terminal of ECM.
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 ECU.

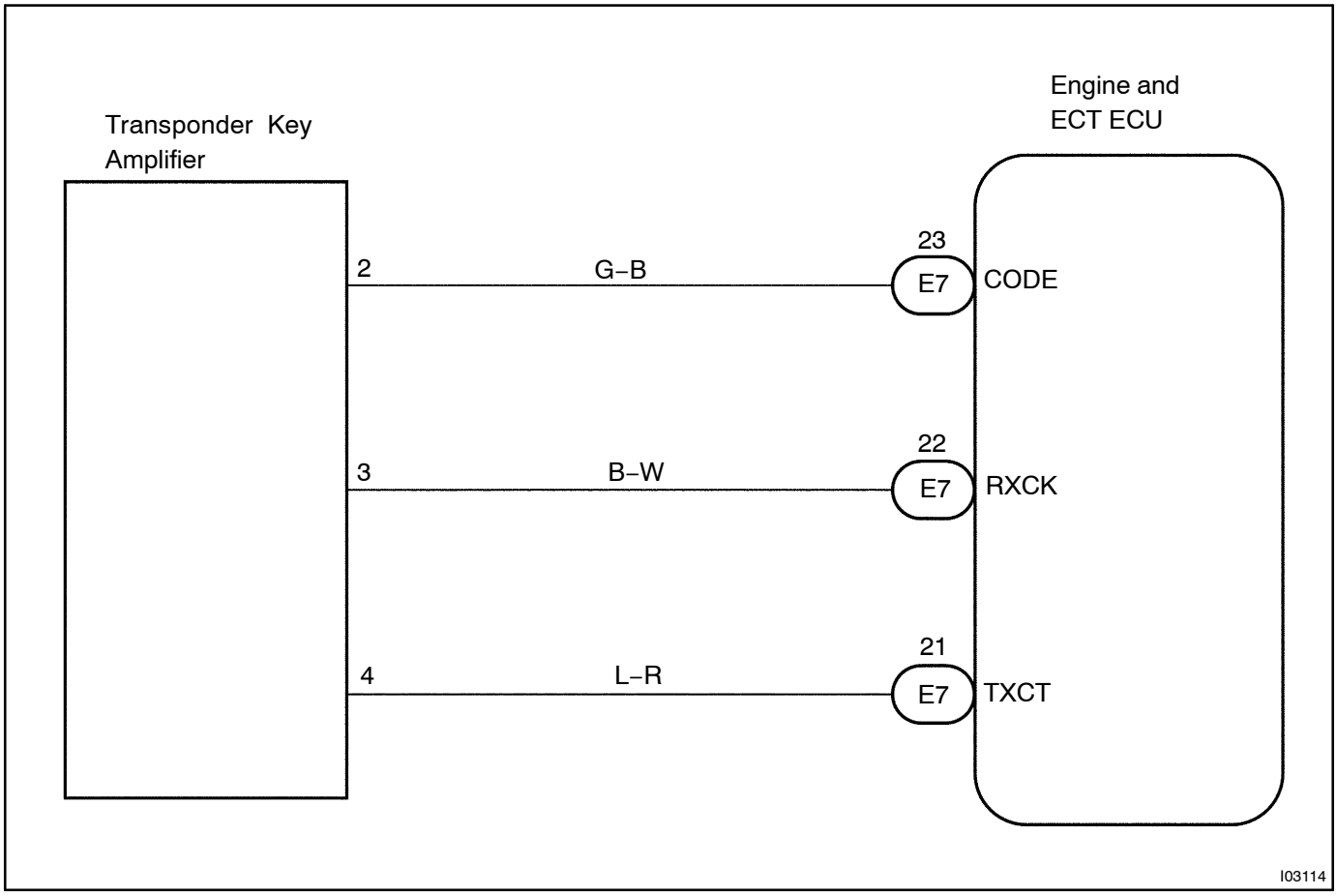
DI1AV–04

DTC	B2798/99	Communication malfunction No.2

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2798/99	Communication error	• Key • Transponder Key Coil • Transponder Key Amplifier • Wire harness • Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transponder key coil (See page BE–253).

NG → Replace transponder key coil

OK

2	Check harness and connector between transponder key amplifier and ECU.

NG → Repair or replace harness and connector

OK

3	Does the system operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

Replace ECU.

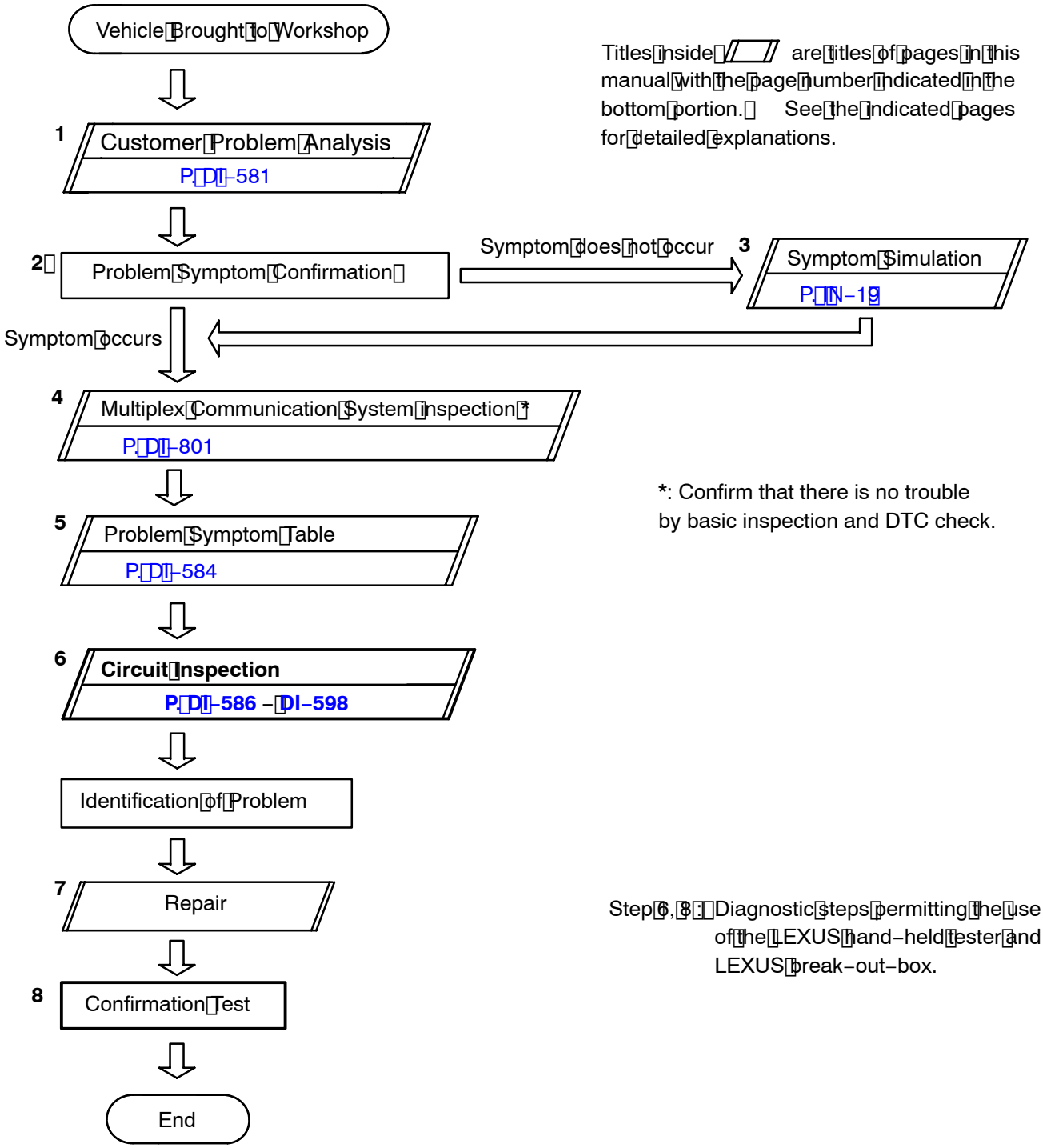
COMBINATION METER SYSTEM

DI27A–02

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.

DI27B–02

CUSTOMER PROBLEM ANALYSIS CHECK

COMBINATION METER SYSTEM Check Sheet

Inspector's name: _____

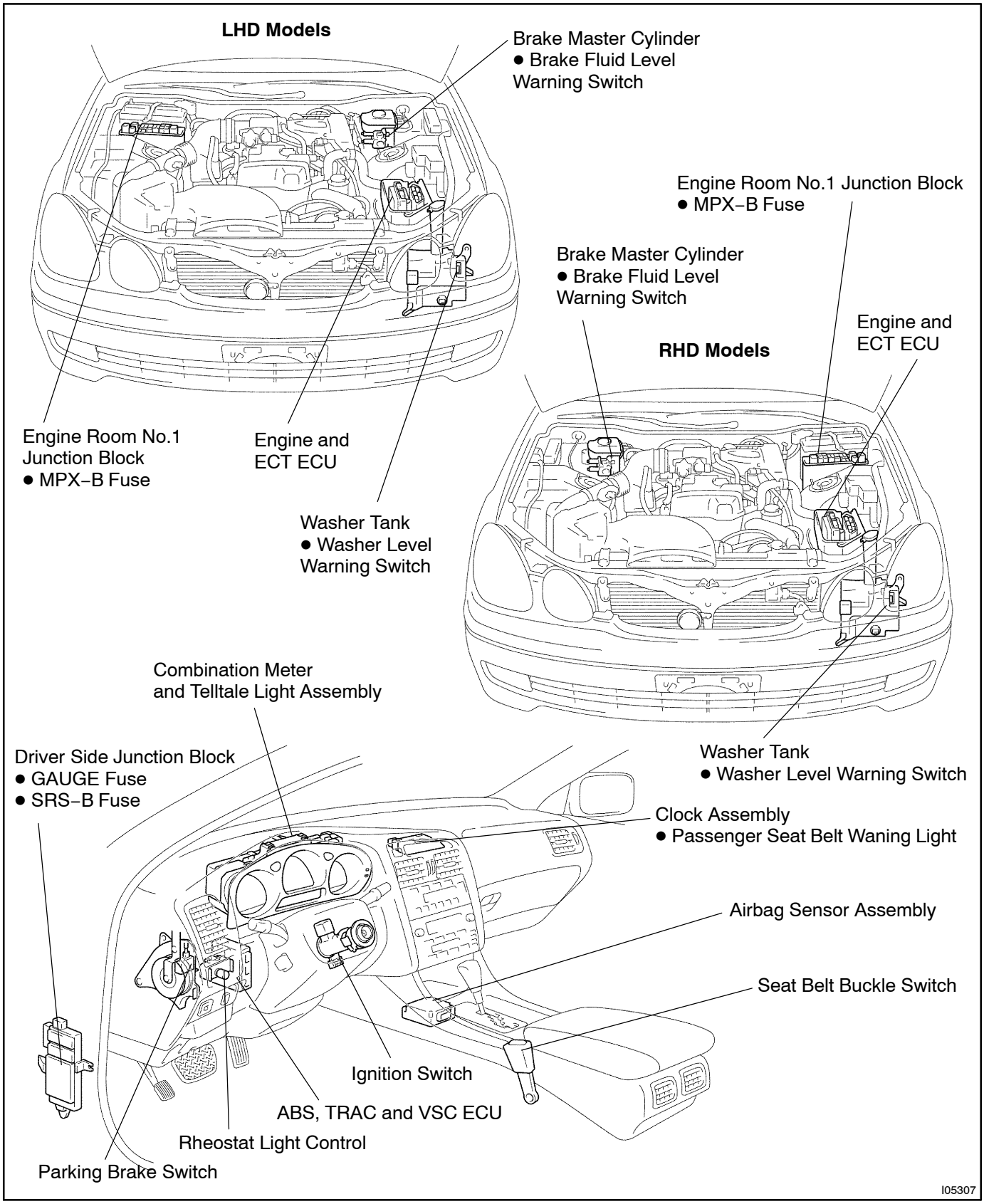
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought In	/ /	**Odometer Reading**	**km Mile**

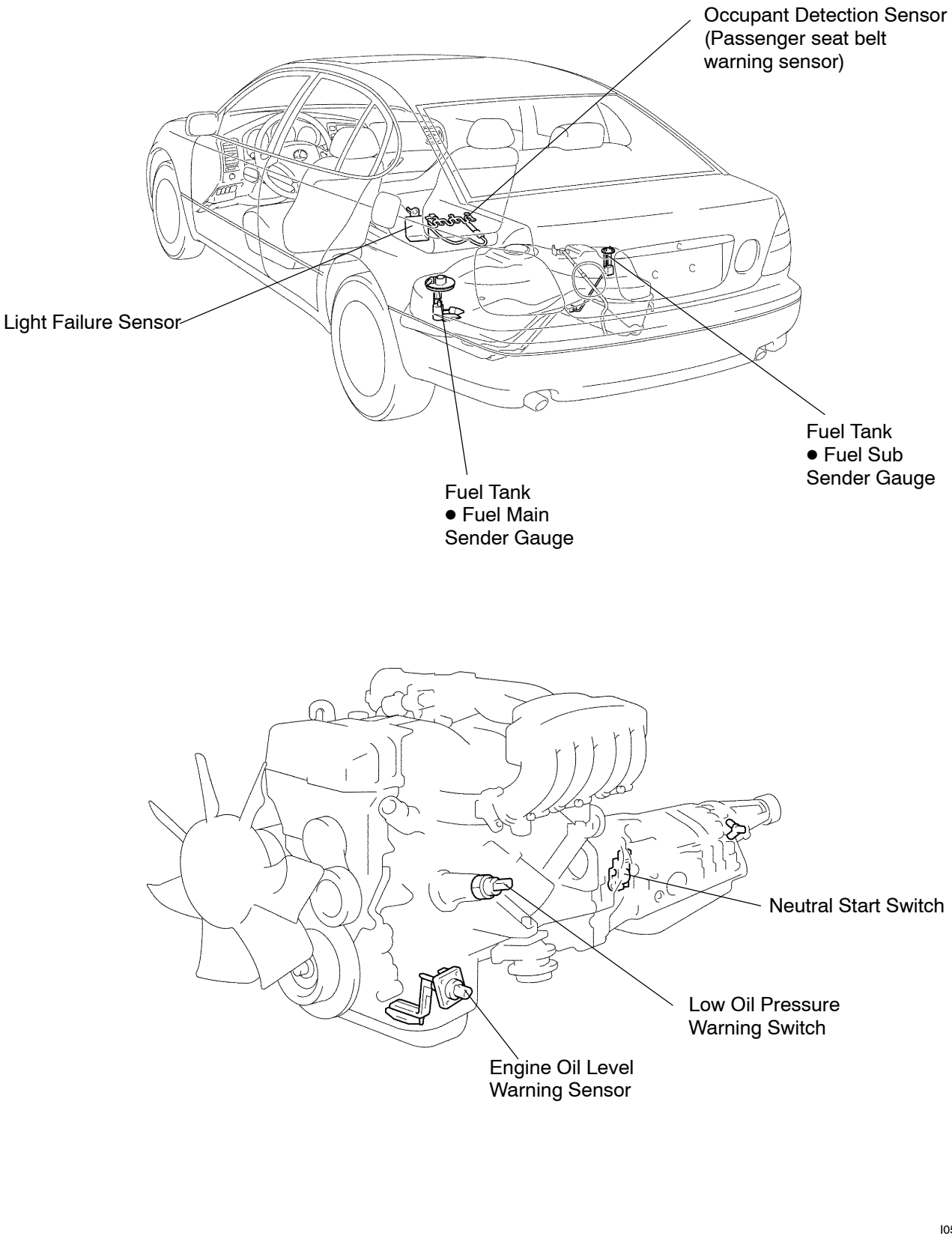
Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom	**Gauge**	☐ Speedometer does not operate or operates abmormally.
		☐ Tachometer does not operate or operates abmormally.
		☐ Fuel Gauge does not operate or operates abmormally.
		☐ Water Temperature Gauge does not operate or operates abmormally.
	Indicator Light and Warning Light	☐ Shift indicator light does not light up.
		☐ Open door warning light does not light up.
		☐ Passenger seat belt warning 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.
		☐ Taillight indicator light does not light up.
		☐ CRUISE MAIN indicator light does not light up.
		☐ ECT SNOW indicator light does not light up.
		☐ ECT PWR indicator light does not light up.
		☐ VSC OFF indicator light does not light up.
		☐ Check engine warning light does not light up.
		☐ Washer Level warning light does not light up.
		☐ Rear Lights warning light does not light up.
		☐ Engine Oil Level Warning light does not light up.
		☐ Others.

DI27C–02

PARTS LOCATION




Occupant Detection Sensor
(Passenger seat belt
warning sensor)
Light Failure Sensor
Fuel Tank
● Fuel Sub
Sender Gauge
Fuel Tank
● Fuel Main
Sender Gauge
Neutral Start Switch
Low Oil Pressure
Warning Switch
Engine Oil Level
Warning Sensor
I05582

DI27D–02

PROBLEM SYMPTOMS TABLE

Gauge:

Symptom	Suspect Area	See page
Speedometer does not operate or operates abnormally.	1. Speedomter 2. Speed Sensor Circuit	DI–586 DI–592
Tachometer does not operate or operates abnormally.	1. Tachometer 2. Igniter Signal Circuit	DI–587 DI–594
Fuel Gauge does not operate or operates abnormally.	1. Fuel Receiver Gauge 2. Fuel Sender Gauge 3. Wire Harness 4. Combination Meter	DI–588 BE–105 BE–91
Engine Coolant Temperature Gauge does not operate.	1. Water Engine Coolant Temperature Receiver Gauge 2. Engine Coolant Temperature Sender Gauge 3. WIre Harness 4. Combination Meter	DI–590 BE–105 BE–91

Indicator Light and Warning Light:

Symptom	Suspect Area	See page
Shift indicator light does not light up.	1. Bulb circuit 2. Neutral start switch 3. Transmission control switch	DI–598 DI–192 DI–202
Open door warning light does not light up.	1. Bulb circuit 2. Door courtesy switch	DI–598 BE–66
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 No.2 ECU	DI–598 BE–105 BE–105 DI–656
Passenger seat belt warning light does not light up.	1. Clock System 2. Passenger Buckle Switch CIrcuit 3. Occupant Detection Sensor 4. Meter Circuit Plate 5. Wire Harness 6. Body No.1 ECU	BE–240 BE–105 BE–105 BE–105 DI–612
Low oil pressure warning light does not light up.	1. Bulb Circuit 2. Low oil pressure warning switch	DI–598 BE–105
Discharge warning light does not light up.	1. Bulb circuit 2. Alternator	DI–598 CH–9
Brake warning light does not light up.	1. Bulb circuit 2. Parking brake switch 3. Brake fluid level warning switch 4. Combination meter	DI–598 BE–105 BE–105 BE–91
Taillight indicator light does not light up.	1. Bulb circuit 2. Headlight and Taillight System 3. Combination meter	DI–598 BE–3 BE–91
CRUISE MAIN indicator light does not light up.	1. Bulb circuit 2. Cruise control switch 3. Combination meter	DI–598 DI–552 BE–91
ECT SNOW indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter	DI–598 DI–201 BE–91

ECT PWR indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter	DI–598 DI–201 BE–91
VSC OFF indicator light does not light up.	1. Bulb circuit 2. ABS, TRC and VSC ECU 3. Combination meter	DI–598 DI–208 BE–91
Washer level warning light does not light up.	1. Bulb circuit 2. Window washer level warning switch 3. Combination meter	DI–598 BE–105 BE–91
Rear Lights warning light does not light up.	1. Bulb circuit 2. Light failure sensor 3. Combination meter	DI–598 BE–105 BE–91
Engine oil level warning light does not light up.	1. Bulb circuit 2. Engine oil level warning sensor 3. Combination meter	DI–598 BE–105 BE–91
Any of indicator lights does not light up.	1. Bulb circuit 2. Combination meter ECU power source circuit 3. Combination meter	DI–598 DI–596 BE–91

DI27E–02

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–584).**

NG

2	**Check speedometer. (See page BE–105)**

NG → **Replace speedometer.**

OK

3	**Check circuit plate. (See page BE–105)**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–91).

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–584).**

NG

2	**Check tachometer (See page BE–105).**

NG → **Replace tachometer.**

OK

3	**Check circuit plate. (See page BE–105)**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–91).

DI27G–02

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 on problem symptoms table. (See page DI–584).**

NG

2	**Check fuel receiver gauge (See page BE–105).**

NG ⟩ **Replace fuel receiver gauge.**

OK

3	**Check fuel sender gauge (See page BE–105).**

NG ⟩ **Replace fuel sender gauge.**

OK

4	Check circuit plate (See page BE–105).

NG → Replace circuit plate.

OK

Check and replace combination meter (See page BE–91).

DI27H–02

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–584).**

NG

2	**Check water temperature receiver gauge (See page BE–105).**

NG ⇒ **Replace water temperature receiver gauge.**

OK

3	**Check water temperature sender gauge (See page BE–105).**

NG ⇒ **Replace water temperature sender gauge.**

OK

4	Check circuit plate (See page BE–105).

NG → Replace circuit plate.

OK

Check and replace combination meter (See page BE–91).

DI27I–02

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–29).

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

OK

Check speed sensor circuit and ABS ECU. (See page DI–208)

INSPECTION PROCEDURE

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–29).

NG → Repair or replace harness or connector.

OK

Check speed sensor circuit and ABS ECU. (See page DI–208)

DI27J–02

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–29).

NG → Repair or replace harness or connector.

OK

Check igniter circuit (See page DI–100)

INSPECTION PROCEDURE

when not using LEXUS hand–held tester:

1	Check ENGINE TOUBLESHOOTING 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–29).

NG → Repair or replace harness or connector.

OK

Check igniter circuit (See page DI–100).

DI27K–02

Combination Meter ECU Power Source Circuit

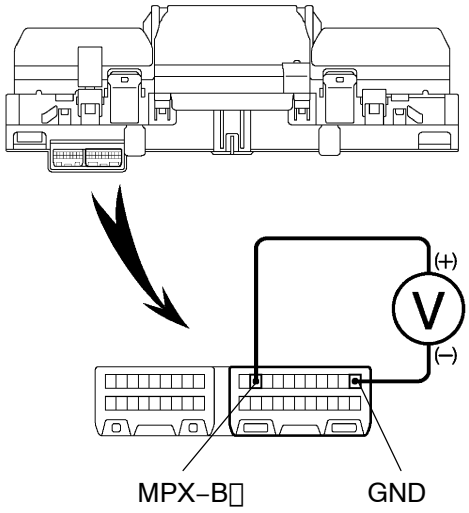
INSPECTION PROCEDURE

1	Check fuses. (GAUGE, MPX–B and DOME fuse)

NG → Replace fuse.

OK

2	Check voltage between terminals MPX+B and GND of combination meter connector.



PREPARATION:

(a) Remove combination meter.

(b) Disconnect the combination meter connector.

CHECK:

Measure voltage between terminals MPX+B and GND of combination meter connector.

OK:

Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–584).

NG

3	Check for open in harness and connector between terminal GND of combination meter and body ground (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connetor between combination meter and battery.

DI27L–02

Bulb Circuit

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

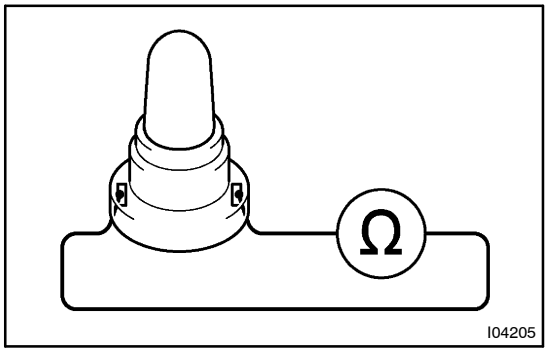
1	**Perform active test.**

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–584).**

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–105)

NG → Replace circuit plate.

OK

Check and replace combination meter (See page BE–91).

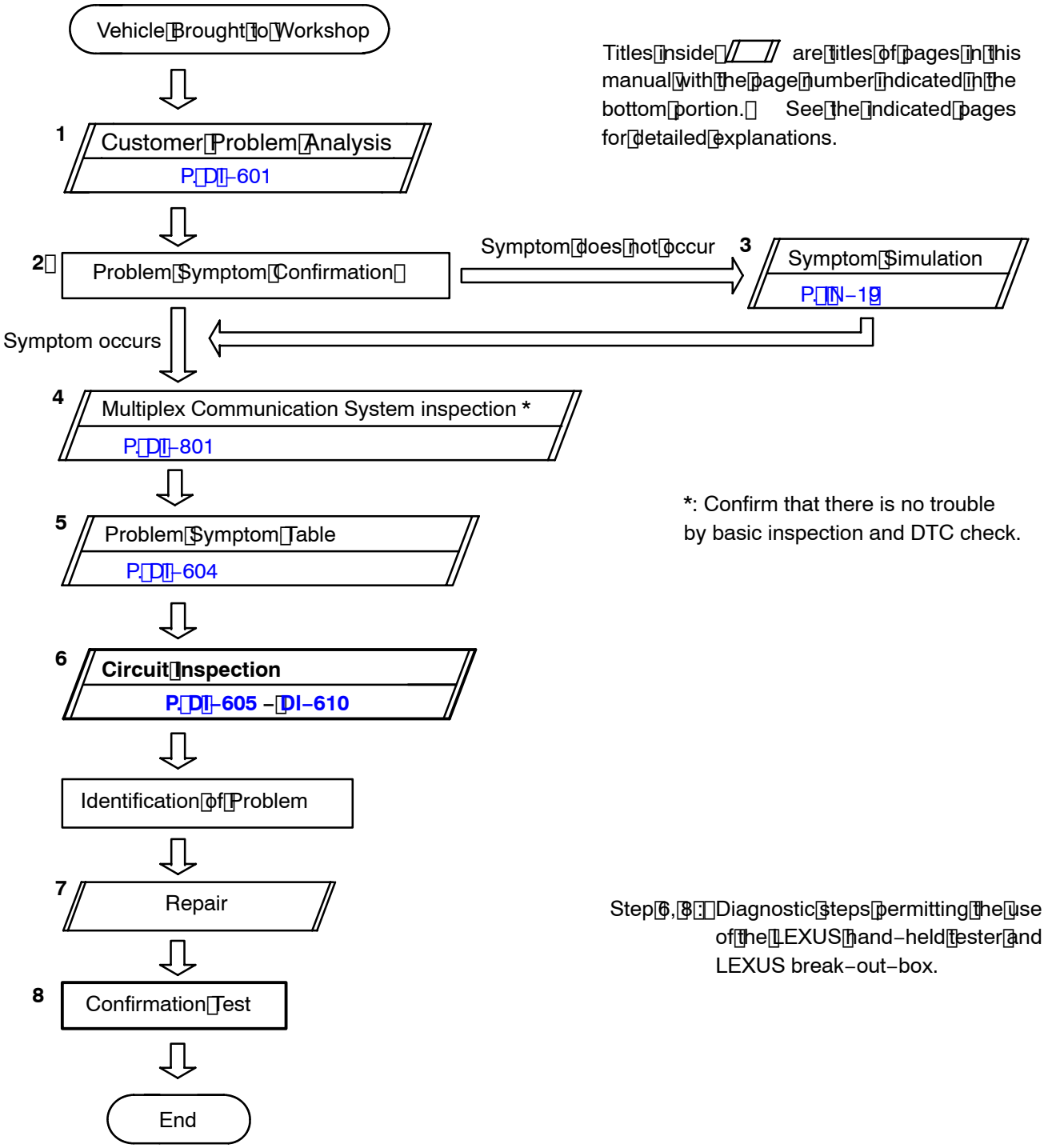
SLIDING ROOF SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI272–02

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.

DI273–02

CUSTOMER PROBLEM ANALYSIS CHECK

SLIDING ROOF CONTROL SYSTEM Check Sheet

Inspector's name: _____

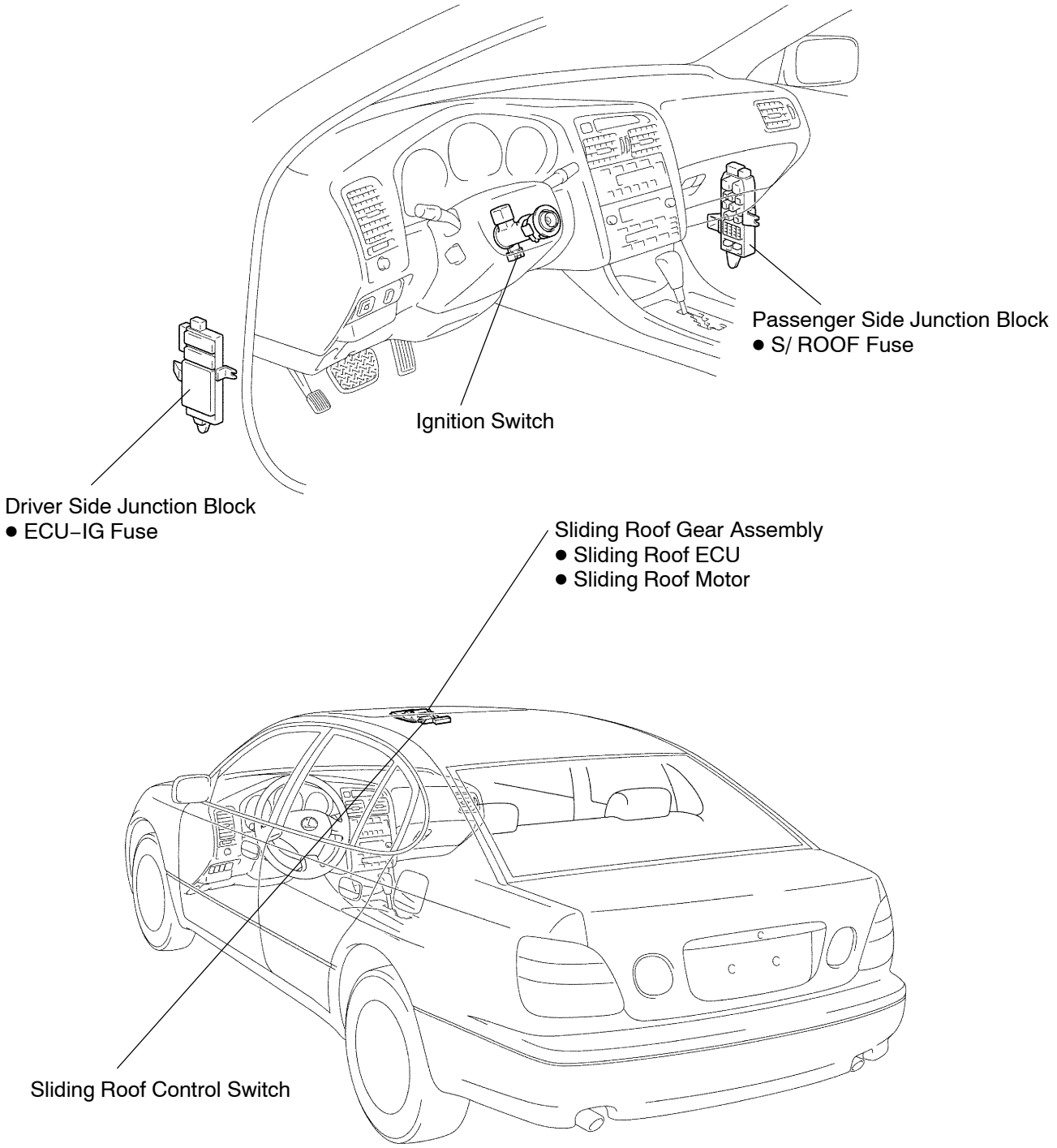
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	☐ Sliding roof control system does not operate.
	☐ Sliding roof operates abnormally or stops half way.
	☐ Jam protection system does not operate.

DI274–02

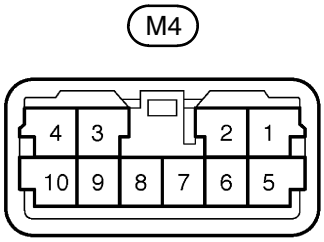
PARTS LOCATION



I05327

DI275–02

TERMINALS OF ECU



I04611

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
MPX ↔ Body ground (M4 – 2 ↔ Body ground)	G–W ↔ W–B	Signal between sliding roof control ECU and Body ECU	10 – 14 V
		Others	Resistance (Approx. 2.5 kΩ)
DWN ↔ E (M4 – 3 ↔ M4 – 7)	V–W ↔ W–B	Sliding roof control switch TILT DOWN	10 – 14 V
		Others	Below 1 V
UP ↔ E (M4 – 4 ↔ M4 – 7)	W ↔ W–B	Sliding roof control switch TILT UP	10 – 14 V
		Others	Below 1 V
+B ↔ E (M4 – 5 ↔ M4 – 7)	O ↔ W–B	Always	10 – 14 V
E ↔ Body ground (M4 – 7 ↔ Body ground)	G–W ↔ W–B	Always	Below 1 V
IG ↔ E (M4 – 8 ↔ M4 – 7)	W ↔ W–B	Ignition switch ON	10 – 14 V
		Ignition switch OFF or ACC	Below 1 V
OPN ↔ E (M4 – 9 ↔ M4 – 7)	V–W ↔ W–B	Sliding roof control switch OPEN	10 – 14 V
		Others	Below 1 V
CLS ↔ E (M4 – 10 ↔ M4 – 7)	W ↔ W–B	Sliding roof control switch CLOSE	10 – 14 V
		Others	Below 1 V

DI276–02

PROBLEM SYMPTOMS TABLE

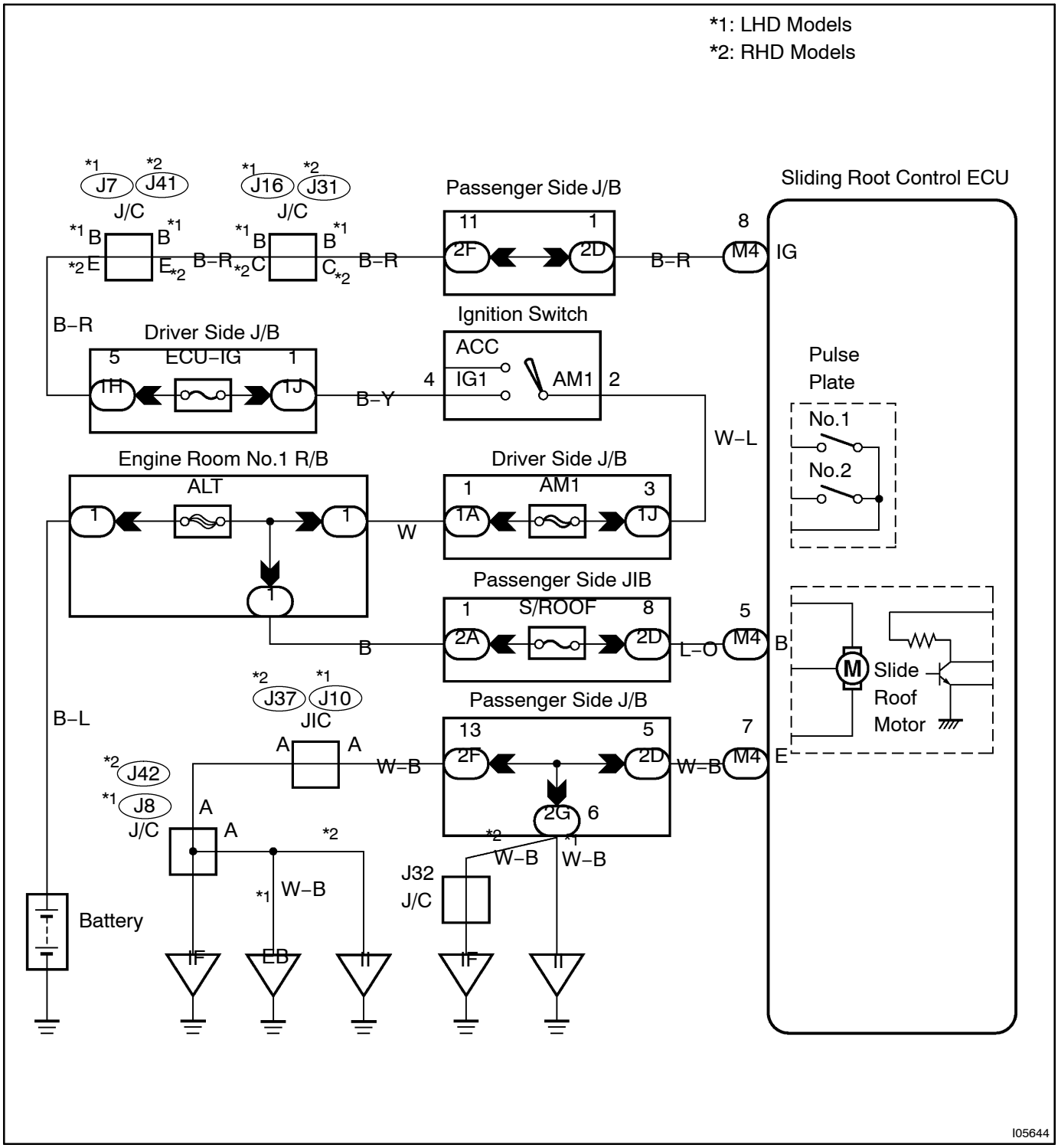
Symptom	Suspect Area	See page
Sliding roof control system does not operate.	1. S/ROOF Fuse 2. ECU–IG Fuse 3. Sliding Roof Control Switch Circuit 4. Sliding Roof Gear Assembly with ECU circuit	BE–21 BE–21 DI–607 DI–605
Sliding roof operates abnormally or stops halfway.	1. Sliding Roof Pulse Plate Circuit	DI–610
Jam protection system does not operate.	1. Sliding Roof Gear Assembly with ECU circuit	DI–605

DI277–02

CIRCUIT INSPECTION

Sliding Roof Gear Assembly with ECU Circuit

WIRING DIAGRAM



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 "Slide roof motor" operates as the LEXUS hand–held tester directs.
NOTICE:
Caution is necessary for a part of body not to be caught in as the jam protection system does not operate during conducting ACTIVE TEST.
HINT:
With one ACTIVE direction, the sliding roof can be slid and tilted continuously.
OK:
The slide roof operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–604).**

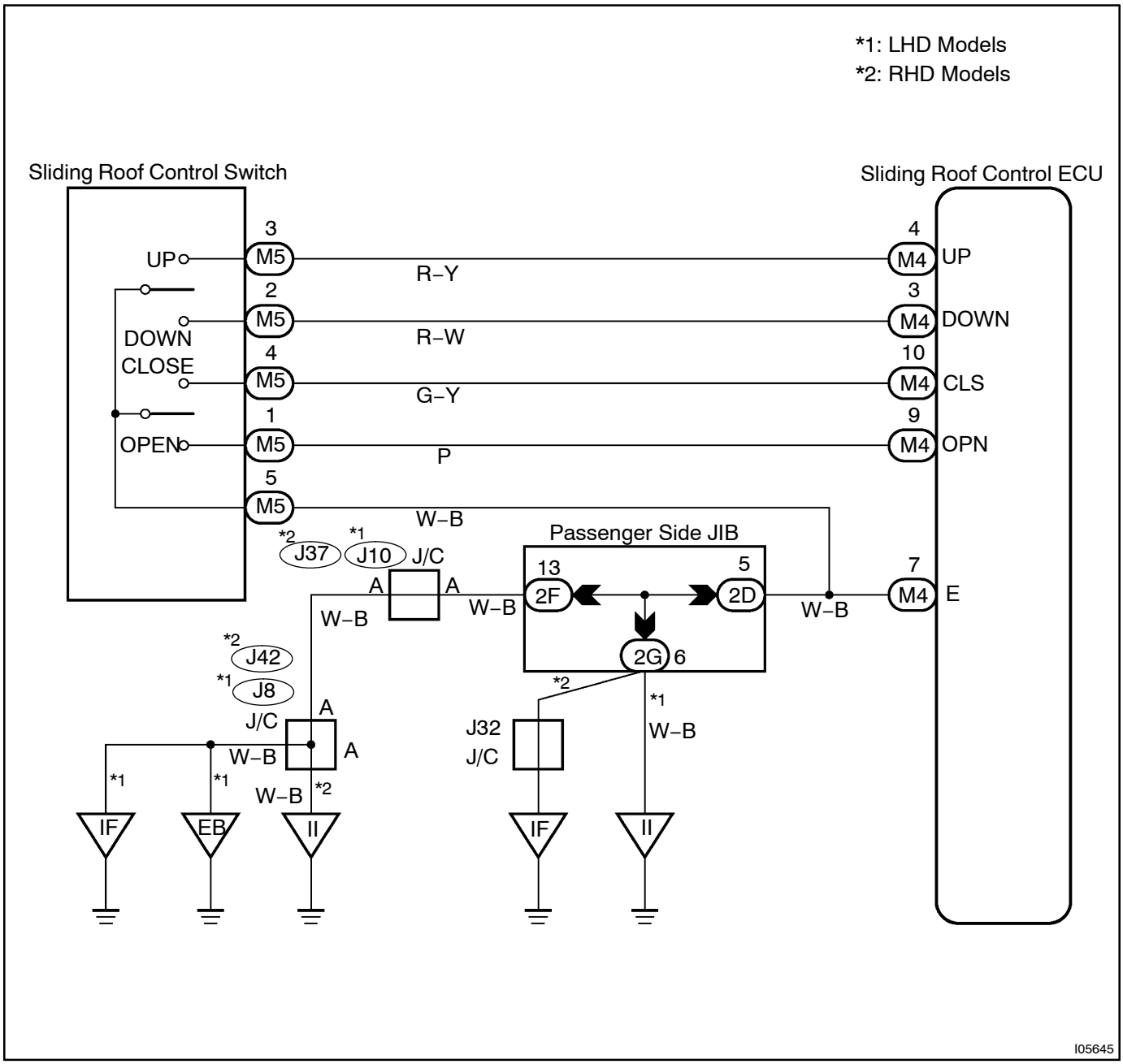
NG

**Check sliding roof gear assembly.
(Mechanical function)**

DI278–02

Sliding Roof Control Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Check sliding roof control switch operation.**

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.

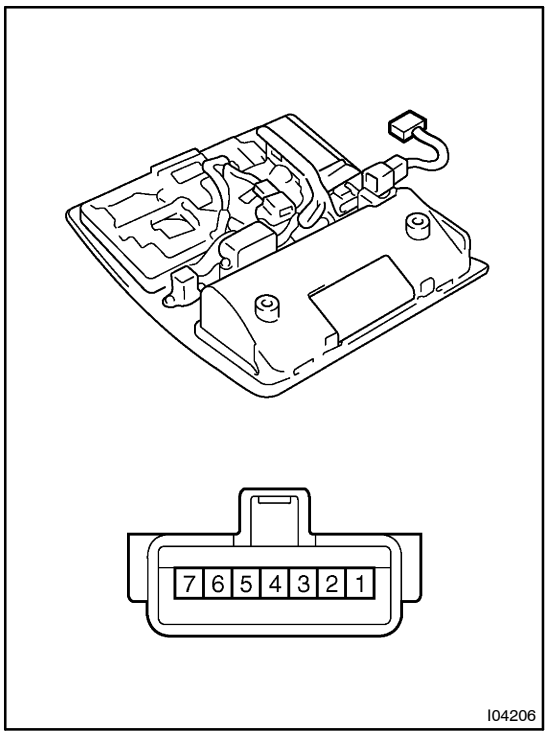
CHECK:
Check that switch status (ON/OFF) changes on the screen of LEXUS hand–held tester as the sliding roof control switch of the vehicle is turned.

OK:
The switch status changes in the same way as the vehicle switch operation.

NG → **Replace sliding roof gear assembly.**

OK

2	**Check sliding roof control switch.**



PREPARATION:
Remove sliding roof control switch.

CHECK:
Check continuity between terminals when switch operated.

OK:

Switch position	Tester connection	Specified condition
SLIDE OPEN	3 – 4	Continuity
SLIDE OFF	–	No continuity
SLIDE CLOSE	2 – 3	Continuity
TILT DOWN	3 – 5	Continuity
TILT OFF	–	No continuity
TILT UP	3 – 6	Continuity

NG → Replace sliding roof control switch.

OK

3	Check for open and short in harness and connectors between sliding roof gear assembly and sliding roof control switch (See page IN–29).

NG → Repair and replace harness or connector.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–604).

DI279–02

Sliding Roof Pulse Plate Circuit

WIRING DIAGRAM

See page DI–605.

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	Check sliding roof control switch operation. (See page DI–607 on step 1)

NG → Check sliding roof control switch circuit (See page DI–607).

OK

2	Check sliding roof pulse plate operation.

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.

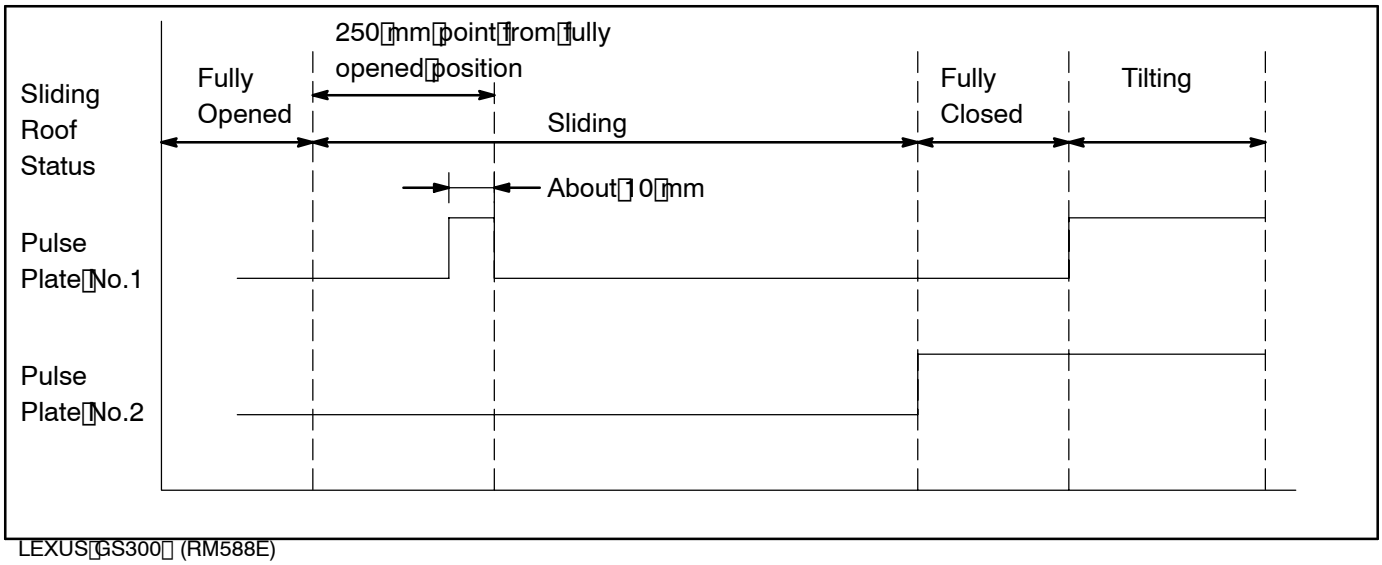
CHECK:

(a) Operate the slide roof as the LEXUS hand–held tester directs.
(b) At this time, check that status (ON/OFF) of pulse plate No.1 and No.2 changes on the LEXUS hand–held tester screen as shown in the chart below.

NOTICE:

Caution is necessary for a part of body not to be caught in as the jam protection system does not operate during conducting ACTIVE TEST.

OK:



NG → Replace sliding roof gear assembly.

OK

3	Check sliding roof motor status.

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

(a) Enter into ACTIVE TEST mode of LEXUS hand–held tester.

(b) Check that "Sliding Roof" operates as the LEXUS hand–held tester directs.

(c) At this time, check that motor status changes on the screen of LEXUS hand–held tester as the sliding roof switch of the vehicle is turned.

OK:

The motor operates normally.

NG → Replace sliding roof gear assembly.

OK

4	Check sliding roof glass alignment. (Mechanical malfunction) (See page BO–74).

NG → Adjust sliding roof (See page BO–81).

OK

Replace sliding roof gear assembly.

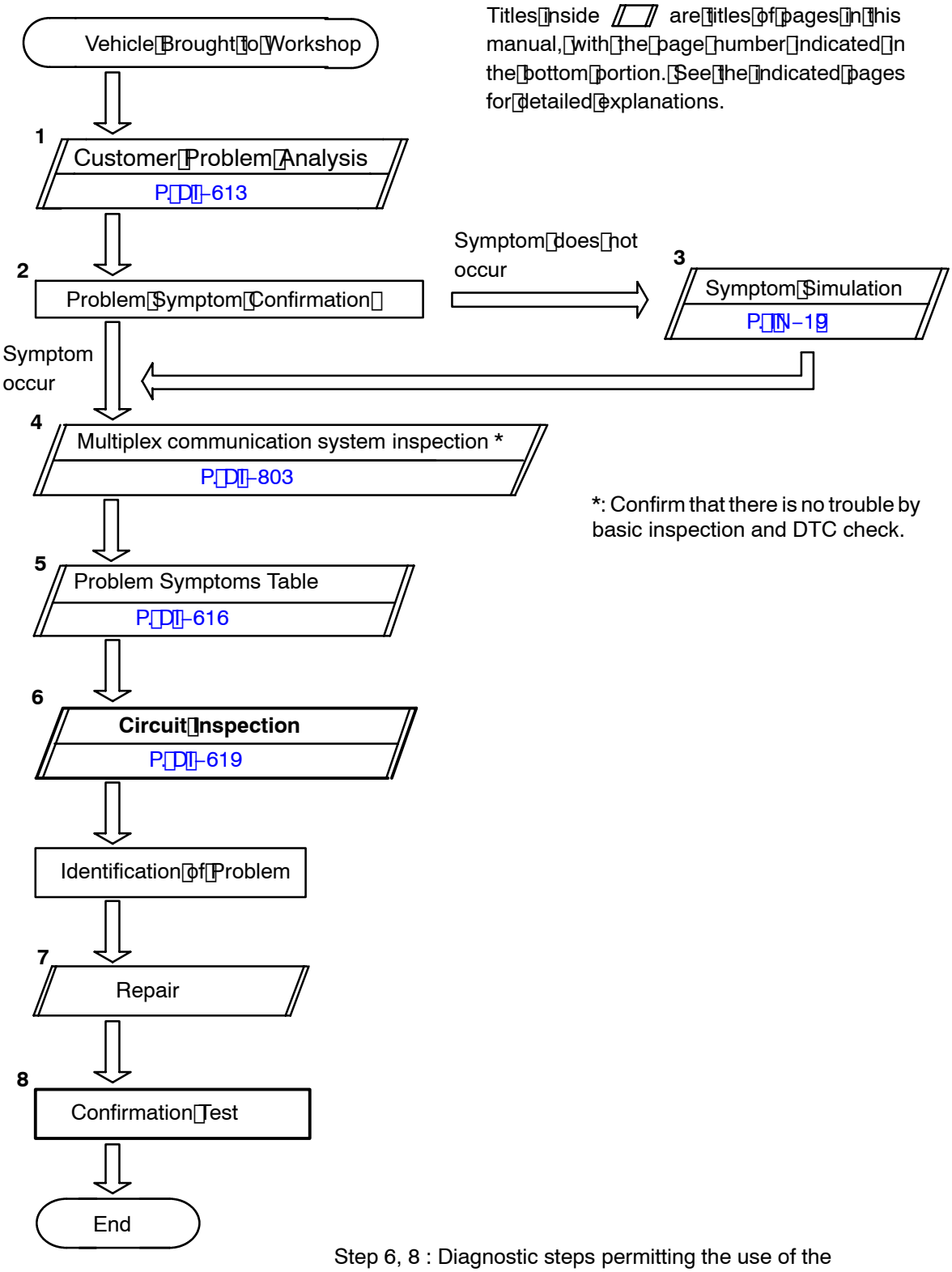
BODY NO.1 CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI29N–02

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 troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI29O–02

CUSTOMER PROBLEM ANALYSIS CHECK

BODY NO.1 CONTROL SYSTEM Check Sheet

Inspector's name: _____

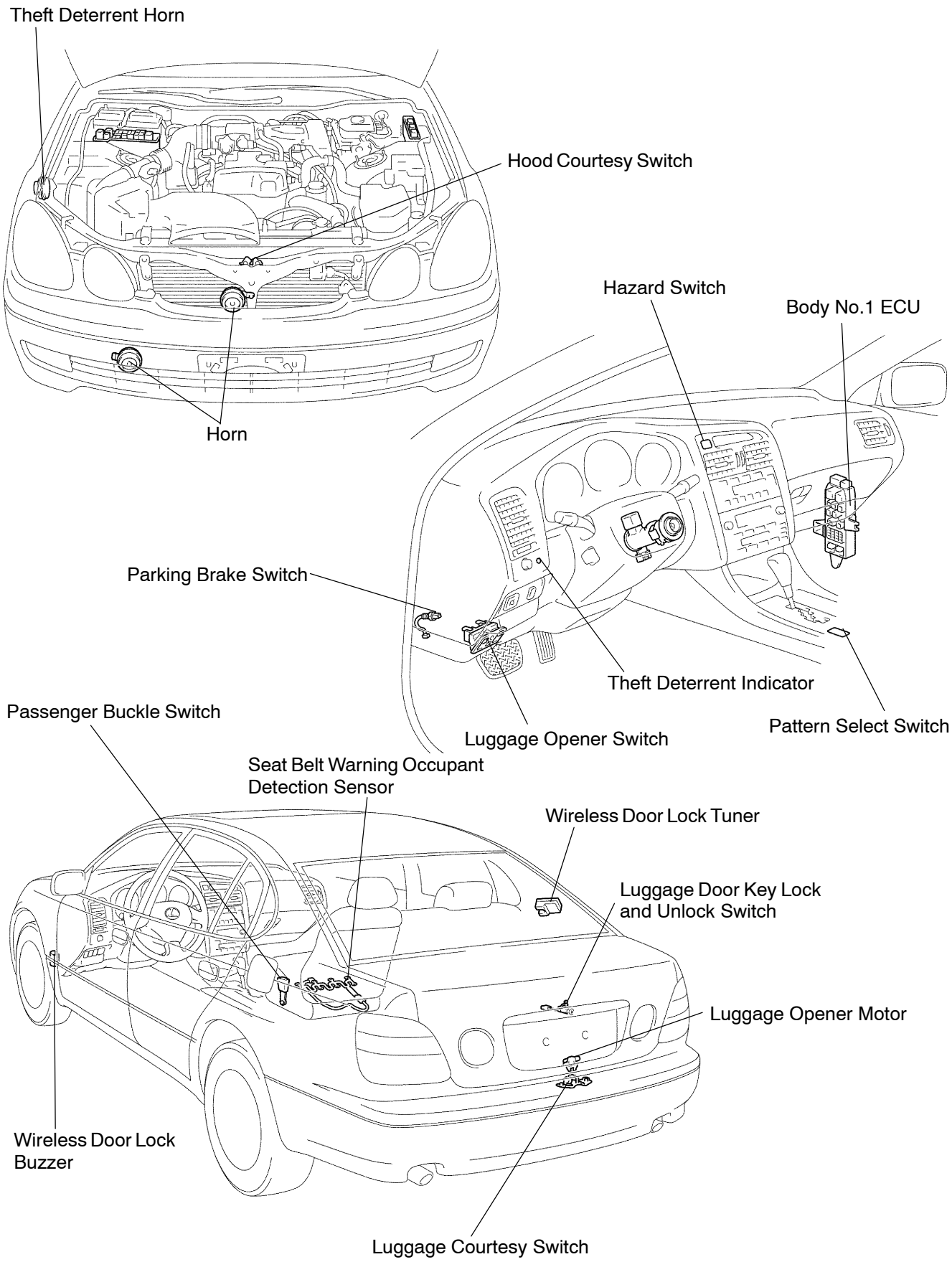
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	☐ Seat Belt Warning
	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Theft Deterrent System
	☐ Wireless Door Lock Control System
	☐ Luggage compartment door opener system
	☐ Others

DI29P–02

PARTS LOCATION

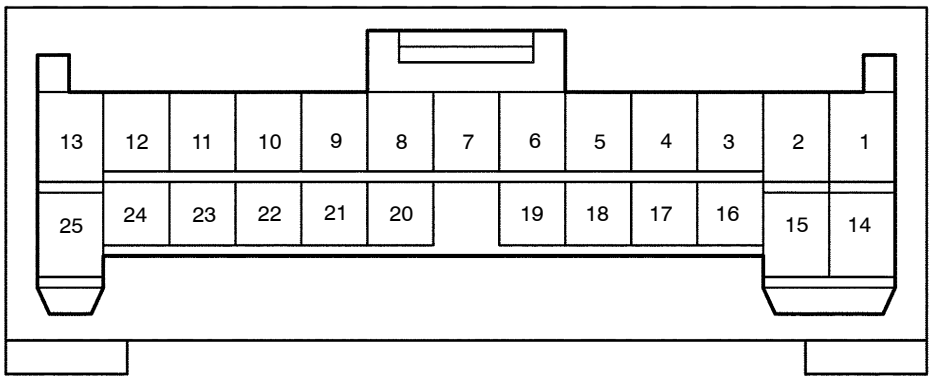


I06101

DI29Q–02

TERMINALS OF ECU

BODY No.1 ECU



I05039

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
ACC ↔ GND (B5–15 ↔ Body Ground)	GR ↔ Body-Ground	Ignition switch position is ACC.	10 – 14 V
TR+ ↔ GND (B5–2 ↔ Body Ground)	L ↔ Body Ground	Luggage compartment door opener switch ON.	10 – 14 V (for 250 ms)
HORN ↔ GND (B5–1 ↔ Body Ground)	G–B ↔ Body Ground	Theft Deterrent System is set, luggage compartment door key lock and unlock switch OFF. Luggage compartment door open.	Voltage change 10 – 14 V ↔ Below 1 V
IND ↔ GND (B5–22 ↔ Body Ground)	V ↔ Body Ground	Security indicator light lights up. (Only for 30 secs. in arming mode. (When the indicator light flashes, engine immobilizer system operates.))	3 – 6 V
		Security indicator light does not light up. (Only for 30 secs. in arming mode. (When the indicator light flashes, engine immobilizer system operates.))	Below 1 V
HDCY ↔ GND (B5–9 ↔ Body Ground)	V–G ↔ Body Ground	Hood is open.	Below 1 V
		Hood is closed.	10 – 14 V
LGCY ↔ GND (B5–10 ↔ Body Ground)	R–W ↔ Body Ground	Luggage door is open.	Below 1 V
		Luggage door is closed.	10 – 14 V
TKUL ↔ GND (B5–16 ↔ Body Ground)	LG–B ↔ Body Ground	Luggage door unlock switch is turned.	Below 1 V
		Luggage door unlock switch is not turned.	10 – 14 V
TSW ↔ GND (B5–17 ↔ Body Ground)	V–Y ↔ Body Ground	Luggage opener S/W is operated.	Below 1 V
		Luggage opener S/W is not operated.	10 – 14 V
PBKL ↔ GND (B5–18 ↔ Body Ground)	B–L ↔ Body Ground	With passenger, no seat belt ON.	Below 1 V
		With passenger with seat belt ON.	10 – 14 V
		No passenger, no seat belt ON.	10 – 14 V
		No passenger, with seat belt ON.	10 – 14 V
B2R ↔ B2R2 (B5–12 ↔ B5–13)	P–B ↔ P–L	When buzzer is sounded.	8 – 10 V
		When buzzer is not sounded.	Below 1 V
SNOW ↔ GND (B5–24 ↔ Body Ground)	G–R ↔ Body Ground	Snow switch (ECT pattern select switch) is ON.	Below 1 V
		Snow switch (ECT pattern select switch) is OFF.	10 – 14 V
PWR ↔ GND (B5–23 ↔ Body Ground)	G–W ↔ Body Ground	PWR switch (ECT pattern select switch) is ON.	Below 1 V
		PWR switch (ECT pattern select switch) is OFF.	10 – 14 V

DI29R–02

PROBLEM SYMPTOMS TABLE

• 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 (D or P) 2. Driver Door ECU (or Passenger Door ECU) 3. Body No.1 ECU	DI–710 DI–742 IN–29
Door key linked function does not operate.	1. Door key lock and unlock switch circuit (D or P) 2. Driver Door ECU (or Passenger Door ECU) 3. Body No.1 ECU	DI–716 DI–748 IN–29
Key confinement prevention function does not operate.	1. Key unlock switch circuit 2. Body No.2 ECU 3. Body No.1 ECU	DI–664
Does not lock and unlock each door only.	1. Door lock motor circuit 2. Any door ECU	DI–712 DI–744 DI–775 DI–793 IN–29
Luggage compartment door opener function does not operate.	1. Luggage component door opener switch circuit 2. Luggage compartment door opener motor circuit 3. Body No.1 ECU	DI–652 DI–638

• WIRELESS DOOR LOCK CONTROL

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate.	1. Transmitter 2. Wireless tuner circuit 3. Key unlock warning switch circuit 4. Body No.2 ECU 5. Body No.1 ECU	BE–171 DI–624 DI–664
Lock (or unlock) function does not operate.	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Any door ECU 4. Body No.1 ECU	DI–716 DI–748 DI–714 DI–746 DI–777 DI–795 IN–29
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. Any door ECU 3. Body No.1 ECU	DI–718 DI–750 DI–779 DI–797 IN–29
Wireless door lock operates, but the buzzer does not sound.	1. Wireless door lock buzzer circuit 2. Body No.1 ECU	DI–636
Buzzer sound, but wireless door lock function does not operate.	1. Body No.1 ECU	
Luggage compartment door opener.	1. Luggage compartment door opener motor circuit 2. Body No.1 ECU	DI–638

• THEFT DETERRENT SYSTEM

Symptom	Suspect Area	See page
No alerting condition is operated. (The system cannot be set.)	1. Theft deterrent indicator circuit	DI–644
	2. Key unlock warning switch circuit	DI–664
	3. Courtesy switch circuit	DI–718
		DI–750
		DI–779
		DI–797
	4. Door unlock detection switch circuit	DI–714
		DI–746
		DI–777
		DI–795
	5. Engine hood courtesy switch circuit	DI–626
	6. Luggage room door courtesy switch circuit	DI–628
	7. Any door ECU	IN–29
	8. Body No.2 ECU	
	9. Body No.1 ECU	
Cannot be canceled when IG is ON with a key.	1. Key unlock warning switch circuit	DI–664
	2. Ignition switch circuit	BE–31
	3. Body No.2 ECU	
	4. Body No.1 ECU	
Cannot be canceled when unlocking the luggage compartment door with a key.	1. Luggage room courtesy switch circuit	DI–628
	2. Body No.1 ECU	
Some of the system does not operate. (Headlight does not light up.)	1. Headlight relay circuit	DI–683
	2. Body No.2 ECU	
	3. Body No.1 ECU	
Some of the system does not operate. (Taillight does not light up.)	1. Taillight relay circuit	DI–681
	2. Body No.2 ECU	
	3. Body No.1 ECU	
Some of the system does not operate. (Hazard does not light up.)	1. Hazard switch circuit	DI–650
	2. Body No.1 ECU	
Theft deterrent horn or horn does not sound	1. Theft deterrent horn circuit	DI–640
	2. Horn circuit	DI–642
	3. Body No.1 ECU	
During warning condition, cannot be canceled by unlocking the door with a key.	1. Door key lock and unlock switch circuit	DI–716
		DI–748
	2. Driver Door ECU (or Passenger Door ECU)	IN–29
	3. Body No.1 ECU	
During warning condition, cannot be canceled by unlocking the door with a key. (transmitter)	1. Transmitter	BE–171
	2. Wireless tuner circuit	DI–624
	3. Body No.1 ECU	
During warning condition, cannot be cancelled by turning the ACC or ON with a key.	1. Ignition switch	BE–31
	2. Key unlock warning switch circuit	DI–664
	3. Body No.2 ECU	
	4. Body No.1 ECU	
The system operated for more 60 records.	1. Body No.1 ECU	

- OTHERS

Symptom	Suspect Area	See page
Does not turn off the passenger seat belt warning light.	1. Passenger buckle switch circuit 2. Body No.1 ECU	DI–621
Rear window defogger does not operate.	1. Defogger relay circuit 2. Defogger switch (A/C ECU) 3. Body No.1 ECU	DI–648
Body No.1 ECU does not operate.	1. Power source circuit 2. Body No.1 ECU	DI–619

DI29S–02

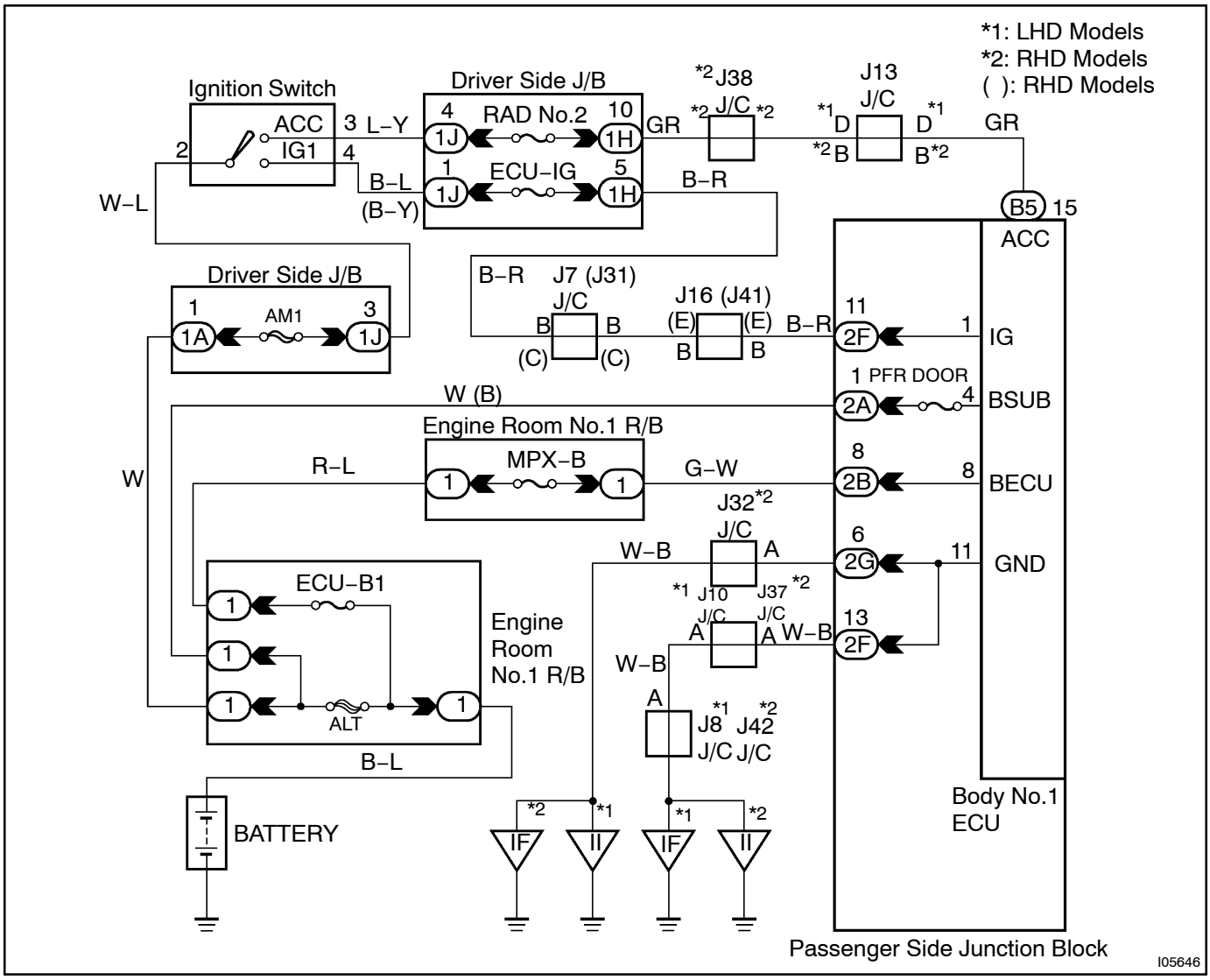
CIRCUIT INSPECTION

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the body No.1 ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check MPX–B, RADIO No.2, DOOR (FL) and GAUGE fuse.

CHECK:
Check continuity of MPX–B, RADIO No.2, DOOR (FL), and GAUGE fuse.
OK:
Continuity

NG → Replace the failure fuse.

OK

2	Check voltage between terminals BECU, BSUB, IG, and ACC and GND of body No.1 ECU connector.

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the body No.1 ECU connector.
CHECK:
Measure voltage between terminals IG, ACC, and GND.
OK:
Voltage: 10 – 14V

OK → Proceed to next circuit inspection shown on matrix chart. (See page DI–616)

NG

3	Check wireharness and connector between body No.1 ECU and body ground.

NG → Repair or replace wireharness or connector.

OK

Check and repair wireharness and connector between body No.1 ECU and battery.

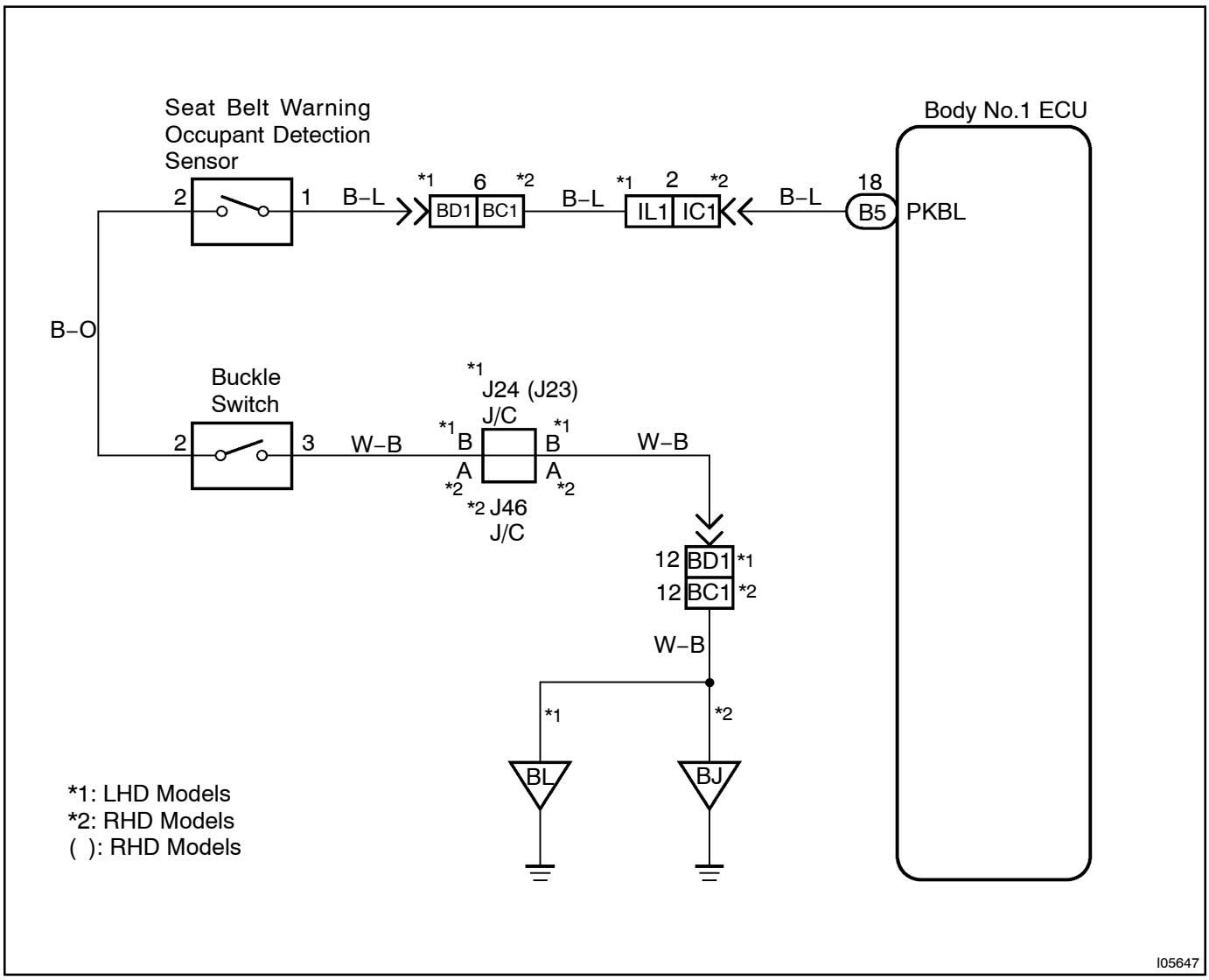
DI29T–02

Passenger buckle switch and seat belt warning occupant detection sensor

CIRCUIT DESCRIPTION

This circuit detects the conditions of the passenger buckle switch and the seat belt warning occupant detection sensor, and makes the passenger seat belt warning flash.

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 passenger buckle switch and seat switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the passenger buckle switch and seat switch using DATA LIST.
OK:

Passenger condition	Seat switch	Passenger buckle switch	P seat buckle SW (Tester display)
With passenger, no seat belt on	ON	ON	ON
With passenger, with seat belt on	ON	OFF	OFF
No passenger, no seat belt on	OFF	ON	OFF
No passenger, with seat belt on.	OFF	OFF	OFF

OK → **Proceed to next circuit inspection shown on problem symptoms table.(See page DI–616)**

NG

2	**Check passenger buckle switch.(See page BE–105)**

NG → **Replace the passenger buckle switch.**

OK

3	Check seat belt warning occupant Detection sensor. (See page BE–105)

NG → Replace the seat belt warning occupant Detection sensor.

OK

4	Check wireharness and connector between seat belt warning occupant Detection sensor and body No.1 ECU, passenger buckle switch and seat belt warning occupant Detection sensor, passenger buckle 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–616)

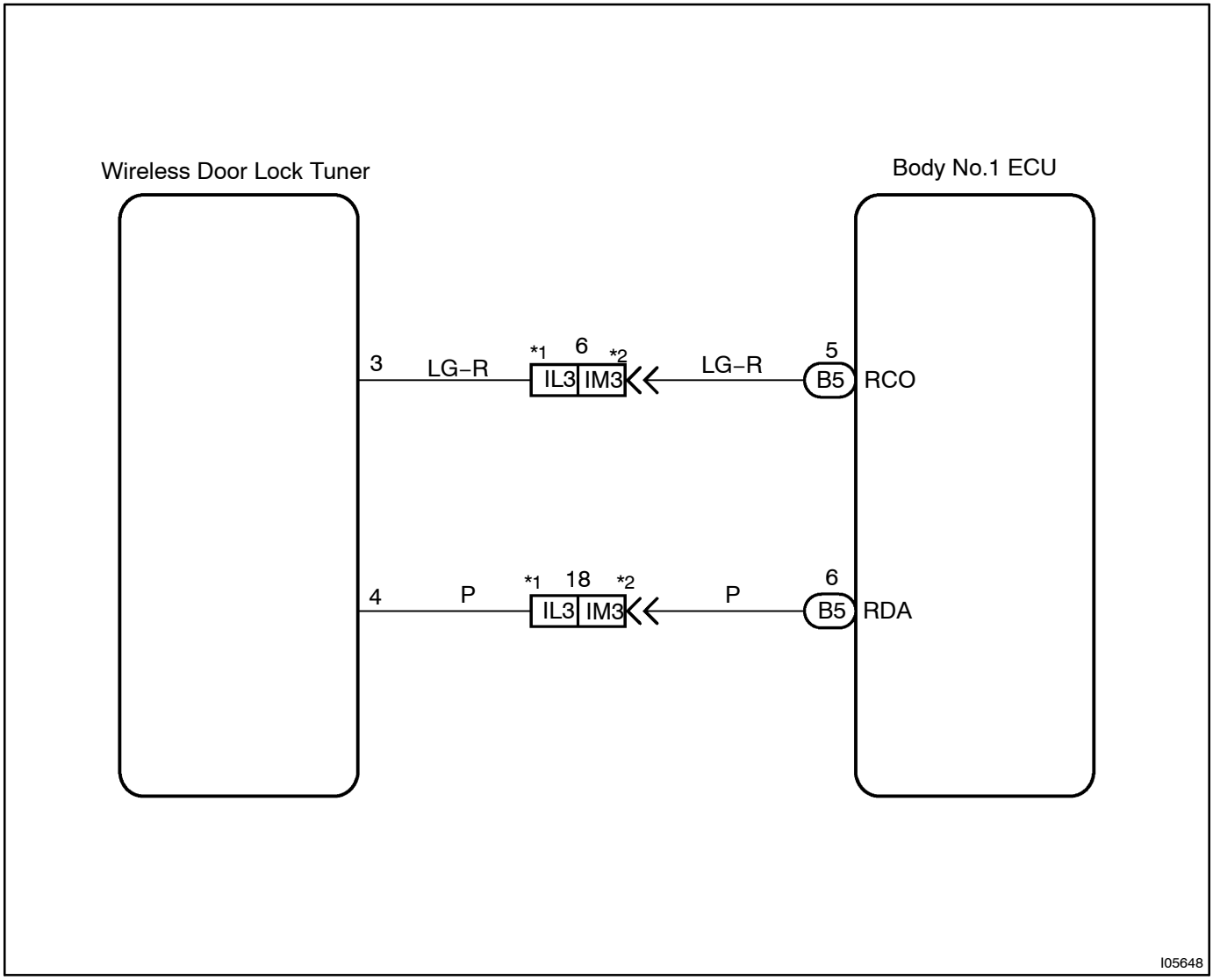
DI29U–02

Wireless door lock tuner circuit

CIRCUIT DESCRIPTION

The signal from the transmitter will be input to the body No.1 ECU through RDA line. RDA line is diagnosed by the body No.1 ECU, so check DTC also in case of the failure of the wireless function.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that DTC 42 is not output

NG → Check the RDA line.

OK

2	Check wire harness

PREPARATION:
Disconnect connectors of wireless door lock tuner and body No.1 ECU.
CHECK:
Check continuity between terminals RCO of wireless door lock tuner and RCO of body No.1 ECU.
OK:
Continuity

NG → Repair or replace wire harness

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–616)

NG

Failure of the original wireless door lock tuner.

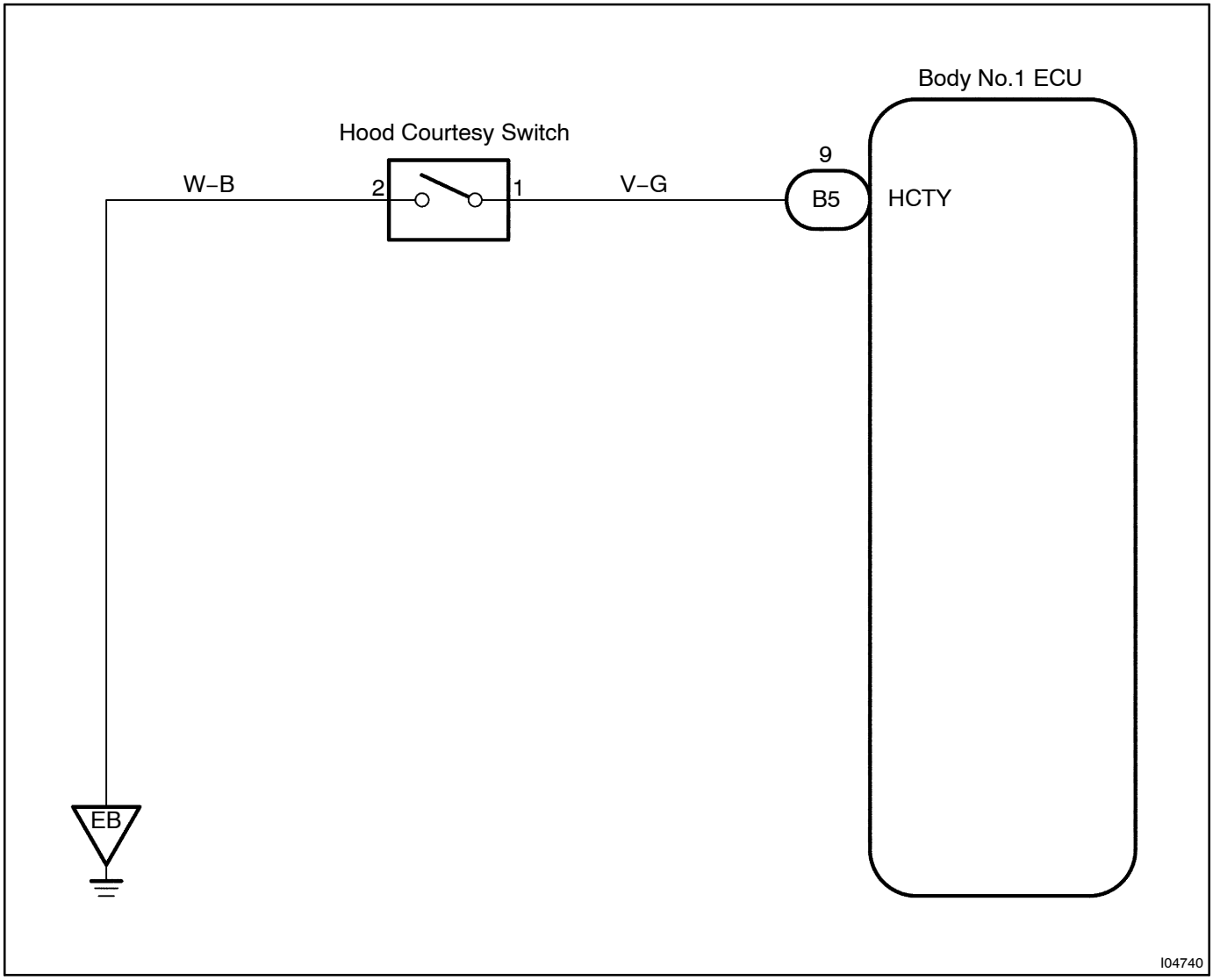
DI29V–02

Hood courtesy switch circuit

CIRCUIT DESCRIPTION

The 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 on problem symptoms table.(See page DI–616)**

NG

2	**Check hood courtesy switch (See page BE–164).**

NG → **Replace the hood courtesy switch.**

OK

3	**Check wireharness and connector between hood courtesy switch and body No.1 ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

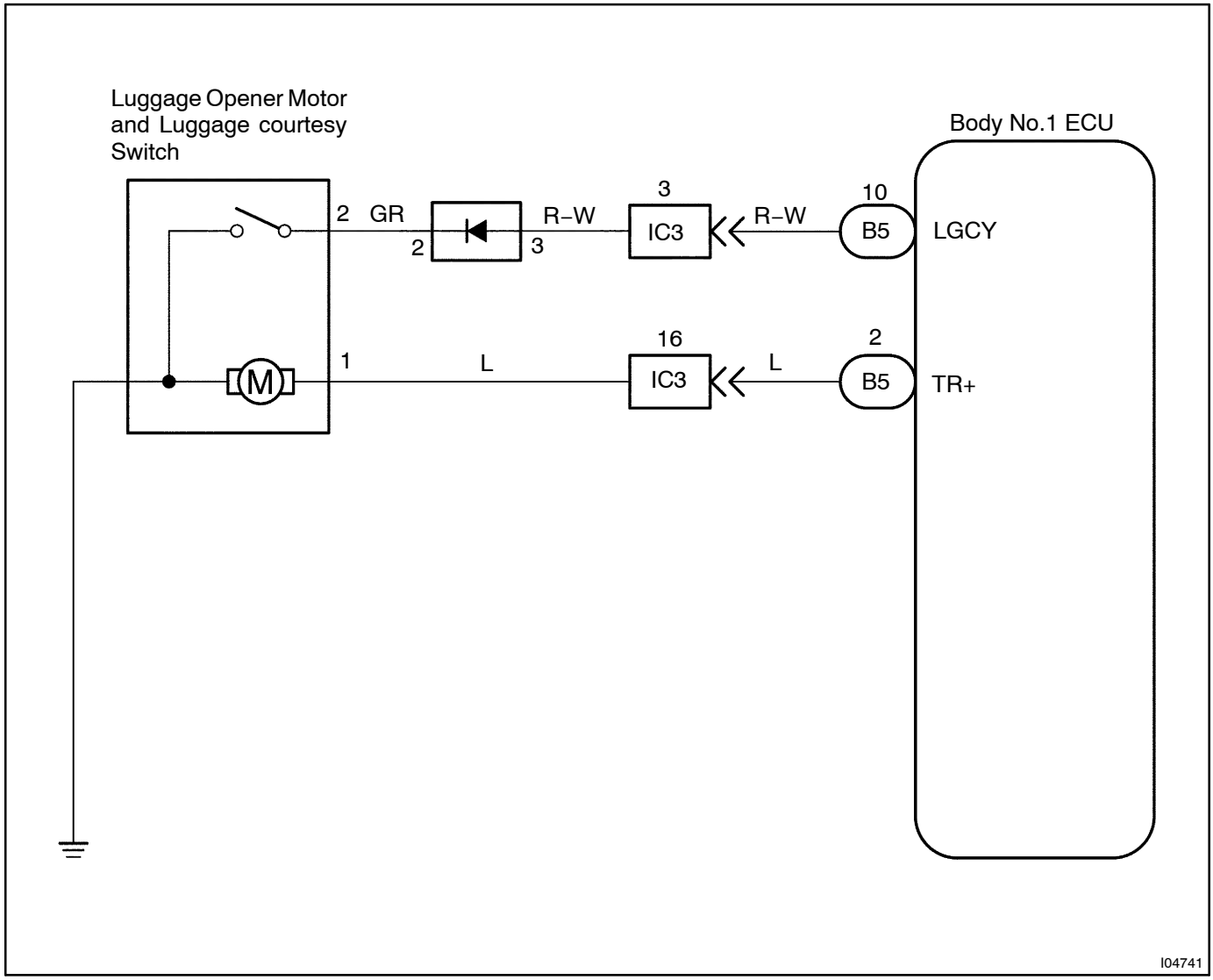
DI29W–02

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



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 courtesy switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS 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–616).**

NG

2	**Check luggage courtesy switch (See page BE–66).**

NG → **Replace the luggage courtesy switch.**

OK

3	**Check wireharness and connector between luggage courtesy switch and body No.1 ECU.**

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

OK

**Proceed to next circuit inspection shown on probem symptoms table.
(See page DI–628)**

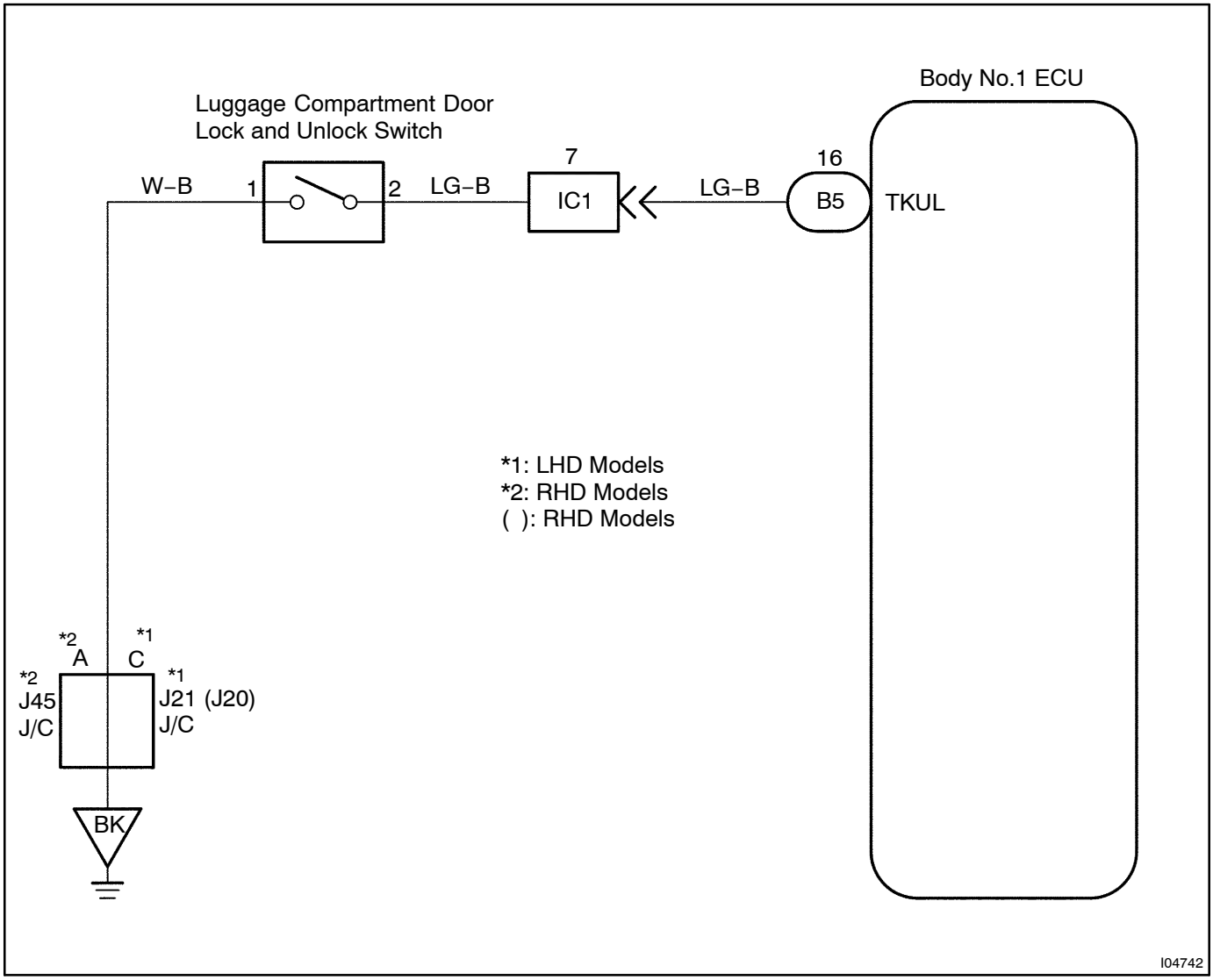
DI29X–02

Luggage compartment door lock and unlock switch circuit

CIRCUIT DESCRIPTION

The luggage compartment door 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 DLC3.
CHECK:
Check the luggage compartment door lock and unlock switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–616).**

NG

2	**Check luggage compartment door lock and unlock switch (See page BE–164).**

NG → **Replace the luggage compartment door lock and unlock switch.**

OK

3	**Check wireharness and connector between luggage compartment door lock and unlock switch and body No.1 ECU.**

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

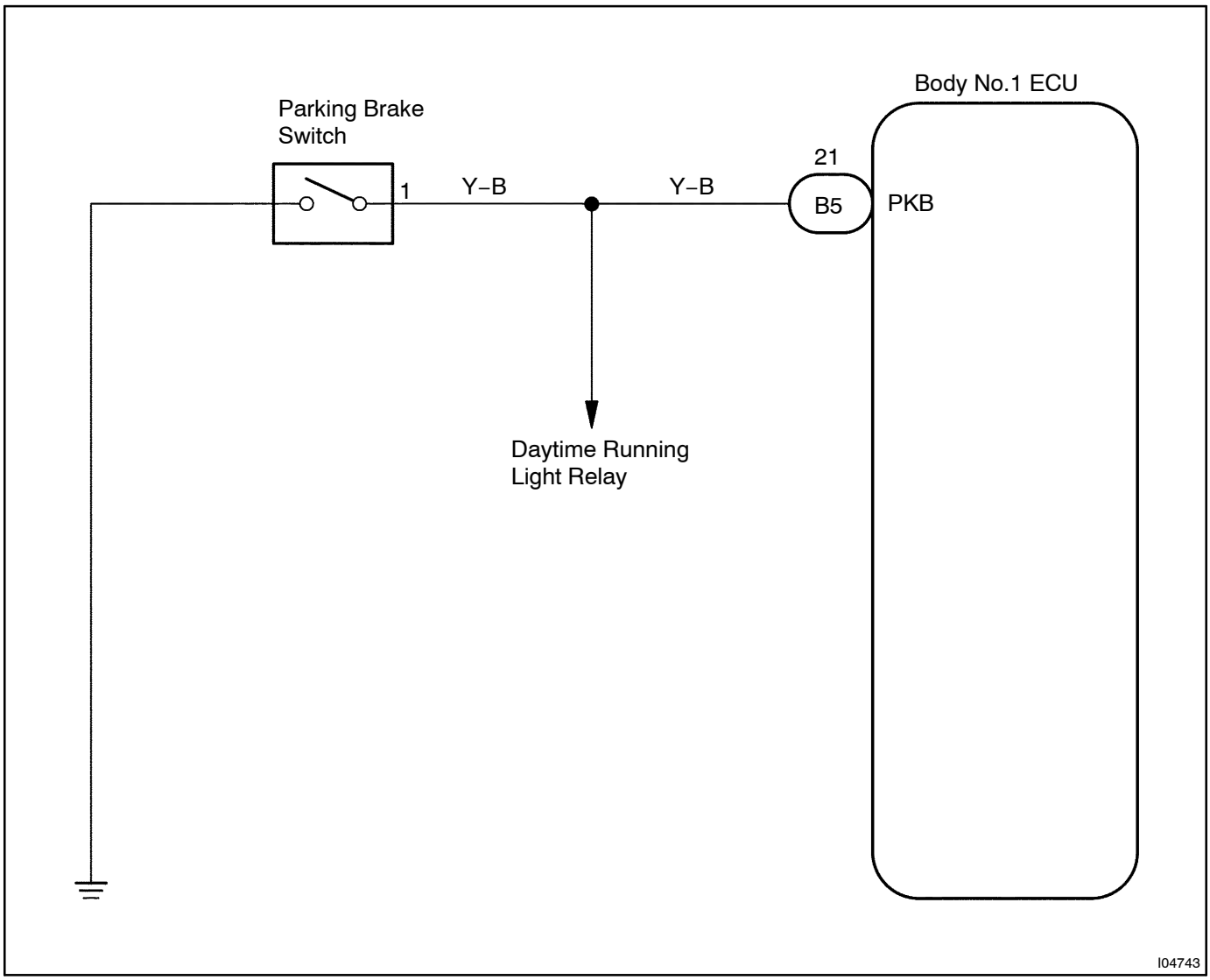
OK

**Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)**

DI29Y–02

Parking brake 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 parking brake switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the parking brake switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–584).**

NG

2	**Check parking brake switch (See page BE–105).**

NG → **Replace the parking brake switch.**

OK

3	**Check wireharness and connector between parking brake switch and body No.1 ECU.**

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

OK

**Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–584)**

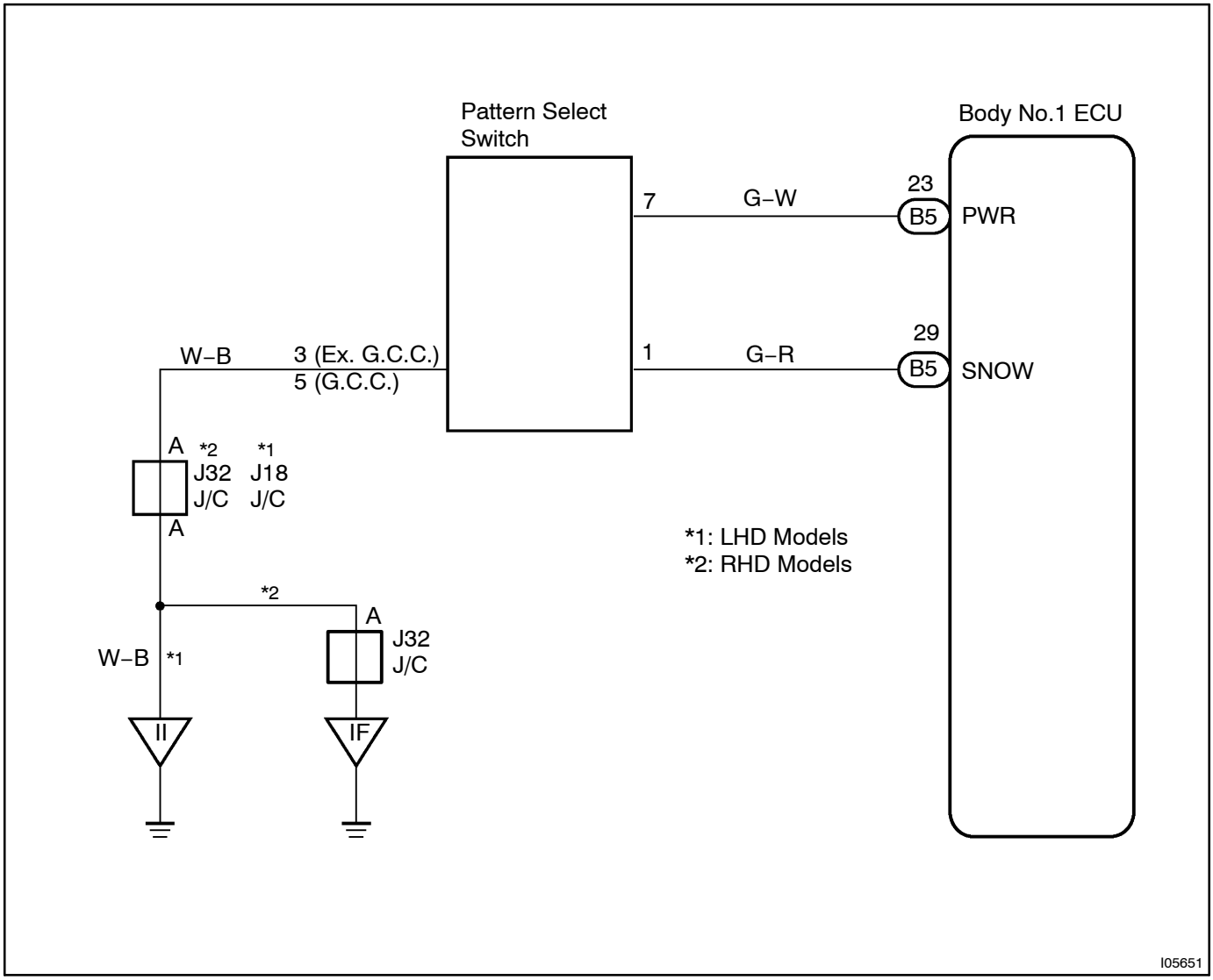
DI29Z–02

Pattern select switch circuit

CIRCUIT DESCRIPTION

Body No.1 ECU detect the state of pattern select switch.

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 pattern select switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the pattern select switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–151)**

NG

2	**Check pattern select switch. (See page DI–201)**

NG → **Replace the pattern select switch.**

OK

3	**Check wireharness and connector between pattern select switch and body No.1 ECU.**

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

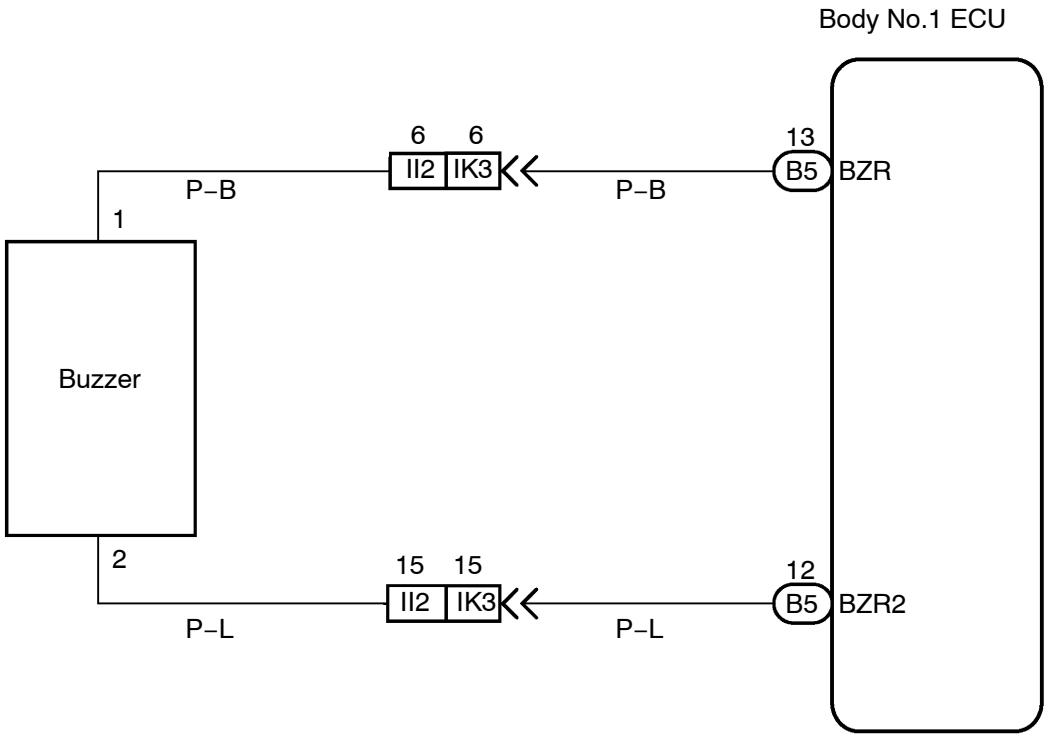
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–151)

DI2A0–02

Wireless door lock buzzer circuit

WIRING DIAGRAM



I05652

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 wireless door lock buzzer using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the wireless door lock buzzer can operated in an ACTIVE TEST.
OK:
The wireless door lock buzzer should sound.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)**

NG

2	**Check wireless door lock buzzer. (See page BE–171)**

NG → **Replace the wireless door lock buzzer.**

OK

3	**Check wireless and connector between wireharness door lock buzzer and body No.1 ECU.**

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

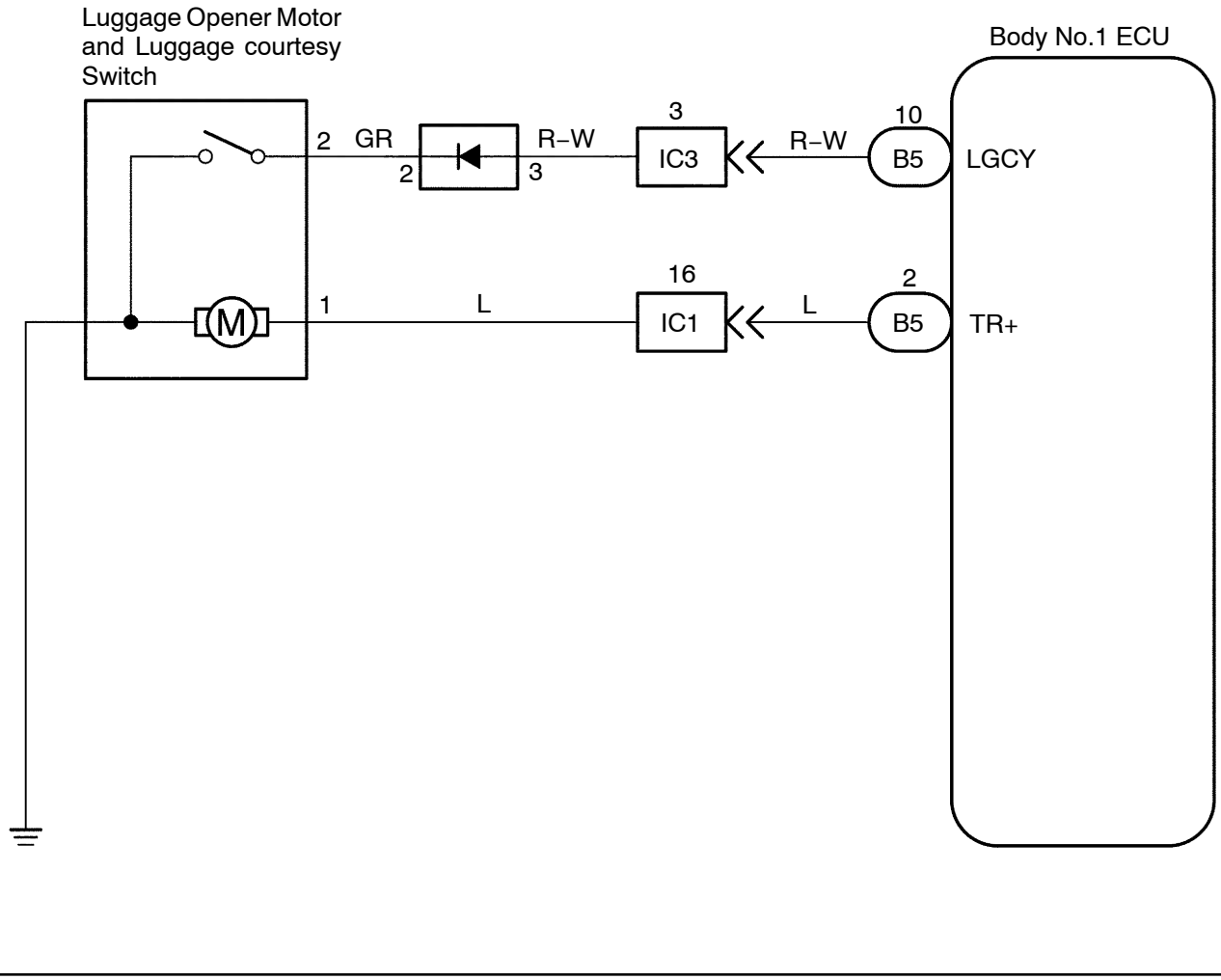
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

DI2A1–02

Luggage opener motor 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 luggage opener motor using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS 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–616)**

NG

2	**Check luggage opener motor. (See page BE–148)**

NG → **Replace the luggage opener motor.**

OK

3	**Check wireharness and connector between luggage opener motor and body No.1 ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

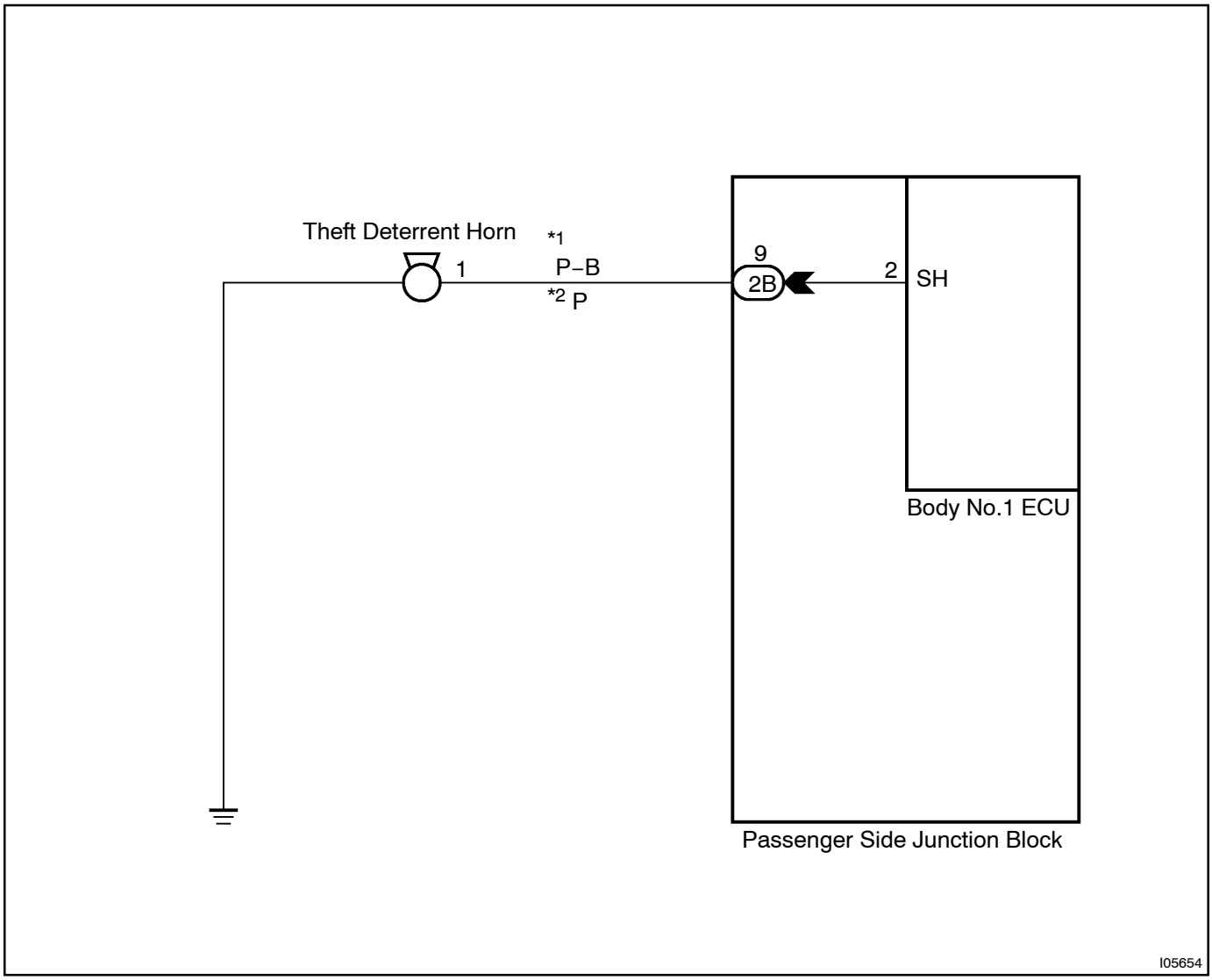
DI2A2–02

Theft deterrent horn circuit

CIRCUIT DESCRIPTION

During warning of the theft deterrent system, the body No.1 ECU activates the theft deterrent horn.

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 horn 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 horn sounds using ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)**

NG

2	**Check theft deterrent horn. (See page BE–164)**

NG → **Replace the theft deterrent horn.**

OK

3	**Check wireharness and connector between theft deterrent horn and body No.1 ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

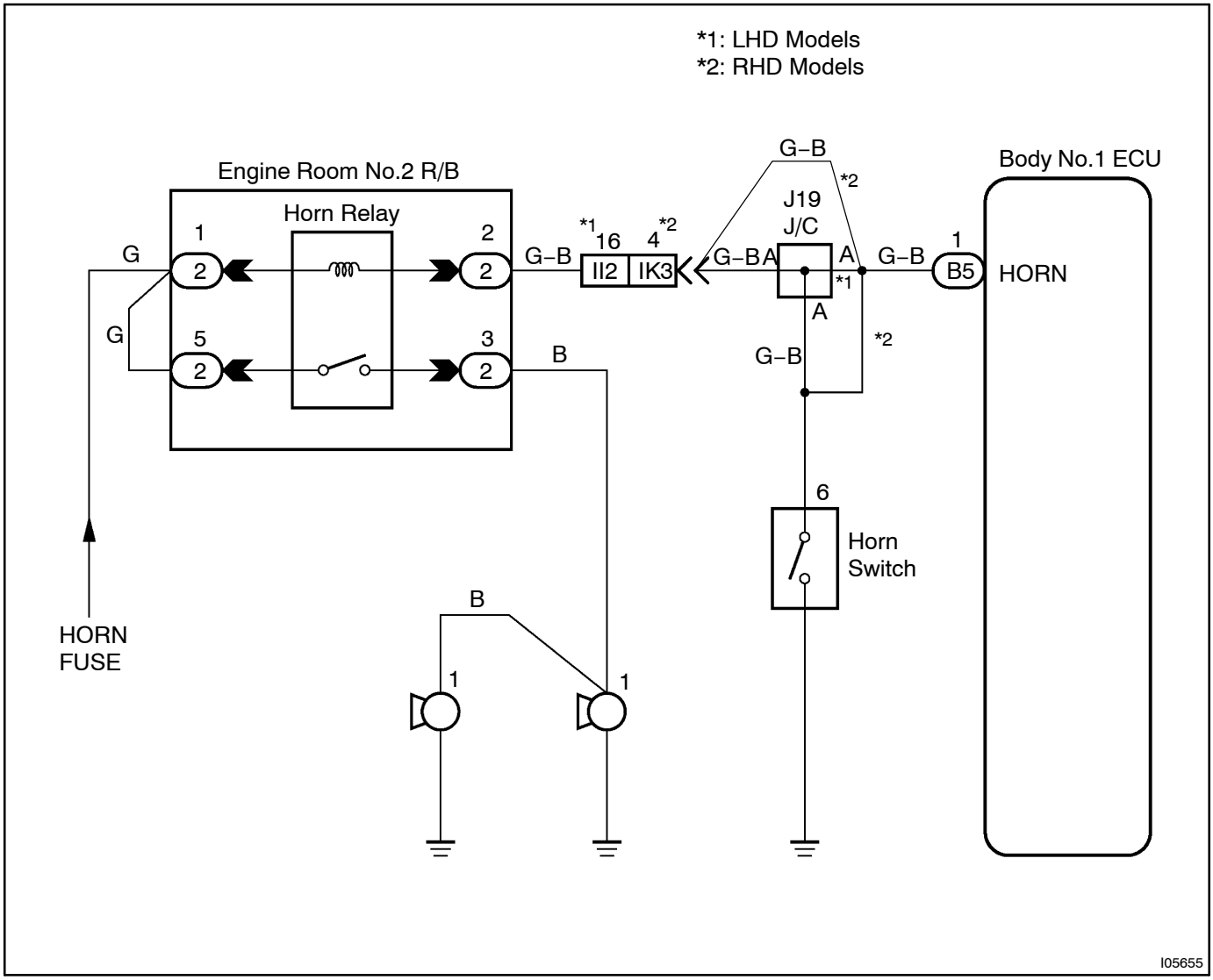
DI2A3–02

Horn circuit

CIRCUIT DESCRIPTION

The horn is connected to the body No.1 ECU and activated by the body No.1 ECU during warning of the theft deterrent system.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check horn. (See page BE–255)

NG → Replace the horn.

OK

2	Check wireharness and connector between horn relay and body ECU, battery and horn relay.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)

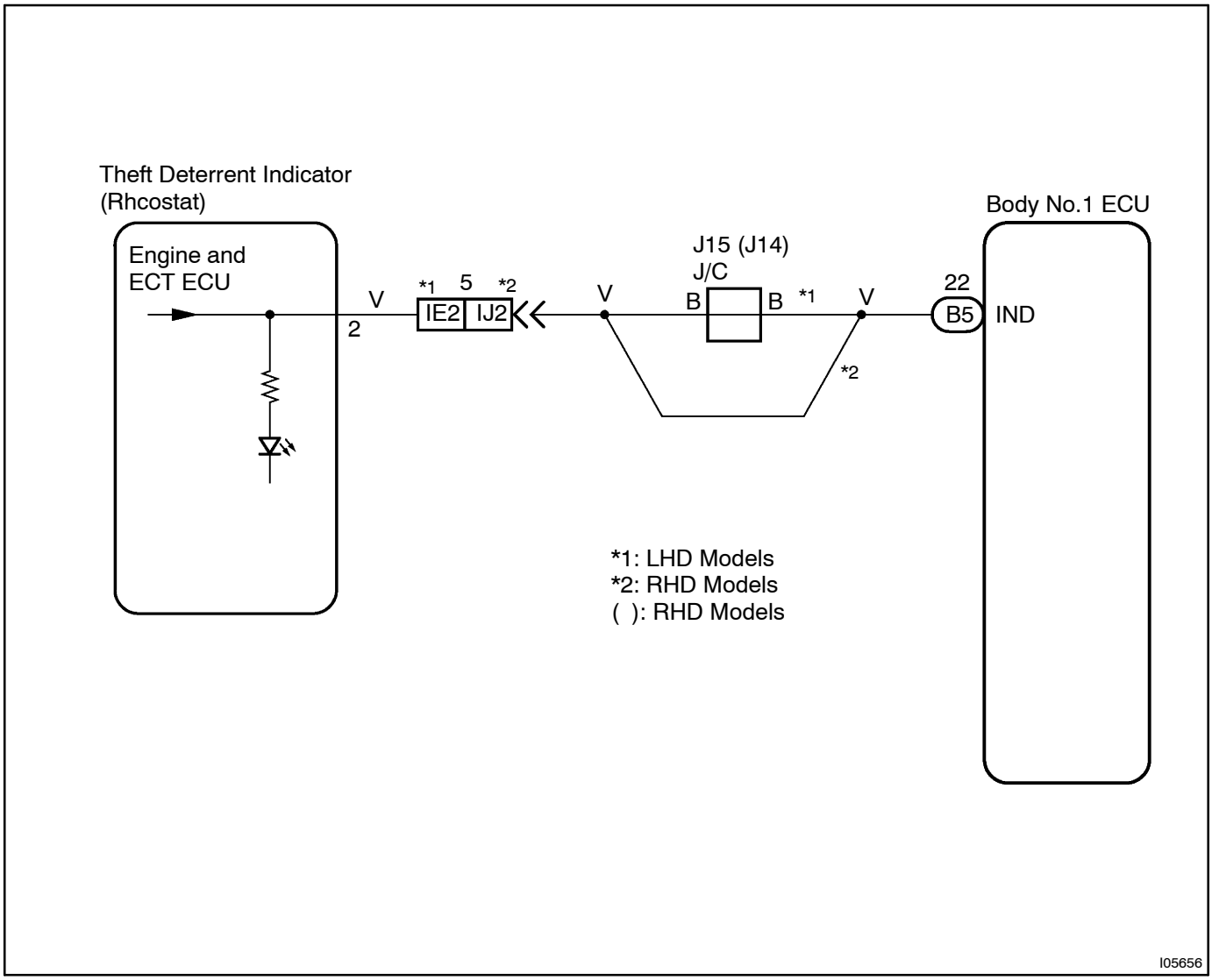
DI2A4–02

Theft deterrent indicator 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.
This theft deterrent indicator is connected to the Engine and ECT ECU and outputs the key judgment of the immobilizer.

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 on problem symptoms table.** (See page DI–616)

NG

2	**Check theft deterrent indicator.** (See page BE–164)

NG → **Replace the theft deterrent indicator.**

OK

3	**Check wireharness and connector between theft deterrent indicator and body No.1 ECU, theft deterrent indicator and body ground.**

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

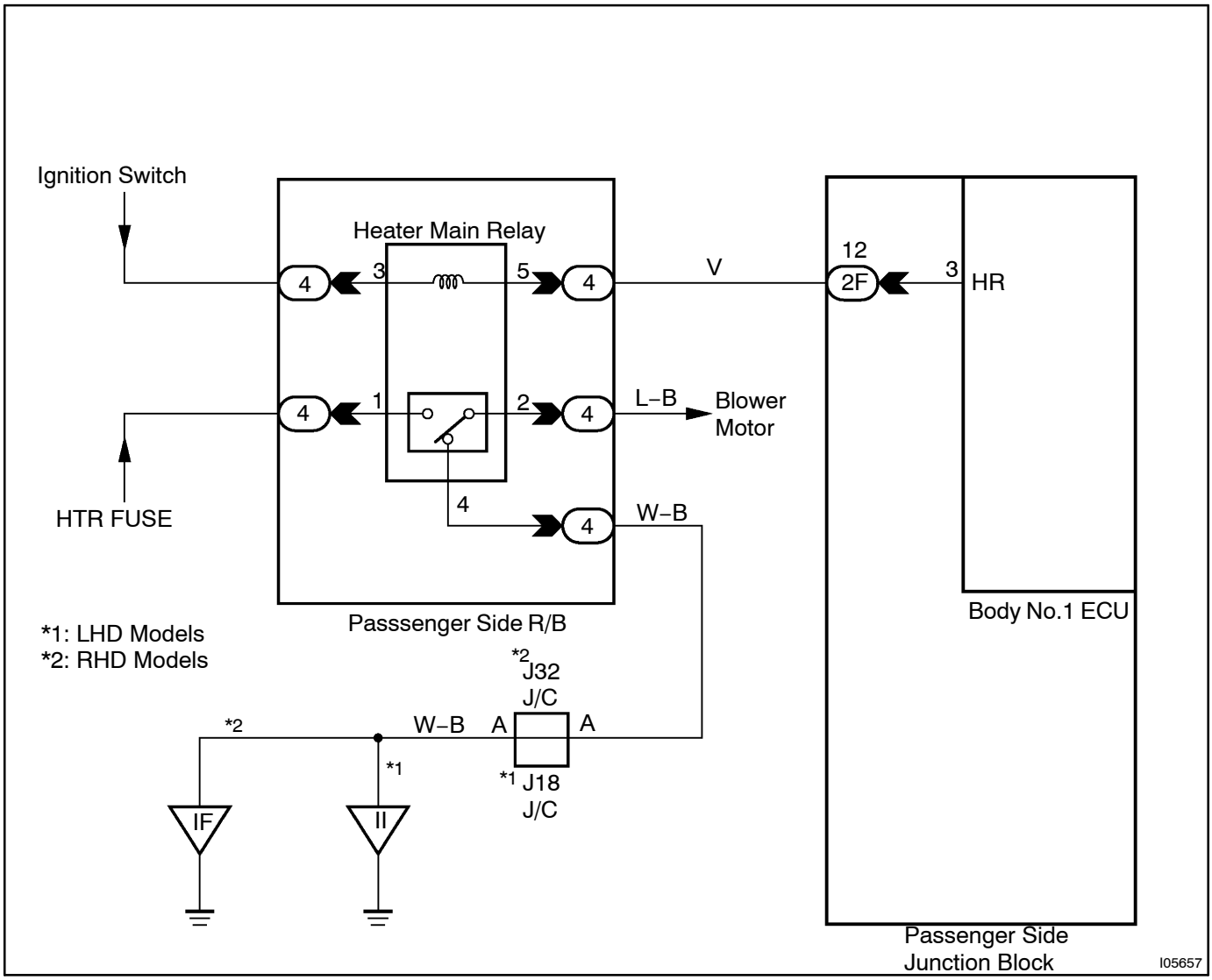
OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)

DI2A5–02

Heater main relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check heater main relay (See page AC–85).

NG → Replace the heater main relay.

OK

2	Check wireharness and connector between heater main relay and body No.1 ECU.

NG → Repair or replace wireharness or connector.

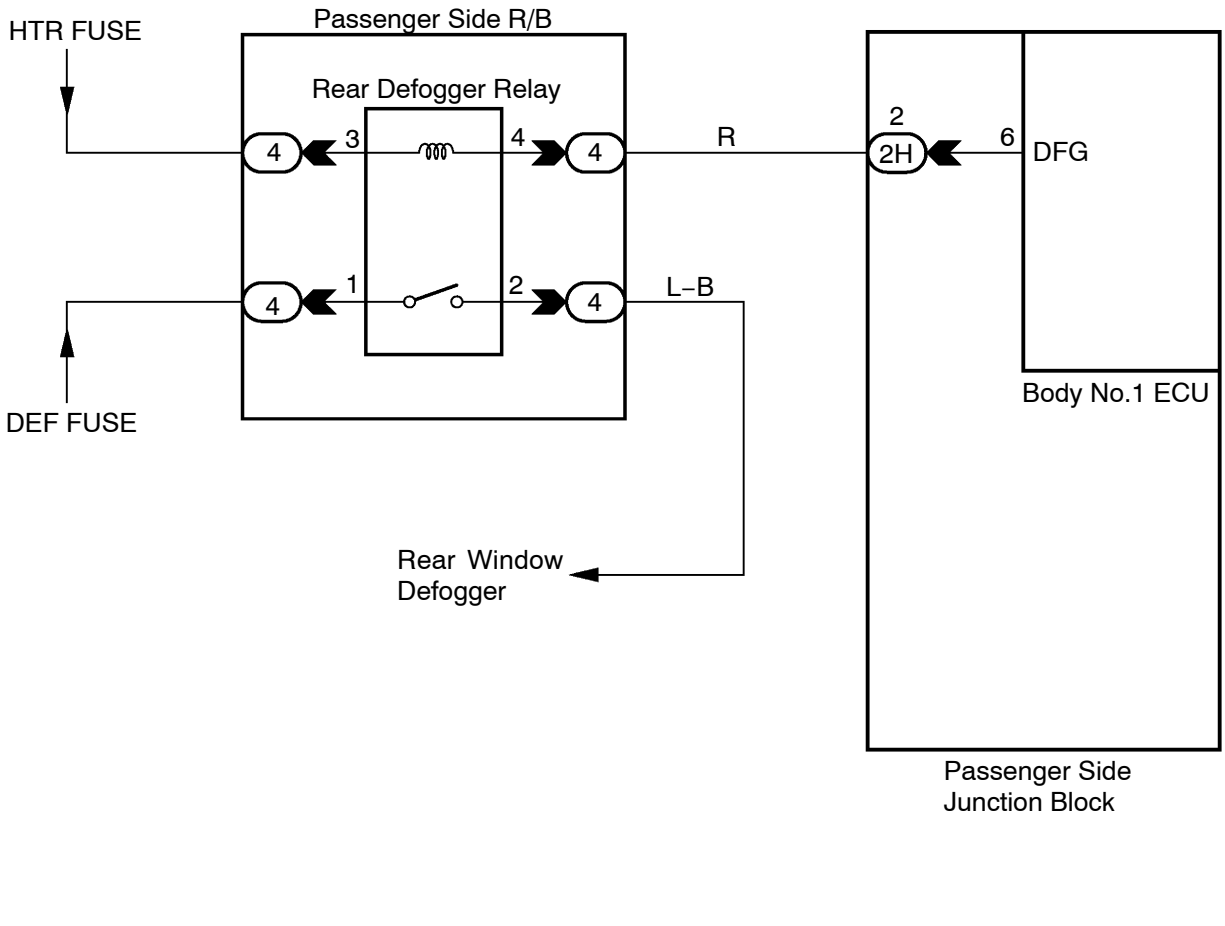
OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–912)

DI2A6–02

Rear defogger relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear defogger relay. (See page BE–125)

NG → Replace the rear defogger relay.

OK

2	Check wireharness and connector between rear defogger relay and body No.1 ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

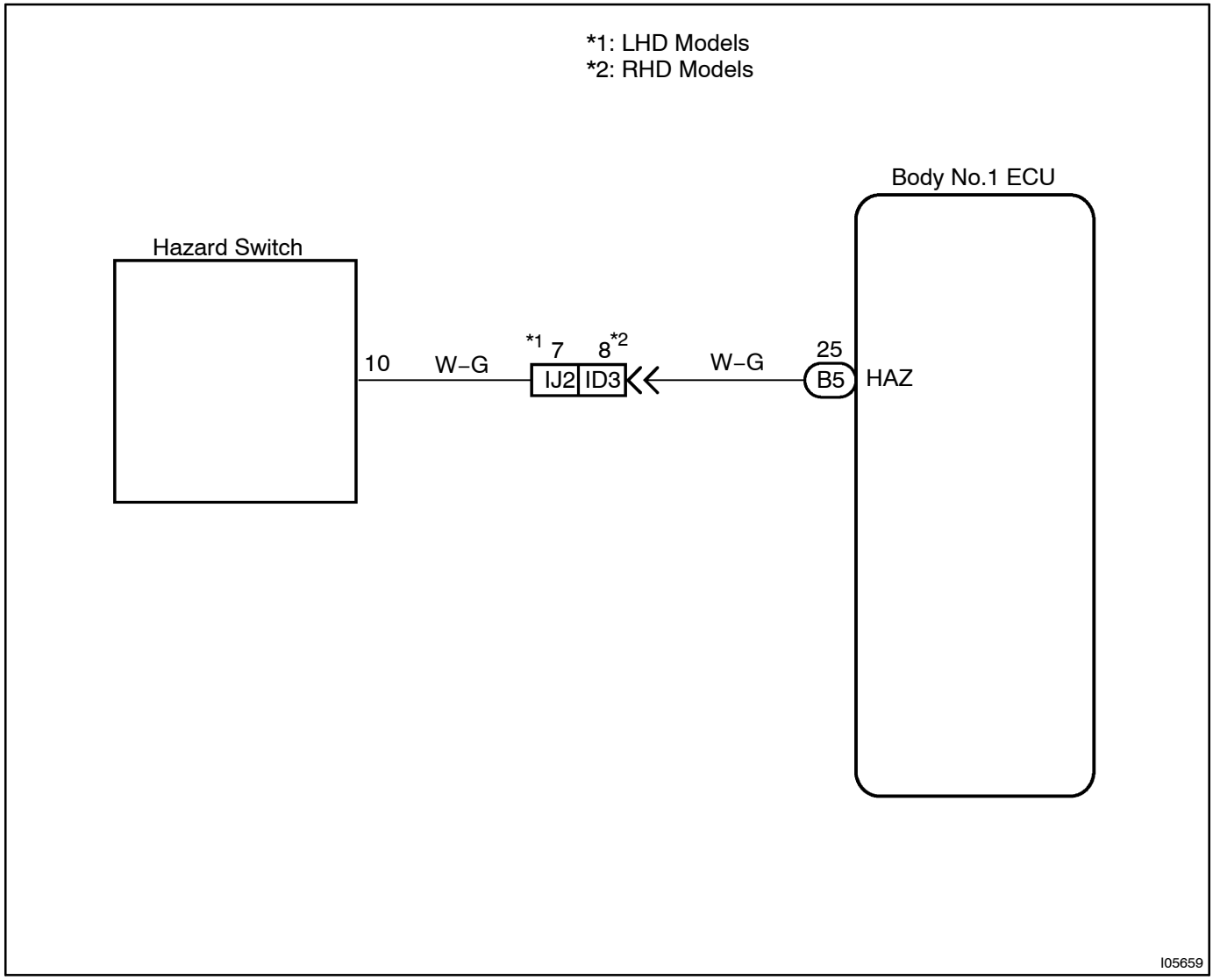
DI2A7–02

Hazard switch circuit

CIRCUIT DESCRIPTION

Body No.1 ECU activates the flasher relay during warning of the theft deterrent system and flashers the hazard.

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 hazard operation using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
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–616)**

NG

2	**Check hazard switch. (See page BE–61)**

NG → **Replace the hazard switch.**

OK

3	**Check wireharness and connector between hazard switch and body No.1 ECU.**

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

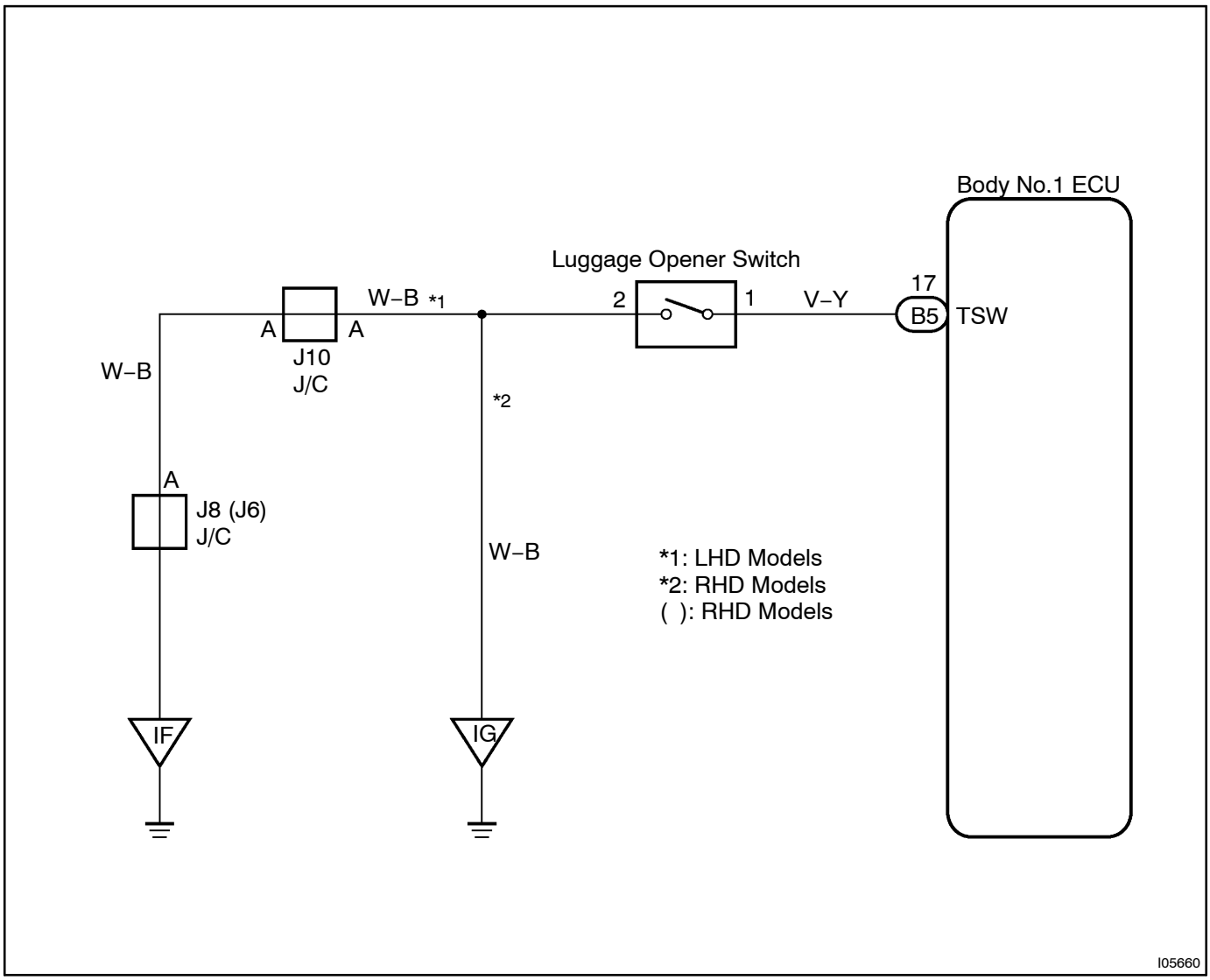
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

DI2A8–02

Luggage opener 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 wiper control switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the luggage opener switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table.** (See page DI–616)

NG

2	**Check luggage opener switch and main switch.** (See page BE–148)

NG → **Replace the luggage opener switch and main switch.**

OK

3	**Check wireharness and connector between luggage opener switch and body No.1 ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

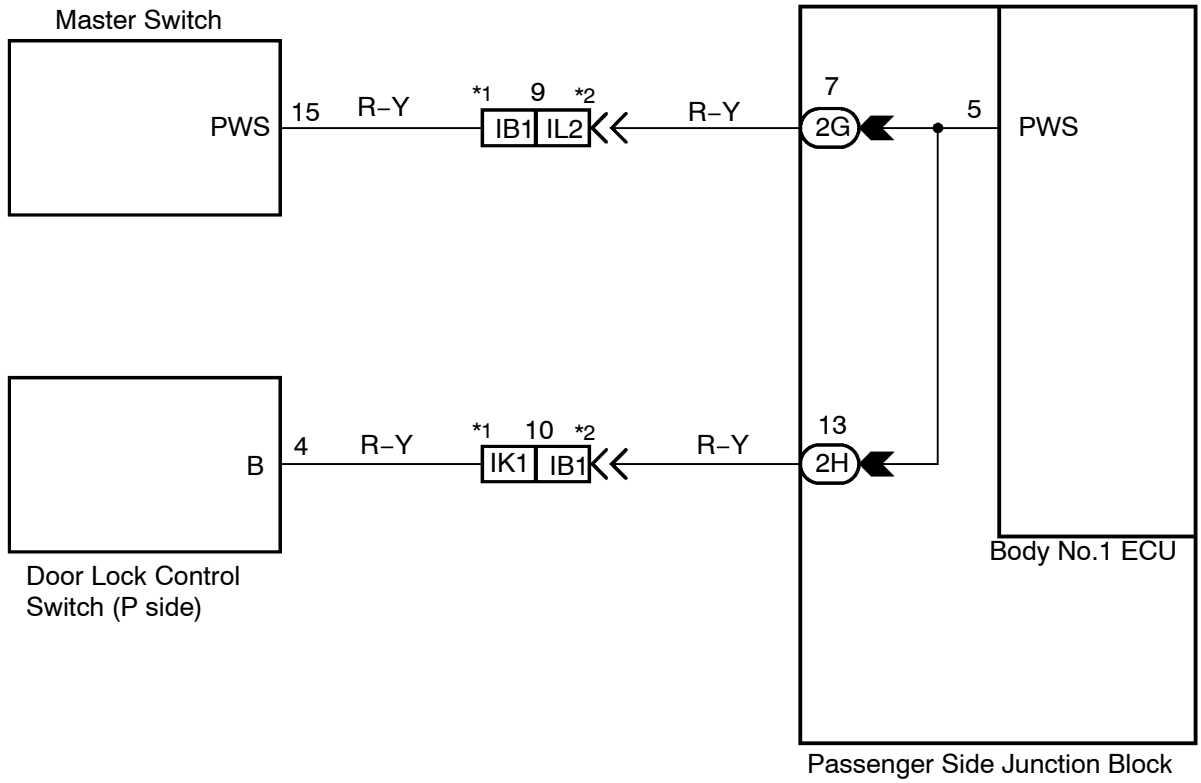
DI2A9–02

PWS circuit

CIRCUIT DESCRIPTION

This circuit is the power source of the master switch for the driver's door and the door lock switch for the passenger's doors.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check wireharness and connector between master switch and body No.1 ECU, door lock switch of passenger door and body No.1 ECU.

NG → Repair or replace wireharness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–706)

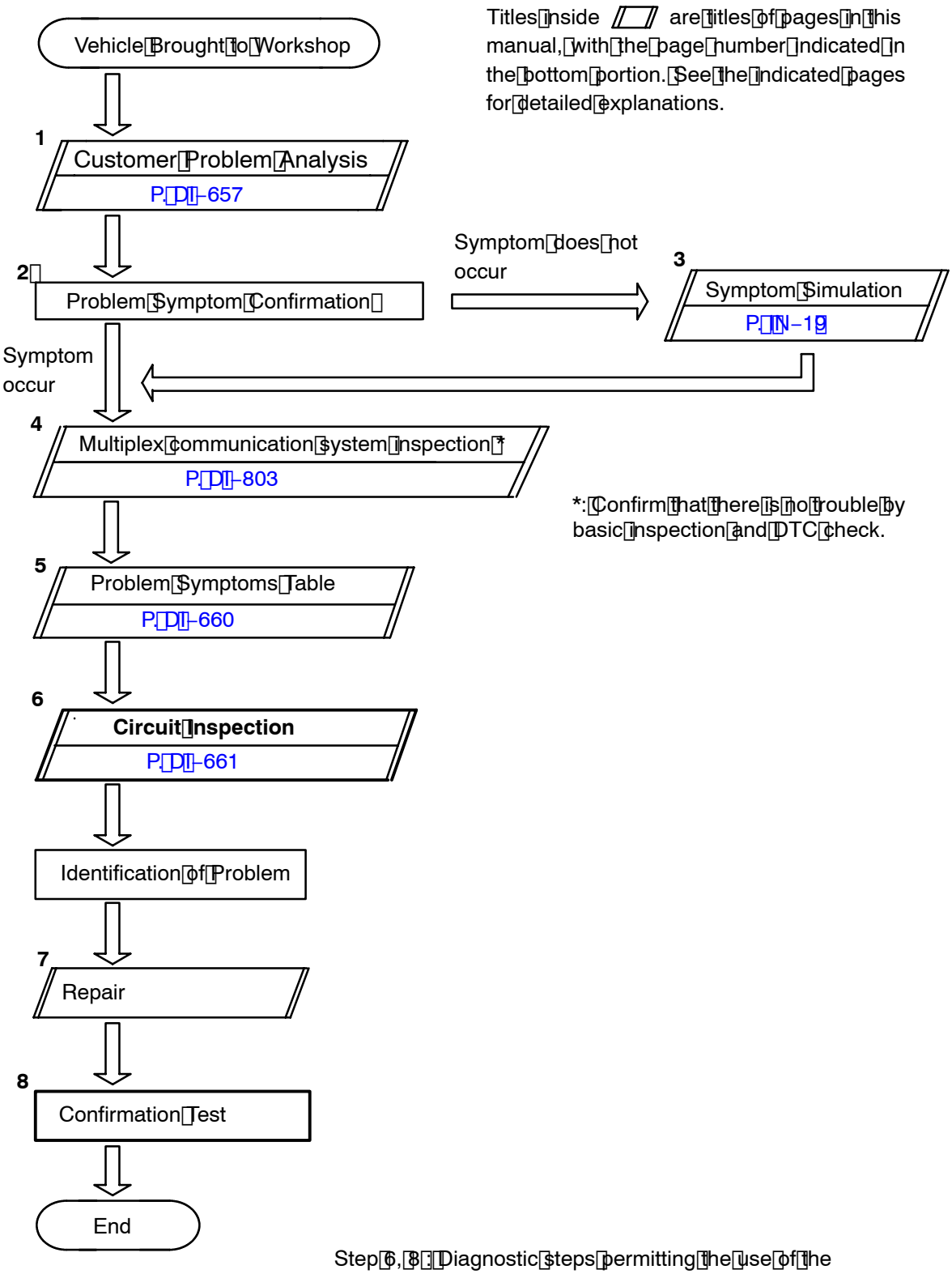
BODY NO.2 CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI2AA–02

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 troubleshooting.



DI2AB–02

CUSTOMER PROBLEM ANALYSIS CHECK

BODY NO.2 CONTROL SYSTEM Check Sheet

Inspector's name: _____

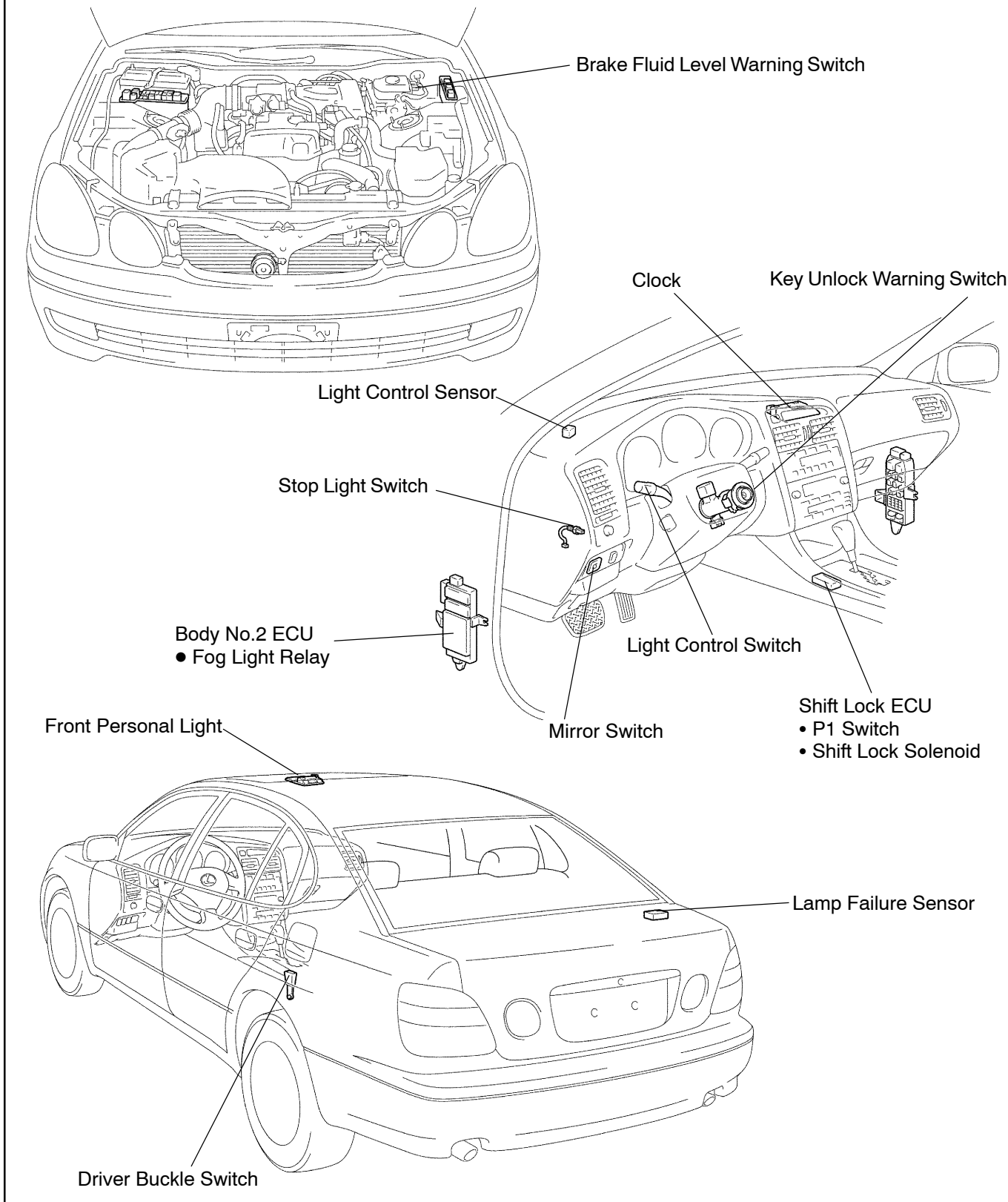
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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
	☐ Headlight and Taillight System
	☐ Light Control System
	☐ Illuminated Entry System
	☐ Seat Belt Warning
	☐ Shift Lock Control System
	☐ Others

DI2AC–02

PARTS LOCATION

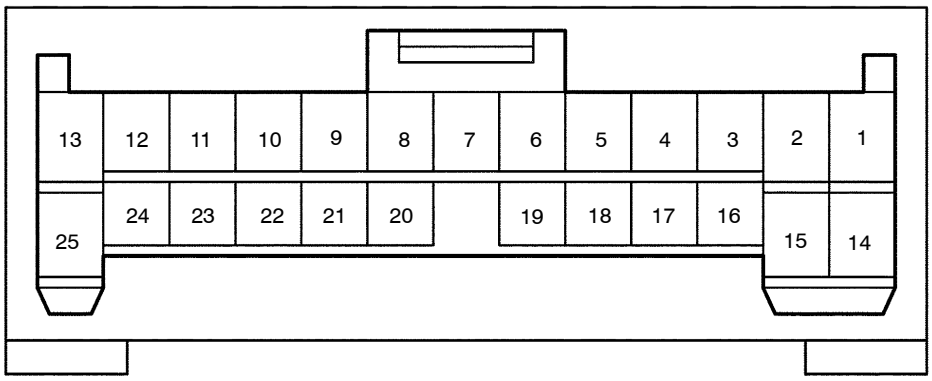


I06102

DI2AD–02

TERMINALS OF ECU

BODY No.2 ECU



I05039

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
HRLY ↔ GND (B6–9 ↔ Body Ground)	R–G ↔ Body Ground	Ignition switch position is ON. Light control switch HEAD position.	Below 2 V
		Ignition switch position is ON. Light control switch OFF position.	10 – 14 V
ILE ↔ GND (B6–13 ↔ Body Ground)	G ↔ Body Ground	Each door are opened.	Below 2 V
		All doors are closed.	10 – 14 V
KSW ↔ GND (B6–5 ↔ Body Ground)	Y ↔ Body Ground	Key, inserted	Below 1 V
		Key, not inserted	10 – 14 V
STPI ↔ GND (B6–14 ↔ Body Ground)	G–W ↔ Body Ground	Brake is ON.	Below 1 V
		Brake is OFF.	10 – 14 V
P1 ↔ GND (B6–20 ↔ Body Ground)	G–O ↔ Body Ground	Shift position is P.	Below 1 V
		Shift position is except P.	10 – 14 V
LF ↔ GND (B6–4 ↔ Body Ground)	V–R ↔ Body Ground	Stop light, high mount stop light and taillight is normal.	10 – 14 V
		Stop light , high mount stop light and taillight is wire break.	Below 1 V
TAIL ↔ GND (B6–2 ↔ Body Ground)	R–Y ↔ Body Ground	Headlight control switch position is TAIL.	Below 1 V
		Headlight control switch position is except TAIL.	10 – 14 V
HEAD ↔ GND (B6–15 ↔ Body Ground)	R–B ↔ Body Ground	Headlight control switch position is HEAD.	Below 1 V
		Headlight control switch position is except HEAD.	10 – 14 V
AUTO ↔ GND (B6–3 ↔ Body Ground)	R ↔ Body Ground	Headlight control switch position is AUTO.	Below 1 V
		Headlight control switch position is except AUTO.	10 – 14 V
FFOG ↔ GND (B6 – 17 ↔ Body Ground)	G–W ↔ W–B	Fog light S/W is ON.	10 – 14 V
FFGO ↔ GND	–	Light control S/W is TAIL or HEAD and fog light S/W ON.	10 – 14 V
RFOG ↔ GND * (B6 – 16 ↔ Body Ground)	R–W ↔ W–B	Rear fog light S/W is ON.	10 – 14 V
RFGO ↔ GND * (B6 – 25 ↔ Body Ground)	G–Y ↔ W–B	Light control S/W is TAIL or HEAD and fog light S/W ON.	10 – 14 V

*: Europe Models

DI2AE–02

PROBLEM SYMPTOMS TABLE

- SHIFT LOCK CONTROL

Symptom	Suspect Area	See page
Does not operate the shift lock function normally.	1. Stop light switch circuit 2. Shift lock solenoid circuit 3. Body No.2 ECU	DI–675 DI–695

- LIGHT CONTROL

Symptom	Suspect Area	See page
Automatic light control does not operate	1. Light sensor circuit 2. Headlight control switch circuit 3. Body No.2 ECU	DI–845 DI–668
Auto turn–off does not operate	1. Door courtesy switch circuit (Driver side) 2. Ignition switch circuit 3. Driver door ECU 4. Body No.2 ECU	DI–718 BE–31 IN–29

- ILLUMINATED ENTRY

Symptom	Suspect Area	See page
Illuminated entry does not operate.	1. Illumination circuit 2. Body No.2 ECU	DI–679

- OTHERS

Symptom	Suspect Area	See page
Does not turn off the driver seat belt warning light	1. Driver buckle switch circuit 2. Body No.2 ECU	DI–666
The clock will not deteriorate the light.	1. Clock circuit 2. Body No.2 ECU	DI–693
Body No.2 ECU does not operate.	1. Power source circuit 2. Body No.2 ECU	DI–661

- FOG LIGHT

Symptom	Suspect Area	See page
Front fog light does not light up.	1. Front fog light switch circuit 2. Front fog light relay circuit 3. Body ECU	DI–685 DI–687
Rear fog light does not light up. *	1. Rear fog light switch circuit 2. Rear fog light relay circuit 3. Body ECU	DI–689 DI–691

*: Europe

DI2AF–02

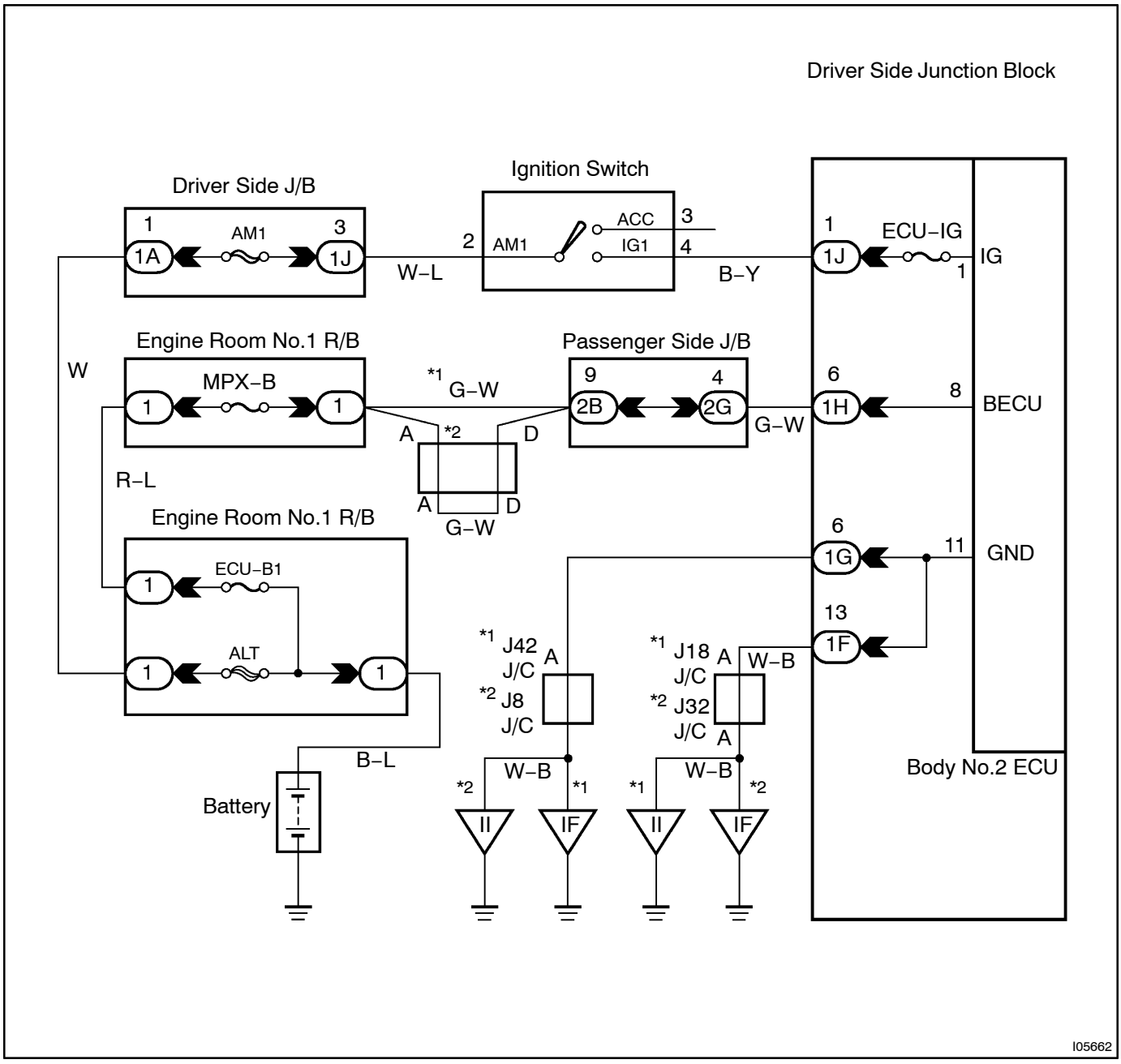
CIRCUIT INSPECTION

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the body No.2 ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check MPX–B and GAUGE fuse.**

CHECK:
Check continuity of MPX–B and GAUGE fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals B ECU, IG and GND of body No.2 ECU connector.**

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals IG and GND.
OK:
Voltage: 10 – 14V
PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the body No.2 ECU connector.
CHECK:
Measure voltage between terminals B ECU and GND.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–660).**

NG

3	**Check wireharness and connector between body No.2 ECU and body ground.**

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

OK

Check and repair wireharness and connector between body No.2 ECU and battery.

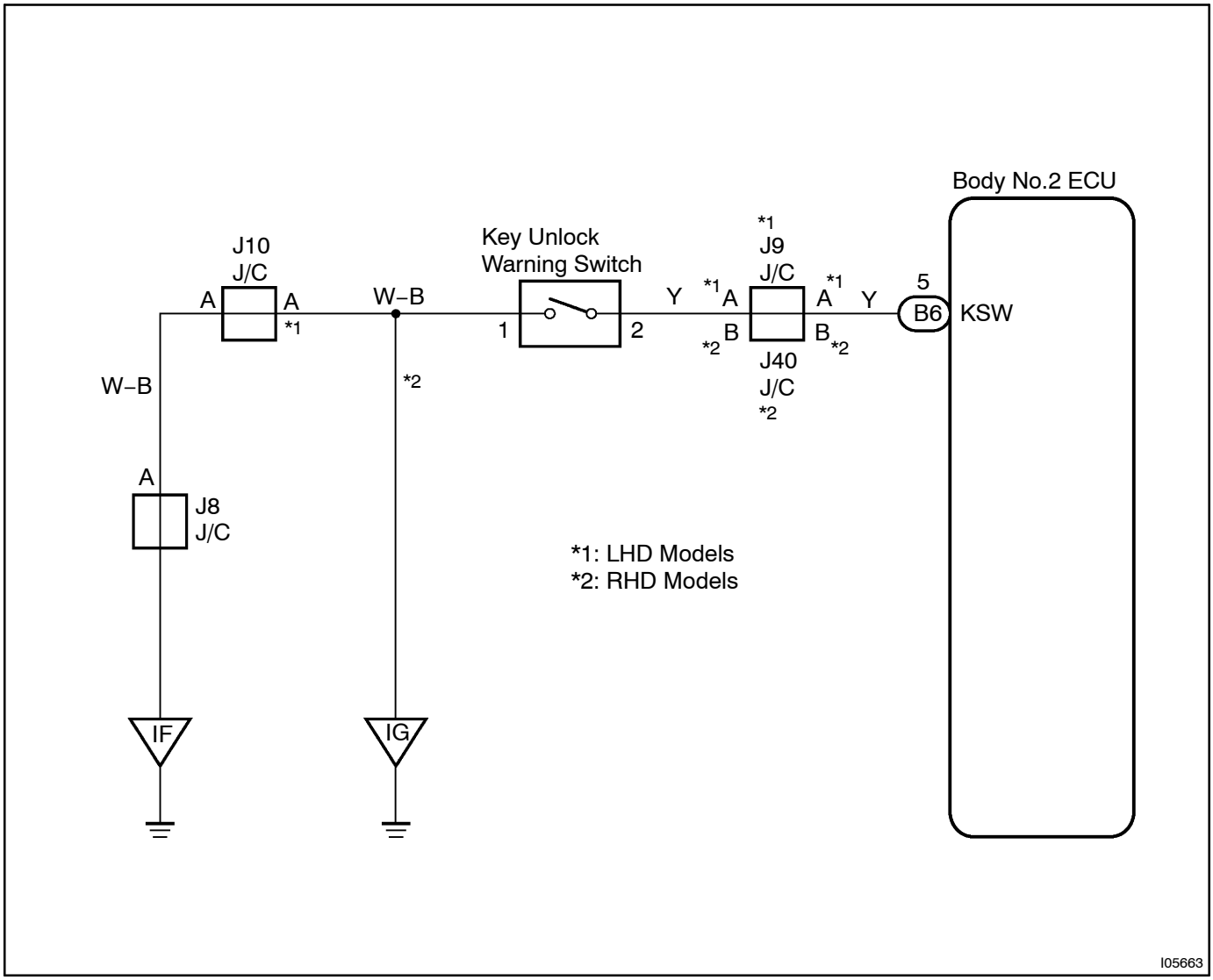
DI2AG–02

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 (See page BE–31)

NG → Replace the key unlock warning switch.

OK

2	Check wireharness and connector between key unlock warning switch and body No.2 ECU.

NG → Repair or replace wireharness or connector.

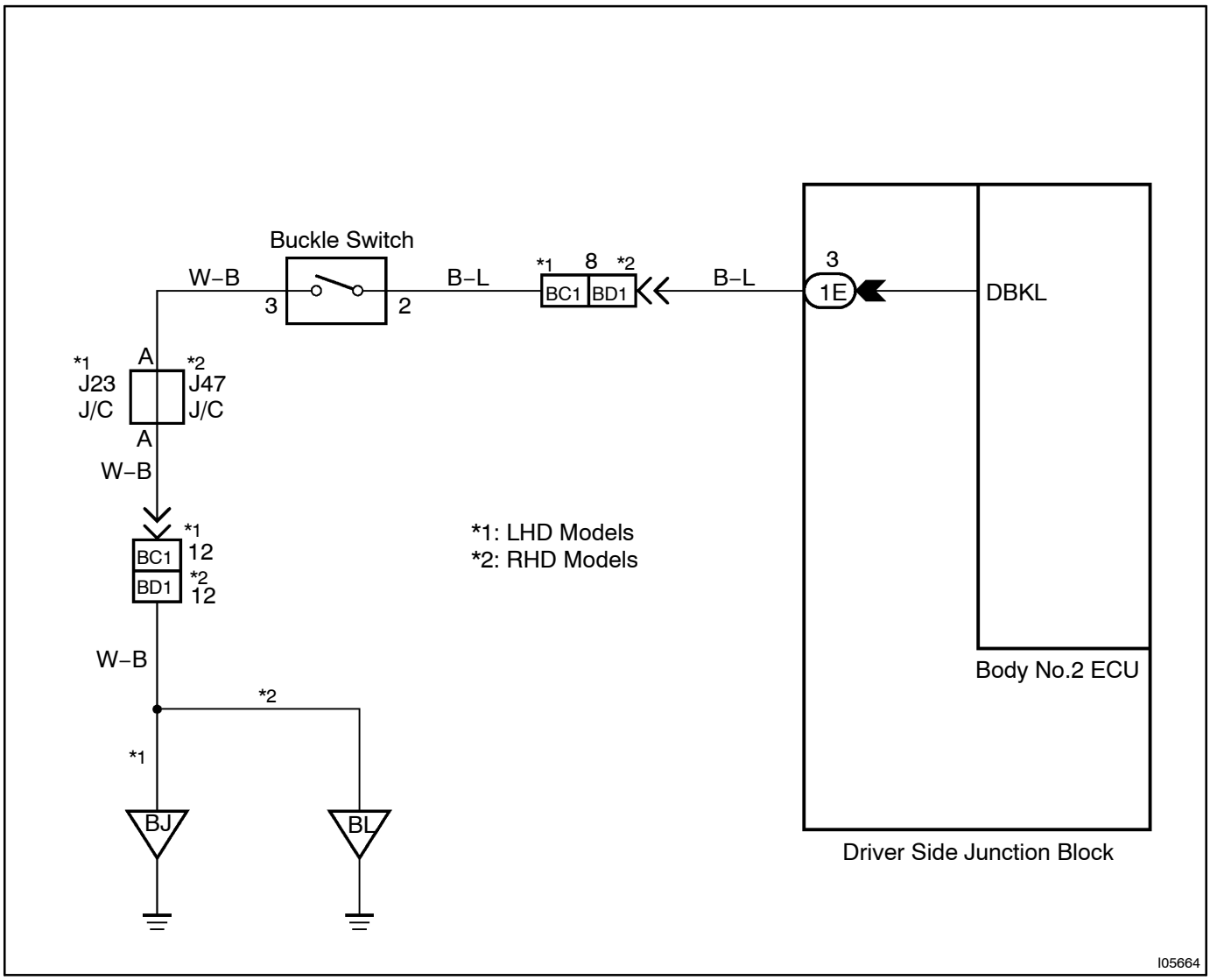
OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)

DI2AH–02

Driver buckle 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 driver buckle switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS 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–660)**

NG

2	**Check driver buckle switch (See page BE–105)**

NG → **Replace the driver buckle switch.**

OK

3	**Check wireharness and connector between driver buckle switch and body No.2 ECU.**

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

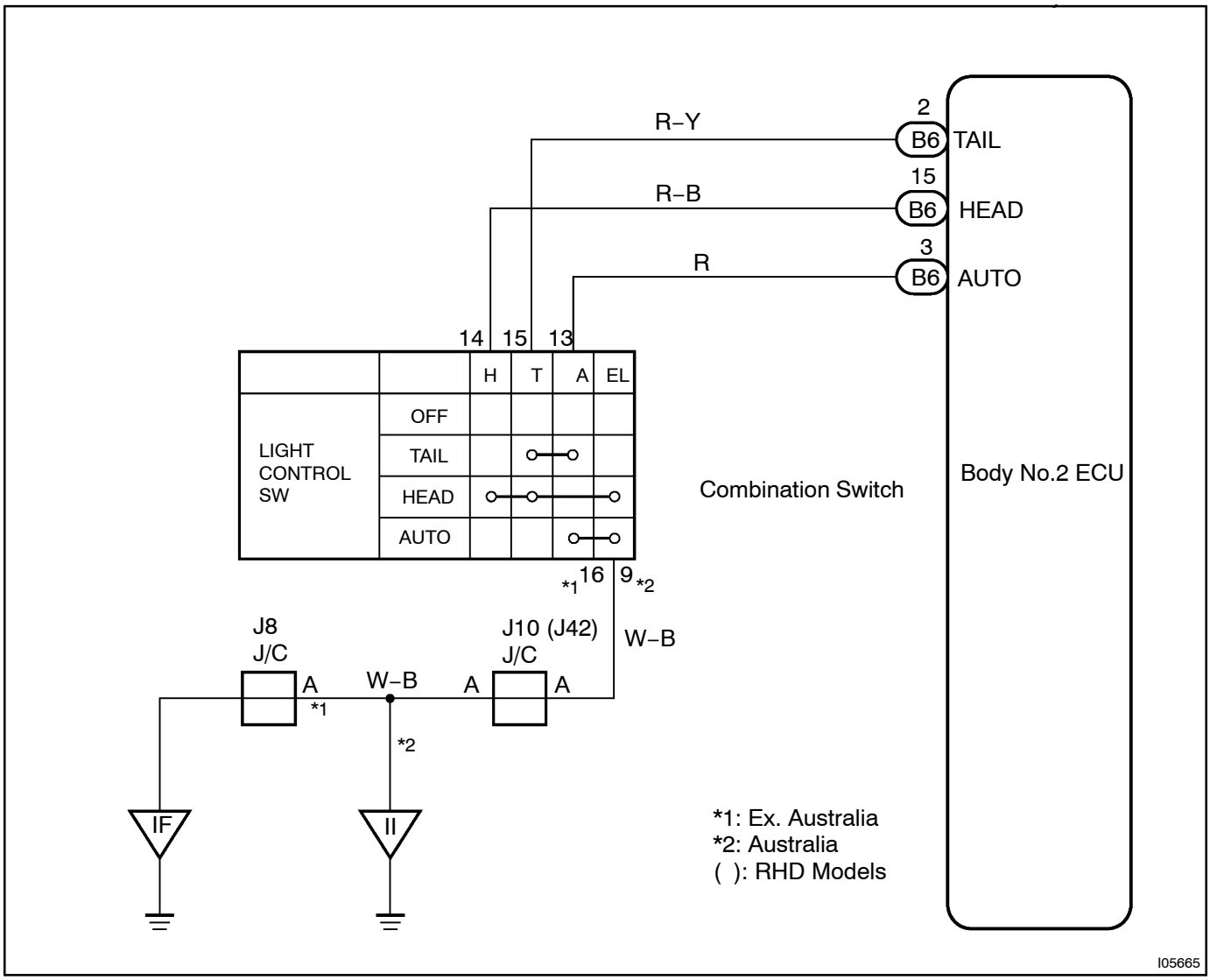
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)

DI2AI–02

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 on problem symptoms table (See page DI–660).**

NG

2	**Check headlight control switch (See page BE–38).**

NG → **Replace the headlight control switch.**

OK

3	Check wireharness and connector between headlight control switch and body No.2 ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–660)

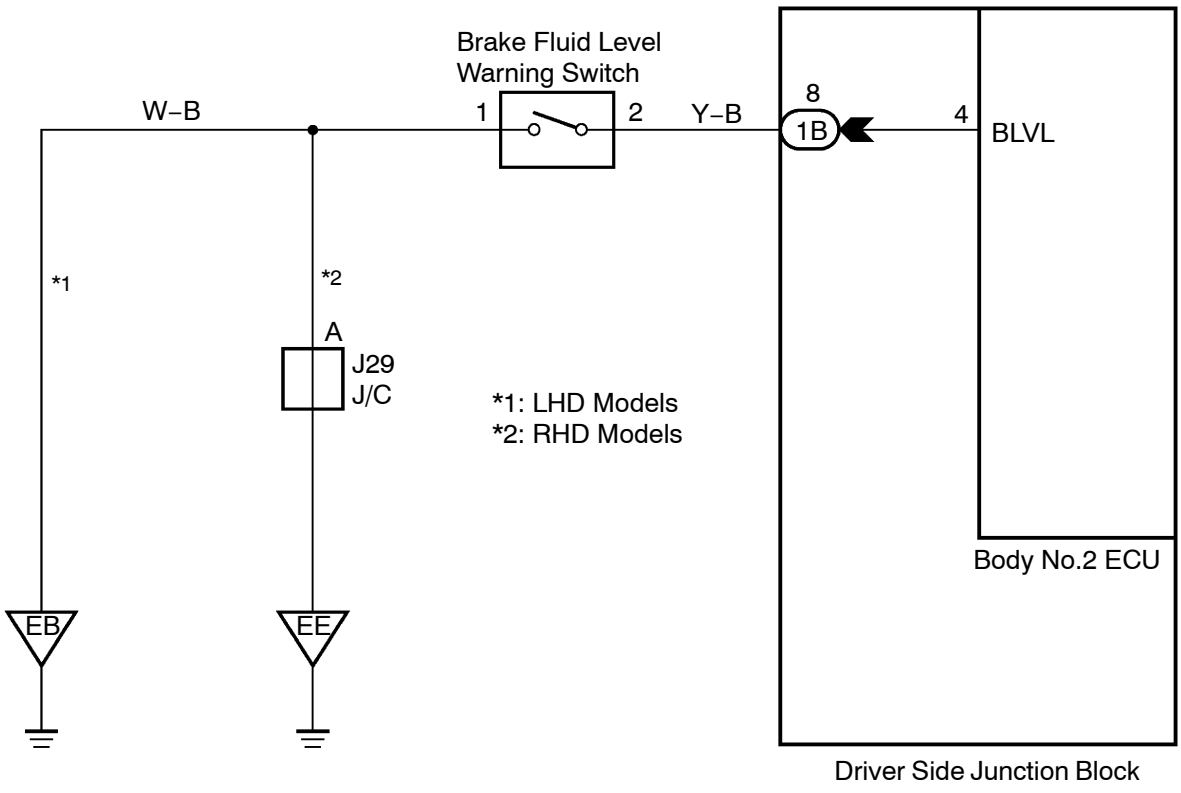
DI2AJ–02

Brake fluid level warning switch circuit

CIRCUIT DESCRIPTION

To detect abnormality of the brake fluid level.

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 brake fluid level warning switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the brake fluid level warning switch using DATA LIST.

Brake fluid level	Switch
Normal	OFF
Abnormal	ON

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–584).**

NG

2	**Check brake fluid level warning switch. (See page BE–105).**

NG → **Replace the brake fluid level warning switch.**

OK

3	**Check wireharness and connector between brake fluid level warning switch and body No.2 ECU.**

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

OK

**Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–584)**

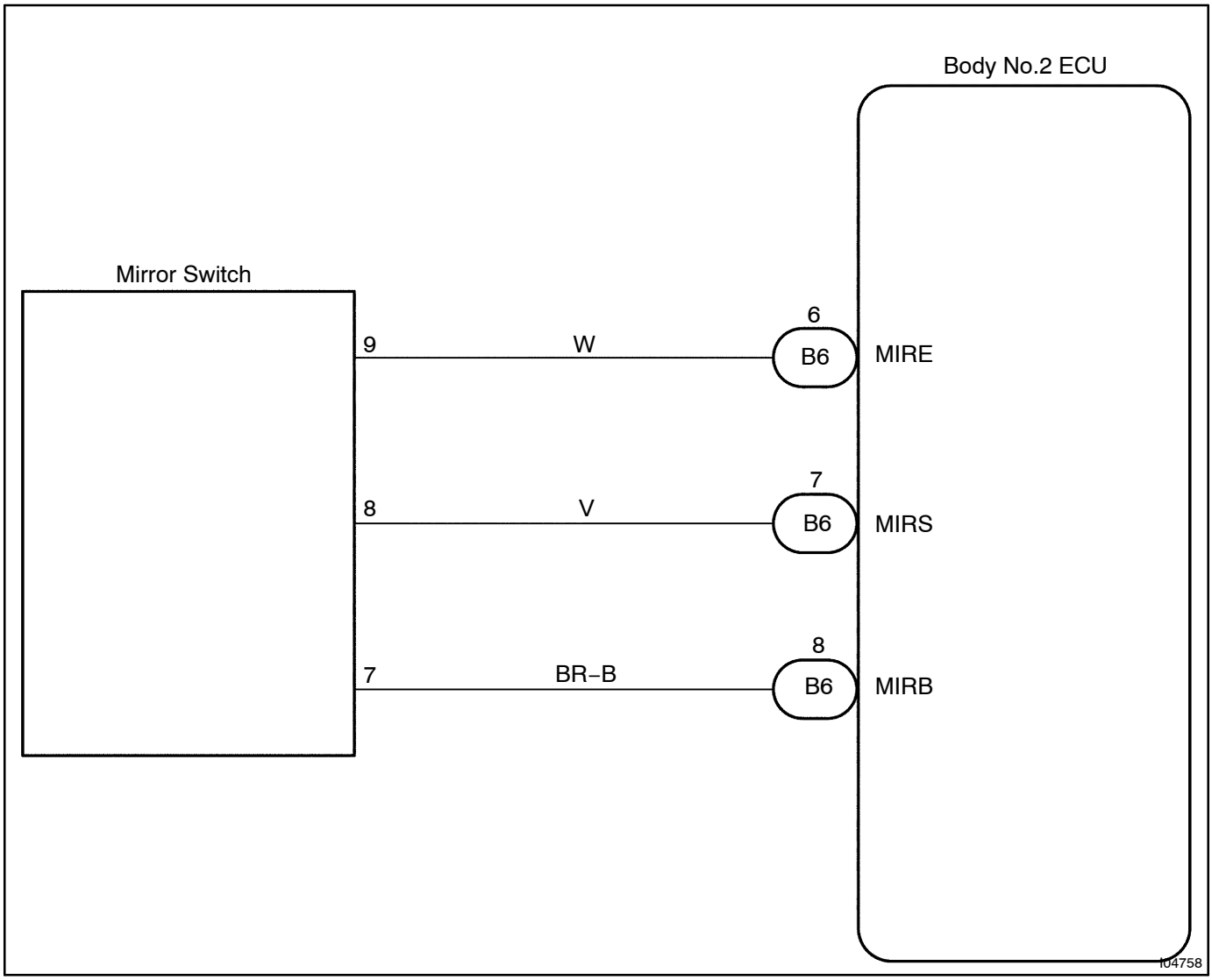
DI2AK–02

Mirror switch circuit

CIRCUIT DESCRIPTION

This circuit detects the conditions of the mirror selection switch and the mirror position switch.

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 mirror switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the mirror switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706, DI–738)**

NG

2	**Check mirror switch (See page BE–192)**

NG → **Replace the mirror switch.**

OK

3	**Check wireharness and connector between mirror switch and body No.2 ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706, DI–738)

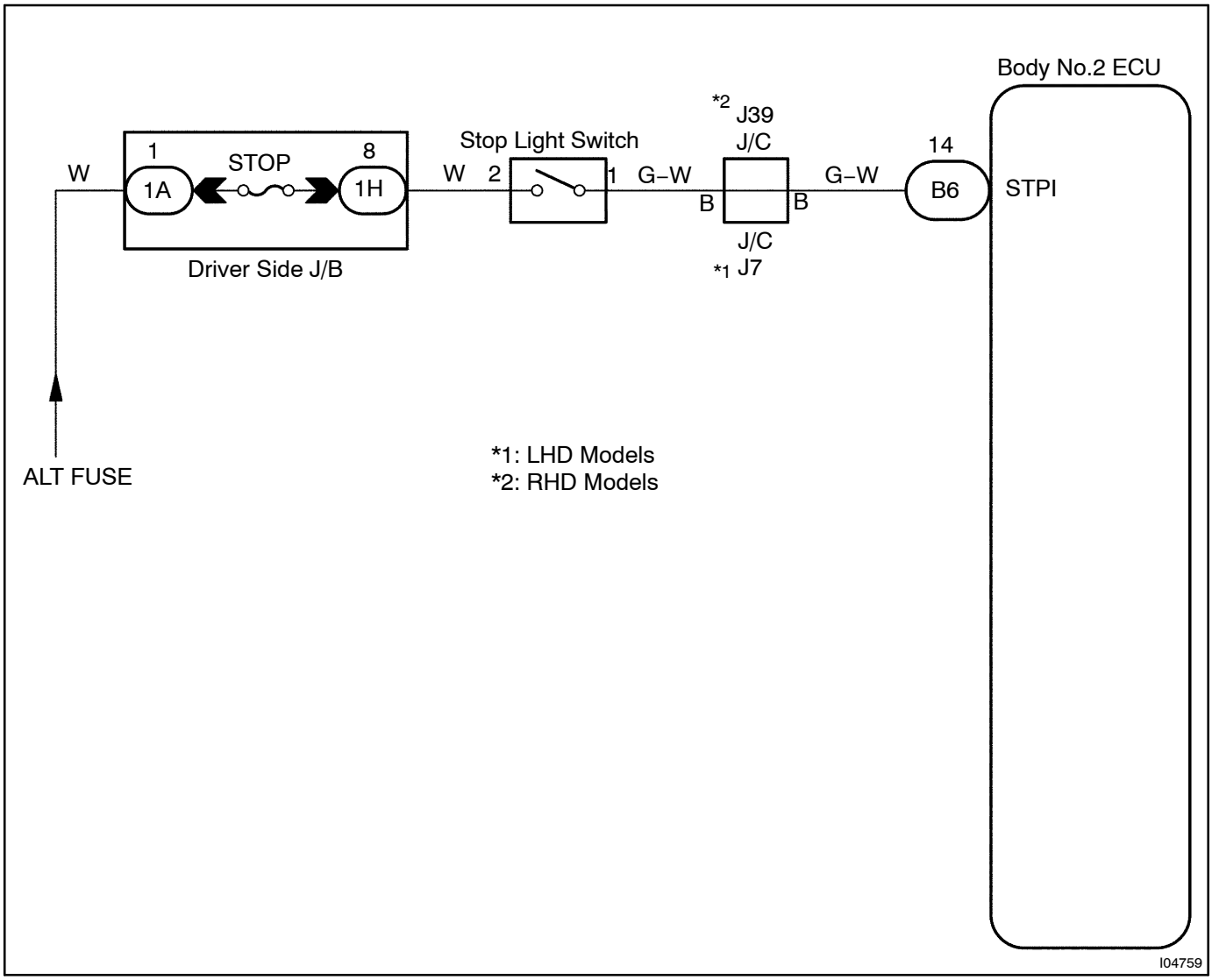
DI2AL–02

Stop light switch circuit

CIRCUIT DESCRIPTION

The body No.2 ECU is detecting the condition of the stop light switch.

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 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 DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–546)**

NG

2	**Check stop light switch. (See page BE–76)**

NG → **Replace the stop light switch.**

OK

3	**Check wireharness and connector between stop light switch and body No.2 ECU, battery and stop light switch.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–546)

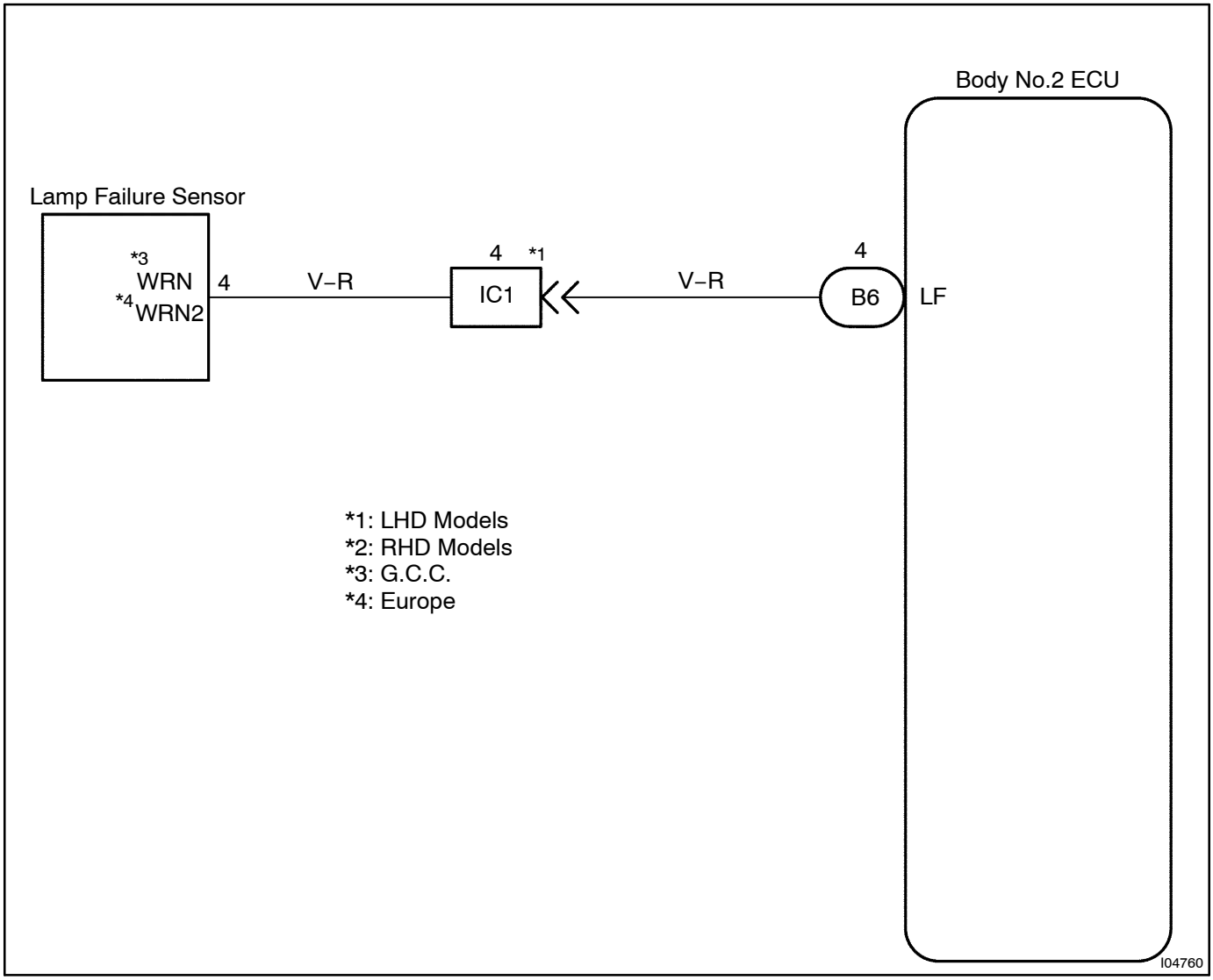
DI2AM–02

Lamp failure sensor circuit

CIRCUIT DESCRIPTION

Lamp failure sensor detects a wire break of the stop light, high mount stop light and tail light and sends that signal to the Body No.2 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 lamp failure sensor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Remove either bulb of the stop light high mount stop light or tail light, and check the operation of the lamp failure sensor with DATA LIST.

Lamp condition	Lamp failure sensor (Tester display)
Normal	OFF
Lamp wire break (or removed)	ON

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–584)**

NG

2	**Check wireharness and connector between lamp failure sensor and body No.2 ECU.**

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

OK

**Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–584)**

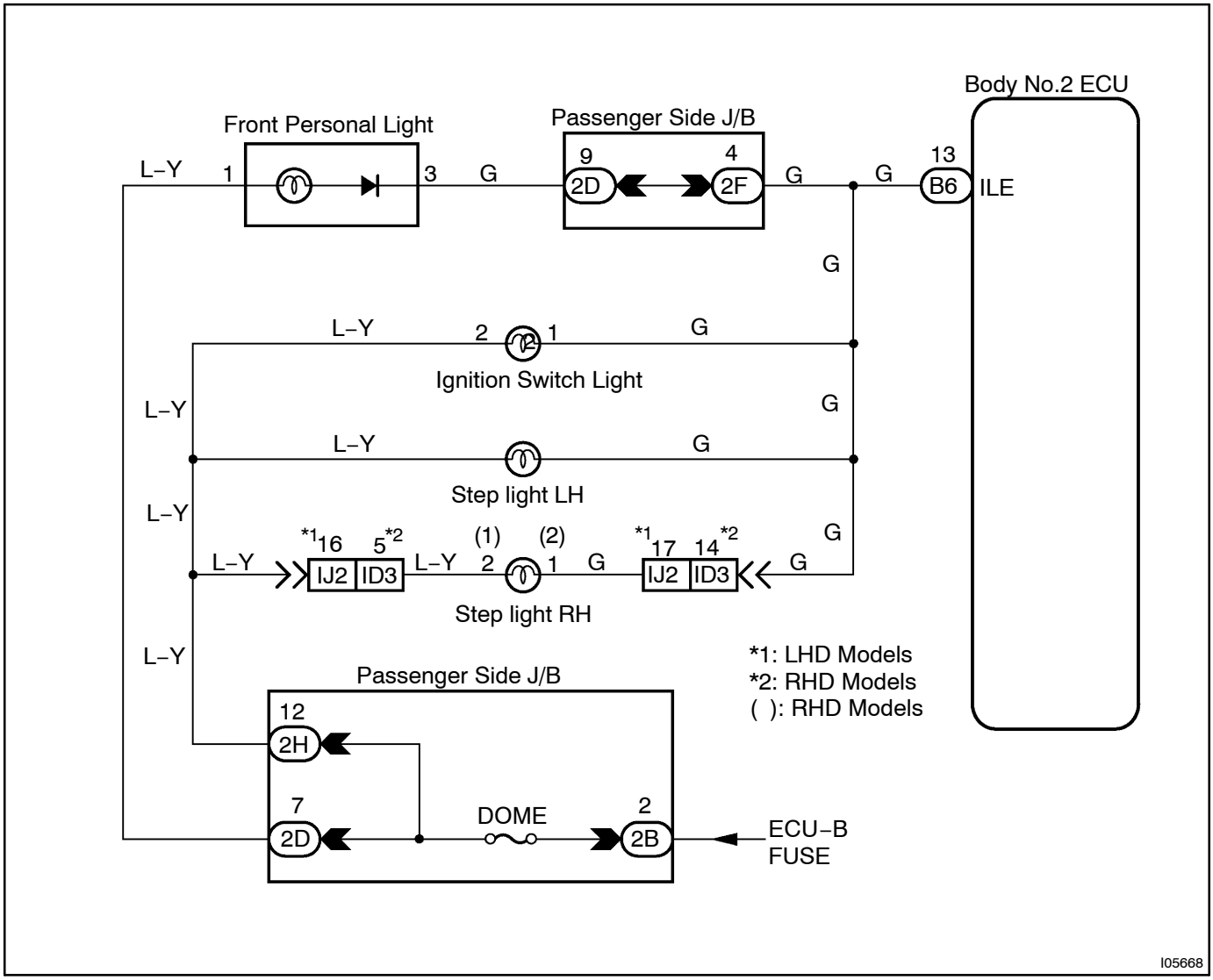
DI2AN–02

Illumination circuit

CIRCUIT DESCRIPTION

Receiving the courtesy signal from either of the door ECU, the body No.2 ECU will make the interior light, ignition light, and foot light come on.

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 illumination (interior light, ignition switch light, foot light) using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the illumination can light in an ACTIVE TEST.
OK:
All the illumination should light on.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)**

NG

2	**Check illumination light. (See page BE–31, BE–66)**

NG → **Replace the failure light.**

OK

3	**Check wireharness and connector between each illumination light and body No.2 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–660)

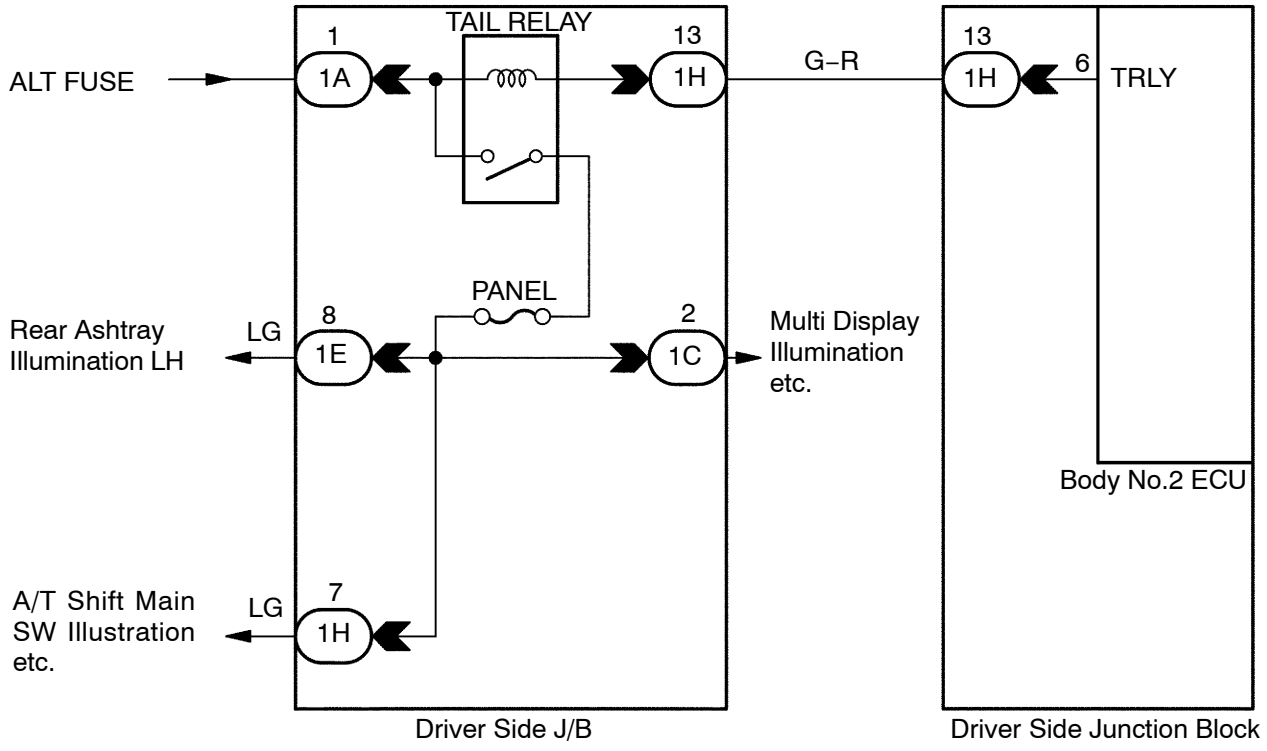
DI2AO–02

Taillight relay circuit

CIRCUIT DESCRIPTION

Taillight relay will be ”ON” by operating the tail light 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



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 tail light relay using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the tail light relay can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)**

NG

2	**Check taillight relay. (See page BE–38)**

NG → **Replace the taillight relay.**

OK

3	**Check wireharness and connector between taillight relay and body No.2 ECU, battery and tail light relay.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

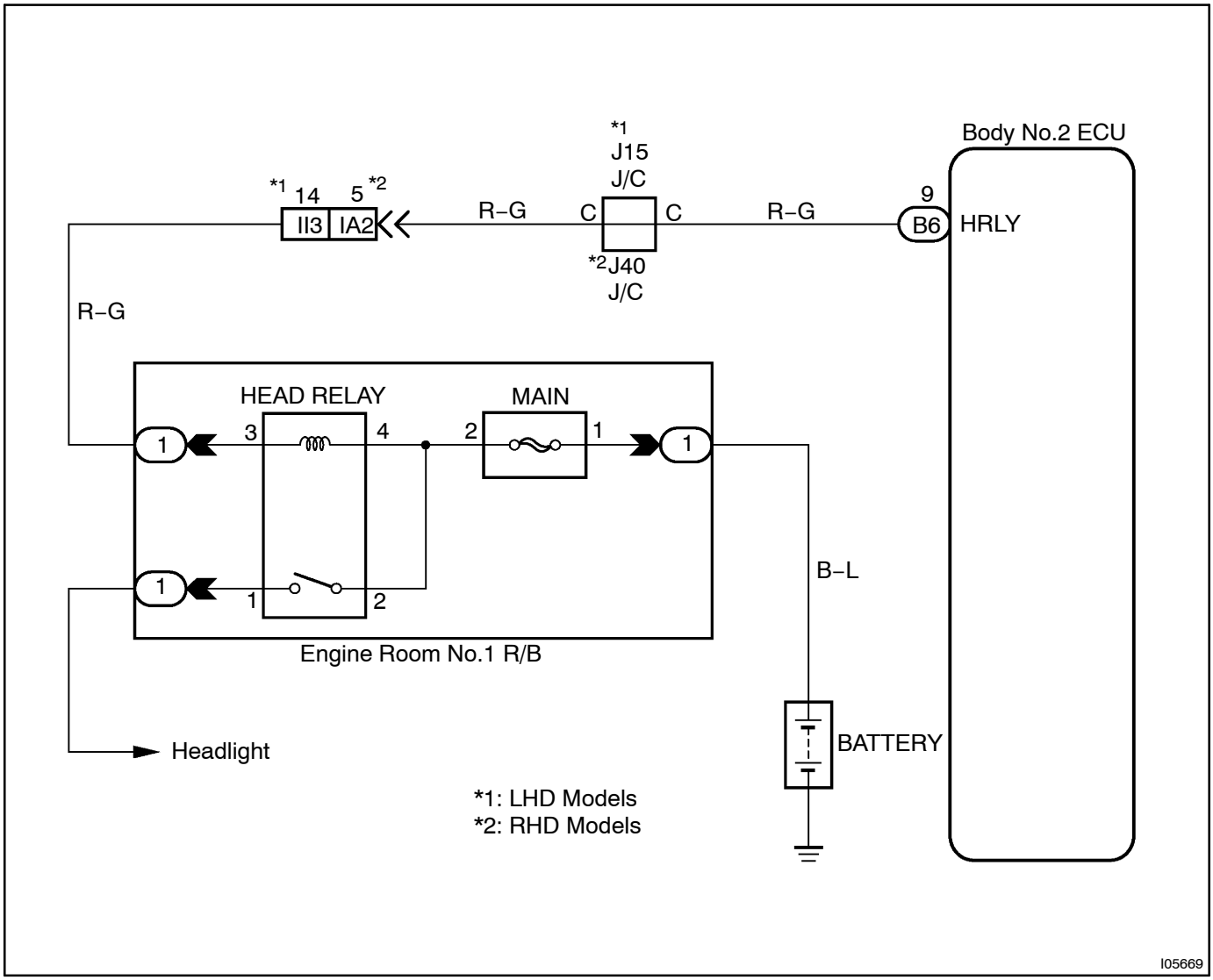
DI2AP–02

Headlight relay circuit

CIRCUIT DESCRIPTION

Head light relay will be ”ON” by operating the head light switch. The transistor which activates the tail light relay has two sorts: one activates directly by the head light switch for fail safe and the other activates by CPU. the one that activates by CPU has two systems and prevents the head light from turning off at the time of one system trouble in the automatic operation 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 relay using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
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 on problem symptoms table. (See page DI–616)**

NG

2	**Check headlight relay. (See page BE–38)**

NG → **Replace the headlight relay.**

OK

3	**Check wireharness and connector between headlight relay and body No.2 ECU, battery and headlight relay.**

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

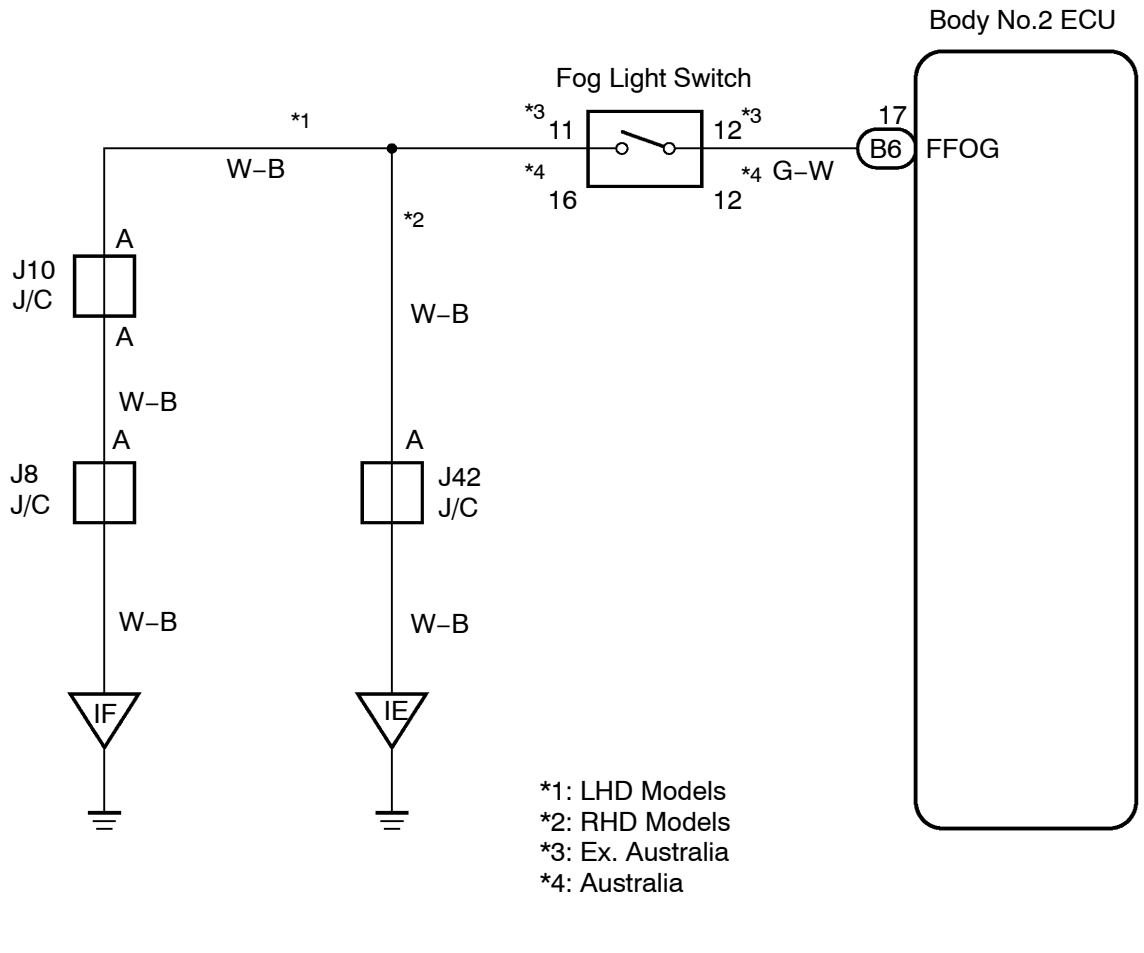
OK

**Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)**

DI2RO–02

Front fog light switch circuit

WIRING DIAGRAM



I05622

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 operating using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the front fog light can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)**

NG

2	**Check front fog light switch. (See page BE–61)**

NG → **Replace the front fog light switch.**

OK

3	**Check wire harness and connector between front fog light switch and Body ECU.**

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

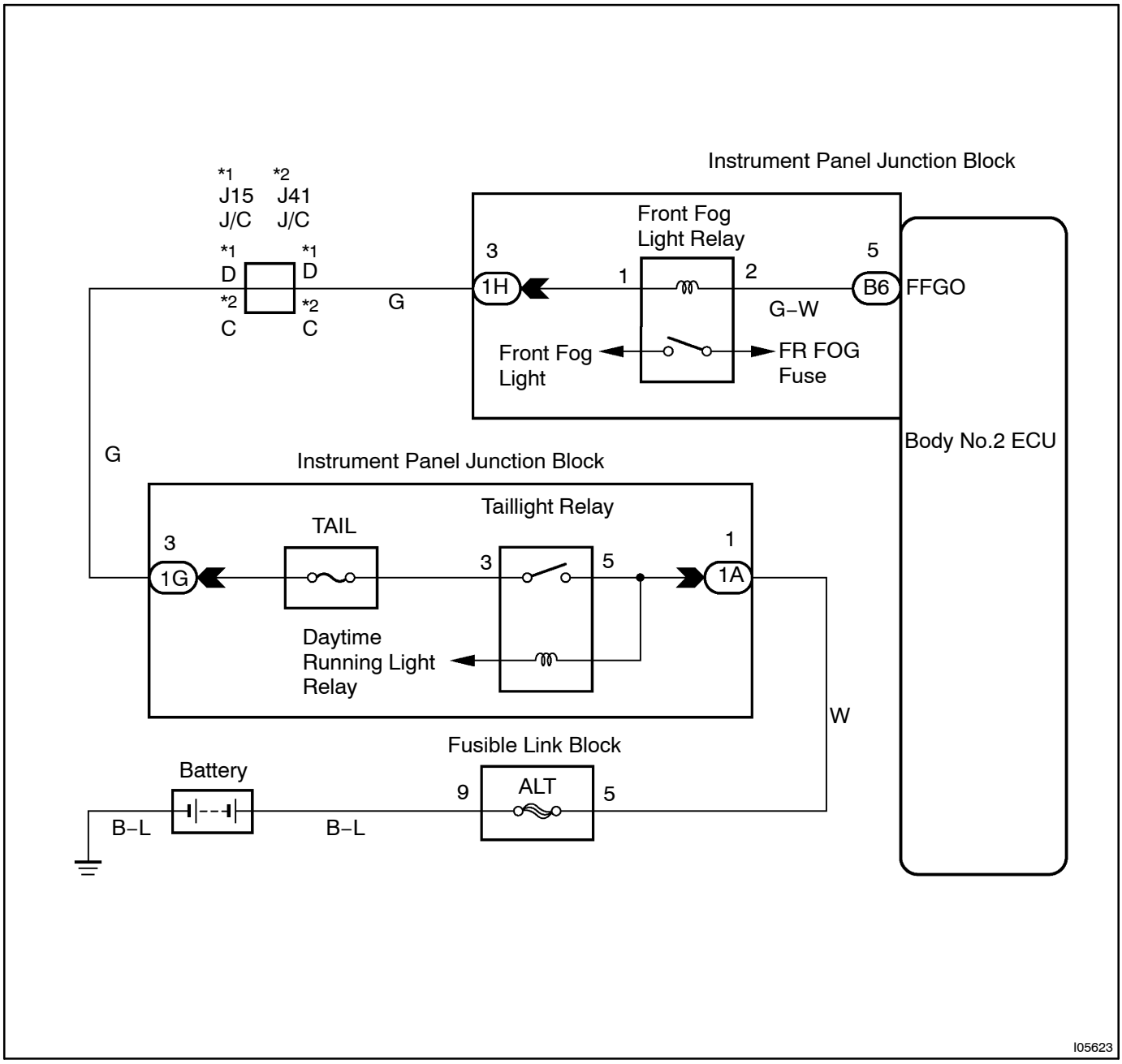
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)

DI2RP–02

Front fog light 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 on problem symptoms table. (See page DI–660)**

NG

2	**Check front fog light relay. (See page BE–38)**

NG → **Replace the front fog light relay.**

OK

3	**Check wire harness and connector between front fog light relay and Body ECU, battery and front fog light relay.**

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

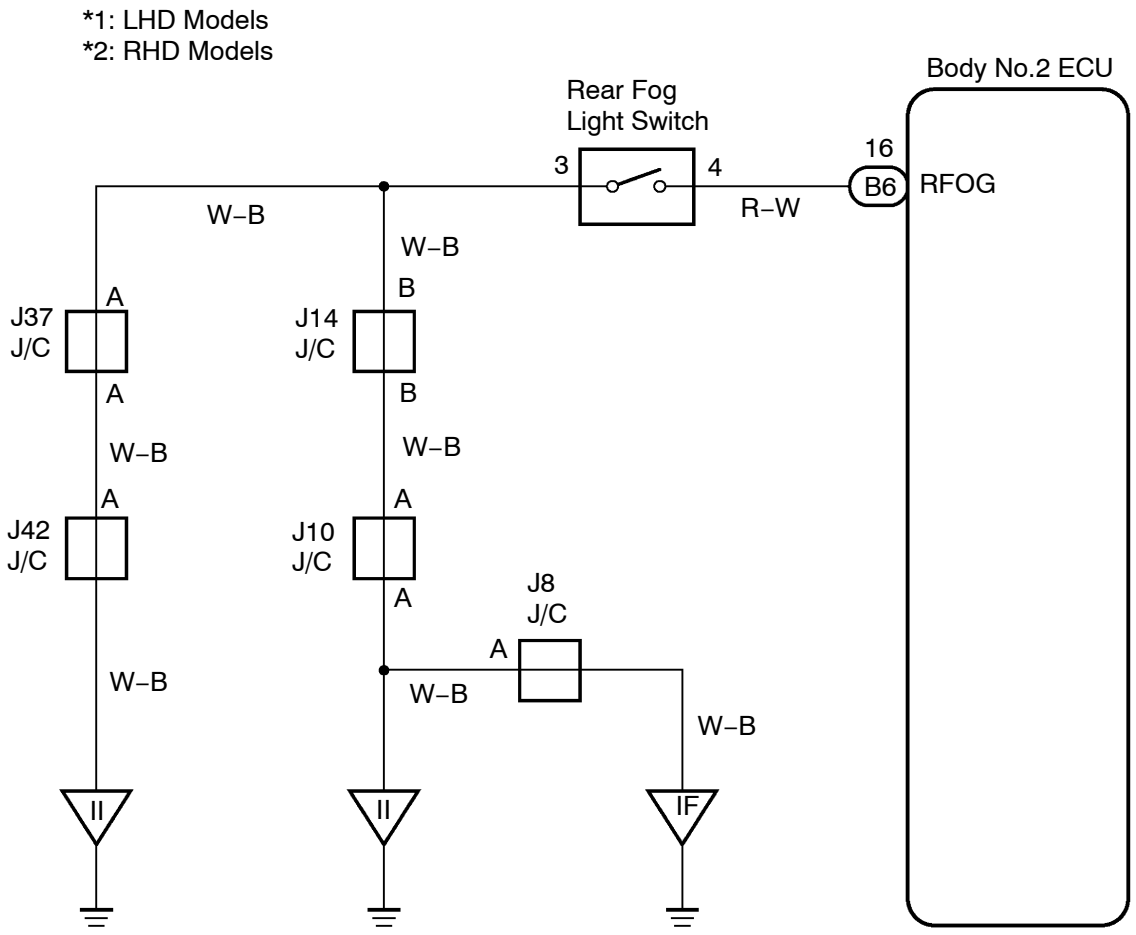
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)

DI2RQ–02

Rear fog light switch circuit (Europe)

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 rear fog light operating using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the rear fog light can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)**

NG

2	**Check rear fog light switch. (See page BE–61)**

NG → **Replace the rear fog light switch.**

OK

3	**Check wire harness and connector between rear fog light switch and Body ECU.**

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

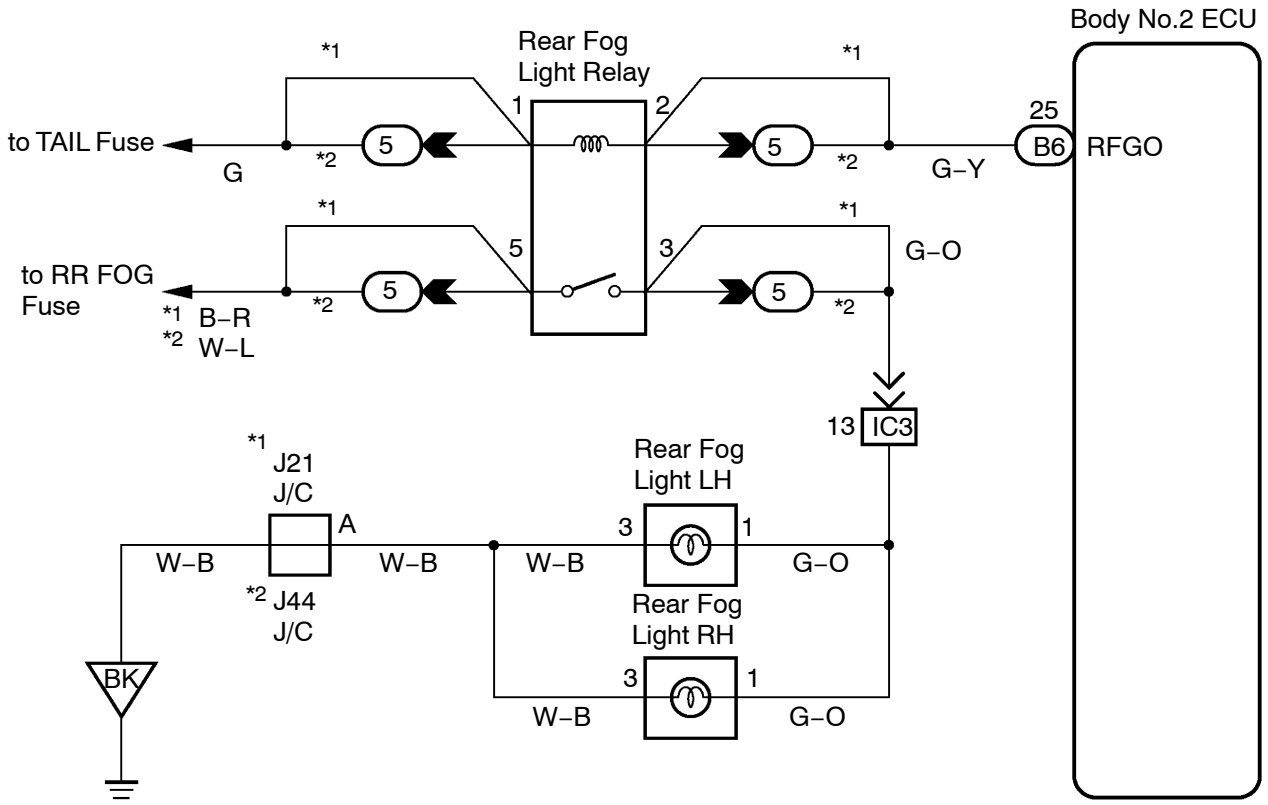
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)

DI2RR–02

Rear fog light relay circuit (Europe)

WIRING DIAGRAM



I05625

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 rear fog light relay using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the rear fog light relay can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)**

NG

2	**Check rear fog light relay. (See page BE–38)**

NG → **Replace the rear fog light relay.**

OK

3	**Check wire harness and connector between rear fog light relay and Body ECU, battery and rear fog light relay.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)

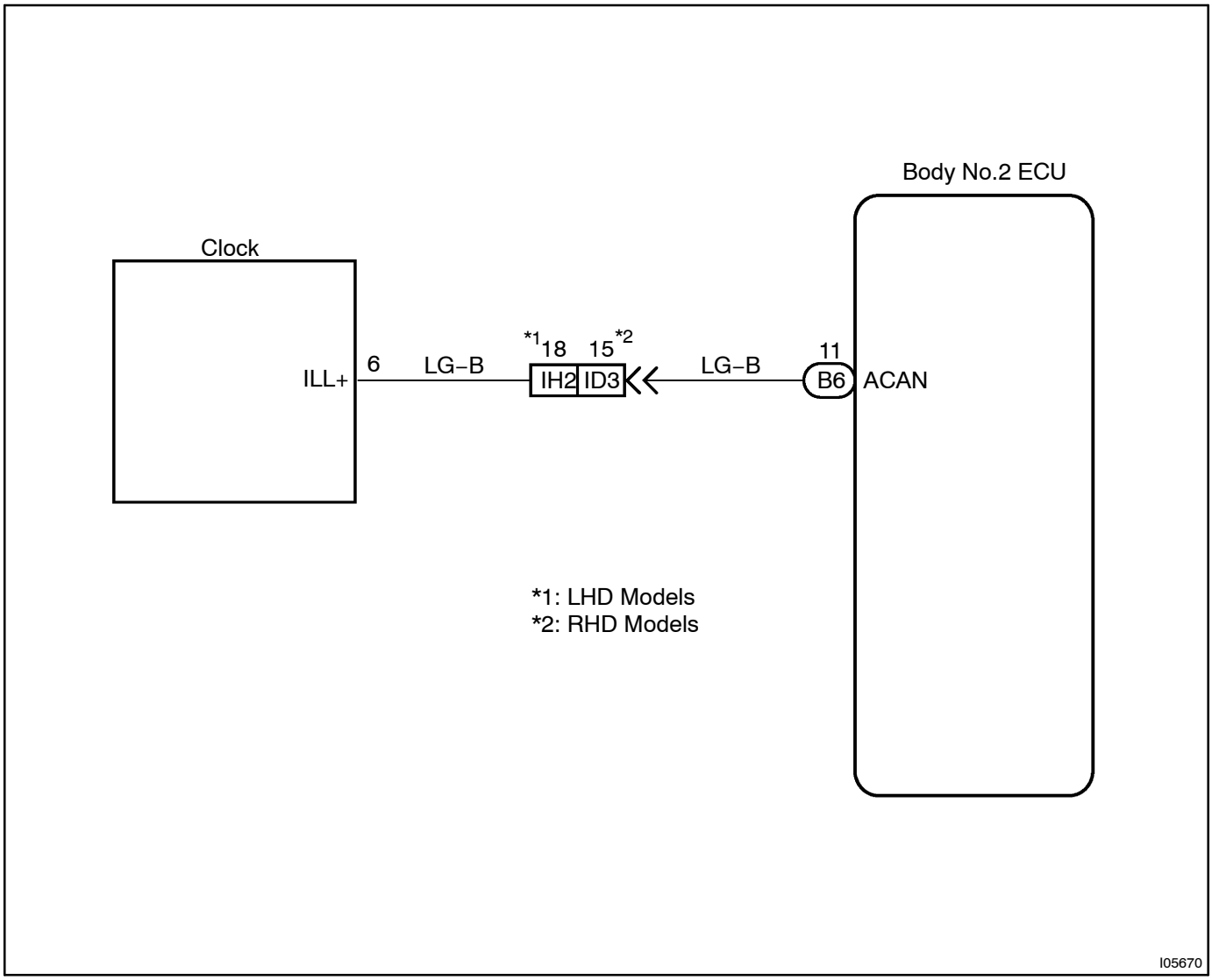
DI2AQ–02

Clock circuit

CIRCUIT DESCRIPTION

Body No.2 ECU will send the light deterioration signal to the clock and deteriorate the 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 clock using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the clock will deteriorate its light in an ACTIVE TEST.
OK:
Clock must be deteriorate.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)**

NG

2	**Check the clock. (See page BE–240)**

NG → **Replace the clock.**

OK

3	**Check wireharness and connector between clock and body No.2 ECU, battery and clock.**

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

OK

**Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–660)**

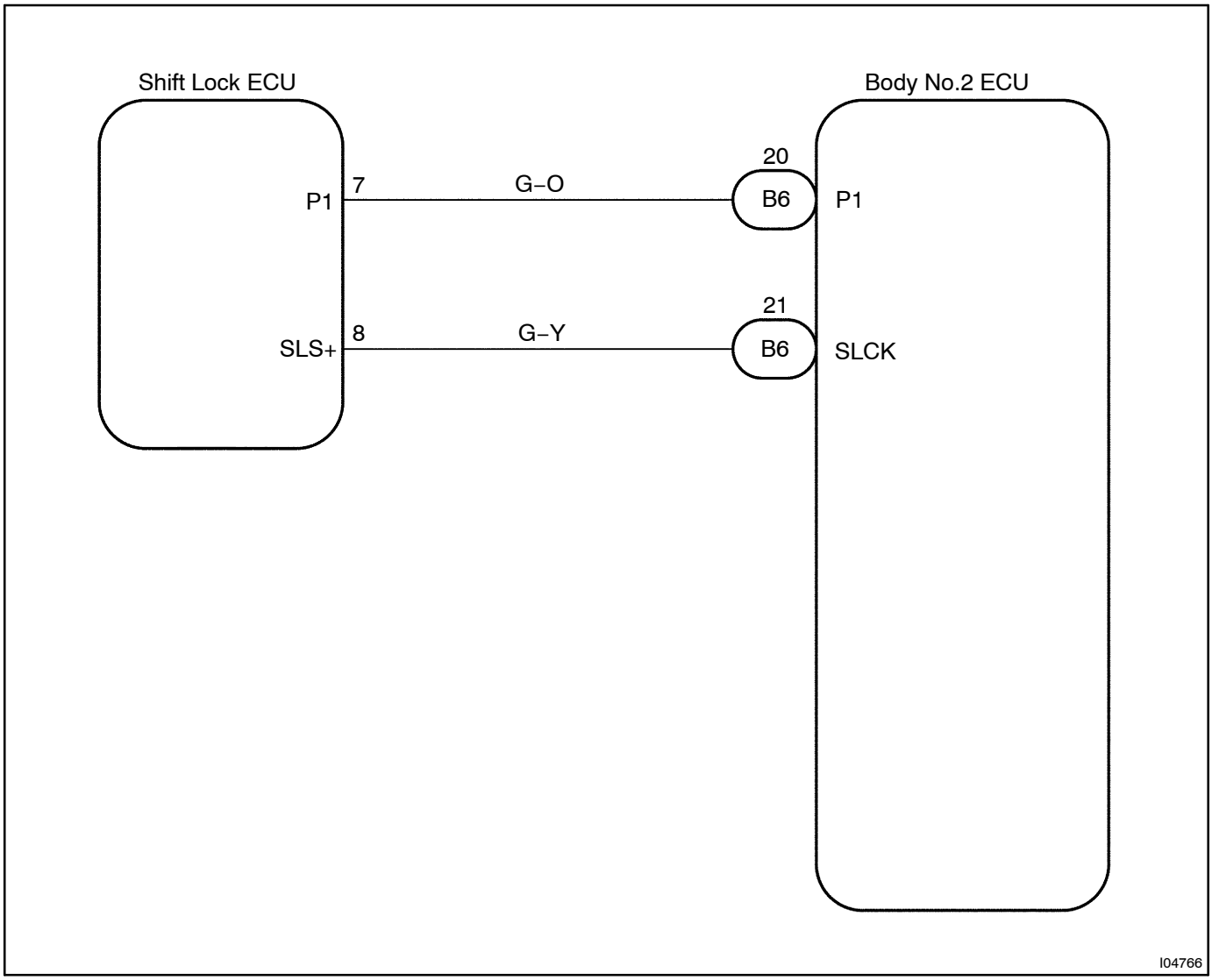
DI2AR–02

Shift lock solenoid circuit

CIRCUIT DESCRIPTION

Body No.2 ECU performs ON/OFF of the shift lock solenoid.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check shift lock solenoid. (See page AT–13)

NG → Replace the shift lock solenoid.

OK

2	Check wireharness and connector between shift lock solenoid and body No.2 ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–660)

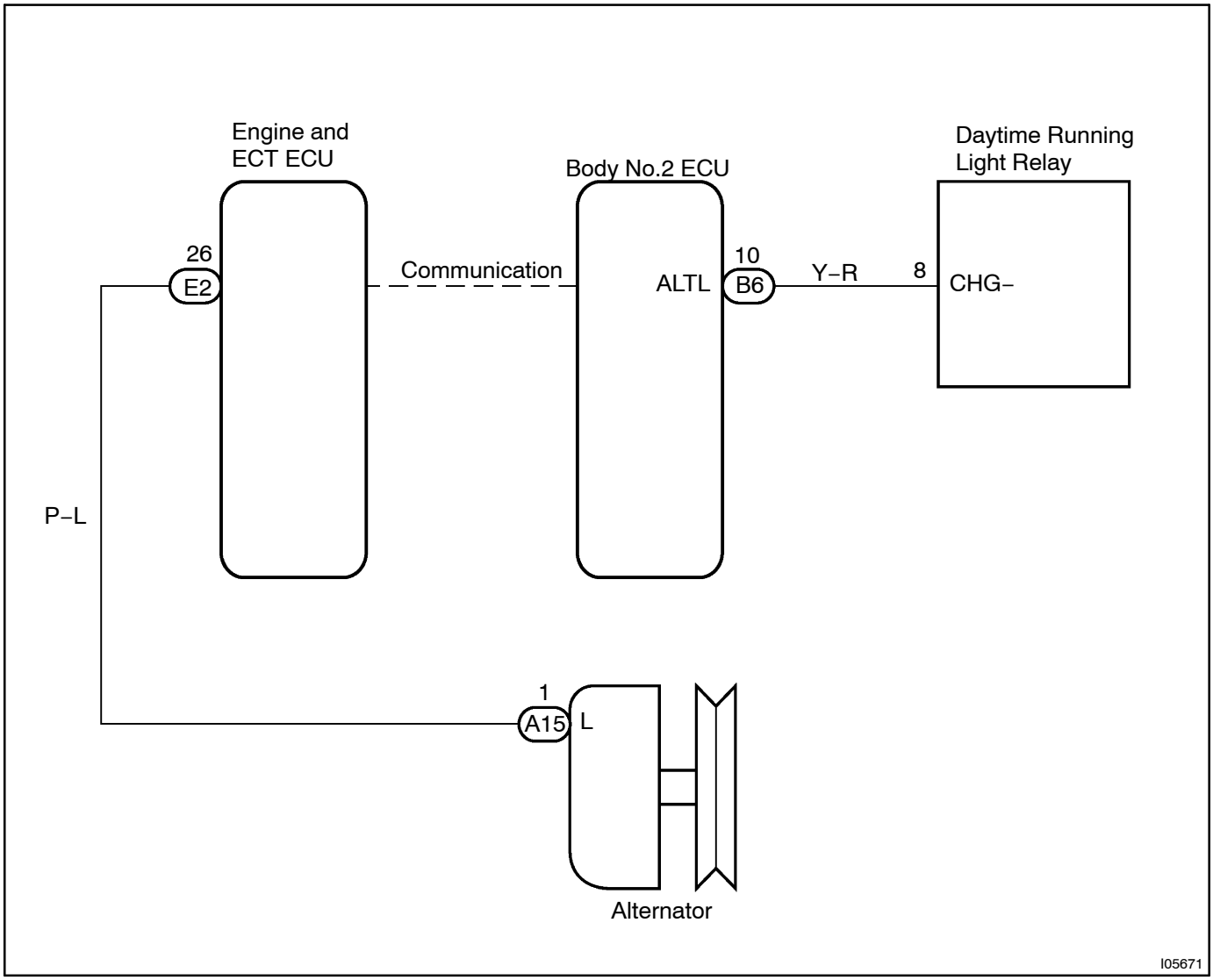
DI2AS–02

Alternator L terminal circuit (w/ DRL vehicle LHD models only)

CIRCUIT DESCRIPTION

Body No.2 ECU receives the alternator L signal from ECM through communication and outputs it to the Day time running light relay.
Day time running light relay judjes whether the engine rotates or not with this alternator L signal and makes the Day time running light turn ON and OFF.

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 generator L terminal output using LEXUS hand–held tester.**

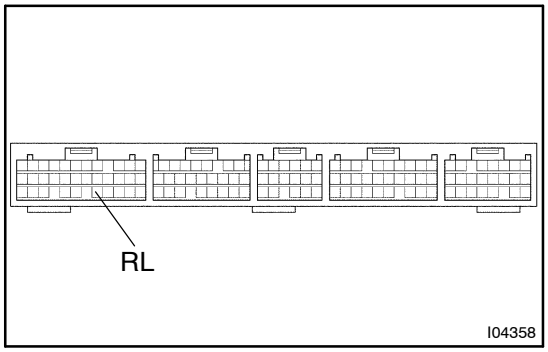
PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the generator L terminal output using DATA LIST.

Condition	Generator L terminal
Engine running	ON
Engine not running	OFF

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page BE–3).**

NG

2	**Check RL terminal of Engine and ECT ECU.**



CHECK:
Check the voltage of RL terminal of Engine and ECT ECU.
OK:

Condition	Voltage
Engine running	10 – 14V
Engine not running	0V

NG → **Replace the Body No. 2 ECU.**

OK

3	**Check wireharness and connector between Engine and ECT ECU and generator.**

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

OK

Repair or replace the alternator or regulater.

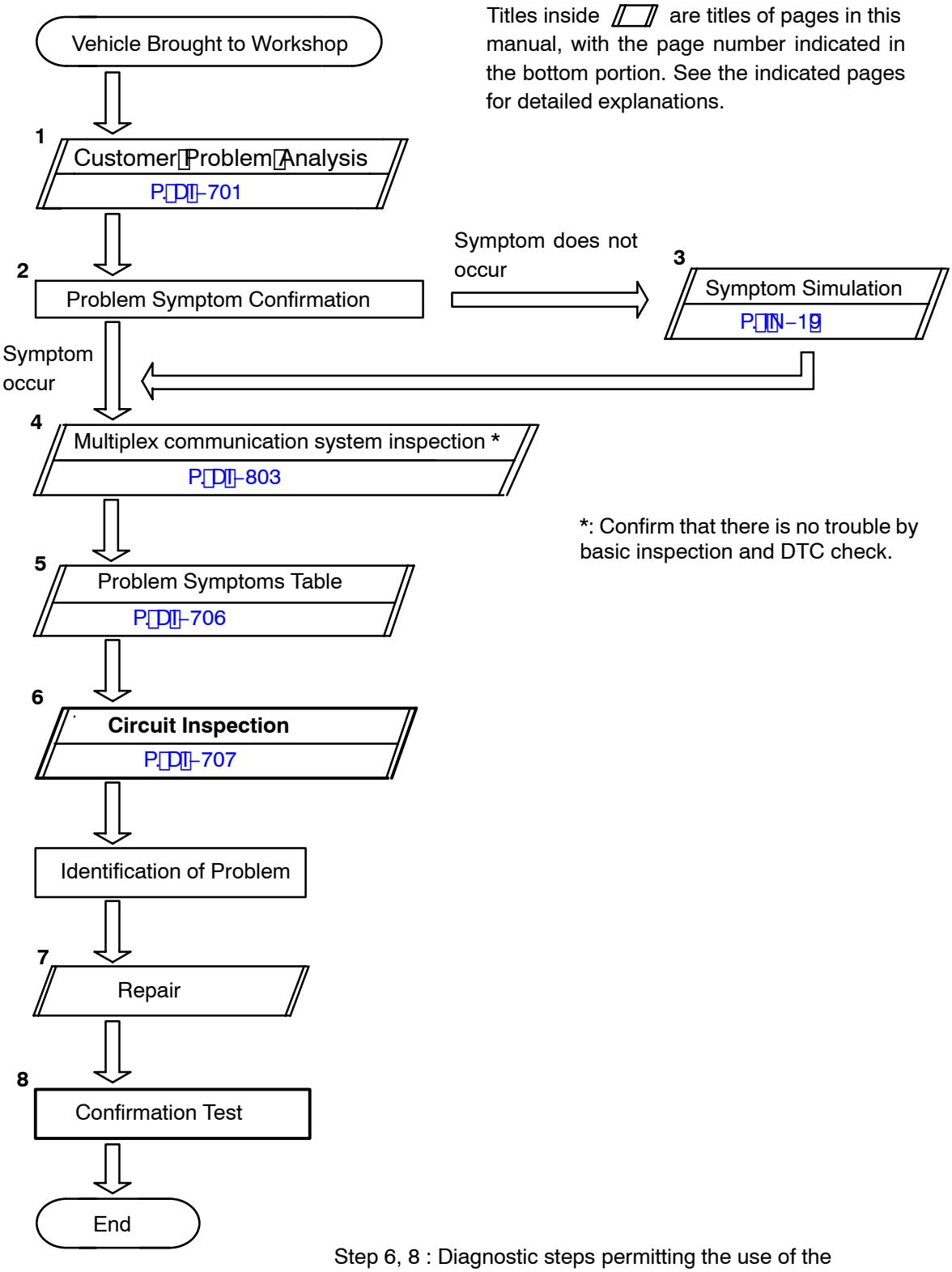
DRIVER DOOR CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI2BH-02

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 troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI2BI–02

CUSTOMER PROBLEM ANALYSIS CHECK

DRIVER DOOR CONTROL SYSTEM Check Sheet

Inspector's name: _____

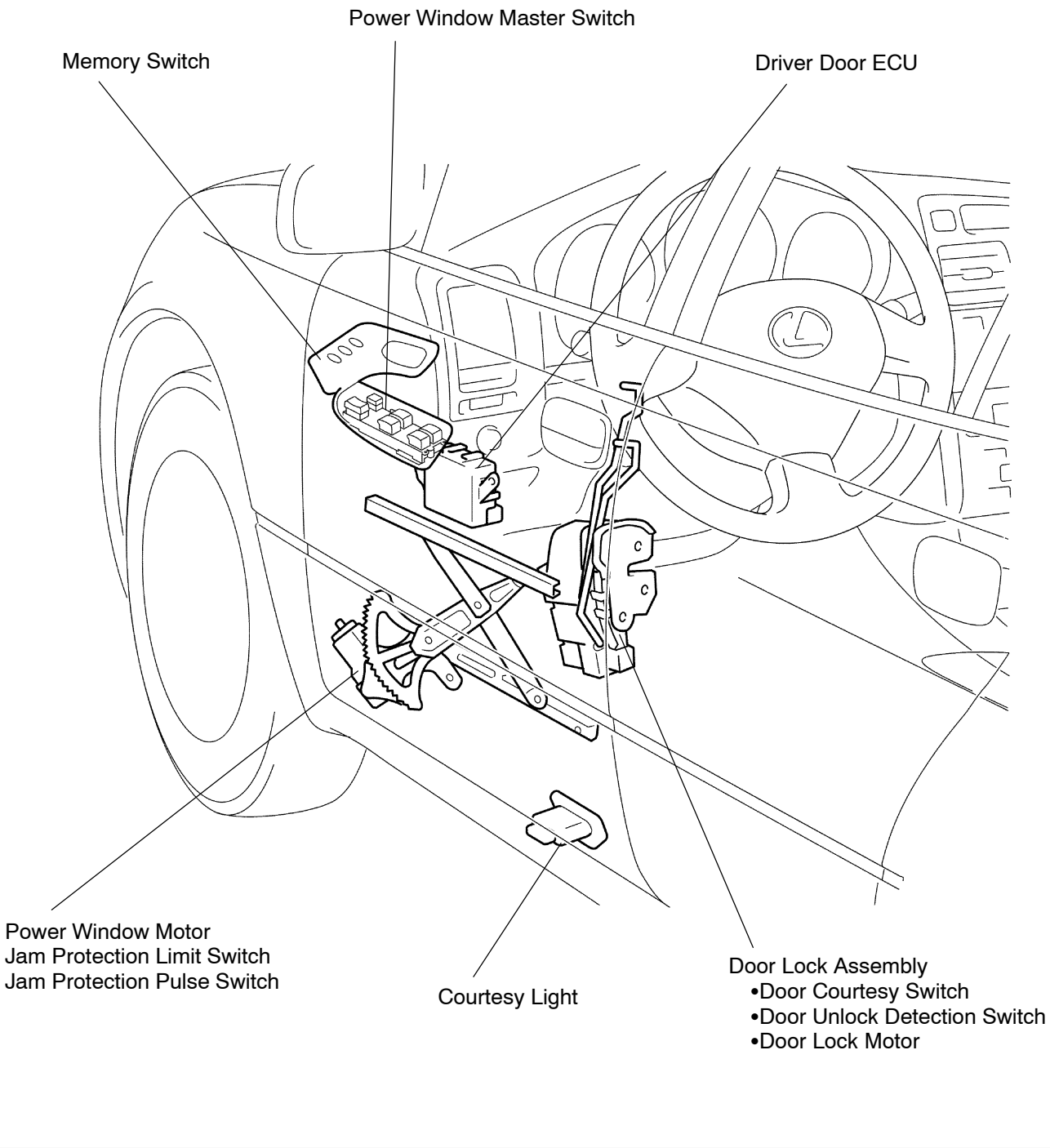
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	☐ Power Window Control System
	☐ Power Mirror Control System
	☐ Power Door Lock Control System
	☐ Theft Deterrent System
	☐ Jam Protection System
	☐ Others

DI2BJ–02

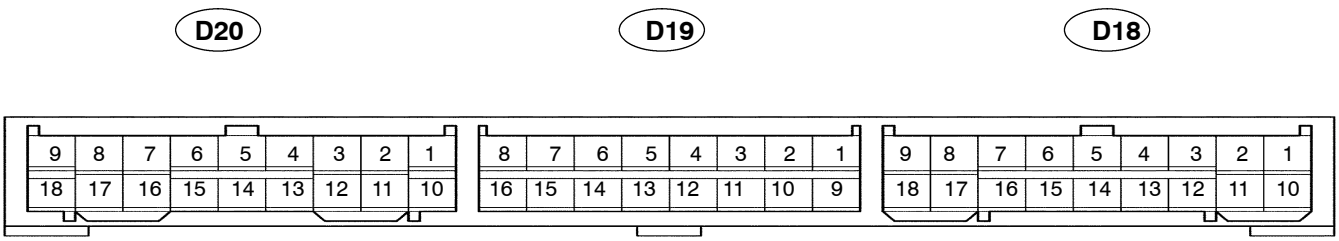
PARTS LOCATION



DI2BK–02

TERMINALS OF ECU

DRIVER DOOR ECU



I03225

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CPUB ↔ GND (D20–3 ↔ D20–12)	G–W ↔ W–B	Constant	10 – 14 V
BDR ↔ GND (D18–1 ↔ D20–12)	L–,B ↔ W–B	Constant	10 – 14 V
CTYB ↔ GND (D18–10 ↔ D20–12)	R–Y ↔ W–B	Constant	10 – 14 V
SIG ↔ GND (D20–2 ↔ D20–12)	B–R ↔ W–B	Ignition switch position is ON.	10 – 14 V
GND ↔ Body Ground (D20–12 ↔ Body Ground)	W–B ↔ Body Ground	Constant	Below 1 V
DSUP ↔ Body Ground (D20–6 ↔ D20–12)	L–W ↔ W–B	Shoulder belt adjust switch position is OFF.	10 – 14 V
		Shoulder belt adjust switch position is UP.	Below 1 V
DSDN ↔ GND (D20–5 ↔ D20–12)	L–Y ↔ W–B	Shoulder belt adjust switch position is OFF.	10 – 14 V
		Shoulder belt adjust switch position is DOWN.	Below 1 V
MM ↔ GND (D20–4 ↔ D20–12)	GR ↔ W–B	Set switch position is OFF.	10 – 14 V
		Set switch position is ON.	Below 1 V
M1 ↔ GND (D20–15 ↔ D20–12)	P ↔ W–B	Memory Switch 1 position is OFF.	10 – 14 V
		Memory Switch 1 position is ON.	Below 1 V
M2 ↔ GND (D20–14 ↔ D20–12)	P–B ↔ W–B	Memory Switch 2 position is OFF.	10 – 14 V
		Memory Switch 2 position is ON.	Below 1 V
CTY ↔ GND (D19–15 ↔ D20–12)	R–G ↔ W–B	Driver door closed.	10 – 14 V
		Driver door opened.	Below 1 V
KL ↔ GND (D18–4 ↔ D20–12)	P–B ↔ W–B	Door key lock and unlock switch position is OFF.	Below 1 V
		Door key lock and unlock switch position is LOCK.	10 – 14 V
KUL ↔ GND (D18–5 ↔ D20–12)	P–G ↔ W–B	Door key lock and unlock switch position is OFF.	Below 1 V
		Door key lock and unlock switch position is UNLOCK.	10 – 14 V
CYL ↔ GND (D18–12 ↔ D20–12)	R–W ↔ W–B	Constant	10 – 14 V

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
AUTO ↔ GND (D19–8 ↔ D20–12)	L–R ↔ W–B	Auto down switch position is OFF.*		Below 1 V
		Ignition switch position is ON. Auto down switch position is ON.*		10 – 14 V
MUP ↔ GND (D19–5 ↔ D20–12)	L–W ↔ W–B	Ignition switch position is ON. Power window switch (FrLH)* position	OFF	Below 1 V
			UP	10 – 14 V
MDN ↔ GND (D19–4 ↔ D20–12)	L–B ↔ W–B	Ignition switch position is ON. Power window switch (FrLH)* position	OFF	Below 1 V
			DOWN	10 – 14 V
ML ↔ GND (D18–6 ↔ D20–12)	LG–B ↔ W–B	Door lock control switch* position	OFF	10 – 14 V
			LOCK	Below 1 V
MUL ↔ GND (D18–7 ↔ D20–12)	LG–R ↔ W–B	Door lock control switch* position	OFF	10 – 14 V
			UNLOCK	Below 1 V
WLSW ↔ GND (D19–7 ↔ D20–12)	Y–G ↔ W–B	Window lock switch* position	UNLOCK	Below 1 V
			LOCK	10 – 14 V
UP ↔ GND (D18–2 ↔ D20–12)	R ↔ W–B	Power window (FrLH) is not operating.		Below 1 V
		Power window (FrLH) is operating upward.		10 – 14 V
DN ↔ GND (D18–11 ↔ D20–12)	G ↔ W–B	Power window (FrLH) is not operating.		Below 1 V
		Power window (FrLH) is operating downward.		10 – 14 V
DMVR ↔ GND (D20–8 ↔ D20–12)	LG–B ↔ W–B	Outside rear view mirror (LH) is not operating.		Below 1 V
		Outside rear view mirror (LH) is operating to down or right.		
		Outside rear view mirror (LH) is operating to up.		10 – 14 V
DM+R ↔ GND (D20–7 ↔ D20–12)	LG–R ↔ W–B	Outside rear view mirror (LH) is not operating.		Below 1 V
		Outside rear view mirror (LH) is operating to up or left.		
		Outside rear view mirror (LH) is operating to down or right.		10 – 14 V
DMHR ↔ GND (D20–16 ↔ D20–12)	LG ↔ W–B	Outside rear view mirror (LH) is not operating.		Below 1 V
		Outside rear view mirror (LH) is operating to up or left.		
		Outside rear view mirror (LH) is operating to left.		10 – 14 V
A+ ↔ GND (D18–8 ↔ D20–12	G–R ↔ W–B	Power door lock (FrLH) is not operating.		Below 1 V
		Power door lock (FrLH) is operating to unlock.		
		Power door lock (FrLH) is operating to lock.		10 – 14 V
A– ↔ GND (D18–17 ↔ D20–12)	G–B ↔ W–B	Power door lock (FrLH) is not operating.		Below 1 V
		Power door lock (FrLH) is operating to lock.		
		Power door lock (FrLH) is operating to lock.		10 – 14 V
LSW ↔ GND (D18–3 ↔ D20–12)	GR ↔ W–B	Driver door is locked.		10 – 14 V
		Driver door is unlocked.		Below 1 V
DVC ↔ GND (D19–8 ↔ D20–12	R ↔ W–B	Ignition switch position is OFF. After 30 seconds from door is closed.		Below 1 V
		Ignition switch position is ON.		4 – 6 V
DT1 ↔ GND (D19–3 ↔ D20–12)	GR–G ↔ W–B	Ignition switch position is ON. Power window switch (FrRH) position	OFF	10 – 14 V
			UP	Below 1 V
			DOWN	Below 1 V
			AUTO	Below 1 V

*: Power Window Master Switch

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
DT2 ↔ GND (D19–2 ↔ D20–12)	GR–R ↔ W–B	Ignition switch position is ON. Power window switch (RrRH) position	OFF	10 – 14 V
			UP	Below 1 V
			DOWN	Below 1 V
			AUTO	Below 1 V
DT1 ↔ GND (D19–1 ↔ D20–12)	GR–G ↔ W–B	Ignition switch position is ON. Power window switch (RrLH) position	OFF	10 – 14 V
			UP	Below 1 V
			DOWN	Below 1 V
			AUTO	Below 1 V
LMT ↔ GND (D19–12 ↔ D20–12)	W–G ↔ W–B	Window full–close position		10 – 14 V
		Except window full–close position		Below 1 V
PLS ↔ GND (D19–13 ↔ D20–12)	W ↔ W–B	During the power window is operation.		Pulse Generation
		Power window is not operated.	SW ON	Below 1 V
			SW OFF	10 – 14 V

DI2BL-02

PROBLEM SYMPTOMS TABLE

- POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
All the power windows does not operate.	1. PWS circuit 2. Power window master switch circuit 3. Body No.1 ECU	DI–654 DI–710
Power window does not operate.	1. Power window switch circuit 2. Power window motor circuit 3. Driver door ECU	DI–710 DI–720
Auto up (or down) function does not operate.	1. Power window master switch circuit 2. Driver door ECU	DI–710
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switch circuit 2. Driver door ECU	DI–722 DI–724

- POWER MIRROR CONTROL SYSTEM

Symptom	Suspect Area	See page
Both right and left mirror does not operate.	1. Mirror switch circuit 2. Body No.2 ECU	DI–673
Only one side of mirror does not operate.	1. Mirror motor circuit 2. Driver door ECU	DI–726
Mirror on the opposite side will be operated.	1. Mirror switch circuit 2. Body No.2 ECU	DI–673
Mirror will not be operated as indicated with switch.		

- OTHERS

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Driver door ECU	DI–707

DI2BM–02

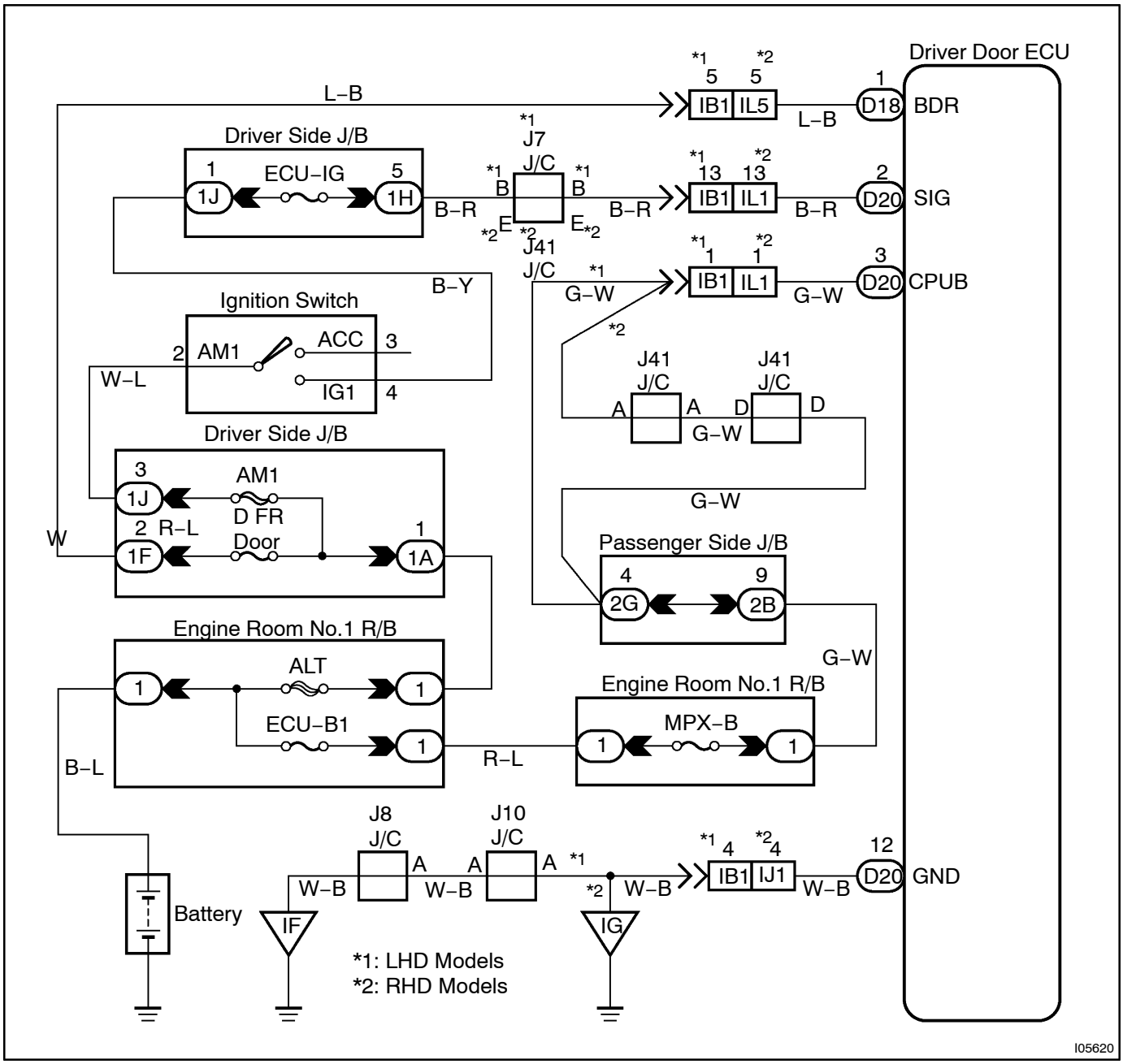
CIRCUIT INSPECTION

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the driver door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check MPXB, GAUGE and DOOR(FR) fuse.**

CHECK:
Check continuity of MPXB, GAUGE and DOOR(FR) fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals BDR, CPUB, SIG and GND of driver door ECU connector.**

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals SIG, and GND.
OK:
Voltage: 10 – 14V
PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the driver door ECU connector.
CHECK:
Measure voltage between terminals BDR, CPUB and GND.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table.(See page DI–706)**

NG

3	**Check wireharness and connector between ECU and body ground.**

NG → **Repair or replace wireharness or connector**

OK

Check and repair wireharness and connector between ECU and battery.

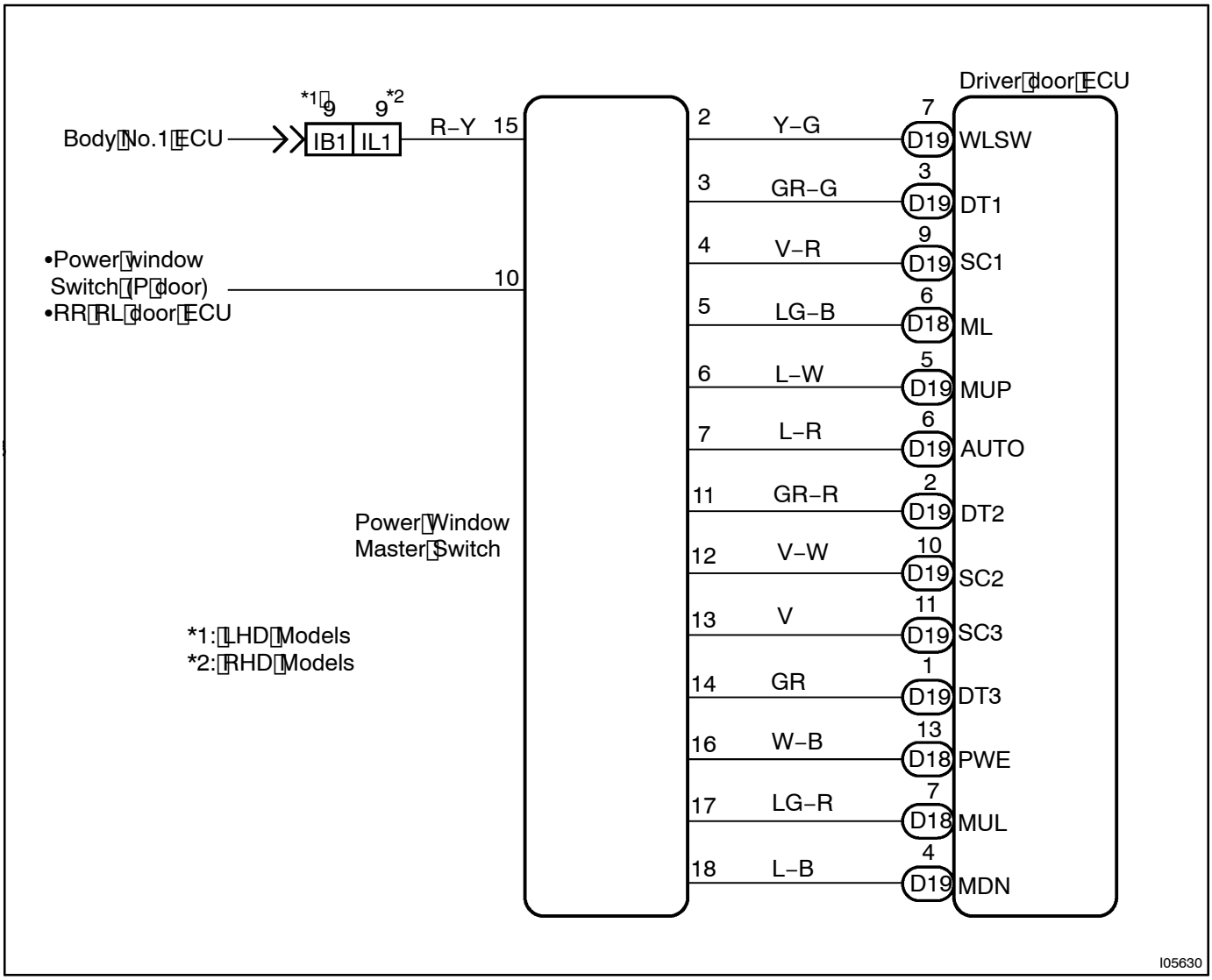
DI2BN–02

Power window master switch circuit

CIRCUIT DESCRIPTION

Power window master switch circuit can be checked using DTC check. (See page DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the power window master switch circuit using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptom table. (See page DI–616, DI–706)

OK

2	Check the power window master switch. (See page BE–134)

NG → Replace the power window master switch.

OK

3	Check wireharness and connector between power window master switch and driver door ECU.

NG → Repair or replace wireharness or connector.

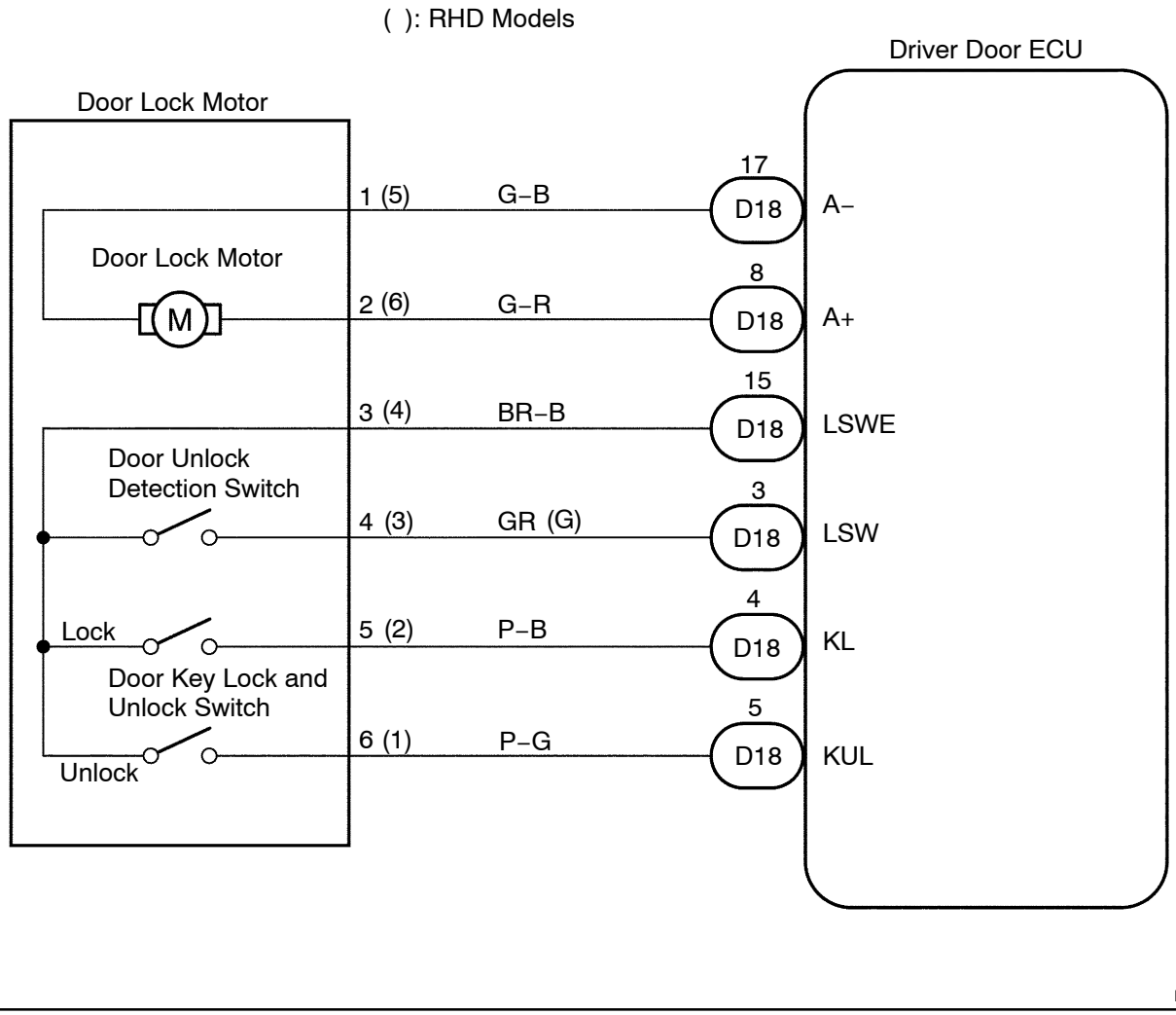
OK

Proceed to next circuit inspection shown on problem symptom table. (See page DI–616, DI–706)

D12BO–02

Door lock motor circuit

WIRING DIAGRAM



I04890

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 door lock motor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the door lock motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptom table. (See page DI–616)**

NG

2	**Check door lock motor. (See page BE–148)**

NG → **Replace the door lock motor.**

OK

3	**Check wireharness and connector between door lock motor and driver door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

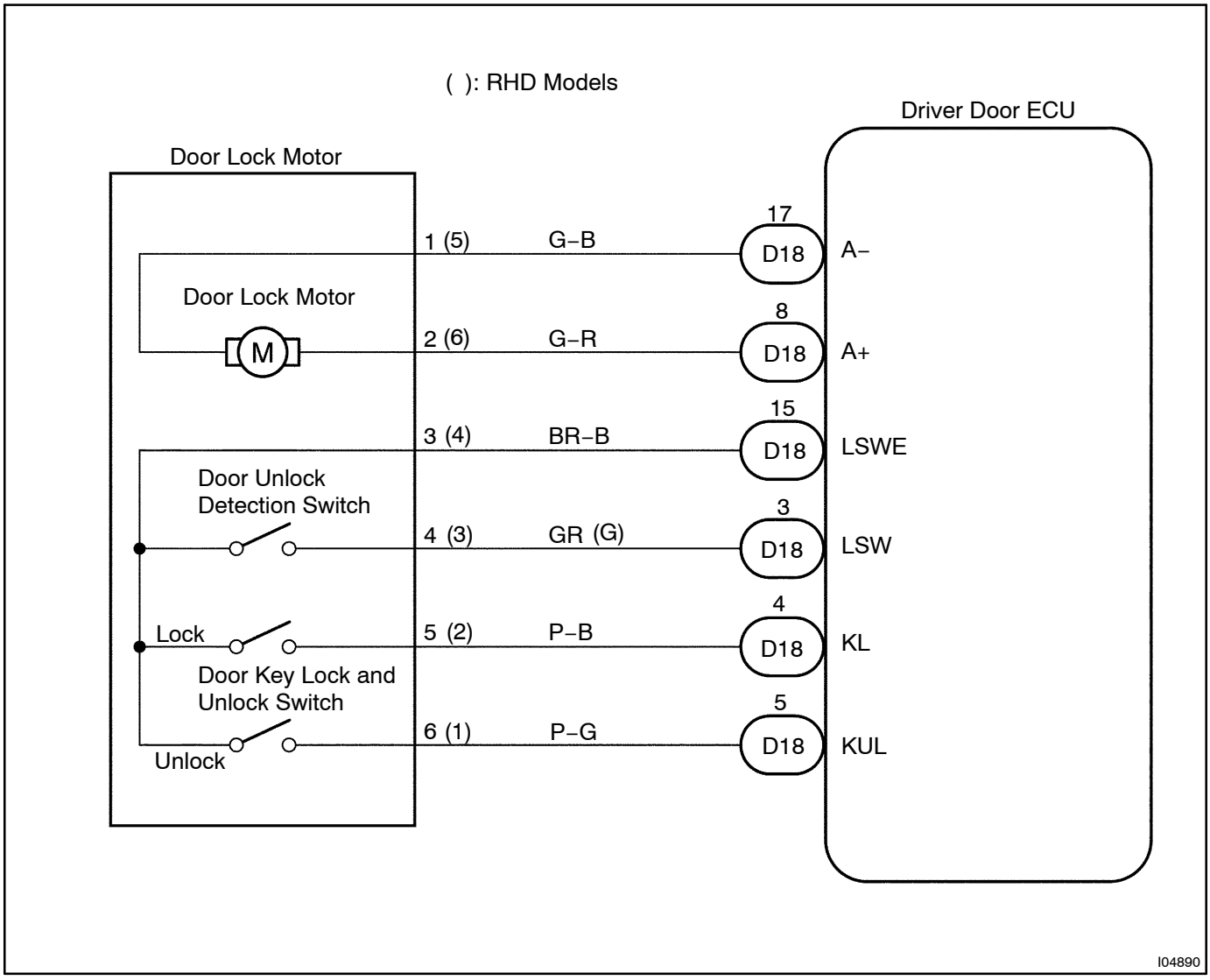
DI2BP–02

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



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 door unlock detection switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the door unlock detection switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptom table. (See page DI–616)**

NG

2	**Check door unlock detection switch. (See page BE–148)**

NG → **Replace the door lock motor.**

OK

3	**Check wireharness and connector between door unlock detection switch and driver door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

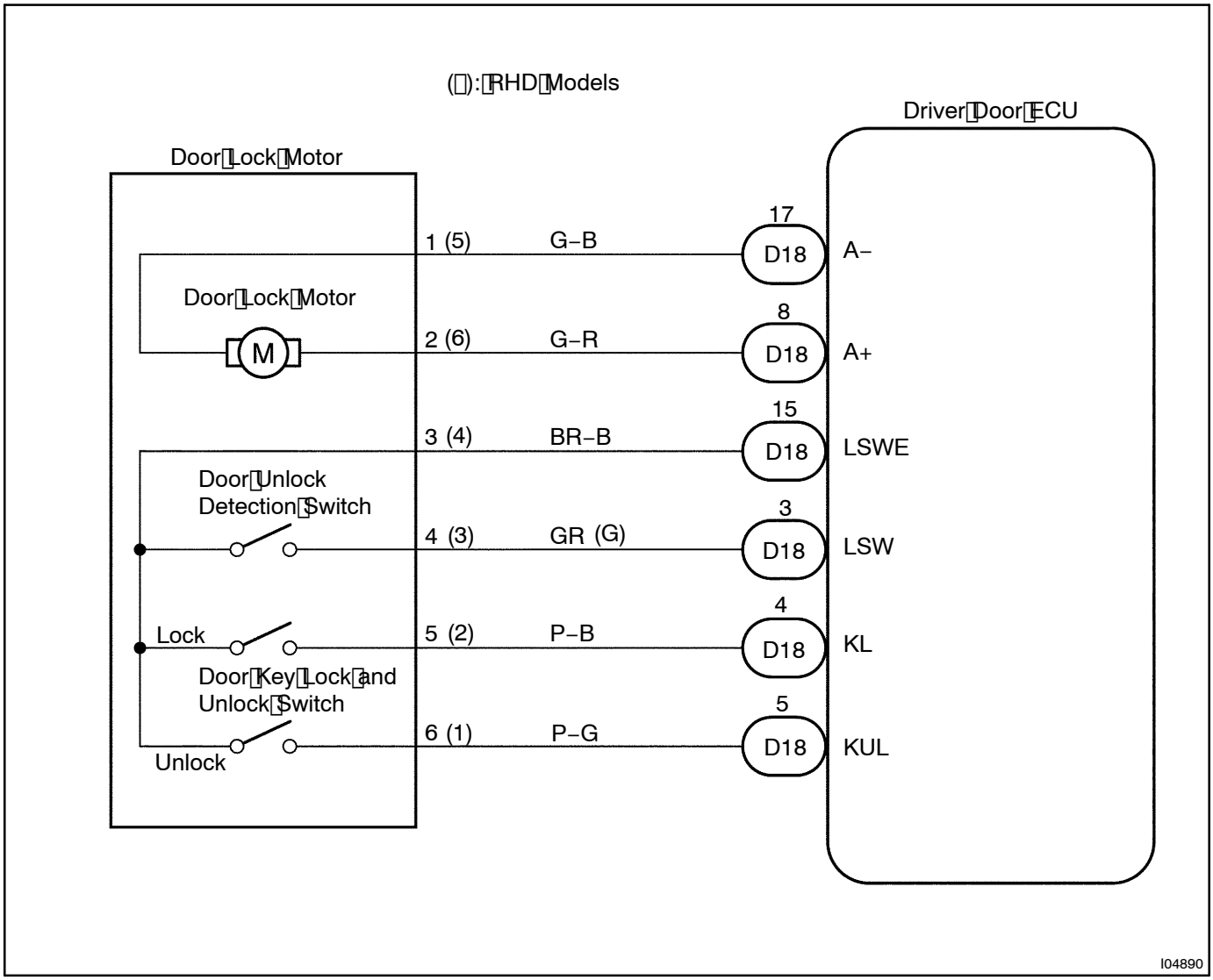
D12BQ–02

Door key lock and unlock switch circuit

CIRCUIT DESCRIPTION

The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 3 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.
Door key lock and unlock switch can be checked using DTC check. (Refer to DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the door key lock and unlock switch using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

NG

2	Check the door key lock and unlock switch. (See page BE–148)

NG → Replace the door key lock and unlock switch.

NG

3	Check wire harness and connector between door key lock and unlock switch and driver door ECU.

NG → Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

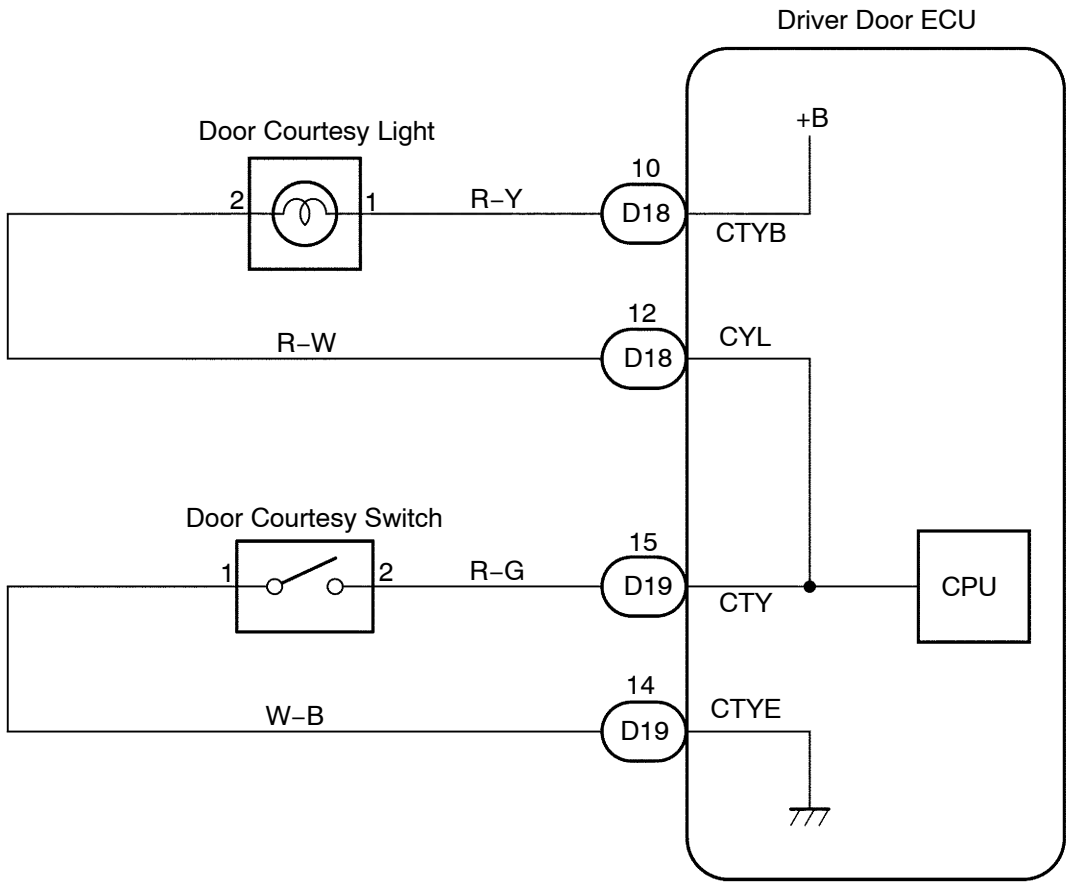
DI2BR–02

Door courtesy light and 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



I03216

INSPECTION PROCEDURE

1	Check operation of door courtesy light.

CHECK:

Check that door courtesy light comes on when door opened, and goes off when door is closed.

OK:

Must be operated normally.

OK → Proceed to next circuit inspection shown on problem symptom table. (See page DI–616)

NG

2	Check courtesy light. (See page BE–66)

NG → Replace the courtesy light.

OK

3	Check courtesy switch. (See page BE–66)

NG → Replace the courtesy switch.

OK

4	Check wireharness and connector between courtesy light and driver door ECU, courtesy switch and driver door ECU.

NG → Repair or replace wireharness or connector.

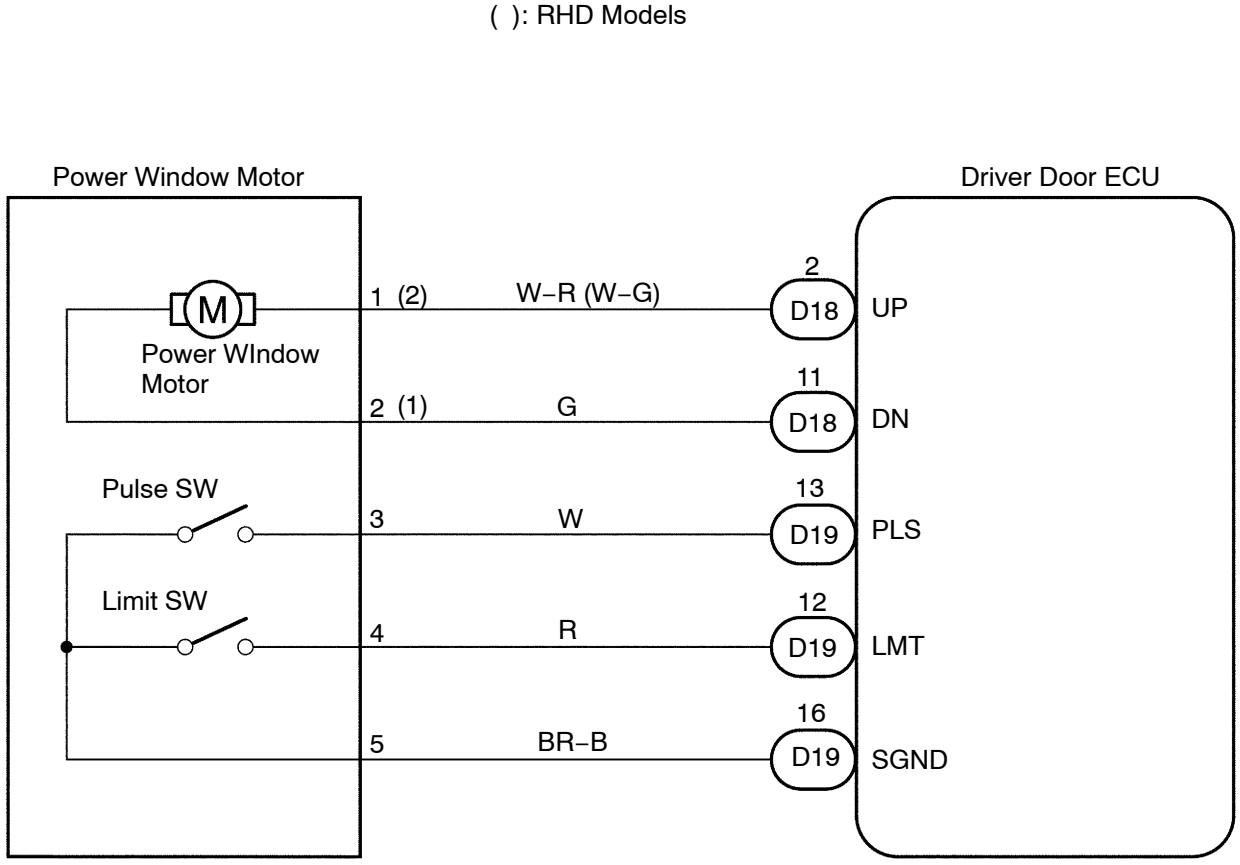
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

DI2BS–02

Power window motor circuit

WIRING DIAGRAM



I03214

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 power window motor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the power window motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)**

NG

2	**Check power window motor. (See page BE–134)**

NG → **Replace the power window motor.**

OK

3	**Check wireharness and connector between power window motor and driver door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)

DI2BT–02

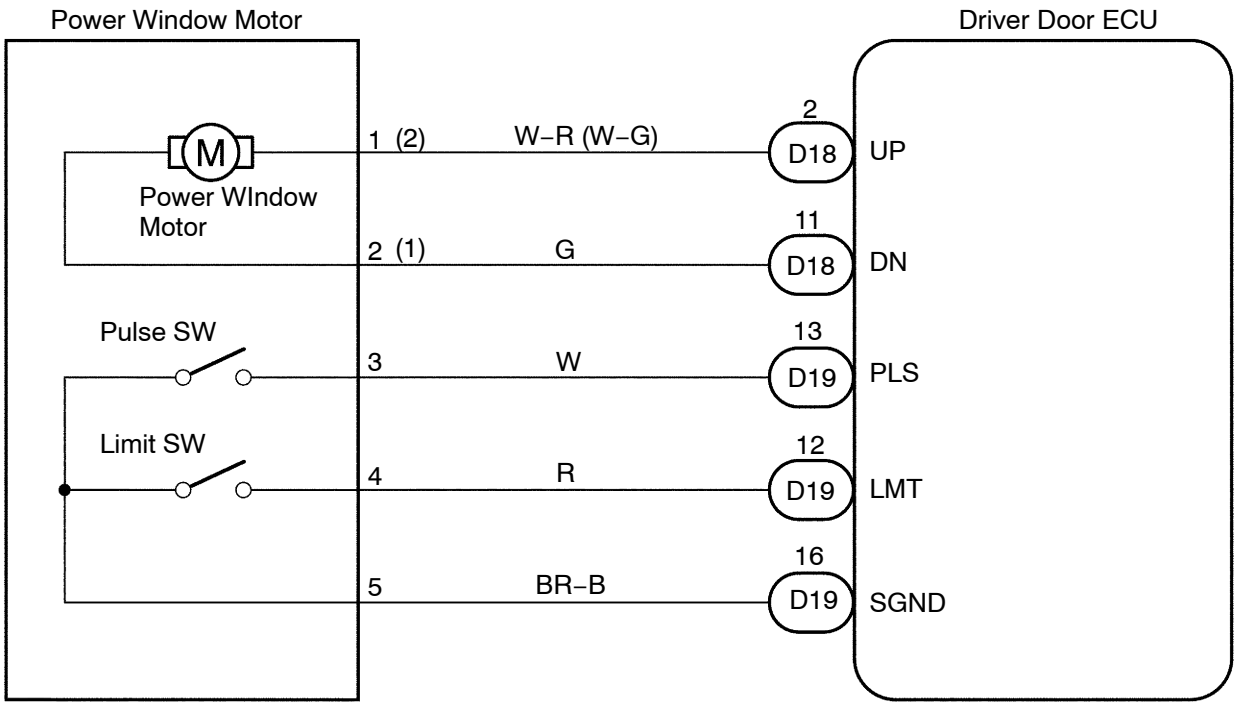
Jam protection limit switch circuit

CIRCUIT DESCRIPTION

Jam protection limit switch is built–in the power window motor. This switch functions to turn ”OFF” before the top dead center, and ECU reads this ”OFF” signal resulting in closing the window fully.

WIRING DIAGRAM

( ): RHD Models



I03214

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 jam protection limit switch using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

Check the jam protection limit switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)**

NG

2	**Check jam protection limit switch. (See page BE–134)**

NG → **Replace the power window motor.**

OK

3	**Check wireharness and connector between jam protection limit switch and driver door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)

DI2BU–02

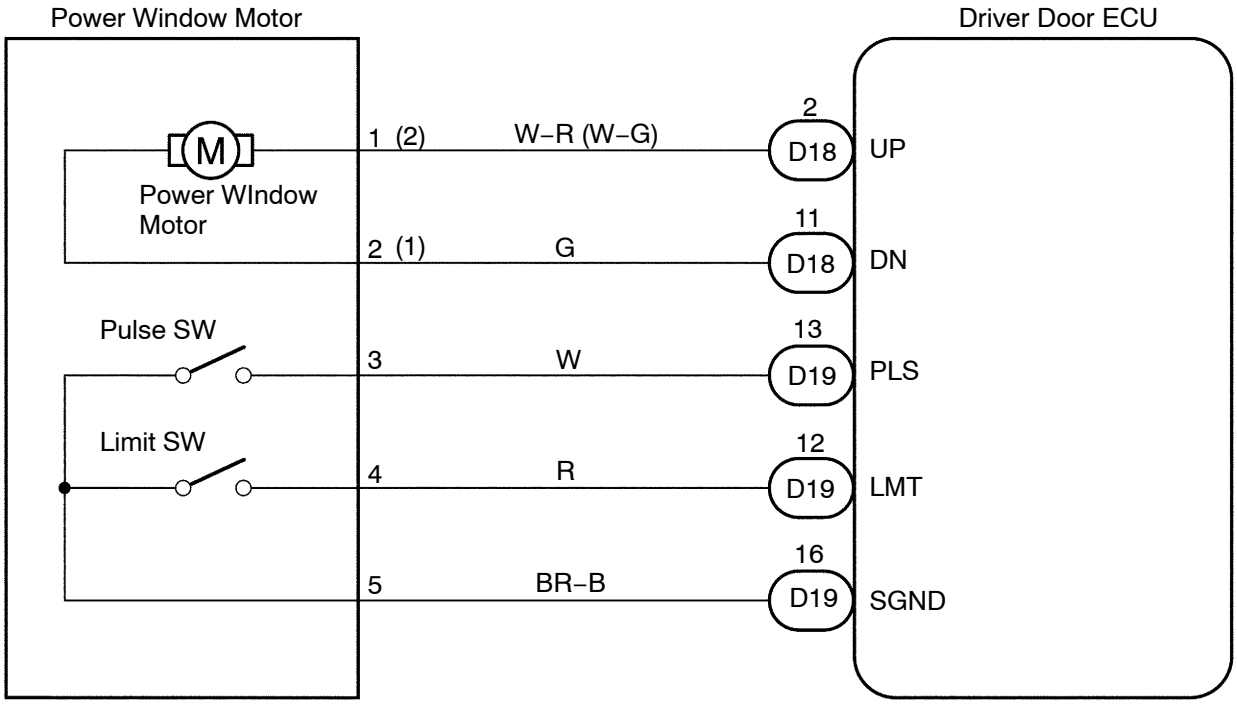
Jam protection pulse switch circuit

CIRCUIT DESCRIPTION

Jam protection pulse switch is built–in the power window motor. Pulse switch outputs ON/OFF pulse when the motor rotates.

WIRING DIAGRAM

( ): RHD Models



I03214

INSPECTION PROCEDURE

1	Check jam protection pulse switch. (See page BE–134)

NG → Replace the power window motor.

OK

2	Check wireharness and connector between jam protection pulse switch and driver door ECU.

NG → Repair or replace wireharness or connector.

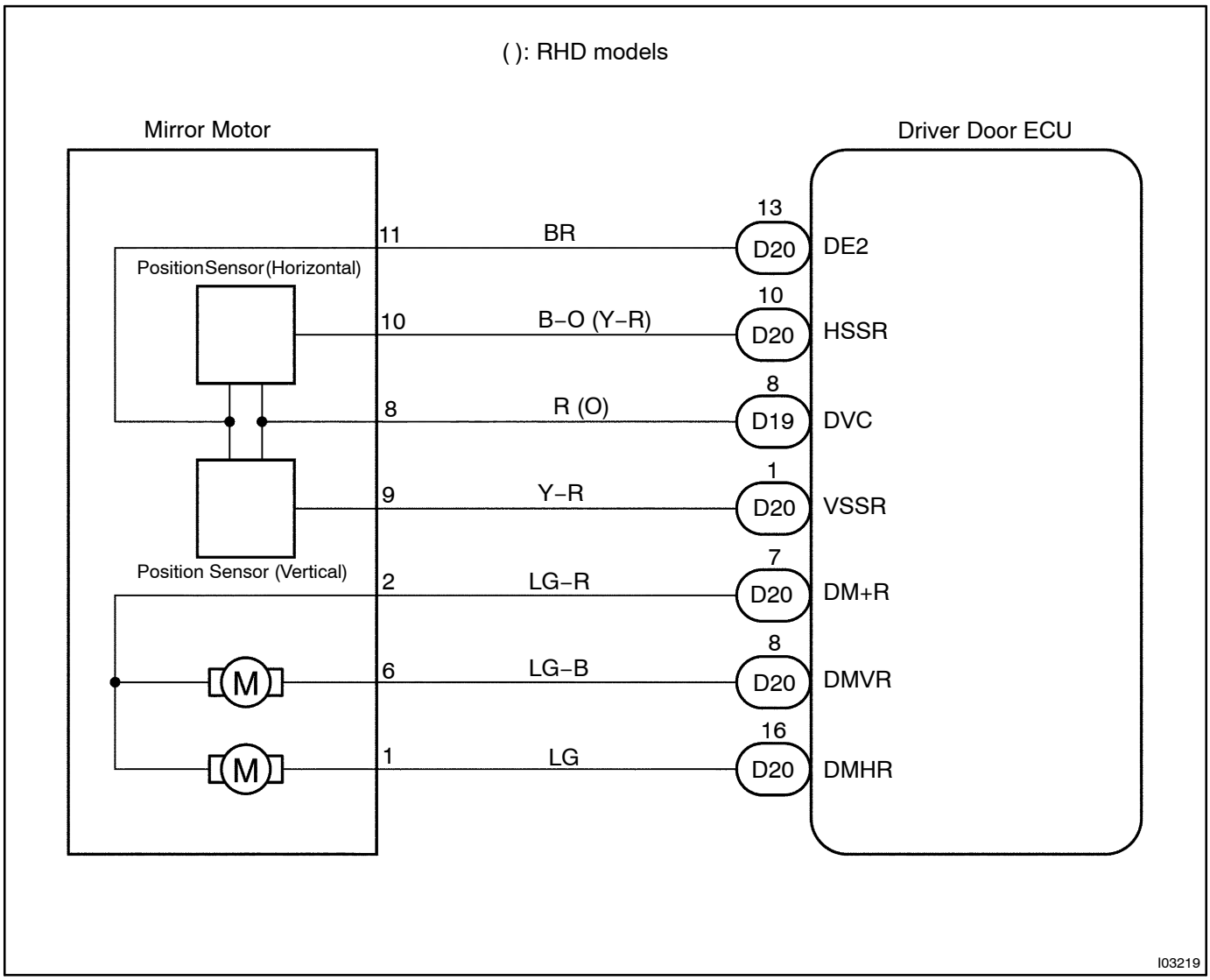
OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–706)

DI2BV–02

Mirror motor 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 mirror motor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the mirror motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)**

NG

2	**Check mirror motor. (See page BE–192)**

NG → **Replace the mirror motor.**

OK

3	**Check wireharness and connector between mirror motor and driver door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)

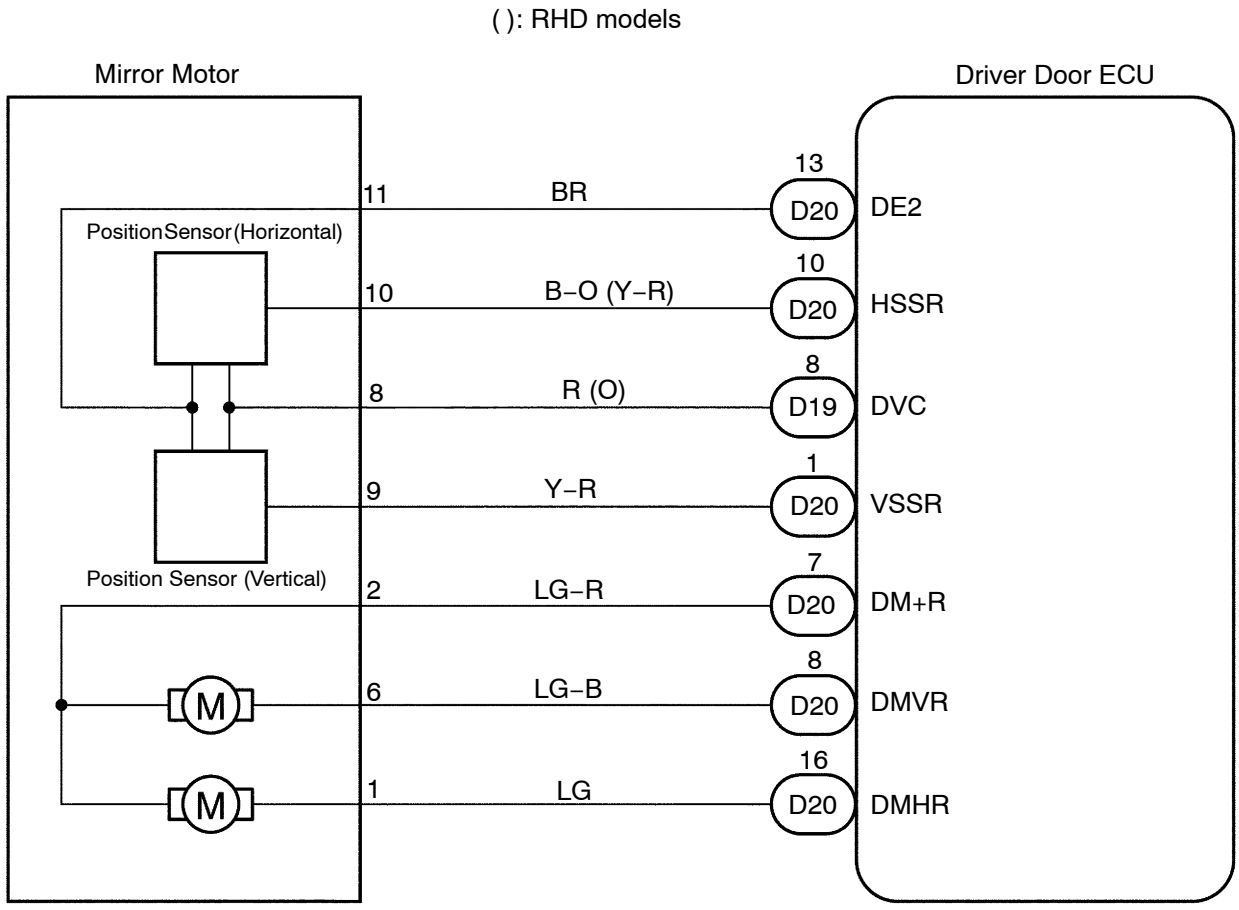
DI2BW–02

Mirror position sensor circuit (W/ memory)

CIRCUIT DESCRIPTION

This position detected by the mirror position sensor will be memorized in the seat ECU. This sensor is equipped in the mirror in spite of the existence of the memory function.

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 mirror position sensor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the voltage of the mirror position sensor using DATA LIST.
OK:
When operating the mirror motor, voltage values should have a smooth change within the ranges shown below.

Vehicle direction	0.27 – 3.80 (V)
Horizontal direction	0.23 – 4.01 (V)

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–522)**

NG

2	**Check mirror position sensor. (See page BE–192)**

NG → **Replace the outer mirror.**

OK

3	Check wireharness and connector between mirror position sensor and driver door ECU.

NG → Repair or replace wireharness or connector.

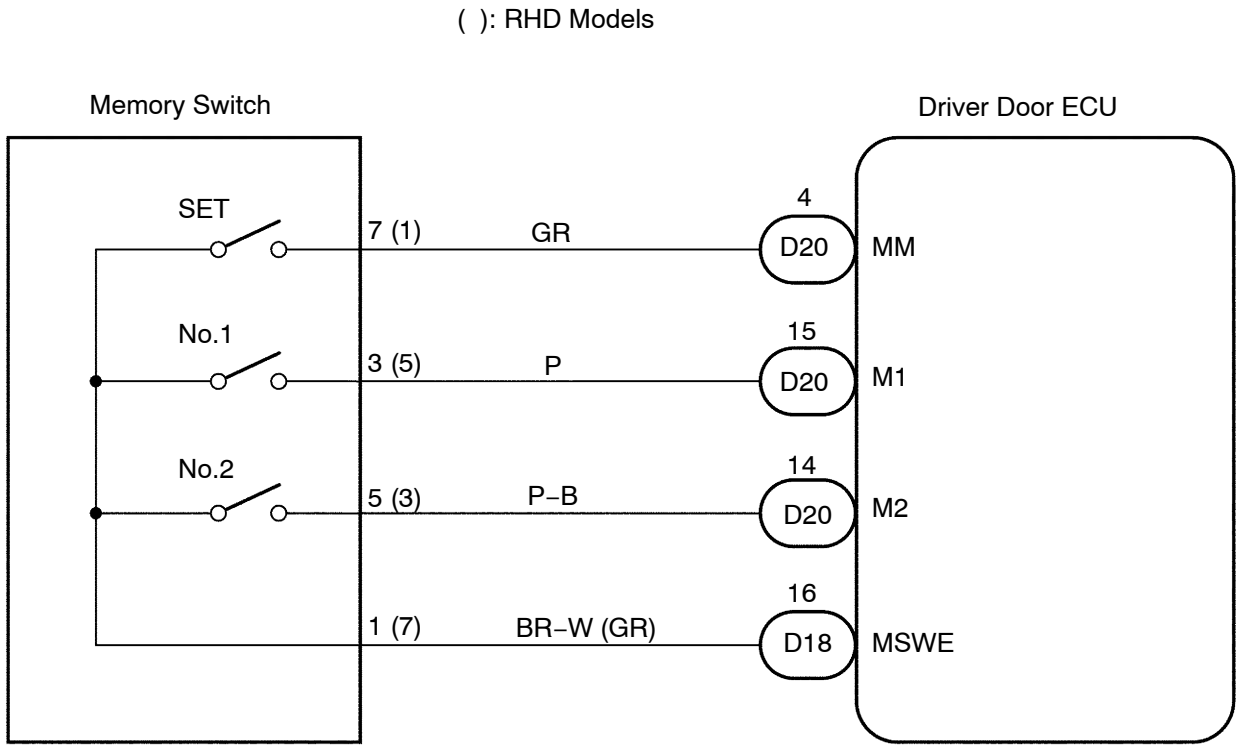
OK →

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–522)

DI2BX–02

Memory switch circuit (W/ memory)

WIRING DIAGRAM



I04892

INSPECTION PROCEDURE

1	Check memory switch. (See page BE–192)

NG → Replace the memory switch.

OK

2	Check wireharness and connector between memory switch and driver door ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–706)

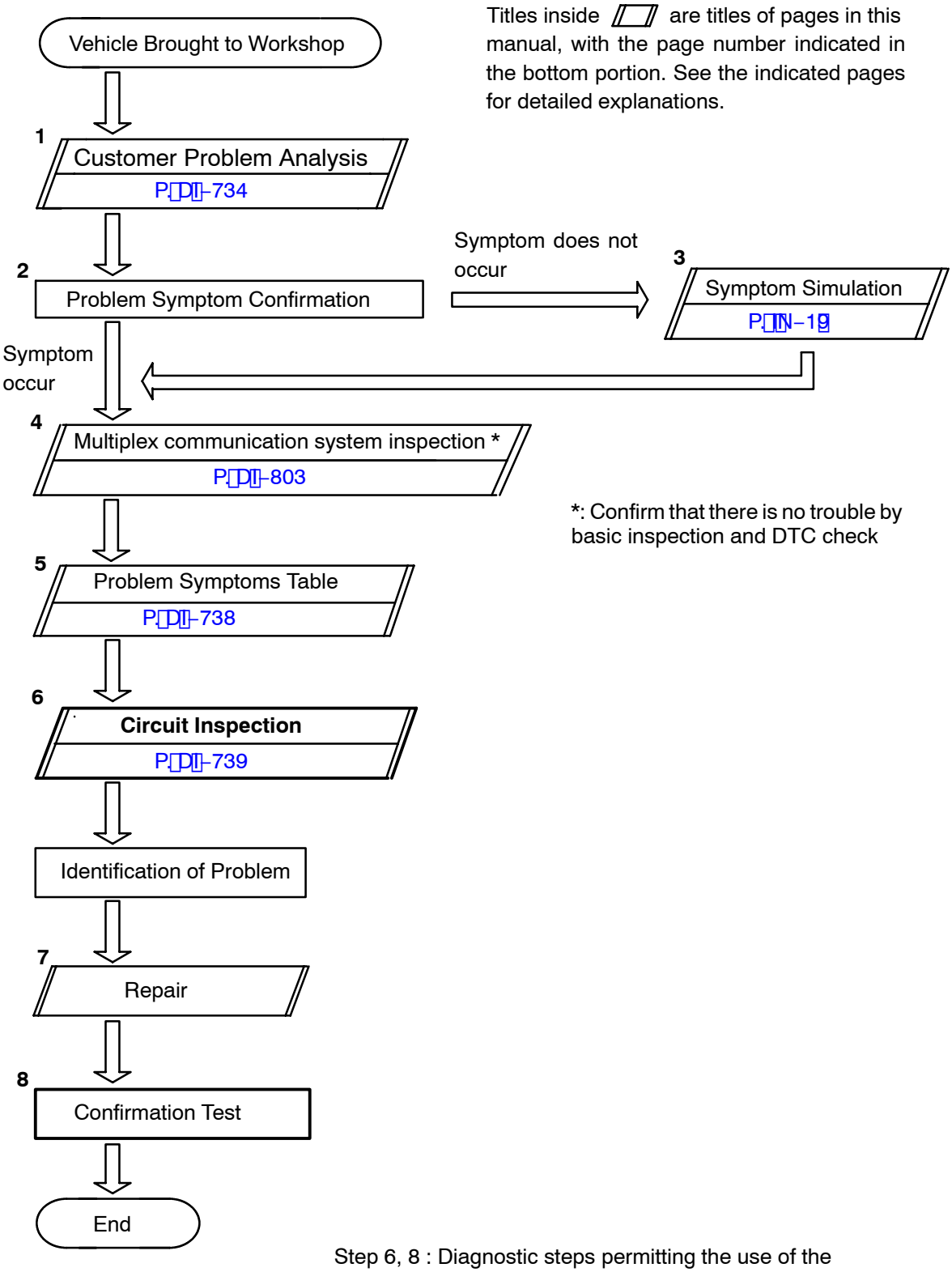
PASSENGER DOOR CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI2ES–02

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 troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI2ET–02

CUSTOMER PROBLEM ANALYSIS CHECK

PASSENGER DOOR CONTROL SYSTEM Check Sheet

Inspector's name: _____

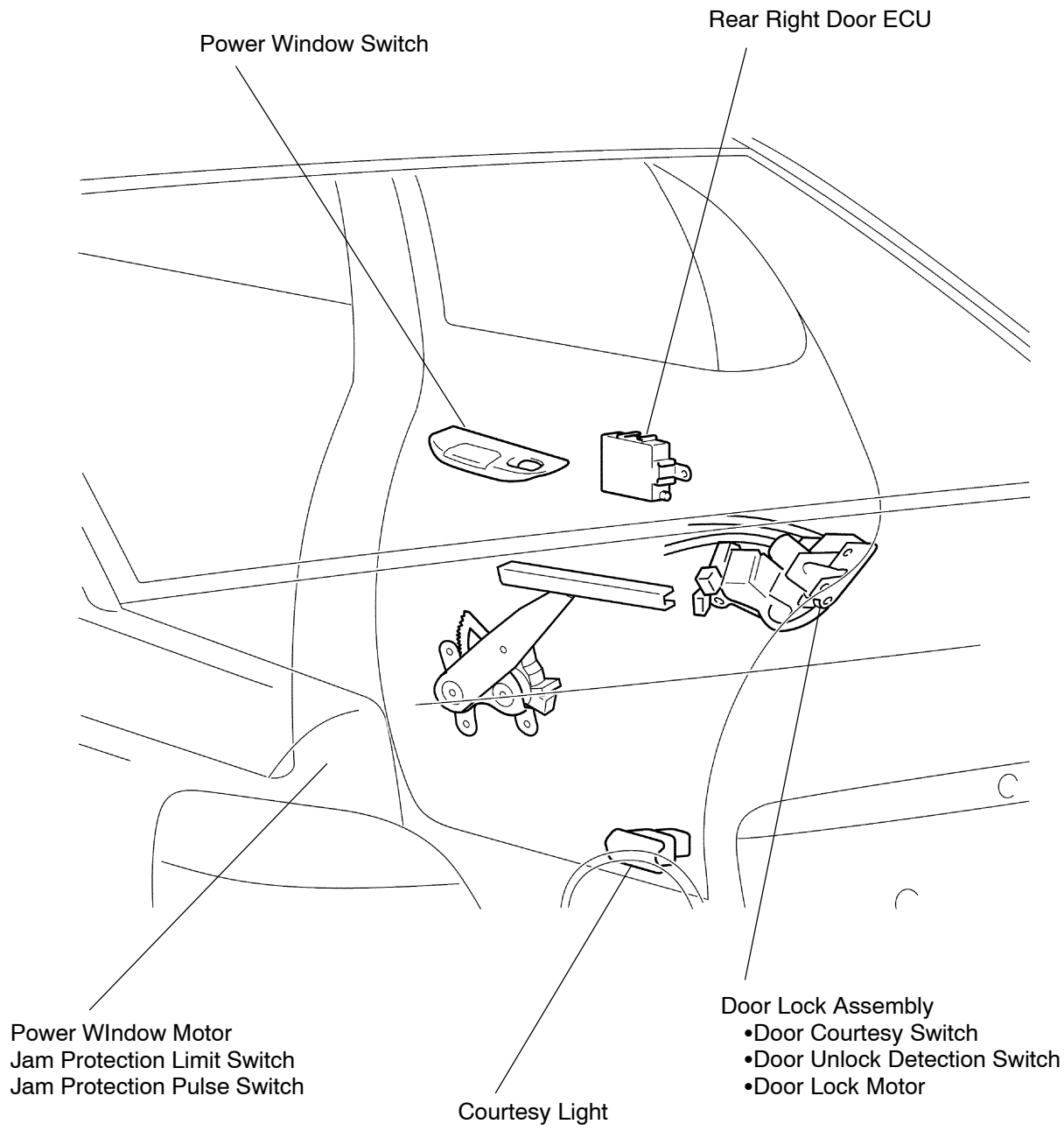
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	☐ Power Window Control System
	☐ Power Mirror Control System
	☐ Power Door Lock Control System
	☐ Theft Deterrent System
	☐ Jam Protection System
	☐ Others

DI2FS–02

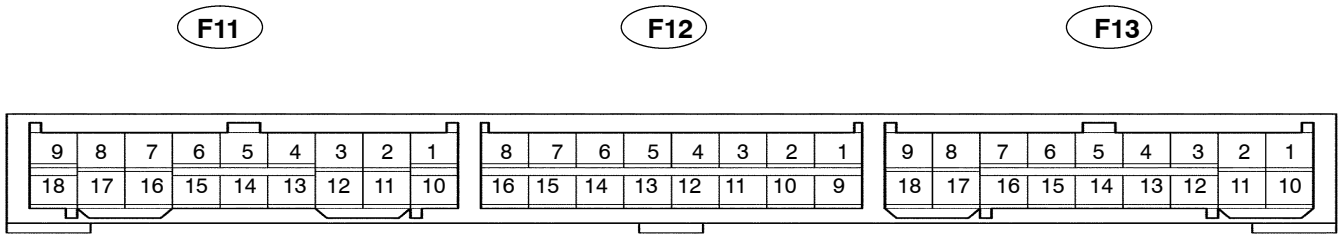
PARTS LOCATION



DI2EV–02

TERMINALS OF ECU

PASSENGER DOOR ECU



I03225

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
CPUB ↔ GND (F11–3 ↔ F11–12)	G–W ↔ W–B	Constant.		10 – 14 V
BDR ↔ GND (F13–1 ↔ F11–12)	L–B ↔ W–B	Constant.		10 – 14 V
CTYB ↔ GND (F13–10 ↔ F13–12)	R–Y ↔ W–B	Constant.		10 – 14 V
SIG ↔ GND (F11–2 ↔ F11–12)	B–R ↔ W–B	Ignition switch position is ON.		10 – 14 V
GND ↔ Body Ground (F11–12 ↔ Body Ground)	W–B ↔ Body Ground	Constant.		Below 1 V
CTY ↔ GND (F12–15 ↔ F11–12)	R–G ↔ W–B	Driver door closed.		10 – 14 V
		Driver door opened.		Below 1 V
KL ↔ GND (F13–4 ↔ F11–12)	P–B ↔ W–B	Door key lock and unlock switch position is OFF.		Below 1 V
		Door key lock and unlock switch position is LOCK.		10 – 14 V
KUL ↔ GND (F13–5 ↔ F11–12)	P–G ↔ W–B	Door key lock and unlock switch position is OFF.		Below 1 V
		Door key lock and unlock switch position is UNLOCK.		10 – 14 V
CYL ↔ GND (F13–12 ↔ F11–12)	R–W ↔ W–B	Constant		10 – 14 V
AUTO ↔ GND (F12–6 ↔ F11–12)	L–R ↔ W–B	Auto down switch position is OFF.		Below 1 V
		Ignition switch position is ON. Auto down switch position is ON.		10 – 14 V
MUP ↔ GND (F12–5 ↔ F11–12)	L–W ↔ W–B	Ignition switch position is ON. Power window switch position	OFF	Below 1 V
			UP	10 – 14 V
MDN ↔ GND (F12–4 ↔ F11–12)	L–B ↔ W–B	Ignition switch position is ON. Power window switch position	OFF	Below 1 V
			DOWN	10 – 14 V
ML ↔ GND (F13–6 ↔ F11–12)	LG–B ↔ W–B	Door lock control switch position	OFF	10 – 14V
			LOCK	Below 1 V

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
MUL ↔ GND (F13–7 ↔ F11–12)	LG–R ↔ W–B	Door lock control switch position	OFF	10 – 14 V
			UNLOCK	Below 1 V
UP ↔ GND (F13–2 ↔ F11–12)	R ↔ W–B	Power window (FrRH) is not operating.		Below 1 V
		Power window (FrRH) is operating upward.		10 – 14 V
DN ↔ GND (F13–11 ↔ F11–12)	G ↔ W–B	Power window (FrRH) is not operating.		Below 1 V
		Power window (FrRH) is operating downward.		10 – 14 V
PMVR ↔ GND (F11–8 ↔ F11–12)	LG–B ↔ W–B	Outside rear view mirror (RH) is not operating.		Below 1 V
		Outside rear view mirror (RH) is operating to down or right.		
		Outside rear view mirror (RH) is operating to up.		10 – 14 V
PM+R ↔ GND (F11–7 ↔ F11–12)	LG–R ↔ W–B	Outside rear view mirror (RH) is not operating.		Below 1 V
		Outside rear view mirror (RH) is operating to up or left.		
		Outside rear view mirror (RH) is operating to down or right.		10 – 14 V
PMHR ↔ GND (F11–16 ↔ F11–12)	LG ↔ W–B	Outside rear view mirror (RH) is not operating.		Below 1 V
		Outside rear view mirror (RH) is operating to up or left.		
		Outside rear view mirror (RH) is operating to left.		10 – 14 V
A+ ↔ GND (F13–8 ↔ F11–12)	G–R ↔ W–B	Power door lock (FrRH) is not operating.		Below 1 V
		Power door lock (FrRH) is operating to unlock.		
		Power door lock (FrRH) is operating to lock.		10 – 14 V
A– ↔ GND (F13–17 ↔ F11–12)	G–B ↔ W–B	Power door lock (FrRH) is not operating.		Below 1 V
		Power door lock (FrRH) is operating to lock.		
		Power door lock (FrRH) is operating to lock.		10 – 14 V
LSW ↔ GND (F13–3 ↔ F11–12)	G ↔ W–B	Passenger door is locked.		10 – 14 V
		Passenger door is unlocked.		Below 1 V
PVC ↔ GND (F12–8 ↔ F11–12	O ↔ W–B	Ignition switch position is OFF. After 30 seconds from door is closed.		Below 1 V
		Ignition switch position is ON.		4 – 6 V
LMT ↔ GND (F12–12 ↔ F11–12)	W–G ↔ W–B	Window full–close position		10 – 14 V
		Except window full–close position		Below 1 V
PLS ↔ GND (F12–13 ↔ F11–12)	W ↔ W–B	During the power window is operation.	SW ON	Below 1 V
		Power window is not operated.	SW OFF	10 – 14 V

DI2EW–02

PROBLEM SYMPTOMS TABLE

- POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
Power window does not operate.	1. Power window switch circuit 2. Power window motor circuit 3. Passenger door ECU	DI–752 DI–754
Auto up (or down) function does not operate.	1. Power window switch circuit 2. Passenger door ECU	DI–752
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switch circuit 2. Passenger door ECU	DI–756 DI–758

- POWER MIRROR CONTROL SYSTEM

Symptom	Suspect Area	See page
Both right and left mirror does not operate.	1. Mirror switch circuit 2. Body No.2 ECU	DI–673
Only one side of mirror does not operate.	1. Mirror motor circuit 2. Passenger door ECU	DI–760
Mirror on the opposite side will be operated.	1. Mirror switch circuit 2. Body No.2 ECU	DI–673
Mirror will not be operated as indicated with switch.		

- OTHERS

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Passenger door ECU	DI–739

DI2EX–02

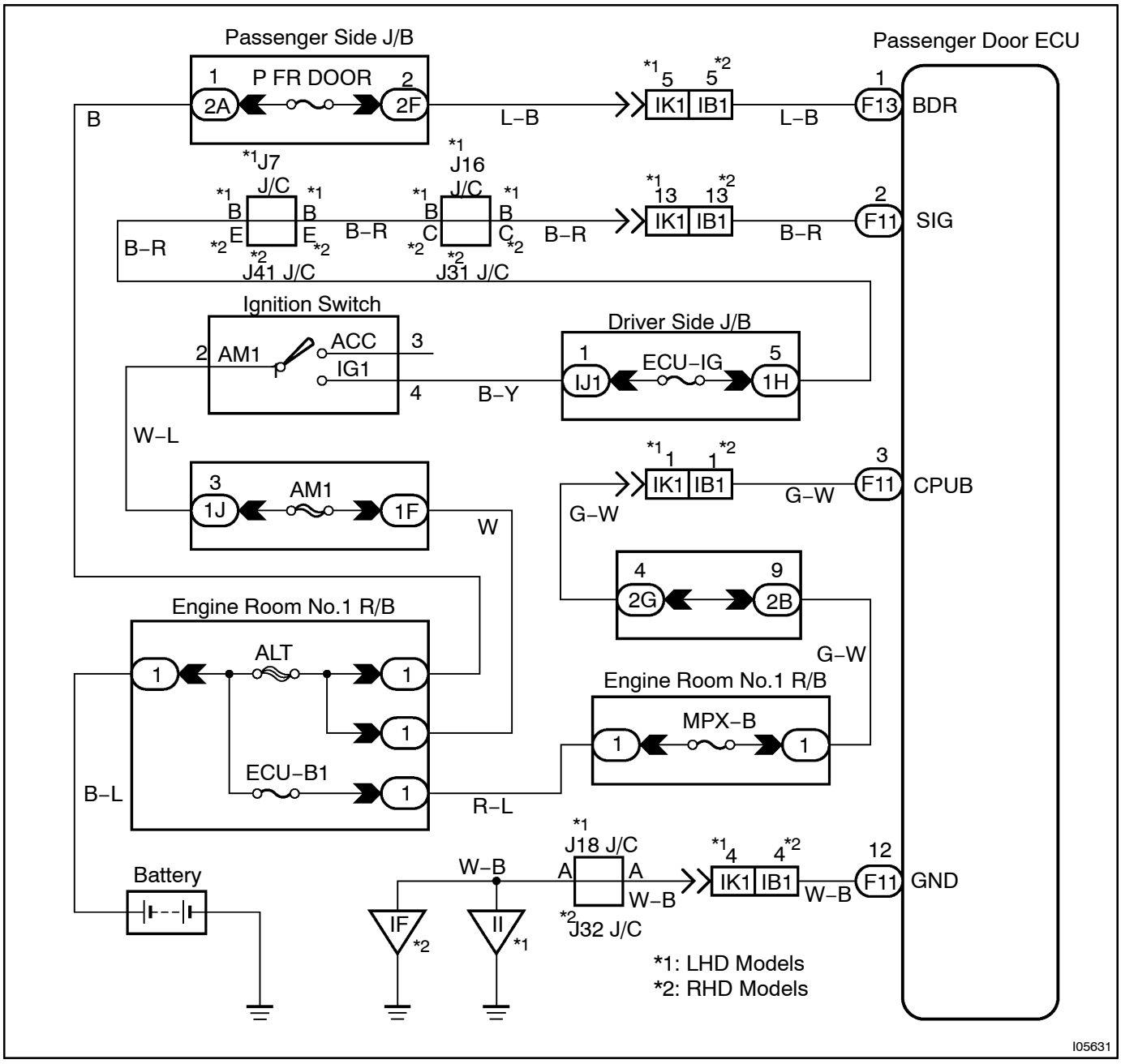
CIRCUIT INSPECTION

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the passenger door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check MPXB, GAUGE and DOOR(FR) fuse.**

CHECK:
Check continuity of MPXB, GAUGE and DOOR(FR) fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals BDR, CPUB, SIG and GND of passenger door ECU connector.**

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals SIG, and GND.
OK:
Voltage: 10 – 14V
PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the passenger door ECU connector.
CHECK:
Measure voltage between terminals BDR, CPUB and GND.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–738).**

NG

3	**Check wireharness and connector between ECU and body ground.**

NG → **Repair or replace wireharness or connector**

OK

Check and repair wireharness and connector between ECU and battery.

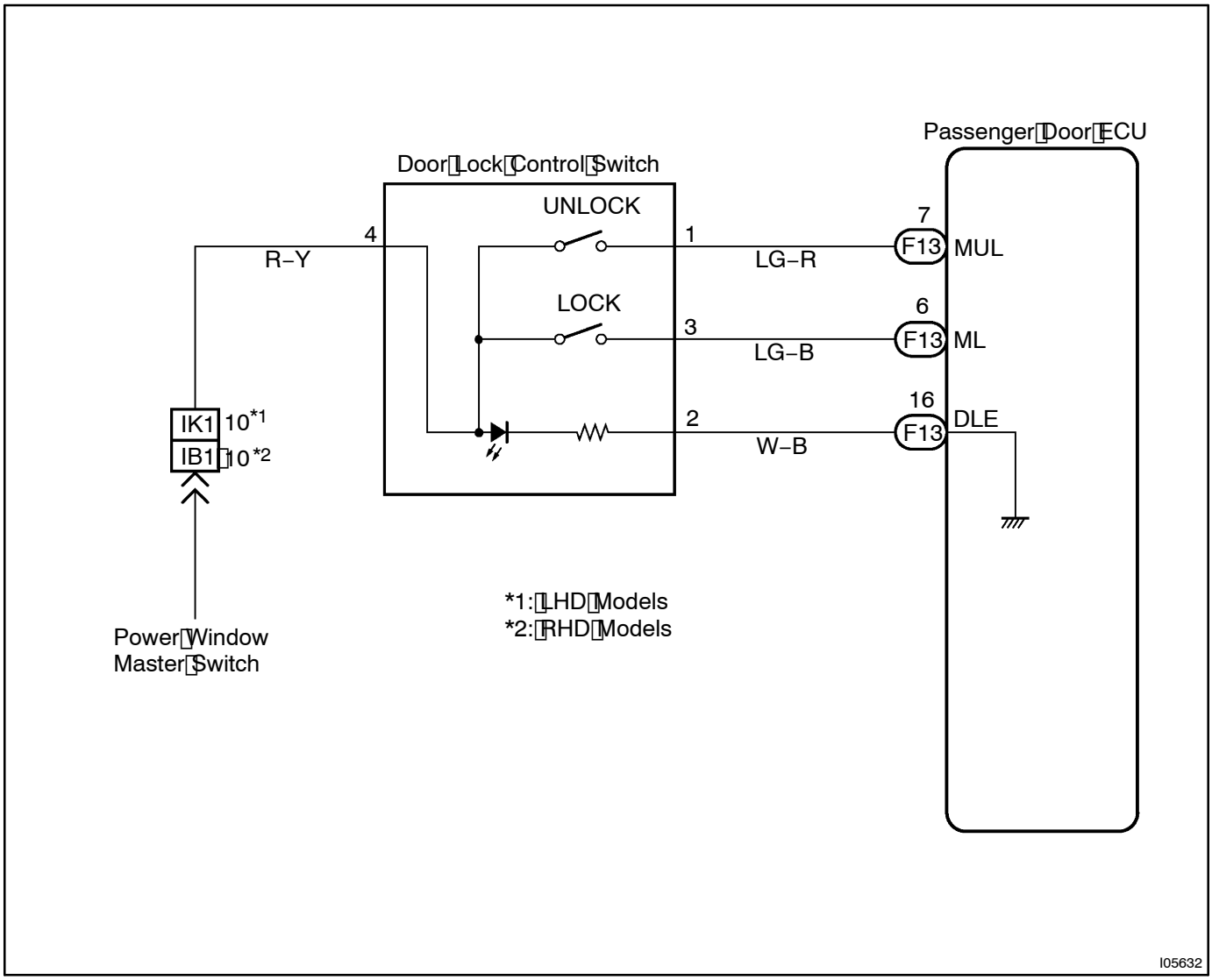
DI2EY–02

Door lock control switch circuit

CIRCUIT DESCRIPTION

Door lock control switch circuit can be checked using DTC check. (Refer to DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the door lock control switch circuit using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

OK

2	Check the door lock control switch. (See page BE–148)

NG → Replace the door lock control switch.

OK

3	Check wireharness and connector between door lock control switch and passenger door ECU.

NG → Repair or replace wireharness or connector.

OK

4	Check wireharness and connector between door lock control switch and power window master switch.

NG → Repair or replace wireharness or connector.

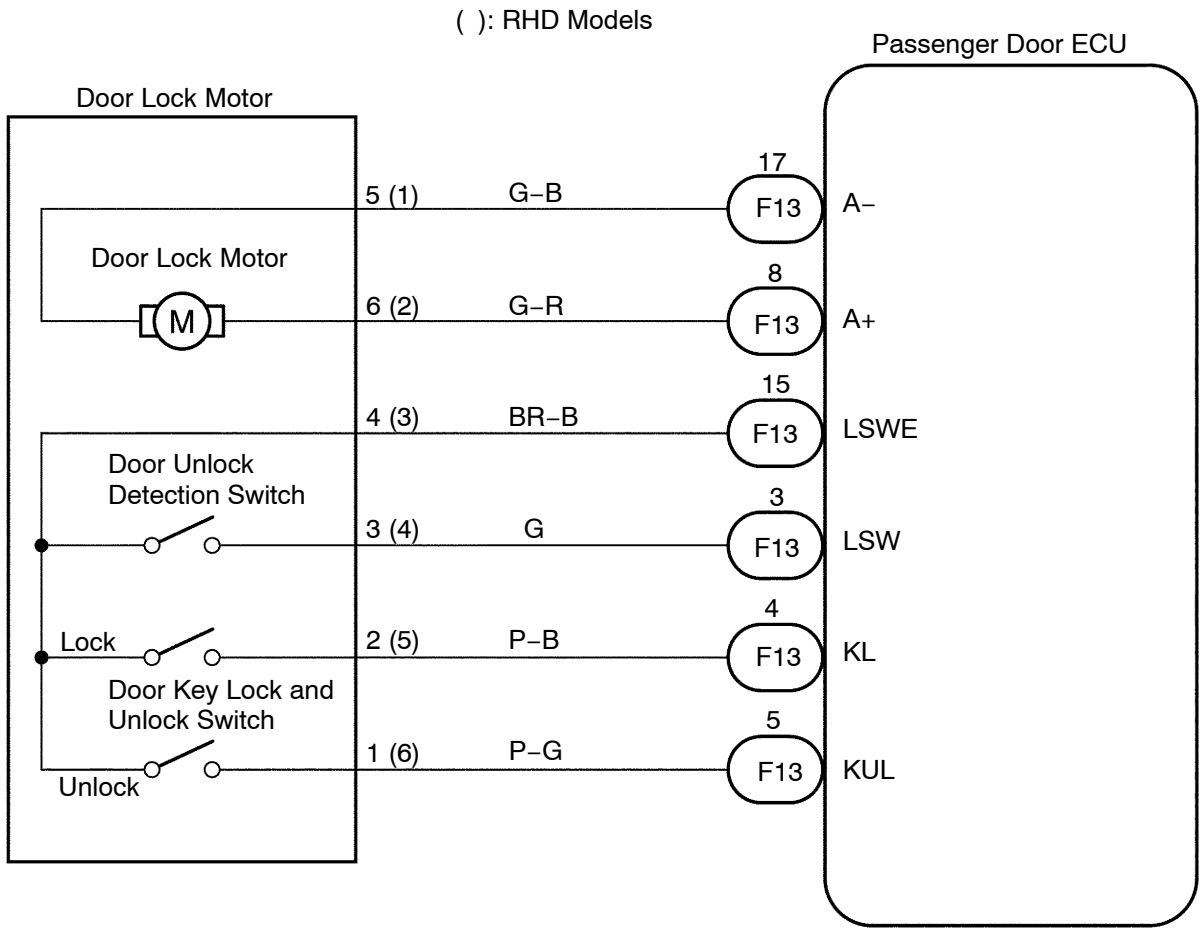
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

DI2EZ–02

Door lock motor 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 door lock motor using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

Check that the door lock motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptom table. (See page DI–616)**

NG

2	**Check door lock motor. (See page BE–148)**

NG → **Replace the door lock motor.**

OK

3	**Check wireharness and connector between door lock motor and driver door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

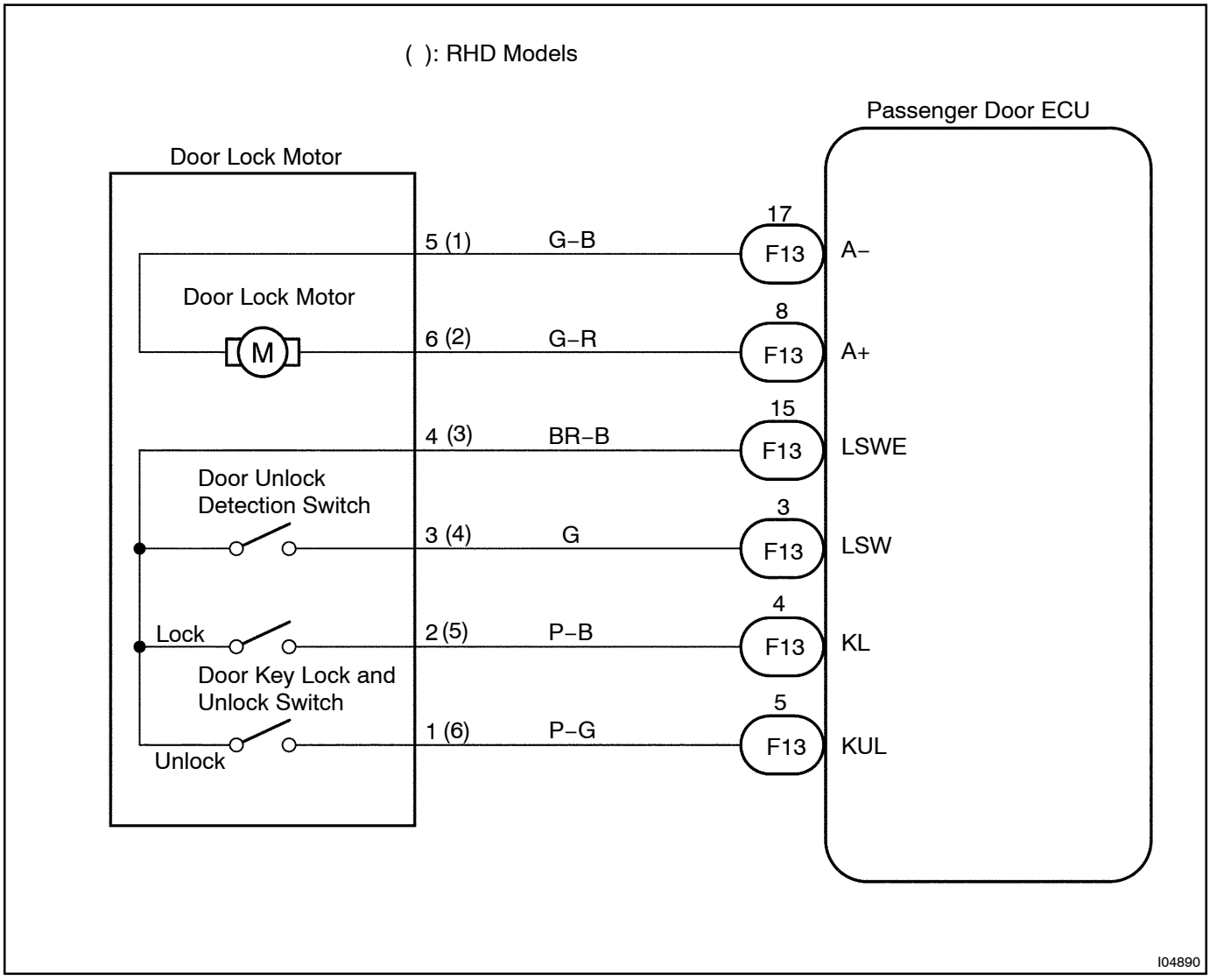
DI2F0–02

Door unlock detection switch

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



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 door unlock detection switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the door unlock detection switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)**

NG

2	**Check door unlock detection switch. (See page BE–148)**

NG → **Replace the door lock motor.**

OK

3	**Check wire harness and connector between door unlock detection switch and passenger door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

D12F1-02

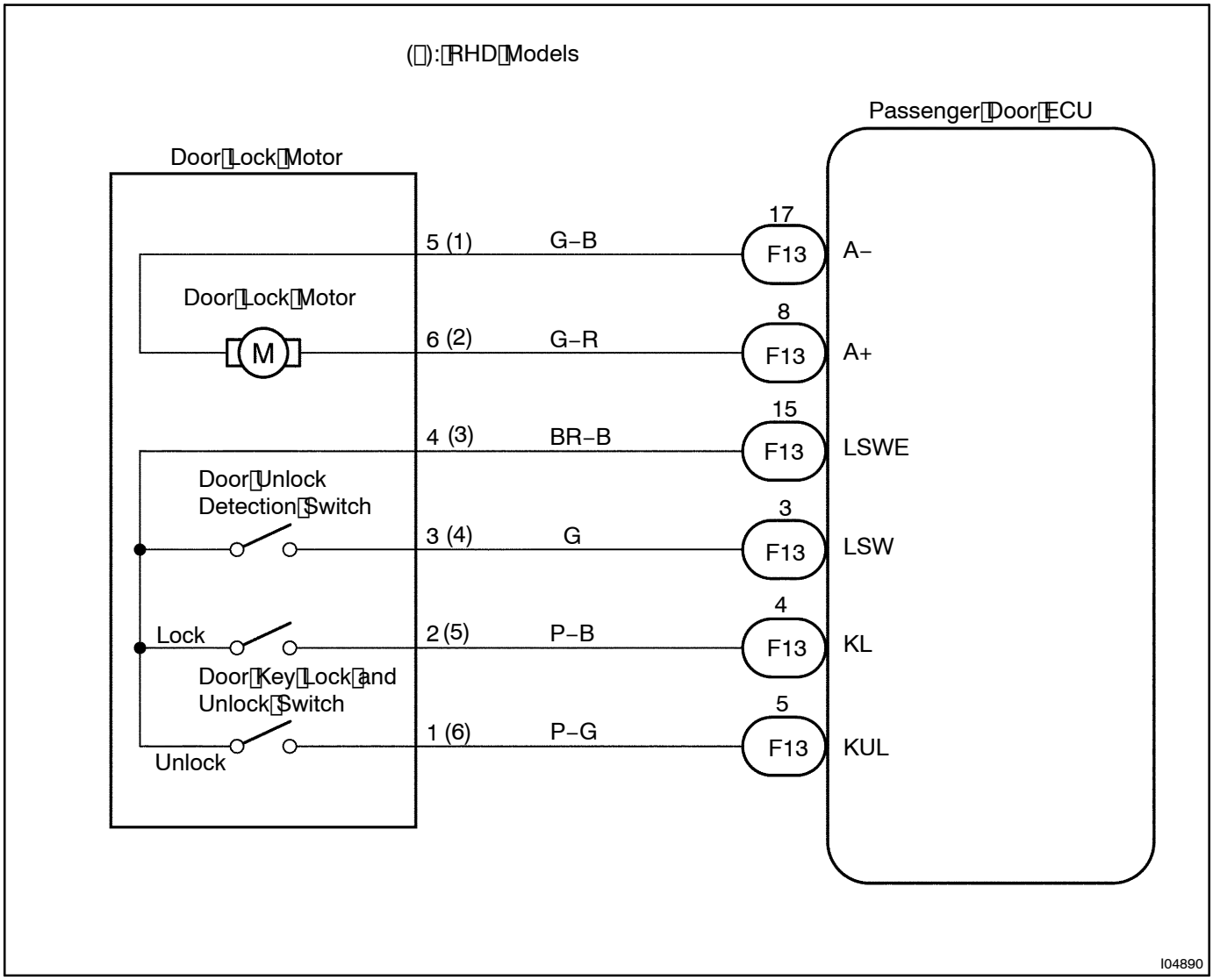
Door key lock and unlock switch circuit

CIRCUIT DESCRIPTION

The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 3 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.

Door key lock and unlock switch can be checked using DTC check. (Refer to DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the door key lock and unlock switch using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

NG

2	Check the door key lock and unlock switch. (See page BE–148)

NG → Replace the door key lock and unlock switch.

NG

3	Check wire harness and connector between door key lock and unlock switch and passenger door ECU.

NG → Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

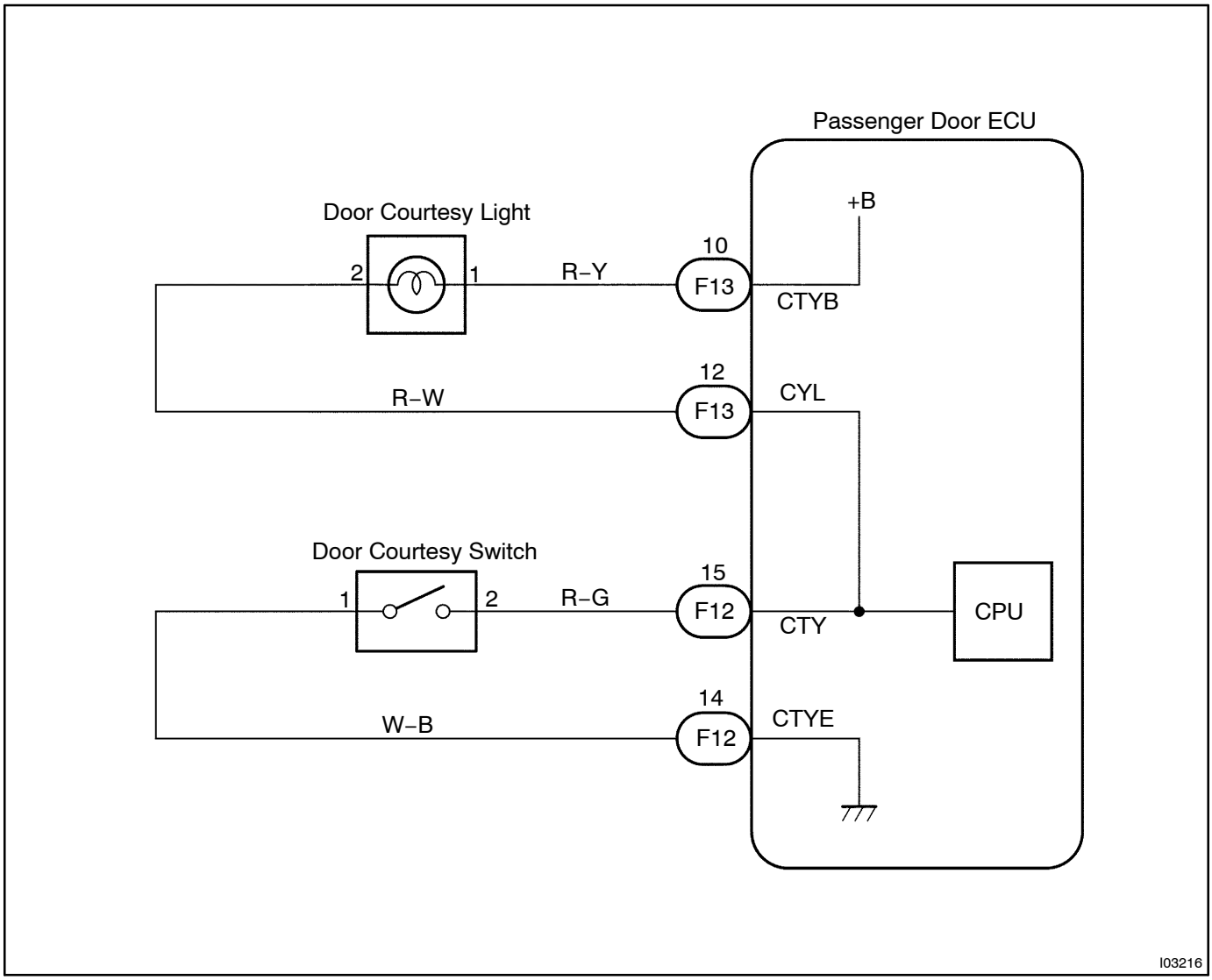
DI2F2–02

Door courtesy light and 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



INSPECTION PROCEDURE

1	Check operation of door courtesy light.

CHECK:

Check that door courtesy light comes on when door opened, and goes off when door is closed.

OK:

Must be operated normally.

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

NG

2	Check courtesy light. (See page BE–66)

NG → Replace the courtesy light.

OK

3	Check courtesy switch. (See page BE–66)

NG → Replace the courtesy switch.

OK

4	Check wireharness and connector between courtesy light and passenger door ECU, courtesy switch and passenger door ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

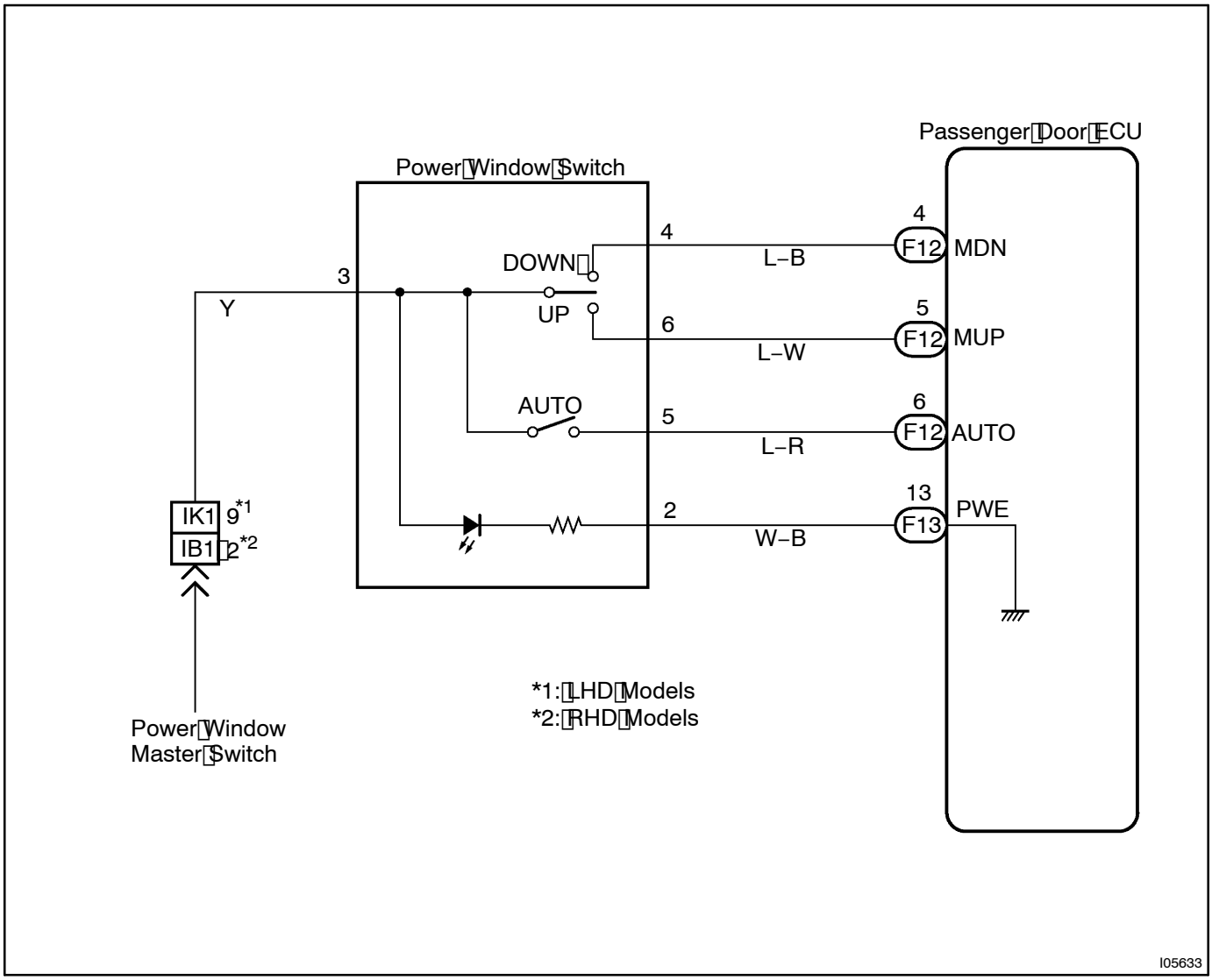
DI2F3–02

Power window switch circuit

CIRCUIT DESCRIPTION

Power window switch circuit can be checked using DTC check. (Refer to DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the power window switch circuit using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)

OK

2	Check the power window switch. (See page BE–134)

NG → Replace the power window switch.

OK

3	Check wireharness and connector between power window switch and passenger door ECU.

NG → Repair or replace wireharness or connector.

OK

4	Check wireharness and connector between power window switch and power window master switch.

NG → Repair or replace wireharness or connector.

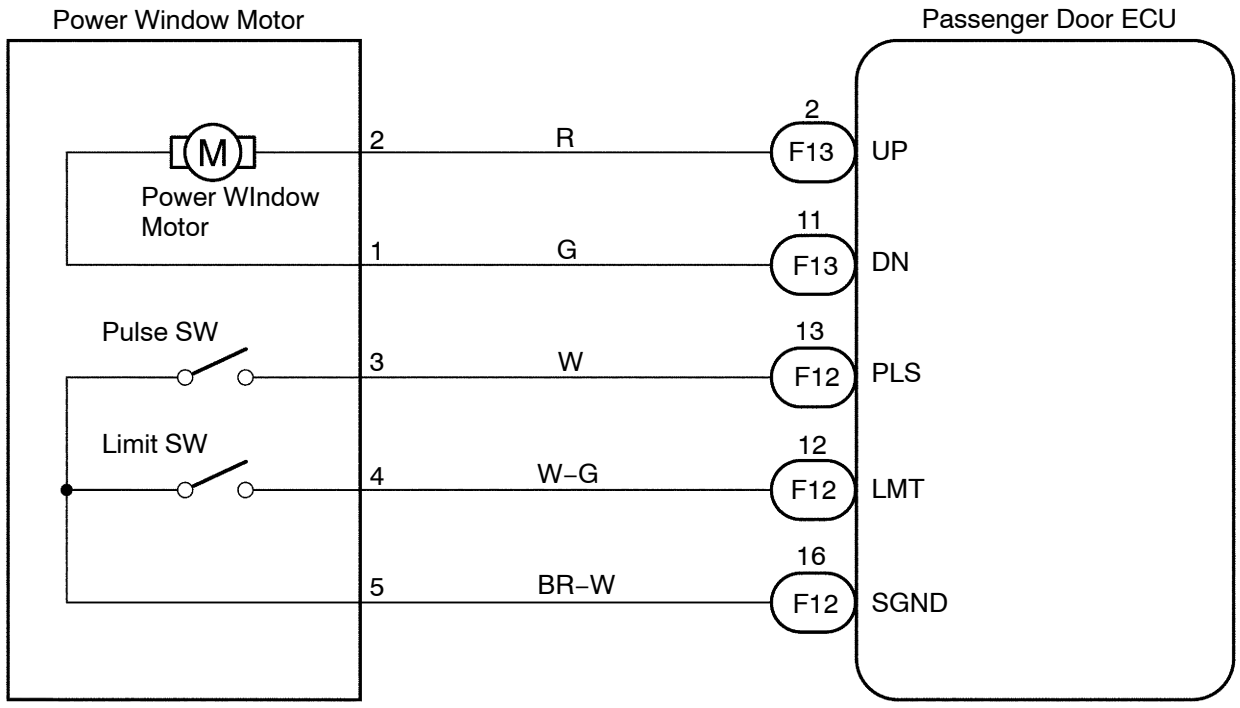
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)

DI2F4–02

Power window motor circuit

WIRING DIAGRAM



I03214

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 power window motor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the power window motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)**

NG

2	**Check power window motor. (See page BE–134)**

NG → **Replace the power window motor.**

OK

3	**Check wireharness and connector between power window motor and passenger door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)

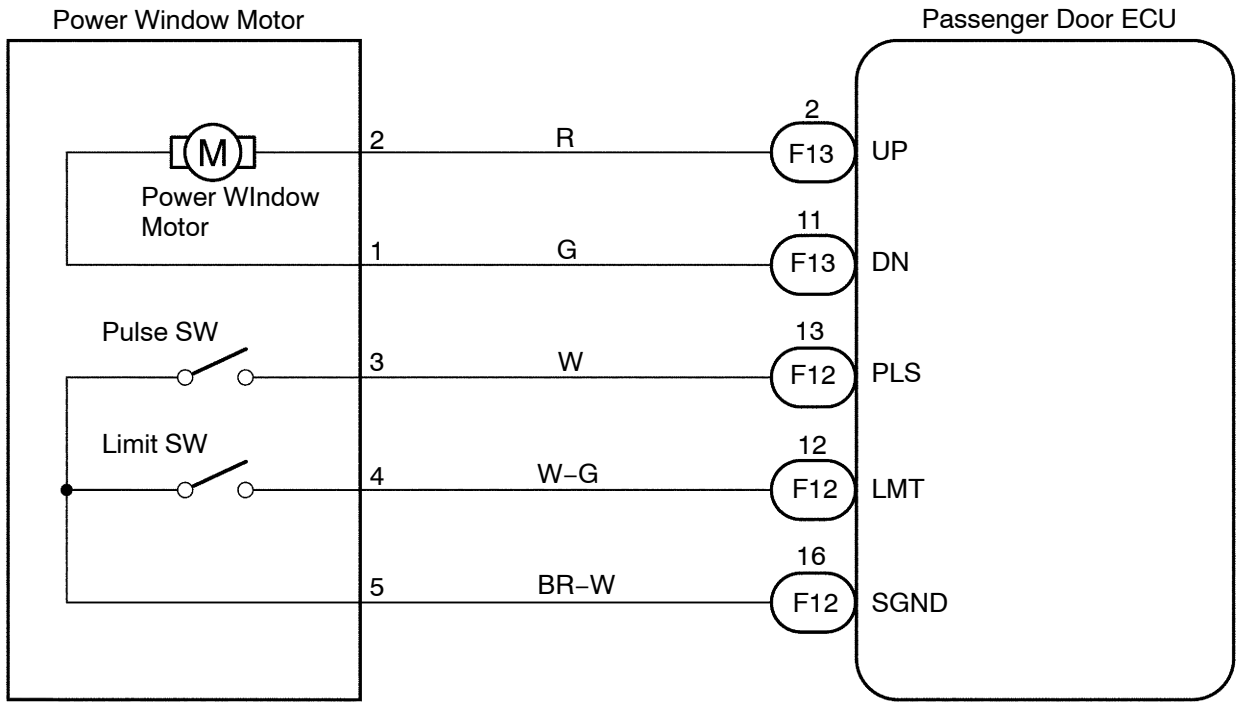
DI2F5–02

Jam protection limit switch circuit

CIRCUIT DESCRIPTION

Jam protection limit switch is built–in the power window motor. This switch functions to turn ”OFF” before the top dead center, and ECU reads this ”OFF” signal resulting in closing the window fully.

WIRING DIAGRAM



I03214

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 jam protection limit switch using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

Check the jam protection limit switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)**

NG

2	**Check jam protection limit switch. (See page BE–134)**

NG → **Replace the power window motor.**

OK

3	**Check wireharness and connector between jam protection limit switch and passenger door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)

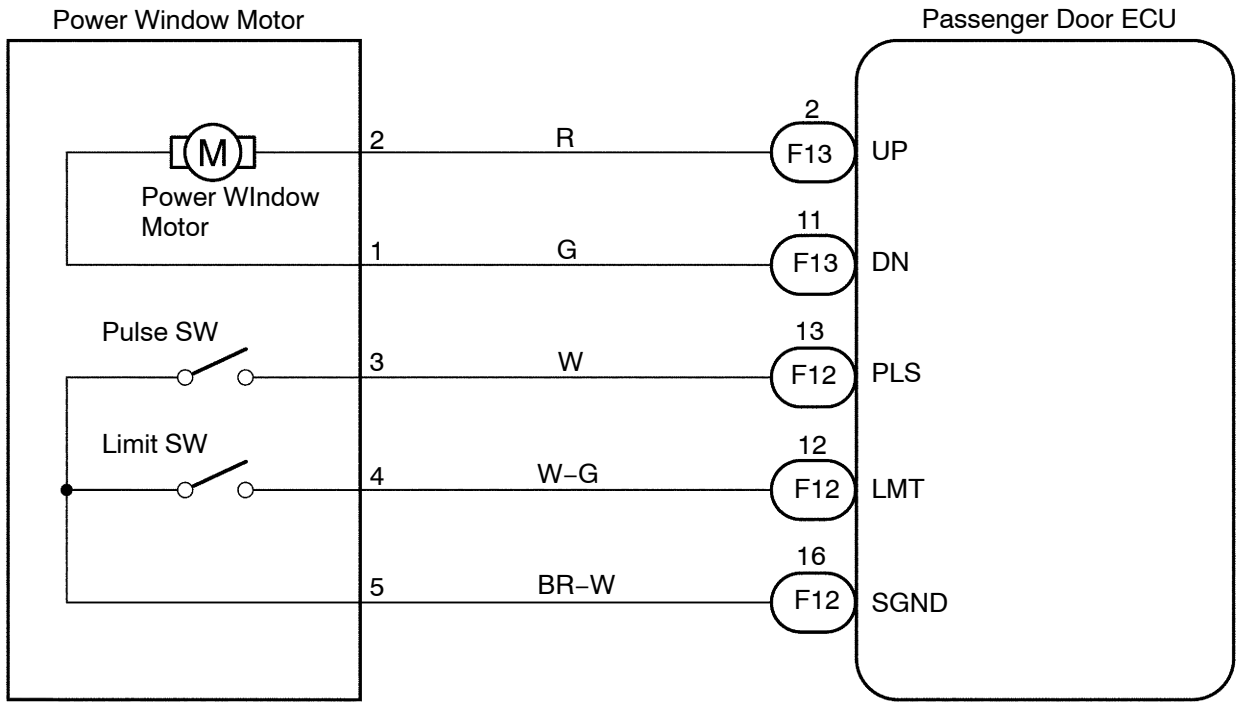
DI2F6–02

Jam protection pulse switch circuit

CIRCUIT DESCRIPTION

Jam protection pulse switch is built–in the power window motor. Pulse switch outputs ON/OFF pulse when the motor rotates.

WIRING DIAGRAM



I03214

INSPECTION PROCEDURE

1	Check jam protection pulse switch. (See page BE–134)

NG → Replace the power window motor.

OK

2	Check wireharness and connector between jam protection pulse switch and passenger door ECU.

NG → Repair or replace wireharness or connector.

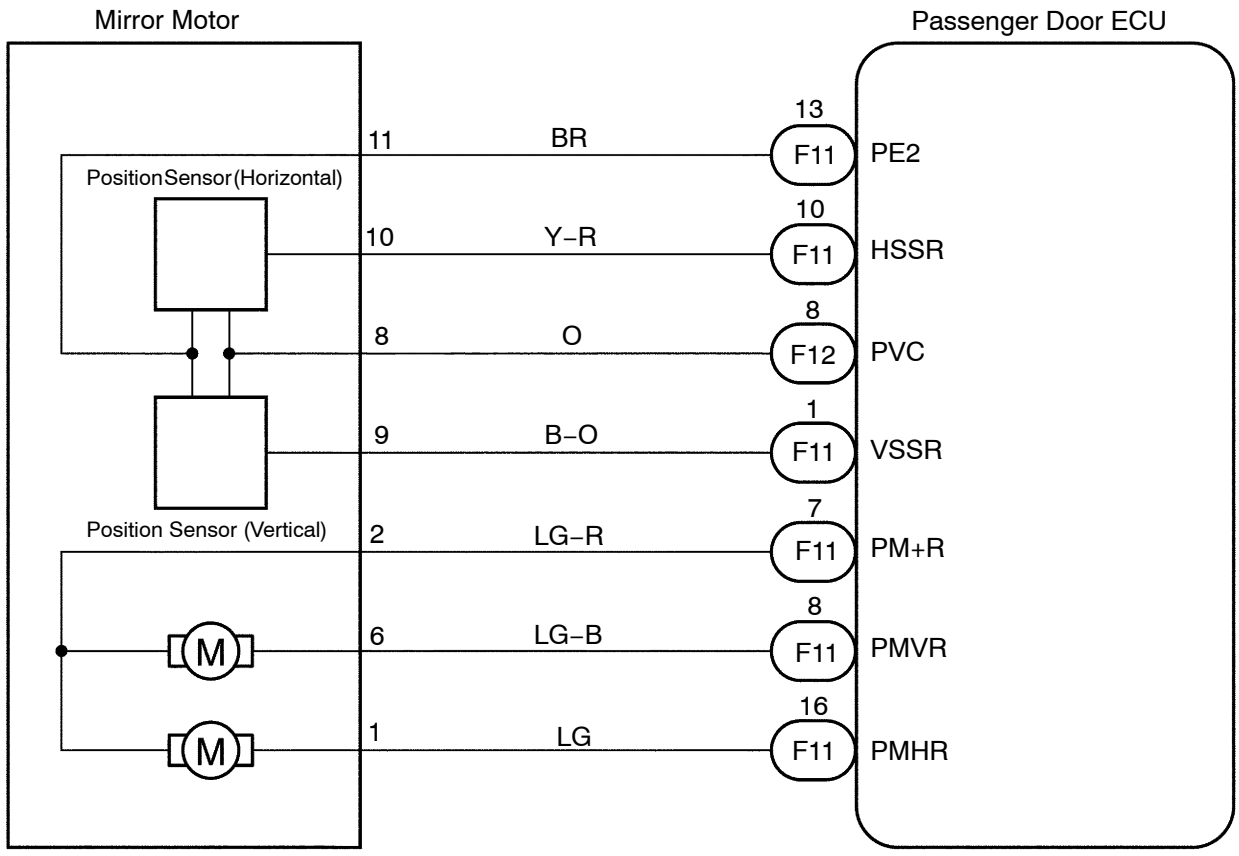
OK

Proceed to next circuit inspection shown on problems symptoms table. (See page DI–738)

DI2F7–02

Mirror motor circuit

WIRING DIAGRAM



I03219

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 mirror motor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the mirror motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)**

NG

2	**Check mirror motor. (See page BE–192)**

NG → **Replace the mirror motor.**

OK

3	**Check wireharness and connector between mirror motor and passenger door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–738)

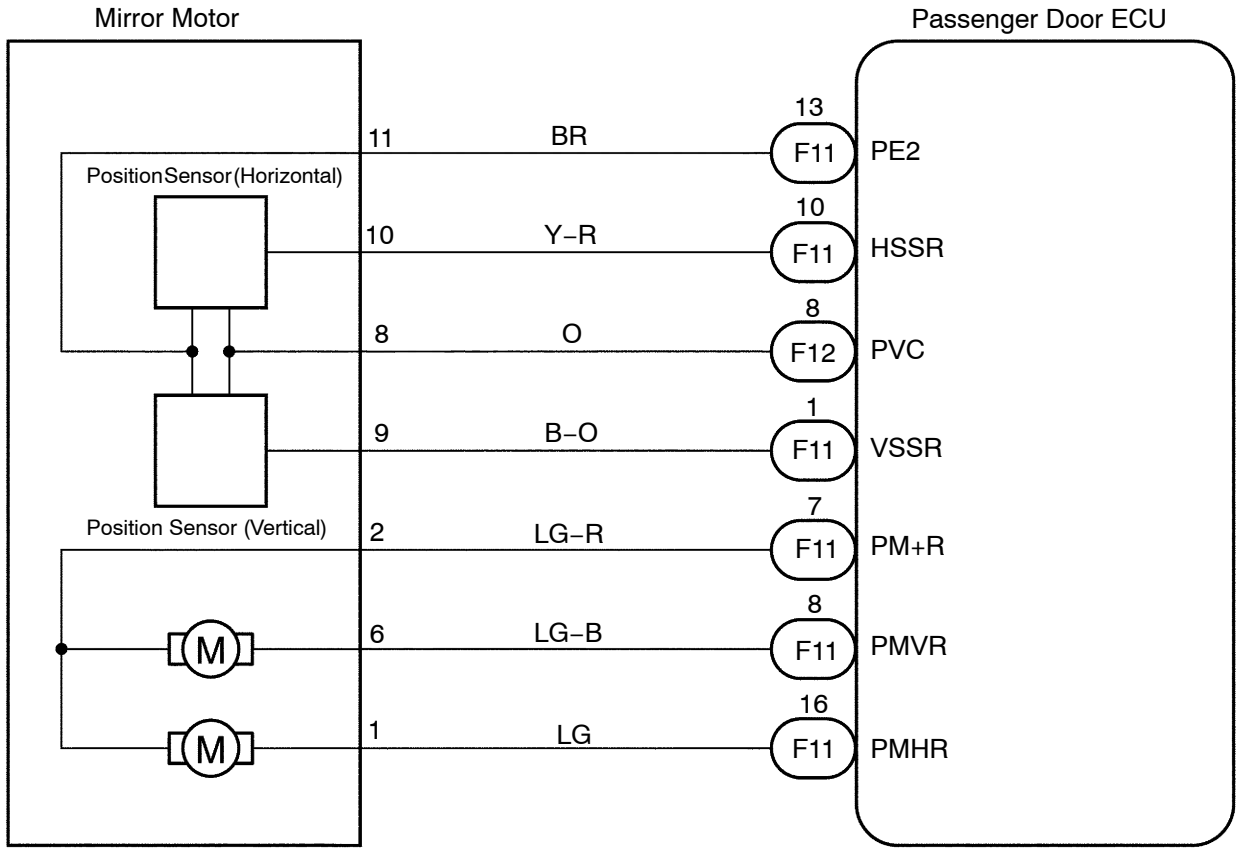
DI2F8–02

Mirror position sensor circuit (W/memory)

CIRCUIT DESCRIPTION

This position detected by the mirror position sensor will be memorized in the seat ECU. This sensor is equipped in the mirror in spite of the existence of the memory function.

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 mirror position sensor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the voltage of the mirror position sensor using DATA LIST.
OK:
When operating the mirror motor, voltage values should have a smooth change within the ranges shown below.

Vehicle direction	0.27 – 3.80 (V)
Horizontal direction	0.23 – 4.01 (V)

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–522)**

NG

2	**Check mirror position sensor. (See page BE–192)**

NG → **Replace the outer mirror.**

OK

3	Check wireharness and connector between mirror position sensor and passenger door ECU.

NG → Repair or replace wireharness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–522)

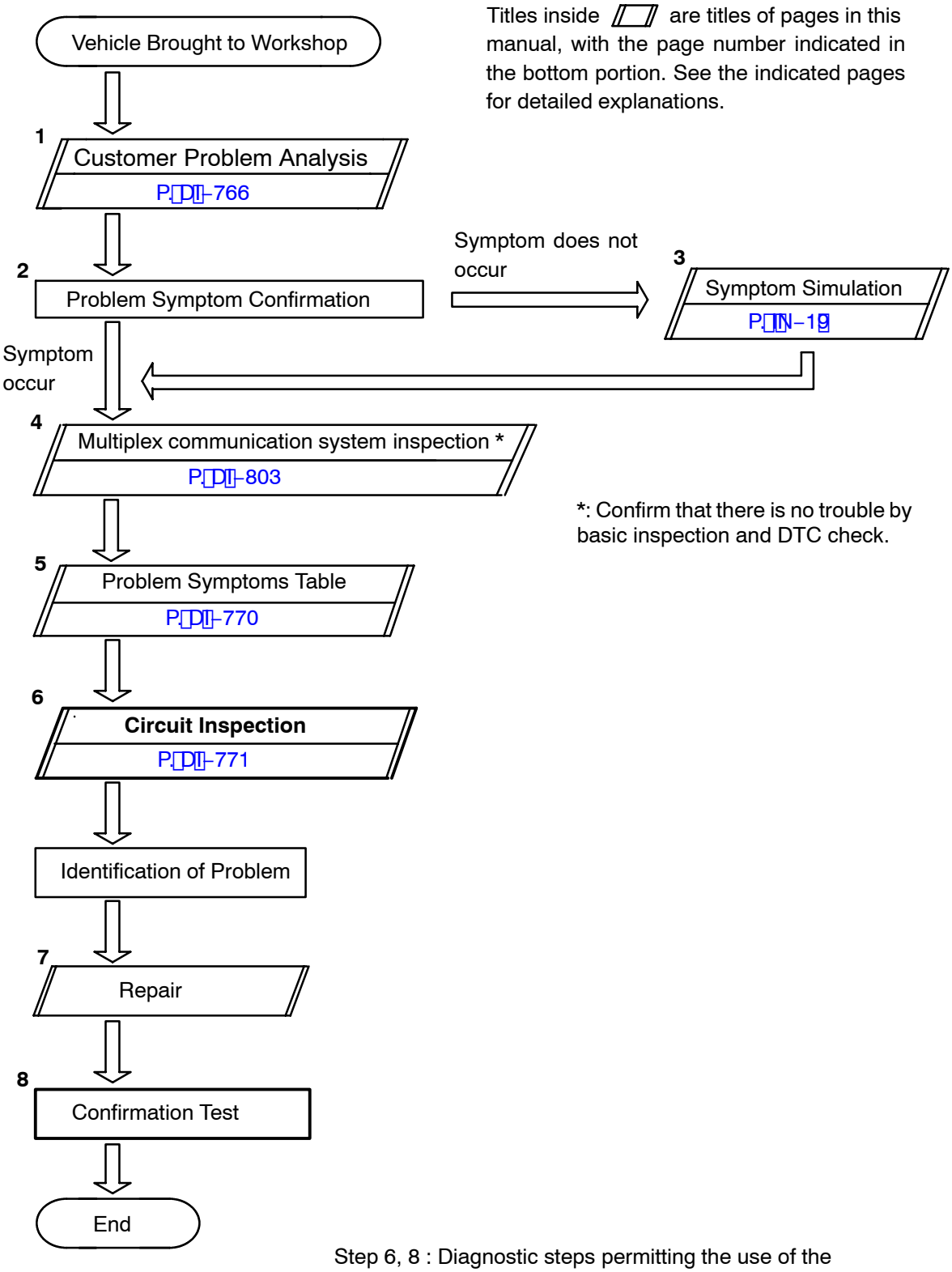
REAR LEFT DOOR CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI2F9–02

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 troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI2FB–02

CUSTOMER PROBLEM ANALYSIS CHECK

REAR LEFT DOOR CONTROL SYSTEM Check Sheet

Inspector's name: _____

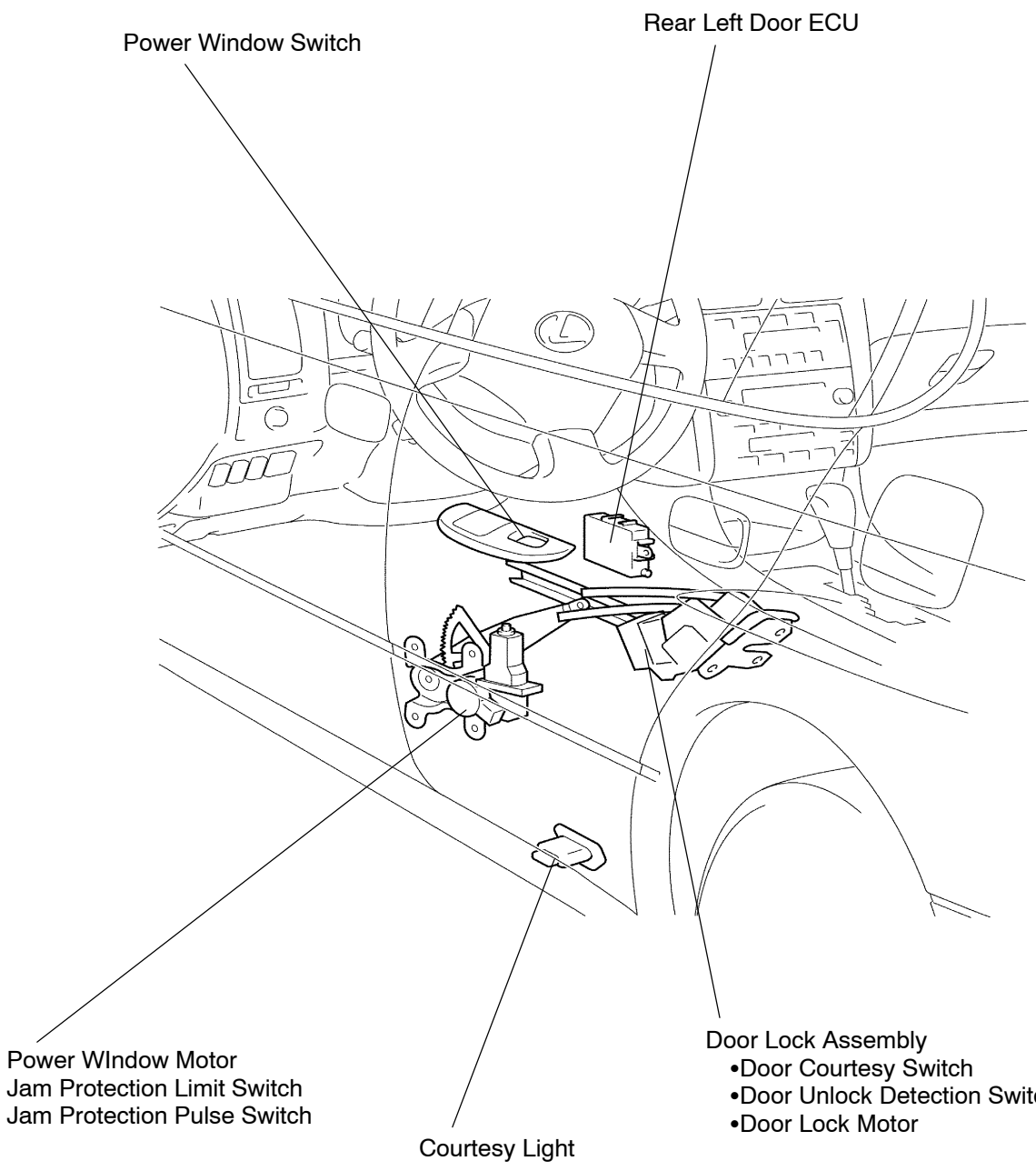
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Theft Deterrent System
	☐ Jam Protection System
	☐ Others

DI2FA–02

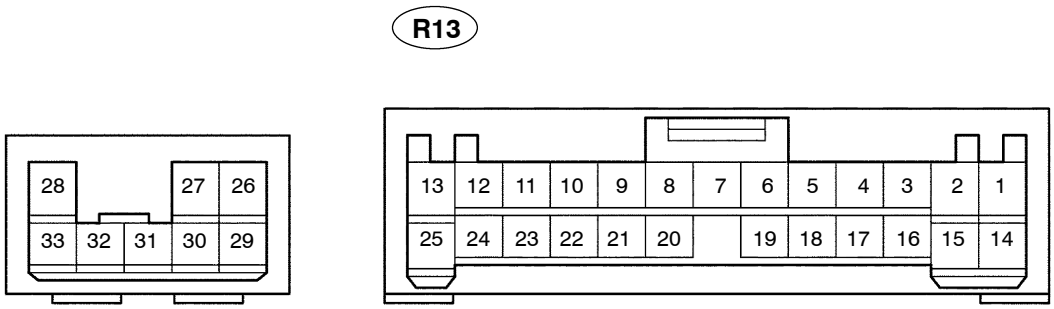
PARTS LOCATION



DI2FH–02

TERMINALS OF ECU

REAR LEFT DOOR ECU



I03226

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
CPUB ↔ GND (R13–15 ↔ R13–25	G–W ↔ W–B	Constant		10 – 14 V
BDR ↔ GND (R13–14 ↔ R13–25)	L–R ↔ W–B	Constant		10 – 14 V
SIG ↔ GND (R13–9 ↔ R13–25)	B–R ↔ W–B	Constant		10 – 14 V
CTYB ↔ GND (R13–2 ↔ R13–25)	G–W ↔ W–B	Constant		10 – 14 V
GND ↔ Body Ground (R13–25 ↔ Body Ground)	W–B ↔ Body Ground	Constant		Below 1 V
CTY ↔ GND (R13–8 ↔ R13–25)	R–W ↔ W–B	Driver door closed.		10 – 14 V
		Driver door opened.		Below 1 V
CYL ↔ GND (R13–7 ↔ R13–25)	R ↔ W–B	Constant		10 – 14 V
AUTO ↔ GND (R13–22 ↔ R13–25)	L–R ↔ W–B	Auto down switch position is OFF.		Below 1 V
		Ignition switch position is ON. Auto down switch position is ON.		10 – 14 V
MUP ↔ GND (R13–24 ↔ R13–25)	L–W ↔ W–B	Ignition switch position is ON. Power window switch position	OFF	Below 1 V
			UP	10 – 14 V
MDN ↔ GND (R13–23 ↔ R13–25)	L–B ↔ W–B	Ignition switch position is ON. Power window switch position	OFF	Below 1 V
			Down	10 – 14 V
UP ↔ GND (R13–28 ↔ R13–25)	R ↔ W–B	Power window (RrLH) is not operating.		Below 1 V
		Power window (RrLH) is operating upward.		10 – 14 V
DN ↔ GND (R13–26 ↔ R13–25)	G ↔ W–B	Power window (RrLH) is not operating.		Below 1 V
		Power window (RrLH) is operating downward.		10 – 14 V
A+ ↔ GND (R13–13 ↔ R13–25)	G–R ↔ W–B	Power door lock (RrLH) is not operating.		Below 1 V
		Power door lock (RrLH) is operating to unlock.		
		Power door lock (RrLH) is operating to lock.		10 – 14 V

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
A– ↔ GND (R13–1 ↔ R13–25)	G–B ↔ W–B	Power door lock (FrLH) is not operating.		Below 1 V
		Power door lock (FrLH) is operating to lock.		
		Power door lock (FrLH) is operating to unlock.		10 – 14 V
LMT ↔ GND (R13–27 ↔ R13–25)	B–W ↔ W–B	Window full–close position		10 – 14 V
		Except window full–close position		Below 1 V
PLS ↔ GND (R13–32 ↔ R13–25)	Y–B ↔ W–B	During the power window is operation.		Pulse Generation
		Power window is not operated.	SW ON	Below 1 V
			SW OFF	10 – 14 V
PCTI ↔ GND (R13–11 ↔ R13–25)	Y–B ↔ W–B	Window lock switch position*	UNLOCK	Below 1 V
			LOCK	10 –14 V
PCTO ↔ GND (R13–10 ↔ R13–25)	W–G ↔ W–B	Window lock switch position*	UNLOCK	Below 1 V
			LOCK	10 – 14 V

*: Power window master switch

DI2FI–02

PROBLEM SYMPTOMS TABLE

- POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
Power window does not operate.	1. Power window switch circuit 2. Power window motor circuit 3. Rear left door ECU	DI–781 BE–134
Auto up (or down) function does not operate.	1. Power window switch circuit 2. Rear left door ECU	DI–781
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switch circuit 3. Rear left door ECU	BE–134 BE–134

- OTHERS

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Rear left door ECU.	DI–771

DI2T4–01

CIRCUIT INSPECTION

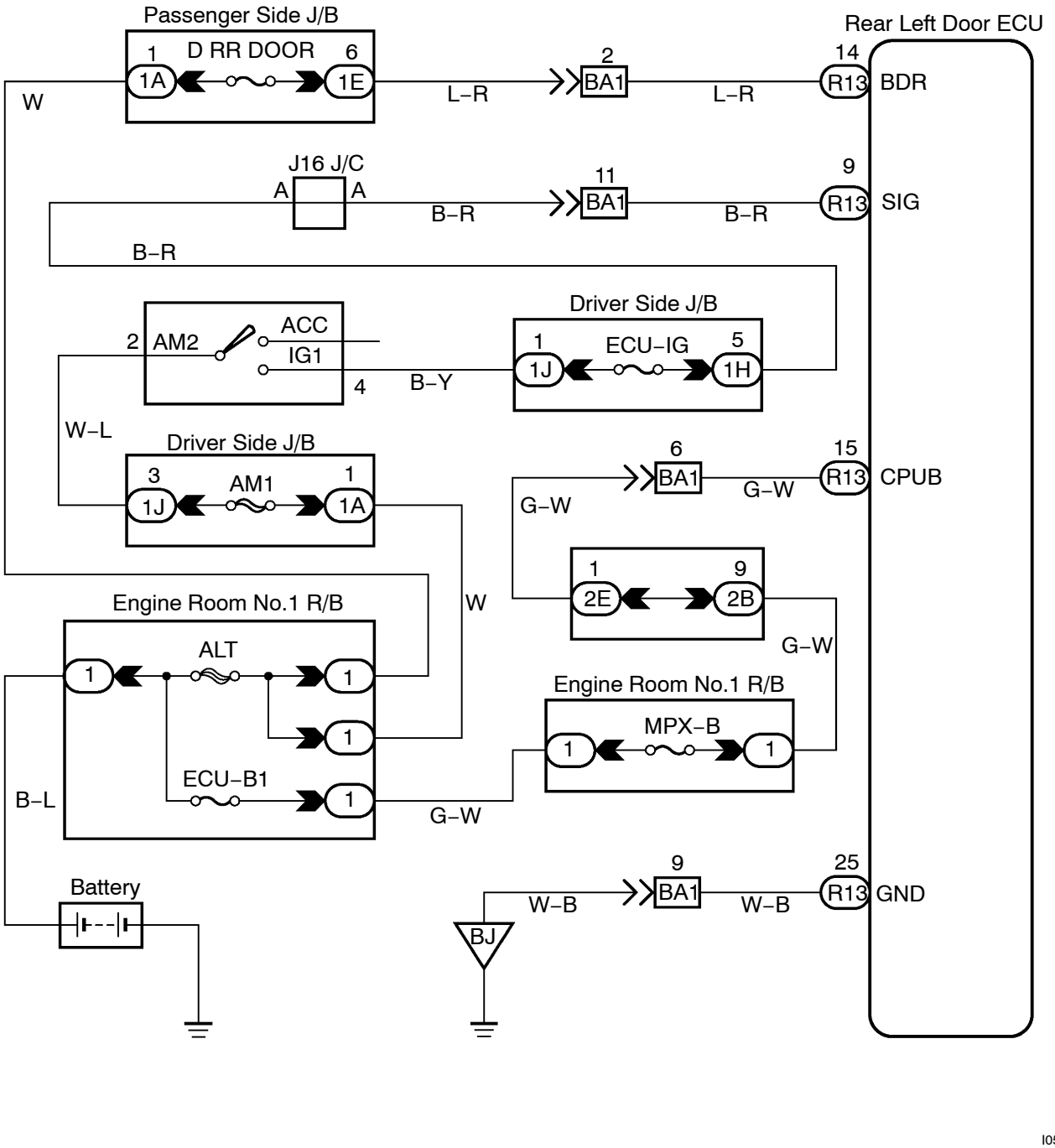
Power source circuit

CIRCUIT DESCRIPTION

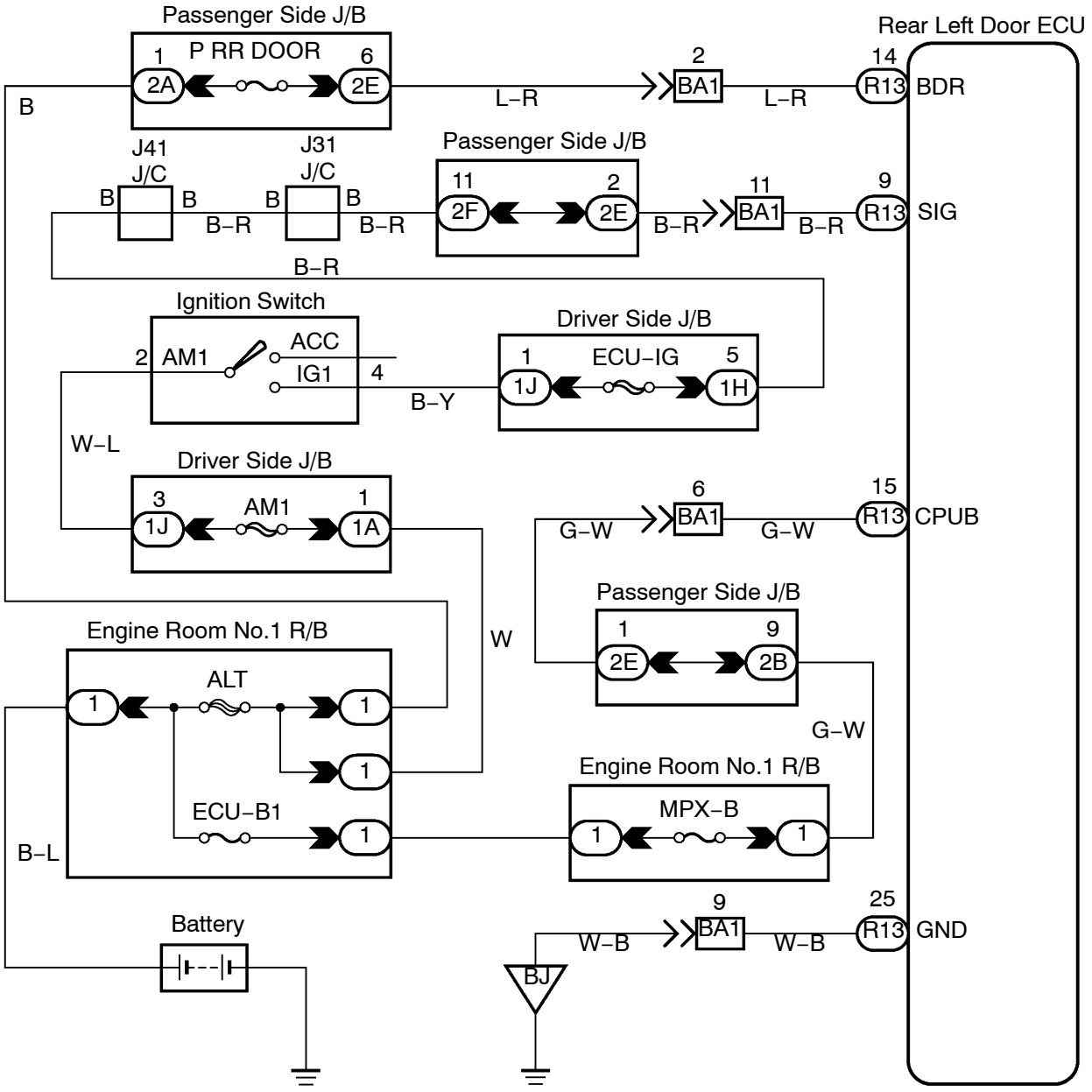
This circuit provides power to operate the rear left door ECU.

WIRING DIAGRAM

Rear Left (LHD)



Rear Left (RHD)



INSPECTION PROCEDURE

1	**Check MPXB, GAUGE and DOOR(RL) fuse.**

CHECK:
Check continuity of MPXB,GAUGE and DOOR(RL) fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals BDR,CPUB, SIG and GND of rear left door ECU connector.**

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals SIG, and GND.
OK:
Voltage: 10 – 14V
PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the rear left door ECU connector.
CHECK:
Measure voltage between terminals BDR, CPUB and GND.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–770).**

NG

3	**Check wireharness and connector between ECU and body ground.**

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

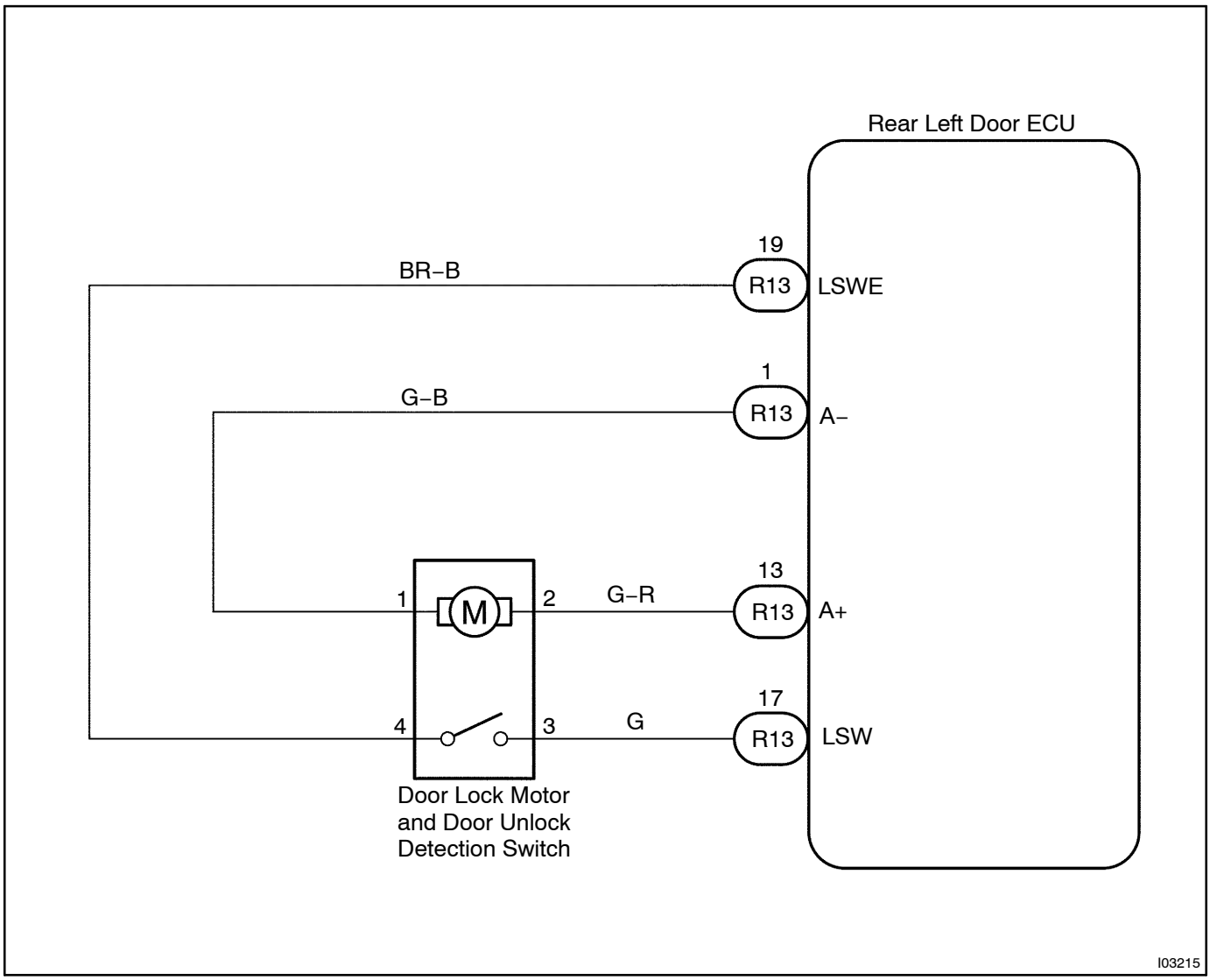
OK

Check and repair wireharness and connector between ECU and battery.

DI2FD-02

Door lock motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door lock motor. (See page BE–148)

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door lock motor and rear left door ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)

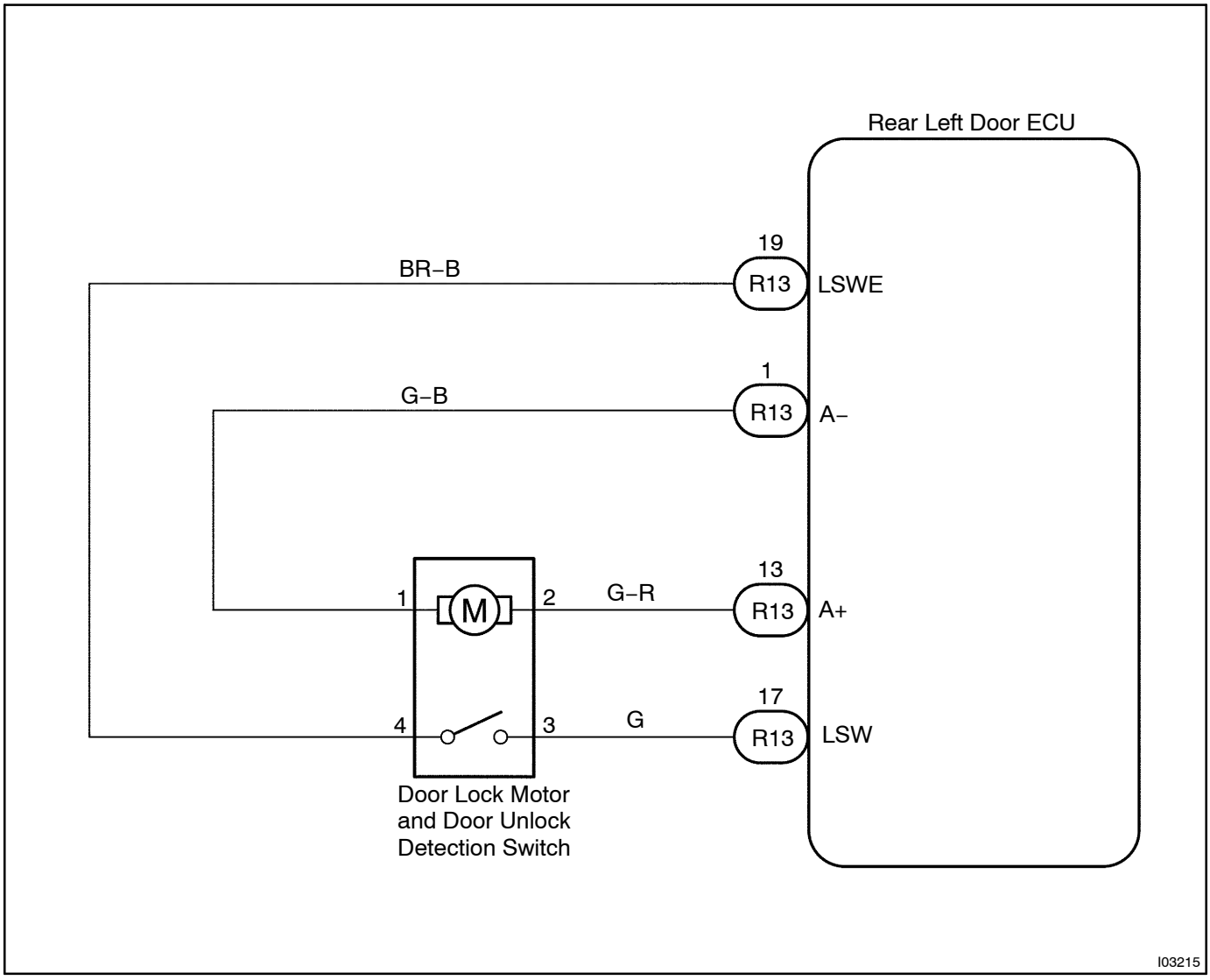
DI2FE–02

Door unlock detection switch

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



INSPECTION PROCEDURE

1	Check door unlock detection switch (See page BE–148).

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door unlock detection switch and rear left door ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problems symptoms table.
(See page DI–616)

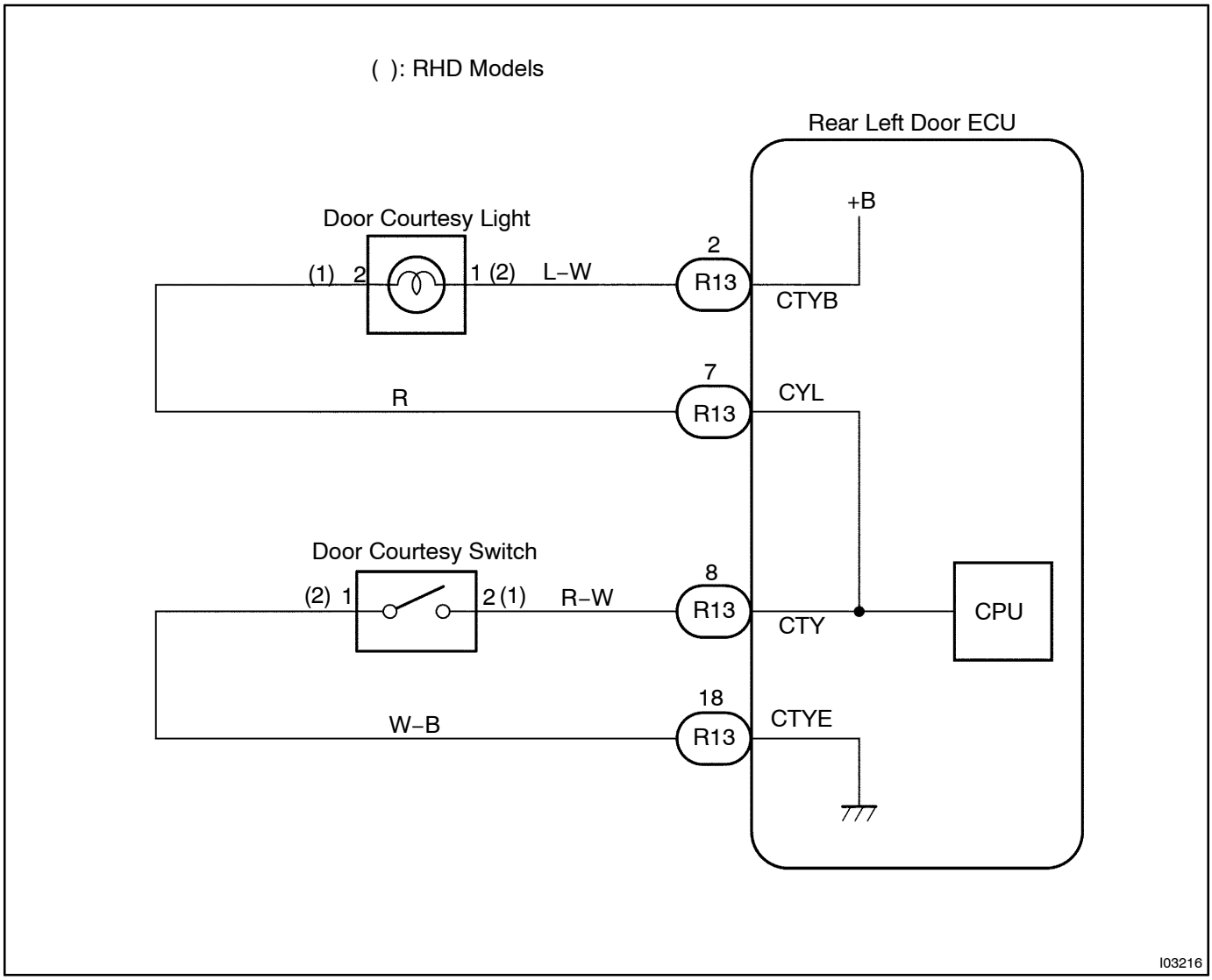
DI2FF–02

Door courtesy light and 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



INSPECTION PROCEDURE

1	**Check operation of door courtesy light.**

CHECK:
Check that door courtesy light comes on when door opened, and goes off when door is closed.
OK:
Must be operated normally.

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–616).**

NG

2	**Check courtesy light (See page BE–66).**

NG → **Replace the courtesy light.**

OK

3	**Check courtesy switch (See page BE–66).**

NG → **Replace the courtesy switch.**

OK

4	**Check wireharness and connector between courtesy light and rear left door ECU, courtesy switch and rear left door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

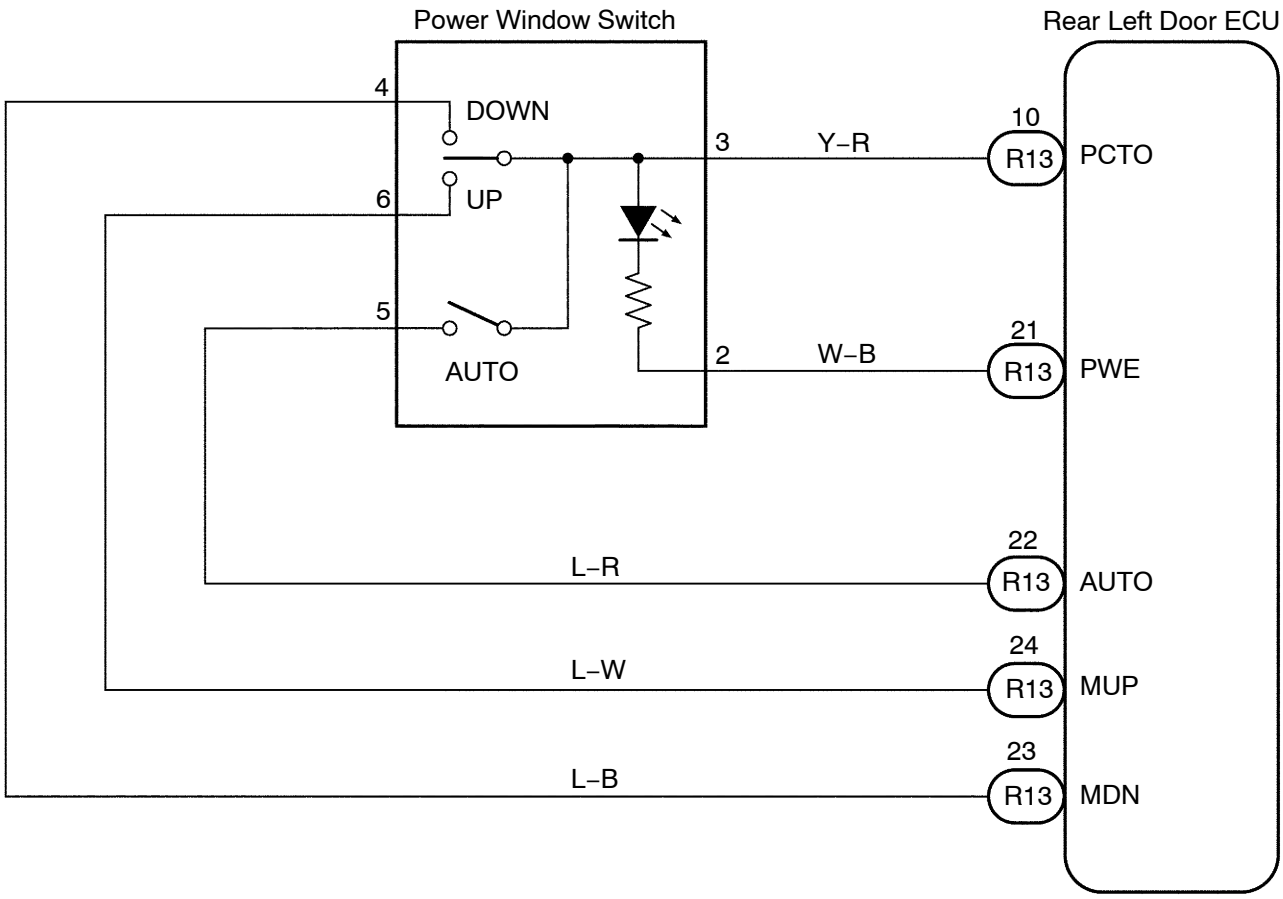
DI2FG–02

Power window switch circuit

CIRCUIT DESCRIPTION

Power window switch circuit can be checked using DTC check. (Refer to DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the power window switch circuit using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–770)

OK

2	Check the power window switch. (See page BE–134)

NG → Replace the power window switch.

OK

3	Check wireharness and connector between power window switch and rear left door ECU.

NG → Repair or replace wireharness or connector.

OK

4	Check wireharness and connector between power window switch and power window master switch.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–770)

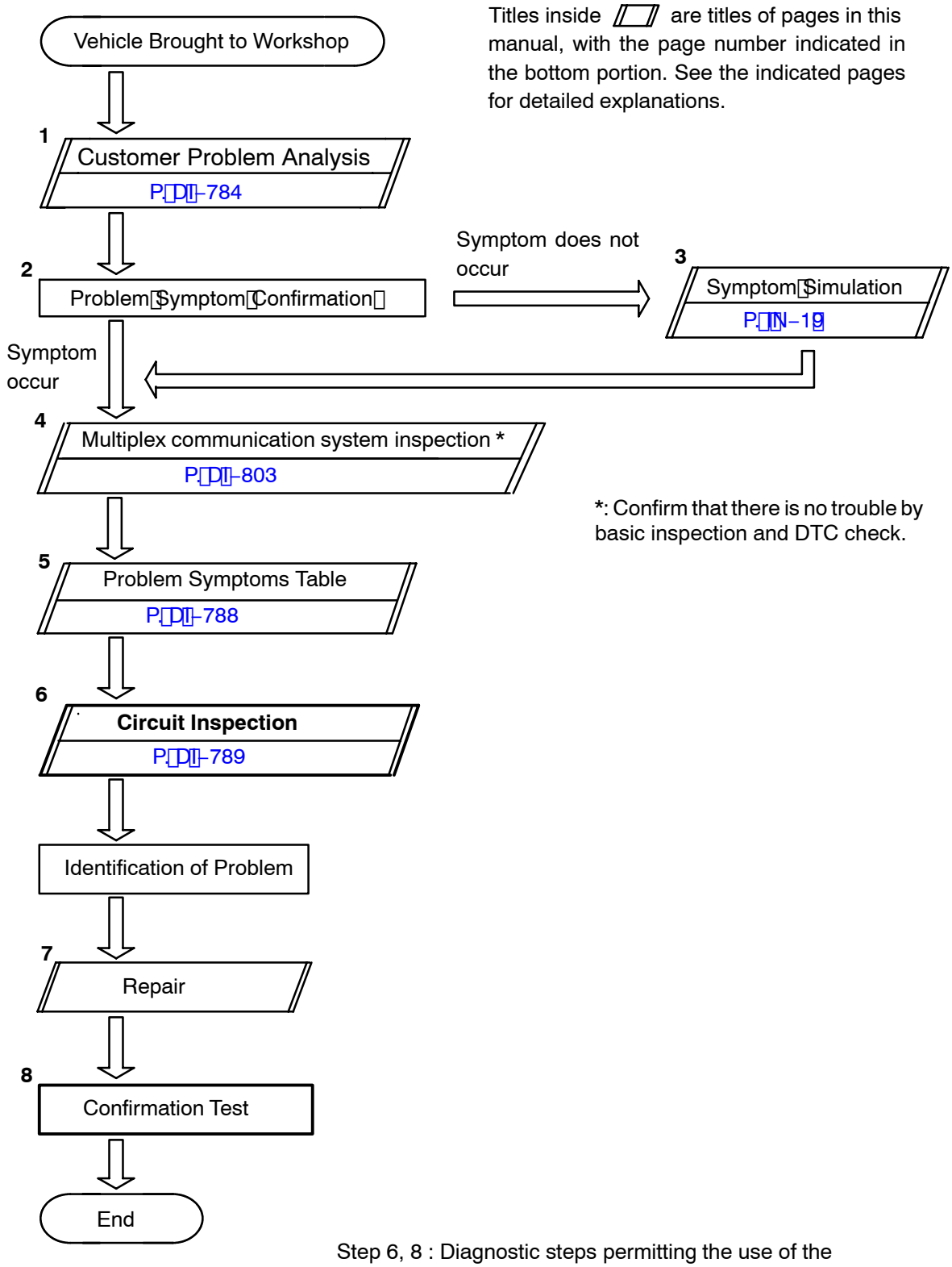
REAR RIGHT DOOR CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI2FO–02

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 troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI2FQ–02

CUSTOMER PROBLEM ANALYSIS CHECK

REAR RIGHT DOOR CONTROL SYSTEM Check Sheet

Inspector's name: _____

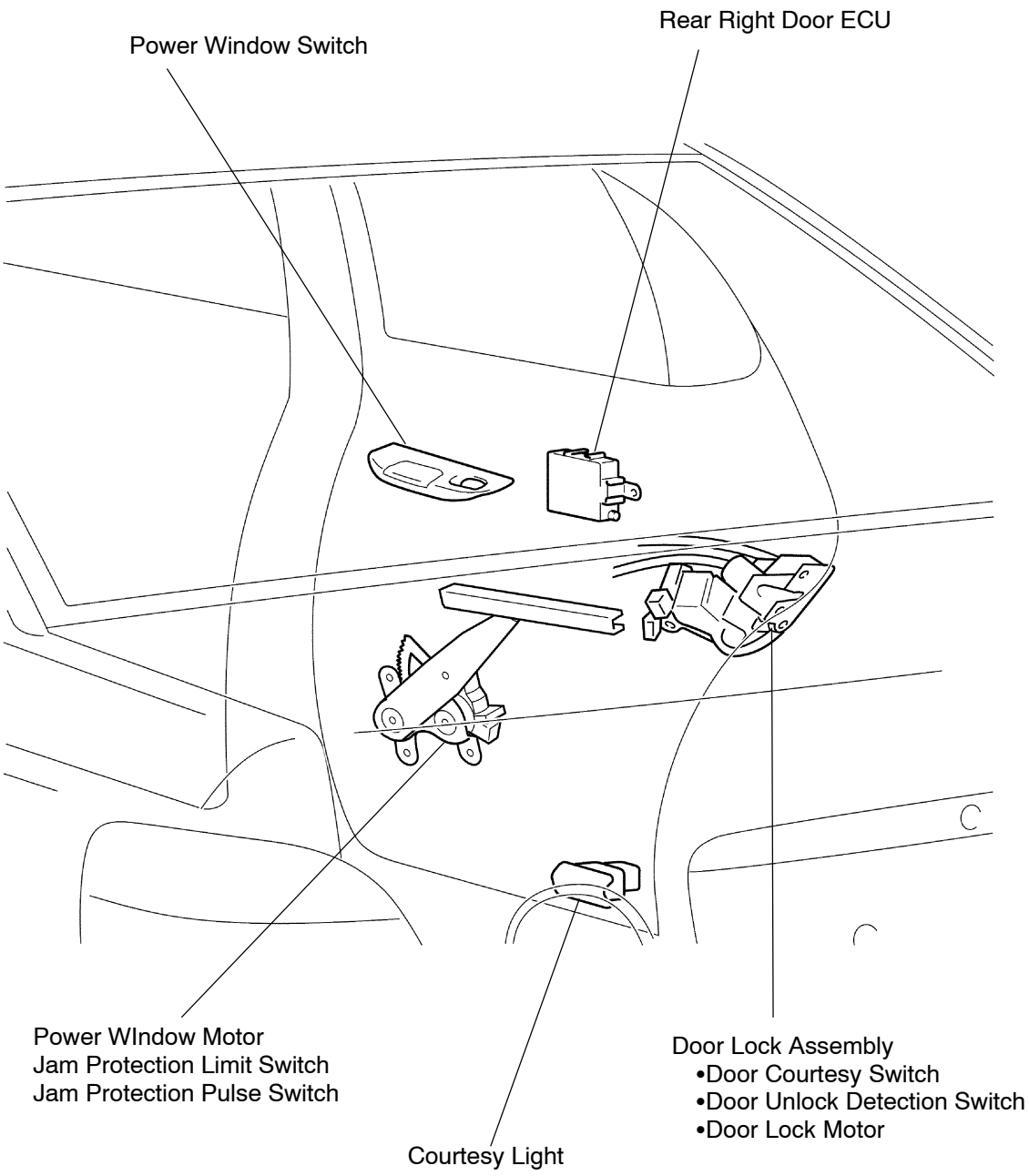
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Theft Deterrent System
	☐ Jam Protection System
	☐ Others

DI2EU–02

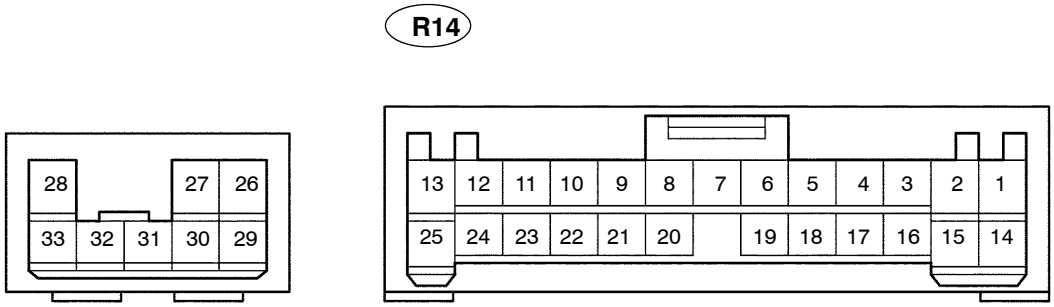
PARTS LOCATION



DI2FR–02

TERMINALS OF ECU

REAR RIGHT DOOR ECU



I03226

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
CPUB ↔ GND (R14–15 ↔ R14–25	G–W ↔ W–B	Constant		10 – 14 V
BDR ↔ GND (R14–14 ↔ R14–25)	L–R ↔ W–B	Constant		10 – 14 V
SIG ↔ GND (R14–9 ↔ R14–25)	B–R ↔ W–B	Constant		10 – 14 V
CTYB ↔ GND (R14–2 ↔ R14–25)	L–W ↔ W–B	Constant		10 – 14 V
GND ↔ Body Ground (R14–25 ↔ Body Ground)	W–B ↔ Body Ground	Constant		Below 1 V
CTY ↔ GND (R14–8 ↔ R14–25)	R–Y ↔ W–B	Rear right door closed.		10 – 14 V
		Rear right door opened.		Below 1 V
CYL ↔ GND (R14–7 ↔ R14–25)	R–W ↔ W–B	Constant		10 – 14 V
AUTO ↔ GND (R14–22 ↔ R14–25)	L–R ↔ W–B	Auto down switch position is OFF.		Below 1 V
		Ignition switch position is ON. Auto down switch position is ON.		10 – 14 V
MUP ↔ GND (R14–24 ↔ R14–25)	L–W ↔ W–B	Ignition switch position is ON. Power window switch position	OFF	Below 1 V
			UP	10 – 14 V
MDN ↔ GND (R14–23 ↔ R14–25)	L–B ↔ W–B	Ignition switch position is ON. Power window switch position	OFF	Below 1 V
			Down	10 – 14 V
UP ↔ GND (R14–28 ↔ R14–25)	R ↔ W–B	Power window (FrRH) is not operating.		Below 1 V
		Power window (FrRH) is operating upward.		10 – 14 V
DN ↔ GND (R14–26 ↔ R14–25)	G ↔ W–B	Power window (FrRH) is not operating.		Below 1 V
		Power window (FrRH) is operating downward.		10 – 14 V
A+ ↔ GND (R14–13 ↔ R14–25)	G–R ↔ W–B	Power door lock (FrRH) is not operating.		Below 1 V
		Power door lock (FrRH) is operating to unlock.		
		Power door lock (FrRH) is operating to lock.		10 – 14 V

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
A– ↔ GND (R14–1 ↔ R14–25)	G–B ↔ W–B	Power door lock (FrRH) is not operating.		Below 1 V
		Power door lock (FrRH) is operating to lock.		
		Power door lock (FrRH) is operating to unlock.		10 – 14 V
LMT ↔ GND (R14–27 ↔ R14–25)	B–W ↔ W–B	Window full–close position		10 – 14 V
		Except window full–close position		Below 1 V
PLS ↔ GND (R14–32 ↔ R14–25)	Y–B ↔ W–B	During the power window is operation.		Pulse Generation
		Power window is not operated.	SW ON	Below 1 V
			SW OFF	10 – 14 V
PCTI ↔ GND (R14–11 ↔ R14–25)	Y ↔ W–B	Window lock switch position*	UNLOCK	Below 1 V
			LOCK	10 –14 V
PCTO ↔ GND (R14–10 ↔ R14–25)	Y–R ↔ W–B	Window lock switch position*	UNLOCK	Below 1 V
			LOCK	10 – 14 V

*: Power window master switch

DI2FP–02

PROBLEM SYMPTOMS TABLE

- POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
Power window does not operate.	1. Power window switch circuit 2. Power window motor circuit 3. Rear right door ECU	DI–799 BE–134
Auto up (or down) function does not operate.	1. Power window switch circuit 2. Rear right door ECU	DI–799
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switcj circuit 3. Rear right door ECU	BE–134 BE–134

- OTHERS

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Rear right door ECU	DI–789

DI2T5–01

CIRCUIT INSPECTION

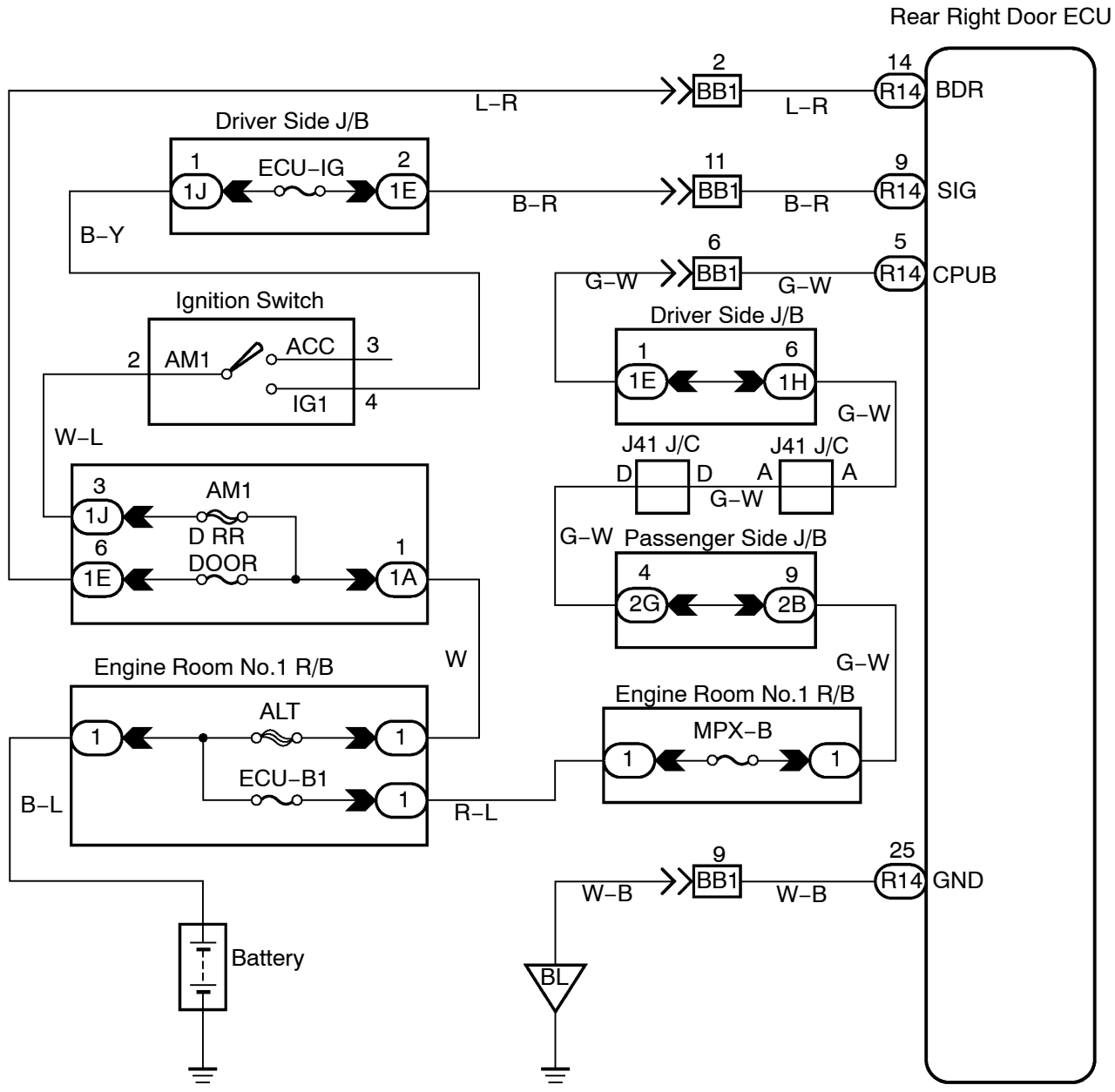
Power source circuit

CIRCUIT DESCRIPTION

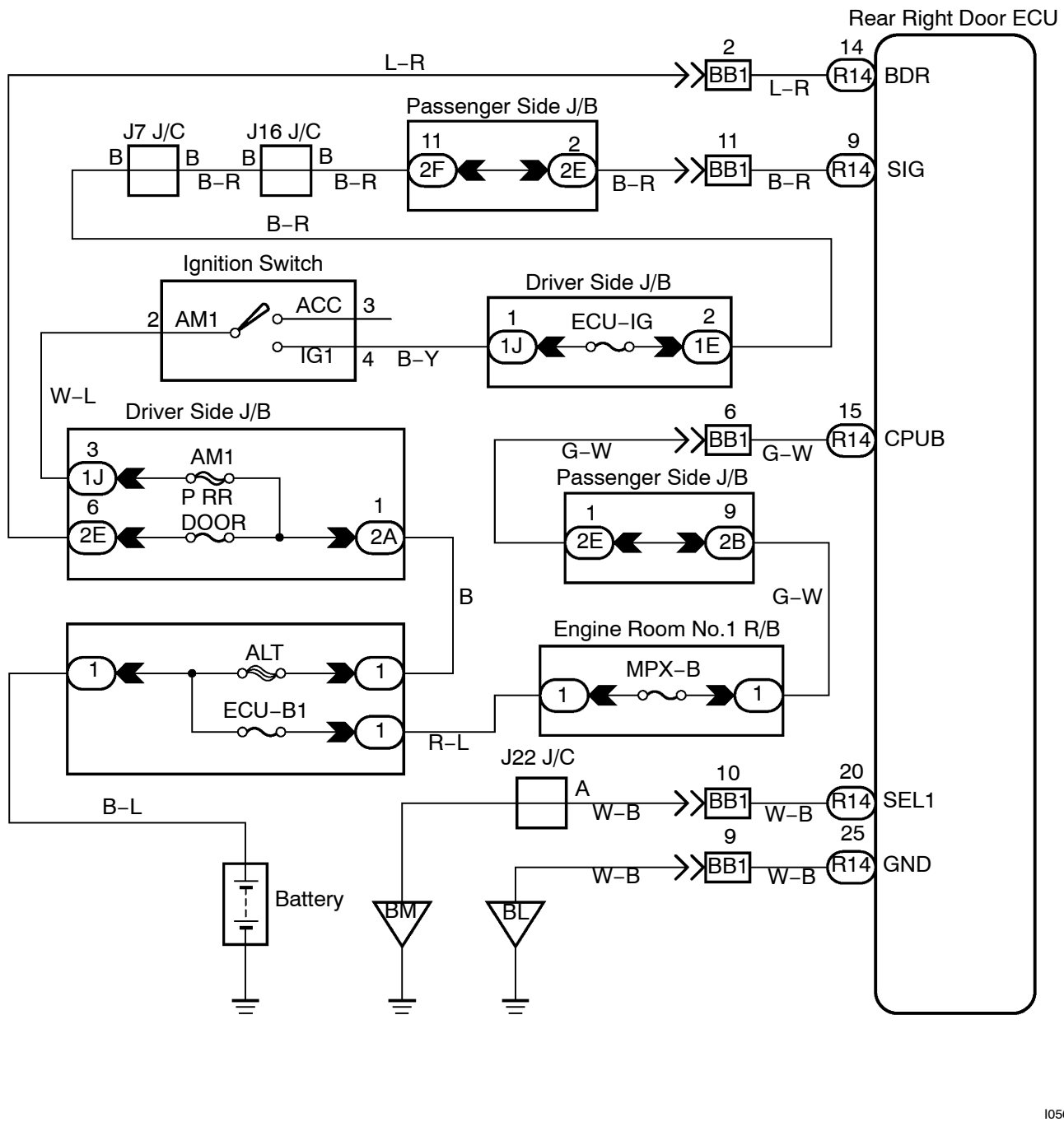
This circuit provides power to operate the rear right door ECU.

WIRING DIAGRAM

Rear Right (LHD)



Rear Right (RHD)



INSPECTION PROCEDURE

1	**Check MPXB, GAUGE and DOOR(RR) fuse.**

CHECK:
Check continuity of MPXB,GAUGE and DOOR(RR) fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals BDR,CPUB, SIG and GND of rear right door ECU connector.**

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals SIG, and GND.
OK:
Voltage: 10 – 14V
PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the rear right door ECU connector.
CHECK:
Measure voltage between terminals BDR, CPUB and GND.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–788).**

NG

3	**Check wireharness and connector between ECU and body ground.**

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

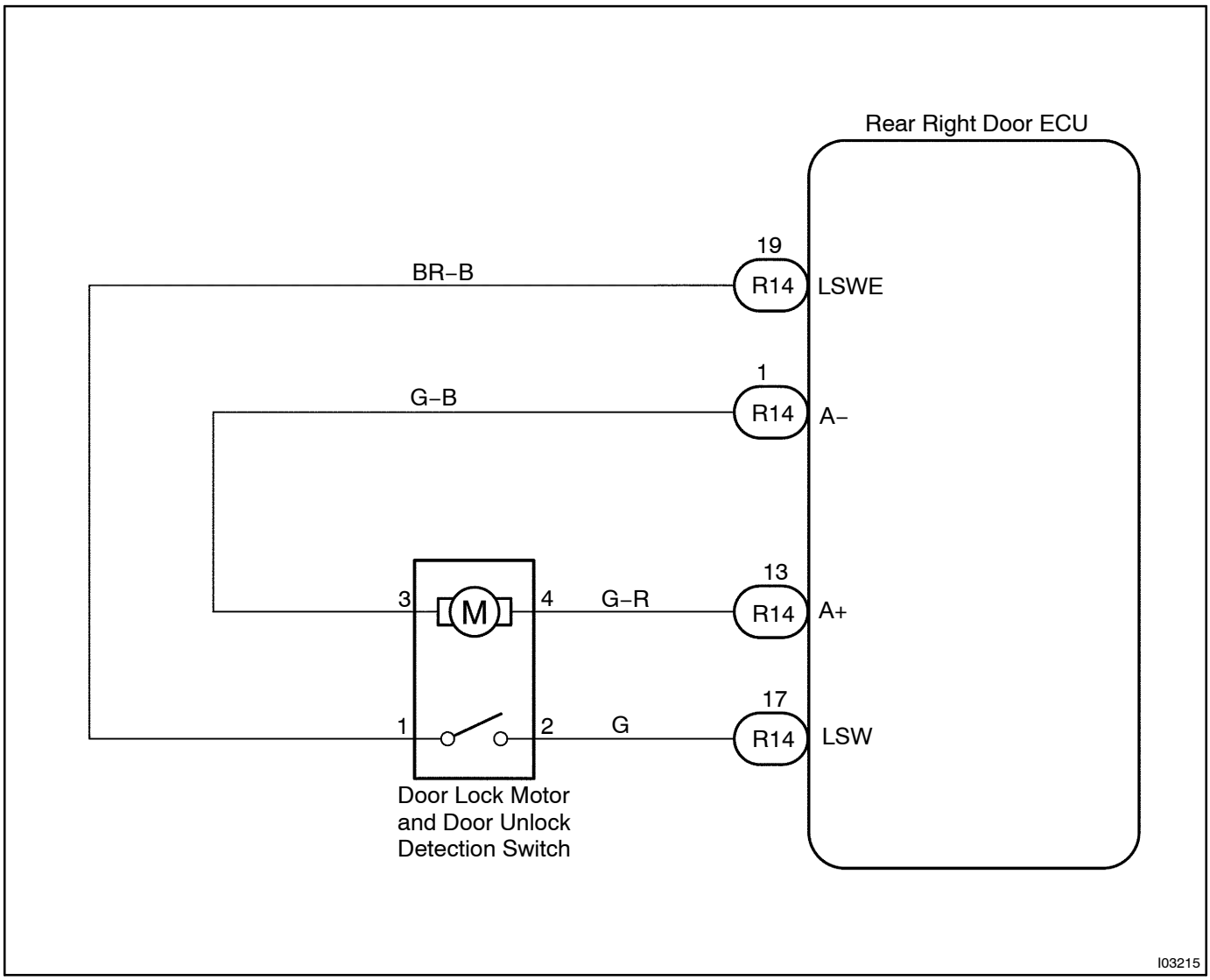
OK

Check and repair wireharness and connector between ECU and battery.

DI2FK–02

Door lock motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door lock motor. (See page BE–148)

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door lock motor and rear right door ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)

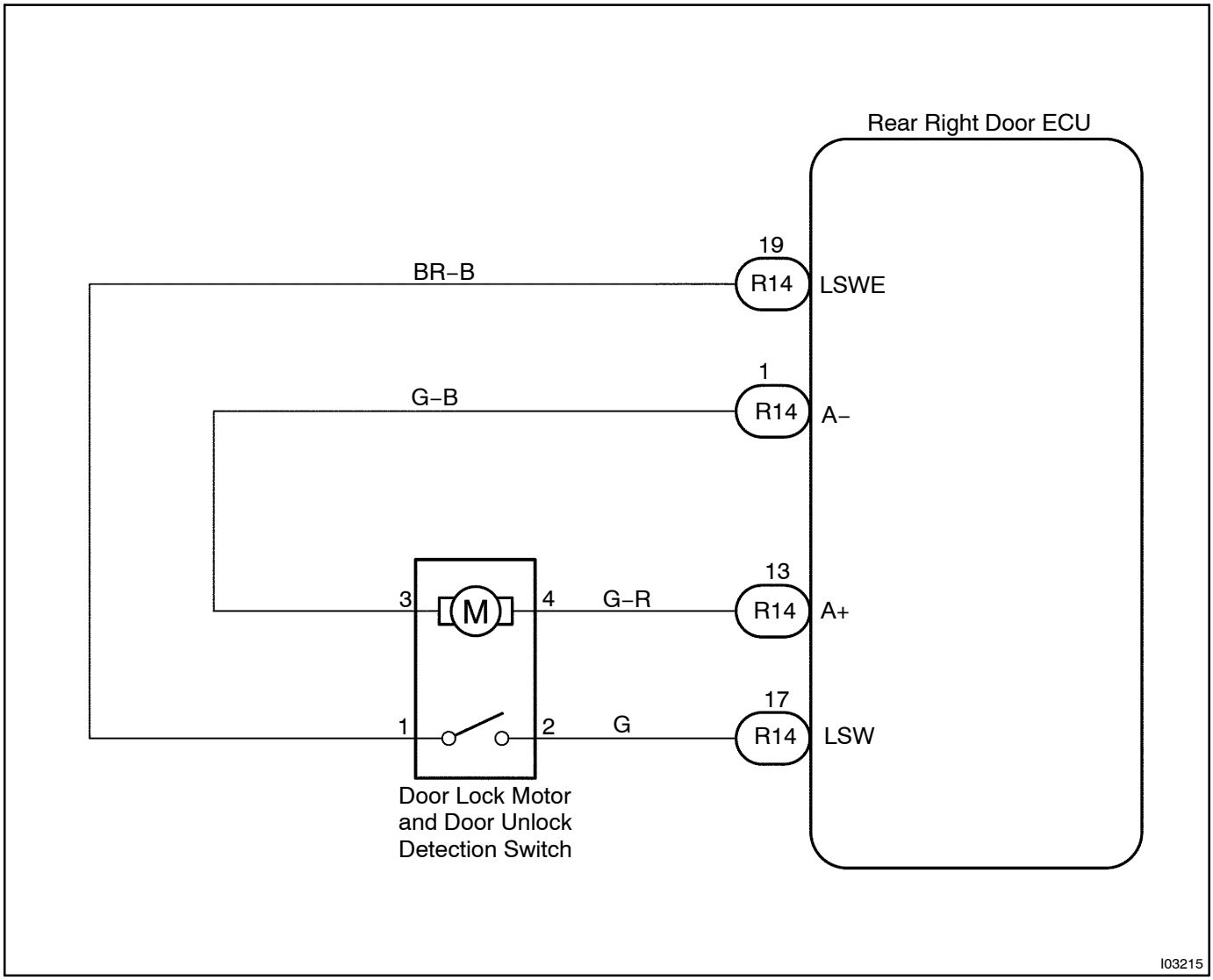
DI2FL–02

Door unlock detectin switch

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



INSPECTION PROCEDURE

1	Check door unlock detection switch. (See page BE–148)

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door unlock detection switch and rear right door ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–616)

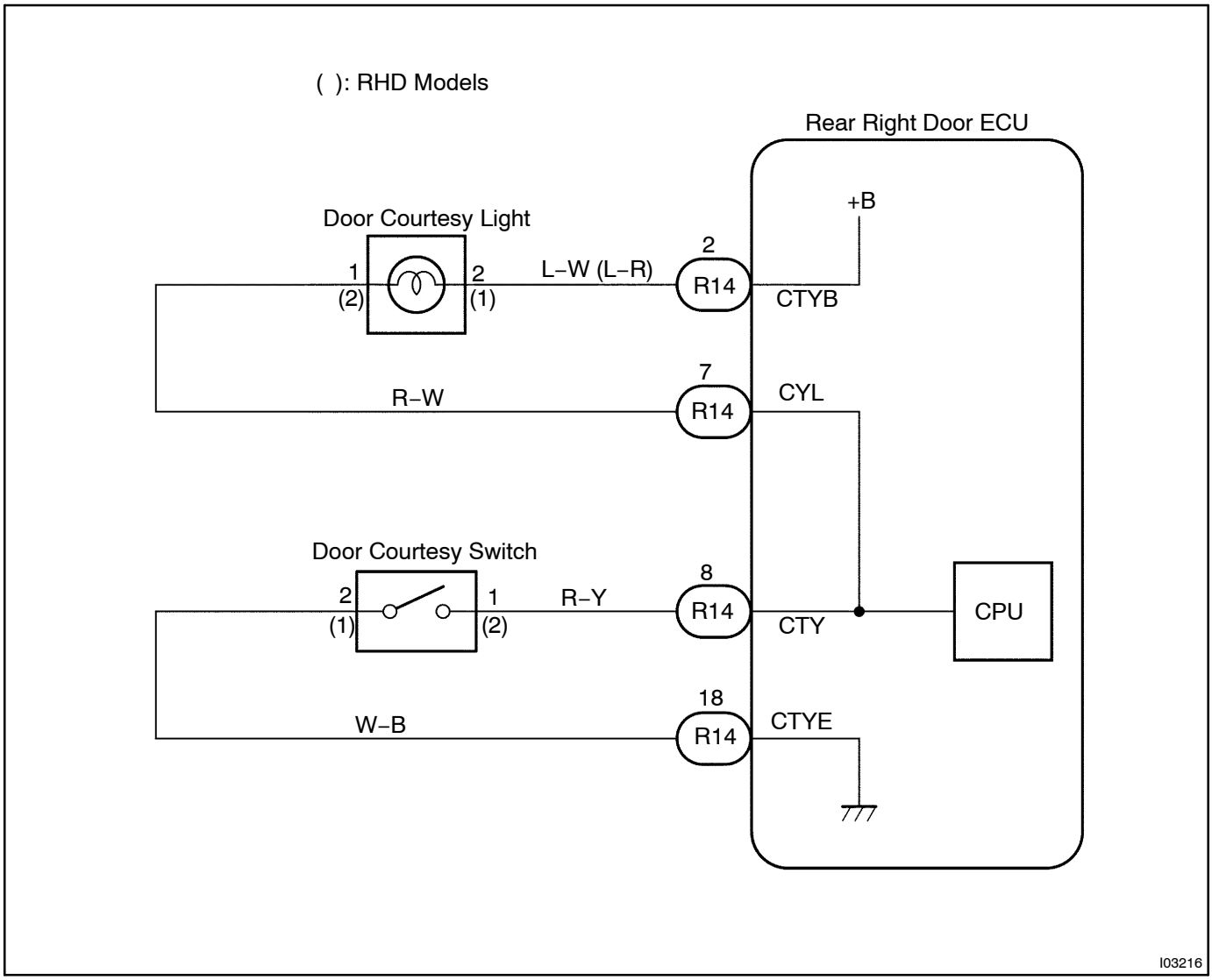
DI2FM–02

Door courtesy light and 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



INSPECTION PROCEDURE

1	**Check operation of door courtesy light.**

CHECK:
Check that door courtesy light comes on when door opened, and goes off when door is closed.
OK:
Must be operated normally.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)**

NG

2	**Check courtesy light. (See page BE–66)**

NG → **Replace the courtesy light.**

OK

3	**Check courtesy switch. (See page BE–66)**

NG → **Replace the courtesy switch.**

OK

4	**Check wireharness and connector between courtesy light and rear right door ECU, courtesy switch and rear right door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–616)

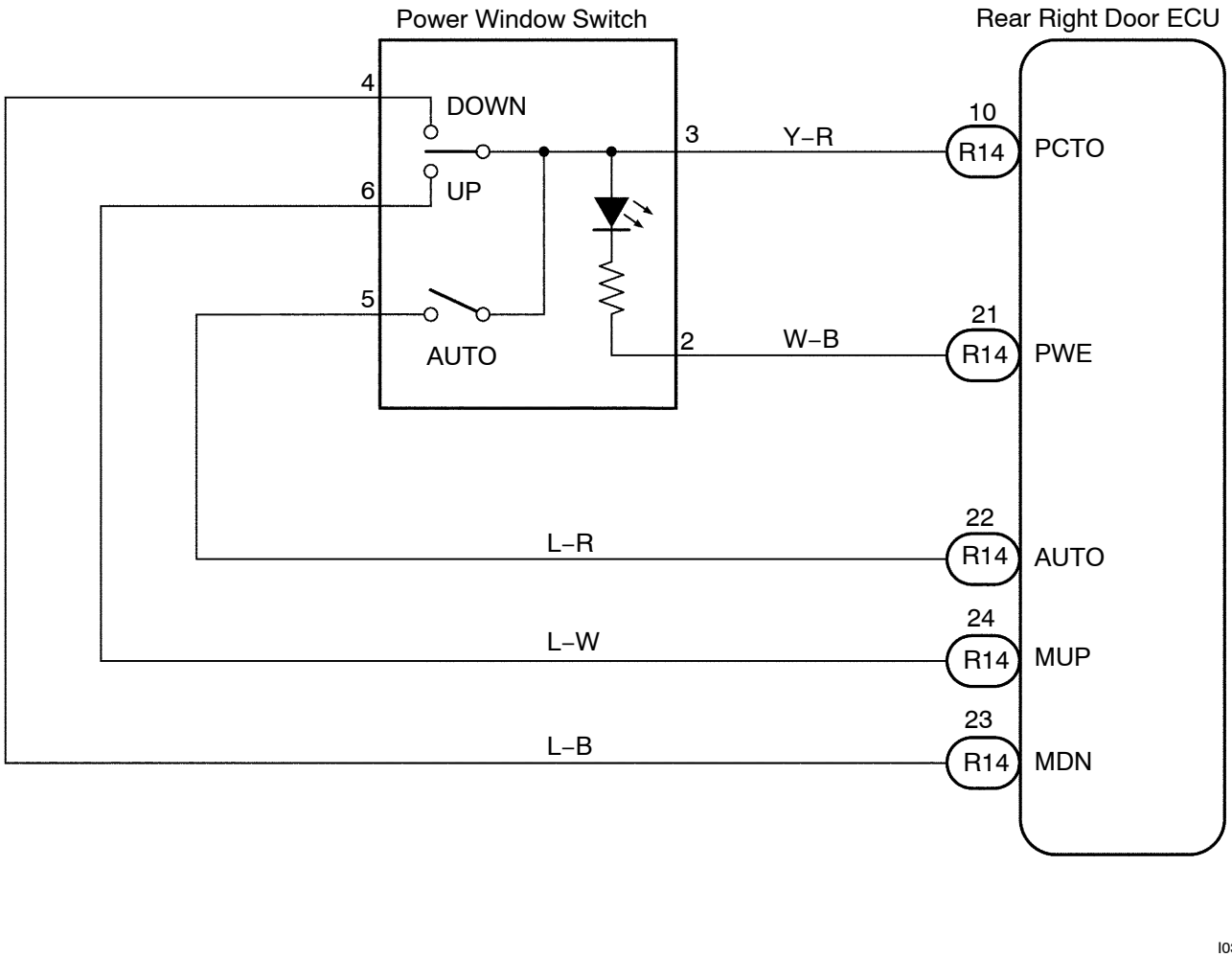
DI2FN–02

Power window switch circuit

CIRCUIT DESCRIPTION

Power window switch circuit can be checked using DTC check. (Refer to DI–836)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the power window switch circuit using DTC check. (See page DI–836)

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–788)

OK

2	Check the power window switch. (See page BE–134)

NG → Replace the power window switch.

OK

3	Check wireharness and connector between power window switch and rear right door ECU.

NG → Repair or replace wireharness or connector.

OK

4	Check wireharness and connector between power window switch and power window master switch.

NG → Repair or replace wireharness or connector.

OK

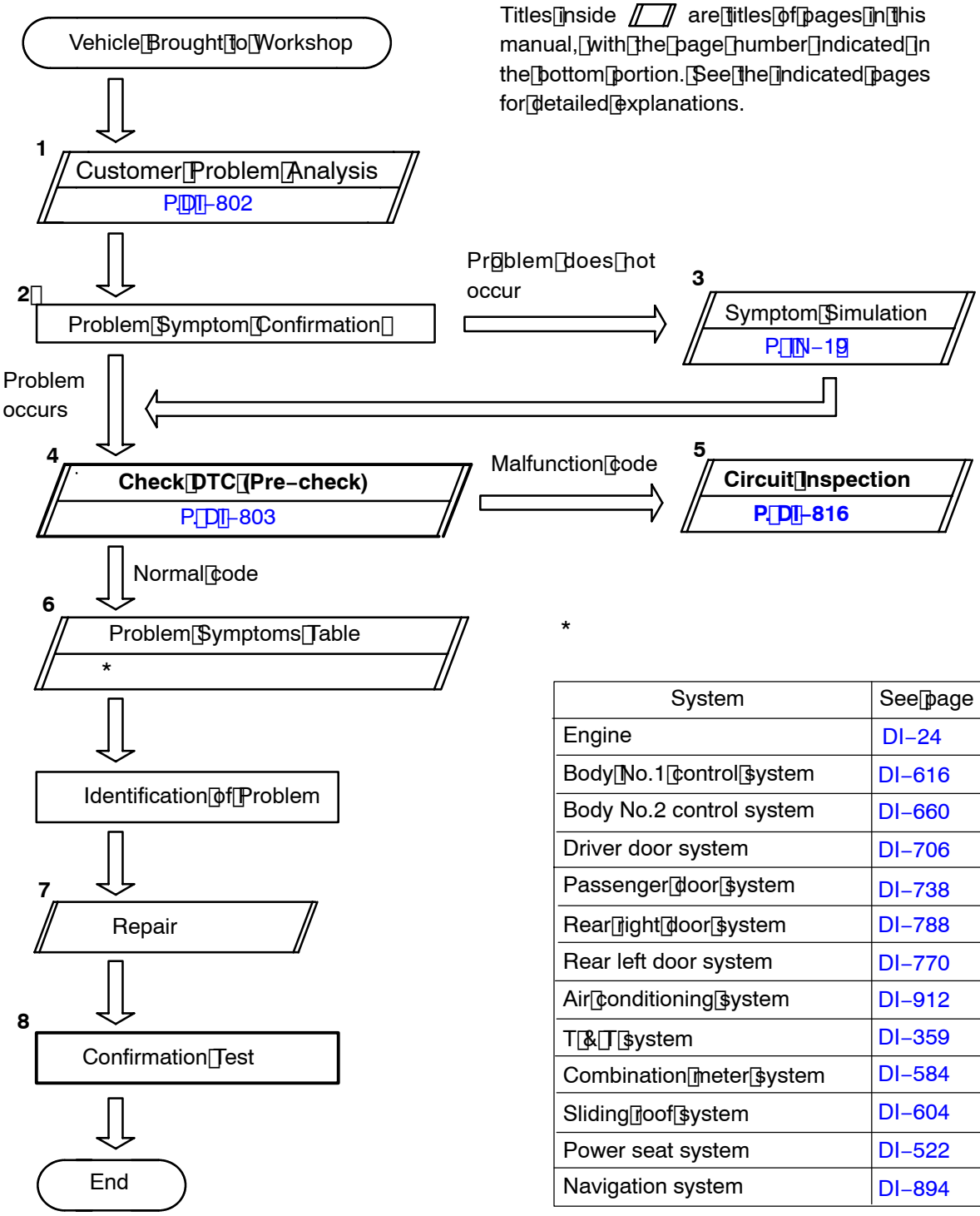
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–788)

MULTIPLEX COMMUNICATION SYSTEM

DI2AT–02

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–24
Body No.1 control system	DI–616
Body No.2 control system	DI–660
Driver door system	DI–706
Passenger door system	DI–738
Rear right door system	DI–788
Rear left door system	DI–770
Air conditioning system	DI–912
T&T system	DI–359
Combination meter system	DI–584
Sliding roof system	DI–604
Power seat system	DI–522
Navigation system	DI–894

Step 4, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI2AU–02

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))

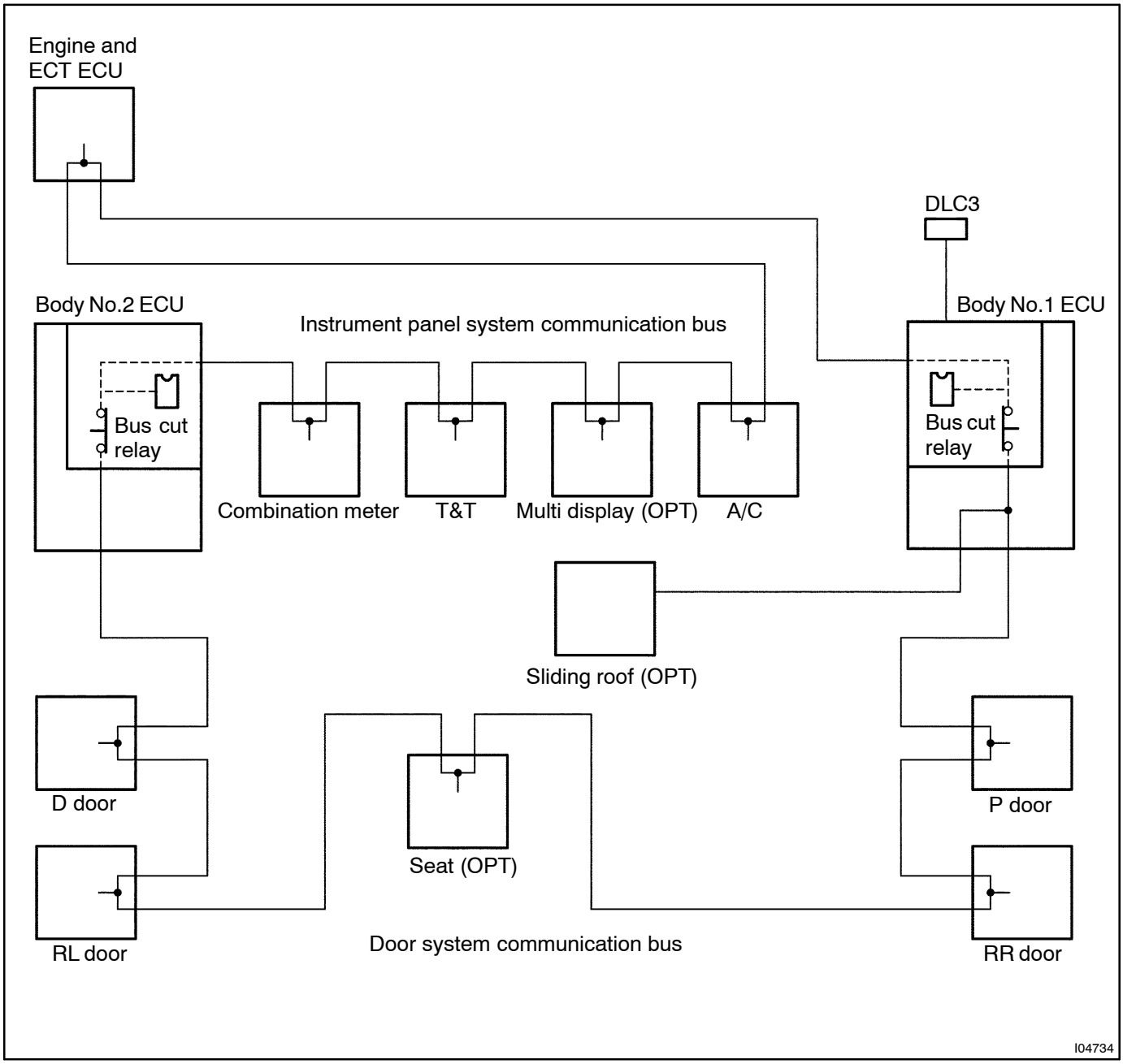
Malfunction System	☐ Engine
	☐ Body No.1 Control System
	☐ Body No.2 Control System
	☐ Driver Door System
	☐ Passenger Door System
	☐ Rear Right Door System
	☐ Rear Left Door System
	☐ Air Conditioning System
	☐ T & T System
	☐ Combination Meter System
	☐ Sliding Roof System
	☐ Power Seat System
	☐ Navigation System

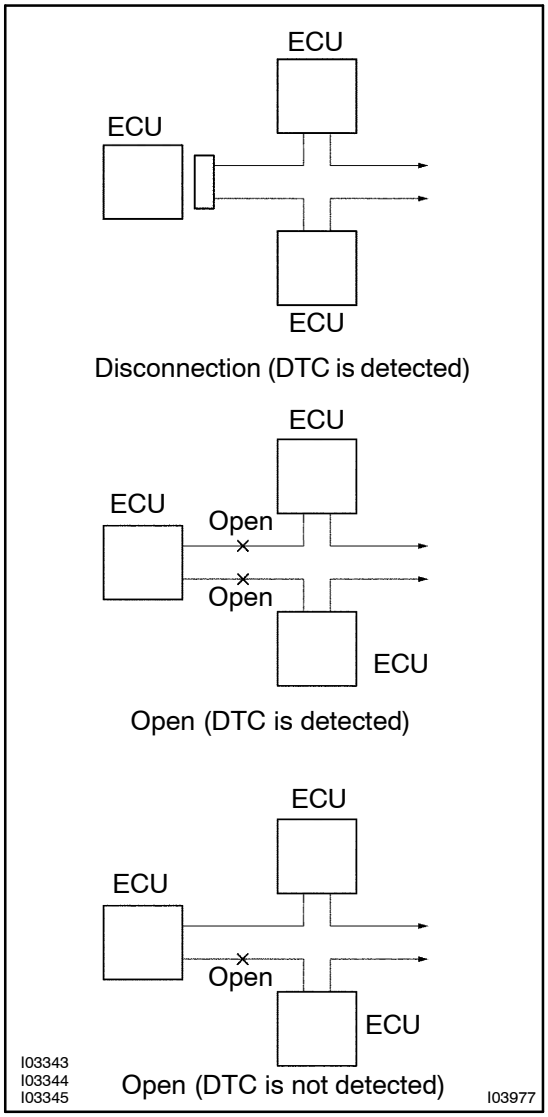
DI2AV–02

PRE–CHECK

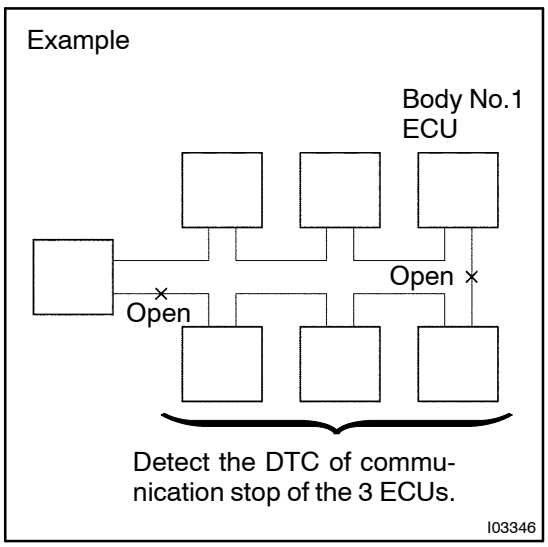
1. DIAGNOSIS SYSTEM

(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 No.1 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 No.1 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 No.1 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 No.1 ECU

1	**Check Body No.1 ECU operation.**

HINT:
With this inspection Body No.1 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 No.1 ECU). (See page BE–148)**

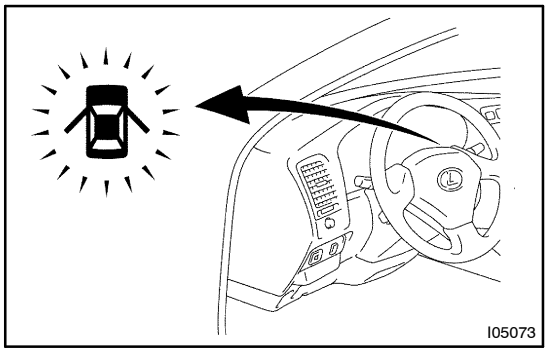
OK → **Replace the Body No.1 ECU.**

NG

Repair of replace malfunction part.

INSPECT OPEN DOOR INDICATOR LIGHT.

1	**Check open door indicator light.**

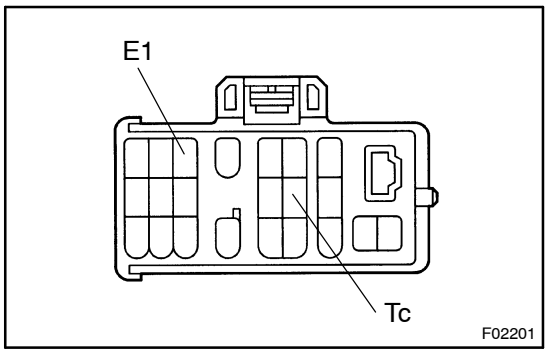


CHECK:
Check if open door Indicator light is turned on when either door open.
HINT:
If open door Indicator light is not turned on, DTC will not be output.

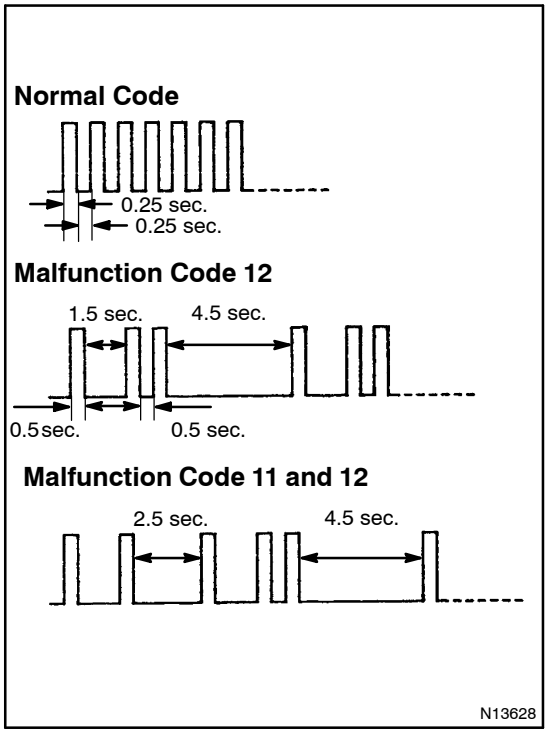
OK → **Go to step 3. "DTC CHECK".**

NG

Repair the open door indicator light.
(See page BE–105)



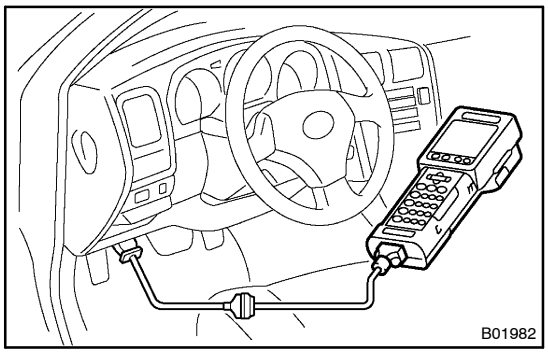
3. DTC CHECK (Using diagnosis check wire)
(a) Using SST, connect terminals Tc and E1 of DLC1.
SST 09843–18020
(b) Turn the ignition switch ON.
(c) Read the DTC on the open door indicator light.



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–808 to confirm the details of the DTCs.

5. DTC CLEARANCE

DTC will be cleared when the troble output to DTC is recovered normally.

DI2AW–02

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–816)	Driver door ECU communication stop	• Wireharness • Driver door ECU
B1212/12 (DI–818)	Front passenger door ECU communication stop	• Wireharness • Passenger door ECU
B1213/13 (DI–820)	Tilt and telescopic ECU communication stop	• Wireharness • Tilt and telescopic ECU
B1214/14 (DI–823)	Door system communication bus malfunction (+B short)	• Wireharness • ECU (Door system bus)
B1215/15 (DI–823)	Door system communication bus malfunction (GND short)	
B1216/16 (DI–830)	Rear right door ECU communication stop	• Wireharness • Rear right door ECU
B1217/17 (DI–832)	Rear left door ECU communication stop	• Wireharness • Rear left door ECU
B1218/18 (DI–834)	Body No.2 ECU communication stop	• Wireharness • Body No.2 ECU
B1221/21 (DI–836)	Power window switch circuit on driver door	• Power window master switch • Wireharness
B1222/22 (DI–836)	Door lock switch circuit on driver door	• Door lock control switch • Door key lock and unlock switch • Wireharness
B1223/23 (DI–836)	Power window switch circuit on passenger door	• Power window switch • Wireharness
B1224/24 (DI–836)	Door lock switch circuit on passenger door	• Door lock control switch • Door key lock and unlock switch • Wireharness
B1225/25 (DI–836)	Power window switch circuit on rear right door	• Power window switch • Wireharness
B1226/26 (DI–836)	Power window switch circuit on rear left door	• Power window switch • Wireharness
B1231/31 (DI–838)	Jam protection limit switch circuit on driver door	• Power window motor • Wireharness
B1232/32 (DI–839)	Jam protection pulse switch circuit on driver door	
B1233/33 (DI–838)	Jam protection limit switch circuit on passenger door	• Power window motor • Wireharness
B1234/34 (DI–839)	Jam protection pulse switch circuit on passenger door	
B1235/35 (DI–838)	Jam protection limit switch circuit on rear right door	• Power window motor • Wireharness
B1236/36 (DI–839)	Jam protection pulse switch circuit on rear right door	
B1237/37 (DI–838)	Jam protection limit switch circuit on rear left door	• Power window motor • Wireharness
B1238/38 (DI–839)	Jam protection pulse switch circuit on rear left door	

B1241/41 (DI–836)	Body No.1 ECU switch circuit diagnosis	• Luggage compartment door opener switch • Luggage compartment door key lock and unlock switch • Wireharness
B1242/42 (DI–840)	Wireless door lock tuner circuit malfunction	• Wireharness • Wireless door lock tuner
B1243/43 (DI–842)	GSW terminal circuit malfunction	• Wireharness • Body No.1 ECU
B1244/44 (DI–845)	Light sensor circuit malfunction	• Light sensor • Wireharness
B1252/52 (DI–836)	Body No.2 ECU switch circuit diagnosis	• Stop light switch • Wireharness
B1253/53 B1254/54 (DI–842)	Body No.2 ECU GSW terminal malfunction (Lo unusual)	• Wireharness • Airbag sensor assembly • Body No.2 ECU
	Body No.2 ECU GSW terminal malfunction (Hi unusual)	
B1255/55 (DI–847)	Body No.2 ECU P1 switch malfunction	• P1 switch • Wireharness
B1261/61 (DI–849)	Engine and ECT ECU communication stop	• Wireharness • Engine and ECT ECU
B1262/62 (DI–851)	A/C ECU communication stop	• Wireharness • A/C ECU
B1266/66 B1267/67 (DI–853)	Instrument panel system communication bus malfunction (+B short)	• Wireharness • ECU (Instrument panel system bus)
	Instrument panel system communication bus malfunction (GND short)	
B1271/71 (DI–861)	Combination meter ECU communication stop	• Wireharness • Combination meter ECU
B1272/72 (DI–863)	Power seat ECU communication stop (w/ Seat memory vehicle only)	• Wireharness • Power seat ECU
B1273/73 (DI–865)	Sliding roof ECU communication stop (w/ Sliding roof vehicle only)	• Wireharness • Sliding roof ECU
B1275/75	Accessory bus buffer communication stop	• Wireharness • Accessory

HINT:

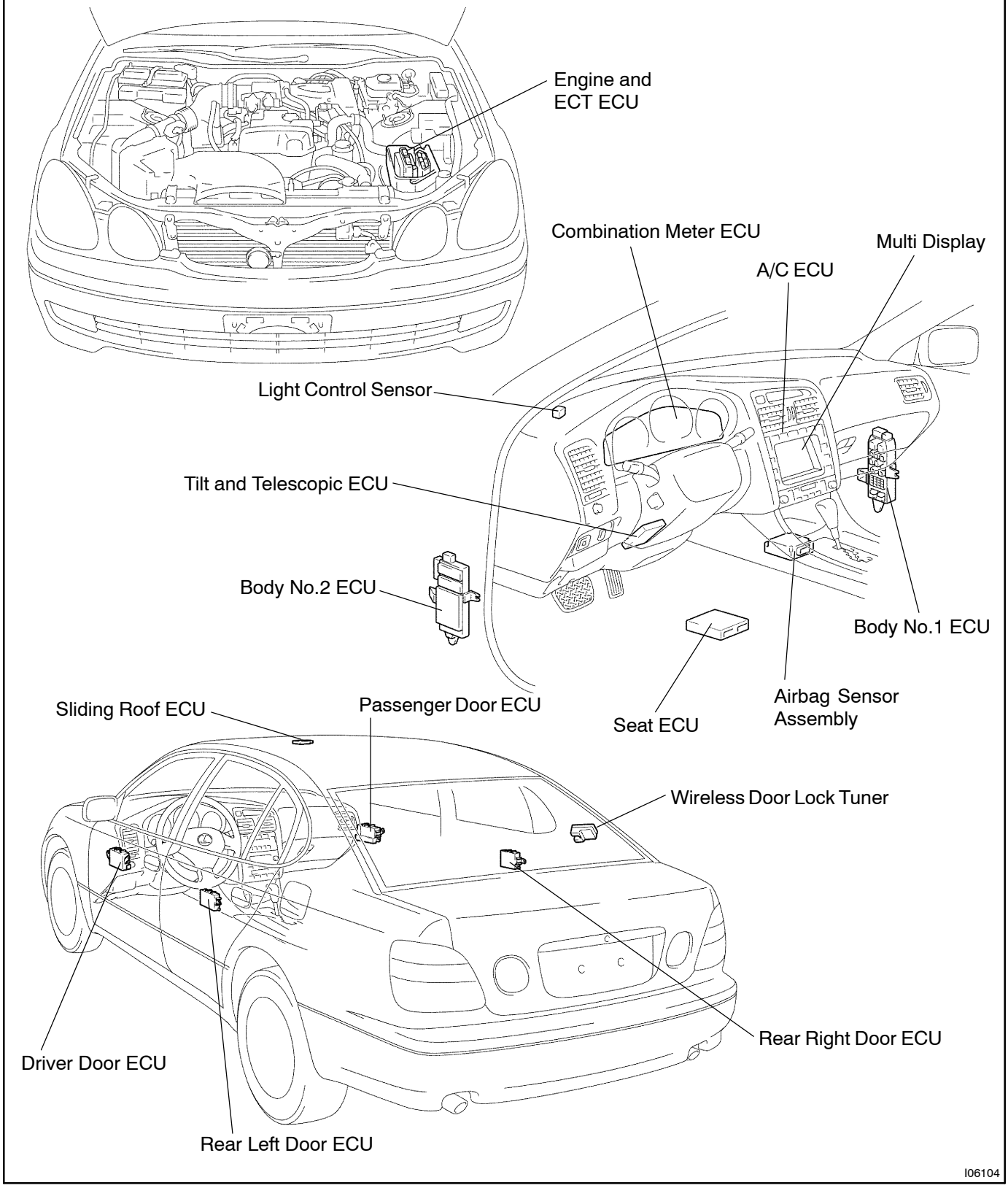
- DTC 66, 67 and 71 are not output through open door warning light on meter because of system itself.
- DTC 21~26, 41 and 52 don't mean switch abnormal but notify how switch works.
  If DTC is not output when operating switch, it means failure of switch contact.
  If DTC is output when not opening switch, it means stick of switch.
- When some of the DTC 14, 15, 66, 67 is output, the DTC of other ECU communication stop is also output. In this case, please repair DTC 14, 15, 66, 67 first. The following shows DTCs which are output when +B or GND short occurs on communication bus.

	Door system communication bus	Instrument panel system communication bus
GND short	After 10 seconds from detecting fail, Instrument panel system communication bus is able to communicate by bus cut function.	After 10 seconds from detecting fail, Door system communication bus is able to communicate by bus cut function.
Communication possible ECU after bus is cut	Body No.1 ECU, Body No.2 ECU, A/C ECU, Multi display, Tilt and telescopic ECU, Combination Meter ECU, Engine and ECT ECU	Driver door ECU, Passenger door ECU, Rear right door ECU, Rear left door ECU, Power seat ECU, Sliding roof ECU, Accessory bus buffer.
DTC(B12XX) ( ): Option	11, 12, 15, 16, 17, (72), (73), (75)	11, 12, 13, 16, 17, 18, 61, 62, 67, 71, (72), (73), (75) *
+B short	(Same as GND short)	(Same as GND short)
Communication possible ECU after bus is cut	(Same as GND short)	(Same as GND short)
DTC(B12XX) ( ): Option	11, 12, 14, 16, 17, (72), (73), (75)	11, 12, 13, 16, 17, 18, 61, 62, 66, 71, (72), (73), (75) *

*: Body No.1 ECU and Door system communication bus are cut off by bus cut relay, so it detects communication stop of ECU connected to Door system communication bus.

DI2AX–02

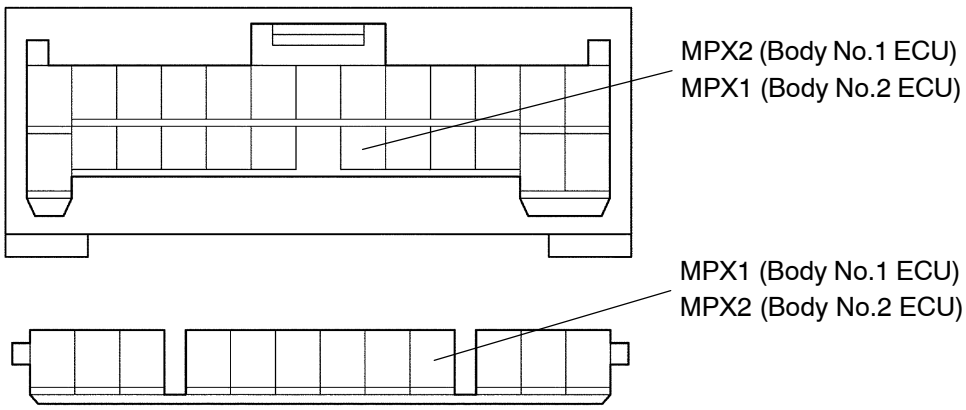
PARTS LOCATION



DI2AY–02

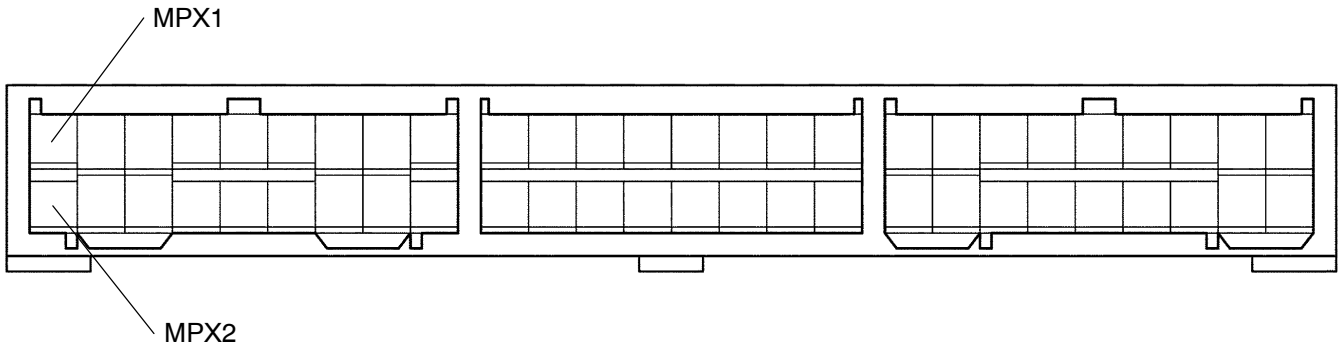
TERMINALS OF ECU

BODY NO.1 ECU AND BODY NO.2 ECU



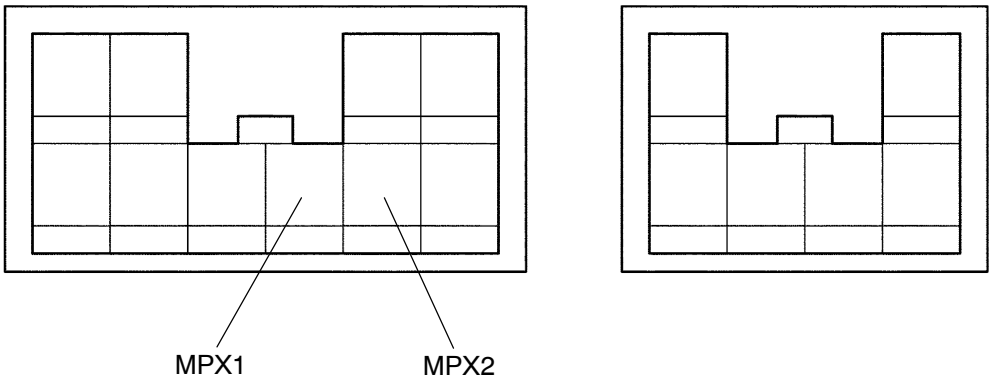
I04354

DRIVER DOOR ECU AND PASSENGER DOOR ECU



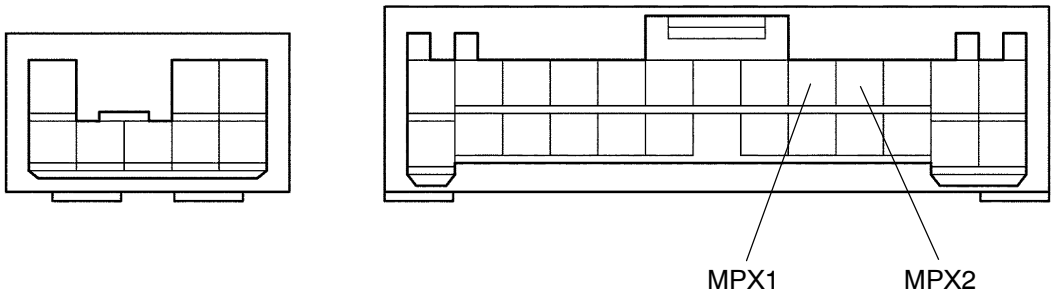
I03225

TILT AND TELESCOPIC ECU



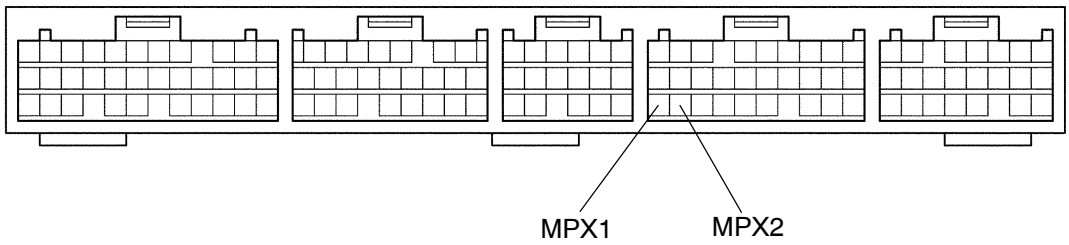
I04355

REAR RIGHT DOOR ECU AND REAR LEFT DOOR ECU



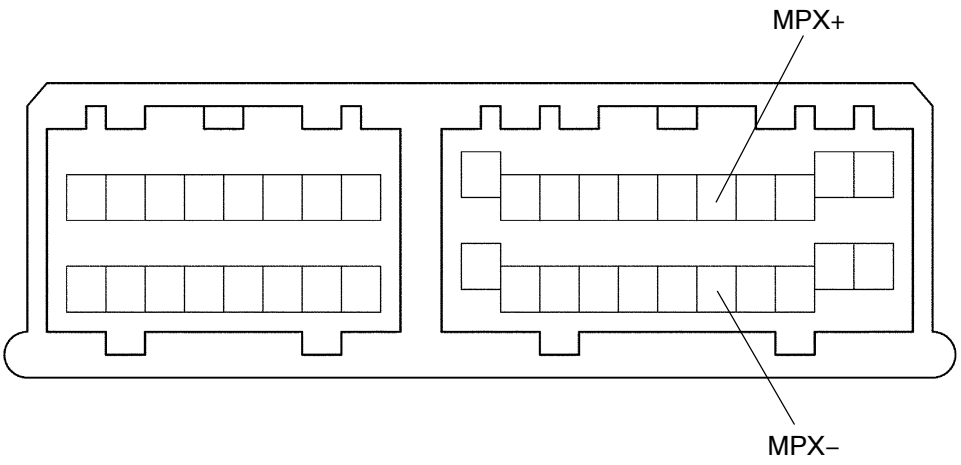
I03226

ECM



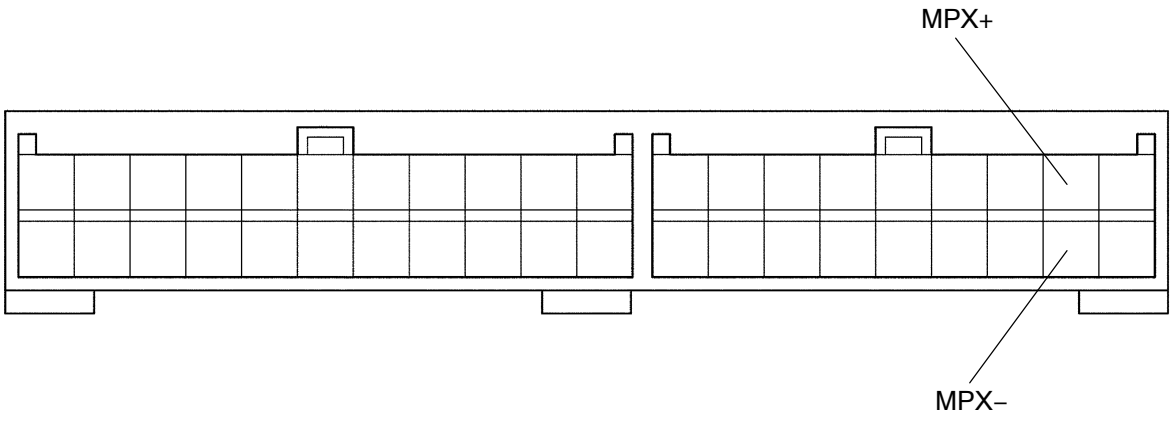
I06601

A/C ECU



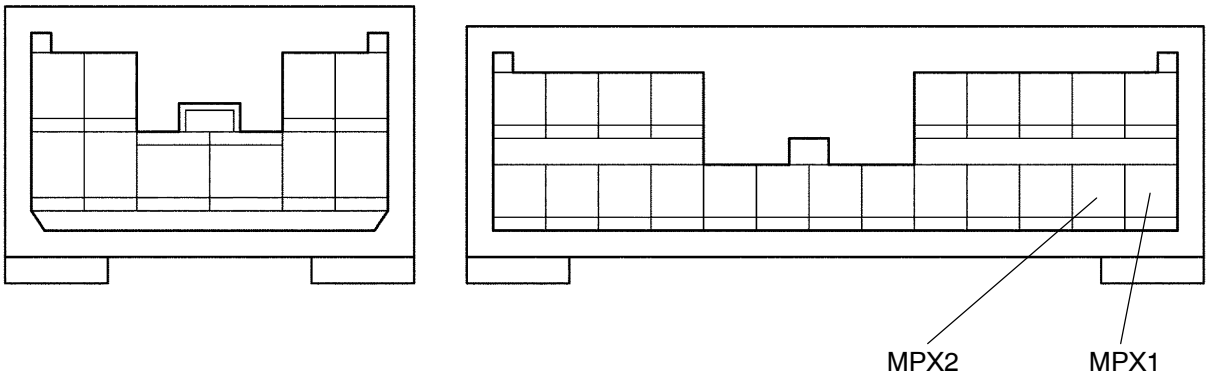
I04359

COMBINATION METER ECU



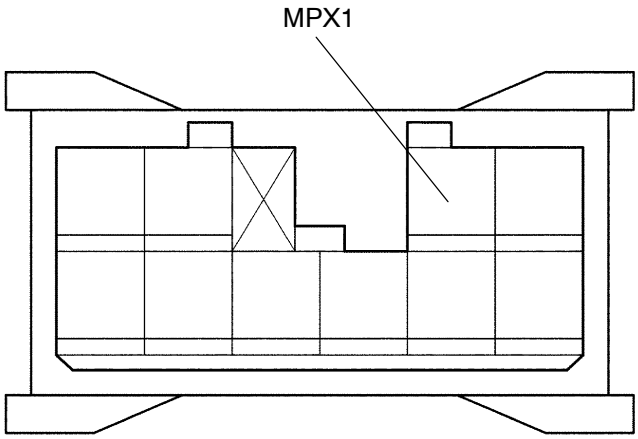
I04357

POWER SEAT ECU



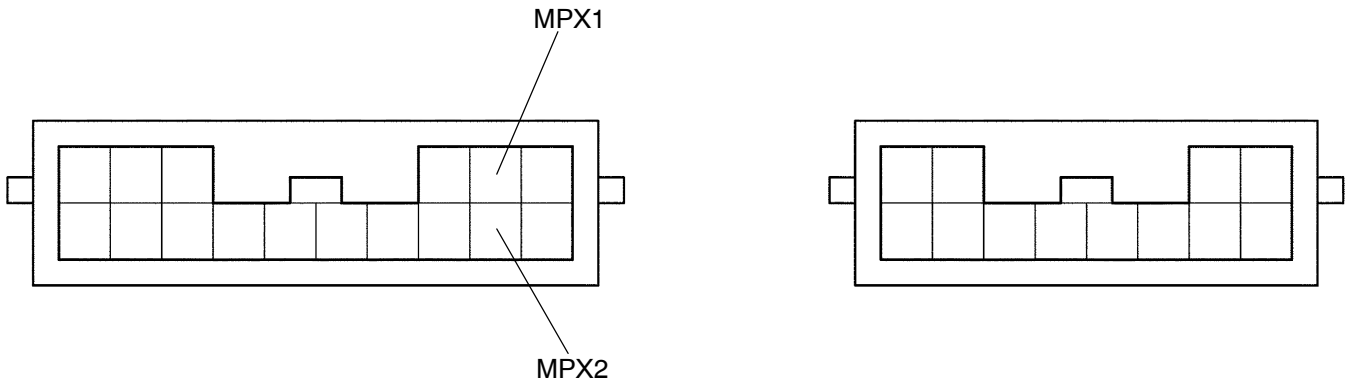
I04356

SLIDING ROOF ECU



I04348

MULTI DISPLAY



I04350

DI2AZ–02

CIRCUIT INSPECTION

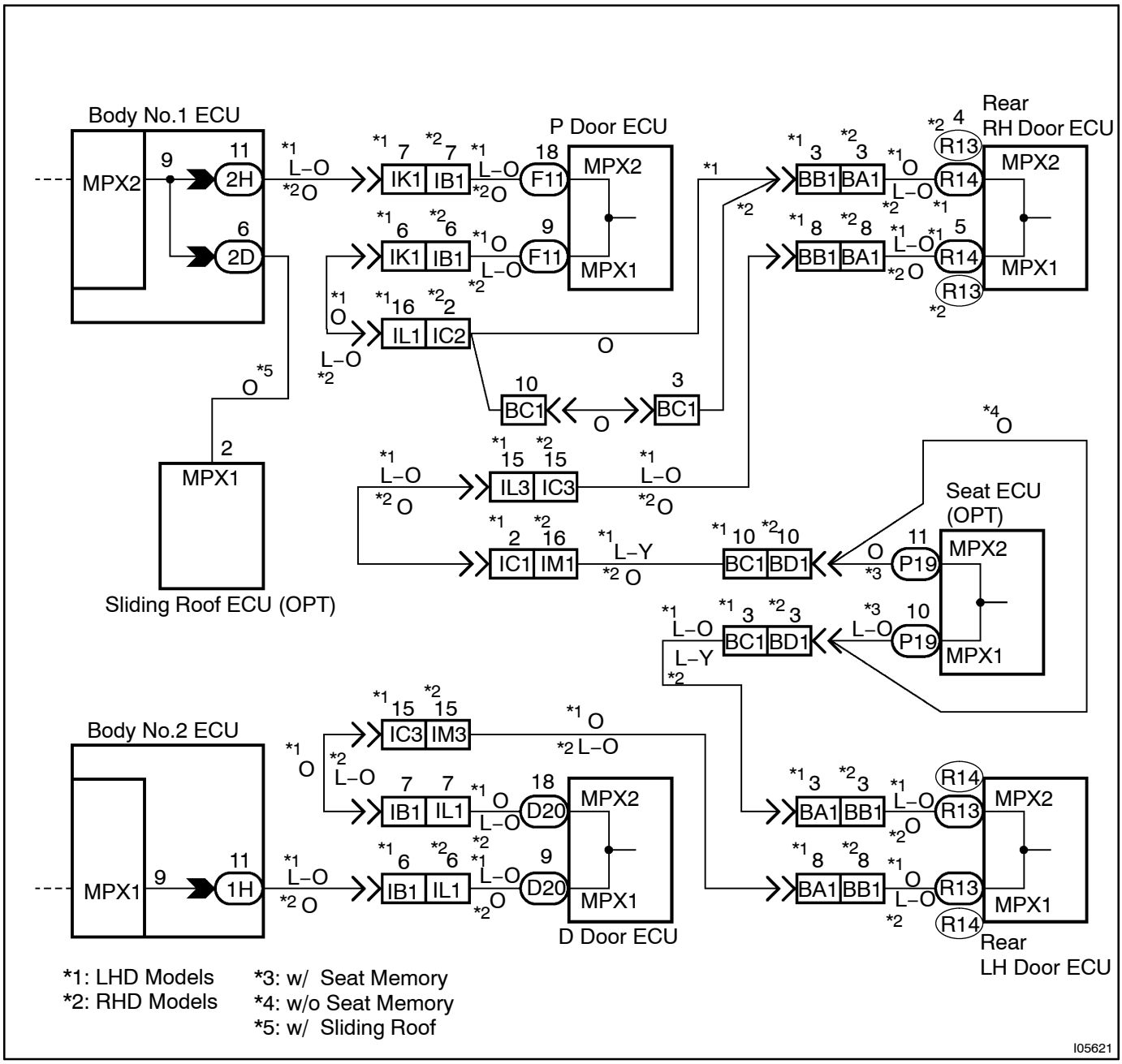
DTC	B1211 / 11	Driver door ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between driver door ECU and body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1211/11	No communication from driver door ECU more than 10 seconds.	• Driver door ECU • Wireharness

WIRING DIAGRAM



INSPECTION PROCEDURE

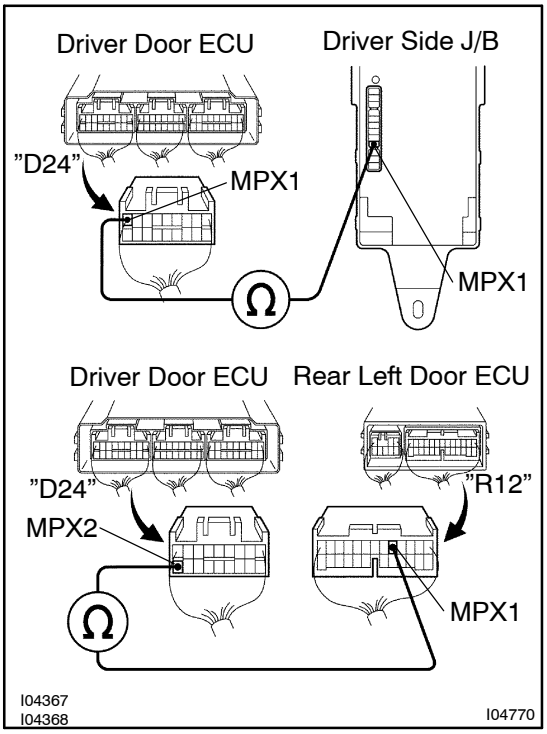
1	**Check driver door ECU.**

CHECK:
Check if the driver door window glass auto up.
HINT:
With this inspection, the driver door ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the driver ECU.**

OK

2	**Check wireharness.**



PREPARATION:
Disconnect connector of body No.2 ECU, "D24" of driver door ECU and "D12" of rear left ECU.

CHECK:
(a) Check continuity between terminals MPX1 of body No.2 ECU and MPX1 of driver door ECU.
(b) Check continuity between terminals MPX2 of driver door ECU and MPX1 of rear left door 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 driver door ECU.

DI2B0–02

DTC	B1212 / 12	Front passenger door ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between front passenger door ECU and body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1212/12	No communication from front passenger door ECU more than 10 seconds.	• Front passenger door ECU • Wireharness

WIRING DIAGRAM

See page DI–816

INSPECTION PROCEDURE

1	Check front passenger door ECU.

CHECK:

Check if the front passenger door window glass auto up.

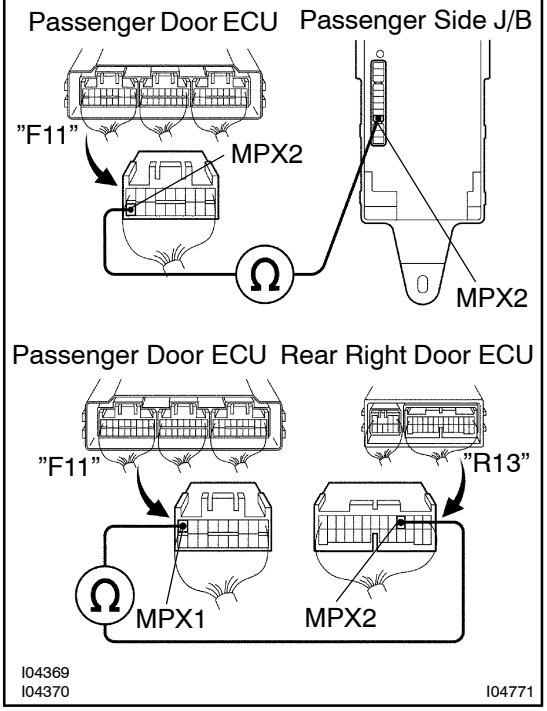
HINT:

With this inspection, the front passenger door ECU CPU can be diagnosed if it works normally or not.

NG → Replace the front passenger door ECU.

OK

2	Check wireharness



PREPARATION:

Disconnect connector of body No.1 ECU, ”F11” of passenger door ECU and ”R13” of rear right door ECU.

CHECK:

(a) Check continuity between terminals MPX2 of body No.1 ECU and MPX2 of passenger door ECU.

(b) Check continuity between terminals MPX1 of passenger door ECU and MPX2 of rear right door ECU.

OK:

There is a continuity in wireharness of both (a) and (b) or (a) 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 passenger door ECU.

DI2B1–02

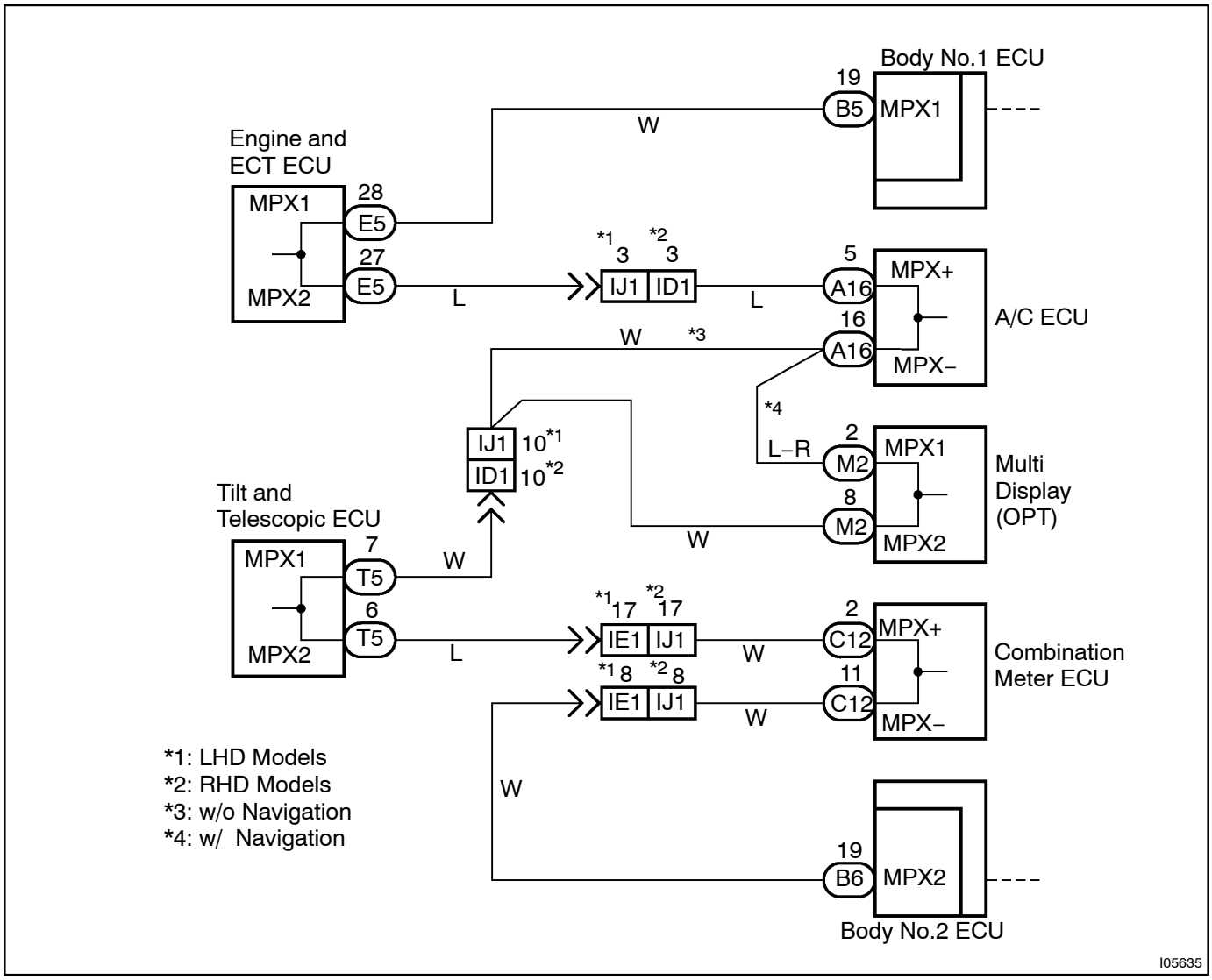
DTC	B1213 / 13	Tilt and telescopic ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between tilt and telescopic ECU and Body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1212/12	No communication from tilt and telescopic ECU more than 10 seconds.	• Tilt and telescopic ECU • Wireharness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check tilt and telescopic ECU.**

CHECK:

Check the operation of the manual tilt and telescopic.

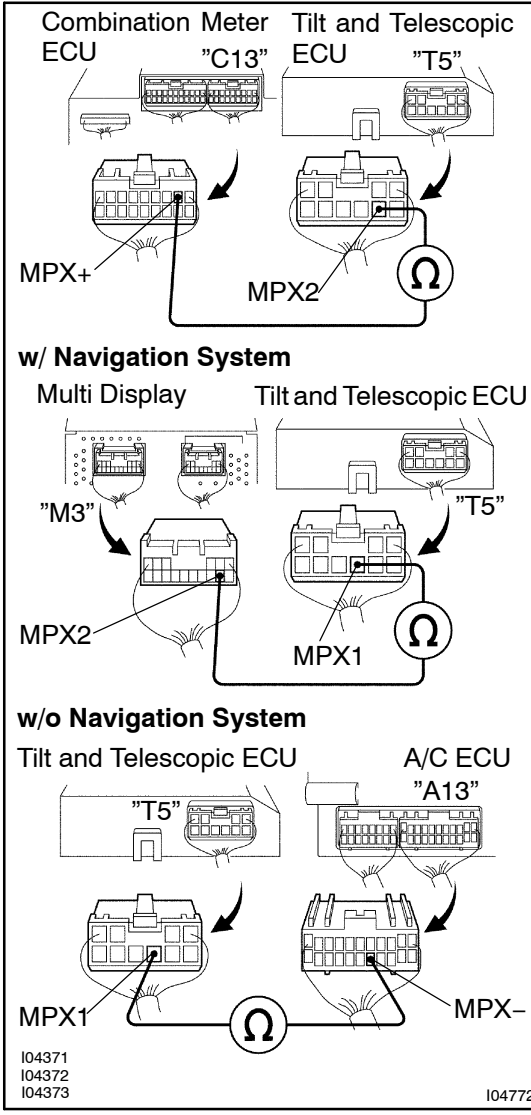
HINT:

With this inspection, the tile and telescopic ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the tilt and telescopic ECU.**

OK

2	**Check wireharness**



PREPARATION:

Disconnect connector "C13" of combination meter ECU, "T5" of tilt and telescopic ECU and "M3" of multi display.(or "A13" of A/C ECU.)

CHECK:

(a) Check continuity between terminals MPX+ of ECU and MPX2 of tilt and telescopic ECU.

(b) w/Navigation
Check continuity between terminals MPX1 of tilt and telescopic ECU and MPX2 of multi display.

(c) w/o Navigation
Check continuity between terminals MPX1 of tilt and telescopic ECU and MPX– of A/C ECU.

OK:

There is a continuity in wireharness of both (a) and (b) or (a) and (c), (a) or either (b) or (c).

HINT:

If there is OPEN in wireharness of either (a), (b) or (c), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the tilt and telescopic ECU.

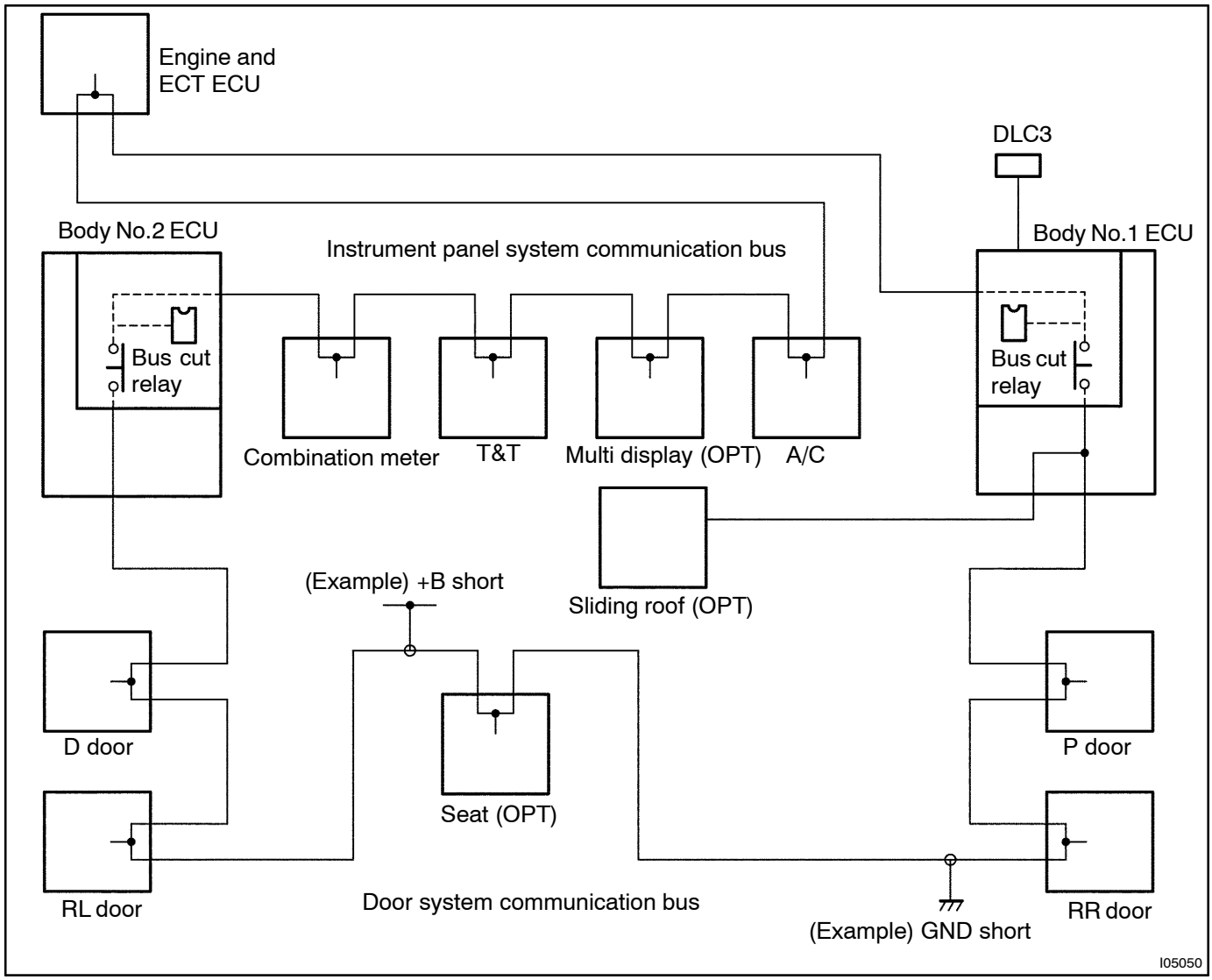
DI2B2-02

DTC	B1214 / 14	Door system communication bus malfunction (+B short)

DTC	B1215 / 15	Door system communication bus malfunction (GND short)

CIRCUIT DESCRIPTION

This DTC is output when +B or GND short occurs on door system communication bus. If +B or GND short is detected on door system communication bus, separate it by bus cut relay in body No.1 ECU and body No.2 ECU to prevent while communication buses' failure.

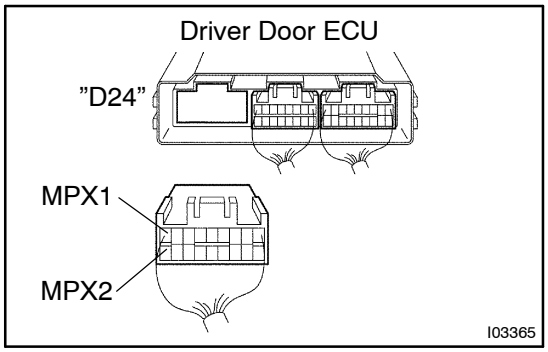


WIRING DIAGRAM

See page DI–816, DI–820

INSPECTION PROCEDURE

1	Check the communication circuit inside driver door ECU.

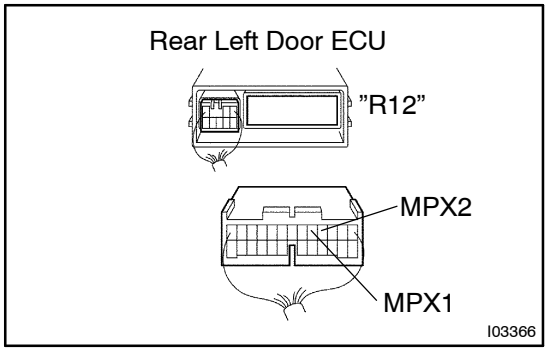


PREPARATION:
Disconnect the connector ”D24” of driver door ECU.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	Replace the driver door ECU.

NG

2	Check the communication circuit inside rear left door ECU.

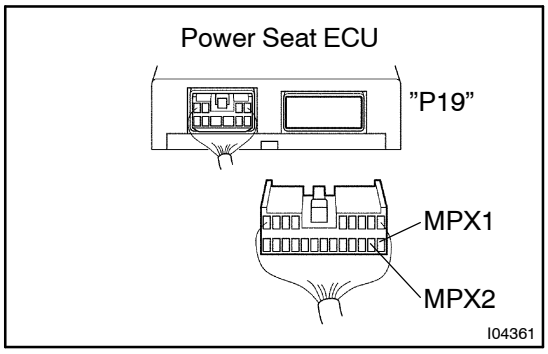


PREPARATION:
(a) Connect the connector ”D24” of driver door ECU.
(b) Disconnect the connector ”R12” of rear left door ECU.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	Replace the rear left door ECU.

NG

3	Check the communication circuit inside seat ECU.



PREPARATION:
(a) Connect the connector ”R12” of rear left door ECU.
(b) Disconnect the connector ”P19” of power seat ECU.

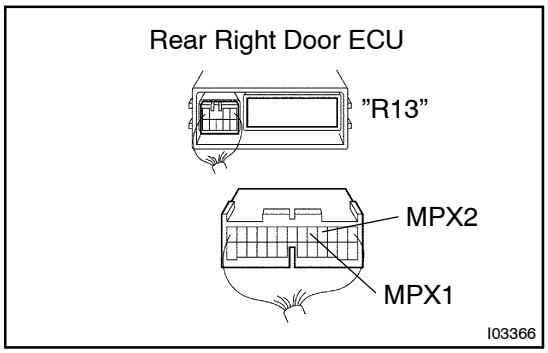
CHECK:
Check the DTC.

OK:
Code B1214/14 or B1215/15 is not output

OK	Replace the power seat ECU.

NG

4	Check the communication circuit inside rear right door ECU.



PREPARATION:
(a) Connect the connector ”P19” of power seat ECU.
(b) Disconnect the connector ”R13” of rear right door ECU.

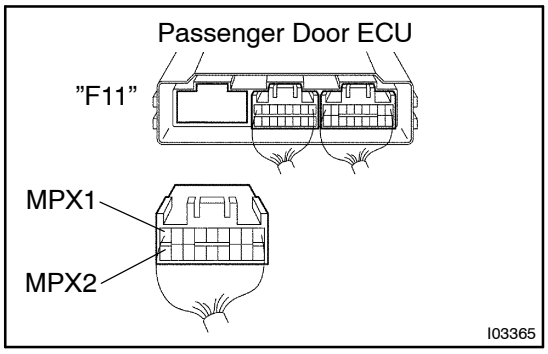
CHECK:
Check the DTC.

OK:
Code B1214/14 or B1215/15 is not output

OK	Replace the rear right door ECU.

NG

5	Check the communication circuit inside passenger door ECU.

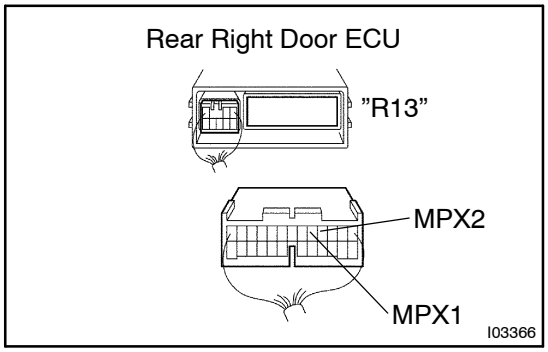


PREPARATION:
(a) Connect the connector ”R13” of rear right door ECU.
(b) Disconnect the connector ”F11” of passenger door ECU.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	Replace the passenger door ECU.

NG

6	Check for short circuit between passenger door ECU and rear right door ECU.

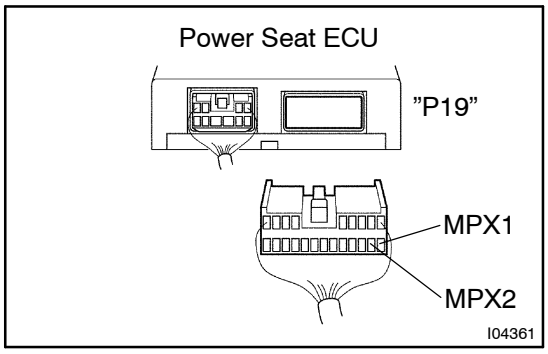


PREPARATION:
(a) Disconnect the connector ”R13” of rear right door ECU.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	Repair or replace the wireharness between passenger door ECU and rear right door ECU.

NG

7	Check for short circuit between rear right door ECU and power seat ECU.



PREPARATION:
(a) Connect the connector ”F11” of passenger door ECU.
(b) Disconnect the connector ”P19” of power seat ECU.

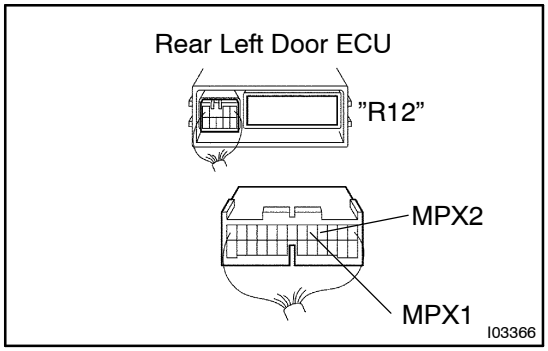
CHECK:
Check the DTC.

OK:
Code B1214/14 or B1215/15 is not output

OK	Repair or replace the wireharness between rear right door ECU and power seat ECU.

NG

8	Check for short circuit between power seat ECU and rear left door ECU.



PREPARATION:
(a) Connect the connector ”R13” of rear right door ECU.
(b) Disconnect the connector ”R12” of rear left door ECU.

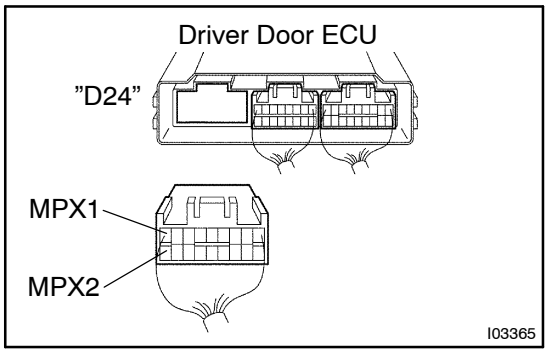
CHECK:
Check the DTC.

OK:
Code B1214/14 or B1215/15 is not output

OK	Repair or replace the wireharness between seat ECU and rear left door ECU.

NG

9	Check for short circuit between rear left door ECU and driver door ECU.



PREPARATION:
(a) Connect the connector ”P19” of power seat ECU.
(b) Disconnect the connector ”D24” of driver door ECU.

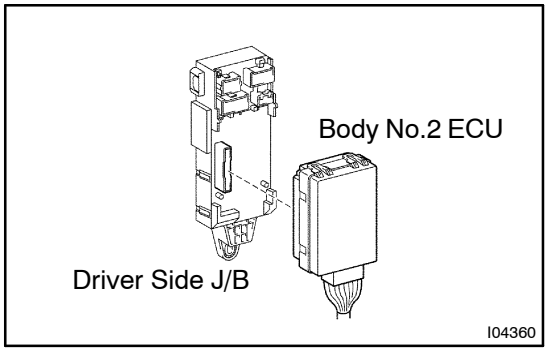
CHECK:
Check the DTC.

OK:
Code B1214/14 or B1215/15 is not output

OK	Repair or replace the wireharness between rear left ECU and driver door ECU.

NG

10	Check for short circuit between driver door ECU and body No.2 ECU.



PREPARATION:
(a) Connect the connector ”R12” of rear left door ECU.
(b) Disconnect the connector of body No.2 ECU.

HINT:
Connector is disconnected by removing Body No.2 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 driver door ECU and body No.2 ECU.

NG

11	**Check for short circuit between passenger door ECU, sliding roof ECU and body No.1 ECU.**

PREPARATION:

(a) Connect the connector ”D24” of driver door ECU.
(b) Install the body No.2 ECU to driver side junction block.
(c) Disconnect the connector of siding roof ECU and ”F11” of passenger door ECU.
(d) Disconnect the connector of body No.1 ECU.

HINT:

Connector is disconnected by removing Body No.1 ECU from passenger side junction block.

CHECK:

Check wireharness between passenger door ECU, sliding roof ECU and body No.1 ECU.

OK:

NG → **Repair or replace the wireharness between passenger door ECU, sliding roof ECU and body No.1 ECU.**

OK ↓

Replace the body No.1 ECU.

DI2B3–02

DTC	B1216 / 16	Rear right door ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between rear right door ECU and body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1216/16	No communication from rear rIght door ECU more than 10 seconds.	• Rear rIght door ECU • Wireharness

WIRING DIAGRAM

See page DI–816

INSPECTION PROCEDURE

1	Check rear right door ECU.

CHECK:

Check if the rear right door window glass auto up.

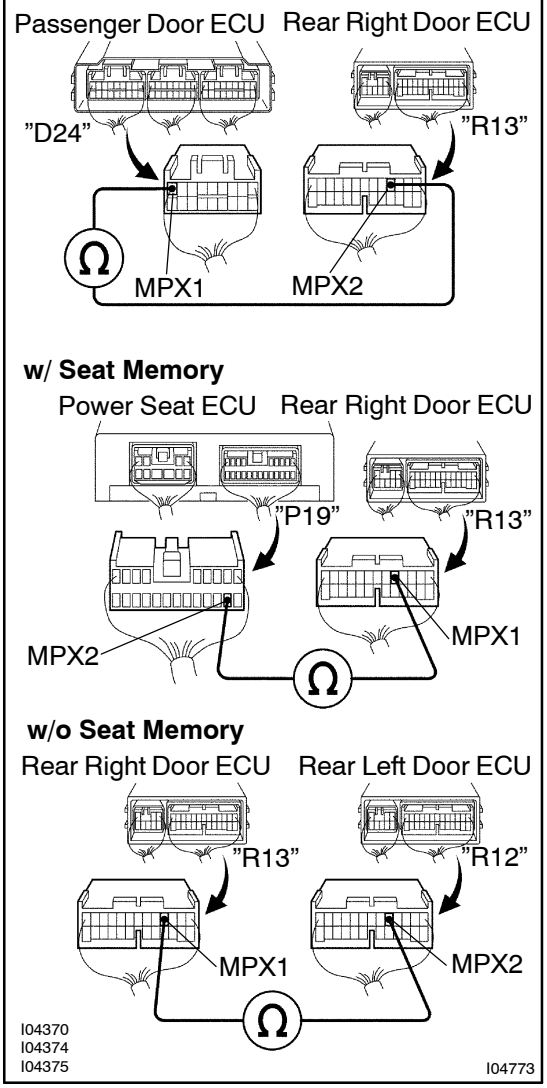
HINT:

With this inspection rear right door ECU CPU can be diagnosed if it works normal or not.

NG → Replace the rear right door ECU.

OK

2	**Check wireharness.**



PREPARATION:

Disconnect connector "F11" of passenger door ECU, "R13" of rear right door ECU and "P19" of power seat ECU.

CHECK:

(a) Check continuity between terminals MPX1 of passenger door ECU and MPX2 of rear right door ECU.

(b) w/Seat memory
Check continuity between terminals MPX1 of rear right door ECU and MPX2 of power seat ECU.

(c) w/o Seat memory
Check continuity between terminals MPX1 of rear right door ECU and MPX2 of rear left door ECU.

OK:

If there is OPEN in wireharness of either (a), (b) or (c), please repair it.

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 rear right door ECU.

DI2B4–02

DTC	B1217 / 17	Rear left door ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between rear left door ECU and body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1217/17	No communication from rear left door ECU more than 10 seconds.	• Rear left door ECU • Wireharness

WIRING DIAGRAM

See page DI–816

INSPECTION PROCEDURE

1	Check rear left door ECU.

CHECK:

Check if the rear left door window glass auto up.

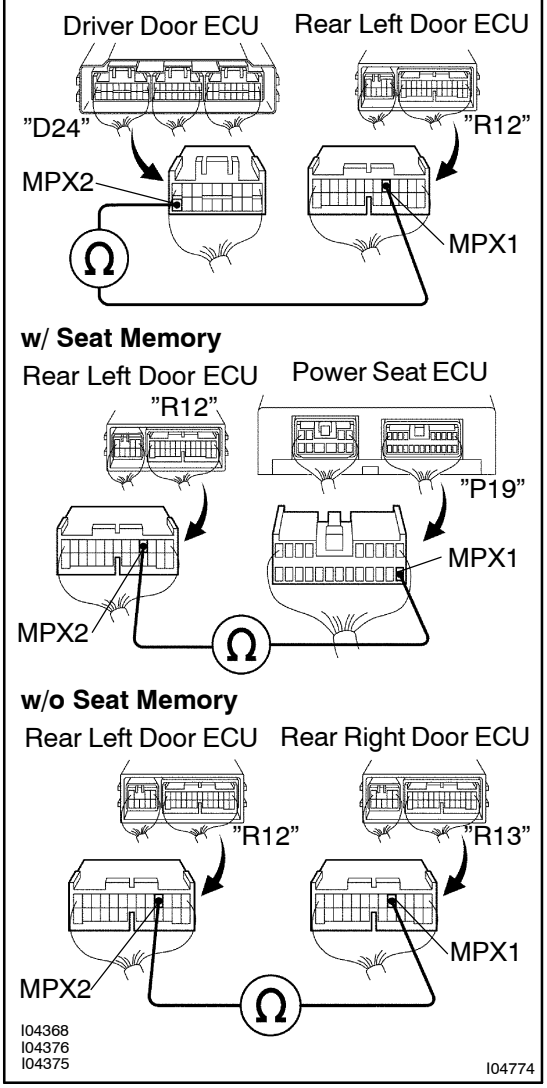
HINT:

With this inspection rear left door ECU CPU can be diagnosed if it works normal or not.

NG → Replace the rear left door ECU.

OK

2	Check wireharness



PREPARATION:

Disconnect connector "D24" of driver door ECU, "R12" of rear left door ECU and "P19" of power seat ECU (or "R13" of rear right door ECU).

CHECK:

(a) Check continuity between terminals MPX2 of driver door ECU and MPX1 of rear left door ECU.

(b) w/Seat memory
Check continuity between terminals MPX2 of rear left door ECU and MPX1 of power seat ECU.

(c) w/o Seat memory
Check continuity between terminals MPX2 of rear left door ECU and MPX1 of rear right door ECU.

OK:

There is a continuity in wireharness of both (a) and (b) or (a) and (c), (a) or either (b) or (c).

HINT:

If there is OPEN in wireharness of either (a), (b) or (c), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the rear left door ECU.

D12B5–02

DTC	B1218 / 18	Body No.2 ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between Body No.2 ECU and Body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1218/18	No communication from Body No.2 ECU more than 10 seconds.	• Body No.2 ECU • Wireharness

WIRING DIAGRAM

See page DI–816, DI–820

INSPECTION PROCEDURE

1	Check Body No.2 ECU.

CHECK:

Check that the headlight comes on when operating the light control switch with the ignition switch off.

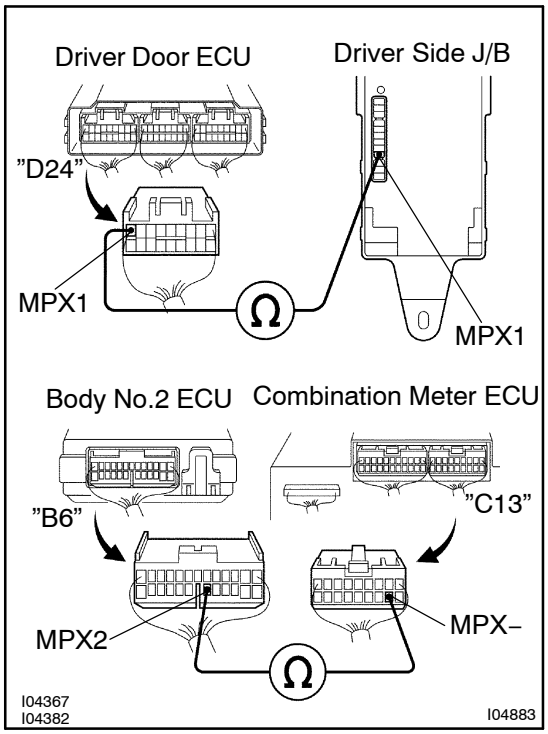
HINT:

- With this inspection rear left door ECU CPU can be diagnosed if it works normal or not.

NG → **Replace the Body No.2 ECU.**

OK

2	Check wireharness



PREPARATION:

(a) Disconnect connector of Body No.2 ECU, "D24" of Driver door ECU and "C13" of Combination meter ECU.

(b) Remove the Body No.2 ECU from Driver side junction block.

CHECK:

(a) Check continuity between terminals MPX1 of Body No.2 ECU and MPX1 of Driver door ECU.

(b) Check continuity between terminals MPX2 of Body No.2 ECU and MPX– of Combination meter 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 Body No.2 ECU.

DI2B6–02

DTC	B1221 / 21	Power window switch circuit on driver door

DTC	B1222 / 22	Door lock switch circuit on driver door

DTC	B1223 / 23	Power window switch circuit on passenger door

DTC	B1224 / 24	Door lock switch circuit on passenger door

DTC	B1225 / 25	Power window switch circuit on rear right door

DTC	B1226 / 26	Power window switch circuit on rear left door

DTC	B1241 / 41	Body No.1 ECU switch circuit diagnosis

DTC	B1252 / 52	Body No.2 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
B1221/21	Stick of either of the power window master switch (except window lock switch)	• Power window master switch • Wireharness

B1222/22	Stick of door key lock and unlock switch	• Door lock control switch • Door key lock and unlock switch • Wireharness
B1223/23	Stick of power window switch or door lock control	• Power window switch • Door lock control switch • Wireharness
B1224/24	Stick of door key lock and unlock switch	• Door lock control switch • Door key lock and unlock switch • Wireharness
B1225/25	Stick of power window switch	• Power window switch • Wireharness
B1226/26	Stick of power window switch	• Power window switch • Wireharness
B1241/41	Stick of switch	• Luggage compartment door opener switch • Luggage compartment door lock and unlock switch • Wireharness
B1252/52	Stick of switch	• Step light switch • Wireharness

HINT:

Please refer to BE section for switch inspection, and to each door system of DI section for wireharness inspection.

DI1SQ–03

DTC	B1231 / 31	Jam protection limit switch circuit on driver door

DTC	B1233 / 33	Jam protection limit switch circuit on passenger door

DTC	B1235 / 35	Jam protection limit switch circuit on rear right door

DTC	B1237 / 37	Jam protection limit switch circuit on rear left door

CIRCUIT DESCRIPTION

These DTCs are output when a malfunction of limit switch within power wIndow motor is detected.

DTC No.	DTC Detection Condition	Trouble Area
B1231/31	No change in limit switch more than 2.0 seconds even if operating glass down when limit switch is OFF (window glass is fully closed)	• Jam protection limit switch • Wireharness
B1233/33		
B1235/35		
B1237/37		

HINT:

Please refer to power window control system of BE section for switch inspection, and to each door system of DI section for wireharness inspection.

DI1SR–03

DTC	B1232 / 32	Jam protection pulse switch circuit on driver door

DTC	B1234 / 34	Jam protection pulse switch circuit on passenger door

DTC	B1236 / 36	Jam protection pulse switch circuit on rear right door

DTC	B1238 / 38	Jam protection pulse switch circuit on rear left door

CIRCUIT DESCRIPTION

These DTCs are output when a malfunction of pulse switch within power window motor is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1232/32	No change in pulse switch more than 2.0 seconds even if opening glass down when limit switch is OFF (window glass is fully closed).	• Jam protection pulse switch • Wireharness
B1234/34		
B1236/36		
B1238/38		

HINT:

Please refer to power window control system of BE section for switch inspection, and to each door system of DI section for wireharness inspection.

DI2B7–02

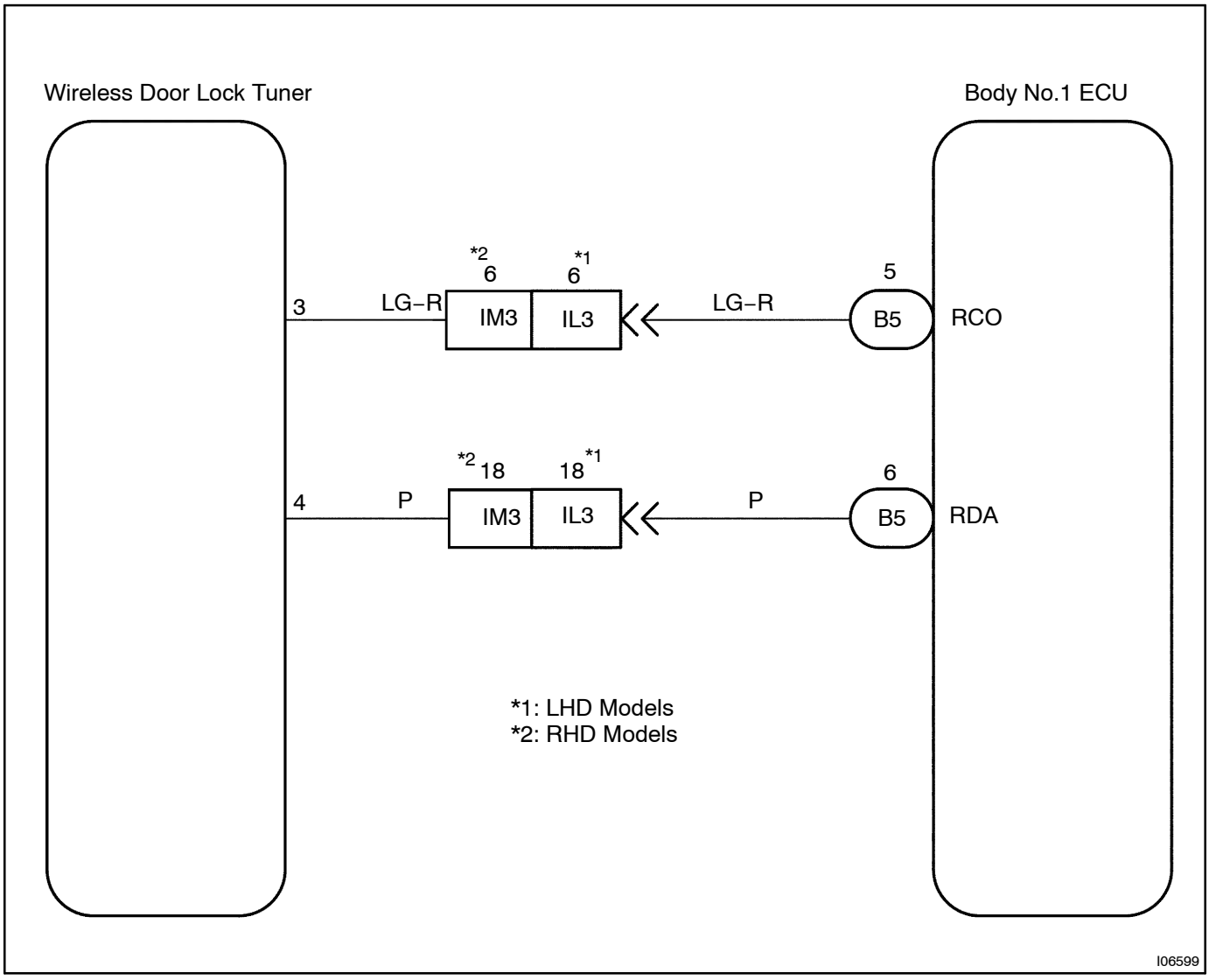
DTC	B1242 / 42	Wireless door lock tuner circuit malfunction

CIRCUIT DESCRIPTION

This DTC is output when GND short of RDA terminal is detected.

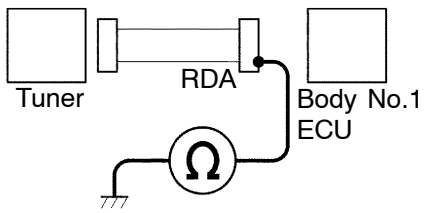
DTC No.	DTC Detecting Condition	Trouble Area
B1242/42	GND short of RDA terminal	• Wireharness • Wireless door lock tuner • Body No.1 ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check wireharness.



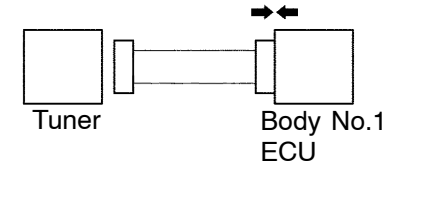
I03347

PREPARATION:
Disconnect the connector of tuner and body No.1 ECU.
CHECK:
Check the continuity between wireharness and body ground.
OK:
No continuity.

NG	Repair or replace the wireharness.

OK

2	Check body No.1 ECU.



I03348

PREPARATION:
Connect the connector of body No.1 ECU.
CHECK:
Check the DTC.
OK:
B1242/42 is not output.

NG	Replace the body No.1 ECU.

OK

Replace the tuner.

DI2B8–02

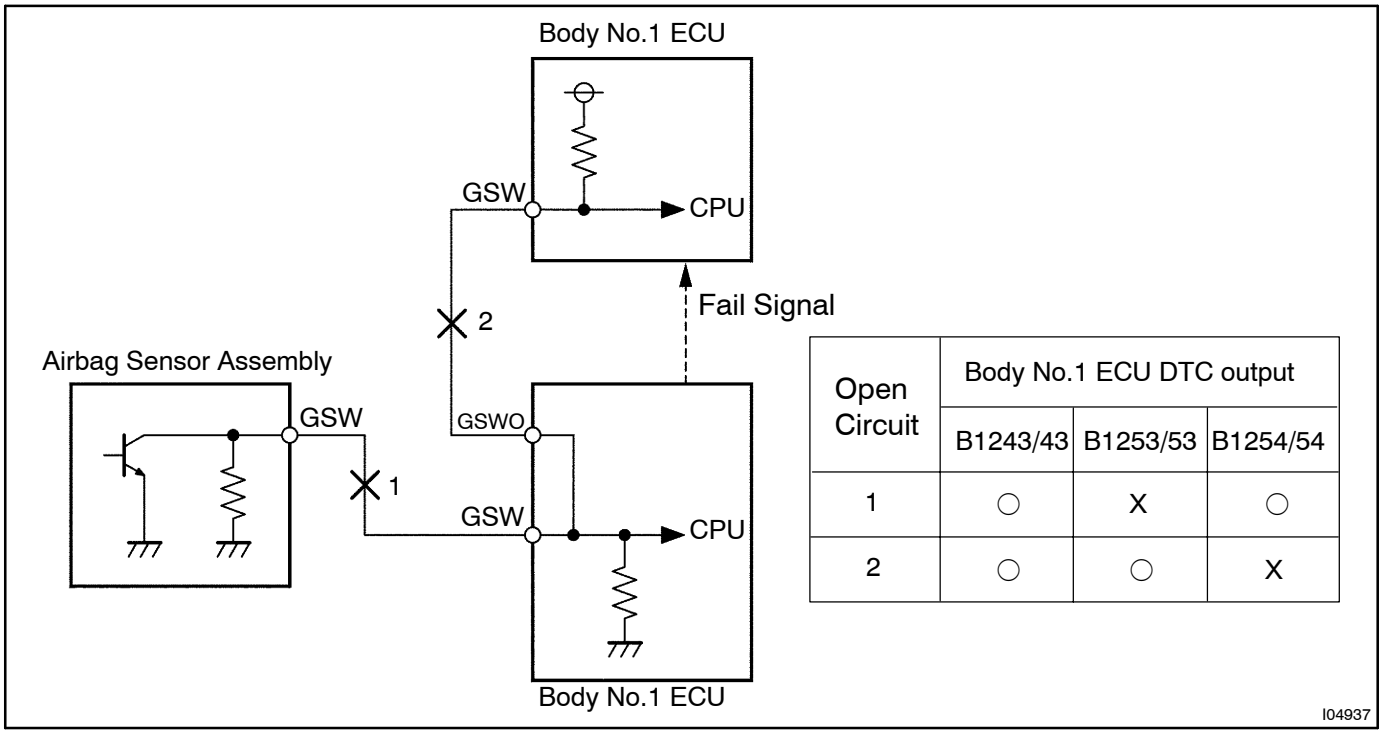
DTC	B1243 / 43	GSW terminal circuit malfunction

DTC	B1253 / 53	Body No.2 GSW terminal malfunction (Lo unusual)

DTC	B1254 / 54	Body No.2 GSW terminal malfunction (Hi unusual)

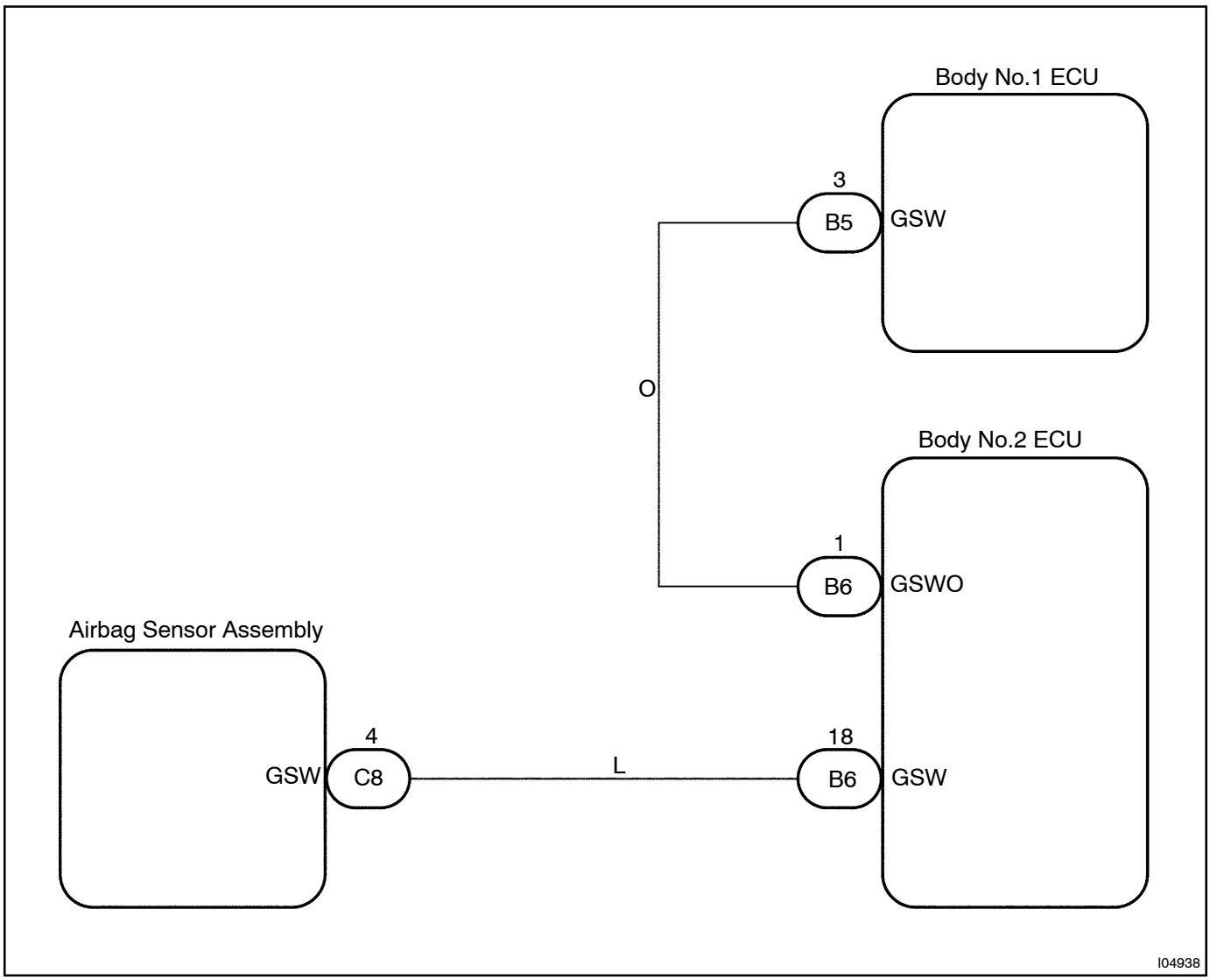
CIRCUIT DESCRIPTION

These DTCs are output wherever detecting OPEN of GSW circuit connecting body No.1 ECU, body No.2 ECU and airbag sensor assembly as shown in the illustration. Do specifying the OPEN position of GSW circuit by using the above DTC combination. Abnormality in GSW terminal of Body No.2 ECU is sent to body No1 ECU by communication.



Open Circuit	Body No.1 ECU DTC output		
	B1243/43	B1253/53	B1254/54
1	○	X	○
2	○	○	X

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wireharness and connector.**

CHECK:

Check the wireharness and connector of the specified position by DTC.

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

OK

2	**Check airbag sensor assembly.**

CHECK:

Check whether or not DC is output when changing to other airbag sensor assembly.

OK:

DTC must not be output.

OK → **Replace the airbag sensor assembly. (Original airbag sensor assembly is failure).**

NG

Replace the body No.1 ECU.

DI2B9–02

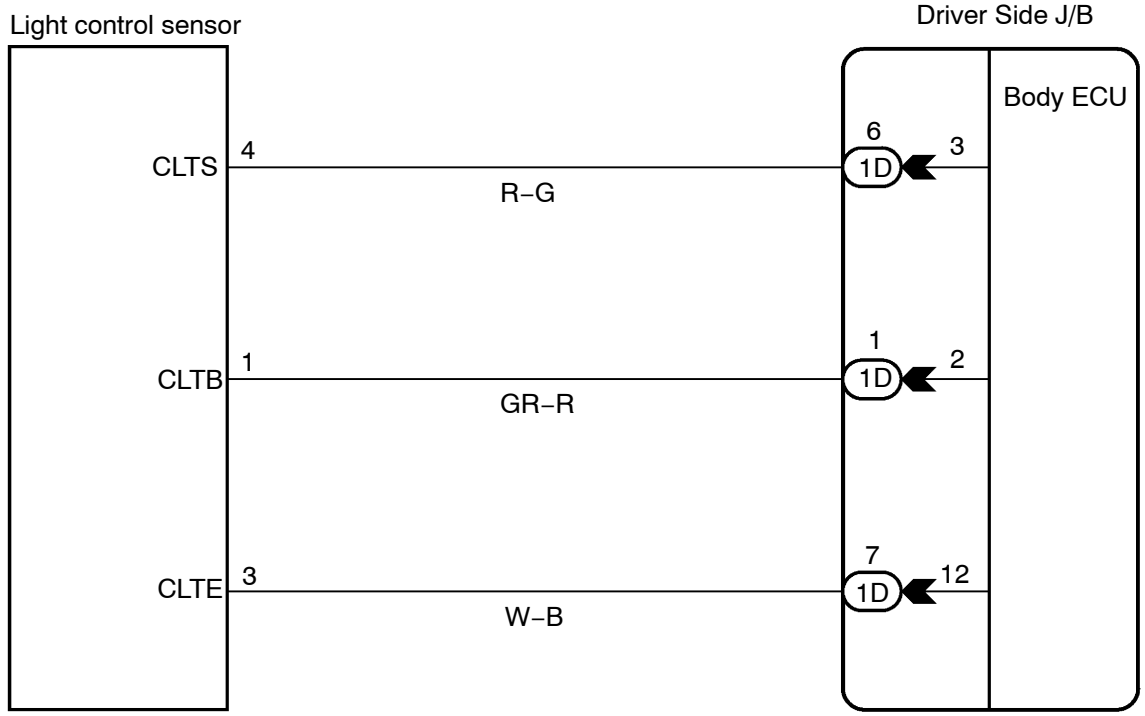
DTC	B1244 / 44	Light sensor circuit malfunction

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 • Body No.2 ECU

WIRING DIAGRAM



I06600

INSPECTION PROCEDURE

1	**Check light sensor.**

Using LEXUS hand –held tester:

PREPARATION:

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

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

CHECK:

The value of the illumination rate should change in the following range when the light sensor is put in the light or covered by a hand.

OK:

0.8 ms ~ 22.0 ms

HINT:

- This is the time to be taken for the light sensor to generate one cycle of frequency according to the brightness.

When not using LEXUS hand–held tester. (See page BE–38)

NG → **Replace the light sensor.**

OK

2	**Check wireharness and connector between light sensor and Body No.2 ECU.**

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

OK

Replace the Body No.2 ECU.

DI2BA–02

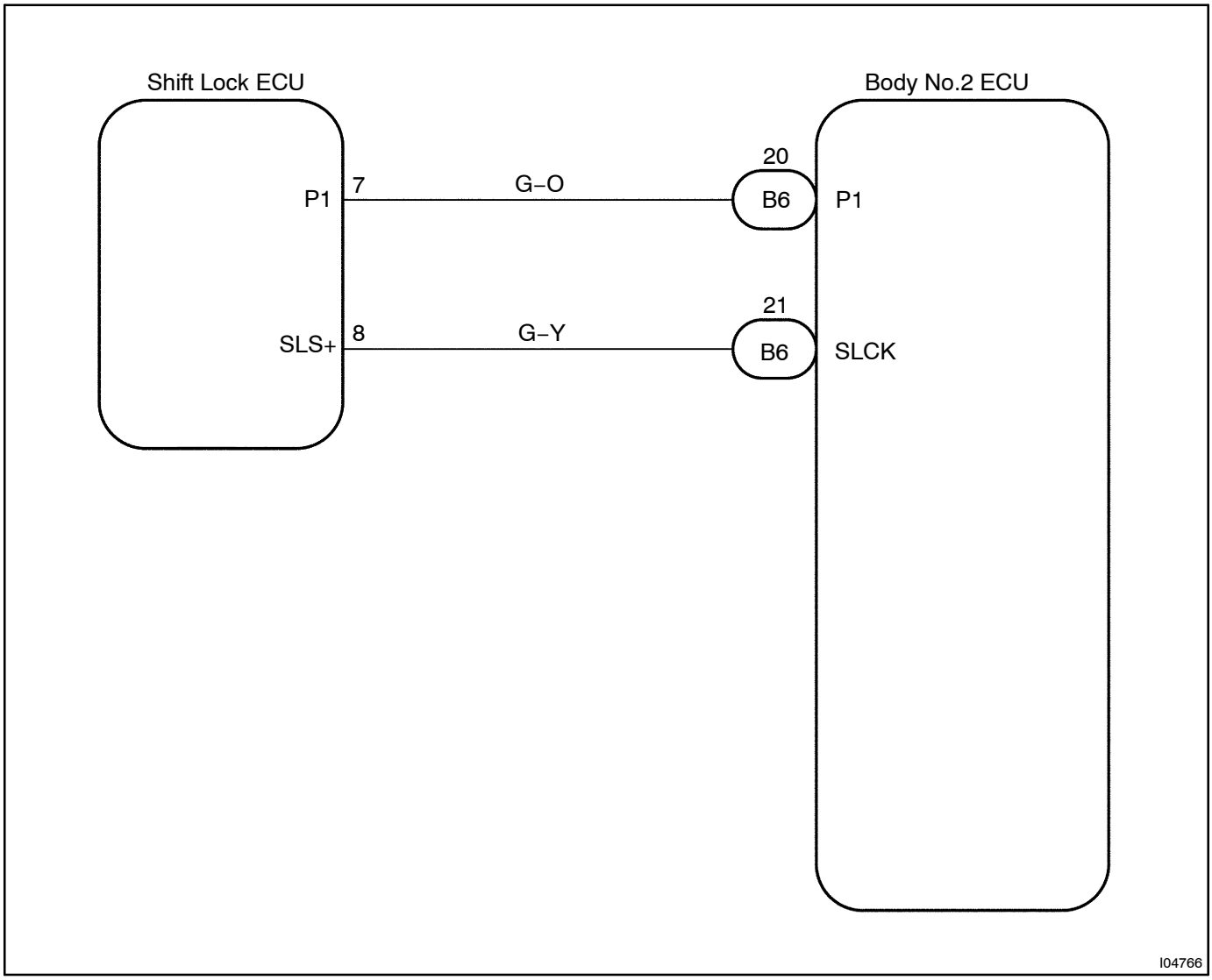
DTC	B1255 / 55	Body No.2 P1 switch malfunction

CIRCUIT DESCRIPTION

This DTC is output when failure of P1 switch is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1255/55	ON stick of P1 switch	• P1 switch • Wireharness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the P1 switch. (See page AT–13)

NG → Replace the P1 switch.

OK

2	Check wireharness and connector.

NG → Repair or replace wireharness and connector.

OK

Replace the body No.2 ECU.

DI2BB–02

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 No.1 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–820

INSPECTION PROCEDURE

1	Check Engine and ECT ECU.

CHECK:

Check that the engine starts normally.

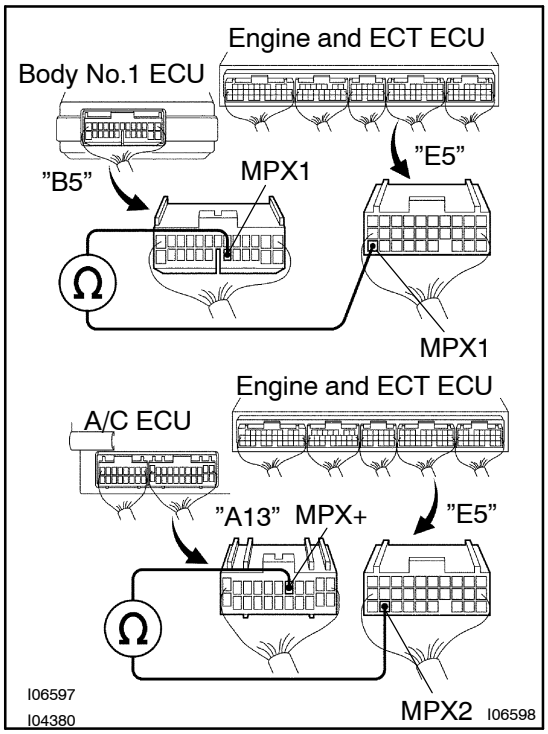
HINT:

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 "B5" of body No.1 ECU, "E7"(or "E5")of Engine and ECT ECU and "A13" of A/C ECU.

CHECK:

(a) Check continuity between terminals MPX1 of body No.1 ECU and MPX1 of Engine and ECT ECU.

(b) Check continuity between terminals MPX2 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.

DI2BC–02

DTC	B1262 / 62	A/C ECU communication stop

CIRCUIT DESCRIPTION

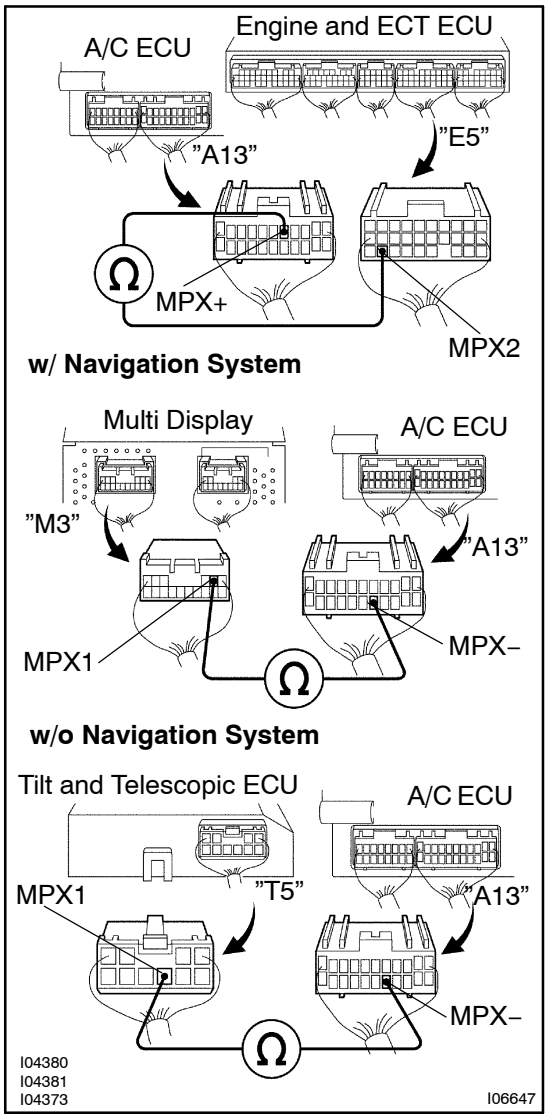
This DTC is output when communication stops between ECM and Body No.1 ECU.

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–820

1	Check wireharness



PREPARATION:

Disconnect connector of "M3" of multi display (or "T5" tilt and telescopic ECU) "A13" of A/C ECU and "E7"(or "E5") of Engine and ECT ECU.

CHECK:

(a) Check continuity between terminals MPX+ of A/C ECU and MPX2 of Engine and ECT ECU.

(b) w/Navigation system
Check continuity between terminals MPX1 of multi display and MPX– of A/C ECU.

(c) w/o Navigation system
Check continuity between terminals MPX1 of tilt and telescopic ECU and MPX– of A/C ECU.

OK:

There is a continuity in wireharness of both (a) and (b) or (a) and (c), (a) or either (b) or (c).

HINT:

If there is OPEN in wireharness of either (a), (b) or (c), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the A/C ECU.

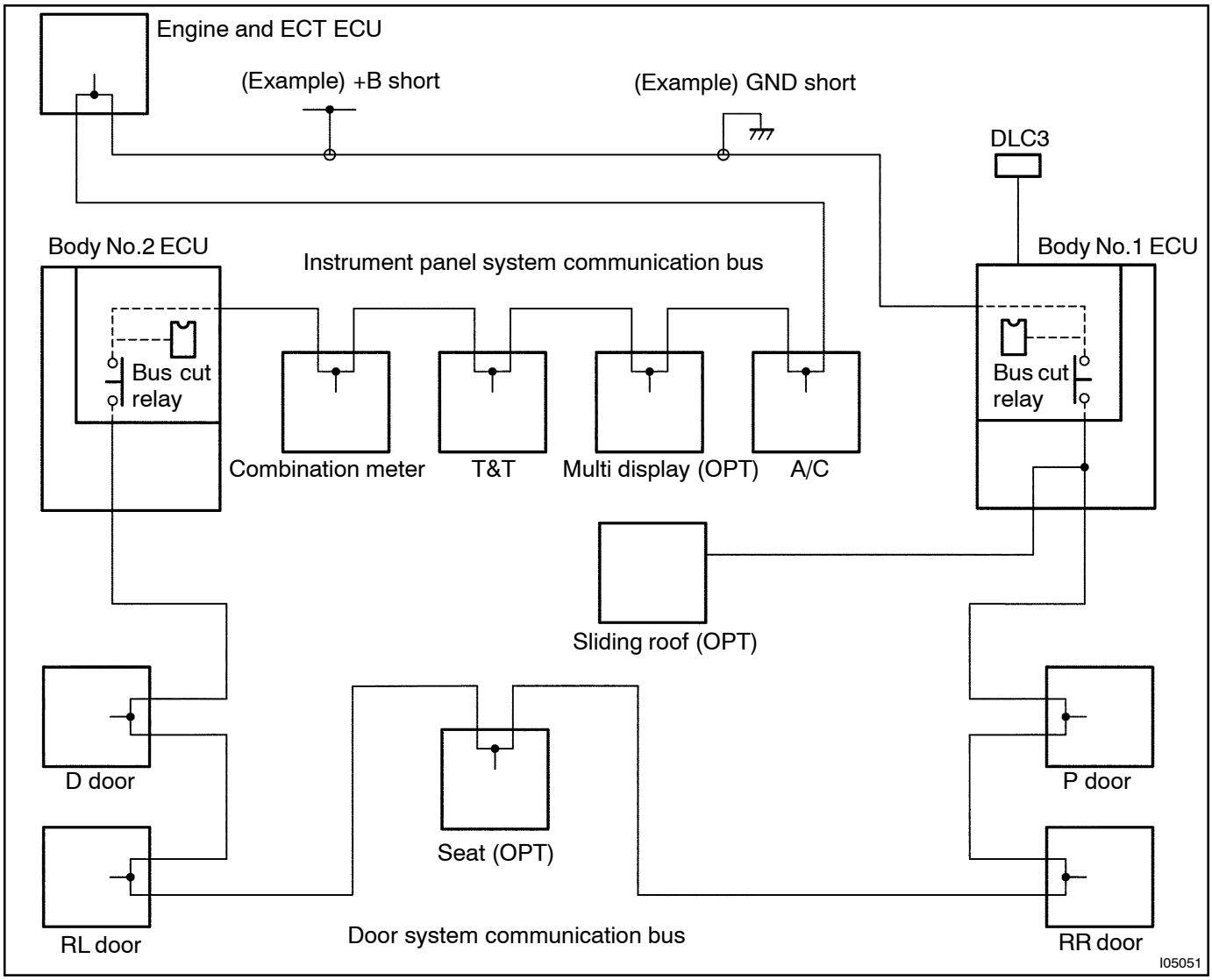
DI2BD–02

DTC	B1266 / 66	Instrument panel system communication bus malfunction (+B short)

DTC	B1267 / 67	Instrument panel system communication bus malfunction (GND short)

CIRCUIT DESCRIPTION

This DTC is output when +B or GND short occurs on instrument panel system communication bus. If +B or GND short is detected on instrument panel system communication bus, separate it by bus cut relay in body No.1 ECU and Body No.2 ECU to prevent while communication buses' failure.



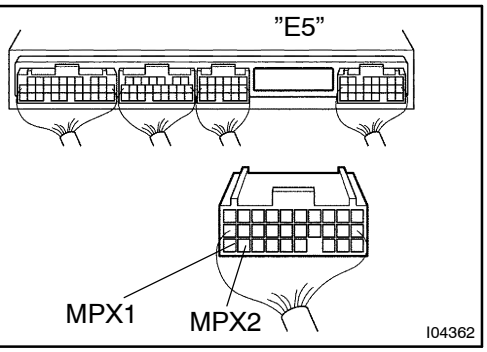
WIRING DIAGRAM

See page DI–816, DI–820

INSPECTION PROCEDURE

HINT:
On the system structure point of view, this DTC cannot display meter. In case of checking DTC, please use LEXUS hand held tester.

1	**Check the communication circuit inside ECM.**

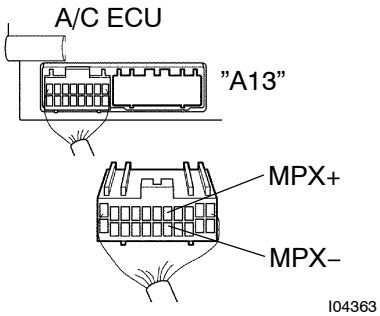


PREPARATION:
Disconnect the connector ”E7”(or ”E5”) of Engine and ECT ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Replace the Engine and ECT ECU.**

NG

2	Check the communication circuit inside A/C ECU.



PREPARATION:

(a) Connect the connector ”E7”(or ”E5”)of Engine and ECT ECU.

(b) Disconnect the connector ”A13” of A/C ECU.

CHECK:

Check the DTC.

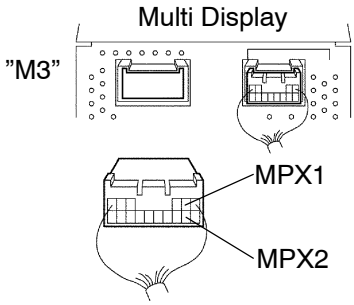
OK:

Code B1266 or B1267 is not output

OK	Replace the A/C ECU.

NG

3	Check the communication circuit inside multi display. (w/Navigation system only)



HINT:

Proceed to next step, when vehicle has no navigation system.

PREPARATION:

(a) Connect the connector ”A13” of A/C ECU.

(b) Disconnect the connector ”M3” of multi display.

CHECK:

Check the DTC.

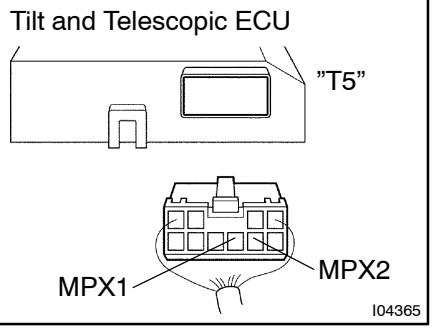
OK:

Code B1266 or B1267 is not output

OK	Replace the multi display.

NG

4	Check the communication circuit inside tilt and telescopic ECU.



PREPARATION:

(a) Connect the connector ”M3” of multi display.(w/Navigation system only)

(b) Disconnect the connector ”T5” of tilt and telescopic ECU.

CHECK:

Check the DTC.

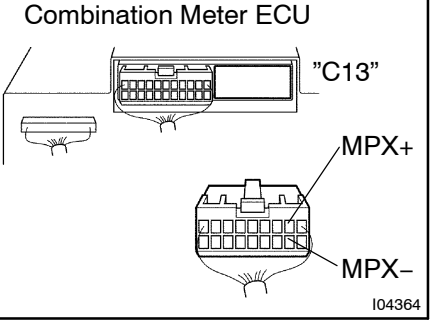
OK:

Code B1266 or B1267 is not output

OK	Replace the tilt and telescopic ECU.

NG

5	Check the communication circuit inside combination meter ECU.



PREPARATION:

(a) Connect the connector ”T5” of tilt and telescopic ECU.

(b) Disconnect the connector ”C13” of combination meter ECU.

CHECK:

Check the DTC.

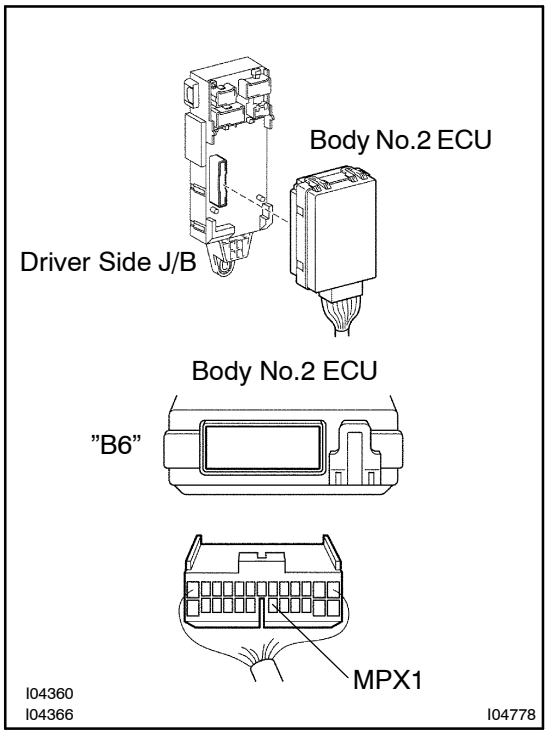
OK:

Code B1266 or B1267 is not output

OK	Replace the combination meter ECU.

NG

6	Check the communication circuit inside Body No.2 ECU.



PREPARATION:

(a) Connect the connector ”C13” of combination meter ECU.
(b) Disconnect the connector ”B6” of Body No.2 ECU.
(c) Remove the Body No.2 ECU from Driver side J/B.

CHECK:

Check the DTC.

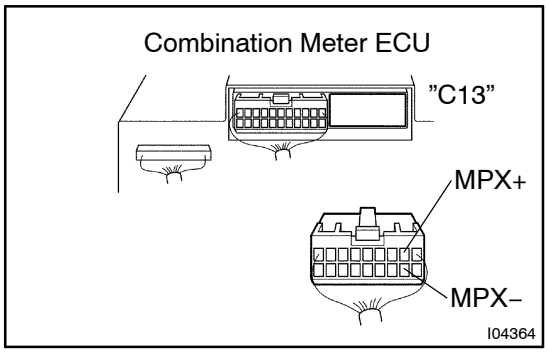
OK:

Code B1266 or B1267 is not output.

OK	Replace the Body No.2 ECU.

NG

7	Check for short circuit between combination meter ECU and Body No.2 ECU.



PREPARATION:

Disconnect the connector ”C13” of combination meter ECU.

CHECK:

Check the DTC.

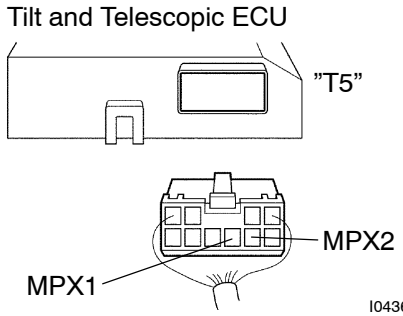
OK:

Code B1266 or B1267 is not output.

OK	Repair or replace the wireharness between combination meter ECU and Body No.2 ECU.

NG

8	Check for short circuit between combination meter ECU and tilt and telescopic ECU.



PREPARATION:

(a) Install the Body No.2 ECU to driver side J/B.
(b) Connect the connector ”B6” of Body No.2 ECU.
(c) Disconnect the connector ”T5” of tilt and telescopic ECU.

CHECK:

Check the DTC.

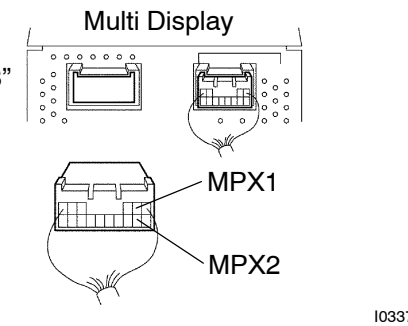
OK:

Code B1266 or B1267 is not output

OK	Repair or replace the wireharness between combination meter ECU and tilt and telescopic ECU.

NG

9	Check for short circuit between tilt and telescopic ECU and multi display.



HINT:

Perform inspection between tilt and telescopic ECU and A/C ECU when vehicle has no navigation system.

PREPARATION:

Connect the connector ”C13” of combination meter ECU.
Disconnect the connector ”M3” of multi display.

CHECK:

Check the DTC.

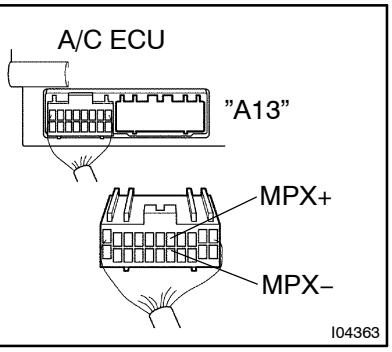
OK:

Code B1266 or B1267 is not output

OK	**Repair or replace the wireharness between tilt and telescopic ECU and multi display.**

NG

10	**Check for short circuit between multi display and A/C ECU.**



HINT:
Perform inspection between tilt and telescopic ECU and A/C ECU when vehicle has no navigation system.

PREPARATION:
Connect the connector ”T5” of tilt and telescopic ECU.
Disconnect the connector ”A13” of A/C ECU.

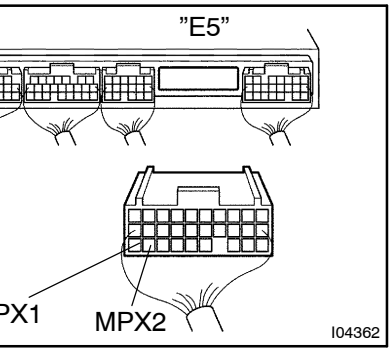
CHECK:
Check the DTC.

OK:
Code B1266 or B1267 is not output

OK	**Repair or replace the wireharness between multi display and A/C ECU.**

NG

11	**Check for short circuit between A/C ECU and Engine and ECT ECU.**



PREPARATION:
Connect the connector ”M3” of multi display.
Disconnect the connector ”E7”(or ”E5”) of Engine and ECT ECU.

CHECK:
Check the DTC.

OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between A/C ECU and Engine and ECT ECU.**

NG

12	**Check for short circuit between Engine and ECT ECU and Body No.1 ECU.**

PREPARATION:
Connect the connector ”A13” of A/C ECU.
Disconnect the connector ”B5” of Body No.1 ECU.
CHECK:
Check wireharness between Engine and ECT ECU and Body No.1 ECU.

NG → **Repair or replace the wireharness between Engine and ECT ECU and Body No.1 ECU.**

OK

Replace the Body No.1 ECU.

DI2BE–02

DTC	B1271 / 71	Combination meter ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between combination meter ECU and body No.1 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–820

INSPECTION PROCEDURE

1	Check combination meter ECU.

CHECK:

Start the engine and check that the speed meter and tacometer operate normally.

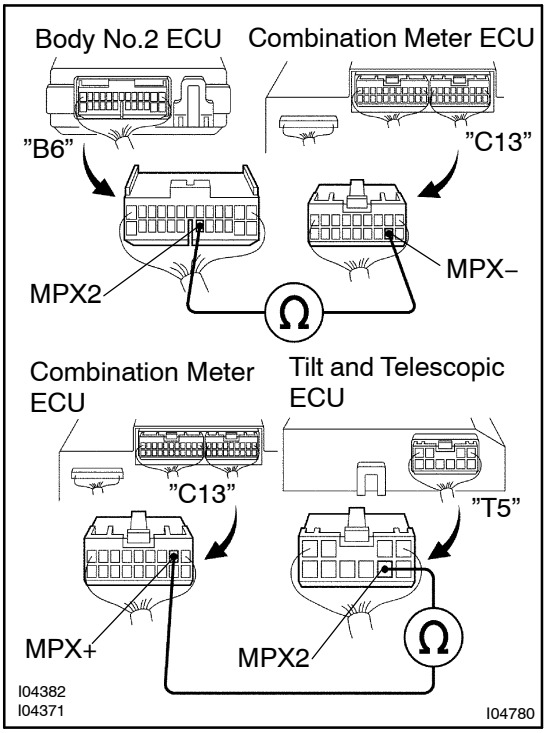
HINT:

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 "B6" of body No.2 ECU, "C13" of combination meter ECU and "T5" of tilt and telescopic ECU.

CHECK:

(a) Check continuity between terminals MPX1 of body No.2 ECU and MPX– of combination meter ECU.

(b) Check continuity between terminals MPX+ of combination meter ECU and MPX2 of tilt and telescopic 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.

DI2BF–02

DTC	B1272 / 72	Power seat ECU communication stop (w/ Seat memory vehicle only)

CIRCUIT DESCRIPTION

This DTC is output when communication stops between power seat ECU and Body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1272/72	No communication from seat ECU more than 10 seconds.	• Power seat ECU • Wireharness

WIRING DIAGRAM

See page DI–816

INSPECTION PROCEDURE

1	Check power seat ECU.

CHECK:

Check that the operation of front vertical and rear vertical is normal.

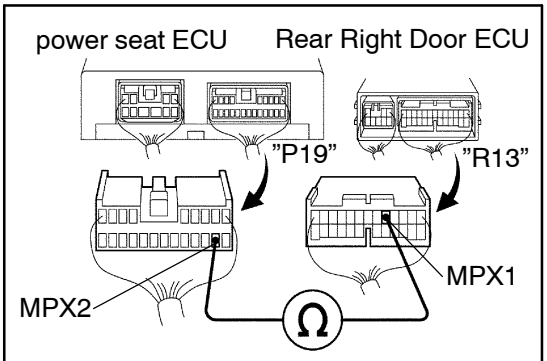
HINT:

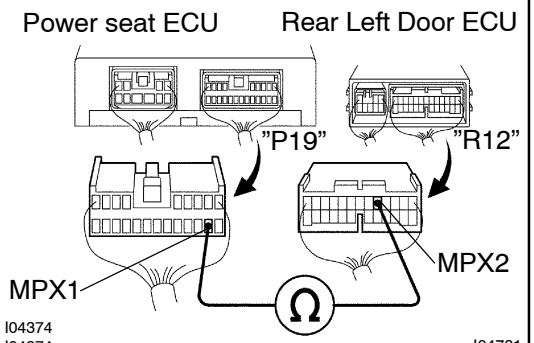
With this inspection, the power seat ECU CPU can be diagnosed if it works normally or not.

NG → Replace the power seat ECU.

OK

2	Check wireharness





I04374
I04374
I04781

PREPARATION:

Disconnect connector ”R13” of rear right door ECU, ”P19” of power seat ECU and ”R12” of rear left door ECU.

CHECK:

(a) Check continuity between terminals MPX1 of rear right door ECU and MPX2 of power seat ECU.

(b) Check continuity between terminals MPX1 of power seat ECU and MPX2 of rear left door 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 power seat ECU.

DI2BG–02

DTC	B1273 / 73	Sliding roof ECU communication stop (w/ Sliding roof vehicle only)

CIRCUIT DESCRIPTION

This DTC is output when communication stops between sliding roof ECU and body No.1 ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1273/73	No communication from sliding roof ECU more than 10 seconds.	• Sliding roof ECU • Wireharness

WIRING DIAGRAM

See page DI–816

INSPECTION PROCEDURE

1	Check sliding roof ECU.

CHECK:

Check that the operation of the sliding roof function is normal.

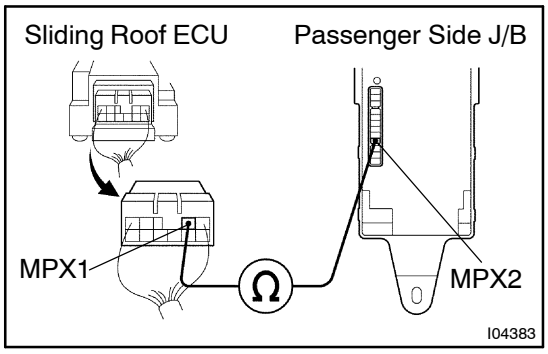
HINT:

With this inspection, the sliding roof ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the sliding roof ECU.**

OK

2	Check wireharness



PREPARATION:

Disconnect connector sliding roof ECU and body No.1 ECU.

HINT:

Connecter is disconnected by removing Body No.1 ECU from passenger side junction block.

CHECK:

(a) Check continuity between terminals MPX2 of body No.1 ECU and MPX1 of sliding roof ECU.

OK:

There is a continuity in wireharness.

NG → **Repair or replace wireharness.**

OK

Replace the sliding roof ECU.

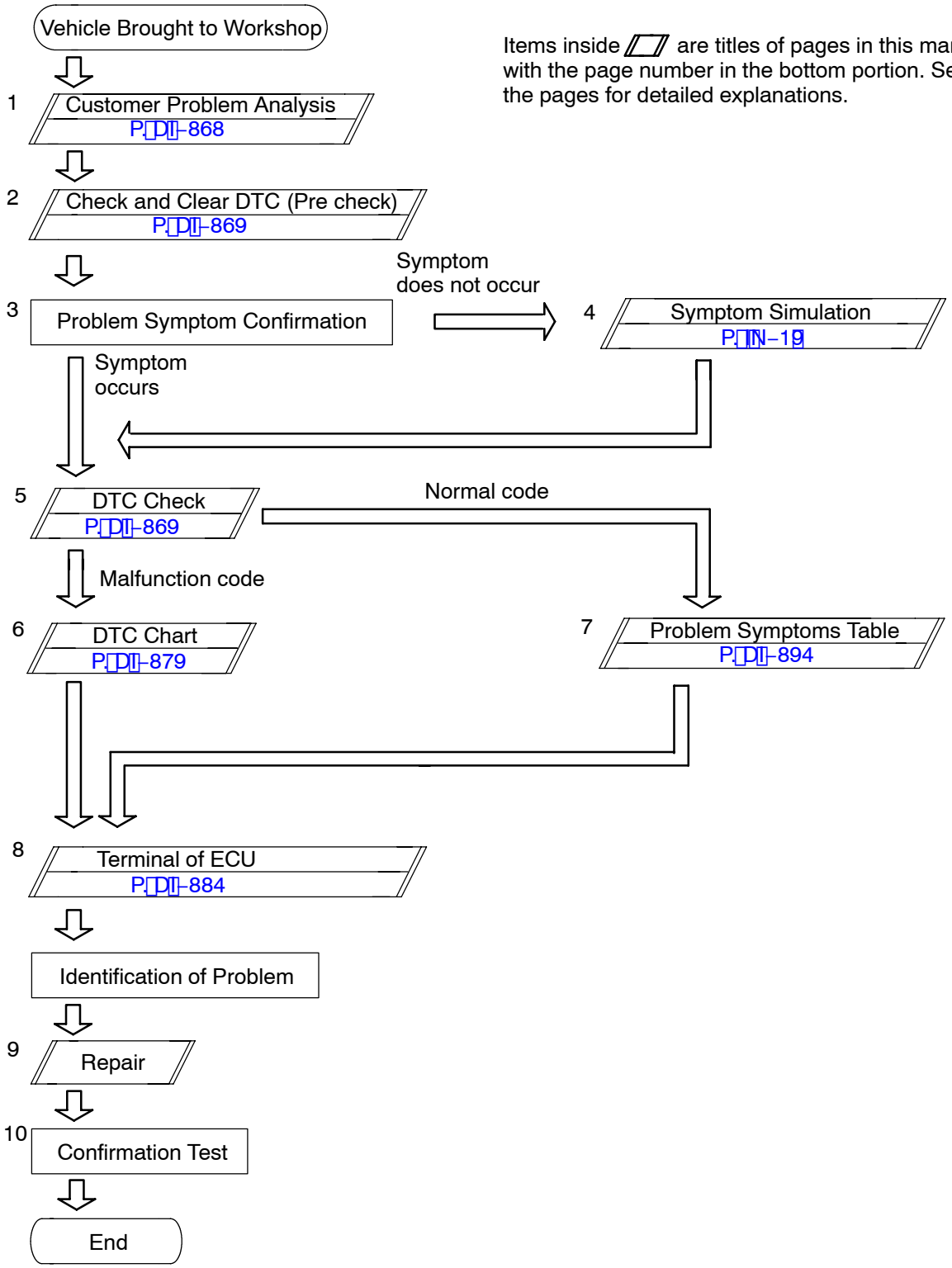
LEXUS NAVIGATION SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI27W–02

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–02

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)

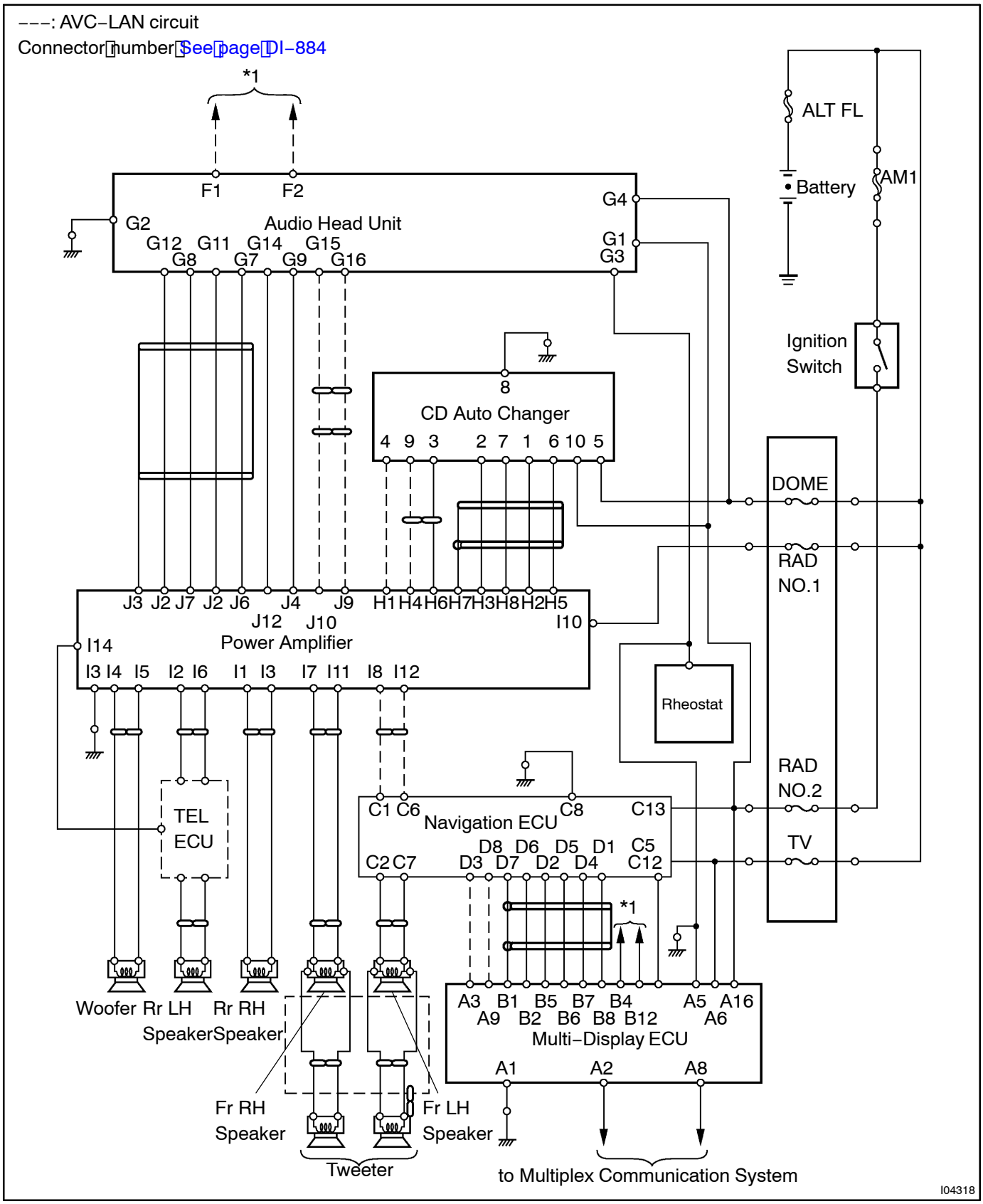
Problem Symptom	**Navigation malfunction**	☐ Cursor movement is defective.
		☐ Cursor does not move.
		☐ GPS mark does not appear.
		☐ Map is not displayed.
		☐ Others ( )
	Display malfunction	☐ Screen is dark.
		☐ Screen is white.
		☐ Color is not uniform.
		☐ Screen is in disorder.
		☐ Others ( )
	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		
	Display ECU		
	Radio receiver assembly		
	Power amplifier		
	CD auto changer		

DI2T7–01

PRE–CHECK

1. WIRING DIAGRAM



2. 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, display ECU, 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.

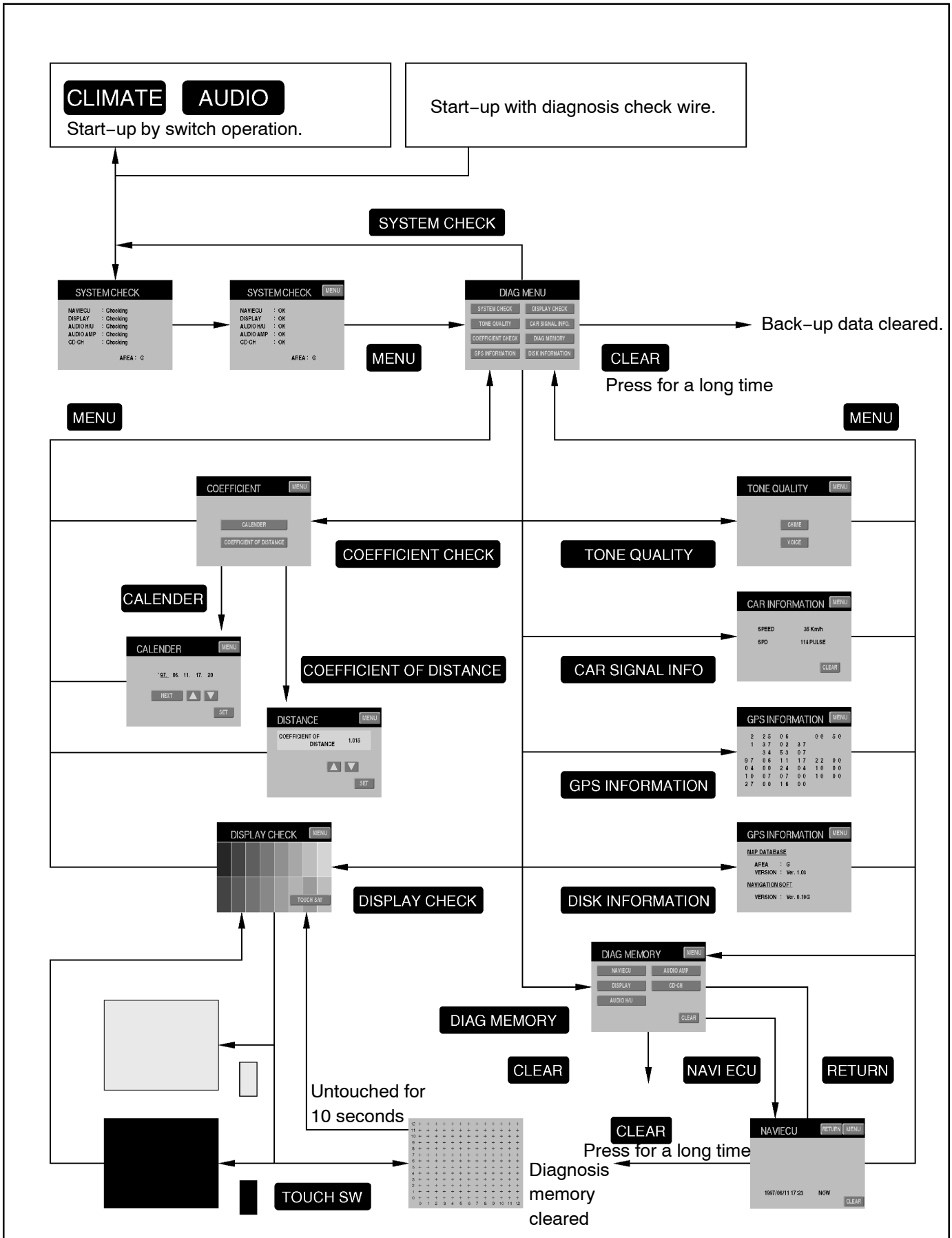
(e) DIAGNOSIS MEMORY
Information is stored in the diagnosis memory when an error occurs in the communication of the system and the system.

(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.

3. DIAGNOSIS CHECK

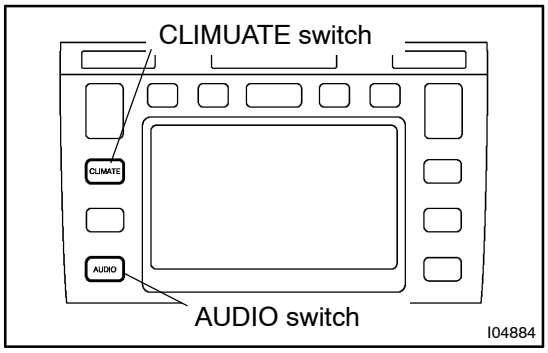


I05145

(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.

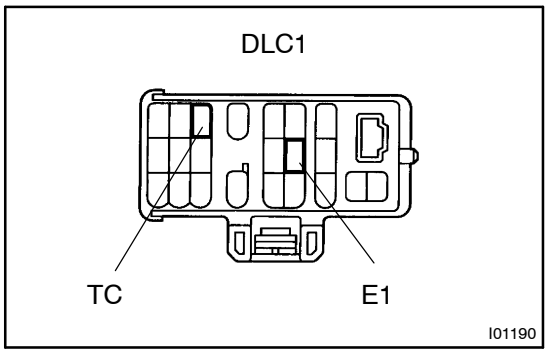


(b) START–UP BY SWITCH OPERATION

While pressing ”CLIMATE” and ”AUDIO” switches simultaneously, by turning the light control switch to OFF, TAIL, OFF, TAIL, and OFF the system is startedup.

NOTICE:

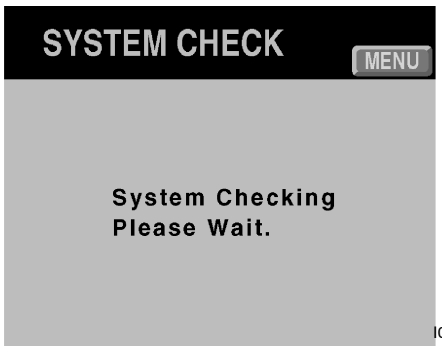
On the screen with LEXUS mark displayed at the time of starting up, do not perform the transmitting operation to the diagnosis mode.



(c) START–UP WITH DIAGNOSIS CHECK WIRE

With the switch in ACC or ON position or engine running, the system is started up by connecting TC and E1 terminals of DLC1 to SST.

SST 09843–18020

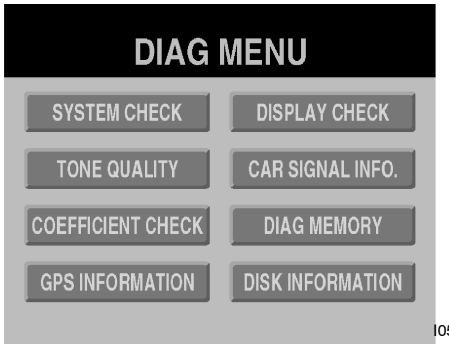


(d) SYSTEM STARTING

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

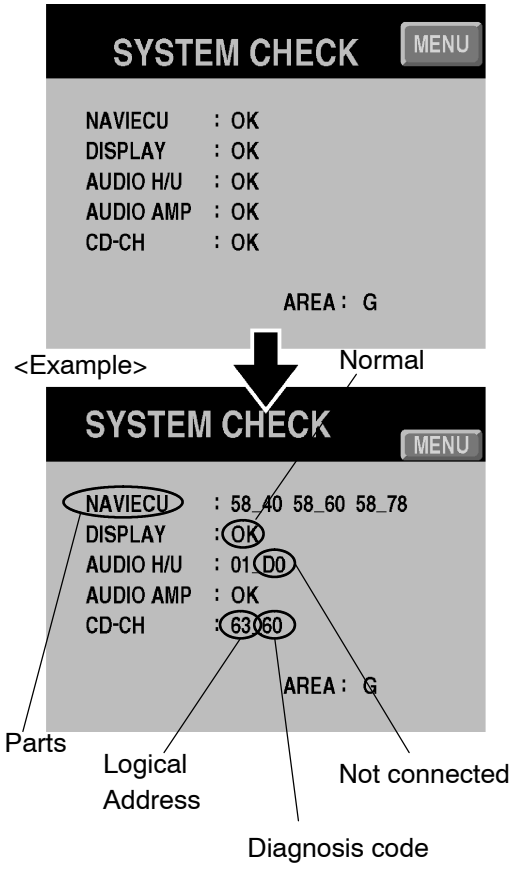
When startingup by switch operation the top menu is displayed on the screen.

Each diagnosis function can be performed by touching switches on this screen.

(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.

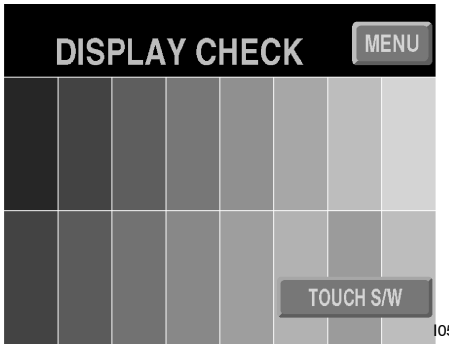
● Checking



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.



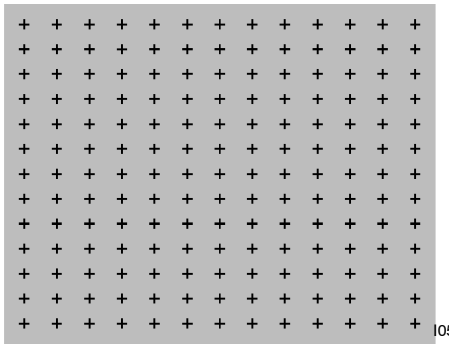
I05148

(h) 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.
- When pressing ”TOUCH S/W”, screen turns to the touch switch check screen.

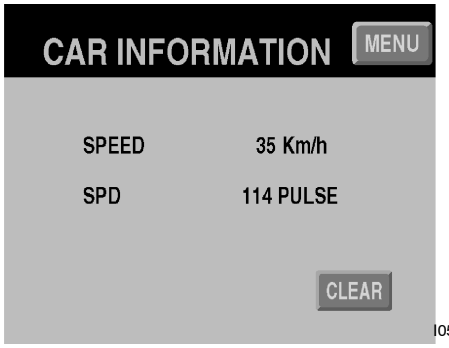

I04300


I04301


I05752

(i) TOUCH SWITCH CHECK SCREEN

- 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.



(j) 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.

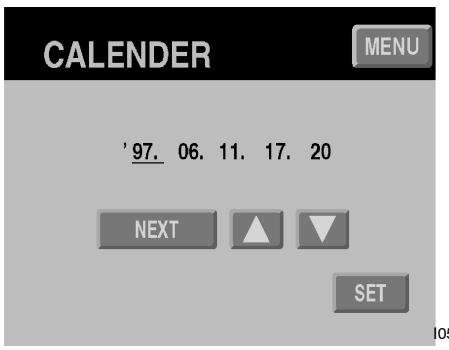
SPEED: This displays the current vehicle speed.
(The displayed unit is the unit currently set.)
SPD: This displays the count of pulse. Pulse is added as the vehicle runs.

- If touching ”CLEAR”, the value of SPD turns to ”0”.
- Each signal is renewed every 1 seconds.



(k) 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.

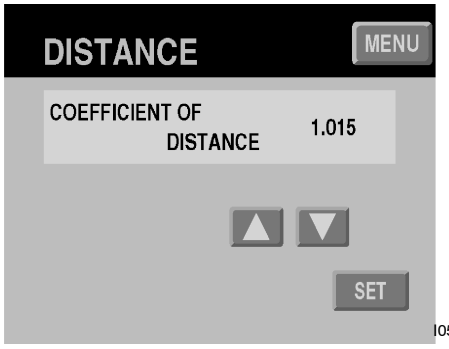


(l) CALENDER SCREEN

- 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.



(m) 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:

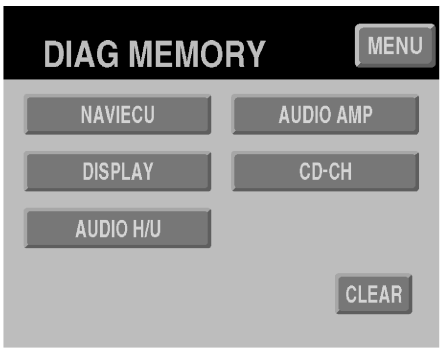
Navigation ECU compensates automatically the error between the distance calculated by ECU and actually measured and performs map–matching. Accordingly it is not necessary for a driver to compensate the error.

- 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.



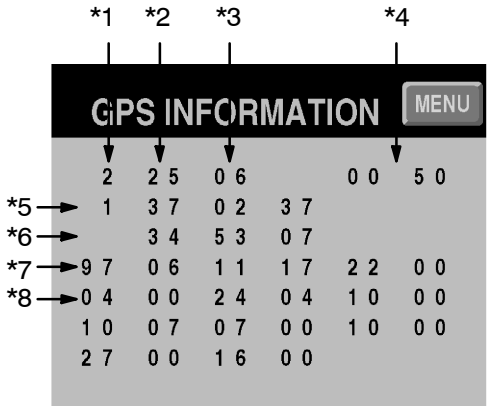
<Example> Select part



(n) 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.
- When the diagnosis code does not occur to any equipment in the system, ”O.K.” is displayed.
- When ”CLEAR” is kept to touch for 3 seconds, all diagnosis memories are cleared.
- When pressing ”CLEAR” for 3 secs., diagnois memories of all equipment are cleared.

<Example>



*1: Two–measurement satellite is caught

*2: 25 satellites available for navigation

*3: 6 satellites that GPS antenna receivess 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 monthes, 11 days,
17 times, 22 minutes, 00 seconds

*8: ID number of satellite

I04225

(o) 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.

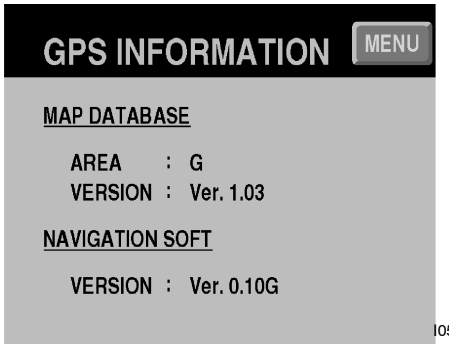
*1: Measurement conditions on present site
0: No measurement satellite is caught.
1: One measurement satellite is caught.
2: Two–measurement satellites are caught.
3: Two–dimensional measurement
4: Three dimensional measurement
F: Receiver disorder
*2: Number of satellites available for navigation.
*3: 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.



I05154

(p) 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 3 times.
- When pressing ”VOICE”, the voice saying ”Please proceed to the highlighted route. Then the route guideance will start.” sounds 1 time.



(q) 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.

DI27Z–02

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–869)
- Diagnosis memory can be memorized when detecting DTC under the usual using condition. (See page DI–869)
- In case that DTC D1 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 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
58	40	Navigation ECU error	When GYRO error is detected.	● Navigation ECU	○	X
58	51	CD–ROM not inserted	CD–ROM is not inserted	● Insert the CD–ROM	○	○
58	52	Different disk	The inserted CD–ROM is not in compliance with the standard.	● Replace the CD–ROM	○	X
58	53	Not readable disk	The data in CD–ROM can not read properly.	● Inspect the CD–ROM	X	○
58	60	GPS error	There is an error on the GPS receiver.	● Navigation ECU	○	○
58	61	GPS antenna not connected	GPS antenna is not connected.	● Connect GPS antenna	○	○
58	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	○	○
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. AUDIO HEAD UNIT

*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
01	D0	ECU unconnected	ECU is unconnected.	● Wire harness and connector ● Audio head unit	○	X
01	FF	Diagnosis no response	Nothing is responded to the required command.	● Wire harness and connector ● Audio head unit	○	X
61	50	Cassette deck error	There is an error on the .cassette deck operation.	● Audio head unit	X	○

3. POWER AMPLIFIER

*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
01	D0	ECU unconnected	ECU is unconnected.	● Wire harness and connector ● Power amplifier	○	X
01	FF	Diagnosis no response	Nothing is responded to the required command.	● Wire harness and connector ● Power amplifier	○	X

4. CD AUTO CHANGER

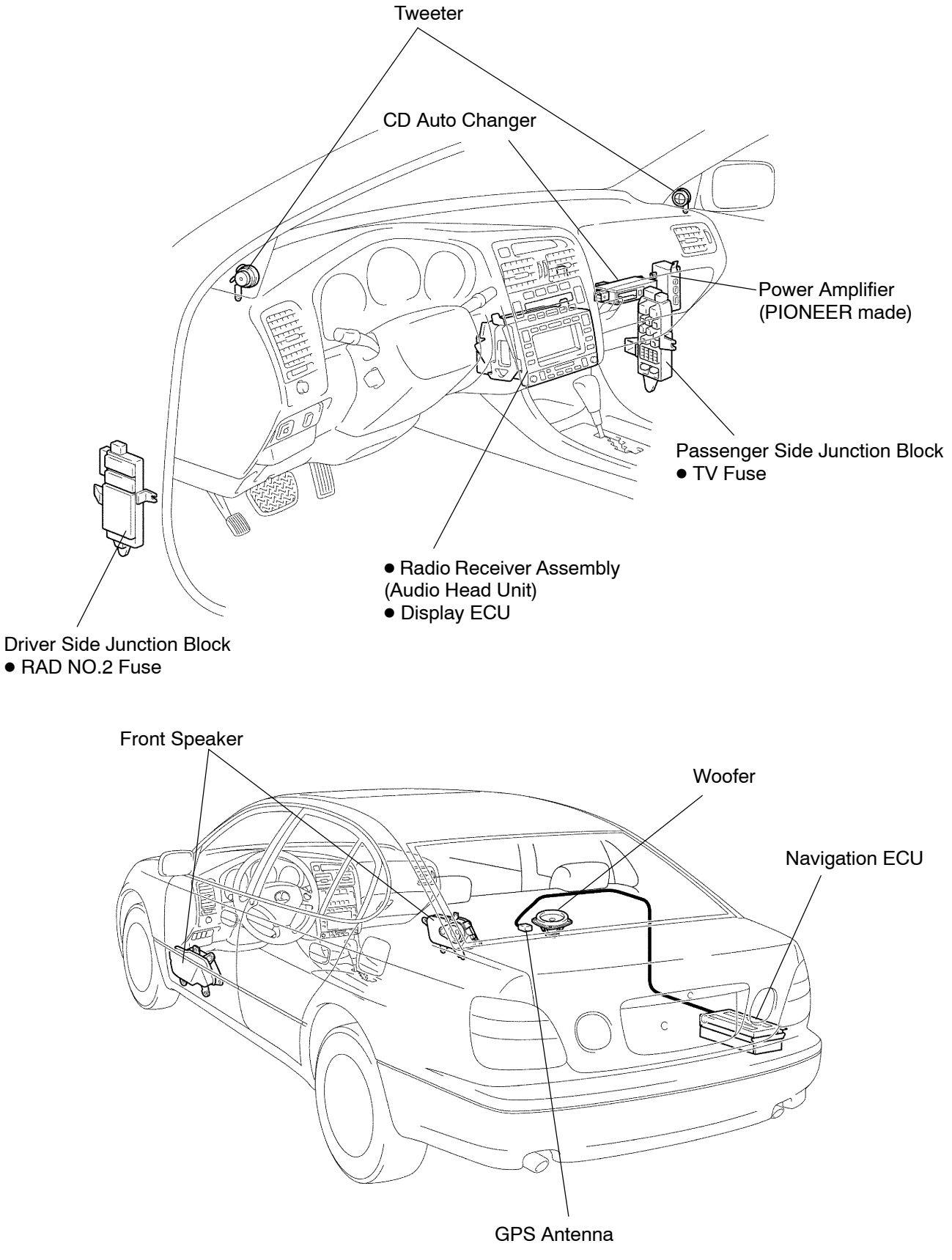
*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
01	D0	ECU unconnected	ECU is unconnected.	● Wire harness and connector ● Display ECU	○	X
01	FF	Diagnosis no response	Nothing is responded to the required command.	● Wire harness and connector ● Display ECU	○	X
63	60	CD auto changer error	There is an error referring to the diagnosis codes except 61 to 69.	● CD auto changer	X	○
63	61	CD auto changer eject error	Magazine can not be ejected from CD auto changer.	● CD auto changer ● Magazine	X	○
63	62	Reversed CD or defect on CD	CD is reversed or has a spot or defect.	● CD	X	○
63	63	CD pick up temperature detection.	High temperature of CD changer is detected.	● CD auto changer	X	○
63	64	CD auto changer excessive voltage check	Excessive voltage is supplied to CD auto changer.	● CD auto changer	X	○
63	67	CD auto changer tray discharging error	Discharging error of the CD auto changer tray occurs.	● CD auto changer ● Magazine	X	○
63	68	CD auto changer elevator error	An error occurs on the CD auto changer elevator.	● CD auto changer	X	○

5. DISPLAY ECU

*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
01	D0	ECU unconnected	ECU is unconnected.	● Wire harness and connector ● Display ECU	○	X
01	FF	Diagnosis no response	Nothing is responded to the required command.	● Wire harness and connector ● Display ECU	○	X
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
34	76	Back light error 1 (No current)	There is an error on the cathode tube in back light system.	● Display ECU	X	○
34	77	Back light error 2 (Excessive current)	There is an error on the cold cathode tube in back light system.	● Display ECU	X	○
21	83	Panel switch error	Nothing is responded from the panel switches.	● Display ECU	○	X
21	84	Touch switch error	Nothing is responede from the touch switches.	● Display ECU	○	X

DI280–02

PARTS LOCATION

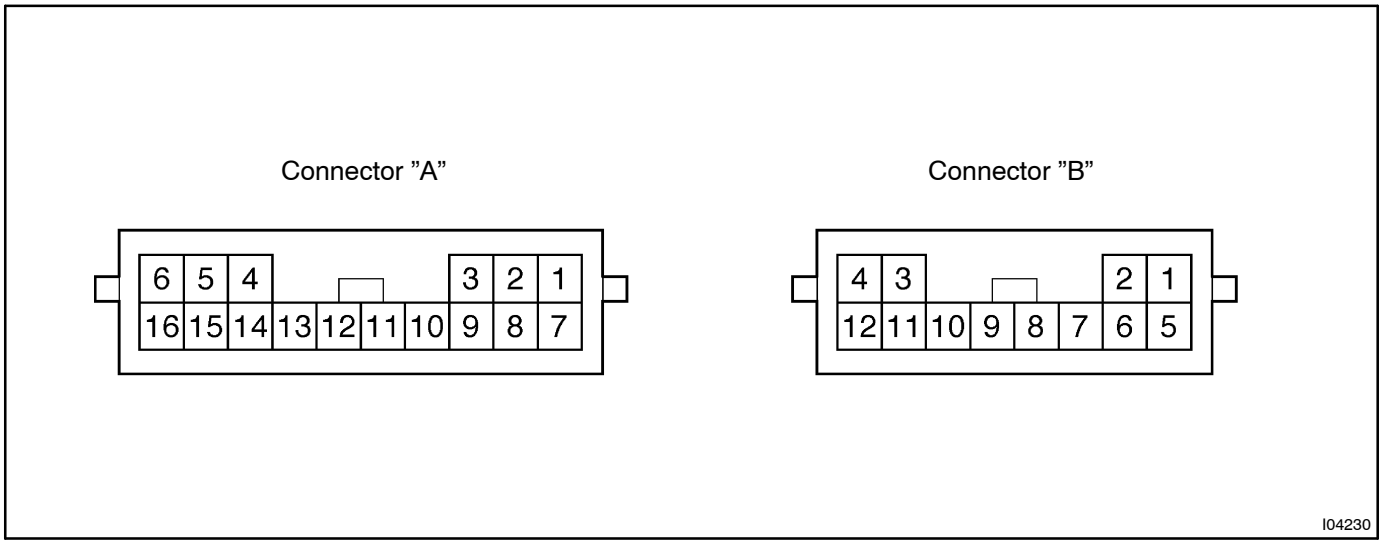


I01381

DI28R–02

TERMINALS OF ECU

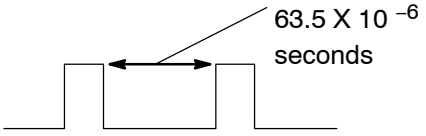
1. DISPLAY ECU



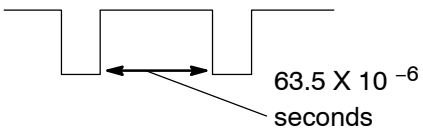
Terminals Symbols	Condition	Specified value	Problem symptom when open circuit is detected. Problem symptom when short circuit is detected.
A1 – Body ground	Constant	Continuity	Screen noise or other types of noise occur.
GND1 – Body ground			LEXUS navigation system is normal.
A2 – A1	Ignition switch ACC or ON (Using an oscilloscope)	10 – 14 V	A/C does not operate.
MPX1 – GND1		1 V or below	
A3 – A1	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.
TX1+ – GND1			
A4 – A1	Seat belt unfastened	0.5 V or below	Seat belt warning light does not light up.
PBEW – GND1			Seat belt warning light lights up.
A5 – A1	Light control switch TAIL (Using an oscilloscope)	10 – 14 V	Panel switch illumination does not light up.
ILL– – GND1		0.5 V or below	Light control rheostat does not operate.
A6 – A1	Constant	10 – 14 V	LEXUS navigation system does not operate.
+B1 – GND1			Fuse is blown.
A8 – A1	Ignition switch ACC or ON (Using an oscilloscope)	10 – 14 V	A/C system does not operate.
MPX2 – GND1		1 V or below	
A9 – A1	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.
TX1– – GND1			
A15 – A1	Light control switch TAIL	10 – 14 V	Panel switch illumination does not light up.
ILL+ – GND1			Fuse is blown. (Panel switch illumination does not light up.)

A16 – A1	Ignition switch ACC or ON	10 – 14 V	LEXUS navigation system does not operate.
ACC – GND1			Fuse is blown. (LEXUS navigation system does not operate.)
B1 – B5	Constant	Continuity	Screen noise or other types of noise occur.
VR – VG			LEXUS navigation system does not operate.
B2 – B5	Display ON (Using an oscilloscope)	0.5 – 1.3 V *2	Screen is in disorder.
SYNC – VG			
B3 – A1	Ignition switch ACC or ON	2 – 3 V	Cellular phone does not operate.
DTX+ – GND1			LEXUS navigation system does not operate.
B4 – A1	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.
TX+ – GND1			
B5 – A1	Constant	Continuity	Screen noise or other types of noise occur.
VG – GND1			LEXUS navigation system is normal.
B6 – B5	Diagnosis display check screen is white. (Using an oscilloscope)	0.7 V ± 0.1 V *1	Screen color turns to yellow.
B – VG			
B7 – B5			Screen color turns to red–purple.
G – VG			
B8 – B5			Screen color turns to light blue.
R – VG			
B11 – A1	Ignition switch ACC or ON	2 – 3 V	Cellular phone does not operate.
DTX– – GND1			LEXUS navigation system does not operate.
B12 – A1	Ignition switch ACC or ON	2 – 3 V	Audio system does not operate.
TX– – GND1			LEXUS navigation system does not operate.

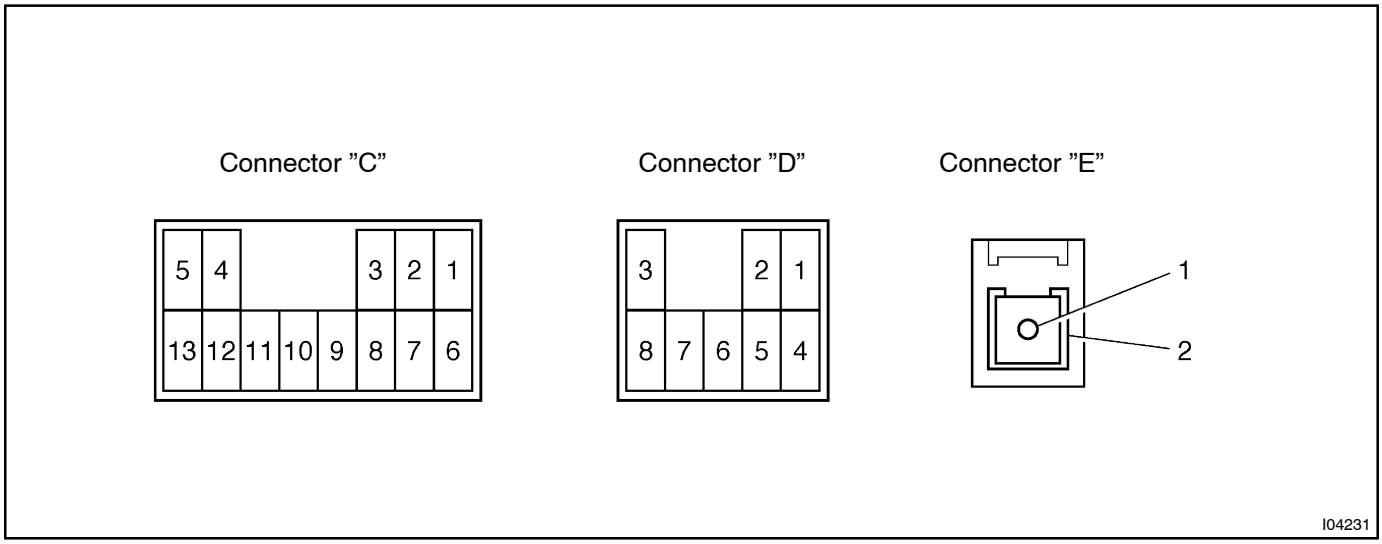
*1



*2



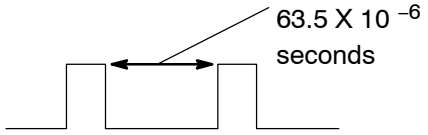
2. NAVIGATION ECU



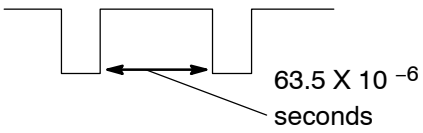
Terminals Symbols	Condition	Specified value	Problem symptom when open circuit Problem symptom when short circuit
C1 – C8 AUI+ – GND1	Radio switch ON	5 – 7 V	Driver’s side speaker does not sound.
C2 – C8 AUO+ – GND1	Radio switch ON	5 – 7 V	Driver’s side speaker does not sound.
C5 – C8	Constant	10 – 14 V	The set route can not be memorized. (The route disappears by turning the ignition switch OFF.)
+B – GND1			Fuse is blown.
C6 – C8 AUI– – GND1	Radio switch ON	5 – 7 V	Driver’s side speaker does not sound.
C7 – C8 AUO– – GND1	Radio switch ON	5 – 7 V	Driver’s side speaker does not sound.
C8 – Body ground	Constant	Continuity	LEXUS navigation system does not operate.
GND1 – Body ground			LEXUS navigation system is normal.
C12 – C8 SPD – GND1	Ignition switch ON and driving wheel rotated slowly.	Repeatedly changes from below 1 V to 9 V	Navigation operation is available during driving, or a cursor on present site does not move.
C13 – C8	Ignition switch ACC	10 – 14 V	LEXUS navigation system does not operate.
ACC – GND1			Fuse is blown.
D1 – D6 R – VR	Diagnosis display check screen is white. (Using an oscilloscope)	0. 7 V ± 0.1 V *1	Screen color turns to light blue.
D2 – D6 SYNC – VR	Ignition switch ACC or ON (Using an oscilloscope)	0.5 – 1.3 V *2	Screen is in disorder.
D3 – C8 TX+ – GND1	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.

D4 – D6	Diagnosis display check screen is white. (Using an oscilloscope)	0. 7 V ± 0.1 V *1	Screen color turns to red–purple.
G – VR			
D5 – D6			Screen color turns to yellow.
B – VR			
D6 – D7	Constant	Continuity	Screen noise or other types of noise occur.
VR – VG			LEXUS navigation system does not operate.
D7 – C8	Constant	Continuity	Screen noise or other types of noise occur.
VG – GND1			LEXUS navigation system does not operate.
D8 – C8	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.
TX– – GND1			
E1	–	–	–
GPS			
E2 – Body ground	Constant	Continuity	GPS signal reception error
GND1 – Body ground			

*1

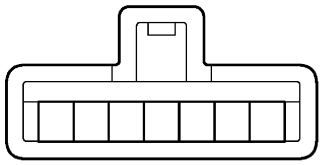


*2

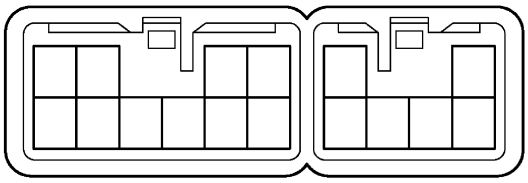


3. AUDIO HEAD UNIT

Connector ”F”



Connector ”G”



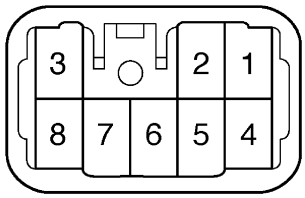
I04232

Terminals Symbols	Condition	Specified value	Problem symptom when open circuit Problem symptom when short circuit
F1 – G2 TX– – GND	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.
F2 – G2 TX+ – GND	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.
F3 – G2 ANTB – GND	Radio switch ON	10 – 14 V	Antenna does not extend.
F4 – G2 ANTA – GND	Radio switch ON	10 – 14 V	Antenna does not extend.
F5 – G2 ANT – GND	Radio switch ON	10 – 14 V	Antenna does not extend.
G1 – G2 ACC – GND	Ignition switch ACC or ON	10 – 14 V	Audio system does not sound.
G2 – Body ground GND – Body ground	Constant	Continuity	Audio system is normal.
G4 – G2	Light control switch TAIL	10 – 14 V	Audio head unit illumination does not light up.
B – GND			Fuse is blown.
G5 – G2	Constant	10 – 14 V	Audio system does not operate.
ILL+ – GND			Fuse is blown.
G6 – G2	Light control switch TAIL	10 – 14 V	Audio head unit illumination does not light up.
ILL– – GND		0.5 V or below	Light control rheostat does not operate.
G7 R+	–	–	Sound from right side speaker is small.
G8 L+	–	–	Sound from left side speaker is small.

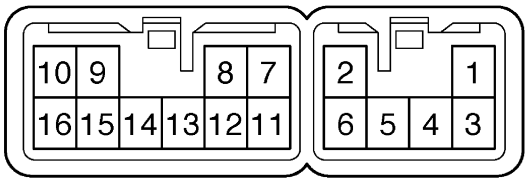
G9 – G2 ACC – GND	Radio switch ON	10 – 14 V	Audio system does not sound.
G11 R–	–	–	Sound from right side speaker is small.
G12 L–	–	–	Sound from left side speaker is small.
G14 – G2 MUTE – GND	Radio switch ON	5 V	Pop sound etc., during key operation.
G15 – G2	Ignition switch ACC or ON	2 – 3 V	Audio system does not operate.
BUS– – GND			LEXUS navigation system does not operate.
G16 – G2 BUS+ – GND	Ignition switch ACC or ON	2 – 3 V	LEXUS navigation system does not operate.

4. POWER AMPLIFIER – 1

Connector ”H”



Connector ”I”



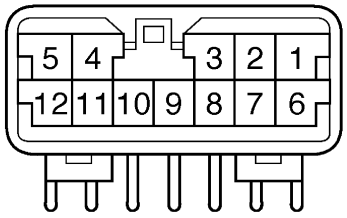
I04233

Terminals Symbols	Condition	Specified value	Problem symptom when open circuit Problem symptom when short circuit
H1 – I13	Ignition switch ACC or ON	2 – 3 V	Audio system does not operate.
TXM+ – E			LEXUS navigation system does not operate.
H2	–	–	Sound from right side speaker is small.
CDR+			
H3	–	–	Sound from left side speaker is small.
CDL+			
H4 – I13	Ignition switch ACC or ON	2 – 3 V	Audio system does not operate.
TXM+ – E			LEXUS navigation system does not operate.
H5	–	–	Sound from right side speaker is small.
CDR–			
H6 – I13	CD auto changer operation	5 V	Pop sound etc..
CDMT – E			
H7 – Body ground	Constant	Continuity	Audio system is normal.
SGND – Body ground			
H8	–	–	Sound from left side speaker is small.
CDL–			
I1 – I13	Radio switch ON	5 – 7 V	Rear RH speaker does not sound.
SRR+ – E			Rear speaker does not sound.
I2 – I13	Radio switch ON	5 – 7 V	Rear LH speaker does not sound.
SRL+ – E			Rear speaker does not sound.
I3 – I13	Radio switch ON	5 – 7 V	Rear RH speaker does not sound.
SRR– – E			Rear speaker does not sound.
I4 – I13	Radio switch ON	5 – 7 V	Woofer does not sound.
WF+ – E	Radio switch ON	5 – 7 V	Woofer does not sound.
I5 – I13	Radio switch ON	5 – 7 V	Woofer does not sound.
WF– – E			

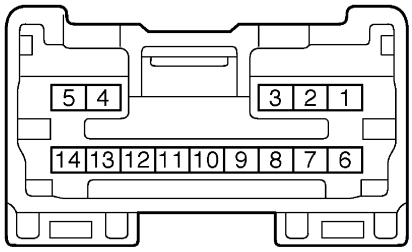
I6 – I13	Radio switch ON	5 – 7 V	Rear LH speaker does not sound.
SRL– – E			Rear speaker does not sound.
I7 – I13	Radio switch ON	5 – 7 V	Rear RH speaker does not sound.
SFR+ – E			Rear speaker does not sound.
I8 – I13	Radio switch ON	5 – 7 V	Rear LH speaker does not sound.
SFL+ – E			Rear speaker does not sound.
I10 – I13	Constant	10 – 14 V	Audio system does not sound.
+B – E			Fuse is blown.
I11 – I13	Radio switch ON	5 – 7 V	Rear RH speaker does not sound.
SFR– – E			Rear speaker does not sound.
I12 – I13	Radio switch ON	5 – 7 V	Rear LH speaker does not sound.
SFL– – E			Rear speaker does not sound.
I13 – Body ground	Constant	Continuity	Audio system is normal.
E – Body ground			
I14 – I13	Cellular phone system is switched.	5 V	Pop sound.
TLMT – E			

5. POWER AMPLIFIER – 2

Connector ”J”



Connector ”K”

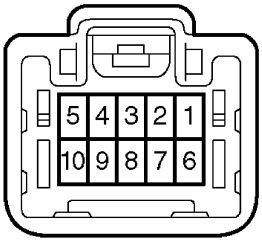


I04234

Terminals Symbols	Condition	Specified value	Problem symptom when open circuit is detected. Problem symptom when short circuit is detected.
J1 R+	–	–	RH side speaker does not sound.
J2 L+	–	–	LH side speaker does not sound.
J3 – Body ground SGND – Body ground	Constant	Continuity	Audio system is normal.
J4 – J3 MUTE – SGND	Radio switch ON	5 V	Pop sound etc.. Audio system does not sound.
J6 R–	–	–	RH side speaker does not sound.
J7 L–	–	–	LH side speaker does not sound.
J9 – J3 RTX– – SGND	Ignition switch ACC or ON	2 – 3 V	Audio system does not sound. LEXUS navigation system does not sound.
J10 – J3 RTX+ – SGND	Ignition switch ACC or ON	2 – 3 V	Audio system does not sound. LEXUS navigation system does not sound.
J12 – J3 ACC – SGND	Ignition switch ACC or ON	10– 14 V	Audio system does not sound.

6. CD AUTO CHANGER

Connector ”L”



I04235

Terminals Symbols	Condition	Specified value	Problem symptom when open circuit is detected. Problem symptom when short circuit is detected.
L1 CDR+	–	–	Sound from right side speaker is small.
L2 CDL+	–	–	Sound from left side speaker is small.
L3 – Body ground SGND – Body gound	Constant	Continuity	Audio system does not sound.
L3 – L8 MUTE – SGND	Radio switch ON	5 V	Pop sound etc.. Audio system does not sound.
L4 – L8 TXM+ – GND	Ignition switch ACC or ON	2 – 3 V	CD auto changer does not operate. LEXUS navigation system does not operate.
L5 – L8 +B – SGND	Constant	10 – 14 V	CD auto changer does not operate. Fuse is blown.
L6 CDR–	–	–	Sound from right side speaker is small.
L7 CDL–	–	–	Sound from left side speaker is small.
L8 – Body ground GND – Body gound	Constant	Continuity	Audio system is normal.
L9 – L8 TXM– – GND	Ignition switch ACC or ON	2 – 3 V	CD auto changer does not operate. LEXUS navigation system does not operate.
L10 – L8 ACC – GND	Ignition switch ACC or ON	10 – 14 V	CD auto changer does not operate. Fuse is blown.

DI282–02

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. Display ECU (connector ”A”) 2. Wire harness and connector	DI–884 IN–29
Nothing appears on the screen. (Back light lights up.)	1. Display ECU (Connector ”B” terminal R, G, B) 2. Navigation ECU (Connector ”C” terminal ACC, +B Connector ”D” terminal R, G,B) 3. Wire harness and connector	 DI–884 DI–884 DI–884 IN–29
The screen is white.	1. Display ECU (Connector ”B” terminal R, G, B) 2. Navigation ECU (Connector ”D” terminal R, G,B) 3. Wire harness and connector	 DI–884 DI–884 IN–29
The screen is in disorder. (Synchronizing disorderly.)	1. Display ECU (Connector ”B” terminal SYNC) 2. Navigation ECU (Connector ”D” terminal SYNC) 3. Wire harness and connector	 DI–884 DI–884 IN–29
The color on the screen is unusual.	1. Display ECU (Connector ”B” terminal R, G, B) 2. Navigation ECU (Connector ”D” terminal R, G,B) 3. Wire harness and connector	 DI–884 DI–884 IN–29
Panel switch does not work. (Touch switch is normal.)	1. Display ECU	DI–884
Panel switch does not work. (Touch switch does not work.)	1. AVC–LAN circuit	DI–896
All touch switches do not work. (Panel switch does not work.)	1. AVC–LAN circuit	DI–896
Each touch switch does not work. (Panel switch is normal.)	1. Display ECU	DI–884
GPS mark does not appear at any time and at any place.	1. Navigation ECU (Diagnosis check) 2. Wire harness and connector (Connector ”E”)	DI–884 IN–29
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 (Connector ”C” terminal ”SPD”)	DI–884 IN–29
Movement of cursor on present site is always unusual.	1. Navigation ECU	DI–884
Even though the battery has not been removed, the route and destination are not displayed.	1. Navigation ECU (Connector ”C” terminal ”+B”) 2. Wire harness and connector	DI–884 IN–29
Navigation voice can not be heard at all from the driver’s side speaker.	1. Navigation ECU (Volume adjustment)	DI–884

No sound except the navigation voice can be heard at all from the driver's side speaker.	1. Power amplifier (Connector "I" terminal "SFL+", "SFL–", ("SFR+", "SFR–")) 2. Navigation ECU (Connector "C" terminal "AUI+" , "AUI–", "AUO+", "AUO–") 3 Wire harness and connector	DI–884 DI–884 IN–29
No sound can be heard at all from the driver's side speaker.	1. Driver's side speaker 2. Wire harness and connector	– IN–29
No sound can be heard from any speakers.	1. See "AUDIO SYSTEM"	BE–204
The A/C operation screen does not tone down.	1. Display ECU 2. Navigation ECU 3. WIre harness and connector	DI–884 DI–884 IN–29
The audio operation screen is unusual.	1. Audio head unit 2. Navigation ECU	DI–884 IN–29
The screen does not turn to the audio operation screen.	1. Audio head unit 2. WIre harness and connector	DI–884 IN–29
The all indicators of A/C do not light up. (The switches related to the A/C do not work.)	1. Display ECU 2. A/C ECU 3. Maltiplex communication system	DI–884 DI–884 IN–29
The each indicator of A/C does not light up. (The switches related to the A/C do not work.)	1. Bulb	–
No map is displayed on the screen.	1. Navigation ECU (Diagnosis check)	 DI–884

DI283–02

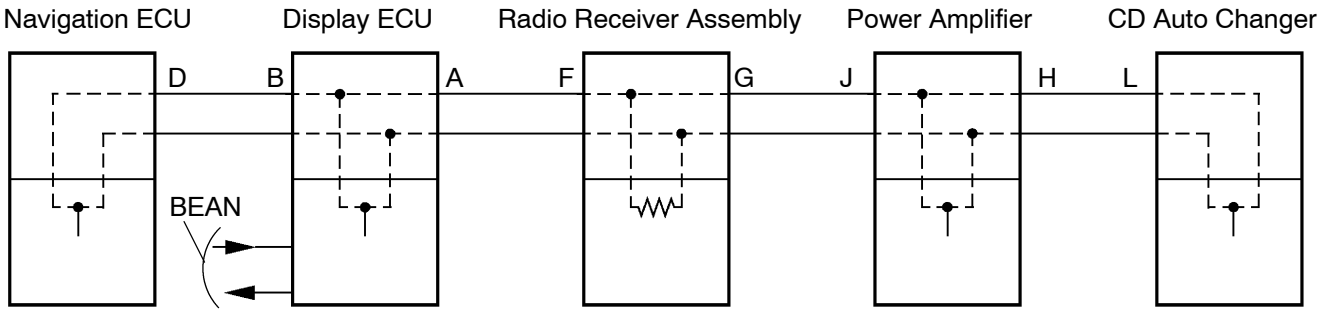
CIRCUIT INSPECTION

AVC–LAN (Communication bus) Circuit

CIRCUIT DESCRIPTION

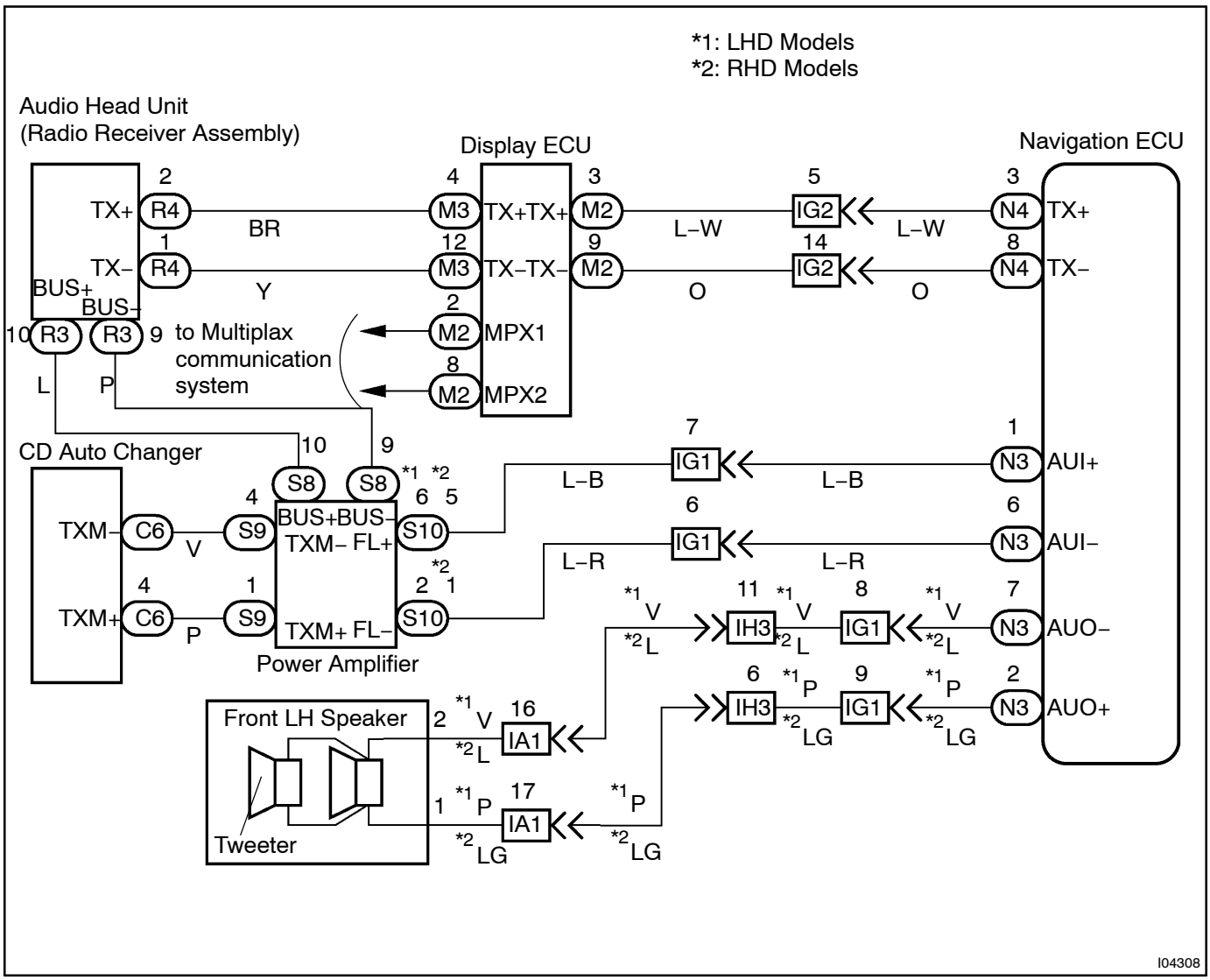
Each unit of LEXUS navigation system connected with AVC–LAN (communication bus) transfers the signal of each switch by communication.
When +B short and GND short occur in this AVC–LAN, LEXUS navigation system will not function normally as the communication is discontinued.
In this AVC–LAN, Navigation ECU becomes the master of the communication, and the audio head unit has a resistance necessary for transmitting the communication.
Display ECU is connected between Navigation ECU and Audio head unit, LEXUS navigation system has the structure that makes communication impossible without Navigation ECU, Display ECU or Audio head unit.

AVC–LAN



I04236

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Disconnect the connector of CD auto changer 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 CD auto changer.**

NG

2	**Disconnect the "J" connector of the Amplifier, 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	**Repair or replace wire harness or connector between amplifier and CD auto changer.**

NG

3	**Disconnect the "I" connector of the Amplifier, 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 amplifier.**

NG

4	**Disconnect the ”G” connector of the Audio head unit, 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 → **Repair or replace wire harness or connector between Audio head unit and amplifier.**

NG

5	**Check wire harness and connector between Audio head unit and Display ECU. (See page IN–29)**

NG → **Repair or replace wire harness or connector between Audio head unit and Display ECU.**

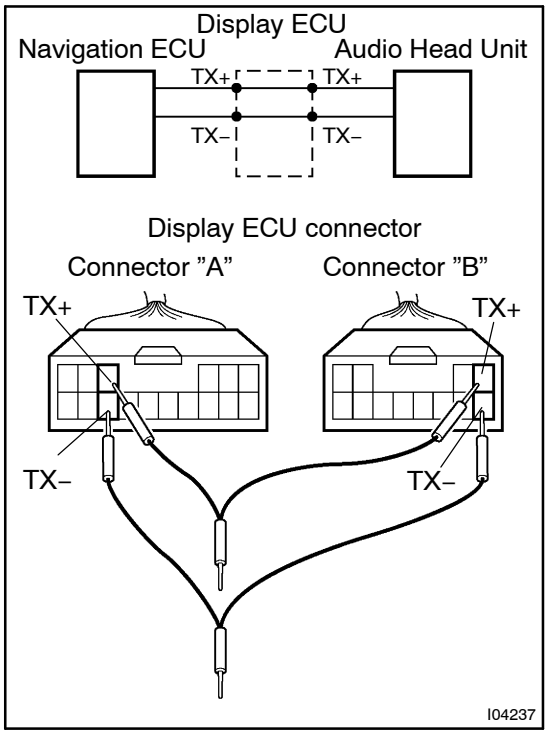
OK

6	**Check wire harness and connector between Display ECU and Navigation ECU. (See page IN–29)**

NG → **Repair or replace wire harness or connector between Display ECU and Navigation ECU.**

OK

7	Skip Display ECU and check AVC–LAN.



PREPARATION:

(a) Connect all the connectors except ”A” and ”B” of the Display ECU.

(b) Using 2 SSTs (Diagnosis check wire P/N 09893–12040), connect the terminal TX+ of connector ”A” and TX+ of connector ”B”, the terminal TX– of connector ”A” and TX– of connector ”B” respectively of Display ECU.

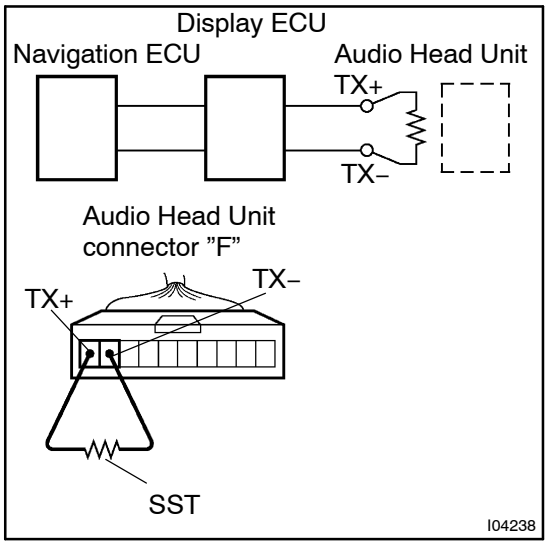
CHECK:

Operate Audio head unit (CD, Cassette tape, etc.) and check that the sound comes out from the speaker.
(Check that AVC–LAN is recovered.)

OK	Replace the Display ECU.

NG

8	Skip Audio head unit and check AVC–LAN.



PREPARATION:

(a) Connect Display ECU connector.
(b) Disconnect Audio head unit ”F” connector.
(c) Using SST (Navigation Check Wire P/N 09843–18050), connect the terminal TX+ to terminal TX– of ”F” connector of Audio head Unit.

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 Audio head unit.**

NG

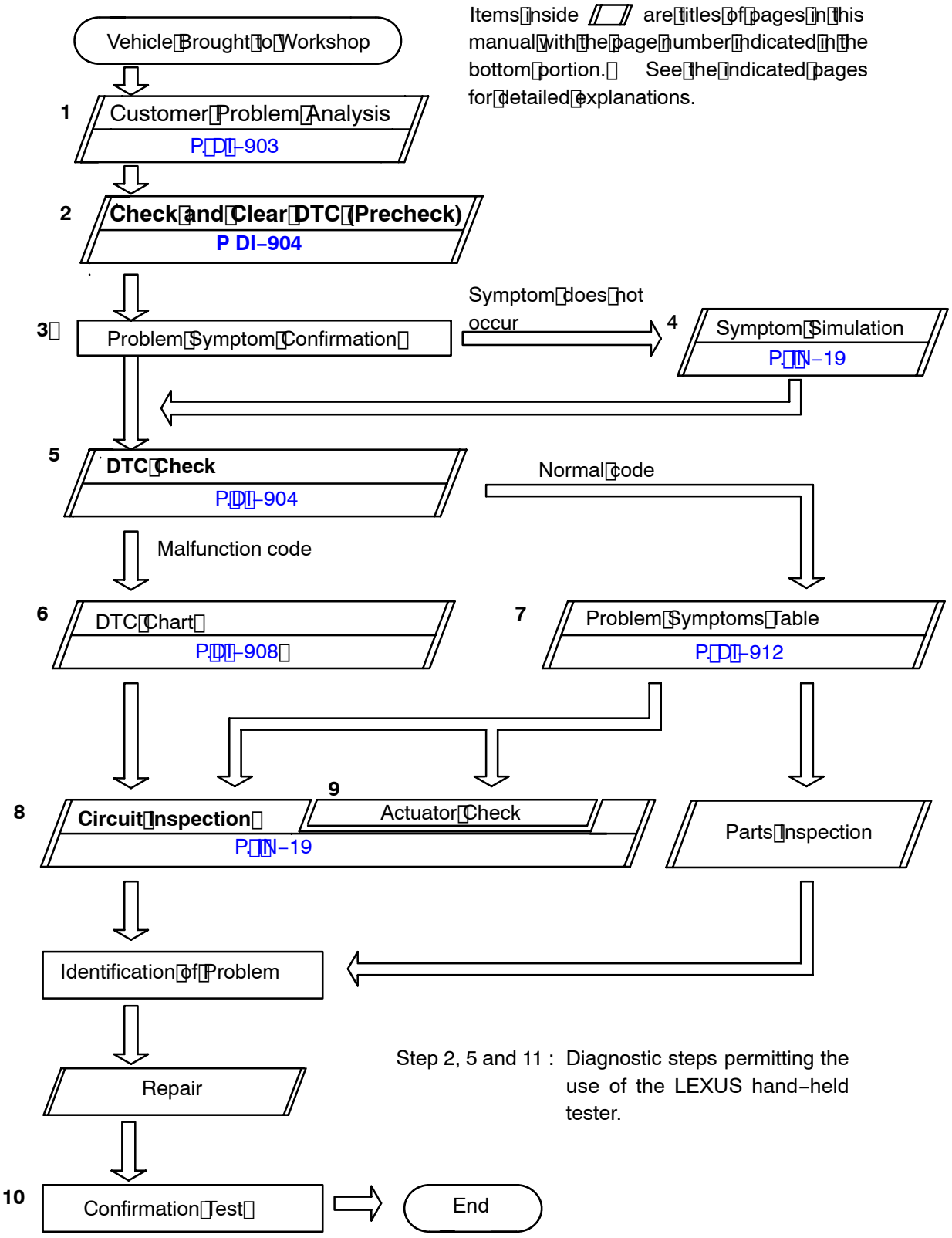
Replace the Navigation ECU.

AIR CONDITIONING SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI261–01

Perform troubleshooting in accordance with the procedure on the following page.



DI262–01

CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

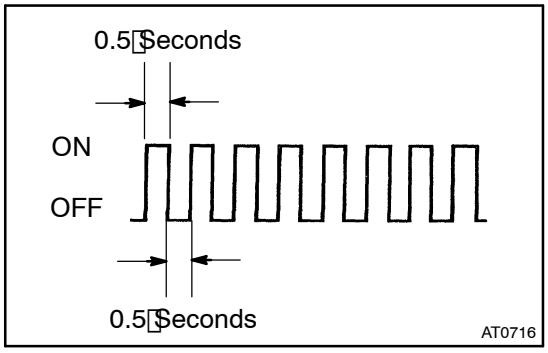
Inspector's name:

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)



DI2QW–01

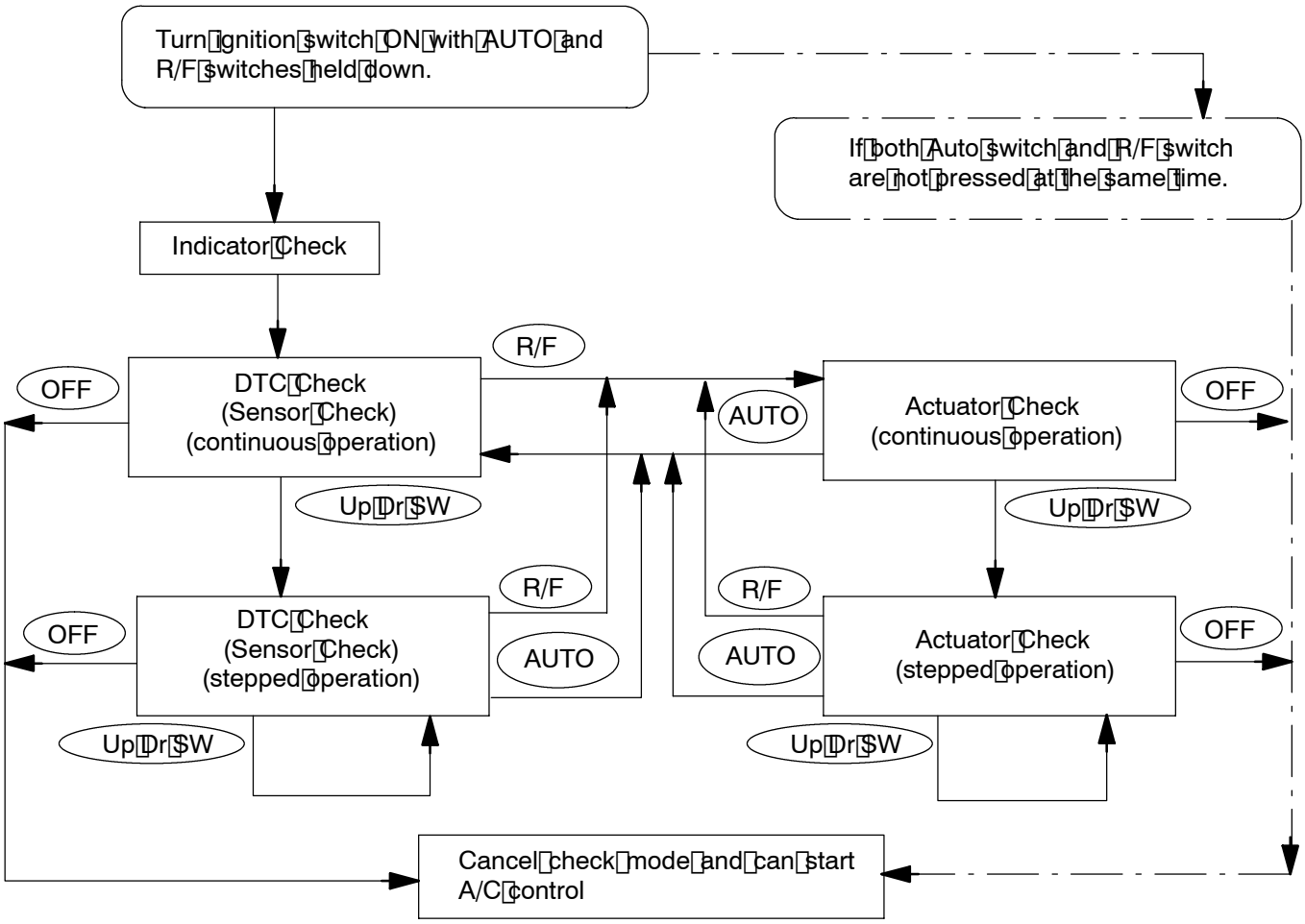
PRE–CHECK

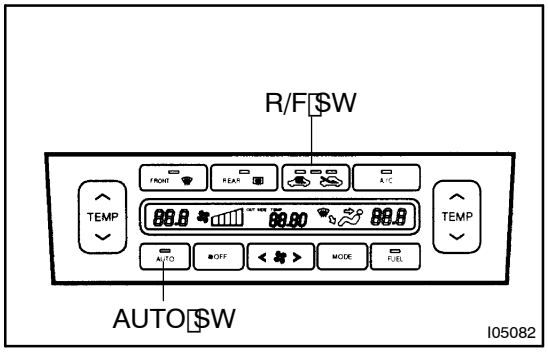
1. WARNING FOR A/C COMPRESSOR LOCK

If compressor lock occurs during A/C operation, the A/C switch indicator on the A/C control assembly starts blinking.
When this occurs, check for compressor lock (DTC B1422/22) using diagnosis trouble code check then proceed to inspect the circuit or the component.
Compressor lock sensor circuit. → (See page DI–929)

2. LIST OF OPERATION METHODS

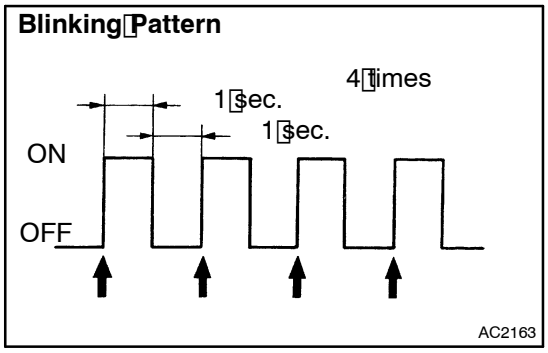
By operating each of the A/C control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.





3. INDICATOR CHECK

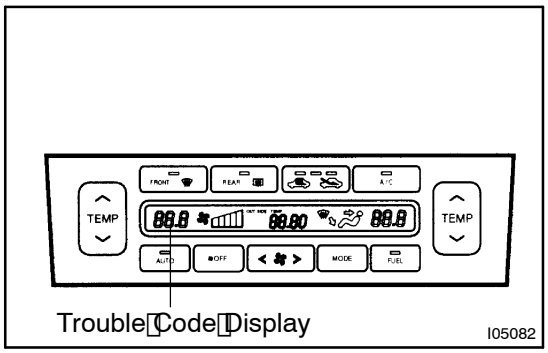
(a) Turn the ignition switch on while pressing the A/C control AUTO switch and R/F SW simultaneously.



(b) Check that all the indicators light up and go off at 1 second intervals 4 times in succession.

HINT:

- After the indicator check is ended, the diagnostic trouble code check begins automatically.
- Press the OFF switch when desiring to cancel the check mode.



4. DTC CHECK (SENSOR CHECK)

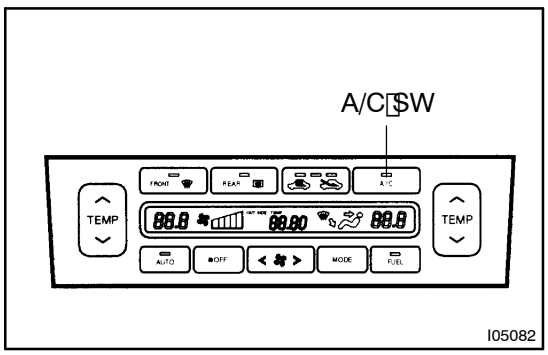
(a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.

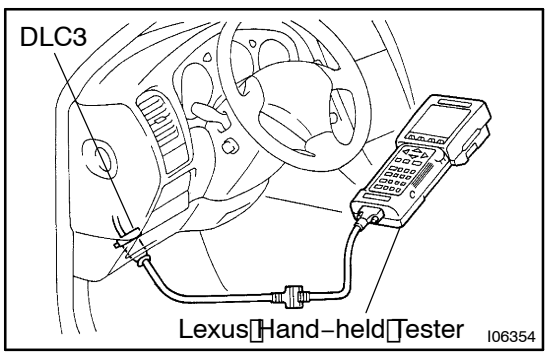
(b) Read the DTC displayed on the panel. Refer to the list of DTCs on page DI–908 when reading the DTCs.
(DTCs are out put at the temperature display.)
If the slower display is desired, press the Driver Side Temp. Control Switch and change it to step operation. Each time the Driver Side Temp. Control switch is pressed, the display changes by 1 step.

HINT:

W/ EMV only

- If the buzzer sounds when a DTC is being read, it means the trouble indicated by that DTC continues to occur.
- If the buzzer does not sound when a DTC is being read, it means the trouble indicated by that DTC occurred earlier (such as poor connector contacts, etc.)

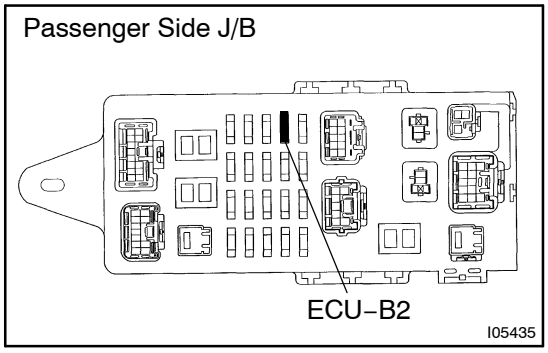




5. DTC CHECK USING LEXUS HAND–HELD TESTER

(a) Hook up the LEXUS hand–held tester to the DLC3.

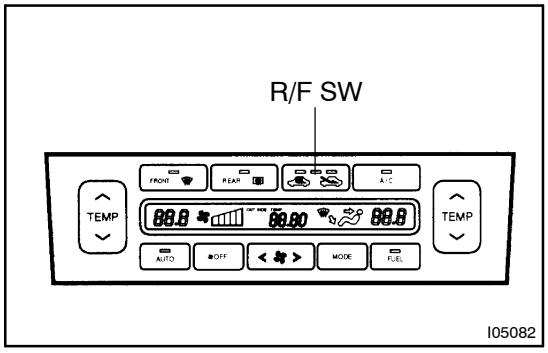
(b) Read the diagnostic trouble codes by following the prompts on the tester screen.
Please refer to the LEXUS hand–held tester operator's manual for further details.

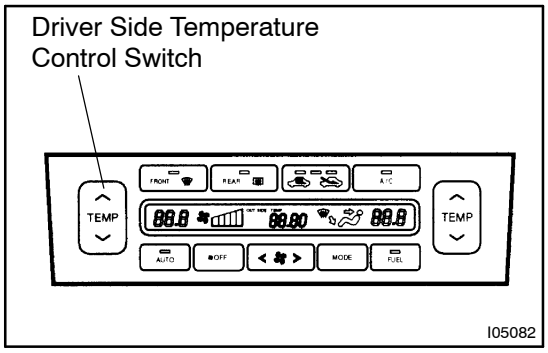


6. CLEARING DTC

(a) Pull out the ECU–B2 fuse in Passenger Side 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.





7. ACTUATOR CHECK

(a) After entering the sensor check mode, press the R/F switch.

(b) Since each damper, motor and relay automatically operates at 1 second intervals beginning in order from 0 in the temperature display, check the temperature and air flow visually and by hand.

If a slower display is desired, press the driver side temp. control switch and change it to step operation. Each time the driver side temp. control switch is pressed, the display changes by 1 step.

HINT:

- The buzzer sounds when the display trouble code changes.(w/ EMV)
- Code are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the Off switch.

Step No.	Display code	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	LO	↑	↑	↑	↑
3	2	MED	↑	R/F (54.5% open)	ON	↑
4	3	↑	↑	↑	↑	↑
5	4	↑	↑	(RECIRC)	↑	Cool / Hot (50% open)
6	5	↑	BI–LEVEL	↑	↑	↑
7	6	↑	FOOT*1 (52.0% open)	↑	↑	Hot side (110% open)
8	7	↑	FOOT*2 (31.0% open)	↑	↑	↑
9	8	↑	FOOT/DEF	↑	↑	↑
10	9	HI	DEF	↑	↑	↑

*1: There is air leakage from defroster.

*2: There is no air leakage from defroster.

DI264–02

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.)

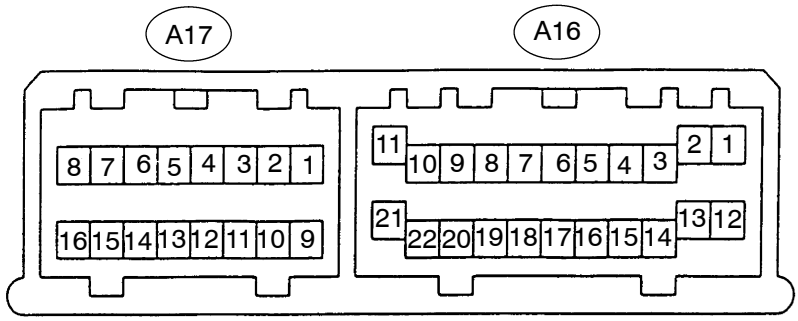
DTC No. (See page)	Detection Item	Trouble Area	Memory
00	Normal	–	–
B1411/11 *1 (DI–914)	Room temperature sensor circuit	• Room temp. sensor • Harness or connector between room temp. sensor and A/C amplifier • A/C amplifier	○ (8.5 min. or more)
B1412/11 (DI–917)	Ambient temperature sensor circuit	• Ambient temp. sensor • Harness or connector between ambient temp. sensor and A/C amplifier • A/C amplifier	○ (8.5 min. or more)
B1413/13 (DI–920)	Evaporator temperature sensor circuit	• Evaporator temp. sensor • Harness or connector between evaporator temp. sensor and A/C amplifier • A/C amplifier	○ (8.5 min. or more)
B1418/18 (DI–923)	Exhaust gas sensor circuit	• Exhaust gas sensor • Harness or connector between exhaust gas sensor and A/C amplifier • A/C amplifier	–
B1421/21 *3 (DI–926)	Solar sensor circuit (Passenger Side)	• Solar sensor • Harness or connector between solar sensor and A/C amplifier • A/C amplifier	– ○ (8.5 min. or more)
B1422/22 *4 (DI–929)	All conditions below are detected for 3 sec. or more (a) Engine speed: 450 rpm or more (b) Ratio between engine and compressor rpm deviates 20% or more in comparison to normal operation.	• Compressor drive belt • Compressor lock sensor • Compressor • Harness and connector between A/C amplifier and compressor, compressor lock sensor • A/C amplifier	–
B1423/23 (DI–932)	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 A/C amplifier • Refrigerant pipe line • A/C amplifier • Compressor	–
B1424/24 (DI–935)	Solar sensor circuit (Driver Side)	• Solar sensor • Harness or connector between solar sensor and A/C amplifier • A/C amplifier	– ○ (8.5 min. or more)
B1431/31 (DI–938)	Air mix damper position sensor circuit (Passenger Side)	• Air mix damper position sensor • A/C amplifier • Harness or connector between air mix damper position sensor and A/C amplifier	○ (1 min. or more)
B1432/32 (DI–941)	Air inlet damper position sensor circuit	• Air inlet damper position sensor circuit • A/C amplifier • Harness or connector between air inlet damper position sensor and A/C amplifier	○ (1 min. or more)

B1433/33 (DI–944)	Air outlet damper position sensor circuit	• Air outlet damper position sensor circuit • A/C amplifier • Harness or connector between max cool damper position sensor and A/C amplifier	○ (1 min. or more)
B1436/36 (DI–947)	Air mix damper position sensor circuit (Driver Side)	• Air mix damper position sensor • A/C amplifier • Harness or connector between air mix damper position sensor and A/C amplifier	○ (1 min. or more)
B1441/41 (DI–950)	Air mix damper control servomotor circuit (Passenger side)	• Air mix damper control servomotor • Air mix damper position sensor • Harness and connector between A/C amplifier and air mix position sensor • Harness and connector between A/C amplifier and mix damper control servomotor • A/C amplifier	○ (15secs. or more)
B1442/42 (DI–953)	Air inlet damper control servomotor	• Air inlet damper control servomotor • Air inlet damper position sensor • Harness and connector between A/C amplifier and air inlet position sensor • Harness and connector between A/C amplifier and air inlet damper control servomotor • A/C amplifier	○ (15 secs. or more)
B1443/43 (DI–956)	Air outlet damper control servomotor circuit	• Air outlet damper control servomotor • Air outlet damper position sensor • Harness and connector between A/C amplifier and ar outlet position sensor • Harness and connector between A/C amplifier and air outlet servomotor • A/C amplifier	○ (15secs. or more)
B1446/46 (DI–959)	Air mix damper control servomotor circuit (Driver side)	• Air mix damper control servomotor • Air mix damper position sensor • Harness and connector between A/C amplifier and air mix position sensor • Harness and connector between A/C amplifier and mix damper control servomotor • A/C amplifier	○ (15secs. or more)
99 (IN–29)	Multiprex communication circuit	Open in multiprex communication circuit	–

HINT:

- *1 If the room temp. is approx. –20°C (–4°F) or lower, DTC B1411/11 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 B1421/21 (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.
- *4 Compressor lock (DTC B1422/22) is indicated only for a current malfunction. (See page DI–929)
  To confirm DTC B1422/22, preform the following steps.
  (1) With the engine ON, enter the DTC check mode.
  (2) Press the R/F switch to enter actuator check mode, and set the operation to Step No. 3.
  (3) Press the AUTO switch to return to DTC check mode.
  (4) The DTC is displayed after approx. 3 secs.
- *5 The A/C control assembly memorizes the DTC of the respective malfunction when it occurs for period of time indicated in the brackets.

TERMINALS OF ECU



I05444

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
+B ↔ GND (A16–1 ↔ A16–22)	W–R ↔ W–B	Always	10 – 14 V
ACC ↔ GND (A16–2 ↔ A16–22)	GR ↔ W–B	Turn ignition switch ACC	10 – 14 V
DGS ↔ GND (A16–3 ↔ A16–22)	L–W ↔ W–B	After 3 min. from IG ON. 10 °C ~ 35 °C	1.0 – 4.5 V
		After 3 min. from IG ON and the sensor is exposed to the exhaust gas.	below 1.0 – 4.5 V
BLW ↔ GND (A16–4 ↔ A16–22)	R–L ↔ W–B	IG ON. Turn the blower motor	1 – 3 V
TPI ↔ SG–4 (A16–6 ↔ A16–18)	R–W ↔ B–O	IG ON. Push REC switch	3.5 – 4.5 V
		IG ON. Push FRS switch	0.5 – 1.5 V
S5–4 ↔ SG–4 (A16–7 ↔ A16–18)	B–W ↔ B–O	IG ON.	4.5 – 5.5 V
AIF ↔ GND (A16–10 ↔ A16–22)	W–L ↔ W–B	IG ON. Push FRS switch	Below 1 V
		IG ON. Push REC switch	10 – 14 V
ILL+ ↔ GND (A16–13 ↔ A16–22)	LG ↔ W–B	Turn the light control switch to TAIL position	10 – 14 V
TR ↔ SG–3 (A16–14 ↔ A16–19)	R ↔ B–Y	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
AIR ↔ GND (A16–21 ↔ A16–22)	R–B ↔ W–B	IG ON. Push FRS switch	10 – 14 V
		IG ON. Push REC switch	Below 1 V
GND ↔ Body Ground (A16–22 ↔ Body Ground)	W–B ↔ Body Ground	Always	Below 1 Ω
TSPa ↔ S5–2 (A17–1 ↔ A17–4)	W–R ↔ B–R	IG ON. Sensor subjected to electric light	0.8 – 4.3 V
		IG ON. Sensor covered by a cloth	Below 0.8 V
TE ↔ SG–5 (A17–2 ↔ A17–13)	R–G ↔ B–Y	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
TPO ↔ SG–5 (A17–3 ↔ A17–13)	G–O ↔ B–Y	IG ON. Air outlet : FACE	3.5 – 4.5 V DI29L–02
		IG ON. Push Front DEF SW	0.5 – 1.5 V
AOF ↔ GND (A17–6 ↔ A16–22)	G ↔ W–B	IG ON. Air outlet : FACE	10 – 14 V
		IG ON. Air outlet : FDEF	Below 1 V
AMHDr ↔ GND (A17–7 ↔ A16–22)	B–W ↔ W–B	IG ON. Set temp. : Max Hot	10 – 14 V
		IG ON. Set temp. : Max Cool	Below 1 V
AMHPa ↔ GND (A17–8 ↔ A16–22)	G–B ↔ W–B	IG ON. Set temp. : Max Hot	10 – 14 V
		IG ON. Set temp. : Max Cool	Below 1 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TSDr ↔ S5–2 (A17–9 ↔ A17–4)	W–G ↔ B–R	IG ON. Sensor subjected to electric light	0.8 – 4.3 V
		IG ON. Sensor covered by a cloth	Below 0.8 V
TPDr ↔ SG–5 (A17–10 ↔ A17–13)	W ↔ B–Y	IG ON. Set temp. : Max Cool	3.5 – 4.5 V
		IG ON. Set temp. : Max Hot	0.5 – 1.5 V
TPPa ↔ SG–5 (A17–11 ↔ A17–13)	G–R ↔ B–Y	IG ON. Set temp. : Max Cool	3.5 – 4.5 V
		IG ON. Set temp. : Max Hot	0.5 – 1.5 V
AOD ↔ GND (A17–14 ↔ A16–22)	G–Y ↔ W–B	IG ON. Air outlet : FACE	Below 1 V
		IG ON. Air outlet : FDEF	10 – 14 V
AMCDr ↔ GND (A17–15 ↔ A16–22)	B–O ↔ W–B	IG ON. Set temp. : Max Cool	10 – 14 V
		IG ON. Set temp. : Max Hot	Below 1 V
AMCPa ↔ GND (A17–16 ↔ A16–22)	G–W ↔ W–B	IG ON. Set temp. : Max Cool	10 – 14 V
		IG ON. Set temp. : Max Hot	Below 1 V

DI29M–02

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate	1. A/C control assembly	IN–29
	2. ACC power source circuit	DI–964
Air Flow Control: No blower operation	1. ACC power source circuit	DI–964
	2. Heater main relay circuit	DI–646
	3. Blower motor circuit	DI–967
	4. A/C control assembly	IN–29
Air Flow Control: No blower control	1. Heater main relay circuit	DI–646
	2. Blower motor circuit	DI–967
	3. A/C control assembly	IN–29
	4.Solar sensor circuit	DI–926
		DI–935
Air Flow Control: Insufficient air flow	Blower motor circuit	DI–967
Temperature Control: No cool air comes out	1. Refrigerant volume	AC–22
	2. Drive belt tension	AC–15
	3. Refrigeration system inspection with manifold gauge set	AC–3
	4. Compressor circuit	DI–969
	5. Pressure switch circuit	DI–932
	6. Compressor lock sensor circuit	DI–929
	7. Air mix damper position sensor circuit	DI–938
		DI–947
	8. Air mix damper control servomotor circuit	DI–950
		DI–959
	9. Room temp. sensor circuit	DI–914
	10. Ambient temp. sensor circuit	DI–917
	11. A/C control assembly	IN–29
Temperature Control: No warm air comes out	1. Air mix damper position sensor circuit	DI–938
		DI–947
	2. Air mix damper control servomotor circuit	DI–950
		DI–959
	3. Room temp. sensor circuit	DI–914
	4. Ambient temp. sensor circuit	DI–917
	5. Evaporator temp. sensor circuit	DI–920
	6. A/C control assembly	IN–29
Temperature Control: Output air is warmer or cooler that the set temperature or response is slow	1. Refrigerant volume	AC–22
	2. Drive belt tension	AC–15
	3. Refrigeration system inspection with manifold gauge set	AC–3
	4. Cooling fan system	CO–22
	5. Solar sensor circuit	DI–926
		DI–935
	6. Room temp. sensor circuit	DI–914
	7. Ambient temp. sensor circuit	DI–917
	8. Evaporator temp. sensor circuit	DI–920
	9. Air mix damper position sensor circuit	DI–938
		DI–947
	10. Air mix damper control servomotor circuit	DI–950
		DI–959
	11. Air inlet damper position sensor circuit	DI–941
	12. Air inlet damper control servomotor circuit	DI–953
	13. Condenser	AC–52
	14. Evaporator	AC–57
	15. Heater radiator	AC–60
	16. Expansion valve	AC–62
	17. A/C control assembly	IN–29

Symptom	Suspect Area	See page
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Room temp. sensor circuit	DI–914
	2. Ambient temp. sensor circuit	DI–917
	3. Air mix damper position sensor circuit	DI–938 DI–947
	4. Air mix damper control servomotor circuit	DI–950 DI–959
	5. A/C control assembly	IN–29
No air inlet control	1. Air inlet damper position sensor circuit	DI–941
	2. Air inlet damper control servomotor circuit	DI–953
	3. A/C control assembly	IN–29
No air flow mode	1. Air outlet damper position sensor circuit	DI–944
	2. Air outlet damper control servomotor circuit	DI–956
	3. A/C control assembly	IN–29
	4. Exhaust gas sensor	DI–923
Engine idle up does not occur, or is continuous	1. Compressor circuit	DI–969
	2. A/C control assembly	IN–29
Blinking of A/C indicator	1. Compressor circuit	DI–969
	2. A/C control assembly	IN–29
Set temp. value displayed does not change up with operation of temp. control switch.	A/C control assembly	IN–29
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back–up power source circuit	DI–962
	2. A/C control assembly	IN–29

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CIRCUIT INSPECTION

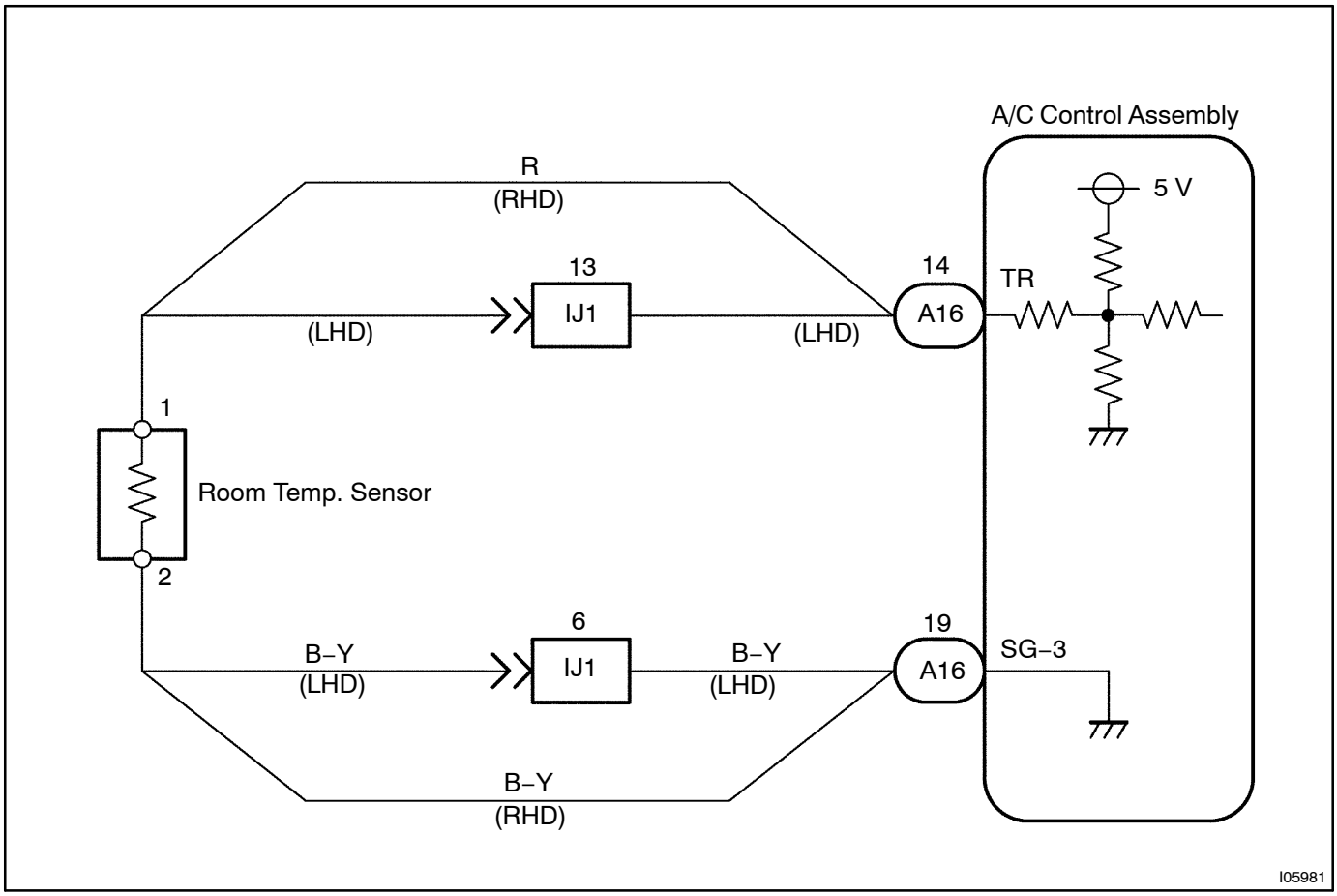
DTC	B1411/11	Room Temperature Sensor Circuit

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
B1411/11	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 LEXUS hand–held tester, start the inspection step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

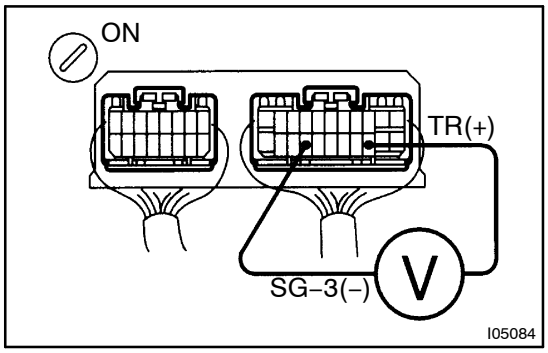
1	**Check room temp. sensor using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS 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–3 of A/C control assembly connector.**



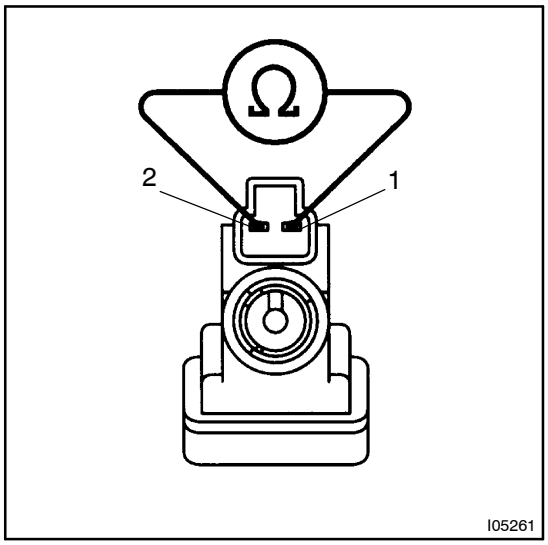
PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Measure voltage between terminals TR and SG–3 of A/C control assembly connector at each temperature.
OK:
Voltage:
at 25°C (77°F): 1.8 – 2.2 V
at 40°C (104°F): 1.2 – 1.6 V
HINT:
As the temperature increases, the voltage decreases.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1411/11 is displayed, check and replace A/C control assembly.

3	Check room temperature sensor.



PREPARATION:
Disconnect room temperature sensor connector.
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–29).

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

OK

Check and replace A/C control assembly.

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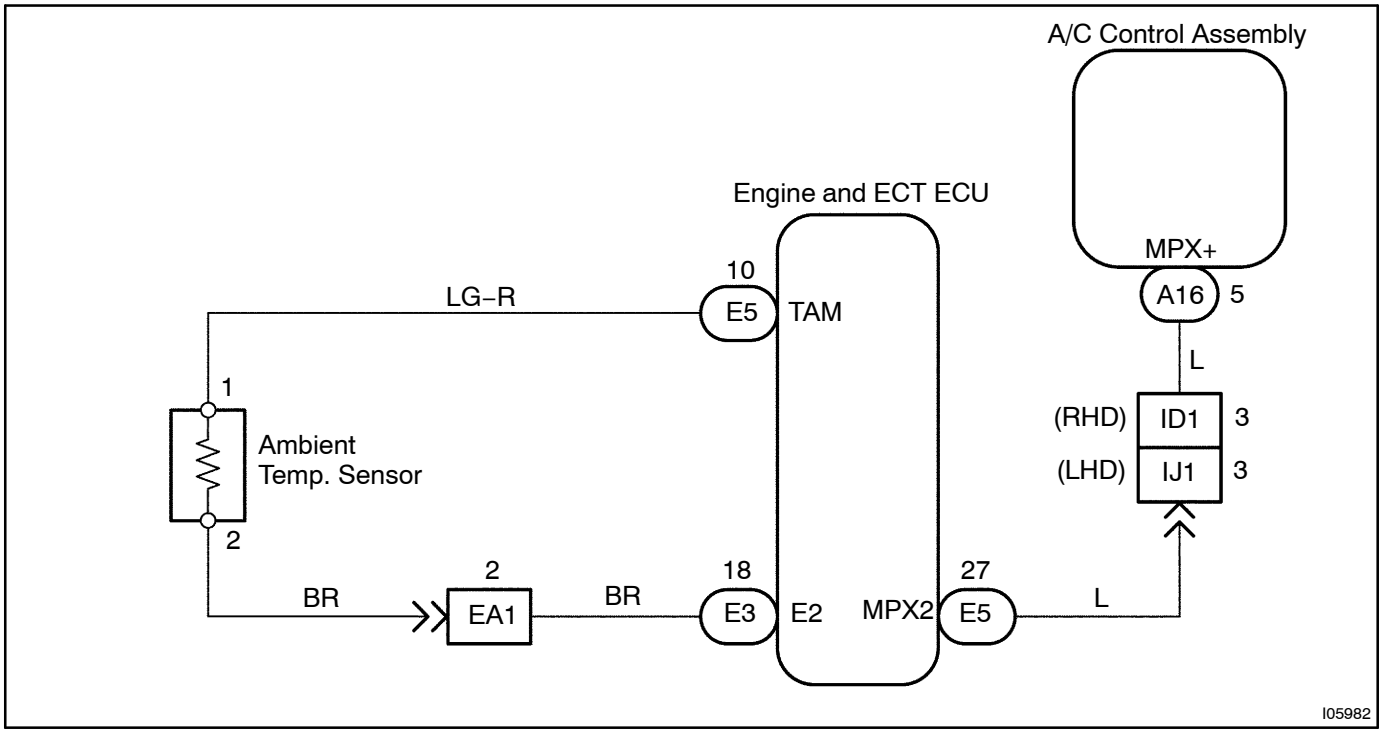
DTC	B1412/12	Ambient Temperature Sensor Circuit

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
B1412/12	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 LEXUS hard–held tester, start the inspection step 1 and in case of not using the LEXUS hard–held tester, start from step 2.

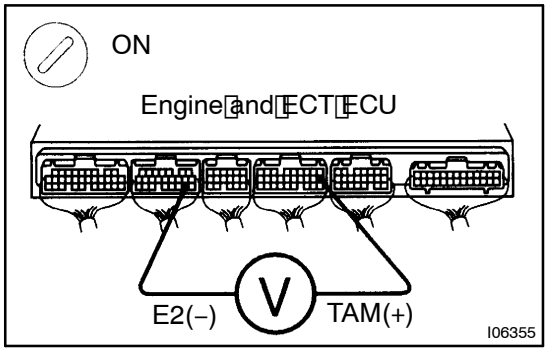
1	**Check ambient temp. sensor using LEXUS hard–held tester.**

PREPARATION:
Connect the LEXUS hard–held tester to the DLC3.
CHECK:
Check the ambient temp. sensor using DATA LIST.

OK ⇒ **Check and replace A/C control assembly.**

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 ON.
(b) Measure voltage between terminals TAM and E2 of engine and ECU 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

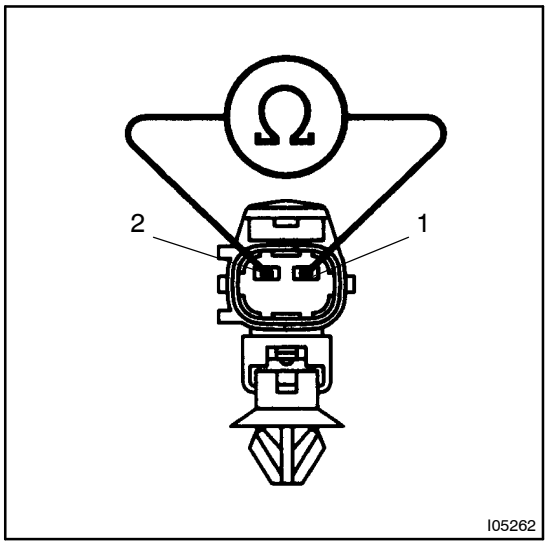
HINT:
As the temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1412/12 is displayed, check and replace engine and ECT ECU and A/C control assembly.

3	**Check ambient temperature sensor.**



PREPARATION:
Disconnect ambient temperature sensor connector.
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–29).**

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–29).**

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

OK

Check and replace engine and ECT ECU and A/C control assembly.

DI267–02

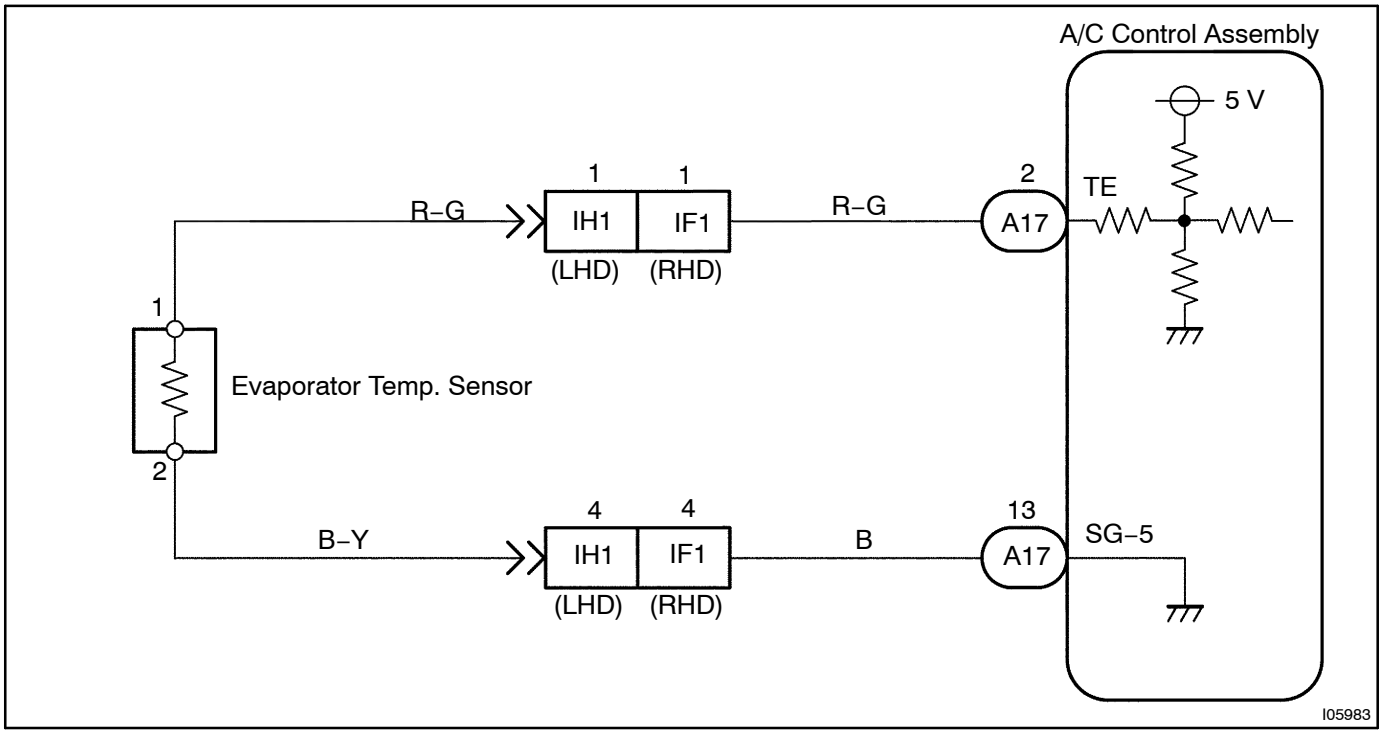
DTC	B1413/13	Evaporator Temperature Sensor circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1413/13	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 LEXUS hard–held tester start the inspection step 1 and in case of not using the LEXUS hard–held tester, start from step 2.

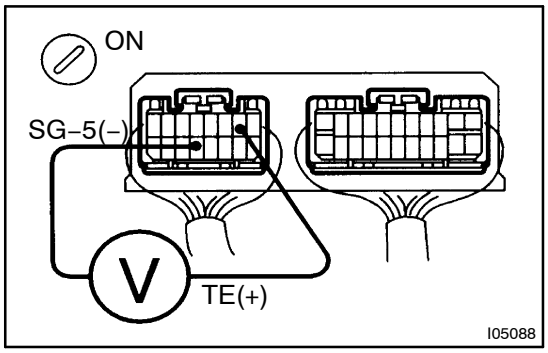
1	**Check evaporator temp. sensor using LEXUS hard–held tester.**

PREPARATION:
Connect the LEXUS hard–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 SG–5 of A/C control assembly connector.**



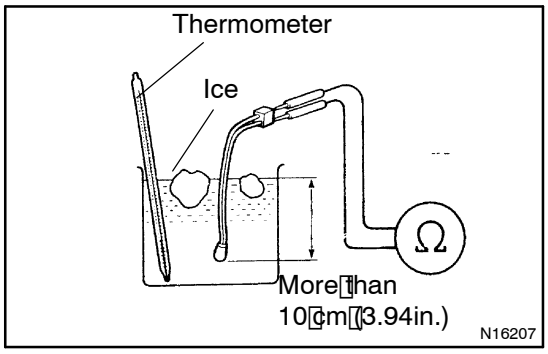
PREPARATION:
Remove air conditioning control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Measure voltage between terminals TE and SG–5 of A/C control assembly connector at each temperature.
OK:
Voltage:
at 0°C (32°F): 2.0 – 2.4 V
at 15°C (59°F): 1.4 – 1.8 V
HINT:
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–912). However, if DTC B1413/13 is displayed, check and replace A/C control assembly.

3	**Check evaporator temperature sensor.**



PREPARATION:
Remove evaporator temperature sensor (See page AC–78).
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–29).**

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

OK

Check and replace A/C control assembly.

DI268–02

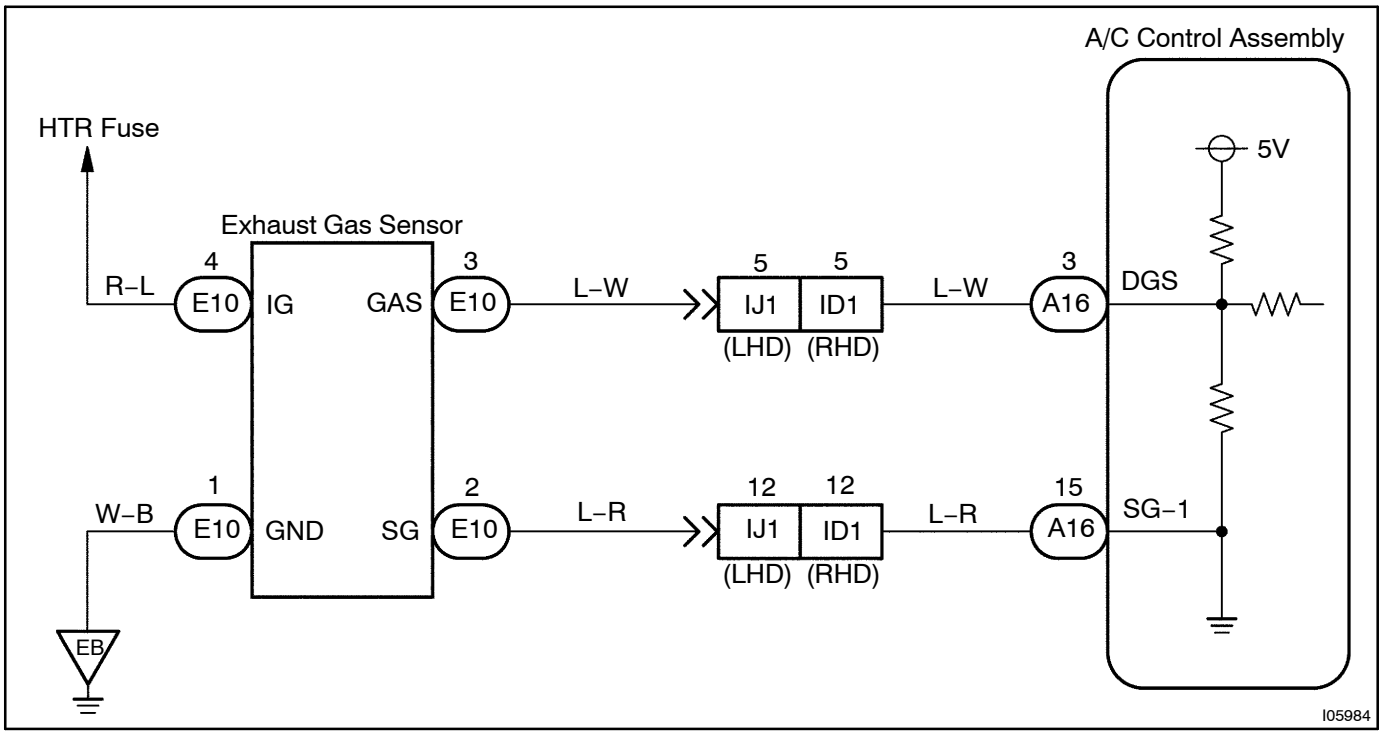
DTC	B1418/18	Exhaust gas sensor circuit

CIRCUIT DESCRIPTION

This sensor detects the exhaust gas outside the vehicle and sends signal to the A/C control assembly.

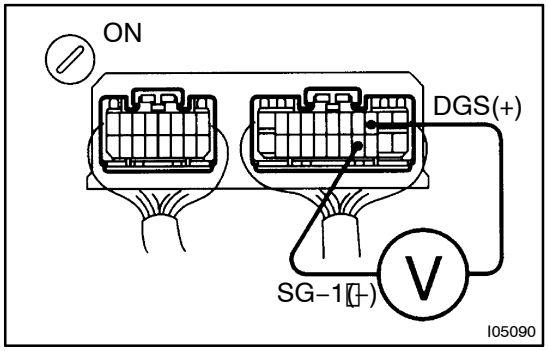
DTC No.	Detection Item	Trouble Area
B1418/18	Short in exhaust gas sensor circuit	• Exhaust gas sensor • Harness or connector between exhaust gas sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals DGS and SG–1 of A/C control assembly.**



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) After continuing to turn ignition switch ON for more than 30 seconds, check voltage between terminals DGS and SG–1 of A/C control assembly connector at the temperature.

OK:

Voltage:

1.0 – 4.5 V at 10 – 35°C (50 – 95°F)

HINT:

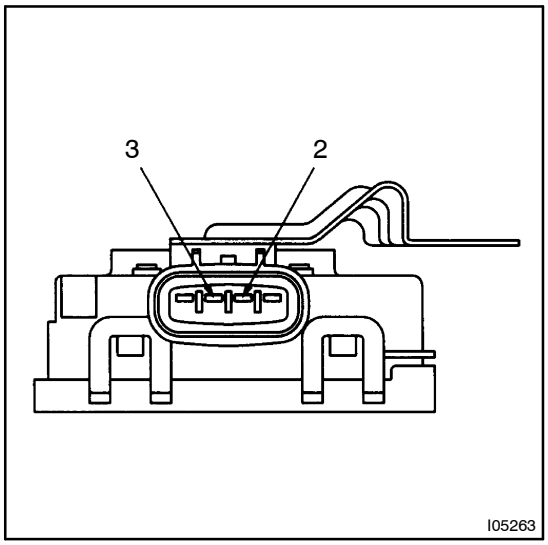
When the sensor is exposed to the exhaust gas, the voltage goes down.

NG → **Go to step 2**

OK

Proceed to next circuit inspection shown on problem symptom table (See page DI–912). However, if DTC B1418/18 is displayed, check and replace A/C control assembly.

2	Check exhaust gas sensor resistance



PREPARATION:

Remove the exhaust gas sensor (See page AC–78).

CHECK:

(a) Connect positive (+) lead from the battery to the terminal 4 and negative (–) lead to terminal 1.

(b) After keeping to apply battery positive voltage between terminals 1 and 4 for more than 30 seconds, measure resistance between terminals 2 and 3.

OK:

Resistance:
5 ~ 100 kΩ V at 10 ~ 35 °C (50 ~ 95 °F)

HINT:

When the sensor is exposed to the exhaust gas, the resistance goes down.

NG	Replace exhaust gas sensor.

OK

3	Check harness and connector between A/C control assembly and exhaust gas sensor.

NG	Repair or replace harness for connector.

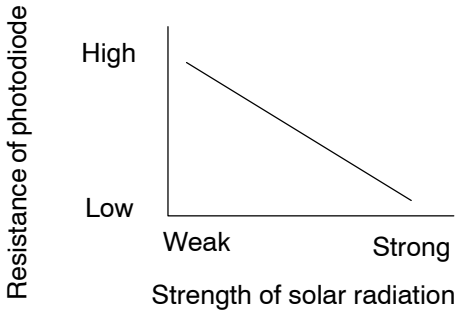
OK

Check and replace A/C control assembly.

DI269–02

DTC	B1421/21	Solar Sensor Circuit (Passenger side)

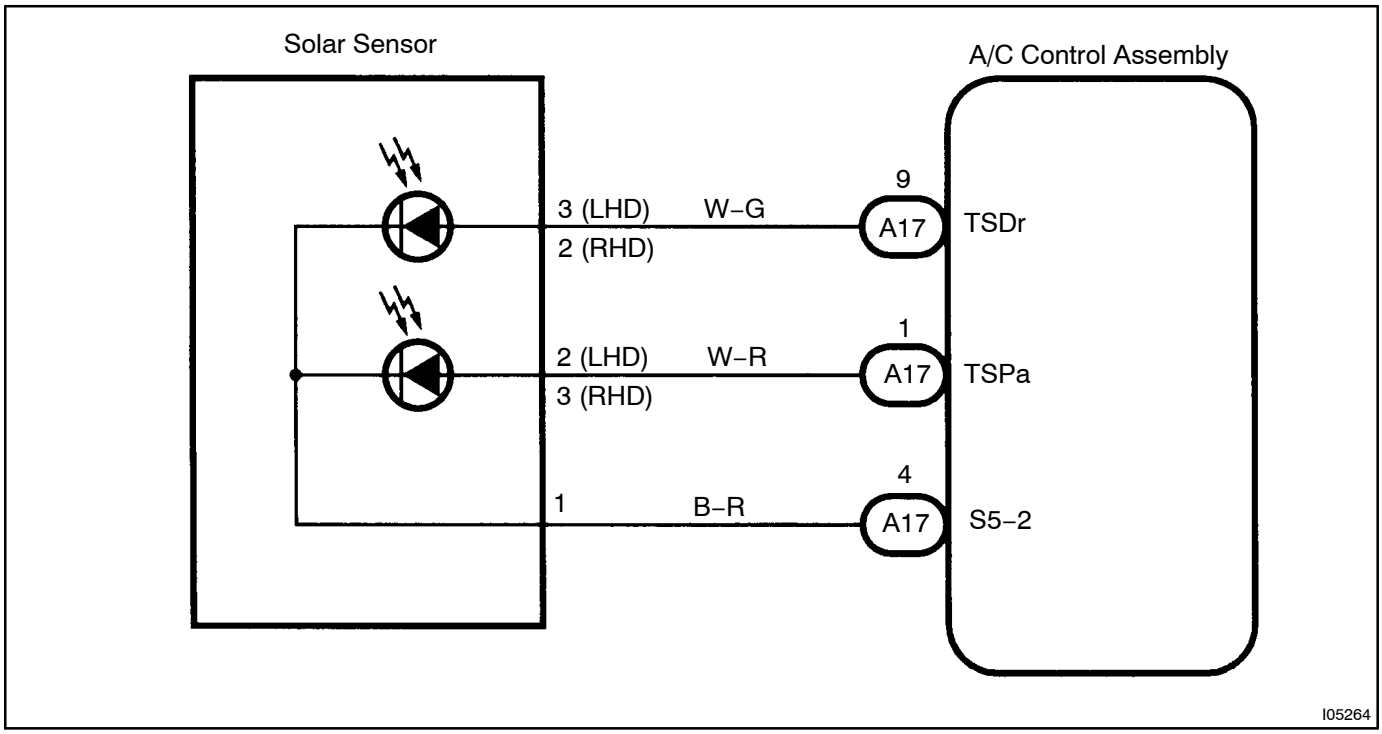
CIRCUIT DESCRIPTION



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
B1421/21	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code 21 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 LEXUS hard–held tester, start the inspection step 1 and in case of not using the LEXUS hard–held tester, start from step 2.

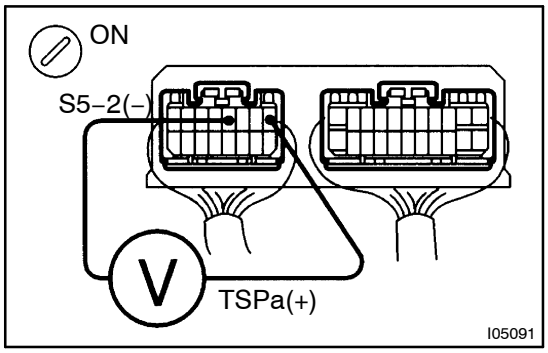
1	**Check solar sensor (Passenger Side) using LEXUS hard–held tester.**

PREPARATION:
Connect the LEXUS hard–held tester to the DLC3.
CHECK:
Check the solar sensor (Passenger Side) using DATA LIST.

OK ⇒ **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals S5–2 and TSPa of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Measure voltage between terminals S5–2 and TSPa 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

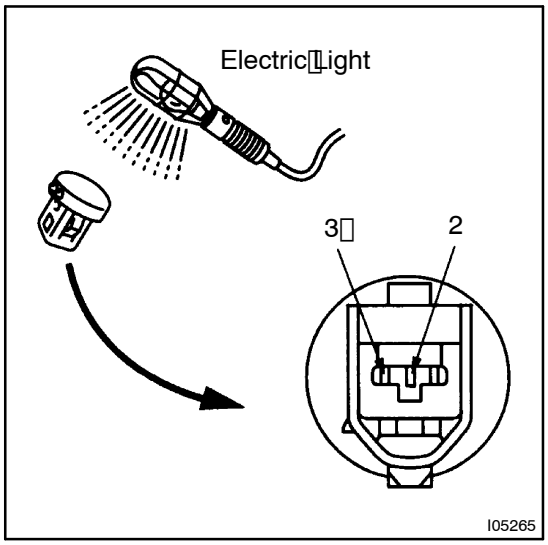
HINT:
As the inspection light is moved away from the sensor, the voltage increases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1421/21 is displayed, check and replace A/C control assembly.

3	Check solar sensor.



PREPARATION:
Remove solar sensor.
CHECK:
(a) Cover the sensor by 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. 4 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–29).

NG	Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

DI26A–02

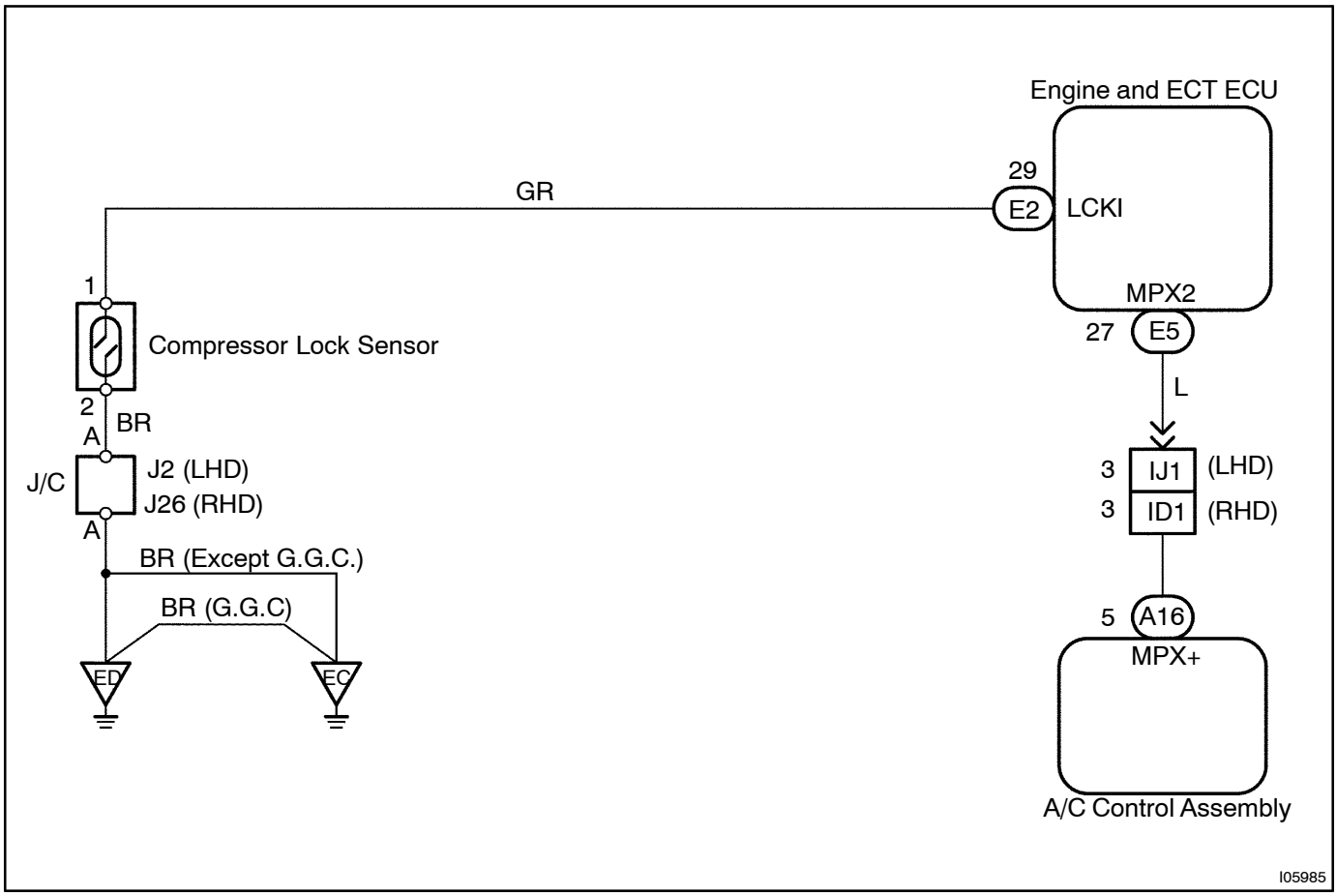
DTC	B1422/22	Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

This sensor sends 4 pulses per engine revolution to the engine and ECT ECU.
If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the engine and ECT ECU turns the compressor OFF. And, the indicator flashes at about 1 second intervals.

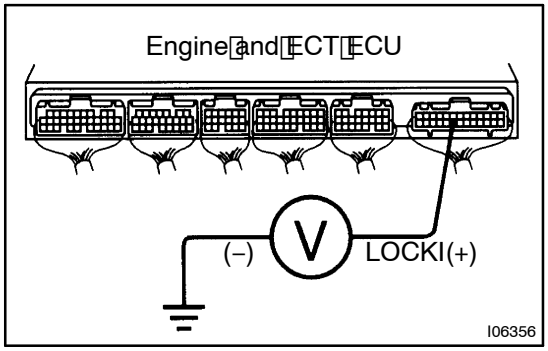
DTC No.	Detection Item	Trouble Area
B1422/22	All conditions below are detected for 3 secs. or more (a) Engine speed : 450rpm or more (b) Ratio between engine and compressor speed deviates 20% or more in comparison to normal operation.	• Compressor. • Compressor drive belt. • Compressor lock sensor. • Harness and connector between compressor and engine and ECT ECU • Harness and connector between engine and ECT ECU and A/C control assembly • Engine and ECT ECU • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal LCKI of engine and ECT ECU and body ground.



CHECK:

(a) Start engine.
(b) Push AUTO SW.
(c) Measure voltage between terminal LCKI of engine and ECT ECU connector and body ground when A/C switch is ON.

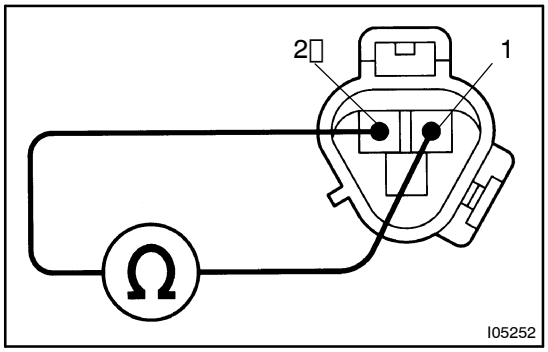
OK:

Voltage: 10 – 14 V

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).

NG

2	Check compressor lock sensor.



PREPARATION:

(a) Jack up the vehicle.
(b) Disconnect compressor lock sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of compressor lock sensor connector.

OK:

Resistance:
at 20°C (68°F): 990 – 1210 Ω
at 100°C (212°F): 1280 – 1550 Ω

NG	Replace compressor lock sensor.

OK

3	Check harness and connectors between engine and ECT ECU and compressor lock sensor. (See page IN–29).

NG	Repair or replace harness or connector.

OK

4	Check harness and connectors between engine and ECT ECU and A/C control assembly.(See page IN–29).

NG → Repair or replace harness or connector.

OK →

Check and replace engine and ECT ECU and A/C control assembly.

DI26B–02

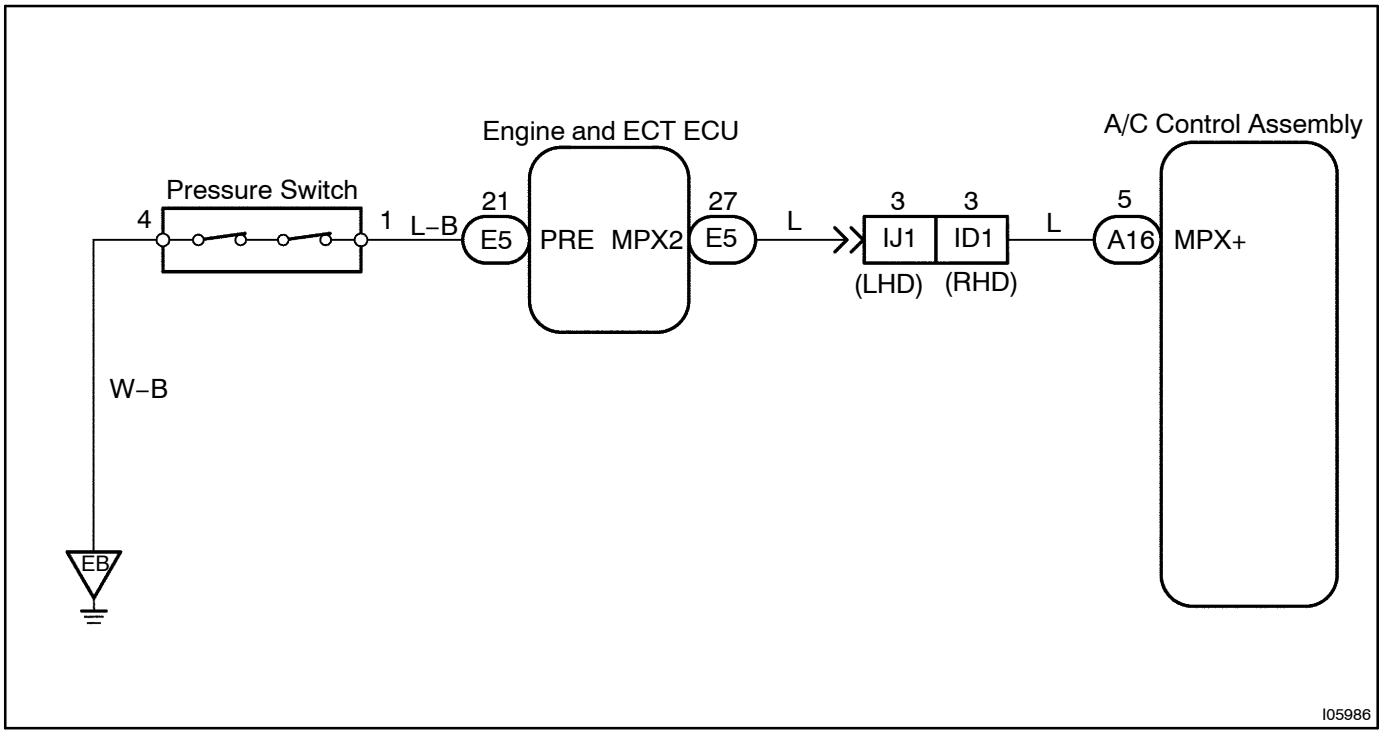
DTC	B1423/23	Pressure Switch Circuit

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.

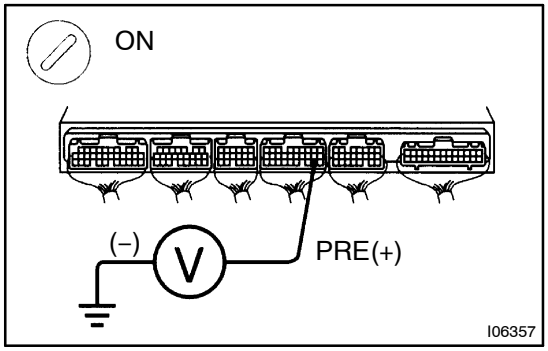
DTC No.	Detection Item	Trouble Area
B1423/23	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 181 kPa (2.0 kg/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)	• Pressure switch. • Harness or connector between pressure switch and engine and ECT ECU • Harness or connector 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.



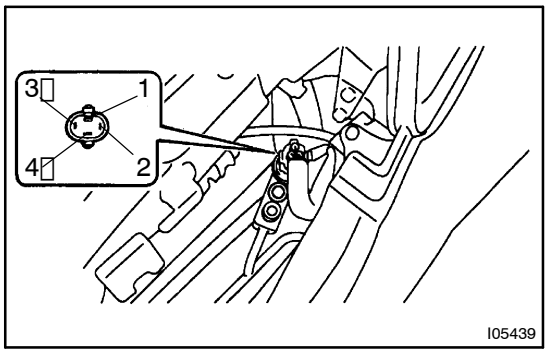
PREPARATION:
Install the manifold gauge set.
CHECK:
(a) Turn ignition switch ON.
(b) Check voltage between terminal PRE of engine and ECT ECU connector and body ground when A/C gas pressure is changed.
OK:
The voltage changes with gas pressure, as shown in the diagram below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (0V) 225 kPa 196 kPa OFF (12V)	ON (0V) 2,550 kPa 3,140 kPa OFF (12V)

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).**

NG

2	Check pressure switch.



PREPARATION:
Disconnect pressure switch connector.
CHECK:
(a) Turn ignition switch ON.
(b) Check continuity between terminals 1 and 4 of pressure switch when A/C gas pressure is changed.
OK:
The continuity changes with gas 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–29).

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–29)

NG → Repair or replace harness or connector.

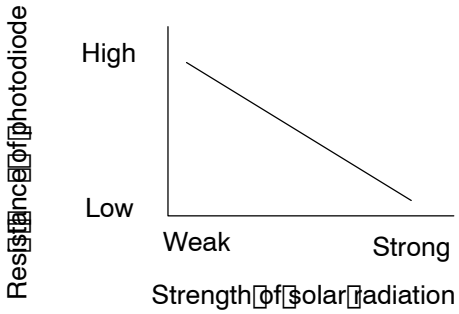
OK

Check and replace engine and ECT ECU.

DI2QV–01

DTC	B1424/24	Solar sensor circuit (Driver side)

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
B1424/24	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code 21 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

See page DI–926

INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

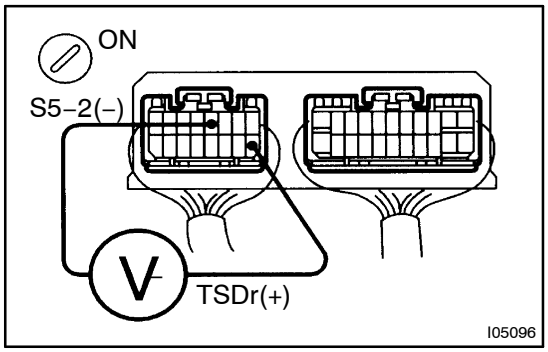
1	Check solar sensor (Driver Side) using LEXUS hand–held tester.

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the Solar Sensor (Driver Side) using DATA LIST.

OK	Check and replace A/C control assembly.

NG

2	**Check voltage between terminals S5–2 and TSDr of A/C control assembly connector.**



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Measure voltage between terminals S5–2 and TSDr 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:

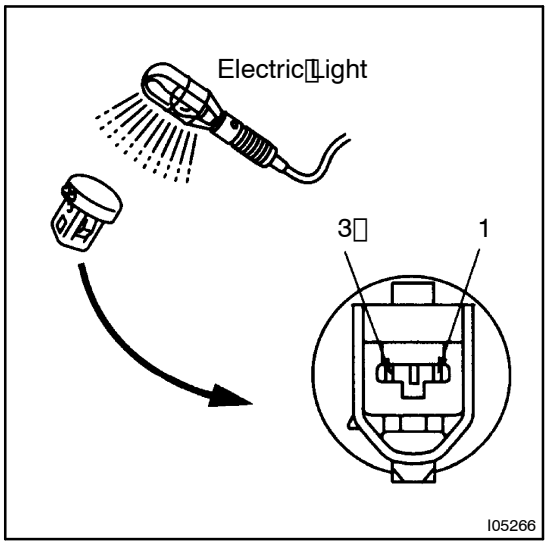
As the inspection light is moved away from the sensor, the voltage increases.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1424/24 is displayed, check and replace A/C control assembly.

3	Check solar sensor.



PREPARATION:

(a) Remove glove compartment assembly.

(b) Remove solar sensor.

CHECK:

(a) Cover the sensor by 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. 4 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–29).

NG	Repair or replace harness or connector.

OK

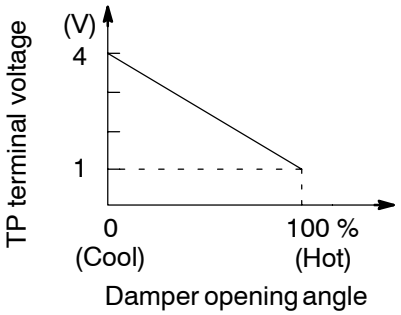
Check and replace A/C control assembly.

DI26O–02

DTC	B1431/31	Air Mix Damper Position Sensor Circuit (Passenger side)

DTC	B1441/41	Air Mix Damper Position Sensor Circuit (Passenger side)

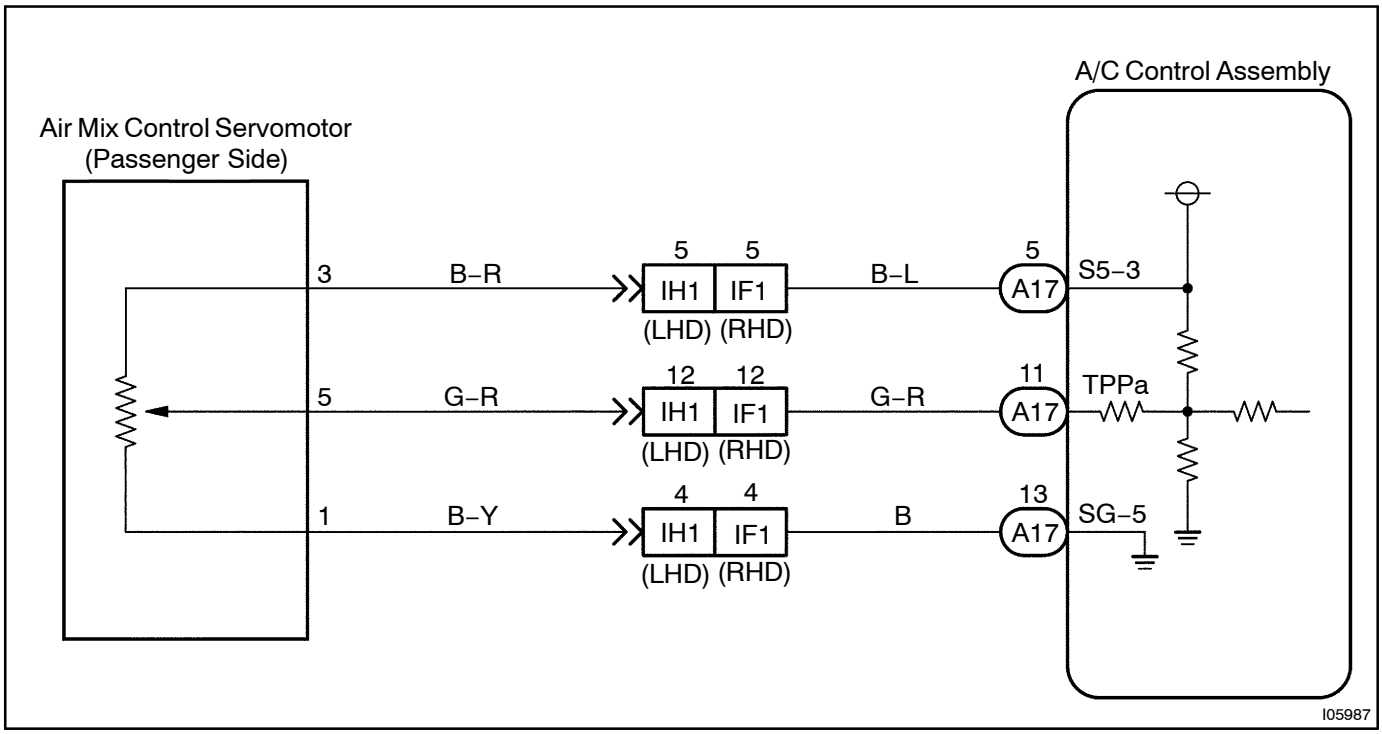
CIRCUIT DESCRIPTION



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
B1431/31	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.
B1441/41	Air mix damper position sensor value does not change even if A/C control assembly operates air mix damper control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step1 and in case of not using the LEXUS hand–held tester, start from step2.

1	**Check air mix damper position (Passenger Side) using LEXUS hand–held tester.**

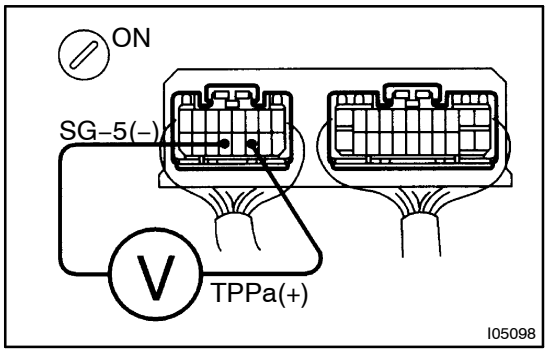
PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the current position of air mix damper (Passenger Side) and the target position of air mix damper (Passenger Side).
OK:

The current position and target position are almost similar.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TPPa and SG–5 of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Change the set temperature to activate the air mix damper control servomotor, and measure the voltage between terminals TPPa and SG–5 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. hot	0.5 – 1.5 V

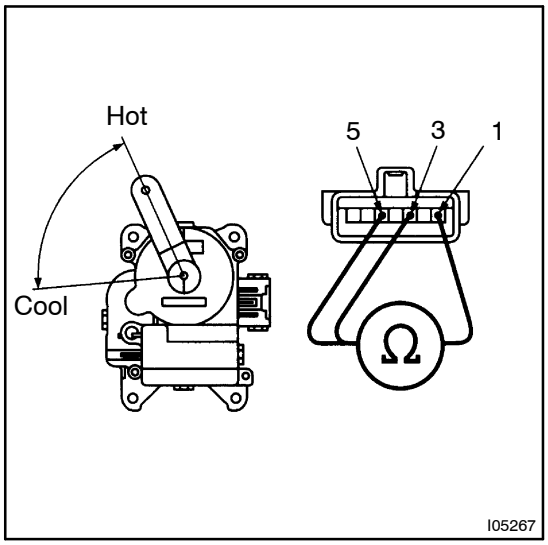
HINT:
As the set temperature increases, the voltage decreases.

NG → **Go to step 3.**

Ok

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1431/31 or B1441/41 displayed, check and replace A/C control assembly.

3	**Check air mix damper position sensor.**



PREPARATION:

(a) Remove heater unit. (See page AC–26)

(b) Disconnect air mix damper control servomotor assembly connector.

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–950, 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. hot	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–29).**

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

OK

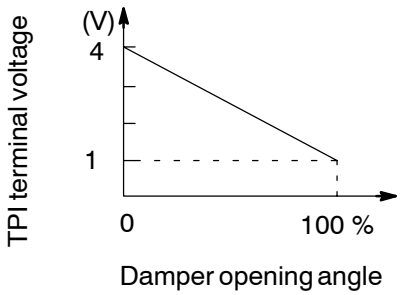
Check and replace A/C control assembly.

DI26D–02

DTC	B1432/32	Air Inlet Damper Position Sensor Circuit

DTC	B1442/42	Air Inlet Damper Position Sensor Circuit

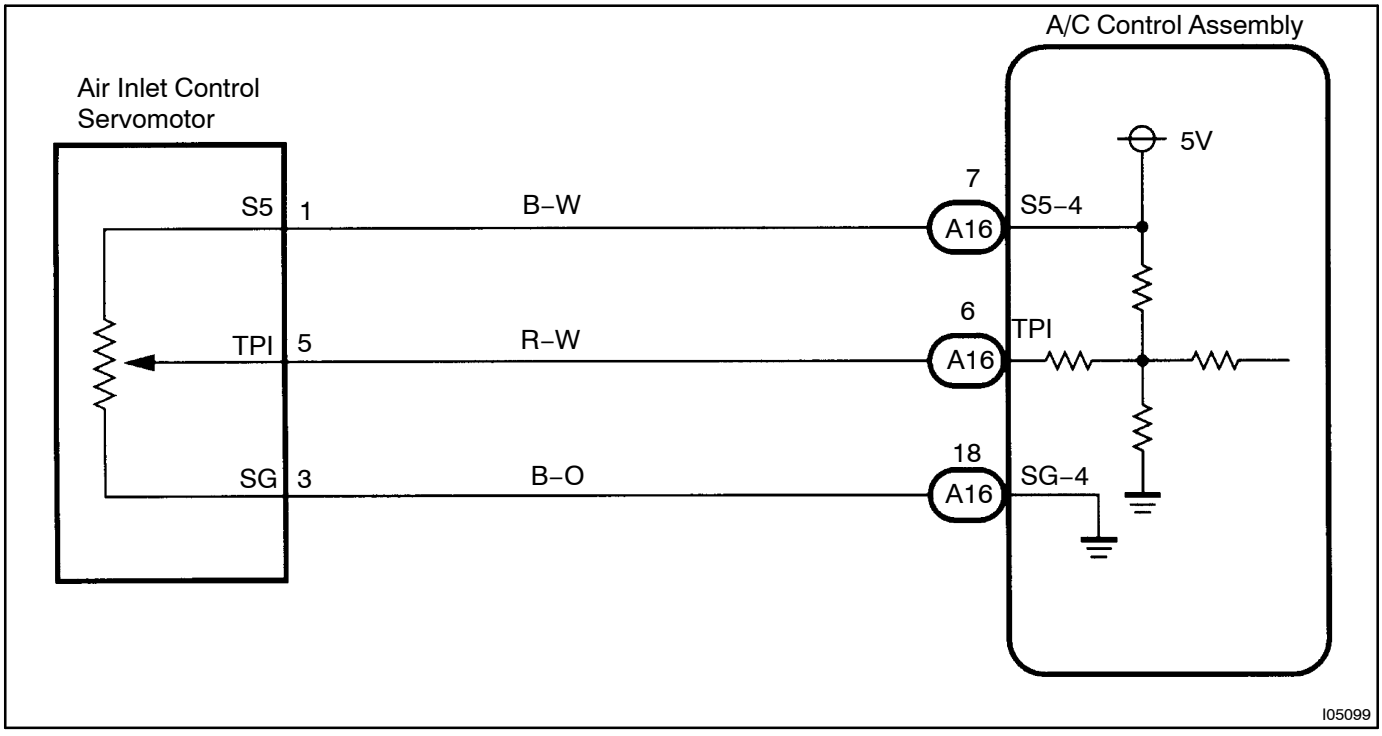
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly.
The position sensor is built into the air inlet damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1432/32	Short to ground or power source circuit in air inlet damper position sensor circuit.	• Air inlet damper position sensor. • Harness or connector between air inlet damper control servomotor assembly and A/C control assembly. • A/C control assembly.
B1442/42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet damper control servomotor.	

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 air inlet damper position using LEXUS hand–held tester.**

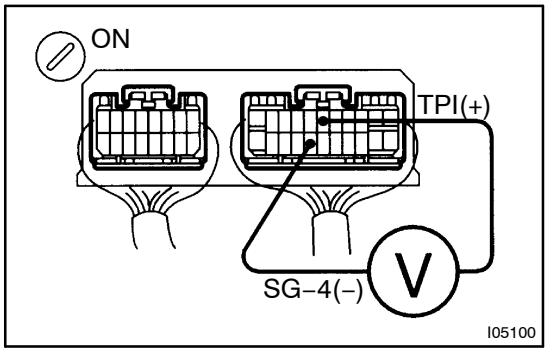
PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the current position of air inlet damper and the target position of air inlet damper.
OK:

The current position and target position are almost similar.

OK	**Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TPI and SG–4 of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Press REC/FRS switch to change air inlet between fresh and recirculation air, and measure voltage between terminals TPI and SG–4 of A/C control assembly when the air inlet damper control servomotor operates.
OK:

FRS–REC Switch	Voltage
REC	3.5 – 4.5 V
FRS	0.5 – 1.5 V

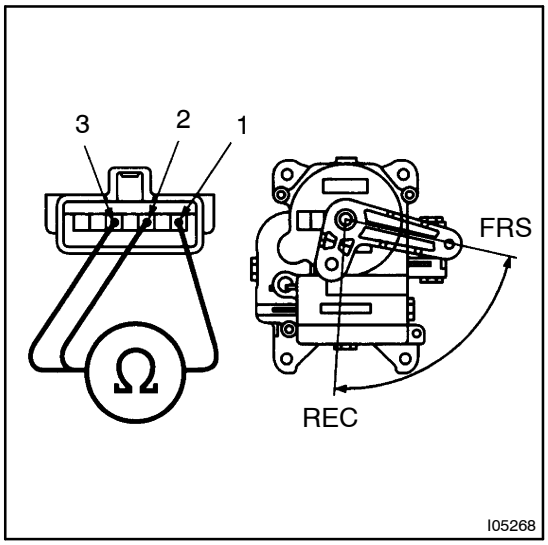
HINT:
As the air inlet damper control servomotor is moved form REC side to FRS side, the voltage decreases.

NG	**Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1432/32 or B1442/42 is displayed, check and replace A/C control assembly.

3	**Check air inlet damper position sensor.**



PREPARATION:

(a) Remove heater unit (See page AC–26).

(b) Disconnect air inlet damper control servomotor assembly connector.

CHECK:

Measure resistance between terminals 1 and 3 of air inlet damper control servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:

While operating air inlet damper control servomotor, following the procedure on page DI–953, measure resistance between terminals 1 and 5 of air inlet damper control servomotor assembly connector.

OK:

Resistance

Damper Position	Resistance
REC side	3.1 – 5.8 kΩ
FRS side	0.8 – 1.6 kΩ

HINT:

As the air inlet damper control servomotor moves from REC side to FRS side, the resistance decreases.

NG	**Replace air inlet damper control servomotor assembly.**

OK

4	**Check harness and connectors between A/C control assembly and air inlet damper control servomotor assembly (See page IN–29).**

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

OK

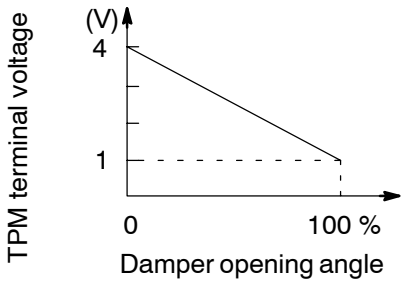
Check and replace A/C control assembly.

DI26E–02

DTC	B1433/33	Air Outlet Damper Position Sensor Circuit

DTC	B1443/43	Air Outlet Damper Position Sensor Circuit

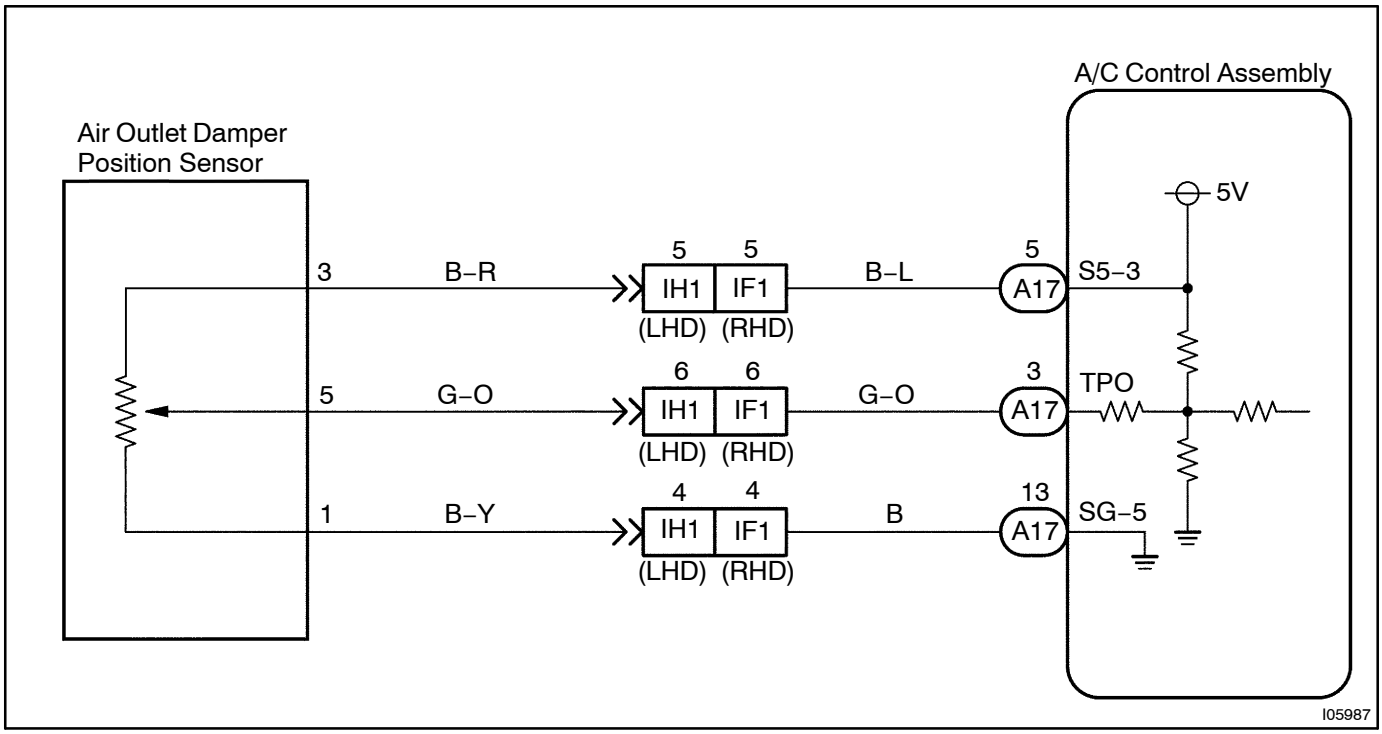
CIRCUIT DESCRIPTION



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
B1433/33	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.
B1443/43	Air outlet damper position sensor value does not change even if A/C control assembly operates air outlet damper control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step1 and in case of not using the LEXUS hand–held tester, start from step2.

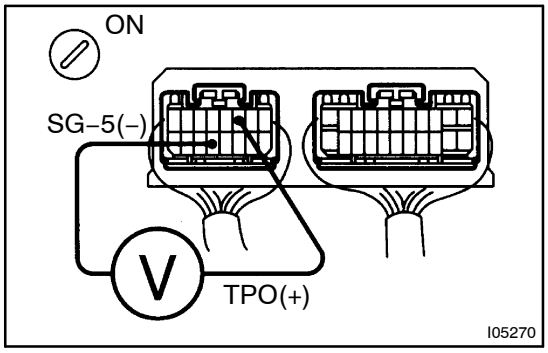
1	**Check air outlet damper position using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS 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 TPO and SG–5 of A/C control assembly connector.**



PREPARATION:
(a) Remove A/C control assembly with connectors still connected.
(b) Turn ignition switch ON.
CHECK:
Measure the voltage between terminals TPO and SG–5 of A/C control assembly.
OK:

FRS–REC Switch	Voltage
VENT	3.5 – 4.5 V
DEF	0.5 – 1.5 V

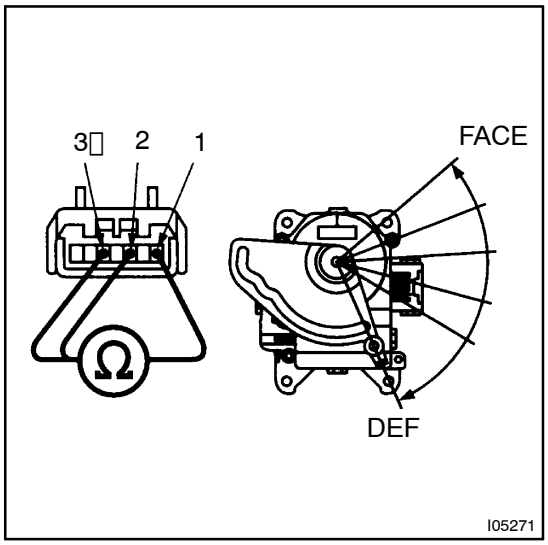
HINT:
As the air outlet damper control servomotor is moved from VENT side to DEF side, the voltage decreases gradually without interruption.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1434/34 or B1444/44 is displayed, check and replace A/C control assembly.

3	Check air outlet damper position sensor.



PREPARATION:

(a) Remove heater unit (See page AC–26).

(b) Disconnect air outlet damper control servomotor assembly connector.

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–956, measure resistance between terminals 1 and 3 of air outlet damper control servomotor.

OK:

Resistance:

Damper Position	Resistance
DEF	0.5 – 1.1 kΩ
VENT	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 max. cool damper control servomotor assembly.

OK

4	Check harness and connector between A/C control assembly and max. cool damper control servomotor assembly (See page IN–29).

NG	Repair or replace harness or connector.

OK

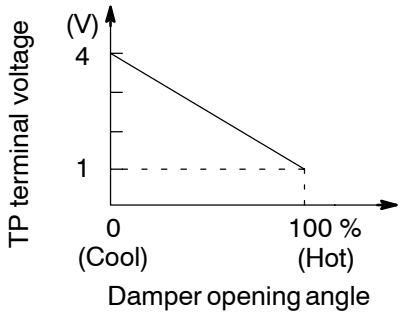
Check and replace A/C control assembly.

D126F–02

DTC	B1436/36	Air Mix Damper Position Sensor Circuit (Driver side)

DTC	B1446/46	Air Mix Damper Position Sensor Circuit (Driver side)

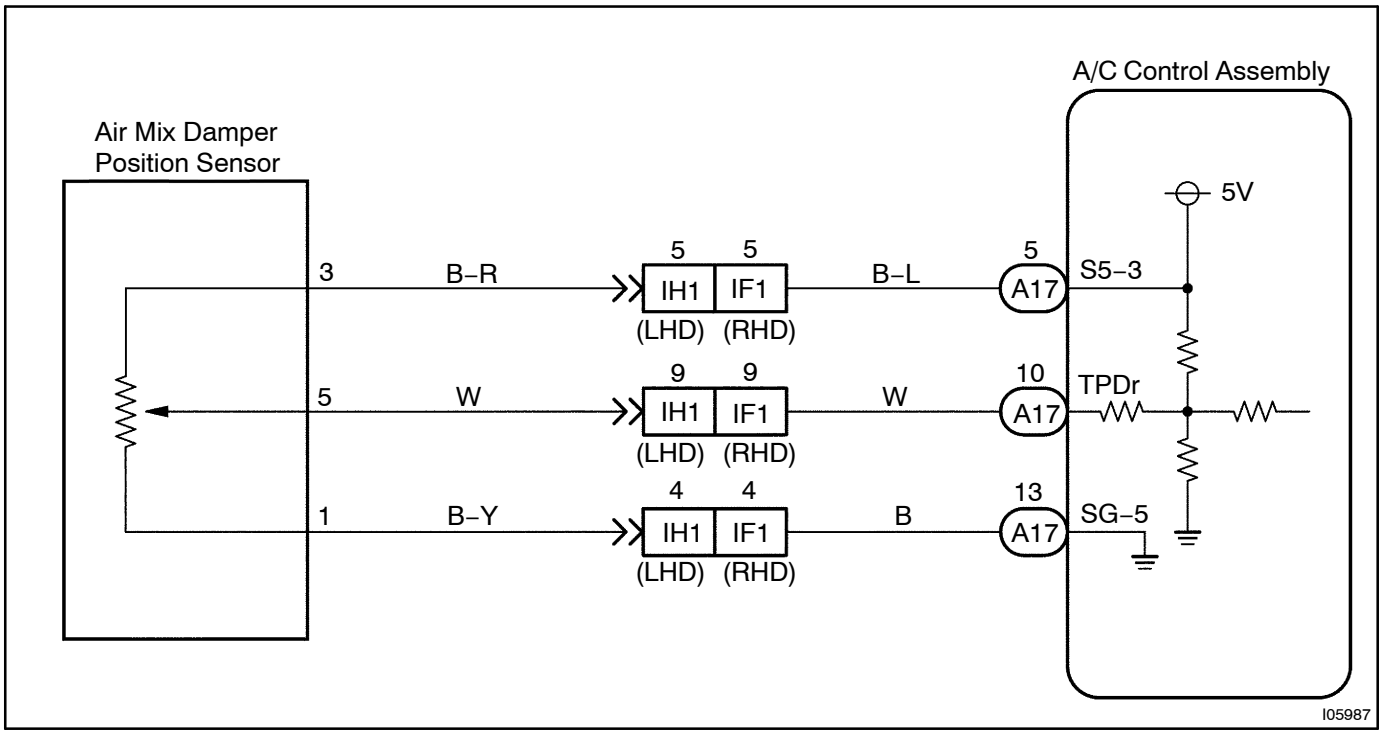
CIRCUIT DESCRIPTION



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
B1436/36	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.
B1446/46	Air mix damper position sensor value does not change even if A/C control assembly operates air mix damper control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step1 and in case of not using the LEXUS hand–held tester, start from step2.

1	**Check air mix damper position (Driver Side) using LEXUS hand–held tester.**

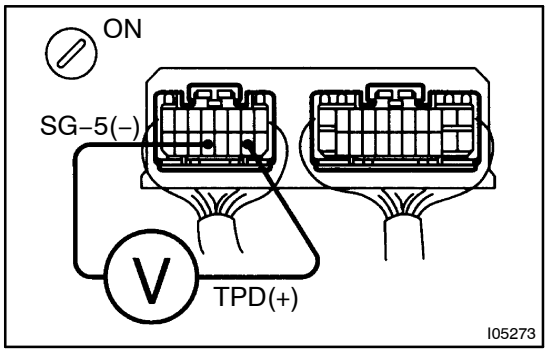
PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the current position of air mix damper (Driver Side) and the target position of air mix damper (Driver Side).
OK:

The current position and target position are almost similar.

OK ⇒ **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TPD and SG–5 of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Change the set temperature to activate the air mix damper control servomotor, and measure the voltage between terminals TPD and SG–5 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. hot	0.5 – 1.5 V

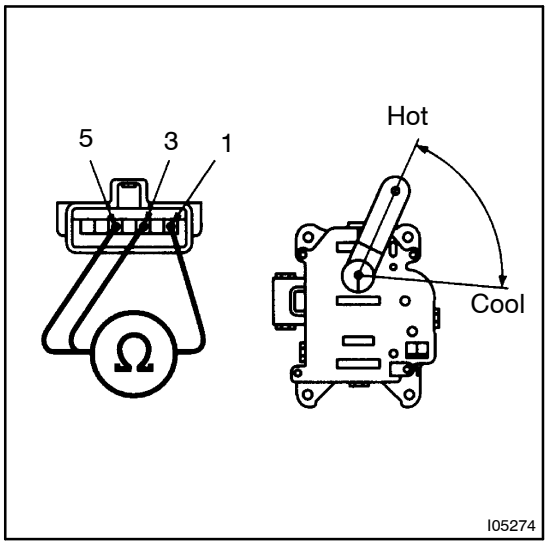
HINT:
As the set temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

Ok

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912). However, if DTC B1436/36 or B1446/46 displayed, check and replace A/C control assembly.

3	**Check air mix damper position sensor.**



PREPARATION:

(a) Remove heater unit (See page AC–26)

(b) Disconnect air mix damper control servomotor assembly connector.

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–959, 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. hot	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–29).**

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

OK

Check and replace A/C control assembly.

DI26G–02

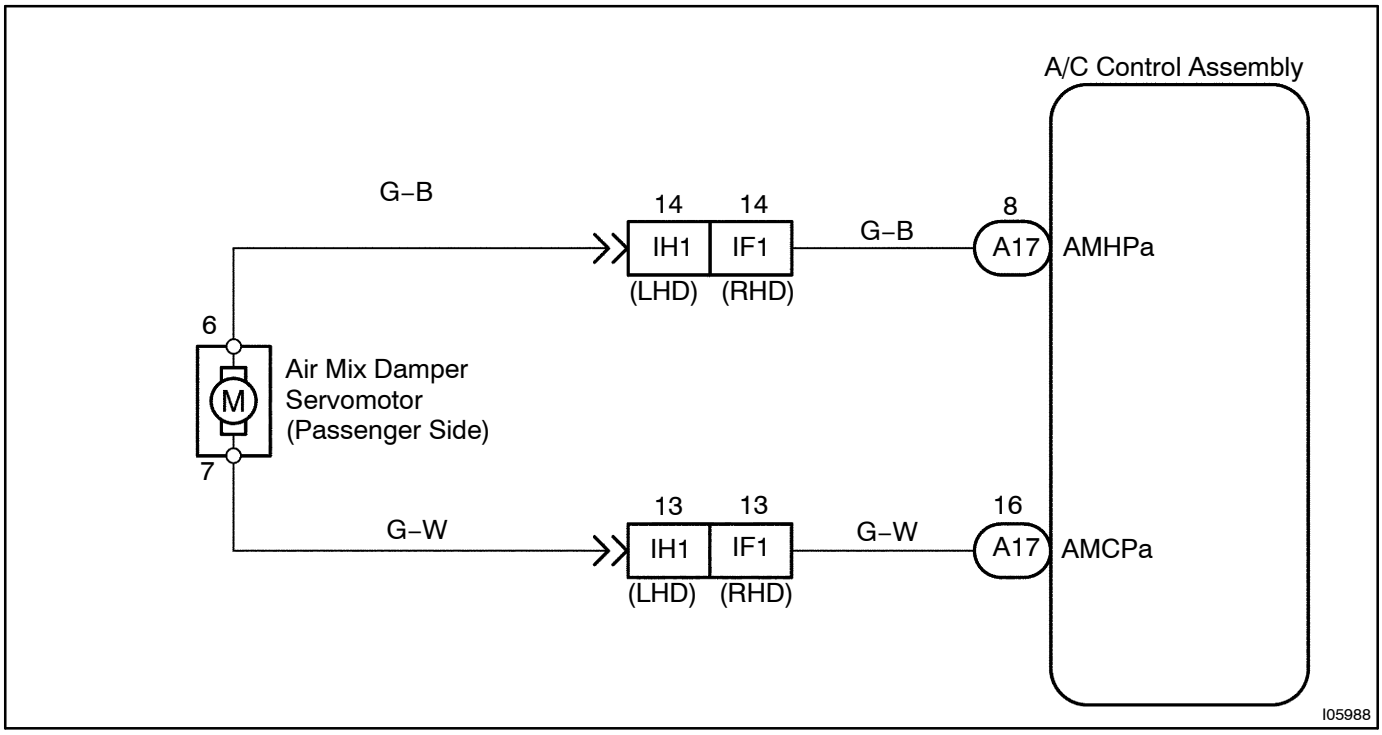
DTC	B1441/41	Air Mix Damper Control Servomotor Circuit (Passenger side)

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.

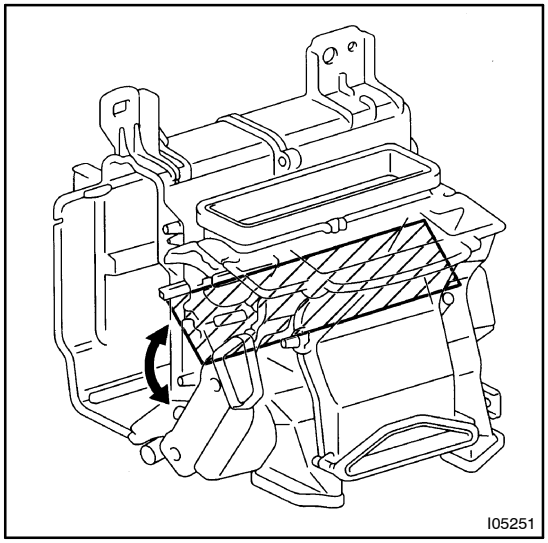
DTC No.	Detection Item	Trouble Area
B1441/41	Air mix damper position sensor value does not change even if A/C control assembly operates air mix damper control servomotor.	• Air mix damper control servomotor. • Air mix damper position sensor. • Harness or connector between A/M control assembly and A/C damper control servomotor, A/M damper position sensor. • A/c control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



PREPARATION:
(a) Warm up the engine.
(b) Set to the actuator check mode (See page DI–904).
(c) Press the A/C switch and change it to step operation.

CHECK:
Press the A/C switch and check the operation of the air mix damper and the condition of the blower.

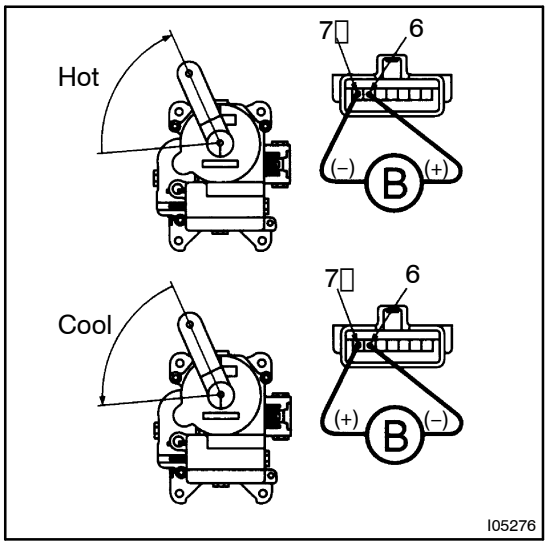
OK:

Display Code	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–912).**

NG

2	Check air mix damper control servomotor.



PREPARATION:
Remove heater unit (See page AC–26).

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–29).

NG → Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

DI26H–02

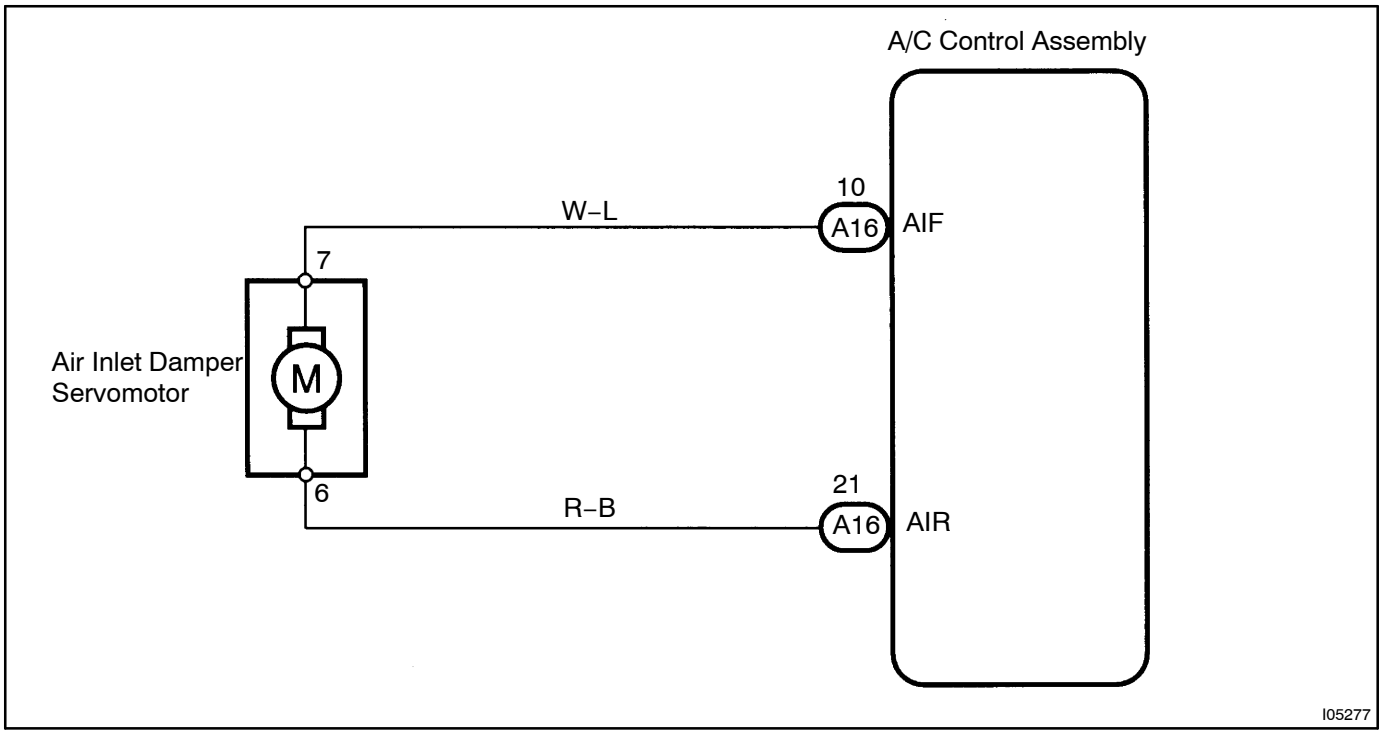
DTC	B1442/42	Air Inlet Damper Control Servomotor Circuit

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.

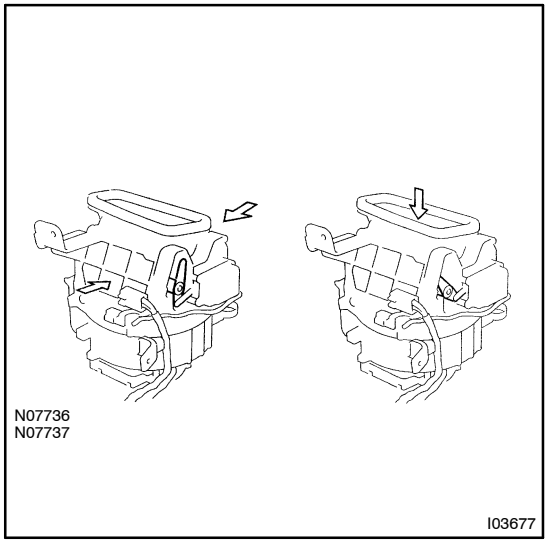
DTC No.	Detection item	Trouble Area
B1442/42	Air inlet damper position sensor value does not change even if A/C control assembly operated air inlet damper control servomotor.	• Air inlet damper position sensor. • Harness or connector between air inlet damper control servomotor assembly and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**



PREPARATION:

(a) Remove glove box to see and check the air inlet damper operation.

(b) Set to the actuator check mode (See page DI–904).

(c) Press the A/C switch and change it to step operation.

CHECK:

Press the A/C switch in order and check the operation of air inlet damper.

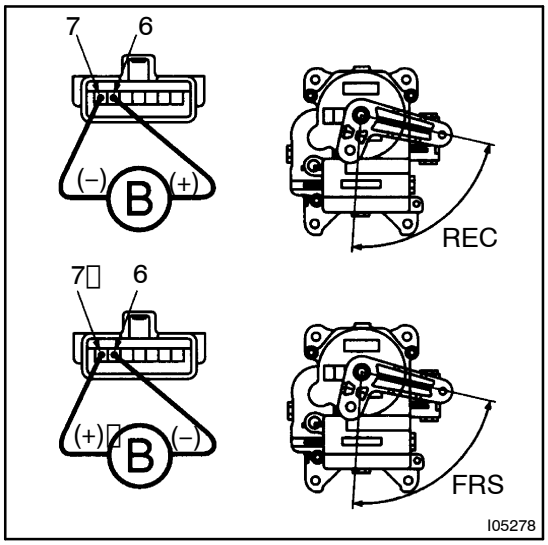
OK:

Display Code	Air Inlet Damper
0 – 1	FRS
2	F/R
3 – 5	REC
6 – 9	FRS

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).**

NG

2	**Check air inlet damper control servomotor.**



PREPARATION:

(a) Remove cooling unit (See page AC–26).

(b) Disconnect the air inlet damper control servomotor assembly connector.

CHECK:

Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.

OK:

The lever moves smoothly to REC position.

CHECK:

Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.

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–29).**

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

OK

Check and replace A/C control assembly.

DI26I–02

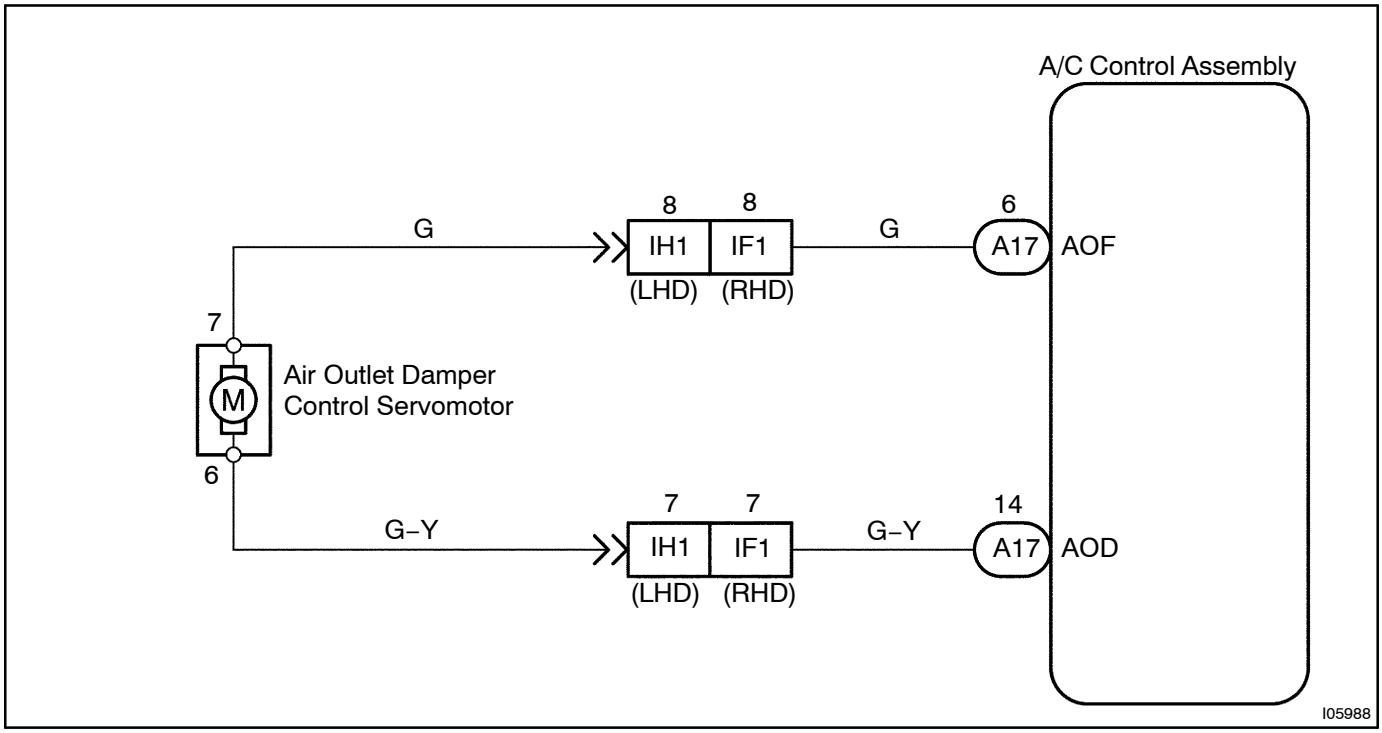
DTC	B1443/43	Air Outlet Damper Control Servomotor Circuit

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.

DTC No.	Detection Item	Trouble Area
B1443/43	Air outlet damper position sensor value does not change even if A/C control assembly operated air outlet damper control servomotor.	• Air outlet damper control servomotor. • Air outlet damper position sensor. • Harness or connector between A/C control assembly air outlet damper control servomotor, air outlet damper position sensor. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

Display Code	Air Flow
0 – 4	FACE
5	BI–LEVEL
6, 7	FOOT
8	FOOT / DEF
9	DEF

PREPARATION:

(a) Set to the actuator check mode (See page DI–904).

(b) Press the driver side temperature control switch and change to step operation.

CHECK:

Press the driver side temperature control switch and check the condition of air flow.

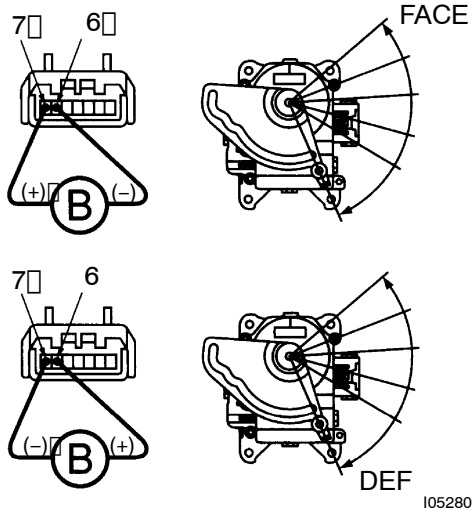
OK:

The mode changes with the change in the temperature display as shown in the table.

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).**

NG

2	**Check air outlet damper control servomotor.**



PREPARATION:

(a) Remove heater unit. (See page AC–26).

(b) Disconnect the air outlet damper control servomotor assembly connector.

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–29).

NG → Repair or replace harness or connector.

OK →

Check and replace A/C control assembly.

DI26J–02

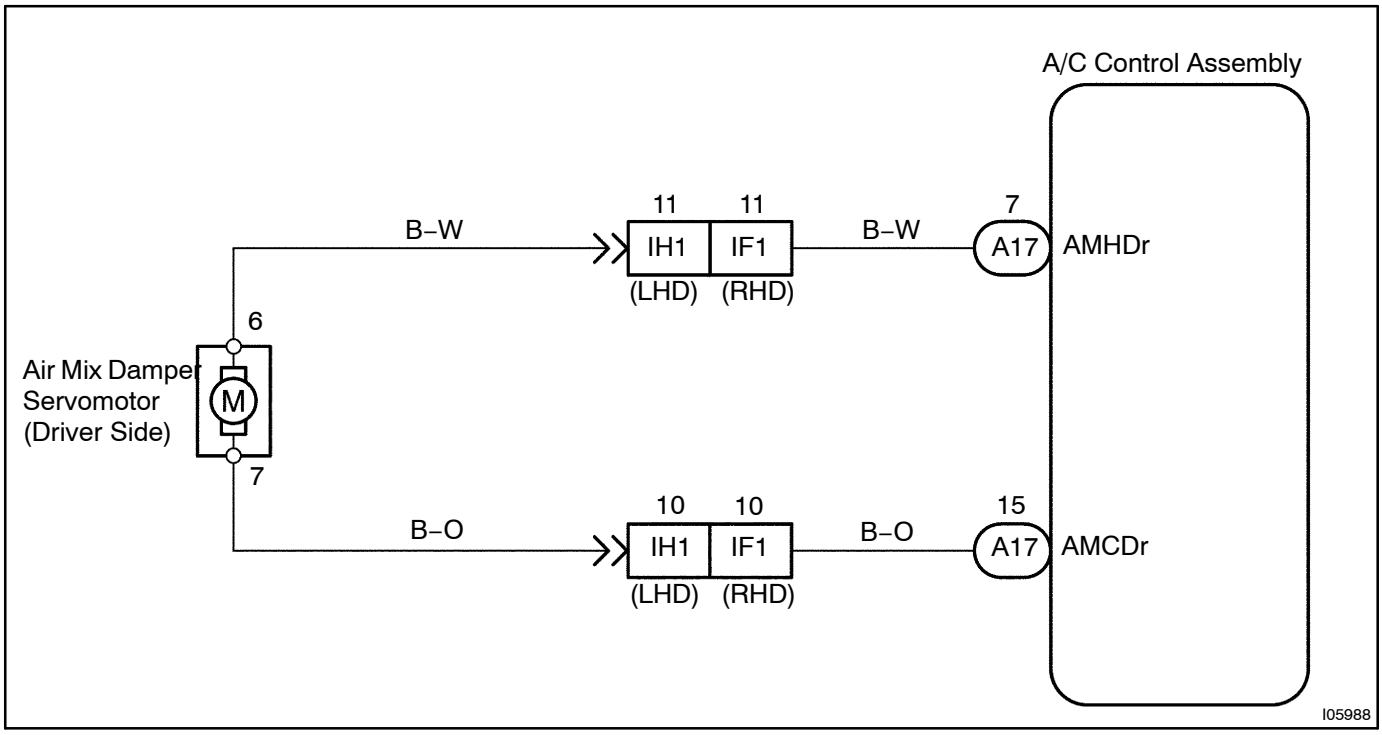
DTC	B1446/46	Air Mix Damper Control Servomotor Circuit (Driver side)

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.

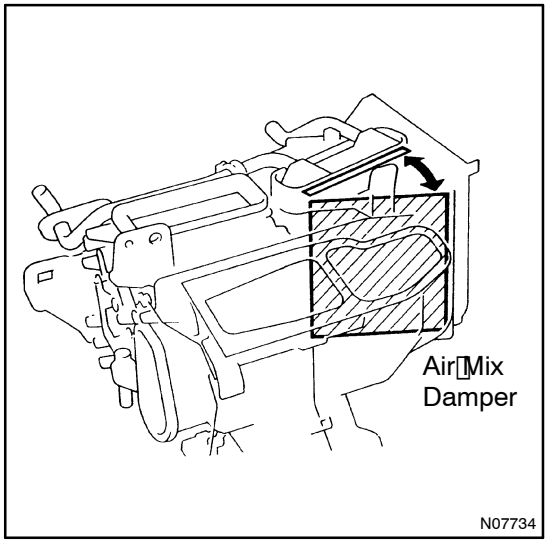
DTC No.	Detection Item	Trouble Area
B1446/46	Air mix damper position sensor value does not change even if A/C control assembly operates air mix damper control servomotor.	• Air mix damper control servomotor. • Air mix damper position sensor. • Harness or connector between A/M control assembly and A/C damper control servomotor, A/M damper position sensor. • A/c control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**



PREPARATION:

(a) Warm up the engine.

(b) Set to the actuator check mode (See page DI–904).

(c) Press the A/C switch and change it to step operation.

CHECK:

Press the A/C switch and check the operation of the air mix damper and the condition of the blower.

OK:

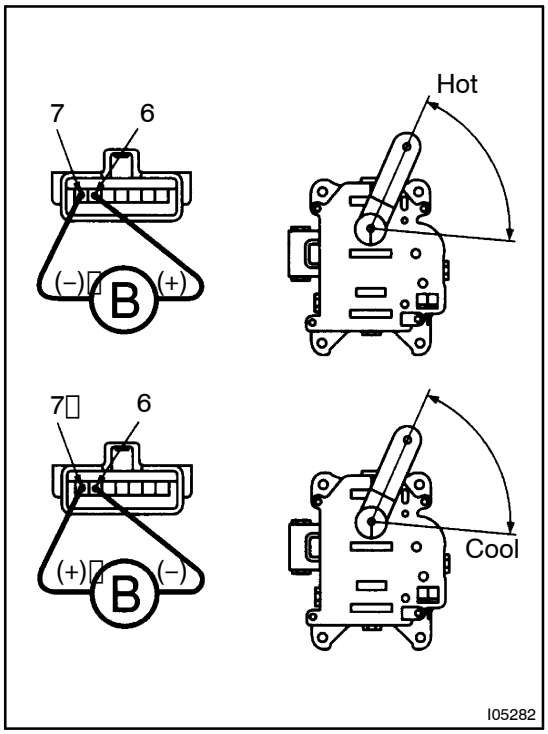
Display Code	Air Mix Damper	Condition
0 – 3	0% (Fully closed)	Cool air comes out
4 – 5	50%	
6 – 9	100% (Fully opened)	Warm air comes out

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).

NG

2	**Check air mix damper control servomotor.**



PREPARATION:
Remove heater unit (See page AC–26).
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–29).**

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

OK ↓

Check and replace A/C control assembly.

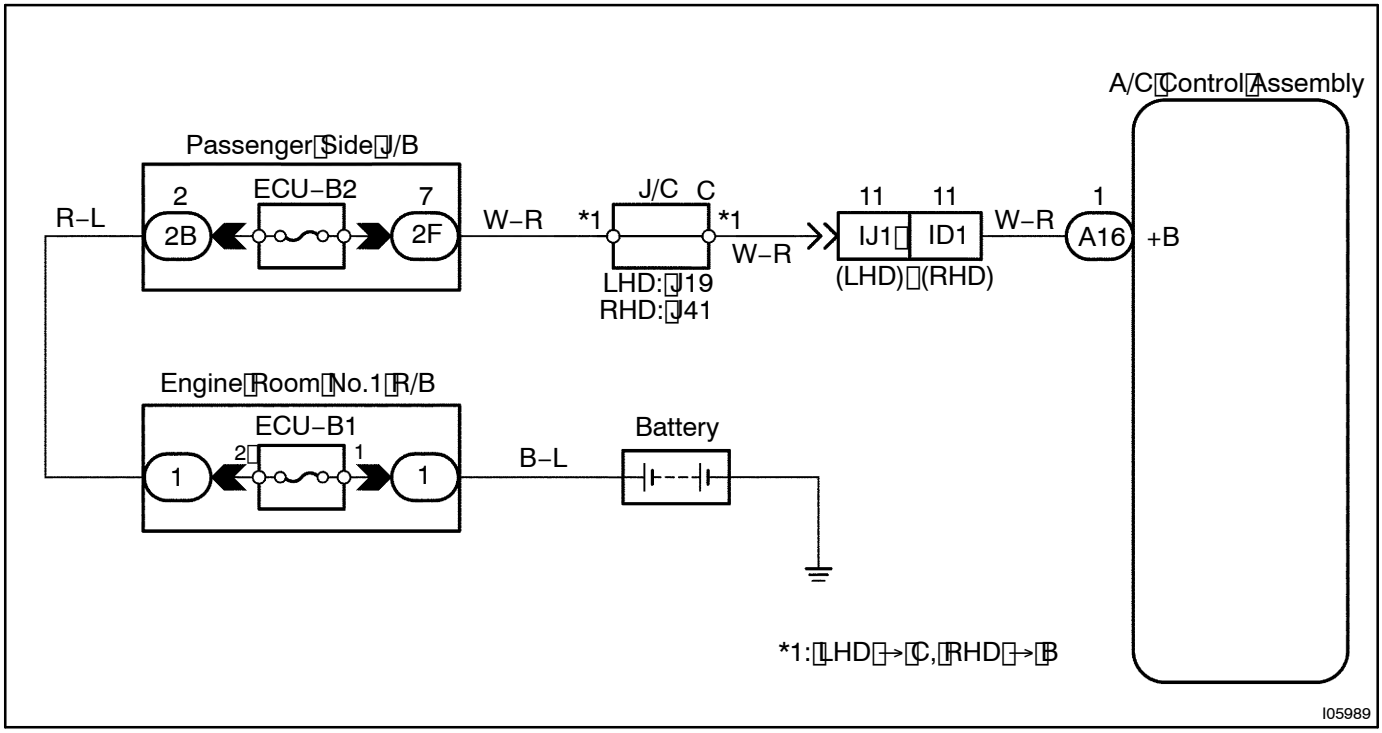
DI26K–02

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

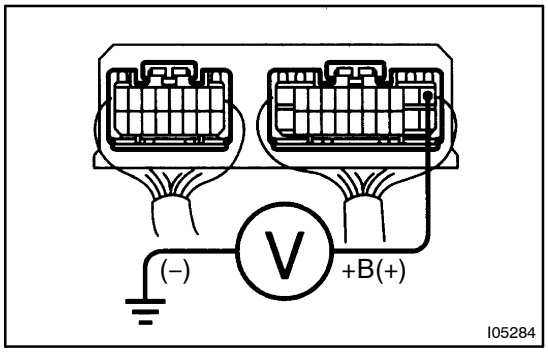
This is the backup poser source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

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:

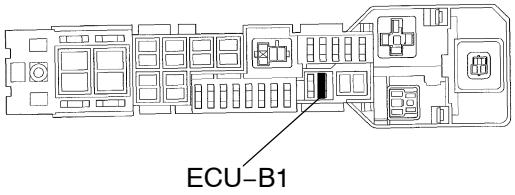
Voltage: Battery positive voltage

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).**

NG

2	Check ECU–B1 fuse.

Engine Room No.2 R/B



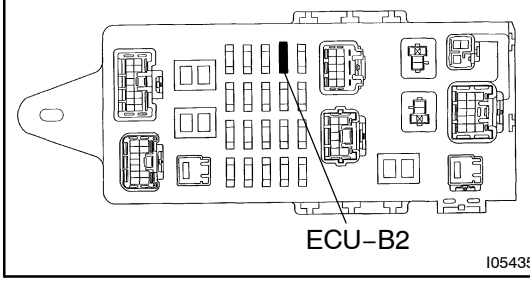
PREPARATION:
Remove ECU–B1 fuse from Engine Room No.1 R/B.
CHECK:
Check continuity of ECU–B1 fuse.
OK:
Continuity

NG	Check for short in all the harness and components connected to the ECU–B1 fuse (See attached wiring diagram).

OK

3	Check ECU–B2 fuse.

Passenger Side J/B



PREPARATION:
Remove ECU–B2 fuse from Passenger Side J/B.
CHECK:
Check continuity of ECU–B2 fuse.
OK:
Continuity

NG	Check for short in all the harness and components connected to the ECU–B2 fuse (See attached wiring diagram).

OK

Check and repair harness and connector between A/C control assembly and battery.

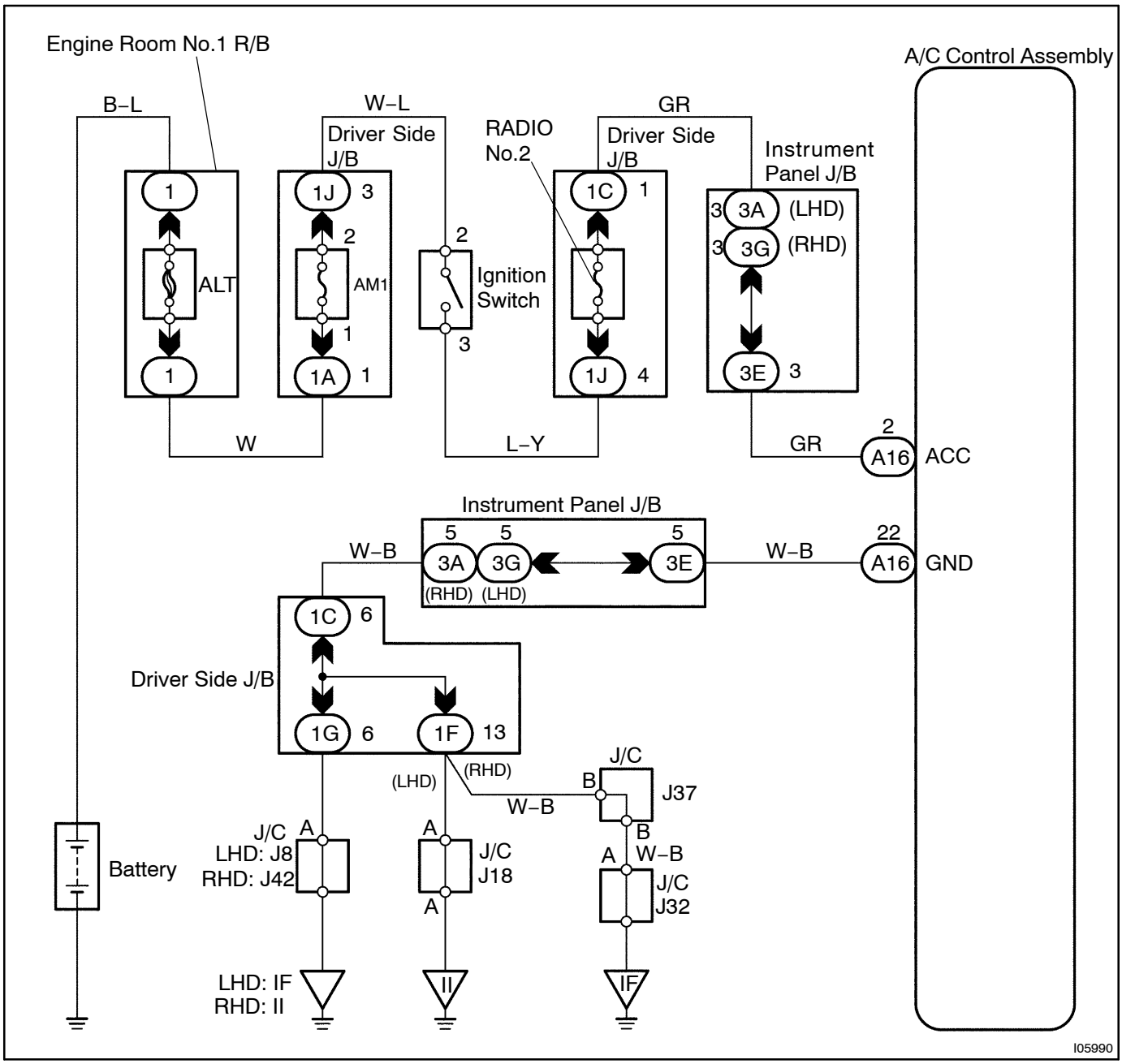
DI26L–02

ACC Power Source Circuit

CIRCUIT DESCRIPTION

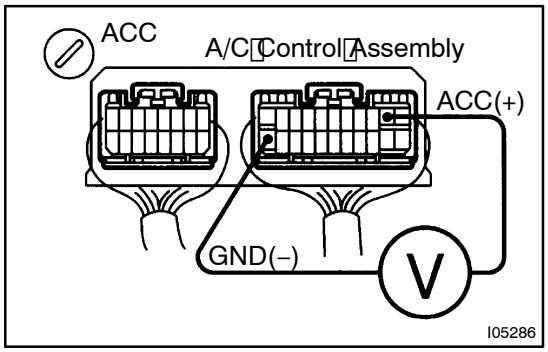
This is the power source for A/C control assembly and servomotors, etc.

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 ON.

(b) Measure voltage between terminals ACC and GND of A/C control assembly.

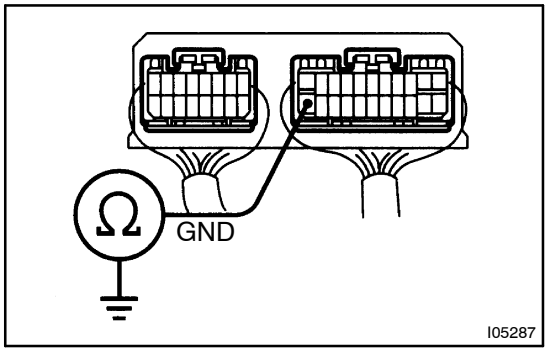
OK:

Voltage : Battery positive voltage

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).**

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:

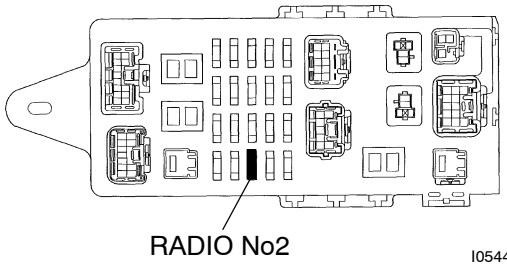
Resistance : 0 Ω (continuity)

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

OK

3	Check RADIO No.2 fuse.

Driver Side J/B



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.

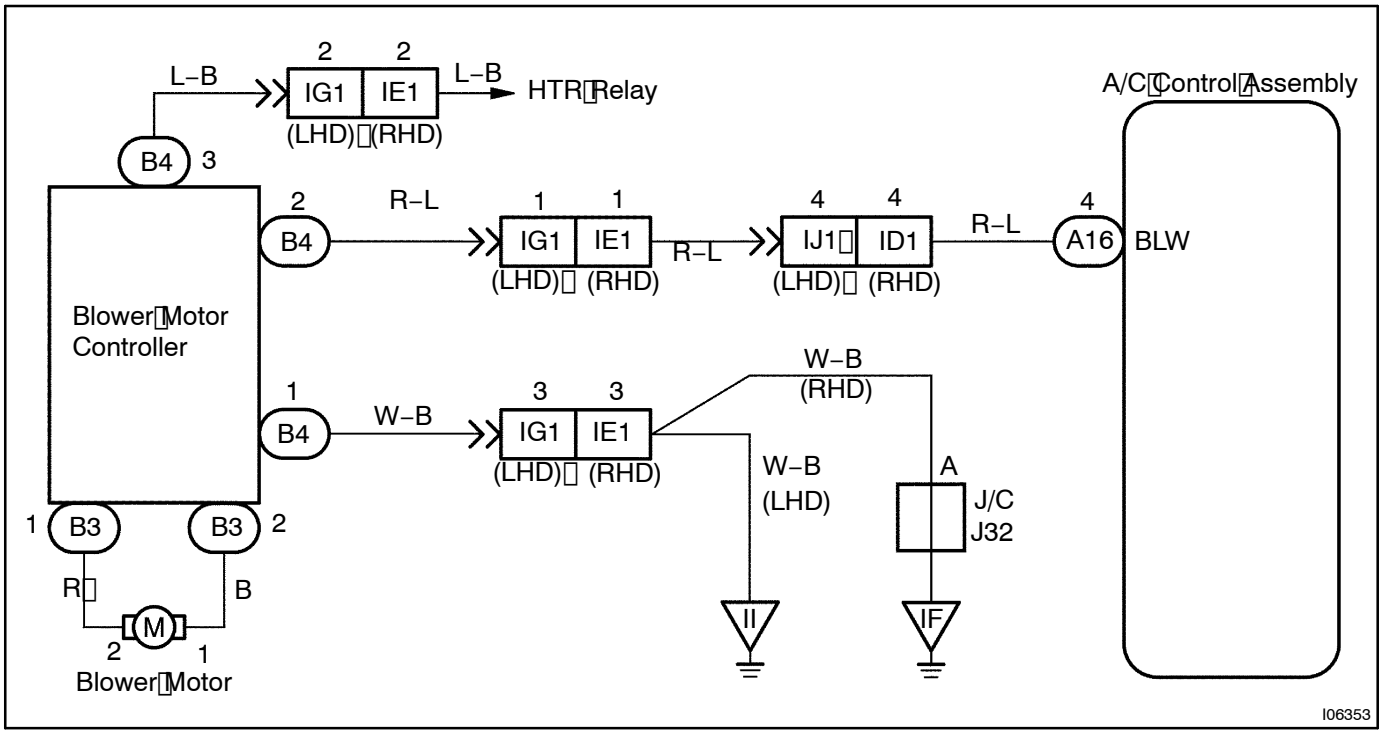
DI29K–02

Blower Motor Circuit

CIRCUIT DESCRIPTION

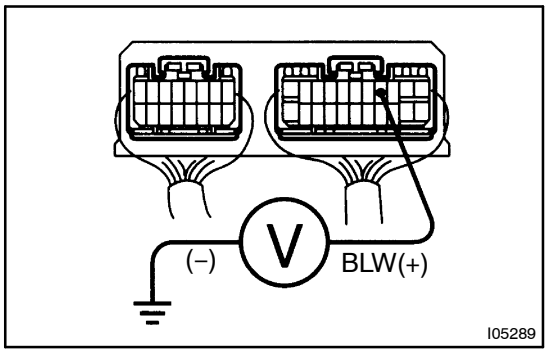
This is the power source for the blower motor.

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 ON.

(b) Operate blower motor.

(c) Measure voltage between terminal BLW of A/C control assembly and body ground.

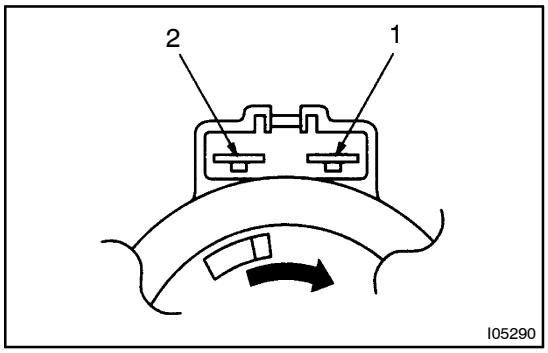
OK:

Voltage: 11 – 13 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–912).**

NG

2	Check blower motor.

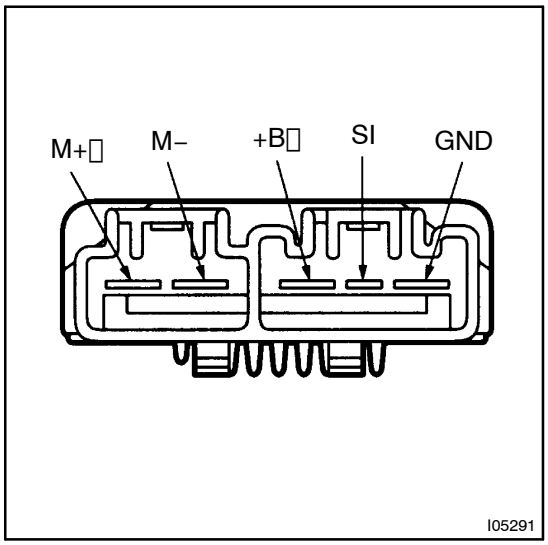


PREPARATION:
Remove blower motor (See page AC–66)
CHECK:
Connect the positive (+) lead from the battery to terminal 2 of blower motor connector and the negative (–) lead to terminal 1.
OK:
Blower motor operates smoothly.

NG → **Replace blower motor.**

OK

3	Check blower motor control relay.



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 Positive Voltage
+M ↔ Body Ground	Battery Positive Voltage
M+ ↔ M–	Battery Positive Voltage
SI ↔ Body Ground	1 – 3 V

NG → **Replace blower motor relay.**

OK

Repair or replace harness or connector.

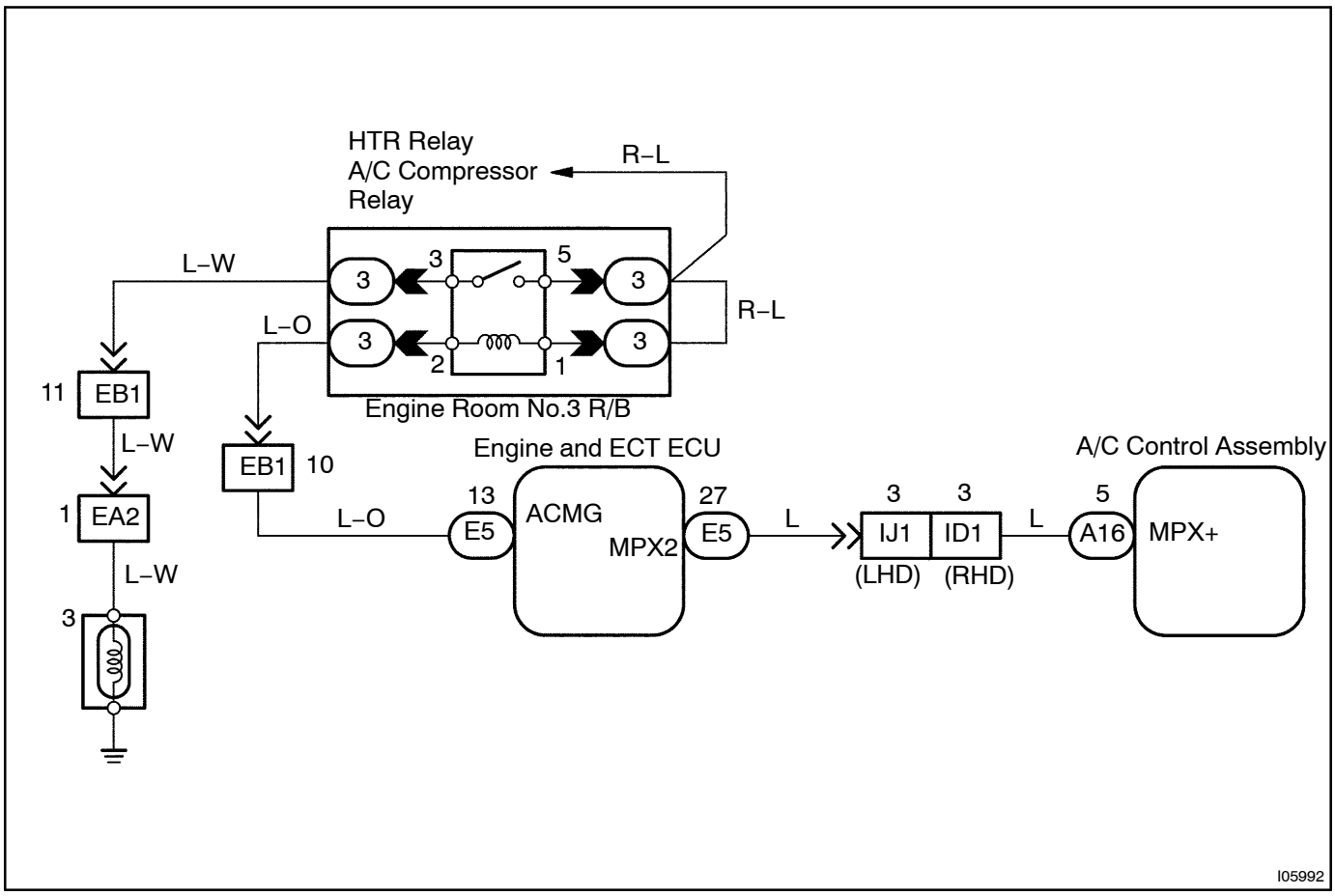
DI26N–02

Compressor Circuit

CIRCUIT DESCRIPTION

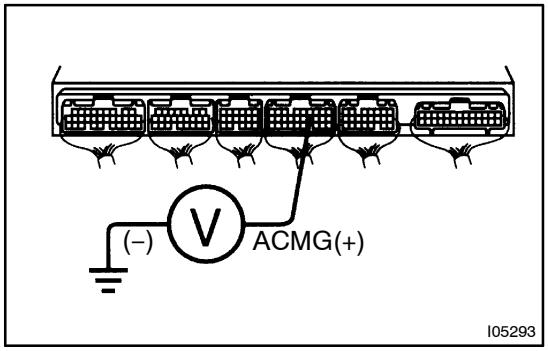
The A/C control assembly outputs the magnetic clutch ON signal from terminal MGC to the ECM. When the ECM receives this signal, it sends a signal from terminal ACMG and switches the A/C magnetic clutch relay ON, thus turning the A/C compressor magnetic clutch ON.

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 ECM connector and body ground when A/C switch is ON and OFF.

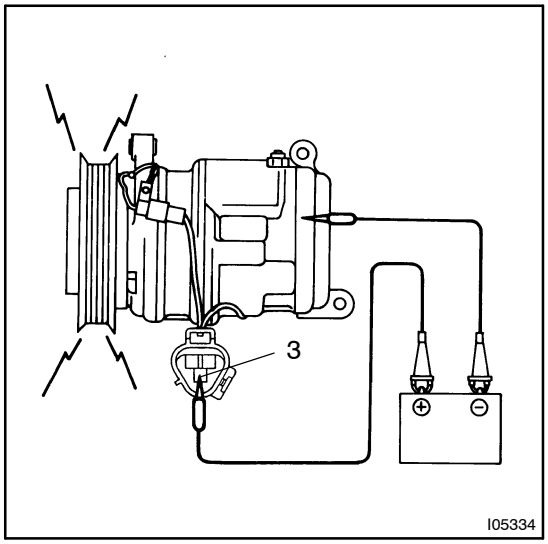
OK:

A/C switch	Voltage
ON	Below 3.0 V
OFF	9.0 – 14 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 3.

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–29)

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between compressor relay and and ECM (See page IN–29).

NG → Repair or replace harness or connector.

OK

5	Check harness and connector between ECM and A/C compressor assembly (See page IN–29).

NG → Repair or replace harness or connector.

OK

Check and replace ECM and/or A/C control assembly.