DIAGNOSTICS

ENGINE

DI4DW–07

HOW TO PROCEED WITH TROUBLESHOOTING

When using hand–held tester, 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.

Vehicle Brought to Workshop

1 Customer Problem Analysis P. DI–2

2 Connect the hand–held tester to DLC3 P. DI–3
If the display indicates a communication fault in the tool, inspect DLC3 P. DI–3

3 Check DTC and Freezed Frame Data (Precheck)
Record or Print DTC and Freezed Frame Data P. DI–3

4 Clear DTC and Freezed Frame Data P. DI–3

5 Visual Inspection

6 Setting the Check (Test) Mode Diagnosis P. DI–3

7 Problem Symptom Confirmation
If the engine does not start perform steps 10 and 12 first

Malfunction occurs.

Malfunction does not occur.

8 Symptom Simulation P IN–29.

9 DTC Check P. DI–3

Normal

Malfunction code.

10 Basic Inspection P. DI–3

11 DTC Chart P. DI–14

12 Problem Symptom Table P. DI–20

14 Parts Inspection

13 Circuit Inspection P. DI–21 – DI–138

15 Check for Intermittent Problems P. DI–3

Identification of Problem

16 Adjustment, Repair

17 Confirmation Test

End

DI4DX–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.	
Data 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 Drivability	☐ 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	

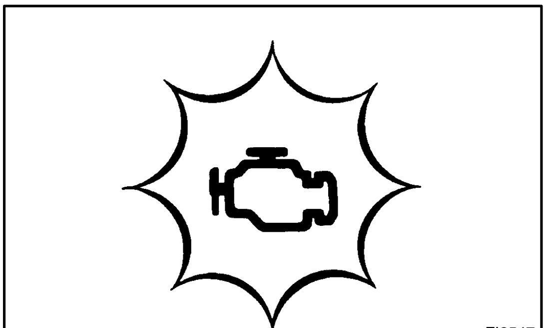
Datas Problem Occurred		
Problem Frequency		☐ Constant ☐ Sometimes (times per day/month) ☐ Once only ☐ Other ____
Condition When Problem Occurs	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other ____
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (approx. ____ °F/____ °C)
	Place	☐ Highway ☐ Suburbs ☐ 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 ____

Condition of check engine warning light (CHK ENG)		☐ Remains on ☐ Sometimes light up ☐ Does not light up
DTC Inspection	Normal mode (Precheck)	☐ Normal ☐ Malfunction code(s) (code) ☐ Freezed frame data ( )
	Check Mode	☐ Normal ☐ Malfunction code(s) (code) ☐ Freezed frame data ( )

DI7O5–01

PRE–CHECK

1. DIAGNOSIS SYSTEM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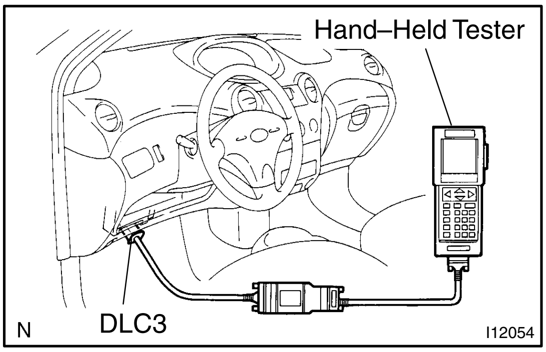
(a) Description

- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's engine ECU.
- Euro–OBD regulations require that the vehicle's on–board computer lights up the check engine warning light on the instrument panel when the computer detects a malfunction in the emission control system / components or in the power train control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTC) prescribed by ISO 15031–4 are recorded in the engine ECU memory (See page DI–14). If the malfunction does not reoccur in 3 consecutive trips, the check engine warning light goes off automatically but the DTCs remain recorded in the engine ECU memory.
- When DTC P3190, P3191 are detected and the remain of the fuel is little, the computer judges the cause as a fuel shortage, and after the next trip, when the supply of fuel is confirmed, it turns off MIL, but the memory of DTC still remains.



N I12054

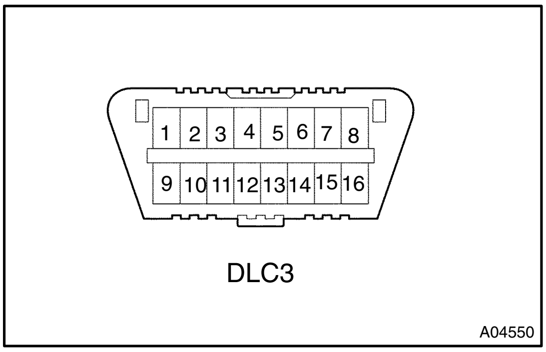
- To check the DTCs, connect the OBD scan tool or hand–held tester to Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the OBD scan tool's instruction book.)

  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page DI–14)

- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting, the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily. (hand–held tester only) (See step 2)
- *2 trip detection logic: When a malfunction is 1st detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this 2nd detection causes the check engine warning light to light up. (2nd trip)
  (However, the IG switch must be turned OFF between the 1st trip and the 2nd trip.)
- Freeze frame data:
  Freeze frame data records the engine condition when a misfire (DTCs P0300 – P0304) or fuel trim malfunction (DTCs P0171, P0172) or other malfunction (first malfunction only), is detected.
  Because freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting it is useful 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.

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

(1) DTCs other than fuel trim malfunction (DTCs P0171, P0172) and misfire (DTCs P0300 – P0304).
(2) Fuel trim malfunction (DTCs P0171, P0172).
(3) Misfire (DTCs P0300 – P0304).

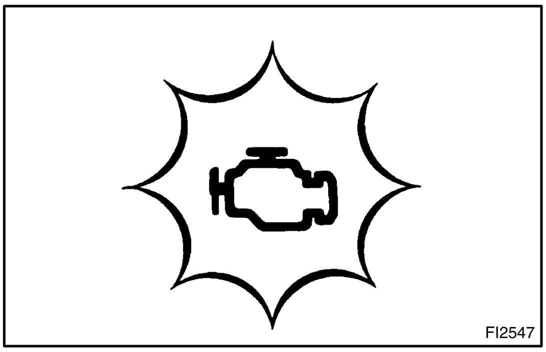


(b) Check the DLC3.
The vehicle's engine ECU uses the ISO 9141–2 communication protocol. The terminal arrangement of DLC3 complies with ISO 15031–03 and matches the ISO 9141–2 format.

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 OBD scan tool or 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 Debarment listed in the tool,s instruction manual.



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.

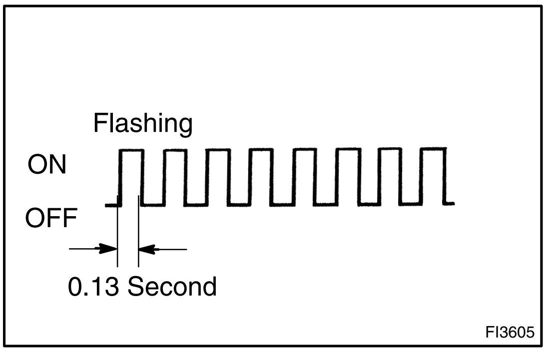
(1) Prepare the hand–held tester.
(2) Connect the hand–held tester to DLC3.
(3) Turn the ignition switch ON and switch the hand–held tester main switch ON.
(4) Use the hand–held tester to check the DTCs and freezed frame data; note them down. (For operating instructions, see the hand–held tester,s instruction book.)
(5) See page DI–14 to confirm the details of the DTCs.

(c) 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 instructions.)
- Disconnecting the battery terminals or EFI fuse.

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

3. INSPECT DIAGNOSIS (Check (Test) Mode)
HINT:
Hand–held tester only:
Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.
Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check (test) mode.
(a) Check the DTC.
(1) Initial conditions
- Battery 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.



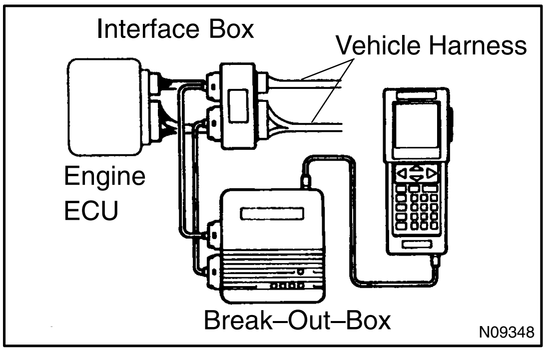
(6) Switch the hand–held tester normal mode to check (test) mode. (Check that the check engine warning light (CHK ENG) flashes.)
(7) Start the engine. (The check engine warning (CHK ENG) light goes out after the engine start.)
(8) Simulate the conditions of the malfunction described by the customer.

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) 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
P0105	• Ignition timing fixed at 5° BTDC	Returned to normal condition
P0110	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
P0115	Water temp. is fixed at 80°(176°F)	Returned to normal condition
P0120	VTA is fixed at 0°	The following condition must be repeated at least 2 times consecutively When closed throttle position switch is ON: 0.1 V ≦ VTA and 0.95 V
P0325	Max. timing retardation	IG switch OFF
P0500	High RPM for cut is prohibited ISC control prohibited	Returned to normal condition
P1300 P1305 P1310 P1315	Fuel cut	Feturned 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–29).
(4) Check the connector and terminal (See page IN–40).
(5) Check the visual check and contact pressure (See page IN–40).
(6) Handle the connector (See page IN–40).

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 11V or more when engine is stopped ?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked ?**

NO → **Proceed to problem table on page DI–20.**

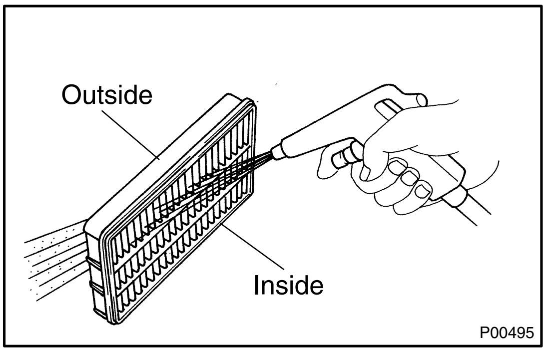
YES

3	**Does engine start ?**

NO → **Go to step 7.**

YES

4	**Check air filter.**

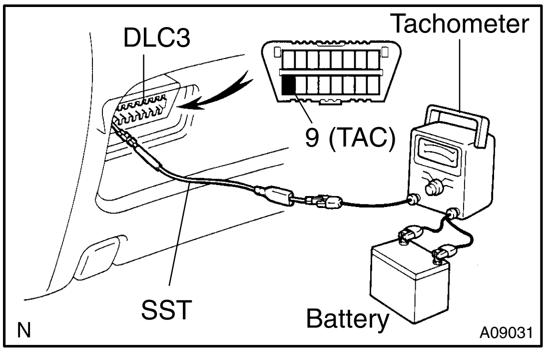


PREPARATION:
Remove the air filter.
CHECK:
Visually check that the air filter is not excessively dirty or oily.
HINT:
If necessary, clean the filter with compressed air. First blow from inside thoroughly, then blow from outside of filter.

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 the "P" position.
(e) Connect the hand–held tester to DLC3 on the vehicle.
(f) If you have no hand–held tester, connect tachometer test prove to terminal 9 (TAC) of DLC3.
SST 09843–18030
(g) Transit to inspection mode.

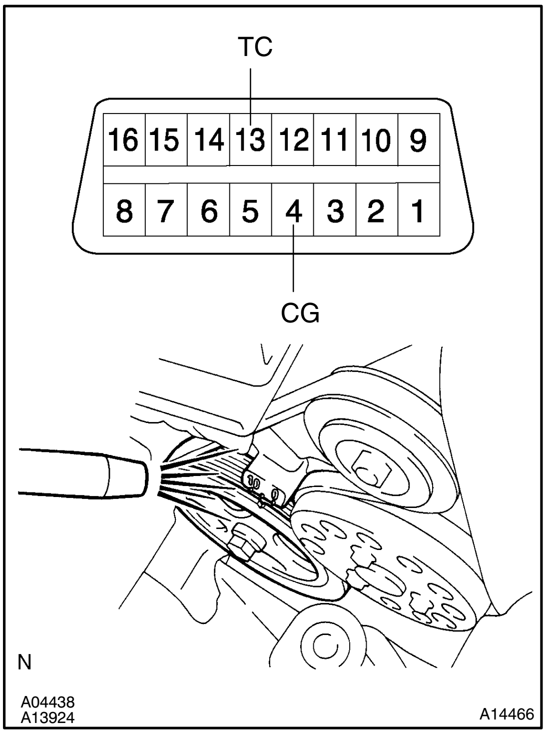
NOTICE:
As some tachometer are not compatible with this ignition system, we recommend that you confirm the compatibility of your until before use.

CHECK:
Check the idle speed.
OK:
Idle speed: 950 – 1,050 rpm

NG → **Proceed to problem symptoms table on page DI–20.**

OK

6	Check ignition timing.



PREPARATION:
(a) Warm up engine to normal operating temperature.
(b) Switch off all accessories.
(c) Switch off air conditioning
(d) Shift transmission into the ”P” position.
(e) Using SST, connect terminals 13 (TC) and 4 (CG) of DLC3.
SST 09843–18040
(f) Using a timing light, connect the tester to No.1 high–tension cord.
(g) Transit to inspection mode.

CHECK:
Check ignition timing.

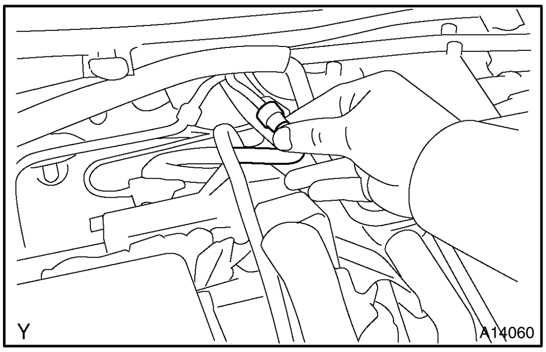
OK:
Ignition timing: 7 – 15° BTDC at idle

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

OK

Proceed to problem symptoms table on page DI–20.

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 there is pressure in the fuel inlet pipe from the fuel line.

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

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) Disconnect the injector connector.
(e) Be sure to ground the screw of the spark plug securely.

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–20.

7. ENGINE OPERATING CONDITION

NOTICE:

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

(a) CARB mandated signal.

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
CALC LOAD	Calculator Load: Current intake air volume as a proportion of max. intake air volume	Idling: 5.4 – 19.2 % Racing without load (2,250rpm): 6.9 – 16.2 %
COOLANT TEMP/WATER TEMP.	Water Temp. Sensor Value	After warming up: 80 – 95°C (176 – 203°F)
SHORT FT #1	Short–term Fuel Trim Bank 1	0 ± 20%
LONG FT #1	Long–term Fuel Trim Bank 1	0 ± 20%
MAF/AFM	Air Flow Rate Through Mass Flow Meter	Idling: 1.11 – 4.38 gm/sec. Racing without load (2,250 rpm): 3.38 – 7.88 gm/sec.
ENGINE SPD	Engine Speed	Idling: 950 – 1,050 rpm
VEHICLE SPD	Vehicle Speed	Vehicle Stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No. 1	Idling: BTDC 7 – 15°
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to Ambient Temp.
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0%, 5 V → 100%	Throttle Fully Closed: 6 – 16 % Throttle Fully Open: 64 – 98 %
O2S B1, S1	Voltage Output of Oxygen Sensor Bank 1, Sensor 1	Idling: 0.05 – 0.95 V
O2FT B1, S1	Oxygen Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2S B1, S2	Voltage Output of Oxygen Sensor Bank 1 Sensor 2	Driving 50 km/h (31 mph): 0.05 – 0.95 V

(b) TOYOTA Enhanced Signals.

Hand–held tester display	Measurement Item	Normal Condition*1
MIL ON RUN DIST	Distance since activation of check engine warning light	When there is no DTC: 0 km (0 mile)
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.0 – 3.0 ms
IGNITION	Total number of ignition for every 1,000 revolutions	0 – 2,000
CYL#1, CYL#2, CYL#3, CYL#4	Abnormal revolution variation for each cylinder	0 %
A/C CUT SIG	A/C Cut Signal	A/C S/W OFF: ON
FUEL PUMP	Fuel Pump Signal	Idling: ON
EVAP (PURGE) VSV	EVAP VSV Signal	VSV operation: Above 30 %
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.8 – 1.2

O2 LR B1 S1	Oxygen Sensor Lean Rich Bank 1 Sensor 1: Response time for oxygen sensor output to switch from lean to rich	Idling after warming up: 0 – 1,000 msec.
O2 RL B1 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warming up: 0 – 1,000 msec.

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

DI12C–17

DIAGNOSTIC TROUBLE CODE CHART

SAE CONTROLLED

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.
- When the ignition switch is ON and ”READY” indicator light is OFF, the bulb check of the ”CHE ENG” warning light is performed (”CHE ENG” warning light is ON).
  When ”CHE ENG” warning light is ON, but the DTC of the engine is not memorized, it may be because of HV control system abnormality, so check HV control system beforehand.

DTC No. (See Page)	Detection Item	Trouble Area	CHK ENG*	Memory
P0100 (DI–21)	Mass Air Flow Circuit Malfunction	• Open or short in air flow meter circuit • Air flow meter • Engine ECU	○	○
P0101 (DI–26)	Mass Air Flow Circuit Range/ Performance Problem	• Air flow meter	○	○
P0110 (DI–26)	Intake Air Temp. Circuit Malfunction	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (built into air flow meter) • Engine ECU	○	○
P0115 (DI–32)	Engine Coolant Temp. Circuit Malfunction	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU	○	○
P0116 (DI–36)	Engine Coolant Temp. Circuit Range/Performance Probrem	• Engine coolant temp. sensor • Cooling system	○	○
P0120 (DI–37)	Throttle/Pedal Position Sensor/ Switch ”A” Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU	○	○
P0121 (DI–43)	Throttle/Pedal Position Sensor/ Switch ”A” Circuit Range/Performance Problem	• Throttle position sensor	○	○
P0125 (DI–44)	Insufficient Coolant Temp. for Closed Loop Fuel Control	• Air induction system • Fuel pressure • Injector injection • Gas leakage on exhaust system • Open or short in heated oxygen sensor (bank 1 sensor 1) circuit • Oxygen sensor (bank 1 sensor 1)	○	○
P0130 (DI–49)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Air induction system • EGR system • Fuel pressure • Injector injection • Open or short in heated oxygen sensor circuit • Heated oxygen sensor	○	○
P0133 (DI–53)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)	• Air induction system • EGR system • Fuel pressure • Injector injection • Open or short in heated oxygen sensor circuit • Heated oxygen sensor • Engine ECU	○	○

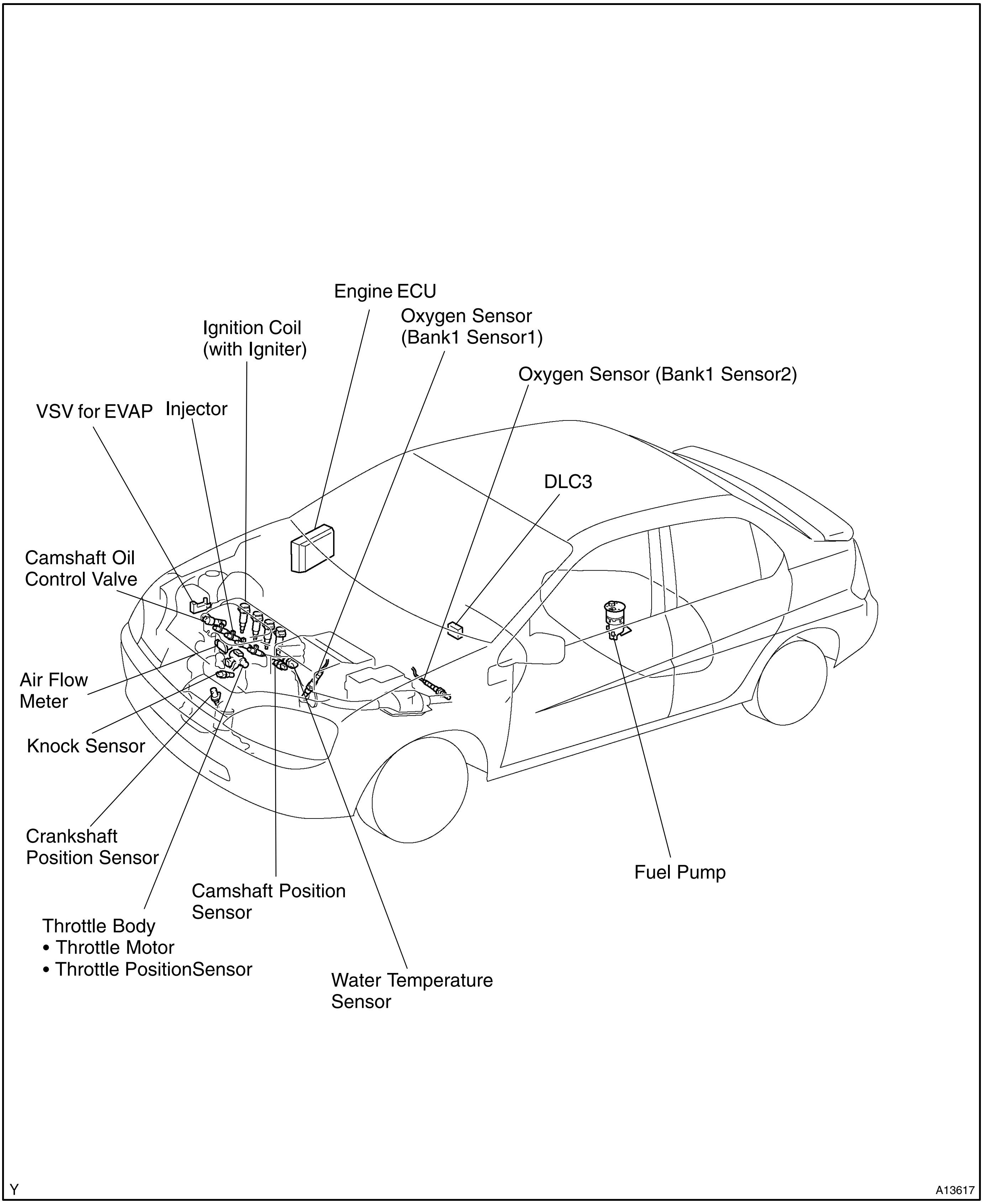
P0135 (DI–56)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU	○	○
P0136 (DI–58)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor	○	○
P0141 (DI–56)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135	○	○
P0171 (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 malfunction • Air flow meter • Water temp. sensor	○	○
P0172 (DI–60)	System too Rich (Fuel Trim)	• Fuel line pressure • Injector leak, blockage • Heated oxygen sensor malfunction • Mass air flow meter • Engine coolant temp. sensor • Gas leakage on exhaust system	○	○
P0300 (DI–66)	Random/Multiple Cylinder Misfire Detected	• Ignition system • Injector • Fuel pressure • Compression pressure • Valve clearance • Valve timing • Air flow meter • Water temp. sensor • Open or short in engine wire • Connector connection • Engine ECU	○	○
P0301 P0302 P0303 P0304 (DI–66)	Misfire Detected – Cylinder 1 – Cylinder 2 – Cylinder 3 – Cylinder 4			
P0325 (DI–72)	Knock Sensor 1 Circuit Malfunction	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU	○	○
P0335 (DI–75)	Crankshaft Position Sensor ”A” Circuit Malfunction	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate • Engine ECU	○	○
P0340 (DI–78)	Camshaft Position Sensor Circuit Malfunction	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Engine ECU	○	○
P0420 (DI–80)	Catalyst System Efficiency Below Threshould (Bank 1)	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter	○	○
P0443 (DI–83)	Evaporative Emission Control System Purge Control Vent Control Malfunction	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU	○	○
P0500 (DI–86)	Vehicle Speed Sensor Malfunction	• Combination meter • Open or short in No.1 vehicle speed sensor circuit • Engine ECU • No.1 vehicle speed sensor	○	○
P0505 (DI–88)	Idle Control System Malfunction	• Electric throttle control system • Air induction system	○	○
P1125 (DI–89)	Throttle Conrol Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • ECM	○	○

P1127 (DI–91)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • ECM	○	○
P1128 (DI–93)	Throttle Conrol Motor Lock Malfunction	• Throttle control motor • Throttle body assembly • ECM	○	○
P1129 (DI–94)	Electric Throttle Conrol System Malfunction	• Electric throttle control system • ECM	○	○
P1300 (DI–95)	Igniter Circuit Malfunction (No.1)	• Open or short in IGF and IGT1 circuit from ignition coil with igniter to Engine ECU • No.1 ignition coil with igniter • Engine ECU	○	○
P1305 (DI–95)	Igniter Circuit Malfunction (No.2)	• Open or short in IGF or IGT2 circuit from No.2 ignition coil with igniter to engine ECU • No.2 ignition coil with igniter • Engine ECU	○	○
P1310 (DI–95)	Igniter Circuit Malfunction (No.3)	• Open or short in IGF and IGT3 circuit from ignition coil with igniter to Engine ECU • No.3 ignition coil with igniter • Engine ECU	○	○
P1315 (DI–95)	Igniter Circuit Malfunction (No.4)	• Open or short in IGF or IGT4 circuit from No.4 ignition coil with igniter to engine ECU • No.4 ignition coil with igniter • Engine ECU	○	○
P1346 (DI–102)	VVT Sensor Circuit Range/PerformanceProblem	• Mechanical system (Jumping teeth of timing belt, belt stretched) • Engine ECU	○	○
P1349 (DI–103)	VVT System Malfunction	• Valve timing • OCV • VVT controller assembly • Engine ECU	○	○
P1525 (DI–109)	Resolver Circuit Malfunction	• HV ECU • Engine ECU	–	○
P1600 (DI–111)	Engine ECU BATT Malfunction	• Open in back up power source circuit • Engine ECU	○	○
P1633 (DI–113)	ECU Malfunction (ETCS Circuit)	• ECM	○	○
P1636 (DI–114)	HV ECU Malfunction	• HV ECU • Engine ECU	○	○
P1637 (DI–116)	EGSTP Signal Malfunction	• HV ECU • Engine ECU	–	○
P1656 (DI–118)	OCV Circuit Malfunction	• Open or short in OCV circuit (bank 1) • OCV • Engine ECU	○	○
P3190 (DI–121)	Poor Engine Power	• Air induction system • Throttle body • Fuel pressure • Engine • Mass air flow meter • Out of fuel • Engine coolant temp. sensor • Crankshaft position sensor • Camshaft position sensor • Engine ECU	○	○
P3191 (DI–121)	Engine dose not Start			

*: – Check engine warning light does not light up. ○ Check engine warning light lights up.

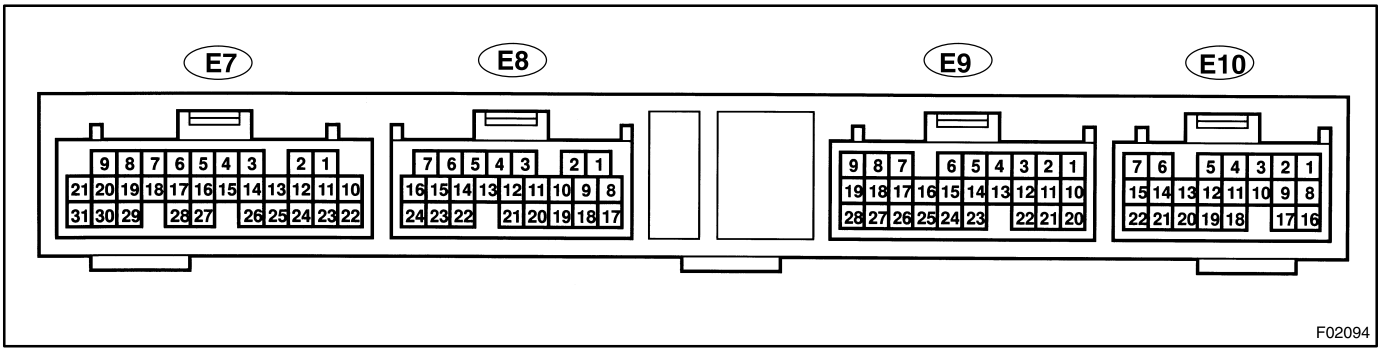
DI68L–08

PARTS LOCATION



DI7O6–01

TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E8 – 3) – E1 (E8 – 17)	R–W ↔ BR	Always	9 – 14
+B (E8 – 4) – E1 (E8 – 17)	B ↔ BR	IG switch ON	9 – 14
+BM (E7 – 6) – E1 (E8 – 17)	GR ↔ BR	Always	9 – 14
IGSW(E10 – 9) – E1(E8 – 17)	B–W ↔ BR	IG switch ON	9 – 14
MREL (E9 – 25) – E1(E8 – 17)	G–R ↔ BR	IG switch ON	9 – 14
VC (E8 – 2) – E2 (E8 – 18)	Y–R ↔ BR	IG switch ON	4.5 – 5.5
VTA (E8 – 23) – E2 (E8 – 18)	P ↔ BR	IG switch ON Throttle valve fully closed	0.4 – 1.0
		IG switch ON Throttle valve fully open	3.2 – 4.8
VTA2 (E8 – 21) – E2 (E8 – 18)	L ↔ BR	IG switch ON Accelerator pedal released	2.0 – 2.9
		IG switch ON Accelerator pedal depressed	4.6 – 5.1
VG (E8 – 10) – EVG (E8 – 19)	G ↔ R	Idling, A/C switch OFF, Shift position in N or P position	0.5 – 3.0
THA (E8 – 22) – E2 (E8 – 18)	R–B ↔ BR	Idling, Intake air temp. 20°C (68°F)	0.5 – 3.4
THW (E8 – 14) – E2 (E8 – 18)	W ↔ BR	Idling, Engine coolant temp. 80°C (176°F)	0.2 – 1.0
#10 (E8 – 5) – E01 (E7 – 21)	Y ↔ W–B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI–66)
#20 (E8 – 6) – E01 (E7 – 21)	B–R ↔ W–B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI–66)
#30 (E7 – 1) – E01 (E7 – 21)	L–W ↔ W–B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI–66)
#40 (E7 – 2) – E01 (E7 – 21)	R–W ↔ W–B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI–66)
IGT1 (E7 – 11) – E1 (E8 – 17)	Y–G ↔ BR	Idling	Pulse generation (See page DI–95)
IGT2 (E7 – 12) – E1 (E8 – 17)	W ↔ BR	Idling	Pulse generation (See page DI–95)
IGT3 (E7 – 13) – E1 (E8 – 17)	G ↔ BR	Idling	Pulse generation (See page DI–95)

IGT4 (E7 – 14) – E1 (E8 – 17)	Y ↔ BR	Idling	Pulse generation (See page DI–95)
IGF (E7 – 25) – E1 (E8 – 17)	B–R ↔ BR	IG switch ON	4.5 – 5.5
		Idling	Pulse generation (See page DI–95)
G2 (E7 – 10) – NE⊖ (E8 – 24)	R ↔ G	Idling	Pulse generation (See page DI–75)
NE+ (E8 – 16) – NE– (E8 – 24)	R ↔ G	Idling	Pulse generation (See page DI–75)
FC (E8 – 9) – E01 (E7 – 21)	G–R ↔ W–B	IG switch ON	9 – 14
EVP1 (E7 – 29) – E1 (E8 – 17)	R–L ↔ BR	IG switch ON	9 – 14
OX1A (E10 – 12) – E2 (E8 – 18)	W ↔ BR	Maintain engine speed at 2,500 rpm for 2 min. after warming up	Pulse generation (See page DI–49)
OX1B (E10 – 11) – E2 (E8 – 18)	Y ↔ BR	Maintain engine speed at 2,500 rpm for 2 min. after warming up	Pulse generation (See page DI–49)
HT1A (E10 – 1) – E1 (E8 – 17)	P–L ↔ BR	Idling	Below 3.0
		IG switch ON	9 – 14
HT1B (E10 – 7) – E1 (E8 – 17)	G–Y ↔ BR	Idling	Below 3.0
		IG switch ON	9 – 14
KNK1 (E7 – 28) – E2 (E8 – 18)	B ↔ BR	Idling	Pulse generation (See page DI–72)
SPD (E10 – 5) – E1 (E8 – 17)	V–W ↔ BR	IG switch ON Rotate driving wheel slowly	Pulse generation
SPHV (E9 – 10) – E1 (E8 – 17)	O ↔ BR	IG switch ON Rotate driving wheel slowly	Pulse generation (See page DI–109)
ESTP (E9 – 16) – E1 (E8 – 17)	R–Y ↔ BR	Idling	9 – 14
TAM (E9 – 23) – E2 (E8 – 18)	W–G ↔ BR	Outer air temp. –30 – 50°C	0.7 – 3.2
W (E10 – 6) – E1 (E8 – 17)	G–R ↔ BR	Idling	9 – 14
		IG switch ON	Below 3.0
ACT (E10 – 5) – E1 (E8 – 17)	P–G ↔ BR	A/C switch OFF	Below 2.0
		A/C switch ON at idling	9 – 14
OCV+ (E7 – 23) – OCV – (E7 – 24)	Y–R ↔ W–G	IG switch ON	Pulse generation (See page DI–103)
M+ (E7 – 8) – E1 (E8 – 17) M– (E7 – 7) – E1 (E8 – 17)	L ↔ BR P ↔ BR	Idling	Pulse generation (See page DI–89)
TC (E9 – 6) – E1 (E8 – 17)	P–B ↔ BR	IG switch ON	9 – 14

DI1IA–18

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	15.MG1 16.HV ECU	– IN–40
No initial combustion (Does not start)	1. Engine immobiliser system 2. ECU power source circuit 3. Fuel pump control circuit	BE–2 DI–124 DI–129
No complete combustion (Does not start)	1. Fuel pump control circuit	DI–129
Under normal condition (Difficult to start)	1. Fuel pump control circuit 2. Compression	DI–129 EM–3
Cold engine (Difficult to start)	1. Fuel pump control circuit	DI–129
Hot engine (Difficult to start)	1. Fuel pump control circuit	DI–129
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECU power source circuit	DI–138 DI–124
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	DI–138 DI–129
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM–3 DI–129
Hunting (Poor idling)	1. ECU power source circuit 2. Fuel pump control circuit	DI–124 DI–129
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit	DI–129
Surging (Poor driveability)	1. Fuel pump control circuit	DI–129
Soon after starting (Engine stall)	1. Engine immobiliser system 2. Fuel pump control circuit	BE–2 DI–129
During A/C operation (Engine stall)	1. A/C signal circuit (Compressor circuit) 2. Engine ECU	DI–138 IN–29

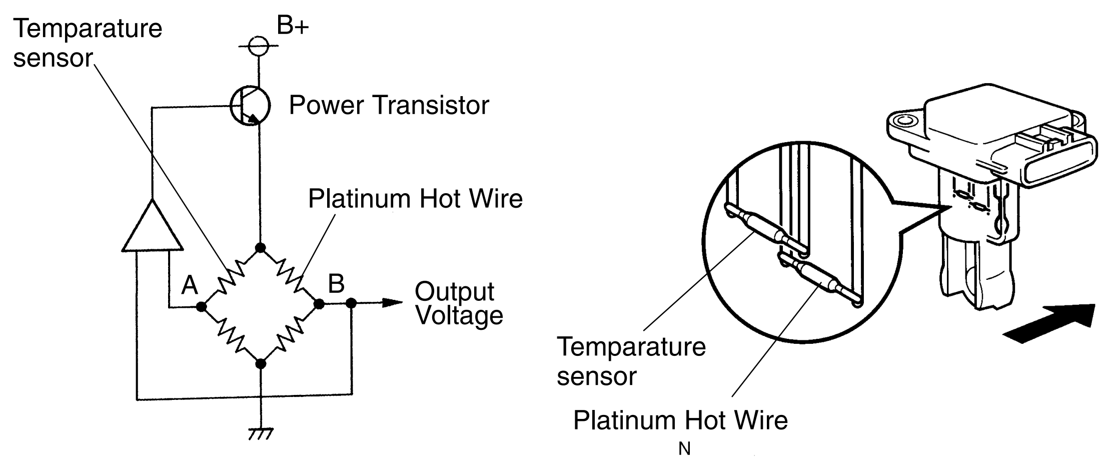
DI7O7–01

CIRCUIT INSPECTION

DTC	P0100	Mass 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, temparature sensor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and temparature sensor 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 then measured as the output voltage of the air flow meter.
The circuit is constructed so that the platinum hot wire and temparature sensor provide a bridge circuit, with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



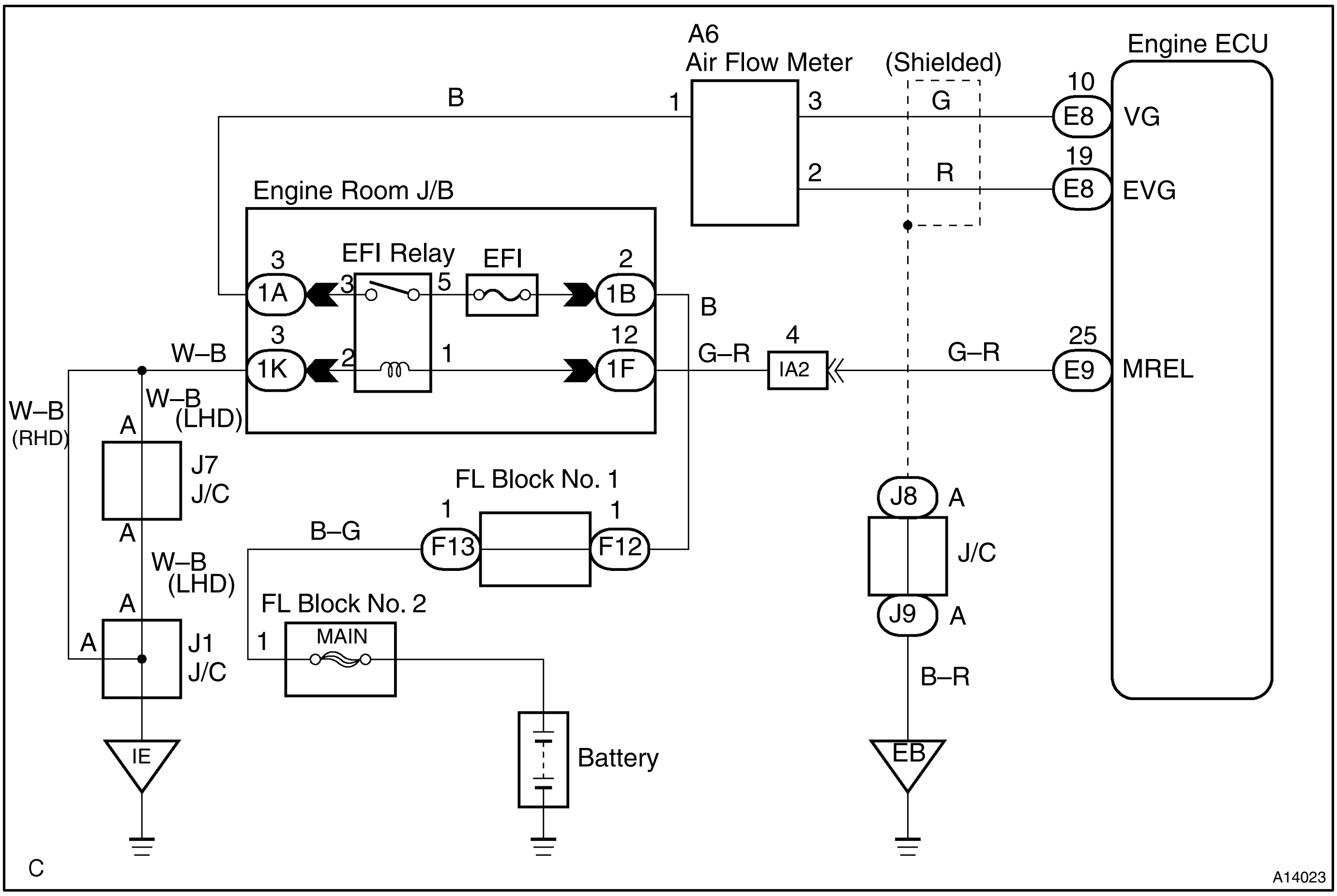
FI6929
A09074
A09707

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

HINT:
After confirming DTC P0100 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

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.

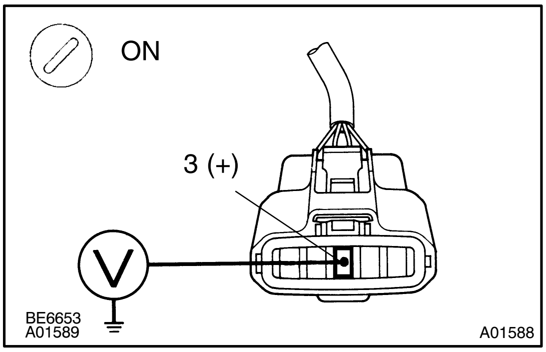
RESULT:

	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.

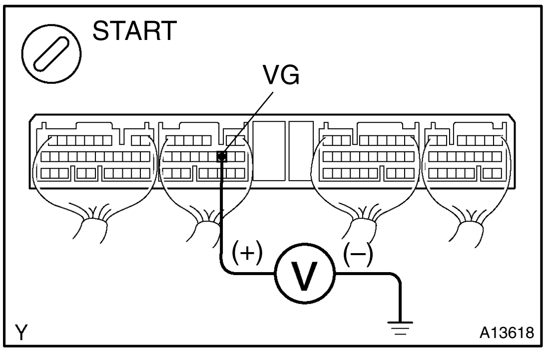
CHECK:
Measure voltage between terminal 4 of the air flow meter connector and body ground.

OK:
Voltage: 9 – 14 V

NG → **Check for open in harness and connector between EFI main relay (Marking: EFI) and air flow meter (See page IN–40).**

OK

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Start the engine.

CHECK:

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

OK:

Voltage:
0.5 – 3.0 V (P or N position and A/C switch OFF)

OK → **Check and replace engine ECU (See page IN–40).**

NG

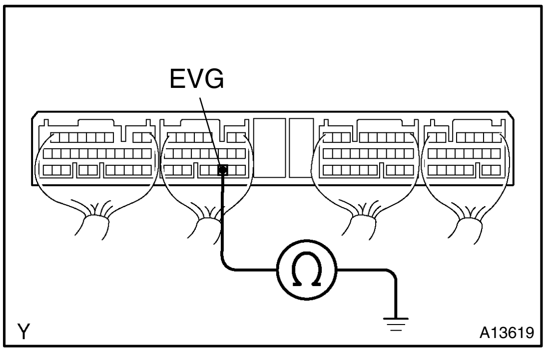
4	Check for open and short in harness and connector between air flow meter and engine ECU (See page IN–40).

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 ECU with connector still connected (See page FI–58).

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–40).**

OK

6	**Check for open in harness and connector between air flow meter and engine ECU (See page IN–40).**

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

OK

Replace air flow meter.

DI7O8–01

DTC	P0101	Mass Air Flow Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0100 on page DI–21.

DTC No.	DTC Detecting Condition	Trouble Area
P0101	After engine is warmed up, conditions (1) and (2) continue with more than 10 sec. engine speed 1,500 rpm or less: (2 trip detection logic) 1. 0.42 V $\leqq$ VTA $\leqq$ 0.86 V 2. Air flow meter output > 2.91 V	• Air flow meter
	Conditions (1) and (2) continue with more than 10 sec. engine speed 2,100 rpm or more: (2 trip detection logic) 1. VTA $\geqq$ 3.0 V 2. Air flow meter output < 1.0 V	

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 P0101) being output?**

NO → **Replace air flow meter.**

YES ↓

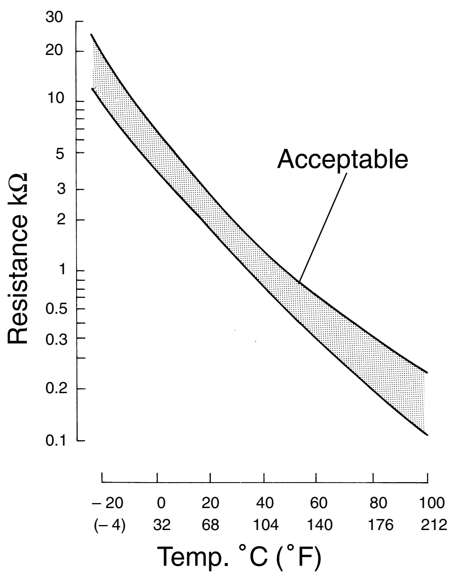
Go to relevant DTC chart (See page DI–14).

DI7O9–01

DTC	P0110	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

(fig. 1)



FI4741

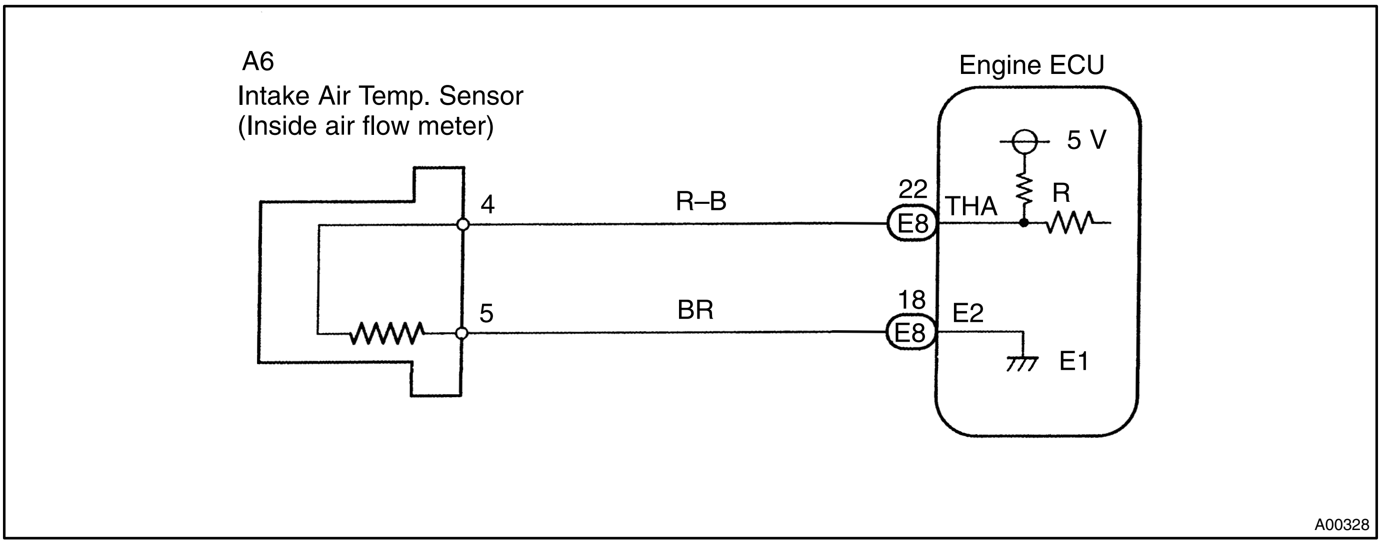
The intake air temp. sensor is built into the air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher 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 (THAR) 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 (THAR) 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	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 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 (Intake Air Temp. Circuit Malfunction), P0115 (Water Temp. Circuit Malfunction), P0120 (Throttle/Pedal Position Sensor/Switch ”A” 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.

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

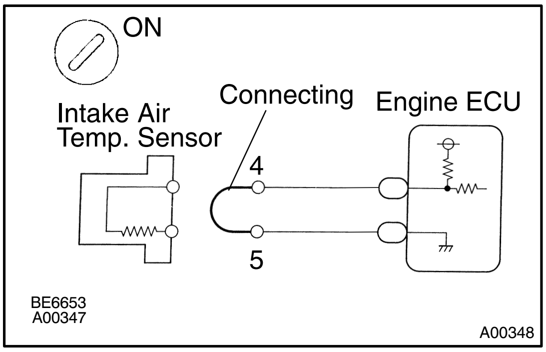
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
CHECK:
Read temperature value on the hand–held tester.
OK:
Same as actual intake air temperature
HINT:
- If there is open circuit, hand–held tester indicates –40˚C (–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–3).

2	Check for open in harness or engine ECU.

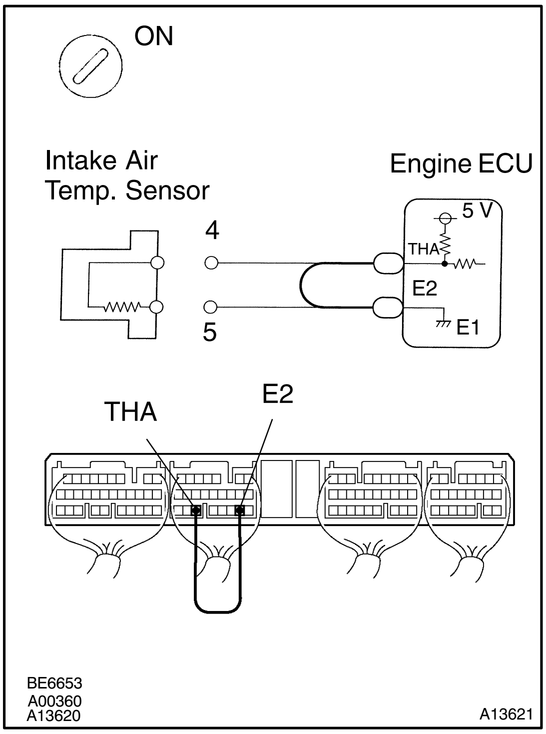


PREPARATION:
(a) Disconnect the air flow meter connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.
CHECK:
Read temperature value on the hand–held tester.
OK:
Temperature value: 140°C (284°F) or more

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 ECU with connector still connected (See page FI–58).

(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–40).

CHECK:

Read temperature value on the hand–held tester.

OK:

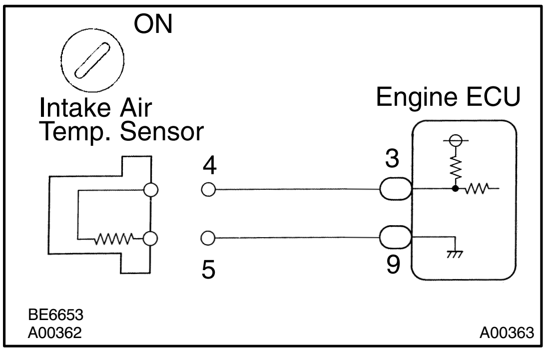
Temperature value: 140°C (284°F) or more

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–40)

4	Check for short in harness and engine ECU.

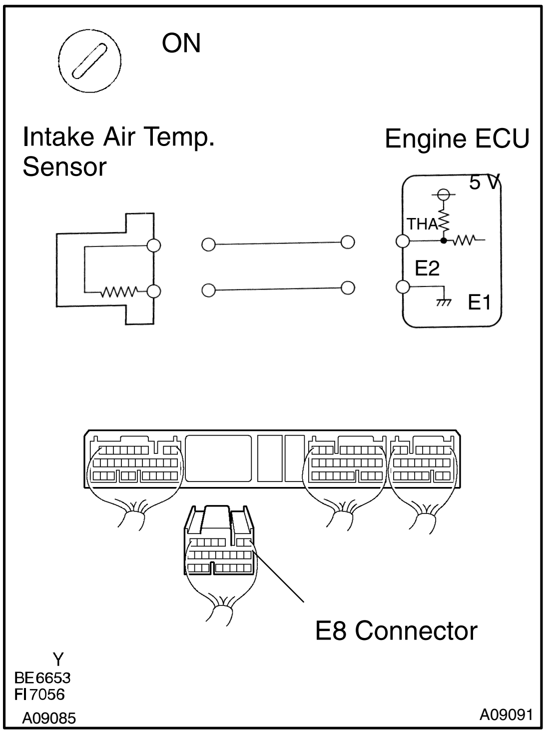


PREPARATION:
(a) Disconnect the air flow meter connector.
(b) Turn the ignition switch ON.
CHECK:
Read temperature value on the hand–held tester.
OK:
Temperature value: –40°C (–40°F)

OK → **Replace air flow meter.**

NG

5	Check for short in harness or engine ECU.



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Disconnect the E8 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–40).

DI7OA–01

DTC	P0115	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

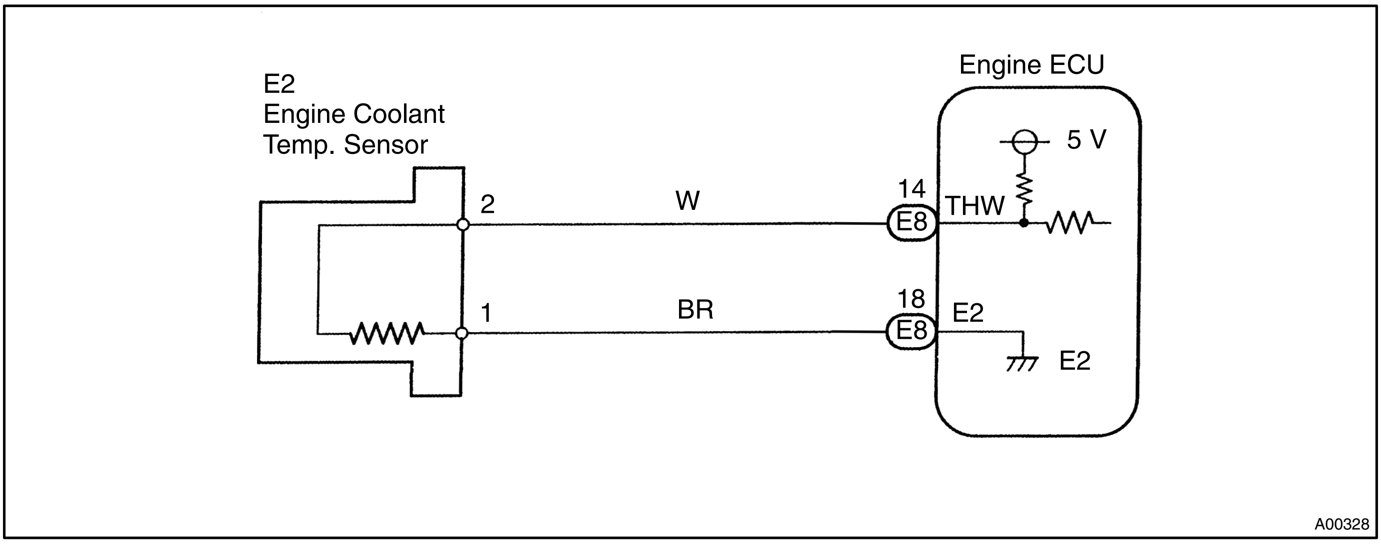
A thermistor built into the water temp. sensor changes the resistance value according to the water temperature.
The structure of the sensor and connection to the engine ECU is the same as in the DTC P0110 shown on page DI–27.

DTC No.	DTC Detecting Condition	Trouble Area
P0115	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 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 (Intake Air Temp. Circuit Malfunction), P0115 (Water Temp. Circuit Malfunction), P0120 (Throttle/Pedal Position Sensor/Switch ”A” 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.

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:

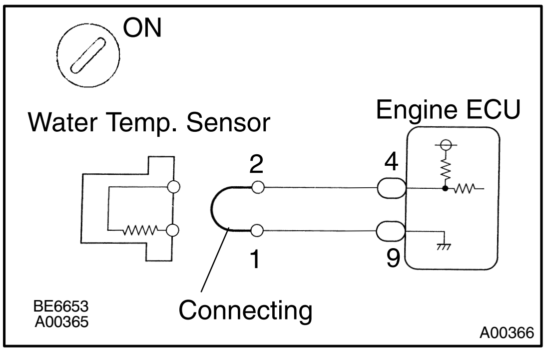
- If there is open circuit, Hand–held tester indicates –40˚C (–40˚F).
- If there is short circuit, Hand–held tester indicates 140˚C (284˚F) or more.

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–3).

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.

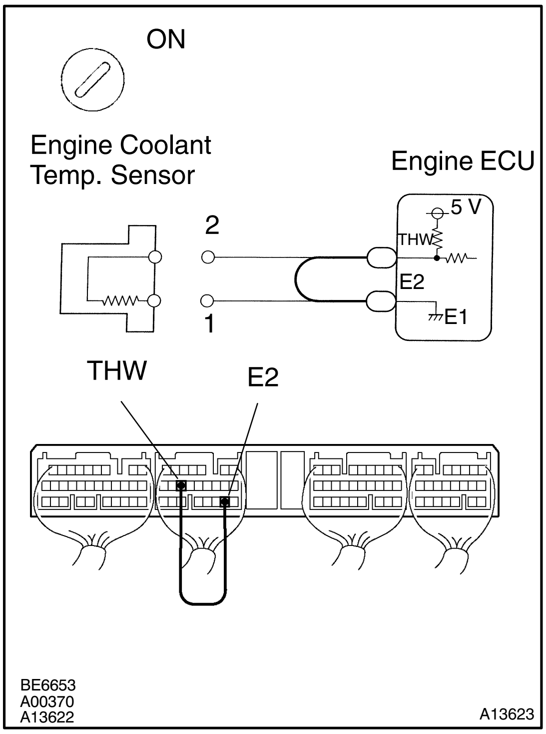
OK:

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 ECU with connector still connected (See page FI–58).
(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–40).

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

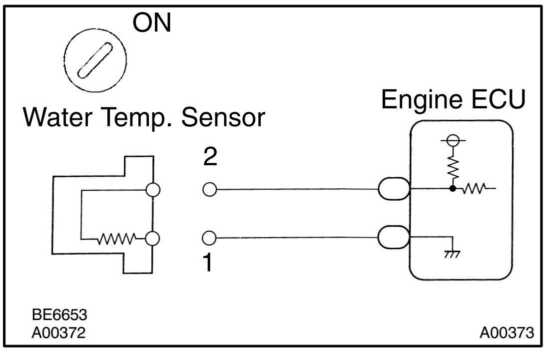
Temperature value: 140°C (284°F) or more

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–40).

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.

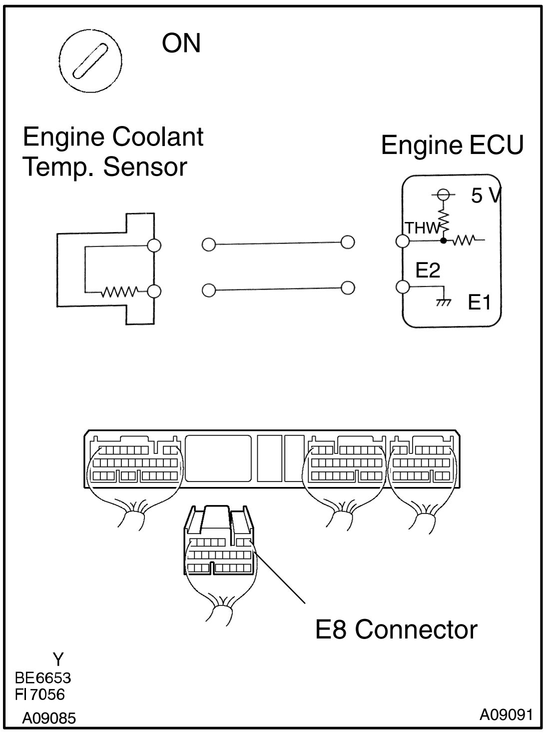
OK:

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 ECU with connector still connected (See page FI–58).

(b) Disconnect the E8 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–40).

DI6UZ–02

DTC	P0116	Water Temp. Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page DI–32.

DTC No.	DTC Detecting Condition	Trouble Area
P0116	When the fluctuations in the engine coolant tempeerature are within 3 °C (37 °F)before and afrer the follwing conditions are met: 1. IDL OFF time ≧ 250 sec. 2. Vehicle speed change of 15 km/h (9 mph) or more occurs 10 times or more. 3. –10 °C (14 °F) ≦ Engine coolant temperature when the ignition switch is turned ON < 60 °C (140 °F) 4. Intake air temperature after starting the engine ≧ –6.7 °C (20 °F)	• Engine coolant temp. sensor • Cooling system

INSPECTION PROCEDURE

HINT:
- If DTC P0115 and P0116 are output simultaneously, water temp. sensor circuit may be open. Perform troubleshooting of DTC P0115 first.
- Read freeze frame data using hand–held tester or OBD scan tool. 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 P0116) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check thermostat (See page CO–10).**

NG → **Replace thermostat.**

OK

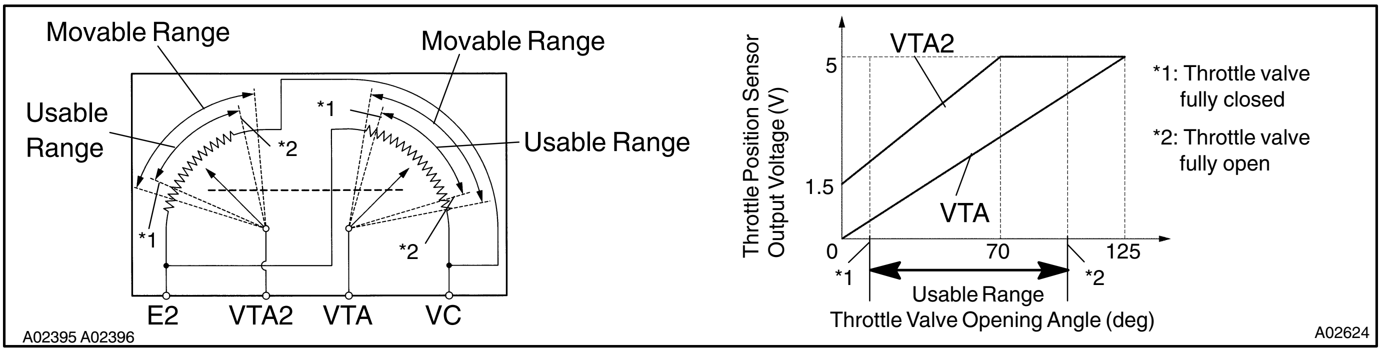
Replace engine coolant temp. sensor.

DI2TV–03

DTC	P0120	Throttle/Pedal Position Sensor/Switch ”A” 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 throttle valve is fully closed by the return spring.

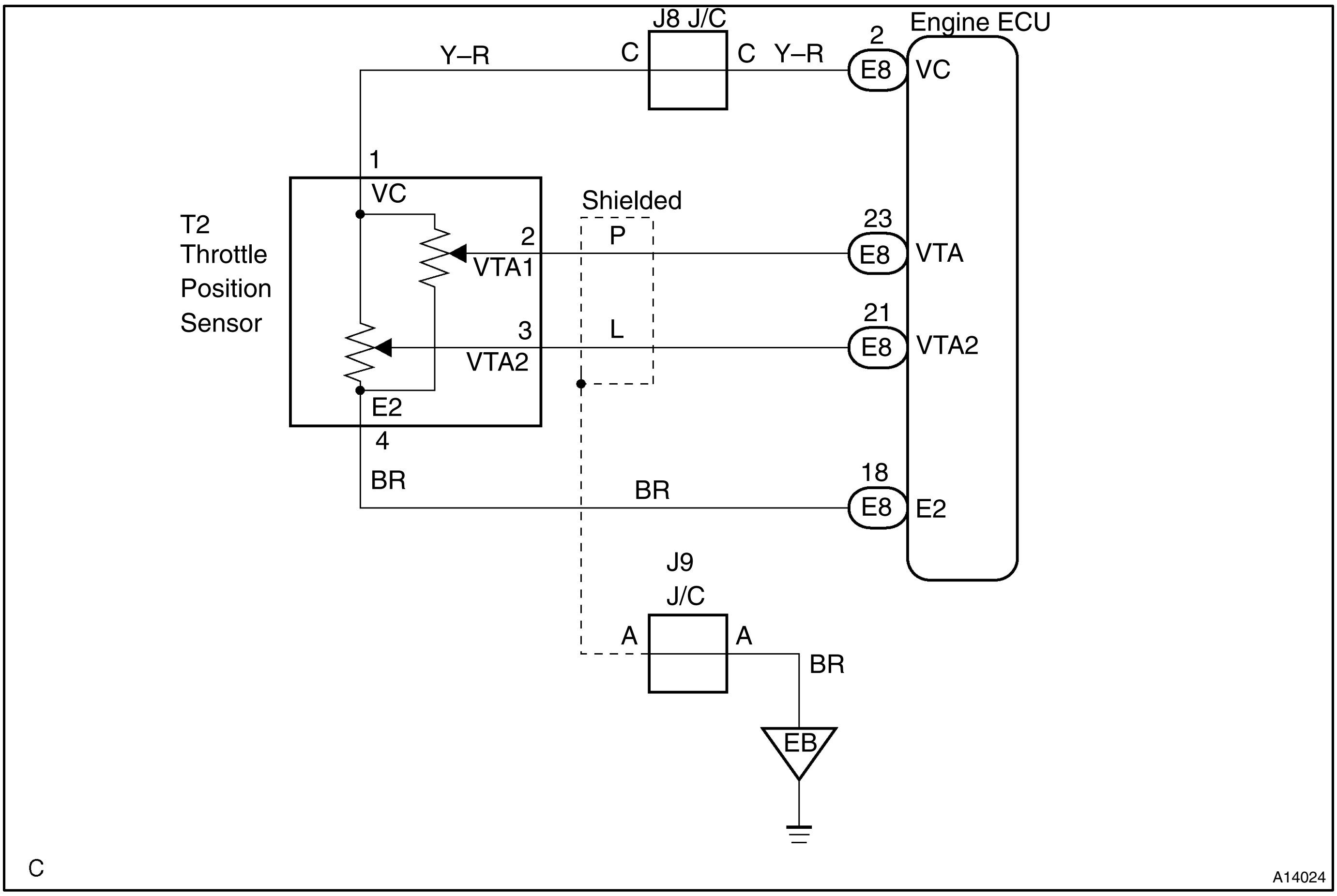


DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.625 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (e) VTA–VTA2 ≦ 0.02 V	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU
	Condition (a) or (b) continues for 0.4 seconds: (a) VTA ≦ 0.2 V and VTA2 ≦ 0.5 V (b) VTA–VTA2 ≦ 0.02 V	

HINT:
After confirming DTC P0120 use the hand–held tester to confirm the throttle valve opening percentage .

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



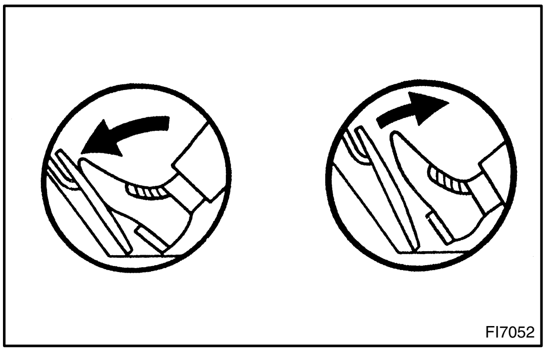
INSPECTION PROCEDURE

HINT:

- If DTC P0110 (Intake Air Temp. Circuit Malfunction), P0115 (Water Temp. Circuit Malfunction), P0120 (Throttle 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.

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.

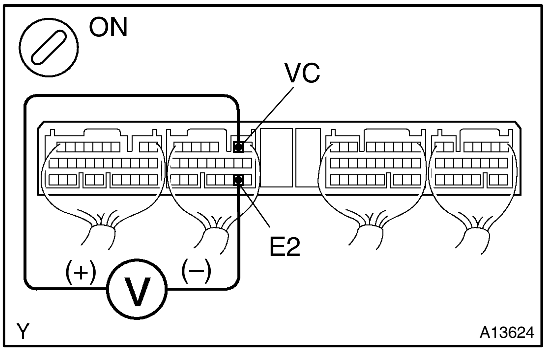
OK:

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–40).**

NG

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

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

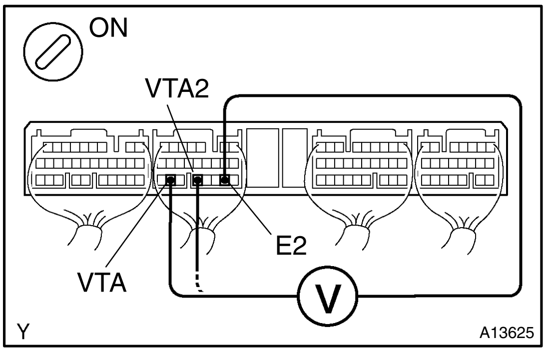
OK:

Voltage: 4.5 – 5.5 V

NG → **Check and replace engine ECU (See page IN–40).**

OK

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(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

NG → **Check and replace engine ECU (See page IN–40).**

NG

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

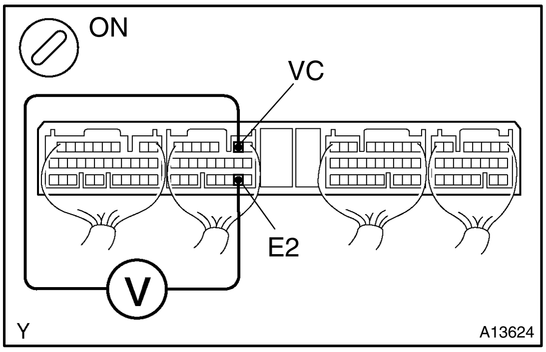
NG → **Replace throttle position sensor (See page FI–32).**

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–40).

When not using hand–held tester

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

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

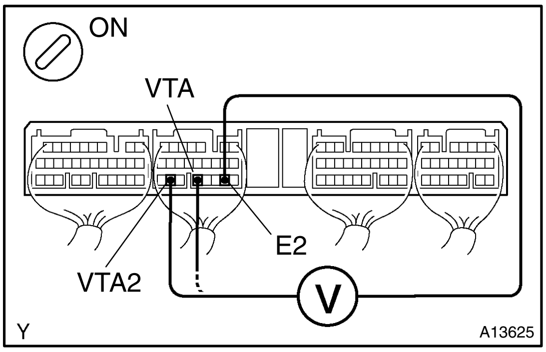
OK:

Voltage: 4.5 – 5.5 V

NG → **Check and replace engine ECU (See page IN–40).**

OK

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(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–40).**

NG

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

NG → **Replace throttle position sensor (See page FI–32).**

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–40).

DI1LI–10

DTC	P0121	Throttle/Pedal Position Sensor/Switch ”A” Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0120 on page DI–37.

DTC No.	DTC Detecting Condition	Trouble Area
P0121	While vehicle speed drops from 30 km/h (19 mph) or more to 0 km/h (0 mph), output value of throttle position sensor is out of applicable range. (2 trip detection logic)	• Throttle position sensor • Engine ECU

INSPECTION PROCEDURE

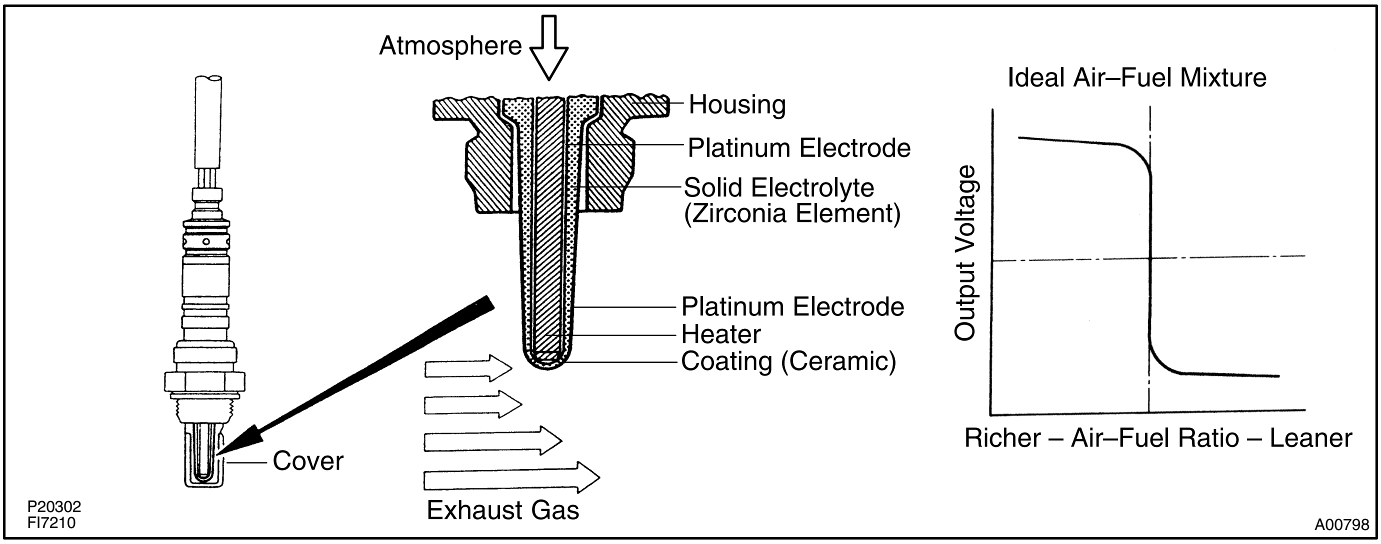
HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at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

Replace throttle body (See page FI–34).

DTC	P0125	Insufficient Coolant Temp. for Closed Loop Fuel Control

CIRCUIT DESCRIPTION

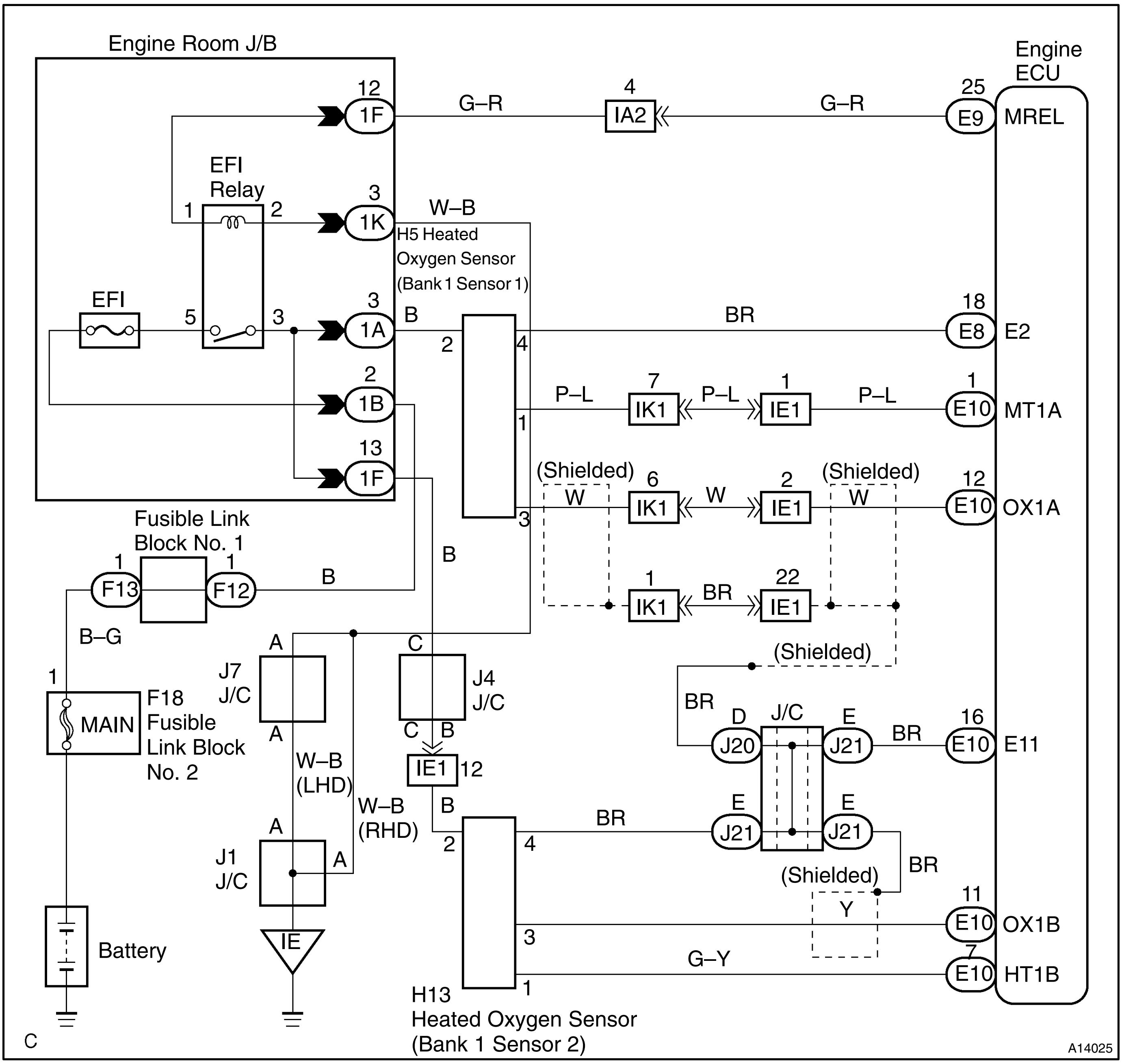
To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.
The oxygen sensor (bank 1 sensor 1) has the characteristic which its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide the engine ECU with feedback to control the air–fuel ratio.
When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the engine ECU of the LEAN condition (small electromotive force: < 0.45 V).
When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the engine ECU of the RICH condition (large electromotive force: > 0.45 V). The engine ECU judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the engine ECU is unable to perform accurate air–fuel ratio control. The oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the engine ECU. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.



DTC No.	DTC Detection Condition	Trouble Area
P0125	After engine is warmed up, oxygen sensors (bank 1, 2 sensor 1) output does not indicate RICH (≧ 0.45 V) even once when conditions (a), (b) and (c) continue for at least 50 sec.: (a) Engine speed: 800 rpm or more (b) Vehicle speed: 40 – 100 km/h (25 – 62 mph) (c) 20 sec. or more after starting engine	• Open or short in oxygen sensor (bank 1 sensor 1) circuit • Oxygen sensor (bank 1 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0125 will be recorded. The CHK ENG warning light then comes on.
- There is a possibility that P0125 is detected because of abnormal fuel system, so, when P0125 is memorized, check P0171 and P0172 even if P0171 and P0172 are memorized.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

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

YES → **Go to relevant DTC chart (See page DI–14).**

NO

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

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Warm up the engine to normal operating temperature (above 75°C (169°F)).
CHECK:
Read the voltage output of the oxygen sensors when the engine is suddenly raced.
HINT:
Perform quick racing to 4,000 rpm 3 times using the accelerator pedal.
OK:
Oxygen sensor output a RICH signal (0.45 V or more) at least once.

OK → **Go to step 9.**

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensor (bank 1 sensor 1) (See page IN–40).

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

OK

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

NG → **Perform troubleshooting for misfire (See page DI–20).**

OK

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

NG → Repair or replace.

OK

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

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

OK

7	Check injector injection (See page FI–18).

NG → Replace injector.

OK

8	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Replace oxygen sensor (bank 1 sensor 1).

9	Perform confirmation driving pattern (See page DI–49).

GO

10	Is there DTC P0125 being output again?

YES → Check and replace engine ECU
(See page IN–40).

NO ↓

11	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems
(See page DI–3).

YES ↓

DTC P0125 is caused by shortage of fuel.

DI7OB–01

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI–44.

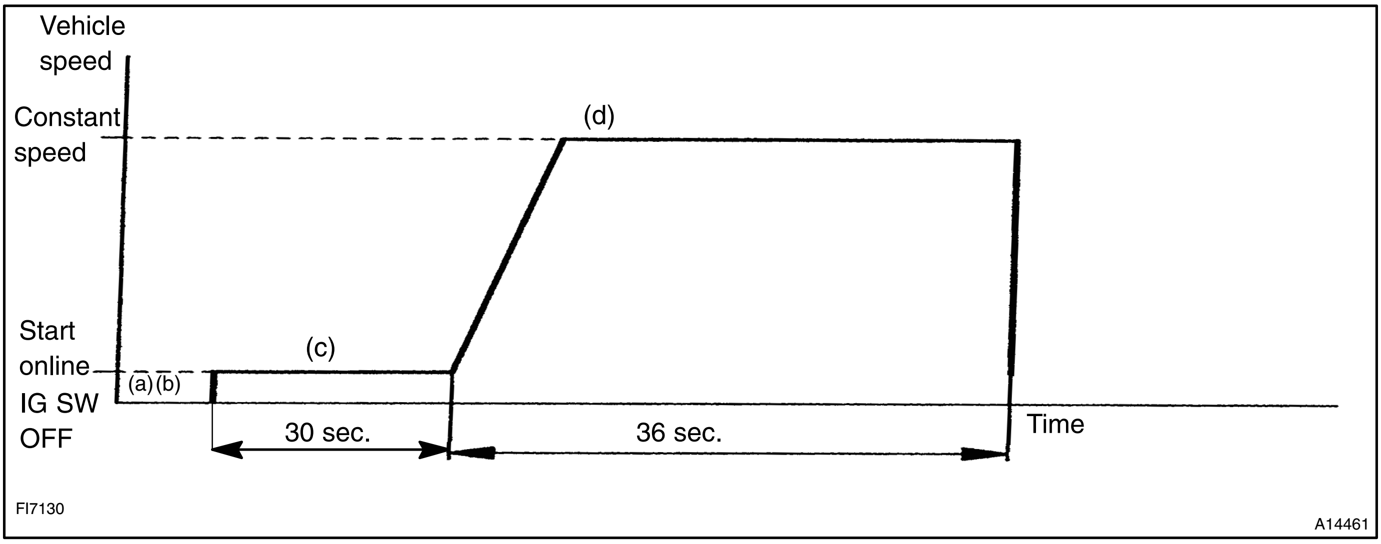
DTC No.	DTC Detection Condition	Trouble Area
P0130	Voltage output of oxygen sensor remains at 0.42 V or more, or 0.48 V or less, during idling after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU

HINT:
The oxygen sensor's output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–44.

CONFIRMATION DRIVING PATTERN



(a) Connect the hand–held tester to the DLC3.
(b) Switch the hand–held tester from normal mode to check mode (See page DI–3).
(c) Start the engine and pass 30 seconds or more.
(d) Drive the vehicle at constant speed for 36 seconds or more.

HINT:
If a malfunction exists, the CHK ENG warning light will be indicated on the multi information display during step (d).

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 (c) to (f), then perform steps (c) to (d) again.

INSPECTION PROCEDURE

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

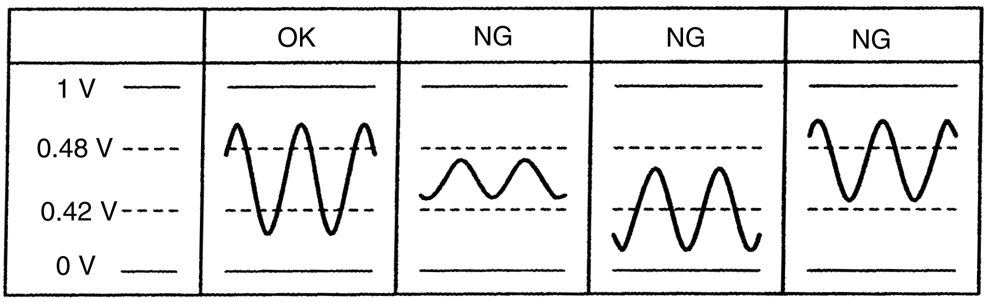
1	**Are there any other codes (besides DTC P0130) being output?**

YES → **Go to relevant DTC chart (See page DI–14).**

NO

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

PREPARATION:
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.
CHECK:
Use the hand–held tester to read the output voltage of the oxygen sensor during idling.
OK:
Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



OK → **Go to step 7.**

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–40).

NG → Repair or replace harness or connector.

OK

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

NG → Repair or replace.

OK

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

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

OK

6	Check injector injection (See page FI–18).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern.

Go

8	Is there DTC P0130 being output again?

NO → Check for intermittent problems (See page DI–3).

YES

Check and replace engine ECU (See page IN–40).

DI57S–10

DTC	P0133	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI–44.

DTC No.	DTC Detecting Condition	Trouble Area
P0133	Response time for oxygen sensor voltage output to change from rich to lean, or from lean to rich, is 0.4 sec. or more during constant vehicle speed after engine is warmed up (2 trip detection logic)	• Air induction system • Fuel pressure • Injector injection • Open or short in heated oxygen sensor circuit • Oxygen sensor • Engine ECU

HINT:
Sensor 1 refers to the sensor closer to the engine body.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–44.

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 P0133) being output?**

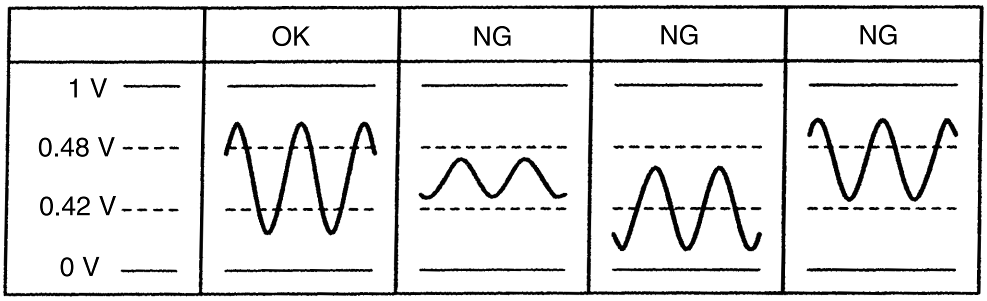
YES → **Go to relevant DTC chart (See page DI–14).**

NO

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

PREPARATION:
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.
CHECK:
Use the hand–held tester to read the output voltage of the heated oxygen sensor during idling.
OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.42 V and more than 0.48 V (See the following table).



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OK → **Go to step 7.**

NG ↓

3	**Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–40).**

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

OK ↓

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

NG → **Repair or replace.**

OK ↓

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

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

OK

6	Check injector injection (See page FI–21).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern (See page DI–49).

GO

8	Is there DTC P0133 being output again?

NO → Check for intermittent problems (See page DI–3).

YES

Check and replace engine ECU (See page IN–40).

DI2S8–10

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

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI–44.

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

WIRING DIAGRAM

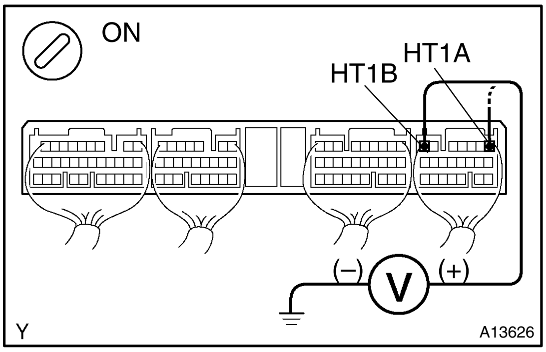
Refer to DTC P0125 on page DI–44.

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 voltage between terminals HT1A, HT1B of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

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

HINT:

OK:

Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–40).**

NG

2	Check resistance of oxygen sensor heater (See page FI–54).

NG → **Replace oxygen sensor.**

OK ↓

Check and repair harness or connector between main relay and oxygen sensor and engine ECU (See page IN–40).

DI68O–06

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI–44.

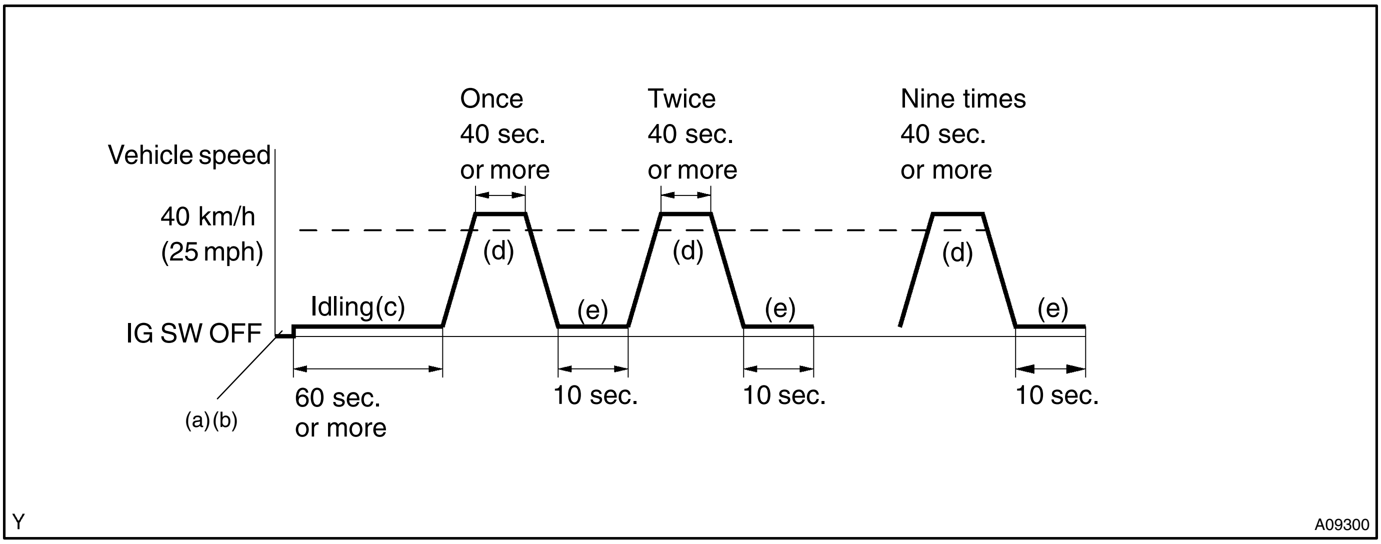
DTC No.	DTC Detecting Condition	Trouble Area
P0136	Voltage output of heated oxygen sensor remains at 0.45 V or more or 0.55 V or less when vehicle is driven at 100 km/h (62 mph) or more after engine is warmed up (2 trip detection logic)	• Open or short in heated oxygen sensor circuit • Oxygen sensor

HINT:
Sensor 2 refers to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–44.

CONFIRMATION DRIVING PATTERN



(a) Connect the hand–held tester to the DLC3.
(b) Switch the hand–held tester from the Normal Mode to the Check (Test) Mode (See page DI–3).
(c) Start the engine and let the engine idle for 60 seconds or more.
(d) Drive the vehicle at 40 km/h (25 mph) or more for 40 seconds or more.
(e) Let the engine idle for 10 seconds or more.
(f) Preform steps (d) to (e) 9 times.

HINT:
- During performing the step (d) to (e) 9 times, drive the vehicle at over 90 km (56 mile) and make the fuel cut happen for over 3 sec.
- If a malfunction exists, the CHK ENG warning light will be indicated on the multi information display during step (f).

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 (c) to (f), then perform steps (c) to (f) again.

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 P0136) being output?**

YES → **Go to relevant DTC chart (See page DI–14).**

NO

2	**Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–40).**

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

OK

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

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Warm up the engine to normal operating temperature.

CHECK:
Read voltage output of the oxygen sensor when the engine suddenly raced.
HINT:
Perform quick racing to 4,000 rpm 3 min. using the accelerator pedal.

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

OK → **Check that each connector is properly connected.**

NG

Replace oxygen sensor.

DI63Y–02

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

DTC	P0172	System too Rich (A/F Rich Malfunction, Bank 1)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared to the basic injection time. Fuel trim includes short–term fuel trim and long–term fuel trim.
Short–term fuel trim is the short–term fuel compensation used to maintain the air–fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air–fuel ratio is RICH or LEAN compared to the ideal theoretical value, triggering a reduction in fuel volume if the air–fuel ratio is rich, and an increase in fuel volume if it is lean.
Long–term fuel trim is overall fuel compensation carried out long–term to compensate for continual deviation of the short–term fuel trim form the central value due to individual engine differences, wear overtime and changes in the usage environment.
If both the short–term fuel trim and long–term fuel trim are LEAN or RICH beyond a certain value, it is detected as a malfunction and the CHK ENG warning light on the multi information display.

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

HINT:
- When the DTC P0171 is recorded, the actual air–fuel ratio is on the LEAN side. When DTC P0172 is recorded, the actual air–fuel ratio is on the RICH side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171 is recorded. The CHK ENG warning light then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ± 38 %, the system is functioning normally.
- The oxygen sensor (bank 1 sensor 1) output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–44.

INSPECTION PROCEDURE

Hand–held tester:

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

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

NG → **Repair or replace.**

OK

2	**Check injector injection (See page FI–18).**

NG → **Replace injector.**

OK

3	**Check air flow meter (See page FI–30) and water temperature sensor (See page FI–50).**

NG → **Repair or replace.**

OK

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

NG → **Repair or replace.**

OK

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

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

OK

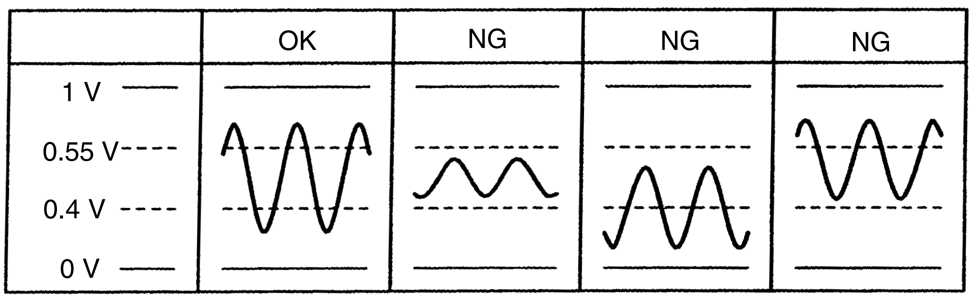
6	Check gas leakage on exhaust system.

NG → **Repair or replace.**

OK

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

PREPARATION:
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.
CHECK:
Used the hand–held tester to read the output voltage of the oxygen sensor during idling.
OK:
Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.5 V (See the following table).



A00292

OK → **Go to step 9.**

NG

8	Check for open and short in harness and connector between engine ECU and oxygen sensor (bank 1 sensor 1) (See page IN–40).

NG → Repair or replace harness or connector.

OK

Replace oxygen sensor.

9	Perform confirmation driving pattern (See page DI–49).

Go

10	Is there DTC P0171 or P0172 being output again?

YES → Check and replace engine ECU (See page IN–40).

NO

11	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI–20).

YES

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

OBD scan tool (excluding hand–held tester):

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

NG → **Repair or replace.**

OK

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

NG → **Check and repair fuel pump, fuel pipe line and filter (See page FI–27).**

OK

3	**Check injector injection (See page FI–21).**

NG → **Replace injector.**

OK

4	**Check air flow meter sensor (See page FI–30) and water temperature sensor (See page FI–50).**

NG → **Repair or replace.**

OK

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

NG → **Repair or replace.**

OK

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

YES → **Repair oxygen sensor.**

NO

Check and replace engine ECU (See page IN–40).

DI12T–12

DTC	P0300	Random/Multiple Cylinder Misfire Detected

DTC	P0301	Cylinder 1 Misfire Detected

DTC	P0302	Cylinder 2 Misfire Detected

DTC	P0303	Cylinder 3 Misfire Detected

DTC	P0304	Cylinder 4 Misfire Detected

CIRCUIT DESCRIPTION

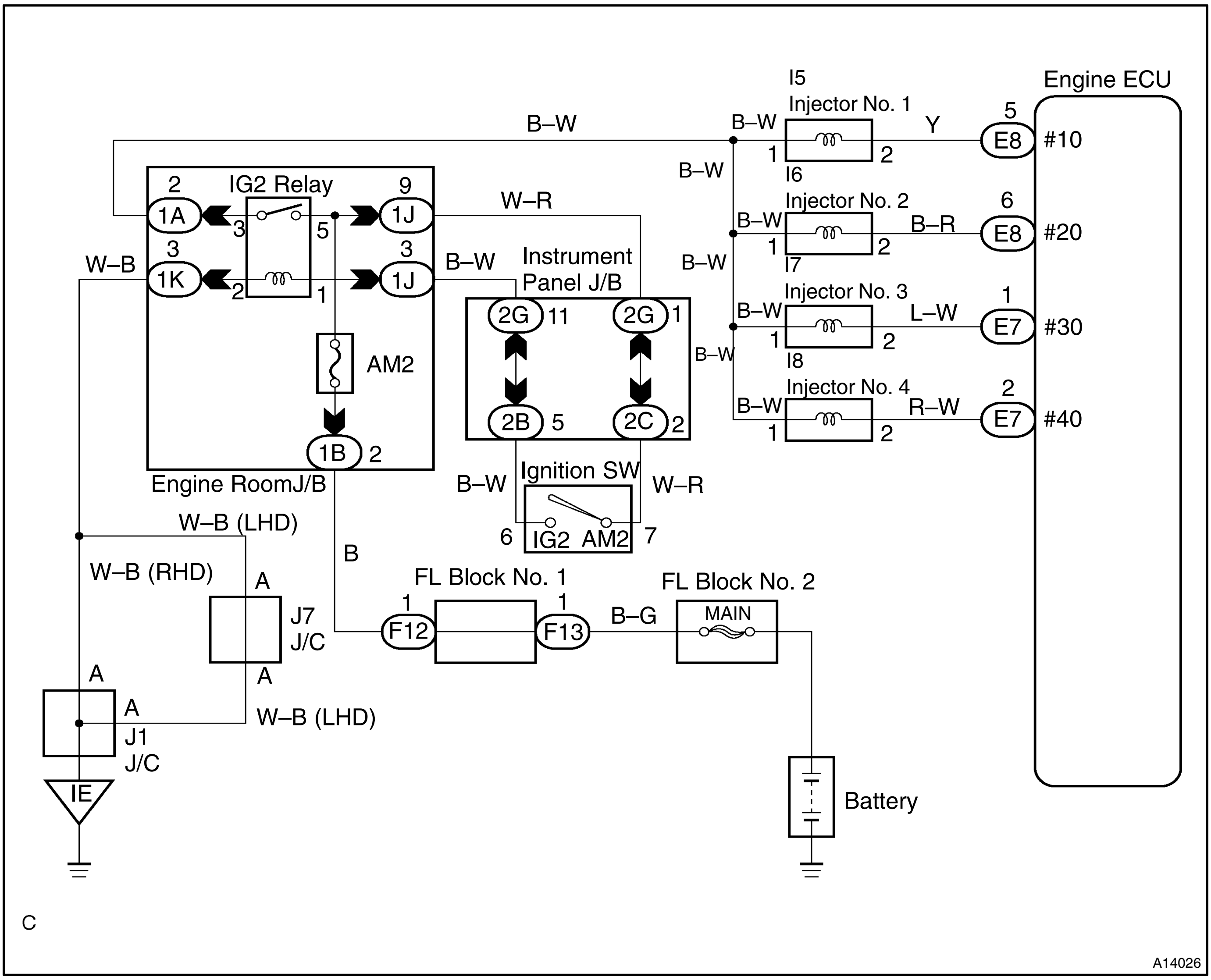
Misfire: The engine ECU uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation for each cylinder.
The engine ECU counts the number of times the engine speed change rate indicates that misfire has occurred. And when the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the check engine warning light lights up.
If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the check engine warning light blinks when misfiring occurs.

<table>
<tr><th>DTC No.</th><th>DTC Detecting Condition</th><th>Trouble Area</th></tr>
<tr><td>P0300</td><td>Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions</td><td rowspan="3">• Ignition system
• Injector
• Fuel pressure
• Compression pressure
• Valve clearance
• Valve timing
• Air flow meter
• Water temp. sensor
• Open or short in engine wire
• Connector connection
• Engine ECU</td></tr>
<tr><td rowspan="2">P0301
P0302
P0303
P0304</td><td>For any particular 200 revolutions for engine, misfiring is detected which can cause catalyst overheating
(This causes MIL to blink) (2 trip detection logic)</td></tr>
<tr><td>For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emissions
(2 trip detection logic)</td></tr>
</table>

HINT:

- When the 2 or more codes for a misfiring cylinder are recorded repeatedly but no random misfire code is recorded, it indicates that the misfires were detected and recorded at different times.
- There is a case where the cylinder other than memorized has an accidental fire (the cylinder which is one ahead of fired cylinder), so. at the time of checking all the checking items and if there is no abnormality, check the cylinder which is different from the recorded cylinder as fired.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

(a) Connect the hand–held tester.
(b) Record DTC and the freeze frame data.
(c) Use the hand–held tester to set to Check Mode (See page DI–3).
(d) Drive the vehicle several times with the engine speed, load and its surrounding range shown with ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the data list.

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

HINT:

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

Engine Speed	Time
1000 rpm	3 minutes or more
2000 rpm	1 minutes 30 seconds or more
3000 rpm	1 minutes or more

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

INSPECTION PROCEDURE

HINT:

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

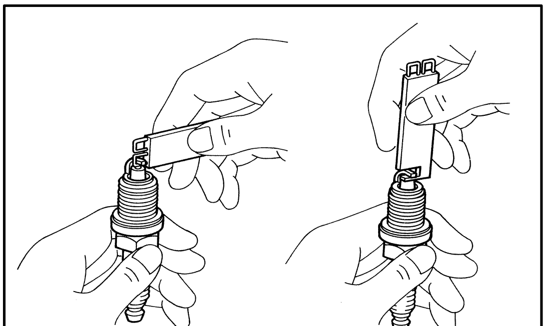
1	Check wire harness, connector and vacuum hose in engine room.

CHECK:
(a) Check the connection conditions of wire harness and connector.
(b) Check the disconnection, piping and break or 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.

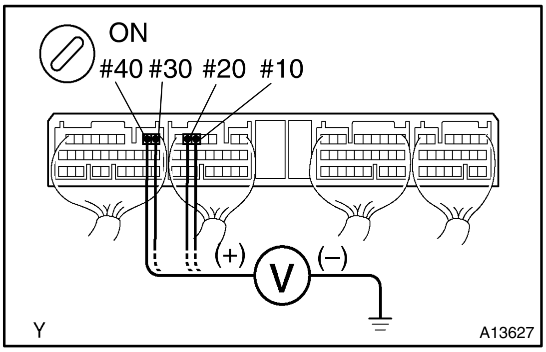

P03792

PREPARATION:
Remove the spark plug (See page IG–1).
CHECK:
(a) Check the electrode of carbon deposits electrode.
(b) Check the electrode gap.
OK:
(a) No large carbon deposit present.
Not wet with gasoline or oil.
(b) Electrode gap: 1.0 – 1.2 mm (0.037 – 0.047 in.)
PREPARATION:
(a) Install the spark plug to the ignition coil.
(b) Disconnect the injector connector.
(c) Ground the spark plug.
CHECK:
Check if spark occurs while the engine is being cracked.
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 terminals for injector of failed cylinder.**



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

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

OK:

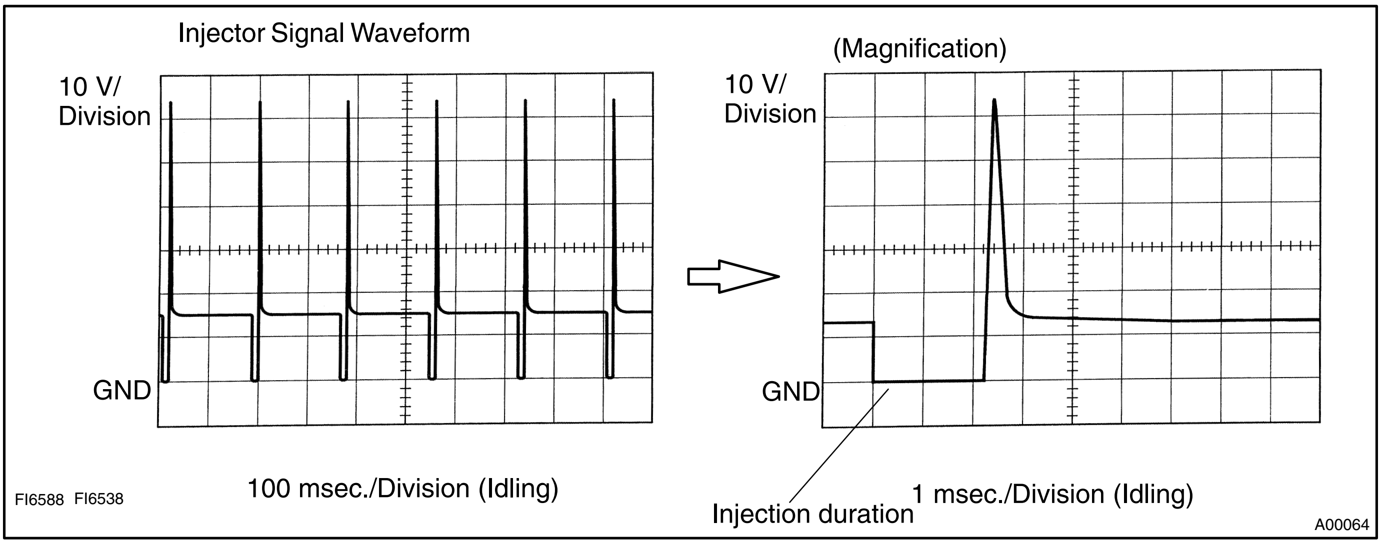
Voltage: 9 – 14 V

Reference: INSPECTION USING OSCILLOSCOPE

With the engine idling, measure between terminals #10 – #40 and E01 of the engine ECU connector.

HINT:

The correct waveforms are as shown.



OK	Go to step 4.

NG

4	Check resistance of injector of misfiring cylinder (See page FI–18).

NG → Replace injector.

OK

Check for open and short in harness and connector between injector and engine ECU (See page IN–40).

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

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

OK

6	Check injector injection (See page FI–21).

NG → Replace injector.

OK

7	Check mass air flow meter and water temp. sensor (See pages FI–30 and FI–50).

NG → Repair or replace.

OK

Check compression pressure, valve clearance and valve timing.

DI4EA–09

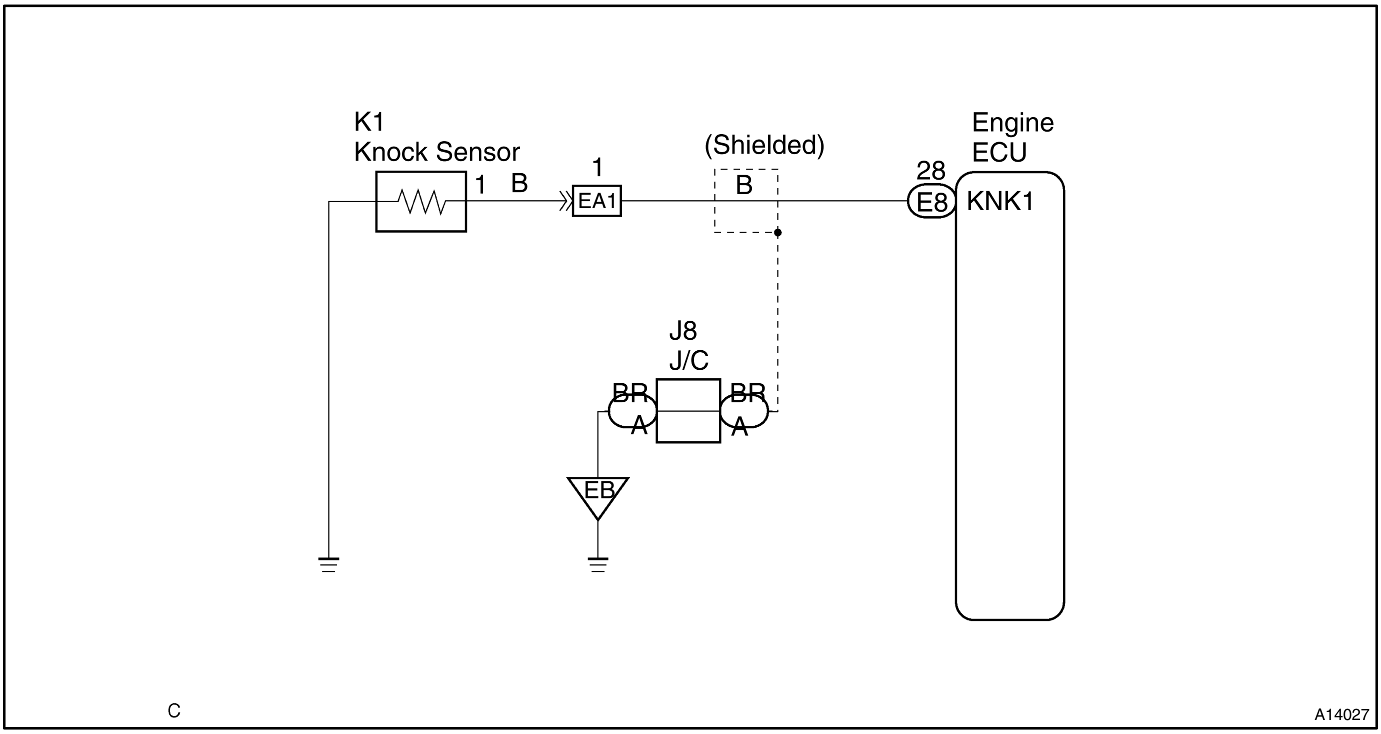
DTC	P0325	Knock Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Knock sensor are fitted to 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	No knock sensor signal to engine ECU with engine speed 1,280 rpm or more	• Open or short in knock sensor circuit • Knock sensor (looseness) • Engine ECU

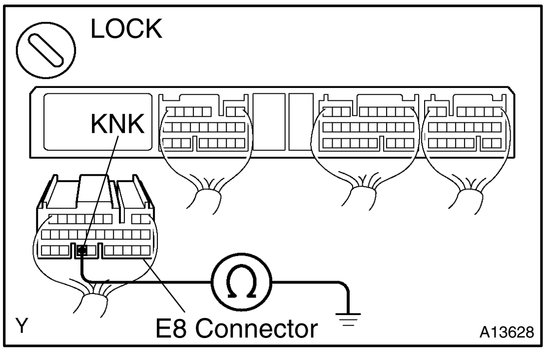
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freed 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.

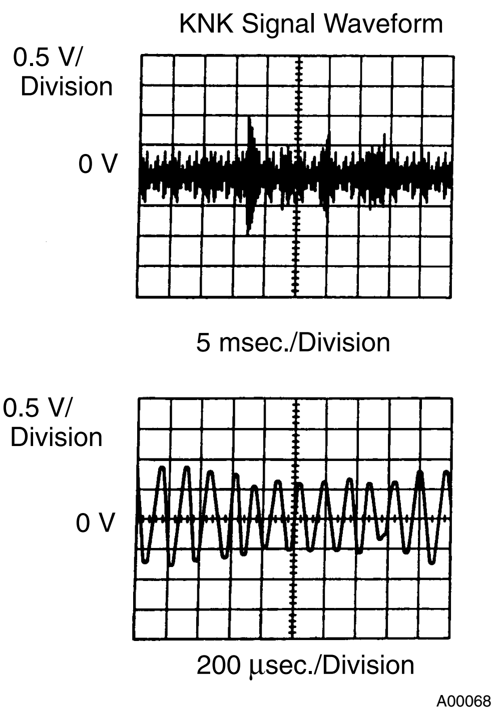
1	**Check continuity between terminal KNK1 of engine ECU connector and body ground.**



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Disconnect the E8 connector of engine ECU.

CHECK:
Measure resistance between terminal KNK1 of engine ECU connector and body ground.

OK:
Resistance: 1 MΩ or higher



Reference: INSPECTION USING OSCILLOSCOPE
- With the engine racing (4,000 rpm) measure between terminal KNK1 of engine ECU and body ground.

HINT:
The correct waveform is as shown.

- Spread the time on the horizontal axis, and confirm that period of the wave is 151 µsec.
  (Normal mode vibration frequency of knock sensor: 8.1 kHz).

HINT:
If normal mode vibration frequency is not 8.1 kHz the sensor is malfunctioning.

OK	Go to step 3 .

NG

2	Check knock sensor (See page FI–52).

NG → **Replace knock sensor.**

OK

3	Check for open and short in harness and connector between engine ECU and knock sensor (See page IN–40).

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–40).

DI4EB–09

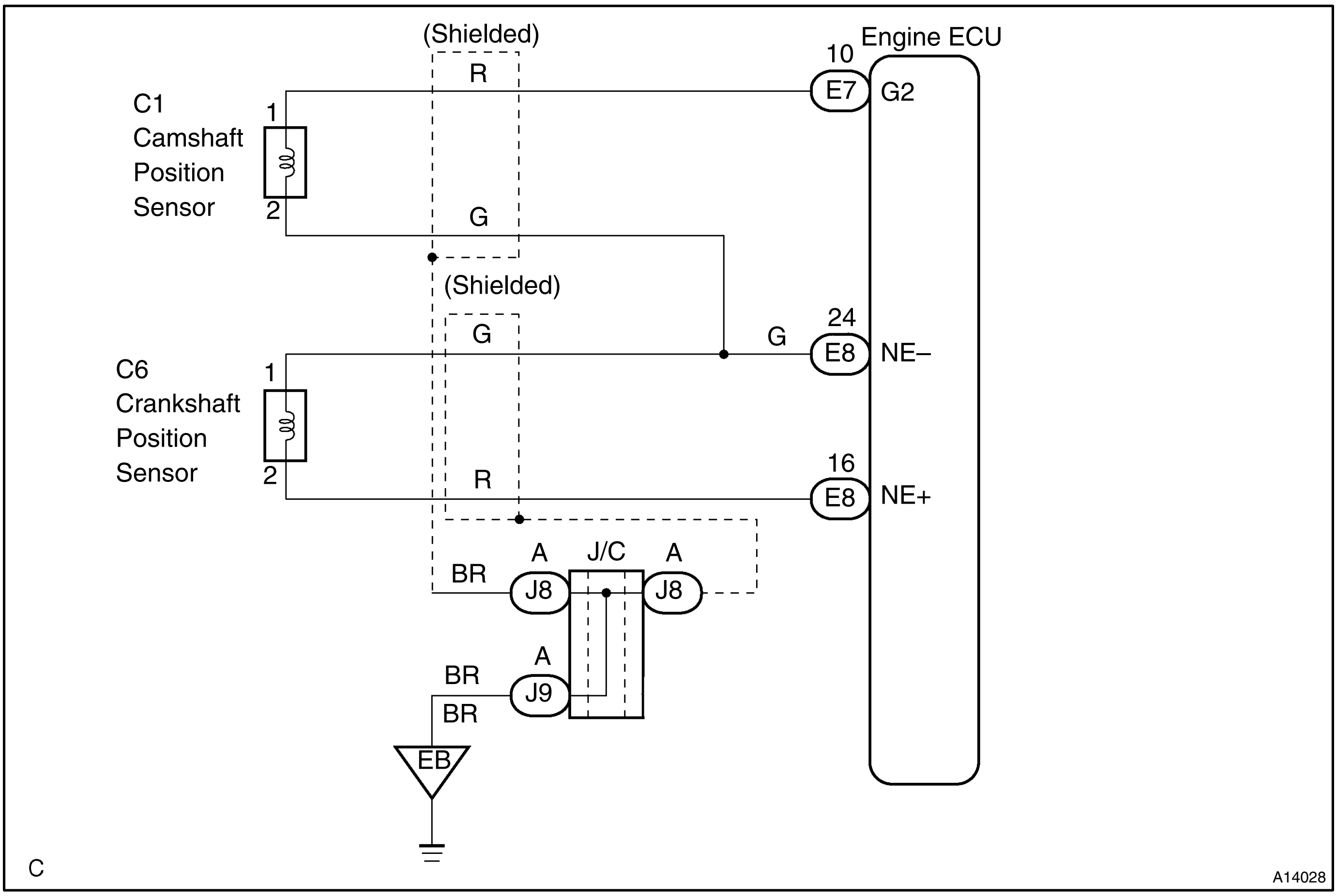
DTC	P0335	Crankshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Crankshaft position sensor (NE signal) consist of a signal plate and pick up coil.
The NE signal plate has 34 teeth and is mounted on the crankshaft. 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 the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0335	No crankshaft position sensor signal to engine ECU during cranking	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Starter • Engine ECU
	Open in NE– circuit	

WIRING DIAGRAM



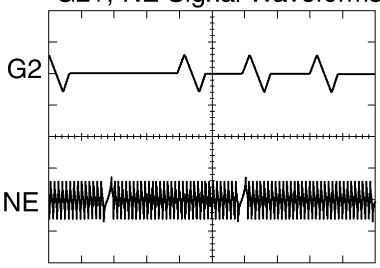
INSPECTION PROCEDURE

HINT:

- Read freed 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.
- Perform troubleshooting of DTC P0335 first. If no trouble is found, troubleshoot the following mechanical system.

1	**Check resistance of crankshaft position sensor (See page IG–13).**

G2+, NE Signal Waveforms



Y 20 msec./Division (Idling) A14463

Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check between terminals G2 and NE–, NE+ and NE– of engine ECU.
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–40).**

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

OK

3	Inspect sensor installation and teeth of signal plate.

NG → **Tighten the sensor. Replace signal plate.**

OK

Check and replace engine ECU
(See page IN–40).

DI4EC–04

DTC	P0340	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft position sensor (G2 signal) consist of a signal plate and pick up coil. The G2 signal plate has one tooth on its outer circumference and is mounted on the camshaft.
When the camshafts rotate, the protrusion on the signal plate and the air gap on the pick up coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pick up 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+ signals and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0340	No camshaft position sensor signal to engine ECU during cranking	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Starter • Engine ECU
	Open in NE– circuit	

WIRING DIAGRAM

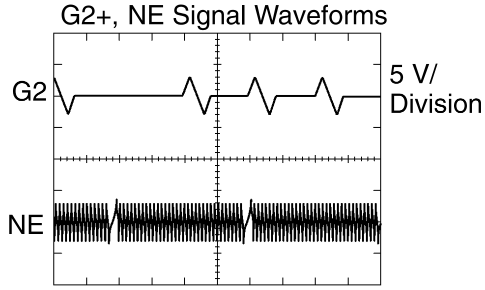
Refer to DTC P0335 on page DI–75.

INSPECTION PROCEDURE

HINT:
Read freed 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 (Signal generator) (See page IG–1).**

G2+, NE Signal Waveforms



Y 20 msec./Division (Idling) A14463

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

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–40).

NG → Repair or replace harness or connector.

OK

3	Inspect sensor installation.

NG → Tighten the sensor.

OK

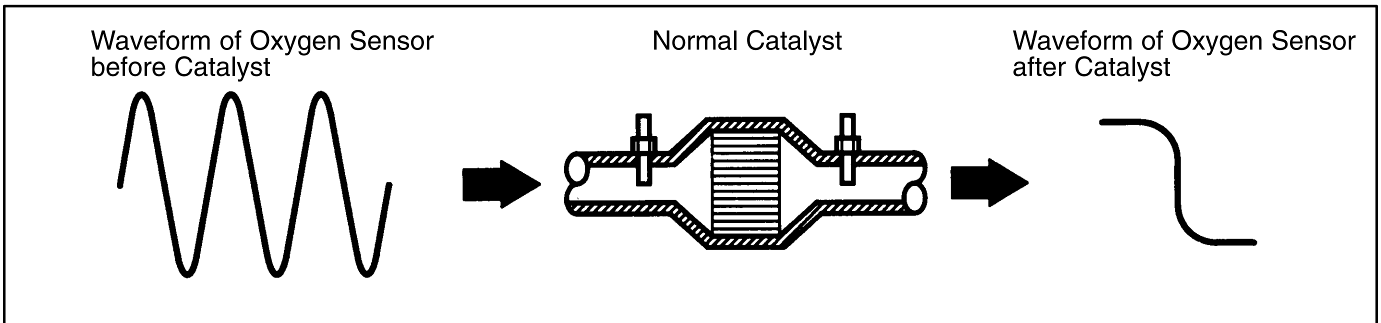
Check and replace engine ECU
(See page IN–40).

DI643–03

DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)

CIRCUIT DESCRIPTION

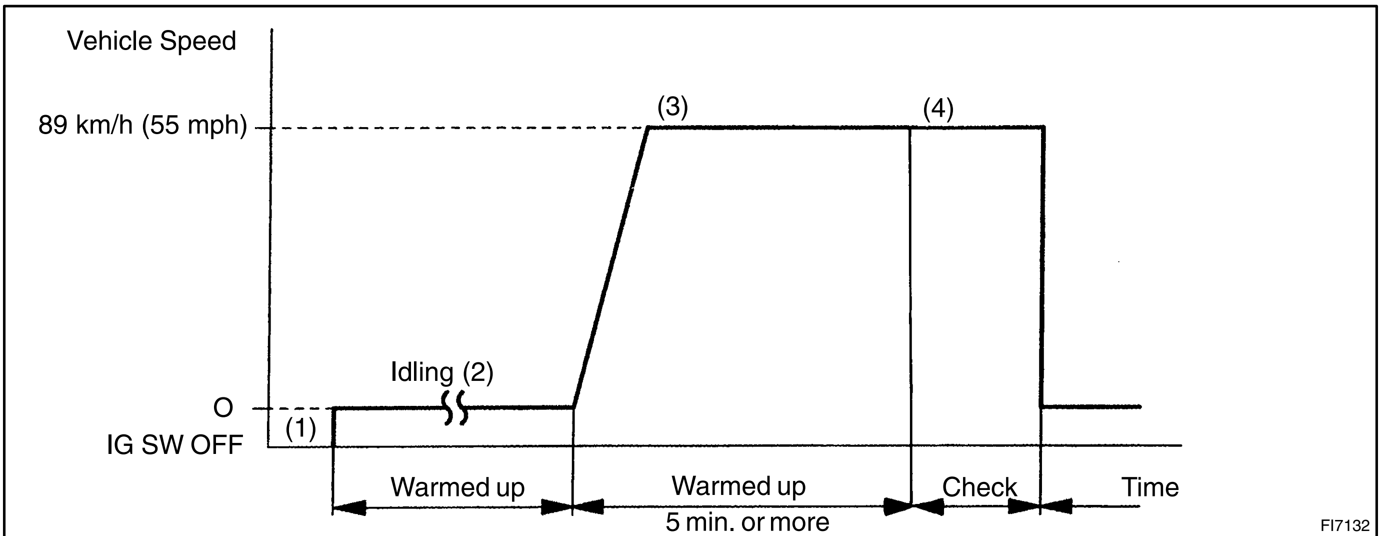
The engine ECU compares the waveform of the oxygen sensor located before the catalyst with the waveform of the oxygen sensor located after the catalyst to determine whether or not catalyst performance has deteriorated.
Air–fuel ratio feedback compensation keeps the waveform of the oxygen sensor before the catalyst repeatedly changing back and forth from rich to lean.
If the catalyst is functioning normally, the waveform of the oxygen sensor after the catalyst switches back and forth between rich and lean much more slowly than the waveform of the oxygen sensor before the catalyst.
But when both waveform change at a similar rate, it indicates that catalyst performance has deteriorated.



FI7081

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

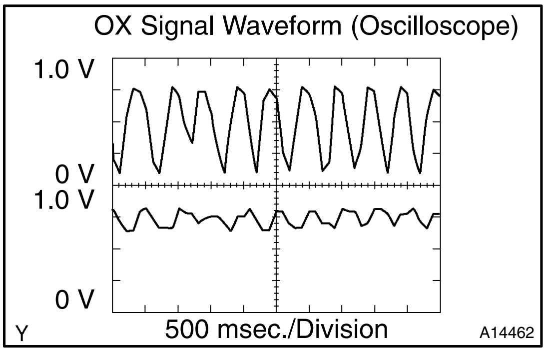
CONFIRMATION ENGINE RACING PATTERN



FI7132

(1) Connect the hand–held tester to the DLC3, or connect the probe of the oscilloscope between terminals OX1A, OX1B, and E1 of the engine ECU connectors.

(2) Start the engine and warm it up with all the accessories switched OFF until engine coolant temperature is stable.
(3) Drive the vehicle at 89 km/h (55 mph) or more for 5 min. or more.
(4) After confirming that the waveform of the oxygen sensor (bank 1 sensor 1) (OX1A), oscillate around 0.5 V during feedback to the engine ECU, check the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B).



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

INSPECTION PROCEDURE

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

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

YES → **Go to relevant DTC chart (See page DI–14).**

NO

2	**Check gas leakage on exhaust system.**

NG → **Repair or replace.**

OK

3	Check oxygen sensor (bank 1 sensor 1) (See page FI–54).

NG — Repair or replace.

OK

4	Check oxygen sensor (bank 1 sensor 2) (See page FI–54).

NG — Repair or replace.

OK

Replace three–way catalytic converter.

DI644–05

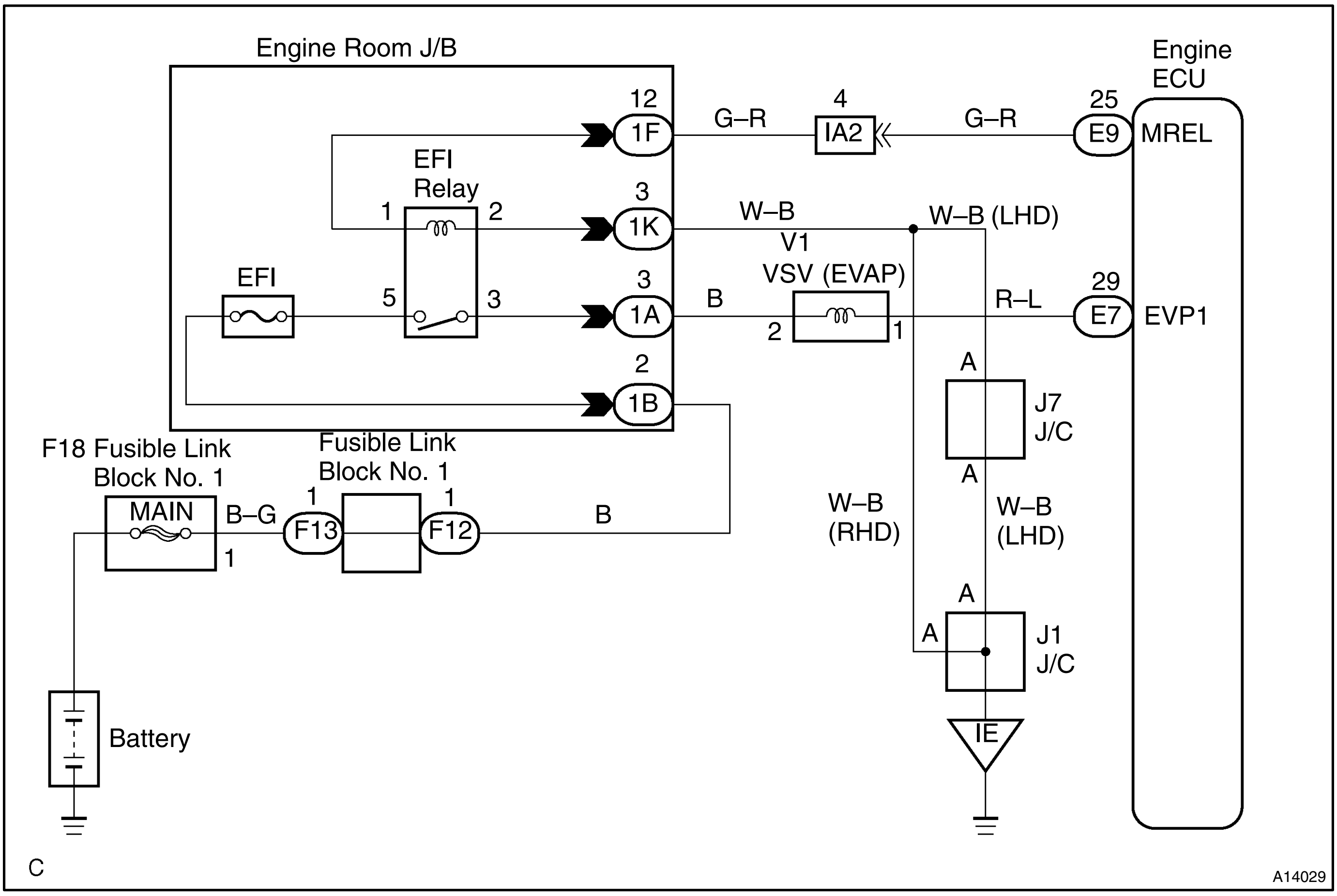
DTC	P0443	Evaporative Emission Control System Purge Control Vent Control Malfunction

CIRCUIT DESCRIPTION

To reduce HC emissions, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.
The engine ECU changes the duty signal to the VSV for the EVAP so that the intake quantity of HC emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is wamed up.

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

WIRING DIAGRAM

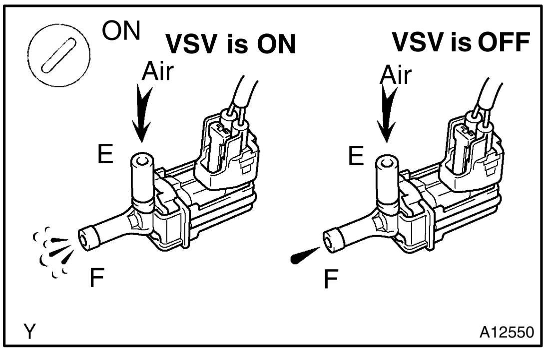


INSPECTION PROCEDURE

Hand–held tester:

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

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



PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

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

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

OK → **Check for intermittent problems (See page DI–3).**

NG

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

NG → **Replace VSV for EVAP.**

OK

3	**Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–40).**

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

OK

Check and replace engine ECU (See page IN–40).

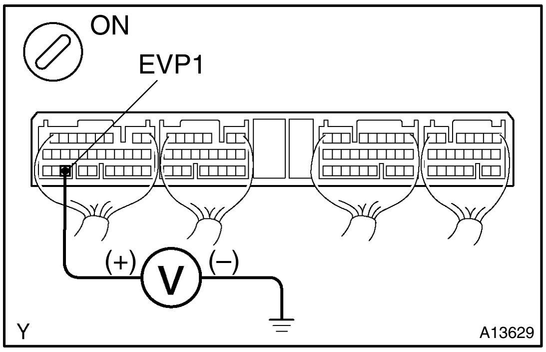
OBD scan tool (excluding hand–held tester):

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

NG — **Replace VSV for EVAP.**

OK

2	**Check voltage between terminal EVP1 of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal EVP1 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–40).**

OK

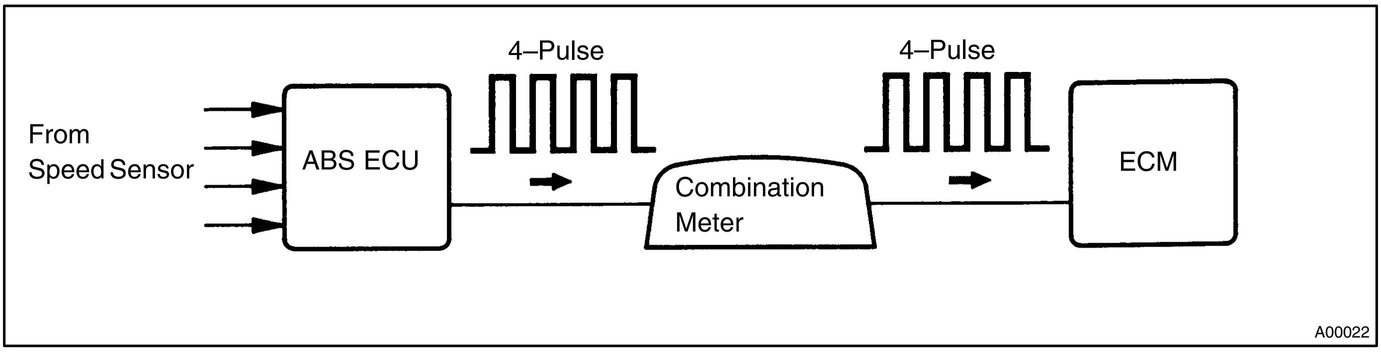
Check and replace engine ECU (See page IN–40).

DI4ED–08

DTC	P0500	Vehicle Speed Sensor Malfunction

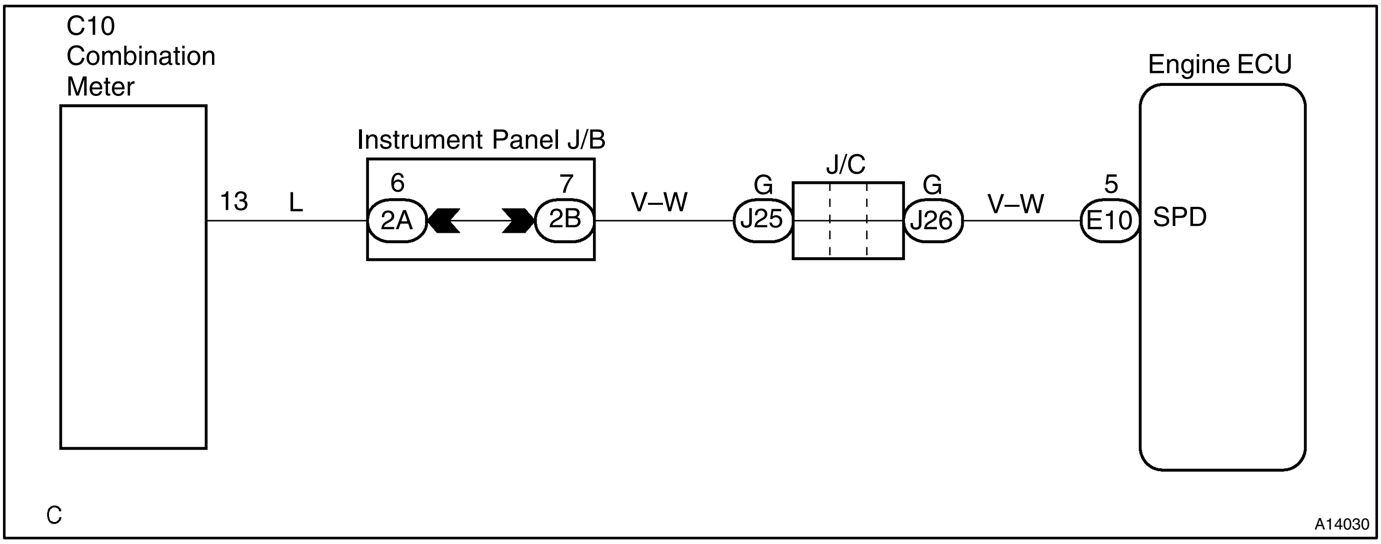
CIRCUIT DESCRIPTION

The vehicle speed sensor outputs a 4–pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the Engine ECU. The EngineECU determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	During vehicle is being driven, no vehicle speed sensor signal to engine ECU (2 trip detection logic)	• Combinationmeter • Open or short in No. 1 vehicle speed sensor circuit • No. 1 vehicle speed sensor • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

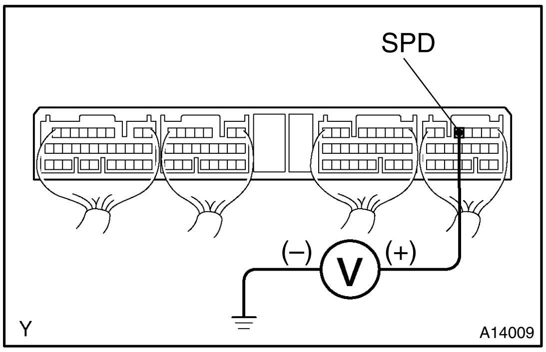
1	**Check operation of speedometer.**

CHECK:
Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
HINT:
The ABS ECU is operating normally if the speedometer display is normal.

NG → **Check and replace combination meter (See page BE–46).**

OK

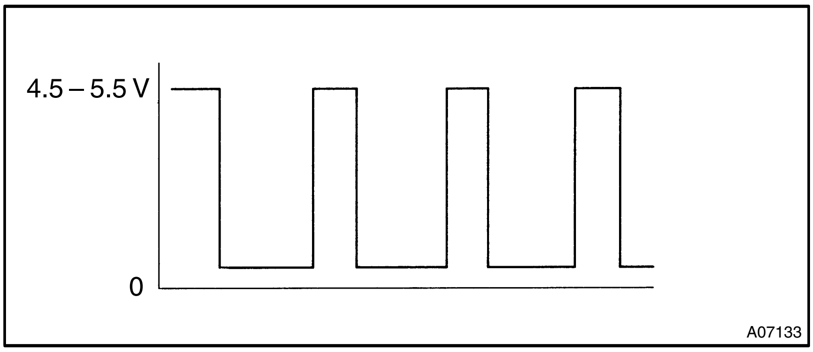
2	**Check voltage between terminal SPD of engine ECU connector and body ground.**



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Drive the vehicle.

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

OK:
Voltage is generated intermittently.



NG → **Check and repair harness and connector between combination meter and engine ECU.**

OK

Check and replace engine ECU (See page IN–40).

DI2CR–04

DTC	P0505	Idle Control System Malfunction

CIRCUIT DESCRIPTION

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

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

INSPECTION PROCEDURE

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

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

YES → **Go to relevant DTC chart (See page DI–14).**

NO

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

NG → **Repair or replace.**

OK

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

DI7OC–01

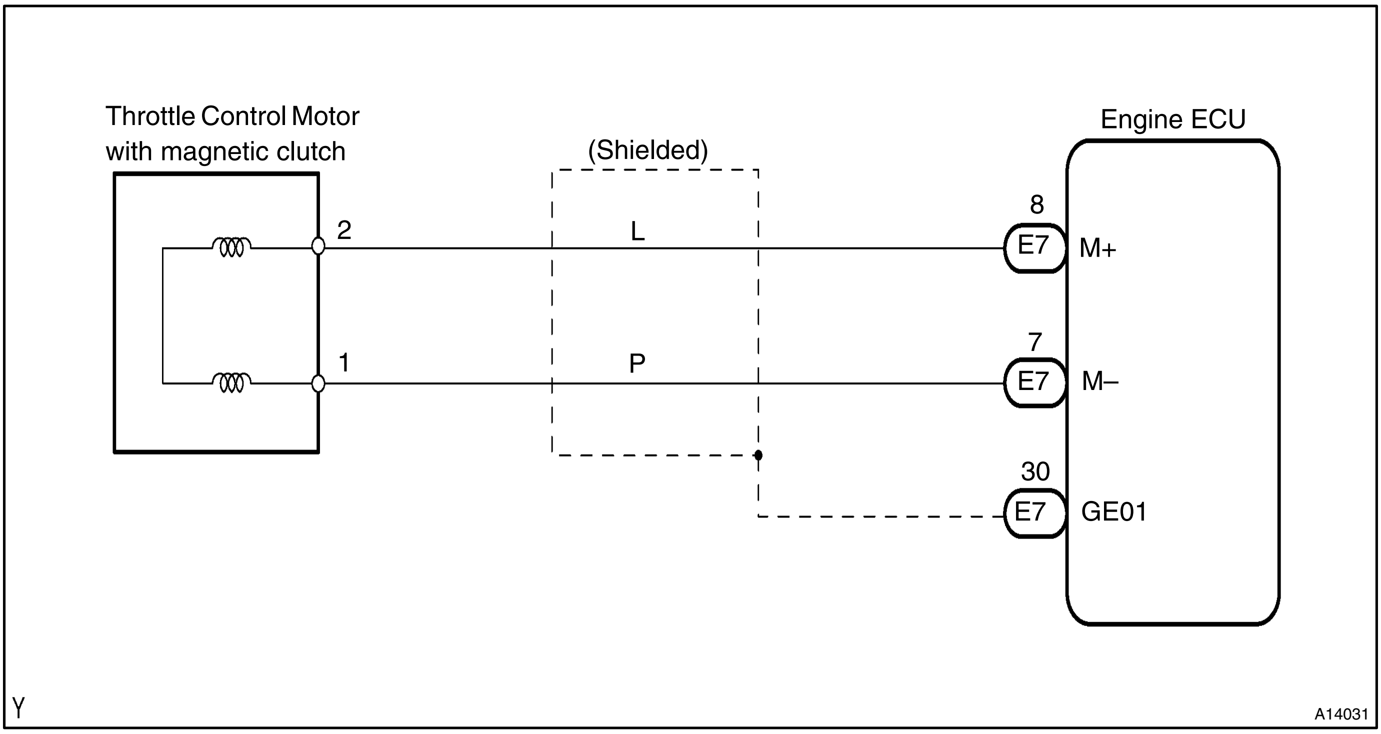
DTC	P1125	Throttle Control Motor Circuit Malfunction

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 throttle valve is fully closed by the return spring.

DTC No.	DTC Detecting Condition	Trouble Area
P1125	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	

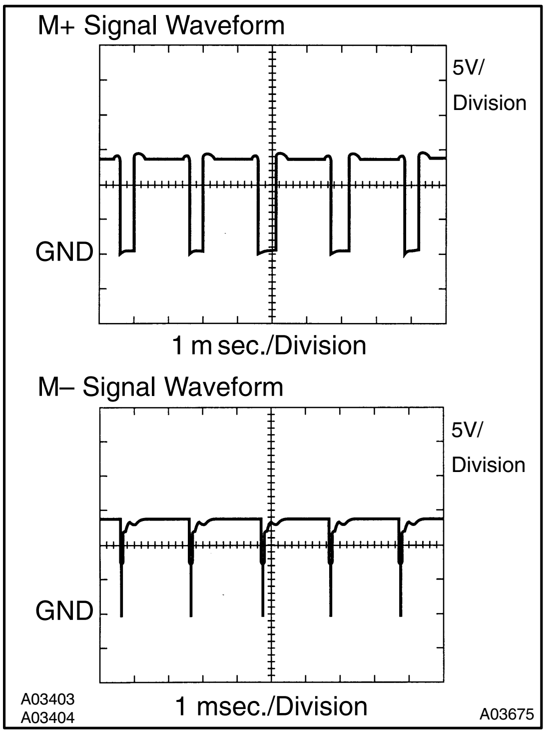
WIRING DIAGRAM



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

1	Check throttle control motor circuit.



PREPARATION:

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

(b) Start the engine.

CHECK:

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

OK:

The correct waveforms are as shown.

HINT:

The waveform frequency varies depending on the throttle opening.

OK → **Check and replace engine ECU (See page IN–40).**

NG

2	Check throttle control motor (See page FI–32).

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

OK

3	Check for open and short in harness and connector between throttle control motor and engine ECU (See page IN–40).

NG → **Repair or replace.**

OK

Check and replace engine ECU (See page IN–40).

DI64A–02

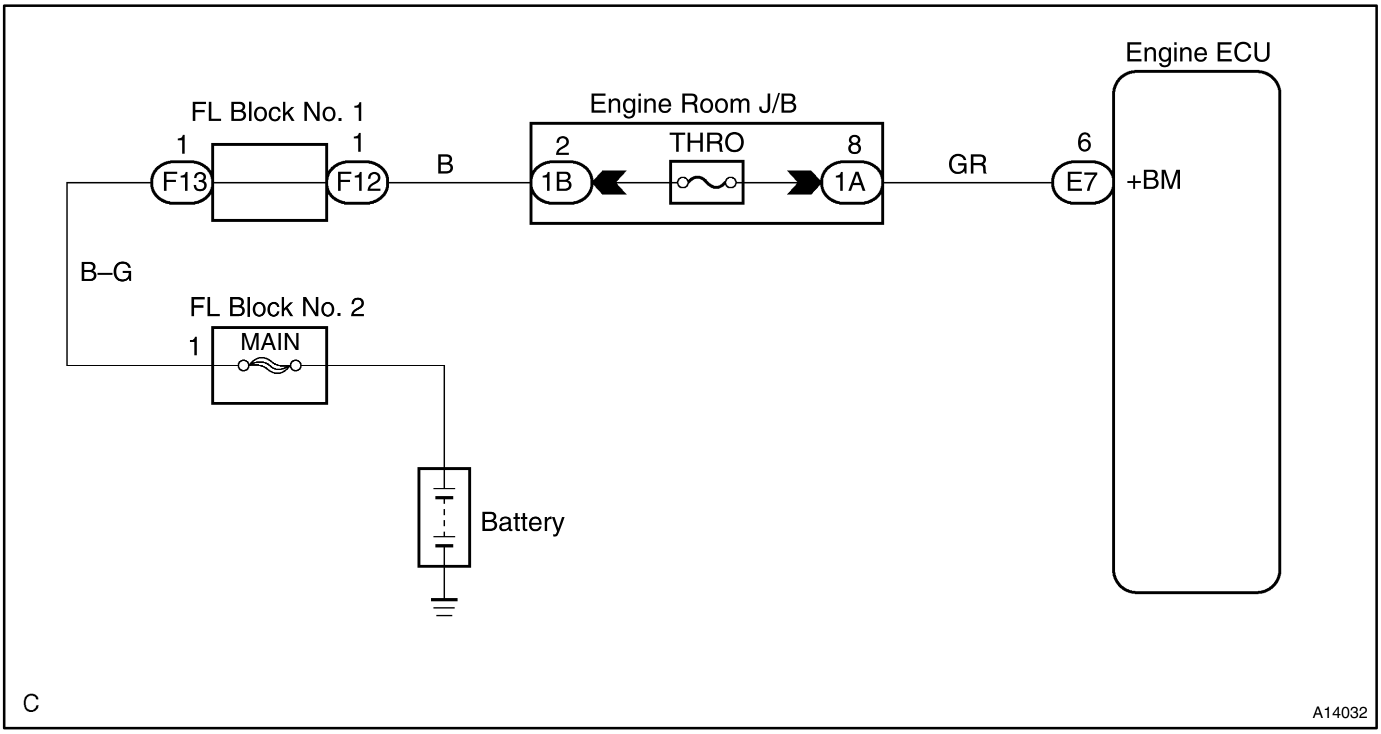
DTC	P1127	ETCS Actuator Power Source Circuit Malfunction

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 throttle valve is fully closed by the return spring.

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

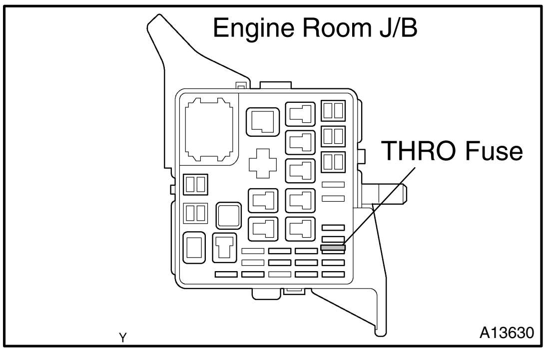
WIRING DIAGRAM



INSPECTION PROCEDURE

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

1	**Check THRO fuse.**

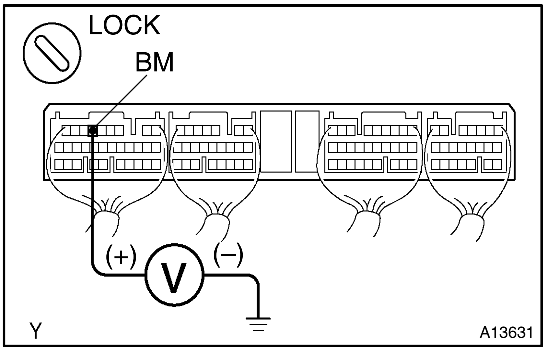


PREPARATION:
Remove the THRO fuse from the engine room J/B.
CHECK:
Check the continuity of the THRO fuse.
OK:
Continuity

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

OK

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



PREPARATION:
Remove the engine ECU with connector still connected (See page FI–58).
CHECK:
Measure the voltage between terminal+ BM of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK → **Check and replace engine ECU (See page IN–40).**

NG

Check and repair harness or connector between battery and ETCS fuse, and ETCS fuse and engine ECU (See page IN–40).

DI7OD–01

DTC	P1128	Throttle Control Motor Lock Malfunction

CIRCUIT DESCRIPTION

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

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

INSPECTION PROCEDURE

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

1	**Check throttle control motor (See page FI–32).**

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

OK

2	**Visually check throttle valve.**

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

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

OK

Replace throttle body.

DI64C–02

DTC	P1129	Electric Throttle Control System Malfunction

CIRCUIT DESCRIPTION

Electric Throttle Control System (ETCS) is composed of the throttle motor to operate 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 throttle valve is fully closed by the return spring.

DTC No.	DTC Detecting Condition	Trouble Area
P1129	Throttle opening angle continues to vary great from target throttle opening angle	• Electric throttle control system • EngIne ECU

WIRING DIAGRAM

Refer to DTC P1125 on page DI–89.

INSPECTION PROCEDURE

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

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

YES → **Go to relevant DTC chart (See page DI–14).**

NO ↓

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

DI68S–04

DTC	P1300	Igniter Circuit Malfunction (No. 1)

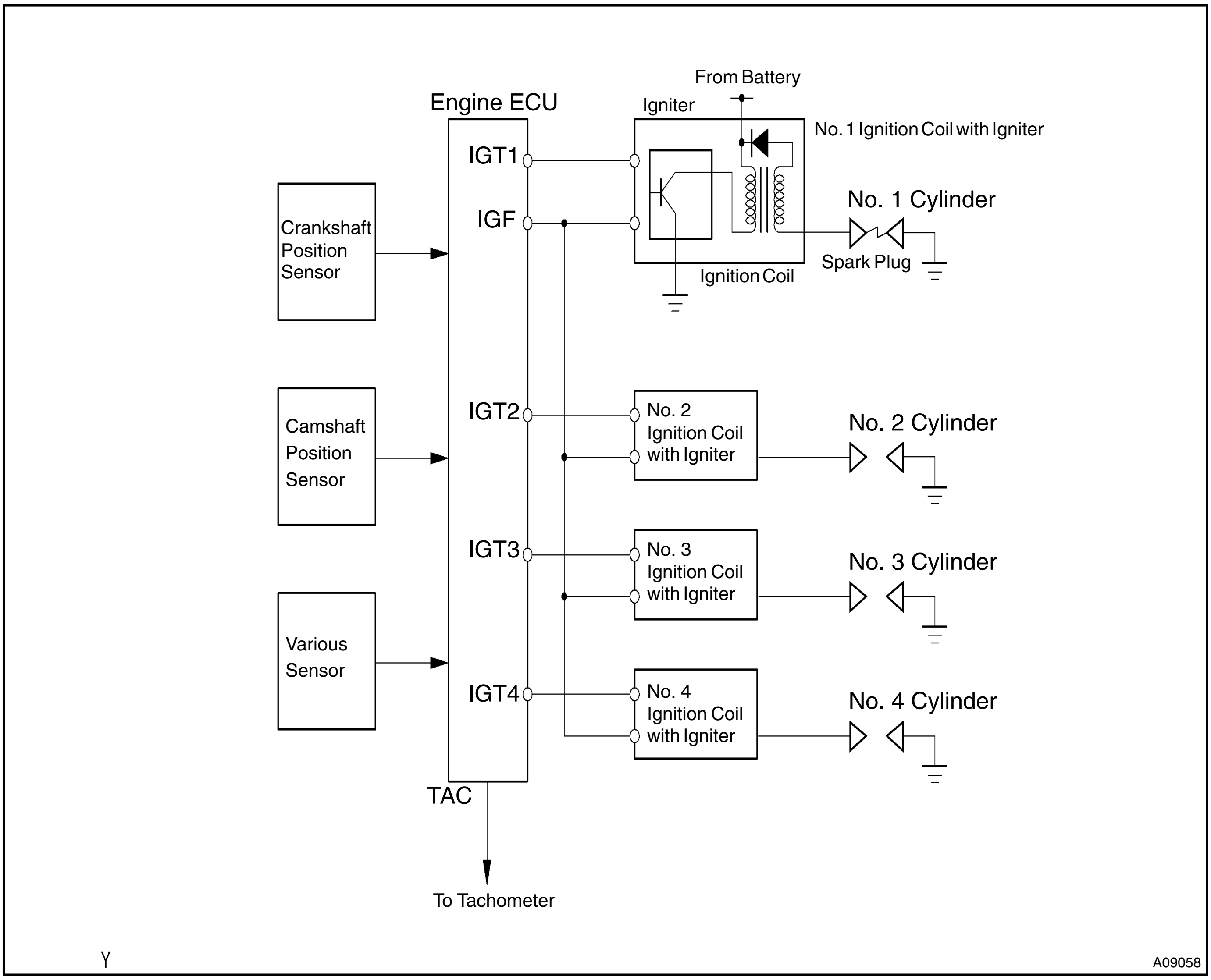
DTC	P1305	Igniter Circuit Malfunction (No. 2)

DTC	P1310	Igniter Circuit Malfunction (No. 3)

DTC	P1315	Igniter Circuit Malfunction (No. 4)

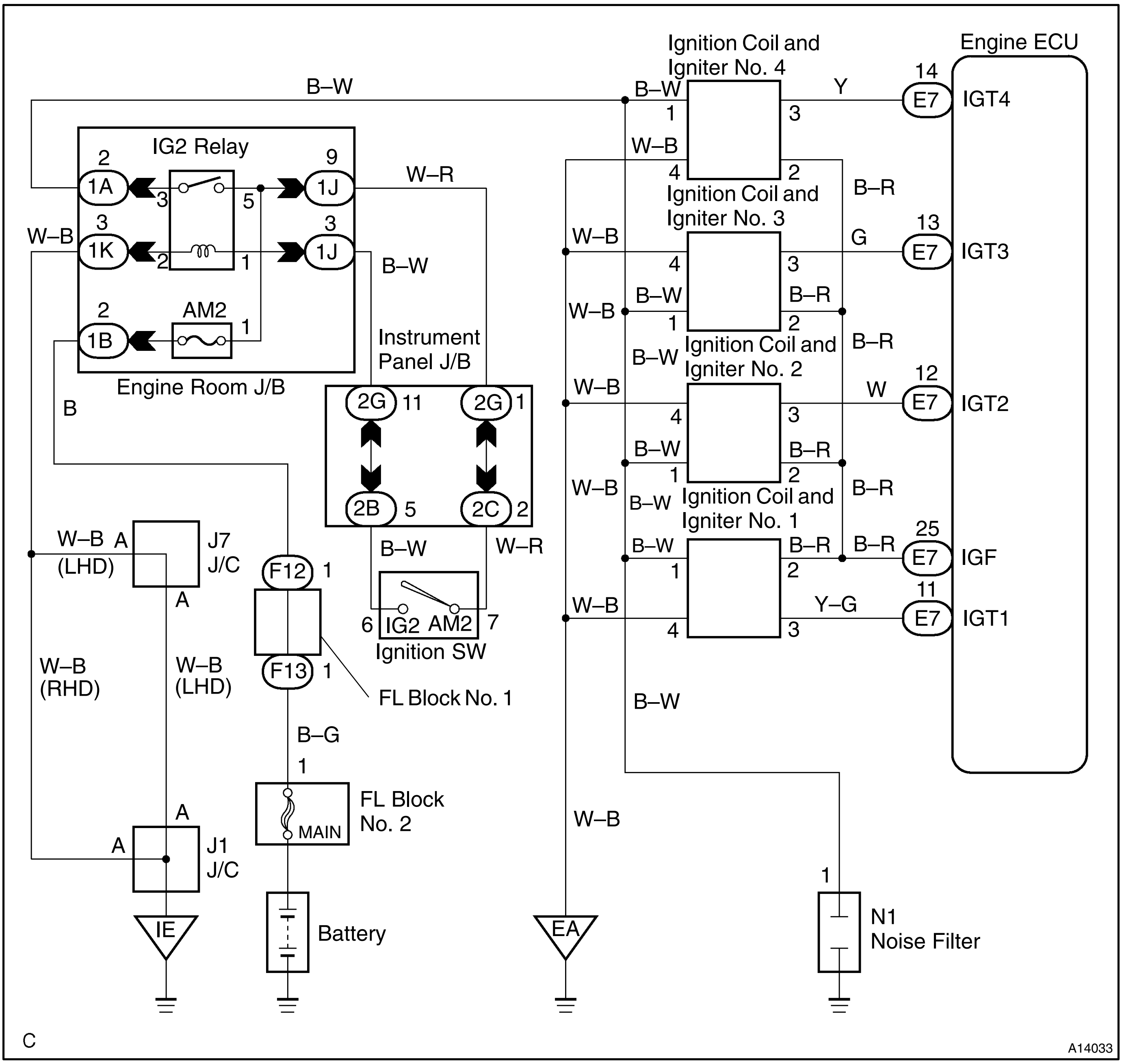
CIRCUIT DESCRIPTION

A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces high–voltage loss, and enhances the the overall reliability of the ignition system by eliminating the distributor. The DIS is a 1–cylinder ignition system which ignites one cylinder with one ignition coil. In the 1–cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug pass from the center electode to the ground electrode.
The engine ECU determines ignition timing and outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the power transistors in the igniter cuts off the current to the primary coil in the ignition coil is supplied to the spark plug that are connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail–safe measure to the engine ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P1300 P1305 P1310 P1315	No IGF signal to engine ECU while engine is running	• Open or short in IGF and IGT1 – 4 circuit from ignition coil with igniter • No. 1 – No. 4 ignition coil with igniter • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1300 is displayed, check No. 1 ignition coil with igniter circuit.
- If DTC P1305 is displayed, check No. 2 ignition coil with igniter circuit.
- If DTC P1310 is displayed, check No. 3 ignition coil with igniter circuit.
- If DTC P1315 is displayed, check No. 4 ignition coil with igniter circuit.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine 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.**

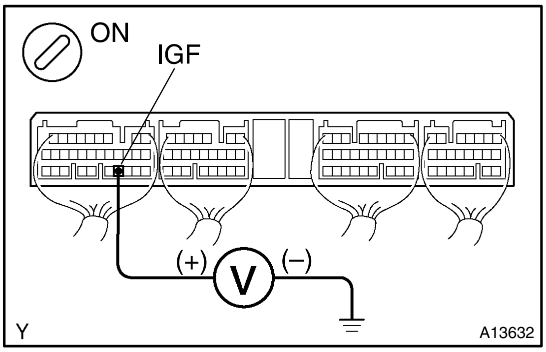
OK

2	Check for open and short in harness and connector in IGF and IGT signal circuit between engine ECU and ignition coil with igniter (See page IN–40).

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

OK

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



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Disconnect the ignition coil with the igniter connector.
(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 ignition coil with igniter.**

NG

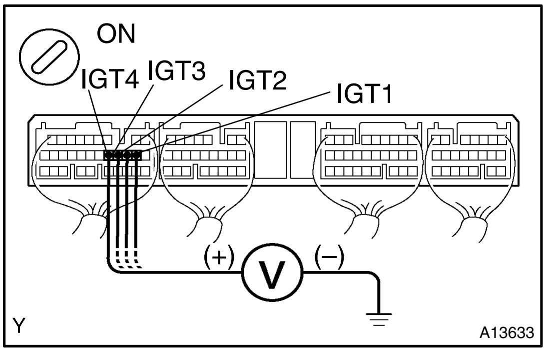
Check and replace engine ECU (See page IN–40).

4	**Check for open and short in harness and connector in IGT signal circuit between engine ECU and ignition coil with igniter (See page IN–40).**

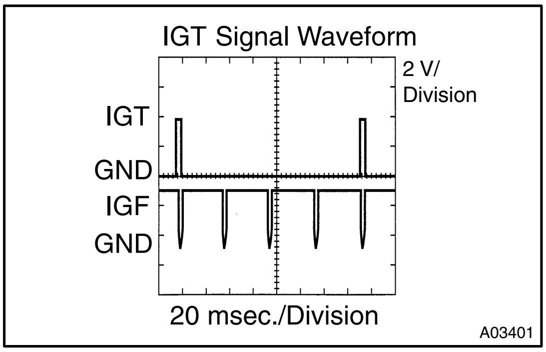
NG → **Repair or replace harness or connector.**

OK

5	**Check voltage between terminals IGT1 – 4 of engine ECU connector and body ground.**



PREPARATION:
Remove the engine ECU with connector still connected (See page FI–58).
CHECK:
Measure voltage between terminals IGT1 – 4 of the engine ECU connector and body ground when the engine is cranked.
OK:
Voltage: More than 0.1 V and less than 4.5 V

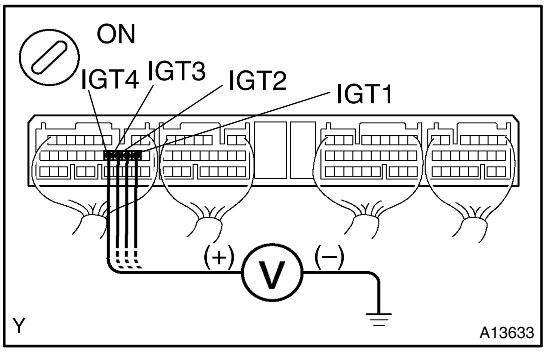


Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check waveform between terminals IGT1 – 4 and E1 of the engine ECU connector.
HINT:
Correct waveform appears as shown, with rectangle waves.

NG → **Check and replace engine ECU (See page IN–40).**

OK

6	**Disconnect ignition coil with igniter connector, and check voltage between terminals IGT1 – 4 of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

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

CHECK:

Measure voltage between terminals IGT1 – 4 of the engine ECU connector and body ground when the engine is cranked.

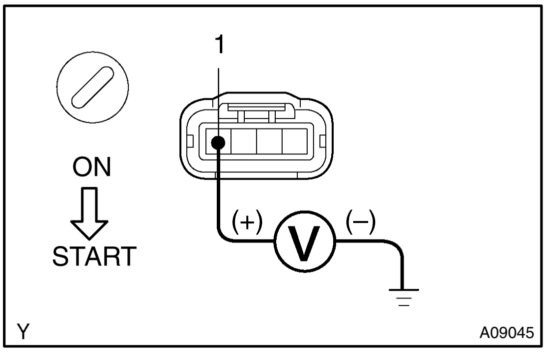
OK:

Voltage: More than 0.1 V and less than 4.5 V

NG	**Check and replace engine ECU (See page IN–40).**

OK

7	**Check ignition coil with igniter power source circuit.**



PREPARATION:

Disconnect the ignition coil the with the igniter connector.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK	**Repair ignition coil with igniter power source circuit.**

NG

8	**Check for open and short in harness and connector between ignition switch and ignition coil with igniter (See page IN–40).**

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

OK

9	Check EFI main relay (Marking: EFI) (See page FI–45).

NG → **Replace EFI main relay.**

OK

Replace ignition coil with igniter.

DI1MB–09

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

CIRCUIT DESCRIPTION

VVT 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 intake 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 actual camshaft angle is detected by the VVT sensor and it provides feedback to the engine ECU to control the intake valve timing in response to during condition.

DTC No.	Detection Item	Trouble Area
P1346	Deviation in crankshaft position sensor signal and VVT sensor signal (2 trip detection logic)	• Mechanical system malfunction (Skipping teeth of timing chain, chain stretched) • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335 on page DI–75.

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 valve timing (Check for loose and jumping teeth of timing chain) (See page EM–21).**

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

OK

Check and replace engine ECU (See page IN–40).

DI7I6–02

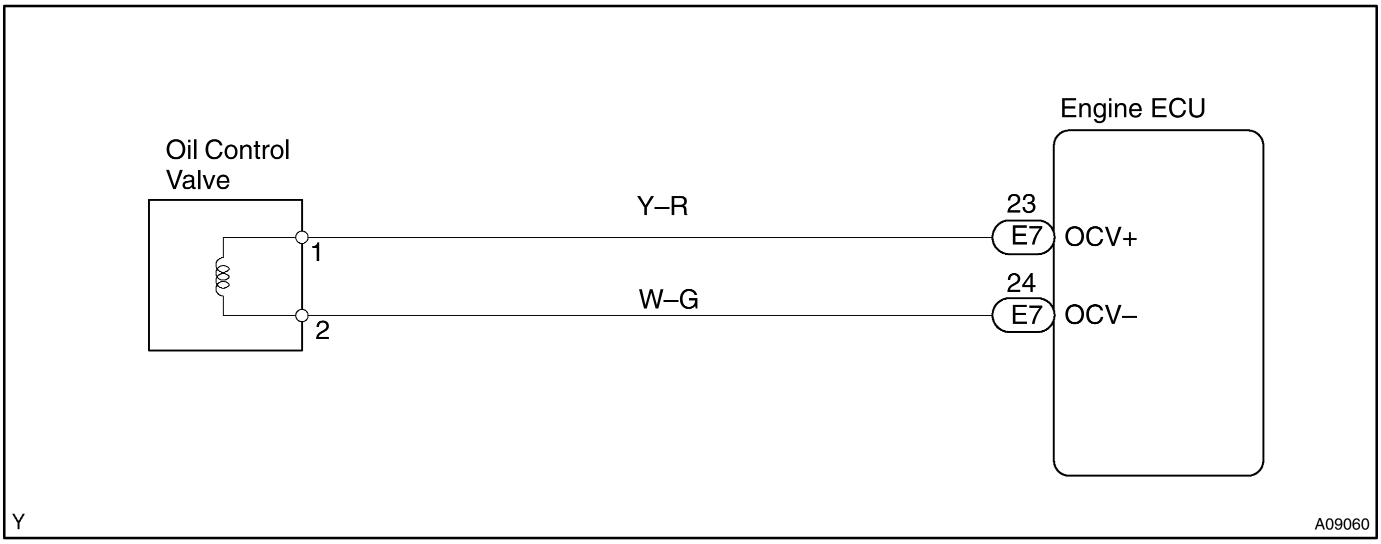
DTC	P1349	VVT System Malfunction

CIRCUIT DESCRIPTION

VVT system controls the intake valve timing to proper timing in response to driving condition.
Engine 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	Condition (a) or (b) continues for after the engine is warmed up and engine speed at 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:
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.

Hand–held tester:

1	**Check valve timing (See page EM–21).**

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.

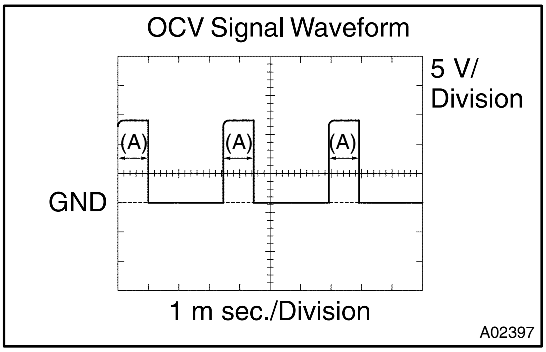
OK:
VVT system OFF to ON (OCV OFF to ON):
Engine speed increases.
VVT system ON to OFF (OCV ON to OFF):
Engine is stalled.

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

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



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, and 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–40).**

OK

4	Check valve timing controller assembly (See page EM–33).

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

OK

5	Check oil control valve (See page FI–43).

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.

NG → Repair or replace.

OK

7	Check whether or not DTC P1349 is stored.

PREPARATION:
(a) Clear the DTC (See page DI–3).
(b) Perform simulation test.

CHECK:
Check whether or not DTC P1349 is stored (See page DI–3).

OK:
DTC P1349 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

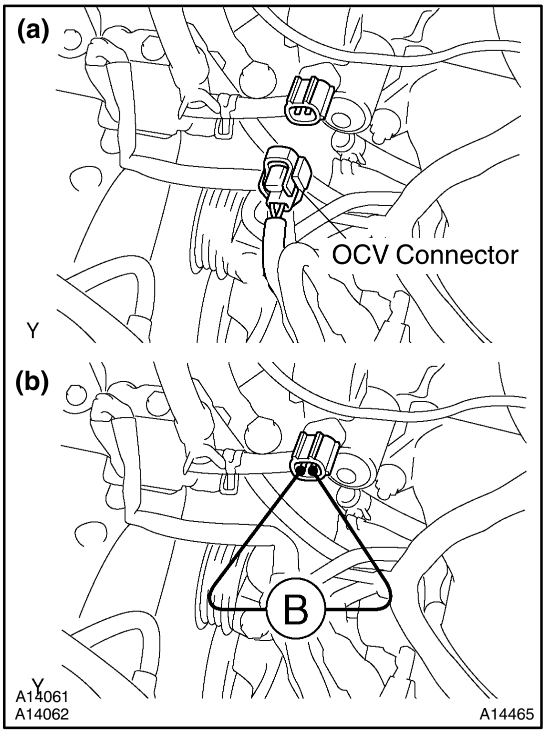
OBD scan tool (excluding hand–held tester):

1	**Check valve timing (See page EM–21).**

NG → **Repair valve timing.**

OK

2	**Check operation of OCV.**



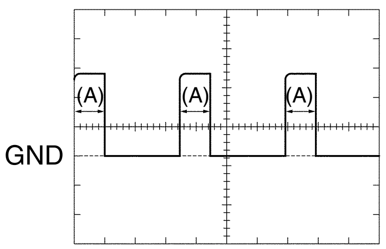
PREPARATION:
Start the engine.
CHECK:
(a) Check the engine speed when disconnecting the OCV connector.
(b) Check the engine speed when applying battery positive voltage between terminals of OCV.
RESULT:

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.***

*: DTCs 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–40).

4	**Check valve timing controller assembly.**

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

OK

5	**Check oil control valve (See page FI–43).**

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–3).
(b) Perform simulation test.
CHECK:
Check whether or not DTC P1349 is stored (See page DI–3).
OK:
DTC P1349 is not stored

OK → **VVT system is OK.***

*: DTCs 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.

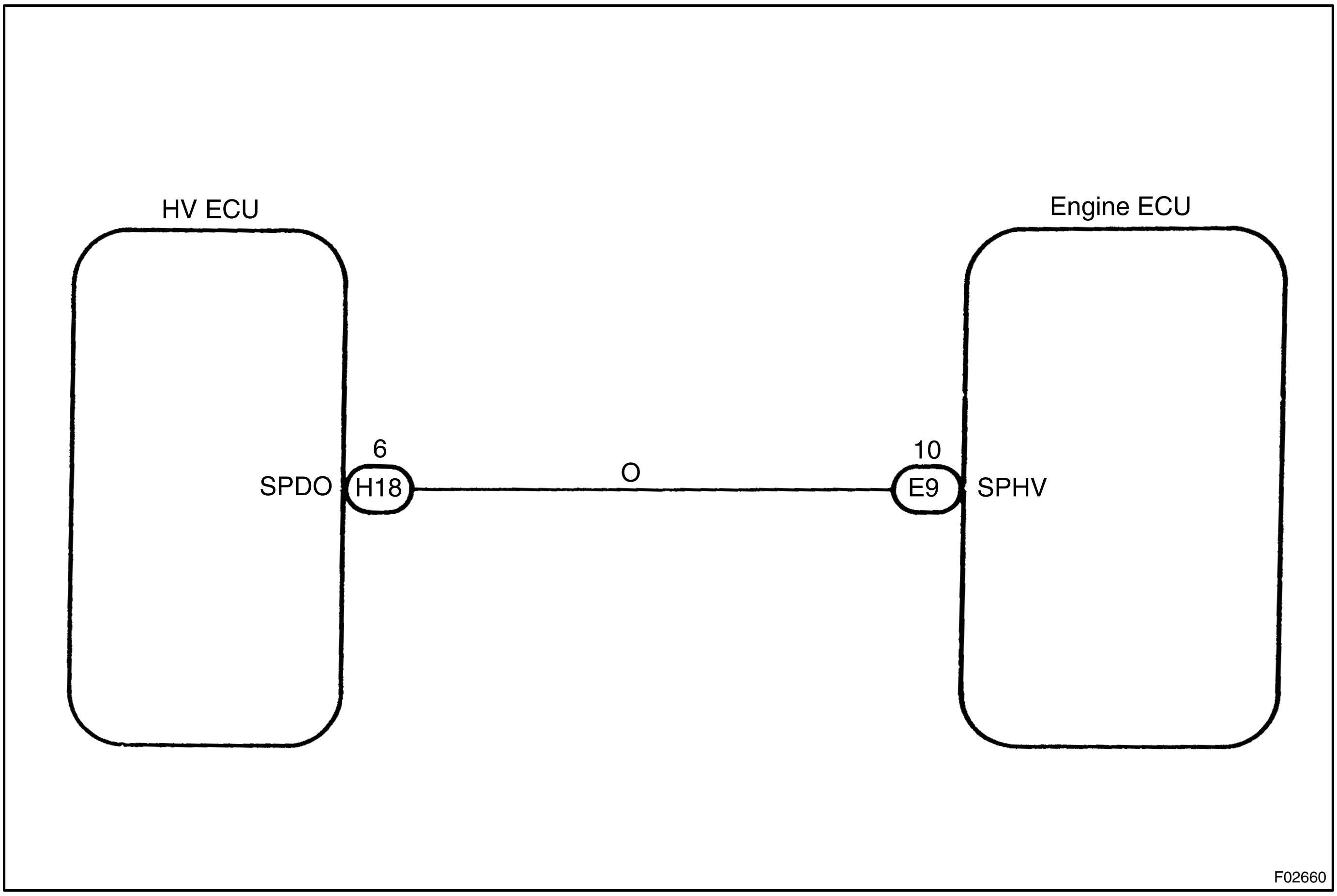
DI7OE–01

DTC	P1525	Resolver Vehicle Malfunction

CIRCUIT DESCRIPTION

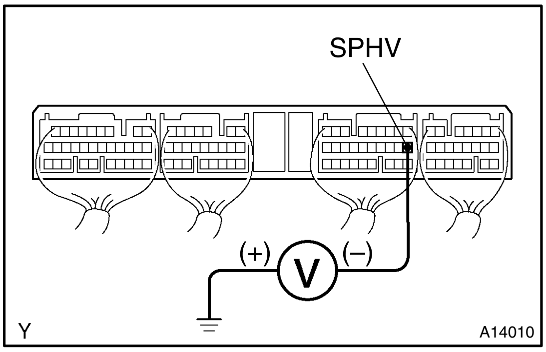
DTC No.	DTC Detecting Condition	Trouble Area
P1525	When signals of vehicle speed is not input from the resolver for 16 sec. or more while rurining at a speed of 20 km/h or more	• Engine ECU • Wire harness • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

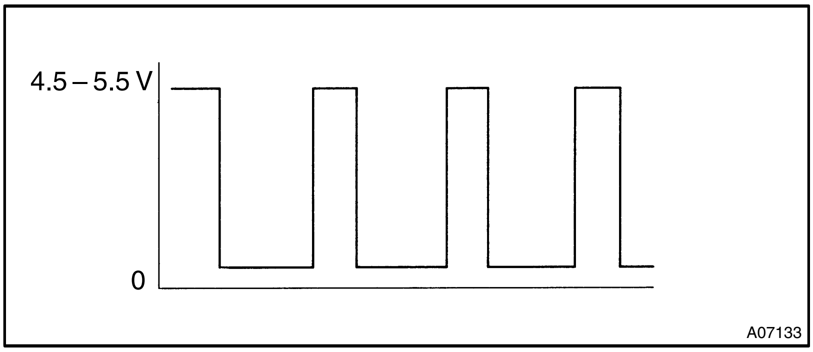
(b) Drive the vehicle at 20 km/h (12 mph).

CHECK:

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

OK:

Voltage is generated intermitlently.



OK → **Replace engine ECU.**

NG ↓

2	Check for open and short in harness and connector between SPHV of engine ECU and SPDO of HV ECU.

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

OK ↓

Replace HV ECU.

DI1ME–13

DTC	P1600	ECM BATT Malfunction

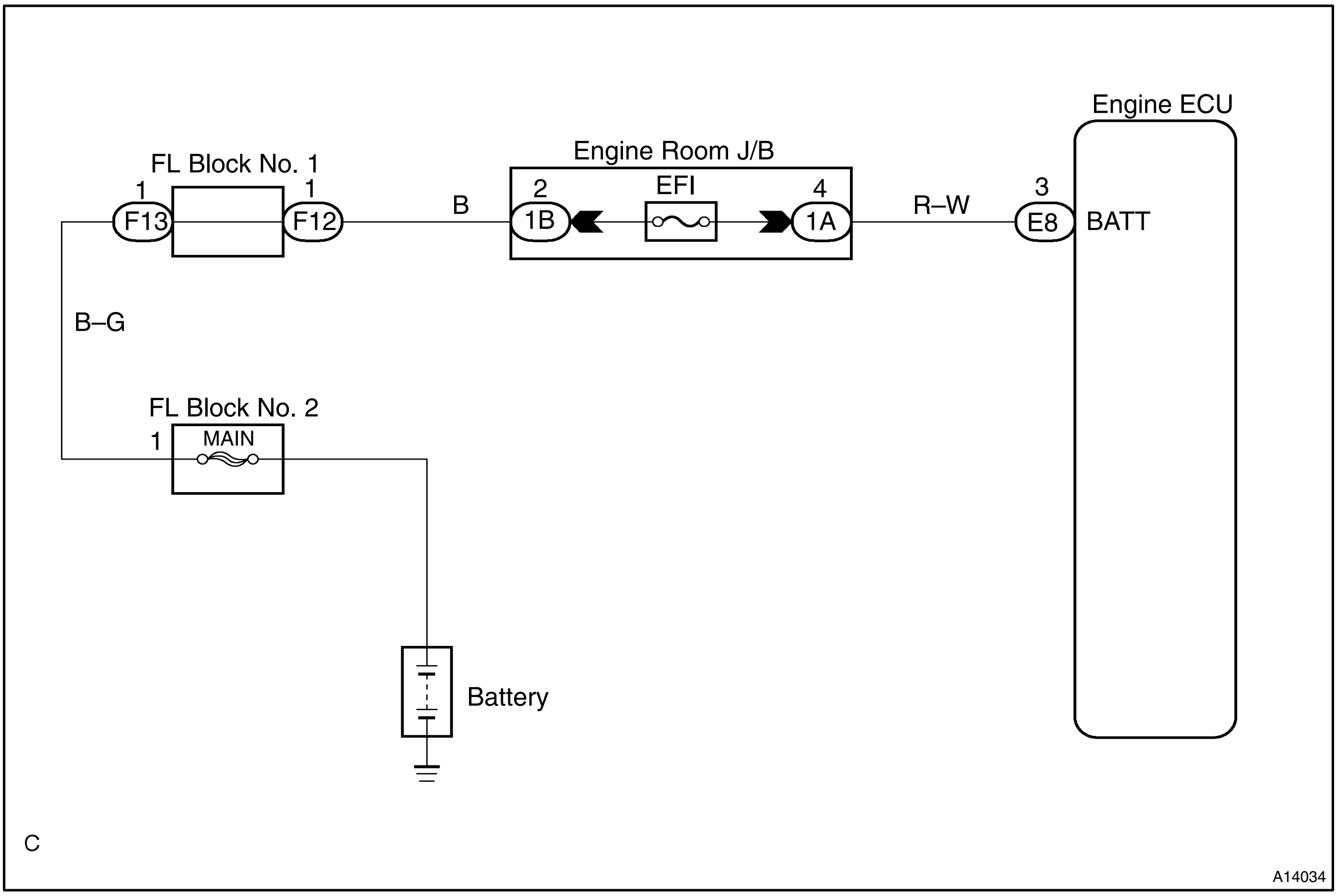
CIRCUIT DESCRIPTION

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

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

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

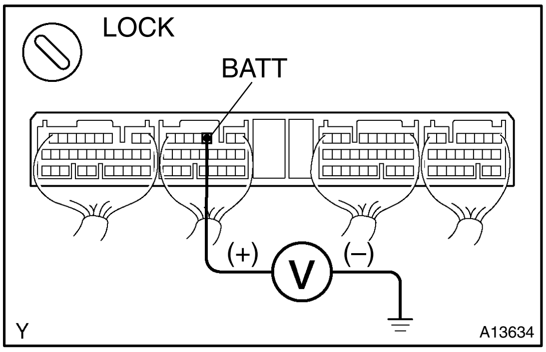
WIRING DIAGRAM



INSPECTION PROCEDURE

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

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

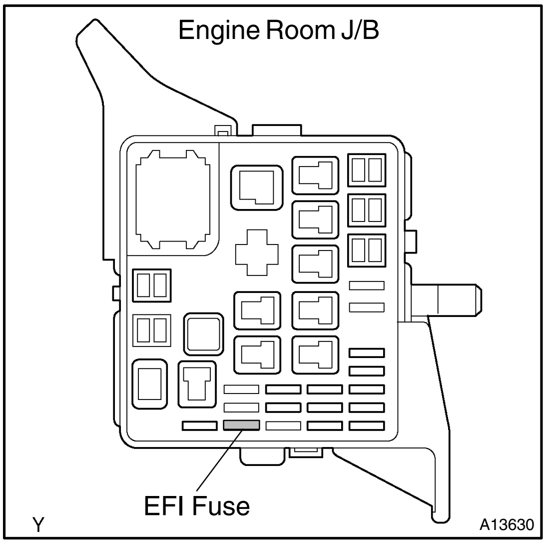


PREPARATION:
Remove the engine ECU with connector still connected (See page FI–58).
CHECK:
Measure voltage between terminal BATT of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–40).**

NG

2	**Check EFI fuse of engine room J/B.**



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

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

OK

Check and repair harness or connector between battery and EFI fuse, and EFI fuse and engine ECU (See page IN–40).

DI1MF–06

DTC	P1633	Engine ECU Malfunction (ETCS Circuit)

CIRCUIT DESCRIPTION

Refer to DTC P1129 on page DI–94.

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

INSPECTION PROCEDURE

HINT:

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

Replace engine ECU.

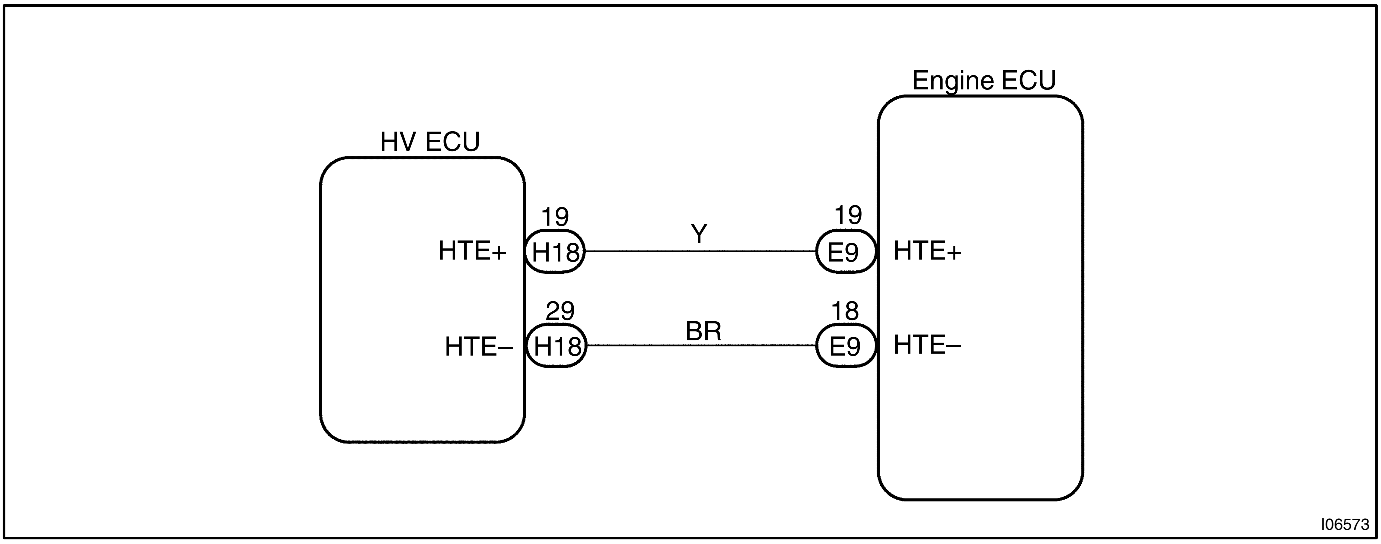
DI7OF–01

DTC	P1636	HV ECU Malfunction

CIRCUIT DESCRIPTION

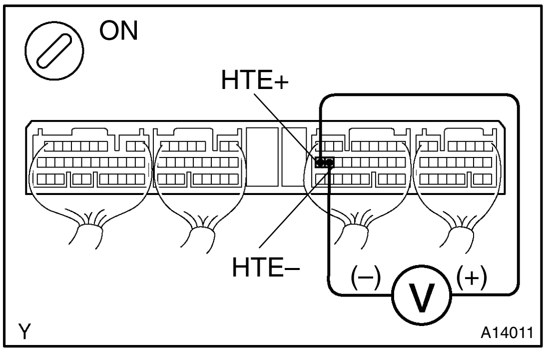
DTC No.	DTC Detecting Condition	Trouble Area
P1636	When communication with HV ECU is interrupted for 1.5 sec. or more	• Wire harness • Engine ECU • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal HTE+ and HTE– of engine ECU.



PREPARATION:

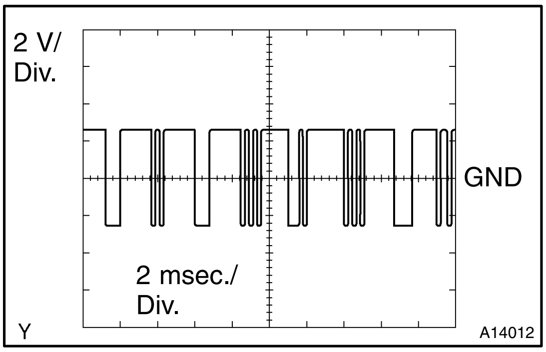
(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition swith ON.

CHECK:

Measure voltage between terminal HTE+ and HTE– of the engine ECU.

OK:



Reference: INSPECTION USING OSCILLOSCOPE

Turn the ignition swith ON, check waveform between terminals HTE+ and HTE– of the engine ECU.

HINT:

The correct waveform is as shown.

OK → **Replace engine ECU.**

NG

2	**Check for open and short in harness and connector between HTE+ and HTE– of engine ECU and HTE+ and HTE– of HV ECU.**

OK → **Replace HV ECU.**

NG

Repair or replace harness or connector.

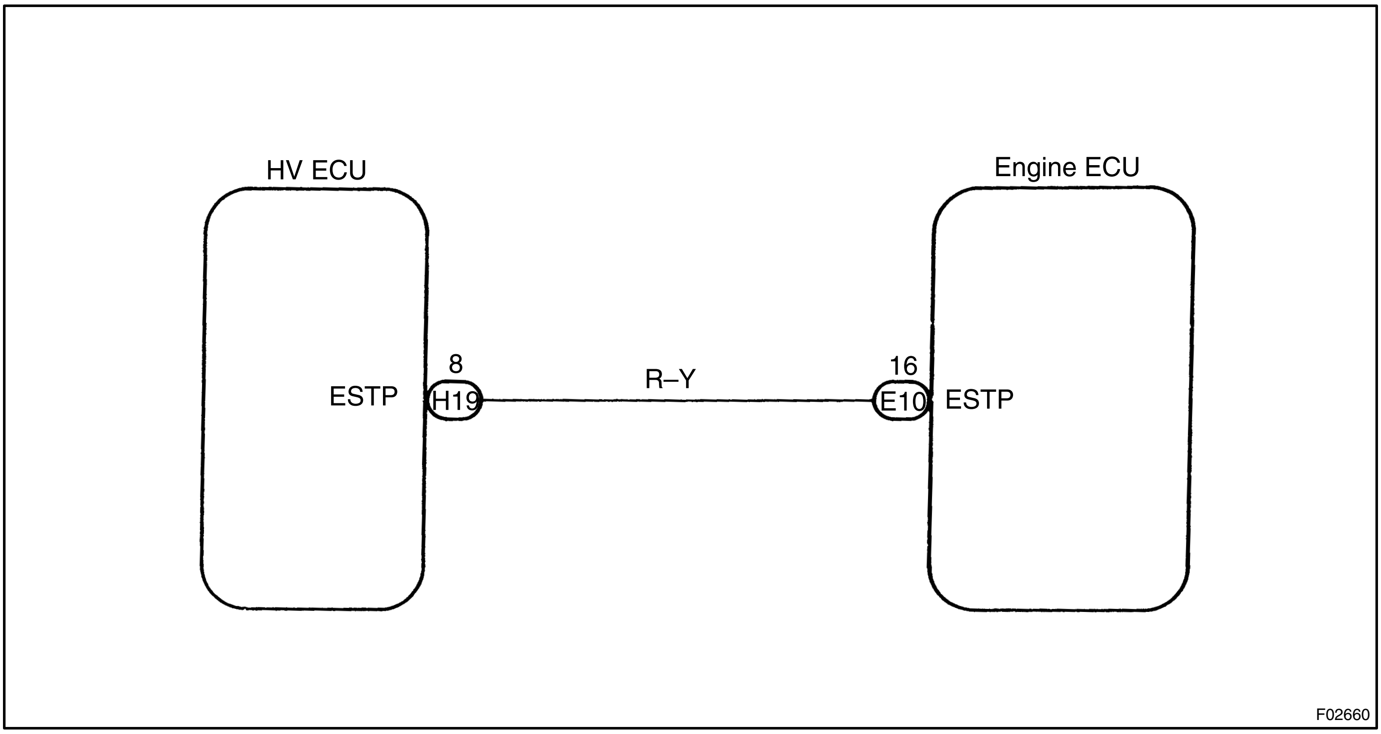
DI7OG–01

DTC	P1637	ESTP Signal Malfunction

CIRCUIT DESCRIPTION

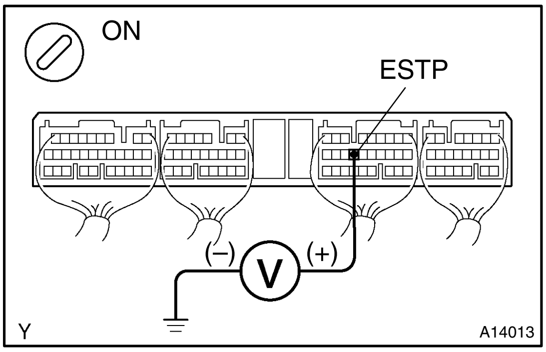
DTC No.	DTC Detecting Condition	Trouble Area
P1637	When signal of ESTP is not input from the HV ECU for 2 sec. or more	• Wire harness • HV ECU • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Start the engine.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK	Replace engine ECU.

NG

2	Check for open and short in harness and connector between ESTP of engine ECU and HV ECU (See page IN–40).

OK → **Replace HV ECU.**

NG

Repair or replace harness or connector.

DI1MH–12

DTC	P1656	OCV Circuit Malfunction

CIRCUIT DESCRIPTION

Refer to DTC P1349 on page DI–103.

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 DTCs P1349 on page DI–103.

INSPECTION PROCEDURE

HINT:

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

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 OFF to ON (OCV OFF to ON):
Engine speed increases.
VVT system ON to OFF (OCV ON to OFF):
Engine is stalled

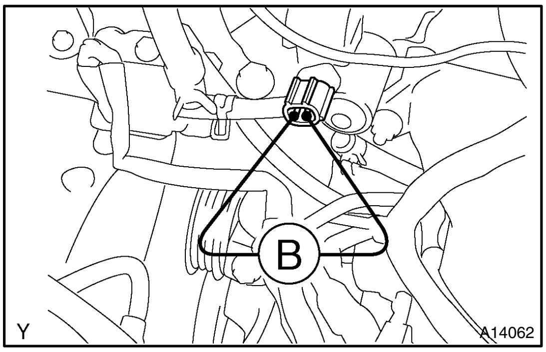
HINT:

The change of engine speed lasts only few seconds.

OK	**Check for intermittent problems (See page DI–3).**

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–103).

NG → **Check and replace engine ECU (See page IN–40).**

OK

4	Check for open and short in harness and connector between OCV and engine ECU (See page IN–40).

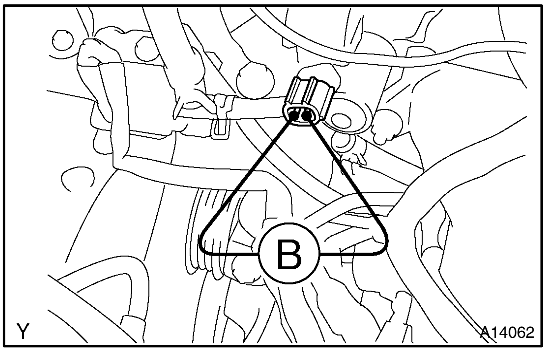
NG → **Repair or replace.**

OK

Check for intermittent problems (See page DI–3).

OBD scan tool (excluding 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–103).

NG → **Check and replace engine ECU (See page IN–40).**

OK ↓

3	Check for open and short in harness and connector between OCV and engine ECU (See page IN–40).

NG → **Repair or replace.**

OK ↓

Check for intermittent problems (See page DI–3).

DI7OH–01

DTC	P3190	Poor Engine Power

DTC	P3191	Engine dose not Start

CIRCUIT DESCRIPTION

From the HV ECU, the engine ECU receives data such as power output required for the engine (required output), estimated torque produced by the engine (estimated torque), engine RPM of control target (target RPM), whether the engine is in start mode or not. Then, based on the required output and target RPM, the engine ECU calculates a target torque that is to be produced by the engine and compares it with the estimated torque.
If the estimated torque is very low compared with the target torque, or the engine start mode continues at the engine RPM or for the duration calculated by water temperature, an abnormal condition is detected.

DTC No.	DTC Detecting Condition	Trouble Area
P3190	Following condition (a) to (e) continues at a fixed engine RPM or a fixed length of time: (a) Communication with HV ECU is normal. (b) Engine RPM is a fixed value or more. (c) Engine star mode is not active. (d) Target torque is a fixed value or more. (e) Ratio of estimated torque against target torque is less than 20 %.	• Air induction system • Throttle body • Fuel pressure • Engine • Air flow meter • Out of fuel • Water temp. sensor • Crankshaft position sensor • Camshaft position sensor • Engine ECU
P3191	Following condition (a) to (c) continues at a fixed engine RPM or for a fixed length of time: (a) Vommunication with HV ECU is normal. (b) Engine RPM is a fixed value or more. (c) Engine start mode is active.	

HINT:
When DTC P3190, P3191 are detected and the remain of the fuel is little, the computer judges the cause as a fuel shortage, and after the next trip, when the supply of fuel is confirmed, it turns off MIL, but the memory of DTC still remains.

WIRING DIAGRAM

Refer to DTC P1636 on page DI–114.

INSPECTION PROCEDURE

1	**Are there any other codes begin output?**

YES → **Go to relevant DTC chart.**

NO

2	Check remaining amount of fuel.

NG → Supply fuel.

OK

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

NG → Repair or replace.

OK

4	Check for umusual noise or vibration when starting engine or racing.

NG → Repair or replace.

OK

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

NG → Check and repair fuel pump and fuel pipe line.

OK

6	Check air flow meter (See page FI–30) and water temp. sensor (See page FI–50).

NG → Repair or replace.

OK

7	Check crankshaft position sensor and camshaft position sensor (See page IG–1).

NG → Repair or replace.

OK ↓

8	Check throttle control motor and throttle position sensor (See page FI–32).

NG → Repair or replace.

OK ↓

Chack and replace engine ECU
(See page IN–40).

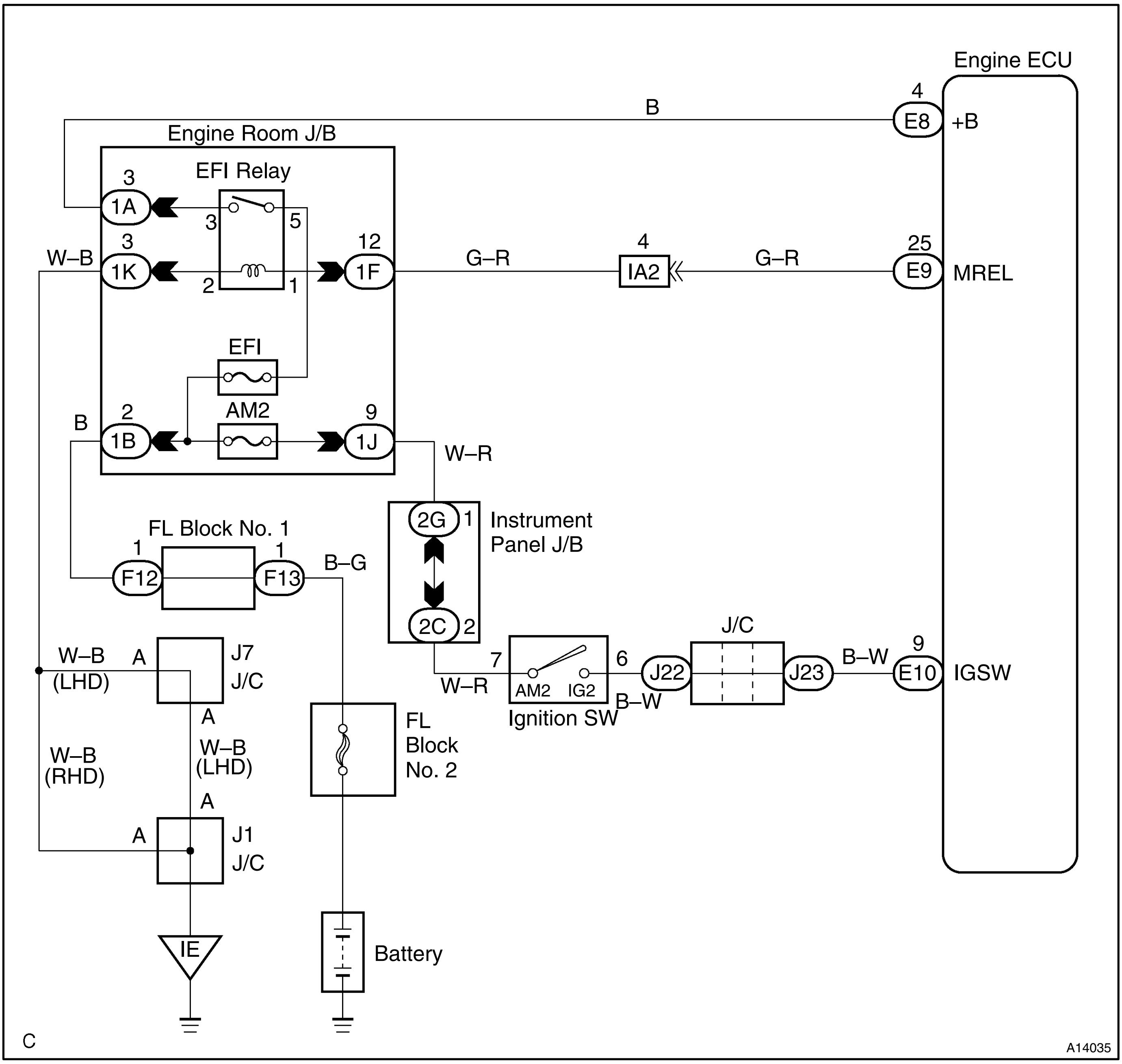
DI7OI–01

Engine ECU Power Source Circuit

CIRCUIT DESCRIPTION

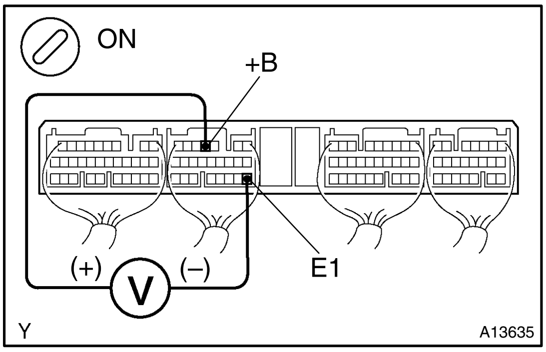
When the ignition switch is turned ON, battery positive voltage is applied to terminal IGSW of the engine ECU and the EFI main relay (Marking: EFI MAIN) control circuit in the engine ECU sends a signal to the terminal MREL of the engine ECU switching on the EFI main relay.
This signal causes current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

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI–20).

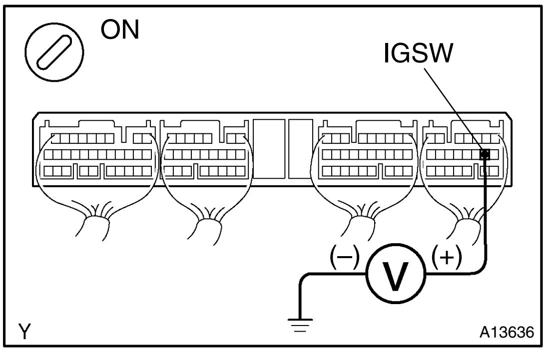
NG

2	Check for open in harness and connector between terminal E1 of engine ECU and body ground (See page IN–40).

NG	Repair or replace harness or connector.

OK

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



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page FI–58).

(b) Turn the ignition switch ON.

CHECK:

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

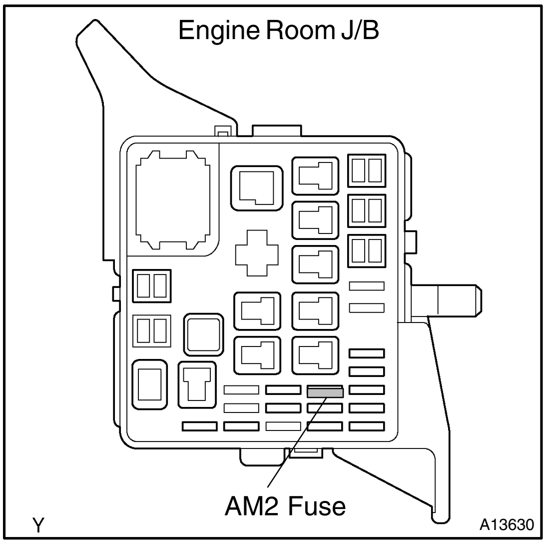
OK:

Voltage: 9 – 14 V

OK → **Go to step 8.**

NG ↓

4	**Check AM2 fuse.**



PREPARATION:
Remove the AM2 fuse from the engine room J/B.
CHECK:
Check the continuity of the AM2 fuse.
OK:
Continuity

NG → **Replace AM2 fuse.**

OK ↓

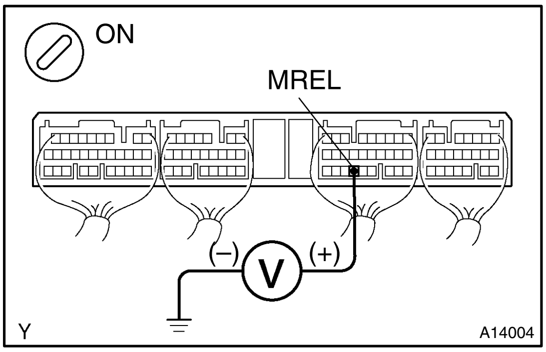
5	**Check ignition switch (See page BE–17).**

NG → **Replace ignition switch.**

OK ↓

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

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



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Turn the ignition switch ON.

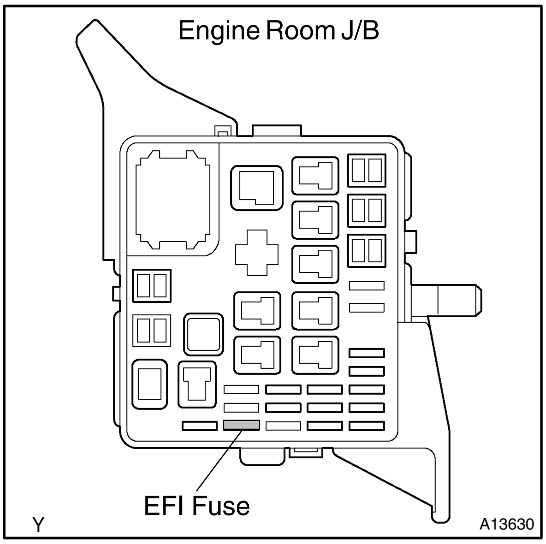
CHECK:
Measure the voltage between terminal MREL of the engine ECU connector and body ground.

OK:
Voltage: 9 – 14 V

NG → **Check and replace engine ECU (See page IN–40).**

OK ↓

7	**Check EFI fuse.**



PREPARATION:
Remove the EFI fuse from the engine room J/B.

CHECK:
Check the continuity of the EFI fuse.

OK:
Continuity

NG → **Check for short in all harness and components connected to EFI1 fuse.**

OK ↓

8	Check EFI main relay (Marking: EFI MAIN) (See page FI–45).

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–40).

NG → Repair and replace harness or connector.

OK

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

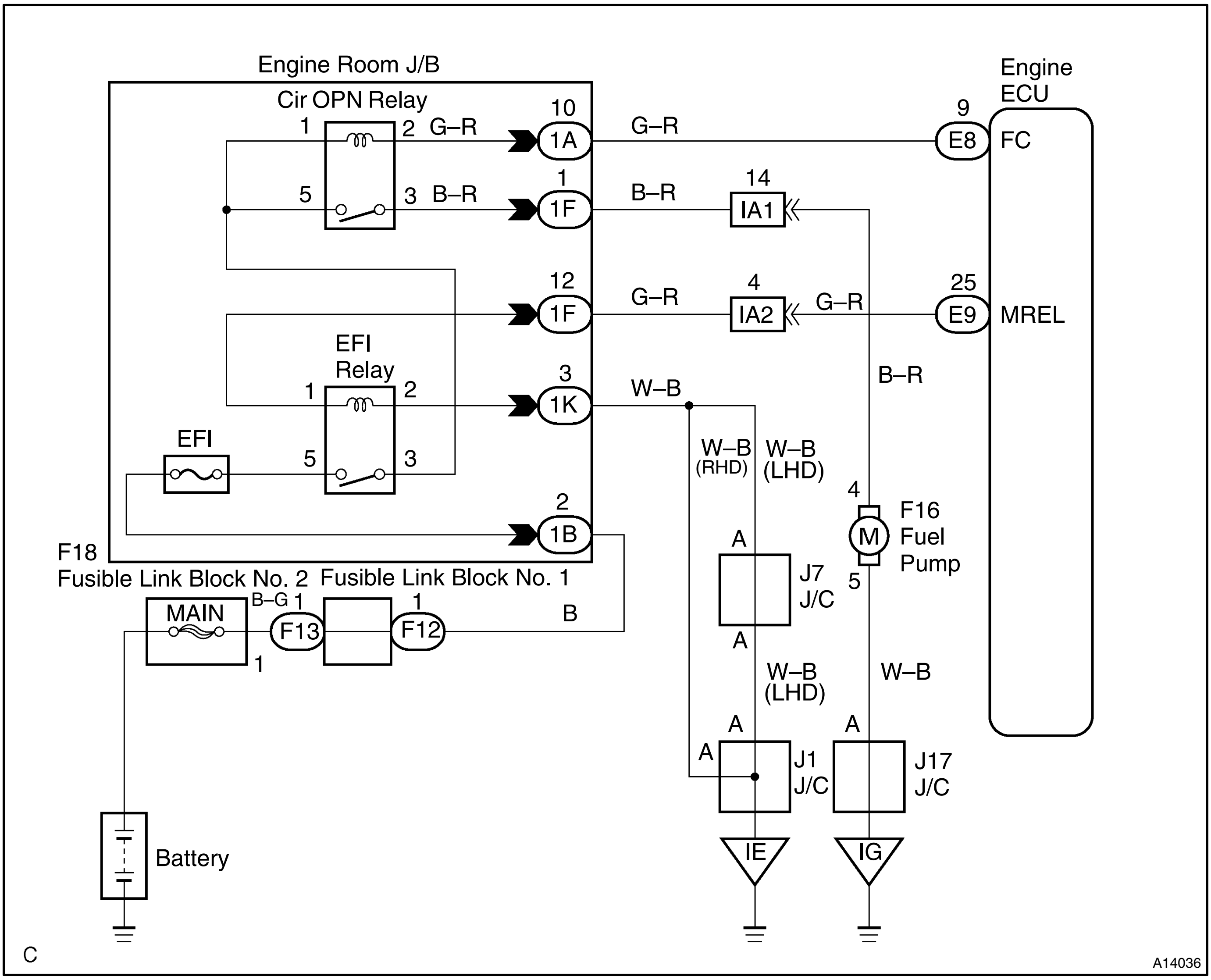
DI7HB–02

Fuel Pump Control Circuit

CIRCUIT DESCRIPTION

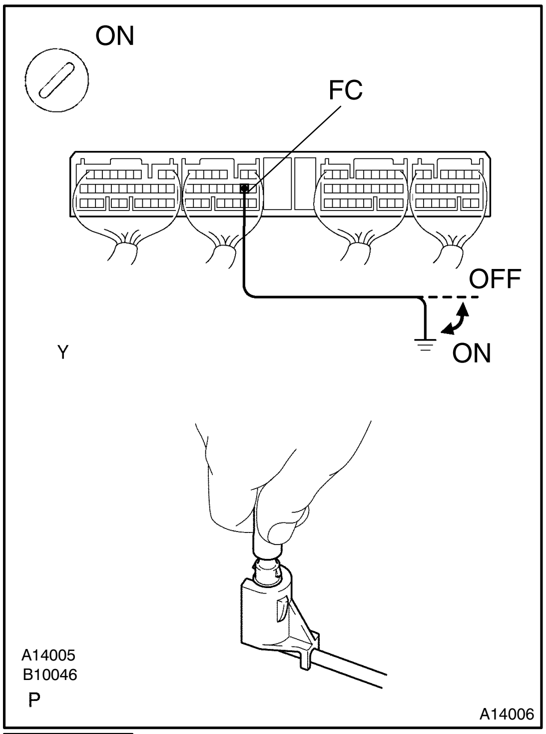
When starting the engine with ignition switch:
HV ECU receives ST signal and decides to start the engine, and send the signal of the engine start prior signal to the engine ECU by the communicatio between the engine ECU and HV ECU.
Engien ECU receives that signal and turns ON the circuit opening relay slightly earlier, then turns the fuel pump.
When starting the engine in an intermittent operation:
With the cranking by MG1, NE signal comes in immediately, so the engine ECU receives the generation of NE signal and turns the fuel pump. (At this time, no refernce of the communication from HV ECU)
When stopping the fuel pump:
When the signal to stop the engine comes in to the engine ECU from HV ECU from HV ECU side, the fuel pump stops.
At the time of the fuel cut opetation such as deceleration by the engine brake, the fuel pump stops.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check fuel pump operation.**



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 the active test mode on the hand–held tester.
(d) If you have no hand–held tester, connect the terminal between FC of the engine ECU and body ground.

CHECK:
Check that the there is pressure in the fuel inlet tube from the fuel line.

OK:
Pressure in the fuel inlet tube.

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–20).**

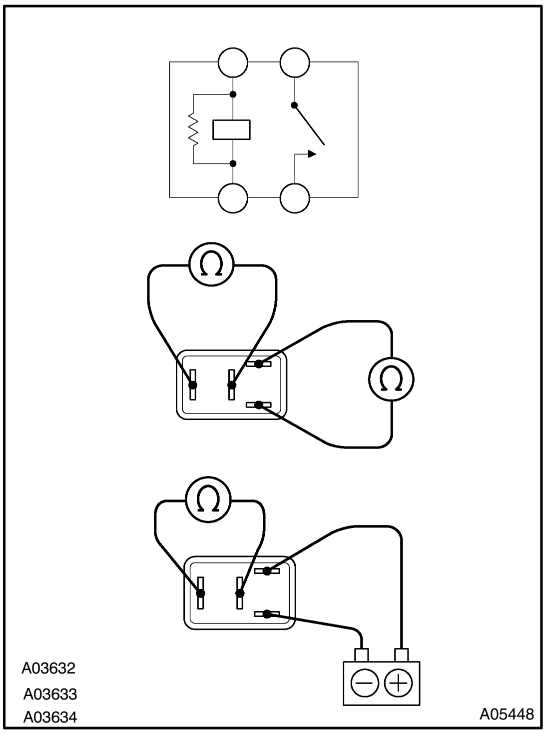
NG

2	**Check for engine ECU power source circuit (See page DI–124).**

NG → **Repair or replace.**

OK

3	Check circuit opening relay.



PREPARATION:
Remove the circuit opening relay from the instrument panel J/B.
CHECK:
Check continuity between terminals of circuit opening relay shown below.
OK:

Terminals 3 and 5	Open
Terminals 1 and 2	Continuity (Reference value 74 Ω)

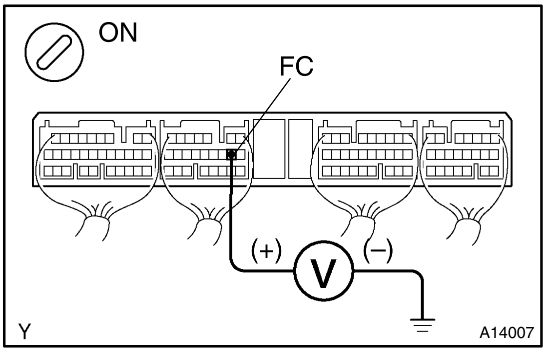
CHECK:
(a) Apply battery positive voltage between terminals 1 and 2.
(b) Check continuity between terminals 3 and 5.
OK:

Terminals 3 and 5	Continuity

NG → **Replace circuit opening relay.**

OK

4	Check voltage between terminal FC of engine ECU and body ground.



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Turn ignition switch ON.
CHECK:
Measure voltage between terminal FC of engine ECU and body ground.
OK:
Voltage: 9 – 14 V

NG → **Check for open in harness and connector between EFI main relay and circuit opening relay, circuit opening relay and engine ECU.**

OK

5	Check fuel pump operation.

NG → Repair or replace fuel pump.

OK

6	Check for open in harness and connector between circuit opening relay and fuel pump, and fuel pump and body ground (See page IN–40).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU
(See page IN–40).

DI6QO–04

CHK ENG Warning Light Circuit Malfunction

CIRCUIT DESCRIPTION

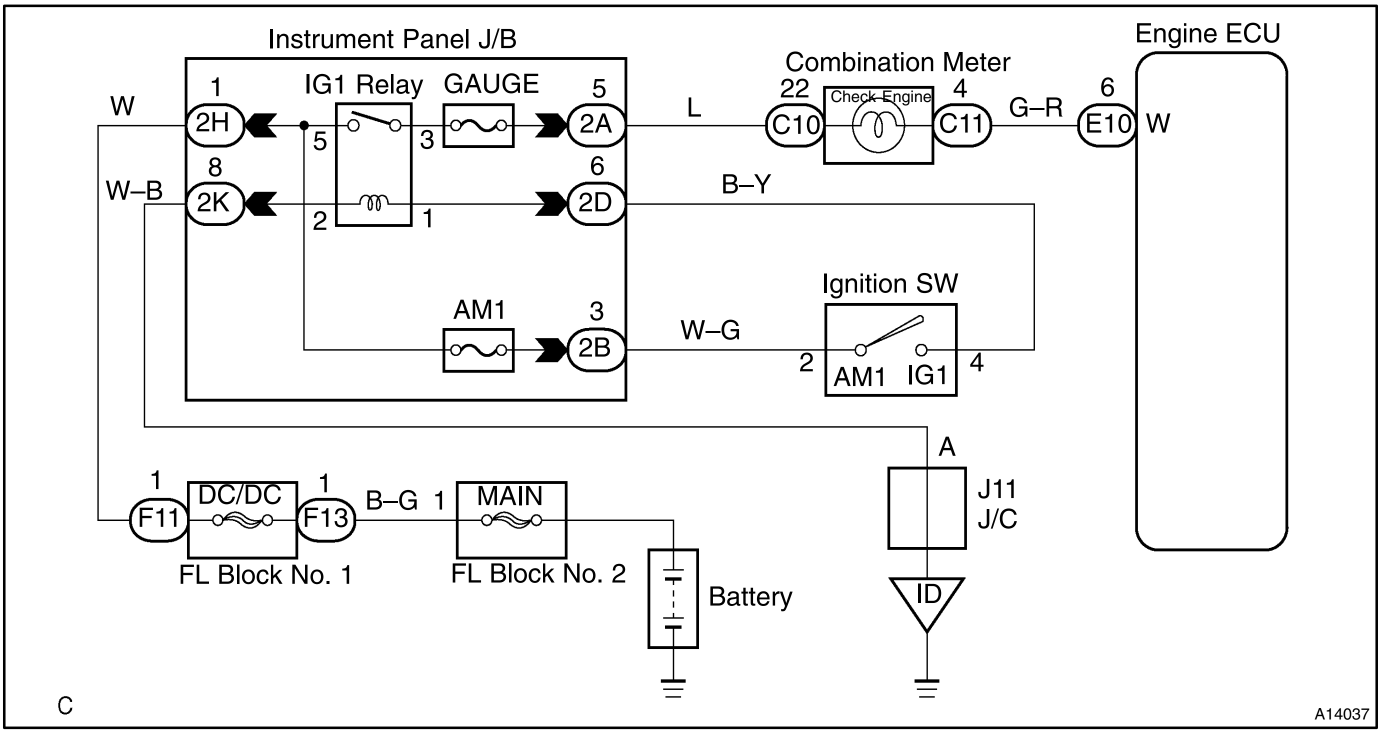
If the engine ECU detects trouble, the CHK ENG warning lights up. At this time, the engine ECU records a DTC in memory.

HINT:

When the ignition switch is ON and ”READY” indicator light is OFF, the bulb check of the ”CHE ENG” warning light is performed (”CHE ENG” warning light is ON).

When ”CHE ENG” warning light is ON, but the DTC of the engine is not memorized, it may be because of HV control system abnormality, so check HV control system beforehand.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshoot in accordance with the chart below for each trouble symptom.

CHK ENG does not light up	Start inspection from step 1 in case of using hand–held tester and start from step 2 in case of not using hand–held tester
CHK ENG remains on	After inspection of step 3, start inspection from step 4 in case of using hand–held tester and start from step 5 in case of not using hand–held tester

1	**Check operation of CHK ENG 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) Switch the hand–held tester from the normal mode to the check mode.
CHECK:
Check if the CHK ENG warning light blinks.
OK:
The CHK ENG warning light blinks.

OK → **Check and replace engine ECU (See page IN–40).**

NG

2	**Check CHK ENG warning light.**

See combination meter troubleshooting (See page BE–2).

NG → **Repair or replace bulb or combination meter assembly.**

OK

3	**Check that engine ECU connectors are securely connected to engine ECU.**

NO → **Connect connector to engine ECU.**

YES

Check for open circuit in harness and connector between combination meter and engine ECU (See page IN–40).

4	Check operation of CHK ENG (See step 1).

OK → **Check and replace engine ECU (See page IN–40).**

NG

5	Is DTC output?

Check DTC on page DI–3.

YES → **Repair circuit indicated by output code.**

NO

6	Check ignition relay (Marking: IG1).

OK → **Replace IG1 relay.**

NG

Check for short circuit in harness and connector between DLC3 and engine ECU (See page IN–40).

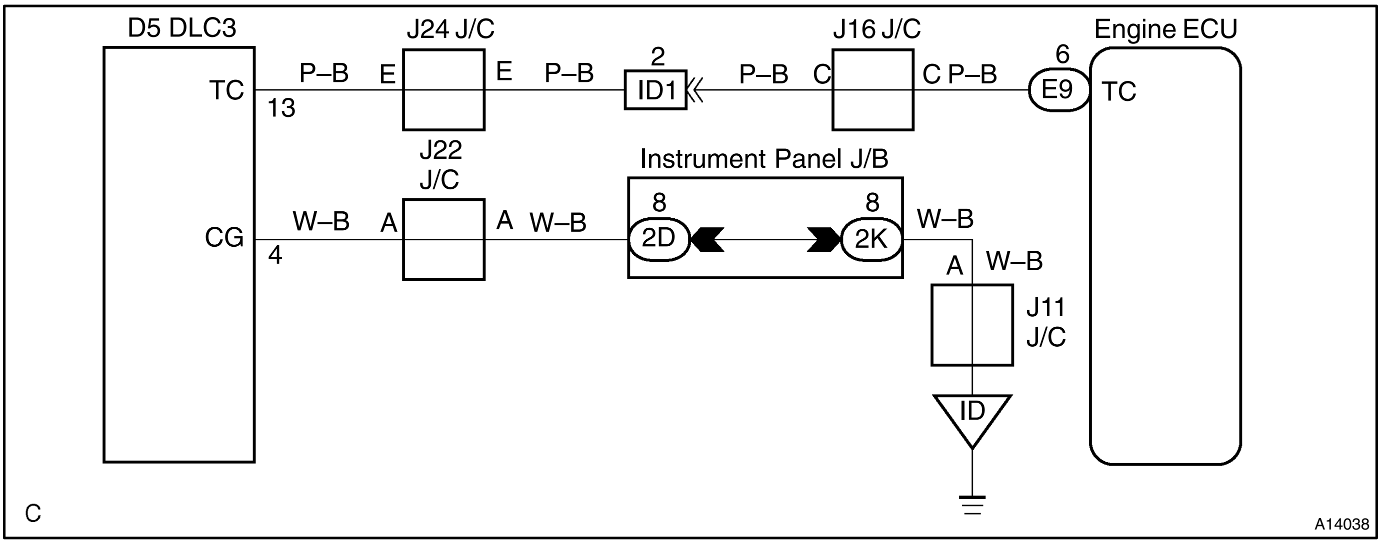
DI6SV–06

TC Terminal Circuit

CIRCUIT DESCRIPTION

Terminal TC and CG are located in the DLC3. When connecting these terminals, DTCs in normal mode or test mode can be read through the check engine warning light in combination meter by flashing it.

WIRING DIAGRAM

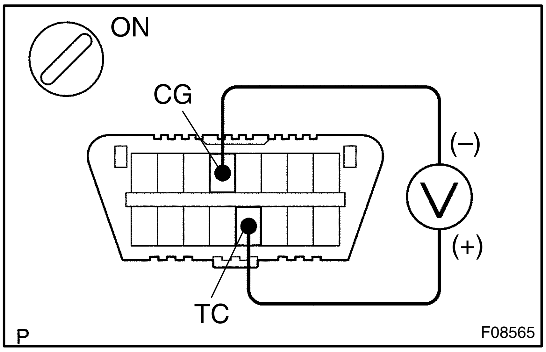


INSPECTION PROCEDURE

HINT:

- Even though terminal TC is not connected with terminal CG, the CHK ENG (MIL) blinks.
- For the above phenomenon, an open or short in the wire harness, or malfunction inside the engine ECU is the likely cause.

1	**Check voltage between terminals TC and CG of DLC3.**



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals TC and CG of the DLC3.
OK:
Voltage: 9 – 14 V

OK → **Check and replace engine ECU (See page IN–40).**

NG

2	Check continuity between terminal CG of DLC3 and body ground.

NG — Repair or replace harness or connector.

OK

3	Check for open and short circuit in harness and connector between engine ECU and DLC3, and DLC3 and body ground (See page IN–40).

NG — Repair or replace harness or connector.

OK

Check and replace engine ECU
(See page IN–40).

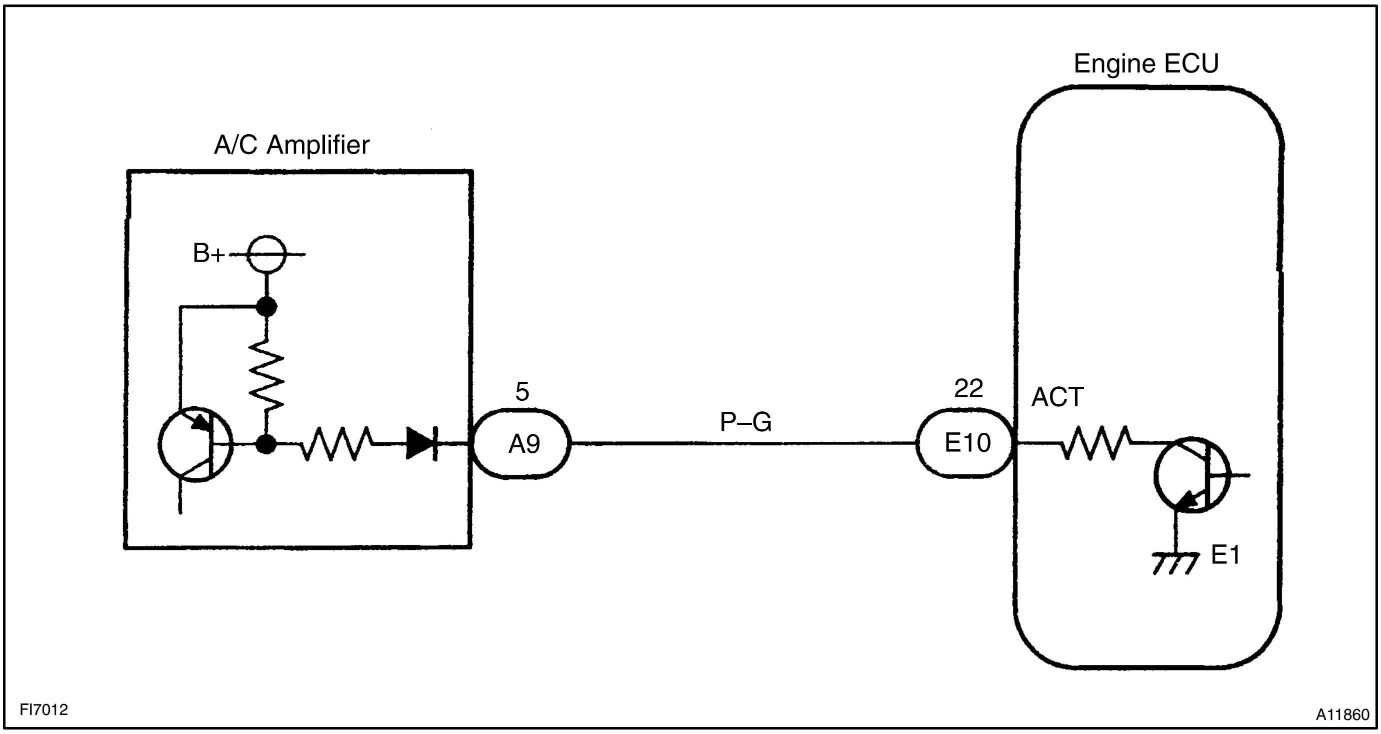
DI70F–02

A/C Cut Control Circuit

CIRCUIT DESCRIPTION

This circuit cuts air conditioning operation during vehicle acceleration in order to increase acceleration performance. During acceleration with the vehicle speed at 25 km/h (16 mph) or less, engine speed at 1,600 rpm or less and throttle valve opening angle at 60° or more, the A/C magnetic switch is turned OFF for several seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze flame data using hand–held tester. Because freeze flame 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.

Hand–held tester:

1	**Connect the hand–held tester and check operation of air conditioning cut control.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and hand–held tester main switch ON.
(c) Start the engine and air conditioner switch ON.
HINT:
A/C magnetic clutch is turned ON.
(d) Select the active test mode on the hand–held tester.

CHECK:
Check operation of A/C magnetic clutch cut when air conditioning cut control is operated by the hand–held tester.
OK:
A/C magnet clutch is turned OFF.

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–20).**

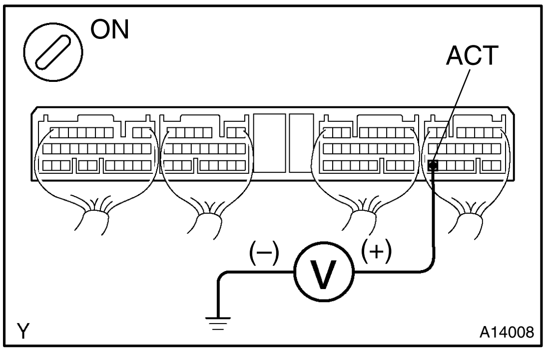
NG

2	Check for open and short in harness and connector between engine ECU and A/C control assembly (See page IN–40).

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

OK

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



PREPARATION:
(a) Remove the engine ECU with connector still connected (See page FI–58).
(b) Start the engine.
CHECK:
Measure voltage between terminal ACT of engine ECU connector and body ground when A/C switch is turned to ON and OFF.
OK:

A/C switch condition	Voltage
ON	9 – 14 V
OFF	0 – 2 V

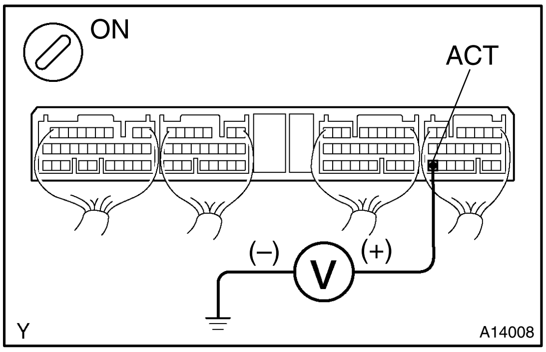
NG → **Repair or replace engine ECU (See page IN–40).**

OK

Check and replace A/C control assembly.

OBD scan tool (excluding hand–held tester):

1	Check voltage between terminal ACT of engine ECU and body ground



PREPARATION:

(a) Remove the engine ECU with connector still connected (See page xx–xxx).

(b) Start the engine.

CHECK:

Measure voltage between terminal ACT of engine ECU connector and body ground when A/C switch is turned to ON and OFF.

OK:

A/C switch condition	Voltage
ON	9 – 14 V
OFF	0 – 2 V

NG → **Check and replace engine ECU (See page IN–40).**

OK

2	Check for open and short in harness and connector between engine ECU and A/C control assembly (See page IN–40).

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

OK

Check and replace A/C control assembly.

HYBRID VEHICLE CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI82I–01

Inside // are shown titles and page numbers in this manual.
See the indicated pages for details.

Vehicle Brought to Workshop

↓

1 Customer Problem Analysis P. DI–266

↓

2 Connect the hand–held tester to DLC3 P. DI–268
If the display indicates a communication fault in the tool, inspect DLC3 P. DI–268

↓

3 Check DTC, INF. code and Freeze Frame Data (Precheck)
Record or Print DTC and Freeze Frame Data P. DI–268

↓

4 DTC Check P. DI–268

↓ Malfunction code.

5 DTC Chart P. DI–272

↓

6 Circuit Inspection P. DI–274

↓

Identification of Problem

↓

7 Adjustment, Repair

↓

8 Confirmation Test

↓

End

DI82J–01

CUSTOMER PROBLEM ANALYSIS CHECK

Prius Problem Check Sheet

Name of Dealer	Person in Charge at Headquarters	Person in Charge at Dealer
Office		

Please fill in the blanks within bold frame.

Vehicle Specifications

Model Code	NHW11–	Problem Occurrence Date	. . . :	Km–reading	km
Frame No.	NHW11–	Service Entry Date	. .	Registration date	. .
Unit No. etc.		Vehicle Delivery Date	. .		
Option	( ) Navigation (equipped by ( ) MOP ( ) dealer) ( ) Cold climate specification ( ) others( )				

Interview Results

Contents of complaint (Status when and before/after occurring in the order of events as correct as possible)

Characteristics of Customer

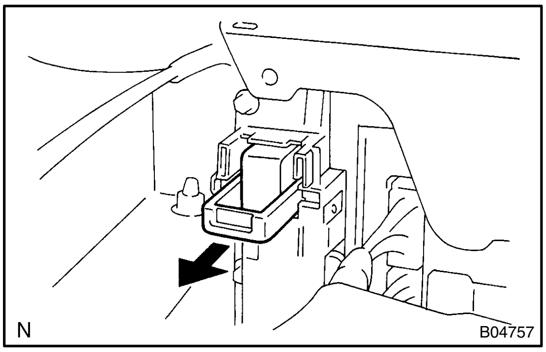
Gender	( ) Male ( ) Female
Age	
Occupation	
Vehicle used before	
Main use area	city area ( ) % suburbs ( ) % mountain area ( ) % Others ( ) ( ) %
Frequency in use	times/day or week or month
Others	

Driving Condition	Road Condition	Vehicle Condition			Others
Vehicle Speed ______km/h ( ) when starting ( ) when according ( ) When normal driving ( ) when decelerating ( ) when braking ( ) when shopping ( ) when parking ( ) when tuming ( ) when ABS actuating ( ) others ( )	( ) flat road ( ) up hill ( ) down hill incline of ______ ° /% distance ______ km ( ) dry paved road ( ) wet paved road ( ) rough paved road ( ) unpaved road ( ) snowy/frozen road ( ) bump/curb ( ) others ( )	( ) when starting ( ) right after starting ( ) until ___min. after starting ( ) until ___min. after starting of driving ( ) when shopping system Status of engine ( ) while shopping engine ( ) when starting engine ( ) when revolving engine	HV Battery indication ( ) 4/4 ( ) 3/4 ( ) 2/4 ( ) 1/4 ( ) unidentified Shift position (indication) ( ) P ( ) R ( ) N ( ) D ( ) B ( ) when operating _____ → _____ ( ) no indication ( ) unidentified A/C status ( ) A/C ( ) FULL ( ) OFF ( ) unidentified	Warning light (MIL) ( ) ON ( ) OFF ( ) PS ( ) main battery ( ) HV! ( ) engine ( ) charge ( ) output control ( ) brake ( ) ABS ( ) others ( )	Weather:______ Temperature: ______ °C Brake operation ( ) brake slowly ( ) Brake suddenly ( ) use two pedals system Frequency in occurrence ( ) always ( ) sometimes ( ) only once

<table>
<tr><td rowspan="10">Vehicle Verification Results</td><td>Verification Results of Warning Light</td><td colspan="3">Verification Results of Diagnostic Code</td></tr>
<tr><td rowspan="6">( ) ON ( ) OFF
( ) engine ( ) HV
( ) HV battery
( ) output control warning light
( ) charge ( ) PS
( ) brake ( ) ABS
( ) others
( )</td><td colspan="2">Engine</td><td></td></tr>
<tr><td colspan="2">HV</td><td></td></tr>
<tr><td></td><td>INF. code</td><td></td></tr>
<tr><td colspan="2">HV battery</td><td></td></tr>
<tr><td colspan="2">Brake</td><td></td></tr>
<tr><td colspan="2">PS</td><td></td></tr>
<tr><td colspan="3">Vehicle Inspection Results (Verification items, reason to identify/presume the cause parts, etc.)</td><td>Reproduction Status</td></tr>
<tr><td colspan="3"></td><td>( ) always
( ) sometimes condition when occurring
( ) no reproduction</td></tr>
<tr><td colspan="3">Replacemect Parts

problem parts: No/Yes (Sending date: . .)</td><td>Confirmation Results After Repair
( ) Normal
( ) reproduction
( ) others ( )</td></tr>
</table>

DI82K–01



PRE–CHECK

1. PRECAUTION

(a) When distinguishing trouble and replace the defective part, take necessary preventive measures against an electric shock (See page IN–4).

(b) Some portions of the wiring harness in the THS vehicle have circuits to which a high voltage is applied. To prevent an electrical shock, be sure to observe the following:

(1) Wear insulated gloves during inspection.

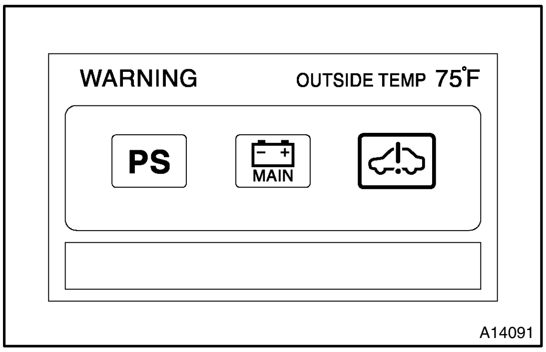
(2) Remove a service plug and do not start any repair operation before 5 minutes have passed. Then, confirm that the voltage at the output terminals has dropped down to 12 V or less.

(3) Use insulated tools during inspection.

(4) When disengaging the wiring connectors, hold the connector bodies to avoid pulling the wires. When engaging the wiring connectors, be sure to engage them securely.

(c) Do not leave the tools or parts (bolts, nuts, etc.) inside the cabin.

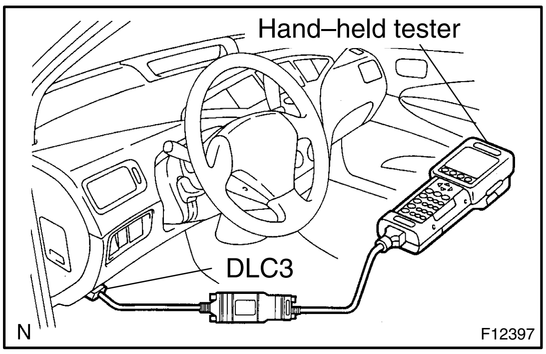
(d) Do not carry metallic objects such as mechanical pencils or scales.



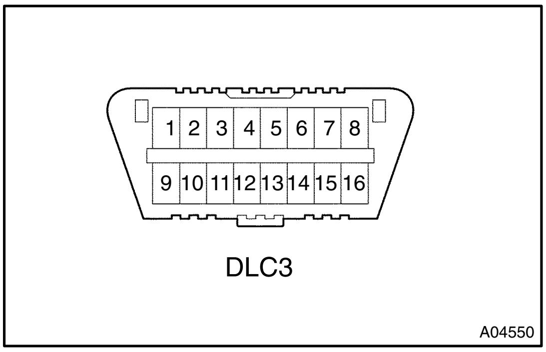
2. DIAGNOSIS SYSTEM

(a) Description

- The HV control ECU has a self–diagnosis system by which malfunction in the computer itself or in THS components is detected and the Hybrid vehicle warning light in the multi–information display are lighted up.



- To check the Diagnostic Trouble Codes (DTC), connect the hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The hand–held tester also enables you to erase the DTC and check freeze frame data and various forms of THS data.
- Freeze frame data:
  As the freeze frame data records the driving condition when a malfunction is detected, when troubleshooting, it is useful for determining whether the vehicle was running, braked, stopped or reversed.



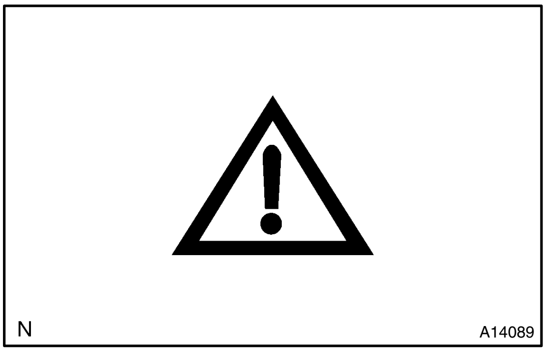
(b) Check the DLC3.
The HV control ECU conforms to ISO 14230 for communication.
The terminal arrangement of the DLC3 complies with SAEJ1962 and matches the ISO 14230 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus ⊕ Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
5	Signal Ground ↔ Body Ground/1 Ω or less	Always
16	Battery Positive ↔ Body Ground/10 – 15 V	Always

HINT:
If your display shows UNABLE TO CONNECT TO VEHICLE when you have connected the cable of the hand–held tester to the DLC3, turned the motor switch ON and operated the tester, there is a problem in the vehicle or tool.
- If communication is normal when the tool is connected to another vehicle, inspect the 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.

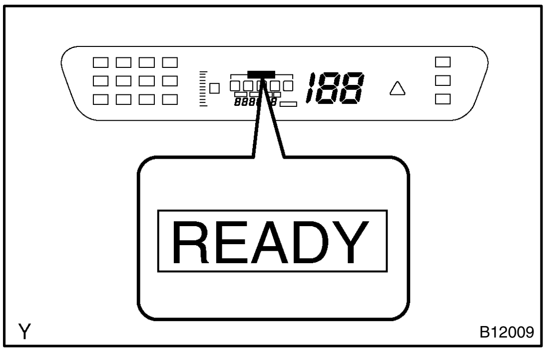
3. INSPECT DIAGNOSIS

(a) Check the auxiliary battery.
(1) Measure the voltage of the auxiliary battery.
Voltage: 10 – 15 V
(2) Inspect the auxiliary battery, fuses, fusible links, wiring harness, connectors and ground.



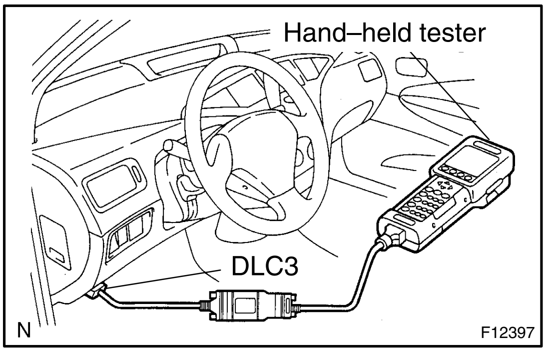
(b) Check the master warning light.
(1) Turn the ignition switch ON and confirm that the master warning light comes on.

HINT:
If the master warning light does not come on, suspect a burnt fuse, burnt bulb, or open in wiring harness.



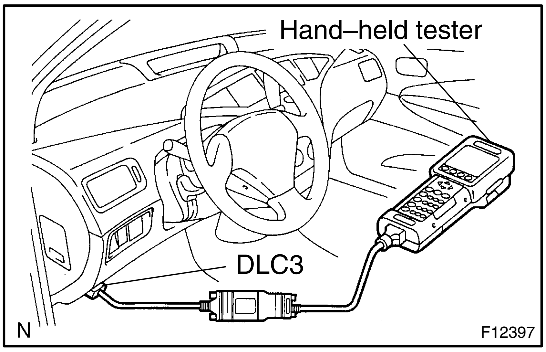
(2) When the ”READY” light is ON, the master warning light should go off.

If the lamp remains on, the diagnosis system has detected a malfunction in the system or the meassage such as ”When you park your care, make sure you shift to Park P.” and ”The batteries will not charge if the shifter is N” appears on the multi–information display.



(c) Check the DTC.
(1) Prepare a hand–held tester.
(2) Connect the hand–held tester to the DLC3.
(3) Turn the ignition switch ON and push the hand–held tester main switch ON.
(4) Use the hand–held tester to check the DTC, information code and freeze frame data and note them down. (For operating instructions, see the hand–held tester operator’s manual).
(5) See a related page to confirm details of the DTC.

(d) Clear the DTC.
(1) Connect the hand–held tester to the DLC3.
(2) Operate the hand–held tester to erase the DTC (See the hand–held tester operator’s manual.).



4. FAIL–SAFE CHART

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

DTC code	INF. code	Trouble are	Driving condition
B2799	101	ImmobilizerMalfunction	Impossible to drive
C2692	102	Regenerative Brake Check	–
C2693	103	Regenerative Brake Check	–
P1120	104	Accelerator Pedal Position Sensor Circuit Malfunction	Limited driving
	105		Limited driving
	106		Limited driving
	107		Limited driving
	108		Limited driving
	109		Limited driving
	110		Limited driving
	111		Limited driving
	112		Limited driving
	113		Limited driving (Creep vehicle speed)
	114		Limited driving (Creep vehicle speed)
P1520	115	Stop Light Switch Malfunction	Cruise control driving impossible

P1566	116	Cruise Control System Malfunction	Cruise control driving impossible
P1600	117	BATT Malfunction	Normal driving
P1780	118	Neutral Start Switch System Malfunction	Impossible to drive/Normal driving when shift position is fixed
	119		Impossible to drive/Normal driving when shift position is fixed
	120		Impossible to drive
	121		Impossible to drive/Normal driving when shift position is fixed
P3000	123	HV Battery Malfunction	Limited driving
	125		Limited driving
	388		Limited driving
	389		Limited driving
P3001	129	HV Battery ECU Malfunction	Limited driving
P3004	130	Power Cable Malfunction	Limited driving
	131		Impossible to drive
	132		Normal driving
	133		Limited driving
P3100	127	HV ECU Malfunction	Limited driving
	128		Limited driving
	134		Impossible to drive
	135		Impossible to drive
	136		Normal driving
	137		Normal driving
	138		Limited driving
	139		Normal driving
	140		Impossible to drive
	141		Impossible to drive
	142		Impossible to drive
	143		Impossible to drive
	144		Impossible to drive
	145		Impossible to drive
	147		Impossible to drive
	148		Normal driving
	149		Normal driving
	150		Impossible to drive
	151		Impossible to drive
	152		Impossible to drive
	153		Impossible to drive
	154		Impossible to drive
	155		Impossible to drive
	156		Impossible to drive
	157		Impossible to drive
	158		Impossible to drive
	159		Impossible to drive
	160		Impossible to drive
	161		Impossible to drive
	162		Impossible to drive

P3100	163	HV ECU Malfunction	Impossible to drive
	164		Impossible to drive
	165		Limited driving
	166		Normal driving
	167		Limited driving
	168		Limited driving
	169		Limited driving
	170		Limited driving
	171		Impossible to drive
	172		Impossible to drive
	173		Impossible to drive
	174		Normal driving
	175		Normal driving
	176		Normal driving
	177		Impossible to drive
	178		Impossible to drive
	179		Impossible to drive
	180		Impossible to drive
	181		Impossible to drive
	182		Impossible to drive
	183		Impossible to drive
	184		Impossible to drive
	185		Impossible to drive
	186		Impossible to drive
	187		Impossible to drive
	188		Limited driving
	189		Limited driving
	190		Limited driving
	191		Limited driving
	192		Limited driving
	193		Limited driving
	194		Limited driving
	195		Limited driving
	196		Limited driving
	197		Limited driving
	198		Normal driving
	199		Limited driving
	200		Limited driving
	201		Limited driving
	202		Limited driving
	203		Limited driving
	271		Normal driving
	310		Limited driving
	392		Impossible to drive
	393		Impossible to drive

P3101	204	Engine System Malfunction	Limited driving
	205		Limited driving
	238		Limited driving
P3105	206	Battery ECU Communication Circuit Malfunction	Limited driving
	207		Limited driving
	208		Limited driving
P3106	209	Engine ECU Communication Circuit Malfunction	Limited driving
	210		Limited driving
	211		Limited driving
	212		Limited driving
	394		Limited driving
P3107	213	Airbag ECU Communication Circuit Malfunction	Normal driving
	214		Normal driving
	215		Normal driving
P3108	216	A/C Amplifier Communication Circuit Malfunction	Normal driving
	217		Normal driving
P3109	218	Battery ECU Communication Circuit Malfunction	Regenerative brake ineffective
	219		Regenerative brake ineffective
	220		Regenerative brake ineffective
	221		Regenerative brake ineffective
	222		Regenerative brake ineffective
P3110	223	IGCT Relay Malfunction	Normal driving
P3115	224	System Main Relay Malfunction	Normal driving
	225		Normal driving
P3115	226	System Main Relay Malfunction	Impossible to drive
	227		Impossible to drive
	228		Impossible to drive
	229		Impossible to drive
	231		Impossible to drive
	232		Limited driving
	233		Impossible to drive
P3120	234	HV Transaxle Malfunction	Regenerative brake ineffective
	235		Impossible to drive
	236		Normal driving
	237		Limited driving
	239		Limited driving
	240		Impossible to drive
	241		Normal driving
	242		Limited driving
	243		Limited driving
	244		Limited driving
	245		Limited driving
	246		Limited driving
	247		Normal driving
	248		Normal driving
	249		Normal driving

P3120	250	HV Transaxle Malfunction	Normal driving
	253		Limited driving
	254		Limited driving
	255		Limited driving
	256		Limited driving
	257		Normal driving
	258		Normal driving
	259		Normal driving
	260		Normal driving
P3125	263	Converter & Inverter Assembly Malfunction	Normal driving
	264		Normal driving
	265		Normal driving
	266		Limited driving
	267		Limited driving
	268		Limited driving
	269		Limited driving
	270		Limited driving
	272		Normal driving
	273		Normal driving
	274		Normal driving
	275		Normal driving
	276		Normal driving
	277		Normal driving
	278		Limited driving
	279		Impossible to drive
	280		Limited driving
	281		Limited driving
	282		Limited driving
	283		Limited driving
	284		Impossible to drive
	285		Limited driving
	286		Limited driving
	287		Limited driving
	288		Limited driving
	289		Limited driving
	290		Limited driving
	291		Limited driving
	292		Limited driving
	293		Limited driving
	294		Limited driving
	295		Limited driving
	296		Limited driving
	297		Limited driving
	298		Limited driving
	299		Limited driving
	300		Limited driving

P3125	301	Converter & Inverter Assembly Malfunction	Limited driving
	302		Limited driving
	303		Limited driving
	304		Limited driving
	305		Limited driving
	306		Limited driving
	307		Limited driving
	308		Impossible to drive
	309		Limited driving
	311		Normal driving
	312		Normal driving
	313		Normal driving
	314		Normal driving
	315		Normal driving
	316		Limited driving
	317		Limited driving
	318		Limited driving
	319		Limited driving
	320		Limited driving
	321		Limited driving
	322		Limited driving
	323		Limited driving
	324		Limited driving
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	327		Limited driving
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	330		Limited driving
	331		Limited driving
	332		Limited driving
	333		Limited driving
	334		Limited driving
	335		Limited driving
	336		Limited driving
	337		Limited driving
	338		Limited driving
	339		Limited driving
	340		Limited driving
	341		Limited driving
	342		Limited driving
	343		Limited driving
	344		Limited driving
	345		Limited driving
P3130	346	Inverter Cooling System Malfunction	Normal driving
	347		Normal driving

P3135	348	Circuit Breaker Sensor Malfunction	Normal driving
	349		Normal driving
P3140	350	Interlock Malfunction	Normal driving
	351		Normal driving
P3145	352	Vehicle Speed Sensor Circuit Malfunction	Cruise control driving impossible

5. CHECK FOR INTERMITTENT PROBLEMS

(a) Perform a simulation test (See page IN–40).
(b) Check the connector and terminal (See page IN–40).
(c) Handle the connector (See page IN–40).

6. HAND–HELD TESTER DISPLAY ITEMS

Hand–held tester display	Measurement Item
1 BEF LATST OR	Number of operation of 1 trip before last
1 BEF LATST TRP	Number of trips bear last
2 BEF LATST OR	Number of operation 2 trips before last
2 BEF LATST TRP	Number of trips 2 bear last
ABNML CON BR–HV	Communication malfunction between HV ECU and brake
ACC SENSOR MAIN	Main accelerator sensor
ACC SENSOR SUB	Sub accelerator sensor
ACC TENT TRBLE	Tentative trouble of accelerator
ACC THROTTLE	Accelerator throttle
ACCEL MODE	History of acceleration and reduction
AIR CON REQUEST	Air conditioner request
AUX. BATT LOW	Auxiliary battery becomes week
AUX. BATT V	Voltage of auxiliary battery
BATT HIGH TEMP	Temperature of the battery is too high
BATT HIGH VOLT	Voltage of the battery is too high
BATT LOW BOLT	Voltage of the battery is low
BATT OVER LOAD	Battery is overloaded
BATT SAVE RQST	Request to save the main battery
BATTERY FULL	Battery full
BRAKE TORQ	Brake torque
CELL TEMP–MAX	Highest temperature of all battery cells
CELL TEMP–MIN	Lowest temperature of all battery cells
CHG RESTRICTION	Charge restriction
COOLANT TEMP	Water temperature
CRUISE CONTROL	Condition of the cruise control
DC/DC CONV STOP	DC/DC converter stop signal
DC/DC CONV STOP	Factors causing DC/DC converter to stop
DC/DC STOP FACT	DC/DC converter has stopped at least once
DC/DC V UNSET	DC/DC voltage is unsettled
DCHG RQST SOC	Discharge request to adjust SOC
DISCHAG INHIBIT	Battery is inhibited to discharge
DRIVE CONDTION	0: When engine is stopped
	1: When stopping engine
	2: When starting engine

DRIVE CONDITION	3: When cranking engine or engine is operating
	4: While generating power or load driving
	5: –
	6: While racing engine in P range
DRIVING PATTEM1	History of driving pattern 1
DRIVING PATTEM2	History of driving pattern 2
DRIVING PATTEM3	History of driving pattern 3
DRIVING PATTERN	HIstory of driving
ECU TYPE	ECU type
ENG INDPDET RQ	Factors causing engine to run independently
ENG STOP RQST	Engine stop request
ENG SEP INHIBIT	Engine stop inhibition
ENG WARM UP RQT	Engine warming up request
ENGINE FUEL CUT	Engine fuel cut
ENGINE SPD	Engine speed
EXCLUSIVE INFO1	Exclusive information 1
EXCLUSIVE INFO2	Exclusive information 2
EXCLUSIVE INFO3	Exclusive information 3
EXCLUSIVE INFO4	Exclusive information 4
EXCLUSIVE INFO5	Exclusive information 5
EXCLUSIVE INFO6	Exclusive information 6
FUEL SHORTAGE	Low fuel
HCAC ABSRT RQST	HCAC OBD request
HV BATT CH RQST	Request from HV ECU to charge the battery
HV ECU INTERMITTENT	HV ECU intermittent problems
IDLING REQUEST	Engine idling request
IG OFF IN DRVIN	Turning IG OFF while driving the car
IG OFF TIME	IG OFF time
ILK OPERATION	Interlock operation
INFORMATION 1–5	Information code
INPUT V LOW	Input voltage is too low
INPUT V OVER	Input voltage is too high
INTAKE AIR	Intake air temperature
INVERT TEMP–MG1	Temperature of MG1
INVERT TEMP–MG2	Temperature of MG2
LATEST OPER	Latest number of operation
LATEST TRIP	Latest number of trips (IG ON–OFF)
LOAD CONDITION	Indicating which of MG1 or MG2 the vehicle uses more
MAIN BATT LOW	SOC of main battery becomes low
MCYL CTRL POWER	Torque for controlling oil pressure of master cylinder
MG1 TEMP HIGH	Temperature MG1 is too high
MG2 TEMP HIGH	Temperature MG2 is too high
MG1 CURRENT V	Electric current of MG1 V phase
MG1 CURRENT W	Electric current of MG1 W phase
MG1 INV TEMP HI	Temperature of inverter MG1 is high
MG1 REV	MG1 revolution

MG1 TEMP	Motor temperature of MG!
MG1 TEMP HIGH	Temperature fo MG1 is too high
MG2 TEMP HIGH	Temperature fo MG2 is too high
MG1 CURRENT V	Electric cuurent of MG1 is V phase
MG1 CURRENT W	Electric cuurent of MG1 is W phase
MG1 INV TEMP HI	Temperature of inverter MG1 is higt
MG1 REV	MG1 revolution
MG1 TEMP	Motor temperature of MG1
MG1 TEMP HIGH	Temperature of MG1 is high
MG1 TORQ	MG1 torque
MG2 CURRENT V	Electric cuurent of MG2 is V phase
MG2 CURRENT W	Electric cuurent of MG2 is W phase
MG2 INV TEMP HI	Temperature of inverter MG2 is higt
MG2 REV	MG2 revolution
MG2 TEMP	Motor temperature of MG2
MG2 TEMP HIGH	Temperature of MG1 is high
MG2 TORQ	MG2 torque
N RANGE OVR TIME	Leaving shift gear into N range over a period of time
N RANGE CTRL1	N range control due to incomplete shift gears
N RANGE CTRL2	N range control due to rapid shift gear (D–R)
OCCURRENCE ORDR	Order in which the trouble occurs
OCCURRNCE TRIP	Number of trips when this error occurred
OUTPUT STOP	Output stop
OUTPUT V OVER	Output voltage is too high
OVER CURRENT	Electric current of the batytery is too high
OVER VOLTAGE	Voltage of the battery is too high
OVR HEAT PRTECT	Overheat protection
POWER RQST	Power output requested by HV ECU
PWR RESOURCE IB	Power resource IB
PWR RESOURCE VM	power resource VM
RAPID SPD CHANG	Vehicle speed is changed too rapidly
REGEN EXEC TORQ	Torque volue of regenerative brake
REGEN IH FACTOR	Inhibiting factor of regeneration
REGEN RQST TORQ	Torque valueof regenerative brake requested by HV ECU
REGN BRK INEFCT	Regenerative brake is ineffective
RESIST OVR HEAT	Restriction resist is overheating
SG B IN REDUCIN	Shifting gear into ”B” in reducing the speed
SG N IN REDUC/P	Shifting gear into ”N” reducing the speed
SHIFT BEF READY	Shifting gear before ”READY” light turns on
SHIFT POSITION	Shift position
SHIFT SENSOR1	Shift sensor 1
SHIFT SENSOR2	Shift sensor 2
SOC	Stated of charge
STEP ACC&BRAKE	Stepping both accelerator & brake at the same time
STEPP ACC IN N	Stepping accelerator in N range
STOP SW COND	Condition of stop switch

STP CIRCIT OPEN	STP circuit short
STP IN CIR MLF	STP circuit malfunciton
TACHO METER	Engine rpm
TARGET ENG SPD	Target engine speed
TEMP TRBLE FACT	Factors causing temporay trouble
VEHICLE SPD	Vehicle speed
WIN CTRL POWER	Power value of charge control
WOUT CTRL POWER	Power value of discharge control

DI82L–01

DIAGNOSTIC TROUBLE CODE CHART

HINT:
Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.
If a malfunction code is displayed during the DTC check in the check mode, check the circuit for that code listed in the table below. For the 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	Hybrid System Warning Light*	Memory
B2799 (DI–169)	ImmobilizerMalfunction	• Wire Harness • HV ECU • Transponder Key ECU	○	○
C2692 (DI–171)	Regenerative Brake Check	–	○	○
C2693 (DI–171)	Regenerative Brake Check	–	X	○
P1120 (DI–172)	Accelerator Pedal Position Sensor Circuit Malfunction	• Accelerator Pedal Position Sensor • Wire Harness	○	○
P1520 (DI–174)	Stop Light Switch (Cruise Control System) Malfunction	• Stop Light Switch • Wire Harness • HV ECU	X	○
P1566 (DI–176)	Cruise Control System Malfunction	• HV ECU • Brake ECU	X	○
P1600 (DI–177)	BATT Malfunction	• HV Fuse • Wire Harness	○	○
P1780 (DI–179)	Neutral Start Switch System Malfunction	• Neutral Start Switch • Wire Harness	○	○
P3000 (DI–181)	HV Battery Malfunction	• HV Battery • Fuse • Power Cable • HV Battery Cooling System	○/X	○
P3001 (DI–182)	HV Battery ECU Malfunction	• Battery ECU	○	○
P3004 (DI–183)	Power Cable Malfunction	• Power Cable • HV Battery System • Main Fuse • Service Plug • System Main Relay	○/X	○
P3100 (DI–187)	HV ECU Malfunction	• Wire Harness • HV ECU • Engine ECU • Battery ECU • Ignition Switch • Converter & inverter Assembly	○	○
P3101 (DI–196)	Engine System Malfunction	• Engine • HV Transaxle	○	○
P3105 (DI–197)	Battery ECU Communication Circuit Malfunction	• Battery ECU • Wire Harness • HV ECU	○	○

P3106 (DI–199)	Engine ECU Communication Circuit Malfunction	• Engine ECU • Wire Harness • HV ECU	○/X	○
P3107 (DI–202)	Airbag ECU Communication Circuit Malfunction	• Airbag Sensor • Wire Harness • HV ECU	○	○
P3108 (DI–204)	A/C Amplifier Communication Circuit Malfunction	• A/C Amplifier • Wire Harness • HV ECU	X	○
P3109 (DI–205)	Brake ECU Communication Circuit Malfunction	• Brake ECU • Wire Harness • HV ECU	○	○
P3110 (DI–207)	IGCT Relay Malfunction	• IGCT Relay • Wire Harness • HV ECU	○	○
P3115 (DI–209)	System Main Relay Malfunction	• System Main Relay • Wire Harness	○	○
P3120 (DI–212)	HV Transaxle Malfunction	• HV Transaxle • Wire Harness • HV ECU	○	○
P3125 (DI–222)	Converter & Inverter Assembly Malfunction	• Converter & Inverter Assembly • Wire Harness • HV ECU	○	○
P3130 (DI–255)	Inverter Cooling System Malfunction	• Inverter Water Pump • Electric Cooling Fun System • Wire Harness • IG2 Relay	○	○
P3135 (DI–258)	Circuit Breaker Sensor Malfunction	• Circuit Breaker Sensor • Wire Harness	○	○
P3140 (DI–260)	Interlock Switch Malfunction	• Interlock Switch • Inverter Terminal Cover • Sensor Cover • Wire Harness	○	○
P3145 (DI–263)	Vehicle Speed Sensor Circuit Malfunction	• Combination Meter • Wire Harness • HV ECU	X	○

*: ○: Hybrid system warning light lights up. X: Hybrid system warning light does not light up.

INFORMATION CODE (Hand–held tester only)

DTC NO.	INF. Code	Detection Item	Detecting Condition
B2799	101	Immobilizer Malfunction	No input of signal from transponder key ECU
C2692	102	Regenerative Brake Check	Regenerative brake check
C2693	103	Regenerative Brake Check	Regenerative brake check
P1120	104	Accelerator Pedal Position Sensor Circuit Malfunction	Open or short in main accelerator sensor circuit
	105		+B short in main accelerator sensor circuit
	106		Main sensor internal error
	107		Open or short in sub accelerator sensor circuit
	108		+B short in sub accelerator sensor circuit
	109		Sub sensor internal error
	110		When difference between main sensor value and sub sensor value is large
	111		When sub sensor value changes while main sensor value does not
	112		When main sensor value changes while sub sensor value does not
	113		When any of the information code 104 – 112 continues to appear
	114		Accelerator pedal not smoothly returning to original position
P1520	115	Cruise Control System Malfunction	Open or short in stop light switch circuit
P1566	116	Cruise Control System Malfunction	When STP signal of HV ECU is inconsistent with that of brake ECU, with cruise control indicator ON
P1600	117	BATT Malfunction	HV ECU back–up power source circuit malfunction
P1780	118	Neutral Start Switch System Malfunction	When more than 2 main signals are ON
	119		When main signal is not turned ON even though sub signal has been input
	120		Open or short in sub sensor circuit
	121		When shift position detected by main signal is different from that detected by sub signal
P3000	123	HV Battery Malfunction	Input of abnormal signal from battery ECU (HV battery system malfunction)
	125		Input of abnormal signal from battery ECU (high voltage fuse blown out)
	388	Discharge Inhibition Control Malfunction	Input of abnormal signal from battery ECU (discharge inhibition control malfunction)
	389	Drop of High Voltage	Input of abnormal signal from battery ECU (drop of high voltage)
P3001	129	HV Battery ECU Malfunction	Battery ECU malfunction
P3004	130	HV Battery Malfunction	When HV battery voltage becomes lower than inverter voltage
	131	Power Cable Malfunction	When main fuse is blown out, service plug is disconnected or limiter resistance is cut off
	132		When voltage sensor is malfunctioning or limiter resistance is broken
	133	HV Battery Malfunction	Input of abnormal signal from battery ECU
P3100	134	HV ECU Internal Error	HV ECU Internal Error
	135		HV ECU Internal Error
	136	GO Signal Error	Open or short in GO signal circuit
	137	Engine Speed Sensor Malfunction	Engine speed sensor malfunction
	127	IB Circuit Malfunction	+B short in IB terminal circuit of HV ECU
	128		Open or short in IB terminal circuit of HV ECU
	138		When the difference between battery current of HV ECU and current of battery is more than 10A

DTC NO.	INF. Code	Detection Item	Detecting Condition
P3100	139	IG Signal Circuit Malfunction	HV EcU internal error
	140	RAM Breaked	HV ECU internal error
	141	ROM Breaked	HV ECU internal error
	142	ST Signal Circuit Malfunction	When ST signal of HV ECU is ON, with ignition switch turned OFF
	143	ImmobilizerMalfunction	HV ECU internal error
	144	Primary Check Malfunction	HV ECU internal error
	145		HV ECU internal error
	146		HV ECU internal error
	147		HV ECU internal error
	391	Motor CPU Malfunction	HV ECU internal error
	392		HV ECU internal error
	393	HV CPU Operation Malfunction	HV ECU internal error
	148	HV CPU Malfunction	HV ECU internal error
	149		HV ECU internal error
	150	Motor CPU Malfunction	HV ECU internal error
	151		HV ECU internal error
	152		HV ECU internal error
	153		HV ECU internal error
	154		HV ECU internal error
	155		HV ECU internal error
	156		HV ECU internal error
	157	Motor CPU Malfunction	HV ECU internal error
	158		HV ECU internal error
	159	Motor ECU Communication CircuitMalfunction	HV ECU internal error
	160		HV ECU internal error
	161	Motor ECU Power Source Malfunction	HV ECU internal error
	162		HV ECU internal error
	163		HV ECU internal error
	164		HV ECU internal error
	165		HV ECU internal error
	271	Motor PWN Line Connection Malfunction	Open or short in inverter switching wiring (MUU, MVU, MWU)
	166	Motor R/D Malfunction	HV ECU internal error
	167		HV ECU internal error
	168		HV ECU internal error
	169		HV ECU internal error
	170		HV ECU internal error
	171	Motor REF Signal Malfunction	HV ECU internal error
	172		HV ECU internal error
	173		HV ECU internal error
	174	Motor Inverter Current Sensor Malfunction	HV ECU internal error
	175		HV ECU internal error
	176	Motor Gate Shutdown Signal Line Connection Malfunction	HV ECU internal error

DTC NO.	INF. Code	Detection Item	Detecting Condition
P3100	177	Motor Main CPU Malfunction	HV ECU internal error
	178		HV ECU internal error
	179		HV ECU internal error
	180	Rotation Angle Check CPU Malfunction	HV ECU internal error
	181		HV ECU internal error
	182		HV ECU internal error
	183		HV ECU internal error
	184		HV ECU internal error
	185		HV ECU internal error
	186		HV ECU internal error
	187	Important RAM Malfunction	HV ECU internal error
	188	Generator CPU Malfunction	HV ECU internal error
	189		HV ECU internal error
	190		HV ECU internal error
	191		HV ECU internal error
	192		HV ECU internal error
	193		HV ECU internal error
	194		HV ECU internal error
	195		HV ECU internal error
	196		HV ECU internal error
	310	Generator PWN Line Connection Malfunction	Open or short in inverter switching wiring (GUU, GVU, GWU)
	197	Generator R/D Malfunction	HV ECU internal error
	198		HV ECU internal error
	199		HV ECU internal error
	200		HV ECU internal error
	201		HV ECU internal error
	202		HV ECU internal error
	203	Generator Shutdown Signal Line Connection Malfunction	HV ECU internal error
	390	Charge Inhibition Control Malfunction	HV ECU internal error
P3101	204	Engine System Malfunction	Input of abnormal signal from engine ECU (abnormal engine output)
	205		Input of abnormal signal from engine ECU (engine unable to start)
	238	Transaxle Malfunction	When engine speed is less than 500rpm with vehicle speed more than 10km/h and generator torque more than 20 N·m
P3105	206	Battery ECU Communication Circuit Malfunction	When communication between battery ECU and HV ECU is abnormal 1 sec. after ignition is turned ON
	207		
P3106	209	Engine ECU Communication Circuit Malfunction	When communication between engine ECU and HV ECU is abnormal 1 sec. after ignition is turned ON
	210		
	211		
	212		Input of abnormal signal from engine ECU
	394		When engine ECU is malfunctioning
P3107	213	Airbag ECU Communication Circuit Malfunction	When communication between airbag ECU and HV ECU is abnormal 10 sec. after ignition is turned ON
	214		
	215		

DTC NO.	INF. Code	Detection Item	Detecting Condition
P3108	216	A/C Amplifier Communication Circuit Malfunction	When communication between A/C amplifier and HV ECU is abnormal
	217		
P3109	218	Brake ECU Communication Circuit Malfunction	When communication between brake ECU and HV ECU is abnormal 1.5 sec. after ignition is turned ON
	219		
	220		
	221		
	222		
P3110	223	IG Circuit Malfunction	When IGCT relay is always closed
P3115	224	SMR Cont1 Malfunction	+B short in system main relay NO. 1 circuit
	225		Open or short in system main relay No. 1 circuit
	226	SMR Cont2 Malfunction	+B short in system main relay NO. 2 circuit
	227		Open or short in system main relay No. 2 circuit
	228	SMR Cont3 Malfunction	+B short in system main relay NO. 3 circuit
	229		Open or short in system main relay No. 3 circuit
	231	Deposit of SMR	System main relay + terminal deposited
	232		System main relay – terminal deposited
	233		System main relay + & – terminal deposited
P3120	234	Energy Balance Malfunction	Small reduction of motor magnetism
	235		Large reduction of motor magnetism
	236		Small reduction of generator magnetism
	237		Large reduction of generator magnetism
	239	HV Transaxle Malfunction	Shaft damaged
	240		Generator locked
	241		Torque limiter sliding
	242		Planetary gear locked
	243	Motor Resolver Malfunction	Motor resolver inter–phase short
	244		Motor resolver inter–phase short (When there is a history that the state of malfunction continued during inverter fail safe mode)
	245		Open or short in motor resolver circuit
	246		Open or short in motor resolver circuit (When there is a history that the state of malfunction continued during inverter fail safe mode)
	247	Motor Temperature Sensor Malfunction	GND short in motor temperature sensor
	248		Motor temperature sensor malfunction
	249		Open or +B short in motor temperature sensor
	250		Motor temperature sensor performance problem
	253	Generator Resolver Malfunction	Generator resolver inter–phase short
	254		Generator resolver inter–phase short (When there is a history that the state of malfunction continued during inverter fail safe mode)
	255		Open or short in generator resolver circuit
	256		Open or short in generator resolver circuit (When there is a history that the state of malfunction continued during inverter fail safe mode)
	257	Generator Temperature Sensor Malfunction	GND short in generator temperature sensor
	258		Generator temperature sensor malfunction
	259		Open or +B short in generator temperature sensor
	260		Generator temperature sensor performance problem

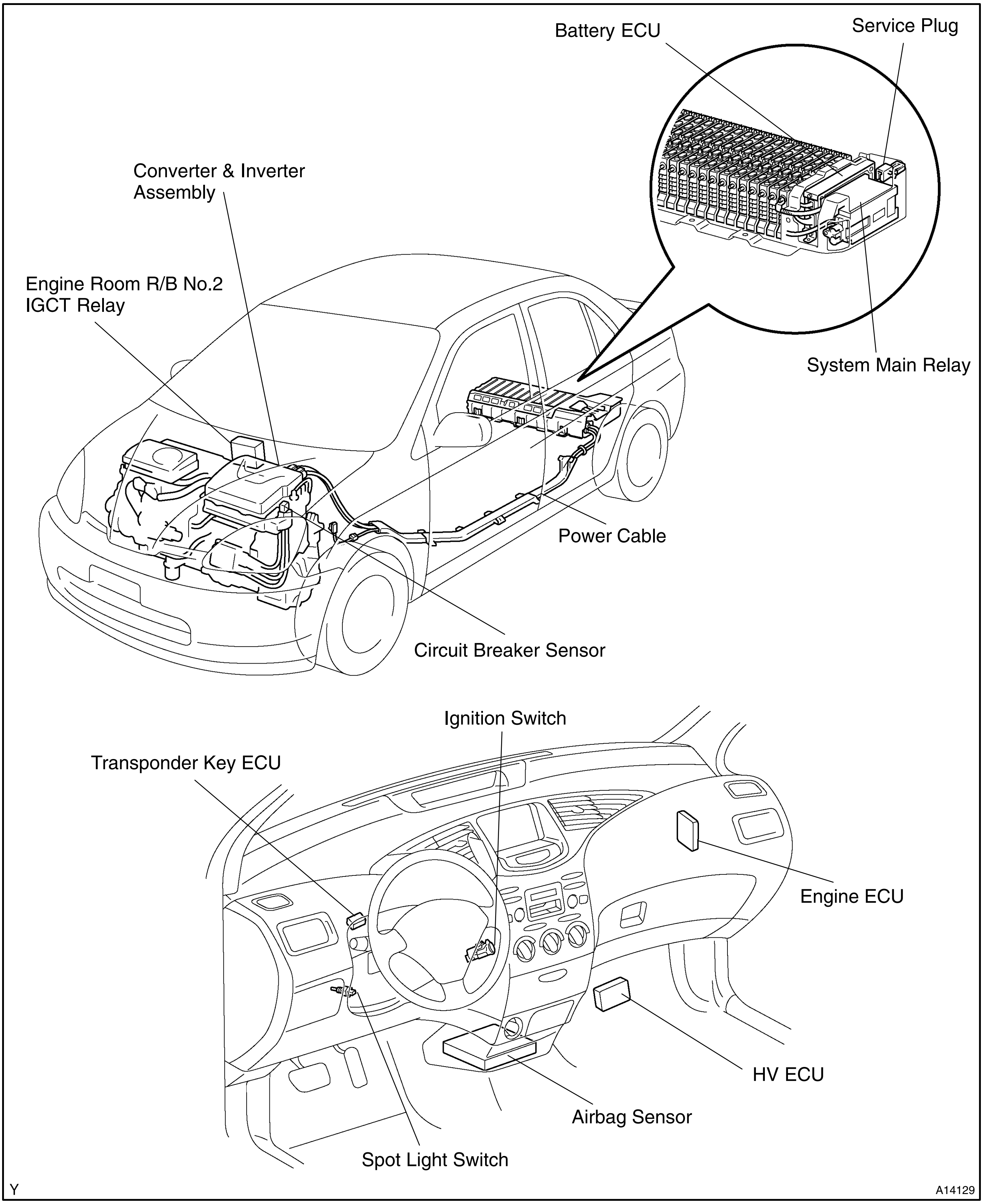
DTC NO.	INF. Code	Detection Item	Detecting Condition
P3125	263	DCDC Converter Malfunction	+B short in DCDC converter NODD wiring
	264		DCDC converter malfunction
	265		Open or GND short in DCDC converter NODD wiring
	266	VM Malfunction	Open or GND short in inverter voltage signal circuit
	267		+B short in inverter voltage signal circuit
	268		Inverter voltage signal is inconsistent with battery voltage
	269		Inverter voltage sensor malfunction
	270		Abnormality of line connection of inverter voltage signal circuit (When there is a history that the state of malfunction continued during inverter fail safe mode)
	272	Motor PWN Line Connection Malfunction	Abnormality of line connection of motor PWM (When there is a history that the state of malfunction continued during inverter fail safe mode)
	273	Motor Inverter Gate Malfunction	Motor inverter gate malfunction
	274	Motor Inverter Temperature	Open or +B short in motor inverter temperature sensor
	275		GND short in motor inverter temperature sensor
	276	Sensor Malfunction	Motor inverter temperature sensor malfunction
	277		Motor inverter temperature sensor performance problem
	278	Motor Inverter Sinv	+B short in motor inverter stop signal circuit
	279		Over–voltage of inverter
	280	Motor Inverter Sinv	Open or GND short in motor inverter stop signal circuit
	281		Voltage drop of inverter power source
	282		Inverter circuit broken
	283	Motor Inverter Finv	+B short in motor inverter fail signal circuit
	284		Inverter overheating
	285		Open or GND short in motor inverter fail signal circuit
	286		Inverter circuit broken
	287		Inverter internal short
	288	Motor Inverter Current Sensor Malfunction	Motor inverter current sensor malfunction (V phase sub sensor)
	289		Open in motor inverter current sensor (V phase sub sensor)
	290		Motor inverter current sensor malfunction (V phase main sensor)
	291		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	292		Open in motor inverter current sensor (V phase main sensor)
	293		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	294		Motor inverter current sensor V phase performance problem
	295		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	296		Motor inverter current sensor malfunction (W phase sub sensor)
	297		Open in motor inverter current sensor (W phase sub sensor)
	298		Motor inverter current sensor malfunction (W phase main)
	299		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	300		Open in motor inverter current sensor (W phase main sensor)
	301		(when there is a history that the state of malfunction continued during inverter fail safe mode)

DTC NO.	INF. Code	Detection Item	Detecting Condition
P3125	302	Motor Inverter Current Sensor Malfunction	Motor inverter current sensor W phase performance problem
	303		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	304	Motor Gate Shutdown Signal Line Connection Malfunction	+B short in motor gate shutdown signal circuit
	305		Open or GND short in motor gate shutdown signal circuit
	306	Failure in Monitoring Motor Torque Performance	Failure in monitoring motor torque performance
	307	Abnormal Current Value of Motor	Abnormal current value of motor
	308	Detection of Collision Signal	Input of collision signal from airbag or inverter
	309	Motor PWM Line Connection Malfunction	Abnormality of generator PWM line connection (when there is a history that the state of malfunction continued during fail safe mode)
	311	Generator Inverter Gate Malfunction	Generator inverter gate broken
	312	Generator Inverter Temperature Sensor Malfunction	Open or +B short in generator inverter temperature sensor
	313		GND short in generator inverter temperature sensor
	314		Generator inverter temperature sensor malfunction
	315		Generator inverter temperature sensor performance problem
	316	Generator Inverter Sinv	+B short in generator inverter stop signal circuit
	317		Over–voltage of inverter
	318		Open or GND short in generation inverter stop signal circuit
	319		Voltage drop of inverter power source
	320		Inverter circuit broken
	321	Generator Inverter Finv	+B short in generator inverter fail signal circuit
	322		Inverter overheating
	323		Open or GND short in generator inverter fail signal circuit
	324		Inverter circuit broken
	325		Inverter internal short
	326	Generator Inverter Current Sensor Malfunction	Generator inverter current sensor malfunction (V phase sub sensor)
	327		Open in generator inverter current sensor (V phase sub sensor)
	328		Generator inverter current sensor malfunction (V phase main sensor)
	329		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	330		Open in generator inverter current sensor (V phase main sensor)
	331		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	332		Generator inverter current sensor V phase performance problem
	333		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	334		Generator inverter current sensor malfunction (W phase sub sensor)
	335		Open in generator inverter current sensor (W phase sub sensor)
	336		Generator inverter current sensor malfunction (W phase main sensor)
	337		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	338		Open in generator inverter current sensor (W phase main sensor)
	339		(when there is a history that the state of malfunction continued during inverter fail safe mode)

DTC NO.	INF. Code	Detection Item	Detecting Condition
P3125	340	Generator Inverter Current Sensor Malfunction	Generator inverter current sensor W phase performance problem
	341		(when there is a history that the state of malfunction continued during inverter fail safe mode)
	342	Motor Gate Shutdown Signal Line Connection	+B short in generator gate shutdown signal circuit
	343		Open or GND short in generator gate shutdown signal circuit
	344	Failure in Monitoring Generator Torque Performance	Failure in monitoring generator torque performance
	345	Abnormal Current Value of Generator	Abnormal current value of generator
P3130	346	Inverter Cooling System Malfunction	Water pump system malfunction
	347		Radiator fan system malfunction
P3135	348	Detection of Collision Signal	GND short in circuit breaker sensor
	349		Open or +B short in circuit breaker sensor
P3140	350	Detection of Open in Interlock Switch	Safety devices operating with vehicle speed less than 5 km/h
	351		Open in interlock signal circuit while vehicle is running (with vehicle speed more than 5 km/h)
P3145	352	Cruise Control System Malfunction	No input of vehicle speed signal during cruise control driving

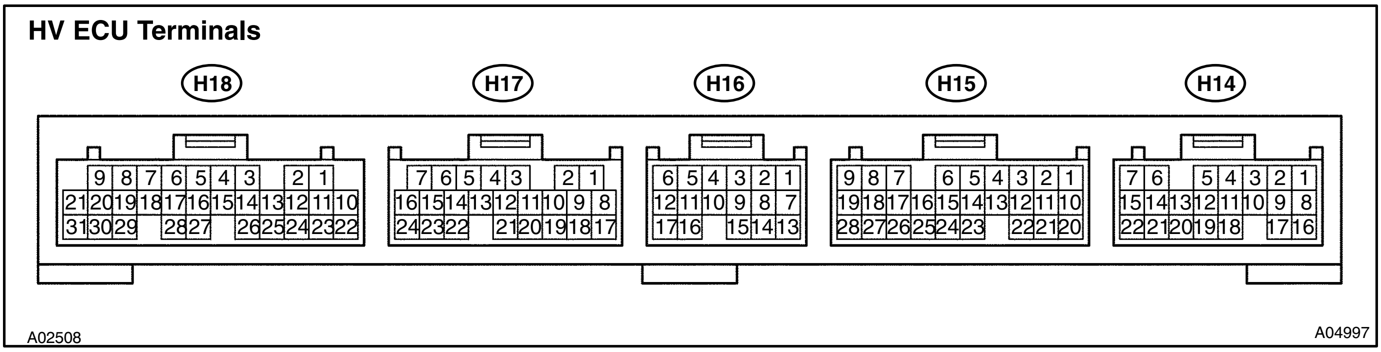
DI82M–01

PARTS LOCATION



DI82N–01

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
BATT (H18–3) – GND1 (H18–31)	G–Y ↔ W–B	Always	9 – 14
+B1 (H18–4) – GND1 (H18–31)	W–G ↔ W–B	Ignition switch ON and ”READY” light ON	9 – 14
+B2 (H18–5) – GND1 (H18–31)	W–G ↔ W–B	Ignition switch ON and ”READY” light ON	9 – 14
IGSW (H17–7) – GND1 (H18–31)	B–W ↔ W–B	Ignition switch ON	9 – 14
ST2 (H17–6) – GND1 (H18–31)	R–W ↔ W–B	Ignition switch ST	9 – 14
ST1 (H18–2) – GND1 (H18–31)	B–Y ↔ W–B	Brake pedal is depressed	Below 0.5
		Brake pedal is released	9 – 14
STP (H18–1) – GND1 (H18–31)	G–W ↔ W–B	Brake pedal is depressed	9 – 14
		Brake pedal is released	Below 0.5
VCP1 (H18–13) – GND1 (H18–31)	Y ↔ W–B	Ignition switch ON	Approx. 5
VPA1 (H18–14) – GND1 (H18–31)	G ↔ W–B	Ignition switch ON and accelerator pedal is released	Approx. 1
		Ignition switch ON and accelerator pedal is fully depressed	Approx. 4
EP1 (H18–12) – GND1 (H18–31)	L ↔ W–B	Ignition switch ON	Below 0.5
VCP2 (H18–23) – GND1 (H18–31)	B ↔ W–B	Ignition switch ON	Approx. 5
VPA2 (H18–15) – GND1 (H18–31)	W ↔ W–B	Ignition switch ON and accelerator pedal is released	Approx. 1
		Ignition switch ON and accelerator pedal is fully depressed	Approx. 4
EP2 (H18–22) – GND1 (H18–31)	R ↔ W–B	Ignition switch ON	Below 0.5
P (H17–15) – GND1 (H18–31)	L–R ↔ W–B	Shift lever is P range	Below 1
		Except shift lever is P range	4 or more
R (H17–14) – GND1 (H18–31)	R–B ↔ W–B	Shift lever is R range	Below 1
		Except shift lever is R range	4 or more
N (H17–13) – GND1 (H18–31)	L–W ↔ W–B	Shift lever is N range	Below 1
		Except shift lever is N range	4 or more
D (H17–23) – GND1 (H18–31)	L–B ↔ W–B	Shift lever is D range	Below 1
		Except shift lever is D range	4 or more
B (H17–22) – GND1 (H18–31)	LG–R ↔ W–B	Shift lever is B range	Below 1
		Except shift lever is B range	4 or more

SFT (H17–11) – GSFT (H17–21)	B–R	Shift lever is P range	Approx. 0.5
		Shift lever is R range	Approx. 2.8
		Shift lever is N range	Approx. 3.4
		Shift lever is D range	Approx. 4.0
		Shift lever is B range	Approx. 4.5
VSFT (H17–12) – GSFT (H17–21)	W–R	Ignition switch ON	4 or more
SPDI (H16–8) – GND1 (H18–31)	V–W ↔ W–B	Ignition switch ON and rotor driving wheel slowly	Pulse generation
ESTP (H18–8) – GND1 (H18–31)	R–Y ↔ W–B	Engine stop is not required	9 – 14
		Engine stop is required	Below 1
SPDO (H18–6) – GND1 (H18–31)	O ↔ W–B	Ignition switch ON and rotor driving wheel slowly	Pulse generation
NODD (H16–4) – GND1 (H18–31)	L–O ↔ W–B	When converter is in normal operation	5 – 7
		When converter is improper	2 – 4
		When converter is required to stop	0.1 – 0.5
ILK (H17–4) – GND1 (H18–31)	O ↔ W–B	Ignition switch ON and interlock switch ON	Below 1
		Ignition switch ON and interlock switch OFF	4 or more
AS1G (H16–14) – AS1 (H16–15)	BR–B ↔ G–R	Ignition switch ON	2.5 – 2.9
IB (H18–25) – GB (H18–26)	B–L ↔ R–W	Ignition switch OFF	Below 1
		Ignition switch from ON to ST (”READY” light ON)	0.5 – 4.5
ABFS (H17–3) – GND1 (H18–31)	L ↔ W–B	Ignition switch ON and ”READY” light ON	2.7 – 3.2
MREL (H16–7) – GND1 (H18–31)	O ↔ W–B	Ignition switch ON	9 – 14

Communication Line

Symbols (Terminals No.)	Wiring Color	Connecting Part or Symbol (Terminal No.)
GSNG (H14–11)	G	MG1, GSNG (M1–7)
GSN (H14–4)	R	MG1, GSN (M1–2)
GRF (H14–10)	B	MG1, GRF (M1–1)
GRFG (H14–17)	W	MG1, GRFG (M1–6)
GCS (H14–5)	Y	MG1, GCS (M1–3)
GCSG (H14–12)	BR	MG1, GCSG (M1–8)
GMTG (H14–8)	G–W	MG1, GMTG (M1–9)
GMT (H14–1)	B–R	MG1, GMT (M1–4)
MSNG (H14–20)	G	MG2, MSNG (M2–5)
MSN (H14–13)	R	MG2, MSN (M2–2)
MRF (H14–19)	P	MG2, MRF (M2–1)
MRFG (H14–18)	L	MG2, MRFG (M2–4)
MCS (H14–14)	B	MG2, MCS (M2–3)
MCSG (H14–21)	W	MG2, MCSG (M2–6)
MMTG (H14–9)	R–W	MG2, MMTG (M3–3)
MMT (H14–2)	GR	MG2, MMT (M3–1)
MSIV (H15–21)	G	Inverter, M–SINV (I10–7)
MSDN (H15–13)	Y	Inverter, M–SDOWN (I9–4)
MIT (H15–11)	L	Inverter, M–INVT (I9–5)

MWU (H15–6)	G	Inverter, M–WU (I9–3)
MUU (H15–4)	R	Inverter, M–UU (I9–1)
MVU (H15–5)	W	Inverter, M–VU (I9–2)
MIVG (H15–26)	B	Inverter, M–GINV (I9–6)
MIVA (H15–16)	B	Inverter, M–IVA (I10–1)
MIVB (H15–7)	W	Inverter, M–IVB (I10–3)
MIWB (H15–17)	G	Inverter, M–IWB (I10–4)
VB (H15–20)	Y	Inverter, VB (I10–5)
MIWA (H15–25)	R	Inverter, M–IWA (I10–2)
GIVA (H15–19)	B	Inverter, G–IVA (I12–1)
GIVB (H15–8)	W	Inverter, G–IVB (I12–4)
GIWB (H15–18)	G	Inverter, G–IWB (I12–4)
GIWA (H15–28)	R	Inverter, G–IWA (I12–2)
GSDN (H15–12)	Y	Inverter, G–SDOWN (I11–4)
GIT (H15–23)	L	Inverter, G–INVT (I11–5)
GWU (H15–3)	G	Inverter, G–WU (I11–3)
GVU (H15–2)	W	Inverter, G–VU (I11–2)
GUU (H15–1)	R	Inverter, G–UU (I11–1)
GIVG (H15–27)	B	Inverter, G–GINV (I11–6)
MFIV (H15–14)	B	Inverter, M–FINV (I10–8)
GSIV (H15–15)	G	Inverter, G–SINV (I12–7)
GFIV (H15–24)	B	Inverter, G–FINV (I12–8)
ETH+ (H18–28)	P	Engine ECU, ETH+ (E9–28)
ETH– (H18–27)	L	Engine ECU, ETH– (E9–27)
E TE+ (H18–19)	Y	Engine ECU, H TE+ (E9–19)
E–TE– (H18–29)	BR	Engine ECU, H TE– (E9–18)
HTB+ (H18–20)	LG	Brake ECU, HV+ (B10–24)
HTB– (H18–30)	V	Brake ECU, HV– (B10–16)
BTH+ (H18–18)	G	Brake ECU, HVO+ (B10–14)
BTH– (H18–17)	R	Brake ECU, HVO– (B10–22)
FCVC (H18–7)	B–W	Transponder Key ECU, HEVC (T5–8))
CON1 (H16–13)	V	System Main Relay (S6–3)
CON2 (H16–2)	GR	System Main Relay (S6–4)
CON3 (H17–1)	P	System Main Relay (S6–5)
HTD+ (H17–2)	W	Battery ECU, HTD+ (B16–6)
HTD– (H17–20)	B	Battery ECU, HTD– (B16–7)
DTD+ (H17–19)	R	Battery ECU, DTD+ (B16–18)
DTD– (H17–18)	G	Battery ECU, DTD– (B16–19)

DI82O–01

CIRCUIT INSPECTION

DTC	B2799	Immobilizer Malfunction

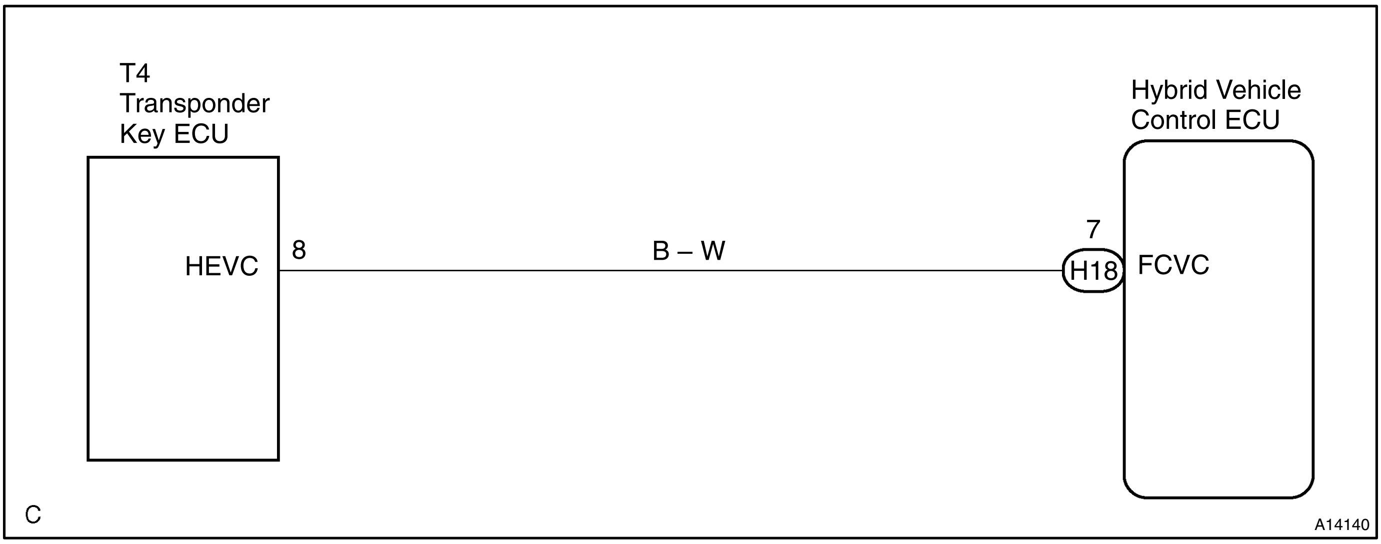
CIRCUIT DESCRIPTION

The HV ECU checks the condition of the communication from the transponder key ECU.

DTC B2799 – Information code 101

INF. code.	Detecting Condition	Trouble Area
101	No input of signal from transponder key ECU	• Wire harness • HV ECU • Transponder key ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short in wire harness between HV ECU FCVC terminal and transponder key ECU HEVC terminal (See page IN–40).

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

OK

2	Check immobilizer system (See page BE–99).

NG → **Repair or replace immobilizer system.**

OK

Replace HV ECU.

DI82P–01

DTC	C2692/C2693	Regenerative Brake Check

CIRCUIT DESCRIPTION

These codes are used to check the regenerative brake at the manufacturing plant.

DTC C2692 – Information code 102

DTC C2693 – Information code 103

INF. code.	Detecting Condition	Trouble Area
102	Regenerative brake check	–
103		

HINT:

Since these are the codes that are used at the manufacturing plant, clear the DTC unless other DTC are recorded.

DI82Q–01

DTC	P1120	Accelerator Pedal Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

The accelerator pedal position sensor mounted on the accelerator pedal has main and sub sensors and detects the accelerator pedal position and the malfunction of the accelerator position sensor itself.

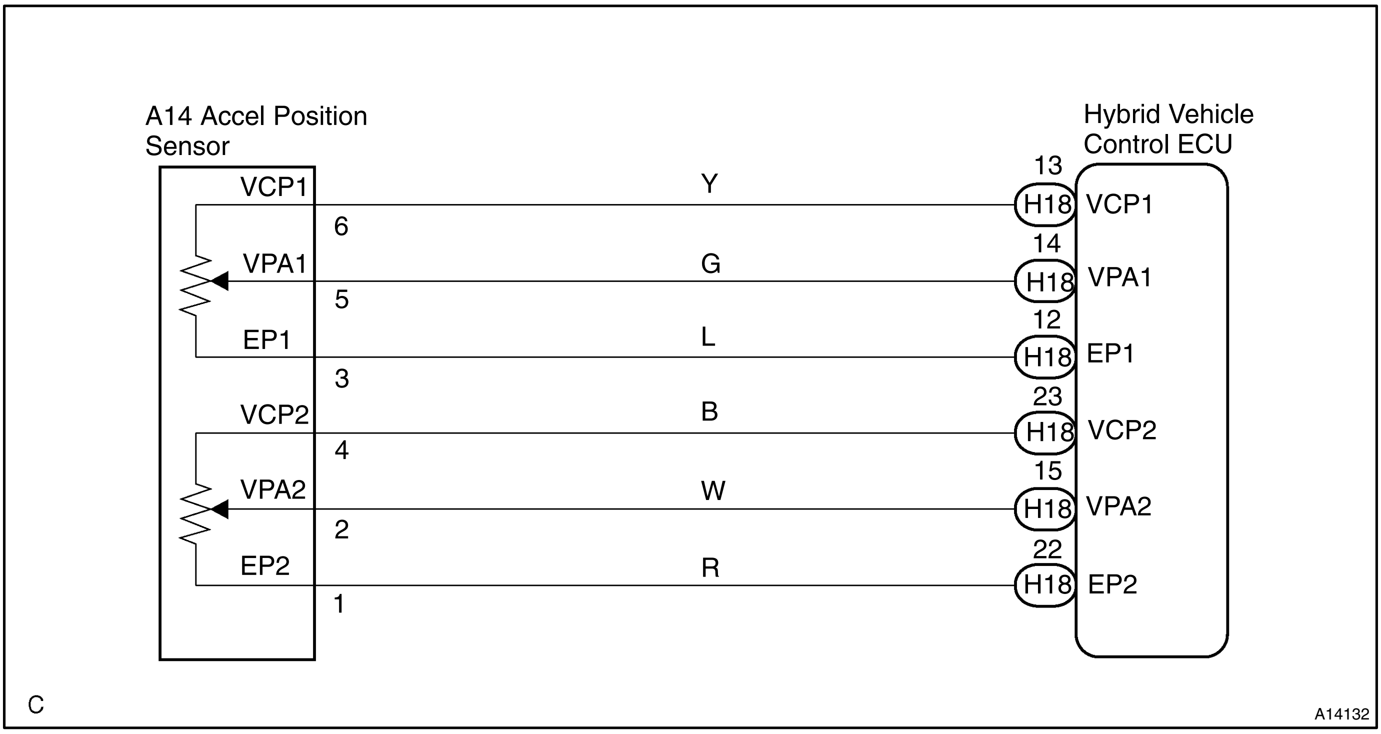
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P1120 – Information code 104, 105, 107, 108

INF. code.	Detecting Condition	Trouble Area
104	Open or short in main accelerator sensor circuit	• Accelerator pedal position sensor • Wire harness
105	+B short in main accelerator sensor circuit	
107	Open or short in sub accelerator sensor circuit	
108	+B short in sub accelerator sensor circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU and accelerator pedal position sensor (See page IN–40).**

Terminals for checking open and short:

Accelerator pedal position sensor Terminals	HV ECU Terminals
VCP1	VCP1
VPA1	VPA1
EP1	EP1
VCP2	VCP2
VPA2	VPA2
EP2	EP2

HINT:
The acceleration pedal position sensor circuit has +B short if the voltage at the HV ECU VPA1 or VPA2 terminal is more than 5V with the ignition ON.

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

OK

Replace accelerator pedal position sensor.

DTC P1120 – Information code 106, 109, 110, 111, 112, 113, 114

INF. code.	Detecting Condition	Trouble Area
106	Main sensor internal error	• Accelerator pedal position sensor
109	Sub sensor internal error	
110	When difference between main sensor value and sub sensor value is large	
111	When sub sensor value changes while main sensor value does not	
112	When main sensor value changes while sub sensor value does not	
113	When any of the information code 104 – 112 continues to appear	
114	Accelerator pedal not smoothly returning to original position	

INSPECTION PROCEDURE

If the information code 106 or 109 – 114 is output, replace the accelerator pedal position sensor.

DI82R–01

DTC	P1520	Stop Light Switch (Cruise Control System) Malfunction

CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the cruise control system and inhibits the operation of the cruise control.

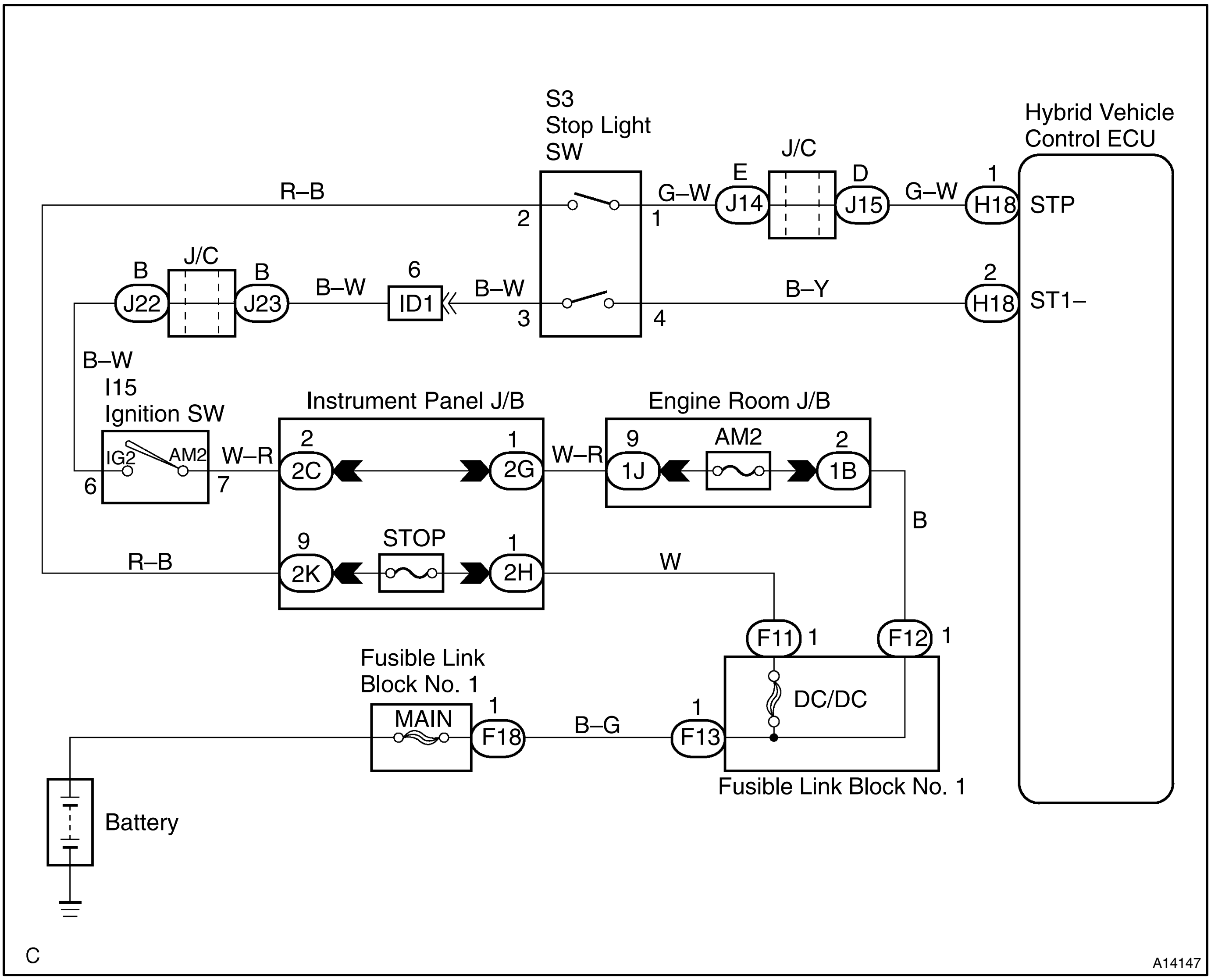
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P1520 – Information code 115

INF. code.	Detecting Condition	Trouble Area
115	Open or short in stop light switch circuit	• Stop light switch • Wire harness • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC of brake ECU being output?

YES → Check DTC of brake ECU (See page DI–313).

NO ↓

2	Check stop light switch (See page BE–36).

NG → Replace stop light switch.

OK ↓

3	Check for open and short in wire harness between stop light switch and HV ECU (See page IN–40).

NG → Repair or replace wire harness.

OK ↓

Replace HV ECU.

DI82S–01

DTC	P1566	Cruise Control System Malfunction

CIRCUIT DESCRIPTION

Refer to DTC P1520.

HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P1566 – Information code 116

INF. code.	Detecting Condition	Trouble Area
116	When STP signal of HV ECU is inconsistent with that of brake ECU, with cruise control indicator ON.	• Brake ECU • HV ECU

WIRING DIAGRAM

Refer to DTC P1520.

INSPECTION PROCEDURE

1	Is DTC of brake ECU being output (See page DI–306)?

NG → **Check DTC of brake ECU (See page DI–306).**

OK

2	Check for +B short in wire harness between stop light switch and HV ECU (See page IN–40).

HINT:

Under the normal condition, the voltage of the HV ECU STP terminal is 0V when the brake pedal is released with the ignition OFF. If there is any output of voltage at this time, the stop light switch circuit has +B short.

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

OK

Replace HV ECU.

DI82T–01

DTC	P1600	BATT Malfunction

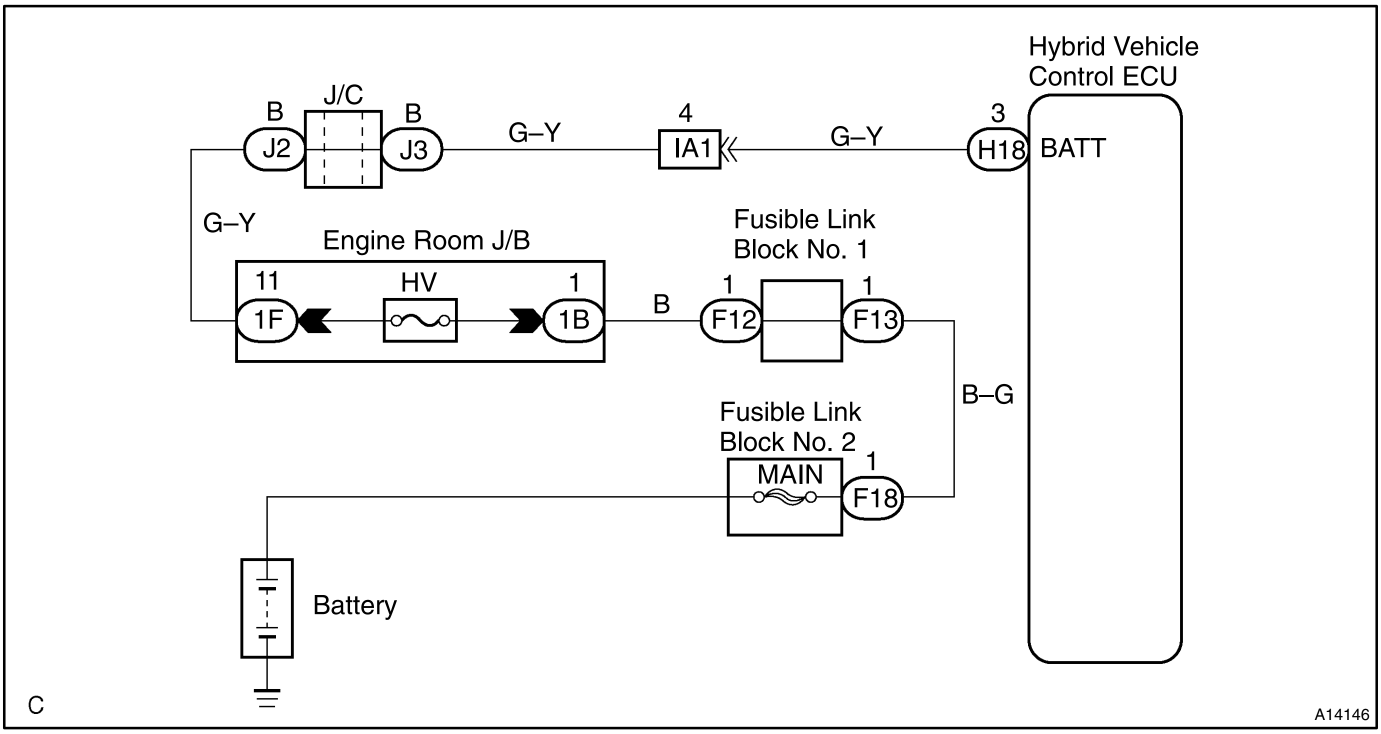
CIRCUIT DESCRIPTION

Since the ECU back–up power source is used for DTC and freeze frame data memory, the back–up power source (BATT) continues to be supplied to the HV ECU even though the ignition switch is turned OFF.

DTC P1600 – Information code 117

INF. code.	Detecting Condition	Trouble Area
117	HV ECU back–up power source circuit malfunction	• Wire harness • HV Fuse

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check continuity of HV fuse of engine room J/B.**

OK:
Continuity

NG → **Check for short in all harness and parts connected to HV fuse.**

OK

Repair or replace wire harness.

DI82U–01

DTC	P1780	Neutral Start Switch System Malfunction

CIRCUIT DESCRIPTION

The neutral start switch sends both main sensor signal (switch signal) and sub sensor signal (analogue value) to the HV ECU. The HV ECU uses those signals to detect the shift lever position (P, R, N, D or B) and to control the forward and backward movement of the vehicle.

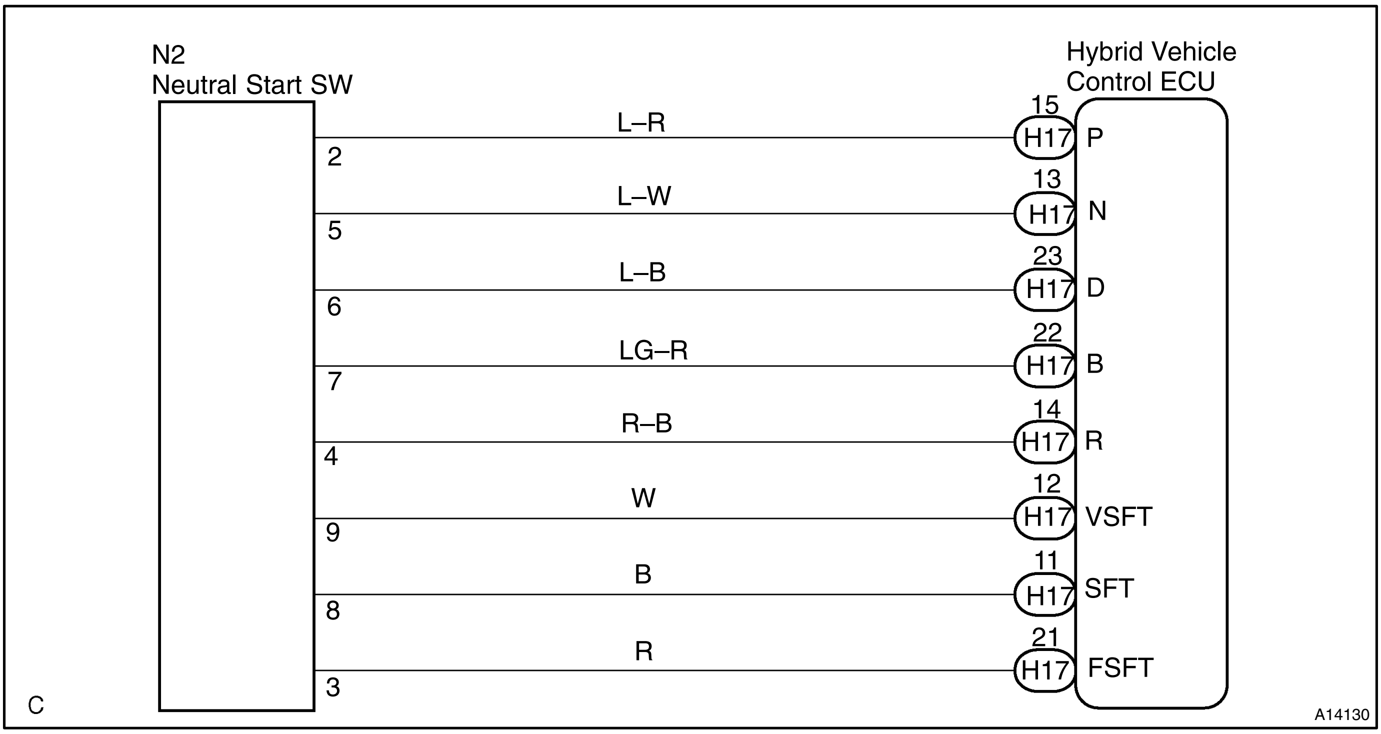
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P1780 – Information code 118, 119, 120, 121

INF. code.	Detecting Condition	Trouble Area
118	When more than two main signals are ON	• Neutral start switch • Wire harness
119	When main signal is not turned ON even though sub signal has been input	
120	Open or short in sub sensor circuit	
121	When shift position detected by main signal is different from that detected by sub signal	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open and short in wire harness between neutral start switch and HV ECU (See page IN–40).**

Terminals for checking open and short:

Neutral Start Switch Terminals	HV ECU Terminals
2	P
5	N
6	D
7	B
4	R
9	VSFT
8	SFT
3	GSFT

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

OK

Check and repair neutral start switch (See page HT–48).

DI82V–01

DTC	P3000	HV Battery Malfunction

CIRCUIT DESCRIPTION

The HV ECU gives warning to the driver and performs the fail safe control, according to the abnormal signal received from the battery ECU.

HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3000 – Information code 123, 125

INF. code.	Detecting Condition	Trouble Area
123	Input of abnormal signal from battery ECU (HV battery system malfunction)	• HV battery system • High voltage fuse • HV battery cooling system • Power Cable
125	Input of abnormal signal from battery ECU (high voltage fuse blown out)	

INSPECTION PROCEDURE

If the information code 123 or 125 is output, after confirming the DTC of the HV battery system, check and repair the applicable DTC. After repairing it, record the DTC of the HV ECU, freeze frame data and history of operation. Then, clear the DTC and check it one more time after starting the system again (”READY” light ON).

DTC P3000 – Information code 388

INF. code.	Detecting Condition	Trouble Area
388	When charged battery is low due to leaving the vehicle in N range, gas shortage or HV system malfunction	–

INSPECTION PROCEDURE

If the information code 388 is output, check if other information codes are being output and then check and repair the applicable code. After that, confirm the gas is affluent and it is OK if you can crank the engine again.

DTC P3000 – Information code 388

INF. code.	Detecting Condition	Trouble Area
389	When main battery is dead or main battery is dead due to HV system malfunction	–

INSPECTION PROCEDURE

If the information code 389 is output, check if other information codes are being output and then check repair the applicable code. After that, replace the main battery and it is OK if you can crank the engine again.

DI82W–01

DTC	P3001	HV Battery ECU Malfunction

CIRCUIT DESCRIPTION

DTC P3001 – Information code 129

INF. code.	Detecting Condition	Trouble Area
129	Battery ECU malfunction	• Battery ECU

INSPECTION PROCEDURE

1	Is DTC of battery ECU being output (See page DI–272)?

YES → **Check DTC of battery ECU.**

NO ↓

Replace the battery ECU.

DI82X–01

DTC	P3004	Power Cable Malfunction

CIRCUIT DESCRIPTION

HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3004 – Information code 130

INF. Code.	Detecting Condition	Trouble Area
130	When HV battery voltage becomes lower than inverter voltage	Converter & inverter assembly

INSPECTION PROCEDURE

If the above information code is output, replace the converter & inverter assembly.

DTC P3004 – Information code 131

INF. Code.	Detecting Condition	Trouble Area
131	When condition (a), (b) or (c) is detected: (d) Main fuse blown out (e) Service plug disconnected (f) Limiter resistance cut off	• Main fuse • Service plug • Limiter resistance

INSPECTION PROCEDURE

1	**Check continuity of main fuse in the service plug.**

NG → **Check the cause of open circuit and replace main fuse.**

OK

2	**Check the condition of service plug terminal (Loosened, poor contact, etc.).**

NG → **Replace service plug.**

OK

3	**Check the continuity of power cable.**

NG → **Replace the power cable.**

OK

Replace the system main relay.

CIRCUIT DESCRIPTION

DTC P3004 – Information code 132

INF. Code.	Detecting Condition	Trouble Area
132	When inverter voltage sensor is malfunctioning or limiter resistance value increases.	• Converter & inverter assembly • System main relay

INSPECTION PROCEDURE

1	Are other information codes recorded?

YES → **Check applicable information code (See page DI–265).**

NO

2	Check continuity of power cable.

OK:

Continuity: Less than 1Ω

NG → **Replace power cable.**

OK

Replace system main relay.

CIRCUIT DESCRIPTION

The HV ECU gives warning to the driver and performs the fail safe control, according to the abnormal signal received from the battery ECU.

DTC P3004 – Information code 133

INF. Code.	Detecting Condition	Trouble Area
133	Input of abnormal signal from battery ECU	• HV battery system

INSPECTION PROCEDURE

If the information code 133 output, after confirming the DTC of the HV ECU, check and repair the applicable DTC. After repairing it, record the DTC of the HV ECU, freeze frame data and history of operation. Then, clear the DTC and check it one more time after starting the system again (”READY” light ON).

DI82Y–01

DTC	P3100	HV ECU Malfunction

CIRCUIT DESCRIPTION

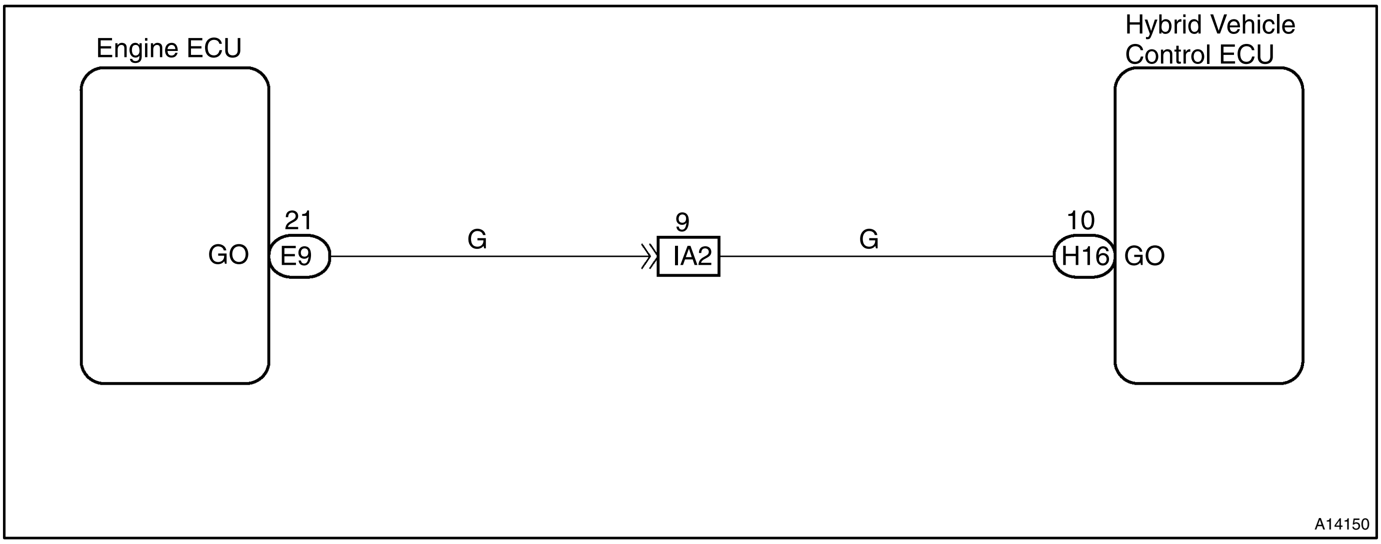
HINT:

- When using an OBD-Ⅱ scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3100 – Information code 136, 137

INF. Code.	Detecting Condition	Trouble Area
136	Open or short in GO signal circuit	• Wire harness • HV ECU • Engine speed sensor
137	Engine speed sensor malfunction	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC of engine ECU being output (See page DI–1)?

Yes → Check applicable DTC (See page DI–1).

NO

2	Check for open and short in wire harness between GO terminal of HV ECU and GO terminal of engine ECU (See page IN–40).

NG → Repair or replace wire harness.

OK

Replace HV ECU.

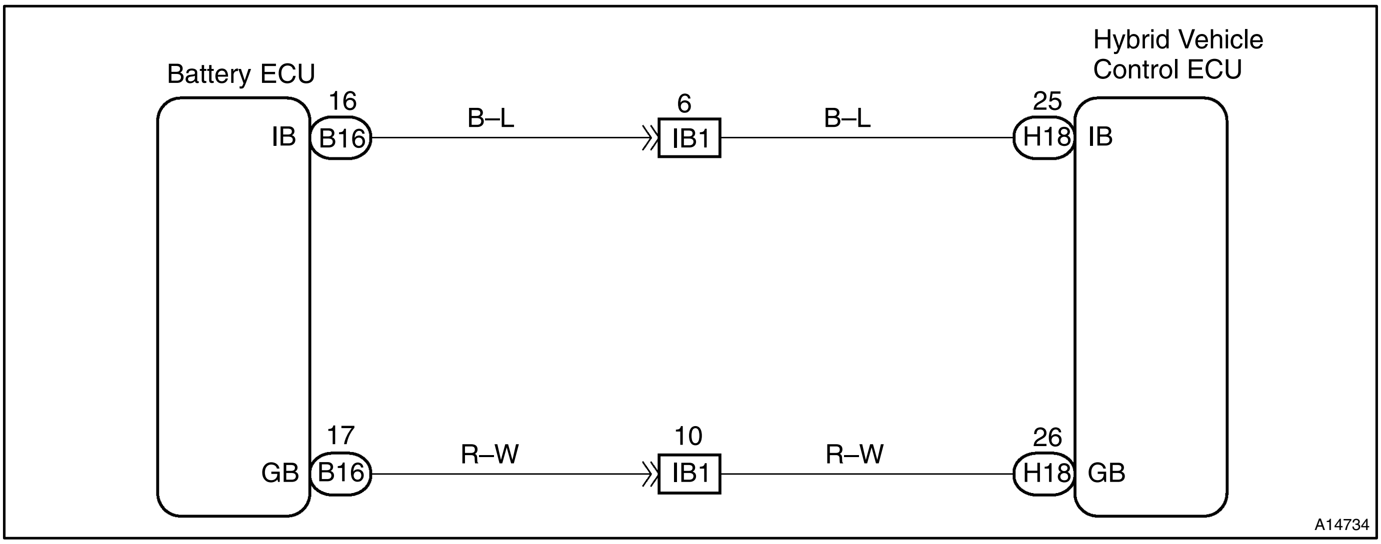
CIRCUIT DESCRIPTION

The HV ECU checks the current value of the battery and detects malfunction.

DTC P3100 – Information code 127, 128

INF. Code.	Detecting Condition	Trouble Area
127	+B short in IB terminal circuit of HV ECU	• Wire harness • HV ECU • Battery ECU
128	Open or short in IB terminal circuit of HV ECU	
138	When the difference between battery current of HV ECU and current of battery is large.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Is DTC of battery ECU being output (See page DI–265)?**

Yes → **Check applicable DTC (See page DI–265).**

NO

2	**Check for open, short and +B short in wire harness between HV ECU IB and GB terminals and battery ECU IB and GB terminals (See page IN–40).**

HINT:
The HV ECU IB terminal has +B short if there is no open in wire harness and the voltage of the IB or GB terminal is more than 5 V with the ignition ON.

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

OK

Replace HV ECU.

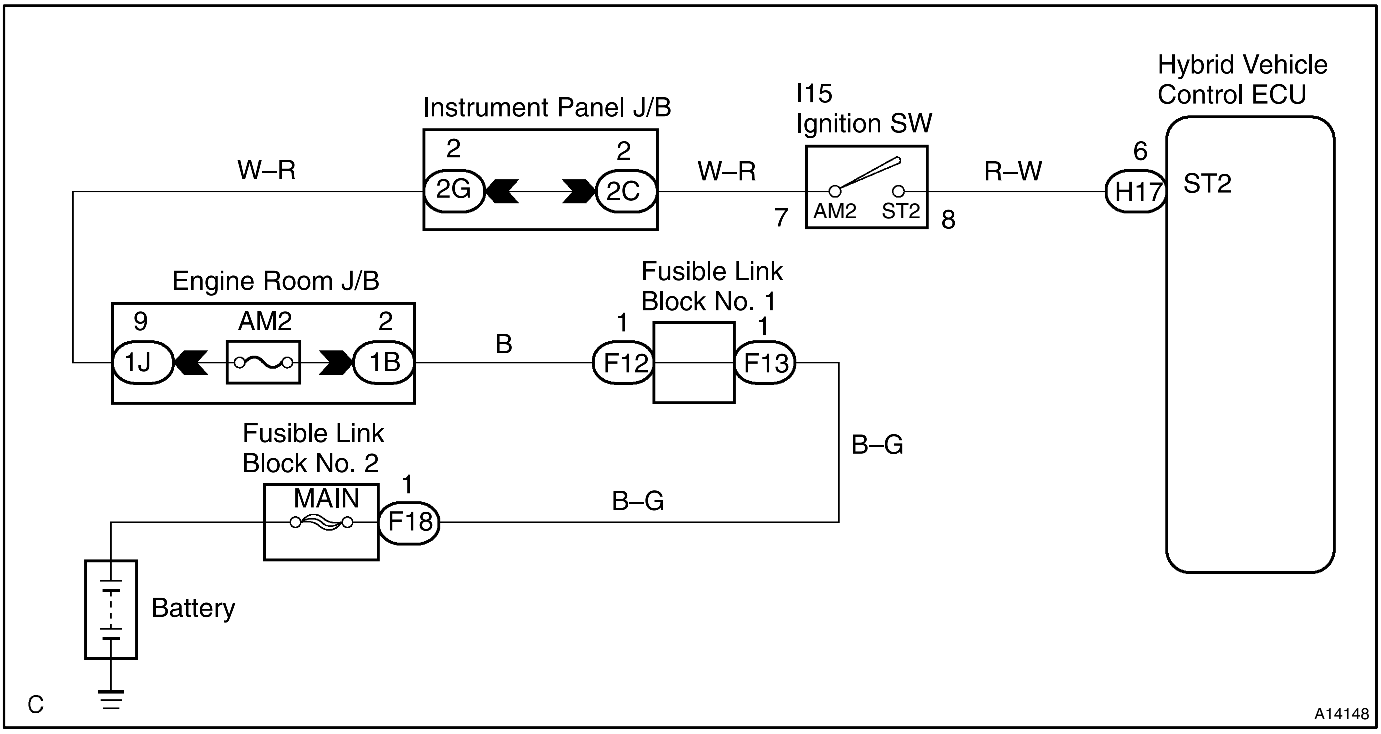
CIRCUIT DESCRIPTION

The HV ECU checks the ST signal and detects malfunction. If the ST signal has +B short, the ST will always be ON. Therefore, even with the IG ON when starting the THS, the system will start. To prevent this from happening, the HV ECU detects the malfunction of the ST signal.

DTC P3100 – Information code 142

INF. Code.	Detecting Condition	Trouble Area
142	When ST signal of HV ECU is ON, with ignition switch turned OFF.	• Wire harness • HV ECU • Ignition switch

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ignition switch (See page BE–17).

NG → **Replace ignition switch (See page SR–11).**

NO

2	Check for +B short in wire harness between ignition switch ST2 terminal and HV ECU ST2 terminal (See page IN–40).

HINT:
The HV ECU ST circuit has +B short if battery voltage is supplied to the ST2 terminal with the ignition ON.

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

OK

Replace HV ECU.

CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the inverter switching wiring (MUU, MVU and MWU) and detects malfunction.

DTC P3100 – Information code 271

INF. Code.	Detecting Condition	Trouble Area
271	Motor PWM line connection malfunction	• Converter & inverter assembly

INSPECTION PROCEDURE

If any of these information codes is output, replace the converter & inverter.

CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the inverter switching wiring (GUU, GVU and GWU) and detects malfunction.

DTC P3100 – Information code 310

INF. Code.	Detecting Condition	Trouble Area
310	Generator PWM line connection malfunction	• Converter & inverter assembly

INSPECTION PROCEDURE

If any of these information codes is output, replace the converter & inverter.

CIRCUIT DESCRIPTION

The HV ECU checks the internal operation of the ECU and detects malfunction.

DTC P3100 – Information code 134, 135, 139, 140, 141, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 390, 391, 392, 393

INF. Code.	Detecting Condition	Trouble Area
134	HV ECU internal error	• HV ECU
135		
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INF. Code.	Detecting Condition	Trouble Area
170	HV ECU internal error	• HV ECU
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INSPECTION PROCEDURE

If any of the above information codes is output, replace the HV ECU.

DI82Z–01

DTC	P3101	Engine System Malfunction

CIRCUIT DESCRIPTION

The HV ECU performs the fail safe control, according to the abnormal signal from the engine ECU.
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3101 – Information code 204, 205

INF. Code.	Detecting Condition	Trouble Area
204	Input of abnormal signal from the engine ECU (abnormal engine output)	• Engine
205	Input of abnormal signal from the engine ECU (engine unable to start)	

INSPECTION PROCEDURE

If any of the above information codes is output, after confirming the DTC of the engine ECU, check and repair the applicable DTC. After repairing it, record the DTC of the HV ECU, freeze frame data and history of operation. Then, clear the DTC and check it one more time after starting the system again (”READY” light ON).

CIRCUIT DESCRIPTION

The HV ECU detects the seizure of the engine or transmission gear and a foreign material and performs the fail safe control.

DTC P3101 – Information code 238

INF. Code.	Detecting Condition	Trouble Area
238	When engine does not start even though cranking it.	• Engine • HV transaxle

INSPECTION PROCEDURE

If the above information code is output, investigate what has caused the revolution resistance of the transaxle and engine to become greater.

- Check the engine lubrication system and transaxle lubrication system.
- Check the engine coolant and transaxle coolant.
- Check for any breakdowns in engine itself and transaxle itself.

DI830–01

DTC	P3105	Battery ECU Communication Circuit Malfunction

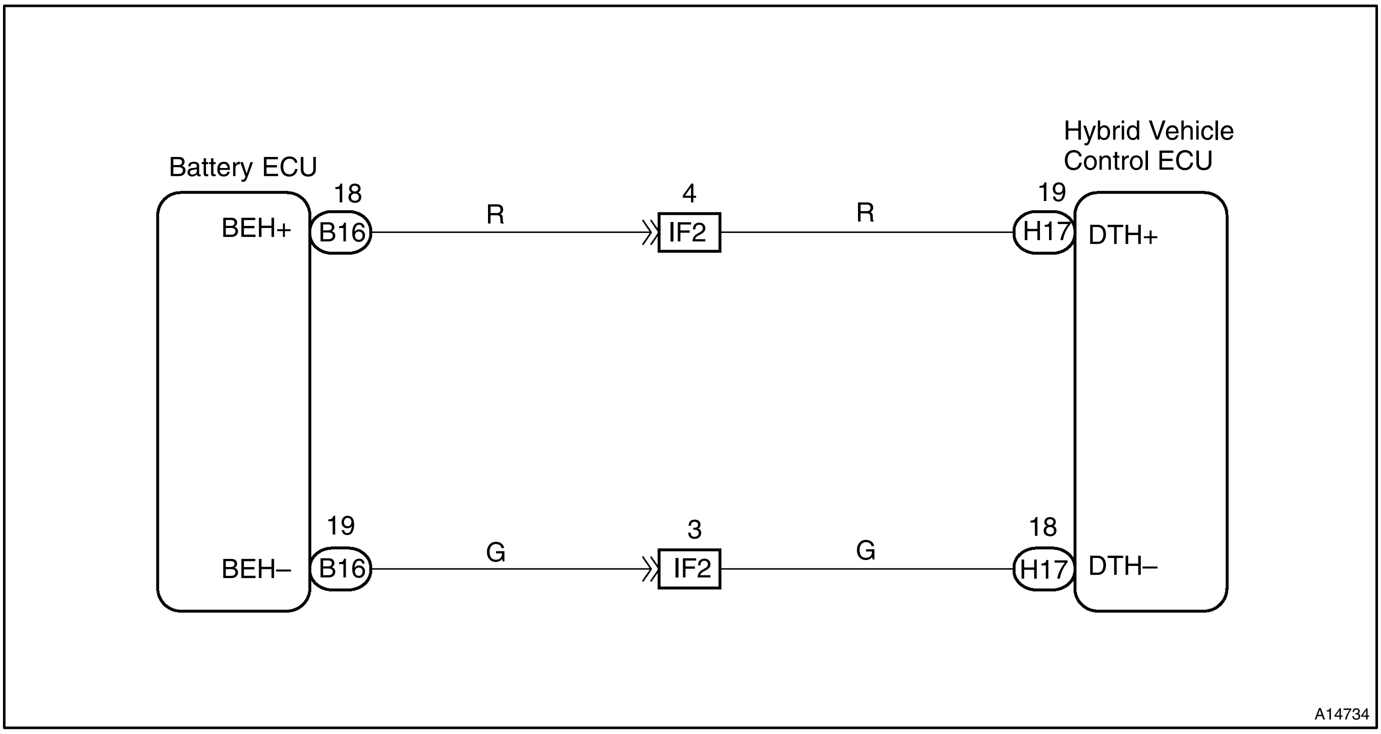
CIRCUIT DESCRIPTION

The HV ECU performs multiple checks to avoid any malfunction that may occur through the communication with the battery ECU due to a noise, etc.

DTC P3105 – Information code 206, 207, 208

INF. Code.	Detecting Condition	Trouble Area
206	When communication between battery ECU and HV ECU is abnormal 1 sec. after ignition is turned ON	• Wire harness • HV ECU • Battery ECU
207		
208		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short in wire harness between HV ECU terminals (DTH+, DTH–) and battery ECU terminals (BEH+, BEH–) (See page IN–40).

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

OK ↓

2	Check battery ECU (See page DI–265).

NG → **Replace battery ECU circuit.**

OK ↓

Replace HV ECU.

DI831–01

DTC	P3106	Engine ECU Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The HV ECU performs multiple checks to avoid any malfunction that may occur through the communication with the engine ECU due to a noise, etc.

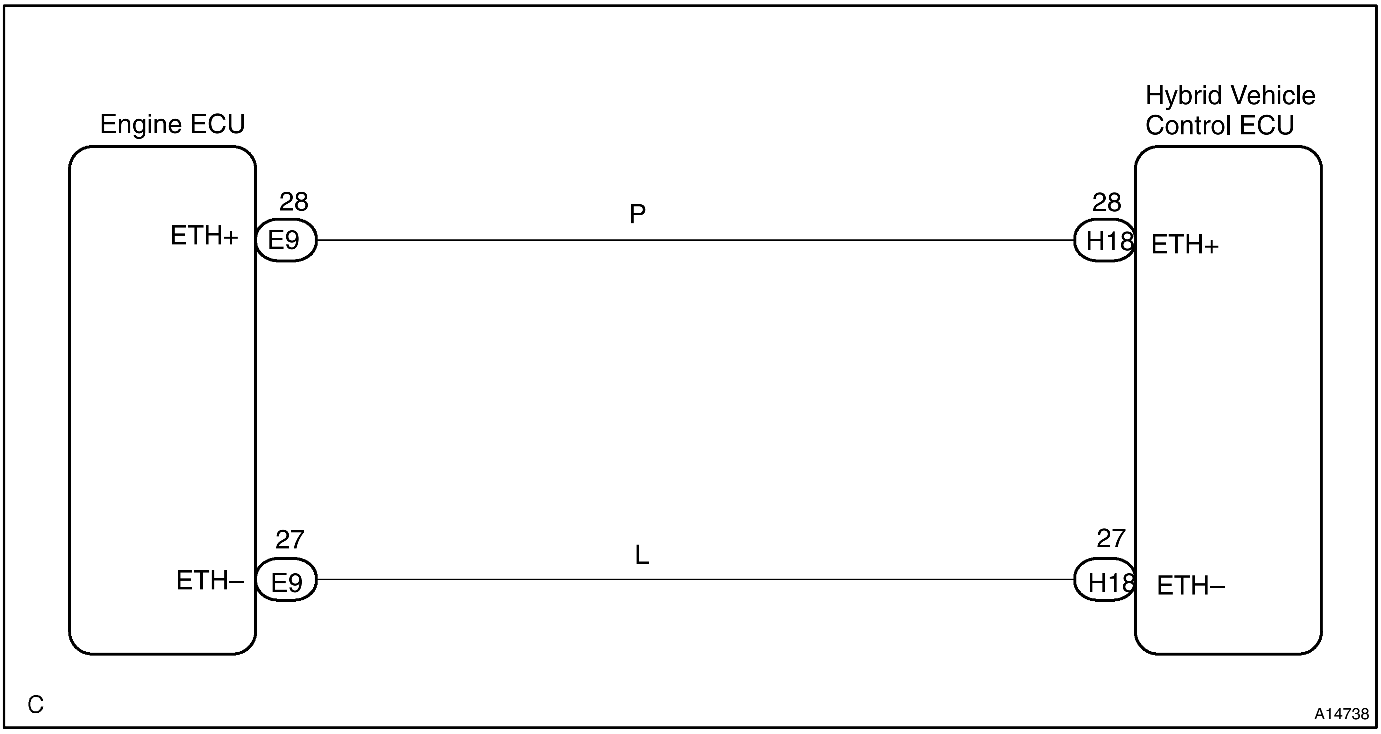
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3106 – Information code 209, 210, 211

INF. Code.	Detecting Condition	Trouble Area
209	When communication between engine ECU and HV ECU is abnormal 1 sec. after ignition is turned ON	• Wire harness • HV ECU • Engine ECU
210		
211		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open and short in wire harness between HV ECU terminals (ETH+, ETH–) and engine ECU terminals (ETH+, ETH–) (See page IN–40).**

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

OK

2	**Check engine ECU (See page DI–1).**

NG → **Replace engine ECU circuit.**

OK

Replace HV ECU.

CIRCUIT DESCRIPTION

DTC P3106 – Information code 212

INF. Code.	Detecting Condition	Trouble Area
212	Input of abnormal signal from engine ECU	• Engine ECU

INSPECTION PROCEDURE

If the information code 212 is output, after confirming the DTC of the engine ECU, check and repair the applicable DTC. After repairing it, record the DTC of the HV ECU, freeze frame data and history of operation. Then, clear the DTC and check it one more time after starting the system again (”READY” light ON).

CIRCUIT DESCRIPTION

DTC P3106 – Information code 394

INF. Code.	Detecting Condition	Trouble Area
394	When engine ECU does not operate	• Engine ECU

INSPECTION PROCEDURE

If the information code 394 is output, check and repair the engine ECU power source circuit. If there is no problem in the power source circuit, replace the engine ECU. After the repair, record the DTC of the HV ECU, freeze frame data and history of operation and clear them. Then, start the system one more time (”READY” light ON) and check the DTC again.

DI832–01

DTC	P3107	Airbag ECU Communication Circuit Malfunction

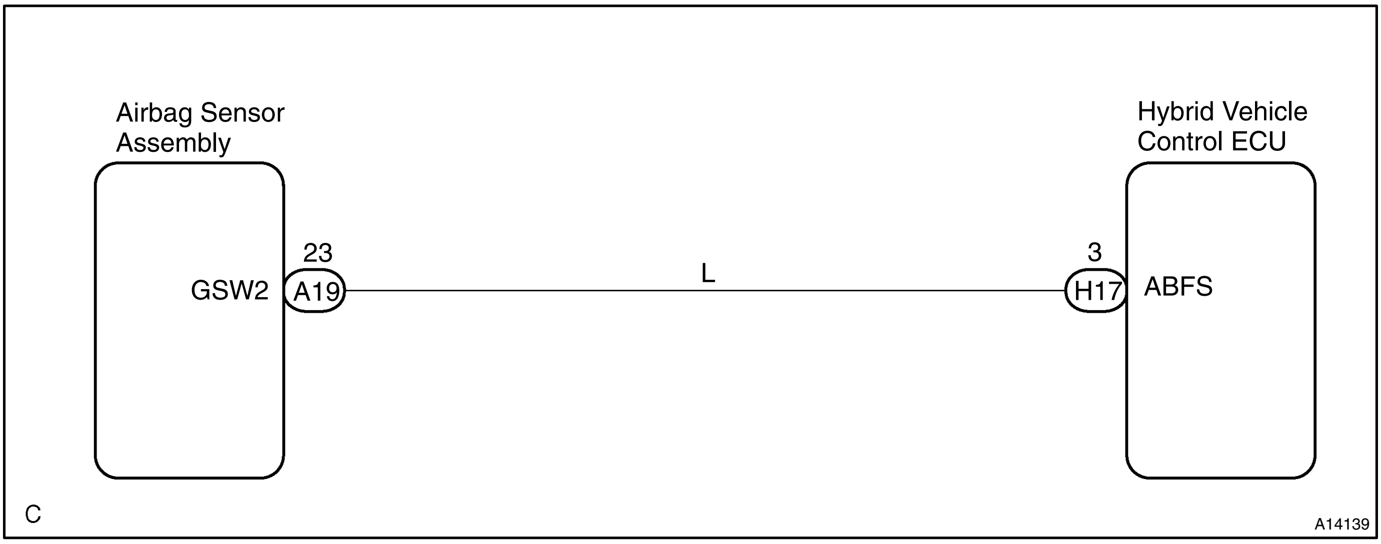
CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the collision signal circuit from the airbag and gives warning to the driver.

DTC P3107 – Information code 213, 214, 215

INF. Code.	Detecting Condition	Trouble Area
213	When communication between airbag ECU and HV ECU is abnormal 10 sec. after ignition is turned ON	• Wire harness • HV ECU • Airbag sensor
214		
215		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU ABFS terminals and airbag ECU GSW 2 terminal (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. If the battery voltage is always applied to the HV ECU ABFS terminal with the ignition ON, the airbag signal circuit has +B short.

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

OK

2	**Check airbag sensor (See page DI–451).**

NG → **Replace airbag sensor circuit.**

OK

Replace HV ECU.

DI833–01

DTC	P3108	A/C Amplifier Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The HV ECU detects the abnormal signal from the A/C amplifier and records it.

DTC P3108 – Information code 216, 217

INF. Code.	Detecting Condition	Trouble Area
216	When communication between A/C amplifier and HV ECU is abnormal.	• Wire harness • HV ECU • A/C ECU
217		

INSPECTION PROCEDURE

If the information code 216 or 217 is output, after confirming the DTC of the A/C amplifier, check and repair the applicable DTC. After repairing it, record the DTC of the HV ECU, freeze frame data and history of operation. Then, clear the DTC and check it one more time after starting the system again (”READY” light ON).

DI834–01

DTC	P3109	Brake ECU Communication Circuit Malfunction

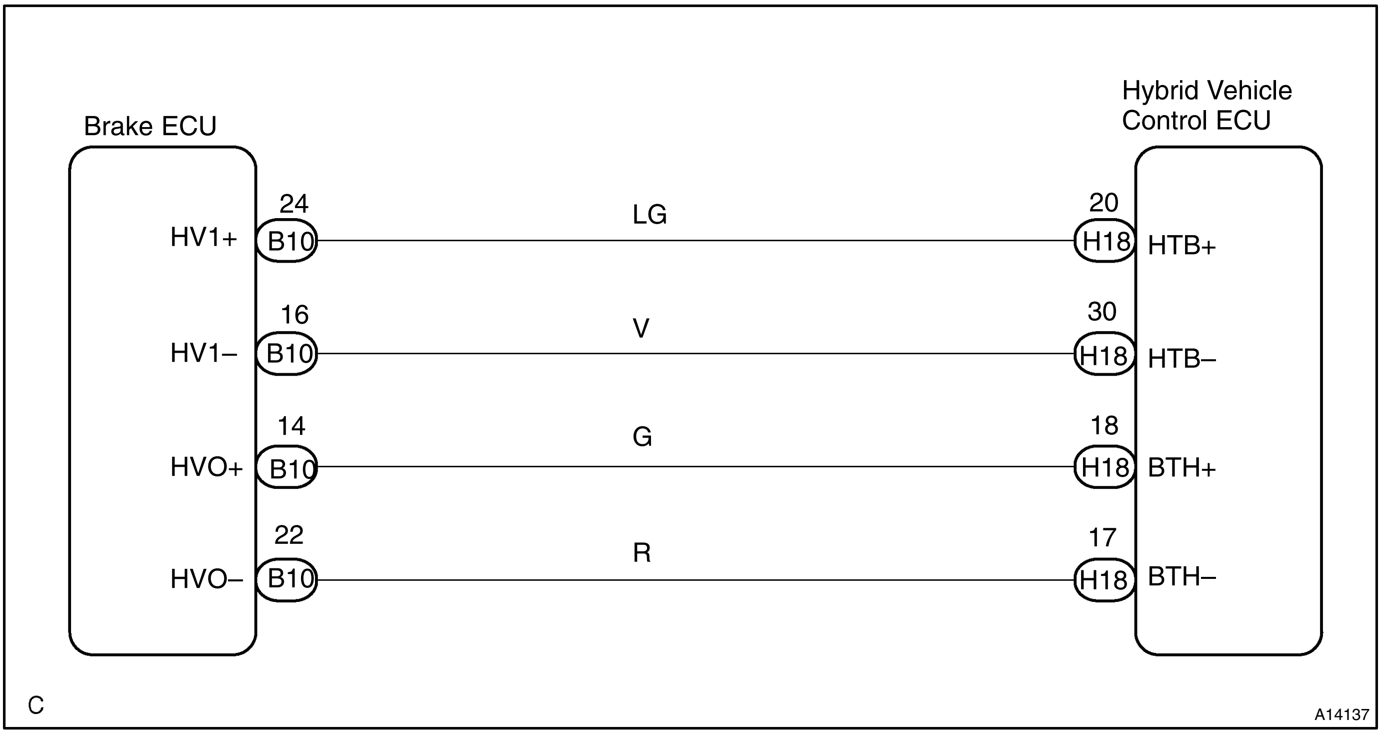
CIRCUIT DESCRIPTION

The HV ECU performs multiple checks to avoid any malfunction that may occur through the communication with the brake ECU due to a noise, etc.

DTC P3109 – Information code 218, 219, 220, 221, 222

INF. Code.	Detecting Condition	Trouble Area
218	When communication between brake ECU and HV ECU is abnormal 1.5 sec. after ignition is turned ON	• Wire harness • HV ECU • Brake ECU
219		
220		
221		
222		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU terminals (HTB+, HTB–, BTH+, BTH–) and brake ECU terminals (HV1+, HV1–, HVO+, HVO–) (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. If the voltage of each HV ECU terminals (HTB+, HTB–, BTH+ and BTH–) is always more than 5 V with the ignition ON, the brake ECU communication circuit has +B short.

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

OK

2	**Check brake ECU (See page DI–306).**

NG → **Replace brake ECU circuit.**

OK

Replace HV ECU.

DI835–01

DTC	P3110	IGCT Relay Malfunction

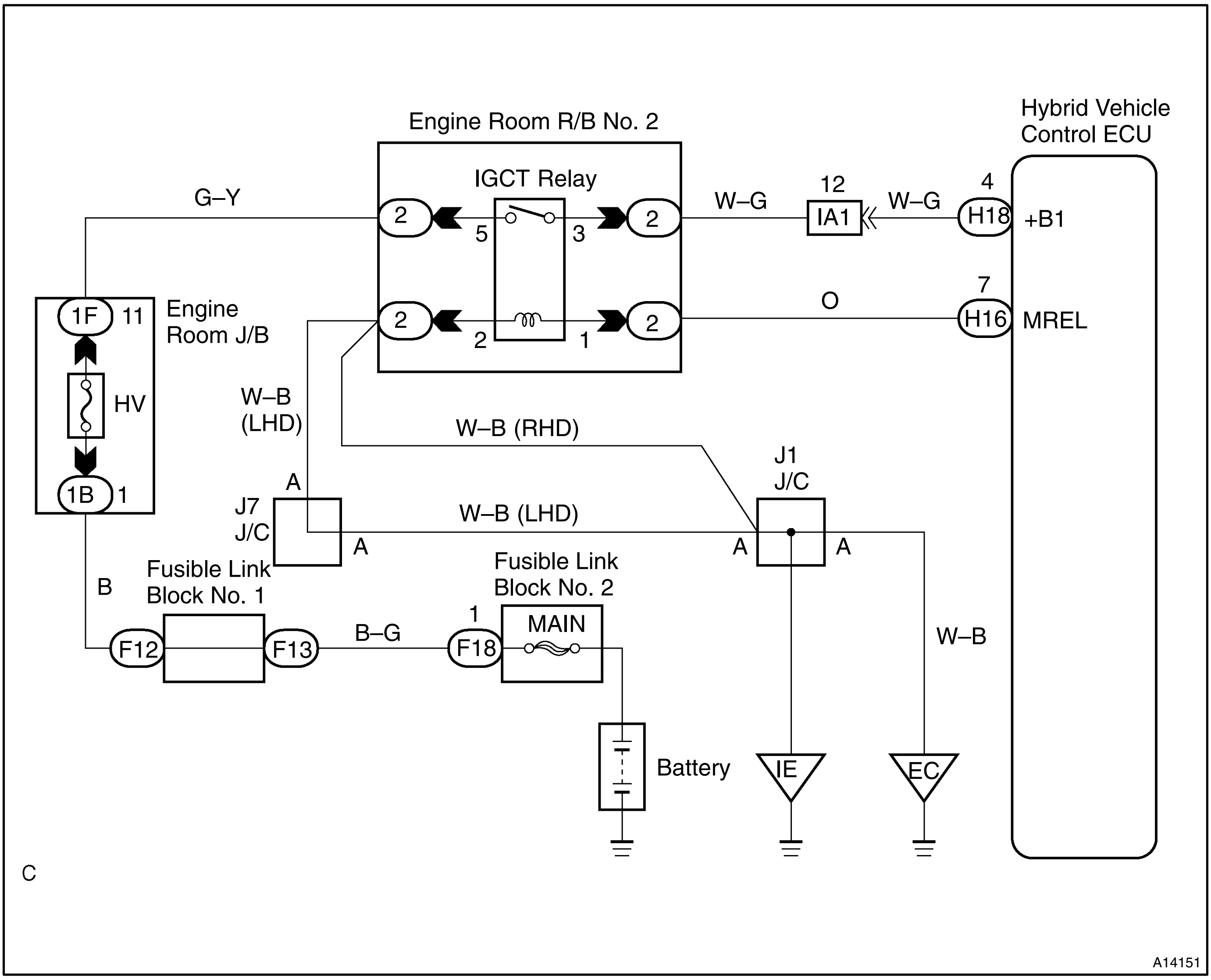
CIRCUIT DESCRIPTION

The HV ECU checks the IGCT relay and detects malfunction.

DTC P3110 – Information code 223

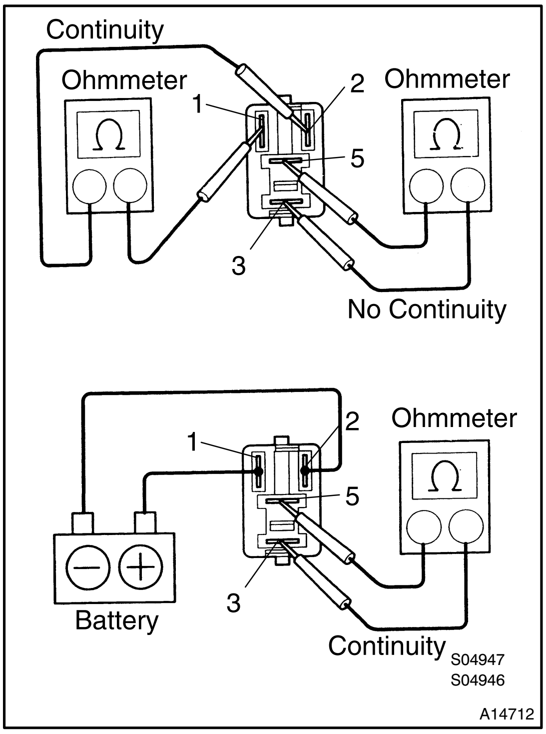
INF. Code.	Detecting Condition	Trouble Area
223	When IGCT relay is always closed.	• Wire harness • IGCT relay

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check IGCT relay.**



PREPARATION:

Remove the IGCT relay from the engine room R/B No. 3.

CHECK:

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

(b) Check that there is no continuity between terminals 3 and 5.

(c) Apply battery voltage across terminals 1 and 2. Using an ohmmeter, check that there is continuity between terminals 3 and 5.

OK:

(a) Continuity
(b) No continuity
(c) Continuity

NG	**Replace IGCT relay.**

OK

Check for +B short in wire harness between HV ECU and IGCT relay (See page IN–40)
Repair or replace wire harness.

HINT:
The HV ECU MREL terminal has +B short if the battery voltage is always applied to the HV ECU +B1 or MREL terminal with the ignition OFF.

DI836–01

DTC	P3115	System Main Relay Malfunction

CIRCUIT DESCRIPTION

The HV ECU checks that the system main relay (No. 1, No. 2, No. 3) is normally operating and detects malfunction.

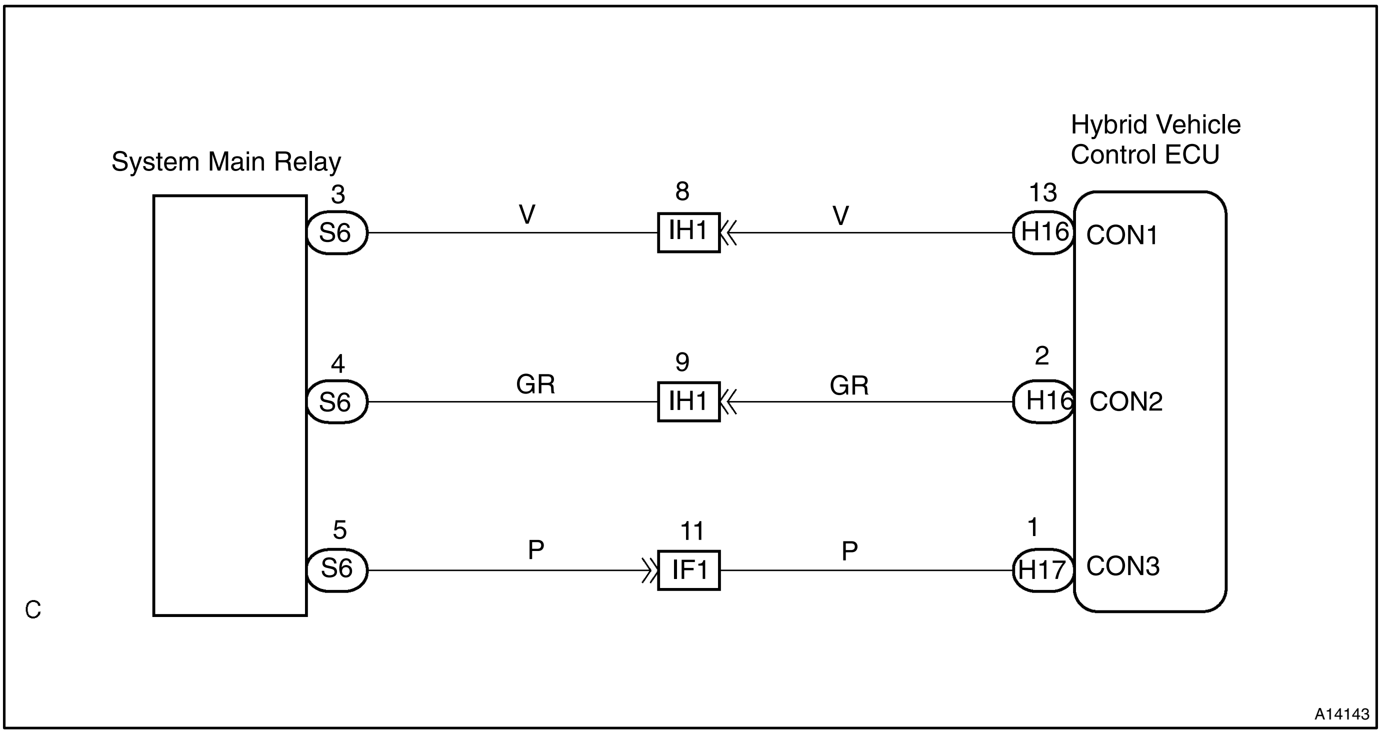
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3115 – Information code 224, 225, 226, 227, 228, 229

INF. Code.	Detecting Condition	Trouble Area
224	Open or +B short in system main relay No. 1 circuit	• Wire harness • System main relay • HV ECU
225	Short in system main relay No. 1 circuit	
226	Open or +B short in system main relay No. 2 circuit	
227	Short in system main relay No. 2 circuit	
228	Open or +B short in system main relay No. 3 circuit	
229	Short in system main relay No. 3 circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU terminals (Cont1, Cont2, Cont3) and system main relay terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. If the battery voltage is always applied to the HV ECU Cont1, Cont2 and Cont3 terminals with the ignition ON (”READY” light OFF), the system main relay has +B short.

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

OK

2	**Is any of the information code 231, 232 or 233 recorded?**

NO → **Replace HV ECU.**

YES

Replace system main relay.

CIRCUIT DESCRIPTION

If the system main relay is deposited, it might be impossible to shut down the high voltage system. Therefore, the HV ECU checks the system main relay and stops the system if malfunction is detected.

DTC P3115 – Information code 231, 232, 233

INF. Code.	Detecting Condition	Trouble Area
231	System main relay + terminal deposited	• System main relay • HV ECU
232	System main relay – terminal deposited	
233	System main relay + & – terminal deposited	

INSPECTION PROCEDURE

If any of these information codes is output, replace the system main relay.
If one of the information codes above and any of the information codes 224 – 229 are recorded at the same time, also replace the HV ECU.

DI837–01

DTC	P3120	HV Transaxle Malfunction

CIRCUIT DESCRIPTION

The HV ECU checks the energy balance and detects abnormality if the magnetism of the motor or generator greatly decreases.

HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3120 – Information code 234, 235, 236, 237

INF. Code.	Detecting Condition	Trouble Area
234	Small reduction of motor magnetism	• HV transaxle (motor)
235	Large reduction of motor magnetism	
236	Small reduction of generator magnetism	• HV transaxle (generator)
237	Large reduction of generator magnetism	

INSPECTION PROCEDURE

1	Is DTC of HV battery ECU being output?

YES → **Check applicable DTC.**

NO

2	**Check main current sensor. (In SMR)**

Measurement of Resistance between SMR S6 Connector Terminals

Terminal No. (Tester +)	Terminal No. (Tester –)	Resistance
7	2	30 – 50 kΩ
7	6	More than 10 MΩ
2	7	30 – 50 kΩ
2	6	More than 10 MΩ
6	7	300 – 400 kΩ
6	2	3 – 5 MΩ

NG → **Replace system main relay.**

OK

Replace HV transaxle motor or generator.

CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the transmission system. Judging from a malfunction symptom, it records one of the four information codes.

DTC P3120 – Information code 239, 240, 241, 242

INF. Code.	Detecting Condition	Trouble Area
239	Shaft damaged	• HV transaxle
240	Generator locked	
241	Torque limiter sliding	
242	Planetary gear locked	

INSPECTION PROCEDURE

If any of these information codes is output, replace the defective part inside the HV transaxle.

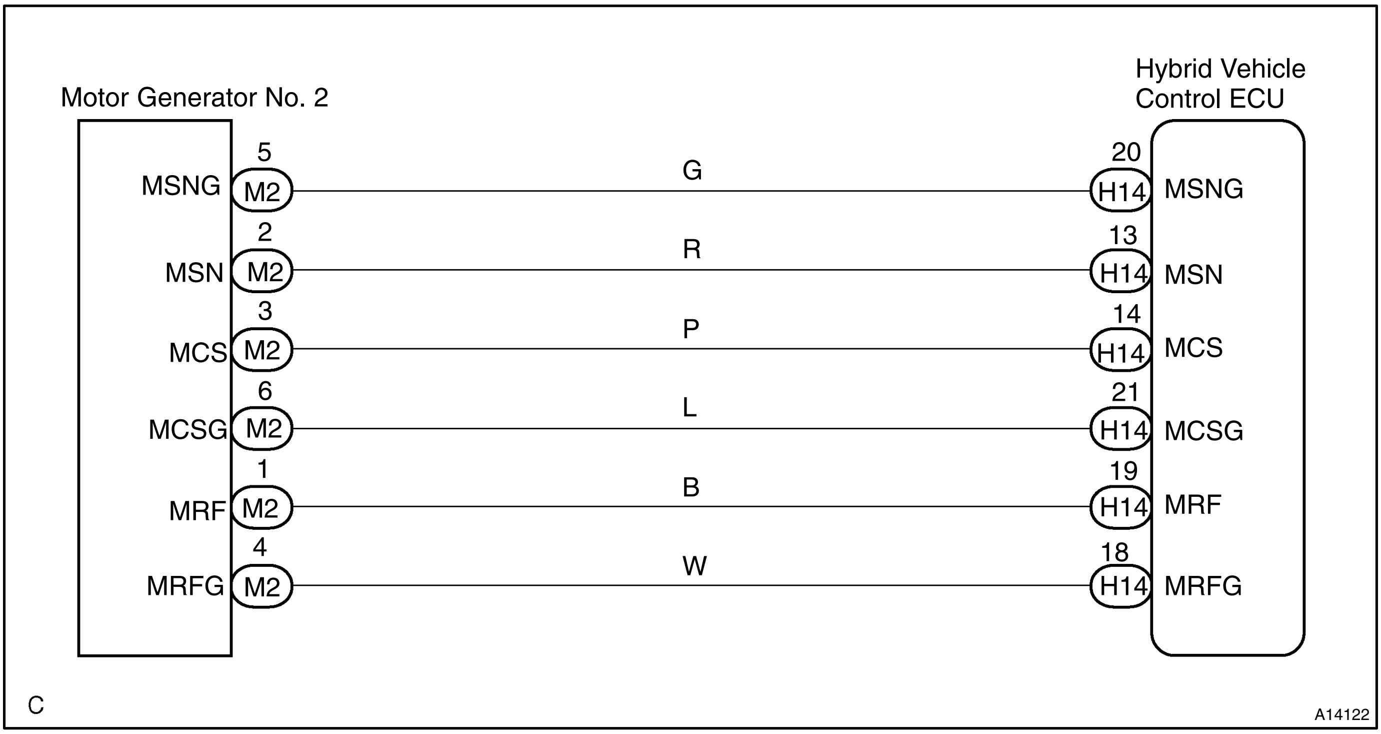
CIRCUIT DESCRIPTION

The HV ECU checks the motor resolver and detects malfunction.

DTC P3120 – Information code 243, 244, 245, 246

INF. Code.	Detecting Condition	Trouble Area
243	Motor resolver inter–phase short	• HV transaxle • Wire harness
244	Motor resolver inter–phase short (when there is a history that the state of malfunction continued during inverter fail safe mode)	
245	Open or short in motor resolver circuit	
246	Open or short in motor resolver circuit (when there is a history that the state of malfunction continued during inverter fail safe mode)	

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check for open and short in wire harness between HV transaxle and HV ECU (See page IN–40).**

Terminals for checking open and short:

MG2 Terminals	HV ECU Terminals
MSNG	MSNG
MSN	MSN
MCS	MCS
MCSG	MCSG
MRF	MRF
MRFG	MRFG

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

OK

Check for open in motor resolver or inter–phase short and then replace HV transaxle motor. Check motor resolver (See page HV–40).

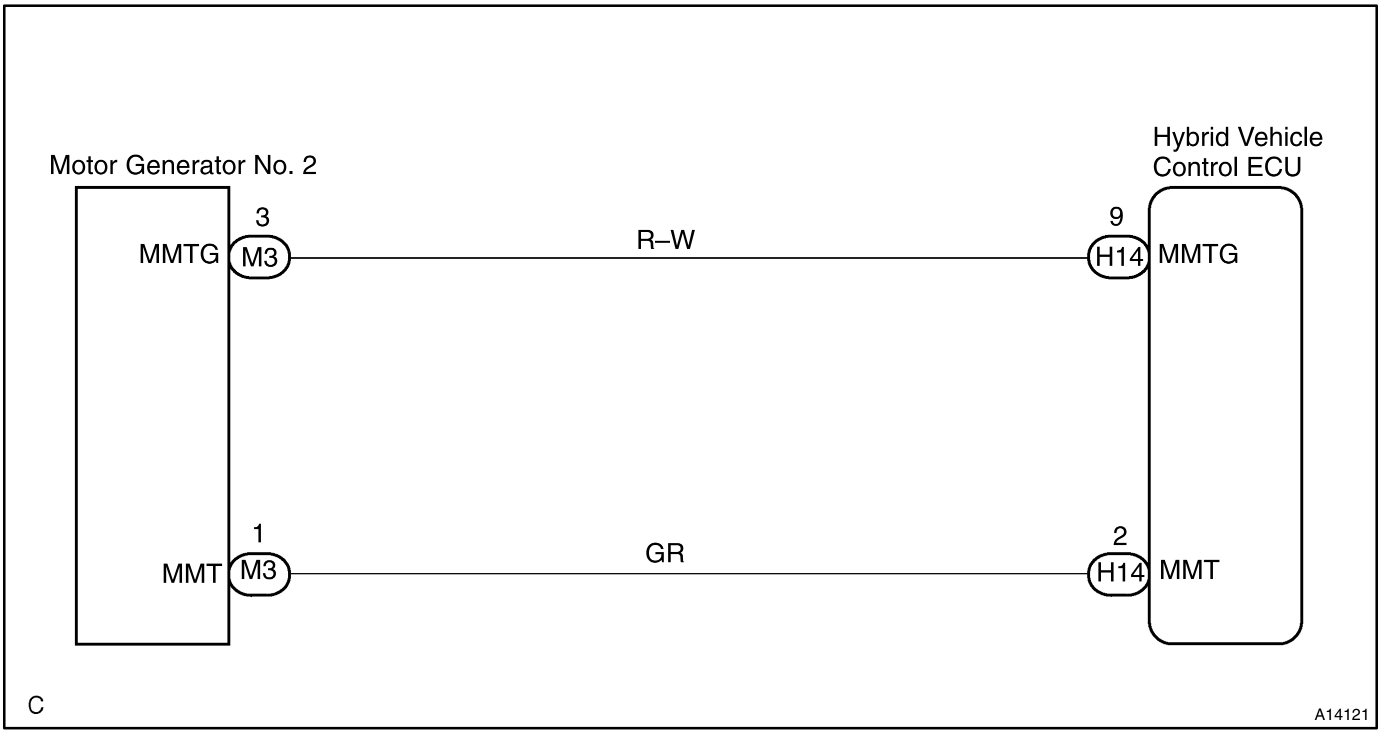
CIRCUIT DESCRIPTION

The HV ECU checks the motor temperature and controls the load limitation in order to prevent the motor from overheating. Also, it detects the abnormality of the line connection of the motor temperature sensor and malfunction of the sensor itself.

DTC P3120 – Information code 247, 249

INF. Code.	Detecting Condition	Trouble Area
247	GND short in motor temperature sensor	• HV transaxle • Wire harness
249	Open or +B short in motor temperature sensor	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check open, short and +B short in wire harness between HV transaxle motor temperature sensor MMT and MMTG terminals and HV ECU MMT and MMTG terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. If the voltage of the HV ECU MMT terminal is always more than 5V with the ignition ON, the motor temperature sensor circuit has +B short.

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

OK

Check for open in motor temperature sensor and then replace HV transaxle motor.
Check motor temperature sensor (See page HV–40).

CIRCUIT DESCRIPTION

DTC P3120 – Information code 248, 250

INF. Code.	Detecting Condition	Trouble Area
248	Motor temperature sensor malfunction	• HV transaxle motor
250	Motor temperature sensor performance problem	

INSPECTION PROCEDURE

If the information code 248 or 250 is output, replace the HV transaxle motor.

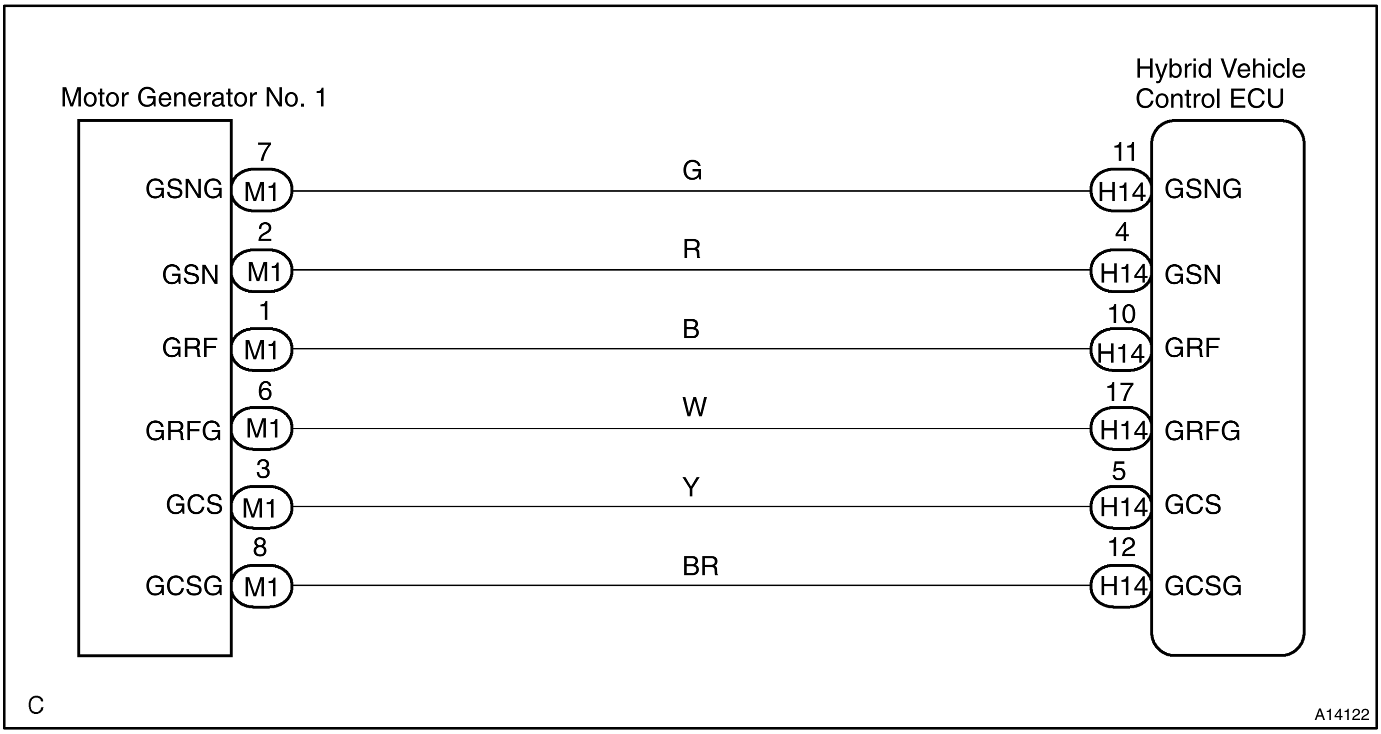
CIRCUIT DESCRIPTION

The HV ECU checks the generator resolver and detects malfunction.

DTC P3120 – Information code 253, 254, 255, 256

INF. Code.	Detecting Condition	Trouble Area
253	Generator resolver inter–phase short	• HV transaxle (generator) • Wire harness
254	Generator resolver inter–phase short (when there is a history that the state of malfunction continued during inverter fail safe mode)	
255	Open or short in generator resolver circuit	
256	Open or short in generator resolver circuit (when there is a history that the state of malfunction contained during inverter fail safe mode)	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open and short in wire harness between HV transaxle and HV ECU (See page IN–40).**

Terminals for checking open and short:

MG1 Terminals	HV ECU Terminals
GSNG	GSNG
GSN	GSN
GCS	GCS
GCSG	GCSG
GRF	GRF
GRFG	GRFG

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

OK

Check for open in generator resolver or inter–phase short and then replace HV transaxle generator.
Check generator resolver (See page HV–40).

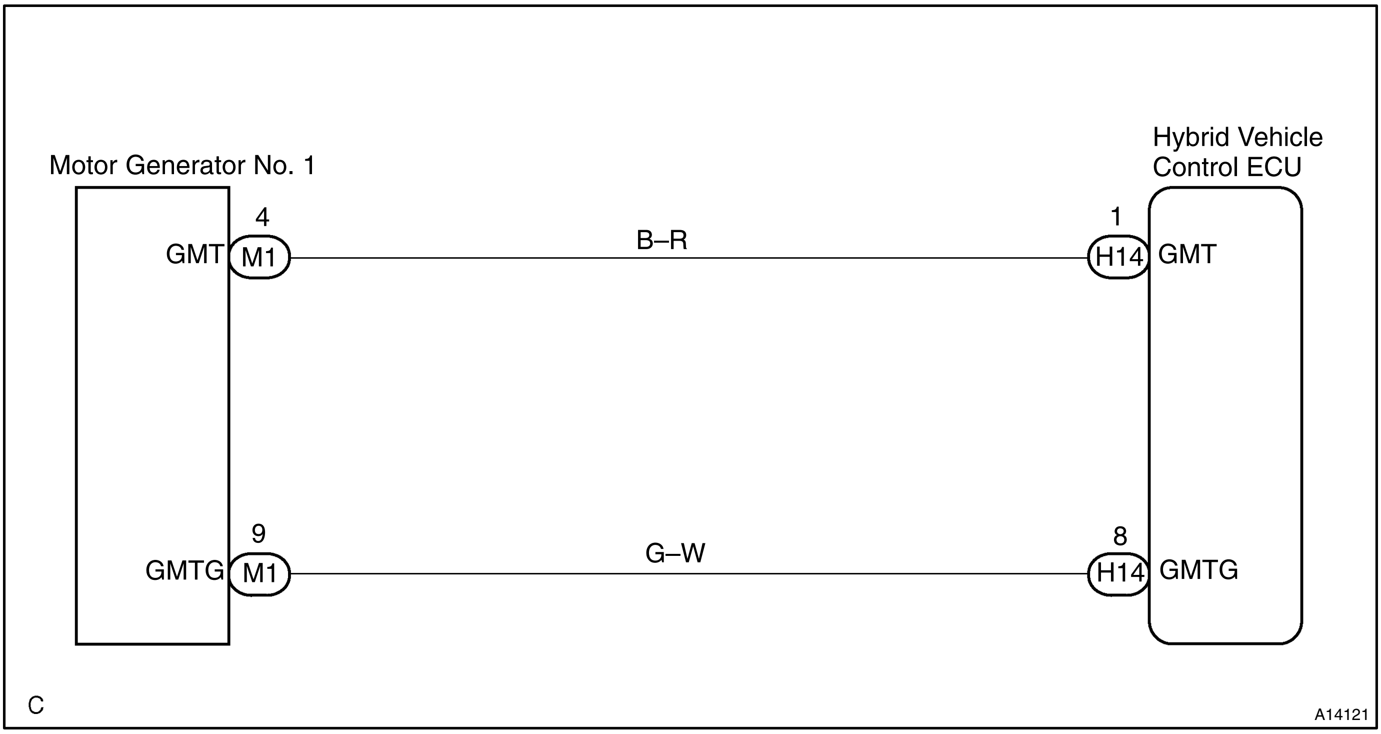
CIRCUIT DESCRIPTION

The HV ECU checks the generator temperature and controls the load limitation in order to prevent the generator from overheating. Also, it detects the abnormality of the line connection of the generator temperature sensor and the malfunction of the sensor itself.

DTC P3120 – Information code 254, 259

INF. Code.	Detecting Condition	Trouble Area
257	GND short in generator temperature sensor	• HV transaxle • Wire harness
259	Open or +B short in generator temperature sensor	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open, short and +B short in wire harness between HV transaxle generator temperature sensor GMT and GMTG terminals and HV ECU GMT and GMTG terminals (See page IN–40).

HINT:
Confirm that there is no open circuit in the wire harness. If the voltage of the HV ECU GMT terminal is always more than 5V with the ignition ON, the generator temperature sensor circuit has +B short.

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

OK

Check for open in generator temperature sensor and then replace HV transaxle generator. Check generator temperature sensor (See page HV–40).

CIRCUIT DESCRIPTION

DTC P3120 – Information code 258, 260

INF. Code.	Detecting Condition	Trouble Area
258	Generator temperature sensor malfunction	• HV transaxle generator
260	Generator temperature sensor performance problem	

INSPECTION PROCEDURE

If the information code 258 or 260 is output, replace the HV transaxle generator.

DI838–01

DTC	P3125	Converter & Inverter Assembly Malfunction

CIRCUIT DESCRIPTION

If driving the vehicle with the DCDC converter malfunctioning, the voltage of the auxiliary battery will drop, which will make it impossible to keep driving the vehicle. Therefore, HV ECU checks the operation of the DCDC converter and gives warning to the driver if malfunction is detected.

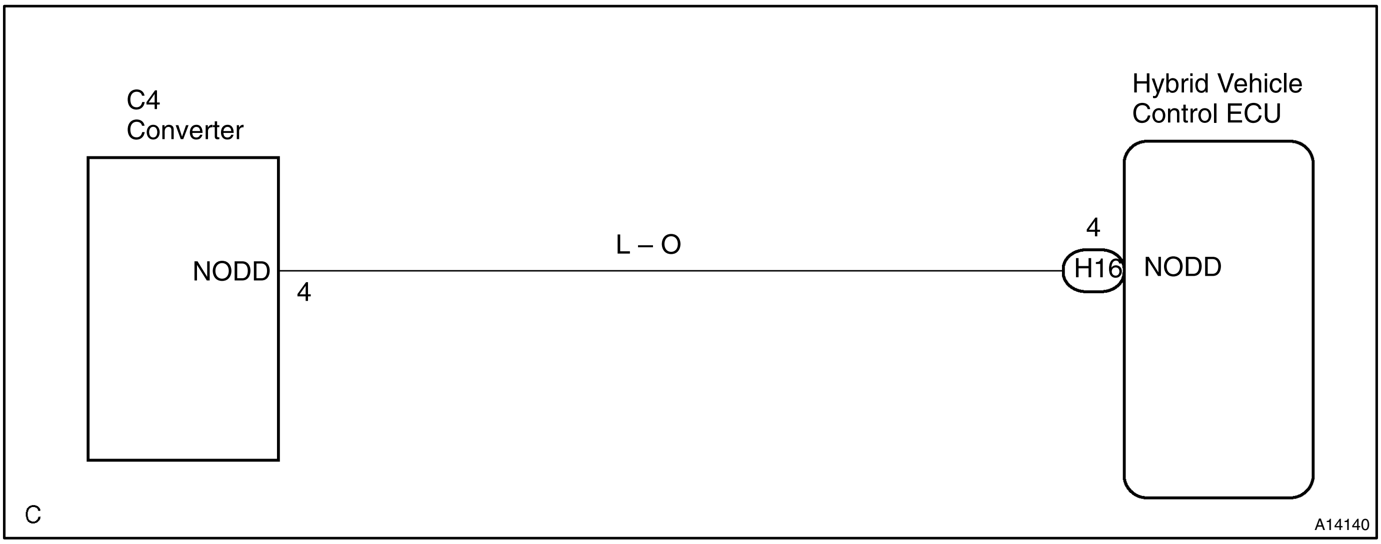
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3125 – Information code 263, 265

INF. Code.	Detecting Condition	Trouble Area
263	+B short in DCDC converter NODD wiring	• Converter & inverter assembly • Wire harness
265	Open or GND short in DCDC converter NODD wiring	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU NODD terminal and converter & inverter NODD terminal (See page IN–40).**

HINT:
The converter has +B short if the battery voltage is always applied to the HV ECU NODD terminal with the ignition ON.

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

OK

Replace converter & inverter.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 264

INF. Code.	Detecting Condition	Trouble Area
264	DCDC converter malfunction	• Converter & inverter assembly

INSPECTION PROCEDURE

If any of the above information code is output, replace the converter & inverter assembly.

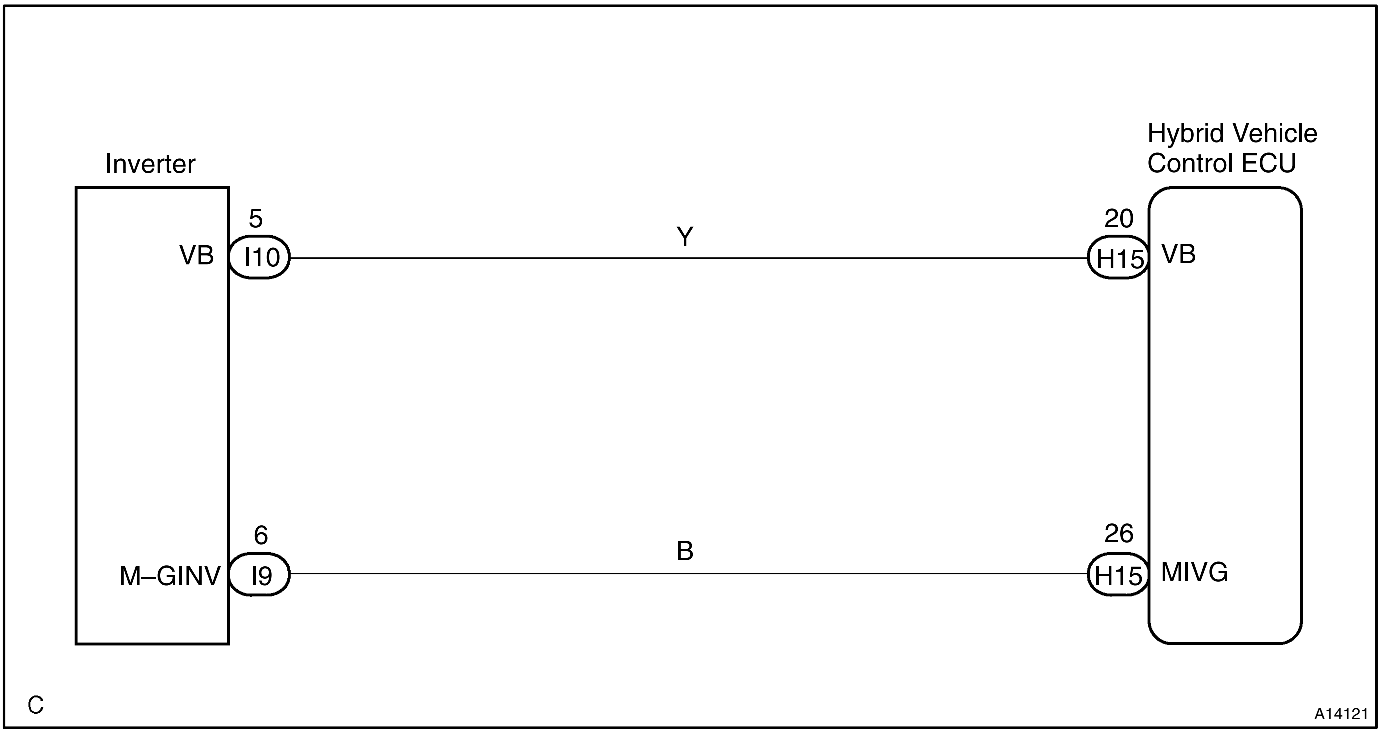
CIRCUIT DESCRIPTION

The HV ECU checks the inverter voltage and detects malfunction.

DTC P3125 – Information code 266, 267, 268, 269, 270

INF. Code.	Detecting Condition	Trouble Area
266	Open or GND short in inverter voltage signal circuit	• Converter & inverter assembly • Wire harness
267	+B short in inverter voltage signal circuit	
268	Inverter voltage signal is inconsistent with battery voltage	
269	Inverter voltage sensor malfunction	
270	Abnormality of line connection of inverter voltage signal circuit (when there is a history that the state of malfunction continued during inverter fail safe mode	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU VB and MIVG terminals and converter & inverter assembly VB and M–GINV terminal (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. If the voltage between the HV ECT VB or MIVG terminal and body ground is always more than 5V with the ignition ON, the inverter voltage signal circuit has +B short.

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

OK

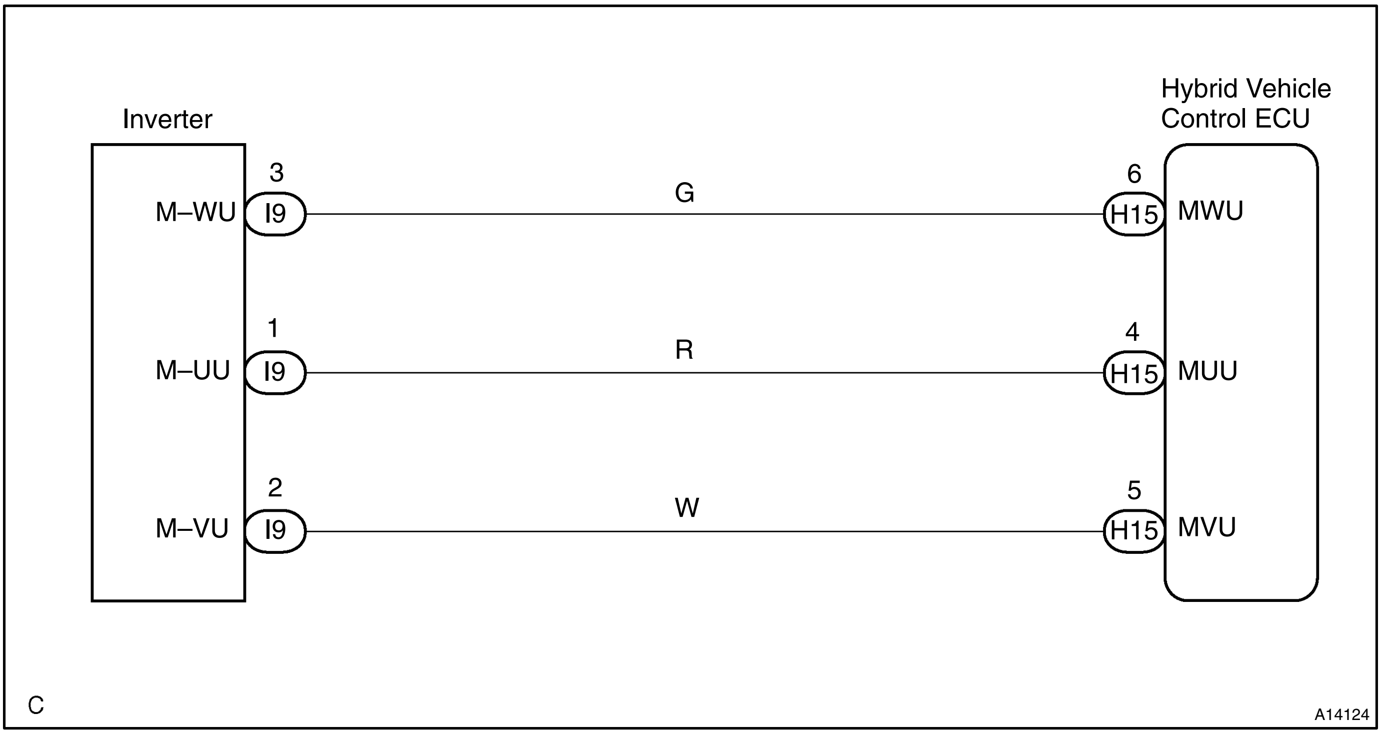
Replace converter & inverter.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 272

INF. Code.	Detecting Condition	Trouble Area
272	Abnormality of line connection of motor PWM (when there is a history that the state of malfunction continued during inverter fail safe mode)	• Wire harness • Converter & inverter assembly • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check open and short in wire harness between HV ECU terminals (MUU, MVU, MWU) and inverter terminals.**

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

OK

2	**Check voltage between inverter terminals (MUU, MVU, MWU) and body ground, with ignition turned ON.**

OK:

Standard voltage: 13 – 17 V

NG → **Replace inverter.**

OK

Replace HV ECU.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 273

INF. Code.	Detecting Condition	Trouble Area
273	Motor inverter malfunction	• Converter & inverter assembly

INSPECTION PROCEDURE

If any of the above information code is output, replace the converter & inverter assembly.

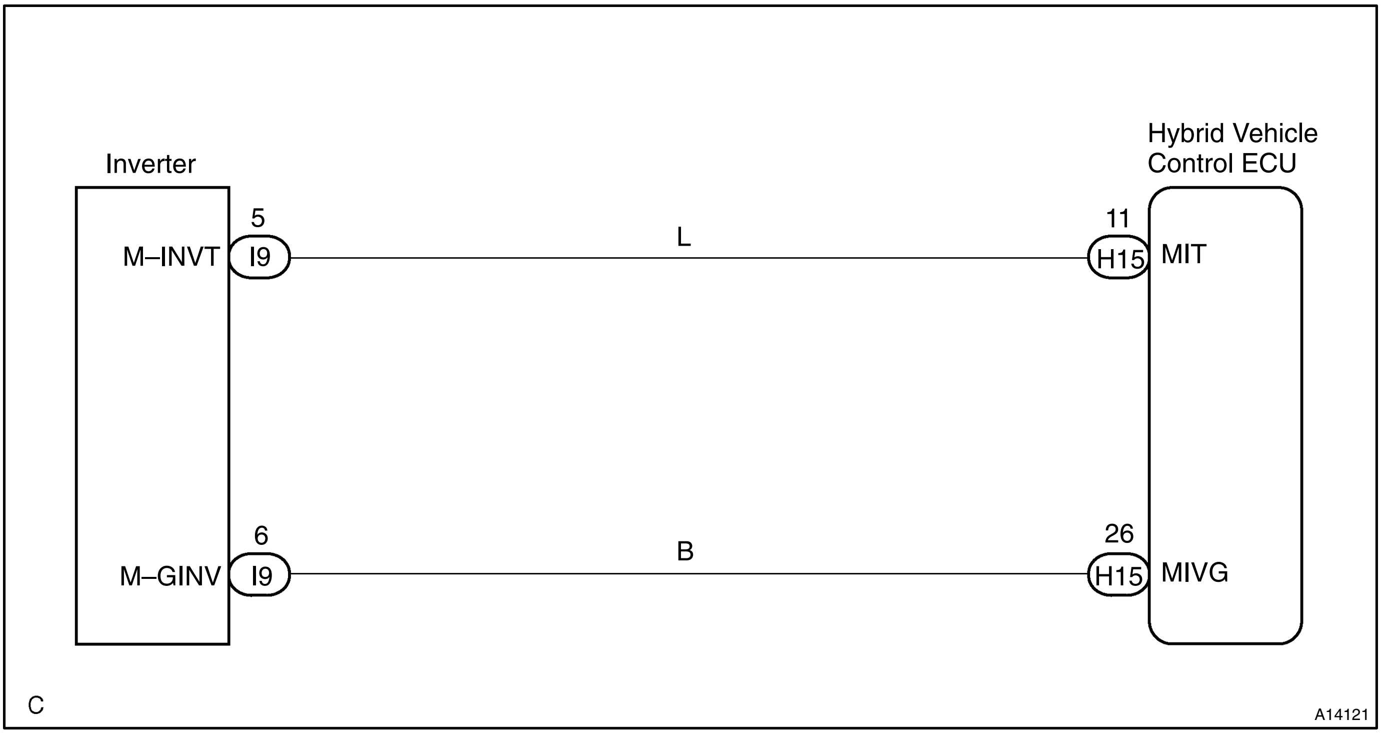
CIRCUIT DESCRIPTION

The HV ECU checks the inverter temperature and controls the load limitation in order to prevent the inverter from overheating. Also, it detects the abnormality of the line connection of the inverter temperature sensor and the malfunction of the sensor itself.

DTC P3125 – Information code 274, 275, 276, 277

INF. Code.	Detecting Condition	Trouble Area
274	Open or +B short in motor inverter temperature sensor	• Converter & inverter assembly • Wire harness • HV ECU
275	GND short in motor inverter temperature sensor	
276	Motor inverter temperature sensor malfunction	
277	Motor inverter temperature sensor performance problem	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU MIT and MIVG terminals and converter & inverter M–INVT, M–GINV terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. If the voltage between the HV ECU MIT or MIVG terminal and body ground is always more than 5V with the ignition ON, the motor inverter temperature sensor circuit has +B short.

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

OK

Check for open in motor inverter temperature sensor and then replace converter & inverter assembly. Check motor inverter temperature sensor (See page HV–14).

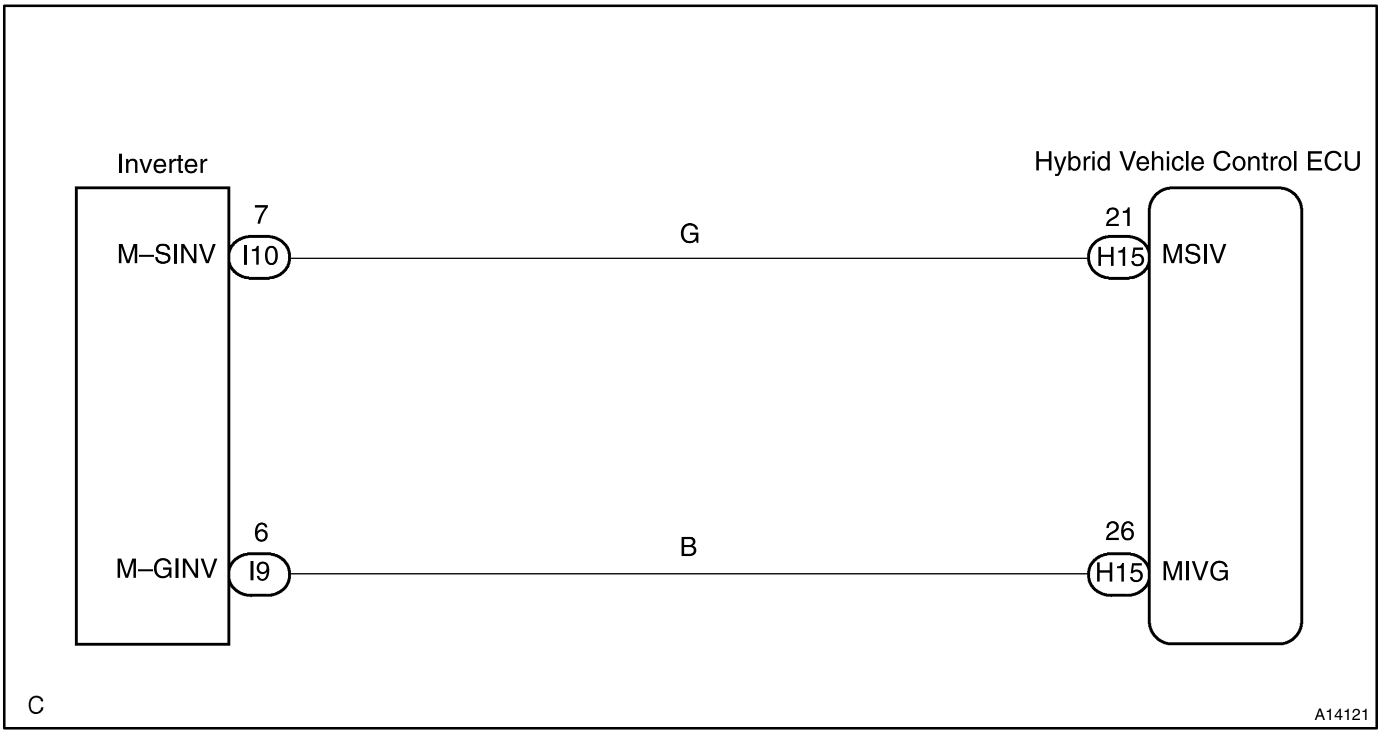
CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the motor inverter stop signal circuit and enters the fail safe mode (limited output driving) if malfunction is detected.

DTC P3125 – Information code 278, 280

INF. Code.	Detecting Condition	Trouble Area
278	+B short in motor inverter stop signal circuit	• Converter & inverter assembly • Wire harness
280	Open or GND short in motor inverter stop signal circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU MSIV and MIVG terminals and converter & inverter assembly M–SINV and M–GIVN terminals (See page IN–40).**

HINT:
The motor inverter stop signal circuit has +B short if the voltage between the HV ECU MSIV or MIGV terminal and body ground is always more than 13 V with the ignition ON (”READY” light OFF).

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

OK

Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 279, 281, 282

INF. Code.	Detecting Condition	Trouble Area
279	Over voltage of inverter	• Converter & inverter assembly
281	Voltage drop of inverter power source	
282	Inverter circuit broken	

INSPECTION PROCEDURE

If the information code 279 or 281 is output, check if other information codes are recorded. If they are recorded, check and repair those codes first.
If the information code 279 or 281 alone is recorded, replace the converter & inverter assembly.
If the information code 282 is output, replace the converter & inverter assembly.

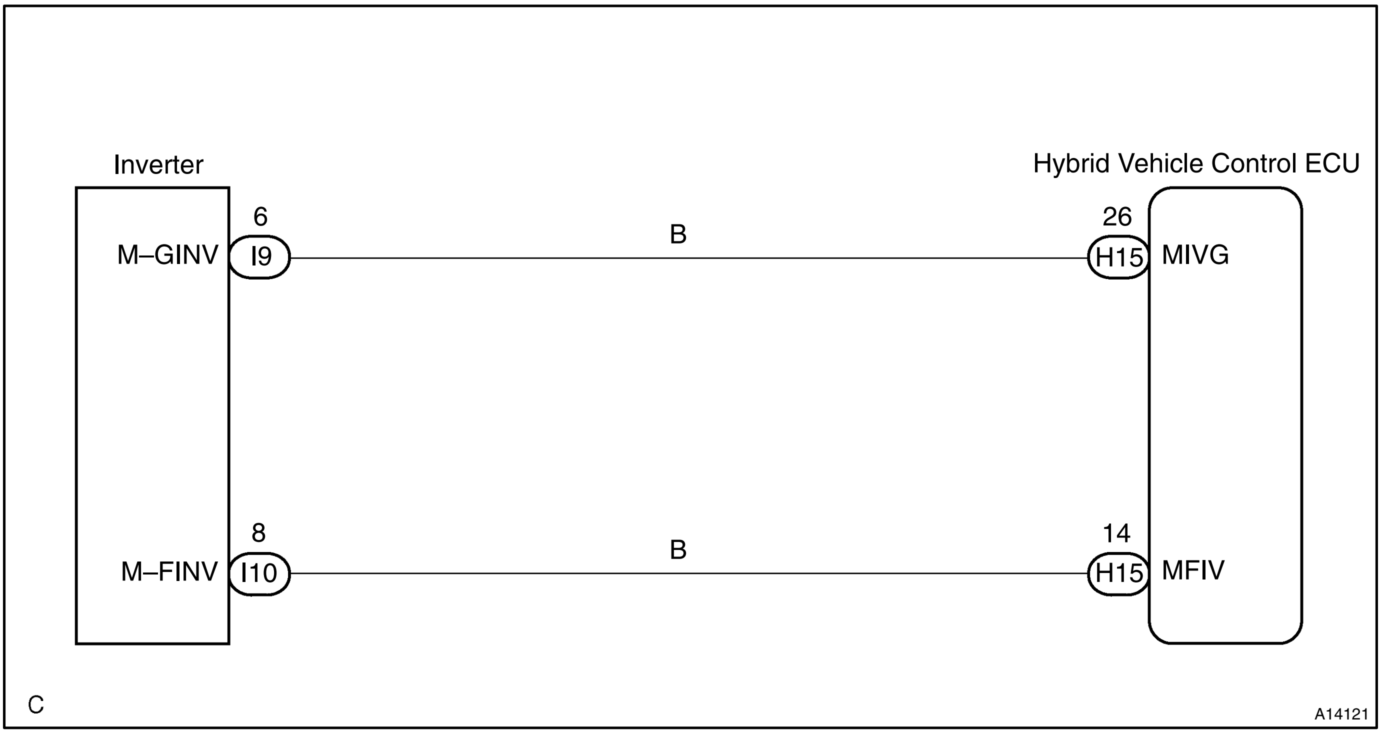
CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the motor inverter fail signal circuit and detects malfunction.

DTC P3125 – Information code 283, 285

INF. Code.	Detecting Condition	Trouble Area
283	+B short in motor inverter fail signal circuit	• Converter & inverter assembly • Wire harness
285	Open or GND short in motor inverter fail signal circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU MFIV and MIVG terminals and converter & inverter assembly M–FINV and M–GINV terminals (See page IN–40).**

HINT:
The motor inverter fail signal circuit has +B short if the voltage between the HV ECU MIVG or MFIV terminal and body ground is always more than 13 V with the ignition ON (”READY” light OFF).

NG — **Repair or replace wire harness.**

OK

Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 284, 286, 287

INF. Code.	Detecting Condition	Trouble Area
284	Inverter overheating	• Converter & inverter assembly
286	Inverter circuit broken	
287	Inverter internal short	

INSPECTION PROCEDURE

If the information code 284 or 287 is output, check if other information codes are recorded. If they are recorded, check and repair those codes first.
If the information code 284 or 287 alone is recorded, replace the converter & inverter assembly.
If the information code 286 is output, replace the converter & inverter assembly.

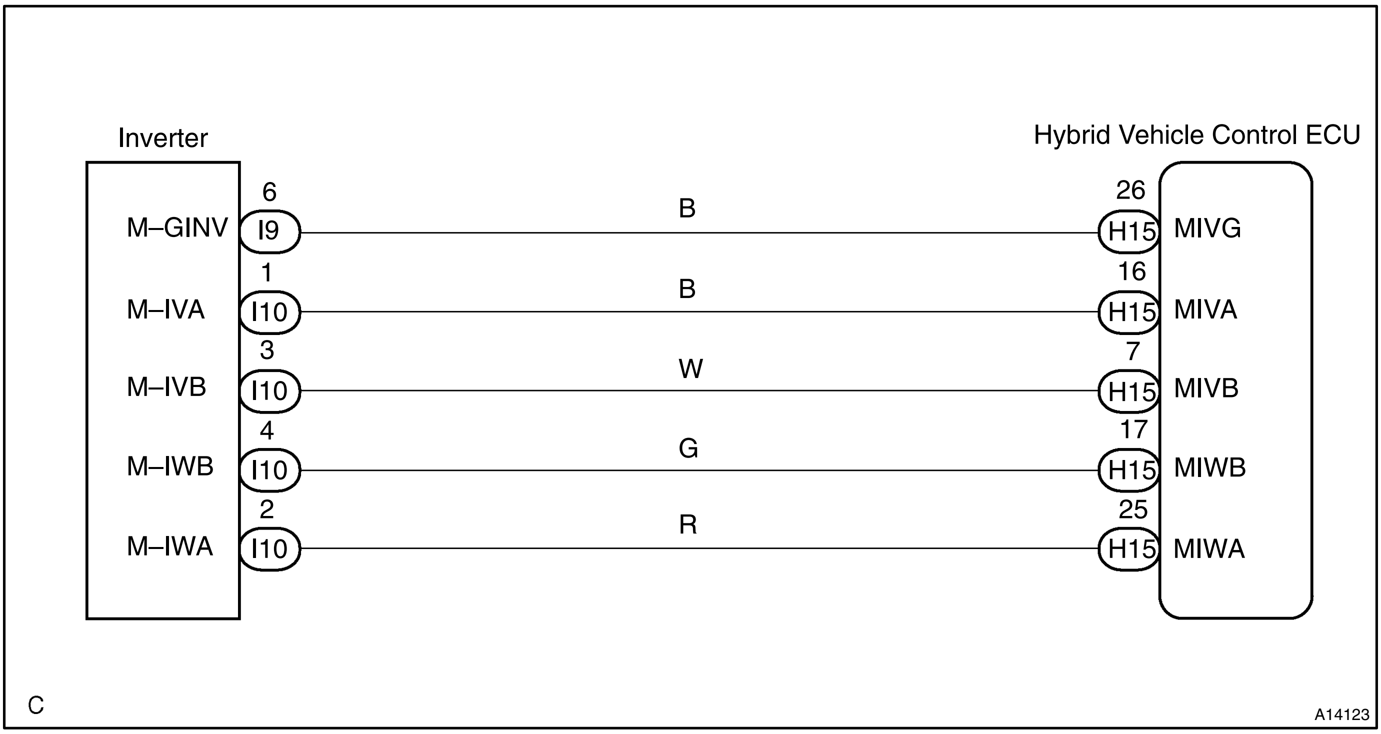
CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the motor inverter current sensor. It detects the malfunction of the sensor system, not of the high voltage system.

DTC P3125 – Information code 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300,301, 302, 303

INF. Code.	Detecting Condition	Trouble Area
289	Open in motor inverter current sensor (V phase sub sensor)	• Converter & inverter assembly • Wire harness
292	Open in motor inverter current sensor (V phase main sensor)	
297	Open in motor inverter current sensor (W phase sub sensor)	
300	Open in motor inverter current sensor (W phase main sensor)	
288	Motor inverter current sensor malfunction (V phase sub sensor)	
290	Motor inverter current sensor malfunction (V phase main sensor)	
294	Motor inverter current sensor V phase performance problem	
296	Motor inverter current sensor malfunction (W phase sub sensor)	
298	Motor inverter current sensor malfunction (W phase main sensor)	
302	Motor inverter current sensor W phase performance problem	
291	(when there is a history that the state of malfunction continued during inverter fail safe mode)	
293		
295		
299		
301		
303		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check continuity of wire harness between HV ECU and converter & inverter assembly (See page IN–40).**

OK:

Continuity: Less then 1 Ω

HV ECU Terminals	Inverter Terminals
MIVA	M–IVA
MIVB	M–IVB
MIWA	M–IWA
MIWB	M–IWB
MIVG	M–GINV

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

OK

Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the motor inverter current sensor. It detects the malfunction of the sensor system, not of the high voltage system.

DTC P3125 – Information code 306, 307

INF. Code.	Detecting Condition	Trouble Area
306	Failure in monitoring motor torque performance	• Converter & inverter assembly
307	Abnormal current value of motor	

INSPECTION PROCEDURE

If the information code 306 or 307 is output, check if other information codes are recorded. If they are recorded, check and repair those codes first.
If the information code 306 or 307 alone is recorded, replace the converter & inverter assembly.

CIRCUIT DESCRIPTION

If the HV ECU detects the collision signal from the airbag or inverter, the HV ECU recognizes it as the destruction of the vehicle and then shuts down the high voltage system to ensure safety.

DTC P3125 – Information code 308

INF. Code.	Detecting Condition	Trouble Area
308	Input of collision signal from airbag or inverter	–

HINT:
When the vehicle collision occurs and the airbag is deployed, this information code will be recorded and the high voltage system will be shut down.

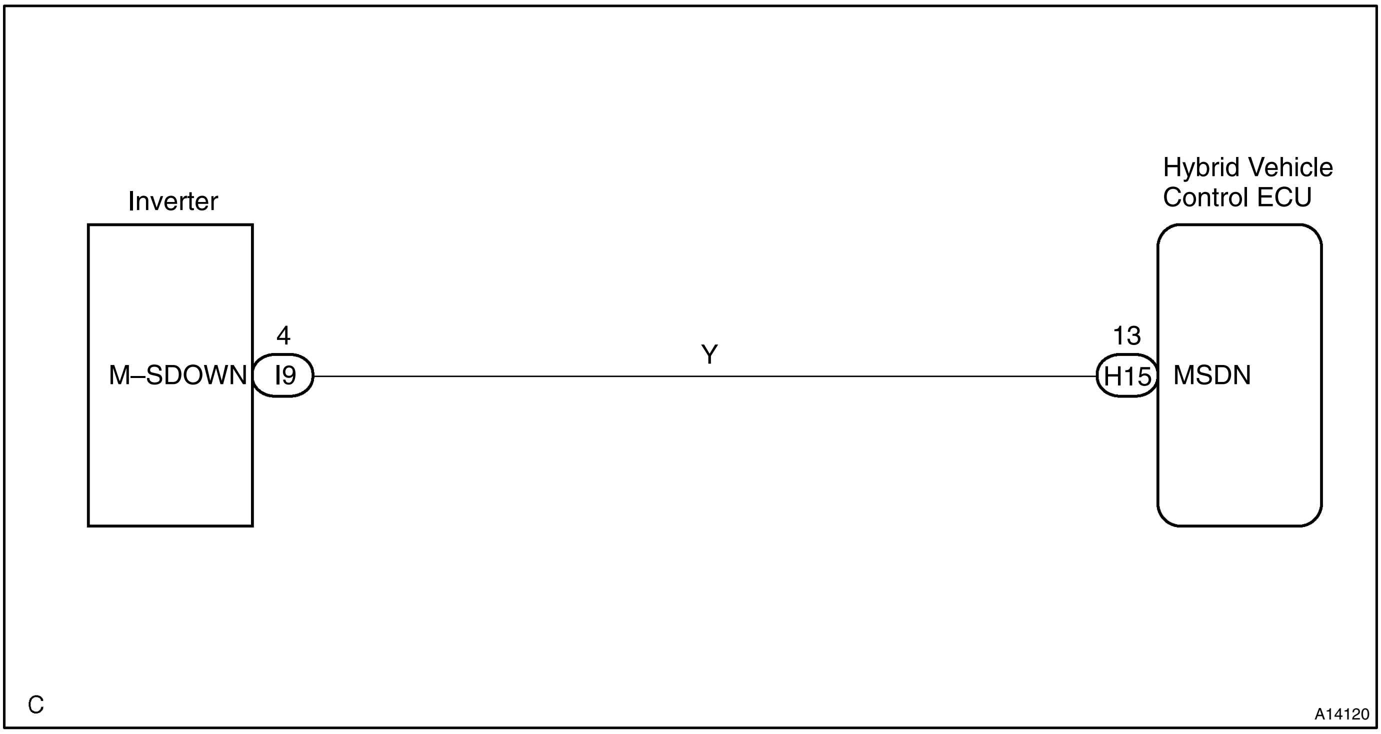
CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the motor gate shutdown signal circuit and detects malfunction.

DTC P3125 – Information code 304, 305

INF. Code.	Detecting Condition	Trouble Area
304	+B short in motor gate shutdown signal circuit	• Converter & inverter assembly • Wire harness
305	Open or GND short in motor gate shutdown signal circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU MSDN terminal and converter & inverter assembly M–SDOWN terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. The motor gate shutdown signal circuit has +B short if the battery voltage is always applied to the HV ECU MSDN terminal with the ignition ON.

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

OK

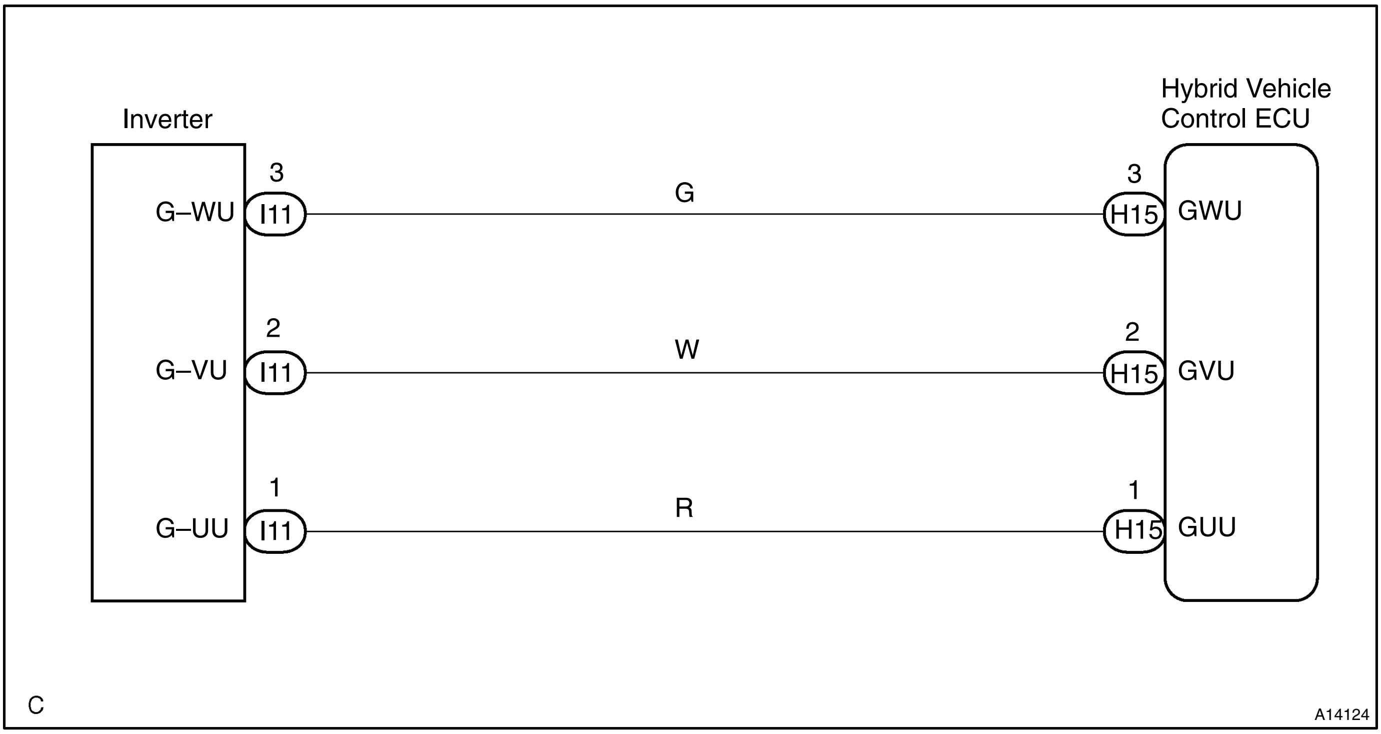
Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 309

INF. Code.	Detecting Condition	Trouble Area
309	Open or short in generator inverter switching wiring (GUU, GVU, GWU)	• Wire harness • Converter & inverter assembly • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short in wire harness between HV ECU terminals (GUU, GVU, GWU) and inverter terminals.

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

OK

2	Check voltage between inverter terminals (GUU, GVU, GWU) and body ground, with ignition turned ON.

OK:

Standard voltage: 13 – 17 V

NG → **Replace inverter.**

OK

Replace HV ECU.

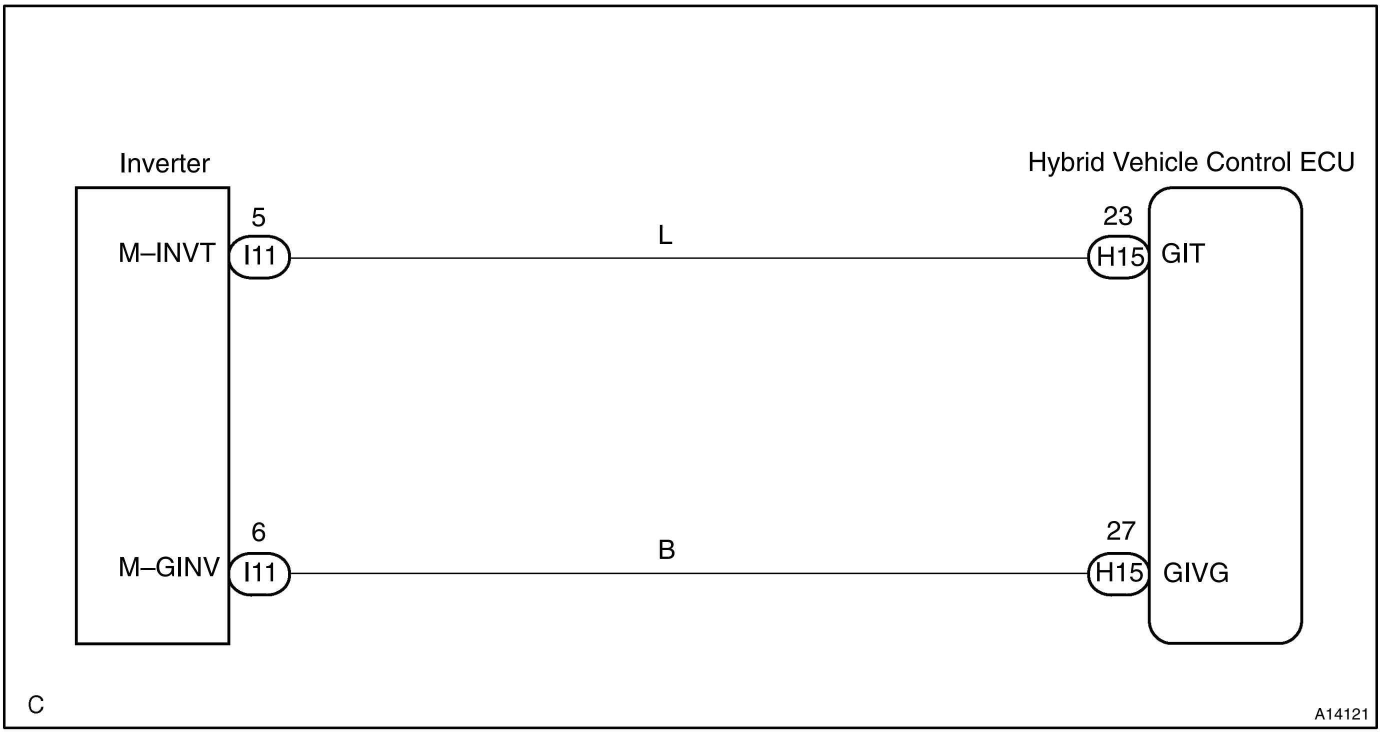
CIRCUIT DESCRIPTION

The HV ECU checks the generator temperature and controls the load limitation in order to prevent the generator from overheating. Also, it detects the abnormality of the line connection of the generator temperature sensor and the malfunction of the sensor itself.

DTC P3125 – Information code 312, 313, 314, 315

INF. Code.	Detecting Condition	Trouble Area
312	Open or +B short in generator inverter temperature sensor	• Converter & inverter assembly • Wire harness • HV ECU
313	GND short in generator inverter temperature sensor	
314	Generator inverter temperature sensor malfunction	
315	Generator inverter temperature sensor performance problem	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU GIT and GIVG terminals and converter & inverter G–GINV or G–GINV terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. The generator inverter temperature sensor circuit has +B short if the voltage between the HV ECU GIT or GIVG terminal and body ground is always more than 5V with the ignition ON.

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

OK

Check for open in generator inverter temperature sensor and then replace converter & inverter assembly. Check generator inverter temperature sensor (See page HV–14).

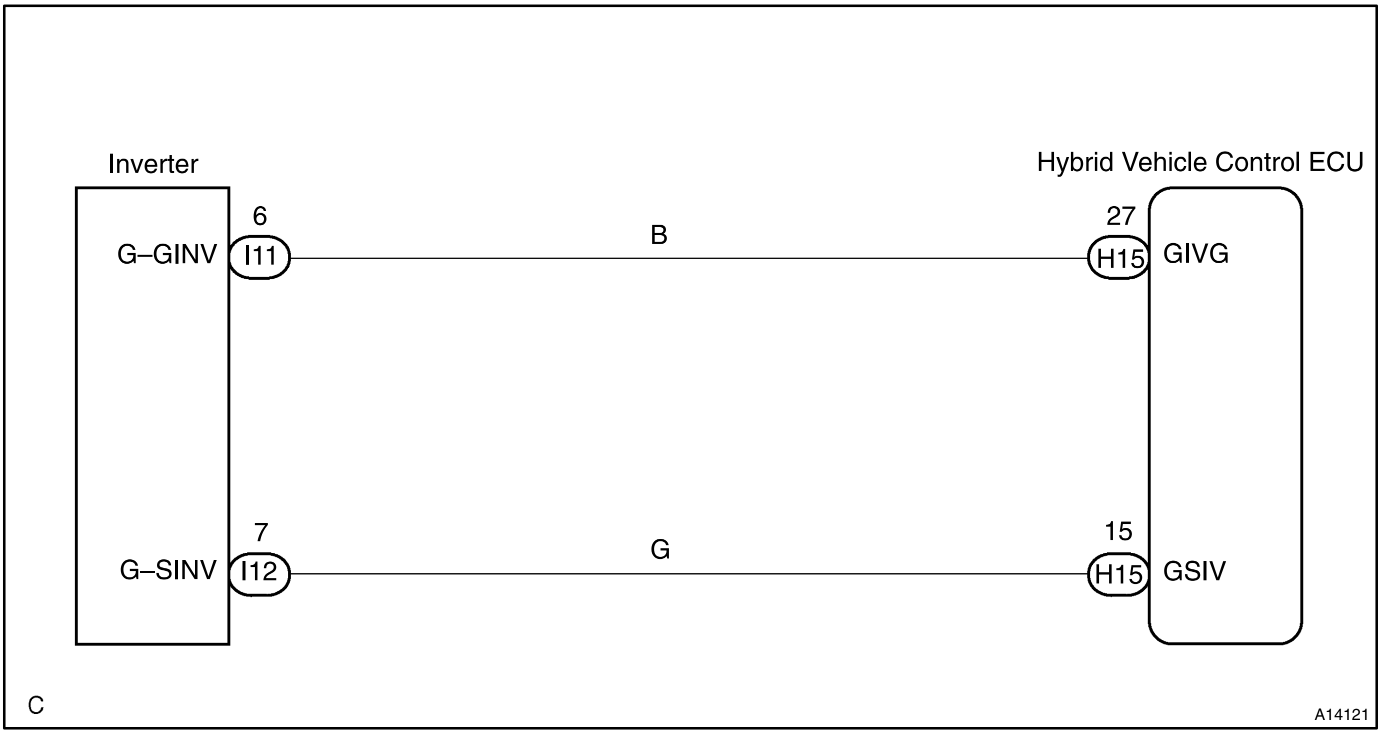
CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the generator inverter stop signal circuit and enters the fail safe mode (limited driving) if malfunction is detected.

DTC P3125 – Information code 316, 318

INF. Code.	Detecting Condition	Trouble Area
316	+B short in generator inverter stop signal circuit	• Converter & inverter assembly • Wire harness
318	Open or GND short in generator inverter stop signal circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU GSIV and GIVG terminals and converter & inverter assembly G–SINV and G–GINV terminals (See page IN–40).**

HINT:
The generator inverter stop signal circuit has +B short if the voltage between the HV ECU GSIV or GIVG terminal and body ground is always more than 13 V with the ignition ON (”READY” light OFF).

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

OK

Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 317, 319, 320

INF. Code.	Detecting Condition	Trouble Area
317	Over voltage of inverter	• Converter & inverter assembly
319	Voltage drop of inverter power source	
320	Inverter circuit broken	

INSPECTION PROCEDURE

If the information code 317 or 319 is output, check if other information codes are recorded. If they are recorded, check and repair those codes first.
If the information code 317 or 319 alone is recorded, replace the converter & inverter assembly.
If the information code 320 is output, replace the converter & inverter assembly.

CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the generator inverter fail signal circuit and detects malfunction.

DTC P3125 – Information code 321, 323

INF. Code.	Detecting Condition	Trouble Area
321	+B short in generator inverter fail signal circuit	• Converter & inverter assembly • Wire harness
323	Open or GND short in generator inverter fail signal circuit	

WIRING DIAGRAM

INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU GFIV and GIVG terminals and converter & inverter assembly G–FINV and G–GINV terminals (See page IN–40).**

HINT:
The generator inverter fail signal circuit has +B short if the voltage between the HV ECU GFIV or GIVG terminal and body ground is always more than 13 V with the ignition ON (”READY” light OFF).

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

OK

Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

DTC P3125 – Information code 322, 324, 325

INF. Code.	Detecting Condition	Trouble Area
322	Inverter overheating	• Converter & inverter assembly
324	Inverter circuit broken	
325	Inverter internal short	

INSPECTION PROCEDURE

If the information code 322 or 325 is output, check if other information codes are recorded. If they are recorded, check and repair those codes first.
If the information code 322 or 325 alone is recorded, replace the converter & inverter assembly.
If the information code 324 is output, replace the converter & inverter assembly.

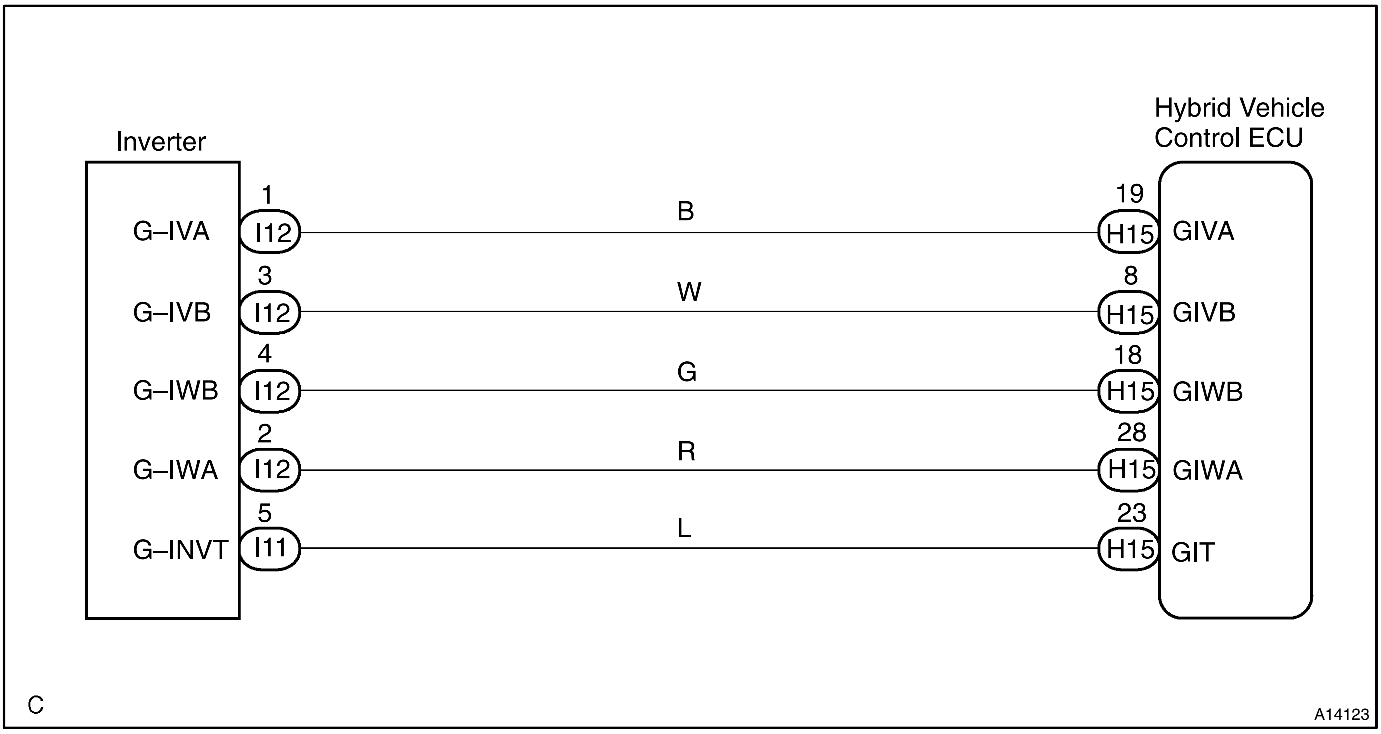
CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the generator inverter current sensor. It detects the malfunction of the sensor system, not of the high voltage system.

DTC P3125 – Information code 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341

INF. Code.	Detecting Condition	Trouble Area
327	Open in generator inverter current sensor (V phase sub sensor)	• Converter & inverter assembly • Wire harness
330	Open in generator inverter current sensor (V phase main sensor)	
335	Open in generator inverter current sensor (W phase sub sensor)	
338	Open in generator inverter current sensor (W phase main sensor)	
326	Generator inverter current sensor malfunction (V phase sub sensor)	
328	Generator inverter current sensor malfunction (V phase main sensor)	
332	Generator inverter current sensor V phase performance problem	
334	Generator inverter current sensor malfunction (W phase sub sensor)	
336	Generator inverter current sensor malfunction (W phase main sensor)	
340	Generator inverter current sensor W phase performance problem	
329	(when there is a history that the state of malfunction continued during inverter fail safe mode)	
331		
333		
337		
339		
341		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check continuity of wire harness between HV ECU and converter & inverter assembly (See page IN–40).**

OK:
Continuity: Less then 1 Ω

HV ECU Terminals	Inverter Terminals
GIVA	G–IVA
GIVB	G–IVB
GIWA	G–IWA
GIWB	G–IWB
GIVG	G–GINV

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

OK

Replace converter & inverter assembly.

CIRCUIT DESCRIPTION

The HV ECU detects the malfunction of the generator inverter current sensor. It detects the malfunction of the sensor system, not of the high voltage system.

DTC P3125 – Information code 344, 345

INF. Code.	Detecting Condition	Trouble Area
344	Failure in monitoring generator torque performance	• Converter & inverter assembly
345	Abnormal current value of generator	

INSPECTION PROCEDURE

If the information code 344 or 345 is output, check if other information codes are recorded. If they are recorded, check and repair those codes first.
If the information code 344 or 345 alone is recorded, replace the converter & inverter assembly.

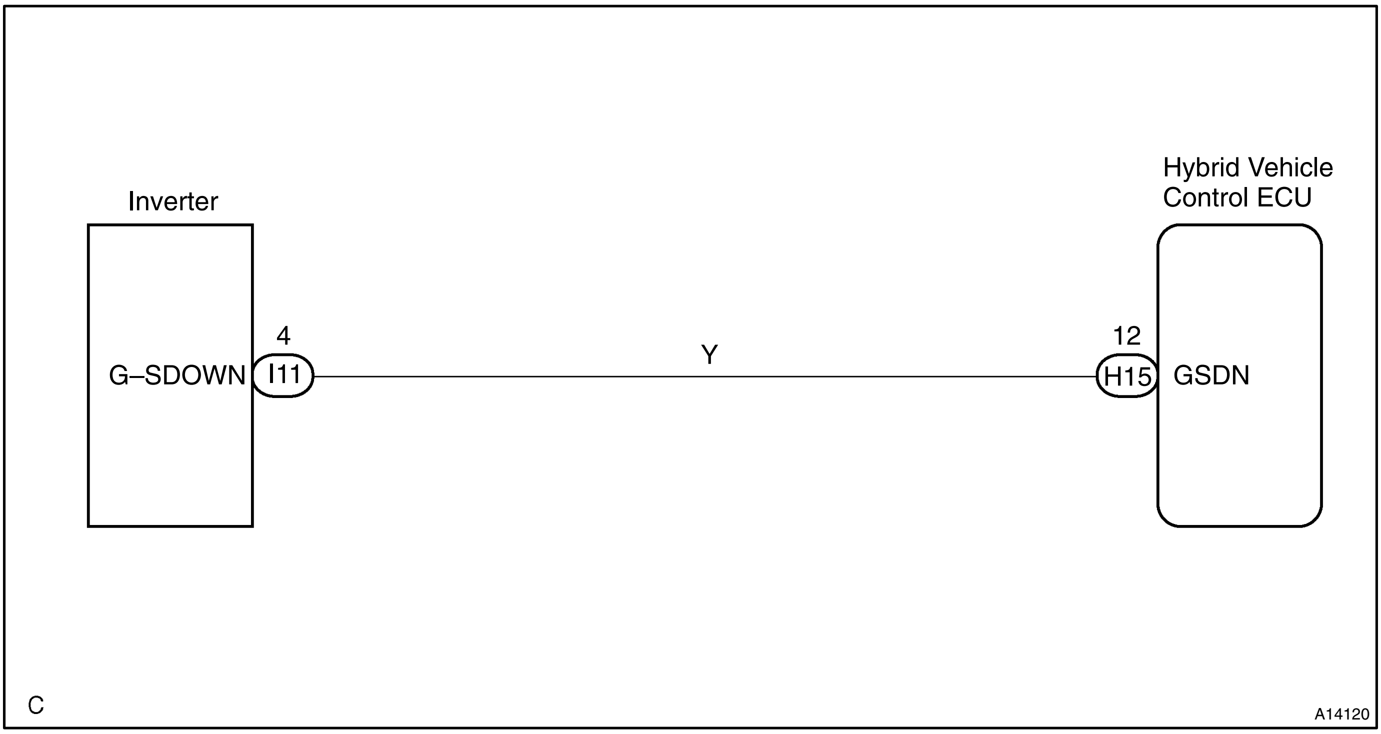
CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the generator gate shutdown signal circuit and detects malfunction.

DTC P3125 – Information code 342, 343

INF. Code.	Detecting Condition	Trouble Area
342	+B short in generator gate shutdown signal circuit	• Converter & inverter assembly • Wire harness
343	Open or GND short in generator gate shutdown signal circuit	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between HV ECU GSDN terminal and converter & inverter assembly G–SDOWN terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. The generator gate shutdown signal circuit has +B short if the battery voltage is always applied to the HV ECU GSDN terminal with the ignition ON.

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

OK

Replace converter & inverter assembly.

DI839–01

DTC	P3130	Inverter Cooling System Malfunction

CIRCUIT DESCRIPTION

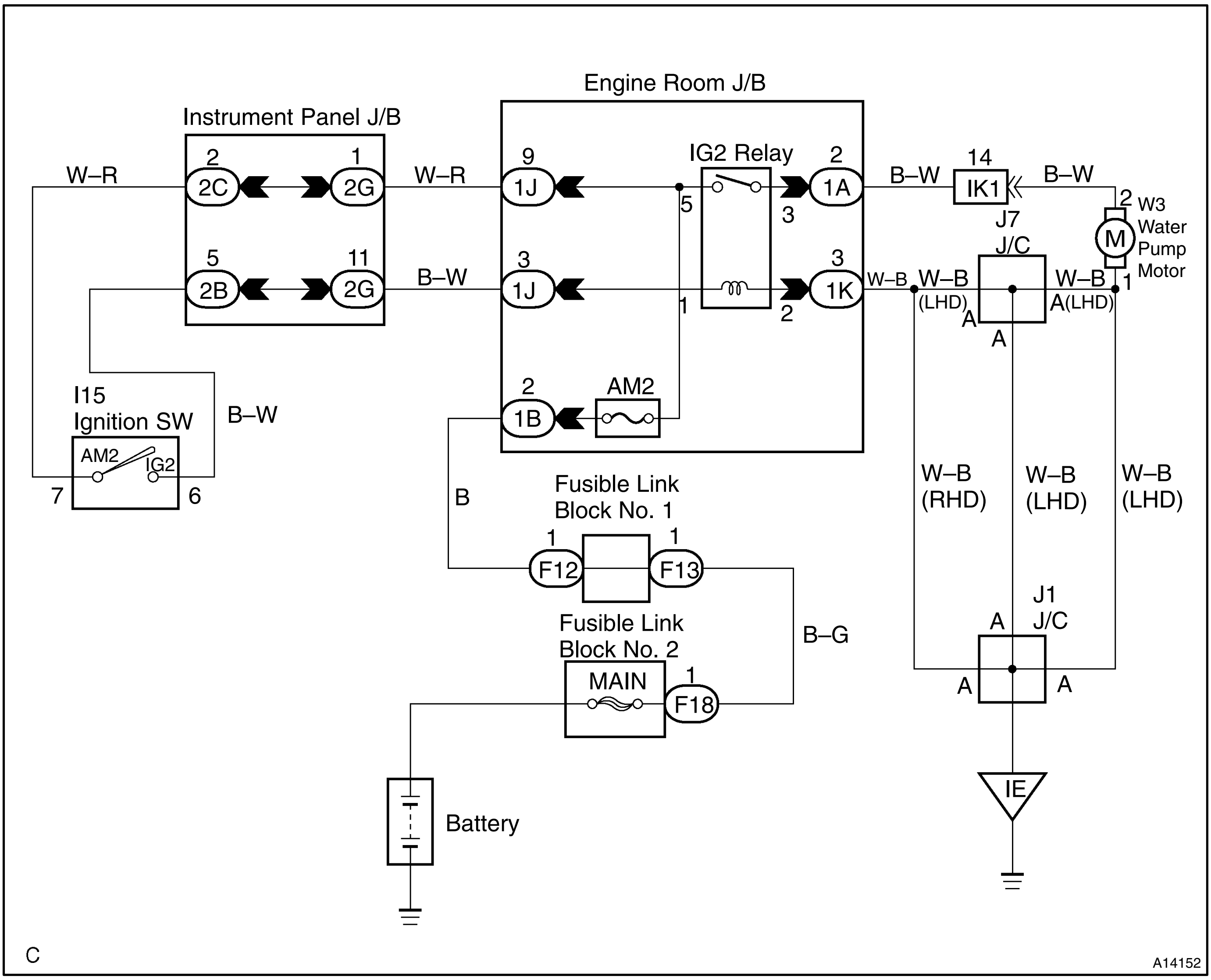
The HV ECU checks the operation of the inverter water pump and detects malfunction.
HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3130 – Information code 346

INF. code.	Detecting Condition	Trouble Area
346	Water pump system malfunction	• Water pump • IG2 relay • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wire harness (See page IN–40).**

HINT:
After removing the IG2 relay, check the electrical condition of each terminal.

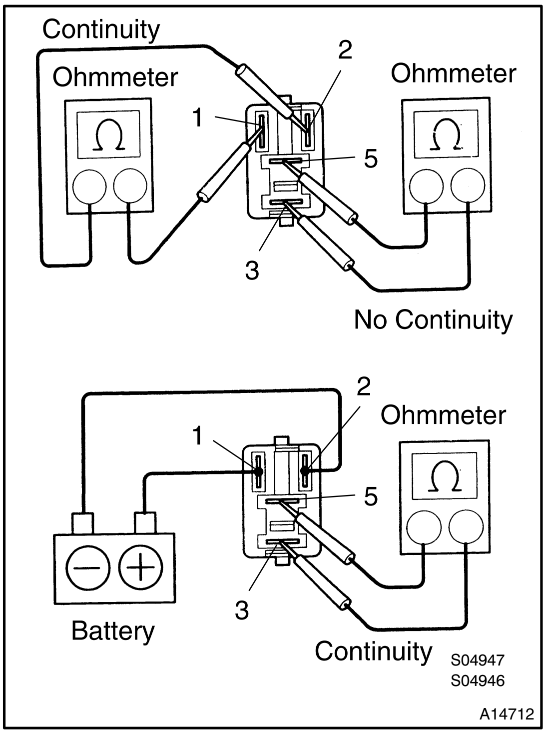
- No. 1 terminal: With the IG switch ON, 10 – 14 V
- No. 2 terminal : Continuity between the IG2 relay No. 2 terminal and body ground (less than 1 Ω)
- No. 3 terminal: Continuity between the IG2 relay No. 3 terminal and water pump No. 2 terminal (less than 1 Ω)
- No. 5 terminal: Always 10 – 14 V

Continuity between the water pump No. 1 terminal and body ground (less than 1 Ω)

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

OK

2	**Check IG2 relay.**



PREPARATION:
Remove the IG2 relay from the engine room J/B.
CHECK:
(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
(b) Check that there is no continuity between terminals 3 and 5.
(c) Apply battery voltage across terminals 1 and 2. Using an ohmmeter, check that there is continuity between terminals 3 and 5.

OK:
(a) Continuity
(b) No continuity
(c) Continuity

NG → **Replace IG2 relay.**

OK

Confirm that water pump is defective and then replace it.
Check water pump (See page HV–26).

CIRCUIT DESCRIPTION

DTC P3130 – Information code 347

INF. code.	Detecting Condition	Trouble Area
347	Radiator fan system malfunction	• Radiator fan system

INSPECTION PROCEDURE

If this information code is output, check the radiator fan system (See page CO–21).

DI83A–01

DTC	P3135	Circuit Breaker Sensor Malfunction

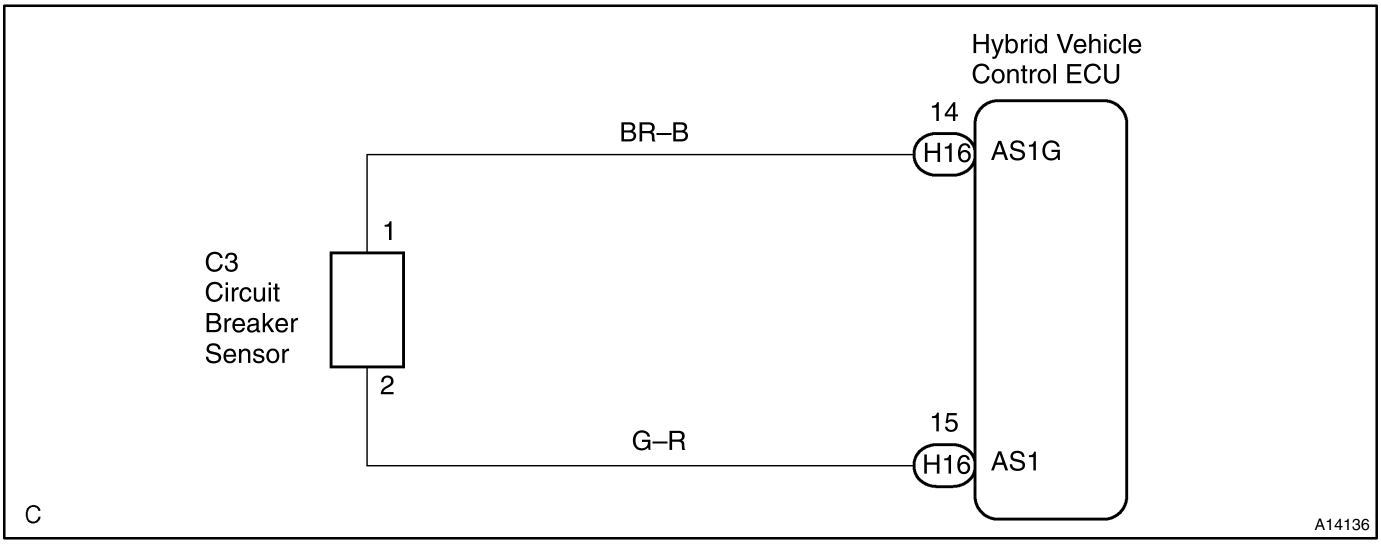
CIRCUIT DESCRIPTION

The HV ECU checks the line connection of the circuit breaker sensor (collision signal) and gives warning to the driver if malfunction is detected.

DTC P3135 – Information code 348, 349

INF. code.	Detecting Condition	Trouble Area
348	GND short in circuit breaker sensor	• Circuit breaker sensor • Wire harness • HV ECU
349	Open or +B short in circuit breaker sensor	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open, short and +B short in wire harness between circuit breaker sensor No. 1 and No. 2 terminals and HV ECU AS1G and AS1 terminals (See page IN–40).**

HINT:
Confirm that there is no open circuit in the wire harness. The circuit breaker sensor circuit has +B short if the voltage of the HV ECU AS1 terminal is more than 5V with the ignition ON.

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

OK

Check for open in resistance between circuit breaker sensor terminals and then replace circuit breaker sensor (Circuit breaker sensor resistance: 820 ± 82 Ω).

DI83B–01

DTC	P3140	Interlock Malfunction

CIRCUIT DESCRIPTION

If the HV ECU detects the operation of the safety devices (removal of the service plug, inverter terminal cover and sensor cover) while the vehicle is not running (with the vehicle is stopped), it will shut down the system main relay. It the safety devices are correctly installed, it will resume the normal operation after the power source is supplied again. If it does not, there is a possibility of an open circuit, so perform the same inspection as the information code 351.

HINT:

- When using an OBD-6 scan tool other than hand–held tester, check all the steps.
- When using hand–held tester, confirm the information code and check it.

DTC P3140 – Information code 350

INF. code.	Detecting Condition	Trouble Area
350	Safety devices operating with vehicle is stopped (ILK signal ON)	–

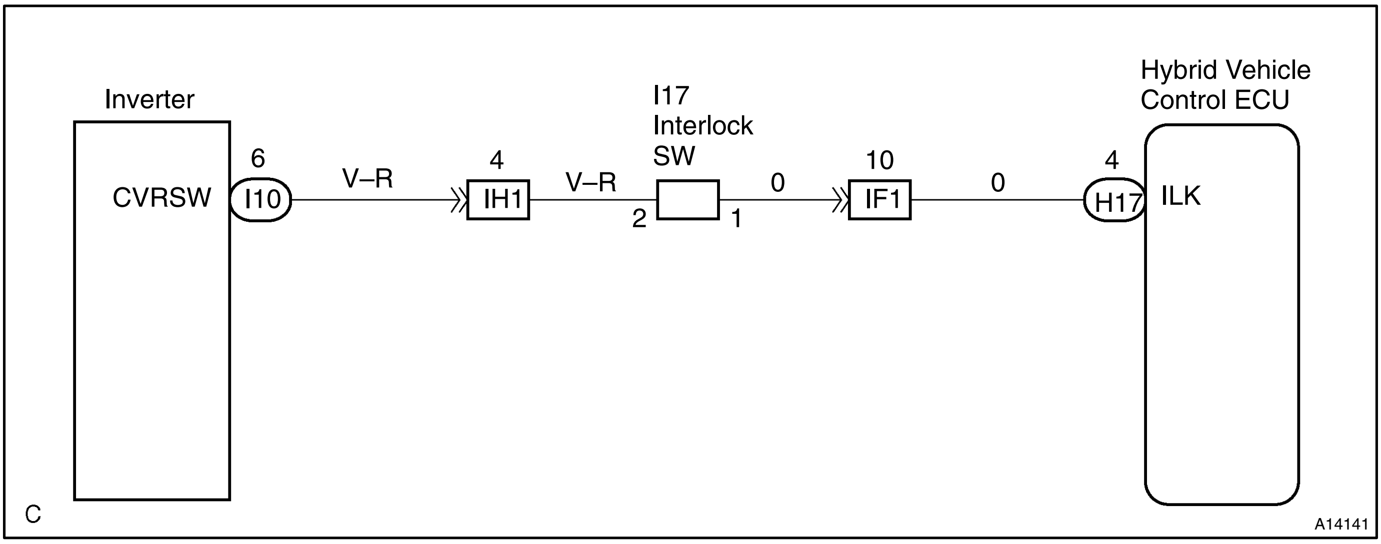
CIRCUIT DESCRIPTION

The HV ECU records the information code 351 and gives warning to the driver when it detects an open circuit in the interlock signal circuit while the vehicle is running . In this case, it does not shut down the high voltage system.

DTC P3140 – Information code 351

INF. code.	Detecting Condition	Trouble Area
351	Open circuit in interlock signal circuit while vehicle is running	• Interlock switch • Inverter terminal cover • Sensor cover • Wire harness • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check installation condition of inverter terminal cover and sensor cover.**

NG → **Install them correctly.**

OK

2	**Check continuity of wire harness between interlock switch No. 1 terminal and HV ECU ILK terminal and interlock switch No. 2 terminal and inverter CVRSW terminal (See page IN–40).**

OK:

Continuity: Less than 1 Ω

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

OK

3	**Check continuity between inverter CVRSW terminal and body ground (See page IN–40).**

OK:

Continuity: Less than 1 Ω

NG → **Replace converter & inverter assembly.**

OK

Confirm that interlock switch is defective and replace it.
Check interlock switch (See page HV–38)

DI83C–01

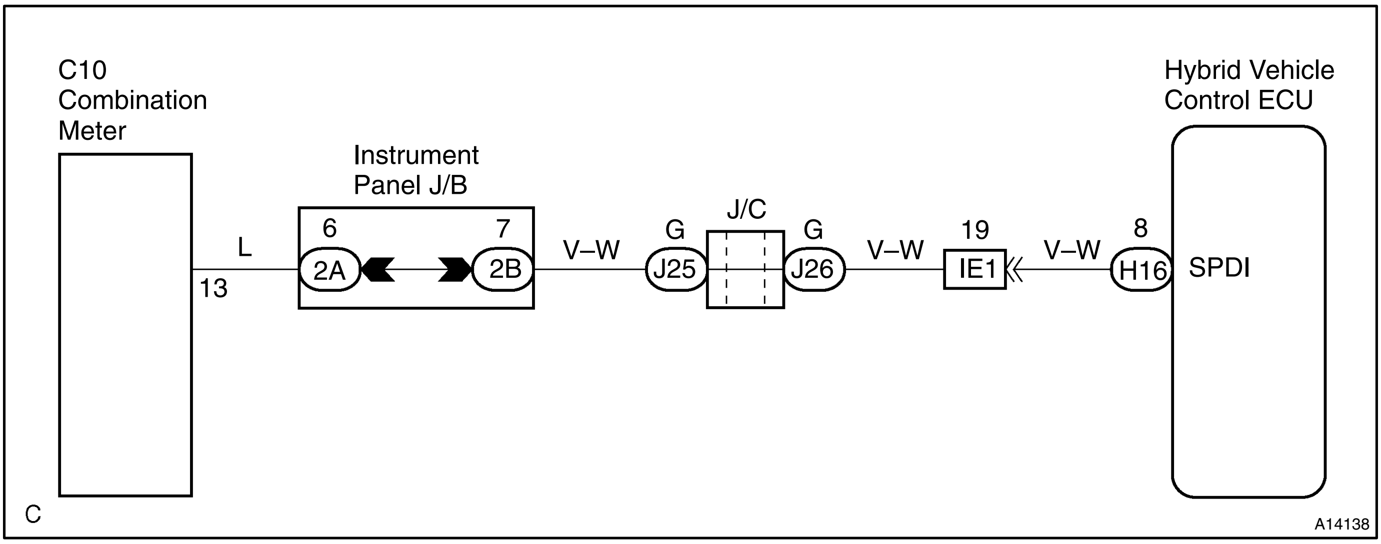
DTC	P3145	Vehicle Speed Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

DTC P3145 – Information code 352

INF. code.	Detecting Condition	Trouble Area
352	No input of vehicle speed during cruise control driving	• Wire harness • Combination meter • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC P0500 of engine ECU being output?

NG → **Check DTC P0500.**

OK

2	Check continuity of wire harness between J26 J/B G terminal and HV ECU SPDI terminal (See page IN–40).

OK:

Continuity: Less than 1 Ω

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

OK

Replace HV ECU.

HV BATTERY CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI81G–01

Inside ⫽ ⫽ shown titles and page numbers in this manual.
See the indicated pages for details.

Vehicle Brought to Workshop

⇩

1 Customer Problem Analysis P. DI–266

⇩

2 Connect the hand–held tester to DLC3 P. DI–268
If the display indicates a communication fault in the tool, inspect DLC3 P. DI–268

⇩

3 Check DTC and Freezed Frame Data (Precheck)
Record or Print DTC and Freezed Frame Data P. DI–268

⇩

4 DTC Check P. DI–268

⇩

5 DTC Chart P. DI–272

⇩

6 Circuit Inspection P. DI–274

⇩

Identification of Problem

⇩

7 Adjustment, Repair

⇩

8 Confirmation Test

⇩

End

DI81H–01

CUSTOMER PROBLEM ANALYSIS CHECK

Prius Problem Check Sheet

Name of Dealer	Person in Charge at Headquarters	Person in Charge at Dealer
Office		

Please fill in the blanks within bold frame.

Vehicle Specifications						
Model Code	NHW11–	Problem Occurrence Date	. . . :	Km–reading	km
Frame No.	NHW11–	Service Entry Date	. .	Registration date	. .
Unit No. etc.		Vehicle Delivery Date	. .		
Option	( ) Navigation (equipped by ( ) MOP ( ) dealer) ( ) Cold climate specification ( ) others( )				

Interview Results

Contents of complaint (Status when and before/after occurring in the order of events as correct as possible)	Characteristics of Customer	
	Gender	( ) Male ( ) Female
	Age	
	Occupation	
	Vehicle used before	
	Main use area	city area ( ) % suburbs ( ) % mountain area ( ) % Others ( ) ( ) %
	Frequency in use	times/day or week or month
	Others	

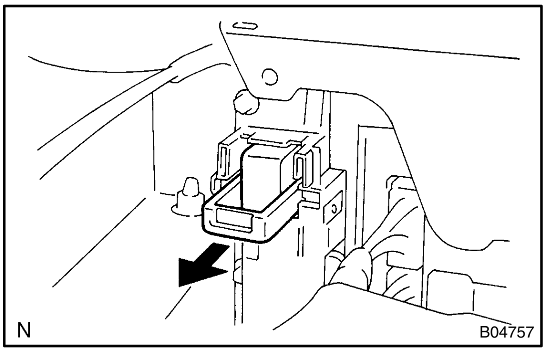
Driving Condition	Road Condition	Vehicle Condition			Others
Vehicle Speed ____km/h ( ) when starting ( ) when according ( ) When normal driving ( ) when decelerating ( ) when braking ( ) when shopping ( ) when parking ( ) when tuming ( ) when ABS actuating ( ) others ( )	( ) flat road ( ) up hill ( ) down hill incline of ____° /% distance ____ km ( ) dry paved road ( ) wet paved road ( ) rough paved road ( ) unpaved road ( ) snowy/frozen road ( ) bump/curb ( ) others ( )	( ) when starting ( ) right after starting ( ) until ___min. after starting ( ) until ___min. after starting of driving ( ) when shopping system Status of engine ( ) while shopping engine ( ) when starting engine ( ) when revolving engine	HV Battery indication ( ) 4/4 ( ) 3/4 ( ) 2/4 ( ) 1/4 ( ) unidentified Shift position (indication) ( ) P ( ) R ( ) N ( ) D ( ) B ( ) when operating ____ → ____ ( ) no indication ( ) unidentified A/C status ( ) A/C ( ) FULL ( ) OFF ( ) unidentified	Warning light (MIL) ( ) ON ( ) OFF ( ) PS ( ) main battery ( ) HV! ( ) engine ( ) charge ( ) output control ( ) brake ( ) ABS ( ) others ( )	Weather:____ Temperature: ____°C Brake operation ( ) brake slowly ( ) Brake suddenly ( ) use two pedals system Frequency in occurrence ( ) always ( ) sometimes ( ) only once

<table>
<tr><td rowspan="14">Vehicle Verification Results</td><td>Verification Results of Warning Light</td><td colspan="3">Verification Results of Diagnostic Code</td></tr>
<tr><td rowspan="6">( ) ON ( ) OFF
( ) engine ( ) HV
( ) HV battery
( ) output control warning light
( ) charge ( ) PS
( ) brake ( ) ABS
( ) others
( )</td><td colspan="2">Engine</td><td></td></tr>
<tr><td colspan="2">HV</td><td></td></tr>
<tr><td></td><td>INF. code</td><td></td></tr>
<tr><td colspan="2">HV battery</td><td></td></tr>
<tr><td colspan="2">Brake</td><td></td></tr>
<tr><td colspan="2">PS</td><td></td></tr>
<tr><td colspan="3">Vehicle Inspection Results (Verification items, reason to identify/presume the cause parts, etc.)</td><td>Reproduction Status</td></tr>
<tr><td colspan="3"></td><td>( ) always
( ) sometimes condition when occurring

( ) no reproduction</td></tr>
<tr><td colspan="3">Replacemect Parts</td><td>Confirmation Results After Repair</td></tr>
<tr><td colspan="3">problem parts: No/Yes (Sending date: . .)</td><td>( ) Normal
( ) reproduction
( ) others ( )</td></tr>
</table>

DI81I–01

PRE–CHECK



1. PRECAUTION

(a) To distinguish a trouble and replace a defective part, take necessary preventive measures against an electric shock (See page IN–4).

(b) Some portions of the wiring harness in the THS vehicle have the circuits, to which a high voltage is applied. To prevent an electrical shock, be sure to observe the following:

(1) Wear insulated gloves during inspection.

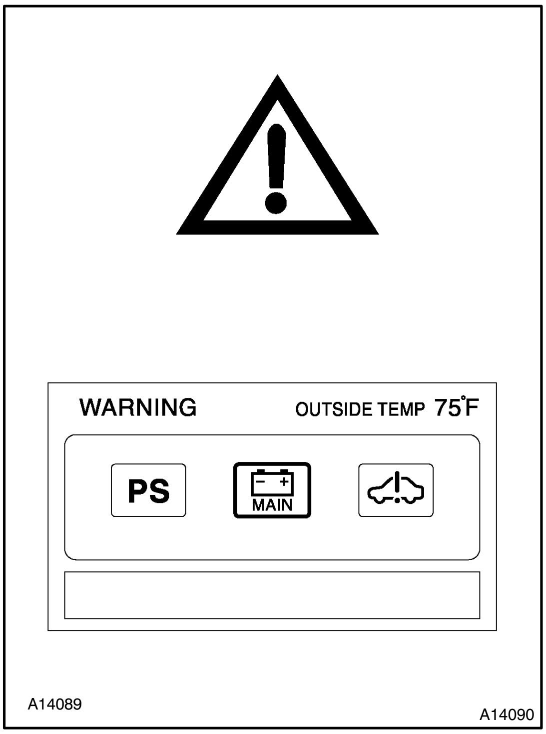
(2) Remove a service plug and do not start any repair operation before 5 minutes have passed, then confirm that the voltage at the output terminals has dropped down to 12 V or less.

(3) Use insulated tools during inspection.

(4) When disengaging wiring connectors, hold the connector bodies to avoid pulling the wires. When engaging wiring connectors, be sure to engage them securely.

(c) Do not leave tools or parts (bolts, nuts, etc.) inside the cabin.

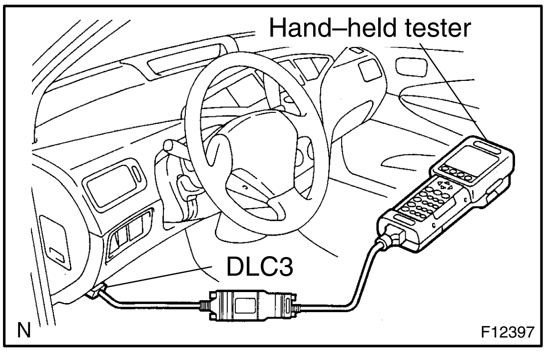
(d) Do not carry metallic objects such as mechanical pencils or scales.



2. DIAGNOSIS SYSTEM

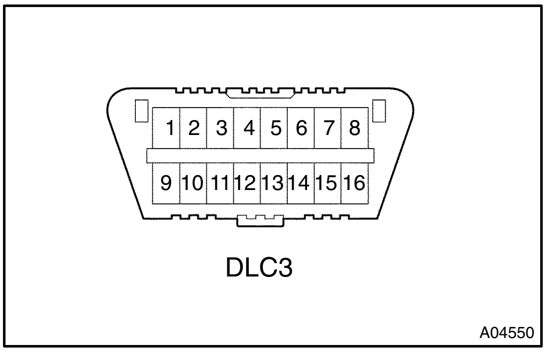
(a) Description

- The HV control ECU has a self–diagnosis system by which malfunction in the computer itself or in THS components is detected and the master warning light in the combination meter and the HV battery warning light in the multi–information display lights up.



- To check the Diagnostic Trouble Codes (DTC), connect the hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The hand–held tester also enables you to erase the DTC and check freeze frame data and various forms of THS data.
- Freeze frame data:
  Freeze frame data records the driving condition when a malfunction is detected. When troubleshooting it is useful to determine whether the vehicle was running, braked, stopped or reversed.

(b) Check the DLC3.
The HV control ECU conforms to ISO 14230 for communication.
The terminal arrangement of the DLC3 complies with SAEJ1962 and matches the ISO 14230 format.



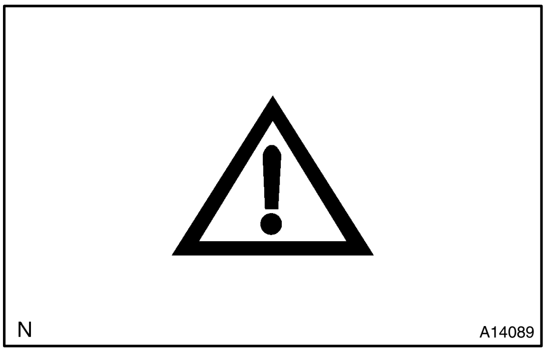
Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus ⊕ Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
5	Signal Ground ↔ Body Ground/1 Ω or less	Always
16	Battery Positive ↔ Body Ground/10 – 15 V	Always

HINT:
If your display shows UNABLE TO CONNECT TO VEHICLE when you have connected the cable of the hand–held tester to the DLC3, turned the motor switch ON and operated the tester, there is a problem in the vehicle or tool.

- If communication is normal when the tool is connected to another vehicle, inspect the 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.

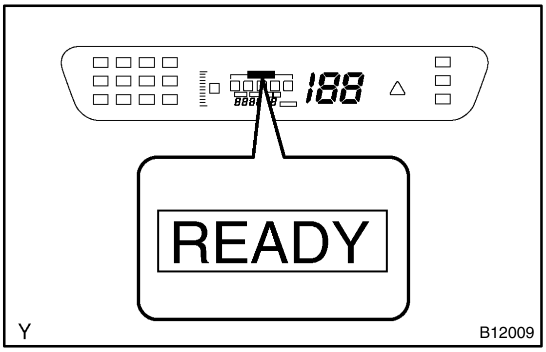
3. INSPECT DIAGNOSIS

(a) Check the auxiliary battery.
  (1) Measure the voltage of the auxiliary battery.
  Voltage: 10 – 15 V
  (2) Inspect the auxiliary battery, fuses, fusible links, wiring harness, connectors and ground.



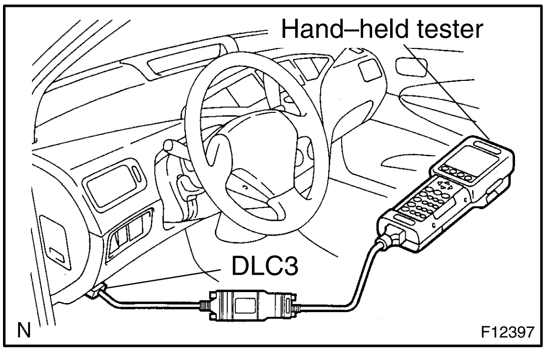
(b) Check the master warning light.
(1) Turn the ignition switch ON and confirm that the master warning light comes on.

HINT:
If the master warning light does not come on, suspect a burnt fuse, burnt bulb, or open in wiring harness.

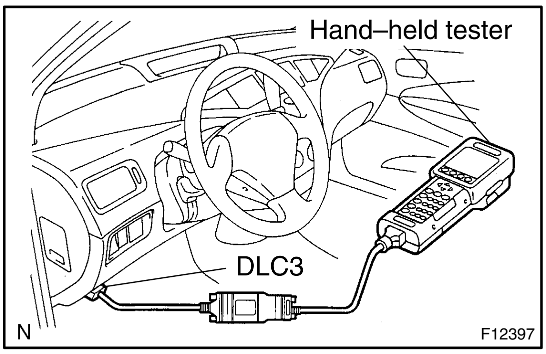


(2) When the "READY" light is ON, the master warning light should go off.

If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.



(c) Check the DTC.
(1) Prepare a hand–held tester.
(2) Connect the hand–held tester to the DLC3.
(3) Turn the ignition switch ON and push the hand–held tester main switch ON.
(4) Use the hand–held tester to check the DTC and freeze frame data and note them down. (For operating instructions, see the TOYOTA hand–held tester operator's manual).
(5) See a related page to confirm details of the DTC.



(d) Clear the DTC.
(1) Connect the hand–held tester to the DLC3.
(2) Operate the hand–held tester to erase the DTC (See the hand–held tester operator's manual.).

4. CHECK FOR INTERMITTENT PROBLEMS

(a) Perform a simulation test (See page IN–29).
(b) Check the connector and terminal (See page IN–40).
(c) Handle the connector (See page IN–40).

5. HAND–HELD TESTER DISPLAY ITEMS

TOYOTA hand–held tester display	Measurement Item
BATTERY SOC	Battery capacity SOC
AVERAGE TEMP	Average battery temperature
ONB CHARGE TIME	Cumulative number of times of on–board uniform charging
BATERY LO TIME	Cumulative number of times of low uniform charging
BC INHIBIT TIME	Cumulative number of times of BC inhibition
IB MAIN BATTERY	IB main battery current (with correction)
BATT BLOCK V#	Battery block voltage #
BAT BLOCK MIN V	Battery block minimum voltage
MIN BAT BLOCK #	Minimum voltage battery block
BAT BLOCK MAX V	Battery block maximum voltage
MAX BAT BLOCK #	Maximum voltage battery block
BATT INSIDE AIR	Ambient temperature inside battery pack
BATTERY TOO HI #	Cumulative number of times of too–high battery voltage
VMF FAN VOLTAGE	VMF fan voltage
AUX. BAT V	Auxiliary battery voltage
WIN	Charge restriction value
WOUT	Discharge restriction value
DELTA SOC	△ SOC
SBL FAN STP RQST	SBL cooling fan stop request signal
COOLING FAN HI	Cooling fan operation in high speed
COOLING FAN MID	Cooling fan operation in middle speed
COOLING FAN LO	Cooling fan operation in low
CCTL	CFRS outer air intake request signal (changed by CCTL)
EQC0 DF RELAY	EQC0 dead front relay
EQTR CHARGE ST	EQTR uniform charging start signal
AX BATT CHARGE	Auxiliary battery charging status
ONBORD CHARGE	Outside uniform charging status
PRE ONBORDE CH	Pre–On–board charging status
TEMPERATURE LO	Stand–by status at low temperature
NORMAL STATUS	Normal status
INSIDE RESIST #	Inside resistance
BATT TEMP #	Battery temperature
ECU CODE	ECU code
IG OFF HOWR	Average time of IG OFF
IG ON HOWR	Average time of IG ON
ET OFF CHG HR	Estimation of time to finish OFF BOARD
DTC	The number of stored DTC

DI81J–01

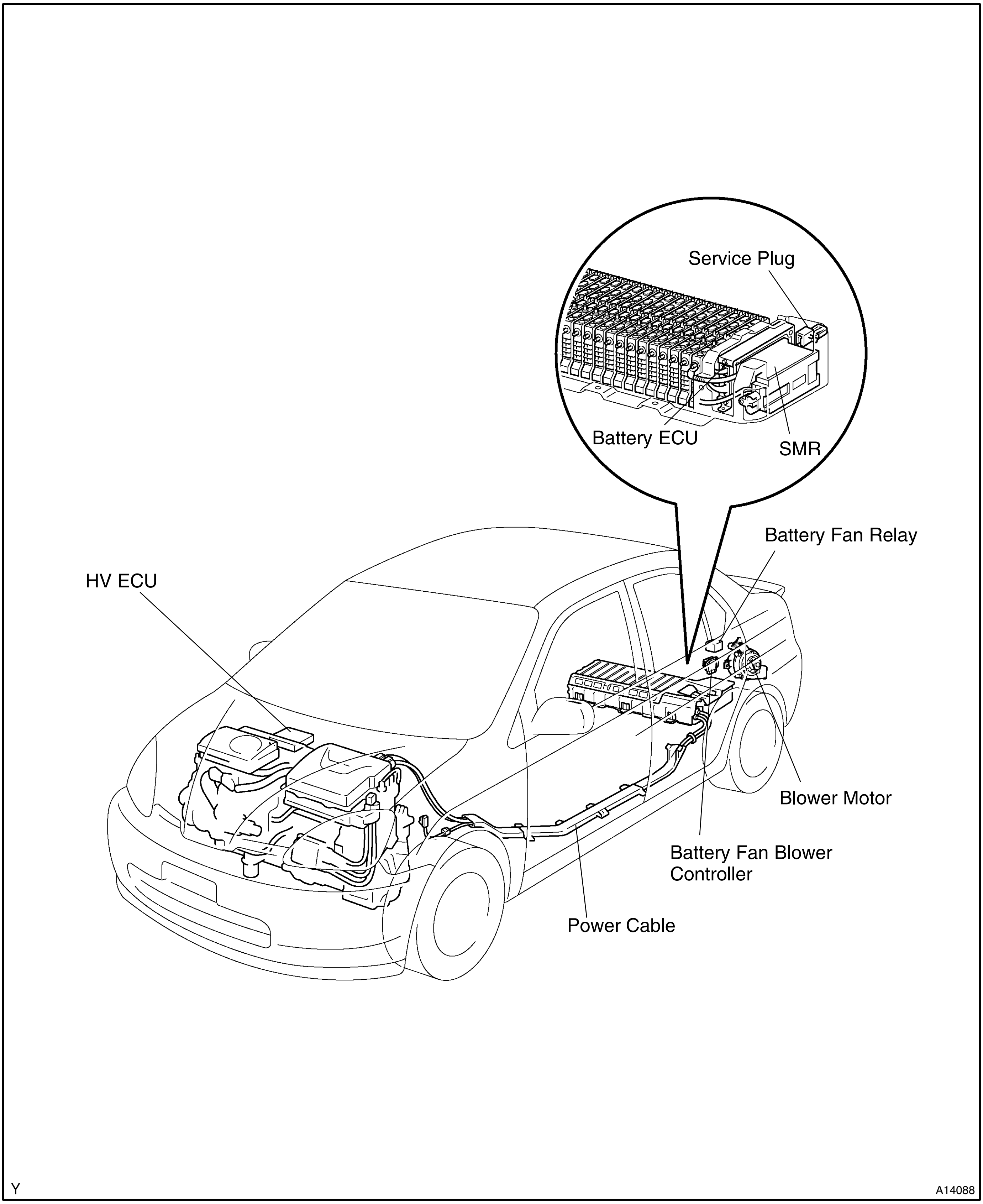
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See Page)	Detection Item	Trouble Area	Master Warning Light	Memory
P1600 (DI–278)	BATT malfunction	• Open in back up power source circuit • Battery ECU	○	○
P3001 (DI–280)	Battery ECU malfunction	• Battery ECU	○	○
P3002 (DI–281)	HV serial communication malfunction	• Battery ECU • HV ECU • Communication bus	○	○
P3005 (DI–284)	High voltage fuse snapped	• High voltage fuse • Power cable	X	○
P3006 (DI–285)	Battery levels are unusually	• Battery pack	○	○
P3007 (DI–286)	Battery levels are becoming different	–	X	○
P3009 (DI–287)	Leak detective	• Battery cover • SMR • Power cable • Converter & inverter assembly • Battery temperature sensor • Battery ECU • HV transaxle • Busbar module	X	○
P3010 (DI–294)	Battery becomes weak	• Battery pack	○	○
P3011–P3029 (DI–295)	Battery block # becomes weak	• Battery pack	○	○
P3030 (DI–296)	Battery voltage detective line snapped	• Open in battery voltage detective line • Connector • Busbar module	○	○
P3060 (DI–298)	Battery temperature sensor malfunction	• Battery temperature sensor	○	○
P3076 (DI–299)	Abnormal air flow by battery cooling fan	• Duct • Blower fan • Battery ECU	○	○
P3077 (DI–301)	Battery fan circuit malfunction	• Battery fan relay • Battery fan blower controller • Blower fan • Wire harness	○	○
P3115 (DI–304)	SMR malfunction	• SMR • Wire harness	○	○
C2552 (DI–274)	Malfunction in external uniform charging	• HV battery conditioner • Wire harness • Adaptor for charger • Battery ECU • SMR	X	○

*:○ ··· Master warning light lights up. X ··· Master warning light does not lights up.

DI81K–01

PARTS LOCATION



DI81L–01

CIRCUIT INSPECTION

DTC	C2552	Malfunction in External Uniform Charging

CIRCUIT DESCRIPTION

When a HV battery is depleted and its charging rate is low, it can be recharged using an external uniform charger.

DTC No.	DTC Detecting Condition	Trouble Area
c2552	Charged current is beyond a fixed range.	• HV battery conditioner not applicable • Wire harness • Adaptor for charger • Battery ECU • SMR

INSPECTION PROCEDURE

1	Check that HV battery conditioner is applicable.

NG → **Replace the HV battery conditioner**

OK

2	Check CCTL line.

PREPARATION:

(a) Remove the adapter for charger.
(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) Set the CCTL line to HI in the active test.

CHECK:

Using a voltmeter, measure the voltage between terminal CCTL and body ground.

OK:

Standard voltage: More than 5 V

OK → **Go to step 4**

NG

3	Check that wire harness is open.

PREPARATION:
Remove the wire harness between the battery ECU and HV battery conditioner.
CHECK:
Using an ohmmeter, check the wire harness continuity.
OK:
Continuity

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

OK ↓

Replace the battery ECU.

4	Check CCTL line.

PREPARATION:
(a) Remove the adapter for charger.
(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) Set the CCTL line to LO in the active test.
CHECK:
Using a voltmeter, measure the voltage between terminal CCTL and body ground.
OK:
Standard voltage: 1V or less

OK → **Go to step 6**

NG ↓

5	Check that wire harness is open.

PREPARATION:
Remove the wire harness between the battery ECU and adapter for THS charger.
CHECK:
Check for short circuit between CCTL terminal and other terminals.
OK:
Short circuit is not identified.

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

OK

Replace the battery ECU.

6	Check high voltage connector for charge

CHECK:
Using a voltmeter, measure the voltage between terminal CEZ and CBZ.
OK:
Standard voltage: 200V or more

OK → **HV battery conditioner malfunction.**

NG

7	Check power cable for battery pack

PREPARATION:
Remove the battery cover (See page HV–2).

CHECK:
Check the power cable inside the battery pack for damage.

NG → **Replace the power cable.**

OK

Replace the SMR.

DI81M–01

DTC	P1600	BATT Malfunction

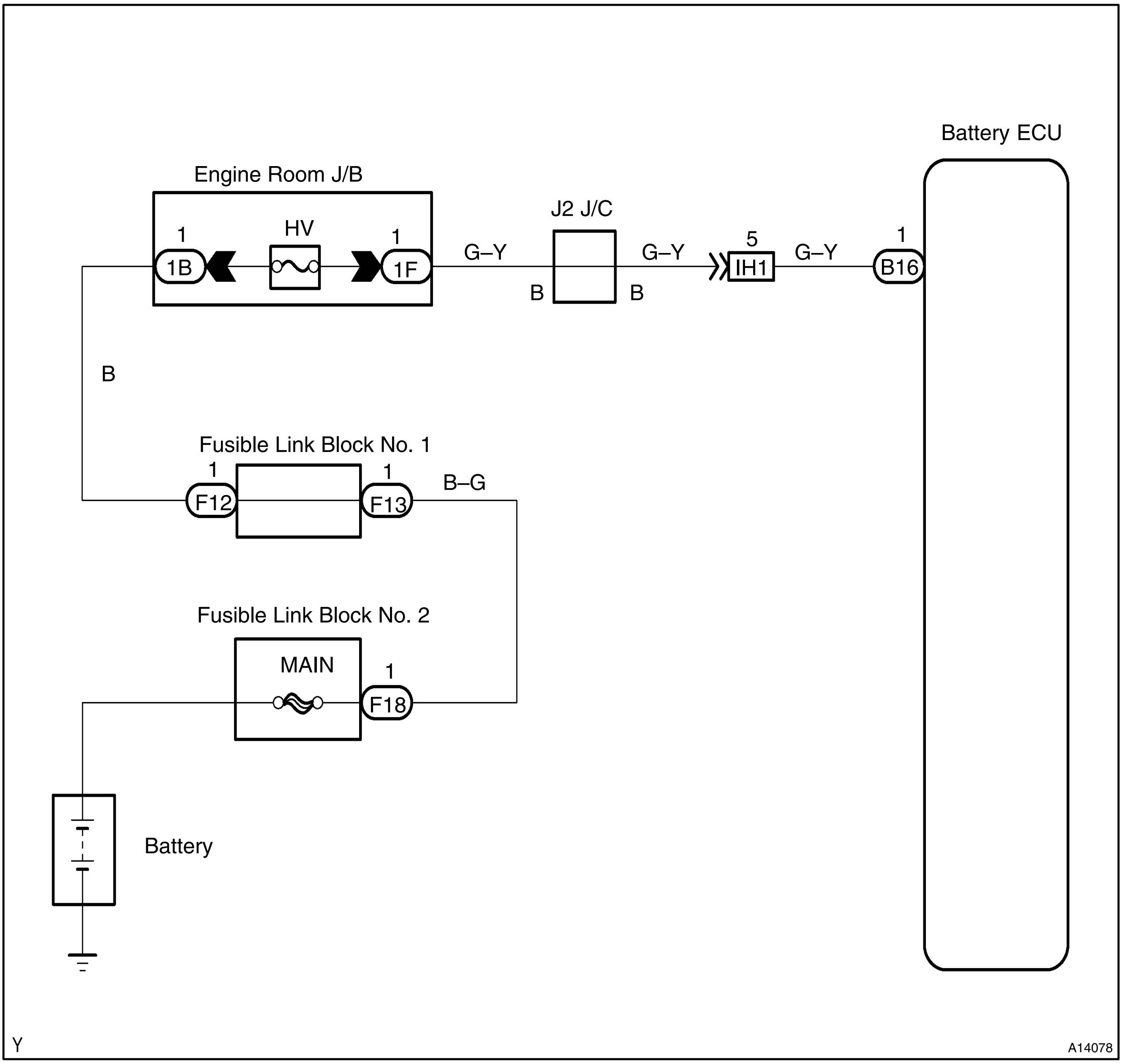
CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal AM of the Battery ECU even when the ignition switch is OFF to read the DTC memory and freeze frame data adaptive control value memory, etc.

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

HINT:
If DTC P1600 appears, the Battery ECU does not store any other DTC.

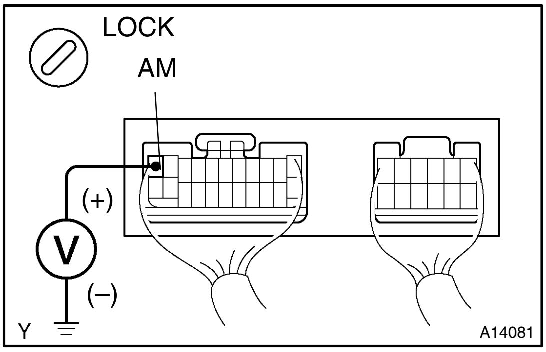
WIRING DIAGRAM



INSPECTION PROCEDURE

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

1	**Check voltage between terminal AM of Battery ECU connector and body ground.**

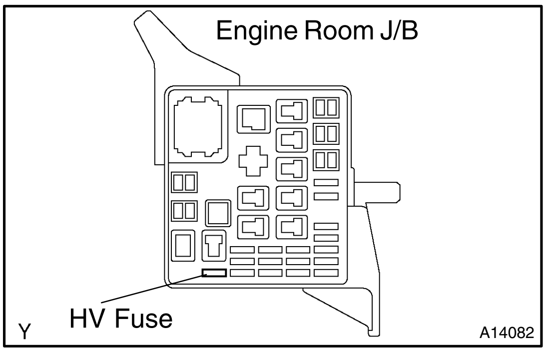


PREPARATION:
Remove the luggage trim.
CHECK:
Measure the voltage between terminal AM of the Battery ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK → **Check and replace Battery ECU (See page IN–40).**

NG ↓

2	**Check HV fuse of engine room J/B.**



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

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

OK ↓

Check and repair harness or connector between battery and HV fuse, and HV fuse and Battery ECU (See page IN–40).

DI81N–01

DTC	P3001	Battery ECU Abnormally

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
P3001	Battery ECU Malfunction	• Battery ECU

INSPECTION PROCEDURE

CAUTION:
To avoid receiving an electric shock, obseve the instructions written in PRECAUTION on page DI–268.

Replace battery ECU.

DI81O–01

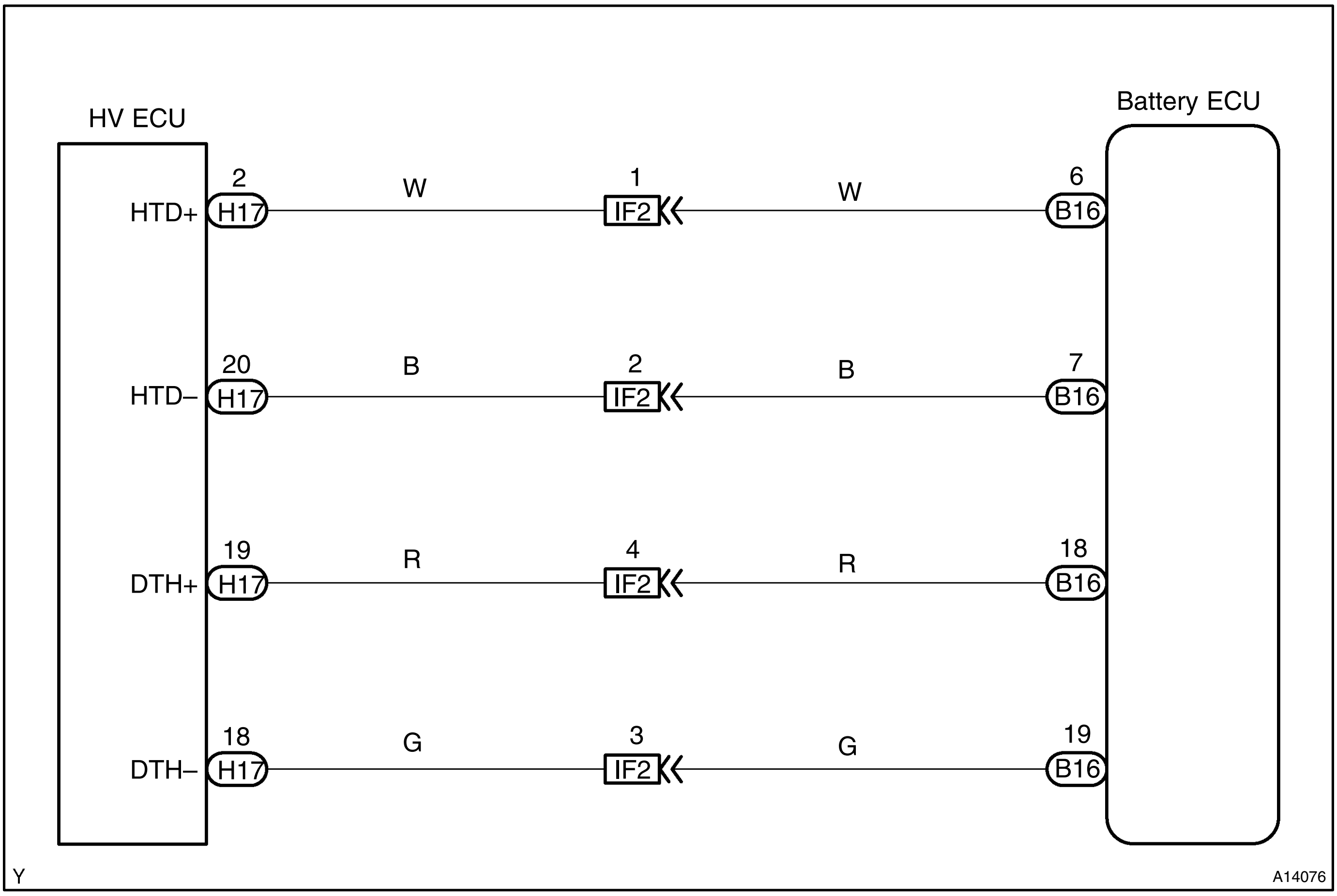
DTC	P3002	HV ECU Communication Malfunction

CIRCUIT DESCRIPTION

The battery ECU inputs information of the AC ECU, SMR connection signals, etc. sent from the HV ECU, and outputs information such as errors inside the battery pack, MIL Light lighting request, etc.

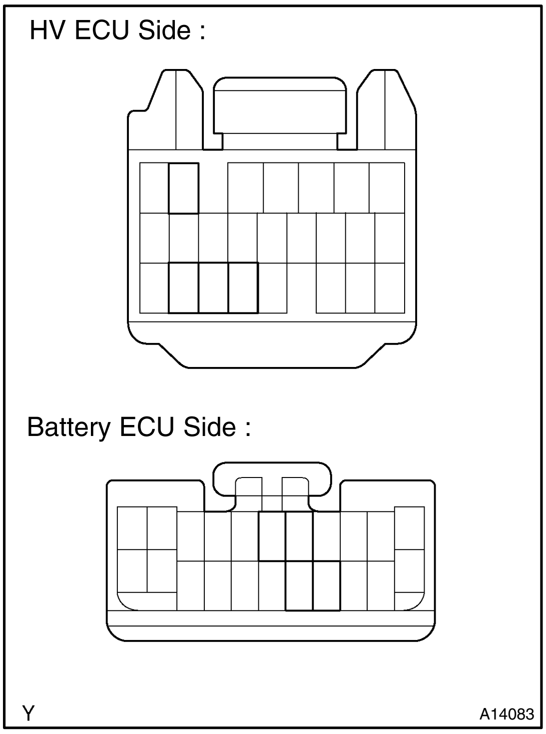
DTC No.	DTC Detecting Condition	Trouble Area
P3002	No serial signals transmitted from HV ECU	• Communication bus line • Battery ECU • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Inspect communication bus line.**



PREPARATION:

Disconnect the connector from the battery ECU and the HV ECU

CHECK:

Check that the communication bus line is not short or open.

OK:

No open or short.

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

OK

2	**Check if noise affect operation or not.**

CHECK:

Using an oscilloscope, inspect the communication signal between the battery ECU and the HV ECU.

OK:

Communication signals of 0 – 5 V are transmitted from the HV ECU to the battery ECU.

NG	**Seek for a cause of the noise occurrence.**

OK

3	Check communication signal.

Using an oscilloscope, check the communication signal between the battery ECU and the HV ECU.

OK:

Communication signals of 0 – 5 V are transmitted from the HV ECU to the battery ECU.

NG → **Replace the HV ECU.**

OK

Replace the battery ECU.

DI81P–01

DTC	P3005	High Voltage Fuse Snapped

CIRCUIT DESCRIPTION

A fuse is set in the service plug to protect high–voltage system parts.

DTC No.	DTC Detecting Condition	Trouble Area
P3005	Although interlock switch is connected, voltage of battery bolck No. 10 is less than specified.	• High voltage fuse • Power cable

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P3005) being output?

NO → **Go to relevant DTC chart.**

OK

2	Check continuity between fuse terminals in service plug.

NO → **Repair or replace the power cable.**

OK

Replace the fuse.

DI81Q–01

DTC	P3006	Battery Levels Are Unusual

CIRCUIT DESCRIPTION

Through the battery voltage detective line, charging rate of each battery is detected.

DTC No.	DTC Detecting Condition	Trouble Area
P3005	• SOC becomes high (42 % or more) • Amount of scatter in charging rate becomes large. (2 trip detection logic)	• Battery pack

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P3006) being output?

NO → **Replace the battery pack assembly, and initialize the battery ECU by performing an active test.**

YES

Go to relevant DTC chart.

DI81R–01

DTC	P3007	Battery Levels Are Becoming Different

CIRCUIT DESCRIPTION

This code is output when charging rates are scattering after a vehicle has been left without driven for a long period. Therefore, it does not indicate any failure of the vehicle.

DTC No.	DTC Detecting Condition	Trouble Area
P3005	• Scattering of charging rate identified after leaving vehicle alone for long period. • SOC is 42 % or more.	–

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P3007) being output?

NO → **Replace the battery pack assembly, and initialize the battery ECU by performing an active test.**

YES

Go to relevant DTC chart.

DTC	P3009	Leak Detected

CIRCUIT DESCRIPTION

Electric leak from the high–voltage system, which may seriously harm the human body, is detected by this code.

DTC No.	DTC Detecting Condition	Trouble Area
P3009	Electric leak from high–voltage system (Insulating resistance of power cable is 100 kΩ or less.)	• Power cable • HV transaxle • Converter & inverter assembly • Battery cover • SMR • Battery temperature sensor • Battery ECU • Busbar module

INSPECTION PROCEDURE

1	Check that P3001 is not detected.

NG → **Troubleshoot against P3001.**

OK

2	Check for recurrence

PREPARATION:
(a) With the shift lever in P, delete this DTC using a hand–held tester.
(b) Then, turn the ”READY” light ON and wait for 1 min.

CHECK:
Check that P3009 is not detected again.

OK:
No continuity.

NG → **Repeat this check.**

HINT:
When this DTC is not detected again, the following causes are plausible.
- Water or foreign matter in the battery pack assembly.
- Water or foreign matter in the inverter or converter.
- Failure inside the inverter, converter or battery ECU.

OK

3	Check power cable

PREPARATION:
(a) Turn the ignition switch OFF.
(b) Remove the auxiliary battery negative terminal.
(c) Remove the service plug.
(d) Disconnect the power cable between the inverter and SMR.

CHECK:
Check the insulating resistance between the power cable and body.

OK:
Standard resistance: 10 MΩ or more

NG → **Replace the power cable.**

OK ↓

4	Check HV transaxle

CHECK:
(a) Check that the voltage between each of 6 connecting points of the power cable which connects the inverter to HV transaxle, and body ground.
(b) Check the resistance between each of the 6 terminals and HV transaxle itself.

OK:
(a) Standard voltage: 0V
(b) Standard resistance: 10 MΩ or more

NG → **Replace the HV transaxle.**

OK ↓

5	**Check inverter**

PREPARATION:
Disconnect the power cable connector from the inverter and SMR.
CHECK:
Check the insulating resistance between each of the 8 contact points (including 6 points connecting the inverter to HV transaxle and 2 points connecting the SMR to inverter) and the inverter itself.

NG → **Replace the Converter & inverter assembly.**

OK

6	**Check cover for high voltage contacting part**

PREPARATION:
(a) Remove the auxiliary battery negative terminal.
(b) Remove the service plug.
(c) Remove the battery carrier catch bracket (See page HV–4).
(d) Connect the auxiliary battery negative terminal (with the service plug removed) and delete the DTC with TOYOTA hand–held tester.
(e) Then, turn the ignition switch ON–OFF–ON (Do not turn it to ST) and wait for 1 min.
CHECK:
Check if P3009 is detected or not.

NG → **Check for foreign matter or water inside the converter. Inspect the power cable. If necessary, replace.**

OK

7	Check battery cover

PREPARATION:
(a) Remove the auxiliary battery negative terminal.
(b) Remove the service plug.
(c) Remove the battery cover (See page HV–5).
(d) Connect the auxiliary battery negative terminal (with the service plug removed) and delete the DTC with a hand–held tester.
(e) Then, turn the ignition switch ON–OFF–ON (Do not turn it to ST) and wait for 1 min.

CHECK:
Check if P3009 is detected or not.

NG → **Check if the battery cover is contact with high voltage part or not. If necessary, replace.**

OK

8	Check high voltage cables in battery pack

PREPARATION:
(a) Turn the ignition switch OFF.
(b) Remove the auxiliary battery negative terminal.
(c) Remove the service plug.
(d) Disconnect the high voltage cables in the battery pack from the battery (both ends of the vehicle front side, 2 places on the center of the rear side).

CHECK:
Check the insulating resistance between each of 4 cables and the body ground.

OK:
Standard resistance: 10 MΩ or more

NG → **Replace the high voltage cable.**

OK

9	**Check SMR**

CHECK:
Check the insulating resistance between each of 4 connecting points (2 on the battery side and 2 on the vehicle side) of the high voltage cable for SMR and body ground.
OK:
Standard resistance: 10 MΩ or more

NG → **Replace SMR.**

OK

10	**Check battery temperature sensor.**

PREPARATION:
Disconnect the connector for battery temperature sensor from the battery ECU (See page HV–5).
CHECK:
Check the insulating resistance between each terminal and the body ground.
OK:
Standard resistance: 10 MΩ or more

NG → **Replace the battery temperature sensor.**

OK

11	Check battery ECU

PREPARATION:
(a) Remove the auxiliary battery negative terminal.
(b) Remove the service plug.
(c) Disconnect the connector for high voltage from the battery ECU (See page HV–5).
(d) Connect the auxiliary battery negative terminal (with the service plug removed) and delete the DTC with TOYOTA hand–held tester.
(e) Then, turn the ignition switch ON–OFF–ON (Do not turn it to ST) and wait for 1 min.

CHECK:
Check if P3009 is detected or not.

NG → **Replace the battery ECU.**

OK

12	Check busbar module

PREPARATION:
(a) Turn the ignition switch OFF.
(b) Remove the auxiliary battery negative terminal.
(c) From the part connected to the battery module (on the vehicle front side), remove all of wire harness used only for module voltage detection.
(d)

CHECK:
Check the insulating resistance between each terminal of orange colored connector on the battery ECU connecting side and the body ground.

OK:
Standard resistance: 10 MΩ or more

NG → **Replace the busbar module.**

OK

13	Check left half of battery module

CHECK:
Check the insulating resistance between the terminal on the left end of the battery module and the body ground.
OK:
Standard resistance: 10 MΩ or more

NG → **Replace the busbar module.**

OK

14	Check right half of battery module

CHECK:
Check the insulating resistance between the terminal on the right end of the battery module and the body ground.
OK:
Standard resistance: 10 MΩ or more

NG → **Replace the busbar module.**

OK

Repeatedly check and observe the result.

DTC	P3010	Battery Becomes Weak

CIRCUIT DESCRIPTION

Depletion of the whole HV battery is detected from its internal resistance.

DTC No.	DTC Detecting Condition	Trouble Area
P3009	Total resistance of battery becomes large.	• Battery pack

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P3010) being outputs?

NO → **Replace the battery pack assembly, and initialize the battery ECU by performing an active test.**

YES

Go to relevant DTC chart.

DI81U–01

DTC	P3011–P3029	Battery Block # Becomes Weak

CIRCUIT DESCRIPTION

Internal resistance of each battery module is measured, detecting battery depletion for each module block, 1 to 19.
Nineteen block of battery modules are arranged in the order of 1 to 19 from the ECU side.

DTC No.	DTC Detecting Condition	Trouble Area
P3009	Battery internal resistance is abnormal.	• Battery pack

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P3011–P3029) being outputs?

NO → **Replace the battery pack assembly, and initialize the battery ECU by performing an active test.**

YES

Go to relevant DTC chart.

DI81V–01

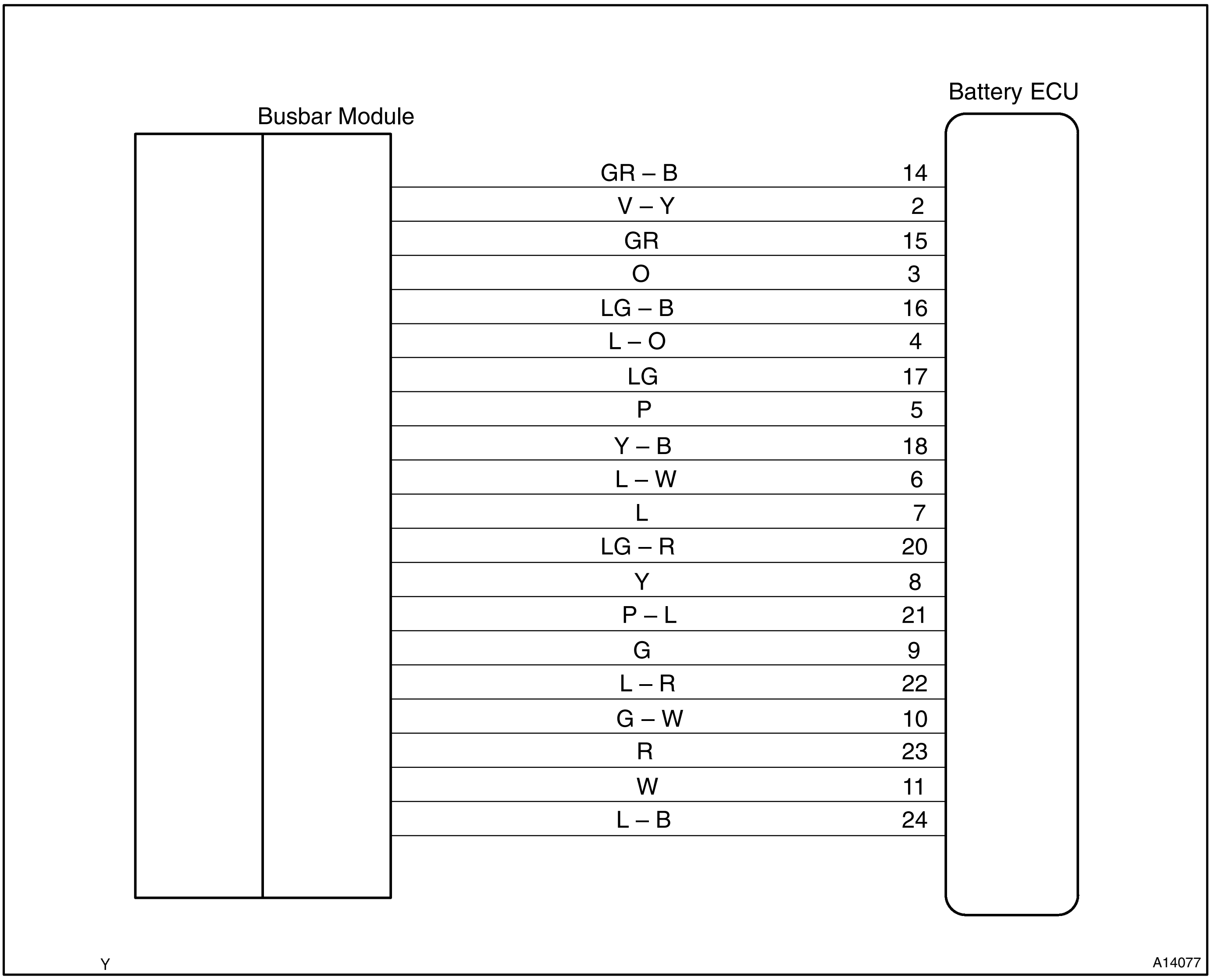
DTC	P3030	Battery Voltage Detective line Snapped

CIRCUIT DESCRIPTION

A voltage sensor set in a busbar module circuit measures a voltage of a pair of battery packs and sends signals to the battery ECU.

DTC No.	DTC Detecting Condition	Trouble Area
P3030	Open in battery voltage detective line	• Open in battery voltage detective line • Connector • Busbar module

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Are there any other codes (besides DTC P3030) being outputs?**

NO → **Go to relevant DTC chart.**

OK

2	**Check if connector is properly connected.**

NG → **Connect properly, repair or replace.**

OK

3	**Check busbar module**

CHECK:
Check the tightening of the nuts of the busbar modules before and behind the battery block which voltage is 2 V or less.
OK:
The nut is not loosened.

NG → **Tighten the nut.**

OK

Replace the busbar module.

DI81W–01

DTC	P3060	Battery Temperature sensor Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor in the sensor set in a battery pack changes its resistance according to battery bemperature. As the battery temperature falls or rises, the sesistance rises or falls accordingly.

DTC No.	DTC Detecting Condition	Trouble Area
P3030	• Open or short in battery temperature sensor circuit • Battery temperature sensor circuit range/performance problem	• Battery temperature sensor • Connector

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P3060) being output?

NO → **Go to relevant DTC chart.**

OK

2	Check if connector is properly connected.

NG → **Connect properly, repair or replace.**

OK

Replace the battery temperature sensor.

DI81X–01

DTC	P3076	Abnormal Air Flow by Battery Cooling Fan

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
P3076	Rotating fan does not lower battery temperature.	• Duct clogged or disconnected. • Mechanical failure of fan • Battery ECU

INSPECTION PROCEDURE

1	Connect hand–held tester, and perform active test.

PREPARATION:
(a) Connect the hand–held tester to the DLC 3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
CHECK:
Operating the fan forcibly, put your hand on the inlet to check that air is being inhaled by the fan.
OK:
Air is inhaled.

OK → **Replace the battery ECU.**

NG

2	Check if duct is correctly installed.

NG → **Repair or replace the duct.**

OK

3	Check duct for clog.

NG → **Repair or replace the duct.**

OK

4	**Check blower fan.**

NG → **Repair or replace the blower fan.**

OK

Replace the battery ECU.

DI81Y–01

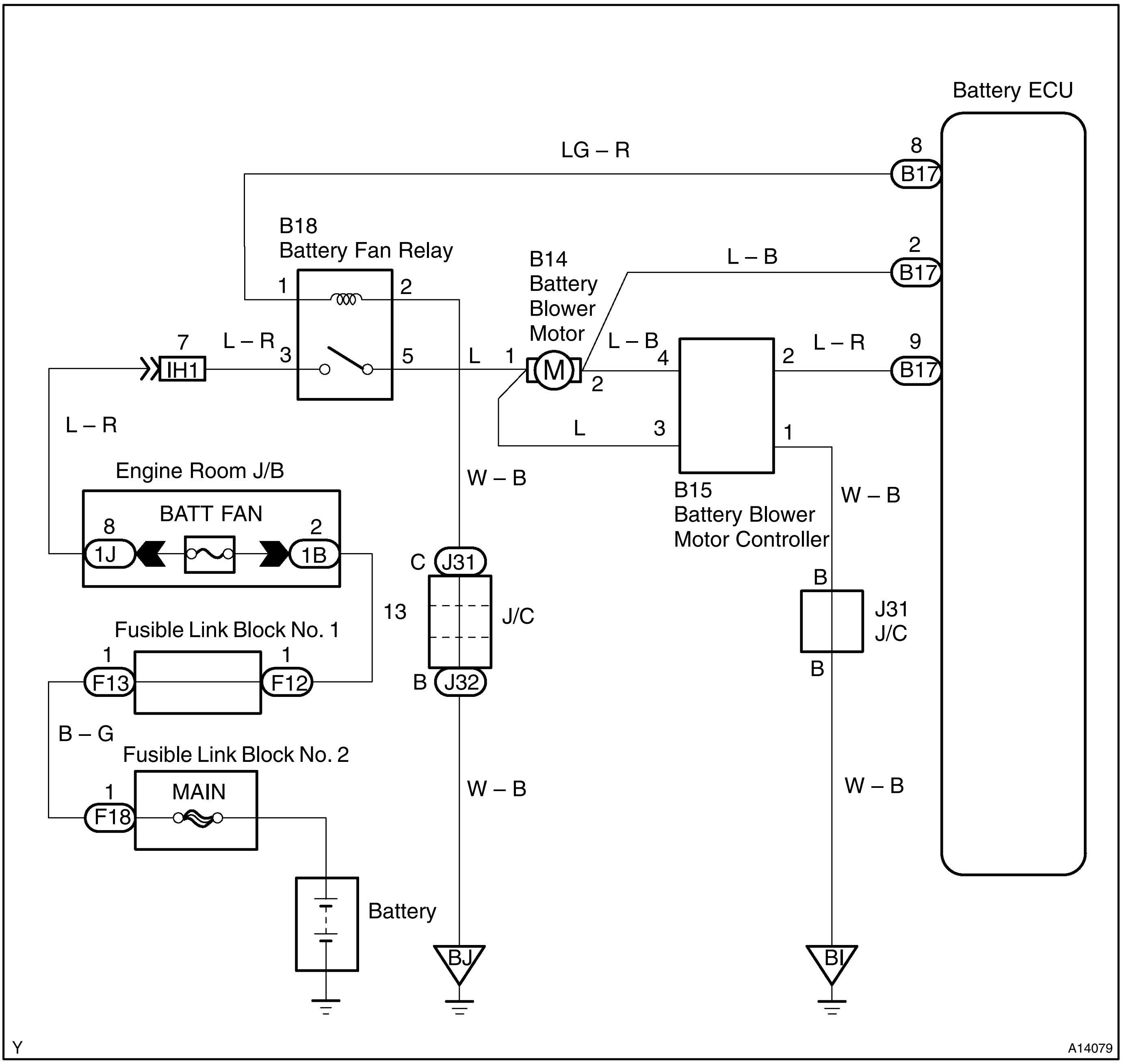
DTC	P3077	Battery Cooling Fan Motor Circuit Malfunction

CIRCUIT DESCRIPTION

To control rise in battery temperature during driving and charging, the battery fan operation is controlled in 3 levels depending on battery temperature.

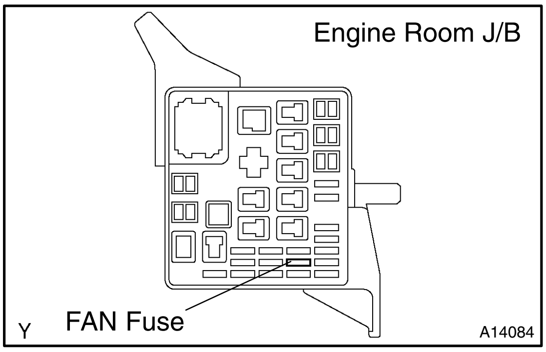
DTC No.	DTC Detecting Condition	Trouble Area
P3002	Electric error in battery cooling fan motor circuit continues for 10 sec. (2 trip detection logic)	• Battery blower motor • Battery fan relay • Battery fan blower controller • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check FAN fuse of engine room J/B.



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

NG	Check for short in all harness and components connected to FAN fuse. Check that the motor is not locked. If locked, replace the motor.

OK

2	Check wire harness open or short (See page IN–40).

NG	Repair or replace the wire harness.

OK

3	Check blower fan relay (See page HV–35).

NG	Replace the blower fan relay.

OK

4	**Check blower fan operation.**

PREPARATION:
Remove the blower fan (See page HV–32).

CHECK:
Apply battery voltage to the power supply terminal of the fan, and check the fan rotation.

OK:
The fan rotates normally.

NG → **Replace the blower fan.**

OK

Replace battery fan blower controller.

DI81Z–01

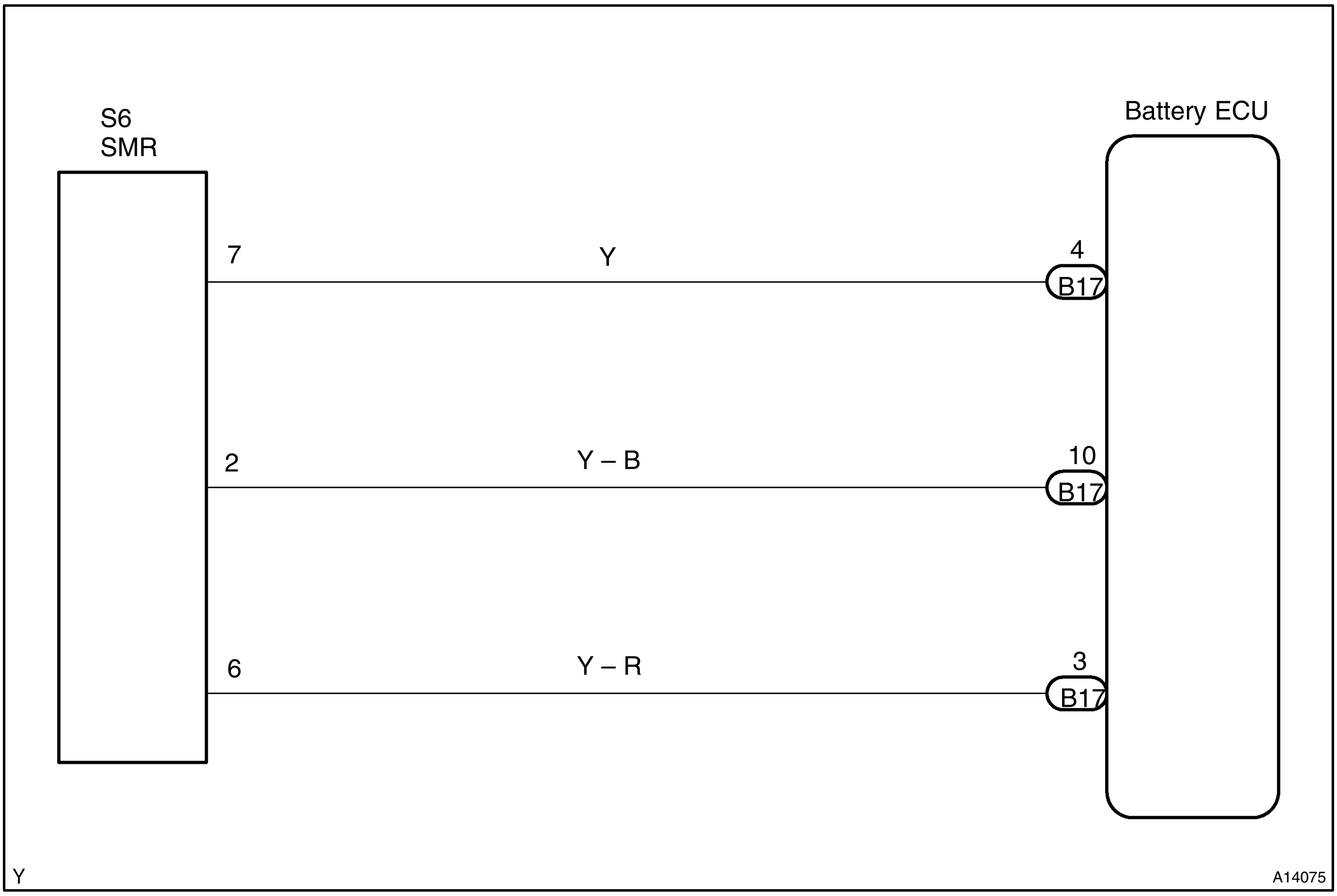
DTC	P3115	SMR Assembly Malfunction

CIRCUIT DESCRIPTION

The SMR connects or breaks electric power in high voltage circuit according to instructions from the HV ECU. The battery ECU inputs signals from a current sensor in the SMR and controls the output current.

DTC No.	DTC Detecting Condition	Trouble Area
P3115	Current sensor in SMR is defective.	• SMR • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Are there any other codes (besides DTC P3115) being output?**

NO → **Go to relevant DTC chart.**

OK

2	**Check if connector is properly connected**

NG → **Connect properly, repair or replace.**

OK

3	**Check wire harness**

PREPARATION:

(a) Disconnect the connector from the battery ECU.

(b) Disconnect the connector from the SMR.

CHECK:

Check that the wire harness between the battery ECU and the SMR is short and open.

OK:

No short and open

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

OK

Replace the SMR.

NOTICE:

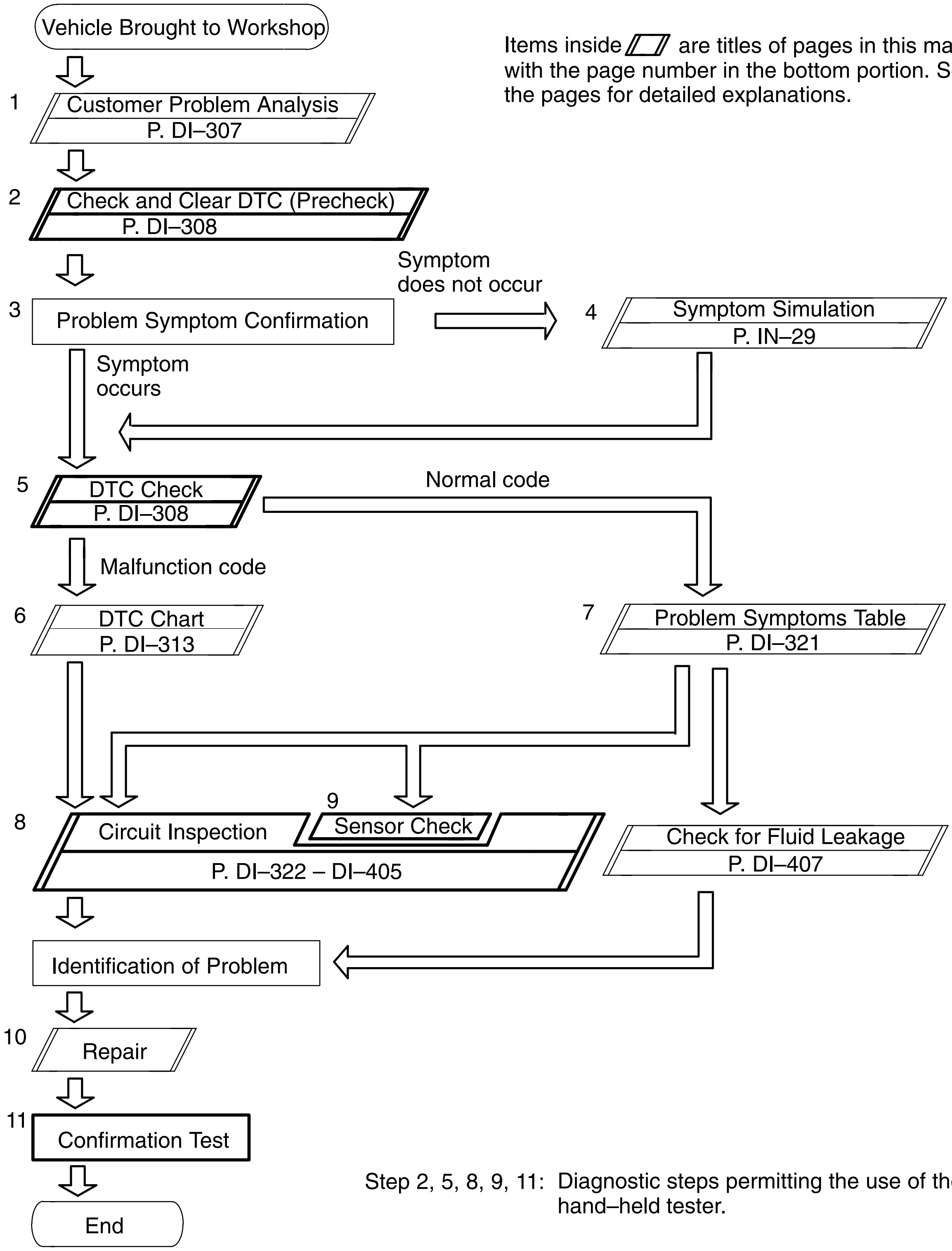
- **If the DTC, P3115 is output from the battery ECU, check the HV ECU for DTC.**
- **If the DTC, P3115 is also output from the HV ECU, replace the SMR. Erase the DTC from the HV ECU and check the DTC.**

ANTI–LOCK BRAKE SYSTEM WITH EBD & RBS

HOW TO PROCEED WITH TROUBLESHOOTING

DI7MJ–01

Troubleshoot in accordance with the procedure on the following pages.



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

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester.

Fail safe function:
When a failure occurs in the ABS & RBS system, the ABS warning light is lit and the ABS & RBS operation is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited.

DI7MK–01

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Date	/ /
		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 intermittently.	
	☐ EBD does not operate.	
	☐ RBS does not operate.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	Brake Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Brake Warning Light	☐ Normal ☐ Does not Light Up

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

DI7ML–01

PRE–CHECK

1. PRECAUTION

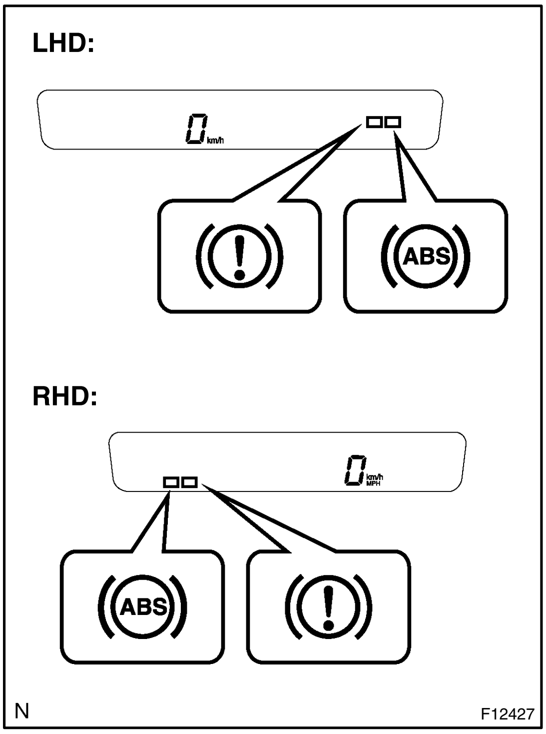
(a) To distinguish trouble and repair it, perform necessary electrical shock prevention operation (See page IN–4).

(b) Some portions of the wiring harness belong to the 288 V circuit, to which a high voltage is supplied. To avoid receiving an electrical shock, be sure to observe the following:

(1) Wear insulating gloves during inspection.

(2) Before removing or installing parts and connectors, remove the service plug and conform that the voltage at the output terminals has dropped down to 0 V.

(3) When disengaging wiring connectors, hold the connector bodies to avoid pulling the wires. When engaging wiring connectors, be sure to engage them securely.



2. DIAGNOSIS SYSTEM

(a) Release the parking brake pedal.

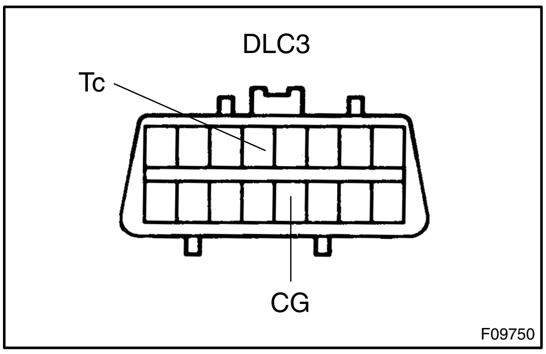
(b) Check the indicator.
When the ignition switch is turned ON, check that the ABS warning light and brake warning light goes on for approx. 3 seconds.

HINT:

- When the parking brake is applied or the level of the brake fluid is low, the brake warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit or brake warning light circuit (See page DI–394 or DI–398).

(c) Check the warning buzzer.
When depressing the brake pedal repeatedly it may turn on the brake warning buzzer.

HINT:
If the warning buzzer check result is not normal, proceed to troubleshooting for the brake warning buzzer circuit (See page DI–401).



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

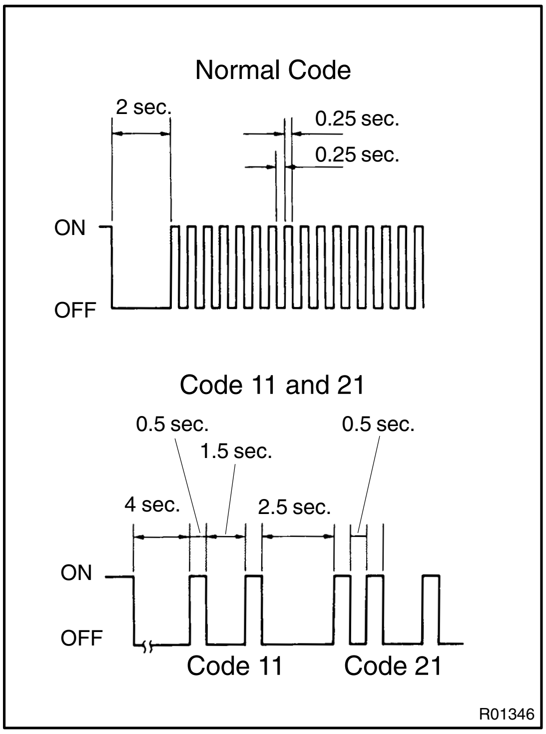
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040

(2) Turn the ignition switch ON.

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

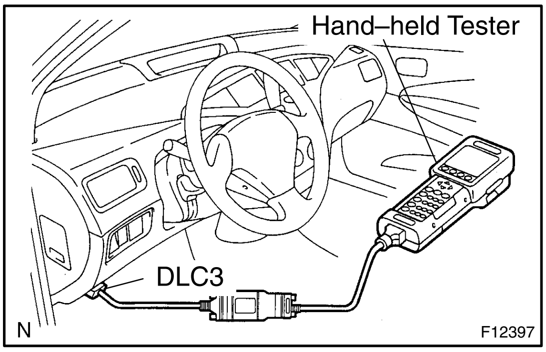
HINT:

- If no code appears, inspect the diagnostic circuit or ABS warning light circuit (See page DI–403 or DI–394).



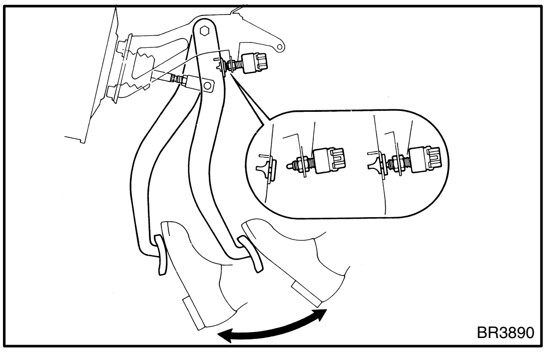
- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.
  (4) Codes are explained in the code table on page DI–313.
  (5) After completing the check, disconnect terminals Tc and CG, and turn off the display.

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

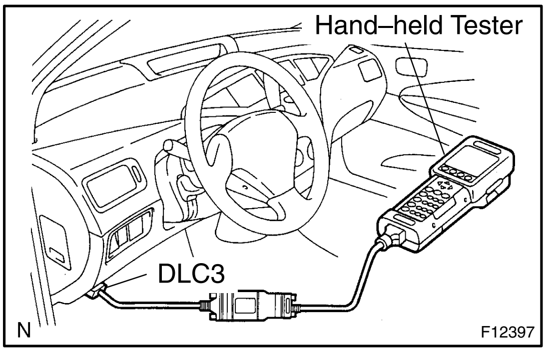


(e) In case of using hand–held tester:
Check the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Read the DTC by following the prompts on the tester screen.

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

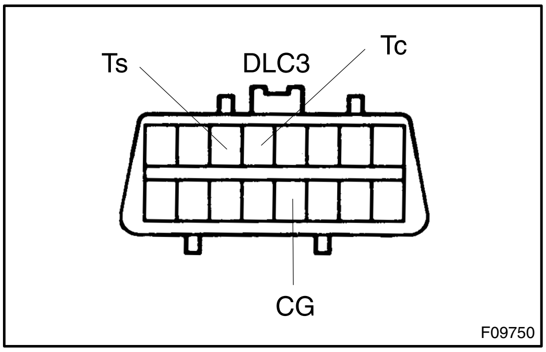


(f) In case of not using hand–held tester:
Clear the DTC.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.
(4) Check that the warning light shows the normal code.
(5) Remove the SST from the terminals of DLC3.
SST 09843–18040



(g) 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.

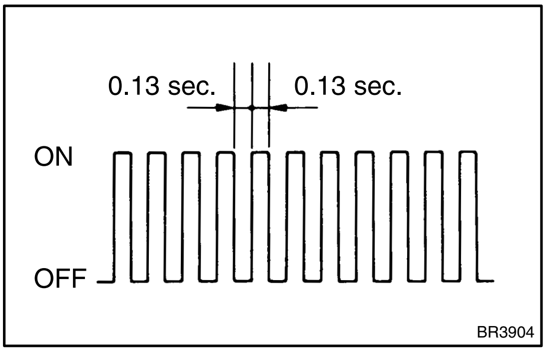
HINT:
Please refer to the hand–held tester operator's manual for further details.



3. 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 CG of DLC3.
SST 09843–18040
(3) Start the engine.
(4) Check that the ABS warning light blinks.



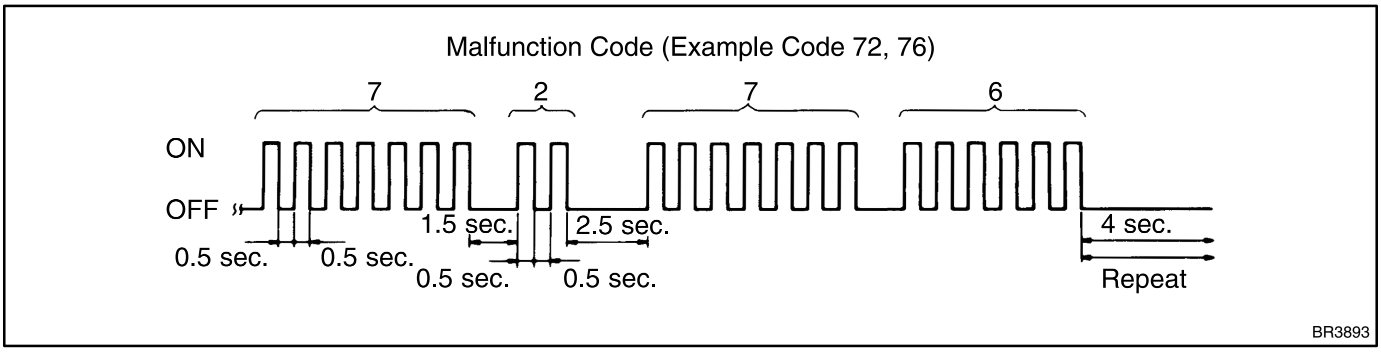
HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit and Ts terminal circuit (See page DI–394, DI–405).

(5) Keep the vehicle in the stationary condition and the brake pedal in free condition for 1 sec. or more.
(6) Keeping the vehicle in the stationary condition, depress the brake pedal with 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.
(7) Drive vehicle straight forward.
When driving the vehicle at the speed faster than 45 km/h (28 mph) for several seconds, check that the ABS warning light comes off.

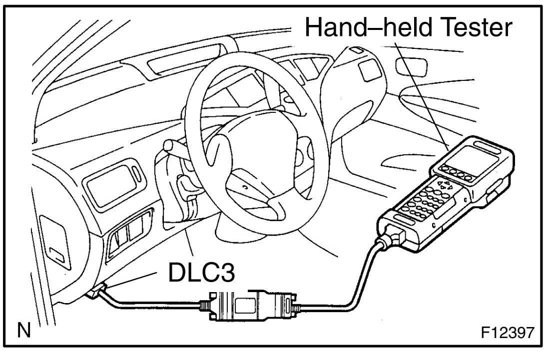
HINT:
There is a case that the sensor check is not completed if the vehicle has its front wheels spun or its steering wheel steered during this check.

(8) Stop the vehicle.
(9) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(10) Read the number of blinks of the ABS warning light.

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



(11) After doing the check, turn ignition switch OFF, and disconnect the SST from terminals Ts and CG, Tc and CG of DLC3.
SST 09843–18040



(b) In case of using hand–held tester:
Check the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Do step (3) to (8) on the previous page and this page.
(3) Read the DTC by following the prompts on the tester screen.

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

DTC of sensor check function:

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Right front speed sensor rotor
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Left front speed sensor rotor
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Right rear speed sensor rotor
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Left rear speed 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
C1281/81	Master cylinder (M/C) pressure sensor output signals is faulty	Master cylinder (M/C) pressure sensor
C1282/82	Regulator (REG) pressure sensor output signal is faulty	Regulator (REG) pressure sensor
C1283/83	Front (FR) pressure sensor output signal is faulty	Front (FR) pressure sensor
C1284/84	Rear (RR) pressure sensor output signal is faulty	Rear (RR) pressure sensor

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

When removing the part, turn the ignition switch OFF.

HINT:

- Using SST 09843–18040, connect the terminals Tc and CG of DLC3.
- 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
C0200/31*1 (DI–322)	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–322)	Left front wheel speed sensor signal malfunction	
C0210/33*1 (DI–322)	Right rear wheel speed sensor signal malfunction	
C0215/34*1 (DI–322)	Left rear wheel speed sensor signal malfunction	
C0226/21 (DI–329)	Malfunction in ABS solenoid (SFR) circuit	• SFRR or SFRH circuit • Brake actuator
C0236/22 (DI–329)	Malfunction in ABS solenoid (SFL) circuit	• SFLR or SFLH circuit • Brake actuator
C0246/23 (DI–329)	Malfunction in ABS solenoid (SR) circuit	• SRR or SRH circuit • Brake actuator
C0278/11 (DI–332)	Open circuit in ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit
C0279/12 (DI–332)	Short circuit in ABS solenoid relay circuit	
C1202/58 (DI–336)	Brake fluid level low Open circuit in brake fluid level warning switch circuit	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit
C1211/61 (DI–338)	Malfunction in linear solenoid (SLA) circuit	• SLA+ or SLA– circuit • Brake actuator
C1212/62 (DI–338)	Malfunction in linear solenoid (SLR) circuit	• SLR+ or SLR– circuit • Brake actuator
C1213/63 (DI–340)	Malfunction in HV ECU communication circuit	• HVI+ or HVI– circuit • HVO+ or HVO– circuit • HV ECU
C1214/64 (DI–342)	Malfunction in hydraulic system	• Each pressure sensor • Each pressure sensor circuit • Fluid leakage
C1215/15 (DI–343)	Low voltage of linear solenoid	• Battery • Charging system • Power source circuit
C1216/16 (DI–343)	High voltage of linear solenoid	
C1217/25 (DI–329)	Malfunction in regenerative solenoid (SMC1) circuit	• Regenerative solenoid (SMC1) circuit • Brake actuator
C1218/26 (DI–329)	Malfunction in regenerative solenoid (SMC2) circuit	• Regenerative solenoid (SMC2) circuit • Brake actuator

C1219/27 (DI–329)	Malfunction in regenerative solenoid (SS) circuit	• Regenerative solenoid (SS) circuit • Brake actuator
C1220/46 (DI–348)	Malfunction in regulator (REG) pressure sensor	• Each pressure sensor • Each pressure sensor circuit • Brake actuator
C1221/46 (DI–348)	Malfunction in front (FR) pressure sensor	
C1222/46 (DI–348)	Malfunction in rear (RR) pressure sensor	
C1241/41 (DI–353)	Low or abnormally high battery positive voltage in IG1 circuit	• Battery • Charging system • Power source circuit
C1242/42*2 (DI–356)	Open circuit in IG2 circuit	• Battery • Charging system • Power source circuit
C1246/46 (DI–348)	Malfunction in master cylinder (M/C) pressure sensor	• Master cylinder (M/C) pressure sensor • Master cylinder (M/C) pressure sensor circuit
C1249/49 (DI–359)	Open circuit in stop light switch circuit	• Stop light switch • Stop light switch circuit
C1251/51*2 (DI–362)	Malfunction in hydraulic brake booster pump motor	Hydraulic brake booster pump motor
C1252/52*2 (DI–366)	Hydraulic brake booster pump motor ON time abnormally long	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)
C1253/53*2 (DI–373)	Malfunction in hydro motor relay circuit	• Hydro motor relay • Hydro motor relay circuit
C1254/54*2 (DI–378)	Malfunction in pressure switch	• Pressure switch (PH or PL) • Pressure switch circuit
C1256/56*2 (DI–381)	Malfunction of accumulator low pressure	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor
C1257/57*2 (DI–387)	Malfunction in power supply drive circuit	• Battery • Power Source circuit
C1259/59 (DI–390)	Malfunction in regenerative of HV ECU	• HV control system • HV ECU
Always ON (DI–391)	Malfunction in brake ECU	• Battery • Charging system • Power source circuit • Brake ECU

*1: As the DTC cannot be erased by replacing parts alone do either of the following operations.

(1) Clear DTC (See page DI–308).

(2) At the vehicle speed of 20 km/h (12 mph), drive the vehicle for 30 sec. or more.

*2: Using the following table, troubled parts can be specified.

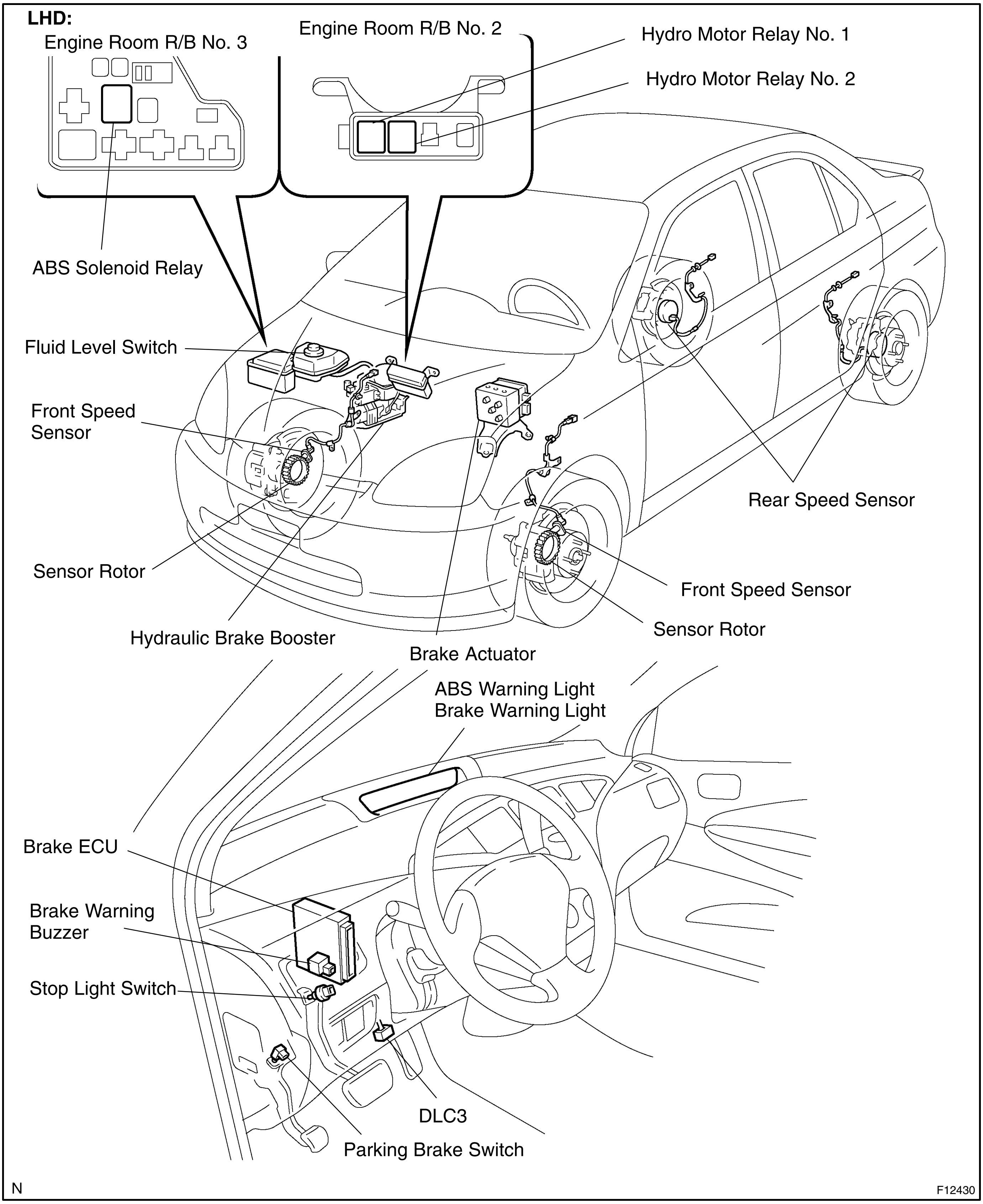
Table of Trouble Part and DTC:

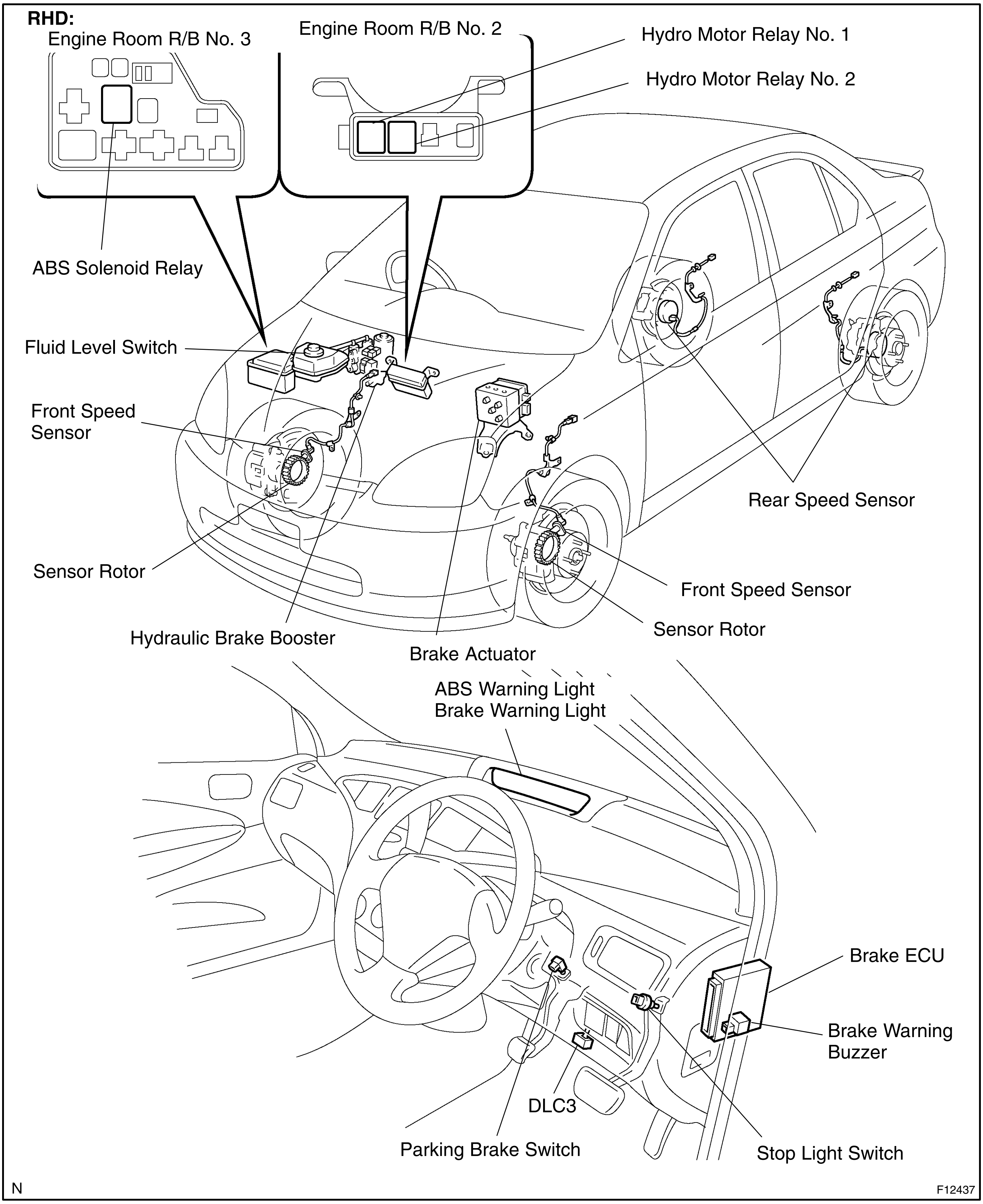
DTC		C1242/42		C1251/51		C1252/52		C1253/53		C1254/54		C1256/56		C1257/57	
Brake warning light and buzzer		Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer
Pressure switch	PH					○	○			○		○	○		
	PL					○	○			○		○	○		
Pump motor circuit	Pump motor			○	○							○	○		
	MTT wire harness					○	○	○							
	MT+ wire harness			○											
	MT– wire harness			○											
Accumulator malfunction												○	○		
Motor relay circuit	MR1 open circuit							○							
	MR2 open circuit							○							
	MR1 welded contact					○	○	○							
	MR2 welded contact					○	○	○							
Hydraulic brake booster	Pressure leaks					○	○					○	○		
Power source*	IG2 open circuit	○													
ECU	Power suplly circuit													○	

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

DI7MN–01

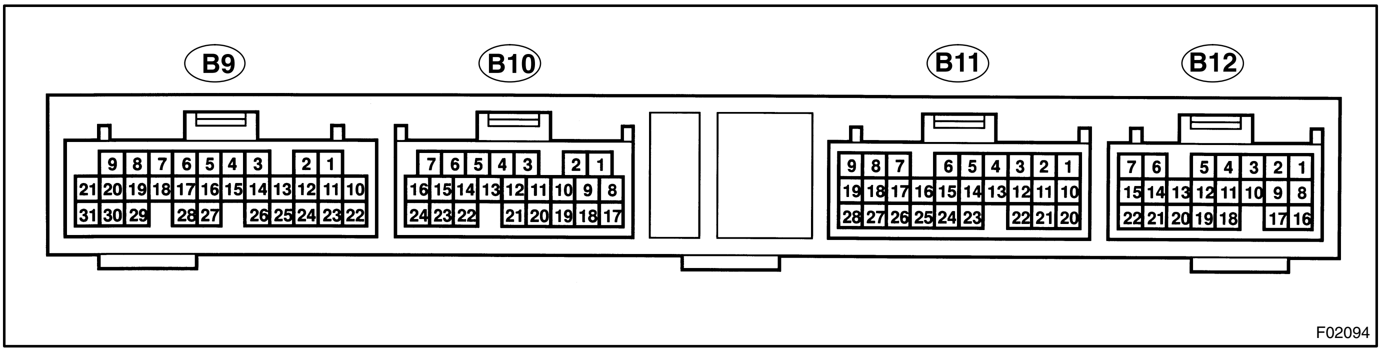
PARTS LOCATION




RHD:
Engine Room R/B No. 3
Engine Room R/B No. 2
Hydro Motor Relay No. 1
Hydro Motor Relay No. 2
ABS Solenoid Relay
Fluid Level Switch
Front Speed Sensor
Rear Speed Sensor
Sensor Rotor
Front Speed Sensor
Sensor Rotor
Hydraulic Brake Booster
Brake Actuator
ABS Warning Light
Brake Warning Light
Brake ECU
Brake Warning Buzzer
DLC3
Parking Brake Switch
Stop Light Switch
N
F12437

DI7MO–01

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SFRH (B9 – 1) – GND (B9 – 6, 31, B10 – 8, 17)	R–B ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (B9 – 2) – GND (B9 – 6, 31, B10 – 8, 17)	R–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SMC2 (B9 – 3) – GND (B9 – 6, 31, B10 – 8, 17)	G–B ↔ W–B	IG switch ON, ABS warning light OFF (Brake pedal released)	10 – 14
SMC1 (B9 – 4) – GND (B9 – 6, 31, B10 – 8, 17)	G–W ↔ W–B	IG switch ON, ABS warning light OFF (Brake pedal released)	10 – 14
SS (B9 – 5) – GND (B9 – 6, 31, B10 – 8, 17)	G–O ↔ W–B	IG switch ON, ABS warning light OFF (Brake pedal released)	10 – 14
SFLR (B9 – 7) – GND (B9 – 6, 31, B10 – 8, 17)	R–G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRH (B9 – 8) – GND (B9 – 6, 31, B10 – 8, 17)	R–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRR (B9 – 9) – GND (B9 – 6, 31, B10 – 8, 17)	R–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
VCM (B9 – 10) – GND (B9 – 6, 31, B10 – 8, 17)	B ↔ W–B	IG switch ON	4.5 – 5.5
PH (B9 – 11) – GND (B9 – 6, 31, B10 – 8, 17)	GR ↔ W–B	Vehicle stops, pump motor rotates	5 – 7
		Vehicle stops, pump motor stops	Below 1.0
SG1 (B9 – 12) – GND (B9 – 6, 31, B10 – 8, 17)	Shielded ↔ W–B	IG switch OFF	Continuity
FR+ (B9 – 14) – FR– (B9 – 13)	P ↔ L	IG switch ON, slowly turn right front wheel	Pulse generation
FL+ (B9 – 16) – FL– (B9 – 15)	R ↔ G	IG switch ON, slowly turn left front wheel	Pulse generation
MT– (B9 – 18) – GND (B9 – 6, 31, B10 – 8, 17)	Y ↔ W–B	IG switch OFF	Continuity
SR (B9 – 19) – GND (B9 – 6, 31, B10 – 8, 17)	B–L ↔ W–B	IG switch ON, ABS warning light OFF	Below 1.5
SFLH (B9 – 21) – GND (B9 – 6, 31, B10 – 8, 17)	Y–B ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
PMC (B9 – 22) – GND (B9 – 6, 31, B10 – 8, 17)	W ↔ W–B	IG switch ON, stop light switch OFF	Below 1.0
E2 (B9 – 23) – GND (B9 – 6, 31, B10 – 8, 17)	R ↔ W–B	IG switch OFF	Continuity
FSS (B9 – 24) – GND (B9 – 6, 31, B10 – 8, 17)	BR ↔ W–B	IG switch OFF	Continuity
MTT (B9 – 27) – GND (B9 – 6, 31, B10 – 8, 17)	W–L ↔ W–B	IG switch ON, pump motor rotates	Above 8.0
		IG switch ON, pump motor stops	Below 1.5

MT+ (B9 – 28) – GND (B9 – 6, 31, B10 – 8, 17)	Y–G ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
MR1 (B9 – 29) – GND (B9 – 6, 31, B10 – 8, 17)	LG–R ↔ W–B	IG switch ON, ABS motor stops	10 – 14
STP (B10 – 1) – GND (B9 – 6, 31, B10 – 8, 17)	G–W ↔ W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
SP1 (B10 – 2) – GND (B9 – 6, 31, B10 – 8, 17)	V–R ↔ W–B	Vehicle driving at about 30 km/h (19 mph)	Pulse generation
Tc (B10 – 3) – GND (B9 – 6, 31, B10 – 8, 17)	P–B ↔ W–B	IG switch ON	10 – 14
Ts (B10 – 4) – GND (B9 – 6, 31, B10 – 8, 17)	GR–G ↔ W–B	IG switch ON	10 – 14
BRL (B10 – 5) – GND (B9 – 6, 31, B10 – 8, 17)	R–Y ↔ W–B	IG switch OFF → ON (Parking brake switch OFF)	10 – 14 for about 3 sec., then Below 2
IG1 (B10 – 6) – GND (B9 – 6, 31, B10 – 8, 17)	B–Y ↔ W–B	IG switch ON	10 – 14
R1+ (B10 – 7) – GND (B9 – 6, 31, B10 – 8, 17)	Y–B ↔ W–B	IG switch ON	10 – 14
D/G (B10 – 10) – GND (B9 – 6, 31, B10 – 8, 17)	W–L ↔ W–B	IG switch ON	10 – 14
RR+ (B10 – 11) – RR– (B10 – 12)	Y ↔ BR	IG switch ON, slowly turn right rear wheel	Pulse generation
HVO+ (B10 – 14) – GND (B9 – 6, 31, B10 – 8, 17)	G ↔ W–B	IG switch ON	About 2.5
RLO (B10 – 15) – GND (B9 – 6, 31, B10 – 8, 17)	W ↔ W–B	Vehicle driving at about 30 km/h (19 mph)	Pulse generation
HVI– (B10 – 16) – GND (B9 – 6, 31, B10 – 8, 17)	V ↔ W–B	IG switch ON	About 2.5
WA (B10 – 18) – GND (B9 – 6, 31, B10 – 8, 17)	B–W ↔ W–B	IG switch ON, ABS warning light ON	10 – 14
		IG switch ON, ABS warning light OFF	Below 2.0
RL+ (B10 – 19) – RL– (B10 – 20)	P ↔ L	IG switch ON, slowly turn left rear wheel	Pulse generation
RSS (B10 – 21) – GND (B9 – 6, 31, B10 – 8, 17)	BR–B ↔ W–B	IG switch OFF	Continuity
HVO– (B10 – 22) – GND (B9 – 6, 31, B10 – 8, 17)	R ↔ W–B	IG switch ON	About 2.5
RRO (B10 – 23) – GND (B9 – 6, 31, B10 – 8, 17)	B ↔ W–B	Vehicle driving at about 30 km/h (19 mph)	Pulse generation
HVI+ (B10 – 24) – GND (B9 – 6, 31, B10 – 8, 17)	LG ↔ W–B	IG switch ON	About 2.5
IG2 (B11 – 1) – GND (B9 – 6, 31, B10 – 8, 17)	B–W ↔ W–B	IG switch ON	10 – 14
LBL (B11 – 7) – GND (B9 – 6, 31, B10 – 8, 17)	LG–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level	4.5 – 6.4
VFR (B11 – 9) – GND (B9 – 6, 31, B10 – 8, 17)	B ↔ W–B	IG switch ON	4.5 – 5.5
PKB (B11 – 13) – GND (B9 – 6, 31, B10 – 8, 17)	R–Y ↔ W–B	IG switch ON, parking brake switch ON	Below 1.5
		IG switch ON, parking brake switch OFF	10 – 14
SG2 (B11 – 15) – GND (B9 – 6, 31, B10 – 8, 17)	Shielded ↔ W–B	IG switch OFF	Continuity

VREG (B11 – 16) – GND (B9 – 6, 31, B10 – 8, 17)	B ↔ W–B	IG switch ON	4.5 – 5.5
SG3 (B11 – 18) – GND (B9 – 6, 31, B10 – 8, 17)	Shielded ↔ W–B	IG switch OFF	Continuity
BZ (B11 – 20) – GND (B9 – 6, 31, B10 – 8, 17)	G ↔ W–B	IG switch ON, buzzer sounds	Below 1.5
		IG switch ON, buzzer does not sound	10 – 14
EREG (B11 – 24) – GND (B9 – 6, 31, B10 – 8, 17)	R ↔ W–B	IG switch OFF	Continuity
PREG (B11 – 25) – GND (B9 – 6, 31, B10 – 8, 17)	W ↔ W–B	IG switch ON, brake pedal released	Below 1.0
EFR (B11 – 27) – GND (B9 – 6, 31, B10 – 8, 17)	R ↔ W–B	IG switch OFF	Continuity
PFR (B11 – 28) – GND (B9 – 6, 31, B10 – 8, 17)	W ↔ W–B	IG switch ON, brake pedal released	Below 1.0
SLA+ (B12 – 1) – GND (B9 – 6, 31, B10 – 8, 17)	L ↔ W–B	IG switch ON	Pulse generation
MR2 (B12 – 2) – GND (B9 – 6, 31, B10 – 8, 17)	Y–G ↔ W–B	IG switch ON, pump motor rotates	Below 1.0
		IG switch ON, pump motor stops	10 –14
R2+ (B12 – 3) – GND (B9 – 6, 31, B10 – 8, 17)	L–O ↔ W–B	IG switch ON	10 – 14
VRR (B12 – 5) – GND (B9 – 6, 31, B10 – 8, 17)	B ↔ W–B	IG switch ON	4.5 – 5.5
AST (B12 – 6) – GND (B9 – 6, 31, B10 – 8, 17)	B–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SLR– (B12 – 7) – GND (B9 – 6, 31, B10 – 8, 17)	V ↔ W–B	IG switch ON	Below 1.5
SLA– (B12 – 8) – GND (B9 – 6, 31, B10 – 8, 17)	LG ↔ W–B	IG switch ON	Below 1.5
PL (B12 – 9) – GND (B9 – 6, 31, B10 – 8, 17)	Y–R ↔ W–B	IG switch OFF, depress brake pedal more than 40 times → IG switch ON	6.5 – 10 → 2.5 – 5.0
PRR (B12 – 13) – GND (B9 – 6, 31, B10 – 8, 17)	W ↔ W–B	IG switch ON, brake pedal released	Below 1.0
SLR+ (B12 – 16) – GND (B9 – 6, 31, B10 – 8, 17)	P ↔ W–B	IG switch ON	Pulse generation
SG4 (B12 – 19) – GND (B9 – 6, 31, B10 – 8, 17)	Shielded ↔ W–B	IG switch OFF	Continuity
ERR (B12 – 20) – GND (B9 – 6, 31, B10 – 8, 17)	R ↔ W–B	IG switch OFF	Continuity
+BS (B12 – 22) – GND (B9 – 6, 31, B10 – 8, 17)	L ↔ W–B	IG switch ON	10 – 14

DI7MP–01

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:

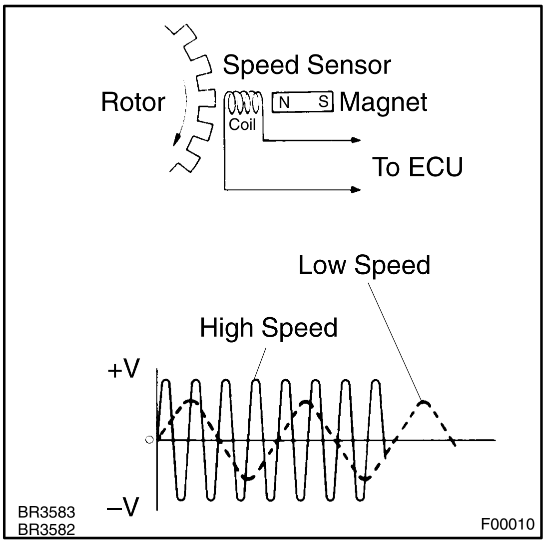
When replacing brake ECU, sensor or etc., turn the IG switch OFF.

Symptom	Suspect Area	See page
ABS does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the brake ECU. 5. Check the DTC reconfirming that the normal code is output. 6. IG power source circuit 7. Speed sensor circuit 8. Check the hydraulic brake booster with a hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–407).	 DI–308 DI–353 DI–322 BR–61
ABS does not operate efficiently	Only when 1. to 4. are all normal and the problem is still occurring, replace the brake ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the hydraulic brake booster with a hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–407).	 DI–308 DI–322 DI–359 BR–61
RBS does not operate.	Only when 1. to 5. are all normal and problem is still occurring, replace brake ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit 3. Master cylinder pressure sensor circuit 4. Wheel cylinder pressure sensor circuit 5. Check the hydraulic brake booster with a hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–407).	 DI–308 DI–353 DI–348 DI–348 BR–61
ABS warning light abnormal	1. ABS warning light circuit 2. Brake ECU	DI–394
Brake warning light abnormal	1. Brake warning light circuit 2. Brake ECU	DI–398
DTC check cannot be done	Only when 1. and 2. are all normal and the problem is still occurring, replace the brake ECU. 1. ABS warning light circuit 2. Tc terminal circuit	 DI–394 DI–403
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. Brake ECU	DI–405

CIRCUIT INSPECTION

DTC	C0200/31 – C0215/34	Speed Sensor Circuit

CIRCUIT DESCRIPTION

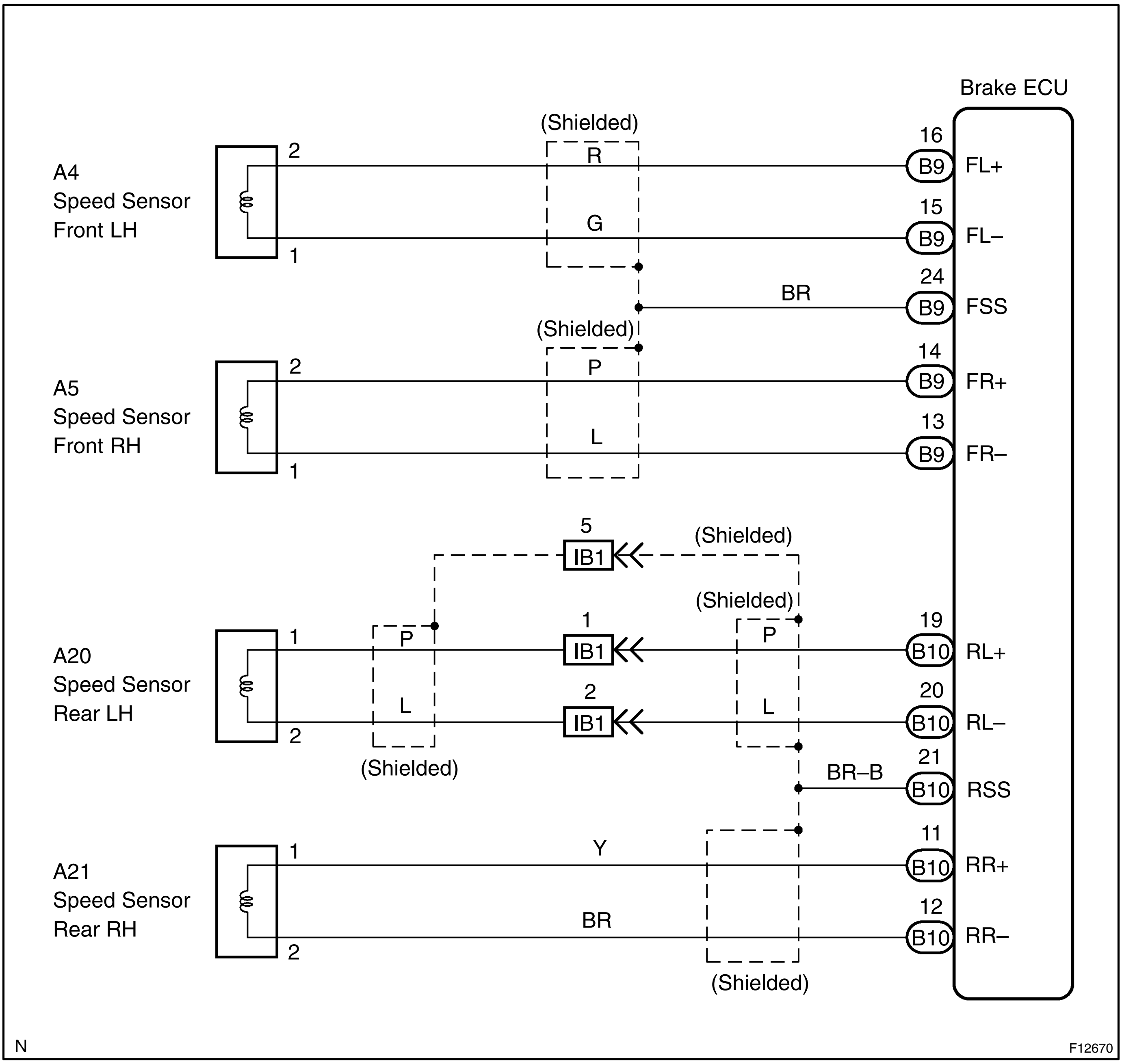


The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS & EBD control system. The front and rear rotors each have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32 C0210/33 C0215/34	Detection of any of conditions 1. through 4.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. or more. 2. While a vehicle is driven at a speed of 15 km/h (24 mph) or more, pulse signals from the speed sensor are instantly omitted 7 times or more. 3. While a vehicle is driven at a speed of 20 km/h (32 mph) or more, error signals from the speed sensor are transmitted consecutively 75 time or more within 5 min. 4. When the ignition switch is ON, an open circuit in the speed sensor continues for 0.5 sec. 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.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	Check output value of speed sensor.

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON, and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:
Check that there is no difference between the speed value output from the speed sensor displayed on the hand–held tester and the speed value displayed on the speedometer when driving the vehicle.

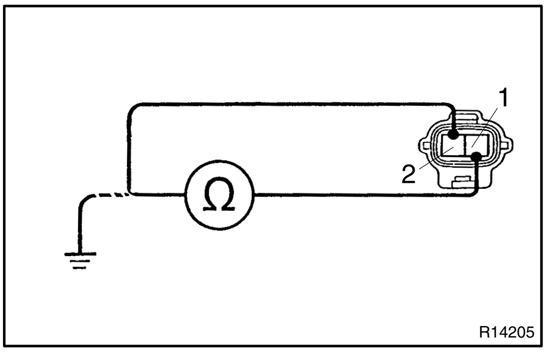
OK:
There is almost no difference from the displayed speed value.

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

OK → **Check and replace brake ECU.**

NG

2	Check speed sensor.



Front:

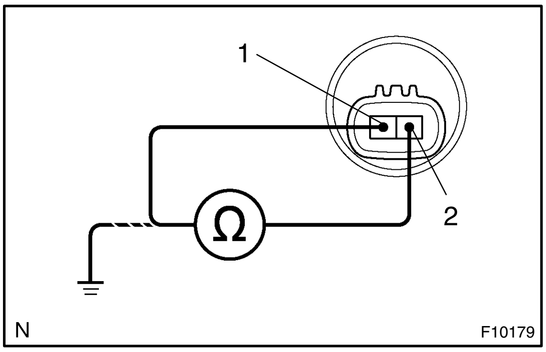
PREPARATION:
(a) Remove the front fender liner.
(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
(c) Disconnect the speed sensor connector.

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

OK:
Resistance: 0.6 – 2.5 kΩ

CHECK:
Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:
Resistance: 10 MΩ or higher



Rear:

PREPARATION:

(a) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(b) Disconnect the speed sensor connector at hub bearing .

CHECK:

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

OK:

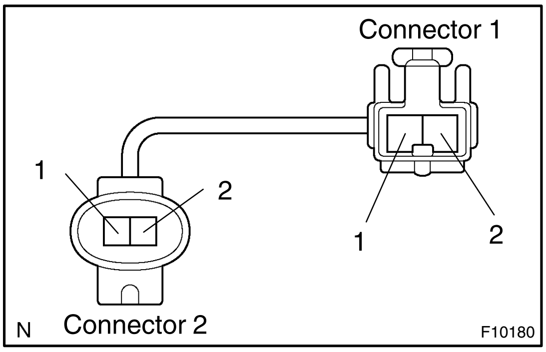
Resistance: 0.7 – 2.2 kΩ

CHECK:

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

OK:

Resistance: 1 MΩ or higher



Rear speed sensor sub–wire harness:

PREPARATION:

(a) Remove the seat cushion and seatback.

(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(c) Disconnect the speed sensor connector inside vehicle.

CHECK:

(a) Measure resistance between terminal 1 of connector 1 and ternial 2 of connector 2.

(b) Measure resistance between terminal 2 of connector 1 and ternial 1 of connector 2.

OK:

Resistance: below 1 Ω

CHECK:

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

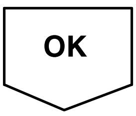
OK:

Resistance: 10 MΩ or higher

NG	**Replace speed sensor or sub–wire harness.**

NOTICE:

Check the speed sensor signal last (See page DI–308).

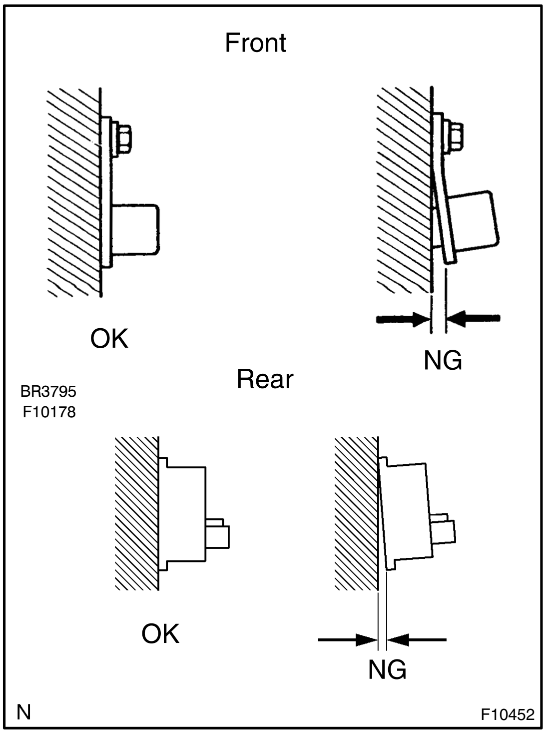


3	Check for open and short circuit in harness and connector between each speed sensor and brake ECU (See page IN–40).

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

OK

4	Check speed sensor installation.



CHECK:

Check the speed sensor installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and steering knuckle or rear axle carrier.

Torque:

Front speed sensor: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

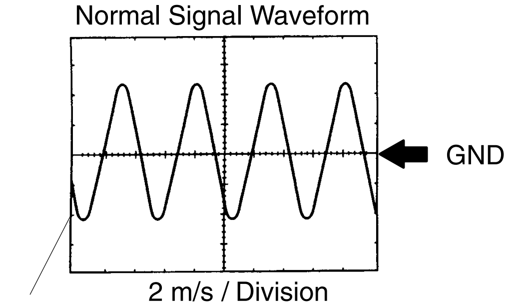
NG → **Replace speed sensor.**

NOTICE:

Check the speed sensor signal last (See page DI–308).

OK

5	**Check speed sensor and sensor rotor serrations.**



W04200

REFERENCE: INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Remove the brake ECU with connectors still connected.

(b) Connect the oscilloscope to the terminals FR+, FL+, RR+ or RL+ and GND of the brake ECU.

CHECK:

Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

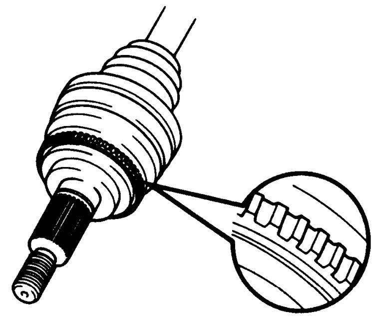
HINT:

- As the vehicle speed (rpm of the wheels) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter deposited on it.

OK	**Check and replace brake ECU.**

NG

6	**Check sensor rotor and sensor tip.**


R00948

Front:

PREPARATION:

Remove the front drive shaft (See page SA–17).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches or missing teeth or foreign objects.

PREPARATION:

Remove the front speed sensor (See page BR–73).

CHECK:

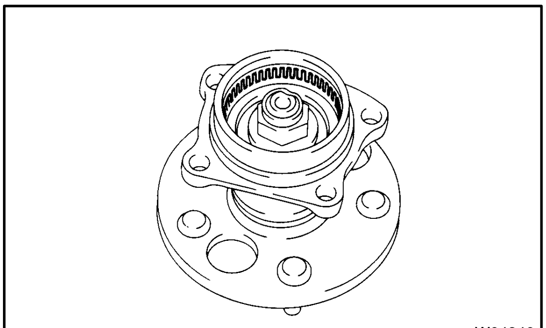
Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.



Rear:

PREPARATION:

Remove the rear speed sensor (See page BR–76).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches or missing teeth or foreign objects.

HINT:

If the sensor rotor is damaged or deformed, replace the hub assembly.

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.

NG → **Replace sensor rotor or speed sensor.**

NOTICE:
Check the speed sensor signal last (See page DI–308).

OK

Check and replace brake ECU.

DI7MR–01

DTC	C0226/21 – C0246/23	ABS Solenoid Circuit

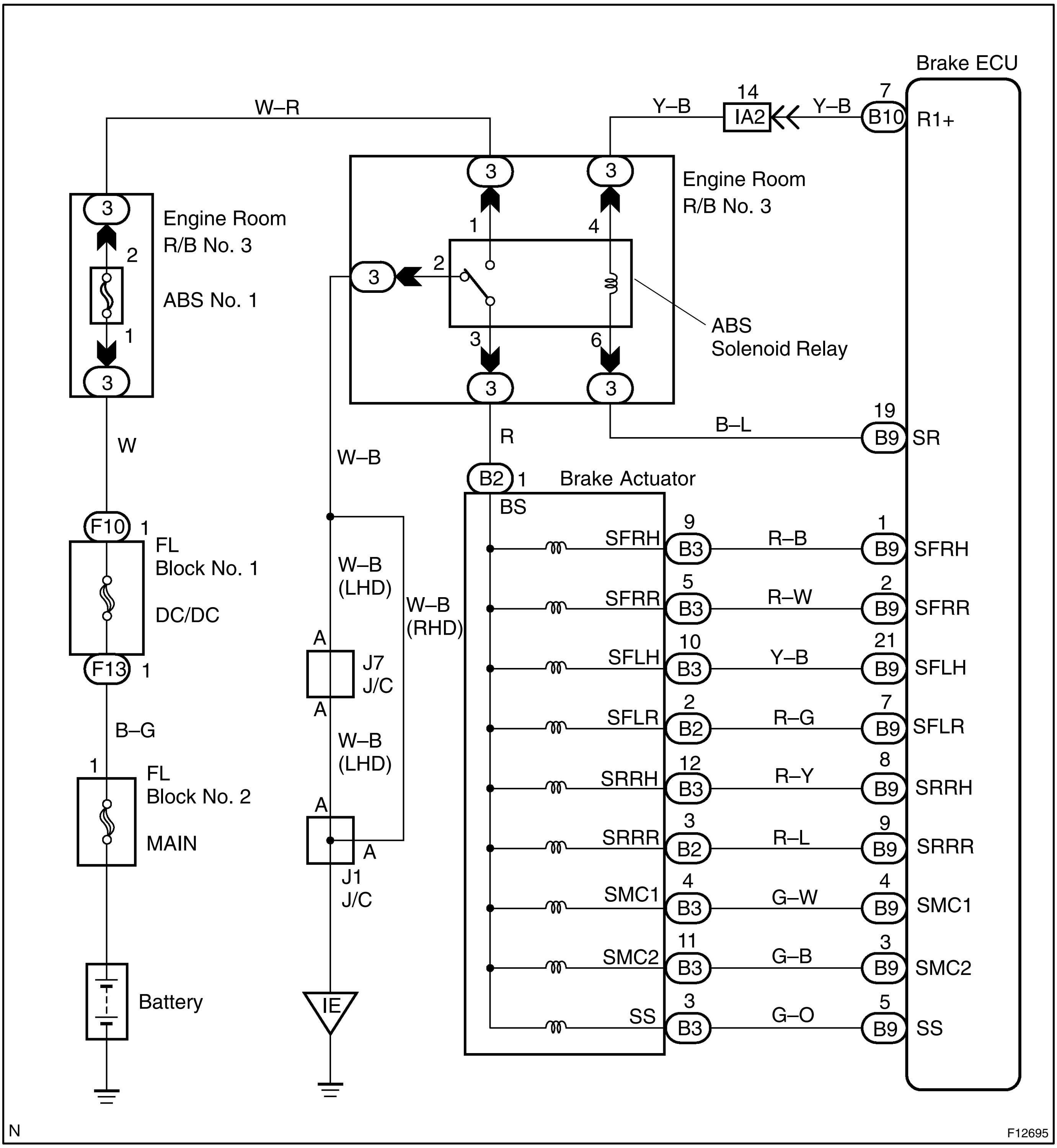
DTC	C1217/25 – C1219/27	Regenerative Solenoid Circuit

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.

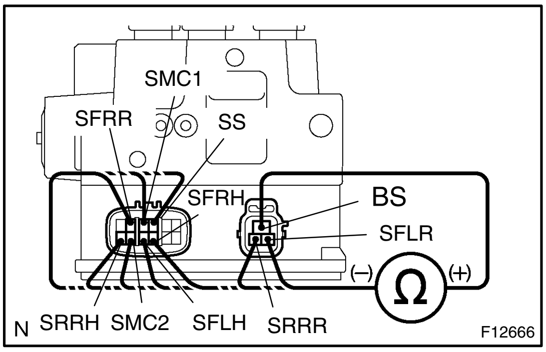
DTC No.	DTC Detecting Condition	Trouble Area
C0226/21	Open or short circuit in SFRH or SFRR circuit continues for 0.05 sec. or more.	• SFRH or SFRR circuit • Brake actuator
C0236/22	Open or short circuit in SFLH or SFLR circuit continues for 0.05 sec. or more.	• SFLH or SFLR circuit • Brake actuator
C0246/23	Open or short circuit in SRR or SRH circuit continues for 0.05 sec. or more.	• SRR or SRH circuit • Brake actuator
C1217/25	Open or short circuit in SMC1 circuit continues for 0.05 sec. or more.	• SMC1 circuit • Brake actuator
C1218/26	Open or short circuit in SMC2 circuit continues for 0.05 sec. or more.	• SMC2 circuit • Brake actuator
C1219/27	Open or short circuit in SS circuit continues for 0.05 sec. or more.	• SS circuit • Brake actuator

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



PREPARATION:
Disconnect the 2 connectors from the brake actuator.
CHECK:
Check continuity between the terminal BS and each of terminals SFRH, SFRR, SFLH, SFLR, SRRH, SRRR, SMC1, SMC2 and SS of brake actuator connector.
OK:
Continuity
HINT:
Resistance of each solenoid at 20 °C (68 °F)
SFRH, SFLH, SRRH: approx. 6.6 Ω
SFRR, SFLR, SRRR: approx. 2.2 Ω
SMC1, SMC2, SS: approx. 16 Ω

NG	**Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between brake ECU and brake actuator (See page IN–40).**

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.

DI7MS–01

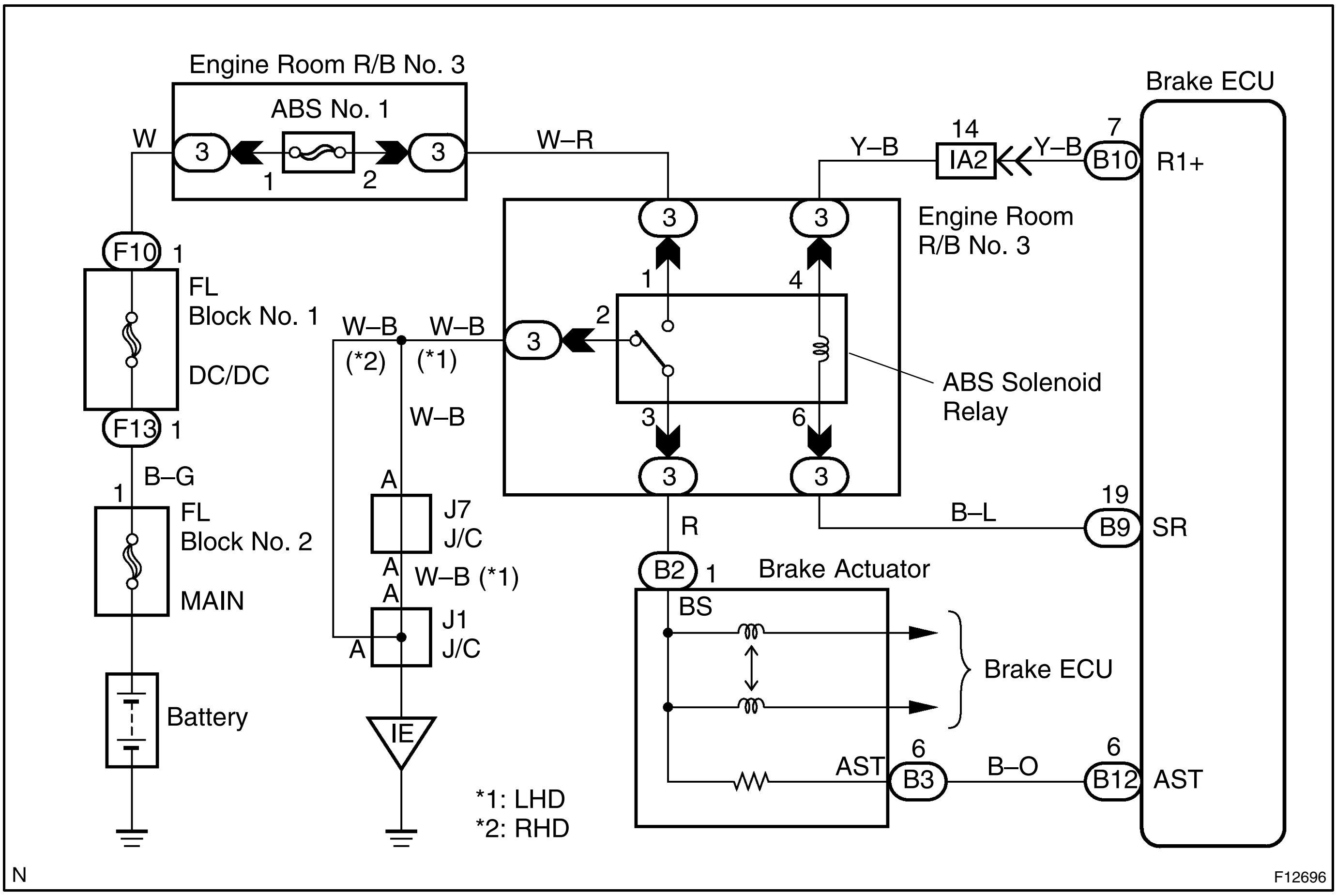
DTC	C0278/11, C0279/12	ABS Solenoid Relay Circuit

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	When the terminal SR in brake ECU is 2 V or less, the terminal AST in brake ECU continues to be in other than the range from 10 – 14 V for 0.2 sec. more.	• ABS solenoid relay • ABS solenoid relay circuit
C0279/12	When the voltage of the terminal SR in brake ECU is 10 – 14 V, the terminal AST in brake ECU continues to be in the range from 10 – 14 V for 0.2 sec. more.	

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 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.

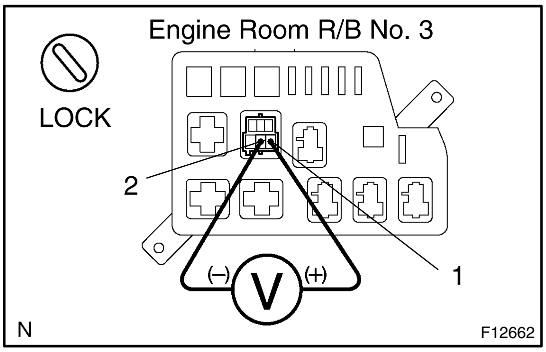
CHECK:
Check the operation sound of the ABS solenoid relay when operating it with the hand–held tester.

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. 3 (for ABS solenoid relay).**



PREPARATION:
Remove the ABS solenoid relay from engine room R/B No. 3.

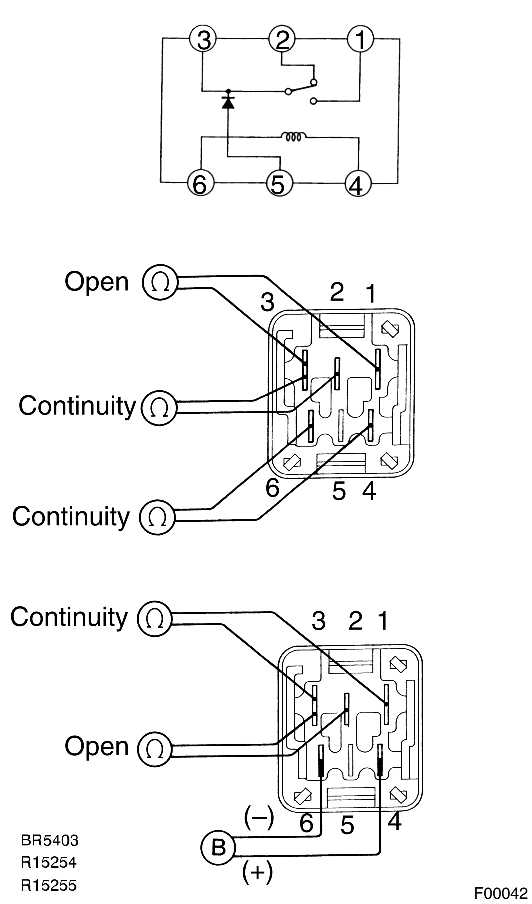
CHECK:
Measure the voltage between terminals 1 and 2 of engine room R/B No. 3 (for ABS solenoid relay).

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS solenoid relay.



CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

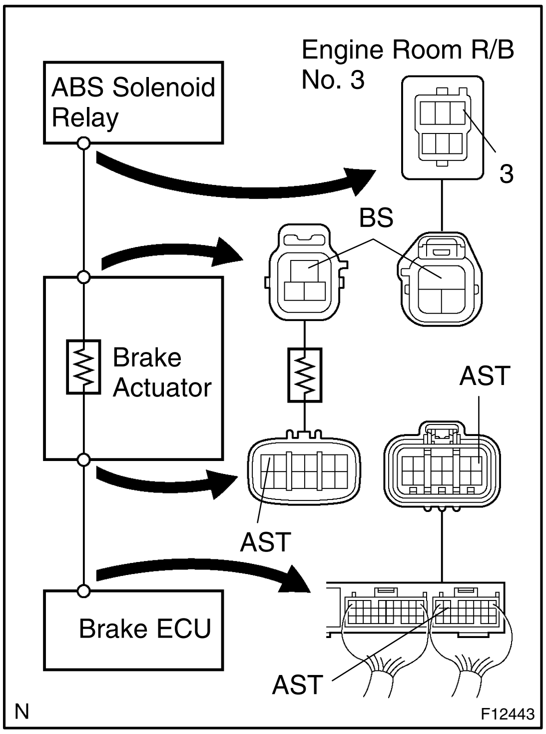
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	**Check continuity between terminals 3 of engine room R/B No. 3 (for ABS solenoid relay) and terminal AST of brake ECU.**



CHECK:

Check continuity between terminal 3 of engine room R/B No. 3 (for ABS solenoid relay) and terminal AST of brake ECU.

OK:

Continuity

HINT:

There is a resistance of approx. 33 Ω between terminals BS and AST of the brake actuator.

NG	**Repair or replace harness or brake actuator.**

OK

5	**Check for open and short circuit in harness and connector between ABS solenoid relay and brake ECU (See page IN–40).**

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.

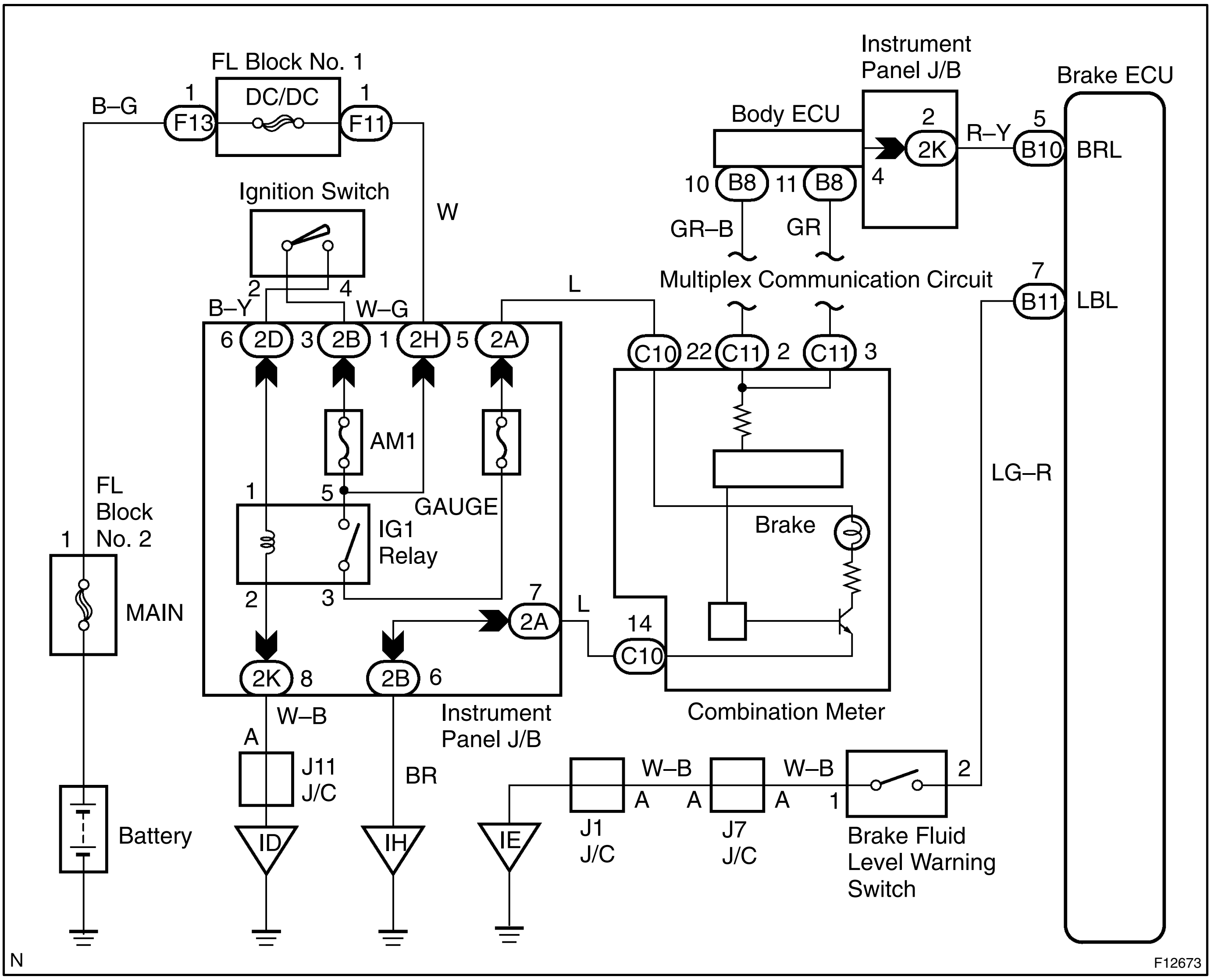
DTC	C1202/58	Brake Fluid Warning Switch Circuit

CIRCUIT DESCRIPTION

The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.
HINT:
Depressing the parking brake pedal also turns on the brake warning light but does not diagnose DTC No. C1202/58.

DTC No.	DTC Detecting Condition	Trouble Area
C1202/58	When any of the following 1. 2. or 3. is detected: 1. When the ignition switch is ON, an open condition in the reservoir level switch circuit continues for 2 sec. or more. 2. While a vehicle is driven at a speed of 3 km/h (5 mph) or more, decrease in the reservoir level continues for 10 sec. or more. 3. While a vehicle is stopped, decrease in the reservoir level continues for 5 sec. or more.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake fluid level.**

CHECK:
Check the amount of fluid in the brake reservoir.

NG → **Check and repair brake fluid leakage and add fluid.**

OK

2	**Check brake fluid level warning switch (See page BE–2).**

NG → **Replace brake fluid level warning switch.**

OK

3	**Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN–40).**

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

OK

Check and replace brake ECU.

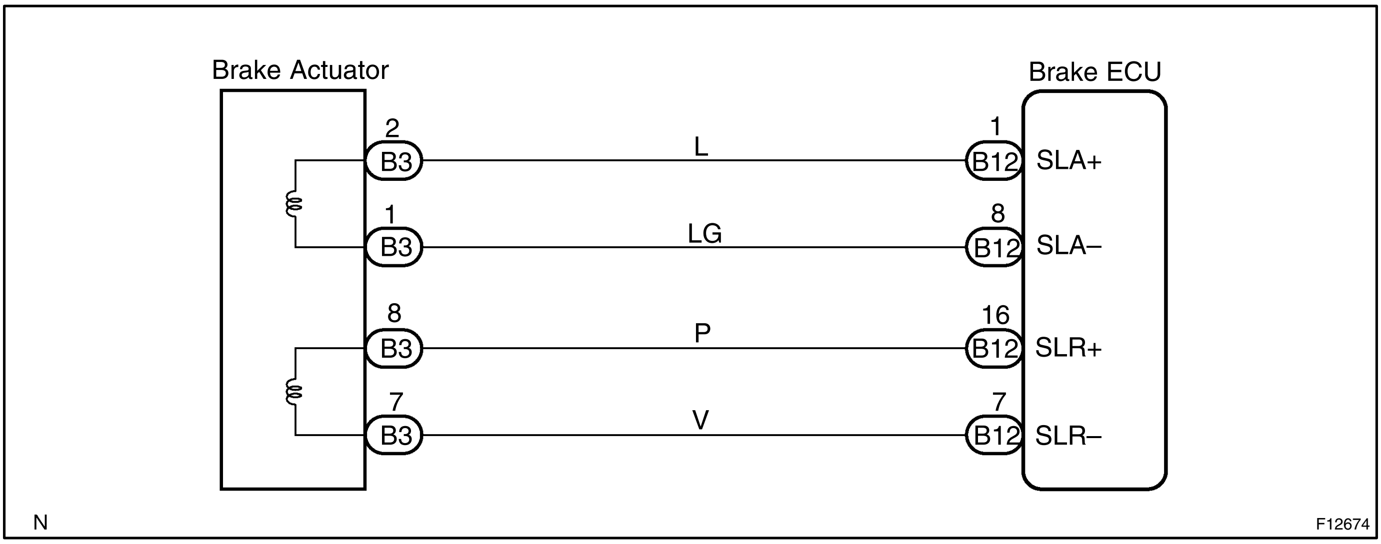
DI7MU–01

DTC	C1211/61, C1212/62	Linear Solenoid Circuit

CIRCUIT DESCRIPTION

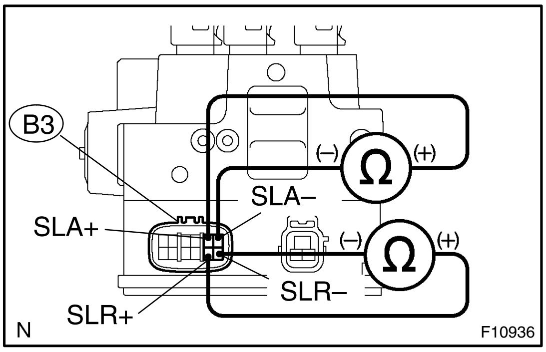
DTC No.	DTC Detecting Condition	Trouble Area
C1211/61	When the ignition switch is ON, an open or short circuit of solenoid continues for 0.1 sec. or more.	• SLA+ or SLA– circuit • Brake actuator
C1212/62		• SLR+ or SLR– circuit • Brake actuator

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



PREPARATION:
Disconnect the connector (B3) from the brake actuator.
CHECK:
Check continuity between each of terminals SLA+ and SLA–, and terminals SLR+ and SLR– of brake actuator.
OK:
Continuity
HINT:
Resistance of each solenoid approx. 2.3 Ω at 20 °C (68 °F).

NG	**Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between brake ECU and brake actuator (See page IN–40).**

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.

DI7MV–01

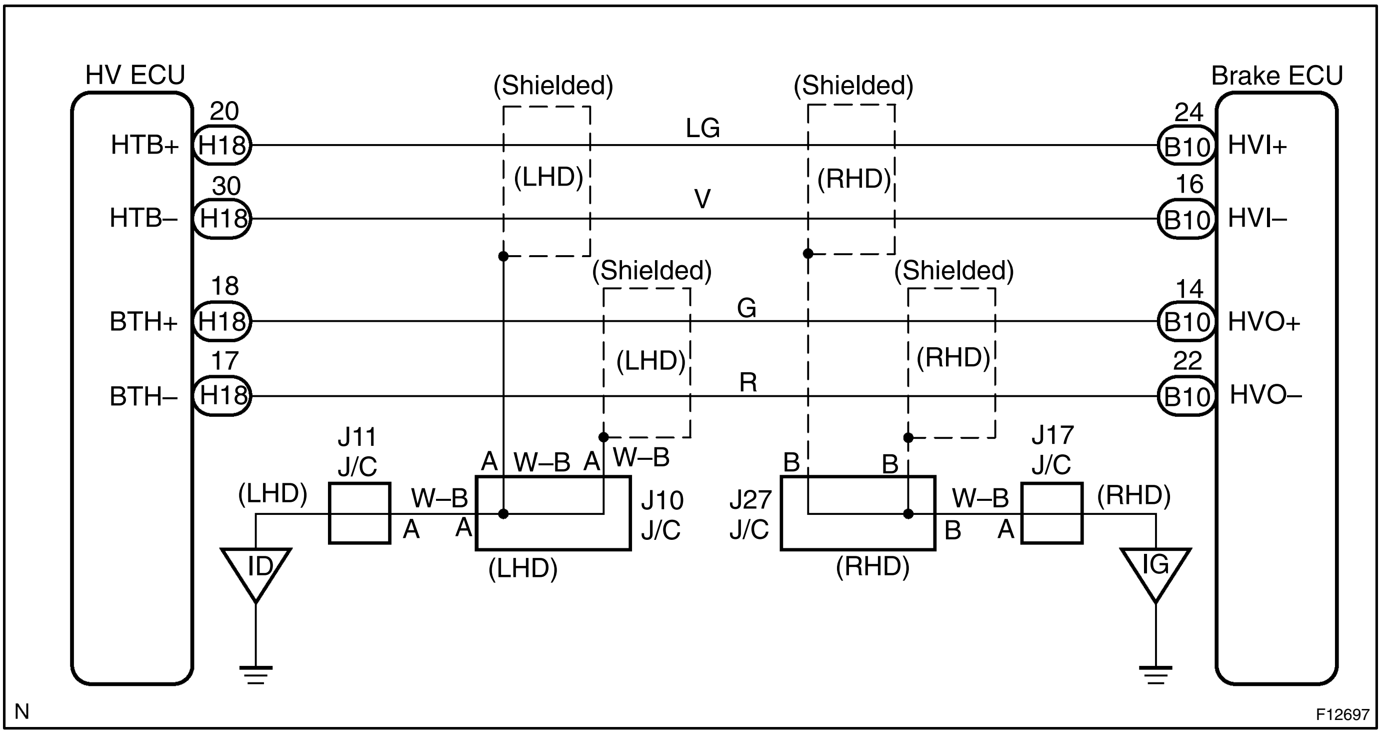
DTC	C1213/63	HV ECU Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send RBS control information from the brake ECU to the HV ECU (HVI+, HVI–), and HV control information from the HV ECU to the brake ECU (HVO+, HVO–).

DTC No.	DTC Detecting Condition	Trouble Area
C1213/63	When the ignition switch is ON, abnormal communication with HV ECU continues for 0.5 sec. or more.	• HVI+ or HVI– circuit • HVO+ or HVO– circuit • HV ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open and short circuit in harness and connector between terminals HVI+, HVI–, HVO+ and HVO– of brake ECU and HV ECU (See page IN–40).**

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

OK

Check and replace HV ECU or brake ECU.

DI7MW–01

DTC	C1214/64	Hydraulic System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1214/64	While the brake pedal is depressed, the condition that output values from each pressure sensor are not equal continues for 1 sec. or more.	• Each pressure sensor • Each pressure sensor circuit • Fluid leakage

INSPECTION PROCEDURE

1	Check each pressure sensor (See page DI–348).

NG → **Replace brake actuator.**

OK ↓

2	Check for open and short circuit in harness and connector between each pressure sensor and brake ECU and brake actuator (See page IN–40).

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

OK ↓

3	Check for fluid leakage (See page DI–407).

NG → **Repair fluid leakage.**

OK ↓

Check and replace brake ECU.

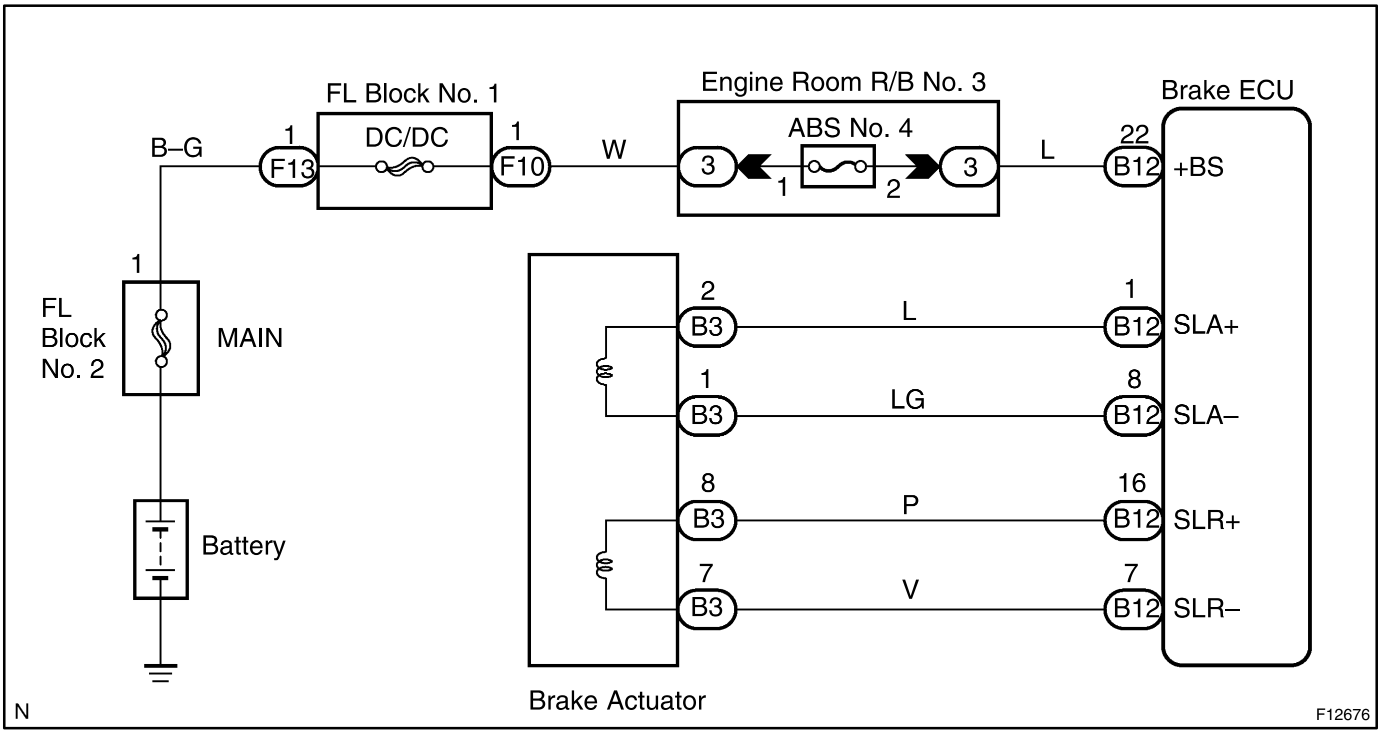
DI7MX–01

DTC	C1215/15, C1216/16	Linear Solenoid Voltage Malfunction

CIRCUIT DESCRIPTION

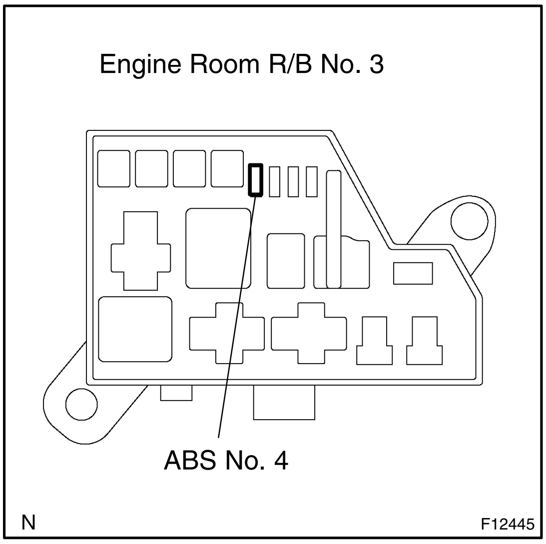
DTC No.	DTC Detecting Condition	Trouble Area
C1215/15	When any of the following 1. or 2. is detected: 1. When the ignition switch is ON, the condition that the voltage of the terminal +BS in brake ECU is 2.5 V or less continues for 0.5 sec. or more. 2. While a vehicle is driven at a speed of 3 km/h (5 mph) or more, the condition that the voltage of the terminal +BS in brake ECU is 9 V or less continues for 10 sec. or more.	• Battery • Charging system • Power source circuit
C1216/16	When the ignition switch is ON, the condition that the voltage of the terminal +BS in brake ECU is 17 V or more continues for 1.2 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ABS No. 4 fuse.**



PREPARATION:
Remove the ABS No. 4 fuse from engine room R/B No. 3.
CHECK:
Check continuity of ABS No. 4 fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ABS No. 4 fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page HV–39).**

OK

3	**Check voltage of the ECU +BS 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.

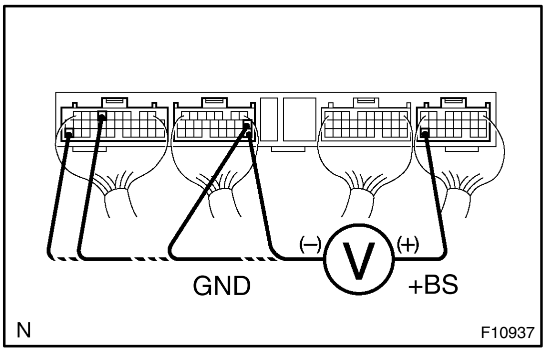
(c) Select the DATALIST mode on the hand–held tester.

CHECK:

Check the voltage condition output from the ECU displayed on the hand–held tester.

OK:

"Normal" is displayed.



In case of not using hand–held tester:

PREPARATION:

Remove the brake ECU with connectors still connected.

CHECK:

Measure voltage between terminals +BS and GND of brake ECU connector.

OK:

Voltage: 10 – 14 V

OK	**Check and replace brake ECU.**

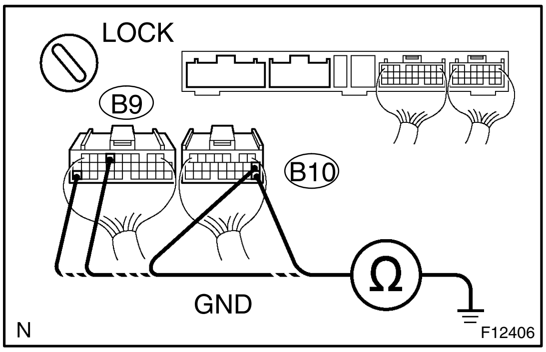
NG

4	**Check for open circuit (to +BS) in harness and connector between brake ECU and battery (See page IN–40).**

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

OK

5	Check continuity between terminal GND of brake ECU connector and body ground.



PREPARATION:
Disconnect the 2 connectors (B9, B10) from the brake ECU.

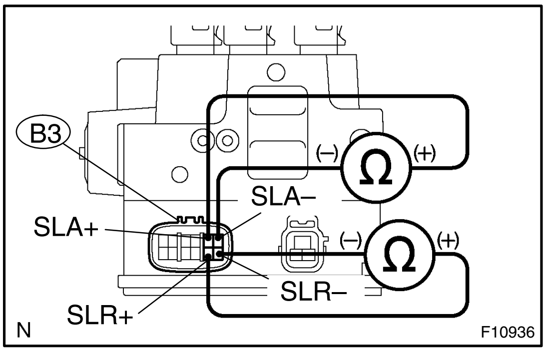
CHECK:
Measure resistance between terminals GND of brake ECU harness side connector and body ground.

OK:
Resistance: 1 Ω or less

NG	Repair or replace harness or connector.

OK

6	Check brake actuator solenoid.



PREPARATION:
Disconnect the connector (B3) from the brake actuator.

CHECK:
Check continuity between each of terminals SLA+ and SLA–, and terminals SLR+ and SLR– of brake actuator.

OK:
Continuity

HINT:
Resistance of each solenoid approx. 2.3 Ω at 20 °C (68 °F).

NG	Replace brake actuator.

OK

7	**Check for short circuit in harness and connector between brake ECU and brake actuator (See page IN–40).**

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

OK ↓

Check and replace brake ECU.

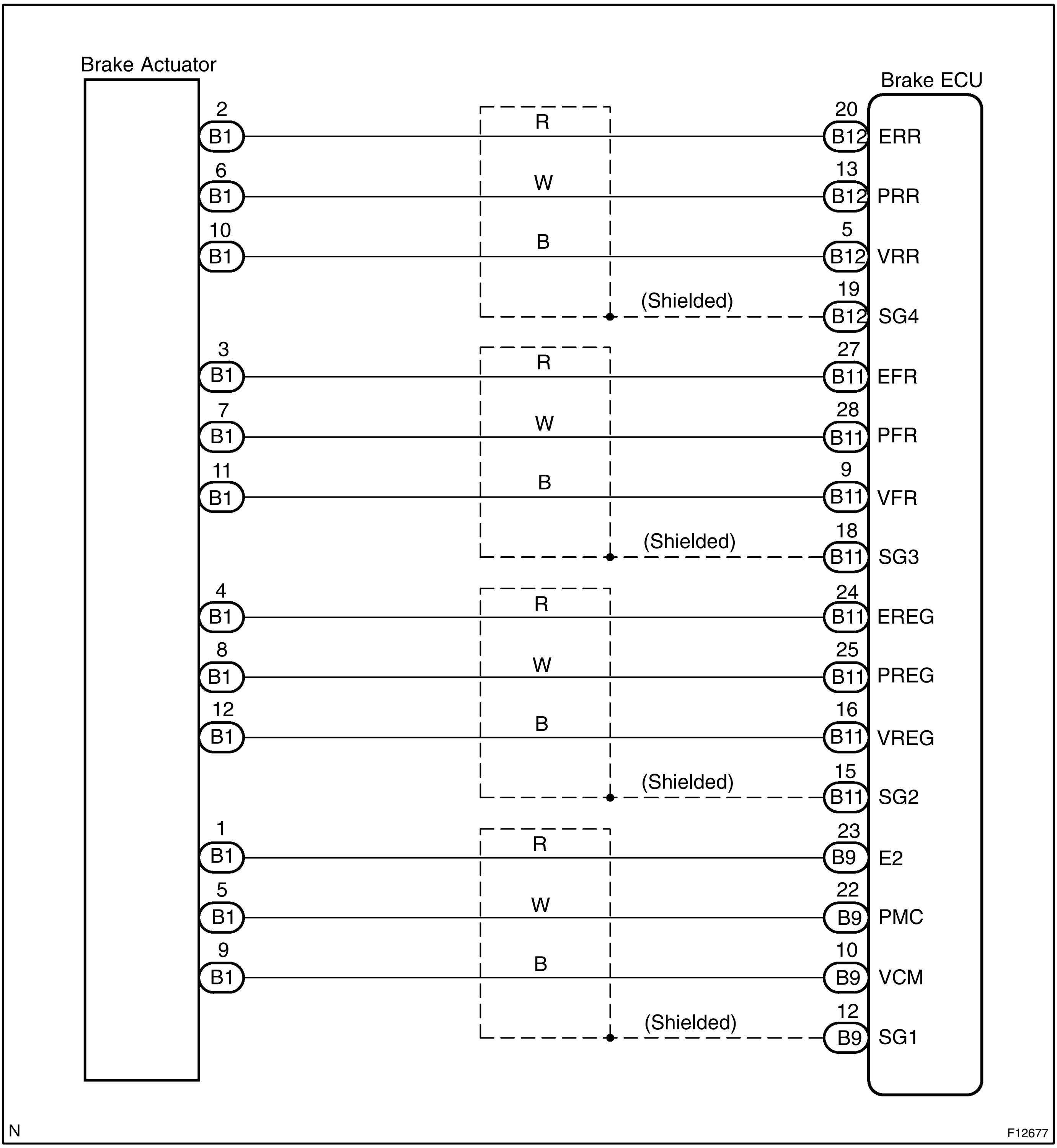
DI7MY–01

DTC	C1220–C1222/C1246/46	Each Hydraulic Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1220/46	Either of the following 1. or 2. is detected: 1. When the ignition switch is ON, the condition that the voltage of the terminal PREG in brake ECU is 0.14 V or less or 4.85 V or more, or that of terminal VREG is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. 2. At a vehicle speed of 15 km/h (24 mph) or more, when both the brake switch and hydro motor are OFF, the voltage ratio of the terminal PREG to VREG of brake ECU is 0.06 or less or 0.14 or more continues for 8 sec. and this condition occurs consecutively 10 times.	• Regulator (REG) pressure sensor • Regulator (REG) pressure sensor circuit • Brake actuator
C1221/46	Either of the following 1. or 2. is detected: 1. When the ignition switch is ON, the condition that the voltage of the terminal PFR in brake ECU is 0.14 V or less or 4.85 V or more, or that of terminal VFR is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. 2. At a vehicle speed of 15 km/h (24 mph) or more, when both the brake switch and hydro motor are OFF, the voltage ratio of the terminal PFR to VFR of brake ECU is 0.06 or less or 0.14 or more continues for 8 sec. and this condition occurs consecutively 10 times.	• Front (FR) pressure sensor • Front (FR) pressure sensor circuit • Brake actuator
C1222/46	Either of the following 1. or 2. is detected: 1. When the ignition switch is ON, the condition that the voltage of the terminal PRR in brake ECU is 0.14 V or less or 4.85 V or more, or that of terminal VRR is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. 2. At a vehicle speed of 15 km/h (24 mph) or more, when both the brake switch and hydro motor are OFF, the voltage ratio of the terminal PRR to VRR of brake ECU is 0.06 or less or 0.14 or more continues for 8 sec. and this condition occurs consecutively 10 times.	• Rear (RR) pressure sensor • Rear (RR) pressure sensor circuit • Brake actuator
C1246/46	Either of the following 1. or 2. is detected: 1. When the ignition switch is ON, the condition that the voltage of the terminal PMC in brake ECU is 0.14 V or less or 4.85 V or more, or that of terminal VMC is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. 2. At a vehicle speed of 15 km/h (24 mph) or more, when both the brake switch and hydro motor are OFF, the voltage ratio of the terminal PMC to VMC of brake ECU is 0.06 or less or 0.14 or more continues for 8 sec. and this condition occurs consecutively 10 times.	• Master cylinder (M/C) pressure sensor • Master cylinder (M/C) pressure sensor circuit • Brake actuator

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of the each 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.

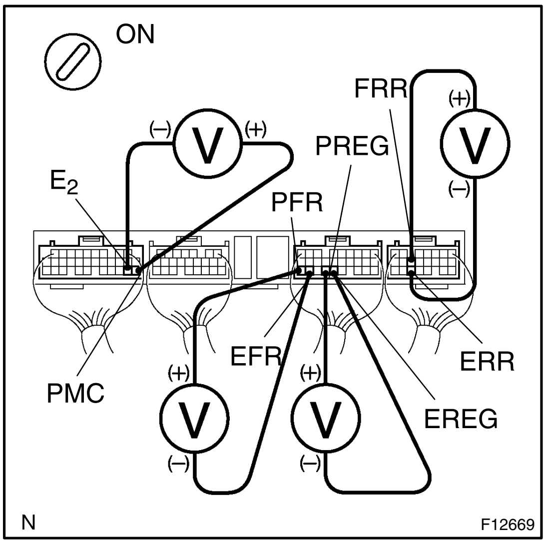
CHECK:
Check that the brake fluid pressure value of the master cylinder pressure sensor, regulator pressure sensor, front pressure sensor and rear pressure sensor displayed on the hand–held tester is changing when depressing the brake pedal.

OK:
Brake fluid pressure value must be changing.

OK	**Go to step 4.**

NG

2	**Check each pressure sensor.**



PREPARATION:

(a) Install the LSPV gauge to the front caliper bleeder plug portion, and bleed LSPV gauge.
SST 09709–29018

(b) Remove the brake ECU with connectors still connected.

CHECK:

Turn the ignition switch ON and depress the brake pedal, then check the relation between the fluid pressure and voltage of terminals of each pressure sensor shown below with the connector still connected.

Pressure sensor name	Symbols
Master cylinder pressure sensor	PMC – E_2
Regulator pressure sensor	PREG – EREG
Front pressure sensor	PFR – EFR
Rear pressure sensor	PRR – ERR

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:

It should be taken into account that the difference in voltage between terminals is caused by the slightly different pressure applied to each pressure sensor.

OK	**Go to step 4.**

NG

3	**Check for open and short circuit in harness and connector between each pressure sensor and brake ECU (See page IN–40).**

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

OK

Replace brake actuator.

4	**Check whether or not the brake 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 BE–2).**

YES

Check and replace brake ECU.

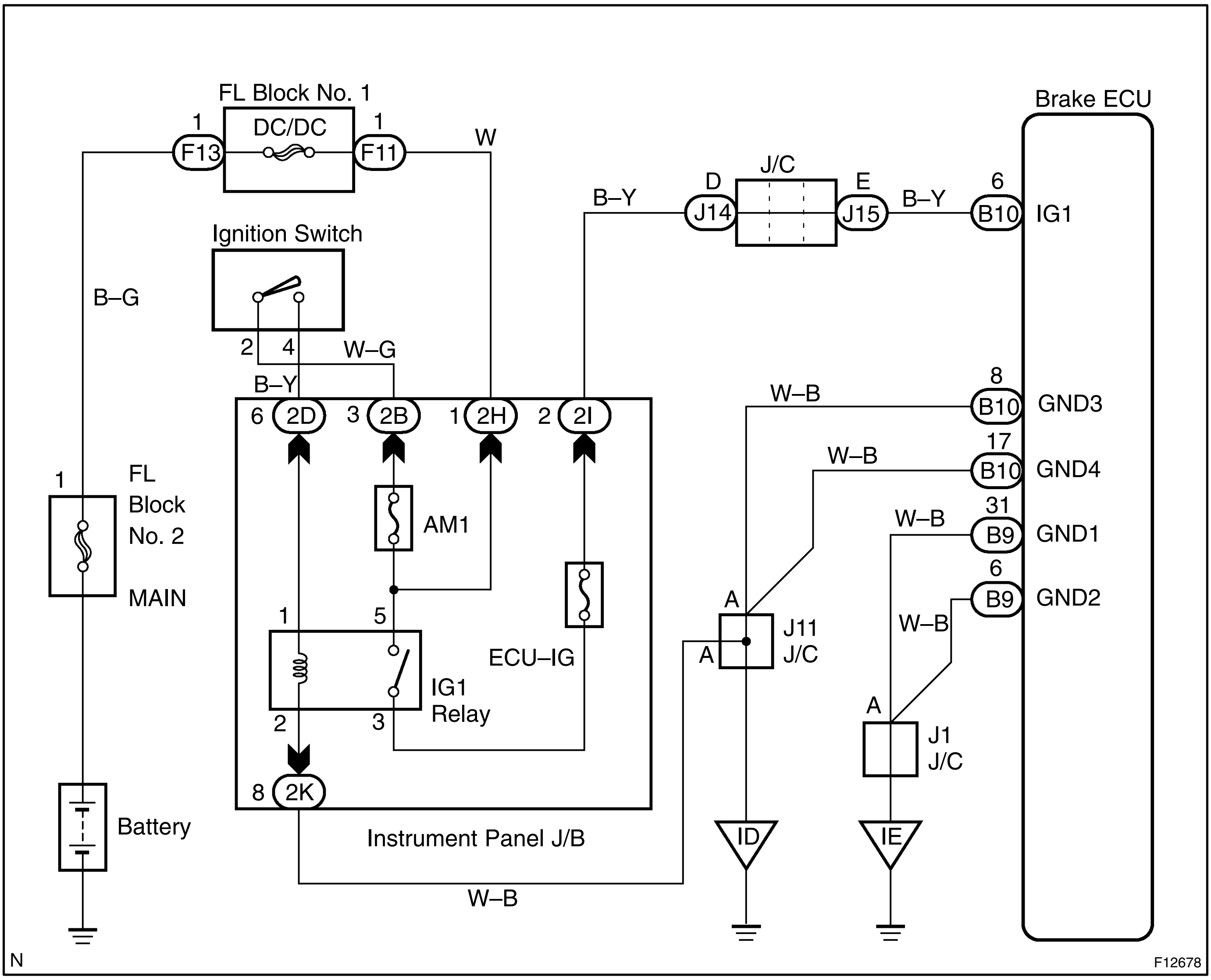
DI7MZ–01

DTC	C1241/41	IG Power Source Circuit

CIRCUIT DESCRIPTION

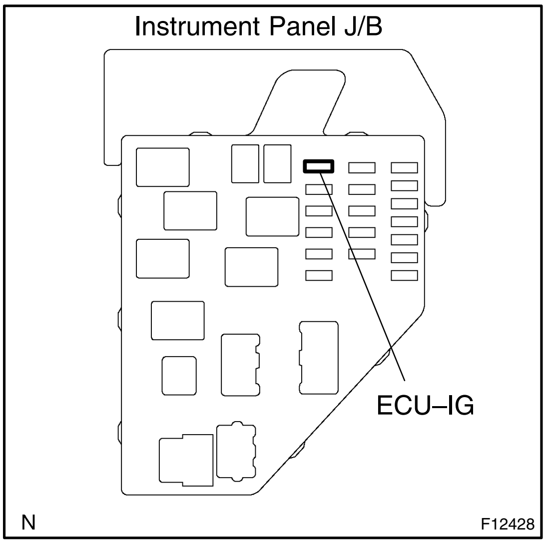
DTC No.	DTC Detecting Condition	Trouble Area
C1241/41	Either of the following 1. 2. or 3. is detected: 1. While a vehicle is driven at a speed of 3 km/h (5 mph), the condition that the voltage of the terminal IG1 in brake ECU is 9 V or less continues for 10 sec. or more. 2. When the solenoid relay is ON, the contact point of the relay becomes OFF for 0.2 sec. or more due to the voltage decrease of the terminal IG1 in brake ECU. 3. When ignition switch is ON, the voltage of terminal IG1 in brake ECU remains in 17 V or more for 1.2 sec. or more.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ECU–IG fuse.



PREPARATION:

Remove the ECU–IG fuse from instrument panel J/B.

CHECK:

Check continuity of ECU–IG fuse.

OK:

Continuity

NG → **Check for short circuit in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

2	Check battery voltage.

OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page HV–39).**

OK

3	**Check voltage of the ECU IG power source.**

In case of using the hand–held tester:

PREPARATION:

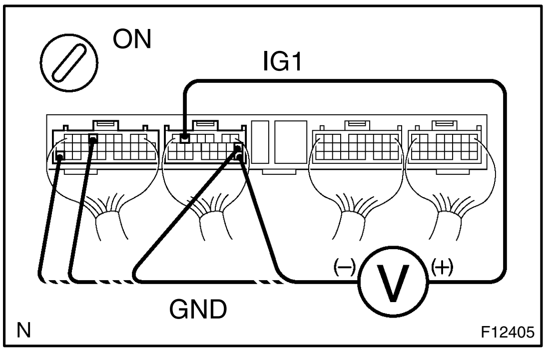
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON, and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

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 the brake ECU with connectors still connected.

CHECK:

Turn the ignition switch ON, measure voltage between terminals IG1 and GND of brake ECU connector.

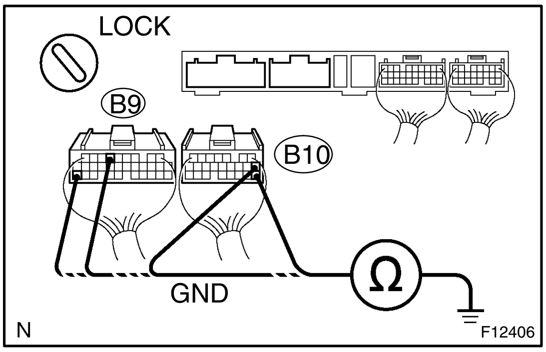
OK:

Voltage: 10 – 14 V

OK	**Check and replace brake ECU.**

NG

4	**Check continuity between terminal GND of brake ECU connector and body ground.**



PREPARATION:

Disconnect the 2 connectors (B9, B10) from the brake ECU.

CHECK:

Measure resistance between terminal GND of brake ECU harness side connector and body ground.

OK:

Resistance: 1 Ω or less

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

OK

Check for open circuit in harness and connector between brake ECU and battery (See page IN–40).

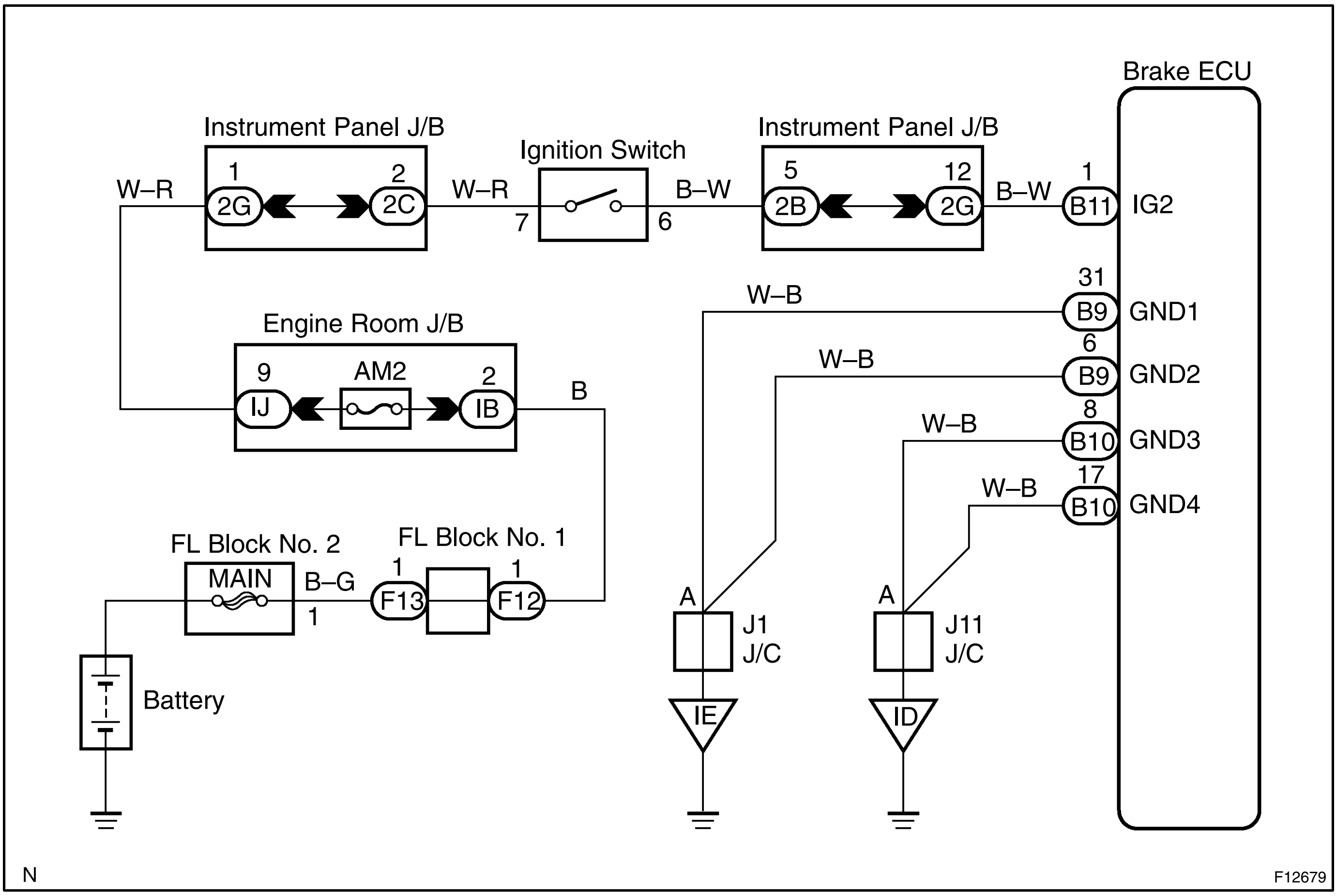
DI7N0–01

DTC	C1242/42	IG2 Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1242/42	When the vehicle is driven at a speed of 3km/h (5 mph) or more, an open condition in IG2 circuit in brake ECU continues for 7 sec. or more.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery voltage.**

OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page HV–39).**

OK ↓

2	**Check voltage of the ECU IG power source.**

In case of using the hand–held tester:

PREPARATION:

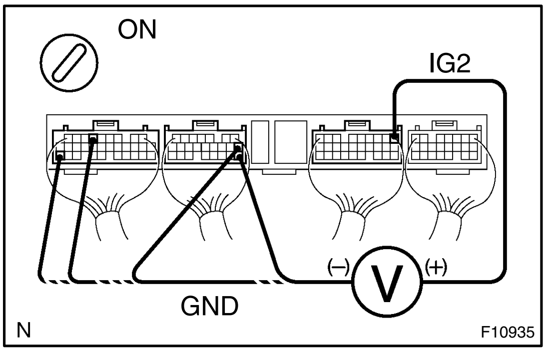
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON, and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

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 the brake ECU with connectors still connected.

CHECK:

Turn the ignition switch ON, measure voltage between terminals IG2 and GND of brake ECU connector.

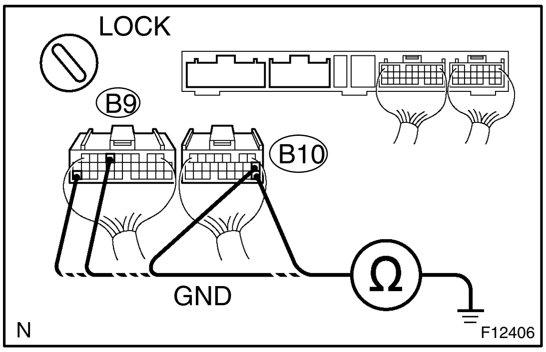
OK:

Voltage: 10 – 14 V

OK → **Check and replace brake ECU.**

NG ↓

3	**Check continuity between terminal GND of brake ECU connector and body ground.**



PREPARATION:
Disconnect the 2 connectors (B9, B10) from the brake ECU.

CHECK:
Measure resistance between terminals GND of brake ECU harness side connector and body ground.

OK:
Resistance: 1 Ω or less

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

OK

Check for open circuit in harness and connector between brake ECU and battery (See page IN–40).

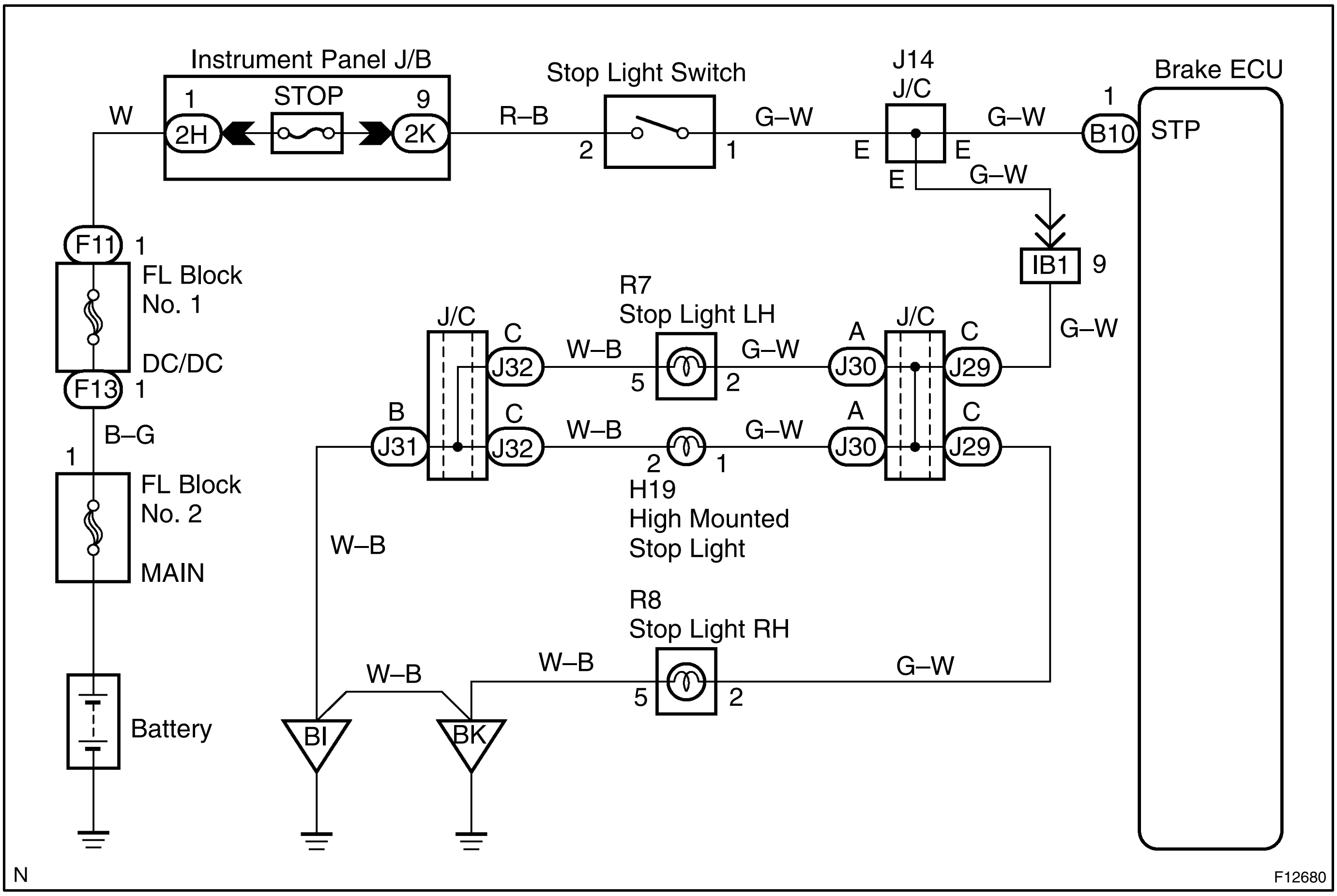
DI7N1–01

DTC	C1249/49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249/49	When the ignition switch is ON, the condition that the terminal STP in brake ECU is 3 – 12 V continues for 1 sec. or more.	• Stop light switch • 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.**

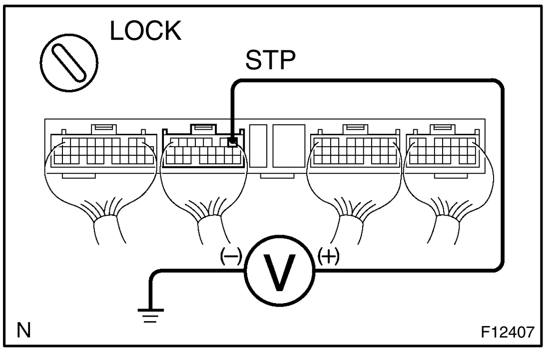
NG

2	**Check stop light circuit (See page BE–2).**

NG → **Repair or replace stop light circuit.**

OK

3	**Check voltage between terminal STP of brake ECU and body ground.**



PREPARATION:
Remove the brake ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP of brake ECU and body ground when brake pedal is depressed.
OK:
Voltage: 8 – 14 V

OK → **Check and replace brake ECU.**

NG

4	**Check for open circuit in harness and connector between brake ECU and stop light switch (See page IN–40).**

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

OK

Proceed to next circuit inspection on problem symptoms table (See page DI–321).

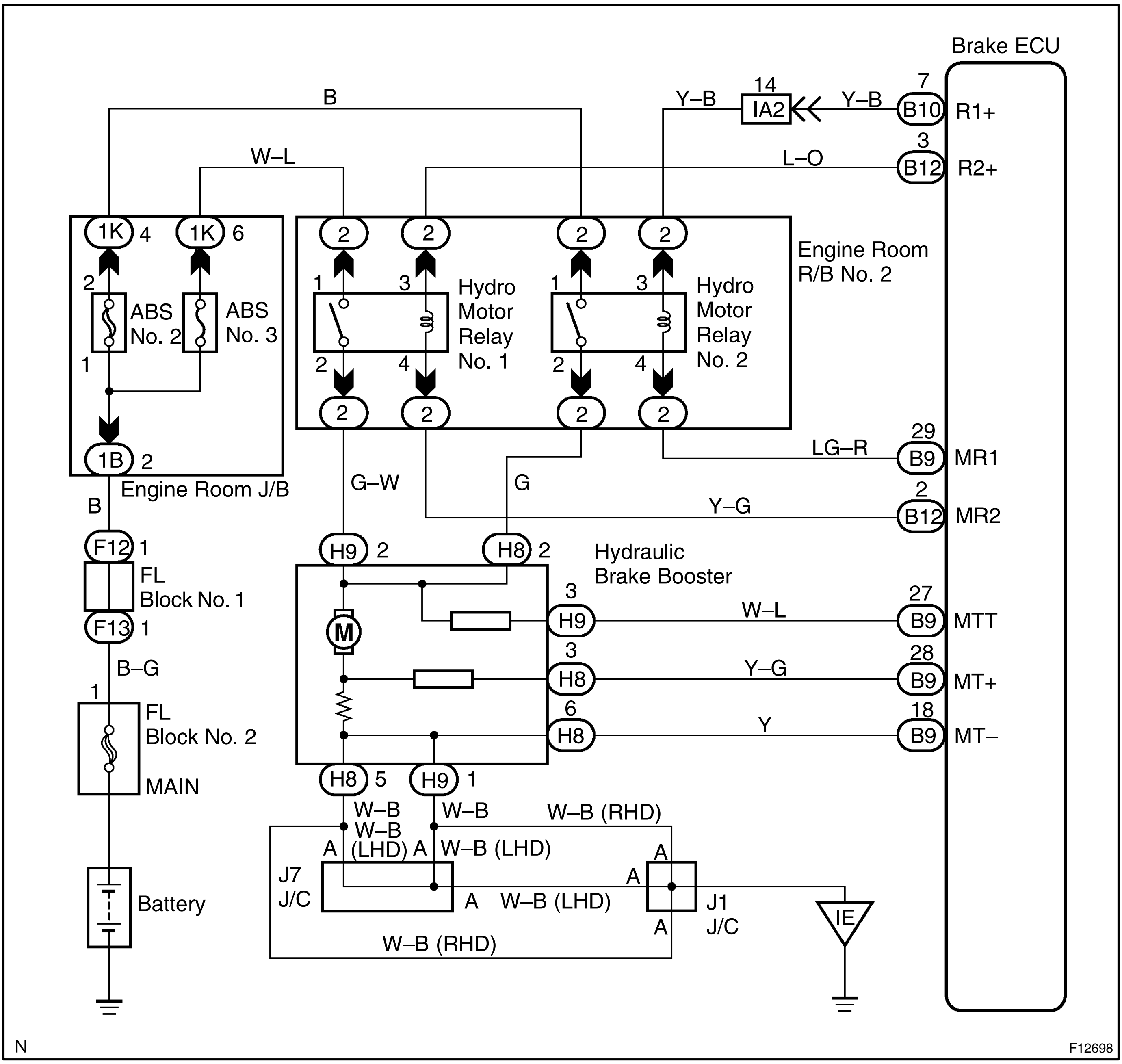
DI7N2–01

DTC	C1251/51	Hydraulic Brake Booster Pump Motor Malfunction

CIRCUIT DESCRIPTION

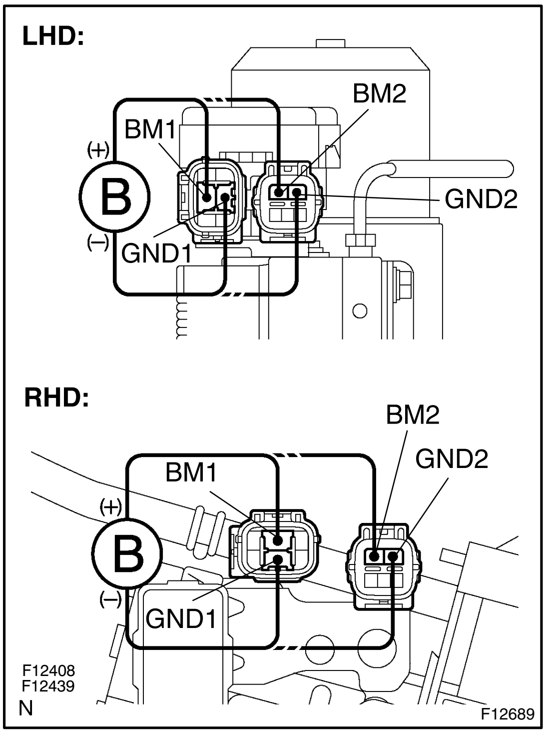
DTC No.	DTC Detecting Condition	Trouble Area
C1251/51	Either of the following 1. or 2. is detected: 1. After turning the ignition switch ON, the current of more than 28A flows to the motor for more than 1 sec. 2. After turning the ignition switch ON, less than 7A change in current is detected more than 3 times in a row when the motor is ON.	Hydraulic brake booster pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of hydraulic brake booster pump motor.



PREPARATION:
Disconnect the 2 connectors from the hydraulic brake booster.

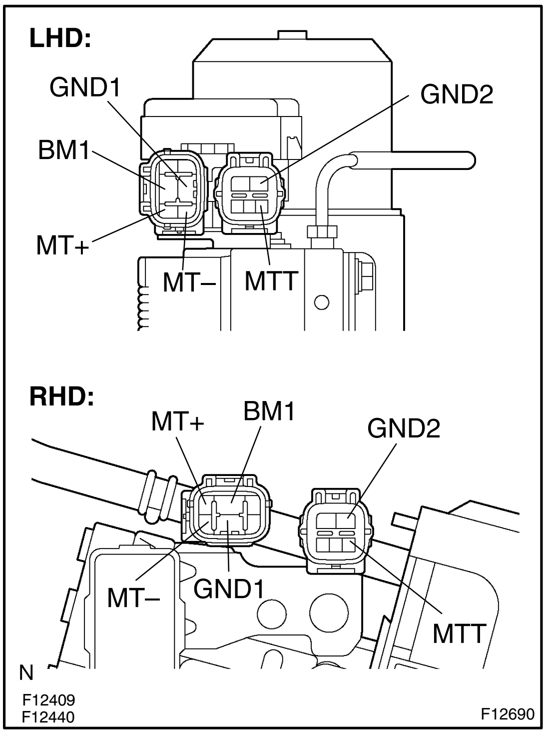
CHECK:
Connect battery positive ⊕ lead to BM1 or BM2 terminal and battery negative ⊖ lead to GND1 or GND2 terminal of the hydraulic brake booster (pump motor) connector.

OK:
The operation sound of the pump motor should be heard.

NG → **Go to step 4.**

OK

2	Check hydraulic brake booster resistance.



CHECK:

Check resistance between terminals MT+ and MT–, BM1 and MTT, BM2 and MTT, GND1 and MT+, GND2 and MT+ of the hydraulic brake booster connector.

OK:

30 – 36 Ω

NG → **Replace the hydraulic brake booster assembly.**

OK

3	Check for open circuit in harness and connector between hydraulic brake booster and brake ECU (See page IN–40).

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

OK

Check and replace brake ECU.

4	Check for open or short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN–40).

NG → **Replace wire harness.**

OK

5	Check hydraulic brake booster pump motor (See page BR–57).

NG → **Replace hydraulic brake booster pump motor.**

OK

Replace hydraulic brake booster.

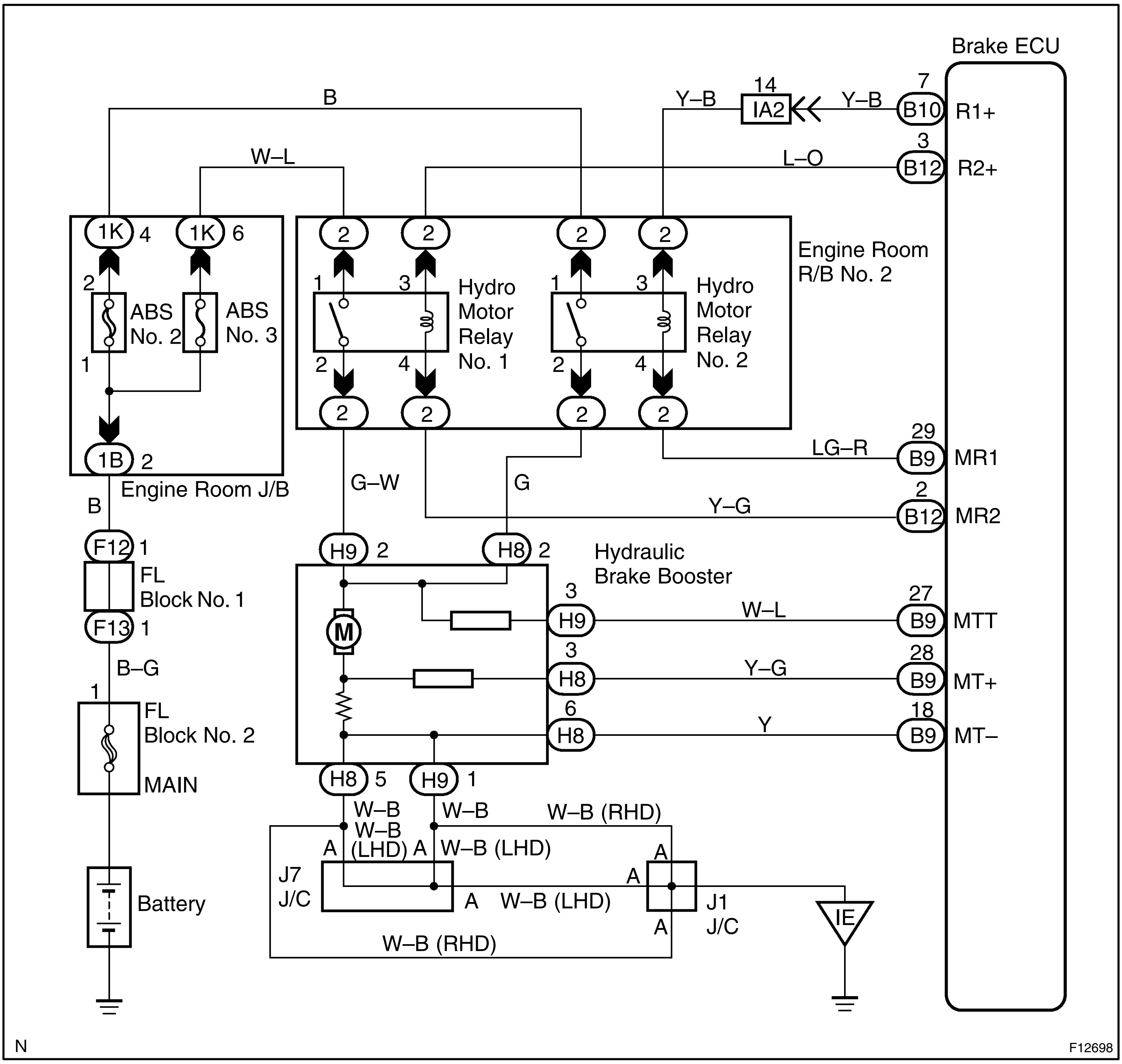
DI7N3–01

DTC	C1252/52	Hydraulic Brake Booster Pump Motor ON Time Abnormally Long

CIRCUIT DESCRIPTION

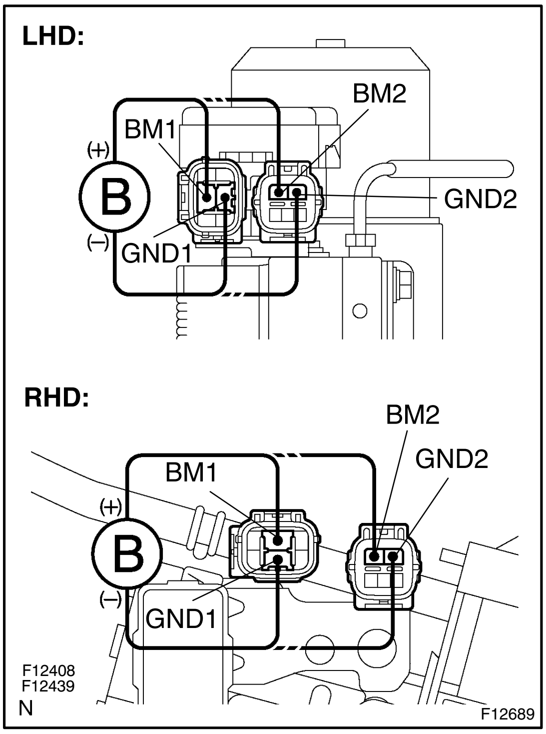
DTC No.	DTC Detecting Condition	Trouble Area
C1252/52	After turning the ignition switch ON, when the power is supplied to the pump motor for more than 5 minutes.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)

WIRING DIAGRAM



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.

NG	Go to step 9.

OK

2	**Check for short circuit in harness and connector between BM1 or BM2 of hydraulic brake booster and hydro motor relay (See page IN–40).**

NG	Repair or replace harness or connector.

OK

3	**Check for short circuit in harness and connector between MTT of hydraulic brake booster and brake ECU (See page IN–40).**

NG	Repair or replace harness or connector.

OK

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:

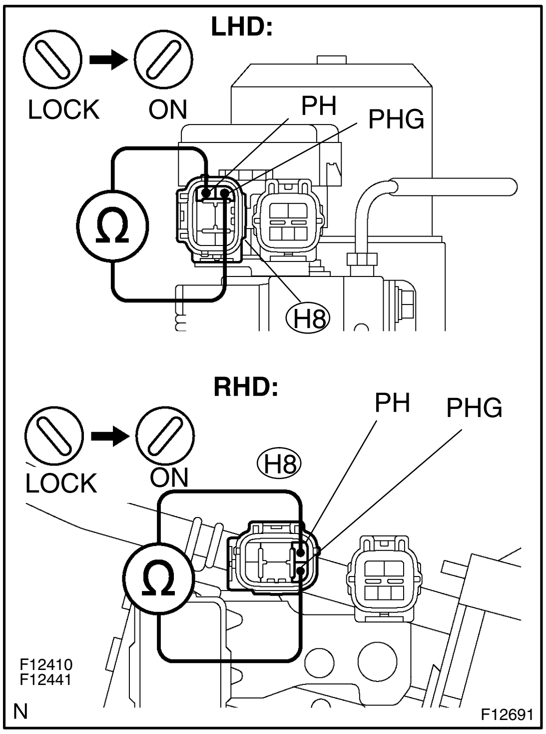
Depress the brake pedal more than 40 times with the ignition switch OFF then turn the ignition switch ON and check the pressure switch (PH) condition.

HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

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 (H8) from the hydraulic brake booster.
(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PH and PHG of hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

PREPARATION:

(a) Connect the connector (H8) to the hydraulic brake booster.
(b) Disconnect the connector (H8) 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, connect the connector and clear the DTC (See page DI–308).

NG	**Replace hydraulic brake booster assembly.**

OK

5	**Check pressure switch (PL).**

In case of using hand–held tester:

PREPARATION:

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

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

(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 (PL) condition.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

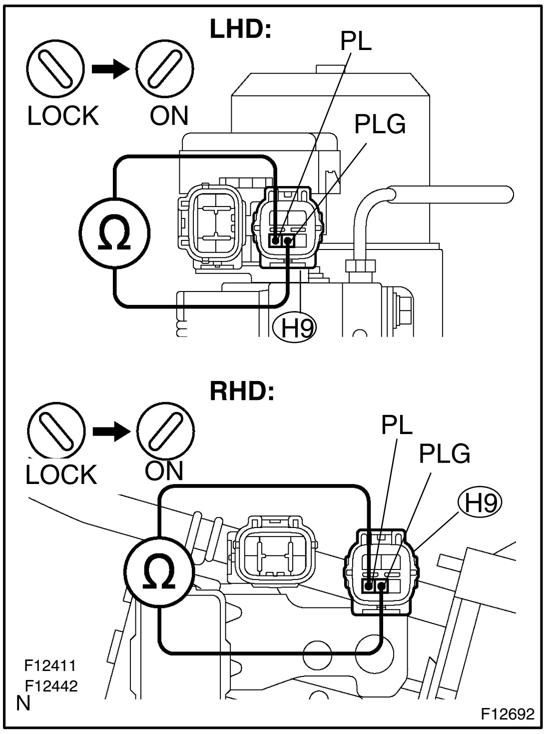
OK:

"OFF" turns to "ON".

HINT:

OFF: Low pressure

ON: High pressure



In case of not using hand–held tester:

PREPARATION:

(a) Disconnect the connector (H9) from the hydraulic brake booster.

(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PL and PLG of hydraulic brake booster connector.

OK:

Resistance: 5.7 kΩ

PREPARATION:

(a) Connect the connector (H9) to the hydraulic brake booster.

(b) Disconnect the connector (H9) 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, connect the connector and clear the DTC (See page DI–308).

NG → **Replace hydraulic brake booster assembly.**

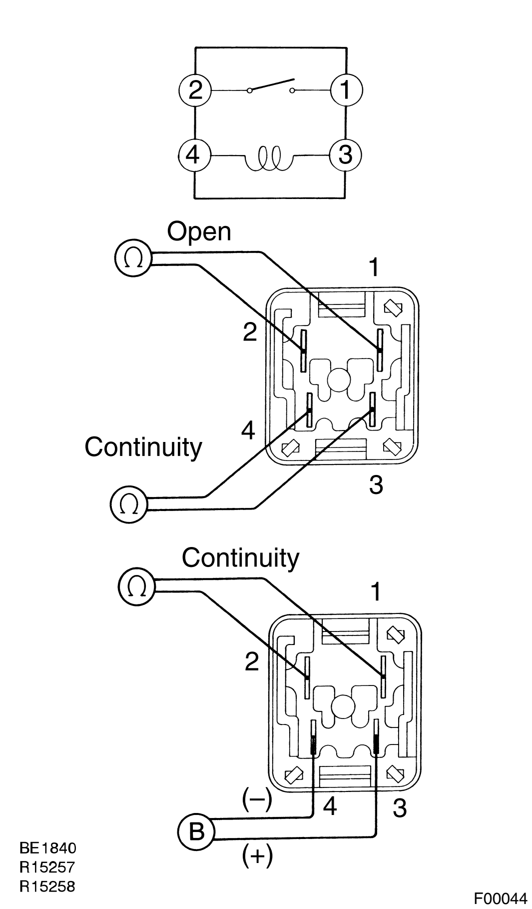
OK

6	**Check for short circuit in harness and connector between pressure switch and brake ECU (See page IN–40).**

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

OK

7	Check hydro motor relay No. 1 and No. 2.



PREPARATION:
Remove the hydro motor relay No. 1 and No. 2 from the 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 *)
Terminals 1 and 2	Open

* Reference value:
Hydro motor relay No. 1 62 Ω
Hydro motor relay No. 2 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 hydro motor relay.**

OK

8	Check for short circuit in harness and connector between hydro motor relay No. 1, No. 2 and brake ECU (See page IN–40).

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

OK

Check and replace brake ECU.

9	Check for open or short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN–40).

NG → **Replace wire harness.**

OK

10	Check hydraulic brake booster pump motor (See page BR–57).

NG → **Replace hydraulic brake booster pump motor.**

OK

Replace hydraulic brake booster.

DI7N4–01

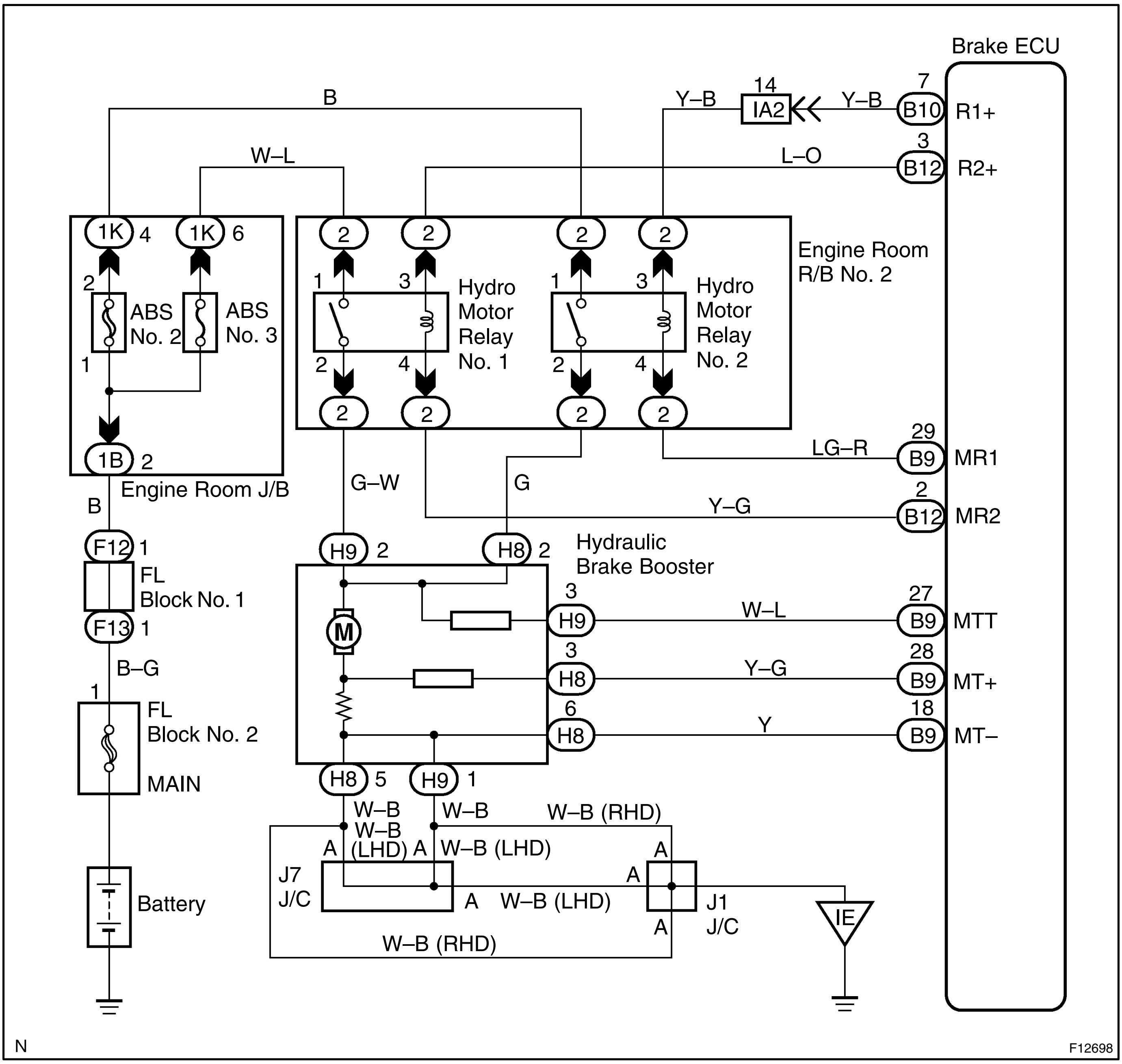
DTC	C1253/53	Hydro Motor Relay Circuit

CIRCUIT DESCRIPTION

The hydro motor relay supplies power to the hydraulic brake booster pump motor. While the ABS & EBD & RBS 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 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 sec. 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 sec.	• Hydro motor relay • Hydro motor relay circuit

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 hand–held tester.

1	**Check hydro 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 hydro motor relays individually when operating it with the hand–held tester.

OK:
The operation sound of the hydro motor relay should be heard.

NG → **Go to step 3.**

OK

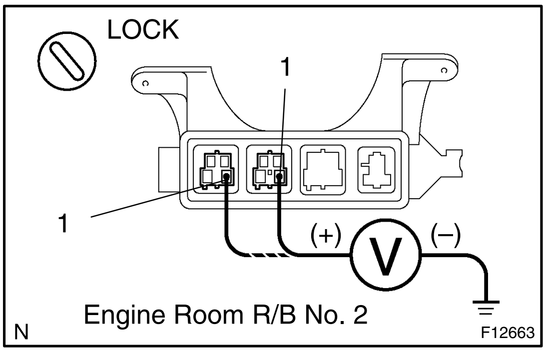
2	**Check for short circuit in harness and connector between MTT of hydraulic brake booster and brake ECU (See page IN–40).**

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

OK

Check and replace brake ECU.

3	Check voltage between terminal 1 of engine room R/B No. 2 (for hydro motor relays) and body ground.



PREPARATION:
Remove the hydro motor relay No. 1 and No. 2 from the engine room R/B No. 2.

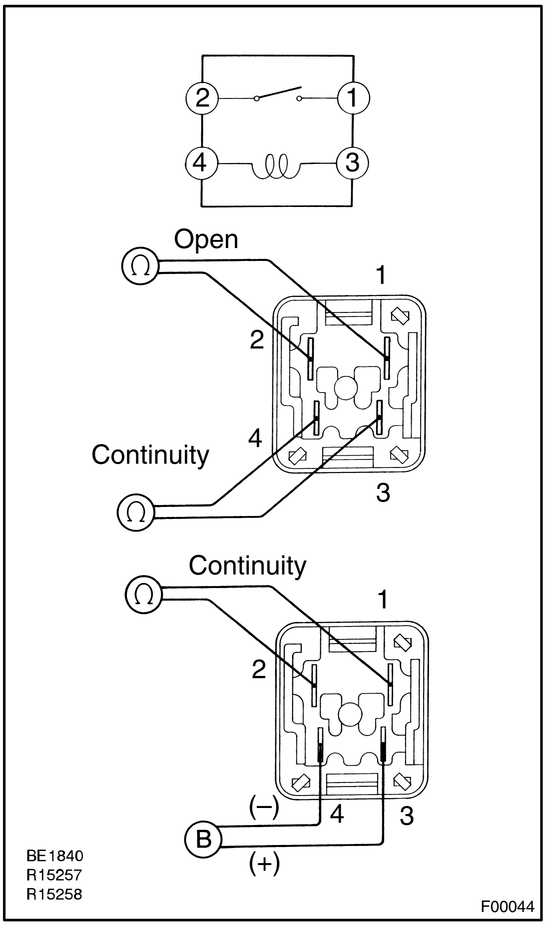
CHECK:
Measure voltage between terminal 1 of engine room R/B No. 2 (for hydro motor relays) and body ground.

OK:
Voltage: 10 – 14 V

NG	Check and repair harness or connector.

OK

4	Check hydro motor relay.



CHECK:
Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value *)
Terminals 1 and 2	Open

* Reference value:
Hydro motor relay No. 1 62 Ω
Hydro motor relay No. 2 54 Ω

CHECK:
(a) Apply battery voltage between terminals 3 and 4.
(b) Check continuity between terminals.

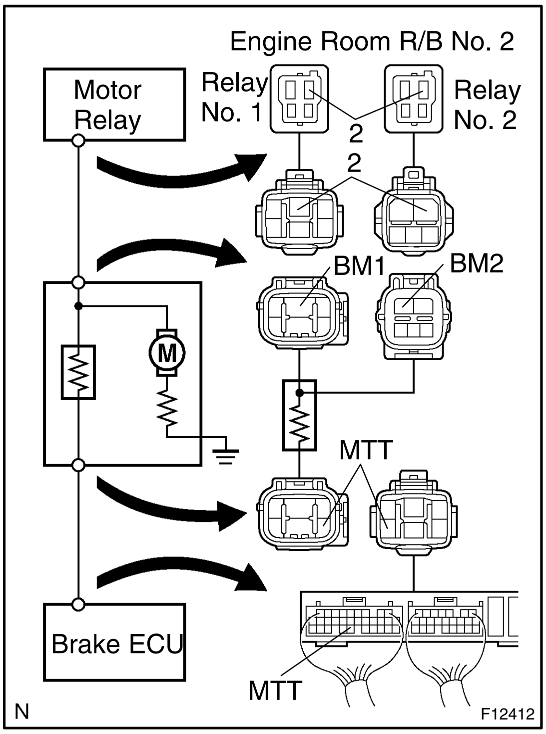
OK:

Terminals 1 and 2	Continuity

NG	Replace hydro motor relay.

OK

5	Check continuity between each terminal 2 of engine room R/B No. 2 (for hydro motor relay) and terminal MTT of brake ECU.



CHECK:

(a) Check continuity betwee terminal 2 of engine room R/B No. 2 (for hydro motor relay No. 1) and terminal MTT of brake ECU.

(b) Check continuity between terminal 2 of engine room R/B No. 2 (for hydro motor relay No. 2) and terminal MTT of brake ECU.

OK:

Continuity

HINT:

There is resistance of 33 ± 3 Ω between terminals BM1or BM2 and MTT of the hydraulic brake booster.

NG	Repair or replace harness, connector or hydraulic brake booster.

OK

6	Check for open and short circuit in harness and connector between hydro motor relay No. 1 and No. 2 and brake ECU (See page IN–40).

NG	Repair or replace harness or connector.

OK

Check and replace brake ECU.

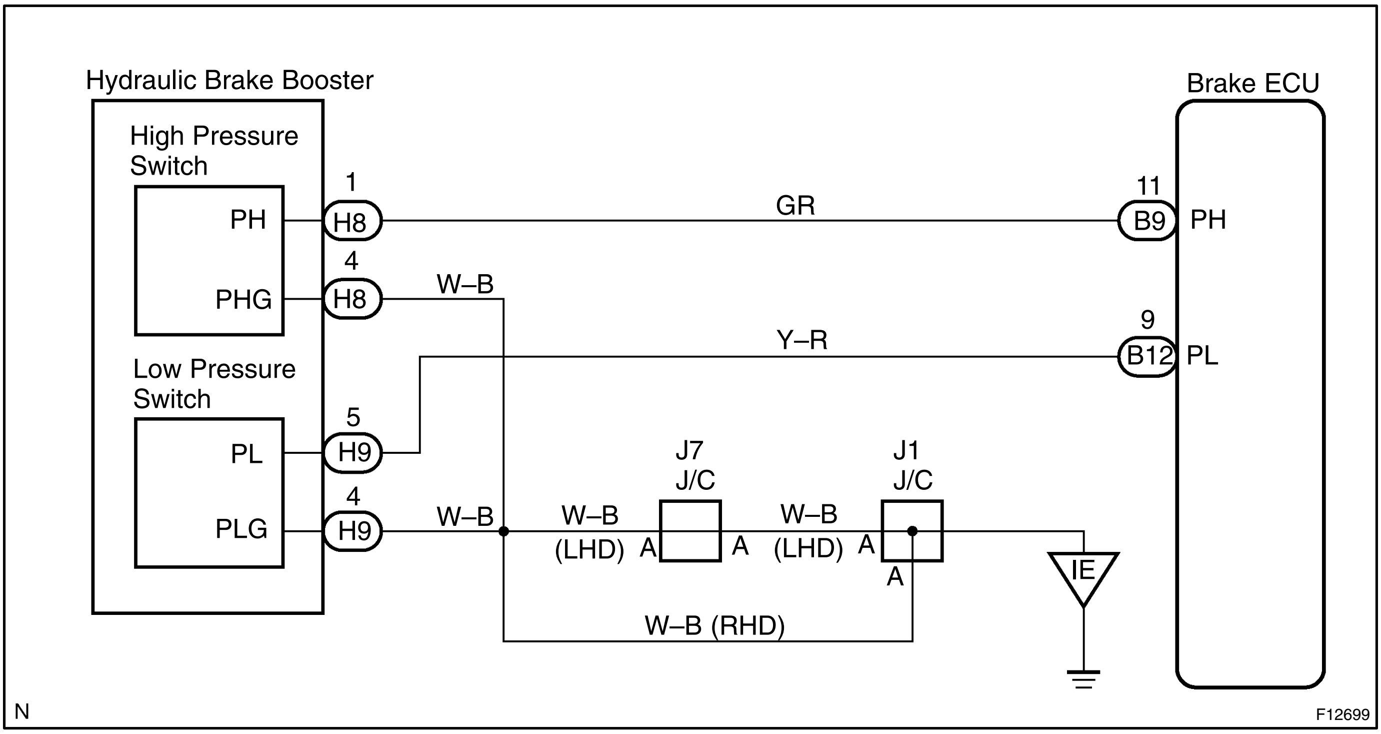
DI7N5–01

DTC	C1254/54	Pressure Switch Circuit

CIRCUIT DESCRIPTION

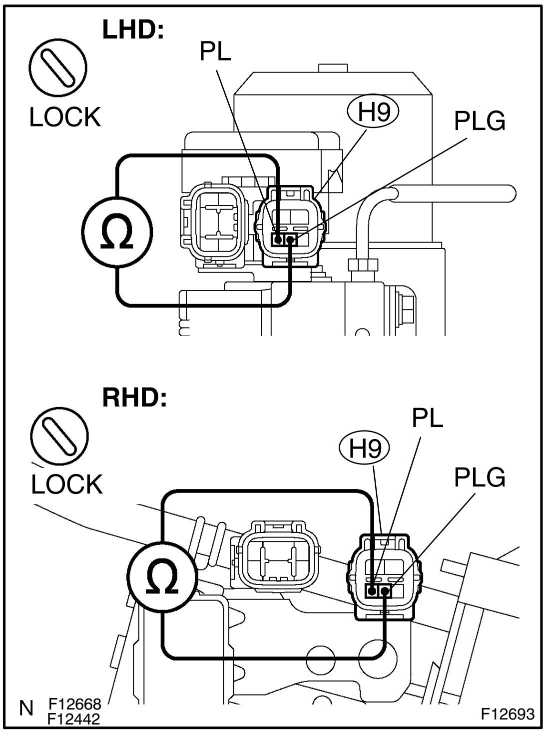
DTC No.	DTC Detecting Condition	Trouble Area
C1254/54	Either of the following 1. or 2. is detected: 1. After turning the ignition switch ON, short or open circuit in pressure switch (PL) continued for more than 1 sec. 2. After turning the ignition switch ON open in pressure switch (PH) continued for more than 1 sec.	• Pressure switch (PH or PL) • Pressure switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check pressure switch (PL) resistance.



PREPARATION:

(a) Disconnect the connector (H9) from the hydraulic brake booster.

(b) With ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PL and PLG of hydraulic brake booster connector.

OK:

Resistance: 5.1 – 6.3 kΩ

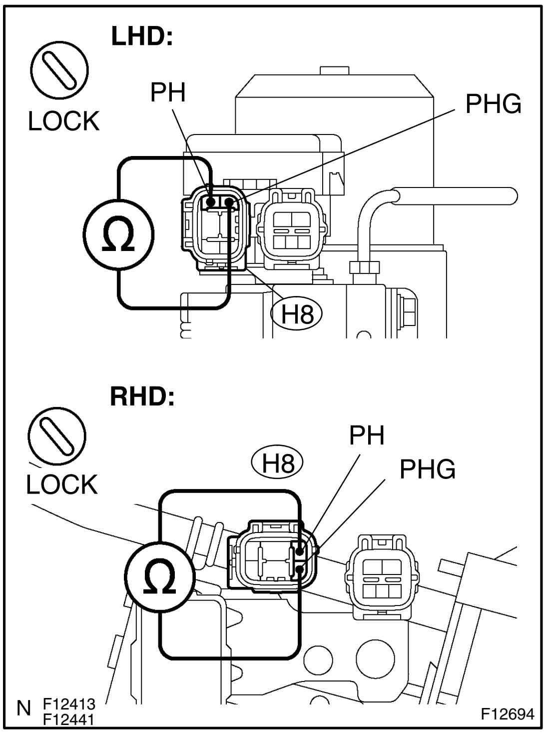
HINT:

After inspection, connect the connector and clear the DTC (See page DI–308).

NG	Replace hydraulic brake booster assembly.

OK

2	Check pressure switch (PH) resistance.



PREPARATION:

(a) Disconnect the connector (H8) from the hydraulic brake booster.

(b) With ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PH and PHG of hydraulic brake booster connector.

OK:

Resistance: 0.9 – 1.1 kΩ

HINT:
After inspection, connect the connector and clear the DTC (See page DI–308).

NG → **Replace hydraulic brake booster assembly.**

OK

3	Check for open and short circuit in harness and connector between each pressure switch and brake ECU (See page IN–40).

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

OK

Check and replace brake ECU.

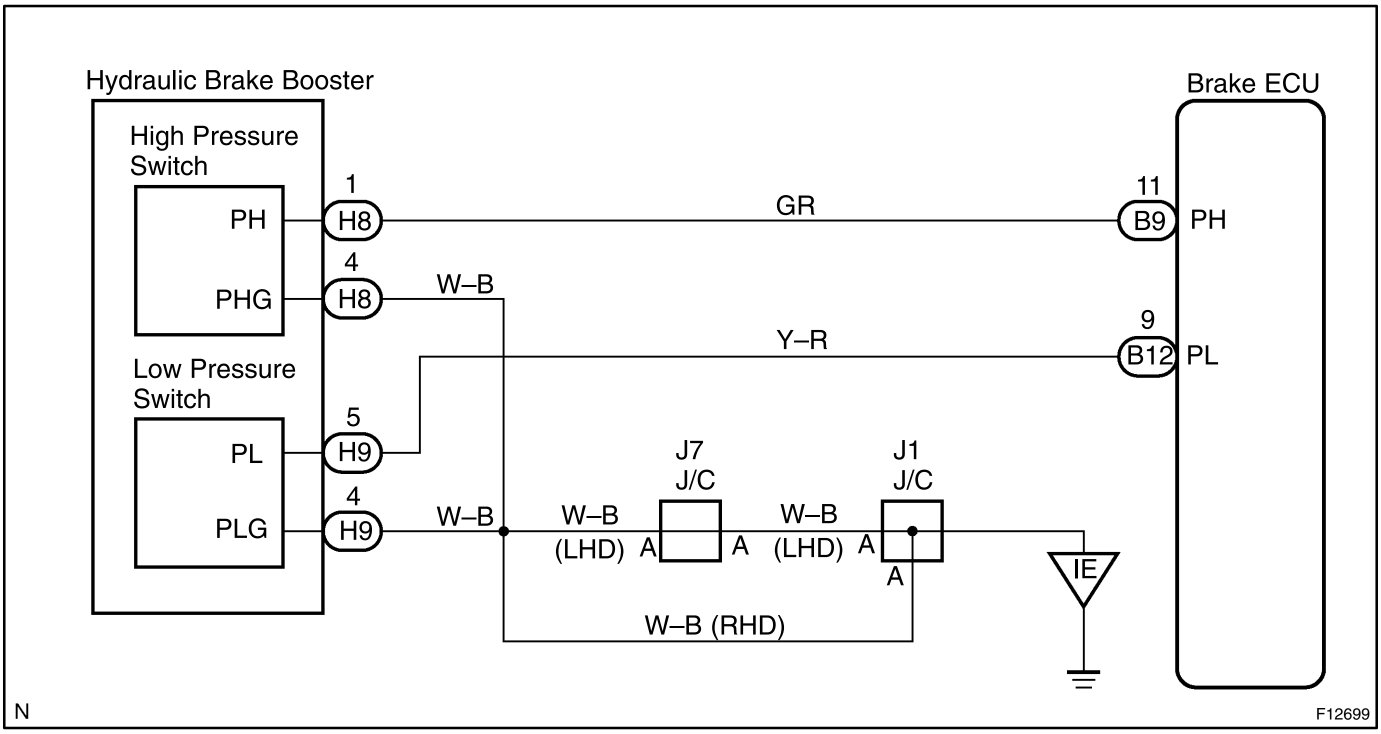
DI7N6–01

DTC	C1256/56	Accumulator Low Pressure Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1256/56	Either of the following 1. through 5. is detected: 1. With the vehicle running, when the pressure switch (PL) detects high pressure, although ABS, EBD or RBS does not control, the pressure switch (PL) detects low pressure for more than 1.4 sec. 2. With the vehicle running, when the pressure switch (PL) detects high pressure, although ABS, EBD or RBS controls, the pressure switch (PL) detects low pressure for more than 0.2 sec. 3. After the ignition switch is turned ON, the pressure switch (PL) detects low pressure for more than 60 sec. 4. After the ignition switch is ON, PL (Low pressure switch) turns ON while PH (High pressure switch) is stuck to ON, or PL cannot turn OFF for 1.4 sec. or more when running the vehicle without ABS, EBD or RBS control. 5. After the ignition switch is ON, PL turns ON while PH is stuck to ON, or PL cannot turn OFF for 0.2 sec. or more when running the vehicle under ABS, EBD or RBS control.	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check accumulator operation.**

PREPARATION:

(a) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to rear wheel cylinder and bleed air.

SST 09709–29018

CHECK:

Depress the brake pedal with force of more than 343 N (35 kgf, 77 lbf) and turn the ignition switch ON, then check the rear wheel cylinder pressure when an increase of pressure changes from acutely to mildly.

OK:

5,099 – 8,924 kPa (52 – 91 kgf/cm^2, 740 – 1,294 psi) at 20°C (68°F)

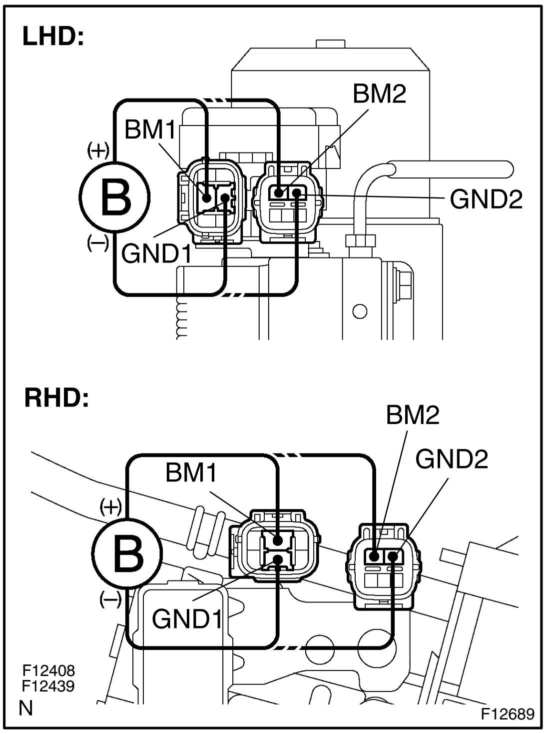
HINT:

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 the 2 connectors from the hydraulic brake booster.

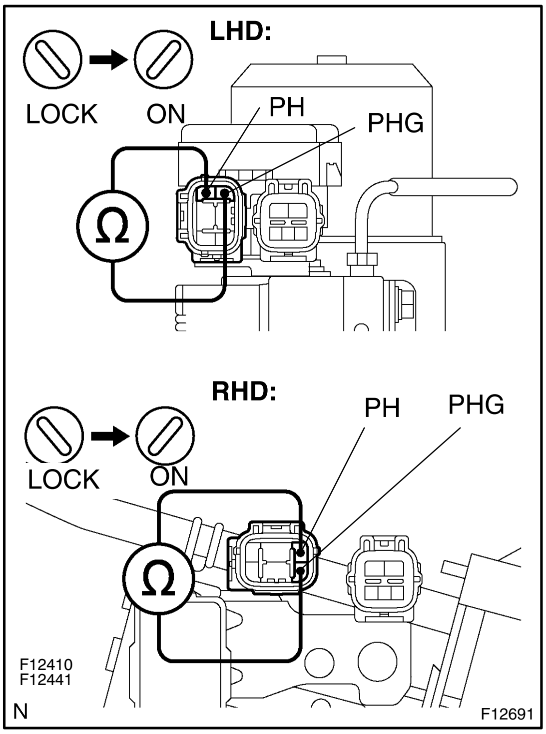
CHECK:
Connect battery positive ⊕ lead to BM1 or BM2 terminal and battery negative ⊖ lead to GND1 or GND2 terminal of the hydraulic brake booster (pump motor) connector.

OK:
The operation sound of the pump motor should be heard.

NG	**Go to step 7.**

OK

3	Check pressure switch (PH) operation.



PREPARATION:

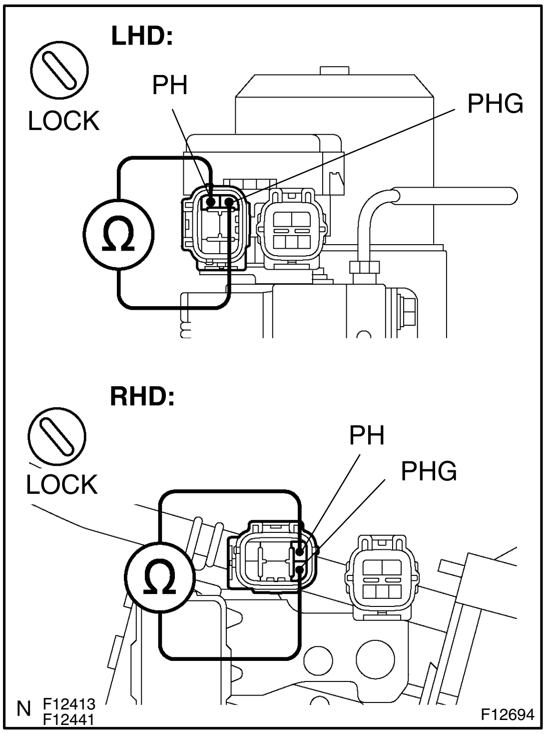
(a) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear brake caliper and bleed air.
SST 09709–29018

CHECK:
While checking the voltage between terminals PH and PHG of hydraulic brake booster, depress the brake pedal with force of more than 343 N (35 kgf, 77 lbf) and turn the ignition switch ON, then check the rear brake caliper pressure when voltage changes from 6 V to 0 V.

OK:
12,553 – 20,104 kpa (128 – 205 kgf·cm^2, 1,820 – 2,916 psi)



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 343 N (35 kgf, 77 lbf) and check the rear brake caliper pressure when resistance changes from 0 kΩ to 1 kΩ between PH and PHG.

OK:
11,964 – 18,240 kpa (122 – 186 kgf·cm^2, 1,735 – 2,645 psi)

HINT:
After inspection, connect the connector, fill brake reservoir with brake fluid and clear the DTC (See page DI–308).

OK	Go to step 5.

NG

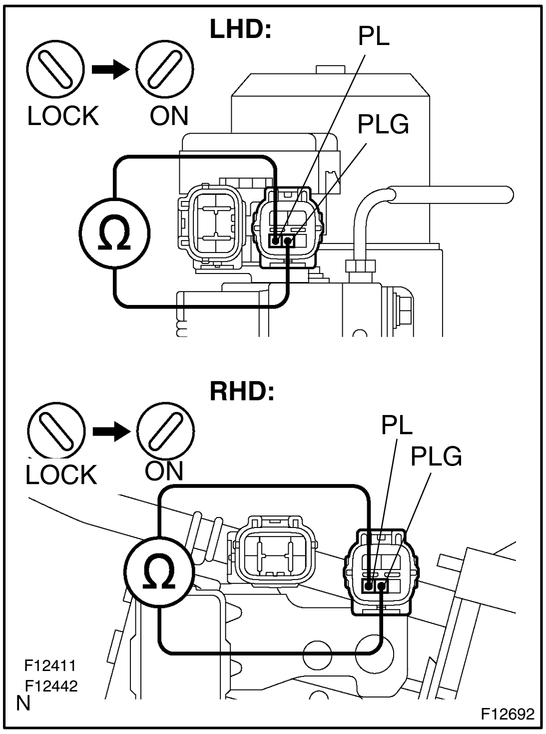
4	Check for open circuit in harness and connector between pressure switch (PH) and brake ECU (See page IN–40).

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

OK

Replace hydraulic brake booster assembly.

5	Check pressure switch (PL) operation.



PREPARATION:

(a) Turn the motor switch OFF, and depress the brake pedal 40 times or more.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear brake caliper and bleed air.

SST 09709 –29018

CHECK:

While checking the resistance between terminals PL and PLG of hydraulic brake booster, depress the brake pedal with force of more than 343 N (35 kgf, 77 lbf) and turn the ignition switch ON, then check the rear brake caliper pressure when the resistance changes from 5.7 kΩ to 1.0 kΩ.

OK:

9,022 – 15,102 kpa (92 – 154 kgf·cm^2, 1,308 – 2,190 psi)

PREPARATION:

Turn the ignition switch OFF and disconnect the connector (8P) from the hydraulic brake booster.

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 343 N (35 kgf, 77 lbf) and check the rear brake caliper pressure when resistance changes from 1.0 kΩ to 5.7 kΩ.

OK:

8,532 – 13,337 kpa (87 – 136 kgf·cm^2, 1,237 – 1,934 psi)

HINT:

After inspection, connect the connector, fill brake reservoir with brake fluid and clear the DTC (See page DI–308).

NG → **Replace hydraulic brake booster assembly.**

OK

6	**Check pressure switch (PH) and pressure switch (PL).**

CHECK:
Compare the pressure value of the rear brake caliper measured in check pressure switch (PL) operation with the one measured in check pressure switch (PH) operation.
OK:
- **Pressure when the voltage between PH and PHG becomes 6 to 0 V > pressure when the resistance between PL and PLG becomes 5.7 kΩ to 1.0 kΩ.**
- **Pressure when the resistance between PH and PHG becomes 0 kΩ to 1 kΩ > pressure when the resistance between PL and PLG becomes 1.0 kΩ to 5.7 kΩ.**

NG → **Replace hydraulic brake booster assembly.**

OK

Check and replace brake ECU.

7	**Check for open or short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN–40).**

NG → **Replace wire harness.**

OK

8	**Check hydraulic brake booster pump motor (See page BR–57).**

NG → **Replace hydraulic brake booster pump motor.**

OK

Replace hydraulic brake booster.

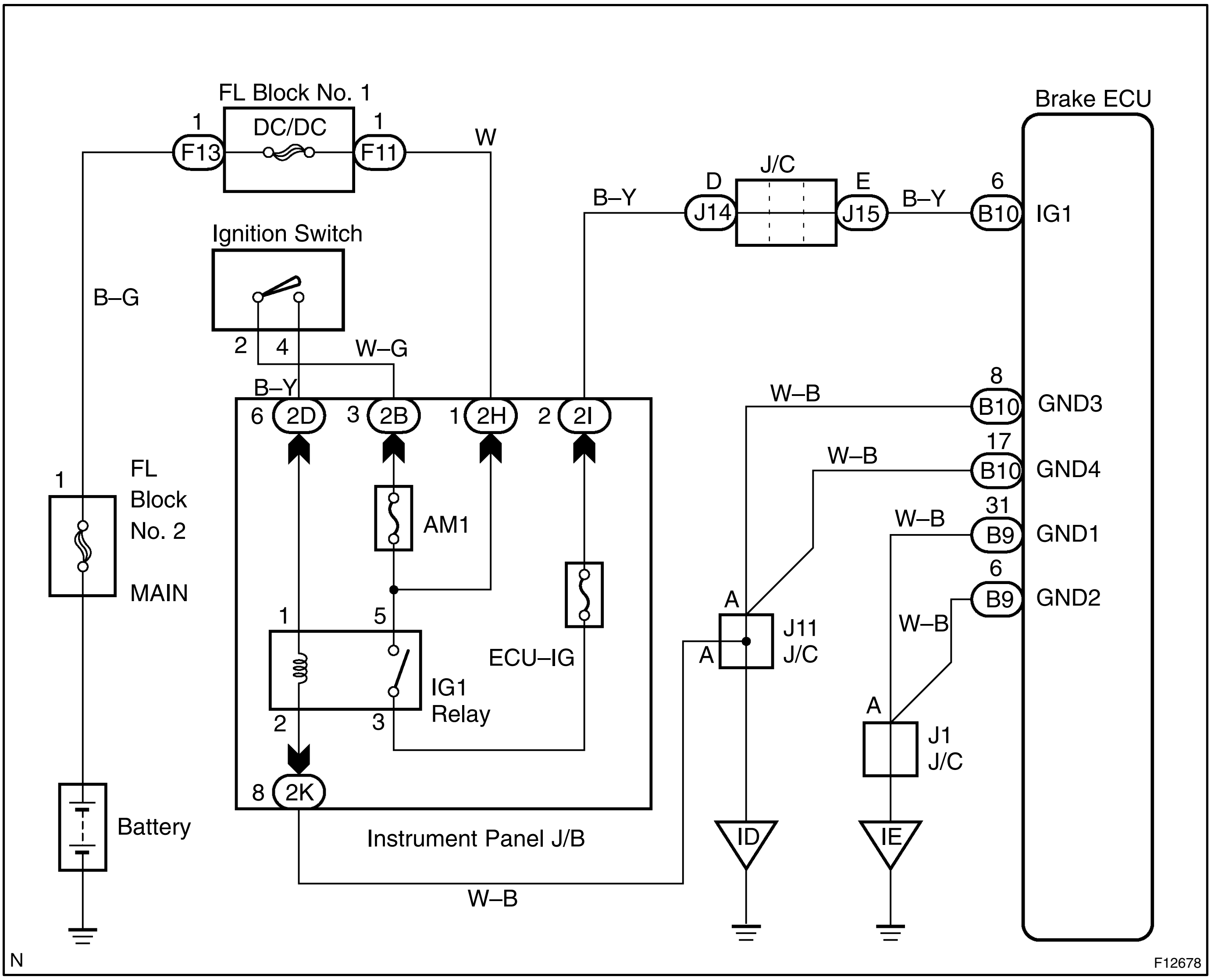
DI7N7–01

DTC	C1257/57	Power Supply Drive Circuit

CIRCUIT DESCRIPTION

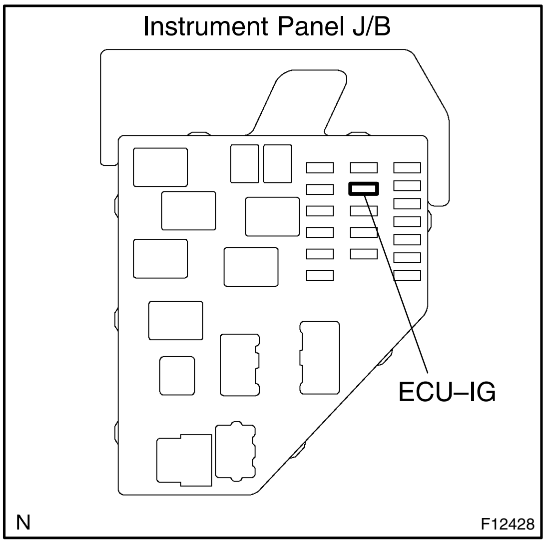
DTC No.	DTC Detecting Condition	Trouble Area
C1257/57	After turning the ignition switch ON, open or short circuit in circuit of power supply drive system inside ECU continues for more than 1.5 sec.	• Battery • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:
Remove the ECU–IG fuse from instrument panel J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page HV–39).**

OK

3	Check voltage of the ECU IG power source.

In case of using the hand–held tester:

PREPARATION:

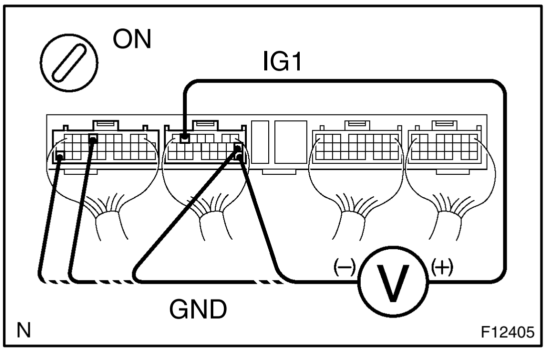
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON, and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

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 the brake ECU with connectors still connected.

CHECK:

Turn the ignition switch ON, measure voltage between terminals IG1 and GND of brake ECU connector.

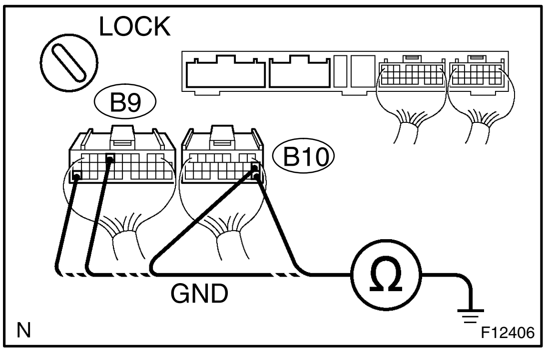
OK:

Voltage: 10 – 14 V

OK → **Check and replace brake ECU.**

NG

4	Check continuity between terminal GND of brake ECU connector and body ground.



PREPARATION:

Disconnect the 2 connectors (B9, B10) from the brake ECU.

CHECK:

Measure resistance between terminal GND of brake ECU harness side connector and body ground.

OK:

Resistance: 1 Ω or less

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

OK

Check for open circuit in harness and connector between brake ECU and battery (See page IN–40).

DI7N8–01

DTC	C1259/59	Malfunction in HV ECU

CIRCUIT DESCRIPTION

If any trouble occurs in the HV control system, the ECU prohibits RBS control.

DTC No.	DTC Detecting Condition	Trouble Area
C1259/59	The conditions 1. to 3. continues for 0.02 sec. 1. The condition that the voltage of the terminal IG2 in brake ECU is 10.5 V or more continues for 1.5 sec. 2. Regenerative malfunction occurs on HV ECU side. 3. Received data is accepted as valid.	• HV control system • HV ECU

INSPECTION PROCEDURE

1	Check the DTC for the HV control system (See page DI–144).

***1** → **Repair HV control system according to the output code.**

***2**

Check that HV ECU is connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI7N9–01

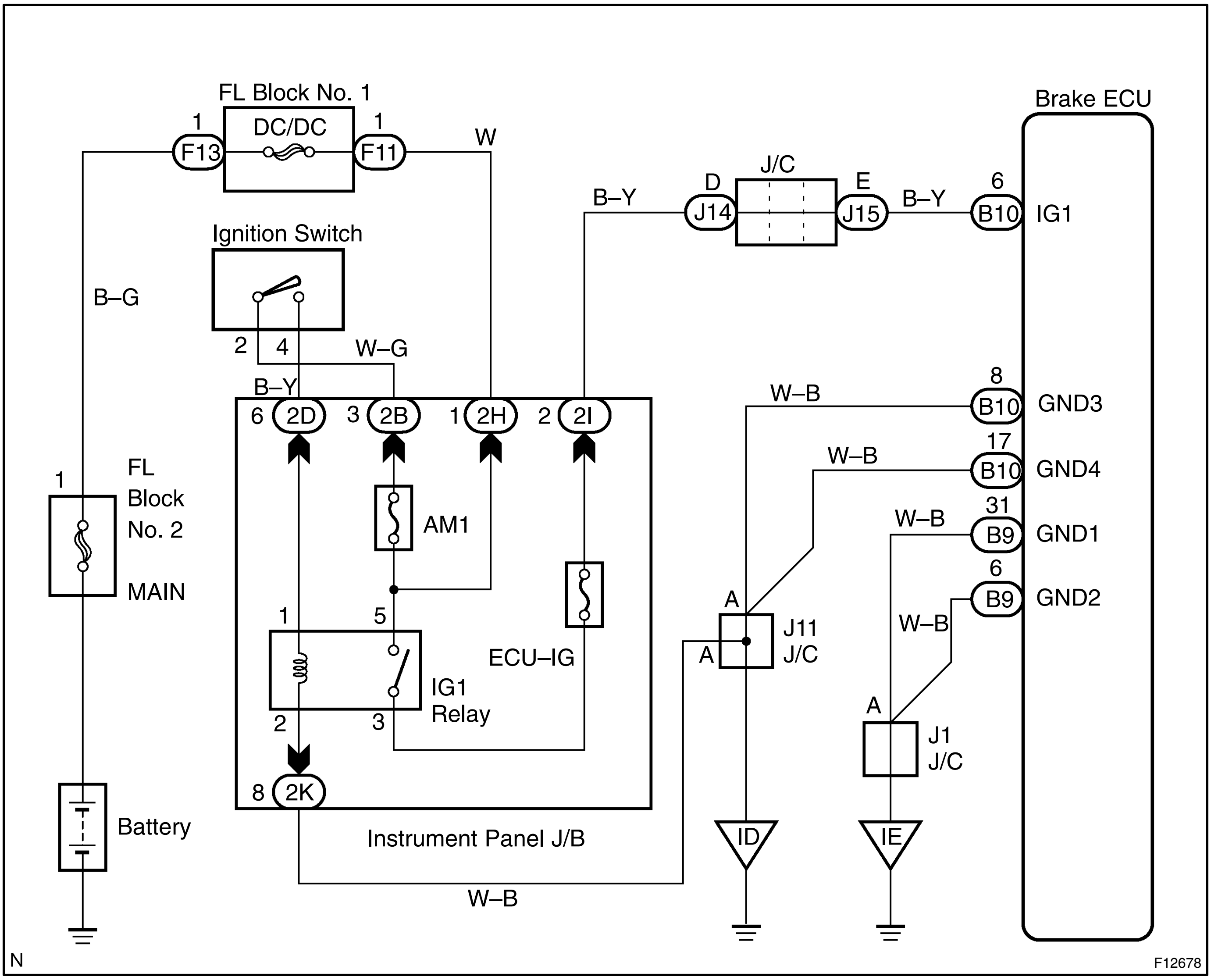
DTC	Always ON	Malfunction in ECU

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1. or 2. is detected: 1. ECU connectors are disconnected from ECU 2. There is a malfunction in ECU internal circuit	• Battery • Charging system • Power source circuit • Brake ECU

HINT:
There is a case that hand–held tester cannot be used when ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check that brake ECU connectors are securely connected to brake ECU.**

NO → **Connect connectors to brake ECU.**

YES ↓

2	**Is DTC output?**

Check DTC on page DI–308.

YES → **Repair circuit indicated by output code.**

NO ↓

3	**Is normal code displayed?**

YES → **Check ABS solenoid relay. Check for short circuit in harness and connector between ABS solenoid relay and DLC3 (See page IN–40).**

NO ↓

4	**Does ABS warning light go off?**

YES → **Check for open or short circuit in harness and connector between ECU–IG fuse and brake ECU (See page IN–40).**

NO ↓

5	**Check battery voltage.**

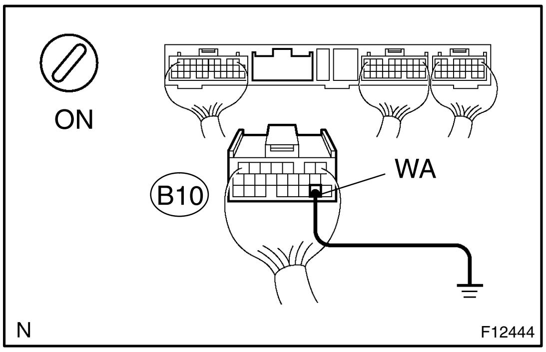
CHECK:
Check the battery voltage.
OK:
Voltage: 10 – 14 V

NG → **Check and repair charging system (See page HV–39).**

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:
(a) Disconnect the connector (B10) from the brake ECU.
(b) Using service wire, connect terminal WA of brake ECU harness side connector and body ground.
(c) Turn the ignition switch ON.
OK:
ABS warning light goes off.

OK → **Check and replace brake ECU.**

NG

Check for short circuit in harness and connector between combination meter and brake ECU, combination meter and DLC3 (See page IN–40).
Check ABS solenoid relay circuit (See page DI–332).

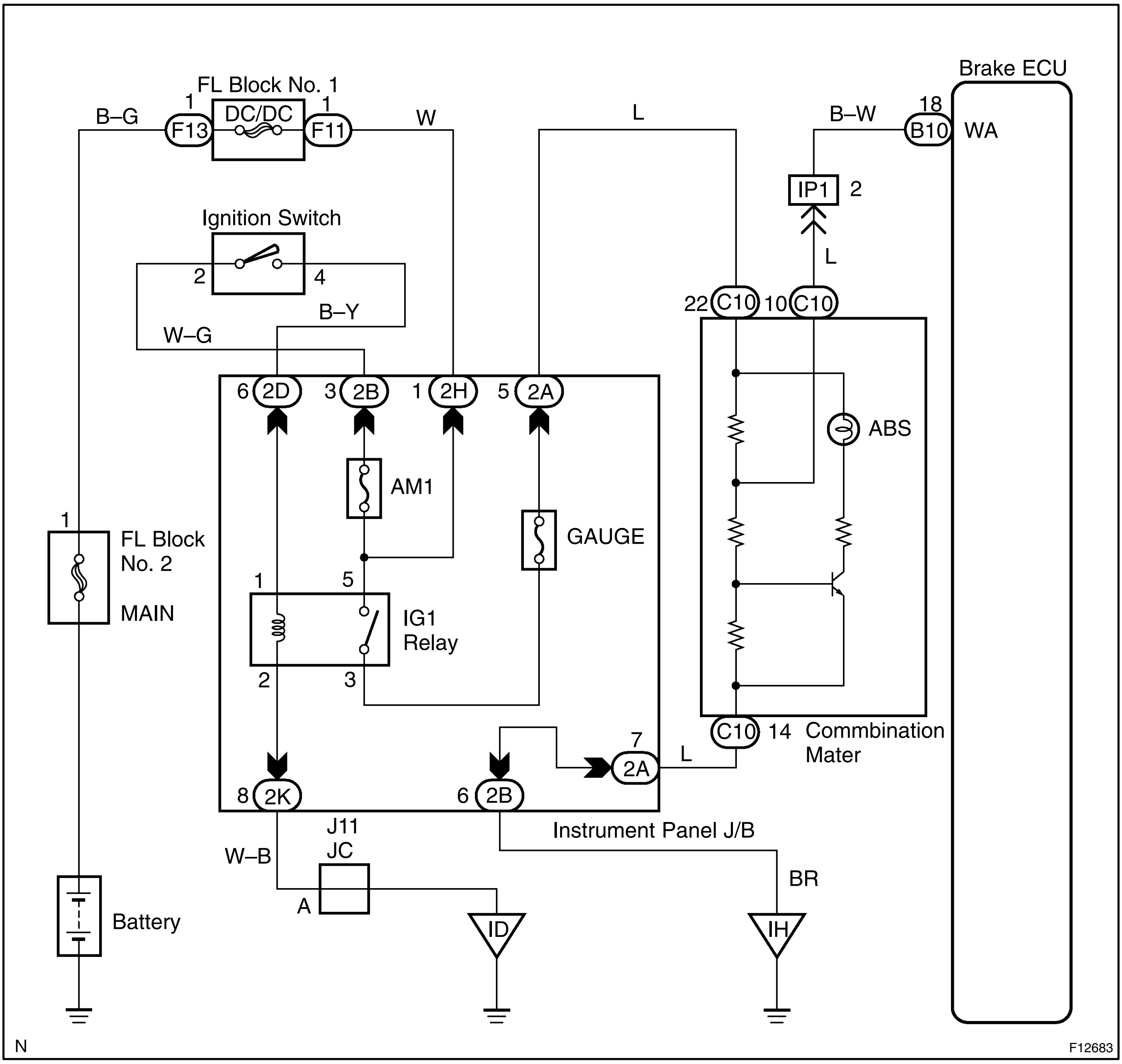
DI7NA–01

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.
Connect terminals Tc and CG of the DLC3 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 brake ECU.**

NG ↓

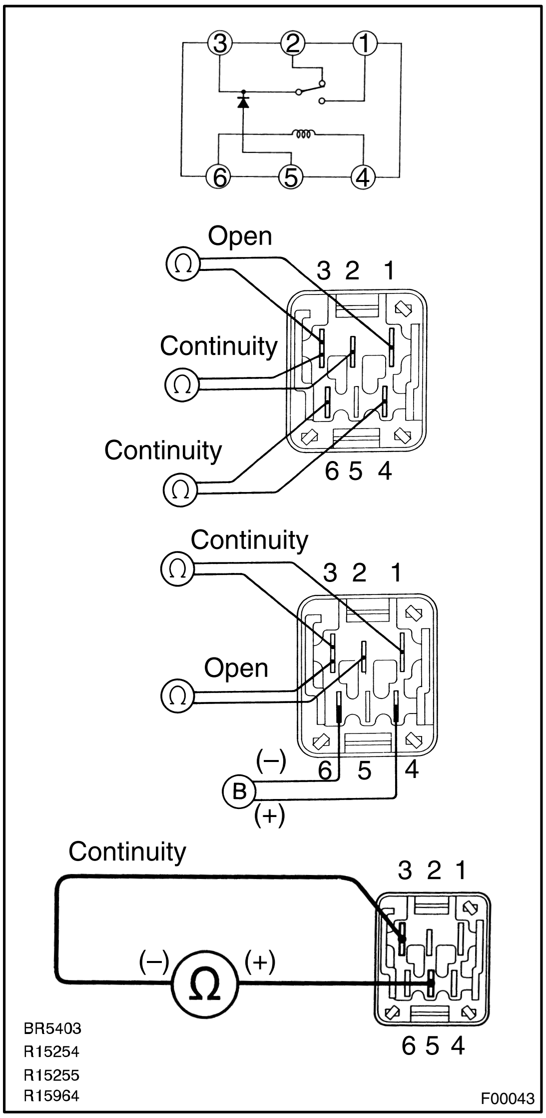
2	**Check ABS warning light.**

See combination meter troubleshooting on page BE–2.

NG → **Repair bulb or combination meter assembly.**

OK ↓

3	**Check ABS solenoid relay.**



PREPARATION:
Remove the ABS solenoid relay from engine room R/B No. 3.

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

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	**Replace ABS solenoid relay.**

OK

Repair or replace and check for open circuit in harness and connector between DLC3 and ABS solenoid relay and body ground (See page IN–40).

4	Check that the brake ECU connectors are securely connected to the brake ECU.

NO → **Connect the connector to the brake ECU.**

YES

5	Check operation of the ABS warning light (See step 1).

OK → **Check and replace brake ECU.**

NG

6	Is DTC output?

Check DTC on page DI–308.

YES → **Repair circuit indicated by the output code.**

NO

7	Check ABS solenoid relay (See step 3).

NG → **Replace ABS solenoid relay.**

OK

Check for short circuit in harness and connector between DLC3 and ABS solenoid relay (See page IN–40).

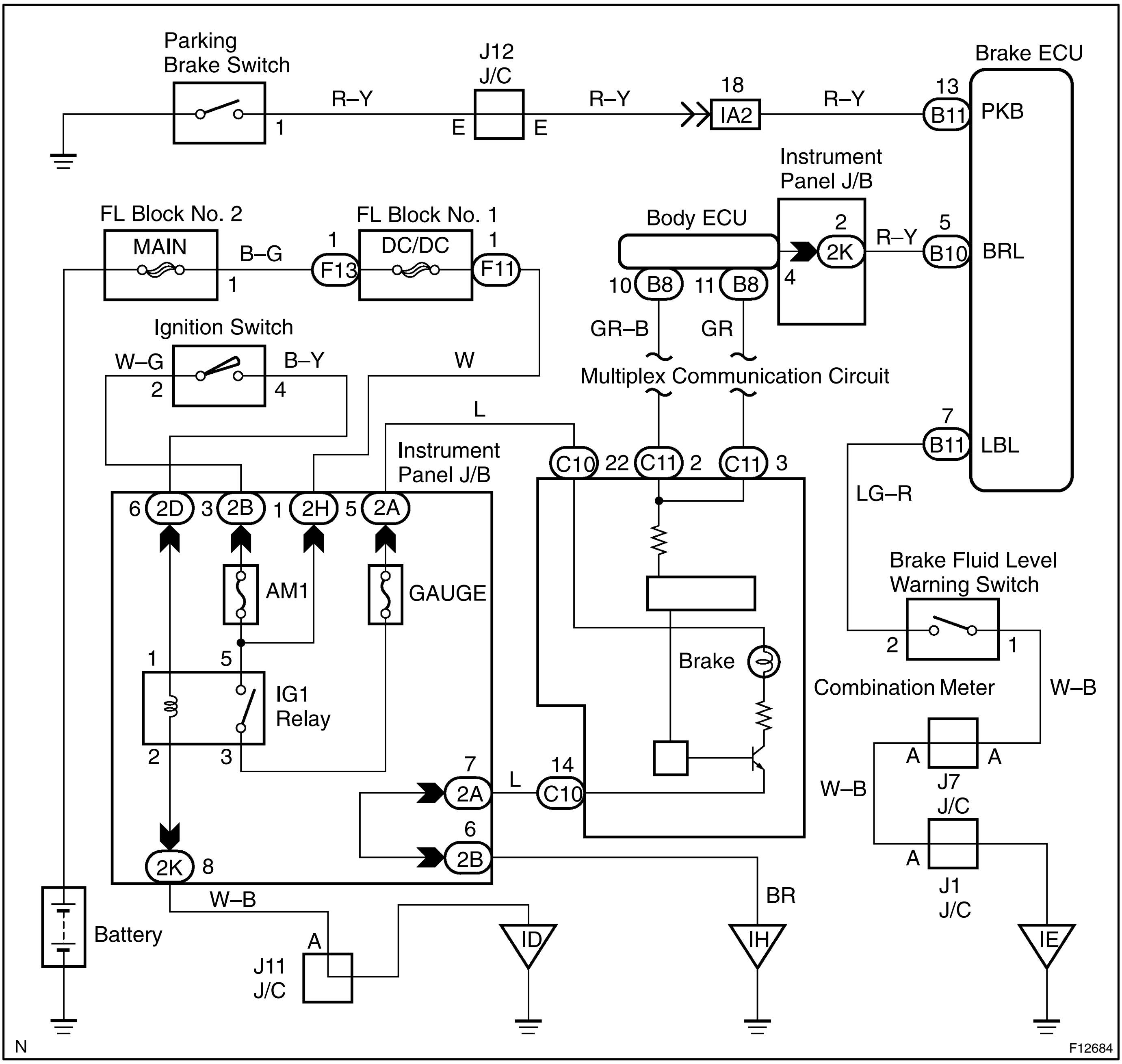
DI7NB–01

Brake Warning Light Circuit

CIRCUIT DESCRIPTION

The brake warning light lights up when the brake fluid is insufficient, the parking brake is applied or the EBD is defective.
The brake warning light also lights up when DTC No. C1259/63 or C1213/13 is detected, however, the EBD is not inhibited in this case.

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 brake warning light.**

PREPARATION:
(a) Release the parking brake pedal.
(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 ACTIVE TEST mode on the hand–held tester.

CHECK:
Check that "ON" and "OFF" of brake warning light can be shown on the combination meter by the hand–held tester.

OK → **Check and replace brake ECU.**

NG ↓

2	**Check parking brake switch circuit (See page BE–2).**

NG → **Repair or replace parking brake switch circuit.**

OK ↓

3	**Check brake fluid level warning switch circuit (See page BE–2).**

NG → **Repair or replace brake fluid level warning switch circuit.**

OK ↓

4	**Is DTC output for ABS ?**

Yes → **Repair circuit indicated by the output code.**

No ↓

5	**Check brake warning light.**

See combination meter troubleshooting on page BE–2.

NG → **Repair or replace combination meter.**

OK

6	**Check multiplex communication system (See page DI–658).**

NG → **Repair or replace multiplex communication circuit.**

OK

Check and replace brake ECU.

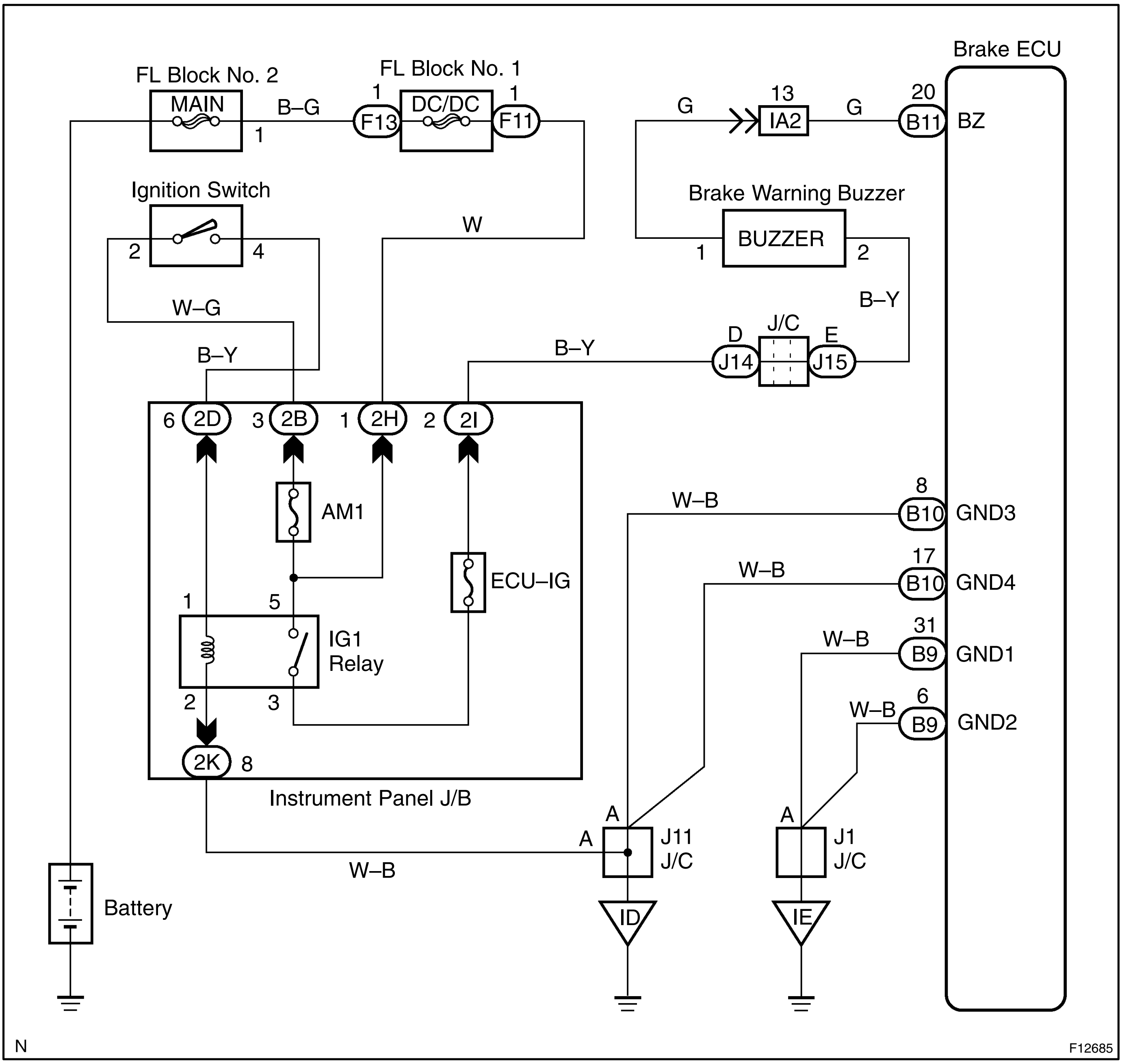
DI7NC–01

Brake Warning Buzzer Circuit

CIRCUIT DESCRIPTION

The brake warning buzzer sounds while the accumulator pressure is abnormally low.

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 brake warning buzzer.**

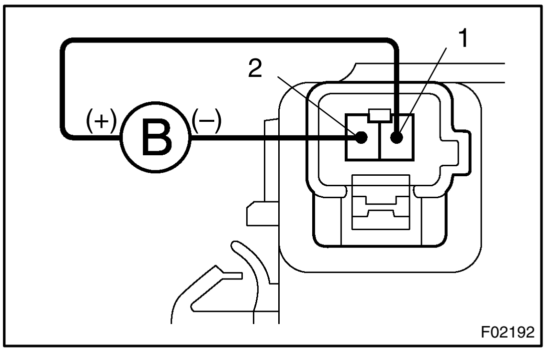
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON, and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check that brake warning buzzer sounds ”ON” and ”OFF” with the hand–held tester.

OK → **Check and replace brake 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 brake ECU and brake warning buzzer (See page IN–40).**

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

OK

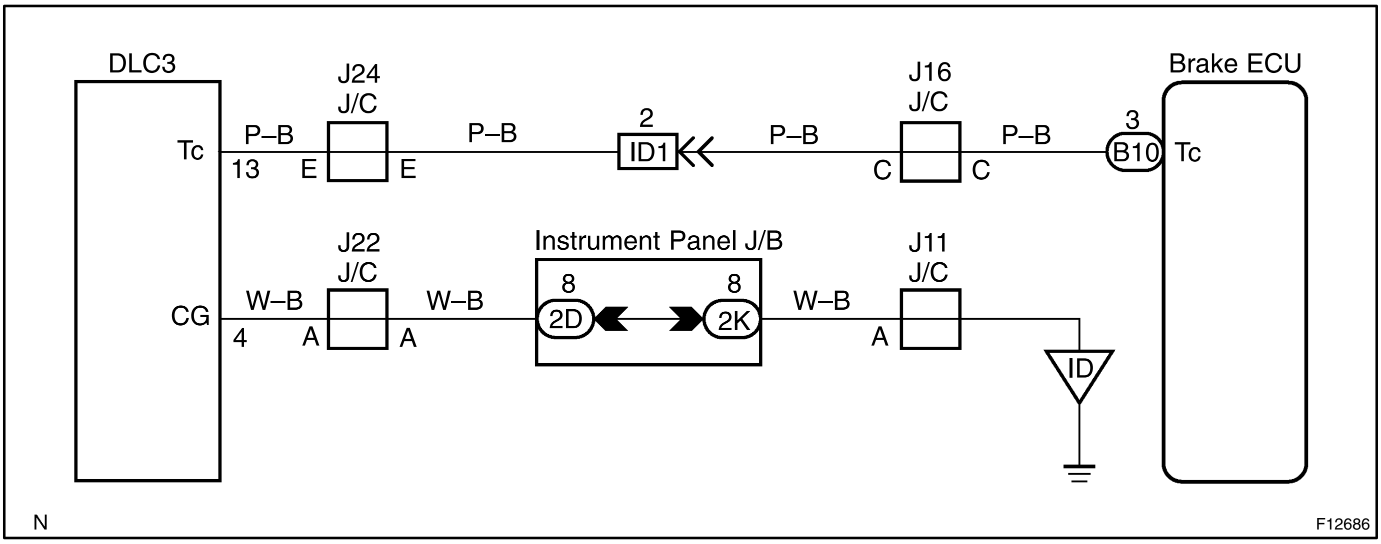
Check and replace brake ECU.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

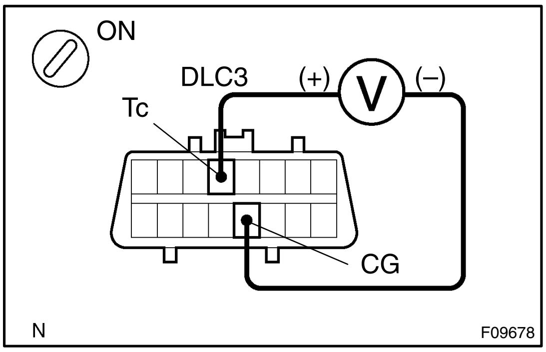
Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and CG of DLC3.**



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal Tc and CG of DLC3.
OK:
Voltage: 10 – 14 V

OK → **If ABS warning light does not blink even after Tc and CG are connected, the ECU may be defective.**

NG

2	Check for open and short circuit in harness and connector between brake ECU and DLC3, DLC3 and body ground (See page IN–40).

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

OK

Check and replace brake ECU.

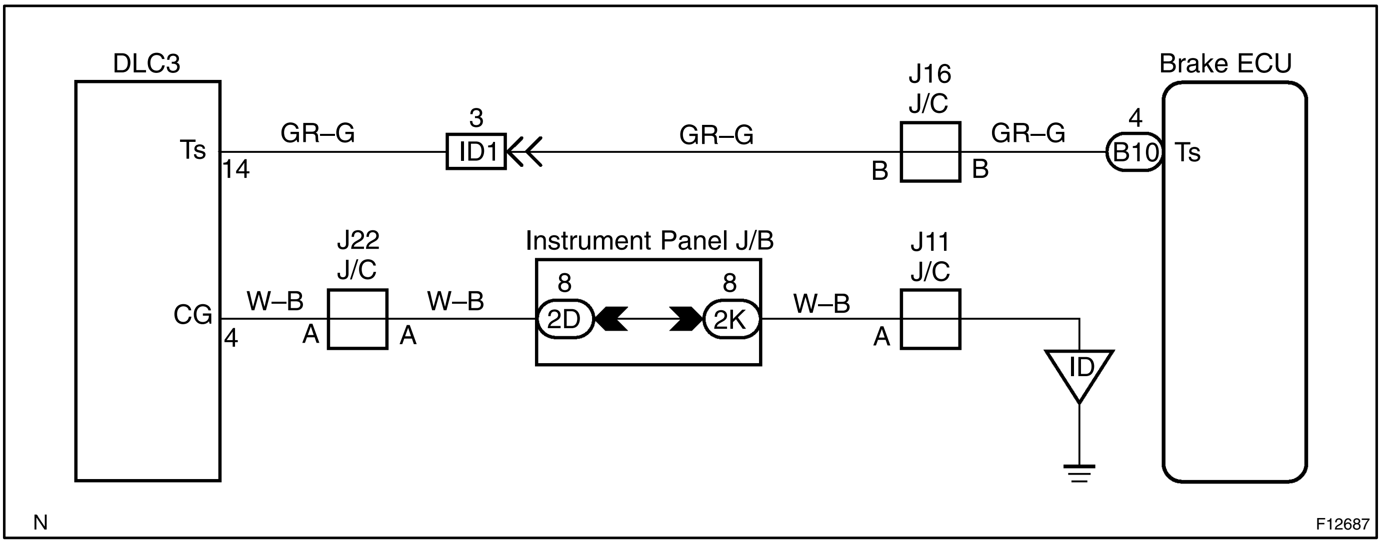
DI7NE–01

Ts Terminal Circuit

CIRCUIT DESCRIPTION

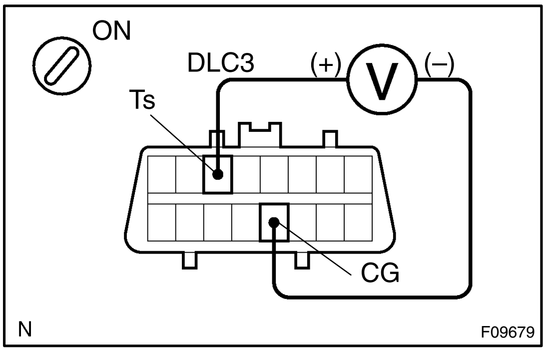
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected by the DTC check.
Connecting terminals Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and CG of DLC3.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK → **If ABS warning light does not blink even after Ts and CG are connected, the ECU may be defective.**

NG

2	Check for open and short circuit in harness and connector between brake ECU and DLC3, DLC3 and body ground (See page IN–40).

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

OK

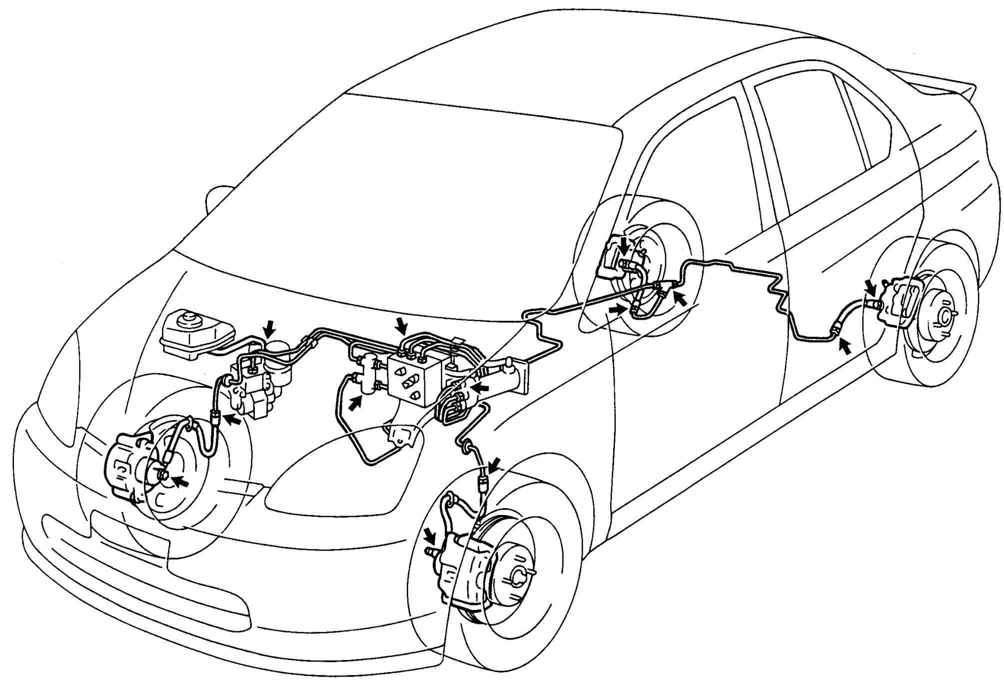
Check and replace brake ECU.

DI7NF–01

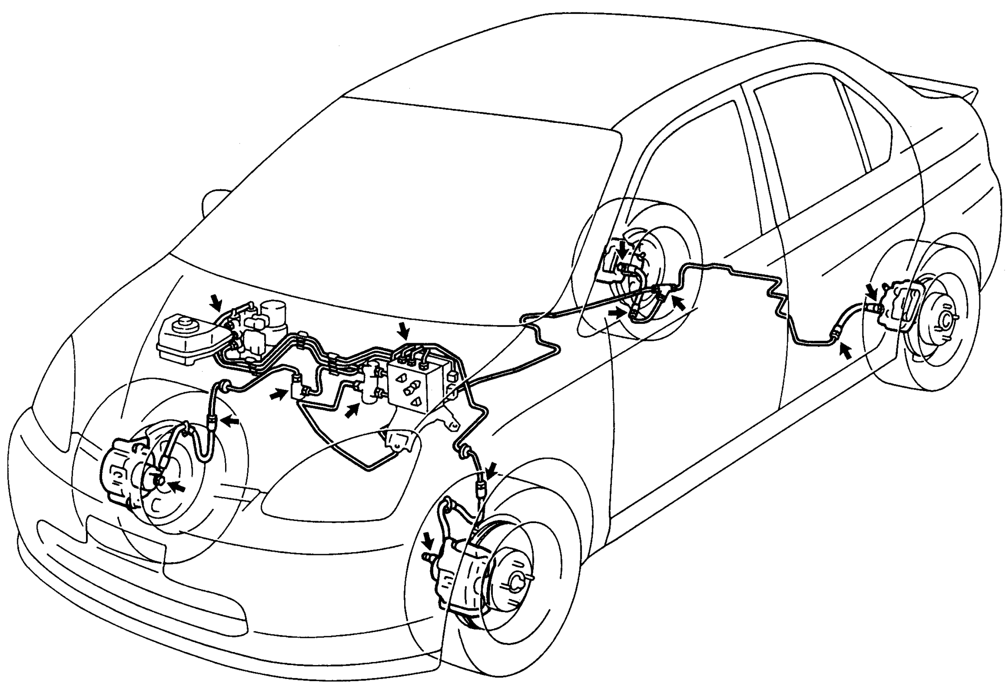
Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.

LHD:



RHD:



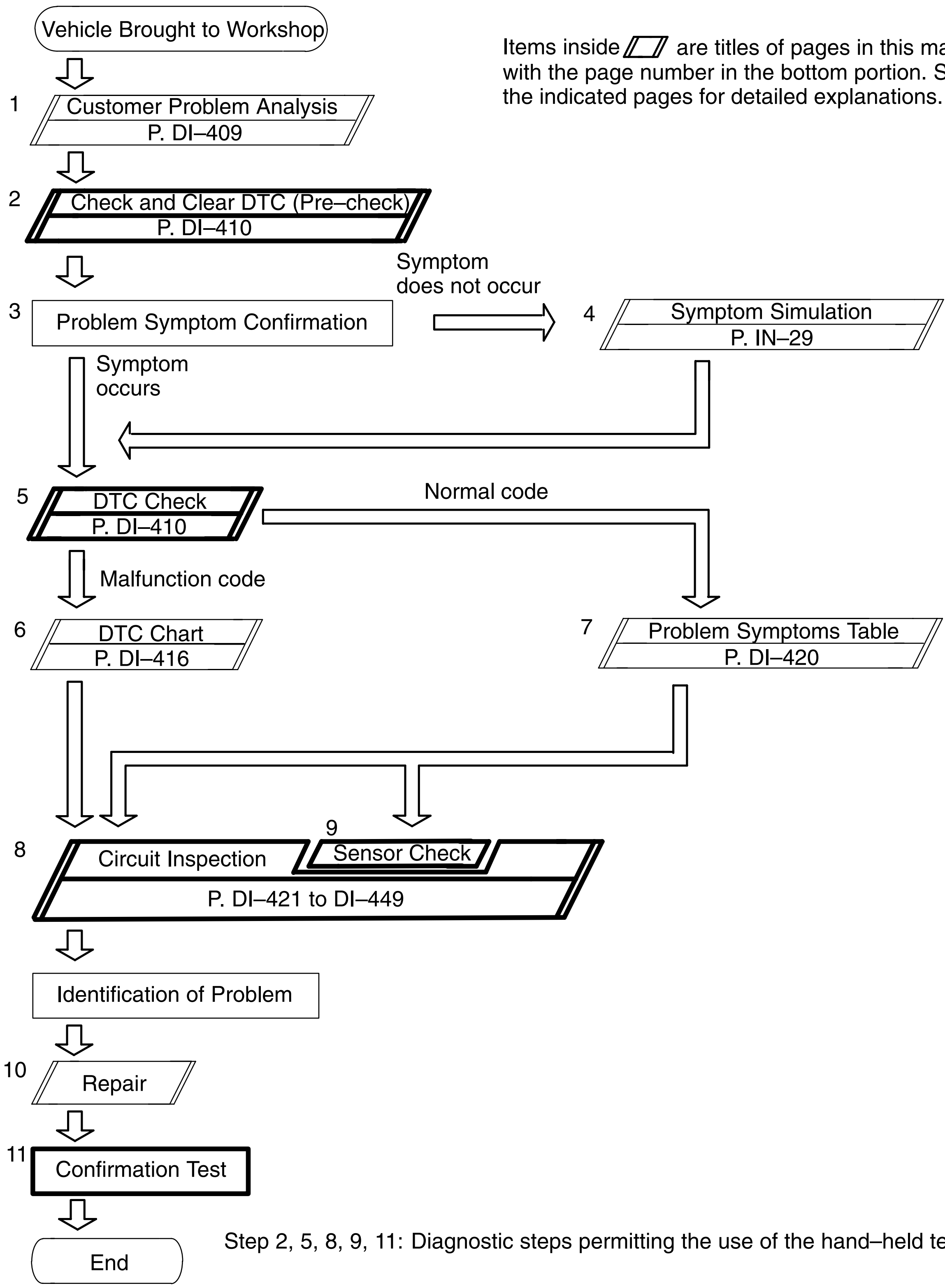
F12438
F12399
N
F12688

ELECTRIC MOTOR POWER STEERING

HOW TO PROCEED WITH TROUBLESHOOTING

DI7PM–01

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 indicated pages for detailed explanations.

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester.

DI7PN–01

CUSTOMER PROBLEM ANALYSIS CHECK

EMPS 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)

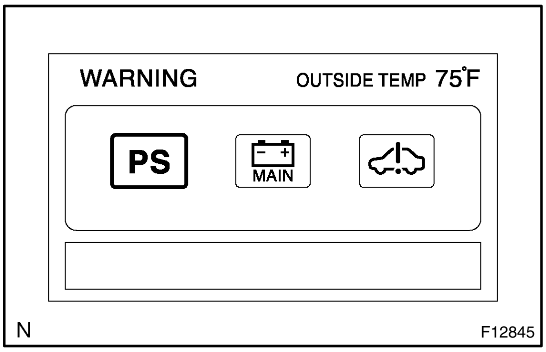
Symptoms	☐ PS does not operate.	
	☐ PS does not operate efficiently.	
	☐ At the time of idling, steering control force is great. (Rest swing is heavy).	
	☐ Even if the vehicle speed is increased, steering effort does not become greater.	
	PS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

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

DI7PO–01

PRE–CHECK

1. DIAGNOSIS SYSTEM

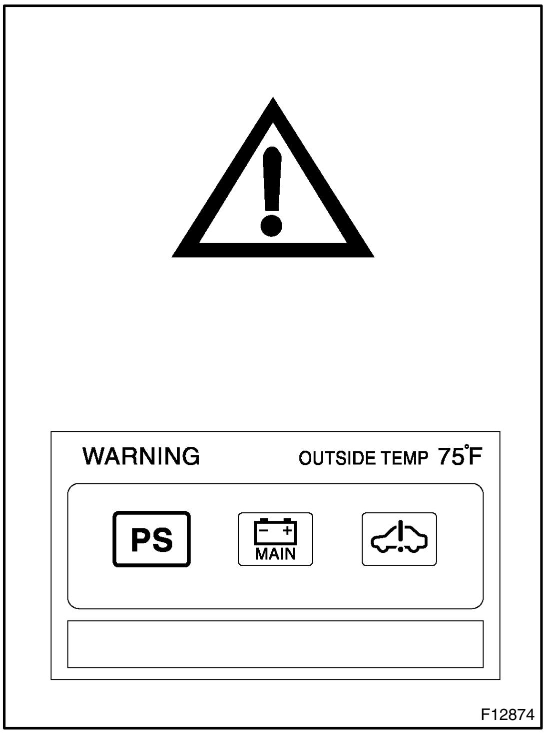


F12845

(a) Check the indicator.
When the ignition switch is turned ON, check that the PS warning light goes on for 1.5 seconds.

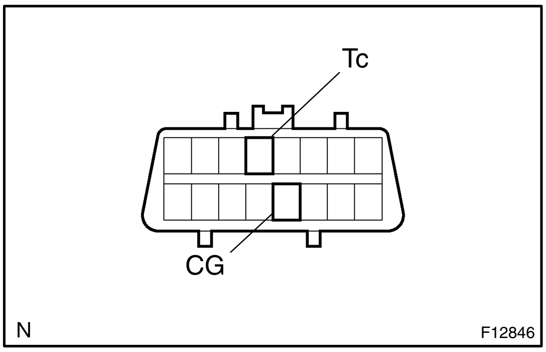
HINT:

- If the indicator check result is not normal, proceed to troubleshooting for the PS warning light circuit (See page DI–442).



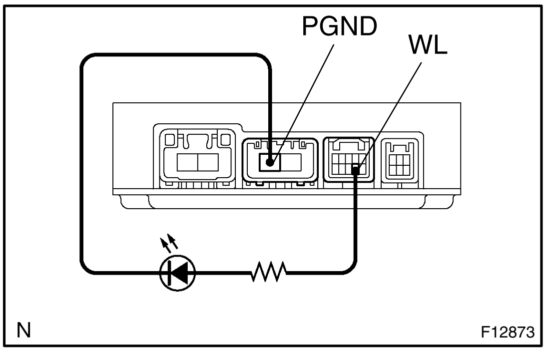
F12874

- When the EMPS system is faulty, the master warning light in the combination meter and the PS warning light in the multiinformation display lights up.



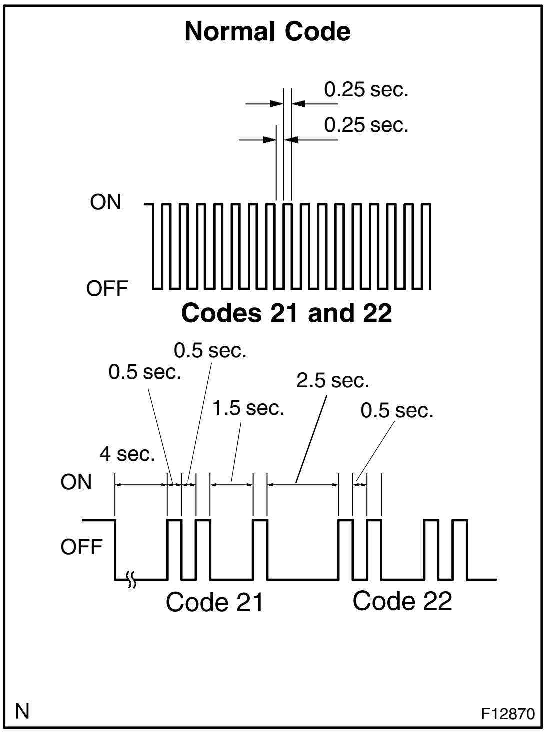
F12846

(b) In case of not using hand–held tester:
Check the DTC.
(1) Using SST, connect terminals Tc and CG of the DLC3.
SST 09843–18040



F12873

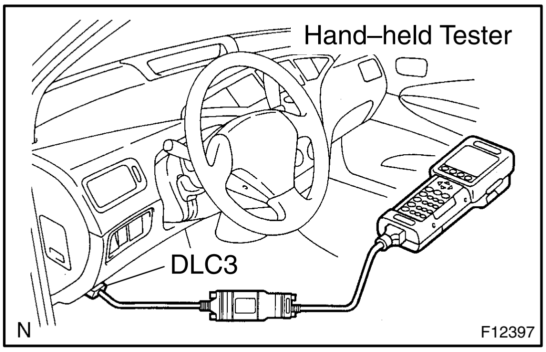
(2) Remove the EMPS ECU with connector still connected
(3) Connect the both terminals of the 1kΩ resistance and LED (Light Emitting Diode) circuit to terminals WL and PGND of the EMPS ECU.
(4) Turn the ignition switch ON.
(5) Read the DTC from the PS warning light.



HINT:
- If no code appears, inspect the diagnostic circuit and PS warning light circuit (See page DI–447 or DI–442).
- As an example, the blinking patterns for normal code and codes 21 and 22 are shown on the left.

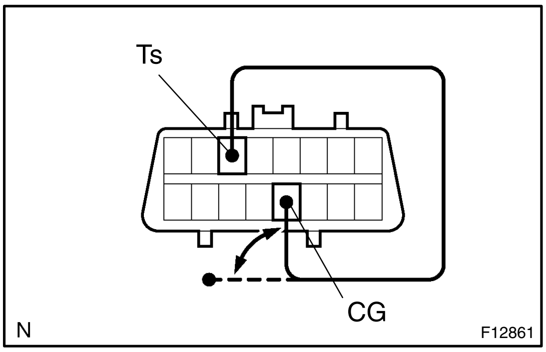
(6) Codes are explained in the DTC chart on page DI–416.

(7) After completing the check, disconnect terminals Tc and CG of the DLC3, and turn off the display.
If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC will be displayed first.

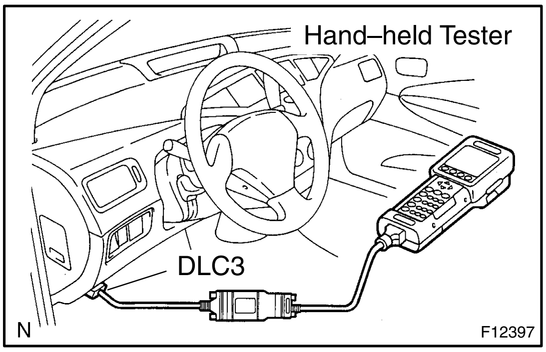


(c) In case of using hand–held tester:
Check the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Read the DTC by following the prompts on the tester screen.

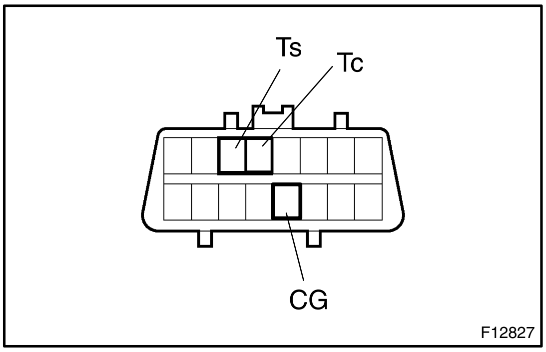
HINT:
Please refer to the hand–held tester operator's manual for further details.



(d) In case of not using hand–held tester:
Clear the DTC.
(1) Using SST, connect terminals Ts and CG of the DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.
(3) ON and OFF the terminal CG of the DLC3 4 times or more within 8 seconds, delete DTC of the EMPS ECU.
(4) Check that the PS warning light shows the normal code.
(5) Remove the SST from the DLC3.
SST 09843–18040



(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.)



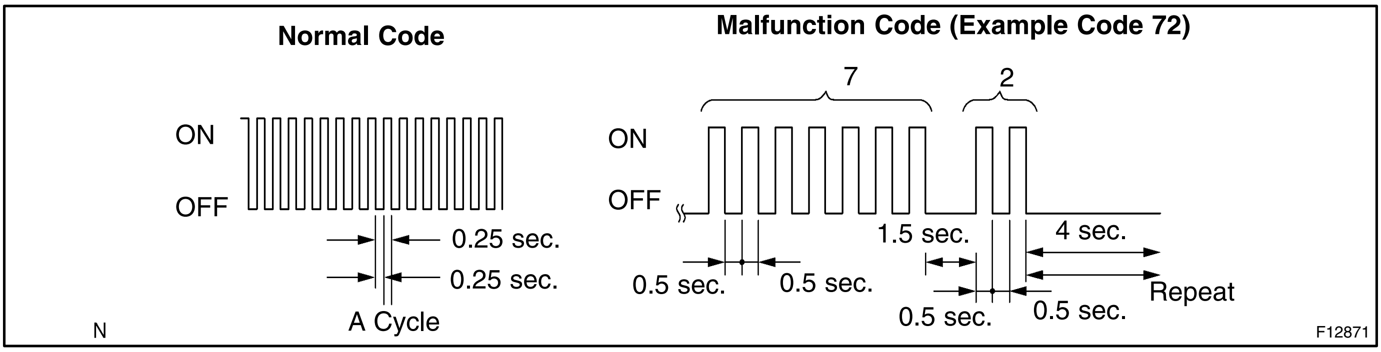
2. INPUT SIGNAL CHECK (TEST MODE)

(a) In case of not using hand–held tester:
Check the input signal.
(1) Turn the ignition switch OFF.
(2) Using SST, connect terminals Ts and CG of DLC3.
(3) Check the warning light goes off with driving more than 20 km/h (12 mph).

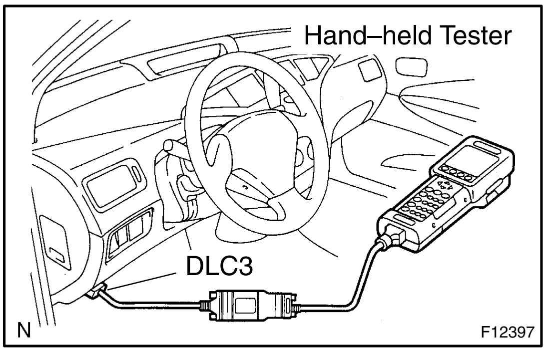
HINT:
If the warning light goes off during driving, the sensor can be judged to normal.

(4) Stop the vehicle.
(5) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(6) Read the number of blinks of the PS warning light.
(7) Remove the EMPS ECU with connected still connected.
(8) Connect the both terminals of the 1k Ω resistance and LED circuit to terminals WL and PGND of the EMPS ECU.

HINT:
- See the list of DTC shown on the next page.
- Even a sensor is normal, it output codes 71 and 72 during test mode.



(9) After doing check, disconnect the SST from the terminals Ts and CG, Tc and CG of DLC3, and turn the ignition switch OFF.
SST 09843–18040



(b) In case of using hand–held tester:
Check the input signal.
(1) Hook up the hand–held tester to the DLC3.
(2) Check the warning light goes off with driving more than 20 km/h.
(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.
- See the list of DTC shown on the bottom of this page.
- Even a sensor is normal, it output codes 71 and 72 during test mode.

DTC of input signal check function:

Code No. (See page)	Diagnosis	Trouble Area
C1515/15 (DI–424)	Calibration of torque sensor zero point not performed	–
C1516/16 (DI–425)	Calibration of torque sensor zero point not completed	–
C1571/71 C1572/72 (DI–430)	Speed sensor malfunction (Test mode)	• Right rear or left rear speed sensor • Sensor installation • Right rear or left rear speed sensor rotor • Right rear or left rear speed sensor circuit • Brake ECU • EMPS ECU

3. CALIBRATION OF TORQUE SENSOR ZERO POINT

HINT:

Perform this operation in the following cases.

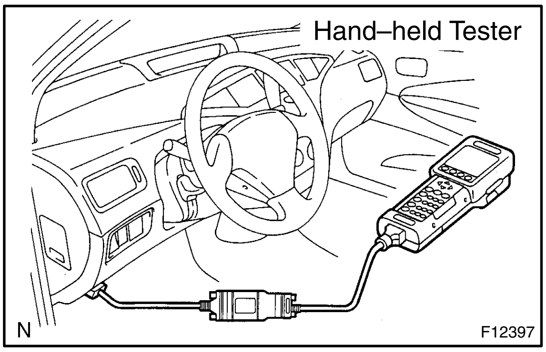
- When removing and installing "steering wheel", "tilt steering column"and "electric power steering gear".
- When replacing EMPS ECU.

(a) Place front wheels and steering wheel facing straight ahead.
(b) In case of using hand–held tester:
Perform the torque sensor zero point initialization.

HINT:

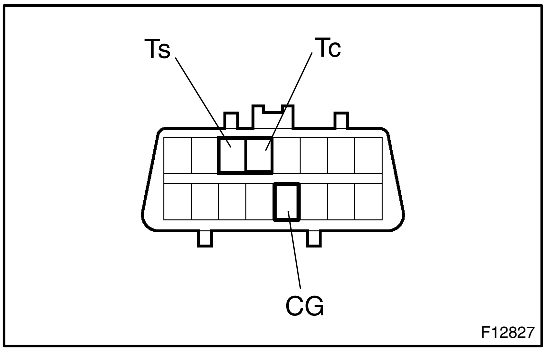
If the EMPS ECU is replaced, however, this operation is not necessary.

(1) Stop the vehicle.



(2) Hook up the hand–held tester to the DLC3.
(3) Select the ”TRQ SENS ADJUST” mode on the hand–held tester.
(4) Select the ”ZERO POINT INITIALIZE”.
(5) Following the screen instructions, perform the torque sensor zero point initialization.

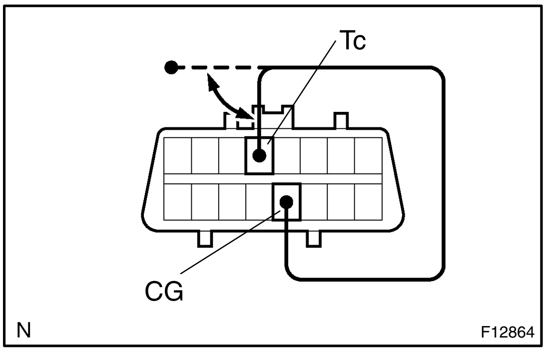
HINT:
Please refer to the hand–held tester operator’s manual for further details.



(c) In case of not using hand–held tester:
Perform the torque sensor zero point initialization.

HINT:
If the EMPS ECU is replaced, however, this operation is not necessary.

(1) Stop the vehicle.
(2) Using SST, connect terminals Ts and CG of DLC3.
SST 09843–18040
(3) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(4) ON and OFF the terminal Tc of DLC3 20 times within 20 seconds.
(5) Check that the DTC C1515/15.



(d) In case of using hand–held tester:
Perform the torque sensor zero point calibration.

HINT:
Don’t touch the steering wheel.

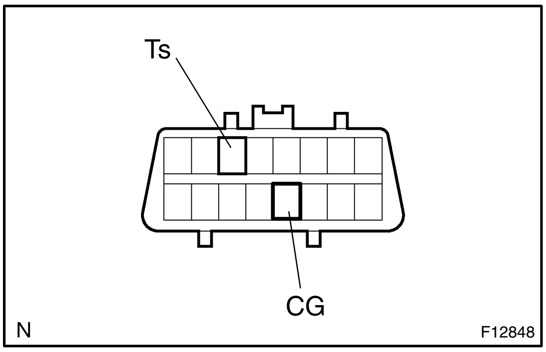
(1) Select the ”TRQ SENS ADJUST” mode on the hand–held tester.
(2) Select the ”ZERO POINT ADJUST”.
(3) Following the screen instructions, perform the torque sensor zero point calibration.

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

(e) In case of not using hand–held tester:
Perform the torque sensor zero point calibration.

HINT:
- Don’t touch the steering wheel.
- Check the DTC except C1515/15 is not output.

(1) Stop the vehicle and turn the ignition switch OFF.



(2) Using SST, connect terminals Ts and CG of DLC3 and ignition switch ON.

SST 09843–18040

(3) Disconnect the SST.

SST 09843–18040

DI7PP–01

DIAGNOSTIC TROUBLE CODE CHART

HINT:

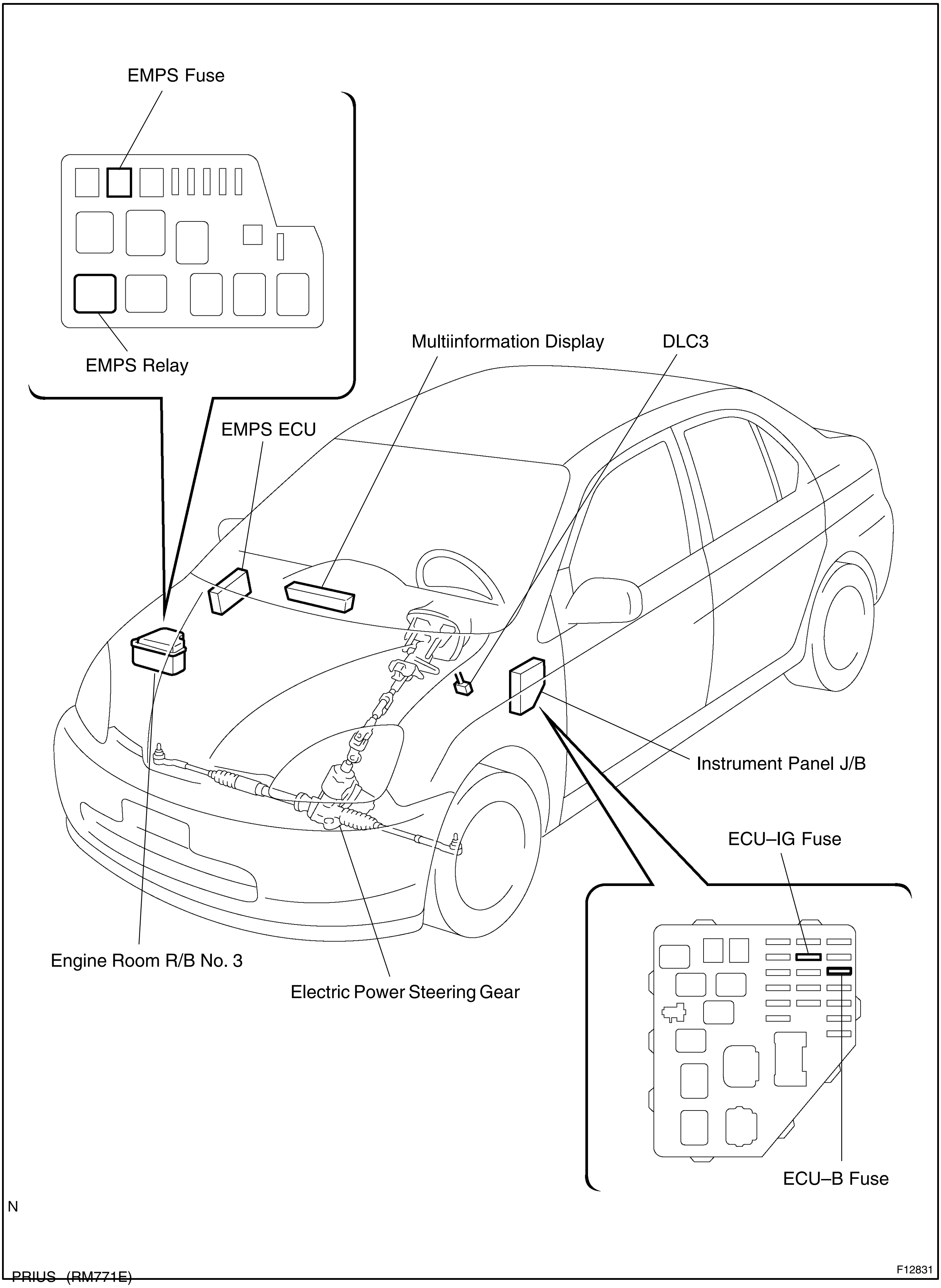
- Using SST 09843–18040, connect terminals Tc and CG of the DLC3.
- If a malfunction code is displayed during the DTC check, check the circuit listed for the code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

DTC No. (See page)	Detection Item	Trouble Area
C1511/11 (DI–421)	Torque sensor circuit malfunction	• Torque sensor • EMPS ECU
C1512/12 (DI–421)		
C1513/13 (DI–421)		
C1514/14 (DI–421)		
C1521/21 (DI–427)	Motor circuit malfunction	• Power steering gear assembly with motor • EMPS ECU
C1522/22 (DI–427)		
C1523/23 (DI–427)		
C1524/24 (DI–427)		
C1531/31 (DI–429)	EMPS ECU malfunction	EMPS ECU
C1532/32 (DI–429)		
C1533/33 (DI–429)		
C1541/41 (DI–430)	Speed sensor malfunction	• Speed sensor • Brake ECU • EMPS ECU
C1542/42 (DI–430)		
C1543/43 (DI–430)		
C1551/51 (DI–432)	IG power source circuit malfunction	• EMPS ECU • Power source circuit • Charging system
C1552/52 (DI–435)	PIG power source drop voltage malfunction	• EMPS ECU • Power source circuit
C1553/53 (DI–438)	When resetting voltage, vehicle is being driven	EMPS ECU
C1554/54 (DI–439)	EMPS relay circuit malfunction	• EMPS relay • EMPS ECU • EMPS relay circuit
C1555/55 (DI–429)	EMPS ECU malfunction	EMPS ECU
C1556/56 (DI–442)	P/S warning light circuit	• Multiinformationdisplay • EMPS ECU

DTC No. (See page)	Detection Item	Trouble Area
C1557/57 (DI–444)	Memory of overheat prevention control	–
C1558/58 (DI–444)	Memory of voltage drop at motor power supply	–
C1559/59 (DI–444)	Memory of continuous control under high load	–
Always ON (DI–445)	Malfunction in EMPS ECU	• Power source circuit • EMPS ECU • PS warning light circuit

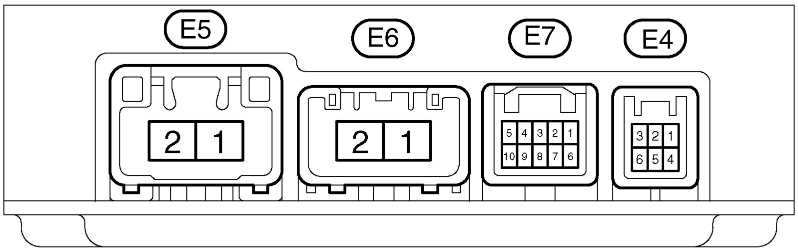
DI7PQ–01

PARTS LOCATION



DI7PR–01

TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
TRQV (E4–1) – PGND (E6–2)	W – W–B	IG switch ON	4.5 – 5.5
TRQ_2 (E4–2) – PGND (E6–2)	G – W–B	IG switch ON, turn the steering wheel to left and right	0.3 – 4.7
TRQG (E4–3) – PGND (E6–2)	B – W–B	IG switch ON	Below 1.0
TRQ_1 (E4–4) – PGND (E6–2)	R – W–B	IG switch ON, turn the steering wheel to left and right	0.3 – 4.7
M_1 (E5–1) – PGND (E6–2)	Y – W–B	IG switch ON, turn the steering wheel to left IG switch ON, turn the steering wheel to right	9 – 14 Below 1.0
M_2 (E5–2) – PGND (E6–2)	B–Y – W–B	IG switch ON, turn the steering wheel to left IG switch ON, turn the steering wheel to right	Below 1.0 9 – 14
PIG (E6–1) – PGND (E6–2)	B – W–B	IG switch ON	9 – 14
PGND (E6–2) – Body Ground	W–B – Body Ground	Always	Below 1.0
SIL (E7–1) – PGND (E6–2)	W–L – W–B	IG switch ON	9 – 14
RLY (E7–2) – PGND (E6–2)	GR – W–B	IG switch ON, After 1 sec. or more	Below 1.0
Tc (E7–3) – PGND (E6–2)	P–B – W–B	IG switch ON	9 – 14
WRR (E7–4) – PGND (E6–2)	B – W–B	IG switch ON	Below 1.5
IG (E7–5) – PGND (E6–2)	B–Y – W–B	IG switch ON	9 – 14
WL (E7–7) – PGND (E6–2)	Y – W–B	After IG switch ON and P/S warning light turns on for 1.5 sec., then it goes off	Below 1.0
Ts (E7–9) – PGND (E6–2)	GR–G – W–B	IG switch ON	9 – 14
WRL (E7–10) – PGND (E6–2)	W – W–B	IG switch ON	Below 1.5

DI7PS–01

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Suspected Area	See page
At the time of idling, steering control force is great.	Only when 1. to 4. are all normal and the problem is still occurring, replace the EMPS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Power source circuit 3. Brake ECU 4. Power steering gear assembly with motor	 DI–410 DI–435 DI–306 SR–18
Even if the vehicle speed is increased, appropriate steering resistance cannot be felt.	Only when 1. to 3. are all normal and the problem is still occurring, replace the EMPS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Brake ECU 3. Power steering gear assembly with motor	 DI–410 DI–306 SR–18
PS warning light abnormal.	1. PS warning light circuit 2. EMPS ECU	DI–442
DTC check cannot be done.	Only when 1. and 2. are all normal and the problem is still occurring, replace the EMPS ECU. 1. PS warning light circuit 2. Tc terminal circuit	 DI–442 DI–447
Speed sensor signal check cannot be done.	1. Ts terminal circuit 2. EMPS ECU 3. Brake ECU	DI–449 DI–306

CIRCUIT INSPECTION

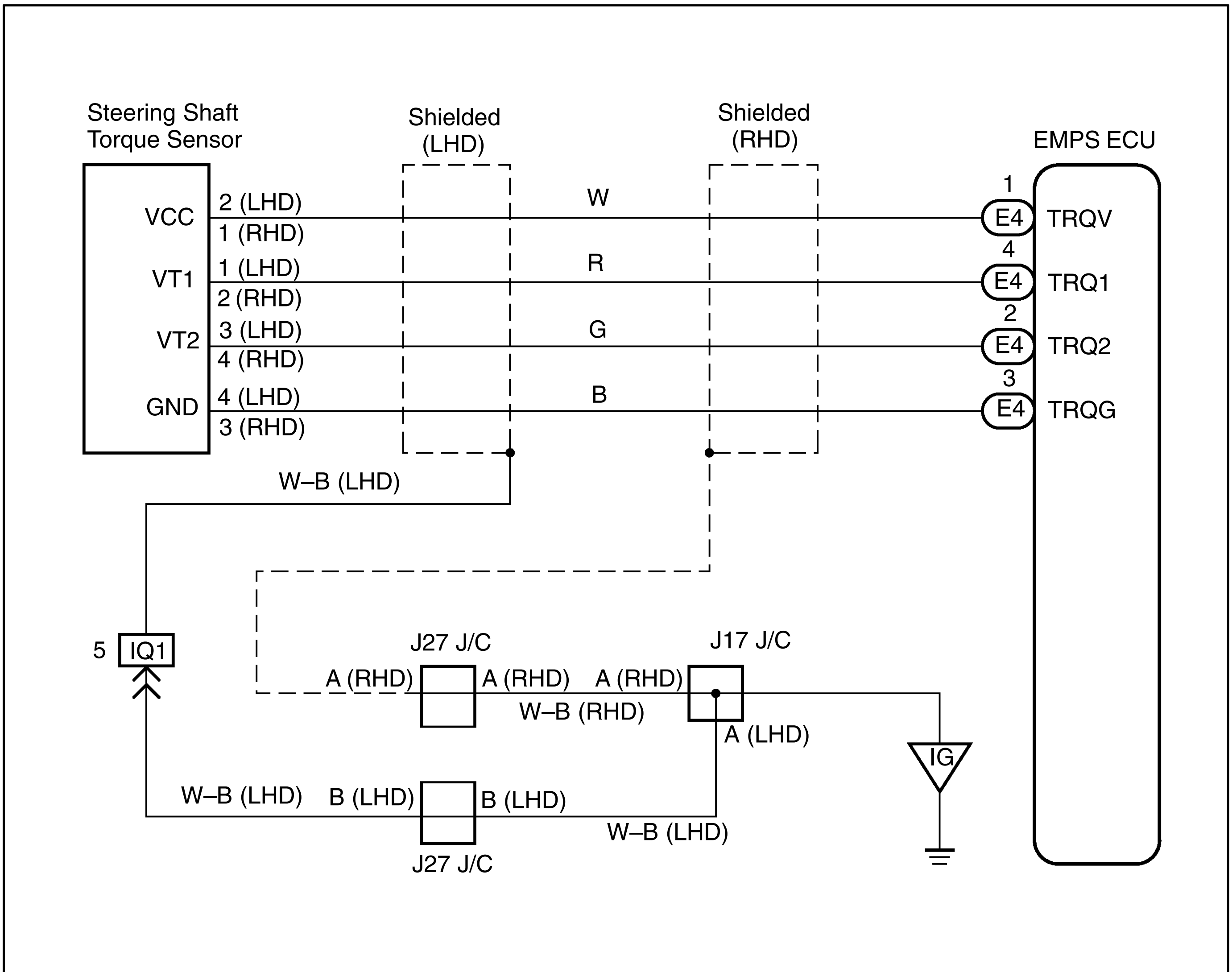
DTC	C1511/11–C1514/14	Torque Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Steering torque detected from output current of torque sensor.

DTC No.	DTC Detecting Condition	Trouble Area
C1511/11	Torque sensor malfunction	• Power steering gear assembly with motor • EMPS ECU
C1512/12		
C1513/13		
C1514/14	Torque sensor power source malfunction	

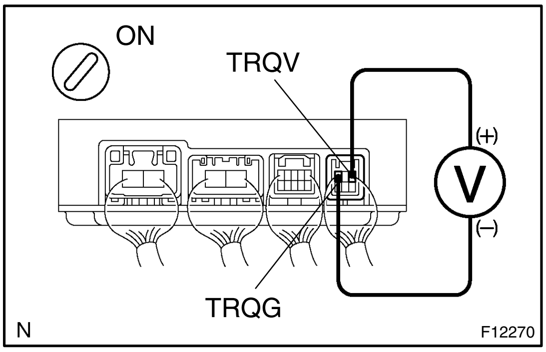
WIRING DIAGRAM



F12833

INSPECTION PROCEDURE

1	Check voltage between terminals TRQV and TRQG of EMPS ECU.



PREPARATION:
Remove the EMPS ECU with connectors still connected.
CHECK:
Measure the voltage between terminals TRQV and TRQG of EMPS ECU connector.
OK:
Voltage: 4.5 – 5.5 V

NG → **Check and replace the EMPS ECU.**

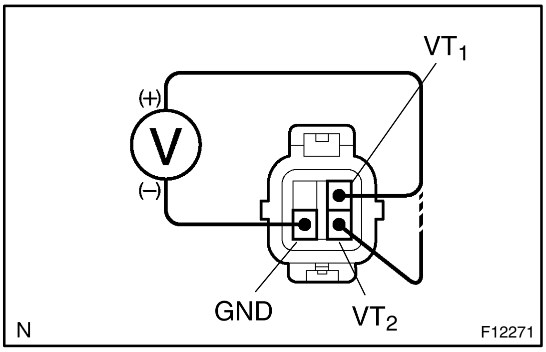
OK

2	Check for open and short circuit in harness and connector between terminals TRQV and TRQG of EMPS ECU connector (See page IN–40).

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

OK

3	Check voltage between terminals VT_1 and GND, VT_2 and GND of torque sensor connector.



PREPARATION:
Remove the torque sensor with connectors still connected.
CHECK:
Measure the voltage between terminals VT_1 and GND, VT_2 and GND of torque sensor connector.
OK:

Steering Position	VT_1	VT_2
Center position	2.1 – 2.9 V	2.1 – 2.9 V
Right turned	0.15 – 2.9 V	2.1 – 4.85 V
Left turned	2.1 – 4.85 V	0.15 – 2.9 V

NG → **Check and replace the power steering gear assembly with motor** (See page SR–18).

OK

4	**Check for open and short circuit in harness and connector between terminals VT_1 of torque sensor connector and TRQ_1 of EMPS ECU connector, VT_2 of torque sensor connector and TRQ_2 of EMPS ECU connector** (See page IN–40).

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

OK

Check and replace the EMPS ECU.

DI7PU–01

DTC	C1515/15	Torque Sensor Zero Point Calibration Not Performed

CIRCUIT DESCRIPTION

This DTC does not indicate trouble. Perform calibration of torque sensor zero point to delete DTC.

DTC No.	DTC Detecting Condition	Trouble Area
C1515/15	When torque sensor zero point calibration not performed, this DTC is detected.	–

INSPECTION PROCEDURE

1	Is DTC except C1515/15 output?

Check DTC on page DI–416.

YES → **Repair circuit indicated by code output.**

NO

2	Perform calibration of torque sensor zero point (See page DI–410).

3	Is DTC C1516/16 output?

Check DTC on page DI–416.

NO → **No problem.**

YES

Repair circuit indicated by DTC C1516/16 (See page DI–425).

DI7PV–01

DTC	C1516/16	Calibration of Torque Sensor Zero Point Not Completed

CIRCUIT DESCRIPTION

This DTC does not indicated trouble. This is detected when the torque sensor zero point calibration is not completed normally.

DTC No.	DTC Detecting Condition	Trouble Area
C1516/16	This is detected when the torque sensor zero point calibration is not completed normally.	–

INSPECTION PROCEDURE

1	**Perform calibration of torque sensor zero point (See page DI–410).**

2	**Is DTC C1516/16 output?**

Check DTC on page DI–416.

NO → **No problem.**

YES

3	**Is DTC C1532/32 output ?**

YES → **Check and replace EMPS ECU.**

NO

4	**Perform calibration of torque sensor zero point again (See page DI–410).**

5	Is DTC C1516/16 output after attempted 3 times or more ?

YES → **Replace the power steering gear assembly with motor.**

NO ↓

No problem.

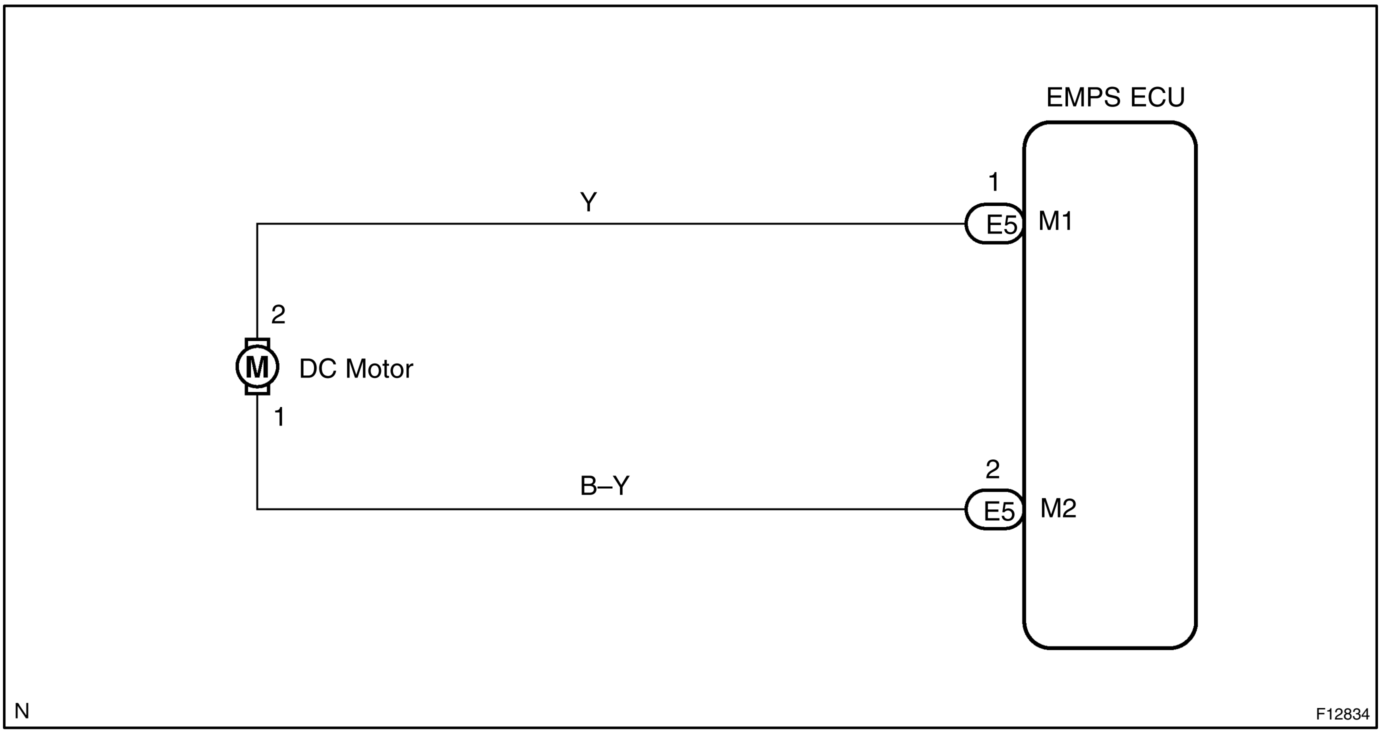
DI7PW–01

DTC	C1521/21–C1524/24	Motor Circuit Malfunction

CIRCUIT DESCRIPTION

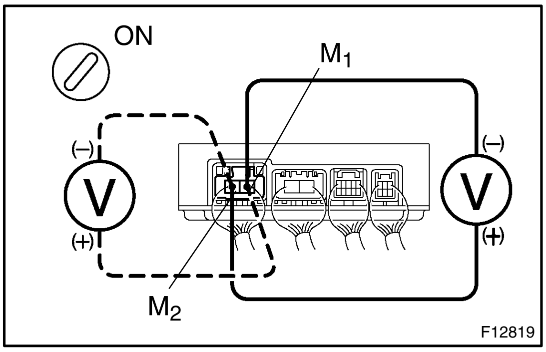
DTC No.	DTC Detecting Condition	Trouble Area
C1521/21	Short circuit of motor terminal or abnormal voltage or current in motor circuit.	• Power steering gear assembly with motor • EMPS ECU
C1522/22		
C1523/23		
C1524/24		

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals M_1 and M_2 of EMPS ECU connector.



PREPARATION:
- Remove the EMPS ECU with connectors still connected.
- Turn the ignition switch ON.

CHECK:
Turn the steering wheel to left and right and measure the voltage between terminals M_1 and M_2 of EMPS ECU connector.

OK:
Voltage: 9 – 14 V

NG | **Check and replace the EMPS ECU.**

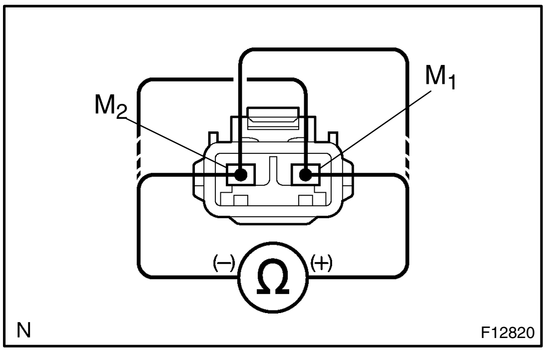
OK

2	**Check for open and short circuit in harness and connector between terminals M_1 and M_2 of EMPS ECU connector (See page IN–40).**

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

OK

3	**Check continuity between terminal M_1 and M_2 of motor connector.**



PREPARATION:

Disconnect the connector from the motor.

CHECK:

Measure the resistance between terminals M_1 and M_2 of motor connector.

OK:

Resistance: 0.1 – 1 Ω

NG | **Check and replace the power steering gear assembly with motor (See page SR–27).**

OK

Check and replace EMPS ECU.

DI7PY–01

DTC	C1531/31–C1533/33, C1555/55	EMPS ECU Circuit Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1531/31	EMPS ECU internal malfunction is detected	EMPS ECU
C1532/32		
C1533/33		
C1555/55		

INSPECTION PROCEDURE

1	Clear DTC (See page DI–410).

↓

2	Recheck EMPS ECU Malfunction.

PREPARATION:
Turn the ignition switch ON.
CHECK:
Turn the steering wheel repeatedly to the right and left.
OK:
DTC is not output.

NG → **Replace EMPS ECU.**

OK

Check multiinformation display circuit (See page BE–92).

DI7PZ–01

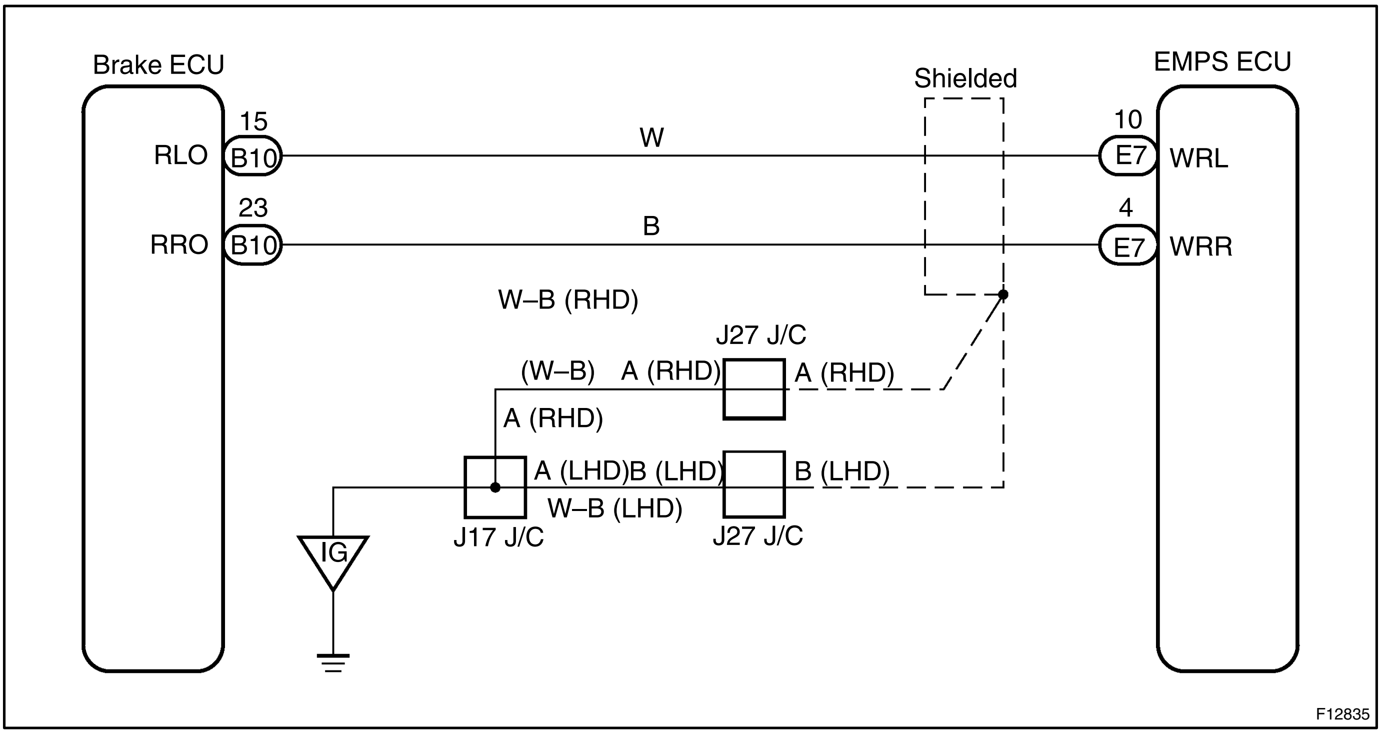
DTC	C1541/41–C1543/43	Speed Sensor Malfunction

DTC	C1571/71, C1572/72	Speed Sensor Malfunction (Test Mode)

CIRCUIT DESCRIPTION

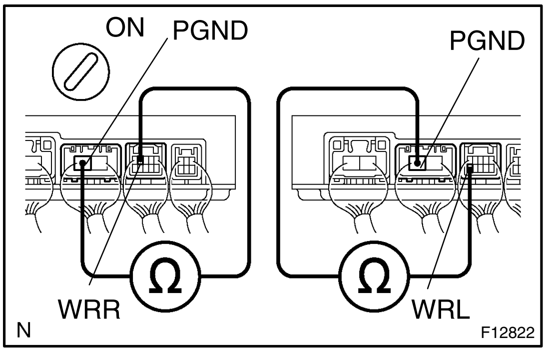
DTC No.	DTC Detecting Condition	Trouble Area
C1541/41 C1542/42 C1543/43	Speed sensor malfunction	• Speed sensor • Brake ECU • EMPS ECU
C1571/71 C1572/72	Speed sensor malfunction (Test mode)	• Right rear or left rear speed sensor • Sensor installation • Right rear or left rear speed sensor rotor • Right rear or left rear speed sensor circuit • Brake ECU • EMPS ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check continuity between terminals WRR and PGND, WRL and PGND of EMPS ECU connector.



PREPARATION:
Remove the EMPS ECU with connectors still connected.
CHECK:
Turn the ignition switch ON and measure the resistance between terminals WRR and PGND, WRL and PGND of EMPS ECU connector.
OK:
Resistance: 1 MΩ or higher

NG → **Check and replace EMPS ECU.**

OK

2	Check for open and short circuit in harness and connector between terminals WRR of EMPS ECU connector and RRO of brake ECU connector, WRL of EMPS ECU and RLO of brake ECU connector (See page IN–40).

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

OK

3	Check the DTC for the ABS with EBD and RBS (See page DI–306).

***1** → **Repair ABS with EBD and RBS control system according to the code output.**

*1: Out put NG code

DI7Q0–01

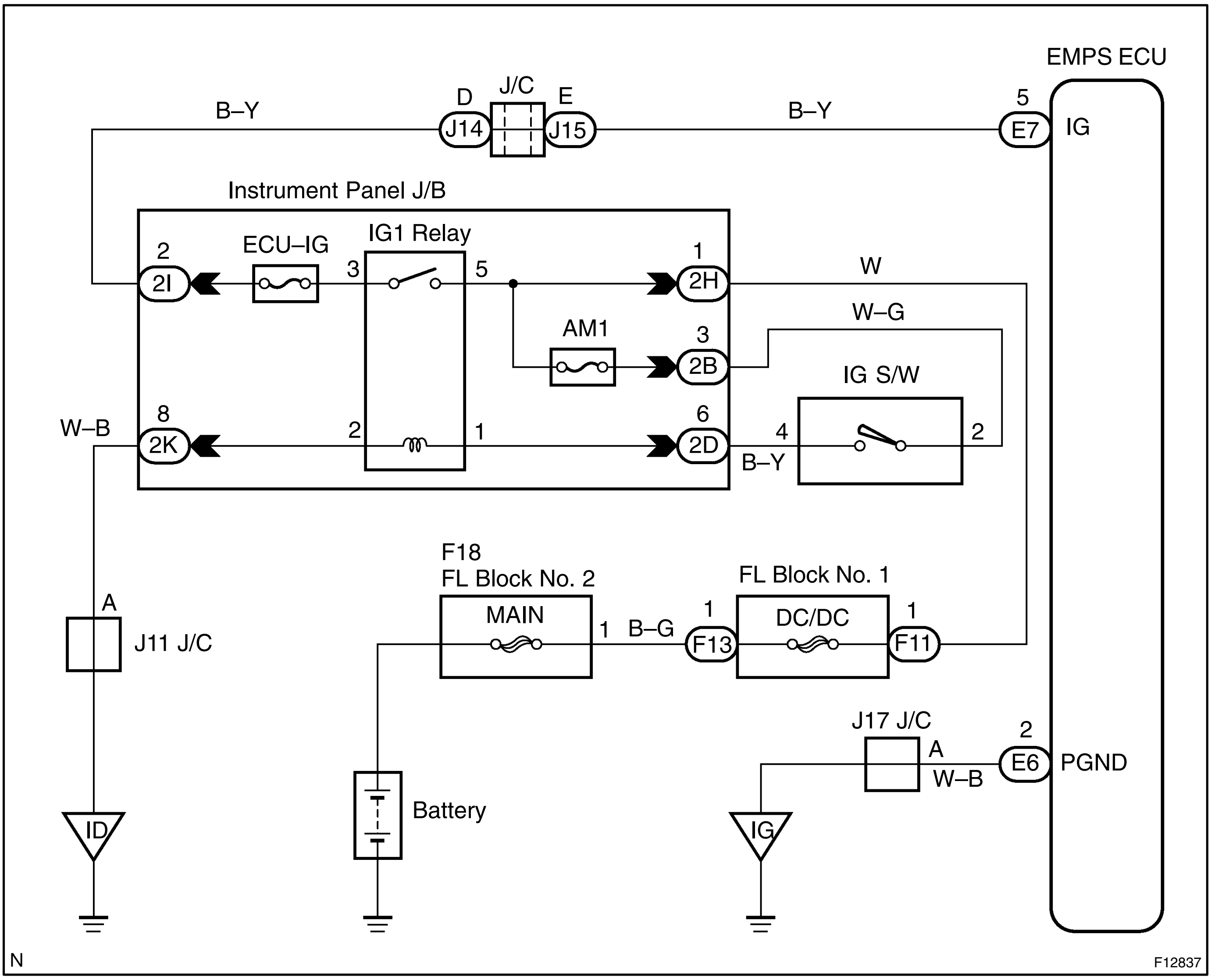
DTC	C1551/51	IG Power Source Circuit Malfunction

CIRCUIT DESCRIPTION

The EMPS ECU identifies ON or OFF status of ignition switch by this circuit.

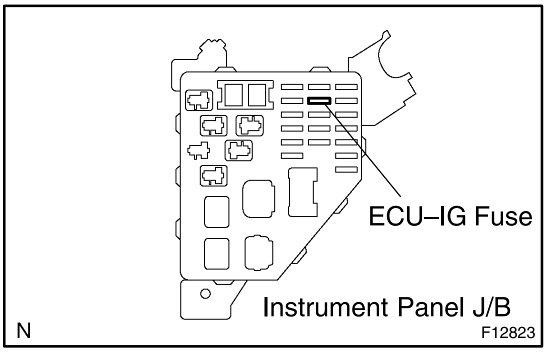
DTC No.	DTC Detecting Condition	Trouble Area
C1551/51	The abnormal IG voltage value which is not within the specification is input to EMPS ECU.	• EMPS ECU • Power source circuit • Charging system

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:
Remove the ECU–IG fuse from the instrument panel J/B.
CHECK:
Check the continuity of the ECU–IG.
OK:
Continuity

NG → **Check for short circuit in all harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

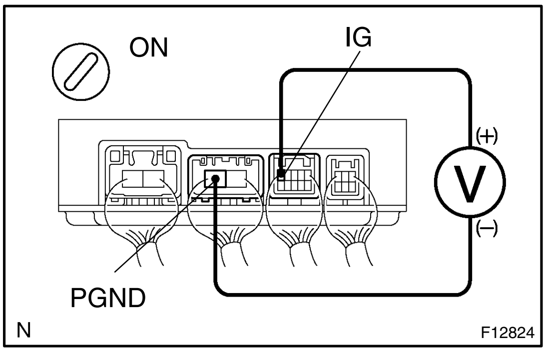
2	**Check that the battery voltage when engine is stopped.**

OK:
Voltage: 9 – 14 V

NG → **Charge or replace battery.**

OK

3	Check voltage between terminals IG and PGND of EMPS ECU connector.

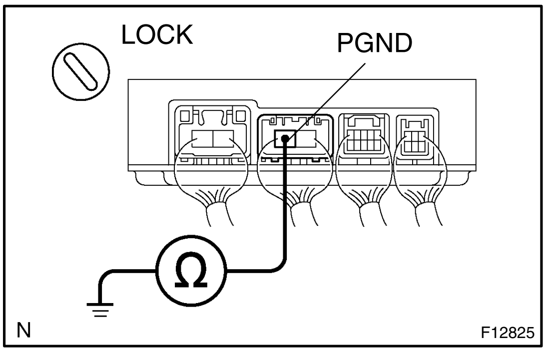


PREPARATION:
Remove the EMPS ECU with connectors still connected.
CHECK:
Turn the ignition switch ON and measure the voltage between terminals IG and PGND of EMPS ECU connector.
OK:
Voltage: 9 – 14 V

NG	Check and replace EMPS ECU.

OK

4	Check continuity between terminals PGND of EMPS ECU connector and body ground.



CHECK:
Measure the resistance between terminals PGND of EMPS ECU connector and body ground.
OK:
Resistance: 1 Ω or less

NG	Repair or replace harness or connector.

OK

Check for open and short circuit harness and connector between EMPS ECU and ECU–IG fuse (See page IN–40).

DI7Q1–01

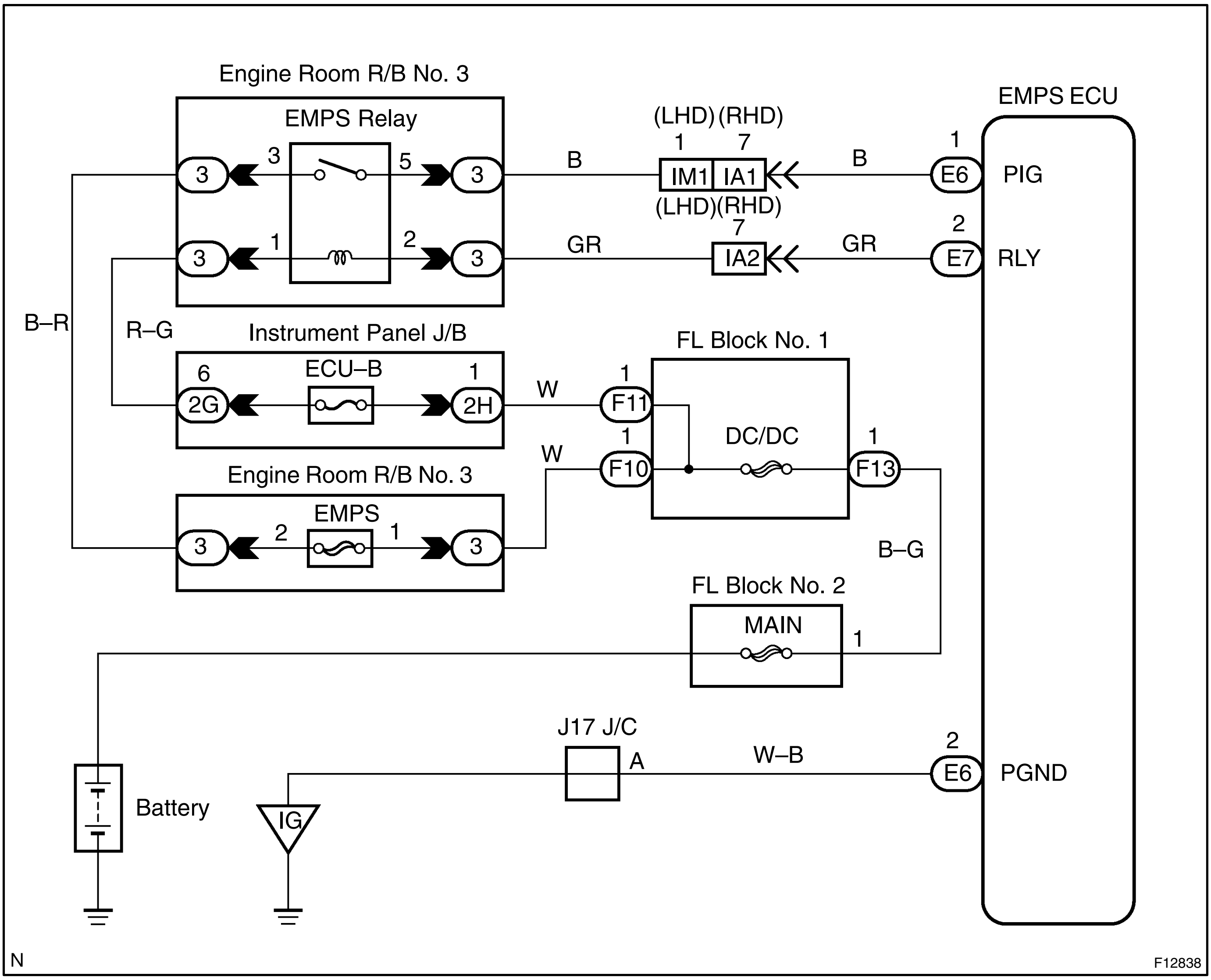
DTC	C1552/52	PIG Power Source Circuit

CIRCUIT DESCRIPTION

When turning ignition switch ON, battery is supplied to terminal PIG of EMPS ECU by EMPS relay operation.

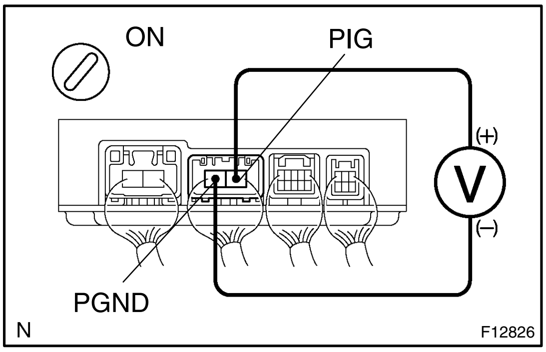
DTC No.	DTC Detecting Condition	Trouble Area
C1552/52	The abnormal motor power source voltage value which is not within the specification is input to EMPS ECU.	• EMPS ECU • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals PIG and PGND of EMPS ECU connector.

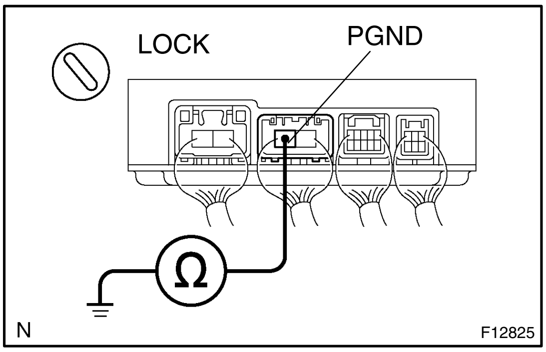


PREPARATION:
Remove the EMPS ECU with connectors still connected.
CHECK:
Turn the ignition switch ON and measure the voltage between terminals PIG and PGND of EMPS ECU connector.
OK:
Voltage: 9 – 14 V

NG → **Check and replace EMPS ECU.**

OK

2	Check continuity between terminals PGND of EMPS ECU connector and body ground.

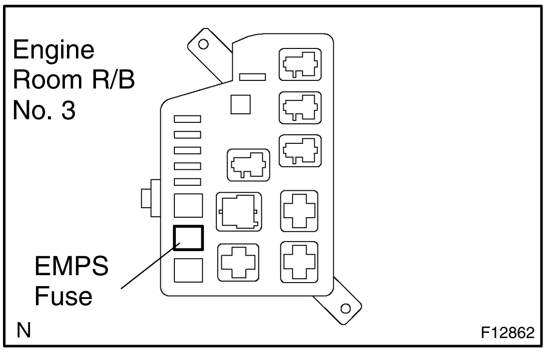


CHECK:
Measure the resistance between terminals PGND of EMPS ECU connector and body ground.
OK:
Resistance: 1 Ω or less

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

OK

3	**Check EMPS fuse.**



PREPARATION:
Remove the EMPS fuse from engine room R/B No. 3.
CHECK:
Check continuity of EMPS fuse.
OK:
Continuity

NG → **Check for short circuit in harness and all components connected to EMPS fuse (See attached wiring diagram).**

OK

Check for open and short circuit in harness and connector between EMPS ECU and battery (See page IN–40).

DI7Q2–01

DTC	C1553/53	When resetting voltage, vehicle is being driven

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1553/53	ECU internal malfunction	EMPS ECU

Fail safe function:
When this code is identified, stop the steering assist.

INSPECTION PROCEDURE

HINT:

- In case the ECU detects that the ignition switch turns ON – OFF – ON while driving and starting the system, DTC C1553/53 is output.
- Stop the vehicle and start the system by turning the ignition switch OFF – ON. Then DTC 1553/53 will not be output.

1	**Check output DTC C1553/53 when turning the ignition switch from OFF to ON (See page DI–410).**

YES → **Check and replace the EMPS ECU.**

NO ↓

No problem.

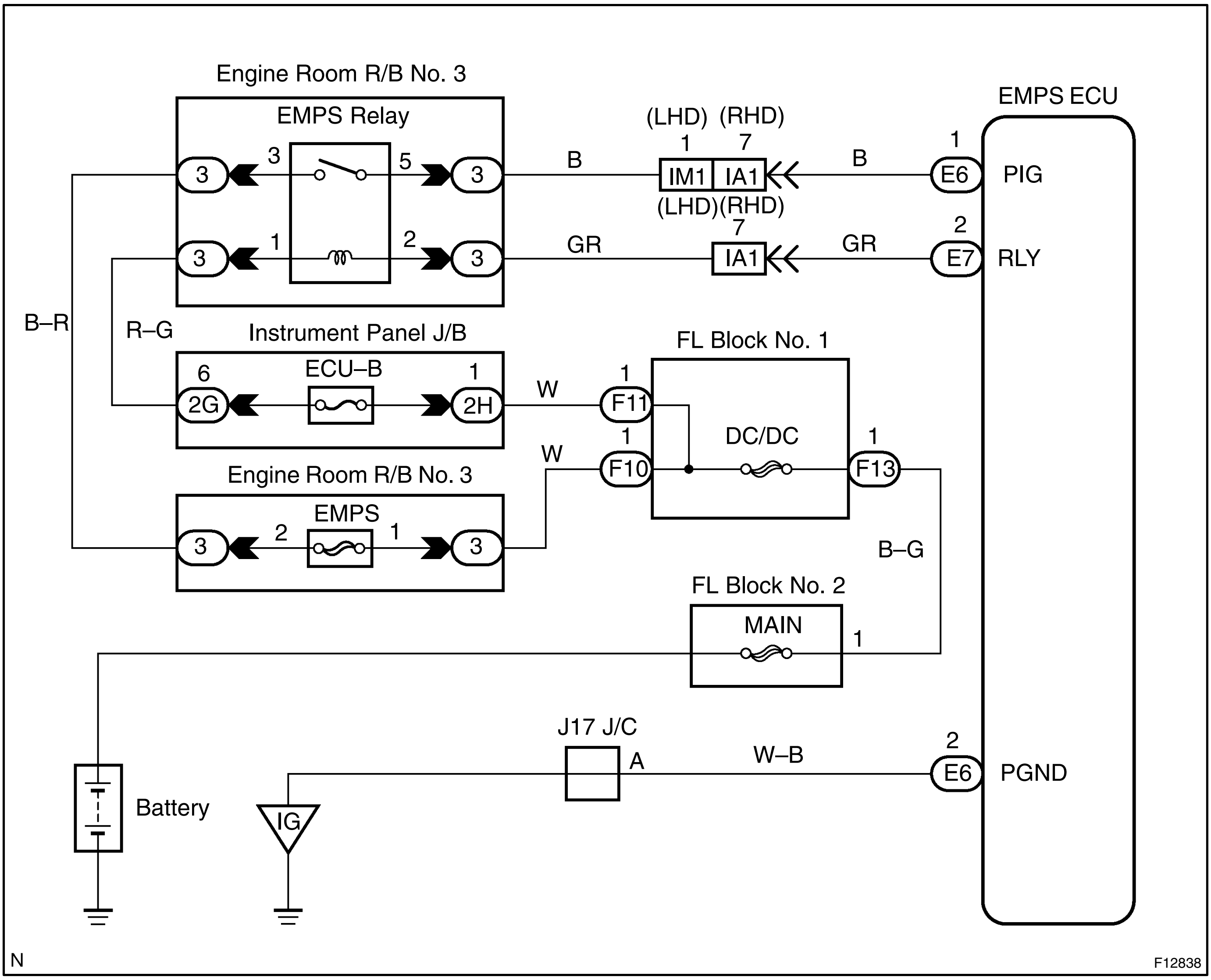
DI7Q3–01

DTC	C1554/54	EMPS Relay Circuit

CIRCUIT DESCRIPTION

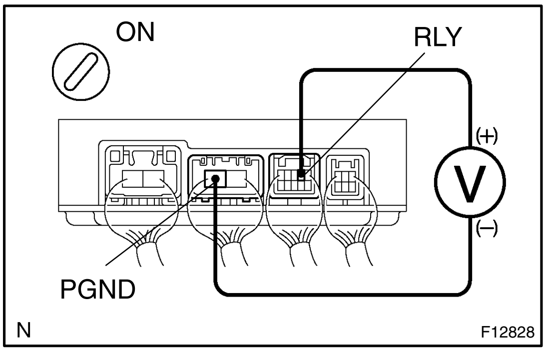
DTC No.	DTC Detecting Condition	Trouble Area
C1554/54	Open or short circuit of EMPS relay circuit is detected	• EMPS relay • EMPS ECU • EMPS relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals RLY and PGND of EMPS ECU connector.

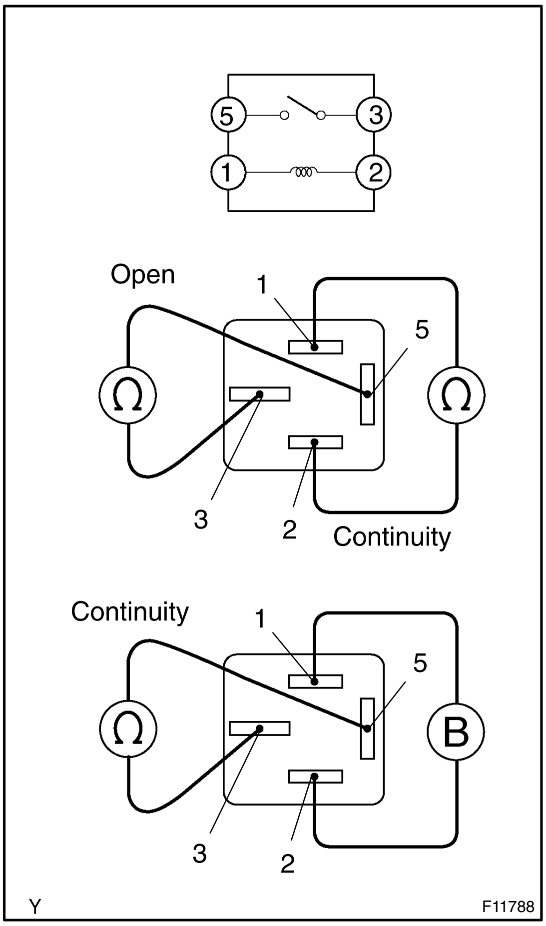


PREPARATION:
Remove the EMPS ECU with connectors still connected.
CHECK:
Turn the ignition switch ON and measure the voltage between terminals RLY and PGND of EMPS ECU connector.
OK:
Voltage: 9 – 14 V

OK → **Check or replace the EMPS ECU.**

NG

2	Check EMPS relay.



PREPARATION:
Remove the EMPS relay from the engine room R/B No. 3.
CHECK:
Check the continuity between each terminal of the EMPS relay.
OK:

Terminals 1 and 2	Continuity (Reference value 80 Ω)
Terminals 3 and 5	Open

CHECK:
(a) Apply battery voltage between terminals 1 and 2.
(b) Check the continuity between the terminals.
OK:

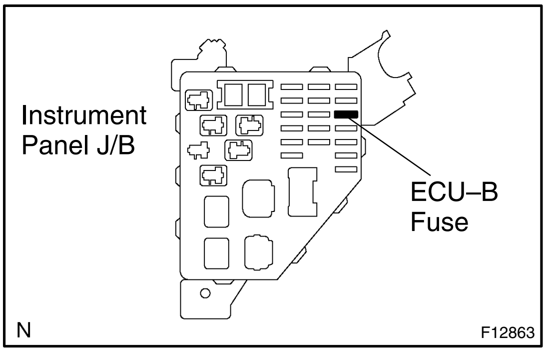
Terminals 3 and 5	Continuity

NG

Replace EMPS relay.

OK

3	**Check ECU–B fuse.**



PREPARATION:
Remove the ECU–B fuse from instrument panel J/B.

CHECK:
Check the continuity of ECU–B fuse.

OK:
Continuity

NG

Check for short circuit in harness and all components connected to ECU–B fuse (See attached wiring diagram).

OK

Check for open and short circuit harness and connector between EMPS ECU and battery (See page IN–40).

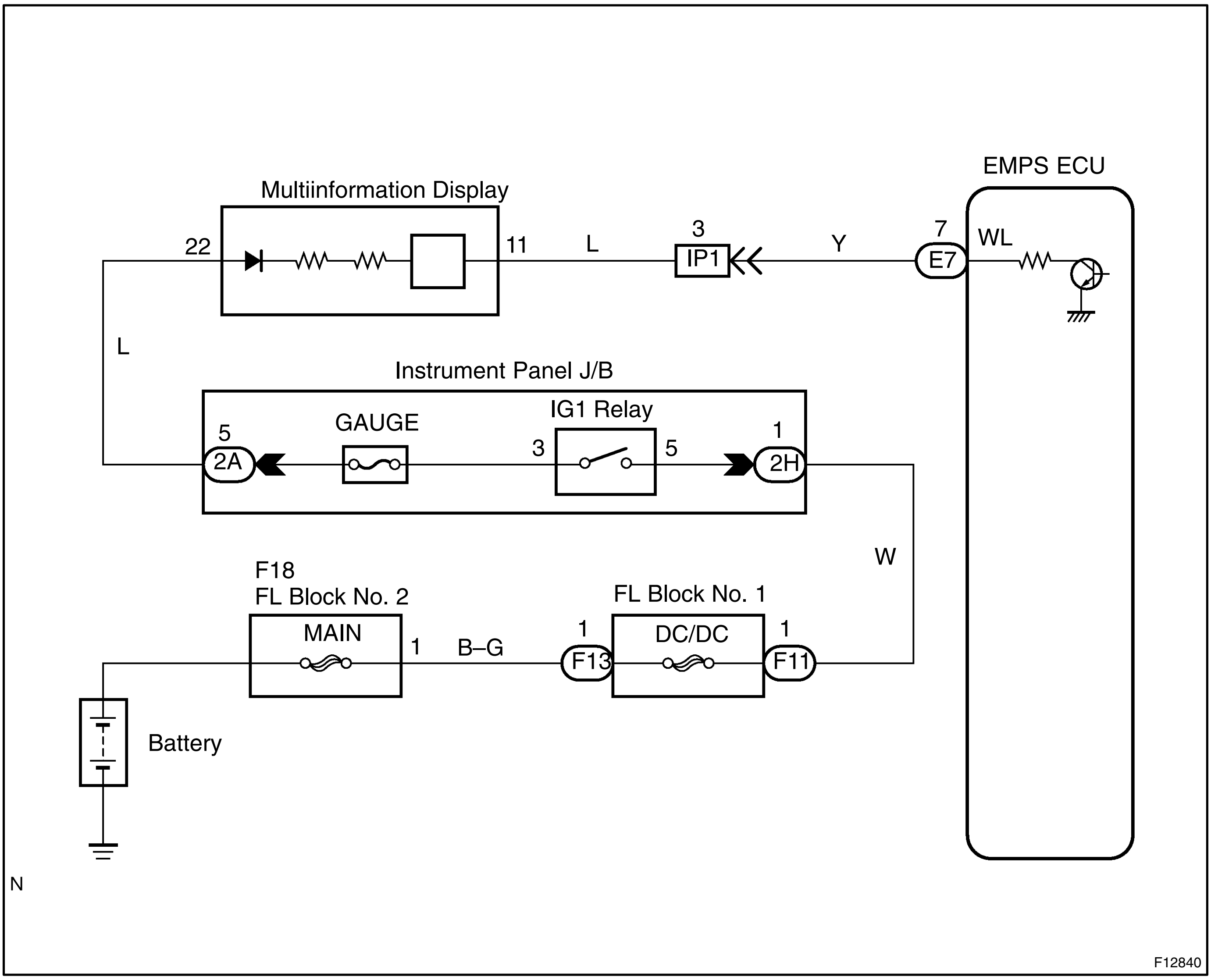
DI7Q4–01

DTC	C1556/56	PS Warning Light Circuit

CIRCUIT DESCRIPTION

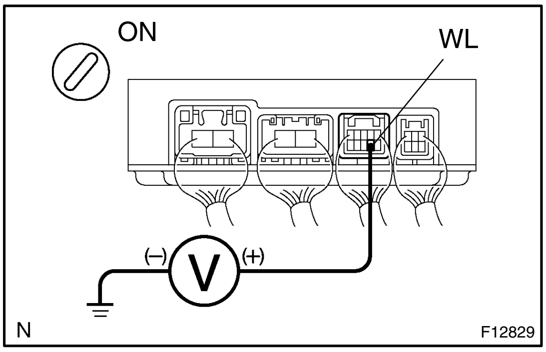
DTC No.	DTC Detecting Condition	Trouble Area
C1556/56	There is a malfunction is PS warning light circuit	• Multiinformationdisplay • EMPS ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals WL of EMPS ECU connector and body ground.



PREPARATION:
Remove the EMPS ECU with connectors still connected.
CHECK:
Turn the ignition switch ON and measure the voltage between terminals WL of EMPS ECU connector and body ground.
OK:
Voltage: 9 – 14 V

NG → **Check and replace EMPS ECU.**

OK

2	Check for open and short circuit in harness and connector between EMPS ECU and multiinformation display (See page IN–40).

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

OK

Check multiinformation display circuit (See page BE–92).

DI7Q5–01

DTC	C1557/57	Memory of Overheat Prevention Control

DTC	C1558/58	Memory of Voltage Drop at Motor Power Supply

DTC	C1559/59	Memory of Continuous Control Under High Load

CIRCUIT DESCRIPTION

- These DTC do not indicated trouble.
- DTC C1557/57 and C1558/58 :
  Steering wheel operation is felt hard to handle when this detected, it is not EMPS failure.
  Check the AUXILIARY BATTERY.
- DTC C1559/59:
  EMPS ECU records this code in some case, for example, when steering wheel operation under high load is repeated, there is no failure in EMPS and it does not affect driving afterward.

DTC No	Detection Item	Trouble Area
C1557/57	Perform the overheat prevention control.	–
C1558/58	Drop the voltage of motor power source.	
C1559/59	Steering wheel operation under high load is repeated.	

DI7Q7–01

DTC	Always ON	Malfunction in EMPS ECU

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	There is a malfunction in the EMPS ECU internal circuit.	• Power source circuit • EMPS ECU • PS warning light circuit

1	Is DTC output?

Check DTC on page DI–416.

YES → **Repair circuit indicated by output code.**

NO ↓

2	Is normal code displayed?

YES → **Check and replace EMPS ECU.**

NO ↓

3	Does PS warning light goes off?

YES → **Check for open or short circuit in harness and connector between ECU–IG fuse and EMPS ECU (See page IN–40).**

NO ↓

4	**Check battery voltage.**

PREPARATION:
Start the engine.
CHECK:
Check the battery voltage.
OK:
Voltage: 9 – 14 V

NG	**Check and repair charging system.**

OK

5	**Check operation of PS warning light.**

PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the EMPS ECU.
(c) Turn the ignition switch ON.
CHECK:
Check the PS warning light goes OFF.

OK	**Check and replace EMPS ECU.**

NG

Check for short circuit in harness and connector between multiinformation display and EMPS ECU,multiinformation display and DLC3 (See page IN–40).

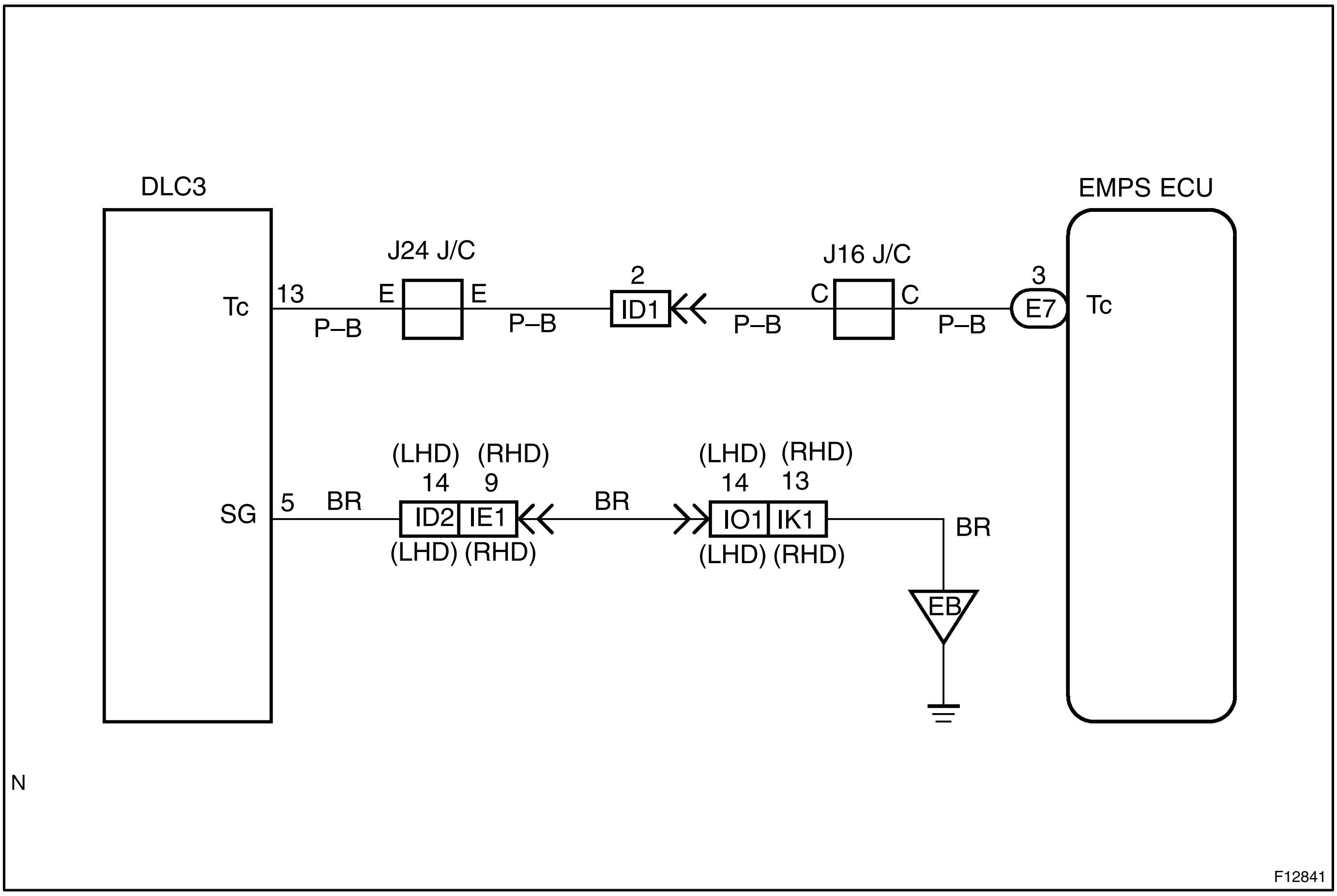
DI7Q8–01

Tc Terminal Circuit

CIRCUIT DESCRIPTION

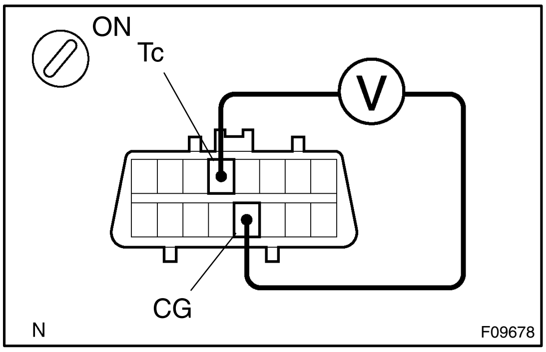
Connecting terminals Tc and CG of the DLC3 causes the EMPS ECU to display the DTC by flashing the PS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and CG of DLC3.



CHECK:
Turn the ignition switch ON and measure the voltage between terminals Tc and CG of the DLC3.
OK:
Voltage: 9 – 14 V

OK → **If PS warning light does not blink even after Tc and CG are connected, EMPS ECU may be defective.**

NG

2	Turn the ignition switch OFF, and check for open and short circuit in harness and connector between EMPS ECU and DLC3, and DLC3 and body ground (See page IN–40).

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

OK

Check and replace EMPS ECU.

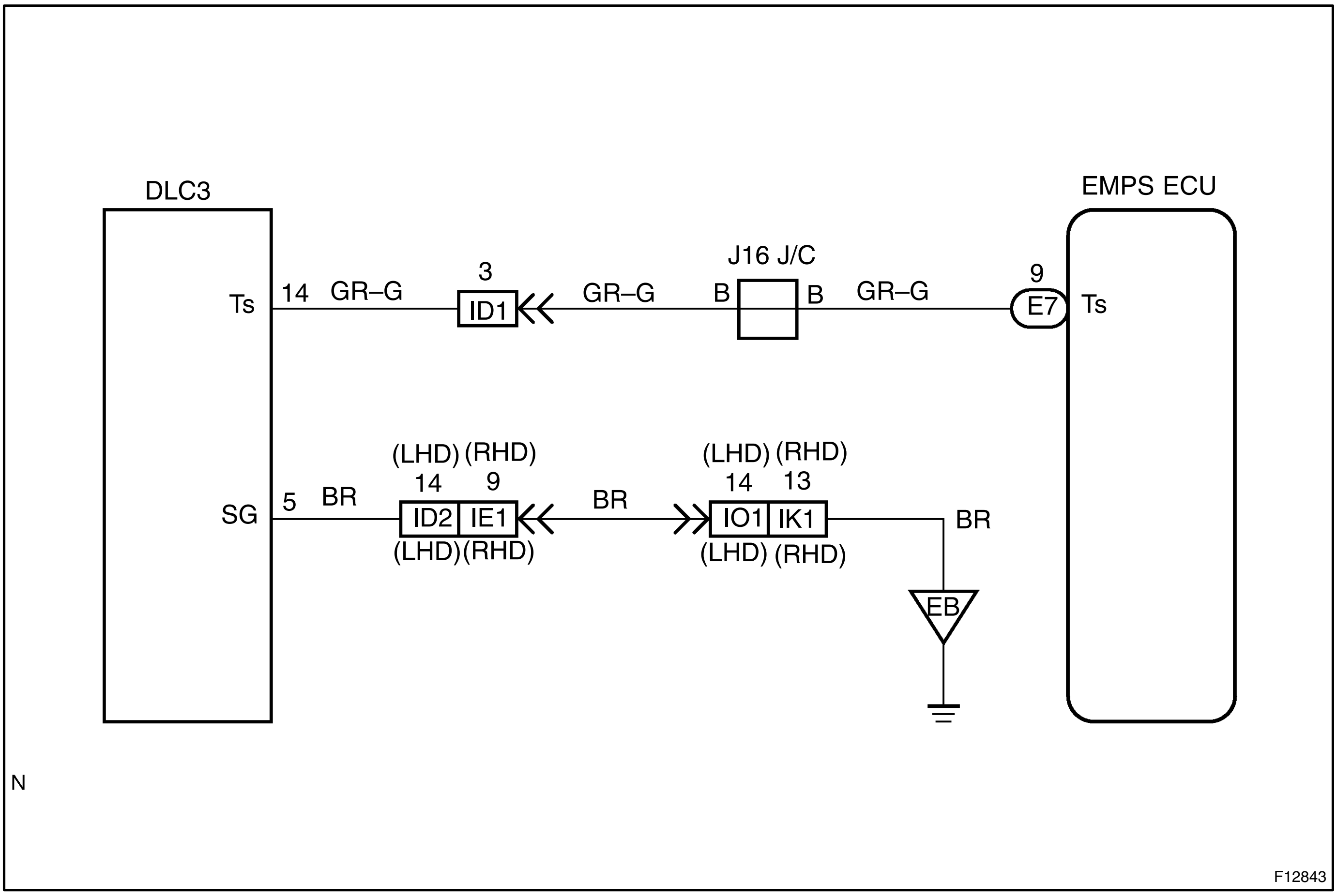
DI7Q9–01

Ts Terminal Circuit

CIRCUIT DESCRIPTION

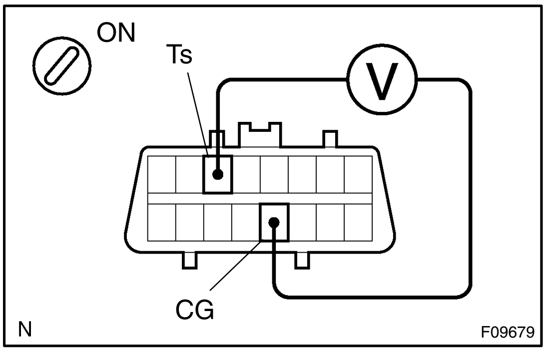
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected by the DTC check.
Connecting terminals Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and CG of DLC3.



CHECK:

Turn the ignition switch ON and measure the voltage between terminals Ts and CG of the DLC3.

OK:

Voltage: 9 – 14 V

OK → **If PS warning light repeats turning ON and OFF even after Ts and CG are connected, EMPS ECU may be defective.**

NG

2	Turn the ignition switch OFF, and check for open and short circuit in harness and connector between EMPS ECU and DLC3, DLC3 and body ground (See page IN–40).

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

OK

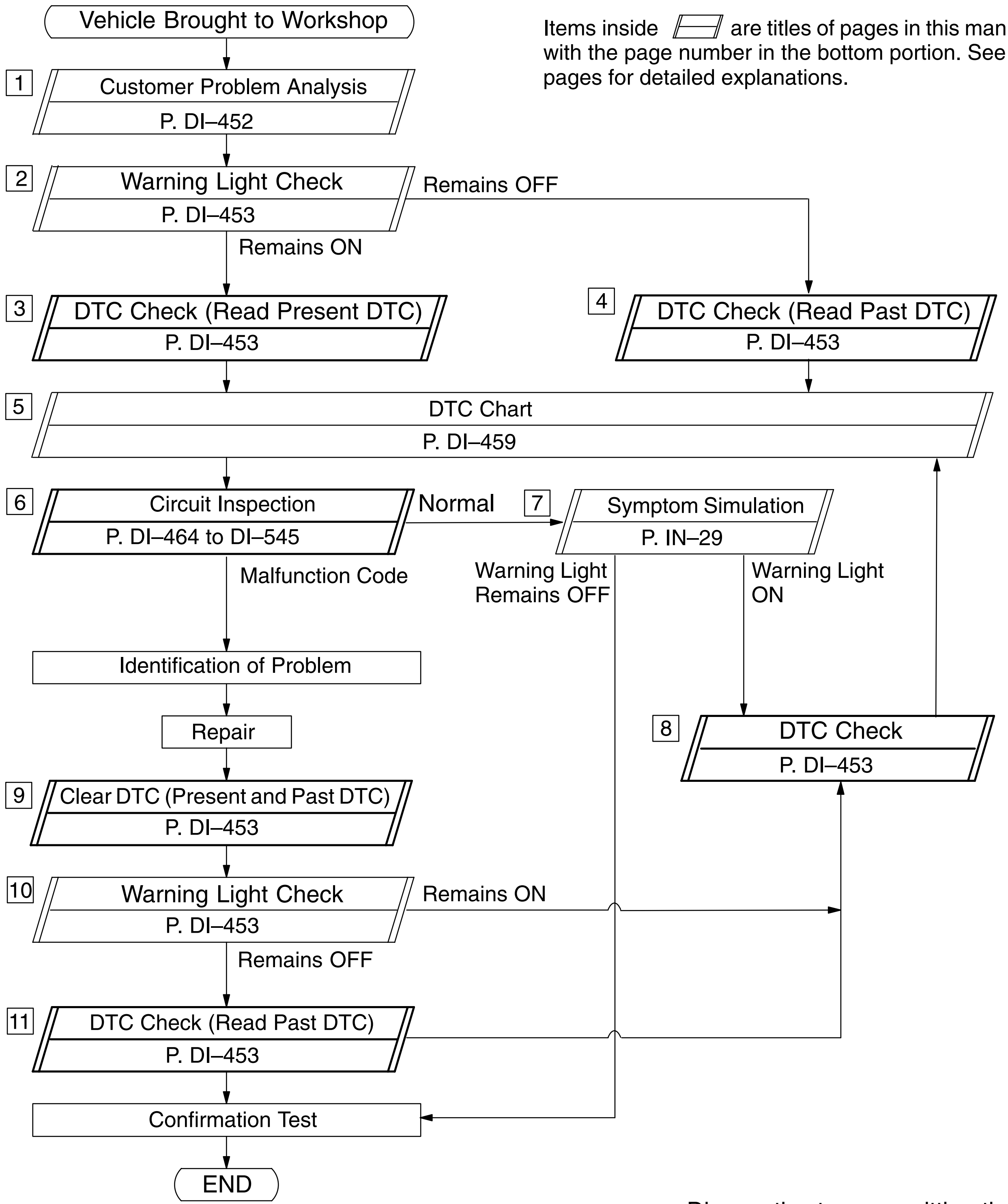
Check and replace EMPS ECU.

SUPPLEMENTAL RESTRAINT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI6OW–02

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



Step 3, 4, 6, 8, 9, 11 : Diagnostic steps permitting the use of the hand–held tester.

DI6OX–01

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	

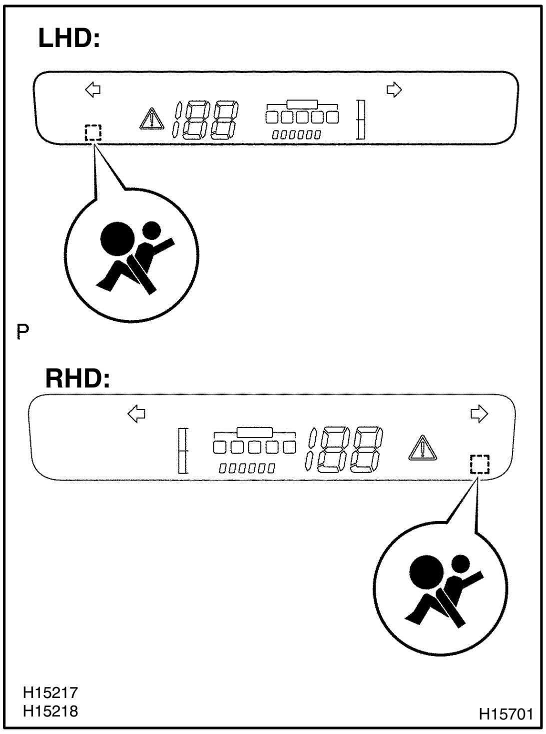
Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

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.]

DI6OY–06

PRE–CHECK



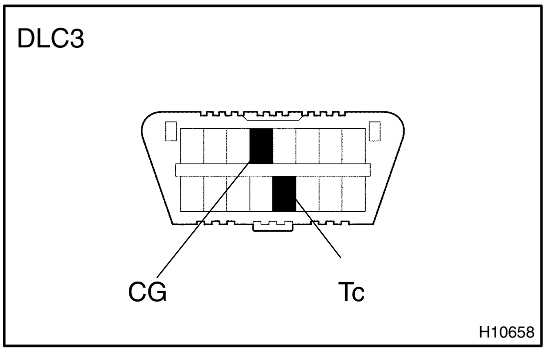
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ON position and check that the SRS warning light lights up.

(b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at 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–541.



2. DTC CHECK (Using diagnosis check wire)

(a) Present troubles codes:

Output the DTC.

(1) Turn the ignition switch to the ON position and wait for approx. 20 seconds.

(2) Using SST, connect terminals Tc and CG of the DLC3.

SST 09843–18020

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

(b) Past troubles codes:

Output the DTC.

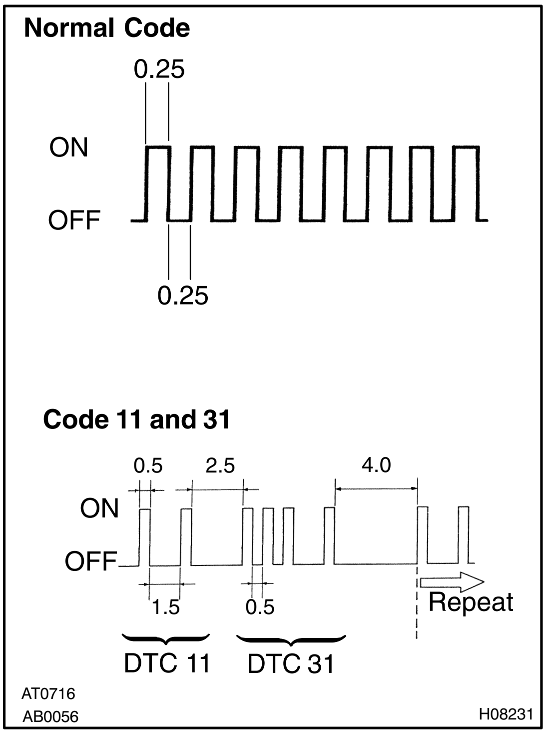
(1) Using service wire, connect terminals Tc and CG of the DLC3.

SST 09843–18020

(2) Turn the ignition switch to the ON position and wait for approx. 20 seconds.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

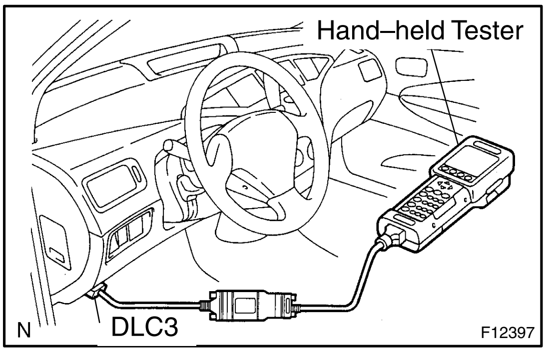


(c) Read the DTC.
Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- Normal code indication
  The light will blink 2 times per second.
- Malfunction code indication
  The first blinking output indicates the first digit of a 2–digit DTC. After a 1.5–second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5–second pause between each code. After all the codes have been output, there will be a 4.0–second pause and they will all be repeated.
HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page DI–545.



3. DTC CHECK (Using hand–held tester)
(a) Hook up the hand–held tester to the DLC3.
(b) Read the DTCs by following the prompts on the tester screen.
HINT:
Please refer to the hand–held tester operator's manual for further details.

4. DTC CLEARANCE (Not using service wire)
When the ignition switch is turned off, the diagnostic trouble code is cleared.
HINT:
DTC might not be cleared by turning the ignition switch OFF. In this case, proceed to the next step.

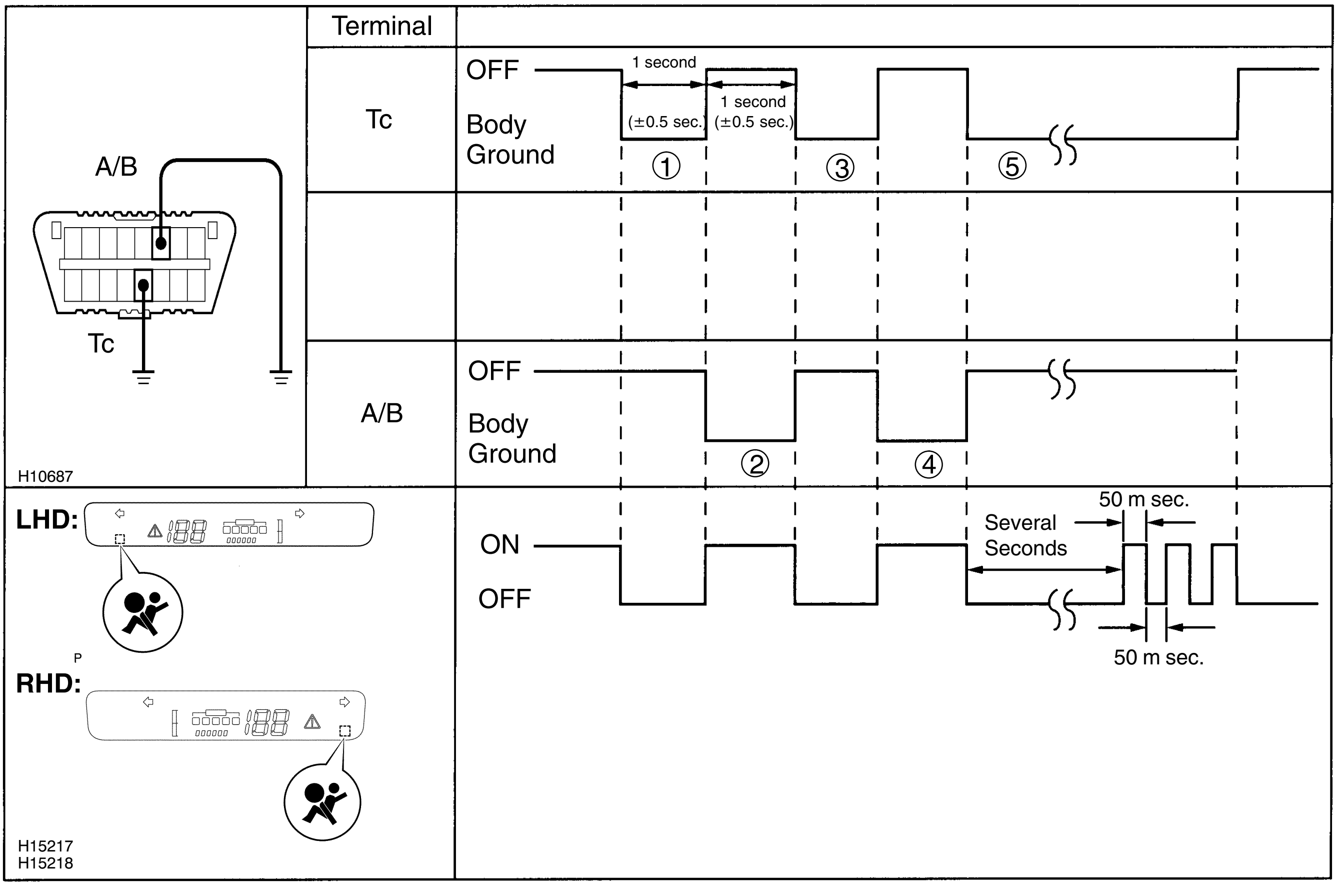
5. DTC CLEARANCE (Using service wire)
(a) Connect the 2 service wires to terminals Tc and A/B of DLC3.
(b) Turn the ignition switch to ON and wait for approx. 6 seconds.

(c) Starting with the Tc terminal, ground alternately terminal Tc and terminal A/B twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remain grounded.

HINT:

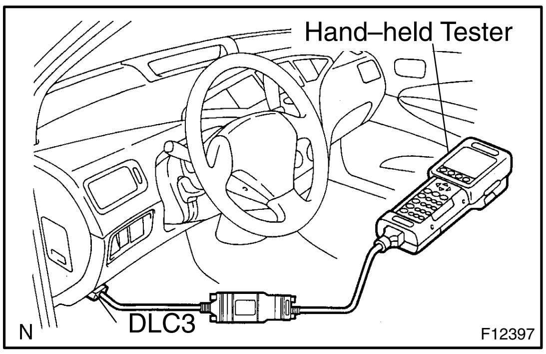
When alternately grounding terminals Tc and A/B, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

If DTCs are not cleared, repeat the above procedure until the codes are cleared.



H15702

(d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 – m sec. cycle to indicate the codes which have been cleared.



F12397

6. **DTC CLEARANCE (Using hand–held tester)**

(a) Hook up the hand–held tester to the DLC3.

(b) Clear the DTCs by following the prompts on the tester screen.

HINT:

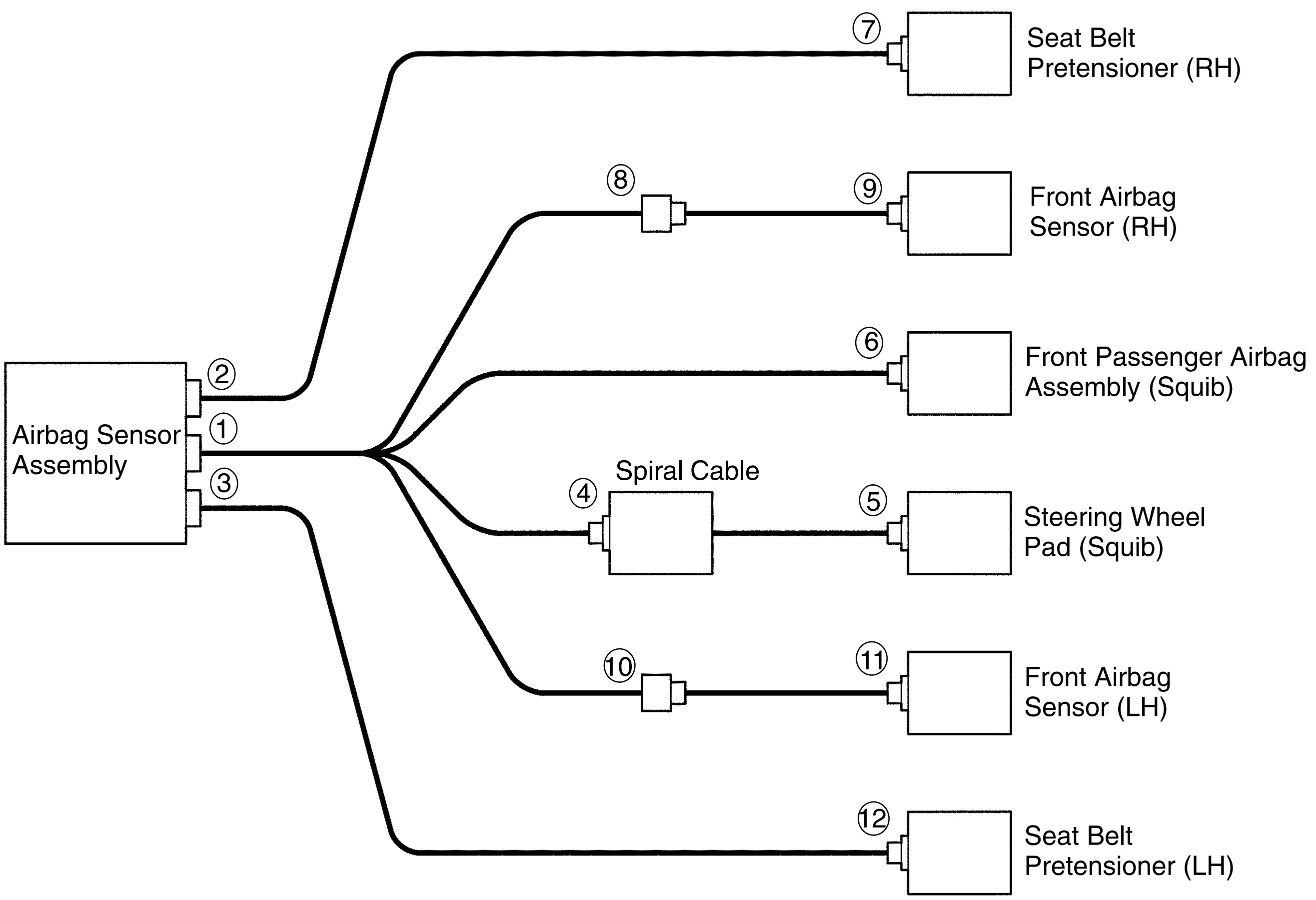
Please refer to the hand–held tester operation's manual for further details.

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

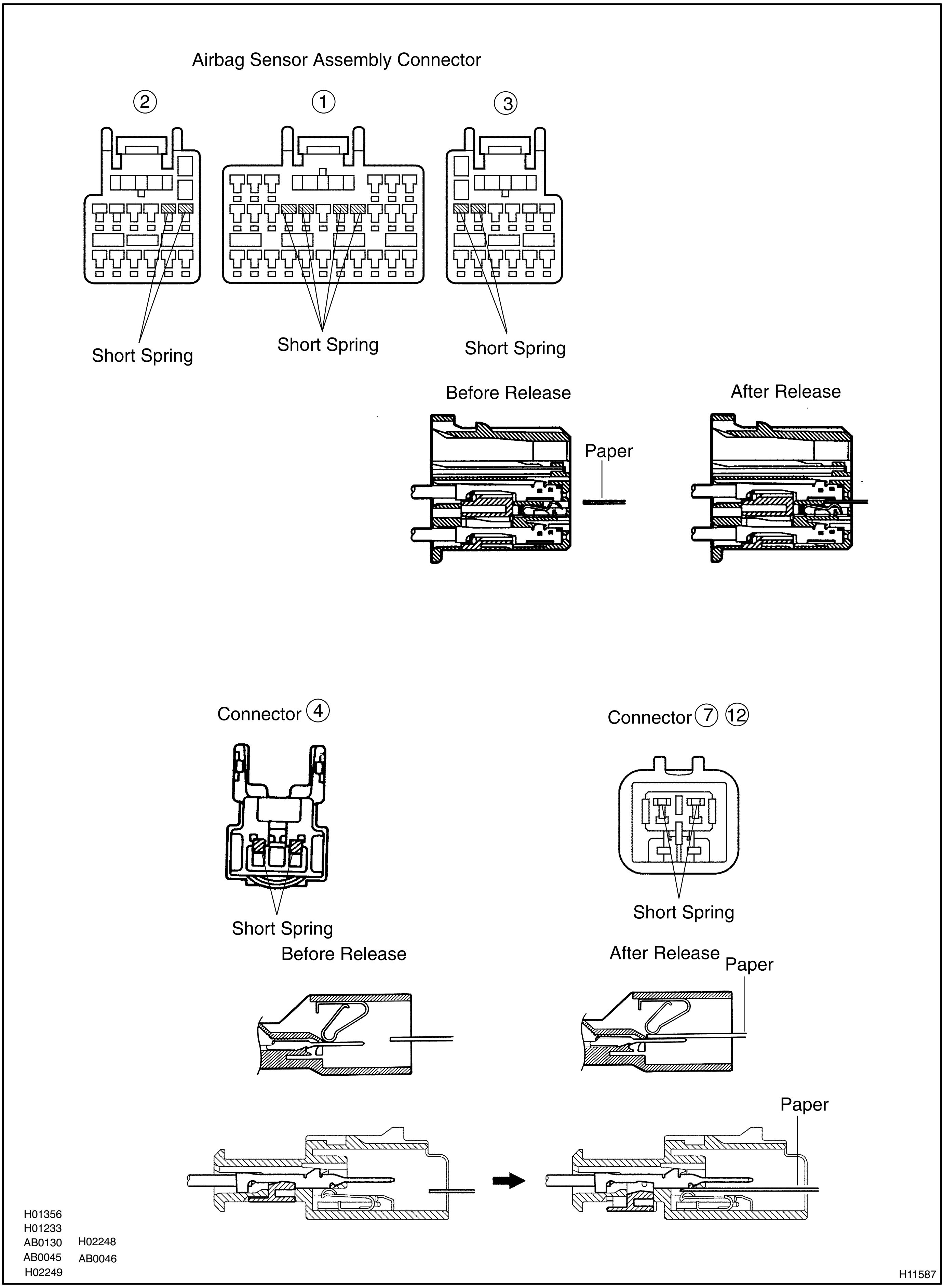
An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

CAUTION:
Never release the airbag activation prevention mechanism on the squib 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)
Front Airbag Sensor (RH)
Front Passenger Airbag Assembly (Squib)
Airbag Sensor Assembly
Spiral Cable
Steering Wheel Pad (Squib)
Front Airbag Sensor (LH)
Seat Belt Pretensioner (LH)
1
2
3
4
5
6
7
8
9
10
11
12
H14955

P


Airbag Sensor Assembly Connector
2
1
3
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Connector 4
Connector 7 12
Short Spring
Short Spring
Before Release
After Release
Paper
Paper
H01356
H01233
AB0130
AB0045
H02249
H02248
AB0046
H11587

DI6OZ–05

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–464)	• Short in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI–469)	• Open in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI–473)	• Short in D squib circuit (to ground)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI–477)	• Short in D squib circuit (to B+)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI–481)	• Short in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI–485)	• Open in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0107/51 (DI–488)	• Short in P squib circuit (to ground)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0108/52 (DI–491)	• Short in P squib circuit (to B+)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0130/63 (DI–494)	• Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0131/64 (DI–498)	• Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0132/61 (DI–501)	• Short in P/T squib (RH) circuit (to ground)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0133/62 (DI–504)	• Short in P/T squib (RH) circuit (to B+)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0135/73 (DI–507)	• Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0136/74 (DI–511)	• Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink

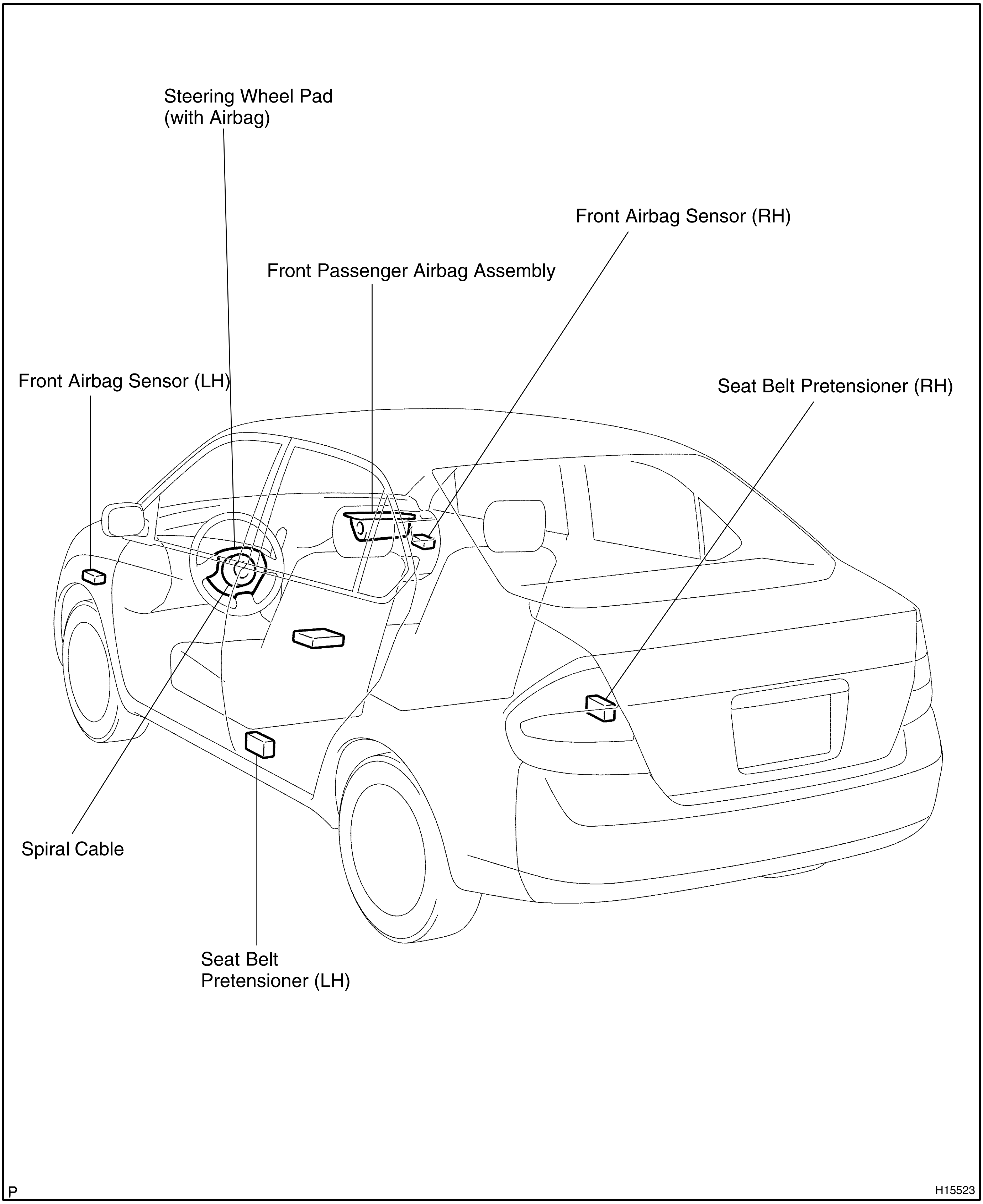
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0137/71 (DI–514)	• Short in P/T squib (LH) circuit (to ground)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0138/72 (DI–517)	• Short in P/T squib (LH) circuit (to B+)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B1100/31 (DI–520)	• Airbag sensor assembly malfunction	• Airbag sensor assembly	ON
B1156/B1157/ 15 (DI–522)	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Airbag sensor assembly • Instrument panel wire harness • Engine room No. 2 wire harness	ON
B1158/B1159/ 16 (DI–530)	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Instrument panel wire harness • Engine room main wire harness	ON
Normal (DI–538)	• System normal	–	OFF
	• Voltage source drop	• Battery • Airbag sensor assembly	ON

HINT:

- When the SRS warning light remains lit up and the DTC is the normal code, this means a voltage source drops.
  This malfunction is not stored in memory by the airbag sensor assembly and if the power source voltage returns to normal, the SRS warning light will automatically go out.
- When 2 or more codes are indicated, the codes will be displayed in numeral order starting from the lowest numbered code.
- If a code not listed on the chart is displayed, the airbag sensor assembly is faulty.

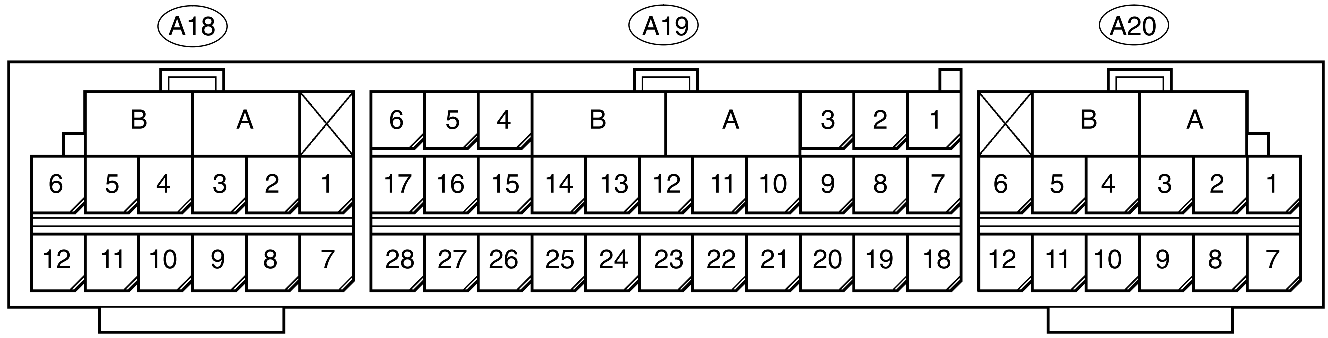
DI6P0–05

PARTS LOCATION



DI6P1–06

TERMINALS OF ECU



No.	Symbol	Terminal Name
A	–	Electrical Connector Check Mechanism
B	–	Electrical Connector Check Mechanism
A19 – 3	LA	SRS Warning Light
A19 – 5	IG2	Power Source
A19 – 6	ACC	Power Source
A19 – 9	+SR	Front Airbag Sensor (RH)
A19 – 10	P+	Squib (Passenger)
A19 – 11	P–	Squib (Passenger)
A19 – 12	SIL	Diagnosis
A19 – 13	D–	Squib (Driver)
A19 – 14	D+	Squib (Driver)
A19 – 15	+SL	Front Airbag Sensor (LH)
A19 – 19	Tc	Diagnosis
A19 – 20	–SR	Front Airbag Sensor (RH)
A19 – 23	GSW2	ECM
A19 – 26	–SL	Front Airbag Sensor (LH)
A19 – 27	E1	Ground
A19 – 28	E2	Ground
A18 – 1	PL–	Squib (Seat Belt Pretensioner, LH)
A18 – 2	PL+	Squib (Seat Belt Pretensioner, LH)
A20 – 5	PR+	Squib (Pretensioner, RH)
A20 – 6	PR–	Squib (Pretensioner, RH)

DI6P2–01

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
• With the ignition switch in ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.	• SRS warning light circuit	DI–541
• SRS warning light is always lit up even when ignition switch is in the LOCK position.		
• With the ignition switch in ON position, the SRS warning light does not light up.		
• DTC is not displayed.	• Tc terminal circuit	DI–545
• SRS warning light is always lit up at the time of DTC check procedure.		
• DTC is displayed without Tc and E1 terminal connection.		

DI6P3–05

CIRCUIT INSPECTION

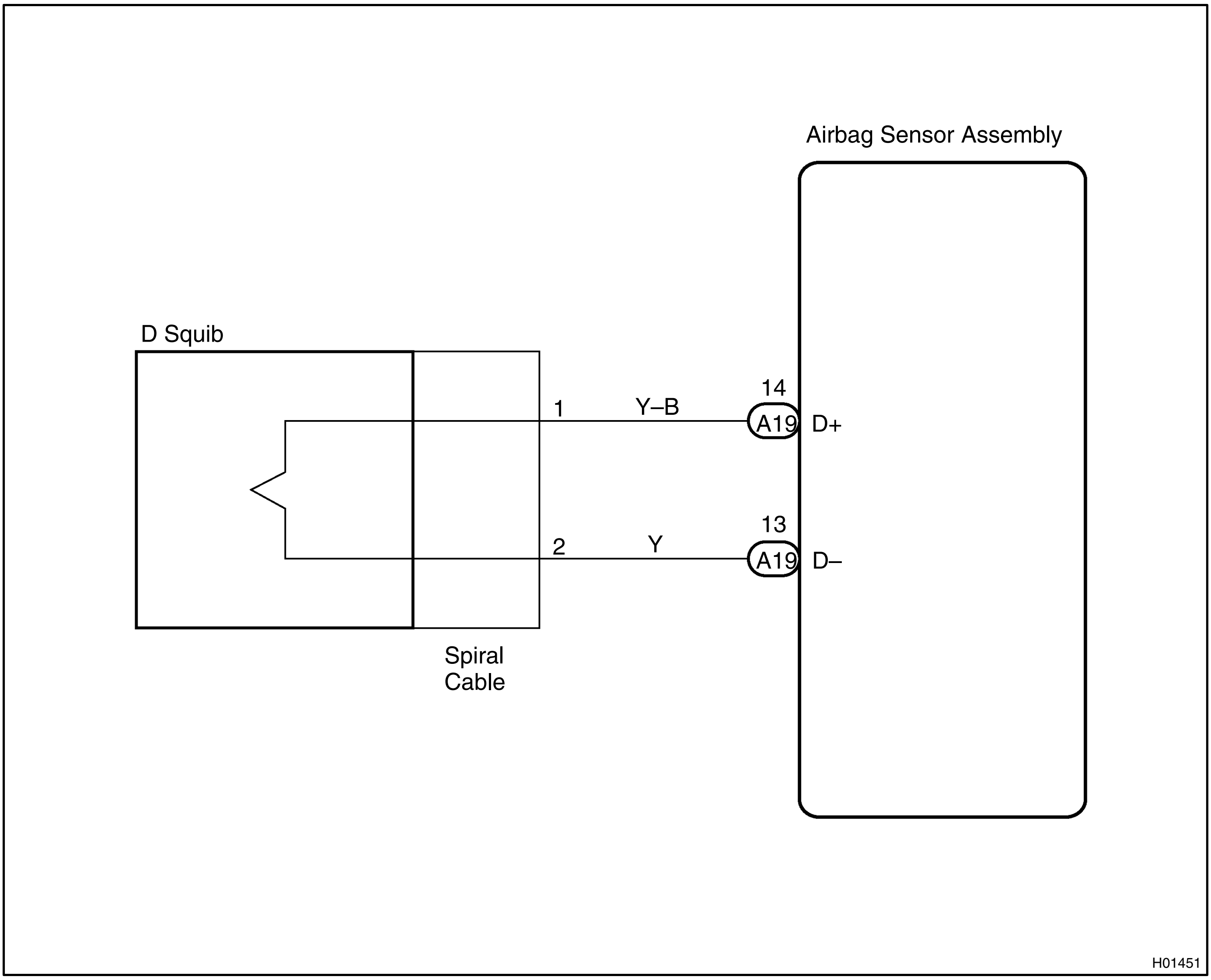
DTC	B0100/13	Short in D Squib Circuit

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

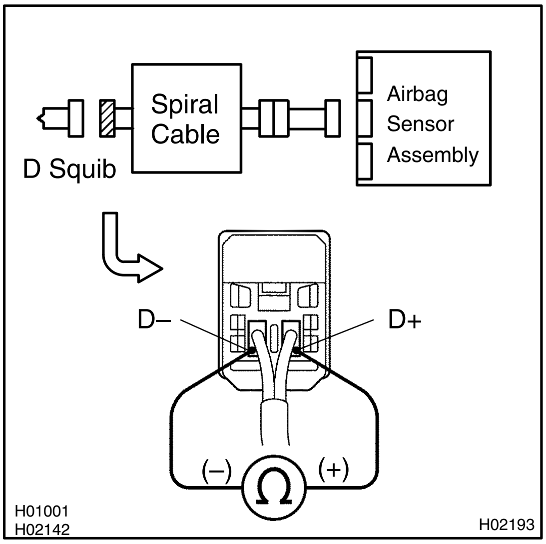
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check D squib circuit.**



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable (See page DI–453).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

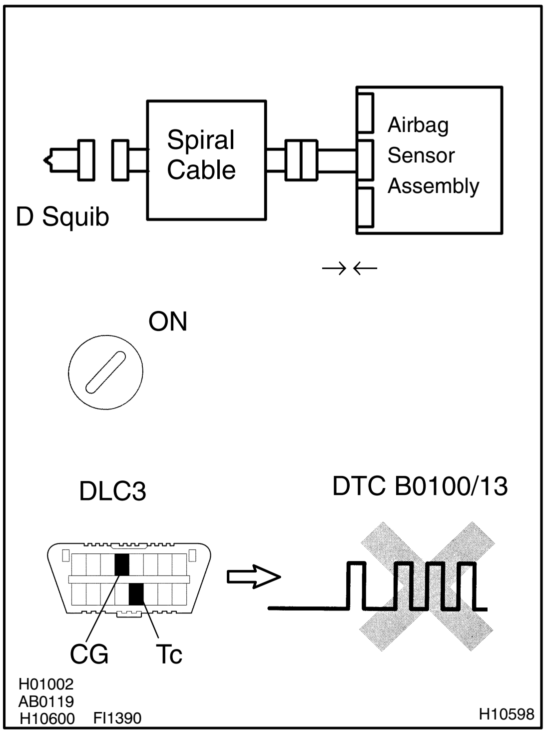
OK:

Resistance: 1 MΩ or Higher

NG	**Go to step 5.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0100/13 is not output.

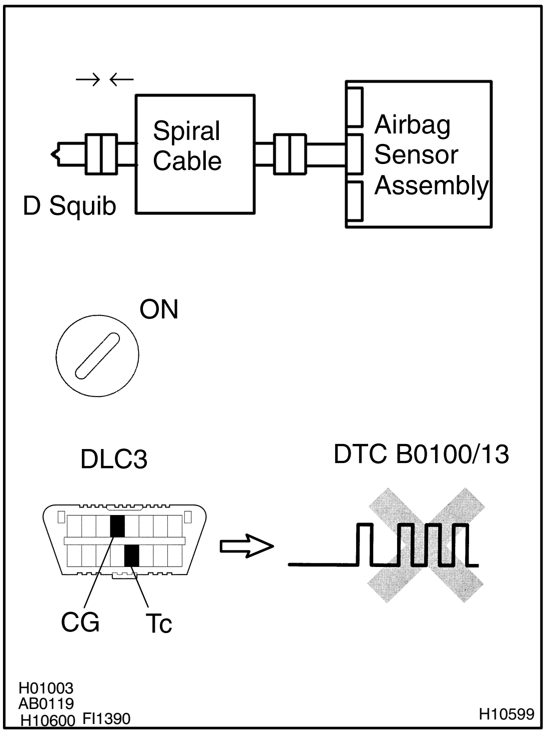
HINT:

Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check D squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn the ignition switch to ON, and wait at least for 20 seconds.
(c) Clear the DTC stored in memory (See page DI–453).
(d) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn the ignition switch to ON, and wait at least for 20 seconds.
(f) Check the DTC (See page DI–453).

OK:

DTC B0100/13 is not output.

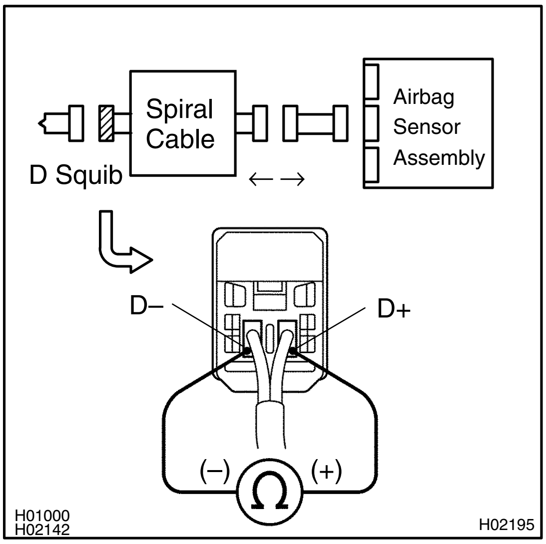
HINT:
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG	**Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	**Check spiral cable.**



PREPARATION:

(a) Disconnect the connector between the airbag sensor assembly and the spiral cable.

(b) Release the airbag activation prevention mechanism of the spiral cable connector on the airbag sensor assembly side (See page DI–453).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

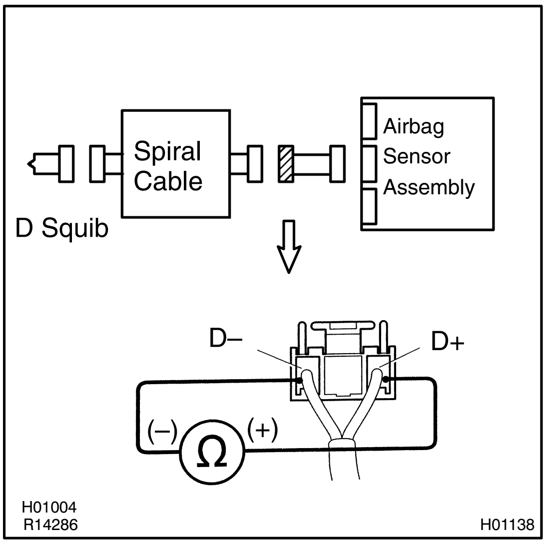
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace spiral cable.**

OK

6	**Check harness between airbag sensor assembly and spiral cable.**



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable (See page DI–453).

CHECK:

For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6P4–03

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

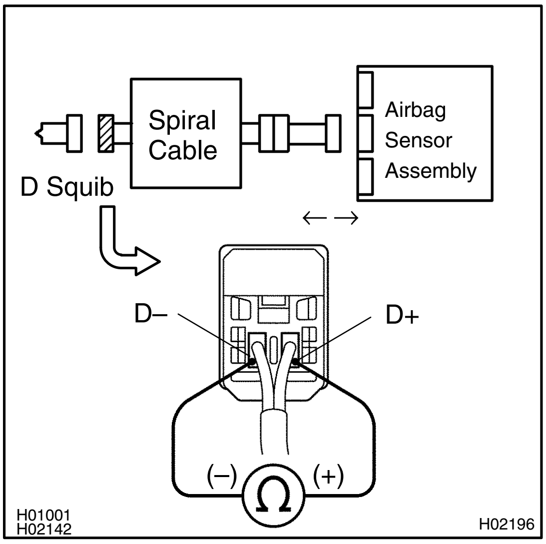
WIRING DIAGRAM

See page DI–464.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check D squib circuit.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

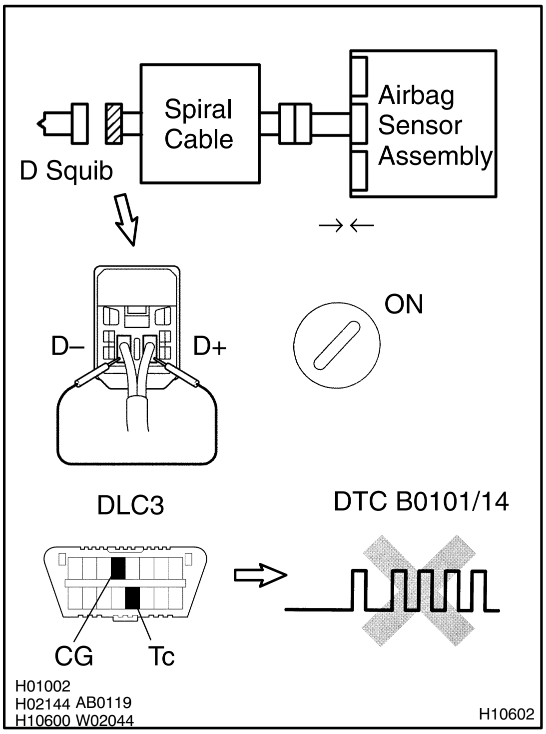
OK:

Resistance: Below 1 Ω

NG	Go to step 5.

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0101/14 is not output.

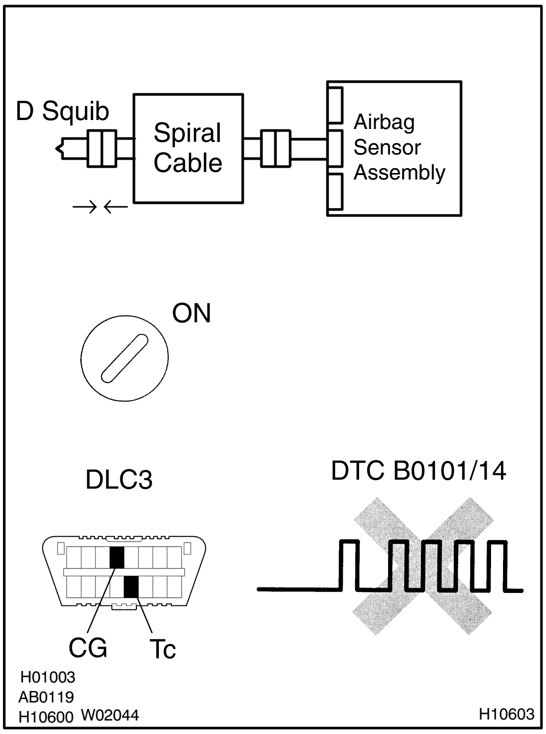
HINT:

Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check D squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0101/14 is not output.

HINT:

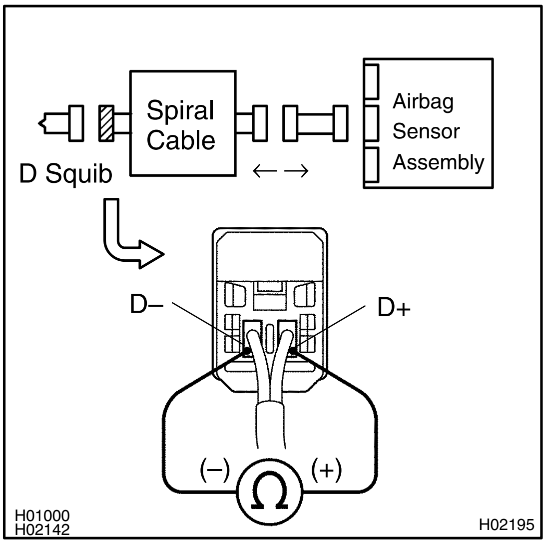
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG	**Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	**Check spiral cable.**



PREPARATION:
Disconnect the connector between the airbag sensor assembly and the spiral cable.

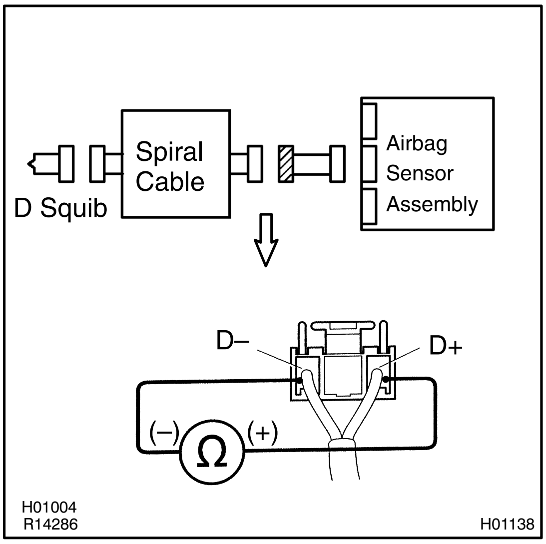
CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

OK:
Resistance: Below 1 Ω

NG	**Repair or replace spiral cable.**

OK

6	**Check harness between airbag sensor assembly and spiral cable.**



CHECK:
For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D–.

OK:
Resistance: Below 1 Ω

NG	**Repair or replace harness or connector between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6P5–03

DTC	B0102/11	Short in D Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0102/11 is recorded when a ground short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	• Short circuit in D squib wire harness (to ground) • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

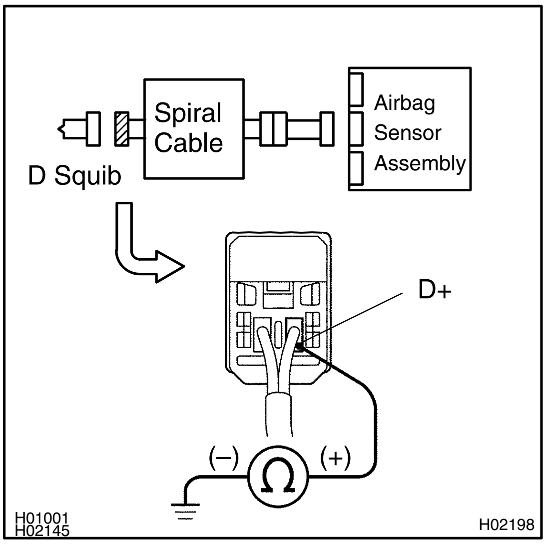
WIRING DIAGRAM

See page DI–464.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check D squib circuit.

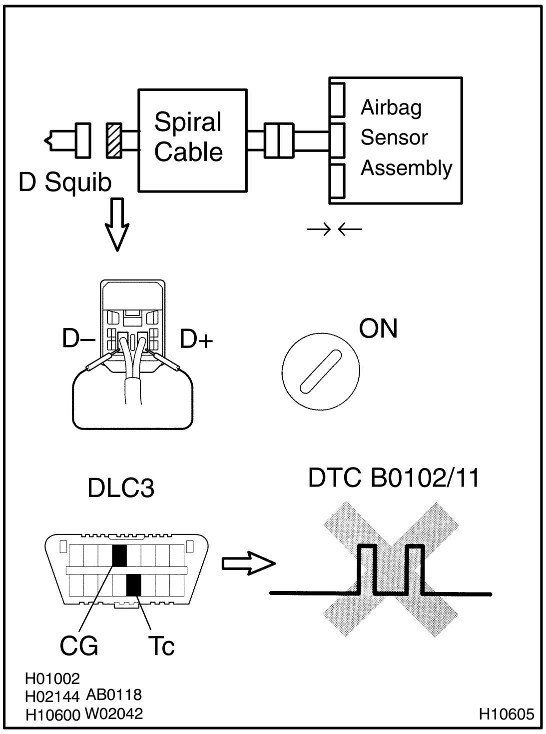


CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG	Go to step 5.

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0102/11 is not output.

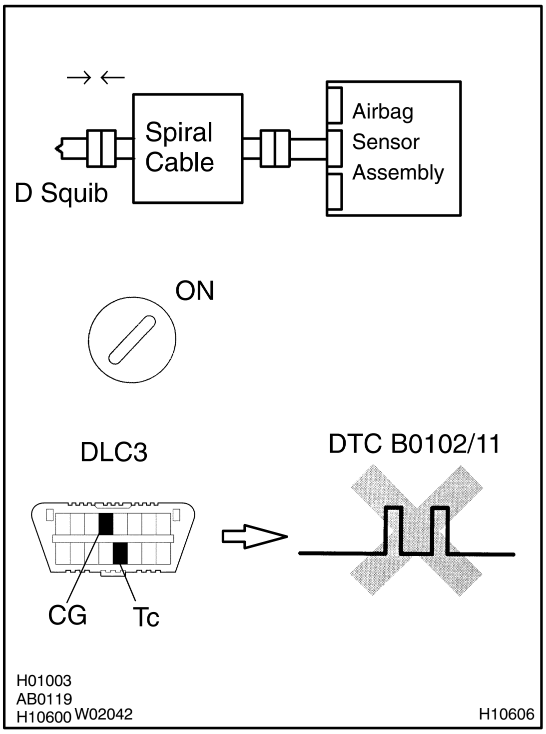
HINT:

Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	**Check D squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0102/11 is not output.

HINT:

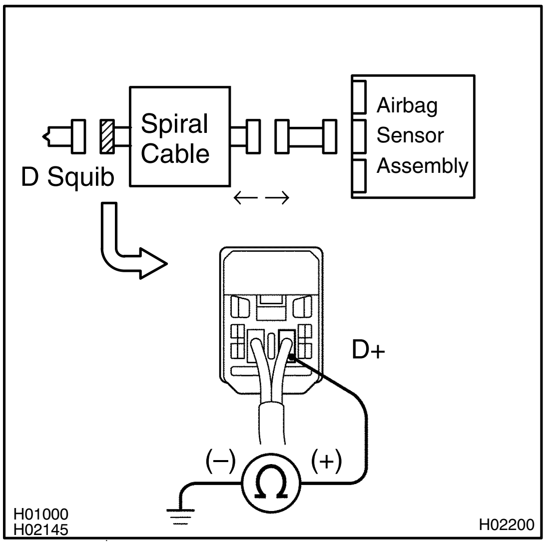
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

NG	**Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	**Check spiral cable.**



PREPARATION:

Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:

For the connector (on the spiral cable side) between the steering wheel pad and the spiral cable, measure the resistance between D+ and body ground.

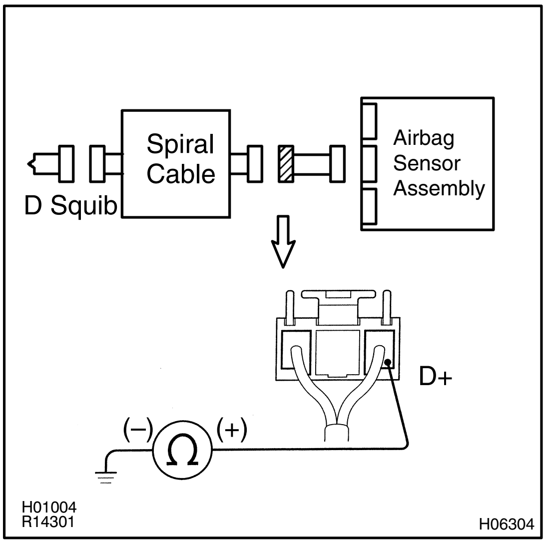
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace spiral cable.**

OK

6	**Check harness between airbag sensor assembly and spiral cable.**



CHECK:

For the connector (on the spiral cable side) between the spiral cable and the airbag sensor assembly, measure the resistance between D+ and body ground.

OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6P6–03

DTC	B0103/12	Short in D Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0103/12 is recorded when a B+ short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	• Short circuit in D squib wire harness (to B+) • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

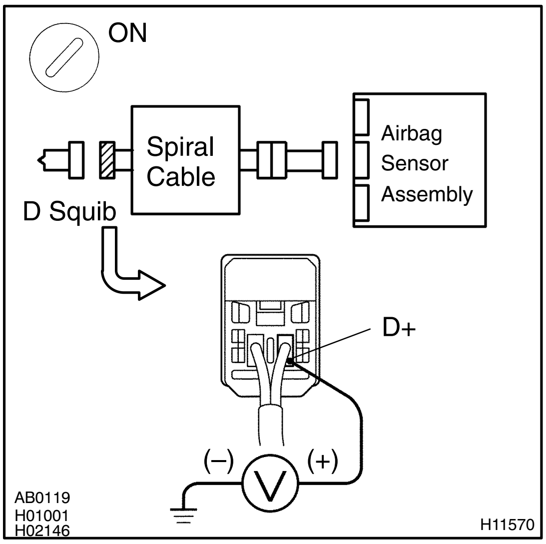
WIRING DIAGRAM

See page DI–464.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check D squib circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

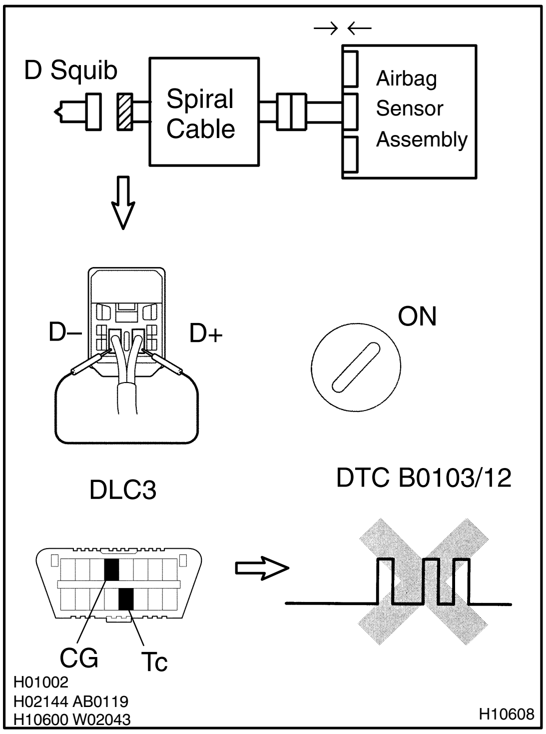
OK:

Voltage: 0 V

NG	Go to step 5.

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.
(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

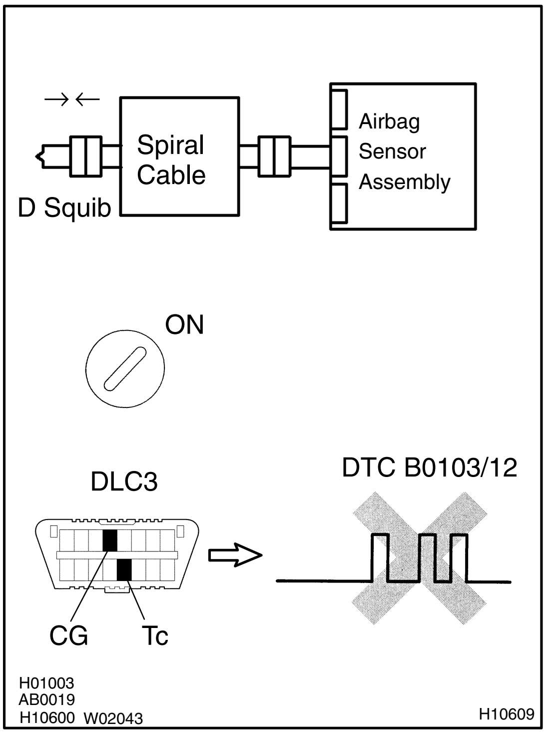
DTC B0103/12 is not output.

HINT:
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	**Check D squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0103/12 is not output.

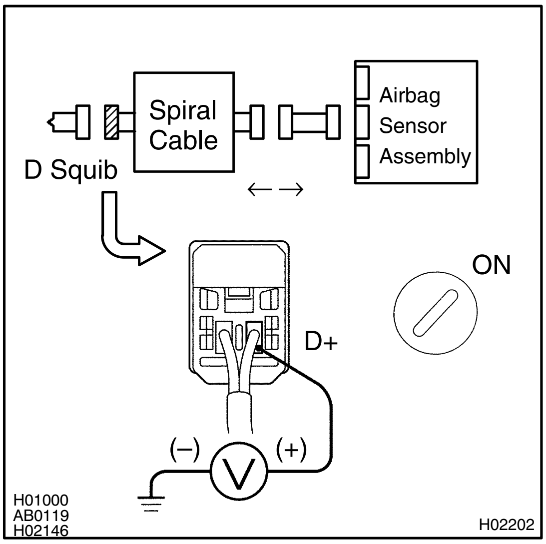
HINT:
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

NG	**Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	**Check spiral cable.**



PREPARATION:
(a) Turn the ignition switch to LOCK.
(b) Disconnect the connector between the airbag sensor assembly and the spiral cable.

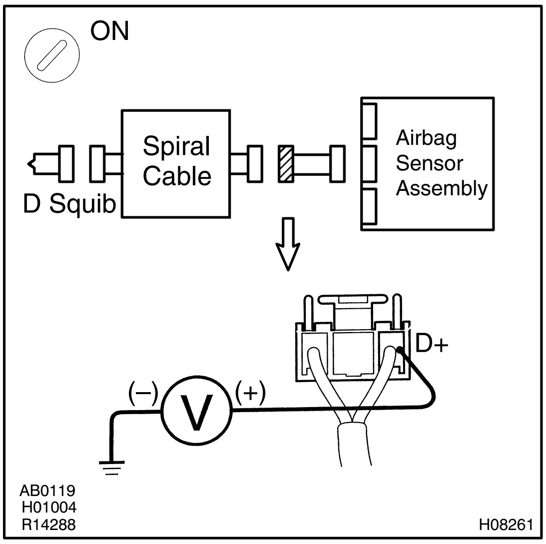
CHECK:
(a) Turn the ignition switch to ON.
(b) For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

OK:
Voltage: 0 V

NG	**Repair or replace spiral cable.**

OK

6	**Check harness between airbag sensor assembly and spiral cable.**



CHECK:
(a) Turn the ignition switch to ON.
(b) For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the voltage between D+ and body ground.

OK:
Voltage: 0 V

NG	**Repair or replace harness between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6P7–05

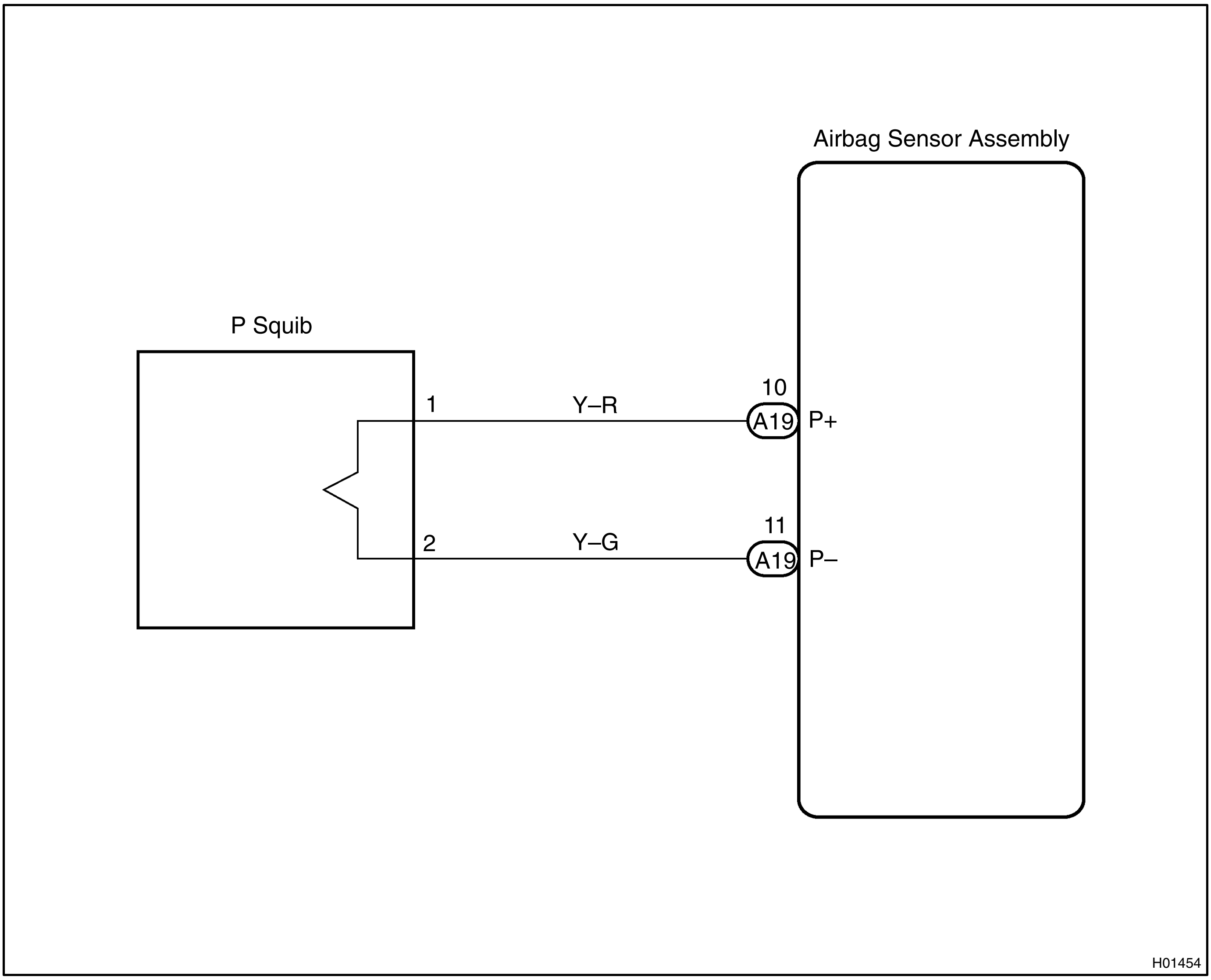
DTC	B0105/53	Short in P Squib Circuit

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 in P squib wire harness • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

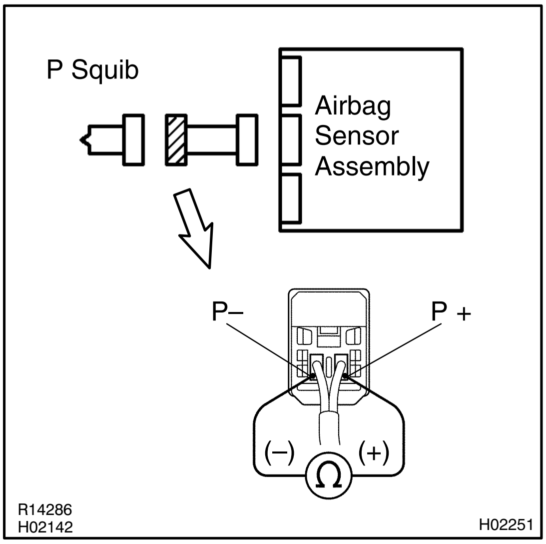
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P squib circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the front passenger airbag assembly and the airbag sensor assembly (See page DI–453).

CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

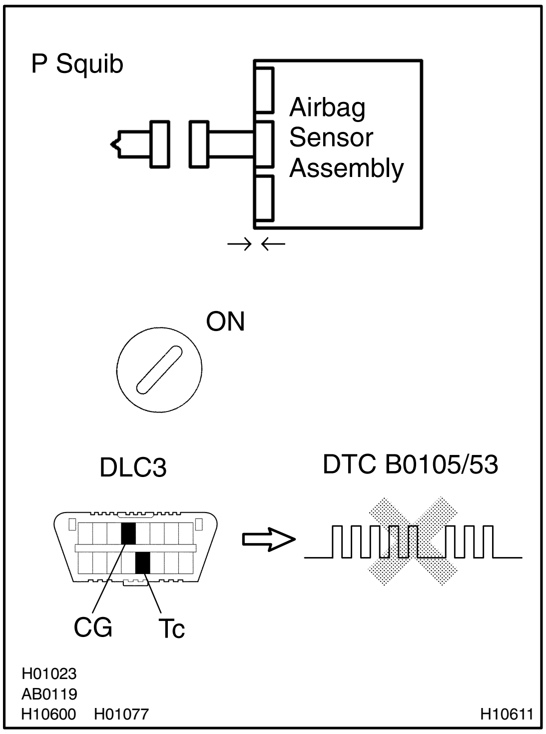
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0105/53 is not output.

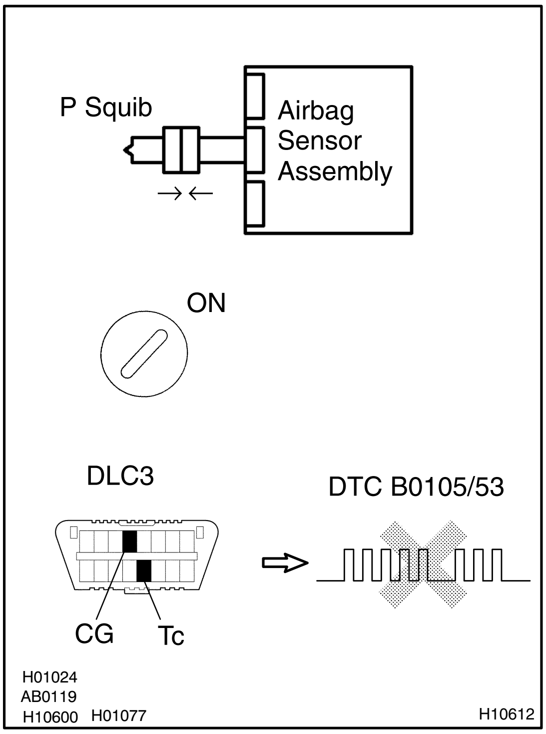
HINT:

Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to LOOK, and wait at least for 20 seconds.
(b) Turn the ignition switch to ON, and wait at least for 20 seconds.
(c) Clear the DTC stored in memory (See page DI–453).
(d) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn the ignition switch to ON, and wait at least for 20 seconds.
(f) Check the DTC (See page DI–453).

OK:

DTC B0105/53 is not output.

HINT:
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG	**Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6P8–01

DTC	B0106/54	Open in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0106/54 is recorded when an open is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	• Open circuit in P+ wire harness or P– wire harness of squib • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

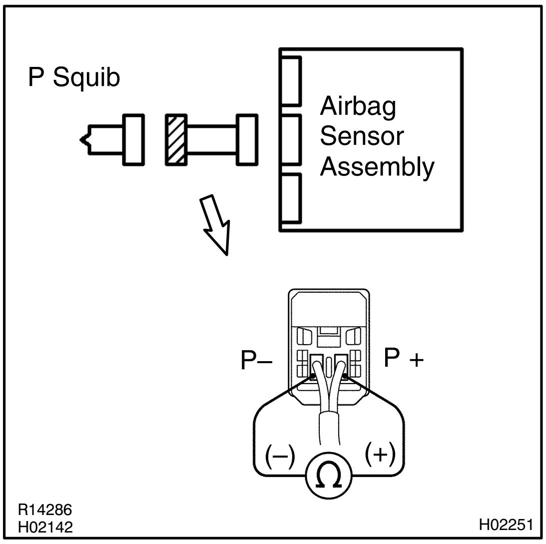
WIRING DIAGRAM

See page DI–481.

INSPECTION PROCEDURE

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check P squib circuit.**



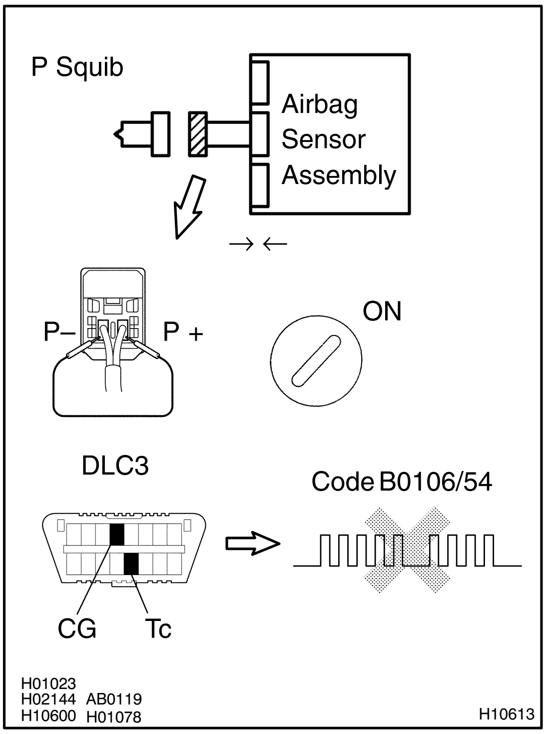
CHECK:
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

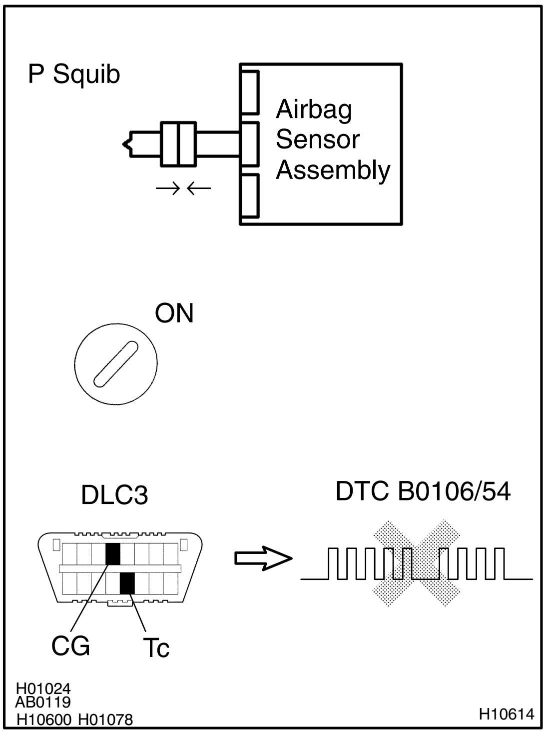
DTC B0106/54 is not output.

HINT:
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0106/54 is not output.

HINT:
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG	**Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6P9–01

DTC	B0107/51	Short in P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0107/51 is recorded when ground short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	• Short circuit in P squib wire harness (to ground) • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

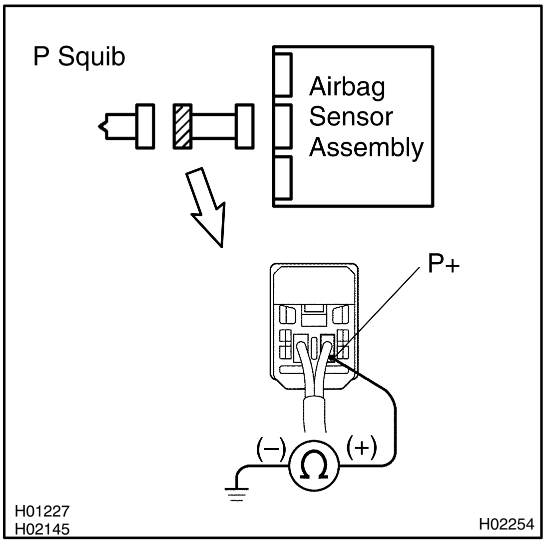
WIRING DIAGRAM

See page DI–481.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and body ground.

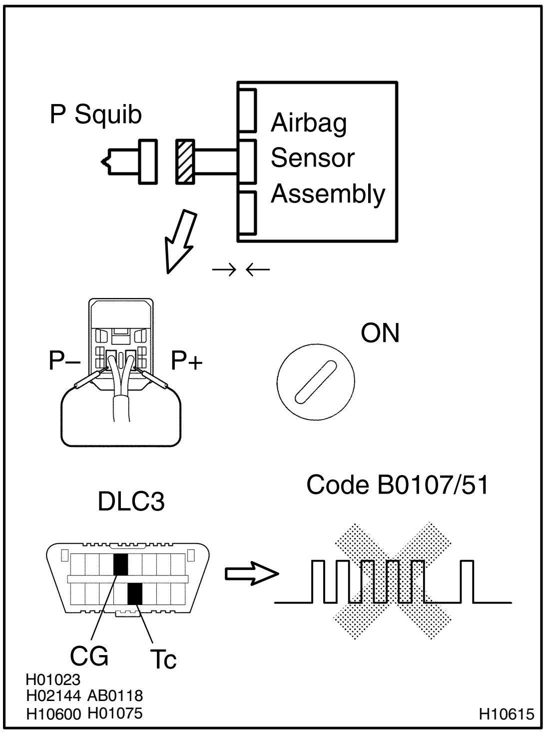
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0107/51 is not output.

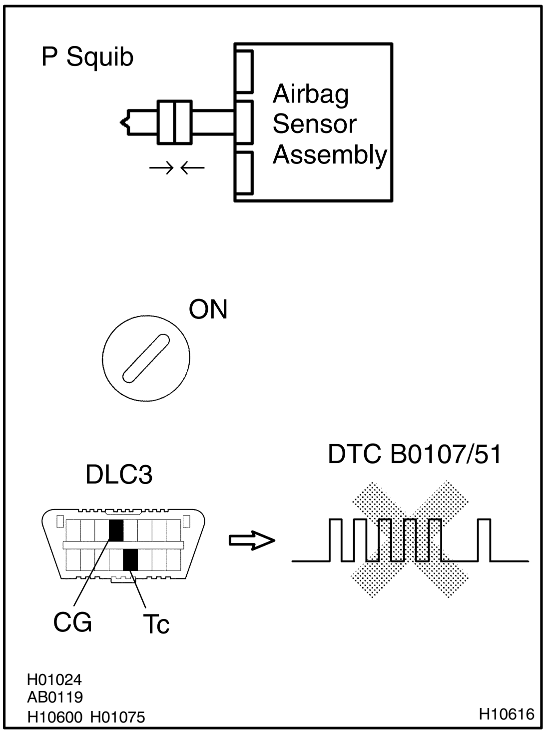
HINT:

Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0107/51 is not output.

HINT:
Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG	**Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B0108/52	Short in P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	• Short circuit in P squib wire harness (to B+) • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

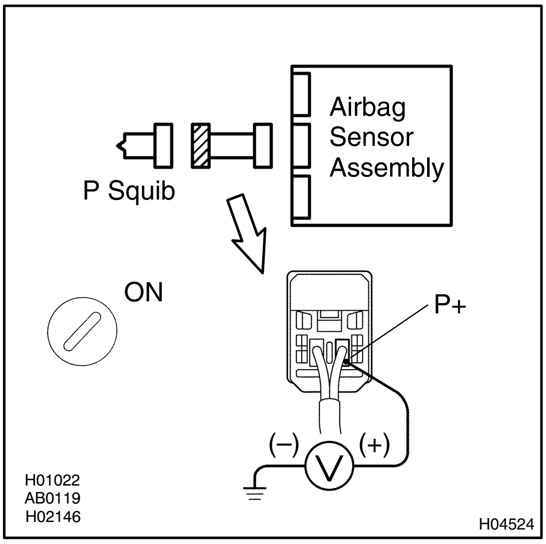
WIRING DIAGRAM

See page DI–481.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P squib circuit.



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the voltage between the P+ and body ground.

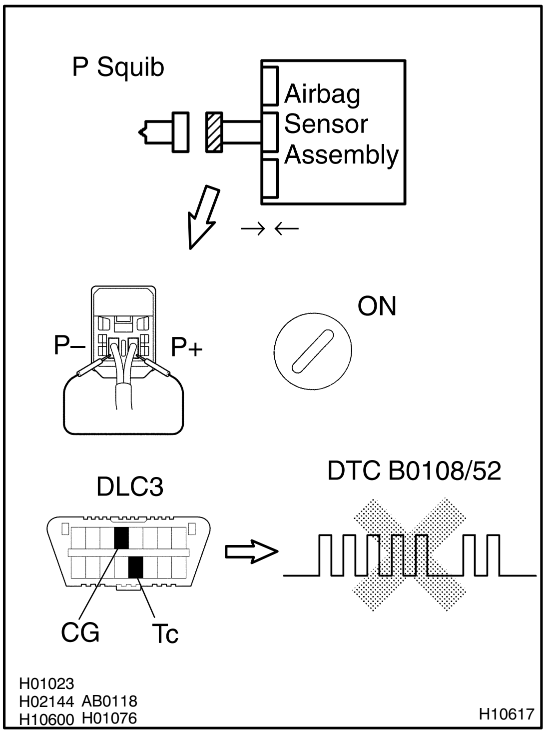
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0108/52 is not output.

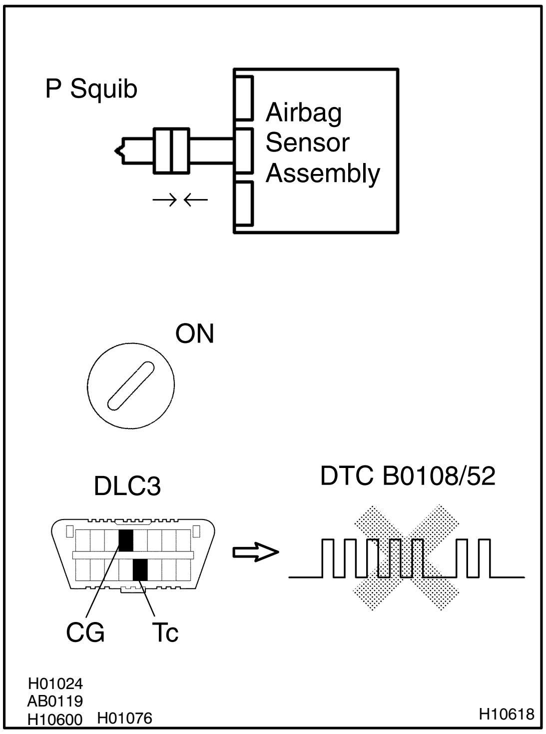
HINT:

Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0108/52 is not output.

HINT:
Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

NG	**Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6PJ–05

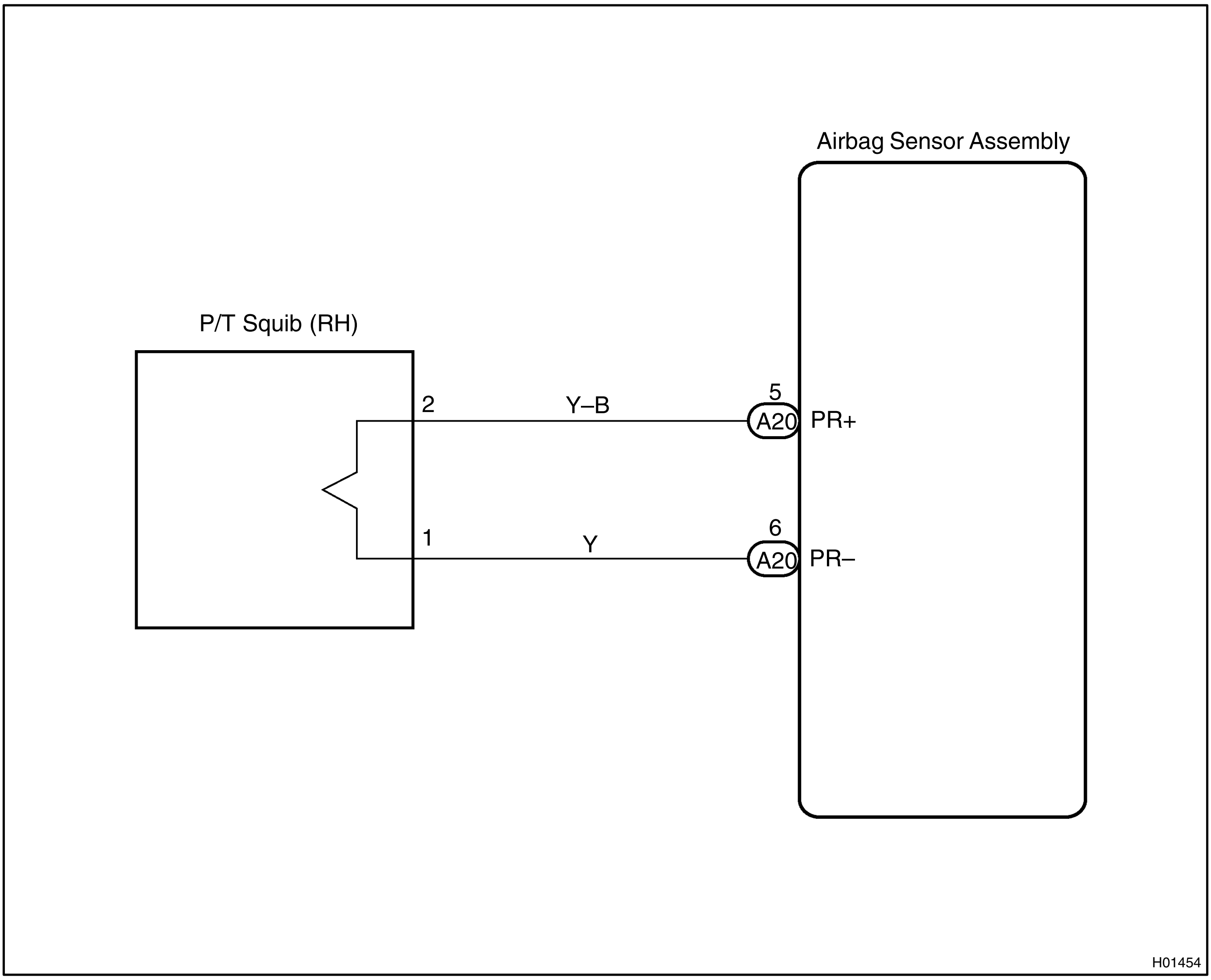
DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	• Short circuit between PR+ wire harness and PR– wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

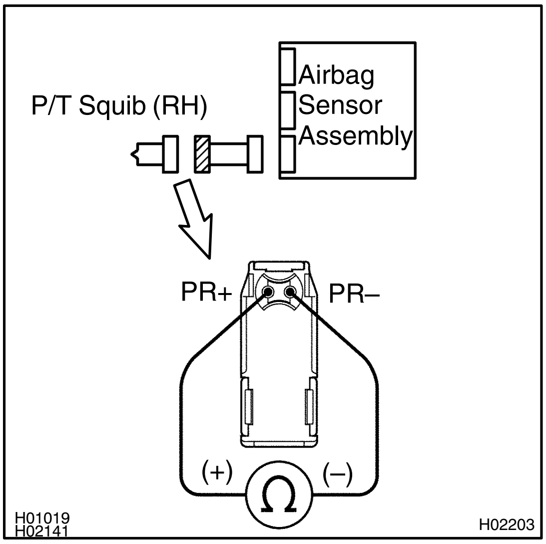
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check P/T squib (RH) circuit.**



PREPARATION:
Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (RH) (See page DI–453).

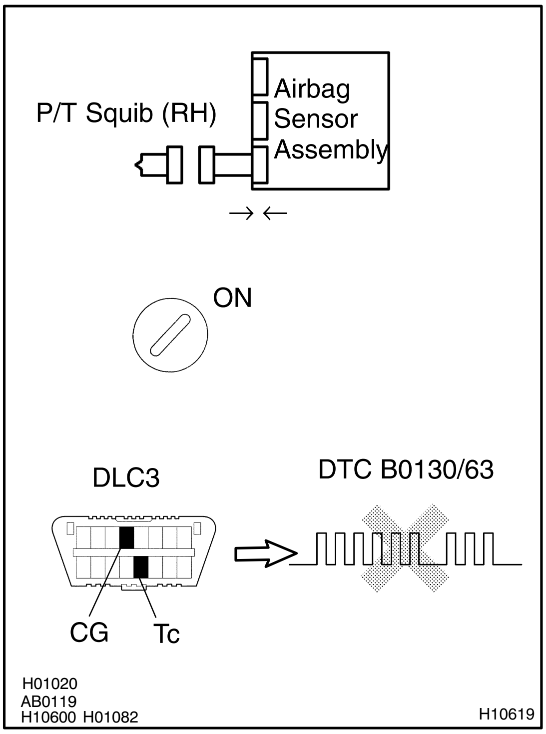
CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR–.

OK:
Resistance: 1 MΩ or Higher

NG — **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0130/63 is not output.

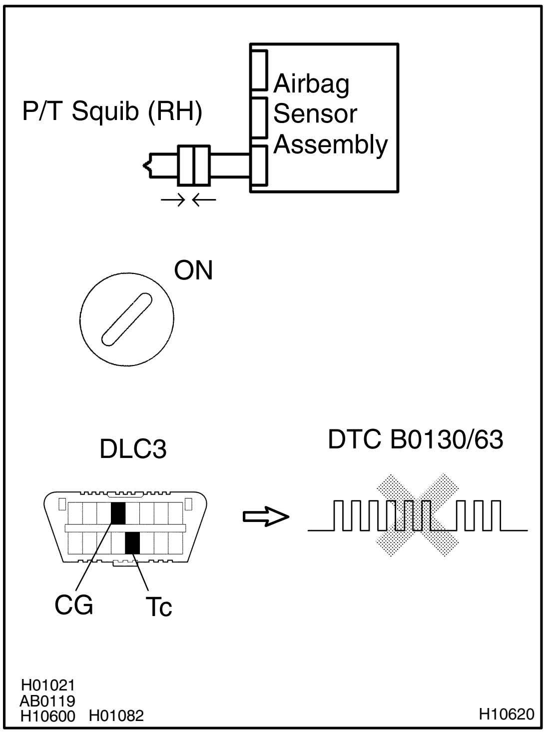
HINT:

Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (RH).**



PREPARATION:

(a) Turn the 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 the ignition switch to LOOK, and wait at least for 20 second.
(b) Turn the ignition switch to ON, and wait at least for 20 seconds.
(c) Clear the DTC stored in memory (See page DI–453).
(d) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn the ignition switch to ON, and wait at least for 20 seconds.
(f) Check the DTC (See page DI–453).

OK:

DTC B0130/63 is not output.

HINT:
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6PK–03

DTC	B0131/64	Open in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (RH) consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	• Open circuit in PR+ wire harness or PR– wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

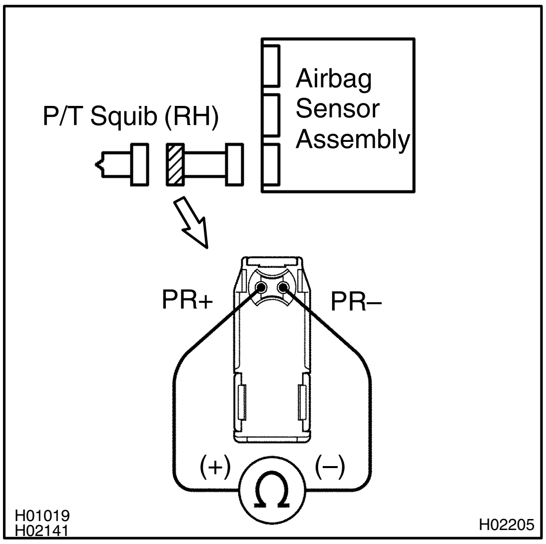
WIRING DIAGRAM

See page DI–494.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P/T squib (RH) circuit.



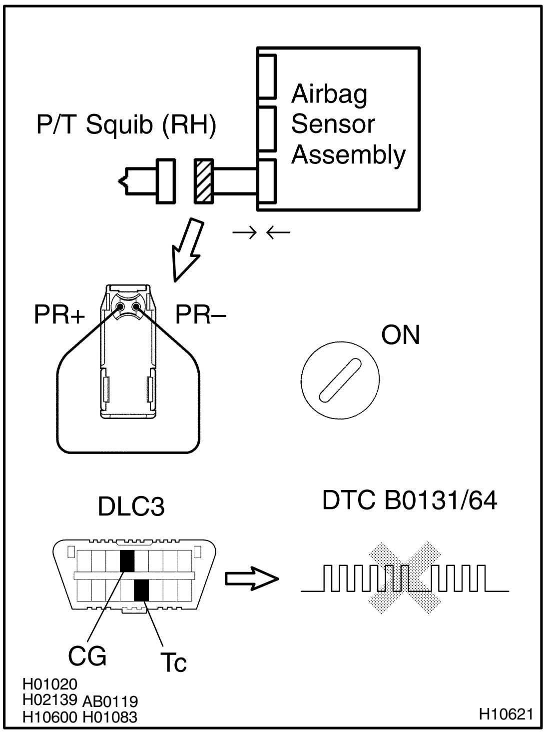
CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR–.

OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0131/64 is not output.

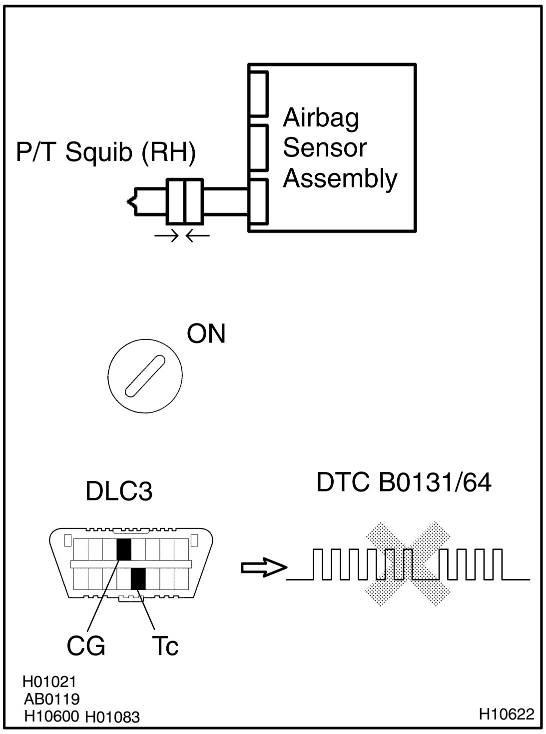
HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (RH).**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0131/64 is not output.

HINT:
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6PL–03

DTC	B0132/61	Short in P/T Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0132/61 is recorded when a ground short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	• Short circuit in P/T squib (RH) wire harness (to ground) • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

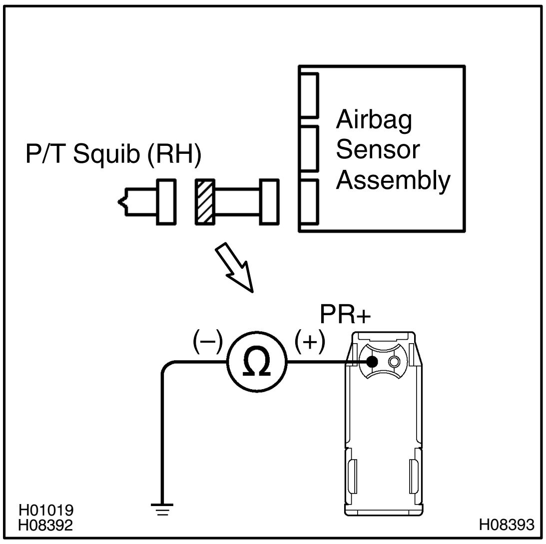
WIRING DIAGRAM

See page DI–494.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P/T squib (RH) circuit.



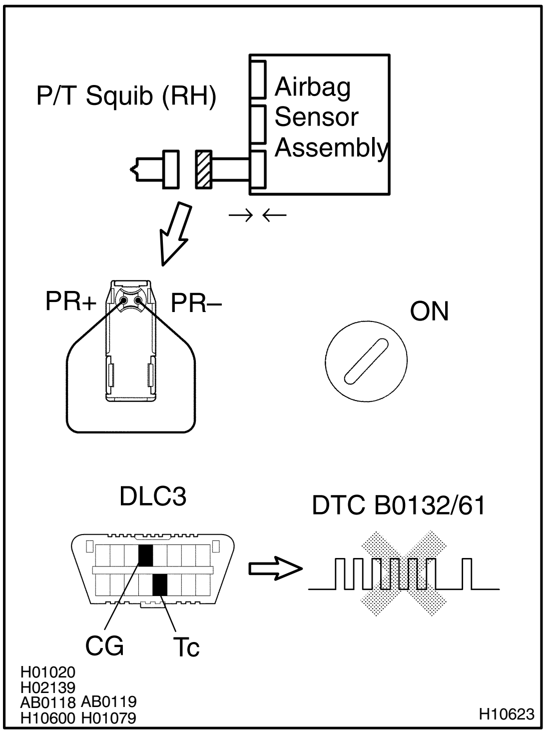
CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and body ground.

OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0132/61 is not output.

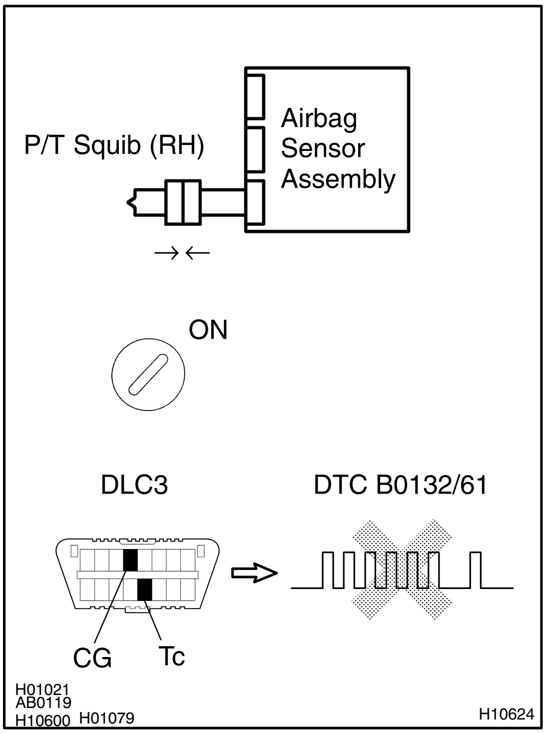
HINT:

Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (RH).**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0132/61 is not output.

HINT:
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6PM–03

DTC	B0133/62	Short in P/T Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0133/62 is recorded when a B+ short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	• Short circuit in seat belt pretensioner (RH) wire harness (to B+) • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

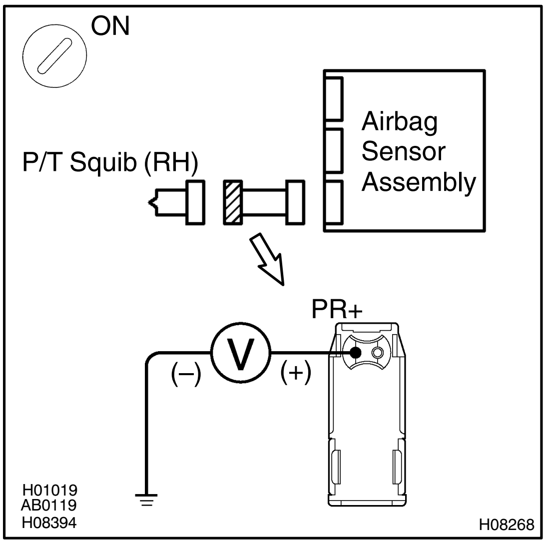
WIRING DIAGRAM

See page DI–494.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P/T squib (RH) circuit.



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the voltage between PR+ and body ground.

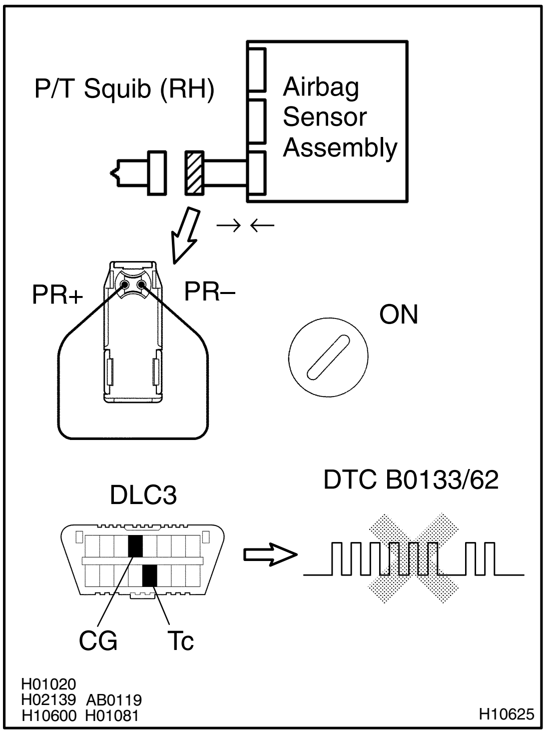
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0133/62 is not output.

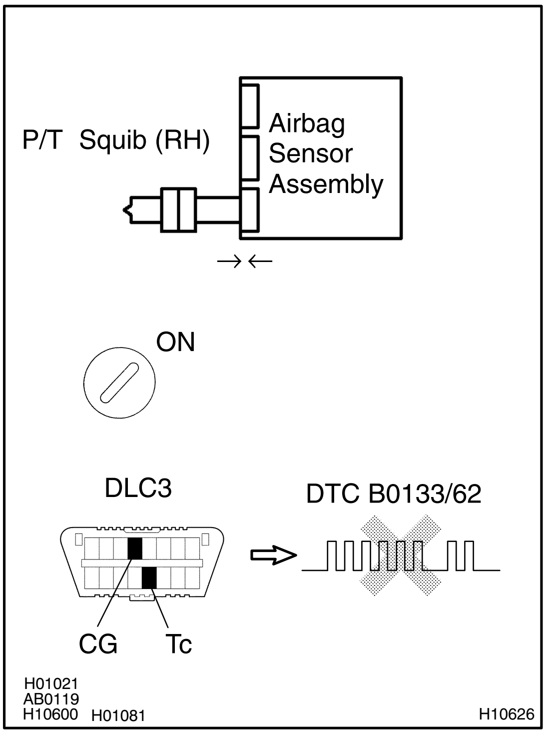
HINT:

Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (RH).**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0133/62 is not output.

HINT:
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6PN–05

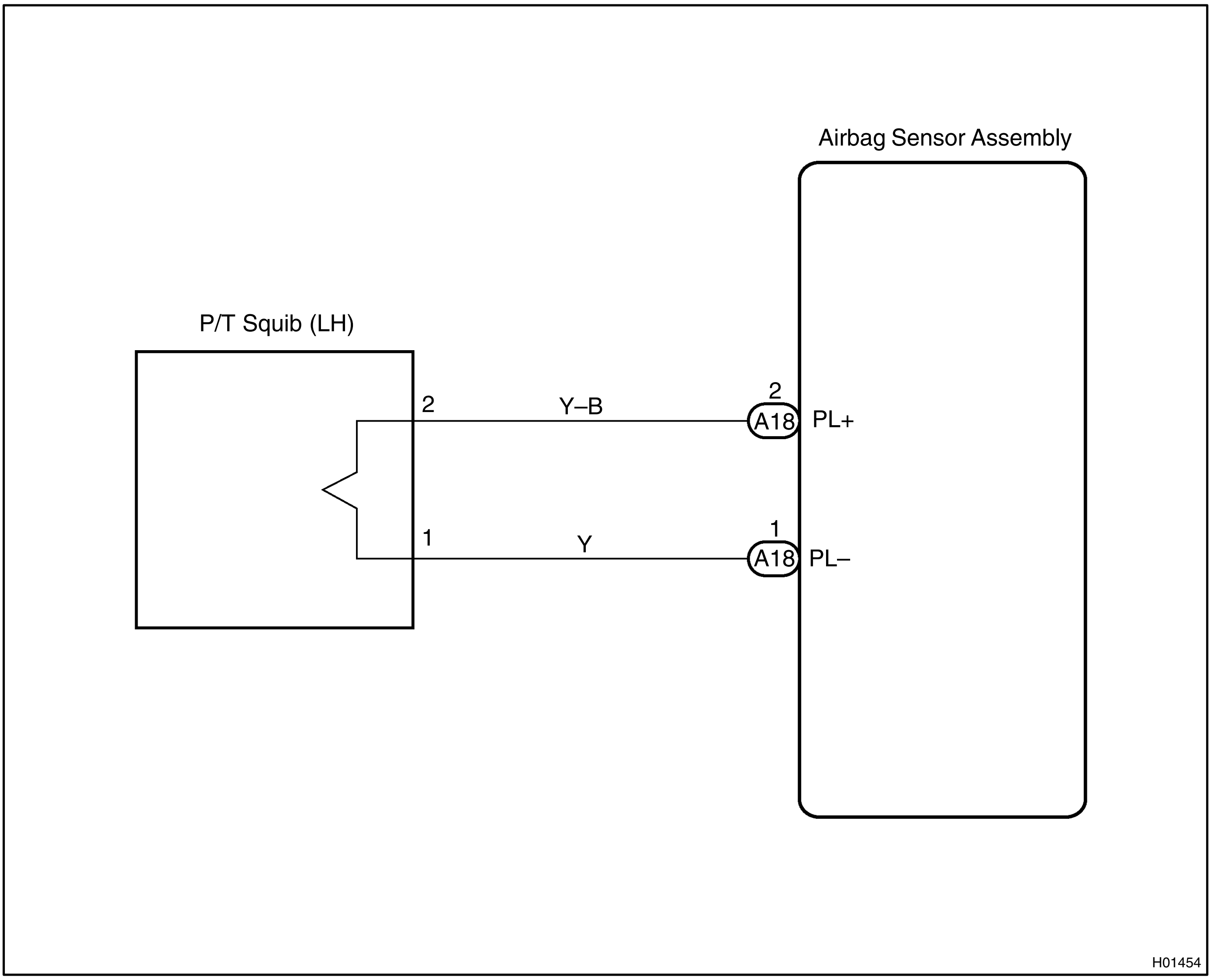
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	• Short circuit between PL+ wire harness and PL– wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

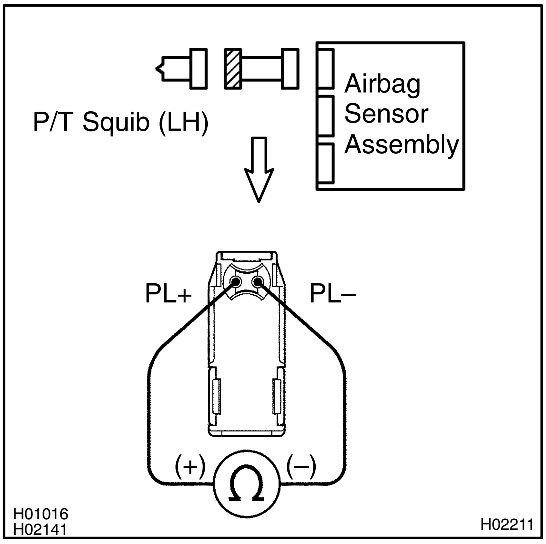
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P/T squib (LH) circuit.



PREPARATION:
Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (LH) (See page DI–453).

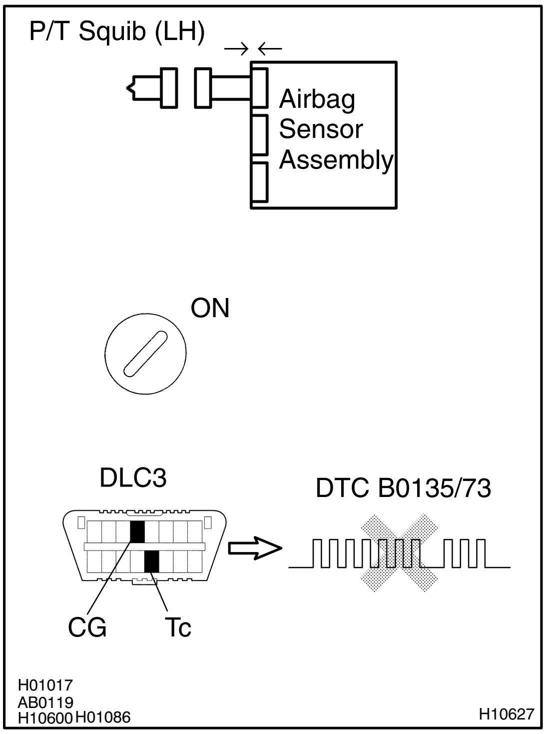
CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL–.

OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0135/73 is not output.

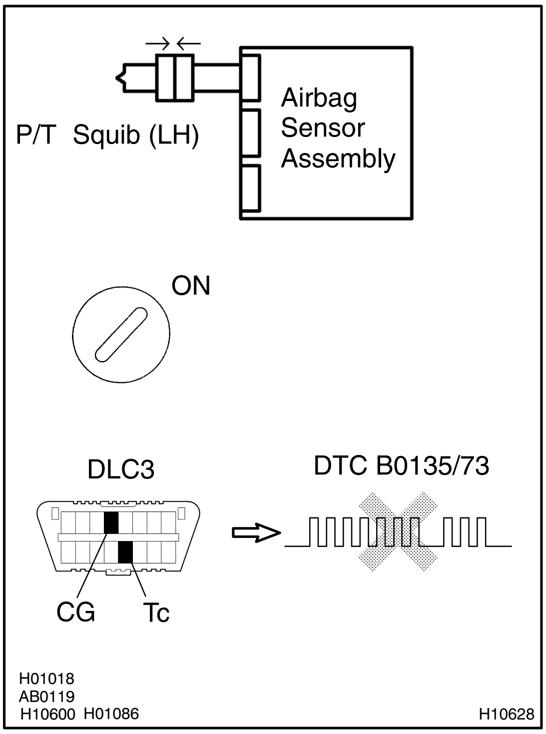
HINT:

Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (LH).**



PREPARATION:

(a) Turn the 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 the ignition switch to LOOK, and wait at least for 20 second.
(b) Turn the ignition switch to ON, and wait at least for 20 seconds.
(c) Clear the DTC stored in memory (See page DI–453).
(d) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn the ignition switch to ON, and wait at least for 20 seconds.
(f) Check the DTC (See page DI–453).

OK:

DTC B0135/73 is not output.

HINT:
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6PO–03

DTC	B0136/74	Open in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (LH) consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	• Open circuit in PL+ wire harness or PL– wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

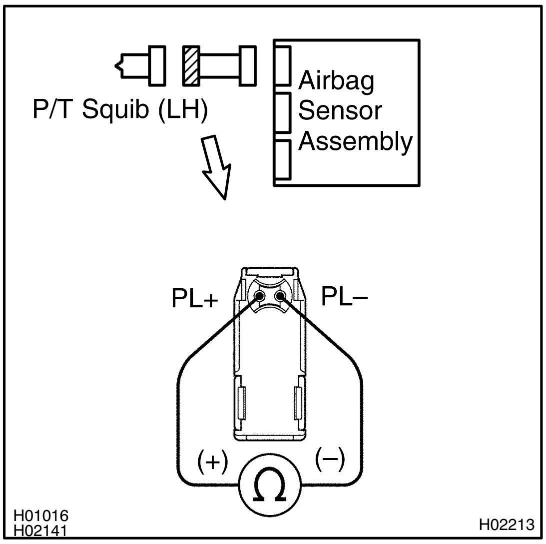
WIRING DIAGRAM

See page DI–507.

INSPECTION PROCEDURE

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check P/T squib (LH) circuit.**



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL–.

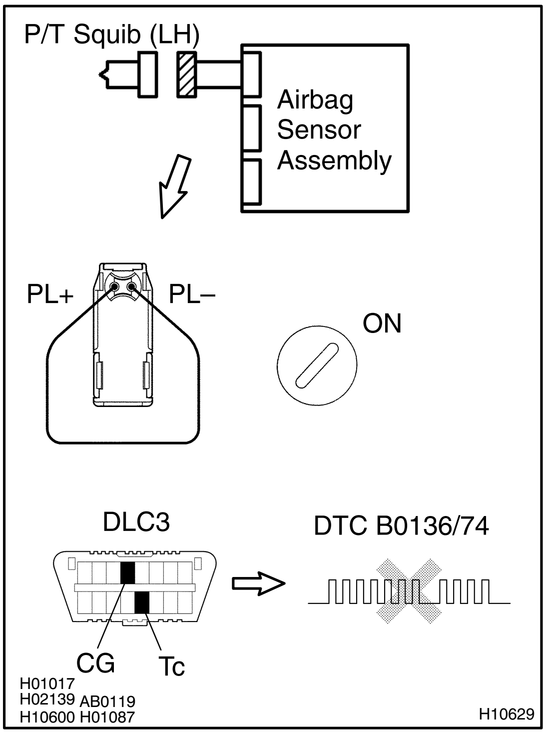
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0136/74 is not output.

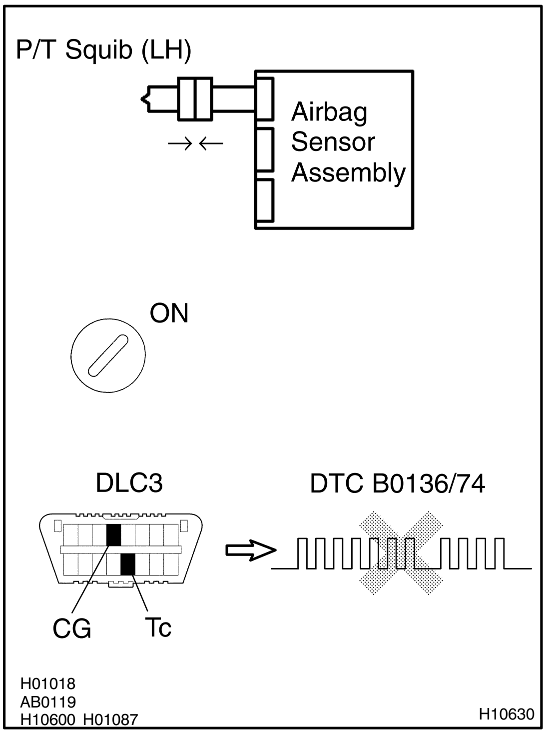
HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (LH).**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0136/74 is not output.

HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6PP–03

DTC	B0137/71	Short in P/T Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0137/71 is recorded when a ground short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	• Short circuit in P/T squib (LH) wire harness (to ground) • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

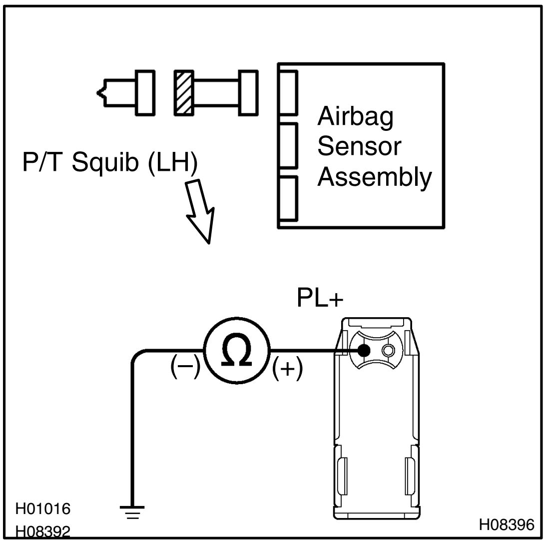
WIRING DIAGRAM

See page DI–507.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P/T squib (LH) circuit.



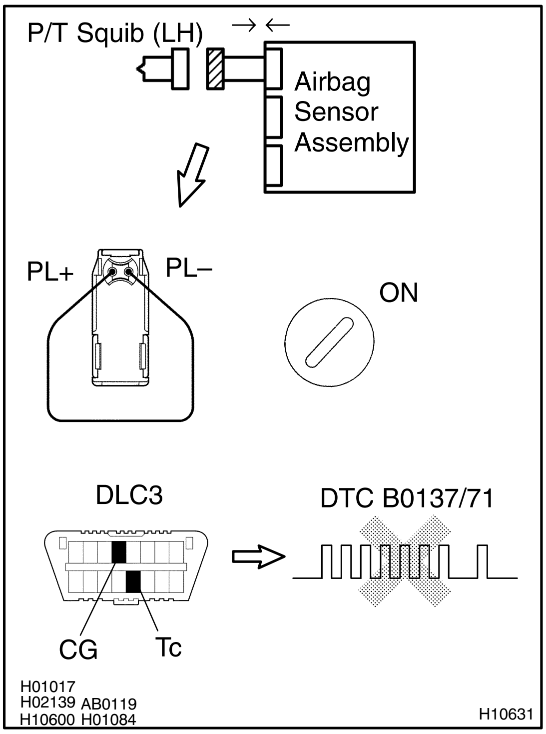
CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and body ground.

OK:
Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0137/71 is not output.

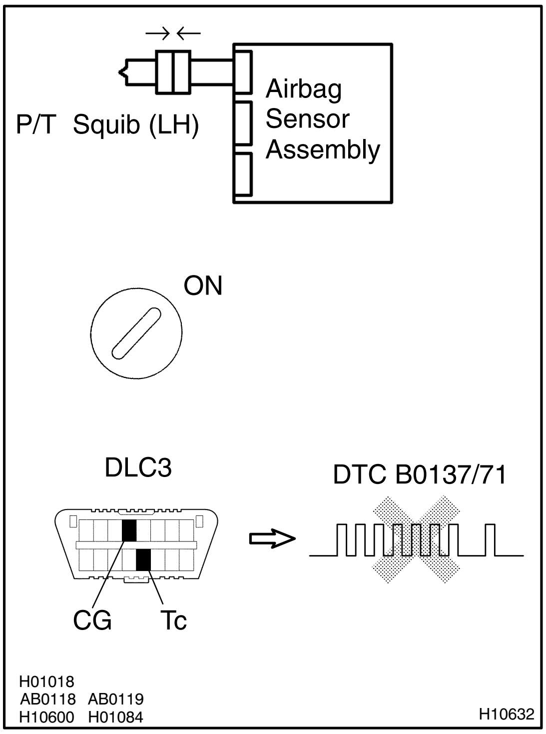
HINT:

Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (LH).**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:

DTC B0137/71 is not output.

HINT:
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6PQ–03

DTC	B0138/72	Short in P/T Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B0138/72 is recorded when a B+ short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	• Short circuit in seat belt pretensioner (LH) wire harness (to B+) • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

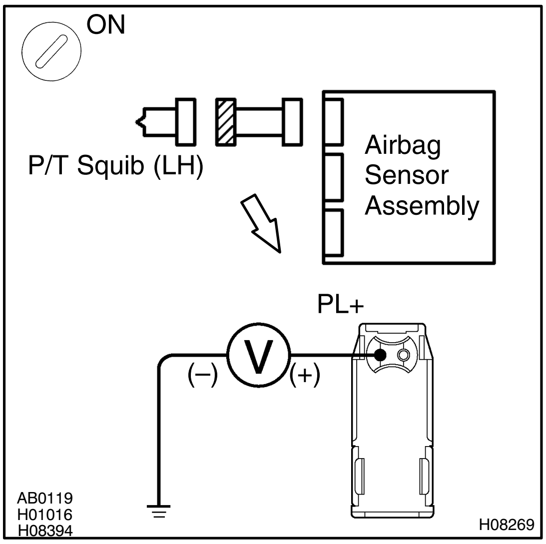
WIRING DIAGRAM

See page DI–507.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI–538).

2	Check P/T squib (LH) circuit.



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the voltage between PL+ and body ground.

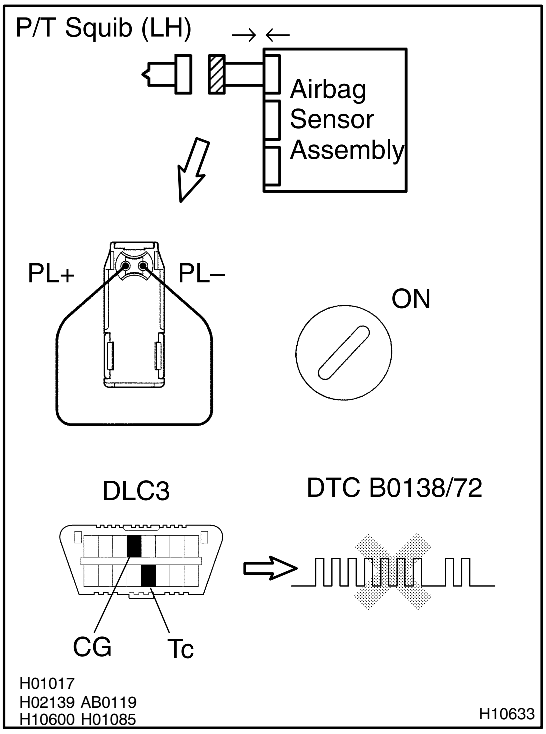
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See step 5 on page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B0138/72 is not output.

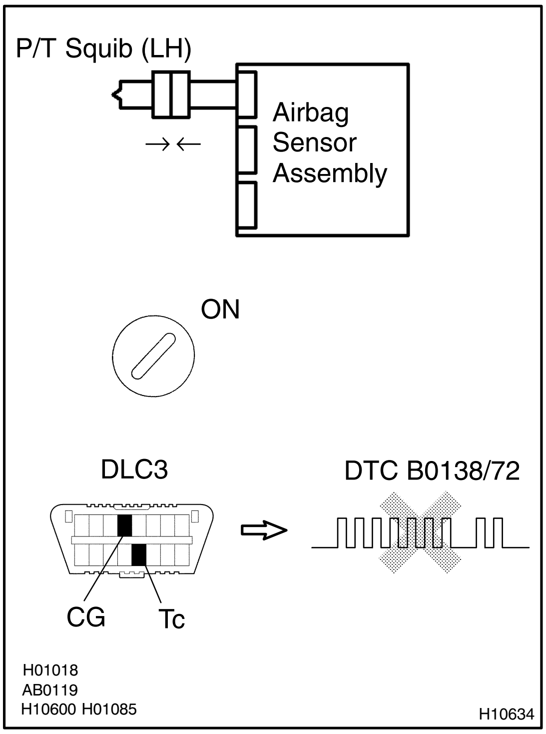
HINT:

Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (LH).**



PREPARATION:
(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See step 5 on page DI–453).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–453).

OK:
DTC B0138/72 is not output.

HINT:
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6PR–04

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 activated, and detects diagnosis system malfunction.
DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

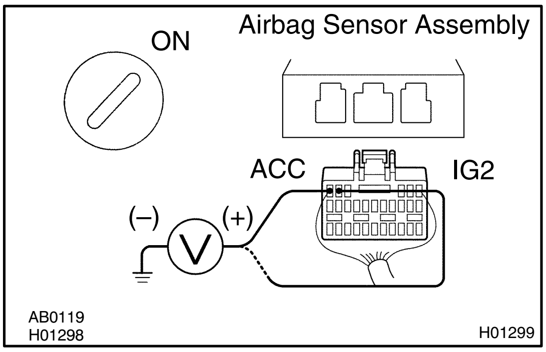
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

INSPECTION PROCEDURE

HINT:
When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check voltage at IG1 and IG2 of airbag sensor assembly.**



CHECK:

(a) Turn the ignition switch to ON.
(b) Measure the voltage between body ground and each of terminals ACC and IG2 of the airbag sensor assembly connector.

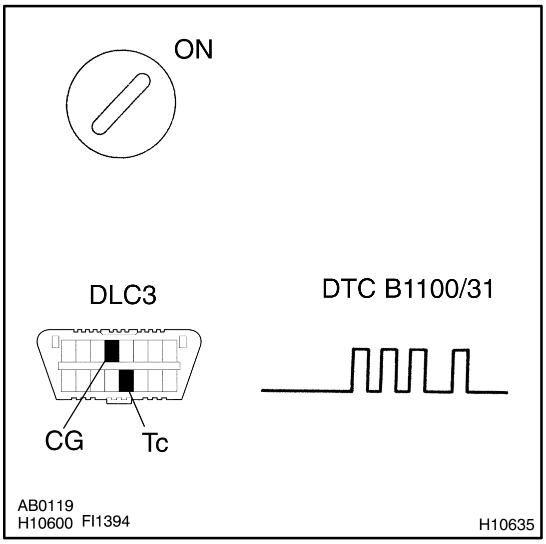
OK:

Voltage: 10 – 14 V

NG	**Check that an abnormality occurs on the battery and charging system.**

OK

3	**Is DTC B1100/31 output again?**



PREPARATION:
Clear the DTC (See step 5 on page DI–453).

CHECK:
(a) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn the ignition switch to ON, and wait at least for 20 seconds.
(c) Repeat operation in step (a) and (b) at least 5 times.
(d) Check the DTC (See page DI–453).

HINT:
Codes other than code B1100/31 may be output at this time, but they are not relevant to this check.

NO → **Using simulation method, reproduce malfunction symptoms (See page IN–29).**

YES

Replace airbag sensor assembly.

DI6PW–05

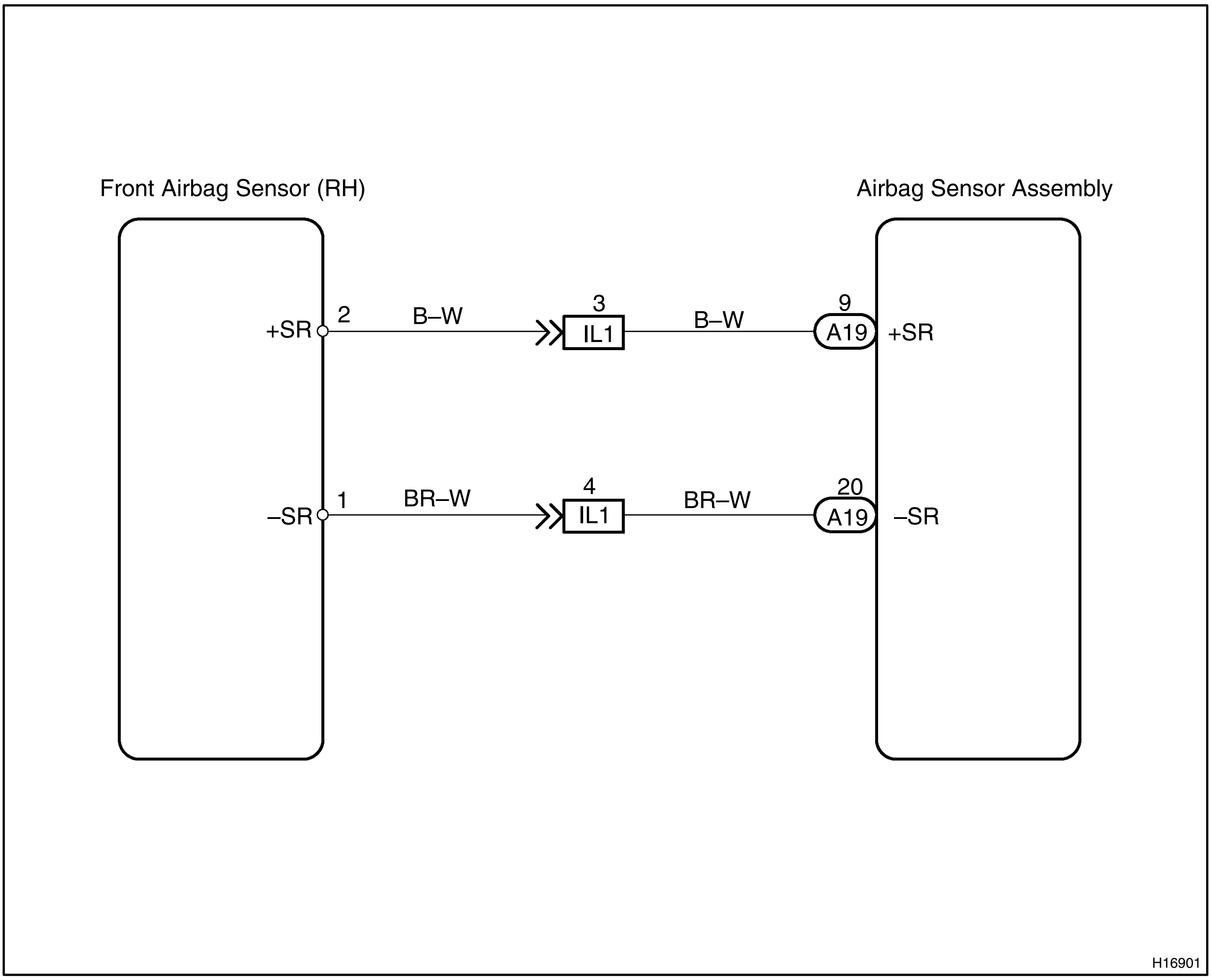
DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1156/B1157/15 is recorded when a malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Airbag sensor assembly • Wire harness • Engine room main wire harness

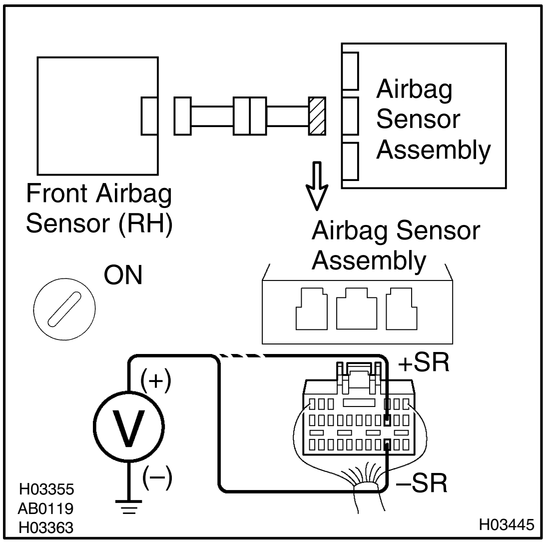
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of +SR and –SR.

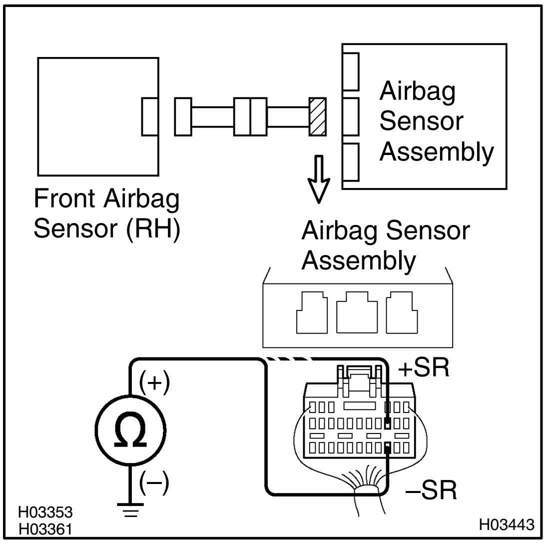
OK:

Voltage: Below 1 V

NG	**Go to step 8.**

OK

3	**Check wire harness (to ground).**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of +SR and –SR.

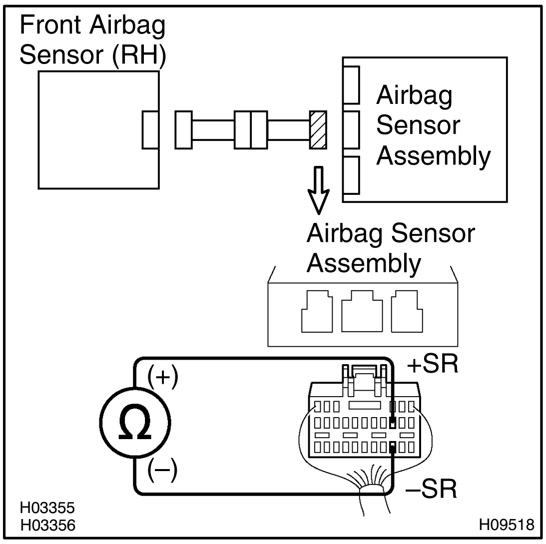
OK:

Resistance: 1 MΩ or Higher

NG	**Go to step 9.**

OK

4	**Check wire harness.**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between +SR and –SR.

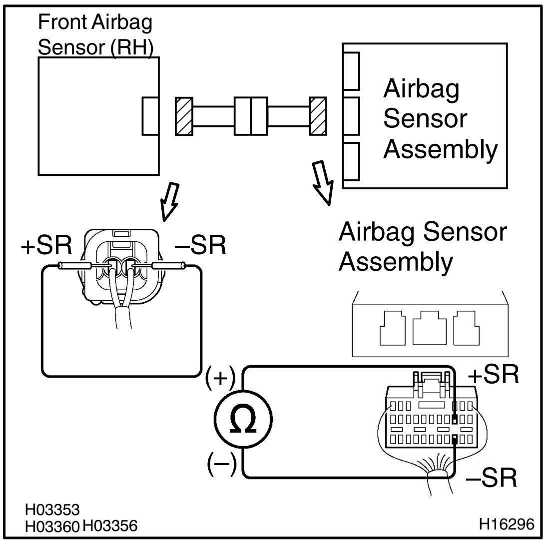
OK:

Resistance: 1 MΩ or Higher

NG	**Go to step 10.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect +SR and –SR of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between +SR and –SR.

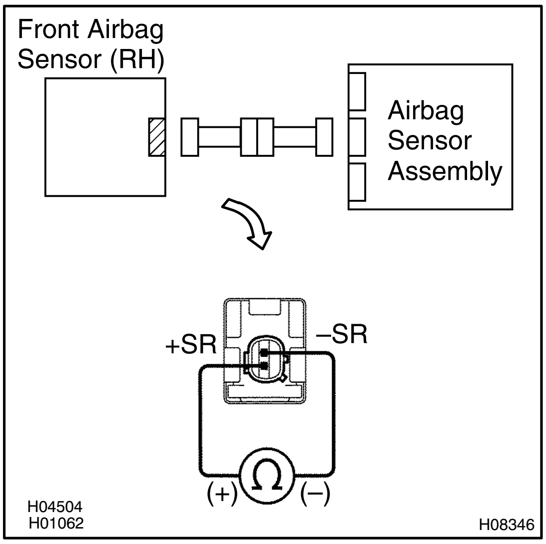
OK:

Resistance: Below 1 Ω

NG	**Go to step 11.**

OK

6	**Check front airbag sensor (RH).**



CHECK:

For the connector of the front airbag sensor (RH), measure the resistance between +SR and –SR.

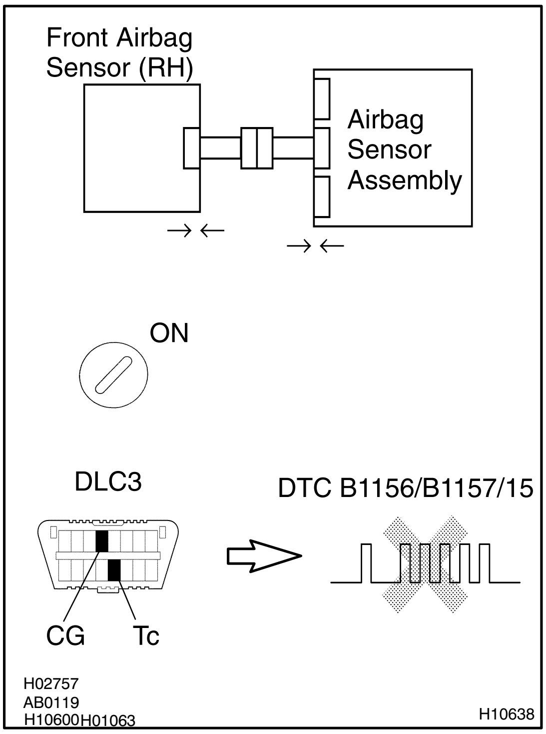
OK:

Resistance: 300 – 1500 Ω

NG	**Replace front airbag sensor (RH).**

OK

7	**Check airbag sensor assembly.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B1156/B1157/15 is not output.

HINT:

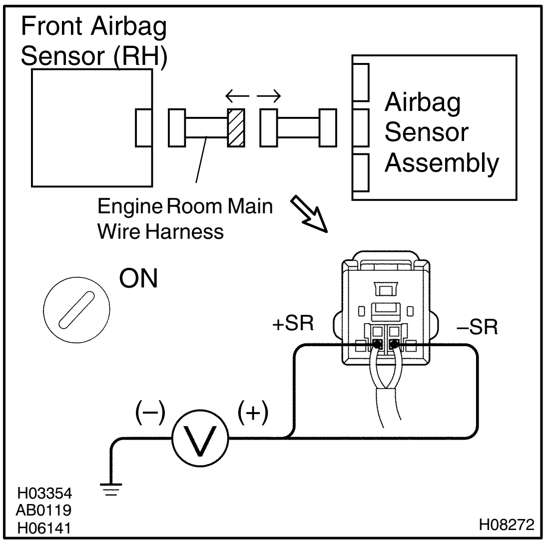
Codes other than code B1156/B1157/15 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8 Check engine room main wire harness (to B+).



PREPARATION:
Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:
(a) Turn the ignition switch to ON.
(b) For the connector (on the RH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of +SR and –SR.

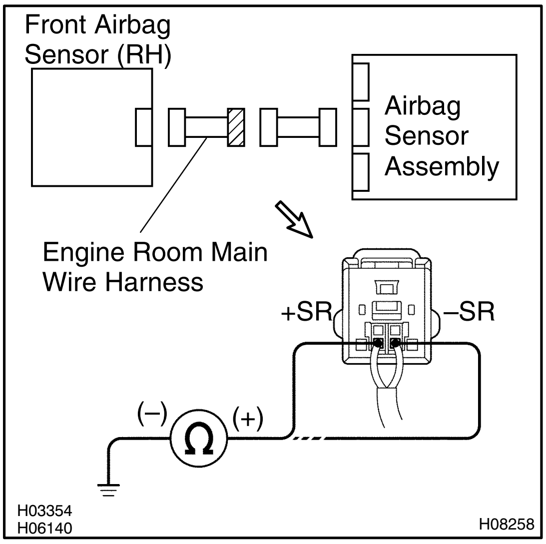
OK:
Voltage: Below 1 V

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9 Check engine room main wire harness (to ground).



PREPARATION:
Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:
For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of +SR and –SR.

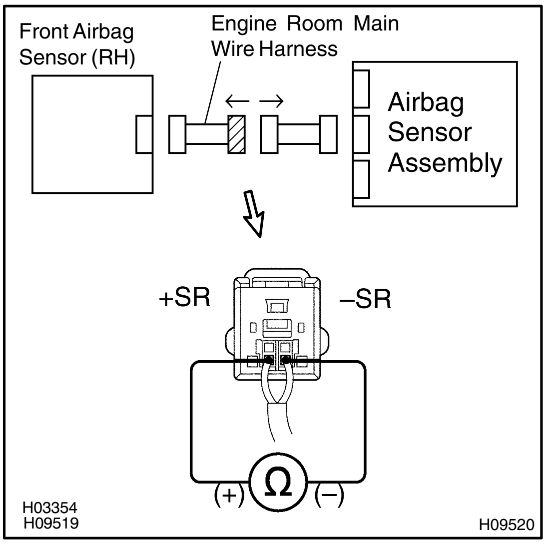
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	**Check engine room main wire harness.**



PREPARATION:
Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:
For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between +SR and –SR.

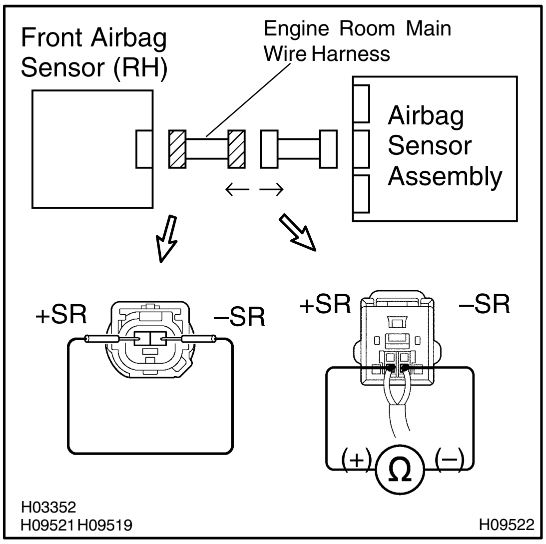
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	**Check engine room main wire harness.**



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect +SR and –SR of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (RH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between +SR and –SR.

OK:

Resistance: Below 1 Ω

NG	**Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI6PX–05

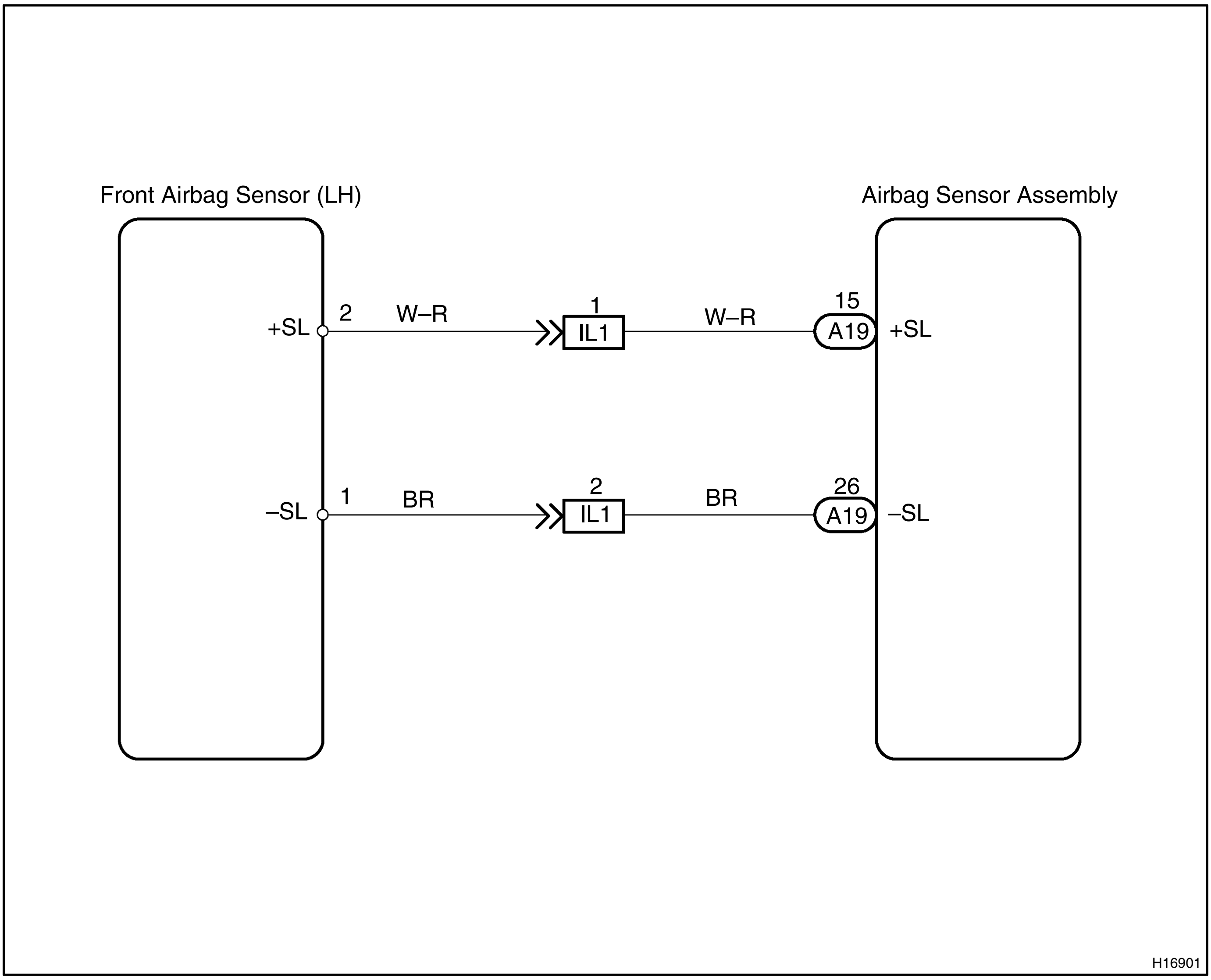
DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (LH) circuit consists of the airbag sensor assembly and front airbag sensor (LH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1158/B1159/16 is recorded when malfunction is detected in the front airbag sensor (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/B1159/16	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Wire harness • Engine room main wire harness

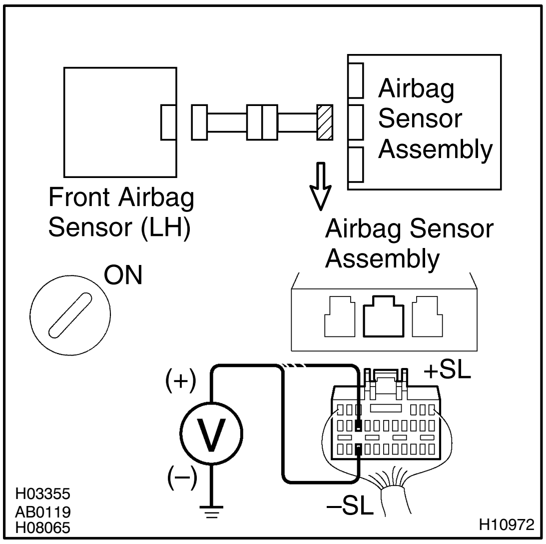
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection (See step 1 on page DI–538).**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of +SL and –SL.

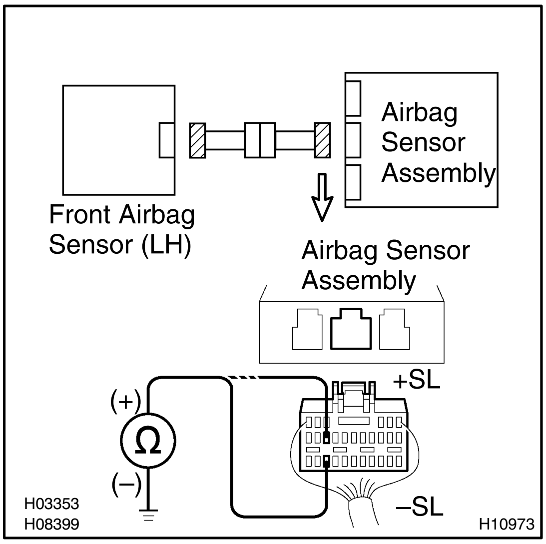
OK:

Voltage: Below 1 V

NG → **Go to step 8.**

OK

3	**Check wire harness (to ground).**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of +SL and –SL.

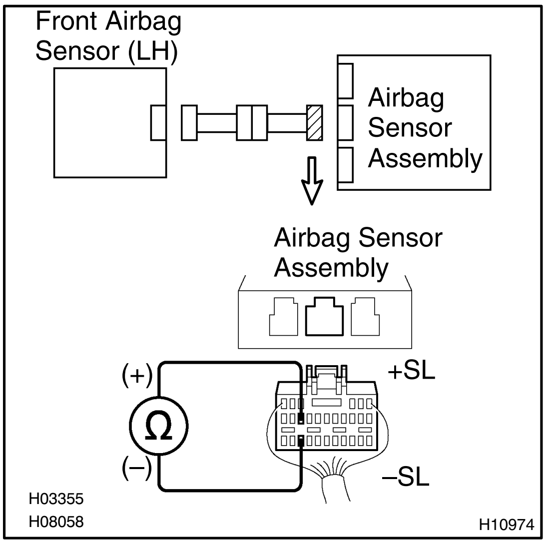
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 9.**

OK

4	**Check wire harness.**

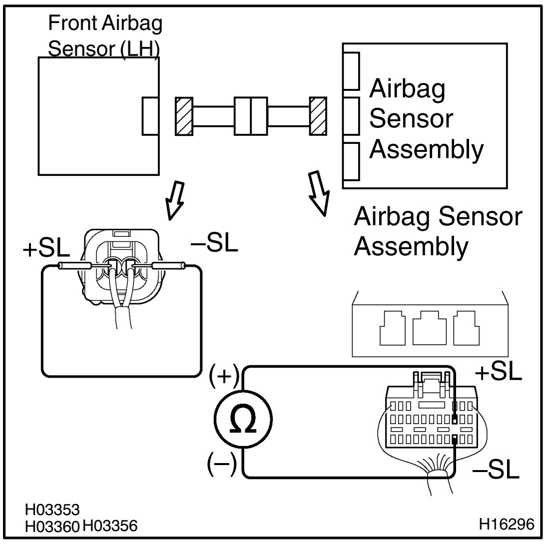


CHECK:
For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between +SL and –SL.
OK:
Resistance: 1 MΩ or Higher

NG → **Go to step 10.**

OK

5	**Check wire harness.**

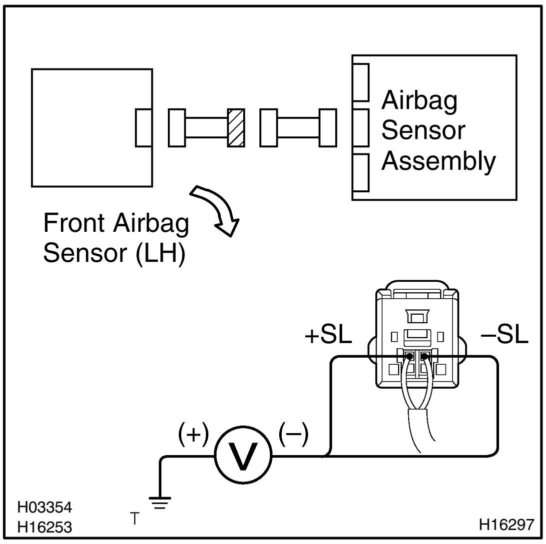


PREPARATION:
Using a service wire, connect +SL and –SL of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).
CHECK:
For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between +SL and –SL.
OK:
Resistance: Below 1 Ω

NG → **Go to step 11.**

OK

6	**Check front airbag sensor (LH).**

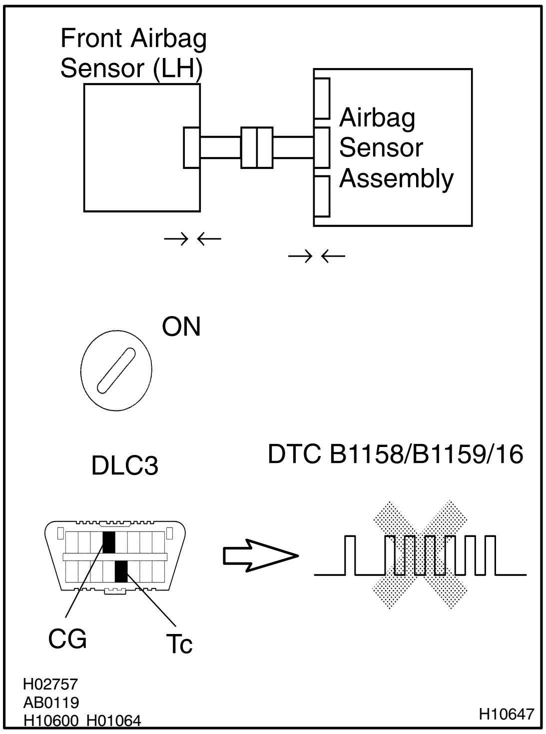


CHECK:
For the connector (on the front airbag sensor (LH)), measure the resistance between +SL and –SL.
OK:
Resistance: 300 – 1500 Ω

NG	**Replace front airbag sensor (LH).**

OK

7	**Check airbag sensor assembly.**



PREPARATION:

(a) Turn the 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 the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–453).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–453).

OK:

DTC B1158/B1159/16 is not output.

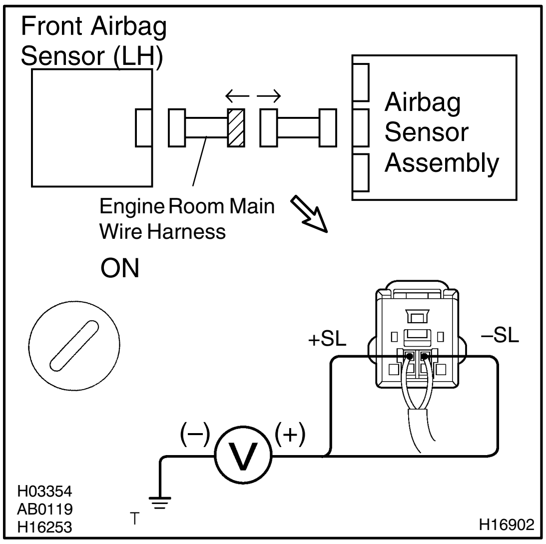
HINT:
Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8	**Check engine room main wire harness (to B+).**



PREPARATION:
Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:
(a) Turn the ignition switch to ON.
(b) For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of +SL and –SL.

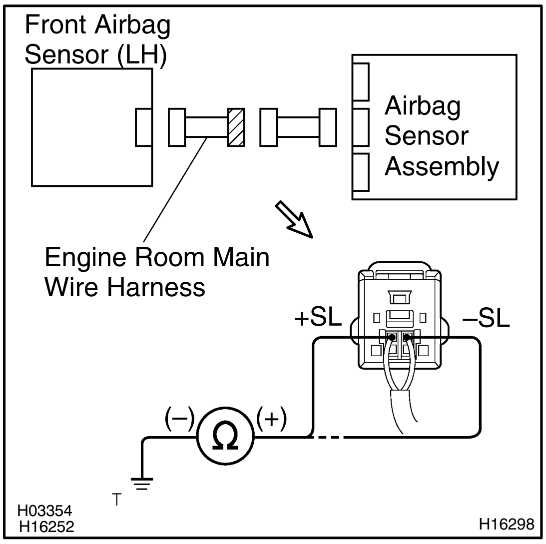
OK:
Voltage: Below 1 V

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	**Check engine room main wire harness (to ground).**



PREPARATION:
Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:
For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of +SL and –SL.

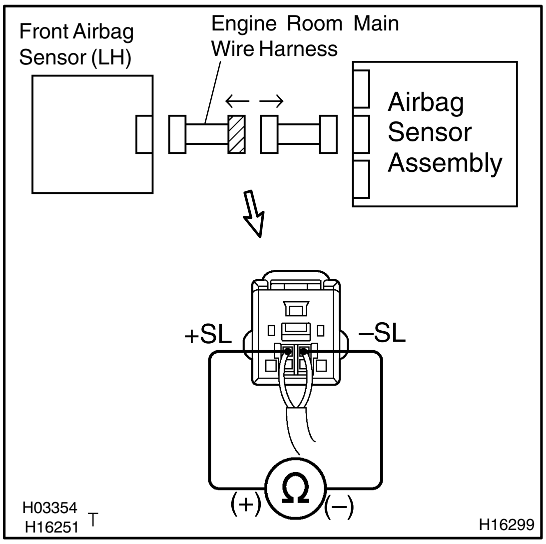
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:
Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:
For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between +SL and –SL.

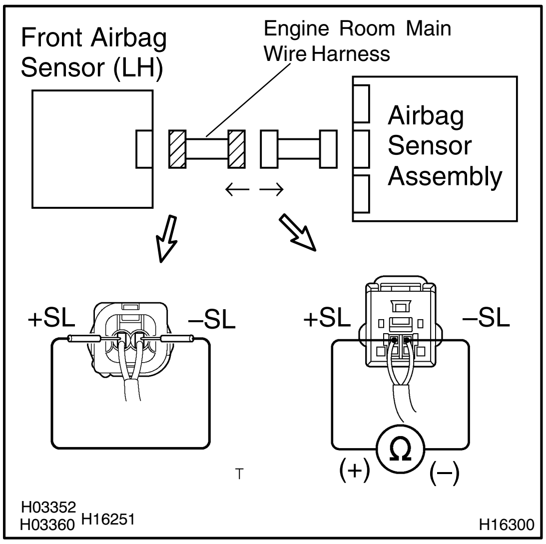
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	**Check engine room main wire harness.**



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect +SL and –SL of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between +SL and –SL.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI6PY–06

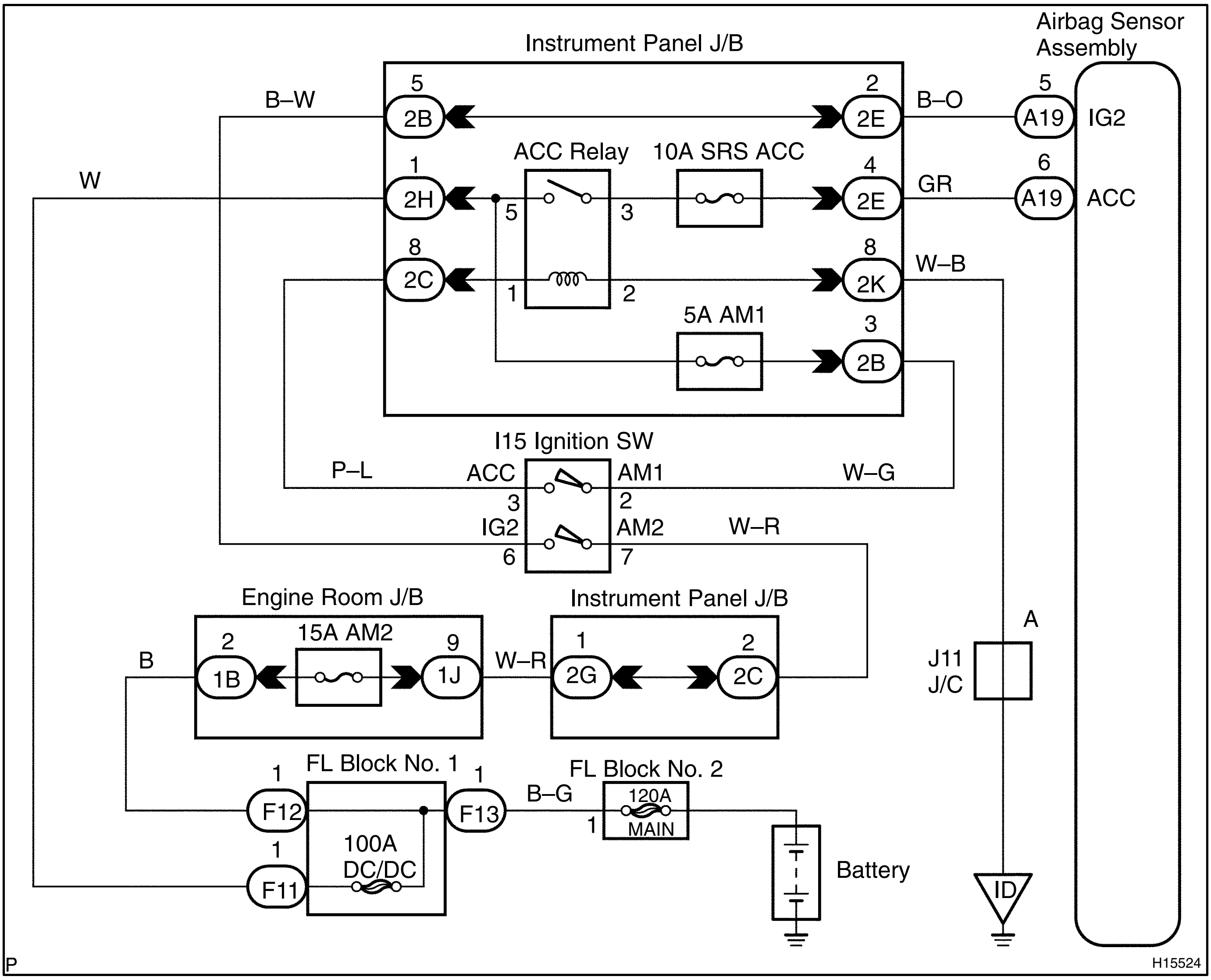
DTC	Normal	Source Voltage Drop

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage–increase circuit (DC–DC converter) in the airbag sensor assembly in case the source voltage drops.
When the battery voltage drops, the voltage–increase circuit (DC–DC converter) functions to increase the voltage of the SRS to normal voltage.
The diagnosis system malfunction display for this circuit is different from other circuits that is when the SRS warning light remains lit up and the DTC is a normal code, source voltage drop is indicated.
Malfunction in this circuit is not recorded in the airbag sensor assembly, and the source voltage returns to normal, the SRS warning light automatically goes off.

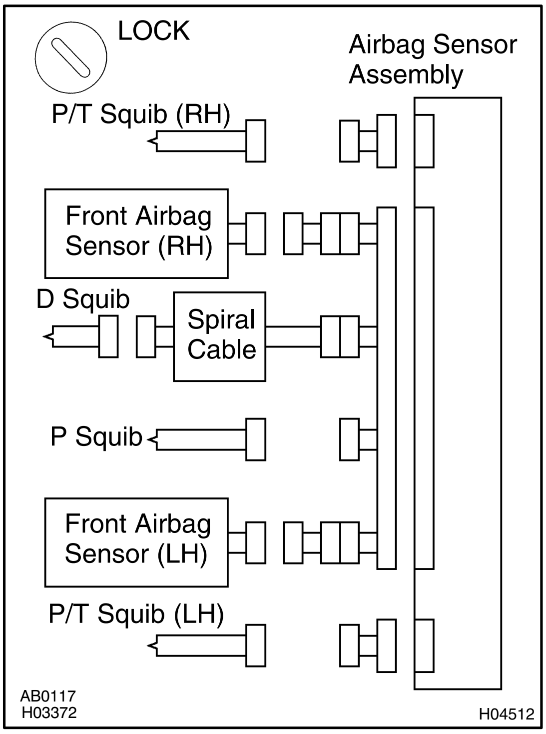
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection.**

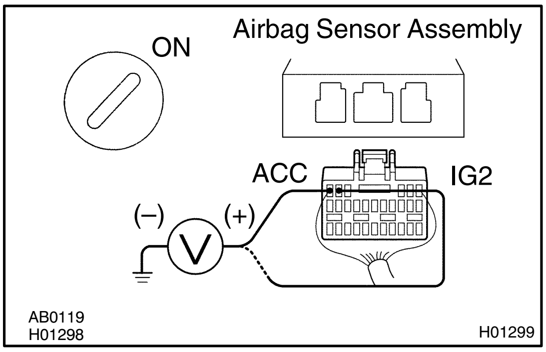


PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(b) Remove the steering wheel pad (See page SR–6).
(c) Disconnect the connector of the front passenger airbag assembly (See page RS–26).
(d) Disconnect the connector of the seat belt pretensioner RH and LH (See page BO–87).
(e) Disconnect the connectors of the airbag sensor assembly (See page RS–39).
(f) Disconnect the connector of the front airbag sensor RH and LH (See page RS–44).

CAUTION:
When storing the steering wheel pad and front passenger airbag assembly, keep the upper surface of the airbag deployment side facing upward.

2	**Check source voltage.**



PREPARATION:
Connect negative (–) terminal cable to the battery.

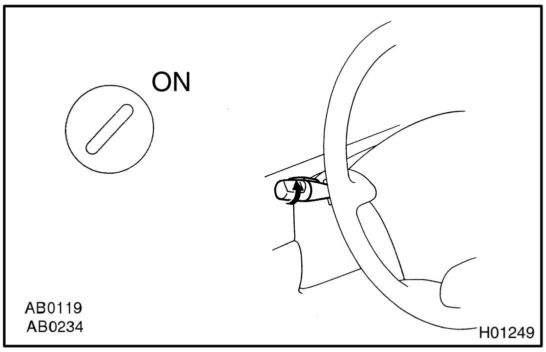
CHECK:
(a) Turn ignition switch ON.
(b) Measure the voltage between body ground and each of ACC and IG2 on the sensor and operate electric system (defogger, wiper, headlight, heater blower, etc.).

OK:
Voltage: 10 – 14 V

NG	**Check harness between battery and airbag sensor assembly, and check battery and charging system.**

OK

3	Does SRS warning light turn off?



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Connect the steering wheel pad connector.
(c) Connect the front passenger airbag assembly connector.
(d) Connect the seat belt pretensioner connectors.
(e) Connect the airbag sensor assembly connectors.
(f) Connect the front airbag sensor connectors.
(g) Turn the ignition switch to ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO → **Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

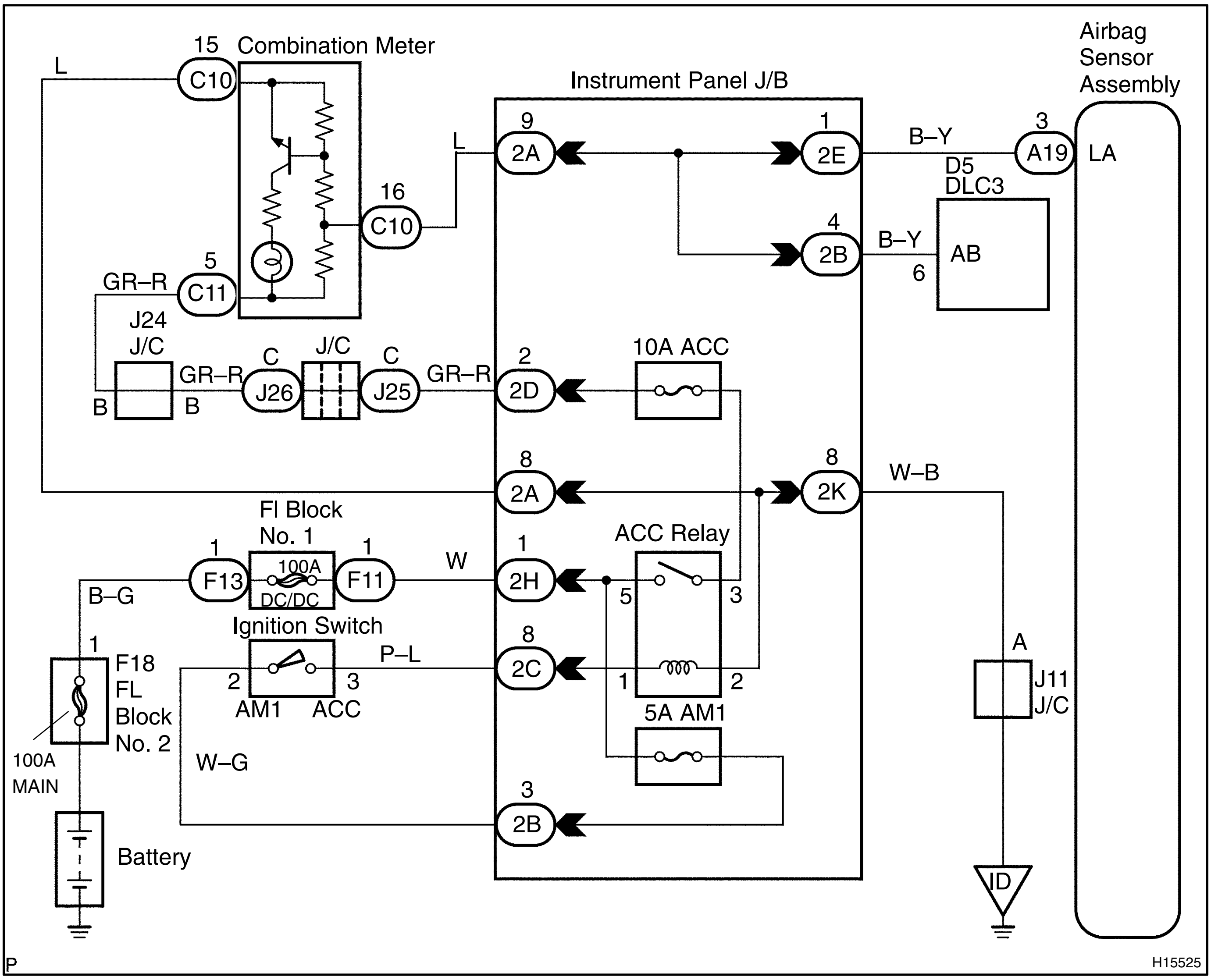
DI7QA–01

SRS Warning Light Circuit Malfunction

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to 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 CG of the DLC3 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

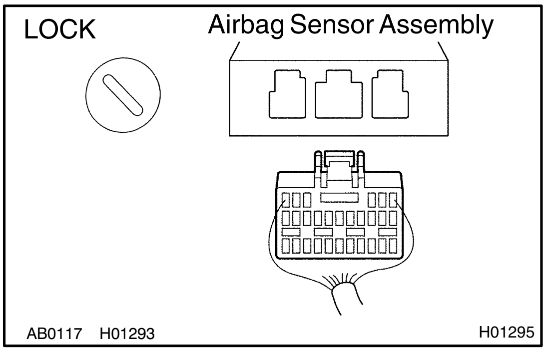


INSPECTION PROCEDURE

Always lights up, when ignition switch is in LOCK position

1	Prepare for inspection (See step 1 on page DI–538).

2	Does SRS warning light turn off?



PREPARATION:

(a) Turn the ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to the battery.

CHECK:

Check operation of SRS warning light.

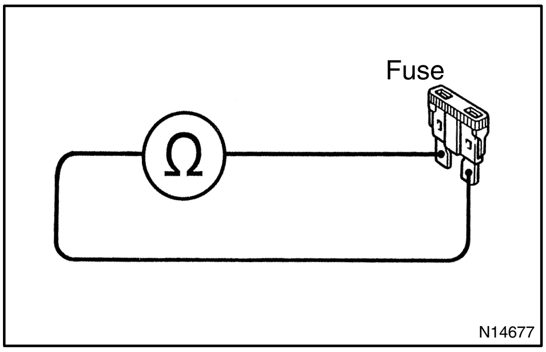
NO → **Check SRS warning light circuit or terminal A/B circuit of DLC3.**

YES

Replace airbag sensor assembly.

Does not light up, when ignition switch is turned to ON

1	**Check AM2 Fuse.**



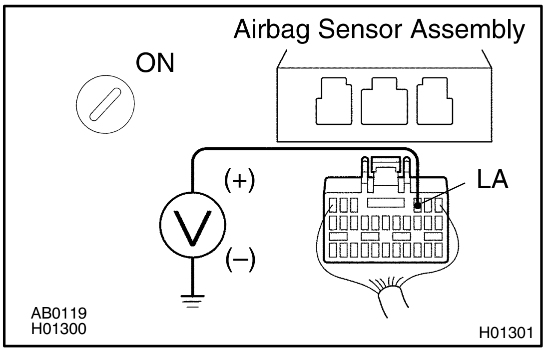
PREPARATION:
Remove the AM2 fuse.
CHECK:
Check continuity of the AM2 fuse.
OK:
Continuity
HINT:
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG → **Go to step 4.**

OK

2	**Prepare for inspection (See step 1 on page DI–538).**

3	**Check SRS warning light circuit.**



PREPARATION:
(a) Disconnect the airbag sensor assembly connector.
(b) Connect negative (–) terminal cable to the battery.
(c) Turn the ignition switch to ON.
CHECK:
Measure the voltage between body ground and LA terminal of the harness side connector of the airbag sensor assembly.
OK:
Voltage: 10 – 14 V

NG → **Check SRS warning light bulb or repair SRS warning light circuit.**

OK

Replace airbag sensor assembly.

4	Is new AM2 fuse burnt out again?

NO → **Using simulation method, reproduce malfunction symptoms (See page IN–29).**

YES ↓

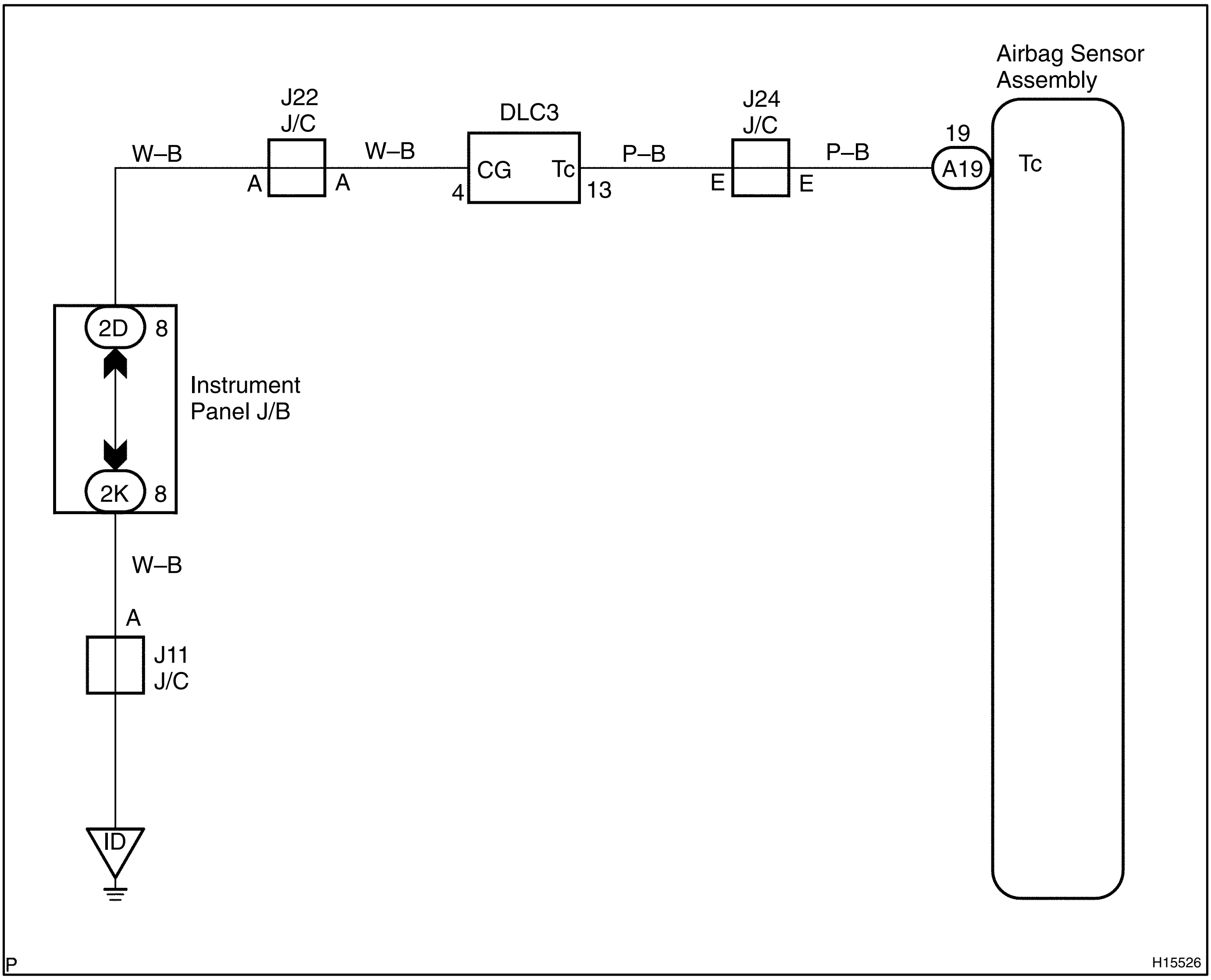
Check harness between AM2 fuse and SRS warning light.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and CG of the DLC3 the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

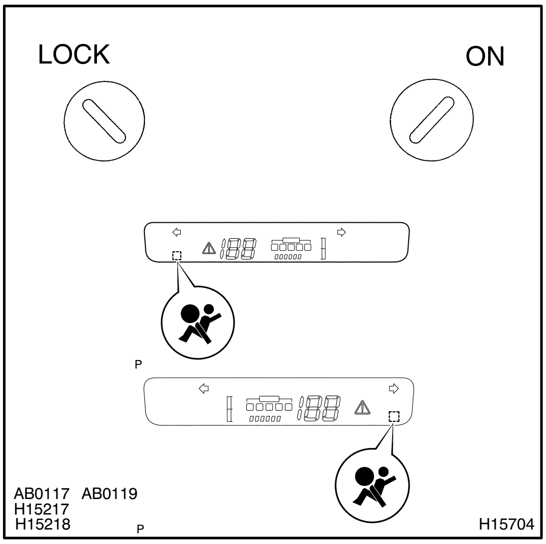
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	**Does SRS warning light light up for approx. 6 seconds?**



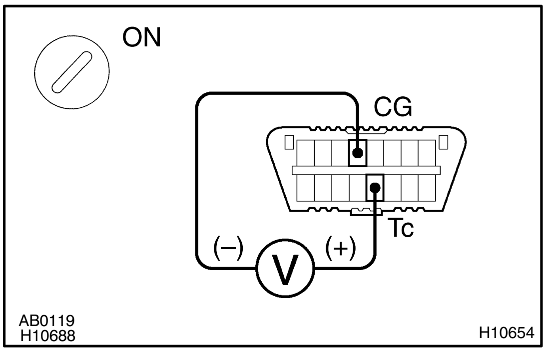
PREPARATION:

Check operation of the SRS warning light after ignition switch is turned from LOCK position to ON position.

NO → **Check SRS warning light system (See page DI–541).**

YES

2	**Check voltage between terminals Tc and CG of DLC3.**



PREPARATION:

Turn the ignition switch to ON.

CHECK:

Measure the voltage between terminals Tc and CG of DLC3.

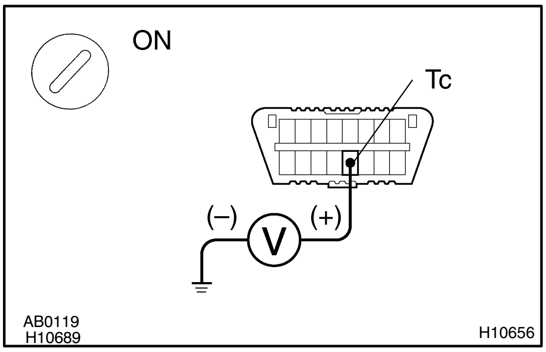
OK:

Voltage: 10 – 14 V

OK → **Go to step 4.**

NG

3	**Check voltage between terminal Tc of DLC3 and body ground.**



CHECK:

Measure the voltage between terminal Tc of DLC3 and body ground.

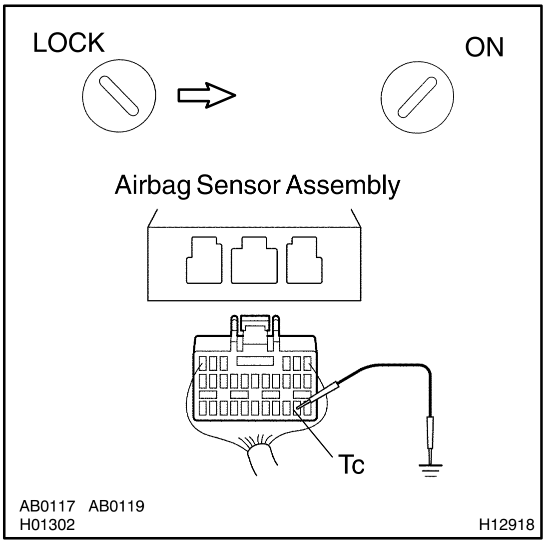
OK:

Voltage: 10 – 14 V

OK → **Check harness between terminal E1 of DLC3 and body ground.**

NG

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Turn the 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 back side as shown in the illustration.
(e) Connect the airbag sensor assembly connector with service wire.
(f) Connect negative (–) terminal cable to the battery.
(g) Turn the ignition switch to ON and wait at least for 20 seconds.
(h) Connect service wire of terminal Tc to body ground.

CHECK:

Check operation of the SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

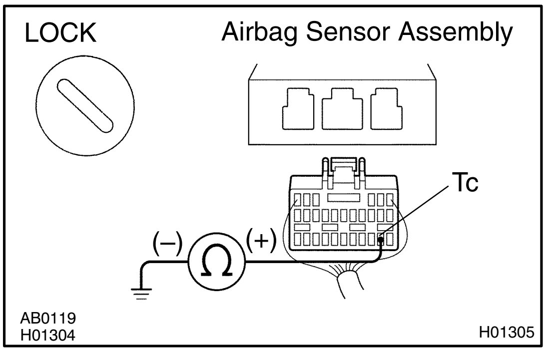
OK → **Check harness between the airbag sensor assembly and DLC3.**

NG

Replace airbag sensor assembly.

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

1	Check resistance between terminal Tc of airbag sensor assembly and body ground.



PREPARATION:

(a) Turn the ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the airbag sensor assembly connector.

CHECK:

Check resistance between terminal Tc of the airbag sensor assembly connector and body ground.

OK:

Resistance: 1 MΩ or Higher

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

OK

Replace airbag sensor assembly.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI611–02

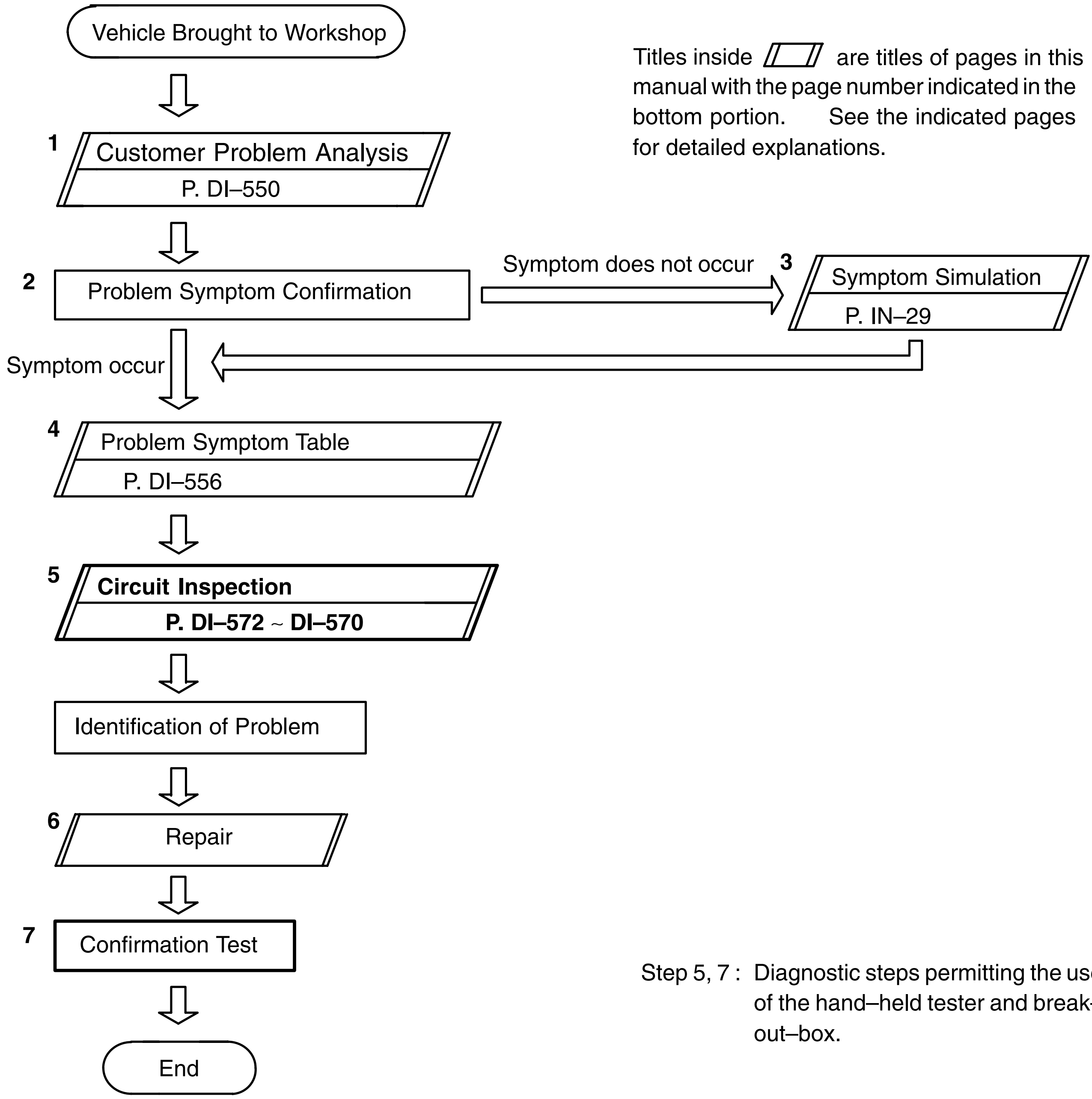
HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

For troubleshooting use a volt/ohm meter.

Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.



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

Step 5, 7 : Diagnostic steps permitting the use of the hand–held tester and break–out–box.

DI612–02

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: ________________

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km** **Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom	☐ Theft deterrent system cannot be set.		
	☐ Indicator light does not flash when the theft deterrent system is set. (It stays ON or does not light at all.)		
	☐ Theft deterrent system does not operate.	☐ When unlocked using the door lock knob. ☐ When the engine hood is opened.	Malfunction ☐ Horns only ☐ Interior light only ☐ Door lock operation only
	☐ System cannot be canceled once set.	☐ When door is unlocked using key or wireless door lock control system.	
	☐ System cannot be canceled during warning operation.	☐ When door is unlocked using key or wireless door lock control system.	
	☐ Others.		

DI7PX–01

PRE–CHECK

1. OUT LINE OF THEFT DETERRENT SYSTEM

When the theft deterrent system detects any theft, it informs people around with flashing lights and sound.
This system is designed to be upgraded by featuring an optional intrusion sensor and siren. (Dealer option)
All initial setting are performed in active mode.
HINT:
There are 4 conditions in this system which are disarmed state, arming preparation, armed state and alarm sounding.

(1) Disarmed state
- When the alarming function does not operate.
- When theft deterrent function is not performed.

(2) Arming preparation
- Time until transferring to armed state.
- Theft deterrent function is not performed.

(3) Armed state
When theft deterrent function is possible.

(4) Alarm sounding:
In this condition, once theft is detected, it is informed using light and sound to people around the vehicle.
Refer to the table for alarming method or time.

Alarming method	Horn
	Siren (Dealer option)
	Hazard
	Interior light
Alarming time	27.5 seconds
Alarming output	Continuous 0.25 secs. (ON) 0.25 secs. (OFF)

HINT:
Alarming output for hazard is same as the one for the hazard on the vehicle.
In the arming condition when either of doors is unlocked with key not in the key cylinder, force lock signal is output.

2. ACTIVE ARMING MODE

Disarmed state (Key not inserted in ignition.)

Perform any of the following and the system will go no to ”Arming preparation”:
- With all the doors, engine hood and luggage compartment door closed, lock all doors with the wireless remote.

Arming preparation

Perform any of the following and the system will return to ”Disarmed state”: ● Open any of the doors, engine hood or luggage compartment door. ● Unlock any of the doors. ● Put the key in the ignition. ● Reconnect the battery.	Perform the following and the system will go on to ”Armed state”: ● Let 30 seconds elapse with all the doors, engine hood and luggage compartment door closed and locked.

Armed state

Perform any of the following and the system will return to ”Disarmed state”: ● Unlock any of the doors with the wireless remote.	Perform any of the following and the system will go on to ”Alarm sounding”: ● Unlock any of the doors with anything other than the wireless remote. ● Open the luggage compartment door (Including key operation). ● Open any of the doors. ● Lift the engine hood. ● Reconnect the battery. ● When input from optional intrusion sensor is detected. (Dealer option) ● Ignition switch is conneted directly.

Alarm sounding

Perform any of the following and the system will return to ”Disarmed state”: ● Unlock any of the doors with the wireless remote.	The vehicle’s horn and self–power siren* will sound, and the hazard and Interior lights flash for 27.5 seconds. *: is optional After the alarm has ended, the system will return to ”Armed state”.

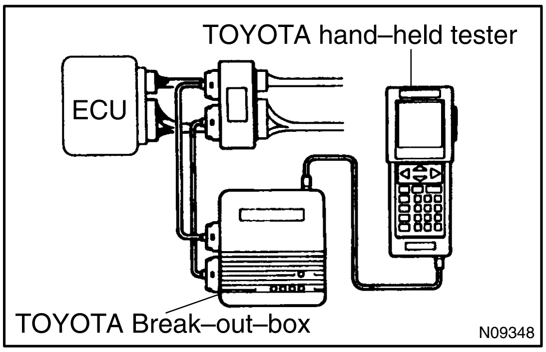
Indicator light output:

Condition	Indicator light
Disarmed state	OFF
Arming preparation	ON
Armed state	OFF
Alarm sounding	ON

HINT:
Even in disarmed state, the indicator light flash. (Due to the signal output form immobilizer system). The indicator always flashes receiving the signal from the immobilizer system at any time in the armed state.

Flashing frequency:
0.2 seconds (ON)
1.8 seconds (OFF)
Answer back:
The hazard lights flush as answer back under the following conditions.

(1) When the system is set.
When arming preparation is set from disarmed state using the wireless door lock, the hazard lights flush once.
(2) When the system is released.
When disarmed state is set from either arming preparation, armed state or alarm sounding using the wireless door lock, the hazard lights flush twice.

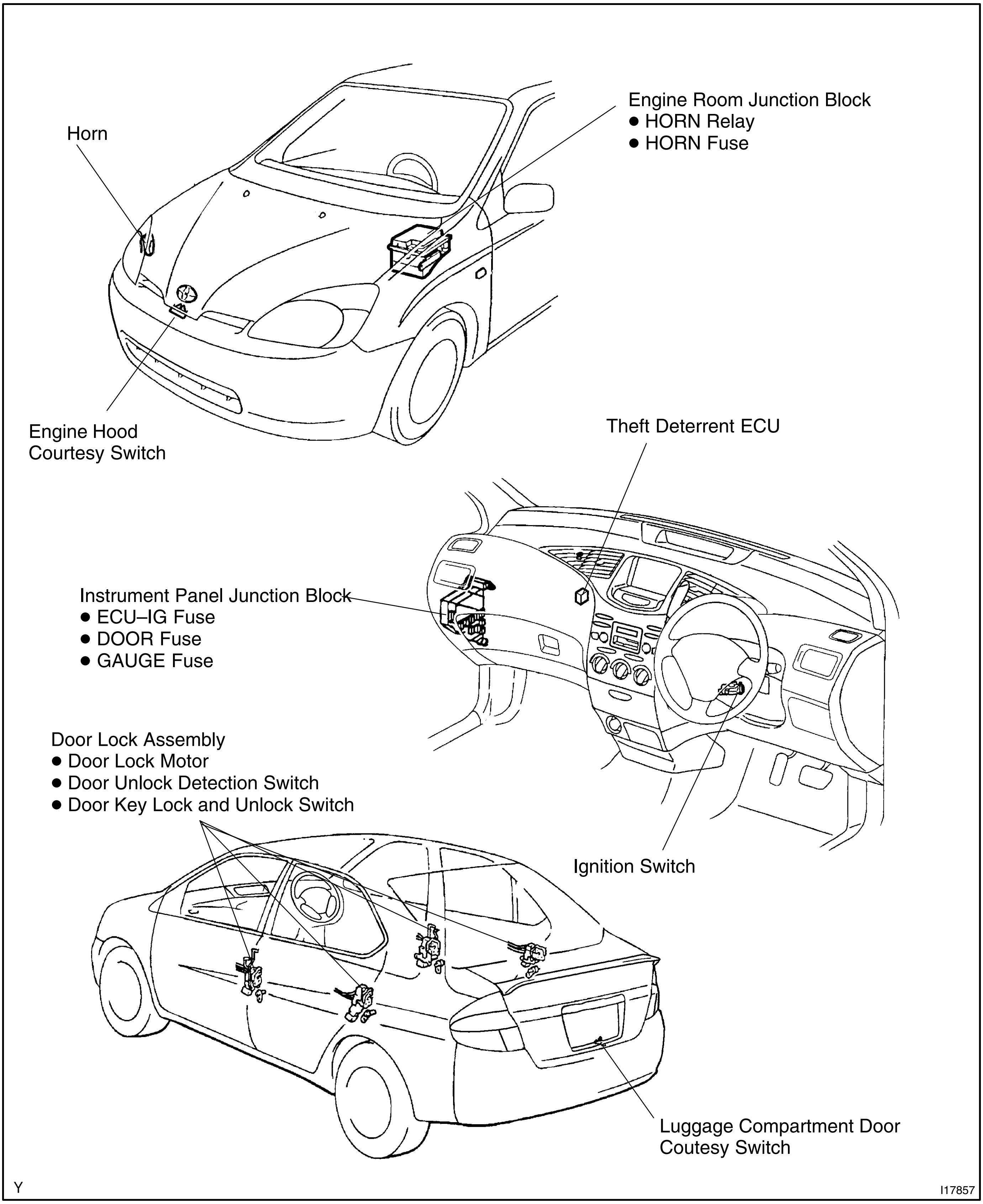


3. ECU TERMINAL VALUES MEASUREMENT BY USING TOYOTA BREAK–OUT–BOX AND TOYOTA HAND–HELD TESTER

(a) Hook up the TOYOTA break–out–box and TOYOTA 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 TOYOTA hand–held tester has a ”Snapshot” function. This records the measured data and is effective in the diagnosis of intermittent problems.

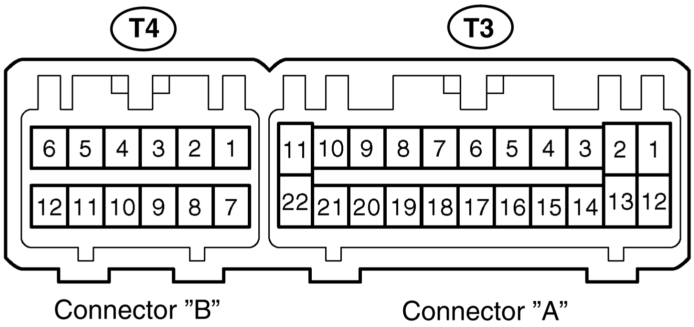
DI614–02

PARTS LOCATION



DI615–02

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Value
DSWH ↔ E (T3–4 ↔ T3–22)	R–W ↔ W–B	Engine hood courtesy switch position is ON. (Engine hood opened)	Below 1 V
		Engine hood courtesy switch position is OFF. (Engine hood closed)	7 – 9 V
DSWL ↔ E (T3–12 ↔ T3–22)	R–W ↔ W–B	Luggage compartment door courtesy switch position is ON. (Door closed)	Below 1 V
		Luggage compartment door courtesy switch position is OFF. (Door opened)	7 – 9 V
IG ↔ E (T3–10 ↔ T3–22)	B–Y ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
+B1 ↔ E (T3–11 ↔ T3–22)	L–Y ↔ W–B	Constant	10 – 14 V
KSW ↔ E (T3–19 ↔ T3–22)	L–B ↔ W–B	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
E ↔ Body ground (T3–22 ↔ Body ground)	W–B ↔ Body ground	Constant	Below 1 V
HORN ↔ E (T4–4 ↔ T3–22)	B–R ↔ W–B	Horn switch position is ON.	Below 1 V
		Horn switch position is OFF.	10 – 14 V
IND ↔ E (T4–12 ↔ T3–22)	LG–B ↔ W–B	During set preparation.	3 – 5 V

DI616–03

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and trouble-shoot for each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Symptom	Suspect Area	See page
The theft deterrent system cannot be set	4. Indicator light circuit 5. ECU power source circuit 6. Key unlock warning switch circuit 7. Luggage compartment door courtesy switch circuit 8. Door key lock and unlock switch circuit 9. Door courtesy switch circuit 10. Door unlock detection switch circuit 11. Engine hood courtesy switch circuit 12. Theft deterrent ECU	DI–564 DI–558 DI–568 DI–572 DI–646 DI–628 DI–644 DI–570 IN–40
The indicator light does not blink when system is set.	1. Indicator light circuit 2. Theft deterrent ECU	DI–564
When the system is set (The system does not operate when the rear door is unlocked).	1. Door unlock detection switch circuit 2. Theft deterrent ECU	DI–644
When the system is set (The system does not operate when the luggage compartment door is opened by a method other than the key).	1. Luggage compartment door courtesy switch circuit 2. Theft deterrent ECU	DI–572
When the system is set (The system does not operate when the engine hood is lifted).	1. Engine hood courtesy switch circuit 2. Theft deterrent ECU	DI–570
* When the system is set (The system does not operate when after 30 seconds put your hand through the window and shake it near the sensor).	1. * Radar sensor circuit 2. Theft deterrent ECU	–
While the system is in warning operation (Horns do not sound).	1. Horn relay circuit 2. Theft deterrent ECU	DI–566
* While the system is in warning operation (Siren does not sound).	1. * Self power siren circuit 2. Theft deterrent ECU	–
* While the system is in warning operation (When the siren does not sound or stops soon after it starts).	1. * Self power siren battery 2. Theft deterrent ECU	–
While the system is in warning operation (Interior light does not light).	1. Illumination circuit 2. Theft deterrent ECU	DI–622
While the system is in warning operation (Hazard lights do not flash).	1. Hazard switch circuit 2. Theft deterrent ECU	DI–635
While the system is in warning operation (The door lock is not locked).	1. Door unlock detection switch circuit 2. Theft deterrent ECU	DI–644
System is still set even when a rear door is open	1. Door courtesy switch circuit 2. Theft deterrent ECU	DI–628
Even when the system is not set (Horns sound).	1. Horn relay circuit 2. Theft deterrent ECU	DI–566
* Even when the system is not set (Siren sounds).	1. * Self power siren circuit 2. Theft deterrent ECU	–
* Even when the system is not set (when the siren does not sound or stops soon after it starts).	1. * Self power siren battery 2. Theft deterrent ECU	–
Even when the system is not set (Hazard lights do not flash).	1. Hazard switch circuit 2. Theft deterrent ECU	DI–635

*: Dealer option

DI618–02

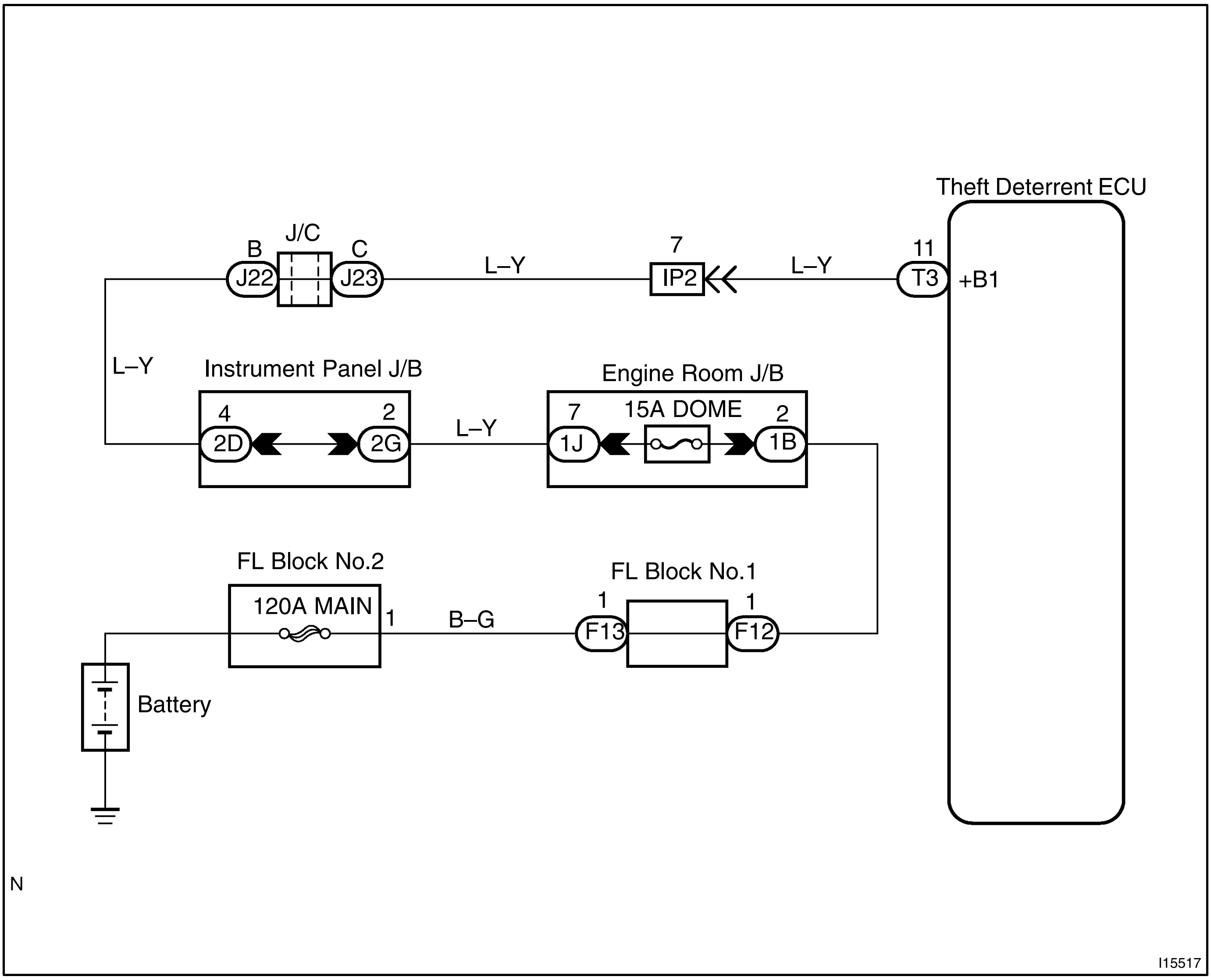
CIRCUIT INSPECTION

ECU Power Source Circuit

CIRCUIT DESCRIPTION

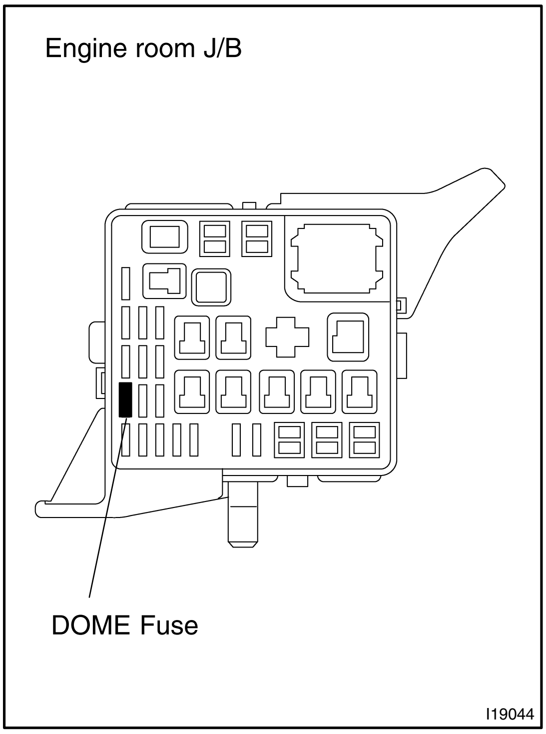
This circuit provides power to operate the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check DOME.

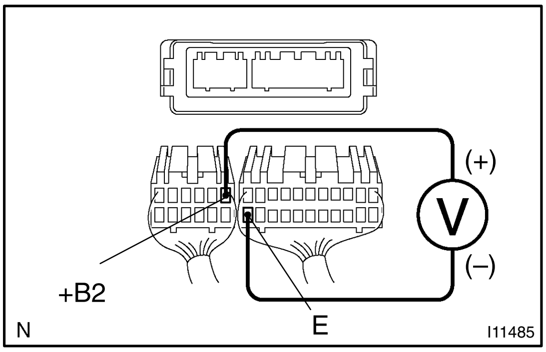


PREPARATION:
Remove DOME fuse from engine room junction block.
CHECK:
Check continuity of DOME fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to the DOME fuse (See attached wiring diagram).**

OK

2	Check voltage between terminals +B and E of theft deterrent ECU connector.



PREPARATION:
Disconnect the theft deterrent ECU connector.
CHECK:
Measure voltage between terminals +B and E of theft deterrent ECU connector.
OK:
Voltage: 10~14V

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–556).**

NG

3	Check for open in harness and connector between ECU and body ground (See page IN–40).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.

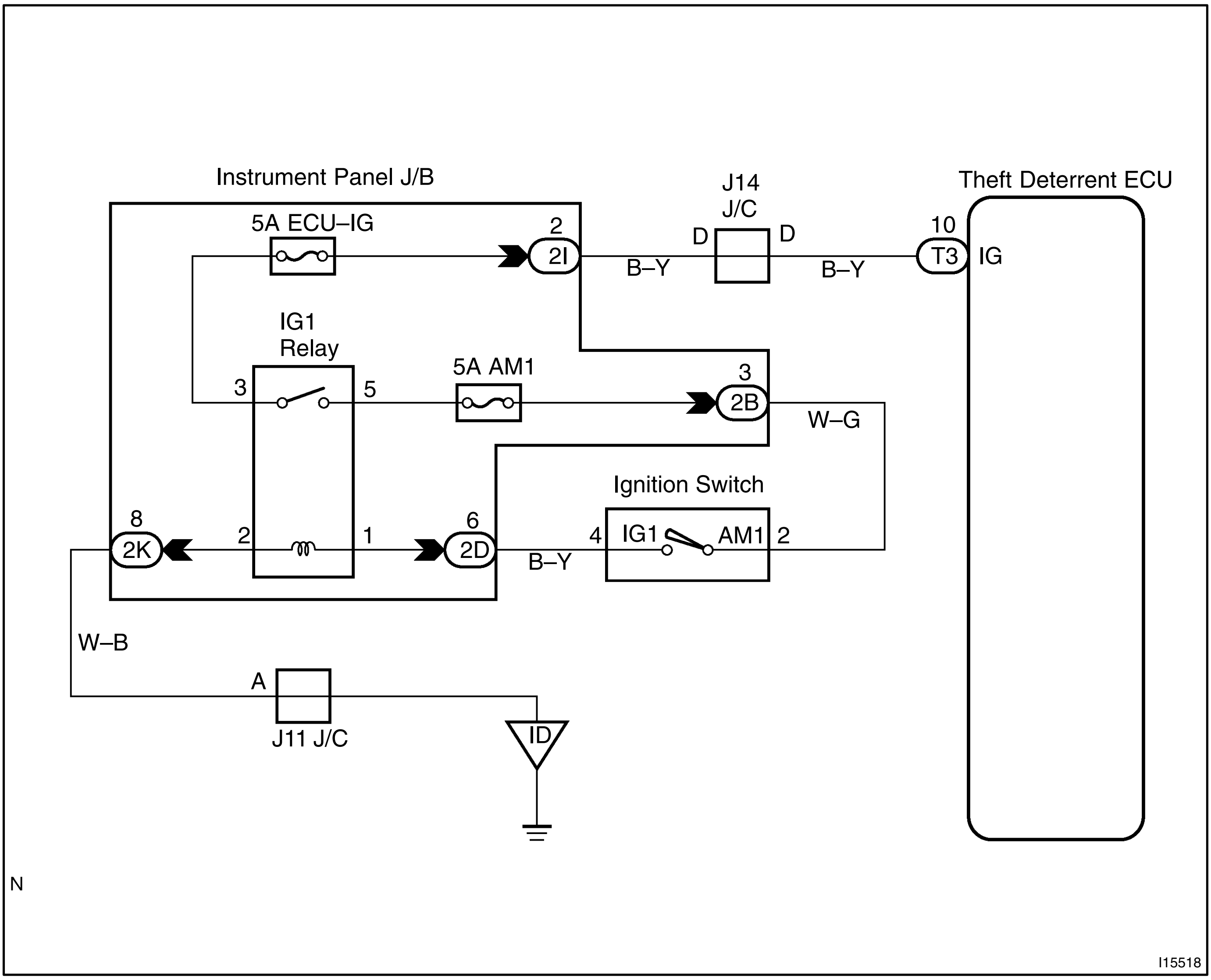
DI619–02

Ignition Switch Circuit

CIRCUIT DESCRIPTION

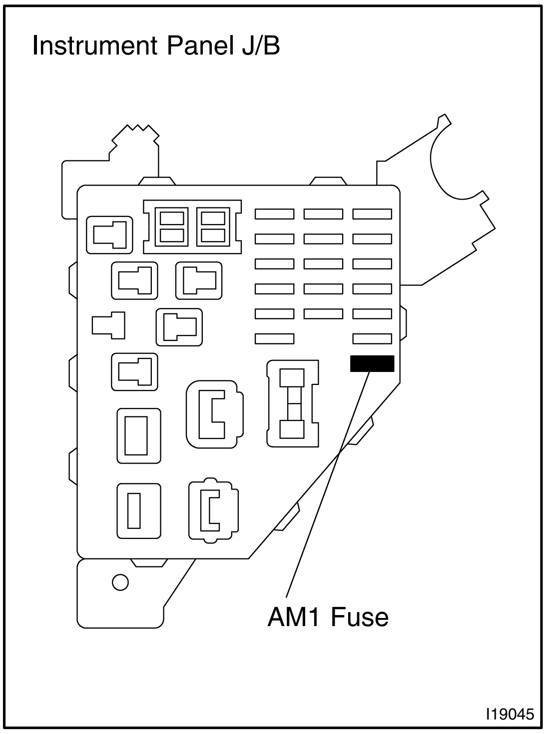
When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU. Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU. When the battery positive voltage is applied to the terminal ACC of the ECU while the theft deterrent system is activated, the warning stops. Furthermore, power supplied from the terminals ACC and IG of the ECU is used as power for the door courtesy switch, and position switch, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check AM1 fuse.**



PREPARATION:

(a) Remove the fuse box opening cover.

(b) Remove AM1 fuse from instrument panel junction block.

CHECK:

Check continuity of AM1 fuses.

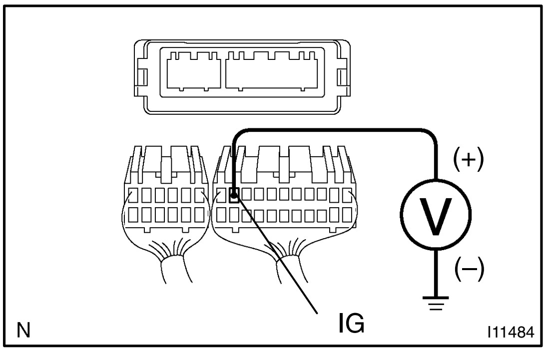
OK:

Continuity

NG → **Check for short in all the harness and components connected to the AM1 fuse (See attached wiring diagram).**

OK

2	**Check voltage between terminals IG of theft deterrent ECU and body ground.**



PREPARATION:

(a) Disconnect the theft deterrent ECU connectors.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals IG of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and battery (See page IN–40).**

OK

Check and replace theft deterrent ECU.

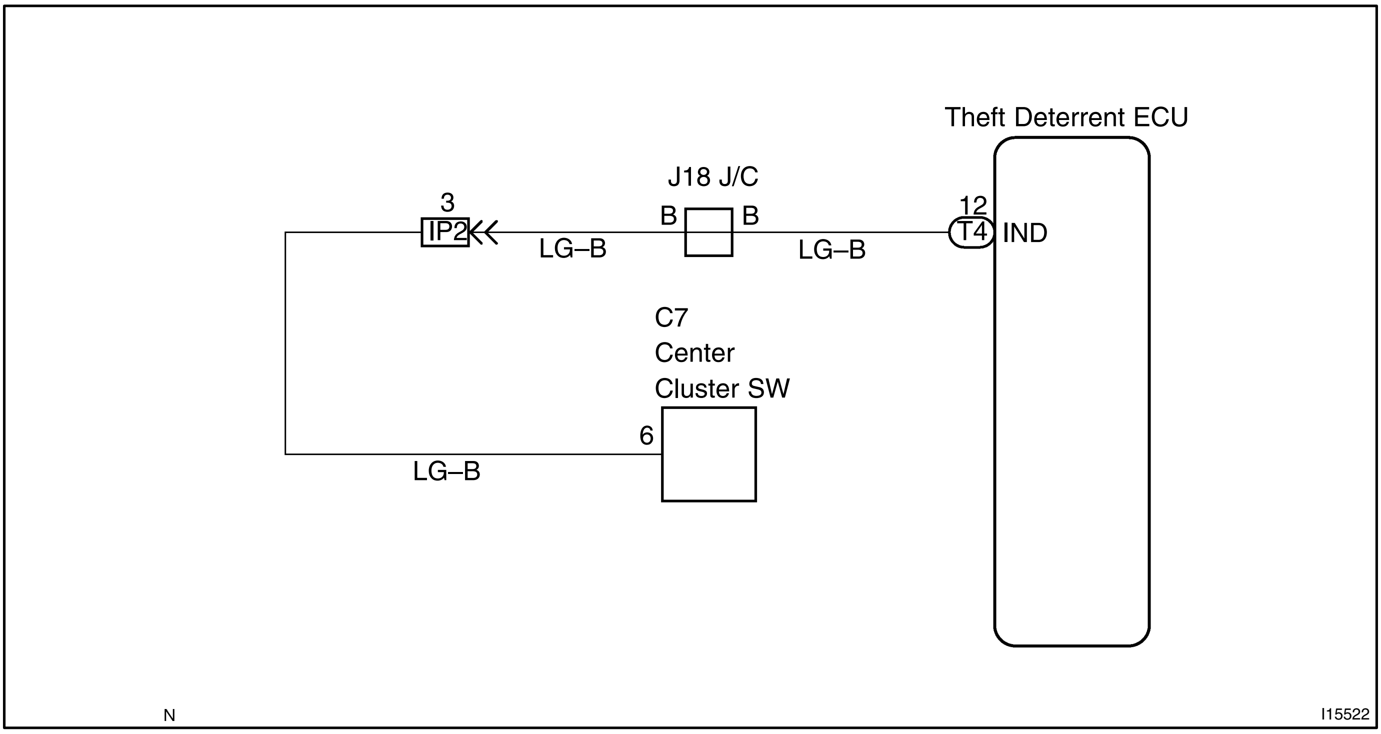
DI617–02

Indicator Light Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light ON for 0.2 second and turns it OFF for 1.8 second, thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check indicator light (center cluster module control) (See page DI–777).**

NG → **Replace the bulb or meter wire harness.**

OK

2	**Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN–40).**

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

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–556).

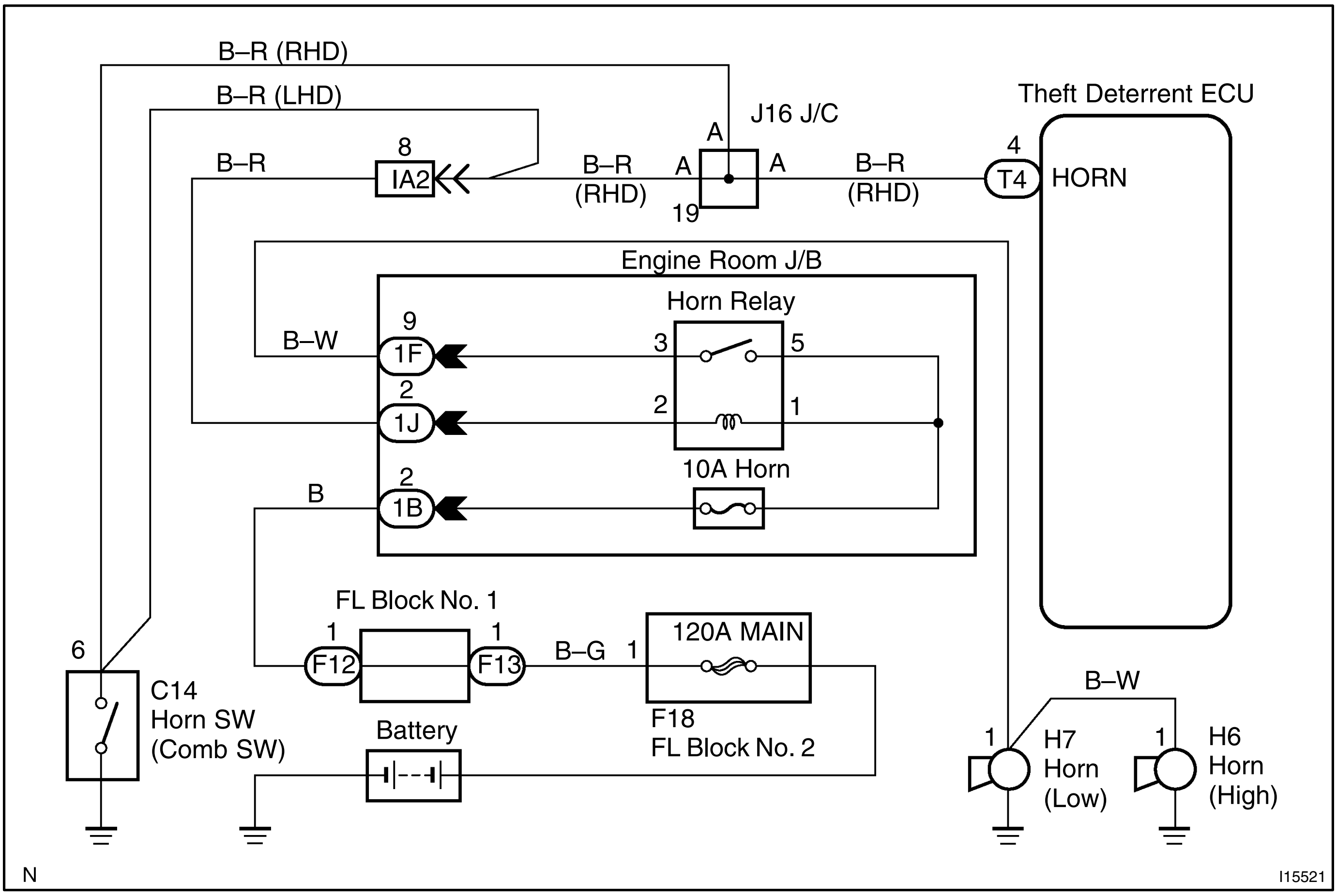
Horn Relay Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF in approximately 0.4 sec. cycles. This switches the horn relay ON and OFF, thus the horns blow (See the wiring diagram below).
In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the horn relay switches OFF, thus stopping the horns from blowing:

(1) Unlock the doors with the wireless door lock control system.
(2) Wait for approximately 27.5 seconds.

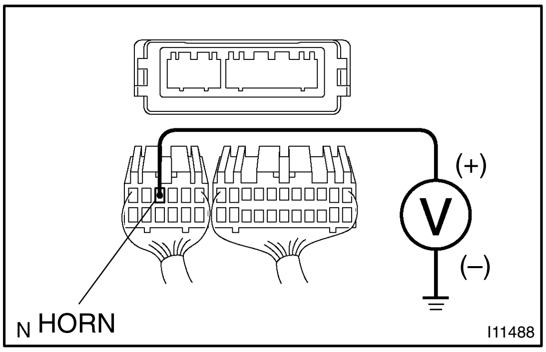
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
The flow chart below is based on the premise that the horns blow normally whenever the horn switch is operated. If horn operation is not normal when the horn switch is operated, check the horn switch.

1	**Check voltage between terminal HORN of theft deterrent ECU connector and body ground.**



PREPARATION:
Disconnect the theft deterrent ECU connectors.
CHECK:
Measure voltage between terminal HORN of theft deterrent ECU connector and body ground.
OK:
Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and horn relay (See page IN–40).**

OK

Check and replace theft deterrent ECU (See page IN–40).

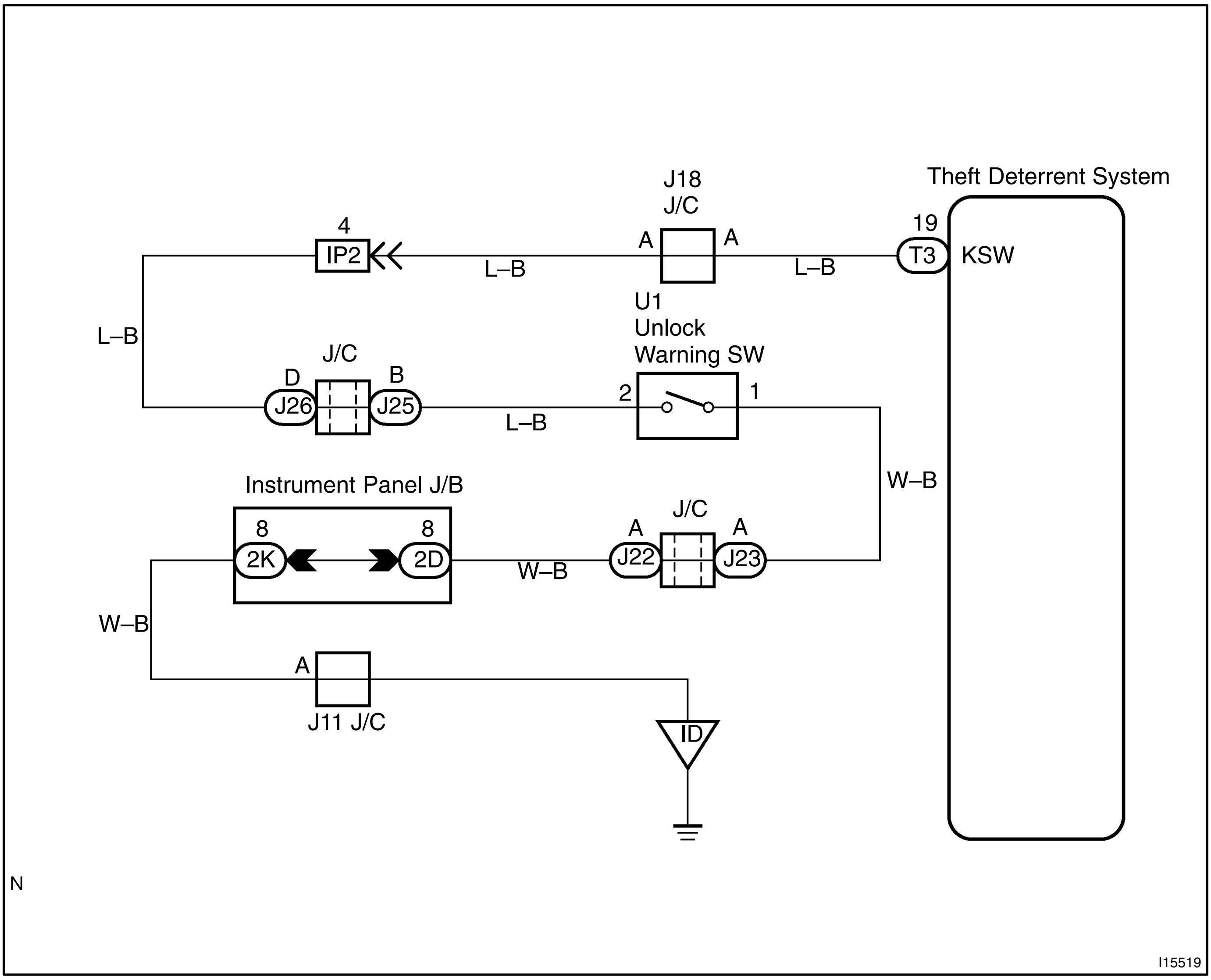
DI61F–02

Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

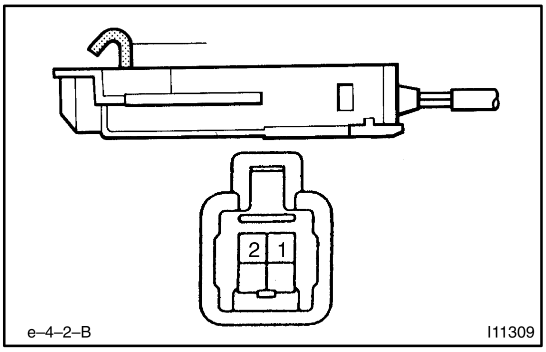
The key unlock warning switch goes ON when the ignition key is inserted in the key cylinder and goes OFF when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check key unlock warning switch.



PREPARATION:
Disconnect key unlock warning switch connector.
CHECK:
Check continuity between terminal 1 and 2 of key unlock warning switch connector, when the key is inserted into the key cylinder or removed.
OK:

Switch position	Tester connection	Specified condition
ON (Key inserted)	1 – 2	Continuity
OFF (Key removed)	–	No continuity

NG → **Replace key unlock warning switch.**

OK

2	Check harness and connectors between ECU and key unlock warning switch, key unlock warning switch and body ground (See page IN–40).

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

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–556).

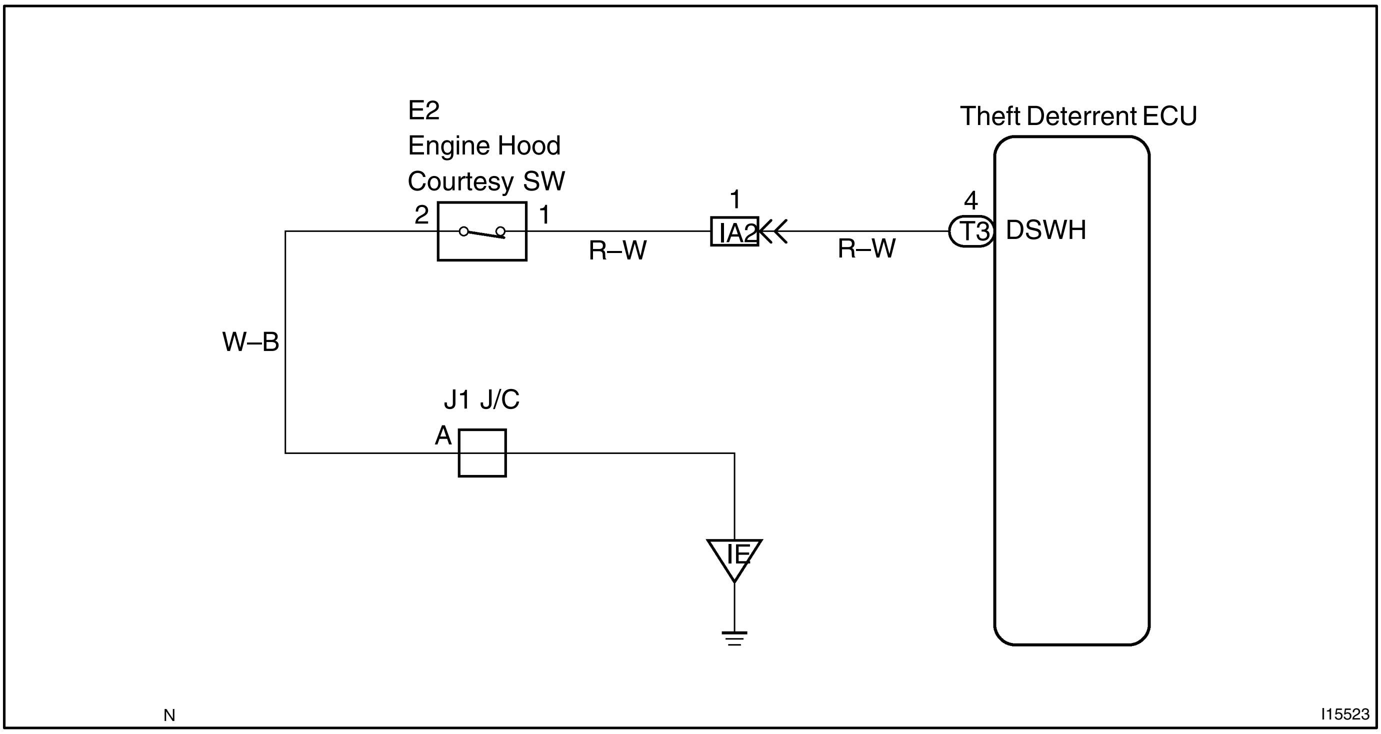
DI61H–02

Engine Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

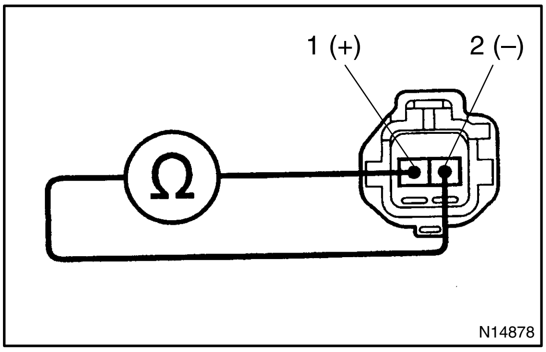
The engine hood courtesy switch is built into the engine hood lock assembly and goes ON when the engine hood is opened and goes OFF when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check engine hood courtesy switch.



PREPARATION:
(a) Remove engine hood lock assembly.
(b) Disconnect engine hood courtesy switch connector.

CHECK:
Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK:

Engine hood lock	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

NG → **Replace engine hood courtesy switch.**

OK

2	Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page IN–40).

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

OK

Check and replace theft deterrent ECU (See page IN–40).

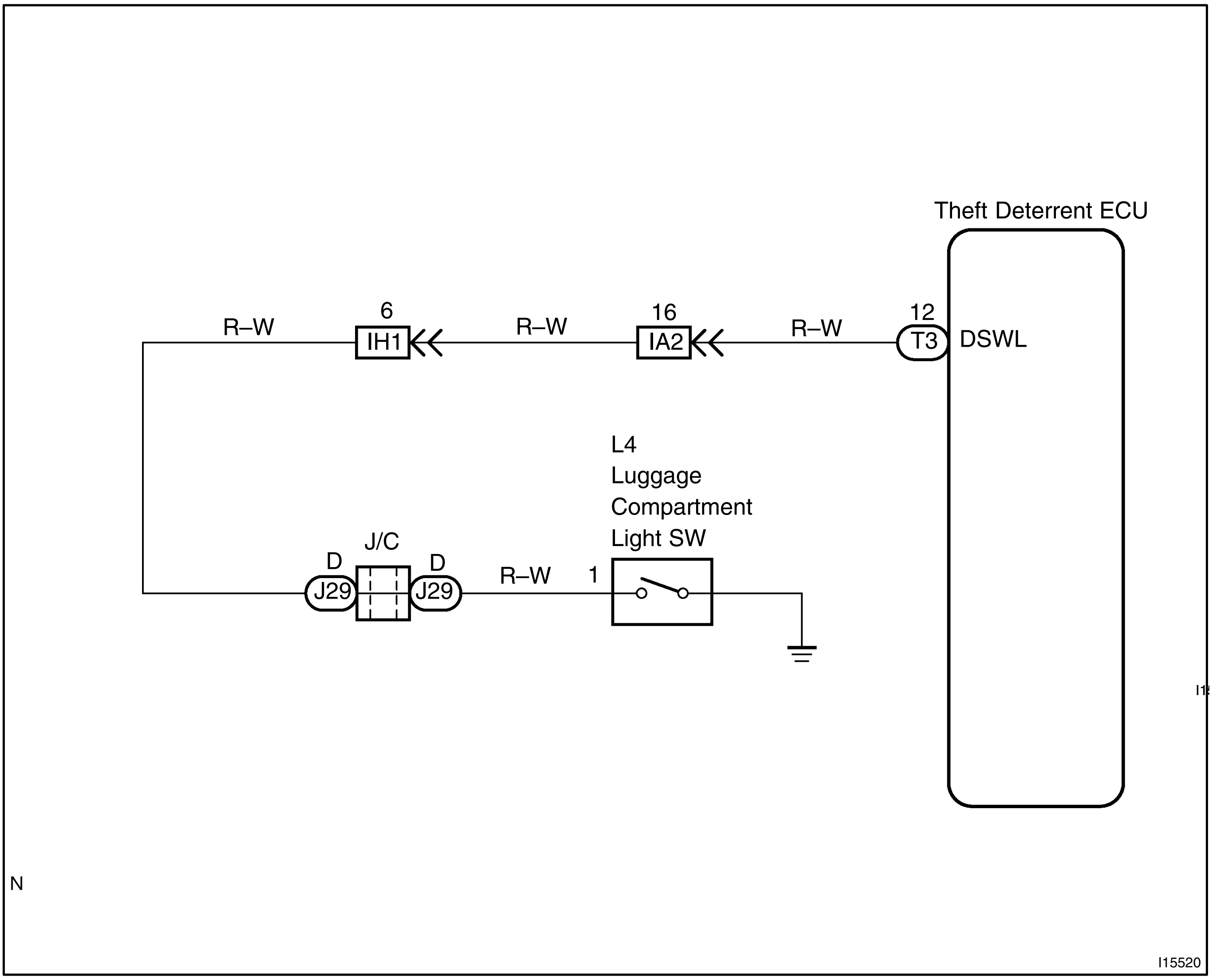
DI7Q6–01

Luggage courtesy switch circuit

CIRCUIT DESCRIPTION

The luggage courtesy switch goes on when luggage compartment door is opened and goes off when luggage compartment door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check luggage courtesy switch (See page BE–31).

NG → Replace the luggage courtesy switch.

OK

2	Check wire harness and connector between luggage courtesy switch and Body ECU. (See page IN–40)

NG → Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page DI–615)

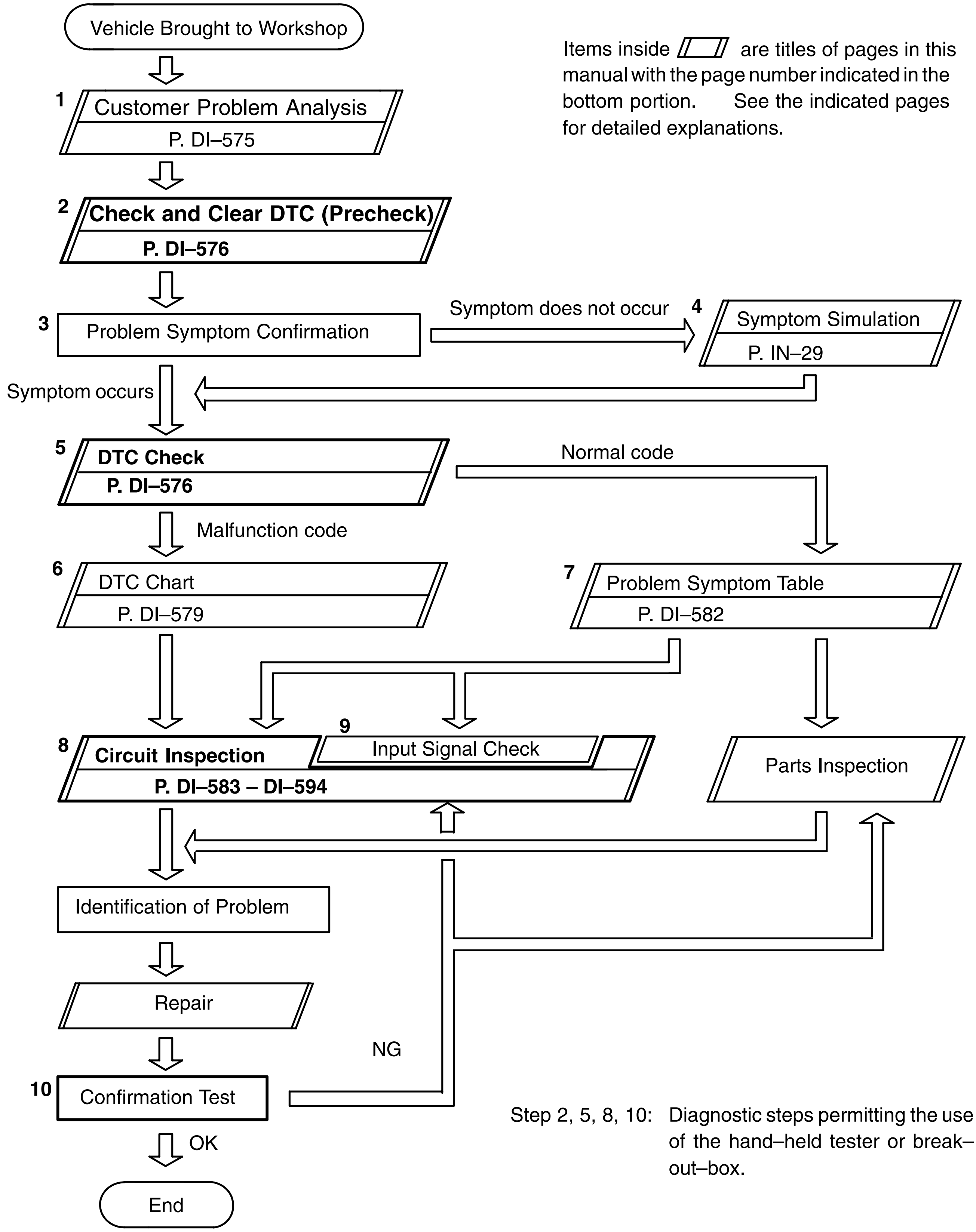
CRUISE CONTROL SYSTEM

DI26R–15

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 hand–held tester or break–out–box.

DI26S–12

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**

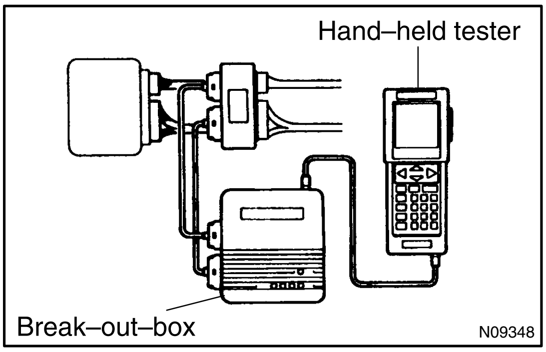
Condition of Problem Occurrence	**Date of Problem Occurrence**	/ /
	Frequency Problem Occurs?	" " Continuous " " Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	**km** **Mile**

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)

DI7NG–02

PRE–CHECK



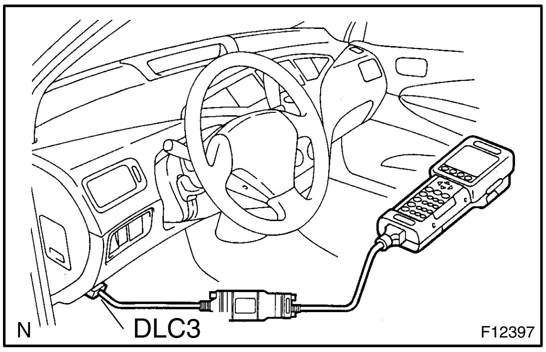
N09348

1. ECU TERMINAL VALUES MEASUREMENT BY 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 ECU input/output values by following the prompts on the tester screen.

(c) Please refer to the hand–held tester has a ”Snapshot” function. This records the measured data and is effective in the diagnosis of intermittent problems.



F12397

2. USING HAND–HELD TESTER

(a) Hook up the hand–held tester to the DLC3.

(b) Monitor the ECU data by following the prompts on the tester screen.

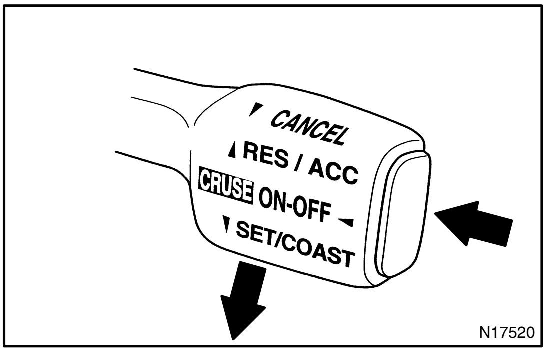
HINT:

Hand–held tester has a ”Snapshot” function which records the monitored data.

Please refer to the hand–held tester operator’s manual for further details.

3. DTC CLEARANCE

DTC can be deleted using a hand–held tester. If there is no hand–held tester or it cannot be used, disconnect the auxiliary battery for 1 min. or more and connect it again.



N17520

4. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

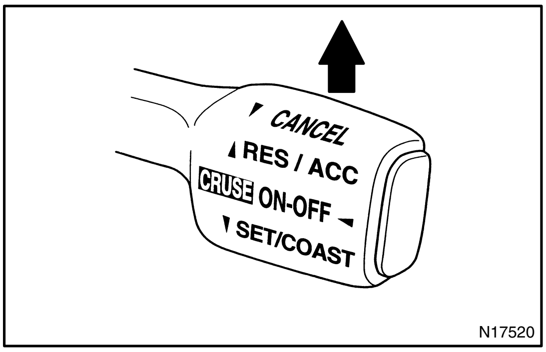
(a) Inspect the SET switch.

(1) Push the main switch ON.

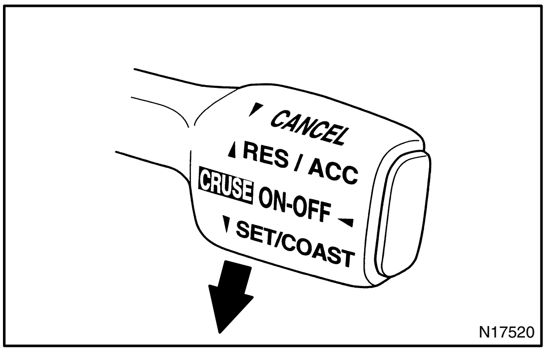
(2) Drive at a desired speed (40 km/h (25 mph) or higher).

(3) Press the control switch to the SET/COAST.

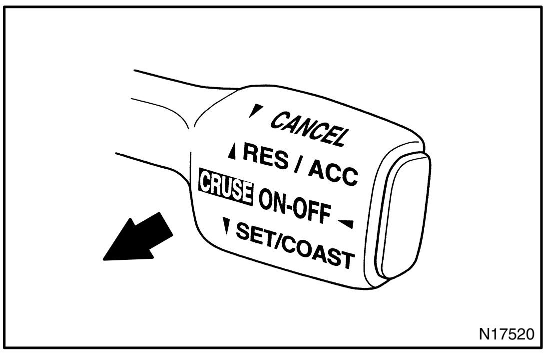
(4) After releasing the switch, check that the vehicle cruises at the desired speed.



(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).

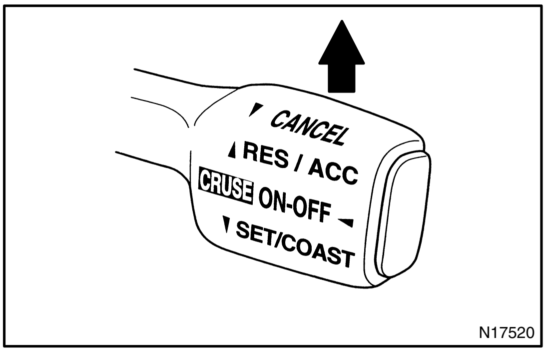


(c) Inspect the COAST switch.
(1) Push the main switch ON.
(2) Drive at a desired speed (40 km/h (25 mph) or higher).
(3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
(4) Momentarily press 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

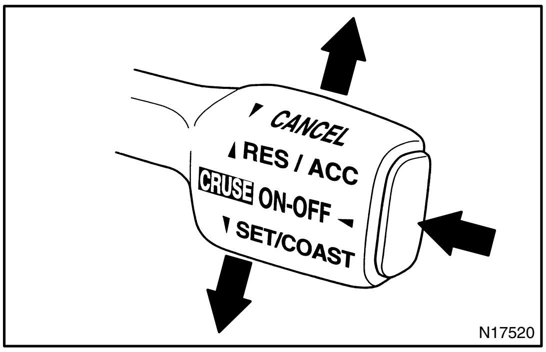
- Pull the cruise control switch to CANCEL



N17520

(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.



N17520

5. INPUT SIGNAL CHECK (Using hand–held tester)

(a) Connect the hand–held tester to DLC3
(b) Check the control switch (MAIN, CANCEL, SET/COAST, RES/ACC)

DI26U–15

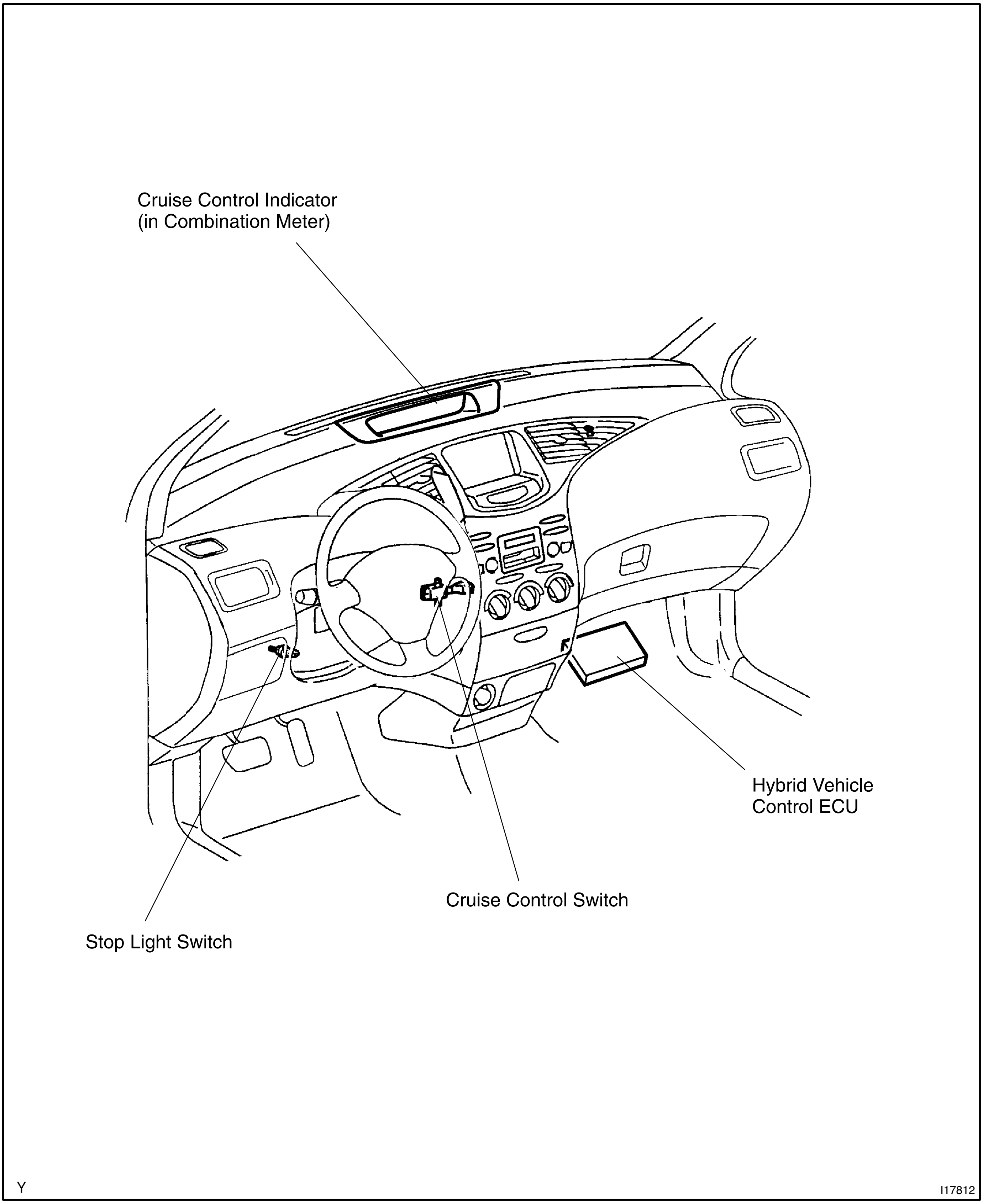
DIAGNOSTIC TROUBLE CODE CHART

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
P1520 (DI–583)	Stop Light Switch Circuit malfunction	• Stop light switch • Harness or connector between hybrid vehicle control ECU and stop light switch circuit • Hybrid vehicle control ECU
P1566 (DI–587)	Input Signal Circuit	• Hybrid vehicle control ECU

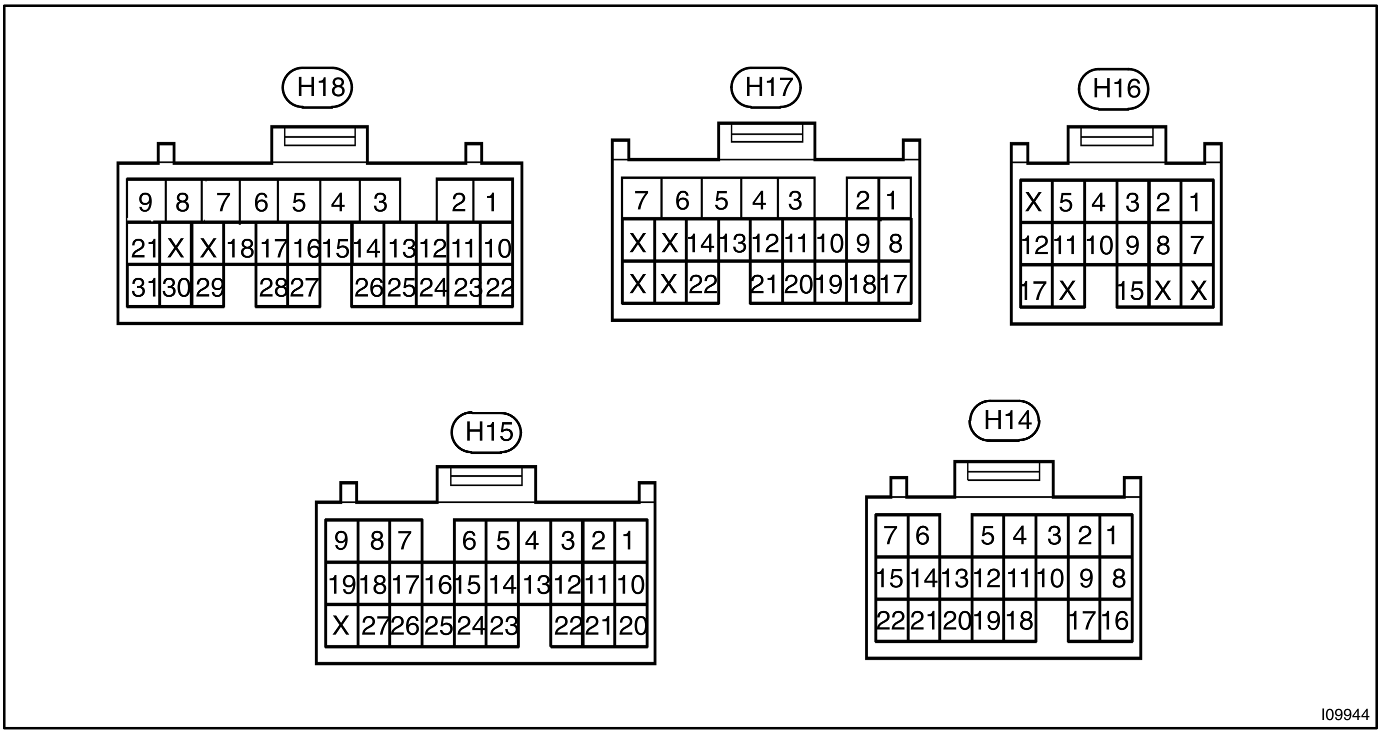
DI7NH–02

PARTS LOCATION



DI3MK–05

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ GND1 (H18–1 ↔ H18–31)	G–W ↔ W–B	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
CCS ↔ GND1 (H18–16 ↔ H18–31)	L ↔ W–B	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch hold ON	6.9 – 9.8 V
		Ignition switch ON SET/COAST switch hold ON	4.7 – 6.9 V
		Ignition switch ON RES/ACC switch hold ON	2.4 – 3.8 V
		Ignition switch ON MAIN switch hold ON	Below 1 V
ST1– ↔ GND1 (H18–2 ↔ H18–31)	B–Y ↔ W–B	Depress brake pedal	Below 1 V
		Release brake pedal	10 – 14 V

DI26X–15

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. Park/Neutral Position Switch Circuit 5. Hybrid vehicle control ECU	DI–587 DI–86 DI–583 DI–179 IN–40
SET not occurring or CANCEL occurring. (DTC is not output)	1. Hybrid vehicle control ECU	IN–40
Actual vehicle speed deviates above or below the set speed.	1. Input Signal Circuit 2. Hybrid vehicle control ECU	DI–587 IN–40
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road. (Hurting)	1. Hybrid vehicle control ECU	IN–40
Cruise control not cancelled, even when brake pedal is depressed.	1. Stop Light Switch Circuit 2. Hybrid vehicle control ECU	DI–583 IN–40
Cruise control not cancelled, even when transmission is shifted to ”N” position.	1. Park/Neutral Position SwitchCircuit 2. Hybrid vehicle control ECU	DI–179 IN–40
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Switch Circuit 2. Hybrid vehicle control ECU	DI–590 IN–40
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Input Signal Circuit 2. Hybrid vehicle control ECU	DI–587 IN–40
Poor response is ACCEL and RESUME modes.	1. Hybrid vehicle control ECU	IN–40
O/D does not resume, even though the road is not uphill.	1. Hybrid vehicle control ECU	IN–40
DTC memory is erased.	1. Hybrid vehicle control ECU	IN–40
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Hybrid vehicle control ECU	– IN–40
Cruise MAIN indicator light remains ON or falls to light up.	1. Input Signal Circuit 2. Hybrid vehicle control ECU	DI–587 IN–40

CIRCUIT INSPECTION

DI7NI–02

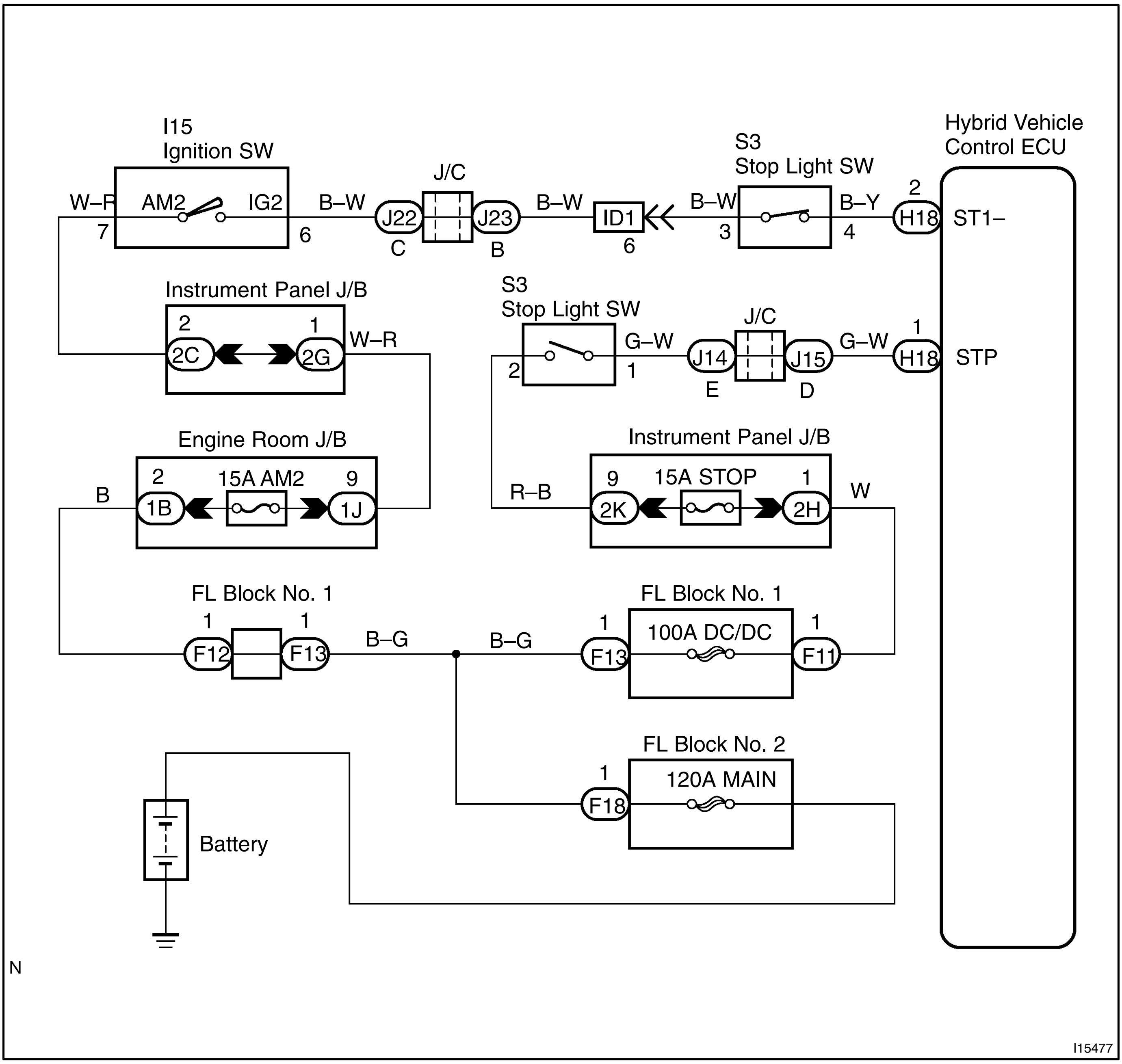
DTC	P1520	Stop light switch circuit

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the hybrid vehicle control ECU. When the hybrid vehicle control ECU receives this signal, it cancels the cruise control.
A fail–safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.
The cancel condition is that battery voltage is supplied to terminal STP.
When the brake is on, battery voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the hybrid vehicle control ECU, and the hybrid vehicle control ECU turns the cruise control OFF.
If the harness connected to terminal STP has an open circuit, terminal STP will have battery voltage and the cruise control will be turned OFF.

DTC No.	Detection Item	Trouble Area
P1520	Stop light switch circuit.	• Stop light switch • Harness or connector between hybrid vehicle control ECU and stop light switch circuit • Hybrid vehicle control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

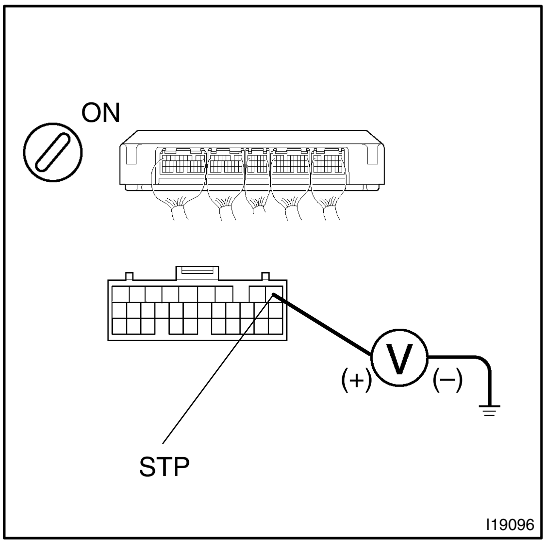
1	**Check operation of stop light.**

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–2).**

OK

2	**Check voltage between terminal STP of hybrid vehicle control ECU connector and body ground.**



PREPARATION:
(a) Remove the hybrid vehicle control ECU with connectors still connected.
(b) Turn ignition switch ON.

CHECK:
Measure voltage between terminal STP of hybrid vehicle control ECU connector and body ground, when the brake pedal is depressed and released.

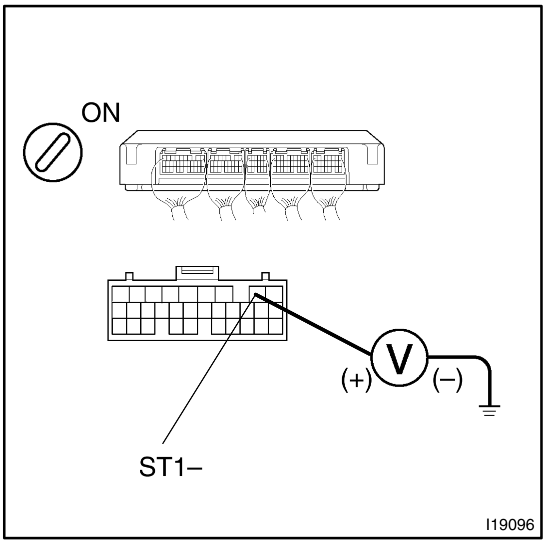
OK:

Depressed	10 – 14 V
Released	Below 1 V

OK — **Proceed to next circuit inspection shown in problem symptom table (See page DI–582).**

NG

3	Check voltage between terminal ST1– of hybrid vehicle control ECU connector and body ground.



PREPARATION:

(a) Remove the hybrid vehicle control ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal ST1– of hybrid vehicle control ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Depressed	Below 1 V
Released	10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–582).**

NG ↓

4	Check wire harness and connector between terminal STP of hybrid vehicle control ECU and stop light switch, and terminal ST1– of hybrid vehicle control ECU and stop light switch (See page IN–40).

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

OK ↓

Check and replace hybrid vehicle control ECU (See page DI–141).

DI3CL–07

DTC	P1566	Input Signal Circuit abnormal

CIRCUIT DESCRIPTION

DTC No.	Detection Item	Trouble Area
P1566	• Stop light switch input signal circuit abnormal.	• Hybrid vehicle control ECU

INSPECTION PROCEDURE

Check and replace hybrid vehicle control ECU (See page DI–141).

DI7NJ–02

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the hybrid vehicle control ECU.

WIRING DIAGRAM

See page DI–124.

INSPECTION PROCEDURE

1	**Check IGN and EFI fuse.**

CHECK:

Check continuity of IGN and EFI fuse.

OK:

Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals IGSW, BATT and GND of hybrid vehicle control ECU connector (See page IN–40).**

PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the hybrid vehicle control ECU connector.

CHECK:

Measure voltage between terminals IGSW, BATT and GND

OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–582).**

NG ↓

3	Check wireharness and connector between hybrid vehicle control ECU and body ground (See page IN–40).

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

OK

Check and repair wireharness and connector between hybrid vehicle control ECU and battery (See page IN–40).

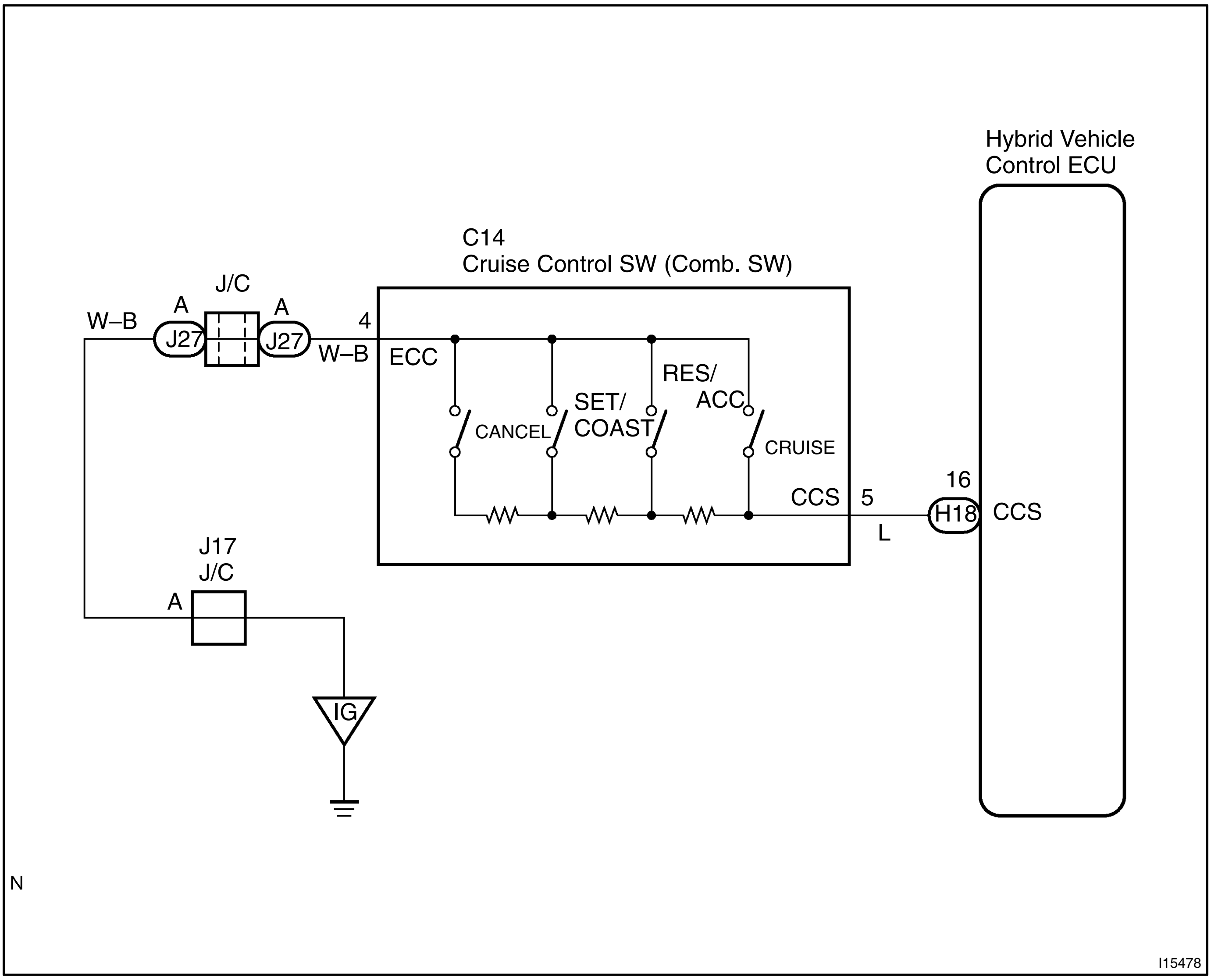
DI7NK–02

Cruise Control Switch Circuit

CIRCUIT DESCRIPTION

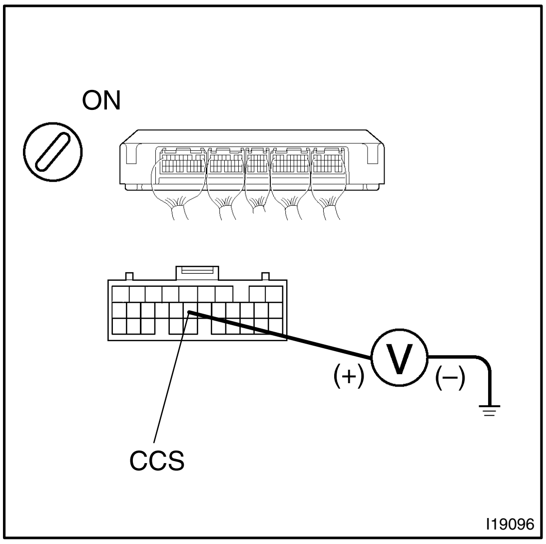
This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signal (each voltage) to the ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals CCS of hybrid vehicle control ECU connector and body ground.**



PREPARATION:

(a) Remove the hybrid vehicle control ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

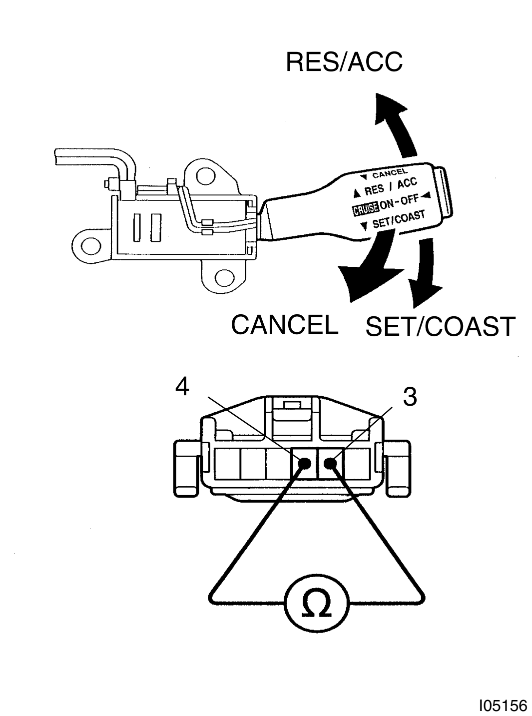
Measure voltage between terminals CCS of hybrid vehicle control ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 –16 V
RES/ACC	2.4 – 3.8 V
SET/COAST	4.7 – 6.9 V
CANCEL	6.9 – 9.8 V

NG — **Proceed to next circuit inspection shown in problem symptoms table (See page DI–582).**

OK

2	Check control switch continuity.



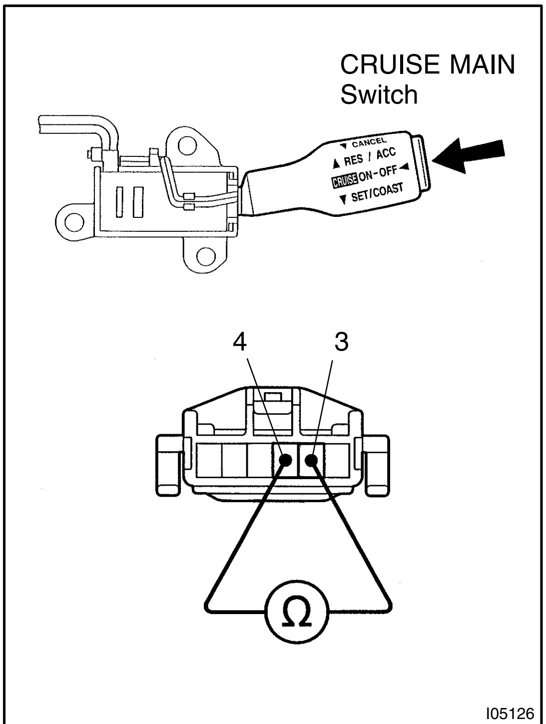
PREPARATION:
(a) Remove steering wheel center pad.
(b) Disconnect the control switch connector.
CHECK:
Measure resistance between terminals 4 and 5 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
RES/ACC	220 – 260
SET/COAST	600 – 660
CANCEL	1,500 – 1,600

NG → **Replace control switch.**

OK

3	Check main switch continuity.



PREPARATION:
(a) Remove steering wheel center pad. (See page SR–6)
(b) Disconnect the control switch connector.
CHECK:
Check continuity between terminals 4 and 5 of control switch connector when main switch is held ON and OFF.
OK:

Switch position	Tester connection	Specified condition
OFF	–	No continuity
Hold ON	4 – 5	Continuity

NG → **Replace control switch.**

OK

4	**Check harness and connector between hybrid vehicle control ECU and cruise control switch, cruise control switch and body ground (See page IN–40).**

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

OK

Check and replace hybrid vehicle control ECU (See page IN–40).

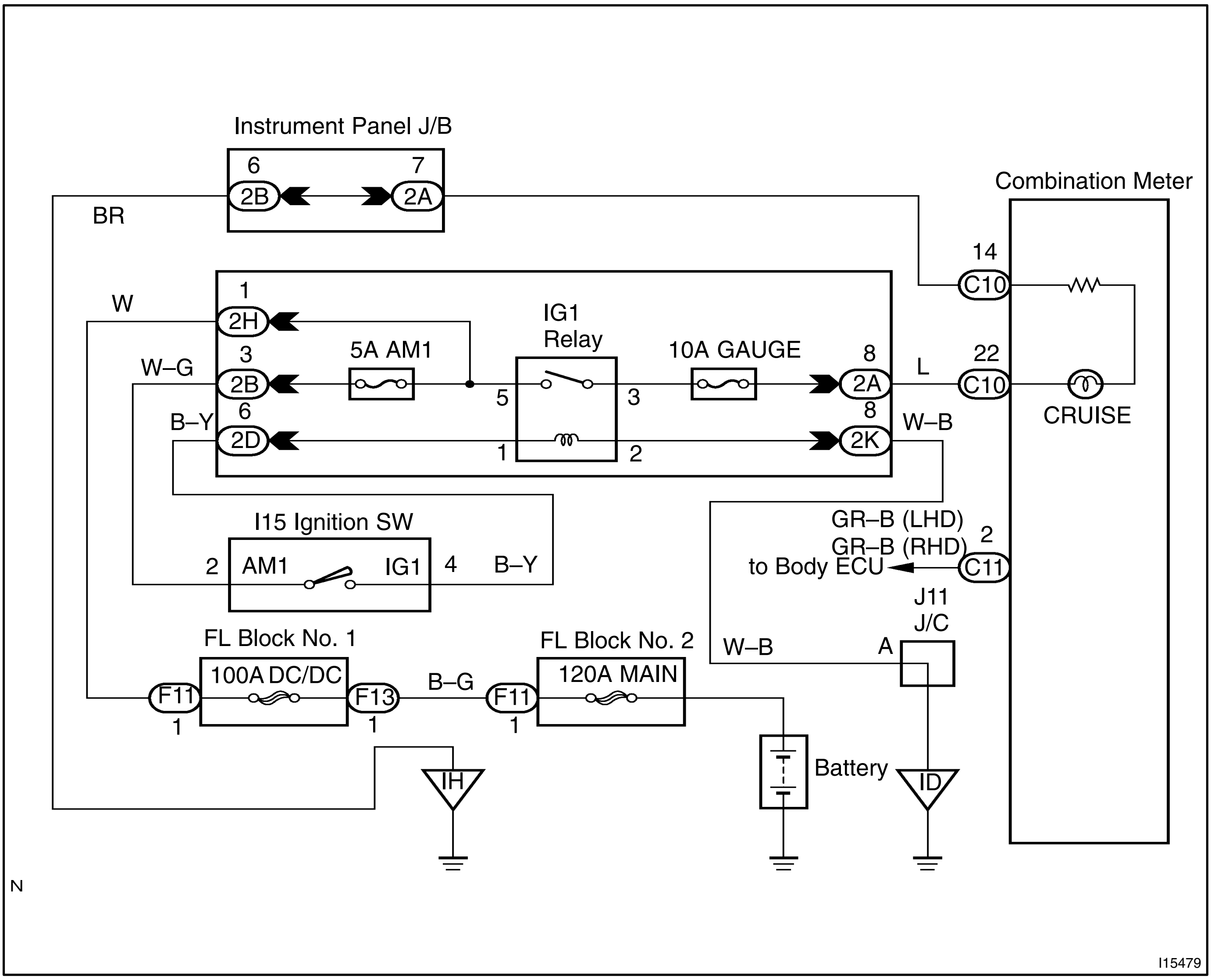
DI7NL–02

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 BE–2).**

NG → **Replace combination meter.**

OK

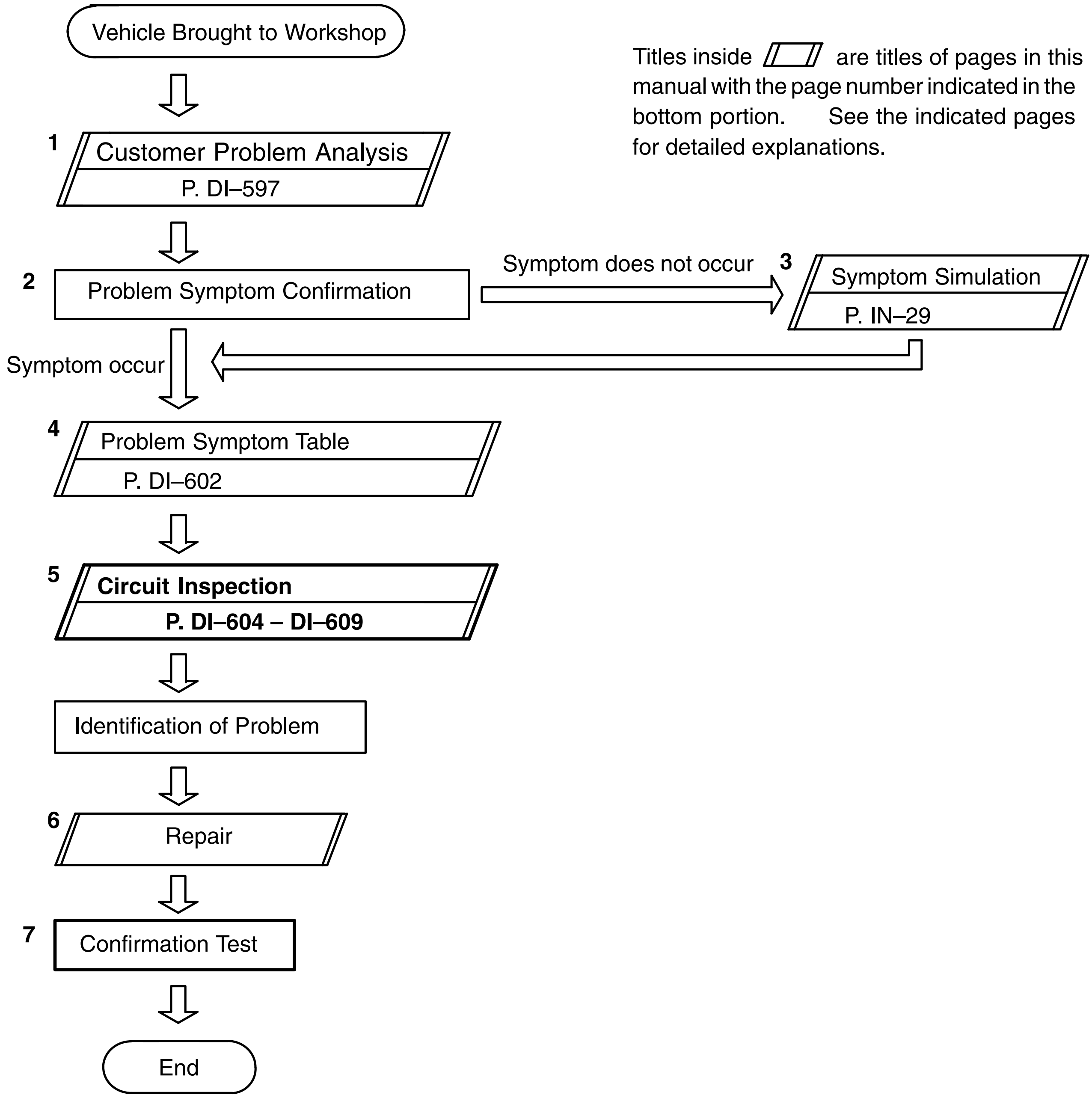
Check and replace hybrid vehicle control ECU (See page DI–141).

COMBINATION METER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI611–04

Troubleshooting in accordance with the procedure on the following page.



DI2BI–09

CUSTOMER PROBLEM ANALYSIS CHECK

COMBINATION METER 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))

DI7XP–02

PRE–CHECK

1. BEFORE CHECK

Since a trouble symptom may result from multiple causes, check not only the part where a user complains of but also the following items in order to be sure no other trouble is identified.

- Fuse related parts
- Wire harness related parts
- Valve related parts

NOTICE:

- **Setting the ignition switch to START temporarily stops all meter operation, however, this is not an error.**
- **When replacing the combination meter ECU, carefully avoid any contact with the IC.**
- **Removing a battery terminal during engine operation may cause a reversed current and lead to malfunction.**
- **When disconnecting any connector or terminal, be sure to disconnect the battery terminal.**

2. FUEL GAUGE DIAGNOSIS CHECK

(a) Fuel emergency display

HINT:

If FR voltage input to the fuel sender gauge is abnormal (4.8 V or more, or 0.06 V or less) due to any error, an emergency will be displayed.

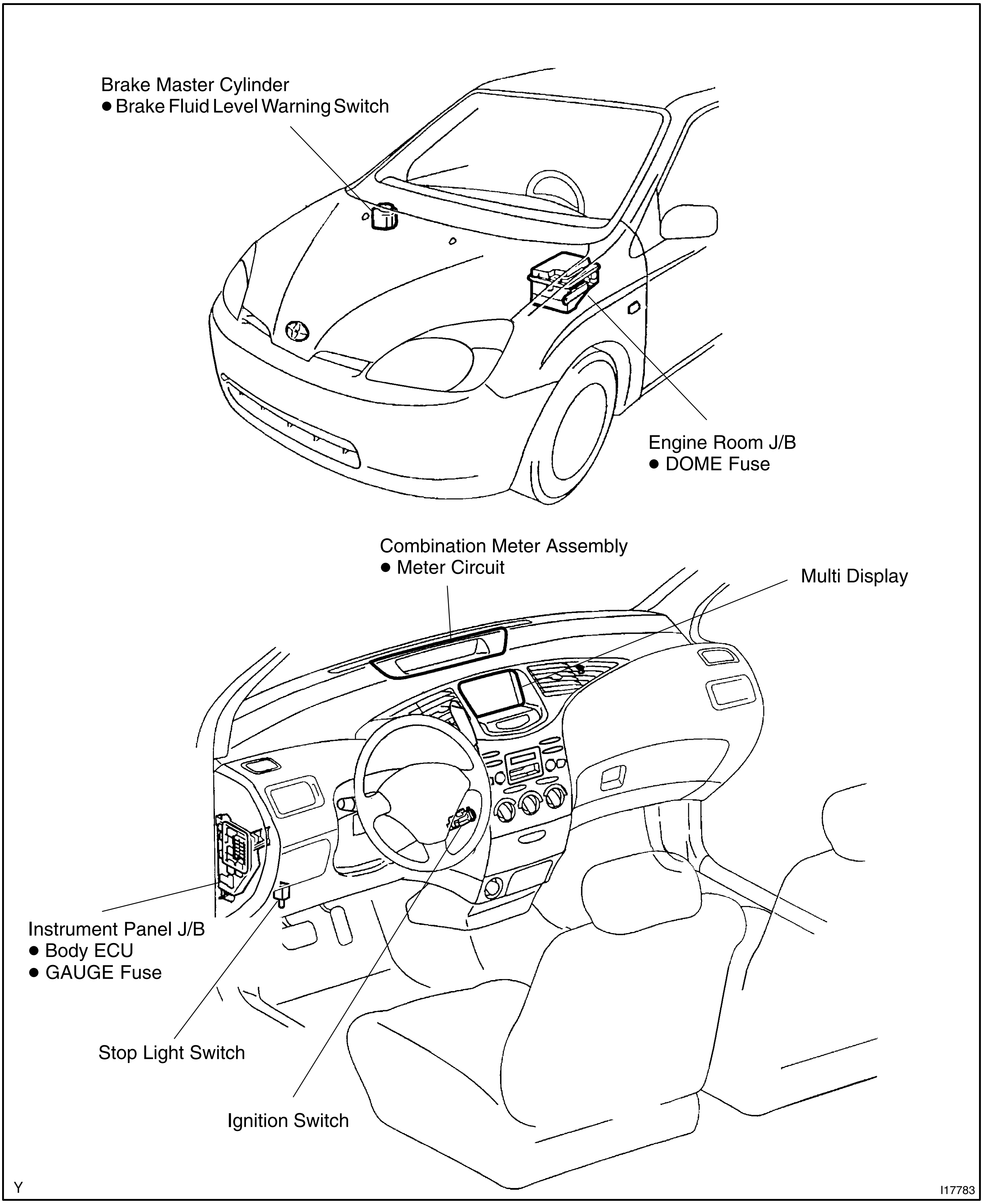
(b) Display:

Immediately after the ignition switch is ON, all of the segments flash.

Diagnosis display	Trouble Item	Plausible Cause
All segments flashing (Flashing pattern No. 1) Cycle: 1.2 sec Duty: 50 %	Multiple communication error	Communication is cut off. 3. Body ECU faulty 4. Engine ECU faulty 5. Open or short in wire harness for communication HINT: Referring to the attached reference material 1 or 2, specify the main cause
All segments flashing (Flashing pattern No. 2) 300 msec. ON 300 msec OFF x 2 + 1.2 sec. OFF	Sender gauge related trouble	1. Sender gauge faulty 2. Open or short in wire harness
Display segments and "E" flashing. (Flashing pattern No. 1) Cycle: 1.2 sec Duty: 50 %	Temperature sensor (located in the tank) related trouble	1. Temperature sensor faulty 2. Open or short in wire harness
Display segments and "E" flashing. (Flashing pattern No. 2) 300 msec. ON 300 msec. OFF x 2 + 1.2 sec. OFF	Indication sensor (located in the meter) trouble	Combination meter faulty
Segment No. 1 flashing (Flashing pattern No. 1) Cycle: 1.2 sec Duty: 50 %	This does not mean any failure. When a battery is connected, it continues flashing until the volume is confirmed.	This occurs when the battery is turned ON. HINT: Low fuel warning: Cycle: 0.6 sec.; Duty: 50 %

DI7XZ–01

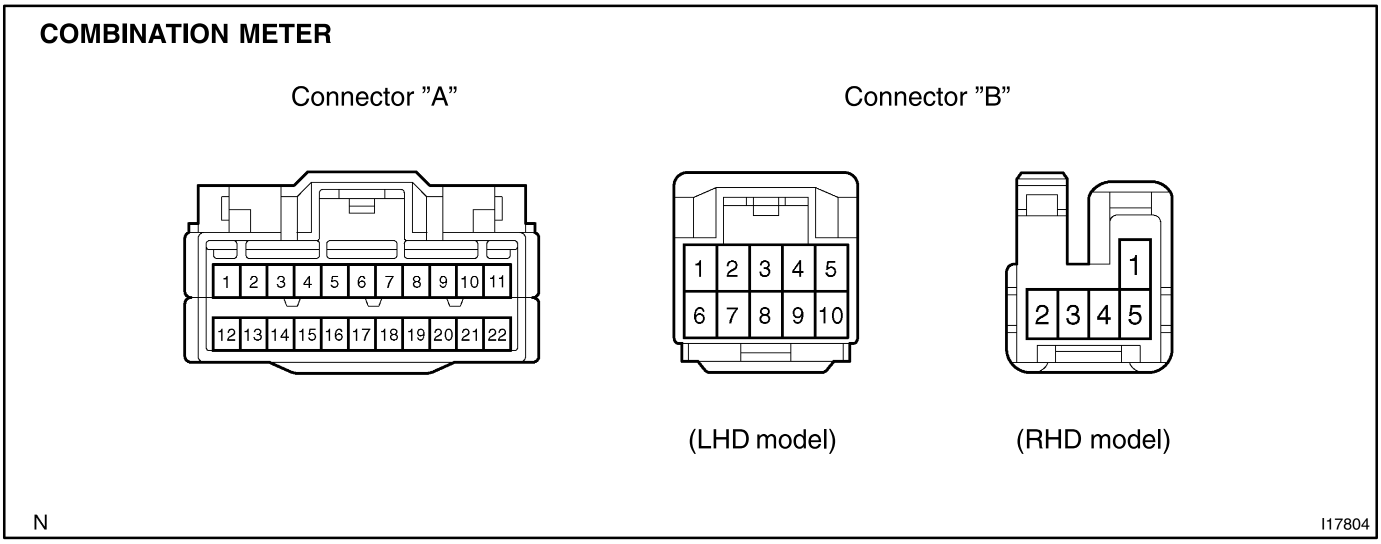
PARTS LOCATION



DI7XR–02

TERMINALS OF ECU

Disconnect connector ”A” and ”B” from the combination meter and inspect the connectors on the wire harness side as shown in the table.



Tester connection	Condition	Specified condition
A1 – Ground (ILL – Body ground)	Ignition switch ON and tail cancel switch ON or OFF	Below 1V or 4.5 – 5.5 V
A2 – Ground (E – Body ground)	Constant	Continuity
A3 – Ground (OPO – Body ground)	Ignition switch ON and trip reset switch ON or OFF	Below 1V or 4.5 – 5.5 V
A9 – Ground (SI – Body ground)	Ignition switch ON and slowly turn drive wheel	Below 1V or 10 – 14 V
A10 – Ground (LP – Body ground)	Ignition switch ON and ABS indicator ON or OFF	Below 1V or 10 – 14 V
A11 – Ground (L – Body ground)	Ignition switch ON	Pulse generation
A13 – Ground (+S – Body ground)	Ignition switch ON and slowly turn drive wheel	Below 1V or 10 – 14 V Below 1V or 4.5 – 5.5 V
A14 – Ground (ES – Body ground)	Constant	Continuity
A15 – Ground (EP – Body ground)	Constant	Continuity
A16 – Ground (SW – Body ground)	Ignition switch ON and air bag indicator light ON or OFF	Below 1V or 10 – 14 V
A17 – Ground (S – Body ground)	Headlight dimmer switch Hi or Low	Below 1V or 10 – 14 V
A18 – Ground (B – Body ground)	Ignition switch ON and turn signal switch right	Below 1V or 10 – 14 V
A19 – Ground (B – Body ground)	Ignition switch ON and turn signal switch left	Below 1V or 10 – 14 V
A21 – Ground (B – Body ground)	Constant	10 – 14 V
A22 – Ground (IG – Body ground)	Ignition switch OFF or ON	Below 1V or 10 – 14 V

B1 – Ground (ROUT – Body ground)	Ignition switch ON and shift lever position is ”R” or except ”R”	Below 1V or 10 – 14 V
B2 – Ground (MPX+ – Body ground)	Ignition switch ON	Pulse generation
B3 – Ground (MPX – Body ground)	Ignition switch ON	Pulse generation
B5 – Ground (ACC – Body ground)	Ignition switch ACC	10 – 14 V

DI7XS–02

PROBLEM SYMPTOMS TABLE

General:

Symptom	Suspect area
Meter display does not properly function.	1. Combination meter ECU
Entirely black screen appears.	1. Fuse 2. Wire harness and connector 3. Combination meter ECU
Turning the light control switch ON does not dim the light.	1. Illumination switch 2. Wire harness and connector 3. Combination meter ECU
Brightness cannot be changed by the illumination switch operation.	1. Illumination switch 2. Wire harness and connector 3. Combination meter ECU

Speedometer:

Symptom	Suspect area
Improper display (Remained as 0 km/h)	1. Accessory that utilizes vehicle speed signals 2. Brake ECU 3. Combination meter ECU 4. Wire harness and connector
Speedometer only does not light up.	1. Combination meter ECU
Abnormal display (Incomplete numbers displayed)	1. Combination meter ECU
DIsplayed value changes frequently or sharply.	1. Accessory that utilizes vehicle speed signals 2. Brake ECU 3. Combination meter ECU 4. Wire harness and connector
Margin of error in speedometer is large.	1. Accessory that utilizes vehicle speed signals 2. Brake ECU 3. Combination meter ECU 4. Wire harness and connector

Fuel gauge:

Symptom	Suspect area
Fuel gauge only does not light up.	1. Combination meter ECU
Some of segments remains ON or cannot light up.	1. Combination meter ECU
DIsplayed level is higher or lower than the actual level.	1. Fuel sender gauge 2. Combination meter ECU 3. Wire harness and connector 4. Multiplex communication circuit
Although the fuel level is full, it does not indicate as ”FULL”.	1. Refueling with the ignition switch ON 2. Fuel sender gauge 3. Combination meter ECU 4. Wire harness and connector 5. Multiplex communication circuit
Fuel gauge display is not stabilized.	1. Fuel sender gauge 2. Wire harness and connector 3. Combination meter ECU 4. Multiplex communication circuit
Fuel gauge warning does not light.	1. Combination meter ECU

Although 2 segments or more are ON, the fuel warning light remains ON.	1. Combination meter ECU
Flashing with the ignition switch ON and after 2 min., ”Empty” is displayed (Fuel Emergency Display is ON).	1. Fuel sender gauge 2. Wire harness and connector 3. Combination meter ECU 4. Multiplex communication circuit

ODO/TRIP Meter:

Symptom	Suspect area
ODO/TRIP only does not light up.	1. Combination meter ECU
Abnormal display (Incomplete number displayed)	1. Combination meter ECU
Both meters do not integrate values. (When speedometer is normal)	1. Combination meter ECU
Trip meter only does not integrate values.	1. ODO/TRIP switch 2. Combination meter ECU
Trip meter cannot be reset.	1. ODO/TRIP switch 2. Combination meter ECU
Display cannot be shifted among ODO, TRIPA and TRIPB.	1. ODO/TRIP switch 2. Combination meter ECU
Without resetting, the display returns to 0.0 km.	1. ODO/TRIP switch 2. +B wire harness 3. Combination meter ECU
Error of accumulated distance is large.	1. Accessory that utilizes vehicle speed signals. 2. GND wire harness 3. Brake ECU 4. Wire harness and connector 5. Combination meter ECU

Others:

Symptom	Suspect area
Some indicators or warning lights are always ON.	1. Meter circuit plate 2. Corresponding switch and ECU 3. Combination meter ECU 4. Multiplex communication circuit
Some indicators or warning lights do not light up.	1. Bulb 2. Meter circuit plate 3. Corresponding switch and ECU 4. Combination meter ECU 5. Multiplex communication circuit
Buzzer does not stop.	1. Combination meter ECU 2. Corresponding switch and ECU

TROUBLESHOOTING:

Flow chart No.	Symptom	See page
1	Check the communication between the combination meter and the multiplex communication circuit.	DI–604
2	The whole meter does not function	DI–605
3	The margin of error in speedometer is large. Or it remains as 0 km/h.	DI–606
4	Fuel receiver gauge is inoperative or improper.	DI–607
5	Indicators or warning lights do not light up.	DI–609

DI7XT–02

CIRCUIT INSPECTION

1. Check the communication between the combination meter and the multiplex communication circuit.

INSPECTION PROCEDURE

1 Inspect indicator.

CHECK:

Turn ON and OFF the switch corresponding to the following indicators and check if the indicator lights up or goes off accordingly.

- Door indicator (Open/close operation of any of doors)
- Brake indicator (ON/OFF operation of the parking brake)
- Seat belt indicator (ON/OFF operation of the buckle switch)

NO

Yes → **Normal communication.**

2 Any of them do not light.

NO

Yes → **Flow chart No. 5.**

3 All of them do not light.

Communication error. Wire harness faulty.

DI7XU–01

2. Whole meter does not function.

INSPECTION PROCEDURE

1	Check the meter operation.

CHECK:
With the ignition switch ON, nothing is displayed.

2	Check the positive terminal of IG.

CHECK:
Check if the fuse (GAUGE 10A) is normal or not. Turn the ignition switch ON and check that a voltage of 10 – 14 V is applied between the meter connector terminal A22 (IG+) and the body ground.

Yes

No → **Fuse faulty. Wire harness faulty.**

3	Check the grounding.

CHECK:
Disconnect the meter connector and check that there is continuity between terminal A15/A14 on the vehicle side connector and the body ground.

Yes

No → **Body ground faulty. Wire harness faulty.**

Improper connection of the meter connector.
Communication meter ECU faulty.

DI7XV–01

3. Margin of error in speedometer is large, or it remains as 0 km/h

INSPECTION PROCEDURE

1	Check the brake ECU.

CHECK:
Perform a diagnosis check of the brake system.
Proceed to next circuit inspection shown in problem symptoms table (See page DI–306).

No

Yes → **Replace brake ECU.**

2	Check the vehicle speed signal input.

PREPARATION:
Turn the ignition switch ON.
CHECK:
Disconnect the meter connector, drive the vehicle at a speed of 2 – 4 km/h and check that continuity between terminal A9 on the vehicle side connector and the body ground is repeatedly turned ON and OFF.

Yes

No → **Wire harness faulty. Speed output terminal in brake ECU faulty.**

Combination meter ECU faulty.

DI7XW–02

4. Fuel receiver gauge is inoperative or improper

INSPECTION PROCEDURE

1	Fuel gauge diagnosis check (See page DI–602).

2	Communication check.

CHECK:
Check if the communication between the combination meter and the multiplex communication circuit is normal or not.

Yes

No → **Communication error. Wire harness faulty.**

3	Check the fuel sender gauge.

CHECK:
Check if the fuel sender gauge is normal or not.

Yes

No → **Fuel sender gauge faulty.**

4	**Check the fuel receiver gauge.**

CHECK:
Check if the fuel receiver gauge is normal or not.

Yes

No → **Fuel receiver gauge faulty.**

5	**Check the body ECU.**

CHECK:
With the fuel sender gauge connector connected, check if the voltage between each of terminal 1 (FV), 5 (FR) and 6 (FE) of the vehicle side wire harness and connector and the body ground is normal or not.

- Terminal 1 (FV): 4.5 – 5.5 V (When the ignition switch is ON)
- Terminal 5 (FR): 0.5 – 5.5 V (When the ignition switch is ON)
- Terminal 6 (FE): Continuity is always identified.

Yes

No → **Body ECU faulty.**

Combination meter ECU faulty.

DI7XX–01

5. Indicators or warning lights do not light up. (*multiplex communication circuit input indicator or warning)

INSPECTION PROCEDURE

1	Multiplex communication circuit input indicator or warning.

2	Communication check.

CHECK:
Check if the communication between the combination meter and the multiplex communication circuit is normal or not.

Yes

No — **Communication error. Wire harness faulty.**

3	Check the bulb or circuit plate.

CHECK:
Check if the bulb circuit plate is normal or not. Check open or short circuit in wire harness.

Yes

No — **Bulb or circuit plate faulty.**

4	Check the corresponding switch or ECU.

CHECK:
Check if the corresponding switch or ECU is normal or not.

Yes

No → **Corresponding switch or ECU faulty.**

Combination meter ECU faulty.

*:

Multiplexcommunication input	Single Communication Input
OPEN DOOR WARNING	HI–BEAM INDICATOR
BRAKE WARNING	TURN SIGNAL IND
OUTPUT CONTROL INDICATOR	SRS WARNING
SHIFT POSITION INDICATOR	ABS WARNING
SEAT BELT WARNING	CHECK ENGINE WARNING
READY INDICATOR	
WATER TEMPERATURE WARNING	
OIL PRESSURE WARNING	
CRUISE CONTROL INDICATOR	
TAIL INDICATOR	
DISCHARGE WARNING	

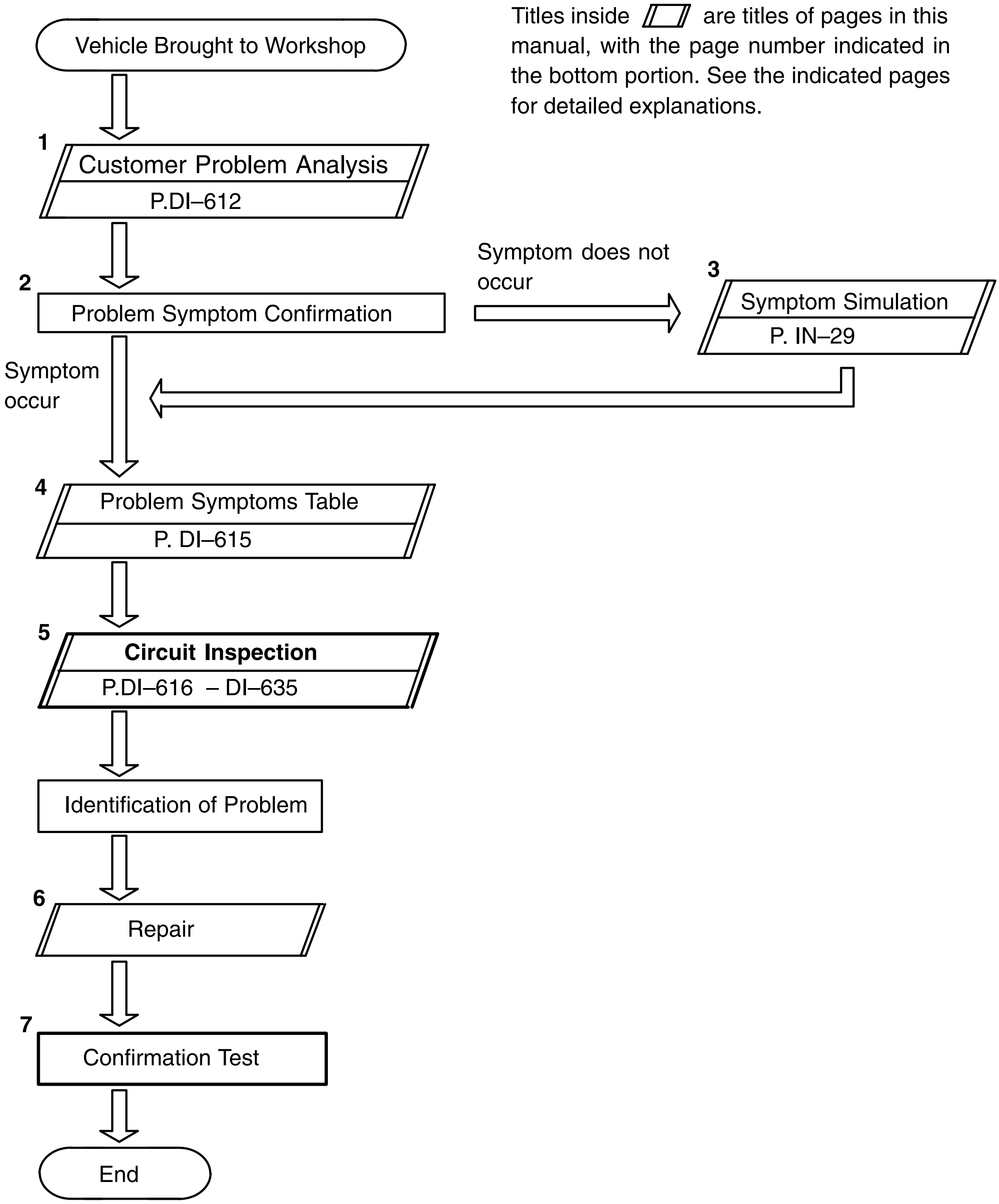
BODY CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI7QE–01

HINT:
This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the trouble shooting.

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



Step 6, 8 : Diagnostic steps permitting the use of the hand–held tester .

DI7QF–01

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

Inspector's name: ________________

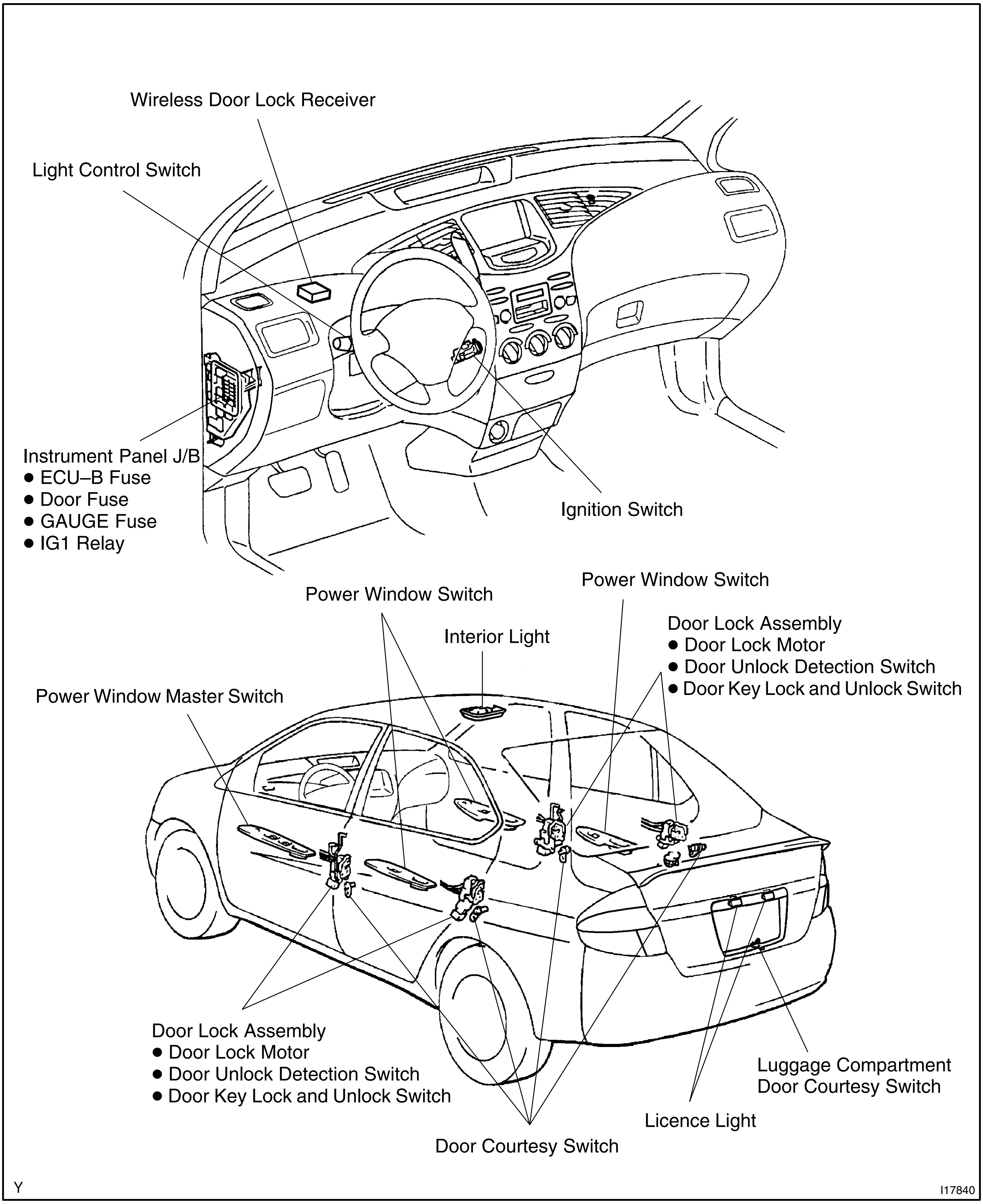
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	km Mile

Date Problem First Occurred		/ /
Frequency Problem Occurs		" " Constant " " Sometimes (times per day, month) " " Once only
Weather Conditions When Problem Occurred	**Weather**	" " Fine " " Cloudy " " Rainy " " Snowy " " Various/ Others
	Outdoor Temperature	" " Hot " " Warm " " Cool " " Cold (Approx. °F (°C))

Malfunction System	" " Key Reminder System
	" " Daytime Running Light System
	" " Combination Meter (Open door warning light)
	" " Light–On Warning System
	" " Illuminated Entry System
	" " Seat Belt Warning
	" " Power Window Control System
	" " Power Door Lock Control System
	" " Wireless Door Lock Control System
	" " Others
	" " Theft Deterrent System

DI7QG–01

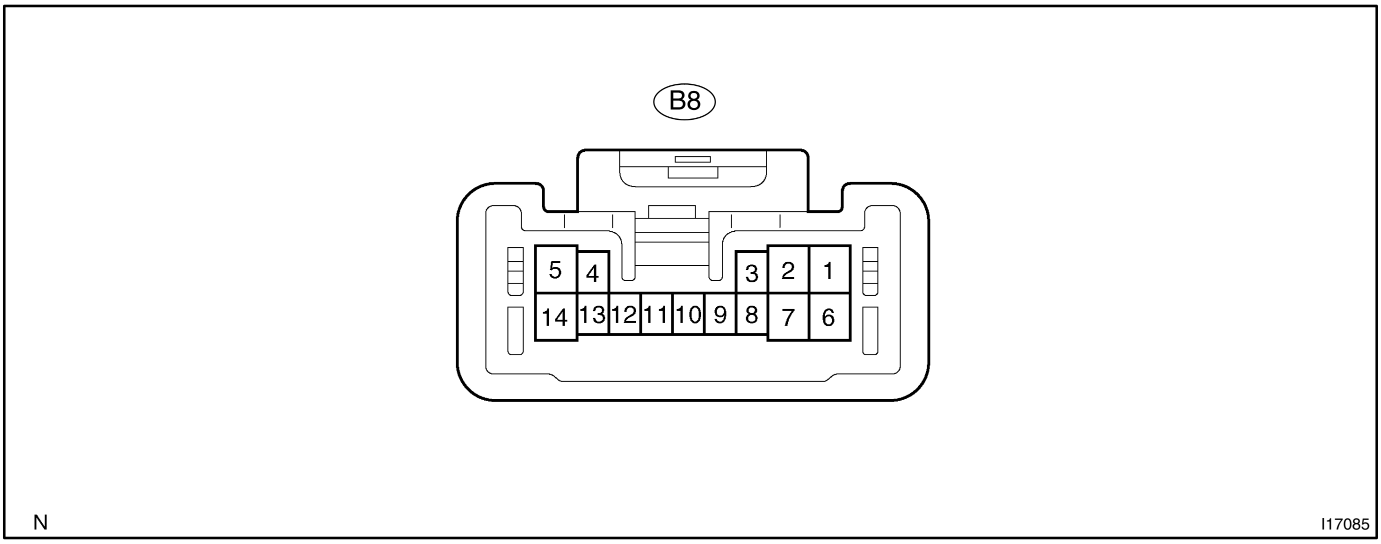
PARTS LOCATION



DI7QH–01

TERMINALS OF ECU

BODY ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
HAZ – E (1 – 7)	G–R – W–B	Hazard warning light is not light	Below 1 v
		Hazard warning light is light	10 – 14 v
FLD – E (3 – 7)	G–B – W–B	Power window (FR LH) is not operating	Below 1 v
		Power window (FR LH) is operating downward	10 – 14 v
B – Body ground (5 – Body ground)	R–G – Body ground	Constant	10 – 14 v
E – Body ground (7 – Body ground)	W–B – Body ground	Constant	Below 1 v
RX (9)	Y	AVC–LAN communication circuit	–
MPX+ (10)	GR–B	Multiplex communication circuit	–
MPX– (11)	GR	Multiplex communication circuit	–
PRG (12)	B–R	Wireless door lock ECU communication circuit	–
RDA (13)	L	Wireless door lock ECU communication circuit	–
FLU – E (14 – 7)	R–W – W–B	Power window (FR LH) is not operating	Below 1 v
		Power window (FR LH) is operating upward	10 – 14 v

DI7QI–01

PROBLEM SYMPTOMS TABLE

POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
All the power windows does not operate.	1. Driver door ECU with master switch	DI–636
Each power window does not operate.	1. Power window switch circuit	DI–624

DOOR LOCK CONTROL

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control S/W.	3. Door lock control switch circuit (Master switch) 4. Body ECU	DI–630 IN–40
Door key linked function does not operate.	1. Door key lock and unlock switch circuit 2. Body ECU	DI–630 IN–40
Key confinement prevention function does not operate.	1. Key unlock switch circuit 2. Body ECU	DI–620 IN–40
Does not lock and unlock each door only.	1. Door lock motor circuit 2. Body ECU	DI–632 IN–40
Luggage compartment door opener function does not operate.	1. Luggage component door courtesy switch circuit 2. Body ECU	DI–572 IN–40

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 ECU	BE–78 DI–626 DI–620 IN–40
Lock (or unlock) function does not operate.	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Body ECU	DI–630 DI–630 IN–40
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system .	1. Door courtesy switch circuit 2. Body ECU	DI–628 IN–40

ILLUMINATED ENTRY

Symptom	Suspect Area	See page
Illuminated entry does not operate.	1. Illuminationcircuit 2. Body ECU	DI–622 IN–40

HEADLIGHT AND TAILLIGHT SYSTEM:

Symptom	Suspect Area	See page
Light–on warning system does not operate.	1. Door courtesy switch circuit (Driver side) 2. Body ECU	DI–628 IN–40

OTHERS

Symptom	Suspect Area	See page
Body ECU does not operate.	1. Power source circuit 2. Ignition switch power source circuit 3. Body ECU	DI–616 DI–618 IN–40

DI7QJ–01

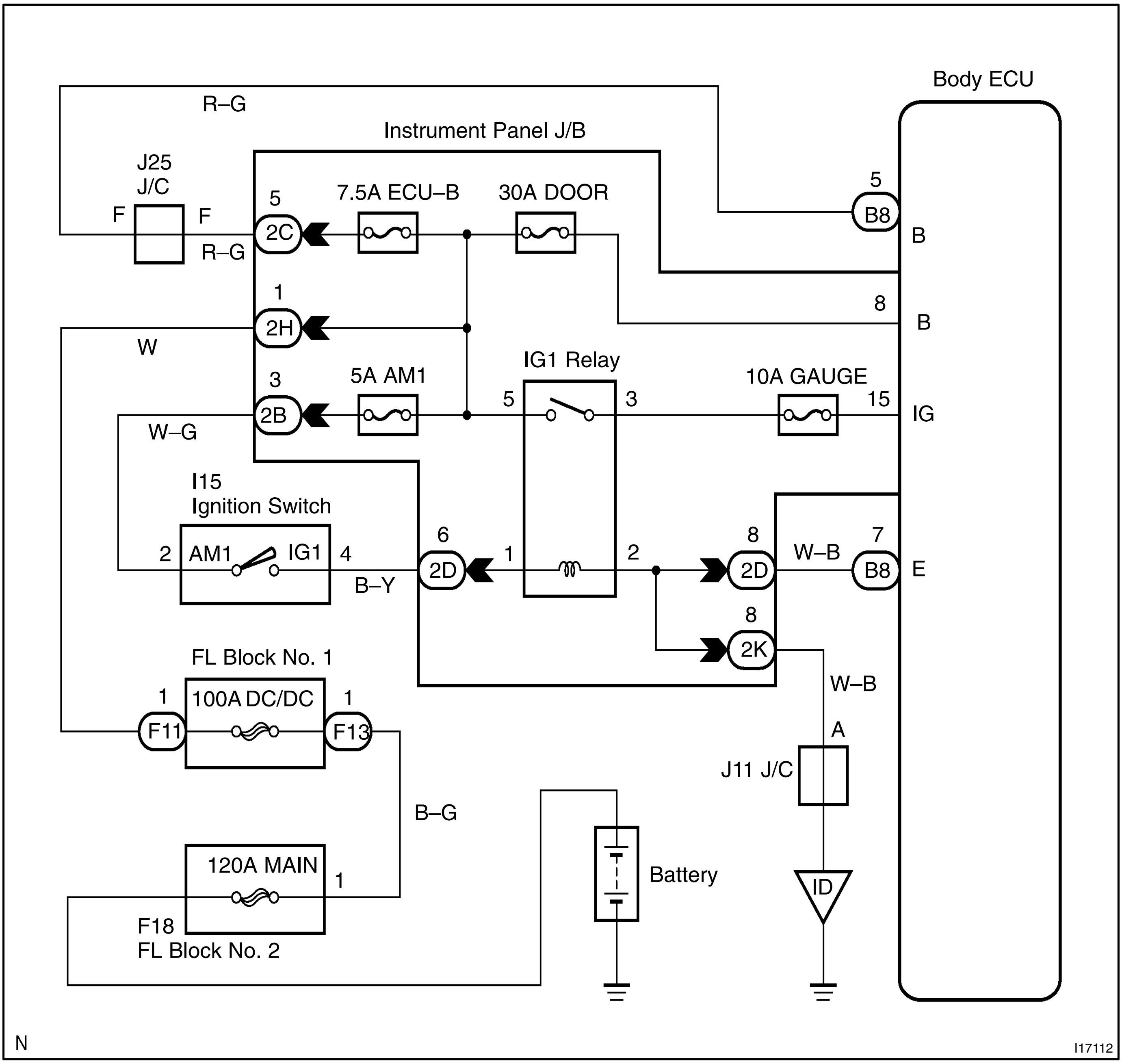
CIRCUIT INSPECTION

Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the Body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ECU–B, DC/DC, GAUGE and DOOR fuse.

CHECK:
Check continuity of ECU–B, DC/DC, GAUGE and DOOR fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	Check voltage between terminals B, BDR and E of body ECU connector.

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Body ECU connector.
CHECK:
Measure voltage between terminals B, BDR and E.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).**

NG ↓

3	Check wireharness and connector between body ECU and body ground (See page IN–40).

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

OK ↓

Check and repair wireharness and connector between Body ECU and battery.

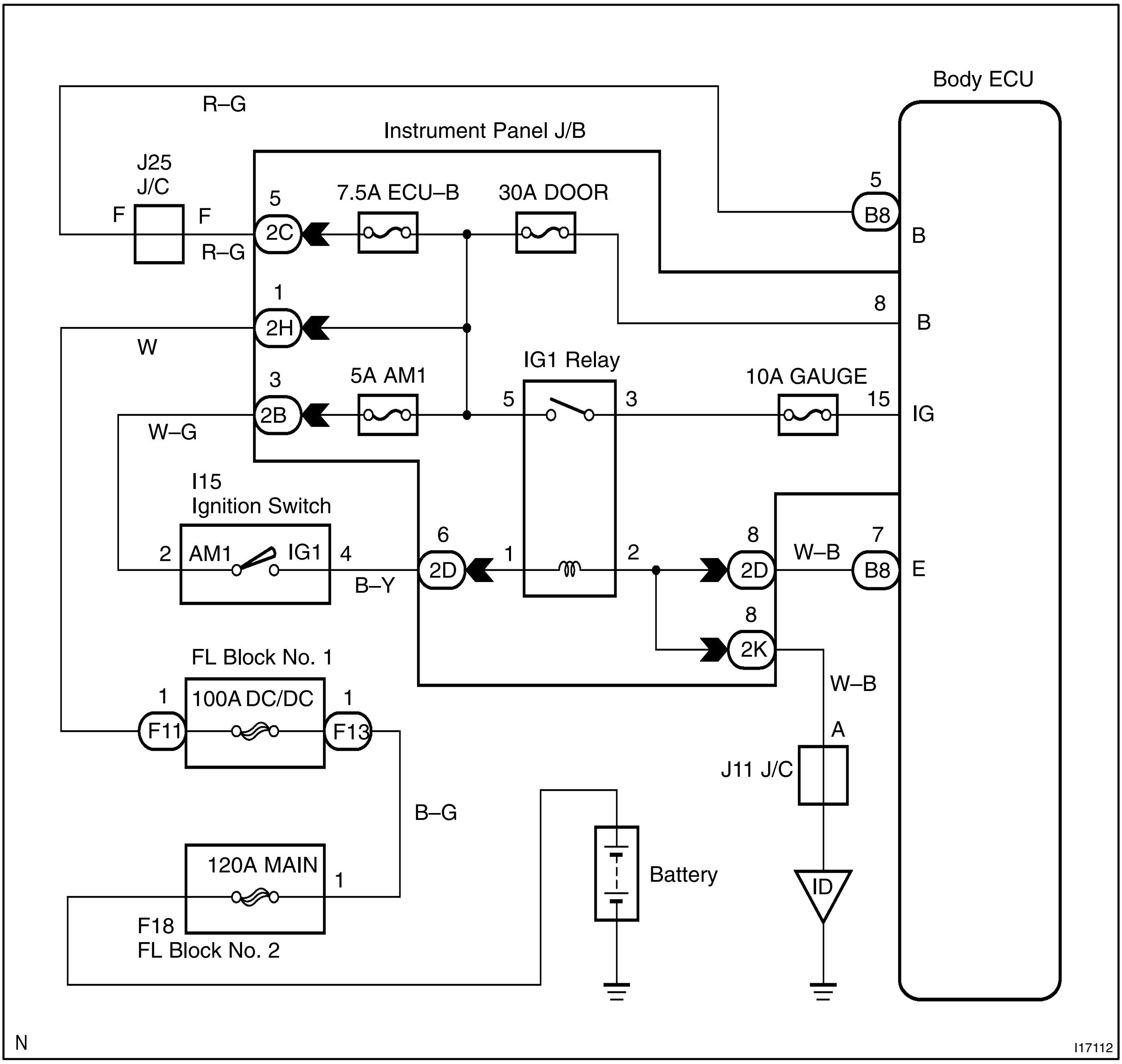
DI7QK–01

Ignition Switch Power Source Circuit

CIRCUIT DESCRIPTION

When the ignition switch is turned to the ACC position, battery voltage is applied to the terminal ACC of the ECU and when the ignition switch is turned to the ON position, battery voltage is applied to the terminal IG of the ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check AM1 fuse.**

CHECK:
Check continuity of AM1 fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals 8, 15 and E of body ECU connector.**

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals 8, 15 and E.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).**

NG ↓

3	**Check wireharness and connector between body ECU and body ground (See page IN–40).**

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

OK ↓

Check and repair wireharness and connector between body ECU and battery.

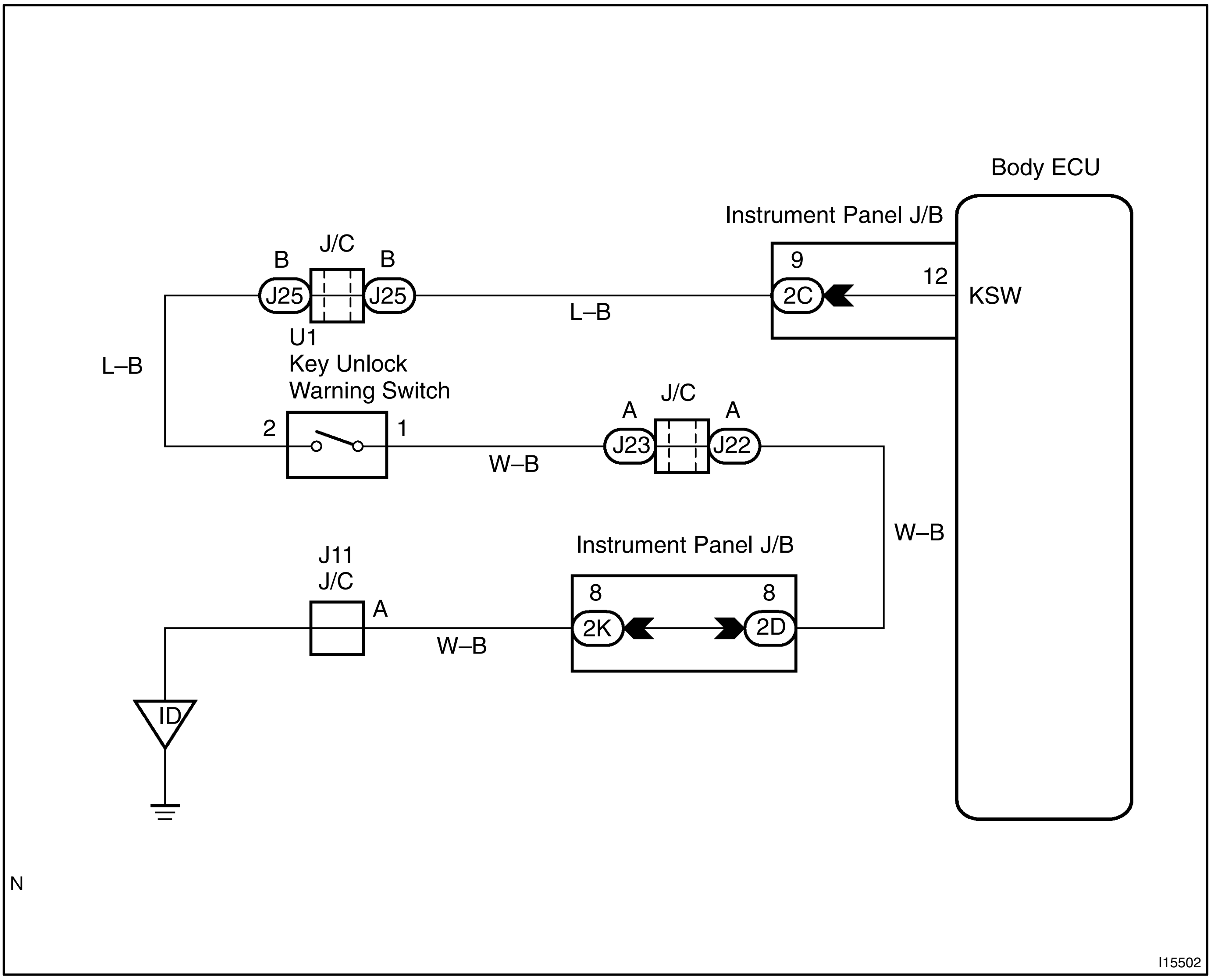
DI7QL–01

Key unlock warning switch circuit

CIRCUIT DESCRIPTION

The key unlock warning switch goes on when the ignition key is inserted in the key cylinder and goes off when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is on.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check key unlock warning switch (See page BE–17).

NG → Replace the key unlock warning switch.

OK

2	Check wireharness and connector between key unlock warning switch and body ECU (See page IN–40).

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).

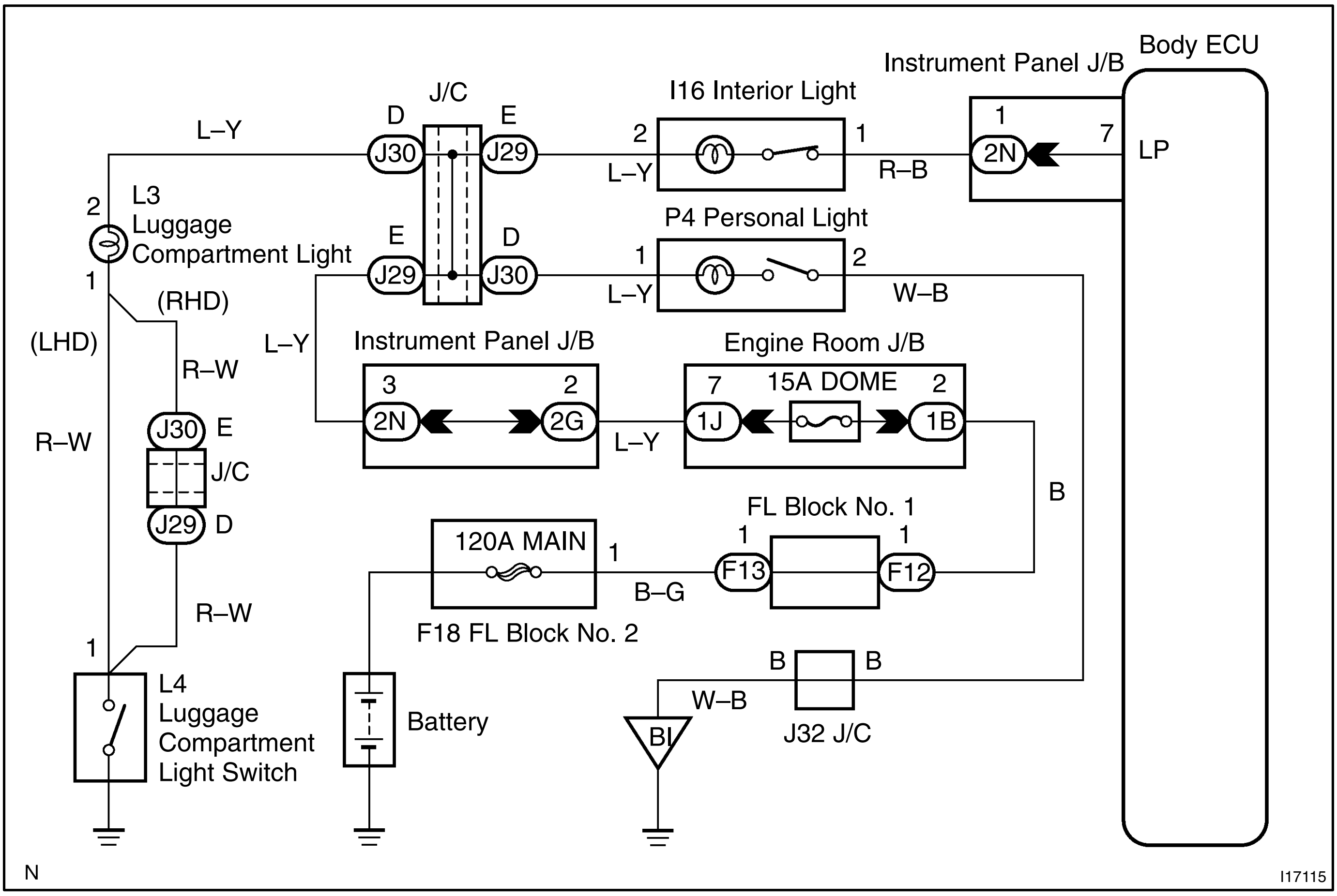
DI7QS–01

Illumination 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 continuously turns the indicator light on for 0.75 secs. and turns it off for 1.25 secs., thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check illumination light (Interior light system)(See page BE–31).**

NG → **Replace the failure light.**

OK ↓

2	**Check harness and connector between body ECU and illumination light, illumination light and body ground (See page IN–40).**

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

OK ↓

Check and replace body ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on problem symptom table (See page DI–556).

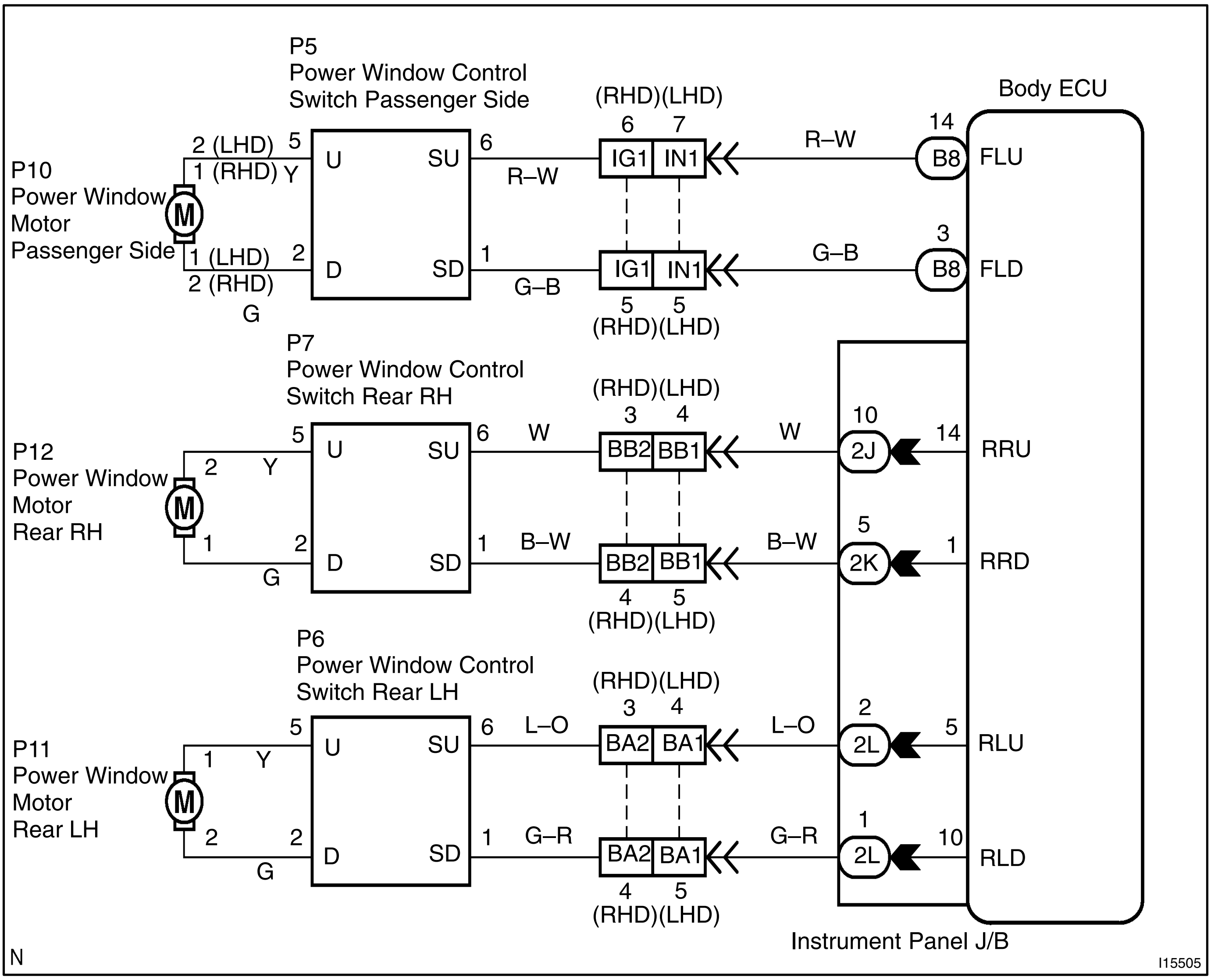
DI7QM–01

Power window switch circuit

CIRCUIT DESCRIPTION

Power window switch circuit can be checked using DTC check. (Refer to DI–672)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the power window switch (See page BE–60).

NG → Replace the power window switch.

OK

2	Check wireharness and connector between power window switch and body ECU (See page IN–40).

NG → Repair or replace wireharness or connector.

OK

3	Check wireharness and connector between power window switch and body ECU (See page IN–40).

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).

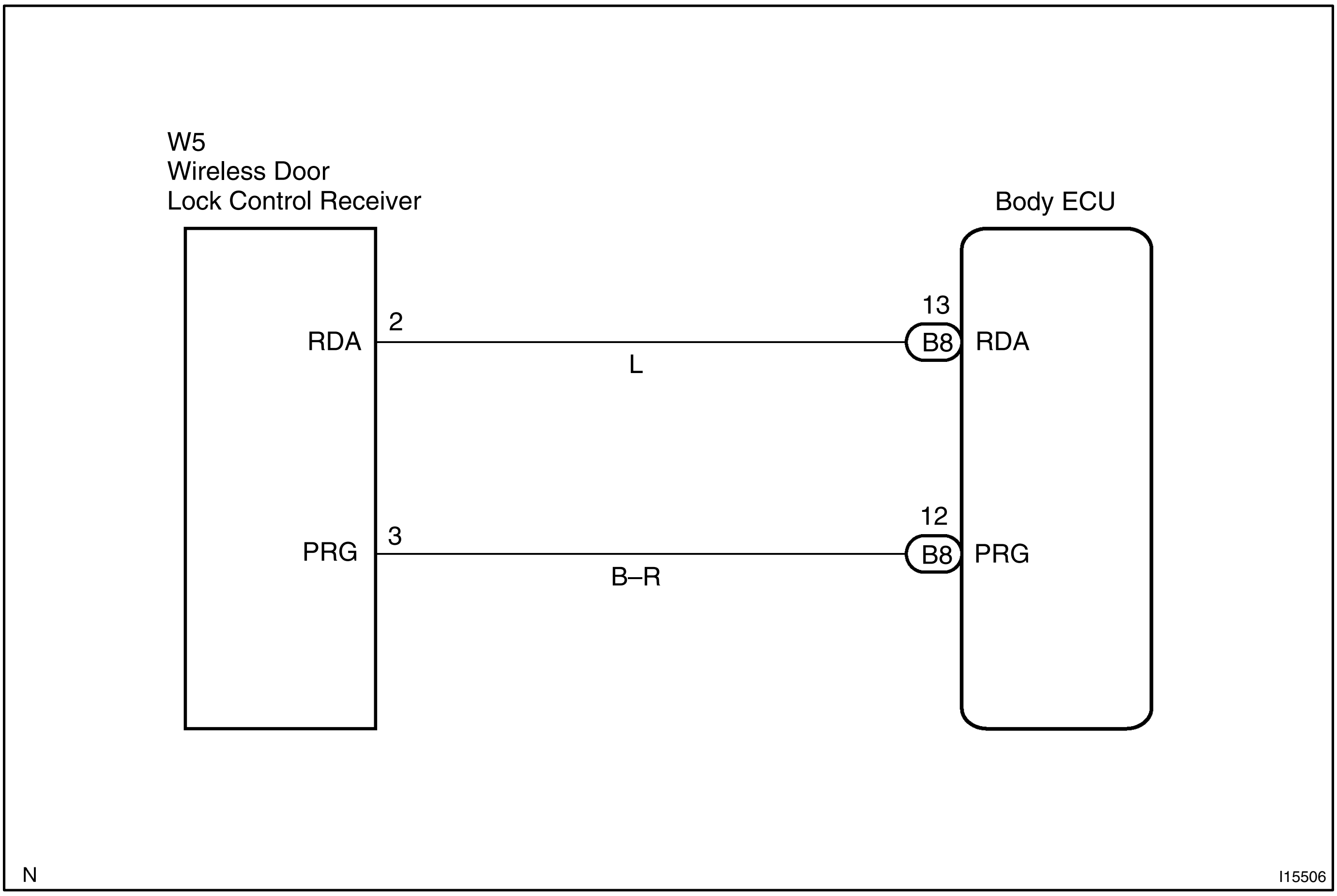
DI7QN–01

Wireless door lock tuner circuit

CIRCUIT DESCRIPTION

The signal from the transmitter will be input to the body ECU through RDA line. RDA line is diagnosed by the body ECU, so check DTC also in case of the failure of the wireless function.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that DTC 42 is not output

NG → **Check the RDA line.**

OK

2	**Check wireharness**

PREPARATION:
Disconnect connectors of wireless door lock tuner and of body ECU.
CHECK:
Check continuity between terminals RCO of wireless door lock tuner and RCO of body ECU.
OK:
Continuity

NG → **Repair or replace wireharness**

OK

3	**Check the wireless door lock tuner**

CHECK:
Replace the wireless door lock tuner and check if it recovers normally.
OK:
Must be recovered normally.

NG → **Proceed to next circuit inspection shown on problem symptoms table.(See page DI–615)**

NG

Failure of the original wireless door lock tuner.

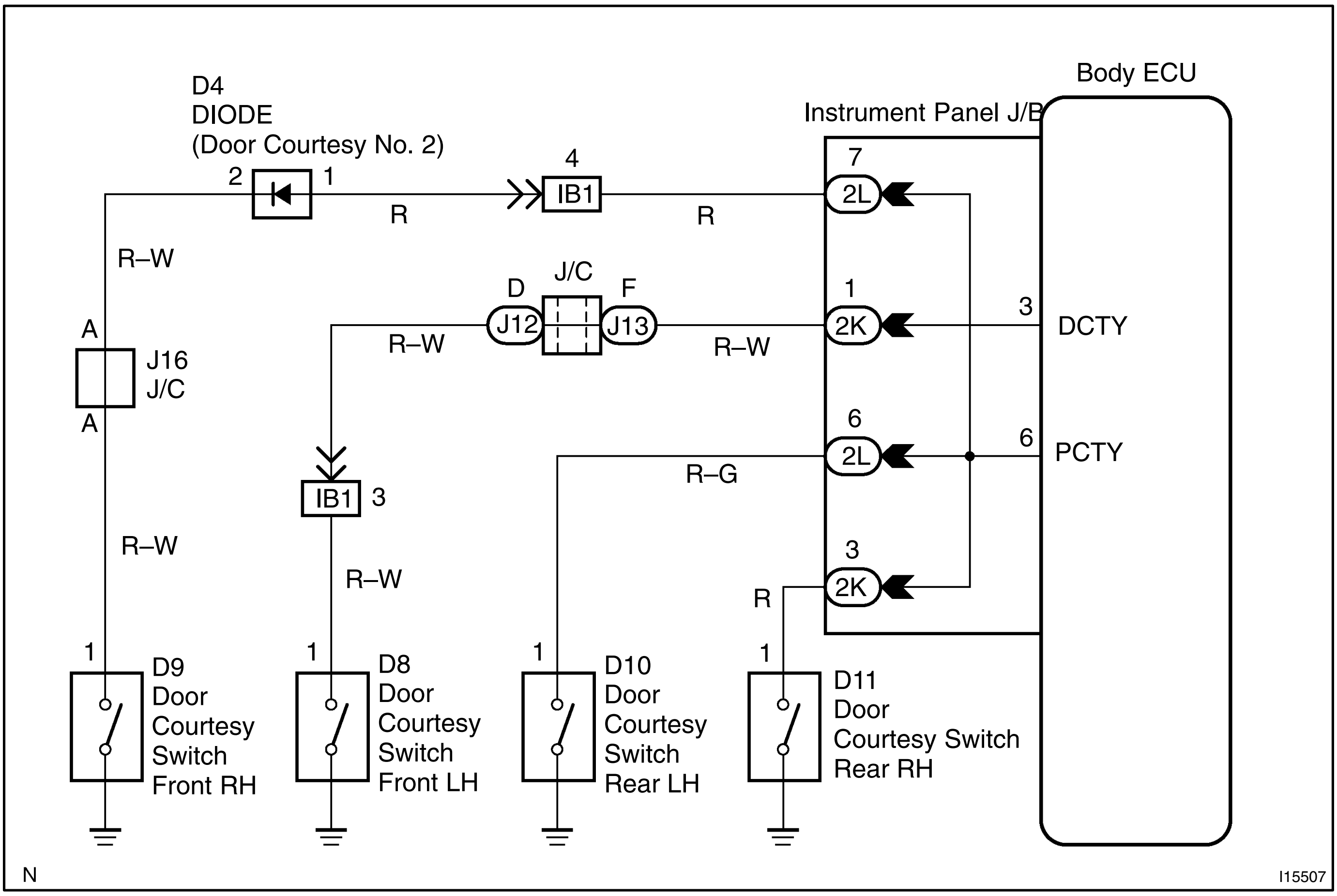
DI7QO–01

Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The door courtesy switch goes on when the door is opened and goes off when door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check courtesy switch (See page BE–31).

NG → Replace the courtesy switch.

OK

2	Check that there is a grounding malfunction caused by looseness of the tighten screw.

NG → Install screw.

OK

3	Check wireharness and connector between courtesy switch and body ECU (See page IN–40).

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).

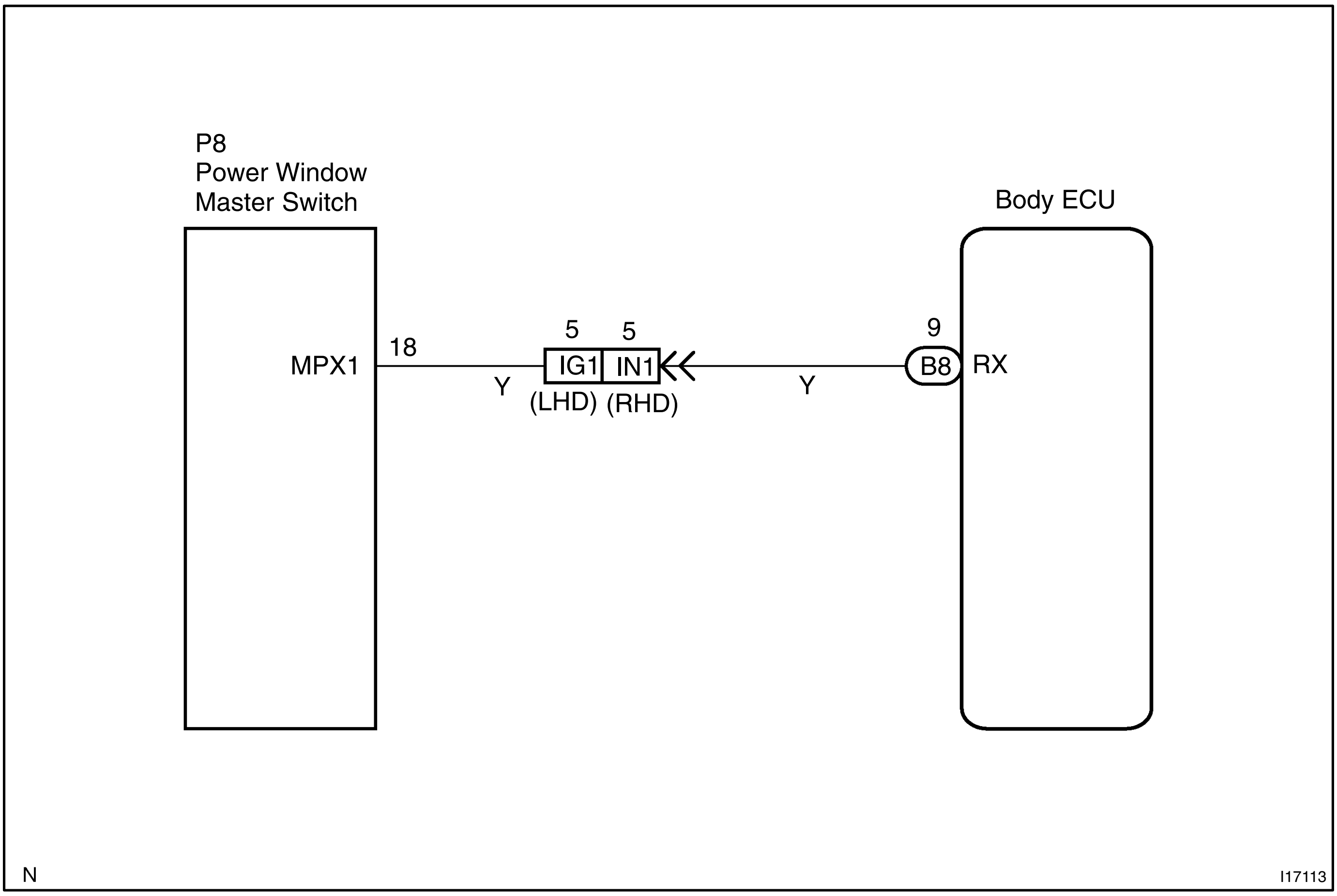
DI7QP–01

Power window master switch circuit

CIRCUIT DESCRIPTION

Power window master switch circuit can be checked using DTC check. (See page DI–672)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check the power window master switch circuit using DTC check. (See page DI–669)**

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–615).**

OK

2	**Check the power window master switch (See page BE–60).**

NG → **Replace the power window master switch.**

OK

3	**Check wireharness and connector between power window master switch and body ECU (See page IN–40).**

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

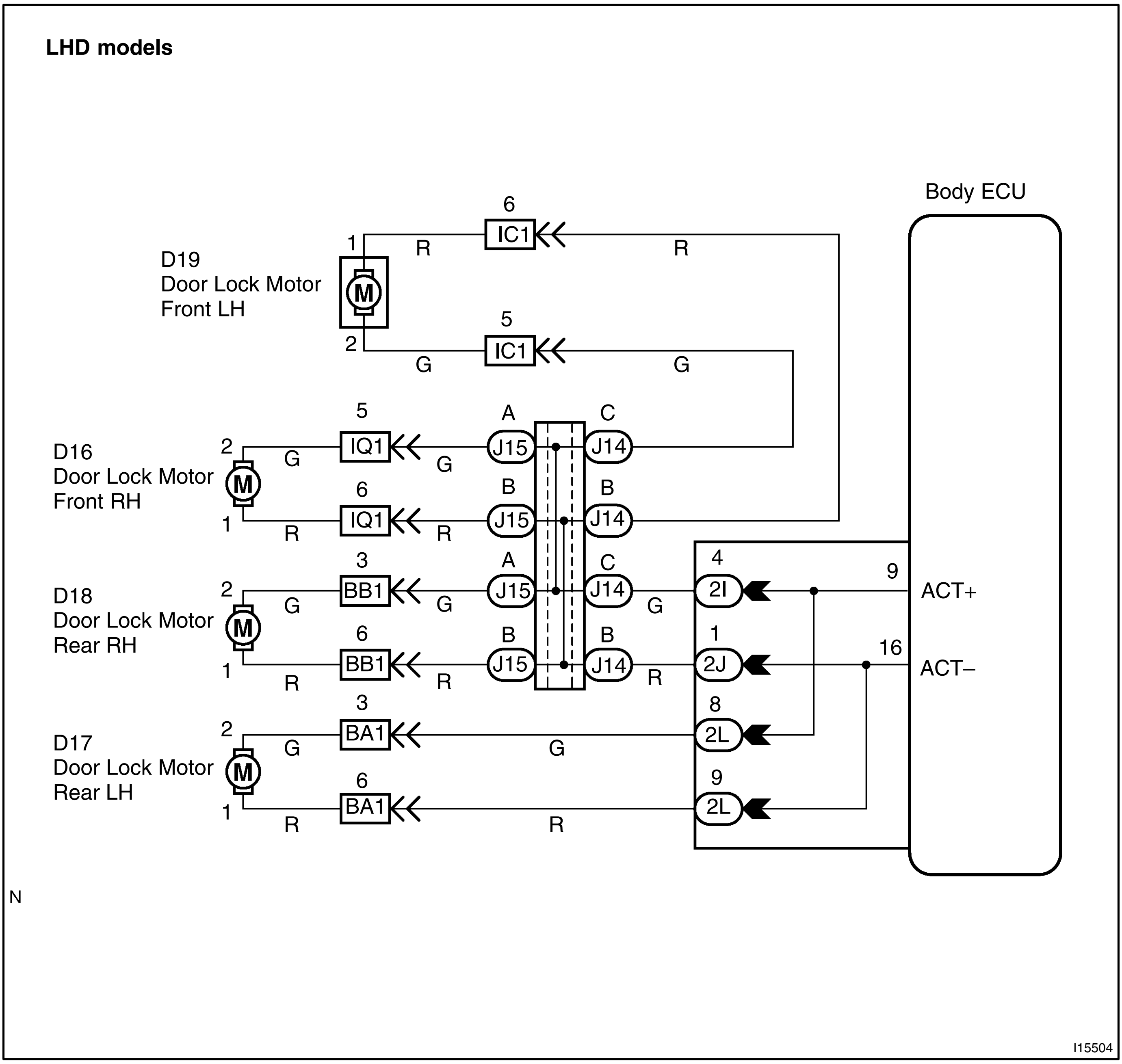
OK

Proceed to next circuit inspection shown on problem symptom table (See page DI–615).

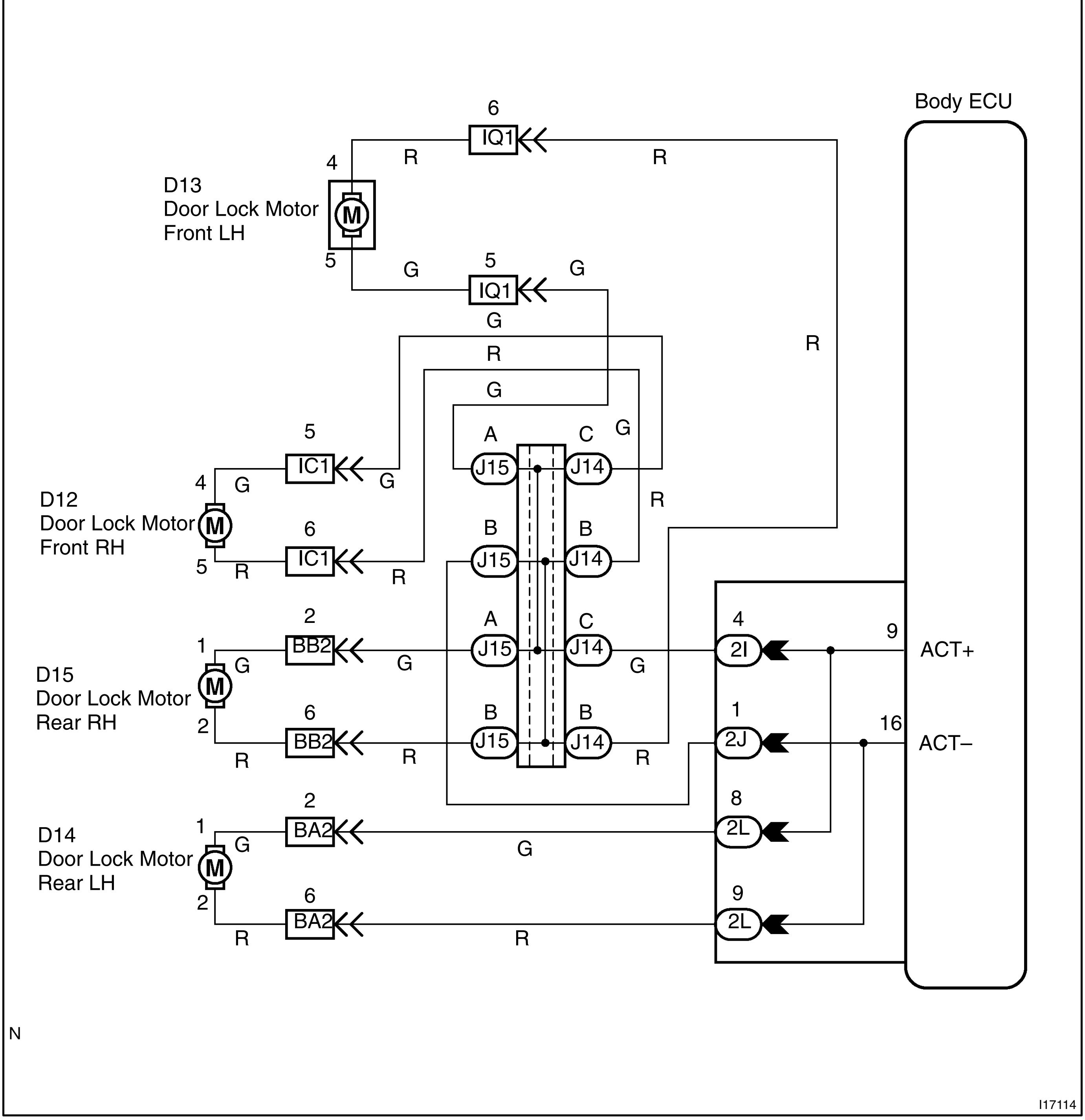
DI7QQ–01

Door lock motor circuit

WIRING DIAGRAM



RHD models


Body ECU
D13
Door Lock Motor
Front LH
D12
Door Lock Motor
Front RH
D15
Door Lock Motor
Rear RH
D14
Door Lock Motor
Rear LH
IQ1
IC1
BB2
BA2
J15
J14
2I
2J
2L
ACT+
ACT–
N
I17114

INSPECTION PROCEDURE

1	Check door lock motor (See page BE–66).

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door lock motor and body ECU (See page IN–40).

NG → Repair or replace wireharness or connector.

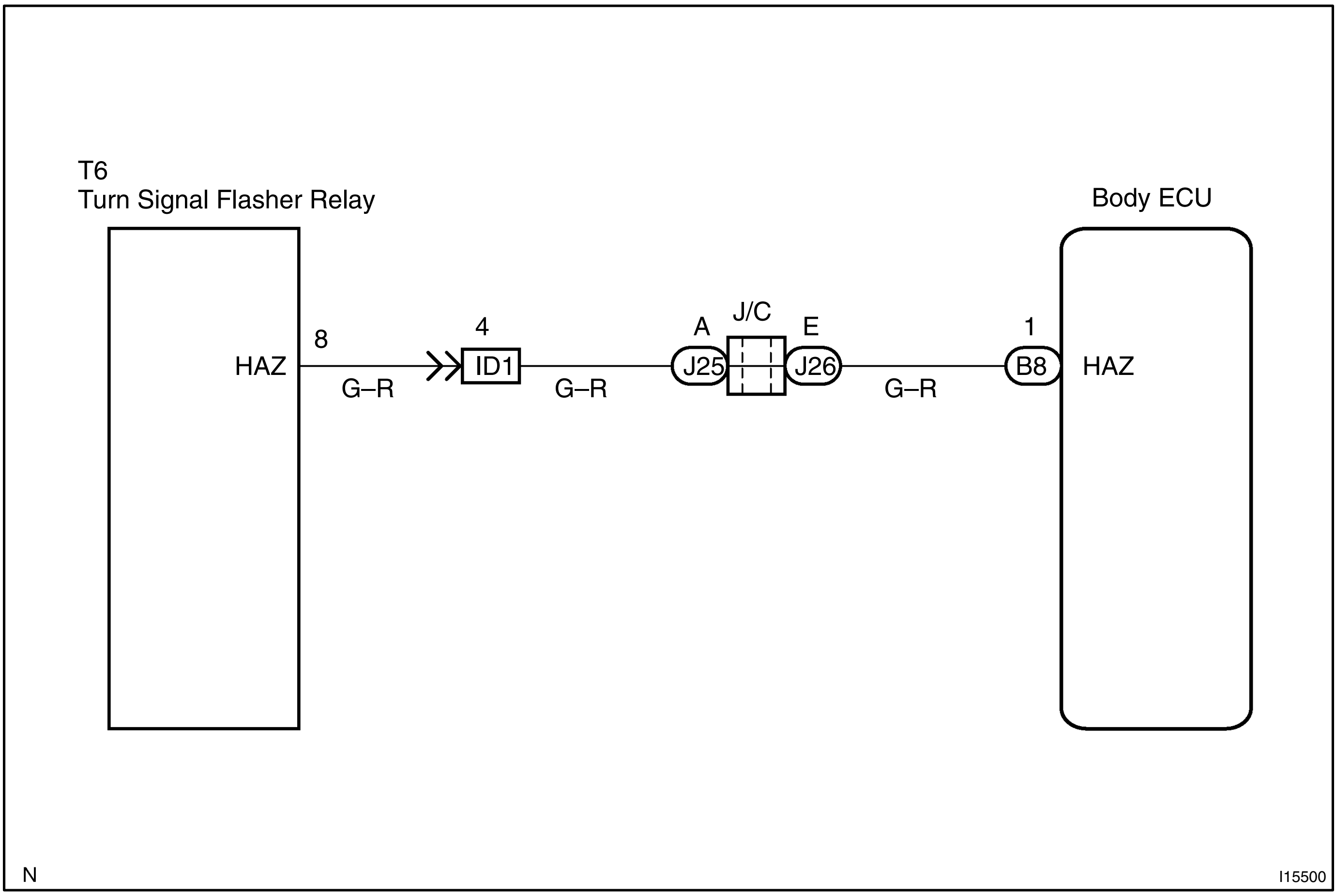
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).

DI7QR–01

Turn Signal Flasher Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wireharness and connector between turn signal flasher and body ECU (See page IN–40).**

NG — **Repair or replace wireharness or connector.**

OK

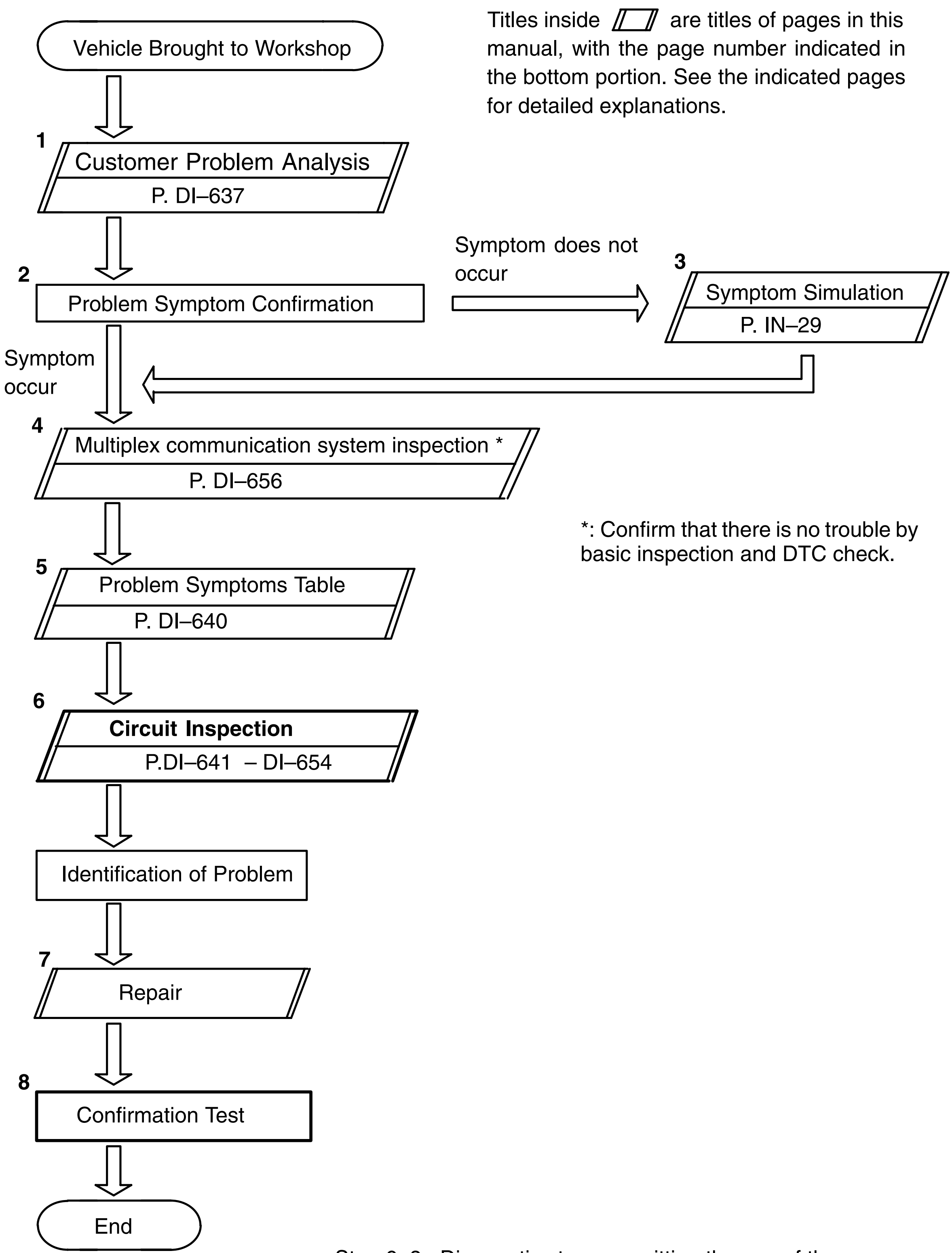
Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).

DRIVER DOOR CONTROL SYSTEM

DI2BH–11

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the hand–held tester.

DI2BI–08

CUSTOMER PROBLEM ANALYSIS CHECK

DRIVER DOOR CONTROL SYSTEM Check Sheet

Inspector's name: ________________

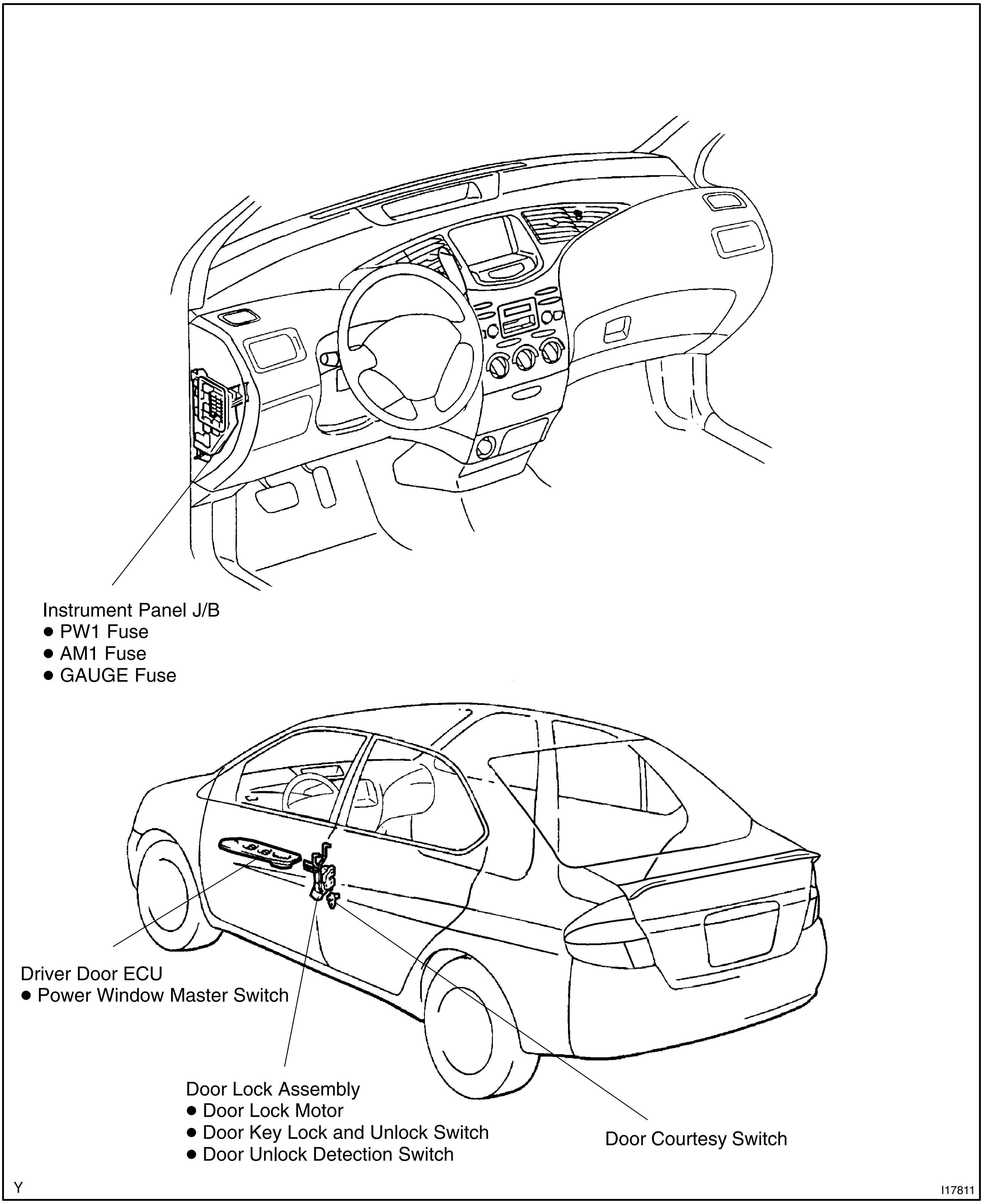
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

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 Door Lock Control System
	" " Theft Deterrent System
	" " Jam Protection System
	" " Others

DI2BJ–10

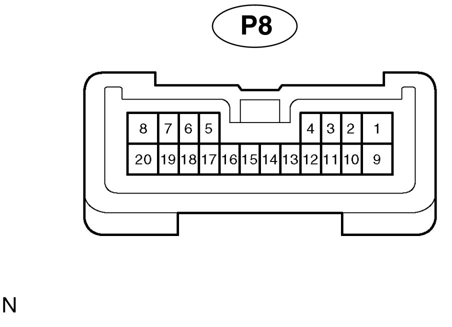
PARTS LOCATION



DI2BK–11

TERMINALS OF ECU

DRIVER DOOR ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
DU ↔ E (P8–8 ↔ P8–9) LHD (P8–20 ↔ P8–9) RHD	Y ↔ W–B	Ignition switch ON and driver's window switch OFF	Below 1.0
		Ignition switch ON and driver's window switch UP	10 – 14
KL ↔ E (P8–6 ↔ P8–9) LHD (P8–15 ↔ P8–9) RHD	G–Y ↔ W–B	Door key lock and unlock switch OFF or UNLOCK	10 – 14
		Door key lock and unlock switch LOCK	Below 1.0
LMT ↔ SGND (P8–13 ↔ P8–11)	P–L ↔ O	Driver's door window fully–closed position	10 – 14
		Driver's door window except fully–closed position	Below 1.0
B ↔ E (P8–1 ↔ P8–9)	W–R ↔ W–B	Constant	10 – 14
DON ↔ E (P8–20 ↔ P8–9) LHD (P8–8 ↔ P8–9) RHD	G ↔ W–B	Ignition switch ON and driver's window switch OFF	Below 1.0
		Ignition switch ON and driver's window switch DOWN	10 – 14
LSWD ↔ E (P8–10 ↔ P8–9)	W ↔ W–B	Driver's door is locked	10 – 14
		Driver's door is unlocked	Below 1.0
CPUB ↔ E (P8–5 ↔ P8–9)	L–Y ↔ W–B	Constant	10 – 14
KUL ↔ E (P8–15 ↔ P8–9) LHD (P8–6 ↔ P8–9) RHD	L–B ↔ L–B	Door key lock and unlock switch OFF or LOCK	10 – 14
		Door key lock and unlock switch UNLOCK	Below 1.0
PLS ↔ SGND (P8–12 ↔ P8–11)	GR ↔ O	During the driver's door power window is operate.	Pulse generation
		Driver's door power window not operate with switch ON	Below 1.0
		Driver's door power window not operate with switch OFF	10 – 14
DCTY ↔ E (P8–16 ↔ P8–9)	R–Y ↔ W–B	Driver's door closed	Below 1.0
		Driver's door open	10 – 14

*: Power window master switch

DI2BL–10

PROBLEM SYMPTOMS TABLE

POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
All the power windows does not operate.	1. Driver door ECU with master switch	–
Power window does not operate.	1. Driver door ECU with master switch	–
Auto up (or down) function does not operate.	1. Driver door ECU with master switch	–
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. Driver door ECU with master switch	DI–652 DI–654 –

OTHERS

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Driver door ECU with master switch	DI–641 –

DI2BM–12

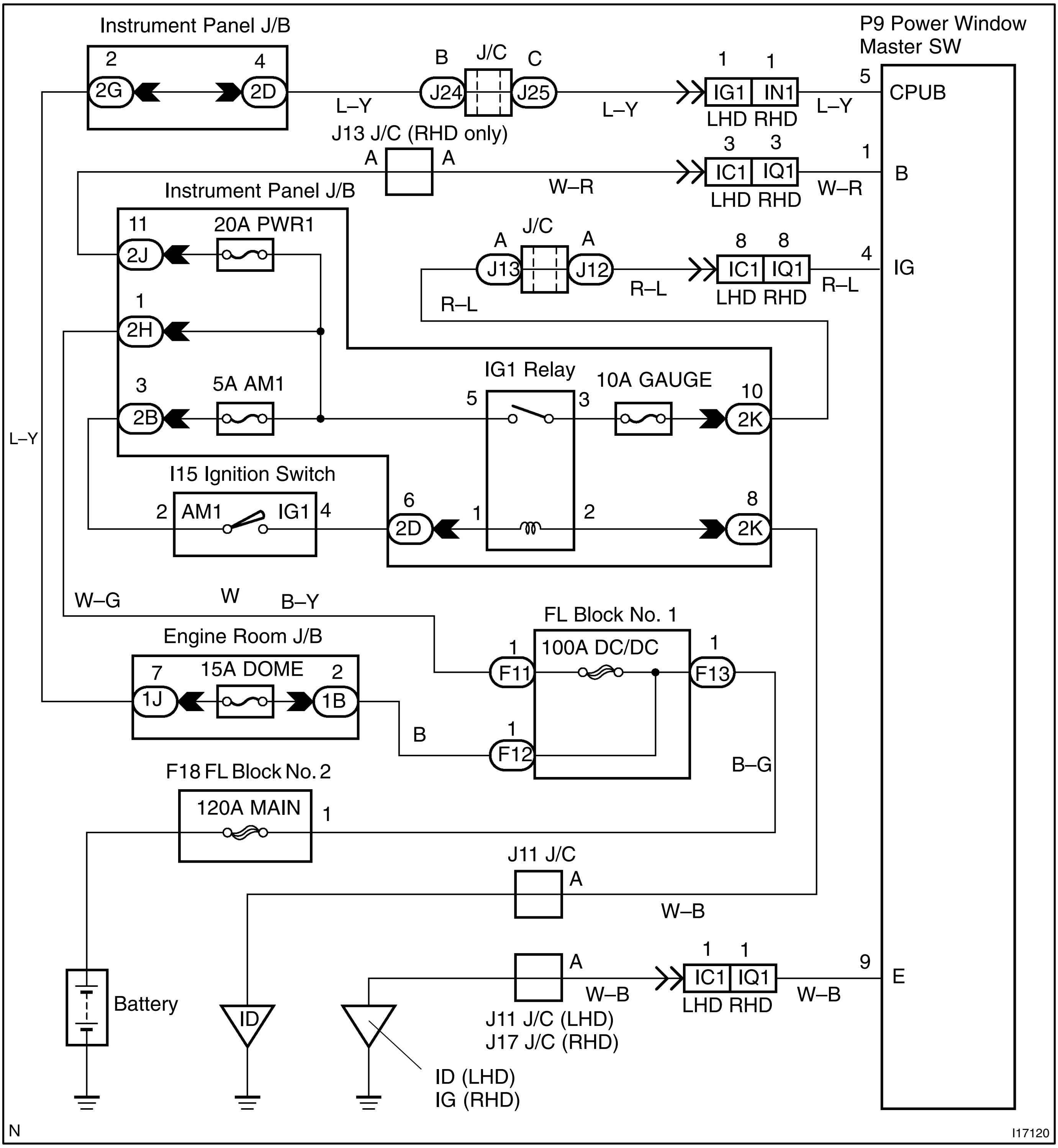
CIRCUIT INSPECTION

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the driver door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check PWR1, AM1 and DOME fuse.**

CHECK:
Check continuity of PWR1, AM1 and DOME fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals B, CPUB, IG and GND of driver door 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 driver door ECU connector.
CHECK:
Measure voltage between terminals B, CPUB and GND.
OK:
Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–640).**

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.

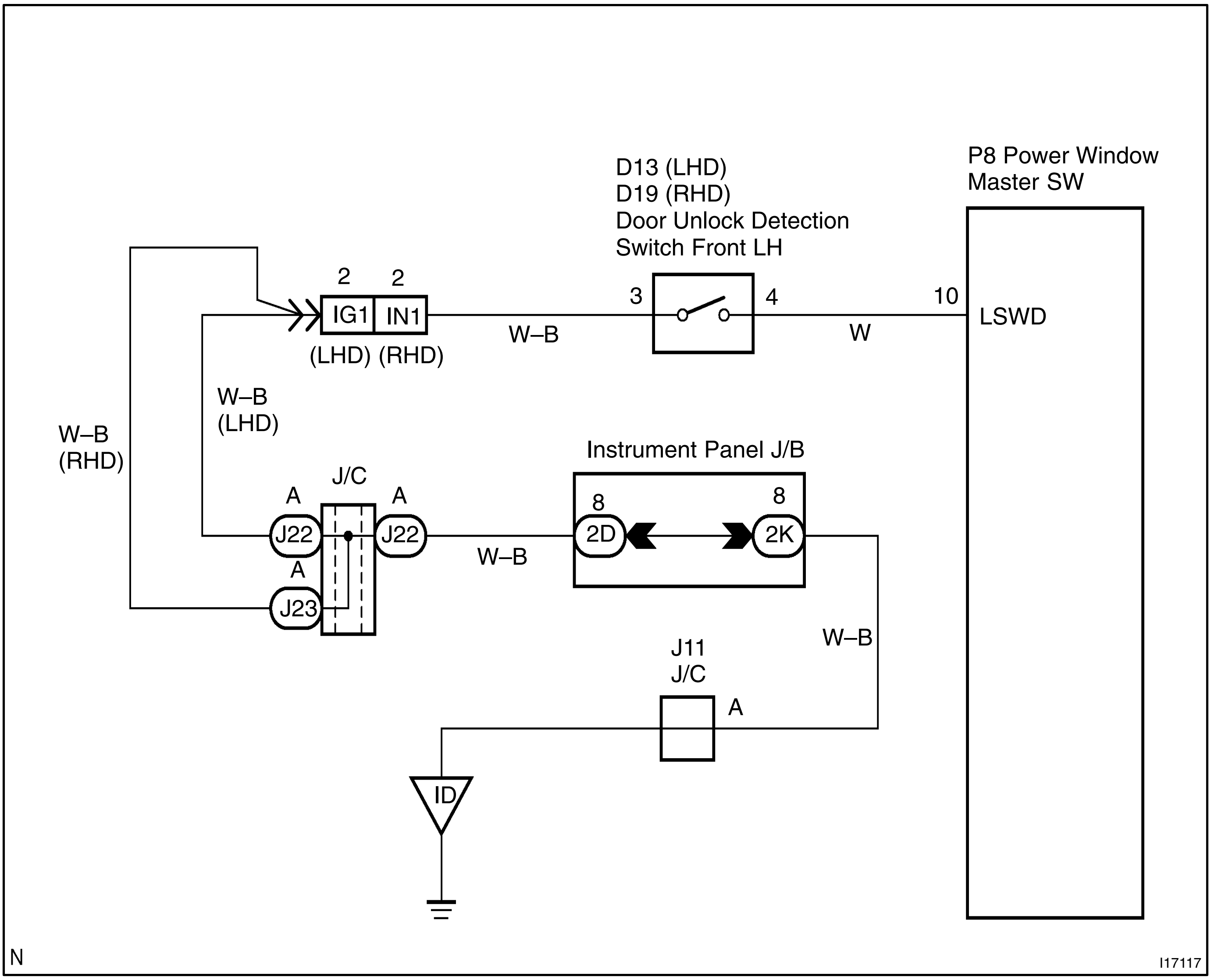
DI2BP–09

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

1	Check door unlock detection switch (See page BE–66).

NG → **Replace the door lock motor.**

OK

2	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–640).

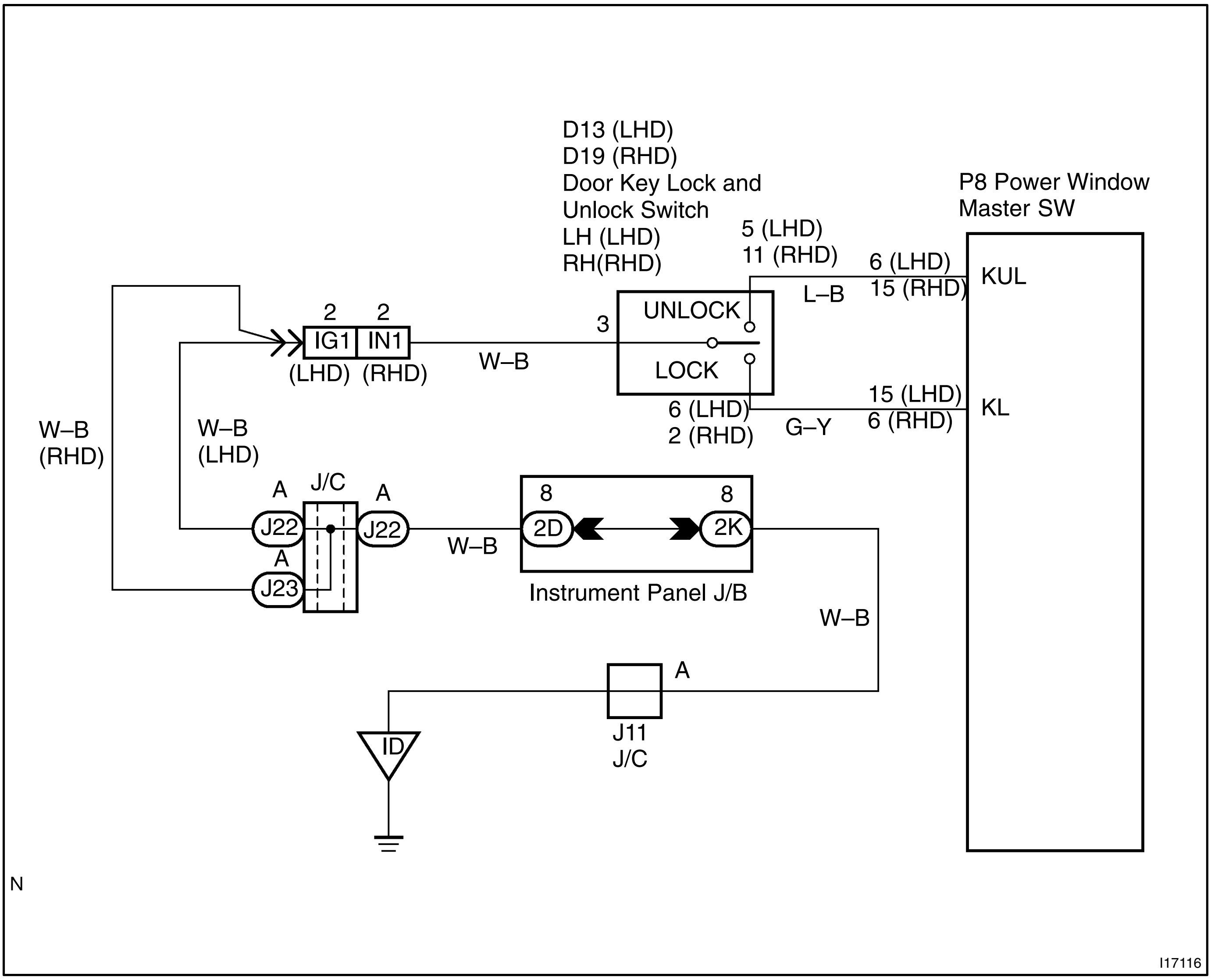
DI2BQ–09

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–672)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the door key lock and unlock switch using DTC check (See page DI–672).

OK → Proceed to next circuit inspection shown on problem symptoms table (See page DI–615).

NG

2	Check the door key lock and unlock switch (See page BE–66).

NG → Replace the door key lock and unlock switch.

NG

3	Check wireharness and connector between door key lock and unlock 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–640).

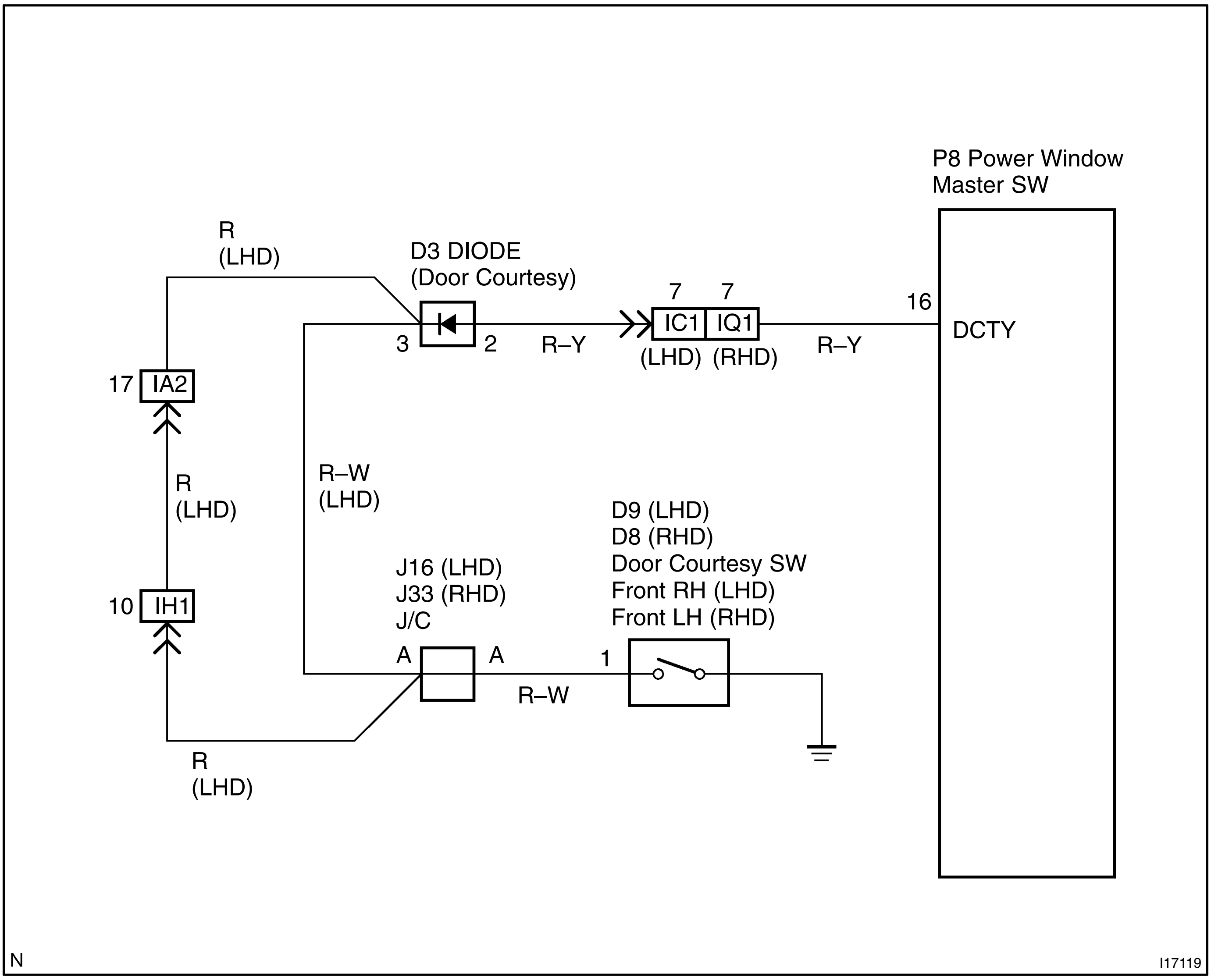
DI2BR–11

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 symptom table (See page DI–640).**

NG ↓

2	**Check courtesy light (See page BE–31).**

NG → **Replace the courtesy light.**

OK ↓

3	**Check courtesy switch (See page BE–31).**

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.**

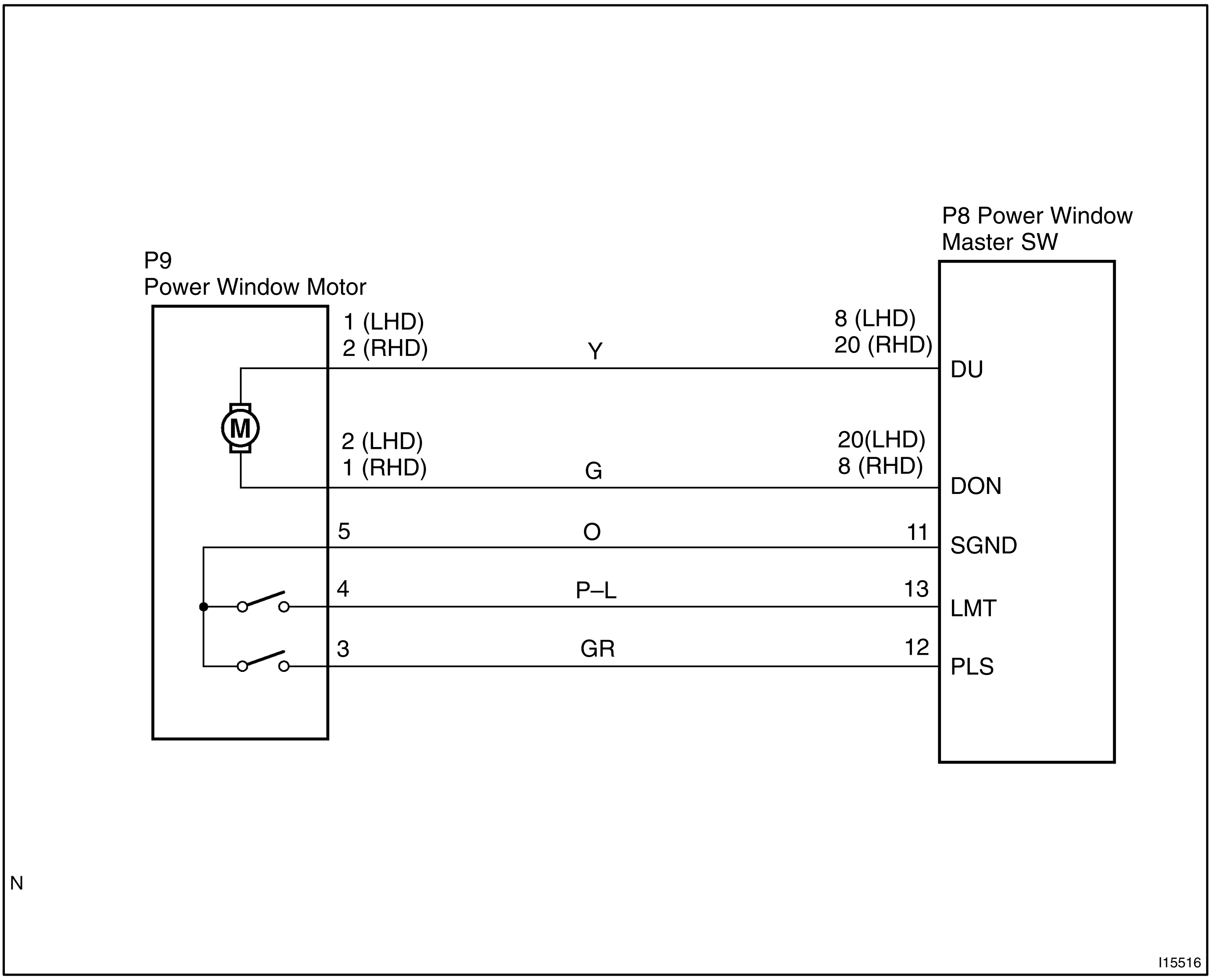
OK ↓

Proceed to next circuit inspection shown on problem symptoms table (See page DI–640).

DI2BS–11

Power window motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check power window motor (See page BE–60).

NG → Replace the power window motor.

OK

2	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–640).

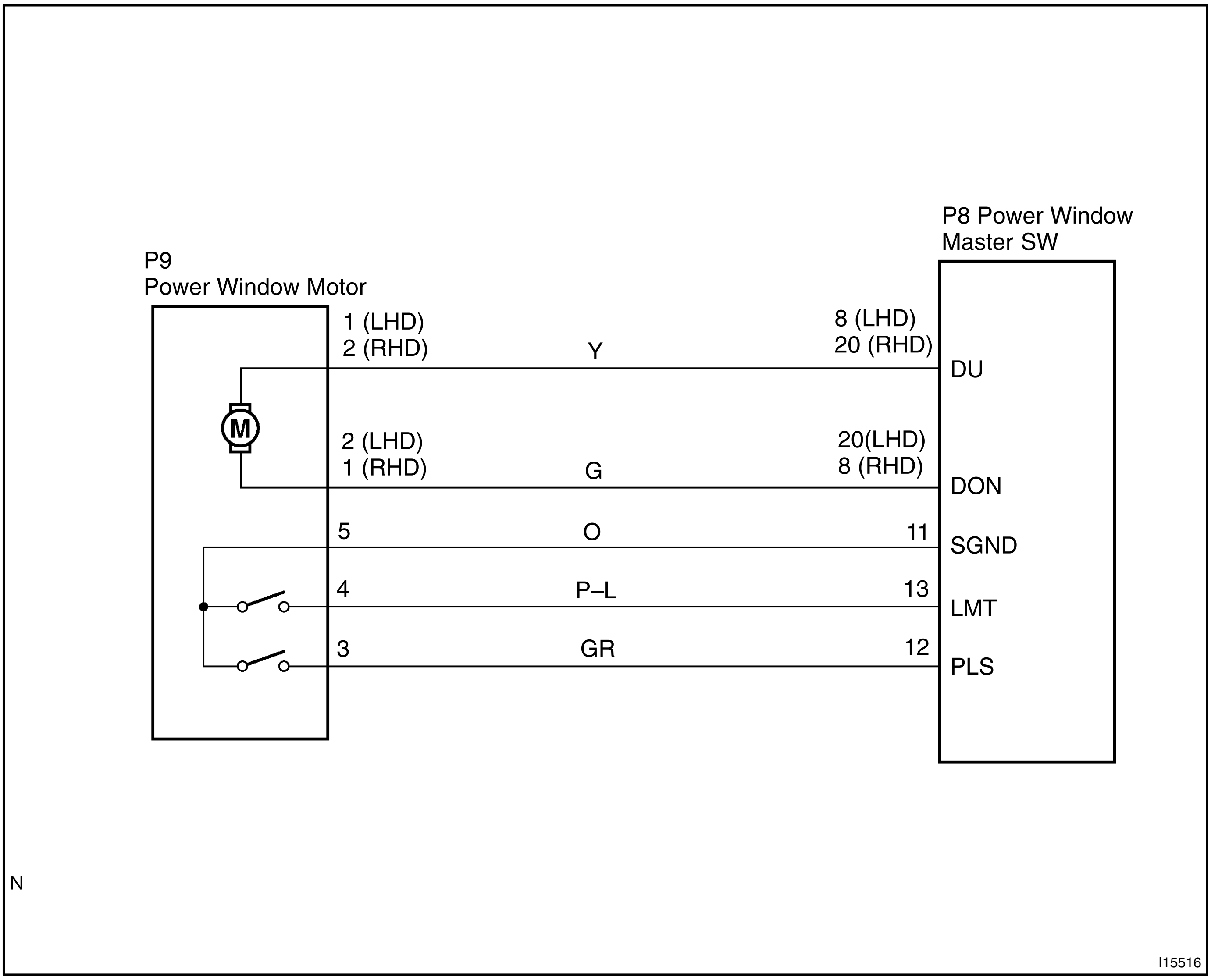
DI2BT–10

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



INSPECTION PROCEDURE

1	Check jam protection limit switch (See page BE–60).

NG → Replace the power window motor.

OK

2	Check wireharness and connector between jam protection limit switch and driver door ECU.

NG → Repair or replace wireharness or connector.

OK

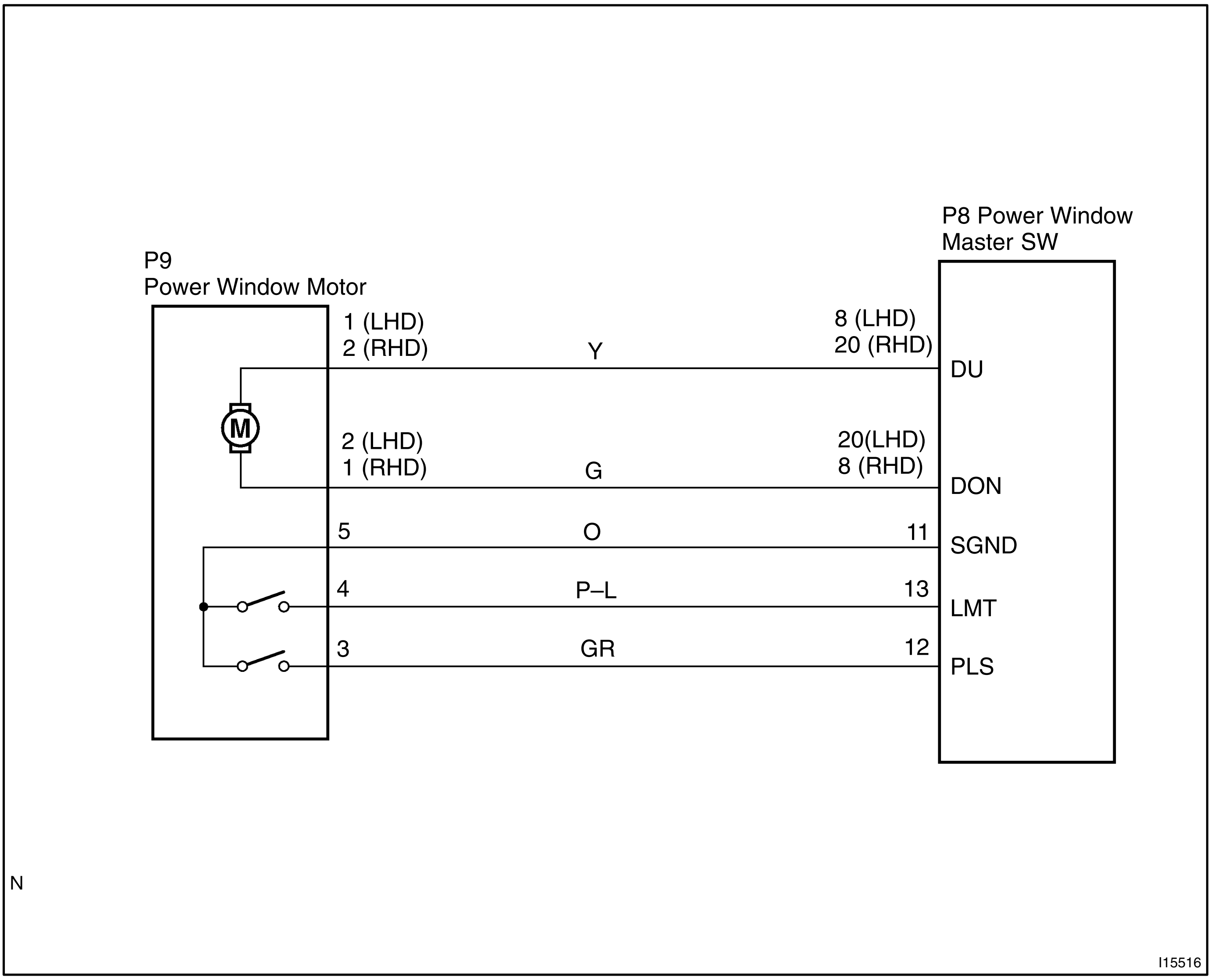
Proceed to next circuit inspection shown on problem symptoms table
(See page DI–640).

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



INSPECTION PROCEDURE

1	**Check jam protection pulse switch (See page BE–60).**

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–640).

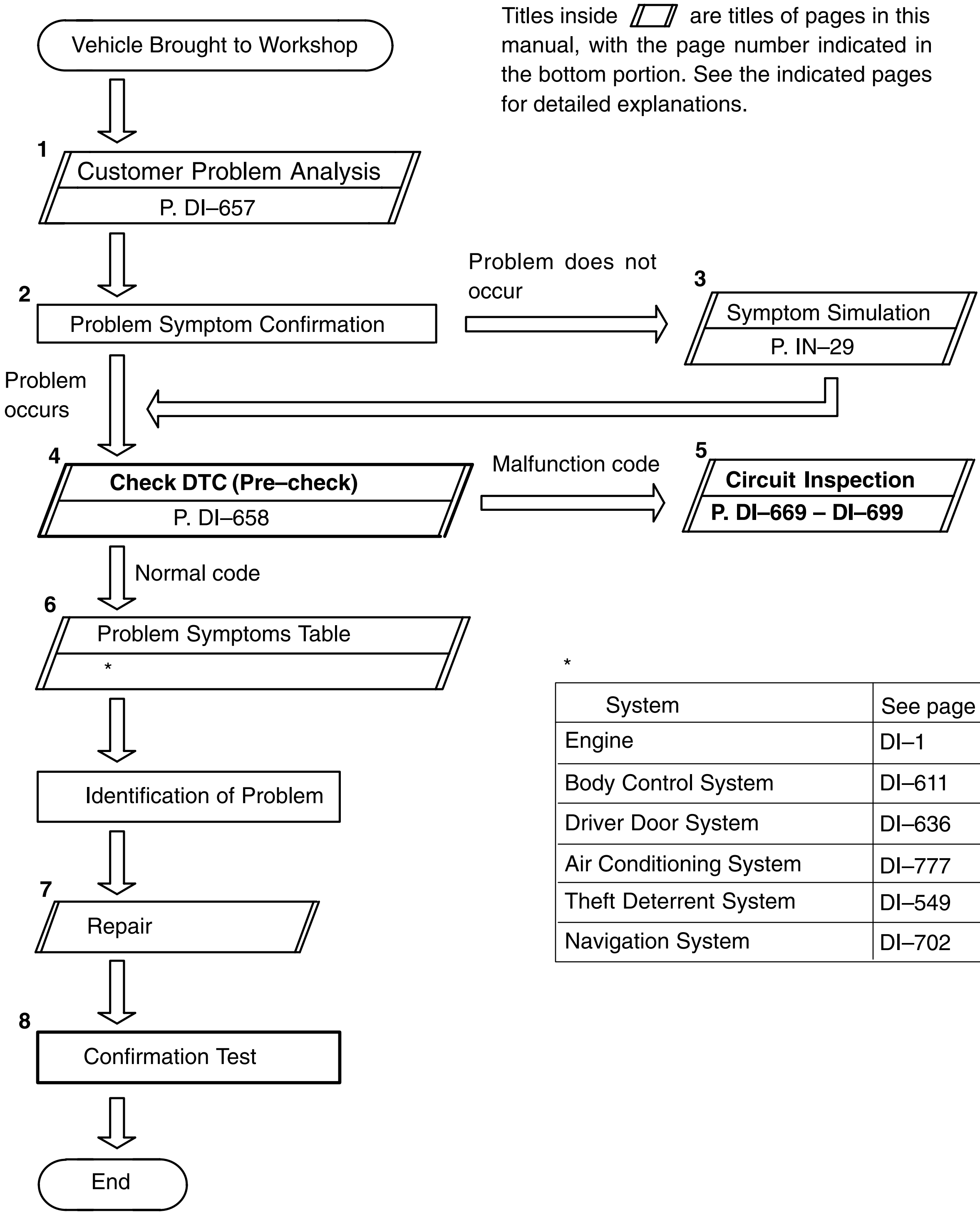
MULTIPLEX COMMUNICATION SYSTEM

DI7RG–01

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.

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



*

System	See page
Engine	DI–1
Body Control System	DI–611
Driver Door System	DI–636
Air Conditioning System	DI–777
Theft Deterrent System	DI–549
Navigation System	DI–702

Step 4, 8 : Diagnostic steps permitting the use of the hand–held tester.

DI7RH–01

CUSTOMER PROBLEM ANALYSIS CHECK

MULTIPLEX COMMUNICATION SYSTEM Check Sheet

Inspector's name: ________________

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km** **Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		" " Constant " " Sometimes (times per day, month) " " Once only
Weather Conditions When Problem Occurred	**Weather**	" " Fine " " Cloudy " " Rainy " " Snowy " " Various/ Others
	Outdoor Temperature	" " Hot " " Warm " " Cool " " Cold (Approx. ˚F (˚C))

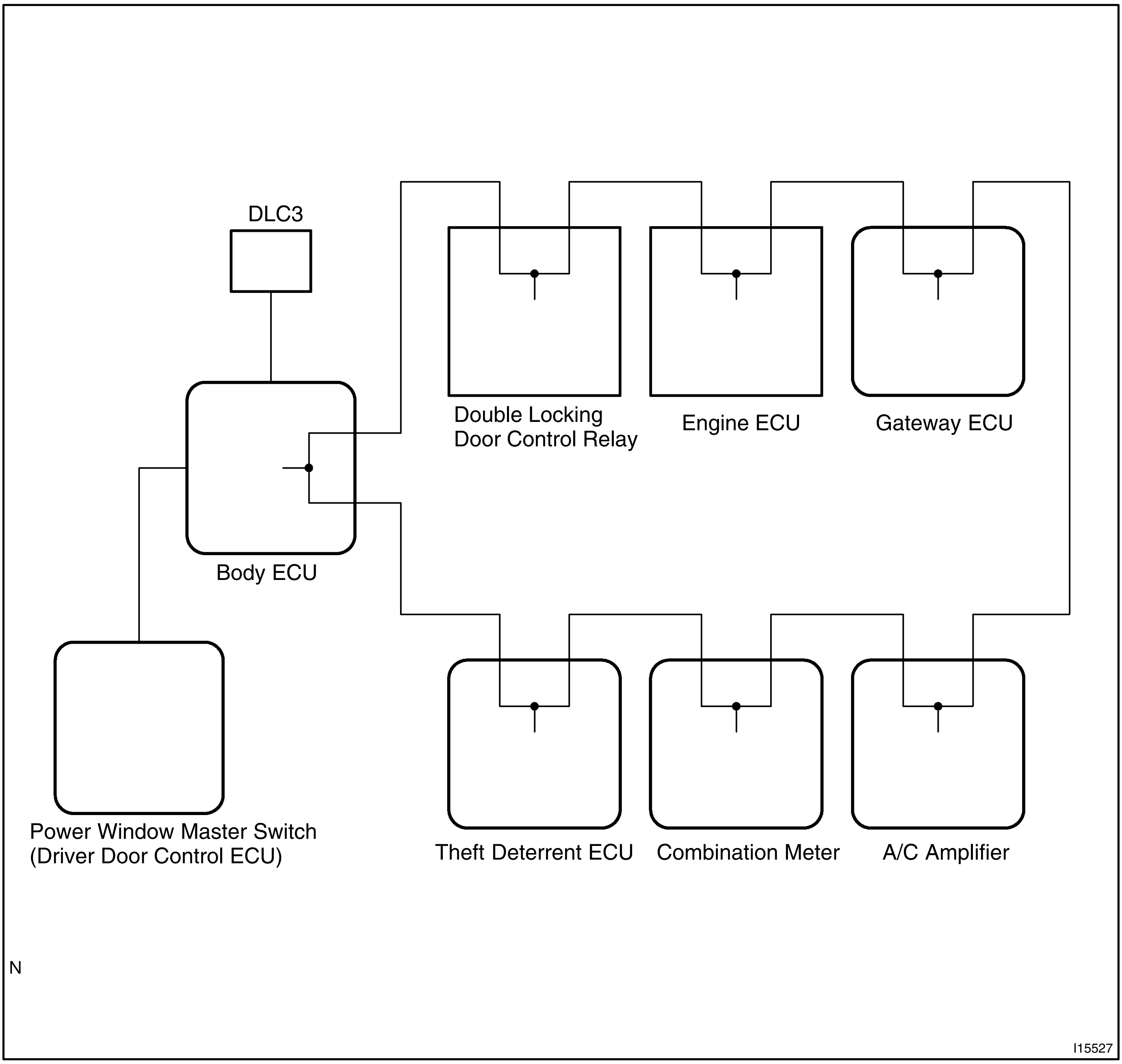
Malfunction System	" " Engine
	" " Body Control System
	" " Driver Door System
	" " Air Conditioning System
	" " Theft Deterrent System
	" " Navigation System

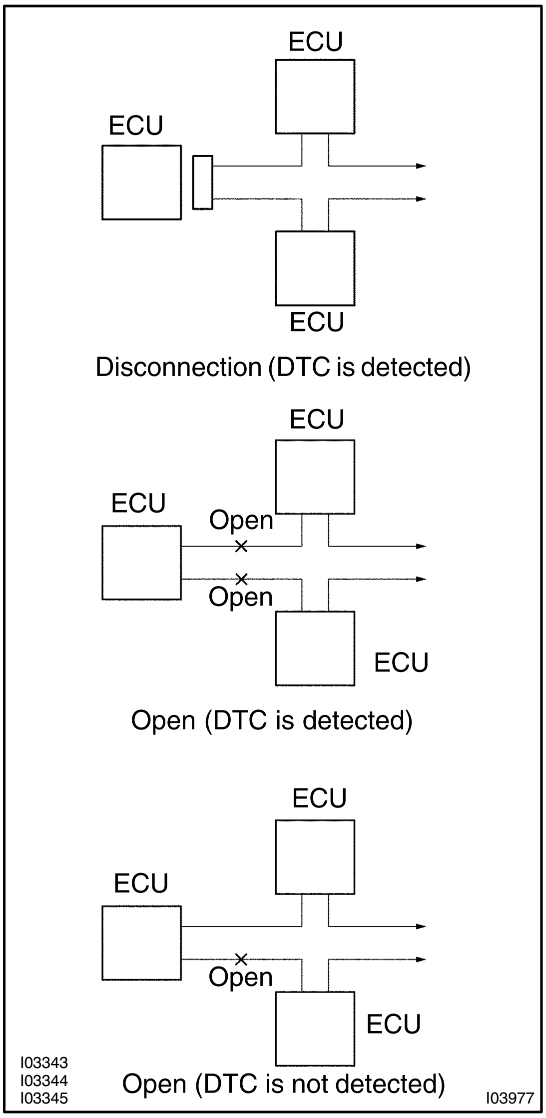
DI7RI–01

PRE–CHECK

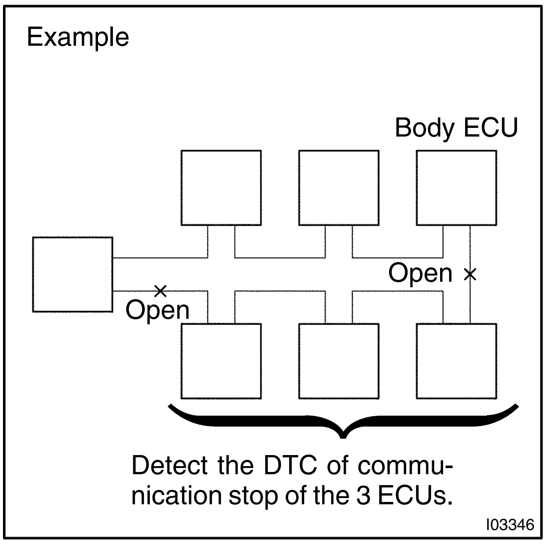
1. DIAGNOSIS SYSTEM

(a) As shown in the following illustration, each ECU of this vehicle is connected by communication bus and it transmits each signal by communication. This communication bus is self–diagnosed by Body ECU and it memorizes DTC when it detects communication stop to ECU or communication bus +B short or GND short. There is a possibility that Body ECU cannot self–diagnose accurately unless it doesn't work normal. So, please note that the troubleshooting of Body Electrical System should be done after confirming if Body ECU and Open door indicator works normal by 2. "BASIC INSPECTION" described later.





(b) If DTC of ECU communication stop is output, there is a possibility of connector disconnection or 2 communication buses open. It will not become abnormal with only 1 communication bus open.



(c) If 2 communication buses are open at the position as shown in the illustration, DTC of ECU communication stop between those 2 buses is output.

2. BASIC INSPECTION

INSPECT BODY ECU

1	Check room light operation.

HINT:
With this inspection body ECU CPU can be diagnosed if it works normal or not.

CHECK:
Check if the room light works normal at DOOR position.

OK → Go to next step"OPEN DOOR INDICATOR LIGHT INSPECTION".

NG ↓

2	Check interior light system (Except body ECU) (See page BE–31).

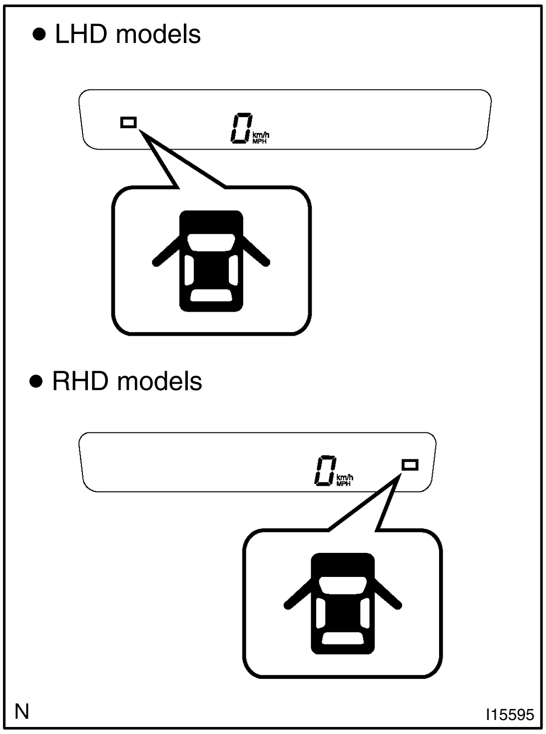
OK → Replace the body ECU.

NG ↓

Repair of replace malfunction part.

INSPECT OPEN DOOR INDICATOR LIGHT

1	**Check open door indicator light.**

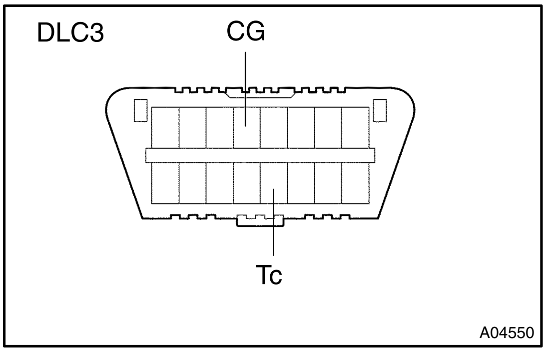


CHECK:
Check if open door Indicator light is turned on when either door open.
HINT:
If open door Indicator light is not turned on, DTC will not be output.

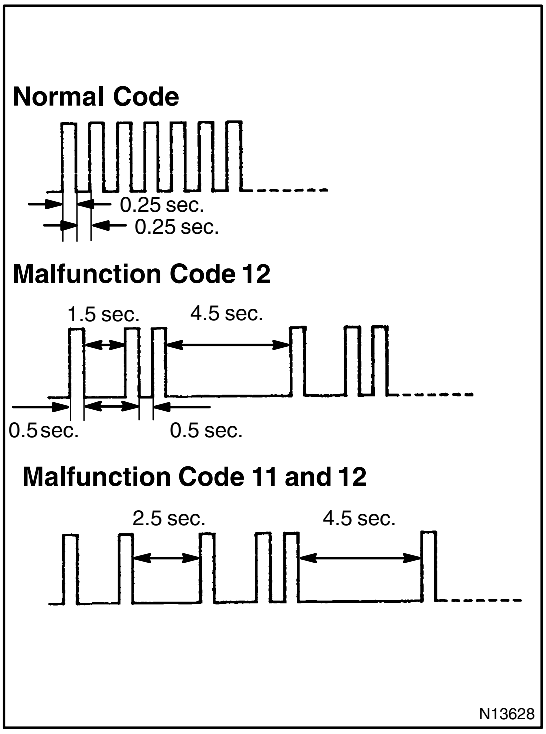
OK → **Go to step 3. "DTC CHECK".**

NG

Repair the open door indicator light (See page BE–46).



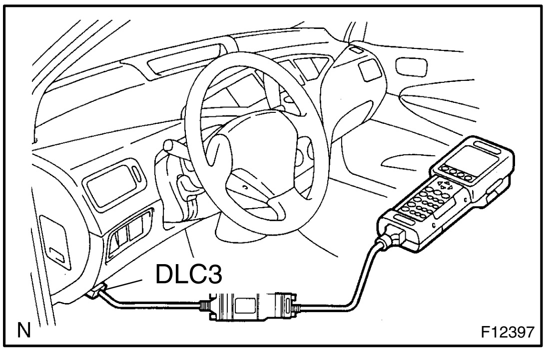
3. DTC CHECK (Using diagnosis check wire)
(a) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18020
(b) Turn the ignition switch ON.
(c) Read the DTC on the open door indicator light.



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 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–663 to confirm the details of the DTCs.

5. DTC CLEARANCE

DTC will be cleared when the trouble output to DTC is recovered normally.

DI7RJ–01

DIAGNOSTIC TROUBLE CODE CHART

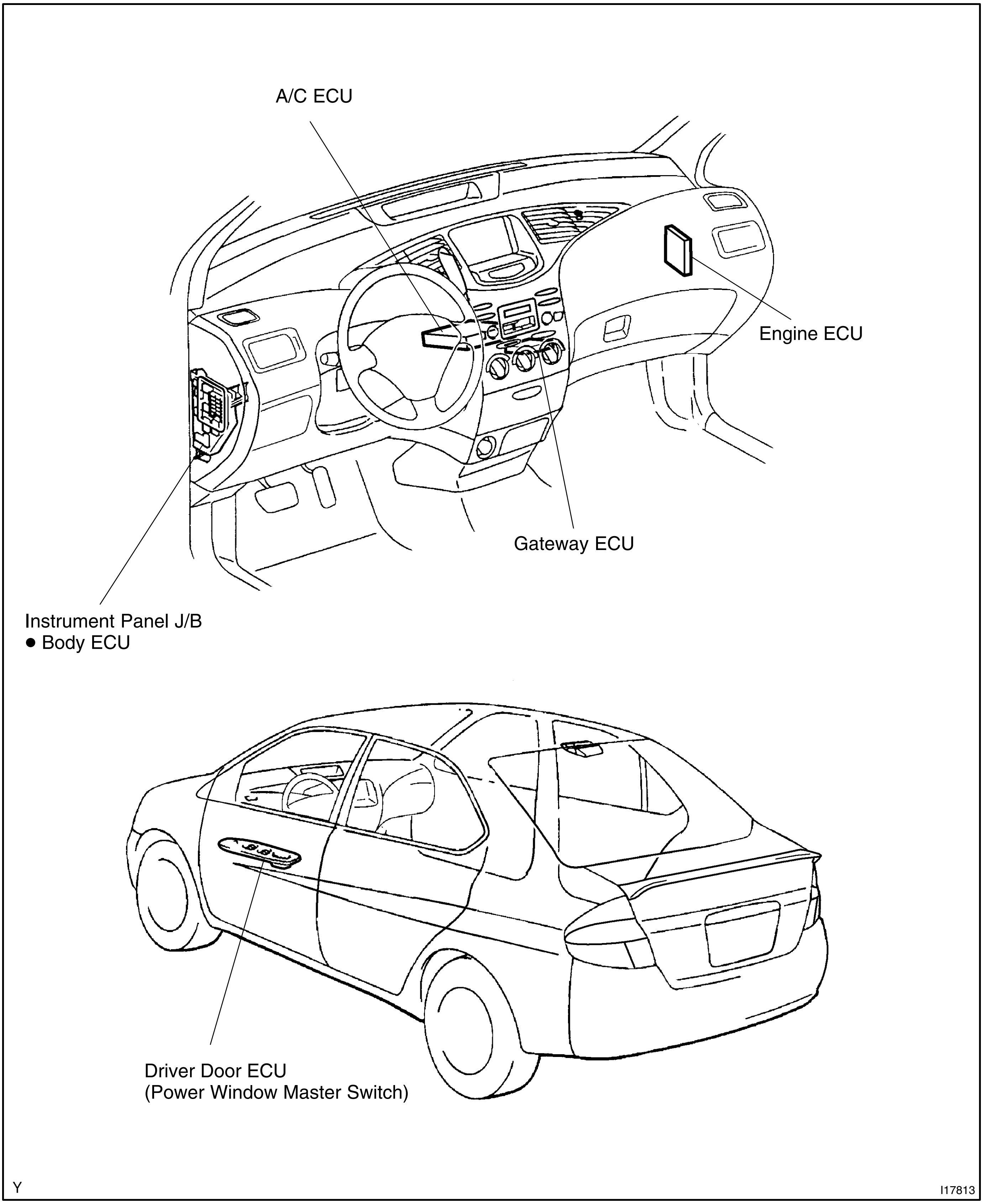
If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

DTC No. (See Page)	Detection Item	Trouble Area
B1211/11 (DI–669)	Driver door ECU communication stop	• Wireharness • Driver door ECU
B1221/21 (DI–672)	Power window switch circuit on driver door	• Power window master switch • Wireharness
B1222/22 (DI–672)	Door lock switch circuit on driver door	• Door lock control switch • Door key lock and unlock switch • Wireharness
B1241/41 (DI–672)	Body ECU switch circuit diagnosis	• Stop light switch • Wireharness
B1242/42 (DI–673)	Wireless door lock tuner circuit malfunction	• Wireharness • Wireless door lock tuner
B1248/48 (DI–675)	AVC–LAN circuit communication stop	• Wireharness • Gateway ECU
B1249/49 (DI–677)	Double locking ECU communication stop	• Wireharness • Double locking ECU
B1261/61 (DI–679)	Engine ECU communication stop	• Wireharness • Engine ECU
B1262/62 (DI–682)	A/C amplifier communication stop	• Wireharness • A/C amplifier
B1266/66 B1267/67 (DI–683)	Instrument panel system communication bus malfunction (+B short) Instrument panel system communication bus malfunction (GND short)	• Wireharness • ECU (Instrument panel system)
B1269/69 (DI–691)	Theft deterrent ECU communication stop	• Wireharness • Theft deterrent ECU
B1271/71 (DI–693)	Combination meter ECU communication stop	• Wireharness • Combination meter ECU
B1274/74 (DI–695)	Multi display communication stop	• Wireharness • Multi display
B1293/93 (DI–697) (DI–699)	Gateway ECU communication circuit	• Wireharness • Power source circuit • Gateway ECU

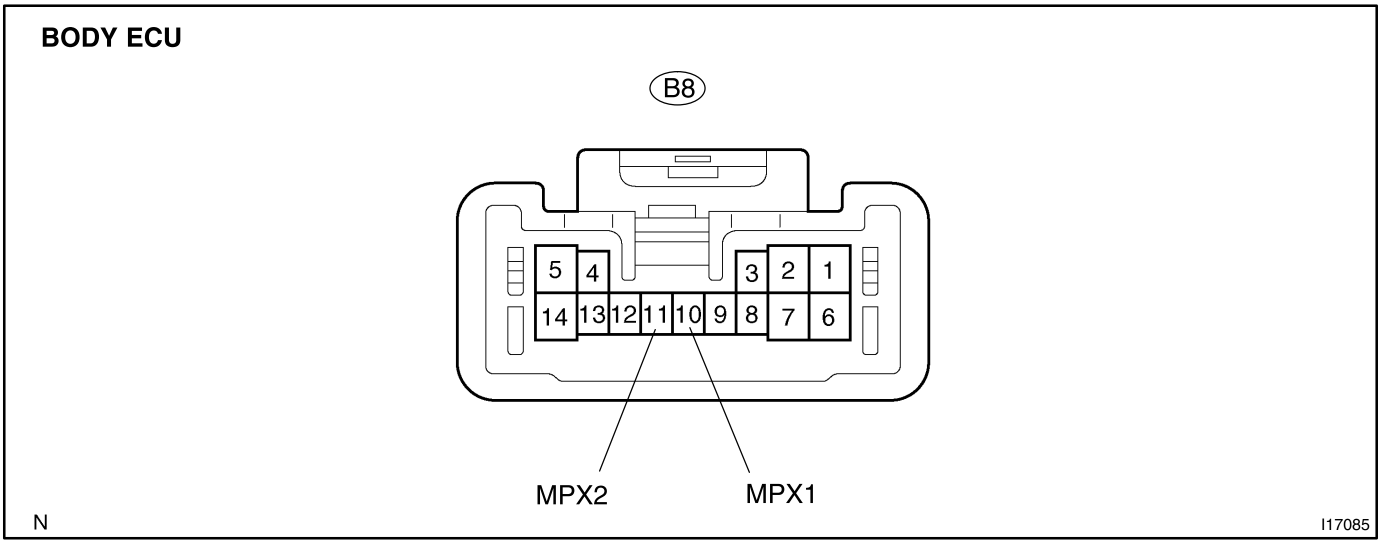
HINT:
DTC 21, 22, and 41 don't mean switch abnormal but notify how switch works.
If DTC is not output when operating switch, it means failure of switch contact.
If DTC is output when not opening switch, it means stick of switch.

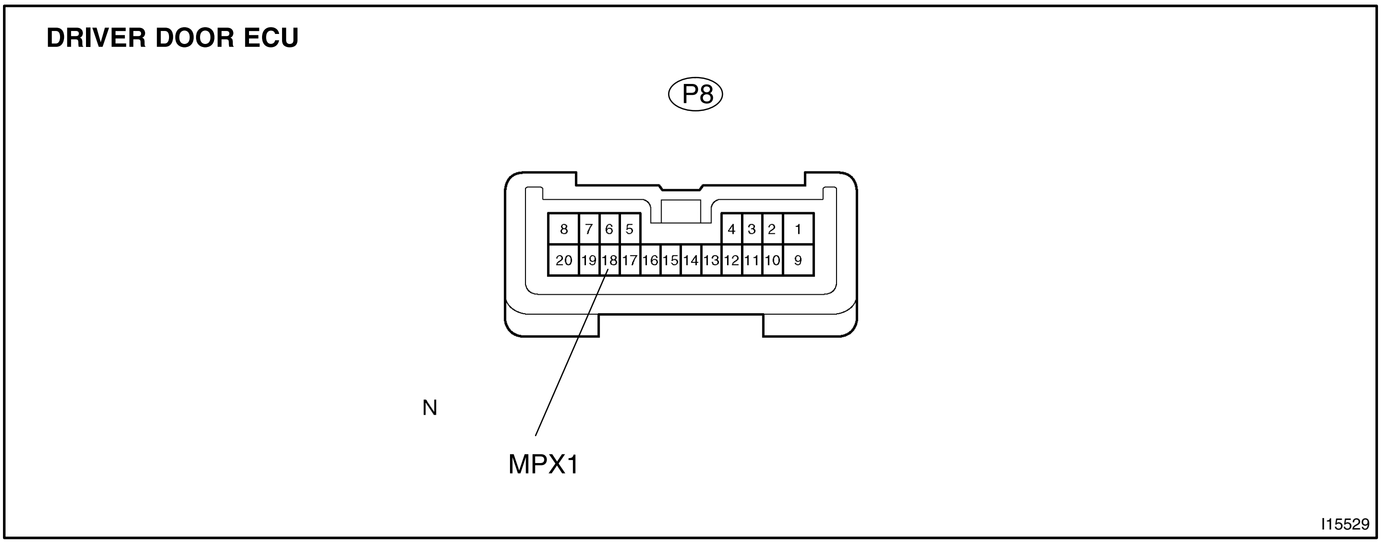
DI7RK–01

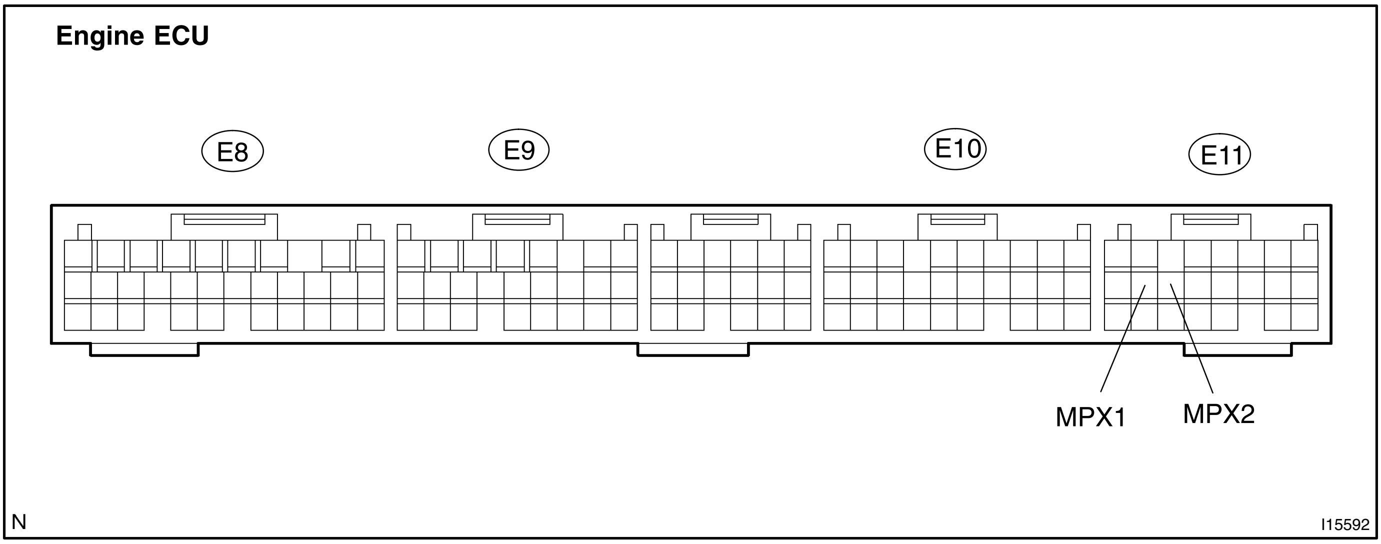
PARTS LOCATION



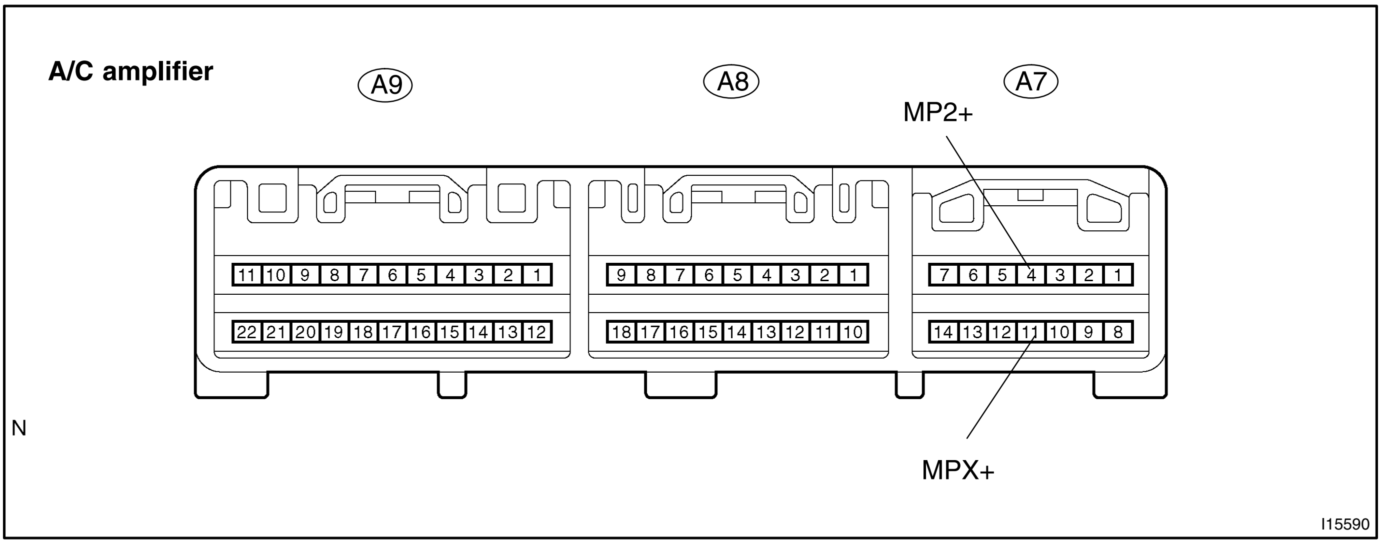
TERMINALS OF ECU

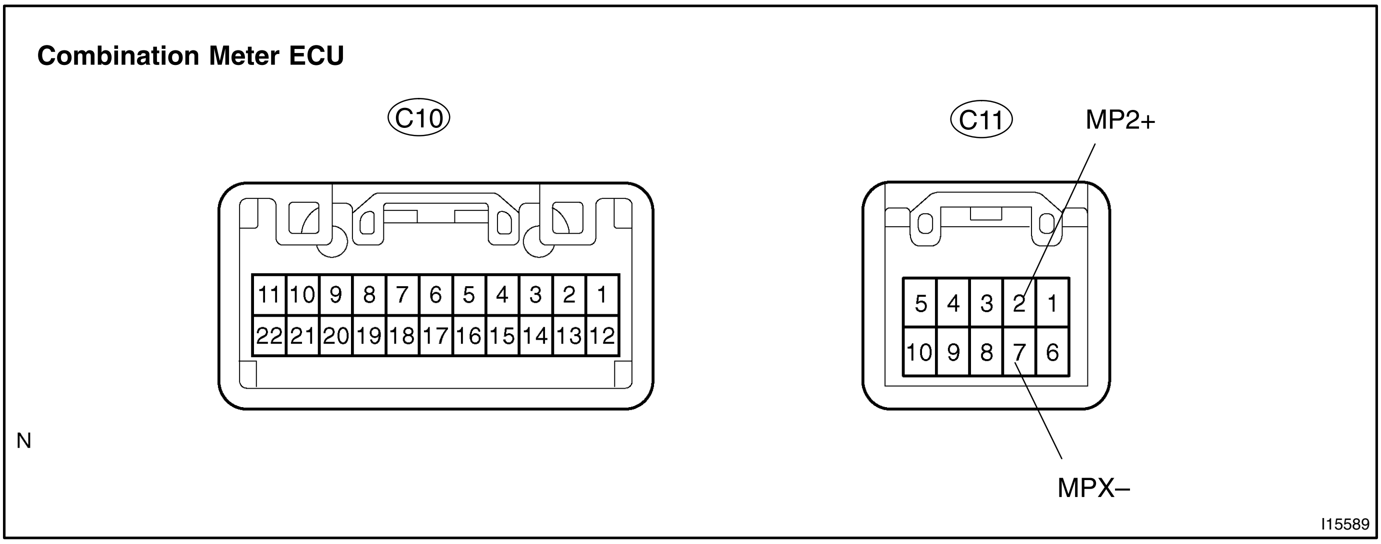


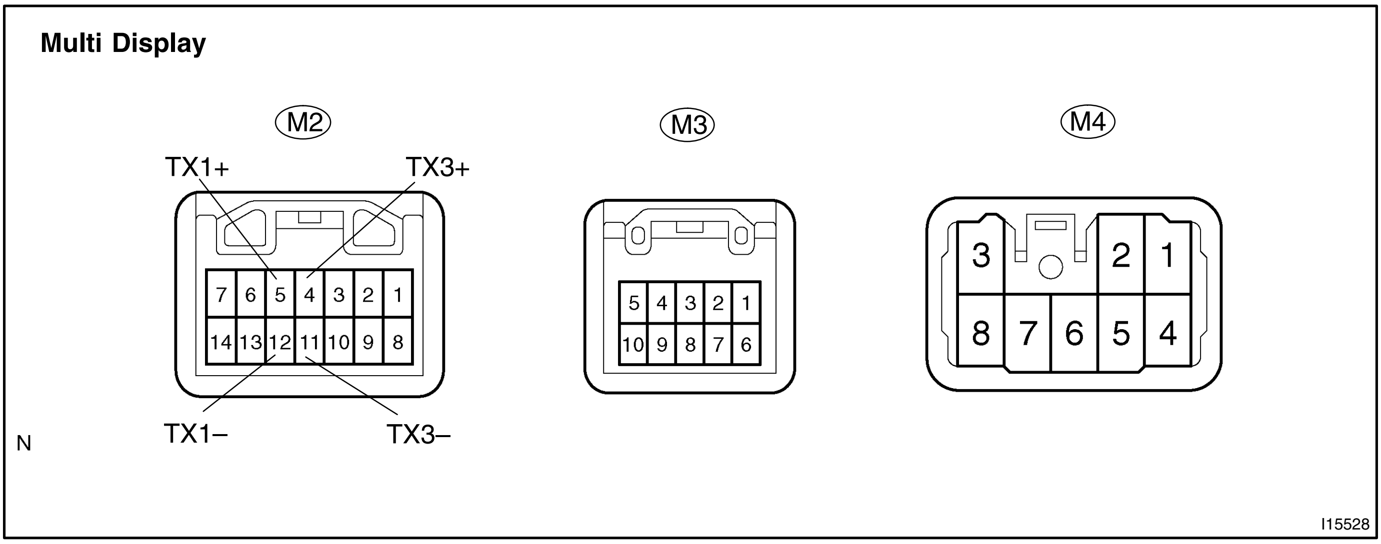




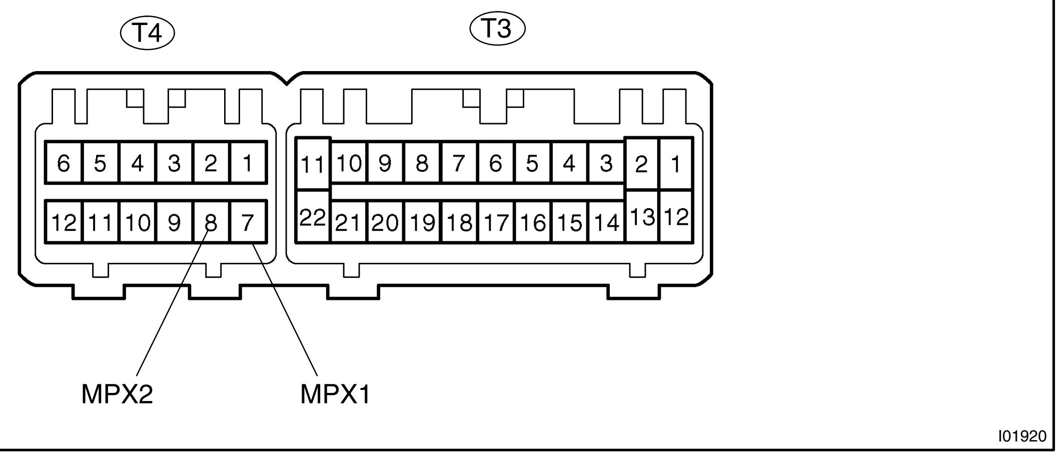
DI7RL–01


A/C amplifier
A9
A8
A7
MP2+
MPX+
N
I15590

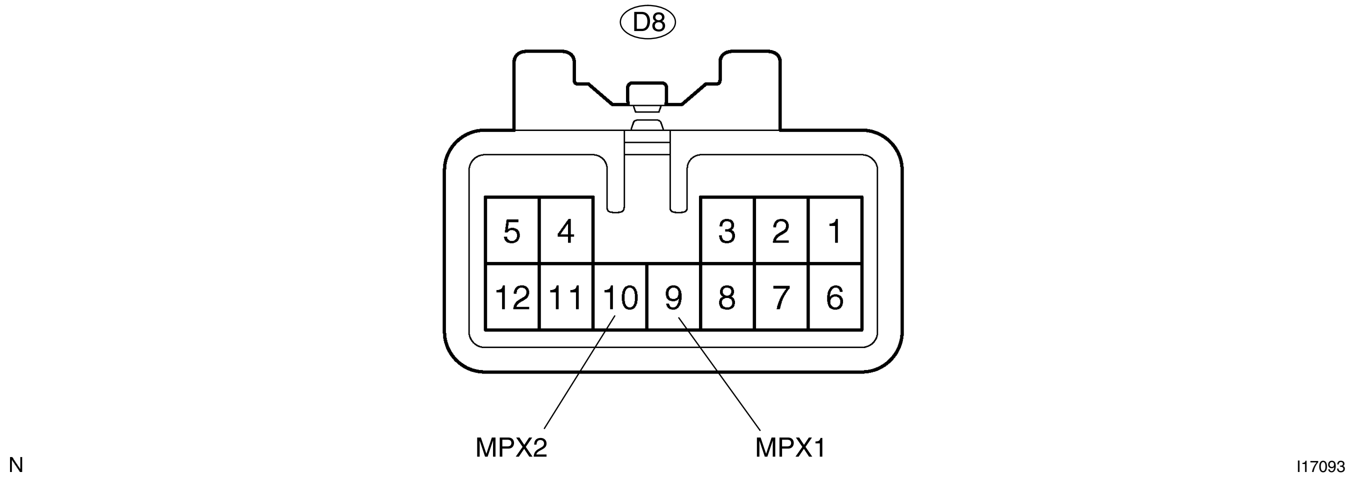

Combination Meter ECU
C10
C11
MP2+
MPX–
N
I15589


Multi Display
M2
M3
M4
TX1+
TX3+
TX1–
TX3–
N
I15528

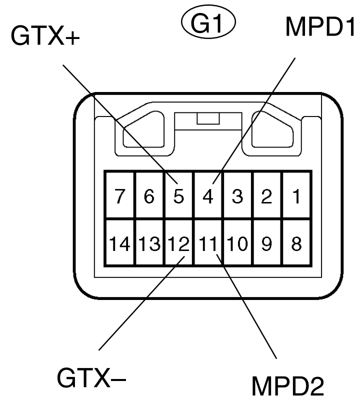
Theft Deterrent ECU



Double Locking Relay



Gateway ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Value (V)
IG ↔ GND (2 ↔ 14)	B–Y ↔ W–B	Ignition switch OFF or ACC	Below 1 V
		Ignition switch ON	10 – 14 V
MDP1 (4)	GR–B	A/C ECU communication circuit	–
GTX+ (5)	R	AVC–LAN communication circuit	–
CG ↔ Body ground (7 ↔ Body ground)	W–B ↔ Body ground	Constant	Below 1 V
BATT ↔ GND (8 ↔ 14)	R–G ↔ W–B	Constant	10 – 14 V
ACC ↔ GND (9 ↔ 14)	GR–R ↔ W–B	Ignition switch OFF	Below 1 V
		Ignition switch ACC or ON	10 – 14 V
MDP2 (11)	GR–L	Engine and ECT ECU communication circuit	–
GTX– (12)	G	AVC–LAN communication circuit	–
GND ↔ Body ground (14 ↔ Body ground)	W–B ↔ Body ground	Constant	Below 1 V

DI7RM–01

CIRCUIT INSPECTION

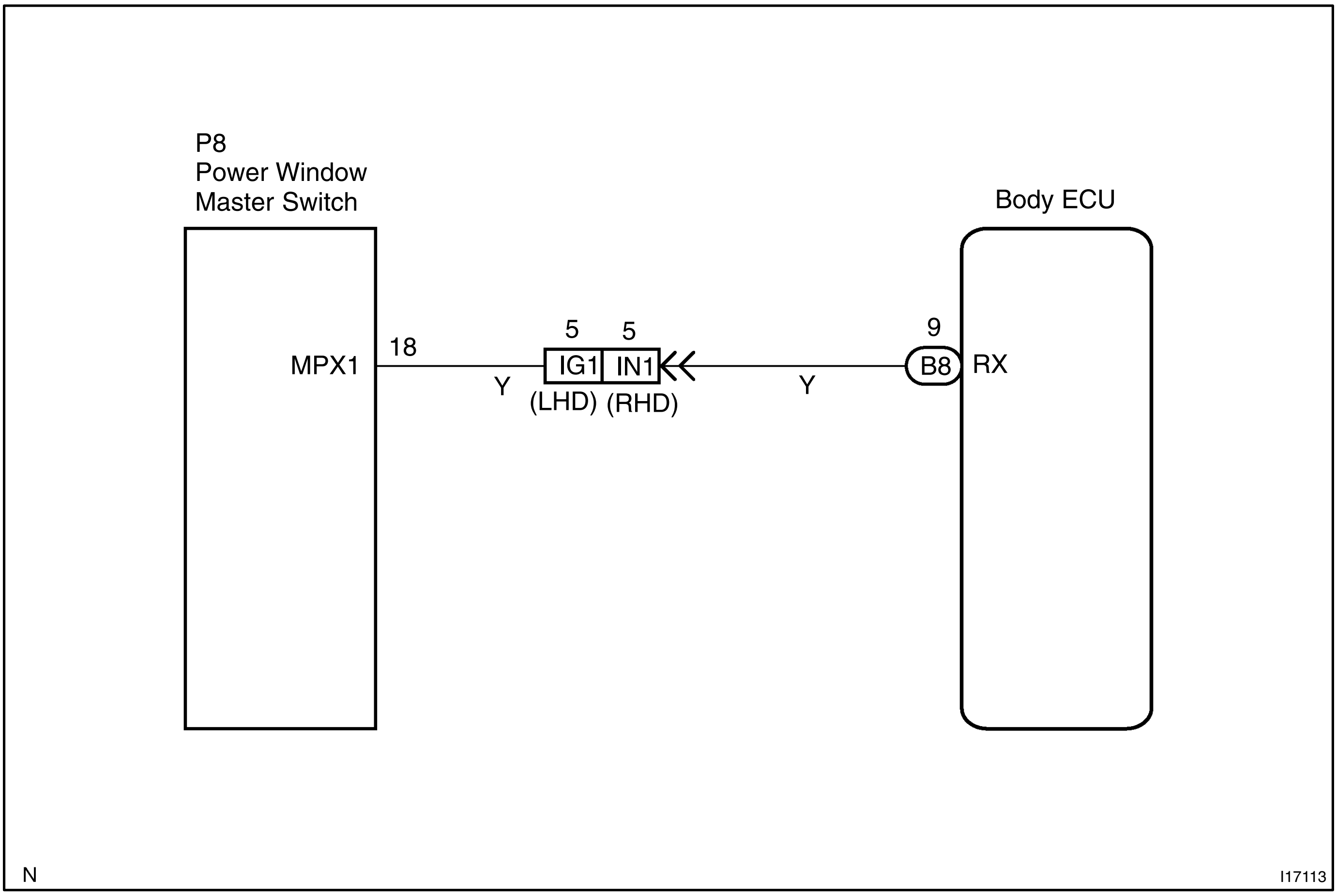
DTC	B1211 / 11	Driver door ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between driver door ECU and body 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.

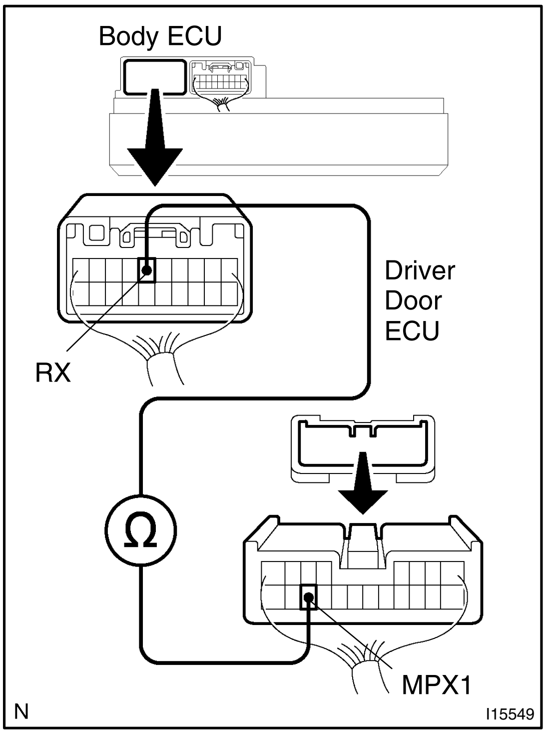
HINT:

With this inspection, the driver door ECU CPU can be diagnosed if it works normally or not.

NG	**Replace the driver door ECU.**

OK

2	**Check wireharness.**



PREPARATION:
Disconnect connector ”B8” of body ECU and ”P9” of driver door ECU.
CHECK:
Check continuity between terminal RX of body ECU and MPX1 of driver door ECU.
OK:
There is a continuity in wireharness.
HINT:
If there is OPEN in wireharness, please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the driver door ECU.

DI7RN–01

DTC	B1221 / 21	Power window switch circuit on driver door

DTC	B1222 / 22	Door lock switch circuit on driver door

DTC	B1241 / 41	Body ECU switch circuit diagnosis

CIRCUIT DESCRIPTION

These DTC notify how switch works as follows:
If DTC is not output when operating switch, it means failure of switch contact. If DTC is output when not operating switch, it means stick of switch. When something wrong is found by this diagnosis, inspect each switch. Then, replace the switch if there is a problem, or check the wireharness if there is no problem.

DTC No.	DTC Detecting Condition	Trouble Area
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
B1241/41	Stick of switch	• Stop light switch • Wireharness

HINT:
Please refer to BE–2 for switch inspection, and to each door system of DI–636 for wireharness inspection.

DI7RO–01

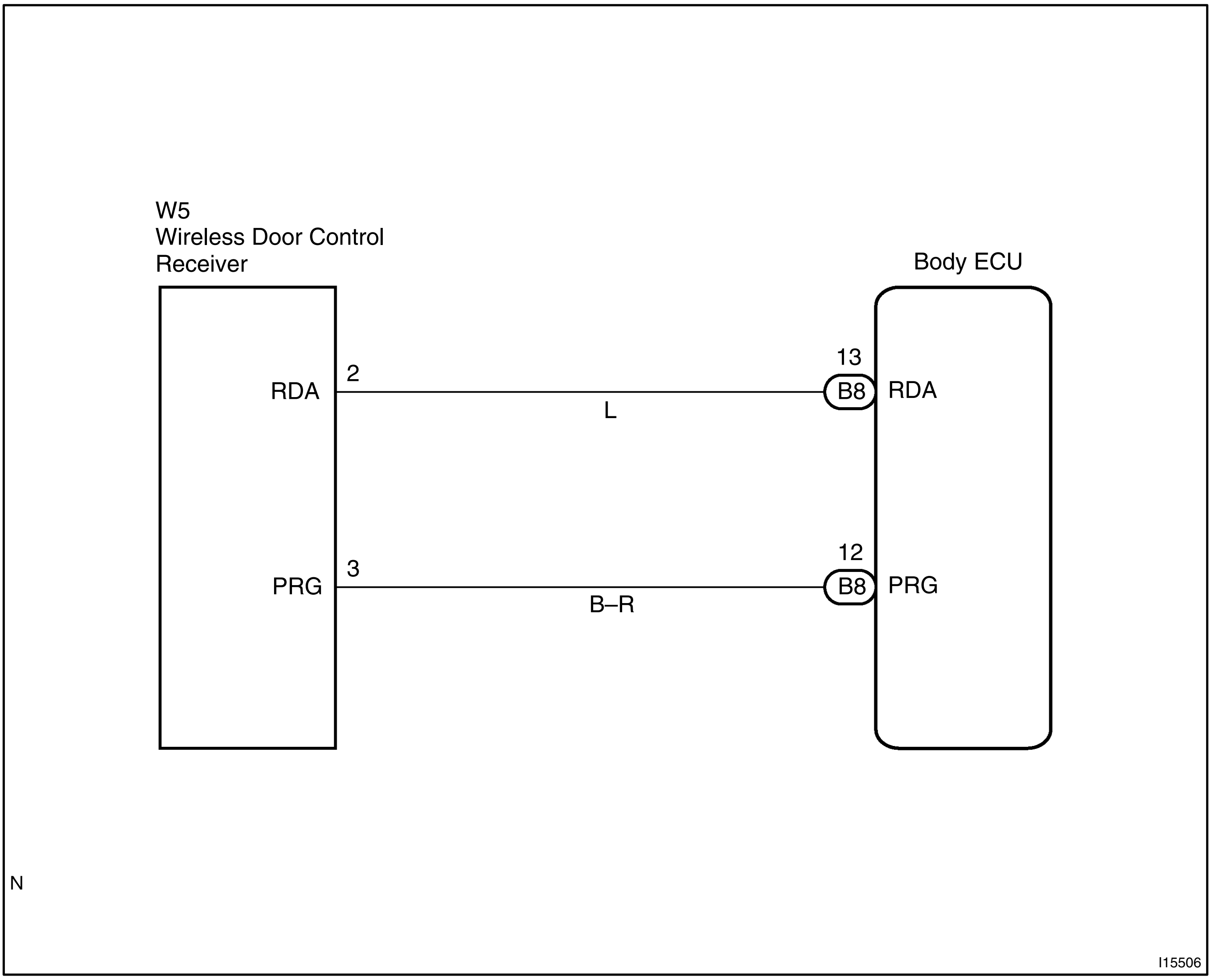
DTC	B1242 / 42	Wireless door lock tuner circuit malfunction

CIRCUIT DESCRIPTION

This DTC is output when GND short of RDA terminal is detected.

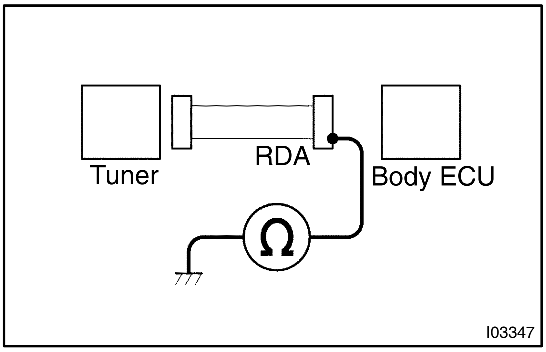
DTC No.	DTC Detecting Condition	Trouble Area
B1242/42	GND short of RDA terminal	• Wireharness • Wireless door lock tuner • Body ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wireharness.**

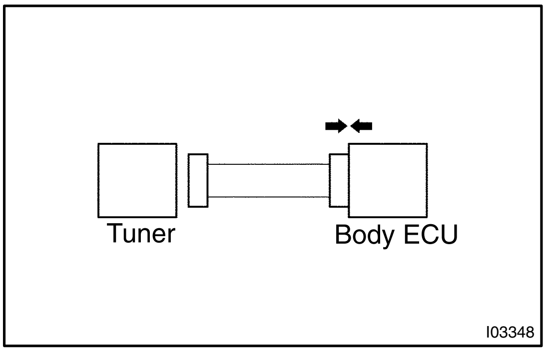


PREPARATION:
Disconnect the connector of tuner and body ECU.
CHECK:
Check the continuity between wireharness and body ground.
OK:
No continuity.

NG → **Repair or replace the wireharness.**

OK

2	**Check body ECU.**



PREPARATION:
Connect the connector of body ECU.
CHECK:
Check the DTC.
OK:
B1242/42 is not output.

NG → **Replace the body ECU.**

OK

Replace the tuner.

DI7RP–01

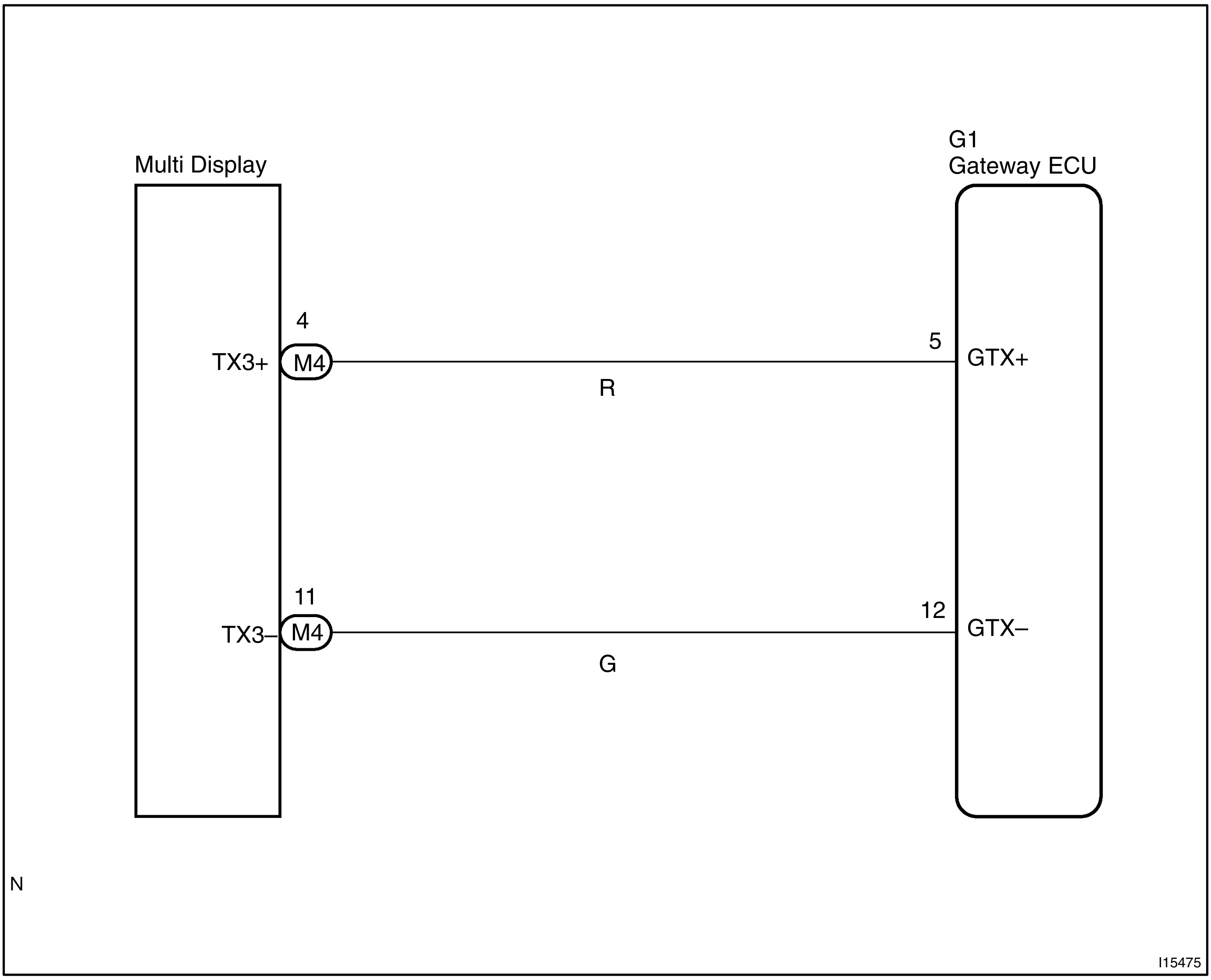
DTC	B1248/48	AVC–LAN circuit communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between gateway ECU and AVC–LAN circuit.
The body ECU performs the diagnosis check of the gateway ECU communication error to ”AVC–LAN”.
The condition of registration can be checked by DTC of the body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1248/48	Condition that the gateway ECU cannot register to AVC–LAN.	• Gateway ECU • Wireharness

WIRING DIAGRAM



INSPECTION PROCEDURE

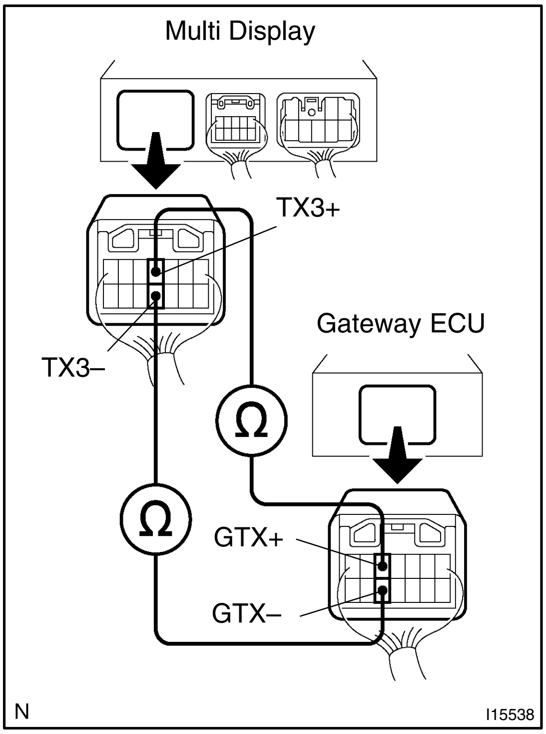
1	**Check ”Service check mode” of audio system. (AVC–LAN diagnosis check) (See page DI–704)**

CHECK:
Connection of the gateway ECU can be checked by AVC–LAN diagnosis. (”Servive check mode” of audio system)
OK:
Display
G/W: OK (System is normal)
G/W: NG (Communication error)
G/W: None (Never registered)

NG → **Replace the gateway ECU.**

OK

2	**Check wireharness**



PREPARATION:
Disconnect connector ”G1” of gateway ECU and ”M2” of multi display.
CHECK:
(a) Check continuity between terminals GTX+ of gateway ECU and TX3+ of multi display.
(b) Check continuity between terminals GTX– of gateway ECU and TX3– of multi display.
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 gateway ECU.

DI7RQ–01

DTC	B1249/49	Double locking ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between double locking ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1249/49	No communication from double locking ECU more than 10 seconds.	• Double locking ECU • Wireharness

WIRING DIAGRAM

See page DI–683.

INSPECTION PROCEDURE

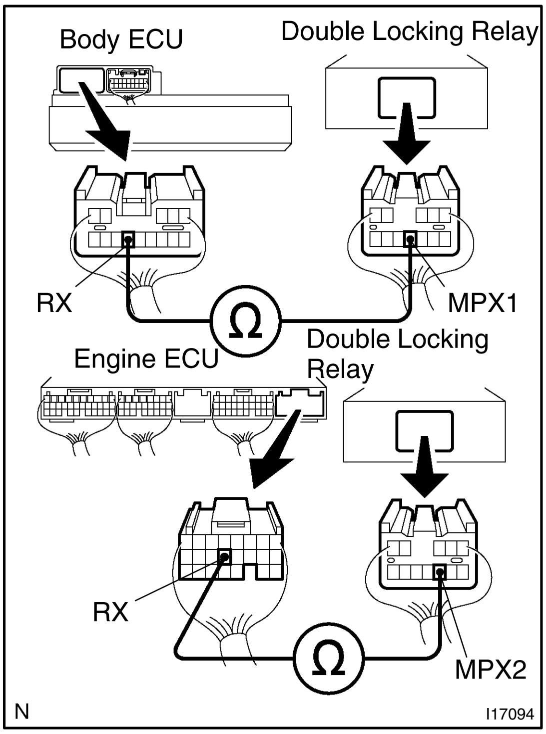
1	**Check double locking ECU.**

CHECK:
Check that the double locking system operate normally.
HINT:
With this inspection, the double locking ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the double locking ECU.**

OK

2	**Check wireharness**



PREPARATION:
Disconnect connector ”D8” of double locking ECU, ”E11” of engine ECU and ”B8” of body ECU.

CHECK:
(a) Check continuity between terminals MPX1 of double locking ECU and terminal RX of body ECU.
(b) Check continuity between terminals MPX2 of double locking ECU and terminal RX of engine 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 double locking ECU.

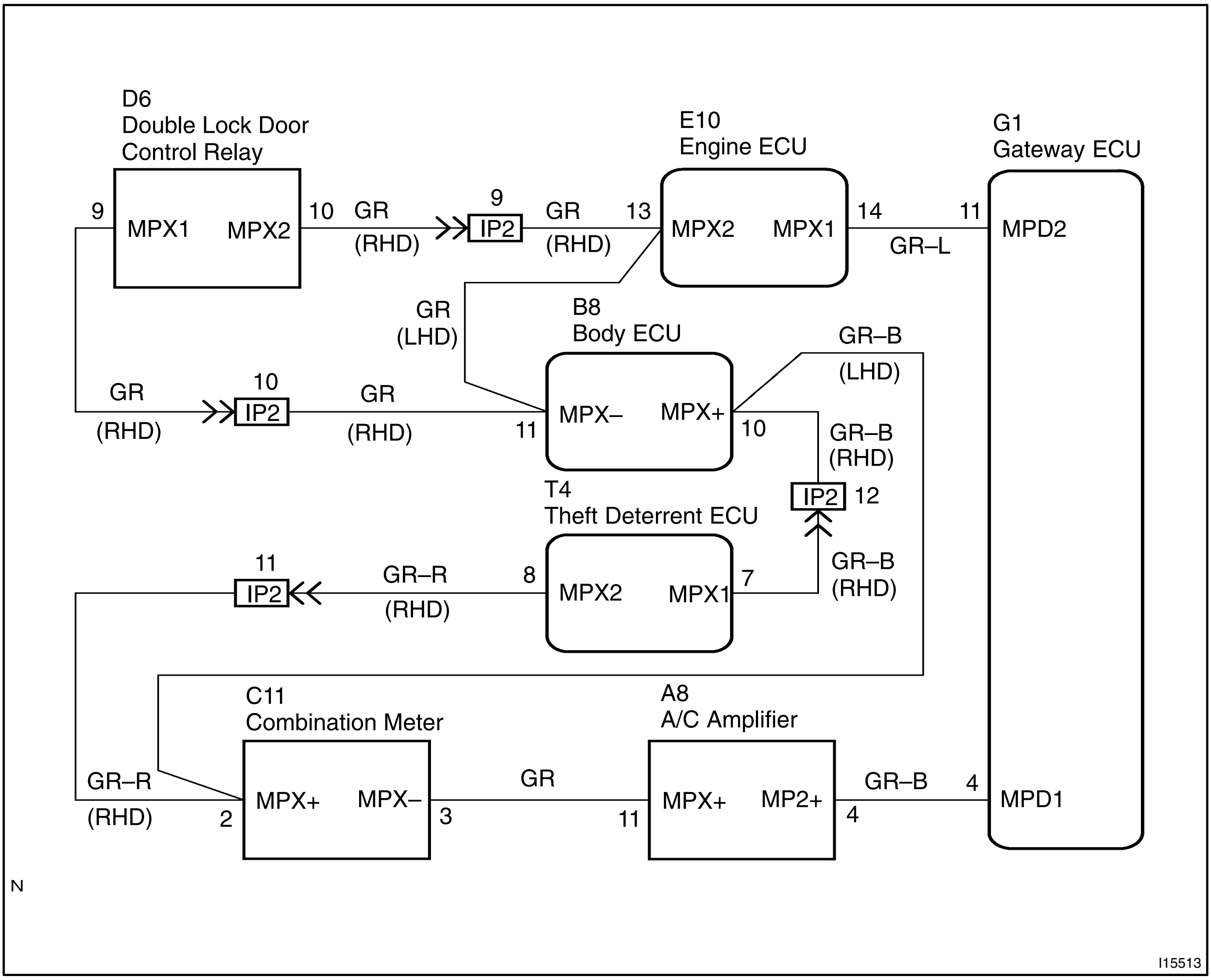
DTC	B1261 / 61	Engine ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between Engine ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1261/61	No communication from Engine ECU more than 10 seconds.	• Engine ECU • Wireharness

WIRING DIAGRAM



INSPECTION PROCEDURE

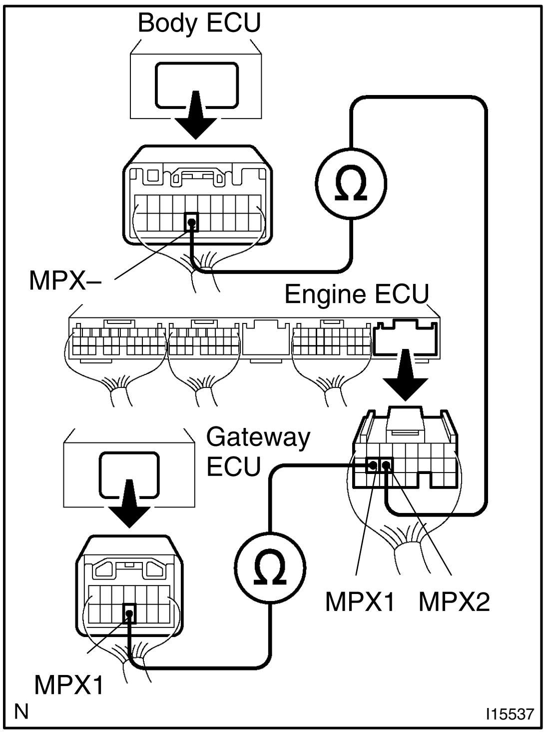
1	**Check Engine ECU.**

CHECK:
Check that the engine starts normally.
HINT:
With this inspection, Engine ECU CPU can be diagnosed if it works normally or not.

NG	**Replace the Engine ECU.**

OK

2	**Check wireharness**



PREPARATION:

Disconnect connector ”B8” of body ECU, ”E11” of Engine ECU and ”G1” of gateway ECU.

CHECK:

(a) Check continuity between terminals MPX– of body ECU and MPX2 of Engine ECU.

(b) Check continuity between terminals MPX1 of Engine ECU and MPX1 of gateway ECU.

OK:

There is a continuity in wireharness of both (1) and (2), or either (1) or (2).

HINT:

If there is OPEN in wireharness of either (1) or (2), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the Engine ECU.

DI7RS–01

DTC	B1262 / 62	A/C amplifier communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between A/C amplifier and body ECU.

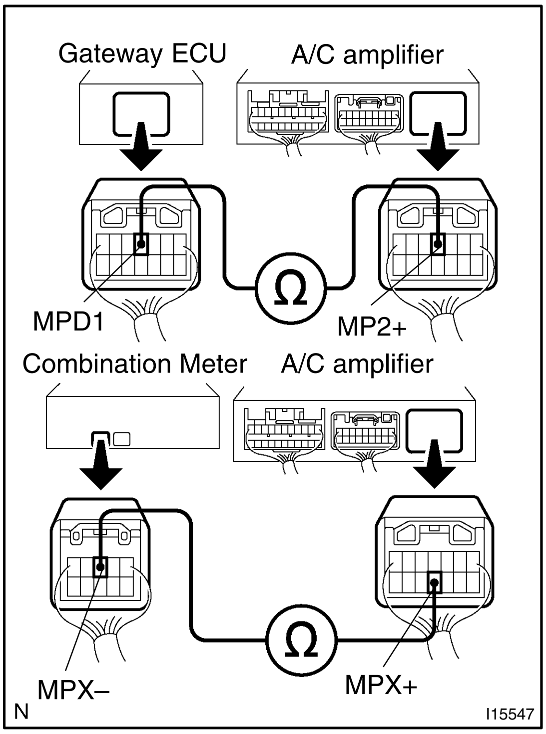
DTC No.	DTC Detecting Condition	Trouble Area
B1262/62	No communication from A/C amplifier more than 10 seconds.	• A/C amplifier • Wireharness

WIRING DIAGRAM

See page DI–682.

INSPECTION PROCEDURE

1	Check wireharness



PREPARATION:

Disconnect connector ”G1” of gateway ECU, ”A7” of A/C amplifier and ”C11” of combination meter ECU.

CHECK:

(a) Check continuity between terminals MPD1 of gateway ECU and MP2+ of A/C amplifier.

(b) Check continuity between terminals MPX+ of A/C amplifier and MPX– of combination meter 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 amplifier.

DI7RT–01

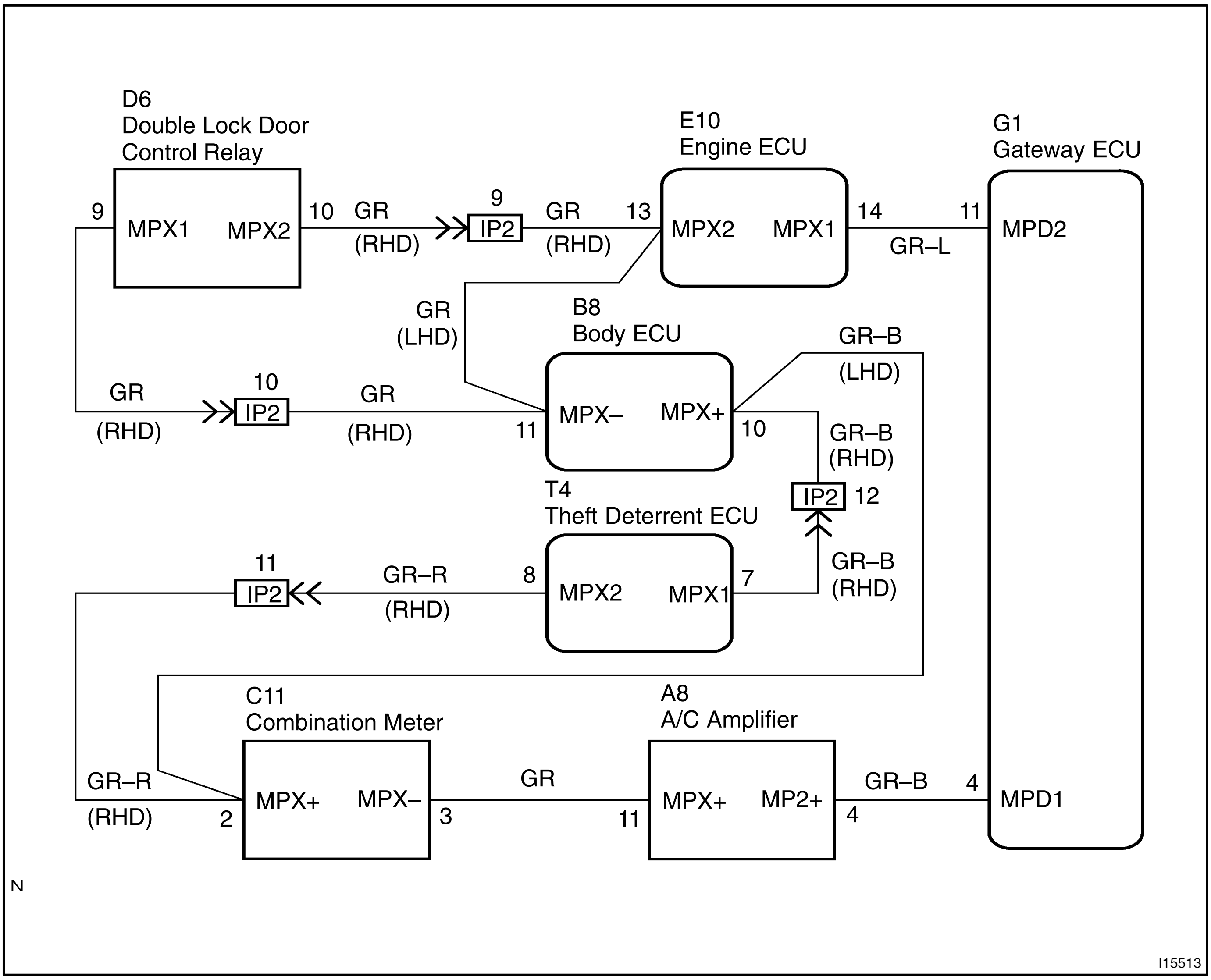
DTC	B1266 / 66	Instrument panel system communication bus malfunction (+B short)

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 ECU to prevent while communication buses' failure.

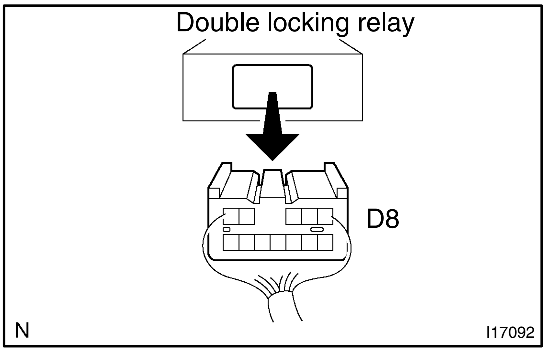
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
On the system structure point of view, this DTC cannot display meter. In case of checking DTC, please use hand–held tester.

1	Check the communication circuit inside double locking relay. (RHD models)

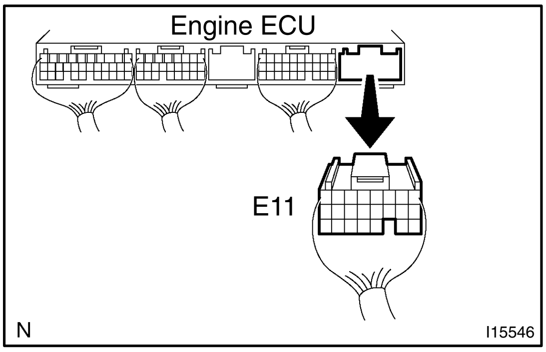


PREPARATION:
Disconnect the connector ”D8” of double locking relay.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK	Replace the double locking relay.

NG

2	Check the communication circuit inside Engine ECU.

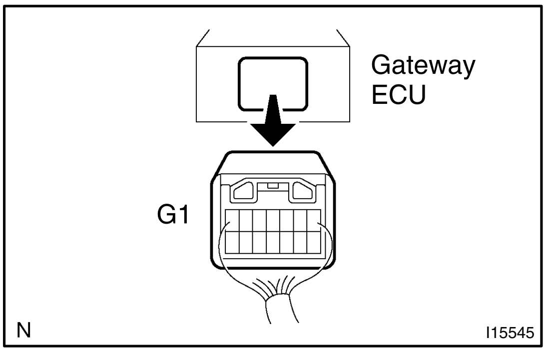


PREPARATION:
Disconnect the connector ”E11” of Engine ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK	Replace the Engine ECU.

NG

3	**Check the communication circuit inside gateway ECU.**

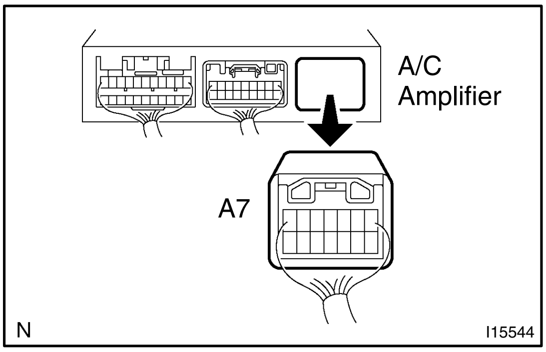


PREPARATION:
(a) Connect the connector ”E11” of Engine ECU.
(b) Disconnect the connector ”G1” of gateway ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Replace the gateway ECU.**

NG

4	**Check the communication circuit inside A/C amplifier.**

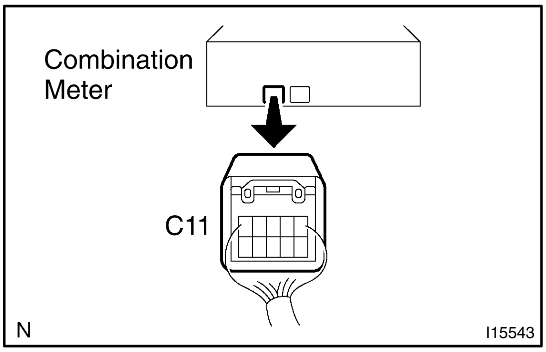


PREPARATION:
(a) Connect the connector of ”G1” of gateway ECU.
(b) Disconnect the connector ”A7” of A/C amplifier.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Replace the A/C amplifier.**

NG

5	Check the communication circuit inside combination meter ECU.



PREPARATION:

(a) Connect the connector ”A7” of A/C amplifier.

(b) Disconnect the connector ”C11” of combination meter ECU.

CHECK:

Check the DTC.

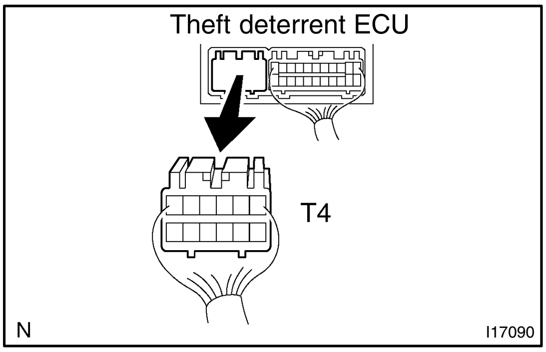
OK:

Code B1266 or B1267 is not output

OK → **Replace the combination meter ECU.**

NG

6	Check the communication circuit inside theft deterrent ECU. (RHD models)



PREPARATION:

Disconnect the connector ”T4” of theft deterrent ECU.

CHECK:

Check the DTC.

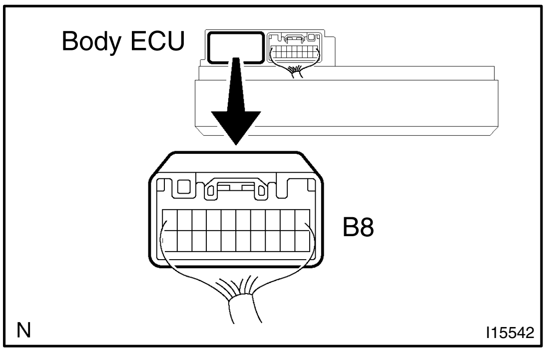
OK:

Code B1266 or B1267 is not output

OK → **Replace the theft deterrent ECU.**

NG

7	**Check for short circuit between combination meter ECU (LHD models) and body ECU. Check for short circuit between theft deterrent ECU (RHD models) and body ECU.**

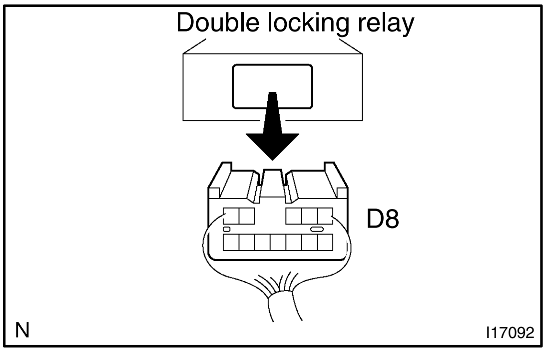


PREPARATION:
Disconnect the connector ”B8” of body ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between combination meter ECU and body ECU.**

NG

8	**Check for short circuit between double locking relay and body ECU. (RHD models)**

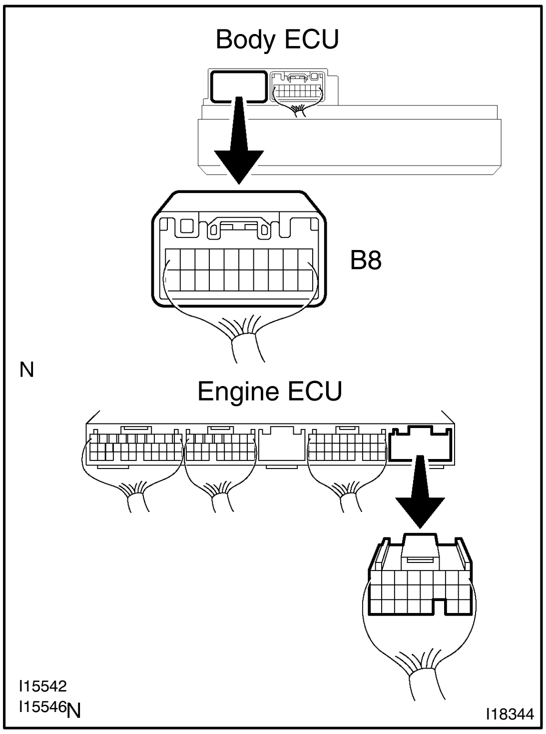


PREPARATION:
Connect the connector ”B8” of body ECU.
Disconnect the connector ”D8” of double locking relay.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between double locking relay and body ECU.**

NG

9	Check for short circuit between body ECU and Engine ECU. (LHD Models)

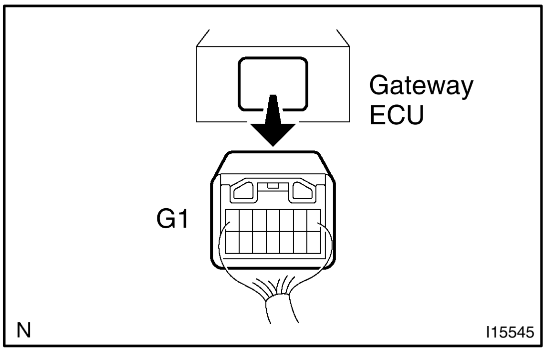


PREPARATION:
Connect the connector ”B8” of body ECU.
Disconnect the connector ”E11” of Engine ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between body ECU and Engine ECU.**

NG

10	Check for short circuit between Engine ECU and gateway ECU.

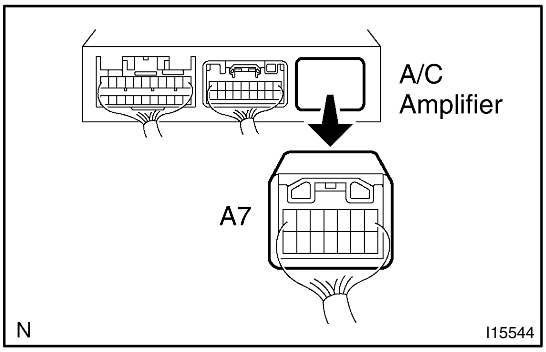


PREPARATION:
Connect the connector ”B8” of body ECU.
Disconnect the connector ”G1” of gateway ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between Engine ECU and gateway ECU.**

NG

11	**Check for short circuit between gateway ECU and A/C amplifier.**

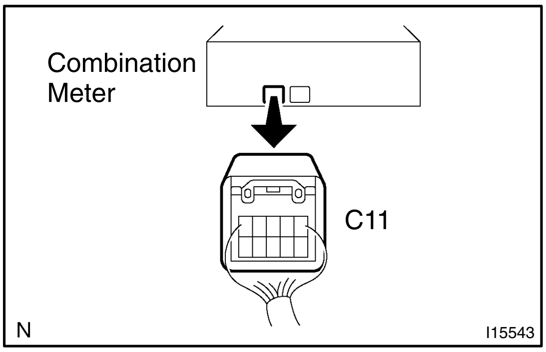


PREPARATION:
Connect the connector "E11" of Engine ECU.
Disconnect the connector "A7" of A/C amplifier.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between Engine ECU and A/C amplifier.**

NG

12	**Check for short circuit between A/C amplifier and combination meter ECU. (LHD models)**

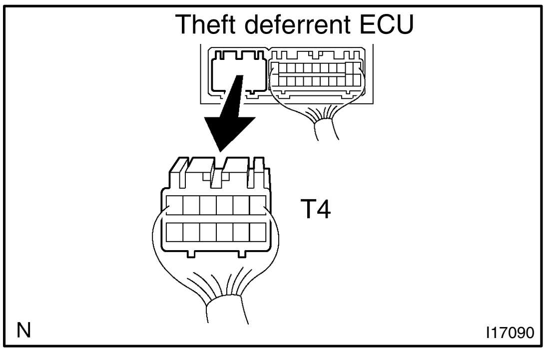


PREPARATION:
Connect the connector "A7" of A/C amplifier.
Disconnect the connector "C11" of combination meter ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Repair or replace the wireharness between A/C amplifier and combination meter ECU.**

NG

13	**Check for short circuit between theft deterrent ECU and combination meter ECU. (RHD models)**



PREPARATION:
Disconnect the connector ”T4” of theft deterrent ECU.
CHECK:
Check the DTC.
OK:
Code B1266 or B1267 is not output

OK → **Replace the theft deterrent ECU.**

NG

Replace the body ECU.

DI7RU–01

DTC	B1269 / 69	Theft deterrent ECU communication stop

CIRCUIT INSPECTION

This DTC is output when communication stops between theft deterrent ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1249/49	No communication from theft deterrent ECU more than 10 seconds.	• Theft deterrent ECU • Wireharness

WIRING DIAGRAM

See page DI–691.

INSPECTION PROCEDURE

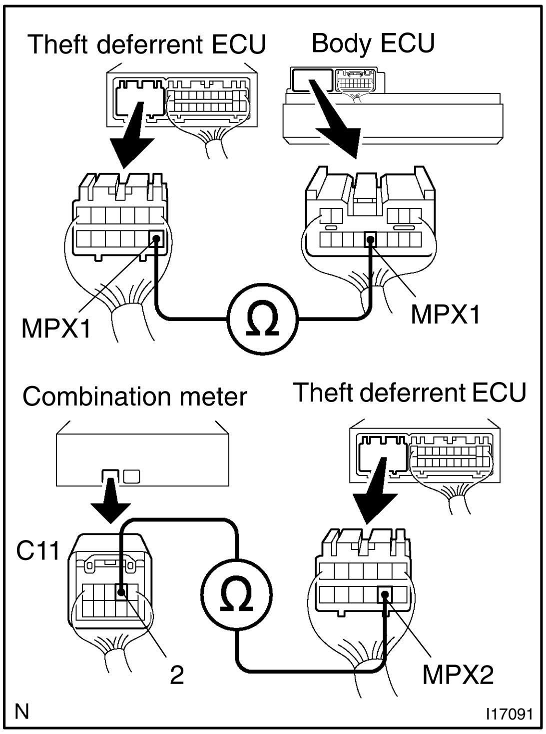
1	Check theft deterrent ECU.

CHECK:
Check that the theft deterrent system operate normally.
HINT:
With this inspection, the theft deterrent ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the theft deterrent ECU.**

OK

2	**Check wireharness**



PREPARATION:
Disconnect connector ”T4” of theft deterrent ECU, ”C11” of combination meter ECU and ”B8” of body ECU.

CHECK:
(a) Check continuity between terminals MPX1 of theft deterrent ECU and terminal MPX1 of body ECU.
(b) Check continuity between terminals MPX2 of theft deterrent ECU and terminal 2 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 theft deterrent ECU.

DI7RV–01

DTC	B1271 / 71	Combination meter ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between combination meter ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1271/71	No communication from Combination meter ECU more than 10 seconds.	• Combination meter ECU • Wireharness

WIRING DIAGRAM

See page DI–683.

INSPECTION PROCEDURE

1	**Check combination meter ECU.**

CHECK:

Start the engine and check that the speed meter and tacometer operate normally.

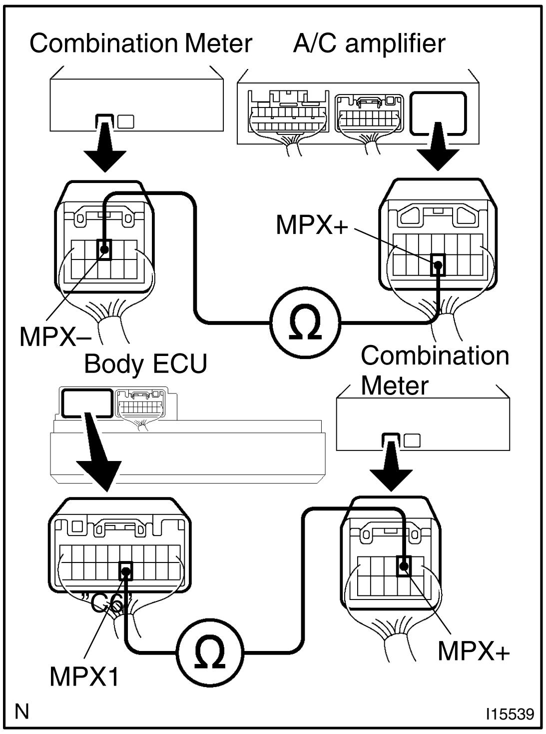
HINT:

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 "A7" of A/C amplifier, "C11" of combination meter ECU and "B8" of body ECU.

CHECK:
(a) Check continuity between terminals MPX+ of A/C amplifier and MPX– of combination meter ECU.
(b) Check continuity between terminals MPX+ of combination meter ECU and MPX1 of body 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.

DI7RW–01

DTC	B1274/74	Multi display communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between multi display and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1274/74	No communication from multi display more than 10 seconds.	• Multi display • Wireharness

WIRING DIAGRAM

See page DI–675.

INSPECTION PROCEDURE

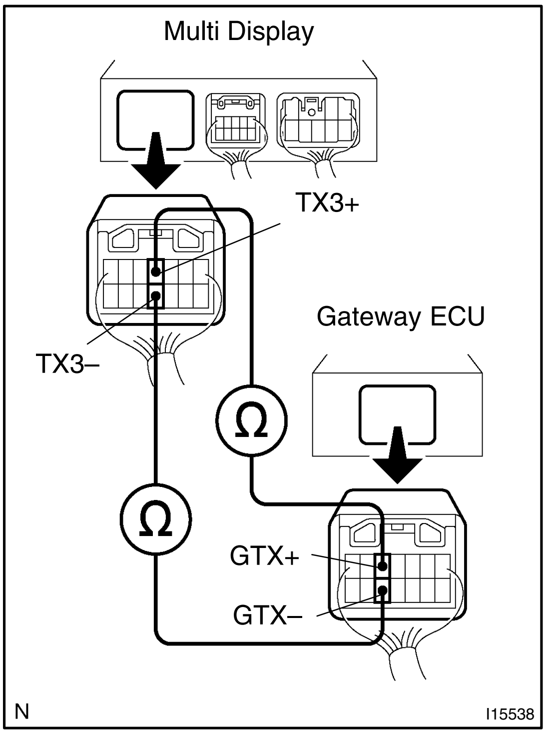
1	Check multi display ECU.

CHECK:
Check that the multi display operate normally.
HINT:
With this inspection, the multi display CPU can be diagnosed if it works normally or not.

NG → **Replace the multi display.**

OK

2	**Check wireharness.**



PREPARATION:
Disconnect connector "M2" of multi display and "G1" of gateway ECU.

CHECK:
(a) Check continuity between terminals TX3+ of multi display and GTX+ of gateway ECU.
(b) Check continuity between terminals TX3– of multi display and GTX– of gateway ECU.

OK:
There is a continuity in wireharness.
HINT:
If there is OPEN in wireharness, please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the multi display.

DI7RX–01

DTC	B1293/93	Gateway ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between gateway ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1293/93	No communication from gateway ECU more than 10 seconds.	• Gateway ECU • Wireharness

WIRING DIAGRAM

See page DI–683.

INSPECTION PROCEDURE

1	Check open door warning light.

CHECK:

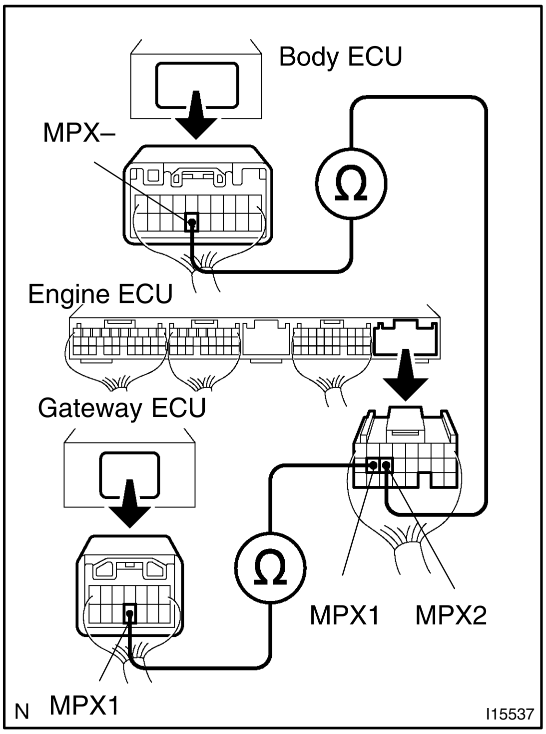
Connection that the gateway ECU and BEAN (Body Electrical Area Network) can be checked by DTC transmitted by the body ECU.

See ”INSPECT OPEN DOOR INDICATOR LIGHT¨on page BE–2.

NG → **Replace the gateway ECU.**

OK

2	Check wireharness



PREPARATION:
Disconnect connector ”B8” of body ECU, ”E11” of engine ECU and ”G1” of gateway ECU.

CHECK:
(a) Check continuity between terminals MPX– of body ECU and MPX2 of engine ECU.
(b) Check continuity between terminals MPX1 of engine ECU and MPX1 of gateway 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 gateway ECU.

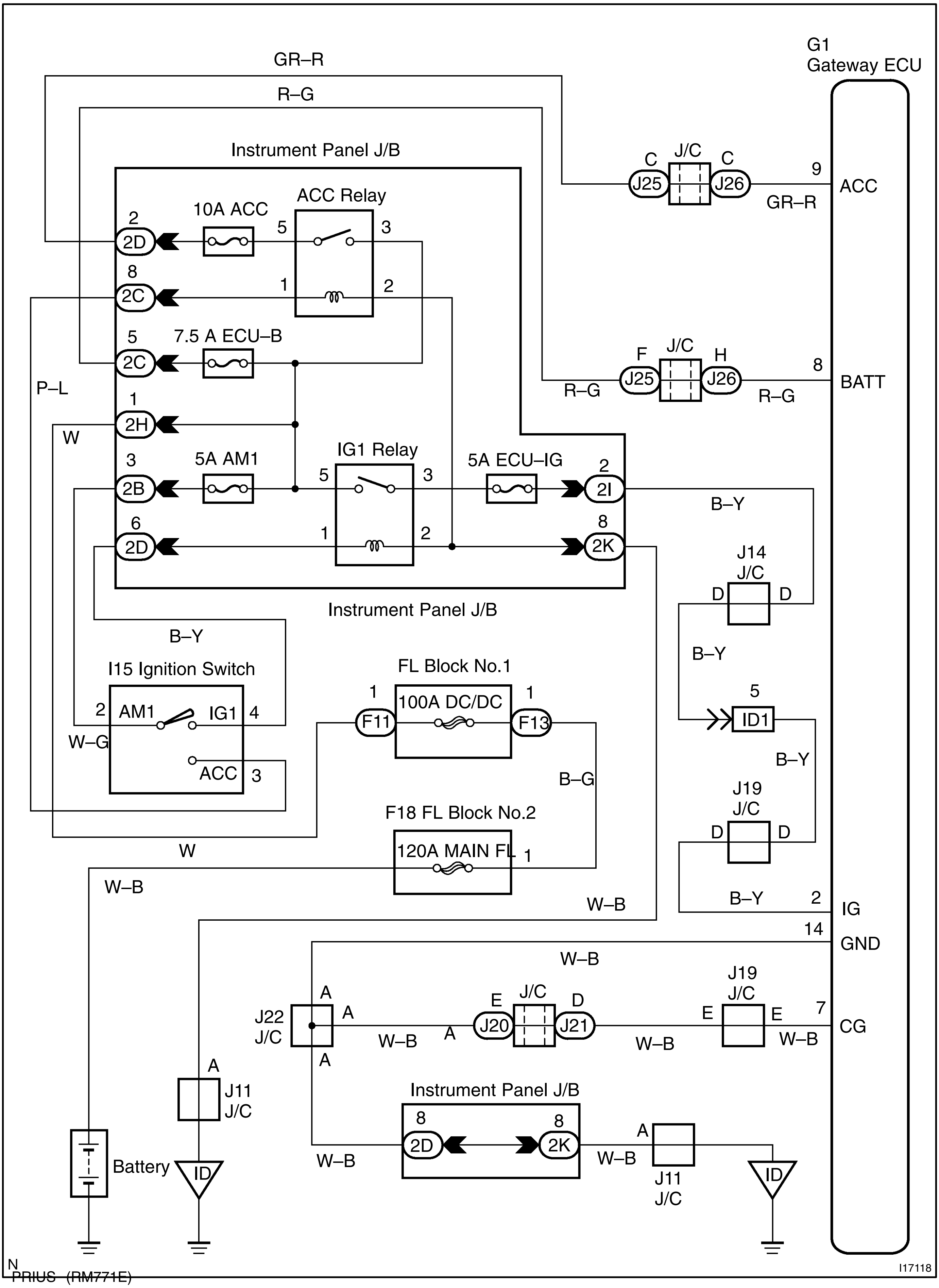
DI7RY–01

Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the gateway ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–B and ECU–IG fuse.**

CHECK:
Check continuity of ECU–B and ECU–IG fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals BATT, IG and GND of body ECU connector.**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the gateway ECU connector.
CHECK:
Measure voltage between terminals BATT and GND.
OK:
Voltage: 10 – 14 V

OK → **Replace the gateway ECU.**

NG ↓

3	**Check wireharness and connector between gateway ECU and body ground (See page IN–40).**

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

OK ↓

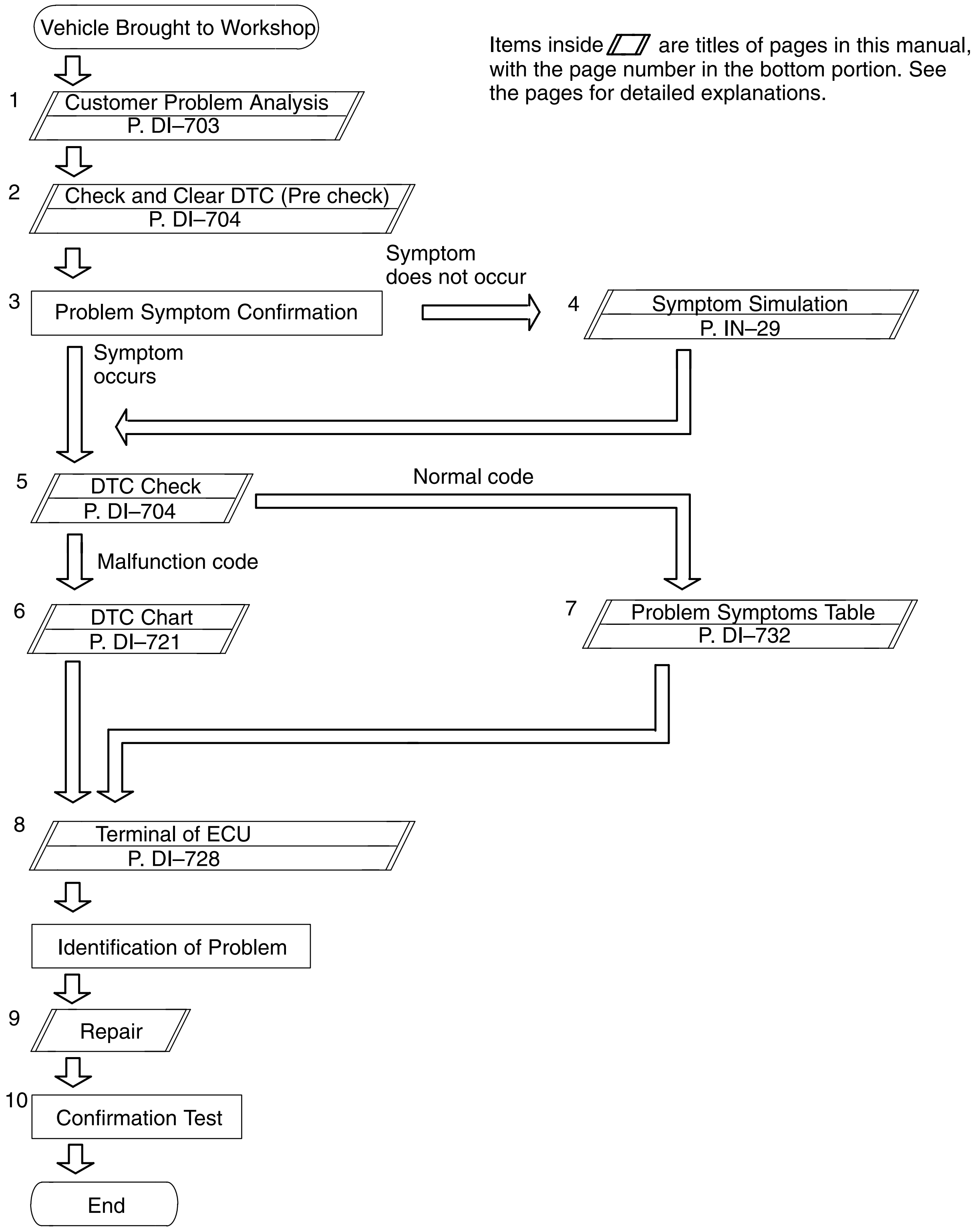
Check and repair wireharness and connector between gateway ECU and battery.

NAVIGATION SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI27W–06

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–06

CUSTOMER PROBLEM ANALYSIS CHECK

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 ( )

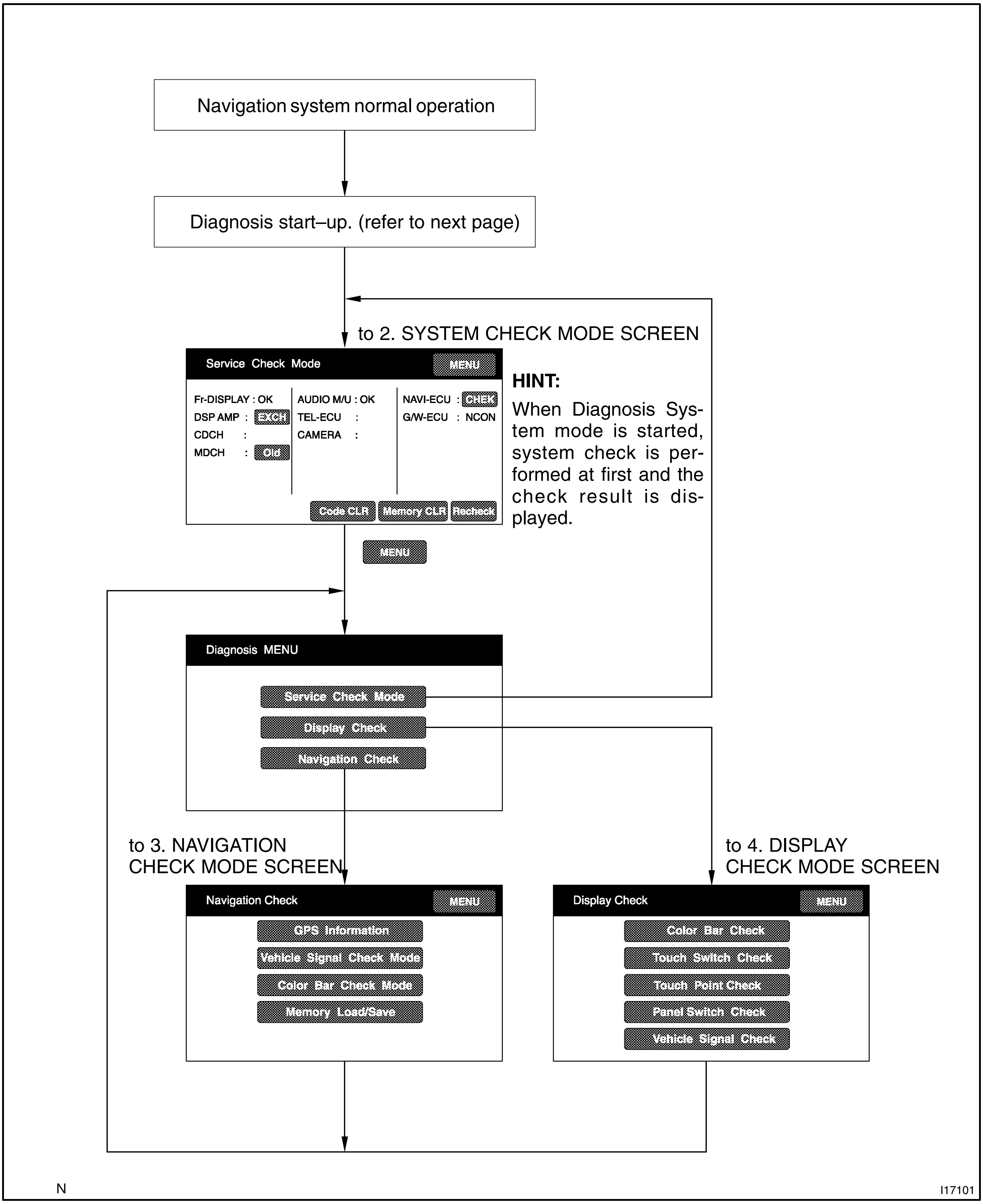
DTC Check	**Parts name**	**1st time malfunction code.**	**2nd time malfunction code.**
	Navigation ECU		
	Multi Display		
	Radio receiver assembly		

DI7OR–02

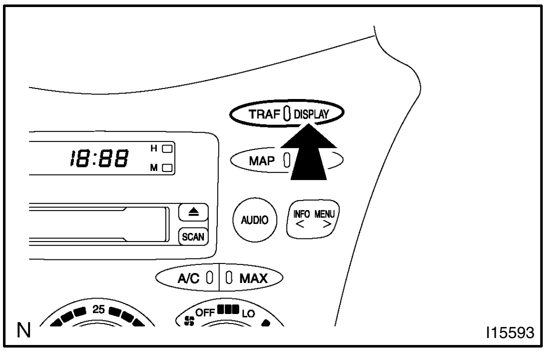
PRE–CHECK

1. DIAGNOSIS SYSTEM MODE

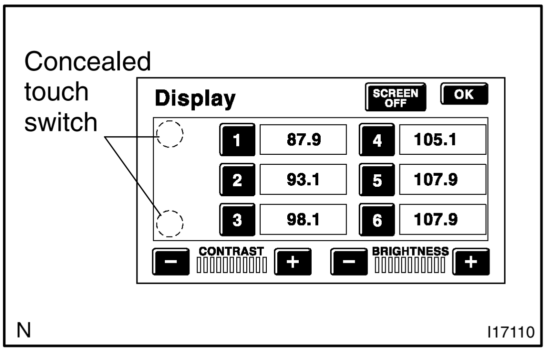
HINT:
Diagnosis System Mode is operated as follows.



(a) DIAGNOSIS START–UP
To start the diagnosis menu, there are 2 ways: using a diagnosis check wire and using a switch.



(b) START–UP BY SWITCH OPERATION
(1) Vehicle speed is 0 km/h (0 mph).
(2) Parking brake switch is pressed.
(3) Press the Display switch to display the Screen Adjustment screen.



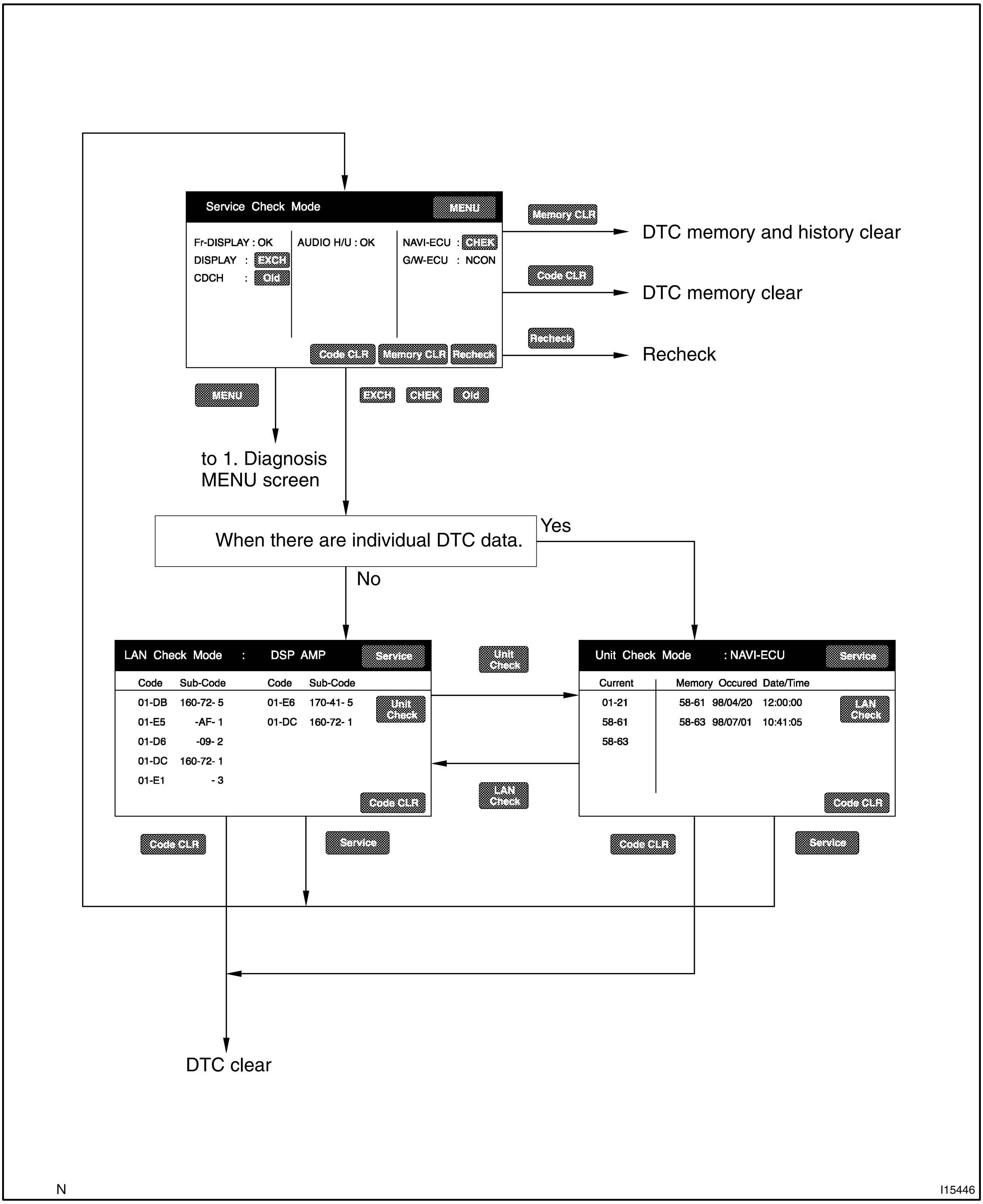
(4) Repeatedly touch the upper and lower bottom parts of the left end of the screen 3 times.

(c) FINISHING DIAGNOSIS SYSTEM MODE
Turn the ignition switch from ACC to OFF to finish the mode. If it is started by switch operation.

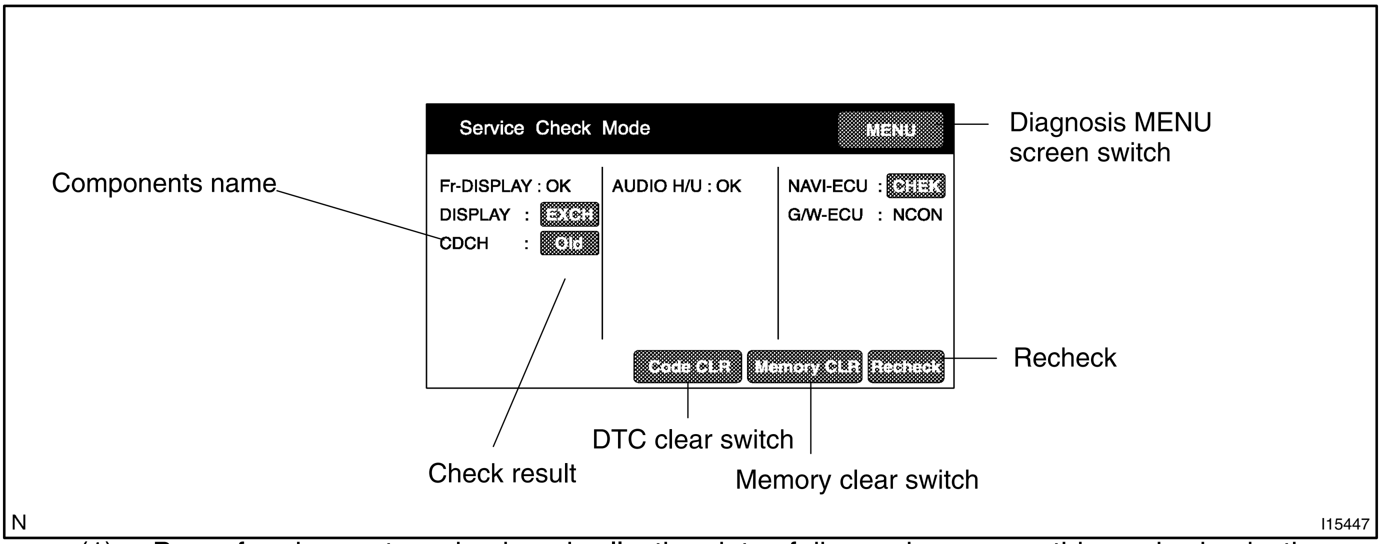
2. SERVICE CHECK MODE

HINT:

Service Check Mode is operated as follows.

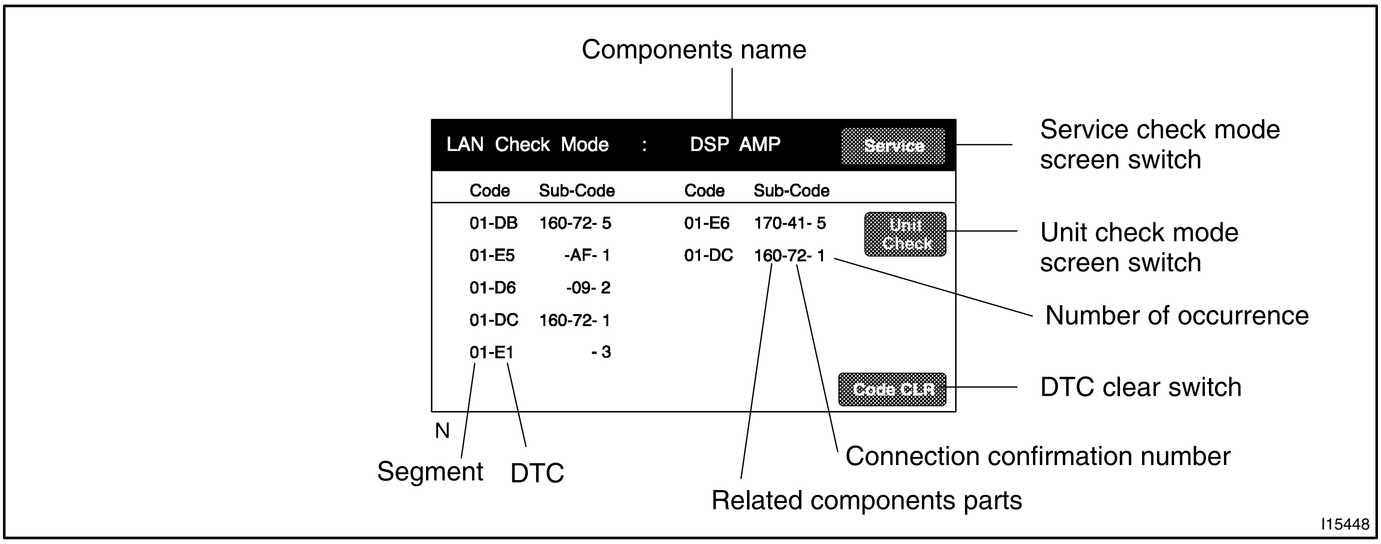


(a) SERVICE CHECK SCREEN



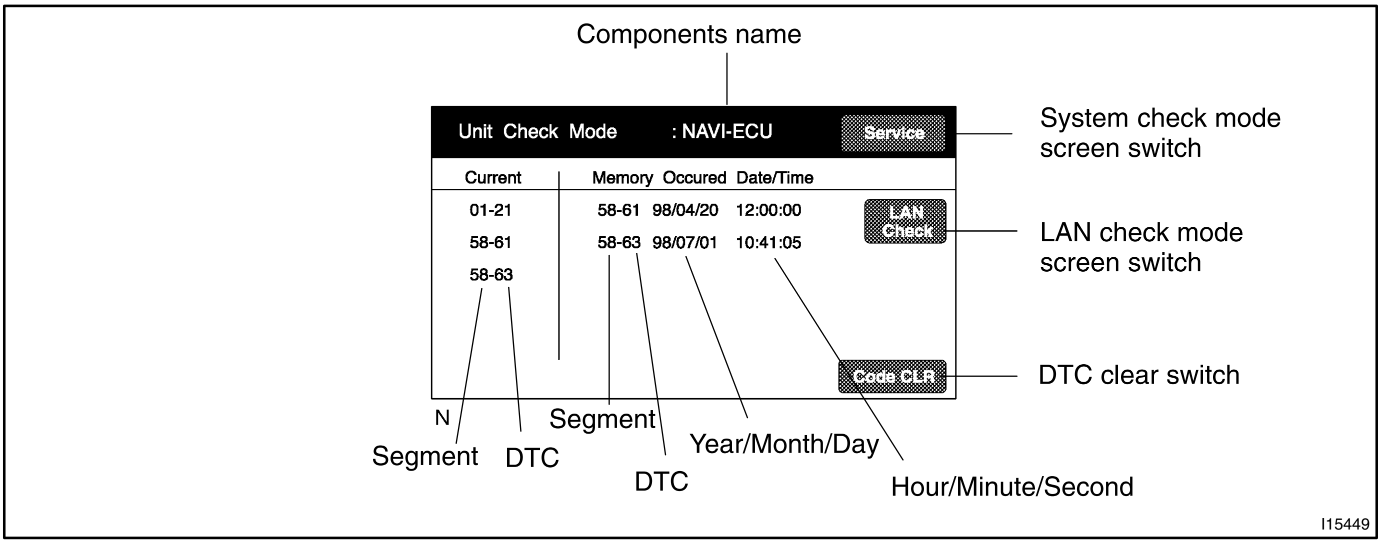
(1) By performing system check and collecting data of diagnosis memory, this mode checks the current and past condition of the vehicle.
(2) List of all components name or physical addresses.
It displays only the components that have been connected at least once.
(3) The check result is displayed for all components.
(4) The check result is displayed by 6 abbreviations: ”OK”, ”EXCH”, ”CHEK”, ”NCON”, ”NRES” and ”Old”. (”EXCH”, ”CHEK” and ”Old” have a function as switches.)
(5) Based on all information obtained from ”System Check Request”, ”Diagnosis Memory Request” and ”Current Diagnosis Result” command, the following results are displayed:
OK: No error is identified.
EXCH: One or more error codes requesting for exchange are detected in any check result.
CHEK: Except the conditions for ”EXCH”, one or more error codes requesting for check are detected in any check result.
(6) The other check results are as follows:
NCON: No response to ”Diagnosis ON Instruction” command and it is not connected when the system is started.
Old: One or more error codes are detected when responding to ”Diagnosis ON Instruction” command because of the old version .
NRES: No response to all commands of ”System Check Request”, ”Diagnosis Memory Request” and ”Current Diagnosis Result”. Or no error is detected by any one of ”System Check Request” or ”Diagnosis Memory Request” when no response to the other command.
(7) ”EXCH”, ”CHEK” and ”Old” are functioned as switches any by pressing these, LAN Check Mode and Unit Check Mode are activated.
(8) Memory Clear Switch
Pressing this switch for 3 sec. deletes all information about master component registration and diagnosis memory of all components.
(9) DTC Clear Switch
Pressing this switch for 3 sec. deletes diagnosis memory of all components.
(10) Recheck Switch
Pressing this switch rechecks the system.
(11) Menu Switch
Pressing this switch activated the Diagnosis Menu Screen.

(b) LAN CHECK MODE SCREEN



(1) As a detailed screen in the System Check Mode, LAN Check Mode is displayed.
(2) Communication codes (logical address ”01”) are extracted from the diagnosis data obtained by ”Diagnosis Memory Request” and displayed.
(3) Component Name
Names of the components to be checked are displayed.
(4) Segment
Logical address codes corresponding to DTC are displayed.
(5) DTC
DTC displayed.
(6) Related components address
Physical address codes corresponding to DTC are displayed.
(7) Connection Confirmation Number
Connection confirmation numbers corresponding to DTC is displayed.
(8) Number of Occurrence
The number of occurrence of the same DTC is displayed.
(9) DTC Clear Switch
Pressing this switch for 3 sec. deletes DTC memory of the selected diagnosis component. When returning to the System Check Mode, the check result is shown as a blank.
(10) Unit Check Mode Screen Switch
Pressing this switch activates the Unit Check Mode screen.
(11) System Check Mode Screen Switch
Pressing this switch activates the System Check Mode screen.

(c) UNIT CHECK MODE SCREEN



(1) As a detailed screen in the System Check Mode, the Unit Check Mode is displayed.
(2) Up to 6 error codes detected by ”The DTC obtained during the system check (including when starting the diagnosis mode)” can be displayed as ”Current”.
(3) Up to 6 error codes detected by ”DTC stored in the past” can be displayed as ”Memory”.
(4) Component Name
Names of the components are displayed.
(5) Segment
Logical address numbers corresponding to DTC are displayed.
(6) DTC
DTC is displayed.
(7) Year/Month/Day/Hour/Minute/Second
The date and time stamped at the time of code occurrence is displayed in the order of year–month–day–hour–minute–second. (Year is shown in 2–digit number.) If the date and time data is invalid, it is displayed as a blank.

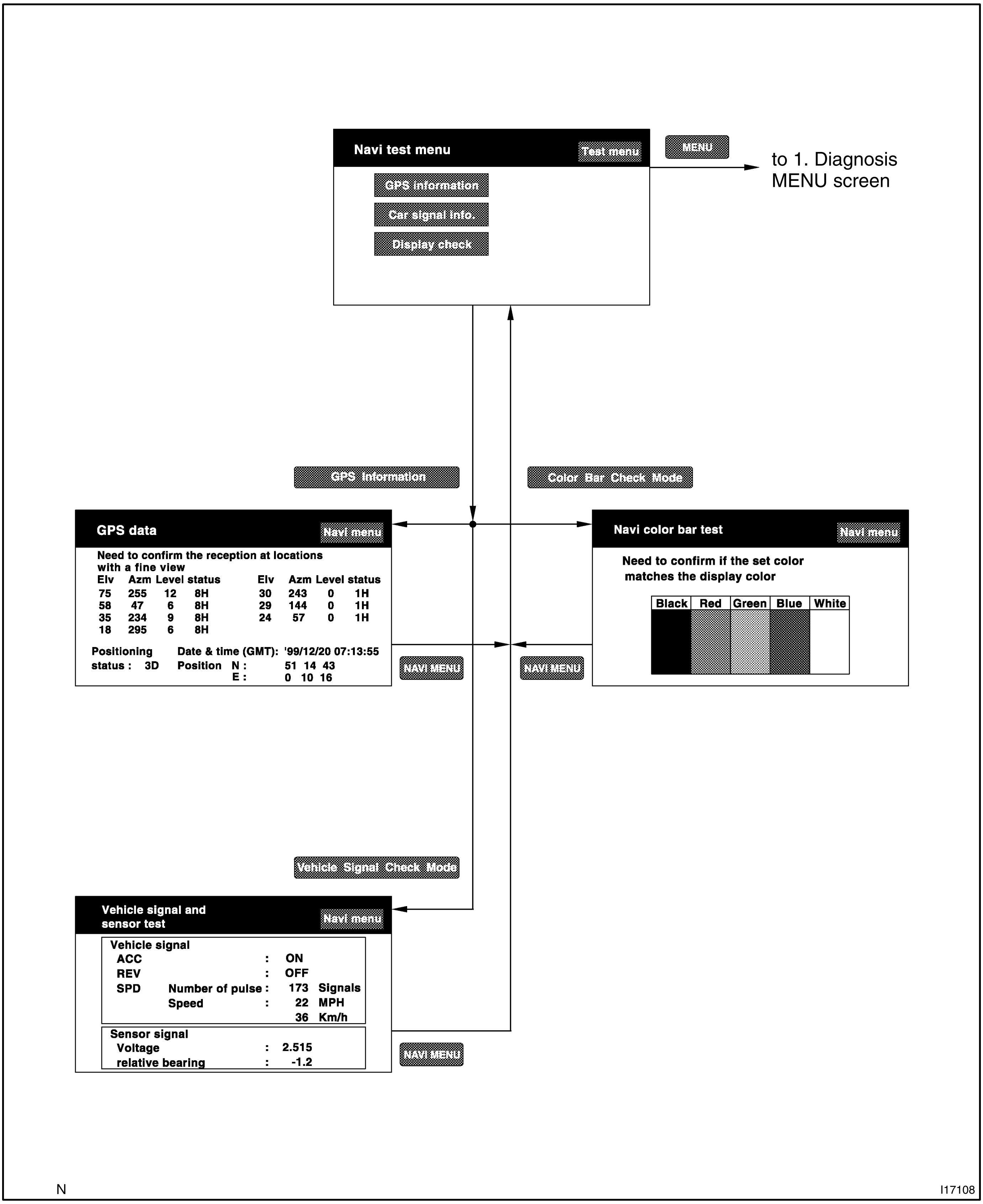
HINT:
Time data is obtained after turning the ignition from ACC to ON. Until the valid time data is obtained, the data shown in the display shall be considered as invalid.
If stored before a valid time data is obtained, the data shall not be displayed.

(8) DTC Clear Switch
Pressing this switch for 3 sec. deletes all diagnosis memory of the component. When returning to the System Check Mode, the check result is displayed as a blank.
(9) Lan Check Mode Screen Switch
Pressing this switch activates the LAN Check Mode screen.
(10) System Check Mode Screen .Switch
Pressing this switch activates the System Check Mode screen.

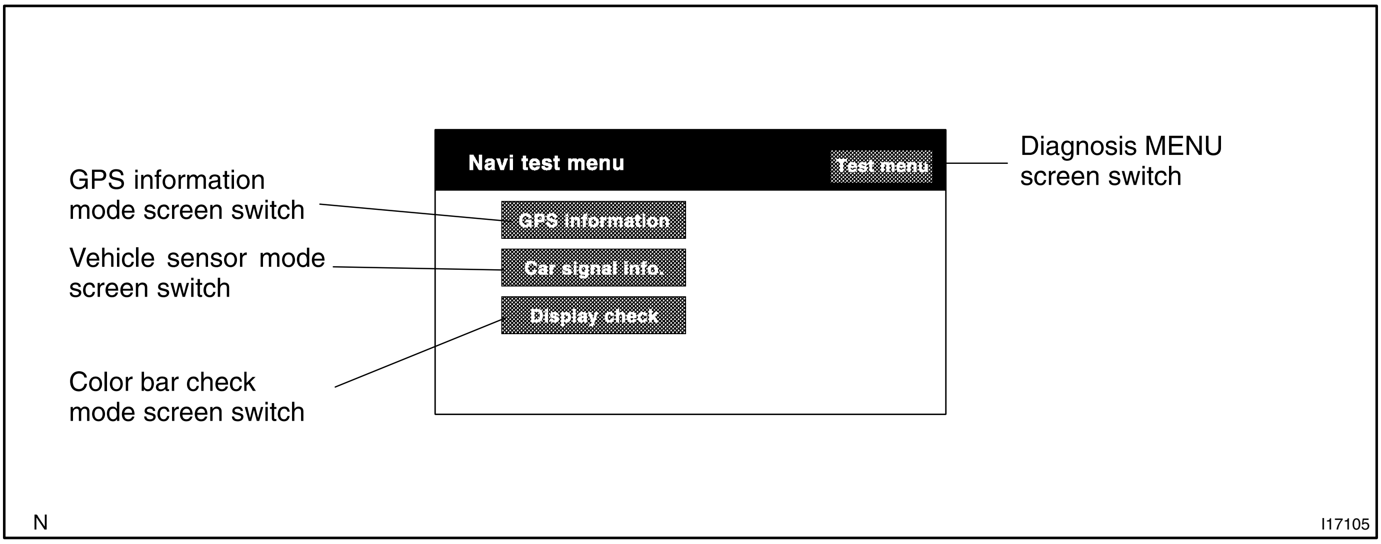
3. NAVIGATION CHECK MODE

HINT:

Navigation Check Mode is operated as follows.

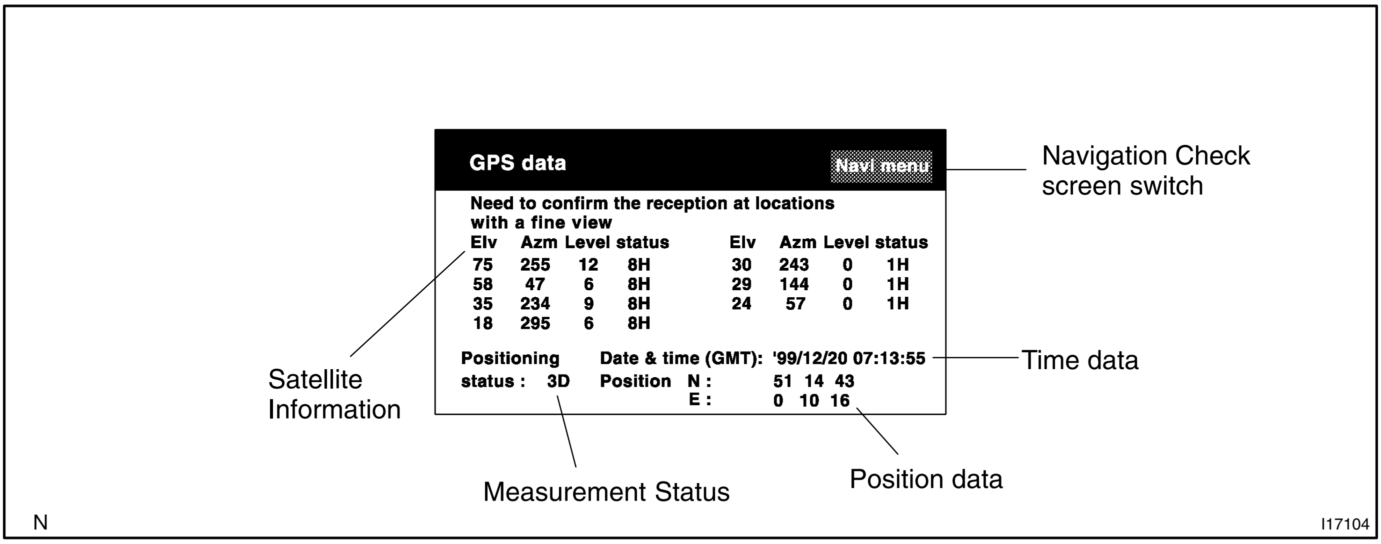


(a) NAVIGATION CHECK MODE SCREEN



(1) Various check screens for the Navigation ECU can be started from this menu screen.
(2) GPS Information Mode Screen Switch
Pressing this switch activates GPS Information Mode Screen.
(3) Vehicle Sensor Mode Screen Switch
Pressing this switch activates the Vehicle Signal Mode screen.
(4) Color Bar Check Mode Screed Switch
Pressing this switch activates the Color Bar Check Mode screen.
(5) Diagnosis Menu Screen Switch
Pressing this switch activates the Diagnosis Menu screen.

(b) GPS INFORMATION MODE SCREEN



(1) This screen displays GPS related data.

HINT:

Data are updated every 1 sec.

(2) Satellite Information

The angle of elevation of relevant satellite, azimuth signal level, and receiving condition of signals are displayed.

HINT:

The reception status shows receiving.

”T”: means in operation but measurement is not being used for positioning.

”P”: means measurement is being used for positioning.

”–”: means no data can be received.

Display area for up to 8 satellites is ensured.

Data shall be updated corresponding to change of information.

(3) Time data: The time data obtained from a GPS receiver is displayed in month, day, year, hour and minute.

(4) The displayed time is Greenwich Mean Time.

(5) Position Data: The latitude and longitude of the current location are displayed in degree and minute.

(6) Measurement Status is displayed in the following 5 items.

2D: 2 dimensions.

3D: 3 dimensions.

NG: GPS information cannot be used.

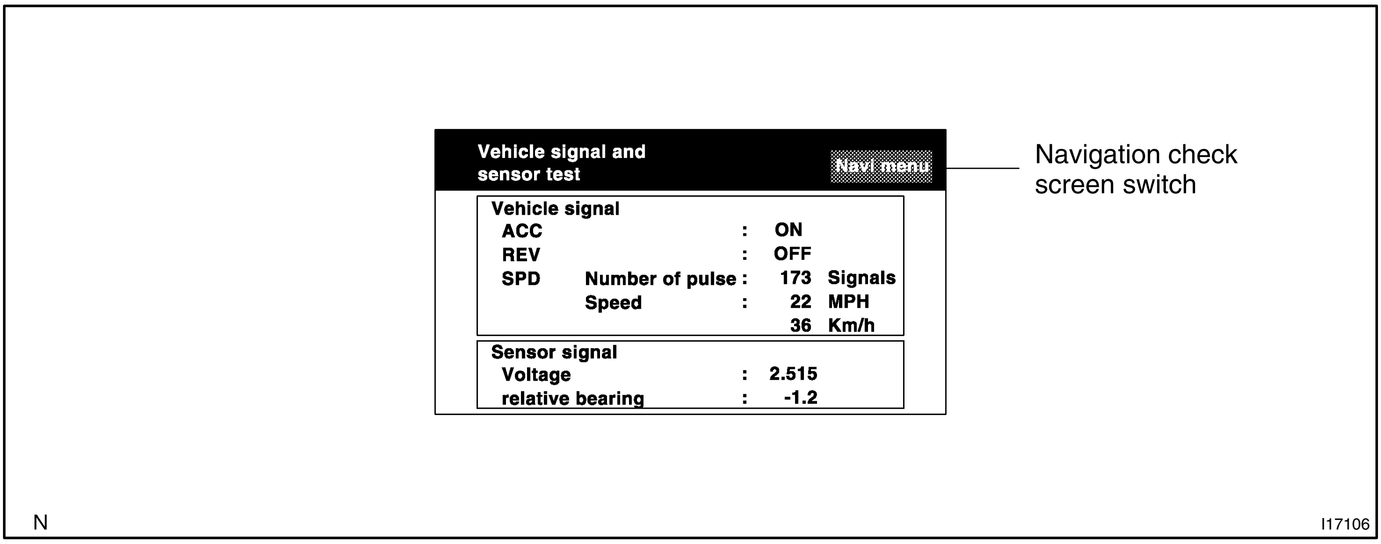
error: Receiving error occurs.

–: Other than the above.

(7) Navigation Check Screen Switch

Pressing this switch activates the Navigation Check screen.

(c) VEHICLE SIGNAL CHECK MODE SCREEN



(1) Status of the vehicle sensor which are input to the Navigation ECU is checked in this screen.

HINT:

Data are updated every 1 sec.

(2) ACC signal status: Displayed as ON/OFF.

(3) REV signal status: Displayed as ON/OFF.

(4) SPD signal status: The following is displayed:

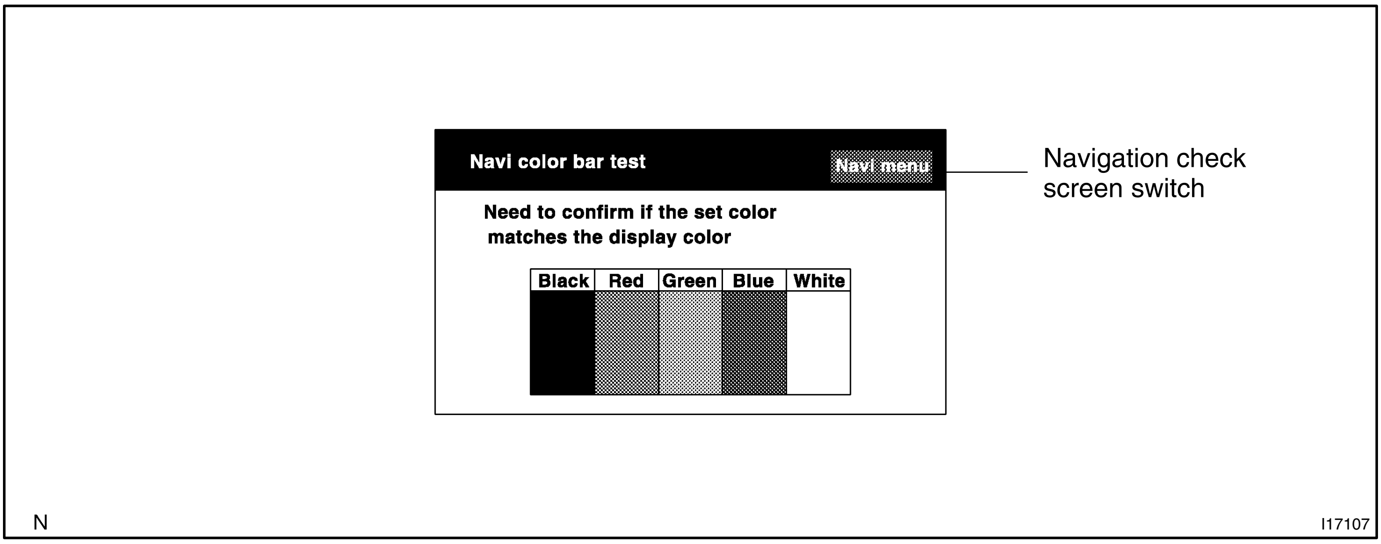
- The cumulative value of the input pulse after displaying this screen. (shown in 5 digits)
- Vehicle speed (Unit: km/h, mph)

(5) Output condition of the gyro sensor: The following is displayed:

- Voltage (Unit: mV, LSB: 1mV)
- Relative azimuthal angle to the current point (0 degree).
  Assuming the angle at a point when this screen is activated as 0 degree.

(6) Navigation Check Menu Screen Switch
Pressing this switch displays the Navigation Check screen.

(d) COLOR BAR CHECK MODE SCREEN

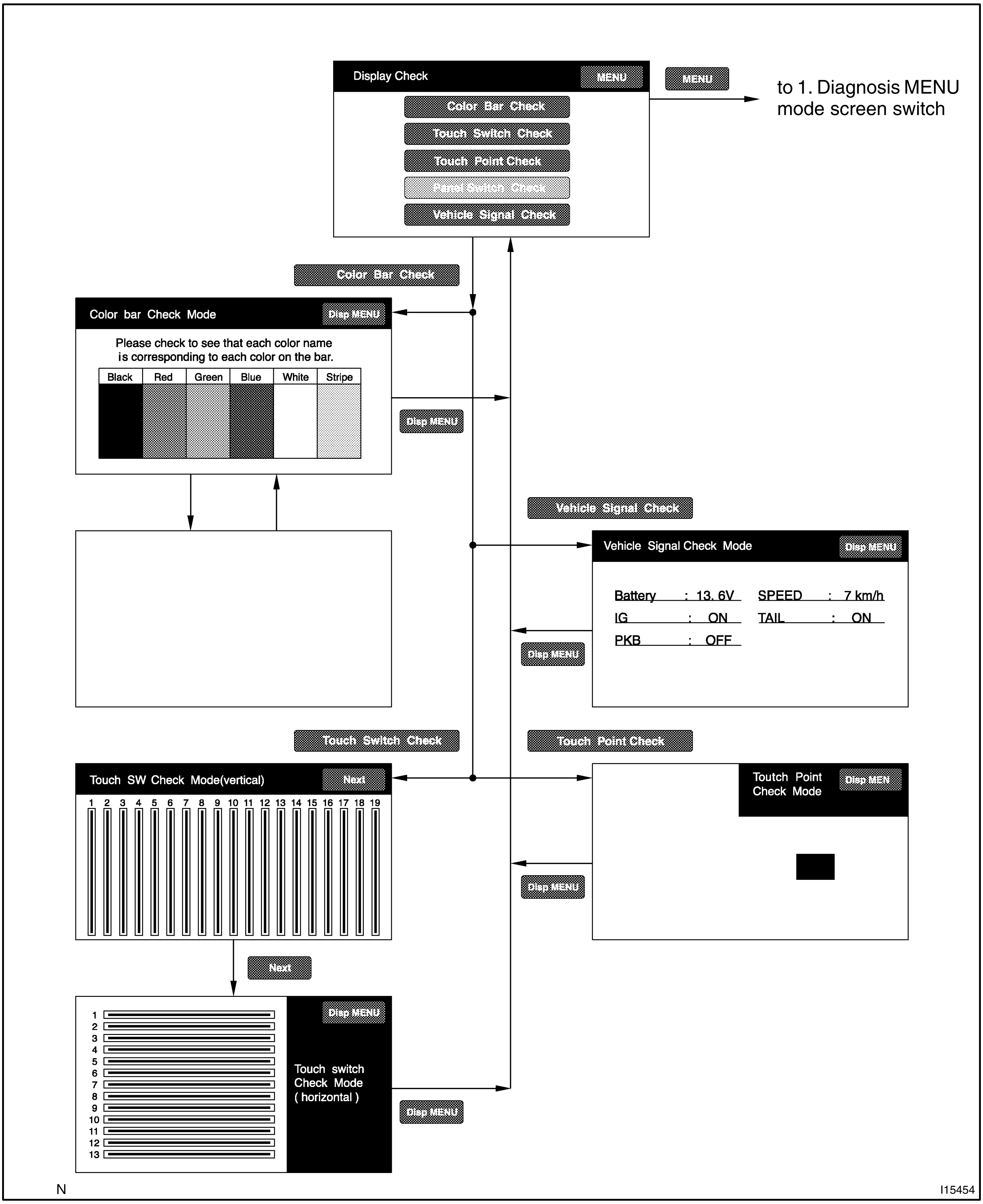


(1) Color display of the Navigation ECU is checked in this screen.
(2) Color Bars:
Five colors of ”BLACK”, ”RED”, ”GREEN”, ”BLUE” and ”WHITE” are displayed as bars.
(3) Navigation Check Screen Switch
Pressing this switch displays the Navigation Check screen.

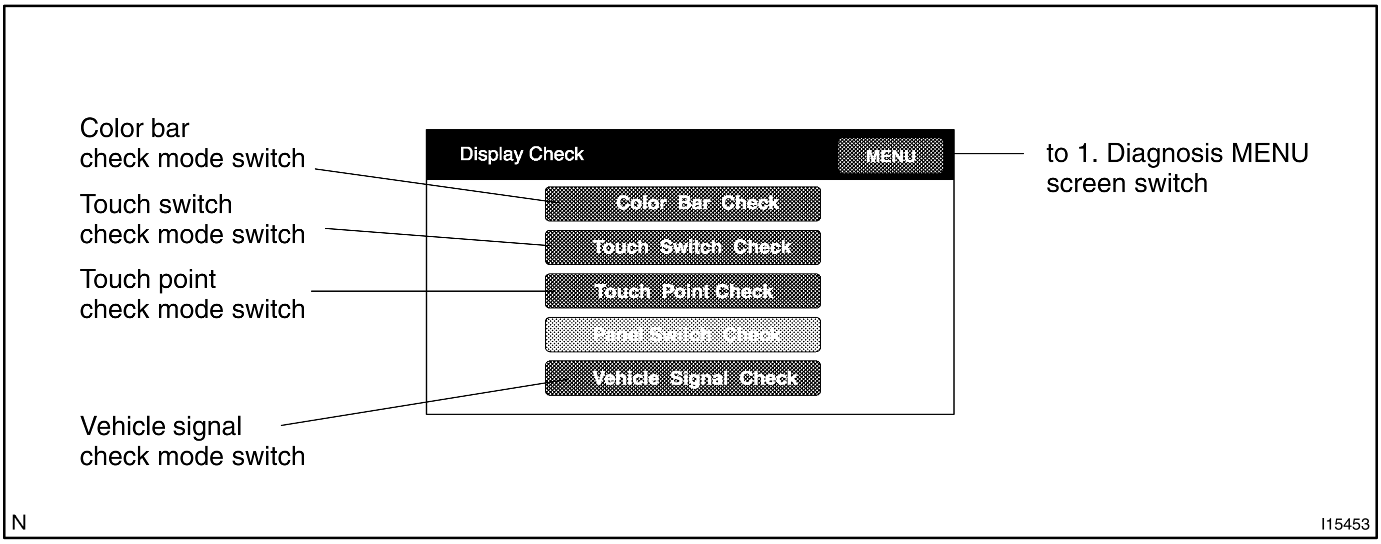
4. DISPLAY CHECK MODE

HINT:

Display Check Mode is operated as follows.

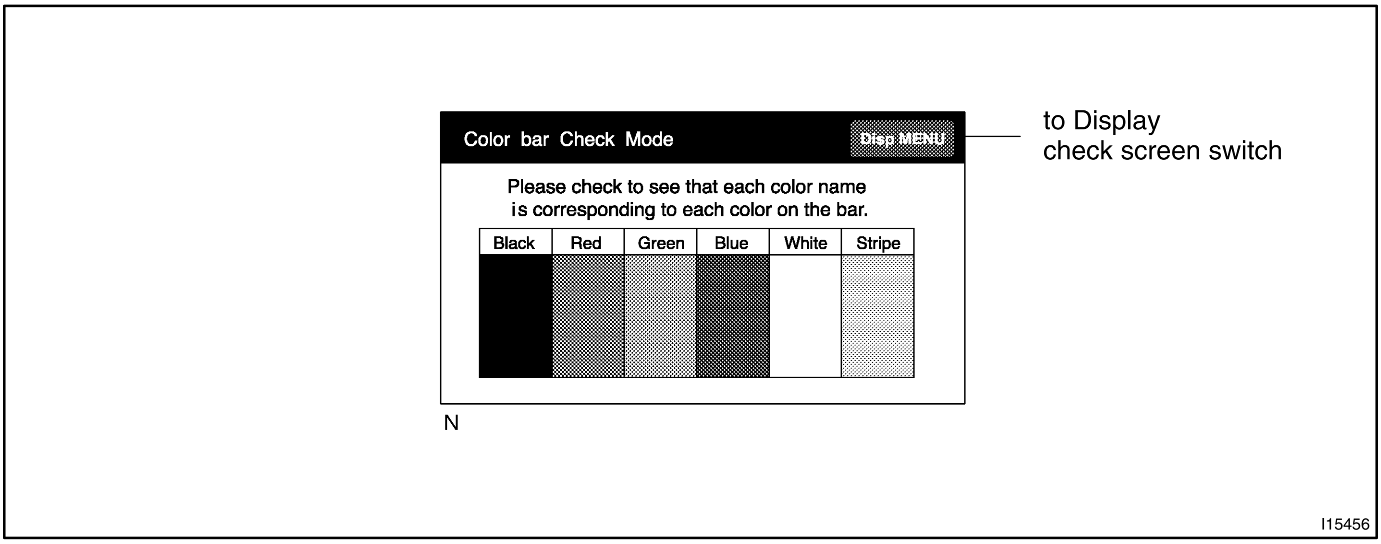


(a) DISPLAY CHECK MENU SCREEN



(1) Various screens to check the display are started from this screen.
(2) Color Bar Check Mode Switch
Pressing this switch activates the Color Bar Check Mode screen.
(3) Touch Switch Check Mode Switch
Pressing this switch activates the Touch Switch Check Mode screen.
(4) Touch Point Check Mode Switch
Pressing this switch activates the Touch Point Check Mode screen.
(5) Vehicle Signal Check Mode Switch
Pressing this switch activates the Vehicle Signal Check Mode screen.
(6) Diagnosis MENU Screen Switch
Pressing this switch activates the Diagnosis MENU screen.

(b) COLOR BAR CHECK MODE SCREEN

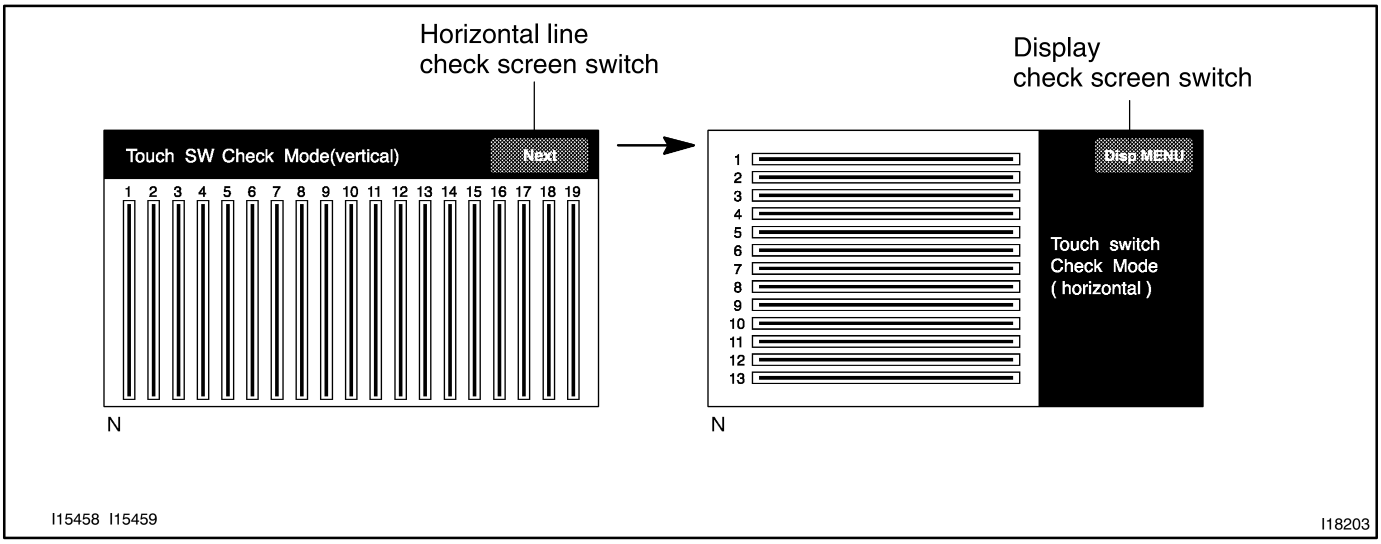


(1) Color display is checked in this screen.
(2) Color Bar:
Black, Red, Green, Blue, White and Stripe is displayed in bars.

If a bar is touched, color or stripe of the bar is appeared all over the screen. When touched again, it returns to the previous screen.

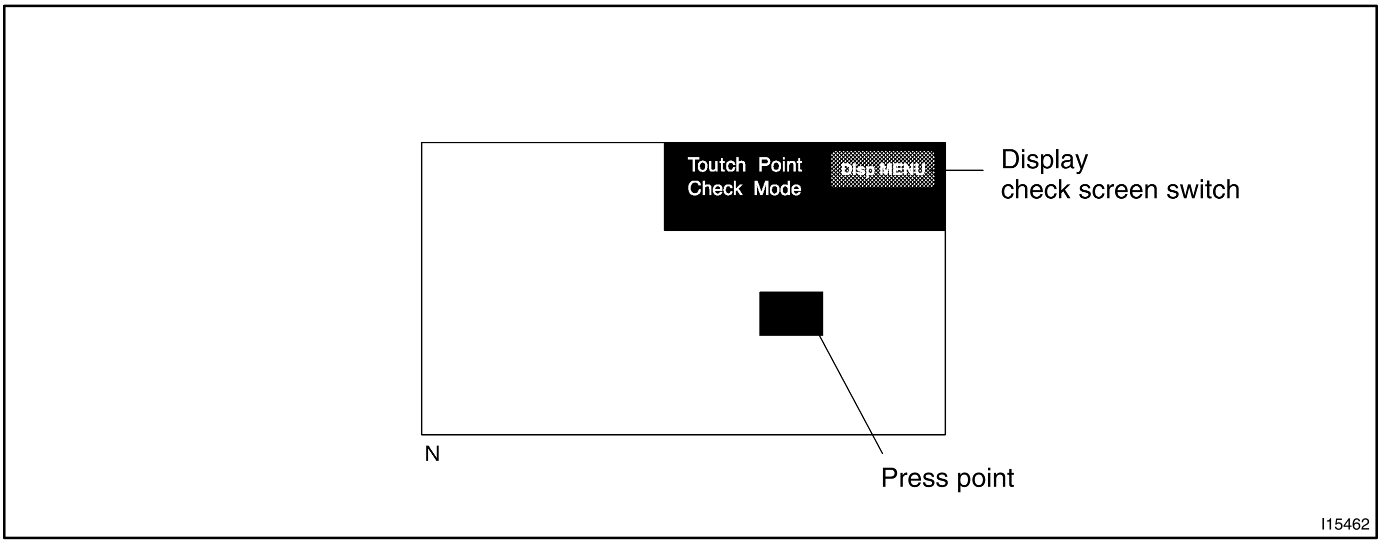
(3) Display Check Screen Switch
Pressing this switch activates the Display Check Mode screen.

(c) TOUCH SWITCH CHECK MODE SCREEN



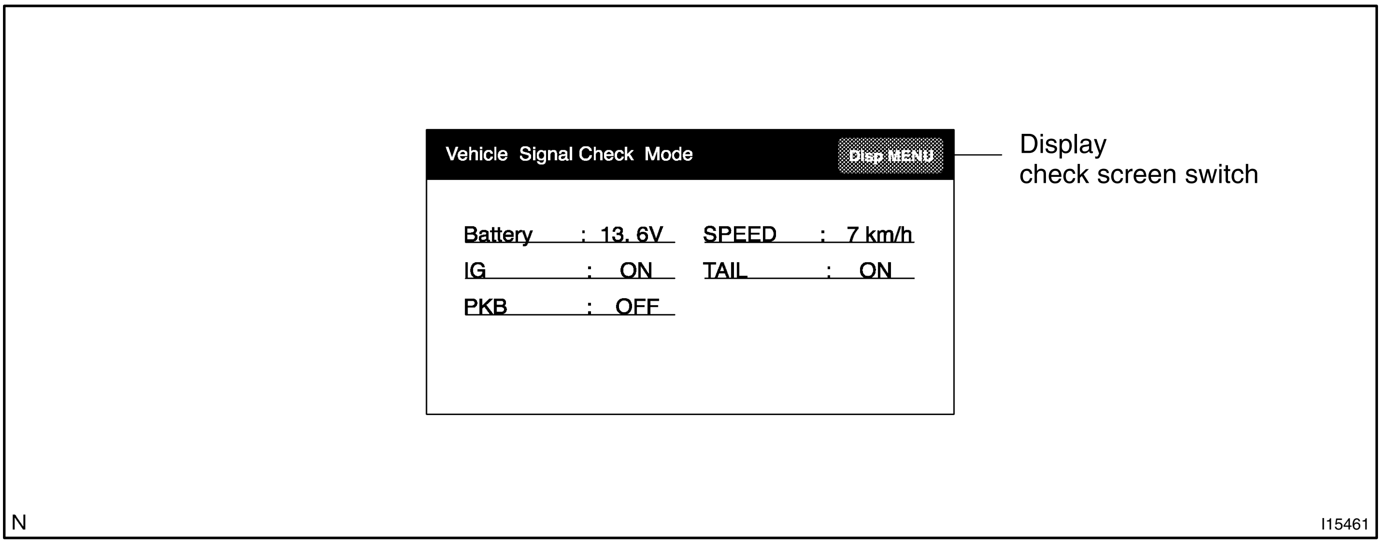
(1) Operating condition is checked line by line in the Touch Switch Check Mode screen.
(2) Check Line:
Lines are displayed by using infrared beams in this screen.
Once a beam is blocked off by touching the screen with a fingertip, the blocked part of the line is deleted.
(3) Horizontal Line Check Screen Switch:
Pressing this switch activates a screen in which beams of horizontal lines are checked.
(4) Display Check Mode Switch
Pressing this switch activates the Display Check Mode screen.

(d) TOUCH POINT CHECK MODE SCREEN



(1) In this screen, the position detected by the pressure sensing touch switch is checked.
(2) Press point:
The detected point is indicated by a cross–hair cursor.
(3) Display Check Screen Switch
Pressing this switch activates the Display Check Mode screen.

(e) VEHICLE SIGNAL CHECK MODE SCREEN



(1) Status of the Vehicle Signal which has been loaded into the display is checked in this screen.

(2) Signal Description

Battery: Displays battery voltage in V.
IG: Displays ON or OFF of the ignition switch.
PKB: Displays ON (applied) or OFF (released) of the parking brake.
SPEED: Displays the vehicle speed in km/h.
TAIL: Displays ON or OFF of the tail light switch.

(3) Display Check Screen Switch

Pressing this switch activates the Display Check Mode screen.

DI27Z–06

DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three–digit code (shown in hexadecimal) which is given to each component comprising the AVC – LAN Corresponding to the function, individual symbols are specified..
Logical address	Two–digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC – LAN.

Physical address: 110 Multi display

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
21 *1 (Switch)	10	Panel Switch Error	Error in panel switch input part is detected. (Error in switch control part, or internal communication error with switch control part is detected.)	• Inspect all switches on touch switch test screen in display check mode. If any of lines and point does not react, replace multi–display assembly. • If all switches function without problem, observe them for a while.
21 (Switch)	11	Touch Switch Error	Error in touch switch sensor is detected.	• Inspect all touch switches on touch switch test screen in display check mode. If any of lines does not react, replace multi–display assembly. • If all of vertical and horizontal lines react normally, observe them for a while.
34 (Front passenger monitor)	10	Error in Picture Circuit	Error in power supply system for picture circuit (abnormal voltage) is detected.	Replace multi–display assembly.
34 (Front passenger monitor)	11	Backlight Error (No current)	Decline in power output from inverter circuit for backlight.	Replace multi–display assembly.
34 (Front passenger monitor)	12	Backlight Error (Excess current)	Excess power output from inverter circuit for backlight.	Replace multi–display assembly.
01 (Communication control)	21	ROM Error	Abnormal condition of ROM is detected.	Replace multi–display assembly.
01 (Communication control)	22	RAM Error	Abnormal condition of RAM is detected.	Replace multi–display assembly.

*1: Check if the operation in Touch Point Check or Touch Switch Check screen is normal. If it operates without any problem, see how things go for a while.
Although this code is defined as Panel Switch Error, there are touch switches only on the display. If the internal communication is erroneous, however, this code is stored.

01 *2 (Communication Control)	D5	Registered component disconnected	Component shown by auxiliary code is or was disconnected from system with ignition switch in ACC or ON. Communication with component shown by auxiliary code is not established when engine is started.	● Check harness for power supply of component shown by auxiliary code ● Check harness for communication system of component shown by auxiliary code
01 *3 (Communication Control)	D8	No response to connection check	Component shown by auxiliary code is or was disconnected from system after engine is started.	● Check harness for power supply of component shown by auxiliary code ● Check harness for communication system of component shown by auxiliary code
01 *2 (Communication Control)	D9	Last Mode Error	Component operated (sound and/or image was provided) before engine stop is or was disconnected with ignition switch in ACC or ON.	● Check harness for power supply of component shown by auxiliary code ● Check harness for communication system of component shown by auxiliary code
01 (Communication Control)	DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation.	● Check harness for power supply of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code. ● If error occurs again, replace component shown by auxiliary code.
01 *2 (Communication Control)	DB	Mode Status Error	Dual sound is detected.	● Check harness for power supply system of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code.
01 *4 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (This code does not necessarily mean actual failure.)	If same component shown by auxiliary code is recorded in other component(s), check harness for power supply and communication system of components shown sub code.
01 *5 (Communication Control)	DE	Slave Reset (Momentary Interruption)	After engine start, slave component has been disconnected. DB	● Check harness for power supply system of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code.
01 *1 (Communication Control)	E4	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.

*2: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

*3: It is stored when 180 sec. has passed after the power supply connector is pulled out after engine start.

*4: It may be stored when the engine key is turned again 1 min. after engine start.

*5: It may be stored when the engine key is turned again after engine start.

Physical address: 190 Radio receiver assembly

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	21	ROM Error	Error is detected in internal ROM.	Replace radio receiver assembly.
01 (Communication Control)	22	RAM Error	Error is detected in internal RAM.	Replace radio receiver assembly.
01 *2 (Communication Control)	D6	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, multi–display assembly was disconnected.	● Check harness for power supply system of multi display. ● Check harness for communication system of multi display. ● Check harness for power supply system of radio receiver assembly. ● Check harness for communication system of radio receiver assembly.
01 *3 (Communication Control)	D8	No Response to Connection Check	Component shown by auxiliary code is or had been disconnected from system after engine start. D9	● Check harness for power supply system of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code.
01 *2 (Communication Control)	D9	Last Mode Error	Component operated (sounds and/or images were provided) before engine stop is or has been disconnected with ignition switch in ACC or ON.	Check harness for power supply system of component shown by auxiliary code. Check harness for communication system of component shown by auxiliary code.
01 (Communication Control)	DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation.	● Check harness for power supply of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code. ● If error occurs again, replace component shown by auxiliary code.
01 *2 (Communication Control)	DB	Mode Status Error	Dual alarm is detected.	● Check harness for power supply of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code.
01 *4 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessary mean actual failure.)	● If same auxiliary code is recorded in other component, check harness for power supply and communication system of components shown sub code.
01 *5 (Communication Control)	DD	Master Reset (Momentary Interruption)	After engine is started, multi–display assembly was disconnected from system.	● If this error occurs frequently, replace multi–display assembly.

01 *5 (Communication Control)	DE	Slave Reset (Momentary Interruption)	After engine is started, slave component was disconnected from system.	● Check harness for power supply of component shown by auxiliary code. ● Check harness for communication system of component shown by auxiliary code.
01 *6 (Communication Control)	DF	Master Error	Due to defective condition of multi display, master function is switched to audio equipment. Error occurs in communication between sub–master (audio) and multi display.	● Check harness for power supply of multi–display assembly. ● Check harness for communication system of multi–display assembly. ● Check harness for communication system between multi–display assembly and sub–master component.
01 (Communication Control)	E0	Registration Completion Instruction Error	”Registration Completion Instruction” command from multi display cannot be received.	● Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
01 *2 (Communication Control)	E1	Audio processor ON error	While source equipment is operating, AMP output is stopped.	● Check harness for power supply of multi–display assembly. ● Check harness for communication system of multi–display assembly.
01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from multi–display assembly.	● Replace multi–display assembly.
01 (Communication Control)	E3	Registration Request Transmission	Registration Request command is output from slave component. Receiving Connection Check Instruction, Registration Request command is output from sub–master component.	● Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	● Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
60 (Radio receiver assembly)	43	AM Tuner Error	Abnormal condition is detected in AM tuner. Inspect radio receiver assembly.	Replace radio receiver assembly.
60 (Radio receiver assembly)	44	FM Tuner Error	Abnormal condition is detected in FM tuner.	Replace radio receiver assembly.
61 (Cassette switch)	40	Mechanical or Media Error	Malfunction due to mechanical failure is identified. Or, cassette tape is cut or entangled.	Inspect cassette tape.
61 (Cassette switch)	41	EJECT Malfunction	Malfunction due to mechanical failure.	Replace radio receiver assembly.
62 (CD player)	42	No Disc Readout	Disc cannot be read.	Inspect CD.
62 (CD player)	44	CD Error	Error is detected in CD player.	Replace radio receiver assembly.

62 (CD player)	45	EJECT Error	Magazine cannot be ejected.	Replace radio receiver assembly.
62 (CD player)	46	Scratched/ Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	Inspect CD.

*2: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

*3: It is stored when 180 sec. has passed after the power supply connector is pulled out after engine start.

*4: It may be stored when the engine key is turned again 1 min. after engine start.

*5: It may be stored when the engine key is turned again after engine start.

*6: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Physical address: 178 Navigation ECU

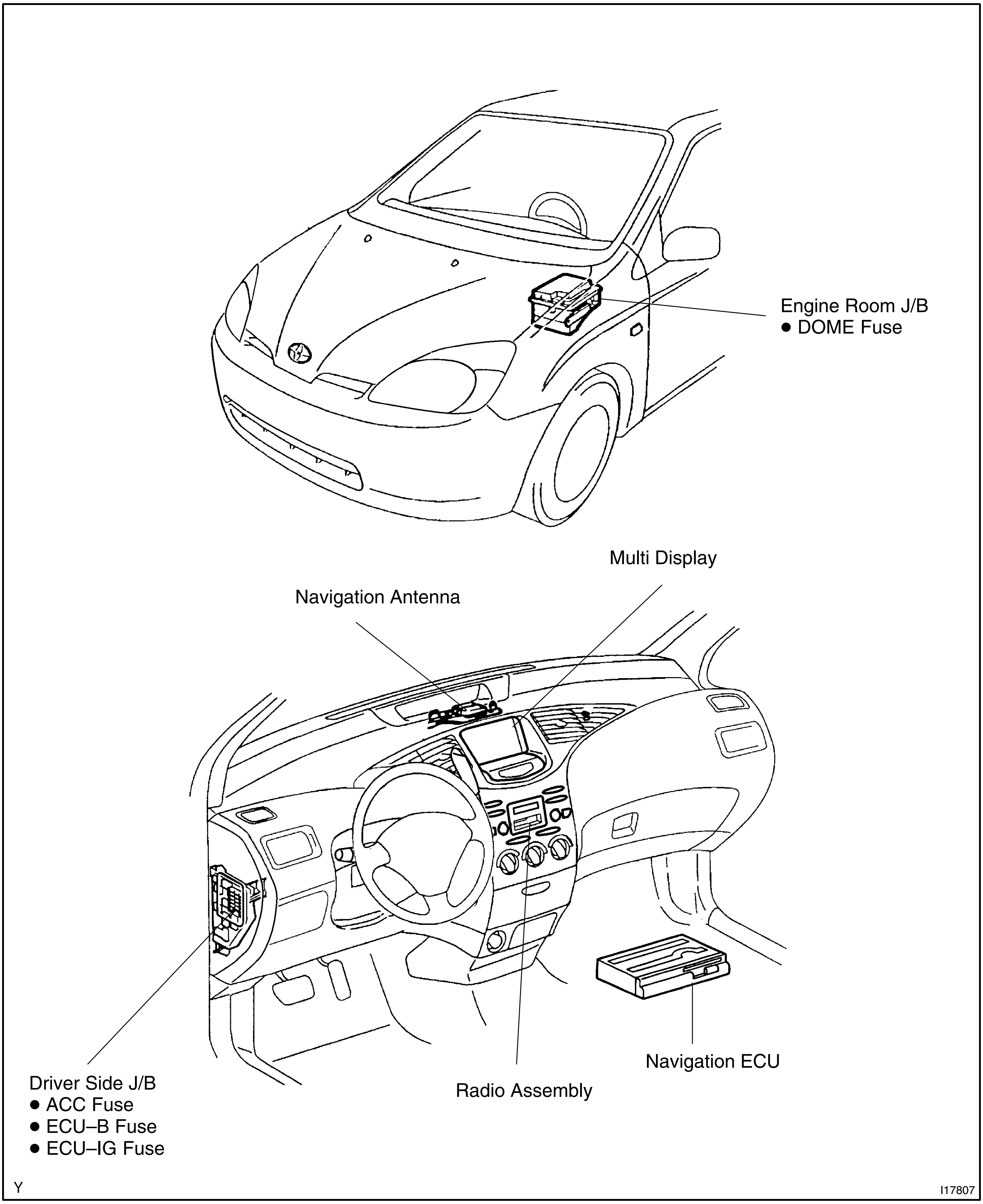
58 (Navigation ECU)	10	Gyro Error	Error in gyro sensor is detected. (Abnormal value in voltage output from sensor is detected for more than specified time.)	● Check the Gyro voltage in the diagnosis system mode.
58 (GPS receiver)	11	GPS Receiver Error	Operation error of GPS receiver is detected.	● At an outdoor site with a clear view, operate to display the GPS information screen of the diagnosis system. If GPS time stamp is not properly displayed after 15 min. or more, replace navigation ECU.
58 (GPS receiver)	40	GPS Antenna Error	Operation condition of GPS antenna cable is detected. (Open circuit, connection failure of connectors, etc.)	● Check if the GPS antenna is correctly connected or positioned or not. After replacing the antenna, if the error remains, replace the navigation ECU.
58 (GPS receiver)	41	Power Supply Error of GPS Antenna	Abnormal voltage of GPS antenna cable or short circuit is detected.	● Inspect GPS antenna and replace if necessary. (When no continuity is identified between connector's core and sealed part, GPS antenna is normal.) ● If GPS antenna is normal, replace navigation ECU.
58 (Navigation ECU)	42	Map Disc Error	Data cannot be read for a specified time due to scratches or dirt on disc surface or insertion of music CD.	● Inspect disc and replace if necessary. (Visually check disc surface and wipe it with soft cloth.)
58 (Navigation ECU)	43	Vehicle speed sensor Signal Error	Input error of vehicle speed sensor signal is detected. (When no vehicle speed sensor signal has been input for a specified time.)	● Check the vehicle speed signal in the diagnosis system mode. ● Inspect wire harness for vehicle speed signal. ● If wire harness is normal, replace navigation ECU.
58 (Navigation ECU)	44	Player Error	Malfunction of player continues for a specified length of time.	● Check if disc can be inserted/taken out or not. If not , replace navigation ECU. ● When the same code is detected in recheck after deleting the DTC memory.
58 (Navigation ECU)	45	Player Temp. Too High	Readout cannot be done because temperature around player's pickup (reading part) is too high.	With IG switch OFF, leave vehicle in cool shaded place for a while and recheck. After deleting the DTC memory, If same code detected, replace navigation ECU.

01 (Communication Control)	D6	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, multi–display assembly was disconnected.	● Check harness for power supply system of multi display. ● Check harness for communication system of multi display. ● Check harness for power supply system of navigation ECU. ● Check harness for communication system of navigation ECU.
01 *6 (Communication Control)	D7	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Or, when this code was recorded, multi–display assembly was disconnected. D6	● Check harness for power supply system of multi display. ● Check harness for communication system of multi display. ● Check harness for power supply system of navigation ECU. ● Check harness for communication system of navigation ECU.
01 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (This code does not necessarily mean actual failure.)	If same auxiliary code is recorded in other component(s), check harness for power supply and communication system of components shown sub code.
01 (Communication Control)	DD	Master Reset (Momentary Interruption)	After engine is started, multi–display assembly was disconnected from system.	● Check harness for power supply system of multi–display assembly. ● Check harness for communication system of multi–display assembly. ● If error occurs frequently, replace multi–display assembly.
01 (Communication Control)	DF	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment . Error occurs in communication between sub–master (audio) and master component.	● Check harness for power supply of multi–display assembly. ● Check harness for communication system of multi–display assembly. ● Check harness for communication system between multi–display assembly and sub–master component.
01 (Communication Control)	E0	Registration Completion Instruction Error	”Registration Completion Instruction” command from multi display cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error is detected in ON/OFF control command from multi–display assembly.	Replace multi–display assembly.
01 (Communication Control)	E3	Registration Request Transmission	● Registration Request command is output from slave component. ● By reception of connection check Instruction, Registration Request command is output from sub–master component.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	● Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

*6: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

DI7OS–02

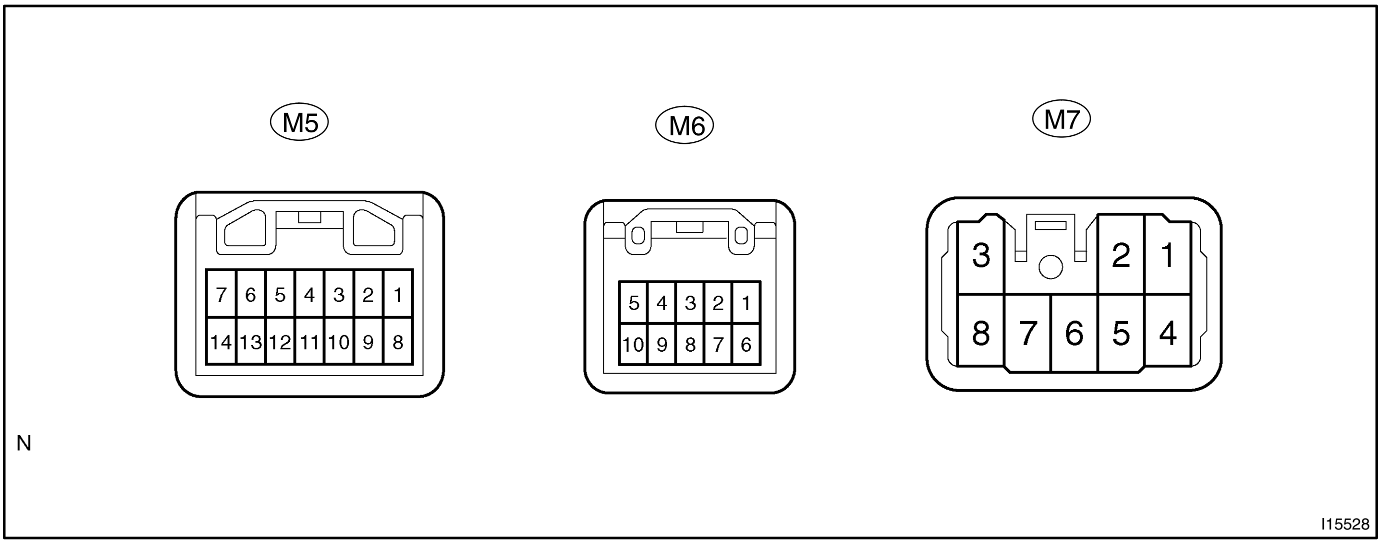
PARTS LOCATION



DI7OT–02

TERMINALS OF ECU

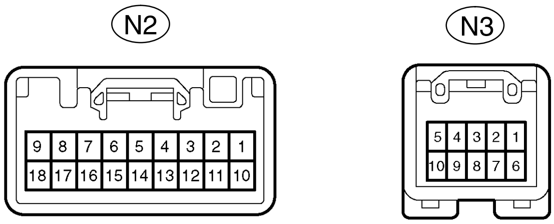
MULTI DISPLAY



Symbols (Terminals NO.)	Condition	STD Voltage (V)	Problem symptom when open circuit is detected. Problem symptom when short circuit is detected.
TX+ (M5–3)	Ignition switch ACC or ON	About 2.5 V	Screen is in disorder.
TX3+ (M5–4)	Ignition switch ACC or ON	About 2.5 V	Screen is in disorder.
SPD – GND (M5–5 – M7–6)	Ignition switch ON, and driving wheel rotated slowly	Repeatedly changes from below 1 to 9 V	Fuel efficiency cannot be calculated.
TX– (M5–10)	Ignition switch ACC or ON	About 2.5 V	Screen is in disorder.
TX3– (M5–11)	Ignition switch ACC or ON	About 2.5 V	Screen is in disorder.
PKB – GND (M5–13 – M7–6)	Parking brake switch ON (parking brake lever released)	5 V	The system cannot enter Diagnosis System mode.
TC – GND (M5–14 – M7–6)	Ignition switch OFF and connect thermals TC and E1 of diagnosis check connector	Continuity	Navigation system is normal. The system cannot exit Service Check mode.
VR – VG (M6–1 – M6–6)	Constant	Continuity	Screen noise or other types of noise occur.
R – VG (M6–2 – M6–6)	Diagnosis display check screen is white (Using an oscilloscope)	0.7 V ± 0.1 V *2	Screen color turns to blue.
B – VG (M6–3 – M6–6)	Diagnosis display check screen is white (Using an oscilloscope)	0.7 V ± 0.1 V *2	Screen color turns to yellow.
TX1+ (M6–5)	AVC–LAN communication circuit	–	Navigation system does not operate.
VG – GND (M6–6 – M7–6)	Constant	Continuity	Screen noise or other types of noise occur. Navigation system does not operation.
G – VG (M6–7 – M6–6)	Diagnosis display check screen is white (Using an oscilloscope)	0.7 V ± 0.1 V *2	Screen color turns to red–purple.

SYNC – VG (M6–8 – M6–6)	Display ON (Using an oscilloscope)	0.5 V – 1.3 V *1	Screen is in disorder
TX1– (M6–10)	AVC–LAN communication circuit	–	Navigation system does not operate.
+B1 – GND (M7–1 – M7–6)	Constant	10 – 14 V	Navigation system does not operate.
IG – GND (M7–2 – M7–6)	Ignition switch ON	10 – 14 V	Navigation system does not operate.
DR – GND (M7–3 – M7–6)	Light control switch TAIL or HEAD and cover the top of automatic light control sensor	9 V or more	No problem is identified in the display.
ACC – GND (M7–4 – M7–6)	Ignition switch ACC	10 – 14 V	Navigation system does not operate.
GND – Body ground (M7–6 – Body ground)	Constant	Below 1 V	Audio system is normal.
TAIL – GND (M7–8 – M7–6)	Light control switch TAIL or HEAD	9 V or more	Switching between Night and Day mode cannot be done.

NAVIGATION ECU

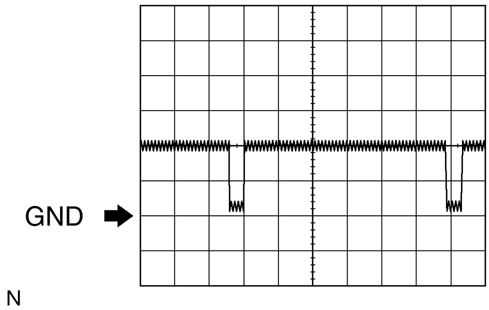


N

I15499

Symbols (Terminals NO.)	Condition	STD Voltage (V)	Problem symptom when open circuit is detected. / Problem symptom when short circuit is detected.
AUI+ – GND (N2–1 – N2–17)	Radio switch ON	5 – 7 V	Driver's side speaker does not sound.
AUO+ – GND (N2–2 – N2–17)	Radio switch ON	5 – 7 V	Driver's side speaker does not sound.
SPD – GND (N2–5 – N2–17)	Ignition switch ON and driving wheel rotated slowly	Repeatedly changes from below 1 to 9 V	Navigation operation is available during, or a cursor on present site does not move.
+B – GND (N2–9 – N2–17)	Constant	10 – 14 V	The set route can not be memorized. (The route disappears by turning the ignition switch OFF.)
			Fuse is blown.
AUI– – GND (N2–10 – N2–17)	Radio switch ON	5 – 7 V	Driver's side speaker does not sound.
AUO– – GND (N2–11 – N2–17)	Radio switch ON	5 – 7 V	Driver's side speaker does not sound.
REV – GND (N2–14 – N2–17)	A/T shift position R	5 V	The direction of advance of the vehicle is different from that of the cursor.
GND – Body ground (N2–17 – Body ground)	Constant	Below 1 V	Audio system is normal.
ACC – GND (N2–18 – N2–17)	Ignition switch ACC or ON	10 – 14 V	Audio system does not sound.
VR – VG (N3–1 – N3–6)	Constant	Continuity	Screen noise or other types of noise occur.
			Navigation system does not operation.
R – VG (N3–2 – N3–6)	Diagnosis display check screen is white (Using an oscilloscope)	0.7 V ± 0.1 V*1	Screen color turns to blue.

+B – GND (N3–3 – N2–17)	Constant	10 – 14 V	The set route can not be memorized. (The route disappears by turning the ignition switch OFF.)
			Fuse is blown.
B – VG (N3–3 – N3–6)	Diagnosis display check screen is white (Using an oscilloscope)	0.7 ± 0.1 V*2	Screen color turns to yellow.
TX1+ – GND (N3–5 – N2–17)	Ignition switch ACC or ON	2 – 3 V	Navigation system does not operate.
VG – GND (N3–6 – N2–17)	Constant	Continuity	Screen noise or other types of noise occur.
			Navigation system does not operation.
G – VG (N3–7 – N3–6)	Diagnosis display check screen is white (Using an oscilloscope)	0.7 ± 0.1 V*2	Screen color turns to red–purple.
SYNC – VG (N3–8 – N3–6)	Display ON (Using an oscilloscope)	0.5 – 1.3 V*1	Screen is in disorder.
TX1– – GND (N3–10 – N2–17)	Ignition switch ACC or ON	2 – 3 V	Navigation system does not operate.

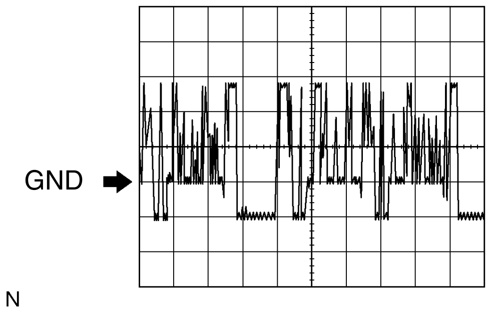


Oscilloscope

*1: wave1

- Measure terminal: SYNC ↔ GND1
- Measure set: 500 mV/DIV 10 µs/DIV
- Condition: Navigation display is displayed

I15531



*2: wave2

- Measure terminal: R, G, B ↔ GND1
- Measure set: 200 mV/DIV 10 µs/DIV
- Condition: Navigation map is switched

I15532

DI282–06

PROBLEM SYMPTOMS TABLE

Flow chart No.	Symptom	See page
1	Black screen (Nothing displayed)	DI–733
2	No sound with POWER switch pressed. (”Audio OFF” on audio screen)	DI–734
3	No navigation screen displayed when ”MAP”, ”Menu”, or ”DEST” switch pressed. (Screen cannot be switched.)	DI–735
4	No corresponding screen displayed when ”Audio” or ”Information” switch pressed.	DI–738
5	No navigation displayed, ”Audio OFF” on audio screen and no audio sound.	DI–739
6	Screen cannot be dimmed in night time.	DI–741
7	Navigation screen not stabilized. (Synchronous error)	DI–743
8	Color on navigation screen is unusual (RGB signal error)	DI–744
9	Black screen appears when ”MAP”, ”Menu” or ”DEST” switch pressed.	DI–746
10	Sound of radio, cassette tape or CD only cannot be heard from speaker.	DI–747
11	No sound (radio, cassette tape, CD) can be heard from driver side door speaker only.	DI–748
12	Map DISC cannot be inserted.	DI–750
13	MAP screen display does not appear. (Disc Caution screen does not change.)	DI–752
14	Map is displayed in white or blue screen. (Switches and vehicle position mark is displayed.)	DI–753
15	Touch switch does not function. (Navigation screen only)	DI–754
16	The screen cannot change to the night mode color.	DI–756
17	Vehicle position is deviated from correct point badly.	DI–757
18	GPS mark does not appear.	DI–760
19	No voice navigation.	DI–762
20	Vehicle position rotates without control. (Map rotates without control)	DI–763
21	Driving direction is opposite to moving direction of vehicle position mark.	DI–765
22	Radio reception poor.	DI–766
23	Cassette tape cannot be inserted.	DI–767
24	Cassette tape cannot be eject.	DI–768
25	CD cannot be inserted.	DI–769
26	CD cannot be eject.	DI–770
27	No AM. FM or CD screen is displayed.	DI–771

DI7OU–02

CIRCUIT INSPECTION

1. Black screen (Nothing displayed)

INSPECTION PROCEDURE

1	**Check the ECU–IG fuse.**

NG → **Replace the fuse.**

OK ↓

2	**Check multi display.**

PREPARATION:
Disconnect the multi display connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK ↓

Replace the multi display.

DI7OV–02

2. No sound with POWER switch pressed. (”Audio OFF” on audio screen)

INSPECTION PROCEDURE

1	**Service check mode. (Check radio receiver assembly)**

NG → **Troubleshoot for each diagnosis.**

OK ↓

2	**Check the radio receiver assembly.**

PREPARATION:
Disconnect the radio receiver assembly connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK ↓

Replace the radio receiver assembly.

DI7OW–02

3. No navigation screen displayed when ”MAP”, ”Menu”, or ”DEST” switch pressed. (Screen cannot be switched.)

INSPECTION PROCEDURE

1	**Service check mode. (Check the navigation ECU)**

NG → **Troubleshoot for each diagnosis.**

OK → **Go to step 6.**

Ncon

2	**Check the navigation ECU.**

PREPARATION:
Disconnect the navigation ECU connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK

3	Check the navigation ECU.

CHECK:
Check terminal R, G and B.
OK:
R, G, B: See ”Naavigation ECU” of ”TERMINAL OF ECU”.

NG → **Replace the navigation ECU.**

OK

4	Check the multi display.

PREPARATION:
Disconnect the multi display connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK

5	Check the multi display.

CHECK:
Check terminal R, G and B.
OK:
R, G, B: See ”multi display” of ”TERMINAL OF ECU”.

NG → **Replace the multi display.**

OK

Replace the multi display.

6	**All of the switches (MAP, Menu, DEST etc.) does not function.**

No → **Replace the center cluster module control.**

Yes

7	**Check each switch (A/C switch e.t.c.) of the center cluster module control does not function.**

No → **Replace the center cluster module control.**

Yes

Replace the multi display.

DI7OX–02

4. No corresponding screen displayed when ”Audio” or ”Information” switch pressed.

INSPECTION PROCEDURE

1	Check ”AVC–LAN communication circuit” (See page DI–773).

NG → Replace or repair AVC–LAN circuit.

OK

2	”Audio” and ”Information” switch does not function.

NG → Replace the center cluster mudule control.

OK

3	Check each switch (A/C switch e.t.c.) of the center cluster module control does not function.

NG → Replace the center cluster mudule control.

OK

Replace the multi display.

DI7OY–02

5. No navigation displayed, "Audio OFF" on audio screen and no audio sound.

INSPECTION PROCEDURE

1	**Service check mode.**

NG → **Troubleshoot for each diagnosis.**

OK ↓

2	**Check the radio receiver assembly.**

PREPARATION:
Disconnect the radio receiver assembly connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK ↓

3	**Check "AVC–LAN communication circuit" (See page DI–773).**

NG → **Replace the AVC–LAN circuit or radio receiver assembly.**

OK ↓

Replace the multi display.

DI7OZ–02

6. Screen cannot be dimmed in night time.

INSPECTION PROCEDURE

1	Check if the screen is dimmed at night. (With the light control switch ON), do all screens except the navigation screen appear in Night Mode?)

NG → **Check the light control switch.**

OK

2	Check the multi display.

CHECK:
Check terminal TAIL.
OK:
TAIL: See ”Multi display” of ”TERMINAL OF ECU”.

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

OK

3	Check the multi display.

PREPARATION:
Disconnect the multi display connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK

Replace the multi display.

DI7P0–02

7. Navigation screen not stabilized (Synchronous error).

INSPECTION PROCEDURE

1	Check the navigation ECU.

CHECK:
Check terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check terminal SYNC, VR or VG.
OK:
SYNC, VR, VG: See ”Navigation ECU” of ”TERMINAL OF ECU”

NG → **Replace the wire harness when all terminals are faulty. Replace the wire harness when the SYNC terminal is faulty.**

OK ↓

Replace the multi display.

DI7P1–02

8. Color on navigation screen is unusual (RGB signal error).

INSPECTION PROCEDURE

1	**Display check mode (Color bar check).**

NG → **Replace the multi display.**

2	**Navigation check mode (Color bar check).**

NG → **Go to step 4.**

OK

3	**Check the screen setting. (Day or Night mode)**

OK → **Normal.**

NG

4	**Check the navigation ECU.**

CHECK:
Check terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check terminal R, G, B, VR or VG.
OK:
R, G, B, VR or VG: See ”Navigation ECU” of ”TERMINAL OF ECU”

NG → **Replace the wire harness when all terminals are faulty. Replace the wire harness when SYNC terminal is faulty.**

OK

Replace the multi display.

DI7P2–02

9. Black screen appears when ”Present Location”, ”Menu” or ”Set Designation” switch pressed.

INSPECTION PROCEDURE

1	Check the navigation ECU.

CHECK:
Check terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check terminal R, G, B, VR or VG.
OK:
R, G, B, VR or VG: See ”Navigation ECU” of ”TERMINAL OF ECU”

NG → **Replace the wire harness when all terminals are faulty. Replace the wire harness when SYNC terminal is faulty.**

OK

Replace the multi display.

DI7P3–02

10. Sound of radio, cassette tape or CD only cannot be heard from speaker.

INSPECTION PROCEDURE

1	Check the radio receiver assembly.

PREPARATION:
Disconnect the radio receiver assembly connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK

Replace the radio receiver assembly.

DI7P4–02

11. No sound (radio, cassette tape, CD) can be heard from driver side door speaker only.

INSPECTION PROCEDURE

1	**Service check mode.**

NG → **Troubleshoot for each diagnosis.**

OK ↓

2	**Check wire harness (between navigation ECU and radio receiver assembly).**

PREPARATION:
Disconnect the navigation ECU and radio receiver assembly connector.

CHECK:
(a) Check continuity between terminal AUI+ of navigation ECU connector and terminal FL+ of radio receiver assembly.
(b) Check continuity between terminal AUI– of navigation ECU connector and terminal FL– of radio receiver assembly.

OK:
Continuity

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

OK ↓

3	**Check the navigation system voice.**

OK → **Go to step 6.**

NG ↓

4	**Check wire harness (between navigation ECU and driver side door speaker).**

PREPARATION:
Disconnect the navigation ECU and driver side door speaker connector.
CHECK:
(a) Check continuity between terminal AUO+ of navigation ECU connector and terminal 1 of driver side door speaker.
(b) Check continuity between terminal AUO– of navigation ECU connector and terminal 2 of driver side door speaker.
OK:
Continuity

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

OK

5	**Check the driver side door speaker.**

NG → **Replace the speaker.**

OK

Replace the navigation ECU.

6	**Check the navigation ECU.**

CHECK:
Check terminal AUO+, AUO–, AUI+ and AUI–.
OK:
AUO+, AUO–, AUI+ and AUI–: See ”Navigation ECU” of ”TERMINAL OF ECU”.

NG → **Replace the navigation ECU.**

OK

Replace the radio receiver assembly.

DI7P5–02

12. Map DISC cannot be inserted.

INSPECTION PROCEDURE

1	**Check the MAP DISC.**

NG → **Replace the MAP DISC.**

OK ↓

2	**Insert a MAP DISC without tilt.**

OK → **Normal.**

NG ↓

3	**Check the navigation ECU.**

PREPARATION:
Disconnect the navigation ECU connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK ↓

Replace the navigation ECU.

DI7P6–02

13. MAP screen display does not appear. (Disc Caution screen does not change)

INSPECTION PROCEDURE

1	**Take appropriate measures according to the caution screen.**

OK → **Normal.**

NG

2	**Check map DISC.**

NG → **Replace the disc.**

OK

Replace the navigation ECU.

CAUTION SCREEN

CAUTION MESSAGE	CAUSE	CORRECTIVE ACTION
Cover is open. Close it.	The cover of the map disk slot is open.	Close the cover,
No disc is set. Set a map disc.	No map disk is inserted.	Insert a proper map disc.
Data cannot be read properly. Check it for scratches or dirt.	Data cannot be read because the map disc is dirty or scratched.	Wipe off dirt on the both disc surface with soft cloth.
Data cannot be read. Check the correct map disc is set.	Something other than map disc is inserted.	Insert a correct map disc.
Due to high temperature of the player, data cannot be read.	Pick–up part of the player is heated to a high temperature.	Stop the vehicle at a shaded cool place and turn the ignition switch OFF. When confirming that the temperature of the navigation ECU has been lowered, turn the ignition switch ON.
Data cannot be read. Contact your sales dealer.	The player cannot read data from the map disc temporarily.	Turn the ignition switch OFF and ON.*1

*1: If the same caution screen appears again after turning the ignition switch ON, replace the navigation ECU.

DI7P7–02

14. Map is displayed in white or blue screen. (Switches and vehicle position mark is displayed)

INSPECTION PROCEDURE

1	**Set the map scale to the max.**

OK → **Normal.**

HINT:
Correct the current position and check it again.

NG ↓

2	**Wipe the disc with a soft cloth, insert it again, and turn the ignition switch ON from OFF.**

NG → **Replace the disc.**

OK ↓

Normal.

HINT:
If the trouble still occurs, replace the navigation ECU.

DI7P8–02

15. Navigation screen cannot change to the night mode color.

INSPECTION PROCEDURE

1	**Check the setting. (Is it set to Day Mode in screen adjustment?)**

Yes → **Normal.**

No ↓

2	**Check if the screen is dimmed at night. (With the light control switch ON, do all screens except the navigation screen appear in Night Mode?)**

NG → **Go to step 5.**

OK ↓

3	**Does the beep sound by operating switches on the navigation screen?**

OK → **Replace the navigation ECU.**

NG ↓

4	**Check ”AVC–LAN communication circuit” (See page DI–773).**

NG → **Replace or repair AVC–LAN circuit.**

OK ↓

Replace the navigation ECU.

5	**Check the multi display.**

CHECK:
Check terminal TAIL.

OK:
TAIL: See "Multi Display" of "TERMINAL OF ECU".

OK → **Replace the multi display.**

NG ↓

Replace or repair wire harness.

DI7P9–02

16. Touch switch does not function. (Navigation screen only)

INSPECTION PROCEDURE

1	**Display check mode (Touch switch, Touch point screen).**

NG → **Replace the multi display.**

OK

2	**Check ”AVC–LAN communication circuit” (See page DI–773).**

NG → **Replace or repair AVC–LAN circuit.**

OK

Replace the navigation ECU.

DI7PA–02

17. Vehicle position is deviated from correct point badly.

INSPECTION PROCEDURE

1	Check the mark display. (At a place with a fine view, is GPS mark displayed or not?)

No → Go to step 7.

Yes

2	Does the trouble occur in the specific area or not?

Yes → Normal. (If the vehicle is positioned in the place where it is difficult to be identified, the current vehicle position may be incorrectly displayed.)

No

3	Check the setting (Color of the automatic calibration button on the calibration screen).

Green → Normal. (Drive the vehicle (10 km or more) until calibration is completed.

Blue

4	Service check mode. (Is ”58–43” displayed in the unit check mode of the navigation ECU?)

Yes → Troubleshoot for each diagnosis.

No

5	**Navigation check mode (vehicle signal check mode: SPD).**

NG → **Replace or repair speed sensor wire harness.**

OK

6	**Recurrence Test (Confirm the phenomenon) (Correct the current position and drive the vehicle for a while with the GPS mark displayed).**

OK → **Normal.**

NG

Replace the navigation ECU.

7	**Check if the harness is caught or sharply bent or not.**

NG → **Navigation antenna is surely connected.**

OK

8	**Check optional components. (Does it become if the optionals such as the theft deterrent system is removed?)**

Yes → **Remove or change the position of the components.**

HINT:
Some optionals receive radio signals, and if this happens, GPS reception may be affected.

No

9	**Is there anything such as a film stuck to the window?**

Yes → **Reception may be affected by a screen such as a film.**

No

10	**Service check mode. (Is ”80–40, 41” is displayed in the unit check mode of the navigation ECU?)**

Yes → **Troubleshoot for each diagnosis.**

No

Replace the navigation antenna.

HINT:
If the trouble still occurs, replace the navigation ECU.

DI7PB–02

18. GPS mark does not appear.

INSPECTION PROCEDURE

1	Check the mark display. (At a place with a fine view, is GPS mark displayed or not?)

Yes → Normal.

No ↓

2	Check if the harness is caught or sharply bent or not.

NG → Navigation antenna is surely connected.

OK ↓

3	Check optional components. (Does it become normal if the optionals such as the theft deterrent system is removed?)

Yes → Remove or change the position of the components.

HINT:
Some optionals receive radio signals, and if this happens, GPS reception may be affected.

No ↓

4	**Is there anything such as a film stuck to the window?**

Yes → **Reception may be affected by a screen such as a film.**

No

5	**Service check mode. (Is ”80–40, 41” is displayed in the unit check mode of the navigation ECU?)**

Yes → **Troubleshoot for each diagnosis.**

No

Replace the navigation antenna.

HINT:
If the trouble still occurs, replace the navigation ECU.

DI7PC–02

19. No voice navigation.

INSPECTION PROCEDURE

1	Set the volume to the max in the menu screen.

OK → Normal. (Voice navigation is not available. No destination is set, or the vehicle is running off the route.)

NG ↓

2	Check wire harness (navigation ECU and driver side door speaker).

PREPARATION:
Disconnect the navigation ECU connector and driver side door speaker connector.
CHECK:
(a) Check continuity between terminal AUO+ of navigation ECU connector and terminal 1 of driver side door speaker.
(b) Check continuity between terminal AUO– of navigation ECU connector and terminal 2 of driver side door speaker.
OK:
Continuity

NG → Replace or repair wire harness.

OK ↓

3	Check the sound. (Check if the radio sound can be heard from the driver side door speaker.)

OK → Replace the navigation ECU.

NG ↓

Replace the speaker.

DI7PD–02

20. Vehicle position rotates without control. (Map rotates without control)

INSPECTION PROCEDURE

1	Recheck. (While not rotating the vehicle, turn the ignition switch ON from OFF again.)

OK → Normal. (While the vehicle was turning, the ignition switch was turned ON.)

NG ↓

2	System check mode. (Is ”58–10” is displayed in the unit check mode of the navigation ECU?)

Yes → Replace the navigation ECU.

No ↓

3	System check mode. (Is ”58–43” is displayed in the unit check mode of the navigation ECU?)

Yes → Replace and repair SPD terminal wire harness.

No ↓

4	Navigation check mode (vehicle signal check mode: SPD and gyro).

OK → Replace the navigation ECU.

NG ↓

Replace or repair wire harness.

DI7PE–02

21. Driving direction is opposite to moving direction of vehicle position mark.

INSPECTION PROCEDURE

1	Navigation check mode (vehicle signal check mode REV).

OK → **Replace the navigation ECU.**

NG

2	Check the navigation ECU.

CHECK:

Check terminal REV.

OK:

REV: See ”Navigation ECU” of ”TERMINAL OF ECU”.

OK → **Replace the navigation ECU.**

NG

Replace or repair wire harness.

DI7PF–02

22. Radio reception poor.

INSPECTION PROCEDURE

1	Check the reception. (Select an AM or FM station band which signals are strong)

Yes → An electric wave environment is bad.

No

2	Are there any additional installation parts? (Telephone antenna, etc.)

Yes → Does the condition get better if removing them?
Influence of additional installation parts.

No

3	Is the contact of the plug jack of the radio OK?

NG → Take a measure for contact.

OK

Is the antenna cord caught or broken?

DI7PG–02

23. Cassette tape cannot be inserted.

INSPECTION PROCEDURE

1	Is there a foreign object inside tape player?

Yes → Remove foreign object.

No ↓

2	Is auto search button radio operating normally?

NG → Radio assembly faulty.

OK ↓

3	Check the cassette tape for deformation or peeling–off of the label.

NG → Replace cassette.

OK ↓

4	Is the tape slack?

NG → Remove slack before using.

OK ↓

Replace the radio receiver assembly.

DI7PH–02

24. Cassette tape cannot be eject.

INSPECTION PROCEDURE

1	**Check if ACC or DOME fuse is OK?**

NG → **Replace fuse.**

OK

2	**Check the radio receiver assembly.**

PREPARATION:
Disconnect the radio receiver assembly connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

HINT:
When sending it for repair, leave as it is without attempting to take it out by force.

OK

Replace the radio receiver assembly.

DI7PI–02

25. CD cannot be inserted.

INSPECTION PROCEDURE

1	Check that a proper CD is inserted. (Is it a music CD and free from scratches or dirt?)

NG → **Replace the CD.**

OK

2	Check that the CD is not set upside down.

NG → **Use a proper CD.**

OK

Replace the radio receiver assembly.

HINT:
When sending it for repair, leave as it is without attempting to take it out by force.

DI7PJ–02

26. CD cannot be eject.

INSPECTION PROCEDURE

1	Check if ACC or DOME fuse is OK?

NG → **Replace fuse.**

OK

2	Check the radio receiver assembly.

PREPARATION:
Disconnect the radio receiver assembly connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

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

OK

Replace the radio receiver assembly.

HINT:
When sending it for repair, leave as it is without attempting to take it out by force.

DI7PK–02

27. No AM, FM or CD screen is displayed.

INSPECTION PROCEDURE

1	Check the sound. (Check if the sound of the radio, cassette or CD can be heard.)

OK → System check mode. (Check radio receiver assembly)

NG ↓

2	Check the radio receiver assembly.

PREPARATION:
Disconnect the radio receiver assembly connector.
CHECK:
Check voltage terminals +B.
OK:
+B: 10 – 14 V
CHECK:
Check voltage terminal ACC when turn ignition switch ACC or ON position.
OK:
ACC: 10 – 14 V
CHECK:
Check continuity terminal GND.
OK:
GND: Continuity

NG → Replace or repair wire harness.

OK ↓

3	Check ”AVC–LAN communication circuit” (See page DI–773).

NG → **Replace or repair AVC–LAN circuit.**

OK

Replace the radio receiver assembly.

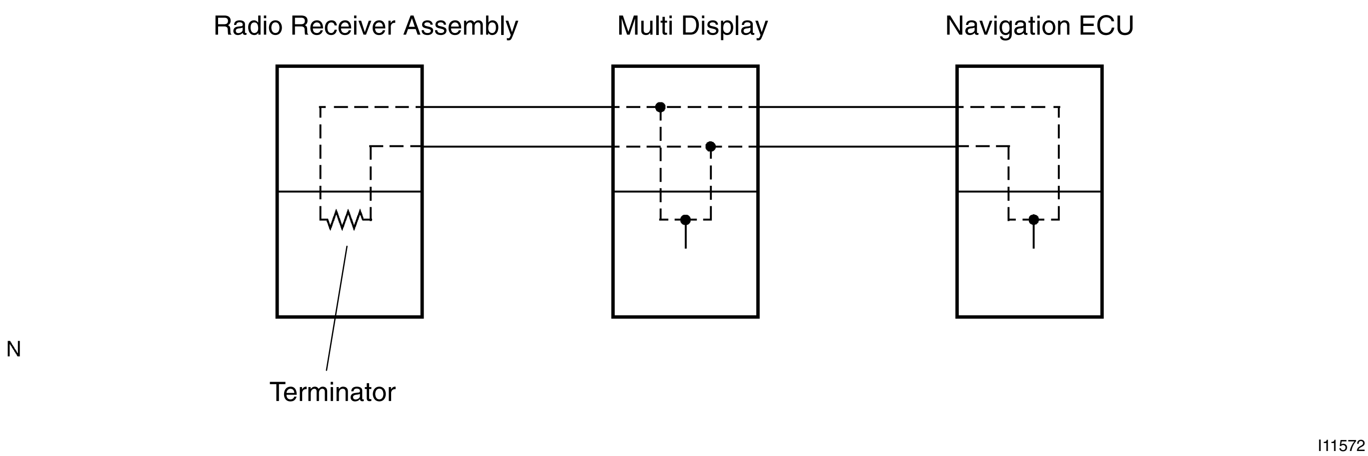
DI7PL–02

AVC–LAN (Communication bus) Circuit

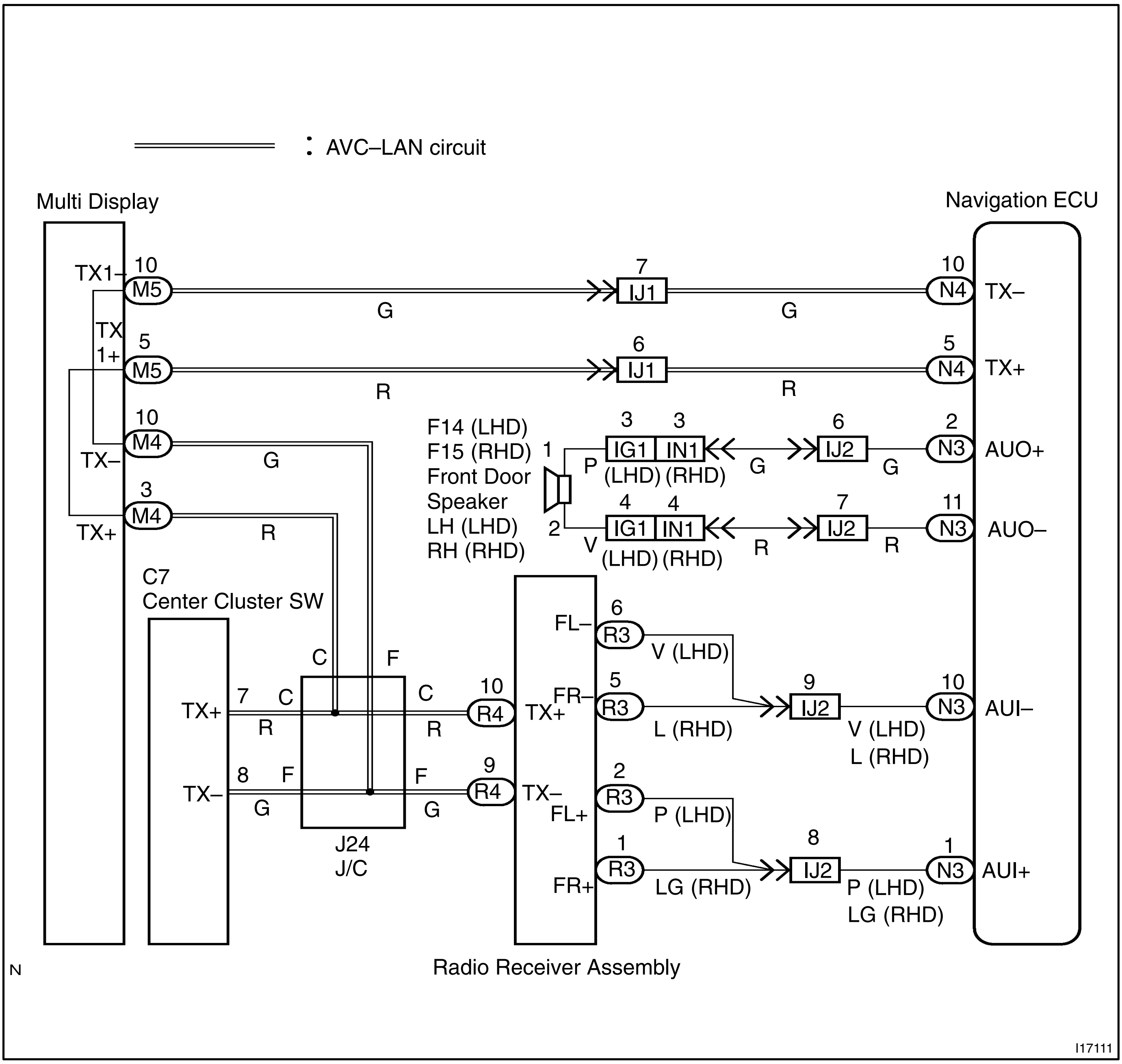
CIRCUIT DESCRIPTION

Each unit of 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, navigation system will not function normally as the communication is discontinued.
In this AVC–LAN, multi display becomes the master of the communication, and the radio receiver assembly has a terminator necessary for transmitting the communication.
multi display is connected between navigation ECU and radio receiver assembly, navigation system has the structure that makes communication impossible without navigation ECU, multi display or radio receiver assembly.

AVC–LAN



WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wire harness and connector between radio receiver assembly and navigation ECU (See page IN–40).**

NG → **Repair or replace wire harness or connector between radio receiver assembly and navigation ECU.**

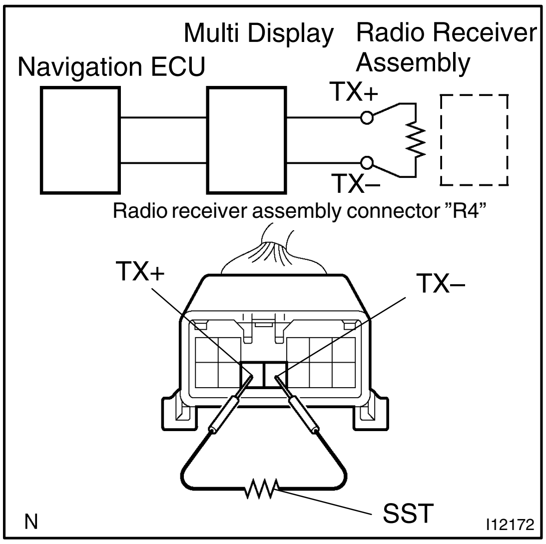
OK

2	**Check wire harness and connector between multi display and navigation ECU (See page IN–40).**

NG → **Repair or replace wire harness or connector between multi display and navigation ECU.**

OK

3	**Skip radio receiver assembly and check AVC–LAN.**



PREPARATION:
(a) Connect Multi Display connector.
(b) Disconnect radio receiver assembly ”R” connector.
(c) Using SST (Navigation Check Wire P/N 09843–18050), connect the terminal TX+ to terminal TX– of ”R4” connector of radio receiver assembly.

CHECK:
Operate the panel switch and the touch switch of the display and check that the navigation functions.
(Check that AVC–LAN is recovered.)

OK → **Replace the radio receiver assembly.**

NG

Replace the Navigation ECU.

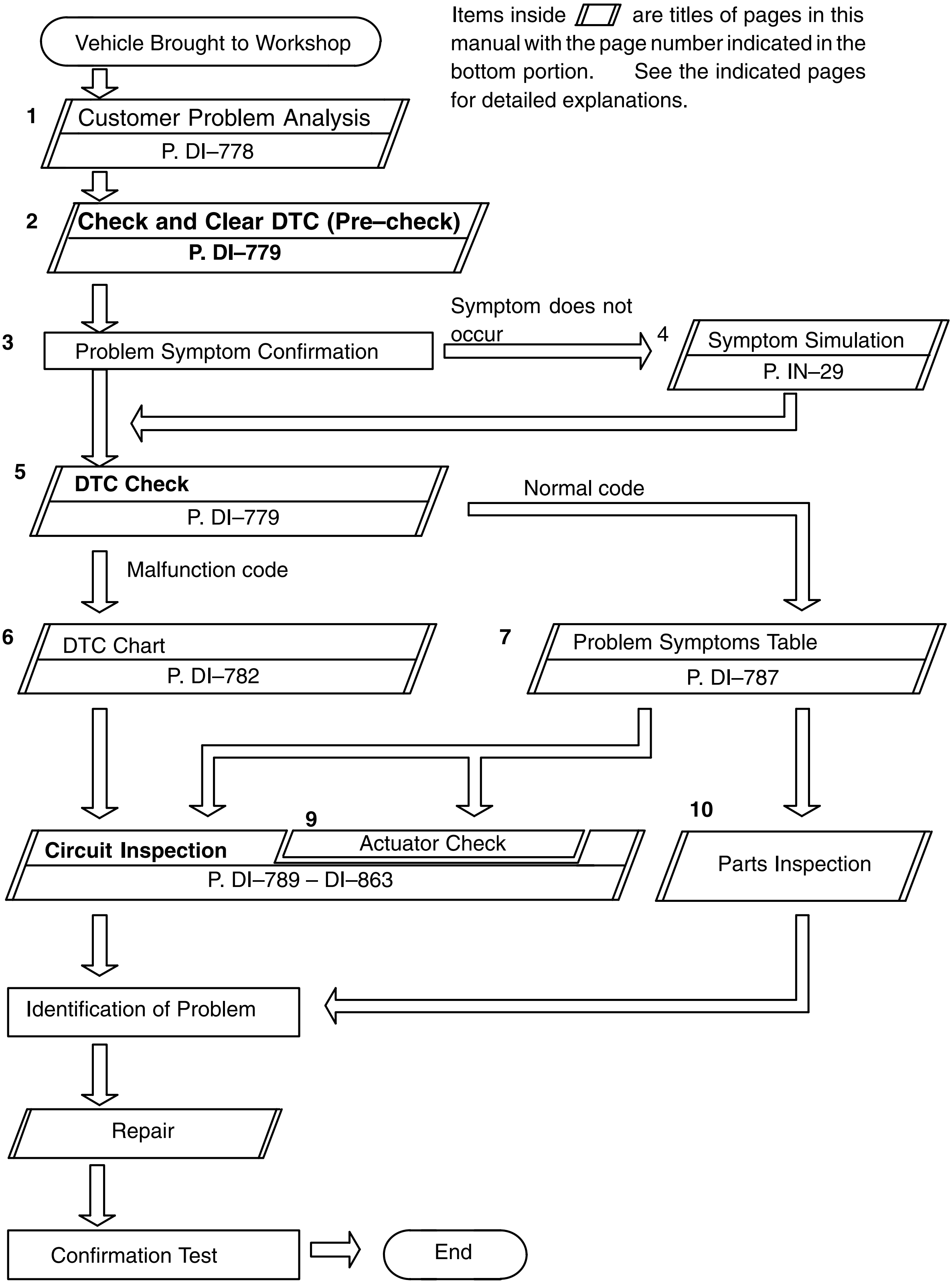
AIR CONDITIONING SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1BX–06

Perform troubleshooting in accordance with the procedure on the fowling 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.



DI1BY–01

CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

Inspector's name:

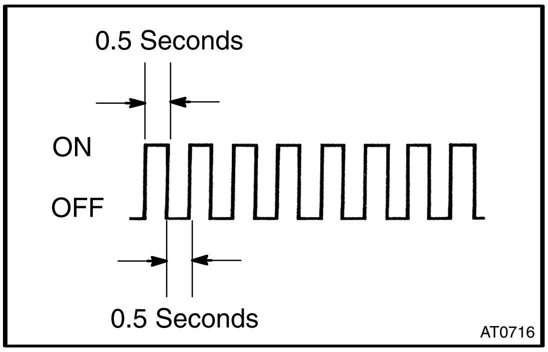
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date vehicle Brought In	/ /	**Odometer Reading**	**km** **Miles**

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 change ☐ Will not enter the desired mode

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

DI7MA–01



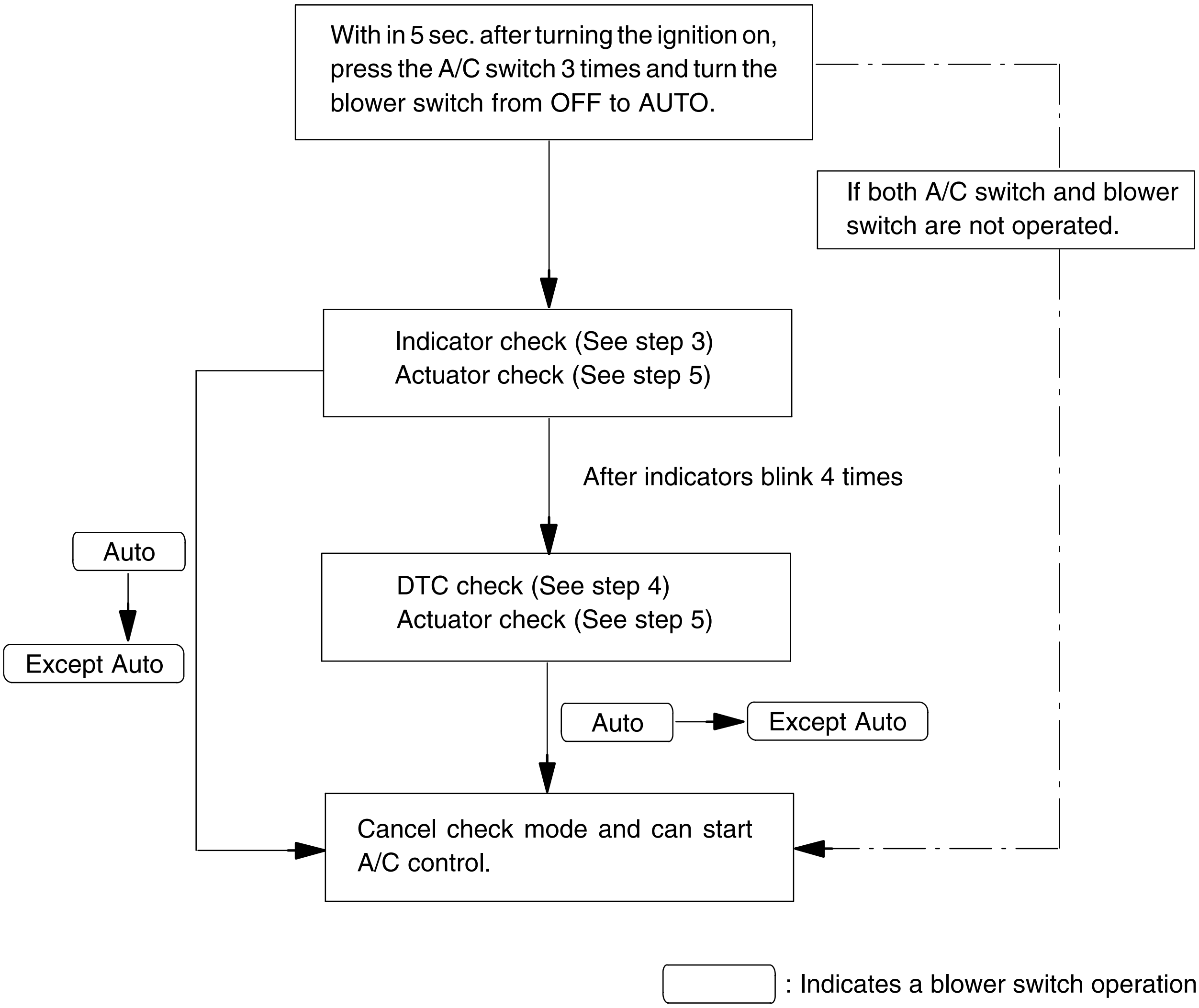
PRE–CHECK

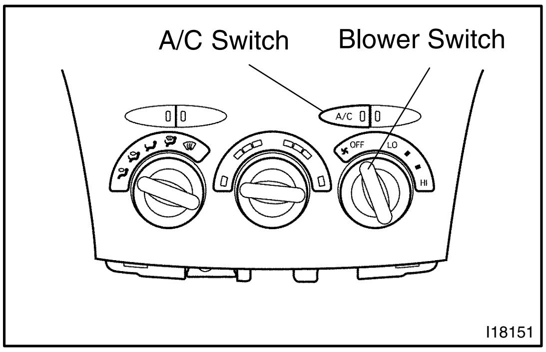
1. WARNING FOR A/C COMPRESSOR LOCK

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 22) using diagnosis trouble code check then proceed to inspect the circuit or the component.
Compressor lock sensor circuit. → (See page DI–804)

2. LIST OF OPERATION METHODS

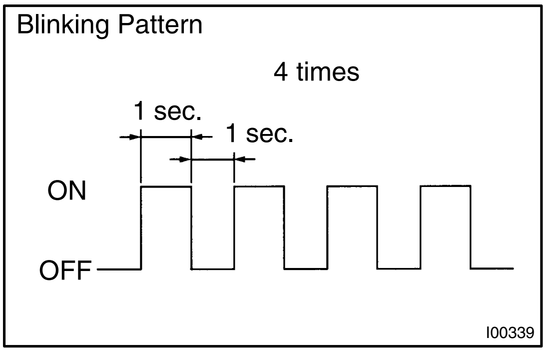
By operating each of the A/C control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.





3. INDICATOR CHECK

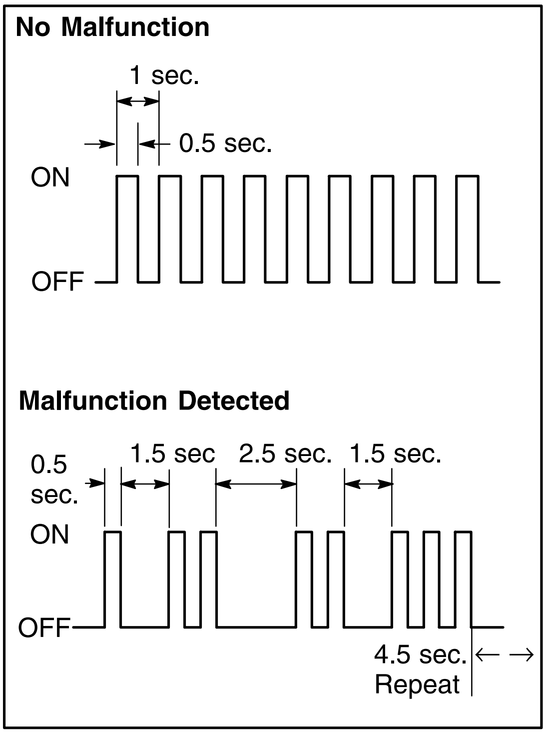
(a) Within 5 sec. after turning the ignition switch on, press the A/C switch 3 times and turn the blower switch from OFF to AUTO.



(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 system enters the DTC begins automatically.
- Operate the blower switch from AUTO to except AUTO position when desiring to cancel the check mode.



4. DTC CHECK (SENSOR CHECK)

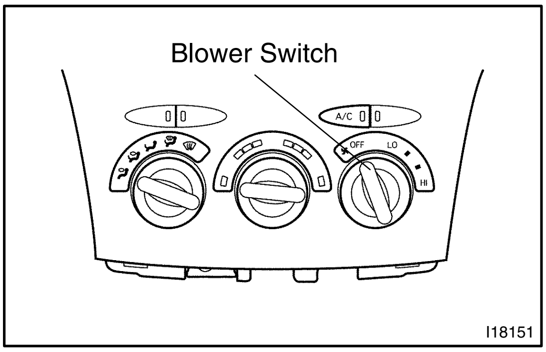
(a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.

(b) Read the DTC as indicated by the number of blinks of the A/C indicator.

HINT:

The illustration shows the blinking pattern associated with the DTC 12 and 23. If 2 or more DTCs (abnormalities) are indicated, the lowest number (code) is output first.

(c) Identify the problem using the chart of the DTC.



5. ACTUATOR CHECK

(a) Actuator check mode is started at the same time with DTC check mode.

(b) Check visually on by hand that the air flow, amount of damper operating and operation of the compressor changes according to the set temperature of the A/C control panel, as shown in the chart.

HINT:

To cancel the check mode, turn blower switch from AUTO to except AUTO.

Step No.	Temp. setting °C	Blower Level	Air Mix Damper		Air Inlet Damper	Air Outlet Damper	Compressor
			*1	*2			
1	Max. Cool ↔ 17.5	4	–10 % (Cool)	–10 % (Cool)	REC (–1 %)	FACE (–10 %)	ON
2	18.0 ↔ 20.5	↑	↑	↑	R/F (82.0 %)	B/L (15 %)	↑
3	21.0 ↔ 23.0	17	50 % (Cool/Warm)	50 % (Cool/Warm)	R/F (102.0 %)	FOOT (50 %)	OFF
4	23.5 ↔ 26.0	↑	↑	↑	FRS (110.0 %)	DEF (110 %)	↑
5	26.5 ↔ Max. Warm	31	110 % (Warm)	100 % (Warm)	FRS (110.0 %)	F/D (90 %)	↑

*1: Except LHD Standard heater
*2: LHD Standard heater

DI7MB–01

DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See Page)	Detection Item	Trouble Area
11*1 (DI–789)	Room temp. sensor circuit	• Room temp. sensor • Harness or connector between room temp. sensor and A/C amplifier • A/C amplifier
12*2 (DI–792)	Ambient temp. sensor circuit	• Ambient temp. sensor • Harness and connector between ambient temp. sensor and engine ECU • Engine and ECT ECU • Harness and connector between engine ECU and A/C amplifier • A/C amplifier
13 (DI–795)	Evaporator temp. sensor circuit	• Evaporator temp. sensor • Harness and connector between evaporator temp. sensor and A/C amplifier • A/C amplifier
14 (DI–798)	Water temp. sensor circuit	• Water temp. sensor • Harness and connector between water temp. sensor and engine ECU • Engine ECU • Harness and connector between engine ECU and A/C amplifier • A/C amplifier
21*3 (DI–801)	Solar sensor circuit	• Solar sensor • Harness or connector between room temp. sensor and A/C amplifier • A/C amplifier
22*4 (DI–804)	All conditions below are detected for 3 sec. or more (g) Engine speed: 500 rpm or more (h) Ratio between engine and compressor rpm deviates 20 % or more in comparison to normal operation	• Engine ECU • Harness and connector between engine ECU and A/C amplifier • Compressor drive belt • Compressor lock sensor • Compressor • Harness and connector between compressor lock sensor and A/C amplifier
23 (DI–807)	Open in pressure switch circuit Abnormal refrigerant pressure [below 196 kPa (2.0 kgf/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)]	• Pressure switch • Harness or connector between pressure switch and A/C amplifier • A/C amplifier
31 (DI–810)	Air mix damper position sensor circuit	• Air mix control servomotor • Harness or connector between air mix control servomotor and A/C amplifier • A/C amplifier
32 (DI–813)	Air inlet damper position sensor circuit	• Air inlet control servomotor • Harness or connector between air inlet control servomotor and A/C amplifier • A/C amplifier
33 (DI–816)	Air outlet damper position sensor circuit	• Air outlet control servomotor • Harness or connector between air outlet control servomotor and A/C amplifier • A/C amplifier

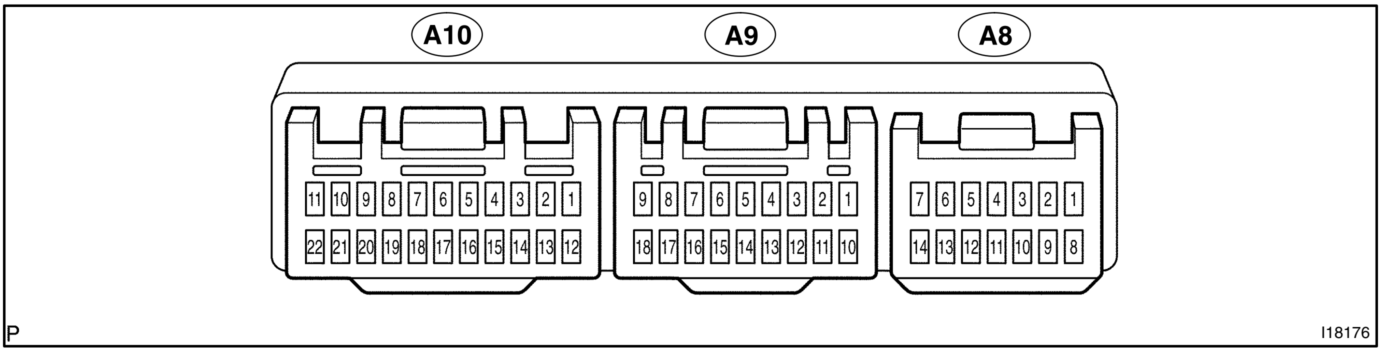
41 (DI–819)	Air mix control servomotor circuit	• Air mix control servomotor • Air mix damper position sensor • Harness or connector between air mix control servomotor and A/C amplifier • A/C amplifier
42 (DI–823)	Air inlet control servomotor circuit	• Air inlet control servomotor • Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C amplifier • A/C amplifier
43 (DI–827)	Air outlet control servomotor circuit	• Air outlet control servomotor • Air outlet damper position sensor • Harness or connector between air outlet control servomotor and A/C amplifier • A/C amplifier

HINT:

- *1: If the room temp. is approx. –18.6°C (–3.7°F) or lower, trouble code 11 may be output even though the system is normal.
- *2: If the ambient temp. is approx. –52.9°C (–61.4°F) or lower, a malfunction code may be output even though the system is normal.
- *3: If the check is being performed in a dark place, DTC 21 (solar sensor circuit abnormal) could be displayed.
- *4: To confirm DTC 22, perform the following steps.
  (1) With the engine is running, enter the DTC check mode.
  (2) Enter actuator check mode and set the operation to step NO. 1.
  (3) Check that the DTC 22 is output.

DI7MD–01

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IG ↔GND (A8–1 ↔ A8–7)	R ↔ W–B	IG ON.	10 – 14
BLW ↔ GND (A8–3 ↔ A8–7)	V ↔ W–B	IG ON. Blower motor: Operate	Pulse generation
MP2+ ↔ GND (A8–4 ↔ A8–7)	GR–B ↔ W–B	IG ON.	Pulse generation
GND ↔ Body ground (A8–7 ↔ Body ground)	W–B ↔ Body ground	Always	Continuity
+B ↔ GND (A8–8 ↔ A8–7)	R–G ↔ W–B	Always	10 – 14
IDH ↔ GND (A8–10 ↔ A8–7)	Y ↔ W–B	IG ON. Head lamp: ON Rear defogger: ON Set temp.: MAX. WARM	10 – 14
		IG ON. Head lamp: OFF Rear defogger: OFF	Below 1.0
MPX+ ↔ GND (A8–11 ↔ A8–7)	GR ↔ W–B	IG ON.	Pulse generation
RF ↔ GND (A9–1 ↔ A8–7)	R–W ↔ W–B	Start engine. Water temp.: Below 90°C Refrigerant pressure: Below 1,230 kPa	10 – 14
		Start engine. Water temp.: Approx. 90°C Refrigerant pressure: Above 1,520 kPa	Below 1.0
CF ↔ GND (A9–2 ↔ A8–7)	V–Y ↔ W–B	Start engine. A/C compressor: ON	Below 1.0
		Start engine. A/C compressor: OFF	10 – 14
WP ↔ GND (A9–3 ↔ A8–7)	L–R ↔ W–B	Engine speed: Below 500 rpm Set temp.: Max. WARM Blower motor: Operate	Below 1.0
		Engine speed: Above 500 rpm Blower motor: Not operate	10 – 14
NE ↔ GND (A9–4 ↔ A8–7)	LG ↔ W–B	Start engine A/C compressor: ON	Pulse generation
ACT ↔ GND (A9–5 ↔ A8–7)	P–G ↔ W–B	Engine speed: Idle speed	10 – 14
HTR0 ↔ GND(*) (A9–6 ↔ A8–7)	P–B ↔ W–B	Start engine Head lamp: OFF Rear defogger: OFF Set temp.: MAX. WARM Blower switch: HI Air flow selector: F/D Water temp.: Below 50 °C	Below 0.7

LOCk ↔ SGLOCK (A9–9 ↔ A9–18)	W–L ↔ BR–W	Start engine. A/C compressor ON.	Pulse generation
MGC ↔ GND (A9–11 ↔ A8–7)	LG–R ↔ W–B	Start engine. A/C compressor: ON	Below 1.0
		Start engine. A/C compressor: OFF	10 – 14
PSW ↔ GND (A9–11 ↔ A8–7)	L–Y ↔ W–B	A/C refrigerant pressure: less than 0.19 Mpa (2.0 kgf/cm^2) or more than 3.14 Mpa (3,140 kgf/cm^2)	From 10 – 14 to Below 1.0
		A/C refrigerant pressure: Except less than 0.19 Mpa (2.0 kgf/cm^2) or more than 3.14 Mpa (3,140 kgf/cm^2)	Below 1.0
HTR2 ↔ GND(*) (A9–13 ↔ A8–7)	P ↔ W–B	Start engine Head lamp: OFF Rear defogger: OFF Set temp.: MAX. WARM Blower switch: HI Air flow selector: F/D Water temp.: 60°C	Below 1.0
SGLOCK ↔ GND (A9–18 ↔ A8–7)	BR–W ↔ W–B	Always	Continuity
TE ↔ SGTE (A10–1 ↔ A10–2)	W ↔ W	IG ON. Ambient temp. 25°C (77°F)	1.35 – 1.75
		IG ON. Ambient temp. 40°C (104°F)	0.85 – 1.25
SGTE ↔ GND (A10–2 ↔ A8–7)	W ↔ W–B	Always	Continuity
SGTR ↔ GND (A10–3 ↔ A8–7)	W ↔ W–B	Always	Continuity
TR ↔ SGTR (A10–4 ↔ A10–3)	W ↔ W	IG ON. Room temp. 25°C (77°F)	1.8 – 2.2
		IG ON. Room temp. 40°C (104°F)	1.2 – 1.6
TS ↔ S5TS (A10–5 ↔ A10–6)	W ↔ W	IG ON. Solar sensor subject to electric light	1.0 or more
		IG ON. Solar sensor cover by a cloth	Below 1.0
S5TS ↔ GND (A10–6 ↔ A8–7)	W ↔ W–B	IG ON.	4.5 – 5.5
S5TPM ↔ SGTPM (A10–7 ↔ A10–9)	W ↔ W	IG ON.	4.5 – 5.5
TPM ↔ SGTPM (A10–8 ↔ A10–9)	W ↔ W	IG ON. Air flow selector: FACE	Above 4.0
		IG ON. Air flow selector: DEF	Below 1.0
SGTPM ↔ GND (A10–9 ↔ A8–7)	W ↔ W–B	Always	Continuity
AOF ↔ GND (A10–10 ↔ A8–7)	W ↔ W–B	IG ON. Air flow selector: FACE	10 – 14
		IG ON. Air flow selector: DEF	Below 1.0
AOD ↔ GND (A10–11 ↔ A8–7)	W ↔ W–B	IG ON. Air flow selector: FACE	Below 1.0
		IG ON. Air flow selector: DEF	10 – 14
AMH ↔ GND (A10–13 ↔ A8–7)	W ↔ W–B	IG ON. Set temp.: Max. COOL	Below 1.0
		IG ON. Set temp.: Max. WARM	10 – 14
AMC ↔ GND (A10–14 ↔ A8–7)	W ↔ W–B	IG ON. Set temp.: Max. COOL	10 – 14
		IG ON. Set temp.: Max. WARM	Below 1.0
SGTP ↔ GND (A10–15 ↔ A8–7)	W ↔ W–B	Always	Continuity
TP ↔ SGTP (A10–16 ↔ A10–15)	W ↔ W	IG ON. Set temp.: Max. COOL	Above 4.0
		IG ON. Set temp.: Max. WARM	Below 1.0
S5TP ↔ SGTP (A10–17 ↔ A10–15)	W ↔ W	IG ON.	4.5 – 5.5

S5TPI ↔ SGTPI (A10–18 ↔ A10–20)	W ↔ W	IG ON.	4.5 – 5.5
TPI ↔ SGTPI (A10–19 ↔ A10–20)	W ↔ W	IG ON. Air intake selector: FRESH	Below 1.0
		IG ON. Air intake selector: RECIRCULATE	4.5 – 5.5
SGTPI ↔ GND (A10–20 ↔ A8–7)	W ↔ W–B	Always	Continuity
AIR ↔ GND (A10–21 ↔ A8–7)	W ↔ W–B	IG ON. Air intake selector: FRESH	Below 1.0
		IG ON. Air intake selector: RECIRCULATE	10 – 14
AIF ↔ GND (A10–22 ↔ A8–7)	W ↔ W–B	IG ON. Air intake selector: FRESH	10 – 14
		IG ON. Air intake selector: RECIRCULATE	Below 1.0

(*): Europe LHD cold area

DI7MC–01

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole function of the does not operate	4. A/C amplifier 5. IG power source circuit	IN–40 DI–832
Air Flow Control: No blower operation	1. IG power source circuit 2. Heater main relay circuit 3. Blower motor circuit 4. A/C amplifier	DI–832 DI–837 DI–840 IN–40
Air Flow Control: No blower control	1. Heater main relay circuit 2. Blower motor circuit 3. A/C amplifier	DI–837 DI–840 IN–40
Air Flow Control: Insufficient air flow	1. Blower motor circuit	DI–840
Temperature Control: No cool air comes out	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Compressor circuit 5. Pressure switch circuit 6. Compressor lock sensor circuit 7. Air mix damper position sensor circuit 8. Air mix damper control servomotor circuit 9. Room temperature sensor circuit 10. Ambient temperature sensor circuit 11. Evaporator temperature sensor circuit 12. A/C amplifier	AC–3 AC–15 AC–3 DI–843 DI–807 DI–804 DI–810 DI–819 DI–787 DI–792 DI–795 IN–40
Temperature Control: No warm air comes out	1. Air mix damper position sensor circuit 2. Air mix damper control servomotor circuit 3. DC/DC converter circuit 4. PTC heater circuit 5. Room temperature sensor circuit 6. Ambient temperature sensor circuit 7. Evaporator temperature sensor circuit 8. Water temperature sensor circuit 9. Water pump circuit 10. Engine ECU 11. A/C amplifier	DI–810 DI–819 DI–850 DI–853, DI–858 DI–789 DI–792 DI–795 DI–798 DI–847 IN–40 IN–40
Temperature Control: Output air is warmer or cooler that the set temperature or response is slow	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Radiator fan and condenser fan circuit 5. Solar sensor circuit 6. Room temperature sensor circuit 7. Ambient temperature sensor circuit 8. Evaporator temperature sensor circuit 9. Air mix damper position sensor circuit 10. Air mix damper control servomotor circuit 11. Evaporator 12. Heater radiator 13. Expansion valve 14. Solar sensor circuit 15. Water temperature sensor circuit 16. A/C amplifier	AC–3 AC–15 AC–3 DI–863 DI–801 DI–789 DI–792 DI–795 DI–810 DI–819 AC–29 AC–29 AC–53 DI–801 DI–798 IN–40

Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Room temperature sensor circuit 2. Ambient temperature sensor circuit 3. Air mix damper position sensor circuit 4. Air mix damper control servomotor circuit 5. A/C amplifier	DI–789 DI–792 DI–810 DI–819 IN–40
No air inlet control	1. Air inlet damper position sensor circuit 2. Air inlet damper control servomotor circuit 3. A/C amplifier	DI–813 DI–823 IN–40
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C amplifier	DI–827 IN–40
Blinking of A/C indicator	1. Compressor lock sensor circuit 2. A/C amplifier	DI–804 IN–40

DI6S2–03

CIRCUIT INSPECTION

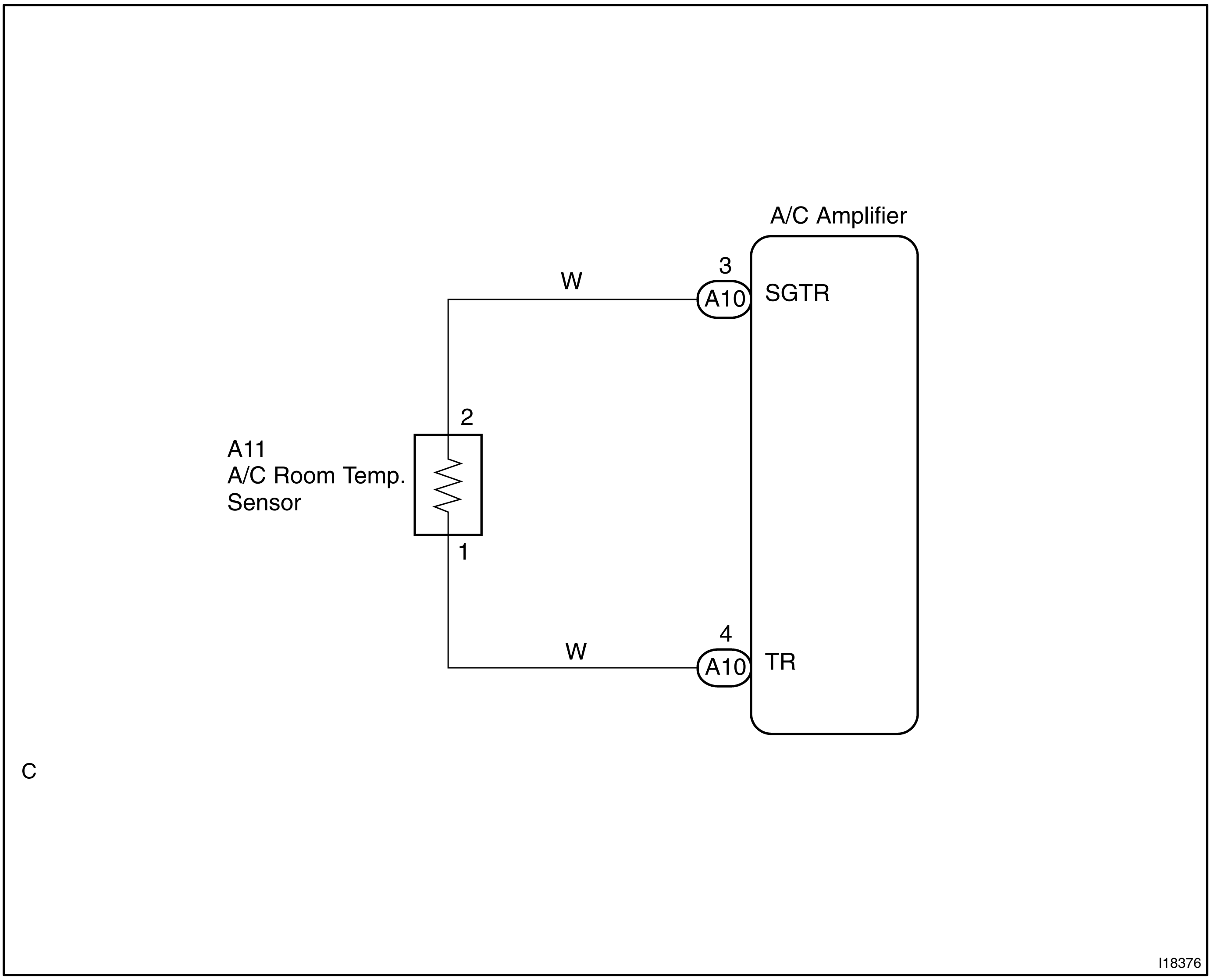
DTC	11	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C amplifier.

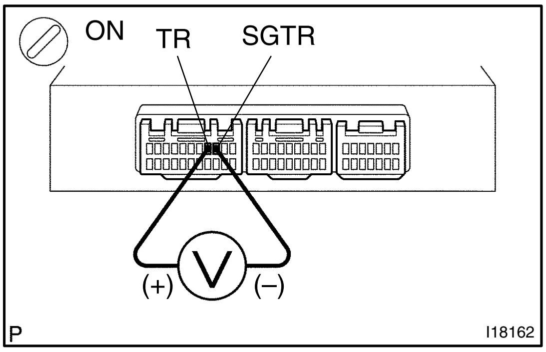
DTC No.	Detection Item	Trouble Area
11	Open or short in room temperature sensor circuit.	• Room temperature sensor. • Harness or connector between room temp. sensor and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TR and SGTR of A/C amplifier connector.



PREPARATION:

(a) Remove center cluster module control with connectors still connected.

(b) Turn the ignition switch ON.

CHECK:

Check voltage between terminals TR and SGTR of A/C amplifier connector at each temperature.

OK:

at 25 °C (77 °F) : 1.8 – 2.2 V
at 40 °C (104 °F) : 1.2 – 1.6 V

HINT:

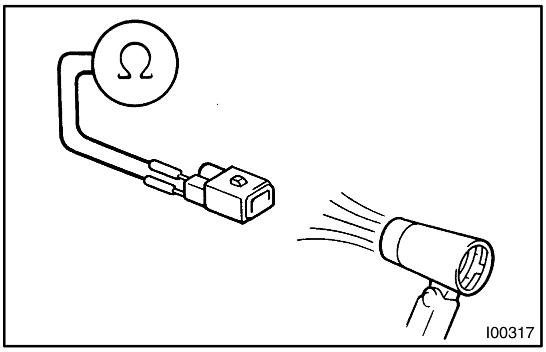
As the temperature increases, the voltage decreases.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 11 is output, check and replace A/C amplifier.

2	Check room temperature sensor.



PREPARATION:

Remove room temperature sensor (See page AC–61).

CHECK:

Check resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.

OK:

at 25 °C (77 °F) : 1.6 – 1.8 kΩ
at 40 °C (104 °F) : 0.5 – 1.7 kΩ

HINT:

As the temperature increases, the resistance decreases.

NG	Replace room temperature sensor.

OK

3	**Check harness and connector between A/C amplifier and room temperature sensor (See page IN–40).**

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

OK ↓

Check and replace A/C amplifier.

DI6S3–03

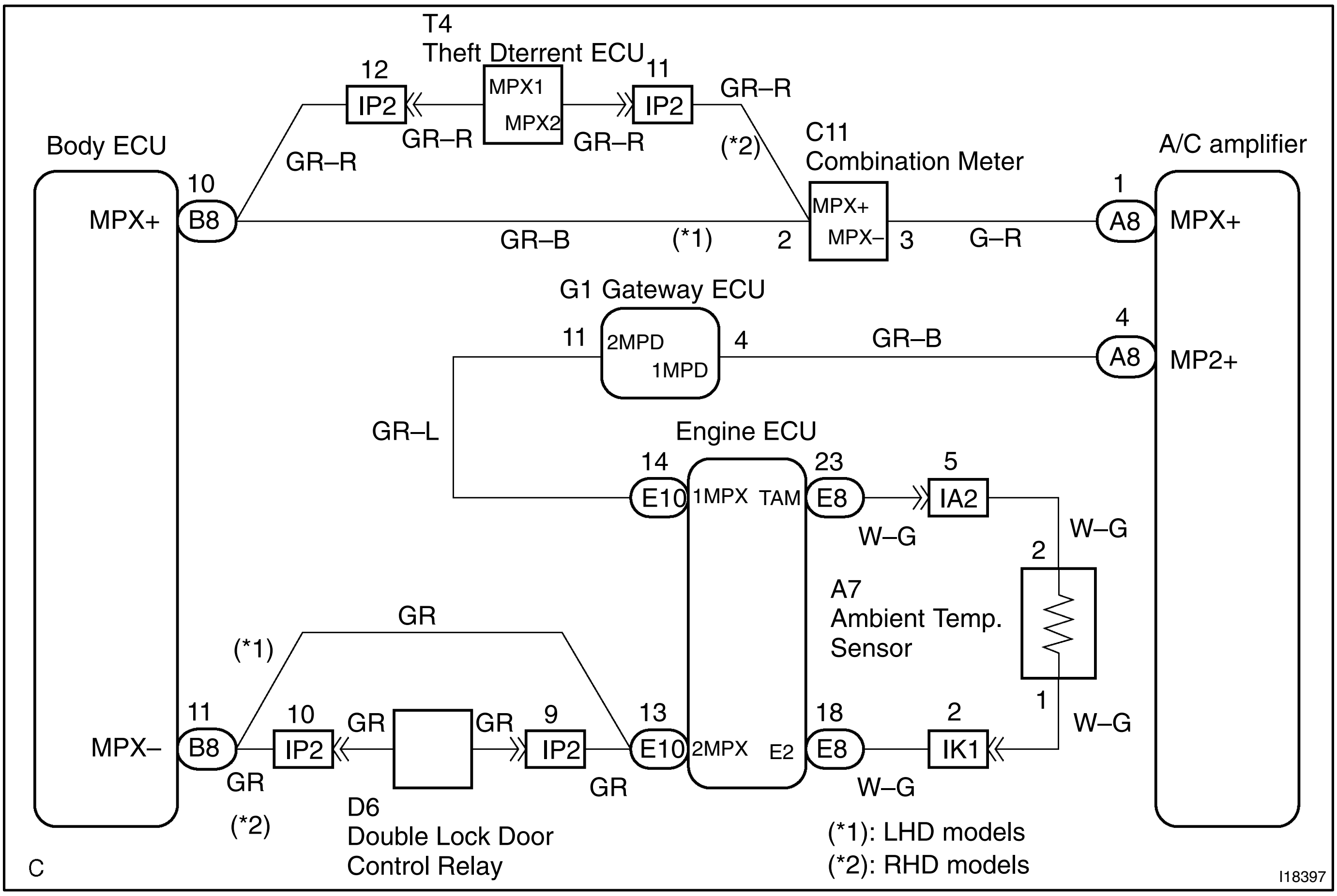
DTC	12	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C amplifier.

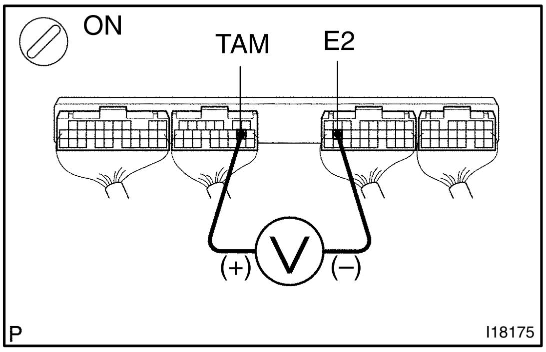
DTC No.	Detection Item	Trouble Area
12	Open or short in ambient temperature sensor circuit.	• Ambient temperature sensor. • Harness or connector between ambient temperature sensor and engine ECU. • Engine ECU. • Harness or connector between engine ECU and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

(a) Remove engine ECU with connectors still connected.
(b) Turn ignition switch ON.

CHECK:

Check voltage between terminals TAM and E2 of engine 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

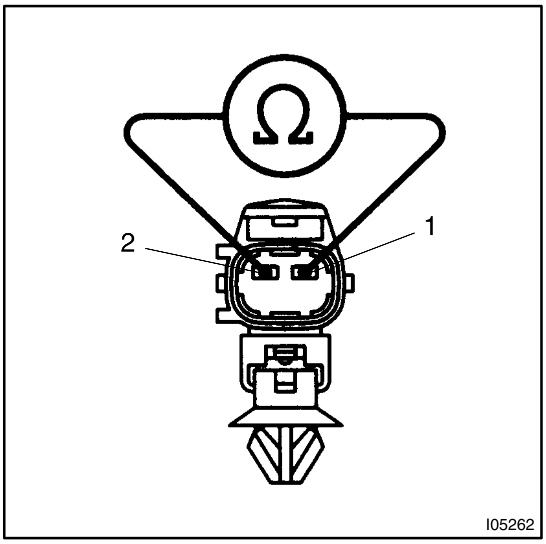
HINT:
As the temperature increases, the voltage decreases.

NG — **Go to step 2.**

OK

Proceed to the next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 12 is displayed, check and replace A/C amplifier.

2	**Check ambient temperature sensor.**



PREPARATION:
Disconnect ambient temperature sensor connector.
CHECK:
Check 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 40 °C (104 °F) : 0.5 – 0.7 kΩ
HINT:
As the temperature increases, the resistance decreases.

NG → **Replace ambient temperature sensor.**

OK

Check multiplex communication system (See page DI–656).

DI6S4–03

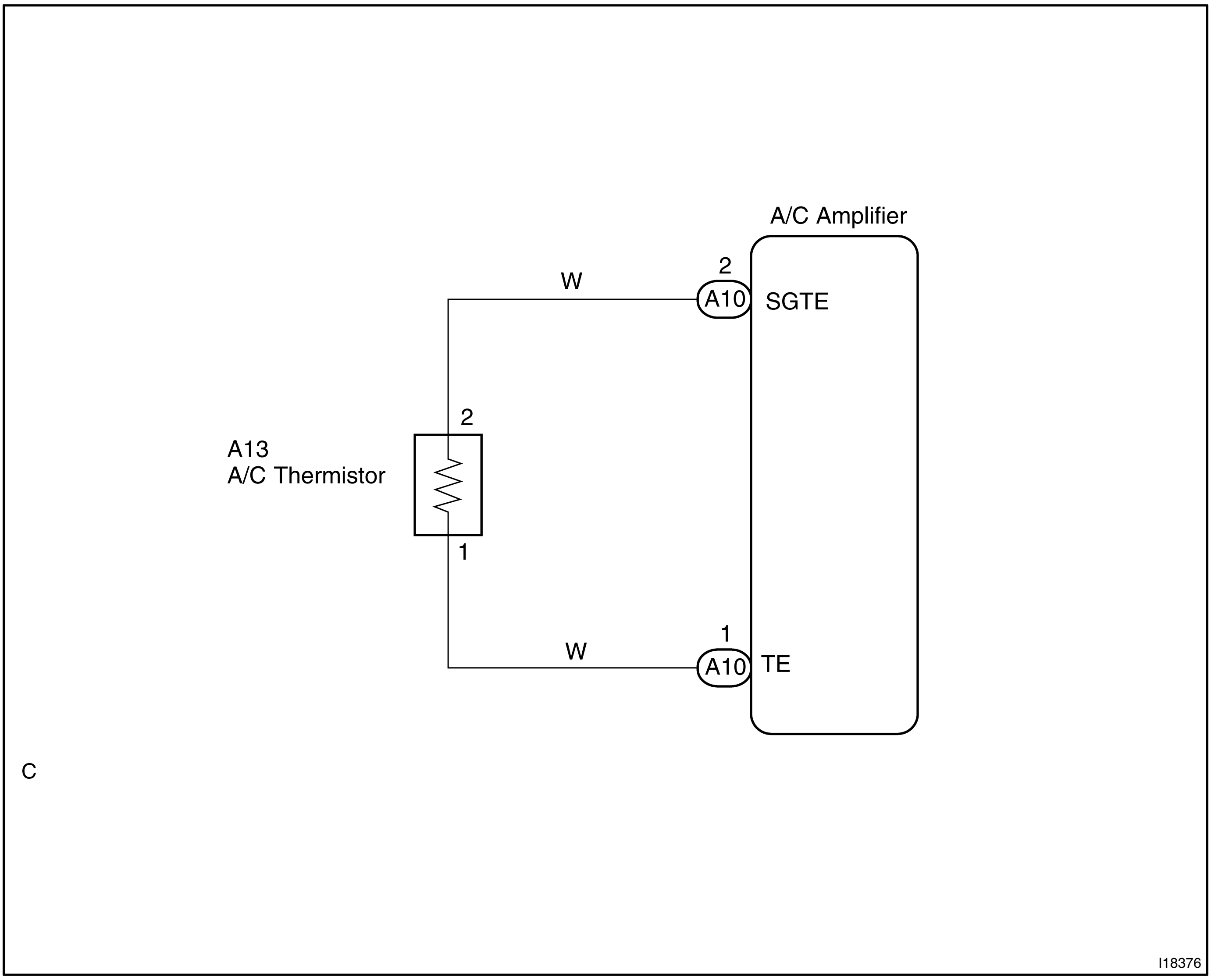
DTC	13	Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

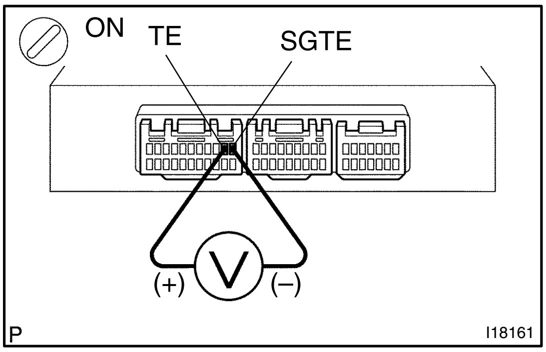
This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	• Evaporator temperature sensor. • Harness or connector between evaporator temperature sensor and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



1	**Check voltage between terminals TE and SGTE of A/C amplifier connector.**



PREPARATION:
(a) Remove center cluster module control with connectors still connected.
(b) Turn ignition switch ON.

CHECK:
Measure voltage between terminals TE and SGTE of A/C amplifier 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

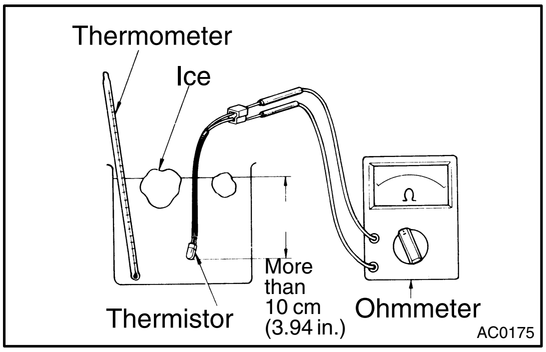
HINT:
As the temperature increases, the voltage decreases.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 13 is displayed, check and replace A/C amplifier.

2	**Check evaporator temperature sensor.**



PREPARATION:
Remove evaporator temperature sensor (See page AC–28).

CHECK:
Check resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.

OK:
Resistance
at 0 °C (32 °F) : 4.6. – 5.1 kΩ
at 15 °C (59 °F) : 2.1 – 2.6 kΩ

HINT:
As the temperature increases, the voltage decreases.

NG → **Replace evaporator temperature sensor.**

OK

3	Check harness and connector between A/C amplifier and evaporator temperature sensor (See page IN–40).

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

OK ↓

Check and replace A/C amplifier.

DI7ME–01

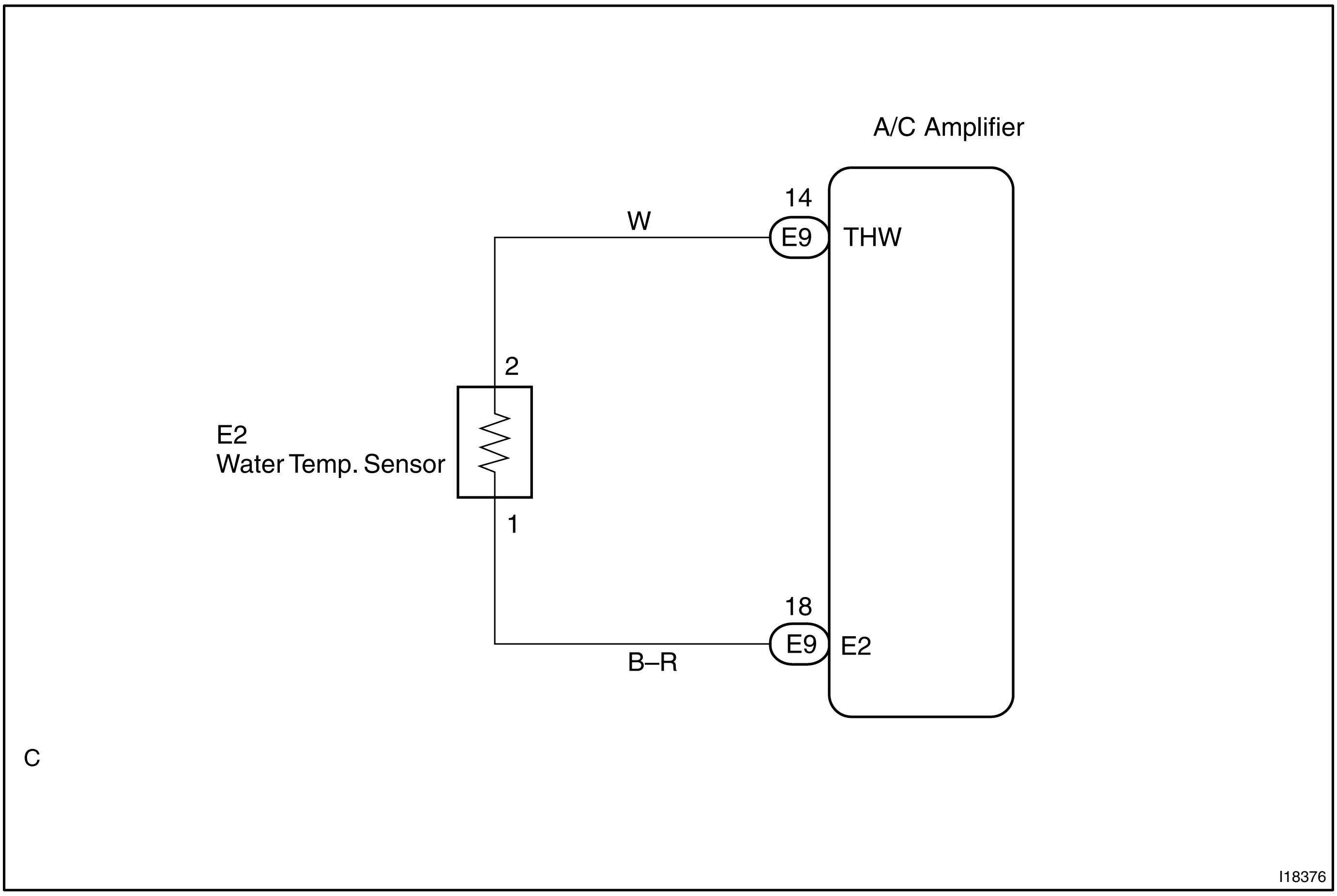
DTC	14	Water Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the water temperature and sends the appropriate signals to the A/C amplifier. These signals are used for warm up control when the engine is cold.

DTC No.	Detection Item	Trouble Area
14	Open or short in water temperature sensor circuit.	• Water temperature sensor • Harness or connector between water temp. sensor and engine ECU • Harness or connector between engine ECU and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

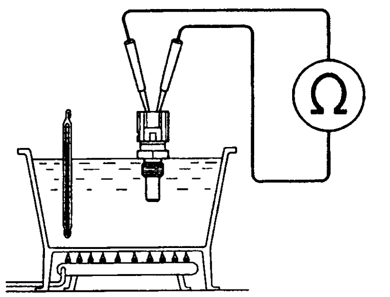
1	Check water temp. sensor using hand–held tester.

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the water temp. sensor using DATA LIST.

OK → **Check or replace A/C amplifier.**

NG

2	Check water temp. sensor.



S05502

PREPARATION:
Disconnect the water temp. sensor connector.
CHECK:
Measure resistance between terminals.
OK:
Resistance is within acceptable zone on chart.

Water temperature	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 IN–40).

NG → Repair or replace harness or connector.

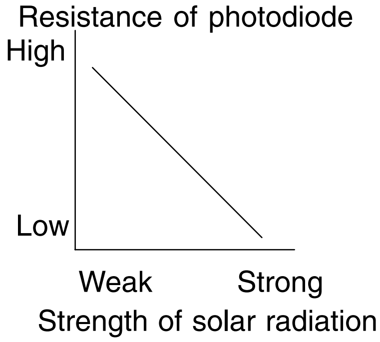
OK

Check multiplex communication system (See page DI–656).

DI6S6–03

DTC	21	Solar Sensor Circuit

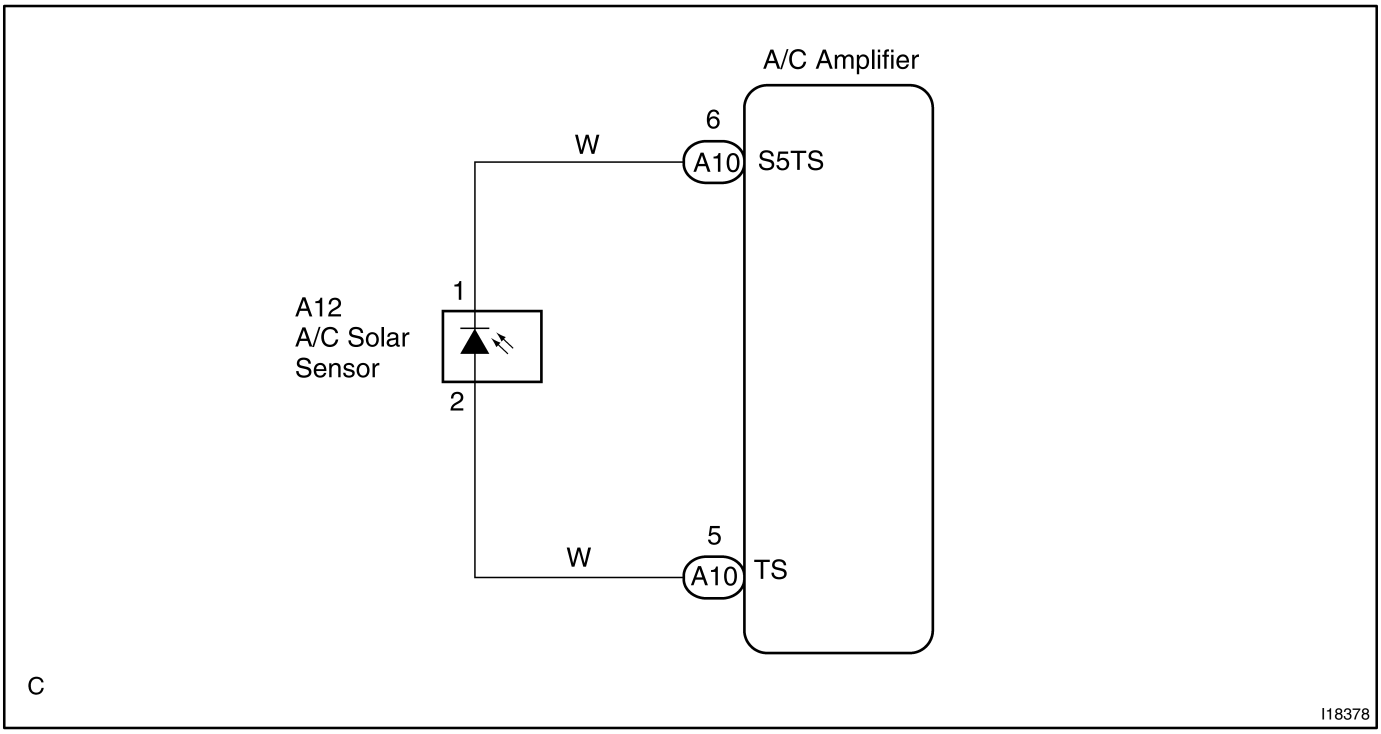
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C amplifier.

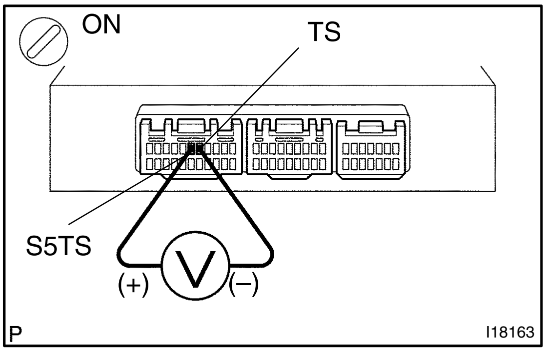
DTC No.	Detection Item	Trouble Area
21	Open or short in solar sensor circuit. (Please note that display of DTC 21 is not abnormal when the sensor is not receiving solar radiation.)	• Solar sensor • Harness or connector between solar sensor and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals S5TS and TS of A/C amplifier connector.



PREPARATION:

(a) Remove center cluster module control with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals S5TS and TS of A/C amplifier 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	Below 4.0 V
Sensor covered by a cloth	4.0 – 4.5 V

HINT:

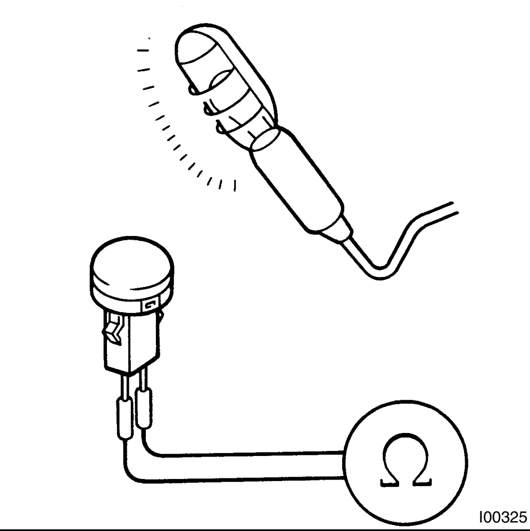
As the inspection light is gradually moved away from the sensor, the voltage increases.

NG	Go to step 2.

NG

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 21 is displayed, check and replace A/C amplifier.

2	**Check solar sensor.**


I00325

PREPARATION:
Remove solar sensor (See page AC–60).
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 2 and negative (–) lead to terminal 1 of the solar sensor.
OK:
Resistance : ∞ Ω (No continuity)
PREPARATION:
Remove the cloth from the solar sensor and subject the sensor to electric light.
CHECK:
Measure resistance.
OK:
Resistance : Below 10 kΩ (Continuity)
HINT:
As the electric light is moved gradually away from the sensor, the resistance increases.

NG	**Replace solar sensor.**

OK

3	**Check harness and connector between A/C amplifier and solar sensor (See page IN–40).**

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

OK

Check and replace A/C amplifier.

DI7IG–02

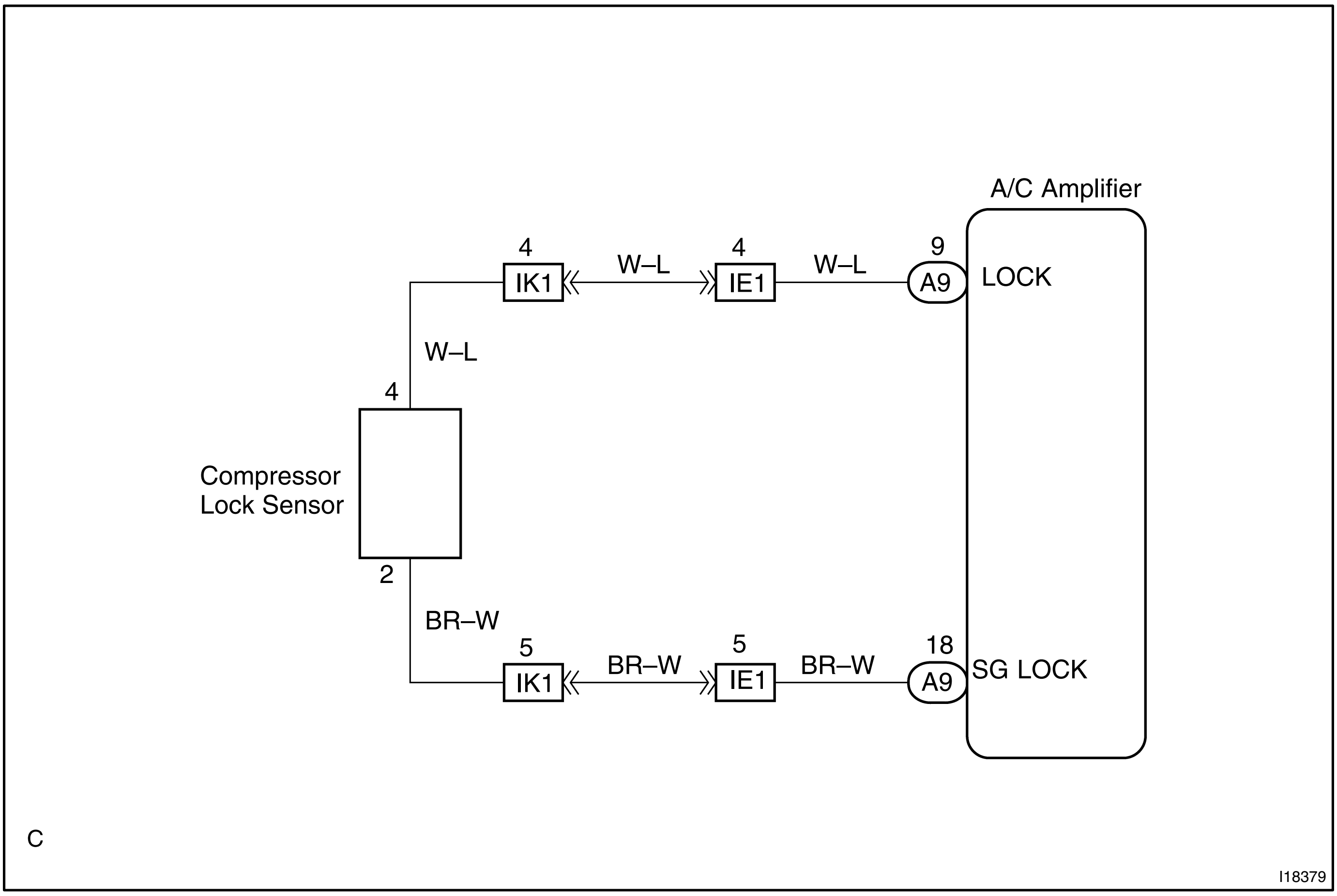
DTC	22	Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

This sensor sends 1 pulse par engine revolution to the A/C amplifier. If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the A/C amplifier turns the compressor off. And, the indicator flashes at about 1 sec. intervals.

DTC No.	Detection Item	Trouble Area
22	All conditions below are detected for 3 secs. or more. (a) Engine speed : 450 rpm 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 or connector between compressor and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check compressor.

PREPARATION:

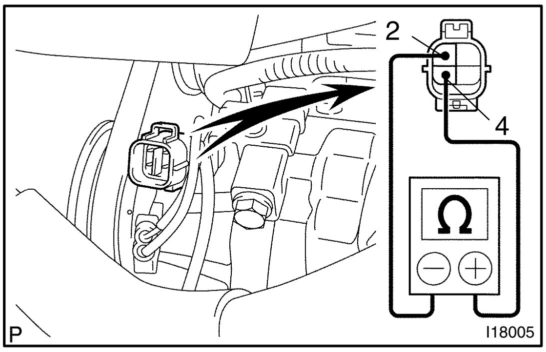
(a) Check compressor drive belt tension (See page AC–15).

(b) Check if the compressor does not lock during operation with engine started and blower switch and A/C switch ON.

NG → **Adjust drive belt tension or repair compressor.**

OK

2	Check compressor lock sensor.



PREPARATION:

Disconnect compressor lock sensor connector.

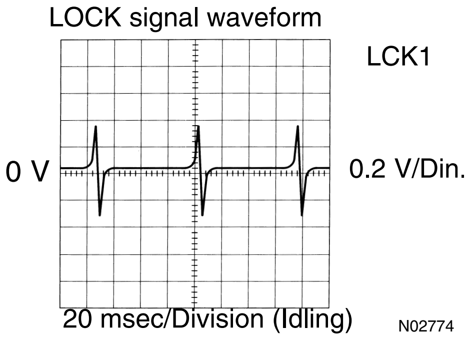
CHECK:

Measure resistance between terminals 2 and 4 of compressor lock sensor connector.

OK:

Resistance : at 20 °C (68 °F) : 65 – 125 Ω

Reference : Inspection using oscilloscope



During cranking or idling, measure voltage between terminals LOCK and SGLOCK of A/C amplifier.

HINT:

The correct waveform appears as shown in the illustration on the left.

NG → **Replace compressor.**

OK

3	Check harness and connector between A/C amplifier and compressor lock sensor (See page IN–40).

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 22 is displayed, check and replace A/C amplifier.

DI7IH–02

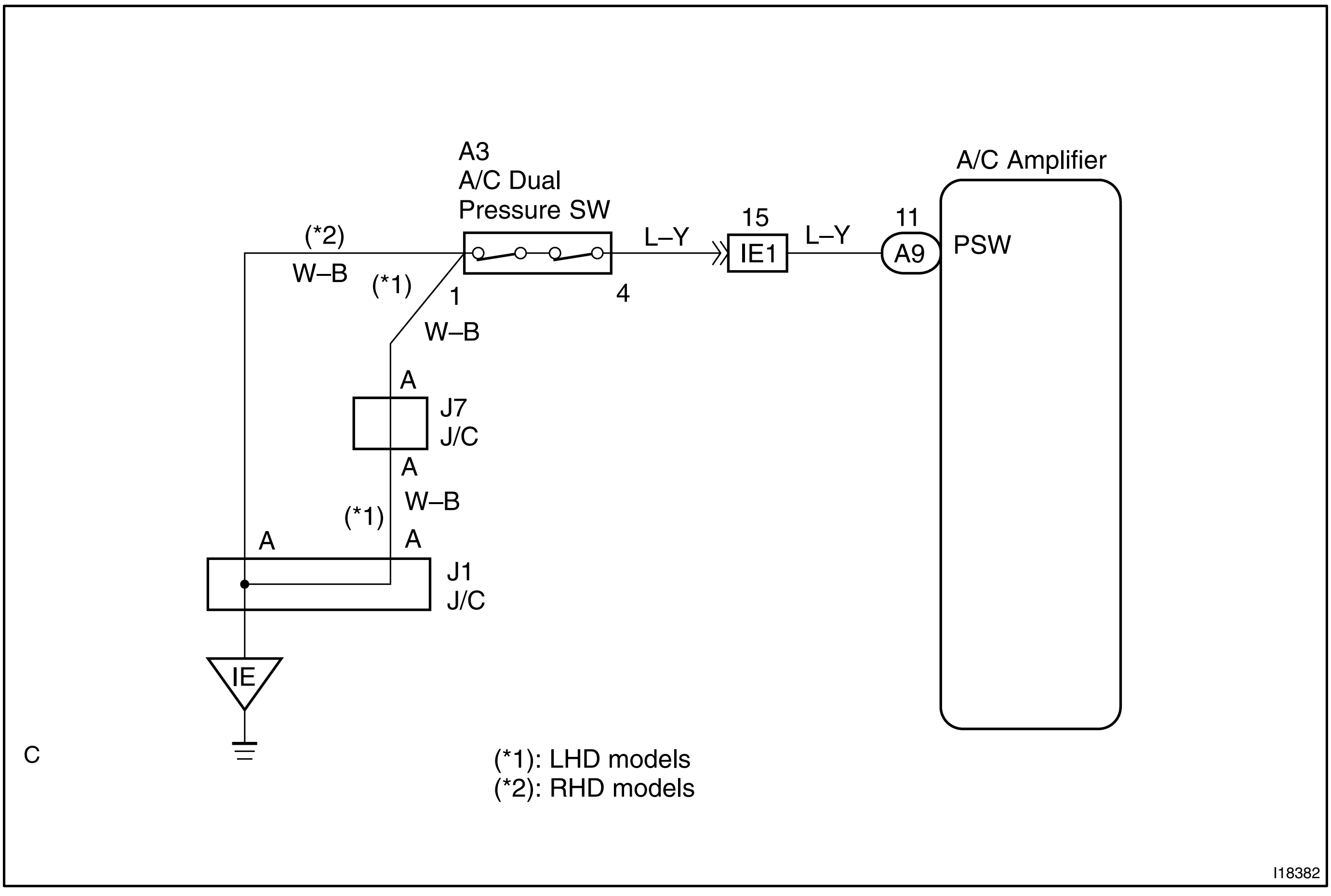
DTC	23	Pressure Switch Circuit

CIRCUIT DESCRIPTION

This pressure switch sends the appropriate signals to the A/C amplifier when the A/C refrigerant pressure drops too low or rises too high. When the A/C amplifier receives these signals, if outputs signals via the A/C amplifier to switch off the compressor relay and turns the magnetic clutch off.

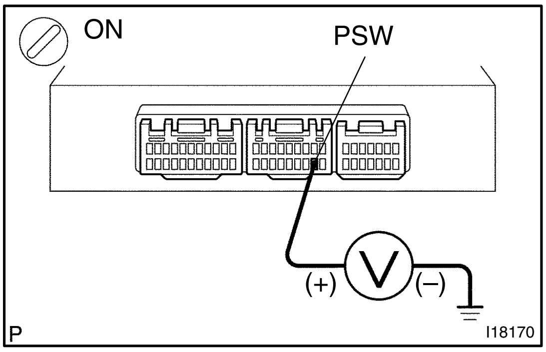
DTC No.	Detection Item	Trouble Area
23	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 196 kPa (2.0 kgf/cm^2. 28 psi) over 3,140 kPa (32.0 kgf/cm^2. 455 psi)	• Pressure switch • Harness or connector between pressure switch and A/C amplifier • Refrigerant pipe line • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals PSW of A/C amplifier and body ground.



PREPARATION:

(a) Install the manifold gauge set (See page AC–18).

(b) Remove the center cluster module control with connectors still connected.

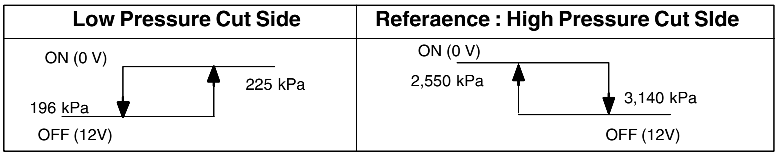
(c) Turn ignition switch ON.

CHECK:

Check voltage between terminals PSW of A/C amplifier connector and body ground when refrigerant pressure is changed.

OK:

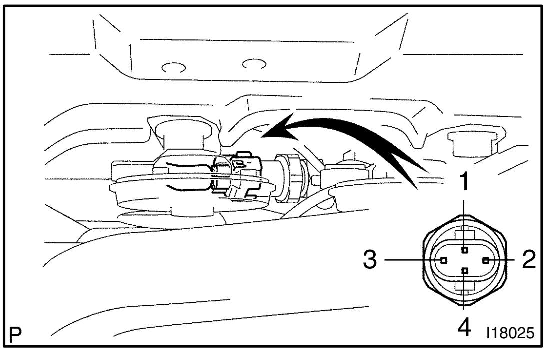
The voltage changes refrigerant pressure, as shown in the chart below.



OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

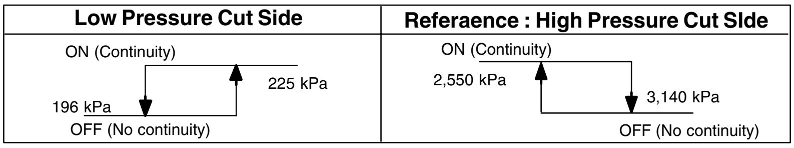
2	**Check pressure switch.**



PREPARATION:
Disconnect pressure switch connector.

CHECK:
Check continuity between terminals 1 and 4 of pressure switch when refrigerant is changed.

OK:
The continuity changes with refrigerant pressure as shown in the chart below.



NG → **Replace pressure switch.**

OK

3	**Check harness and connector between A/C amplifier and pressure switch, pressure switch and body ground (See page IN–40).**

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

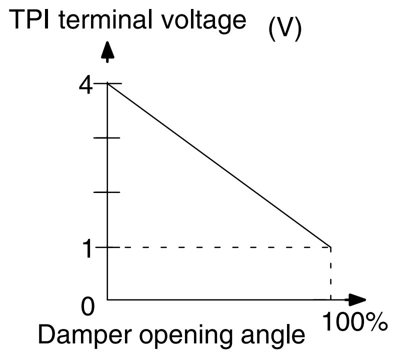
OK

Check and replace A/C amplifier.

DI6S8–03

DTC	31, 41	Air Mix Damper Position Sensor Circuit

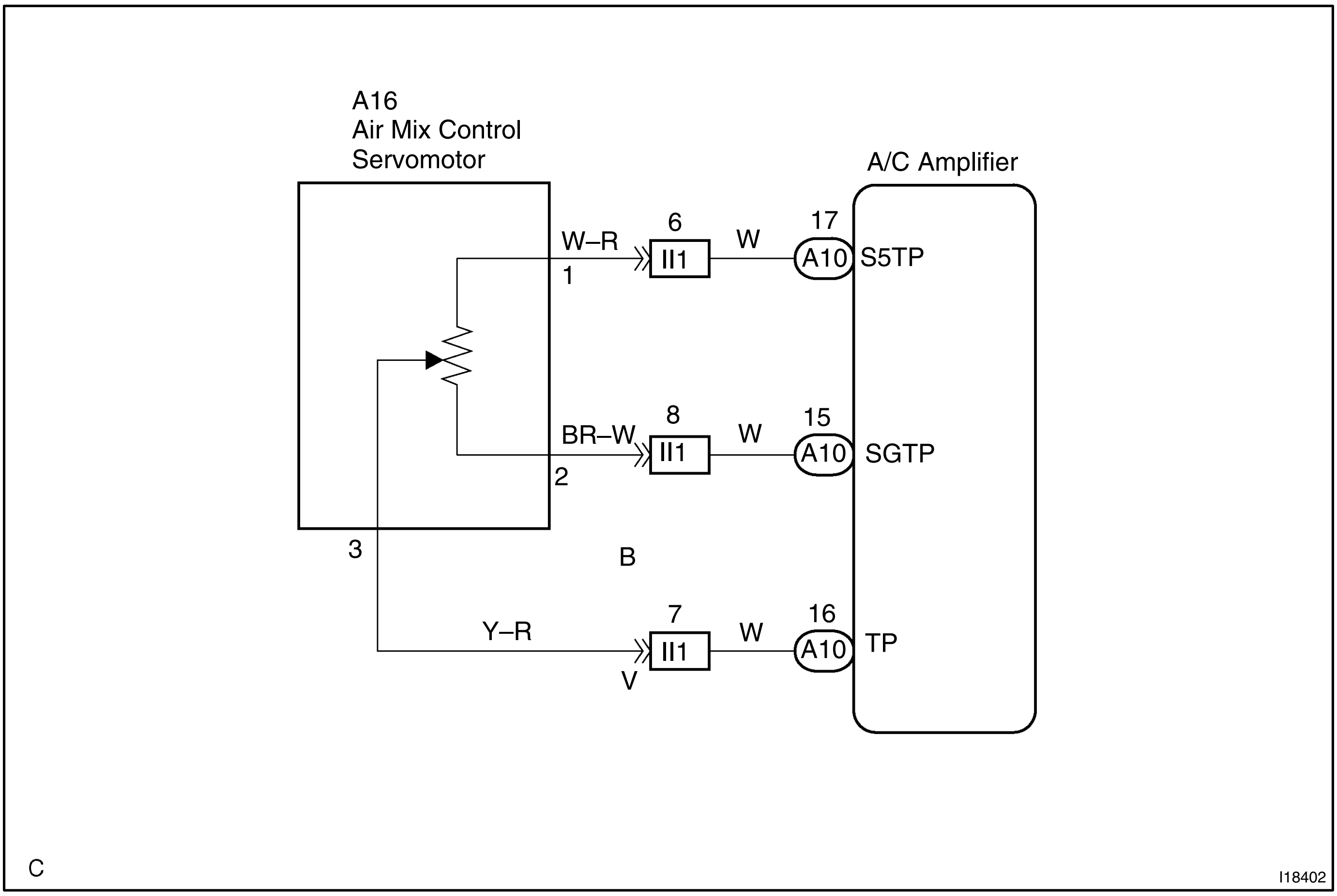
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C amplifier. The position sensor is built into the air mix control servomotor.

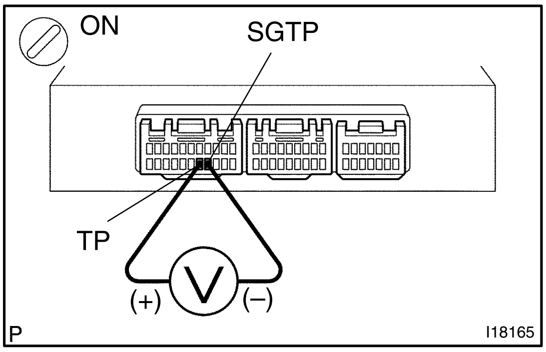
DTC No.	Detection Item	Trouble Area
31	Short to ground or power source circuit in air mix damper position sensor circuit.	• Air mix damper position sensor. • Harness of connector between air mix control servomotor and A/C amplifier. • A/C amplifier.
41	Air mix damper position sensor value does not change even if A/C amplifier operates air mix control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TP and SGTP of A/C amplifier connector.**



PREPARATION:

(a) Remove center cluster module control with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SGTP of A/C amplifier connector each time when the set temperature is changed.

OK:

Set Temperature	Voltage
Max. COOL	3.5 – 4.5 V
Max. WARM	0.5 – 1.8 V

HINT:

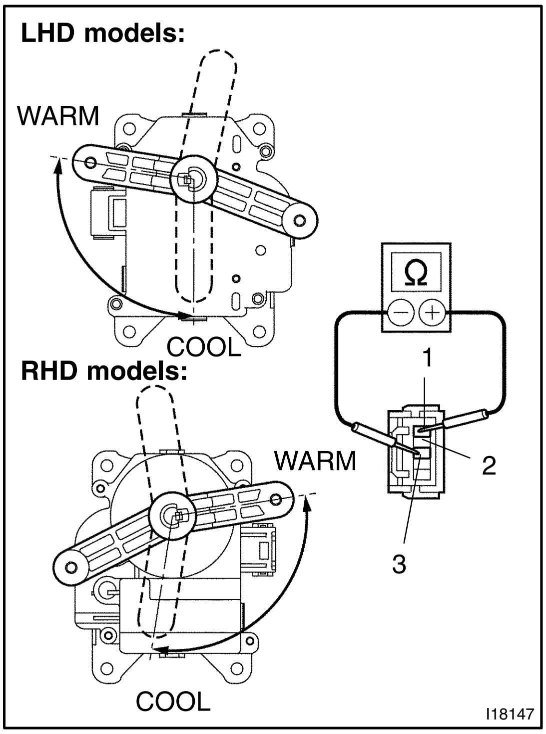
As the set temperature increases, the voltage decreases gradually without interruption.

NG — **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 31 or 41 is displayed, check and replace A/C amplifier.

2	Check air mix damper position sensor.



PREPARATION:
Remove air mix control servomotor (See page AC–57).

CHECK:
Measure resistance between terminals 1 and 2 of air mix control servomotor connector.

OK:
Resistance : 4.2 – 7.8 kΩ

CHECK:
While operating air mix control servomotor as shown in the procedure on page DI–819, measure resistance between terminals 2 and 3 of air mix control servomotor connector.

OK:

Position	Resistance
Max. COOL	3.6 – 6.7 kΩ
Max. WARM	0.6 – 1.1 kΩ

HINT:
As the air mix control servomotor moves from cool side to hot side, the resistance decreases gradually without interruption.

NG	Replace air mix control servomotor.

OK

3	Check harness and connector between A/C amplifier and air mix control servomotor (See page IN–40).

NG	Repair or replace harness or connector.

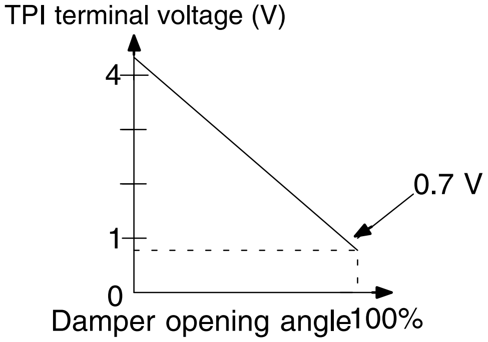
OK

Check and replace A/C amplifier.

DI7II–02

DTC	32, 42	Air Inlet Damper Position Sensor Circuit

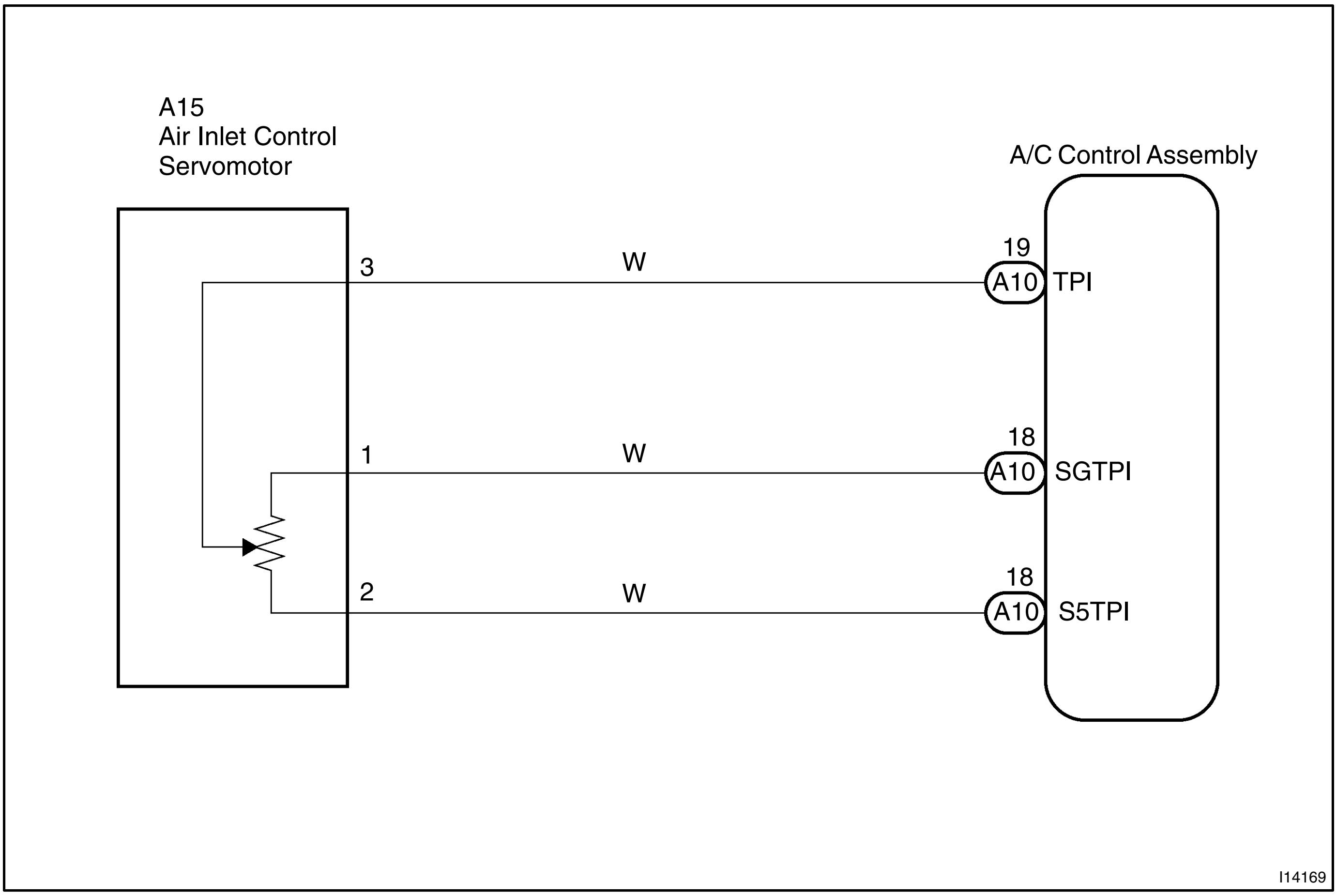
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C amplifier. The position sensor is built into the air inlet control servomotor.

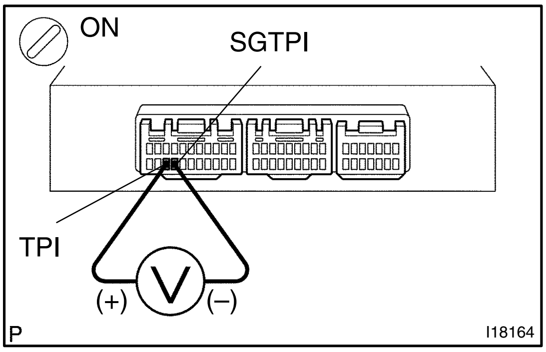
DTC No.	Detection Item	Trouble Area
32	Short to ground or power source circuit in air inlet damper position sensor circuit.	• Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C amplifier • A/C amplifier
42	Air inlet damper position sensor value does not change even if A/C amplifier operates air inlet control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TPI and SGTPI of A/C amplifier connector.



PREPARATION:

(a) Remove center cluster module control with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Press REC/FRS switch to change air inlet between fresh and recirculation air and measure voltage between terminals TPI and SGTPI of A/C amplifier when the air inlet servomotor operates.

OK:

REC/FRS Switch	Voltage
REC	3.5 – 4.5 V
FRS	0.5 – 1.8 V

HINT:

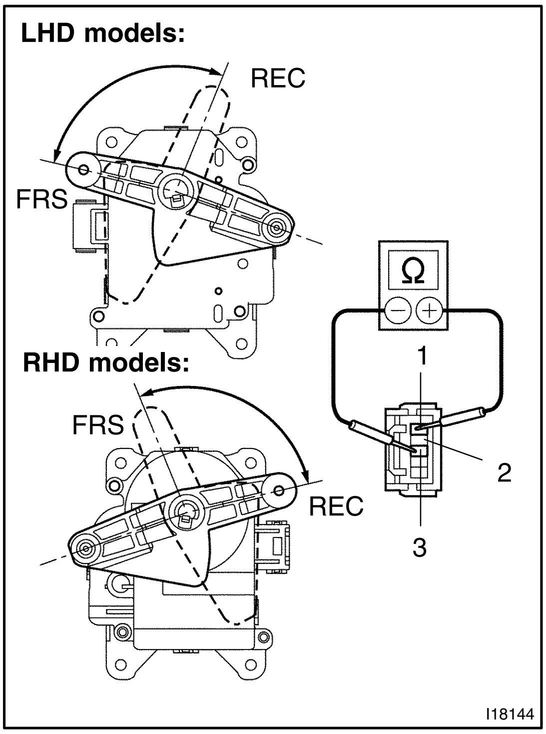
As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 32 or 42 is displayed, check and replace A/C amplifier.

2	**Check air inlet damper position sensor.**



PREPARATION:
Remove air inlet control servomotor (See page AC–34).

CHECK:
Measure resistance between terminals 1 and 2 of air inlet control servomotor connector.

OK:
Resistance : 4.2 – 7.8 kΩ

CHECK:
While operating air inlet control servomotor as in the procedure on page DI–823, measure resistance between terminals 2 and 3 of air inlet control servomotor connector.

OK:
Resistance :

Damper Position	Resistance
REC side	3.4 – 6.2 kΩ
FRS side	0.8 – 1.6 kΩ

HINT:
As the air inlet control servomotor is moved from REC side to FRS side, the resistance decreases gradually without interruption.

NG	**Replace air inlet control servomotor.**

OK

3	**Check harness and connector between A/C amplifier and air inlet control servomotor (See page IN–40).**

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

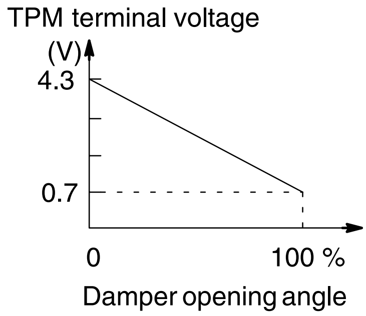
OK

Check and replace A/C amplifier.

DI6S9–03

DTC	33, 43	Air Outlet Damper Position Sensor Circuit

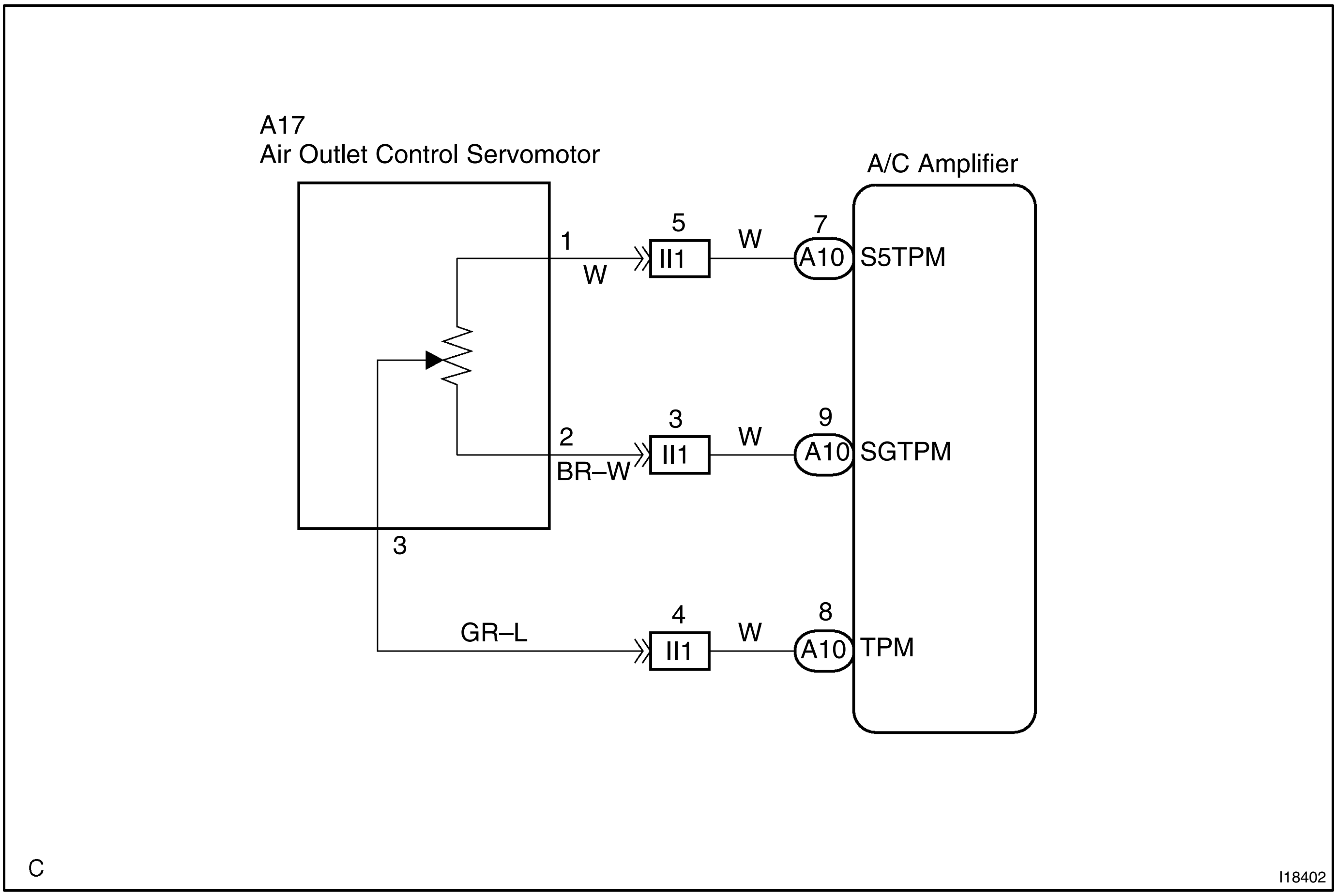
CIRCUIT DESCRIPTION



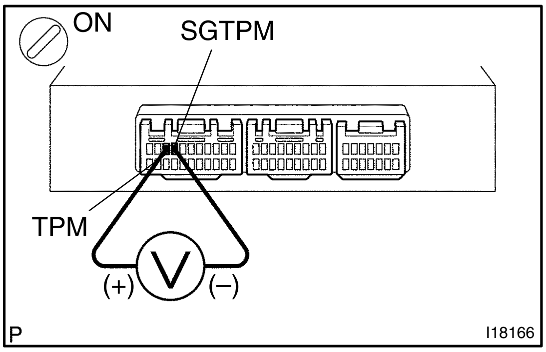
This sensor detects the position of the air outlet damper and sends the appropriate signals to the A/C amplifier.
The position sensor is built into the air outlet damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
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 amplifier. • A/C amplifier.
43	Air outlet damper position sensor value does not change even if A/C amplifier operates air outlet damper control servomotor.	

WIRING DIAGRAM



1	**Check voltage between terminals TPM and SGTPM of A/C amplifier connector.**



PREPARATION:

(a) Remove center cluster module control with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure the voltage between terminals TPM and SGTPM of A/C amplifier.

OK:

Air inlet selector	Voltage
FACE	3.5 – 4.5 V
DEF	0.5 – 1.5 V

HINT:

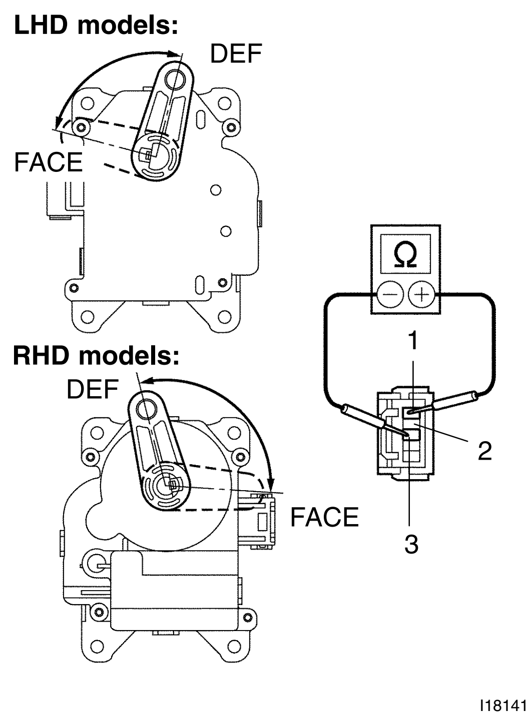
As the air outlet damper control servomotor is moved from FACE side to DEF side, the voltage decreases gradually without interruption.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787). However, if DTC 34 or 44 is displayed, check and replace A/C amplifier.

2	**Check air outlet damper position sensor.**



PREPARATION:

Remove air outlet servomotor (See page AC–58).

CHECK:

Measure resistance between terminals 1 and 2 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–827, measure resistance between terminals 2 and 3 of air outlet damper control servomotor.

OK:

Resistance:

Damper Position	Resistance
DEF	3.6 – 6.7 kΩ
FACE	0.6 – 1.1 kΩ

HINT:

As the air outlet servomotor moves from DEF side to FACE side, the resistance decreases gradually without interruption.

NG → **Replace air outlet control servomotor assembly.**

OK

3	**Check harness and connector between A/C amplifier and air outlet control servomotor assembly (See page IN–40).**

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

OK

Check and replace A/C amplifier.

DI7IJ–02

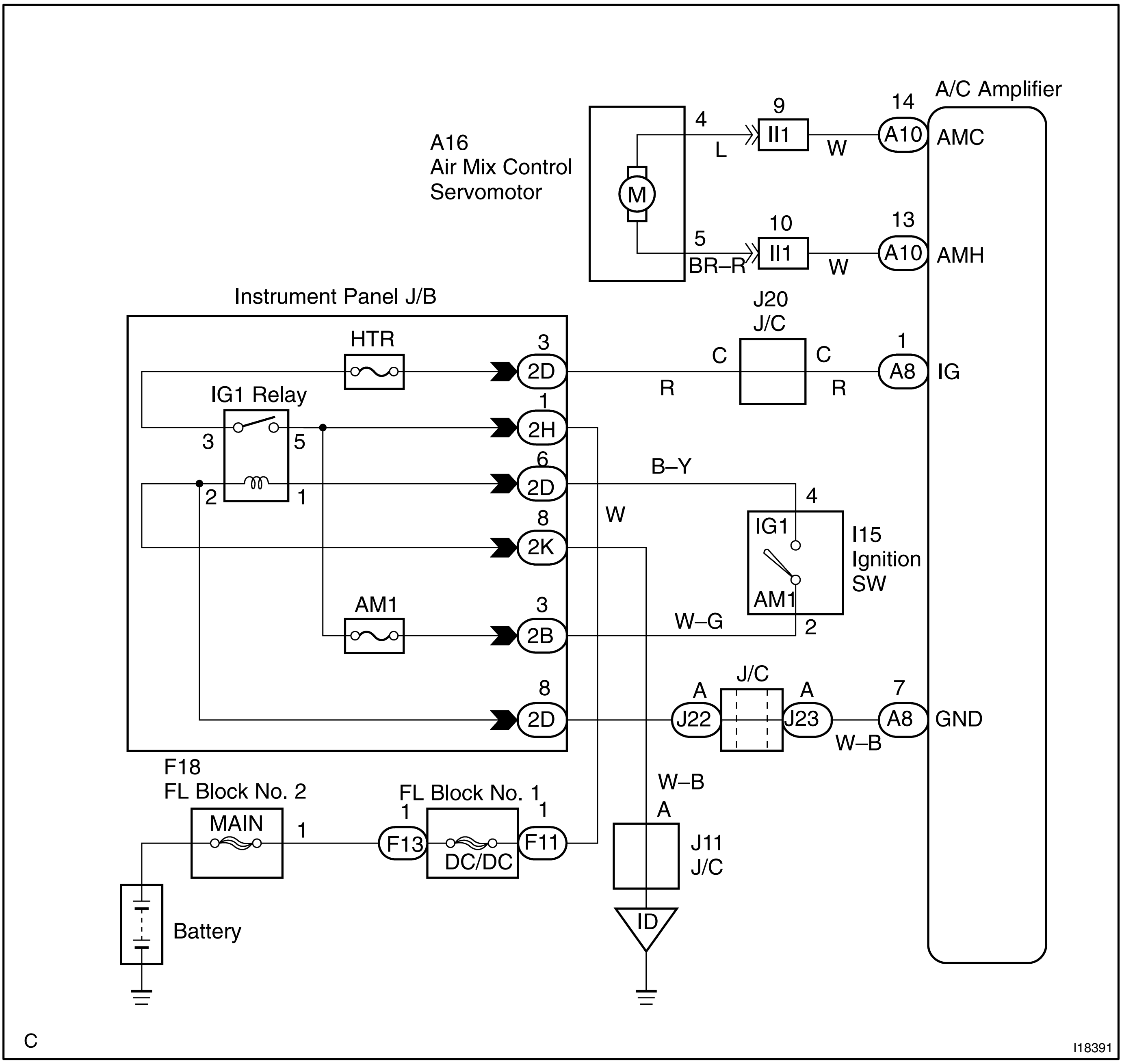
DTC	41	Air Mix Control Servomotor Circuit

CIRCUIT DESCRIPTION

This air mix control servomotor is controlled by the A/C amplifier and moves the air mix damper to the desired position.

DTC No.	Detection Item	Trouble Area
41	Air mix damper position sensor value does not change even if A/C amplifier operates air mix control servomotor.	• Air mix control servomotor. • Air mix damper position sensor. • Harness or connector between A/C amplifier and air mix control servomotor, air mix damper position sensor. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.

PREPARATION:
(a) Warm up the engine.
(b) Set to the actuator check mode (See page DI–779).
CHECK:
Operate the temperatur control switch and check the operation of the air mix damper and the condition of the blower.
OK:

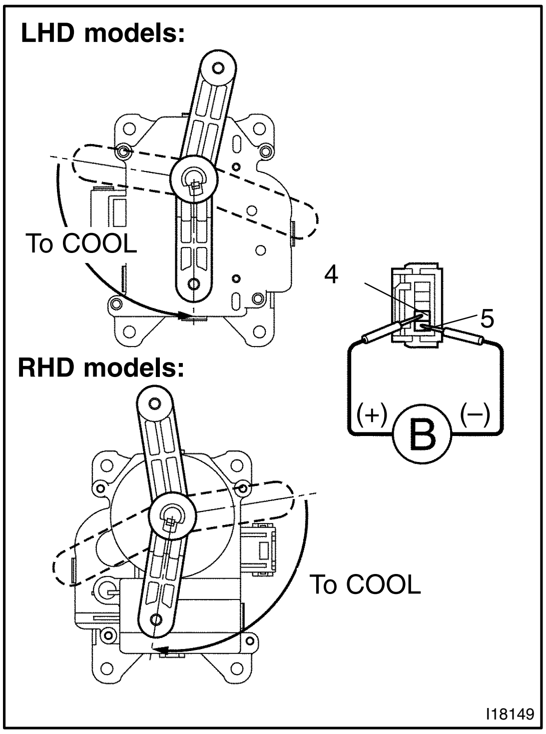
Temp. Setting ˚C	Air Mix Damper		Condition
	*1	*2	
Max. COOL ↔ 17.5	–10 % (Fully closed)	–10 % (Fully closed)	Cool air comes out
18.0 ↔ 20.5	↑	↑	↑
21.0 ↔ 23.0	50 %	50 %	
23.5 ↔ 26.0	↑	↑	
26.5 ↔ Max. WARM	110 % (Fully opened)	100 % (Fully opened)	Warm air comes out

*1: Except LHD standard heater
*2: LHD standard heater

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

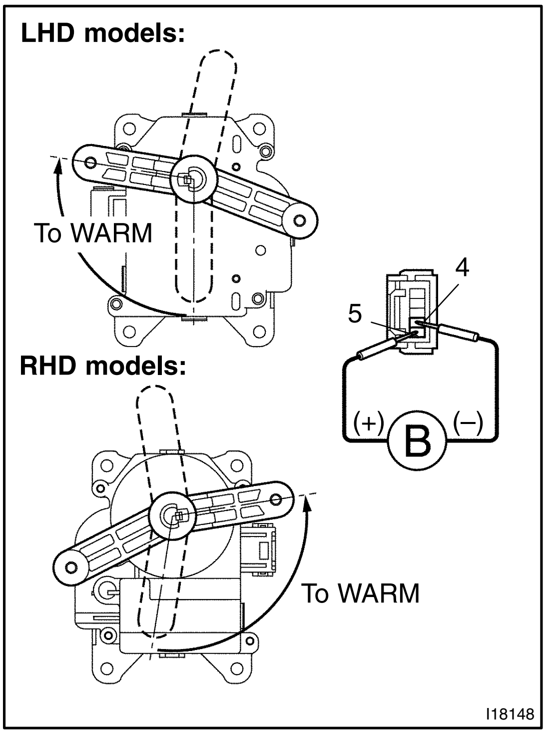
2	**Check air mix control servomotor.**



PREPARATION:
Remove air mix control servomotor (See page AC–57).

CHECK:
Connect positive (+) lead to terminal 4 and the negative (–) lead to terminal 5.

OK:
The lever turns smoothly to COOL side.



CHECK:
Connect negative (–) lead to terminal 4 and positive (+) lead to terminal 5.

OK:
The lever turns smoothly to WARM side.

NG	**Replace air mix control servomotor.**

OK

3	Check harness and connector between A/C amplifier and air mix control servomotor (See page IN–40).

NG → Repair or replace harness or connector.

OK ↓

Check and replace A/C amplifier.

DI7IK–02

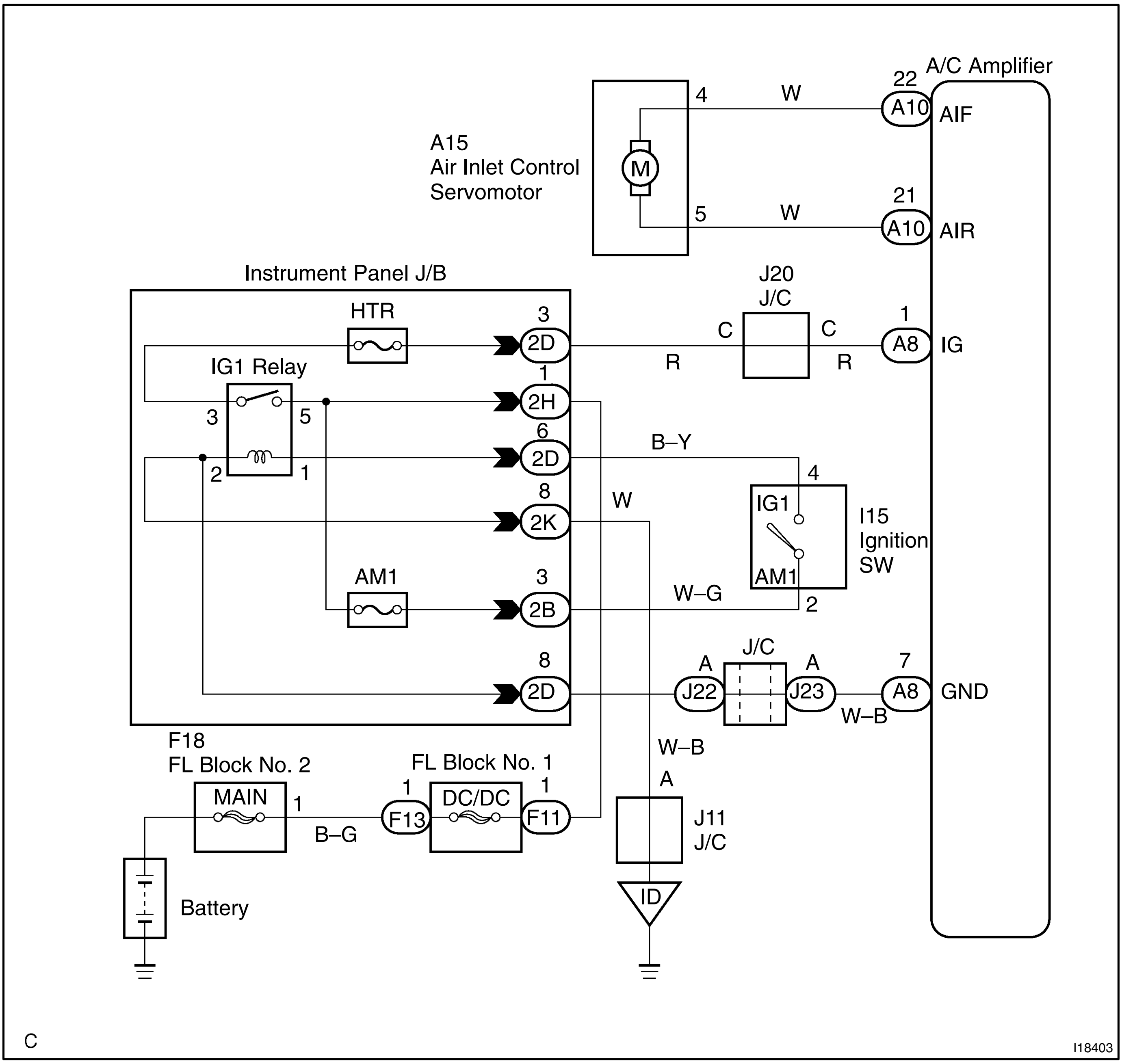
DTC	42	Air Inlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air inlet control servomotor is controlled by the A/C amplifier and moves the air inlet damper to the desired position.

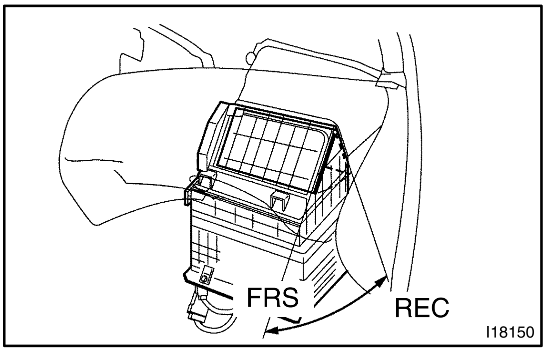
DTC No.	Detection Item	Trouble Area
42	Air inlet damper position sensor value does not change even if A/C amplifier operates air inlet control servomotor.	• Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



PREPARATION:
(a) Remove glove compartment door to see and check the air inlet damper operation.
(b) Set to the actuator check mode (See page DI–779).
(c) Operate the temperature control switch and change it to step operation.

CHECK:
Operate the temperature control switch and check the operation air inlet damper.

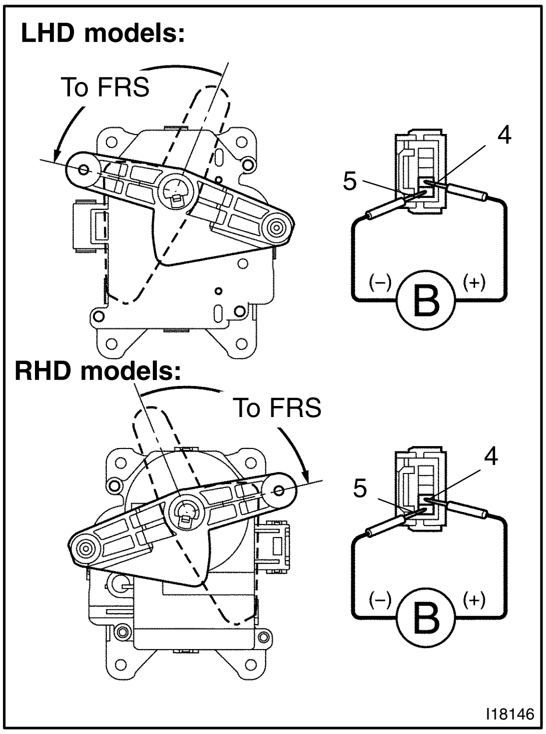
OK:

Temp. setting °C	Air Inlet Damper
Max. COOL ↔ 17.5	REC
18.0 ↔ 23.0	REC/FRS
23.5 ↔ Max. WARM	FRS

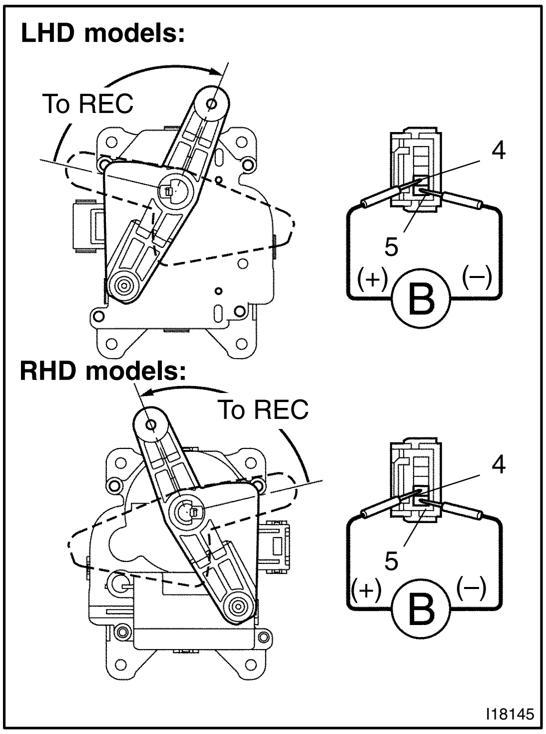
OK — **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

2	**Check air inlet control servomotor.**



PREPARATION:
Remove air inlet control servomotor (See page AC–34).
CHECK:
Connect positive (+) lead from the battery to terminal 4 and negative (–) lead to terminal 5.
OK:
The lever moves smoothly to FRS position.



CHECK:
Connect negative (+) lead from the battery to terminal 5 and positive (–) lead to terminal 4.
OK:
The lever moves smoothly to REC position.

NG	**Replace air inlet control servomotor assembly.**

OK

3	Check harness and connector between A/C amplifier and air inlet control servo-motor (See page IN–40).

NG → Repair or replace harness or connector.

OK

Check and replace A/C amplifier.

DI7IL–02

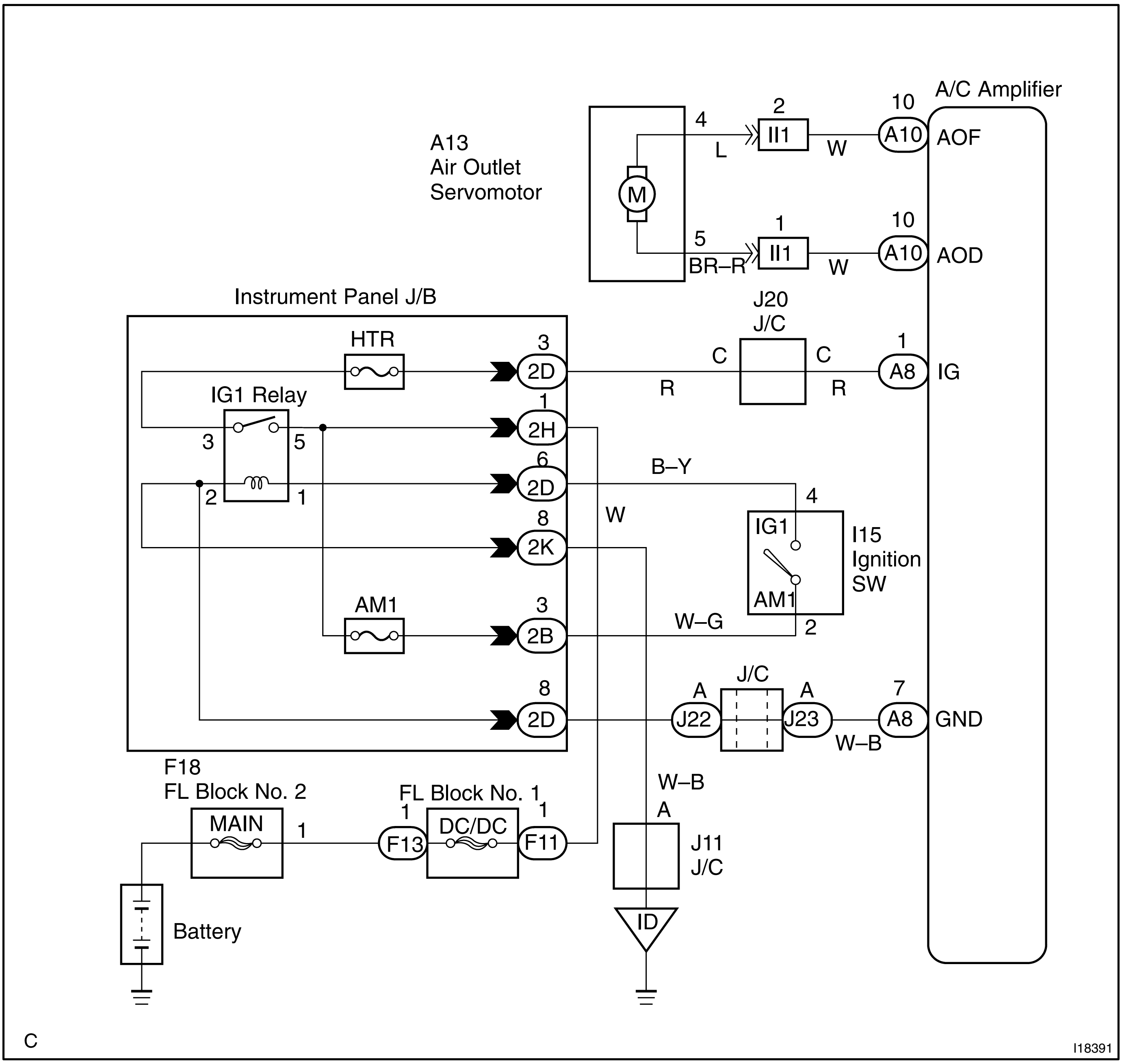
DTC	43	Air Outlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by the signals from the A/C amplifier. When the AUTO switch is on, the A/C amplifier changes the mode automatically between (FACE), (BI–LEVEL) and (FOOT) according to the temperature setting.

DTC No.	Detection Item	Trouble Area
43	Air outlet damper position sensor value does not change even if A/C amplifier operated air outlet damper control servomotor.	• Air outlet damper control servomotor. • Air outlet damper position sensor. • Harness or connector between A/C amplifier air outlet damper control servomotor, air outlet damper position sensor. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

Temp. setting ˚C	Air Flow
Max. COOL ↔ 17.5	FACE
18.0 ↔ 20.5	B/L
21.0 ↔ 23.0	FOOT
23.5 ↔ 26.0	DEF
26.5 ↔ Max. WARM	FOOT/DEF

PREPARATION:

(a) Set to the actuator check mode (See page DI–779).

(b) Press the DEF switch and change to step operation.

CHECK:

Press the DEF switch in order and check the condition of air flow mode.

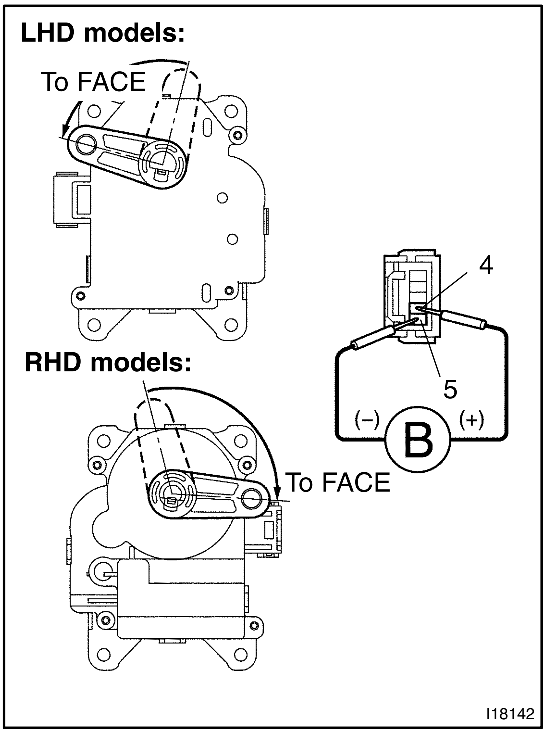
OK:

The mode changes with the change in the temperature setting as shown in the table.

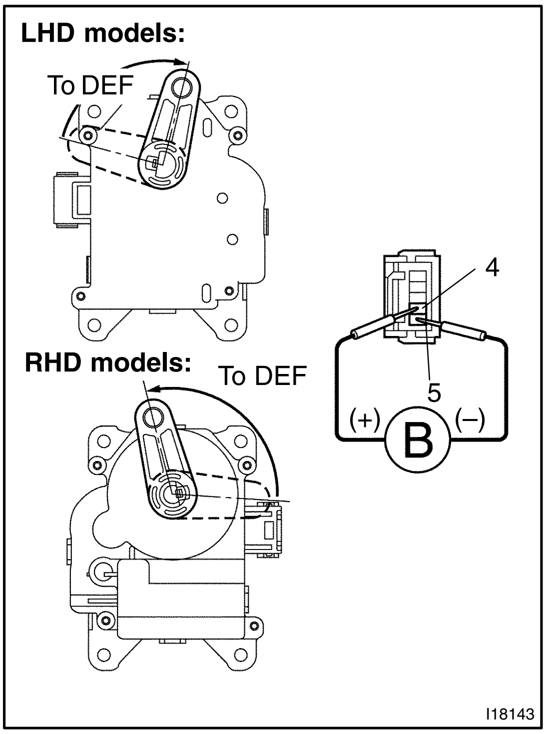
OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

2	**Check air outlet control servomotor.**



PREPARATION:
Remove air outlet control servomotor (See page AC–58).
CHECK:
Connect positive (+) lead to terminal 4 and negative (–) lead to terminal 5.
OK:
The lever moves smoothly to FACE position.



CHECK:
Connect positive (+) lead to terminal 5 and negative (–) lead to terminal 4.
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 amplifier and air outlet servomotor (See page IN–40).

NG → Repair or replace harness or connector.

OK ↓

Check and replace A/C amplifier.

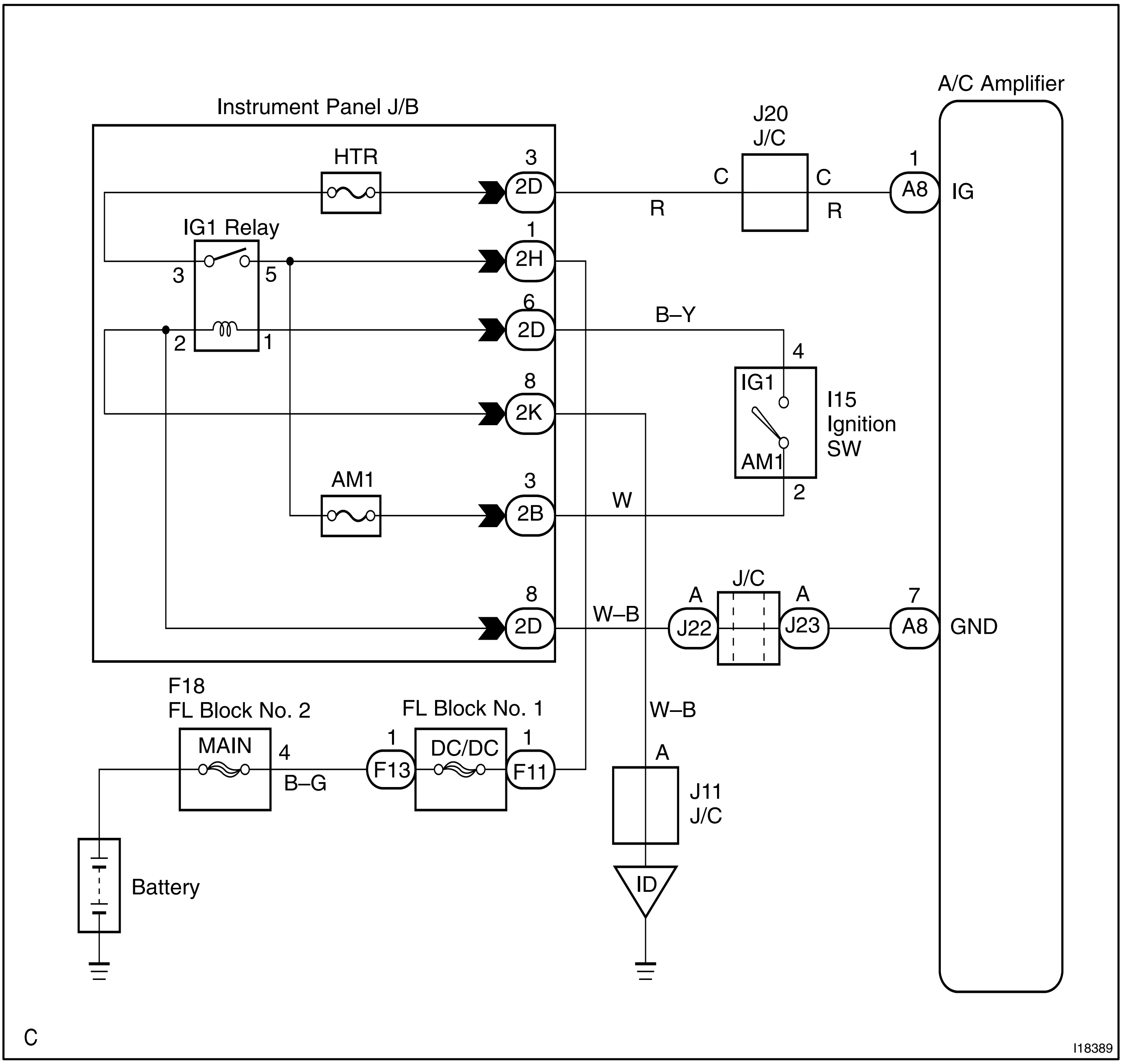
DI1CG–06

IG Power Source Circuit

CIRCUIT DESCRIPTION

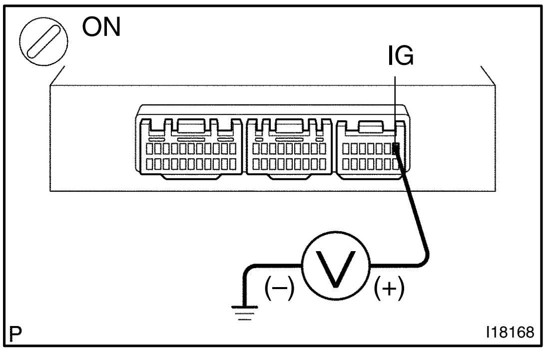
This is the power source for the A/C amplifier (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals IG and GND of A/C amplifier connector.



PREPARATION:

(a) Remove center cluster module control with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals IG and GND of A/C amplifier.

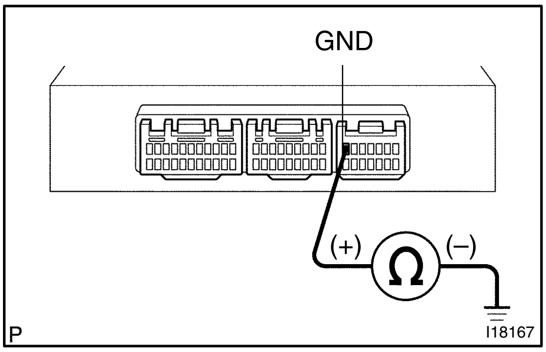
OK:

Voltage : 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

2	Check continuity between terminal GND of A/C amplifier and body ground.



CHECK:

Measure resistance between terminal GND of A/C amplifier and body ground.

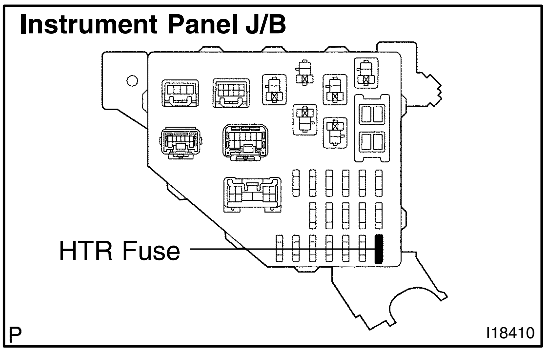
OK:

Resistance : Below 1 Ω

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

OK

3	**Check HTR fuse.**



PREPARATION:
Remove HTR fuse from instrument panel J/B.
CHECK:
Check continuity of HTR fuse.
OK:
Continuity exists.

NG **Check for shot in all the harness and components connected to the HTR fuse.**

OK

Check and repair harness and connector between A/C amplifier and battery.

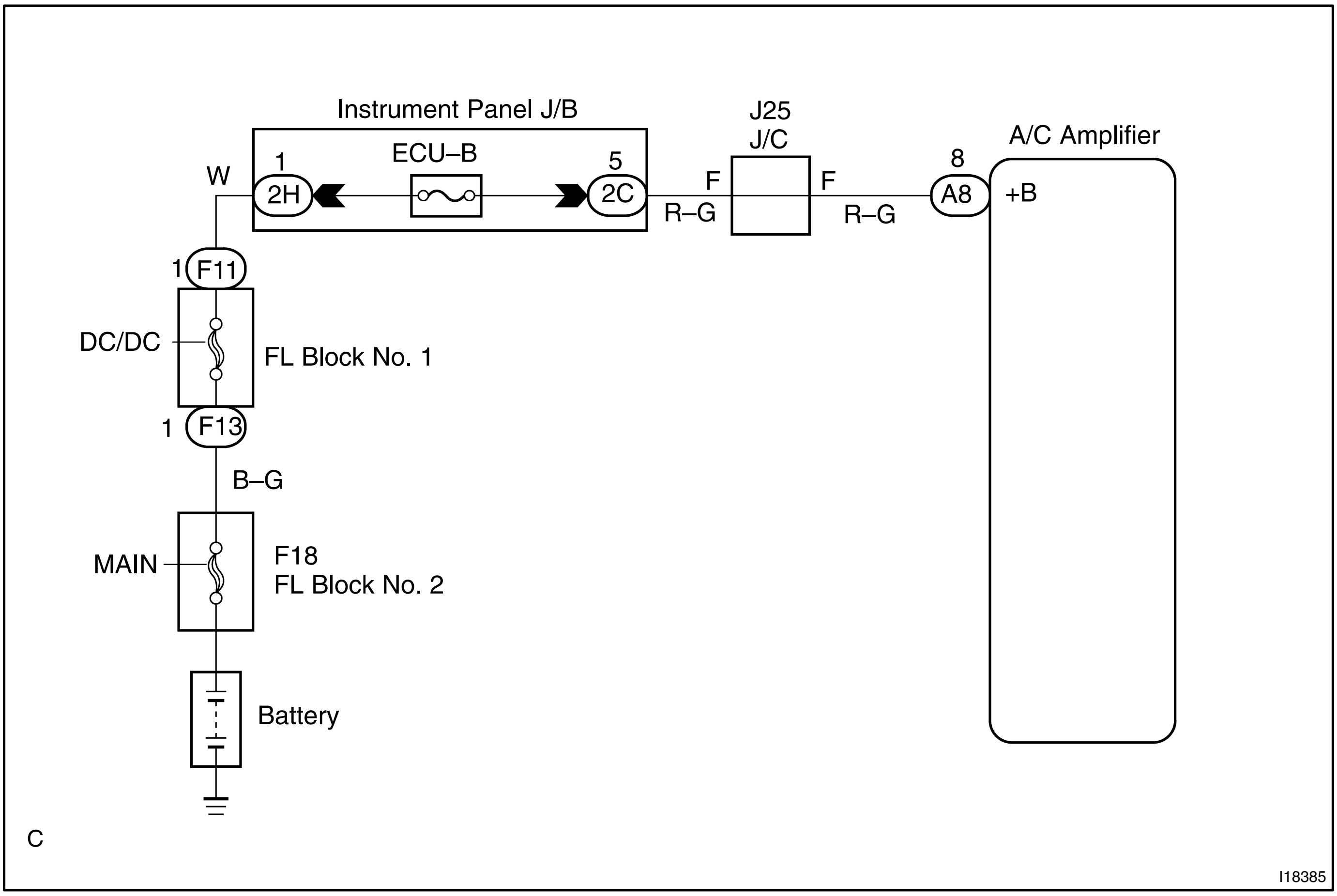
DI1CH–06

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

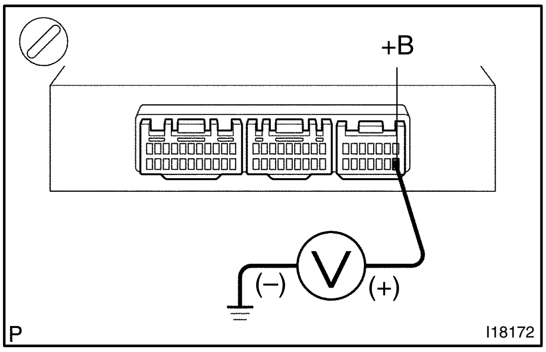
This is the back–up power source for the A/C amplifier. Power is supplied even when the ignition switch is off.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal +B of A/C amplifier connector and body ground.

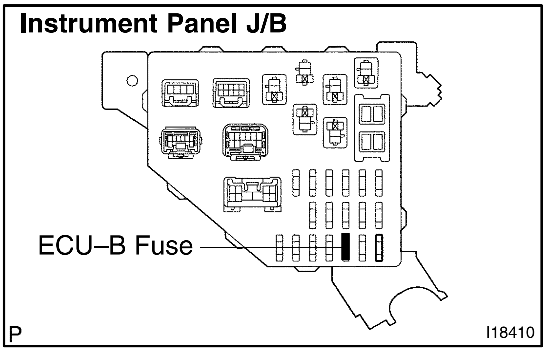


PREPARATION:
Remove A/C amplifier with connectors still connected.
CHECK:
Measure voltage between terminal +B of A/C amplifier connector and body ground.
OK:
Voltage : 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

2	Check ECU–B fuse.



PREPARATION:
Remove ECU–B fuse from instrument panel J/B.
CHECK:
Check continuity of ECU–B fuse.
OK:
Continuity exists.

NG → **Check for short in all the harness and components connected to the ECU–B fuse (See page IN–40).**

OK

Check and repair harness and connector between A/C amplifier and battery.

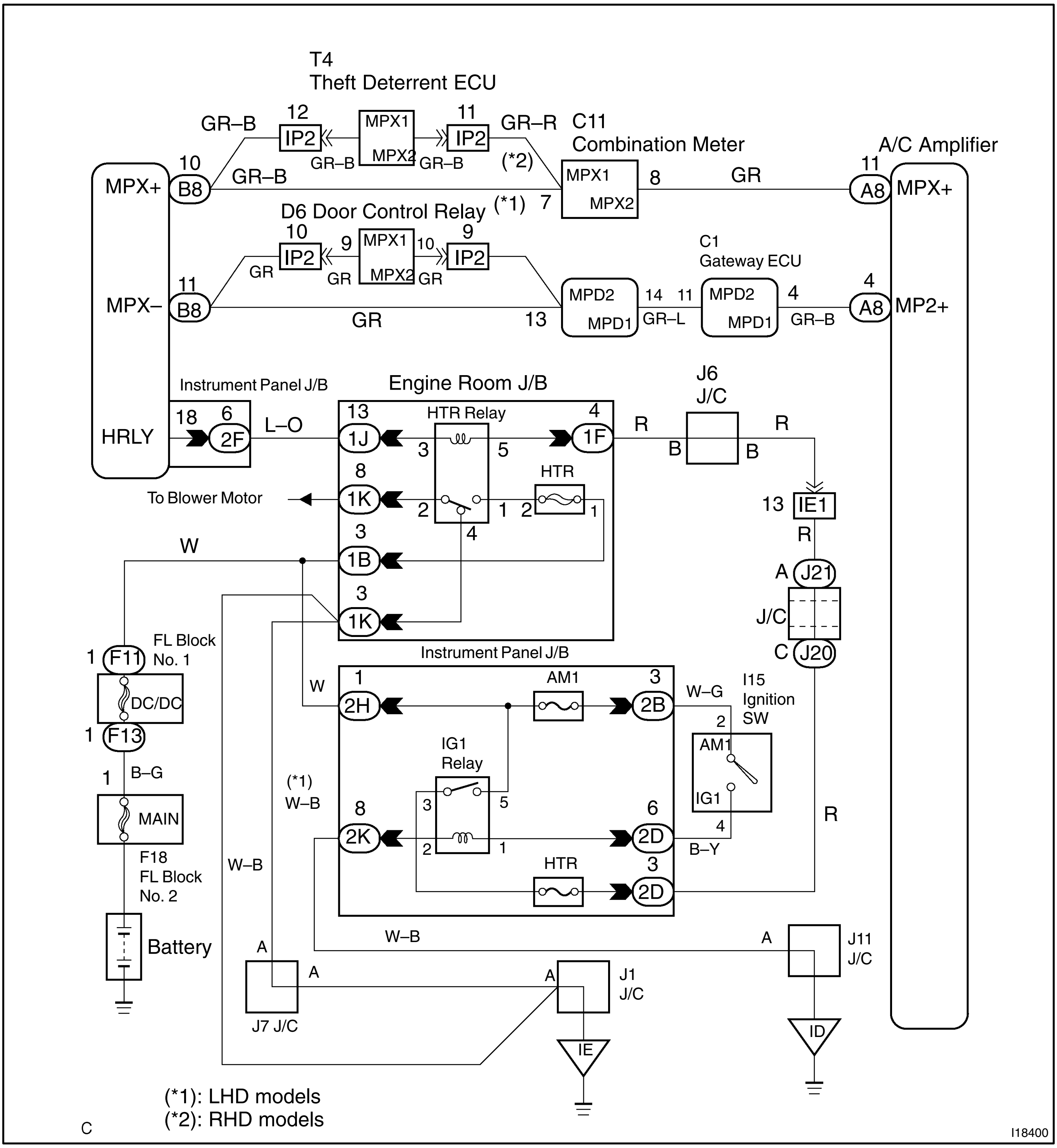
DI7MF–01

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

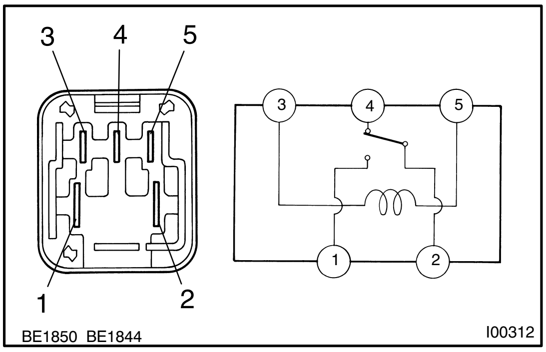
The heater main relay is switched on by signals from the A/C amplifier. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check heater main relay.**



PREPARATION:
Remove heater main relay from engine room J/B.
CHECK:
Check continuity between each pair of terminals of heater main relay shown below.
OK:

Tester connection	Specified condition
1 – 4	No continuity
2 – 4	Continuity
3 – 5	62.5 – 90.9 Ω

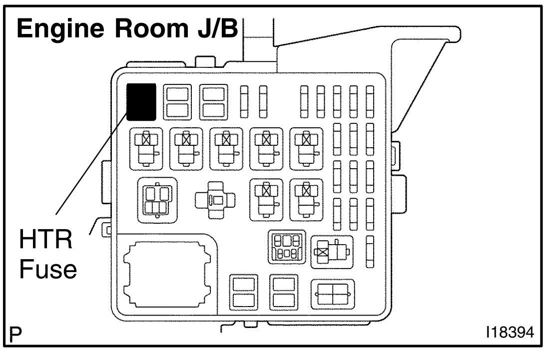
PREPARATION:
Apply battery positive voltage between terminals 3 and 5.
CHECK:
Check continuity between each pair of terminal shown below.
OK:

Tester connection	Specified condition
1 – 2	Continuity
2 – 4	No continuity

NG	**Replace hater main relay.**

OK

2	**Check HTR fuse**



PREPARATION:
Remove HTR fuse from engine room J/B.
CHECK:
Check continuity of HTR fuse.
OK:
Continuity exists.

NG	**Check for short in all the harness and components connected to the HTR fuse (See page IN–40).**

OK

3	Check harness and connector between heater main relay and body ground, heater main relay and battery heater main relay and body ECU (See page IN–40).

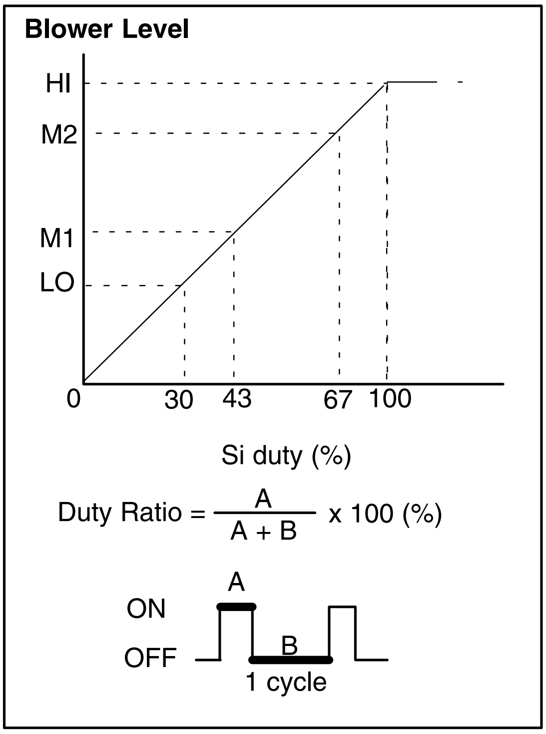
NG → Check and replace harness and connector.

OK ↓

Check multiplex communication system (See page DI–656).

DI7IN–02

Blower Motor Circuit



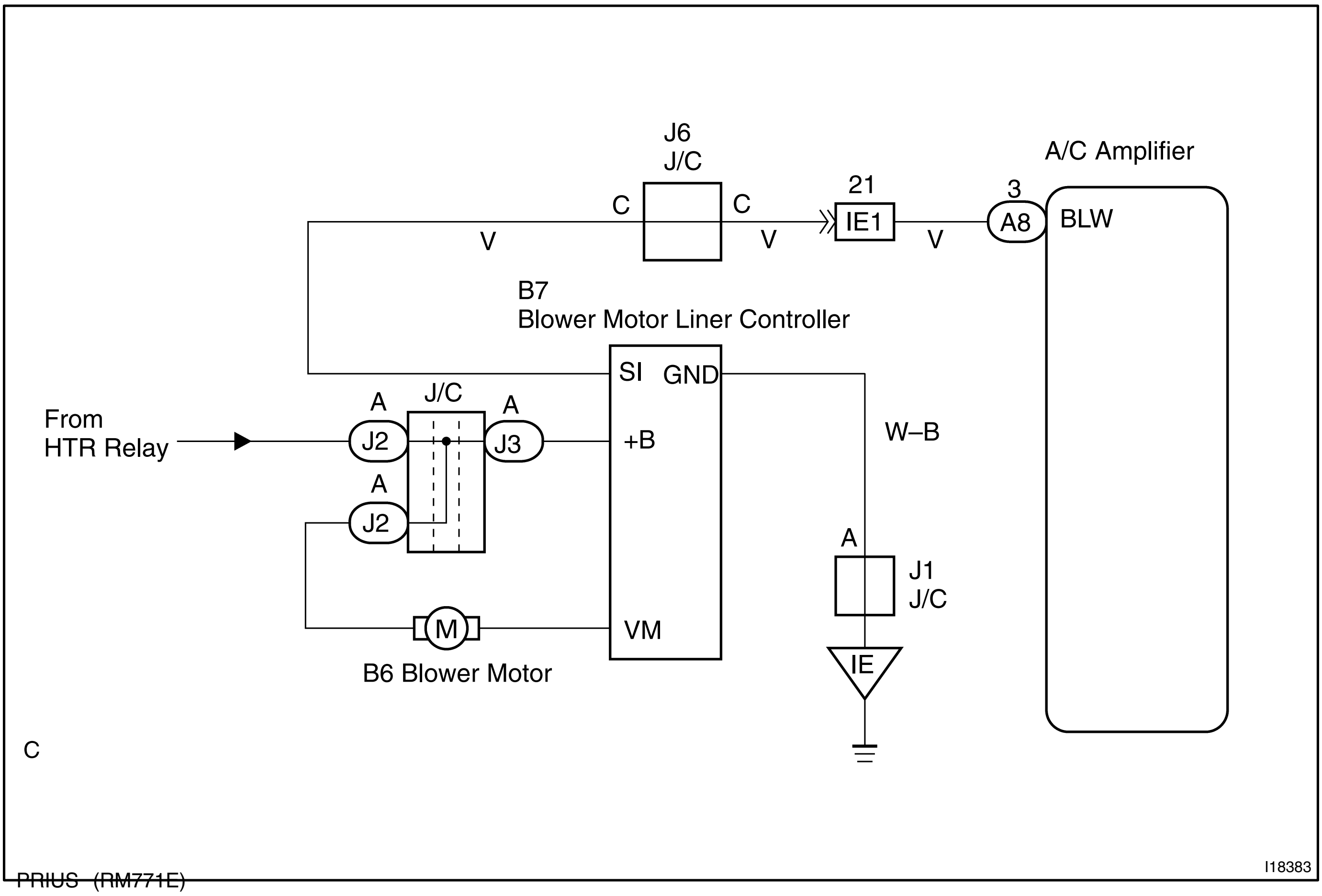
CIRCUIT DESCRIPTION

The blower motor is operated by signals from the A/C amplifier. Blower motor speed signals are transmitted by changes in the Duty Ratio.

Duty Ratio

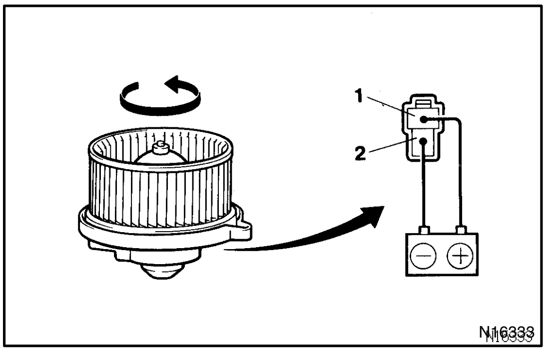
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non–continuity, then.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check blower motor.**



PREPARATION:
Remove blower motor (See page AC–34).
CHECK:
Connect positive (+) lead connected to terminal 2 of blower motor connector, negative (–) lead to terminal 1.
OK:
Blower motor operates smoothly.

NG	**Replace blower motor.**

OK

2	**Check harness and connector between battery and blower motor, blower motor and body ground (See page IN–40).**

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

OK

3	**Check harness and connector between blower motor linear controller and A/C amplifier (See page IN–40).**

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

OK

4	**Check A/C amplifier (See page IN–40).**

NG → **Replace A/C amplifier.**

OK

Replace blower motor linear controller.

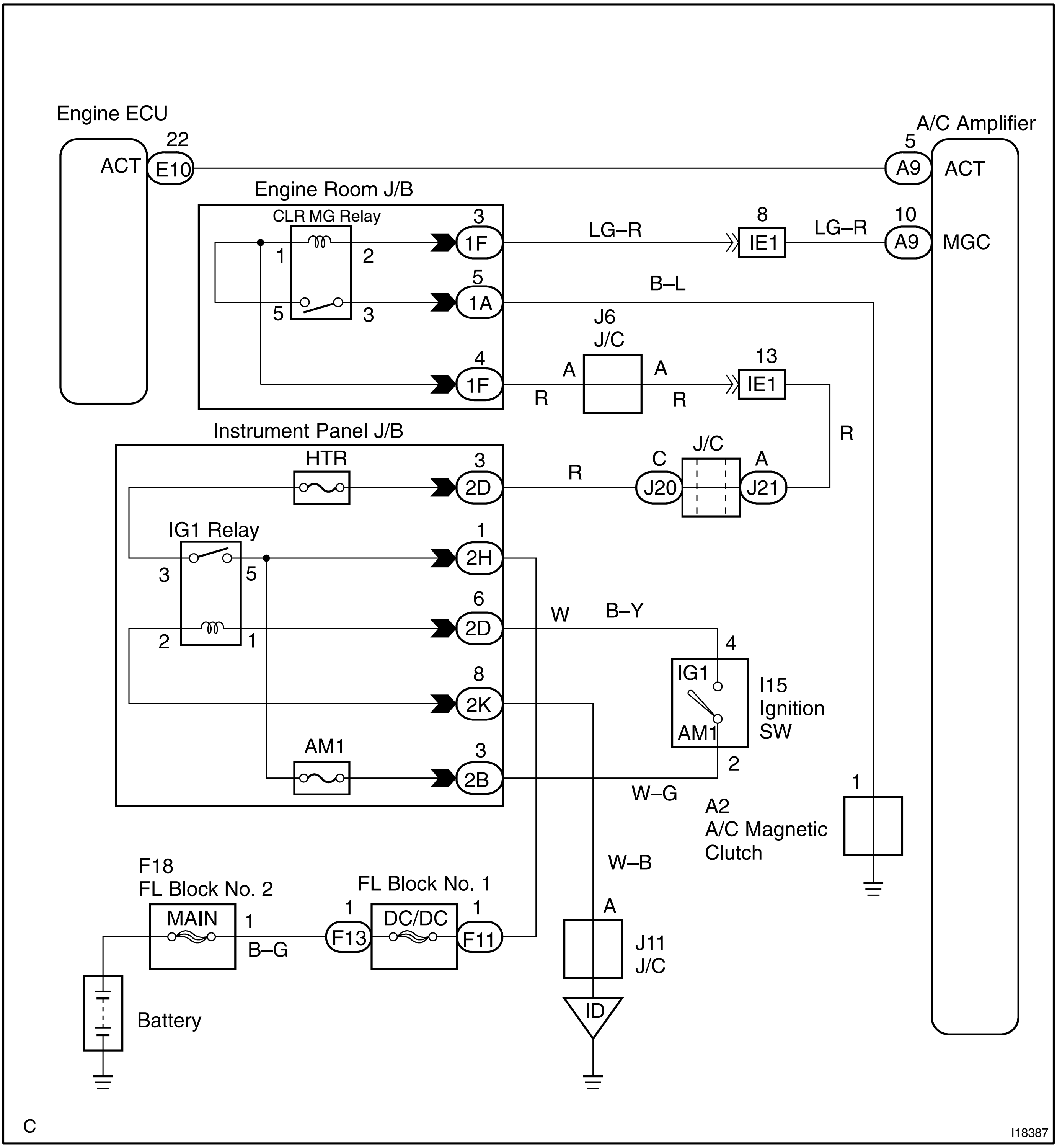
DI7MI–01

Compressor Circuit

CIRCUIT DESCRIPTION

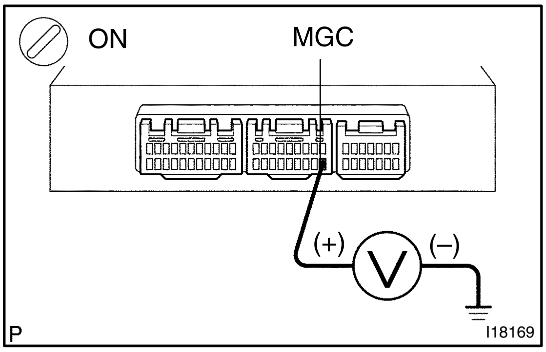
A/C amplifier switches the A/C magnetic clutch relay ON, thus turning the A/C compressor magnetic clutch ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal MGC of A/C amplifier and body ground.



CHECK:
(a) Start engine.
(b) Turn blower switch to AUTO.
(c) Measure voltage between terminal MGC of A/C amplifier connector and body ground when A/C switch is On and OFF.

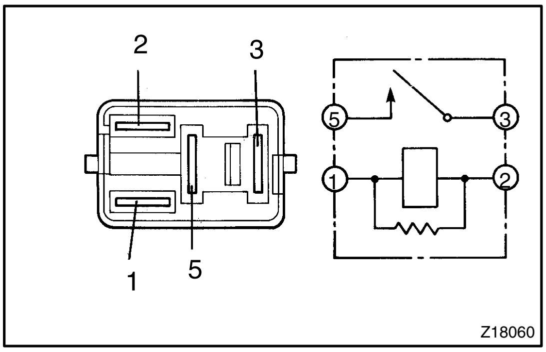
OK:

A/C switch	Voltage
ON	Below 0.7 V
OFF	10 – 14 V

OK — **Go to step 5.**

NG

2	Check magnetic clutch relay.



PREPARATION:
Remove magnetic clutch relay from engine room J/B.
CHECK:
Check continuity between each pair of terminals shown below of magnetic clutch relay.
OK:

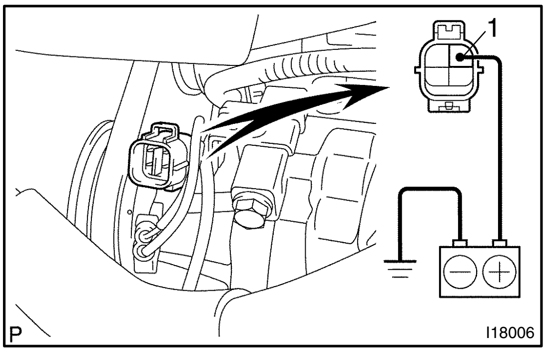
Tester connection	Specified condition
1 – 2	62.5 – 90.9 Ω
3 – 5	No continuity

PREPARATION:
Apply battery positive (+) voltage between terminals 1 and 2.
CHECK:
Check continuity between terminals 3 and 5.
OK:
Continuity exists.

NG — **Replace magnetic clutch relay.**

OK

3	**Check A/C magnetic clutch.**



PREPARATION:
Disconnect magnetic clutch connector.
CHECK:
Connect positive (+) lead connected to battery to magnetic clutch connector terminal 3 and negative (–) lead to body ground.
OK:
Magnetic clutch is energized.

NG → **Repair A/C magnetic clutch.**

OK

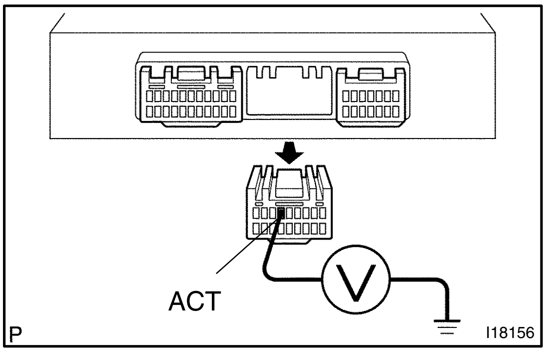
4	**Check harness and connector between magnetic clutch relay and A/C amplifier, A/C compressor and body ground (See page IN–40).**

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

OK

Proceed to next circuit inspection shown on problem symptons table (See page DI–787).

5	**Check voltage between terminal ACT of A/C amplifier connector side and body ground.**

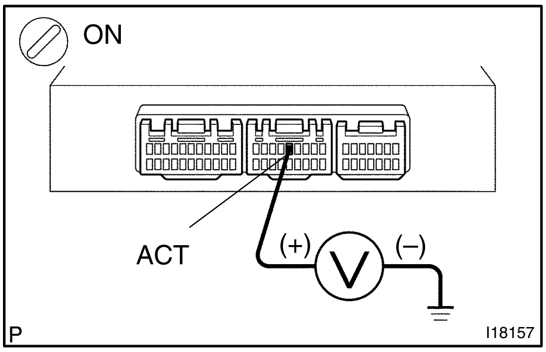


PREPARATION:
(a) Disconnect A/C amplifier connector.
(b) Turn ignition switch ON.
CHECK:
Check voltage between terminal ACT of A/C amplifier harness side connector.
OK:
Voltage : 10 – 14 V

NG → **Check and replace engine ECU.**

OK

6	Check voltage between terminal ACT of A/C amplifier connector and body ground.



PREPARATION:
(a) Remove center cluster module control with connector still connected.
(b) Start the engine and turn blower switch to AUTO.

CHECK:
Check the voltage between terminal ACT of A/C amplifier connector and body ground when magnetic clutch is ON and OFF by A/C switch.

OK:

Magnetic clutch	Voltage
ON	10 – 14 V
OFF	Below 1.0 V

NG → **Check and replace A/C amplifier.**

OK

7	Check harness and connector between magnetic clutch relay and A/C amplifier (See page IN–40).

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).

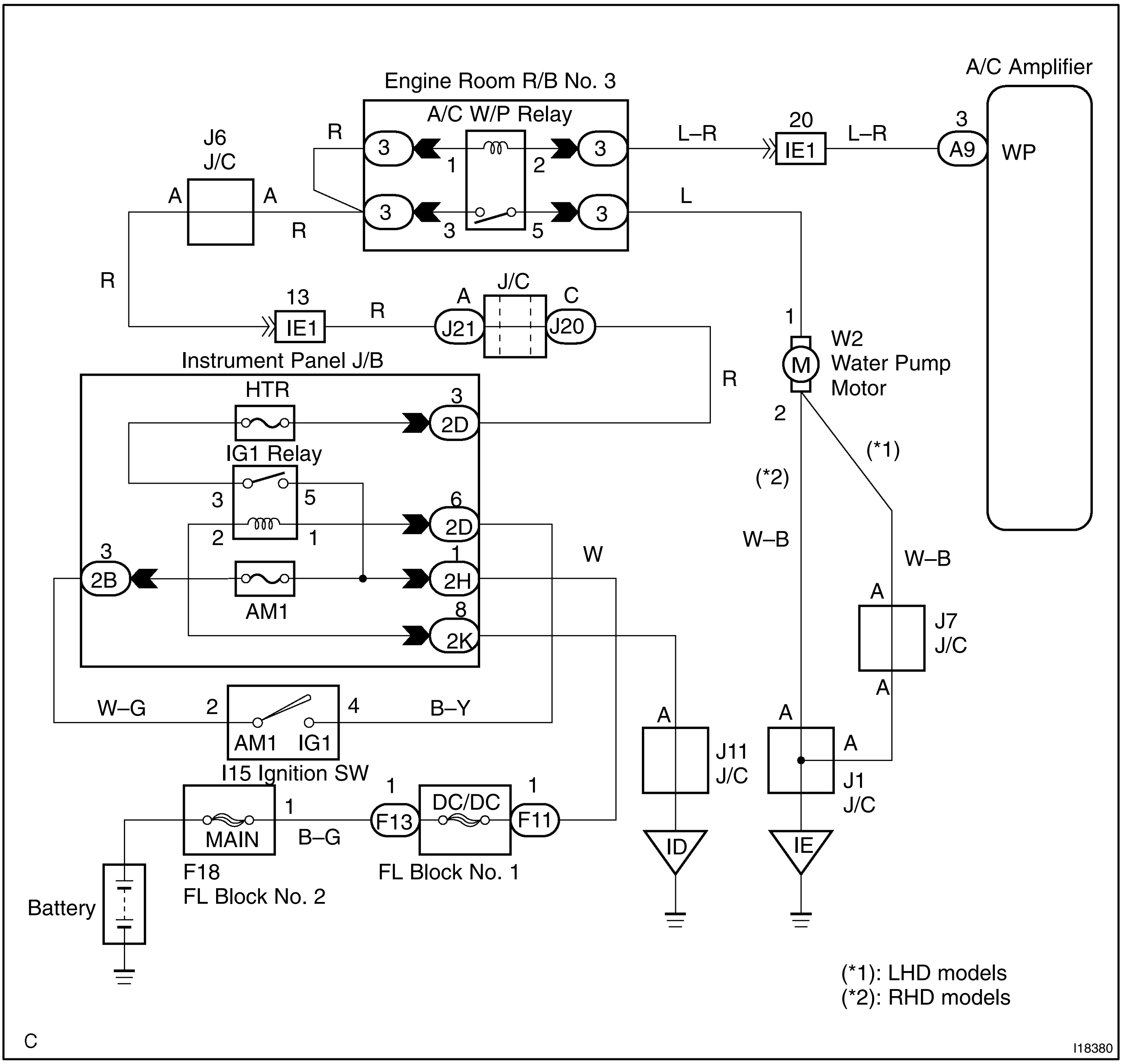
DI7MH–01

Water Pump Circuit

CIRCUIT DESCRIPTION

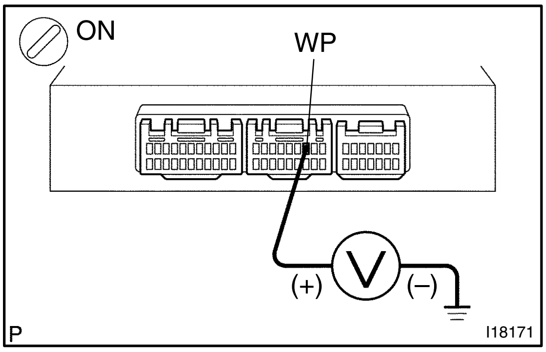
This is hte power source for the water pump motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal WP of A/C amplifier and body ground.



PREPARATION:

(a) Remove the center cluster module control with connectors still connected.
(b) Start engine.
(c) Operate blower motor.
(d) Set temp. on MAX. WARM.

CHECK:

Measure voltage between terminal WP of A/C amplifier and body ground when each condition as shown in the chart.

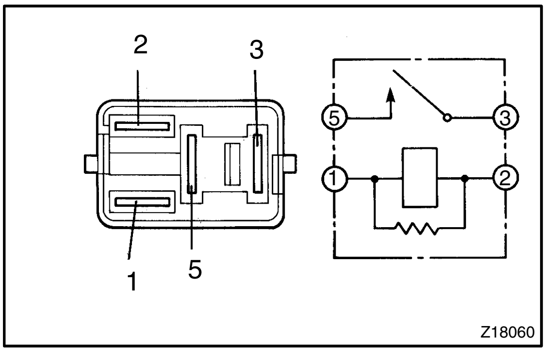
OK:

condition	Voltage
Engine running	10 – 14 V
Engine stop	Below 1.0 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

2	Check A/C water pump relay.



PREPARATION:

Remove the A/C water pump relay from engine room R/B NO. 3.

CHECK:

Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK:

Tester connection	Specified condition
1 – 2	62.5 – 90.9 Ω
3 – 5	No continuity

PREPARATION:

Apply battery positive (+) voltage between terminals 1 and 2.

CHECK:

Check continuity between terminals 3 and 5.

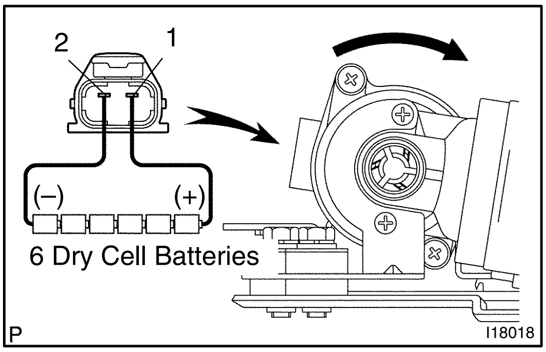
OK:

Continuity exists.

NG → **Replace magnetic clutch relay.**

OK

3	Check water pump motor.



PREPARATION:
Remove the water pump (See page AC–56).

CHECK:
Connect the positive (+) lead from the 6 dry cell batteries (7 – 10.5 V) to terminal 1 and negative (–) lead to terminal 2, then check that the motor operation.

NOTICE:
- **Do not apply battery voltage.**
- **Operate without water should be done within 10 sec.**

OK:
Motor operation smoothly.

NG	Replace water pump.

OK

4	Check harness and connector between water pump motor and A/C amplifier, water pump motor and body ground (See page IN–40).

NG	Repair or replace harness or connector.

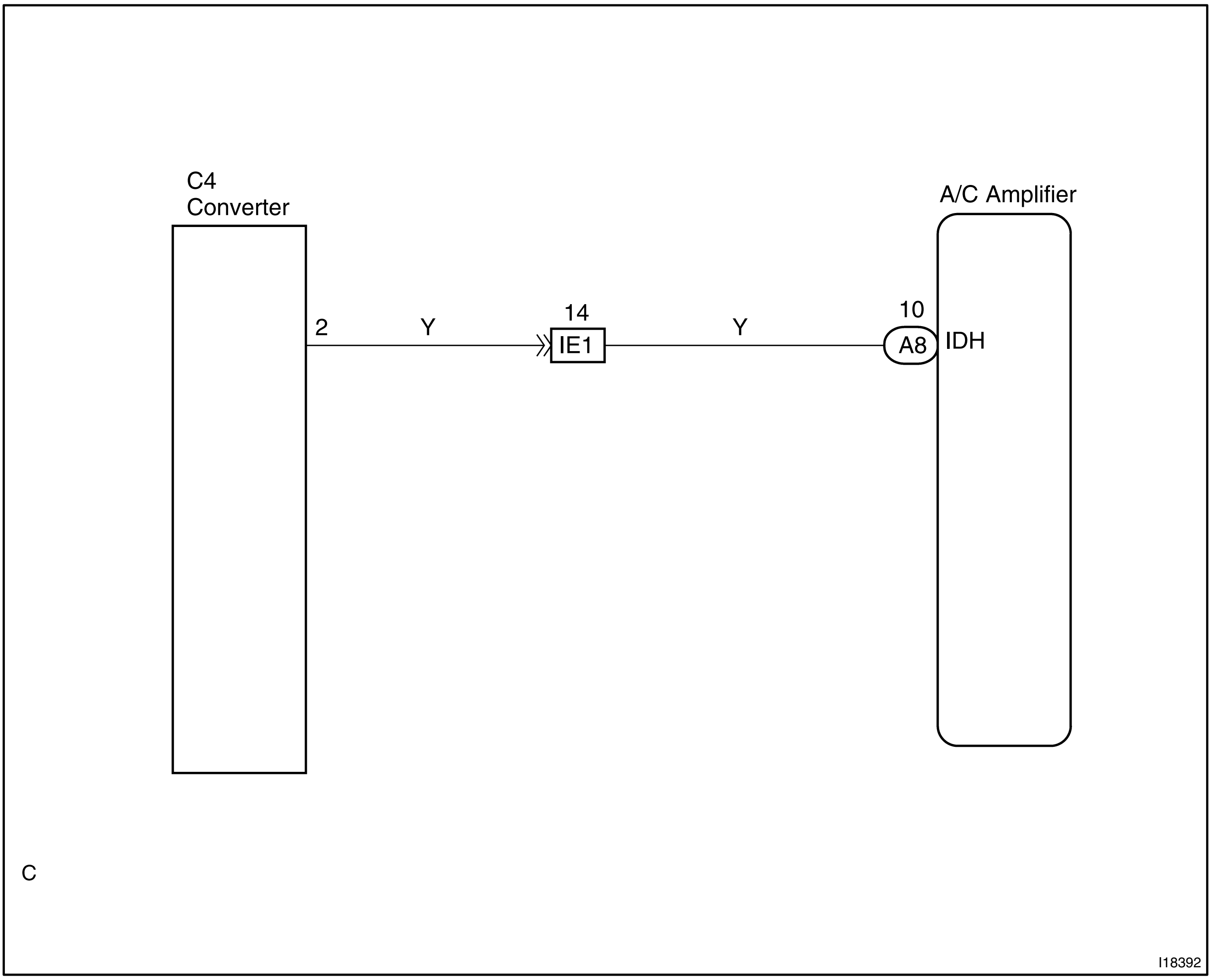
OK

Check and replace A/C amplifier.

DI7MG–01

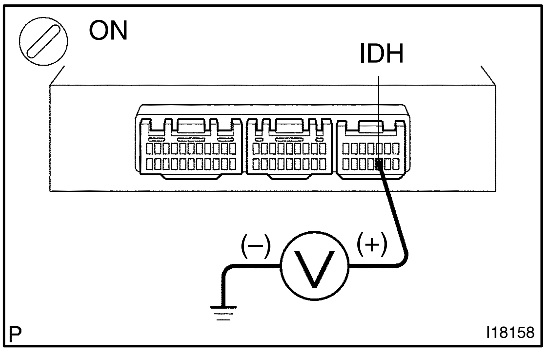
Converter Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal IDH of A/C amplifier and body ground.**



PREPARATION:
Remove the center cluster module control with connectors still connected.

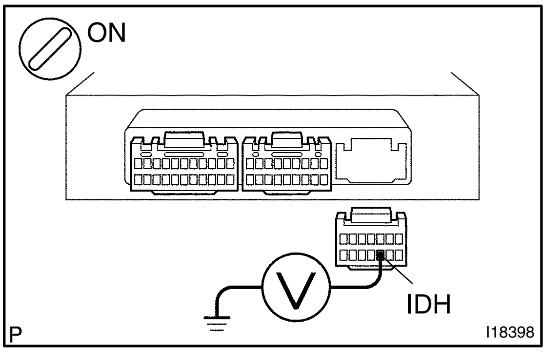
CHECK:
(a) Turn ignition switch ON.
(b) Turn light control switch OFF.
(c) Turn rear defogger switch OFF.
(d) Measure voltage between terminal IDH of A/C amplifier.

OK:
Voltage: Below 1.0 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–787).**

NG

2	**Check voltage between terminal IDH of A/C amplifier and body ground.**



PREPARATION:
Disconnect the connector from A/C amplifier.

CHECK:
(a) Turn ignition switch ON.
(b) Turn light control switch OFF.
(c) Turn rear defogger switch OFF.
(d) Measure voltage between terminal IDH of A/C amplifier on wire harness side connector.

OK:
Voltage: Below 1.0 V

OK → **Check and replace A/C amplifier.**

NG

3	**Check harness and connector between A/C amplifier and converter (See page IN–40).**

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

OK

Check and replace converter.

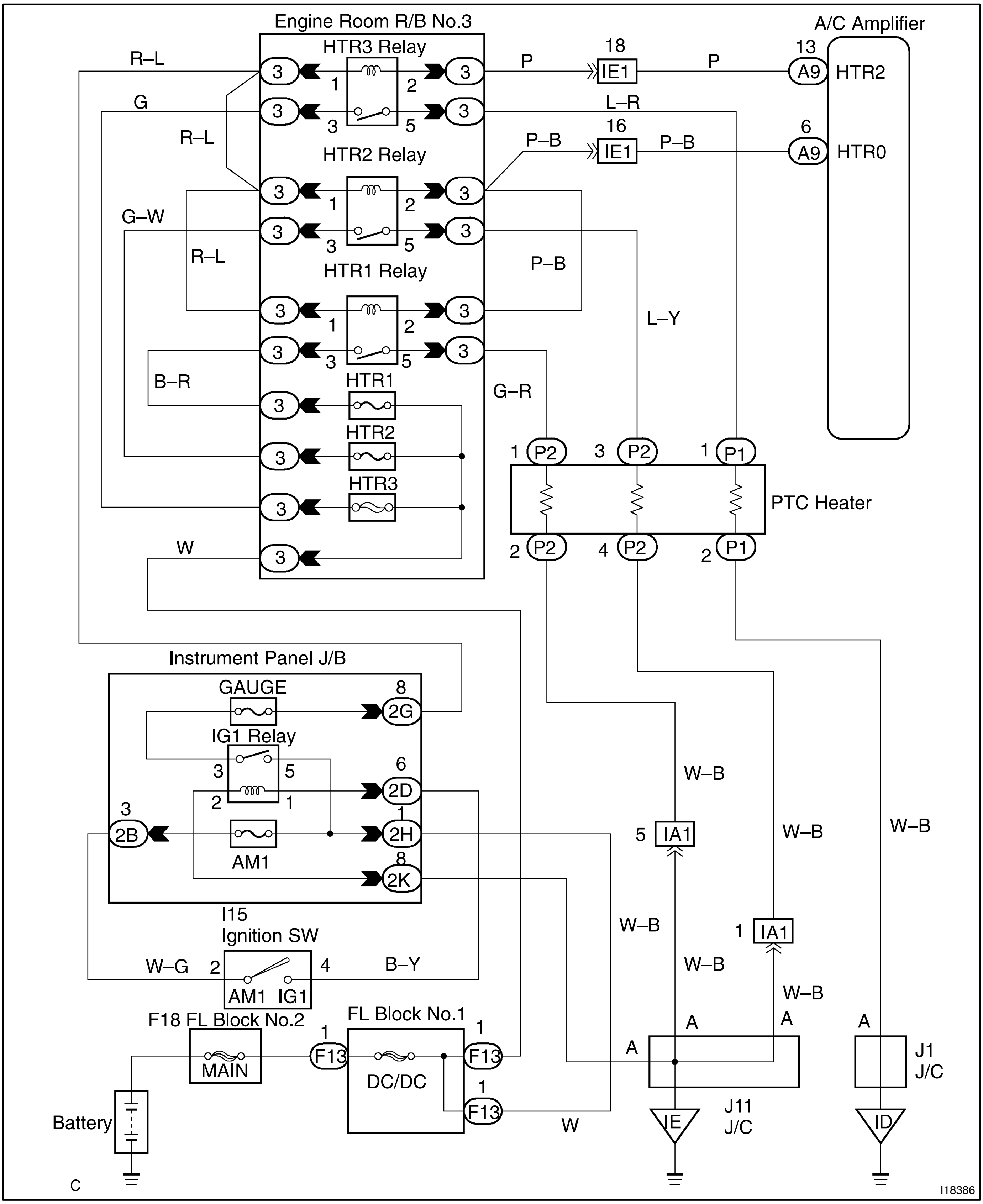
DI7QB–01

PTC Heater Circuit (Quick Heater)

CIRCUIT DESCRIPTION

A/C amplifier switches the HTR3 relay ON by signal from the A/C amplifier. It supplies power to PTC heater (Quick heater).

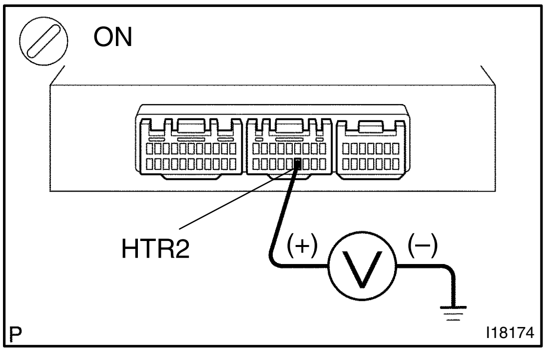
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check converter circuit (See page DI–850).

2	Check voltage between terminal HTR2 of A/C amplifier and body ground.



PREPARATION:

Remove the center cluster module control with connectors still connected.

CHECK:

(a) Start engine.
(b) Set temperature control switch on "MAX. WARM" position.
(c) Set blower switch on "HI" position.
(d) Turn light control switch OFF.
(e) Turn defogger switch OFF.
(f) Check voltage between terminal HTR2 of A/C amplifier and body ground at each conditions, as shown in the chart.

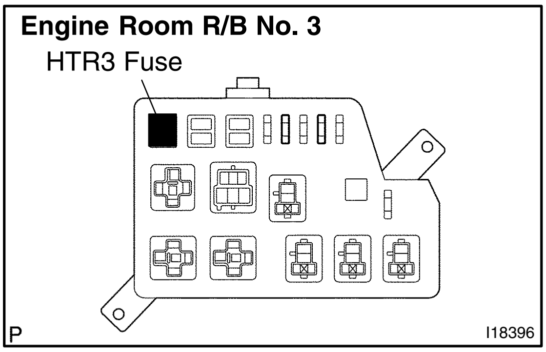
OK:

Condition	Voltage
• Air flow selector: FOOT • Water temp. : Below 65°C (149°F)	Below 1.0 V
• Air flow selector: FOOT/DEF • Water temp. : Below 60°C (140°F)	Below 1.0 V
• Air flow selector: DEF • Water temp. : 75°C (167°F)	Below 1.0 V

OK → **Go to step 6.**

NG

3 Check HTR3 fuses.

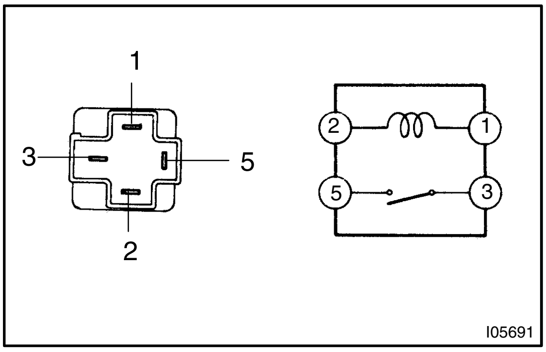


PREPARATION:
Remove the HTR3 fuse from engine room R/B No. 3.
CHECK:
Check continuity of HTR1 and HTR2 fuses.
OK:
Continuity exists.

NG — **Check for short in all the harness and components connected to the HTR1 and HTR2 fuses (See attached wiring diagram).**

OK

4 Check HTR3 relay.



PREPARATION:
Remove the HTR3 relay from engine room relay block No. 3.
CHECK:
Check continuity between each pair of terminals shown below of magnetic clutch relay.
OK:

Tester connection	Specified condition
1 – 2	62.5 – 90.9 Ω
3 – 5	No continuity

PREPARATION:
Apply battery positive (+) voltage between terminals 1 and 2.
CHECK:
Check continuity between terminals 3 and 5.
OK:
Continuity exists.

NG — **Replace HTR3 relay.**

OK

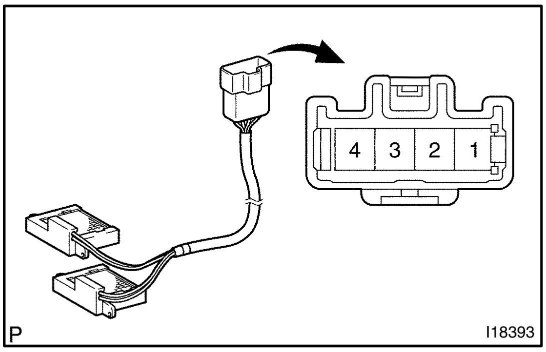
5	Check harness and connector between A/C amplifier and HTR1 and HTR2 fuses (See page IN–40).

NG — **Check and replace harness and connector.**

OK

Check and replace A/C amplifier.

6	Check PTC heater.



PREPARATION:
Remove the PTC heater (See page AC–28).
CHECK:
Check continuity between terminals of PTC heater connector, as shown in the chart.
OK:

Tester connection	Result
1 – 2	Continuity
3 – 4	Continuity

NG — **Replace heater radiator.**

OK

Check harness and connector between PTC heater and HTR1, HT2 relays, PTC heater and body ground (See page IN–40).

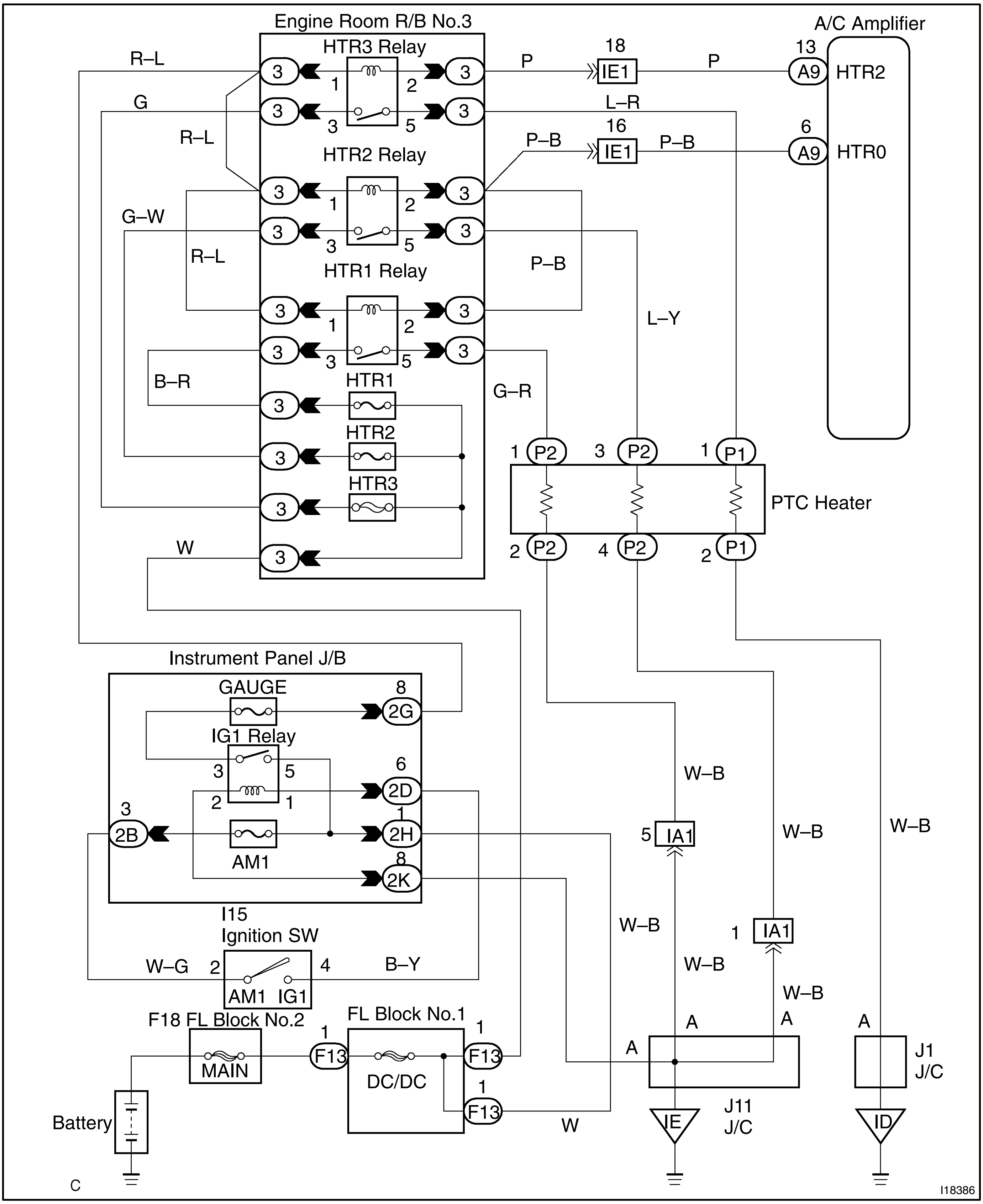
DI7QC–01

PTC Heater Circuit (Heater Radiator)

CIRCUIT DESCRIPTION

A/C amplifier switches the HTR1 relay and HTR2 relay ON by signal from the A/C amplifier. It supplies power to PTC heater (Heater radiator).

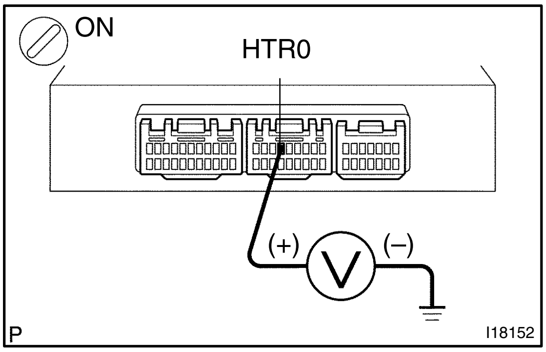
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check converter circuit (See page DI–850).

2	Check voltage between terminal HTR0, of A/C amplifier and body ground.



PREPARATION:

Remove the center cluster module control with connectors still connected.

CHECK:

(a) Start engine.
(b) Set temperature control switch on ”MAX WARM” position.
(c) Set blower switch on ”HI” position.
(d) Turn light control switch to OFF.
(e) Turn defogger switch OFF.
(f) Check voltage between terminal HTR0 of A/C amplifier and body ground at each conditions, as shown in the chart.

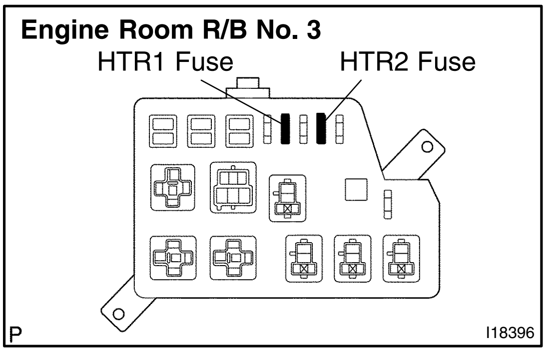
OK:

Condition	Voltage
• Air flow selector: FOOT • Water temp. : Below 60°C (140°F)	Below 1.0 V
• Air flow selector: FOOT/DEF • Water temp. : Below 50°C (122°F)	Below 1.0 V

OK → **Go to step 6.**

NG

3	Check HTR1 and HTR2 fuses.

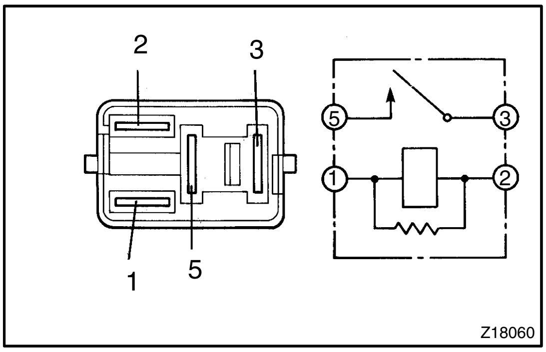


PREPARATION:
Remove the HTR1 and HTR2 fuses from engine room R/B NO. 3.
CHECK:
Check continuity of HTR1 and HTR2 fuses.
OK:
Continuity exists.

NG → **Check for short in all the harness and components connected to the HTR1 and HTR2 fuses (See attached wiring diagram).**

OK

4	Check HTR1 and HTR2 relays.



PREPARATION:
Remove the HTR1 and HTR2 relays from engine room relay block NO. 3.
CHECK:
Check continuity between each pair of terminals shown below of magnetic clutch relay.
OK:

Tester connection	Specified condition
1 – 2	62.5 – 90.9 Ω
3 – 5	No continuity

PREPARATION:
Apply battery positive (+) voltage between terminals 1 and 2.
CHECK:
Check continuity between terminals 3 and 5.
OK:
Continuity exists.

NG → **Replace HTR1 and (or) HTR2 relay.**

OK

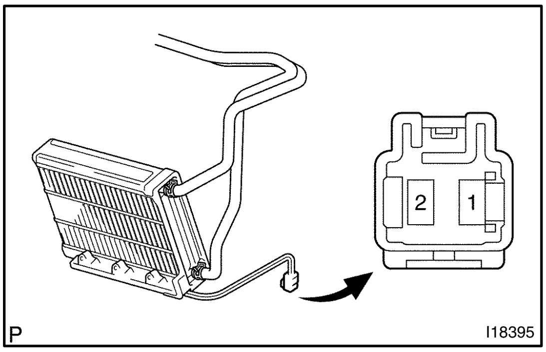
5	Check harness and connector between A/C amplifier and HTR1 and HTR2 fuses (See page IN–40).

NG → **Check and replace harness and connector.**

OK

Check and replace A/C amplifier.

6	Check PTC heater (Heater Radiator).



PREPARATION:
Remove the heater radiator (See page AC–28).
CHECK:
Check continuity between terminals of PTC heater connector.
OK:
Continuity exists.

NG → **Replace heater radiator.**

OK

Check harness and connector between PTC heater and HTR1, HTR2 relays, PTC heater and body ground (See page IN–40).

DI7QD–01

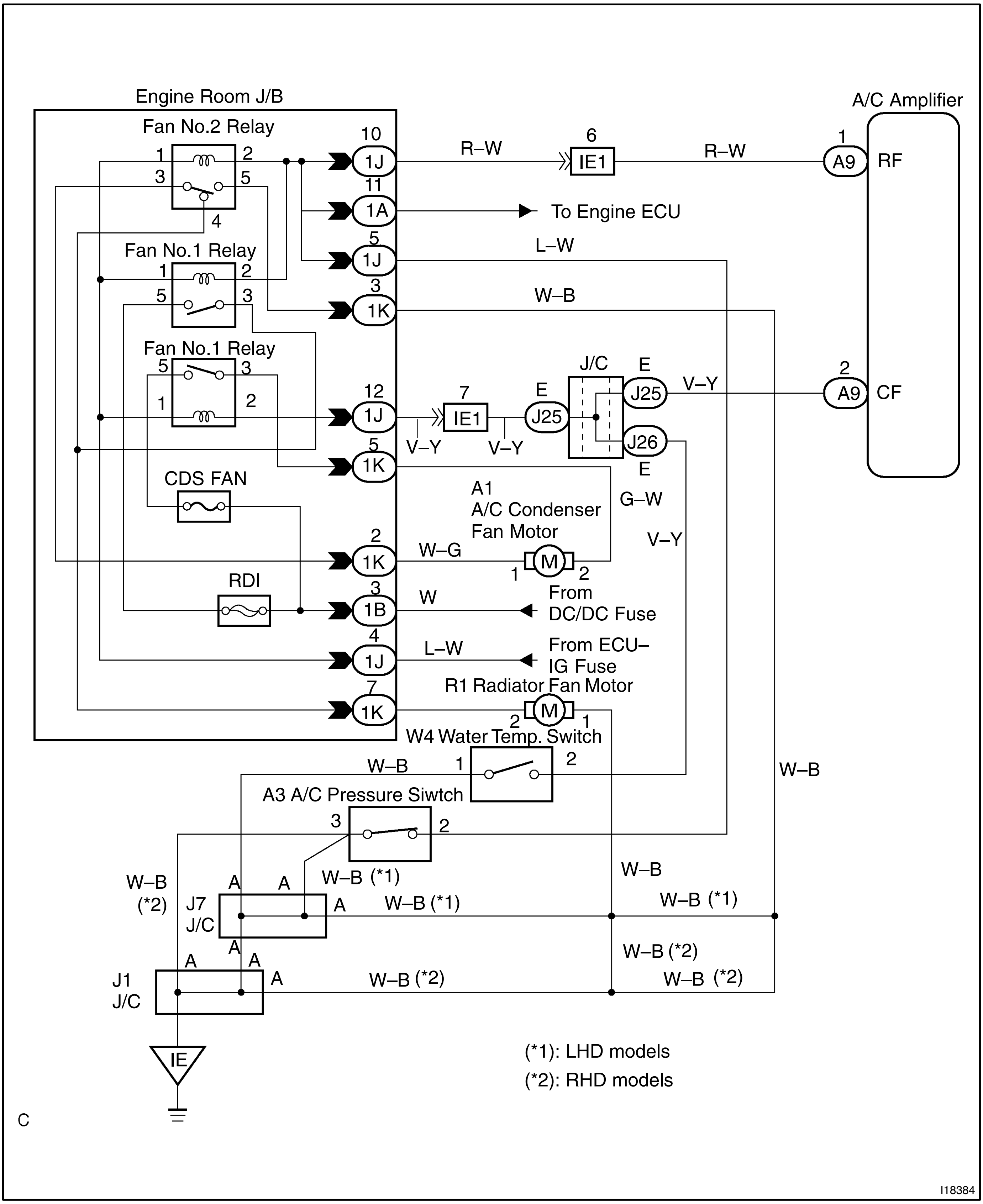
Radiator Fan and Condenser Fan Circuit

CIRCUIT DESCRIPTION

The electric fan speed is controlled as described below, in accordance with the following signals:

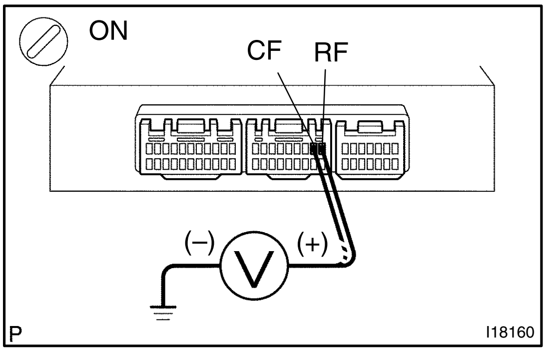
- ON/OFF signal of A/C switch
- ON/OFF signal detected by the pressure switch (that cut out at medium pressure)
- ON/OFF signal detected by water temperature switch

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals RF, CF of A/C amplifier and body ground.



PREPARATION:

Remove the center cluster module control with connectors still connected.

CHECK:

(a) Start engine.

(b) Turn A/C switch ON.

(c) Measure voltage between terminal RF, CF of A/C amplifier and body ground at each conditions as shown in the chart.

OK:

Terminal	Condition	Voltage
RF ↔ Body ground	Water temp.: Below 90°C (194 °F) Refrigerant pressure: Below 1,520 kPa (15.5 kgf/cm^2, 220 psi)	10 – 14 V
	Water temp.: Above 90°C (194 °F) Refrigerant pressure: Above 1,520 kPa (15.5 kgf/cm^2, 220 psi)	Below 1.0 V
CF ↔ Body ground	A/C switch: ON	Below 1.0 V
	A/C switch: OFF	10 – 14 V

OK → **Go to step 4.**

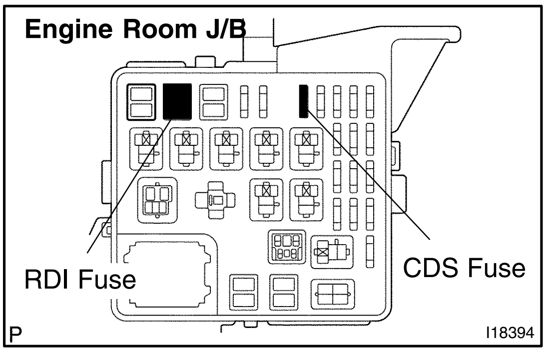
NG

2	Check Fan No. 1, No. 2 and No. 3 relays (See page AC–66).

NG → **Replace faulty relay**

OK

3	Check RDI fuse and CDS fuse.



PREPARATION:
Remove RDI fuse and CDS fuse from engine room J/B.

CHECK:
Check continuity of RDI fuse and CDS fuse.

OK:
Continuity exists.

NG → **Check for short in all the harness and components connected to the RDI fuse (See attached wiring diagram).**

OK

Check harness and connector between A/C control amplifier and battery (See page IN–40).

4	Check fan motor operation (See page AC–68).

NG → **Replace fan motor.**

OK

5	Check pressure switch (See page AC–63).

NG → **Replace pressure switch.**

OK

6	**Check water temp. switch (See page AC–85).**

NG → **Replace water temp. switch.**

OK

7	**Check harness and connector between A/C amplifier and pressure switch, pressure switch and body ground (See page IN–40).**

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

OK

8	**Check harness and connector between A/C amplifier and water temp. switch, water temp. switch and body ground (See page IN–40).**

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

OK

Check and replace A/C amplifier.