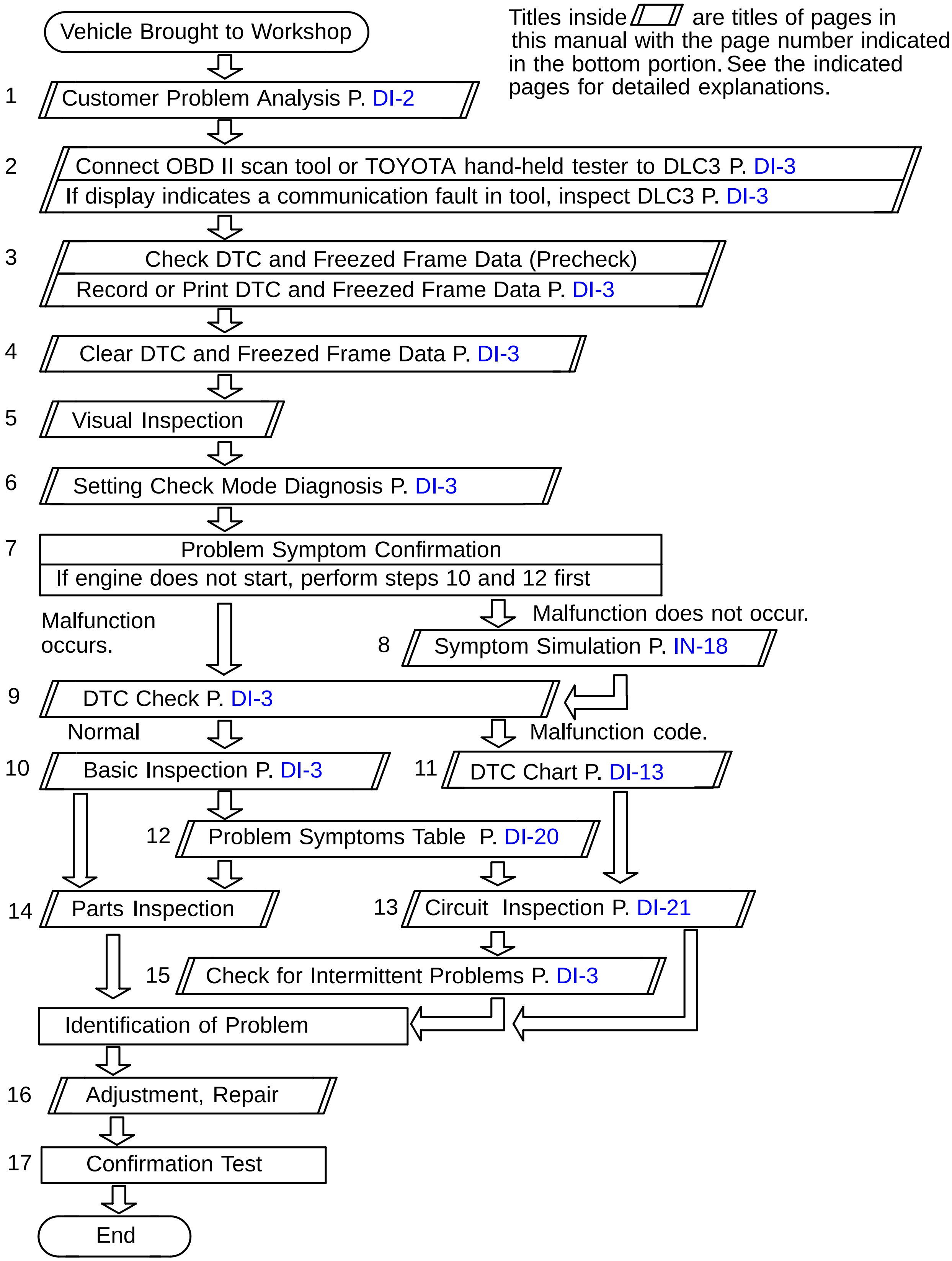
ENGINE (5VZ-FE)

DI0RJ-07

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



DI0RK-06

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name ______

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

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

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

Condition of MIL		☐ Remains on ☐ Sometimes lights 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 ( )

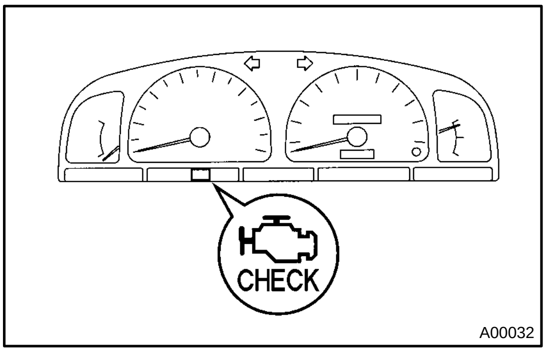
DI8XG-01

PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

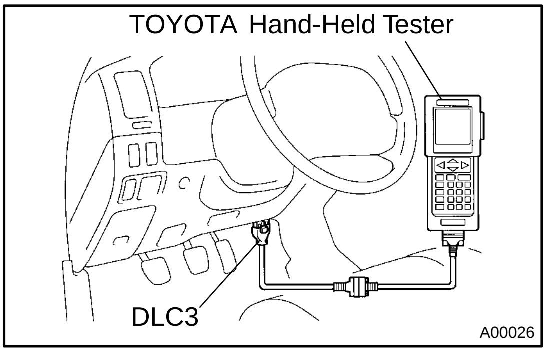
- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect the vehicle to the OBD II scan tool complying with SAE J1978 or TOYOTA hand-held tester, and read off various data output from the vehicle's ECM.



A00032

- OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the MIL lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by SAE J2012 are recorded in the ECM memory (See page DI-13).

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



A00026

- To check the DTC, connect the OBD II scan tool or TOYOTA hand-held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD II scan tool or TOYOTA hand-held tester also enables you to erase the DTC and check freezed frame data and various forms of engine data (For operating instructions, see the OBD II scan tool's instruction book.). DTC include SAE controlled codes and manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI-13).

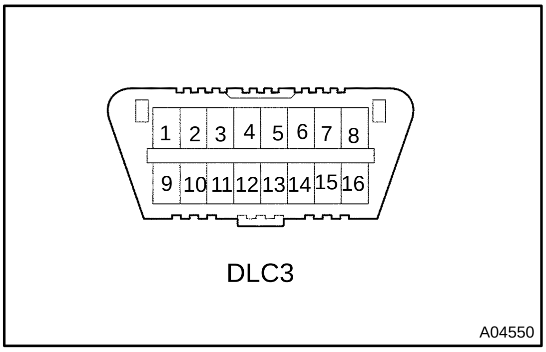
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTC use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily (TOYOTA hand-held tester only). (See step 2)
- *2 trip detection logic:
  When a malfunction is 1st detected, the malfunction is temporarily stored in the ECM memory. (1st trip)

If the same malfunction is detected again during the second drive test, this second detection causes the MIL to light up. (2nd trip) (However, the ignition switch must be turned OFF between the 1st trip and 2nd trip.).

- Freeze frame data:
  Freeze frame data records the engine condition when a misfire (DTCs P0300 - P0306) or fuel trim malfunction (DTCs P0171,P0172, P0174 and P0175) 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 was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

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

(1) DTC other than fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175) and misfire (DTCs P0300 - P0306).
(2) Fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175).
(3) Misfire (DTCs P0300 - P0306).

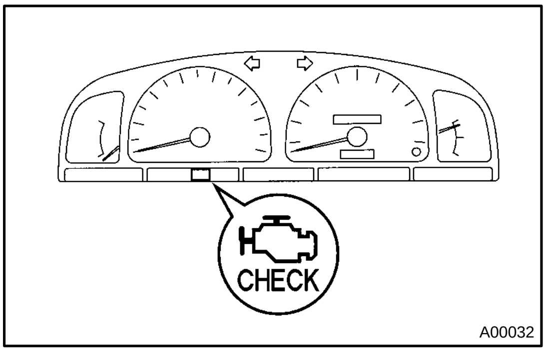


(b) Check the DLC3.
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus ⊕ Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
5	Signal 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 II scan tool or TOYOTA hand-held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect 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 listed in the tool's instruction manual.



2. INSPECT DIAGNOSIS (Normal Mode)

(a) Check the MIL.

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

HINT:
If the MIL does not light up, troubleshoot the combination meter (See page BE-2).

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

(b) Check the DTC.

NOTICE:

- **If there is no DTC in the normal mode, check the 1st trip DTC using Continuous Test Results function (Mode 7 for SAE J1979) on the OBDII scan tool or TOYOTA hand-held tester.**

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

  (1) Prepare the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester.
  (2) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3 at the lower center of the instrument panel.
  (3) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester switch ON.
  (4) Use the OBD II scan tool or TOYOTA hand-held tester to check the DTC and freezed frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book.).

If there is no DTC in the normal mode, check the 1st trip DTC using Continuous Test Results function (Mode 7 for SAE J1979) on the OBDII scan tool or TOYOTA hand-held tester.

  (5) See page DI-3 to confirm the details of the DTC.

NOTICE:

- **When simulating symptoms with an OBD II scan tool (excluding TOYOTA hand-held tester) to check the DTC, use the normal mode. For code on the DTC chart subject to ”2 trip detection logic”, performe the following either action.**
- **Turn the ignition switch OFF after the symptom is simulated the 1st time. Then repeat the simulation process again. When the problem has been simulated twice, the MIL lights up and the DTCs are recorded in the ECM.**
- **Check the 1st trip DTC using Mode 7 (Continuous Test Results) for SAE J1979.**

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

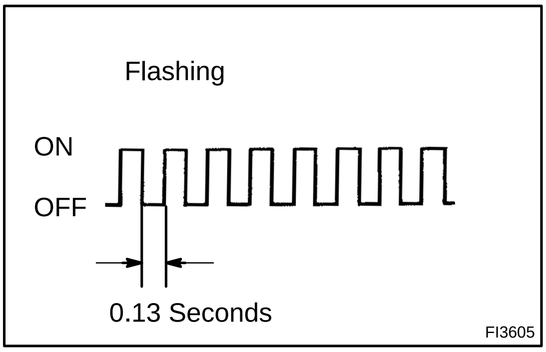
- Operating the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
- Disconnecting the battery terminals or EFI fuse.

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

3. INSPECT DIAGNOSIS (Check Mode)

HINT:
TOYOTA 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 mode.

(a) Check the DTC.
  (1) Initial conditions.
    - Battery positive voltage 11 V or more
    - Throttle valve fully closed
    - Transmission in P or N position
    - A/C switched OFF
  (2) Turn the ignition switch OFF.
  (3) Prepare the TOYOTA hand-held tester.
  (4) Connect the TOYOTA hand-held tester to the DLC3 at the lower center of the instrument panel.
  (5) Turn the ignition switch ON and push the TOYOTA hand-held tester switch ON.



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

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

  (7) Start the engine (The MIL 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 TOYOTA hand-held tester diagnosis selector to check the DTC and freezed frame data, etc.

HINT:
Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check mode to normal mode. So all DTC, etc. are erased.

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

4. FAIL-SAFE CHART

If any of the following codes is recorded, the ECM enters fail-safe mode.

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0100	Ignition timing fixed at 10° BTDC	Returned to normal condition
P0110	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
P0115	Engine coolant temp. is fixed at 80°C (176°F)	Returned to normal condition
P0120	VTA is fixed at 0°	Following condition must be repeated at least 2 times consecutively: (a) VTA ≧ 0.1 V and ≦ 0.95 V, Vehicle speed= 0 km/h (only ECT) (b) Vehicle speed: 0 km/h (0 mph) (only for A/T)
P0135 P0141	The heater circuit in witch an abnormality is detected is turned off	Ignition switch OFF
P0325 P0330	Max. timing retardation	Ignition switch OFF
P1300	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HINT:
TOYOTA hand-held tester only:
By putting the vehicle's ECM in the check mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuits is increased. This makes it easier to detect intermittent problems.

(a) Clear the DTCs (See step 2).
(b) Set the check mode (See step 3).
(c) Perform a simulation test (See page IN-18).
(d) Check the connector and terminal (See page IN-28).
(e) Handle the connector (See page IN-28)

6. BASIC INSPECTION

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

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

NO → **Charge or replace battery.**

YES

2	**Is engine cranked?**

NO → **Proceed to page ST-15, and continue to trouble-shoot.**

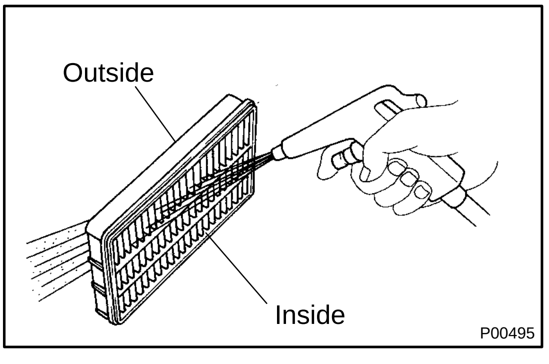
YES ↓

3	**Does engine start?**

NO → **Go to step 7.**

YES ↓

4	**Check air filter.**



PREPARATION:

Remove the air filter.

CHECK:

Visually check that the air filter is not dirty or excessive oily.

HINT:

If necessary, clean the air filter with compressed air. First blow from inside thoroughly, then blow from outside of the air filter.

NG → **Repair or replace.**

OK ↓

5	**Check idle speed (See page EM-10).**

OK:

Idle speed: 650 - 750 rpm

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

OK ↓

6	Check ignition timing (See page EM-9).

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 (See page SF-7).

NG → Proceed to page SF-7 , and continue to trouble-shoot.

OK

8	Check for spark (See page IG-1).

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 varies differ 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 signals.

TOYOTA 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: 14.9 - 21.3 % Racing without load (2,500rpm): 16.6 - 23.5 %
COOLANT TEMP	Engine Coolant Temp. Sensor Value	After warming up: 80 - 95°C (176 - 203°F)
SHORT FT #1	Short-term Fuel Trim Bank 1	0 ± 20 %
LONG FT #1	Long-term Fuel Trim Bank 1	0 ± 20 %
SHORT FT #2	Short-term Fuel Trim Bank 2	0 ± 20 %
LONG FT #2	Long-term Fuel Trim Bank 2	0 ± 20 %
ENGINE SPD	Engine Speed	Idling: 650 - 750 rpm
VEHICLE SPD	Vehicle Speed	Vehicle stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No.1	Idling: BTDC 12.5 - 22.0°
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to ambient temp.
MAF	Air Flow Rate Through Mass Air Flow Meter	Idling: 3.3 - 4.7 gm/sec. Racing without load (2,500 rpm): 12.9 - 18.3 gm/sec.
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0 %, 5 V → 100 %	Throttle valve fully closed: 7 - 11 % Throttle valve fully open: 65 - 75 %
AFS B1 S1	Voltage Output of Oxygen Sensor Bank 1 Sensor 1	Idling: 0.1 - 0.9 V
AFFT 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): 0.1 - 0.9 V

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

(b) TOYOTA Enhanced Signals.

TOYOTA hand-held tester display	Measurement Item	Normal Condition*
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0: 0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0: 0 g/r
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.82 - 3.15 ms
STARTER SIG	Starter Signal	Cranking: ON
CTP SIG	Closed Throttle Position Signal	Throttle Fully Closed: ON
PS OIL PRESS SW	Power Steering Oil Pressure Switch Signal	Turn steering wheel: ON
A/C SW	A/C Switch Signal	A/C ON: ON
PNP SW	Park/Neutral Position Switch Signal	P or N position: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: ON
FC IDL	Fuel Cut Idle: Fuel cut when throttle valve fully closed, during deceleration	Fuel cut operating: ON
FC TAU	Fuel Cut TAU: Fuel cut during very light load	Fuel cut operating: ON
CYL#1 - CYL#6	Abnormal revolution variation for each cylinder	0 %
IGNITION	Total number of ignition for every 1,000 revolutions	0 - 3,000
A/C CUT SIG	A/C Cut Signal	A/C SW OFF: ON
FUEL PUMP / SPD	Fuel Pump Signal	Idling: ON
EVAP VSV	EVAP VSV Signal	VSV operating: ON
VAPOR PRESS VSV	Vapor Pressure VSV Signal	VSV operating: ON (TANK)
THROTTLE POS #2	Throttle position sensor No.2 output voltage	Throttle fully closed: 2.0 - 2.9 V Throttle fully open: 4.7 - 5.1 V

ACCEL POS #1	Accelerator pedal position sensor No.1 output voltage	Accelerator pedal released: 0.3 - 0.9 V Accelerator pedal depressed: 3.2 - 4.8 V
ACCEL POS #2	Accelerator pedal position sensor No.2 output voltage	Accelerator pedal released: 1.8 - 2.7 V Accelerator pedal depressed: 4.7 - 5.1 V
THROTTLE TARGET	Target position of throttle valve	Idling: 0.4 - 1.1 V
DUTY	Throttle motor opening duty ratio	Throttle fully closed: 0 % When accelerator pedal is depressed, duty ratio is increased
THROTL CLS DUTY	Throttle motor closed duty ratio	Throttle fully closed: 0 % When accelerator pedal is quick released, duty ratio is increased
THROTTLE MOT	Whether or not throttle motor control is permitted	Idling: ON
CLUTCH	Whether or not magnetic clutch control is permitted	Idling: ON
+BM	Whether or not electric throttle control system power is inputted	Idling: ON
ACCEL IDL POS	Whether or not accelerator pedal position sensor is detecting idle	Idling: ON
THROTTL IDL POS	Whether or not throttle position sensor is detecting idle	Idling: ON
FAIL #1	Whether or not fail safe function is executed	ETCS is failed: ON
FAIL #2	Whether or not fail safe function is executed	ETCS is failed: ON
THROTTLE INITIAL	Throttle fully closed learning value	0.4 - 0.8 V
ACCEL LEARN VAL	Accelerator fully closed learning value	0.4 - 0.8 V
THROTTLE MOT	Throttle motor control current	Idling: 0 - 3.0 A
CLUTCH	Magnetic clutch control current	0.8 - 1.0 A
TOTAL FT #1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.8 - 1.2 V
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 warmed 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 warmed up: 0 - 1,000 msec.

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

DI0RM-16

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 check mode, check the circuit for the codes 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. ¿

SAE CONTROLLED

DTC No. (See page)	Detection Item	Trouble Area	MIL*1	Memory
P0100 (DI-21)	Mass Air Flow Circuit Malfunction	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM	○	○
P0101 (DI-25)	Mass Air Flow Circuit Range/ Performance Problem	• Mass 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 mass air flow meter) • ECM	○	○
P0115 (DI-30)	Engine Coolant Temp. Circuit Malfunction	• Open or short in engine coolant temp. sensor circuit • Engine coolant temp. sensor • ECM	○	○
P0116 (DI-34)	Engine Coolant Temp. Circuit Range/Performance Problem	• Cooling system • Engine coolant temp. sensor	○	○
P0120 (DI-36)	Throttle/Pedal Position Sensor/ Switch "A" Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • ECM	○	○
P0121 (DI-41)	Throttle/Pedal Position Sensor/ Switch "A" Circuit Range/Performance Problem	• Throttle position sensor	○	○
P0125 (DI-42)	Insufficient Coolant Temp. for Closed Loop Fuel Control	• Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • PCV valve and hose • ECM	○	○
P0128 (DI-47)	Thermostat Malfunction	• Thermostat • Cooling system • Engine Coolant temp. sensor • ECM	○	○
P0136 (DI-48)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor	○	○
P0141 (DI-50)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135	○	○

P0171 (DI-52)	System too Lean (Fuel Trim)	• Air induction system • Injector blockage • Mass air flow meter • Engine coolant temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • PCV valve and hose • ECM	○	○
P0172 (DI-52)	System too Rich (Fuel Trim)	• Injector leak, blockage • Mass air flow meter • Engine coolant temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • ECM	○	○
P0300 (DI-57)	Random/Multiple Cylinder Misfire Detected	• Open or short in engine wire • Connector connection • Vacuum hose connector • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temp. sensor • Compression pressure • Valve clearance • Valve timing • PCV valve and hose • ECM	○*2	○
P0301 (DI-57)	Cylinder 1 Misfire Detected			
P0302 (DI-57)	Cylinder 2 Misfire Detected			
P0303 (DI-57)	Cylinder 3 Misfire Detected			
P0304 (DI-57)	Cylinder 4 Misfire Detected			
P0305 (DI-57)	Cylinder 5 Misfire Detected			
P0306 (DI-57)	Cylinder 6 Misfire Detected			
P0325 (DI-63)	Knock Sensor 1 Circuit Malfunction (Bank 1)	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • ECM	○	○
P0330 (DI-63)	Knock Sensor 2 Circuit Malfunction (Bank 2)	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • ECM	○	○
P0335 (DI-66)	Crankshaft Position Sensor "A" Circuit Malfunction	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • ECM	○	○
P0340 (DI-68)	Camshaft Position Sensor Circuit Malfunction	• Open or short in camshaft position sensor circuit • Camshaft position sensor • RH camshaft timing pulley • ECM	○	○
P0420 (DI-70)	Catalyst System Efficiency Below Threshold (Bank 1)	• Gas leakage on exhaust system • A/F sensor (bank 1 sensor 1) • Heated oxygen sensor (bank 1 sensor 2) • Three-way catalytic converter	○	○

P0440 (DI-73)	Evaporative Emission Control System Malfunction	• Hose or tube cracked, holed, damaged or loose seal ((3) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Vacuum hose cracked, holed, blocked, damaged or disconnected ((1) or (2) in Fig. 1) • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM	○	○
P0441 (DI-83)	Evaporative Emission Control System Incorrect Purge Flow	• Vacuum hose cracks, holed, damaged or disconnected ((1), (4), (5), (6) and (7) in Fig. 1) • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for vapor pressure sensor • VSV for vapor pressure sensor • Charcoal canister cracks, holed or damaged • ECM	○	○
P0442 (DI-73)	Evaporative Emission Control System Leak detected (Small Leak)	• Same as DTC No. P0440	○	○
P0446 (DI-83)	Evaporative Emission Control System Vent Control Malfunction	• Vacuum hose cracks, holed, damaged or disconnected ((1), (4), (5), (6) and (7) in Fig. 1) • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for vapor pressure sensor • VSV for vapor pressure sensor • Charcoal canister cracks, holed or damaged • ECM	○	○
P0450 (DI-101)	Evaporative Emission Control System Pressure Sensor Malfunction	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM	○	○
P0451 (DI-101)	Evaporative Emission Control System Pressure Sensor Range/ Performance			
P0500 (DI-103)	Vehicle Speed Sensor Malfunction	• Speedometer cable • Open or short in speed signal circuit • ECM	○	○
P0505 (DI-105)	Idle Control System Malfunction	• Air induction system • Electric throttle control system • PCV valve and hose	○	○

*1: MIL lights up.
*2: MIL lights up or blinking.

MANUFACTURER CONTROLLED

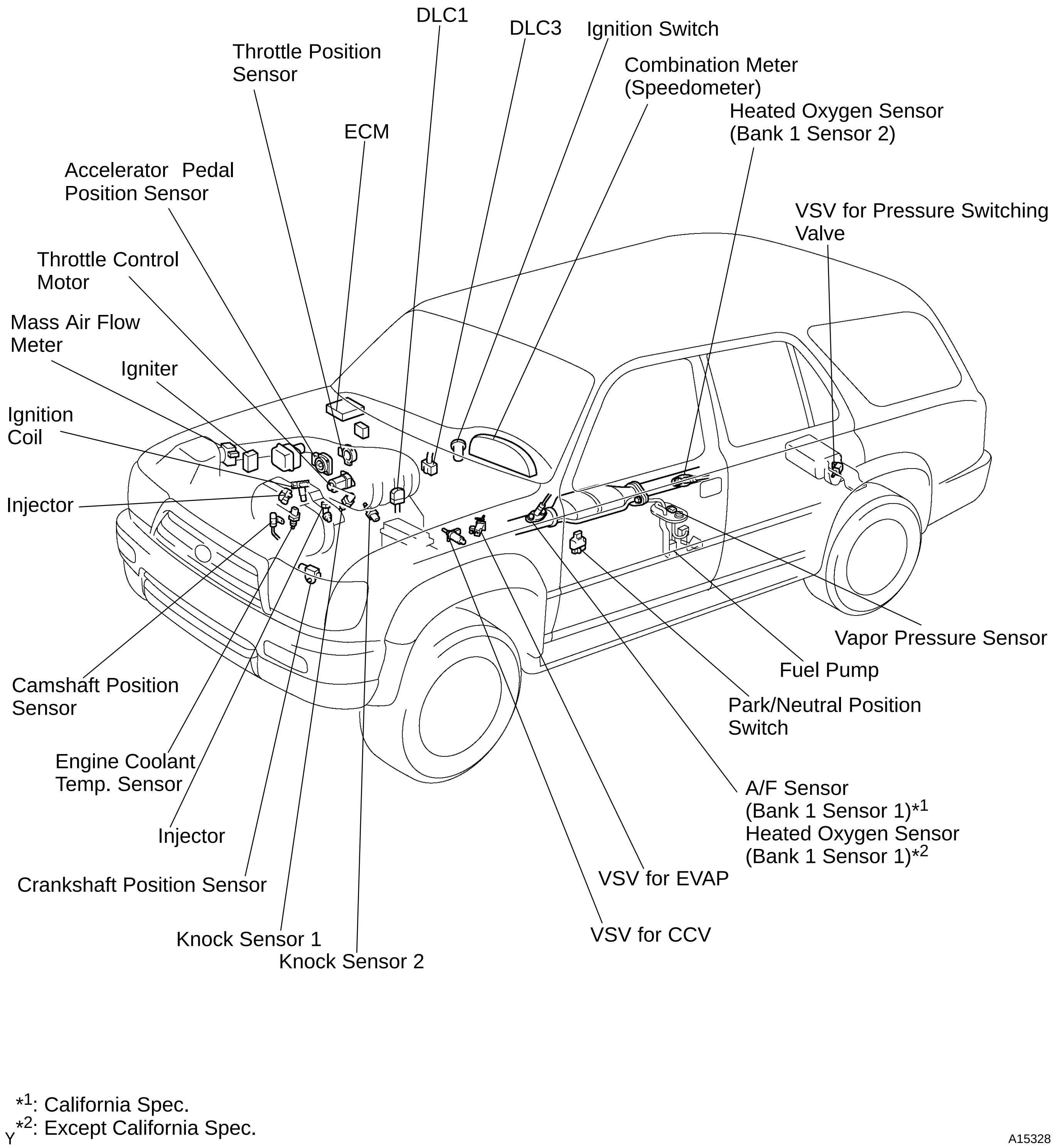
DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P1120 (DI-107)	Accelerator Pedal Position Sensor Circuit Malfunction	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM	○	○

P1121 (DI-112)	Accelerator Pedal Position Sensor Range/Performance Problem	• Accelerator pedal position sensor	○	○
P1125 (DI-113)	Throttle Control Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • ECM	○	○
P1126 (DI-115)	Magnetic Clutch Circuit Malfunction	• Open or short in magnetic clutch circuit • Magnetic clutch • ECM	○	○
P1127 (DI-118)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • ECM	○	○
P1128 (DI-121)	Throttle Control Motor Lock Malfunction	• Throttle control motor • Throttle body assembly	○	○
P1129 (DI-121)	Electric Throttle Control System Malfunction	• Electric throttle control system • ECM	○	○
P1130 (DI-122)	A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM	○	○
P1133 (DI-126)	A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM	○	○
P1135 (DI-130)	A/F Sensor Heater Circuit Malfunction (Bank1 Sensor 1)	• Open or short in heater circuit of A/F sensor • A/F sensor heater • ECM	○	○
P1300 (DI-132)	Igniter Circuit Malfunction	• Ignition system • Open or short in IGF and IGT circuits from igniter to ECM • Igniter • Ignition coil • ECM	○	○
P1335 (DI-137)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate • ECM	-	○
P1520 (DI-138)	Stop Light Switch Signal Malfunction	• Short in stop light switch signal circuit • Stop light switch • ECM	○	○
P1600 (DI-141)	ECM BATT Malfunction	• Open in back up power source circuit • ECM	○	○
P1633 (DI-143)	ECM Malfunction (ETCS Circuit)	• ECM	○	○
P1780 (DI-144)	Park/Neutral Position Switch Malfunction (Only for A/T)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	○	○

*: ○ ... MIL lights up. - ... MIL does not light up.

DI0RN-11

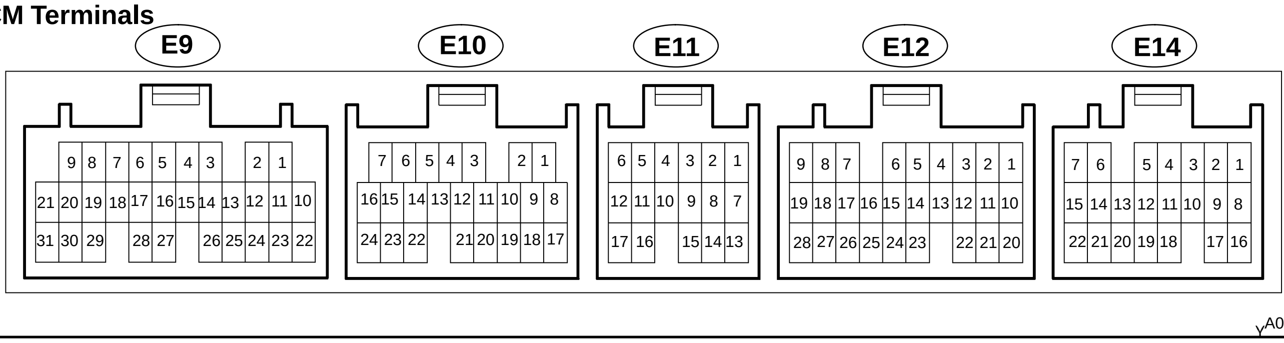
PARTS LOCATION



DI4DE-03

TERMINALS OF ECM

ECM Terminals



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E14-16) - E1 (E10-17)	L-R ↔ BR	Always	9 - 14
+B (E14-1) - E1 (E10-17)	W-L ↔ BR	IG switch ON	9 - 14
VC (E9-25) - E2 (E9-11)	G-B ↔ L-B	IG switch ON	4.5 - 5.5
VTA (E9-15) - E2 (E9-11)	B-Y ↔ L-B	IG switch ON, Throttle valve fully closed	0.3 - 1.0
		IG switch ON, Throttle valve fully open	2.7 - 5.2
VTA2 (E11-4) - E2 (E9-11)	G-Y ↔ L-B	IG switch ON, Throttle valve fully closed	0.3 - 1.0
		IG switch ON, Throttle valve fully open	2.7 - 5.2
VG (E9-12) - E2G (E9-10)	R-W ↔ B-W	Idling, A/C switch OFF	1.1 - 1.5
NE+ (E10-12) - NE- (E10-21)	L ↔ G	Idling	Pulse generation (See page DI-66)
G2 (E10-13) - NE- (E10-21)	R ↔ G	Idling	Pulse generation (See page DI-66)
THA (E9-13) - E2 (E9-11)	Y-G ↔ L-B	Idling, Intake air temp. 20°C (68°F)	0.5 - 3.4
THW (E9-18) - E2 (E9-11)	G ↔ L-B	Idling, Engine coolant temp. 80°C (176°F)	0.2 - 1.0
STA (E14-7) - E1 (E10-17)	B-W ↔ BR	Cranking	6.0 or more
#10 (E10-6) - E01 (E9-4) #20 (E10-5) - E01 (E9-4) #30 (E10-4) - E01 (E9-4) #40 (E10-3) - E01 (E9-4) #50 (E10-1) - E01 (E9-4) #60 (E10-8) - E01 (E9-4)	R ↔ W-B W ↔ W-B G ↔ W-B R-B ↔ W-B L ↔ W-B Y ↔ W-B	IG switch ON	9 - 14
		Idling	Pulse generation (See page DI-57)
IGT1 (E10-11) - E1 (E10-17)	B-L ↔ BR	Idling	Pulse generation (See page DI-132)
IGT2 (E10-10) - E1 (E10-17)	L-Y ↔ BR		
IGT3 (E10-9) - E1 (E10-17)	G-W ↔ BR		
IGF (E10-2) - E1 (E10-17)	B-Y ↔ BR	IG switch ON	4.5 - 5.5
		Idling	Pulse generation (See page DI-132)
FC (E14-22) - E01 (E9-4)	G-Y ↔ W-B	IG switch ON	9 - 14
		Idling	0 - 3.0
EVP1 (E10-14) - E01 (E9-4)	W-G ↔ W-B	IG switch ON	9 - 14
CCV (E10-19) - E01 (E9-4)	L-B ↔ W-B	IG switch ON	9 - 14
OX2B (E9-27) - E1 (E10-17)	B ↔ BR	Maintain engine speed at 2,500 rpm for 3 min. after warming up	Pulse generation (See page DI-70)
HT2B (E9-29) - E03 (E9-7)	G-Y ↔ W-B	Idling	Below 3.0
		IG switch ON	9 - 14
KNK1 (E9-23) - E1 (E10-17)	B ↔ BR	Idling	Pulse generation (See page DI-63)
KNK2 (E9-22) - E1 (E10-17)	GR ↔ BR		

NSW (E12-3) - E1 (E10-17)	B ↔ BR	IG switch ON, Other shift position in P, N	9 - 14
		IG switch ON, Shift position in P, N	0
TBP (E10-20) - E01 (E9-4)	R-Y ↔ W-B	IG switch ON, Disconnect vacuum hose from vapor pressure sensor	9 - 14
PTNK (E9-24) - E2 (E9-11)	Y ↔ L-B	IG switch ON	2.9 - 3.7
		IG switch ON, Apply vacuum 4.0 kPa (30 mmHg, 1.18 in.Hg)	0.5 or less
SIL (E14-14) - E1 (E10-17)	W ↔ BR	During transmission	Pulse generation
STP (E14-20) - E1 (E10-17)	G-W ↔ BR	IG switch ON, Brake pedal depressed	7.5 - 14
		IG switch ON, Brake pedal released	Below 1.5
AF1+ (E9-14) - E1 (E10-17)	W ↔ BR	IG switch ON	3.0 - 3.6
AF1- (E9-26) - E1 (E10-17)	B ↔ BR	IG switch ON	2.7 - 3.3
HAFF (E9-21) - E04 (E9-8)	L ↔ W-B	Idling	Below 3.0
		IG switch ON	9 - 14
KSW (E14-11) - E1 (E10-17)	Y-R ↔ BR	At time of inserting key	Below 1.5
		In condition without key inserted	4 - 5
CODE (E14-5) - E1 (E10-17)	GR-R ↔ BR	At time of inserting key	Pulse generation
IGSW (E14-15) - E1 (E10-17)	B-L ↔ BR	IG switch ON	9 - 14
TXCT (E14-19) - E1 (E10-17)	P-B ↔ BR	At time of inserting key	Pulse generation
IMLD (E14-12) - E1 (E10-17)	L ↔ BR	In condition without key inserted	Pulse generation
MREL (E14-4) - E1 (E10-17)	GR-B ↔ BR	IG switch ON	9 - 14

DI0RP-10

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	10. Starter 11. Starter relay	ST-15 ST-17
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	DI-148 DI-151 IN-28
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-151
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-145 DI-151 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-145 DI-151
Hot engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-145 DI-151
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	DI-632 AC-89 DI-148
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	DI-632 AC-89 DI-151
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM-3 DI-151
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	DI-148 DI-151
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. A/T faulty	DI-151 DI-175
Surging (Poor driveability)	1. Fuel pump control circuit	DI-151
Soon after starting (Engine stall)	1. Fuel pump control circuit	DI-151
During A/C operation (Engine stall)	1. A/C signal circuit (Compressor circuit) 2. ECM	DI-632 AC-89 IN-28

DI0RQ-16

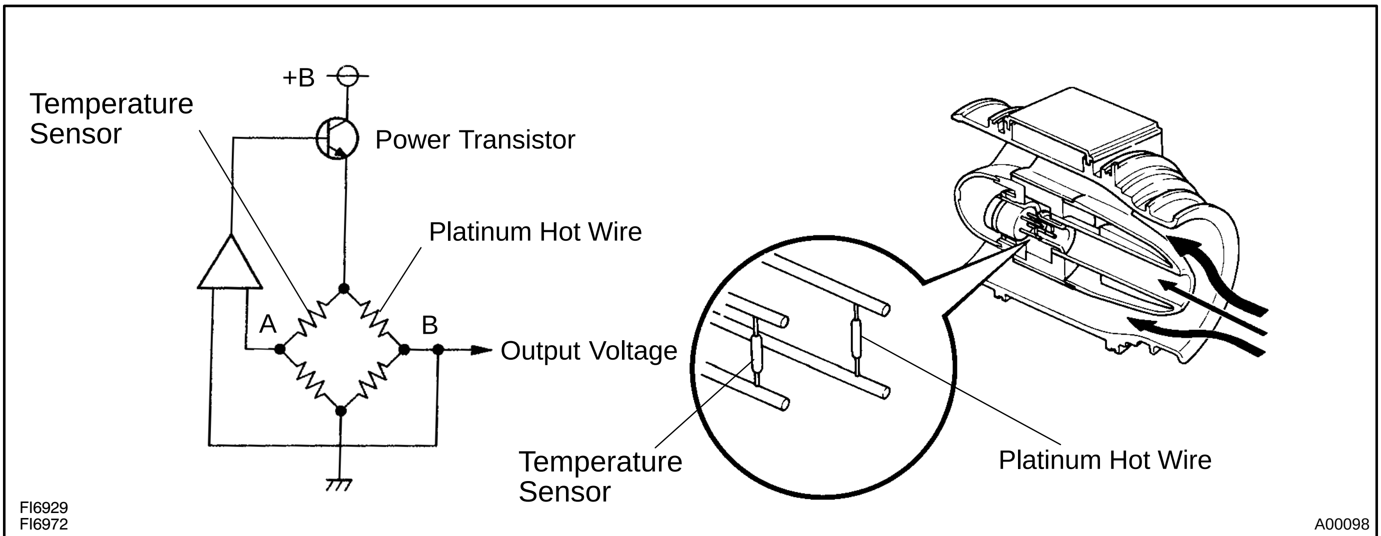
CIRCUIT INSPECTION

DTC	P0100	Mass Air Flow Circuit Malfunction

CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, temperature 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 temperature 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 mass air flow meter.

The circuit is constructed so that the platinum hot wire and temperature 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.

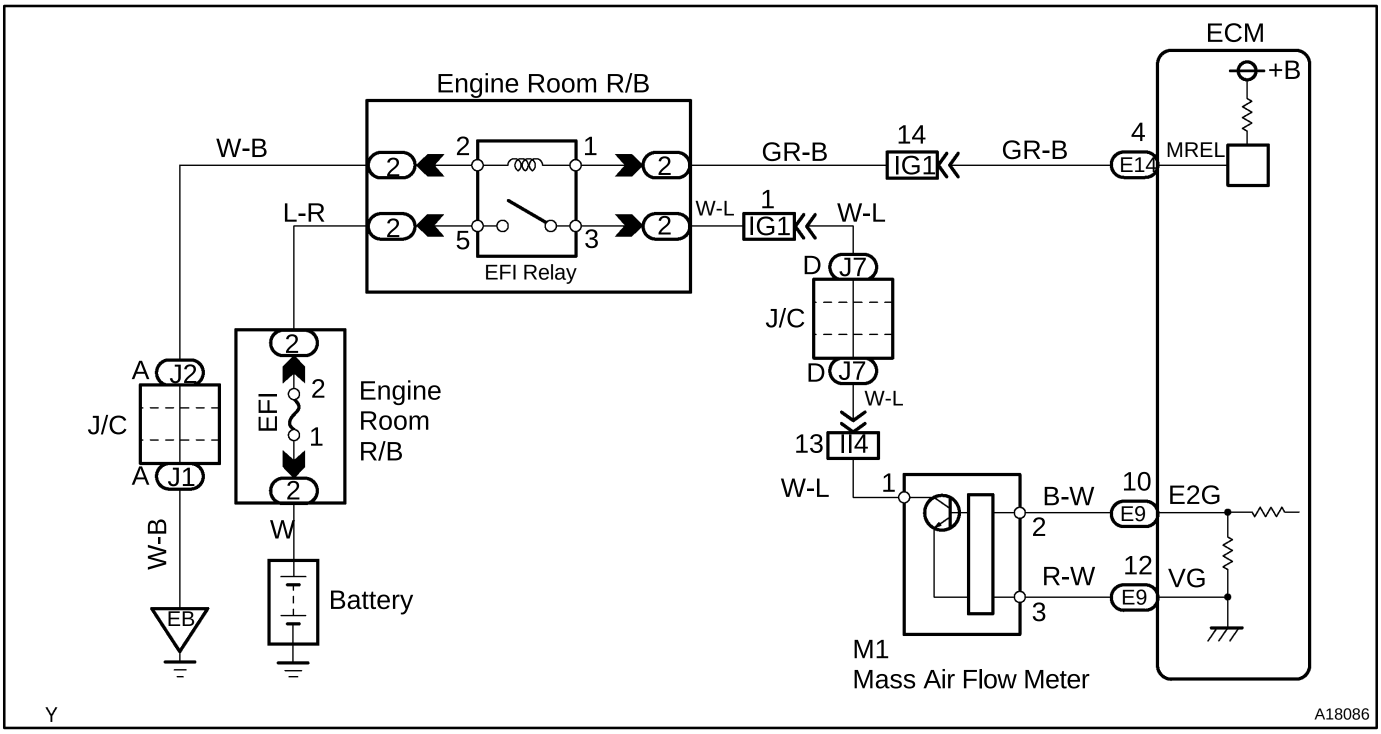


DTC No.	DTC Detecting Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit with engine speed 4,000 rpm or less	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM
	Open or short in mass air flow meter circuit with engine speed 4,000 rpm or more (2 trip detection logic)	

HINT:
After confirming DTC P0100, use the OBD II scan tool or TOYOTA hand-held tester to confirm the mass air flow ratio from the CURRENT DATA.

Mass Air Flow Value (gm/sec.)	Malfunction
Approx. 0	• Mass air flow meter power source circuit open • VG circuit open or short
11.0 - 25.1 (idling after warmed up)	• E3 circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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	**Connect OBD II scan tool or TOYOTA hand-held tester, and read value of mass air flow rate.**

PREPARATION:
(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(b) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.
(c) Start the engine.

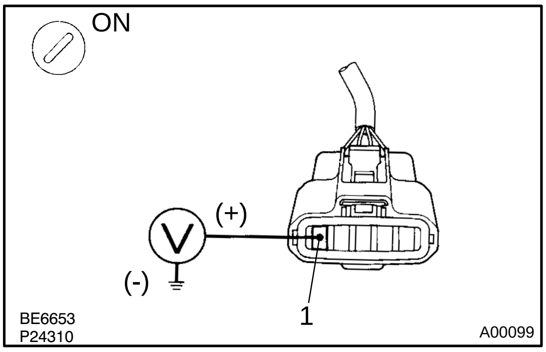
CHECK:
Read the mass air flow rate on the OBD II scan tool or TOYOTA hand-held tester.

RESULT:

	Type I	Type II
Mass Air Flow Rata (gm/sec.)	Approx. 0	11.0 ~ 25.1 (idling after warmed up)

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

2	Check voltage of mass air flow meter power source.



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal 1 of the mass air flow meter connector and body ground.

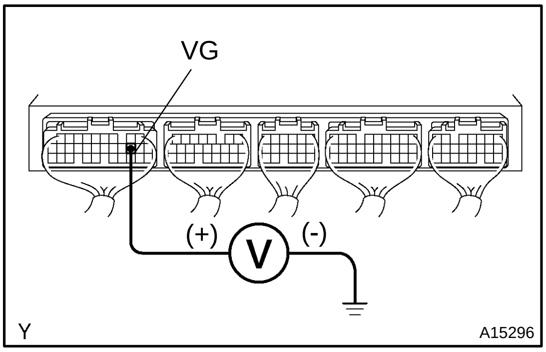
OK:

Voltage: 9 - 14 V

NG → **Check for open in harness and connector between EFI main relay (Marking: EFI) and mass air flow meter (See page IN-28).**

OK

3	Check voltage between terminal VG of ECM connector and body ground.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Start the engine.

CHECK:

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

OK:

Voltage:

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

OK → **Check and replace ECM (See page IN-28).**

NG

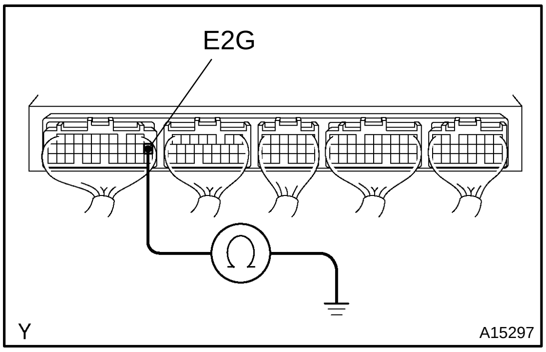
4	Check for open and short in harness and connector between mass air flow meter and ECM (See page IN-28).

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

OK

Replace mass air flow meter.

5	**Check continuity between terminal E2G of ECM connector and body ground.**



PREPARATION:

Remove the glove compartment (See page SF-54).

CHECK:

Check the continuity between terminal E2G of the ECM connector and body ground.

OK:

Continuity (1 Ω or less)

NG → **Check and replace ECM (See page IN-28).**

OK

6	**Check for open in harness and connector between mass air flow meter and ECM (See page IN-28).**

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

OK

Replace mass air flow meter.

DI0RR-09

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 (a) and (b) continue with engine speed 900 rpm or less: (2 trip detection logic) (a) Throttle valve fully closed (b) Mass air flow meter output > 2.2 V	• Mass air flow meter
	Conditions (a) and (b) continue with engine speed 1,500 rpm or more: (2 trip detection logic) (a) VTA ≧ 0.63 V (b) Mass air flow meter output < 1.06 V	

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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 DTC P0101) being output?

NO → **Replace mass air flow meter.**

YES ↓

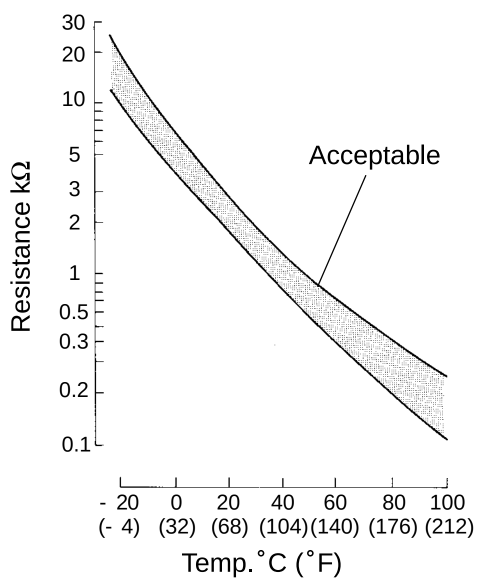
Go to relevant DTC chart (See page DI-13).

DI0RS-16

DTC	P0110	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

Fig. 1



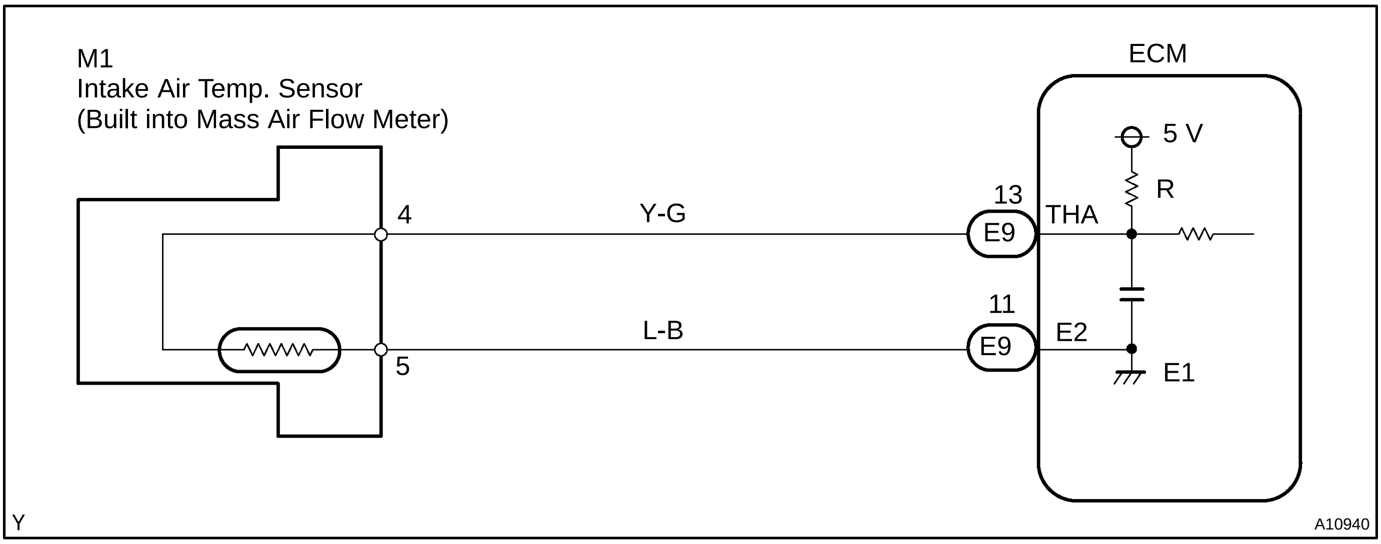
The intake air temperature sensor is built into the mass air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).
The intake air temperature sensor is connected to the ECM (See below). The 5 V power source voltage in the ECM is applied to the intake air temp. sensor from terminal THA via resistor R.
That is, resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation. If the ECM detects the DTC P0110, it operates the fail safe function in which the intake air temperature is assumed to be 20°C (68°F).

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 (built into mass air flow meter) • ECM

HINT:
After confirming DTC P0110, use the OBD II scan tool or TOYOTA hand-held tester to confirm the intake air temperature from the CURRENT DATA.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115 and P0120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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	**Connector OBD II scan tool or TOYOTA hand-held tester, and read value of intake air temperature**

PREPARATION:

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

(b) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Same as actual intake air temperature.

HINT:

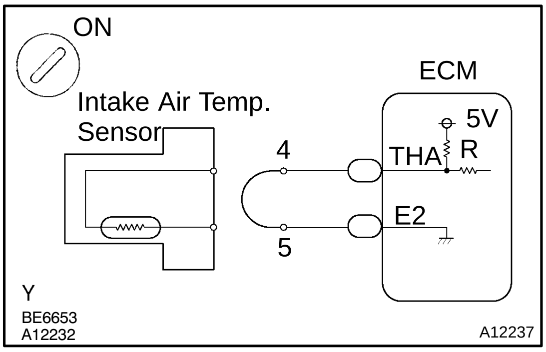
- If there is open circuit, OBD II scan tool or TOYOTA hand-held tester indicates -40°C (–40°F).
- If there is short circuit, OBD II scan tool or TOYOTA hand-held tester indicates 140°C (284°F) or more.

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 ECM.



PREPARATION:
(a) Disconnect the mass air flow meter connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.

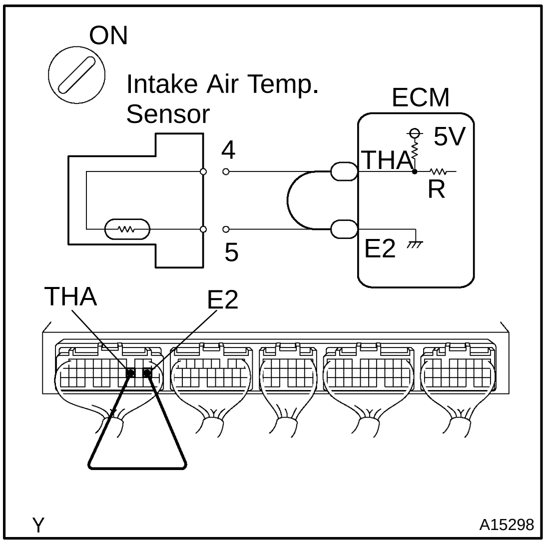
CHECK:
Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

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

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

NG

3	Check for open in harness or ECM.



PREPARATION:
(a) Remove the glove compartment (See page SF-54).
(b) Connect between terminals THA and E2 of the ECM connector.

HINT:
The mass air flow meter connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page IN-28).

CHECK:
Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

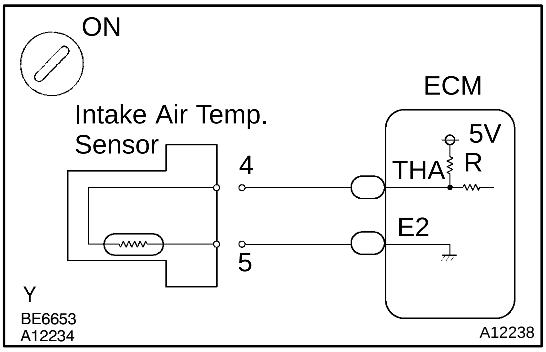
OK:
Temperature value: 140°C (284°F) or more

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

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page IN-28).

4	Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

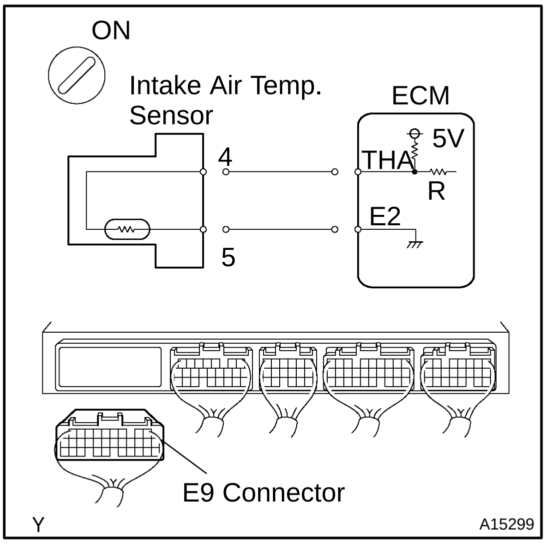
OK:

Temperature value: -40°C (-40°F)

OK → **Replace mass air flow meter.**

NG ↓

5	Check for short in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Disconnect the E9 connector from the ECM.

HINT:

The mass air flow meter connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Temperature value: -40°C (-40°F)

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

NG ↓

Check and replace ECM (See page IN-28).

DI0RT-11

DTC	P0115	Engine Coolant Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the engine coolant temp. sensor changes the resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as in the DTC P0110 shown on page DI-26

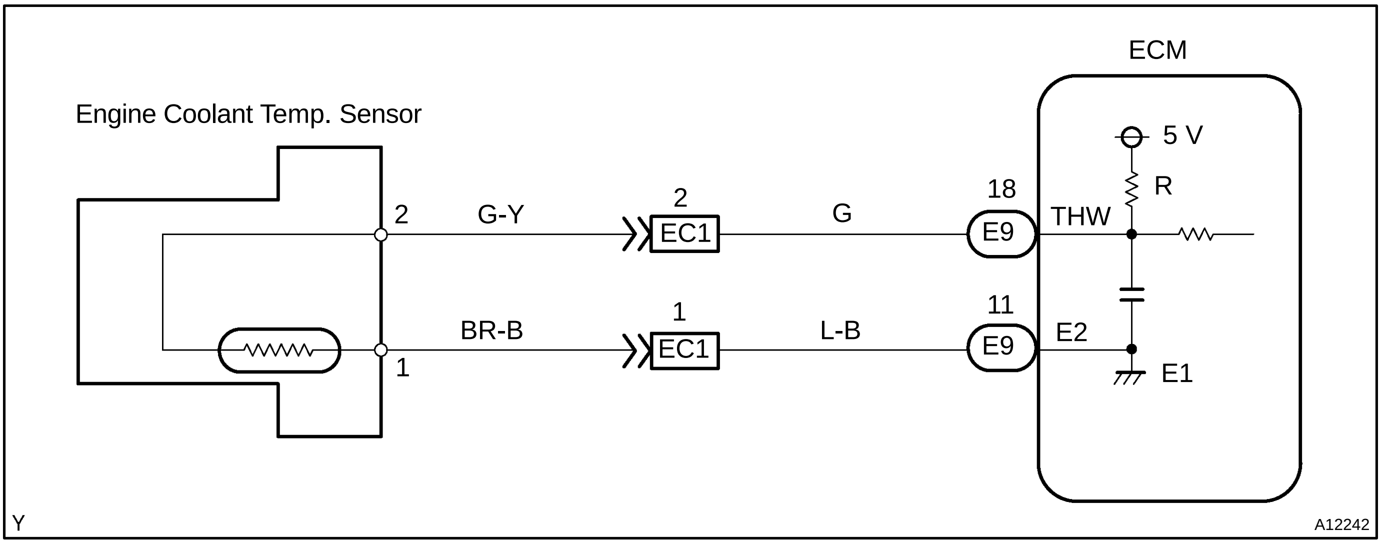
DTC No.	DTC Detecting Condition	Trouble Area
P0115	Open or short in engine coolant temp. sensor circuit	• Open or short in engine coolant temp. sensor circuit • Engine coolant temp. sensor • ECM

HINT:

After confirming DTC P0115, use the OBD II scan tool or TOYOTA hand-held tester to confirm the engine coolant temperature from the CURRENT DATA.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115 and P0120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBDII 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	**Connect OBD II scan tool or TOYOTA hand-held tester, and read value of engine coolant temperature.**

PREPARATION:
(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(b) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.

CHECK:
Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:
Same as actual engine coolant temperature.

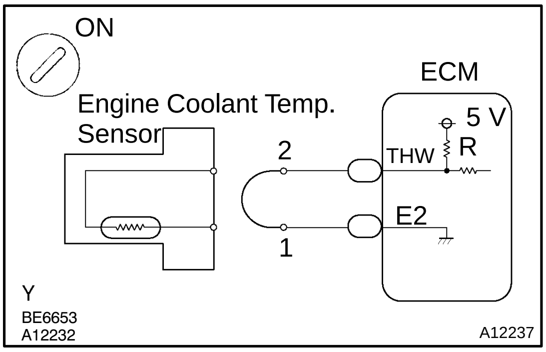
HINT:
- If there is open circuit, OBD II scan tool or TOYOTA hand-held tester indicates -40°C (-40°F).
- If there is open circuit, OBD II scan tool or TOYOTA hand–held tester indicates 140°C (284°F) or more.

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 ECM.**



PREPARATION:
(a) Disconnect the engine coolant temp. sensor connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.

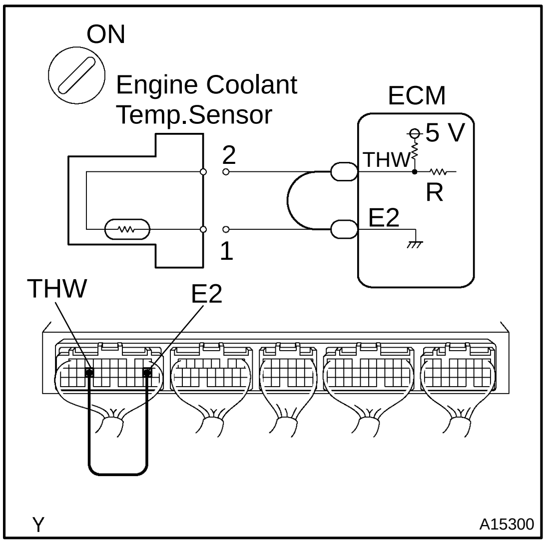
CHECK:
Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

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

OK	**Confirm good connection at sensor. If OK, replace engine coolant temperature sensor.**

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

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

HINT:

The engine coolant temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page IN-28).

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

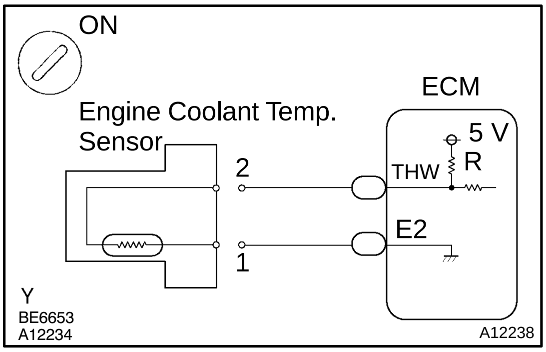
Temperature value: 140°C (284°F) or more

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

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page IN-28).

4	Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the engine coolant temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

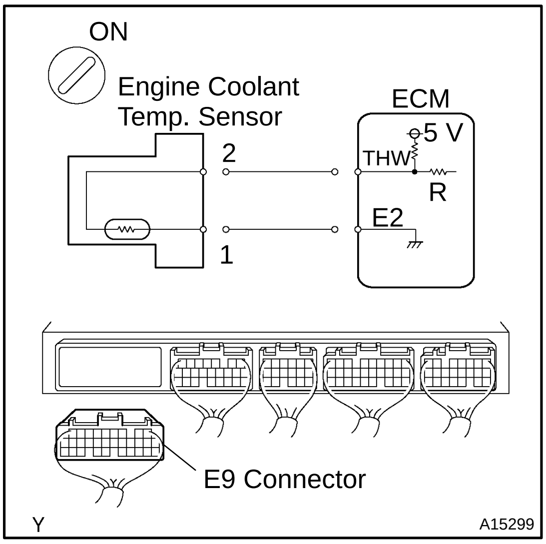
OK:

Temperature value: -40°C (-40°F)

OK → **Replace engine coolant temperature sensor (See page SF-43).**

NG

5	**Check for short in harness or ECM.**



PREPARATION:
(a) Remove the glove compartment (See page SF-54).
(b) Disconnect the E9 connector from the ECM.
HINT:
The engine coolant temperature sensor connector is disconnected.
(c) Turn the ignition switch ON.

CHECK:
Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:
Temperature value: -40°C (-40°F)

OK	**Repair or replace harness or connector.**

NG

Check and replace ECM (See page IN-28).

DI0RU-11

DTC	P0116	Engine Coolant Temp. Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page DI–30.

DTC No.	DTC Detecting Condition	Trouble Area
P0116	If THW ¿ -7˚C (19.4˚F) at engine start, 20 min. or more after starting engine, engine coolant temp. sensor value is 15˚C (59˚F) or less (2 trip detection logic)	• Cooling system • Engine coolant temp. sensor
	If THW ¿ -7˚C (19.4˚F) and ¿ 10˚C (50˚F) at engine start, 5 min. or more after starting engine, engine coolant temp. sensor value is 17˚C (62.6˚F) or less (2 trip detection logic) If THW ≧ 10˚C (50˚F) at engine start, 2 min. or more after starting engine, engine coolant temp. sensor value is 35˚C (95˚F) or less. (2 trip detection logic)	
	When THW ≧ 35˚C (95˚F) and < 60˚C (140˚F), and THA ≧ -6.7 ˚C (19.9˚F), and when starting engine, conditions (a) and (b) continue: (2 trip detection logic) (a) Vehicle speed is changing (Not stable) (b) THW change is lower than 3˚C (5.4˚F) from THW since when starting engine	

INSPECTION PROCEDURE

HINT:

- If DTCs P0115 and P0116 are output simultaneously, engine coolant temp. sensor circuit may be open. Perform troubleshooting of DTC P0115 first.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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 DTC P0116) being output?

YES → Go to relevant DTC chart (See page DI-13).

NO

2	Check thermostat (See page CO-11).

NG → **Replace thermostat.**

OK ↓

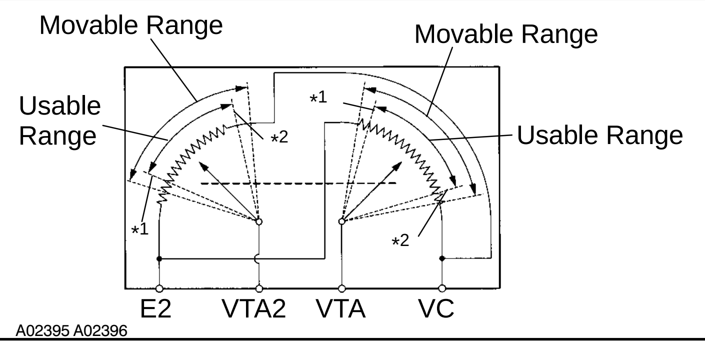
Replace engine coolant temperature sensor.

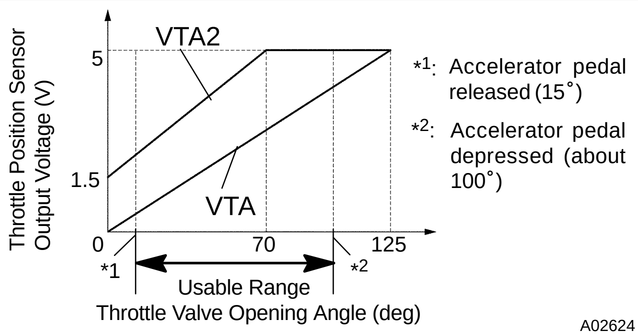
DI1LH-14

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 ECM changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.
The ECM judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to driving condition.
If this DTC is stored, the ECM shuts down the power for the throttle motor and the electromagnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.



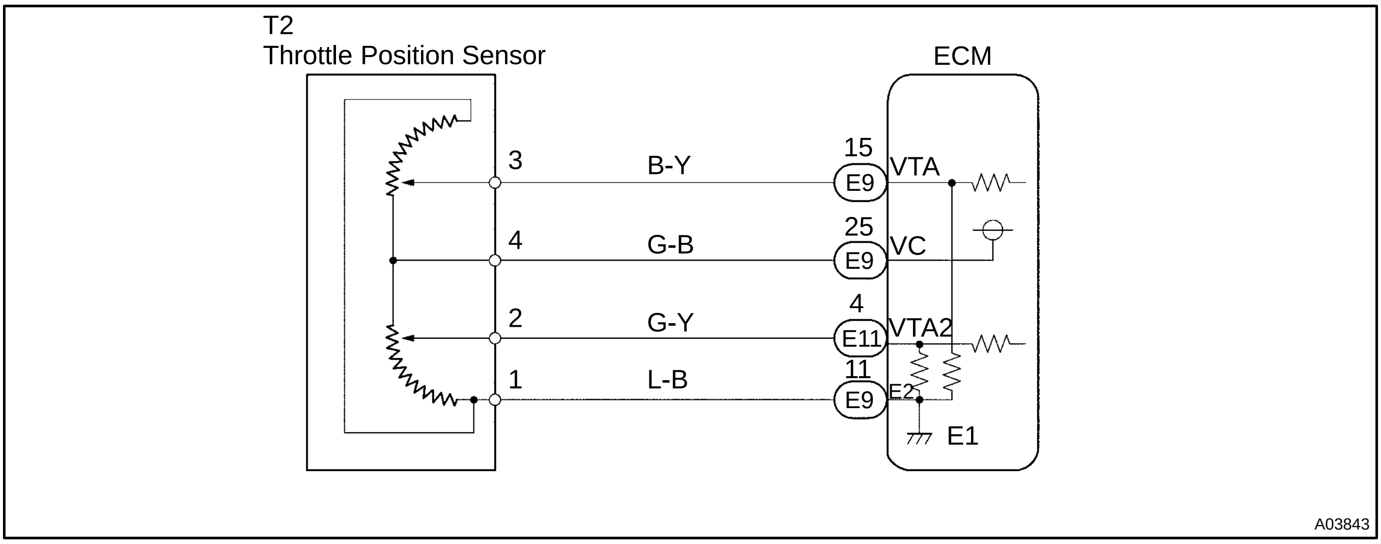


DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (e) VTA-VTA2 ≦ 0.02 V, or VTA2-VTA ≧ 0.02V	• Open or short in throttle position sensor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

HINT:
After confirming DTC P0120, use the OBD II scan tool or TOYOTA hand-held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Throttle valve opening 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 circuit open
0 %	2.0 - 2.9 V	0 %	4.7 - 5.1 V	VTA circuit open or ground short
8 - 20 %	0 V	64 - 96 %	0 V	VTA2 circuit open or ground short
100 %	5 V	100 %	5 V	E2 circuit open

WIRING DIAGRAM



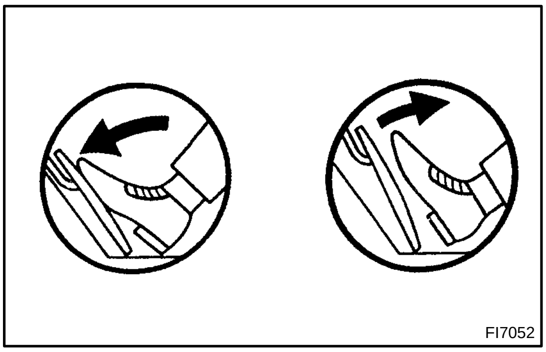
INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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.

TOYOTA hand-held tester:

1	**Connect TOYOTA hand-held tester, and read throttle valve opening percentage.**


FI7052

PREPARATION:

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

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

CHECK:

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

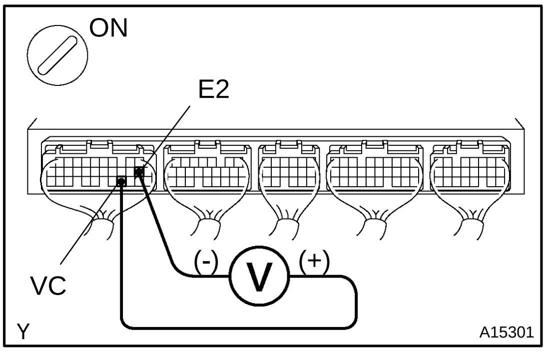
OK:

Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	8 - 20 %	2.0 - 2.9 V
Depressed	64 - 96 %	4.7 - 5.1 V

OK → **Check and replace ECM (See page IN-28).**

NG

2	Check voltage between terminals VC and E2 of ECM connector.



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

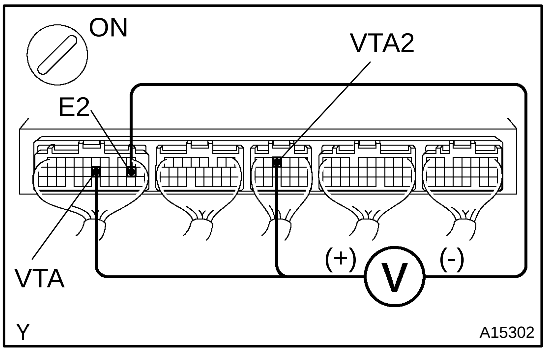
CHECK:
Measure the voltage between terminals VC and E2 of the ECM connector.

OK:
Voltage: 4.5 - 5.5 V

NG → **Check and replace ECM (See page IN-28).**

OK

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



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

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

OK:

Accelerator pedal	Voltage	
	VTA - E2	VTA2 - E2
Released	0.4 - 1.0 V	2.0 - 2.9 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK → **Check and replace ECM (See page IN-28).**

NG

4	Check throttle position sensor (See page SF-30).

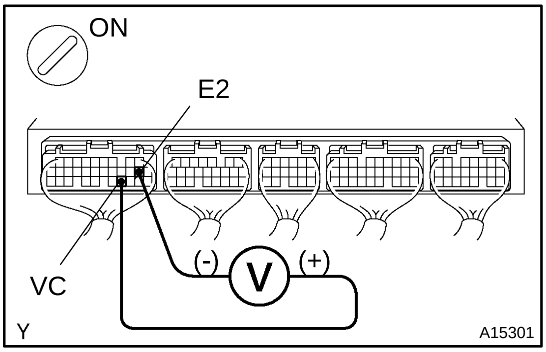
NG → **Replace throttle position sensor (See page SF-32).**

OK

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between ECM and throttle position sensor (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	Check voltage between terminals VC and E2 of ECM connector.



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

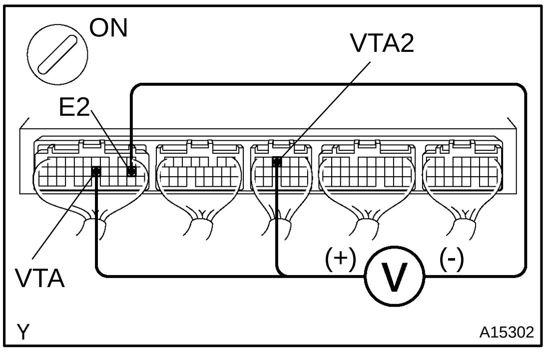
CHECK:
Measure the voltage between terminals VC and E2 of the ECM connector.

OK:
Voltage: 4.5 - 5.5 V

NG → **Check and replace ECM (See page IN-28).**

OK

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



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

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

OK:

Accelerator pedal	Voltage	
	VTA - E2	VTA2 - E2
Released	0.4 - 1.0 V	2.0 - 2.9 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK → **Check and replace ECM (See page IN-28).**

NG

3	Check throttle position sensor (See page SF-30).

NG → **Replace throttle position sensor (See page SF-32).**

OK ↓

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between ECM and throttle position sensor (See page IN-28).

DI0RW-07

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

CIRCUIT DESCRIPTION

Refer to DTC P0120 on page DI–36.

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

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the 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 P0121) being output?**

YES → **Go to relevant DTC chart (See page DI–13).**

NO

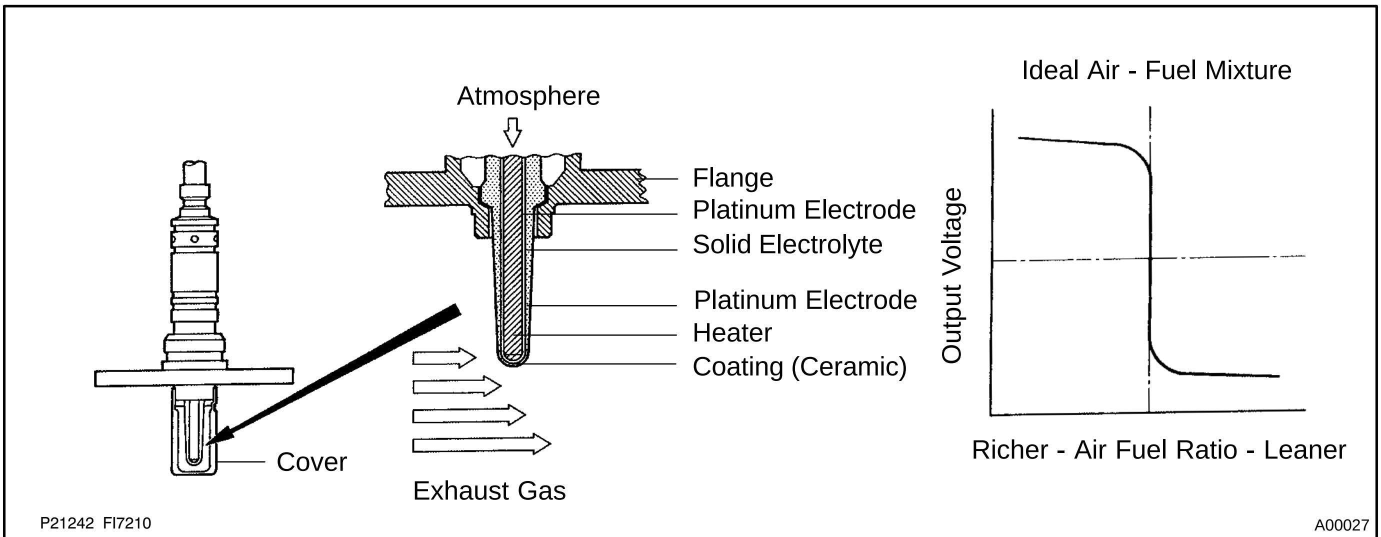
Replace throttle position sensor.

DI5C4-08

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 A/F sensor has the characteristic that provides output voltage* approximately proportional to the existing air-fuel ratio. The A/F sensor output voltage* is used to provide feedback for the ECM to control the air-fuel ratio. By the A/F sensor output, the ECM can determine the deviation amount from the stoichiometric air-fuel ratio and control the proper injection time immediately. If the A/F sensor is malfunctioning, ECM is unable to perform accurate air-fuel ratio control.
The A/F sensor is equipped with a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temp. of the exhaust gas is low), current flows to the heater to heat the sensor for accurate oxygen concentration detection.
*: The voltage value changes at the inside of the ECM only.

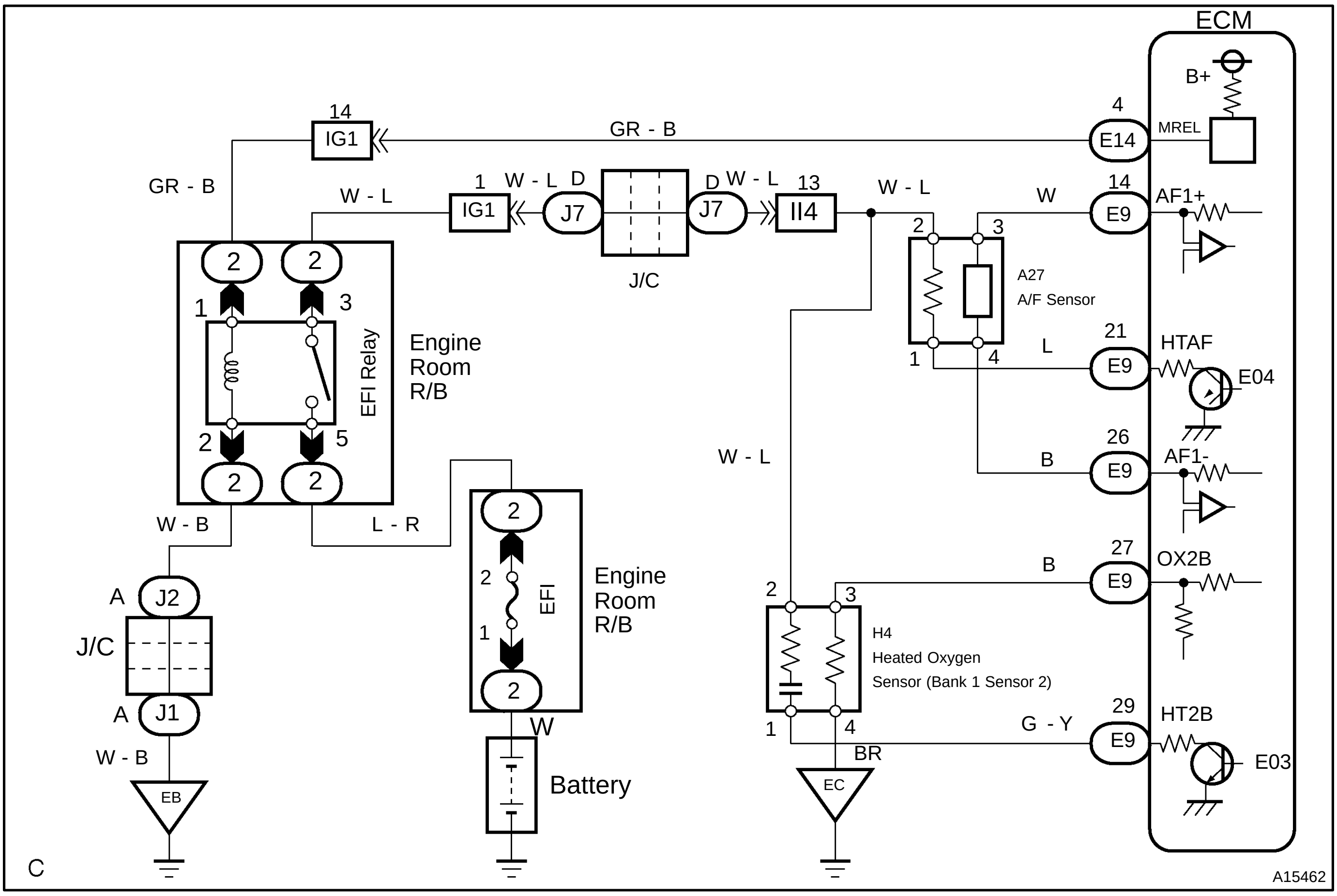


DTC No.	DTC Detecting Condition	Trouble Area
P0125	After engine is warmed up, A/F sensor output* does not change when conditions (a), (b) and (c) continue for at least 1.5 min.: *: Output value changes at inside of ECM only (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 - 100 km/h (25 - 62 mph) (c) Throttle valve does not fully closed (d) After starting engine ≧ 140 sec.	• Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • PCV valve and hose • ECM

HINT:

- After confirming DTC P0125, use the OBD II scan tool or TOYOTA hand–held tester to confirm voltage output of the heated oxygen sensor (bank 1 sensor 1) from the CURRENT DATA.
- The ECM controls the voltage of the AF1+ and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II 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 DTC P0125) being output?**

YES → **Go to relevant DTC chart.**

NO

2	Check connection of PCV valve and hose

NG → Repair or replace PCV valve and hose

OK

3	Connect OBD II scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor (bank 1 sensor 1).

PREPARATION:

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

(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage value of the A/F sensor on the screen of the OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of AF1+ terminal of the ECM is 3.3 fixed and the AF1- terminal is 3.0 V fixed. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.3. V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding TOYOTA hand-held tester)
Engine idling	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or move, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76 V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding TOYOTA hand-held tester).

OK → Go to step 9.

NG

4	Check for open and short in harness and connector between ECM and A/F sensor (bank 1 sensor 1) (See page IN-28).

NG → Repair or replace harness or connector.

OK

5	Check resistance of A/F sensor heater (bank 1 sensor 1) (See page SF-51).

NG → Replace A/F sensor.

OK

6	Check air induction system (See page SF-1).

NG → Repair or replace.

OK

7	Check fuel pressure (See page SF-7).

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

OK

8	Check injector injection (See page SF-21).

NG → Replace injector.

OK

9	Check gas leakage on exhaust system.

NG → Repair or replace.

OK ↓

Replace A/F sensor (bank 1 sensor 1).

10	Perform confirmation driving pattern (See page DI-122).

Go ↓

11	Is there DTC P0125 being output again?

YES → Check and replace ECM (See page IN-28).

NO ↓

12	Did vehicle runs out of fuel in past?

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

YES ↓

DTC P0125 is caused by running out of fuel.

DI6I2-06

DTC	P0128	Thermostat Malfunction

CIRCUIT DESCRIPTION

If the water temperature doesn't get to 75°C (167°F) even after warming up, it is abnormal.

DTC No.	DTC Detection Condition	Trouble Area
P0128	Condition (a), (b) and (c): (a) Cold start (b) After engine is warmed up (c) Engine coolant temp. < 75°C (167°F)	• Thermostat • Cooling system • Engine coolant temp. sensor • ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II 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	**Check thermostat. (See page CO-11)**

NG → **Replace thermostat.**

YES

2	**Are there any other codes (besides DTC P0128) being output?**

YES → **Go to relevant DTC chart. (See page DI–13)**

NG

Check and replace ECM. (See page IN-28)

DI0S1-11

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P0136	Voltage output of heated oxygen sensor remains at 0.45 *1V/0.4 V*2 or more or 0.60 V*1/0.5 V*2 or less when vehicle is driven at 50 km/h (31 mph) or more after engine is warmed up (2 trip detection logic) *1: California Spec. *2: Except California Spec.	• Open or short in Heated oxygen sensor circuit • Heated oxygen sensor

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

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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 DTC P0136) being output?

YES → **Go to relevant DTC chart (See page IN-28).**

NO

2	Check for open and short in harness and connector between ECM and heated oxygen sensor (See page IN-28).

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

OK

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

PREPARATION:
(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(b) Warm up the engine to normal operating temperature.
CHECK:
Read the voltage output of the heated oxygen sensor when the engine is suddenly raced.
HINT:
Perform quick racing to 4,000 rpm 3 min. using the accelerator pedal.
OK:
Heated oxygen sensor output voltage:
Alternates from 0.45 V^{*1}/0.4 V^{*2} or less to 0.60 V^{*1}/0.5 V^{*2} or more.
***1: California Spec.**
***2: Except California Spec.**

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

NG ↓

Replace heated oxygen sensor.

DI0S0-11

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P0141	When heater operates, heater current exceeds 2.35 A (2 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • ECM
	Heater current of 0.2 A or less when heater operates (2 trip detection logic)	

HINT:

- Sensor 1 refer to the sensor closer to the engine body.
- Sensor 2 refer to the sensor farther away from the engine body.

WIRING DIAGRAM

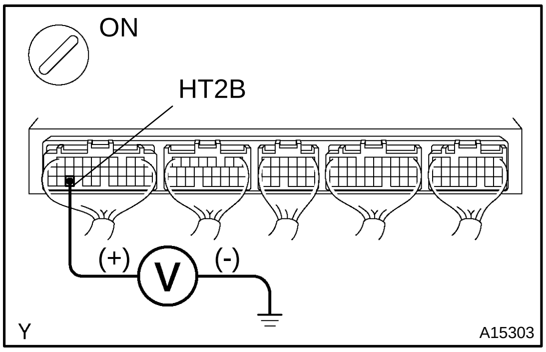
Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

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

1	**Check voltage between terminals HT2B of ECM connectors and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals HT2B of the ECM connectors and body ground.

OK:

Voltage: 9 - 14 V

OK	**Check and replace ECM (See page IN-28).**

NG

2	**Check resistance of heated oxygen sensor heater (See page SF-52).**

NG → **Replace heated oxygen sensor.**

OK

Check and repair harness or connector between EFI main relay (Marking: EFI) and heated oxygen sensor, and heated oxygen sensor and ECM (See page IN-28).

DI5C7-08

DTC	P0171	System too Lean (Fuel Trim)

DTC	P0172	System too Lean (Fuel Trim)

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 A/F sensor is approximately proportional to the existing air-fuel ratio, and ECM comparing it with the ideal theoretical value, the ECM reduces fuel volume immediately if the air-fuel ratio is rich and increases fuel volume if it is lean.
Long-term fuel trim compensates for the deviation from the central value of the short-term fuel trim stored up by each engine tolerance, and the deviation from the central value due to the passage of time and changes of environment.
If both the short-term fuel trim and long-term fuel trim exceed a certain value, it is detected as a malfunction and the MIL lights up.

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 RICH side (2 trip detection logic)	• Air induction system • Injector blockage • Mass air flow meter • Engine coolant temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • PCV valve and hose • ECM
P0172	When air fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on LEAN side (2 trip detection logic)	• Injector leak, blockage • Mass air flow meter • Engine coolant temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • ECM

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 MIL then comes on.
- If the total of the short-term fuel trim value and long-term fuel trim value is within ±35 % (80˚C (176˚F) or more), the system is functioning normally.
- The A/F sensor (bank 1 sensor 1) output voltage and the short-term fuel trim value can be read using the OBD II scan tool or TOYOTA hand-held tester.

- The ECM controls the voltage of the AF1- and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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	**Check connection of PCV valve and hose.**

NG → **Repair or replace PCV valve and hose.**

OK ↓

2	**Check air induction system (See page SF-1).**

NG → **Repair or replace.**

OK ↓

3	**Check injector injection (See page SF-21).**

NG → **Replace injector.**

OK ↓

4	Check mass air flow meter (See page SF-28) and engine coolant temperature sensor (See page SF-44).

NG → Repair or replace.

OK

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

NG → Repair or replace.

OK

6	Check fuel pressure (See page SF-7).

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

OK

7	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

8	Check output voltage A/F sensor (bank 1 sensor 1).

PREPARATION:
(a) Connect the OBDII scan tool or TOYOTA hand-held tester to the DLC3.
(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:
Read the voltage value of the A/F sensor on the screen of the OBDII scan tool or TOYOTA hand-held tester when you perform all the following conditions.
HINT:
The voltage of the AF1+ terminal of the ECM is 3.3 fixed and AF1- terminal is 3.0 V fixed. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBDII scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25mph) or more, and operate throttle valve open and close	

HINT:
- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76 V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBDII scan tool (excluding TOYOTA hand-held tester).

OK → **Go to step 9.**

NG

9	Check for open and short in harness and connector between ECM and A/F sensor (bank 1 sensor 1) (See page IN-28).

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

OK

Replace A/F sensor.

10	Perform confirmation driving pattern (See page DI-122).

Go

11	Is there DTC P0171 or P0172 being output again?

YES → Check and replace ECM (See page IN-28).

NO

12	Did vehicle runs out of fuel in past?

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

YES

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

DI8XH-02

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**

DTC	**P0305**	**Cylinder 5 Misfire Detected**

DTC	**P0306**	**Cylinder 6 Misfire Detected**

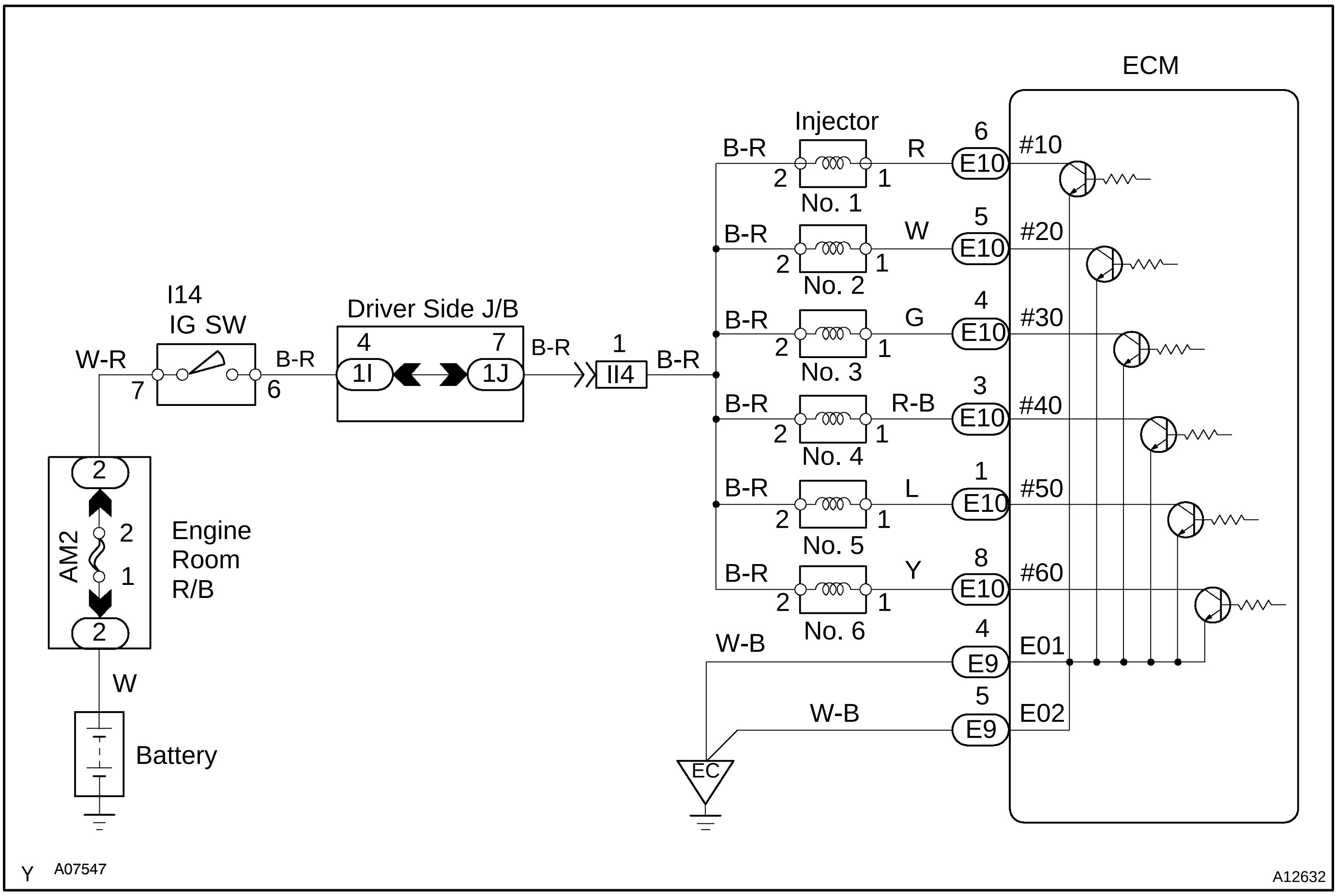
CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
P0300	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions	• Open or short in engine wire • Connector connection • Vacuum hose connector • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temp. sensor • Compression pressure • Valve clearance • Valve timing • PCV valve and hose • ECM
P0301 P0302 P0303 P0304 P0305 P0306	For any particular 200 revolutions for engine, misfiring is detected which can cause catalyst overheating (This causes MIL to blink)	
	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emission (2 trip detection logic)	

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.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

(a) Connect the TOYOTA hand-held tester or OBD II scan tool.
(b) Record DTC and the freeze frame data.
(c) Use the TOYOTA hand-held tester to set to the check mode (See page DI-3).

(d) Drive the vehicle several times with the engine speed, load and its surrounding range shown with the ENGINE SPD, CALC LOAD in the freeze frame data or the MISFIRE RPM, MISFIRE LOAD in the data list.

If you have no TOYOTA 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 the MISFIRE RPM, MISFIRE LOAD in the data list for the following period of time.

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

(e) Check whether there is misfire or not by monitoring DTC and the freeze frame data. After that, record them.

(f) Turn the ignition switch OFF and wait at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If is case that DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. 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 was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition or freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See the confirmation driving pattern).
- When either of the 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 the COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility or misfire only during warming 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 connection of PCV valve and hose**

NG → **Repair or replace PCV valve and hose**

OK

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

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

NG → **Repair or replace, then confirm that there is no misfire (See confirnation drive pattern).**

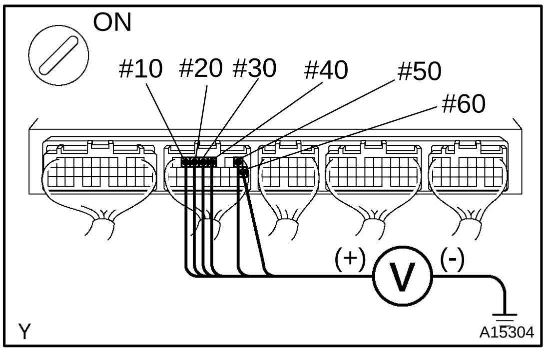
OK

3	**Check spark plug and spark of misfiring cylinder (See page IG-1).**

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

OK

4	**Check voltage of ECM terminal for injector of failed cylinder.**



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between applicable terminals of the ECM connector and body ground.

OK:

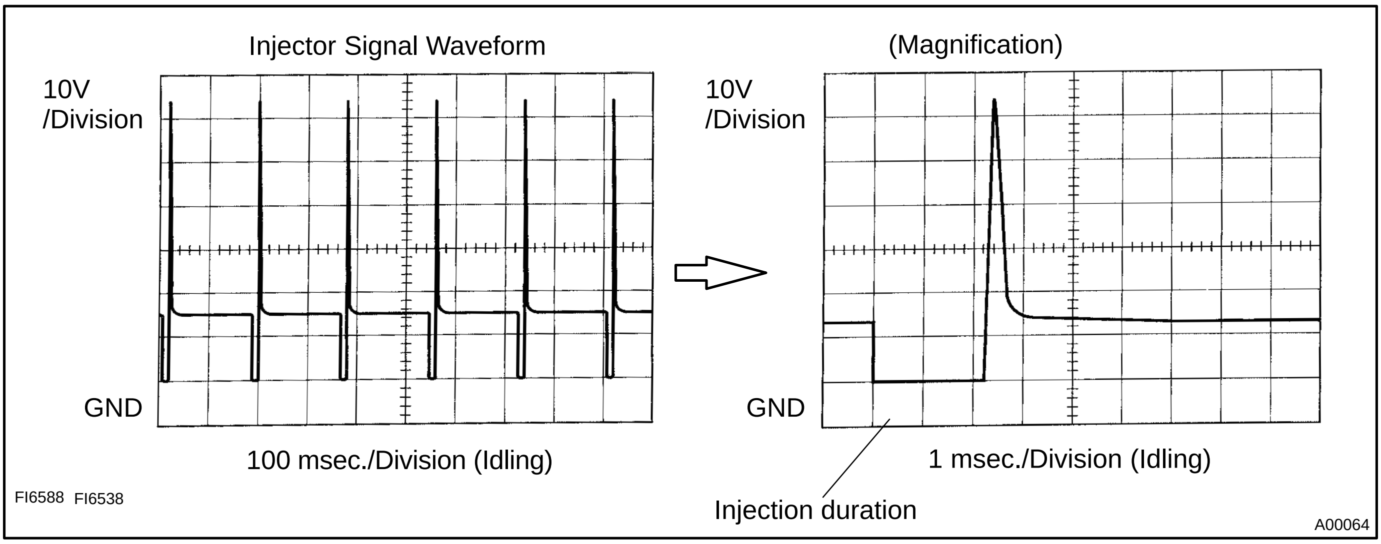
Voltage: 9 - 14 V

Reference: INSPECTION USING OSCILLOSCOPE

With the engine idling, check the waveform between terminals #10 - #60 and E01 of the ECM connector.

HINT:

The correct waveform is as shown.



OK	**Go to step 4.**

NG

5	Check resistance of injector of misfiring cylinder (See page SF-21).

NG → Replace injector.

OK ↓

Check for open and short in harness and connector between injector and ECM (See page IN-28).

6	Check fuel pressure (See page SF-7).

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

OK ↓

7	Check injector injection (See page SF-21).

NG → Replace injector.

OK ↓

8	Check mass air flow meter (See page SF-28) and engine coolant temperature sensor (See page SF-44).

NG → Repair or replace.

OK ↓

Check compression pressure, valve clearance and valve timing.

DI0S4-11

DTC	P0325	Knock Sensor 1 Circuit Malfunction (Bank 1)

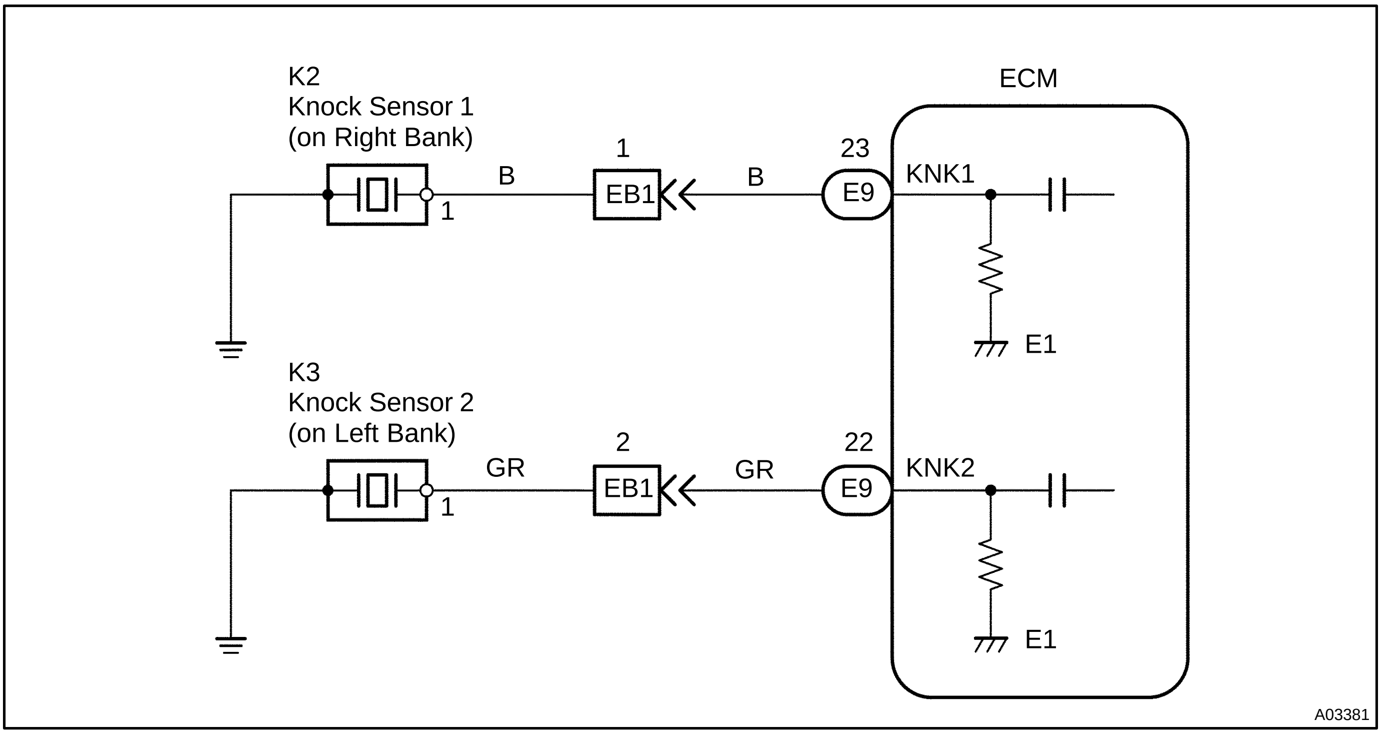
DTC	P0330	Knock Sensor 2 Circuit Malfunction (Bank 2)

CIRCUIT DESCRIPTION

Knock sensors are fitted one to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed between 2000 rpm and 5,600 rpm	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • ECM
P0330	No knock sensor 2 signal to ECM with engine speed between 2000 rpm and 5,600 rpm	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • ECM

WIRING DIAGRAM



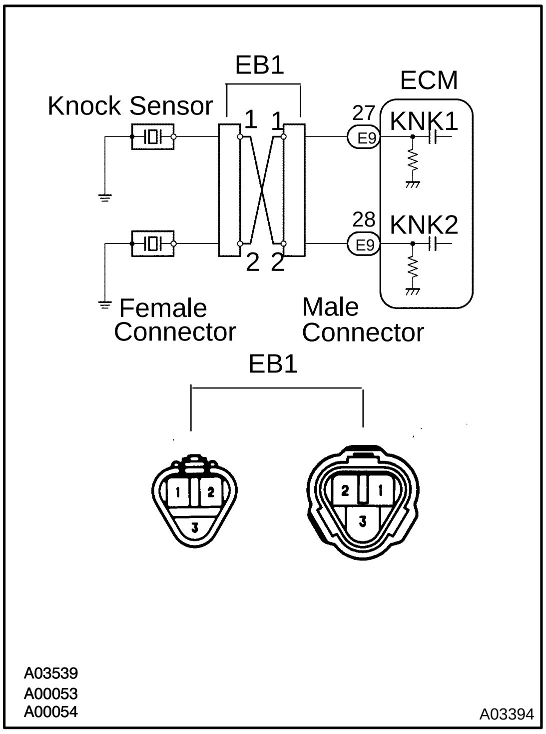
INSPECTION PROCEDURE

HINT:

- DTC P0325 is for the right bank knock sensor circuit.
- DTC P0330 is for the left bank knock sensor circuit.

- Read freeze frame data using TOYOTA hand-held tester or OBD II 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	**Connect OBD II scan tool or TOYOTA hand-held tester, and check knock sensor circuit.**



PREPARATION:

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

(b) Disconnect the EB1 connector.

(c) Connect the terminals of the disconnected EB1 male connector and EB1 female as follows.

Male connector ↔ Female connector
Terminal 1 ↔ Terminal 2
Terminal 2 ↔ Terminal 1

(d) Turn the ignition switch ON and push the OBDII scan tool or TOYOTA hand-held tester main switch ON.

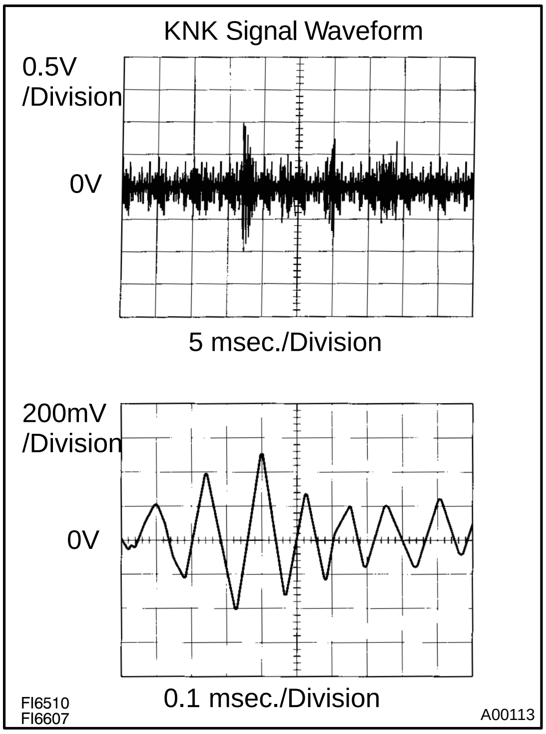
(e) After the engine is warmed up, perform quick racing to 4,000 rpm 3 times.

CHECK:

Check the DTC.

RESULT:

Type I	DTC same as when vehicle brought in P0325 → P0325 or P0330 → P0330
Type II	DTC different to when vehicle brought in P0325 → P0330 or P0330 → P0325



Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

The correct waveform is as shown.

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

HINT:

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

Type II	**Go to step 3.**

Type I

2	**Check for open and short in harness and connector between EB1 connector and ECM (See page IN-28).**

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

OK

Check and replace ECM (See page IN-28).

3	**Check for open and short in harness and connector between EB1 connector and knock sensor (See page IN-28).¿**

HINT:

- If DTC P0325 has changed to P0330, check the knock sensor circuit on the right bank side.
- If DTC P0330 has changed to P0325, check the knock sensor circuit on the left bank side.

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

OK

Replace knock sensor.

DI0S5-14

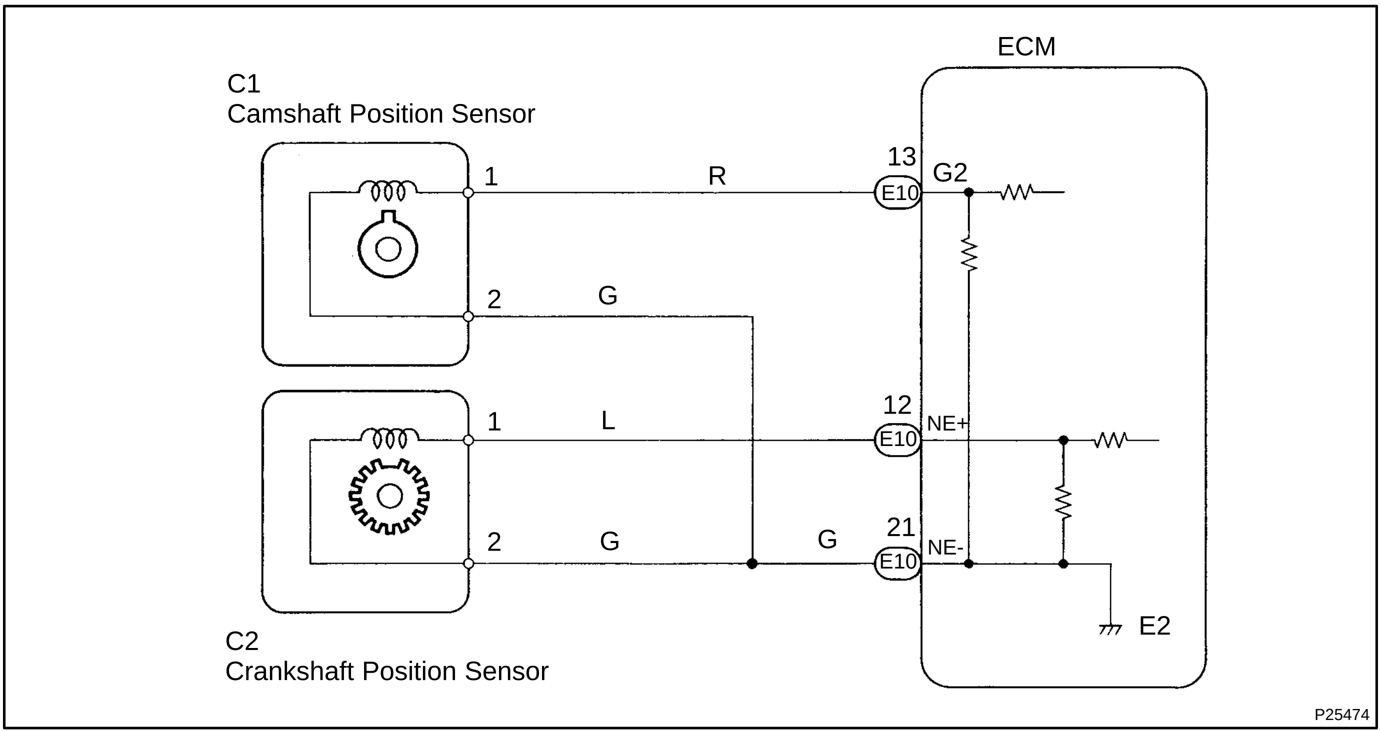
DTC	P0335	Crankshaft Position Sensor "A" Circuit Malfunction

CIRCUIT DESCRIPTION

The crankshaft position sensor, which detects the engine speed and crankshaft angle signal (NE signal), has been installed on the oil pump body.
The NE signal plate has 34 teeth. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal, and the actual crankshaft angle and the engine speed by the NE signal.

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

WIRING DIAGRAM

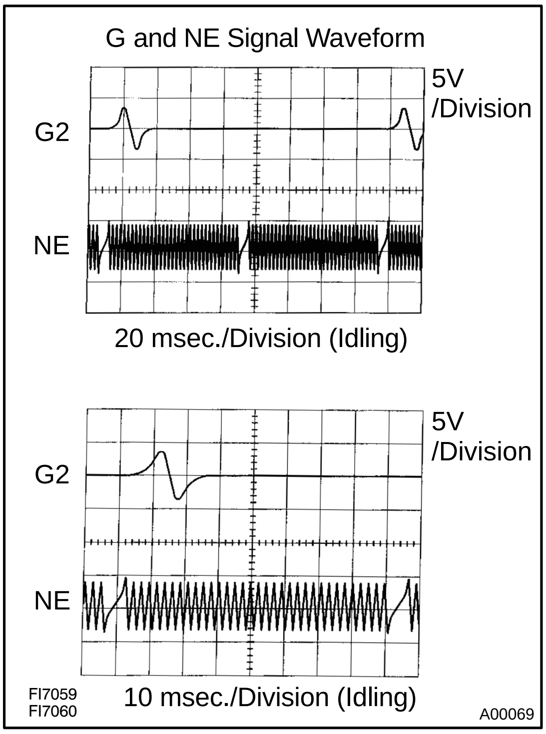


INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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	Check resistance of crankshaft position sensor (See page IG-13).



Reference: INSPECTION USING OSCILLOSCOPE

During cranking or idling, check the waveforms between terminals G2 and NE-, and NE+ and NE- of the ECM connector.

HINT:

The correct waveforms are as shown.

NG	Replace crankshaft position sensor.

OK

2	Check for open and short in harness and connector between ECM and crankshaft position sensor (See page IN-28).

NG	Repair or replace harness or connector.

OK

3	Inspect sensor installation and teeth of crankshaft timing pulley.

NG	Tighten the sensor. Replace crankshaft timing pulley.

OK

Check and replace ECM (See page IN-28).

DI0S6-08

DTC	P0340	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft posision sensor (G signal) consists of a magnet, iron core and pickup coil.
The G signal plate has 1 tooth, on its outer circumference and is mounted on the left bank camshafts.
When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations, in the magnetic field and generating an electromotive force in the pickup coil.
The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal and the actual crankshaft angle and the engine speed by the NE signal.

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

WIRING DIAGRAM

Refer to DTC P0335 on page DI-66 .

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBDII 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	**Check resistance of camshaft position sensor (See page IG-1).**

Reference: INSPECTION USING OSCILLOSCOPE
Refer to DTC P0335 on page DI-66 .

NG → **Replace camshaft position sensor.**

OK

2	**Check for open and short in harness and connector between ECM and camshaft position sensor (See page IN-28).**

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

OK

3	**Inspect sensor installation and tooth of RH camshaft timing pulley.**

NG → **Tighten sensor. Replace RH camshaft timing pulley**

OK

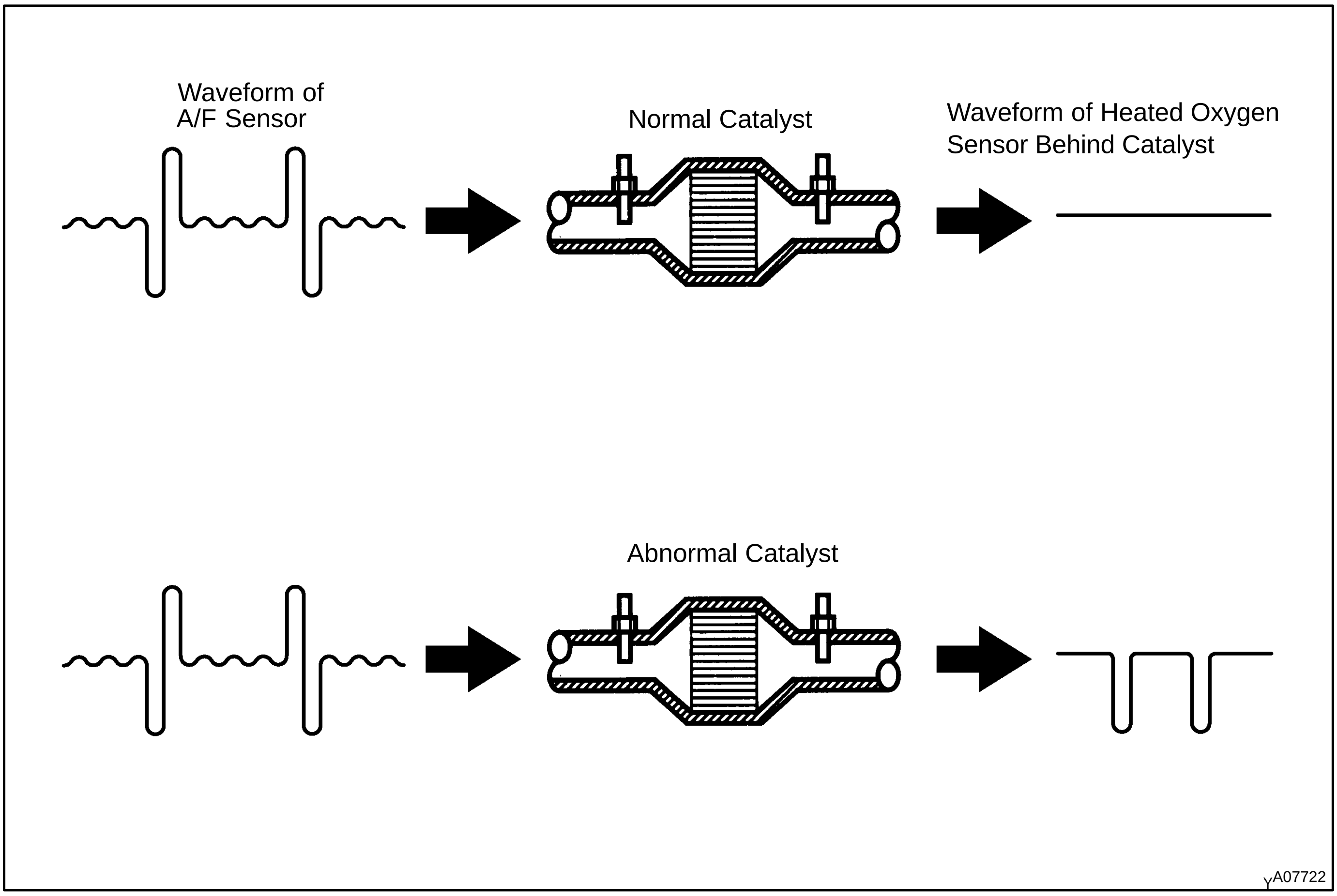
Check and replace ECM (See page IN-28).

DI5C9-06

DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)

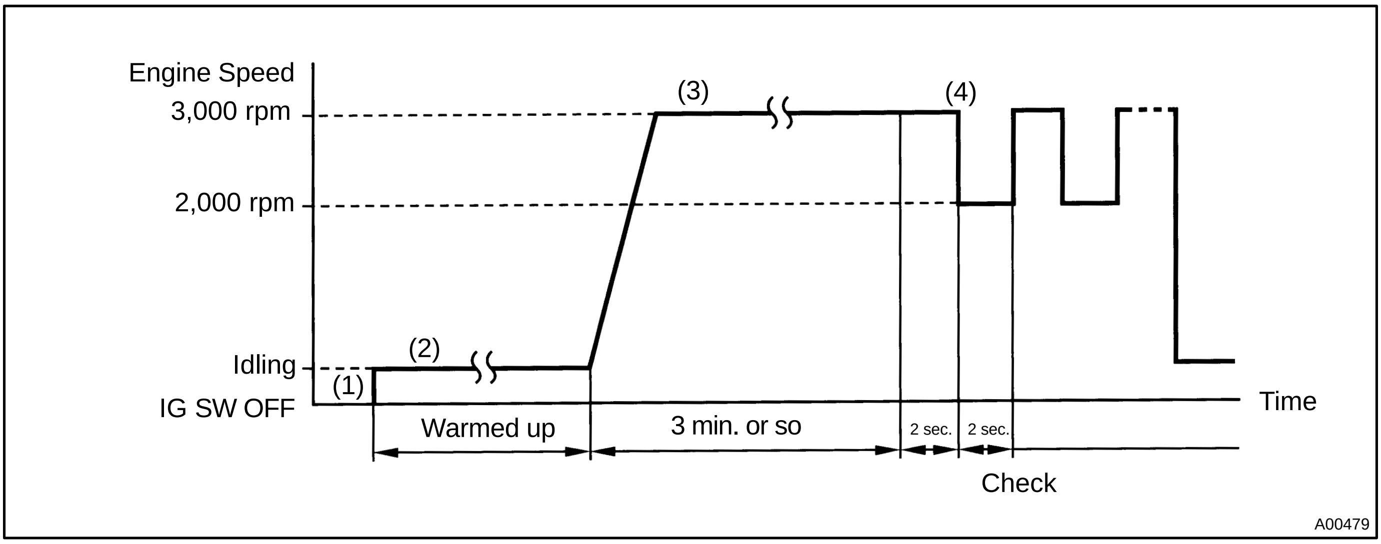
CIRCUIT DESCRIPTION

The ECM observes the waveform of the heated oxygen sensor located behind the catalyst to determine whether the catalyst is performance has deteriorated. If the catalyst is functioning normally, the waveform of the heated oxygen sensor located behind the catalyst switches back and forth between rich and lean much more slowly. When the waveform of the heated oxygen sensor located behind the catalyst alternates flatteringly between rich and lean, it indicates that catalyst performance has deteriorated.



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 heated oxygen sensor (bank 1 sensor 2) alternates flatteringly between rich and lean (2 trip detection logic)	• Gas leakage on exhaust system • A/F sensor (bank 1 sensor 1) • Heated oxygen sensor (bank 1 sensor 2) • Three-way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(2) Start the engine and warm it up with all the accessories switched OFF until the water temperature is stable.
(3) Race the engine at 2,500 - 3,000 rpm for about 3 min.
(4) When racing the engine at 3,000 rpm for 2 sec. and 2,000 rpm for 2 sec. alternately, check the waveform of the heated oxygen sensor (bank 1 sensor 2).

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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 DTC P0420) being output?**

YES → **Go to relevant DTC chart.**

NO

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

NG → **Repair or replace.**

OK

3	Check A/F sensor (bank 1 sensor 1) (See page SF-51).

NG → Repair or replace.

OK ↓

4	Check heated oxygen sensor (bank 1 sensor 2) (See page SF-52).

NG → Repair or replace.

OK ↓

Replace three-way catalytic converter.

DI9O0-01

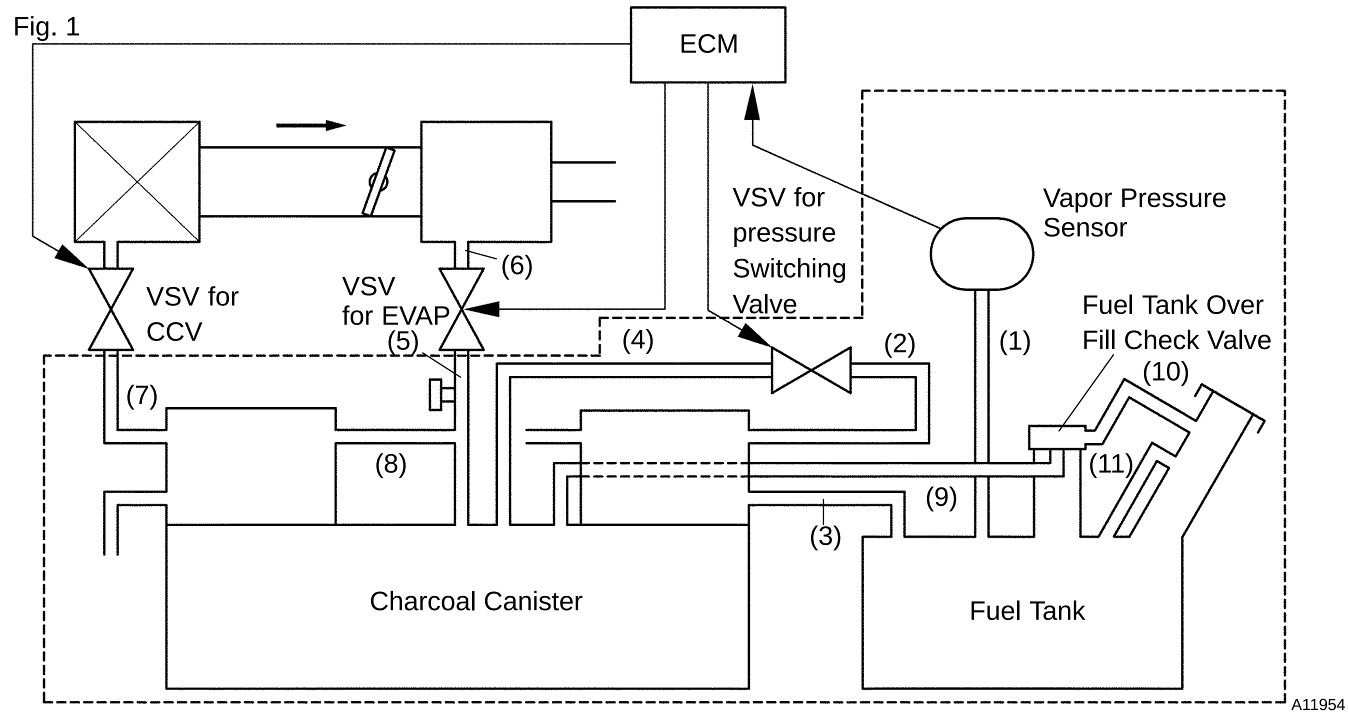
DTC	P0440	Evaporative Emission Control System Malfunction

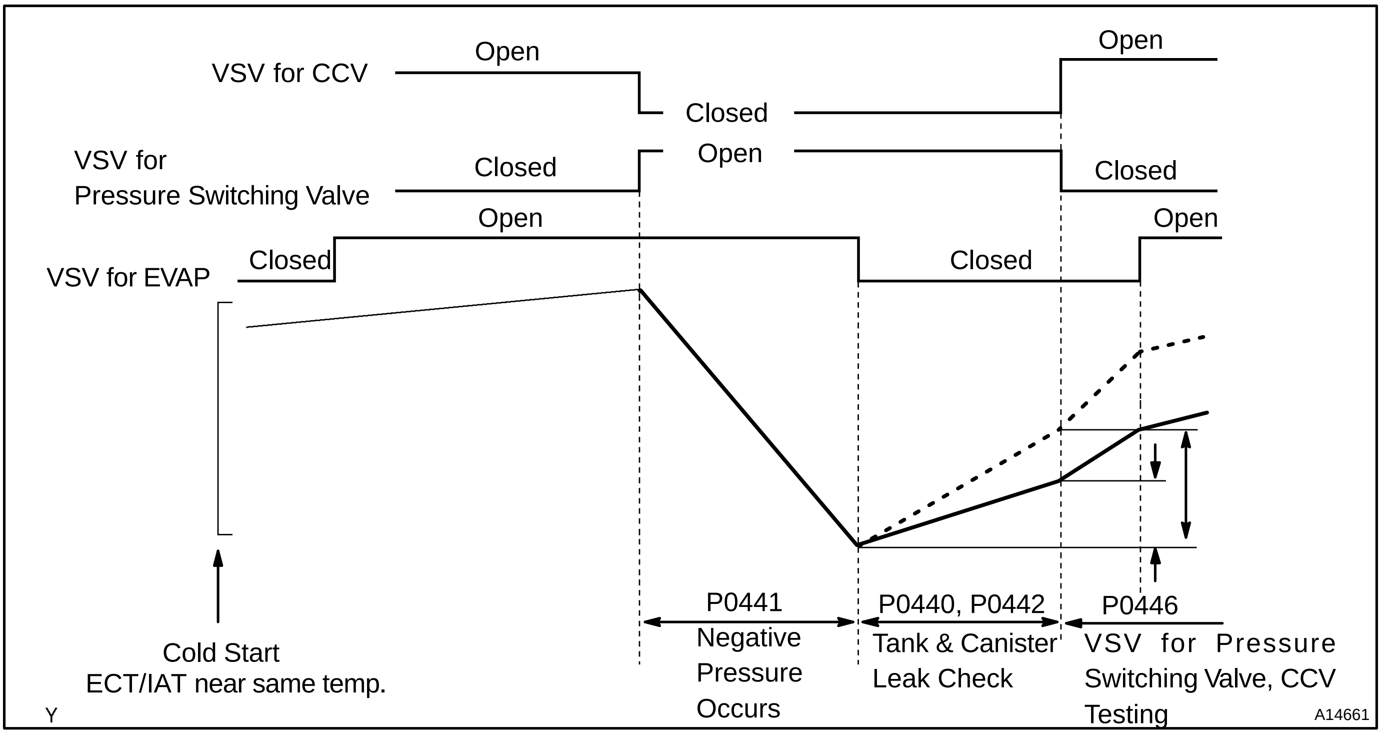
DTC	P0442	Evaporative Emission Control System Leak Detected (Small Leak)

CIRCUIT DESCRIPTION

The vapor pressure sensor, VSV for canister closed valve (CCV) and VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.
The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.
DTC P0440 is recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when the vapor pressure sensor malfunctions.

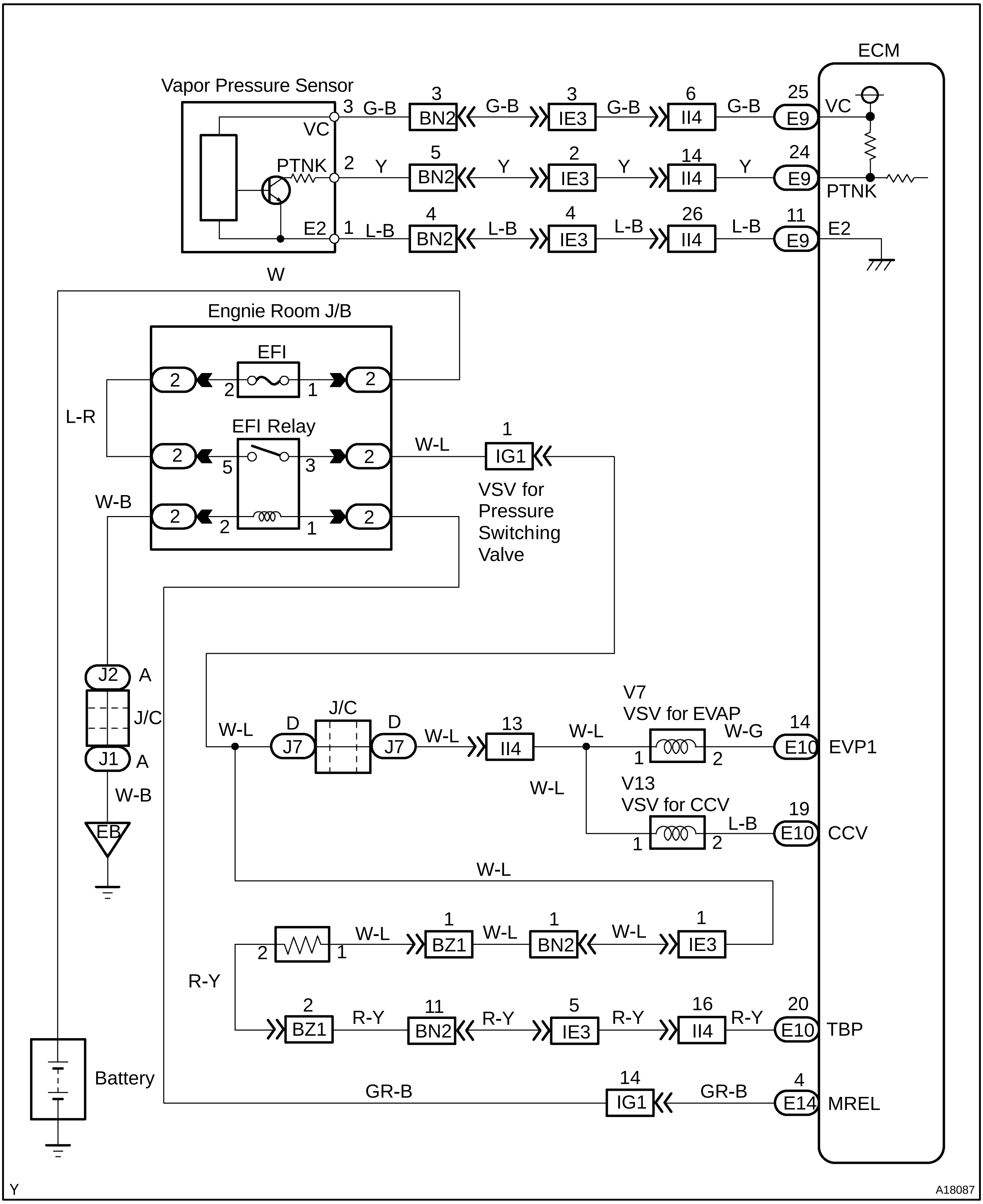
Fig. 1





DTC No.	DTC Detecting Condition	Trouble Area
P0440 P0442	After cold engine start. After VSV for EVAP operation, the VSV for EVAP is turned off sealing the vacuum in the system and the ECM begins to monitor the pressure increase. Some increase is normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system and sets the DTC P0440. This monitoring method is also able to distinguish what is called the small leak detection.(DTC P0442) A pressure rise just above normal indicates a very small hole.	• Hose or tube cracked, hole, damaged or loose seal ((3) or (9) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Vacuum hose cracked, holed, blocked, damaged or disconnected ((1), (2), (4), (5), (6), (7), (8), (10)and (11) in Fig. 1) • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Fuel tank over fill check valve cracked or damaged • ECM

WIRING DIAGRAM



CONFIRMATION READINESS TEST

First Trip Procedure

(a) Vehicle must be cold, ambient temperature approximately between 50˚F - 95˚F.

(b) Intake Air Temp. (IAT) and Engine Coolant Temp. (ECT) sensor almost same value.

READINESS TESTS

MISFIRE MON .... AVAIL
FUEL SYS MON .... AVAIL
COMP MON .... AVAIL
CAT EVAL .... INCMPL
HTD CAT EVAL .... N/A
EVAP EVAL .... INCMPL
2nd AIR EVAL .... N/A
A/C EVAL .... N/A
O2S EVAL .... INCMPL
O2S HTR EVAL .... INCMPL
EGR EVAL .... INCMPL

A15402

(c) Clear DTC's.
- Disconnecting the battery terminals or EFI fuse.
- Readiness tests will show INCMPL (incomplete).

(d) Drive the vehicle according to LA#4 drive cycle. Note the state of Readiness Tests. They will change to COMPL as the evaluation monitors operate and if the system passes. This procedure may take approximately 20 minutes or more.

NOTICE:
Do not shut off the engine - the results will be invalid.

Pass Condition - No Problem Found by the ECM

If the EVAP evaluation monitor shows COMPL, go to the Non-Continuous Test screen.

NOTICE:
Do not shut off the engine - the results will be invalid.

READINESS TESTS

MISFIRE MON .... AVAIL
FUEL SYS MON .... AVAIL
COMP MON .... AVAIL
CAT EVAL .... COMPL
HTD CAT EVAL .... N/A
EVAP EVAL .... COMPL
2nd AIR EVAL .... N/A
A/C EVAL .... N/A
O2S EVAL .... COMPL
O2S HTR EVAL .... COMPL
EGR EVAL .... COMPL

A15403

NON−CONTINUOUS TESTS

Time$01 CID$01 .... Pass
Time$02 CID$01 .... Pass
Time$02 CID$02 .... Pass
Time$02 CID$03 .... Pass
Time$02 CID$04 .... Pass
Time$04 CID$00 .... Pass
Time$04 CID$02 .... Pass
Time$05 CID$01 .... Pass
Time$06 CID$01 .... Pass
Time$07 CID$01 .... Pass

A15404

- To get there, go to Advanced OBD II, Onboard Tests, Non-continuous Tests.
- If all of the tests in the time $02 category Tests show Pass, the evaluation monitor has operated and no problem was detected.

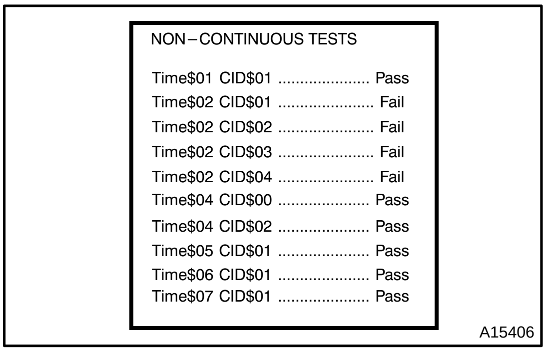
Fail Condition - Problem Detected by the ECM

If the EVAP evaluation monitor shows INCMPL, go to the Non-Continuous Test screen.

READINESS TESTS

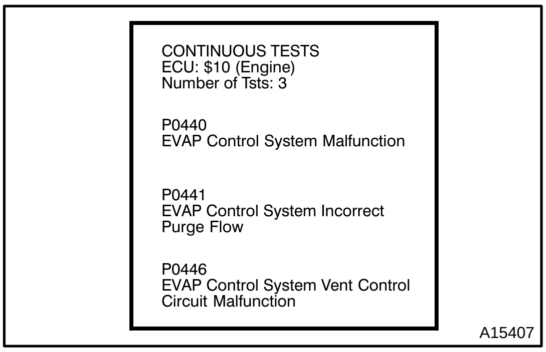
MISFIRE MON .... AVAIL
FUEL SYS MON .... AVAIL
COMP MON .... AVAIL
CAT EVAL .... COMPL
HTD CAT EVAL .... N/A
EVAP EVAL .... INCMPL
2nd AIR EVAL .... N/A
A/C EVAL .... N/A
O2S EVAL .... COMPL
O2S HTR EVAL .... COMPL
EGR EVAL .... N/A

A15405



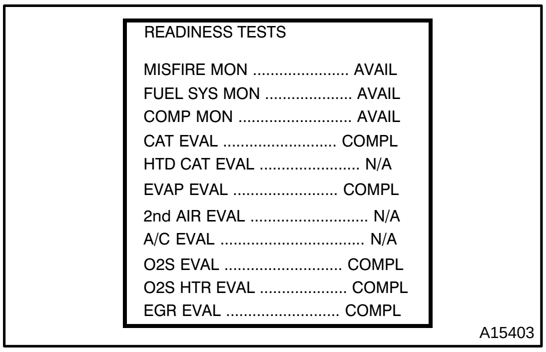
(1) If all Tests show Pass, the following may have occurred.
- The EVAP evaluation monitor did not operate.
- The EVAP evaluation monitor did not finish.
- The ECM withheld judgement.

(2) If one or more of the tests in the time $02 category show Fail, the EVAP evaluation monitor did operate and the ECM detected a problem.



(3) Go to Continuous Tests screen. This is the only place DTC's are listed for the first trip.

NOTICE:
The DTC listed may not be valid. A second trip is needed to confirm the DTC.



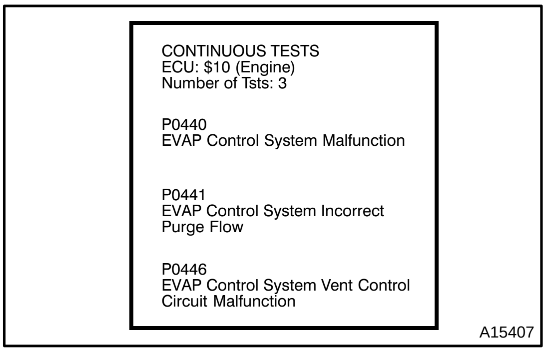
Second Trip Procedure

(a) Vehicle must be cold, ambient temperature approximately between 50˚F - 95˚F.

(b) Go to Readiness Tests screen.

(c) Drive the vehicle according to LA#4 drive cycle. Note the state of EVAP evaluation monitor. This procedure may take approximately 20 minutes or more.

NOTICE:
Do not shut off the engine - the results will be invalid.



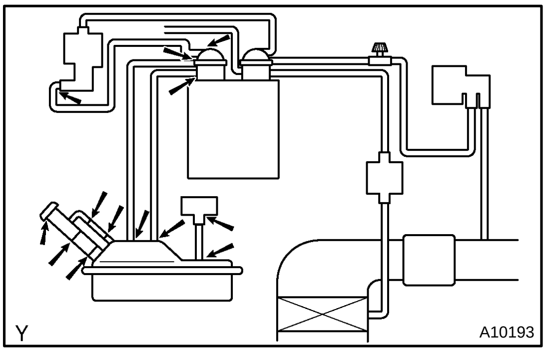
(d) If Readiness Tests changes to COMPL, the EVAP evaluation monitor has operated. Check for any stored DTC's.
- If a DTC has stored, the problem has been detected and confirmed by the ECM.
- If no DTC was found, the EVAP monitor operated but no problem was detected.

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442 first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 or P0442 next.
- Ask the customer whether, after the MIL came on, the customer found the fuel tank cap loose and tightened it. Also ask the customer whether the fuel tank cap was loose when refuelling. If the fuel tank cap was not loose, it was the cause of the DTC. If the fuel tank cap was not loose or if the customer was not sure if it was loose, troubleshoot according to the following procedure.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.**



CHECK:

Check for cracks, deformation and loose connection of these parts:

- Fuel tank
- Charcoal canister
- Fuel tank filler pipe
- Hoses and tubes around the fuel tank and charcoal canister

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is TOYOTA genuine parts.**

NG → **Replace to TOYOTA genuine parts.**

OK

3	Check that fuel tank cap is correctly installed.

NG → **Correctly install fuel tank cap.**

OK

4	Check fuel tank cap (See page EC-6).

NG → **Replace fuel tank cap.**

OK

5	Check filler neck for damage.

PREPARATION:
Remove the fuel tank cap.
CHECK:
Visually inspect the filler neck for damage.

NG → **Replace filler pipe.**

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister.

CHECK:

(a) Check that the vacuum hose is connected correctly.

(b) Check the vacuum hose for looseness and disconnection.

(c) Check the vacuum hose for cracks, hole and damage.

NG → **Repair or replace.**

OK

7	Check hose and tube between fuel tank and charcoal canister.

CHECK:

(a) Check for proper connection of the fuel tank and fuel evap pipe (See page EC-6), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.

(b) Check the hose and tube for cracks, hole and damage.

NG → **Repair or replace.**

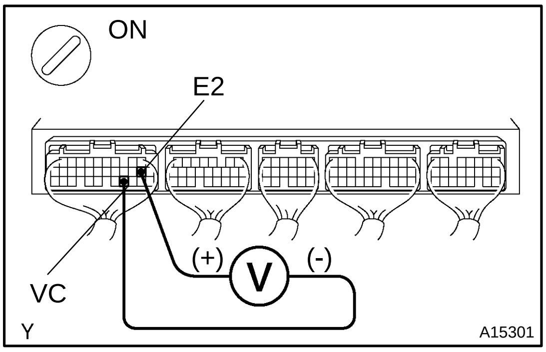
OK

8	Check charcoal canister for cracks, hole and damage (See page EC-6).

NG → **Replace charcoal canister.**

OK

9	Check voltage between terminals VC and E2 of ECM connector.



CHECK:
(a) Remove the grove compartment.
(b) Turn the ignition switch ON.

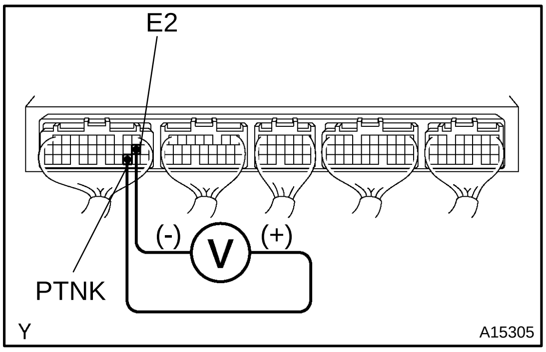
CHECK:
Measure the voltage between terminals VC and E2 of the ECM connector.

OK:
Voltage: 4.5 - 5.5 V

NG	Check and replace ECM (See page IN-28).

OK

10	Check voltage between terminals PTNK and E2 of ECM connectors.



PREPARATION:
(a) Remove the grove compartment.
(b) Remove the fuel tank cap.
(c) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals PTNK and E2 of the ECM connectors.

OK:
Voltage: 3.3 V

OK	Go to step 12.

NG

11	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).

NG	Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

12	**Check fuel tank and fuel tank over fill check valve for cracks and damage.**

NG → **Replace fuel tank or fuel tank over fill check valve.**

OK

It is likely that vehicle user did not properly close fuel tank cap. Please explain to customer how to properly install fuel tank cap.

DI8XJ-01

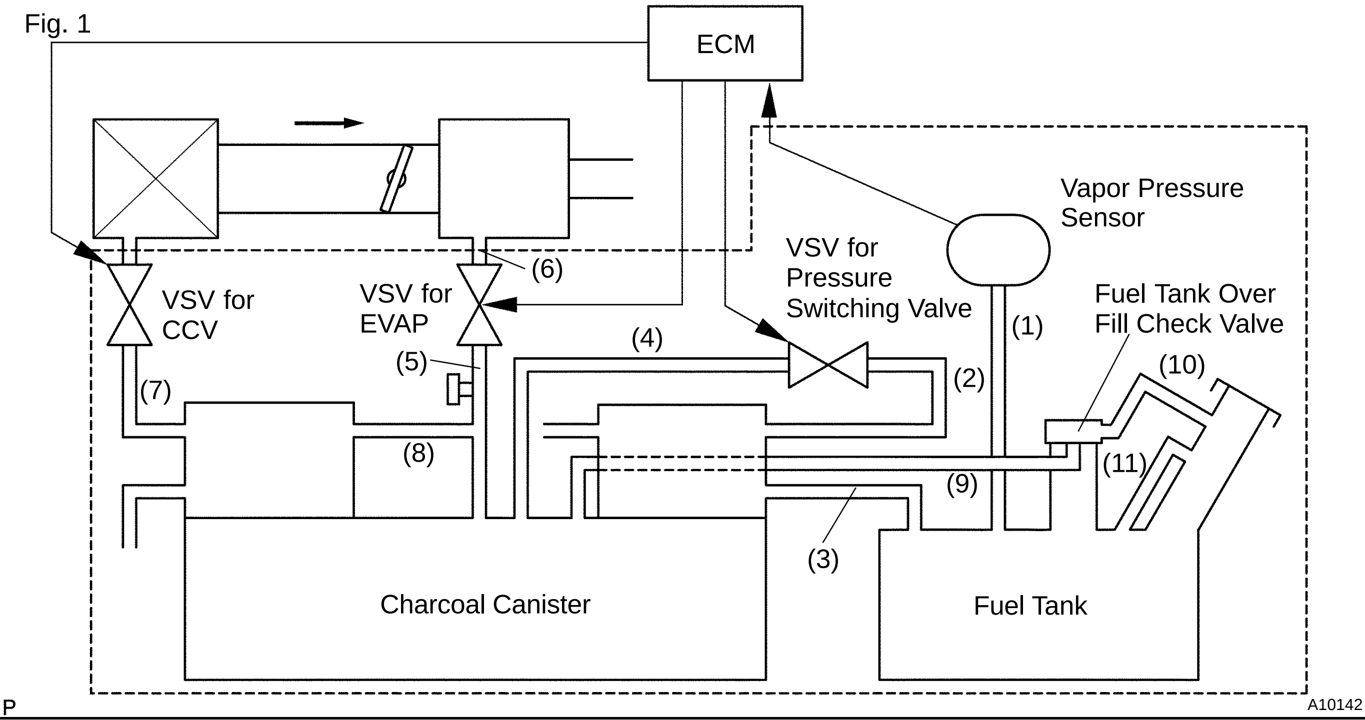
DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

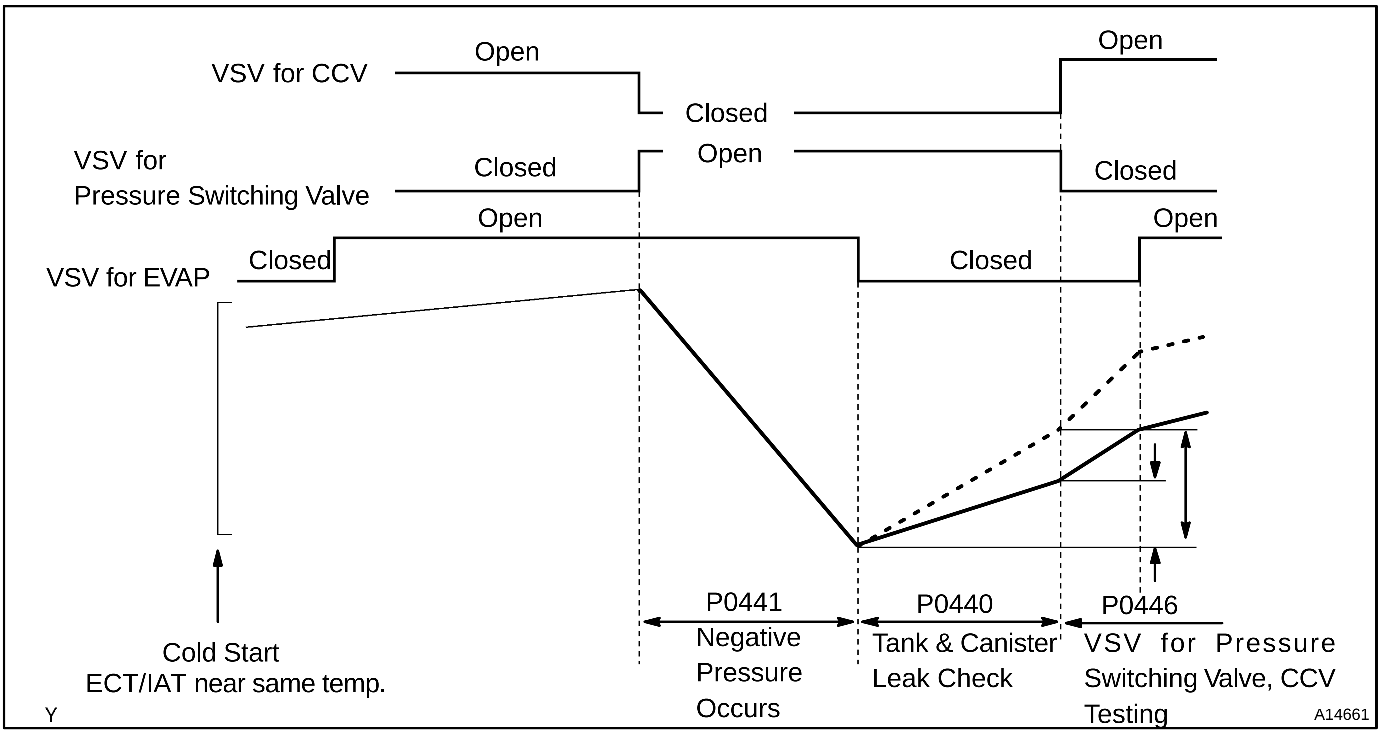
DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

CIRCUIT DESCRIPTION

The vapor pressure sensor, VSV for canister closed valve (CCV), VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.
The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.
DTCs P0441 and P0446 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when there is a malfunction in either the VSV for EVAP, the VSV for pressure switching valve, or in the vapor pressure sensor itself.

Fig. 1





DTC No.	DTC Detecting Condition	Trouble Area
P0441	Pressure in charcoal canister and fuel tank does not drop or drop in pressure increased beyond the specified limit during purge control (2 trip detection logic)	• Vacuum hose cracks, holed blocked, damaged or disconnected ((1), (2), (3), (4), (5), (6), (7), (8), (9), (10) and (11) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for CCV • VSV for CCV • Open or short in VSV circuit for pressure switching valve • VSV for pressure switching valve • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Fuel tank over fill check valve cracked damaged • ECM
P0446	When the vapor pressure rises to a specified point, the ECM opens the VSV for CCV. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side. The ECM closes the VSV for pressure switching valve. The pressure rise is no longer as great. If there was no change in pressure, the ECM will conclude the VSV for pressure switching valve did not close.	

WIRING DIAGRAM

Refer to DTC P0440 on page DI-73 .

CONFIRMATION READINESS TEST

Refer to DTC P0440 on page DI-73 .

INSPECTION PROCEDURE

HINT:
- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 next.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

TOYOTA hand-held tester:

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page DI-73 , step 1).**

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is TOYOTA genuine parts (See page DI-73 ,step 2).**

NG → **Replace to TOYOTA genuine parts.**

OK

3	**Check that fuel tank cap is correctly installed (See page DI-73 , step 3).**

NG → **Correctly install fuel tank cap.**

OK

4	**Check fuel tank cap (See page DI-73 , step 4).**

NG → **Replace fuel tank cap.**

OK

5	Check filler neck for damage (See page DI-73 , step 5).

NG — Replace filler pipe.

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page DI-73 , step 6).

NG — Repair or connect VSV or sensor connector.

OK

7	Check hose and tube between fuel tank and charcoal canister (See page DI-73 , step 7).

NG — Repair or replace.

OK

8	Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.

NG — Repair or connect VSV or sensor connector.

OK

9	Check vacuum hoses ((8), (9), (10) and (11) in Fig. 1 in circuit description).

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

10	Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).

NG → **Check and replace ECM (See page IN-28).**

OK

11	Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).

OK → **Go to step 13.**

NG

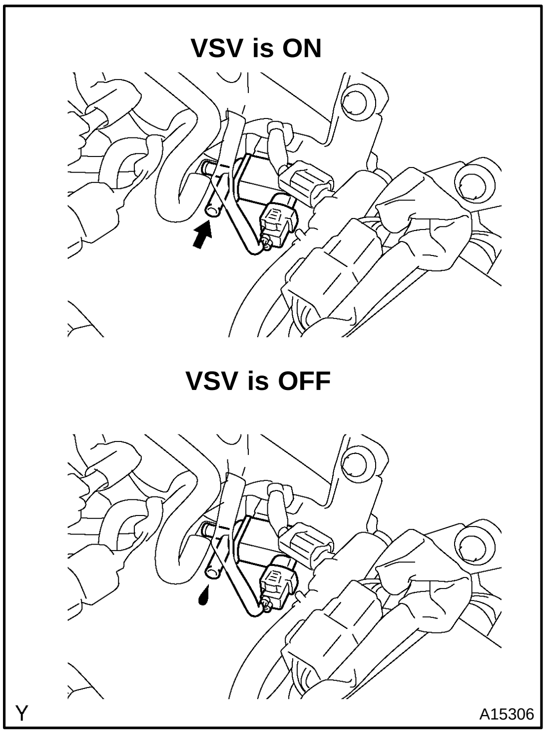
12	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).

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

OK

Replace vapor pressure sensor.

13	Check purge flow.



PREPARATION:
(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(c) Disconnect the vacuum hose for the VSV for the EVAP from the charcoal canister.
(d) Start the engine.

CHECK:
When the VSV for the EVAP is operated by the TOYOTA hand-held tester, check whether the disconnected hose applies suction to your finger.

OK:
VSV is ON:
Disconnected hose applies suction to your finger.
VSV is OFF:
Disconnected hose applies no suction to your finger.

OK	Go to step 17.

NG

14	Check vacuum hose between intake manifold and VSV for EVAP, and VSV for EVAP and charcoal canister.

CHECK:
(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG	Repair or replace.

OK

15	Check operation of VSV for EVAP (See page SF-39).

OK	Go to step 16.

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister.

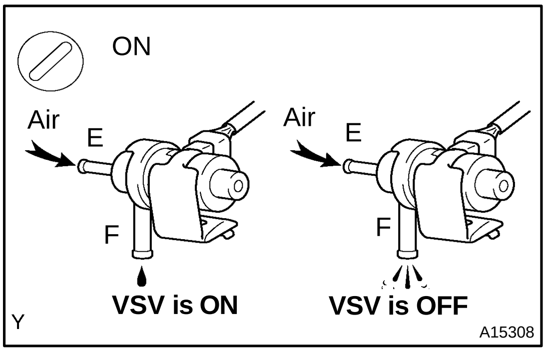
16	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).**

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

OK

Check and replace ECM (See page IN-28).

17	**Check VSV for CCV.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Disconnect the vacuum hose for the VSV for the CCV from the charcoal canister.
(c) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
(d) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check the VSV operation when it is operated by the TOYOTA hand-held tester.

OK:

VSV is ON:
Air does not flow from port E to port F.
VSV is OFF:
Air from port E flows out through port F.

OK → **Go to step 21.**

NG

18	**Check vacuum hose between VSV for CCV and charcoal canister.**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole damage and blockage.

NG → **Repair or replace.**

OK

19	**Check operation of VSV for CCV (See page SF-40).**

OK → **Go to step 20.**

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

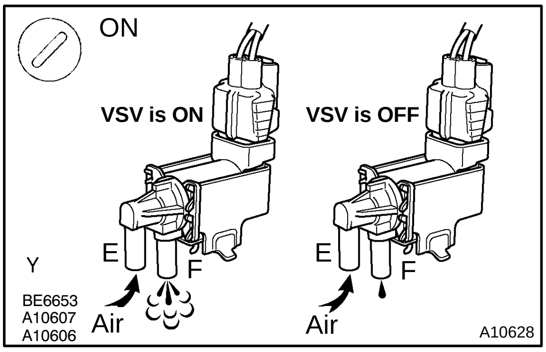
20	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page IN-28).**

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

OK

Check and replace ECM (See page IN-28).

21	Check VSV for pressure switching valve.



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

CHECK:
Check the VSV operation when it is operated by the TOYOTA hand-held tester.

OK:
VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air does not flow from port E to port F.

OK	Go to step 24.

NG

22	Check operation of VSV for pressure switching valve (See page SF-42).

OK	Go to step 23.

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

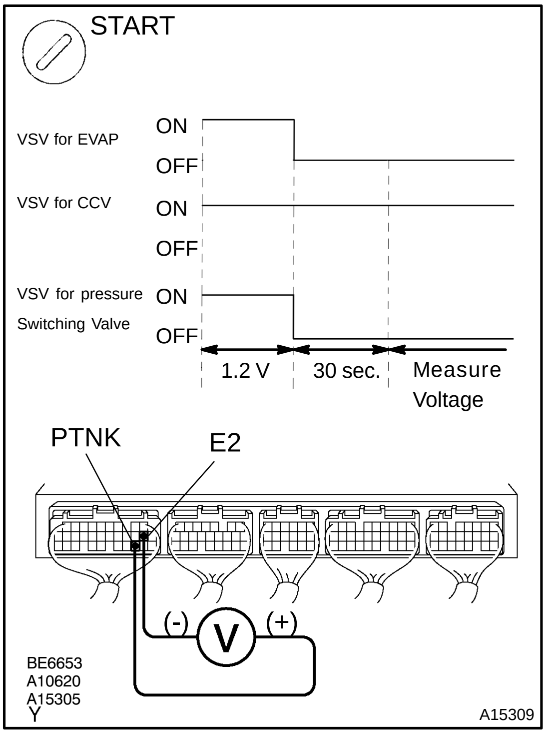
23	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-28).

NG	Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-28).

24	Check fuel tank.



PREPARATION:

(a) Remove the grove compartment.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.
(e) The VSV for the CCV is ON by the TOYOTA hand-held tester.
(f) The VSV for the EVAP and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP and the VSV for the pressure switching valve from ON to OFF.

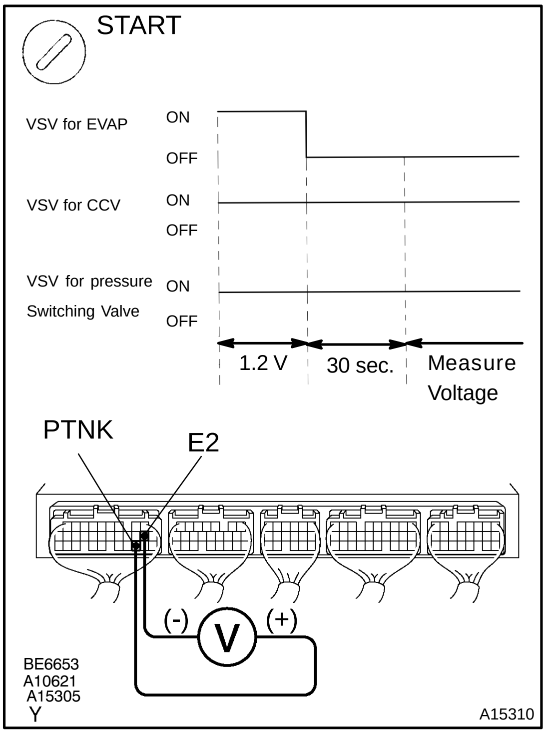
OK:

Voltage:
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG	Replace fuel tank.

OK

25	**Check charcoal canister.**



PREPARATION:

(a) Remove the grove compartment.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.
(e) The VSV for the CCV and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester.
(f) The VSV for the EVAP is ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP from ON to OFF.

OK:

Voltage:
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG	**Replace charcoal canister.**

OK

26	**Remove charcoal canister and check it (See page EC-6).**

NG	**Replace charcoal canister.**

OK

27	**Check fuel tank over fill check valve (See page EC-6).**

NG	**Replace fuel tank over fill check valve or fuel tank.**

OK

Check and replace charcoal canister (See page EC-6).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page DI-73 , step 1).**

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is TOYOTA genuine parts (See page DI-73 , step 2).**

NG → **Replace to TOYOTA genuine parts.**

OK

3	**Check that fuel tank cap is correctly installed (See page DI-73 , step 3).**

NG → **Correctly install fuel tank cap.**

OK

4	**Check fuel tank cap (See page DI-73 step, 4).**

NG → **Replace fuel tank cap.**

OK

5	Check filler neck for damage (See page DI-73 , step 5).

NG → Replace filler pipe.

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page DI-73 , step 6).

NG → Repair or connect VSV or sensor connector.

OK

7	Check hose and tube between fuel tank and charcoal canister (See page DI-73 , step 7).

NG → Repair or replace.

OK

8	Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.

NG → Repair or connect VSV or sensor connector.

OK

9	Check vacuum hoses ((8), (9) , (10) and (11) in Fig. 1 in circuit description).

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole damage and blockage.

NG → **Repair or replace.**

OK

10	Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).

NG → **Check and replace ECM (See page IN-28).**

OK

11	Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).

OK → **Go to step 13.**

NG

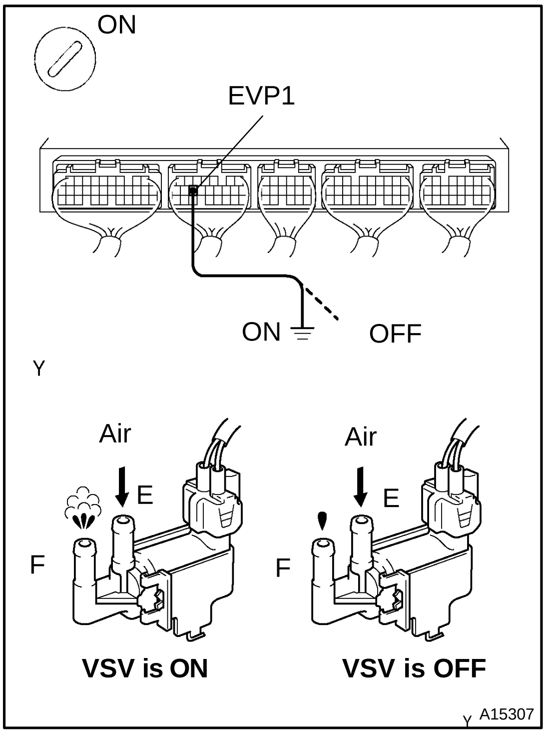
12	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).

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

OK

Replace vapor pressure sensor.

13	Check VSV for EVAP.



PREPARATION:
(a) Remove the glove compartment.
(b) Turn the ignition switch ON.

CHECK:
Check the VSV function.
(1) Connect between terminal EVP1 of the ECM connector and body ground (ON).
(2) Disconnect between terminal EVP1 of the ECM connector and body ground (OFF).

OK:
(1) VSV is ON:
Air from port E frows out through port F.
(2) VSV is OFF:
Air does not flow from port E to port F.

OK → **Go to step 16.**

NG

14	Check operation of VSV for EVAP (See page SF-39).

OK → **Go to step 15.**

NG

Replace VSV and clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister, and then check charcoal canister.

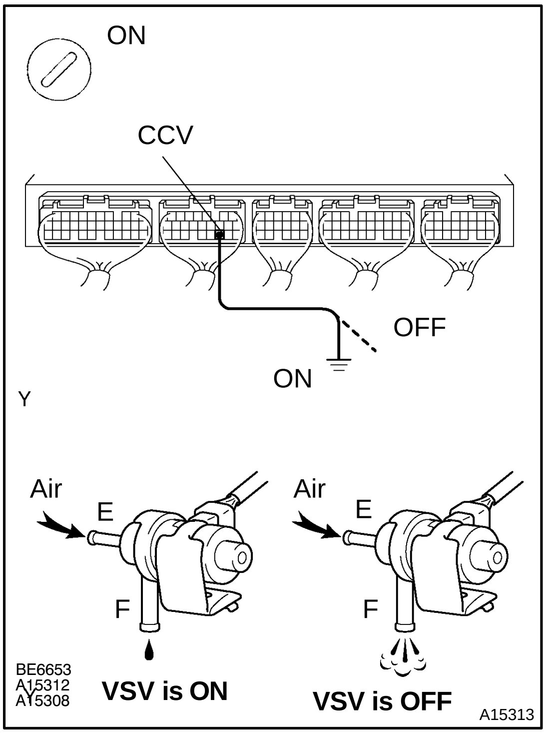
15	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).

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

OK

Check and replace ECM (See page IN-28).

16	Check VSV for CCV.



PREPARATION:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal CCV of the ECM connector and body ground (ON).

(2) Disconnect between terminal CCV of the ECM connector and body ground (OFF).

OK:

VSV is ON:
Air does not flow from port E to port F.
VSV is OFF:
Air from port E flows out through port F.

OK → **Go to step 19.**

NG

17	Check operation of VSV for CCV (See page SF-40).

OK → **Go to step 18.**

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

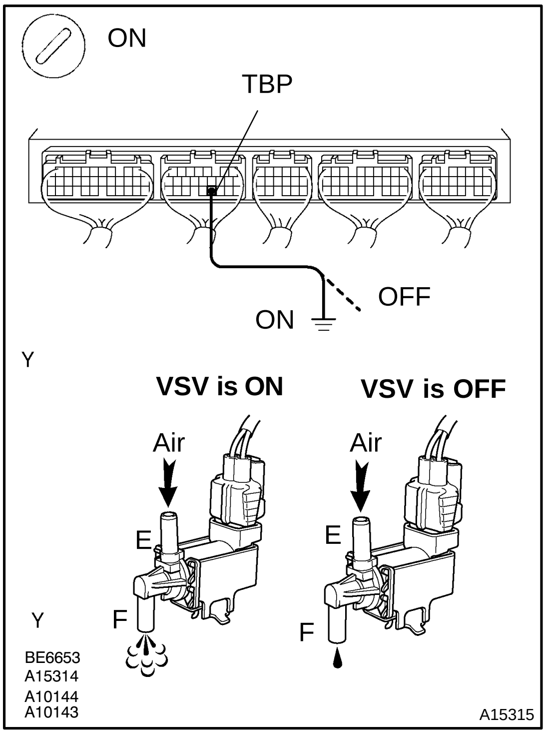
18	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page IN-28).

NG — Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-28).

19	Check VSV for pressure switching valve.



PREPARATION:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal TBP of the ECM connector and body ground (ON).

(2) Disconnect between terminal TBP of the ECM connector and body ground (OFF).

OK:

(1) VSV is ON:
Air from port E flows out through port F.
(2) VSV is OFF:
Air does not flow from port E to port F.

OK — Go to step 22

NG

20	Check operation of VSV for pressure switching valve (See page SF-42).

OK — Go to step 21.

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

21	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-28).**

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

OK

Check and replace ECM (See page IN-28).

22	**Check fuel tank over fill check valve (See page EC-6).**

NG → **Replace fuel tank over fill check valve or fuel tank.**

OK

Check and replace charcoal canister (See page EC-6).

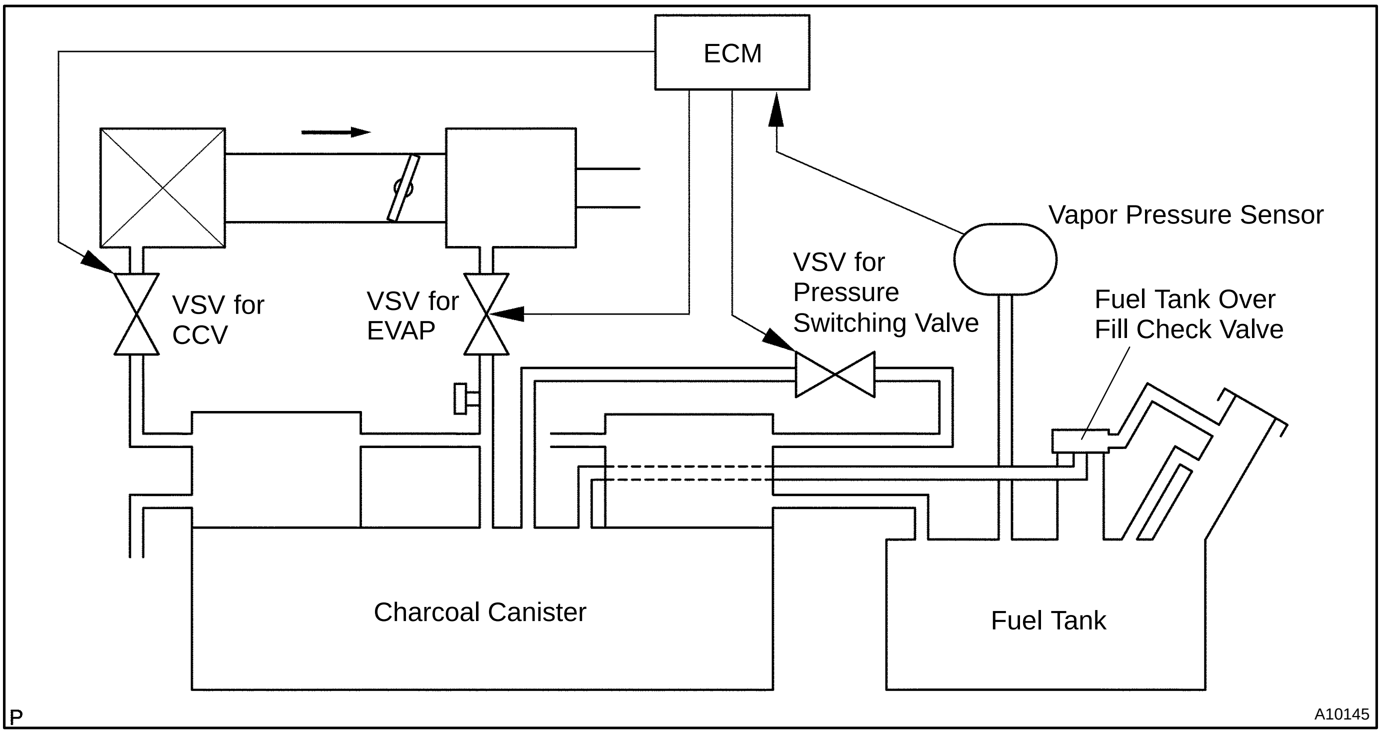
DI09X-09

DTC	P0450	Evaporative Emission Control System Pressure Sensor Malfunction

DTC	P0451	Evaporative Emission Control System Pressure Sensor Range/Performance

CIRCUIT DESCRIPTION

The vapor pressure sensor, VSV for canister closed valve (CCV) and VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.
The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.
DTC P0450 or P0451 is recorded by the ECM when the vapor pressure sensor malfunction.



DTC No.	DTC Detecting Condition	Trouble Area
P0450	10 seconds or less after engine starting condition vapor pressure sensor fixed value continues for fixed value or more: (2 trip detection logic)	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0451	Vapor pressure sensor output extremely changes under conditions of (a) and (b): (2 trip detection logic) (a) Vehicle speed: 0 km/h (0mph), Engine speed: Idling and VSV for pressure switching valve is OFF (b) vavor pressure sensor value ≧ opening pressure valve of charcoal canister	

WIRING DIAGRAM

Refer to DTC P0440 on page DI-73 .

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 first trouble shoot DTC P0441, P0446 P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 next.
- Read freeze frame data using LEXUS hand-held tester or OBD II 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.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1	**Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).**

NG → **Check and replace ECM (See page IN-28).**

OK

2	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).**

OK → **Check and replace ECM (See page IN-28).**

NG

3	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

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

OK

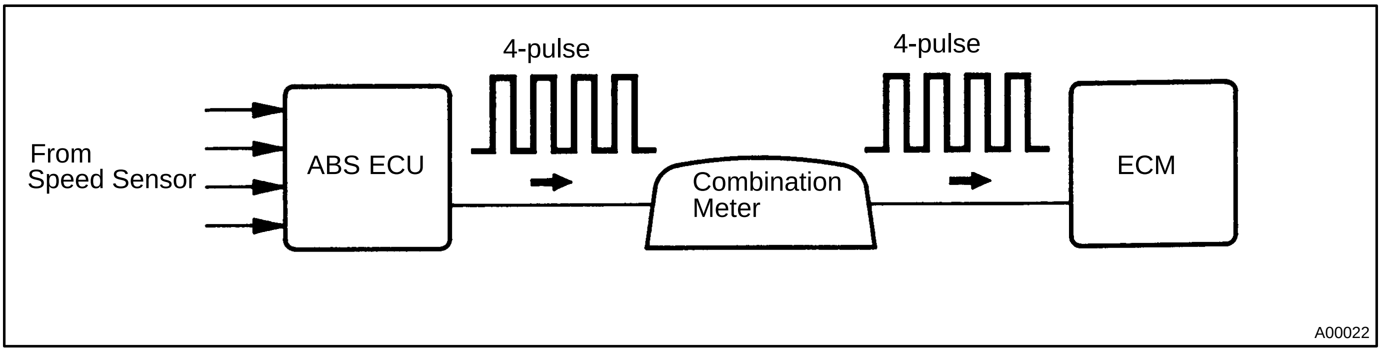
Replace vapor pressure sensor.

DI0SB-12

DTC	P0500	Vehicle Speed Sensor Malfunction

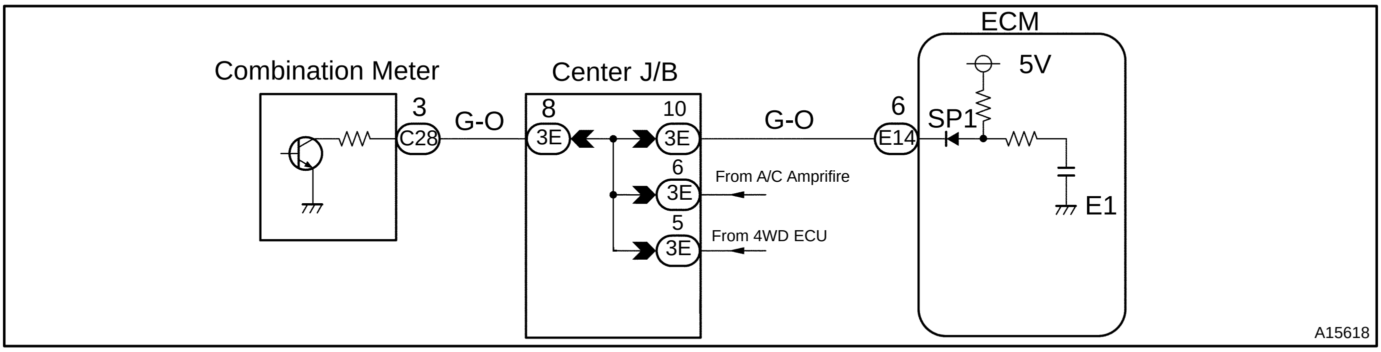
CIRCUIT DESCRIPTION

The speed sensor for ABS detects the wheel speed and sends the appropriate signals to the ABS ECU. The ECU converts these signals into a 4-pulse signal and outputs it to the combination meter. 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 ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	No vehicle speed sensor signal to ECM under following conditions: (2 trip detection logic) For A/T: (a) Park/neutral position switch is OFF (b) Vehicle is being driven For M/T: (a) Engine speed is between 1,800 rpm and 3,500 rpm	• Speedometer cable • Open or short in speed signal circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II 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.

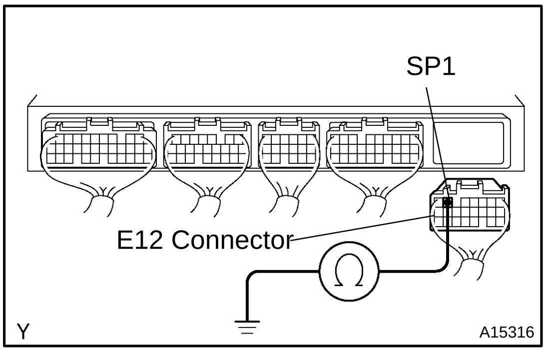
1	Check operation of speedometer.

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

NG → **Check speedometer circuit (See page BE-40).**

OK

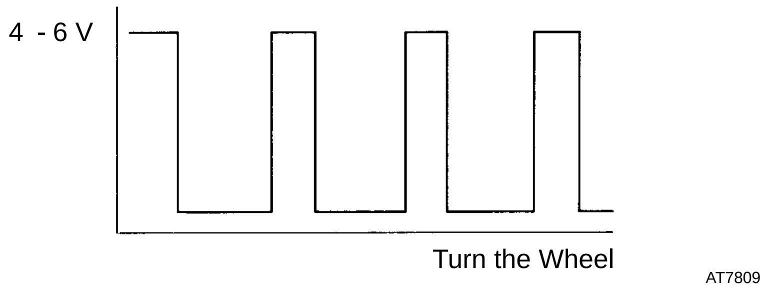
2	Check voltage between terminal SP1 of ECM connector and body ground.



PREPARATION:
(a) Remove the glove compartment (See page SF-54).
(b) Disconnect the E12 connector from the ECM.
(c) Shift the shift lever to the neutral.
(d) Jack up a rear wheel on one side.
(e) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminal SP1 of the ECM connector and body ground when the wheel is turned slowly.

OK:
Voltage is generated intermittently.



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

OK

Check and replace ECM (See page IN-28).

DI1LY-11

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 magnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the ECM to control the ETCS and the one valve type throttle body.
The ECM 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 • PCV valve and hose

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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-13).**

NO

2	Check connection of PCV valve and hose

NG → **Repair or replace PCV valve and hose**

OK

3	**Check air induction system (See page SF-1).**

NG → **Repair or replace.**

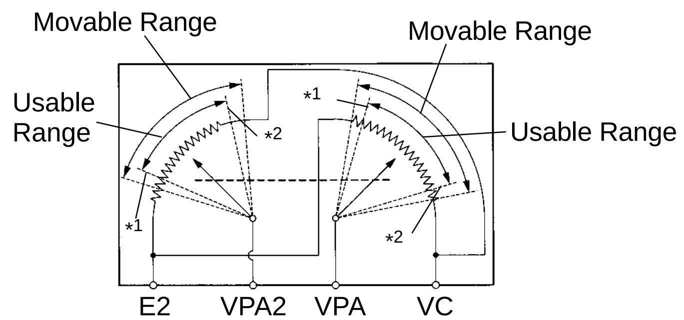
OK

Check electric throttle control system (See page SF-30).

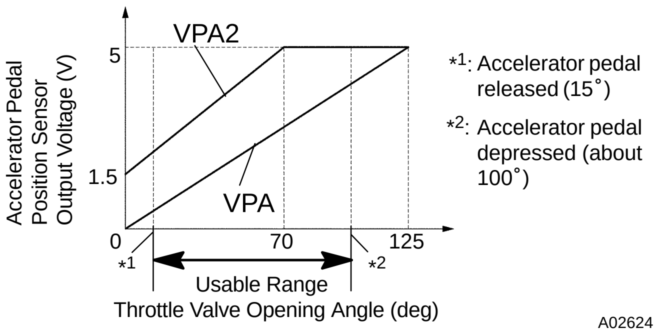
DTC	P1120	Accelerator Pedal Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

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



A02395 A02396



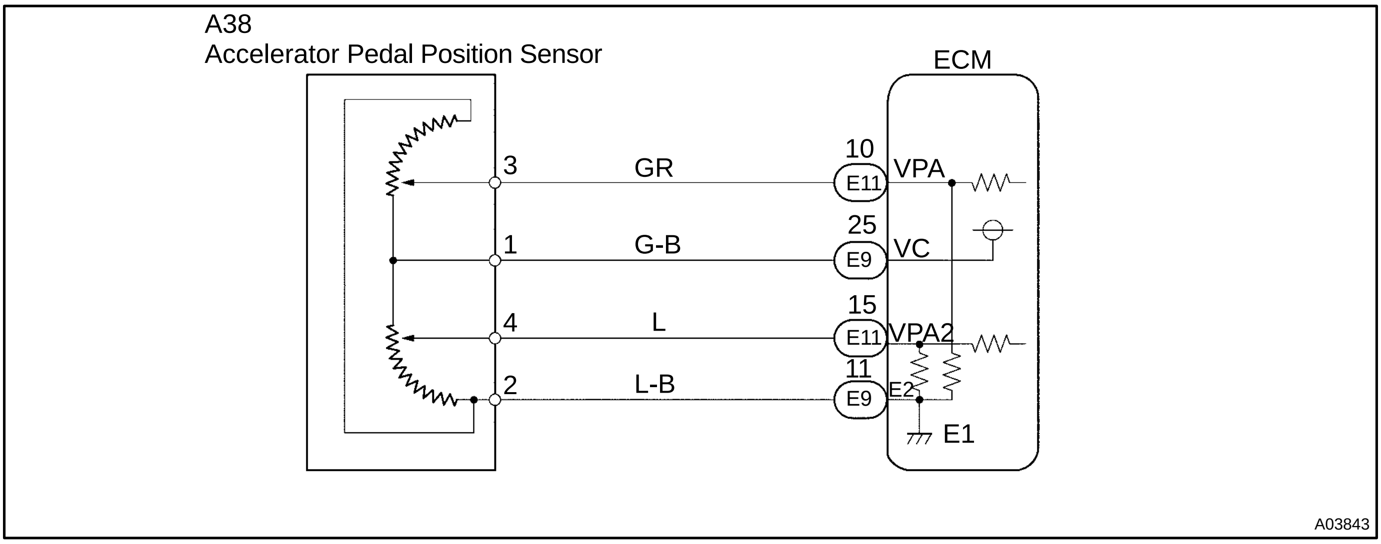
A02624

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

HINT:
After confirming DTC P1120, use the OBD II scan tool or TOYOTA hand-held tester to confirm the throttle valve opening percentage.

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

WIRING DIAGRAM



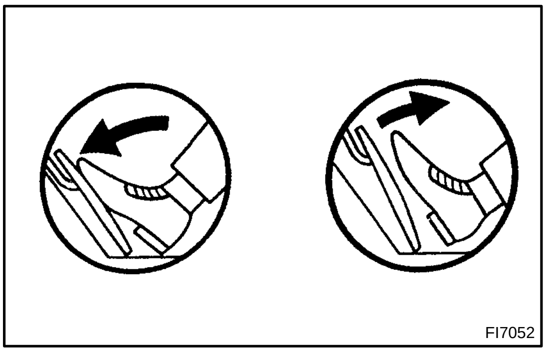
INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II 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.

TOYOTA hand-held tester:

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



PREPARATION:

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

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

CHECK:

Read the voltage for the accelerator pedal position sensor data.

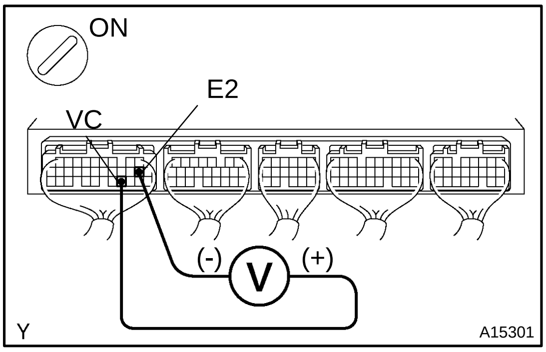
OK:

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

OK → **Check and replace ECM (See page IN-28).**

NG

2	Check voltage between terminals VC and E2 of ECM connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the ECM connector.

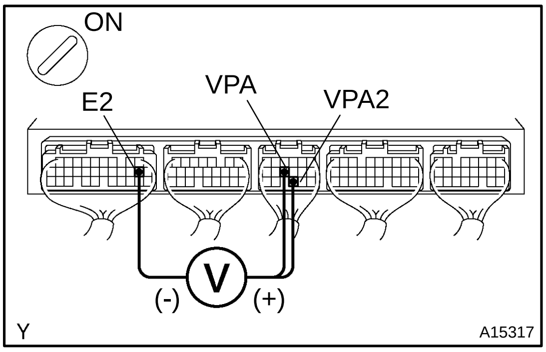
OK:

Voltage: 4.5 - 5.5 V

NG → **Check and replace ECM (See page IN-28).**

OK

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



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

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

OK:

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

OK → **Check and replace ECM (See page IN-28).**

NG

4	Check accelerator pedal position sensor (See page SF-30).

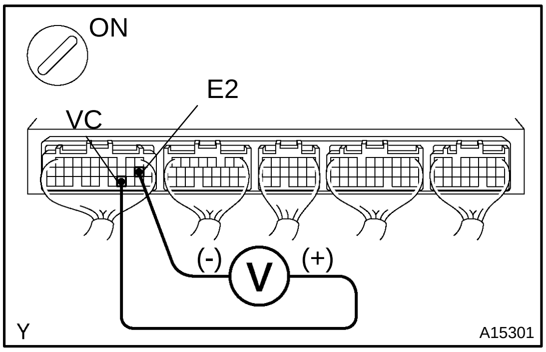
NG → **Replace accelerator pedal position sensor (See page SF-32).**

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between ECM and accelerator pedal position sensor (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	**Check voltage between terminals VC and E2 of ECM connector.**



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the ECM connector.

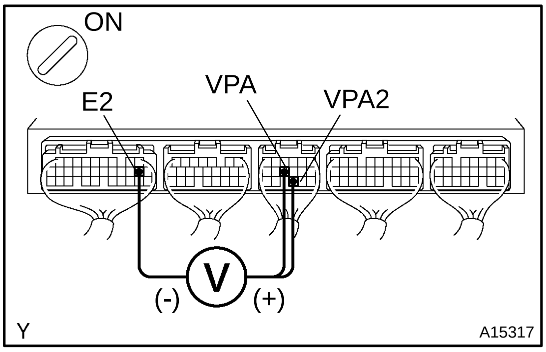
OK:

Voltage: 4.5 - 5.5 V

NG → **Check and replace ECM (See page IN-28).**

OK

2	**Check voltage between terminals VPA and E2, and VPA2 and E2 of ECM connector.**



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

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

OK:

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

OK → **Check and replace ECM (See page IN-28).**

NG

3	Check accelerator pedal position sensor (See page SF-30).

NG → Replace accelerator pedal position sensor (See page SF-32).

OK ↓

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between ECM and accelerator pedal position sensor (See page IN-28).

DI1M0-10

DTC	P1121	Accelerator Pedal Position Sensor Range/ Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P1120 on page DI-107 .

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

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II 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 accelerator pedal position sensor (See page SF-32).

DI8XK-01

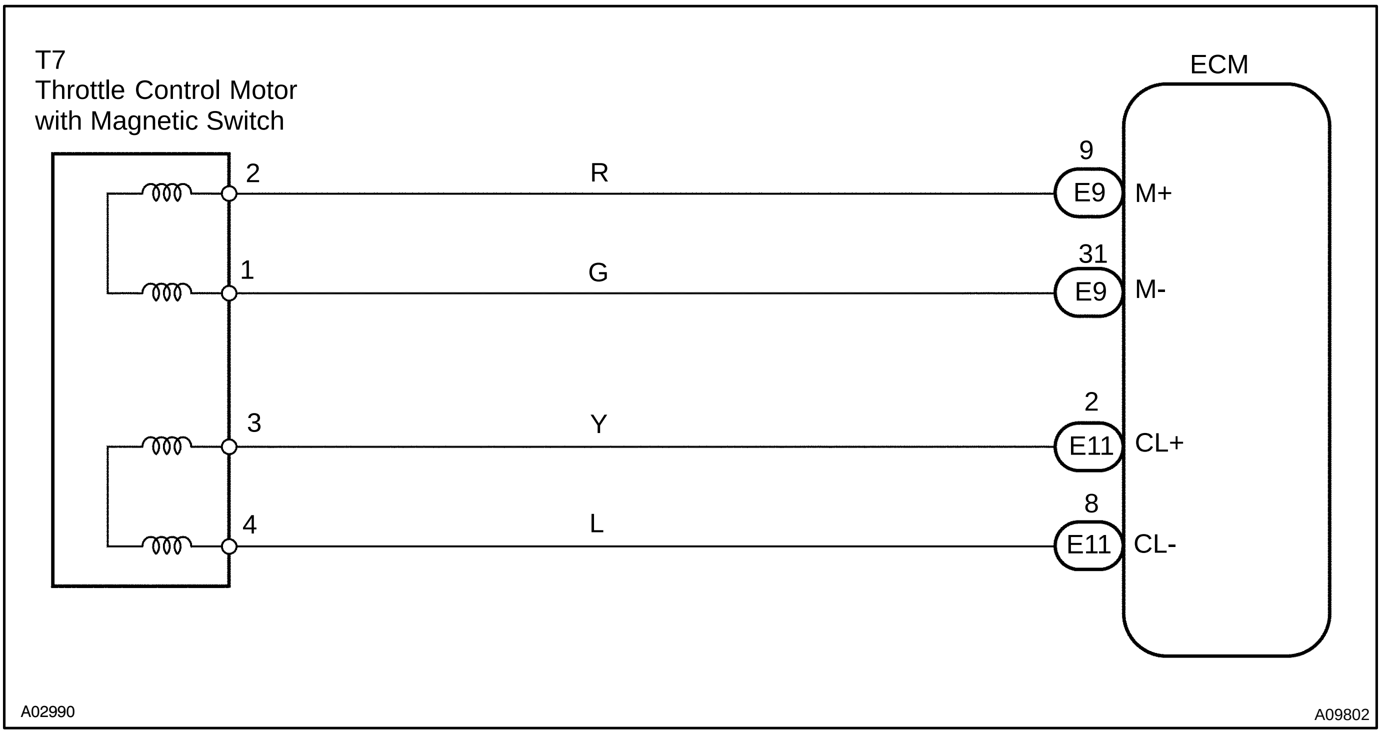
DTC	P1125	Throttle Control Motor Circuit Malfunction

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECM 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 ECM 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 ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1125	Conditions (a) and (b) continue 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 • ECM
	Throttle control motor current ≧ 16 A	
	Condition (a) continues for 0.6 seconds: (a) Throttle control motor current ≧ 7 A	

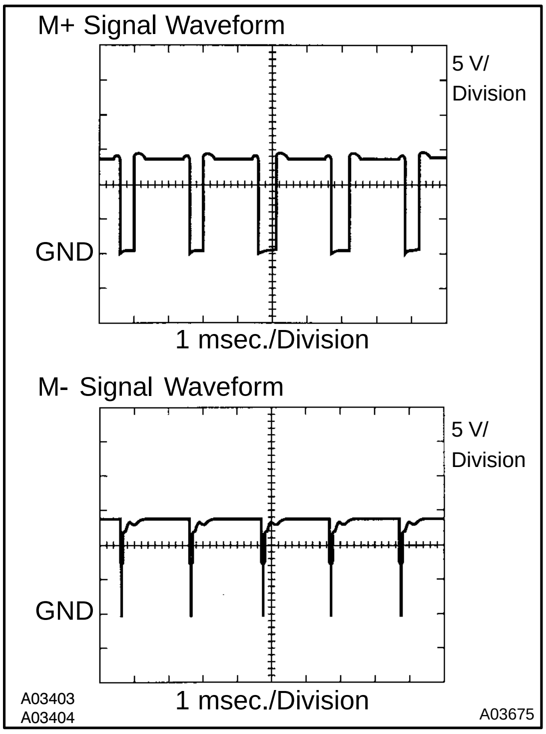
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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	Check throttle control motor circuit.



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals M+ or M- and E1 of the ECM connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals M+ or M- and E1 of the ECM 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 ECM (See page IN-28).**

NG ↓

2	Check throttle control motor (See page SF-30).

NG → **Replace throttle control motor (See page SF-32).**

OK ↓

3	Check for open and short in harness and connector between throttle control motor and ECM (See page IN-28).

NG → **Repair or replace.**

OK ↓

Check and replace ECM (See page IN-28).

DI8XL-01

DTC	P1126	Magnetic Clutch Circuit Malfunction

CIRCUIT DESCRIPTION

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

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

WIRING DIAGRAM

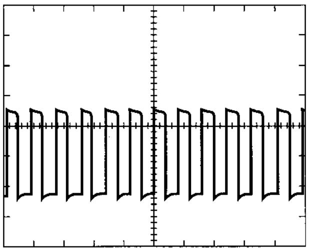
Refer to DTC P1125 on page DI-113.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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	Check magnetic clutch circuit.

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



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals CL+ and CL- of the ECM connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals CL+ and CL- of the ECM connector when the engine is idling.

OK:

The correct waveform is as shown.

NG	**Go to step 4.**

OK

2	**Check magnetic clutch (See page SF-30).**

NG	**Replace throttle control motor with magnetic clutch (See page SF-32).**

OK

3	**Check for open and short in harness and connector between magnetic clutch and ECM (See page IN-28).**

NG	**Repair or replace.**

OK

4	**Check operation of magnetic clutch.**

CHECK:

(a) Clear the DTC.

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

(1) Turn the ignition switch ON.

(2) Start the engine.

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

(4) Turn the ignition switch ON.

OK:

DTC P1126 is not stored.

NG → **Replace throttle control motor with magnetic clutch (See page SF-32).**

OK

Check and replace ECM (See page IN-28).

DI1M4-14

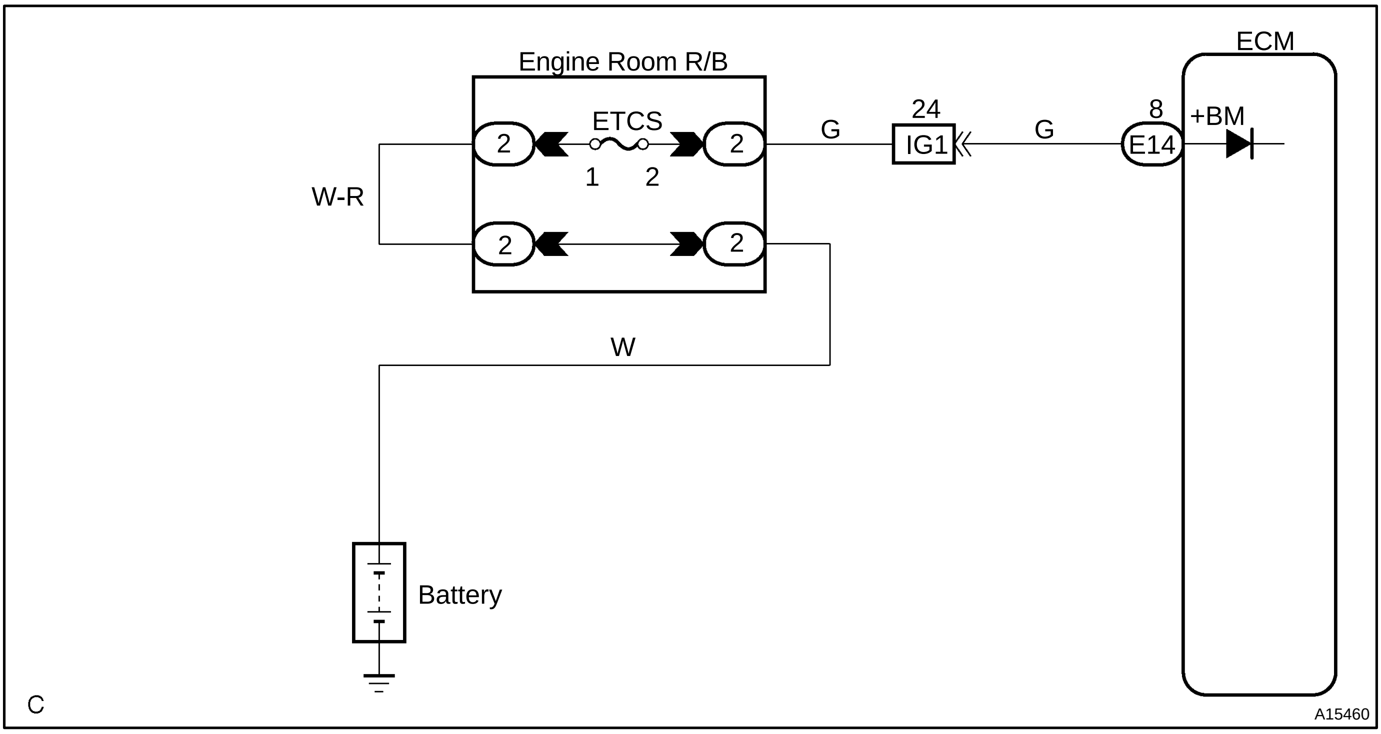
DTC	P1127	ETCS Actuator Power Source Circuit Malfunction

CIRCUIT DESCRIPTION

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

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

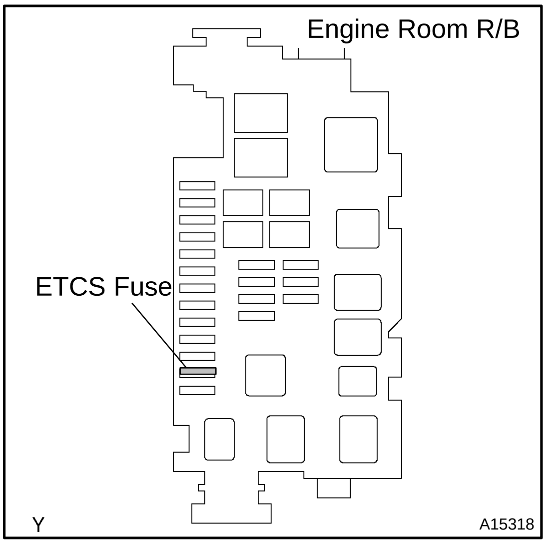
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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	**Check ETCS fuse.**

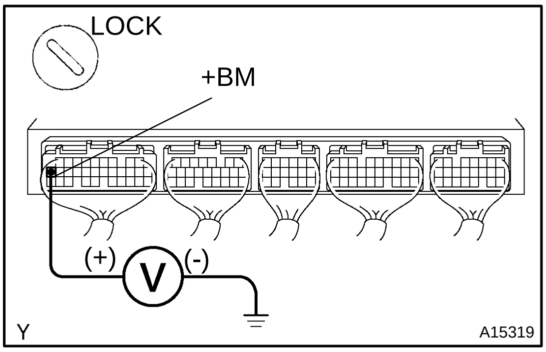


PREPARATION:
Remove the ETCS fuse from the engine room R/B.
CHECK:
Check the countinuity of the ETCS fuse.
OK:
Continuity

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

OK ↓

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



PREPARATION:
Remove the glove compartment door.
CHECK:
Measure the voltage between terminal +BM of the ECM connector and body ground.
OK:
Voltage: 9 - 14 V

OK **Check and replace ECM (See page IN-28).**

NG ↓

Check and repair harness or connector between battery and ETCS fuse, and ETCS fuse and ECM (See page IN-28).

DI8XM-01

DTC	P1128	Throttle Control Motor Lock Malfunction

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECM 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 ECM to control the throttle motor in order the throttle valve opening angle properly in response to driving condition. If this DTC is stored, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring. However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

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

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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	Check throttle control motor (See page DI-113).

NG → **Replace throttle control motor (See page SF-32).**

OK ↓

2	Visualy check throttle valve.

PREPARATION:
Remove the intake air connector.
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.

DI1M6-10

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 electromagnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the ECM to control the ETCS and the one valve type throttle body.
The ECM 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 ECM to control the throttle motor.
If the ETCS has a malfunction, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

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

WIRING DIAGRAM

Refer to DTC P1125 on page DI-1 13.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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 ECM, and clear DTC. If DTC P1129 is memorized again, and then replace throttle body.

DI5CA-07

DTC	P1130	A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P1130	Voltage output* of A/F sensor remains at 3.8 V or more, or 2.8 V or less, during engine running after engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM
	Voltage output* of A/F sensor does not change from 3.30 V, during engine running after engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	
	Open or short in A/F sensor circuit (2 trip detection logic)	

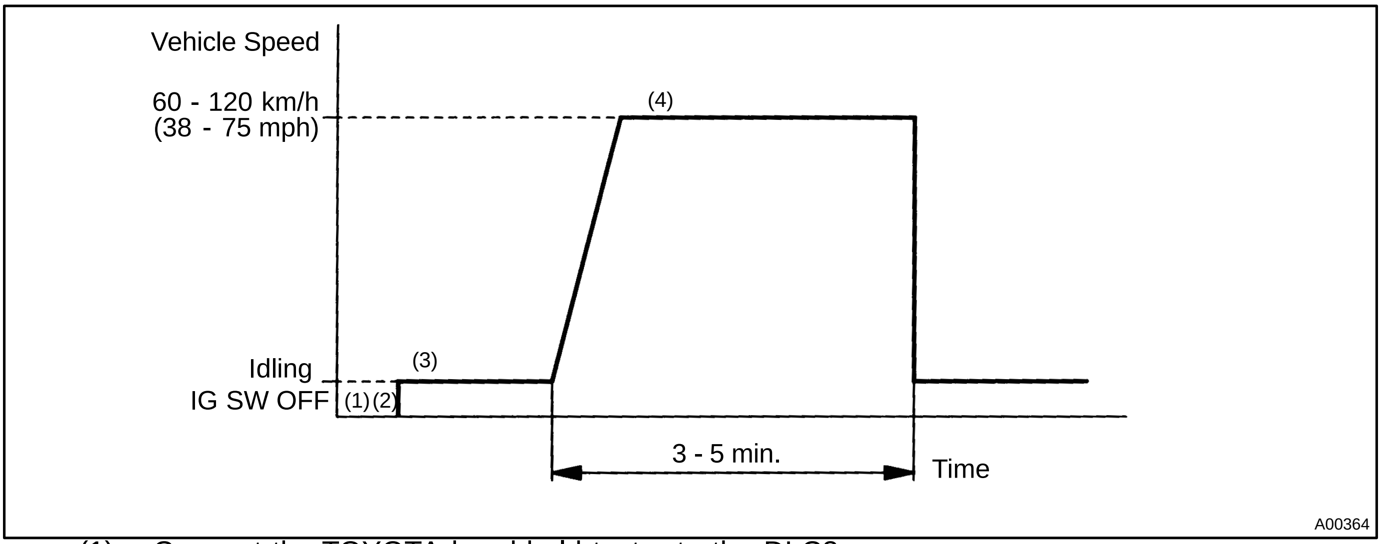
HINT:

- After confirming DTC P1130, use the OBD II scan tool or TOYOTA hand-held tester to confirm voltage output of the A/F sensor (AFS B1 S1/O2S B1 S1) from the CURRENT DATA.
- The A/F sensor's output voltage and the short-term fuel value can be read using the OBD II scan tool or TOYOTA hand-held tester.
- The ECM controls the voltage of AF1+ and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

CONFIRMATION DRIVING PATTERN



(1) Connect the TOYOTA hand-held tester to the DLC3.
(2) Switch the TOYOTA hand-held tester from the normal mode to the check mode (See page DI-3).

(3) Start the engine and warm it up with all the accessory switches OFF.
(4) Drive the vehicle at 60 - 120 km/h (38 - 75 mph) and the engine speed at 1,600 - 3,200 rpm for 3 - 5 min.

HINT:
If a malfunction exists, the MIL will light up during step (4).

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 TOYOTA hand-held tester, turn the ignition switch OFF after performing steps (3) and (4), then perform steps (3) and (4) again.**

INSPECTION PROCEDURE

HINT:

- If DTC P1130 is displayed, check the bank 1 sensor 1 circuit.
- Read frame freeze data using the TOYOTA hand-held tester or OBD II 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 DTC P1130) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Connect OBDII scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor.**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage of the A/F sensor on the screen of OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:
The voltage of the AF1+ terminals of the ECM is fixed at 3.3 V and the voltage of the AF1- terminals is fixed at 3.0 V. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:
- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding TOYOTA hand-held tester).

OK	**Go to step 8.**

NG

3	**Check for open and short in harness and connector between ECM and A/F sensor (See page IN-28).**

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

OK

4	**Check resistance of A/F sensor heater (See page SF-51).**

NG	**Replace A/F sensor.**

OK

5	**Check air induction system (See page SF-1).**

NG	**Repair or replace.**

OK

6	**Check fuel pressure (See page SF-7).**

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

OK

7	Check injector injection (See page SF-21).

NG → **Replace injector.**

OK

Replace A/F sensor.

8	Perform confirmation driving pattern.

Go

9	Is there DTC P1130 being output again?

YES → **Check and replace ECM (See page IN-28).**

NO

10	Did vehicle runs out of fuel in past?

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

YES

DTC P1130 is caused by running out of fuel.

DI5CB-07

DTC	P1133	A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P1133	After engine is warmed up and during vehicle driving at engine speed 1,400 rpm or more and vehicle speed 60 km/h (38 mph) or more, if response characteristic of A/F sensor becomes deteriorated (2 trip detection logic)	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II 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 DTC P1133) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Connect OBDII scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor.**

PREPARATION:

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

(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage of the A/F sensor on the screen of the OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of the AF1+ terminal of the ECM is fixed at 3.3 V and the voltage of the AF1- terminal is fixed at 3.0 V. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding TOYOTA hand-held tester).

OK → **Go to step 8.**

NG

3	**Check for open and short in harness and connector between ECM and A/F sensor (See page IN-28).**

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

OK

4	**Check resistance of A/F sensor heater (See page SF-51).**

NG → **Replace A/F sensor.**

OK

5	**Check air induction system (See page SF-1).**

NG → **Repair or replace.**

OK

6	Check fuel pressure (See page SF-7).

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

OK

7	Check injector injection (See page SF-21).

NG — Replace injector.

OK

Replace A/F sensor.

8	Perform confirmation driving pattern (See page DI-122).

Go

9	Is there DTC P1133 being output again?

YES — Check and replace ECM (See page IN-28).

NO

10	Did vehicle runs out of fuel in past?

NO — Check for intermittent problems (See page DI-3).

YES

DTC P1133 is caused by running out of fuel.

DI5CC-07

DTC	P1135	A/F Sensor Heater Circuit Malfunction (Bank 1 Sensor 1) (California Spec.)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P1135	When heater operates, heater current exceeds 8 A (2 trip detection logic)	• Open or short in heater circuit of A/F sensor • A/F sensor heater • ECM
	Heater current of 0.25 A or less when heater operates (2 trip detection logic)	

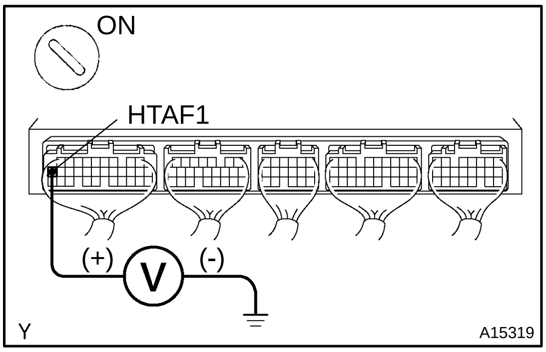
WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the TOYOTA hand-held tester or OBD II 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	Check voltage between terminal HTAF of ECM connector and body ground.



PREPARATION:
(a) Remove the glove compartment (See page SF-53).
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals HTAF of the ECM connector and body ground.
OK:
Voltage: 9 - 14 V

OK	Check and replace ECM (See page IN-28).

NG

2	Check resistance of A/F sensor heater (See page SF-51).

NG	Replace A/F sensor.

OK

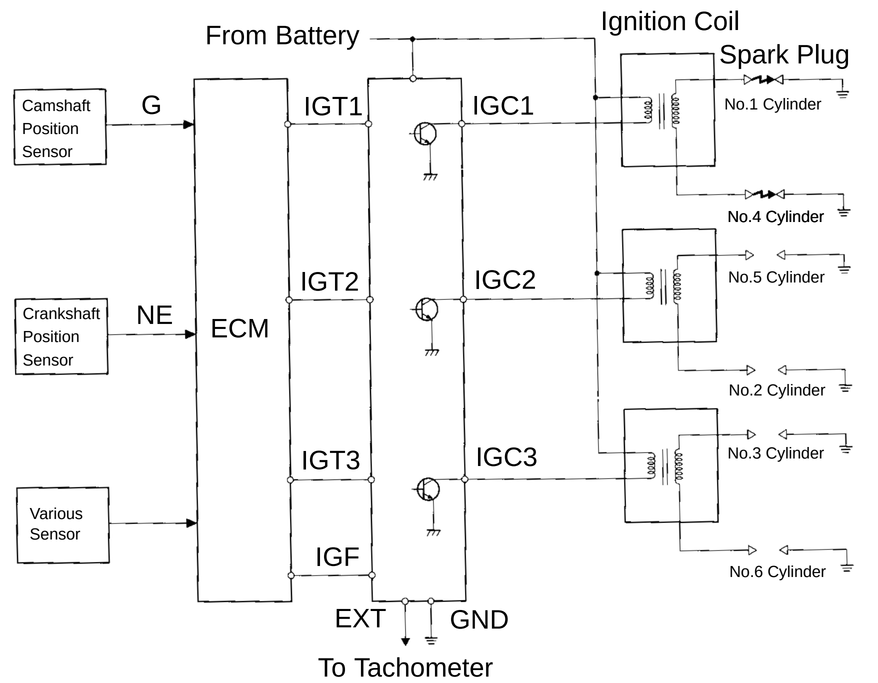
Check and repair harness or connector between EFI main relay (Marking: EFI) and A/F sensor, and A/F sensor and ECM (See page IN-28).

DI0SD-15

DTC	P1300	Igniter Circuit Malfunction

CIRCUIT DESCRIPTION

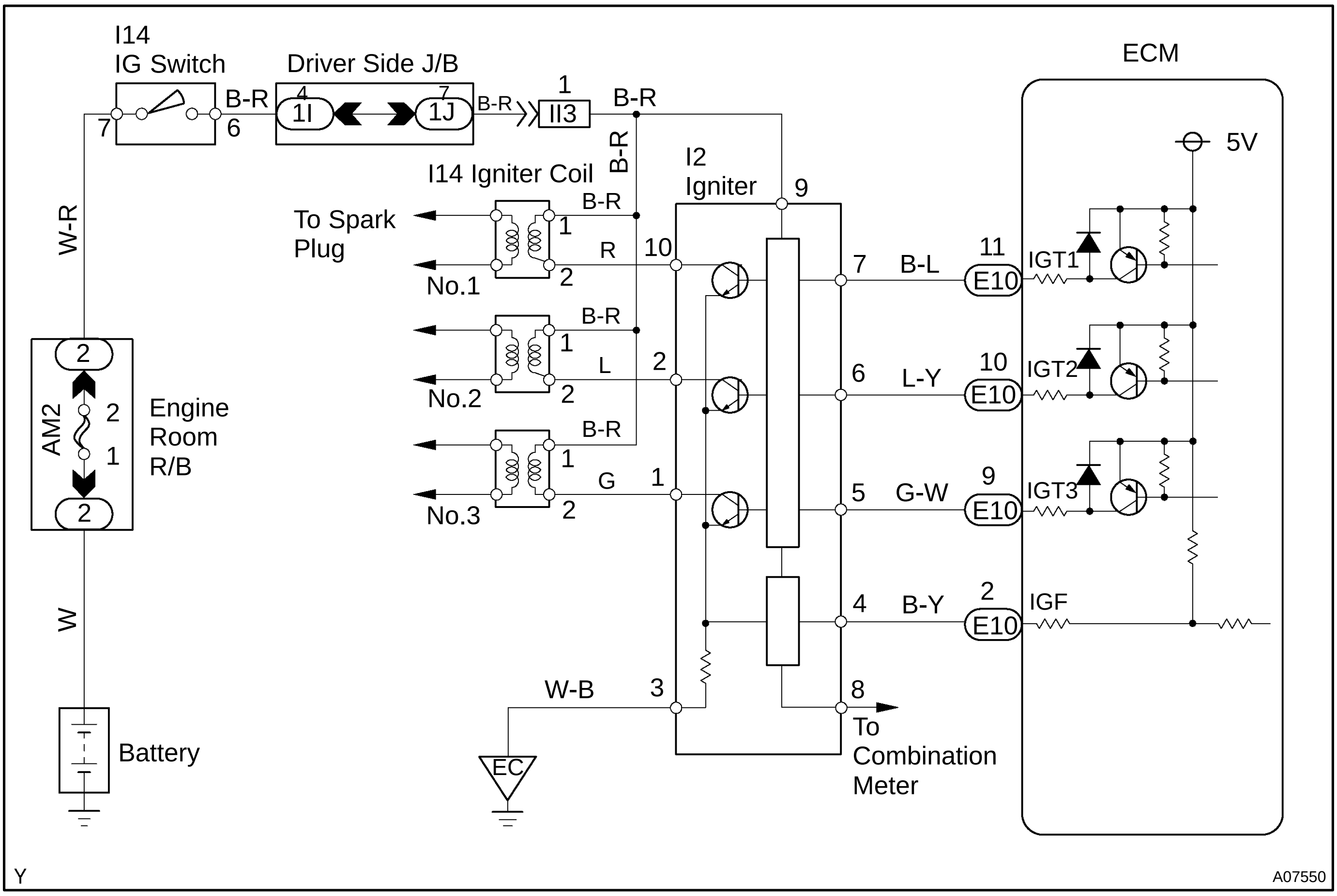
A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces high-voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor. The DIS is a 2-cylinder simultaneous ignition system which ignites 2 cylinders simultaneously with one ignition coil. In the 2-cylinder simultaneous ignition system, each of the 2 spark plugs is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plugs. The sparks of the 2 spark plugs pass simultaneously from the center electrode to the ground electrode. The ECM determines ignition timing end outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the igniter controls the primary ignition signals (IGC) for all ignition coils. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail-safe measure to the ECM.



S00251

DTC No.	DTC Detecting Condition	Trouble Area
P1300	Condition (a) is repeated 3 times consecutively during 6 consecutively IGT signals while engine is running (a) IGF signal is not input to ECM for 2 or more ignitions	• Ignition system • Open or short in IGF and IGT circuits from igniter to ECM • Igniter • Ignition coil • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II 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	**Check spark plug and spark of misfiring cylinder (See page DI-57).**

NG	**Go to step 4.**

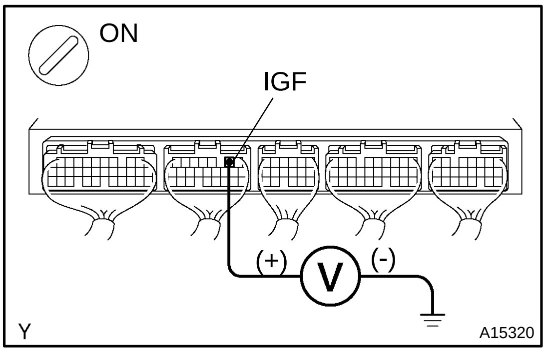
OK

2	**Check for open and short in harness and connector in IGF signal circuit between ECM and igniter (See page IN-28).**

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

OK

3	**Disconnect igniter connector and check voltage between terminal IGF of ECM connector and body ground.**



PREPARATION:
(a) Disconnect the igniter connector.
(b) Remove the glove compartment (See page SF-54).
(c) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminal IGF of the ECM connector and body ground.

OK:
Voltage: 4.5 - 5.5 V

OK → **Replace igniter.**

NG

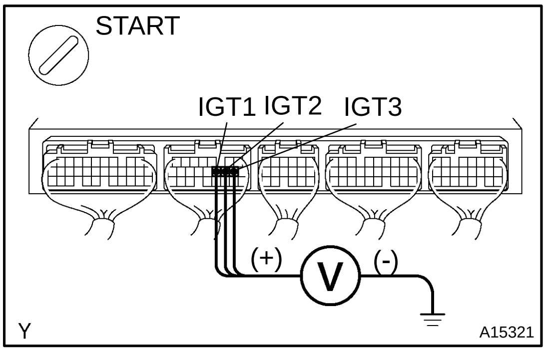
Check and replace ECM (See page IN-28).

4	**Check for open and short in harness and connector in IGT signal circuit between ECM and igniter (See page IN-28).**

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

OK

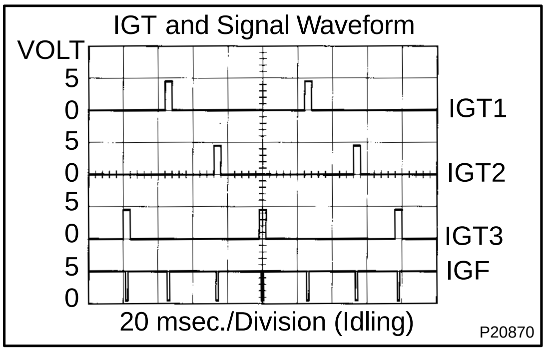
5	**Check voltage between terminals IGT1 - IGT3 of ECM connector and body ground.**



PREPARATION:
Remove the glove compartment (See page SF-54).

CHECK:
Measure the voltage between terminal IGT1 - IGT3 of the ECM 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 idling, check waveform between terminals IGT1 - IGT3 and E1, and IGF and E1 of the ECM connector.

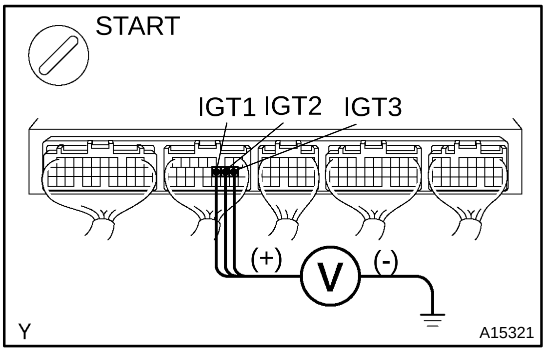
HINT:

The correct waveform is as shown.

NG — **Check and replace ECM (See page IN-28).**

OK

6	**Disconnect igniter connector, and check voltage between terminals IGT1 - IGT3 of ECM connector and body ground.**



PREPARATION:

(a) Disconnect the igniter connector.

(b) Remove the glove compartment (See page SF-54).

CHECK:

Measure the voltage between terminals IGT1 - IGT3 of the ECM connector and body ground when the engine is cranked.

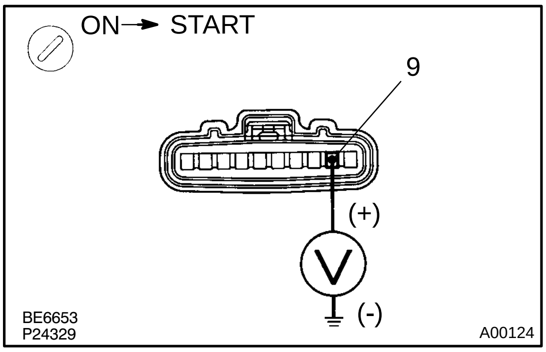
OK:

Voltage: More than 0.1 V and less than 5.0 V

NG — **Check and replace ECM (See page IN-28).**

OK

7	**Check voltage between terminal 9 of igniter connector and body ground.**



PREPARATION:

Disconnect the igniter connector.

CHECK:

Measure the voltage between terminal 9 of the igniter connector and body ground when the ignition switch is turned to ON and START position.

OK:

Voltage: 9 - 14 V

NG — **Check and repair igniter power source circuit.**

OK

8	Check for open and short in harness and connector between ignition switch and ignition coil, and ignition coil and igniter (See page IN-28).

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

OK

9	Check ignition coil (See page IG-1).

NG → **Replace ignition coil.**

OK

Replace igniter.

DI0SE-08

DTC	P1335	Crankshaft Position Sensor Circuit Malfunction (During engine running)

CIRCUIT DESCRIPTION

Refer to DTC P0335 on page DI-66 .

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

WIRING DIAGRAM

Refer to DTC P0335 on page DI-66 .

INSPECTION PROCEDURE

Refer to DTC P0335 on page DI-66 .

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II 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.

DI1D3-06

DTC	P1520	Stop Light Switch Signal Malfunction

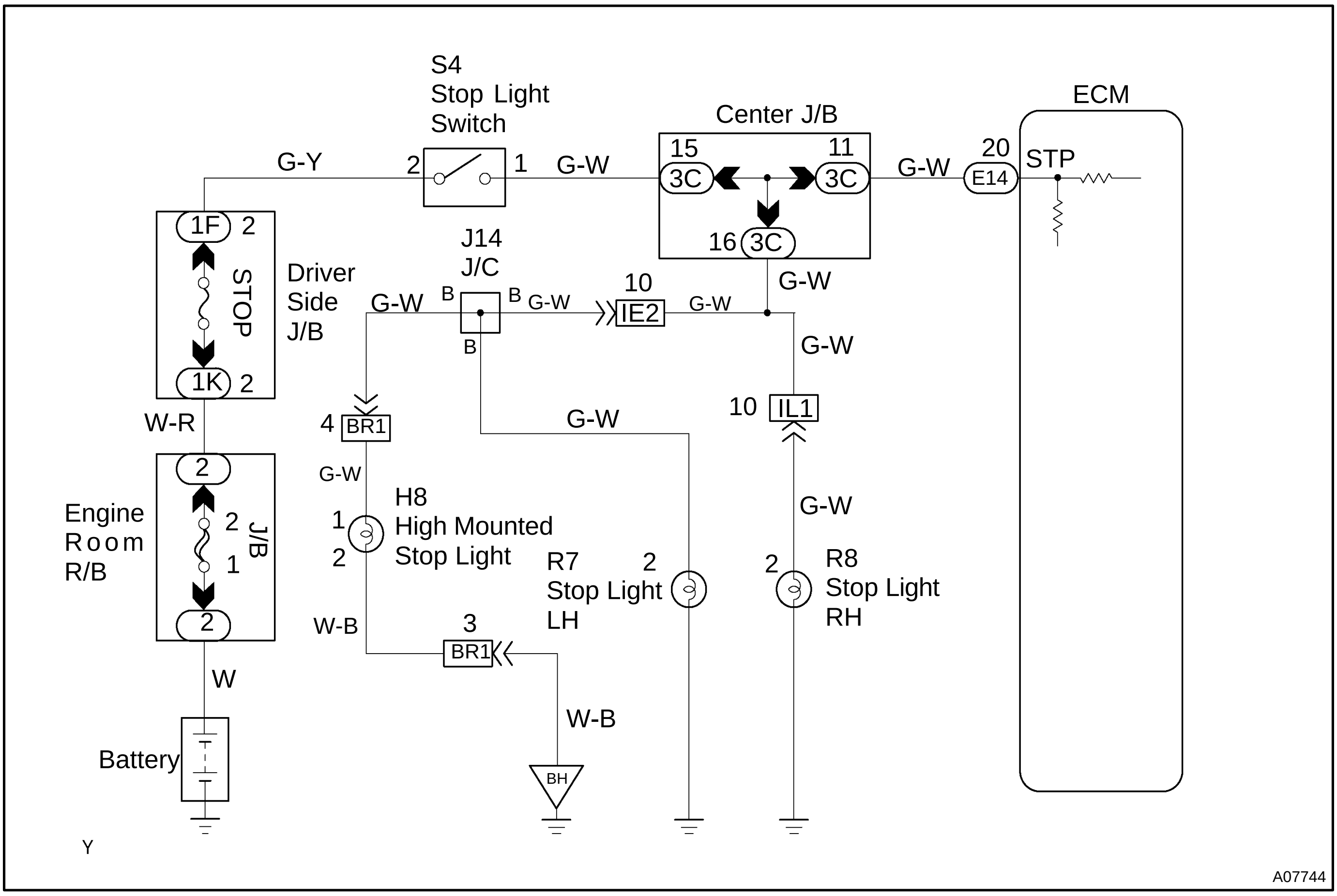
CIRCUIT DESCRIPTION

This signal is used to detect when the brakes have been applied. The STP signal voltage is the same as the voltage supplied to the stop lights. The STP signal is used mainly to control the fuel cut-off engine speed. (The fuel cut-off engine speed is reduced slightly when the vehicle is braking.)

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

HINT:
In this circuit, diagnosis can only be made in the check mode.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the TOYOTA hand-held tester or OBD II 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.

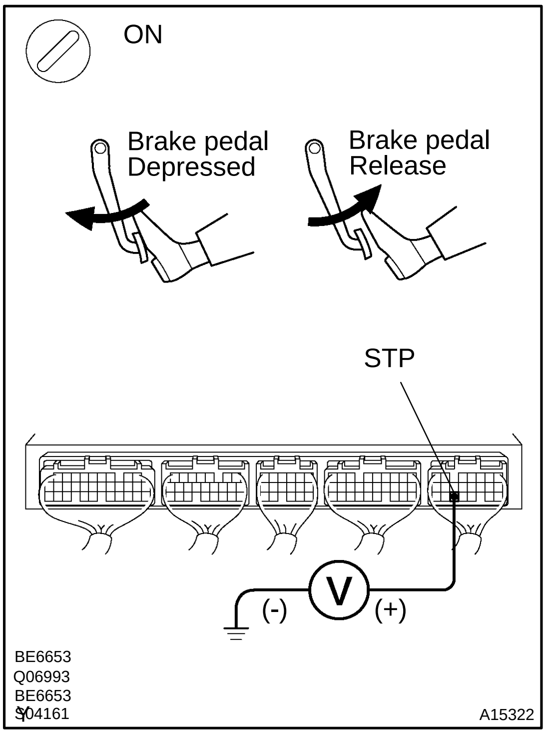
1	**Check operation of stop light.**

CHECK:
Check if the stop lights go on and off normally when the brake pedal is operated and released.

NG → **Check and repair stop light circuit (See page BE-32).**

OK

2	**Check STP signal.**



When using TOYOTA hand-held tester:

PREPARATION:

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

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

CHECK:
Read the STP signal on the TOYOTA hand-held tester.

OK:

Brake Pedal	STP Signal
Depressed	ON
Release	OFF

When not using TOYOTA hand-held tester:

PREPARATION:
Turn the ignition switch ON.

CHECK:
Check the voltage between terminal STP of the ECM connector and body ground.

OK:

Brake Pedal	Voltage
Depressed	7.5 - 14 V
Release	Below 1.5 V

OK → **Check for intermittent problems (See page DI-20).**

NG

3	**Check harness and connector between stop light switch and ECM (See page DI-18).**

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

OK

Check and replace ECM (See page IN-28).

DI0SG-11

DTC	P1600	ECM BATT Malfunction

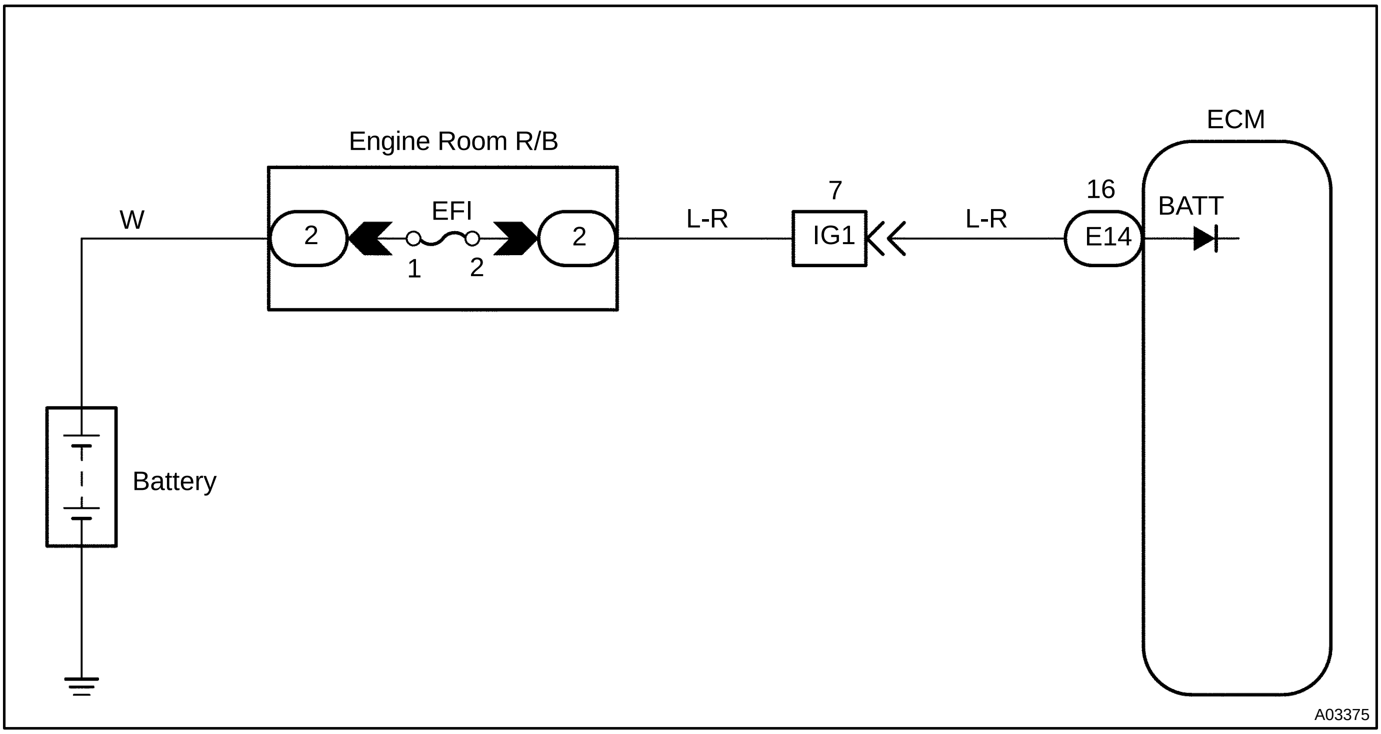
CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BATT of the ECM 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 • ECM

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

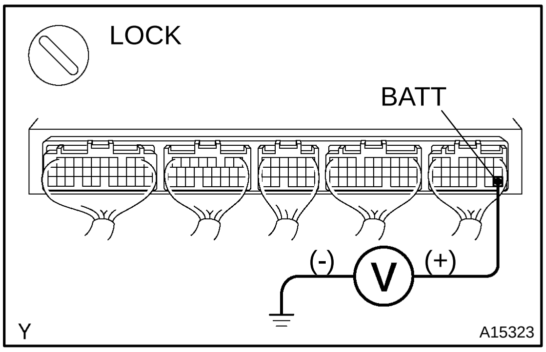
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the TOYOTA hand-held tester or OBD II 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	Check voltage between terminal BATT of ECM connector and body ground.

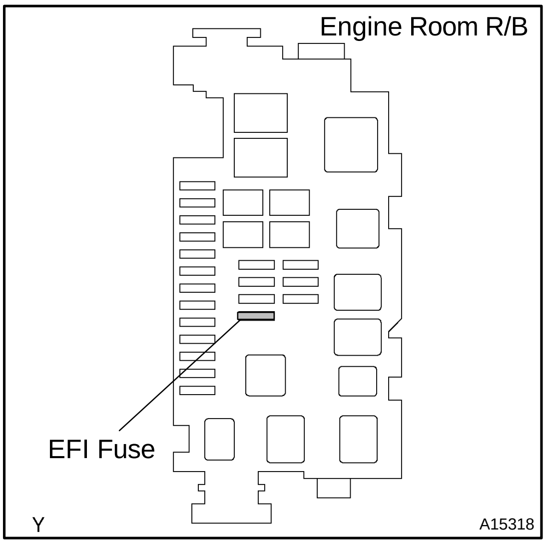


PREPARATION:
Remove the glove compartment (See page SF-54).
CHECK:
Measure the voltage between terminal BATT of the ECM connector and body ground.
OK:
Voltage: 9 - 14 V

OK → **Check and replace ECM (See page IN-28).**

NG

2	Check EFI fuse.



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

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

OK

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

DI1MF-08

DTC	P1633	ECM Malfunction (ETCS Circuit)

CIRCUIT DESCRIPTION

Refer to DTC P1129 on page DI-121 .

DTC No.	DTC Detecting Condition	Trouble Area
P1633	ECM malfunction	• ECM

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II 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 ECM.

DI0SH-08

DTC	P1780	Park/Neutral Position Switch Malfunction (Only for A/T)

CIRCUIT DESCRIPTION

The park/neutral position switch go on when the shift lever is in the N or P shift position. When it goes on terminal NSW of the ECM is grounded to body ground via the starter relay, thus the terminal NSW voltage becomes 0V. When the shift lever is in the D, 2, L or R position, the park/neutral position switch goes off, so the voltage of ECM. Terminal NSW becomes battery voltage, the voltage of the ECM internal power source. If the shift lever is moved from the N position to the D position, this signal is used for air-fuel ratio correction and for idle speed control (estimated control), etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for P, R, N, D, 2 and L position (2 trip detection logic)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM
	When driving under conditions (a) and (b) for 30 sec. or more park/neutral position switch is ON (N position): (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 - 2,500 rpm	

HINT:
After confirming DTC P1780, use the TOYOTA hand-held tester to confirm the PNP switch signal from the CURRENT DATA.

WIRING DIAGRAM

Refer to DTC P1780 on page DI-203 .

INSPECTION PROCEDURE

Refer to DTC P1780 on page DI-203 .
HINT:
Read freeze frame data using the TOYOTA hand-held tester or OBD II 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.

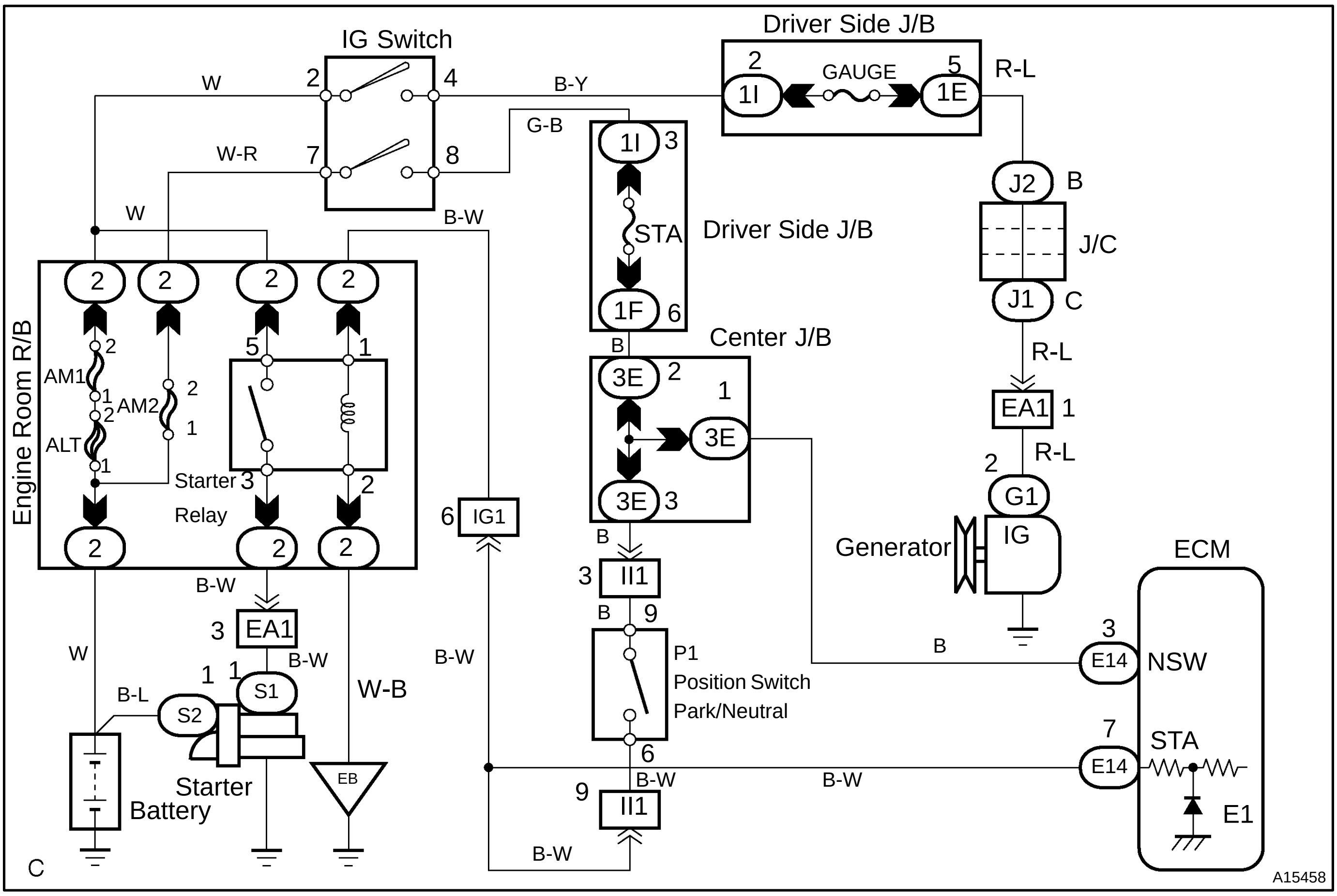
DI0SI-14

Starter Signal Circuit

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page DI-20 .

TOYOTA hand-held tester:

1	**Connect TOYOTA hand-held tester, and check STA signal.**

PREPARATION:

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

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

CHECK:

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

OK:

Ignition Switch Position	ON	START
STA Signal	OFF	ON

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

NG

2	Check for open in harness and connector between ECM and starter relay (See page DI-18).

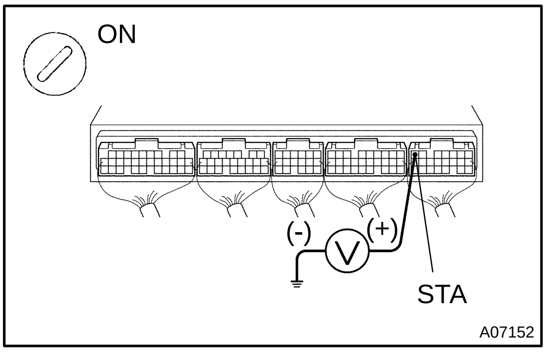
NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

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



PREPARATION:

Remove the glove compartment (See page SF-54).

CHECK:

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

OK:

Voltage: 6 V or more

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

NG

2	Check for open in harness and connector between ECM and starter relay (See page DI-18).

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

OK

Check and replace ECM (See page IN-28).

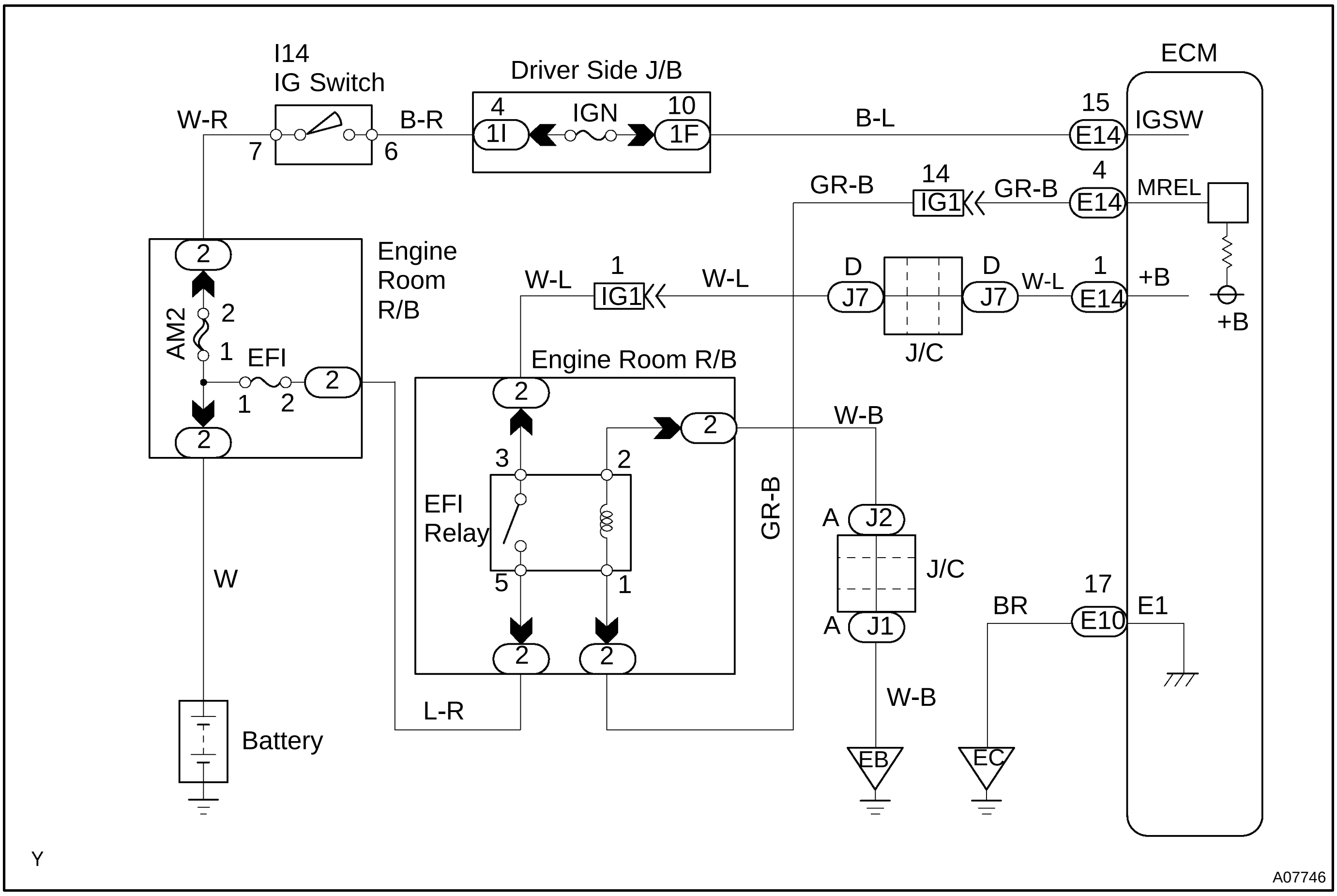
DI0SJ-08

ECM Power Source Circuit

CIRCUIT DESCRIPTION

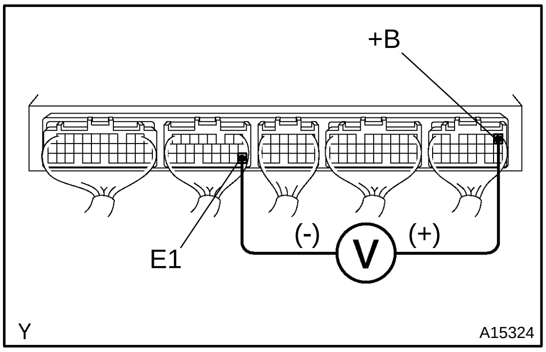
When the ignition switch is turned ON, battery positive voltage is applied to the coil, closing the contacts of the EFI main relay (Marking: EFI) and supplying power to terminal +B of the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals +B and E1 of the ECM 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 ECM and body ground (See page IN-28).

NG → Repair or replace harness or connector.

OK

3	Check EFI main relay (Marking: EFI) (See page SF-35).

NG → Replace EFI main relay.

OK

4	Check EFI fuse (See page DI-148 , step 2).

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

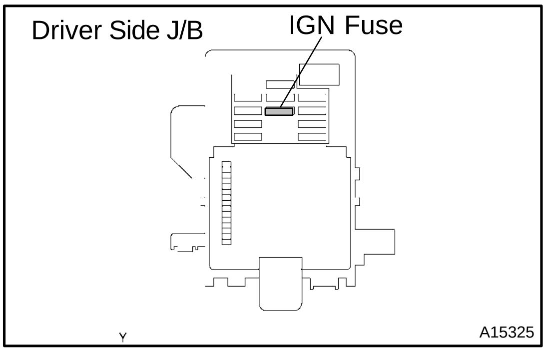
OK

5	Check for open harness and connector between EFI main relay (Marking: EFI) and battery, and EFI main relay and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

6	**Check IGN fuse.**



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

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

OK

7	**Check ignition switch (See page BE-12).**

NG	**Replace ignition switch (See page SR-17).**

OK

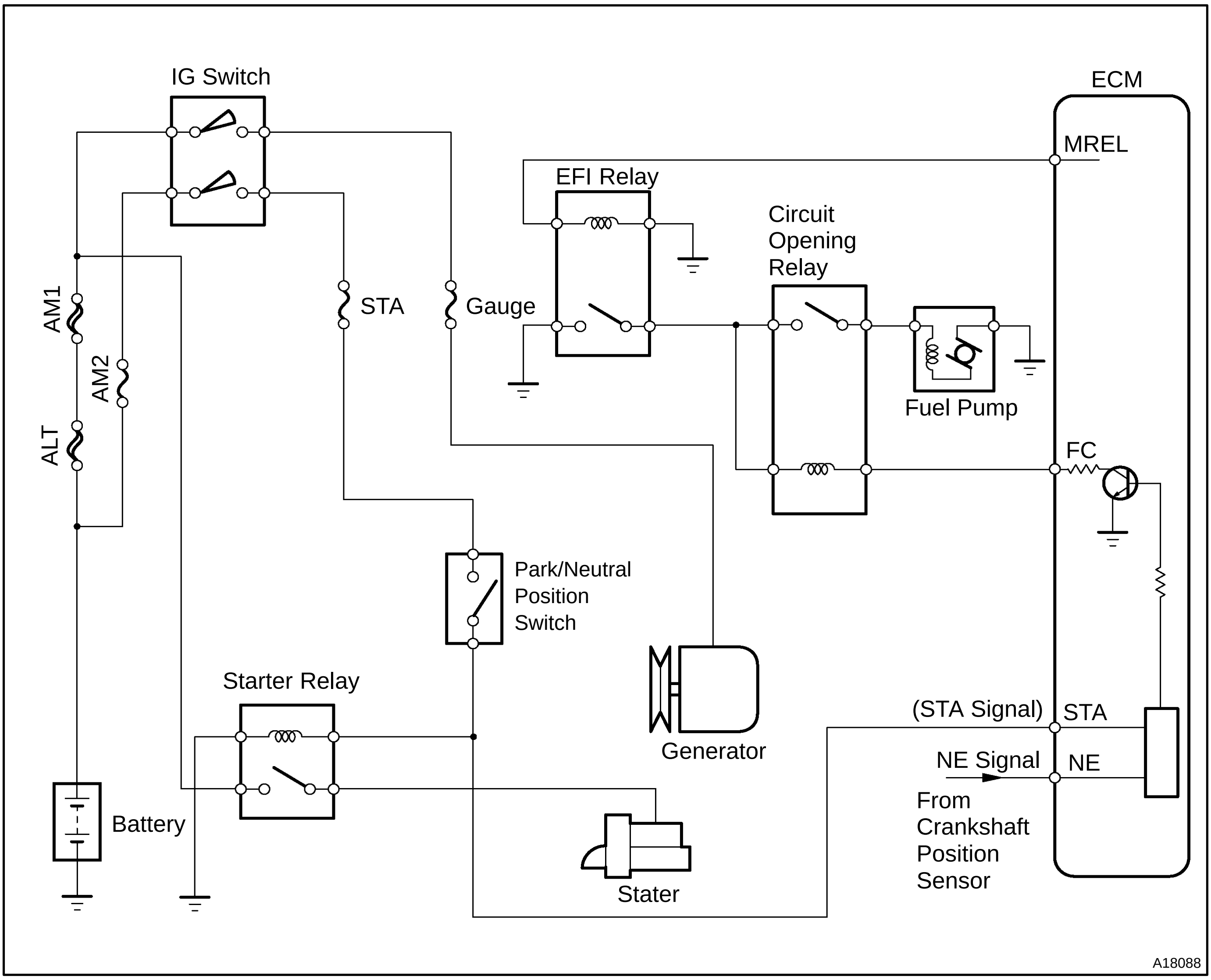
Check for open in harness and connector between ignition switch and EFI main relay (Marking: EFI), and EFI main relay and body ground (See page IN-28).

DI8XN-02

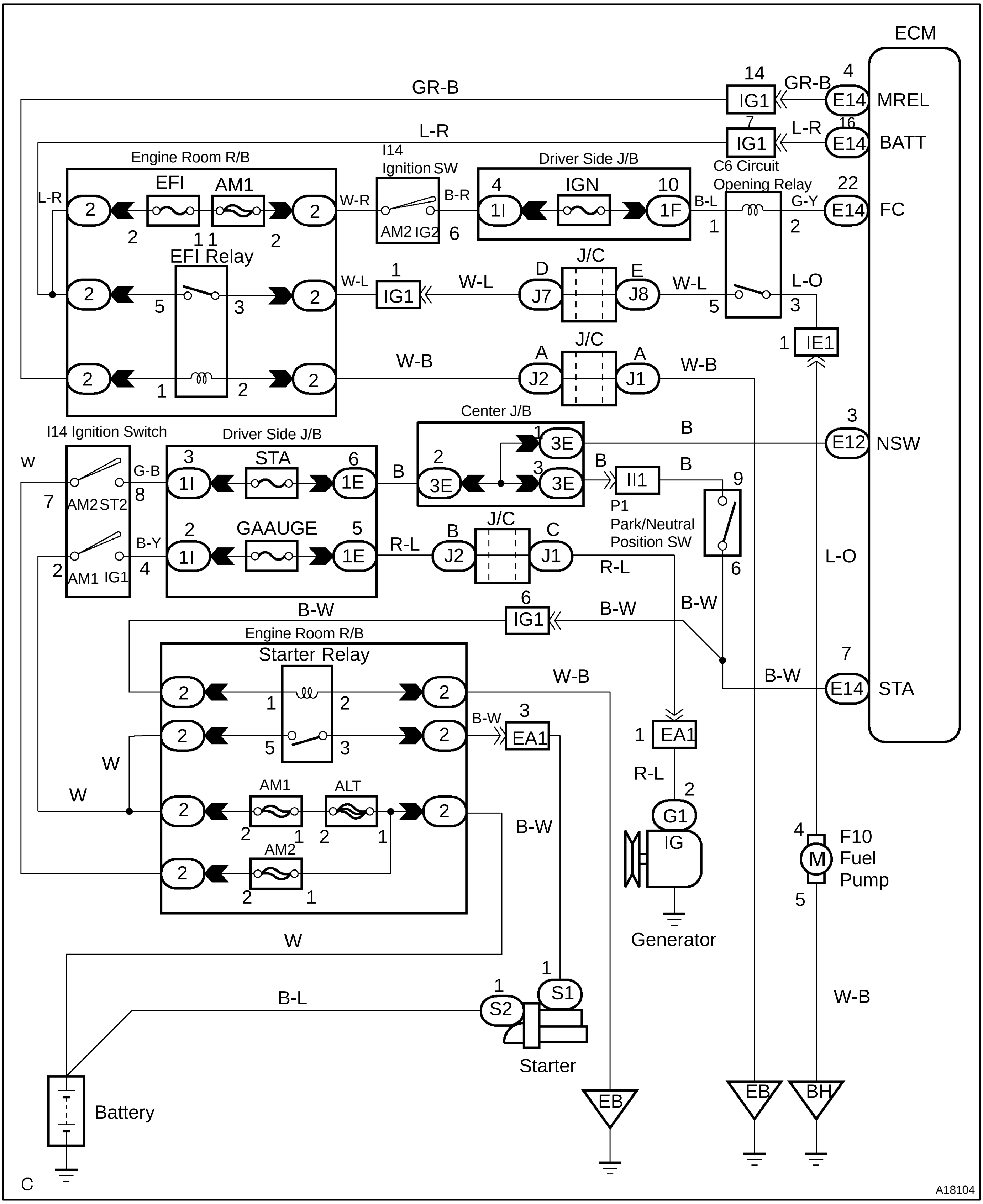
Fuel Pump Control Circuit

CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay coil, the starter relay switches on and current flows to coil L1 of the circuit opening relay. Thus the circuit opening relay switches on, power is supplied to the fuel pump and the fuel pump oparates. When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to coil L2 of the circuit opening relay, the relay switches on, and the fuel pump operates. While the NE signal is generated (engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



WIRING DIAGRAM



INSPECTION PROCEDURE

TOYOTA hand-held tester:

1	Connect TOYOTA hand-held tester, and check operation of fuel pump (See page SF-7).

OK → Check for starter signal circuit (See page DI-145).

NG ↓

2	Check for ECM power source circuit (See page DI-148).

NG → Repair or replace.

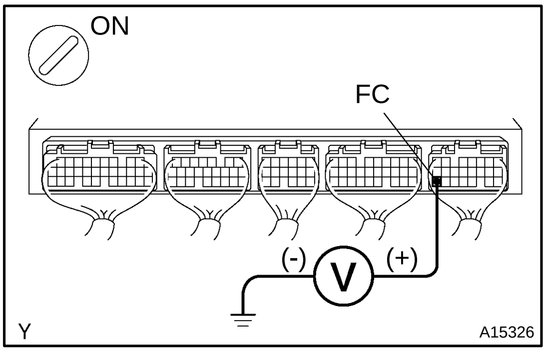
OK ↓

3	Check circuit opening relay (See page SF-37).

NG → Replace circuit opening relay.

OK ↓

4	**Check voltage between terminals FC of ECM and body ground.**



PREPARATION:
(a) Remove the glove compartment (See page SF-54).
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminal FC of the ECM and body ground.

OK:
Voltage: 9 - 14 V

OK	**Go to step 5.**

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and circuit opening relay, and circuit opening relay and ECM.

5	**Check fuel pump (See page SF-7).**

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-28).**

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

OK

Check and replace ECM (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	Check operation of fuel pump (See page SF-7).

OK → Check for starter signal circuit (See page DI-145).

NG ↓

2	Check for ECM power source circuit (See page DI-148).

NG → Repair or replace.

OK ↓

3	Check circuit opening relay (See page SF-37).

NG → Replace circuit opening relay.

OK ↓

4	Check voltage between terminals FC of ECM connector and body ground (See page DI-151 , step 4).

OK → Go to step 5.

NG ↓

Check for open in harness and connector between EFI main relay (Marking: EFI) and circuit opening relay, and circuit opening relay and ECM.

5	**Check fuel pump (See page SF-7).**

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-28).**

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

OK

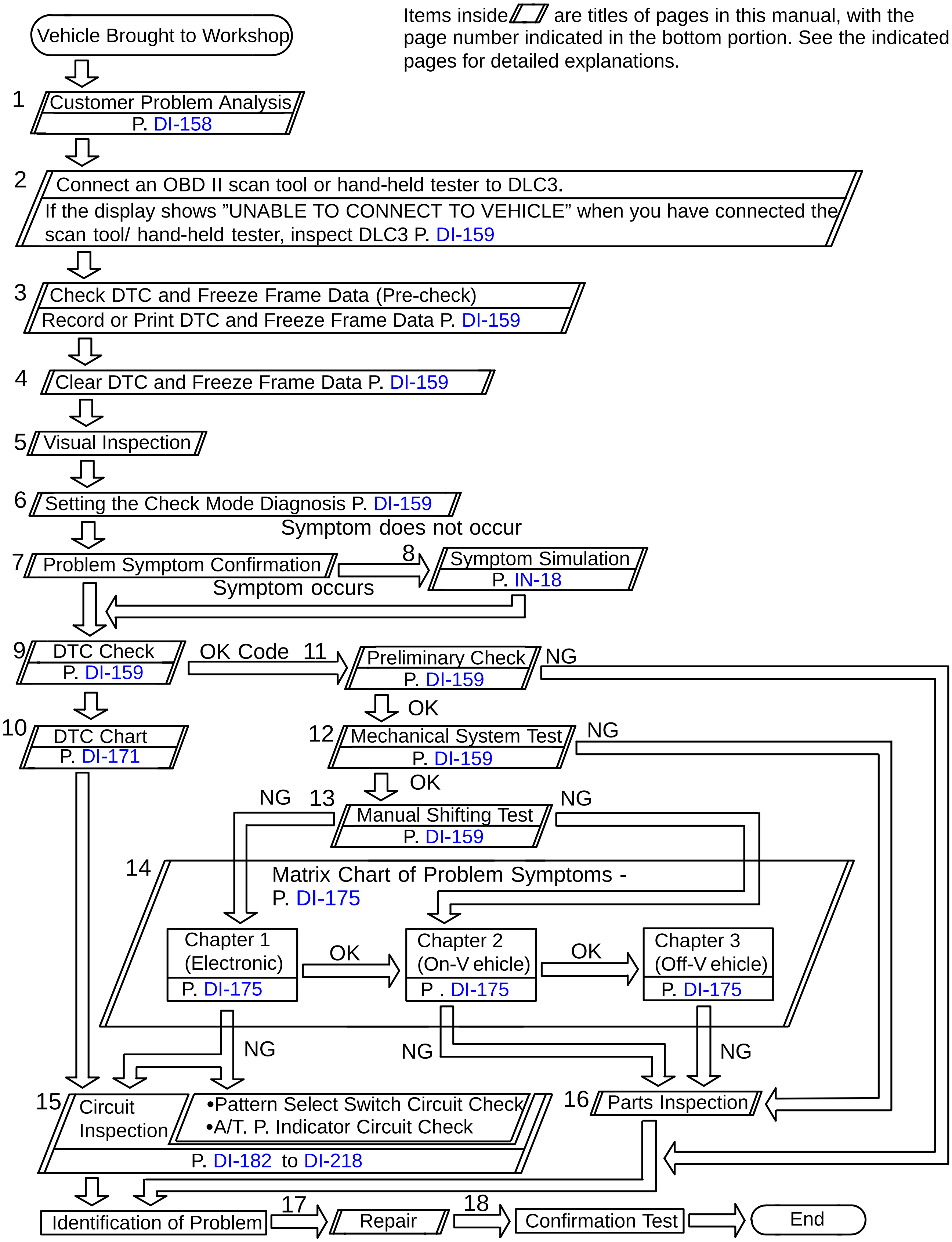
Check and replace ECM (See page IN-28).

AUTOMATIC TRANSMISSION

DI0SL-29

HOW TO PROCEED WITH TROUBLESHOOTING

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.



DI0SM-03

CUSTOMER PROBLEM ANALYSIS CHECK

Transmission Control System Check Sheet	Inspector's Name :

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

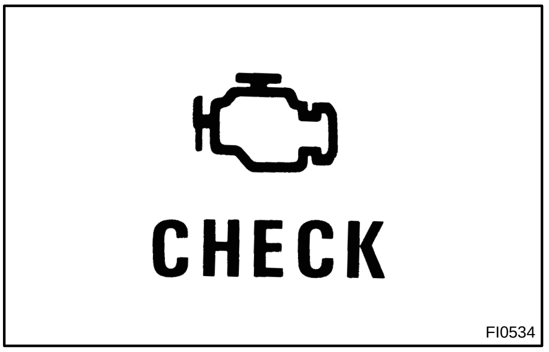
Date Problem Occurred	/ /
How Often Problem Occurs?	☐ Continuous ☐ Intermittent (times a day)

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

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains ON

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

DI8WD-02

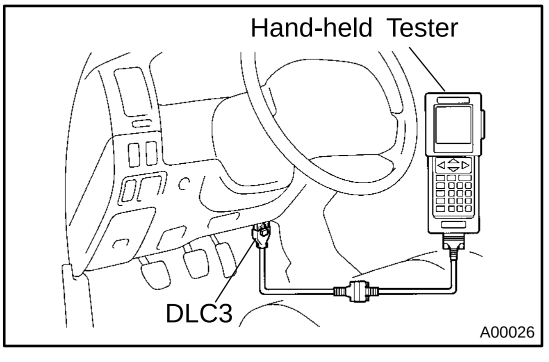


PRE-CHECK

1. DIAGNOSIS SYSTEM

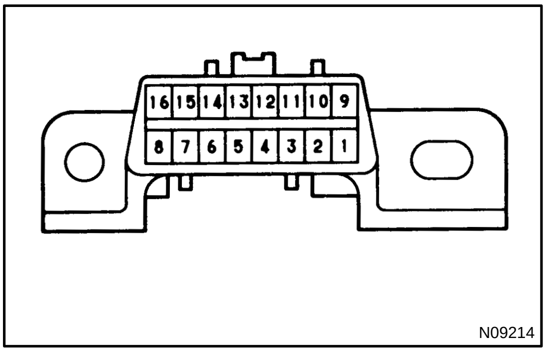
(a) Description

- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle an OBD II scan tool complying with SAE J1987 or hand-held tester, and read off various data output from the vehicle's ECM.
  OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page DI-13).
  If the malfunction only occurs in 3 trips, the MIL goes off but the DTCs remain recorded in the ECM memory.



- To check the DTCs, connect an OBD II scan tool or hand-held tester to DLC3 on the vehicle. The OBD II scan tool or hand-held tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For instruction book).
  DTCs include SAE controlled codes and Manufacturer controlled codes.
  SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI-171).

- The diagnosis system operates in normal mode during normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2 trip detection logic(*) to prevent erroneous detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up and for a malfunction that is only detected once or momentarily.
  (hand-held tester) (See page DI-159)
- *2 trip detection logic:
  When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the MIL to light up.

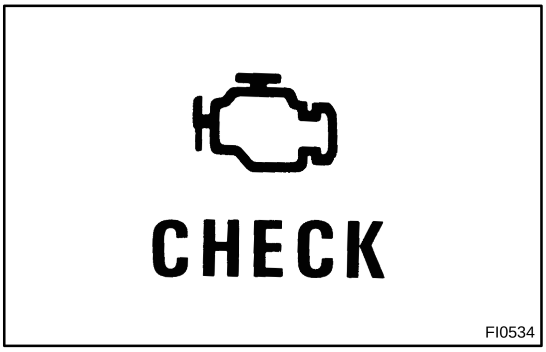


(b) Inspect the DLC3.
The vehicle's ECM uses the V.P.W. (Variable Pulse Width) for communication to comply with SAE J1850. The terminal arrangement of DLC3 complies with SAE J1962 and matches the V.P.W. format.

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

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

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



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2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) Check the MIL.

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

HINT:

If the MIL does not light up, troubleshoot the combination meter (See page BE-2).

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

(b) Check the DTC.

NOTICE:

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

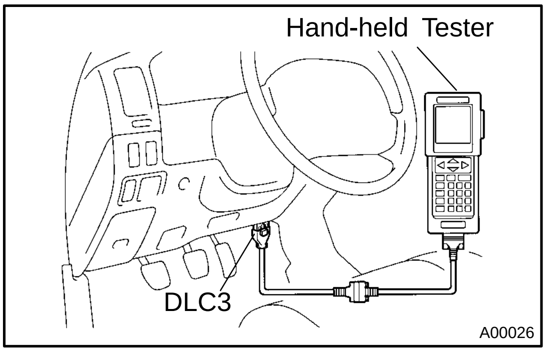
(1) Prepare an OBD II scan tool (complying with SAE J1978) or hand-held tester.

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

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

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

(5) See page DI-159 to confirm the details of the DTCs.



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NOTICE:

When simulating symptoms with an OBD II scan tool (excluding hand-held tester) to check the DTCs, use normal mode. For codes on the DTCs chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptoms have been simulated the 1st time. Then repeat the simulation process again. When the program has DTCs, they are recorded in the ECM.

3. INSPECT DIAGNOSIS (CHECK MODE)

HINT:

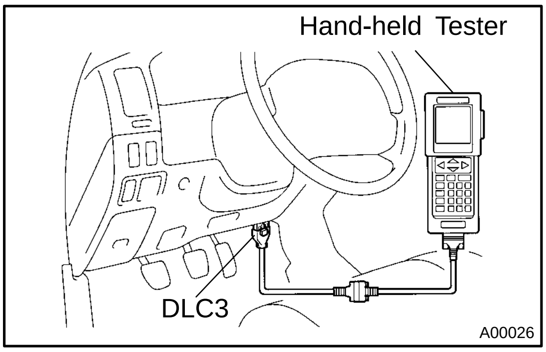
hand-held tester only: Compared to the normal mode, the check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in Normal mode can also be detected in Check mode.

(a) Check the DTC.

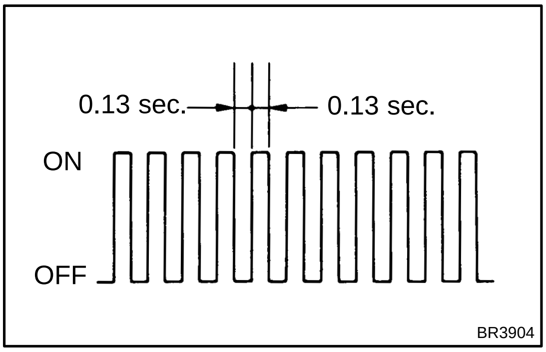
(1) Check the initial conditions.

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

(2) Turn the ignition switch OFF.
(3) Prepare a hand-held tester.



(4) Connect the hand-held tester to DLC3 at the lower portion of the instrument panel.
(5) Turn the ignition switch ON and switch the hand-held tester ON.



(6) Switch the hand-held tester from Normal mode to Check mode (Check that the MIL flashes).
(7) Start the engine (MIL goes out after the engine starts).
(8) Simulate the conditions of the malfunction described by the customer.

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

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

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

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

(b) Clear the DTC.
The following operation will erase the DTC and freeze frame data. Operating an OBD II scan tool (complying with SAE J1978) or hand-held tester to erase the codes (See the OBD II scan tool's instruction book for operating instructions.).

4. ROAD TEST

NOTICE:

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

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

(1) Check up-shift operation.
1 → 2, 2 → 3 and 3 → O/D up-shift takes place, at the shift point shown in the automatic shift schedule (See page SS-23).

HINT:

- O/D Gear Up-shift Prohibition Control (1. Coolant temp. is 60 °C (140 °F) or less.)
- O/D Gear Lock-up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60 °C (140 °F) or less.)

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

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

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

(4) Check kick-down operation.
While running in the D position, 2nd, 3rd and O/D gears, check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick-downs conform to those indicated on the automatic shift schedule (See page SS-23).

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

(6) Check the lock-up mechanism.

- Drive in D position, O/D gear, at a steady speed (lock-up ON) of about 70 km/h (43 mph).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, lock-up mechanism is not functioning.

(b) 2 position test:
Shift into the 2 position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.
Check to see that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page SS-23).

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

(2) Check engine braking.
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.

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

(c) L position test:
Shift into the 2 position and fully depress the accelerator pedal and check the following points.

(1) Check no up-shift.
While running in the L position, check that no up-shift occurs to 2nd gear.

(2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration.

(d) R position test:
Shift into the R position and fully depress the accelerator pedal and check for slipping.

CAUTION:
Before conducting this test ensure that the test area is free from people and obstruction.

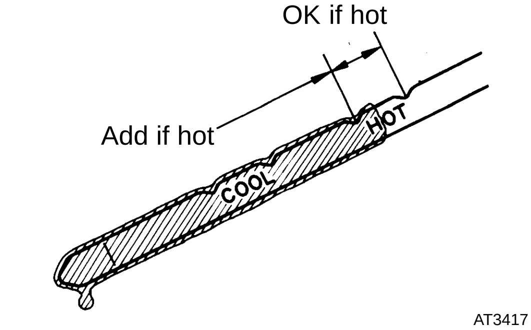
(e) P position test:
Stop the vehicle on a grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.

5. BASIC INSPECTION

(a) Check the fluid level.

HINT:

- Drive the vehicle so that the engine and transmission are at normal operating temperature.
  Fluid temp.: 70 - 80 °C (158 - 176 °F)
- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.



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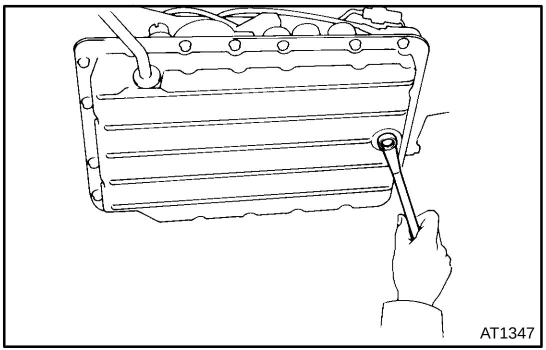
(1) Park the vehicle on a level surface and set the parking brake.
(2) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from P to L position and return to P position.
(3) Pull out the dipstick and wipe it clean.
(4) Push it back fully into the pipe.
(5) Pull it out and check that the fluid level is in the HOT range.

If the level is not within the HOT range, add new fluid.

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

NOTICE:
Do not overfill.

(b) Check the fluid condition.
If the fluid smells burnt or is black, replace it.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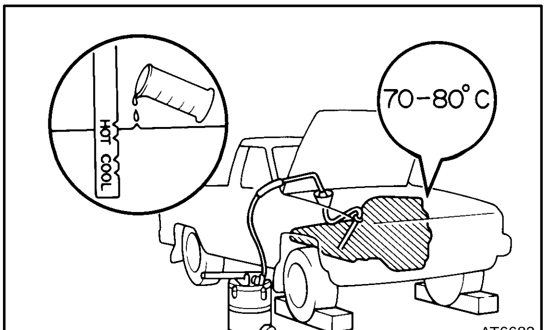
(c) Replace the ATF.
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.



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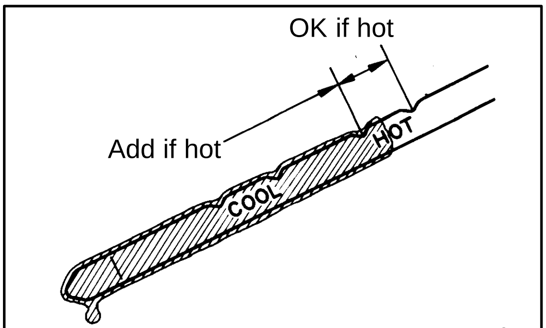
(3) With the engine OFF add new fluid through the oil filler pipe.

Fluid type: ATF D-II or DEXRON®III (DEXRON®II)
Capacity:
A340E: 1.6 liters (1.7 US qts, 1.4 Imp. qts)
A340F: 2.0 liters (2.1 US qts, 1.8 Imp. qts)

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



AT3417

(5) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.

(6) Check the fluid level at the normal operating temperature, 70 - 80 °C (158 - 176 °F), and add as necessary.

NOTICE:
Do not overfill.

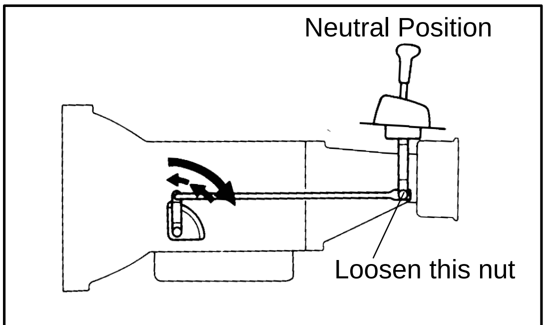
(d) Check the fluid leaks.
Check for leaks in the transmission.

If leaks occurs, it is necessary to repair or replace O-rings, FIPGs, oil seals, plugs or other parts.

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

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

(1) Loosen the nut on the shift lever.
(2) Push the control shaft fully rearward.
(3) Return the control shaft lever 2 notches to N position.



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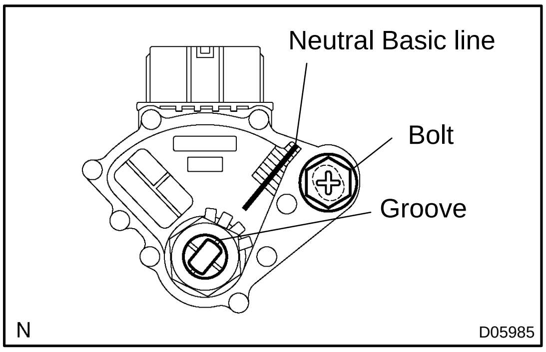
(4) Set the shift lever to N position.
(5) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.

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

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



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

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

(1) Loosen the park/neutral position switch bolt and set the shift lever to the N position.
(2) Align the groove with neutral basic line.
(3) Hold in position and tighten the bolt.

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

HINT:
For continuity inspection of the park/neutral position switch, See page DI-203 .

(g) Check the idle speed.
Idle speed (In N position and air conditioner OFF):
700 ± 50 rpm

6. MECHANICAL SYSTEM TESTS

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

NOTICE:

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

(1) Chock the 4 wheels.
(2) Connect an OBD II scan tool or hand-held tester to DLC3.
(3) Fully apply the parking brake.
(4) Keep your left foot pressing firmly on the brake pedal.
(5) Start the engine.
(6) Shift into the D position. Depress all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed:
2,250 ± 150 rpm

(7) Do the same test in R position.

Stall speed:
2,250 ± 150 rpm

Evaluation:

Problem	Possible cause
(c) Stall speed low in D and R positions	• Engine output may be insufficient • Stator one-way clutch not operating properly HINT: If more than 600 rpm below the specified value, the torque converter clutch could be faulty.
(d) Stall speed high in D position	• Line pressure too low • Forward clutch slipping • No. 2 one-way clutch not operating properly • O/D one-way clutch not operating properly
(e) Stall speed high in R position	• Line pressure too low • Direct clutch slipping • 1st & reverse brake slipping • O/D one-way clutch not operating properly
(f) Stall speed high in D and R positions	• Line pressure too low • Improper fluid level • O/D one-way clutch not operating properly

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

NOTICE:

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

(1) Fully apply the parking brake.
(2) Start the engine and check idle speed.
Idle speed (In N position and air conditioner OFF):
700 ± 50 rpm
(3) Shift the shift lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.
Time lag: N → D Less than 1.2 seconds
(4) In the same manner, measure the time lag for N → R.
Time lag: N → R Less than 1.5 seconds

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

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

7. HYDRAULIC TEST

Measure the line pressure.

NOTICE:

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

(1) Warm up the ATF.
(2) Remove the test plug on the transmission case front left side and connect SST (See page AT-18 for the location to connect SST).
SST 09992-00095, 09992-00151, 09992-00271
(3) Fully apply the parking brake and chock the 4 wheels.
(4) Start the engine and check idling speed.
(5) Keep your left foot pressing firmly on the brake pedal and shift into D position.
(6) Measure the line pressure when the engine is idling.
(7) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
(8) In the same manner, do the test in R position.

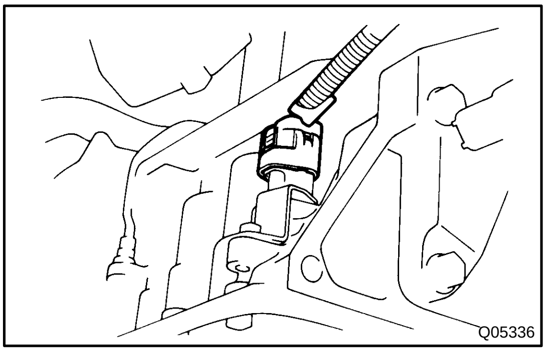
Specified line pressure:

Condition	D position kPa (kgf/cm^2, psi)	R position kPa (kgf/cm^2, psi)
Idling	382 - 441 (3.9 - 4.5, 55 - 64)	598 - 696 (6.1 - 7.1, 87 - 101)
Stall	1,196 - 1,334 (12.2 - 13.6, 174 - 193)	1,598 - 1,942 (16.3 - 19.8, 232 - 282)

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

Evaluation

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



8. MANUAL SHIFTING TEST

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

(a) Disconnect the solenoid wire.
(b) Inspect the manual driving operation.
Check that the shift and gear positions correspond with the table below.
While driving, shift through the L, 2 and D positions. Check that the gear change corresponds to the shift position.

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

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

(c) Connect the solenoid wire.
(d) Cancel out the DTC (See page DI-159).

DI0SO-19

DIAGNOSTIC TROUBLE CODE CHART

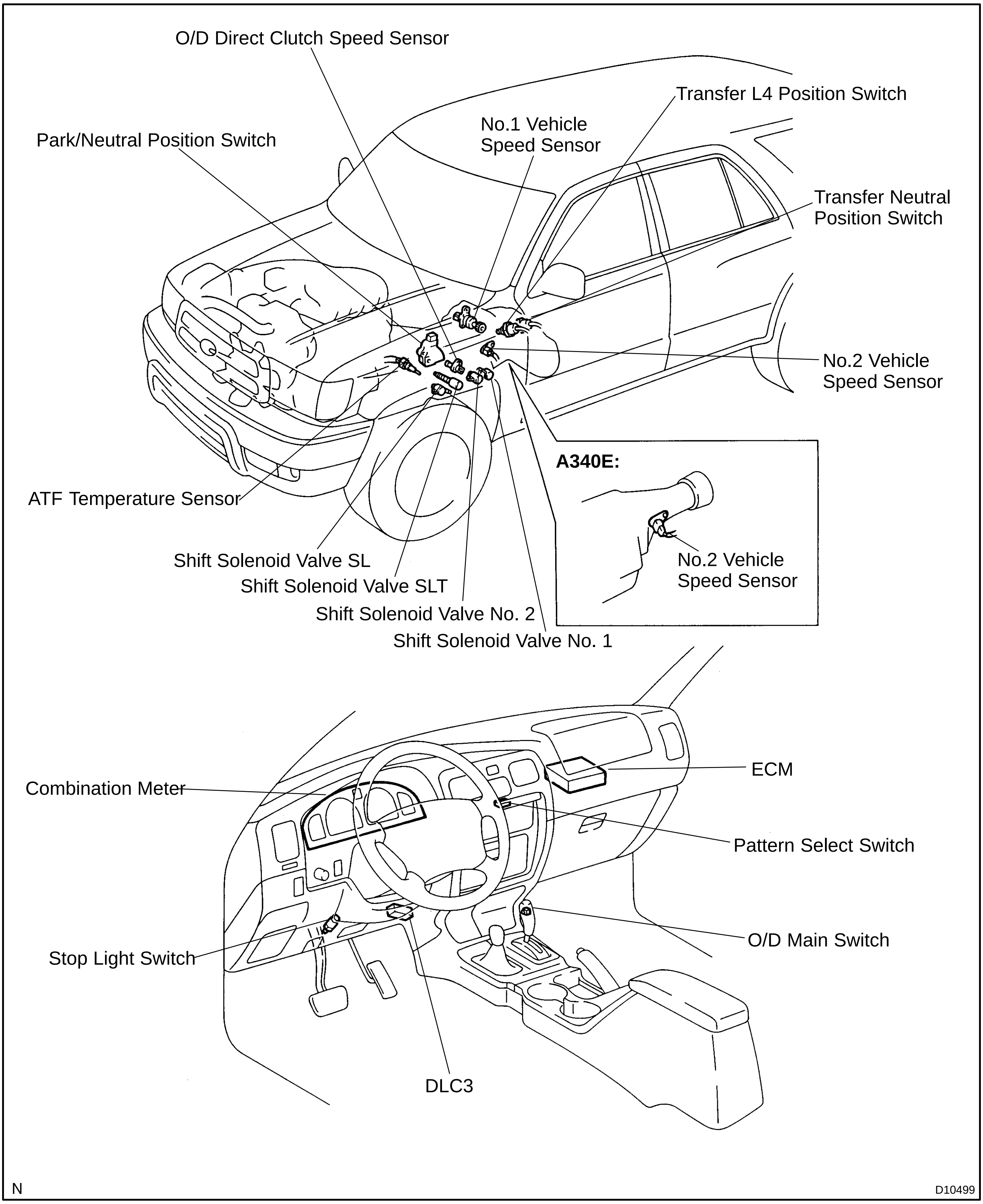
If a DTC is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the page given.

DTC No. (See Page)	Detection Item	Trouble Area	MIL *1	Memory
P0500 (DI-179)	Vehicle Speed Sensor Malfunction	• Open or short in No. 1 vehicle speed sensor circuit • No. 1 vehicle speed sensor • Combination meter • ECM • Automatic transmission (clutch, bracket or gear etc.)	●	○
P0710 (DI-182)	Transmission Fluid Temperature Sensor Malfunction	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • ECM	●	○
P0750 (DI-184)	Shift Solenoid "A" Malfunction	• Shift solenoid valve No. 1 is stuck open or closed • Valve body is blocked up or stuck	●	○
P0753 (DI-186)	Shift Solenoid "A" Electrical	• Open or short in shift solenoid valve No. 1 circuit • Shift solenoid valve No. 1 • ECM	●	○
P0755 (DI-184)	Shift Solenoid "B" Malfunction	• Shift solenoid valve No. 2 is stuck open or closed • Valve body is blocked up or stuck	●	○
P0758 (DI-186)	Shift Solenoid "B" Electrical	• Open or short in shift solenoid valve No. 2 circuit • Shift solenoid valve No. 2 • ECM	●	○
P0770 (DI-190)	Shift Solenoid "E" Malfunction	• Shift solenoid valve SL is stuck open or closed • Valve body is blocked up or stuck • Lock-up clutch	●	○
P0773 (DI-192)	Shift Solenoid "E" Electrical	• Open or short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	●	○
P1520 (DI-195)	Stop Light Switch Circuit Malfunction	• Short in stop light switch signal circuit • Stop light switch • ECM	●	○
P1700 (DI-196)	Speed Sensor No. 2 Malfunction	• Open or short in No. 2 vehicle speed sensor circuit • No. 2 vehicle speed sensor • ECM	●	○
P01760 (DI-200)	Linear Solenoid for Line Pressure Control Circuit Malfunction	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM	●	○
P1780 (DI-203)	Park/Neutral Position Switch Malfunction	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	●	○
P1782 *2 (DI-208)	Transfer L4 SW Circuit Malfunction	• Transfer L4 position switch • Transfer L4 position switch circuit • ECM	●	○
P1783 *2 (DI-211)	Transfer N SW Circuit Malfunction	• Transfer neutral position switch • Transfer neutral position switch circuit • ECM	●	○

* 1: ●...MIL lights up.
* 2: 4WD only.

DI8WE-01

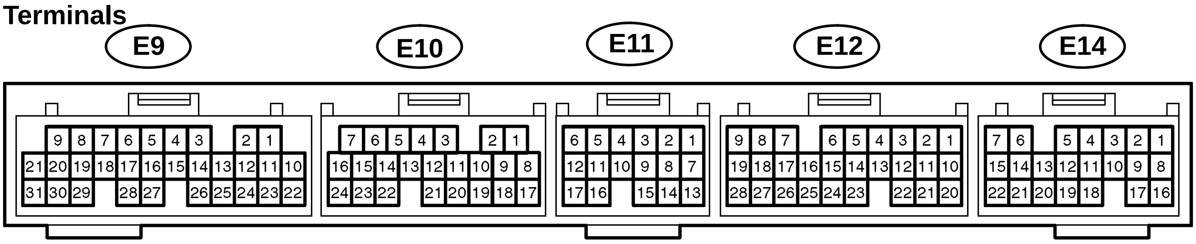
PARTS LOCATION



DI8WF-02

TERMINALS OF ECM

ECM Terminals



N

D10501

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S1 - E1 (E9-3 - E10-17)	P-L ↔ BR	IG ON	9 - 14
		1st or 2nd gear	9 - 14
		3rd or O/D gear	Below 1.5
S2 - E1 (E9-2 - E10-17)	L-W ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	9 - 14
		1st or O/D gear	Below 1.5
SL - E1 (E9-1 - E10-17)	LG ↔ BR	IG ON	Below 1.5
		Vehicle driving under lock-up position	9 - 14
SLT + (E11-5) - SLT - (E11-11)	R-Y ↔ Y-B	IG ON	Below 3
		Engine is idling	Pulse signal is output Below 1.5 ↔ 10 - 12
SP1 (E14-6) - E1 (E10-17)	G-O ↔ BR	IG switch ON Rotate driving wheel slowly	Pulse generation
SP2 + - SP2 - (E10-23 - E10-22)	Y-R ↔ W-R	Vehicle driving	Pulse signal is output Below 1.5 ↔ 4 - 6
ODLP - E1 (E12-20 - E10-17)	G-Y ↔ BR	O/D main switch ON (O/D OFF)	Below 3
		O/D main switch OFF (O/D ON)	9 - 14
THOC - E2 (E9-19 - E9-11)	L-R ↔ L-B	ATF temperature: 115˚C (239˚F) or more	Below 1.5
D (E12 - 25) - E1 (E10 - 17)	*1 W-R ↔ BR *2 GR-B ↔ BR	IG ON and Shift lever D position	9 - 14
		IG ON and Shift lever other than D position	Below 1.5
L - E1 (E12-4 - E10-17)	LG ↔ BR	IG ON and Shift lever L position	9 - 14
		IG ON and Shift lever other than L position	Below 1.5
2 - E1 (E12-5 - E10-17)	V ↔ BR	IG ON and Shift lever 2 position	9 - 14
		IG ON and Shift lever other than 2 position	Below 1.5
R - E1 (E12-6 - E10-17)	W-L ↔ BR	IG ON and Shift lever R position	9 - 14
		IG ON and Shift lever other than R position	Below 1.5
NSW - E1 (E12-3 - E10-17)	B ↔ BR	IG ON and Shift lever P or N position	Below 1.5
		IG ON and Shift lever other than P or N position	9 - 14
TFN *2 - E1 (E12-11 - E10-17)	B-R ↔ BR	IG ON and Transfer shift position H2 or H4 or L4	9 - 14
		IG ON and Transfer shift position N	Below 1.5
PWR - E1 (E12-1 - E10-17)	G-R ↔ BR	IG ON and Pattern select switch ”NORM”	Below 1.5
		IG ON and Pattern select switch ”PWR”	9 - 14
L4 *2 - E1 (E12-2 - E10-17)	L-R ↔ BR	IG ON and Transfer shift position L4	Below 1.5
		IG ON and Transfer shift position H2 or H4	9 - 14

OILW*2 - E1 (E12-21 - E10-17)	Y ↔ BR	ATF temperature: 149˚C (300˚F) or more	Below 1.5
ODMS - E1 (E12-14 - E10-17)	L-R ↔ BR	IG ON	9 - 14
		IG ON and Press continuously O/D main switch	Below 1.5

*1: 2WD
*2: 4WD

DI0SR-12

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the diagnostic trouble code check but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

- If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check and replace the ECM.

CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

Symptom	Suspect Area	See page
No up-shift (A particular gear from 1st to 3rd gear is not up-shifted)	1. ECM	IN-28
No up-shift (3rd → O/D)	3. O/D main switch & O/D OFF indicator light circuit 4. ECM	DI-218 IN-28
No down-shift (O/D → 3rd)	1. ECM	IN-28
No down-shift (A particular gear from 1st to 3rd gear is not down-shifted)	1. ECM	IN-28
No lock-up	1. ECM	IN-28
No lock-up off	1. ECM	IN-28
Shift point too high or too low	1. Pattern select switch circuit 2. ECM	DI-214 IN-28
Up-shift to O/D from 3rd while main switch is off	1. O/D main switch & O/D OFF indicator light circuit 2. ECM	DI-218 IN-28
Up-shift to O/D from 3rd while engine is cold	1. ECM	IN-28
Poor acceleration	1. ECM	IN-28
No pattern select	1. Pattern select switch 2. ECM	DI-214 IN-28
Large shift shock or engine stalls when starting off or stopping	1. ECM	IN-28

CHAPTER 2: ON-VEHICLE REPAIR
(★: A340E, A340F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM391U)
(★: A340F, A343F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM479U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Transmission control rod 2. Manual valve 3. Parking lock pawl 4. Off-vehicle repair matrix chart	DI-159 ★ ★ DI-175
Vehicle does not move in R position	1. Off-vehicle repair matrix chart	DI-175
Vehicle does not move in particular position or positions (except R position)	1. Off-vehicle repair matrix chart	DI-175
No up-shift (1st → 2nd)	1. 1-2 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No up-shift (2nd → 3rd)	1. 2-3 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No up-shift (3rd → O/D)	1. 3-4 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No down-shift (O/D → 3rd)	1. 3-4 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No down-shift (3rd → 2nd)	1. 2-3 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No down-shift (2nd → 1st)	1. 1-2 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No lock-up or No lock-up off	1. Lock-up control valve 2. Lock-up relay valve 3. Off-vehicle repair matrix chart	★ ★ DI-175
Harsh engagement (N → D)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_1 accumulator 4. Orifice control valve 5. Off-vehicle repair matrix chart	★ ★ ★ ★ DI-175
Harsh engagement (Lock-up)	1. Lock-up control valve 2. Lock-up relay valve 3. Solenoid relay valve 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Solenoid modulator valve 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Harsh engagement (N → L)	1. Low coast modulator valve	★
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Accumulator control valve 2. Solenoid modulator valve	★ ★
Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_2 accumulator 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Harsh engagement (3rd → O/D)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_0 accumulator 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175

Symptom	Suspect Area	See page
Harsh engagement (O/D → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_0 accumulator 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Pressure relief valve 4. Off-vehicle repair matrix chart	DI-159 ★ ★ DI-175
Slip or shudder (Particular position)	1. Transmission control rod 2. Off-vehicle repair matrix chart	DI-159 DI-175
No engine braking (1st: L position)	1. Low coast modulator valve 2. Off-vehicle repair matrix chart	★ DI-175
No engine braking (2nd: 2 position)	1. 2nd coast modulator valve 2. Off-vehicle repair matrix chart	★ DI-175
No kick-down	1. 1-2 shift valve 2. 2-3 shift valve	★ ★

CHAPTER 3: OFF-VEHICLE REPAIR
(★: A340E, A340F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM391U)
(★: A340F, A343F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM479U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. O/D one-way clutch (F_0) 2. O/D direct clutch (C_0) 3. O/D planetary gear unit 4. Torque converter clutch	★ ★ ★ ★
Vehicle does not move in R position	1. Front and rear planetary gear unit 2. Direct clutch (C_2) 3. 1st and reverse brake (B_3) 4. O/D direct clutch (C_0)	★ ★ ★ ★
No up-shift (1st → 2nd)	1. 2nd brake (B_2) 2. No. 1 one-way clutch (F_1)	★ ★
No up-shift (2nd → 3rd)	1. Direct clutch (C_2)	★
No up-shift (3rd → O/D)	1. O/D brake (B_0)	★
No lock-up or No lock-up off	1. Torque converter clutch	★
Harsh engagement (N → D)	1. Forward clutch (C_1) 2. O/D one-way clutch (F_0) 3. No. 2 one-way clutch (F_2)	★ ★ ★
Harsh engagement (N → R)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3) 3. O/D one-way clutch (F_0)	★ ★ ★
Harsh engagement (N → 2)	1. Forward clutch (C_1) 2. O/D one-way clutch (F_0) 3. No. 2 one-way clutch (F_2)	★ ★ ★
Harsh engagement (N → L)	1. Forward clutch (C_1) 2. 1st and reverse brake (B_3) 3. O/D one-way clutch (F_0) 4. No. 2 one-way clutch (F_2)	★ ★ ★ ★
Harsh engagement (Lock-up)	1. Torque converter clutch	★
Slip or shudder (Forward and reverse: After warm-up)	1. Torque converter clutch 2. O/D one-way clutch (F_0) 3. O/D direct clutch (C_0)	★ ★ ★
Slip or shudder (Particular position: Just after engine starts)	1. Torque converter clutch	★
Slip or shudder (R position)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3)	★ ★
Slip or shudder (1st)	1. Forward clutch (C_1) 2. No. 2 one-way clutch (F_2)	★ ★
Slip or shudder (2nd)	1. 2nd brake (B_2) 2. 2nd coast brake (B_1) 3. No. 1 one-way clutch (F_1)	★ ★ ★
Slip or shudder (3rd)	1. Direct clutch (C_2)	★
Slip or shudder (O/D)	1. O/D brake (B_0)	★
No engine braking (1st - 3rd: D position)	1. 2nd brake (B_2)	★
No engine braking (1st: L position)	1. 1st and reverse brake (B_3)	★
No engine braking (2nd: 2 position)	1. 2nd coast brake (B_1)	★
Poor acceleration (All position)	1. Torque converter clutch	★
Poor acceleration (O/D)	1. O/D direct clutch (C_0) 2. O/D planetary gear unit	★ ★
Engine stalls when starting off or stopping	1. Torque converter clutch	★

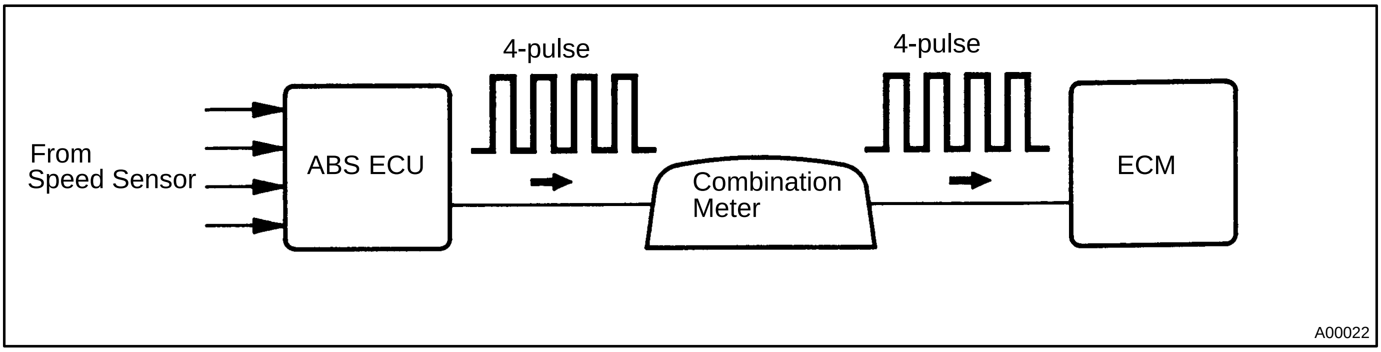
DI3BU-10

CIRCUIT INSPECTION

DTC	P0500	Vehicle Speed Sensor Malfunction

CIRCUIT DESCRIPTION

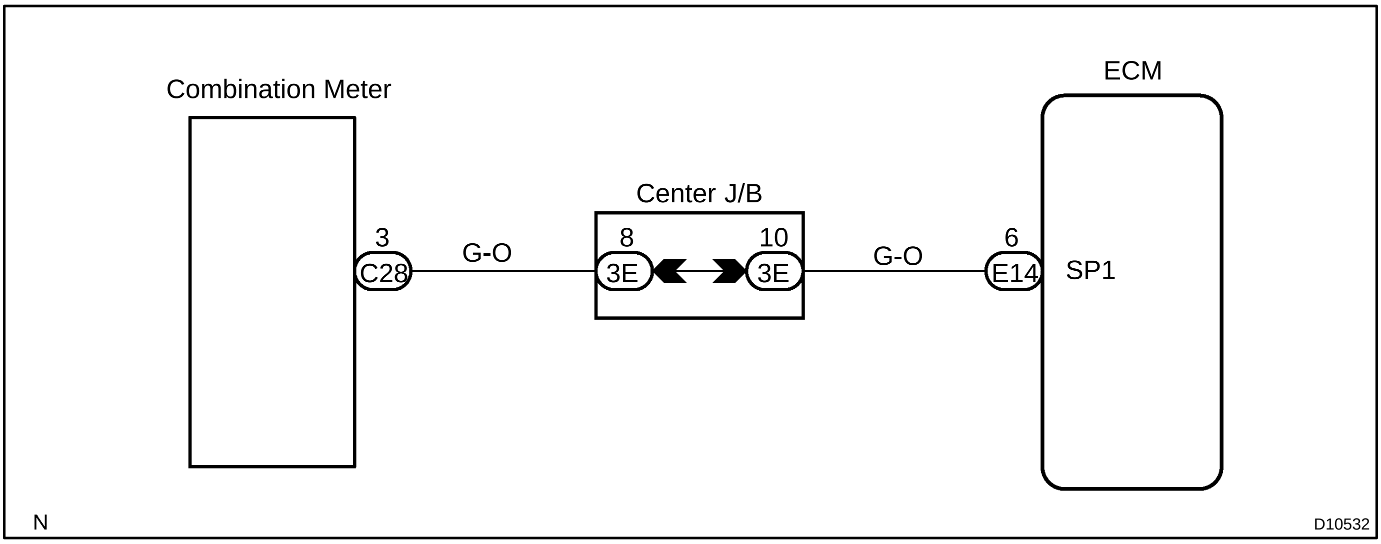
The speed sensor for ABS detects the wheel speed and sends the appropriate signals to the ABS ECU. The ECU converts these signals into a 4-pulse signal and outputs it to the combination meter. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	No vehicle speed sensor signal to ECM under conditions 1. and 2. (2-trip detection logic). 1. Park/neutral position switch is OFF. 2. Vehicle is being driven.	• Open or short in No. 1 vehicle speed sensor circuit • No. 1 vehicle speed sensor • Combination meter • ECM
	Clutch or brake slips or gear is broken	• Automatic transmission (clutch, brake or gear etc.)

HINT:
Check the No. 1 vehicle speed sensor when DTC P0500 (Vehicle Speed Sensor Malfunction) is output.

WIRING DIAGRAM



INSPECTION PROCEDURE

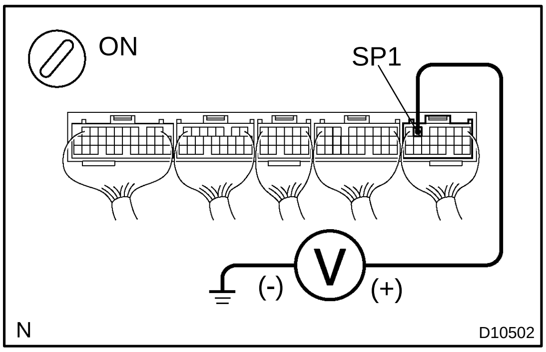
1	**Check operation of speedometer.**

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

NG → **Check speedometer circuit (See page BE-40).**

OK

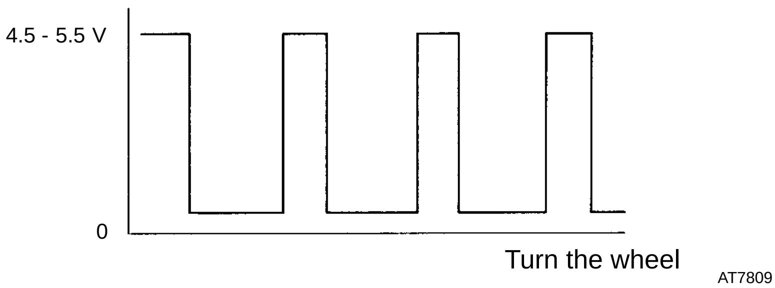
2	**Check voltage between terminal SP1 of ECM connector and body ground.**



PREPARATION:
(a) Shift the shift lever to neutral.
(b) Jack up a rear wheels on one side.
(c) Turn the ignition switch ON.

CHECK:
Measure voltage between terminal SP1 of ECM connector and body ground when the wheel is turned slowly.

OK:
Voltage is generated intermittently.



NG → **Check and repair harness and connector between combination meter and ECM (See page IN-28).**

OK

3	**Check ECM (See page IN-28).**

NG → **Replace the ECM.**

OK

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

DI0ST-18

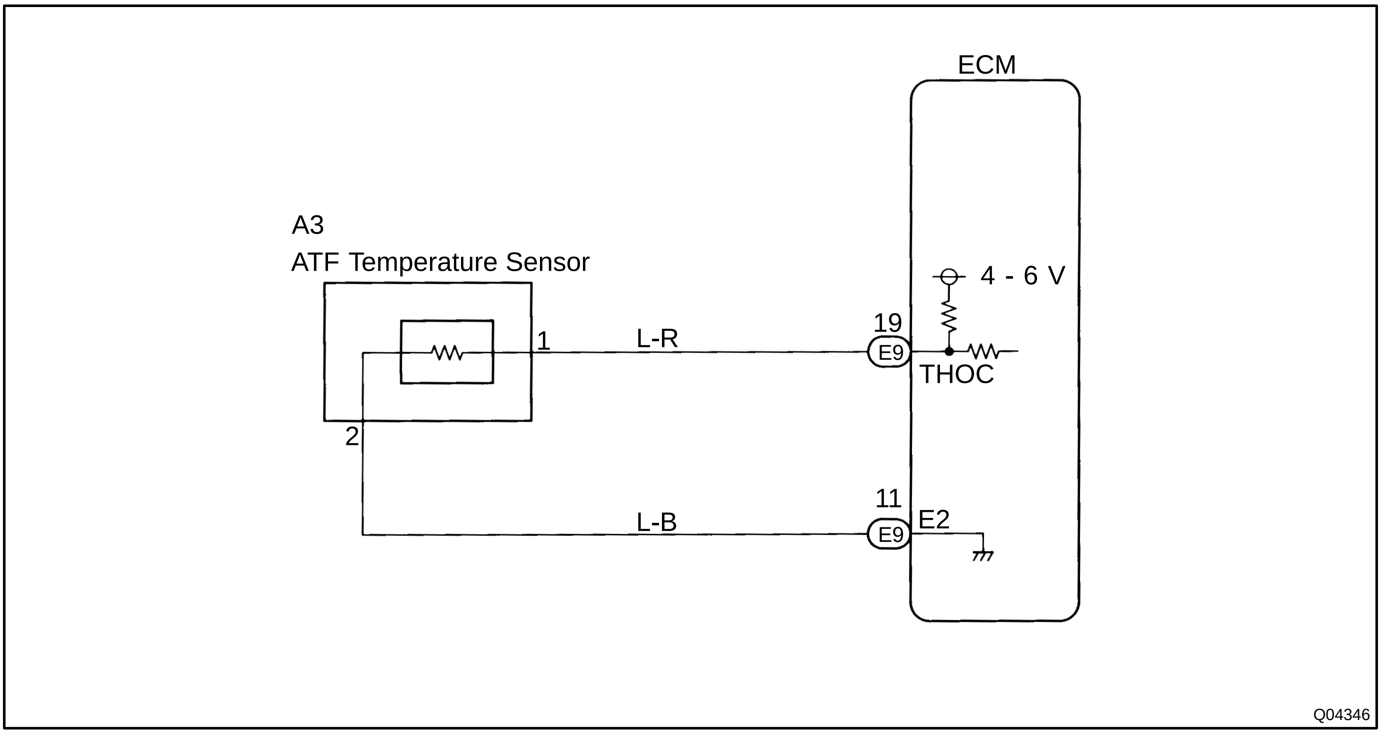
DTC	P0710	Transmission Fluid Temperature Sensor Malfunction

CIRCUIT DESCRIPTION

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

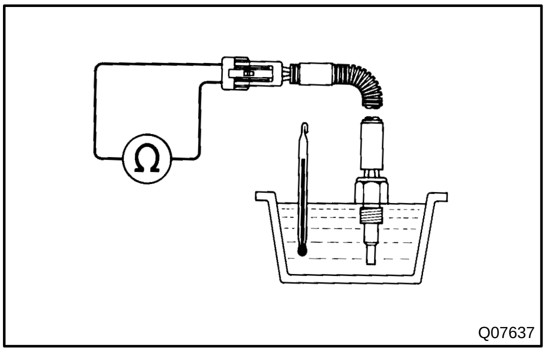
DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either 1. or 2. is detected for 0.5 sec. or more (2 trip detection logic). 1. Temp. sensor resistance is less than 79 Ω 2. After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	• Open or short in ATF temp. sensor • ATF temp. sensor • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ATF temperature sensor.



PREPARATION:
Remove the ATF temperature sensor.
CHECK:
Measure resistance between terminals of ATF temperature sensor at 20 °C (68 °F) and 110 °C (230 °F).
OK:
Resistance (Approx.):
20 °C (68 °F): 4.29 kΩ
110 °C (230 °F): 690 Ω

NG → **Replace the ATF temperature sensor.**

OK

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

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

OK

Check and replace the ECM.

DI0SU-14

DTC	P0750	Shift Solenoid "A" Malfunction

DTC	P0755	Shift Solenoid "B" Malfunction

SYSTEM DESCRIPTION

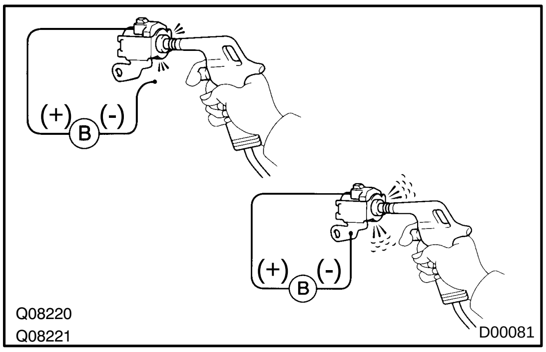
The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical trouble of the shift solenoid valves and valve body.

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

HINT:
Check the shift solenoid valve No. 1 when DTC P0750 (Shift Solenoid "A" Malfunction) is output and check shift solenoid valve No. 2 when DTC P0755 (Shift Solenoid "B" Malfunction) is output.

INSPECTION PROCEDURE

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



PREPARATION:
(a) Remove the oil pan.
(b) Remove the shift solenoid valve No. 1 or No. 2.

CHECK:
(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.
(b) When battery positive voltage is supplied to the shift solenoid valve, check that the solenoid valve opens.

OK:
(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

NG	Replace the shift solenoid valve No. 1 or No. 2.

OK

2	**Check the valve body (See page DI-175).**

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

OK

**Repair or replace the transmission
(See page AT-18 and AT-22).**

DI0SV-22

DTC	P0753	Shift Solenoid ”A” Electrical

DTC	P0758	Shift Solenoid ”B” Electrical

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with status (ON and OFF) of the shift solenoid valves No. 1 and No. 2 controlled by ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

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

X: Malfunctions

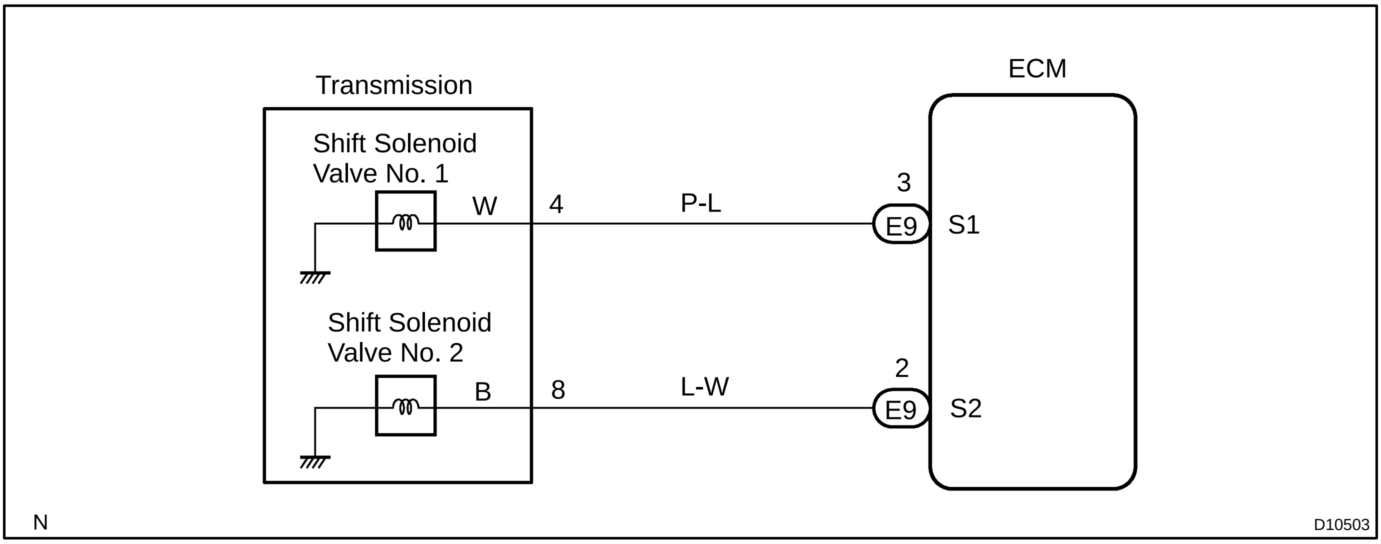
HINT:

Check the shift solenoid valve No. 1 when DTC P0753 (Shift Solenoid ”A” Electrical) is output and check the shift solenoid valve No. 2 when DTC P0758 (Shift Solenoid ”B” Electrial) is output.

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

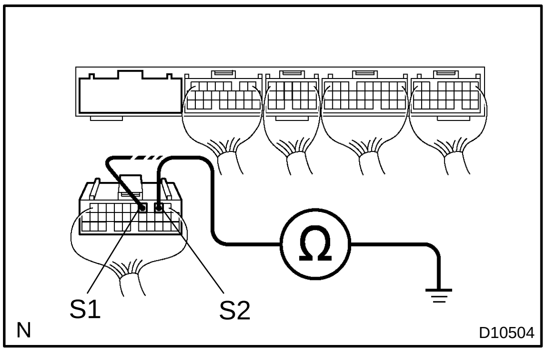
Fail safe function:
If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table above. The ECM also turns the shift solenoid valve SL OFF at the same time. If both solenoids are malfunctioning,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

WIRING DIAGRAM



INSPECTION PROCEDURE

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

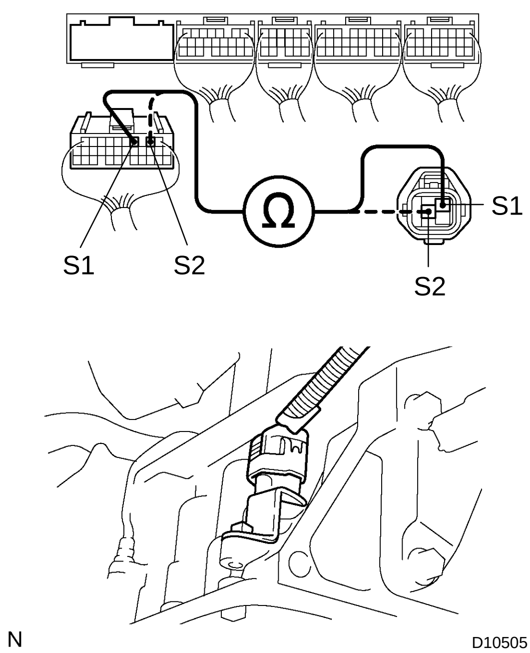


PREPARATION:
Disconnect the connector from ECM.
CHECK:
Measure resistance between terminal S1 or S2 of ECM and body ground.
OK:
Resistance: 11 - 15 Ω at 20°C (68°F)

OK	**Check and replace the ECM (See page IN-28).**

NG

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



PREPARATION:

Disconnect the solenoid connector from the automatic transmission.

CHECK:

Check the harness and connector between terminal S1 or S2 of ECM and terminal S1 or S2 of solenoid connector.

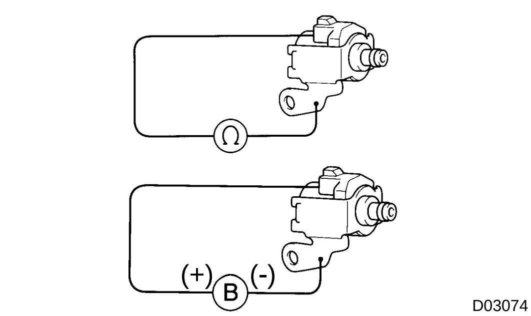
OK:

There is no open and no short circuit.

NG	Repair or replace the harness or connector.

OK

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



PREPARATION:

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

CHECK:

(a) Measure resistance between solenoid connector and body ground.
(b) Connect positive (+) lead to terminal of solenoid connector, negative (-) lead to solenoid body.

OK:

(a) Resistance: 11 - 15 Ω at 20°C (68°F)
(b) The solenoid makes an operation noise.

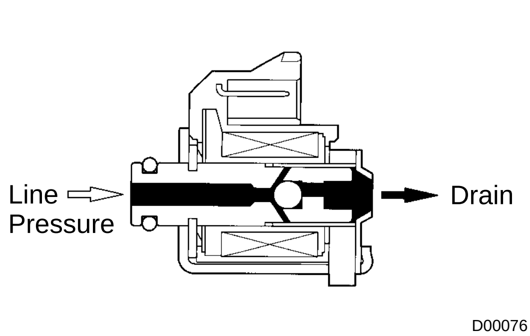
NG	Replace the solenoid valve.

OK

Repair or replace the solenoid wire.

DI0SW-15

DTC	P0770	Shift Solenoid ”E” Malfunction



SYSTEM DESCRIPTION

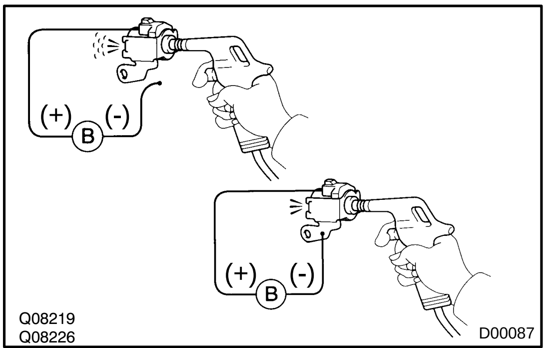
The ECM uses the signals from the throttle position sensor, airflow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.
Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve SL, valve body and torque converter clutch.

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

HINT:
Check the shift solenoid valve SL when DTC P0770 (Shift Solenoid ”E” Malfunction) is output.

INSPECTION PROCEDURE

1	Check solenoid valve SL operation.



PREPARATION:
(a) Remove the oil pan.
(b) Remove the shift solenoid valve SL.

CHECK:
(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.
(b) When battery voltage is supplied to the shift solenoid valve, check that the solenoid valve opens.

OK:
(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

NG	Replace the solenoid valve SL.

OK

2	**Check valve body (See page DI-175).**

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

OK

Replace the torque converter clutch (See page AT-18 and AT-22).

DI0SX-20

DTC	P0773	Shift Solenoid ”E” Electrical

CIRCUIT DESCRIPTION

The shift solenoid valve SL is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

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

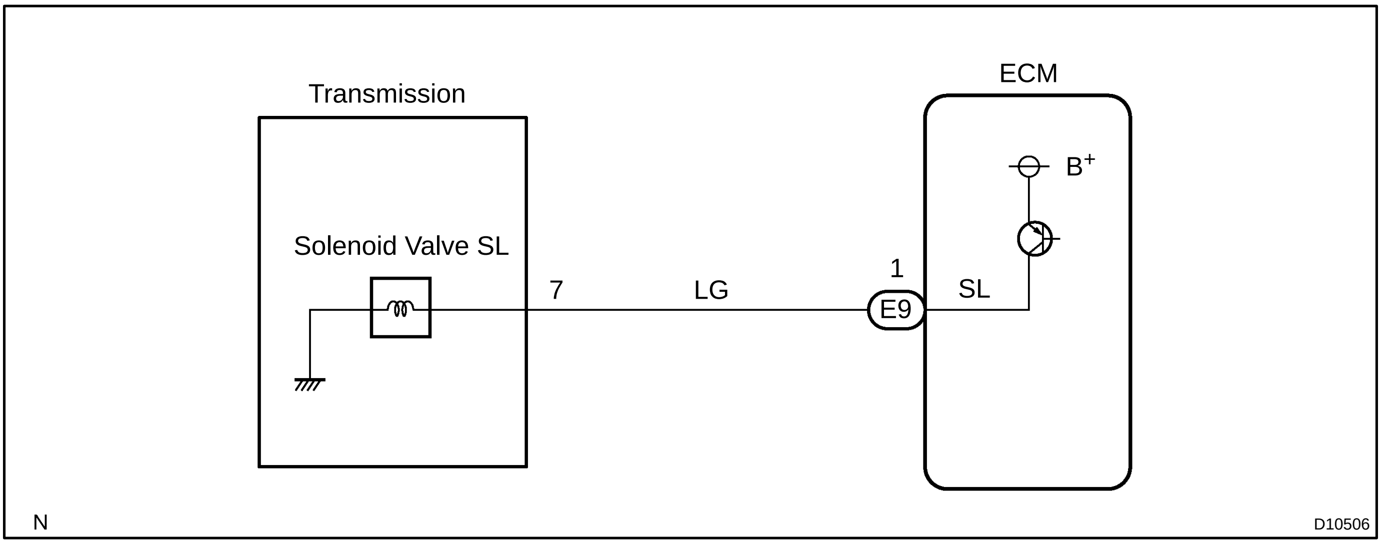
Fail safe function

If the ECM detects a malfunction, it turns the shift solenoid valve SL OFF.

HINT:

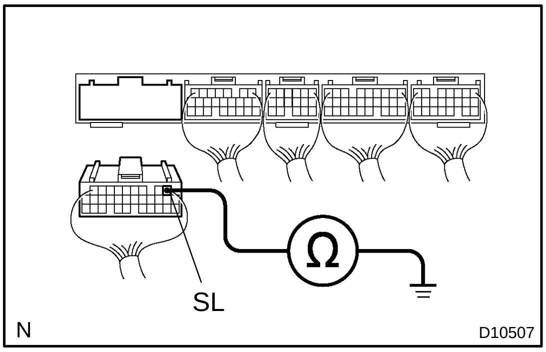
Check the shift solenoid valve SL when DTC P0773 (Shift Solenoid ”E” Electrical) is output.

WIRING DIAGRAM



INSPECTION PROCEDURE

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

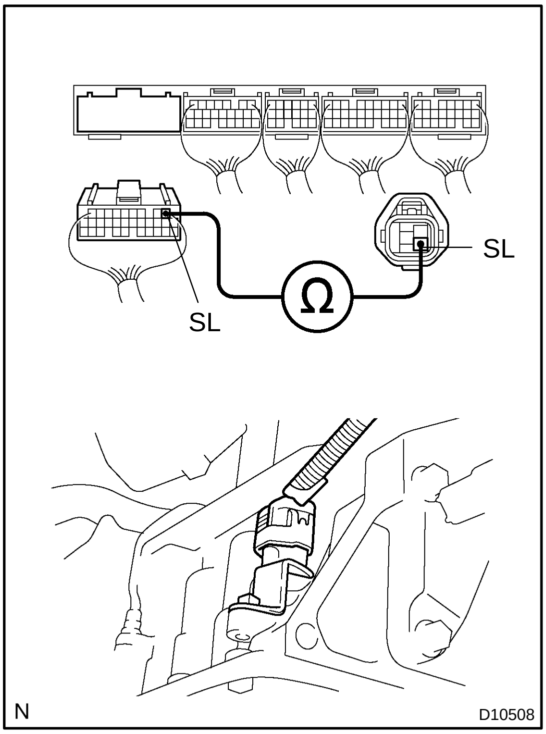


PREPARATION:
Disconnect the connector from the ECM.
CHECK:
Measure resistance between terminal SL of ECM and body ground.
OK:
Resistance: 11 - 15 Ω at 20°C (68°F)

OK → **Check and replace the ECM (See page IN-28).**

NG

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

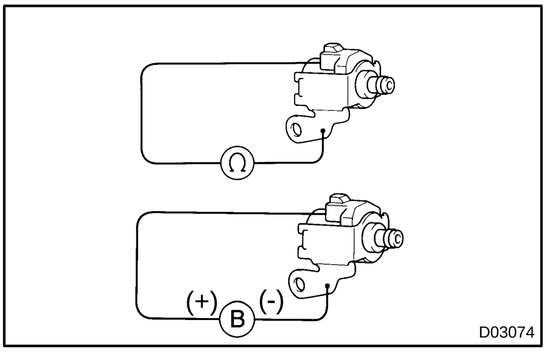


PREPARATION:
Disconnect the solenoid connector from the transmission.
CHECK:
Check the harness between terminal SL of ECM and terminal SL of transmission solenoid connector.
OK:
There is no open or short circuit.

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

OK

3	Check shift solenoid valve SL.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the shift solenoid valve SL.

CHECK:

(a) Measure resistance between terminal SL of shift solenoid valve and solenoid body.

(b) Connect positive (+) lead to terminal of solenoid connector, negative (-) lead to solenoid body.

OK:

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

(b) The shift solenoid valve SL makes operation noise.

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

OK

Repair or replace the solenoid wire.

DI0SY-07

DTC	P1520	Stop Light Switch Circuit Malfunction

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling, while driving in lock-up condition, when brakes are suddenly applied.
When the brake pedal is operated, this switch sends a signals to ECM. Then the ECM cancels operation of the lock-up clutch while braking is in progress.

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

WIRING DIAGRAM

See page DI-144 .

INSPECTION PROCEDURE

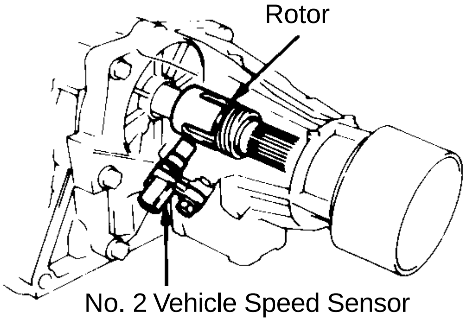
See page DI-144 .

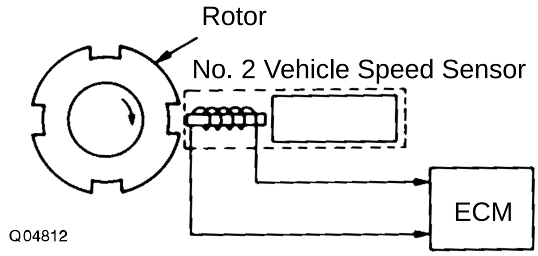
DI0SZ-27

DTC	P1700	Speed Sensor No. 2 Malfunction

CIRCUIT DESCRIPTION

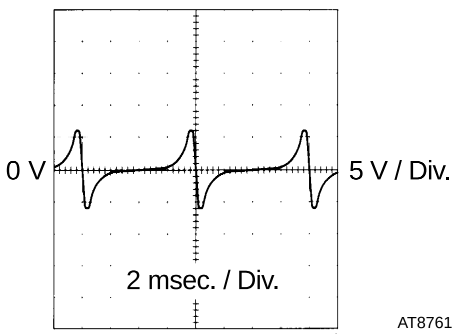
The No. 2 vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. The ECM determines the vehicle speed based on these signals.
An AC voltage is generated in the No. 2 vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the ECM.
The gear shift point and lock-up timing are controlled by the ECM based on the signals from this vehicle speed sensor and the throttle position sensor signal.
If the No. 2 vehicle speed sensor malfunctions, the ECM uses input signals from the No. 1 vehicle speed sensor as a back-up signal.





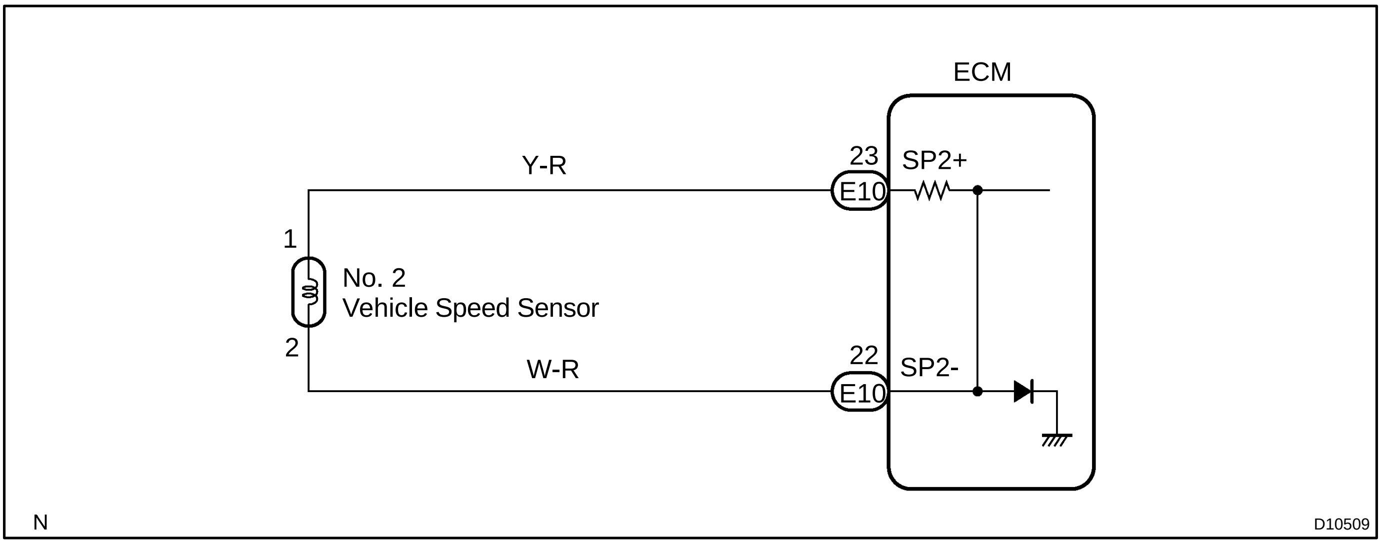
D00010

DTC No.	DTC Detecting Condition	Trouble Area
P1700	All conditions below are detected 500 times or more continuously (2 - trip detection logic). 1. No signal from No. 2 vehicle speed sensor is input to ECM while 4 pulses of No. 1 vehicle speed sensor signal are sent. 2. Vehicle speed: 9 km/h (5.6 mph) or more for at least 4 seconds. 3. Park/neutral position switch: OFF (Other than P or N) 4. Transfer position: Other than N position (A340F only)	• Open or short in No. 2 vehicle speed sensor circuit • No. 2 vehicle speed sensor • ECM



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

WIRING DIAGRAM



INSPECTION PROCEDURE

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

When using OBD II scan tool or hand-held tester:

PREPARATION:

(a) Remove the DLC3 cover.

(b) Connect an OBD II scan tool or hand-held tester to the DLC3.

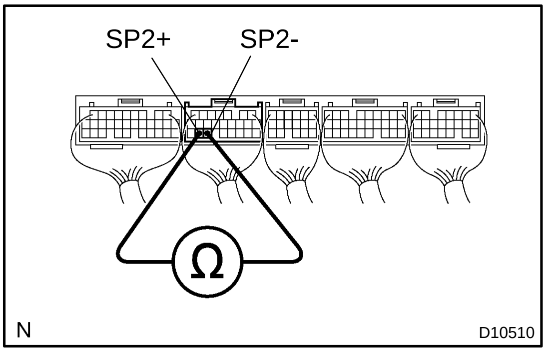
(c) Start the engine and turn OBD II scan tool or hand-held tester main switch ON.

CHECK:

Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value.



When not using OBD II scan tool or hand-held tester:

PREPARATION:

Disconnect the connector from the ECM.

CHECK:

Check resistance between terminals $SP2^+$ and $SP2^-$ of ECM.

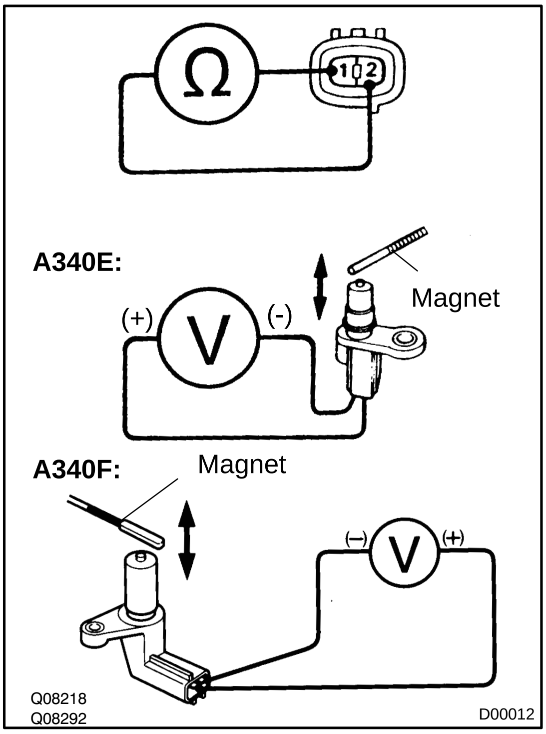
OK:

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

OK → **Check and replace the ECM (See page IN-28).**

NG

2	Check No. 2 vehicle speed sensor.



PREPARATION:

Remove the No. 2 vehicle speed sensor from the transmission.

CHECK:

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

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

OK:

(a) Resistance: 560 - 680 Ω at 20°C (68°F)

(b) Voltage is generated intermittently.

HINT:

The voltage generated is extremely low.

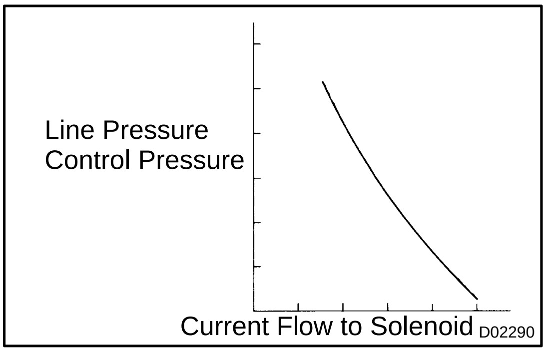
NG	Replace the No. 2 vehicle speed sensor.

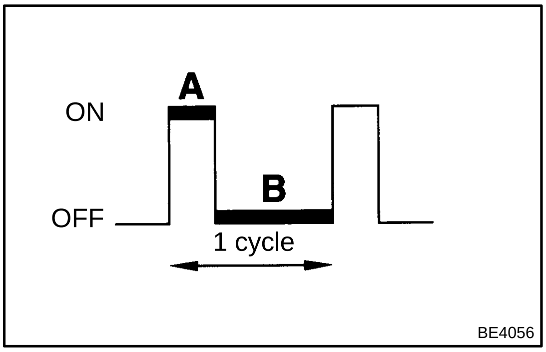
OK

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

DI1O9-27

DTC	P1760	Linear Solenoid for Line Pressure Control Circuit Malfunction





CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the solenoid valve SLT, under electronic control, to precisely and minutely modulate and generate line pressure according to the accelerator pedal effort, or the detected engine power output.

This reduces the function of line pressure and provides smooth shifting characteristics.

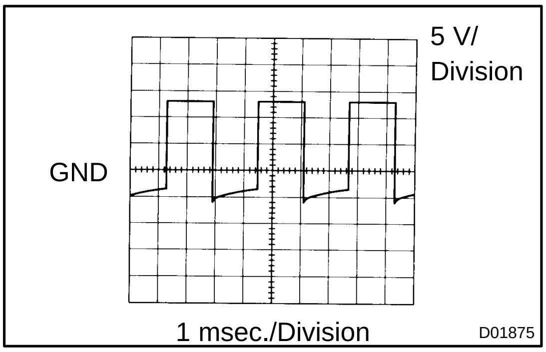
Upon receiving the throttle valve opening angle signal, ECM controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure, and generating throttle pressure.

(*) Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

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

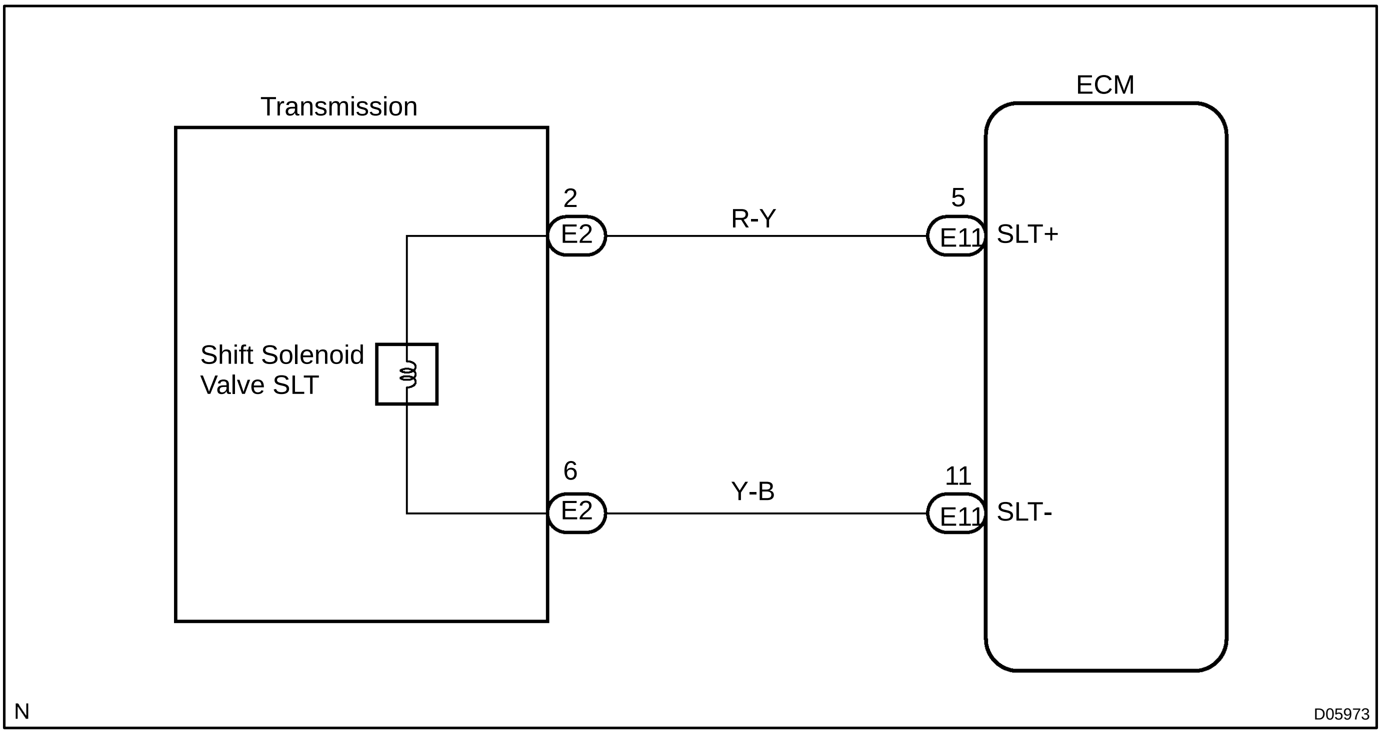
DTC No.	DTC Detecting Condition	Trouble Area
P1760	1. or 2. condition below is detected for 1 second or more. 1. SLT⁻ terminal: 0 V 2. SLT⁻ terminal: 12 V	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM



HINT:

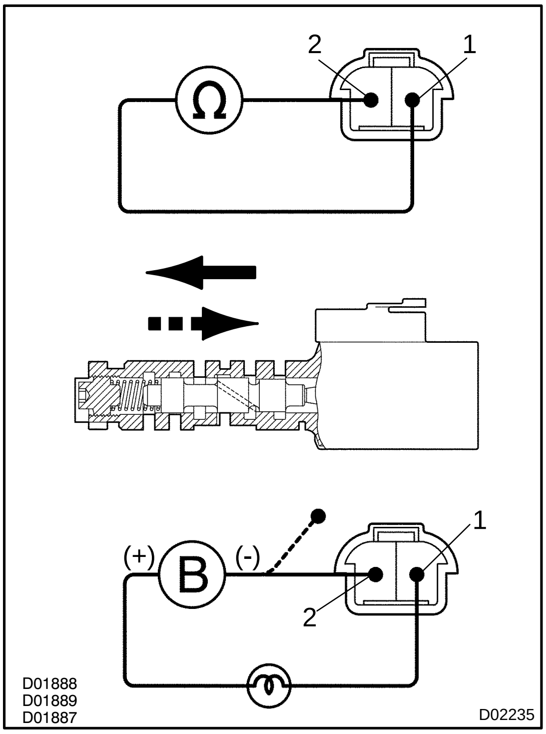
Waveform between terminals SLT^+ and SLT^- during engine idling is shown at left.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check shift solenoid valve SLT.**



PREPARATION:

(a) Remove the oil pan.

(b) Disconnect the solenoid connector.

Check solenoid resistance:

CHECK:

Measure resistance between terminals 1 and 2 of solenoid connector.

OK:

Resistance: 5.0 - 5.6 Ω at 20 °C (68 °F)

Check solenoid operation:

CHECK:

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

OK:

When battery positive voltage is applied.	Valve moves in direction in illustration at left.
When battery positive voltage is cut off.	Valve moves in direction in illustration at left.

NG	**Replace shift solenoid valve SLT.**

OK

2	**Check harness and connector between shift solenoid valve SLT and ECM (See page IN-28).**

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

OK

Check and replace ECM (See page IN-28).

DI6AH-03

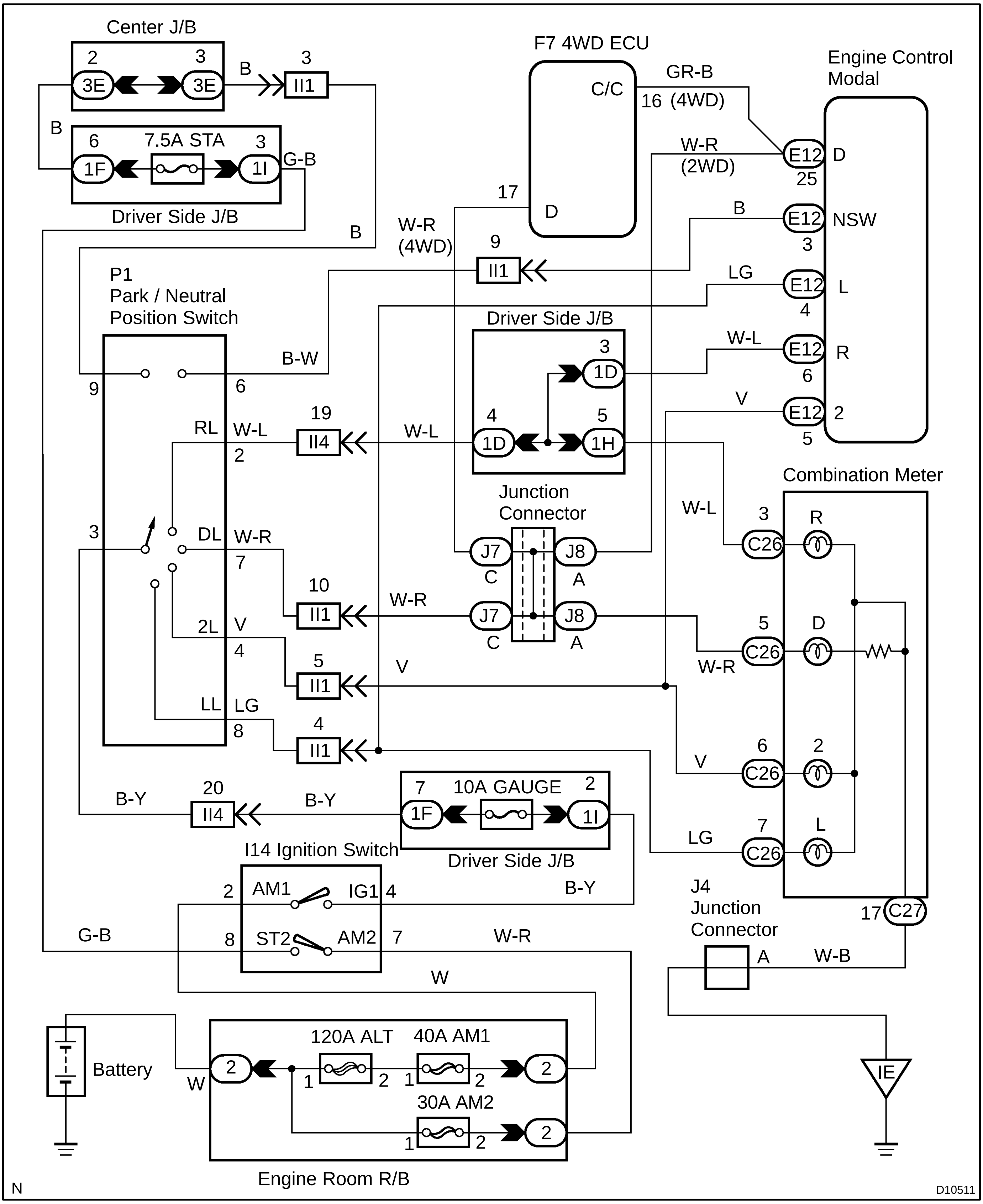
DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for R, N, 2 and L positions (2 - trip detection logic).	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM
	When driving under conditions 1. and 2. for 30 seconds or more, the park/neutral position switch is ON (N position) (2 trip detection logic). 1. Vehicle speed: 70 km/h (44 mph) or more 2. Engine speed: 1,500 - 2,500 rpm	

WIRING DIAGRAM



INSPECTION PROCEDURE

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

When using hand-held tester:

PREPARATION:

(a) Remove the DLC3 cover.

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

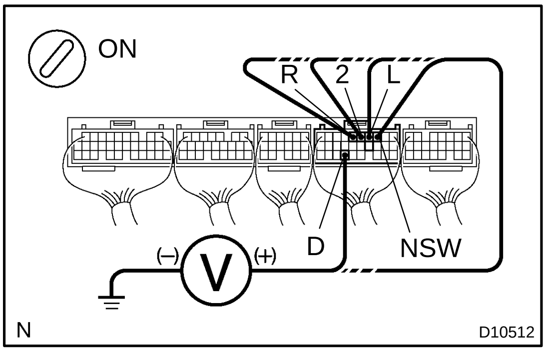
(c) Turn the ignition switch ON and hand-held tester main switch ON.

CHECK:

Shift lever into the P, R, D, N, 2 and L positions, and read the PNP, REVERSE, 4TH/DRIVE 2ND and LOW signals on the TOYOTA hand-held tester.

OK:

Shift position	Signal
2	2ND OFF → ON
L	LOW OFF → ON
D	4TH / DRIVE OFF → ON
R	REVERSE OFF → ON
P, N	PNP OFF → ON



When not using hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminals NSW, 2, L and R of ECM and body ground when the shift lever is shifted to the following positions.

OK:

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

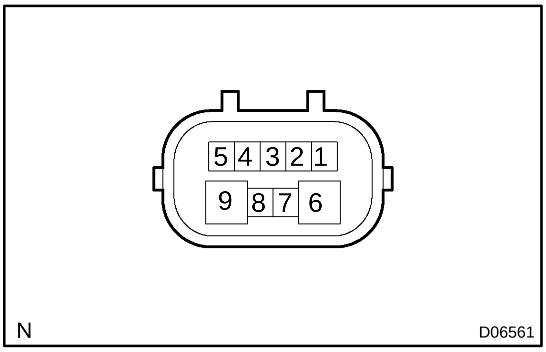
HINT:

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

OK → **Check and replace the ECM (See page IN-28).**

NG

2	Check park/neutral position switch.



PREPARATION:
(a) Jack up the vehicle.
(b) Disconnect the park/neutral position switch connector.
CHECK:
Check continuity between each terminal shown below when the shift lever is moved to each position.
OK:

Shift Position	Terminal No. to continuity	Terminal No. to continuity
P	6 - 9	1 - 3
R	2 - 3	-
N	6 - 9	3 - 5
D	3 - 7	-
2	3 - 4	-
L	3 - 8	-

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

OK

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

DI9OB-01

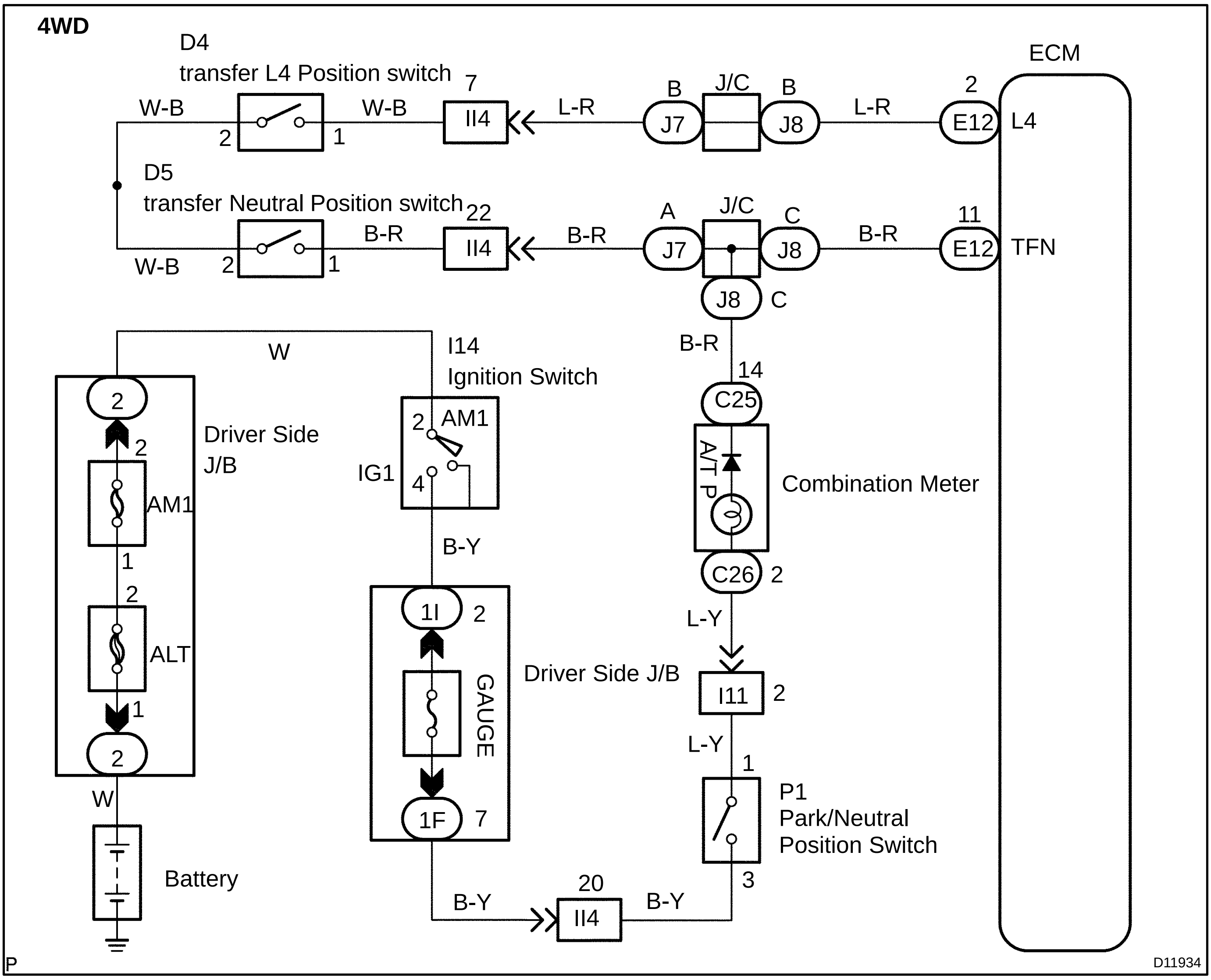
DTC	P1782	Transfer L4 SW Circuit Malfunction

CIRCUIT DESCRIPTION

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

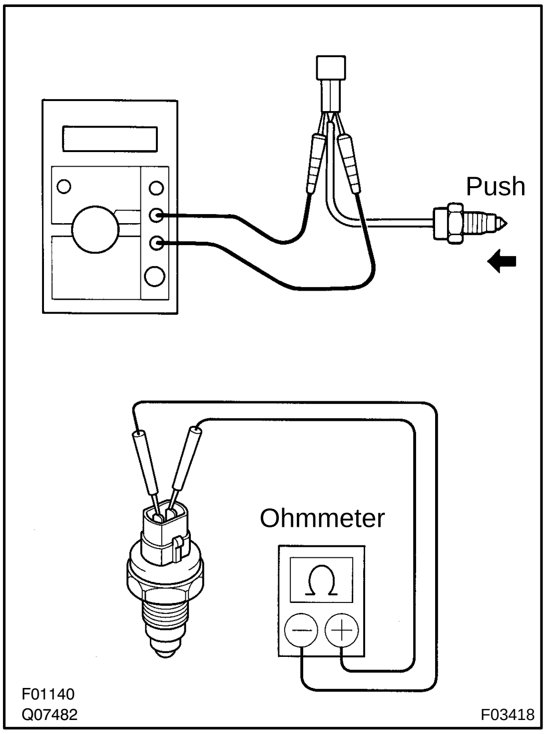
DTC No.	DTC Detecting Condition	Trouble Area
P1782	When driving under conditions (a) and (b) for 1.8 seconds or more, the indicator switch (LOW switch) is ON . (1-trip detection logic) (a) Output shaft speed 3000 rpm or less (b) Transfer shift position is H	• Short in transfer L4 position switch (LOW switch) signal circuit • transfer L4 position switch (LOW switch) • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transfer L4 position switch (See page TR-1 1).



PREPARATION:

Remove the transfer L4 position switch (See page TR-9).

CHECK:

Check that there is continuity between terminals, as shown.

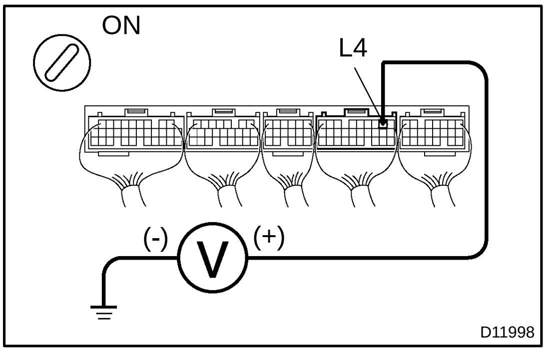
OK:

Switch position	Specified condition
Push	Continuity
Free	No continuity

NG → **Replace transfer L4 position switch.**

OK

2	Check voltage between terminal L4 of ECM and body ground.



PREPARATION:

Remove the ECM with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal L4 of ECM and body ground when transfer in L4 position.

OK:

Transfer shift position	Voltage (V)
L	Below 1.5
Except L	9 - 14

OK → **Proceed to next circuit inspection shown in problem symptoms chart (See page DI-175).**

NG ↓

3	**Check for open or short circuit in harness and connector between transfer L4 position switch and ECM (See page IN-28).**

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

OK ↓

Check and replace ECM.

DI9OC-01

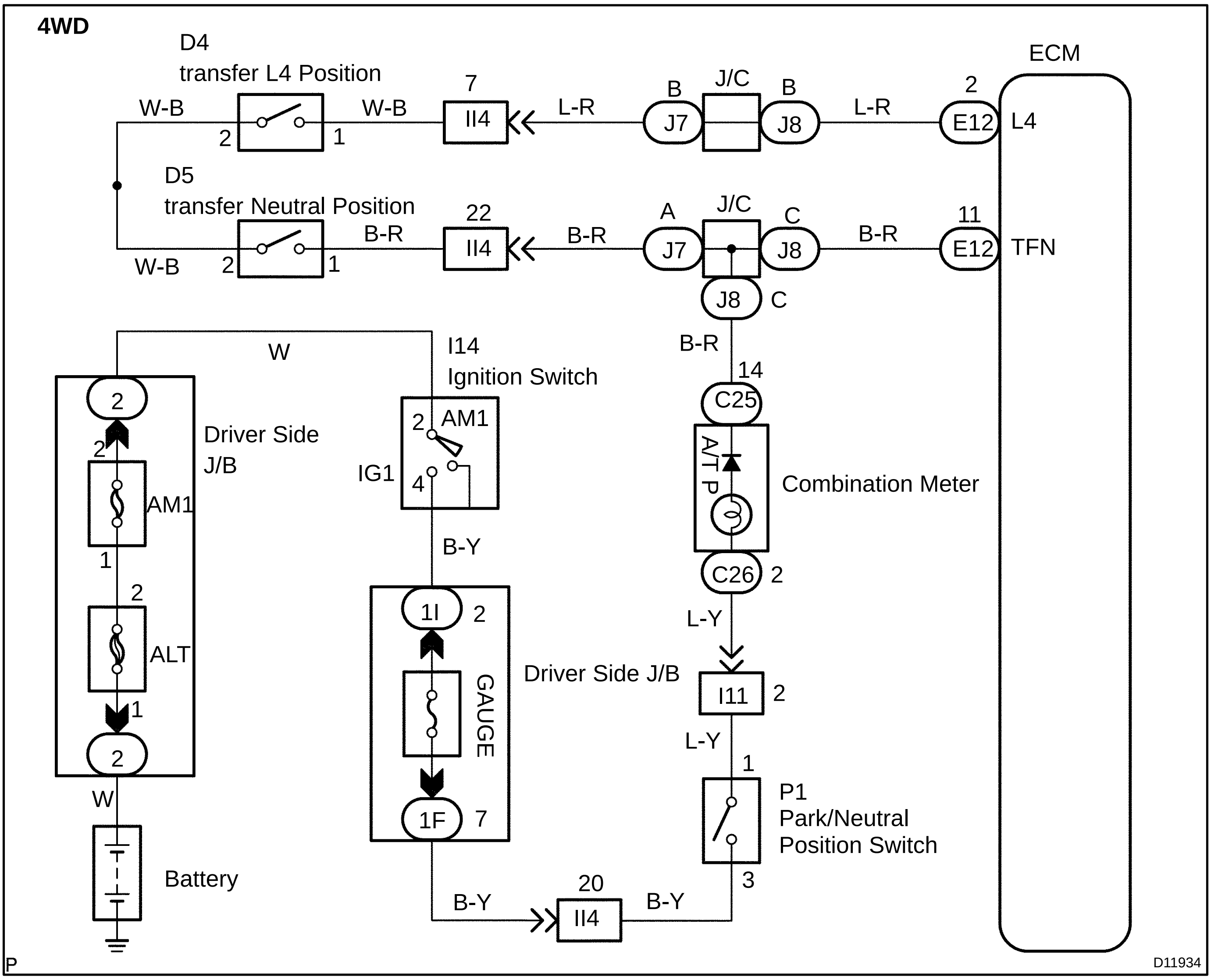
DTC	P1783	Transfer N SW Circuit Malfunction

CIRCUIT DESCRIPTION

The propeller shaft and wheels are free even when the transmission shift lever is set to P as long as the transfer shift lever is in Neutral position. The A/T.P. indicator light lights up to warn the drive that the propeller shaft and wheels are not locked.
If the A/T.P. indicator light goes on, the transfer shift lever should be shifted out of N position.
The ECM receive signal TFN from the indicator switch (neutral position switch).

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

WIRING DIAGRAM



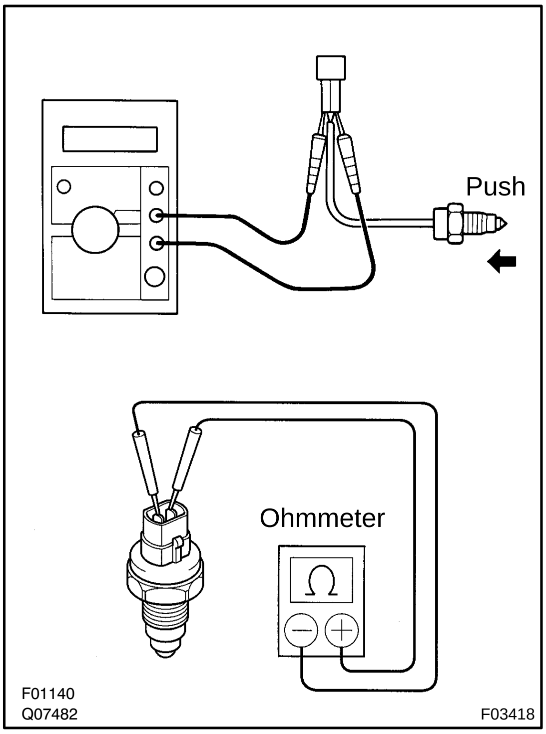
INSPECTION PROCEDURE

1	Check park/neutral position switch (See page DI-203).

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

OK

2	Check transfer neutral position switch.



PREPARATION:

Remove the transfer park/neutral position switch (See page TR-9).

CHECK:

Check that there is continuity between terminals, as shown.

OK:

Switch position	Specified condition
Push	Continuity
Free	No continuity

OK → **Replace the transfer neutral position switch.**

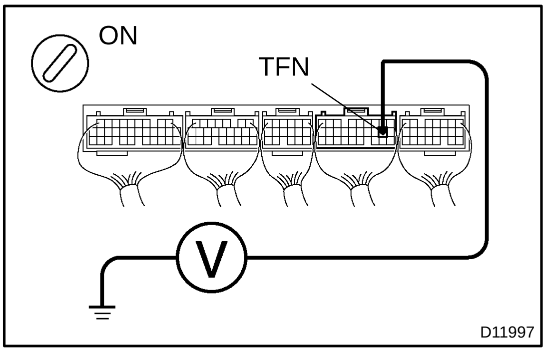
NG

3	Check combination meter (See page BE-45).

NG → **Repair or replace the combination meter.**

OK

4	Check voltage between terminal TFN of ECM and body ground.



PREPARATION:
Remove the ECM with connectors still connected.
CHECK:
Turn the ignition switch ON, measure voltage between terminal TFN of ECM and body ground when transfer shift lever is shifted to the following position.
OK:

Transfer shift position	Voltage (V)
N	Below 1.5
Except N	9 - 14

OK → **Proceed to next circuit inspection shown on problem symptom chart (See page DI-175).**

NG

5	Check for open or short circuit in harness and connector between transfer neutral position switch and ECM (See page IN-28).

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

OK

Check and replace ECM.

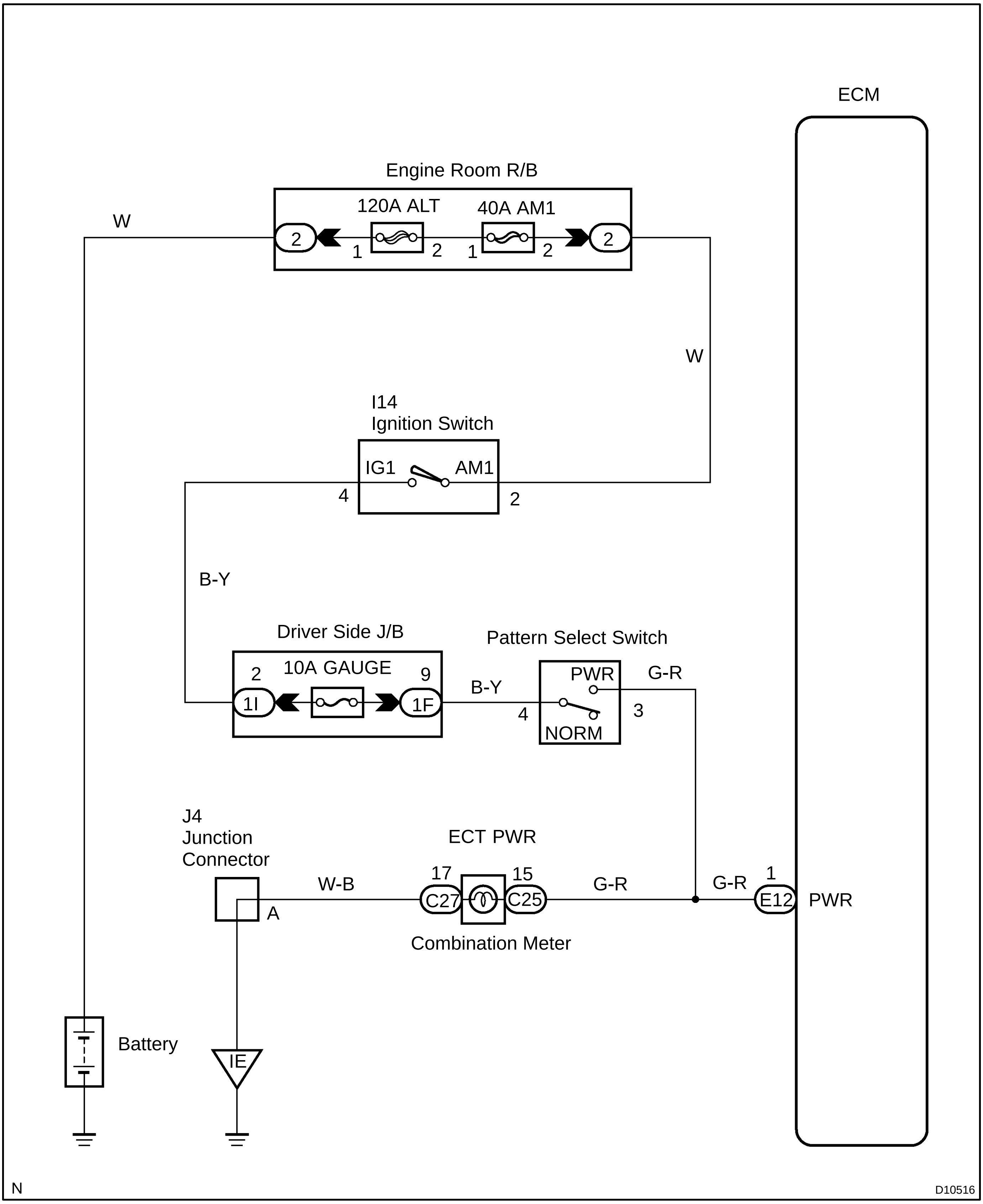
DI0T3-12

Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check PATTERN SEL SW signal.**

When using TOYOTA hand-held tester:

PREPARATION:

(a) Remove the DLC3 cover.

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

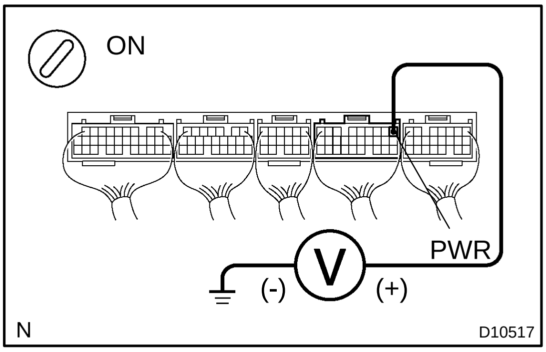
(c) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

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

OK:

Pattern select switch	PATTERN SEL SW signal
Pushed in	ON
Pushed out	OFF



When not using TOYOTA hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal PWR of the ECM and body ground when the pattern select switch set to the PWR (POWER) position and NORM (NORMAL) position.

OK:

Pattern select switch	Voltage
PWR	9 - 14 V
NORM	Below 1.5 V

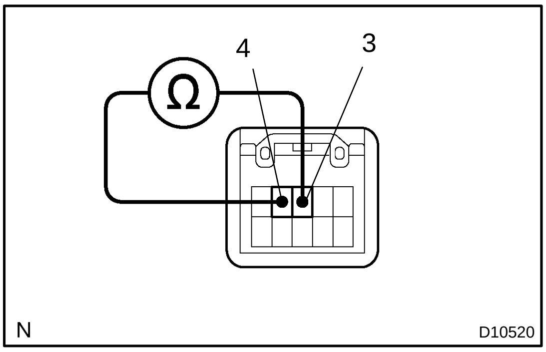
HINT:

The ECM uses the normal pattern signal if the PWR signal is not input.

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI-175).**

NG

2	Check pattern select switch.



PREPARATION:
Disconnect the pattern select switch connector.

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

OK:

Pattern select switch	Specified condition
PWR	Continuity
NORM	No continuity

NG → **Replace the pattern select switch.**

OK

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

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

OK

Check and replace the ECM (See page IN-28).

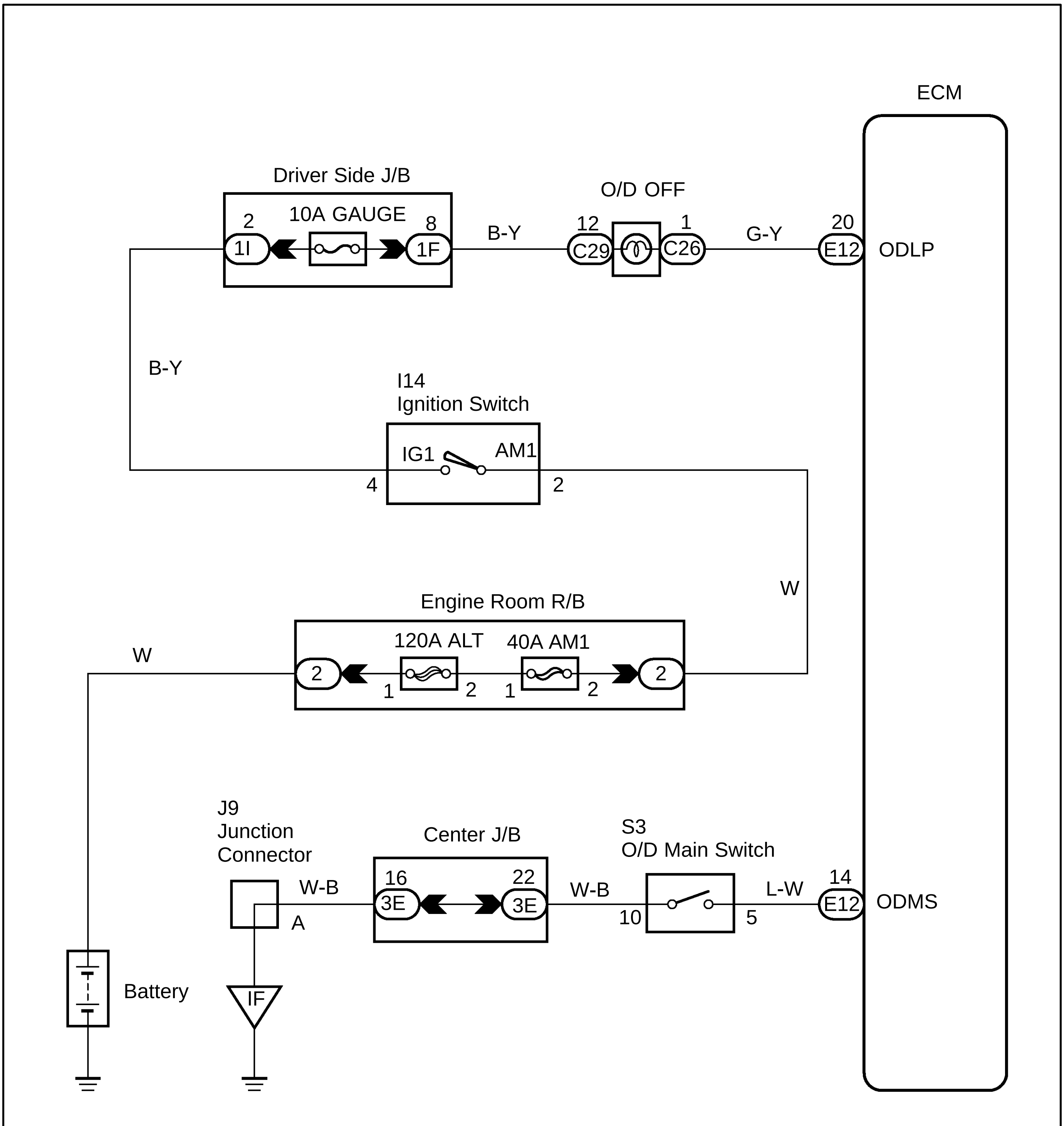
DI1CP-14

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

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of O/D main switch.

PREPARATION:
Turn the ignition switch ON.
CHECK:
(a) Check O/D OFF indicator light when O/D main switch is pushed in to ON.
(b) Check O/D OFF Indicator light when O/D main switch is pushed again.
OK:
(a) O/D OFF indicator light lights up.
(b) O/D OFF indicator light goes off.

OK → **Proceed to next inspection shown on problem symptoms table (See page DI-175).**

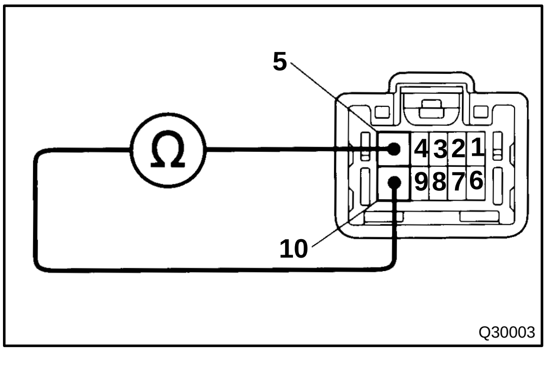
NG

2	Check and replace combination meter (See page BE-45).

NG → **Replace the combination meter.**

OK

3	Check O/D main switch.



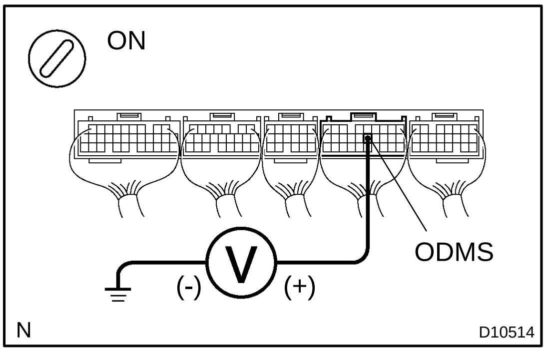
PREPARATION:
Disconnect the O/D main switch connector.
CHECK:
Check continuity between 5 and 10 of the O/D main switch connector.
OK:

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

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

OK

4	Check voltage between terminal ODMS of ECM and body ground.



PREPARATION:

Turn the ignition switch ON.

CHECK:

Check voltage between terminal ODMS of the ECM and body ground when O/D main switch is ON and OFF.

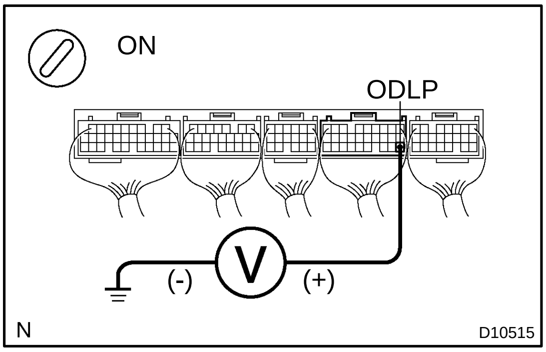
OK:

O/D main switch	Specified voltage
Press continuously O/D main switch	Below 1.5 V
Release O/D main switch	9 - 14 V

OK → **Check and replace the ECM (See page IN-28).**

NG

5	Check voltage between terminal ODLP of ECM and body ground.



PREPARATION:

(a) Disconnect the connector of ECM.

(b) Turn the ignition switch ON.

CHECK:

Check voltage between terminal ODLP of the ECM and body ground.

OK:

O/D main switch	Specified voltage
Press continuously O/D main switch	Below 3 V
Release O/D main switch	9 - 14 V

OK → **Check and replace the ECM (See page IN-28).**

NG

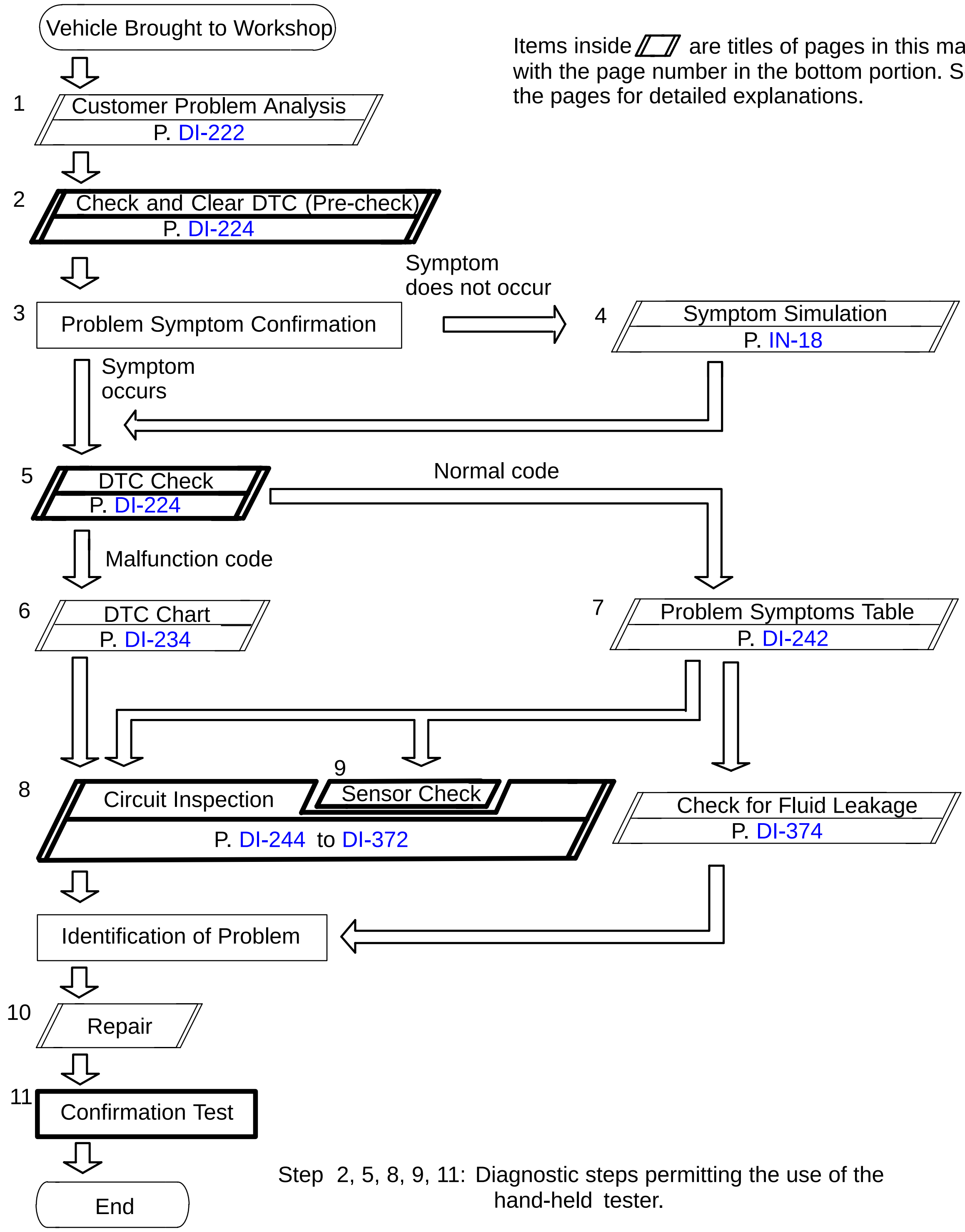
Check and replace harness and connector between combination meter and ECM, O/D main switch and ECM, O/D main switch and body ground (See page IN-28).

ABS WITH EBD & BA & TRAC & VSC SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI6BA-04

Troubleshooting in accordance with the procedure on the following pages.



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

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand-held tester.

Fail safe function:
When a failure occurs in the ABS & BA & TRAC & VSC system, the ABS and VSC TRAC warning light is lit and the ABS & BA & TRAC & VSC operation is prohibited. In addition to this, when the failure that disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited.

DI6BB-03

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

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

BA & TRAC & VSC Check Sheet

Inspector's Name :

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

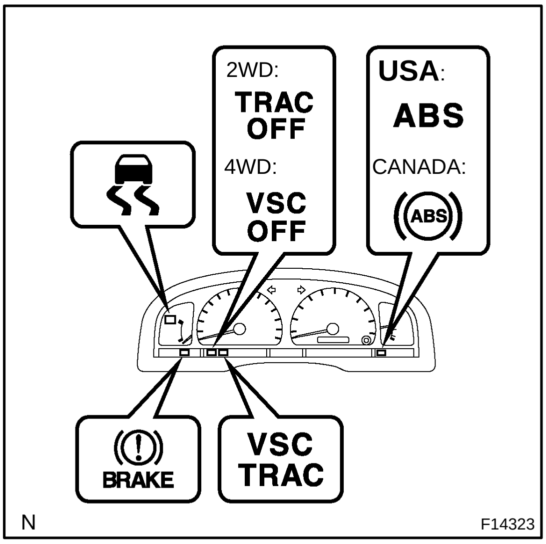
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ TRAC does not operate. (Wheels spin when starting rapidly.)	
	☐ VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	☐ BA does not operate.	
	VSC OFF TRAC OFF Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC TRAC Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Lamp	☐ Normal ☐ Malfunction Code (Code)
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC Warning Buzzer Abnormal	☐ Sounds ☐ Does not Sound

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

DI8XO-02



PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Inspect the battery positive voltage.

Battery positive voltage: 10 - 14 V

(b) Check the warning lights and buzzer.

(1) Release the parking brake lever.

(2) When the ignition switch is ON, check that the ABS, BRAKE, VSC TRAC warning lights, VSC or TRAC OFF and SLIP indicator lights go on for 3 sec.

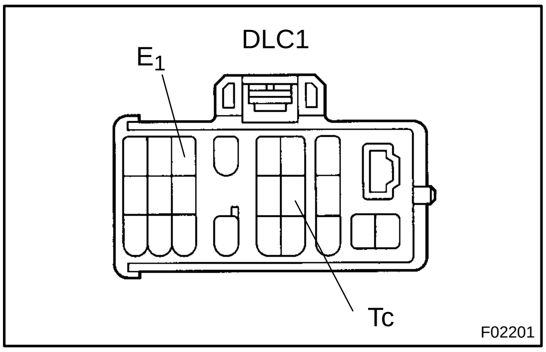
(3) 4WD:
Check that the center diff. lock indicator light and VSC OFF indicator light light up when the center diff. lock switch is pressed.

(4) Depressing the brake pedal repeatedly may light the warning light and sound the buzzer.

HINT:

- If the ECU stores DTC, ABS or VSC TRAC indicator light is ON.
- If the indicator check result is not normal, proceed to troubleshooting for the circuits of the ABS, BRAKE warning lights,VSC or TRAC OFF, SLIP, center diff. lock indicator lights.

Trouble Area	See page
ABS warning light circuit	DI-351
BRAKE warning light circuit	DI-365
VSC TRAC warning light circuit	DI-354
VSC OFF indicator light circuit (4WD)	DI-357
TRAC OFF indicator light circuit (2WD)	DI-360
SLIP indicator light circuit	DI-363
Center diff. lock indicator light circuit (4WD)	DI-357
VSC buzzer circuit	DI-367



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

(1) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020

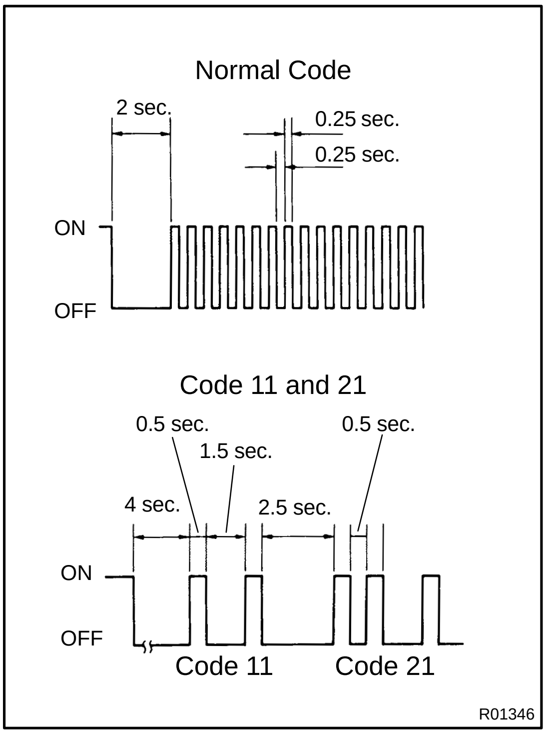
(2) Turn the ignition switch ON.

(3) Read the DTC from the ABS or VSC TRAC warning lights on the combination meter.

HINT:

- If no code appears, inspect the diagnostic circuit, ABS or VSC TRAC warning light circuit.

Trouble Area	See page
Tc terminal circuit	DI-370
ABS warning light circuit	DI-351
VSC TRAC warning light circuit	DI-354

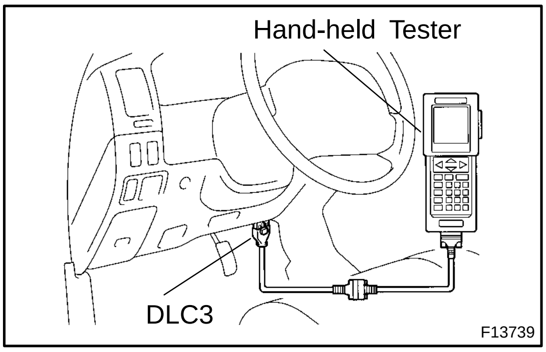


- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(4) Codes are explained in the code table on page DI-234 .

(5) After completing the check, disconnect terminals Tc and E_1 of DLC1, and turn off the display.

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



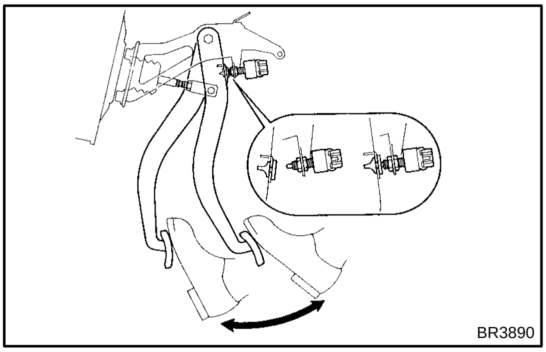
(d) In case of using the hand-held tester:
Check the DTC.

(1) Hook up the hand-held tester to 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.



(e) In case of not using the hand-held tester:
Clear the DTC.

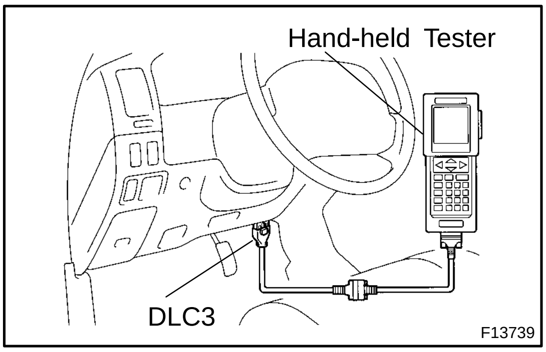
(1) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020

(2) Turn the ignition switch ON.

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

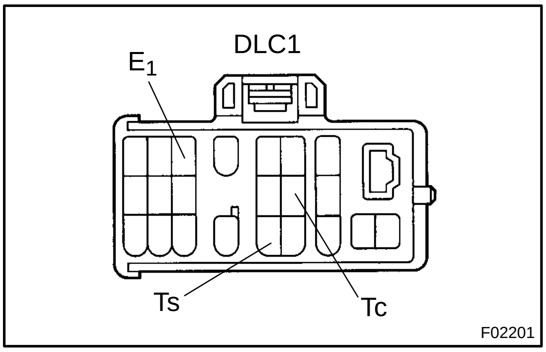
(4) Check that the warning light shows the normal code blinking pattern.

(5) Remove the SST from terminals Tc and E_1 of DLC1.
SST 09843-18020



(f) In case of using the hand-held tester:
Clear the DTC.
(1) Hook up the hand-held tester to DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand-held tester to erase the codes.

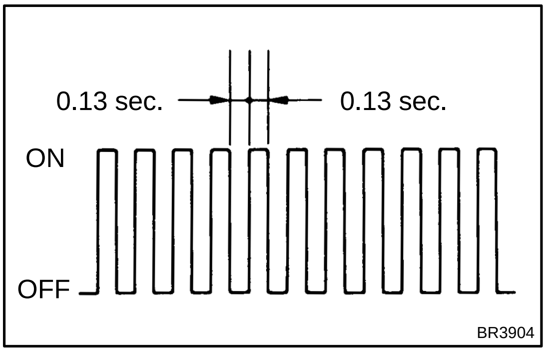
HINT:
Please refer to the hand-held tester operator's manual for further details.



**2. In case of not using the hand-held tester:
ABS SENSOR SIGNAL CHECK (TEST MODE)**

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

(a) Procedures for the test mode:
(1) Turn the ignition switch OFF.
(2) Shift the shift lever to P range.
(3) Using SST, connect terminals Ts and E_1 of DLC1.
SST 09843-18020
(4) Check that the steering wheel is in the straight-ahead position.
(5) Turn the ignition switch ON.



(6) Check that the ABS warning light blinks.

HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit or the Ts terminal circuit.

Trouble Area	See page
Ts terminal circuit	DI-372
ABS warning light circuit	DI-351

(b) Check the deceleration sensor.
Keep the vehicle in a stationary condition on a level place for 1 sec. or more.

(c) Check the master cylinder pressure sensor.
Leaving the vehicle in a stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with the force of 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.

HINT:
At this time, the ABS warning light goes on for 3 sec.

(d) 4WD:
Check the center diff. lock switch.
Turn the center diff. lock switch from OFF to ON and OFF again.

(e) 4WD:
Check the L4 position switch.
(1) Shift the transfer lever to L4 position and turn the center diff. lock switch ON.
(2) Shift the transfer lever to H4 position.

(f) Check the speed sensor signal.
Drive the vehicle straight forward.
Drive the vehicle with a speed faster than 45 km/h (28 mph) for several seconds. Check that the ABS warning light comes off.

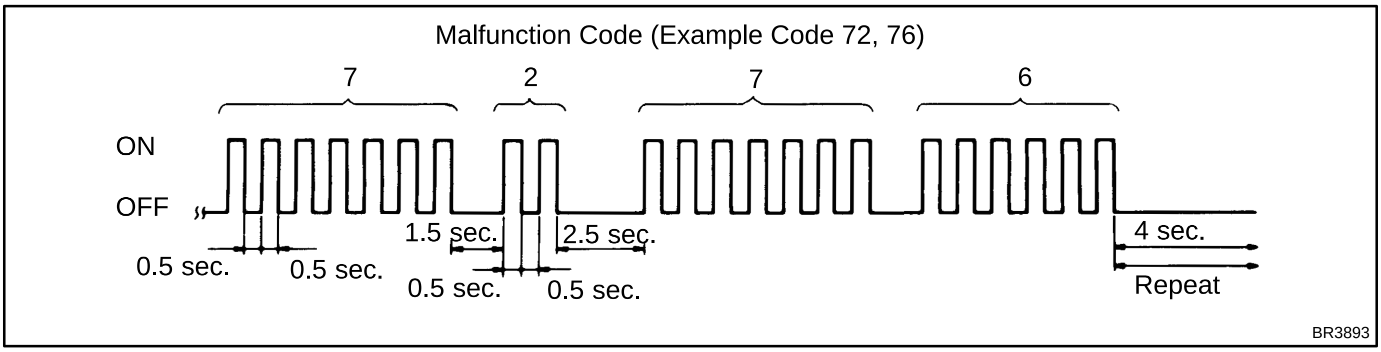
HINT:
The sensor check may not be completed if the wheels spin or the steering wheel is steered during this check.

(g) Stop the vehicle.

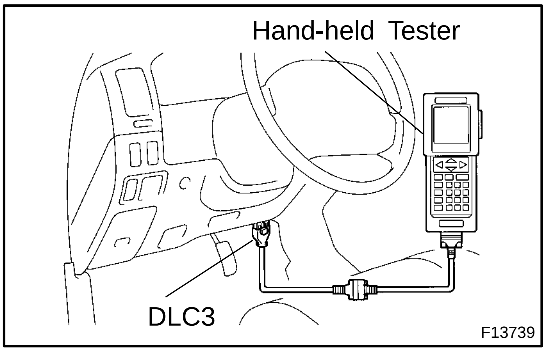
(h) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020

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

HINT:
- See the list of DTC 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 number code will be displayed 1st.



(j) After doing the check, disconnect SST from the terminals of DLC1 and turn the ignition switch OFF.
SST 09843-18020



3. **In case of using the hand-held tester:**
ABS SENSOR SIGNAL CHECK (TEST MODE)
(a) Hook up the hand-held tester to DLC3.
(b) Do step (b) - (g) on the previous page.
(c) 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 ABS sensor check function:

Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Sensor rotor
C1272 / 72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Sensor rotor
C1273 / 73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Sensor rotor
C1274 / 74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor
C1279 / 79	Deceleration sensor is faulty	• Deceleration sensor • Sensor installation
C1281 / 81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor
C1282 / 82*	Transfer indicator (center diff. lock) switch malfunction	Transfer indicator (center diff. lock) switch
C1283 / 83*	Transfer L4 position switch malfunction	Transfer L4 position switch

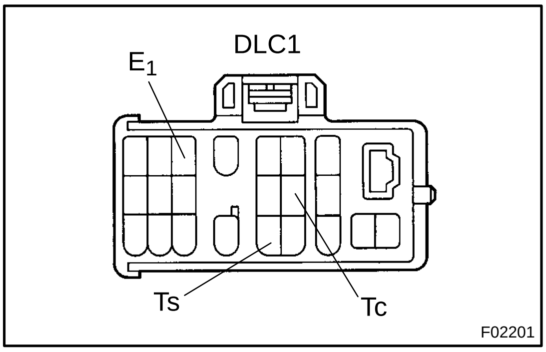
*: 4WD

4. **In case of not using the hand-held tester:**
VSC SENSOR SIGNAL CHECK (TEST MODE)

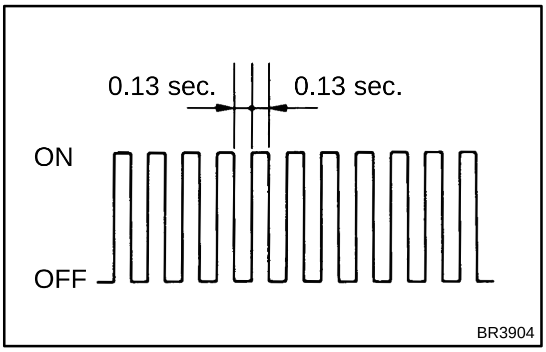
NOTICE:
When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.).

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

(a) Procedures for the test mode:
   (1) Turn the ignition switch OFF.
   (2) Check that the shift lever position is at P range. Turn the steering wheel to the neutral position.



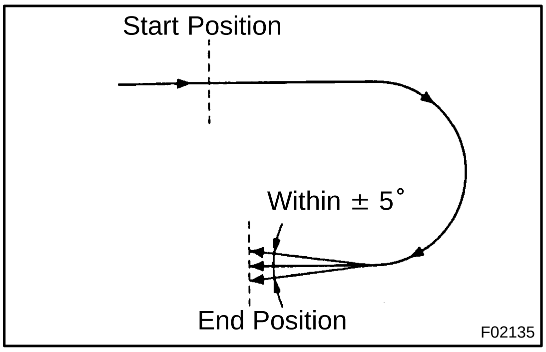
(3) Using SST, connect terminals Ts and E_1 of DLC1.
SST 09843-18020
(4) Start the engine.



(5) Check that the VSC TRAC warning light blinks.
HINT:
If the VSC TRAC warning light does not blink, inspect the VSC TRAC warning light circuit or the Ts terminal circuit.

Trouble Area	See page
Ts terminal circuit	DI-372
VSC TRAC warning light circuit	DI-354

(b) Check the steering angle sensor.
Turn the steering wheel either to left or right for 450° or more from the vehicle stationary condition, and turn back the steering wheel to the straight ahead position.



(c) Check the yaw rate sensor.
Shift the shift lever to the D position and drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to left or right for 90° or more, and maintain wheel 180° circular drive for the vehicle.
Stop the vehicle and shift the shift lever to the P position, check that the VSC buzzer sounds for 3 sec.
HINT:
- If the VSC buzzer sounds, the sensor check is in normal completion.
- If the VSC buzzer does not sound, check the VSC buzzer circuit, then do the sensor check again.

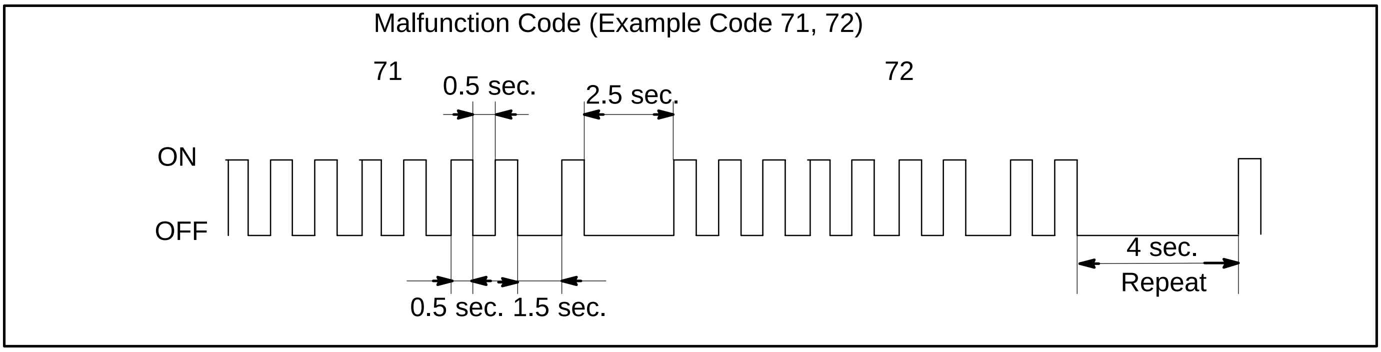
Trouble Area	See page
VSC buzzer circuit	DI-367

- If the VSC buzzer still won't sound, there is malfunction in the VSC sensor, so check the DTC.

HINT:
- Drive the vehicle circularly by 180°. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- Do not spin the wheels.

(d) Read the DTC.
   (1) Using SST, connect terminals Tc and E_1 of DLC1.
   SST 09843-18020
   (2) Read the number of blinks of the VSC OFF indicator light.

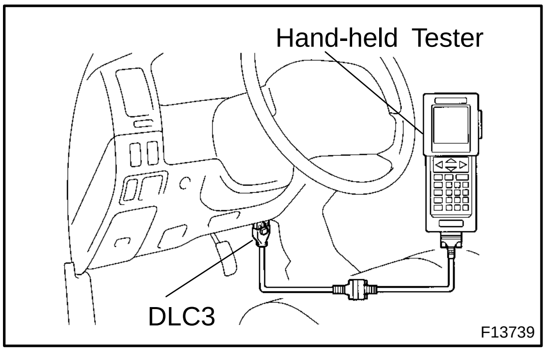
HINT:
- See the list of DTC shown on the next page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



   (3) After doing the check, disconnect SST from terminals Ts and E_1 of DLC1 and turn the ignition switch OFF.
   SST 09843-18020

5. In case of using the hand-held tester:
VSC SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:
When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.). Make sure that this operation should be done before starting the following is started.



(a) Hook up the hand-held tester to DLC3.
(b) Do steps (a)-(2), (a)-(4), (b) and (c) on the previous pages.
(c) 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 VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371/71	Yaw rate sensor output signal malfunction	• Yaw rate sensor • Yaw rate sensor circuit
C1208/72	Steering position sensor output signal malfunction	• Steering position sensor • Steering position sensor circuit

6. DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM

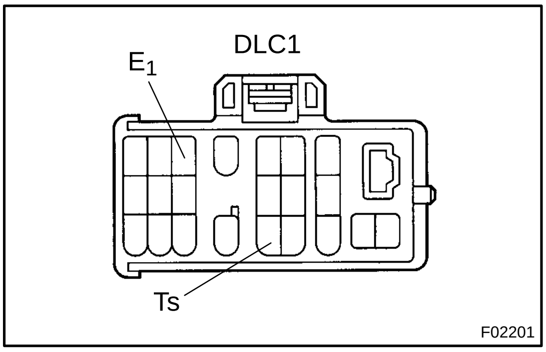
CAUTION:
While the deceleration sensor operating diagnosis system is checked, ABS does not work.

7. IF NECESSARY, YAW RATE SENSOR ZERO POINT CALIBRATION

HINT:
- When having replaced the yaw rate sensor, deceleration sensor or the ECU, make sure to perform yaw rate and deceleration sensors zero point calibration.
- This operation is also required when the deceleration sensor or yaw rate sensor has been replaced since the calibrated zero point of both sensors will be erased.

NOTICE:
- **While obtaining the zero point, do not give any vibration to the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- **Be sure to do this on a level surface (within an inclination of 1%).**

(a) Clear the zero point of the yaw rate and deceleration sensors.
  (1) Shift the shift lever to P range.
  (2) Turn the ignition switch ON in a stationary condition.



F02201

(3) With the ignition switch ON, using SST, repeat a cycle of connect and disconnect between terminals Ts and E_1 of DLC1 4 times or more within 8 sec. Check that the VSC TRAC warning light is lit indicating the recorded zero point is erased.
SST 09843-18020
(4) Turn the ignition switch OFF.

(b) Obtain zero point of the yaw rate sensor.
(1) Make terminals Ts and E_1 of DLC1 disconnected.
(2) Turn the ignition switch ON.

HINT:
The vehicle should be in a stationary condition with the shift lever in P range.

(3) Check that the lit VSC TRAC warning light goes off about 15 sec. after the ignition switch is turned ON.

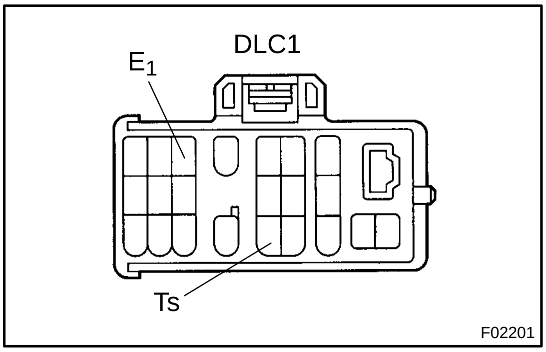
HINT:
Even if the ignition switch is not turned OFF in step (a)-(4) and remains ON, the yaw rate sensor zero point calibration can be completed. In this case, the VSC TRAC warning light is lit for about 15 sec. and starts blinking. (Normal code)

(4) After ensuring that the VSC warning light remains OFF for 2 sec., turn the ignition switch OFF.

HINT:
If the ignition switch is not turned OFF in step (a)-(4), make sure that the light blinks for 2 sec. and turn the ignition switch OFF.

(c) Perform deceleration sensor zero point calibration.

NOTICE:
After step (b) (the yaw rate sensor zero point calibration), the VSC TRAC warning light goes off. At this time, if the vehicle is driven without preforming step (c) (deceleration sensor zero point calibration), deceleration sensor zero point calibration malfunction will be detected and the VSC warning light will light up.
Therefore, perform step (c) right after step (b).



F02201

(1) Using SST, connect terminals Ts and E_1 of DLC1.
SST 09843-18020
(2) Turn the ignition switch ON.

HINT:
Make sure that the vehicle is in a stationary condition with the shift lever in P range.

(3) After turning the ignition switch ON, check that the VSC TRAC warning light is lit for about 4 sec. and then starts quick blinking at 0.13 sec. intervals.

(4) After making sure that the VSC TRAC warning light blinks for 2sec., turn the ignition switch OFF.

(5) Remove SST and make terminals Ts and E_1 of DLC1 disconnected.

DI6BD-04

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

When removing the part, turn the ignition switch OFF.

HINT:

- Using SST 09843-18020, connect terminals Tc and E_1 of DLC1.
- If any abnormality is not found when parts are inspected, 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 in the "See page" for respective "DTC No." in the DTC chart.
- EBD shall be checked according to the ABS trouble code chart.

DTC chart of ABS:

DTC No. (See Page)	Detection Item	Trouble Area
C0200 / 31*1 (DI-244)	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-244)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI-244)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI-244)	Left rear wheel speed sensor signal malfunction	
C0226 / 21 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SFR circuit)	• Hydraulic brake booster • SFRR or SFRH circuit
C0236 / 22 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SFL circuit)	• Hydraulic brake booster • SFLR or SFLH circuit
C0246 / 23 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SRR circuit)	• Hydraulic brake booster • SRRR or SRRH circuit
C0256 / 24 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SRL circuit)	• Hydraulic brake booster • SRLR or SRLH circuit
C0278 / 11 (DI-253)	Open or short circuit in ABS SOL relay circuit	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12 (DI-253)	B+ short circuit in ABS SOL relay circuit	
C1225 / 25 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (SA1 circuit)	• Hydraulic brake booster • SA1 circuit
C1226 / 26 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (SA2 circuit)	• Hydraulic brake booster • SA2 circuit
C1227 / 27 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (SA3 circuit)	• Hydraulic brake booster • SA3 circuit
C1228 / 28 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (STR circuit)	• Hydraulic brake booster • STR circuit
C1237 / 37 (DI-284)	Some tire's different size is from the other tires'	Tire size
C1241 / 41 (DI-285)	Low battery positive voltage or abnormally high battery positive voltage	• Battery • Charging system • Power source circuit
C1242 / 42*2 (DI-288)	Open circuit in IG2 circuit	• Battery • Charging system • Power source circuit
C1243 / 43 (DI-291)	Malfunction in deceleration sensor (constant output)	• Deceleration sensor • Wire harness for deceleration sensor system

C1244 / 44 (DI-276)	Open or short circuit in deceleration sensor circuit	• Deceleration sensor • Deceleration sensor circuit
C1245 / 45 (DI-291)	Malfunction in deceleration sensor	• Deceleration sensor • Wire harness for deceleration sensor system
C1246 / 46 (DI-294)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249 / 49 (DI-297)	Open circuit in stop light switch circuit	Stop light switch circuit
C1251 / 51*2 (DI-300)	Pump motor is locked Open circuit in pump motor ground	Hydraulic brake booster pump motor
C1252 / 52*2 (DI-303)	Hydraulic brake booster pump motor malfunction	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)
C1253 / 53*2 (DI-309)	Hydraulic brake booster pump motor relay malfunction	• ABS or TRC MTR relay • ABS or TRC MTR relay circuit • Hydraulic brake booster pump motor circuit
C1254 / 54*2 (DI-314)	Pressure switch malfunction	• Pressure switch (PH or PL) • Pressure switch circuit
C1256 / 56*2 (DI-317)	Accumulator low pressure malfunction	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor
C1257 / 57*2 (DI-317)	Power supply drive circuit malfunction	• Battery • Power source circuit • Skid control ECU
C1268 / 68*3 (DI-331)	Transfer L4 position signal transmission failure	• Transfer L4 position switch • Transfer L4 position switch circuit
C1269 / 69 (DI-334)	Malfunction in PNP switch circuit (R range)	• PNP switch • PNP switch circuit (R range)
Always ON (DI-343)	Malfunction in skid control ECU	• Battery • Charging system • Power source circuit • Skid control ECU

*1: As the DTC cannot be erased by replacing parts alone, do either one of the following operations.
(1) Clear DTC (See page DI-224).
(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.
*3: 4WD

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 supply circuit													○	

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

DTC chart of VSC:

DTC No. (See Page)	Detection Item	Trouble Area
C1201 / 51 (DI-259)	ECM system malfunction	Engine control system
C1203 / 53 (DI-260)	ECM communication circuit malfunction	• TRC+ or TRC- circuit • ENG+ or ENG- circuit • ECM
C1207 / 37 (DI-262)	Malfunction in neutral start switch (P/R range)	• PNP switch • PNP switch circuit (P/R range)
C1210 / 36 (DI-264)	Zero point calibration of yaw rate sensor undone	• Yaw rate sensor • Yaw rate sensor circuit • PNP switch circuit (P range)
C1223 / 43 (DI-267)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI-268)	Open or short circuit in NE signal circuit	• NEO circuit • ECM • Skid control ECU
C1231 / 31 (DI-272)	Malfunction in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1232 / 32 (DI-276)	Malfunction in deceleration sensor	• Deceleration sensor • Deceleration sensor circuit
C1233 / 33 (DI-280)	Open or short circuit in yaw rate sensor circuit	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34 (DI-280)	Malfunction in yaw rate sensor	• Yaw rate sensor • Yaw rate sensor circuit
C1258 / 58* (DI-328)	Transfer 4WD position signal transmission failure	• Transfer 4WD position switch • Transfer 4WD position switch circuit
C1336 / 39 (DI-337)	Zero point calibration of deceleration sensor undone	• Deceleration sensor • Deceleration sensor circuit • PNP switch (P range) circuit
C1340 / 47* (DI-341)	Open circuit in center differential lock signal	• Center differential lock system • Center differential lock circuit • Center differential lock indicator light circuit
Always ON (DI-347)	Malfunction in skid control ECU Open circuit in VSC TRAC warning indicator circuit	• Power source circuit • VSC TRAC warning light circuit

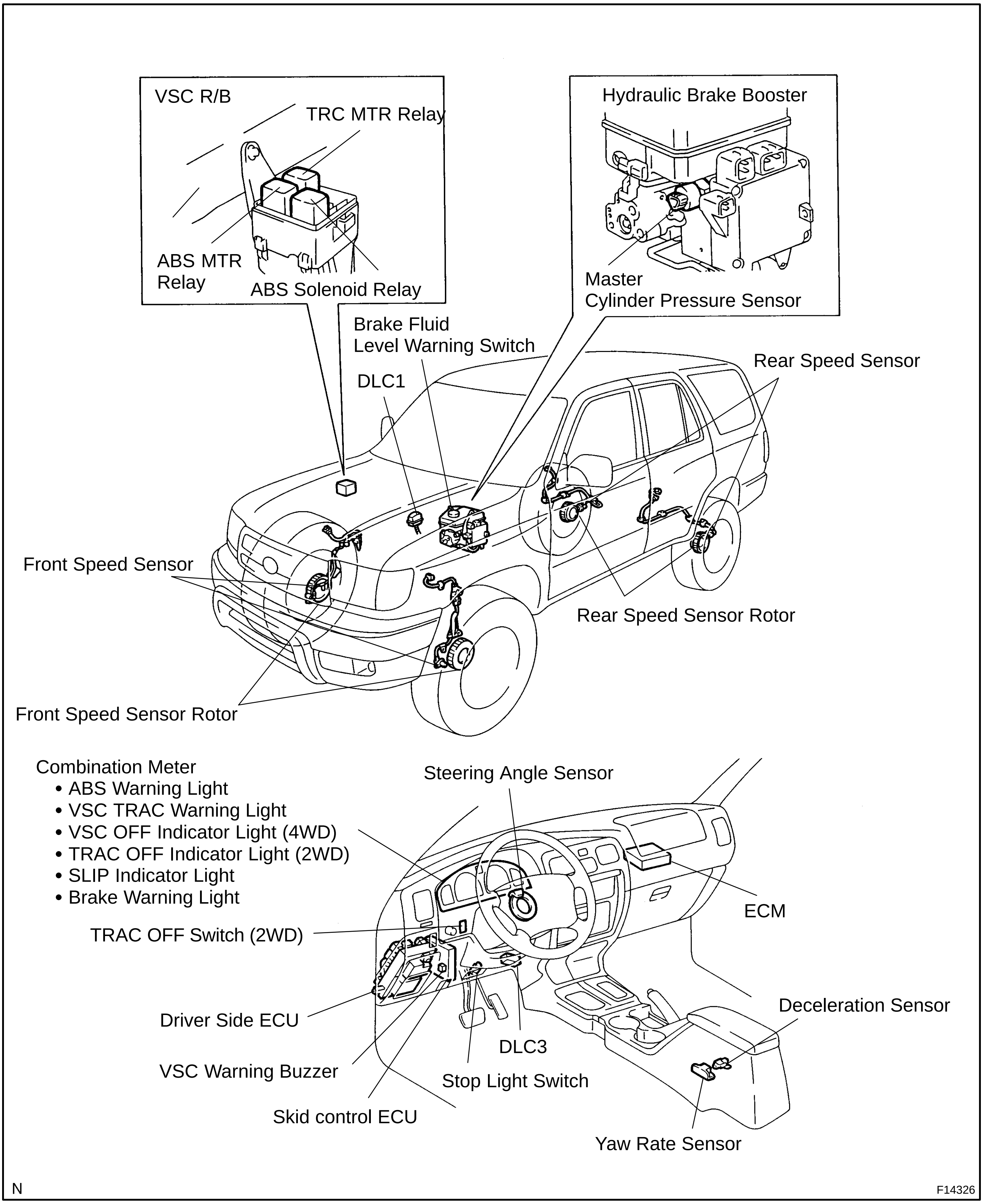
*: 4WD

HINT:

There is a case that the hand-held tester cannot be used when the VSC TRAC warning light is always on.

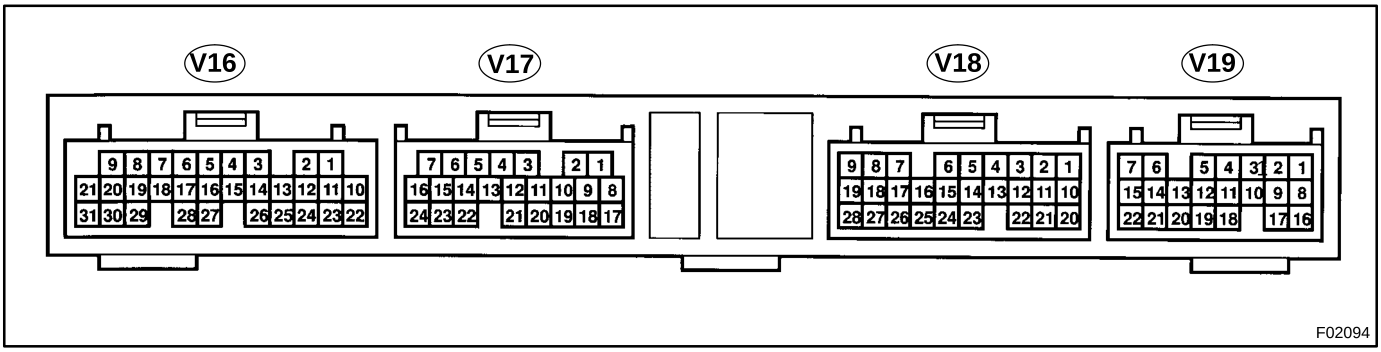
DI6BE-02

PARTS LOCATION



DI8XP-02

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SA1 (V16 - 2) - GND (V16 - 6, 31, V19 - 8, 16)	B-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SA2 (V16 - 3) - GND (V16 - 6, 31, V19 -8, 16)	W-L ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SA3 (V16 - 4) - GND (V16 - 6, 31, V19 - 8, 16)	W-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
STR (V16 - 5) - GND (V16 - 6, 31, V19 - 8, 16)	Y-G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFLR (V16 - 7) - GND (V16 - 6, 31, V19 - 8, 16)	Y-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRH (V16 - 8) - GND (V16 - 6, 31, V19 - 8, 16)	G-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRR (V16 - 9) - GND (V16 - 6, 31, V19 - 8, 16)	LG ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
VCM (V16 - 10) - GND (V16 - 6, 31, V19 - 8, 16)	B ↔ W-B	IG switch ON	4.5 - 5.5
PH (V16 - 11) - GND (V16 - 6, 31, V19 - 8, 16)	LG-B ↔ W-B	IG switch ON, pressure switch (PH) ON	Below 0.9
		IG switch ON, pressure switch (PH) OFF	5 - 8
FR+ (V16 - 14) - FR- (V16 - 13)	LG ↔ L	IG switch ON, right front wheel is turned slowly	Pulse generation
FL+ (V16 - 16) - FL- (V16 - 15)	W ↔ R	IG switch ON, left front wheel is turned slowly	Pulse generation
SR (V16 - 19) - R1+ (V16 - 1)	G-B ↔ R-B	IG switch ON, ABS warning light OFF	10 - 14
SFLH (V16 - 21) - GND (V16 - 6, 31, V19 - 8, 16)	L-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
PMC (V16 - 22) - E2 (V16 - 23)	W ↔ R	IG switch ON, stop light switch released	0.3 - 0.7
MSS (V16 - 24) - GND (V16 - 6, 31, V19 - 8, 16)	BR ↔ W-B	IG switch OFF	Continuity
MMT (V16 - 27) - GND (V16 - 6, 31, V19 - 8, 16)	P-B ↔ W-B	IG switch ON, (Motor relay is OFF)	Below 1.5
MT+ (V16 - 28) - MT- (V16 - 18)	GR ↔ O	IG switch ON, (Motor relay is OFF)	Below 1.5
MR1 (V16 - 29) - R1+ (V16 - 1)	L-B ↔ R-B	IG switch ON, hydraulic brake booster pump motor running	10 - 14
MR2 (V17 - 1) - R2+ (V17 - 2)	P-B ↔ Y-B	IG switch ON, hydraulic brake booster pump motor running	10 - 14

SRLR (V17 - 3) - GND (V16 - 6, 31, V19 - 8, 16)	R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRLH (V17 - 4) - GND (V16 - 6, 31, V19 - 8, 16)	L ↔ W-B	IG switch ON, ABC warning light OFF	10 - 14
SFRR (V17 - 5) - GND (V16 - 6, 31, V19 - 8, 16)	Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRH (V17 - 6) - GND (V16 - 6, 31, V19 - 8, 16)	G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
PL (V17 - 8) - GND (V16 - 6, 31, V19 - 8, 16)	L-W ↔ W-B	IG switch ON, pressure switch ON	3 - 5
		IG switch ON, pressure switch OFF	7 - 11
AST (V17 - 10) - GND (V16 - 6, 31, V19 - 8, 16)	LG-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
IG2 (V17 - 18) - GND (V16 - 6, 31, V19 - 8, 16)	GR-B ↔ W-B	IG switch ON	10 - 14
VGS (V18 - 1) - GGND (V18 - 21)	G ↔ B	IG switch ON	4.5 - 5.5
EXI*1 (V18 - 3) - GND (V16 - 6, 31, V19 - 8, 16)	R-B ↔ W-B	IG switch ON, center diff. lock switch ON	Below 2.0
		IG switch ON, center diff. lock switch OFF	10 - 14
VSCW (V18 - 4) - GND (V16 - 6, 31, V19 - 8, 16)	V-W ↔ W-B	IG switch ON, VSC TRAC warning light ON	Below 2.0
		IG switch ON, VSC TRAC warning light OFF	10 - 14
BRL (V18 - 5) - GND (V16 - 6, 31, V19 - 8, 16)	O ↔ W-B	IG switch ON, brake warning light ON	10 - 14
		IG switch ON, brake warning light OFF	Below 2.0
IND (V18 - 6) - GND (V16 - 6, 31, V19 - 8, 16)	R-W ↔ W-B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 - 14
WT (V18 - 7) - GND (V16 - 6, 31, V19 - 8, 16)	L-W ↔ W-B	IG switch ON, VSC (TRAC) OFF indicator light ON	Below 2.0
		IG switch ON, VSC (TRAC) OFF indicator light OFF	10 - 14
EXI3*1 (V18 - 8) - GND (V16 - 6, 31, V19 - 8, 16)	B-L ↔ W-B	IG switch ON, ADD switch ON (4WD)	Below 2.0
		IG switch ON, ADD switch OFF (2WD)	10 - 14
VYS (V18 - 9) - GND (V16 - 6, 31, V19 - 8, 16)	R ↔ W-B	IG switch ON	4.5 - 5.5
GL2 (V18 - 10) - GGND (V18 - 21)	R ↔ LB	IG switch ON, vehicle is placed on the horizontal surface	2.0 - 3.0
GSS (V18 - 11) - GND (V16 - 6, 31, V19 - 8, 16)	BR ↔ W-B	IG switch OFF	Continuity
SS1+ (V18 - 14) - SS1- (V18 - 23)	P ↔ V	Engine idling, steering wheel is turned slowly.	Pulse generation
SP1 (V18 - 16) - GND (V16 - 6, 31, V19 - 8, 16)	GR-L ↔ W-B	Vehicle drive at about 20 km/h (12mph)	Pulse generation
EXI4*1 (V18 - 17) - GND (V16 - 6, 31, V19 - 8, 16)	L-R ↔ W-B	IG switch ON, transfer in L4 position	Below 2.0
		IG switch ON, transfer in except L4 position	10 - 14
YSS (V18 - 18) - GND (V16 - 6, 31, V19 - 8, 16)	BR-B ↔ W-B	IG switch OFF	Continuity
YD (V18 - 19) - GYAW (V18 - 27)	Y ↔ B	IG switch ON, ABS warning light OFF	4.5 - 5.3
GGND (V18 - 21) - GND (V16 - 6, 31, V19 - 8, 16)	B ↔ W-B	IG switch OFF	Continuity
GL1 (V18 - 22 - GGND (V18 - 21)	W ↔ LB	IG switch ON, ABS warning light OFF	2.0 - 3.0

CD*1 (V18 - 24) - GND (V16 - 6, 31, V19 - 8, 16)	P-G ↔ W-B	IG switch ON, center diff. lock indicator ON	Below 2.0
		IG switch ON, center diff. lock indicator OFF	10 - 14
TF*1 (V18 - 25) - GND (V16 - 6, 31, V19 - 8, 16)	B-R ↔ W-B	IG switch ON, transfer in N position	Below 2.0
		IG switch ON, transfer in except N position	10 - 14
CSW*2 (V18 - 26) - GND (V16 - 6, 31, V19 - 8, 16)	L ↔ W-B	IG switch ON, TRAC OFF switch OFF	10 - 14
		IG switch ON, TRAC OFF switch ON	Below 1.5
YAW (V18 - 28) - GYAW (V18 - 27)	W ↔ B	IG switch ON, ABS warning light OFF	2.42 - 2.58
WA (V19 - 1) - GND (V16 - 6, 31, V19 - 8, 16)	B-L ↔ W - B	IG switch ON, ABS warning light ON	10 - 14
		IG switch ON, ABS warning light OFF	Below 2.0
NEO (V19 - 2) - GND (V16 - 6, 31, V19 - 8, 16)	V-W ↔ W - B	Engine idling	Pulse generation
P (V19 - 3) - GND (V16 - 6, 31, V19 - 8, 16)	L-Y ↔ W-B	IG switch ON, PNP switch in P position	10 - 14
		IG switch ON, PNP switch in except P position	Below 1.5
TRC+ (V19 - 4) - TRC- (V19 - 17)	BR-Y ↔ Y-G	Engine idling	Pulse generation
ENG+ (V19 - 6) - ENG- (V19 - 5)	L ↔ P	Engine idling	Pulse generation
IG1 (V19 - 7) - GND (V16 - 6, 31, V19 - 8, 16)	Y ↔ W-B	IG switch ON	10 - 14
PKB (V19 - 9) - GND (V16 - 6, 31, V19 - 8,16)	R-W ↔ W-B	IG switch ON, parking brake switch ON	Below 1.5
		IG switch OFF, parking brake switch OFF	10 - 14
R (V19 - 10) - GND (V16 - 6, 31, V19 - 8, 16)	W-L ↔ W-B	IG switch ON, PNP switch in R position	10 - 14
		IG switch ON, PNP switch in except R position	Below 1.5
Ts (V19 - 11) - GND (V16 - 6, 31, V19 - 8, 16)	G-R ↔ W-B	IG switch ON and terminals Ts-E_1 of DLC1 connected	Below 1.5
		IG switch ON and terminals Ts-E_1 of DLC1 not connected	10 - 14
Tc (V19 - 12) - GND (V16 - 6, 31, V19 - 8, 16)	GR ↔ W-B	IG switch ON and terminals Tc-E_1 of DLC1 connected	Below 1.5
		IG switch ON and terminals Tc-E_1 of DLC1 not connected	10 - 14
STP (V19 - 13) - GND (V16 - 6, 31, V19 - 8, 16)	G-W ↔ W-B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 - 14
DG (V19 - 15) - GND (V16 - 6, 31, V19 - 8, 16)	W ↔ W-B	IG switch ON	10 - 14
RR+ (V19 - 19) - RR- (V19 - 18)	B ↔ W	IG switch ON, right rear wheel is turned slowly	Pulse generation
RL+ (V19 - 21) - RL- (V19 - 20)	R ↔ G	IG switch ON, left rear wheel is turned slowly	Pulse generation
BZ (V19 - 22) - GND (V16 - 6, 31, V19 - 8, 16)	L-B ↔ W-B	IG switch ON, VSC buzzer is sounded	Below 1.0 ↔ 10 - 14
		IG switch ON, VSC buzzer is not sounded	10 - 14

*1: 4WD
*2: 2WD

DI6BG-03

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

NOTICE:

When replacing skid control ECU, sensor or etc., turn the ignition switch OFF.

Symptom	Suspect Area	See page
ABS does not operate BA does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output 2. IG power source circuit 3. Speed sensor circuit 4. Check the hydraulic brake booster with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI-374).	DI-224 DI-285 DI-244 BR-26
ABS does not operate efficiently BA does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control 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 checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI-374).	DI-224 DI-244 DI-297 BR-26
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	DI-351 IN-28
DTC check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. ABS warning light circuit 2. Tc terminal circuit	DI-351 DI-370
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	DI-372 IN-28
TRAC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	DI-224 DI-285 DI-374 DI-244

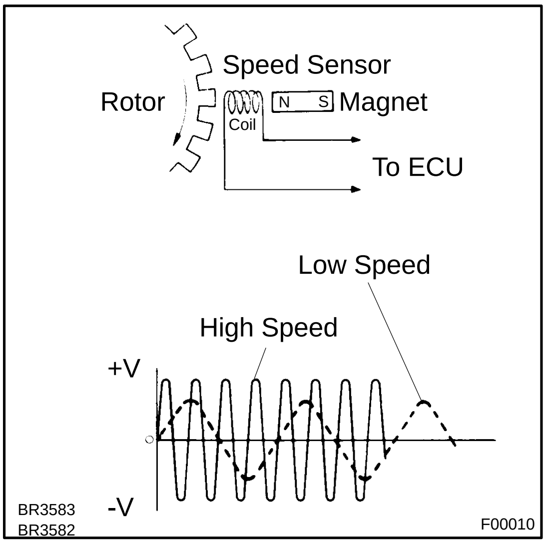
VSC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit	 DI-224 DI-285 DI-374 DI-244 DI-276 DI-280 DI-272
VSC TRAC warning light abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. VSC TRAC warning light circuit 2. Skid control ECU	 DI-354 IN-28
SLIP indicator light abnormal	SLIP indicator light circuit	DI-363
VSC OFF or TRAC OFF indicator abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. VSC OFF or TRAC OFF indicator light circuit 2. Center diff. lock indicator switch circuit	 DI-357 DI-360 DI-341
Center diff. lock indicator light abnormal	Center diff. lock indicator light circuit	DI-357
DTC check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. VSC TRAC warning light circuit 2. Tc terminal circuit	 DI-354 DI-370

DI6BH-03

CIRCUIT INSPECTION

DTC	C0200 / 31 - C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS & BA & TRAC & VSC control system. The front and rear rotors each have 48 serrations.

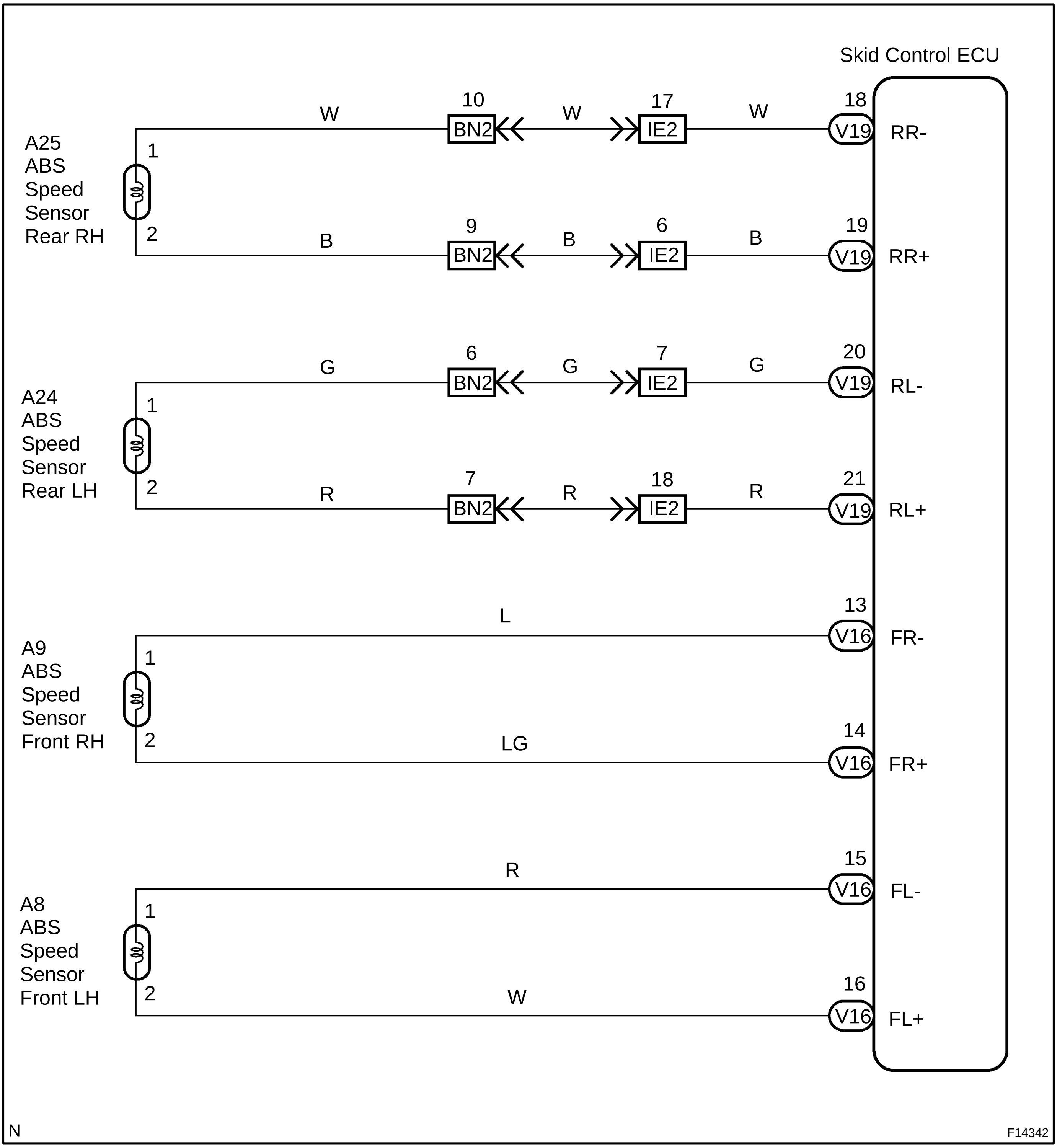
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 4.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between turning the ignition switch ON and turning it OFF. 3. Continuous noise occurs in the speed sensor signals with the vehicle speed of 20 km/h (12 mph) or more. 4. The condition that the speed sensor signal circuit is open continues for 0.12 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 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.

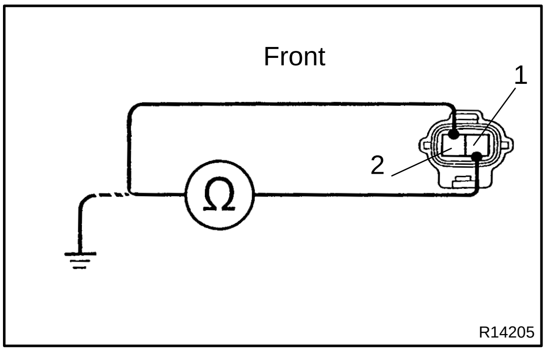
OK:
There is almost no difference in the displayed speed value.

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

OK → **Go to step 4.**

NG

2	Check speed sensor.



R14205

Front:

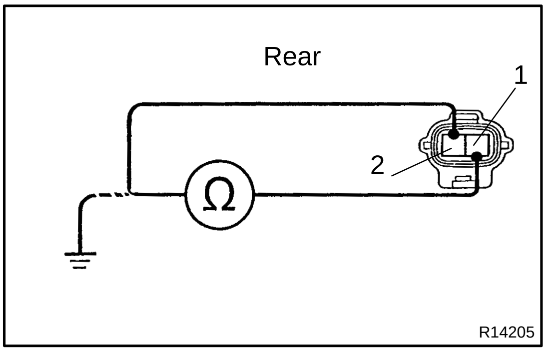
PREPARATION:
(a) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
(b) Disconnect the speed sensor connector.

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

OK:
Resistance: 1.4 - 1.8 kΩ

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

OK:
Resistance: 1 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.

CHECK:

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

OK:

Resistance: 1.0 - 1.4 kΩ

CHECK:

Measure resistance between terminal 1 or 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG	Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page DI-224).

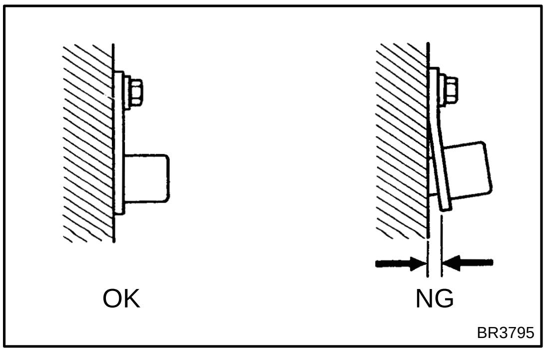
OK

3	Check for open and short circuit in harness and connector between each speed sensor and skid control ECU (See page IN-28).

NG	Repair or replace harness or connector.

OK

4	Check sensor installation.



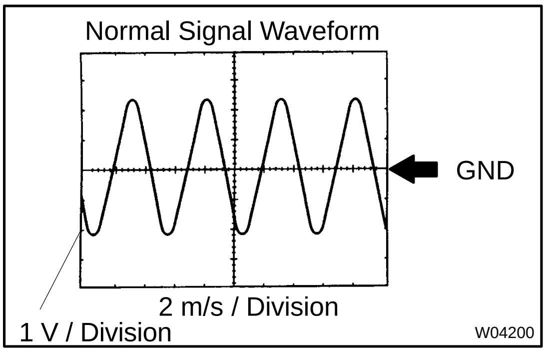
CHECK:
Check the speed sensor installation.
OK:
The installation bolt is tightened properly and there is no clearance between the sensor and the front steering knuckle or the rear axle carrier.
Torque: 8.0 N.m (82 kgf.cm, 71 in.·lbf)

NG	Replace speed sensor.

NOTICE:
Check the speed sensor signal last (See page DI-224).

OK

5	Check speed sensor and sensor rotor serrations.

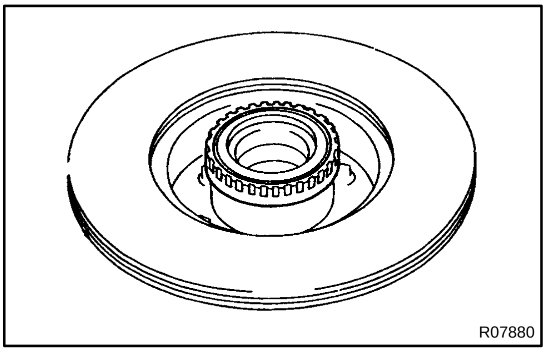


(REFERENCE) INSPECTION USING OSCILLOSCOPE
PREPARATION:
(a) Remove the skid control ECU with the connector still connected.
(b) Connect the oscilloscope to terminals FR+ - FR-, FL+ - FL-, RR+ - RR- and RL+ - RL- of the skid control ECU.
CHECK:
Drive the vehicle at about 20 km/h (12 mph), and check the signal waveform.
HINT:
- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes geater.
- 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 skid control ECU.

NG

6	**Check sensor rotor and sensor tip.**



Front:

PREPARATION:

Remove the front axle hub (See page SA-9).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the front speed sensor (See page BR-46).

CHECK:

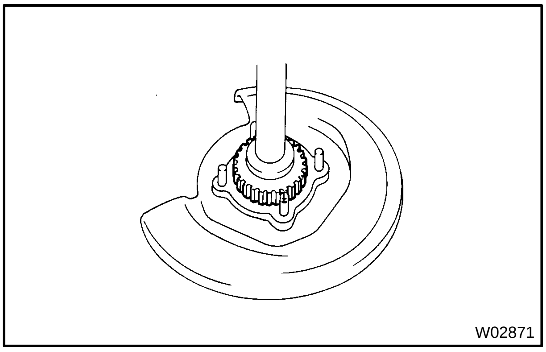
Check the sensor tip.

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 axle shaft (See Page SA-80).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor (See Page BR-49).

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 speed sensor or rotor.**

NOTICE:

Check the speed sensor signal last (See page DI-224).

OK

Check and replace skid control ECU.

DI6BI-03

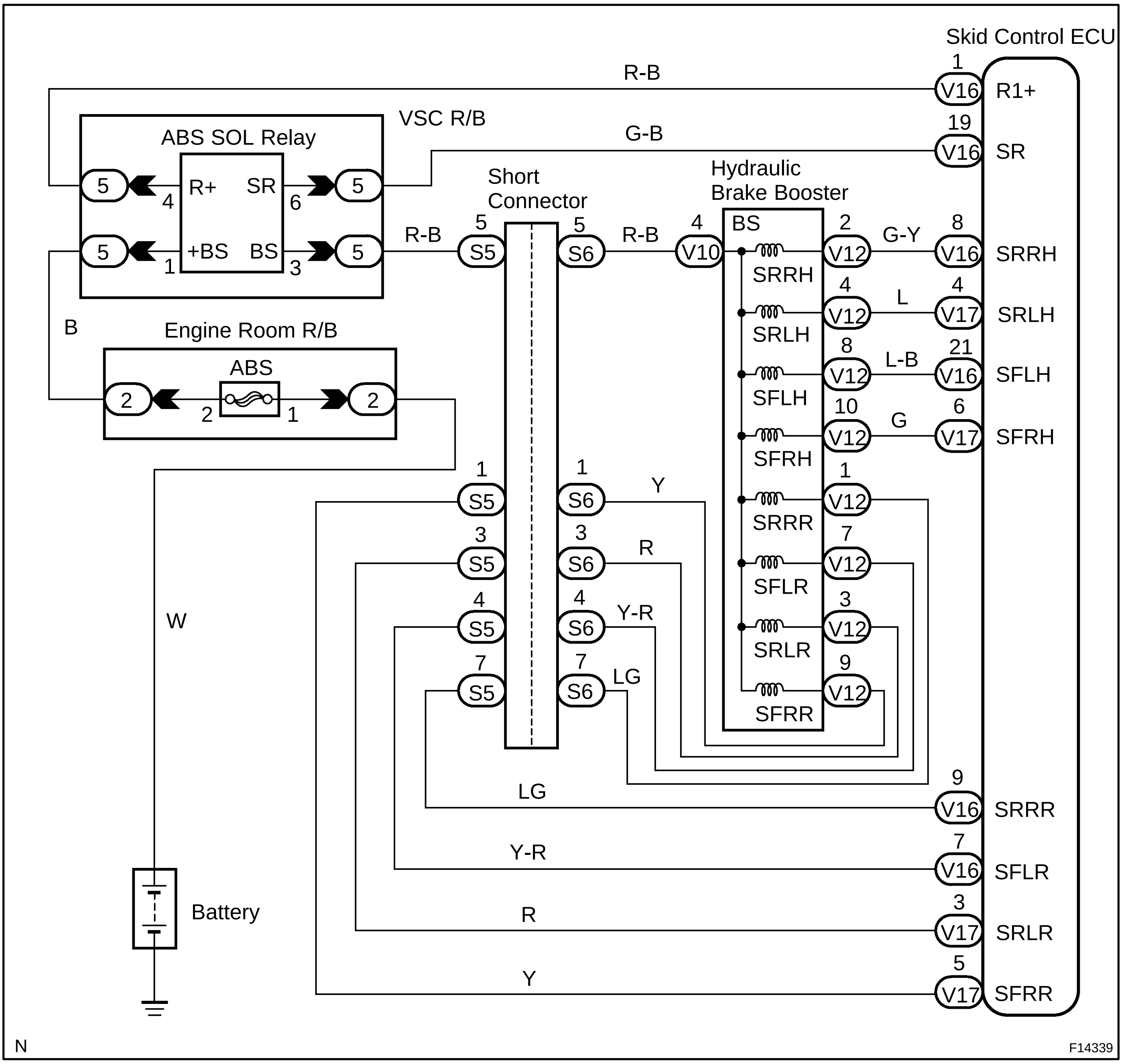
DTC	C0226 / 21 - C0256 / 24	ABS Solenoid Circuit

CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

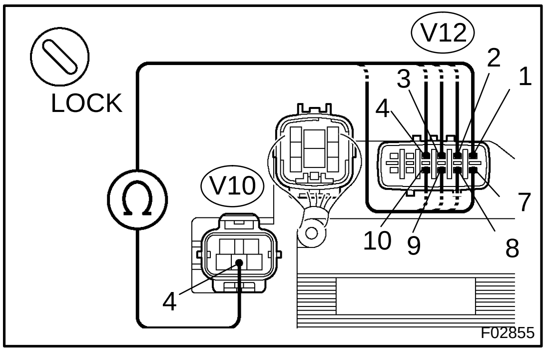
DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit in SFRH or SFRR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SFRH or SFRR circuit
C0236 / 22	Open or short circuit in SFLH or SFLR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SFLH or SFLR circuit
C0246 / 23	Open or short circuit in SRRH or SRRR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SRRH or SRRR circuit
C0256 / 24	Open or short circuit in SRLH or SRLR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SRLH or SRLR circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check hydraulic brake booster solenoid.**



PREPARATION:
Disconnect the 2 connectors (V10, V12) from the hydraulic brake booster.
CHECK:
Check continuity between each of the terminals V10 - 4 and V12 - 1, 2, 3, 4, 7, 8, 9 and 10 of hydraulic brake booster connector.
OK:
Continuity
HINT:
Resistance of each solenoid at 20 °C (68 °F)
SFRH, SFLH, SRRH, SRLH: 4.75 - 5.25 Ω
SFRR, SFLR, SRRR, SRLR: 2.00 - 2.40 Ω

NG	**Replace hydraulic brake booster.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and hydraulic brake booster (See page DI-224).**

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, ECU may be defective.

DI6BJ-03

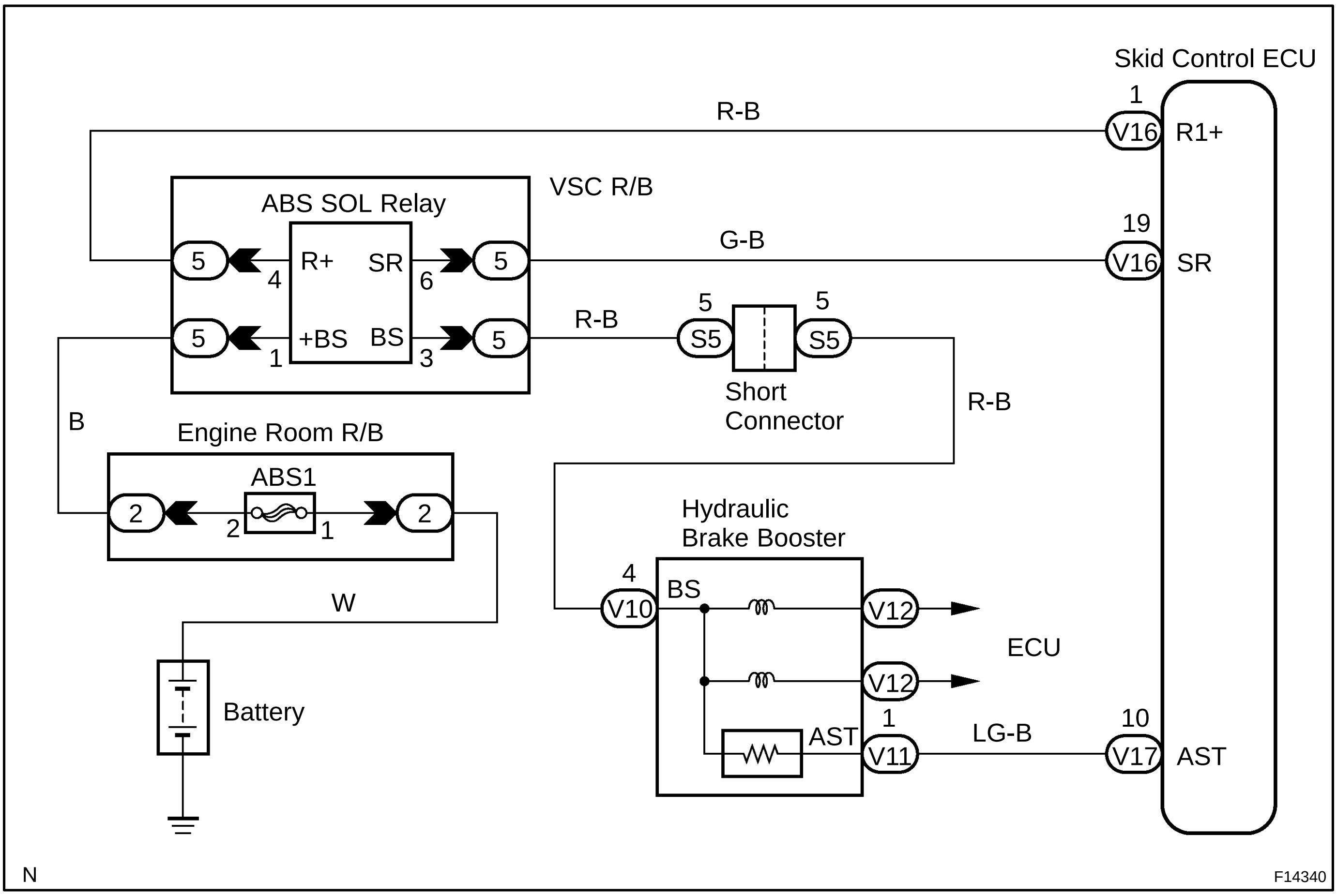
DTC	C0278 / 11, C0279 / 12	ABS SOL Relay Circuit

CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.0 V and the ABS SOL relay is ON, however, the contact point of the ABS SOL relay is OFF. 2. With ABS SOL relay ON, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the ABS SOL relay does not become ON.	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, ABS SOL relay is OFF. However, the condition that the ABS SOL relay remains ON due to the contact point continues for 0.2 sec. or 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 SOL relay operation.**

PREPARATION:
(a) Connect the hand-held tester to 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.

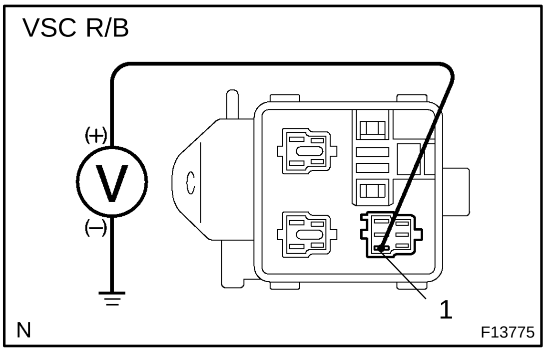
CHECK:
Check the operation sound of the ABS SOL relay when operating it with the hand-held tester.

OK:
The operation sound of the ABS SOL relay should be heard.

OK → **Go to step 6.**

NG

2	**Check voltage between terminal 1 of VSC R/B (for ABS SOL relay) and body ground.**



PREPARATION:
Remove the ABS SOL relay from VSC R/B.

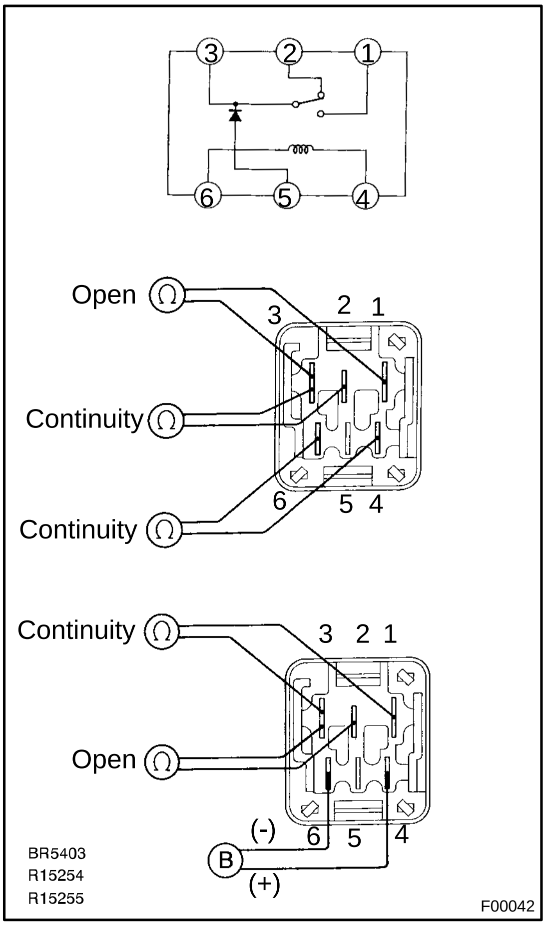
CHECK:
Measure the voltage between terminals 1 and 2 of VSC R/B (for ABS SOL relay).

OK:
Voltage: 10 - 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS SOL relay.



CHECK:

Check continuity between each terminal of ABS SOL 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 positive voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS SOL relay.

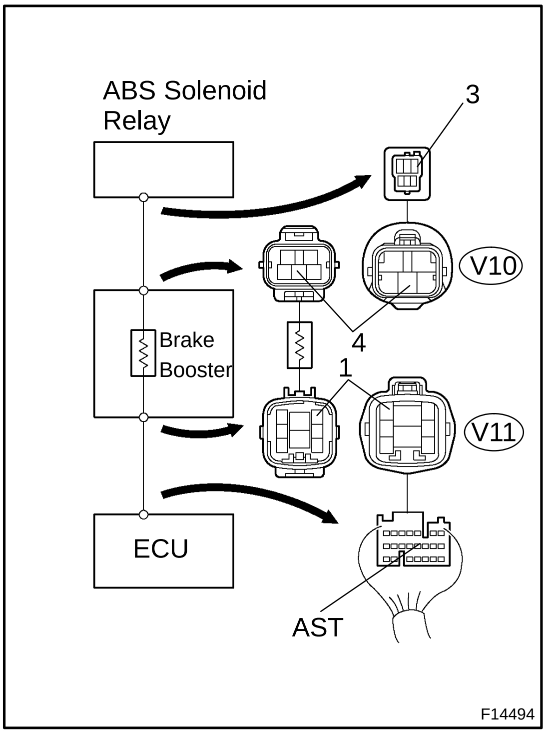
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG **Replace ABS SOL relay.**

OK

4	**Check continuity between terminal 3 of VSC R/B (for ABS SOL relay) and terminal AST of skid contorl ECU.**



CHECK:
Check continuity between terminal 3 of VSC R/B (for ABS SOL relay) and terminal AST of the skid control ECU.
OK:
Continuity
HINT:
There is a resistance of 33 ± 3 Ω between terminal 4 of connector V10 and terminal 1 of connector V11.

NG — **Repair or replace harness or hydraulic brake booster.**

OK

5	**Check for open and short circuit in harness and connector between VSC R/B and skid control ECU (See page IN-28).**

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, ECU may be defective.

6	Check for open circuit in harness and connector between terminals AST of hydraulic brake booster and skid control ECU (See page IN-28).

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

OK

Check and replace skid control ECU.

DI6CD-03

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If trouble occurs in the engine control system, the ECU prohibits TRAC and VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	Engine control system

INSPECTION PROCEDURE

1	**Check DTC for engine.**

*1 → **Repair engine control system according to the output code.**

*2 ↓

Check for ECM connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI6CE-03

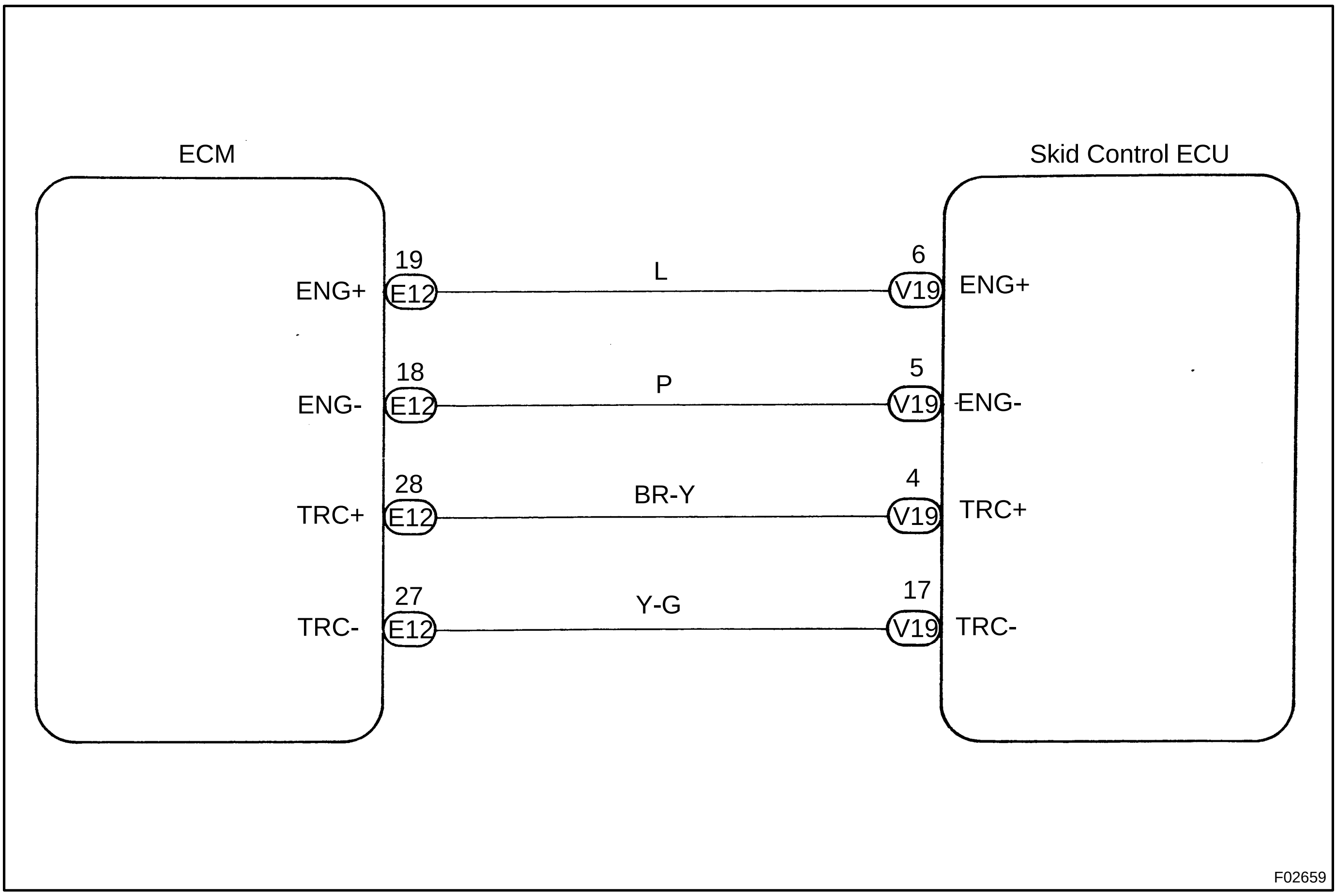
DTC	C1203 / 53	ECM Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRAC & VSC control information from the skid control ECU to the ECM (TRC+, TRC-), and engine control information from the ECM to the skid control ECU (ENG+, ENG-).

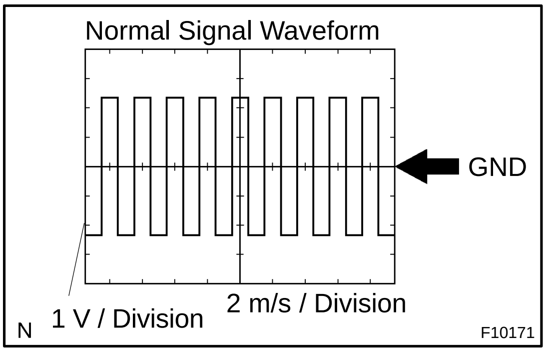
DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either the condition 1. or 2. continues for 5 sec.: 1. ECU IG1 terminal voltage is 9.5 V to 17.0 V and data transmission to the ECM is impossible. 2. ECU IG1 terminal voltage is 9.5 V to 17.0 V, engine speed is 500 rpm or more or vehicle speed is 60 km/h (36 mph) or more and data receiving from the ECM is impossible.	• TRC+ or TRC- circuit • ENG+ or ENG- circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check skid control ECU communication.



(REFERENCE) INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Remove the skid control ECU with the connector still connected.

(b) Connect the oscilloscope to each of terminals ENG+ - ENG- and TRC+ - TRC- of the skid control ECU.

CHECK:

Start the engine and check the signal waveform.

OK → **Check and replace skid control ECU.**

NG

2	Check for open and short circuit in harness and connector between each of terminals ENG+, ENG-, TRC+, TRC- of skid control ECU and ECM (See page IN-28).

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

OK

Check and replace ECM.

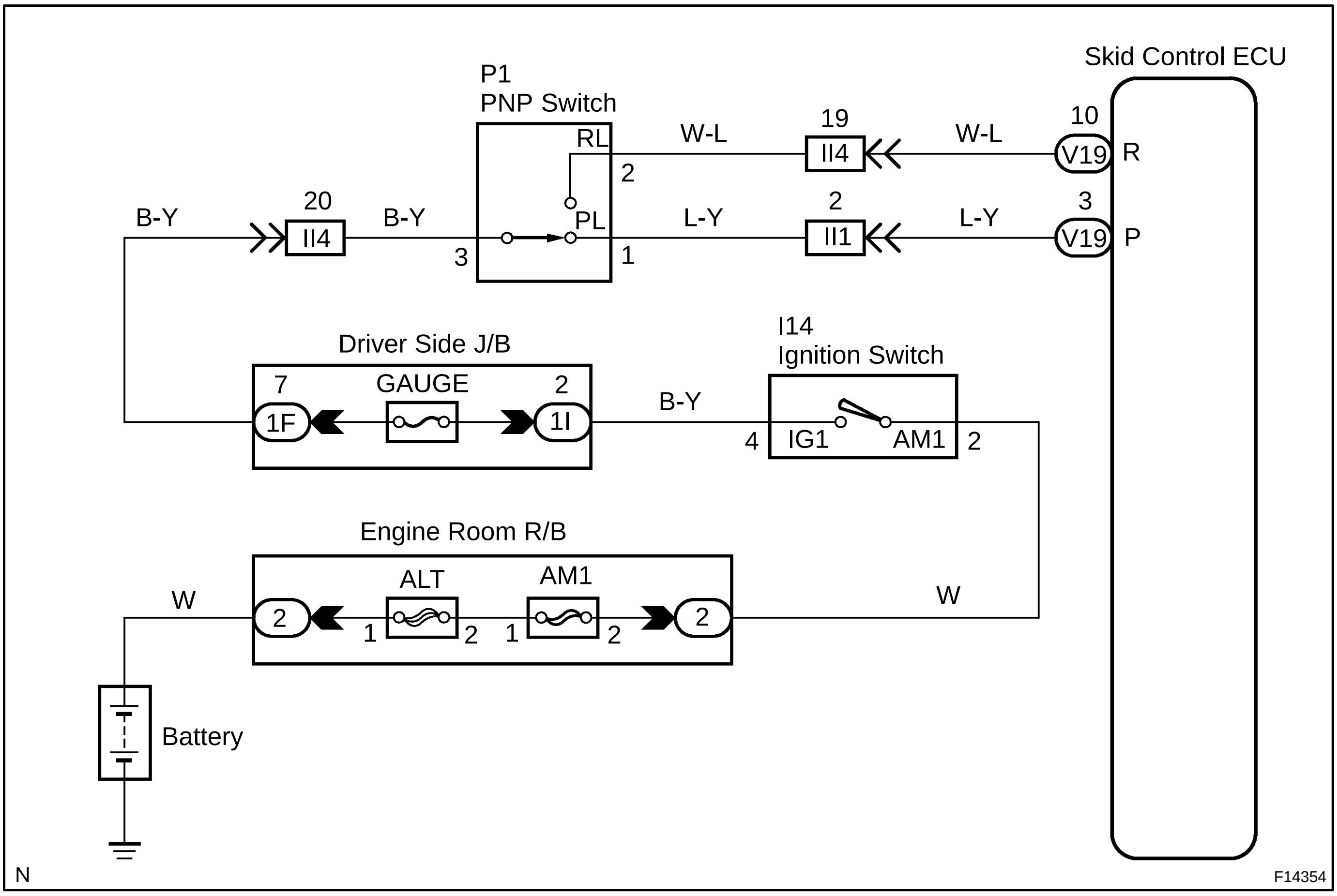
DI6CF-03

DTC	C1207 / 37	PNP Switch Circuit (P/R Range)

CIRCUIT DESCRIPTION

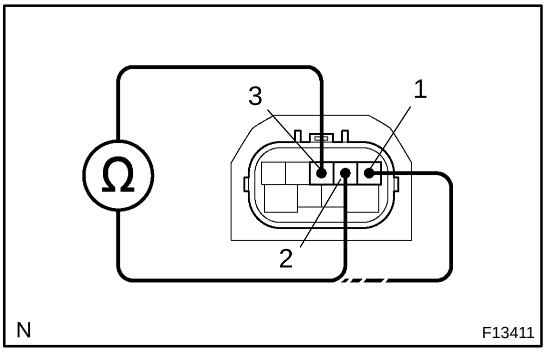
DTC No.	DTC Detection Condition	Trouble Area
C1207 / 37	When any of the condition 1. through 3. is detected: 1. At vehicle speed of 15 km/h (9 mph) or less, the conditions that P signal open circuit of park/neutral position switch is detected and the voltage of IG1 terminal is 9.5 V to 17 V continue for 5 sec. or more. 2. At vehicle speed of 15 km/h (9 mph) or more, the condition that P signal from park/neutral position switch is ON, and the the shift lever position information from the ECM is other than in P or N position continues for 60 sec. or more. 3. At vehicle speed of 15 km/h (9 mph) or less, the conditions that P signal open circuit of park/neutral position switch is ON and the voltage of IG1 terminal is 9.5 V to17 V continue for 5 sec. or more.	• PNP switch • PNP switch circuit (P/R range)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check PNP switch (P/R range).



PREPARATION:
(a) Jack up the vehicle.
(b) Disconnect the PNP switch connector.

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

OK:

P range	Terminals 3 - 1	Continuity
R range	Terminals 3 - 2	Continuity

NG → **Replace PNP switch.**

OK ↓

2	Check for open and short circuit in harness and connector between terminals P and R of skid control ECU and PNP switch (See page IN-28).

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

OK ↓

Check and replace skid control ECU.

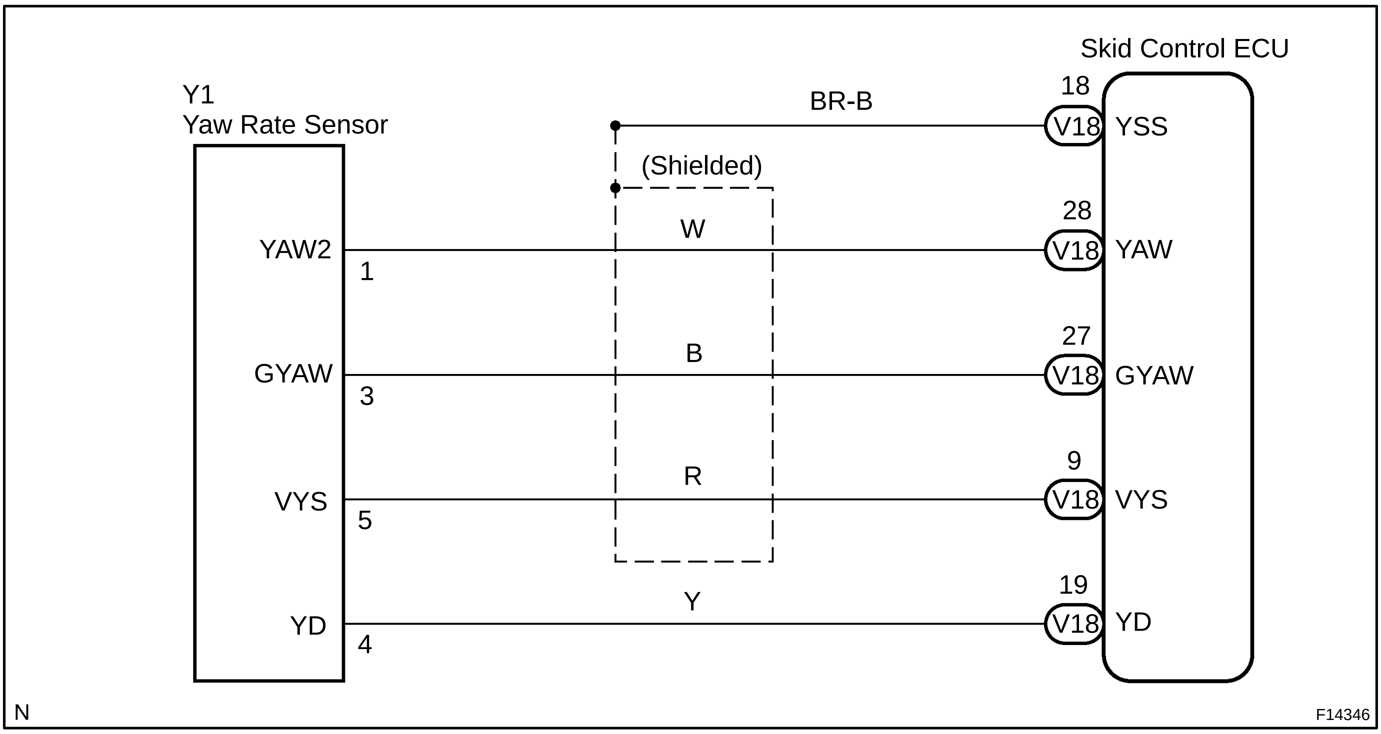
DI8XQ-02

DTC	C1210 / 36	Zero Point Calibration of Yaw Rate Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1210 / 36	When either the condition 1. or 2. is detected: 1. After battery terminal was connected, ECU terminal IG1 is turned ON for the first time. Within 15 sec. the shift lever is moved to any position except P range. 2. When the yaw rate sensor zero point recorded in ECU is deleted.	• Yaw rate sensor • Yaw rate sensor circuit • PNP switch circuit (P range)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Perform zero point calibration of yaw rate sensor (See page DI-224).**

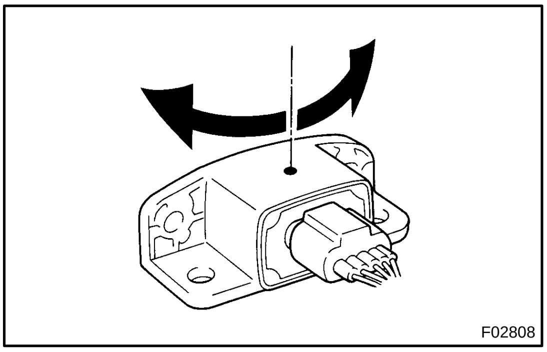
2	**Is DTC still output?**

Check DTC on page DI-224 .

NO → **No problem.**

YES

3	**Check output value of yaw rate sensor.**



F02808

In case of using the hand-held tester:

PREPARATION:

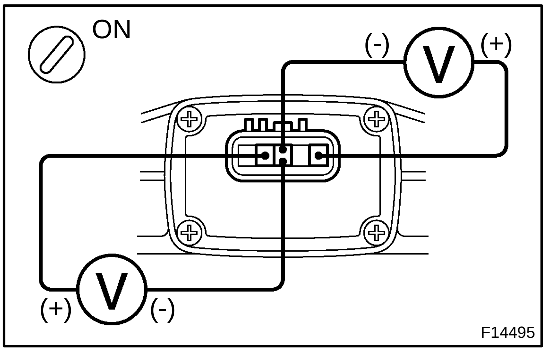
(a) Remove the 2 bolts and the yaw rate sensor with the connector still connected.
(b) Connect the hand-held tester to DLC3.
(c) Turn the ignition switch ON and push the hand-held tester main switch ON.
(d) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the yaw rate sensor value of the yaw rate sensor displayed on the hand-held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.
(Reference)
When the yaw rate sensor is stationary:
Output value: ± 4 deg/s



In case of not using the hand-held tester:

PREPARATION:

(a) Remove the consol box, then the yaw rate sensor with the connector still connected.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals YAW2 (1) - GYAW (3), and terminals YD (4) - GYAW (3) of the yaw rate sensor.

OK:

Terminals 1 and 3 (YAW - GYAW)	About 2.42 - 2.58 V
Terminals 4and 3 (YD - GYAW)	About 4.5 - 5.3 V

NG → **Replace yaw rate sensor.**

OK

4	**Check for open and short circuit in harness and connector between yaw rate sensor and skid control ECU (See page IN-28).**

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

OK

Check and replace skid control ECU.

DI6CH-03

DTC	C1223 / 43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	ABS control system is abnormal.	ABS control system

INSPECTION PROCEDURE

1	**Check DTC for ABS (See page DI-224).**

*1 → **Repair ABS control system according to the code output.**

*2 ↓

Check ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI6CI-03

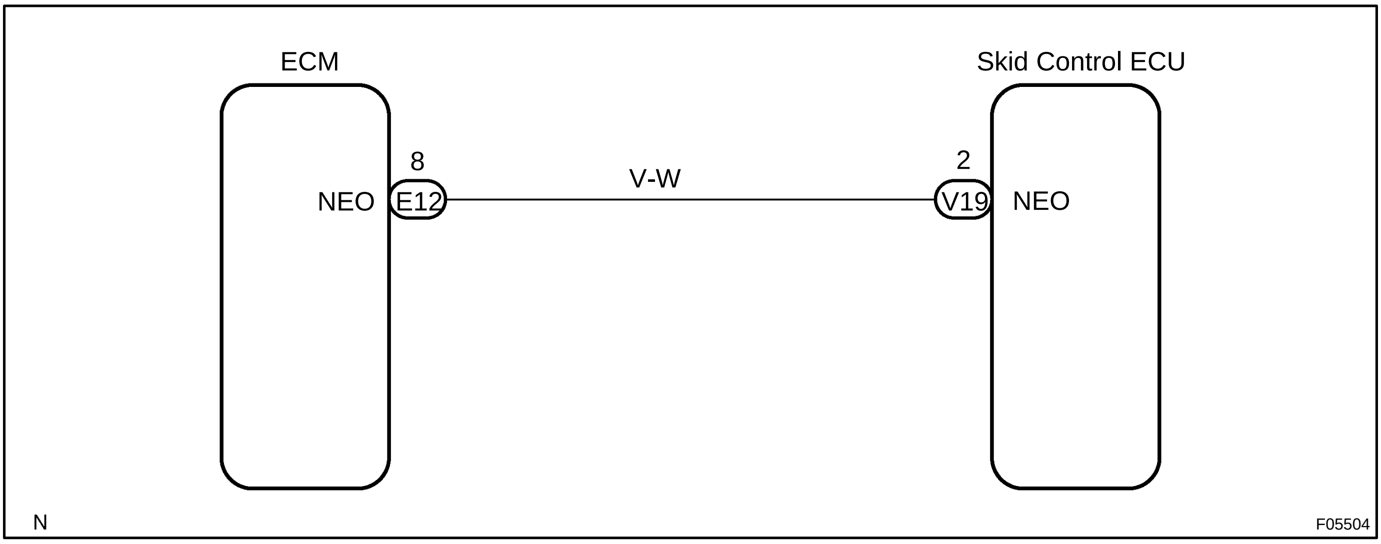
DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

The ABS & BA & TRAC & VSC ECU receives engine revolution speed signals (NE signals) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When either the condition 1. or 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data received from the ECM is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRAC is operating, the conditions that open or short circuit in engine revolution signal circuit is detected, main throttle opening degree is 0 and IDL switch is OFF continue for 0.24 sec. or more.	• NEO circuit • ECM • Skid control ECU

WIRING DIAGRAM



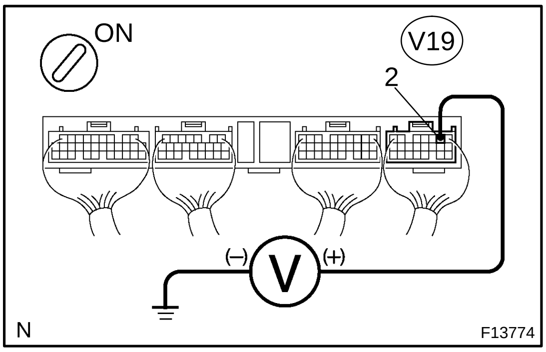
INSPECTION PROCEDURE

1	**Check for open and short circuit in harness and connector between terminal NEO of skid control ECU and terminal NEO of ECM (See page IN-28).**

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

OK

2	**Check voltage between terminal NEO of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

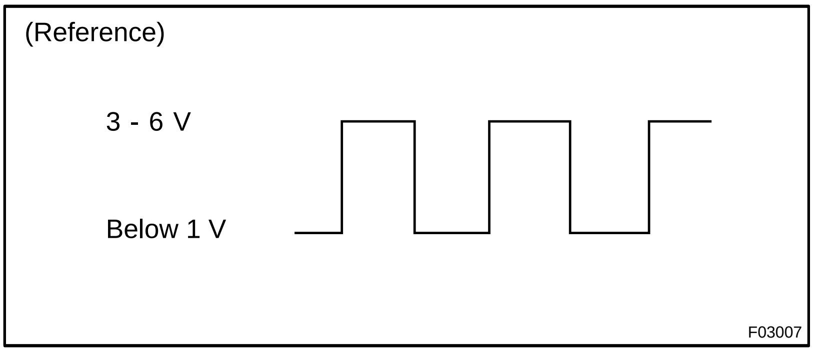
CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal NEO (V19 - 2) of the skid control ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 - 6 V or below 1 V
ON (Idling)	3 - 6 V ↔ below 1 V (Pulse)



NG → **Check and replace skid control ECU or ECM.**

OK

If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

DI6BK-03

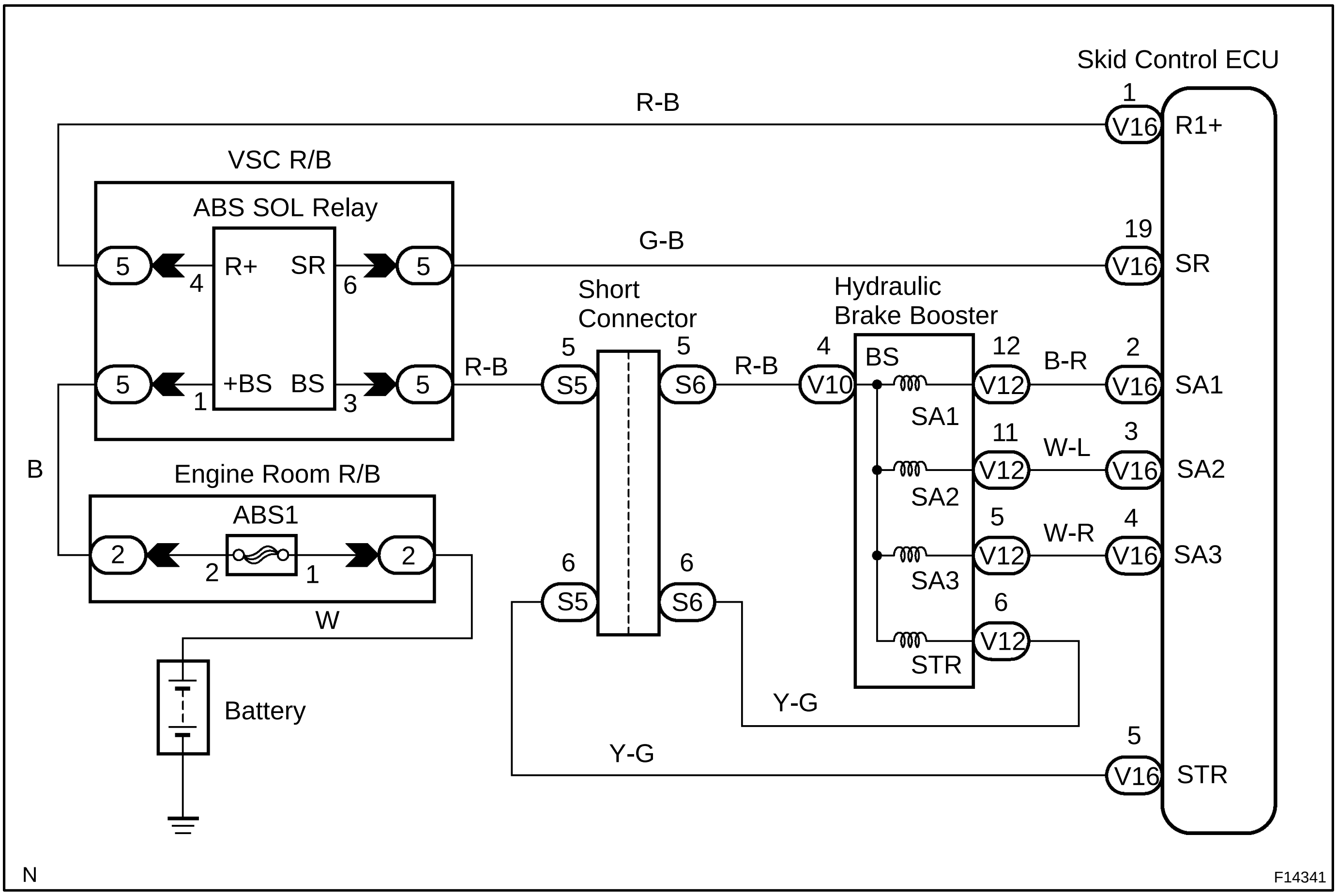
DTC	C1225 / 25 - C1228 / 28	TRAC & VSC Solenoid Circuit

CIRCUIT DESCRIPTION

The TRAC & VSC solenoid operates in accordance with signals from the ECU and raises and lowers the fluid pressure in the brake cylinders.

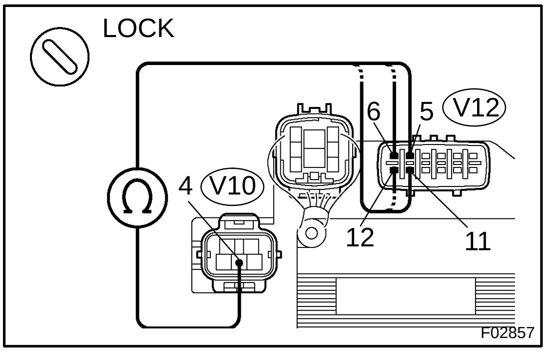
DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Open or short circuit for SA1 circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SA1 circuit
C1226 / 26	Open or short circuit for SA2 circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SA2 circuit
C1227 / 27	Open or short circuit for SA3 circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SA3 circuit
C1228 / 28	Open or short circuit for STR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • STR circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check TRAC & VSC solenoid.



PREPARATION:
Disconnect the 2 connectors (V10, V12) from the hydraulic brake booster.

CHECK:
Check continuity between terminals V10 - 4 and V12 - 5, 6, 11 and 12 of the hydraulic brake booster.

OK:
Continuity

HINT:
Resistance of each solenoid at 20 ˚C (68 ˚F)
SA1, SA2, STR: 3.5 - 3.9 Ω
SA3: 4.75 - 5.25 Ω

NG → **Replace hydraulic brake booster.**

OK

2	Check for open and short circuit in harness and connector between skid control ECU and hydraulic brake booster (See page IN-28).

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, ECU may be defective.

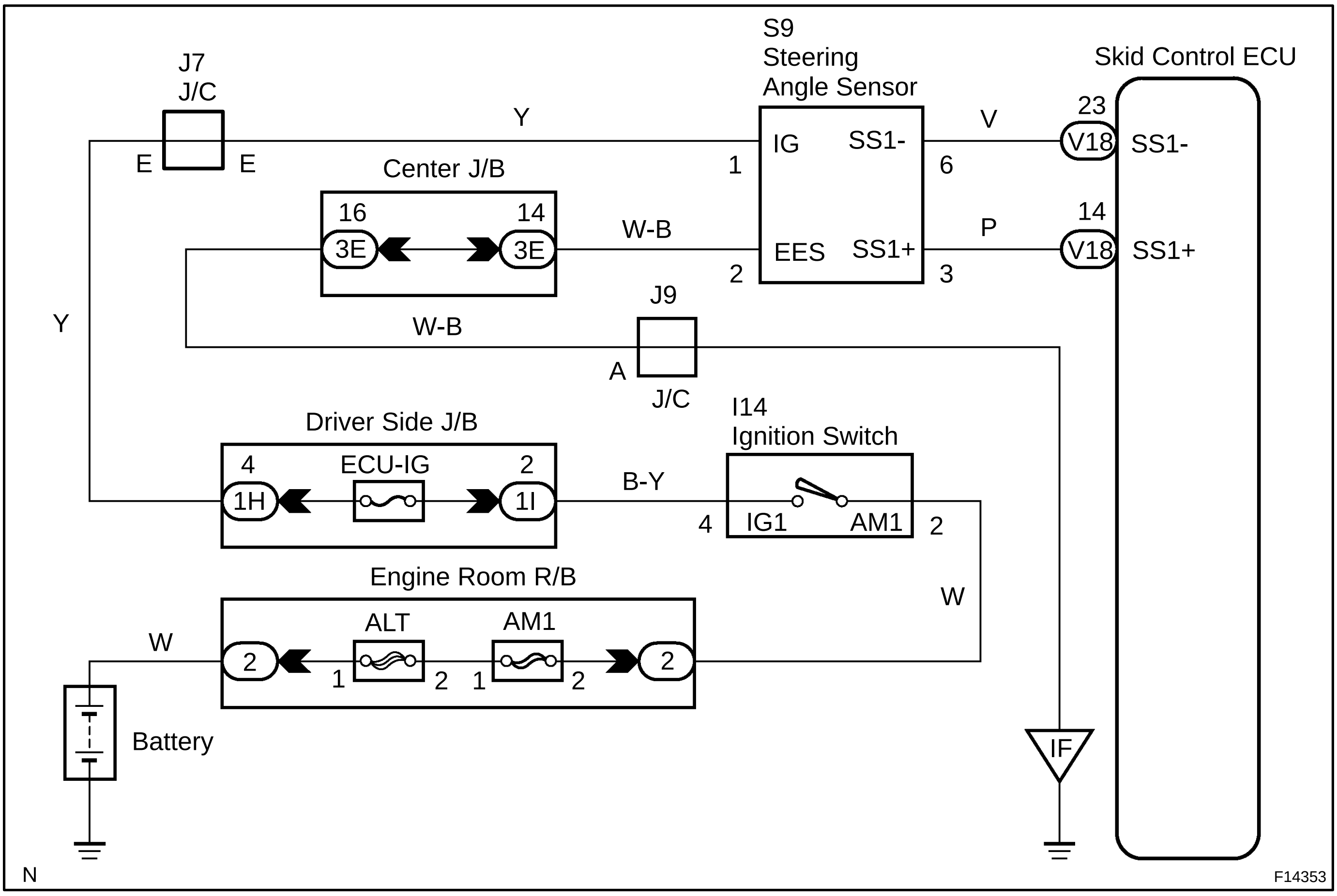
DI6CJ-03

DTC	C1231 / 31	Steering Angle Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	Detection of any of conditions 1. through 3.: 1. When the condition that ECU terminal IG1 voltage is 9.5 V or more, and ECU does not receive a data from steering angle sensor continues for 1 sec. or more. 2. When the steering angle sensor value changes by 360° or more with SSC signal from steering angle sensor remaining ON or OFF. 3. When the condition that difference between the steering angle valve output by SSC when the steering wheel is positioned straight-forward, and the one when the steering wheel is turned for 360° is out of the range from 355.5° - 364.5° occurs 10 times or more.	• Steering angle sensor • Steering angle sensor 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 the hand-held tester.

1	Check output value of steering angle sensor.

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

CHECK:
Check that the steering wheel turning angle value of the steering angle position sensor displayed on the hand-held tester is changing when the steering wheel is turned.

HINT:
It is necessary to drive the vehicle straight-forward at 35 km/h (22 mph) or more for 1 sec. or more so that the hand-held tester can measure and output the data.

OK:
Steering wheel turning angle value must be changing.

OK → **Go to step 3.**

NG

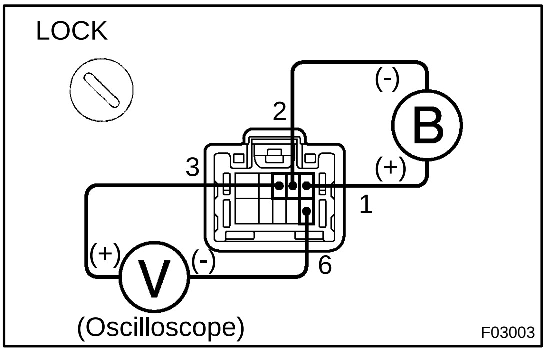
2	Replace ECU and check whether or not the trouble occurs again.

OK → **Replace steering angle sensor.**

NG

END

3	**Check steering angle sensor.**



PREPARATION:

(a) Remove the steering wheel lower covers, steering wheel pad, steering wheel column upper and lower covers (See page SR-22).

(b) Disconnect the combination switch connector (for the steering angle sensor).

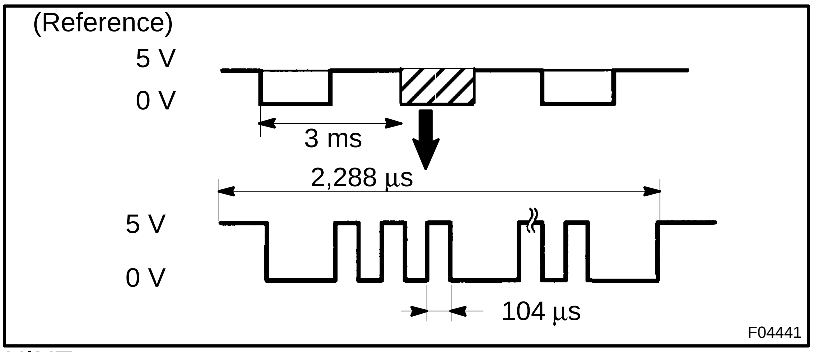
(c) Connect the oscilloscope to terminals 3 and 6 of the combination switch connector (for the steering angle sensor).

(d) Apply battery positive voltage between terminals 1 and 2.

CHECK:

Turns the steering wheel slowly and check the signal waveform.

OK:



HINT:

The above signal waveform does not repeat ON and OFF regularly and this combination changes case by case according to the data.

NG	**Replace steering angle sensor.**

OK

4	**Check that slits of the steering sensor disc are clogged up.**

NG	**Repair or replace steering sensor disc.**

OK

5	**Check for open and short circuit in harness and connector between steering angle sensor and skid control ECU (See page IN-28).**

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

OK

Check and replace skid control ECU.

DI8XR-02

DTC	C1232 / 32, C1244 / 44	Deceleration Sensor Circuit

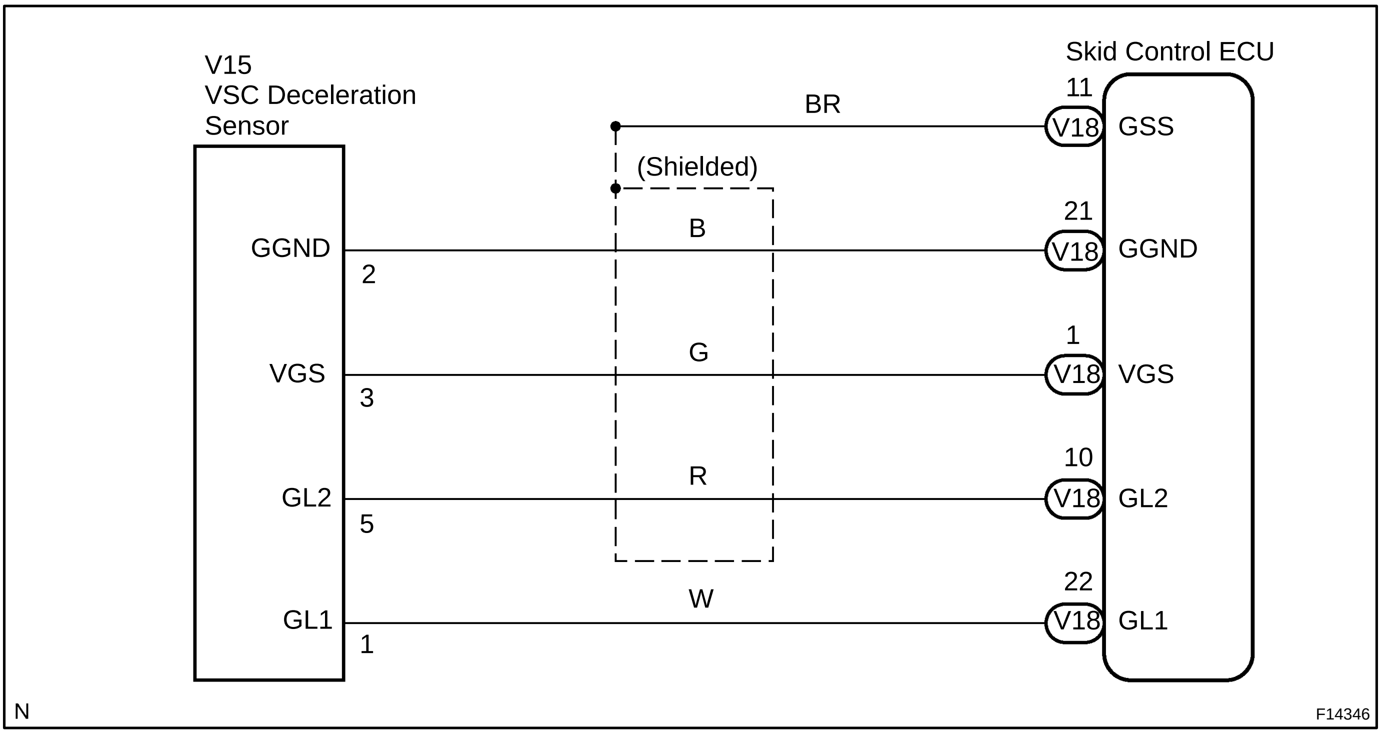
CIRCUIT DESCRIPTION

This sensor detects deceleration on the vehicle. The sensor signal is used in ABS & BA & TRAC & VSC. If the sensor functions abnormally, the ABS warning light comes on.

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1232 / 32	Detection of either the condition 1. or 2.: 1. At the vehicle speed of 10 km/h (6 mph) or more, when the condition that ECU terminal GL1 signal change range is less than 20 mV, and ECU terminal GL2 signal change range swings by 468 mV or more occurs for 30 sec. or more. 2. At the vehicle speed of 10 km/h (6 mph) or more, the condition that ECU terminal GL2 signal change range is less than 20 mV, and ECU terminal GL1 signal change range swings by 468 mV or more occurs for 30 sec. or more.	• Deceleration sensor • Deceleration sensor circuit
C1244 / 44	Any of the conditions 1. through 4. is detected: 1. The condition that ECU terminals GL1 and GL2 values are -1.5 G or less or 1.5 G or more continues for 1.2 sec. or more. 2. The condition that the deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. 3. At the vehicle speed of 0 km/h (0 mph), after the difference of output value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, the condition that it does not become 0.4 G or less continues for 60 sec. or more. 4. Deceleration sensor signal momentary open occurs for 7 times or more.	• Deceleration sensor • Deceleration sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).

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

OK

2	Check deceleration sensor.

In case of using the hand-held tester:

PREPARATION:

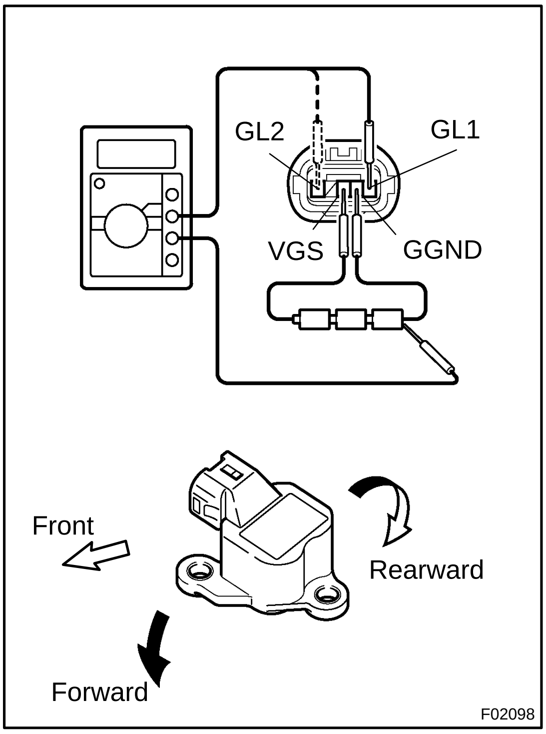
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and turn the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing as the vehicle is tilted.

OK:

Deceleration value must be changing.



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In case of not using the hand-held tester:

PREPARATION:

(a) Remove the consol box.
(b) Connect 3 dry batteries of 1.5 V in series.
(c) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (-) terminal, apply about 4.5 V between VGS and GGND terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

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

HINT:

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

NG → **Replace deceleration sensor.**

OK

Check and replace skid control ECU.

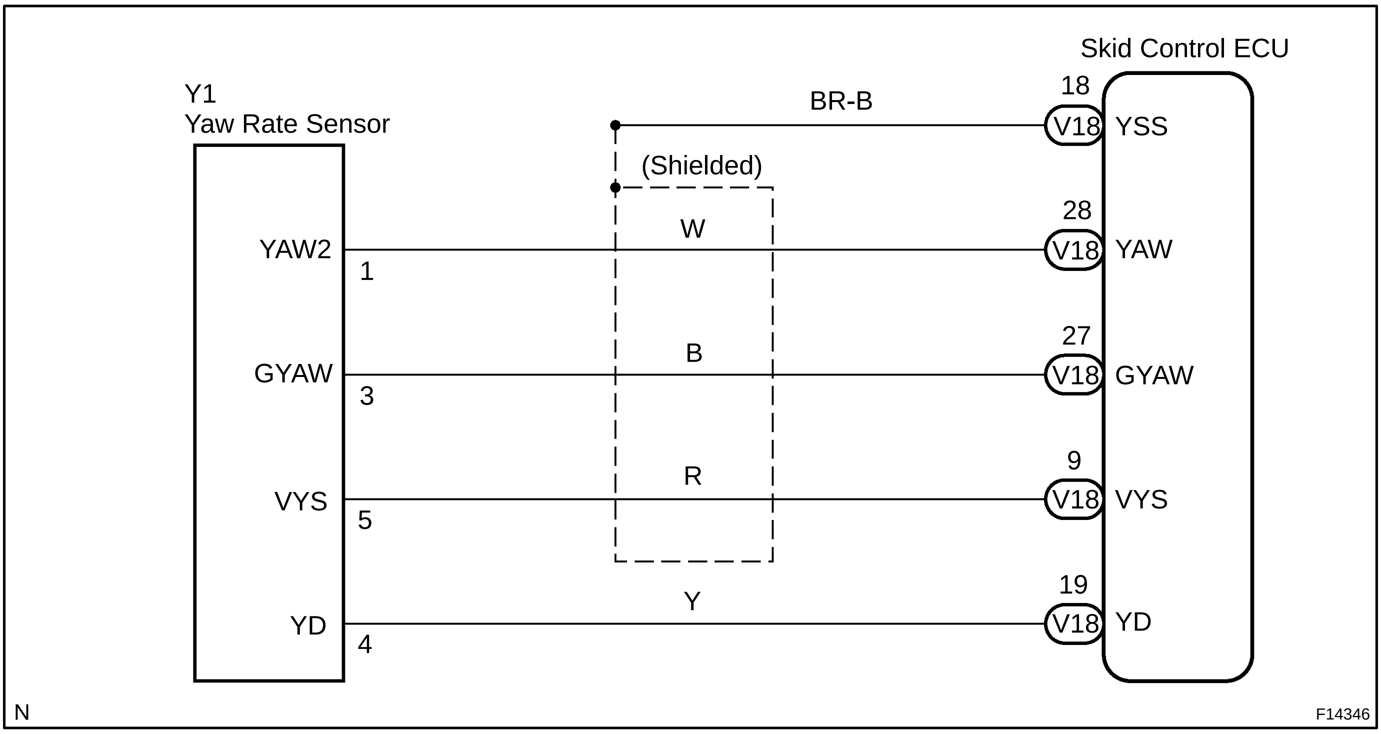
DI6CL-03

DTC	C1233 / 33, C1234 / 34	Yaw Rate Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	When any of the conditions 1. through 4. is detected: 1. ECU terminal IG1 voltage is 9.5 V to 17.0 V, and the condition that yaw rate sensor voltage is out of the range from 0.25 V to 4.75 V continues for 1 sec. or more. 2. The conditions that yaw rate sensor open detect circuit signal is ON and the voltage of ECU terminal IG1 is 9.5 V to 17 V continue for 1 sec. or more. 3. The conditions that yaw rate sensor power source voltage is out of the range from 4.4 V to 5.6 V and the voltage of ECU terminal IG1 is 9.5 V to 17 V continue for 1 sec. or more. 4. The condition that yaw rate sensor signal is momentarily open occurs 10 times or more and the voltage of ECU terminal IG1 is 9.5 V to 17 V.	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34	Condition 1. or 2. is detected: 1. The conditions that yaw rate sensor VYS terminal voltage is 4.75 V to 5.25 V and YD malfunction signal of yaw rate sensor is ON continue for 5 sec. or more. 2. Shift lever position is in P range and output voltage of yaw rate sensor is out of the range from 2.4 V to 2.6 V or after the difference from zero point calibration voltage of yaw rate sensor has become 0.08 V or more and when the condition that the vehicle speed exceeds 15 km/h (9 mph) while output condition of yaw rate sensor has been repeated more than 3 times.	

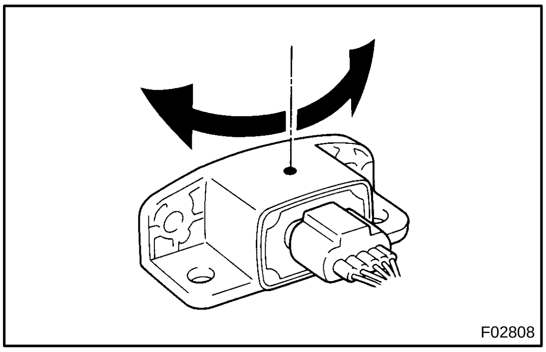
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand-held tester and start from step 3 in case of not using the hand-held tester.

1	**Check output value of yaw rate sensor.**



PREPARATION:

(a) Remove the 2 bolts and the yaw rate sensor with the connector still connected.
(b) Connect the hand-held tester to DLC3.
(c) Turn the ignition switch ON and push the hand-held tester main switch ON.
(d) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the yaw rate value of the yaw rate sensor displayed on the hand-held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.

OK	**Go to step 4.**

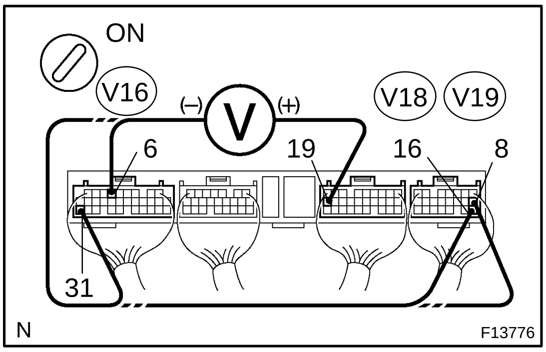
NG

2	Check whether continuity exists between terminal YD of yaw rate sensor and terminal skid control ECU.

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

OK

3	Check voltage between terminals YD and GND of skid control ECU.



PREPARATION:

Remove the skid control ECU with the connector still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals YD (V18 - 19) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

OK:

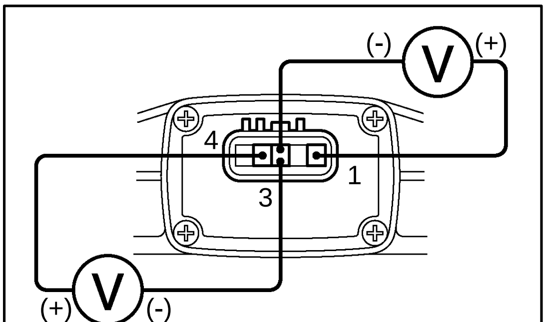
Voltage: 4.5 - 5.3 V

NG — **Replace yaw rate sensor.**

OK

Check and replace skid control ECU.

4	Check yaw rate sensor.



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CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals 1 and 3, 3 and 4 of the yaw rate sensor with the connector still connected.

OK:

Terminals 1 and 3 (YAW - GYAW)	Approx. 2.5 V
Terminals 3 and 4 (GYAW - YD)	Approx. 4.5 V - 5.3 V

NG → **Replace yaw rate sensor.**

OK

Check and replace skid control ECU.

DI6BL-03

DTC	C1237 / 37	Tires of Different Size

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1237 / 37	The condition of driving at more than 30 km/h (19 mph) for more than 20 seconds with 1 or 2 tires of different size is detected 3 times continuously.	Tire size

INSPECTION PROCEDURE

1	Check tire size.

NG → **Replace tires so that all 4 tires are of the same size.**

OK ↓

Check and replace skid control ECU.

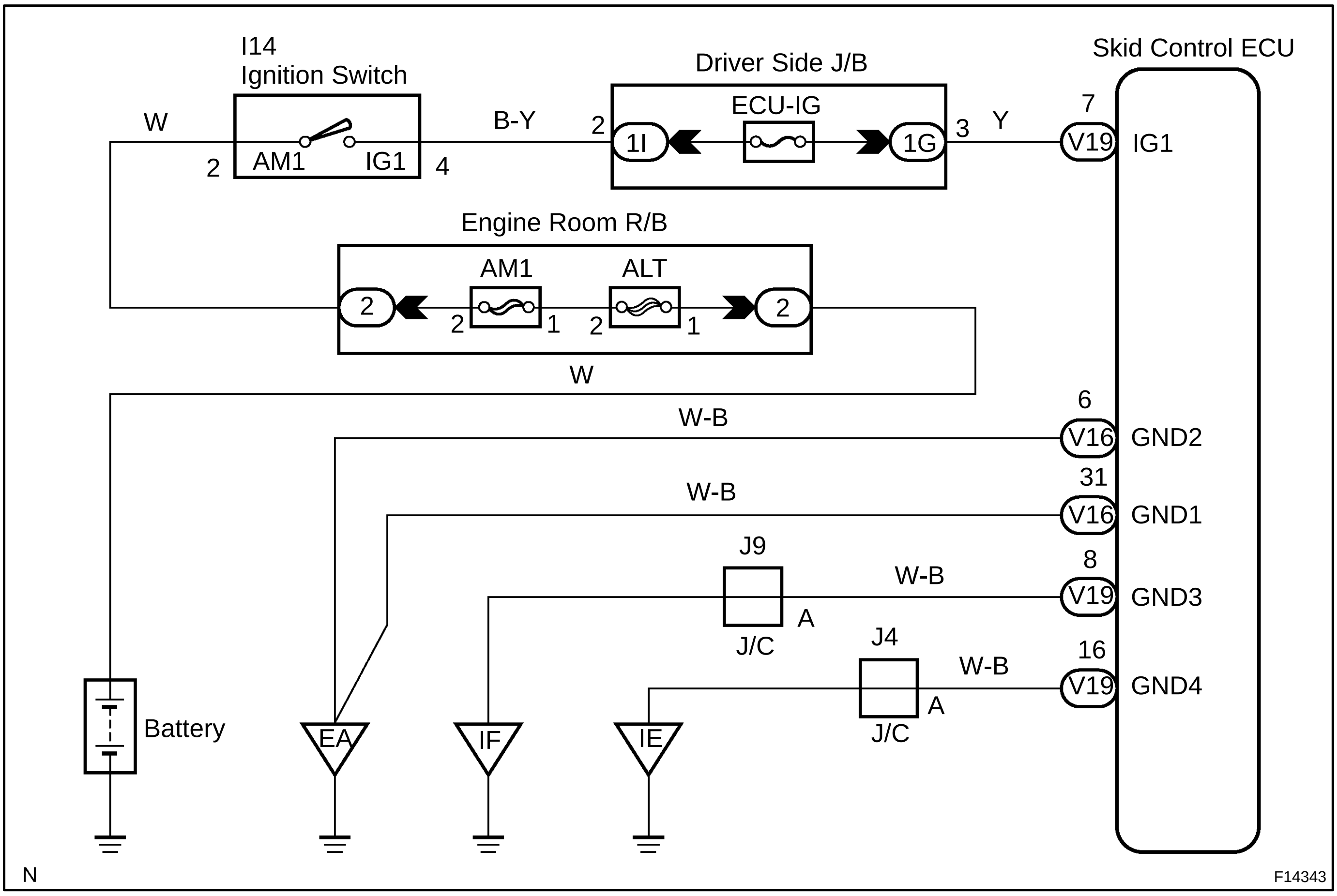
DI6BM-03

DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. through 4.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains below 9.5 V for more than 10 sec. 2. While the condition that the ABS SOL relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the ABS SOL relay is OFF continues for 0.2 sec. or more. 3. The condition that ECU terminal IG1 voltage is more than 17.0 V continues for 1.2 sec. or more. 4. While the ABS SOL relay outputs ON signal, ECU terminal IG1 voltage becomes more than 17.0 V, and the condition that the contact point of the ABS SOL relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

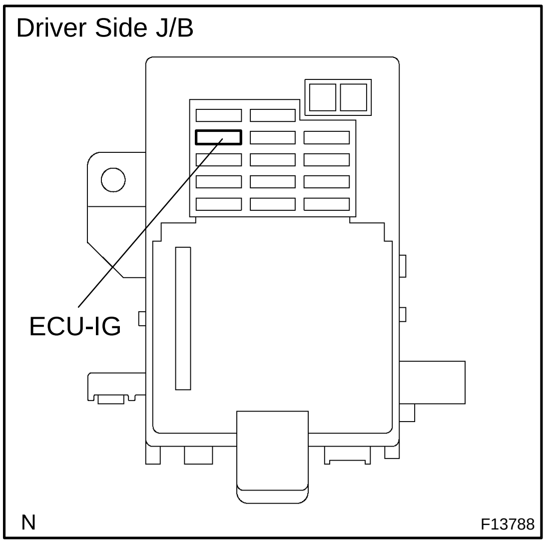
1	**Check battery positive voltage.**

OK:
Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK ↓

2	**Check ECU-IG fuse.**



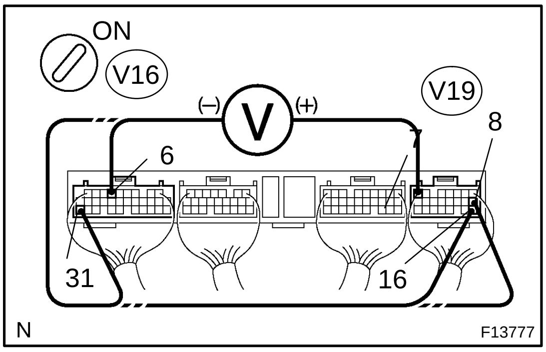
PREPARATION:
Remove the ECU-IG fuse from the driver side J/B.
CHECK:
Check continuity of the ECU-IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harnessers and components connected to ECU-IG fuse (See attached wiring diagram).**

OK ↓

3	**Check voltage of 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 TOYOTA hand-held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 (V19 - 7) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

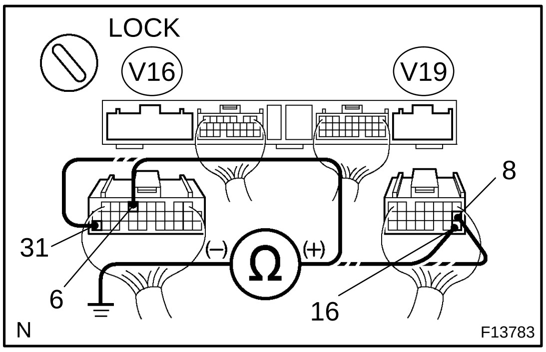
OK:

Voltage: 10 - 14 V

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

NG

4	**Check continuity between terminal GND of skid control ECU connector and body ground.**



PREPARATION:

Disconnect the connectors (V16, V19) from the skid control ECU.

CHECK:

Measure resistance between terminal GND (V16 - 6, 31, V19 - 8, 16) of the skid control 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 skid control ECU and battery (See page IN-28).

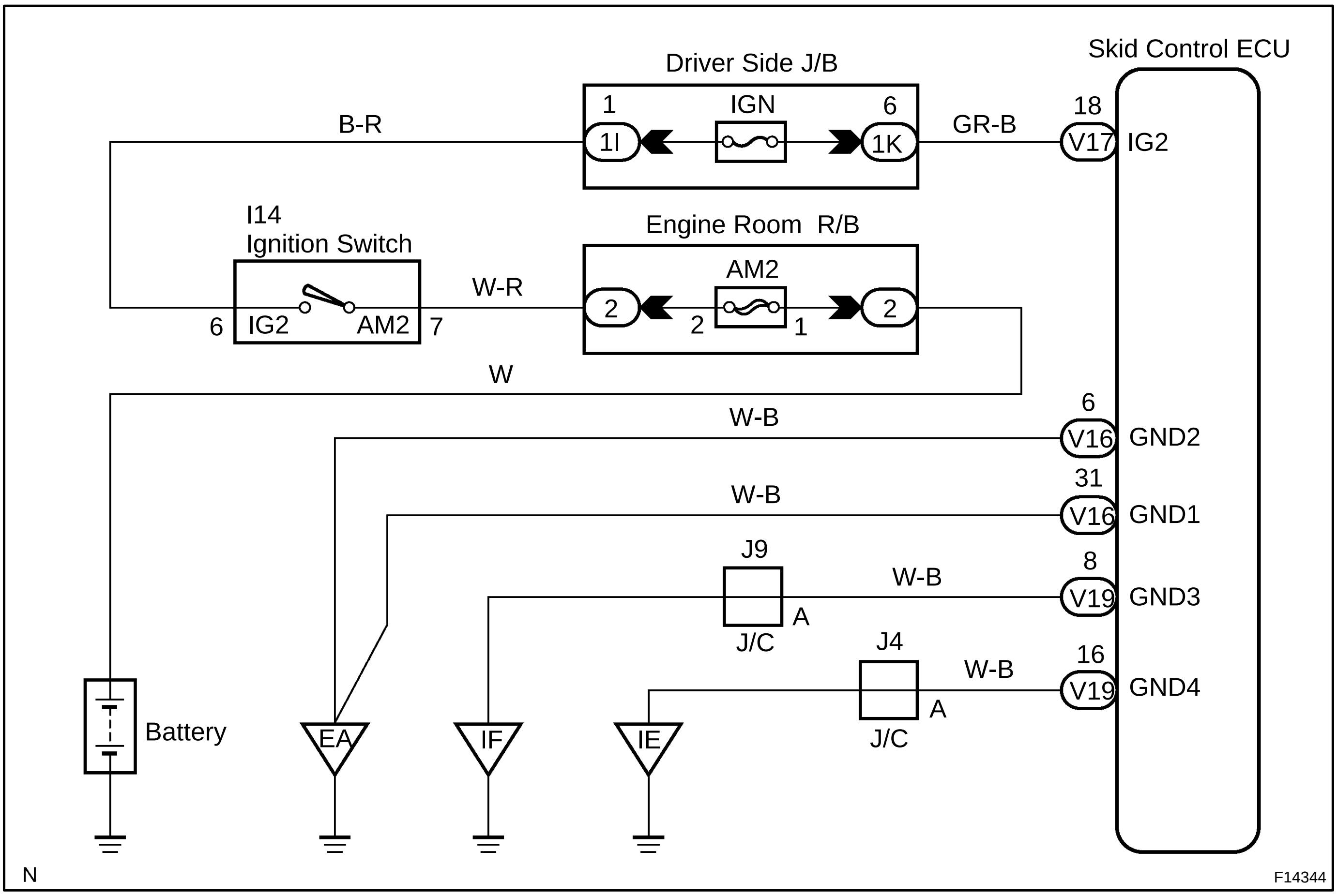
DI6BN-03

DTC	C1242 / 42	IG2 Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1242 / 42	With the vehicle running, open circuit in IG2 is detected for more than 7 sec.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

OK:

Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK ↓

2	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

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

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

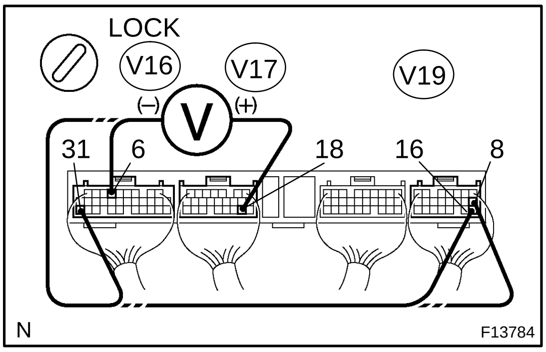
(c) Select the DATALIST mode on the hand-held tester.

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 skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG2 (V17 - 18) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

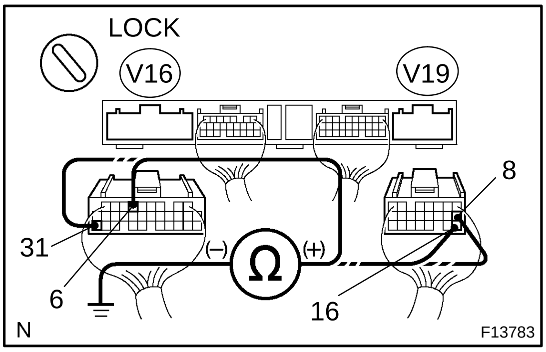
OK:

Voltage: 10 - 14 V

OK → **Check and replace skid control ECU.**

NG ↓

3	**Check continuity between terminal GND of skid control ECU connector and body ground.**



PREPARATION:
Disconnect the connectors (V16, V19) from the skid control ECU.
CHECK:
Measure resistance between terminal GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU connector and body ground.
OK:
Resistance: 1 Ω or less

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

OK

Check for open circuit in harness and connector between skid control ECU and battery (See page IN-28).

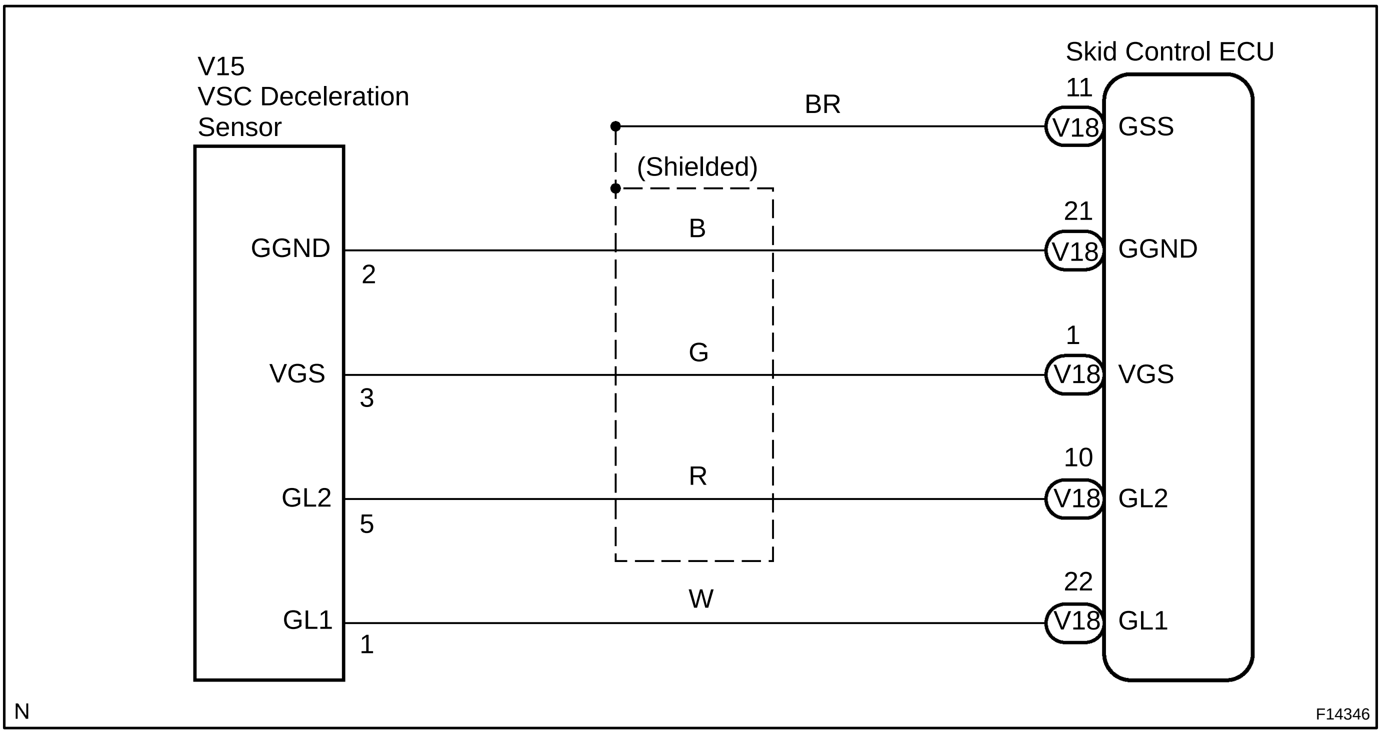
DI8XS-02

DTC	C1243 / 43, C1245 / 45	Malfunction in Deceleration Sensor

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1243 / 43	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph), the condition that GL1 and GL2 signals of ECU terminals do not change 40 mV or less continues 16 times in sequence.	• Deceleration sensor • Wire harness for deceleration sensor system
C1245 / 45	At the vehicle speed of 30 km/h (18 mph) or more, the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand-held tester, and go to step 3 in case of not using the hand-held tester.

1	**Check output value of deceleration sensor.**

PREPARATION:
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and turn the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:
Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing when the vehicle is tilted.

OK:
Deceleration value must be changing.

OK → **Go to step 3.**

NG

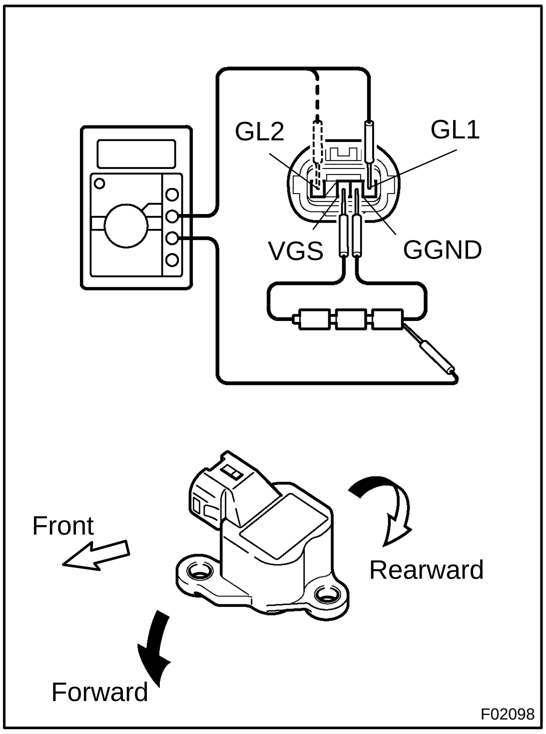
2	**Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).**

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

OK

Replace deceleration sensor.

3	Check deceleration sensor.



PREPARATION:

(a) Remove the consol box.

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

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

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

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

HINT:

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

NG → **Replace deceleration sensor.**

OK

4	Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).

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

OK

Check and replace skid control ECU.

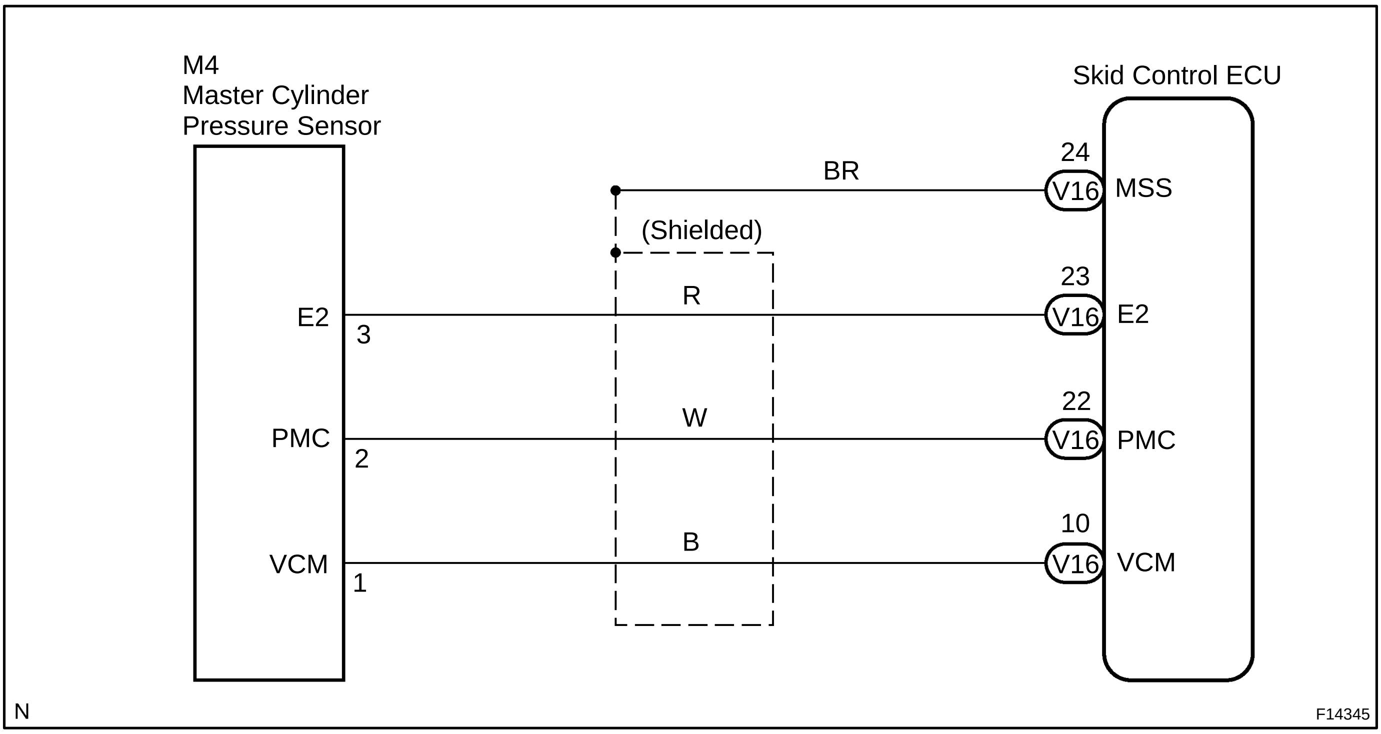
DI6BQ-04

DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Any of the conditions 1. through 5. is detected: 1. At the vehicle speed of 7 km/h (4 mph) or more, ECU terminal PMC voltage becomes more than 0.86 V and the condition that 0.01 V or less does not change continues for 30 sec. 2. Interference occurs to ECU terminal PMC 7 times or more in 5 sec. 3. ECU terminal STP is OFF, and the condition that terminal PMC voltage becomes more than 0.86 V or less than 0.3 V continues for 5 sec. or more. 4. The condition that ECU terminal IG1 voltage is 9.5 V to 17.0 V, and terminal VCM voltage is out of the range from 4.4 V to 5.6 V continues for 1.2 sec. or more. 5. The condition that ECU terminal VCM voltage is 4.4 V to 5.6 V, and terminal PMC voltage is out of the range from 0.14 V to 4.85 V continues for 1.2 sec. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit

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 master cylinder pressure sensor.**

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

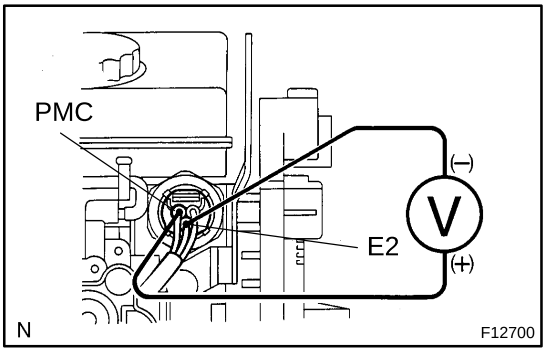
CHECK:
Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the hand-held tester is changing when the brake pedal is depressed.

OK:
Brake fluid pressure value must be changing.

OK → **Go to step 4.**

NG

2	**Check master cylinder pressure sensor.**



PREPARATION:
Install LSPV gauge to the front caliper bleeder plug portion, and bleed LSPV gauge.
SST 09709-29018

CHECK:
Start the engine and depress the brake pedal, then check the relation between the fluid pressure and voltage of PMC and E2 terminals of the master cylinder pressure sensor with the connector still connected.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kgf/cm^2, 0 psi)	0.37 - 0.63 V
5,883 kPa (60 kgf/cm^2, 853 psi)	1.57 - 1.83 V
11,768 kPa (120 kgf/cm^2, 1,706 psi)	2.77 - 3.03 V

HINT:
Voltage of between terminals VCM and E2: 4.7 - 5.3 V

NG → **Replace master cylinder pressure sensor.**

OK

3	**Check for open and short circuit in harness and connector between master cylinder pressure sensor and skid control ECU (See page IN-28).**

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

OK

4	**Check whether or not ECU terminal STP input voltage is changed when stop light switch is turned on and off.**

NO → **Check stop light switch circuit (See page BE-40).**

YES

Check and replace skid control ECU.

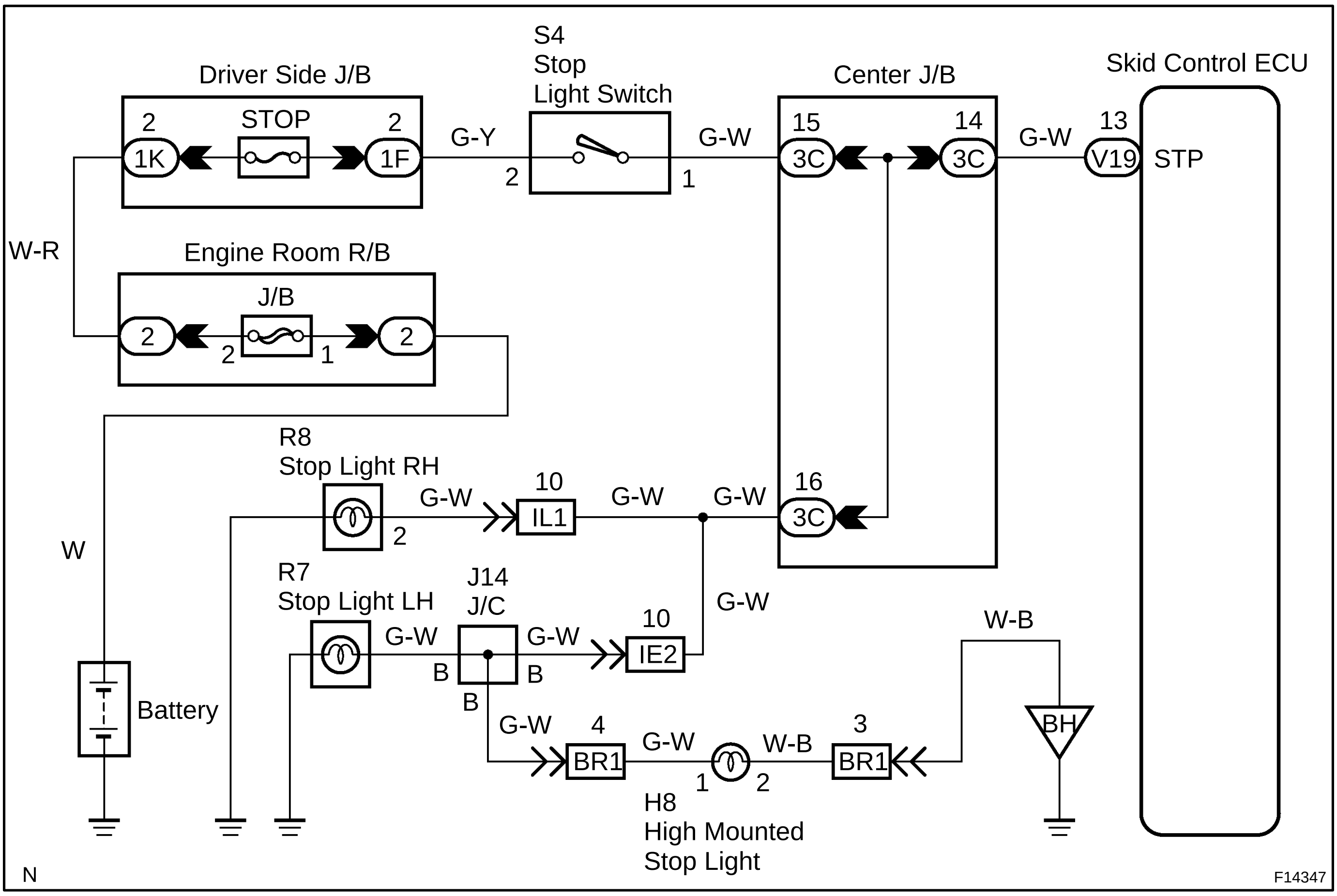
DI6BR-03

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non-operation, the open circuit in stop light switch circuit continues for 0.3 sec. or more.	Stop light switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of stop light switch.**

CHECK:
Check that the stop light lights up when the brake pedal is depressed and turns OFF when the brake pedal is released.

OK → **Go to step 3.**

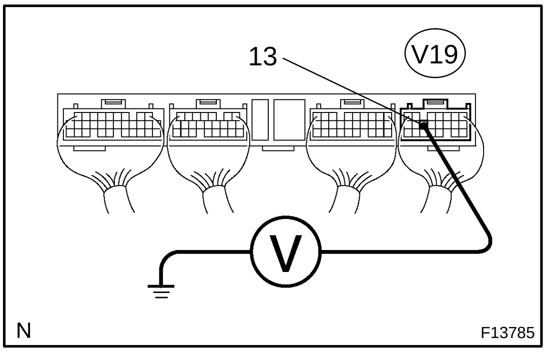
NG

2	**Check stop light circuit (See page BE-40).**

NG → **Repair or replace stop light circuit.**

OK

3	**Check voltage between terminal STP of skid control ECU and body ground.**



PREPARATION:
Remove the skid control ECU with the connectors still connected.
CHECK:
Measure voltage between terminal STP (V19 - 13) of the skid control ECU and body ground when the brake pedal is depressed.
OK:
Voltage: 10 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-242).**

NG

4	Check for open circuit in harness and connector between skid control ECU and stop light switch (See page IN-28).

NG — Repair or replace harness or connector.

OK

5	Check stop light bulb.

NG — Replace stop light bulb.

OK

Check and replace skid control ECU.

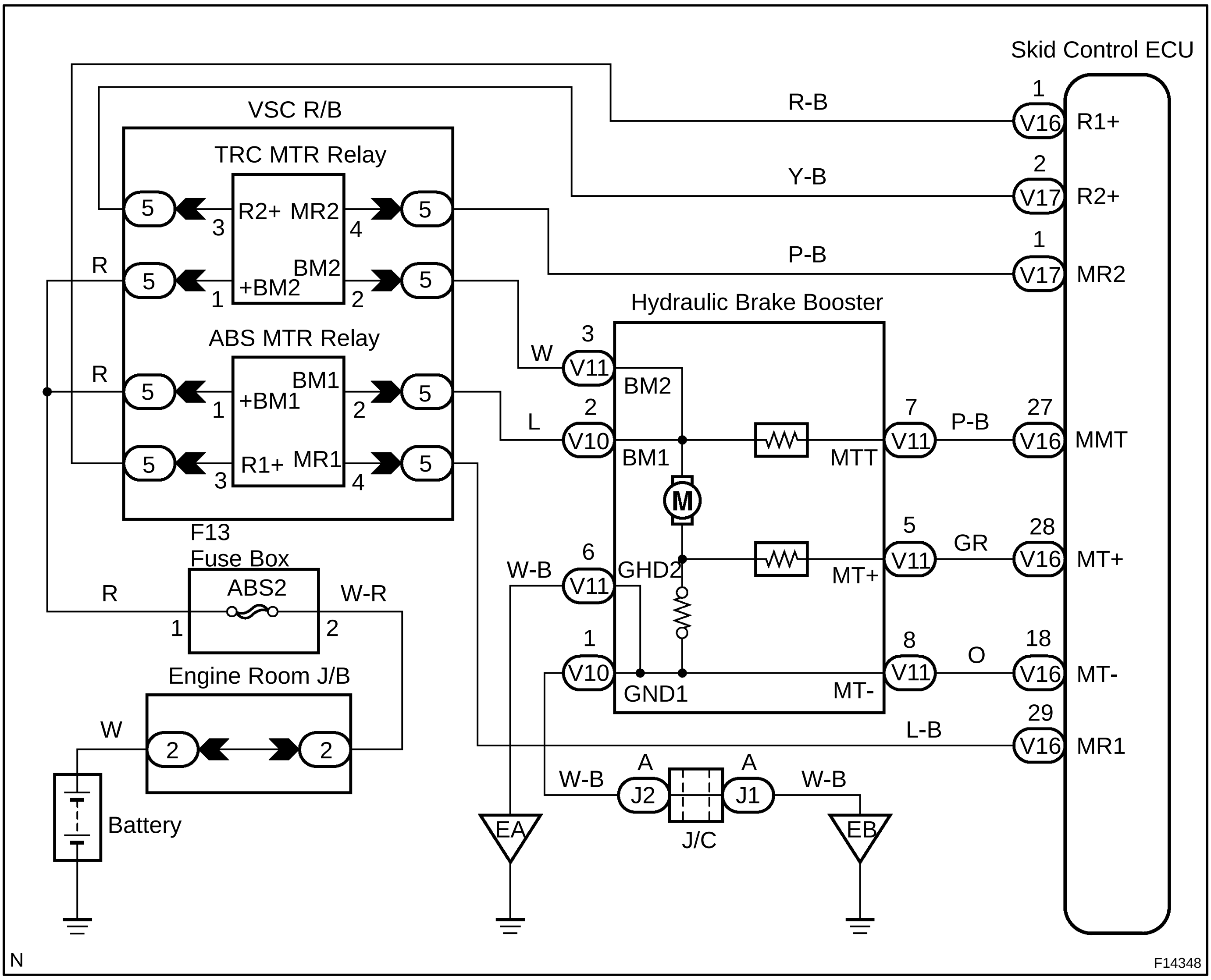
DI6BS-08

DTC	C1251 / 51	Hydraulic Brake Booster Pump Motor Malfunction

CIRCUIT DESCRIPTION

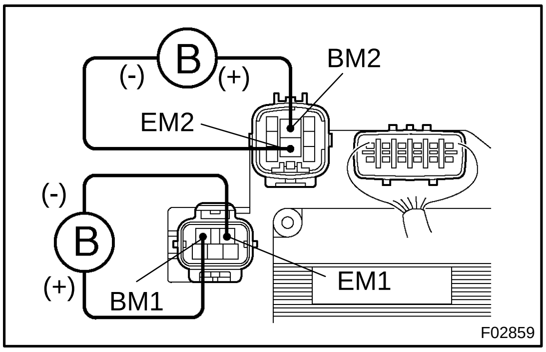
DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the condition 1. or 2. is detected: 1. After the ignition switch is turned ON, the current of more than 30 A flows to the motor for more than 1 sec. 2. After the ignition switch is turned ON, less than 7 A change in current is detected more than 3 times continuously when the motor is ON.	Hydraulic brake booster pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of hydraulic brake booster pump motor.

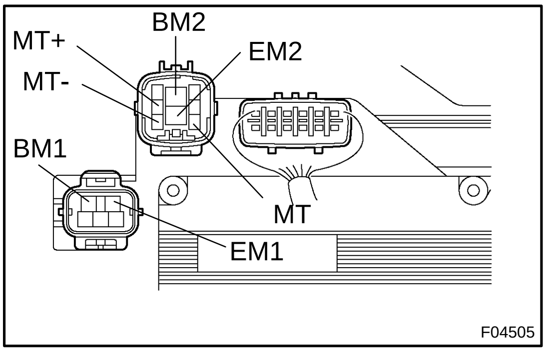


PREPARATION:
Disconnect the 2 connectors from the hydraulic brake booster.
CHECK:
Connect battery positive (+) lead to BM1 or BM2 terminal and battery negative (-) lead to EM1 or EM2 terminal of the hydraulic brake booster (pump motor) connector.
OK:
The operation sound of the pump motor should be heard.

NG	Go to step 4.

OK

2	Check hydraulic brake booster resistance.



PREPARATION:
Disconnect the 2 connectors from the hydraulic brake booster.
CHECK:
Check resistance between terminals MT+ and MT-, BM1 and MT, BM2 and MT, EM1 and MT+, EM2 and MT+ of the hydraulic brake booster connector.
OK:
30 - 36 Ω

NG	Replace hydraulic brake booster assembly.

OK

3	Check for open circuit in harness and connector between hydraulic brake booster (MT+, MT-) and skid control ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

4	Check for open and short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN-28).

NG → Replace wire harness.

OK

5	Check hydraulic brake booster pump motor (See page BR-42).

NG → Replace hydraulic brake booster pump motor.

OK

Replace hydraulic brake booster.

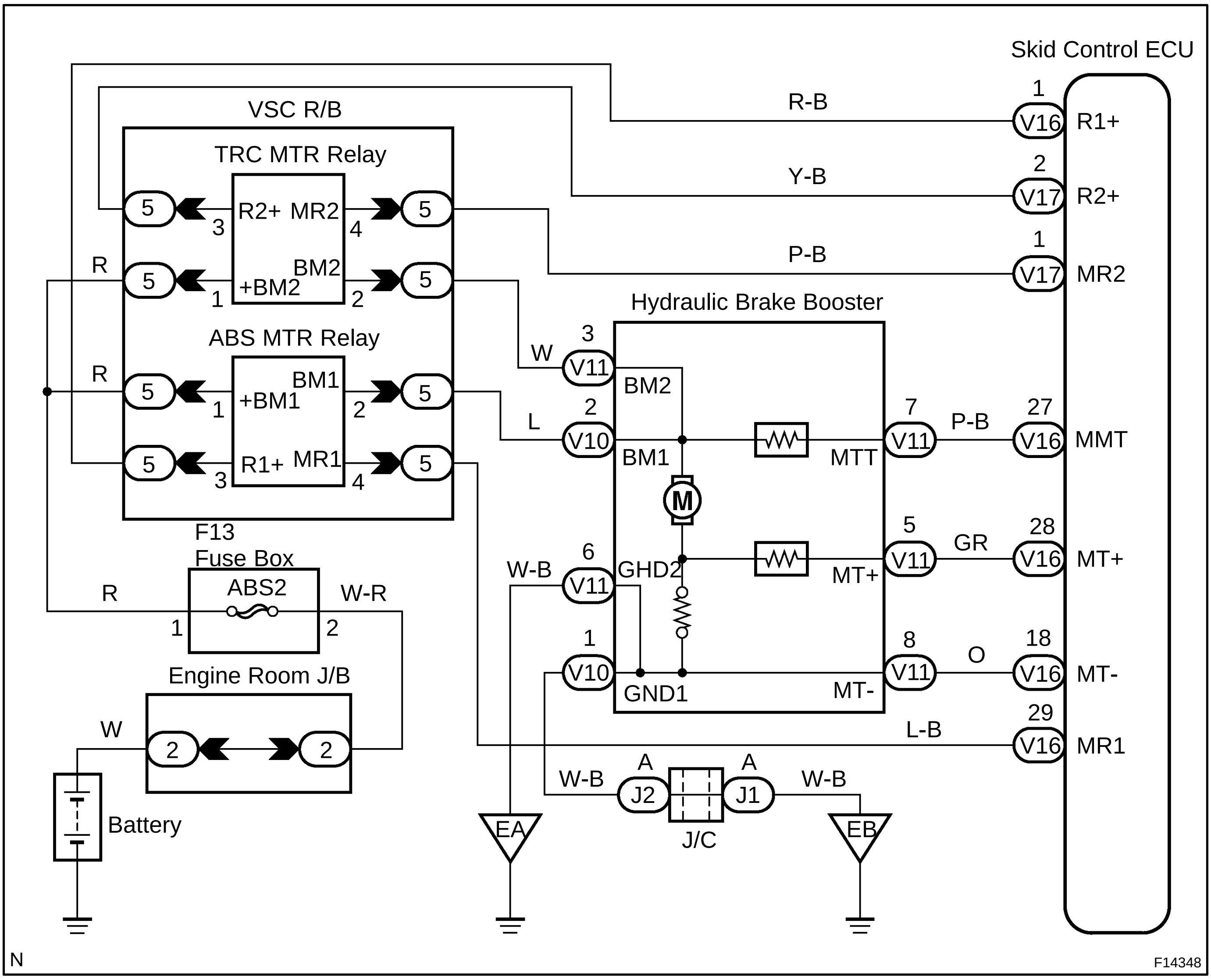
DI6BT-08

DTC	C1252 / 52	Hydraulic Brake Booster Pump Motor ON Time Abnormally Long

CIRCUIT DESCRIPTION

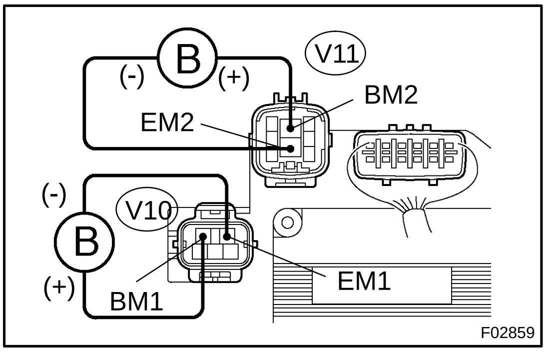
DTC No.	DTC Detecting Condition	Trouble Area
C1252 / 52	After the ignition switch has been turned ON, the power is supplied to the pump motor for more than 5 minutes.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of hydraulic brake booster pump motor.**



PREPARATION:

Disconnect the 2 connectors from (V10, V11) the hydraulic brake booster.

CHECK:

Connect battery positive (+) lead to BM1 or BM2 terminal and battery negative (-) lead to EM1 or EM2 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 (to B+) in harness and connector between BM1 or BM2 of hydraulic brake booster and ABS MTR relay or TRC MTR relay (See page IN-28).**

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

OK

3	**Check for short circuit (to B+) in harness and connector between MT of hydraulic brake booster and skid control ECU (See page IN-28).**

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 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.

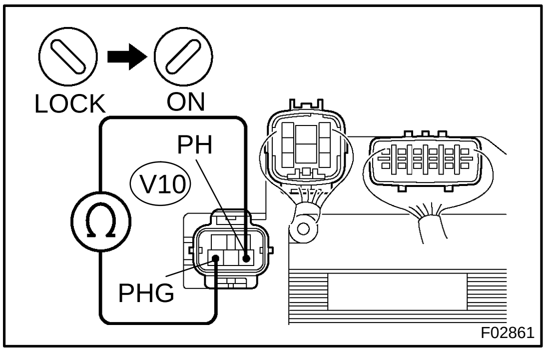
HINT:
When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

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 (V10) 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 the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

PREPARATION:

(a) Connect the connector (V10) to the hydraulic brake booster.
(b) Disconnect the connector (V10) after the ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

OK:

Resistance: 0 Ω

HINT:
After inspection, connect the connector and clear the DTC (See page DI-224).

NG	Replace hydraulic brake booster assembly.

OK

5	**Check pressure switch (PL).**

In case of using the hand-held tester:

PREPARATION:

(a) Connect the hand-held tester to 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.

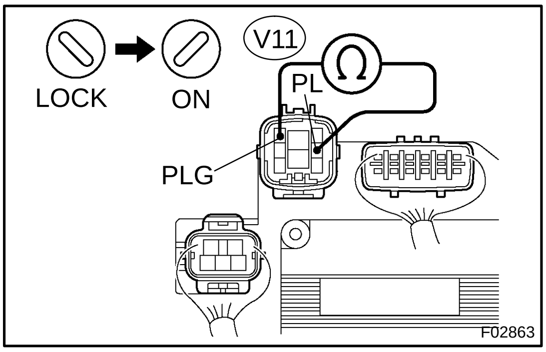
HINT:
When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

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 (V11) 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 the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

OK:

Resistance: 5.7 kΩ

PREPARATION:

(a) Connect the connector (V11) to the hydraulic brake booster.
(b) Disconnect the connector (V11) after the ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

HINT:
After inspection, connect the connector and clear the DTC (See page DI-224).

NG **Replace hydraulic brake booster assembly.**

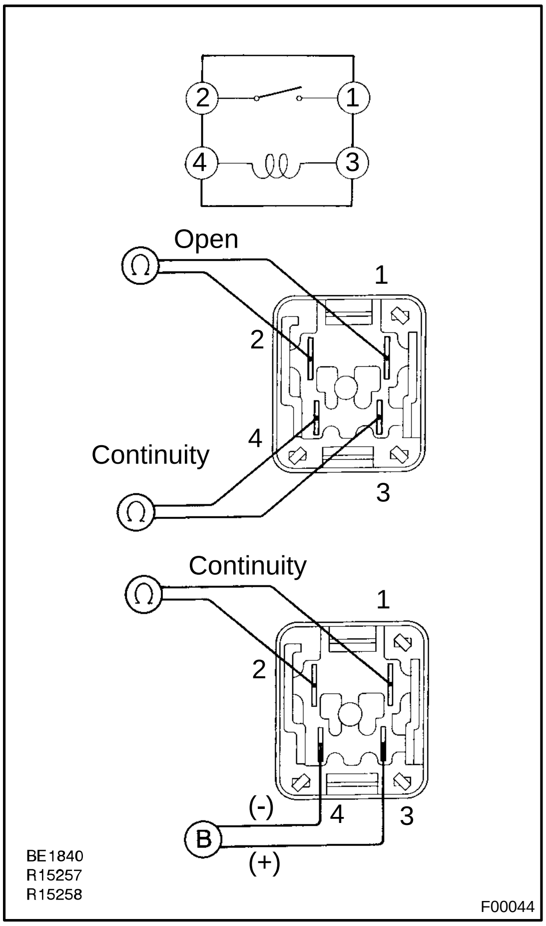
OK

6	**Check for short circuit (to B+) in harness and connector between pressure switch and skid control ECU (See page IN-28).**

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

OK

7	**Check ABS MTR relay and TRC MTR relay.**



PREPARATION:
Remove the ABS MTR relay and TRC MTR relay from VSC R/B.
CHECK:
Check continuity between each pair of terminals of the motor relay.
OK:

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

*1: ABS MTR relay 62 Ω
TRC MTR relay 54 Ω

CHECK:
(a) Apply battery positive voltage between terminals 3 and 4.
(b) Check continuity between terminals.
OK:

Terminals 1 and 2	Continuity

NG — **Replace ABS MTR relay or TRC MTR relay.**

OK

8	**Check for short circuit in harness and connector between ABS MTR relay or TRC MTR relay and skid control ECU (See page IN-28).**

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

OK

Check and replace skid control ECU.

9	**Check for open and short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN-28).**

NG — **Replace wire harness.**

OK

10	**Check hydraulic brake booster pump motor (See page BR-42).**

NG — **Replace hydraulic brake booster pump motor.**

OK

Replace hydraulic brake booster.

DI6BU-08

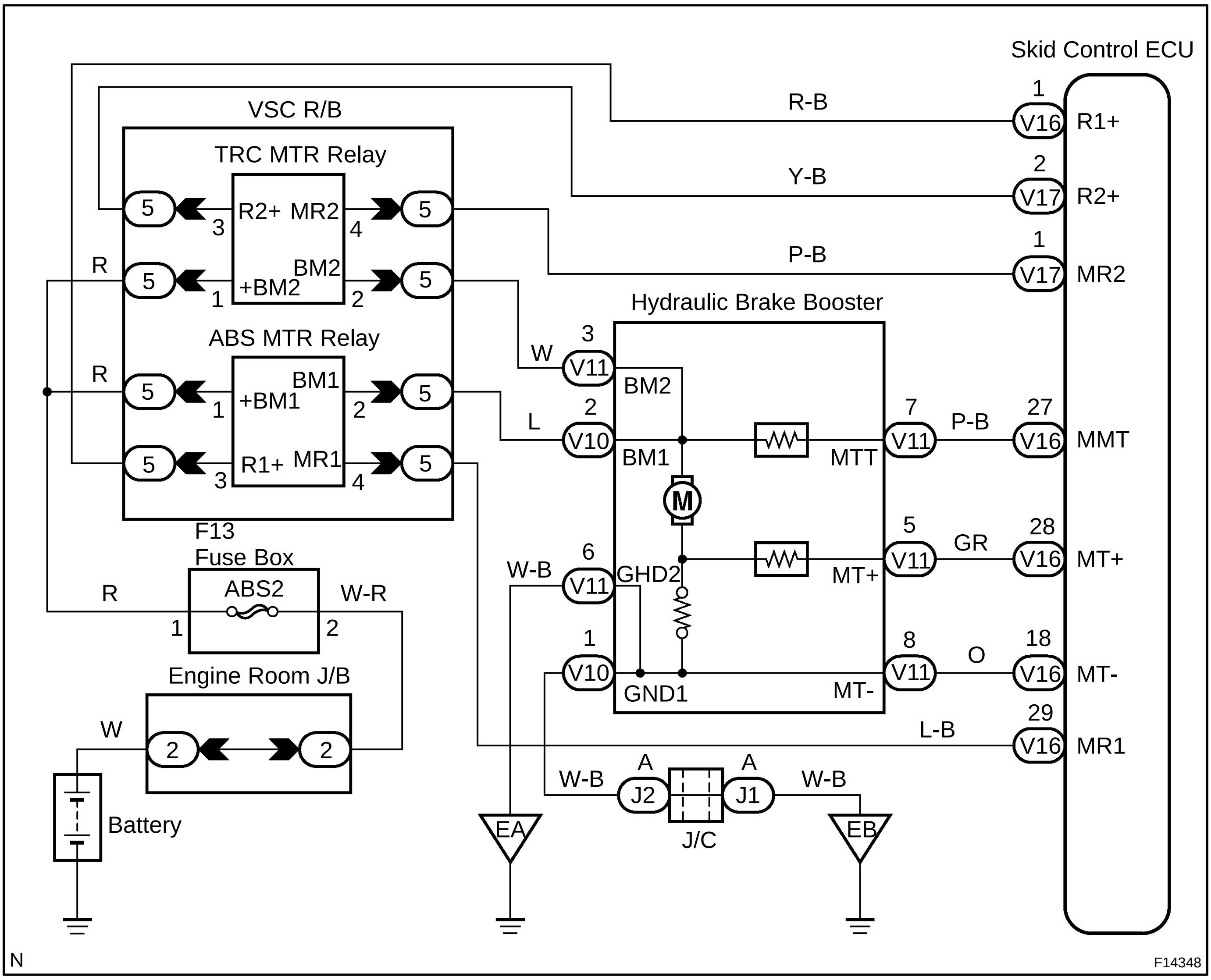
DTC	C1253 / 53	Motor Relay Circuit

CIRCUIT DESCRIPTION

The ABS MTR relay and TRC MTR relay supply power to the hydraulic brake booster pump motor. While the ABS & BA & TRAC & VSC are activated, the ECU switches the motor relay ON and operates the hydraulic brake booster pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C1253 / 53	When any of the condition 1. through 4. is detected: 1. After the ignition switch is turned 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.	• ABS MTR relay or TRC MTR relay • ABS MTR relay or TRC MTR relay circuit • Hydraulic brake booster pump motor 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 the hand-held tester.

1	**Check ABS MTR relay and TRC MTR relay operation.**

PREPARATION:
(a) Connect the hand-held tester to 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 MTR relay and TRC MTR relay individually when operating them with the hand-held tester.

OK:
The operation sound of the ABS MTR relay and TRC MTR relay should be heard.

NG → **Go to step 3.**

OK ↓

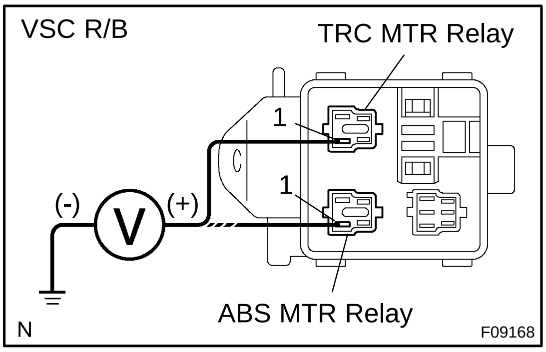
2	**Check for short circuit (to B+) in harness and connector between MT of hydraulic brake booster and skid control ECU (See page IN-28).**

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

OK ↓

Check and replace skid control ECU.

3	Check voltage between terminal 1 of VSC R/B (for ABS MTR relay and TRC MTR relay) and body ground.

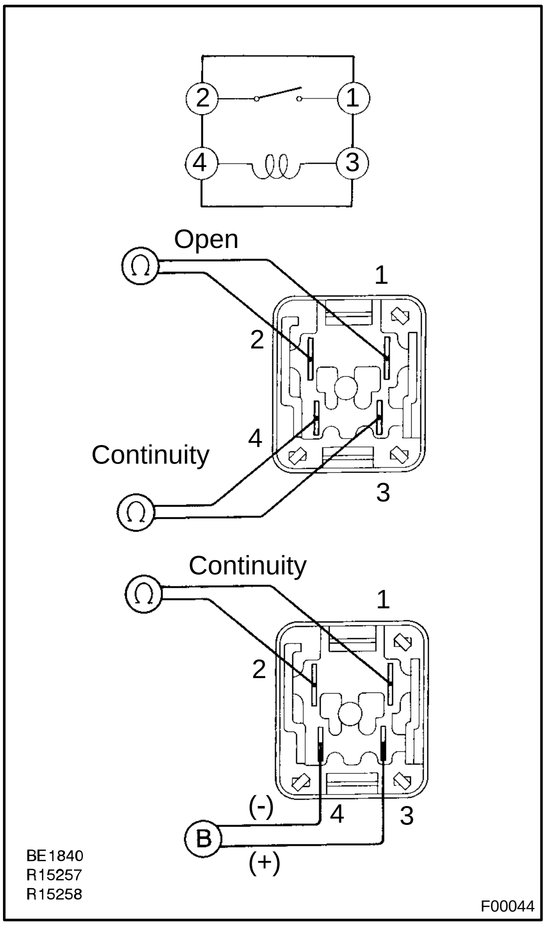


PREPARATION:
Remove the ABS MTR relay and TRC MTR relay from VSC R/B.
CHECK:
Measure voltage between terminal 1 of VSC R/B (for ABS MTR relay and TRC MTR relay) and body ground.
OK:
Voltage: 10 - 14 V

NG → **Check and repair harness or connector.**

OK

4	Check ABS MTR relay and TRC MTR relay.



CHECK:
Check continuity between each pair of terminals of the motor relay.
OK:

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

*1: ABS MTR relay 62 Ω
TRC MTR relay 54 Ω

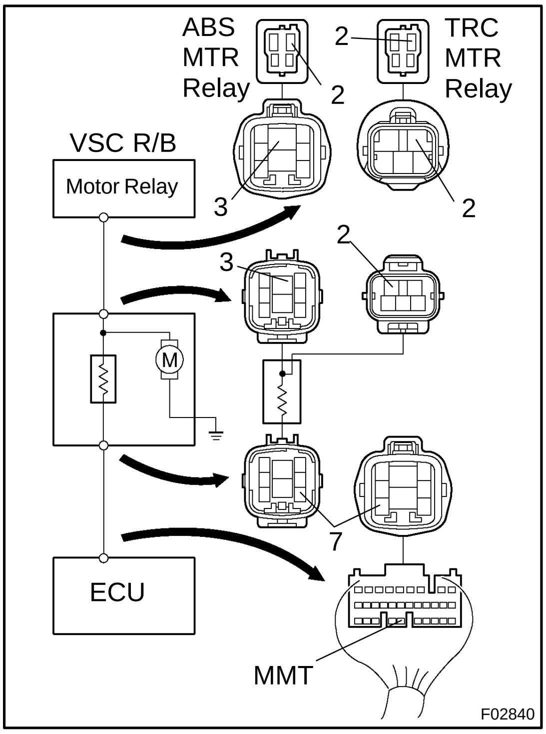
CHECK:
(a) Apply battery positive voltage between terminals 3 and 4.
(b) Check continuity between terminals.
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS MTR relay or TRC MTR relay.**

OK

5	Check continuity between each terminal BM1 and BM2 and terminal MMT of skid control ECU.



CHECK:

(a) Check continuity between terminal BM1 of the ABS MTR relay and terminal MMT of the skid control ECU.

(b) Check continuity between terminal BM2 of the TRC MTR relay and terminal MMT of the skid control ECU.

OK:

Continuity

HINT:

There is resistance of 33 ± 3 Ω between terminal BM1or BM2 and MT 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 ABS MTR and TRC MTR relay and skid control ECU (See page IN-28).

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

OK

Check and replace skid control ECU.

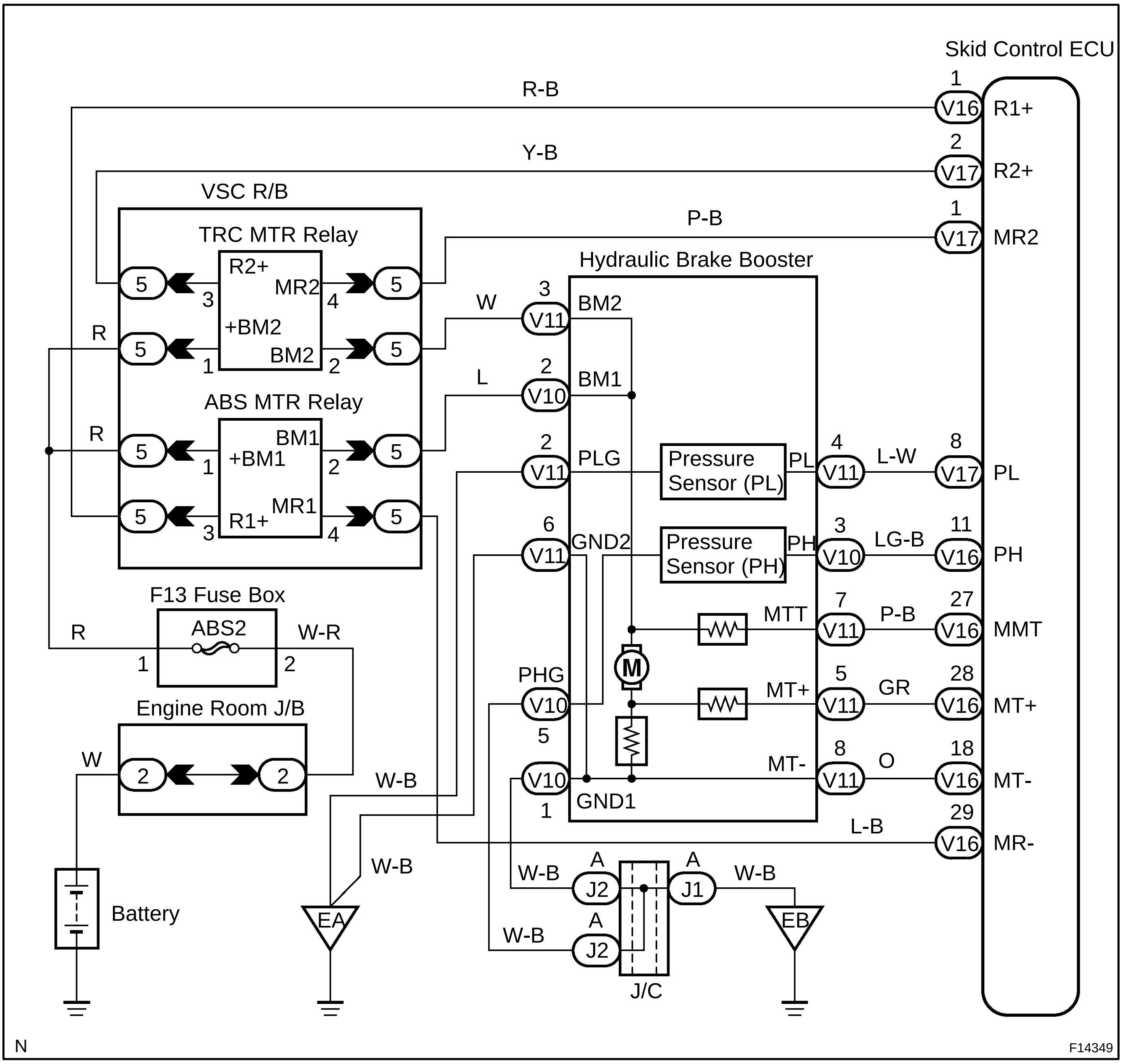
DI6BV-08

DTC	C1254 / 54	Pressure Switch Circuit

CIRCUIT DESCRIPTION

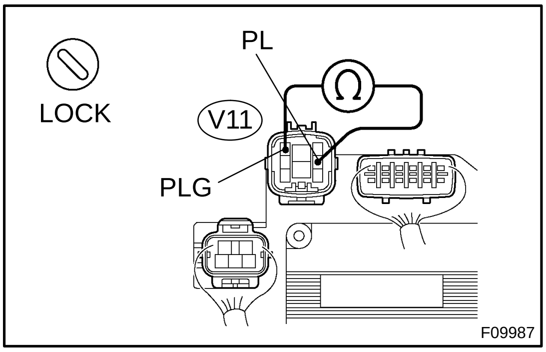
DTC No.	DTC Detecting Condition	Trouble Area
C1254 / 54	Either of the condition 1. or 2. is detected: 1. After the ignition switch is turned ON, short or open circuit in pressure switch (PL) continues for more than 1 sec. 2. After the ignition switch is turned ON, open circuit in pressure switch (PH) continues 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 (V11) 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 the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:
Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

OK:

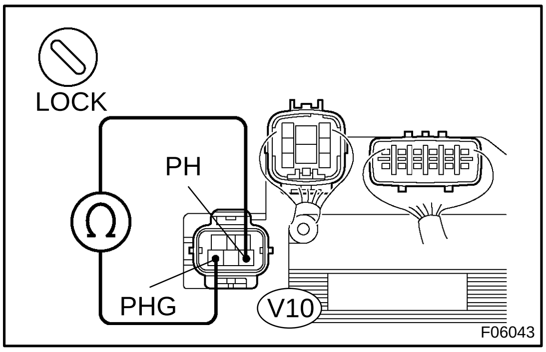
Resistance: 5.1 - 6.3 kΩ

HINT:
After inspection, connect the connector and clear the DTC (See page DI-224).

NG	Replace hydraulic brake booster assembly.

OK

2	Check pressure switch (PH) resistance.



PREPARATION:

(a) Disconnect the connector (V10) 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 the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:
Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

OK:

Resistance: 0.9 - 1.1 kΩ

HINT:
After inspection, connect the connector and clear the DTC (See page DI-224).

NG → **Replace hydraulic brake booster assembly.**

OK ↓

3	**Check for open and short circuit in harness and connector between pressure switch and skid control ECU (See page IN-28).**

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

OK ↓

Check and replace skid control ECU.

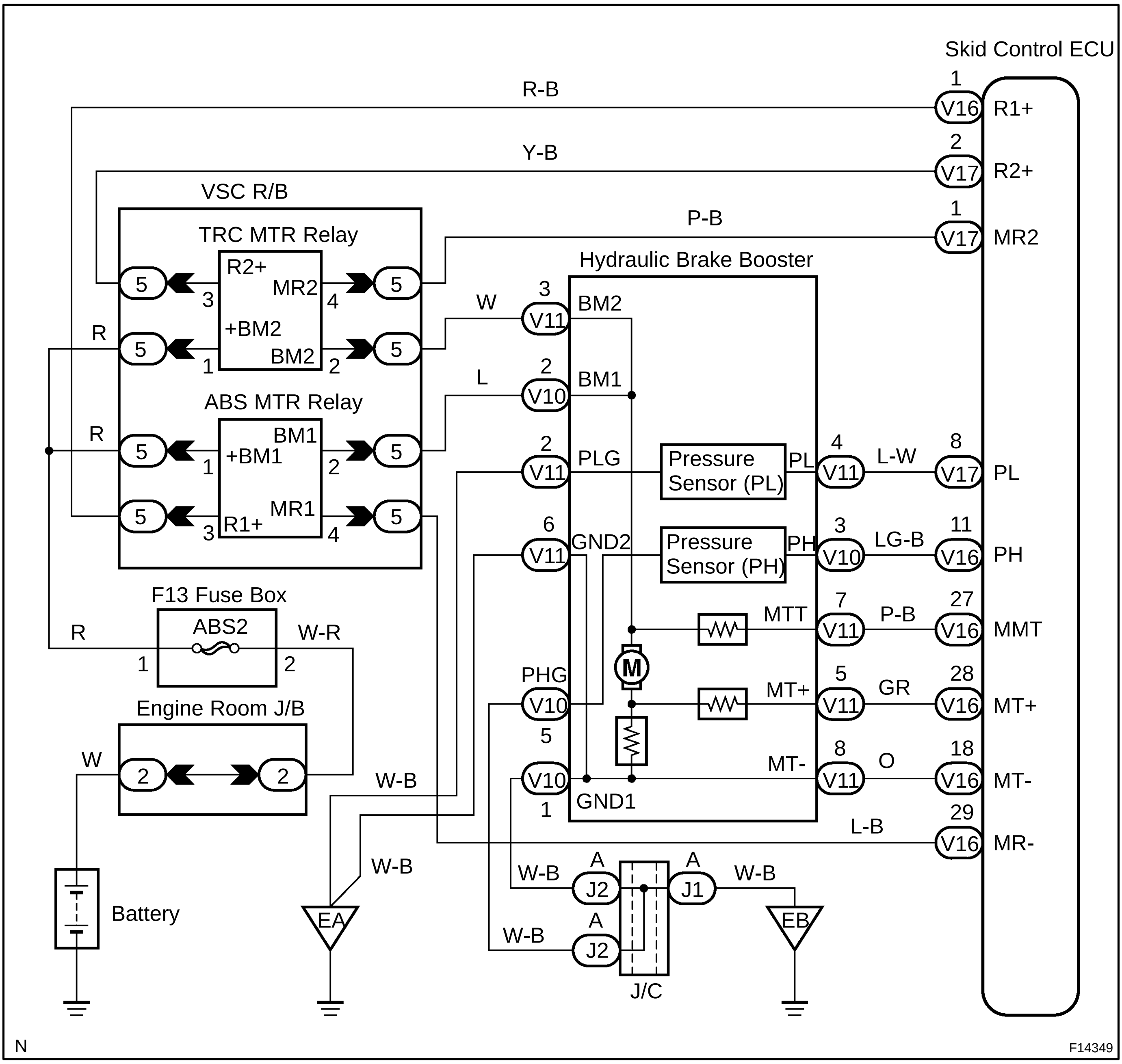
DI6BW-08

DTC	C1256 / 56	Accumulator Low Pressure Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1256 / 56	Any of the conditions 1. through 5. is detected: 1. With the vehicle running and ABS, TRAC or VSC not in operation, the pressure switch (PL) detects low pressure for 1.4 sec. or more while the pressure switch (PH) detects high pressure. 2. With the vehicle running and ABS, TRAC or VSC not in operation, the pressure switch (PL) detects low pressure for 0.2 sec. or more while the pressure switch (PH) detects high pressure. 3. After the ignition switch is turned ON, the pressure switch (PL) detects low pressure for 60 sec. or more. 4. With the vehicle running and after the ignition switch is turned ON, the pressure switch (PL) remains ON while ABS, TRAC or VSC does not operate for 1.4 sec. or more. 5. With the vehicle running and after the ignition switch is turned OFF, the pressure switch (PL) remains ON while ABS, TRAC or VSC operates for 0.2 sec. or more.	• 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 the pressure in the power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the 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)

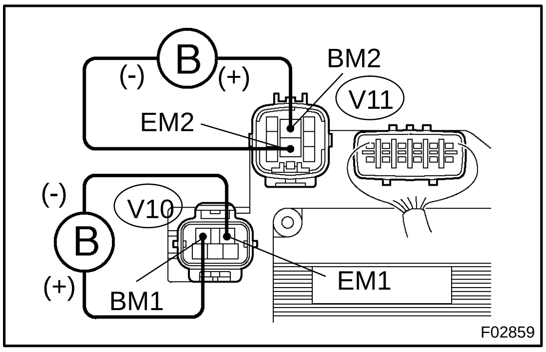
HINT:

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 (V10, V11) from the hydraulic brake booster.

CHECK:

Connect battery positive (+) lead to BM1 or BM2 terminal and battery negative (-) lead to EM1 or EM2 terminal of the hydraulic brake booster (pump motor) connector.

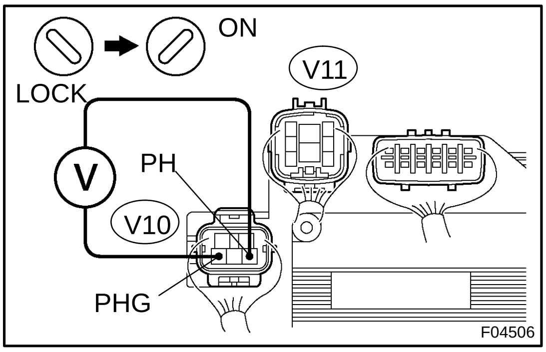
OK:

The operation sound of the pump motor should be heard.

NG	**Go to step 7.**

OK

3	Check pressure switch (PH) operation.



PREPARATION:

(a) Connect the 2 connectors (V10, V11), and depress the brake pedal 40 times or more.

HINT:

When a pressure in the power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear wheel cylinder and bleed air.

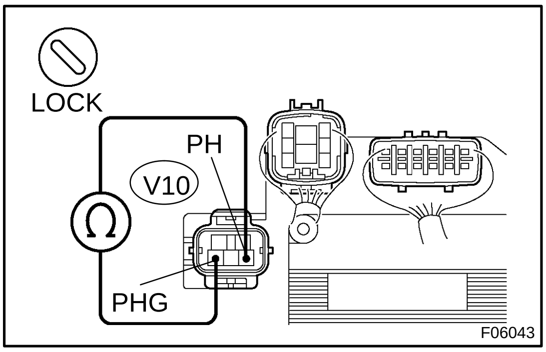
SST 09709-29018

CHECK:

While checking the voltage between terminals PH and PHG of the 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 wheel cylinder 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)



PREPARATION:

Turn the ignition switch OFF and disconnect the connector (V10) from the hydraulic brake booster.

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 wheel cylinder 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 the brake reservoir with brake fluid and clear the DTC (See page DI-224).

OK	Go to step 5.

NG

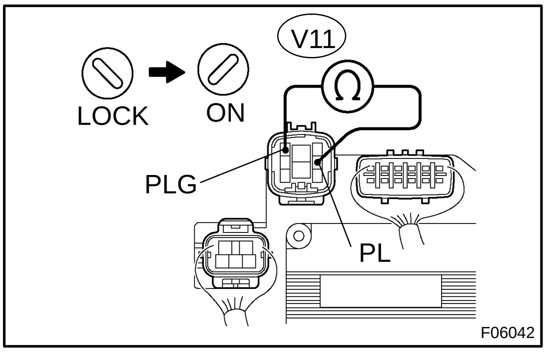
4	Check for open circuit in harness and connector between pressure switch (PH) and skid control ECU (See page IN-28).

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 the power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear wheel cylinder and bleed air.
SST 09709 -29018

(c) Disconnect the connector (V11) from the hydraulic brake booster.

CHECK:

While checking the resistance between terminals PL and PLG of the 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 wheel cylinder 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 (V11) from the hydraulic brake booster.

CHECK:

While checking the resistance between terminals PL and PLG of the 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 wheel cylinder 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 the brake reservoir with brake fluid and clear the DTC (See page DI-224).

NG → **Replace hydraulic brake booster assembly.**

OK ↓

6	**Check pressure switch (PH) and pressure switch (PL)**

CHECK:
Compare the pressure value of the rear wheel cylinder measured in the check pressure switch (PL) operation with the one measured in the 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 skid control ECU.

7	**Check for open and short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN-28).**

NG → **Replace wire harness.**

OK ↓

8	**Check hydraulic brake booster pump motor (See page BR-42).**

NG → **Replace hydraulic brake booster pump motor.**

OK ↓

Replace hydraulic brake booster.

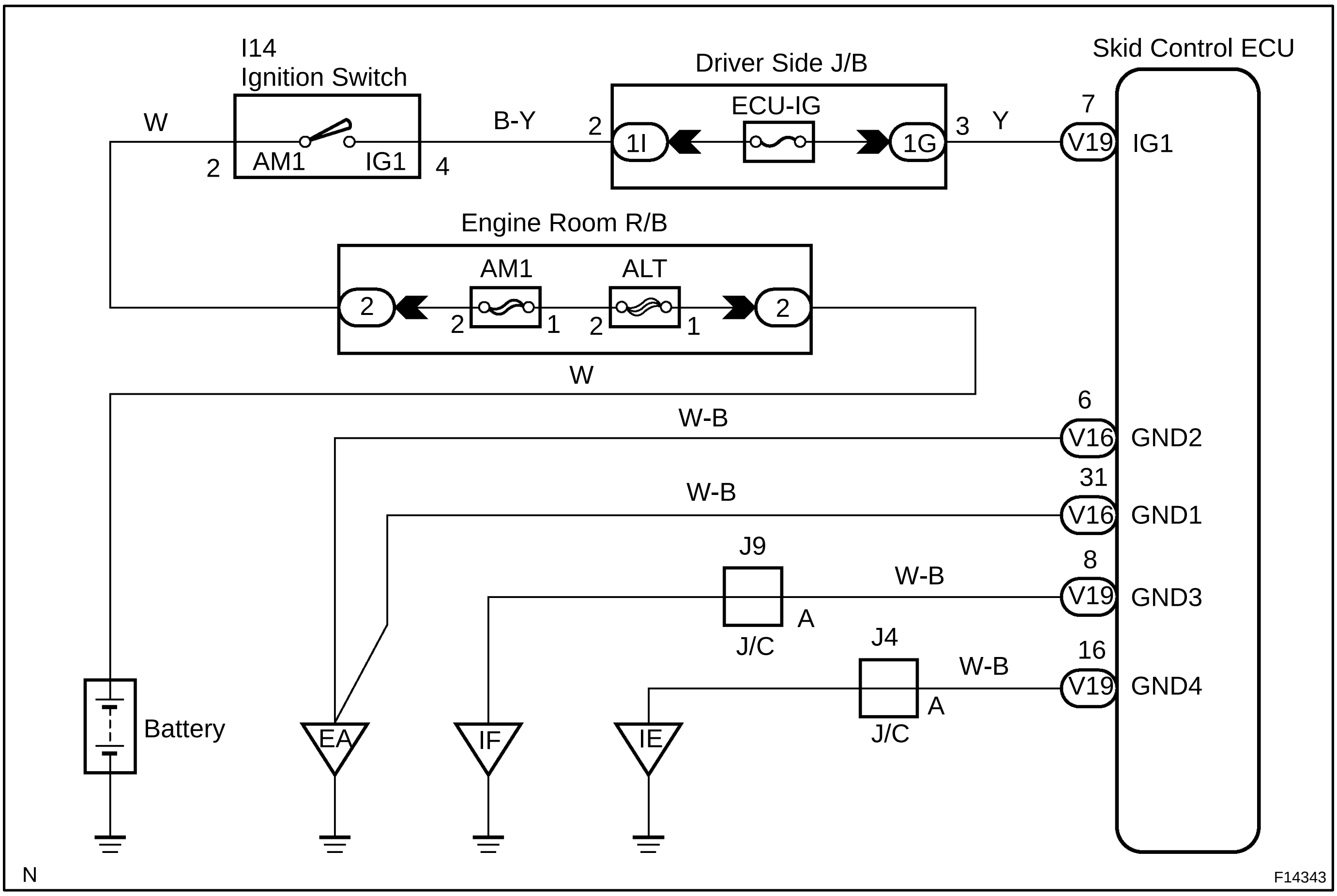
DI6BX-03

DTC	C1257 / 57	Power Supply Drive Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1257 / 57	When malfunction inside ECU is detected.	• Battery • Power source circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

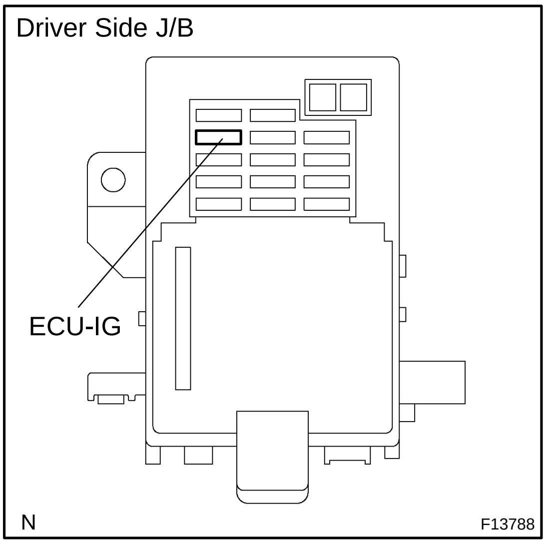
OK:

Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK

2	**Check ECU-IG fuse.**



PREPARATION:

Remove the ECU-IG fuse from the driver side J/B.

CHECK:

Check continuity of the ECU-IG fuse.

OK:

Continuity

NG → **Check for short circuit in all the harnesses and components connected to ECU-IG fuse (See attached wiring diagram).**

OK

3	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

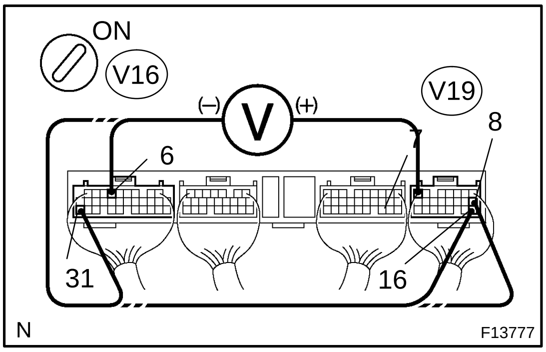
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

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 skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 (V19 - 7) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU connector.

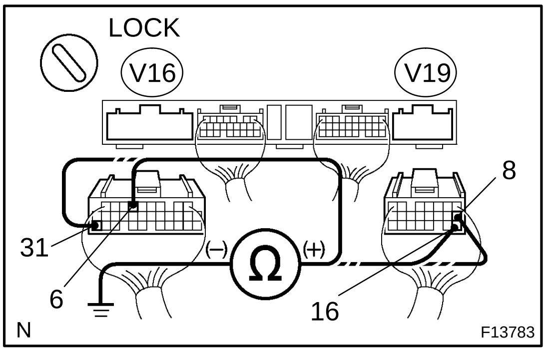
OK:

Voltage: 10 - 14 V

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

NG

4	**Check continuity between terminal GND of skid control ECU and body ground.**



PREPARATION:
Disconnect the 2 connectors (V16, V14) from the skid control ECU.

CHECK:
Measure resistance between terminal GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU 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 skid control ECU and battery (See page IN-28).

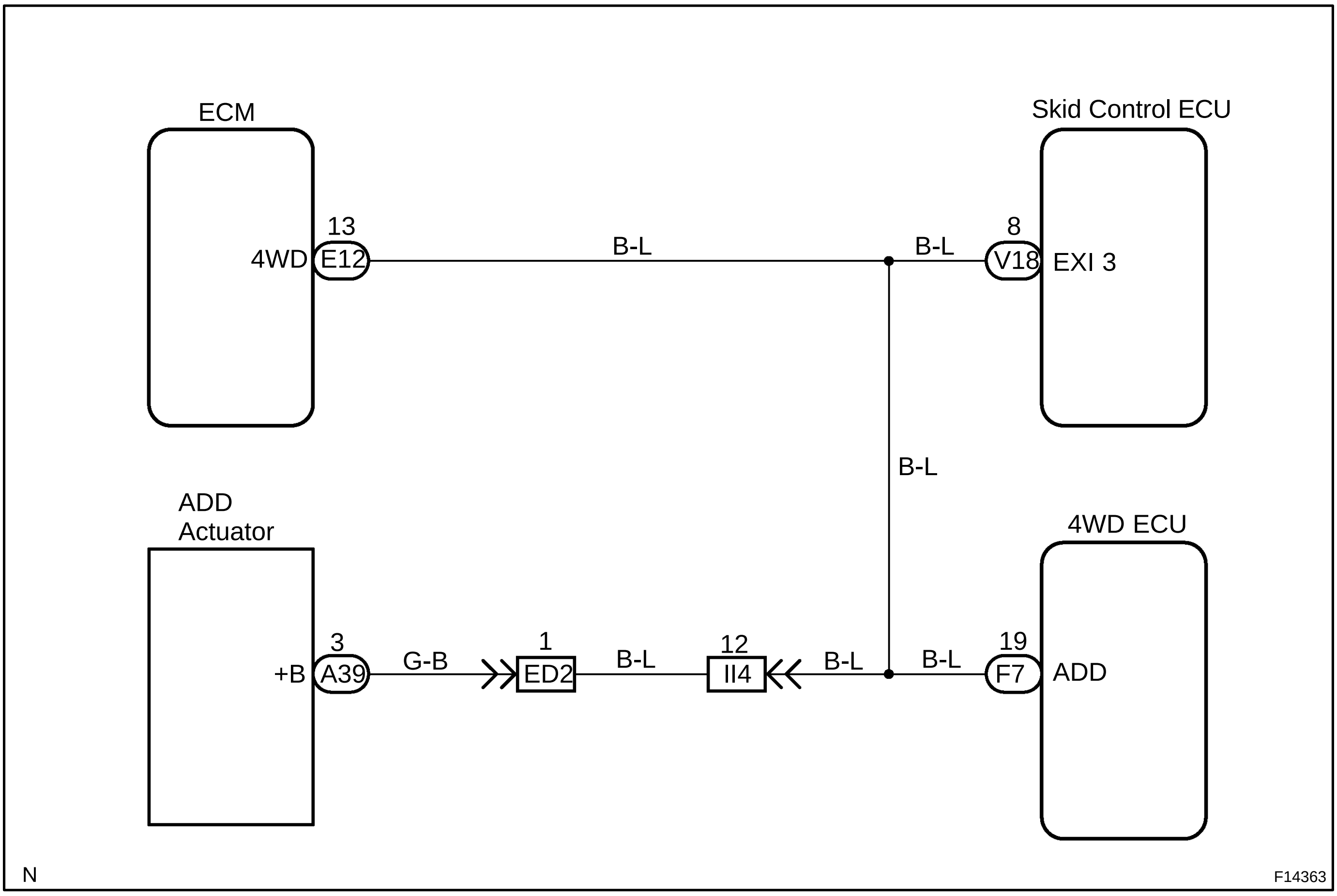
DI8XT-02

DTC	C1258 / 58	Transfer 4WD Position Switch Circuit

CIRCUIT DESCRIPTION

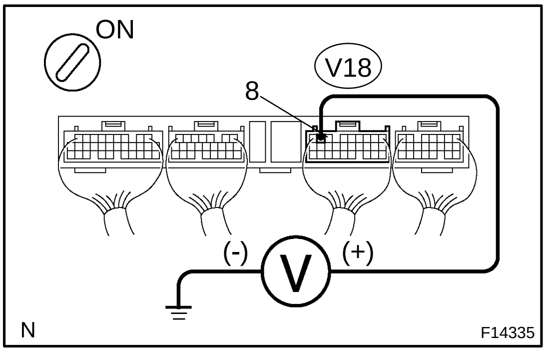
DTC No.	DTC Detecting Condition	Trouble Area
C1258 / 58	Open or short circuit in transfer 4WD position switch circuit.	• Transfer 4WD position switch • Transfer 4WD indicator switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal EXI3 of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal EXI3 (V18 - 8) of the skid control ECU and body ground with the transfer shift lever in 4WD position and in other than 4WD position.

OK:

Voltage:
4WD position: Below 2.0 V
Except 4WD position: 10 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-242).**

NG

2	**Check transfer 4WD position switch (See page TR-11).**

NG → **Replace transfer 4WD position switch.**

OK

3	**Check for open and short circuit in harness and connector between transfer 4WD position switch and skid control ECU (See page IN-28).**

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

OK

4	**Check for open and short circuit in harness and connector between skid control ECU and ECM (See page IN-28).**

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

OK

Check and replace skid control ECU.

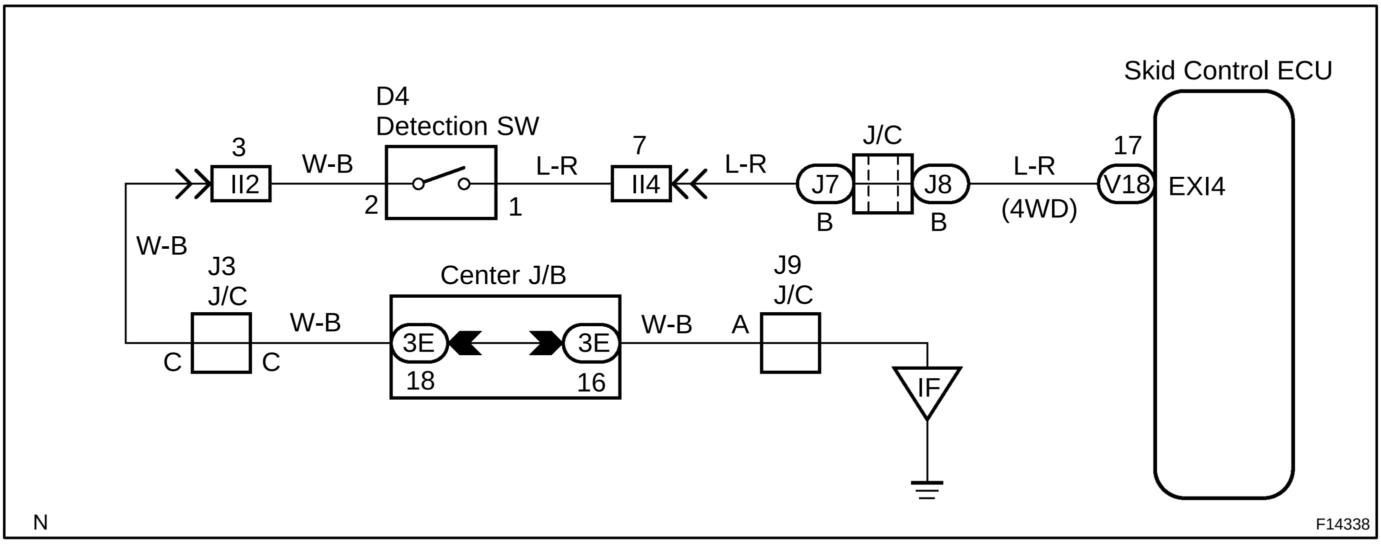
DI6BY-03

DTC	C1268 / 68	Transfer L4 Position Switch Circuit

CIRCUIT DESCRIPTION

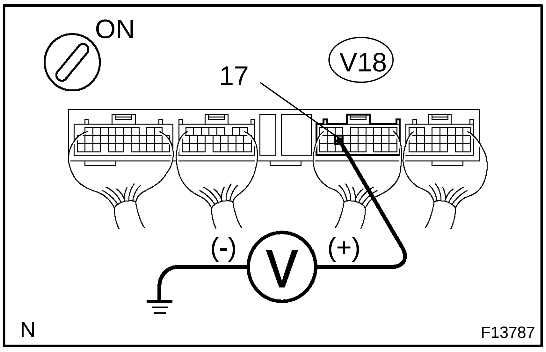
DTC No.	DTC Detecting Condition	Trouble Area
C1268 / 68	Open or short circuit in transfer L4 position switch circuit.	• Transfer L4 position switch • Transfer L4 indicator switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal EXI4 of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal EXI4 (V18 - 17) of the skid control ECU and body ground with the transfer shift lever in L4 position and in other than L4 position.

OK:

Voltage:
L4 position: Below 2.0 V
Except L4 position: 10 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-242).**

NG ↓

2	**Check transfer L4 position switch (See page TR-1 1).**

NG → **Replace transfer L4 position switch.**

OK ↓

3	**Check for open and short circuit in harness and connector between transfer L4 position switch and skid control ECU (See page IN-28).**

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

OK ↓

4	**Check for open and short circuit in harness and connector between skid control ECU and ECM (See page IN-28).**

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

OK

Check and replace skid control ECU.

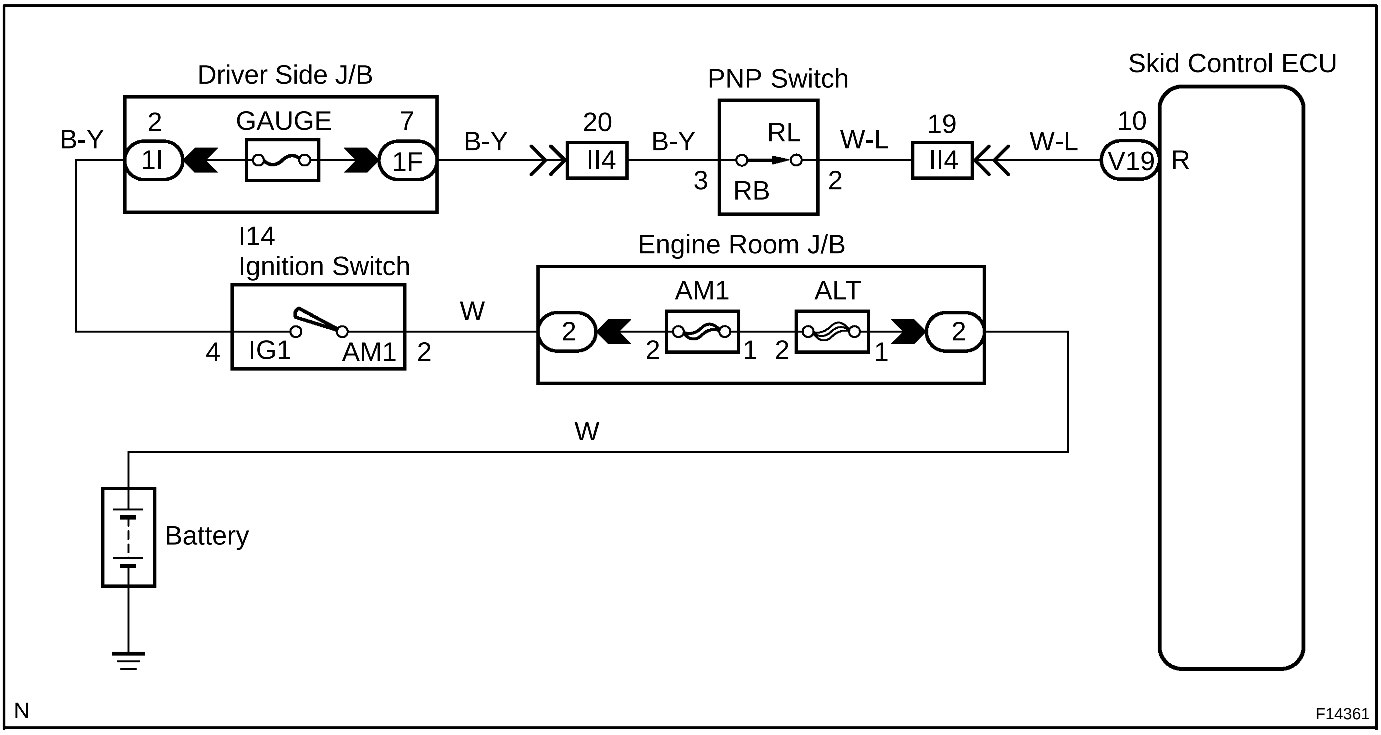
DI6BZ-03

DTC	C1269 / 69	PNP Switch Circuit (R range)

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1269 / 69	With the vehicle speed less than 15 km/h (9 mph), open circuit in R signal circuit is detected for more than 2 sec.	• PNP switch • PNP switch circuit (R range)

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 PNP switch (R range) circuit.**

PREPARATION:
(a) Connect the hand-held tester to 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:
Set the shift lever in the R range, and read the R signal on the hand-held tester.
OK:
”ON” is displayed.

OK → **Check and replace skid control ECU.**

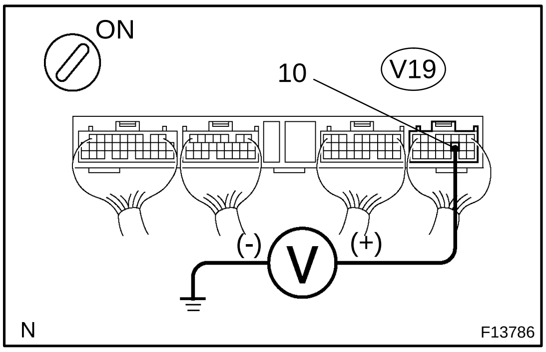
NG

2	**Check PNP switch (R range) (See page DI-159).**

NG → **Repair or replace PNP switch.**

OK

3	Check voltage between terminal R of skid control ECU and body ground.



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal R (V19 - 10) of the skid control ECU and body ground when the brake pedal is depressed and shift the shift lever to R position.

OK:

Voltage: 10 - 14 V

NG — **Go to step 4.**

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, ECU may be defective.

4	Check for open circuit in harness and connector between PNP switch (R range) and skid control ECU (See page IN-28).

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

OK

Check and replace skid control ECU.

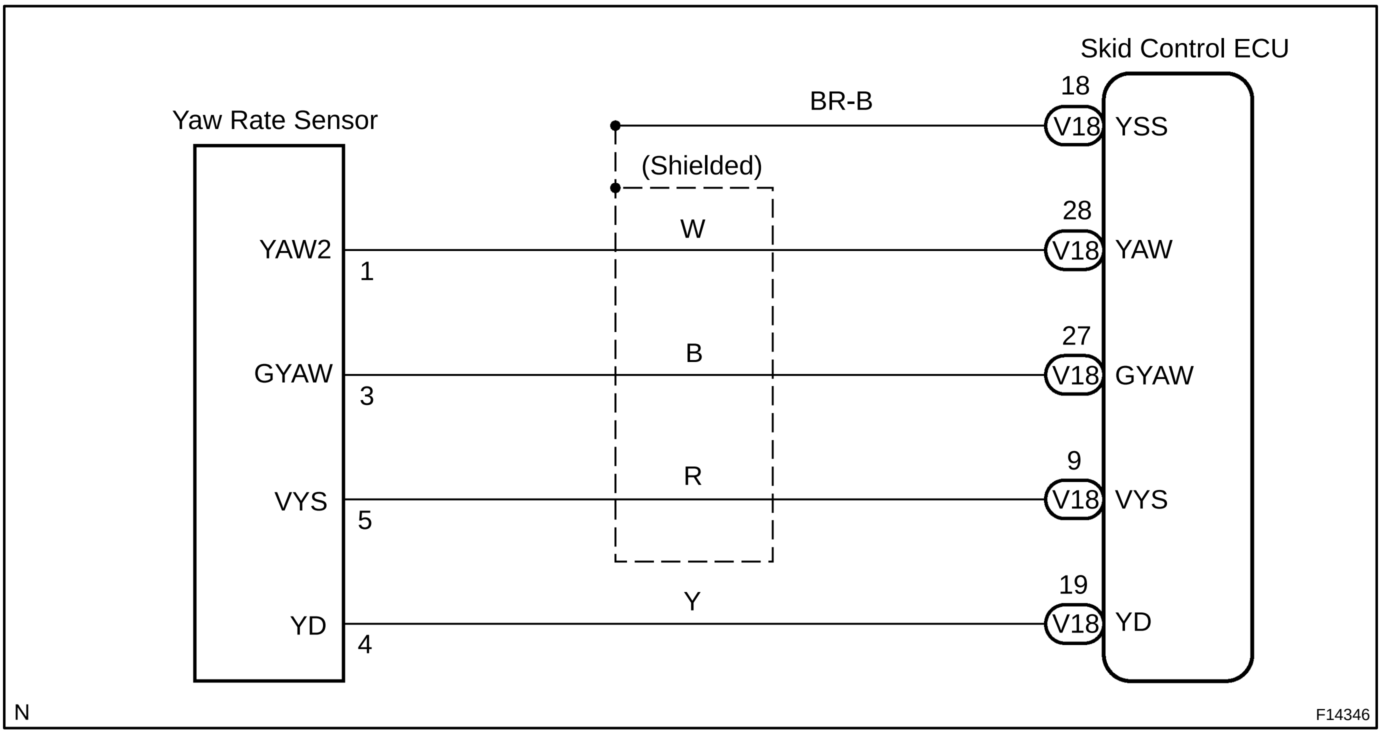
DI8XU-02

DTC	C1336 / 39	Zero Point Calibration of Deceleration Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1336 / 39	Either the condition 1. or 2. is detected: 1. In TEST mode, the shift lever is shifted to any position except P range within 2 sec. after ECU terminal IG1 is turned ON for the first time. 2. The deceleration sensor zero point recorded in ECU is deleted.	• Deceleration sensor • Deceleration sensor circuit • PNP switch circuit (P range)

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
After step 1 and 2, go to step 3 in case of using the hand-held tester, and go to step 5 in case of not using the hand-held tester.

1	**Perform zero point calibration of Deceleration sensor (See page DI-224).**

2	**Is DTC still output?**

Check DTC on page DI-224 .

NO → **No problem.**

YES

3	**Check output value of deceleration sensor.**

PREPARATION:
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and turn the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.
CHECK:
Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing when the vehicle is tilted.
OK:
Deceleration value must be changing.

OK → **Go to step 3.**

NG

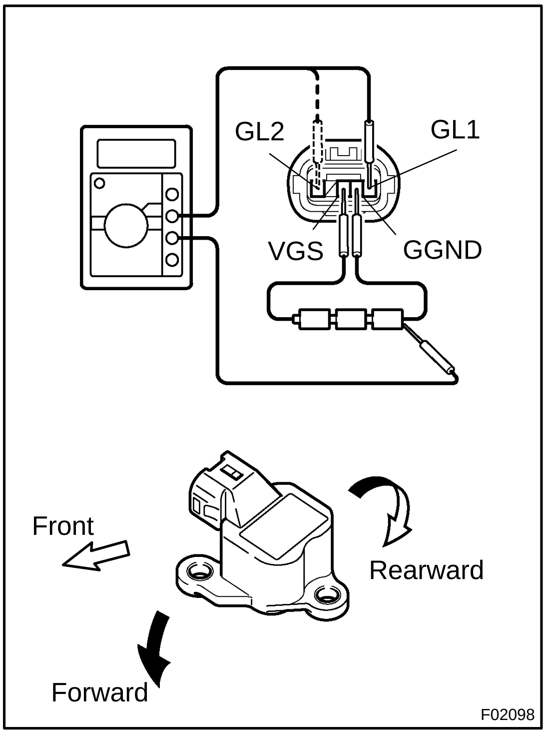
4	**Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).**

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

OK

Replace deceleration sensor.

5	**Check deceleration sensor.**



PREPARATION:

(a) Remove the consol box.

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

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

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

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

HINT:

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

NG	**Replace deceleration sensor.**

OK

6	Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).

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

OK

Check and replace skid control ECU.

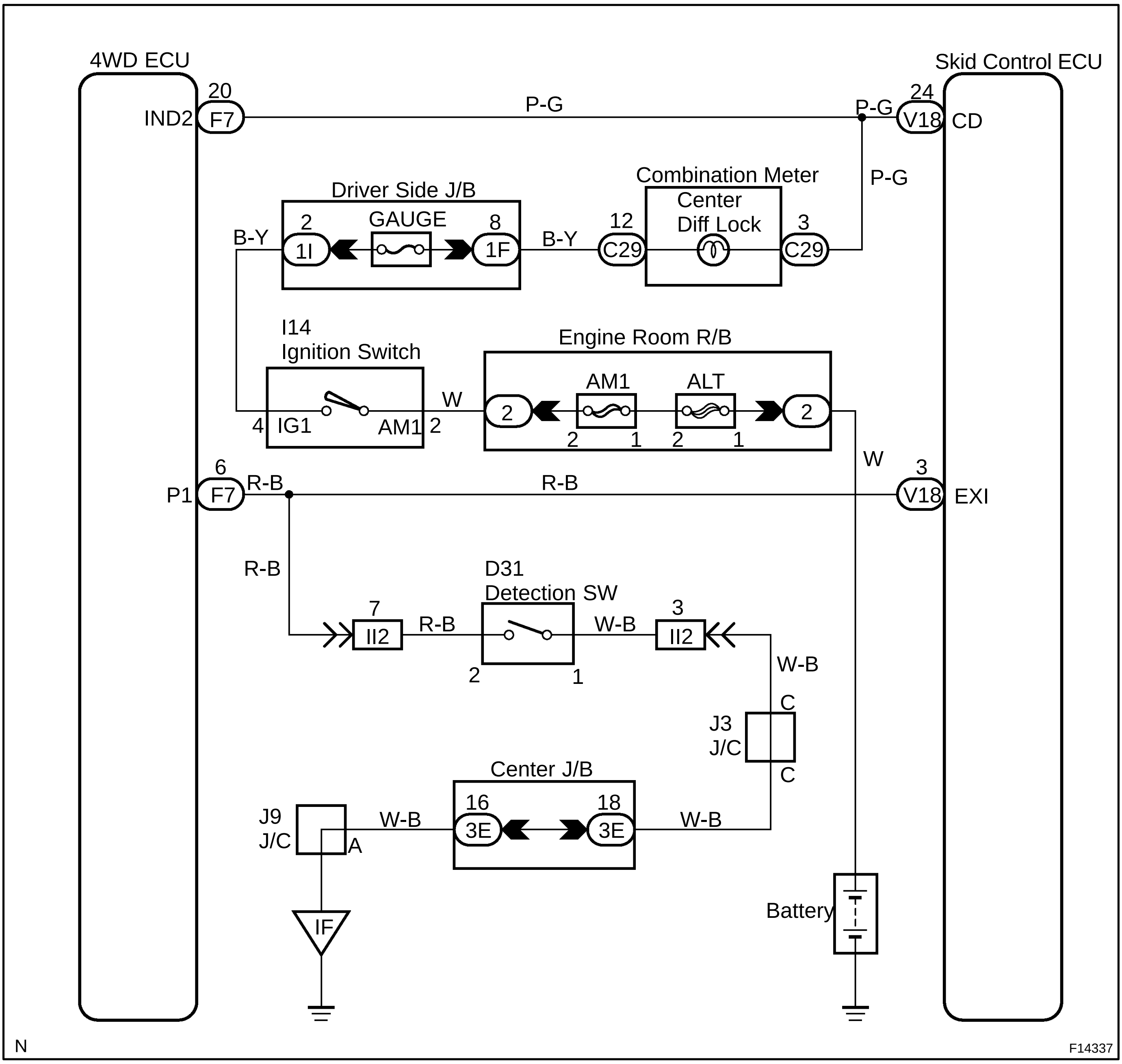
DI6CN-03

DTC	C1340 / 47	Center Differential Lock Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1340 / 47	Open or short circuit in center differential lock circuit.	• Center differential lock system • Center differential lock circuit • Center differential lock indicator light circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check that center differential is free and center diff. lock switch is OFF.**

NG → **Repair center differential lock system.**

OK

2	**Is DTC output?**

Check DTC on page DI-224 .

NO → **Normal.**

YES

3	**Check that bulb for center diff. lock indicator light is not burnt out.**

YES → **Replace indicator light.**

NO

4	**Check for open circuit in harness and connector between center diff. lock switch and skid control ECU, skid control ECU and center diff. lock indicator light (See page IN-28).**

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

OK

Check and replace skid control ECU.

DI8XV-02

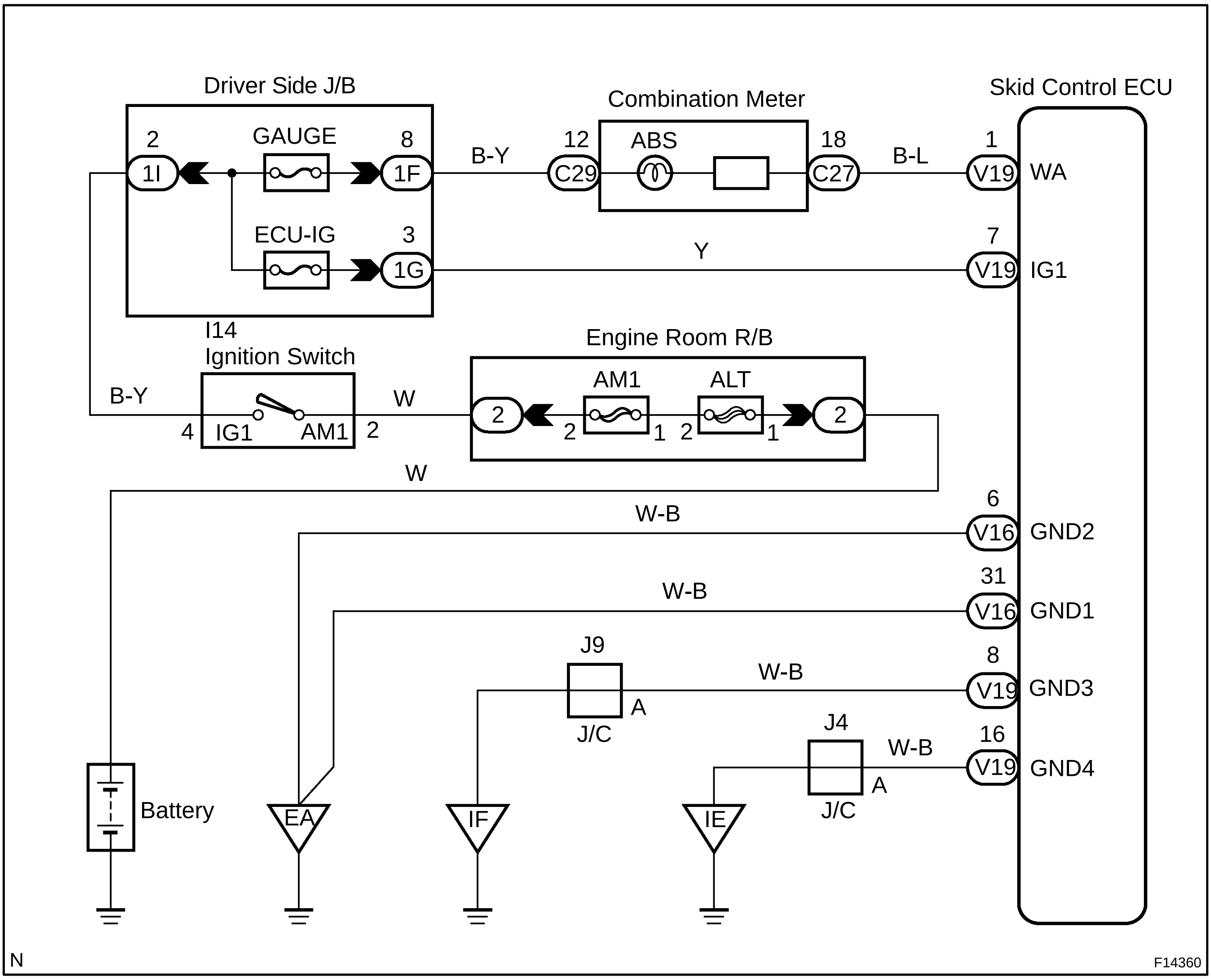
DTC	Always ON	Malfunction in ECU ABS Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either the condition 1. or 2. is detected: 1. The ECU connectors are disconnected from the ECU. 2. There is a malfunction in the ECU internal circuit.	• Battery • Charging system • Power source circuit • Skid control ECU

HINT:
There is a case that the hand-held tester cannot be used when ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Is DTC output?**

Check DTC on page DI-224 .

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

NO ↓

2	**Check that ECU connectors are securely connected to ECU.**

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

YES ↓

3	**Check battery positive voltage.**

CHECK:
Check the battery positive voltage.
OK:
Voltage: 10 - 14 V

NG → **Check and repair charging system.**

OK ↓

4	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

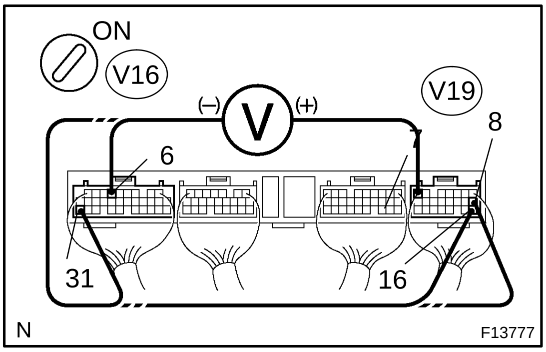
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

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 skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 (V19 - 7) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

OK:

Voltage: 10 - 14 V

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

NG

5	Check operation of ABS warning light.

In case of using the hand-held tester:

PREPARATION:

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

CHECK:

Check that ”ON” and ”OFF” of the ABS warning light can be shown on the combination meter by the hand-held tester.

In case of not using the hand-held tester:

PREPARATION:

(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the skid control ECU.
(c) Turn the ignition switch ON.

CHECK:

Check that the ABS warning light goes off.

OK → **Check and replace combination meter (See page BE-40).**

NG ↓

6	Check for short circuit in harness and connector between combination meter and skid control ECU (See page IN-28).

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

OK ↓

Check and replace skid control ECU.

DI6CO-03

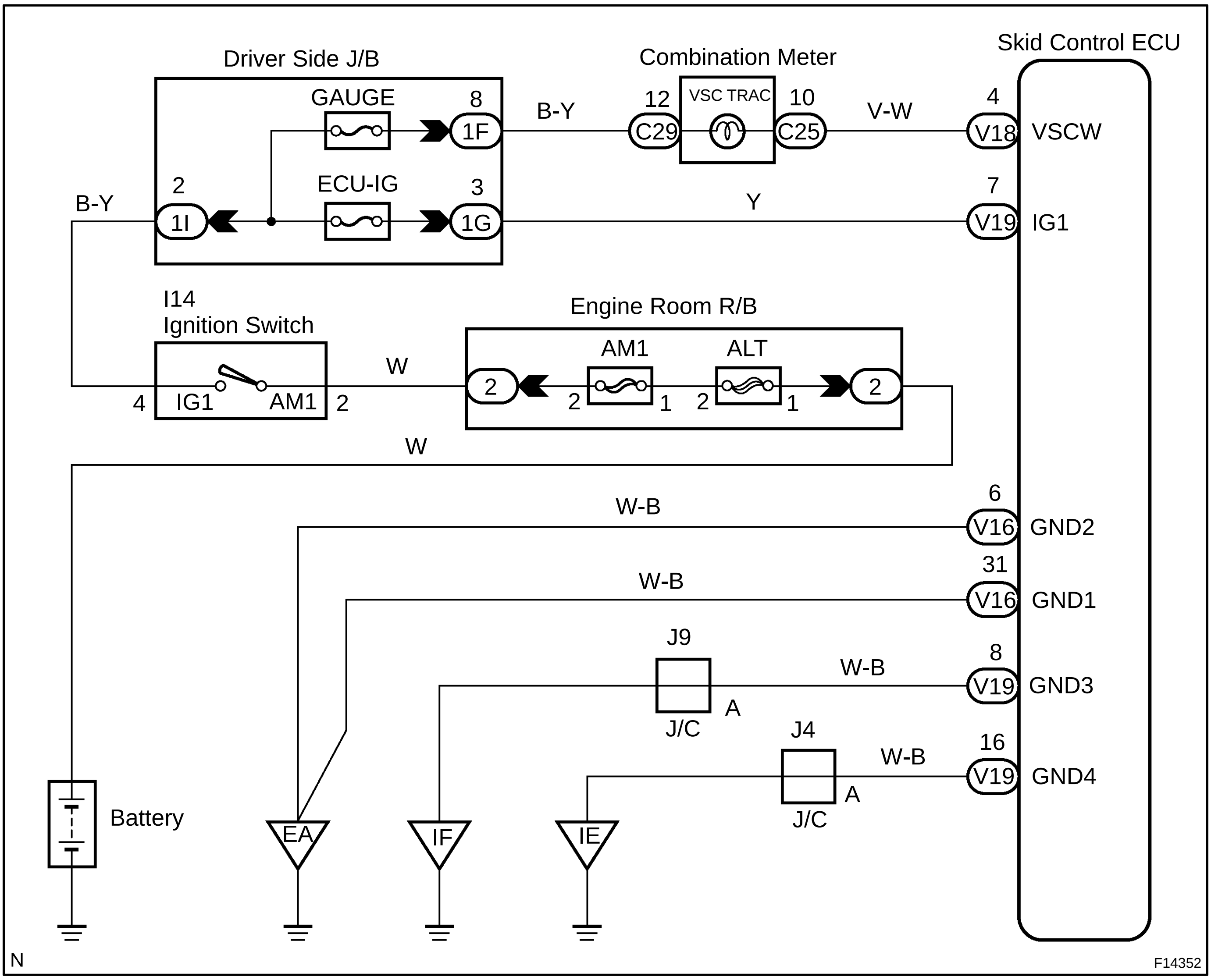
DTC	Always ON	Malfunction in ECU VSC TRAC Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	There is a malfunction in the ECU internal circuit.	• Power source circuit • VSC TRAC warning light circuit • Skid control ECU

HINT:
If fail safe function is activated in VSC system, the ”VSC OFF” indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check that ECU connectors are securely connected to ECU.**

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

YES ↓

2	**Is DTC output for VSC?**

Check DTC on page DI-224 .

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

NO ↓

3	**Does VSC TRAC warning light go off?**

YES → **Check for open and short circuit in harness and connector between ECU-IG fuse and ECU (See page IN-28).**

NO ↓

4	**Check battery positive voltage.**

CHECK:
Check the battery positive voltage.
OK:
Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK

5	**Check operation of VSC TRAC warning light.**

In case of using the hand-held tester:
PREPARATION:
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.
CHECK:
Check that "ON" and "OFF" of the VSC TRAC warning light can be shown on the combination meter on the hand-held tester.
In case of not using the hand-held tester:
PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the skid control ECU.
(c) Turn the ignition switch ON.
CHECK:
Check that the VSC TRC warning light goes off.

NG → **Check and replace combination meter (See page BE-40).**

OK

6	**Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC1 (See page IN-28).**

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

OK

Check and replace skid control ECU

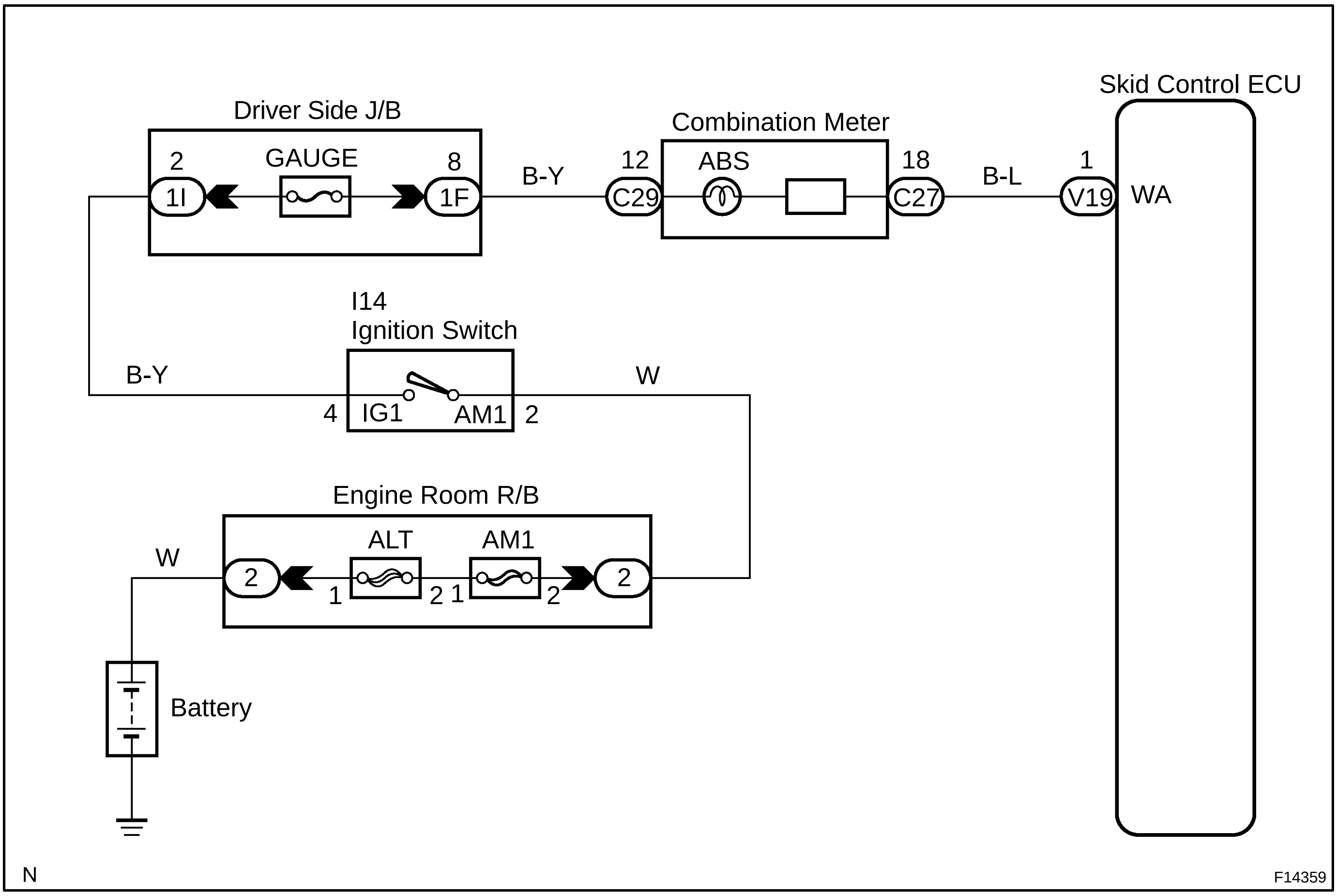
DI8XW-02

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while prohibiting ABS control. At this time, the ECU records DTC in memory.
Connect terminals Tc and E_1 of DLC1 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 the 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 the hand-held tester.

1	Check operation of ABS warning light.

PREPARATION:

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

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

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

CHECK:

Check that ”ON” and ”OFF” of the ABS warning light can be shown on the combination meter by the hand-held tester.

OK → **Check and replace skid control ECU.**

NG

2	Check ABS warning light.

See the combination meter troubleshooting on page BE-40 .

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

OK

Check for short circuit in harness and connector between combination meter and skid control ECU (See page BE-40). Repair or replace harness or connector.

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

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

YES

4	**Check operation of ABS warning light (See step 1).**

OK → **Check and replace skid control ECU.**

NG

5	**Is DTC output?**

Check DTC on page DI-224 .

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

NO

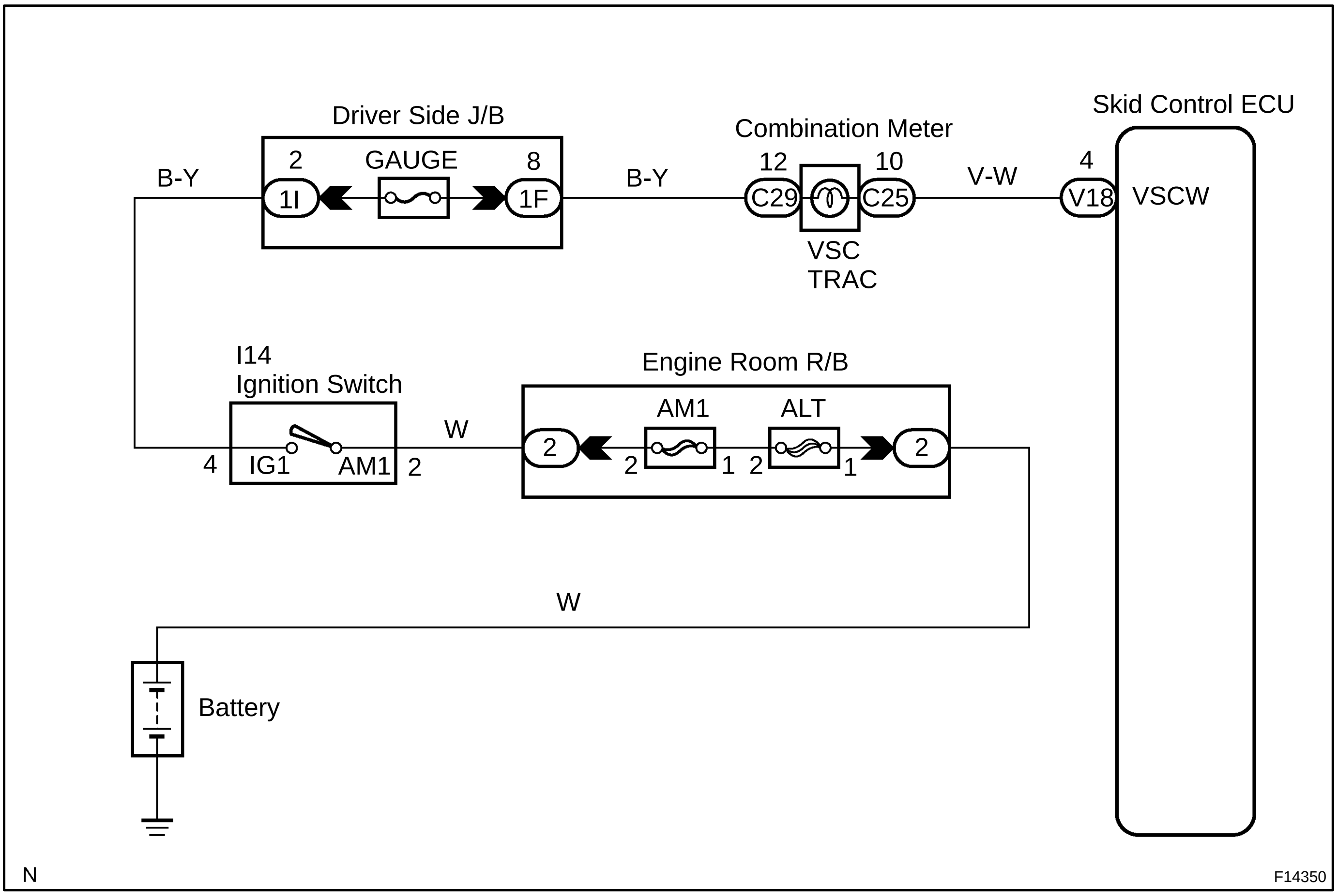
Check for open circuit in harness and connector between combination meter and skid control ECU (See page IN-28). Repair or replace harness or connector.

VSC TRAC Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU stores DTC, the VSC TRAC warning light lights on the combination meter.

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 VSC TRAC warning indicator.**

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

CHECK:
Check that ”ON” and ”OFF” of the VSC TRAC warning light can be shown on the combination meter by the hand-held tester.

OK → **Check and replace skid control ECU.**

NG ↓

2	**Is DTC output for VSC?**

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

NO ↓

3	**Check for open and short circuit in harness and connector between skid control ECU and VSC TRAC warning light (See page IN-28).**

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

OK ↓

4	**Check VSC TRAC warning light.**

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

OK

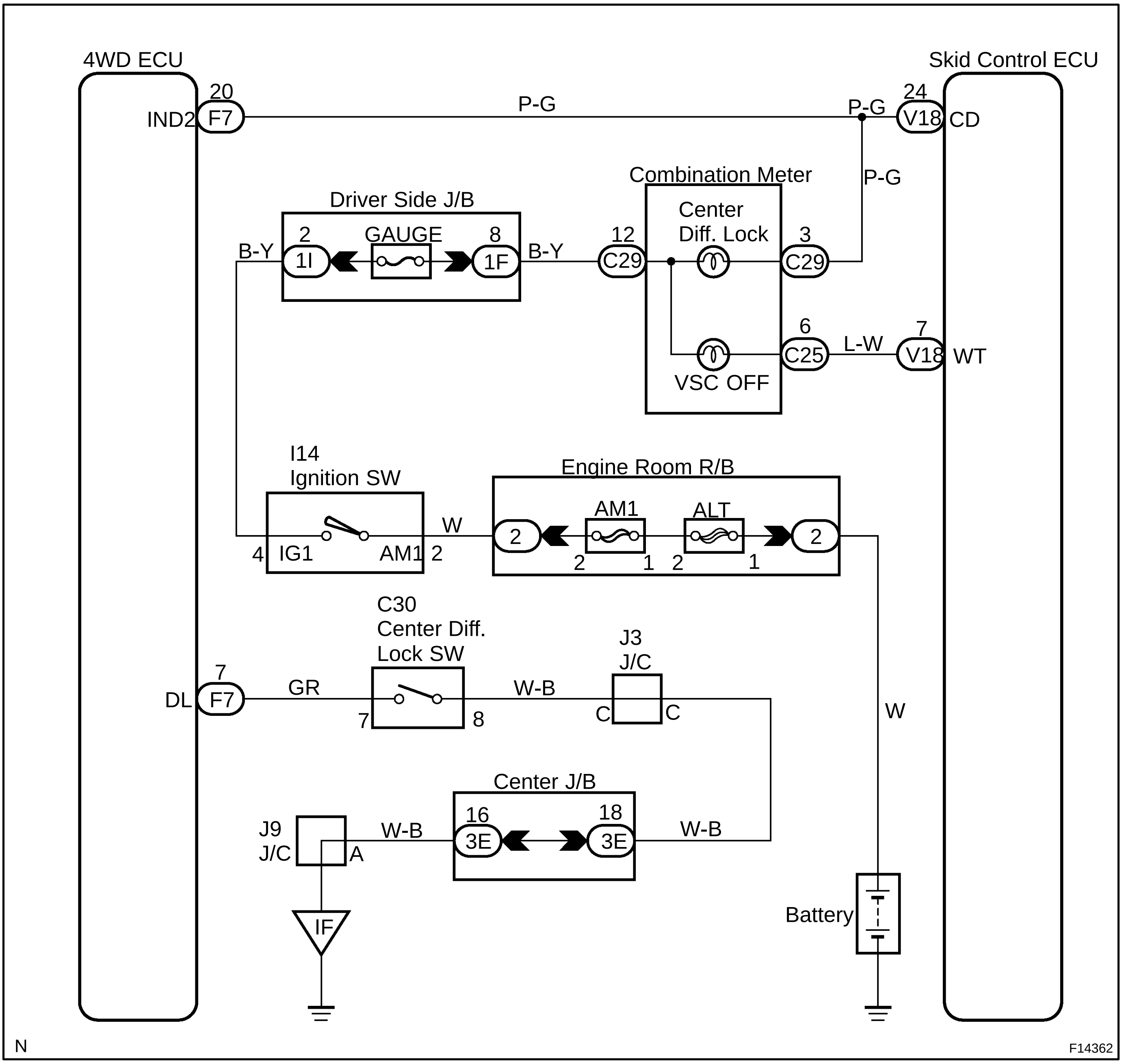
Check and replace skid control ECU.

4WD:
VSC OFF Indicator Light, Center Diff. Lock Switch Circuit

CIRCUIT DESCRIPTION

When the center differential is locked, VSC control goes off and the VSC OFF indicator lights up. Also, the VSC OFF indicator light goes on when the VSC system is at the fail safe control.

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 VSC OFF indicator light.**

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the VSC OFF indicator light can be shown on the combination meter by the hand-held tester.

NG → **Go to step 4.**

OK ↓

2	**Check center diff. lock switch (See page TR-11).**

NG → **Replace center diff. lock switch.**

OK ↓

3	**Check for open and short circuit in harness and connector between terminal EXI of skid control ECU and center diff. lock switch and body ground (See page IN-28).**

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

OK ↓

4	Check VSC OFF indicator light.

NG → Repair or replace combination meter.

OK

5	Check for open and short circuit in harness and connector between terminal WT of skid control ECU and VSC OFF indicator light (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

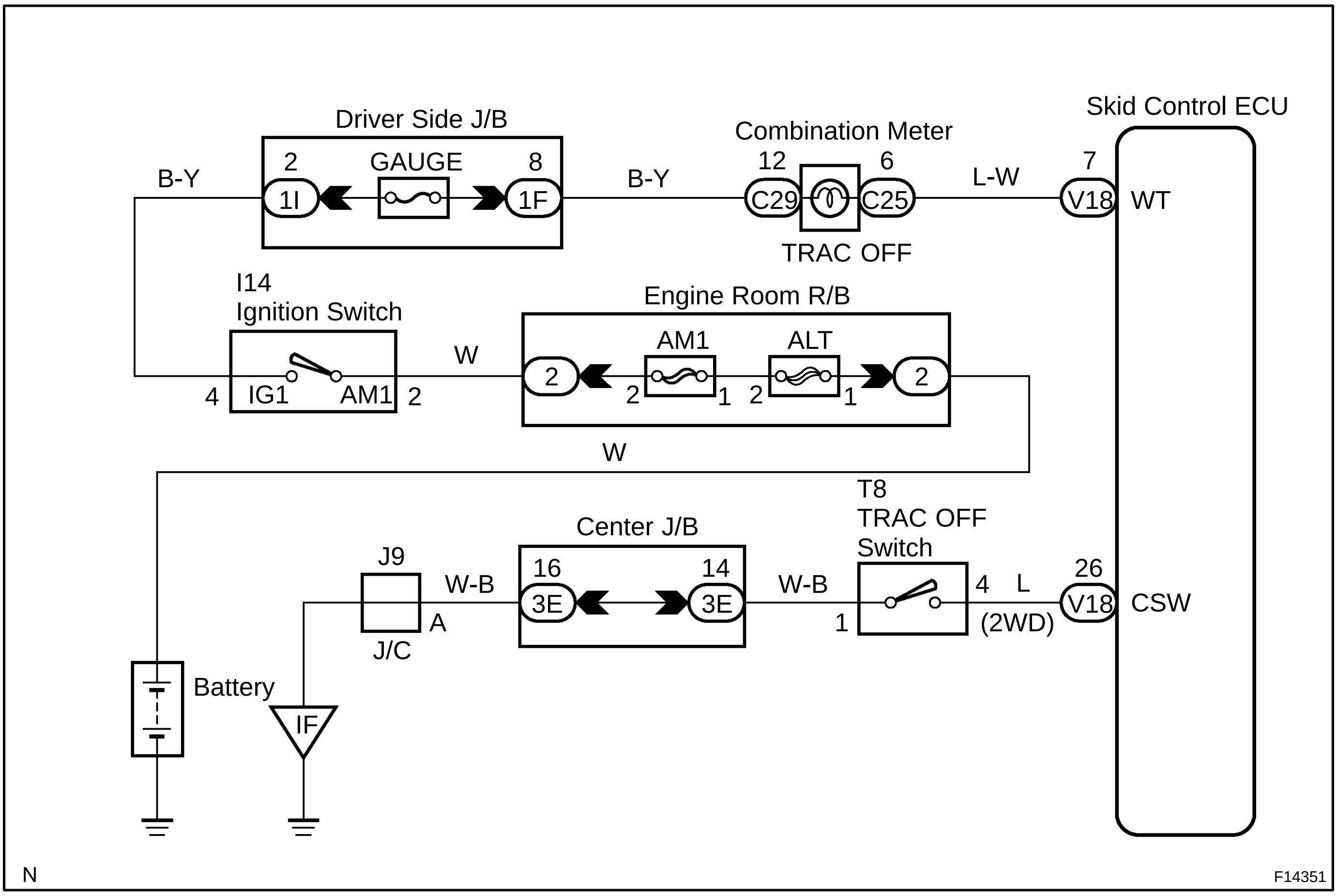
DI3JI-04

2WD:
TRAC OFF Indicator, TRAC OFF Switch Circuit

CIRCUIT DESCRIPTION

This is the TRAC control main switch. When the TRAC OFF switch is pushed on, TRAC control goes off and the TRAC OFF indicator light lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

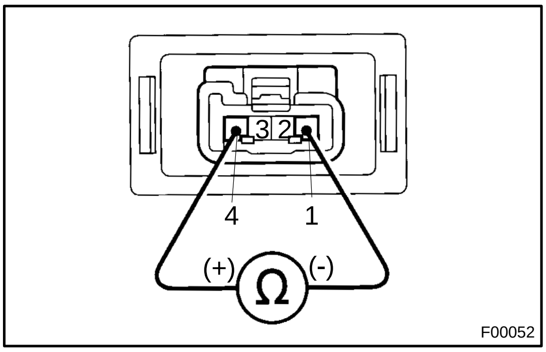
1	**Check DTC.**

Check DTC on page DI-224 .

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

NO

2	**Check TRAC OFF switch.**



PREPARATION:

(a) Remove the TRAC OFF switch.

(b) Disconnect the TRAC OFF switch connector.

CHECK:

Measure resistance between terminals 1 and 4 of the TRAC OFF switch when the TRAC OFF switch is ON and OFF.

OK:

TRAC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRAC OFF switch.**

OK

3	**Check for open and short circuit in harness and connector between terminal CSW of skid control ECU and TRAC OFF switch and body ground (See page IN-28).**

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

OK

4	**Check TRAC OFF indicator light.**

See the combination meter troubleshooting on page BE-2 .

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

OK

5	**Check for open and short circuit in harness and connector between terminal WT of skid control ECU and TRAC OFF indicator light (See page IN-28).**

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

OK

Check and replace skid control ECU.

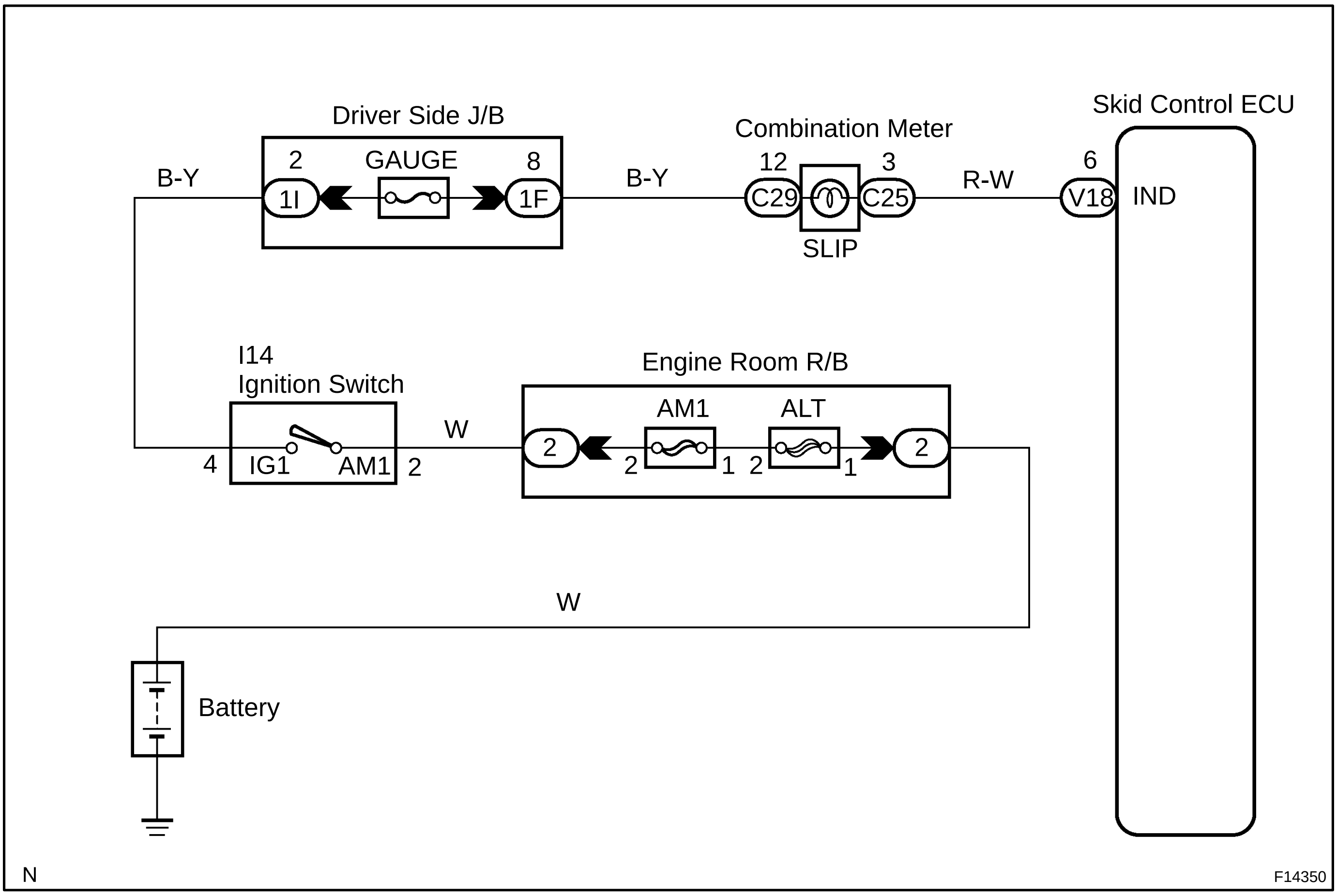
DI6CQ-03

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that SLIP indicator light is ON for 3 sec. soon after ignition switch is turned ON.

OK → Check and replace skid control ECU.

NG ↓

2	Check SLIP indicator light.

NG → Repair or replace combination meter check.

OK ↓

3	Check for open and short circuit in harness and connector between skid control ECU and SLIP indicator light (See page IN-28).

NG → Repair or replace harness or connector.

OK ↓

Check and replace skid control ECU.

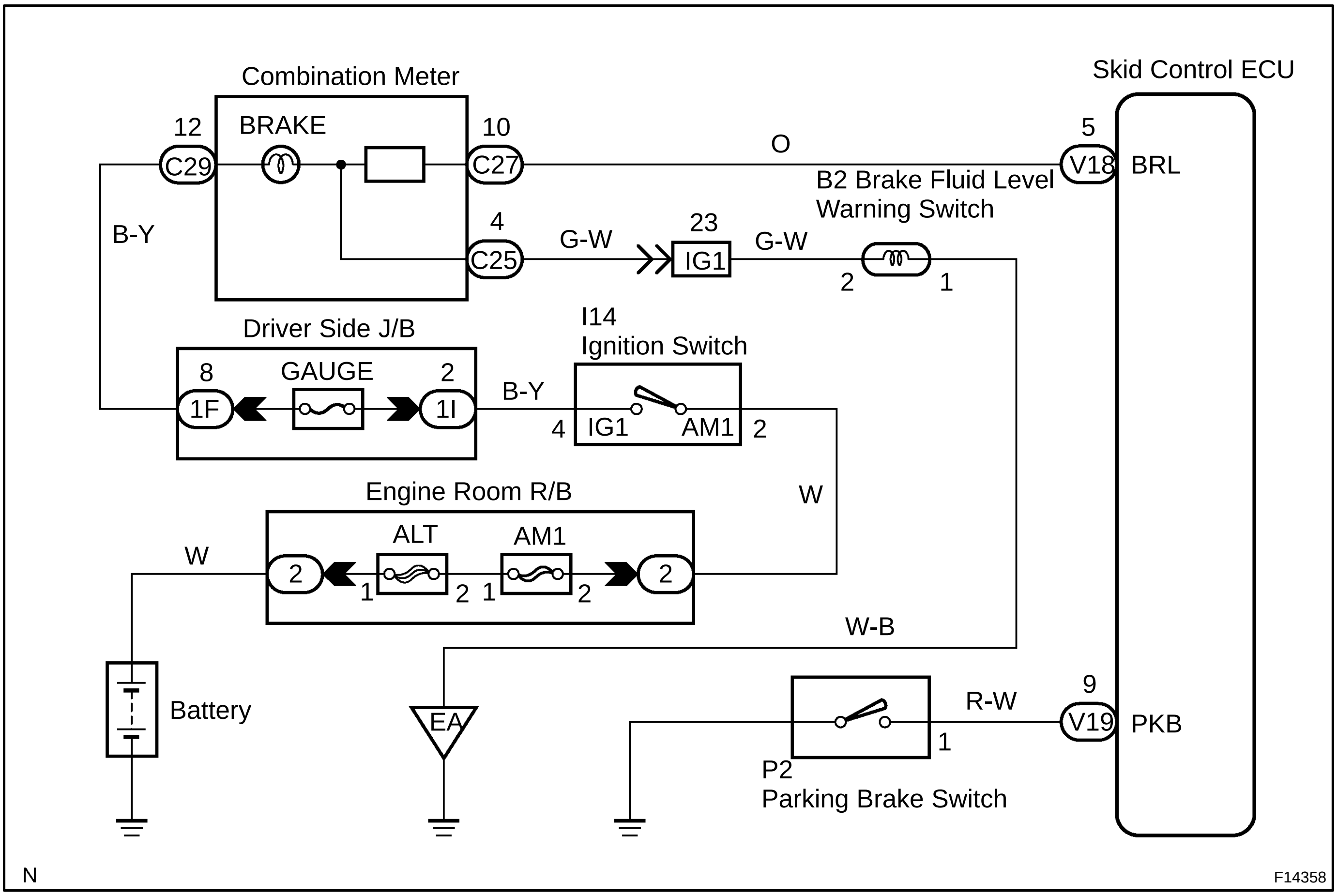
DI6C2-03

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.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check parking brake switch circuit (See page BE-45).

NG → **Repair or replace parking brake switch circuit.**

OK

2	Check brake fluid level warning switch circuit (See page BE-45).

NG → Repair or replace brake fluid level warning switch circuit.

OK ↓

3	Is DTC output for ABS ?

Yes → Repair circuit indicated by the output code.

No ↓

4	Check BRAKE warning light.

See the combination meter troubleshooting on page BE-40 .

NG → Repair or replace combination meter.

OK ↓

Check and replace skid control ECU.

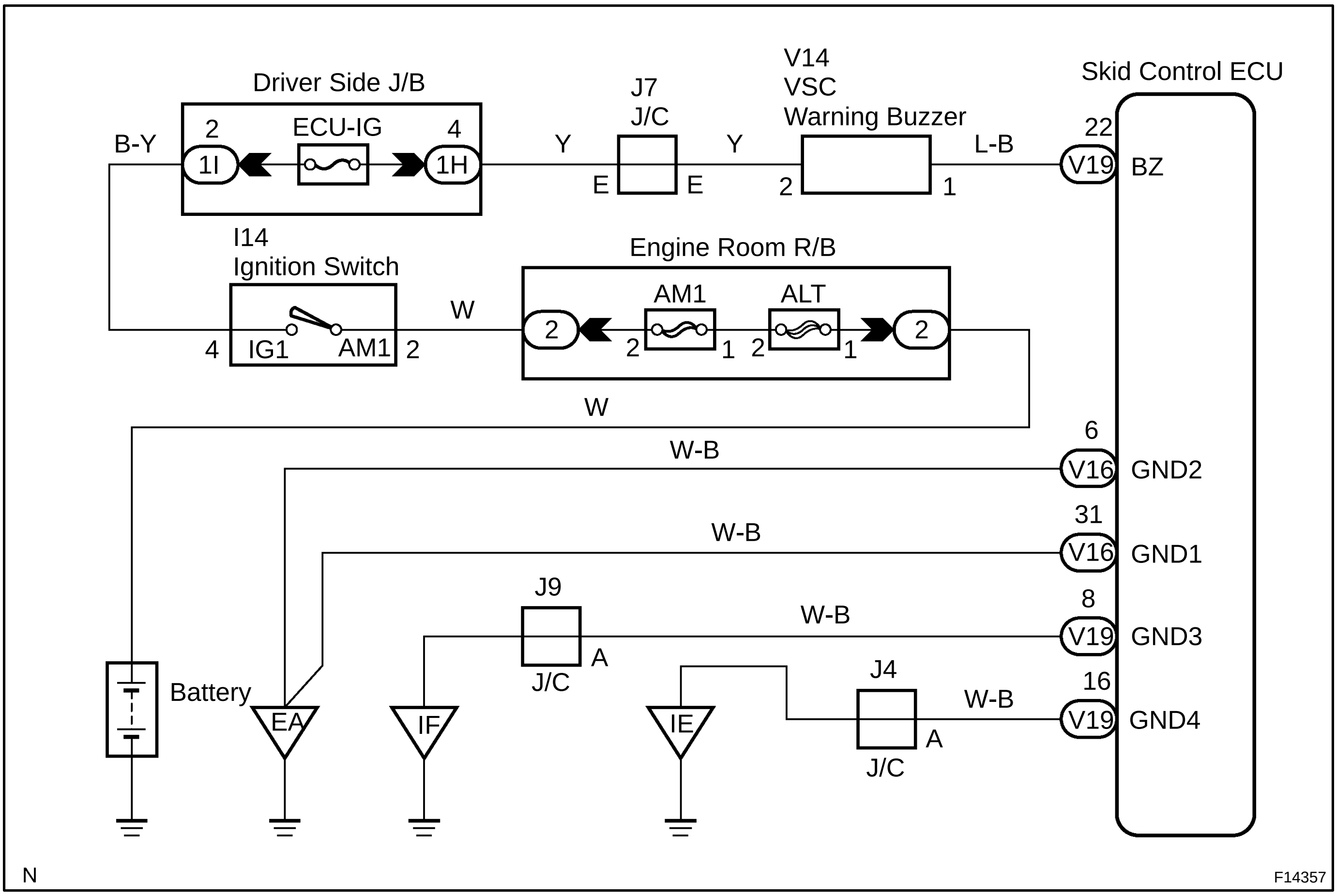
DI6C3-03

VSC Warning Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC warning buzzer sounds while the accumulator pressure is abnormally low or an abnormality causing low fluid pressure occurs.

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 VSC buzzer.**

PREPARATION:

(a) Connect the hand-held tester to 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.

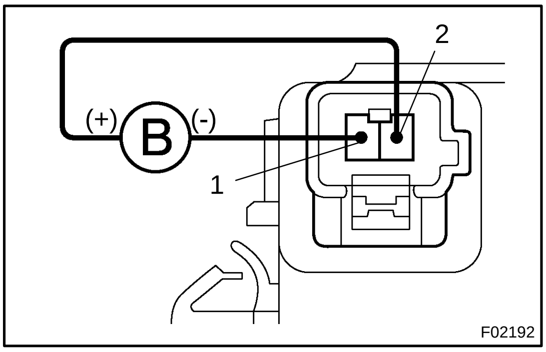
CHECK:

Check that the VSC warning buzzer sounds ”ON” and ”OFF” with the hand-held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Check VSC warning buzzer.**



PREPARATION:

Disconnect the VSC warning buzzer connector.

CHECK:

Apply battery positive voltage to terminals 1 and 2 of the VSC buzzer connector, check that the VSC warning buzzer sounds.

NG → **Replace VSC warning buzzer.**

OK

3	Check for open and short circuit in harness and connector between skid control ECU and VSC warning buzzer (See page IN-28).

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

OK

Check and replace skid control ECU.

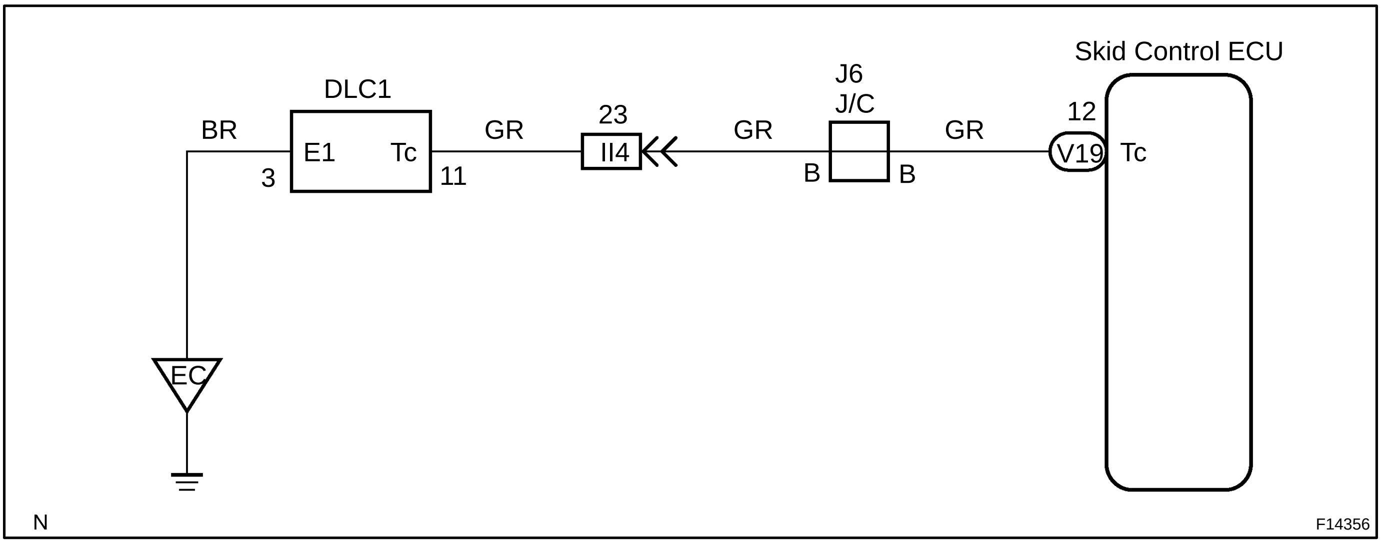
DI6C4-03

Tc Terminal Circuit

CIRCUIT DESCRIPTION

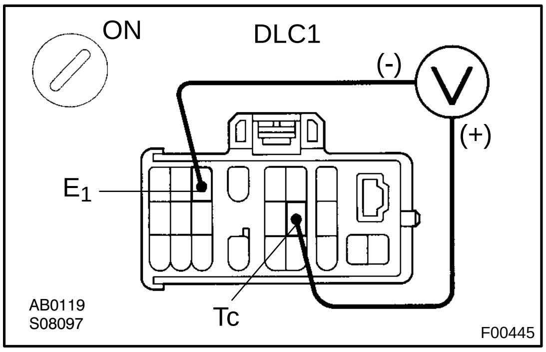
Connecting terminals Tc and E_1 of DLC1 causes the ECU to display the DTC by flashing the ABS warning light and VSC TRAC warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E_1 of DLC1.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Tc and E_1 of DLC1.

OK:

Voltage: 10 - 14 V

OK → **If ABS warning light does not blink even after Tc and E_1 have been connected, ECU may be defective.**

NG

2	IG switch OFF, and check for open and short circuit in harness and connector between skid control ECU and DLC1, DLC1 and body ground (See page IN-28).

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

OK

Check and replace skid control ECU.

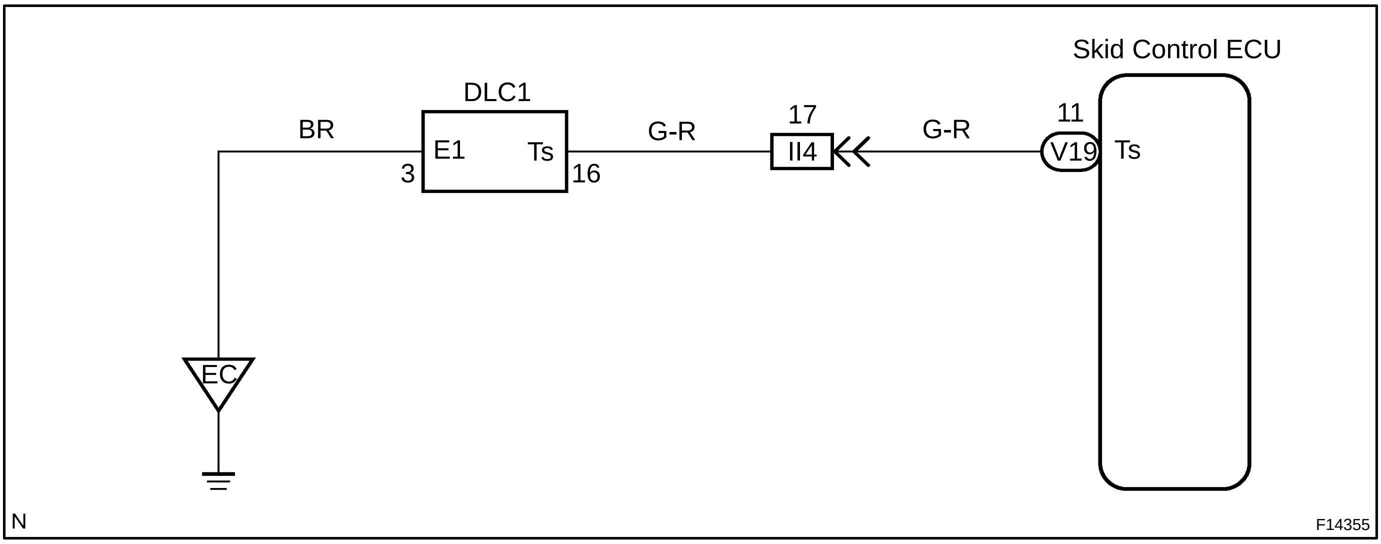
DI6C5-03

Ts Terminal Circuit

CIRCUIT DESCRIPTION

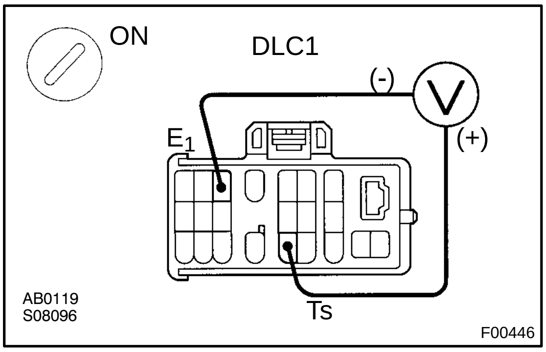
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected by the DTC check.
Connecting terminals Ts and E_1 of DLC1 or Tc starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and E_1 of DLC1.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and E_1 of DLC1.

OK:

Voltage: 10 - 14 V

OK → **If ABS warning light does not blink even after Ts and E_1 have been connected, ECU may be defective.**

NG ↓

2	IG switch OFF, and check for open and short circuit in harness and connector between skid control ECU and DLC1, DLC1 and body ground (See page IN-28).

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

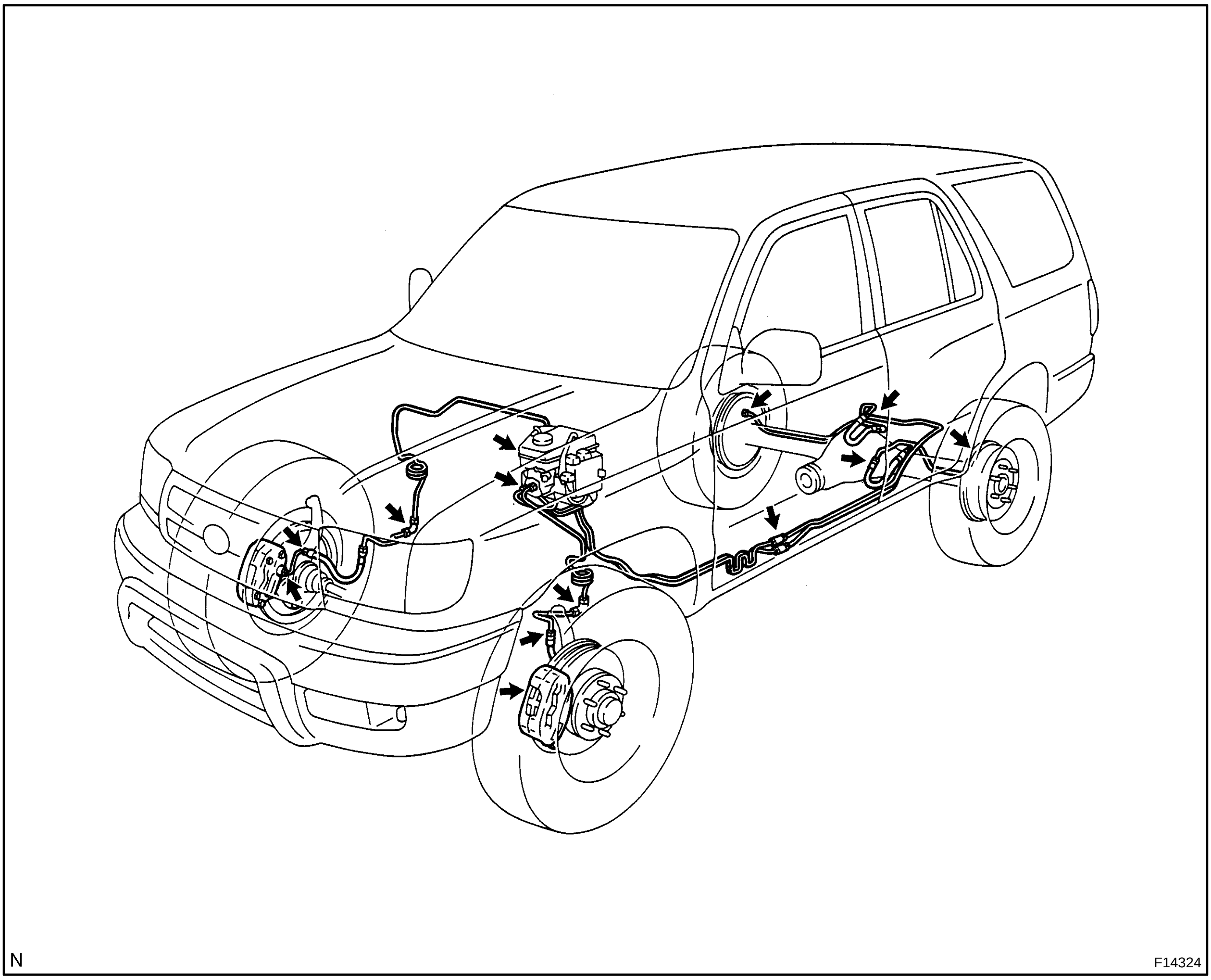
OK ↓

Check and replace skid control ECU.

DI6CU-02

Check for Fluid Leakage

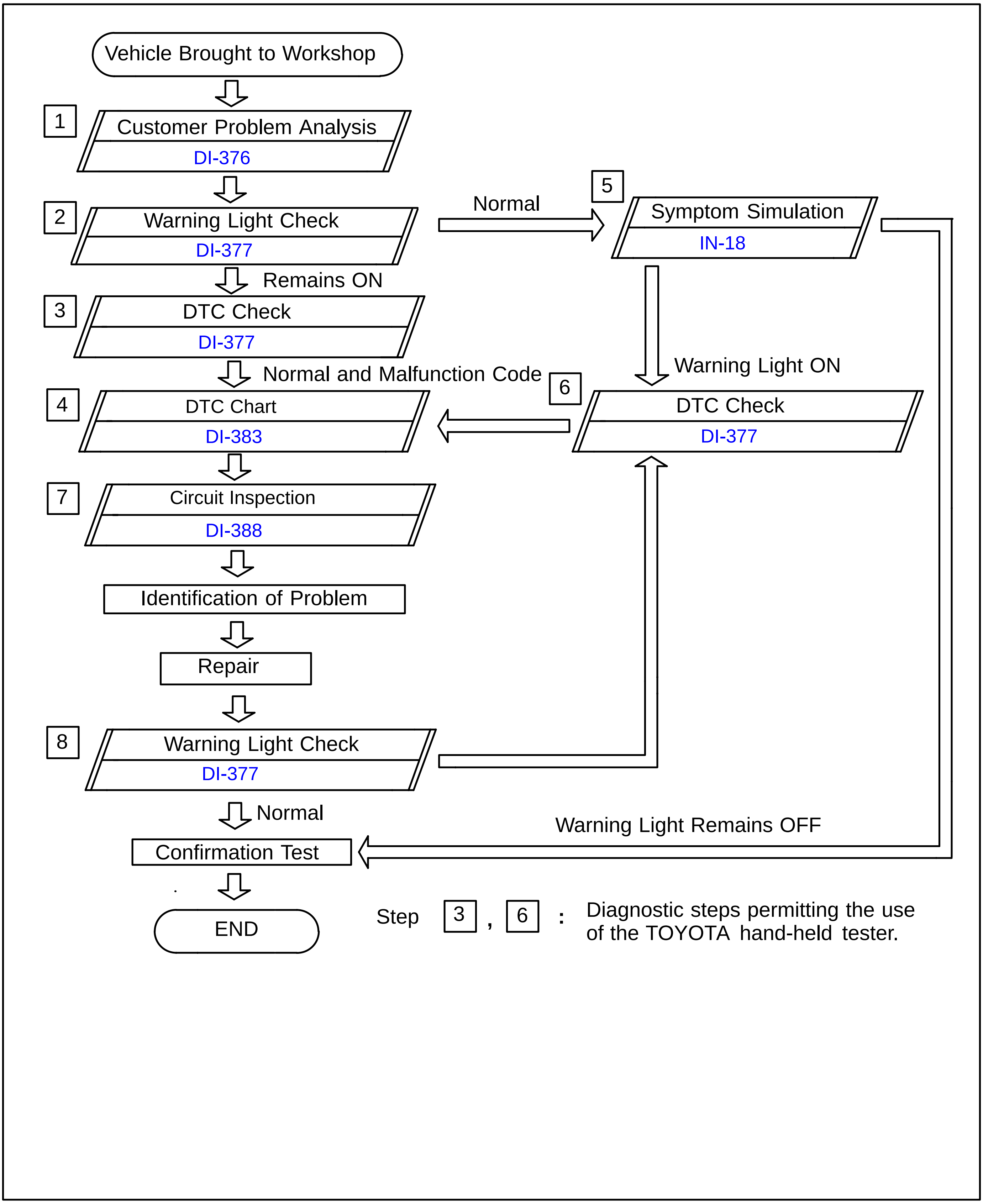
Check for fluid leakage from the actuator or the hydraulic lines.



SUPPLEMENTAL RESTRAINT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI18J-16



DI18K-03

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

Inspector's Name ____________________

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

Date Problem Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	**Approx.**

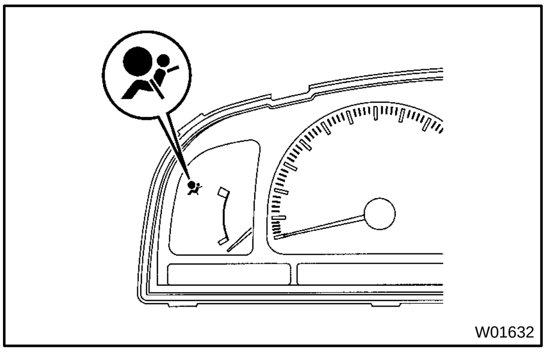
Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

Vehicle Inspection and 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.]

DI58G-01



PRE-CHECK

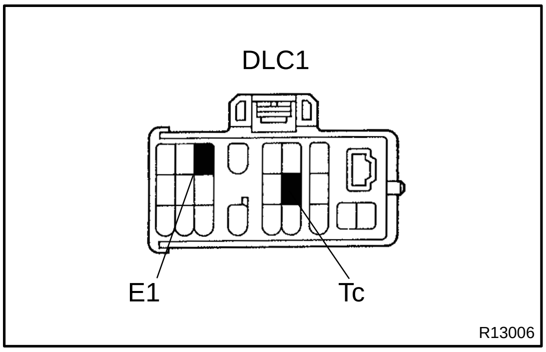
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ACC or ON position and check that the SRS warning light lights up.

(b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the SRS warning light remains ON or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on page DI-459 , DI-461 .



2. DTC CHECK (Using diagnosis check wire)

(a) Present trouble codes:

Output the DTC.

(1) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

(2) Using SST, connect terminals Tc and E1 of the DLC1.

SST 09843-18020

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

(b) Past trouble codes:

Output the DTC.

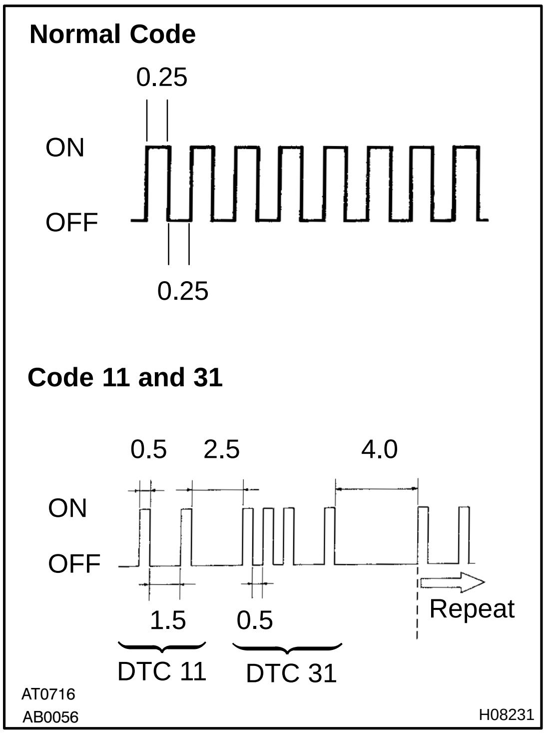
(1) Using SST, connect Terminals Tc and E1 of the DLC1.

SST 09843-18020

(2) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.



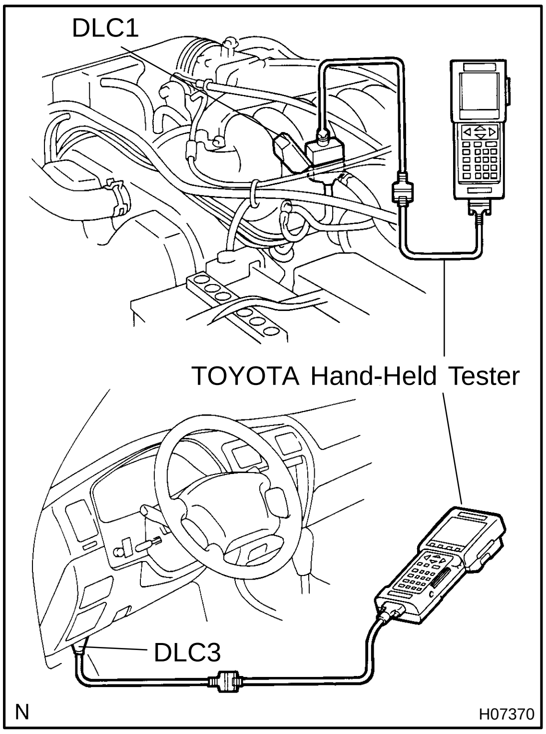
(c) Read the DTC.
Read the 2-digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- Normal code indication
  The light will blink 2 times per second.
- Malfunction code indication
  The first blinking output indicates the first digit of a 2-digit DTC. After a 1.5-second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5-second pause between each code. After all the codes have been output, there will be a 4.0-second pause and they will all be repeated.

HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page DI-465 .



3. DTC CHECK (Using TOYOTA hand-held tester)

(a) Hook up the TOYOTA hand-held tester to the DLC1 or DLC3.

(b) Read the DTCs by following the prompts on the tester screen.

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

4. DTC CLEARANCE (Not using service wire)

When the ignition switch is turned OFF, the diagnostic trouble code is cleared.

5. DTC CLEARANCE (Using service wire)

(a) Connect the 2 service wires to terminals Tc and AB of DLC1.

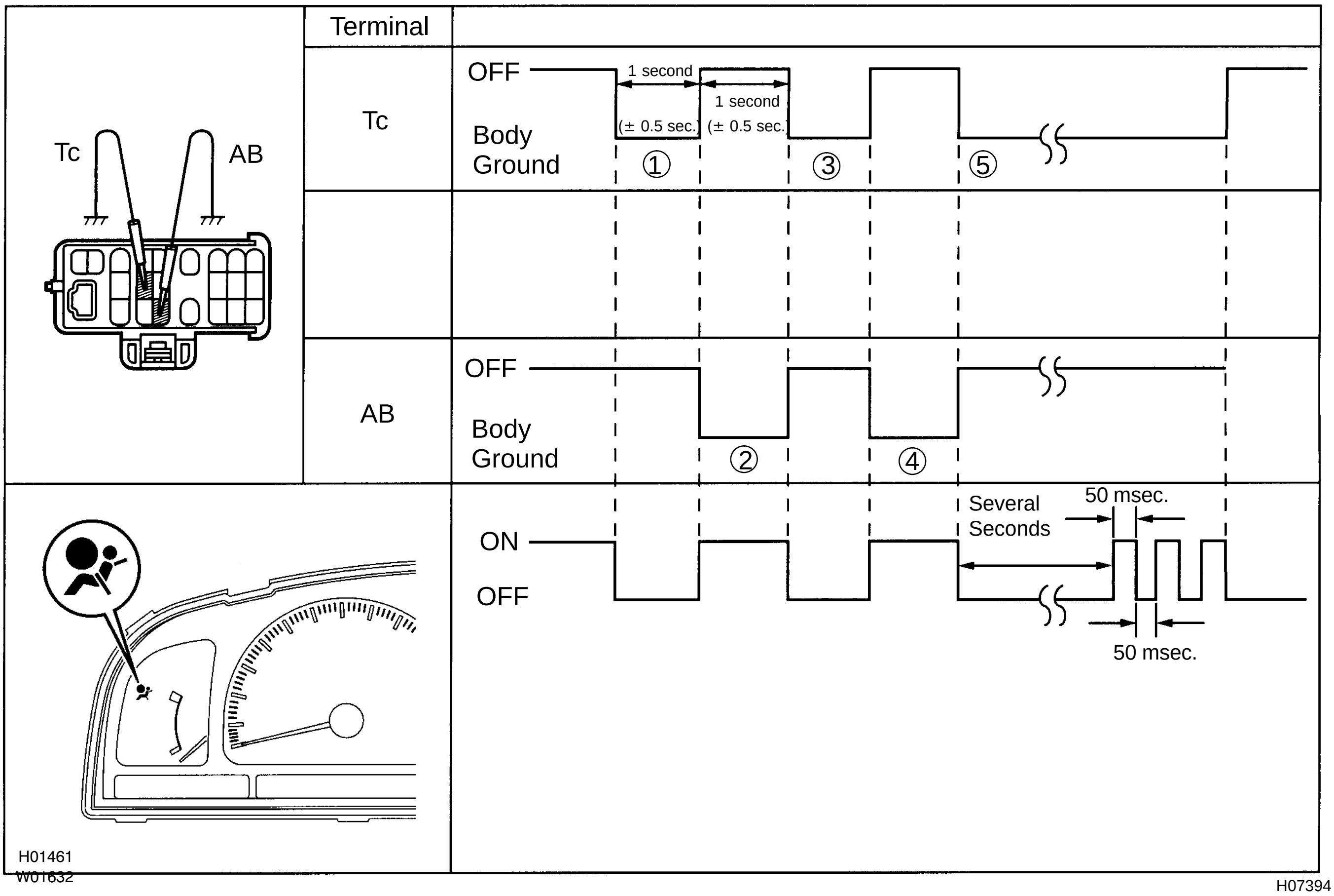
(b) Turn the ignition switch to ACC or ON and wait for approx. 6 seconds.

(c) Starting with the Tc terminal, ground alternately terminal Tc and terminal AB twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remains grounded.

HINT:

When alternately grounding terminals Tc and AB, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

If DTCs are not cleared, repeat the above procedure until the codes are cleared.



(d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 msec. cycle to indicate the codes which have been cleared.

6. Past trouble codes:
DTC CLEARANCE
(See step 5.)

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

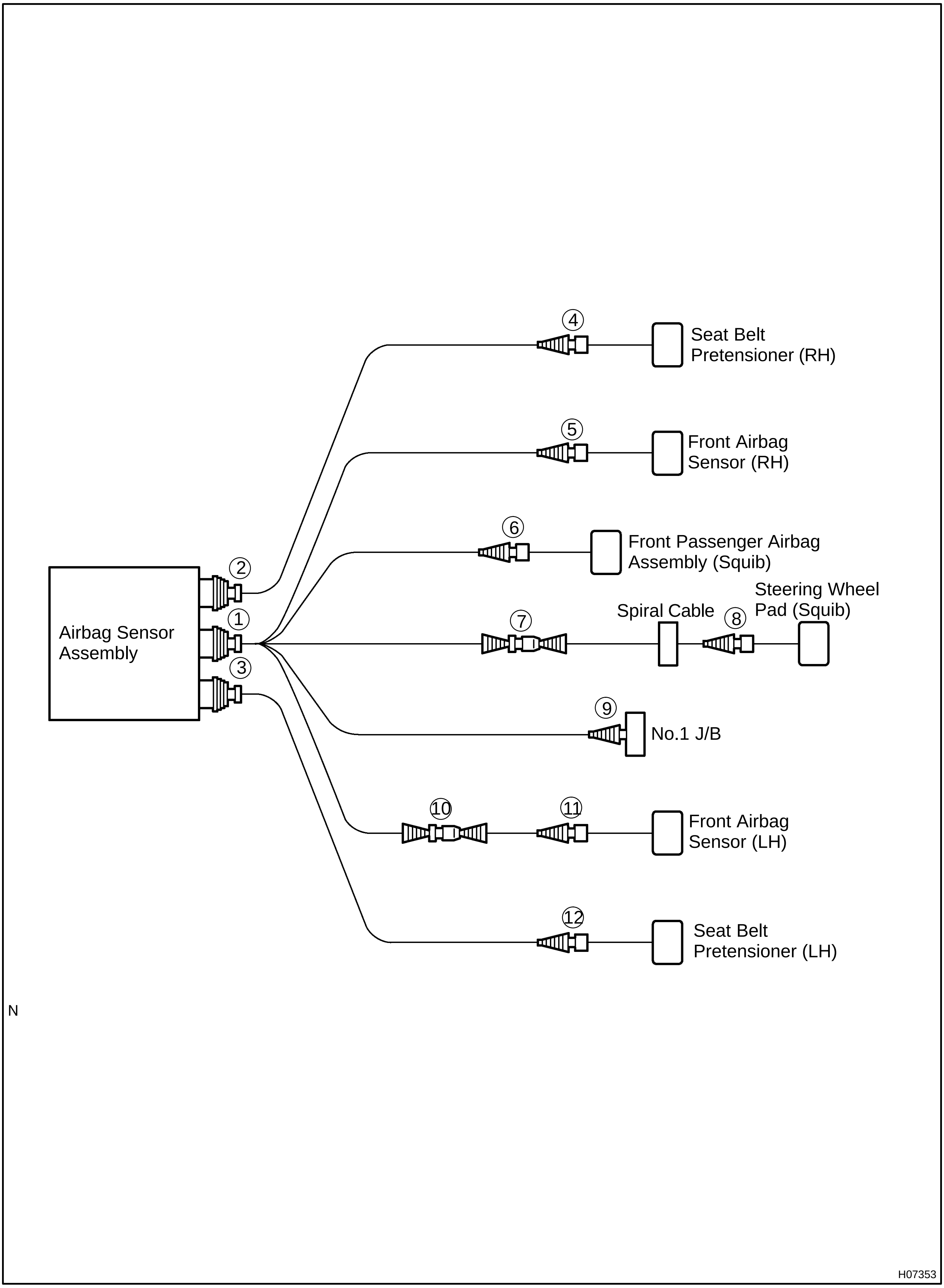
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustrations on the following pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

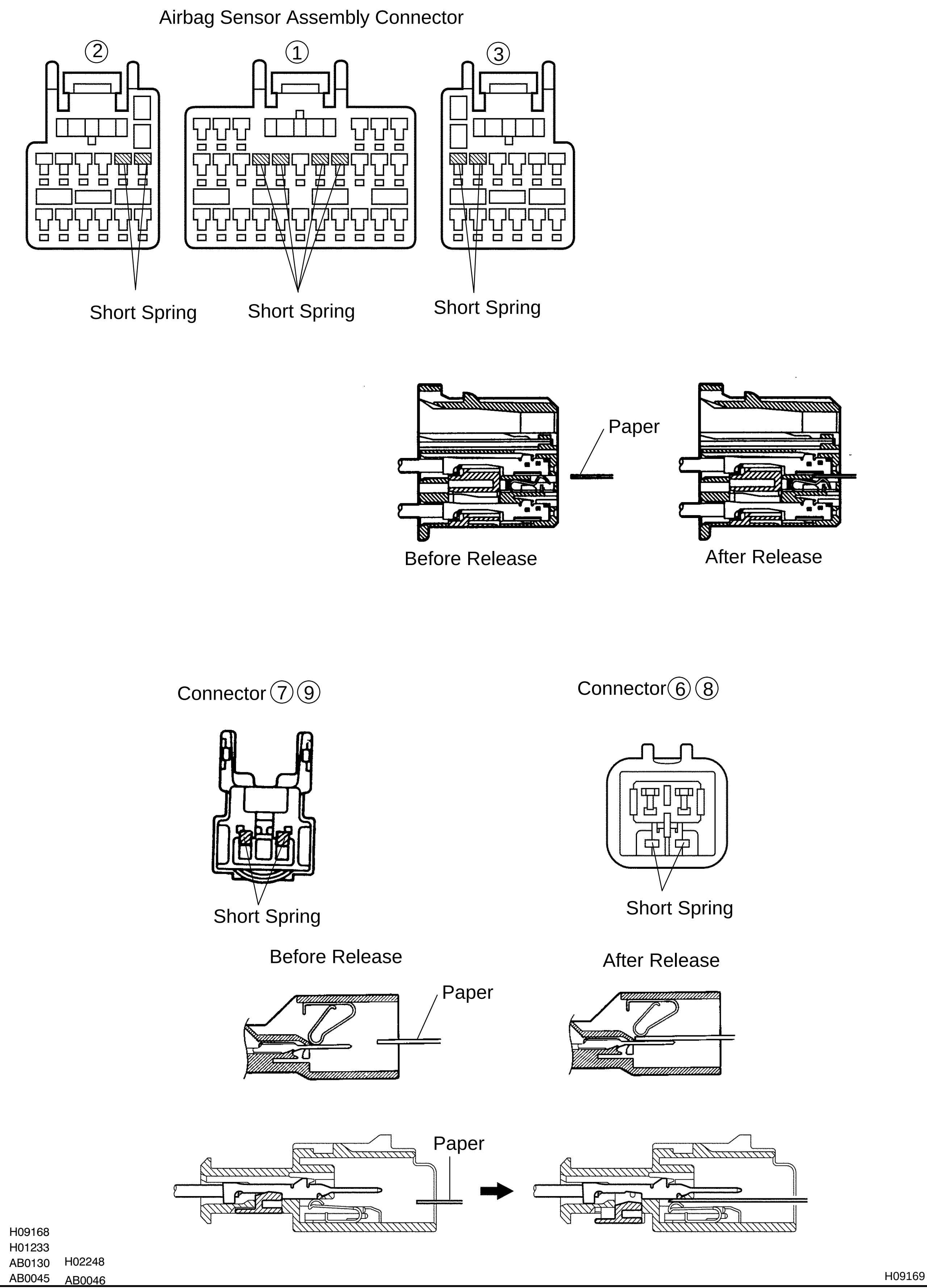
CAUTION:

Never release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.

NOTICE:

If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.


Airbag Sensor Assembly
①
②
③
④
Seat Belt Pretensioner (RH)
⑤
Front Airbag Sensor (RH)
⑥
Front Passenger Airbag Assembly (Squib)
⑦
Spiral Cable
⑧
Steering Wheel Pad (Squib)
⑨
No.1 J/B
⑩
⑪
Front Airbag Sensor (LH)
⑫
Seat Belt Pretensioner (LH)
N
H07353


Airbag Sensor Assembly Connector
2
1
3
Short Spring
Short Spring
Short Spring
Paper
Before Release
After Release
Connector 7 9
Connector 6 8
Short Spring
Short Spring
Before Release
After Release
Paper
Paper
H09168
H01233
AB0130
H02248
AB0045
AB0046
H09169

DI161-37

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.).

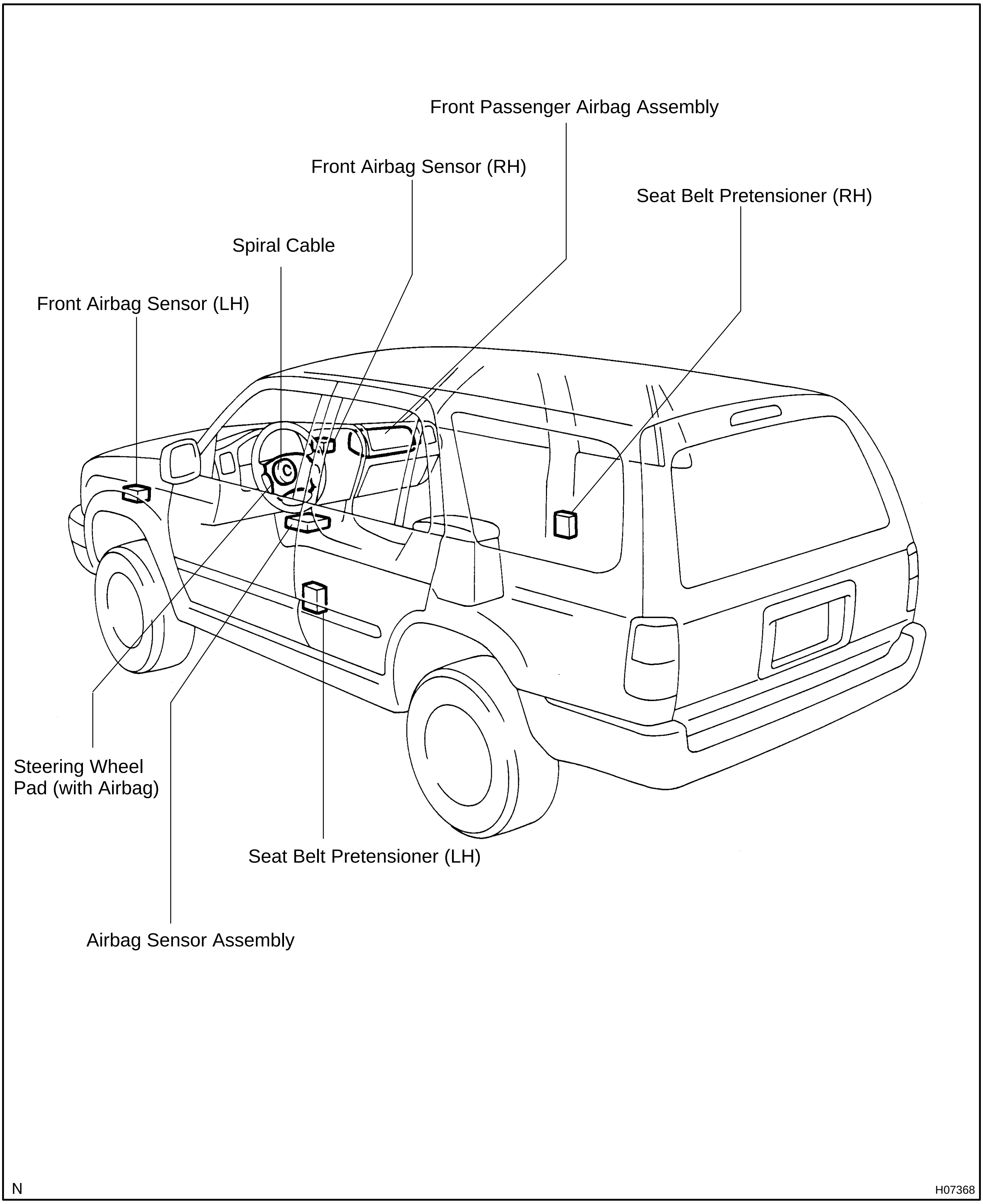
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI-388)	Short in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI-393)	Open in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI-397)	Short in D and P squib circuit (to ground)	• Steering wheel pad (squib) • Front passenger airbag assembly (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI-404)	Short in D and P squib circuit (to B+)	• Steering wheel pad (squib) • Front passenger airbag assembly (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI-410)	Short in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI-414)	Open in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0130/63 (DI-417)	Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	ON
B0131/64 (DI-421)	Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	ON
B0132/61 (DI-424)	Short in LH and RH P/T squib (RH) circuit (to ground)	• Seat belt pretensioners (squib) • Airbag sensor assembly • Wire harness	ON
B0133/62 (DI-429)	Short in LH and RH P/T squib (RH) circuit (to B+)	• Seat belt pretensioners (squib) • Airbag sensor assembly • Wire harness	ON
B0135/73 (DI-434)	Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	ON
B0136/74 (DI-438)	Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	ON
B1100/31 (DI-441)	Airbag sensor assembly malfunction	Airbag sensor assembly	ON

DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B1156/B1157/ 15 (DI-443)	Front airbag sensor assembly (RH) malfunction	• Front airbag sensor assembly (RH) • Wire harness	ON
B1158/B1159/ 16 (DI-448)	Front airbag sensor assembly (LH) malfunction	• Front airbag sensor assembly (LH) • Wire harness	ON
Normal (DI-459)	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.

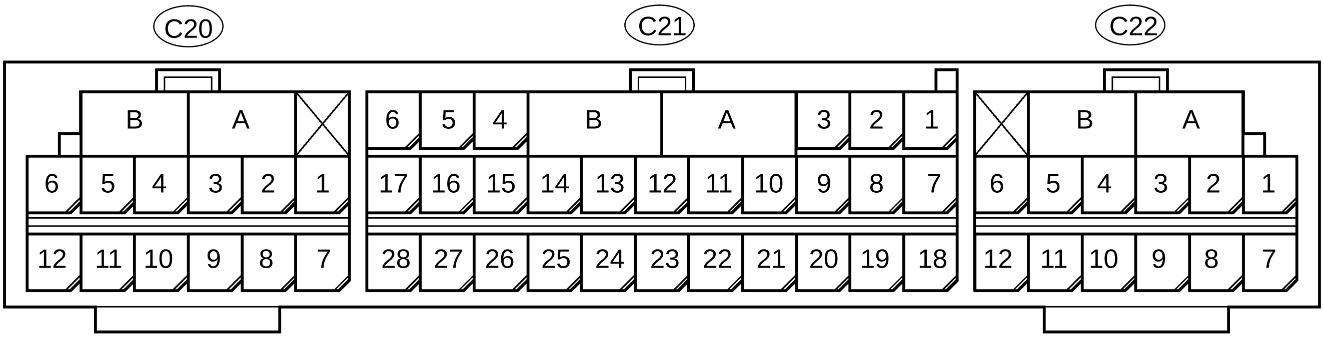
DI1HD-17

PARTS LOCATION



DI1B1-31

TERMINALS OF ECU



No.	Symbol	Terminal Name
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
C20 - 1	PL-	Squib (Seat Belt Pretensioner, LH)
C20 - 2	PL+	Squib (Seat Belt Pretensioner, LH)
C20-11	LBE+	Seat Belt Buckle Switch (LH)
C21 - 3	LA	SRS Warning Light
C21 - 5	IG2	Power Source (IGN Fuse)
C21 - 6	IG1	Power Source (ECU-IG Fuse)
C21 - 9	+SR	Front Airbag Sensor (RH)
C21 - 10	P+	Squib (Passenger)
C21 - 11	P-	Squib (Passenger)
C21 - 12	SIL	Diagnosis
C21 - 13	D-	Squib (Driver)
C21 - 14	D+	Squib (Driver)
C21 - 15	+SL	Front Airbag Sensor (LH)
C21 - 19	Tc	Diagnosis
C21 - 20	-SR	Front Airbag Sensor (RH)
C21 - 26	-SL	Front Airbag Sensor (LH)
C21 - 27	E1	Ground
C21 - 28	E2	Ground
C22 - 5	PR+	Squib (Seat Belt Pretensioner, RH)
C22 - 6	PR-	Squib (Seat Belt Pretensioner, RH)
C22 - 8	RBE+	Seat Belt Buckle Switch (LH)

DI18P-05

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
With the ignition switch at ACC or ON, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.	SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	DI-459
SRS warning light is always lit up even when ignition switch is in the LOCK position.		
With the ignition switch at ACC or ON, the SRS warning light does not light up.	SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	DI-461
DTC is not displayed.	Tc terminal circuit	DI-465
SRS warning light is always lit up in a DTC check procedure.		
DTC is displayed without Tc and E1 terminal connection.		

DI18Q-35

CIRCUIT INSPECTION

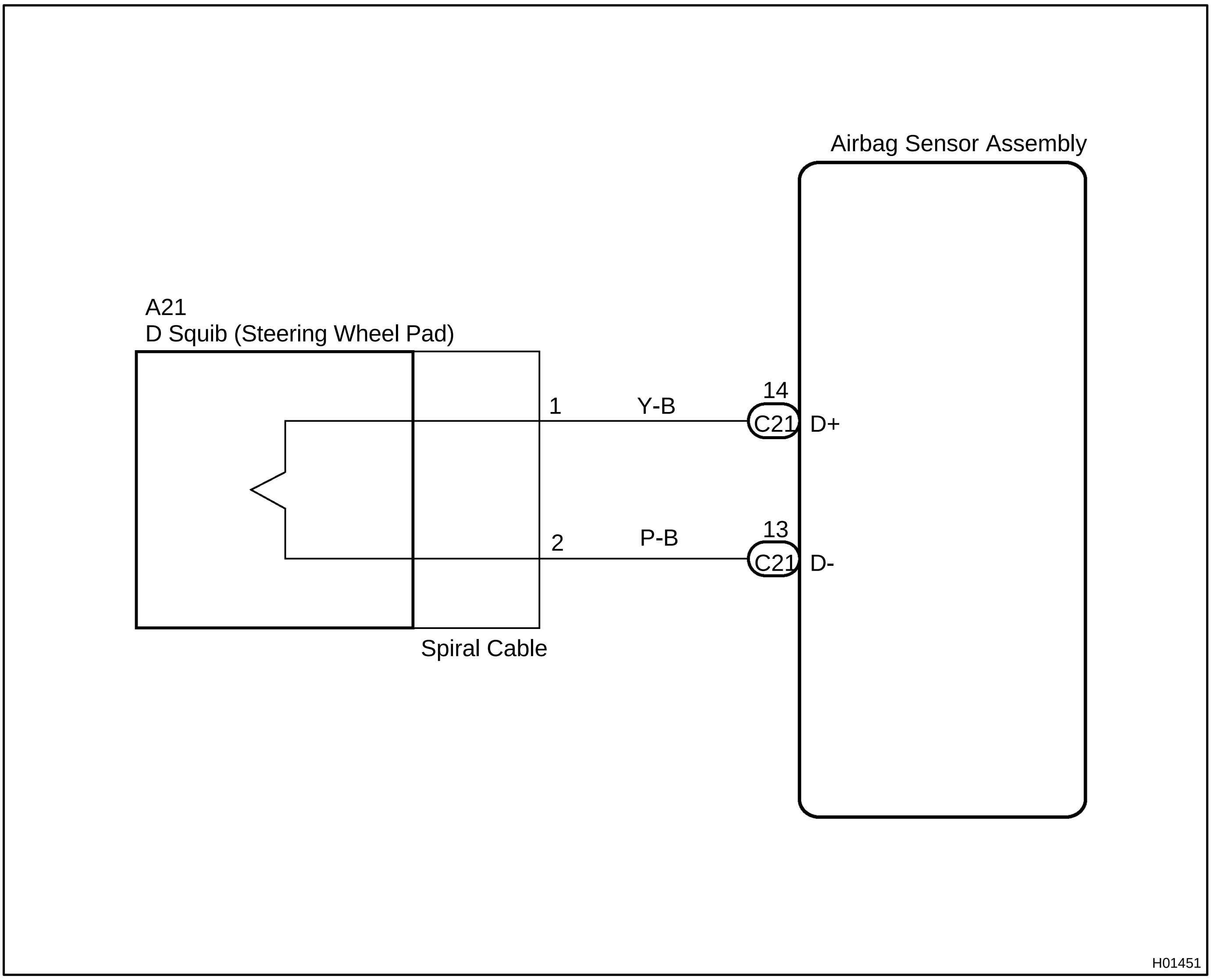
DTC	B0100/13	Short in D Squib Circuit

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

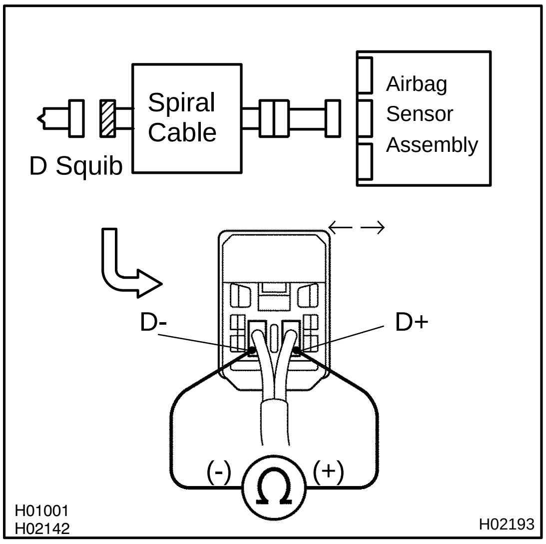
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

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-377)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

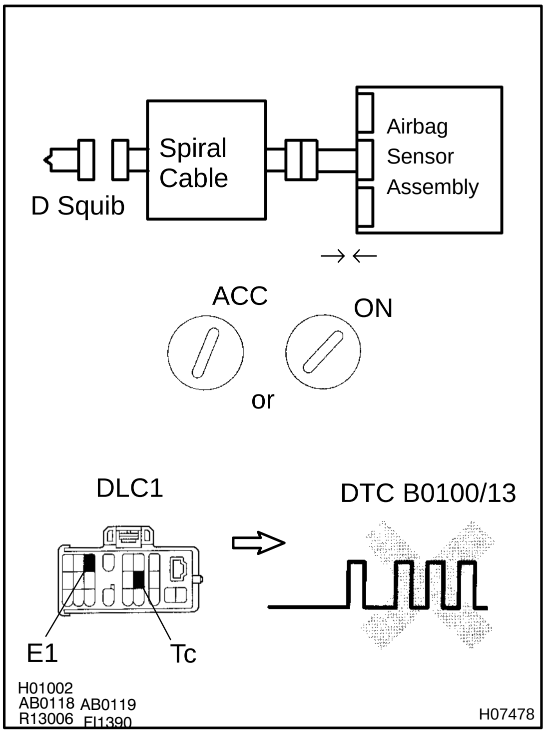
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 5.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

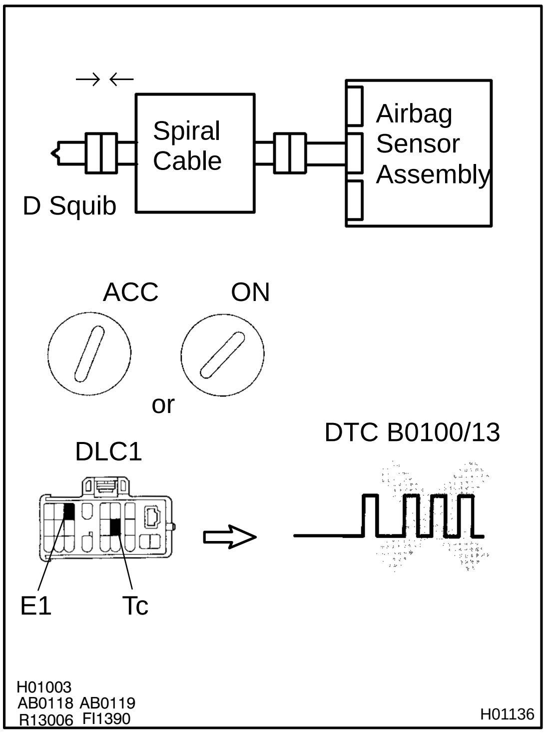
DTC B0100/13 is not output.

HINT:
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check D squib.**



PREPARATION:
(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:
(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:
DTC B0100/13 is not output.

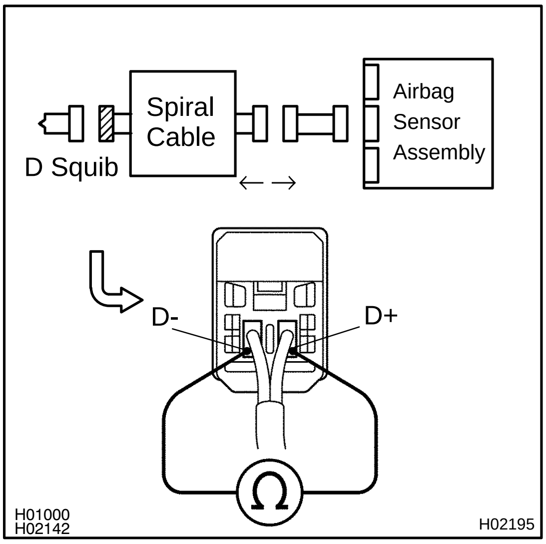
HINT:
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

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-377)

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-.

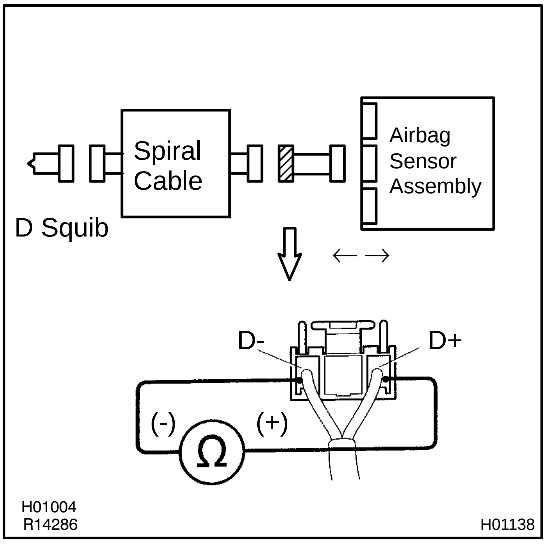
OK:

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-377)

CHECK:

For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D-.

OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI18R-18

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

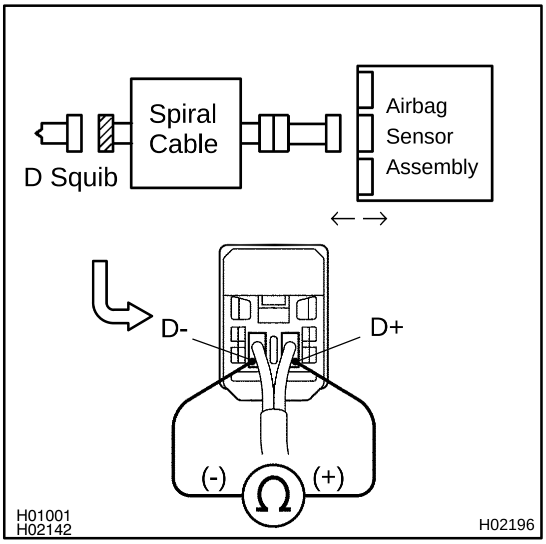
WIRING DIAGRAM

See page DI-388 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

2	Check D squib circuit.



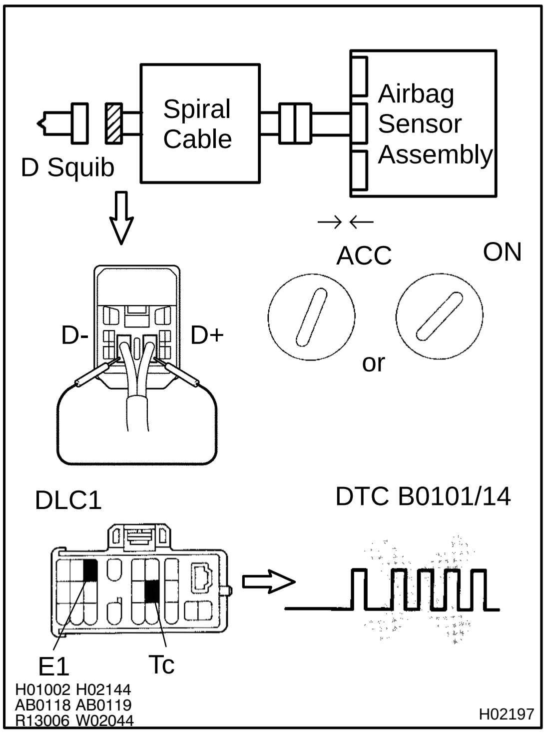
CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

OK:
Resistance: Below 1 Ω

NG	Go to step 5.

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D- of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

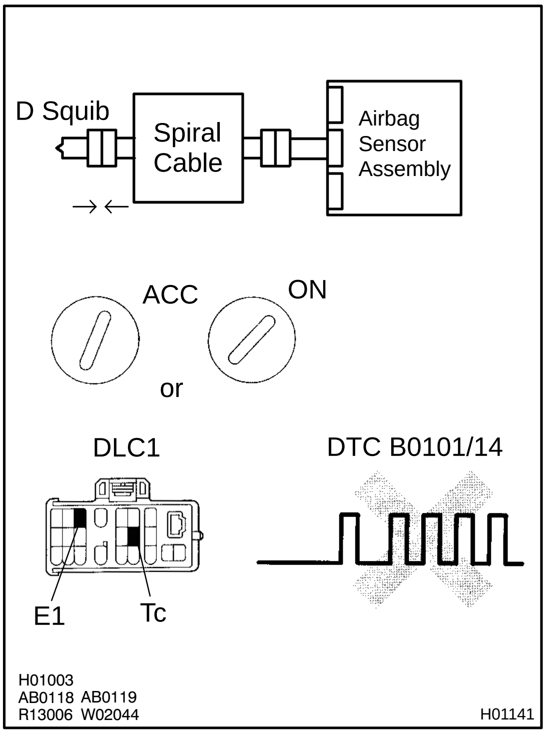
DTC B0101/14 is not output.

HINT:
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check D squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the steering wheel pad connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0101/14 is not output.

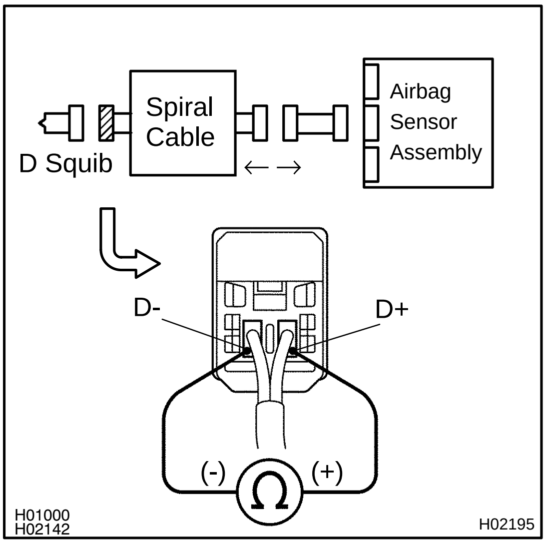
HINT:
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

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-.

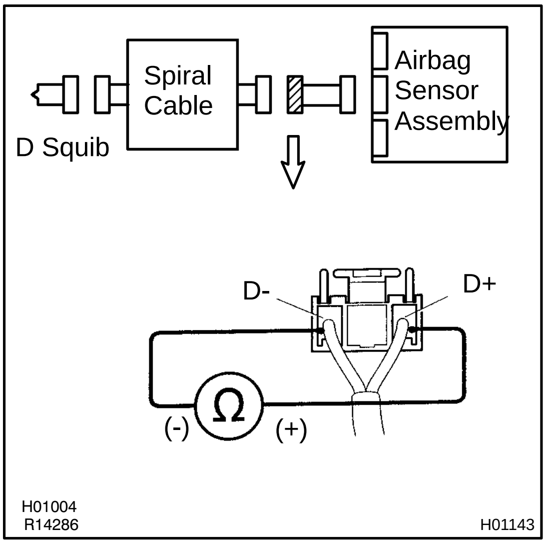
OK:

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.

DI58K-02

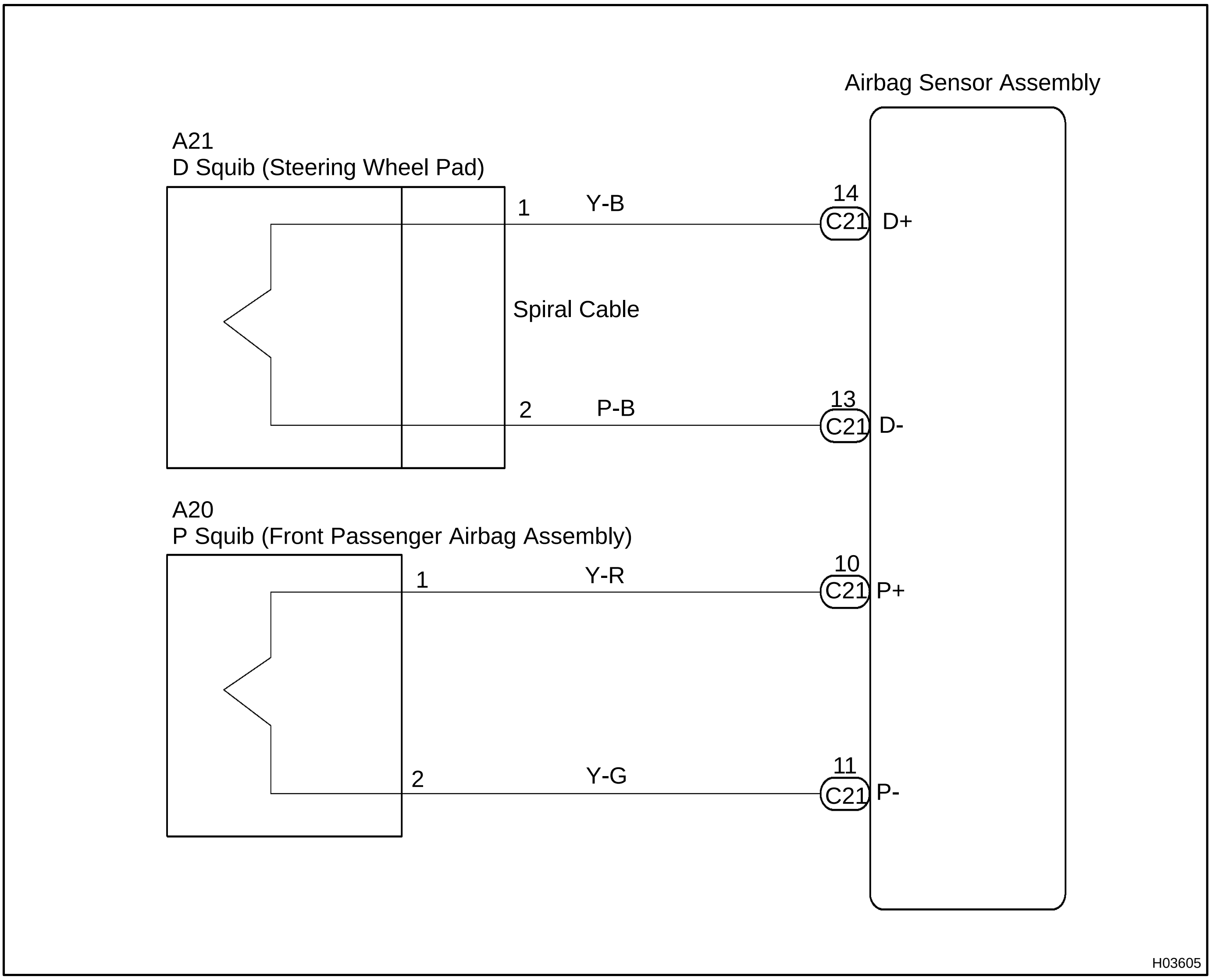
DTC	B0102/11	Short in D and P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D and P squib circuits consist of the airbag sensor assembly, spiral cable, steering wheel pad and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2.
DTC B0102/11 is recorded when ground short is detected in the D and P squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	• Short circuit in D squib wire harness (to ground) • Short circuit in P squib wire harness (to ground) • D squib malfunction • P squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Front passenger airbag assembly (P squib) • Spiral cable • Airbag sensor assembly • Wire harness

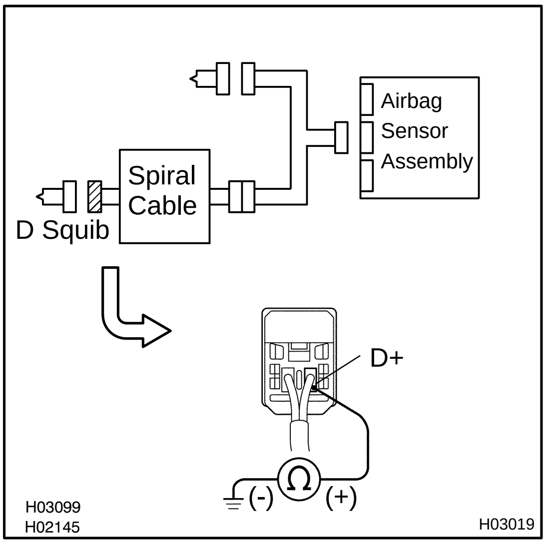
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

2	Check D squib circuit.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and body ground.

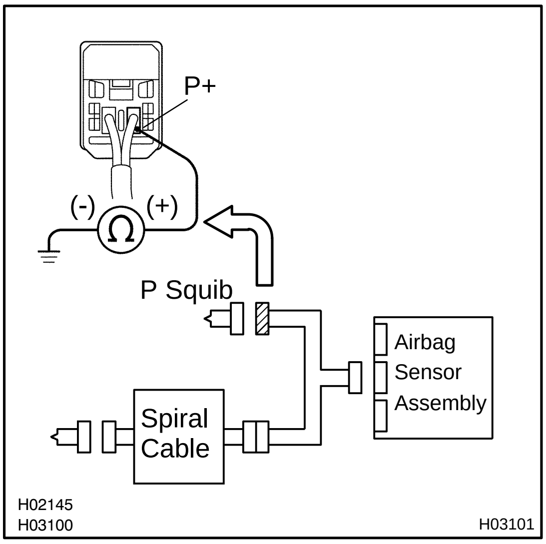
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 7.

OK

3	**Check P squib circuit.**



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the resistance between P+ and body ground.

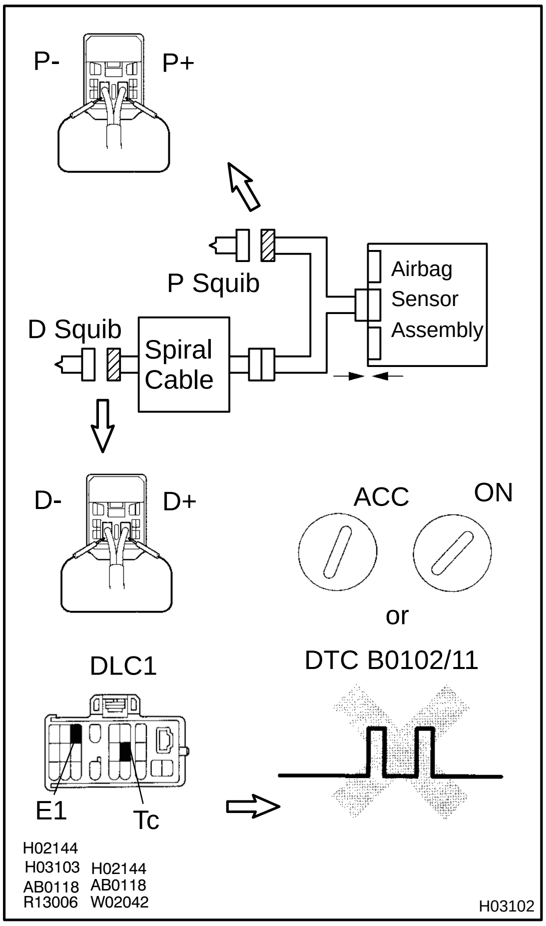
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D- of the connector (on the spiral cable side) between the spiral cable and steering wheel pad.

(c) Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

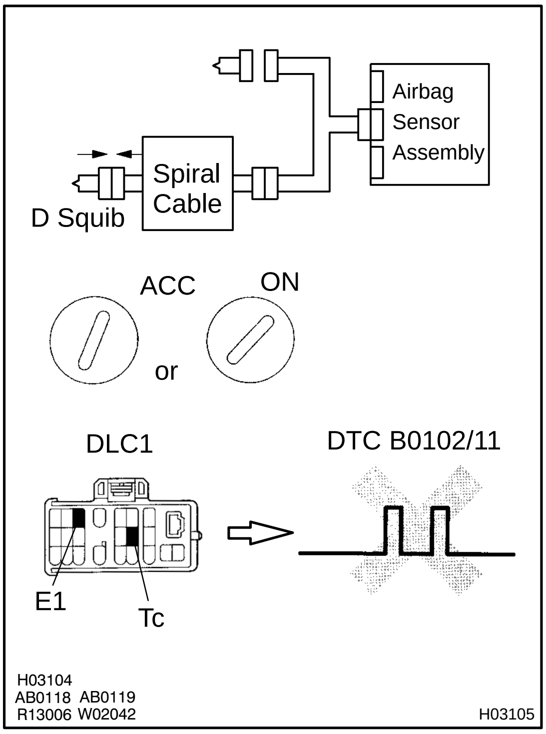
DTC B0102/11 is not output.

HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

5	**Check D squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the steering wheel pad connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

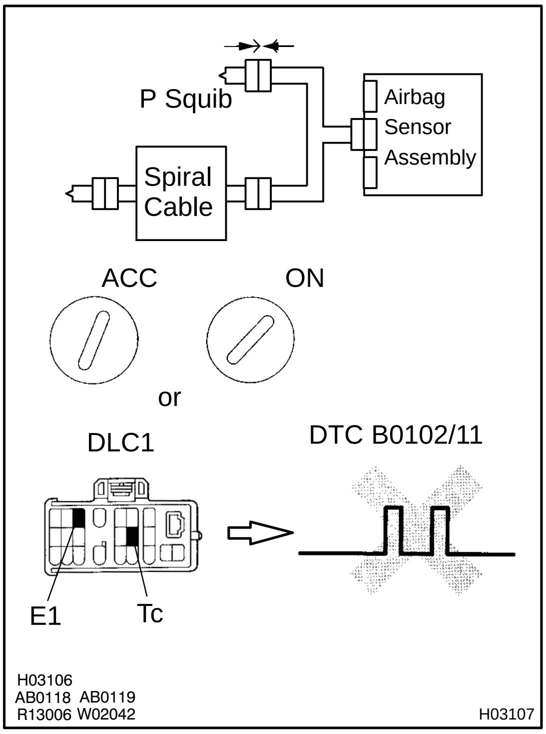
DTC B0102/11 is not output.

HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG	**Replace steering wheel pad.**

OK

6	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front passenger airbag assembly connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0102/11 is not output.

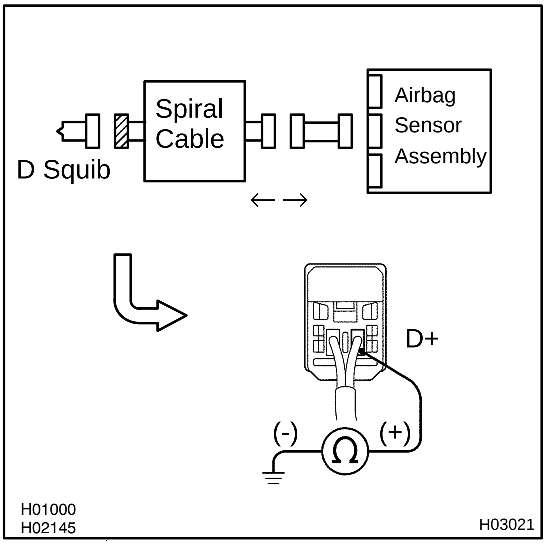
HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace front passenger airbag assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

7	Check spiral cable.



PREPARATION:

Disconnect the connector between the airbag sensor assembly and spiral cable.

CHECK:

For the connector (on the spiral cable side) between the steering wheel pad and spiral cable, measure the resistance between D+ and body ground.

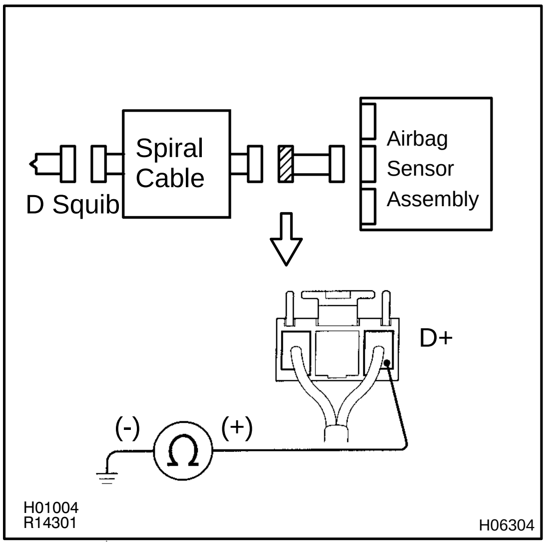
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

8	Check harness between airbag sensor assembly and spiral cable.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the resistance between D+ and body ground.

OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI58L-02

DTC	B0103/12	Short in D and P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D and P squib circuits consist of the airbag sensor assembly, spiral cable, steering wheel pad and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see page OPERATION on page RS-2 .
DTC B0103/12 is recorded when B+ short is detected in the D and P squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	• Short circuit in D squib wire harness (to B+) • Short circuit in P squib wire harness (to B+) • D squib malfunction • P squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Front passenger airbag assembly (P squib) • Spiral cable • Airbag sensor assembly • Wire harness

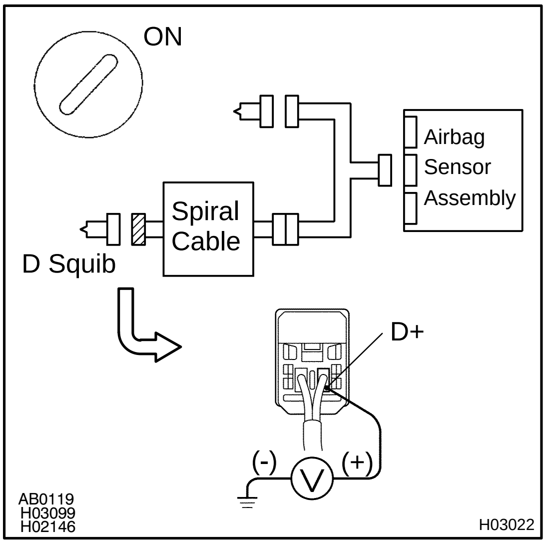
WIRING DIAGRAM

See page DI-397 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

2	Check D squib circuit.

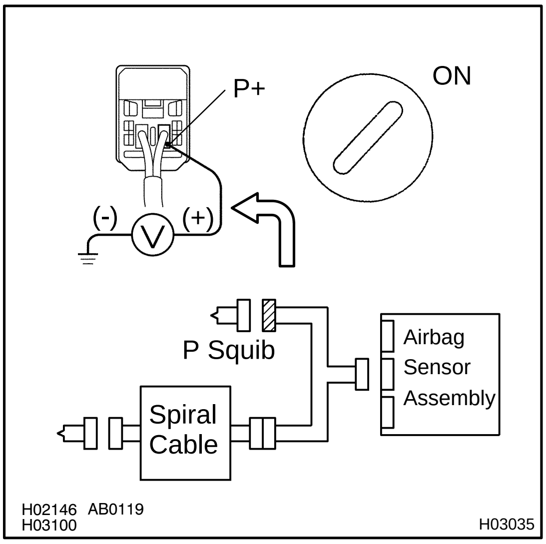


PREPARATION:
Turn ignition switch ON
CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.
OK:
Voltage: Below 1 V

NG	Go to step 7.

OK

3	**Check P squib circuit.**



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the voltage between P+ and body ground.

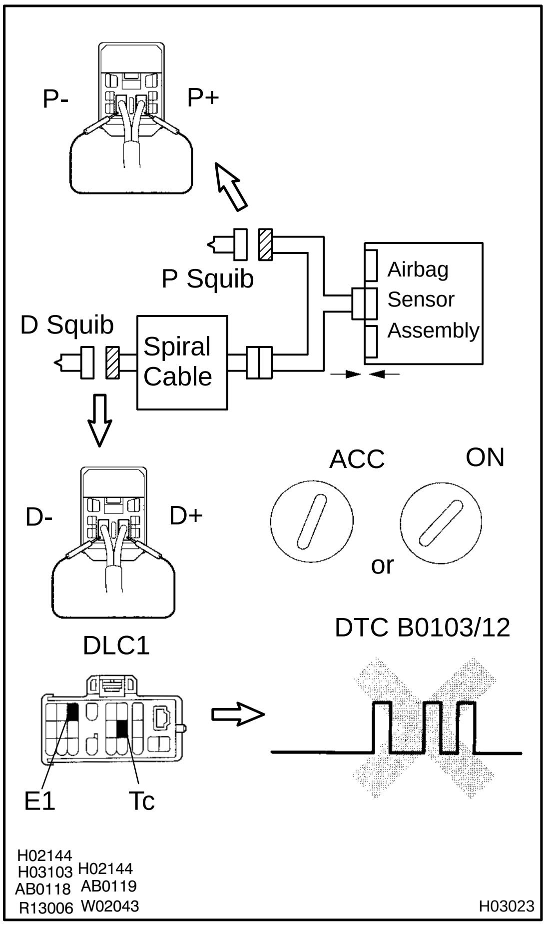
OK:

Voltage: Below 1 V

NG	**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D- of the connector (on the spiral cable side) between the spiral cable and steering wheel pad.

(c) Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

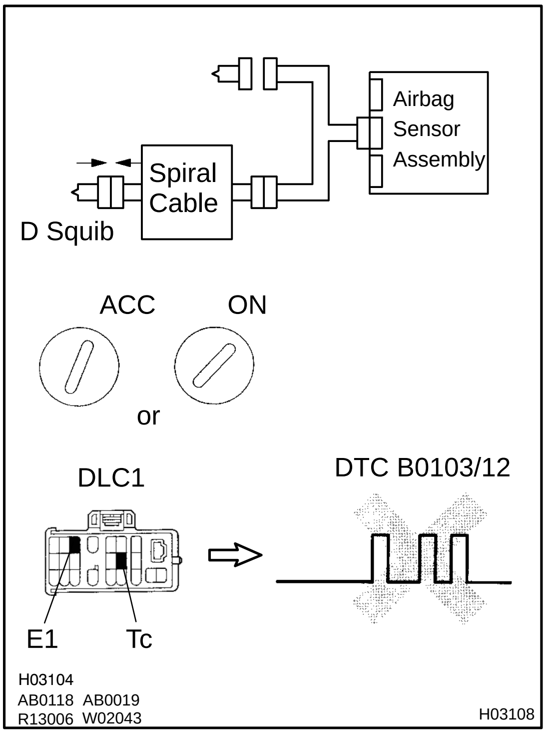
DTC B0103/12 is not output.

HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

5	**Check D squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the steering wheel pad connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

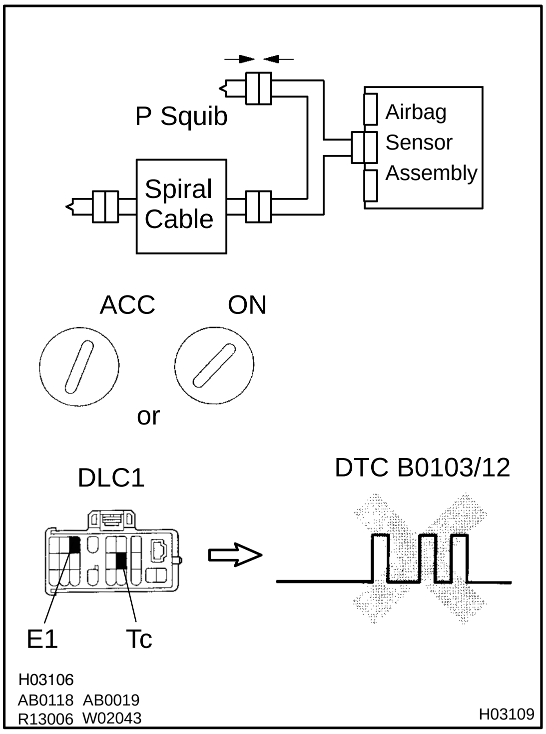
DTC B0103/12 is not output.

HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	**Replace steering wheel pad.**

OK

6	**Check P squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front passenger airbag connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0103/12 is not output.

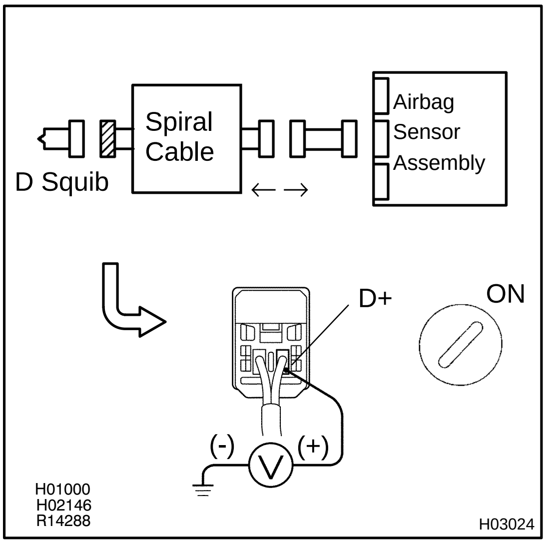
HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	**Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

7	**Check spiral cable.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect the connector between the airbag sensor assembly and spiral cable.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.

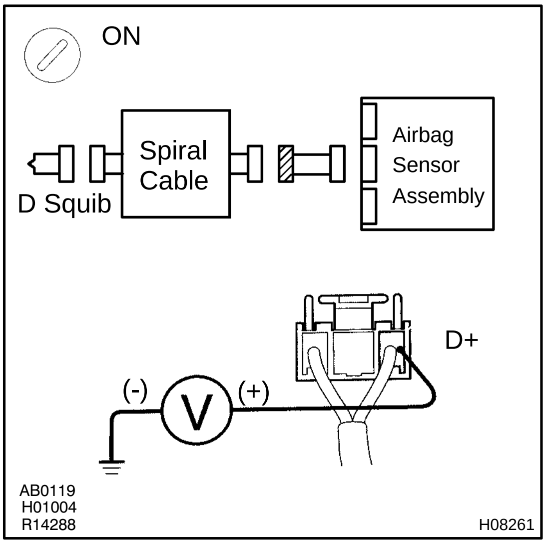
OK:

Voltage: Below 1 V

NG	**Repair or replace spiral cable.**

OK

8	**Check spiral cable.**



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the voltage between D+ and body ground.

OK:

Voltage: 0 V

NG	**Repair or replace harness between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1B6-36

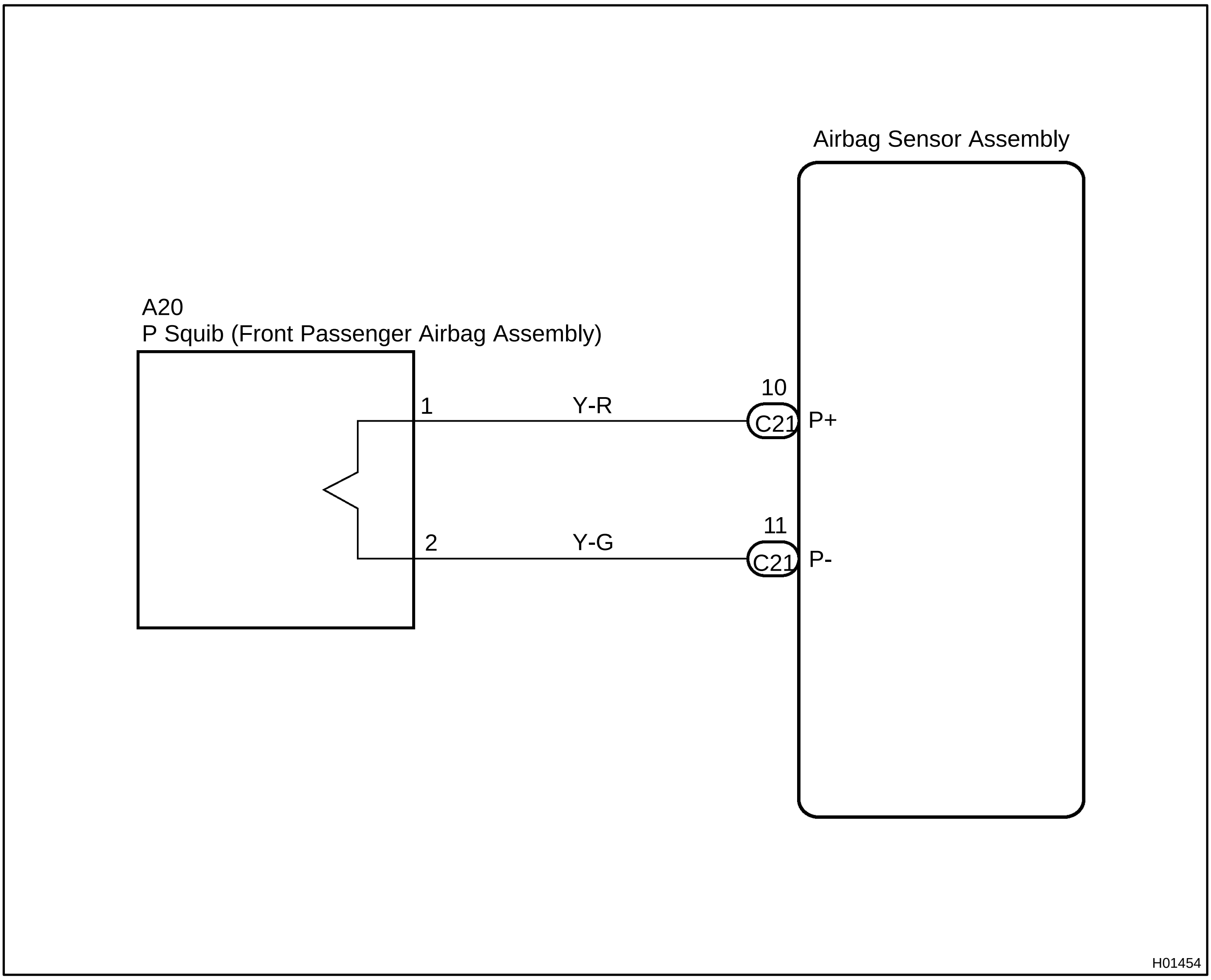
DTC	B0105/53	Short in P Squib Circuit

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

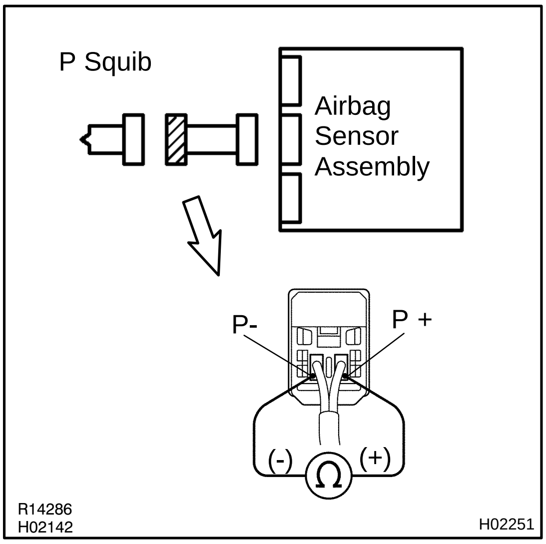
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

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.

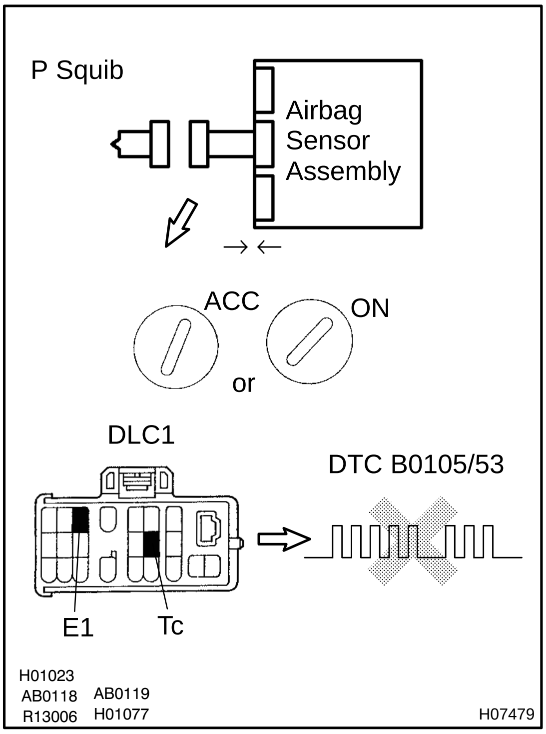
CHECK:
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P-.

OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

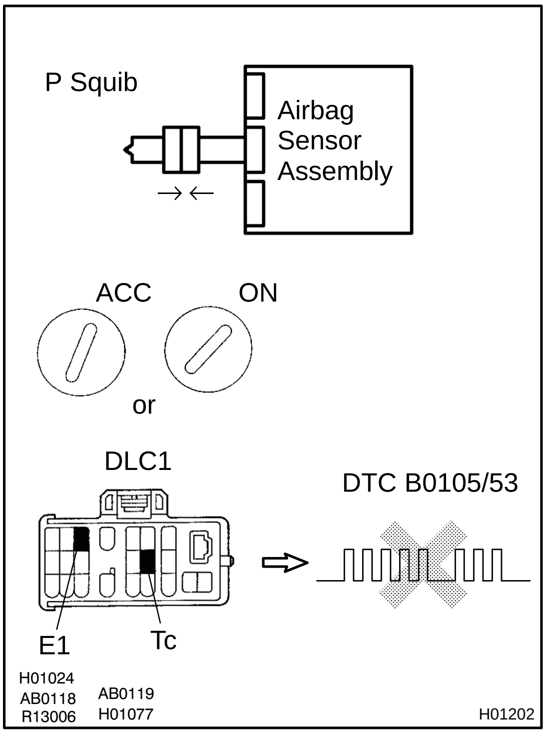
DTC B0105/53 is not output.

HINT:
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:

DTC B0105/53 is not output.

HINT:
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG	**Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1B7-36

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 • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

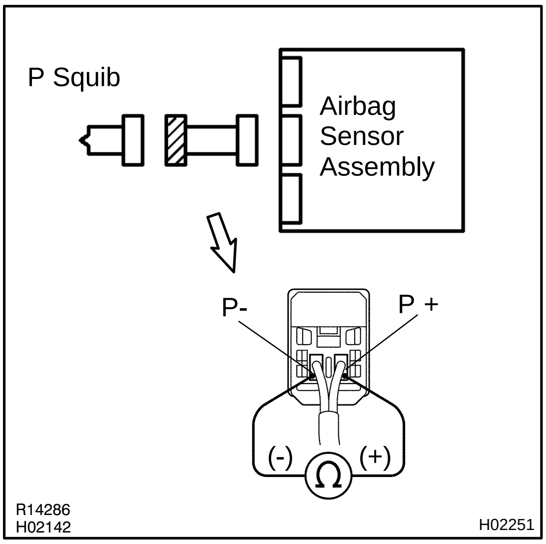
WIRING DIAGRAM

See page DI-410 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

2	Check P squib circuit.

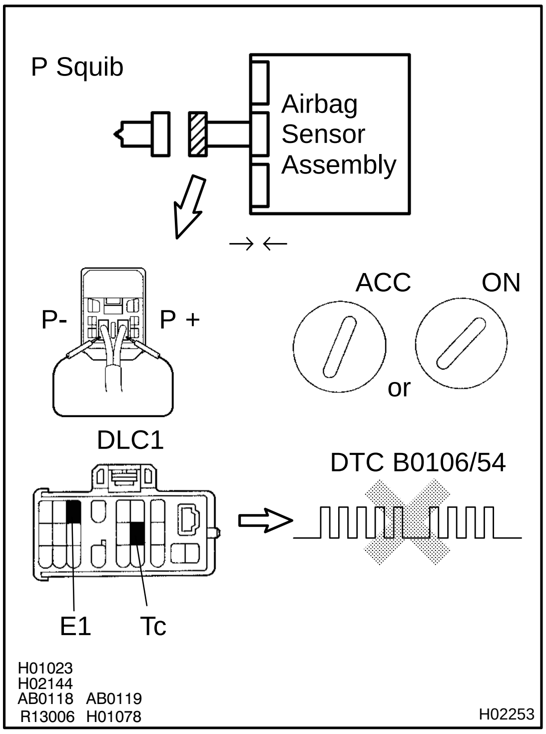


CHECK:
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P-.
OK:
Resistance: Below 1 Ω

NG	Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

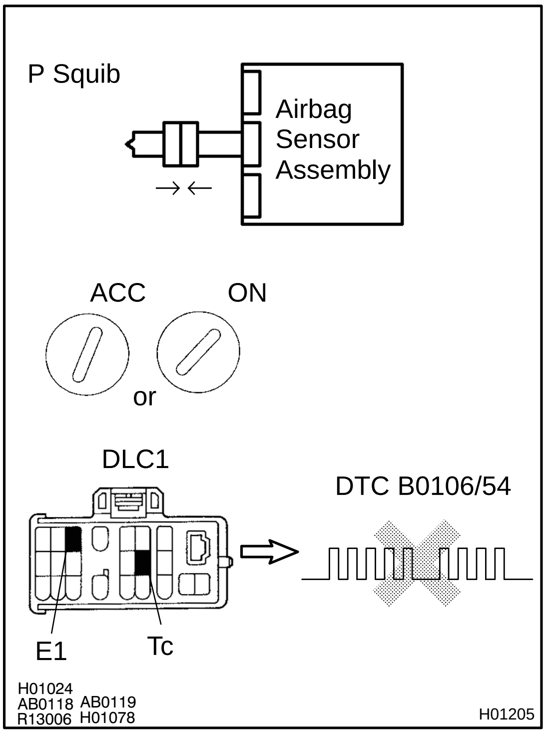
DTC B0106/54 is not output.

HINT:
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:
(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:
(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

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.

DI16S-43

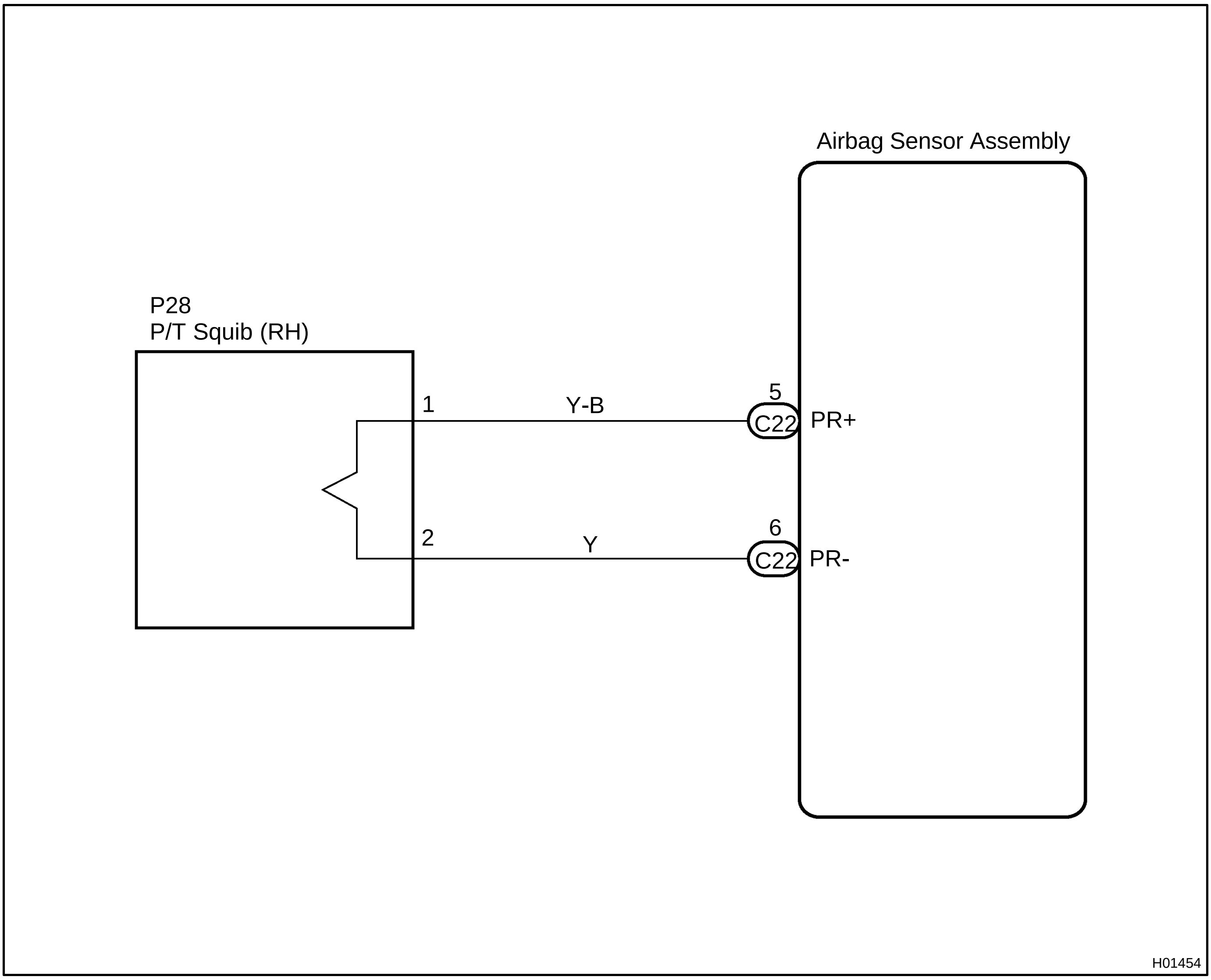
DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the seat belt pretensioner (RH) to activate when the seat belt pretensioner (RH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	• Short circuit between PR+ wire harness and PR- wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

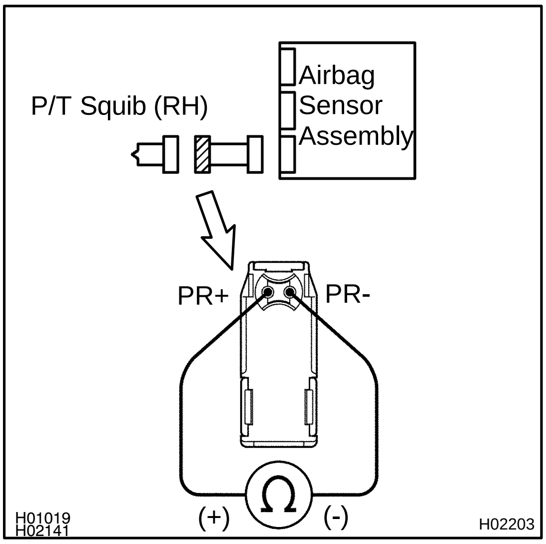
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

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-377)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR-.

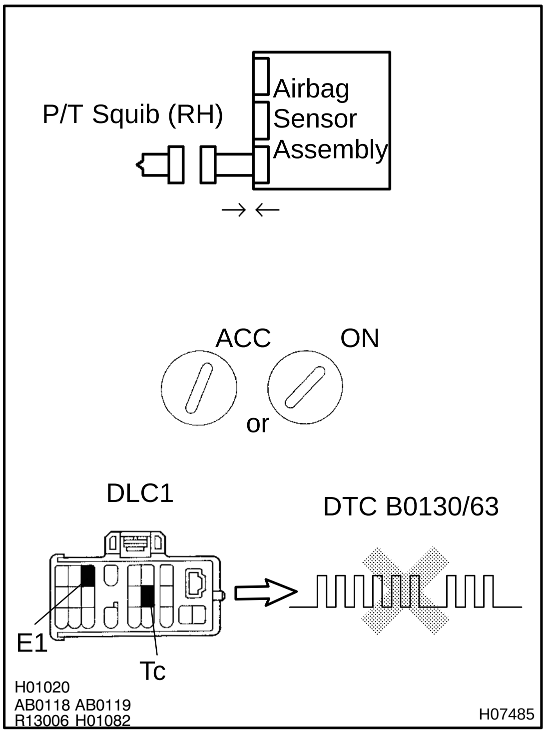
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0130/63 is not output.

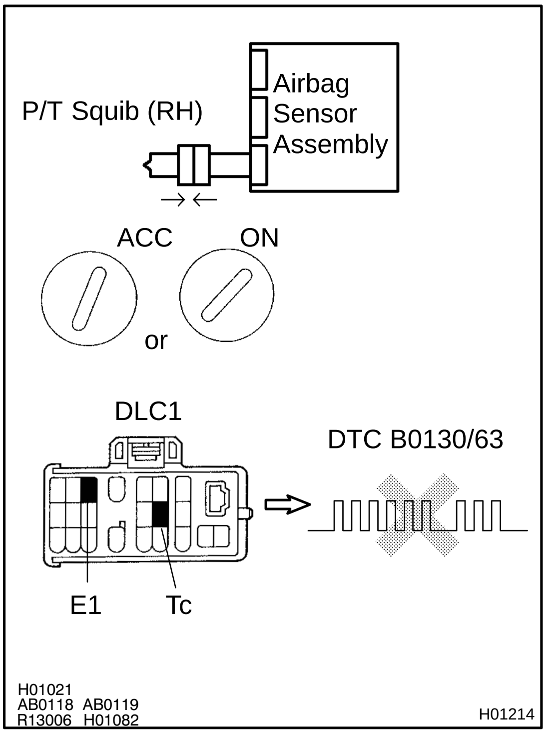
HINT:

Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (RH).**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:

DTC B0130/63 is not output.

HINT:
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1BG-34

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 seat belt pretensioner (RH) to activate when the seat belt pretensioner (RH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	• Open circuit in PR+ wire harness or PR- wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

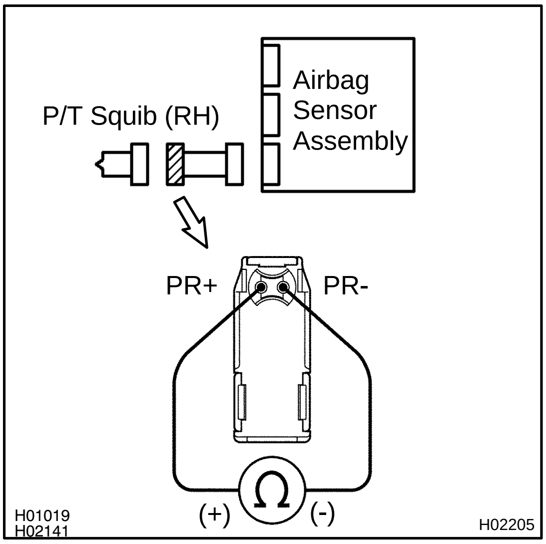
WIRING DIAGRAM

See page DI-417 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

2	Check P/T squib (RH) circuit.

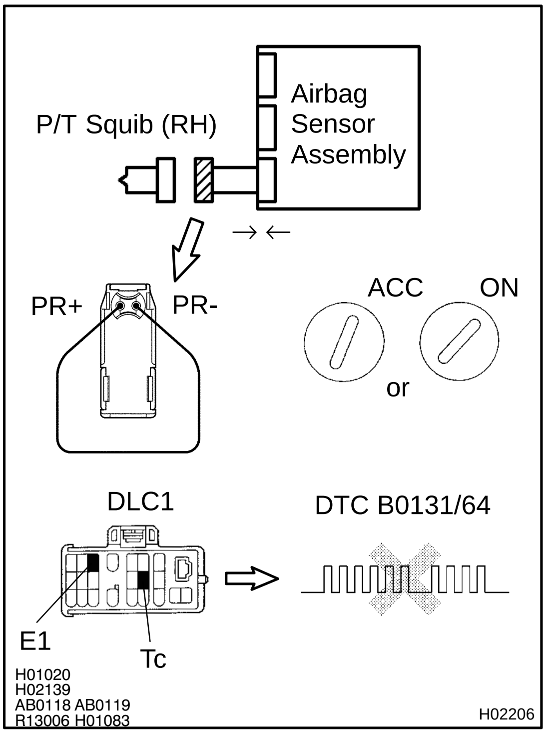


CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR-.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

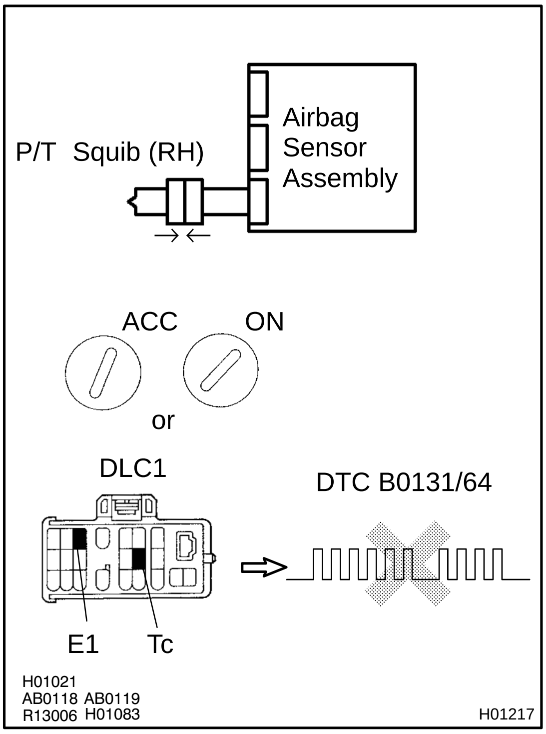
DTC B0131/64 is not output.

HINT:
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (RH).**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

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.

DI58N-02

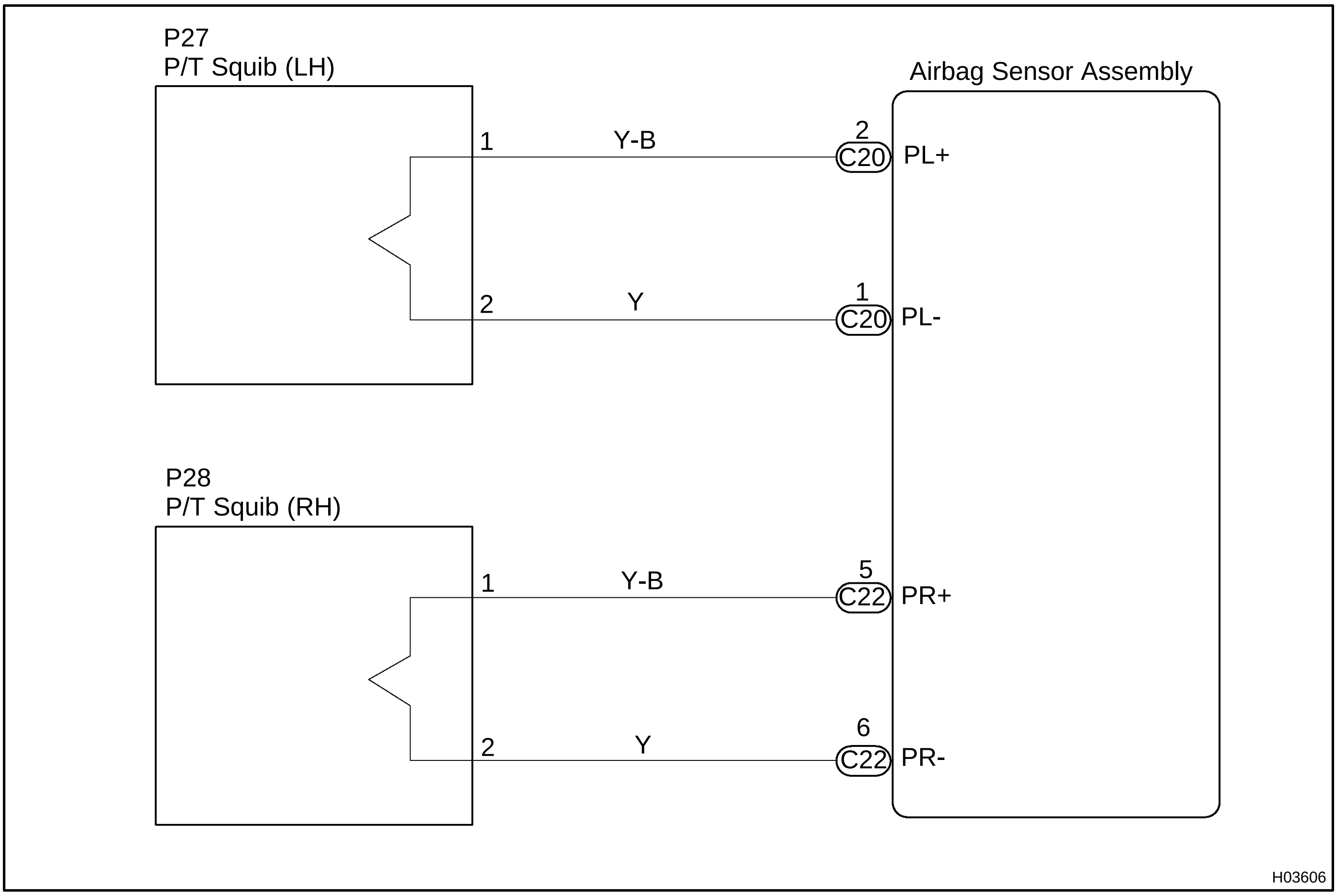
DTC	B0132/61	Short in LH and RH P/T Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The LH and RH P/T squib circuits consist of the airbag sensor assembly and LH and RH seat belt pretensioners.
It causes the pretensioner to activate when the pretensioner activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0132/61 is recorded when a ground short is detected in the LH and RH P/T squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	• Short circuit in P/T squib (LH) wire harness (to ground) • Short circuit in P/T squib (RH) wire harness (to ground) • P/T squib (RH) malfunction • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

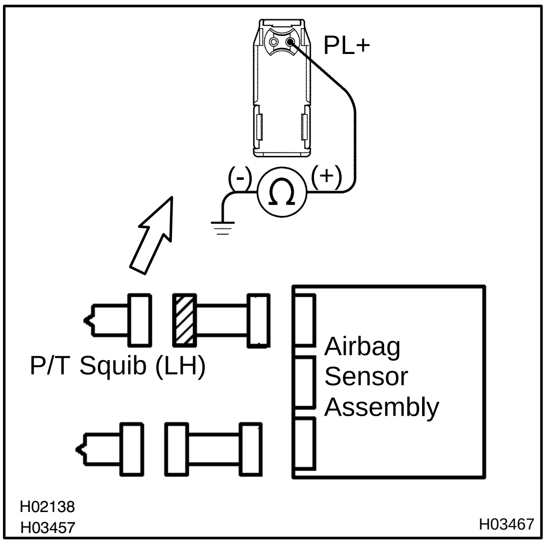
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (LH) circuit.**



CHECK:

For the connector (on the airbag sensor assembly side) between the seat belt pretensioner and airbag sensor assembly, measure the resistance between PL+ and body ground.

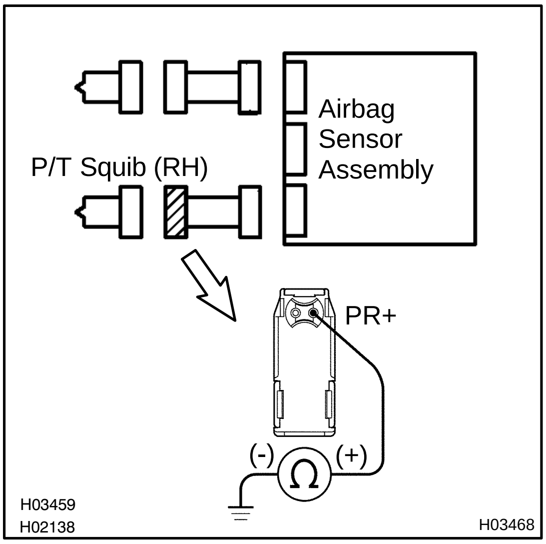
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	**Check P/T squib (RH) circuit.**



CHECK:

For the connector (on the airbag sensor assembly side) between the seat belt pretensioner and airbag sensor assembly, measure the resistance between PR+ and body ground.

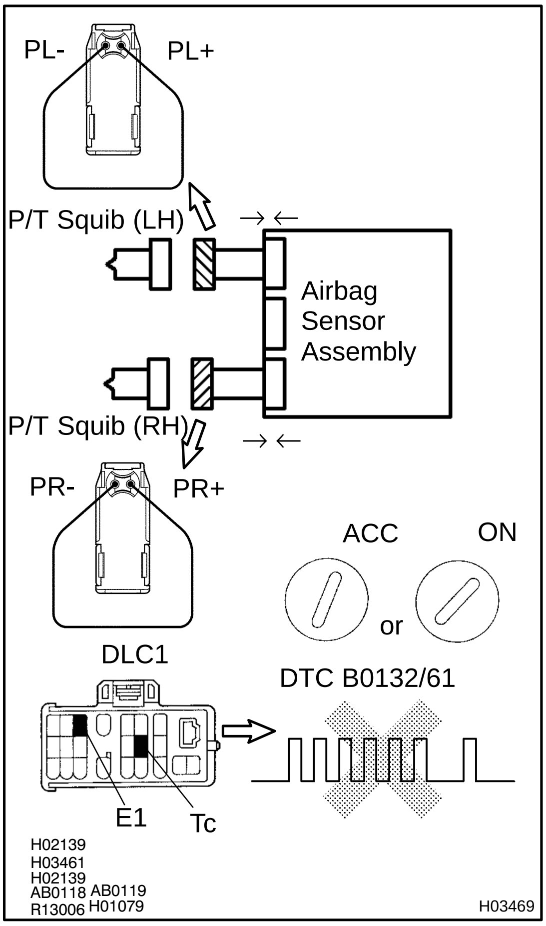
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connectors to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly.

(c) Using a service wire, connect PR+ and PR- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0132/61 is not output.

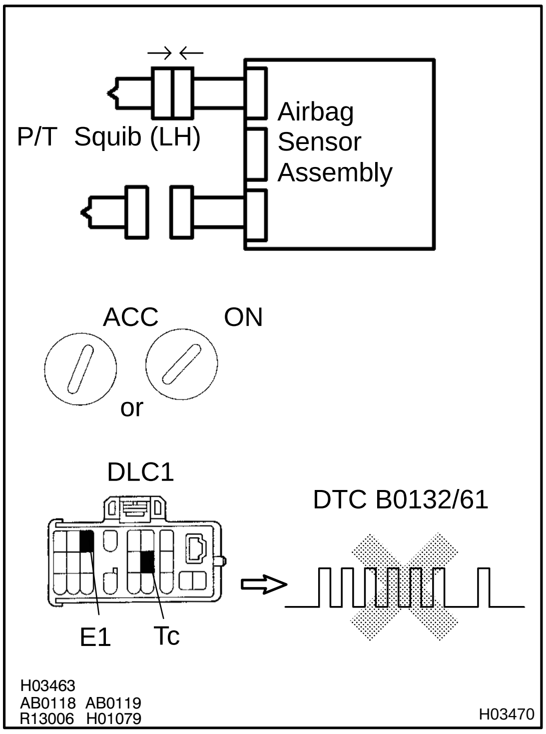
HINT:

Codes other than DTC B0132/61 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

5	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the seat belt pretensioner (LH) connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI-377)

OK:

DTC B0132/61 is not output.

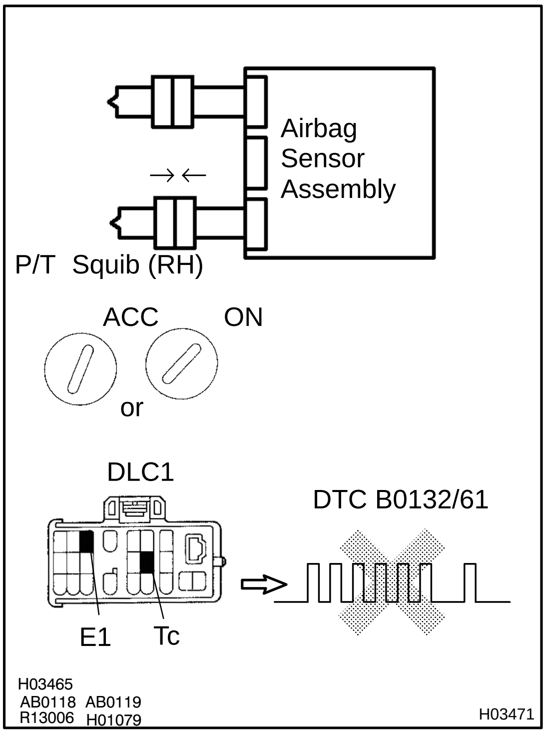
HINT:

Codes other than DTC B0132/61 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

OK

6	Check P/T squib (LH).



PREPARATION:
(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:
(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI-377)

OK:
DTC B0132/61 is not output.

HINT:
Codes other than DTC 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.

DI58O-01

DTC	B0133/62	Short in LH and RH P/T Squib Circuits (to B+)

CIRCUIT DESCRIPTION

The LH and RH P/T squib circuits consist of the airbag sensor assembly and LH and RH seat belt pretensioners.
It causes the pretensioner to activate when the pretensioner activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0133/62 is recorded when B+ is detected in the LH and RH P/T squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	• Short circuit in seat belt pretensioner (LH) wire harness (to B+) • Short circuit in seat belt pretensioner (RH) wire harness (to B+) • P/T squib (LH) malfunction • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

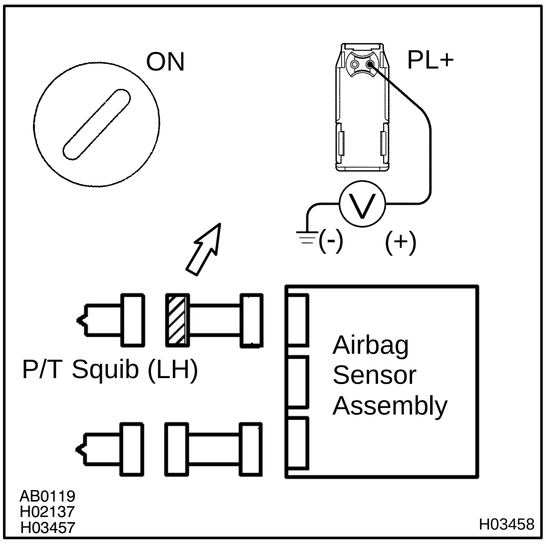
WIRING DIAGRAM

See page DI-424 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	Check P/T squib (LH) circuit.



PREPARATION:

Turn ignition switch ON.

CHECK:

For the connector (on the airbag sensor assembly side) between the seat belt pretensioner (LH) and airbag sensor assembly, measure the voltage between PL+ and body ground.

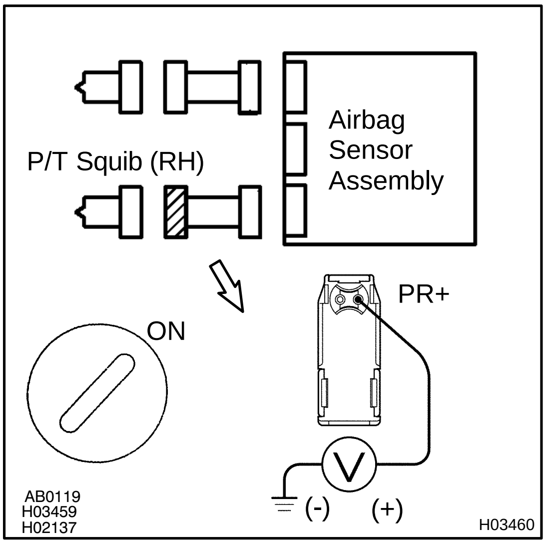
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check P/T squib (RH) circuit.



PREPARATION:

Turn ignition switch ON.

CHECK:

For the connector (on the airbag sensor assembly side) between the seat belt pretensioner (RH) and airbag sensor assembly, measure the voltage between PR+ and body ground.

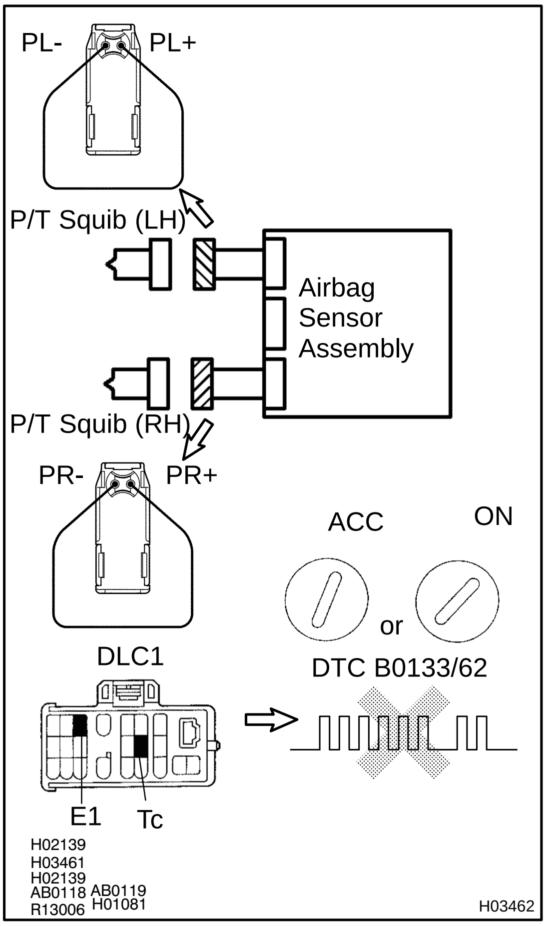
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL- of the connector (on the pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly.

(c) Using a service wire, connect PR+ and PR- of the connector (on the pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0133/62 is not output.

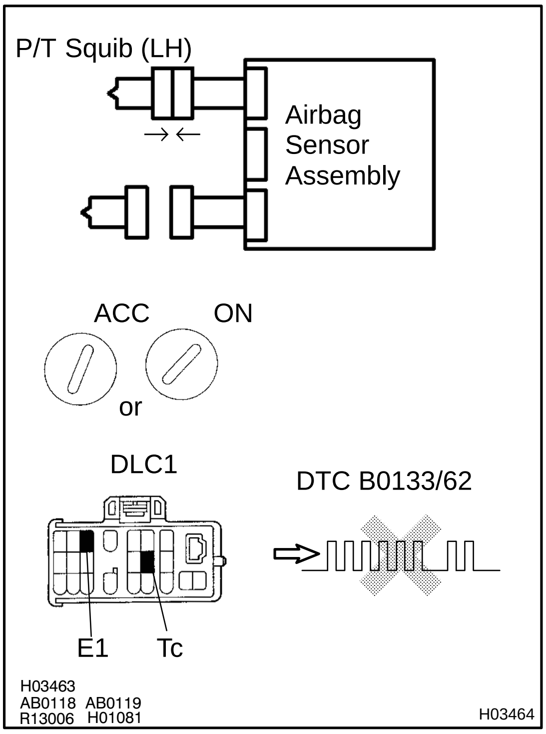
HINT:

Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

5	**Check P/T squib (LH).**



PREPARATION:
(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:
(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

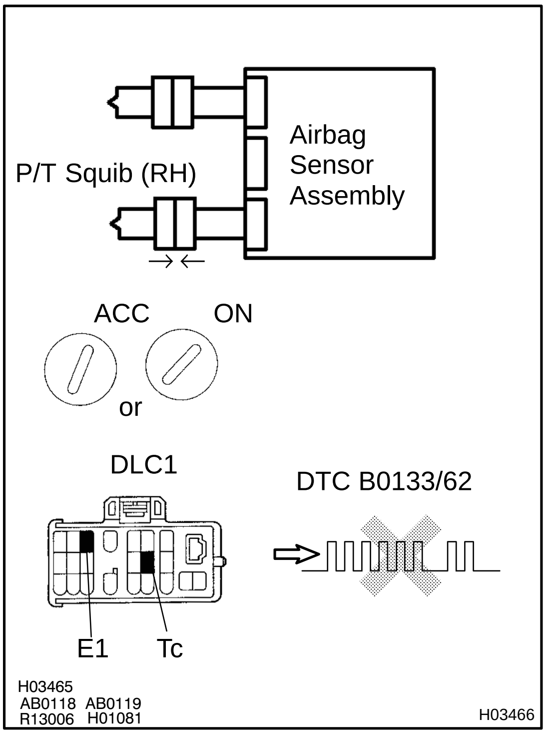
OK:
DTC B0133/62 is not output.

HINT:
Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG	**There is possibility that D, P and side airbags except for pretensioner are damaged, so check DTC B0103/12, B0113/42 and B0118/46.**

OK

6	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0133/62 is not output.

HINT:
Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG	There is possibility that D, P and side airbags except for pretensioner are damaged, so check DTC B0103/12, B0113/42 and B0118/46.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI16W-44

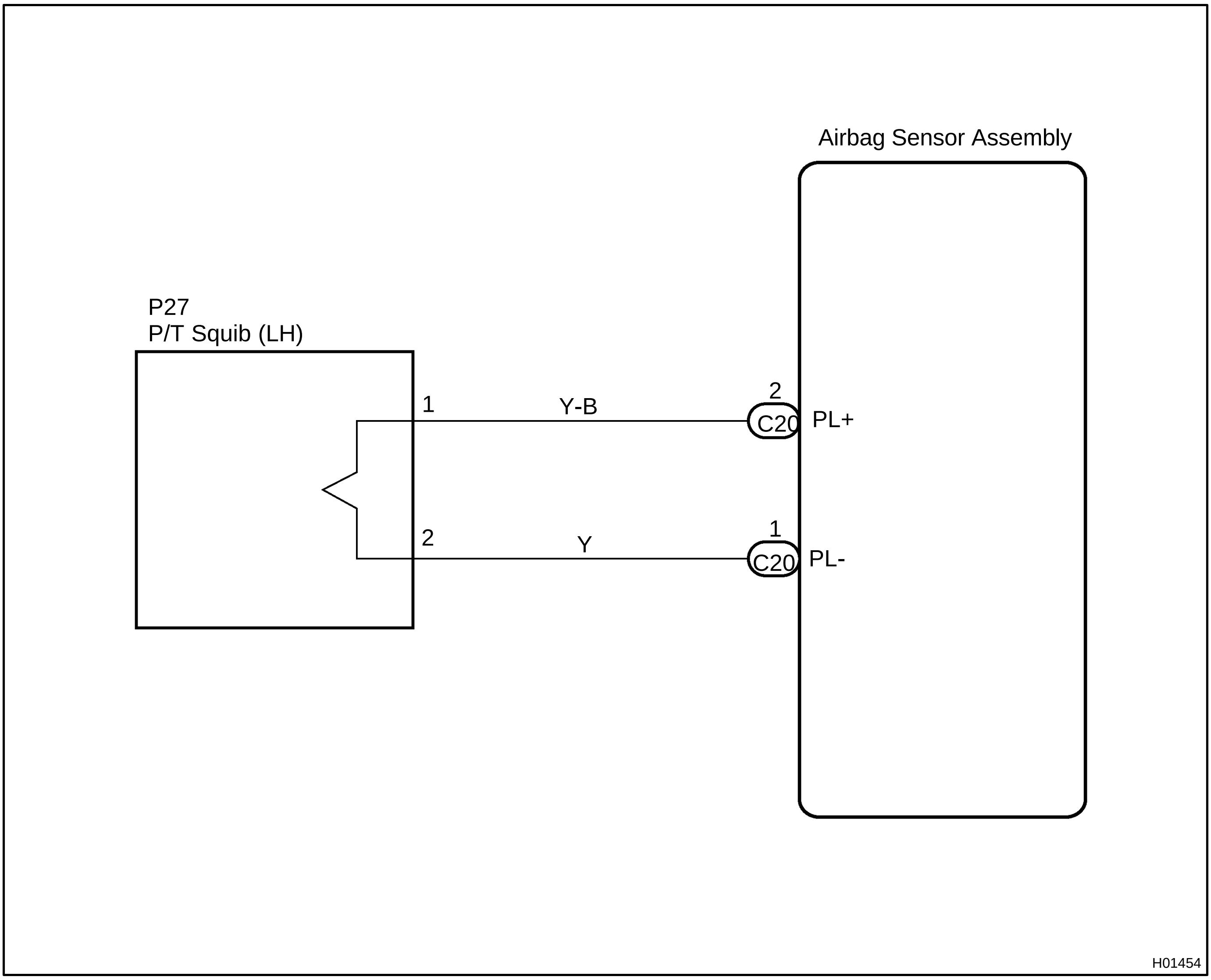
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the seat belt pretensioner (LH) to activate when the seat belt pretensioner (LH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2.
DTC B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	• Short circuit between PL+ wire harness and PL- wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

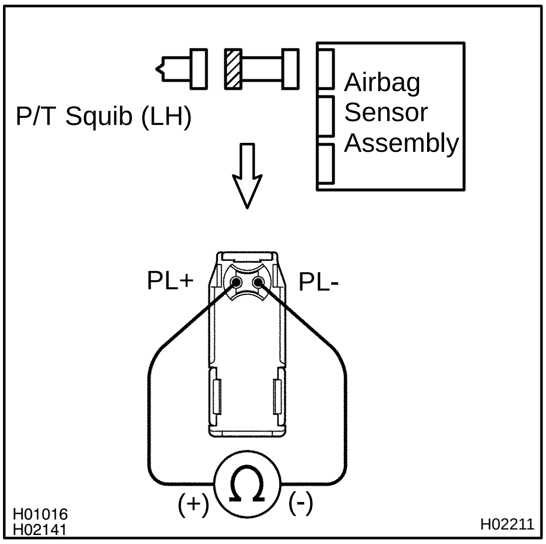
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

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-377)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL-.

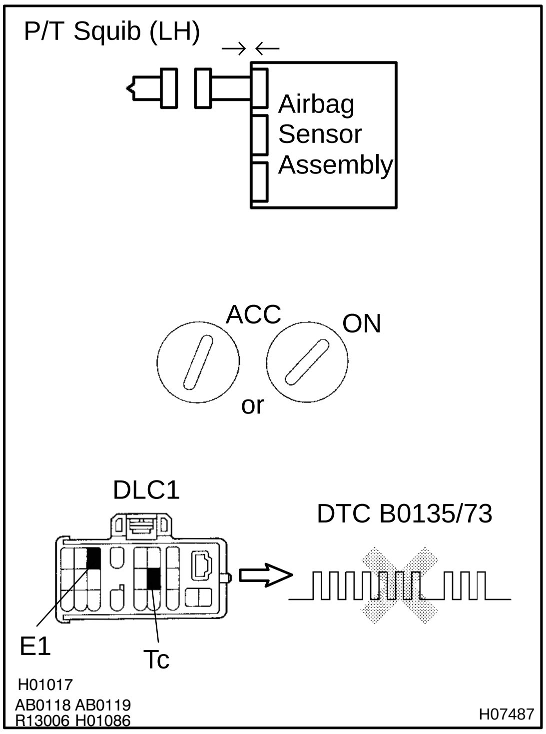
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

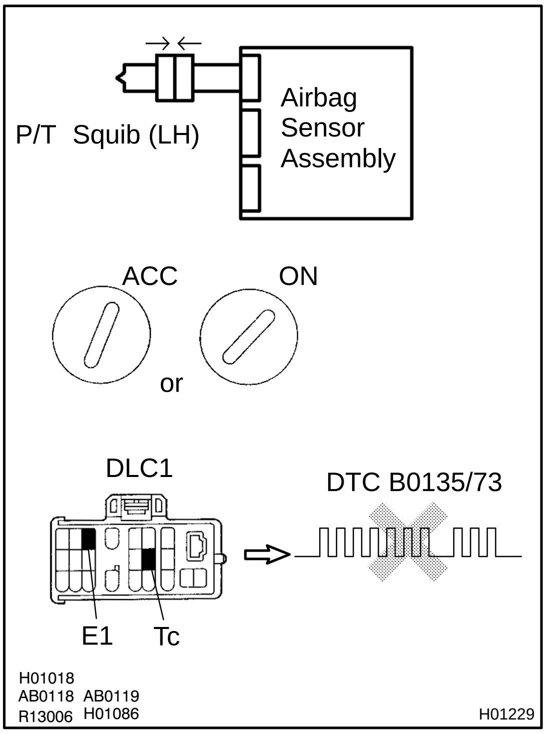
DTC B0135/73 is not output.

HINT:
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (LH).**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

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.

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 seat belt pretensioner (LH) to activate when the seat belt pretensioner (LH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	• Open circuit in PL+ wire harness or PL- wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

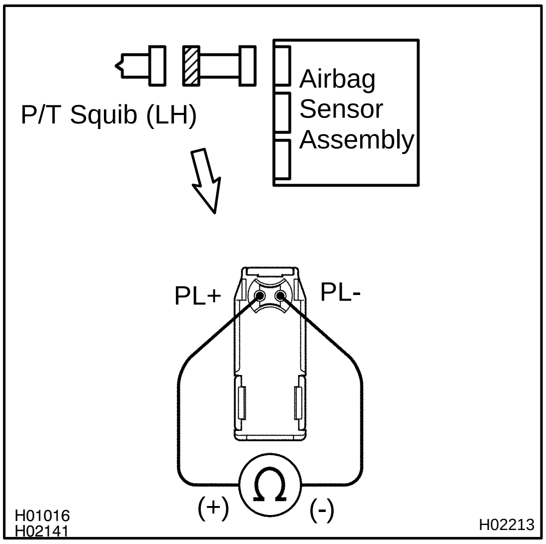
WIRING DIAGRAM

See page DI-434 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (LH) circuit.**

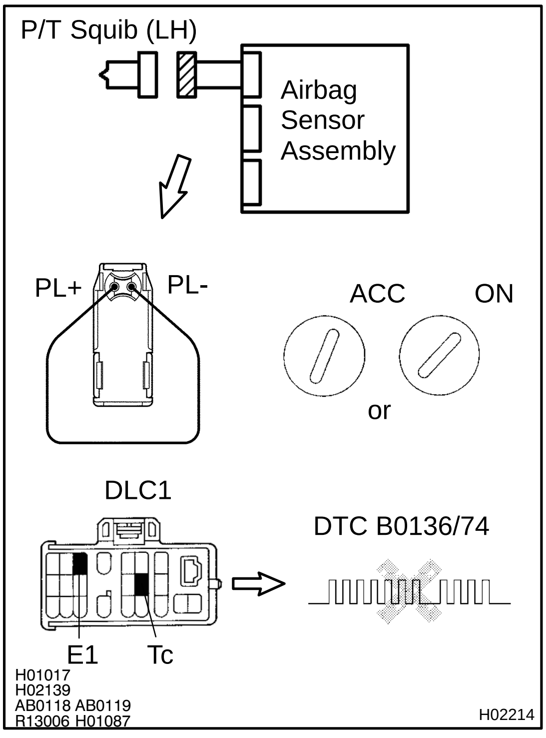


CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL-.
OK:
Resistance: Below 1 Ω

NG	**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

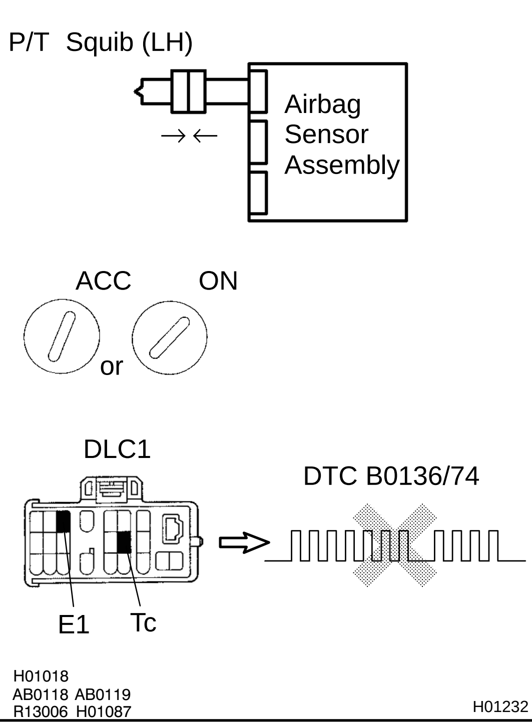
DTC B0136/74 is not output.

HINT:
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	**Replace airbag sensor assembly.**

OK

4	**Check P/T squib (LH).**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the seat belt pretensioner (LH) connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0136/74 is not output.

HINT:
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	**Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	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.

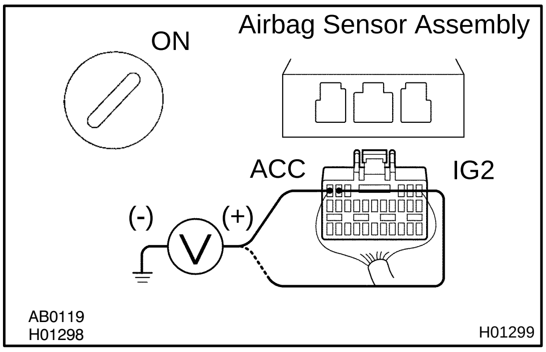
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

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-456)**

2	**Check voltage at IG2 and ACC of airbag sensor assembly.**



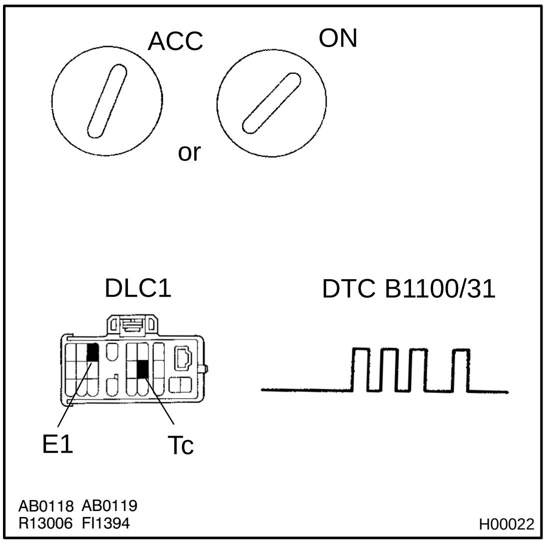
CHECK:
(a) Turn ignition switch to ON.
(b) Measure the voltage between body ground and each of terminals IG2 and ACC of the airbag sensor assembly connector.

OK:
Voltage: Below 10 - 14 V

NG	**Check that an abnormality occurs on the battery and charging system.**

OK

3	**Is DTC B1100/31 output again?**



PREPARATION:
Clear DTC.
(See step 5 on page DI-377)

CHECK:
(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Repeat operation in step (a) and (b) at least 5 times.
(d) Check DTC.
(See page DI-377)

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-18)**

YES

Replace airbag sensor assembly.

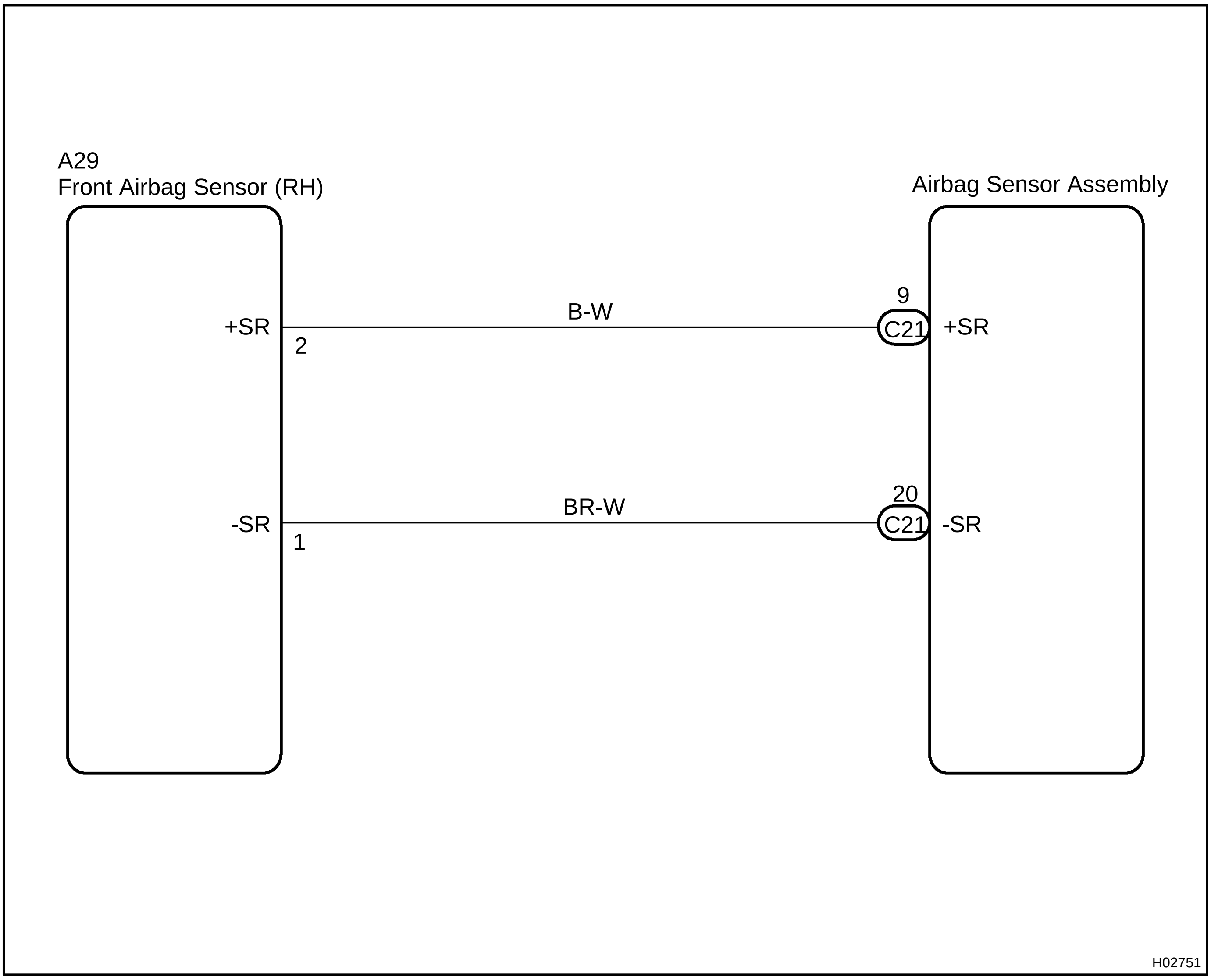
DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH).
For details of the function of each component, see OPERATION on page RS-2.
DTC B1156/B1157/15 is recorded when malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Wire harness • Engine room main wire harness • Airbag sensor assembly

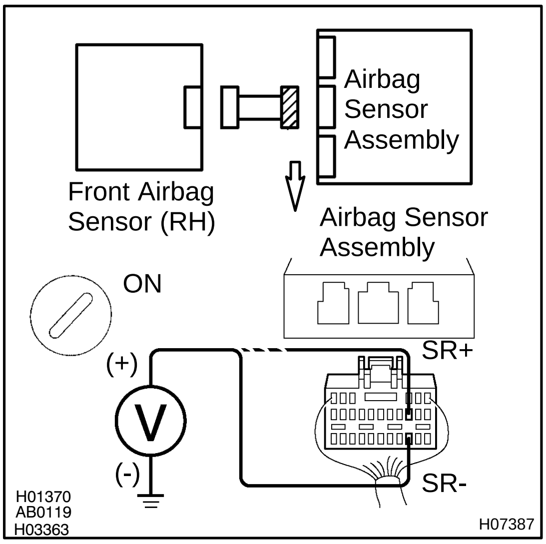
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of SR+ and SR-.

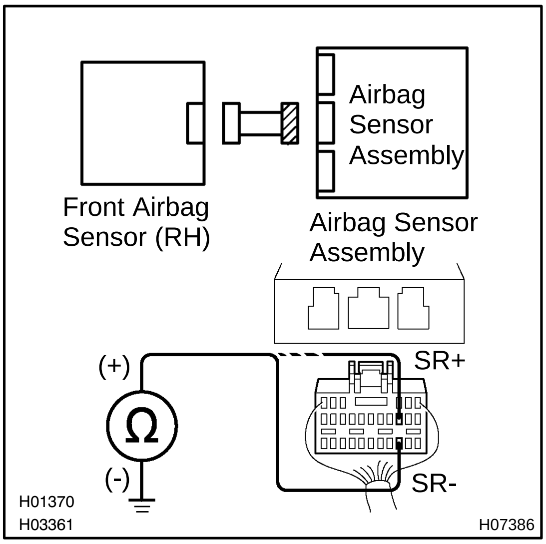
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

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-.

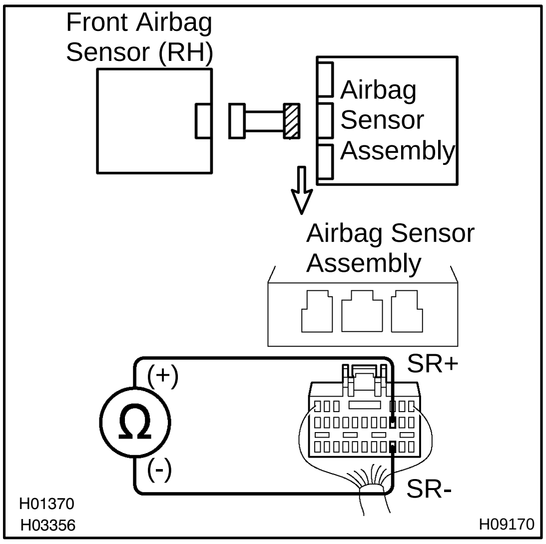
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

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-.

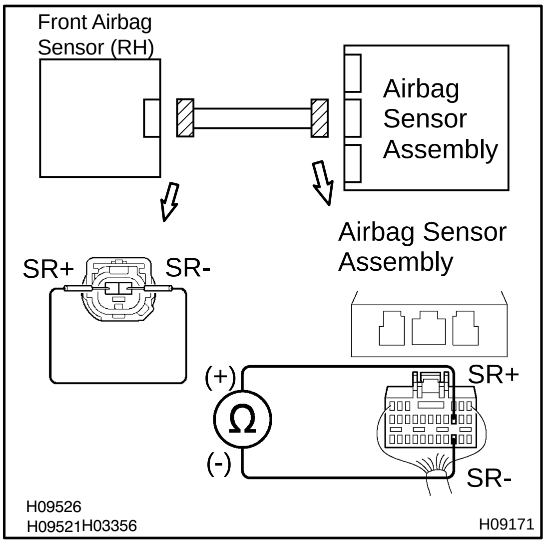
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

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-.

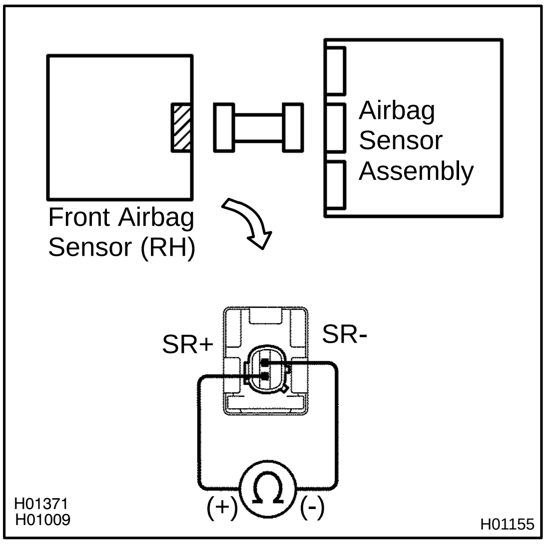
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

OK

6	Check front airbag sensor (RH).



CHECK:

For the connector (on the front airbag sensor (RH)), measure the resistance between SR+ and SR-.

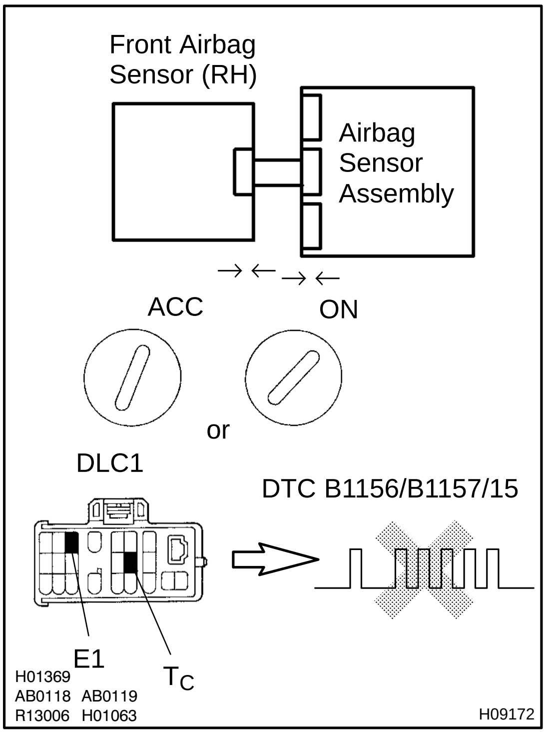
OK:

Resistance: 300 - 1500 Ω

NG → **Replace front airbag sensor (RH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front airbag sensor (RH) connector and airbag sensor assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

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.

DI58Q-07

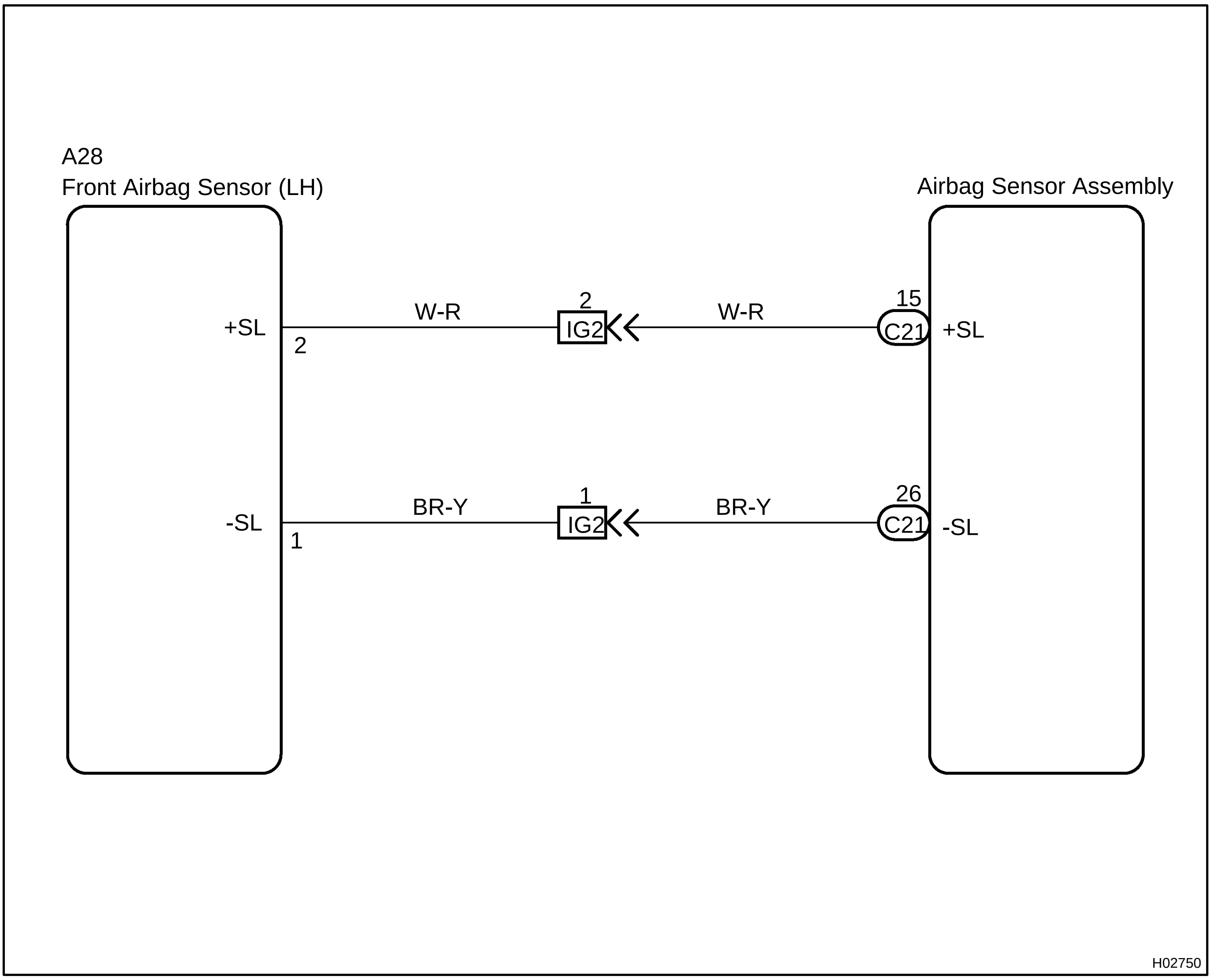
DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

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) • Wire harness • Airbag sensor assembly

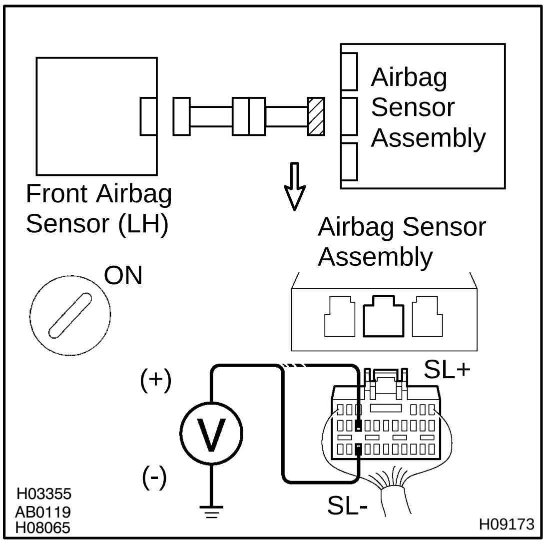
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SL+ and SL-.

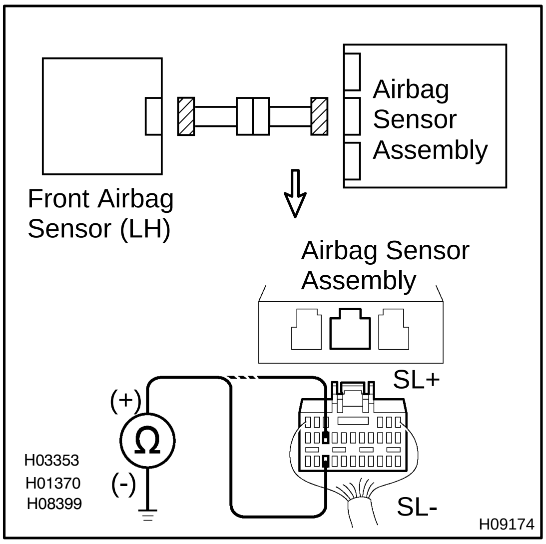
OK:

Voltage: Below 1 V

NG	**Go to step 8.**

OK

3	**Check wire harness (to ground).**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SL+ and SL-.

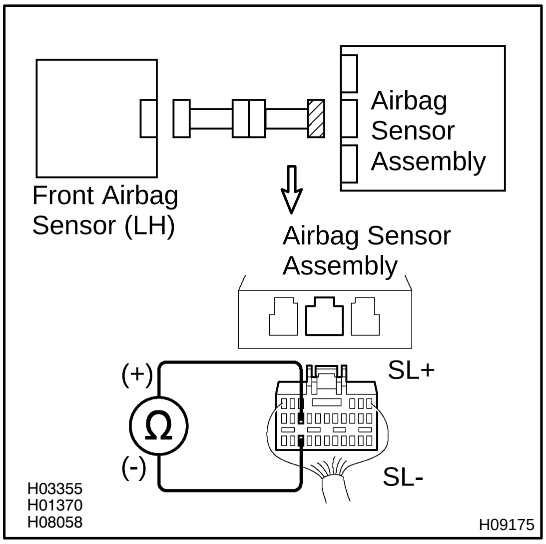
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 9.

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL-.

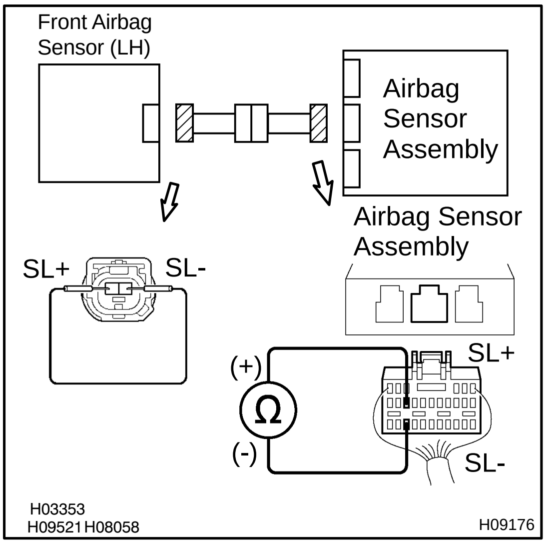
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 10.

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect SL+ and SL- of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL-.

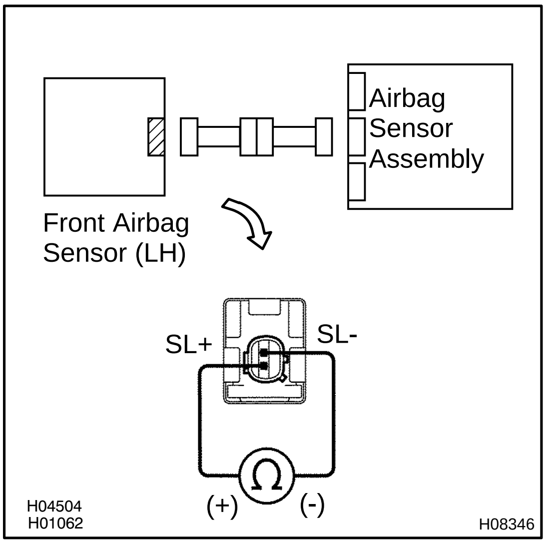
OK:

Resistance: Below 1 Ω

NG	Go to step 11.

OK

6	**Check front airbag sensor (LH).**



CHECK:

For the connector (on the front airbag sensor (LH)), measure the resistance between SL+ and SL-.

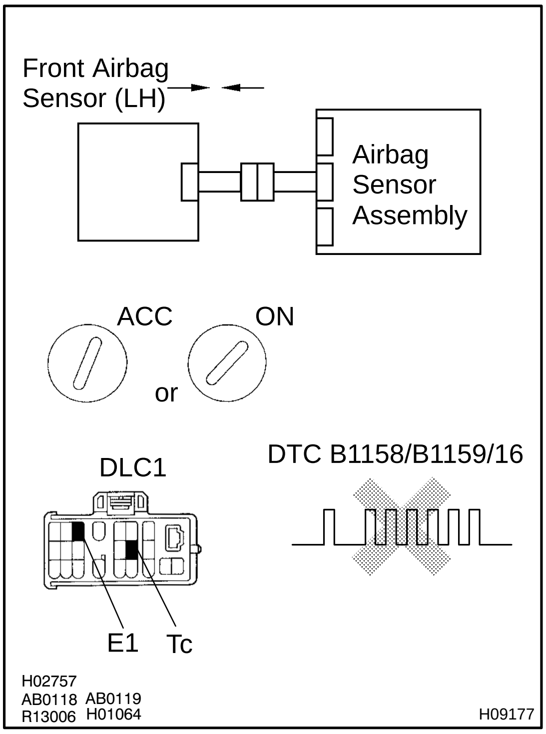
OK:

Resistance: 300 - 1500 Ω

NG → **Replace front airbag sensor (LH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B1158/B1159/16 is not output.

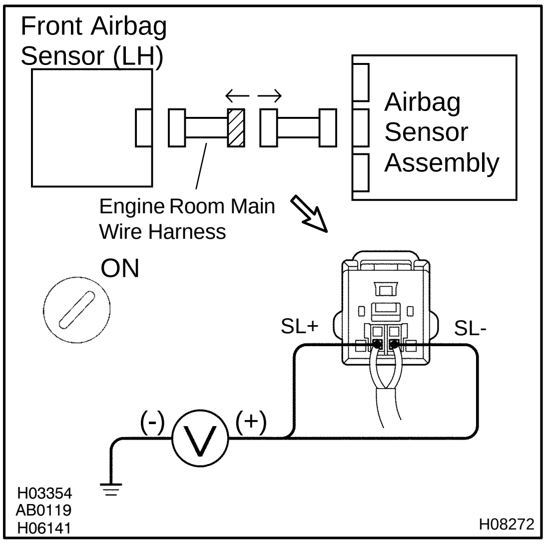
HINT:
Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8	**Check engine room main wire harness (to B+).**



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SL+ and SL-.

OK:

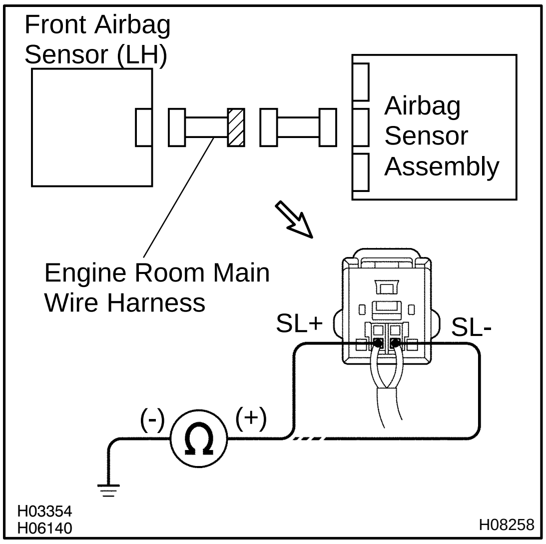
Voltage: Below 1 V

NG	**Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	**Check engine room main wire harness (to ground).**



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SL+ and SL-.

OK:

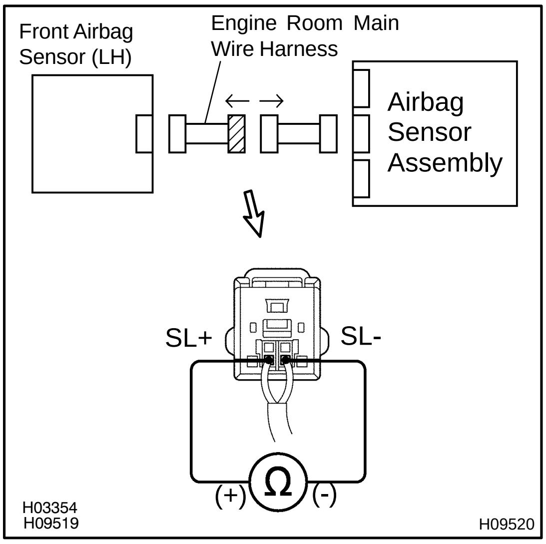
Resistance: 1 MΩ or Higher

NG	**Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL-.

OK:

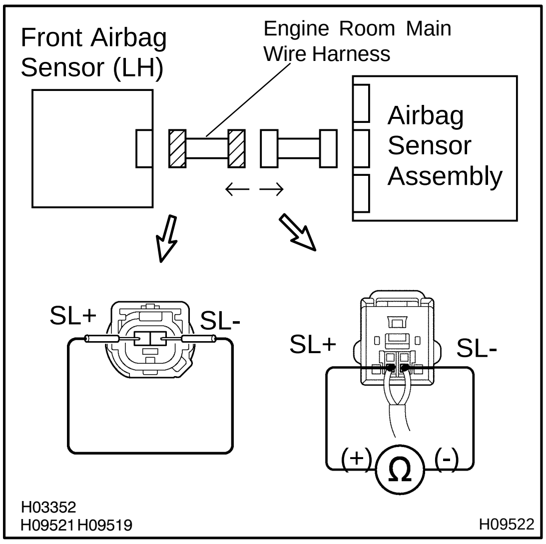
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK ↓

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect SL+ and SL- of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL-.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI18Z-33

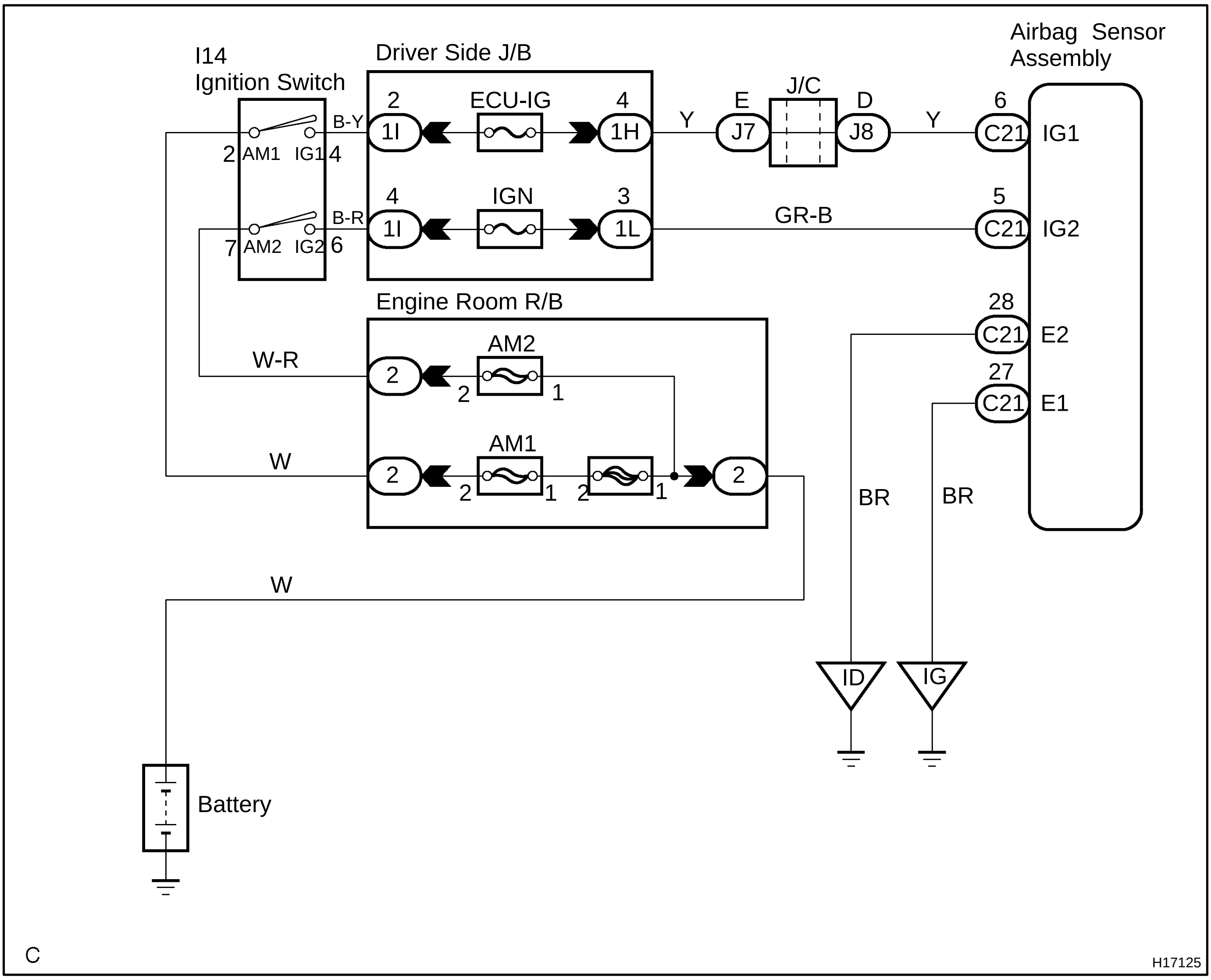
DTC	Normal	Source Voltage Drop

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.

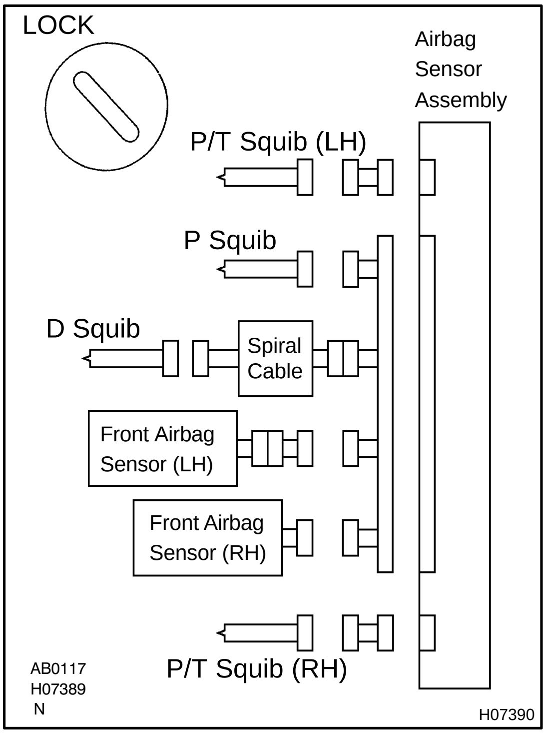
DTC No.	Diagnosis
(Normal)	Source voltage drop

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-13)

(c) Disconnect the connector of the front passenger airbag assembly. (See page RS-25)

(d) Disconnect the connectors of the seat belt pretensioner RH and LH. (See page BO-121)

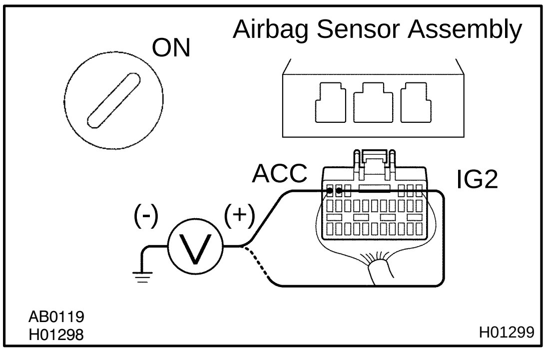
(e) Disconnect the connectors of the airbag sensor assembly. (See page RS-38)

(f) Disconnect the connectors of the front airbag sensor RH and LH. (See page RS-43)

CAUTION:

Store the steering wheel pad with the front surface facing upward.

2	Check source voltage.



PREPARATION:

(a) Connect negative (-) terminal cable to the battery.
(b) Turn ignition switch to ON.

CHECK:

Operating electric system (defogger, wiper, headlight, heater blower, etc.), measure the voltage between each of IG2 and ACC of sensor and body ground.

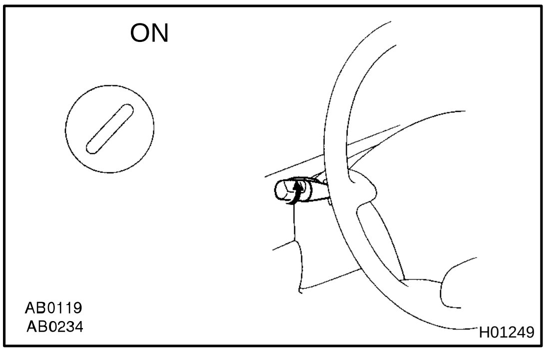
OK:

Voltage: 10 - 14 V

NG → **Check harness between battery and airbag sensor assembly, and check battery and charging system.**

OK

3	Does SRS warning light turn OFF?



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Connect the steering wheel pad connector.
(c) Connect the front passenger airbag assembly connector.
(d) Connect the seat belt pretensioner connector RH and LH.
(e) Connect the airbag sensor assembly connector.
(f) Turn ignition switch to ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO → **Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

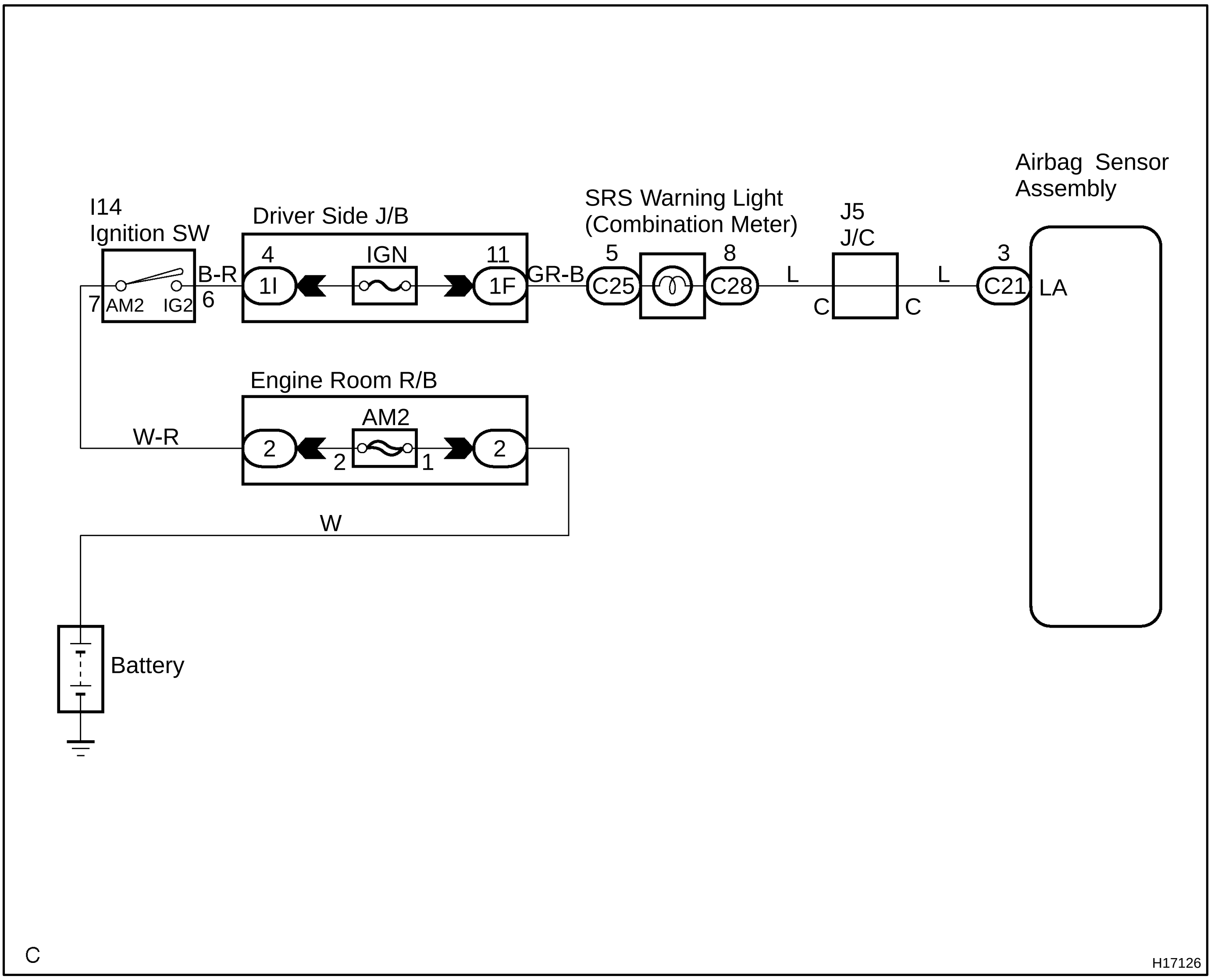
DI2I5-21

SRS Warning Light Circuit Malfunction (Always lights up, when ignition switch is in LOCK position.)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to ACC or ON position, and then turns OFF automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality.
When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by blinking the SRS warning light.

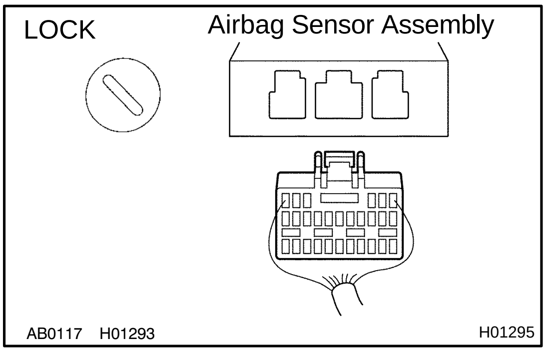
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Does SRS warning light turn OFF?**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the airbag sensor assembly connector.

(d) Connect negative (-) terminal cable to the battery.

CHECK:

Check operation of SRS warning light.

NO → **Check SRS warning light circuit or terminal AB circuit of DLC1.**

YES

Replace airbag sensor assembly.

DI191-23

SRS Warning Light Circuit Malfunction (Does not light up, when ignition switch is turned to ACC or ON.)

CIRCUIT DESCRIPTION

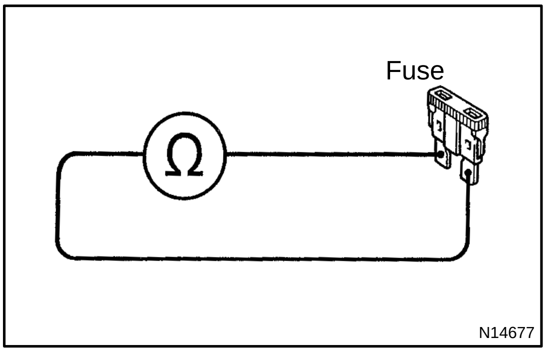
The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns OFF automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

See page DI-459 .

INSPECTION PROCEDURE

1	**Check ECU-B Fuse.**



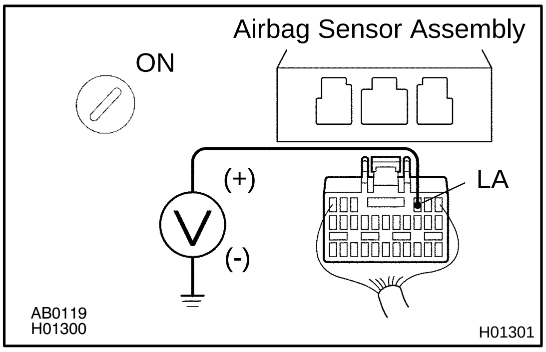
PREPARATION:
Remove ECU-B fuse.
CHECK:
Check continuity of ECU-B fuse.
OK:
Continuity
HINT:
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG → **Go to step 5.**

OK

2	**Prepare for inspection. (See step 1 on page DI-456)**

3	**Check SRS warning light circuit.**



PREPARATION:

(a) Connect negative (-) terminal cable to the battery.

(b) Turn ignition switch to ACC or ON.

CHECK:

Measure the voltage between LA terminal of the harness side connector and body ground.

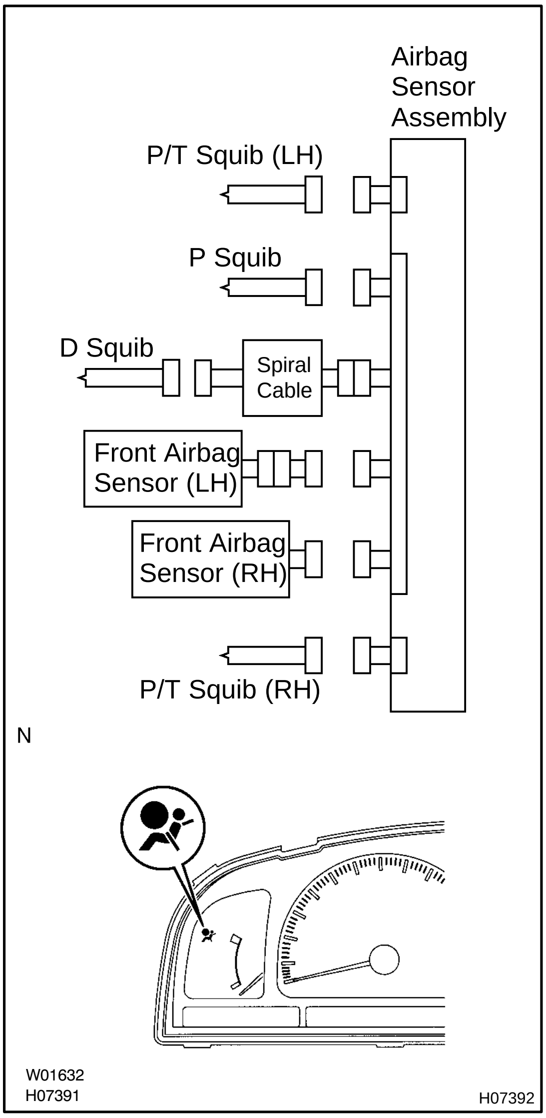
OK:

Voltage: 10 - 14 V

NG → **Check SRS warning light bulb or repair SRS warning light circuit.**

OK

4	Does SRS warning light come on?



PREPARATION:

(a) Disconnect negative (-) terminal cable from the battery.

(b) Connect the airbag sensor assembly connector.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

(d) Turn ignition switch to ACC or ON.

CHECK:

Check operation of SRS warning light.

NO → **Check terminal LA of airbag sensor assembly. If normal, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

5	Is new ECU-B fuse burnt out again?

NO → **Using simulation method, reproduce malfunction symptoms. (See page IN-18)**

YES

Check harness between ECU- B fuse and SRS warning light.

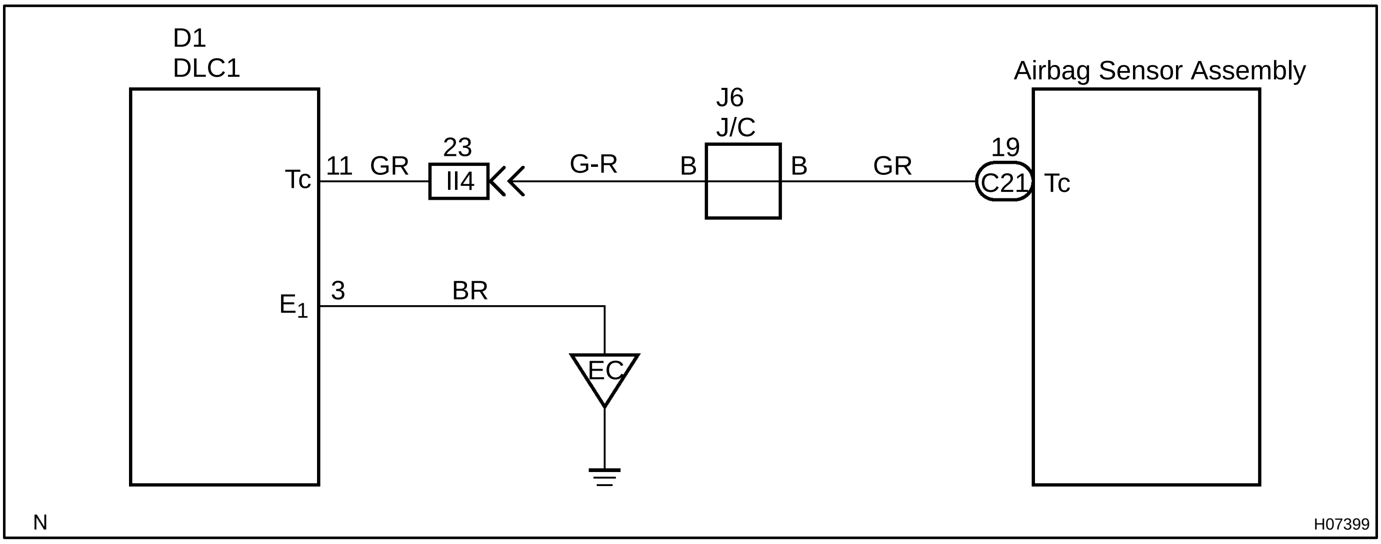
DI192-33

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E1 of the DLC1 the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

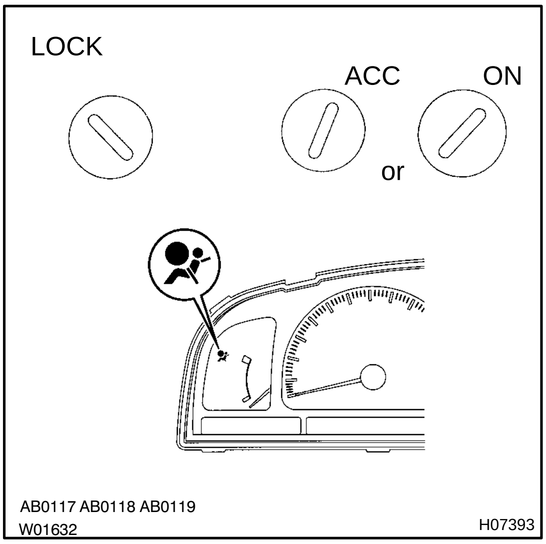
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	**Does SRS warning light light up for approx. 6 seconds?**



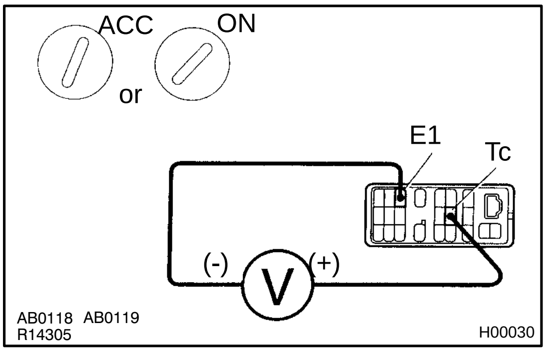
PREPARATION:

Check operation of the SRS warning light after ignition switch is turned from LOCK position to ACC or ON position.

NO → **Check SRS warning light system.**
(See page DI-377)

YES

2	**Check voltage between terminals Tc and E1 of DLC1.**

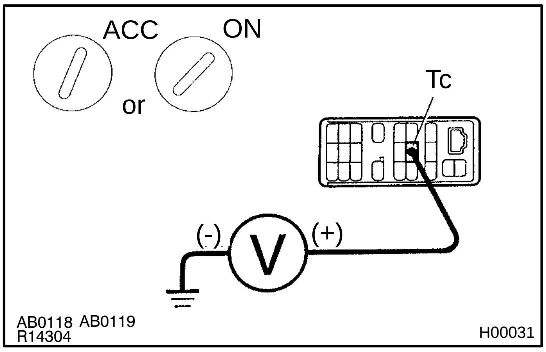


PREPARATION:
Turn ignition switch to ACC or ON.
CHECK:
Measure the voltage between terminals Tc and E1 of DLC1.
OK:
Voltage: 10 - 14 V

OK → **Go to step 4.**

NG

3	**Check voltage between terminal Tc of DLC1 and body ground.**

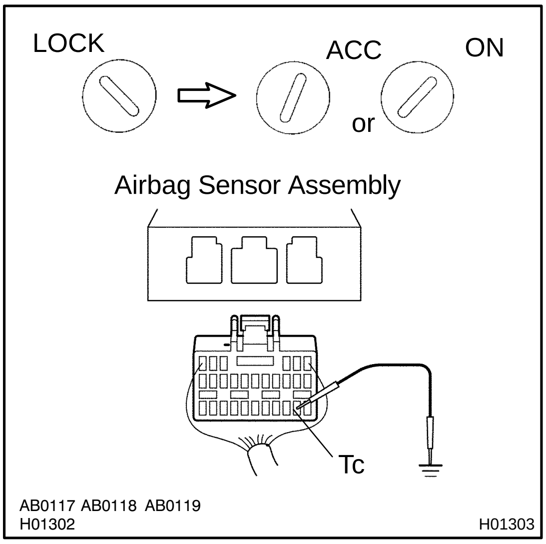


CHECK:
Measure the voltage between terminal Tc of DLC1 and body ground.
OK:
Voltage: 10 - 14 V

OK → **Check harness between terminal E1 of DLC1 and body ground.**

NG

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.
(d) Insert service wire into terminal Tc from 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 ignition switch to ACC or ON and wait at least for 20 seconds.
(h) Connect service wire of terminal Tc to body ground.

CHECK:

Check operation of SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

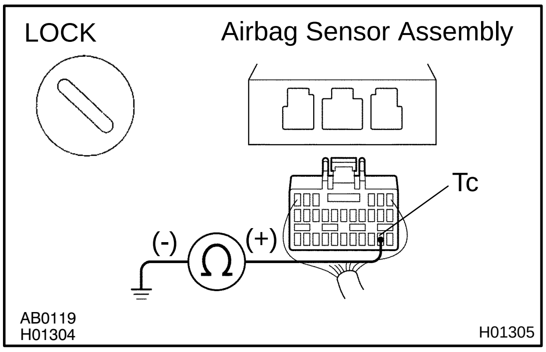
OK → **Check harness between the airbag sensor assembly and DLC1.**

NG

Replace airbag sensor assembly.

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

1	**Check resistance between terminal Tc of airbag sensor assembly and body ground.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the airbag sensor assembly connector.

CHECK:

Check the 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

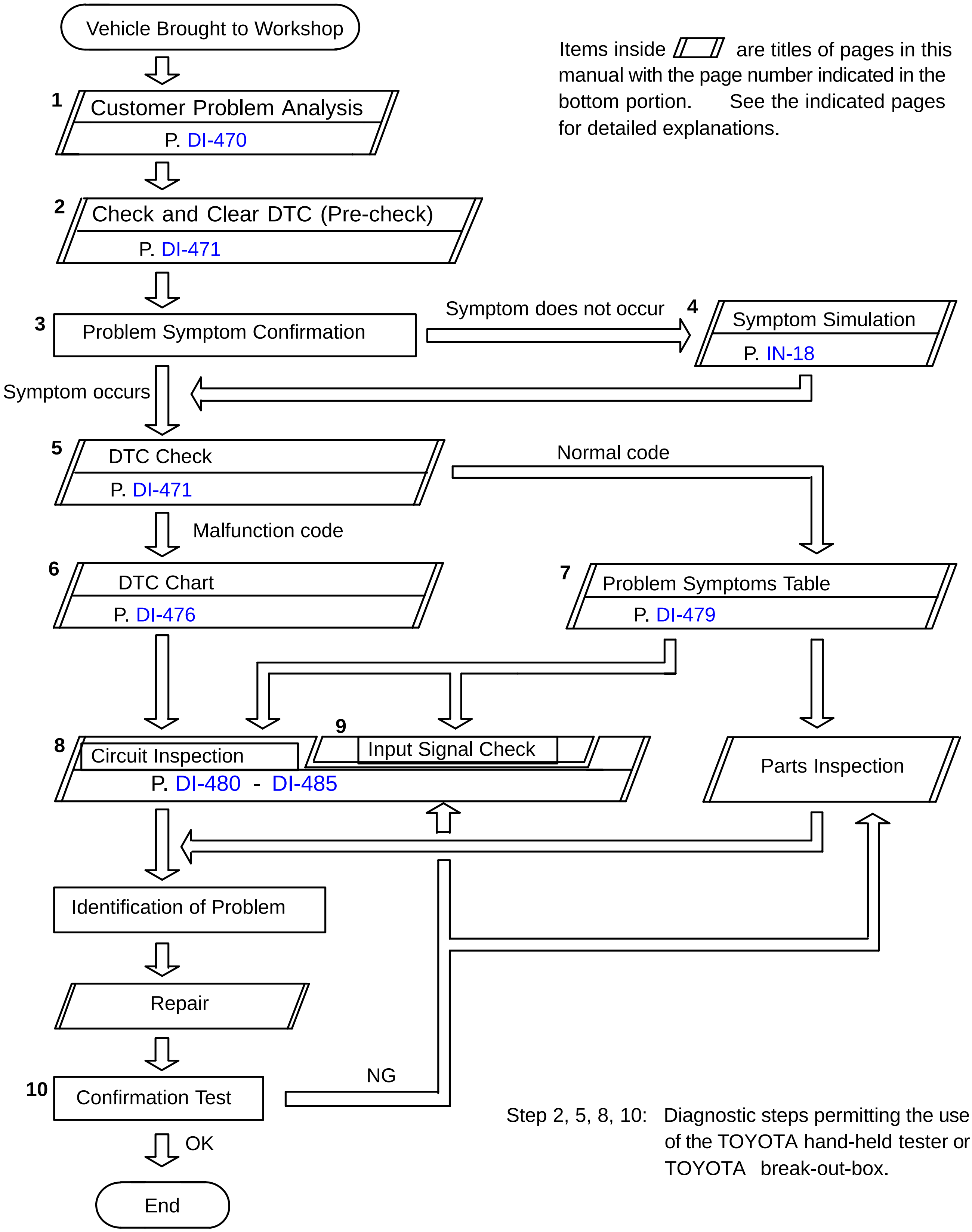
Replace airbag sensor assembly.

CRUISE CONTROL SYSTEM (DENSO Made)

DI0QT-04

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



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

Step 2, 5, 8, 10: Diagnostic steps permitting the use of the TOYOTA hand-held tester or TOYOTA break-out-box.

DI0QU-03

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: ________________

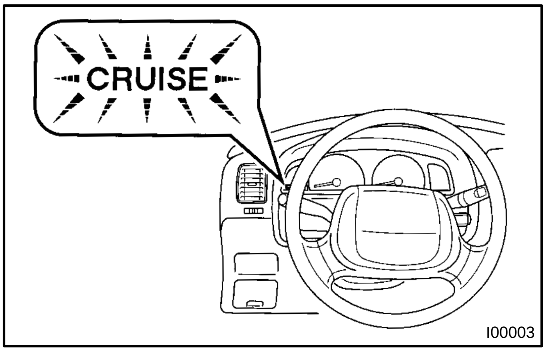
Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	Frequency Problem Occurs?	☐ Continuous ☐ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	☐ Auto cancel occurs	● Driving condition ☐ City driving ☐ Freeway ☐ Up hill ☐ Down hill ● After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ With brake ON ☐ Except D position shift ☐ When control SW turns to CANCEL position
	☐ Cruise control malfunction	☐ Slip to acceleration side ☐ Slip to deceleration side ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ ACC ☐ COAST ☐ RES ☐ CANCEL
	☐ Cruise main indicator light	☐ Remains ON ☐ Does not light up ☐ Blinks

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

DI0QV-04



PRE-CHECK

1. DIAGNOSIS SYSTEM

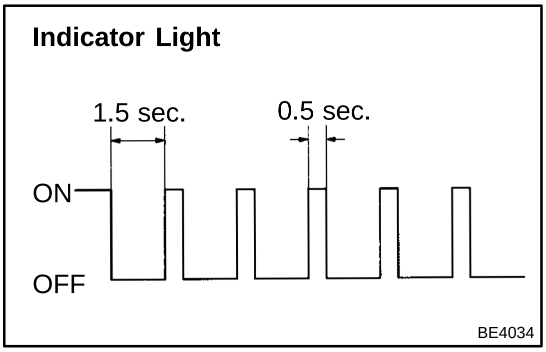
(a) Check the indicator.

(1) Turn the ignition switch ON.

(2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT:

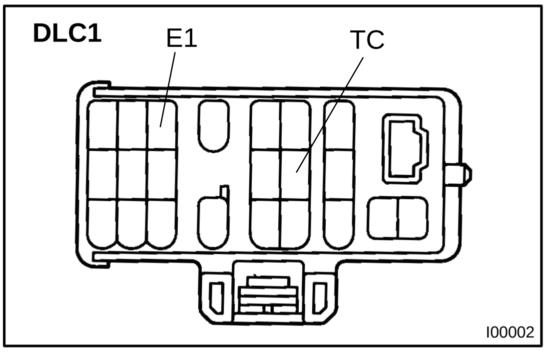
If the indicator check result is not normal, proceed to troubleshooting (See page BE-2) for the combination meter section.



(b) Check the DTC.

HINT:

If a malfunction occurs in the No. 1 vehicle speed sensor or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns ON and OFF the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



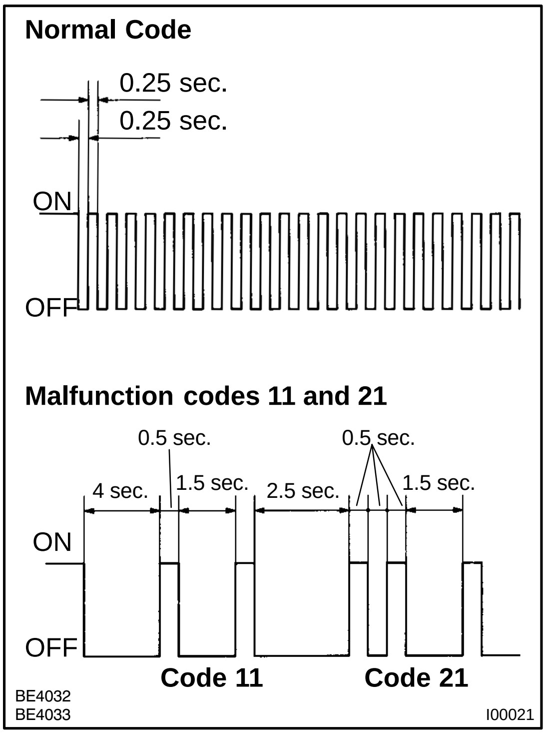
(c) Using diagnosis check wire, check the output of DTC.

(1) Turn the ignition switch ON.

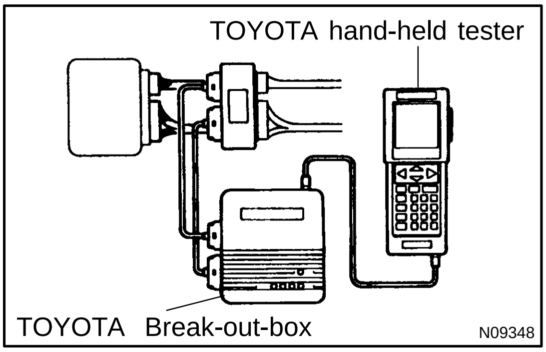
(2) Using SST, connect terminals Tc and E_1 of DLC1.

SST 09843-18020

(3) Read the DTC on the CRUISE MAIN indicator light.



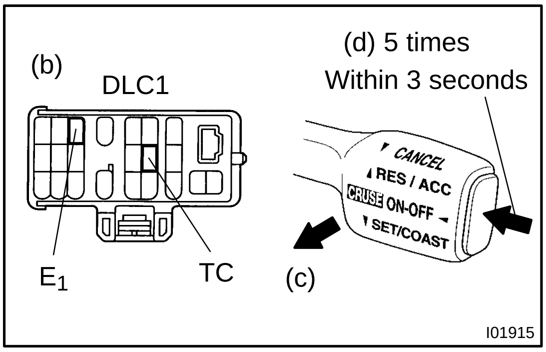
HINT:
If the DTC is not output, inspect the diagnosis circuit.
As an example, the blinking patterns for codes; normal 11 and 21 are shown in the illustration.



2. ECU TERMINAL VALUES MEASUREMENT BY USING TOYOTA BREAK-OUT-BOX AND TOYOTA HAND-HELD TESTER

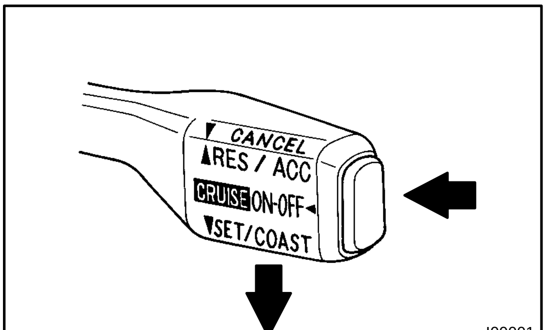
(a) Hook up the TOYOTA break- out- box and TOYOTA hand-held tester to the vehicle.
(b) Read the ECU input/output values by following the prompts on the tester screen.

HINT:
TOYOTA 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 TOYOTA hand-held tester/TOYOTA break-out-box operator's manual for further details.



3. DTC CLEARANCE (ERASE MODE)

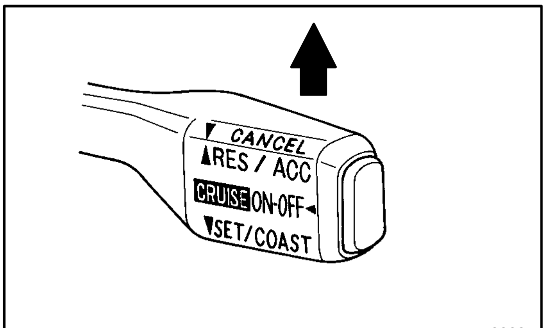
HINT:
Under the erase mode, diag detection does not work.
(a) Drive at about 15 km/h or below.
(b) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020
(c) Pull the cruise control switch to CANCEL.
(d) On the above metioned condition, turn on the cruise control main switch 5 times within 3 seconds.



I00001

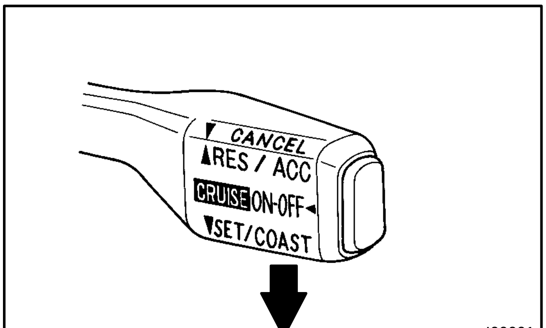
4. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

(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.



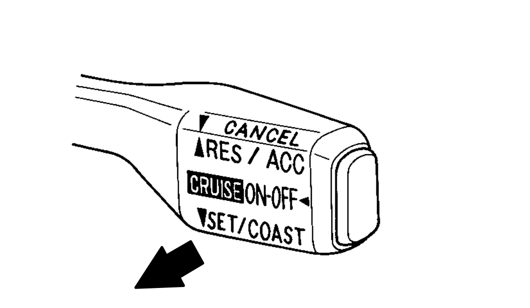
I00001

(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) Press the control switch to the SET/COAST.
  (4) 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.
  (5) Momentarily press the control switch upward to RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.6 km/h (1 mph) (Tap-up function).



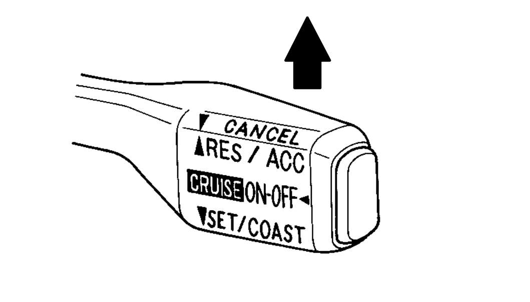
I00001

(c) Inspect the COAST.
  (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) 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.
  (5) Momentarily press the control switch downward to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.6 km/h (1 mph) (Tap-down function).



I00001

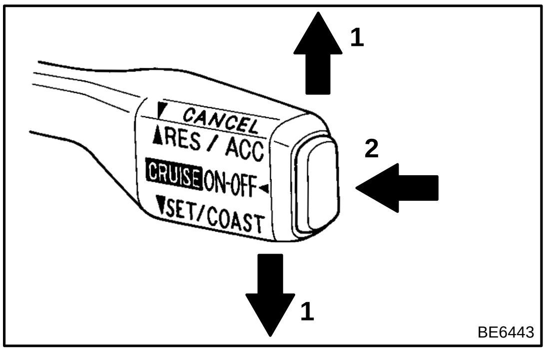
(d) Inspect the CANCEL switch.
(1) Push the main switch ON.
(2) Drive at a desired speed (40 km/h (25 mph) or higher).
(3) Press the control switch to the SET/COAST.
(4) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depress the brake pedal
- Depress the clutch pedal (M/T)
- Shift to except D position (A/T)
- Turn the main switch OFF
- Pull the cruise control switch to CANCEL



I00001

(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) Press the control switch to the SET/COAST.
(4) 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
- Depress the clutch pedal (M/T)
- Shift to except D position (A/T)
- Pull the cruise control switch to CANCEL

(5) 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.



5. INPUT SIGNAL CHECK

HINT:

(1) For check No.1 ~ No.2
- Turn the ignition switch ON.

(2) For check No.3
- Turn ignition switch ON.
- Shift to D position.

(3) For check No.4
- Jack up the vehicle.
- Start the engine.
- Shift to D position.

(a) Press the control switch to SET/COAST or RES/ACC position and hold it down or hold it up respecively (1)
(b) Push the main switch ON (2).
(c) Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.
(d) Turn the SET/COAST or RES/ACC switch OFF.
(e) Operate each switch as listed in the table below.
(f) Read the blinking pattern of the CRUISE MAIN indicator light.
(g) After performing the check, turn the main switch OFF.

HINT:
When 2 or more signals are input to the ECU, the lowest numbered code will be displayed first.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON	Light ON OFF 0.25 sec. 0.25 sec. 1sec.	SET/COAST switch circuit is normal
2	Turn RES/ACC switch ON	Light ON OFF	RES/ACC switch circuit is normal
3	Turn CANCEL switch ON	Light ON OFF Switch OFF Switch ON	CANCEL switch circuit is normal
	Turn stop light switch ON Depress brake pedal		Stop light switch circuit is normal
	Turn Park/Neutral Position switch OFF (Shift to except D position)	Light ON OFF Switch ON Switch OFF	Park/Neutral Position switch circuit is normal
	Turn clutch switch OFF (Depress clutch pedal)		Clutch switch circuit is normal
4	Drive at about 40 km/h (25 mph)or higher	Light ON OFF	Vehicle Speed Sensor is normal
	Drive at about 40 km/h (25 mph) or below	Light ON OFF	

DI0QW-04

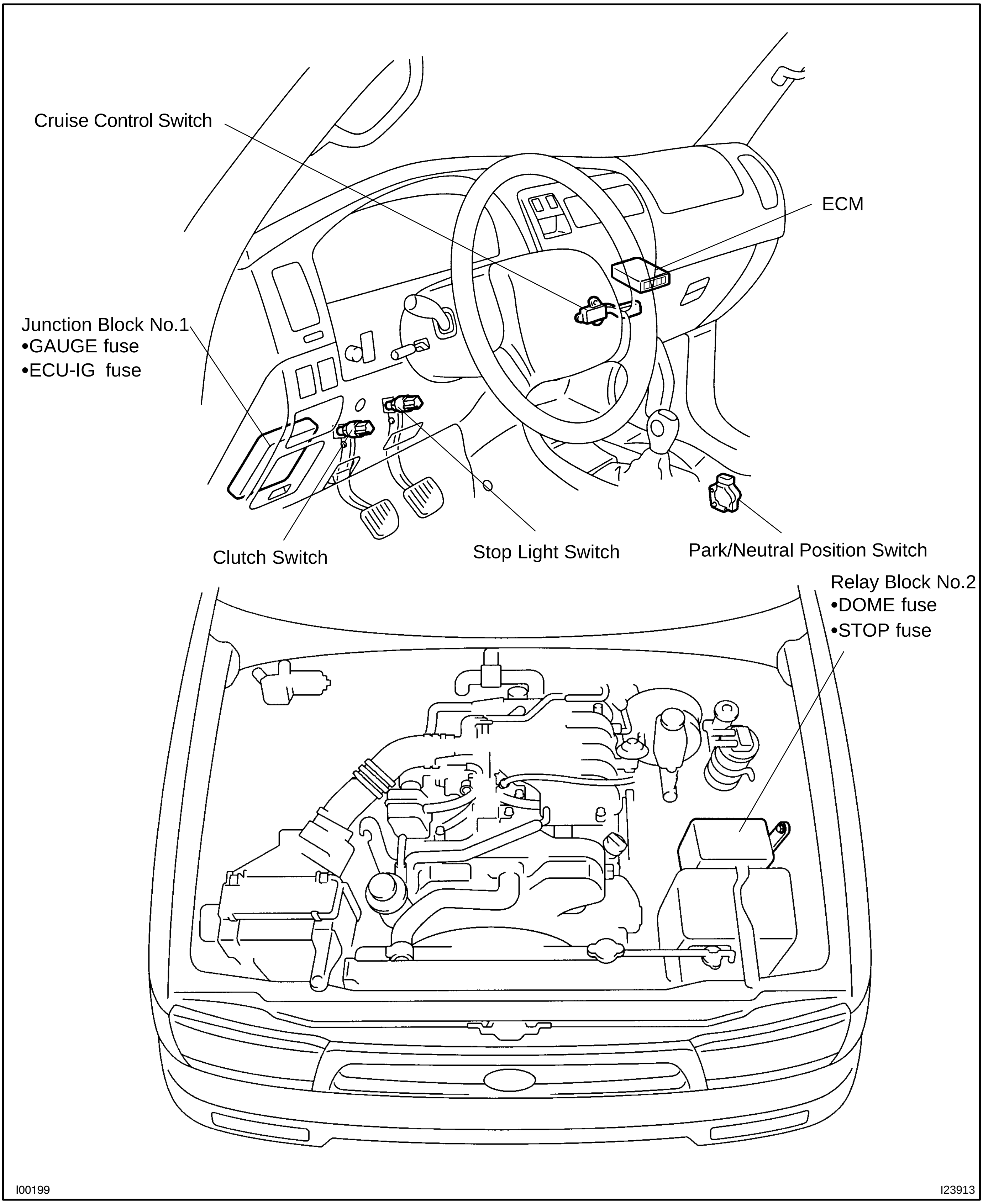
DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See page)	Detection Item	Trouble Area
P0500/21, 23 (DI-480)	Vehicle Speed Signal Abnormal	• Combination meter • Harness or connector between ECM and vehicle speed sensor • Vehicle speed sensor • ECM
P1520/52 (DI-481)	Short in Stop Light Switch Circuit	• Stop light switch • Harness or connector between ECM and stop light switch • ECM
P1566/54 (DI-485)	Input Signal Circuit	• ECM

DI0QX-05

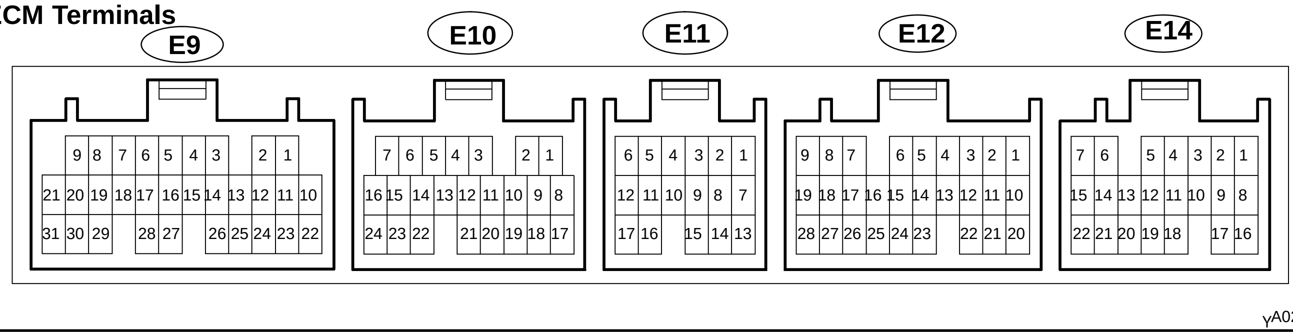
PARTS LOCATION



DI1CQ-04

TERMINALS OF ECU

ECM Terminals



Symbols (Terminal No.)	Wiring Color	Condition		STD Voltage
STP (E14-20) - E1 (E10-17)	G-W - BR	Depress brake pedal		7.5 - 14 V
		Release brake pedal		0 - 1.5 V
CCS (E12-22) - E1 (E10-17)	G - BR	Ignition switch ON		9 - 14 V
		Ignition switch ON	MAIN switch hold ON	Below 1 V
		Ignition switch ON	CANCEL switch hold ON	6.0 - 10.1 V
		Ignition switch ON	SET/COAST switch hold ON	4.0 - 7.1 V
		Ignition switch ON	RES/ACC switch hold ON	2.1 - 4.0 V
PI (E14-17) - E1 (E10-17)	GR - BR	Ignition switch ON	Cruise control main switch ON	0 - 3 V
		Ignition switch ON	Cruise control main switch OFF	9 - 14 V
ST1- (E12-9) - E1 (E10-17)	R-B - BR	Depress brake pedal		0 - 1.5 V
		Release brake pedal		7.5 - 14 V

DI0QZ-05

PROBLEM SYMPTOMS TABLE

Symptom	Suspected 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. ECM	DI-485 DI-480 DI-481 DI-203 IN-28
SET not occurring or CANCEL occurring (DTC is not output)	1. ECM	IN-28
Actual vehicle speed deviates above or below the set speed	1. Input signal circuit 2. ECM	DI-485 IN-28
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road (Hurting)	1. ECM	IN-28
Cruise control not cancelled, even when brake pedal is depressed	1. Stop light switch circuit 2. ECM	DI-481 IN-28
Cruise control not cancelled, even when transmission is shifted to N position	1. Park/neutral position switch circuit 2. ECM	DI-203 IN-28
Cruise control not cancelled, even when clutch pedal is depressed	1. ECM	IN-28
Control switch does not operate (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise control switch circuit 2. ECM	DI-486 IN-28
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. ECM	DI-485 IN-28
Poor response is ACC and RES modes	1. ECM	IN-28
O/D does not resume, even though the road is not uphill	1. ECM	IN-28
DTC memory is erased	1. ECM	IN-28
DTC is not output, or is output when should not be	1. Diagnosis circuit 2. ECM	- IN-28
Cruise main indicator light remains on or falls to lighting up	1. Input signal circuit 2. ECM	DI-485 IN-28

DI3CI-09

CIRCUIT INSPECTION

DTC	P0500/21, 23	Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

See page DI-179 .

DTC No.	DTC Detection Condition	Trouble Area
P0500/21, 23	Speed signal is not input to ECM while cruise control is set	• Combination meter • Harness or connector between ECM and vehicle speed sensor • Vehicle speed sensor • ECM

WIRING DIAGRAM

See page DI-179 .

INSPECTION PROCEDURE

See page DI-179 ..

DI3CJ-18

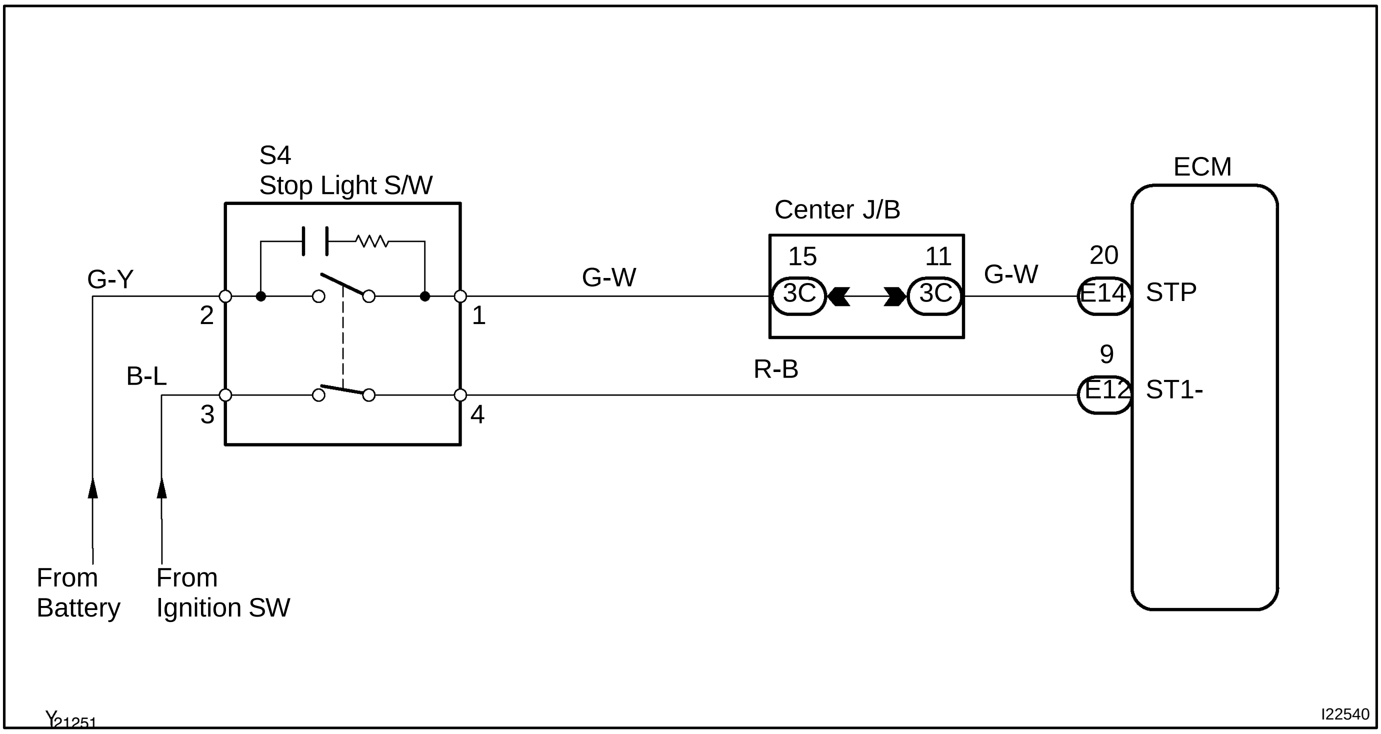
DTC	P1520/52	Stop light switch circuit

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECM. When the ECM receives this signal, it cancels the cruise control.
A fail-safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.
The cancel condition is that battery positive voltage is supplied to terminal STP.
When the brake is on, battery positive voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the ECM, and the ECM turns the cruise control OFF.
If the harness connected to terminal STP has an open circuit, terminal STP will have battery positive voltage and the cruise control will be turned OFF.

DTC No.	DTC Detection Condition	Trouble Area
P1520/52	Stop light switch circuit	• Stop light switch • Harness or connector between ECM and stop light switch • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the TOYOTA hand-held tester, start the inspection from step 1 and in case of not using the TOYOTA hand-held tester, start it from step 2.

1	**Check stop light switch using TOYOTA hand-held tester.**

PREPARATION:
Connect the TOYOTA hand-held tester to the DLC3.
CHECK:
Check the stop light switch using DATA LIST.
OK:

Condition	STP LIGHT SW1-S (Sub CPU)	STP LIGHT SW2-S (Sub CPU)	STP LIGHT SW2-M (Main CPU)
Depressed	ON	ON	ON
Released	OFF	OFF	OFF

HINT:
- STP LIGHT SW1 has a function to disconnect the connection (OFF) when depressing the pedal, however, the ECM is control by the logic reverse, so with the TOYOTA hand-held tester, it displays ON.
- STP LIGHT SW1 indicates an input of the ST1- terminal and STP LIGHT SW2 indicates an input of the STP terminal.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

NG

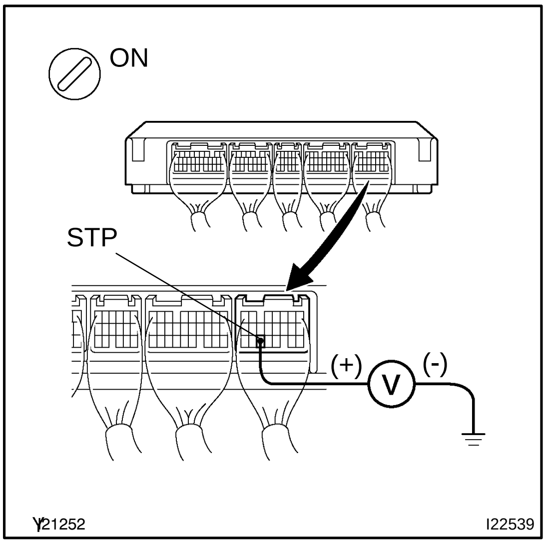
2	**Check operation of stop light.**

CHECK:
Check that the stop light comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

NG → **Check stop light system (See page BE-32).**

OK

3	Check voltage between terminal STP of ECM connector and body ground.



PREPARATION:

(a) Remove the ECM with connectors being connected.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal STP of the ECM connector and the body ground when the brake pedal is depressed and released.

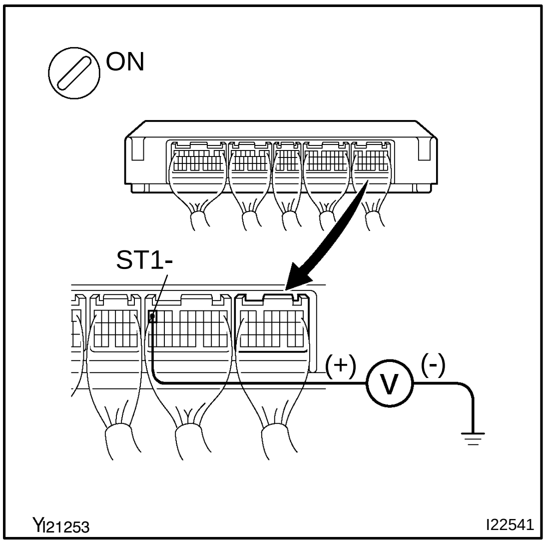
OK:

Brake Pedal	Voltage
Depressed	7.5 - 14 V
Released	0 - 1.5 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

NG

4	Check voltage between terminal ST1- of ECM connector and body ground.



PREPARATION:

(a) Remove the ECM with connectors being connected.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal ST1- of the ECM connector and the body ground when the brake pedal is depressed and released.

OK:

Brake Pedal	Voltage
Depressed	Below 1 V
Released	7.5 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

NG

5	**Check harness and connector between terminal STP of ECM and stop light switch, and terminal ST1- of ECM and stop light switch (See page IN-28).**

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

OK

Check and replace ECM (See page IN-28).

DI3CL-12

DTC	P1566/54	Input Signal Circuit

CIRCUIT DESCRIPTION

See page DI-481 .

DTC No.	DTC Detection Condition	Trouble Area
P1566/54	Input signal abnormal	ECM

INSPECTION PROCEDURE

Check and replace ECM (See page IN-28).

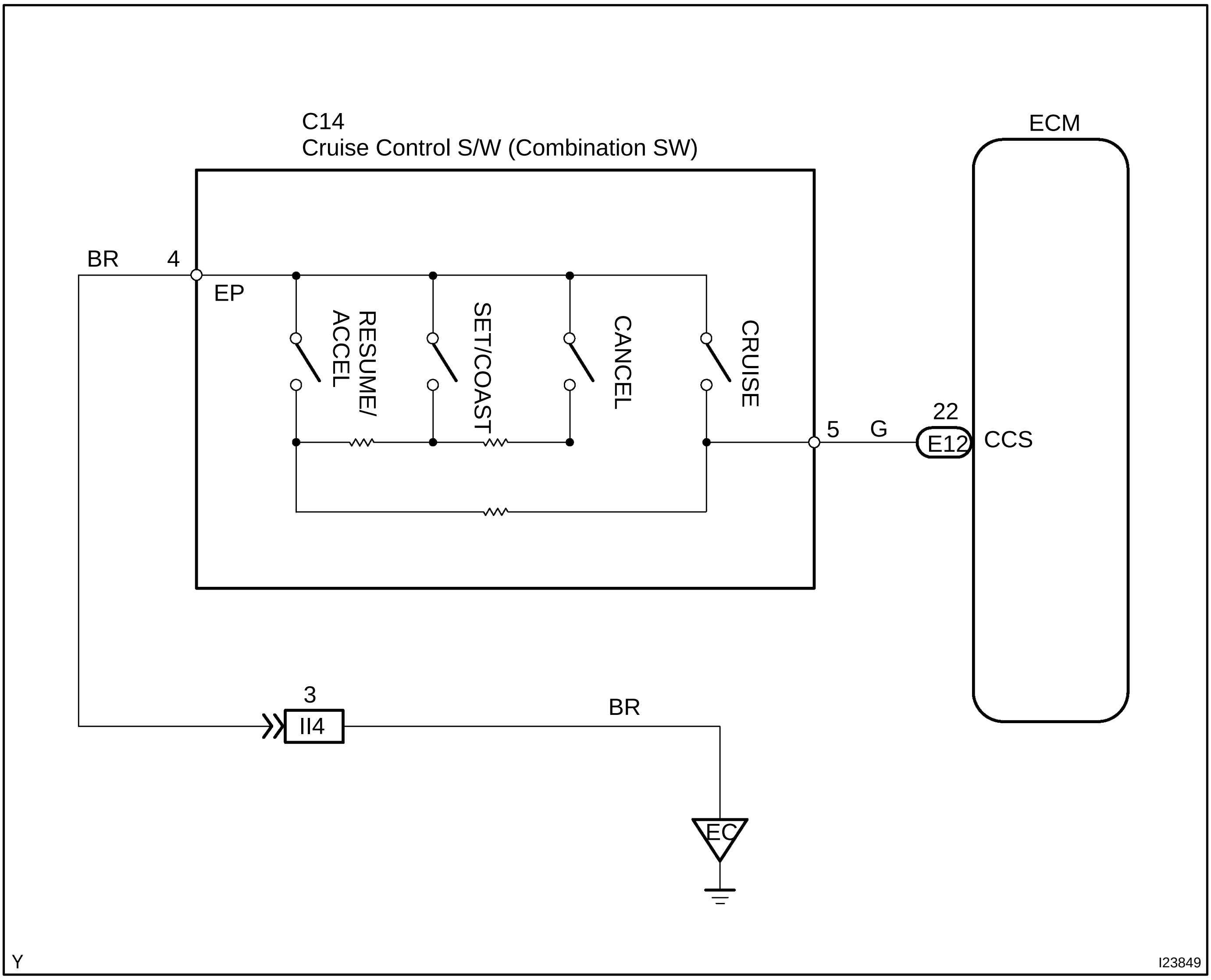
DI3CK-12

Control Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

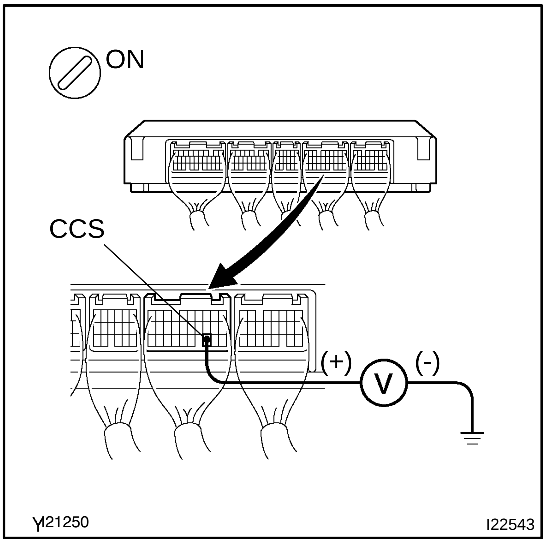
This circuit Sends the SET/COAST, RES/ACC and CANCEL signals (each voltage) to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal CCS of ECM connector and body ground.



PREPARATION:

(a) Remove the ECM with connector being connected.

(b) Turn the ignition switch ON.

CHECK:

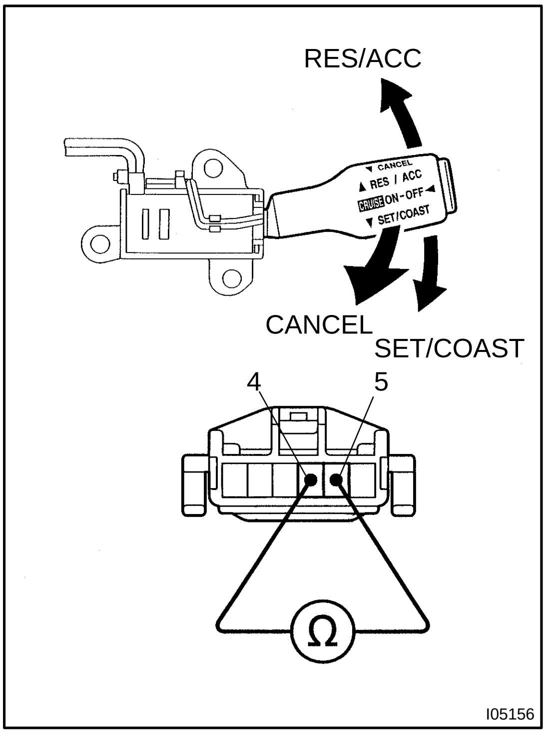
Measure the voltage between terminals CCS of the ECM connector and the body ground when each control switch is operated.

Switch position	Voltage
Neutral	9 - 14 V
MAIN	Below 1 V
RES/ACC	2.1 - 4.0 V
SET/COAST	4.0 - 7.1 V
CANCEL	6.0 - 10.1 V

NG — **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

OK

2	**Check control switch continuity.**



PREPARATION:

(a) Remove the steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

Measure the resistance between terminals 4 and 5 of the control switch connector when the control switch is operated.

Switch Position	Resistance
Neutral	∞ (No continuity)
RES/ACC	210 - 270 Ω
SET/COAST	560 - 700 Ω
CANCEL	1380 - 1700 Ω

NG → **Replace control switch.**

OK

3	**Check harness and connector between ECM and cruise control switch, and cruise control switch and body ground (See page IN-28).**

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

OK

4	**Check cruise control indicator light (See combination meter).**

NG → **Replace combination meter.**

OK

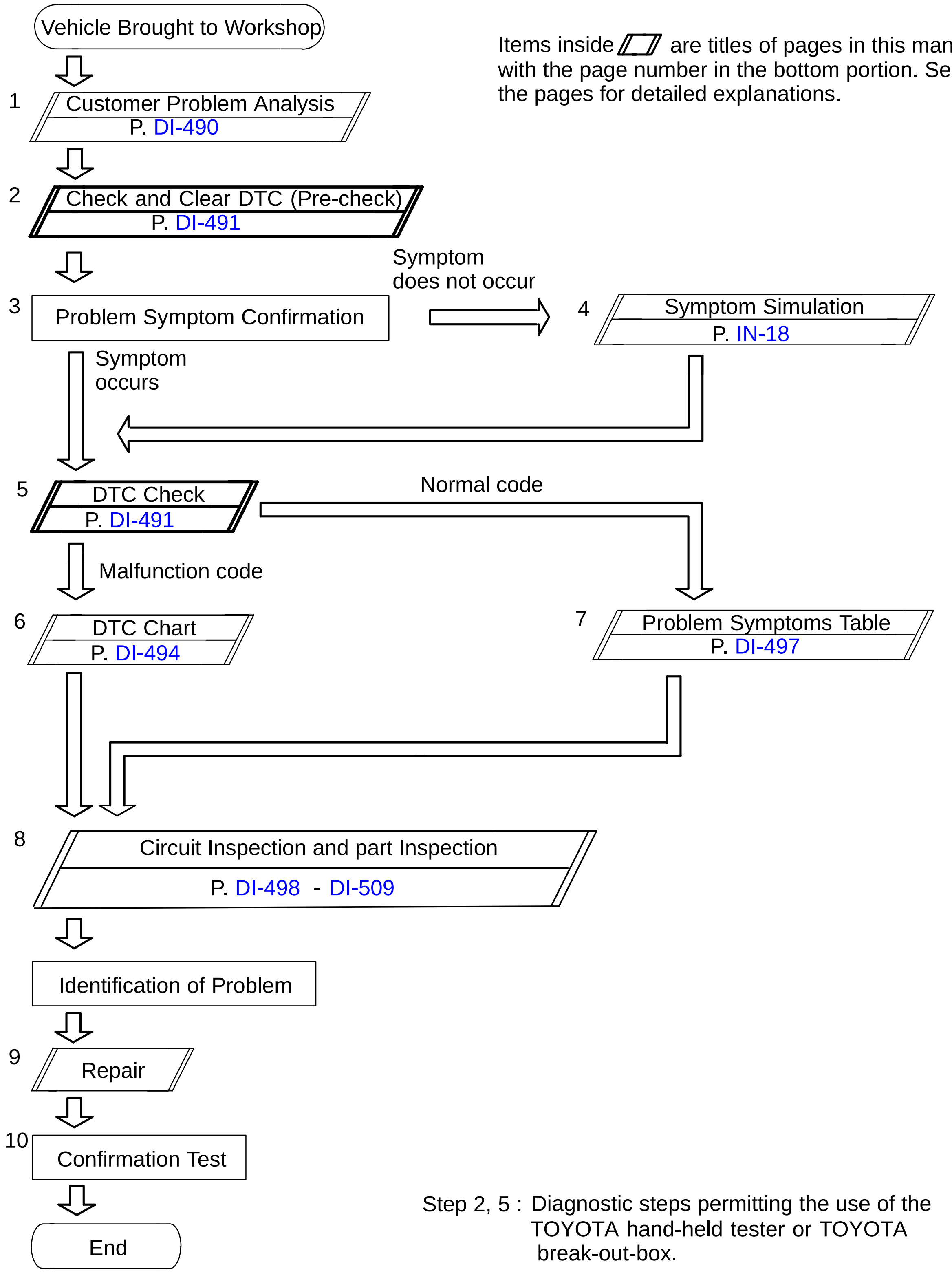
Check and replace ECM (See page IN-28).

ENGINE IMMOBILISER SYSTEM

DI1KE-05

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshooting in accordance with the procedure on the following pages.



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

Step 2, 5 : Diagnostic steps permitting the use of the TOYOTA hand-held tester or TOYOTA break-out-box.

DI1KF-05

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBILISER Check Sheet

Inspector's Name :

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

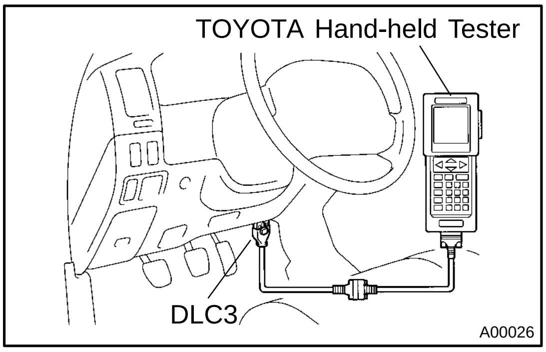
Date Problem First Occurred	/ /
Frequency Problem Occurs	□ Continuous □ Intermittent (times a day)

Symptoms	□ Immobiliser is not set. (Engine starts with key codes other than the registered key code.)
	□ Engine does not start.

Check Item	Malfunction Indicator Light	□ Normal □ Remains ON □ Does not Light Up

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

DI1KG-10

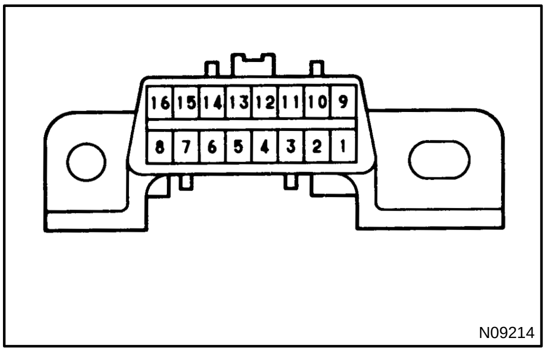


PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

ECM controls the function of immobiliser on this vehicle. Data of the immobiliser or DTC can be read form DLC3 of the vehicle. When a trouble occurs in immobiliser, MIL does not light ON but DTC inspection is performed. Therefore when there seems to be a trouble with immobiliser, use TOYOTA hand-held tester or SST to check and troubleshoot it.



(b) Inspect the DLC3.

The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141-2 format.

Tester connection	Condition	Specified condition
7 (Bus ⊕ line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis ground) - Body	Always	1 Ω or less
5 (Signal ground) - Body	Always	1 Ω or less
16 (B+) - Body	Always	9 - 14 V

HINT:

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

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

2. **INSPECT DIAGNOSIS**

(a) Check the DTC (Using TOYOTA hand-held tester).

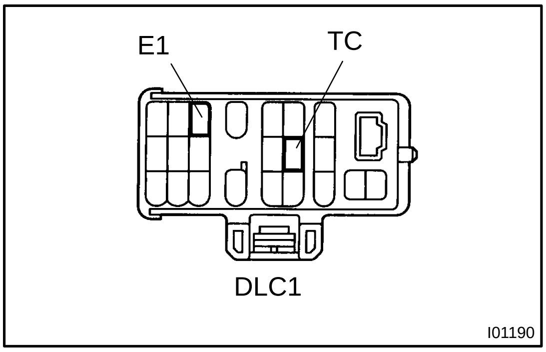
(1) Prepare the OBD II scan tool (complying with SAEJ 1978) or TOYOTA hand-held tester.

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

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

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

(5) See page DI-494 to confirm the details of the DTCs.



(b) Check the DTC (Using diagnosis check wire).

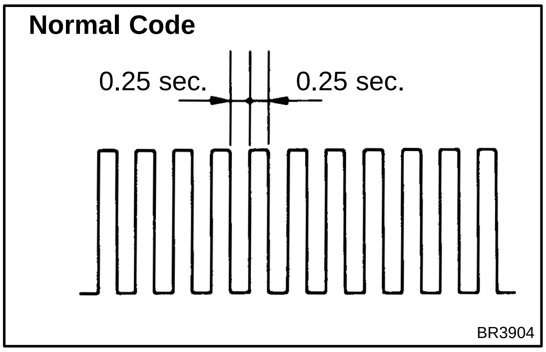
(1) Turn the ignition switch ON.

(2) Using SST, connect between terminals 11 (TC) and 3 (E1) of the DLC1.
SST 09843-18040

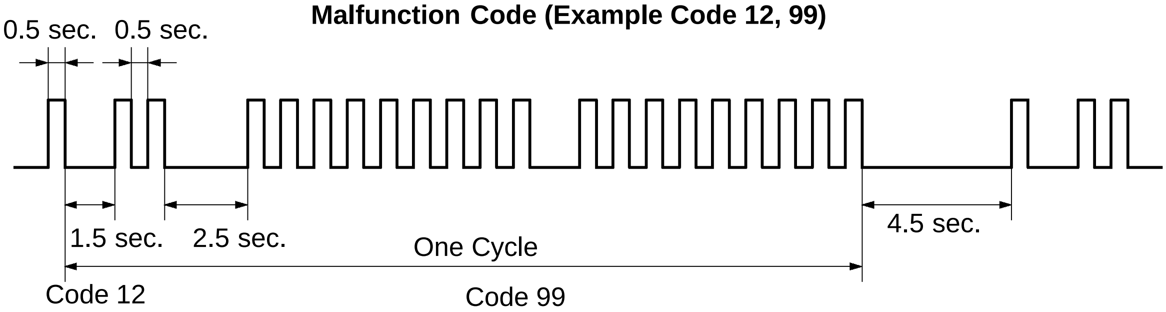
(3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit .
- ECM controls the immobiliser function on this vehicle, DTC is out put with DTC of engine.



- As an example, the blinking patterns for codes; normal, 12 and 99 are as shown in the illustration.



(4) When DTC "99" is output, there is a trouble with immobiliser. Start troubleshooting referring to PROBLEM SYMPTOM TABLE.

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

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

(c) Clear the DTC.
The following procedures will erase the DTCs and freeze frame data.

(1) Operating the OBD II scam tool (complying with SAEJ1978) or TOYOTA hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)

(2) Disconnecting the battery terminals or EFI fuse.

DI1KH-09

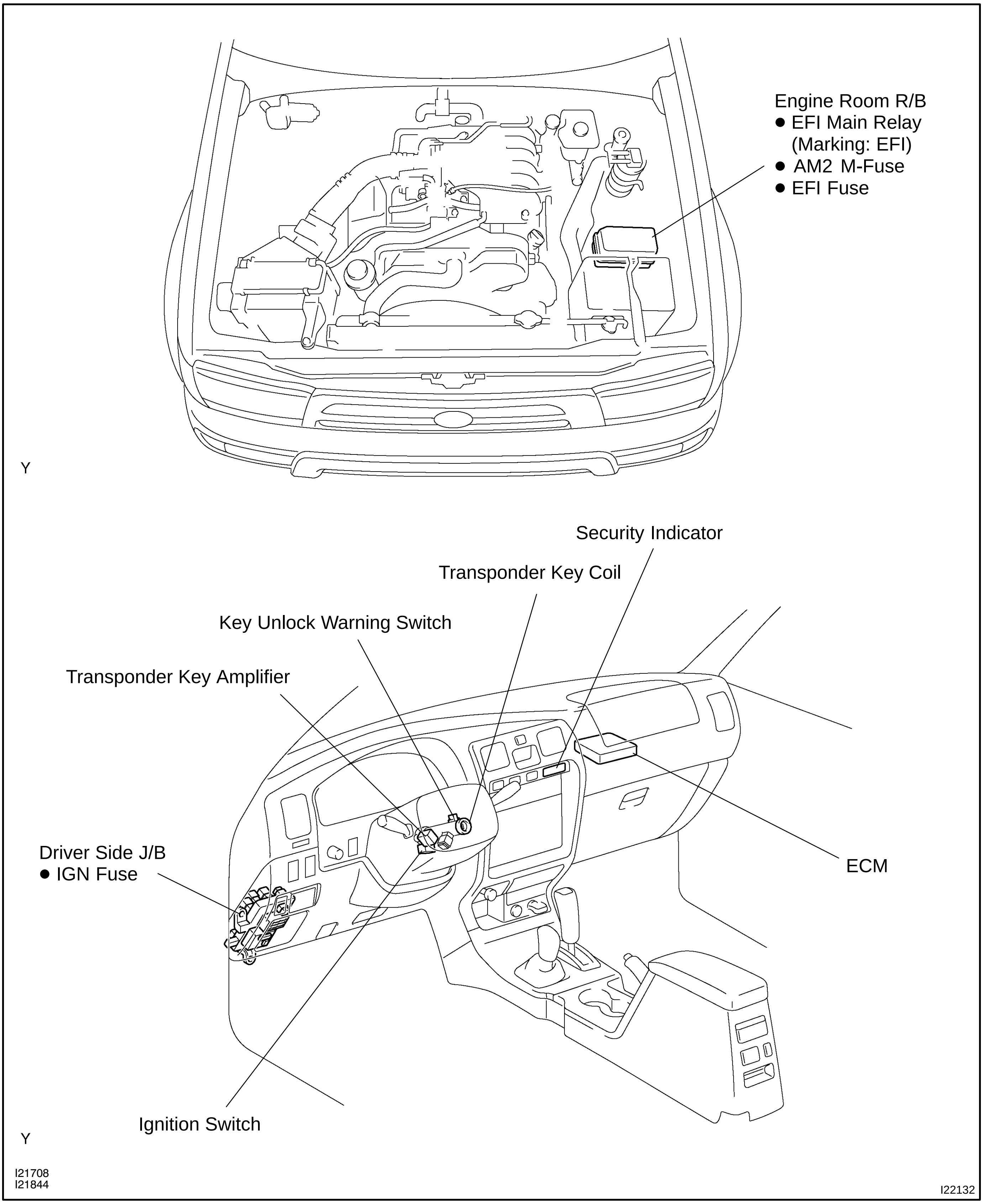
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See page)	Detection Item	Trouble Area
B2785 (DI-498)	Ignition Switch ON Malfunction	• Ignition switch • EFI main relay • Wire harness • ECM
B2786 (DI-498)	Ignition Switch OFF Malfunction	
B2791 (DI-502)	Key Unlock Warning Switch OFF Malfunction	• Key unlock warning switch • Wire harness • ECM
B2795 (DI-504)	Unmatched Key Code	• Key • Unregistered key inserted before
B2796 (DI-505)	No Communication in Immobiliser System	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM
B2797 (DI-507)	Communication Malfunction No. 1	• Communication contests • Unregistered key inserted before • ECM
B2798 (DI-509)	Communication Malfunction No. 2	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM

HINT:
To reduce the unnecessary exchange of ECM, check that a trouble occurs with the original ECM at the time of exchanging ECM and the trouble will disappear with a new ECM.

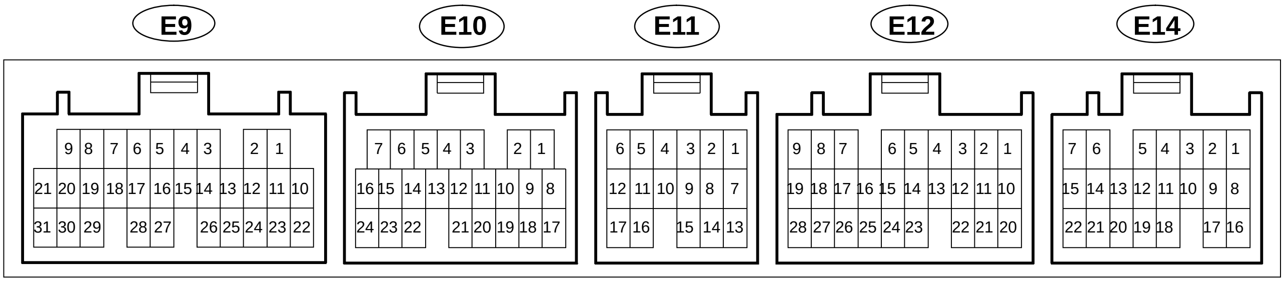
DI1KI-09

PARTS LOCATION



DI1KJ-10

TERMINALS OF ECM



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
CODE (E14-5) - E1 (E10-17)	GR-R - BR	Ignition switch ON	10 - 14
TXCT (E14-19) - E1 (E10-17)	P-B - BR	Ignition switch ON	10 - 14
KSW (E14-11) - E1 (E10-17)	Y-R - BR	Ignition switch ON	10 - 14
EOM (E14-10) - E1 (E10-17)	W-B - BR	Ignition switch ON	4.5 - 5.5
RXCK (E14-18) - E1 (E10-17)	R-B - BR	Ignition switch ON	10 - 14

DI1KK-08

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Immobiliser is not set (Engine starts with key codes other than the registered key code)	3. ECM	IN-28
Engine does not start	1. Key 2. Wire harness 3. Transponder key coil 4. Transponder key amplifier 5. ECM	*1 IN-28 BE-172 - IN-28
Security indicator is always ON	1. Security indicator 2. Wire harness 3. ECM	*2 IN-28 IN-28
Security indicator is always ON (Although code has been registered in the automatic registration mode, indicator is not OFF)	1. Wire harness 2. Transponder key coil 3. Transponder key amplifier 4. ECM	IN-28 BE-172 - IN-28
Security indicator is OFF (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key coil 3. Transponder key amplifier 4. ECM	IN-28 BE-172 - IN-28
Security indicator is OFF (When DTC of immobiliser is not output)	1. Wire harness 2. ECM	IN-28 IN-28
Security indicator is abnormally blinking	1. Wire harness 2. ECM	IN-28 IN-28

*1: Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key codes.
*2: Finish the automatic registration mode because the mode might still remain.

DI1KL-08

CIRCUIT INSPECTION

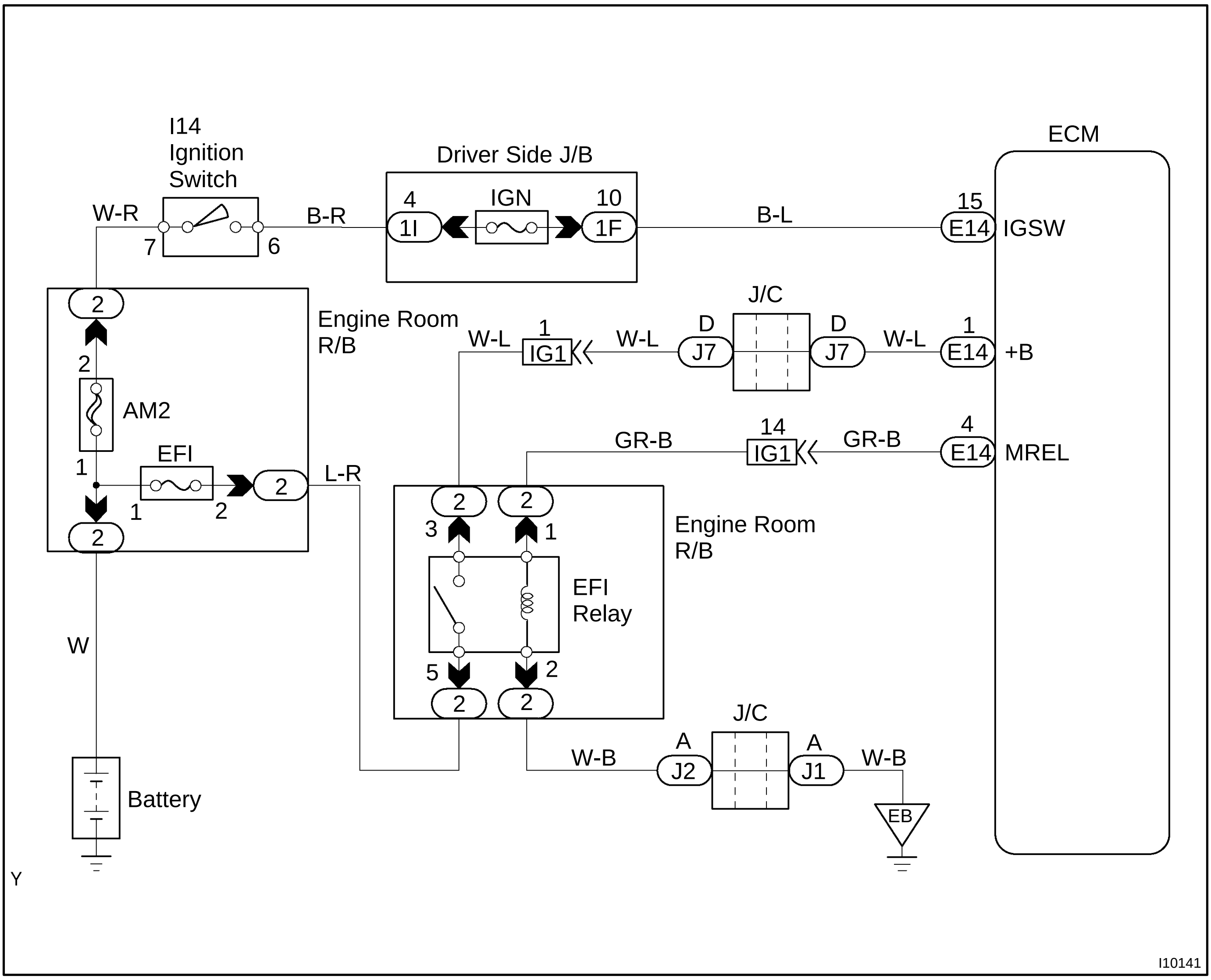
DTC	B2785/99	IG Switch ON Malfunction

DTC	B2786/99	IG Switch OFF Malfunction

CIRCUIT DESCRIPTION

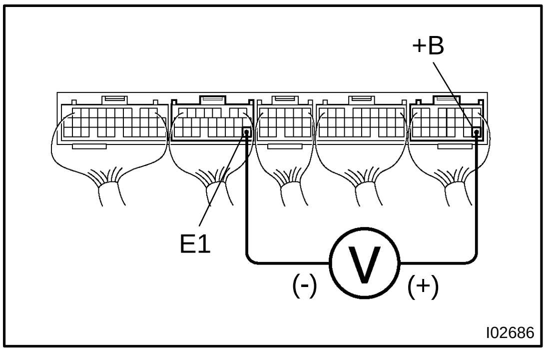
DTC No.	DTC Detection Condition	Trouble Area
B2785/99	• Short circuit in IG switch circuit • Ignition switch adheres to ON position	• Ignition switch • EFI main relay • Wire harness • ECM
B2786/99	• Open circuit in IG switch circuit • Ignition switch adheres to OFF position	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals +B and E1 of ECM connectors.**



PREPARATION:
(a) Remove the glove compartment.
(b) Turn the ignition switch ON.

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

OK:
Voltage: 9 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms (See page DI-497).**

NG

2	**Check for open in harness and connector between terminal E1 of ECM and body ground (See page IN-28).**

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

OK

3	**Check EFI main relay (Marking: EFI) (See page SF-35).**

NG → **Replace EFI main relay.**

OK

4	**Check EFI fuse.**

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

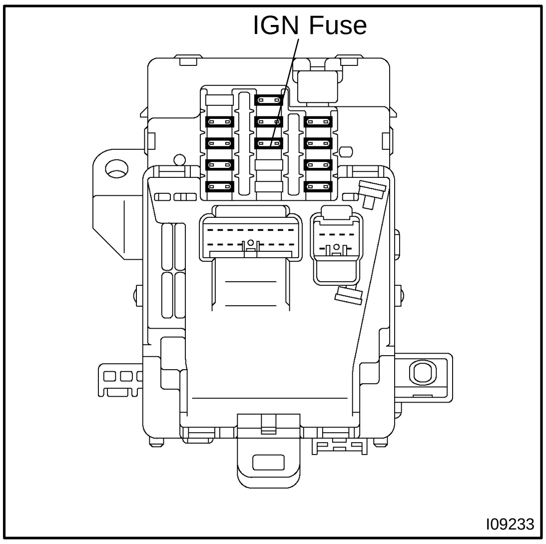
OK

5	**Check for open harness and connector between EFI main relay (Marking: EFI) and battery, and EFI main relay and ECM (See page IN-28).**

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

OK

6	**Check IGN fuse.**



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

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

OK

7	**Check ignition switch (See page BE-12).**

NG → **Replace ignition switch.**

OK

8	**Check for open circuit in harness and connector between ignition switch and EFI main relay (Marking: EFI), and EFI main relay and body ground (See page IN-28).**

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

OK

Replace ECM.

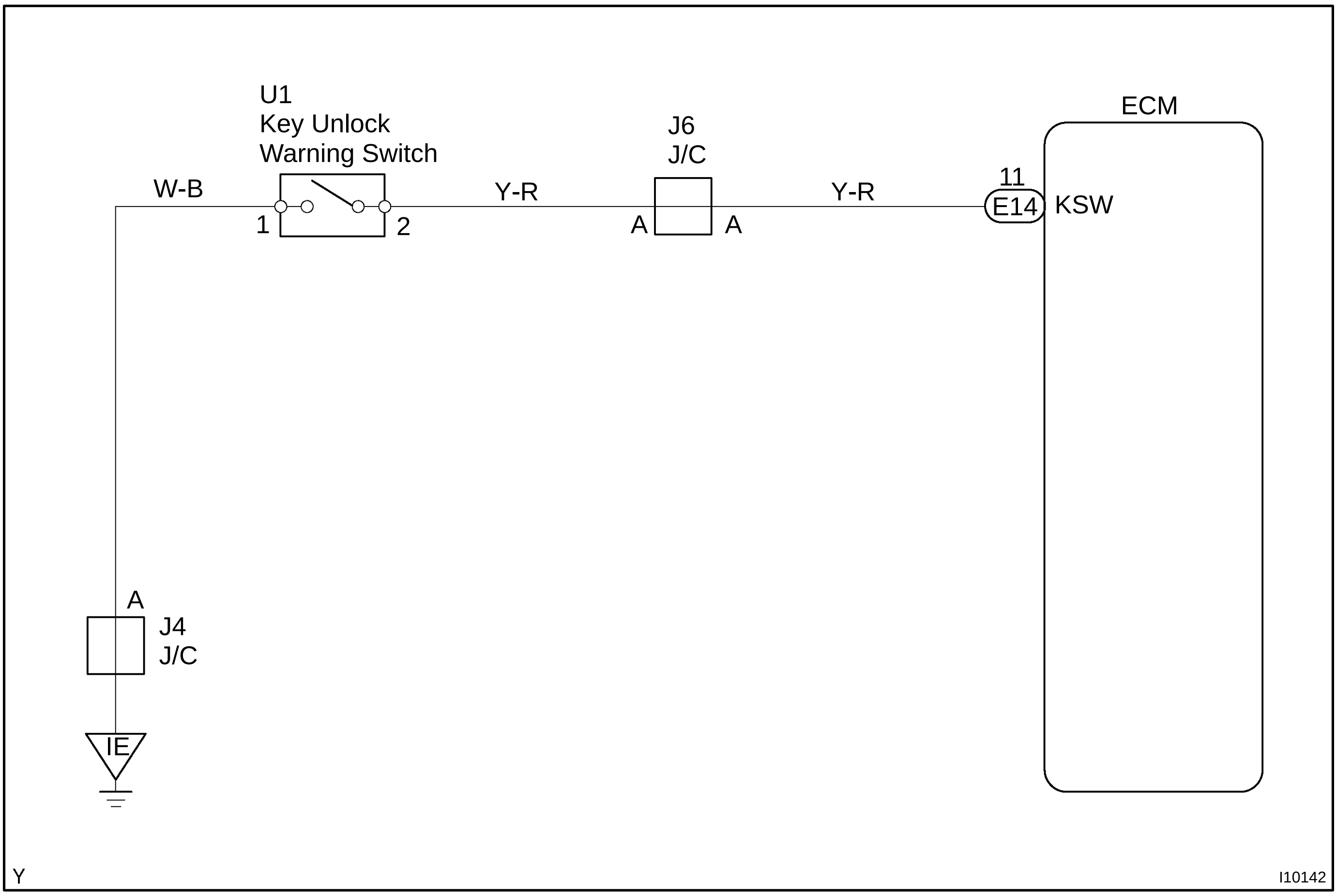
DI1KM-07

DTC	B2791/99	Key Unlock Warning SW OFF Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
B2791/99	• Open circuit in key unlock warning switch circuit • Key unlock warning switch adheres to OFF position	• Key unlock warning switch • Wire harness • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check key unlock warning switch (See page BE-12).**

NG → **Replace key unlock warning switch.**

OK

2	**Check harness and connector between key unlock warning switch and ECM (See page IN-28).**

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

OK

Replace ECM

DI1KN-07

DTC	B2795/99	Unmatched Key Code

CIRCUIT DESCRIPTION

This DTC is output when an unregistered key is inserted. When this DTC is output, delete DTC and insert the key that a customer keeps to check that B2795 is output.
When a key that outputs B2795 is found, register this key. when B2795 is not output, there is a possibility that the unregistered key has been inserted before (ECM is normal.).
Inquire a customer the condition of using the system to find the cause of the trouble.
(Example: Another key has been inserted, etc.)

DTC No.	DTC Detection Condition	Trouble Area
B2795/99	No communication	• Key • Unregistered key inserted before

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

HINT:
When inserting the key that does not start the engine, DTC (B2795) is stored in memory.

RESULT:

OK	All keys starts the engine
NG	A specific key does not start the engine

OK → **No problem.**

HINT:
If the result is ”OK”, please confirm whether or not customers have ever inserted the unregistered key or the immobiliser key (with transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

NG

Register key that does not start engine.

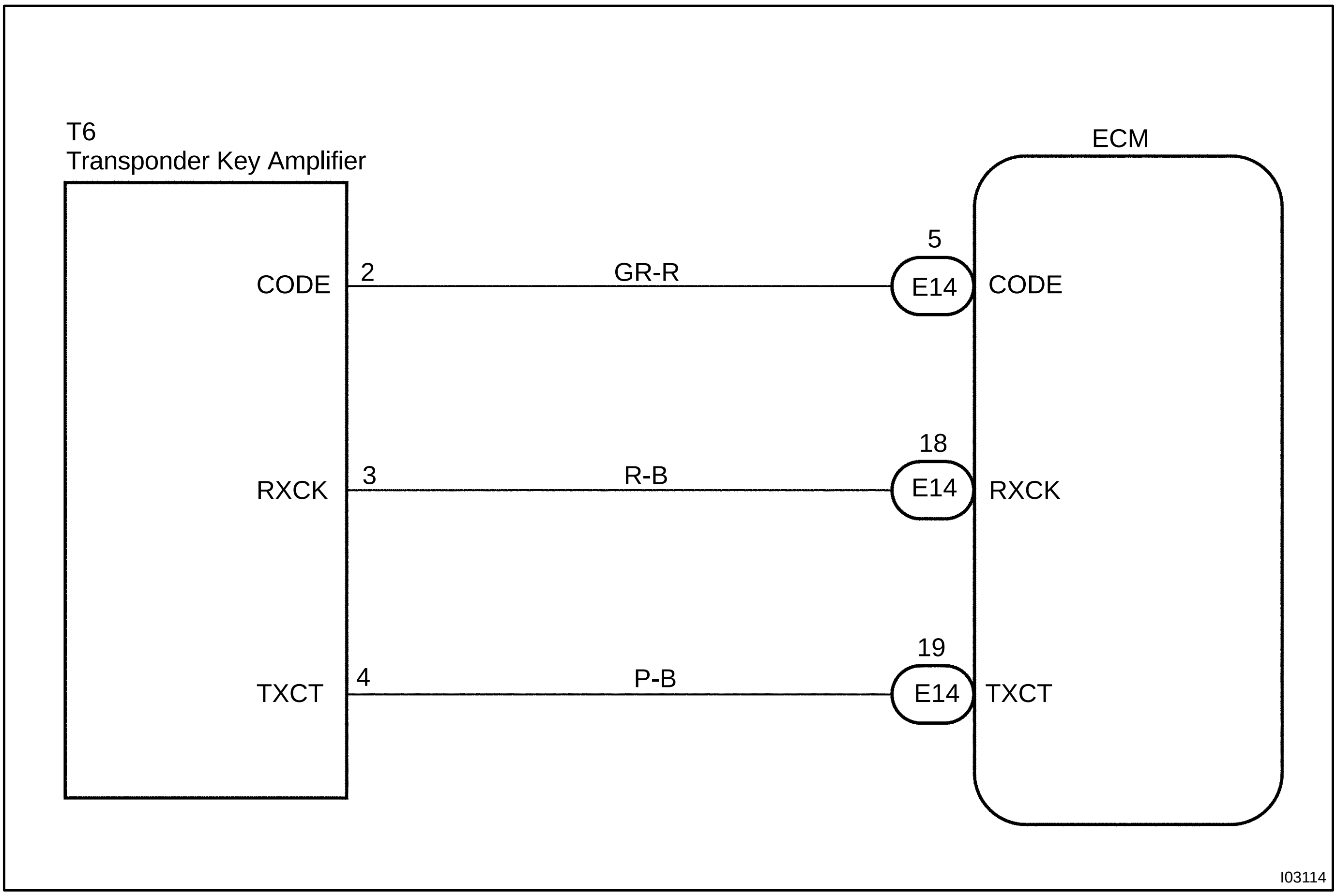
DI1KO-09

DTC	B2796/99	No Communication in Immobiliser System

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
B2796/99	No communication	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transponder key coil (See page BE-172).

NG → Replace transponder key coil.

OK

2	Check harness and connector between transponder key amplifier and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

3	Does it operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

Replace ECM.

DI1KP-10

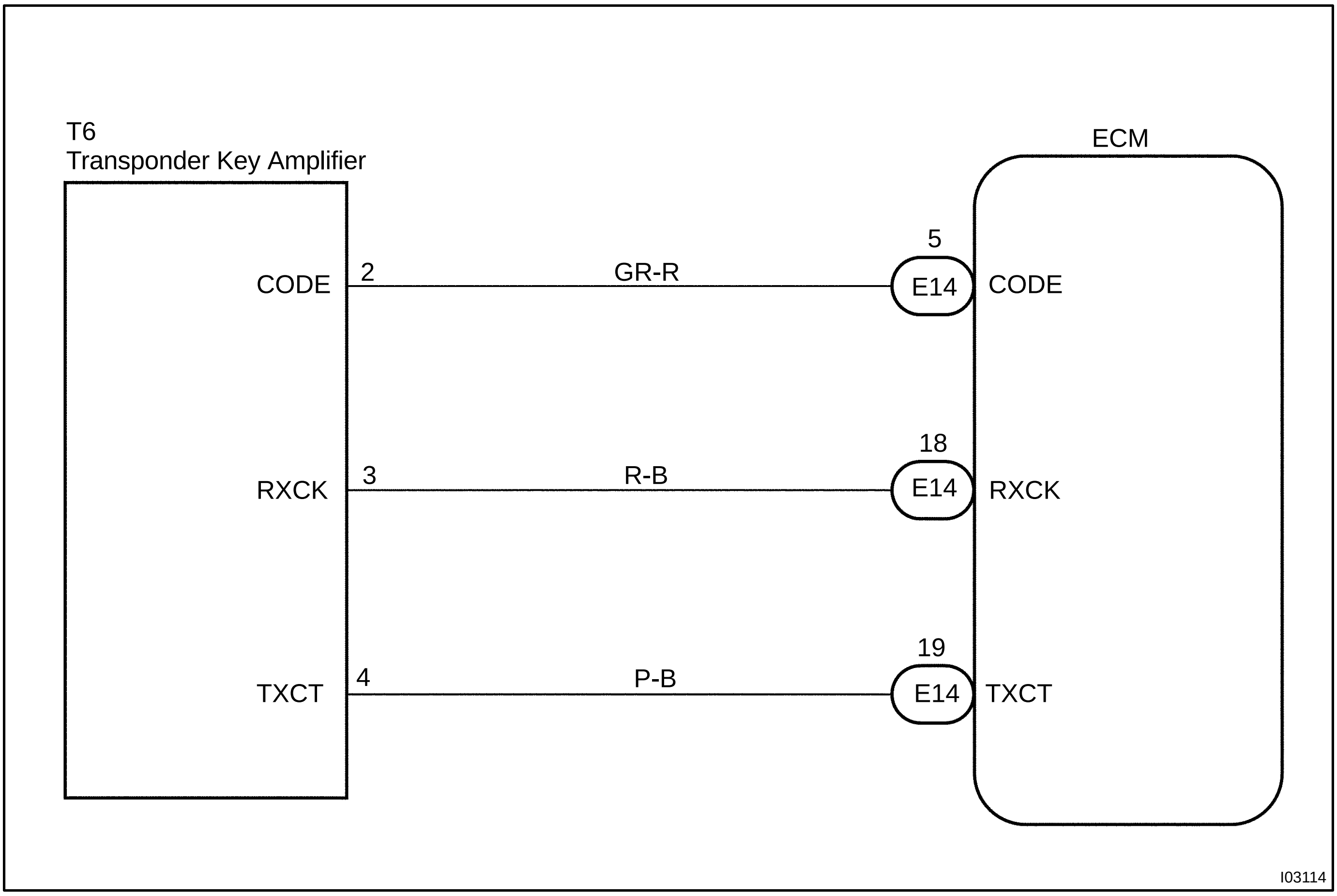
DTC	B2797/99	Communication Malfunction No. 1

CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs. (Example: Some noise is included in communication line.)

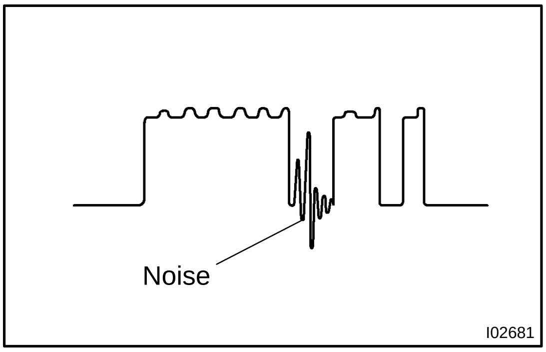
DTC No.	DTC Detection Condition	Trouble Area
B2797/99	Communication error	• Wire harness • Transponder key amplifier • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check noise.**



PREPARATION:
Insert already registered master key in the key cylinder.
CHECK:
Using an oscilloscope or TOYOTA hand-held tester, check that noise is included in terminal CODE of the ECM.
OK:
No noise is detected.

NG → **Try to find cause of noise and remove it.**

OK

2	**Does it operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace ECM.

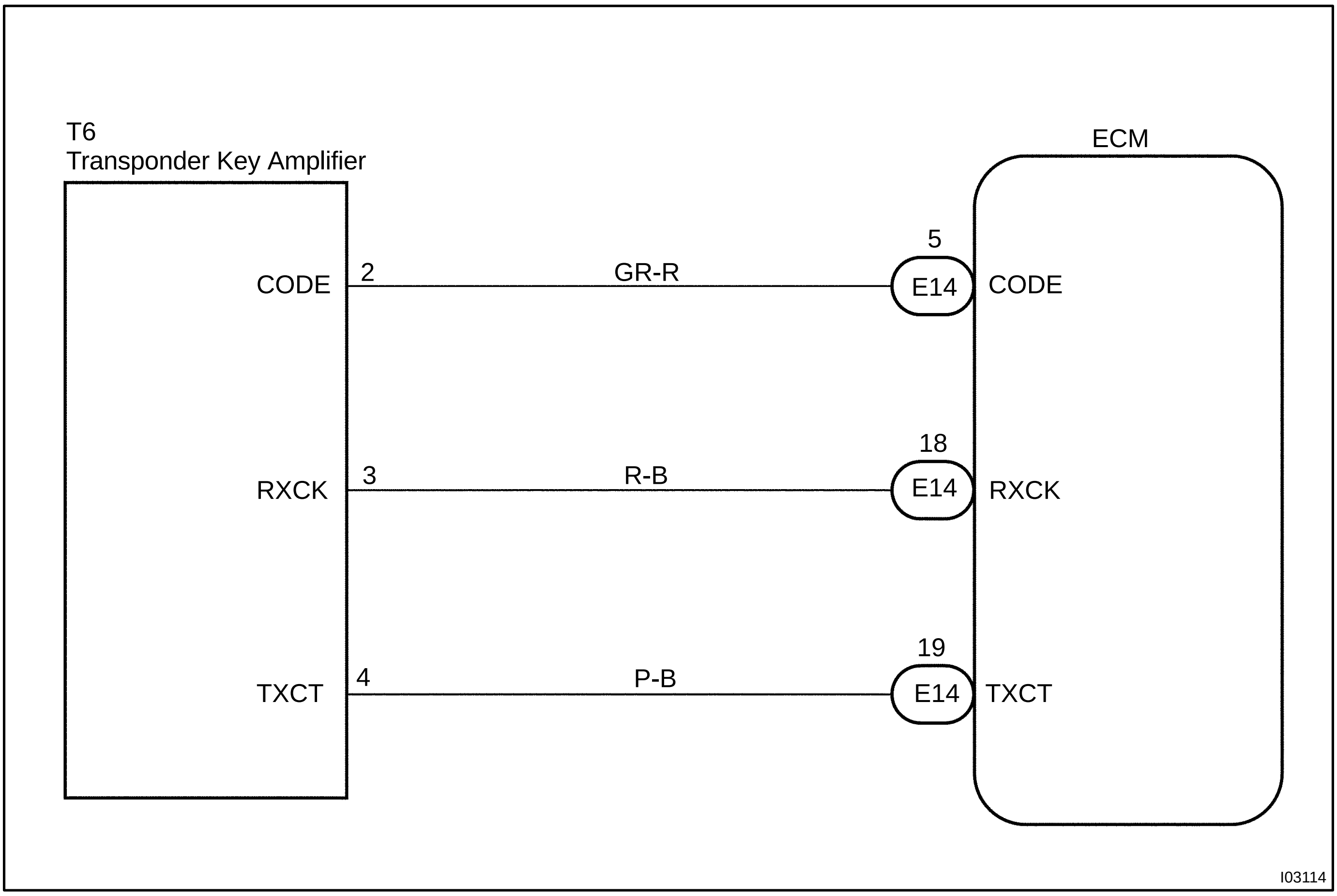
DI1KQ-08

DTC	B2798/99	Communication Malfunction No. 2

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
B2798/99	Communication error	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transponder key coil (See page BE-172).

NG → Replace transponder key coil.

OK ↓

2	Check harness and connector between transponder key amplifier and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK ↓

3	Does it operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No ↓

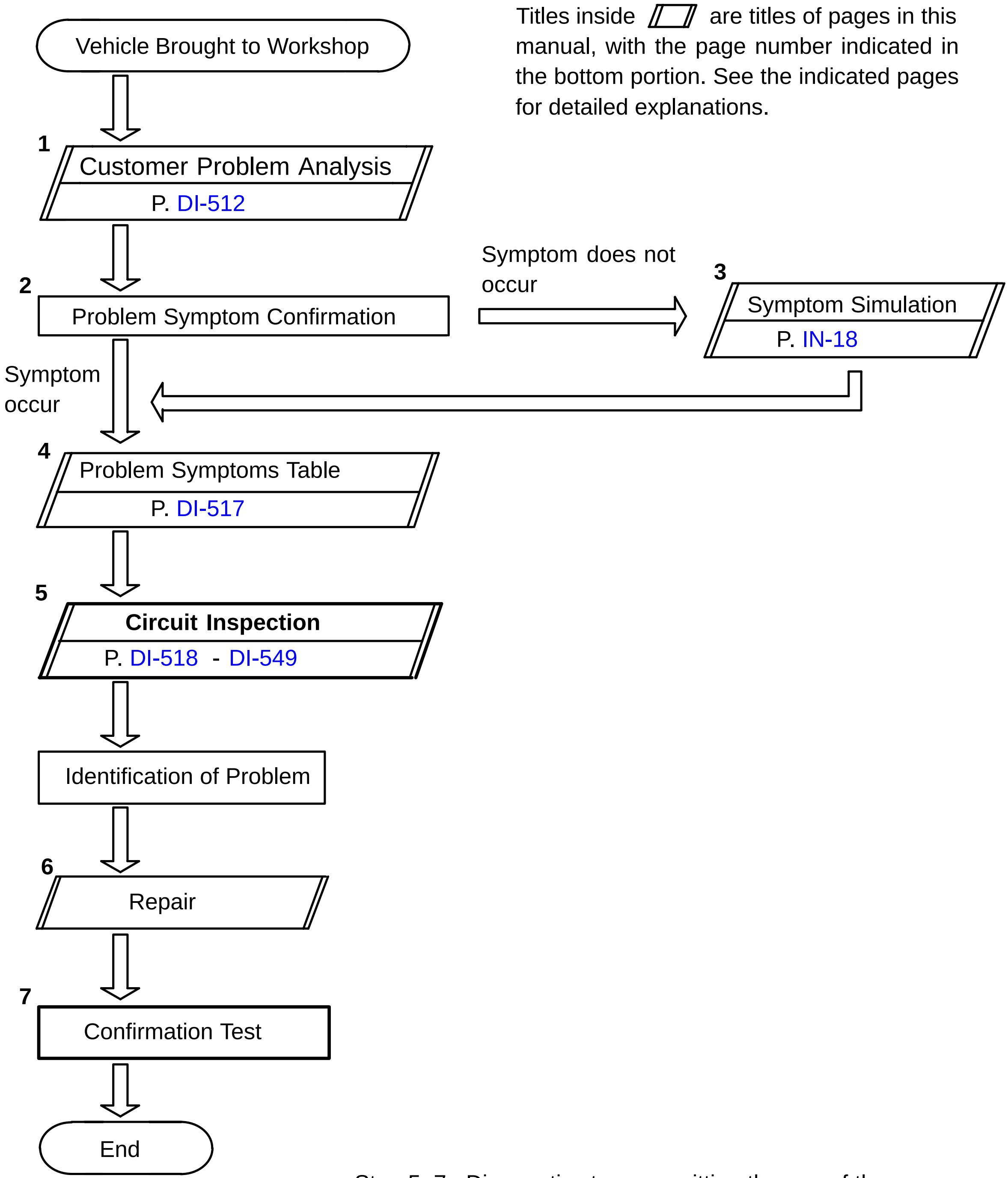
Replace ECM.

BODY CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1OD-09

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 TOYOTA hand-held tester .

DI1OE-09

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

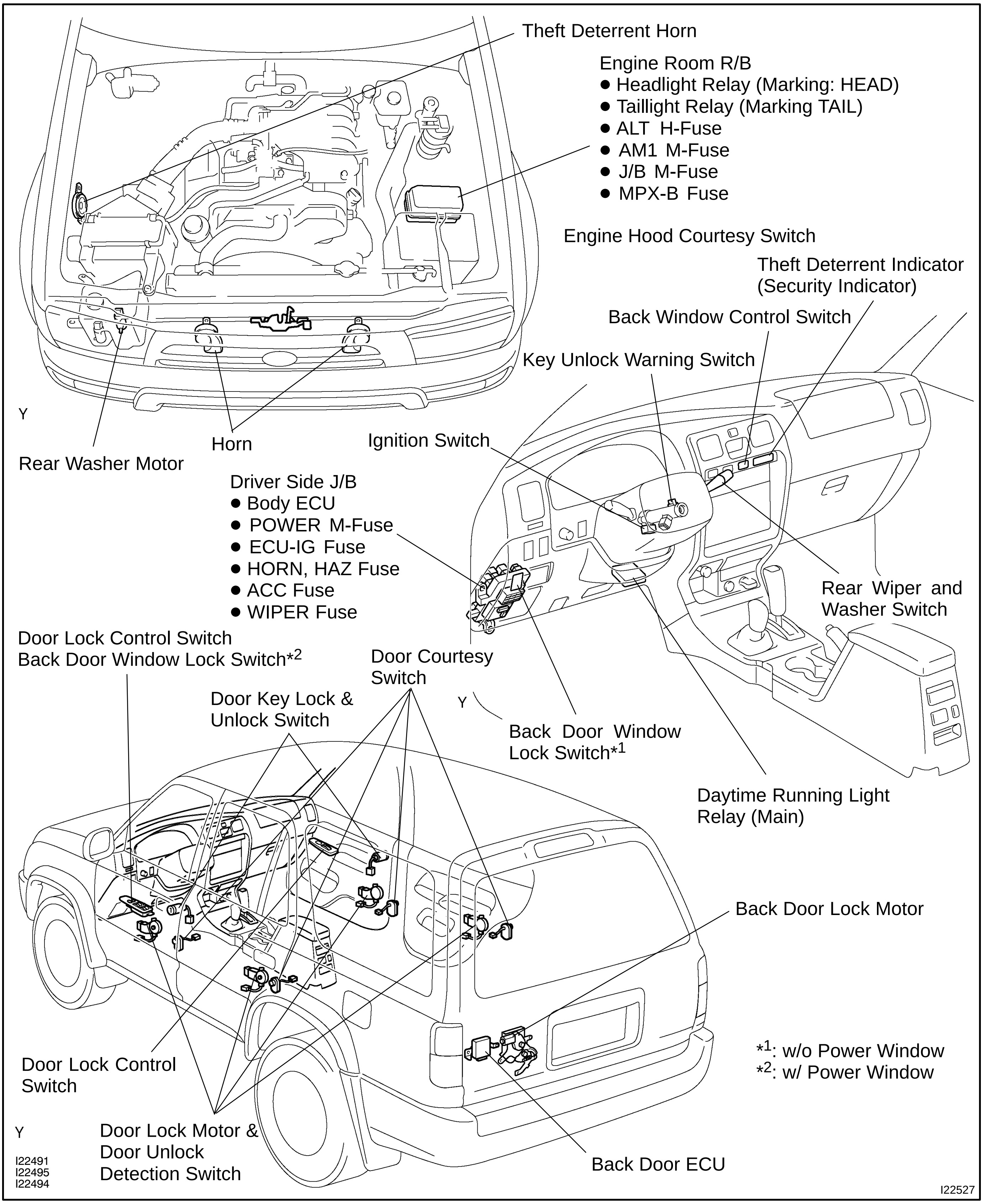
Inspector's name: ________________

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))

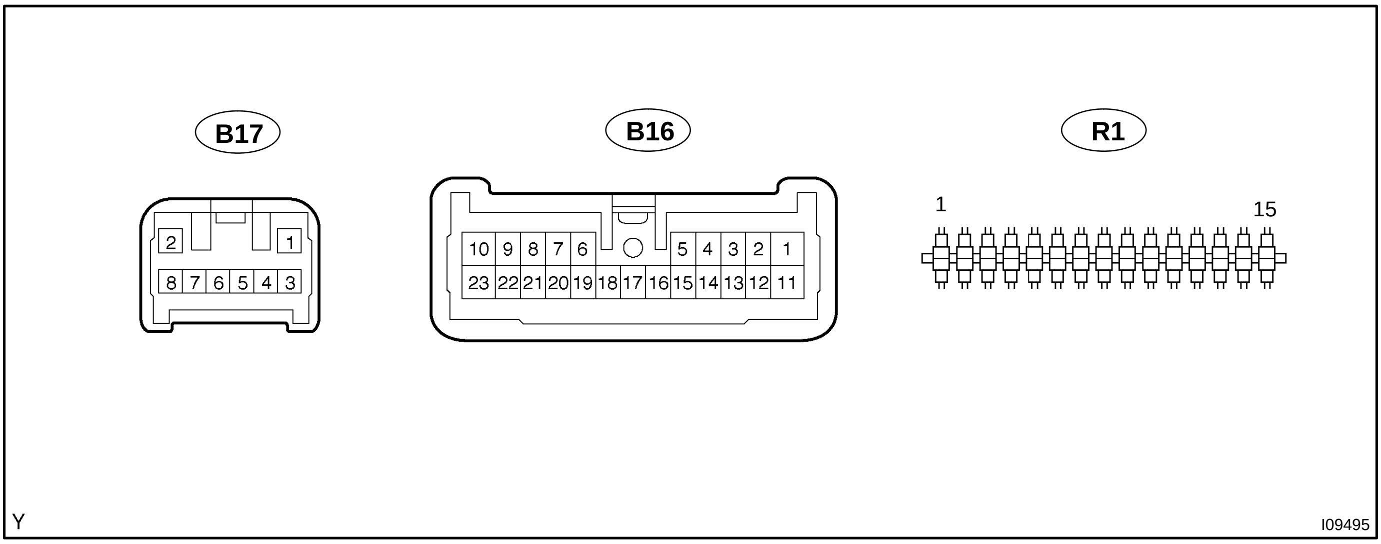
Malfunction System	□ Rear Washer System
	□ Defogger System
	□ Power Door Lock Control System
	□ Theft Deterrent System
	□ Others

PARTS LOCATION



DI1OG-19

TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
HORN SW (B16-1) - Body ground	G-R	Horn switch OFF	10 - 14
		Horn switch ON	Below 1.0
KSW (B16-2) - Body ground	Y-R	Key unlock warning switch OFF (Key not inserted)	10 - 14
		Key unlock warning switch ON (Key inserted)	Below 1.0
DIND (B16-3) - Body ground	LG-R	Rear window defogger operating	Below 2.0
		Rear window defogger not operating	10 - 14
DOWN (B16-4) - Body ground	R-B	Back door power window switch OFF or UP position	10 - 14
		Back door power window switch DOWN position	Below 1.0
UP (B16-5) - Body ground	R	Back door power window switch OFF or DOWN position	10 - 14
		Back door power window switch UP position	Below 1.0
ACC (B16-9) - Body ground	GR	Ignition switch OFF	Below 1.0
		Ignition switch ACC or ON	10 - 14
ECU-B (B16-10) - Body ground	L-R	Constant	10 - 14
L2 (B16-11) - Body ground	BR-W	Driver and passenger door key lock & unlock switch OFF or UNLOCK position	10 - 14
		Driver or passenger door key lock & unlock switch LOCK position	Below 1.0
UL2 (B16-12) - Body ground	G-Y	Passenger door key lock & unlock switch OFF or LOCK position	10 - 14
		Passenger door key lock & unlock switch UNLOCK position	Below 1.0
UL3 (B16-13) - Body ground	L-B	Driver door key lock & unlock switch OFF or LOCK position	10 - 14
		Driver door key lock & unlock switch UNLOCK position	Below 1.0
LSWP (B16-14) - Body ground	L-Y	Driver door unlock detection switch OFF (Locked)	10 - 14
		Driver door unlock detection switch ON (Unlocked)	Below 1.0
RCTY (B16-15) - Body ground	B-R	Rear door courtesy switch OFF (Closed)	10 - 14
		Any rear door courtesy switch ON (Open)	Below 1.0
PCTY (B16-16) - Body ground	B-W	Passenger door courtesy switches OFF (Closed)	10 - 14
		Passenger door courtesy switch ON (Open)	Below 1.0
LSWD (B16-17) - Body ground	R-L	Driver door unlock detection switch OFF (Locked)	10 - 14
		Driver door unlock detection switch ON (Unlocked)	Below 1.0

DEF SW (B16-18) - Body ground	LG-B	Rear defogger switch OFF	10 - 14
		Rear defogger switch ON	Below 1.0
DCTY (B16-19) - Body ground	B	Driver door courtesy switch OFF (Closed)	10 - 14
		Driver door courtesy switch ON (Open)	Below 1.0
R/W ON (B16-20) - Body ground	GR-G	Rear wiper switch OFF or INT	10 - 14
		Rear wiper switch ON	Below 1.0
R/W INT (B16-21) - Body ground	GR-R	Rear wiper switch OFF or ON	10 - 14
		Rear wiper switch INT	Below 1.0
B/D CTY (B16-22) - Body ground	G-W	Back door courtesy switch OFF (Closed)	10 - 14
		Back door courtesy switch ON (Open)	Below 1.0
ACTD (B16-23) - Body ground	B-Y	Power door lock operating to LOCK	10 - 14
		Power door lock not operating or operating to UNLOCK	Below 1.0
SEC IND (B17-1) - Body ground	L	Security indicator light lights up	10 - 14
		Security indicator dies not light up	Below 1.0
SH (B17-2) - Body ground	R-W	Security horn sounding	10 - 14
		Security horn not sounding	Below 1.0
HRY (B17-3) - Body ground	R*2 G*3	Headlight relay OFF	10 - 14
		Headlight relay ON	Below 1.0
TRY (B17-4) - Body ground	R-G	Taillight relay OFF	10 - 14
		Taillight relay ON	Below 1.0
HOOD SW (B17-7) - Body ground	G-O	Hood courtesy switch OFF (Closed)	10 - 14
		Hood courtesy switch ON (Open)	Below 1.0
LSWR (B17-8) - Body ground	LG	Rear door unlock detection switch OFF (Locked)	10 - 14
		Rear door unlock detection switch ON (Unlocked)	Below 1.0
HORN (R1-1) - GND (R1-8)	-	Horn switch OFF	Below 1.0
		Horn switch ON	10 - 14
POWER (R1-3) - GND (R1-8)	-	Constant	10 - 14
P/W (R1-2) - GND (R1-8)	-	Ignition switch OFF or ACC*1	Below 1.0
		Ignition switch ON	10 - 14
DEF (R1-4) - GND (R1-8)	-	Rear defogger not operating	10 - 14
		Rear defogger operating	Below 1.0
HAZ (R1-7) - GND (R1-8)	-	Constant	10 - 14
GND (R1-8) - Body ground	-	Constant	Below 1.0
WIP (R1-9) GND (R1-8)	-	Ignition switch OFF or ACC	Below 1.0
		Ignition switch ON	10 - 14
ECU-IG (R1-10) - GND (R1-8)	-	Ignition switch OFF or ACC	Below 1.0
		Ignition switch ON	10 - 14
L1 (R1-11) - GND (R1-8)	-	Driver or passenger door lock control switch OFF or UNLOCK	10 - 14
		Driver or passenger door lock control switch LOCK	Below 1.0
UL1 (R1-12) - GND (R1-8)	-	Driver or passenger door lock control switch OFF or LOCK	10 - 14
		Driver or passenger door lock control switch UNLOCK	Below 1.0
WMTR (R1-13) - GND (R1-8)	-	Rear washer switch OFF	10 - 14
		Rear washer switch ON	Below 1.0
ACT+ (R1-14) - GND (R1-8)	-	Power door lock not operating or operating to UNLOCK	Below 1.0
		Power door lock operating to LOCK	10 - 14

ACT- (R1-15) - GND (R1-8)	-	Power door lock not operating or operating to LOCK	Below 1.0
		Power door lock operating to UNLOCK twice	10 - 14

*1 (Exceptions): During 60 seconds after the ignition switch is turned ON to OFF (ACC) or until driver or passenger door is opened after the ignition switch is turned ON to OFF (ACC).
*2: w/o Daytime running light
*3: w/ Daytime running light

DI56V-03

PROBLEM SYMPTOMS TABLE

DOOR LOCK CONTROL

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control switch	3. Door lock control switch circuit (D or P) 4. Body ECU	DI-533 IN-28
Door key linked function does not operate	1. Door key lock and unlock switch circuit (D or P) 2. Body ECU	DI-535 IN-28
Key confinement prevention function does not operate	1. Key unlock warning switch circuit 2. Body ECU	DI-527 IN-28

THEFT DETERRENT SYSTEM

Symptom	Suspect Area	See page
No alerting condition is operated (System cannot be set)	1. Security indicator circuit 2. Key unlock warning switch circuit 3. Courtesy switch circuit 4. Door unlock detection switch circuit 5. Engine hood courtesy switch circuit 6. Back door courtesy switch circuit 7. Back door ECU 8. Body ECU	DI-543 DI-527 DI-539 DI-533 DI-541 DI-562 IN-28 IN-28
Cannot be canceled when ignition switch is ON with a key	1. Key unlock warning switch circuit 2. Ignition switch 3. Body ECU	DI-527 BE-12 IN-28
Cannot be canceled when unlocking the back door with a key	1. Back door courtesy switch circuit 2. Body ECU	DI-562 IN-28
Some of the system does not operate (Headlight does not light up)	1. Headlight relay circuit 2. Body ECU	DI-526 IN-28
Taillight does not light up	1. Taillight relay circuit 2. Body ECU	DI-525 IN-28
Theft deterrent horn or horn does not sound	1. Security horn circuit 2. Horn circuit 3. Body ECU	DI-547 DI-545 IN-28
During warning condition, cannot be canceled by unlocking the door with a key	1. Door key lock and unlock switch circuit 2. Body ECU	DI-535 IN-28
During warning condition, cannot be canceled by unlocking the door with a key (Transmitter)	1. Transmitter 2. Back door ECU 3. Body ECU	BE-93 IN-28 IN-28
During warning condition, cannot be cancelled by turning the ON with a key	1. Ignition switch 2. Key unlock warning switch circuit 3. Body ECU	BE-12 DI-527 IN-28
The system operated for more 60 records	1. Body ECU	IN-28

DI56W-03

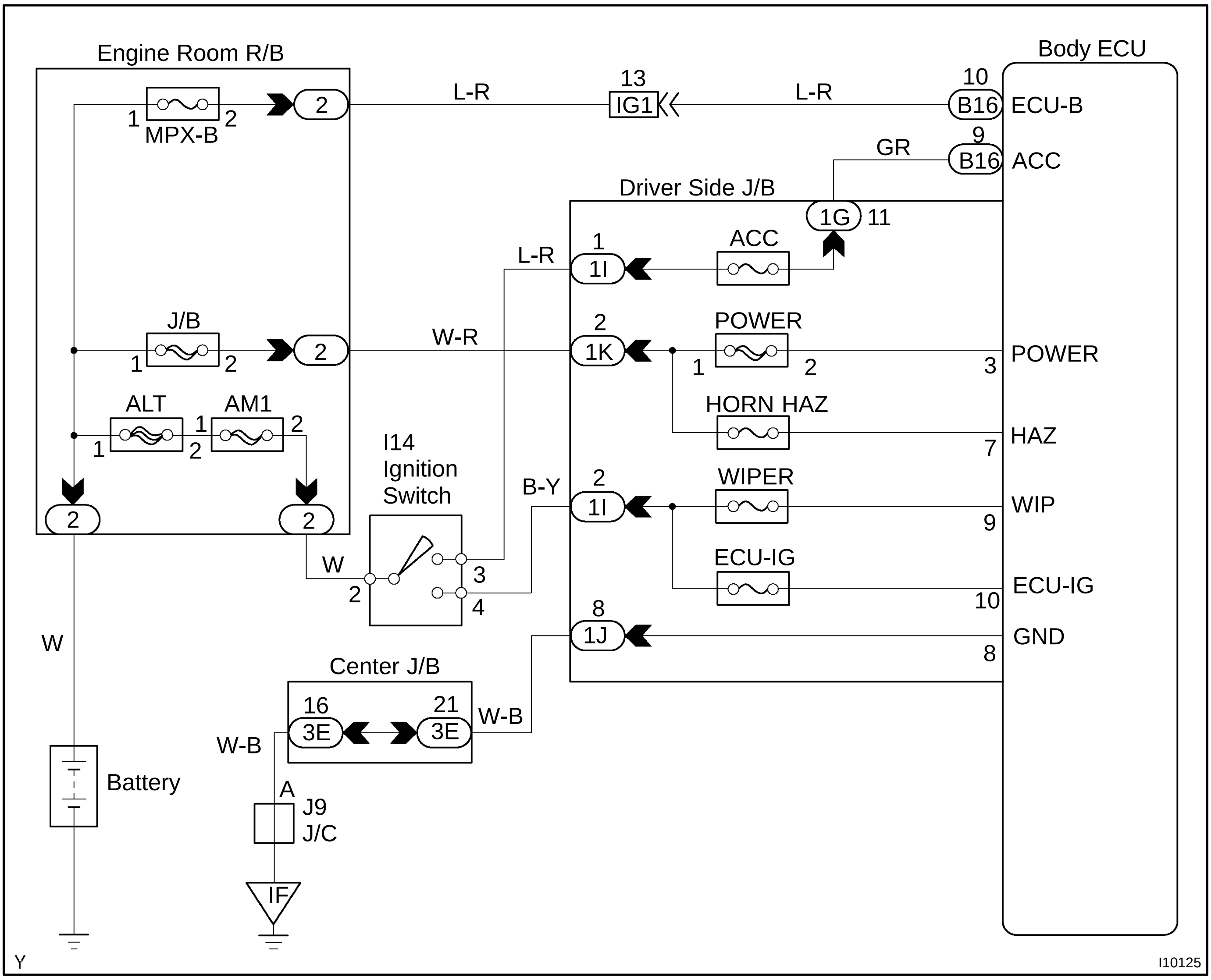
CIRCUIT INSPECTION

Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

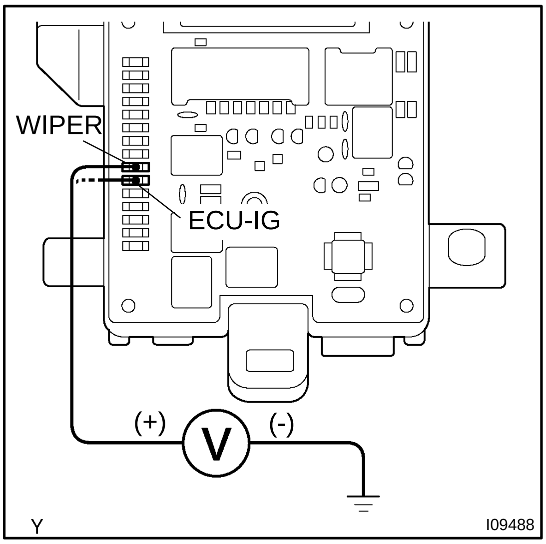
1	Check POWER M-fuse, WIPER, ACC, HORN, HAZ, MPX-B and ECU-IG fuses.

CHECK:
Check the continuity of the POWER M-fuse, the WIPER, ACC, HORN, HAZ, MPX-B and ECU-IG fuses.
OK:
Continuity

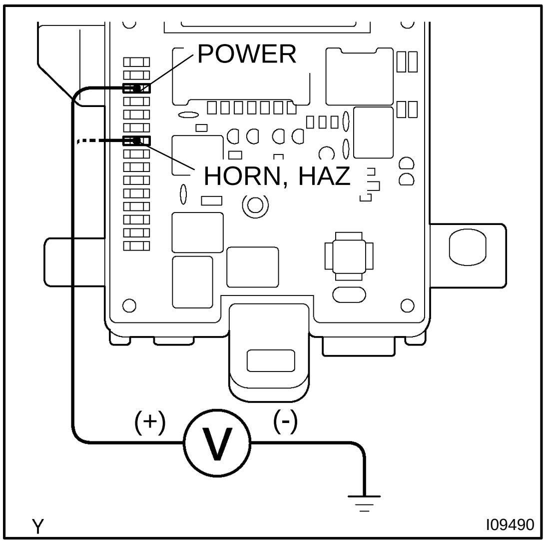
NG → **Replace failure fuse.**

OK ↓

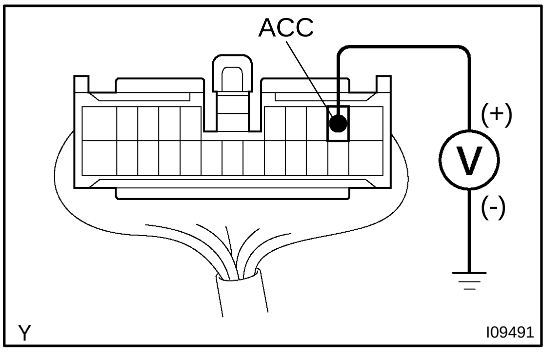
2	Check voltage between terminals WIPER, ACC, HORN, HAZ, POWER, ECU-B, ECU-IG and GND of body ECU connector and body ground.



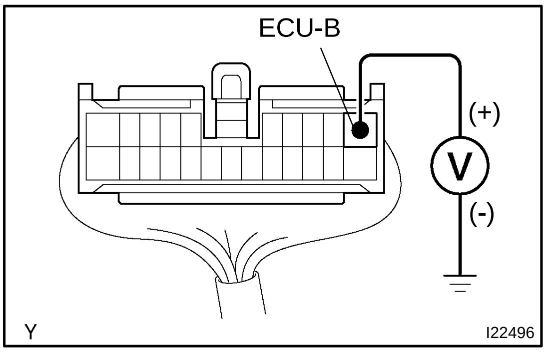
PREPARATION:
(a) Disconnect the 2 connectors and remove the cover.
(b) Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals WIPER, ECU-IG and body ground.
OK:
Voltage: 10 - 14 V



PREPARATION:
Turn the ignition switch OFF.
CHECK:
Measure the voltage between terminals HORN, HAZ, POWER and body ground.
OK:
Voltage: 10 - 14 V



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminal ACC and body ground.
OK:
Voltage: 10 - 14 V

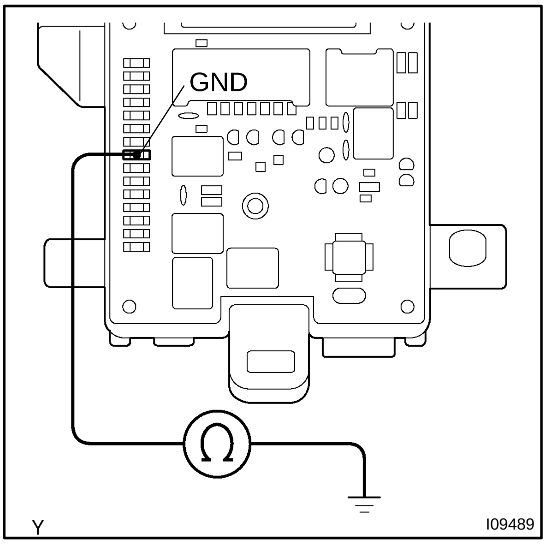


PREPARATION:
Turn the ignition switch OFF.
CHECK:
Measure the voltage between terminal ECU- B and body ground.
OK:
Voltage: 10 - 14 V

NG — **Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).**

OK

3	Check continuity between terminal GND and body ground.



PREPARATION:
Disconnect the 2 connectors and remove the cover.
CHECK:
Check the continuity between terminal GND and body ground.
OK:
Continuity

NG — **Repair or replace driver side J/B, harness or connector.**

OK

Replace driver side J/B.

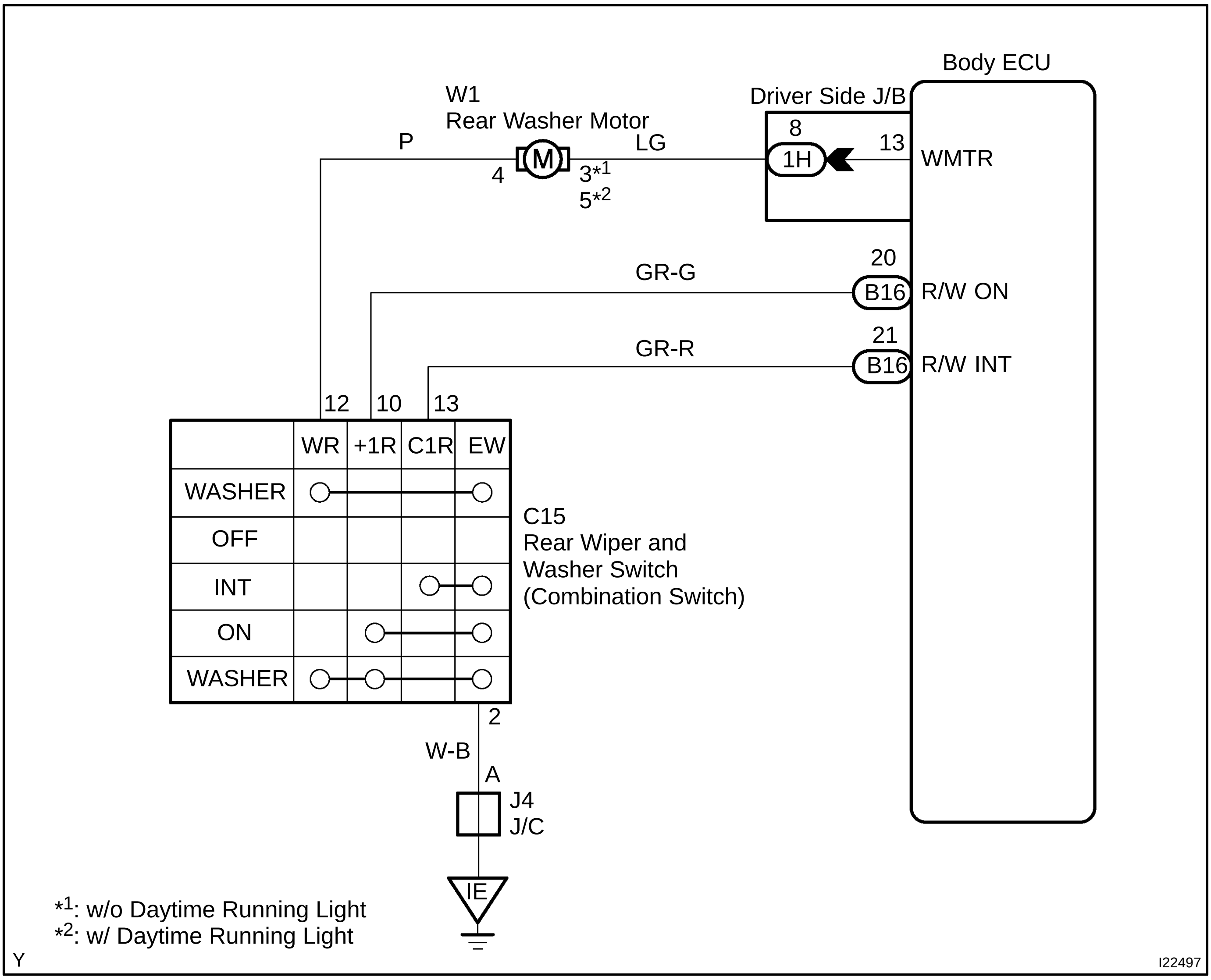
DI56X-05

Rear Wiper Switch Circuit

CIRCUIT DESCRIPTION

Body ECU judges the switch position with the terminal voltage of the rear wiper switch and runs the wiper motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper and washer switch (See page BE-34).

NG → Replace rear wiper and washer switch.

OK

2	Check harness and connector between rear wiper and washer switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

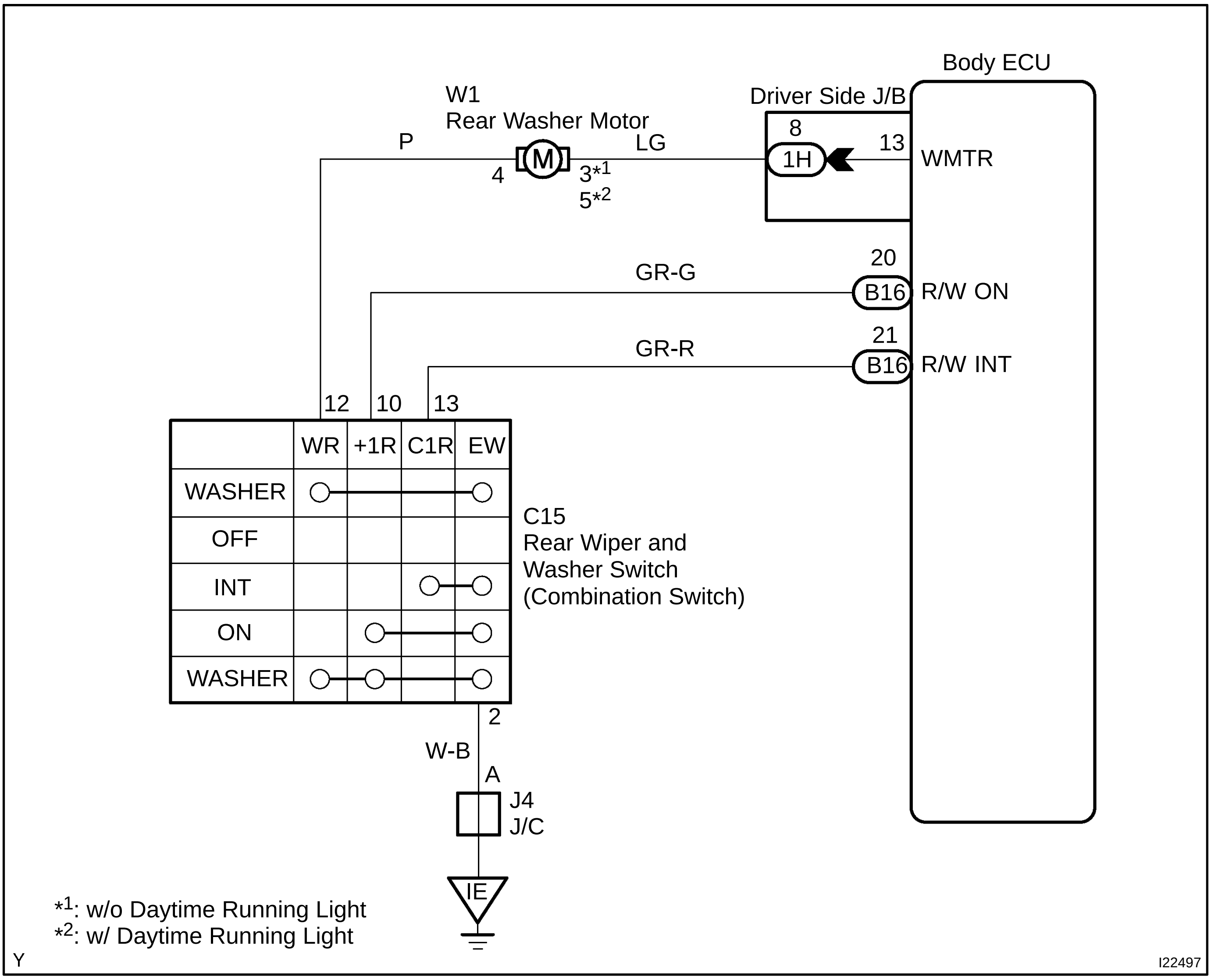
DI56Y-05

Rear Washer Motor Circuit

CIRCUIT DESCRIPTION

Body ECU judges the switch position with the terminal voltage of the wiper and washer switch and runs the wiper motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper and washer switch (See page BE-34).

NG → Replace rear wiper and washer switch.

OK

2	Check rear washer motor (See page BE-34).

NG → Replace wiper motor.

OK

3	Check harness and connector between rear wiper and washer switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

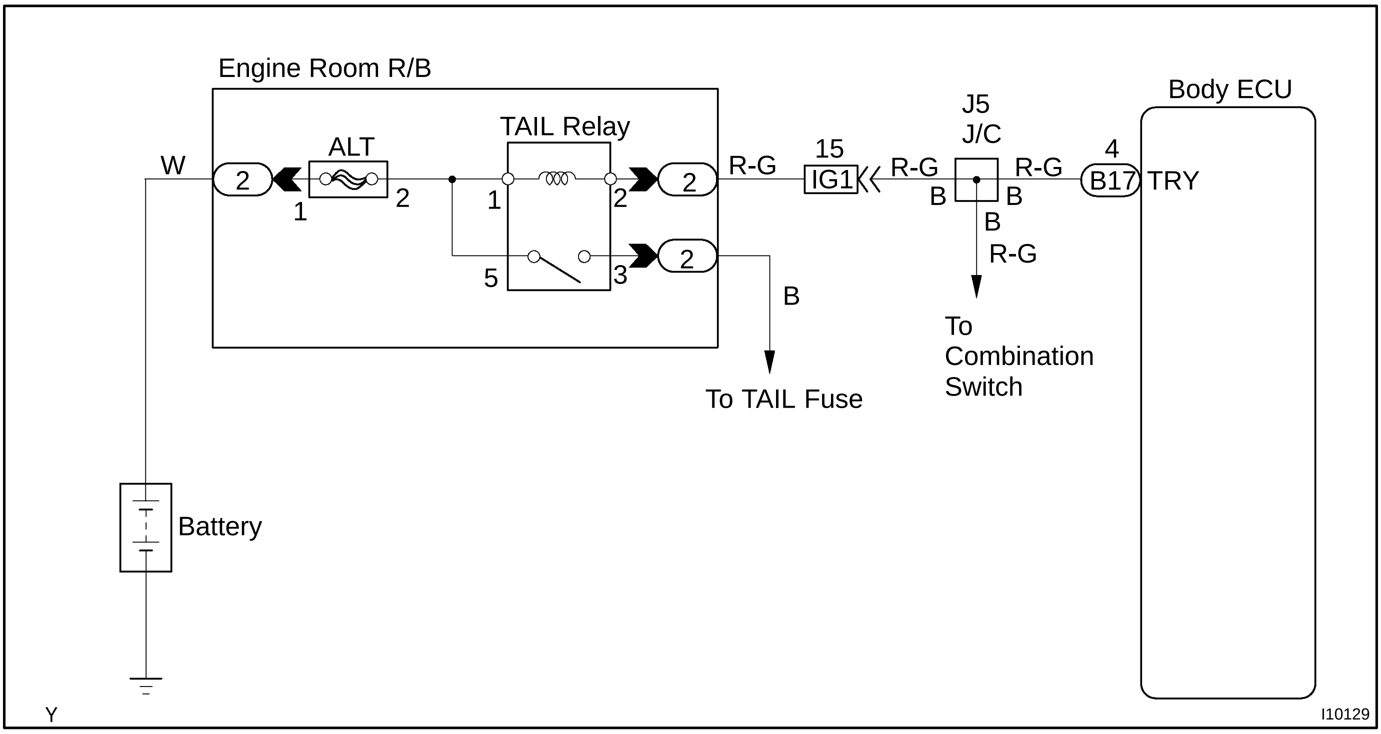
DI56Z-03

Taillight Relay Circuit

CIRCUIT DESCRIPTION

When the panic signal is received, the control of the taillight relay is performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check harness and connector between taillight relay (Marking: TAIL) and body ECU (See page IN-28).**

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

OK

Check and replace body ECU.

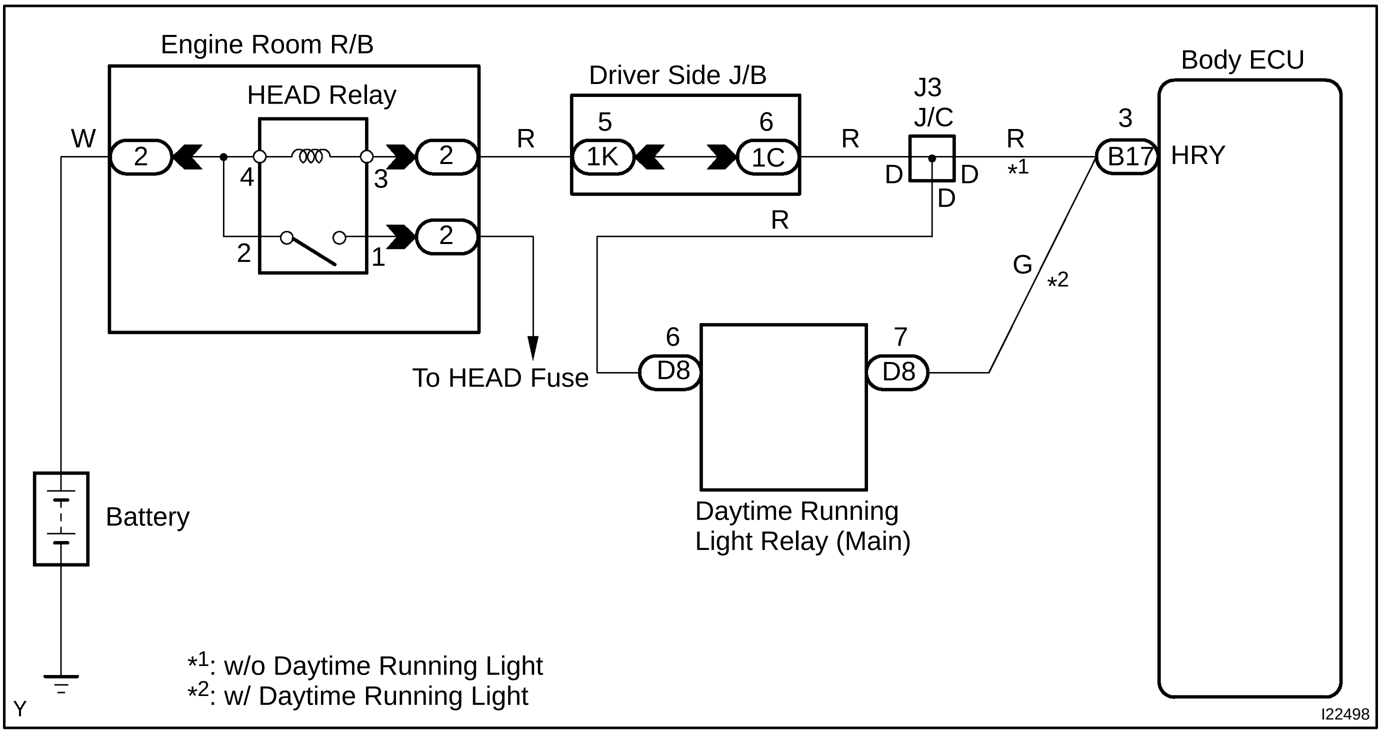
DI570-03

Headlight Relay Circuit

CIRCUIT DESCRIPTION

When the panic signal is received, the control of the headlight relay is performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check harness and connector between headlight relay (Marking: HEAD) and body ECU, and battery and headlight relay (See page IN-28).**

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

OK

Check and replace body ECU.

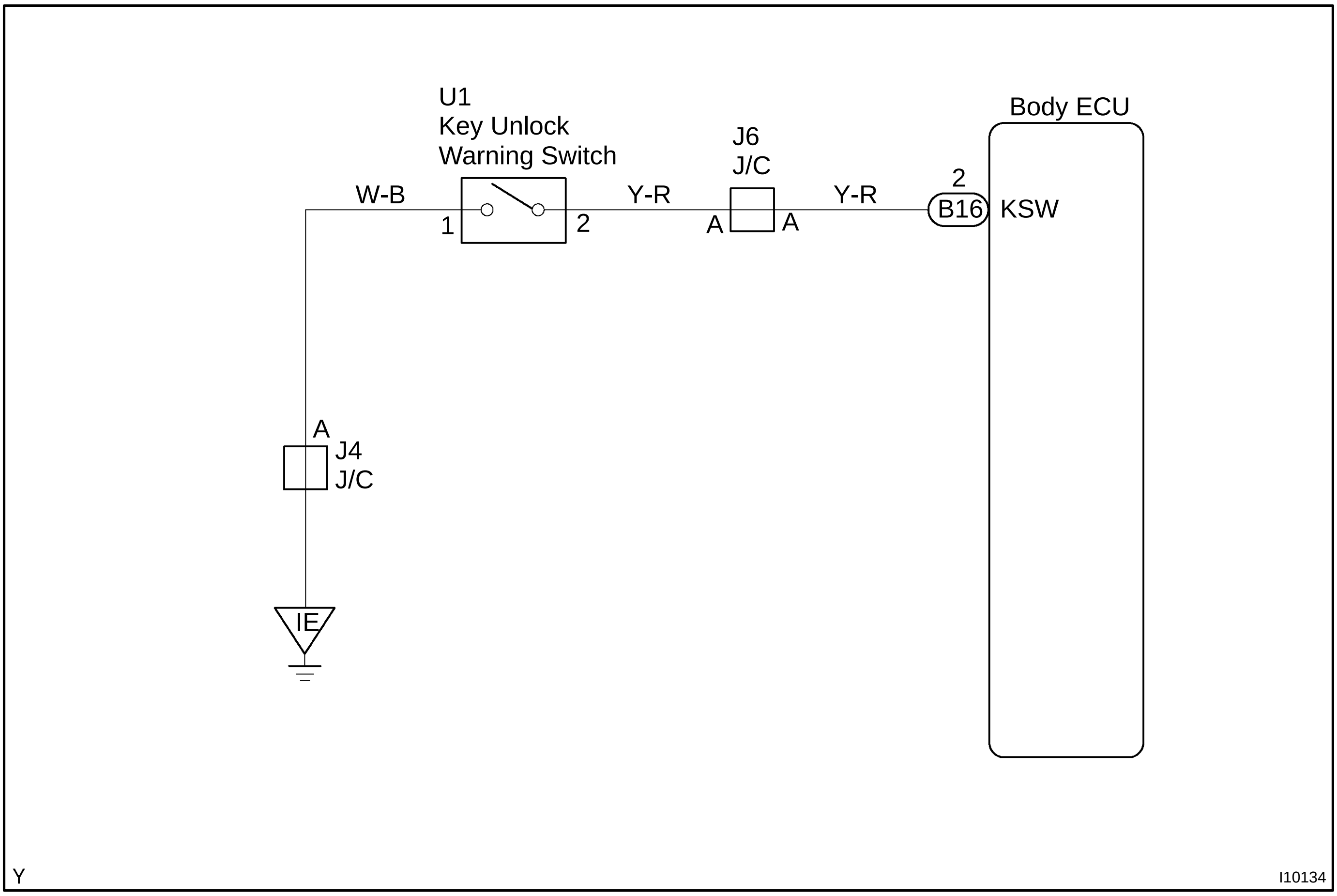
DI571-05

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.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check key unlock warning switch (See page BE-12).**

NG → **Replace key unlock warning switch.**

OK

2	**Check harness and connector between key unlock warning switch and body ECU (See page IN-28).**

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

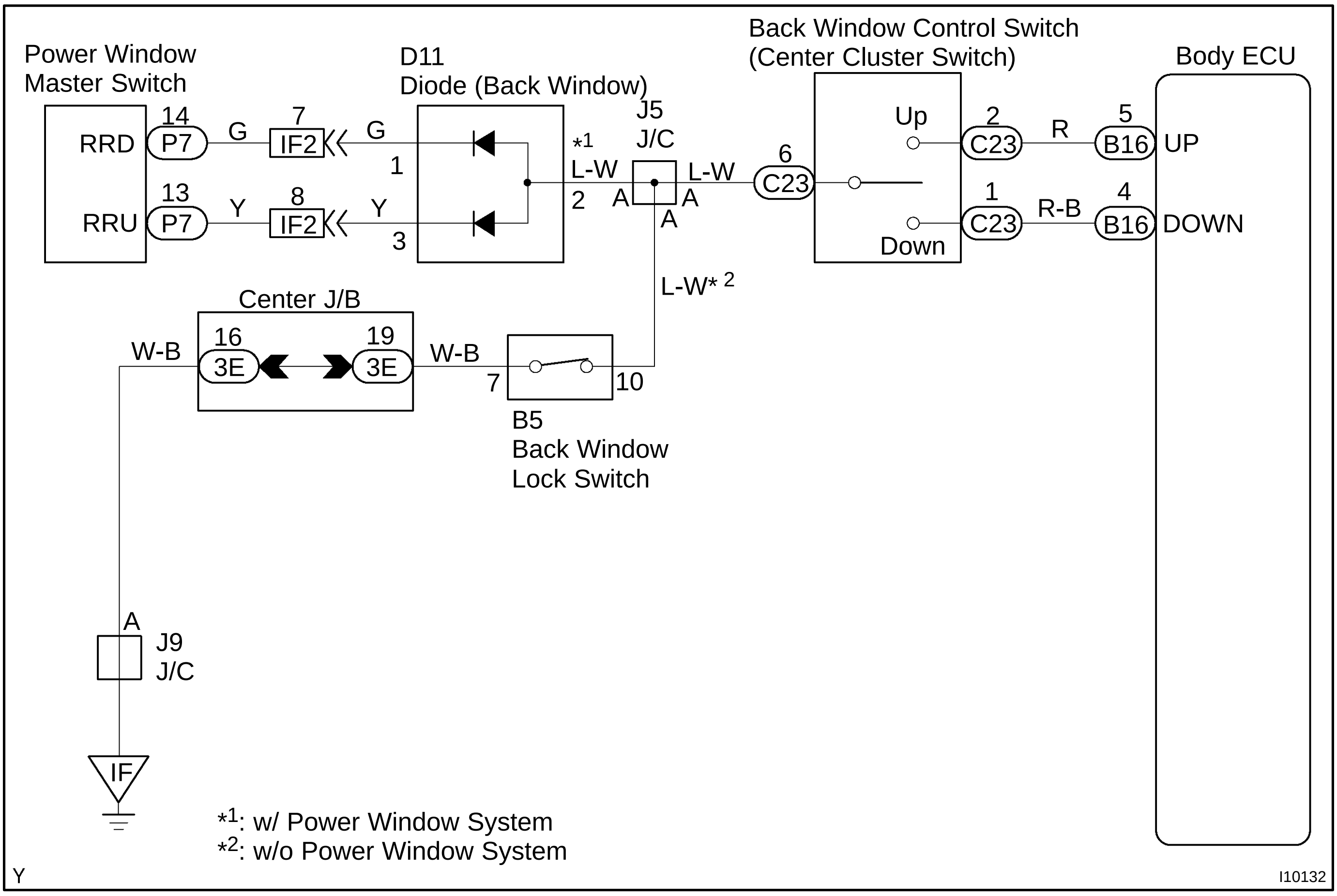
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI572-05

Back Door Power Window Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check back door power window switch (See page BE-65).**

NG → **Replace back door power window switch.**

OK

2	**Check harness and connector between power window switch and body ECU (See page IN-28).**

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

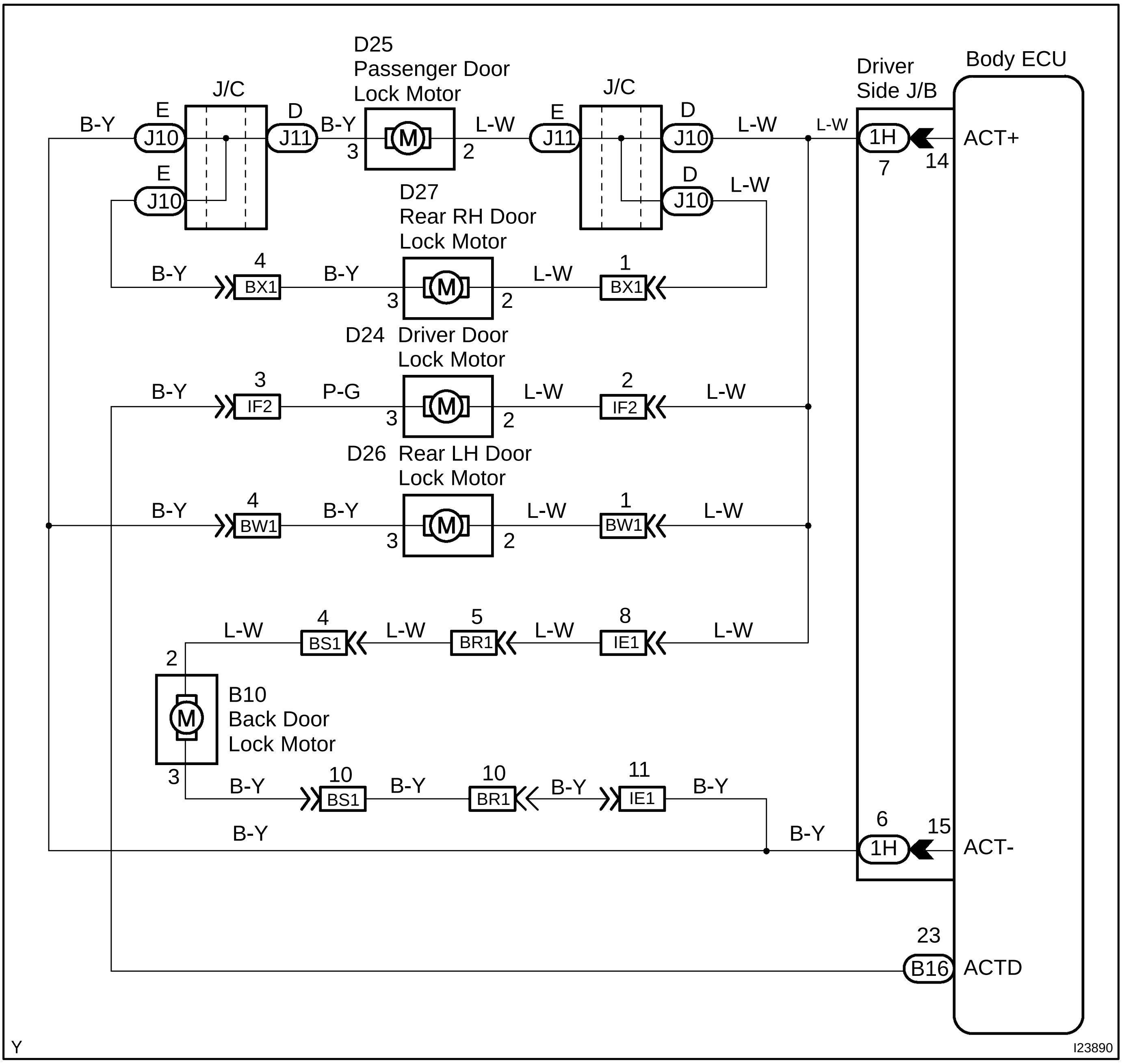
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI573-05

Door Lock Motor Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check door lock motor (See page BE-76).**

NG → **Replace door lock motor.**

OK

2	**Check harness and connector between door lock motor and body ECU (See page IN-28).**

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

OK

Check and replace body ECU.

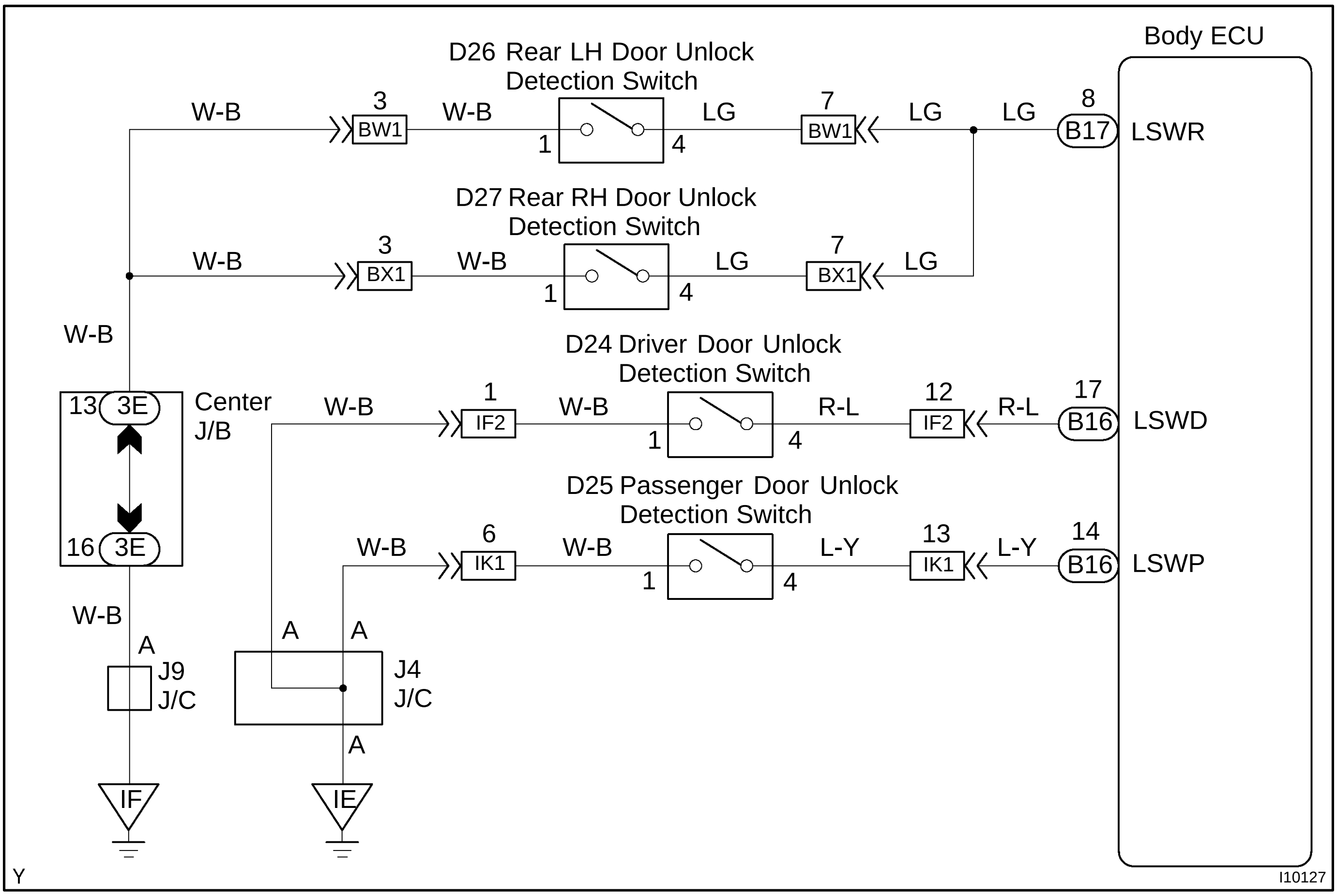
DI574-03

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, wireless door lock control system and theft deterrent system.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door unlock detection switch (See page BE-76).

NG | Replace door lock motor.

OK

2	Check harness and connector between door unlock detection switch and body ECU (See page IN-28).

NG | Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

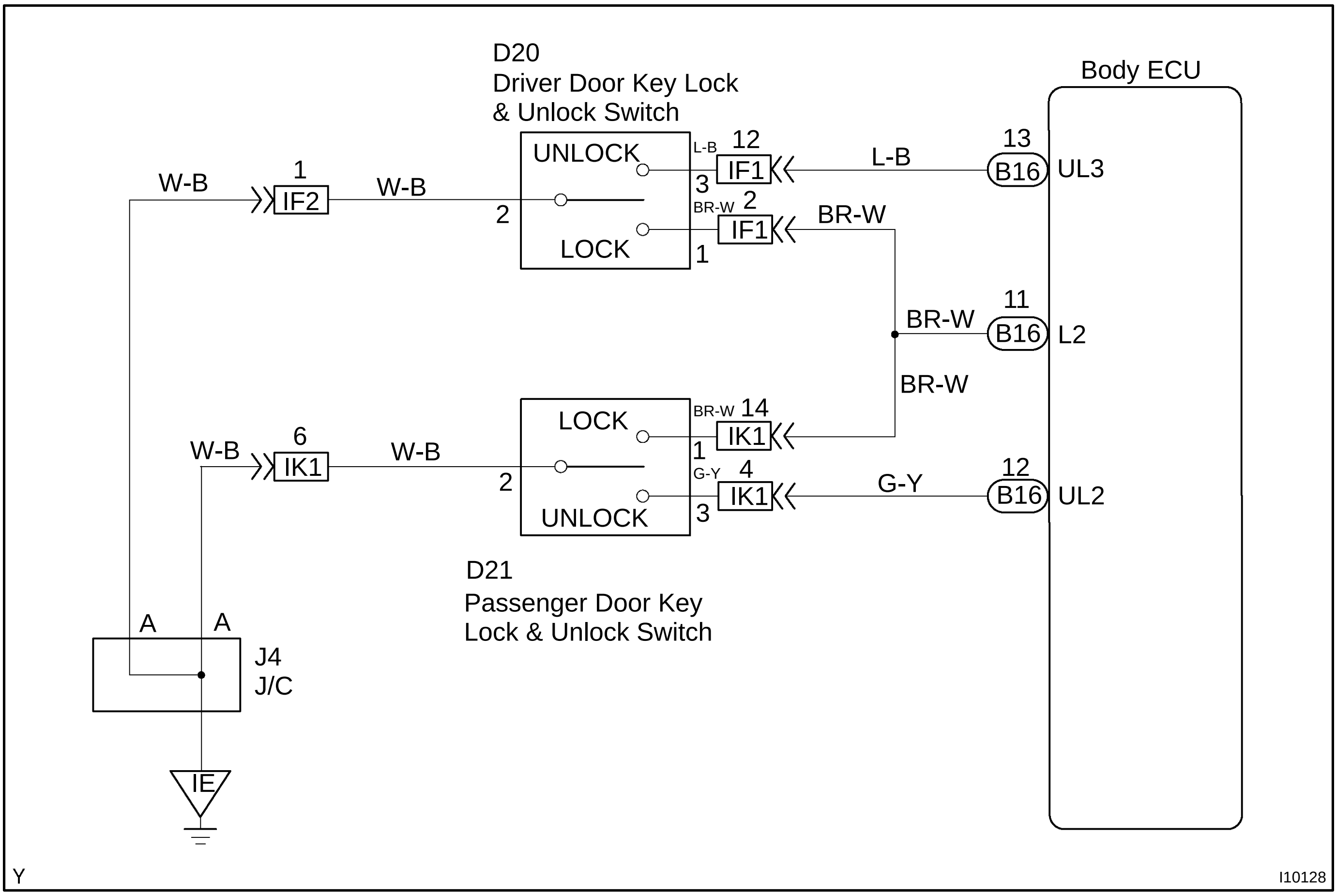
DI575-03

Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

The door key lock and unlock switch is installed to the door key cylinder. When the key is turned to the lock side, terminal 1 of the switch is grounded and when the key is turned to the unlock side, terminal 3 of the switch is grounded.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check door key lock and unlock switch (See page BE-76).**

NG → **Replace door key lock and unlock switch.**

OK

2	**Check harness and connector between door key lock and unlock switch and body ECU (See page IN-28).**

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

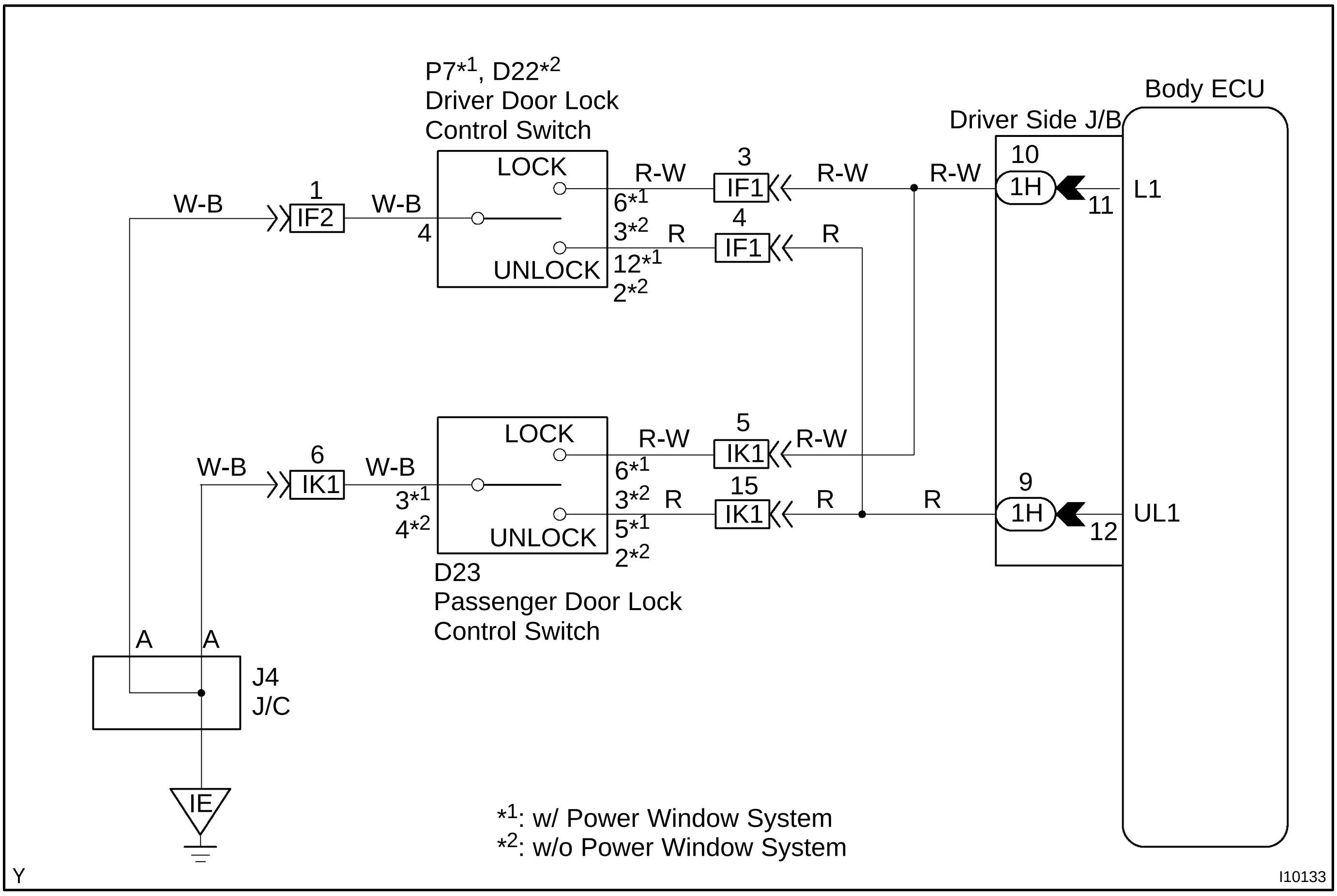
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI576-03

Door Lock Control Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door lock control switch (See page BE-76).

NG → Replace door lock control switch.

OK

2	Check harness and connector between door lock control switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

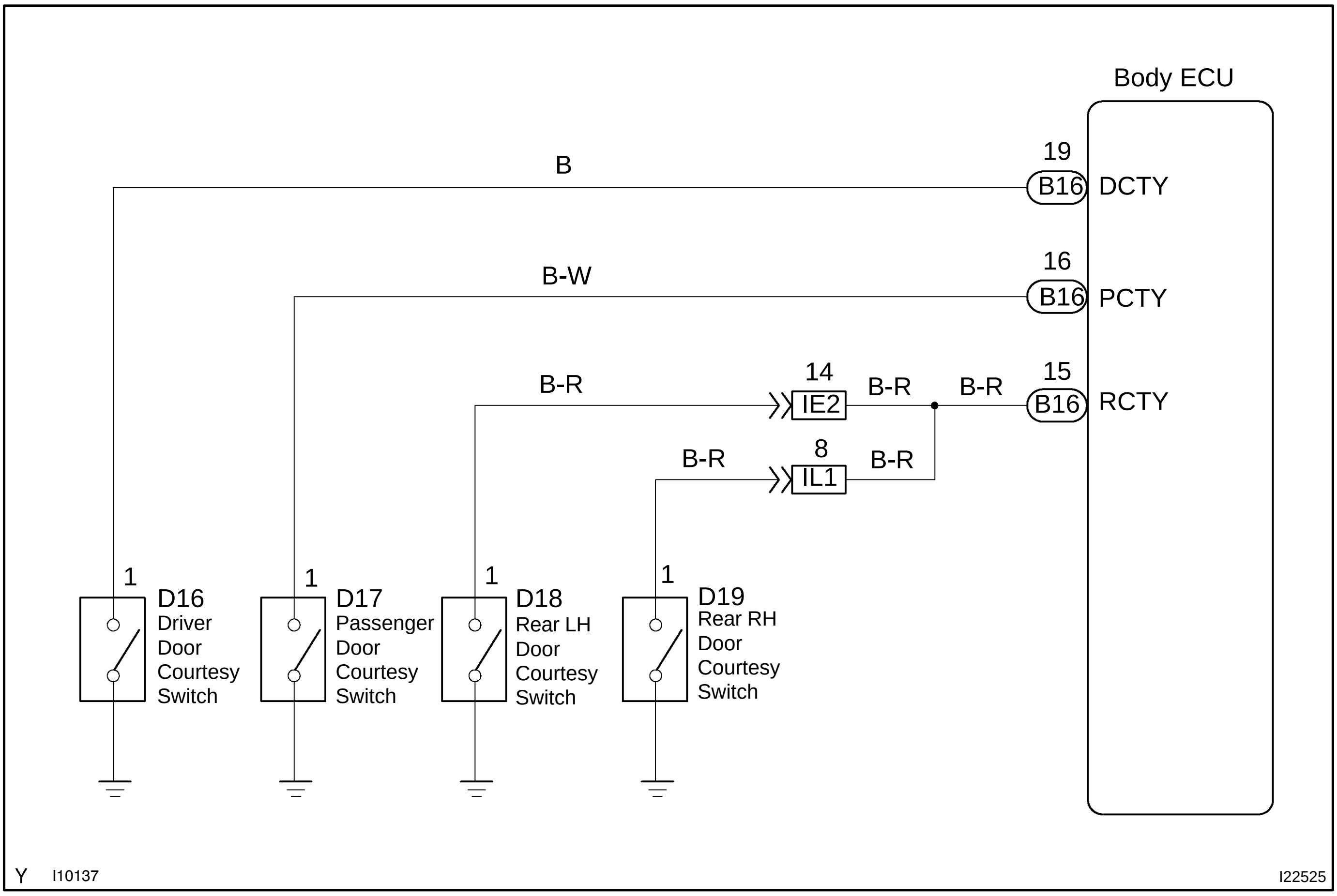
DI577-03

Front and Rear Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The door courtesy switch ON when the door is opened and OFF when door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door courtesy switch (See page BE-26).

NG → **Replace door courtesy switch.**

OK

2	Check harness and connector between door courtesy switch and body ECU (See page IN-28).

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

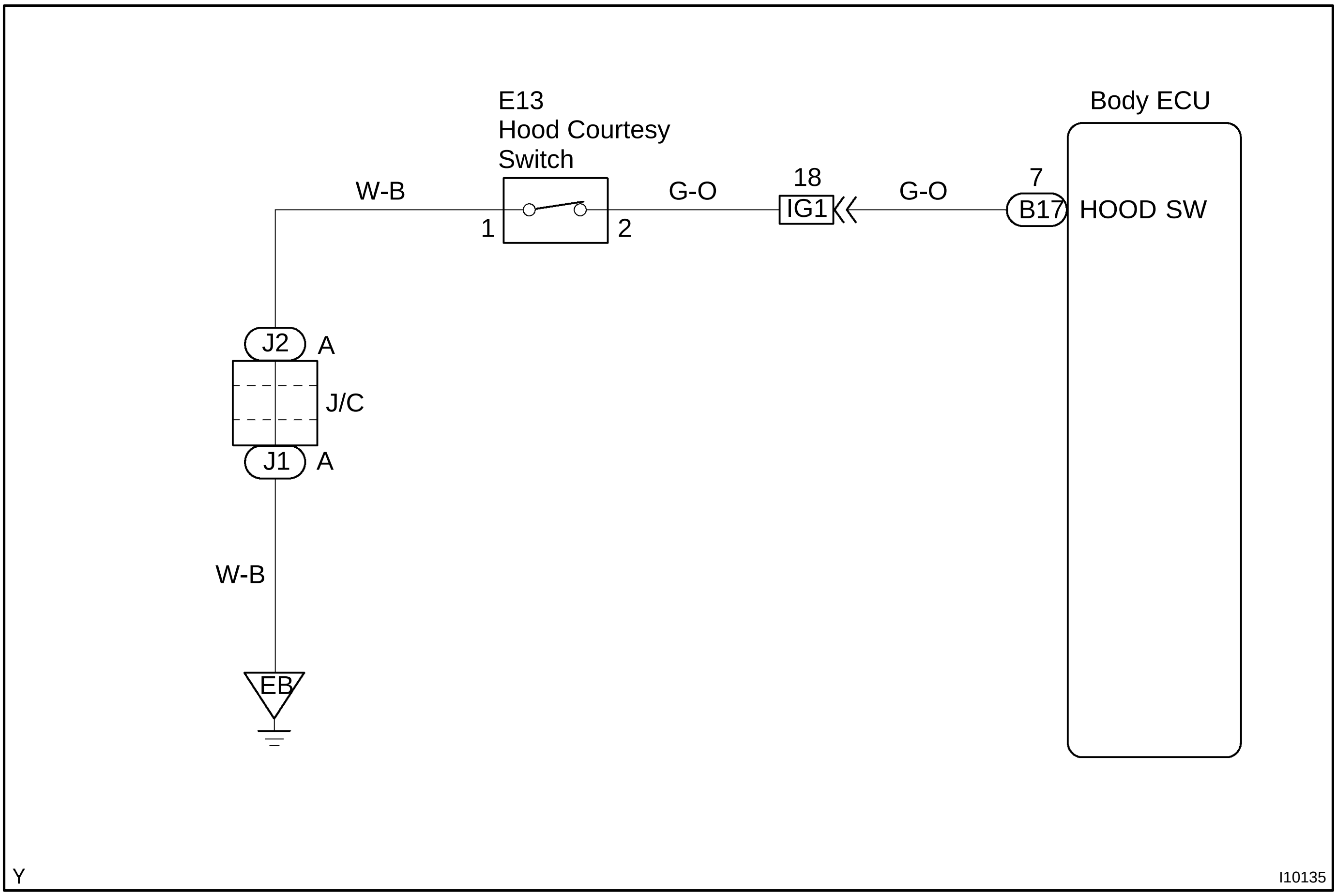
DI578-02

Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The hood courtesy switch is built into the engine hood lock assembly and goes on when the engine hood is opened and goes off when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check hood courtesy switch (See page BE-85).

NG → Replace hood courtesy switch.

OK

2	Check harness and connector between hood courtesy switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI579-02

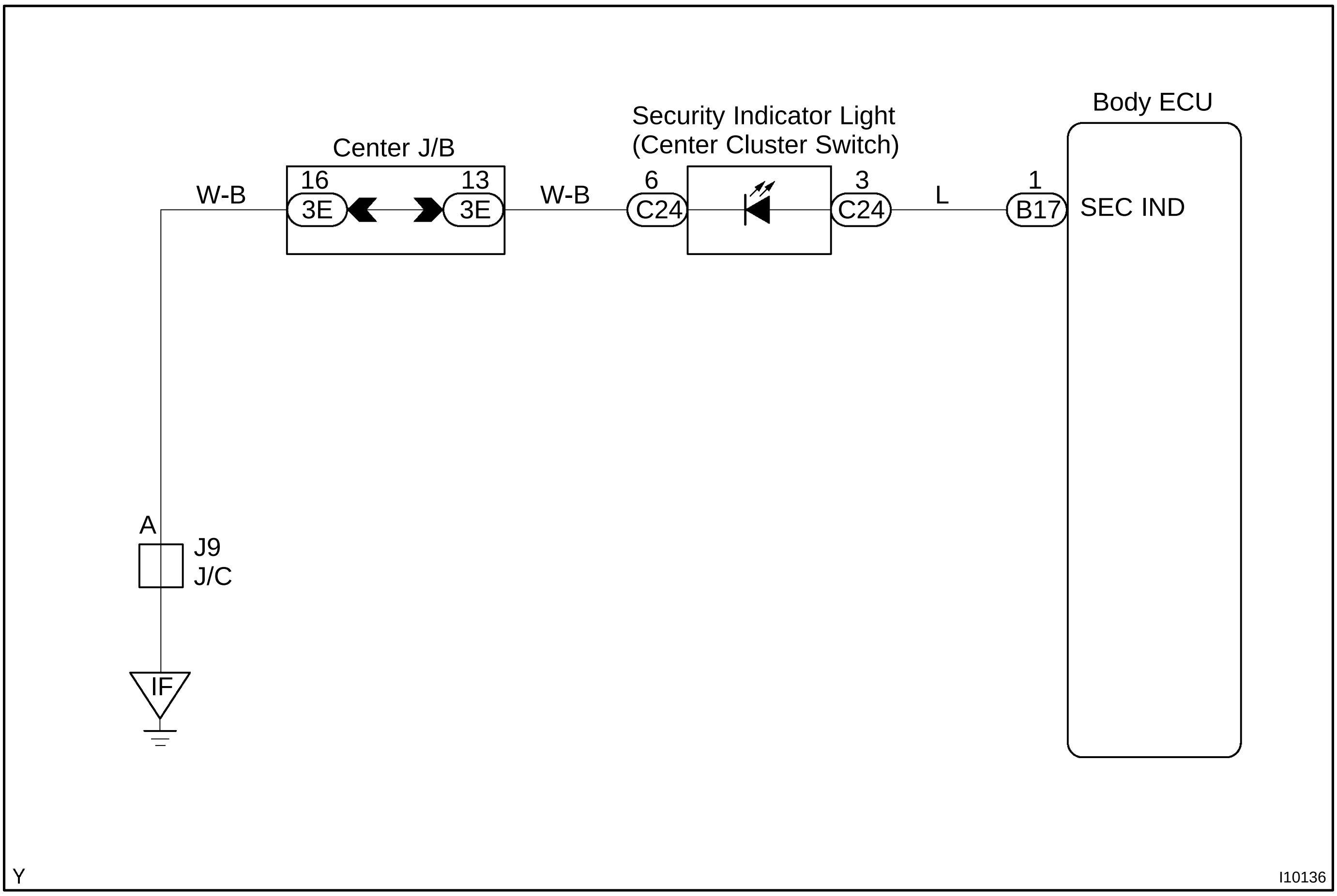
Theft Deterrent Indicator Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light on for 1 second and turns it off for 1 second, thus blinking the indicator light.

This theft deterrent indicator is connected to the ECM and outputs the key judgment of the immobilizer.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check theft deterrent indicator (See page BE-85).**

NG → **Replace theft deterrent indicator.**

OK

2	**Check harness and connector between theft deterrent indicator and body ECU, and theft deterrent indicator and body ground (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

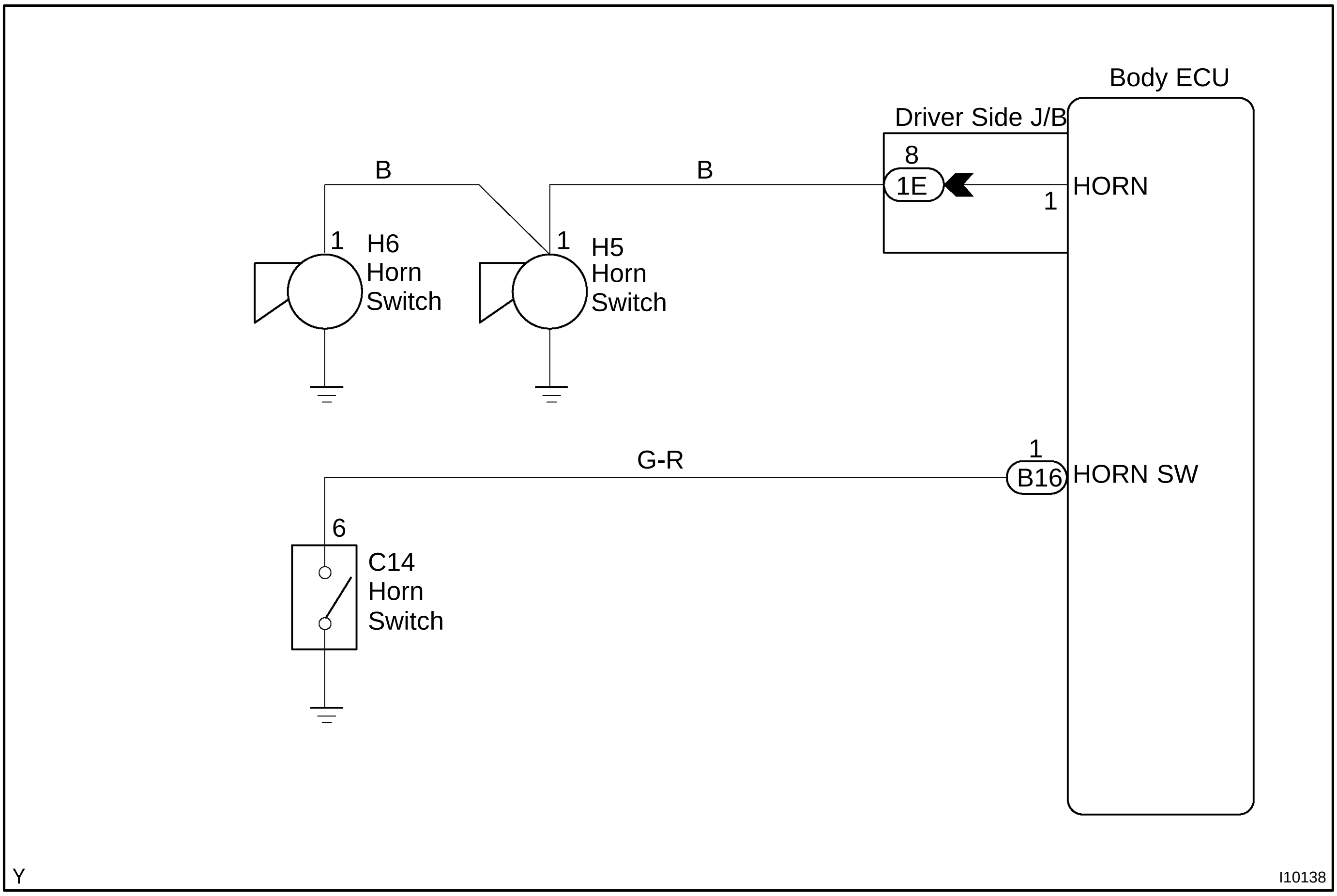
DI57A-03

Horn Circuit

CIRCUIT DESCRIPTION

The horn is connected to the body ECU and activated by the body ECU during warning of the theft deterrent system and horn switch ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check horn.

NG → **Replace horn.**

OK

2	Check horn switch.

NG → **Replace horn switch.**

OK

3	Check harness and connector between horn and body ECU, and body ECU and horn switch (See page IN-28).

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

OK

Check and replace driver side J/B.

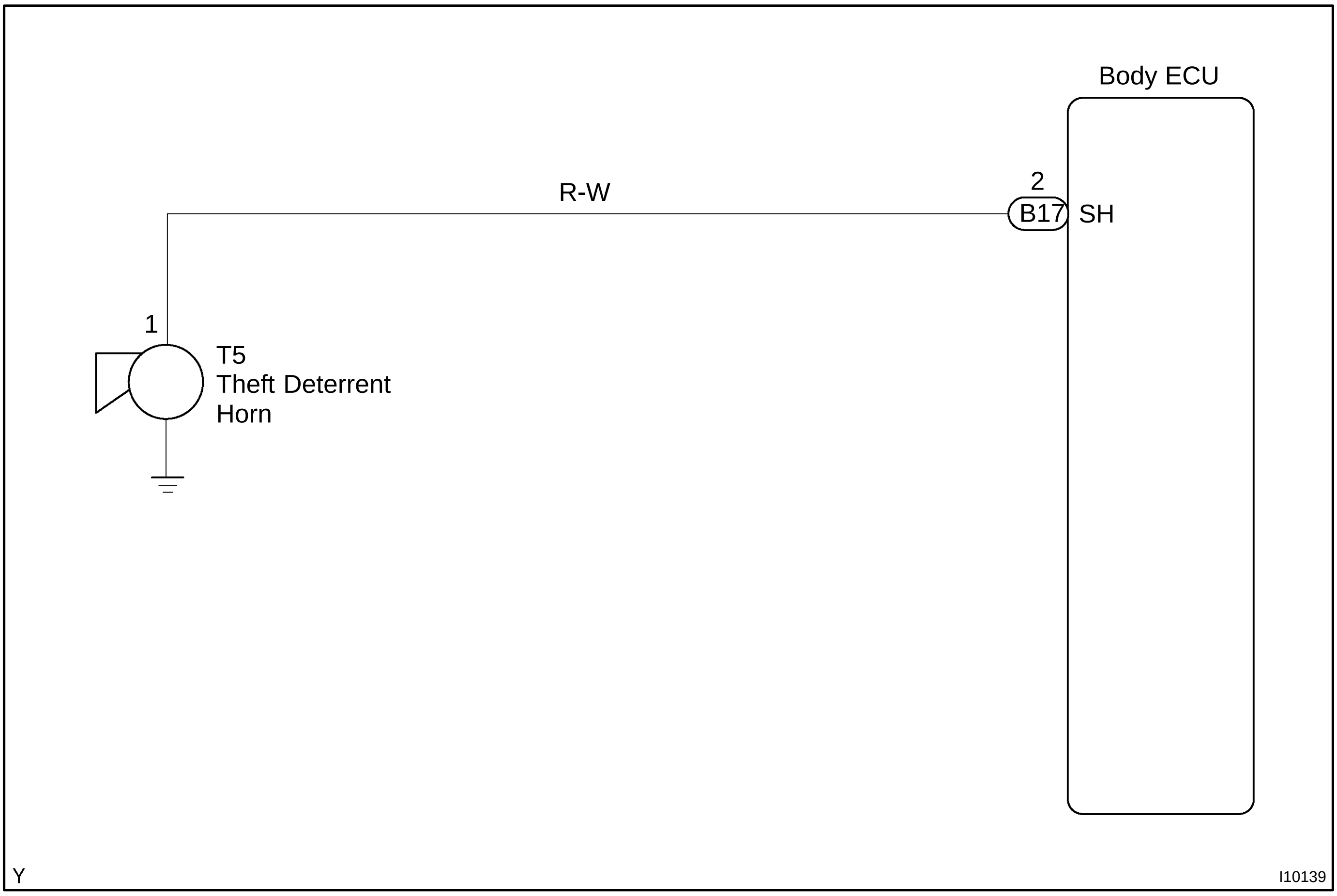
DI57B-02

Theft Deterrent Horn Circuit

CIRCUIT DESCRIPTION

During warning of the theft deterrent system, the body ECU activates the theft deterrent horn.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check theft deterrent horn (See page BE-85).**

NG → **Replace theft deterrent horn.**

OK

2	**Check harness and connector between theft deterrent horn and body ECU (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

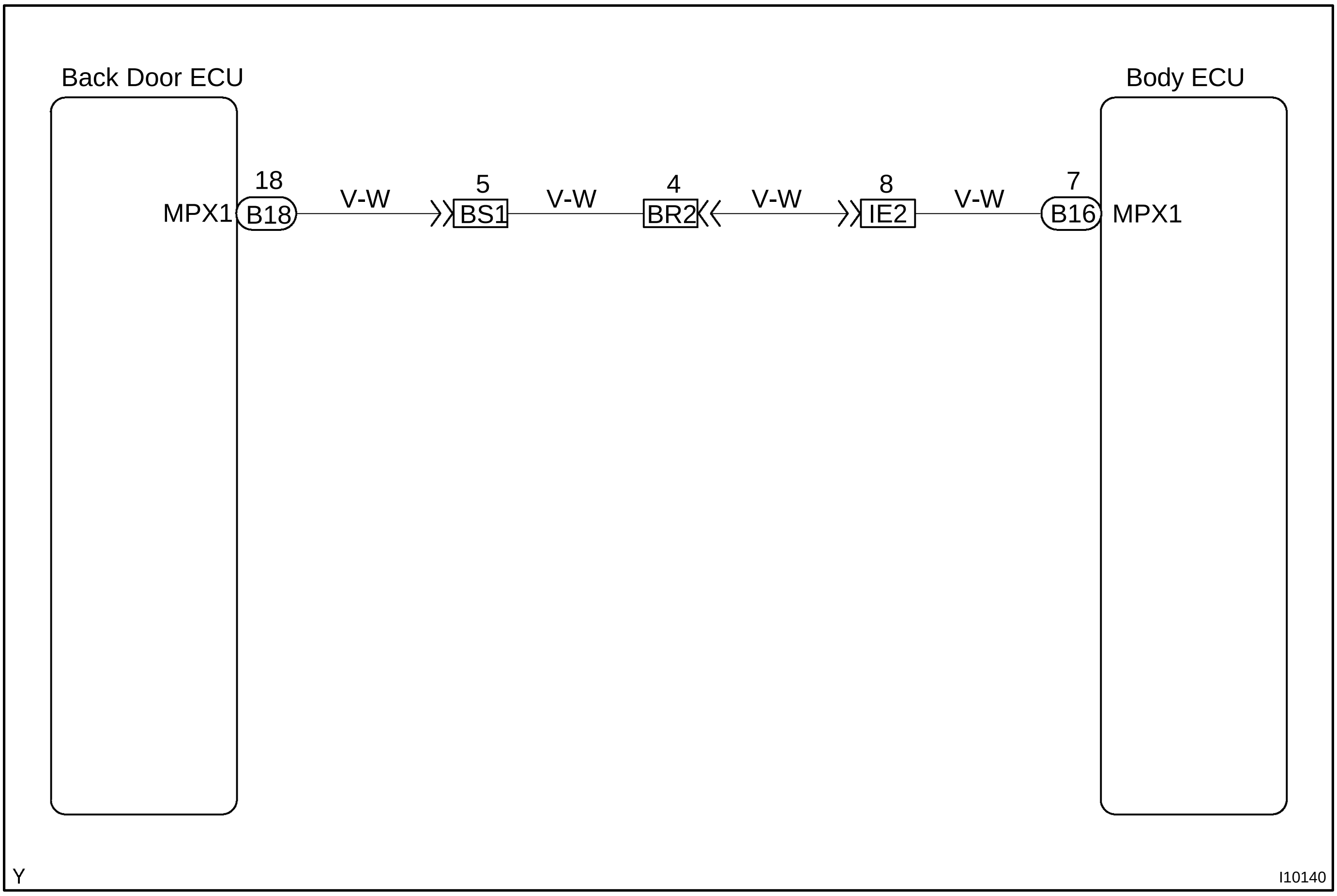
DI57C-04

MPX Circuit

CIRCUIT DESCRIPTION

This circuit communicates information of the wireless door lock control system, rear defogger system, open door warning, luggage light, theft deterrent system, rear wiper washer system and back door power window system between the body ECU and back door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check harness and connector between back door ECU and body ECU (See page IN-28).**

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

OK

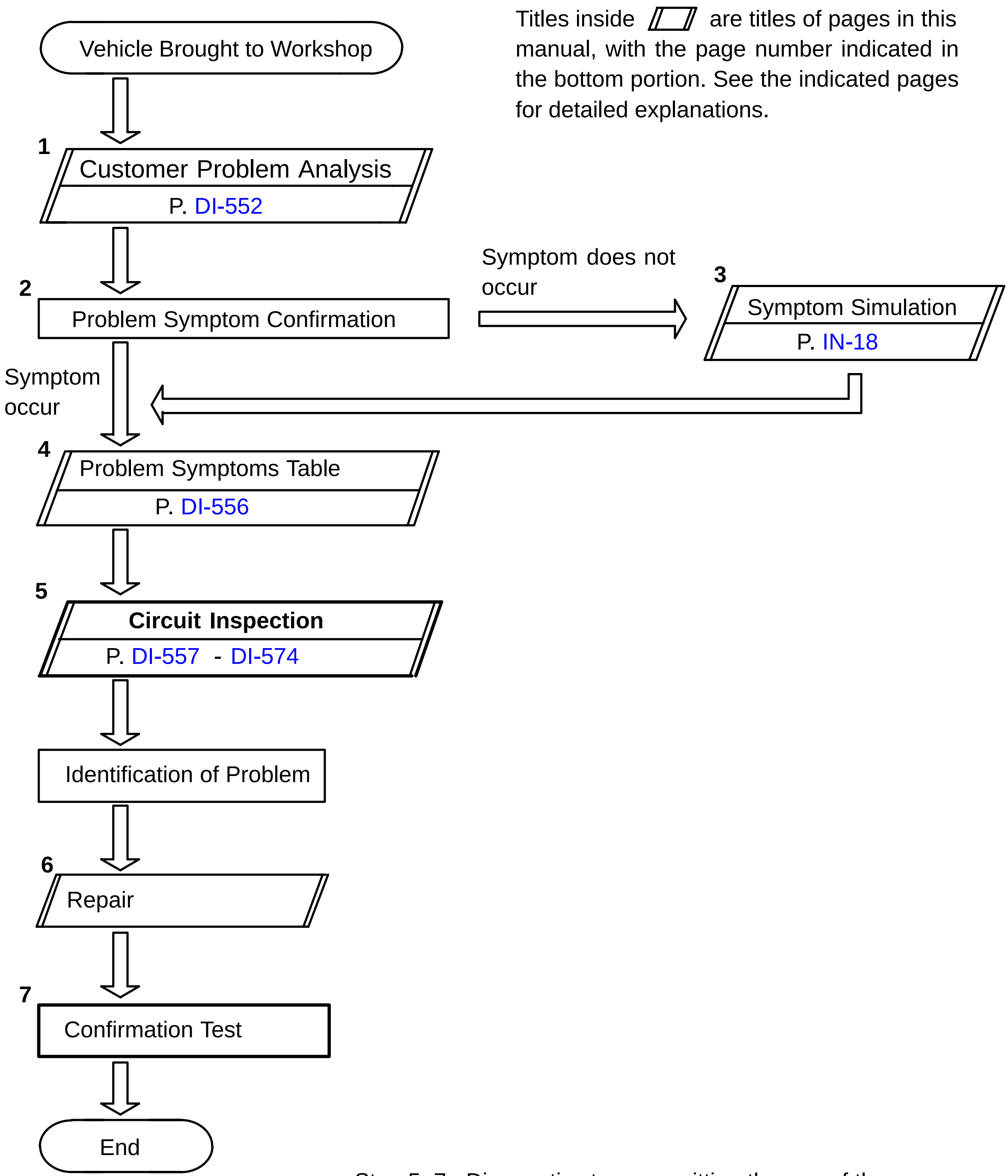
Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

BACK DOOR CONTROL SYSTEM

DI57D-01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the troubleshooting.



Step 5, 7 : Diagnostic steps permitting the use of the TOYOTA hand-held tester.

DI57E-01

CUSTOMER PROBLEM ANALYSIS CHECK

BACK DOOR CONTROL SYSTEM Check Sheet

Inspector's name: ________________

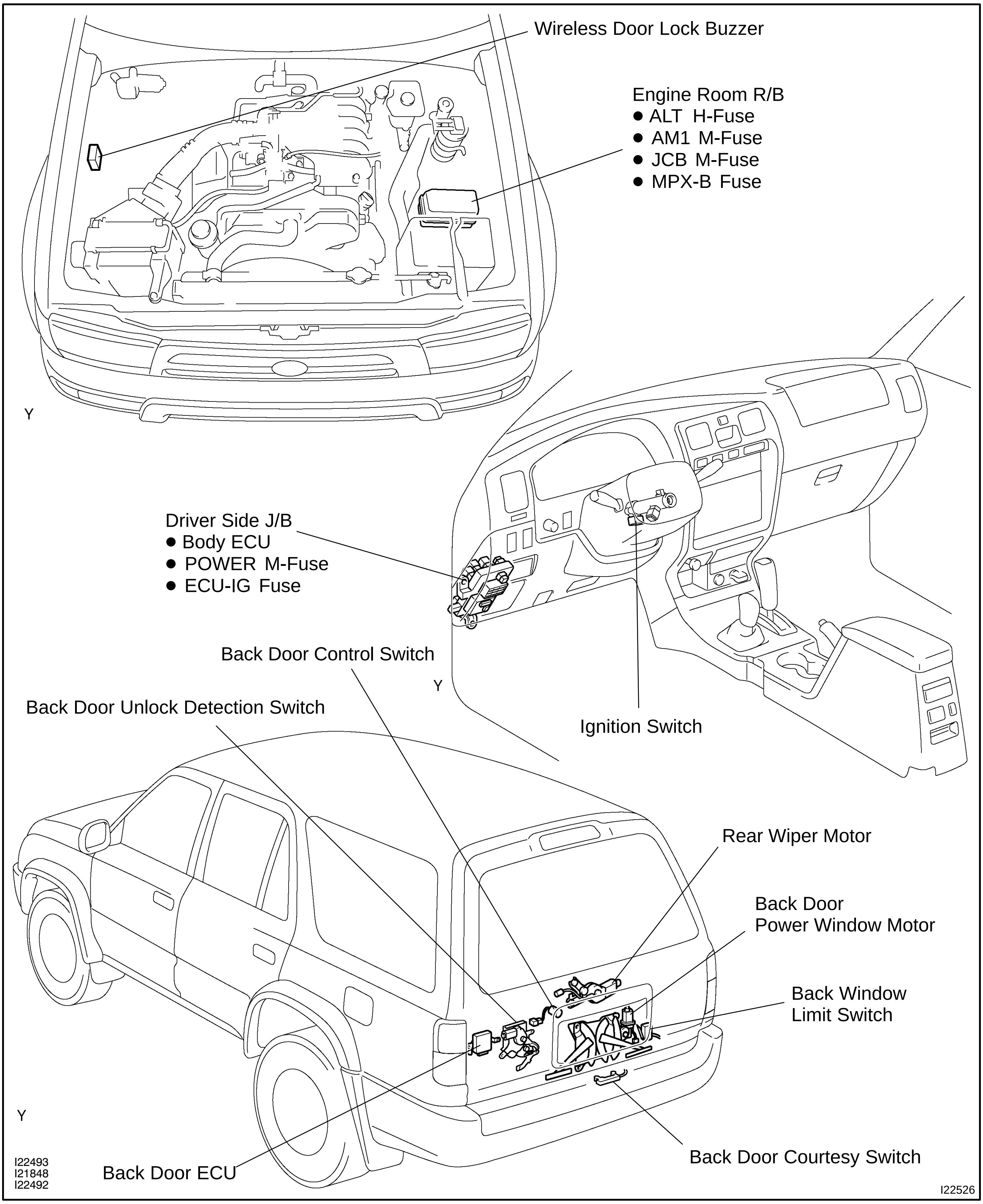
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km** **Mile**

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	□ Wireless Door Lock Control System
	□ Power Door Lock Control System
	□ Theft Deterrent System
	□ Others

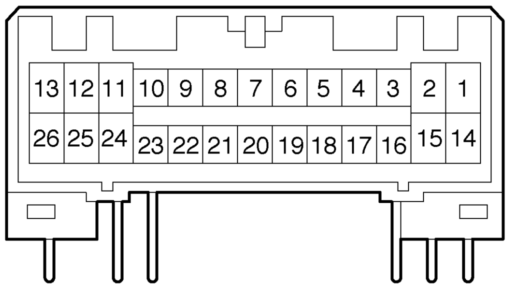
DI57F-03

PARTS LOCATION



DI57G-05

TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
POWE (B18-1) - GND (B18-26)	L - W-B	Constant	10 - 14
ECU-B (B18-2) - GND (B18-26)	L-R - W-B		
IG (B18-3) - GND (B18-26)	Y - W-B	Ignition switch OFF or ACC	Below 1.0
		Ignition switch ON	10 - 14
BZR1 (B18-5) - BZR2 (B18-4)	P-B - P-G	Wireless door lock buzzer sounded	10 - 14
		Wireless door lock buzzer not sounded	Below 1.0
BCTY (B18-7) - GND (B18-26)	L-W - W-B	Back door courtesy switch OFF (Closed)	10 - 14
		Back door courtesy switch ON (Open)	Below 1.0
CLS (B18-9) - GND (B18-26)	G-R - W-B	Back door control switch OFF or DOWN	10 - 14
		Back door control switch UP	Below 1.0
OPN (B18-10) - GND (B18-26)	G-Y - W-B	Back door control switch OFF or UP	10 - 14
		Back door control switch DOWN	Below 1.0
CLSM (B18-11) - GND (B18-26)	R - W-B	Back door power window not operating	Below 1.0
		Back door power window operating upward	10 - 14
OPNM (B18-12) - GND (B18-26)	G - W-B	Back door power window not operating	Below 1.0
		Back door power window operating downward	10 - 14
LMTW (B18-13) - GND (B18-26)	R-L - W-B	Window limit switch OFF (Closed)	10 - 14
		Window limit switch ON (Open)	Below 1.0
LSWB (B18-20) - GND (B18-26)*	L-B - W-B	Back door unlock detection switch OFF (Locked)	10 - 14
		Back door unlock detection switch ON (Unlocked)	Below 1.0
LMT2 (B18-22) - GND (B18-26)	GR - W-B	Rear wiper arm storing position	10 - 14
		Rear wiper arm not storing position	Below 1.0
LMT1 (B18-23) - GND (B18-26)	GR-R - W-B	Rear wiper arm between stopping and reversing position	10 - 14
		Rear wiper arm except stopping and reversing position	Below 1.0
WIP- (B18-24) - GND (B18-26)	L-B - W-B	Rear wiper motor not operating	Below 1.0
		Rear wiper motor rotates reversely	10 - 14

WIP+ (B18-25) - GND (B18-26)	L-Y - W-B	Rear wiper motor not operating	Below 1.0
		Rear wiper motor rotates	10 - 14
GND (B18-26) - Body ground	W-B - Body ground	Constant	Below 1.0

*: w/ Theft deterrent system

DI57H-01

PROBLEM SYMPTOMS TABLE

WIRELESS DOOR LOCK CONTROL

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate	2. Transmitter 3. Key unlock warning switch circuit 4. Back door ECU 5. MPX circuit 6. Body ECU	BE-93 DI-527 IN-28 DI-549 IN-28
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-535 DI-533 IN-18
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. Back door ECU	DI-539 IN-18
Wireless door lock operates, but the buzzer does not sound	1. Wireless door lock buzzer circuit 2. MPX circuit 3. Back door ECU	DI-574 DI-549 IN-18
Buzzer sound, but wireless door lock function does not operate	1. Body ECU	IN-18
Back door window open control system does not operate	1. Back door power window motor circuit 2. Rear wiper limit switch circuit 3. Back door ECU	DI-570 DI-568 IN-18

REAR WIPER AND WASHER

Symptom	Suspect Area	See page
Rear wiper does not operate	1. Wiper switch circuit 2. Wiper motor circuit 3. Body ECU 4. Back door ECU	DI-521 DI-523 IN-18 IN-18
Rear washer does not operate	1. Washer switch circuit 2. Washer motor 3. Wire harness 4. Body ECU	DI-521 DI-521 - IN-18
Wiper does not operate when washer switch is ON	1. Wiper switch circuit 2. Body ECU	DI-521 IN-18

DI57I-05

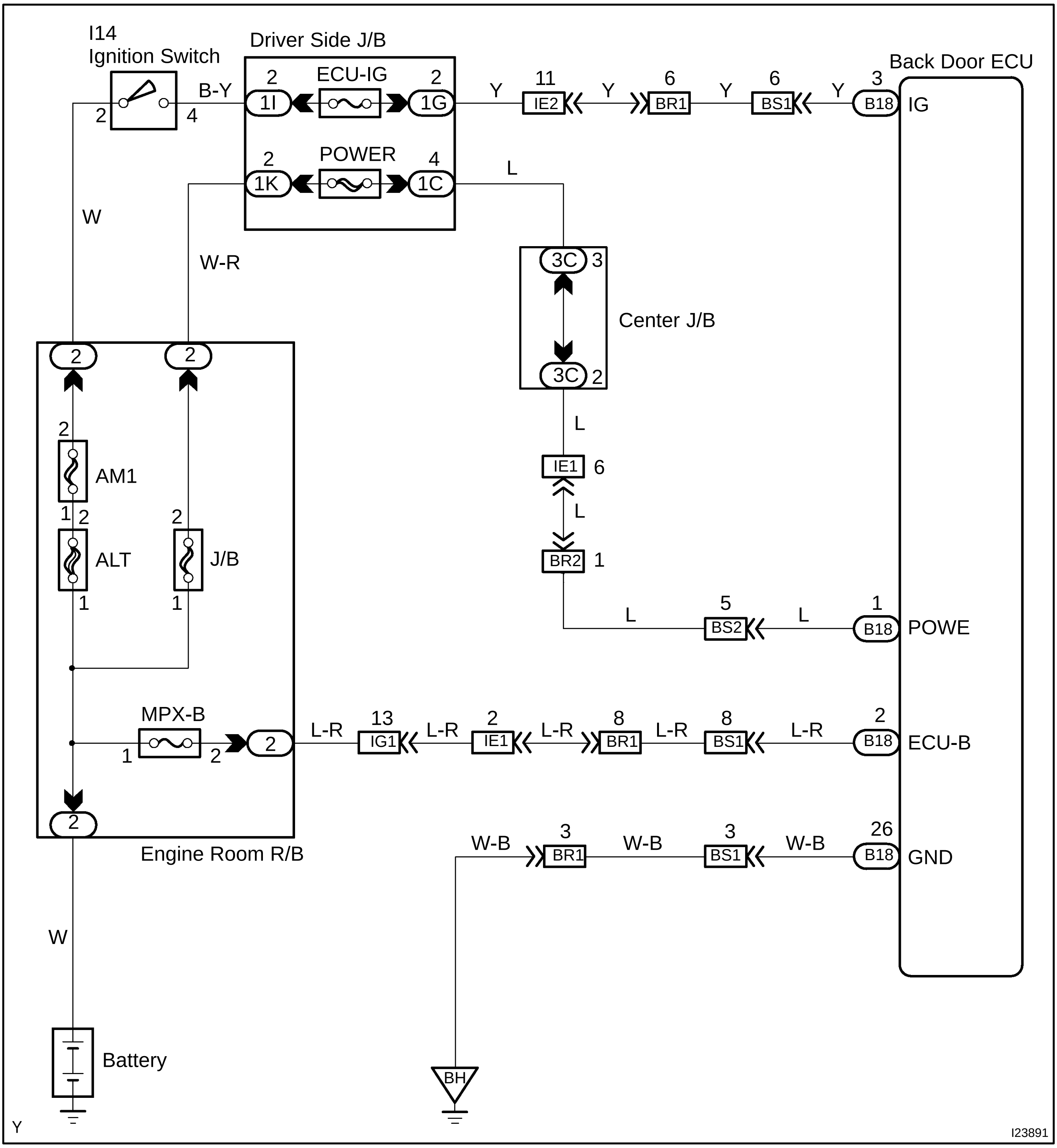
CIRCUIT INSPECTION

Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the back door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check POWER and JCB M-fuses, and MPX-B and ECU-IG fuses.**

CHECK:
Check the continuity of the POWER and JCB M-fuses, and MPX-B and ECU-IG fuse.
OK:
Continuity

NG → **Replace failure fuse.**

OK

2	**Check voltage between terminals POWE/ECU-B/IG and GND of back door ECU connector.**

PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals IG and GND.
OK:
Voltage: 10 - 14 V
PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the back door ECU connector.
CHECK:
Measure the voltage between terminals POWE/ECU-B and GND.
OK:
Voltage: 10 - 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).**

NG

3	**Check harness and connector between back door ECU and body ground (See page IN-28).**

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

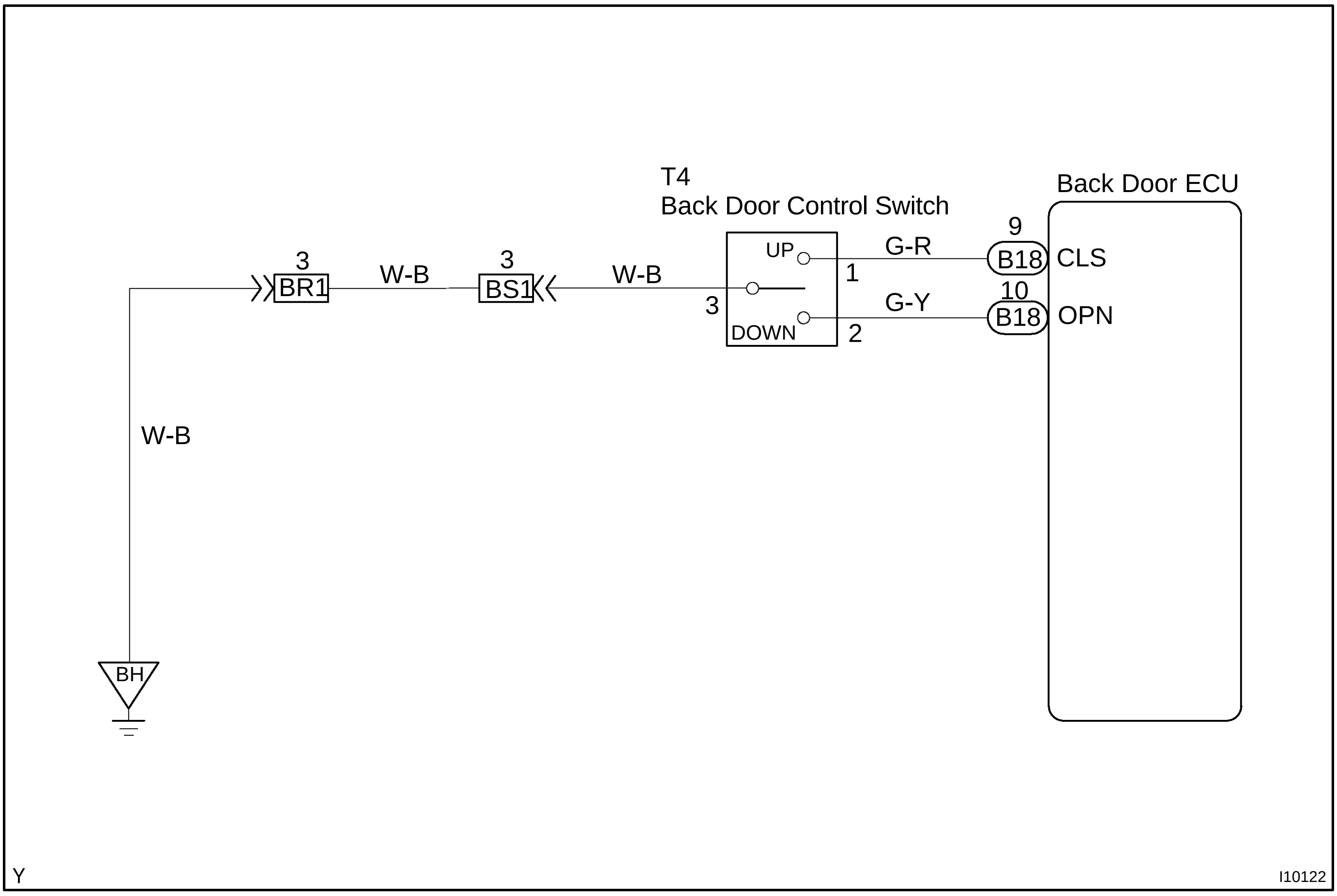
OK

Check and repair harness and connector between back door ECU and battery.

DI57J-03

Back Door Control Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check back door control switch (See page BE-65).**

NG → **Replace back door control switch.**

OK

2	**Check harness and connector between back door control switch and back door ECU.**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

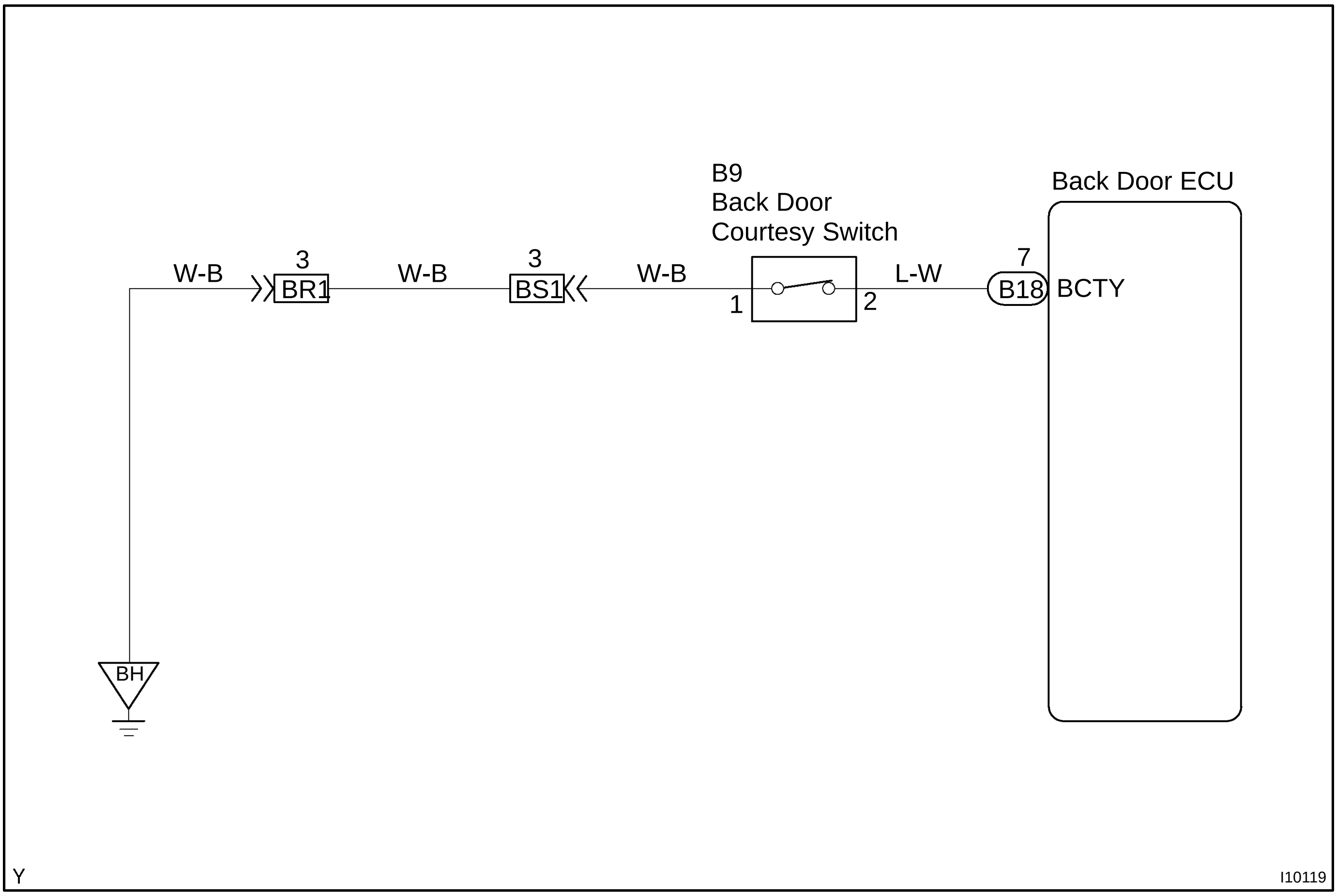
DI57K-03

Back Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The back door courtesy switch is built in the back door lock.
This switch goes on when the back door is opened and goes off when back door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check back door courtesy switch (See page BE-26).**

NG → **Replace back door courtesy.**

OK

2	**Check harness and connector between back door courtesy switch and back door ECU (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

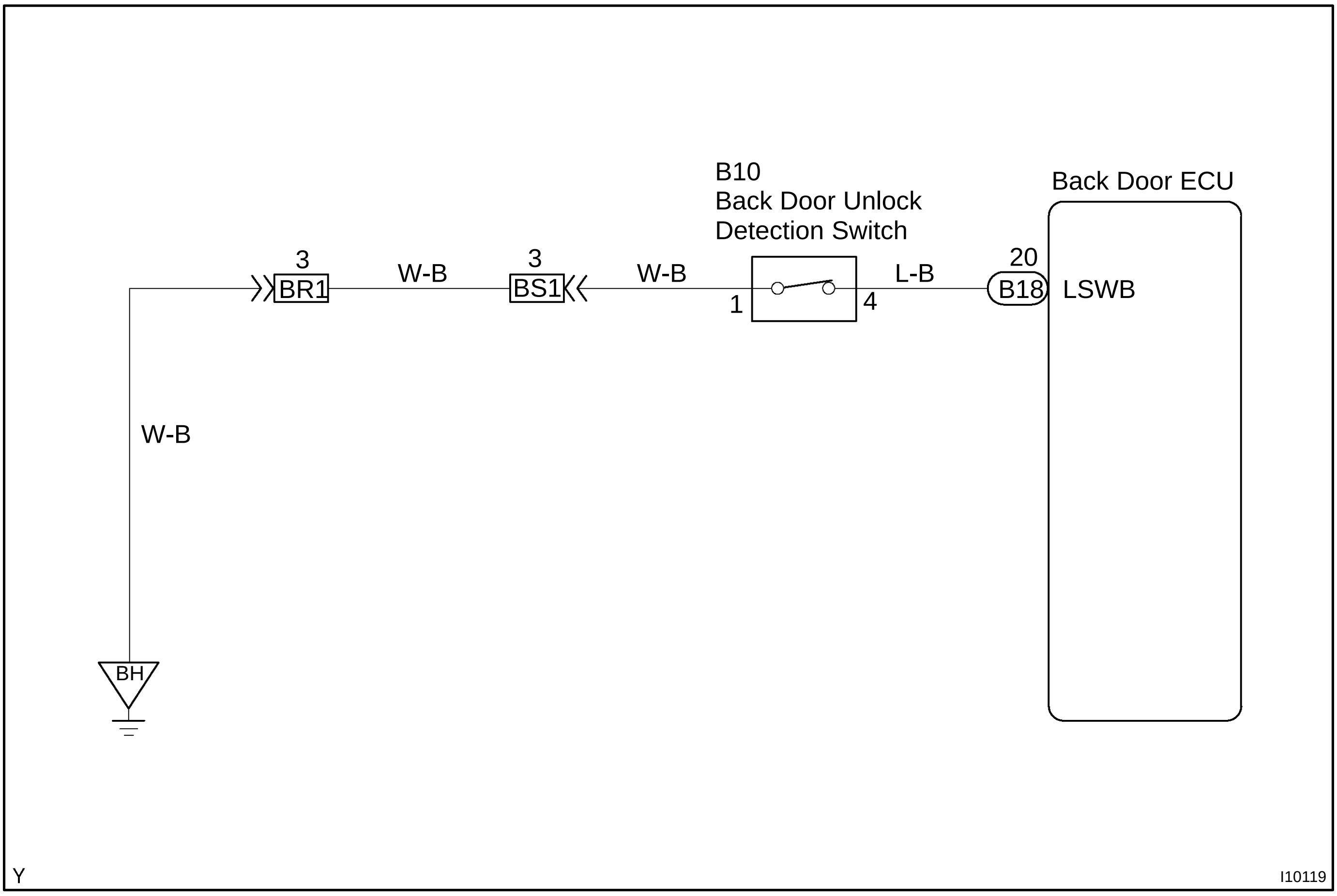
DI57L-05

Back Door Unlock Detection Switch Circuit (w/ Theft Deterrent System)

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 theft deterrent system.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check back door unlock detection switch (See page BE-76).**

NG → **Replace door lock motor.**

OK

2	**Check harness and connector between door unlock detection switch and back door ECU (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

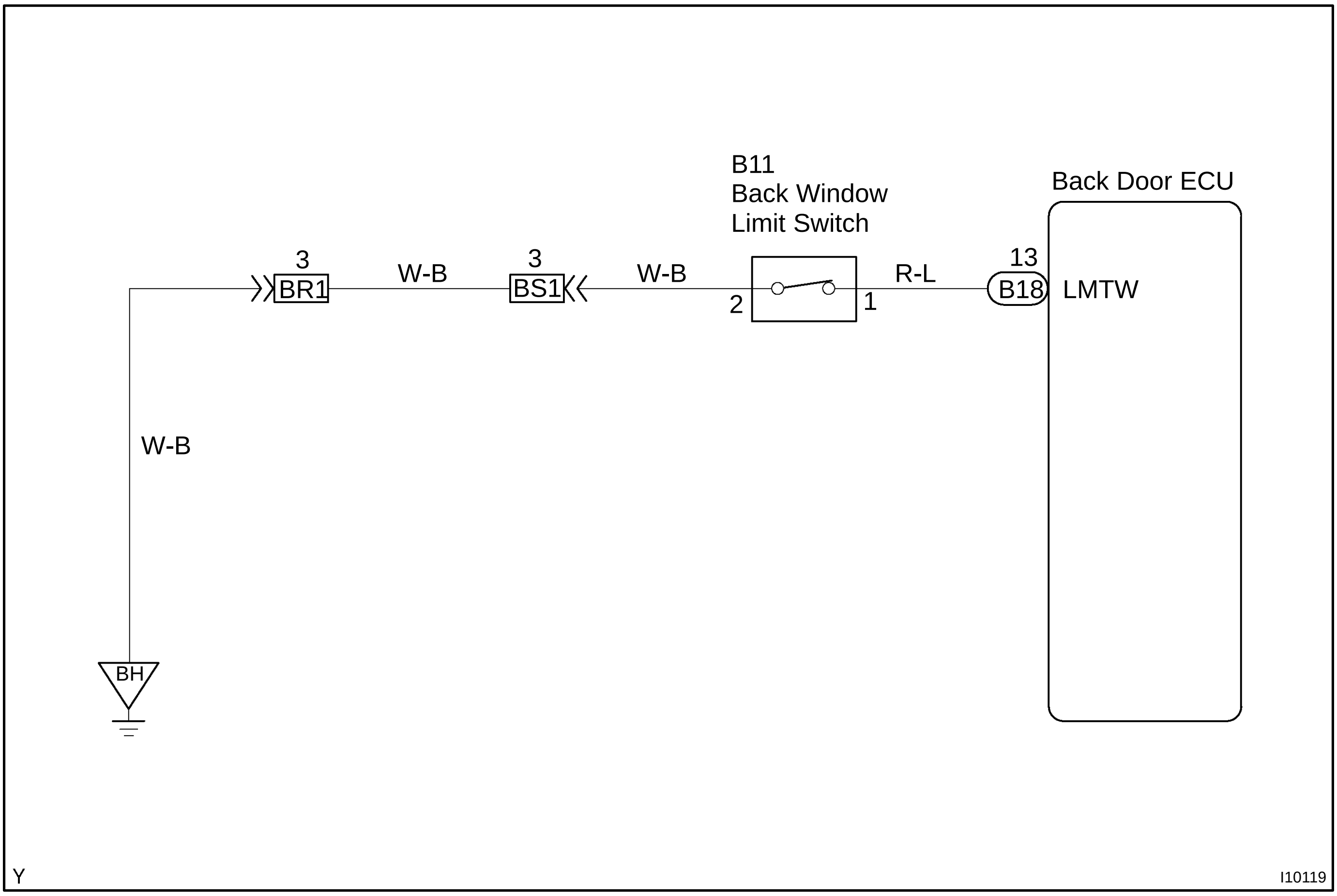
DI57M-04

Window Limit Switch Circuit

CIRCUIT DESCRIPTION

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 window limit switch (See page BE-65).**

NG → **Replace window limit switch.**

OK

2	**Check harness and connector between window limit switch and back door ECU (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

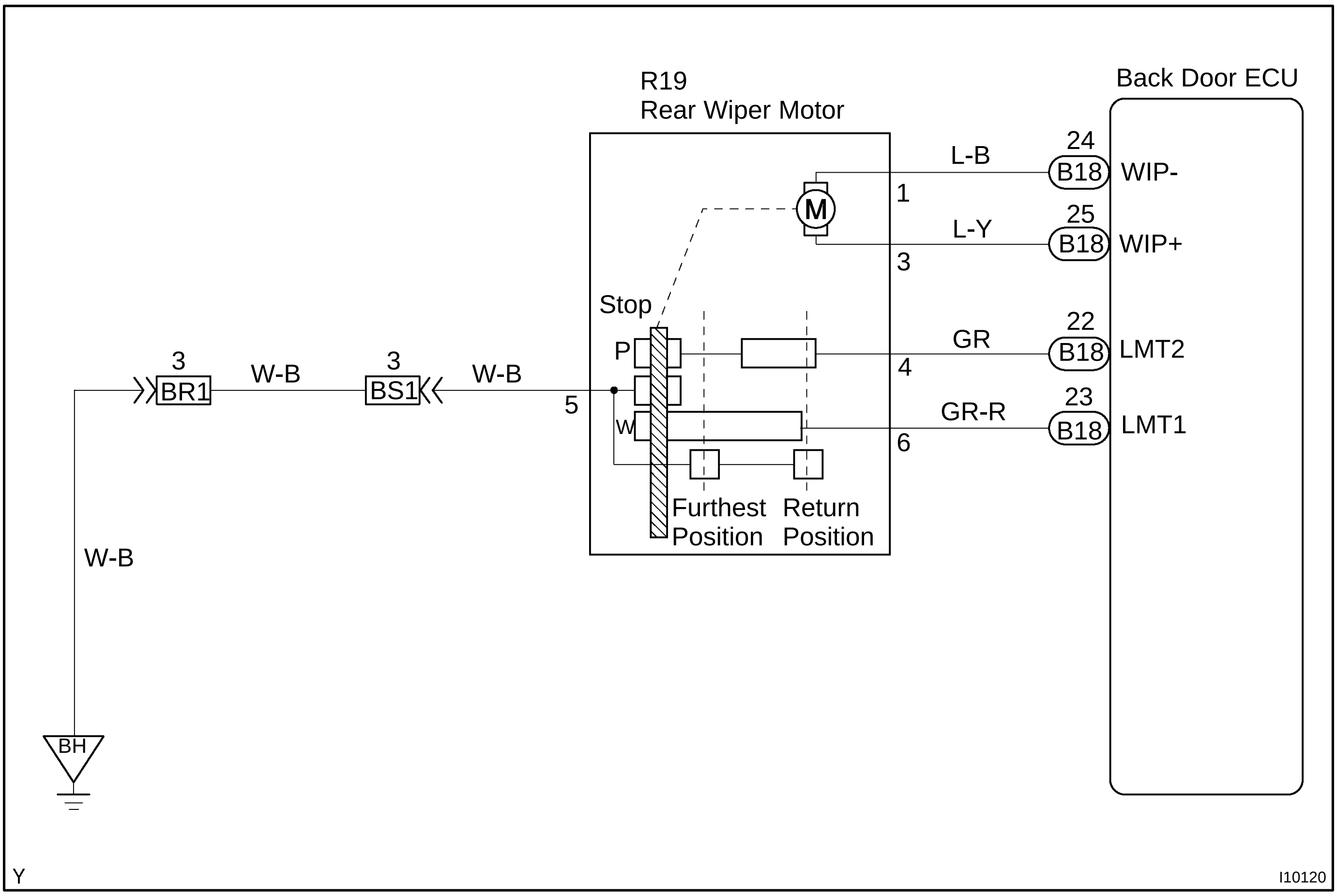
DI57N-03

Rear Wiper Limit Switch Circuit

CIRCUIT DESCRIPTION

Rear wiper limit switch is built-in the rear wiper motor. LMT1 switch is ON when the rear wiper arm is in the between stopping and reversing position and OFF when the rear wiper arm is in the except between stopping and reversing position. LMT2 switch is ON when the rear wiper arm is in the except storing position and OFF when the rear wiper arm is in the storing position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check rear wiper motor continuity (See page BE-65).**

NG → **Replace rear wiper motor.**

OK

2	**Check harness and connector between rear wiper motor and back door ECU (See page IN-28).**

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

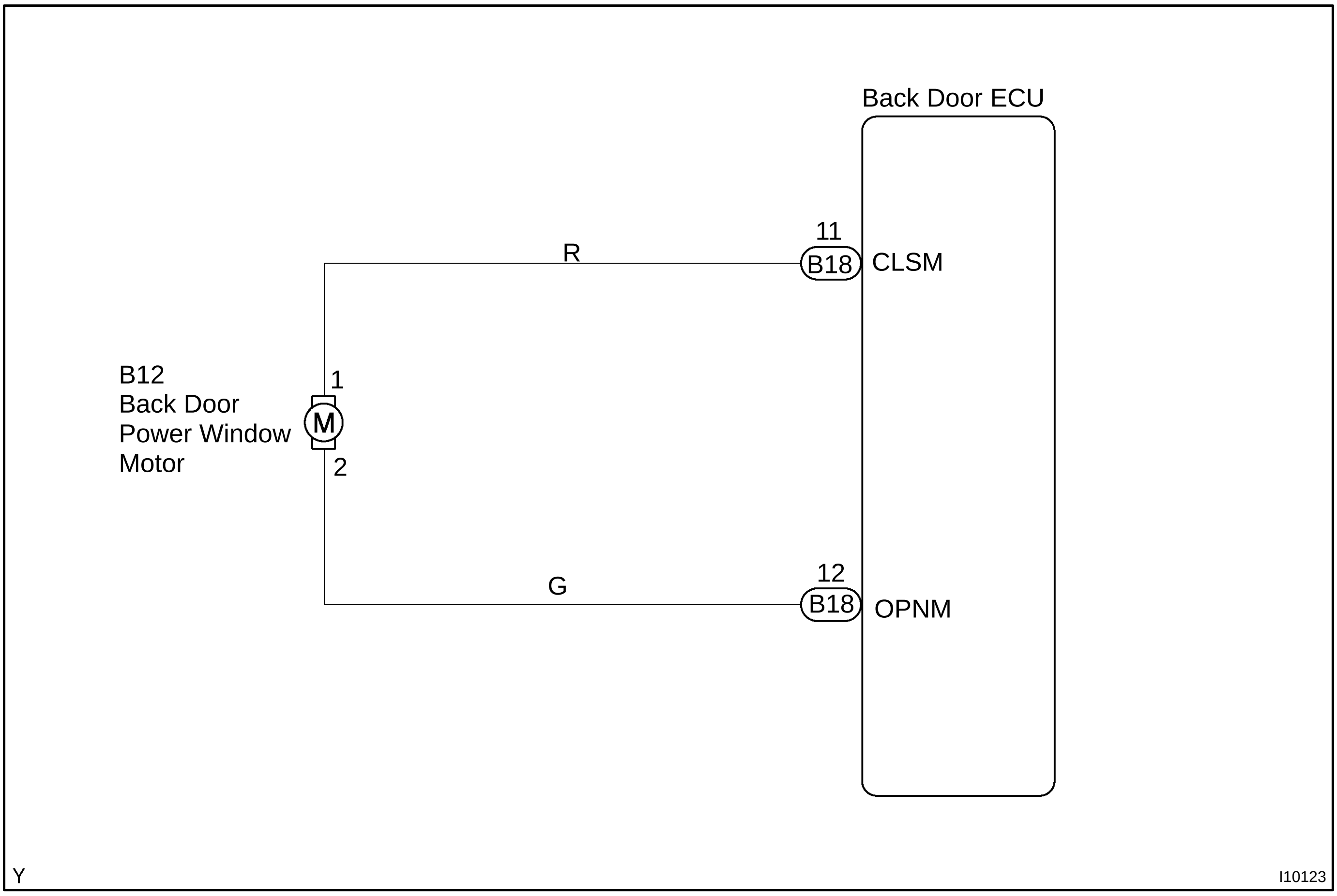
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

DI57O-03

Back Door Power Window Motor Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check back door power window motor (See page BE-65).**

NG → **Replace back door power window motor.**

OK

2	**Check harness and connector between back door power window motor and back door ECU (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

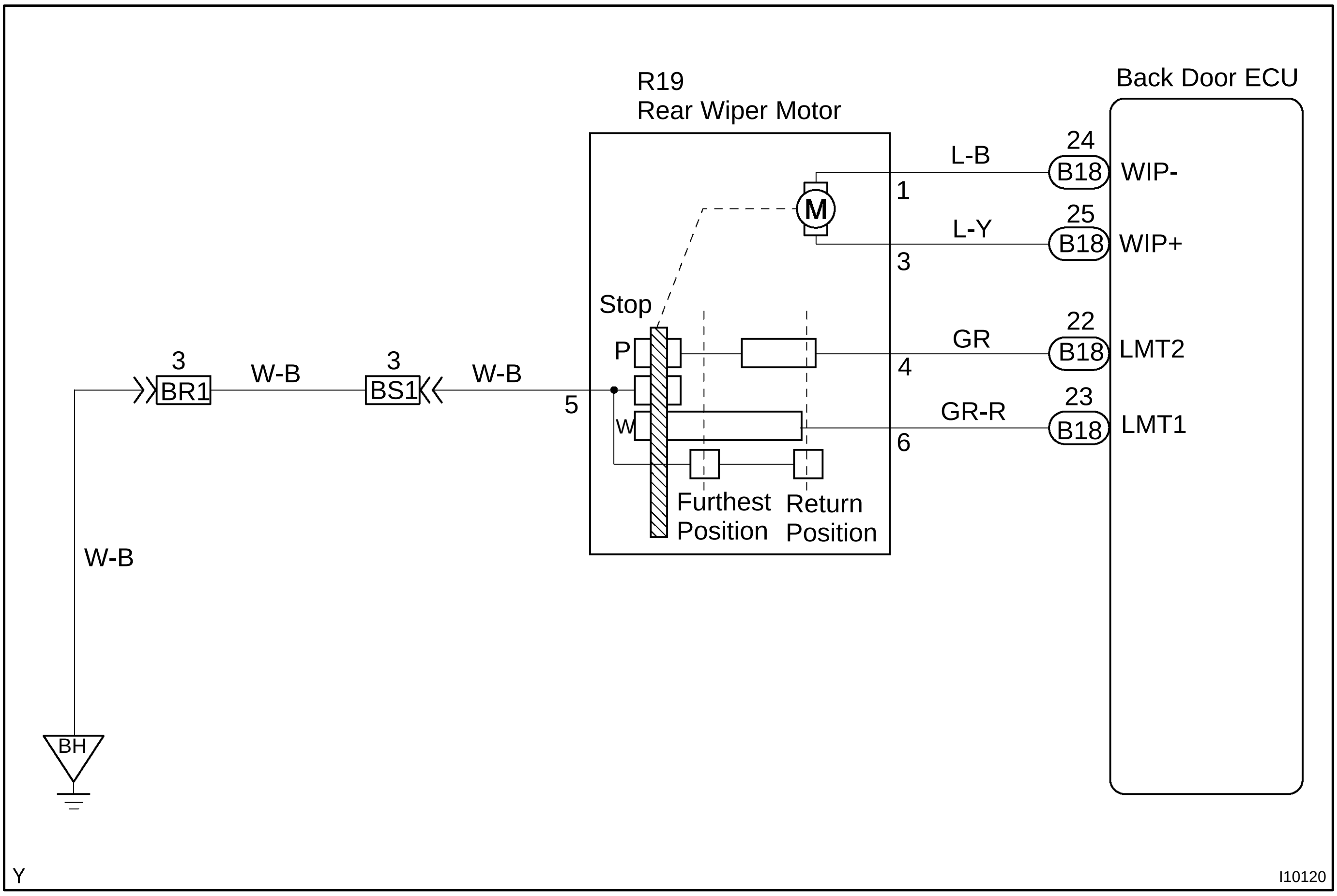
DI57P-05

Rear Wiper Motor Circuit

CIRCUIT DESCRIPTION

Wiper motor is controlled by the back door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper motor (See page BE-34).

NG — Replace rear wiper motor.

OK

2	Check harness and connector between wiper motor and back door ECU (See page IN-28).

NG — Repair or replace harness or connector.

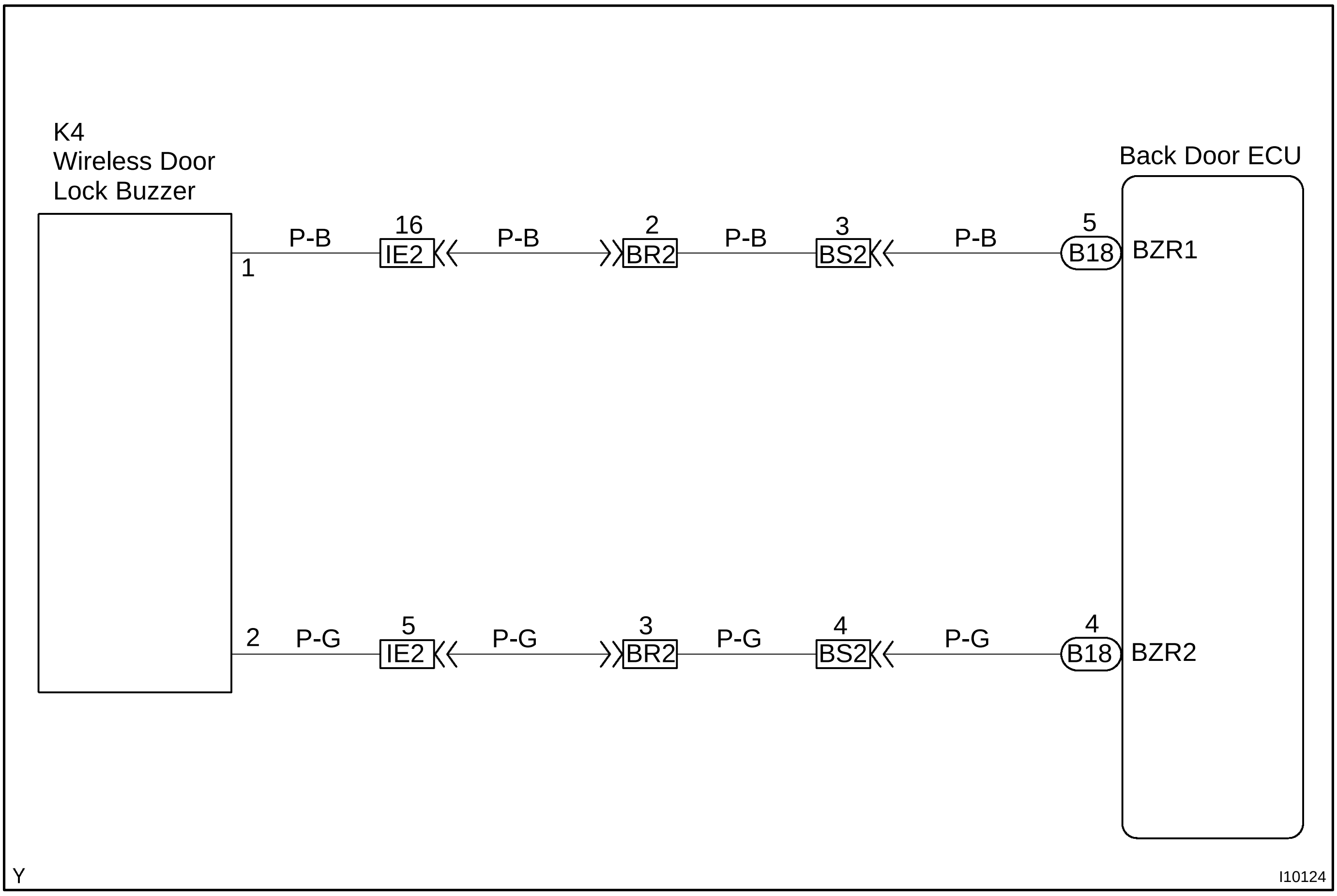
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

DI57Q-02

Wireless Door Lock Buzzer Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wireless door lock buzzer (See page BE-93).**

NG → **Replace wireless door lock buzzer.**

OK

2	**Check harness and connector between wireless door lock buzzer and back door ECU (See page IN-28).**

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

OK

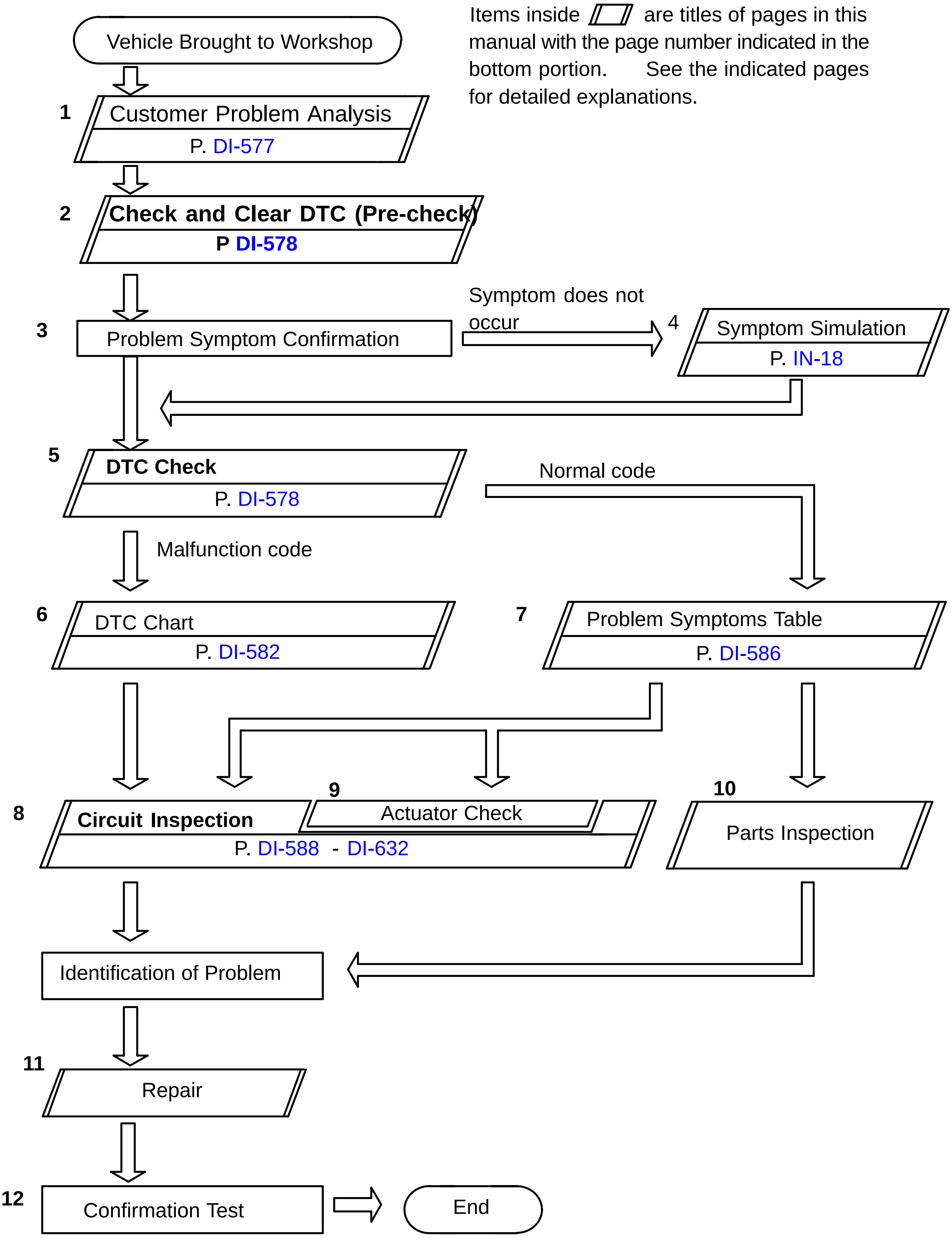
Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

AIR CONDITIONING SYSTEM

DI3VS-09

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



DI3VT-02

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

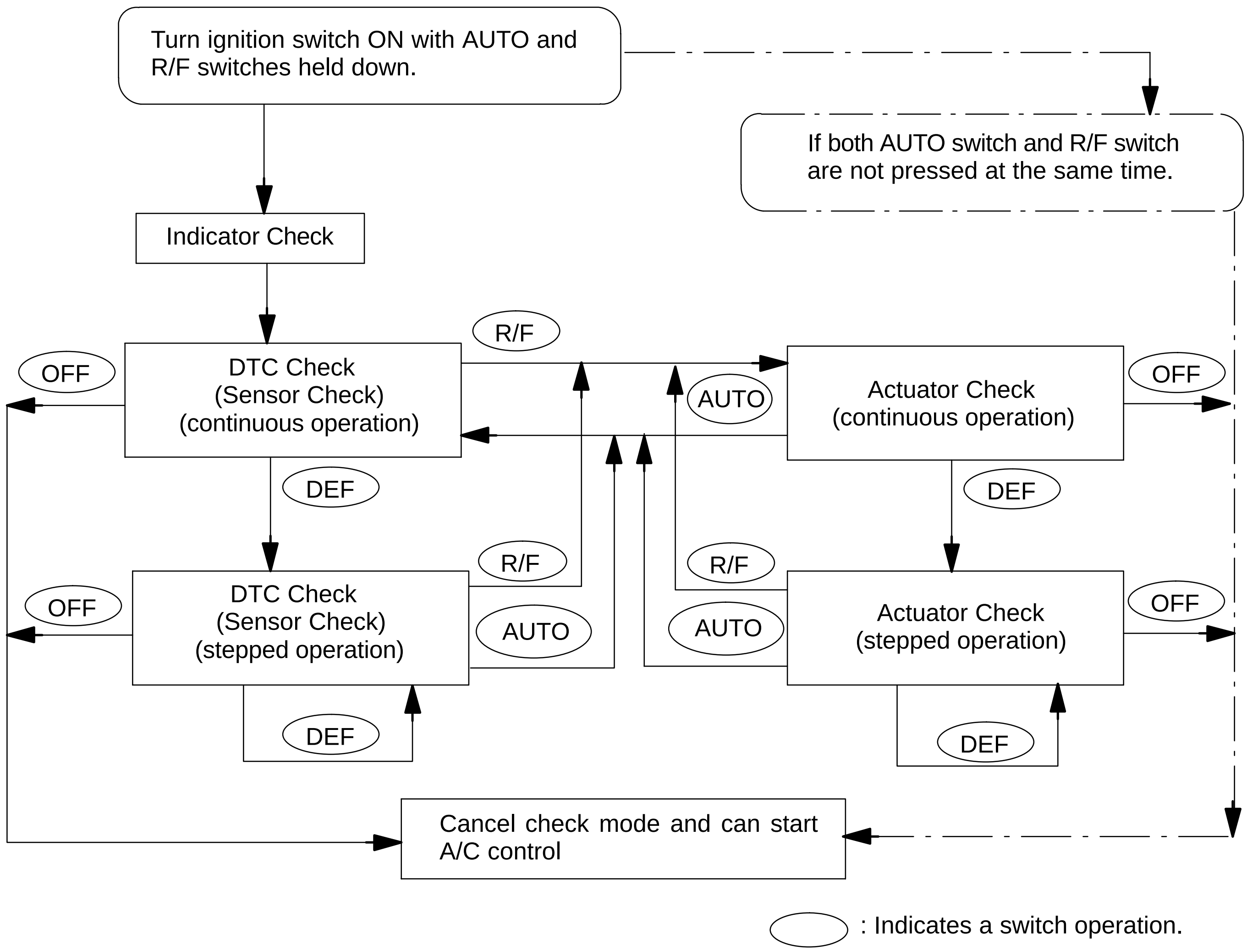
DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

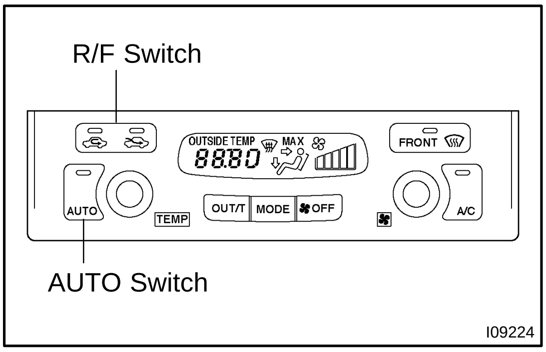
DI5CD-01

PRE-CHECK

1. LIST OF OPERATION METHODS

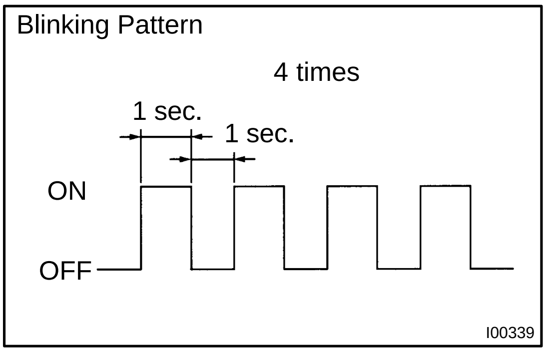
By operating each of the A/C control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.





2. INDICATOR CHECK

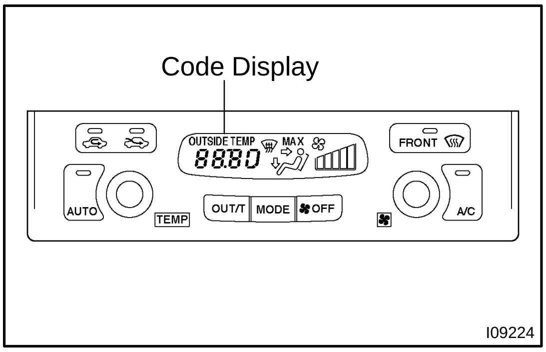
(a) Turn the ignition switch to ON while pressing the air conditioning control AUTO switch and R/F switch simultaneously.



(b) Check that all the indicators light up and go off at 1 second intervals 4 times in succession.

HINT:

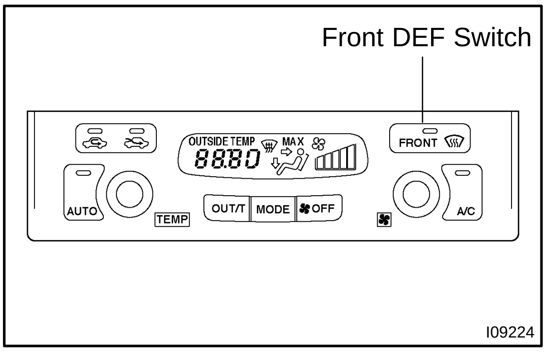
- After the indicator check is ended, the system enters the DTC begins automatically.
- Press the OFF switch when desiring to cancel the check mode.



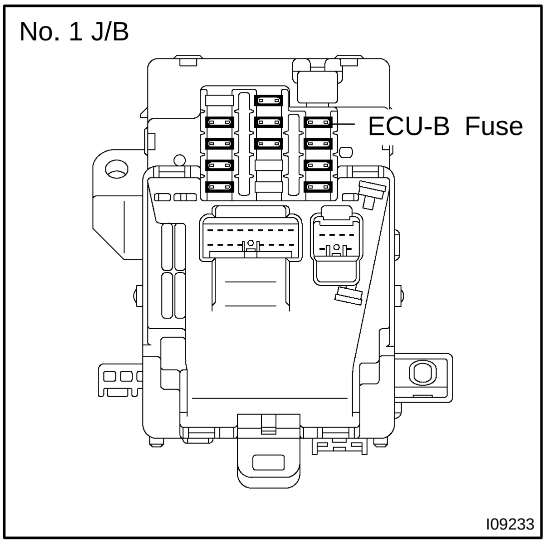
3. DTC CHECK (SENSOR CHECK)

(a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.

(b) Read the code displayed on the panel. Refer to the list of DTCs on page DI-582 when reading the DTCs. (DTCs are output at the temperature display).



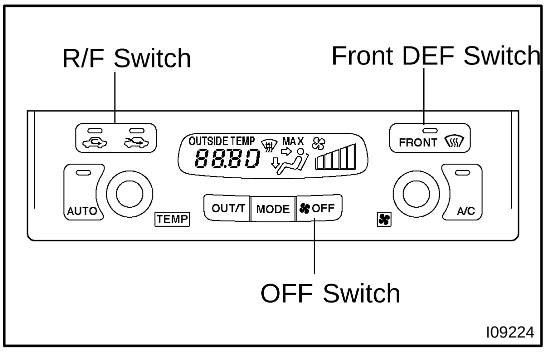
(c) If the slower display is desired, press the front DEF switch and change it to stepped operation. Each time the front DEF switch is pressed, the display changes by 1 step.



4. CLEARING DTC

(a) Pull out the ECU-B fuse in No. 1 J/B for 10 sec., or longer to clear the DTC memory.

(b) After reinserting the fuse, check that the normal code is output.



5. ACTUATOR CHECK

(a) After entering the DTC check mode (Sensor Check Mode) press the R/F switch.

(b) Since each damper, motor and relay automatically operates at 1 second intervals beginning in order from 10 in the temperature display, check the temperature and air flow visually and by hand.

If a slower display is desired, press the FRONT DEF switch and change it to a stepped operation. Each time the FRONT DEF switch is pressed, the display changes by 1 step.

HINT:

- Code are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the Off switch.

Step No.	Display code	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnetic clutch	Air mix damper
1	0	OFF	FACE	FRESH	OFF	Cool side (0 % open)
2	1	1	FACE	FRESH	OFF	Cool side (0 % open)
3	2	16	FACE	FRESH	ON	Cool side (0 % open)
4	3	16	FACE	FRS/REC	ON	Cool side (0 % open)
5	4	16	FACE	RECIRC	ON	Cool / Hot (50 % open)
6	5	16	BI-LEVEL	RECIRC	ON	Cool / Hot (50 % open)
7	6	16	FOOT	RECIRC	ON	Hot side (100 % open)
8	7	16	FOOT	RECIRC	ON	Hot side (100 % open)
9	8	16	FOOT/DEF	RECIRC	ON	Hot side (100 % open)
10	9	31	DEF	RECIRC	ON	Hot side (100 % open)

DI3VV-06

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check (sensor check), check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

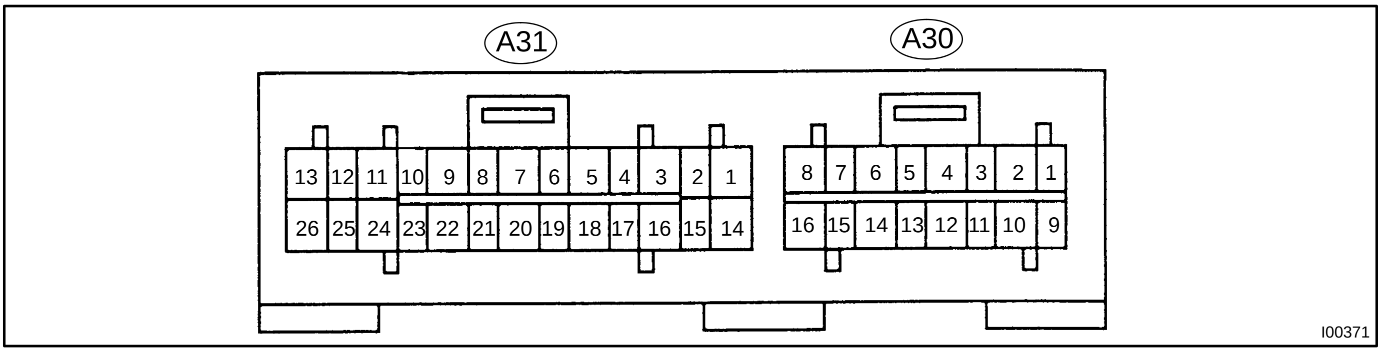
DTC No. (See Page)	Detection Item	Trouble Area	Memory
00	Normal	-	-
11*1 (DI-588)	Room temperature sensor circuit	• Room temp. Sensor • A/C control assembly • Harness or connector between room temp. sensor and A/C control assembly	○ (8.5 min. or more)
12*2 (DI-591)	Ambient temperature sensor circuit	• Ambient temp. Sensor • Harness or connector between ambient temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
13 (DI-594)	Evaporator temperature sensor circuit	• Evaporator temp. Sensor • Harness or connector between evaporator temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
14 (DI-597)	Engine coolant temperature sensor circuit	• Engine coolant temp. sensor • Harness or connector between engine coolant temp. sensor and A/C control assembly • A/C control assembly	-
21*3 (DI-600)	Solar sensor circuit (short)	• Solar sensor • Harness or connector between solar sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
	Solar sensor circuit (open)		-
23 (DI-603)	Pressure switch circuit	• Pressure switch • Harness or connector between pressure switch and A/C control assembly • Refrigerant pipe line • A/C control assembly	-
31 (DI-606)	Air mix damper position sensor circuit	• Air mix damper position sensor • A/C control assembly • Harness or connector between air mix damper position sensor and A/C control assembly	○ (1 min. or more)
32 (DI-609)	Air inlet damper position sensor circuit	• Air inlet damper position sensor • A/C control assembly • Harness or connector between air inlet damper position sensor and A/C control assembly	○ (1 min. or more)
41 (DI-606, DI-612)	Air mix control servomotor	• Air mix control servomotor • Air mix damper position sensor • Harness or connector between air mix damper servomotor and A/C control assembly • A/C control assembly	○ (15 sec.)
42 (DI-609, DI-616)	Air inlet control servomotor	• Air inlet control servomotor • Air inlet damper position sensor • Harness or connector between air inlet damper servomotor and A/C control assembly • A/C control assembly	○ (15 sec.)

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.
- The A/C control assembly memorizes the DTC of the respective malfunction it has occurred for the period of the time indicated in the brackets.

DI3VW-08

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TAM (A30 - 3) - SG (A31 - 1)	B-L - GR	IG ON. Ambient temp.: 25 °C (77 °F)	1.35 - 1.75 V
		IG ON. Ambient temp.: 40 °C (104 °F)	0.85 - 1.25 V
TR (A30 - 4) - SG (A31 - 1)	B-Y - GR	IG ON. Room temp.: 25 °C (77 °F)	1.8 - 2.2 V
		IG ON. Room temp.: 40 °C (104 °F)	1.2 - 1.6 V
TS (A30 - 5) - SG (A31 - 1)	P - GR	IG ON. Sensor subjected to electrical light.	1.0 V or more
		IG ON. Sensor covered by cloth	Below 1.0 V
TE (A30 - 6) - SG (A31 - 1)	W-R - GR	IG ON. Evaporator temp.: 0 °C (32 °F)	2.0 - 2.4 V
		IG ON. Evaporator temp.: 15 °C (59 °F)	1.4 - 1.8 V
TPI (A30 - 7) - SG (A31 - 1)	V - GR	IG ON. Push REC switch	3.5 - 4.5 V
		IG ON. Push FRS switch	0.5 - 1.8 V
TP (A30 - 8) - SG (A31 - 1)	B - GR	Set temp.: Max. Cool	3.5 - 4.5 V
		Set temp.: Max. Hot	0.5 - 1.8 V
PSW(A30-9) - GND (A31-14)	O - W-B	IG ON.	Below 1.0 V
		IG ON. Disconnect the pressure switch connector.	10 - 14 V
ACT (A30-10) - GND (A31-14)	L-B - W-B	Start the Engine (Idling). Operate the compressor	10 - 14 V
		Start the Engine (Idling). Do not operate compressor	Below 1.5 V
VER1 (A30-11) - GND (A31-14)	W-B - W-B	IG ON.	Below 1.0 V
AC1 (A30-13) - GND (A31-14)	L-Y - W-B	Start the engine, AUTO switch ON and magnetic clutch ON.	Below 1.0 V
		Start the engine, AUTO switch ON and magnetic clutch OFF.	10 - 14 V
BLW (A30-16) - GND (A31-14)	R-W - W-B	IG ON. Operate the blower motor	Below 1.5 V
SG (A31-1) - Body Ground	GR - Body Ground	Always	1 Ω or less
FACE (A31-4) - GND (A31-14)	G-B - W-B	IG ON. Air Flow: FACE	Below 1.0 V
AIF (A31-6) - AIR - (A31-7)	Y-G - R-G	IG ON.	No voltage
AMC (A31-8) - AMH (A31-9)	W - R	IG ON.	13 - 19 Ω
HR (A31-10) - GND (A31-14)	Y-R - W-B	IG ON. Operate the blower motor	Below 1.0 V
		IG ON. Do not operate the blower motor	10 - 14 V
S5 (A31-11) - SG (A31-1)	Y - GR	IG ON.	4 - 6 V
S5 (A31-11) - TS (A30-5)	Y - P	IG ON. Solar sensor subjected to electrical light.	Below 4.0 V
		IG ON. Solar sensor covered by a cloth.	4.0 - 4.5 V
B (A31-13) - GND (A31-14)	L-R - W-B	IG OFF.	10 - 14 V
GND (A31-14) - Body Ground	W-B - Body Ground	Always	1 Ω or less
SPD (A31-15) - GND (A31-14)	G-O - W-B	Turn propeller shaft slowly	Pulse

B/L (A31-17) - GND (A31-14)	G-W - W-B	IG ON. Air Flow: BI-LEVEL.	Below 1.0 V
FOOT (A31-18) - GND (A31-14)	R-L - W-B	IG ON. Air Flow: FOOT.	Below 1.0 V
F/D (A31-19) - GND (A31-14)	P-B - W-B	IG ON. Air Flow: FOOT/DEF	Below 1.0 V
DEF (A31-20) - GND (A31-14)	Y-B - W-B	IG ON. Air Flow: DEF	Below 1.0 V
FR (A31-23) - GND (A31-14)	R-Y - W-B	IG ON. Operate blower motor	Below 1.0 V
		IG ON. Do not operate blower motor	10 - 14 V
IG+ (A31-26) - GND (A31-14)	B-Y - W-B	IG ON.	10 - 14 V

DI3VX-02

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate.	3. IG power source circuit 4. A/C control assembly	DI-622 IN-28
Air Flow Control: No blower operation	1. Heater main relay circuit 2. Blower motor circuit 3. Engine coolant temperature sensor circuit 4. IG power source circuit 5. A/C control assembly	DI-627 DI-630 DI-597 DI-622 IN-28
Air Flow Control: No blower control	1. Blower motor circuit 2. IG power source circuit 3. Heater main relay circuit	DI-630 DI-622 DI-627
Air Flow Control: Insufficient air out	1. Blower motor circuit	DI-630
Temperature Control: No cool air comes out	1. Volume of refrigerant 2. Drive belt tension 3. Inspect refrigeration system with manifold gauge set 4. Compressor circuit 5. Pressure switch circuit 6. Air mix control servomotor circuit 7. Air mix damper position sensor circuit 8. Room temp. sensor circuit 9. Ambient temp. sensor circuit 10.A/C control assembly	AC-3 AC-16 AC-3 DI-632 DI-603 DI-612 DI-606 DI-588 DI-591 IN-28
Temperature Control: No warm air comes out	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. Ambient temp. sensor circuit 4. Room temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C control assembly 7. Heater radiator (in heater unit)	DI-612 DI-606 DI-591 DI-588 DI-594 IN-28 AC-34
Temperature Control: Output air is warmer or cooler than the set temperature or response is slow.	1. Volume of refrigerant 2. Drive belt tension 3. Inspect refrigeration system with manifold gauge set 4. Ambient temp. sensor circuit 5. Evaporator temp. sensor circuit 6. Solar sensor circuit 7. Air mix damper position sensor circuit 8. Engine coolant temp. sensor circuit 9. Air mix control servomotor circuit 10.Compressor 11.Condenser 12.Receiver 13.Evaporator 14.Heater radiator (in heater unit) 15.Expansion valve 16.A/C control assembly	AC-3 AC-16 AC-3 DI-591 DI-594 DI-600 DI-606 DI-597 DI-612 AC-49 AC-60 AC-57 AC-29 AC-34 AC-24 IN-28
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. A/C control assembly	DI-612 DI-606 IN-28
No air outlet control	1. Air outlet control servomotor circuit 2. A/C control assembly	DI-619 IN-28
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C control assembly	DI-632 IN-28

Symptom	Suspect Area	See page
Set temperature value displayed does not match up with operation of temperature control switch.	1. A/C control assembly	IN-28
Brightness does not change when rheostat volume or light control switch is turned.	1. Illumination light system 2. A/C control assembly	BE-15 IN-28
Unable to access the diagnosis mode.	A/C control assembly	IN-28
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back-up power source circuit 2. A/C control assembly	DI-625 IN-28

DI3VY-09

CIRCUIT INSPECTION

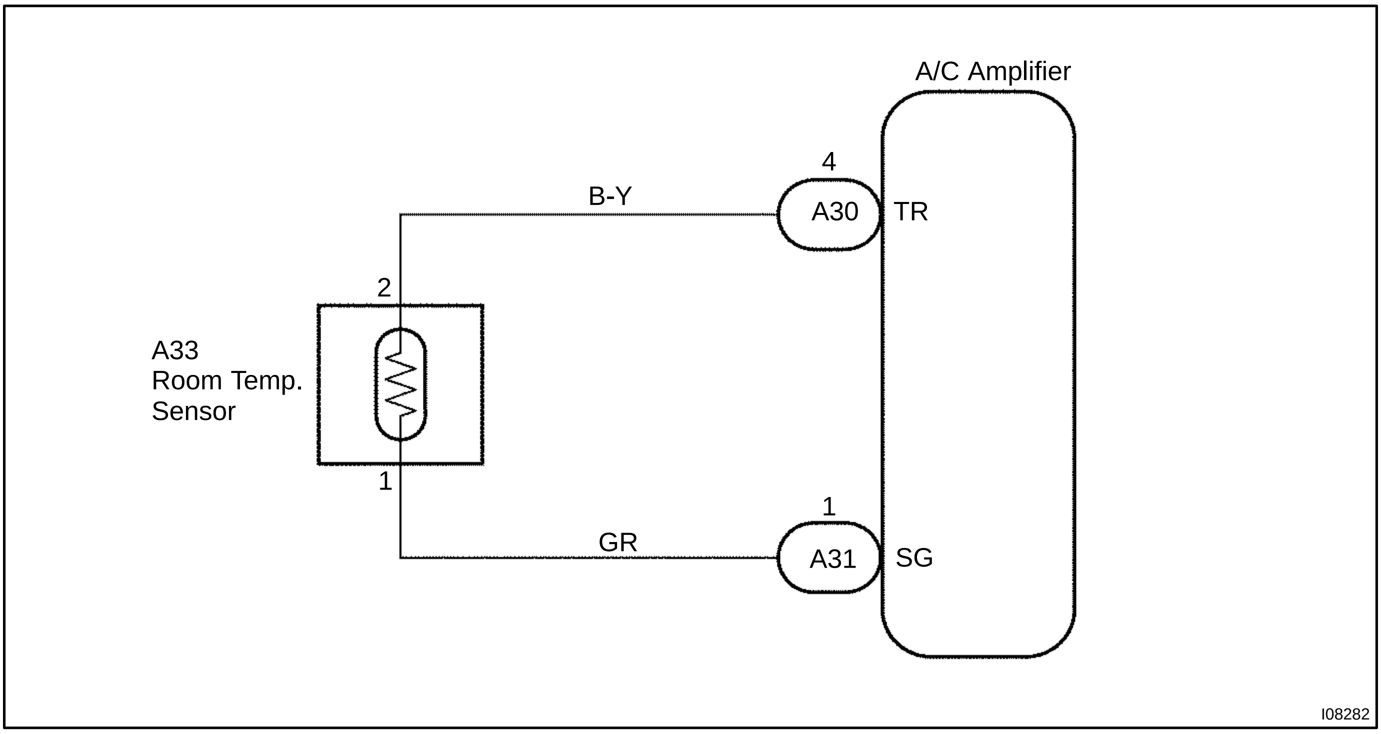
DTC	11	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C control assembly.

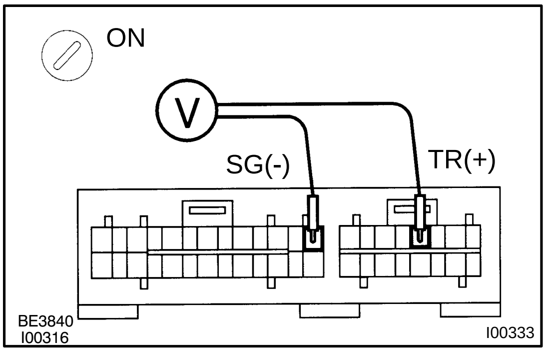
DTC No.	Detection Item	Trouble Area
11	Open or short in room temperature sensor circuit.	• Room temperature sensor • Harness or connector between room temp. sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TR and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Check voltage between terminals TR and SG of A/C control assembly 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:

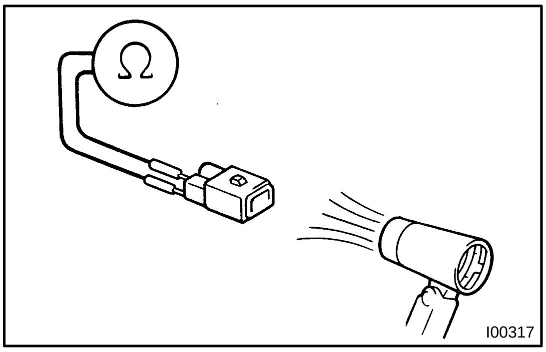
As the temperature increases, the voltage decreases.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 11 is displayed, check and replace A/C control assembly.

2	Check room temperature sensor.



PREPARATION:

(a) Remove room temperature sensor from lower No. 1 panel (See page AC-74).

(b) Disconnect room temperature sensor connector.

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 control assembly and room temperature sensor (See page IN-28).**

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

OK

Check and replace A/C control assembly.

DI3VZ-10

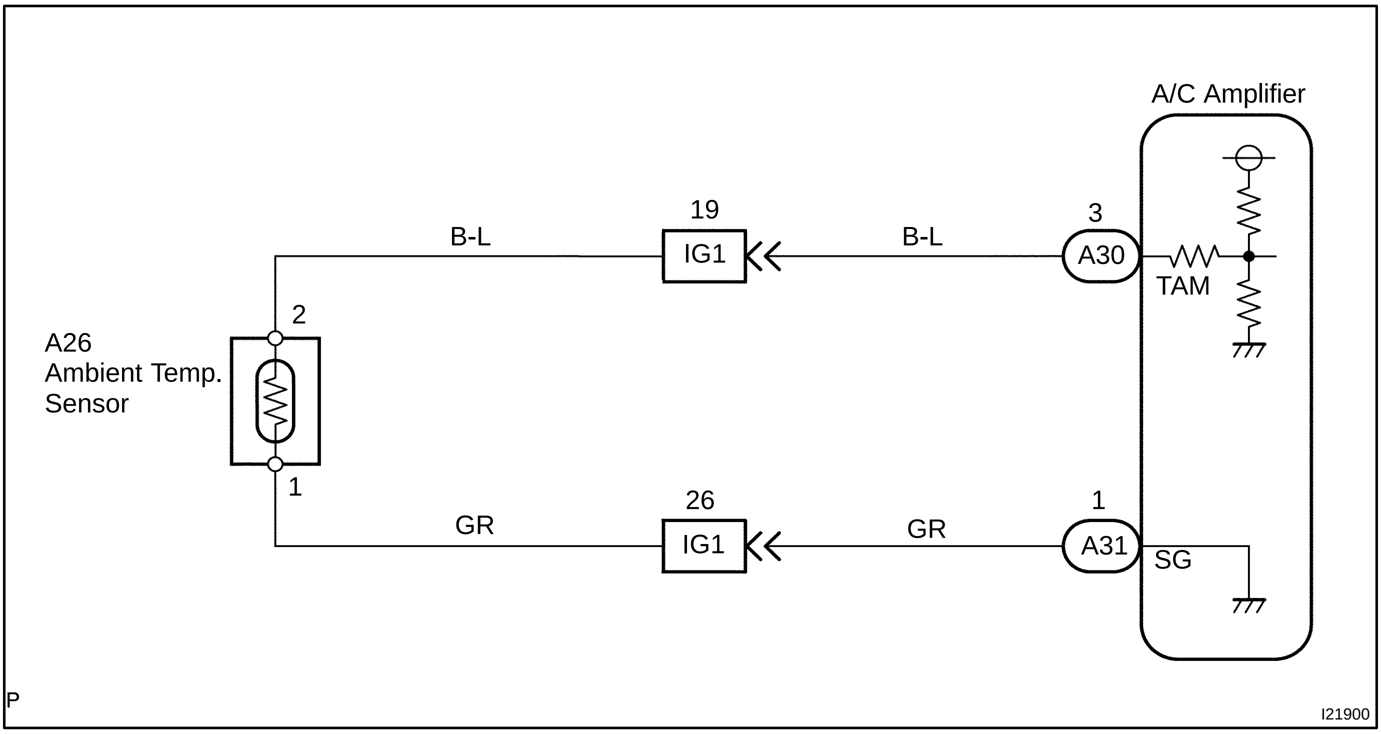
DTC	12	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C control assembly.

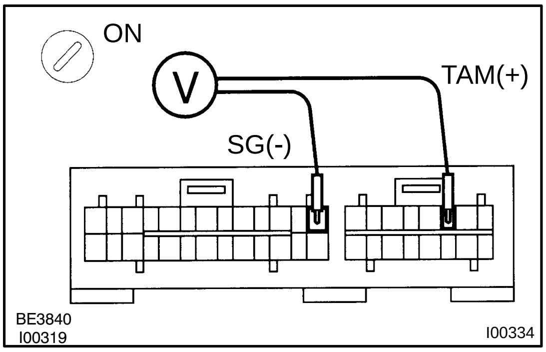
DTC No.	Detection Item	Trouble Area
12	Open or short in ambient temperature sensor circuit.	• Ambient temperature sensor • Harness or connector between ambient temperature sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TAM and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Check voltage between terminals TAM and SG of A/C control assembly 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

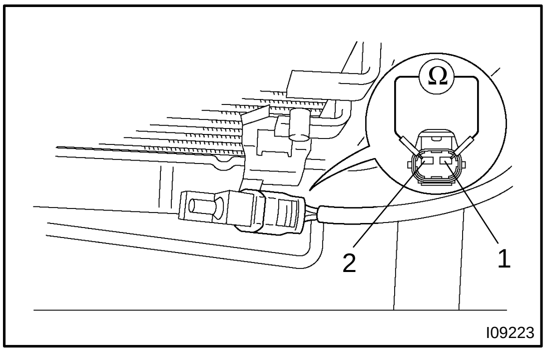
HINT:
As the temperature increases, the voltage decreases.

NG	**Go to step 2.**

OK

Proceed to the next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 12 is displayed, check and replace A/C control assembly.

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 increase, the resistance decrease.

NG	**Replace ambient temperature sensor.**

OK

3	Check harness and connector between A/C control assembly and ambient temperature sensor (See page IN-28).

NG → Repair or replace harness or connector.

OK ↓

Check and replace A/C control assembly.

DI3W0-10

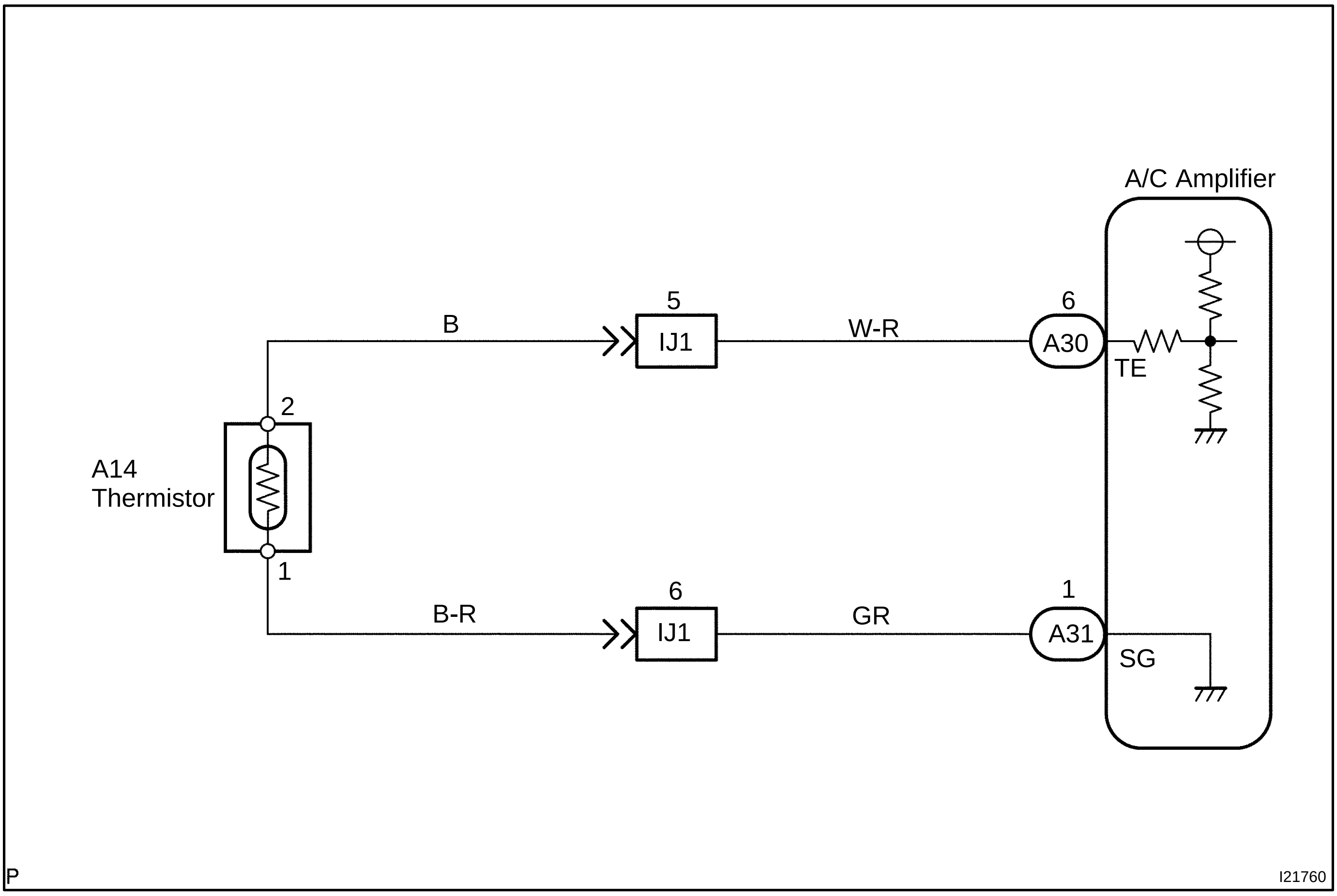
DTC	13	Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the A/C unit and sends the appropriate signals to the A/C control assembly.

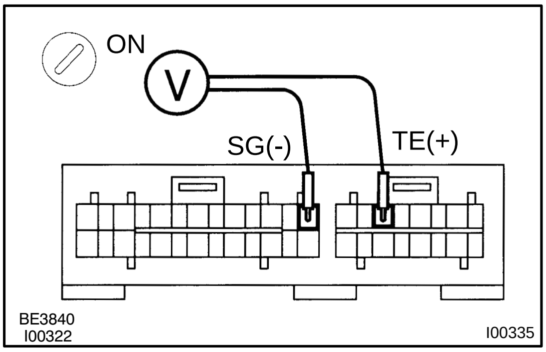
DTC No.	Detection Item	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	• Evaporator temperature sensor • Harness or connector between evaporator temperature sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TE and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals TE and SG of A/C control assembly connector at each temperature.

OK:

Voltage
at 0 °C (32 °F) : 2.0 - 2.4 V
at 15 °C (59 °F) : 1.4 - 1.8 V

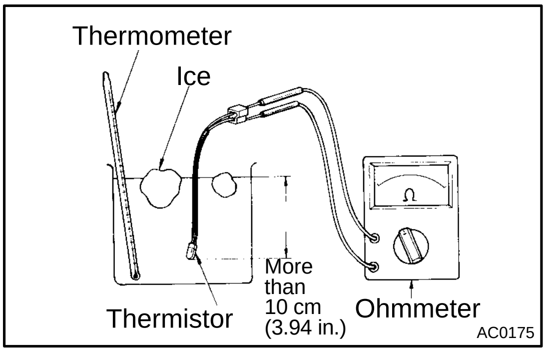
HINT:
As the temperature increases, the voltage decreases.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 13 is displayed, check and replace A/C control assembly.

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 resistance decreases.

NG	Replace evaporator temperature sensor.

OK

3	Check harness and connector between A/C control assembly and evaporator temperature sensor (See page IN-28).

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

OK ↓

Check and replace A/C control assembly.

DI5CE-02

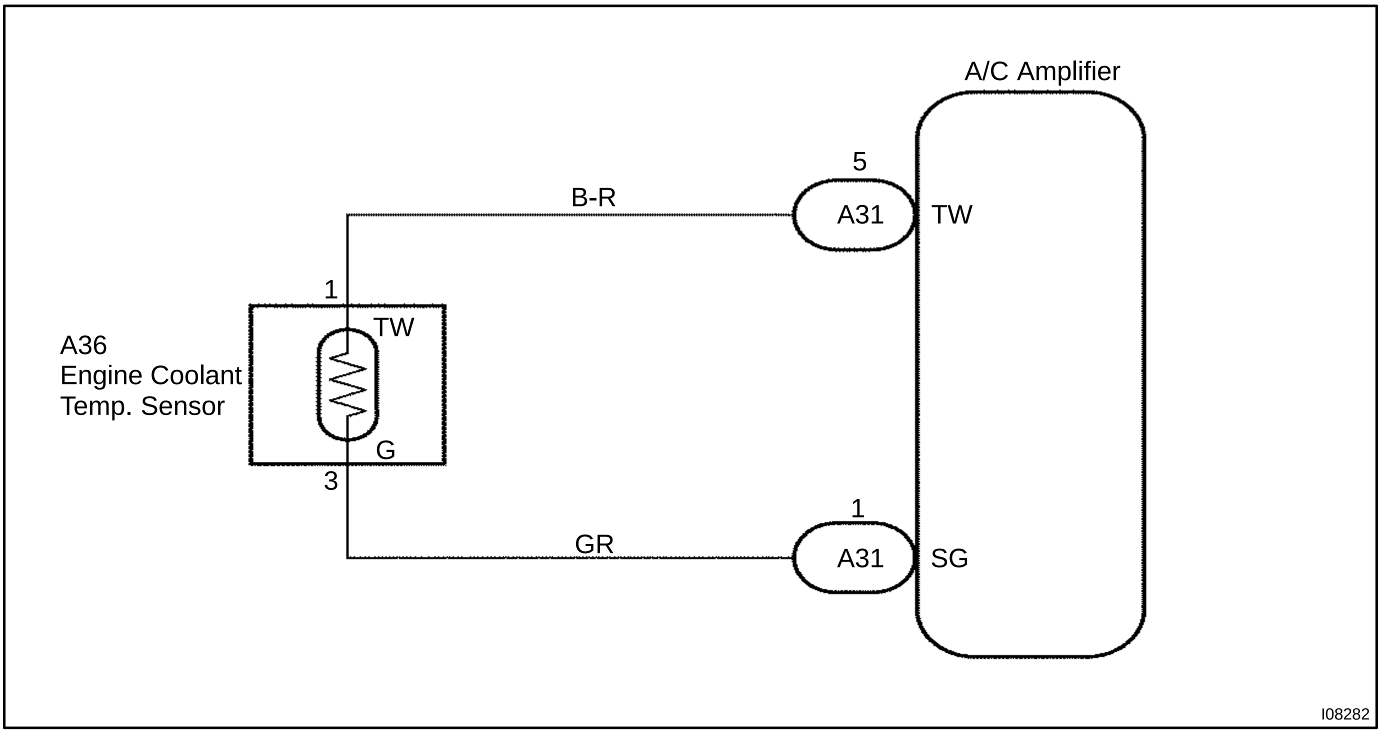
DTC	14	Engine Coolant Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the engine coolant temperature and sends the appropriate signals to the A/C control assembly. These signals are used for warm up control when the engine is cold.

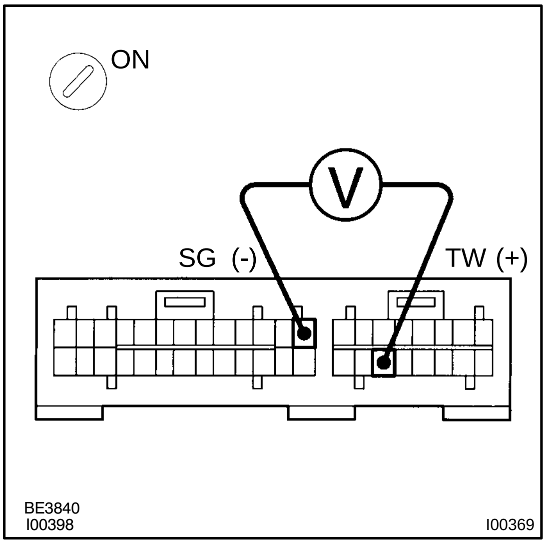
DTC No.	Detection Item	Trouble Area
14	Open or short in engine coolant temperature sensor circuit.	• Engine coolant temperature sensor • Harness or connector between engine coolant temp. sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TW and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals TW and SG of A/C control assembly connector at each engine coolant temperature.

OK:

Voltage
at 0 °C (32 °F): 2.8 - 3.2 V
at 40 °C (104 °F): 1.8 - 2.2 V
at 70 °C (158 °F): 0.9 - 1.3 V

HINT:

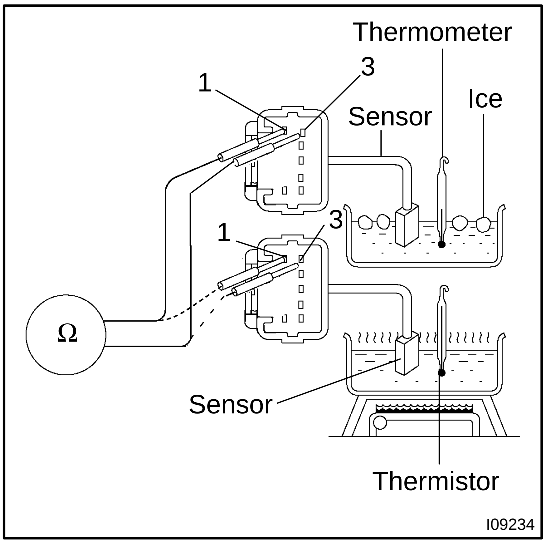
As the temperature increases, the voltage decreases.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 14 is displayed, check and replace A/C control assembly.

2	**Check engine coolant temperature sensor.**



PREPARATION:

Remove engine coolant temperature sensor (See page AC-28).

CHECK:

Measure resistance between terminals 1 and 3 of engine coolant temperature sensor connector at each temperature.

OK:

Resistance :
at 0°C (32°F) : Below 50 kΩ
at 40°C (104°F) : 2.5 - 2.7 kΩ
at 100 °C (212°F): Over 0.3 kΩ

HINT:
As the temperature increases, the resistance decreases gradually.

NG → **Replace engine coolant temperature sensor.**

OK ↓

3	**Check harness and connector between A/C control assembly and engine coolant temperature sensor (See page IN-28).**

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

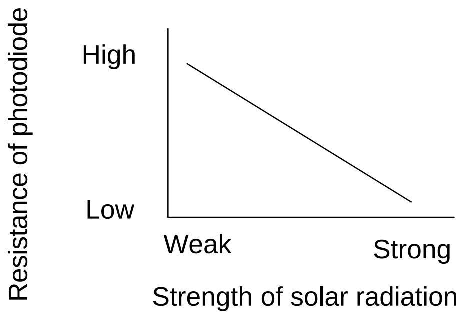
OK ↓

Check and replace A/C control assembly.

DI3W2-11

DTC	21	Solar Sensor Circuit

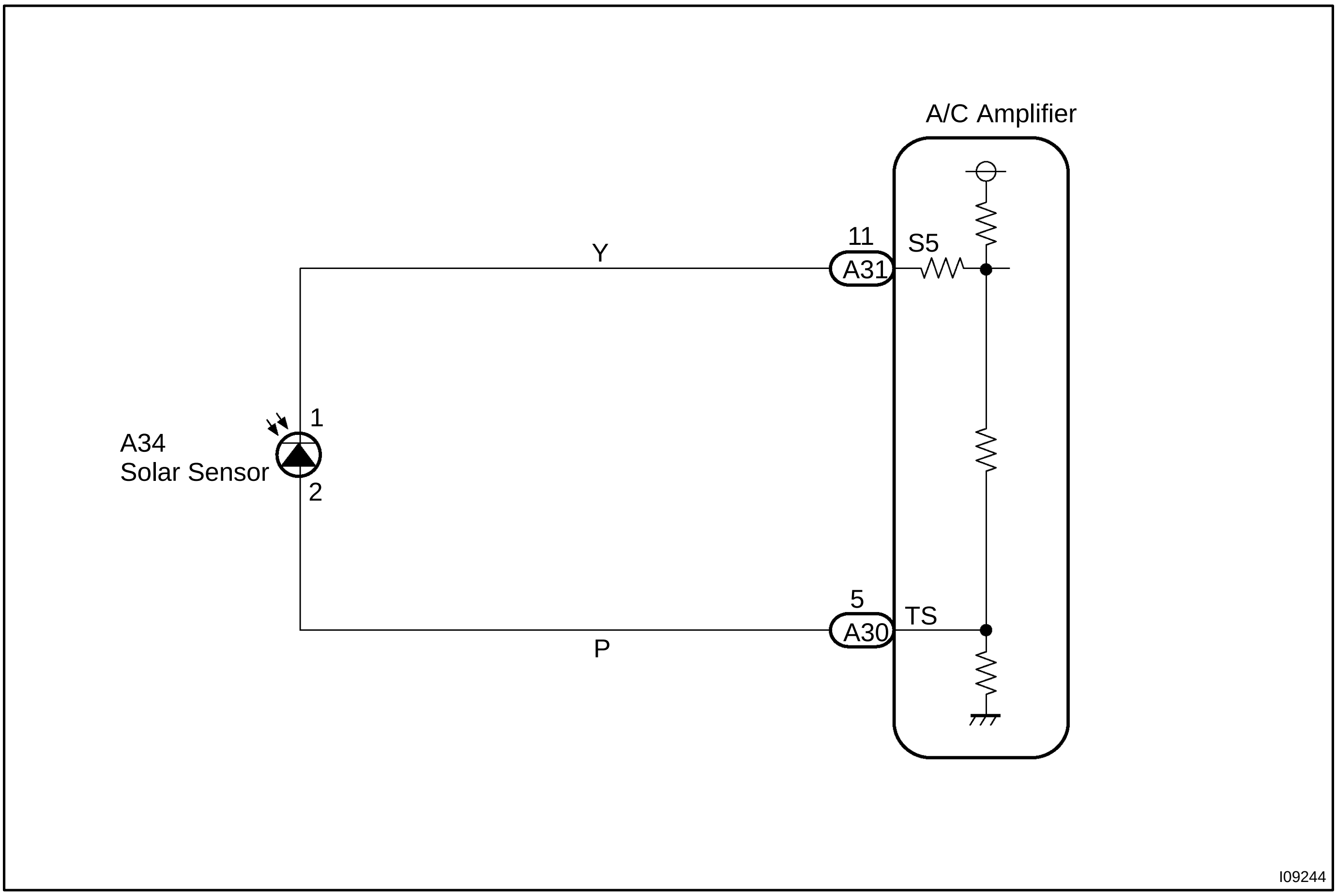
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C control assembly.

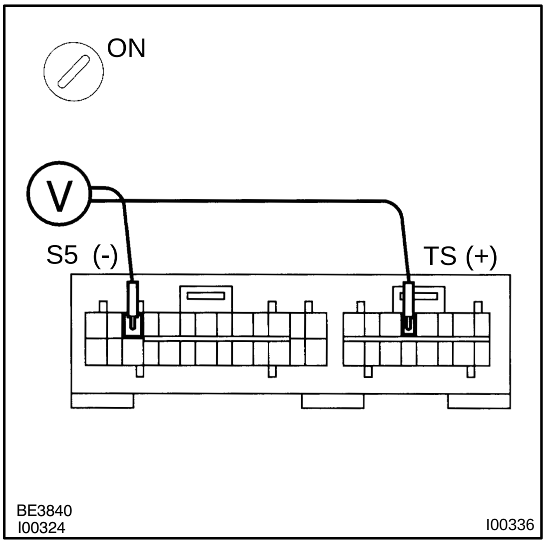
DTC No	Detection Item	Trouble Area
21	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code 21 is not abnormal when the sensor is not receiving solar radiation.	• Solar sensor • Harness or connector between solar sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals S5 and TS of A/C control assembly connector.



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

(a) Turn ignition switch to ON.

(b) Measure voltage between terminals S5 and TS of A/C control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

OK:

Condition	Voltage
Sensor subjected to electric light	Below 4.0 V
Sensor covered by a cloth	4.0 - 4.5 V

HINT:

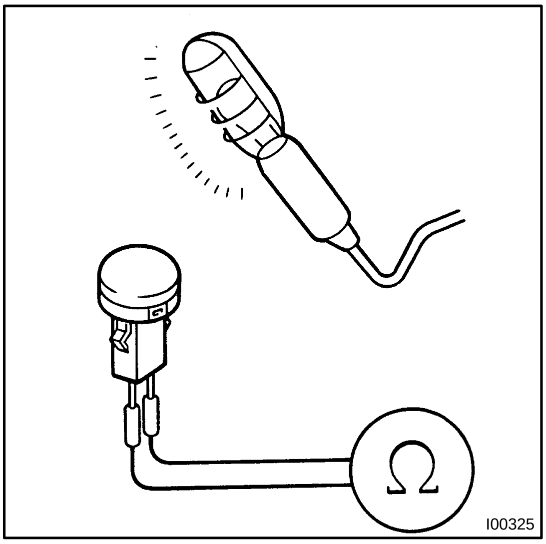
As the inspection light is moved away from the sensor, the voltage increases.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 21 is displayed, check and replace A/C control assembly.

2	**Check solar sensor.**



PREPARATION:

Remove solar sensor (See page AC-73).

CHECK:

(a) Cover the sensor with a cloth.

(b) Measure resistance between terminals 1 and 2 of solar sensor connector.

HINT:

Connect positive (+) lead of ohmmeter to terminal 1 and negative (-) lead to terminal 2 of the solar sensor.

OK:

Resistance : ∞ Ω (no continuity)

PREPARATION:

(a) Remove the cloth from the solar sensor and subject the sensor to electric light.

(b) Measure resistance between terminals.

OK:

Resistance : Approx. 10 kΩ (continuity)

HINT:

As the electric light is moved away from the sensor, the resistance increases.

NG	**Replace solar sensor.**

OK

3	**Check harness and connector between A/C control assembly and solar sensor (See page IN-28).**

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

OK

Check and replace A/C control assembly.

DI3W4-11

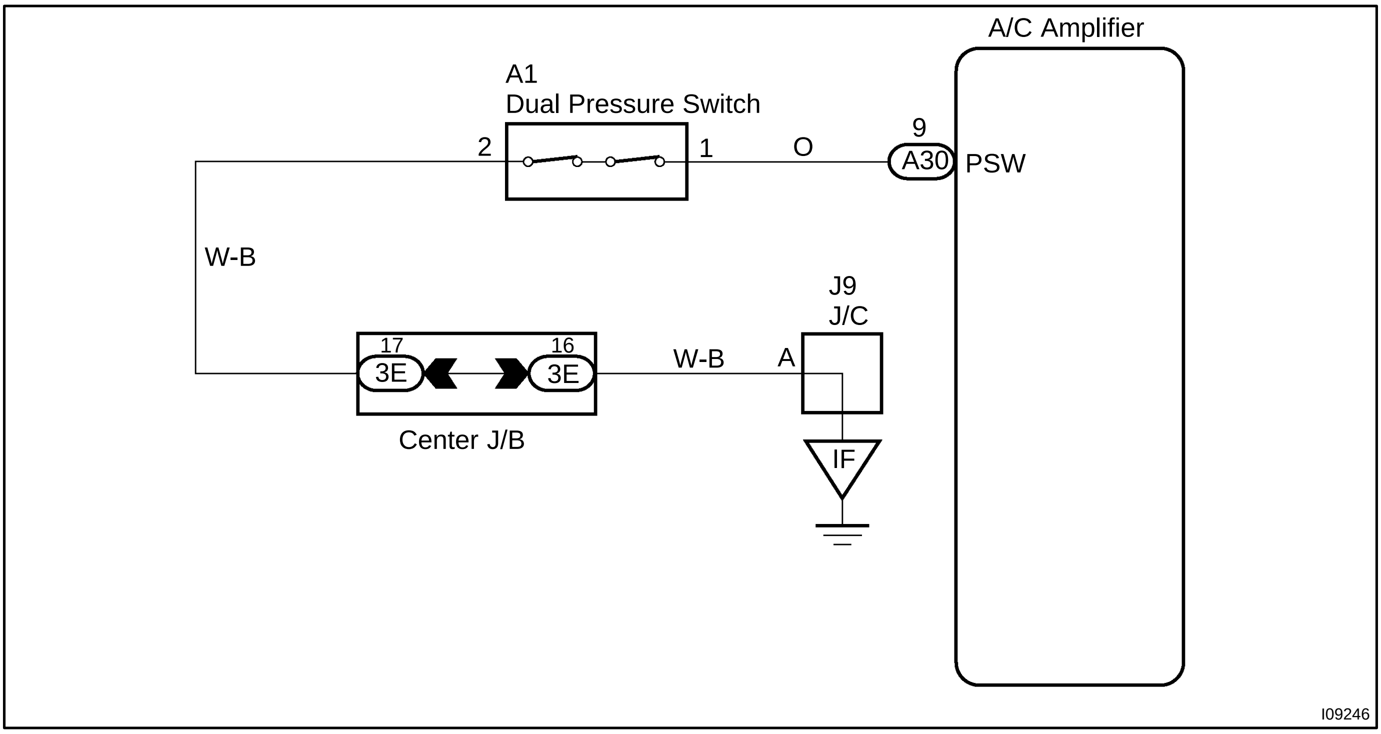
DTC	23	Pressure Switch Circuit

CIRCUIT DESCRIPTION

This pressure switch sends the appropriate signals to the A/C control assembly when the A/C refrigerant pressure drops too low or rises too high. When the A/C control assembly receives these signals, if outputs signals via the ECM to switch off the compressor relay and turns the magnetic clutch off.

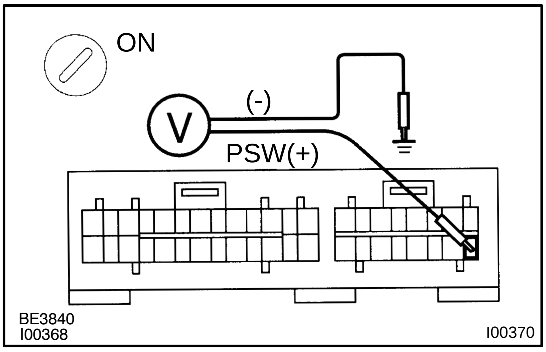
DTC No.	Detection Item	Trouble Area
23	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 196 kPa (2.0 kgf/cm^2. 28 psi) over 3,140 kPa (32.0 kgf/cm^2. 455 psi)	• Pressure switch • Harness or connector between pressure switch and A/C control assembly • Refrigerant pipe line • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals PSW of A/C control assembly and body ground.**



PREPARATION:

(a) Install the manifold gauge set (See page AC-19).

(b) Remove the A/C control assembly with connectors still connected.

(c) Turn ignition switch to ON.

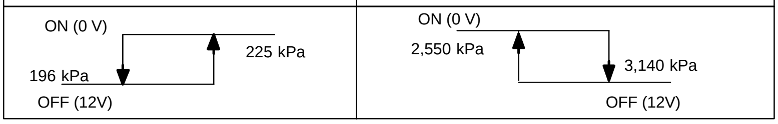
CHECK:

Check voltage between terminals PSW of A/C control assembly connector and body ground when refrigerant pressure is changed.

OK:

The voltage changes refrigerant pressure, as shown in the chart below.

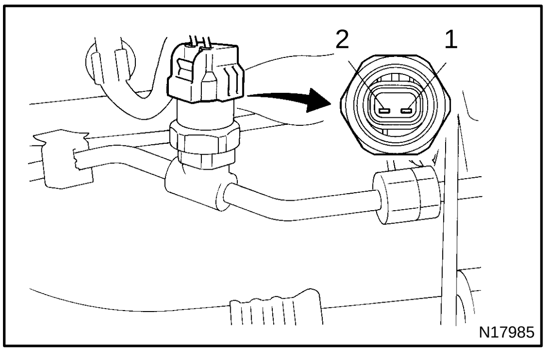
Low Pressure Cut Side	Referaence : High Pressure Cut SIde



OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	**Check pressure switch.**



PREPARATION:

Disconnect pressure switch connector.

CHECK:

Check continuity between terminals 1 and 2 of pressure switch when refrigerant is changed.

OK:

The continuity changes with refrigerant pressure as shown in the chart below.

Low Pressure Cut Side	Referaence : High Pressure Cut SIde
ON (continuity) 196 kPa 225 kPa OFF (no continuity)	ON (continuity) 2,550 kPa 3,140 kPa OFF (nocontinuity)

NG	**Replace pressure switch.**

OK

3	**Check harness and connector between A/C control assembly and pressure switch, pressure switch and body ground (See page IN-28).**

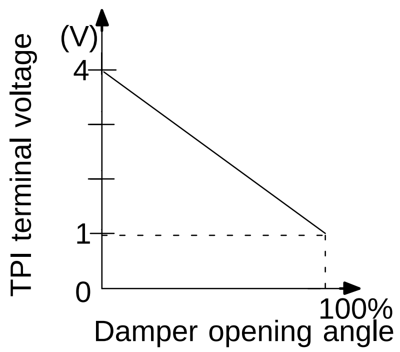
NG	**Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DTC	31, 41	Air Mix Damper Position Sensor Circuit

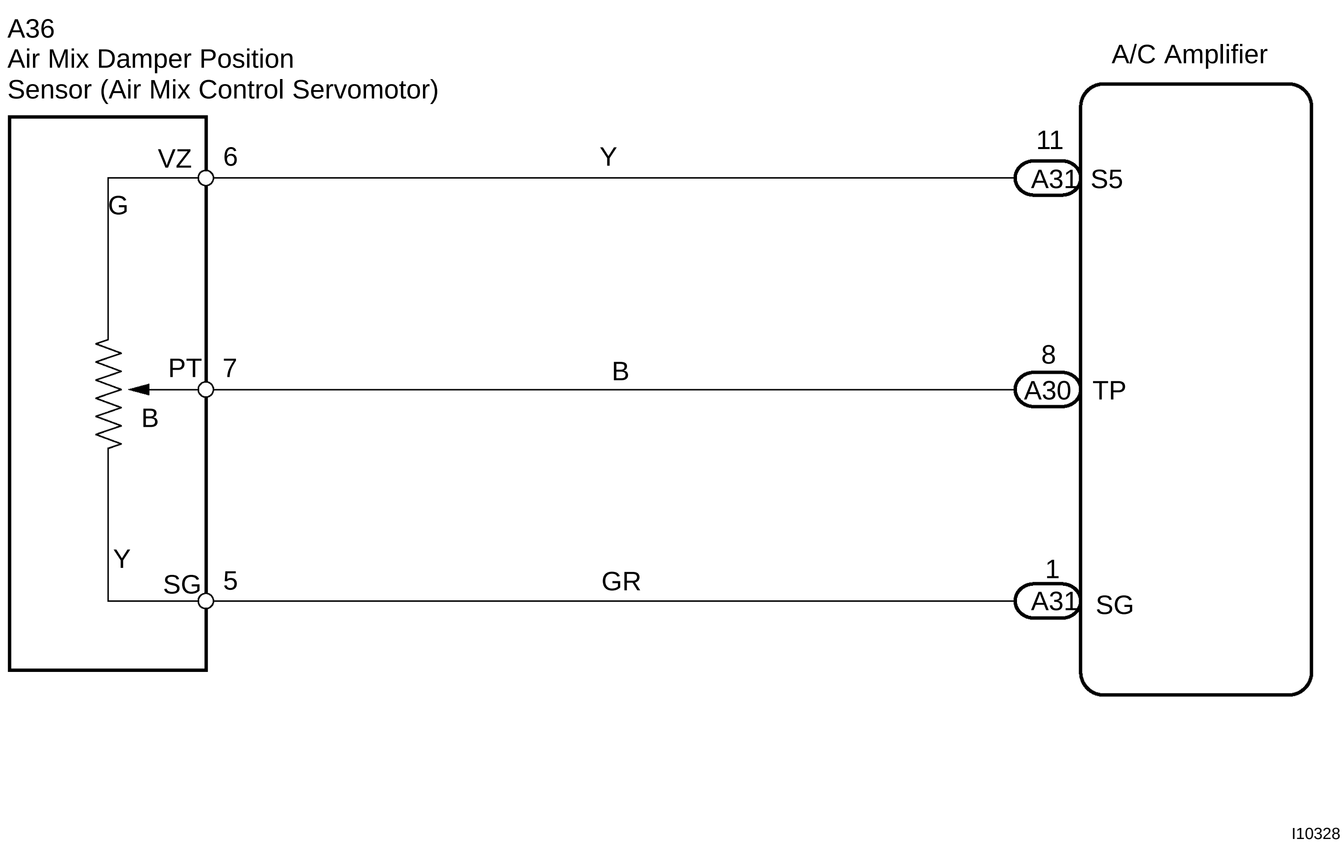
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air inlet control servomotor.

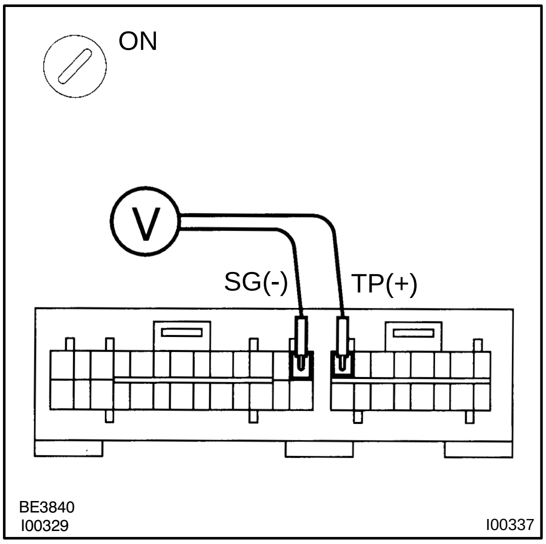
DTC No.	Detection Item	Trouble Area
31	Short to ground or power source circuit in air mix damper position sensor circuit.	• Air mix damper position sensor • Harness or connector between air inlet control servomotor and A/C control assembly • A/C assembly
41	Air mix damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TP and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SG of A/C control assembly connector each time when the set temperature is changed.

OK:

Set Temperature	Voltage
Max. cool	3.5 - 4.5 V
Max. hot	0.5 - 1.8 V

HINT:

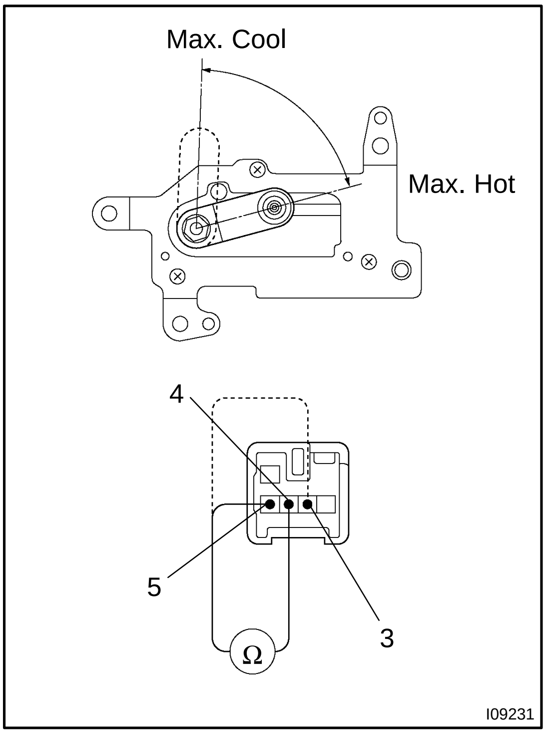
As the set temperature increases, the voltage decreases gradually without interruption.

NG — **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 31 or 41 is displayed, check and replace A/C control assembly.

2	Check air mix damper position sensor.



PREPARATION:

Remove air mix control servomotor (See page AC-34).

CHECK:

Measure resistance between terminals 4 and 5 of air inlet control servomotor connector.

OK:

Resistance: 4.8 - 7.2 kΩ

CHECK:

While operating air mix control servomotor as shown in the procedure on page DI-612 , measure resistance between terminals 3 and 5 of air mix control servomotor connector.

OK:

Position	Resistance
Max. cool	3.8 - 5.8 kΩ
Max. hot	0.95 - 1.45 kΩ

HINT:

As the air inlet 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 control assembly and air mix control servomotor. (See page IN-28).

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

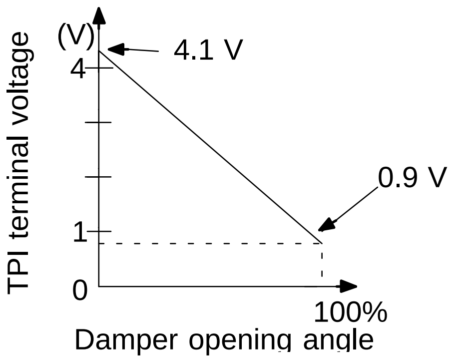
OK

Check and replace A/C control assembly.

DI3W6-09

DTC	32, 42	Air Inlet Damper Position Sensor Circuit

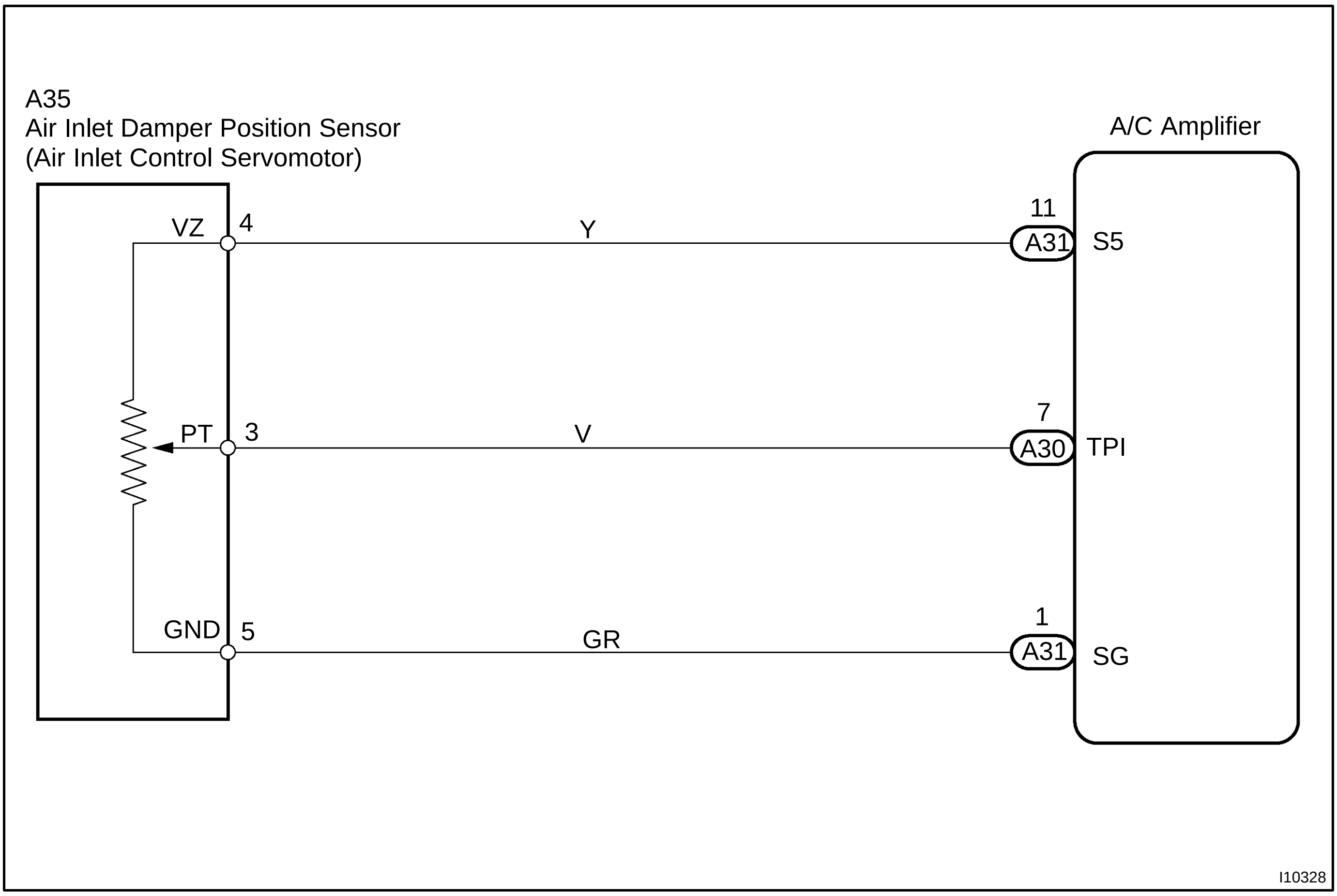
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air inlet control servomotor.

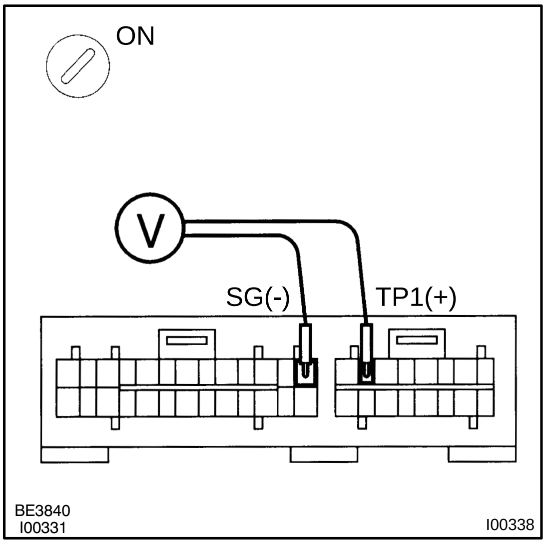
DTC No.	Detection Item	Trouble Area
32	Short to ground or power source circuit in air inlet damper position sensor circuit.	• Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C control assembly • A/C control assembly
42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TPI and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Press REC/FRS switch to change air inlet between fresh and recirculation air and measure voltage between terminals TP1 and SG of A/C control assembly when the air inlet servomotor operates.

OK:

REC/FRS Switch	Voltage
REC	3.5 - 4.5 V
FRS	0.5 - 1.8 V

HINT:

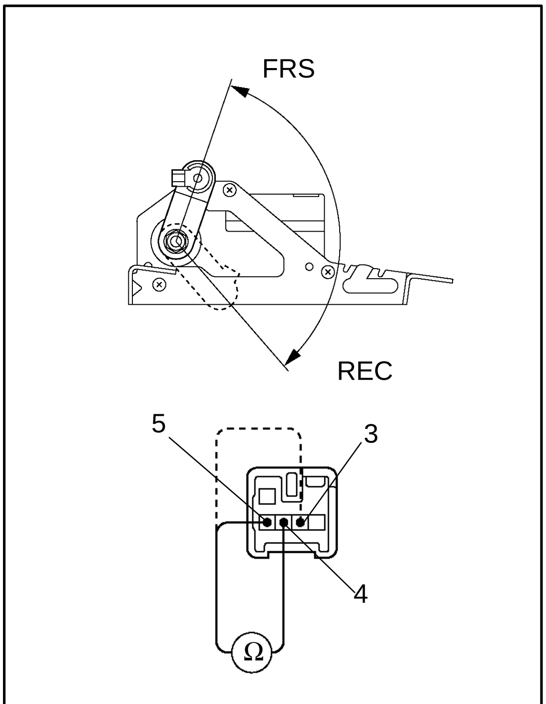
As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

NG	**Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 32 or 42 is displayed, check and replace A/C control assembly.

2	Check air inlet damper position sensor.



I09225

PREPARATION:

(a) Remove air inlet control servomotor (See page AC-46).

(b) Disconnect air inlet control servomotor connector.

CHECK:

Measure resistance between terminals 4 and 5 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, measure resistance between terminals 3 and 4 of air inlet control servomotor connector.

OK:

Resistance :

Damper Position	Resistance
REC side	3.4 - 6.4 kΩ
FRS side	0.76 - 1.4 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 control assembly and air inlet control servomotor. (See page AC-84).

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

OK

Check and replace A/C control assembly.

DI3W7-07

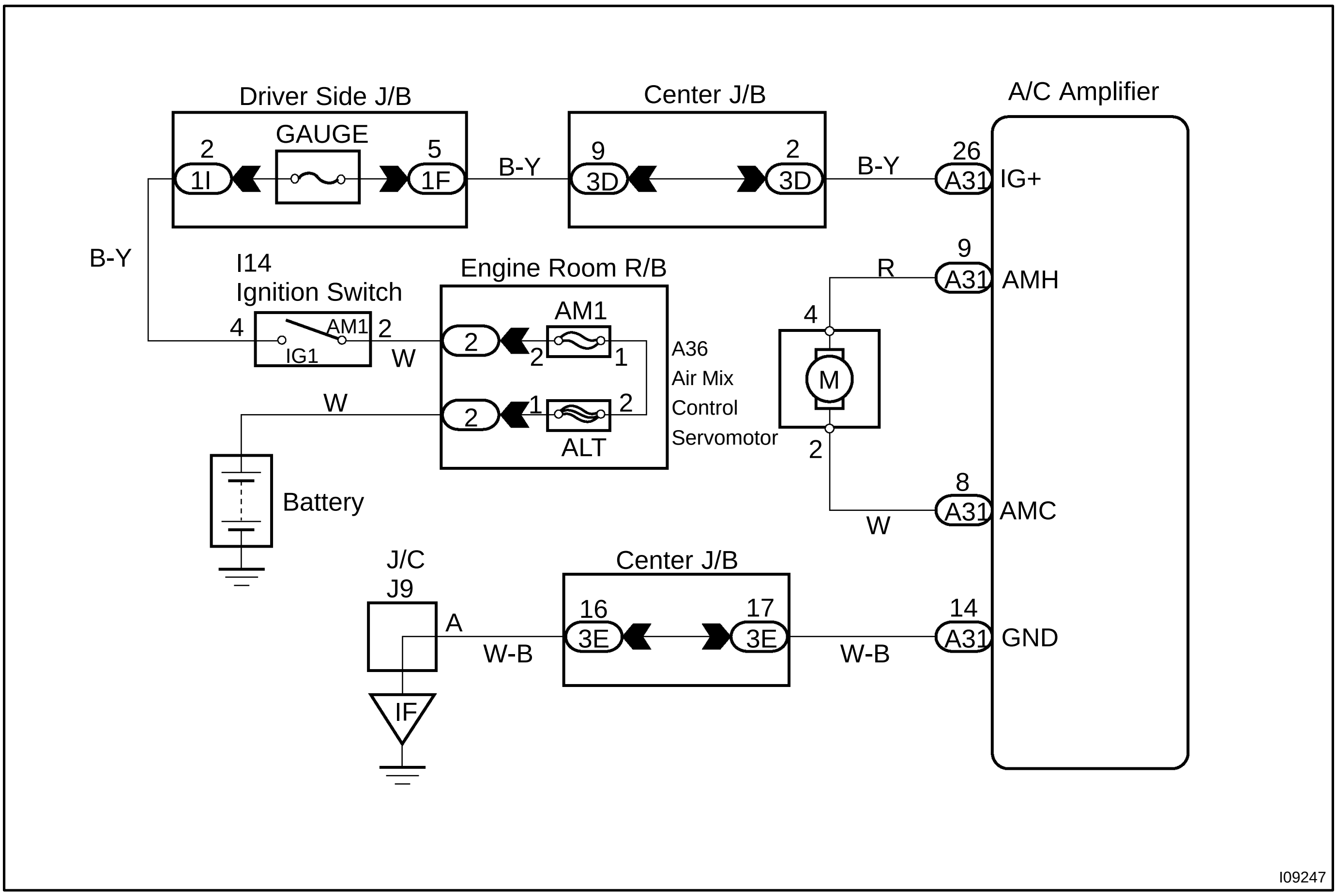
DTC	41	Air Mix Control Servomotor Circuit

CIRCUIT DESCRIPTION

This air mix control servomotor is controlled by the A/C control assembly and moves the air mix damper to the desired position.

DTC No.	Detection Item	Trouble Area
41	Air mix damper position sensor value does not change even if A/C control assembly operates air mix control servomotor.	• Air mix control servomotor • Air mix damper position sensor • Harness or connector between A/C control assembly and air mix control servomotor, air mix damper position sensor • A/C control assembly

WIRING DIAGRAM



I09247

INSPECTION PROCEDURE

1	Actuator check

PREPARATION:

(a) Warm up the engine.

(b) Set to the actuator check mode (See page DI-578).

(c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation of the air mix damper and the condition of the blower.

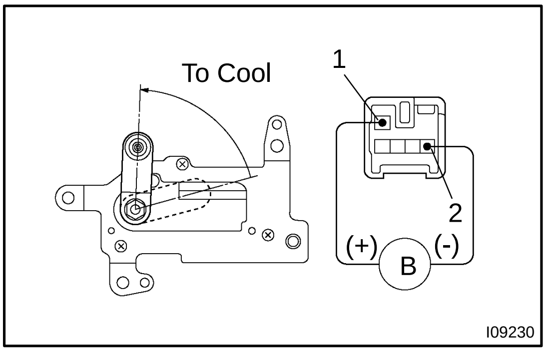
OK:

Display Code	Air Mix Damper	Condition
0 - 3	0 % (Fully closed)	Cool air comes out
4 - 5	50 %	
6 - 9	100 % (Fully opened)	Warm air comes out

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	**Check air mix control servomotor.**



PREPARATION:

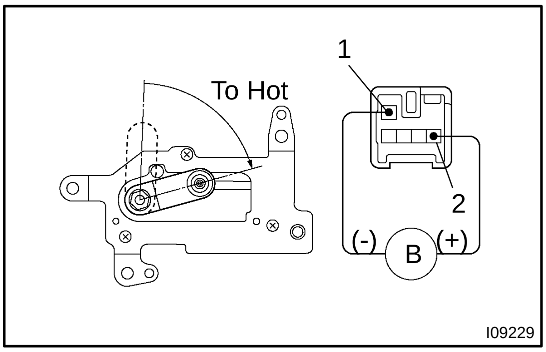
Remove air mix control servomotor (See page AC-34).

CHECK:

Connect positive (+) lead to terminal 1 and the negative (-) lead to terminal 2.

OK:

The lever turns smoothly to COOL side.



CHECK:

Connect negative (-) lead to terminal 1 and positive (+) lead to terminal 2.

OK:

The lever turns smoothly to HOT side.

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

OK

3	Check harness and connector between A/C control assembly and air mix control servomotor (See page IN-28).

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

OK

Check and replace A/C control assembly (See page IN-28).

DI3W8-04

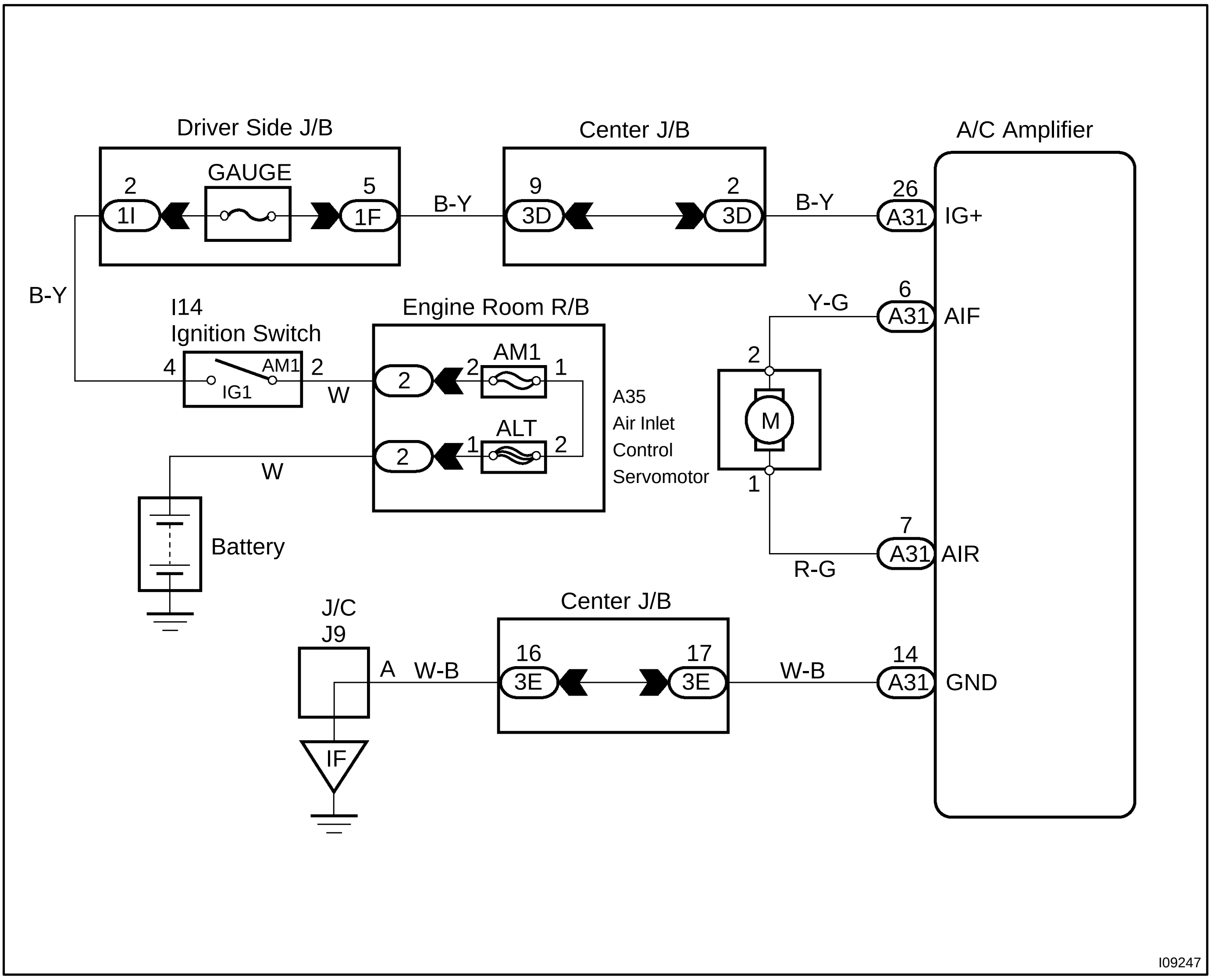
DTC	42	Air Inlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air inlet control servomotor is controlled by the A/C control assembly and moves the air inlet damper to the desired position.

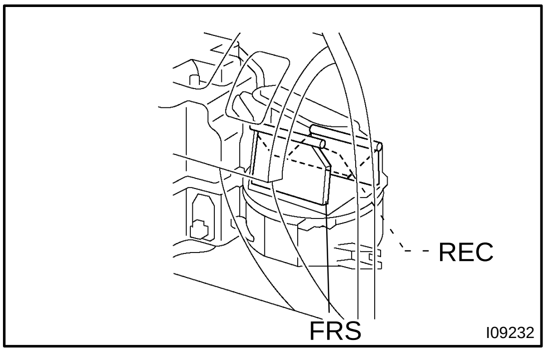
DTC No.	Detection Item	Trouble Area
42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	• Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



PREPARATION:

(a) Remove glove compartment to see and check the air inlet damper operation.

(b) Set to the actuator check mode (See page DI-578).

(c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation air inlet damper.

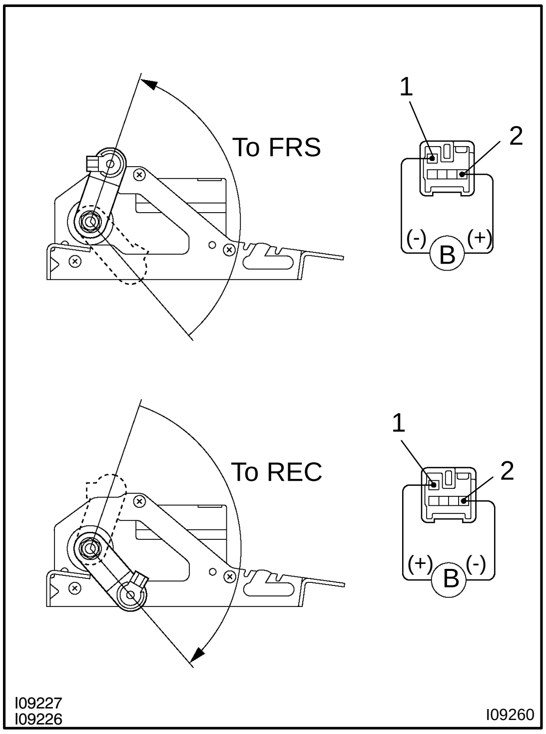
OK:

DIsplay Code	Air Inlet Damper
0 - 2	FRS
3	REC/FRS
4 - 9	REC

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	Check air inlet control servomotor.



PREPARATION:

Remove air inlet control servomotor (See page AC-46).

CHECK:

Connect positive (+) lead to terminal 2 and negative (-) lead to terminal 1.

OK:

The lever moves smoothly to FRS position.

CHECK:

Connect negative (-) lead to terminal 2 and positive (+) lead to terminal 1.

OK:

The lever moves smoothly to REC position.

NG → **Replace air inlet control servomotor assembly.**

OK

3	**Check harness and connector between A/C control assembly and air inlet control servomotor. (See page IN-28).**

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

OK

Check and replace A/C control assembly.

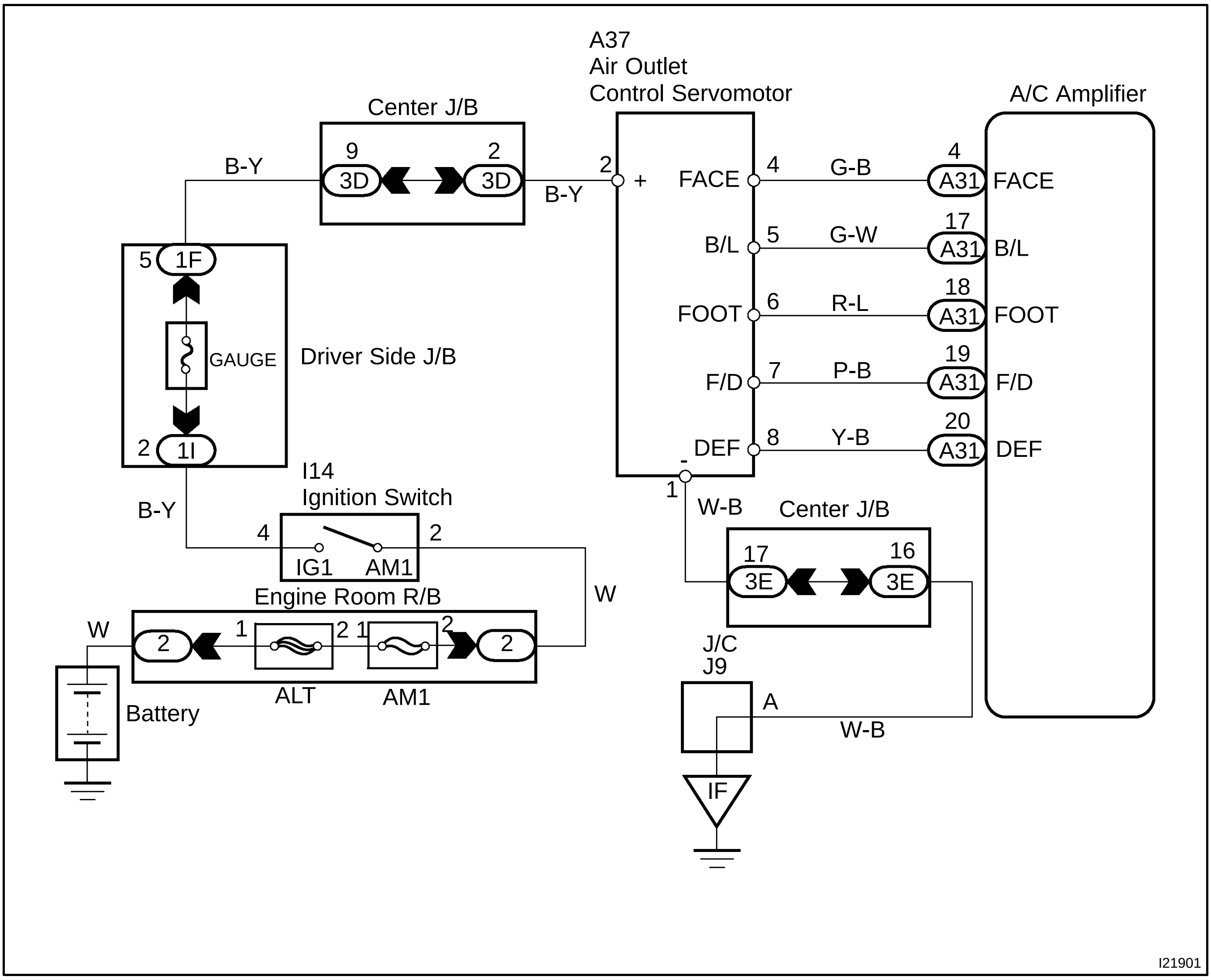
DI3W9-10

Air Outlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by signals from the A/C control assembly. When the AUTO switch is ON, the A/C control assembly changes the mode automatically between FACE, BI-LEVEL and FOOT according to the temperature setting.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.

Display Code	Air Flow Mode
0 - 4	FACE
5	BI-LEVEL
6 - 7	FOOT
8	FOOT/DEF
9	DEF

PREPARATION:

(a) Set to the actuator check mode (See page DI-578).

(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 by hand.

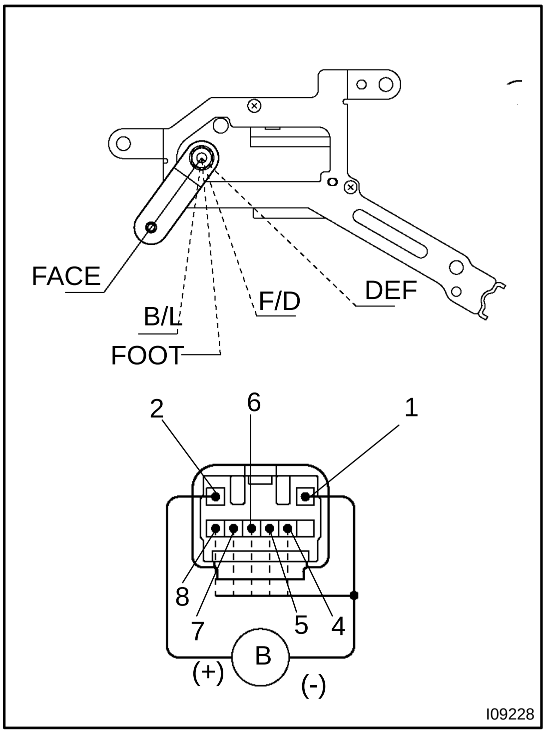
OK:

The mode changes with the change in the temperature display as shown in the table.

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

NG

2	Check air outlet control servomotor.



PREPARATION:

Remove air outlet control servomotor (See page AC-72).

CHECK:

(a) Connect positive (+) lead to terminal 2 and negative (-) lead to terminal 1.

(b) Check the lever operation when the negative (-) lead is connected to the terminals shown below.

OK:

The lever moves smoothly to the position for each mode.

Ground Terminals	Mode
8	DEF.
7	FOOT/DEF
6	FOOT
5	B/L
4	FACE

NG	Replace air outlet control servomotor.

OK

3	Check harness and connector between A/C control assembly and air outlet control servomotor, air outlet control servomotor and battery, air outlet control servomotor and body ground (See page IN-28).

NG → Repair or replace harness or connector.

OK

Repair or replace A/C control assembly.

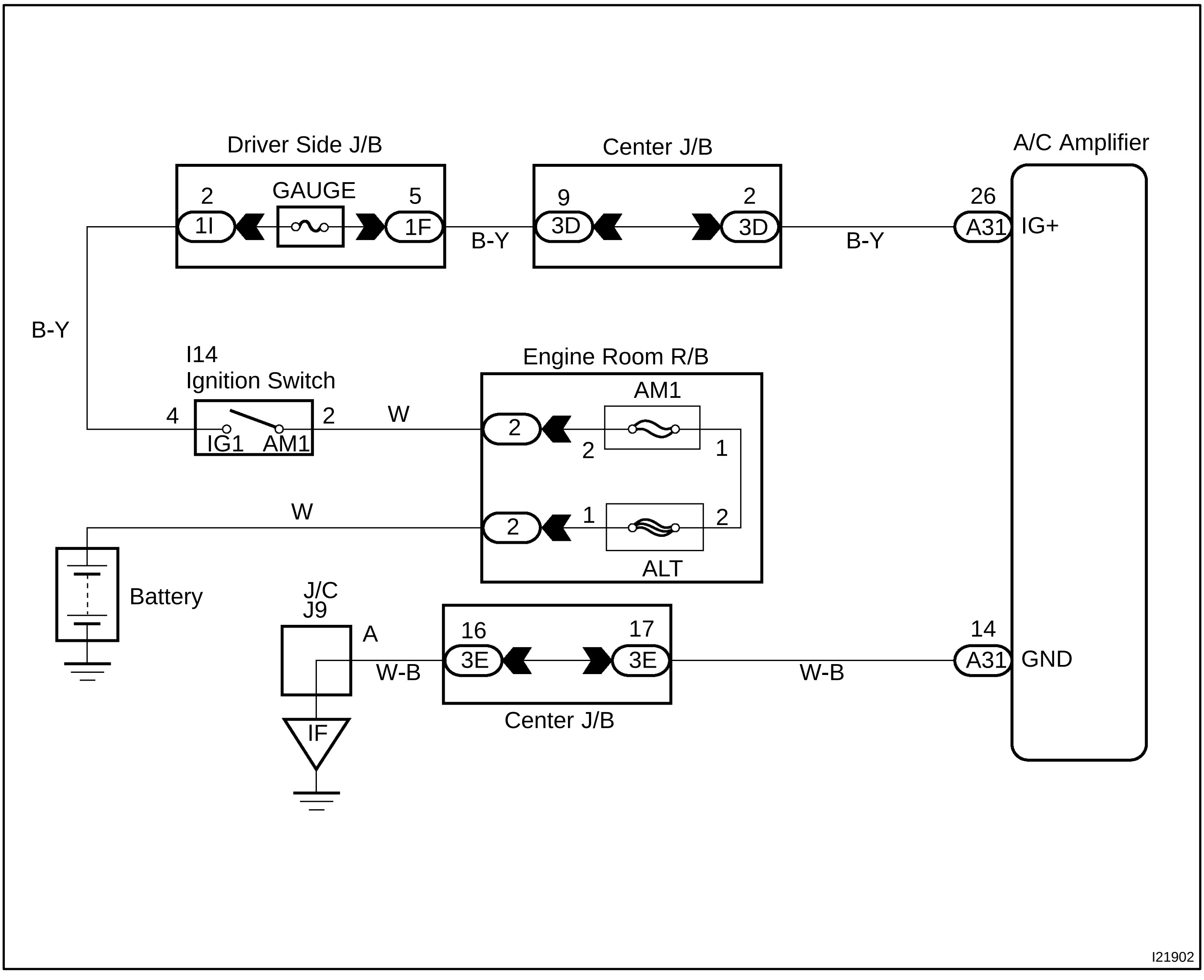
DI3WA-14

IG Power Source Circuit

CIRCUIT DESCRIPTION

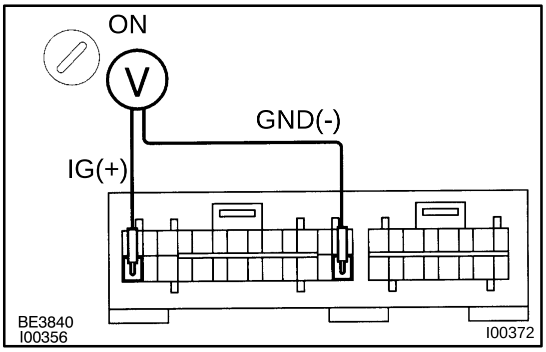
This is the power source for the A/C control assembly (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals IG and GND of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals IG and GND of A/C control assembly.

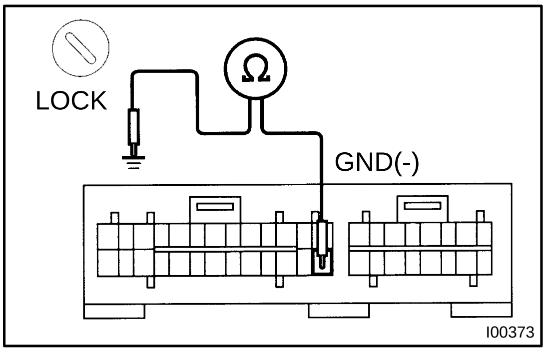
OK:

Voltage : 10 - 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	Check continuity between terminal GND of A/C control assembly and body ground.



PREPARATION:

Turn ignition switch to LOCK.

CHECK:

Measure resistance between terminal GND of A/C control assembly and body ground.

OK:

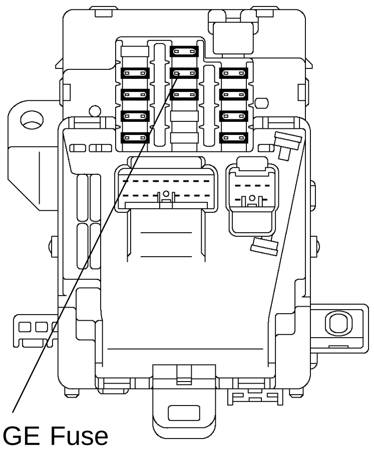
Resistance : Below 1 Ω

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

OK

3	**Check GAUGE fuse.**

No. 1 J/B



PREPARATION:

Remove GAUGE fuse from No. 1 J/B.

CHECK:

Check continuity of GAUGE fuse.

OK:

Continuity exists.

NG → **Check for shot in all the harness and components connected to the GAUGE fuse (See page IN-28).**

OK

Check and repair harness and connector between A/C control assembly and battery.

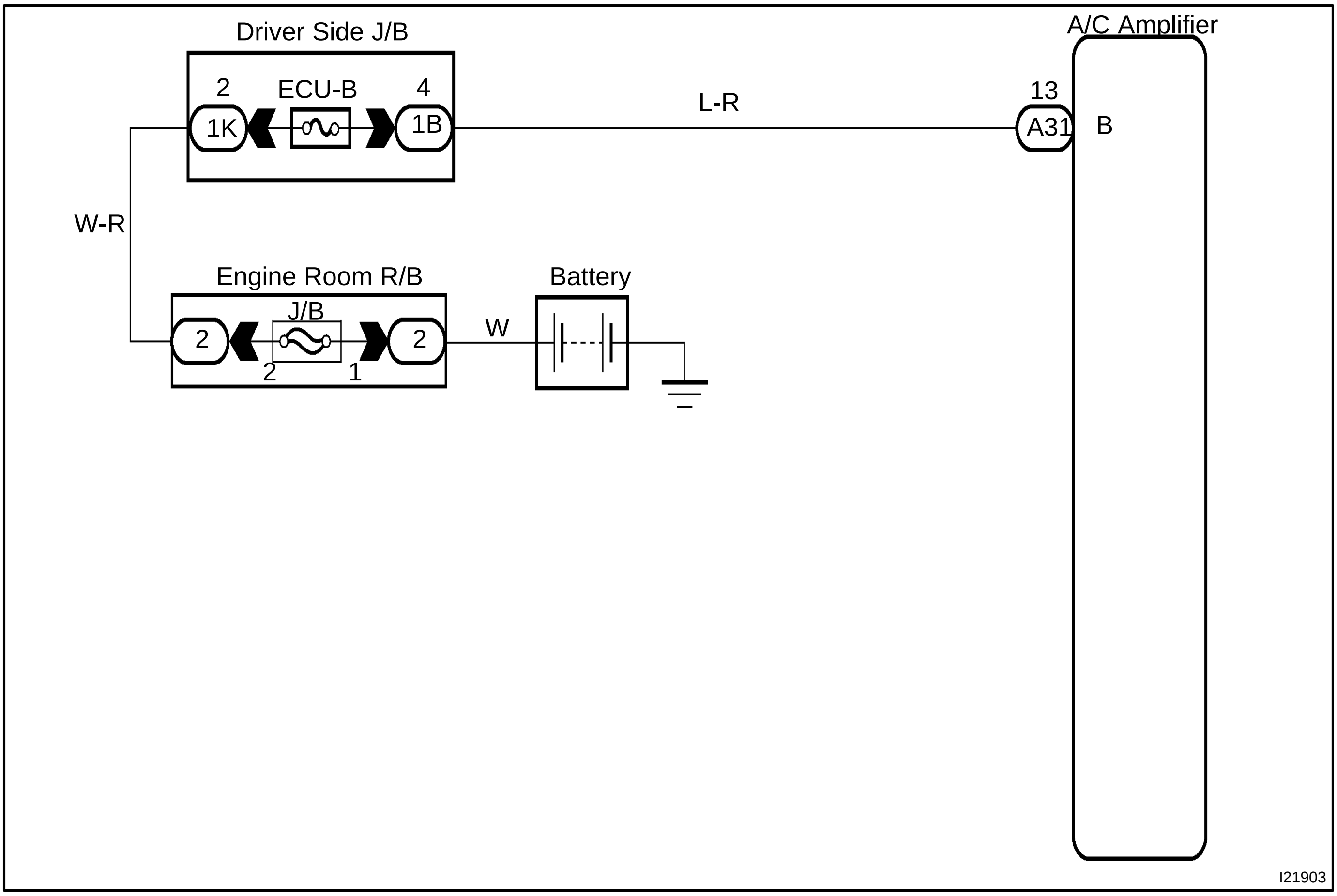
DI3WB-08

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

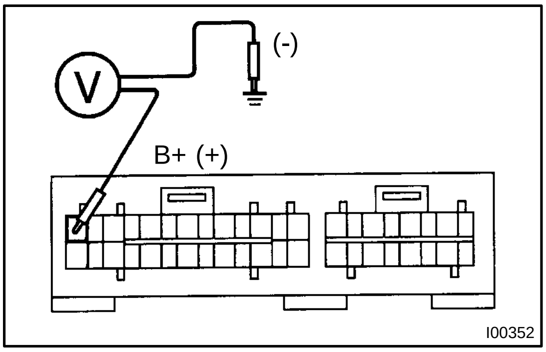
This is the back-up power source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for DTC memory, etc..

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal B+ of A/C control assembly connector and body ground.



PREPARATION:
Remove A/C control assembly with connectors still connected (See page AC-84).

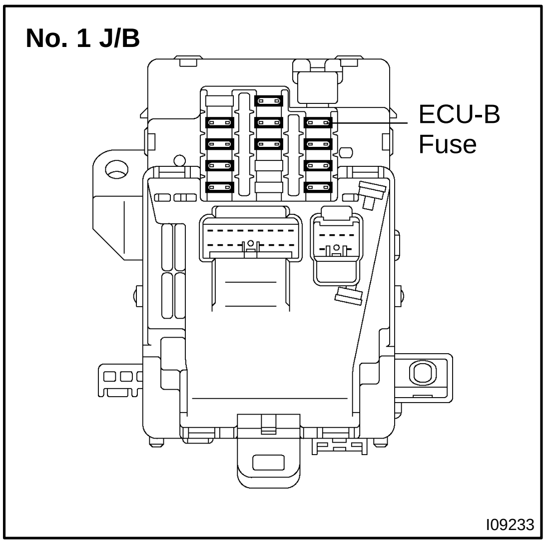
CHECK:
Measure voltage between terminal B+ of A/C control assembly connector and body ground.

OK:
Voltage : 10 - 14 V

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

NG

2	Check ECU-B fuse.



PREPARATION:
Remove ECU-B fuse from No. 1 J/B.

CHECK:
Check continuity of ECU-B fuse.

OK:
No continuity exists.

NG	Check for short in all the harness and components connected to the ECU-B fuse (See attached wiring diagram).

OK

Check and repair harness and connector between A/C control assembly and battery.

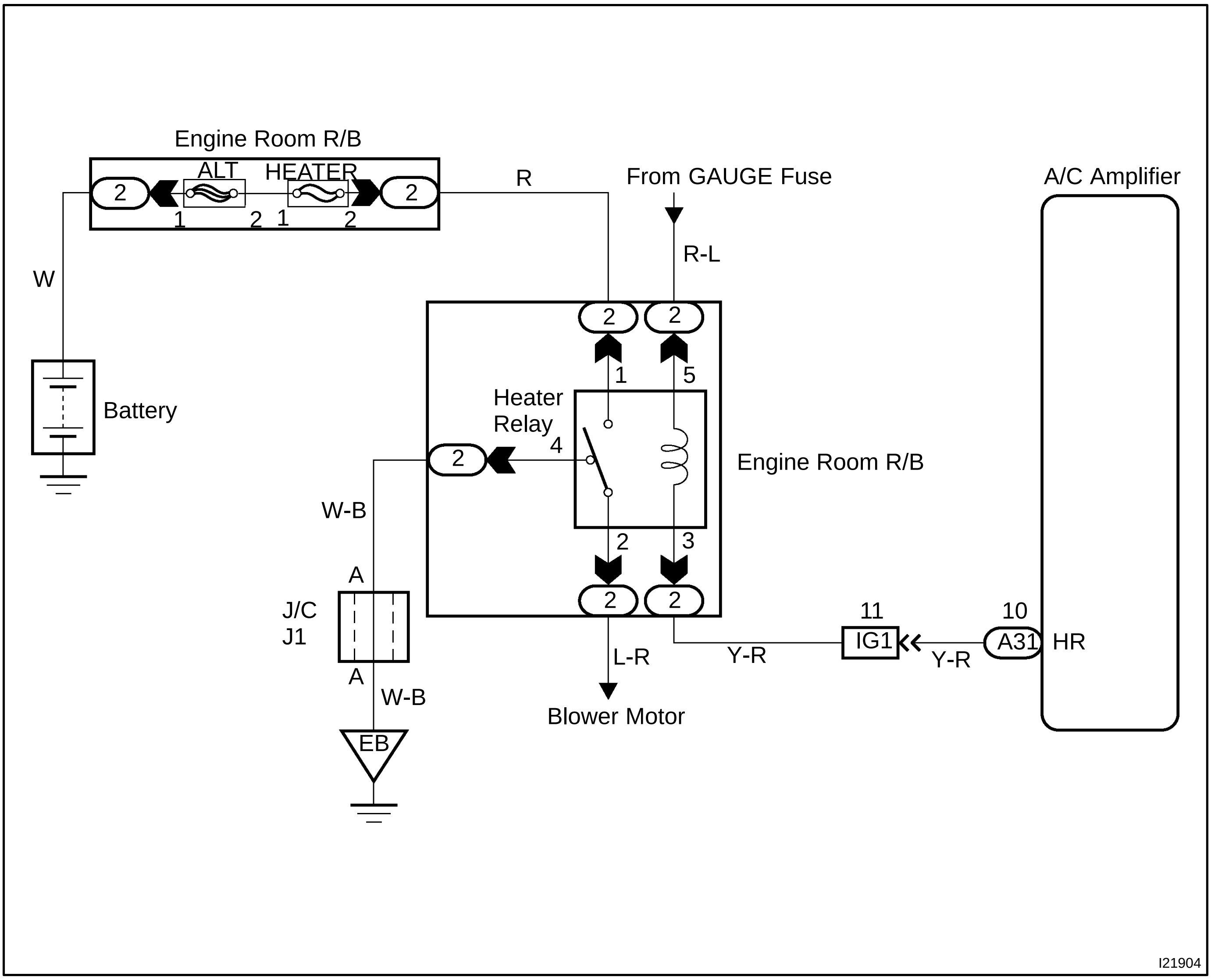
DI3WC-17

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

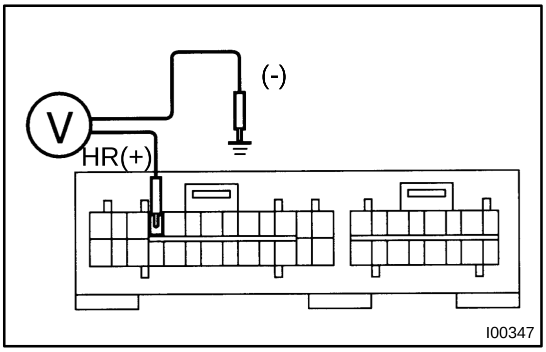
The heater main relay is switched on by signals from the A/C control assembly. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal HR of A/C control assembly connector and body ground.**



PREPARATION:

Remove A/C control assembly with connectors still connected (See page AC-84).

CHECK:

Measure voltage between terminal HR of A/C control assembly and body ground when ignition switch is ON and OFF.

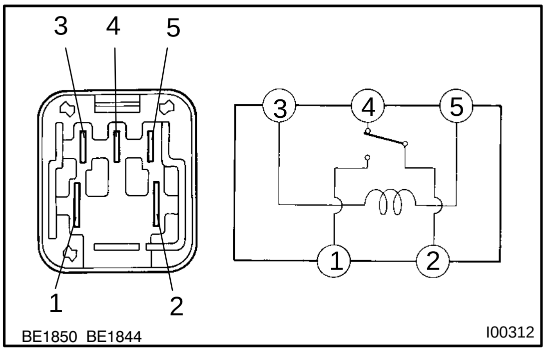
OK:

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 - 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2 Check heater main relay.



PREPARATION:

Remove heater main relay from No. 2 R/B.

CHECK:

Check continuity between each pair of terminals of heater main relay shown below.

OK:

Tester connection	Specified condition
1 - 4	No continuity
2 - 4	Continuity
3 - 5	62.5 - 90.9 Ω

PREPARATION:

Apply battery positive voltage between terminals 3 and 5.

CHECK:

Check continuity between each pair of terminal shown below.

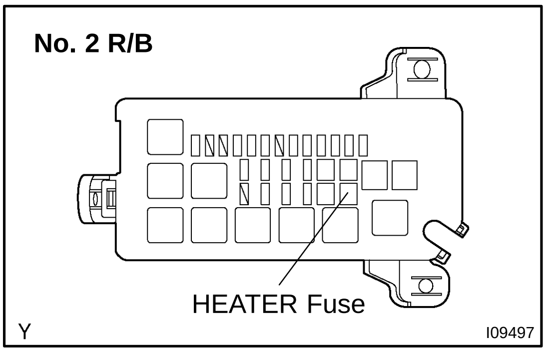
OK:

Tester connection	Specified condition
1 - 2	Continuity
2 - 4	No continuity

NG | **Replace hater main relay.**

OK

3 Check HEATER fuse



PREPARATION:

Remove HEATER fuse from No. 2 R/B.

CHECK:

Check continuity of HEATER fuse.

OK:

Continuity exists.

NG | **Check for short in all the harness and components connected to the HEATER fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

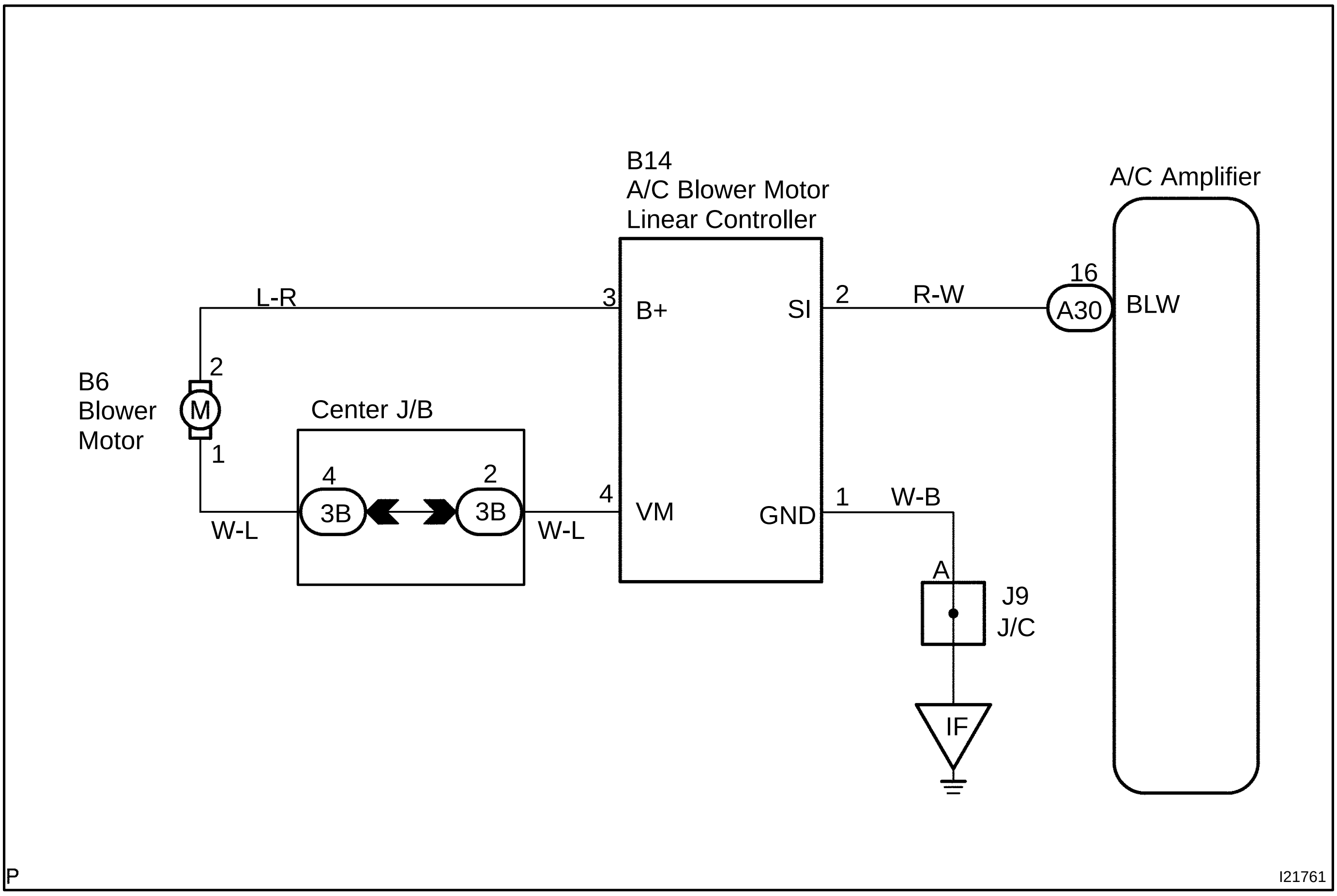
DI3WD-09

Blower Motor Circuit

CIRCUIT DESCRIPTION

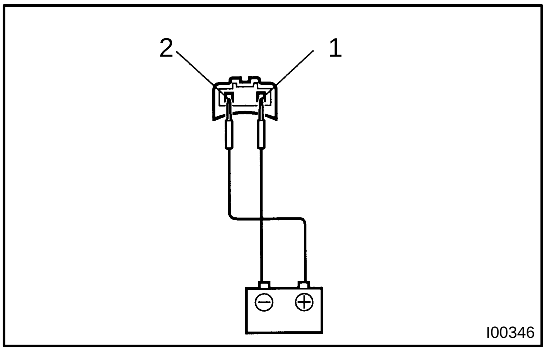
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check blower motor.



PREPARATION:
Remove blower motor (See page AC-66).
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-28).

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

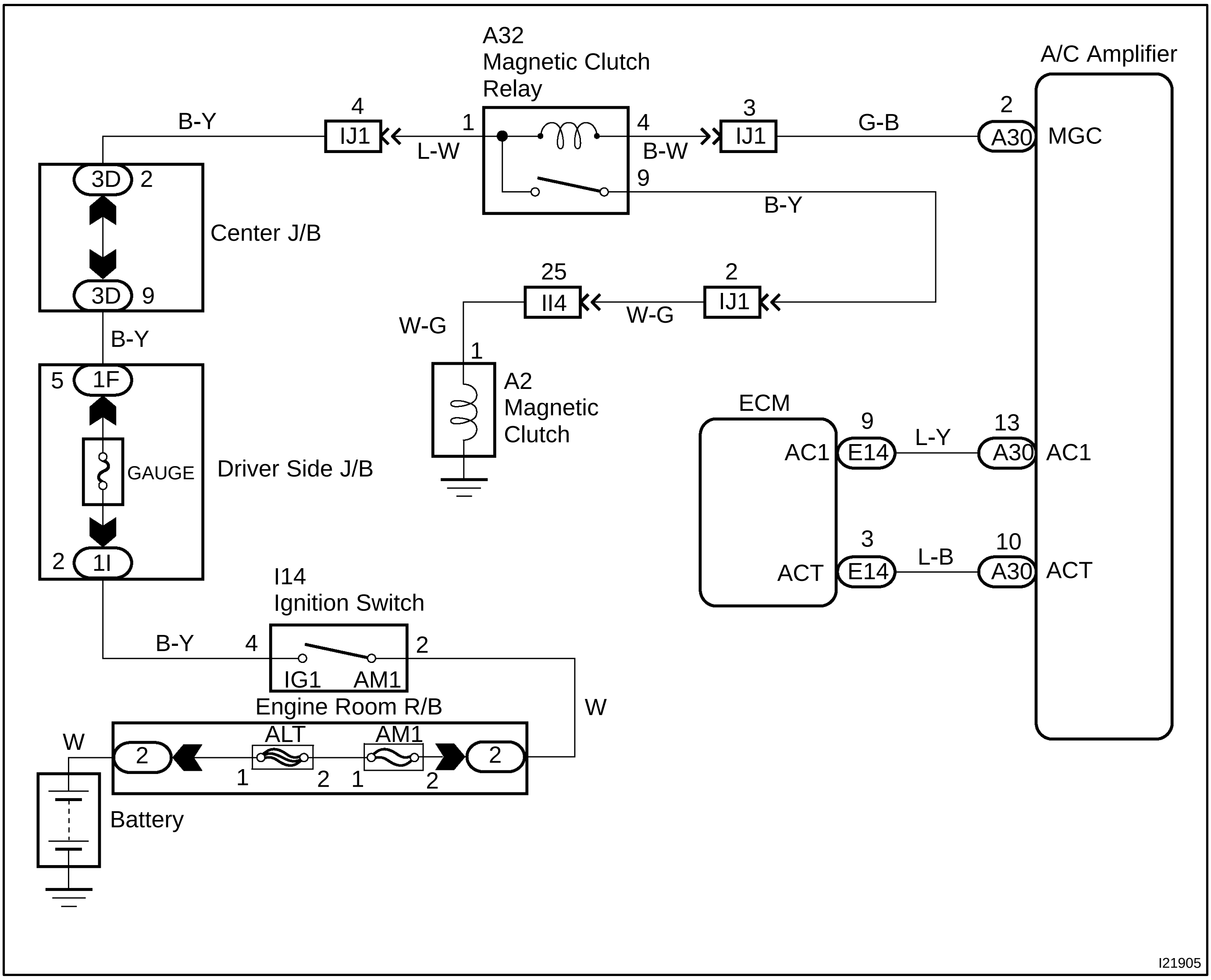
DI3WF-08

Compressor Circuit

CIRCUIT DESCRIPTION

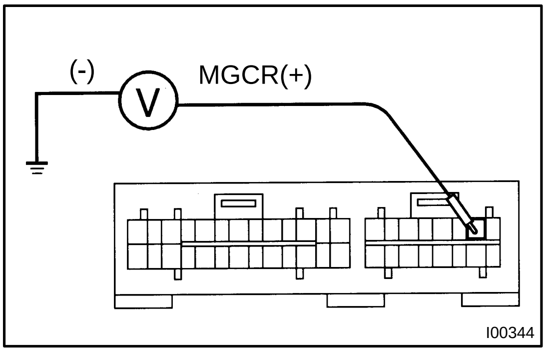
The A/C control assembly outputs the magnetic clutch ON signal from terminal AC1 to the ECM. When the ECM receives this signal, it sends a signal from terminal ACT and switches the A/C magnetic clutch relay ON, thus turning on the A/C magnetic clutch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal MGC of A/C control assembly connector and body ground.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Start the engine and push AUTO switch.

CHECK:

Check voltage between terminal MGC of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.

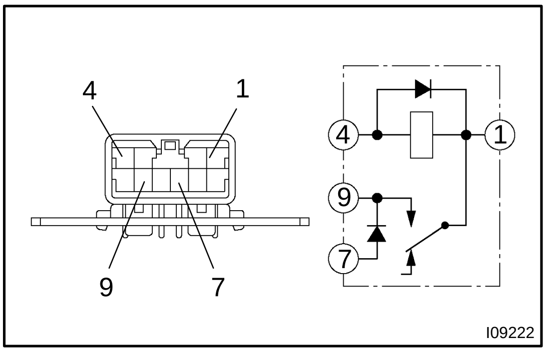
OK:

A/C switch	Voltage
ON	Below 1 V
OFF	10 - 14 V

NG → **Go to step 5.**

OK

2	Check magnetic clutch relay.



PREPARATION:

Remove magnetic clutch relay from cooling unit (See page AC-28).

CHECK:

Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK:

Tester connection	Specified condition
1 - 4	62.5 - 90.9 Ω
7 - 9	Continuity

PREPARATION:

Apply battery positive (+) voltage between terminals 1 and 4.

CHECK:

Check continuity between terminals 1 and 9.

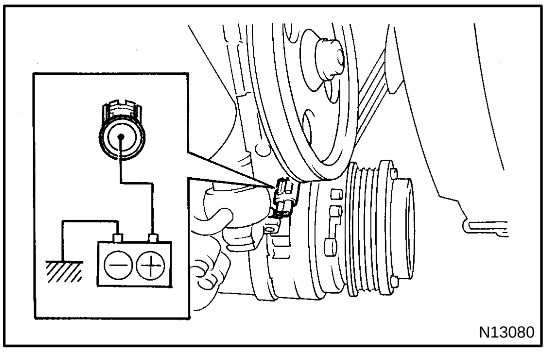
OK:

Continuity exists.

NG → **Replace magnetic clutch relay.**

OK

3	Check A/C magnetic clutch.


N13080

PREPARATION:
Disconnect magnetic clutch connector.
CHECK:
Connect positive (+) lead connected to battery to magnetic clutch connector and negative (-) lead connected to battery to body ground.
OK:
Magnetic clutch is energized.

NG → **Repair A/C magnetic clutch.**

OK

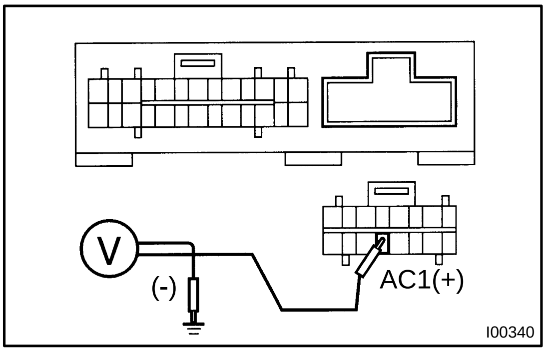
4	Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground (See page IN-28).

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

5	Check voltage between terminal AC1 of A/C control assembly connector side and body ground.

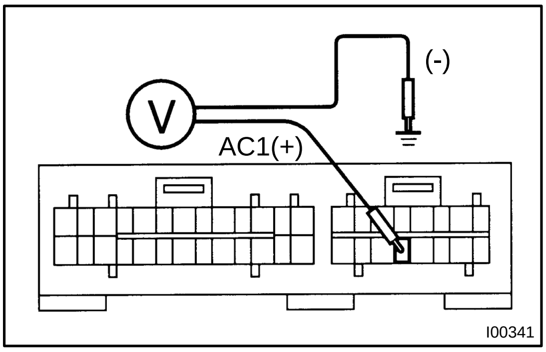


PREPARATION:
(a) Disconnect A/C control connector.
(b) Ignition switch to ON.
CHECK:
Check voltage between terminal AC1 of A/C control assembly harness side connector.
OK:
Voltage : 10 - 14 V

NG → **Check and replace ECM.**

OK

6	Check voltage between terminal AC1 of A/C control assembly connector and body ground.



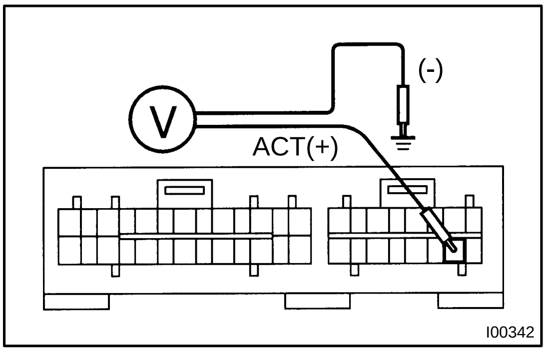
PREPARATION:
(a) Remove A/C control assembly with connector still connected (See page AC-84).
(b) Start the engine and push AUTO switch.
CHECK:
Check the voltage between terminal AC1 of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.
OK:

Magnetic clutch	Voltage
ON	Below 1 V
OFF	10 - 14 V

NG → **Check and replace A/C control assembly.**

OK

7	**Check voltage between terminal ACT of A/C control assembly and body ground.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal ACT of A/C control assembly and body ground.

OK:

A/C switch	Voltage
ON	10 - 14 V
OFF	Below 1.5 V

NG → **Check and replace ECM.**

OK

8	**Check voltage between terminal ACT of ECM connector and body ground (See page DI-18).**

NG → **Check and replace ECM.**

OK

9	**Check harness and connector between A/C control assembly and ECM (See page IN-28).**

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

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).