

# DIAGNOSTICS

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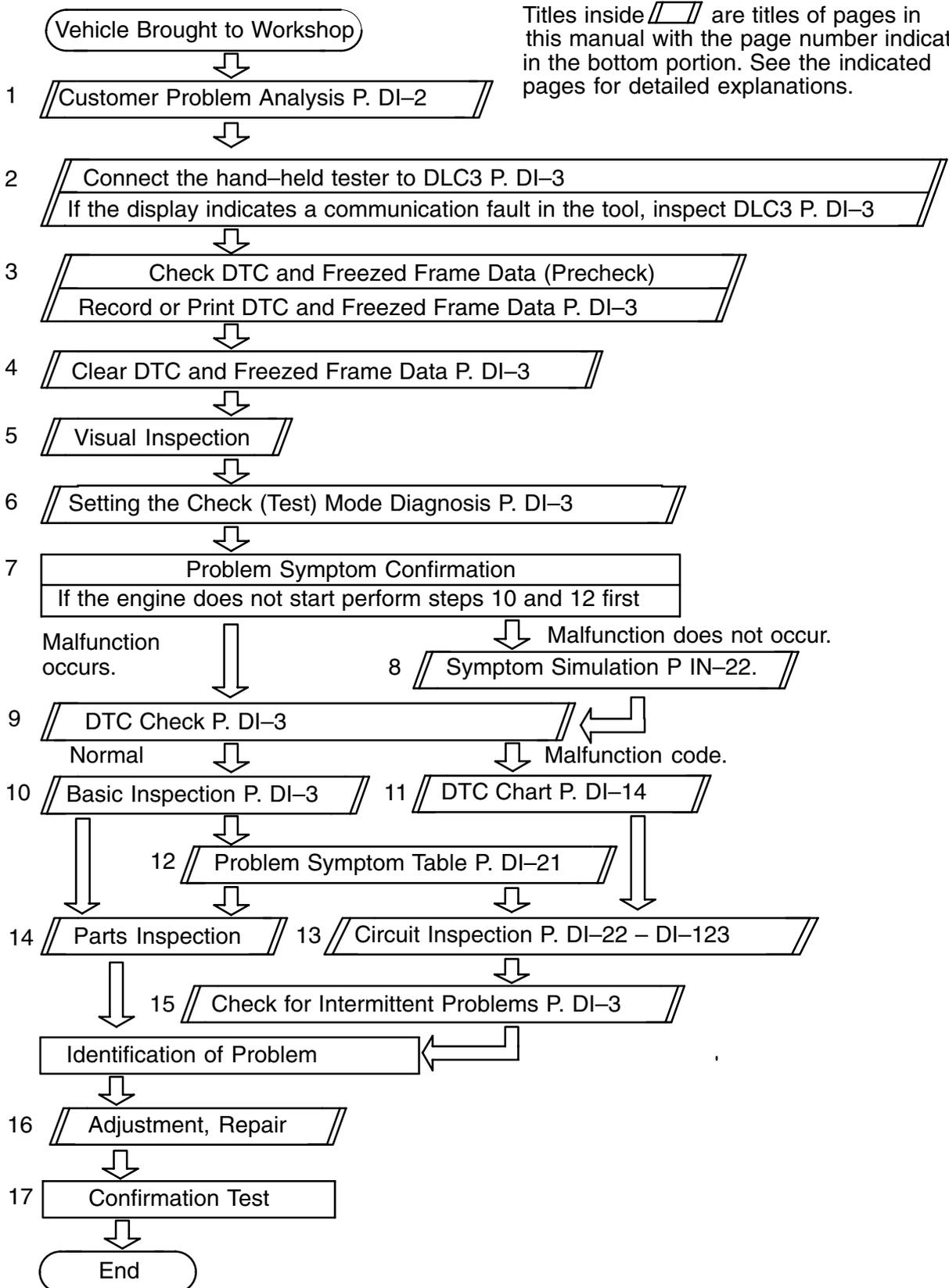
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# ENGINE

## HOW TO PROCEED WITH TROUBLESHOOTING

DI4DW-13

When using hand-held tester, troubleshooting in accordance with the procedure on the following page.



Titles inside **//** are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

# CUSTOMER PROBLEM ANALYSIS CHECK

## ENGINE CONTROL SYSTEM Check Sheet

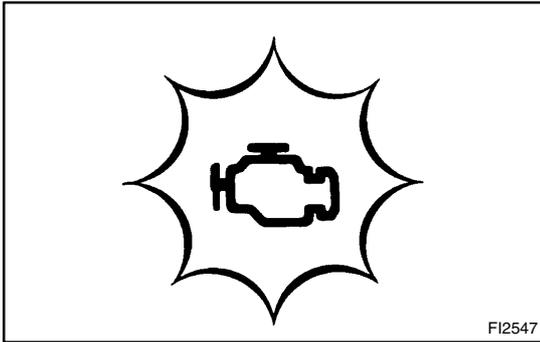
Inspector's Name \_\_\_\_\_

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

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

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

Condition of check engine warning light (CHK ENG)		<input type="checkbox"/> Remains on <input type="checkbox"/> Sometimes light up <input type="checkbox"/> Does not light up		
DTC Inspection	Normal mode (Precheck)	<input type="checkbox"/> Normal	<input type="checkbox"/> Malfunction code(s) (code          ) <input type="checkbox"/> Freezed frame data (          )	
	Check Mode	<input type="checkbox"/> Normal	<input type="checkbox"/> Malfunction code(s) (code          ) <input type="checkbox"/> Freezed frame data (          )	

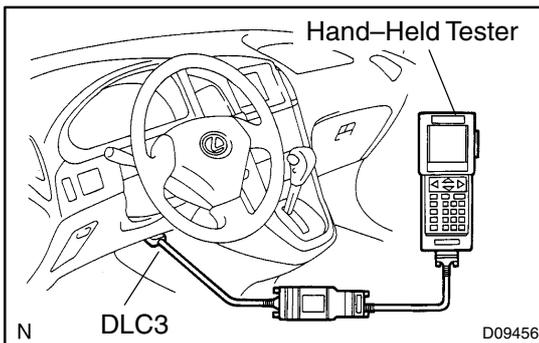


## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

#### (a) Description

- When troubleshooting Euro-OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031-4 or hand-held tester, and read off various data output from the vehicle's engine ECU.
- Euro-OBD regulations require that the vehicle's on-board computer lights up the check engine warning light on the instrument panel when the computer detects a malfunction in the emission control system / components or in the power train control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTC) prescribed by ISO 15031-4 are recorded in the engine ECU memory (See page DI-14). If the malfunction does not reoccur in 3 consecutive trips, the check engine warning light goes off automatically but the DTCs remain recorded in the engine ECU memory.
- When DTC P3190, P3191 are detected and the remain of the fuel is little, the computer judges the cause as a fuel shortage, and after the next trip, when the supply of fuel is confirmed, it turns off MIL, but the memory of DTC still remains.
- To check the DTCs, connect the OBD scan tool or hand-held tester to Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand-held tester also enables you to erase the DTCs and check frozen frame data and various forms of engine data. (For operating instructions, see the OBD scan tool's instruction book.)  
DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page DI-14)



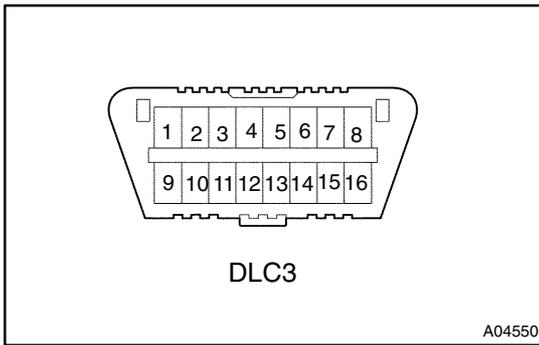
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic\* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting, the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily. (hand-held tester only) (See step 2)
- \*2 trip detection logic: When a malfunction is 1st detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this 2nd detection causes the check engine warning light to light up. (2nd trip)  
(However, the IG switch must be turned OFF between the 1st trip and the 2nd trip.)
- Freeze frame data:  
Freeze frame data records the engine condition when a misfire (DTCs P0300 – P0306) or fuel trim malfunction (DTCs P0171, P0172, P0174, 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 warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

Priorities for troubleshooting:

If troubleshooting priorities for multiple DTCs are given in the applicable DTC chart, these should be followed.

If no instructions are given troubleshoot DTCs according to the following priorities.

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



## (b) Check the DLC3.

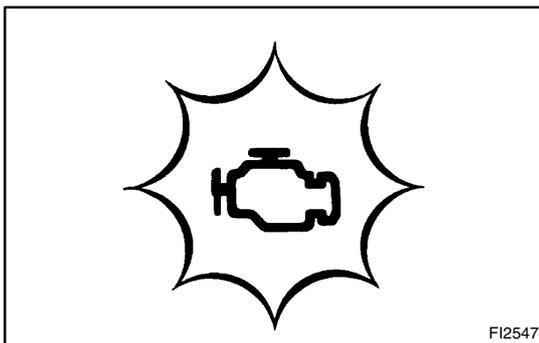
The vehicle's engine ECU uses the ISO 9141-2 communication protocol. The terminal arrangement of DLC3 complies with ISO 15031-03 and matches the ISO 9141-2 format.

Terminal No.	Connection / Voltage or Resistance	Condition
7	Bus $\oplus$ Line / Pulse generation	During transmission
4	Chassis Ground / $\leftrightarrow$ Body Ground 1 $\Omega$ or less	Always
16	Battery Positive / $\leftrightarrow$ Body Ground 9 - 14 V	Always

**HINT:**

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

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

**2. INSPECT DIAGNOSIS (Normal Mode)**

## (a) Check the check engine warning light.

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

**HINT:**

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

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

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

**NOTICE:****Hand-held tester only:**

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

- (1) Prepare the hand-held tester.
  - (2) Connect the hand-held tester to DLC3.
  - (3) Turn the ignition switch ON and switch the hand-held tester main switch ON.
  - (4) Use the hand-held tester to check the DTCs and freeze frame data; note them down. (For operating instructions, see the hand-held tester's instruction book.)
  - (5) See page DI-14 to confirm the details of the DTCs.
- (c) Clear the DTC.
- The following actions will erase the DTCs and freeze frame data.
- Operating the hand-held tester to erase the codes. (See the hand-held tester's instruction book for operating instructions.)
  - Disconnecting the battery terminals or EFI fuse.

**NOTICE:**

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

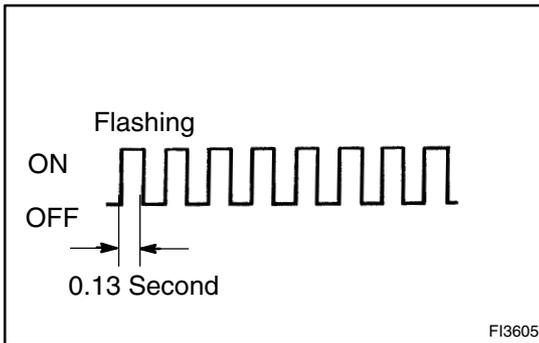
**3. INSPECT DIAGNOSIS (Check (Test) Mode)****HINT:**

Hand-held tester only:

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check (test) mode.

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



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

**NOTICE:**

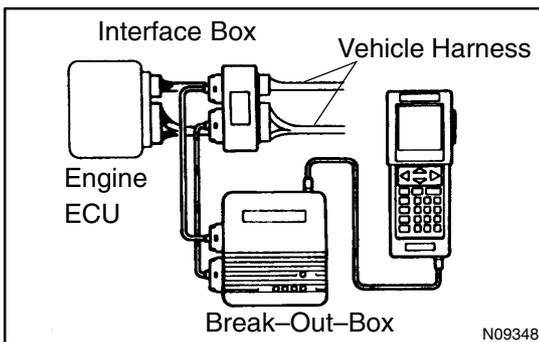
**Leave the ignition switch ON until you have checked the DTC, etc.**

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

**HINT:**

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

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



- (b) Using break-out-box and hand-held tester

- (1) Hook up the break-out-box and hand-held tester to the vehicle.
- (2) Read the engine ECU input/output values following the prompts on the tester screen.

**HINT:**

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

#### 4. FAIL-SAFE CHART

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

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
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	Water temp. is fixed at 80° (176°F)	Returned to normal condition
P0120	VTA is fixed at 0°	The following condition must be repeated at least 2 times consecutively When closed throttle position switch is ON: 0.1 V ≤ VTA and 0.95 V
P0325 P0300	Max. timing retardation	IG switch OFF
P0500	High RPM for cut is prohibited ISC control prohibited	Returned to normal condition
P1300 P1305 P1310 P1315	Fuel cut	Returned to normal condition

## 5. CHECK FOR INTERMITTENT PROBLEMS

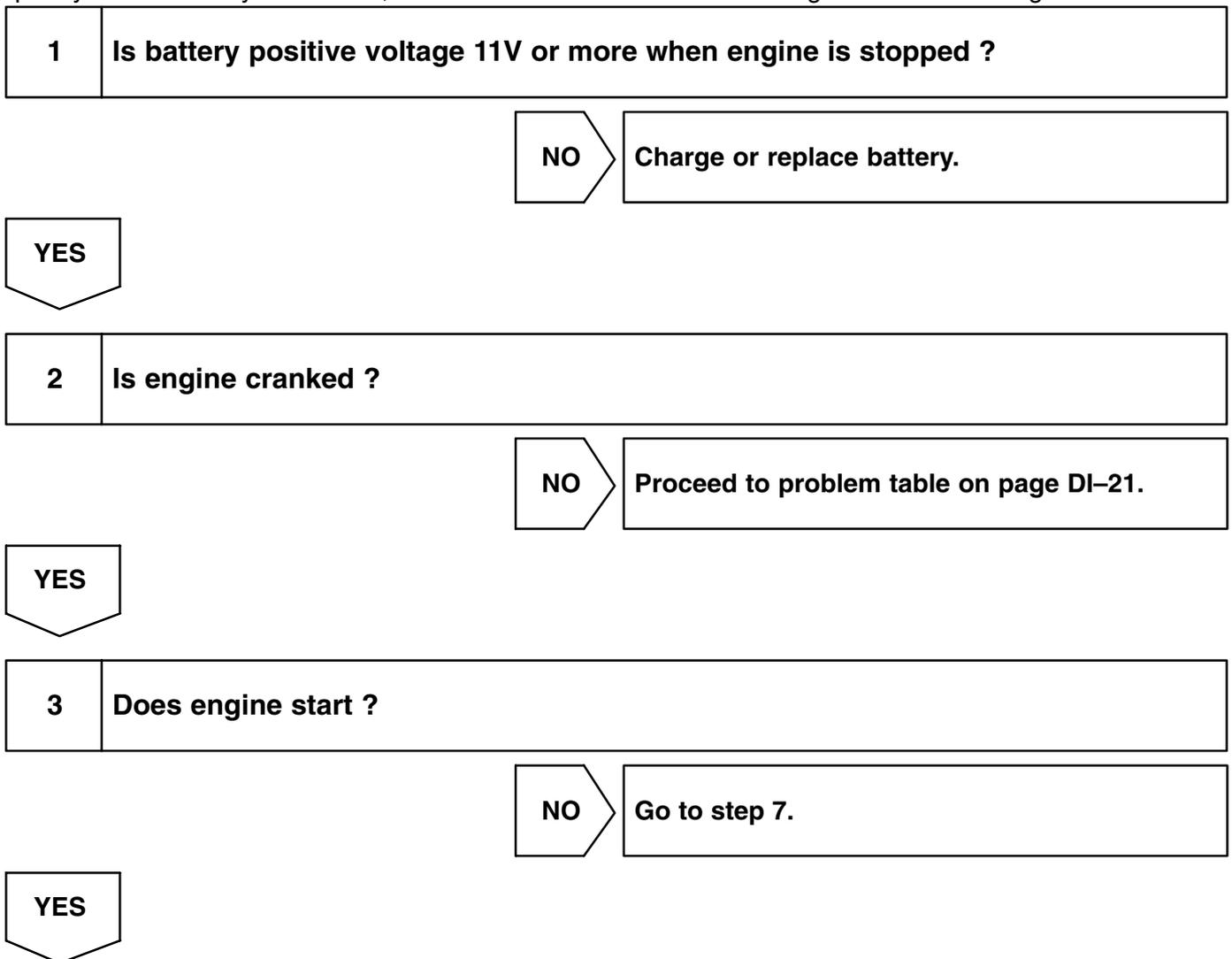
HAND-HELD TESTER only:

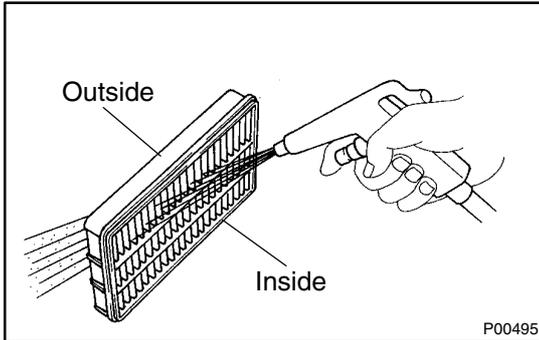
By putting the vehicle's engine ECU in check (test) mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuits is increased. This makes it easier to detect intermittent problems.

- (1) Clear the DTC (See step 3.).
- (2) Set the check (test) mode (See step 3.).
- (3) Perform a simulation test (See page IN-22).
- (4) Check the connector and terminal (See page IN-32).
- (5) Check the visual check and contact pressure (See page IN-32).
- (6) Handle the connector (See page IN-32).

## 6. BASIC INSPECTION

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



**4 Check air filter.****PREPARATION:**

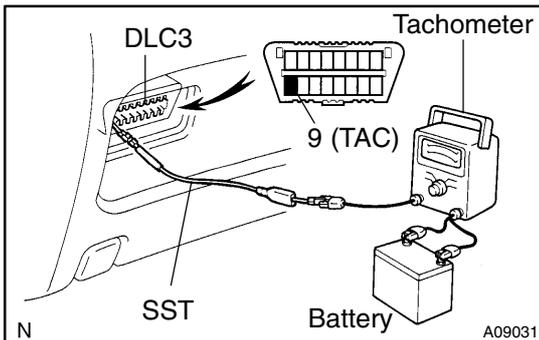
Remove the air filter.

**CHECK:**

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

**HINT:**

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

**NG****Repair or replace.****OK****5 Check engine idle speed.****PREPARATION:**

- Warm up engine to normal operating temperature.
- Switch off all accessories.
- Switch off air conditioning.
- Shift transmission into the "P" position.
- Connect the hand-held tester to DLC3 on the vehicle.
- If you have no hand-held tester, connect tachometer test probe to terminal 9 (TAC) of DLC3.  
SST 09843-18030
- Transit to inspection mode.

**NOTICE:**

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

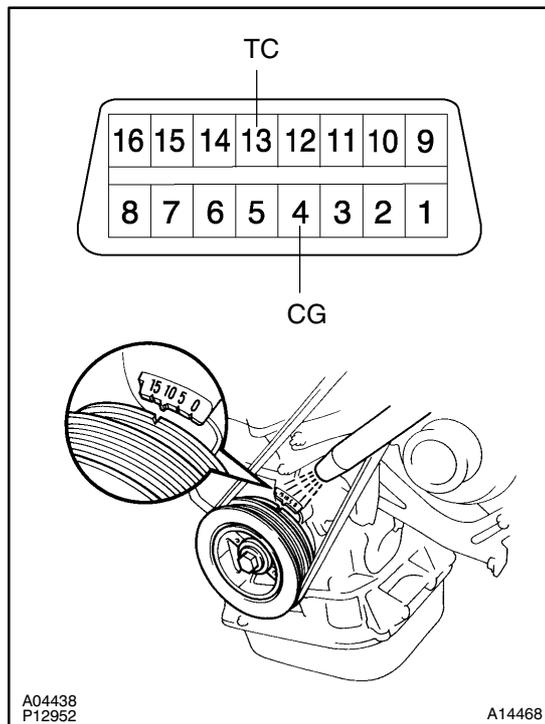
**CHECK:**

Check the idle speed.

**OK:**

**Idle speed: 650 – 750 rpm**

**NG****Proceed to problem symptoms table on page DI-21.****OK**

**6 Check ignition timing.**

**PREPARATION:**

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

**CHECK:**

Check ignition timing.

**OK:**

Ignition timing: 10° BTDC at idle

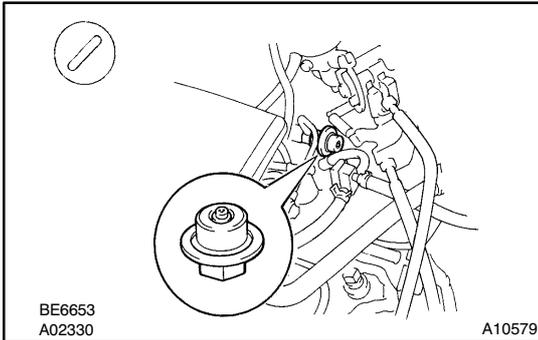
NG

Proceed to page IG-1 and continue to trouble-shoot.

OK

Proceed to problem symptoms table on page DI-21.

## 7 Check fuel pressure.



### PREPARATION:

- (a) Be sure that enough fuel is in the tank.
- (b) Turn the ignition switch ON.
- (c) Connect the hand-held tester to the DLC3.
- (d) Use ACTIVE TEST mode to operate the fuel pump.
- (e) If you have no hand-held tester, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector (See page FI-5 ).

### CHECK:

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

**NG**

**Proceed to page FI-5, and continue to trouble-shoot.**

**OK**

## 8 Check for spark.

### PREPARATION:

- (a) Remove ignition coil.
- (b) Remove the spark plug.
- (c) Install the spark plug to the ignition coil, and connect the ignition coil connector.
- (d) Disconnect the injector connector.
- (e) Be sure to ground the screw of the spark plug securely.

### CHECK:

Check if spark occurs while engine is being cranked.

### NOTICE:

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

**NG**

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

**OK**

**Proceed to problem symptoms table on page DI-21.**

## 7. ENGINE OPERATING CONDITION

### NOTICE:

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

Hand-held tester display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1 OPEN: Air-fuel ratio feedback stopped CLOSED: Air-fuel ratio feedback operating	Idling after warming up: CLOSED
FUEL SYS #2	Fuel System Bank 2 OPEN: Air-fuel ratio feedback stopped CLOSED: Air-fuel ratio feedback operating	Idling after warming up: CLOSED
CALC LOAD	Calculator Load: Current intake air volume as a proportion of max. intake air volume	Idling: 13.1 – 18.7 % Racing without load (2,500rpm): 11.7 – 17.3 %
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 8 – 12°
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): 10.4 – 15.4 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 %
O2S B1 S2	Voltage Output of Oxygen Sensor Bank 1, Sensor 2	Driving 50 km/h (31 mph): 0.05 – 0.95 V
A/FS B1 S1	Voltage Output of A/F Sensor Bank 1 Sensor 1	Idling: 2.8 – 3.8 V
A/FS B2 S1	Voltage Output of A/F Sensor Bank 2 Sensor 1	Idling: 2.8 – 3.8 V
A/FFT B1 S1	A/F Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
A/FFT B2 S1	A/F Sensor Fuel Trim Bank 2, Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
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: 1.6 – 2.9 ms
MIL ON RUN DIST	Distance since activation of check engine warning light	When there is no DTC: 0 km (0 mile)
IAC DUTY RATIO	Intake Air Control Valve Duty Ratio Opening ratio rotary solenoid type IAC valve	Idling: 27 – 47 %
STARTER SIG	Starter Signal	Cranking: ON
CTP SIG	Closed Throttle Position Signal	Throttle fully closed: ON
A/C SIG	A/C Switch Signal	A/C ON: ON
PNP SW	Park/Neutral Position Switch Signal	P or N position: ON
ELCTRCL LOAD SIG	Electrical Load Signal	Defogger switch ON: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: ON

## DIAGNOSTICS – ENGINE

PS OIL PRESS SW	Power Steering Oil Pressure Switch Signal	Turn steering wheel: ON
FC IDL	Fuel Cut Idle: Fuel cut when throttle valve fully closed, during deceleration	Fuel cut operating: ON
FC TAU	Fuel Cut TAU: Fuel cut during very light load	Fuel cut operating: ON
CYL#1 – CYL#6	Abnormal revolution variation for each cylinder	0 %
IGNITION	Total number of ignition for every 1,000 revolutions	0 – 3,000
INTAKE CTRL VSV	Intake Air Control Valve VSV Signal	VSV operating: ON
A/C CUT SIG	A/C Cut Signal	A/C S/W OFF: ON
FUEL PUMP	Fuel Pump Signal	Idling: ON
EVAP (PURGE) VSV	EVAP VSV Signal	VSV operating: Above 30 %
VAPOR PRESS VSV	Vapor Pressure VSV Signal	VSV operating: ON
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.8 – 1.2
TOTAL FT B2	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 2	Idling: 0.8 – 1.2

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

# DIAGNOSTIC TROUBLE CODE CHART

## SAE CONTROLLED

### HINT:

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

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

DTC No. (See Page)	Detection Item	Trouble Area	CHK ENG*1	Memory
P0100 (DI-22)	Mass Air Flow Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in air flow meter circuit</li> <li>• Air flow meter</li> <li>• Engine ECU</li> </ul>	○	○
P0101 (DI-26)	Mass Air Flow Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>• Air flow meter</li> </ul>	○	○
P0110 (DI-26)	Intake Air Temp. Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in intake air temp. sensor circuit</li> <li>• Intake air temp. sensor (built into air flow meter)</li> <li>• Engine ECU</li> </ul>	○	○
P0115 (DI-31)	Engine Coolant Temp. Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in water temp. sensor circuit</li> <li>• Water temp. sensor</li> <li>• Engine ECU</li> </ul>	○	○
P0116 (DI-35)	Engine Coolant Temp. Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>• Engine coolant temp. sensor</li> <li>• Cooling system</li> </ul>	○	○
P0120 (DI-36)	Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in throttle position sensor circuit</li> <li>• Throttle position sensor</li> <li>• Engine ECU</li> </ul>	○	○
P0121 (DI-41)	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>• Throttle position sensor</li> </ul>	○	○
P0125 (DI-42)	Insufficient Coolant Temp. for Closed Loop Fuel Control	<ul style="list-style-type: none"> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Injector injection</li> <li>• Gas leakage on exhaust system</li> <li>• Open or short in heated oxygen sensor (bank 1 sensor 1) circuit</li> <li>• Oxygen sensor (bank 1 sensor 1)</li> </ul>	○	○
P0136*2 (DI-48)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	<ul style="list-style-type: none"> <li>• Open or short in heater circuit of oxygen sensor</li> <li>• Oxygen sensor</li> </ul>	○	○
P0141 (DI-50)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	<ul style="list-style-type: none"> <li>• Same as DTC No. P0135</li> </ul>	○	○
P0171*2 (DI-52)	Fuel Trim System too Lean (A/F Lean Malfunction, Bank 1)	<ul style="list-style-type: none"> <li>• Air intake (hose loose)</li> <li>• Fuel line pressure</li> <li>• Injector blockage</li> <li>• Oxygen sensor malfunction</li> <li>• Air flow meter</li> <li>• Water temp. sensor</li> </ul>	○	○
P0172*2 (DI-52)	System too Rich (A/F Rich Malfunction Bank 1)	<ul style="list-style-type: none"> <li>• Fuel line pressure</li> <li>• Injector leak, blockage</li> <li>• Heated oxygen sensor malfunction</li> <li>• Mass air flow meter</li> <li>• Engine coolant temp. sensor</li> <li>• Gas leakage on exhaust system</li> </ul>	○	○

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P0174 <sup>*2</sup> (DI-52)	System too Lean (A/F Lean Malfunction Bank 2)	Same as DTC No. P0171	○	○
P0175 <sup>*2</sup> (DI-52)	System too Rich (A/F Rich Malfunction Bank 2)	Same as DTC No. P0172	○	○
P0300 <sup>*2</sup> (DI-57)	Random/MultipleCylinder Misfire Detected	<ul style="list-style-type: none"> <li>• Ignition system</li> <li>• Injector</li> <li>• Fuel pressure</li> <li>• Compression pressure</li> <li>• Valve clearance</li> <li>• Valve timing</li> <li>• Air flow meter</li> <li>• Water temp. sensor</li> <li>• Open or short in engine wire</li> <li>• Connectorconnection</li> <li>• Engine ECU</li> </ul>	○	○
P0301 <sup>*2</sup> (DI-57)	Cylinder 1 Misfire Detected			
P0302 <sup>*2</sup> (DI-57)	Cylinder 2 Misfire Detected			
P0303 <sup>*2</sup> (DI-57)	Cylinder 3 Misfire Detected			
P0304 <sup>*2</sup> (DI-57)	Cylinder 4 Misfire Detected			
P0305 <sup>*2</sup> (DI-57)	Cylinder 5 Misfire Detected			
P0306 <sup>*2</sup> (DI-57)	Cylinder 6 Misfire Detected			
P0325 (DI-63)	Knock Sensor 1 Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in knock sensor 1 circuit</li> <li>• Knock sensor 1 (looseness)</li> <li>• Engine ECU</li> </ul>	○	○
P0330 (DI-63)	Knock Sensor 2 Circuit Malfunction (Bank 2)	<ul style="list-style-type: none"> <li>• Open or short in knock sensor 2 circuit</li> <li>• Knock sensor 2 (looseness)</li> <li>• Engine ECU</li> </ul>	○	○
P0335 (DI-67)	Crankshaft Position Sensor "A" Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in crankshaft position sensor circuit</li> <li>• Crankshaft position sensor</li> <li>• Signal plate</li> <li>• Engine ECU</li> </ul>	○	○
P0340 (DI-69)	Camshaft Position Sensor Circuit Malfunction	<ul style="list-style-type: none"> <li>• Open or short in camshaft position sensor circuit</li> <li>• Camshaft position sensor</li> <li>• Engine ECU</li> </ul>	○	○
P0420 <sup>*2</sup> (DI-71)	Catalyst System Efficiency Below Threshold (Bank 1)	<ul style="list-style-type: none"> <li>• Gas leakage on exhaust system</li> <li>• Oxygen sensor</li> <li>• Three-way catalytic converter</li> </ul>	○	○
P0443 (DI-74)	Evaporative Emission Control System Purge Control Vent Control Malfunction	<ul style="list-style-type: none"> <li>• Open or short in VSV circuit for EVAP</li> <li>• VSV for EVAP</li> <li>• Engine ECU</li> </ul>	○	○
P0500 (DI-77)	Vehicle Speed Sensor Malfunction	<ul style="list-style-type: none"> <li>• Combinationmeter</li> <li>• Open or short in No.1 vehicle speed sensor circuit</li> <li>• Engine ECU</li> <li>• No.1 vehicle speed sensor</li> </ul>	○	○
P0505 (DI-80)	Idle Control System Malfunction	<ul style="list-style-type: none"> <li>• Open or short in ISC valve circuit</li> <li>• ISC valve is stuck or closed</li> <li>• Open or short in A/C signal circuit</li> <li>• Air induction system</li> <li>• Engine ECU</li> </ul>	○	○
P1130 <sup>*2</sup> (DI-85)	A/F Sensor Circuit Range/Perfor- mance Malfunction (Bank 1 Sen- sor 1)	<ul style="list-style-type: none"> <li>• Open or short in A/F sensor circuit</li> <li>• A/F sensor</li> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Injector</li> <li>• Engine ECM</li> </ul>	○	○

P1133*2 (DI-90)	A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>• Open or short in A/F sensor circuit</li> <li>• A/F sensor</li> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Injector</li> <li>• Engine ECM</li> </ul>	○	○
P1135 (DI-94)	A/F Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>• Open or short in heater circuit of A/F sensor</li> <li>• A/F sensor heater</li> <li>• Engine ECM</li> </ul>	○	○
P1150*2 (DI-85)	A/F Sensor Circuit Range/Performance Malfunction (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>• Same as DTC No. P1130</li> </ul>	○	○
P1153*2 (DI-90)	A/F Sensor Circuit Response Malfunction (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>• Same as DTC No. P1133</li> </ul>	○	○
P1155 (DI-94)	A/F Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>• Same as DTC No. P1135</li> </ul>	○	○
P1300 (DI-96)	Igniter Circuit Malfunction (No.1)	<ul style="list-style-type: none"> <li>• Open or short in IGF and IGT1 circuit from ignition coil with igniter to Engine ECU</li> <li>• No.1 ignition coil with igniter</li> <li>• Engine ECU</li> </ul>	○	○
P1305 (DI-96)	Igniter Circuit Malfunction (No.2)	<ul style="list-style-type: none"> <li>• Open or short in IGF or IGT2 circuit from No.2 ignition coil with igniter to engine ECU</li> <li>• No.2 ignition coil with igniter</li> <li>• Engine ECU</li> </ul>	○	○
P1310 (DI-96)	Igniter Circuit Malfunction (No.3)	<ul style="list-style-type: none"> <li>• Open or short in IGF and IGT3 circuit from ignition coil with igniter to Engine ECU</li> <li>• No.3 ignition coil with igniter</li> <li>• Engine ECU</li> </ul>	○	○
P1315 (DI-96)	Igniter Circuit Malfunction (No.4)	<ul style="list-style-type: none"> <li>• Open or short in IGF or IGT4 circuit from No.4 ignition coil with igniter to engine ECU</li> <li>• No.4 ignition coil with igniter</li> <li>• Engine ECU</li> </ul>	○	○
P1320/14 (DI-96)	Igniter Circuit Malfunction (No.5)	<ul style="list-style-type: none"> <li>• Ignition system</li> <li>• Open or short in IGF or IGT5 circuit from igniter to engine ECU</li> <li>• Igniter</li> <li>• Engine ECU</li> </ul>	○	○
P1325/14 (DI-96)	Igniter Circuit Malfunction (No.6)	<ul style="list-style-type: none"> <li>• Ignition system</li> <li>• Open or short in IGF or IGT6 circuit from igniter to engine ECU</li> <li>• Igniter</li> <li>• Engine ECU</li> </ul>	○	○
P1335/13 (DI-101)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	<ul style="list-style-type: none"> <li>• Open or short in crankshaft position sensor circuit</li> <li>• Crankshaft position sensor</li> <li>• Crankshaft timing pulley</li> <li>• Engine ECU</li> </ul>	–	○
P1346 (DI-102)	VVT Sensor Circuit Range/Performance Problem (Bank 1)	<ul style="list-style-type: none"> <li>• Mechanical system (Jumping teeth of timing belt, belt stretched)</li> <li>• Engine ECU</li> </ul>	○	○
P1349 (DI-103)	VVT System Malfunction (Bank 1)	<ul style="list-style-type: none"> <li>• Valve timing</li> <li>• OCV</li> <li>• VVT controller assembly</li> <li>• Engine ECU</li> </ul>	○	○
P1350 (DI-109)	VVT Sensor/Camshaft position Sensor Circuit Malfunction (Bank 2)	<ul style="list-style-type: none"> <li>• Open or short in VVT sensor (camshaft position Sensor) circuit</li> <li>• VVT sensor (camshaft position Sensor)</li> <li>• Engine ECU</li> </ul>	○	○

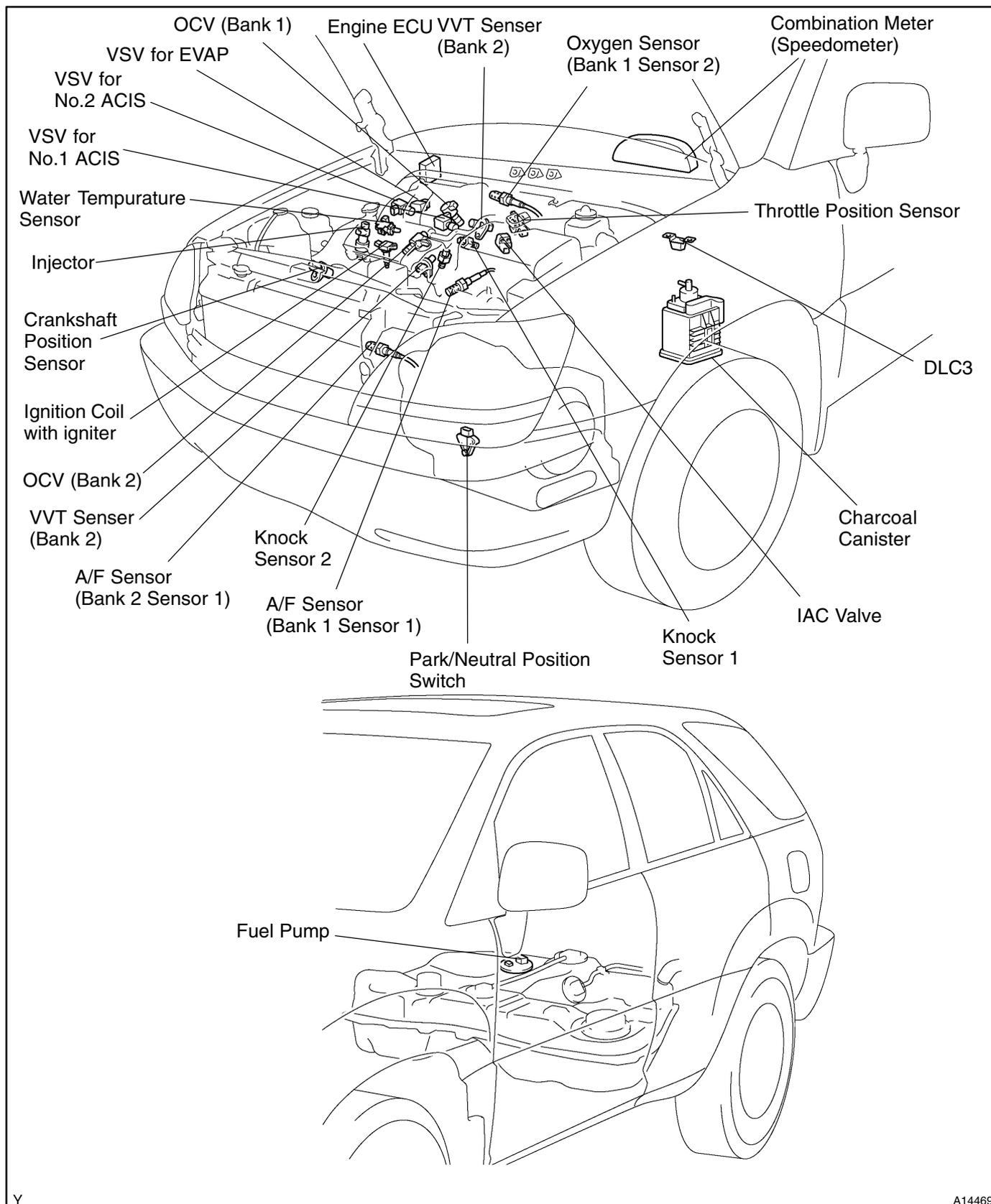
## DIAGNOSTICS – ENGINE

P1351 (DI-102)	VVT Sensor/Camshaft position Sensor Circuit Range/Performance Problem (Bank 2)	• Same as DTC No. P1346	○	○
P1354 (DI-103)	VVT System Malfunction (Bank 2)	• Same as DTC No. P1349	○	○
P1520 (DI-111)	Stop Light Switch Signal Malfunction	• Short in stop light switch signal circuit • Stop light switch • Engine ECU	○	○
P1600 (DI-113)	Engine ECU BATT Malfunction	• Open in back up power source circuit • Engine ECU	○	○
P1645 (DI-115)	Body ECU Malfunction	• Body ECU • A/C ECU • Communicationbus	–	○
P1651 (DI-116)	VSV for ACIS Circuit Malfunction (European spec.)	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU	○	○
P1656 (DI-120)	OCV Circuit Malfunction (Bank 1)	• Open or short in OCV circuit • OCV	○	○
P1663 (DI-120)	OCV Circuit Malfunction (Bank 2)	• Engine ECM		
P1666 (DI-116)	VSV for AICS circuit Malfunction	• Open or short in VSV circuit • VSV • Engine ECM	○	○
P1780 (DI-123)	Park/Neutral Position Switch Malfunction	• Short in park/neutral position switch circuit • Park/neutral position switch • Engine ECM	○	○

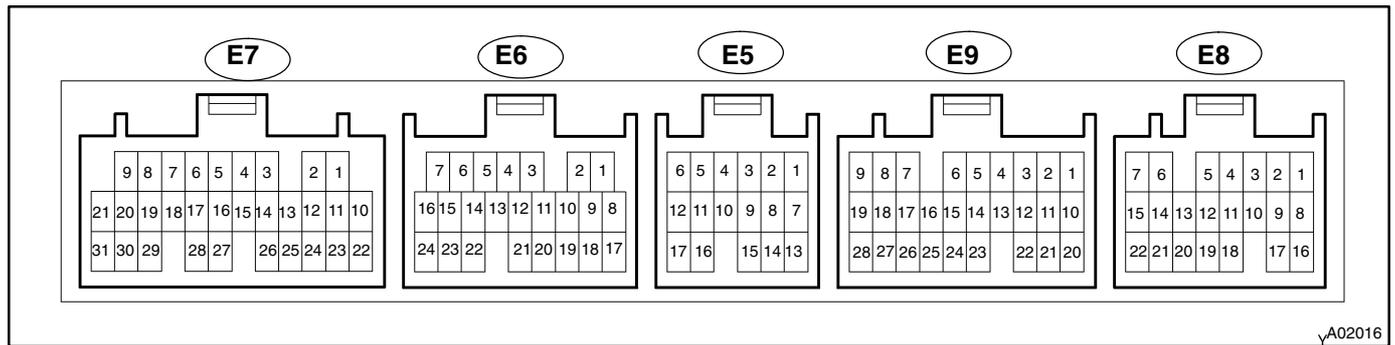
\*1: – Check engine warning light does not light up. ○ Check engine warning light lights up.

\*2: Europe only

# PARTS LOCATION



## TERMINALS OF ECU



A02016

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E9-1) – E1 (E7-17)	B-Y ↔ BR	Always	9 – 14
+B (E9-16) – E1 (E7-17)	B-R ↔ BR	IG switch ON	9 – 14
VC (E7-2) – E2 (E7-18)	Y-B ↔ BR	IG switch ON	4.5 – 5.5
VTA1 (E7-23) – E2 (E7-18)	L-W ↔ BR	IG switch ON, Throttle valve fully closed	0.3 – 1.0
		IG switch ON, Throttle valve fully open	2.7 – 5.2
VG (E7-10) – E2G (E7-19)	Y-R ↔ G-B	Idling, A/C switch OFF	1.1 – 1.5
THA (E7-22) – E2 (E7-18)	L-B ↔ BR	Idling, Intake air temp. 20°C (68°F)	0.5 – 3.4
THW (E7-14) – E2 (E7-18)	G-W ↔ BR	Idling, Engine coolant temp. 80°C (176°F)	0.2 – 1.0
STA (E9-7) – E1 (E7-17)	B ↔ BR	Cranking	6.0 or more
#10 (E7-5) – E01 (E8-21)	W ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-57)
#20 (E7-6) – E01 (E8-21)	Y ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-57)
#30 (E8-1) – E01 (E8-21)	B ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-57)
#40 (E8-2) – E01 (E8-21)	L ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-57)
#50 (E8-3) – E01 (E8-21)	R ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-57)
#60 (E8-4) – E01 (E8-21)	G ↔ W-B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-57)
OC1+(E8-6) – OC1- (E8-5)	Y-B ↔ G-W	IG switch ON	Pulse generation (See page DI-127)
OC2+(E8-29) – OC2-(E8-18)	G-R ↔ G-Y		
IGT1 (E8-11) – E1 (E7-17)	B-Y ↔ BR	Idling	Pulse generation (See page DI-96)
IGT2 (E8-12) – E1 (E7-17)	L-R ↔ BR		
IGT3 (E8-13) – E1 (E7-17)	Y-G ↔ BR		
IGT4 (E8-14) – E1 (E7-17)	L-Y ↔ BR		
IGT5 (E8-15) – E1 (E7-17)	Y ↔ BR		
IGT6 (E8-16) – E1 (E7-17)	G-B ↔ BR		
VV2 (E8-22) – E1 (E7-17)	L ↔ BR		

IGF (E8-25) – E1 (E7-17)	B ↔ BR	IG switch ON	4.5 – 5.5
		Idling	Pulse generation (See page DI-96)
VV1+ (E8-10) – NE- (E8-24)	O ↔ W	Idling	Pulse generation (See page DI-67)
NE+ (E8-16) – NE- (E8-24)	B ↔ W	Idling	Pulse generation (See page DI-67)
ACIS (E8-17) – E01 (E8-21)	R-Y ↔ W-B	IG switch ON	9 – 14
ACI1 (E7-15) – E01 (E8-21)	LG ↔ W-B		
FC (E9-3) – E01 (E8-21)	L-Y ↔ W-B	IG switch ON	9 – 14
		Idling	0 – 3.0
EVP1 (E7-7) – E01 (E8-21)	W-L ↔ W-B	IG switch ON	9 – 14
RSO (E8-26) – E01 (E8-21)	Y-R ↔ W-B	IG switch ON, Disconnect E17 connector from engine ECU	9 – 14
OXS (E10-8) – E1 (E7-17)	W ↔ BR	Maintain engine speed at 2,500 rpm for 3 min. after warming up	Pulse generation (See page DI-71)
HTS (E10-9) – E03 (E8-30)	B ↔ W-B	Idling	9 – 14
		IG switch ON	Below 3.0
KNKR (E8-27) – E1 (E7-17)	W ↔ BR	Idling	Pulse generation (See page DI-63)
KNKL (E8-28) – E1 (E7-17)	B ↔ BR		
NSW (E10-20) – E1 (E7-17)	B-W ↔ BR	IG switch ON, Other shift position in P, N	9 – 14
		IG switch ON, Shift position in P, N	0 – 3.0
SPD (E10-22) – E1 (E7-17)	V-W ↔ BR	IG switch ON, Rotate driving wheel slowly	0 – 5
TC (E10-5) – E1 (E7-17)	P-B ↔ BR	IG switch ON	9 – 14
W (E9-6) – E01 (E8-21)	Y-G ↔ W-B	IG switch ON	Below 3.0
PS (E7-9) – E1 (E7-17)	B-Y ↔ BR	IG switch ON	9 – 14
CF (E10-26) – E1 (E7-17)	R-W ↔ BR	Electric cooling fan is operating on high speed	9 – 14
		Electric cooling fan is operating on low speed or OFF	0 – 2
TACH (E10-27) – E1 (E7-17)	O ↔ BR	Idling	Pulse generation
SIL (E9-4) – E1 (E7-17)	W ↔ BR	During transmission	Pulse generation
STP (E9-15) – E1 (E7-17)	G-O ↔ BR	IG switch ON, Brake pedal depressed	7.5 – 14
		IG switch ON, Brake pedal released	Below 1.5
AFR+ (E7-11) – E1 (E7-17)	R ↔ BR	IG switch ON	3.3
AFL+ (E7-12) – E1 (E7-17)	L ↔ BR		
AFR- (E7-20) – E1 (E7-17)	G ↔ BR	IG switch ON	3.0
AFL- (E7-21) – E1 (E7-17)	B-W ↔ BR		
HAFR (E7-3) – E04 (E7-1)	L ↔ W-B	IG switch ON	Below 3.0
		Idling (warm up engine)	Pulse generation
HAFL (E7-4) – E05 (E7-8)	G ↔ W-B	IG switch ON	Below 3.0
		Idling (warm up engine)	Pulse generation
KSW (E10-23) – E1 (E7-17)	L ↔ BR	At time of inserting the key	Below 1.5
		In condition without the key inserted	4 – 5
RXCK (E10-19) – E1 (E7-17)	P ↔ BR	At time of inserting the key	Pulse generation
CODE (E10-28) – E1 (E7-17)	V ↔ BR	At time of inserting the key	Pulse generation
IGSW (E9-2) – E1 (E7-17)	B-O ↔ BR	IG switch ON	9 – 14
TXCT (E10-18) – E1 (E7-17)	GR ↔ BR	At time of inserting the key	Pulse
IMLO (E9-22) – E1 (E7-17)	L ↔ BR	In condition without the key inserted	Pulse
MREL (E9-8) – E1 (E7-17)	B-W ↔ BR	IG switch ON	9 – 14

**PROBLEM SYMPTOMS TABLE**

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay 2. Neutral start switch circuit	ST-2 ST-20 DI-140
No initial combustion (Does not start)	1. Engine immobiliser system 2. ECU power source circuit 3. Fuel pump control circuit	BE-2 DI-124 DI-128
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-128
Under normal condition (Difficult to start)	1. Fuel pump control circuit 2. Compression	DI-128 EM-3
Cold engine (Difficult to start)	1. Fuel pump control circuit	DI-128
Hot engine (Difficult to start)	1. Fuel pump control circuit	DI-128
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECU power source circuit	– DI-124
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	– DI-128
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM-3 DI-128
Hunting (Poor idling)	1. ECU power source circuit 2. Fuel pump control circuit	DI-124 DI-128
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit	DI-128
Surging (Poor driveability)	1. Fuel pump control circuit	DI-128
Soon after starting (Engine stall)	1. Engine immobiliser system 2. Fuel pump control circuit	BE-2 DI-128
During A/C operation (Engine stall)	1. A/C signal circuit (Compressor circuit) 2. Engine ECU	– IN-22

## CIRCUIT INSPECTION

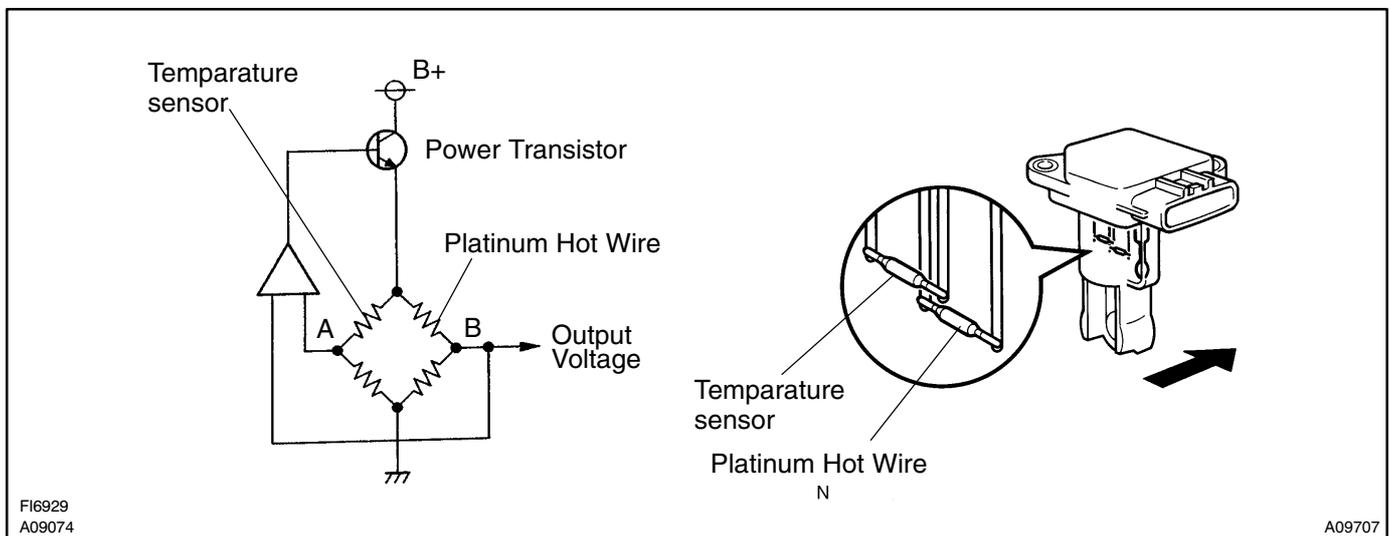
<b>DTC</b>	<b>P0100</b>	<b>Mass Air Flow Circuit Malfunction</b>
------------	--------------	--

### CIRCUIT DESCRIPTION

The 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 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.



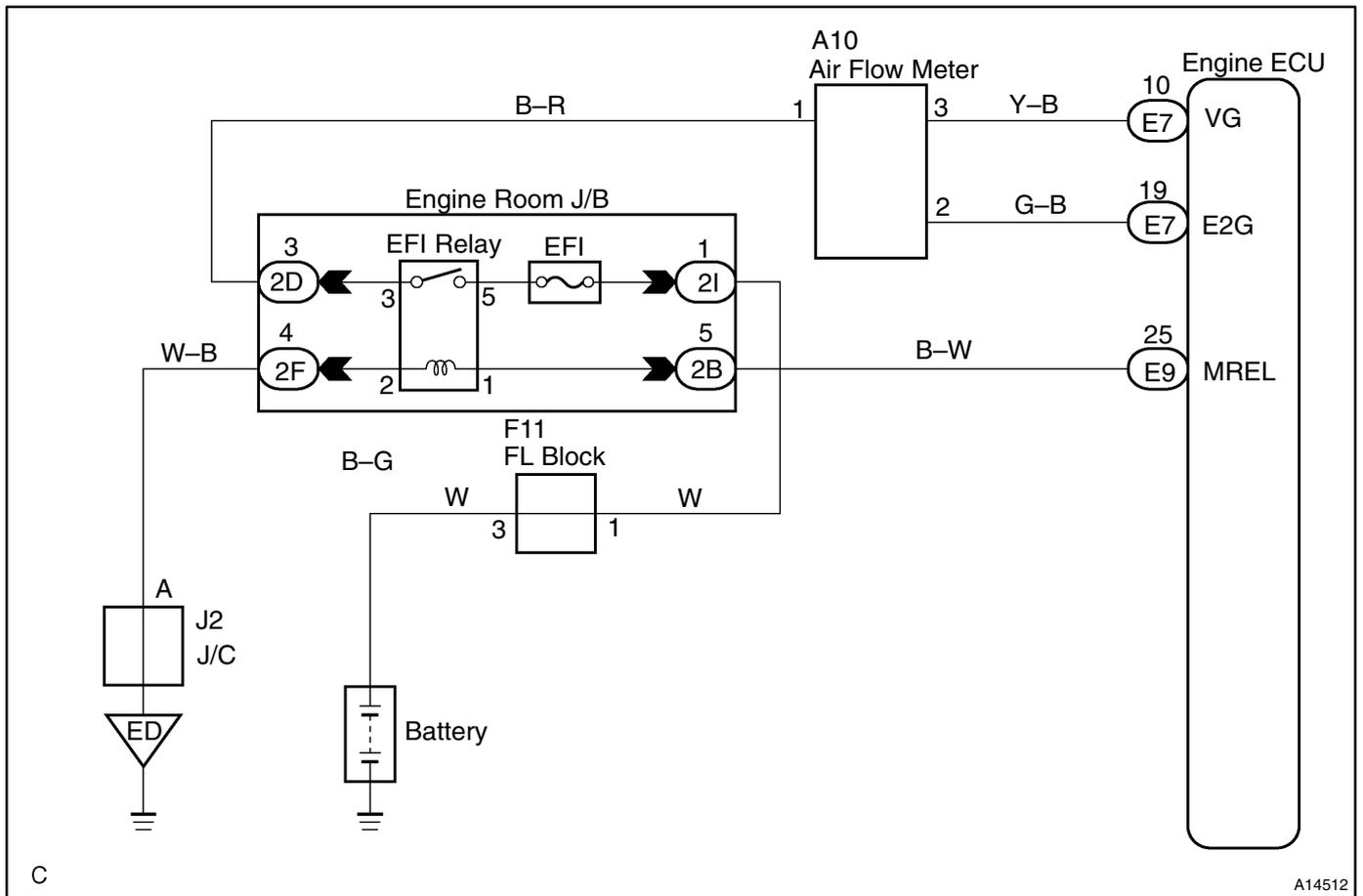
DTC No.	DTC Detecting Condition	Trouble Area
P0100	Open or short in air flow meter circuit with more than 3 sec. engine speed less than 4,000 rpm	<ul style="list-style-type: none"> <li>• Open or short in air flow meter circuit</li> <li>• Air flow meter</li> <li>• Engine ECU</li> </ul>

#### HINT:

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

Air Flow Value (gm/sec.)	Malfunction
Approx. 0.0	<ul style="list-style-type: none"> <li>• Air flow meter power source circuit open</li> <li>• VG circuit open or short</li> </ul>
271.0 or more	<ul style="list-style-type: none"> <li>• EVG circuit open</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

HINT:

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

<b>1</b>	<b>Connect hand-held tester, and read value of air flow rate.</b>
----------	---

**PREPARATION:**

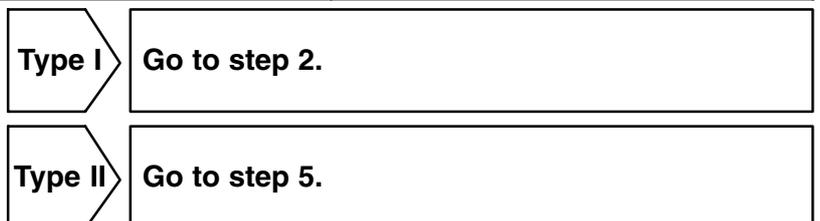
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Start the engine.

**CHECK:**

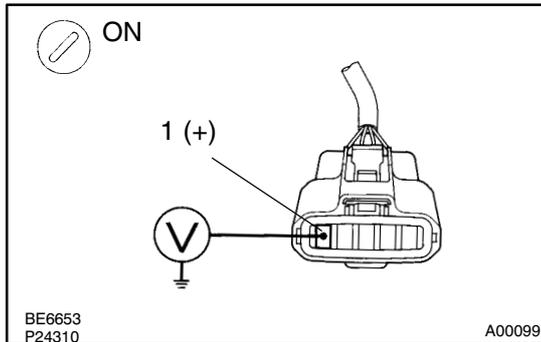
Read air flow rate on the hand-held tester.

**RESULT:**

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



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



### PREPARATION:

- Disconnect the air flow meter connector.
- Turn the ignition switch ON.

### CHECK:

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

### OK:

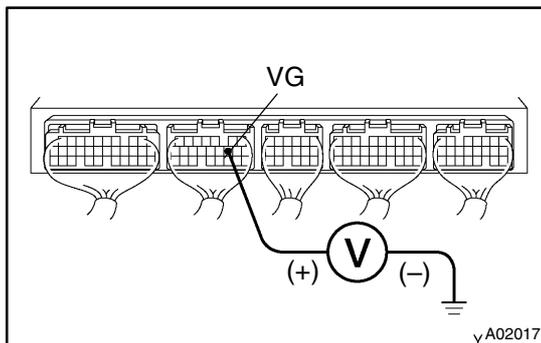
**Voltage: 9 – 14 V**

**NG**

**Check for open in harness and connector between EFI main relay (Marking: EFI) and air flow meter (See page IN-32).**

**OK**

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



### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Start the engine.

### CHECK:

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

### OK:

**Voltage:**

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

**OK**

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

**NG**

## 4 Check for open and short in harness and connector between air flow meter and engine ECU (See page IN-32).

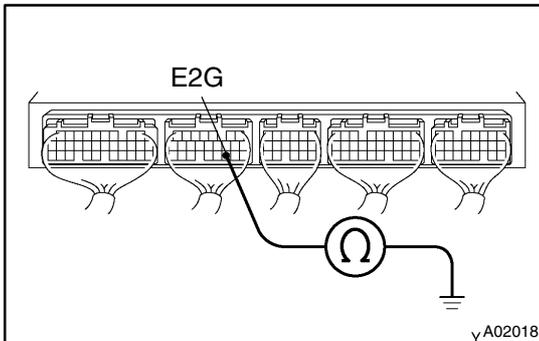
**NG**

**Repair or replace harness or connector.**

**OK**

Replace air flow meter.

- 5** Check continuity between terminal E2G of engine ECU connector and body ground.



**PREPARATION:**

Remove the engine ECU with connector still connected (See page FI-70).

**CHECK:**

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

**OK:**

Continuity (1  $\Omega$  or less)

NG

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

OK

- 6** Check for open in harness and connector between air flow meter and engine ECU (See page IN-32).

NG

Repair or replace harness or connector.

OK

Replace air flow meter.

<b>DTC</b>	<b>P0101</b>	<b>Mass Air Flow Circuit Range/Performance Problem</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0100 on page DI-22.

DTC No.	DTC Detecting Condition	Trouble Area
P0101	After engine is warmed up, conditions (1), (2) and (3) continue with more than 10 sec. engine speed 1,500 rpm or less: (2 trip detection logic) 1. Throttle valve fully closed 2. Air flow meter output > 2.2 V 3. THW > 70 °C (158 °F)	• Air flow meter
	Conditions (1) and (2) continue with more than 10 sec. engine speed 2,100 rpm or more: (2 trip detection logic) 1. VTA $\geq$ 0.63 V 2. Air flow meter output < 1.06 V	

## INSPECTION PROCEDURE

HINT:

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

<b>1</b>	<b>Are there any other codes (besides DTC P0101) being output?</b>
----------	--

**NO**

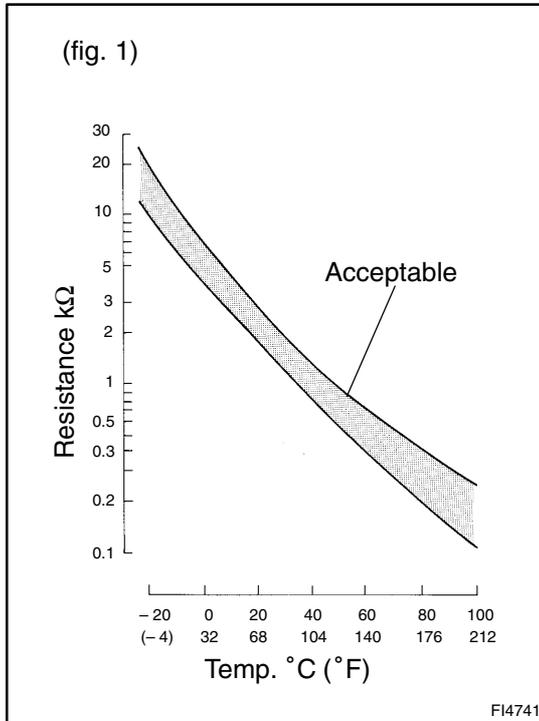
**Replace air flow meter.**

**YES**

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

<b>DTC</b>	<b>P0110</b>	<b>Intake Air Temp. Circuit Malfunction</b>
------------	--------------	---

## CIRCUIT DESCRIPTION



The intake air temp. sensor is built into the air flow meter and senses the intake air temperature.

A thermistor built in the sensor changes the resistance value according to the intake air temperature.

The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See fig. 1).

The intake air temp. sensor is connected to the engine ECU (See below). The 5 V power source voltage in the engine ECU is applied to the intake air temp. sensor from the terminal THA (THAR) via resistor R.

That is, the resistor R and the intake air temp. sensor are connected in series. When the resistance value of the intake air temp. sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA (THAR) also changes. Based on this signal, the engine ECU increases the fuel injection volume to improve driveability during cold engine operation.

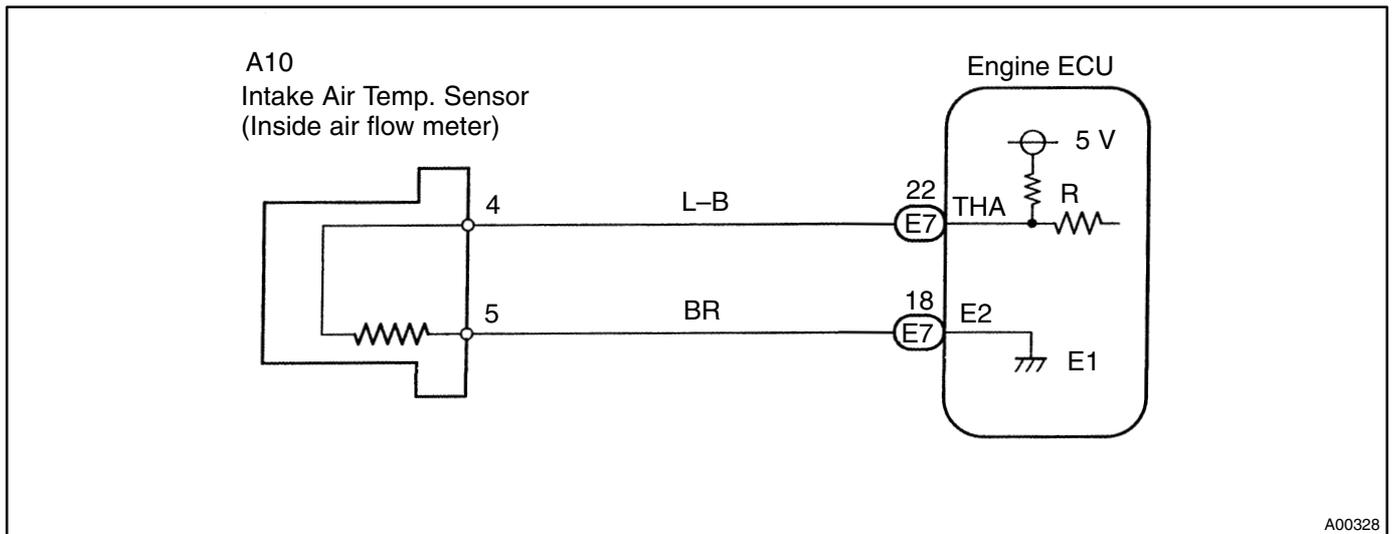
DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temp. sensor circuit	<ul style="list-style-type: none"> <li>• Open or short in intake air temp. sensor circuit</li> <li>• Intake air temp. sensor (inside air flow meter)</li> <li>• Engine ECU</li> </ul>

### HINT:

After confirming DTC P0110 use the hand-held tester to confirm the intake air temperature from CURRENT DATA.

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

## WIRING DIAGRAM



A00328

## INSPECTION PROCEDURE

### HINT:

- If DTC P0110, P0115, P0120 are output simultaneously, E2 (Sensor Ground) may be open.
- Read freeze frame data using hand-held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

<b>1</b>	<b>Connect hand-held tester, and read value of intake air temperature.</b>
----------	--

### PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.

### CHECK:

Read temperature value on the hand-held tester.

### OK:

**Same as actual intake air temperature**

### HINT:

- If there is open circuit, hand-held tester indicates  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ).
- If there is short circuit, hand-held tester indicates  $140^{\circ}\text{C}$  ( $284^{\circ}\text{F}$ ) or more.

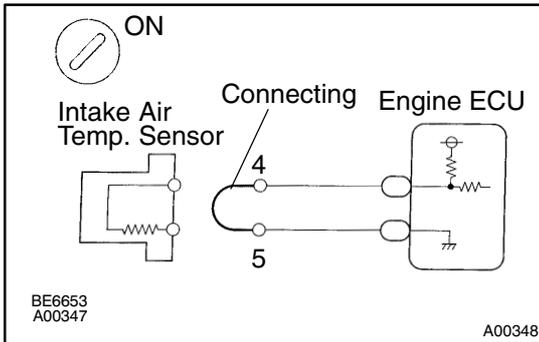
**NG**

**$-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ )...Go to step 2  
 $140^{\circ}\text{C}$  ( $284^{\circ}\text{F}$ ) or more...Go to step 4.**

**OK**

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

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



### PREPARATION:

- Disconnect the air flow meter connector.
- Connect the sensor wire harness terminals together.
- Turn the ignition switch ON.

### CHECK:

Read temperature value on the hand-held tester.

### OK:

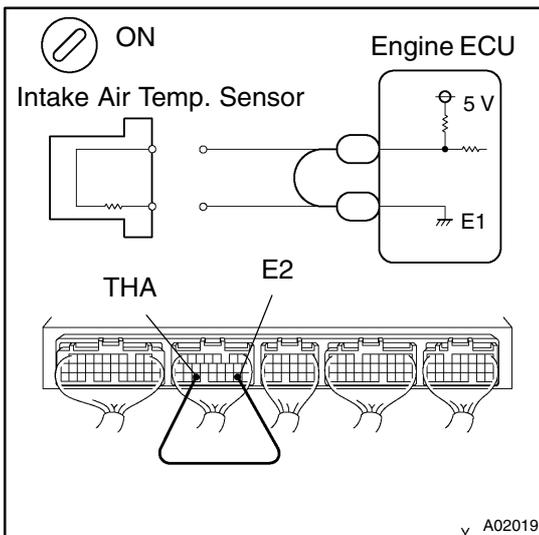
Temperature value: 140°C (284°F) or more

OK

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

NG

## 3 Check for open in harness or engine ECU.



### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Connect between terminals THA and E2 of the engine ECU connector.

### HINT:

Air flow meter connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN-32).

### CHECK:

Read temperature value on the hand-held tester.

### OK:

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

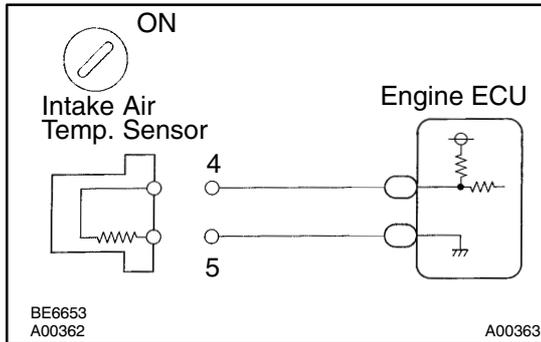
OK

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

NG

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

#### 4 Check for short in harness and engine ECU.



#### PREPARATION:

- Disconnect the air flow meter connector.
- Turn the ignition switch ON.

#### CHECK:

Read temperature value on the hand-held tester.

#### OK:

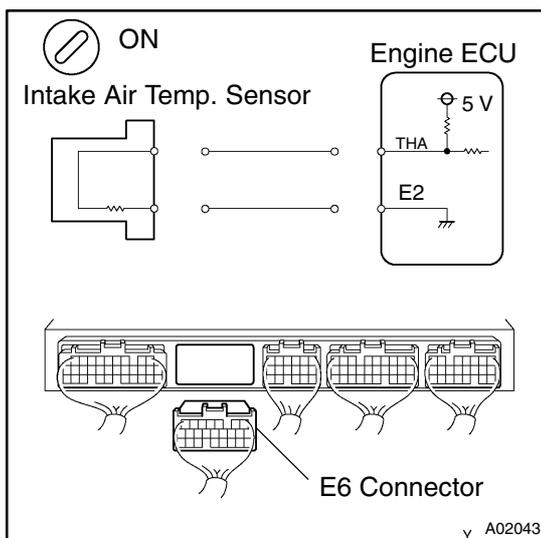
Temperature value:  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ )

OK

Replace air flow meter.

NG

#### 5 Check for short in harness or engine ECU.



#### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Disconnect the E6 connector of the engine ECU.

#### HINT:

Air flow meter connector is disconnected.

- Turn the ignition switch ON.

#### CHECK:

Read temperature value on the hand-held tester.

#### OK:

Temperature value:  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ )

OK

Repair or replace harness or connector.

NG

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

<b>DTC</b>	<b>P0115</b>	<b>Water Temp. Circuit Malfunction</b>
------------	--------------	--

**CIRCUIT DESCRIPTION**

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

The structure of the sensor and connection to the engine ECU is the same as in the DTC P0110 shown on page DI-27.

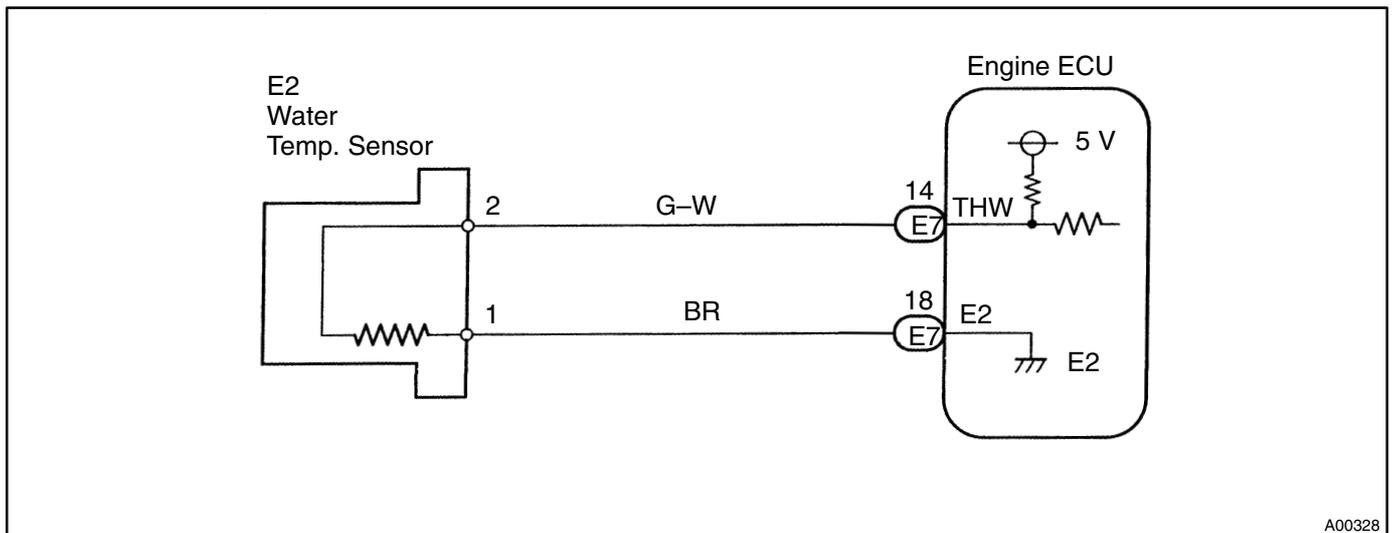
DTC No.	DTC Detecting Condition	Trouble Area
P0115	Open or short in water temp. sensor circuit	<ul style="list-style-type: none"> <li>• Open or short in water temp. sensor circuit</li> <li>• Water temp. sensor</li> <li>• Engine ECU</li> </ul>

**HINT:**

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

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

**WIRING DIAGRAM**



A00328

## INSPECTION PROCEDURE

### HINT:

- If DTC P0110, P0115, P0120 are output simultaneously, E2 (Sensor Ground) may be open.
- Read freeze frame data using hand-held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

<b>1</b>	<b>Connect hand-held tester, and read value of water temperature.</b>
----------	---

### PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and switch the hand-held tester main switch ON.

### CHECK:

Read temperature value on the hand-held tester.

### OK:

**Same as actual water temperature**

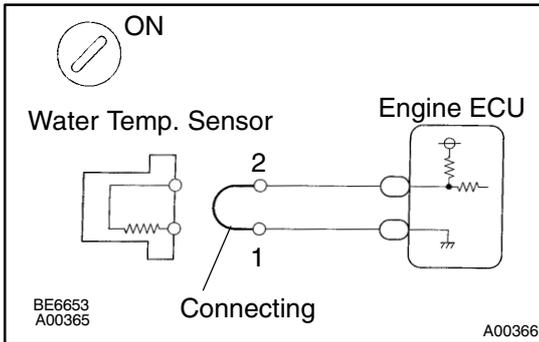
### HINT:

- If there is open circuit, Hand-held tester indicates  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ).
- If there is short circuit, Hand-held tester indicates  $140^{\circ}\text{C}$  ( $284^{\circ}\text{F}$ ) or more.



<b>Check for intermittent problems (See page DI-3).</b>
---

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



### PREPARATION:

- Disconnect the water temp. sensor connector.
- Connect sensor wire harness terminals together.
- Turn the ignition switch ON.

### CHECK:

Read temperature value on the hand-held tester.

### OK:

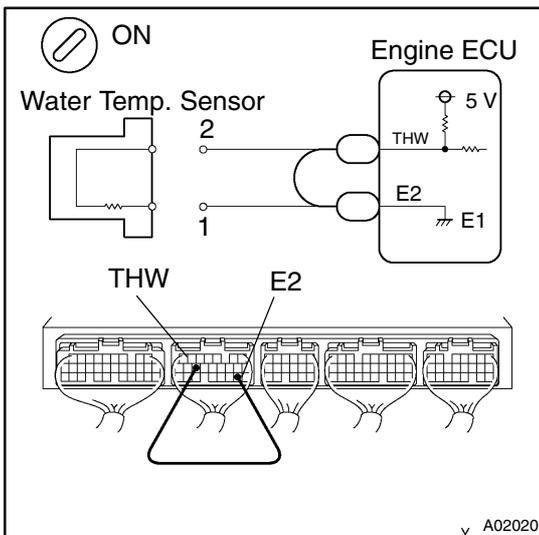
Temperature value: 140°C (284°F) or more

OK

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

NG

## 3 Check for open in harness or engine ECU.



### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Connect between terminals THW, and E2 of the engine ECU connector.

### HINT:

Water temp. sensor connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN-32).

- Turn the ignition switch ON.

### CHECK:

Read temperature value on the hand-held tester.

### OK:

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

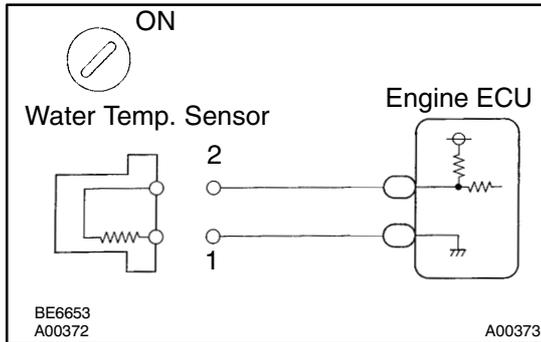
OK

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

NG

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

#### 4 Check for short in harness and engine ECU.



#### PREPARATION:

- Disconnect the water temp. sensor connector.
- Turn the ignition switch ON.

#### CHECK:

Read temperature value on the hand-held tester.

#### OK:

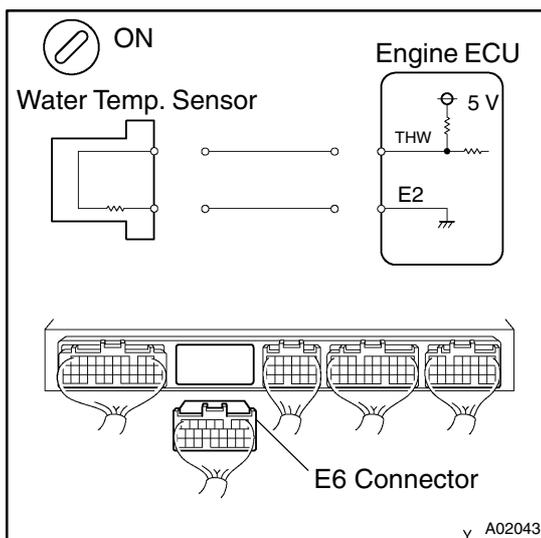
Temperature value:  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ )

OK

Replace water temp. sensor.

NG

#### 5 Check for short in harness or engine ECU.



#### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Disconnect the E6 connector of the engine ECU.

#### HINT:

Water temp. sensor connector is disconnected.

- Turn the ignition switch ON.

#### CHECK:

Read temperature value on the hand-held tester.

#### OK:

Temperature value:  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ )

OK

Repair or replace harness or connector.

NG

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

<b>DTC</b>	<b>P0116</b>	<b>Water Temp. Circuit Range/Performance Problem</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0115 on page DI-31.

DTC No.	DTC Detecting Condition	Trouble Area
P0116	If THW < -6.7°C (20°F), 20 min. or more after starting engine, engine coolant temp. sensor value is 35°C (95°F) or less (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Engine coolant temp. sensor</li> <li>• Cooling system</li> </ul>
	If THW ≥ -6.7°C (20°F) and < 10°C (50°F), 5 min. or more after starting engine, engine coolant temp. sensor value is 35°C (95°F) or less (2 trip detection logic)	
	If THW ≥ 10°C (50°F), 2 min. or more after starting engine, engine coolant temp. sensor value is 35°C (95°F) or less (2 trip detection logic)	

## INSPECTION PROCEDURE

### HINT:

- If DTC P0115 and P0116 are output simultaneously, water temp. sensor circuit may be open. Perform troubleshooting of DTC P0115 first.
- Read freeze frame data using hand-held tester or OBD scan tool. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

<b>1</b>	<b>Are there any other codes (besides DTC P0116) being output?</b>
----------	--

**YES** →

**Go to relevant DTC chart.**

**NO**

<b>2</b>	<b>Check thermostat (See page CO-10).</b>
----------	---

**NG** →

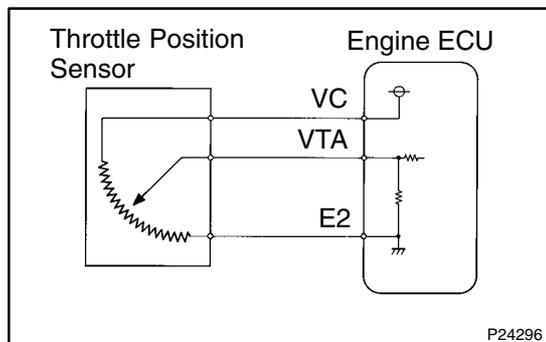
**Replace thermostat.**

**OK**

**Replace engine coolant temp. sensor.**

<b>DTC</b>	<b>P0120</b>	<b>Throttle Position Sensor Circuit Malfunction</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**



The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle. When the throttle valve is fully closed, a voltage of approx. 0.7 V is applied to terminal VTA of the engine ECU. The voltage applied to the terminals VTA of the engine ECU increases in proportion to the opening angle of the throttle valve and becomes approx. 2.7 – 5.2 when the throttle valve is fully opened. The engine ECU judges the vehicle driving conditions from these signals input from terminals VTA and uses them as one of the conditions for deciding the air–fuel ratio correction, power increase correction and fuel–cut control etc.

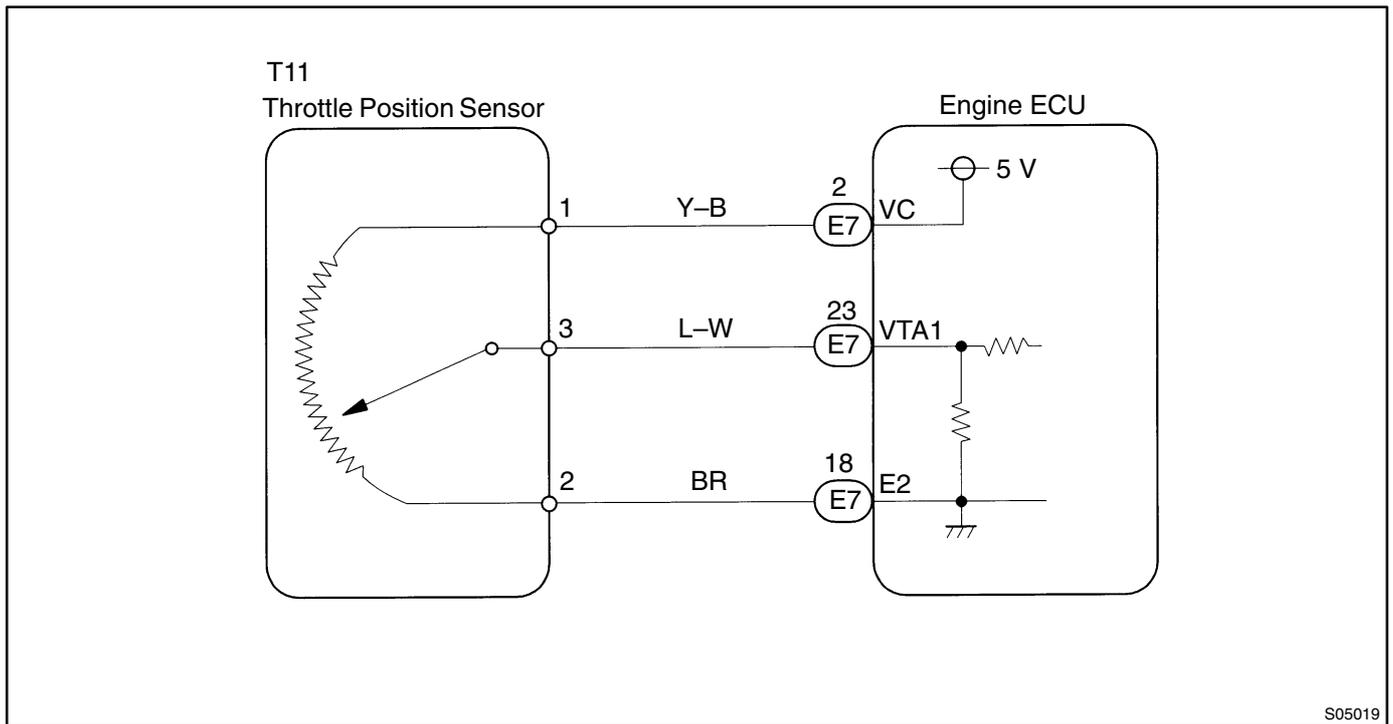
DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a) or (b) continues: (a) VTA < 0.1 V (b) VTA > 4.9 V	<ul style="list-style-type: none"> <li>• Open or short in throttle position sensor circuit</li> <li>• Throttle position sensor</li> <li>• Engine ECU</li> </ul>

**HINT:**

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

Throttle valve opening position expressed as percentage		Trouble Area
Throttle valve fully closed	Throttle valve fully open	
0 %	0%	VC line open VTA line open or short
Approx. 100%	Approx. 100%	E2 line open

## WIRING DIAGRAM



S05019

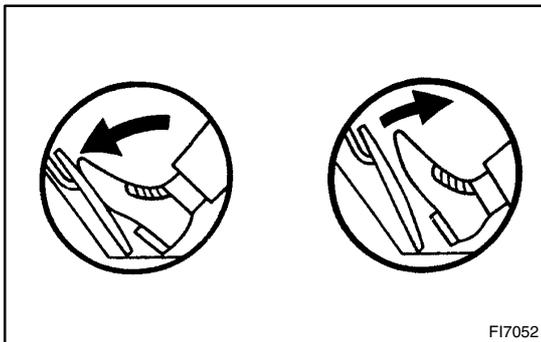
## INSPECTION PROCEDURE

### HINT:

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

### When using hand-held tester:

1	<b>Connect hand-held tester, read throttle valve opening percentage.</b>
---	--



FI7052

### PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.

### CHECK:

Read the throttle valve opening percentage.

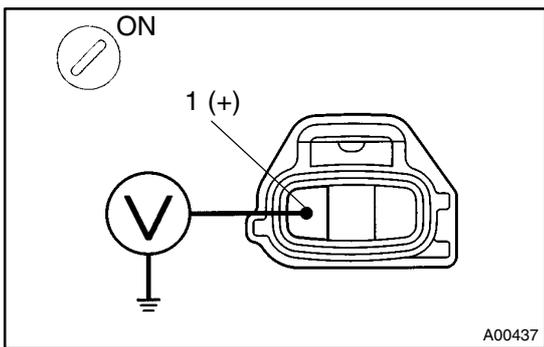
### OK:

Throttle valve	Throttle valve opening position expressed as percentage
Fully open	Approx. 75 %
Fully closed	Approx. 10 %

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

**NG**

**2 Check voltage between terminal 1 of wire harness side connector and body ground.**



**PREPARATION:**

- (a) Remove the engine ECU with connector still connected (See page FI-70).
- (b) Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminal 1 (VC) of wire harness side connector and body ground.

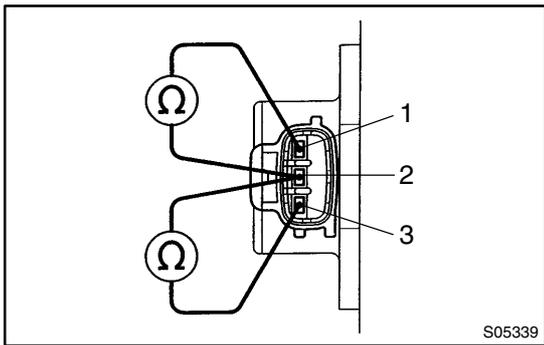
**OK:**

**Voltage: 4.5 – 5.5 V**

**NG** Go to step 5.

**OK**

**3 Check throttle position sensor.**



**PREPARATION:**

Disconnect the throttle position sensor connector.

**CHECK:**

Measure voltage between terminals 1, 3 and 2 of throttle position sensor.

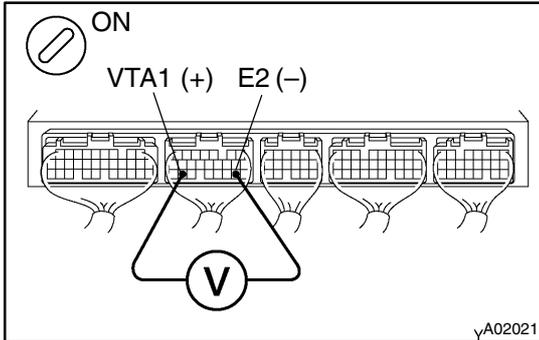
**OK:**

Terminals	Throttle valve	Resistance
1 – 2	–	2.5 – 5.9 kΩ
3 – 2	Fully closed	0.2 – 6.3 kΩ
3 – 2	Fully open	2.0 – 10.2 kΩ

**OK** Replace throttle position sensor.

**NG**

#### 4 Check voltage between terminals VTA1 and E2 of engine ECU.



##### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

##### CHECK:

Measure voltage between terminals VTA1 and E2 of the engine ECU connector.

##### OK:

Throttle valve	Voltage
Fully closed	0.3 – 1.0 V
Fully open	2.7 – 5.2 V

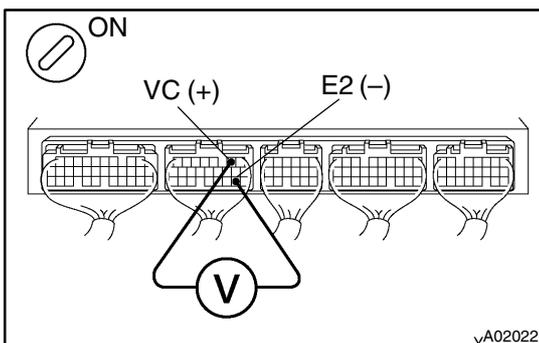
NG

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

OK

Check for open and short circuit in harness and connector between engine ECU and throttle position sensor (VTA line) (See page IN-32).

#### 5 Check voltage between terminals VC and E2 of engine ECU.



##### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

##### CHECK:

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

##### OK:

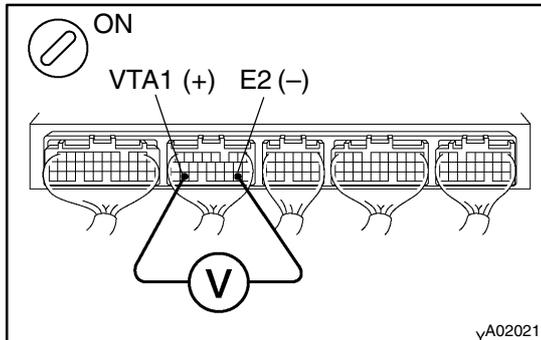
Voltage: 4.5 – 5.5 V

NG

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

OK

Check for open in harness and connector between engine ECU and sensor (VC line) (See page IN-32).

**When not using hand-held tester:****1 Check voltage between terminals VTA1 and E2 of engine ECU****PREPARATION:**

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminals VTA1 and E2 of the engine ECU connector.

**OK:**

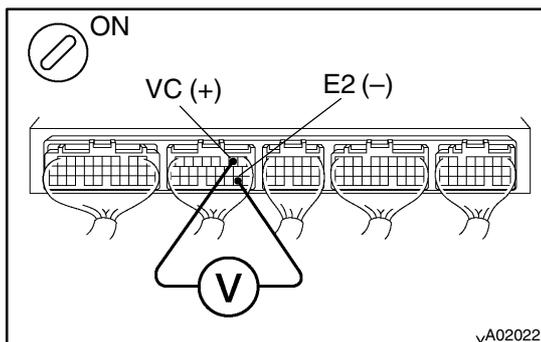
Throttle valve	Voltage
Fully closed	0.3 – 1.0 V
Fully open	2.7 – 5.2 V

**NG**

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

**OK**

**Check for open and short in harness and connector between engine ECU and throttle position sensor (VTA line) (See page IN-32).**

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

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

**CHECK:**

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

**OK:**

**Voltage: 4.5 – 5.5 V**

**NG**

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

**OK**

**Check for open in harness and connector between engine ECU and sensor (VC line) (See page IN-32).**

<b>DTC</b>	<b>P0121</b>	<b>Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem</b>
------------	--------------	--

## 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)	<ul style="list-style-type: none"> <li>• Throttle position sensor</li> <li>• Engine ECU</li> </ul>

## INSPECTION PROCEDURE

### HINT:

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

**Replace throttle body (See page FI-33).**

<b>DTC</b>	<b>P0125</b>	<b>Insufficient Coolant Temp. for Closed Loop Fuel Control</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

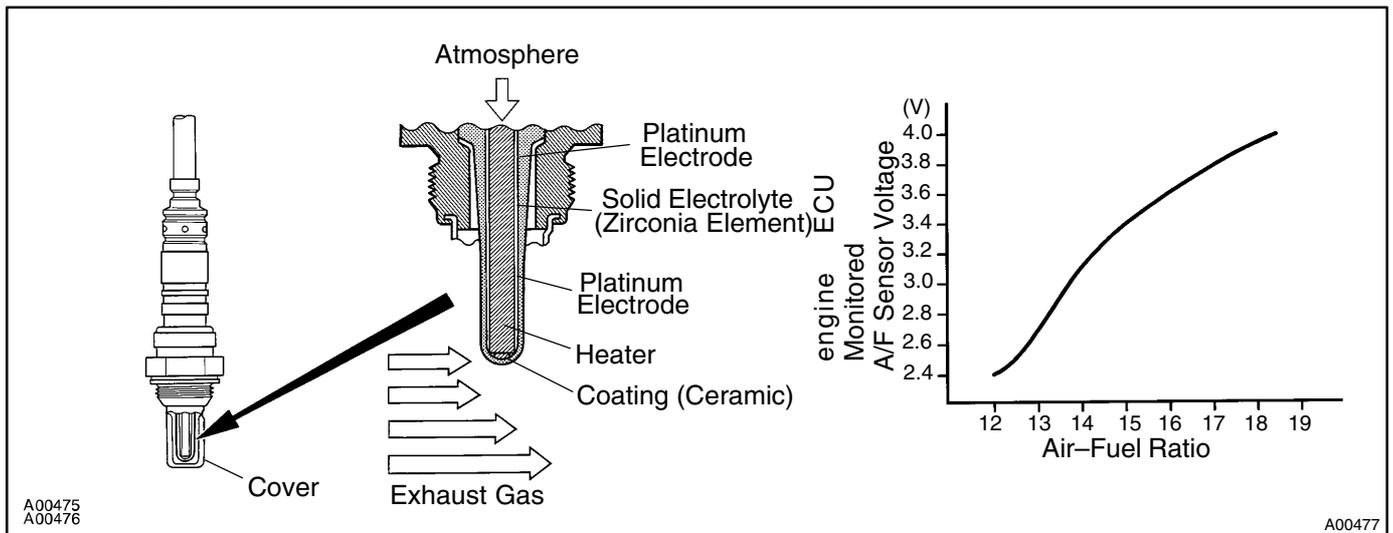
To obtain a high purification rate for the CO, HC and NO<sub>x</sub> components of the exhaust gas, a three-way catalytic converter is used. For the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric 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 engine ECU to control the air-fuel ratio.

By the A/F sensor output, the engine ECU 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, the engine ECU 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 engine ECU. 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 engine ECU only.

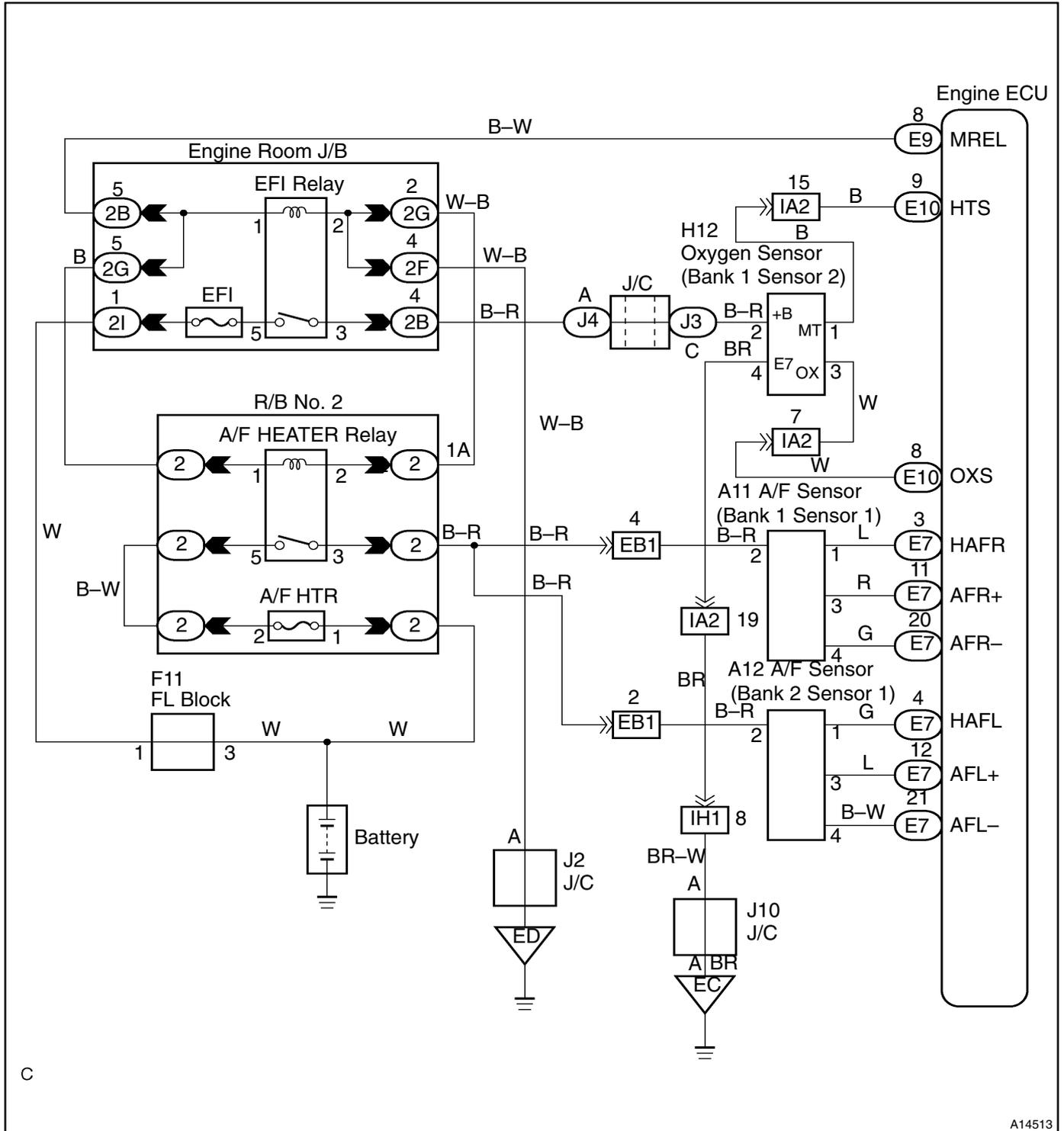


DTC No.	DTC Detecting Condition	Trouble Area
P0125	<p>After engine is warmed up, A/F sensor output* does not change when conditions (a), (b) and (c) continue for at least 1.5 min.</p> <p>*: Output value changes at inside of engine ECU only.</p> <p>(a) Engine speed: 1,500 rpm or more</p> <p>(b) Vehicle speed: 40 ~ 100 km/h (25 ~ 62 mph)</p> <p>(c) Throttle valve does not fully closed</p> <p>(d) After starting engine <math>\geq</math> 140 sec</p>	<ul style="list-style-type: none"> <li>• Fuel system</li> <li>• Injector</li> <li>• Ignition system</li> <li>• Gas leakage on exhaust system</li> <li>• Open or short in A/F sensor circuit (bank 1, 2 sensor 1)</li> <li>• A/F sensors (bank 1, 2 sensor 1)</li> <li>• Engine ECU</li> </ul>

HINT:

- After confirming DTC P0125, use a hand-held tester to confirm voltage output of heated oxygen sensors (bank 1, 2 sensor 1) from CURRENT DATA.
- The engine ECU controls the voltage of AFL+, AFR+ and AFL-, AFR- terminals of engine ECU to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without a hand-held tester.

WIRING DIAGRAM



C

A14513

## INSPECTION PROCEDURE

### HINT:

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

<b>1</b>	<b>Are there any other codes (besides DTC P0125) being output ?</b>
----------	---

**YES**

**Go to relevant DTC chart.**

**NO**

<b>2</b>	<b>Connect hand-held tester and read value for voltage output of A/F sensors (bank 1, 2 sensor 1).</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Warm up the A/F sensors (bank 1, 2 sensor 1) with the engine at 2,500 rpm for approx. 90 sec.

### CHECK:

Read voltage value of A/F sensors (bank 1, 2 sensor 1) on the screen of hand-held tester when you perform all the following conditions.

### HINT:

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

### OK:

Condition	A/F Sensor Voltage value
Engine idling	<ul style="list-style-type: none"> <li>• Not remains at 3.3 V</li> <li>• Not remains at 3.8 V or more</li> <li>• Not remains at 2.8 V or less</li> </ul>
Engine idling	
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 A/F sensors (bank 1, 2 sensor 1) is below 2.8 V, it is normal.
- During fuel cut, there is a case that the output voltage of A/F sensors (bank 1, 2 sensor 1) is above 3.8 V, it is normal.
- If output voltage of A/F sensors (bank 1, 2 sensor 1) remains at 3.30 V even after performing all the above conditions, A/F sensors (bank 1, 2 sensor 1) circuit may be open.
- If output voltage of A/F sensor remains at 3.8 V or more, or 2.8 V or less even after performing all the above conditions, A/F sensors (bank 1, 2 sensor 1) circuit may be short.

**OK** Go to step 9.

**NG**

**3** Check for open and short in harness and connector between engine ECU and A/F sensors (bank1, 2 sensor1) (See page IN-32).

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

**OK**

**4** Check resistance of A/F sensor heaters (bank1, 2 sensor1) (See page FI-67).

**NG** Replace A/F sensor.

**OK**

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

**NG** Repair or replace.

**OK**

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

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

**OK**

<b>7</b>	<b>Check injector injection (See page FI-18).</b>
----------	---

**NG**

**Replace injector.**

**OK**

<b>8</b>	<b>Check gas leakage on exhaust system.</b>
----------	---

**NG**

**Repair or replace**

**OK**

**Replace A/F sensors (bank1, 2 sensor1).**

<b>9</b>	<b>Perform confirmation driving pattern (See page DI-85).</b>
----------	---

**Go**

<b>10</b>	<b>Is there DTC P0125 being output again ?</b>
-----------	--

**YES**

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

**NO**

11	Did vehicle run out of fuel in the past ?
----	---

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

YES

DTC P0125 is caused by running out of fuel.
---

<b>DTC</b>	<b>P0136</b>	<b>Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)</b>
------------	--------------	--

## 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 V or more or 0.55 V or less when vehicle is driven at 100 km/h (62 mph) or more after engine is warmed up (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Open or short in heated oxygen sensor circuit</li> <li>• Oxygen sensor</li> </ul>

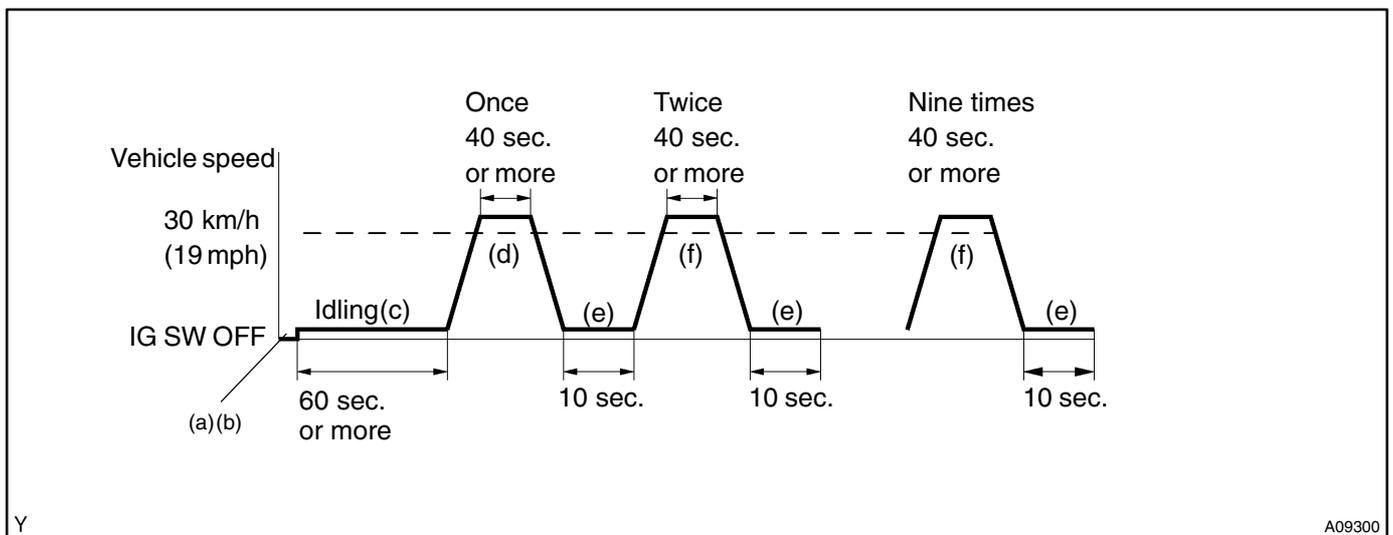
### HINT:

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

## WIRING DIAGRAM

Refer to DTC P0125 on page DI-42.

## CONFIRMATION DRIVING PATTERN



- (a) Connect the hand-held tester to the DLC3.
- (b) Switch the hand-held tester from the Normal Mode to the Check (Test) Mode (See page DI-3).
- (c) Start the engine and let the engine idle for 60 seconds or more.
- (d) Drive the vehicle at 30 km/h (19 mph) or more for 40 seconds or more.
- (e) Let the engine idle for 10 seconds or more.
- (f) Perform steps (d) to (e) 9 times.

### HINT:

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

### NOTICE:

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

## INSPECTION PROCEDURE

### HINT:

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

<b>1</b>	<b>Are there any other codes (besides DTC P0136) being output?</b>
----------	--

YES

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

NO

<b>2</b>	<b>Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN-32).</b>
----------	---

NG

Repair or replace harness or connector.

OK

<b>3</b>	<b>Check output voltage of oxygen sensor.</b>
----------	---

### PREPARATION:

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

### CHECK:

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

### HINT:

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

### OK:

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

OK

Check that each connector is properly connected.

NG

Replace oxygen sensor.

<b>DTC</b>	<b>P0141</b>	<b>Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42.

DTC No.	DTC Detecting Condition	Trouble Area
P0141	When the heater operates, heater current exceeds 2 A	<ul style="list-style-type: none"> <li>• Open or short in heater circuit of oxygen sensor</li> <li>• Oxygen sensor heater</li> <li>• Engine ECU</li> </ul>
	Heater current of 0.2 A or less when the heater operates	

## WIRING DIAGRAM

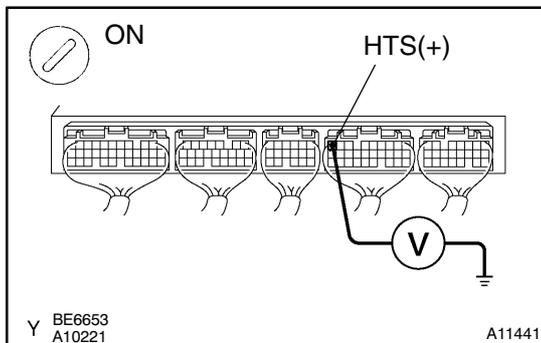
Refer to DTC P0125 on page DI-42.

## INSPECTION PROCEDURE

HINT:

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

<b>1</b>	<b>Check voltage between terminals HT1A, HT1B of engine ECU connector and body ground.</b>
----------	--



### PREPARATION:

- (a) Remove the engine ECU with connector still connected (See page FI-70).
- (b) Turn the ignition switch ON.

### CHECK:

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

HINT:

### OK:

**Voltage: 9 – 14 V**

<b>OK</b>	<b>Check and replace engine ECU (See page IN-32).</b>
-----------	---



2

**Check resistance of oxygen sensor heater (See page FI-69).**

NG

**Replace oxygen sensor.**

OK

**Check and repair harness or connector between main relay and oxygen sensor and engine ECU (See page IN-32).**

<b>DTC</b>	<b>P0171</b>	<b>System too Lean (Fuel Trim) (Bank 1)</b>
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<b>DTC</b>	<b>P0172</b>	<b>System too Rich (Fuel Trim) (Bank 1)</b>
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<b>DTC</b>	<b>P0174</b>	<b>System too Lean (Fuel Trim) (Bank 2)</b>
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<b>DTC</b>	<b>P0175</b>	<b>System too Rich (Fuel Trim) (Bank 2)</b>
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### CIRCUIT DESCRIPTION

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

Short-term fuel trim is the short-term fuel compensation used to maintain the air-fuel ratio at its ideal theoretical value.

The signal from the A/F sensor is approximately proportional to the existing air-fuel ratio, and engine ECU comparing it with the ideal theoretical value, the engine ECU reduces fuel volume immediately if the air-fuel ratio is rich and increases fuel volume if it is lean.

Long-term fuel trim compensates 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 using 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 check engine warning light lights up.

DTC No.	DTC Detecting Condition	Trouble Area
P0171 P0174	When air fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on RICH side (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Gas leakage on exhaust system</li> <li>• Air intake (hose loose)</li> <li>• Fuel line pressure</li> <li>• Injector blockage</li> <li>• Mass air flow meter</li> <li>• Engine coolant temp. sensor</li> <li>• A/F sensors (bank 1, 2 sensor 1)</li> </ul>
P0172 P0175	When air fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on LEAN side (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Gas leakage on exhaust system</li> <li>• Fuel line pressure</li> <li>• Injector leak, blockage</li> <li>• Mass air flow meter</li> <li>• Engine coolant temp. sensor</li> <li>• A/F sensors (bank 1, 2 sensor 1)</li> </ul>

## HINT:

- When DTC P0171 or P0174 is recorded, the actual air–fuel ratio is on the lean side. When DTC P0172 or P0175 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 or P0174 is recorded. The check engine warning light then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within  $\pm 35\%$  ( $80^{\circ}\text{C}$  ( $176^{\circ}\text{F}$ ) or more), the system is functioning normally.
- The A/F sensors (bank 1, 2 sensor 1) output voltage and the short–term fuel trim value can be read using the hand–held tester.
- The engine ECU controls the voltage of AFL+, AFR+ and AFL–, AFR– terminals of the engine ECU to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without hand–held tester.

**INSPECTION PROCEDURE**

## HINT:

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

<b>1</b>	<b>Check air induction system (See page FI–1).</b>
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<b>2</b>	<b>Check injector injection (See page FI–18).</b>
----------	---



<b>3</b>	<b>Check air flow meter and water temp. sensor (See pages FI–30 and FI–63).</b>
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<b>4</b>	<b>Check for spark and ignition (See page IG-1).</b>
----------	--

NG

Repair or replace.

OK

<b>5</b>	<b>Check fuel pressure (See page FI-5).</b>
----------	---

NG

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

OK

<b>6</b>	<b>Check gas leakage on exhaust system.</b>
----------	---

NG

Repair or replace.

OK

<b>7</b>	<b>Check the output voltage A/F sensors (bank1, 2 sensor1).</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Warm up the A/F sensors (bank1, 2 sensor1) with the engine speed at 2,500 rpm for approx. 90 sec.

**CHECK:**

Read voltage value of A/F sensors (bank1, 2 sensor1) on the screen of the hand-held tester when you perform all the following conditions.

**HINT:**

The voltage of AFL+, AFR+ terminal of engine ECU is fixed to 3.3 V and AFL-, AFR- terminal to 3.0 V. Therefore, it is impossible to check the A/F sensors (bank1, 2 sensor1) output voltage at the terminals (AFL+, AFR+ / AFL-, AFR-) of the engine ECU.

**OK:**

Condition	A/F Sensor Voltage value
Engine idling	<ul style="list-style-type: none"> <li>• Not remain at 3.30 V</li> <li>• Not remain at 3.8 V or more</li> <li>• Not remain at 2.8 V or less</li> </ul>
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 A/F sensors (bank1, 2 sensor1) is below 2.8 V, it is normal.
- During fuel cut, there is a case that the output voltage of A/F sensors (bank1, 2 sensor1) is above 3.8 V, it is normal.
- If the output voltage of A/F sensors (bank1, 2 sensor1) remains at 3.30 V even after performing all the above conditions, A/F sensors (bank1, 2 sensor1) circuit may be open.
- If the output voltage of A/F sensors (bank1, 2 sensor1) remains at 3.8 V or more, or 2.8 V or less even after performing all the above conditions, A/F sensors (bank1, 2 sensor1) circuit may be short.

**OK** → **Go to step 9.**

**NG**

**8** Check for open and short in harness and connector between engine ECU and A/F sensors (bank1, 2 sensor1) (See page IN-32).

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

**OK**

**Replace A/F sensors (bank1, 2 sensor1).**

**9** Perform confirmation driving pattern (See page DI-85).

**Go**

<b>10</b>	<b>Is there DTC P0171, P0172, P0174 or P0175 being output again ?</b>
-----------	---

**YES**

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

**NO**

<b>11</b>	<b>Did vehicle run out of fuel in the past ?</b>
-----------	--

**NO**

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

**YES**

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

<b>DTC</b>	<b>P0300</b>	<b>Random/Multiple Cylinder Misfire Detected</b>
<b>DTC</b>	<b>P0301</b>	<b>Cylinder 1 Misfire Detected</b>
<b>DTC</b>	<b>P0302</b>	<b>Cylinder 2 Misfire Detected</b>
<b>DTC</b>	<b>P0303</b>	<b>Cylinder 3 Misfire Detected</b>
<b>DTC</b>	<b>P0304</b>	<b>Cylinder 4 Misfire Detected</b>
<b>DTC</b>	<b>P0305</b>	<b>Cylinder 5 Misfire Detected</b>
<b>DTC</b>	<b>P0306</b>	<b>Cylinder 6 Misfire Detected</b>

## CIRCUIT DESCRIPTION

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

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

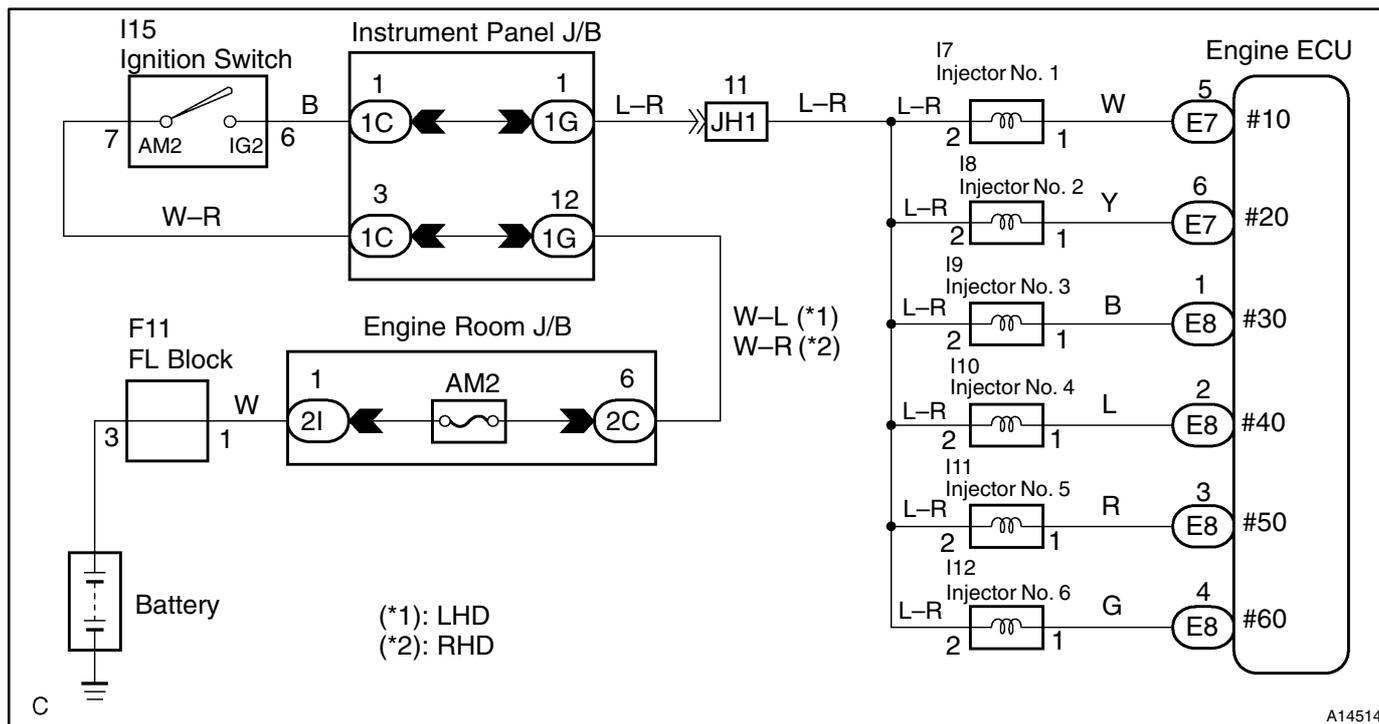
If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the check engine warning light blinks when misfiring occurs.

DTC No.	DTC Detecting Condition	Trouble Area
P0300	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions	<ul style="list-style-type: none"> <li>• Ignition system</li> <li>• Injector</li> <li>• Fuel pressure</li> <li>• Compression pressure</li> <li>• Valve clearance</li> <li>• Valve timing</li> <li>• Air flow meter</li> <li>• Water temp. sensor</li> <li>• Open or short in engine wire</li> <li>• Connector connection</li> <li>• Engine ECU</li> </ul>
P0301	For any particular 200 revolutions for engine, misfiring is detected which can cause catalyst overheating (This causes MIL to blink) (2 trip detection logic)	
P0302		
P0303		
P0304	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emissions (2 trip detection logic)	
P0305		
P0306		

### 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



A14514

## CONFIRMATION DRIVING PATTERN

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

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

### HINT:

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

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

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

## INSPECTION PROCEDURE

### HINT:

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

<b>1</b>	<b>Check wire harness, connector and vacuum hose in engine room.</b>
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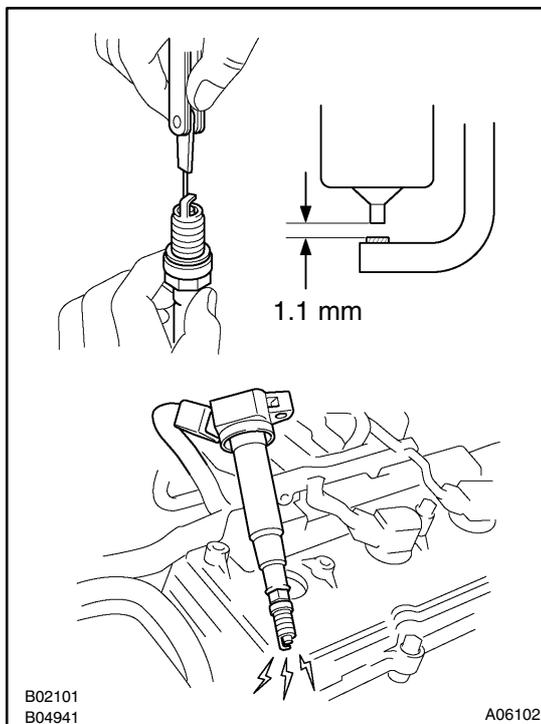
**CHECK:**

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

<b>NG</b>	<b>Repair or replace, then confirm that there is no misfire (See confirmation driving pattern).</b>
-----------	---

<b>OK</b>
-----------

<b>2</b>	<b>Check spark plug and spark of misfiring cylinder.</b>
----------	--

**PREPARATION:**

Remove the spark plug (See page IG-1).

**CHECK:**

- (a) Check the electrode of carbon deposits electrode.
- (b) Check the electrode gap.

**OK:**

- (a) **No large carbon deposit present.**  
**Not wet with gasoline or oil.**
- (b) **Electrode gap: 1.1 mm (0.043 in.)**

**PREPARATION:**

- (a) Install the spark plug to the ignition coil.
- (b) Disconnect the injector connector.
- (c) Ground the spark plug.

**CHECK:**

Check if spark occurs while the engine is being cranked.

**NOTICE:**

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

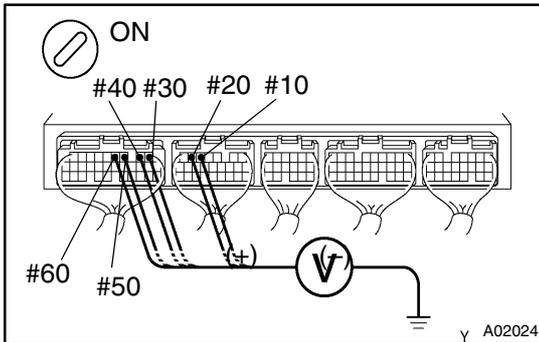
**OK:**

**Spark jumps across electrode gap.**

<b>NG</b>	<b>Replace or check ignition system (See page IG-1).</b>
-----------	--

<b>OK</b>
-----------

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



#### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

#### CHECK:

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

#### OK:

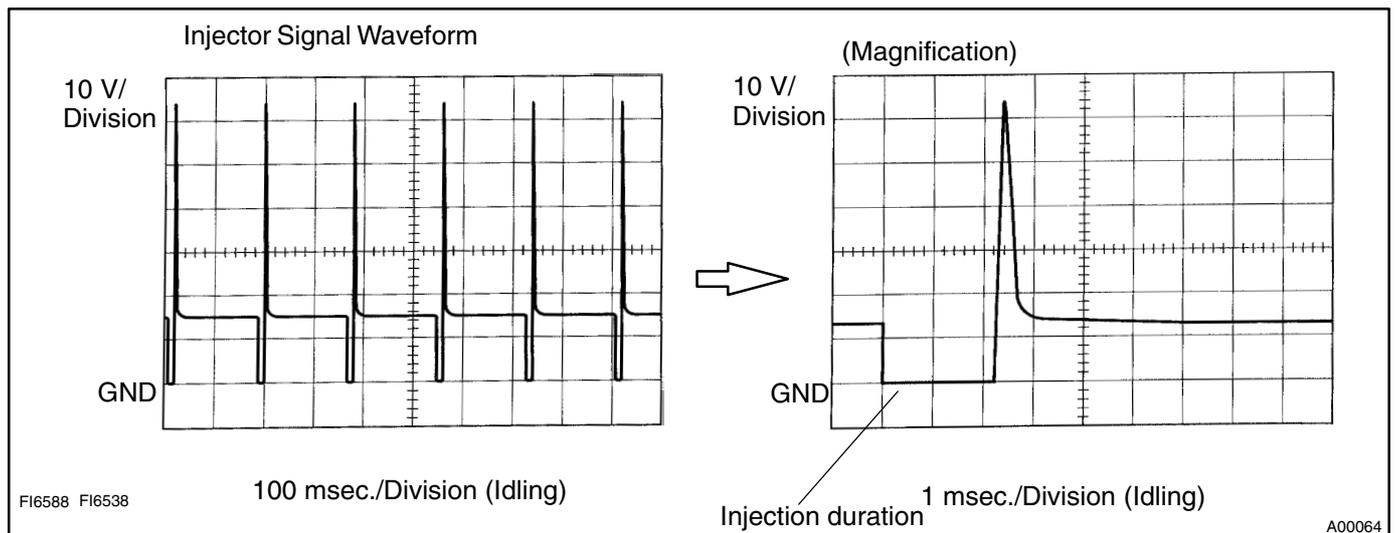
**Voltage: 9 – 14 V**

#### Reference: INSPECTION USING OSCILLOSCOPE

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

#### HINT:

The correct waveforms are as shown.



OK

Go to step 4.

NG

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

**NG**

Replace injector.

**OK**

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

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

**NG**

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

**OK**

**6** Check injector injection (See page FI-22).

**NG**

Replace injector.

**OK**

**7** Check mass air flow meter and water temp. sensor (See pages FI-30 and FI-63).

**NG**

Repair or replace.

**OK**

Check compression pressure, valve clearance and valve timing.

<b>DTC</b>	<b>P0325</b>	<b>Knock Sensor 1 Circuit Malfunction (Bank 1)</b>
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<b>DTC</b>	<b>P0330</b>	<b>Knock Sensor 2 Circuit Malfunction (bank 2)</b>
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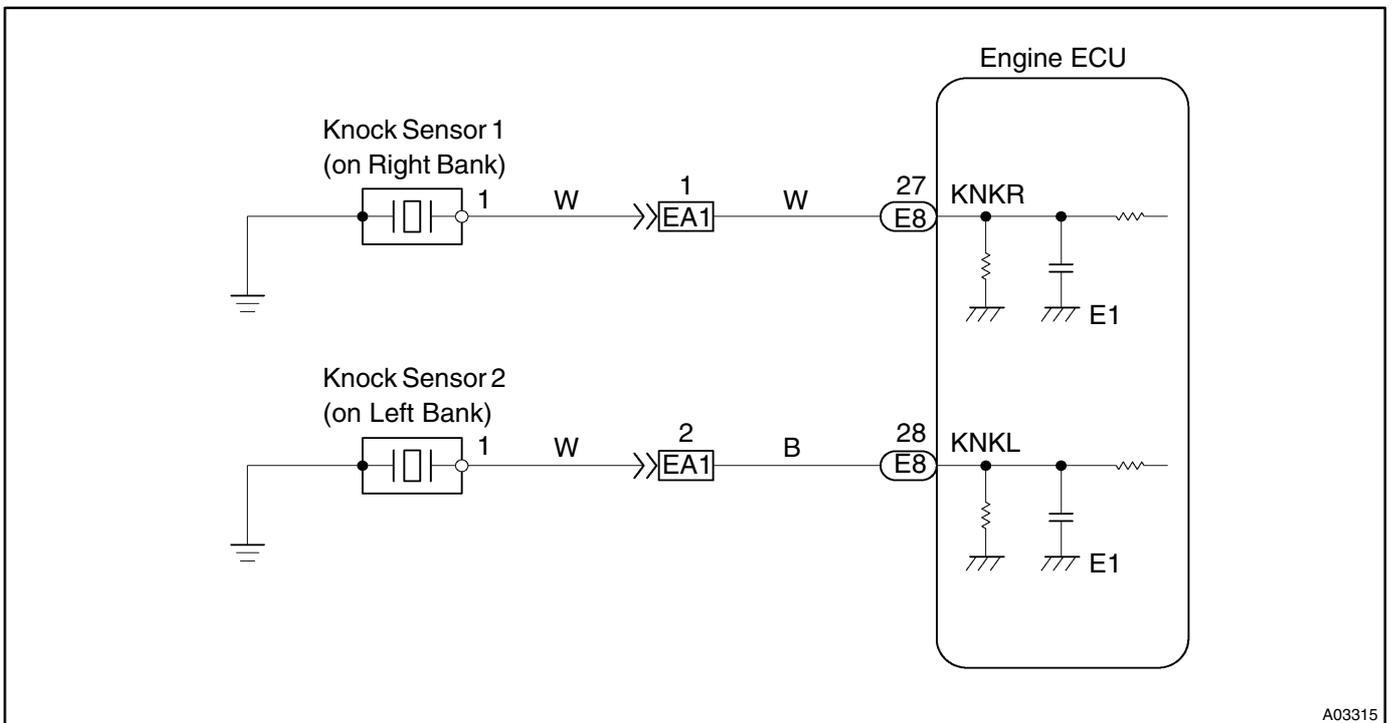
**CIRCUIT DESCRIPTION**

Each of knock sensor is fitted 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 engine ECU with engine speed between 2,000 rpm and 5,600 rpm	<ul style="list-style-type: none"> <li>• Open or short in knock sensor 1 circuit</li> <li>• Knock sensor 1 (looseness)</li> <li>• Engine ECU</li> </ul>
P0330	No knock sensor 2 signal to engine ECU with engine speed between 2,000 rpm and 5,600 rpm	<ul style="list-style-type: none"> <li>• Open or short in knock sensor 2 circuit</li> <li>• Knock sensor 2 (looseness)</li> <li>• Engine ECU</li> </ul>

If the ECM detects the above diagnosis conditions, it operates the fail-safe function in which the corrective retard angle value is set to the maximum value.

**WIRING DIAGRAM**



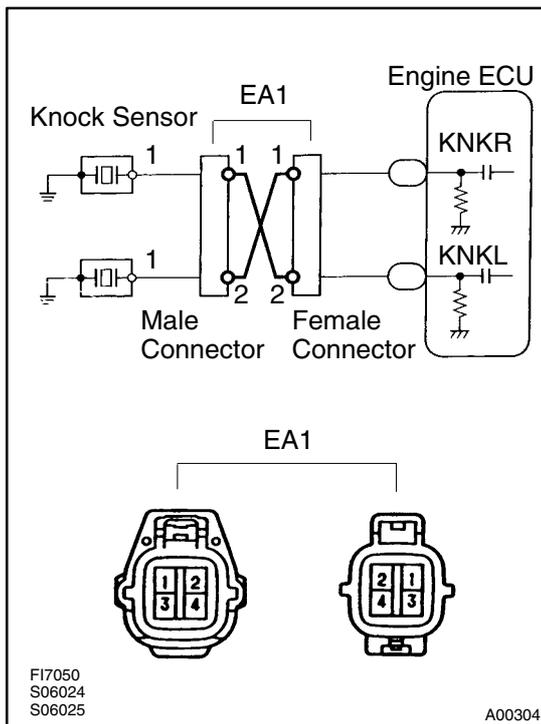
A03315

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

### 1 Connect OBD scan tool or hand-held tester, and check knock sensor circuit.



### PREPARATION:

- Connect the OBD scan tool or hand-held tester to the DLC3.
- Disconnect the wire to wire connector EA1.
- Connect the terminals of the disconnected EA1 male connector and EA1 female as follows.

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

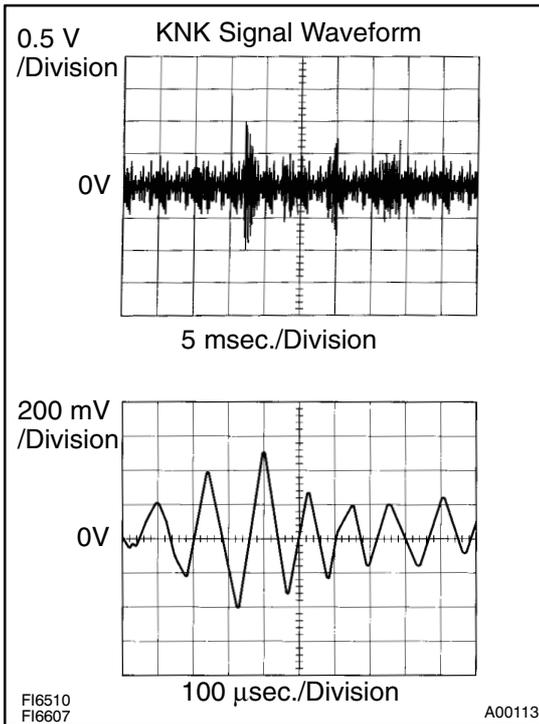
- Turn the ignition switch ON and push the OBD scan tool or hand-held tester main switch ON.
- After the engine is warmed up, perform quick racing to 4,000 rpm three times.

### 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 KNKR, KNKL 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 141 μsec. (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 EA1 connector and engine ECU (See page IN-32).**

NG

Repair or replace harness or connector.

OK

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

<b>3</b>	<b>Check for open and short in harness and connector between EA1 connector and knock sensor (See page IN-32).</b>
----------	---

## 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.**

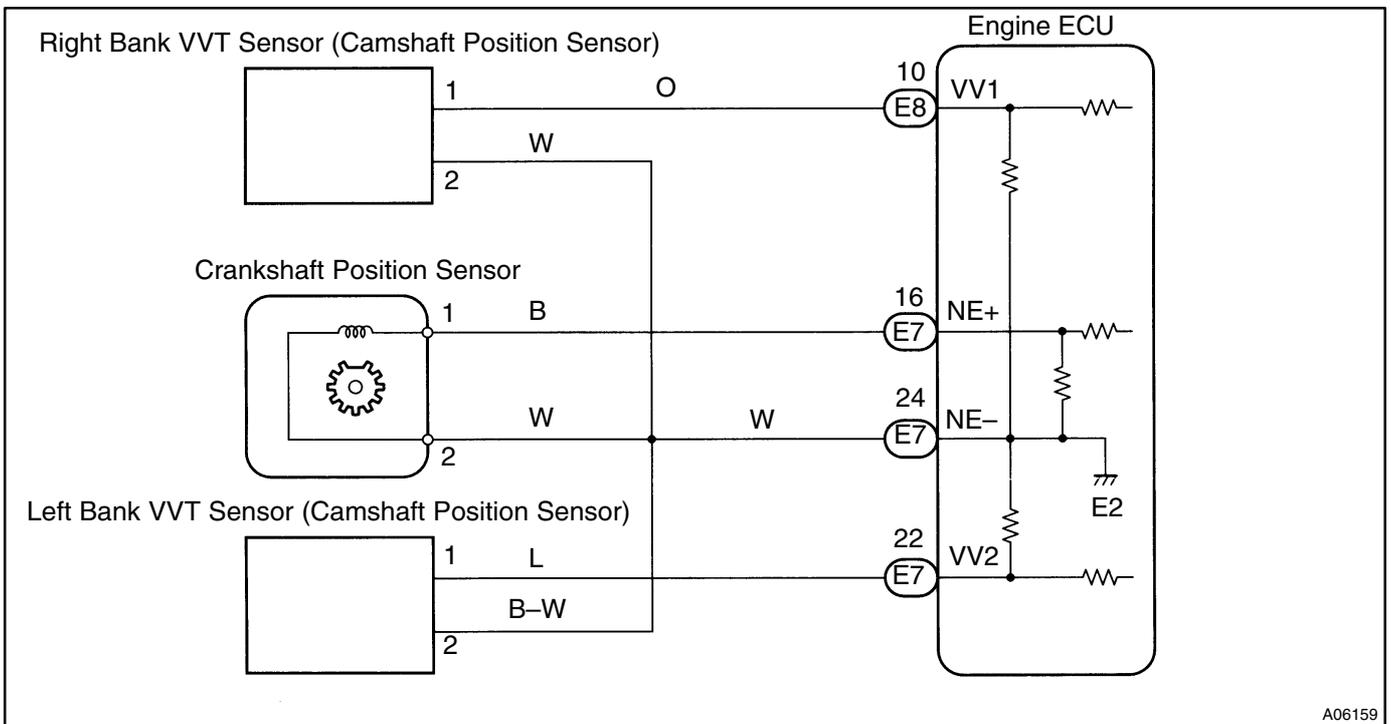
<b>DTC</b>	<b>P0335</b>	<b>Camshaft Position Sensor Circuit Malfunction</b>
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### CIRCUIT DESCRIPTION

Crankshaft position sensor (NE signal) consist of a signal plate and pick up coil. The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals of every engine revolution. The engine ECU detects the standard crankshaft angle based on the G2 signals, and the actual crankshaft angle the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0335	No crankshaft position sensor signal to engine ECU during cranking	<ul style="list-style-type: none"> <li>• Open or short in crankshaft position sensor circuit</li> <li>• Crankshaft position sensor</li> <li>• Starter</li> <li>• Engine ECU</li> </ul>
	Open in NE- circuit	

### WIRING DIAGRAM



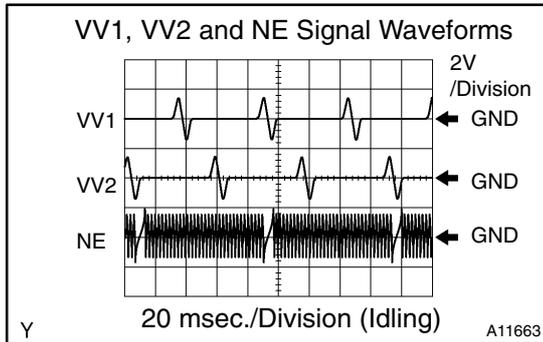
A06159

### INSPECTION PROCEDURE

**HINT:**

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

### 1 Check resistance of crankshaft position sensor (See page IG-14).



#### Reference: INSPECTION USING OSCILLOSCOPE

During cranking or idling, check between terminals VV1 and NE-, VV2 and NE-, NE+ and NE- of engine ECU.

#### HINT:

The correct waveforms are as shown.

NG

Replace crankshaft position sensor.

OK

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

NG

Repair or replace harness or connector.

OK

### 3 Inspect sensor installation and teeth of signal plate.

NG

Tighten the sensor. Replace signal plate.

OK

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

<b>DTC</b>	<b>P0340</b>	<b>Camshaft Position Sensor Circuit Malfunction</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

Camshaft position sensor (G(VV) signal) consist of a signal plate and pick up coil. The G(VV) signal plate has one tooth on its outer circumference and is mounted on the camshaft.

When the camshafts rotate, the protrusion on the signal plate and the air gap on the pick up coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pick up coil.

The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals for every engine revolution. The engine ECU detects the standard crankshaft angle based on the G2+ signals and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0340	No camshaft position sensor signal to engine ECU during cranking	<ul style="list-style-type: none"> <li>• Open or short in camshaft position sensor circuit</li> <li>• Camshaft position sensor</li> <li>• Starter</li> <li>• Engine ECU</li> </ul>
	Open in NE- circuit	

## WIRING DIAGRAM

Refer to DTC P0335 on page DI-67.

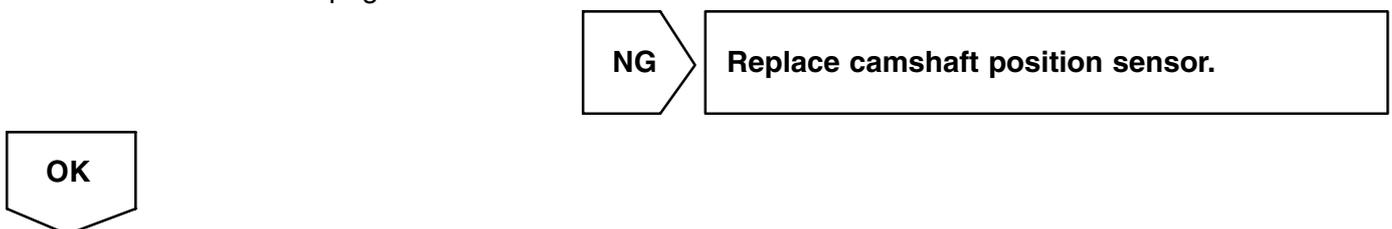
## INSPECTION PROCEDURE

### HINT:

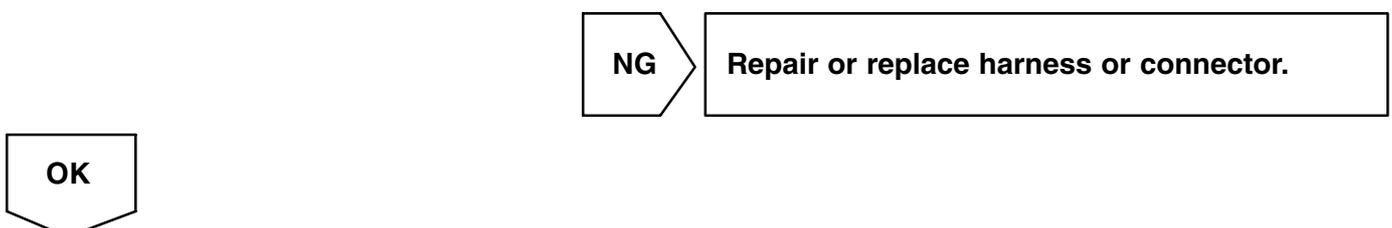
Read freed frame data using hand-held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time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

<b>1</b>	<b>Check resistance of camshaft position sensor (Signal generator) (See page IG-1).</b>
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Refer to DTC P0335 on page DI-67.



<b>2</b>	<b>Check for open and short in harness and connector between engine ECU and camshaft position sensor (See page IN-32).</b>
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<b>3</b>	<b>Inspect sensor installation.</b>
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<b>NG</b>	<b>Tighten the sensor.</b>
-----------	----------------------------

<b>OK</b>
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<b>Check and replace engine ECU (See page IN-32).</b>
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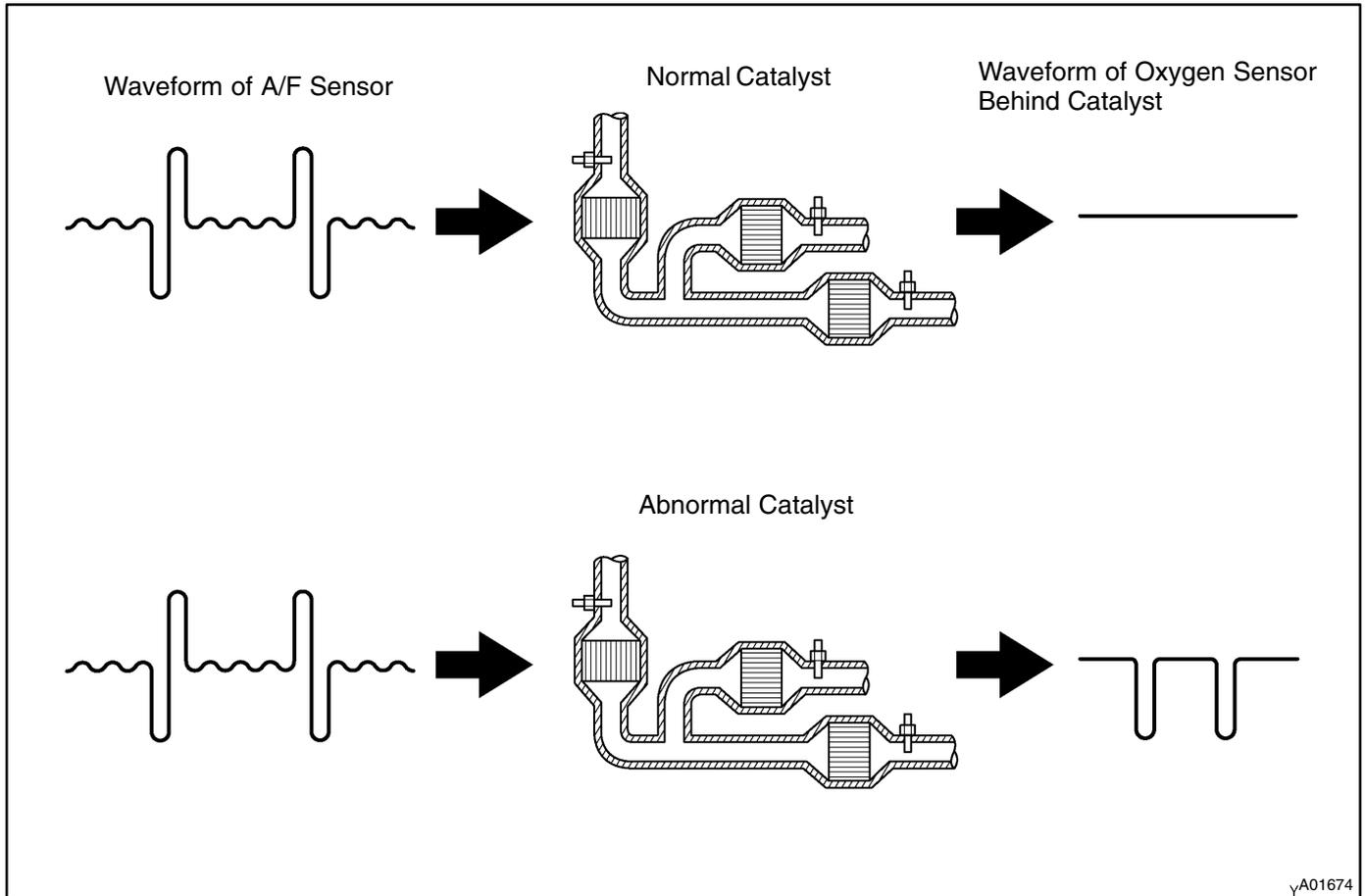
<b>DTC</b>	<b>P0420</b>	<b>Catalyst System Efficiency Below Threshold</b>
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**CIRCUIT DESCRIPTION**

The engine ECU observes the waveform of the oxygen sensor located behind the catalyst to determine whether the catalyst is performance has deteriorated.

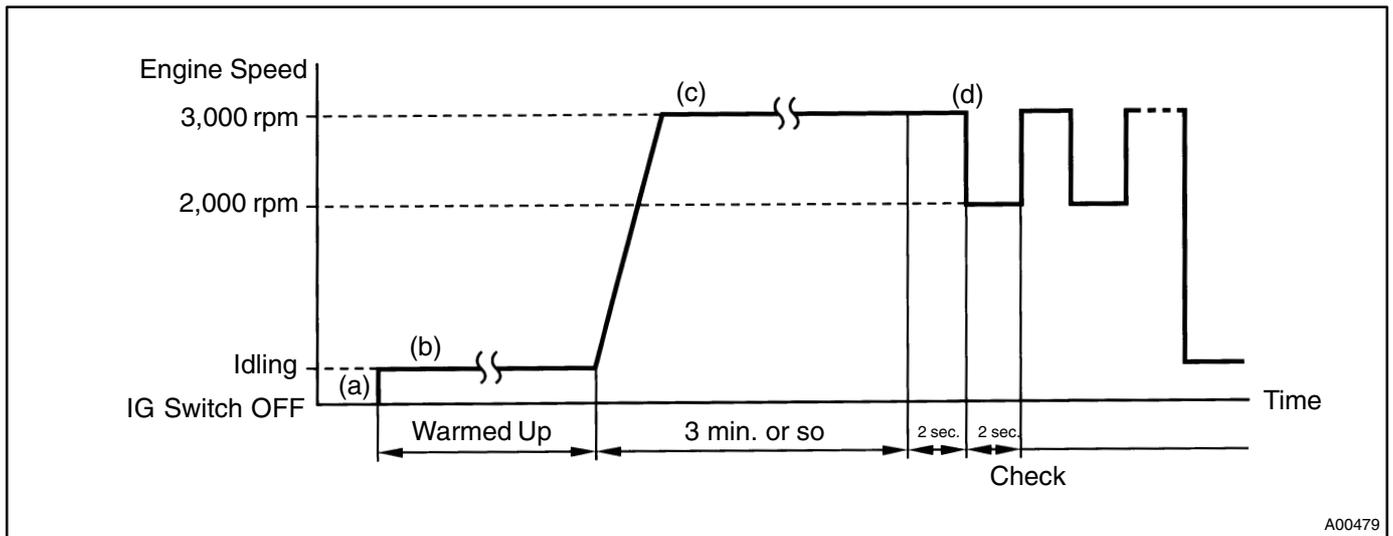
If the catalyst is performance functioning normally, the waveform of the oxygen sensor located behind the catalyst switches back and forth between rich and lean much more slowly.

When the waveform of the 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 the engine and the catalyst are warmed up, and while the vehicle is driven within the set vehicle and engine speed range, the waveforms of the heated oxygen sensors (bank 1 sensor 2) have the same amplitude (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Three-way catalytic converter</li> <li>• Open or short in oxygen sensor (bank 1 sensor 2) circuit</li> <li>• Oxygen sensor (bank 1 sensor 2)</li> <li>• Open or short in A/F sensor (bank 1, 2 sensor 1) circuit</li> <li>• A/F sensor (bank 1, 2 sensor 1)</li> </ul>

## CONFIRMATION ENGINE RACING PATTERN



A00479

- (a) Connect the hand-held tester to the DLC3.
- (b) Start engine and warm it up with all accessories switched OFF until water temp. is stable.
- (c) Race the engine at 2,500 – 3,000 rpm for about 3 min.
- (d) When racing the engine at 3,000 rpm for 2 sec. and 2,000 rpm for 2 sec. alternately, check the waveform of the oxygen sensor (bank 1 sensor 2).

## INSPECTION PROCEDURE

### HINT:

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

<b>1</b>	<b>Are there any other codes (besides DTC P0420) being output?</b>
----------	--

YES

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

NO

<b>2</b>	<b>Check gas leakage on exhaust system.</b>
----------	---

NG

Repair or replace.

OK

<b>3</b>	<b>Check A/F sensor (bank 1 sensor 2) (See page FI-67).</b>
----------	---

<b>NG</b>	<b>Repair or replace.</b>
-----------	---------------------------

<b>OK</b>
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<b>4</b>	<b>Check oxygen sensor (bank 1 sensor 2) (See page FI-69).</b>
----------	--

<b>NG</b>	<b>Repair or replace.</b>
-----------	---------------------------

<b>OK</b>
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<b>Replace three-way catalytic converter.</b>
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<b>DTC</b>	<b>P0443</b>	<b>Evaporative Emission Control System Purge Control Vent Control Malfunction</b>
------------	--------------	---

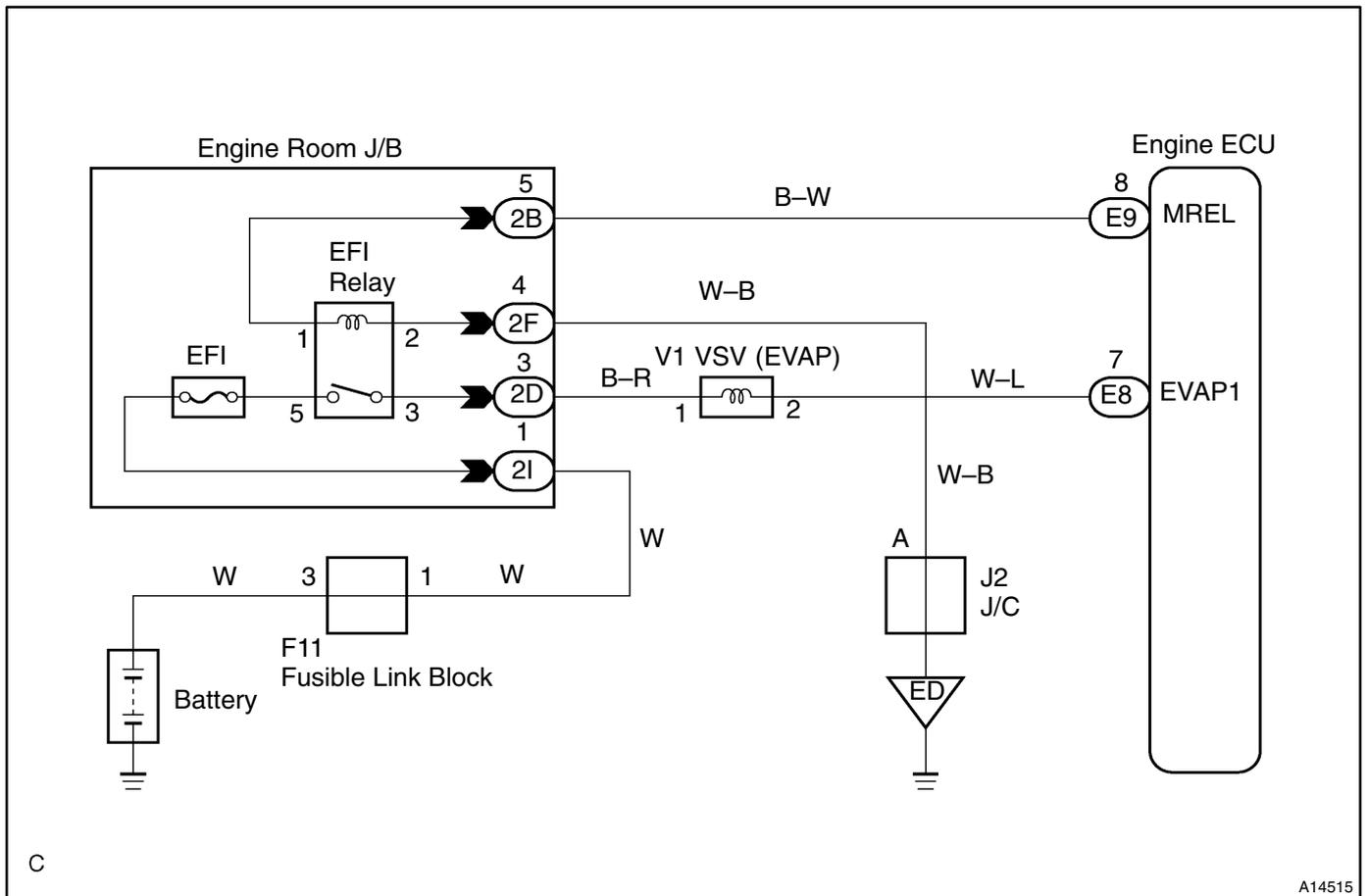
### CIRCUIT DESCRIPTION

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

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

DTC No.	DTC Detecting Condition	Trouble Area
P0443	Proper response to engine ECU command does not occur	<ul style="list-style-type: none"> <li>• Open or short in VSV circuit for EVAP</li> <li>• VSV for EVAP</li> <li>• Engine ECU</li> </ul>

### WIRING DIAGRAM



C

A14515

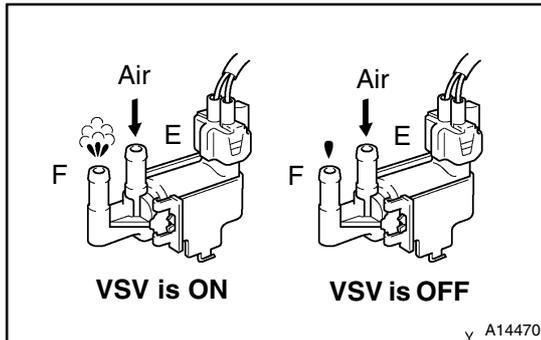
## INSPECTION PROCEDURE

### Hand-held tester:

#### HINT:

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

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



#### PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.
- Select the ACTIVE TEST mode on the hand-held tester.

#### CHECK:

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

#### OK:

**VSV is ON:**

Air from port E flows out through port F.

**VSV is OFF:**

Air from port E is flows out through the air filter.

OK

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

NG

#### 2 Check VSV for EVAP (See page FI-59).

NG

Replace VSV for EVAP.

OK

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

NG

Repair or replace harness or connector.

OK

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

### OBD scan tool (excluding hand-held tester):

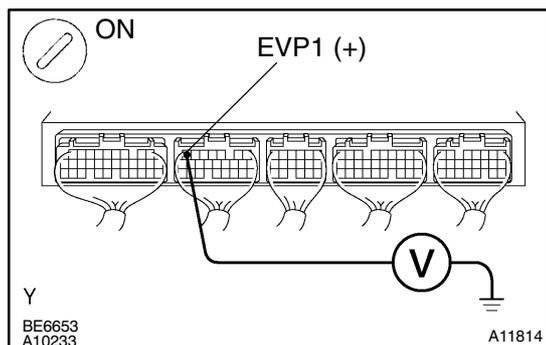
1 Check VSV for EVAP (See page FI-59).

NG

Replace VSV for EVAP.

OK

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



#### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

#### CHECK:

Measure the voltage between terminal EVP1 of the engine ECU connector and body ground.

#### OK:

**Voltage: 9 – 14 V**

NG

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

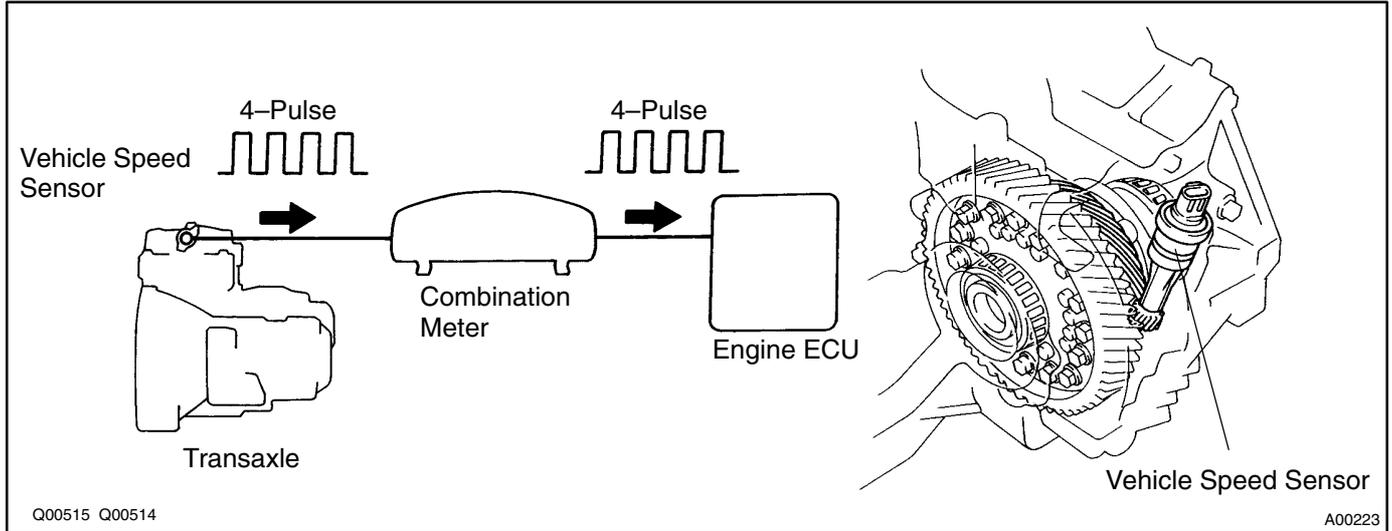
OK

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

<b>DTC</b>	<b>P0500</b>	<b>Vehicle Speed Sensor Malfunction</b>
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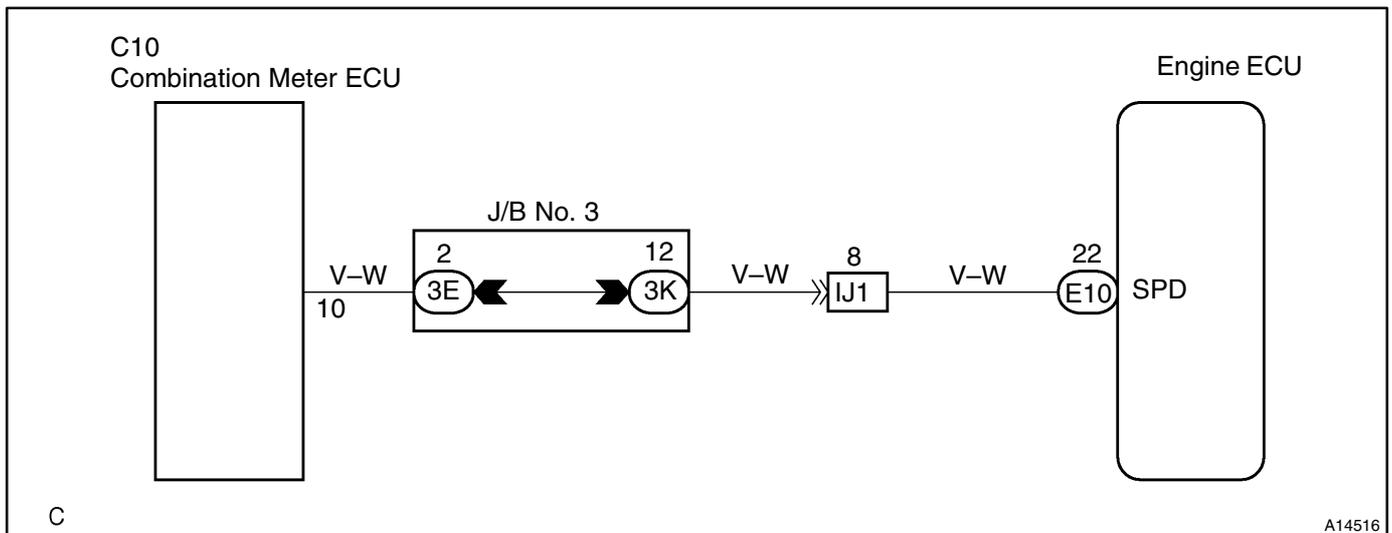
### CIRCUIT DESCRIPTION

The vehicle speed sensor outputs a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the engine ECU. The engine ECU 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 engine ECU under conditions (a) and (b): (2 trip detection logic) (a) Neutral start switch is OFF (b) Vehicle is being driven	<ul style="list-style-type: none"> <li>• Open or short in vehicle speed sensor circuit</li> <li>• Vehicle speed sensor</li> <li>• Combinationmeter</li> <li>• Engine ECU</li> </ul>

### WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

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

### 1 Check operation of speedometer.

#### CHECK:

Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

#### HINT:

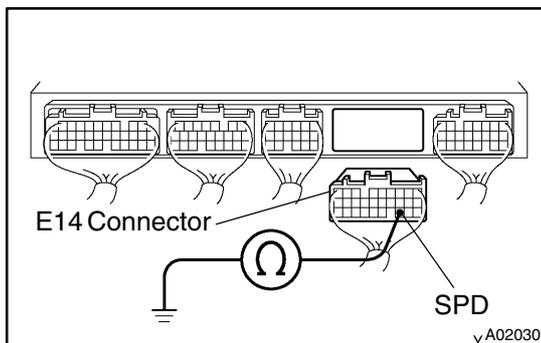
The vehicle speed sensor is operating normally if the speedometer display is normal.

NG

Check speedometer circuit.

OK

### 2 Check for short in harness and connector between terminal SPD of engine ECU and body ground.



#### PREPARATION:

- Remove the glove compartment (See page FI-70).
- Disconnect the E14 connector of engine ECU.

#### CHECK:

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

#### OK:

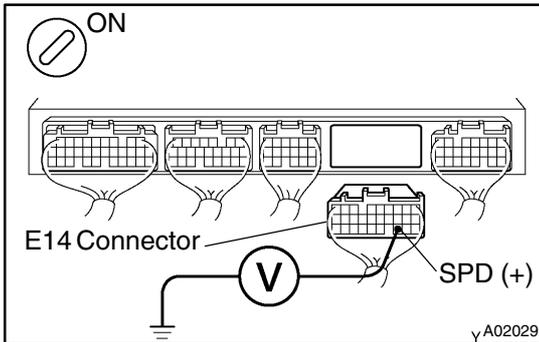
No continuity (1 MΩ or higher)

NG

Repair or replace harness or connector.

OK

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



#### PREPARATION:

Turn the ignition switch ON.

#### CHECK:

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

#### OK:

**Voltage: 9 – 14 V**

**NG**

**Check for open in harness and connector between junction connector and engine ECU (See page IN-32).**

**OK**

### 4 Check for open in harness and connector between junction connector and combination meter (See page IN-32).

**NG**

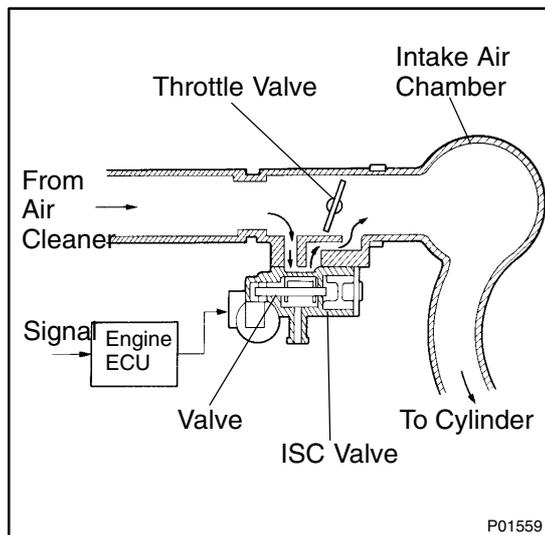
**Repair or replace harness or connector.**

**OK**

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

<b>DTC</b>	<b>P0505</b>	<b>Idle Control System Malfunction</b>
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## CIRCUIT DESCRIPTION



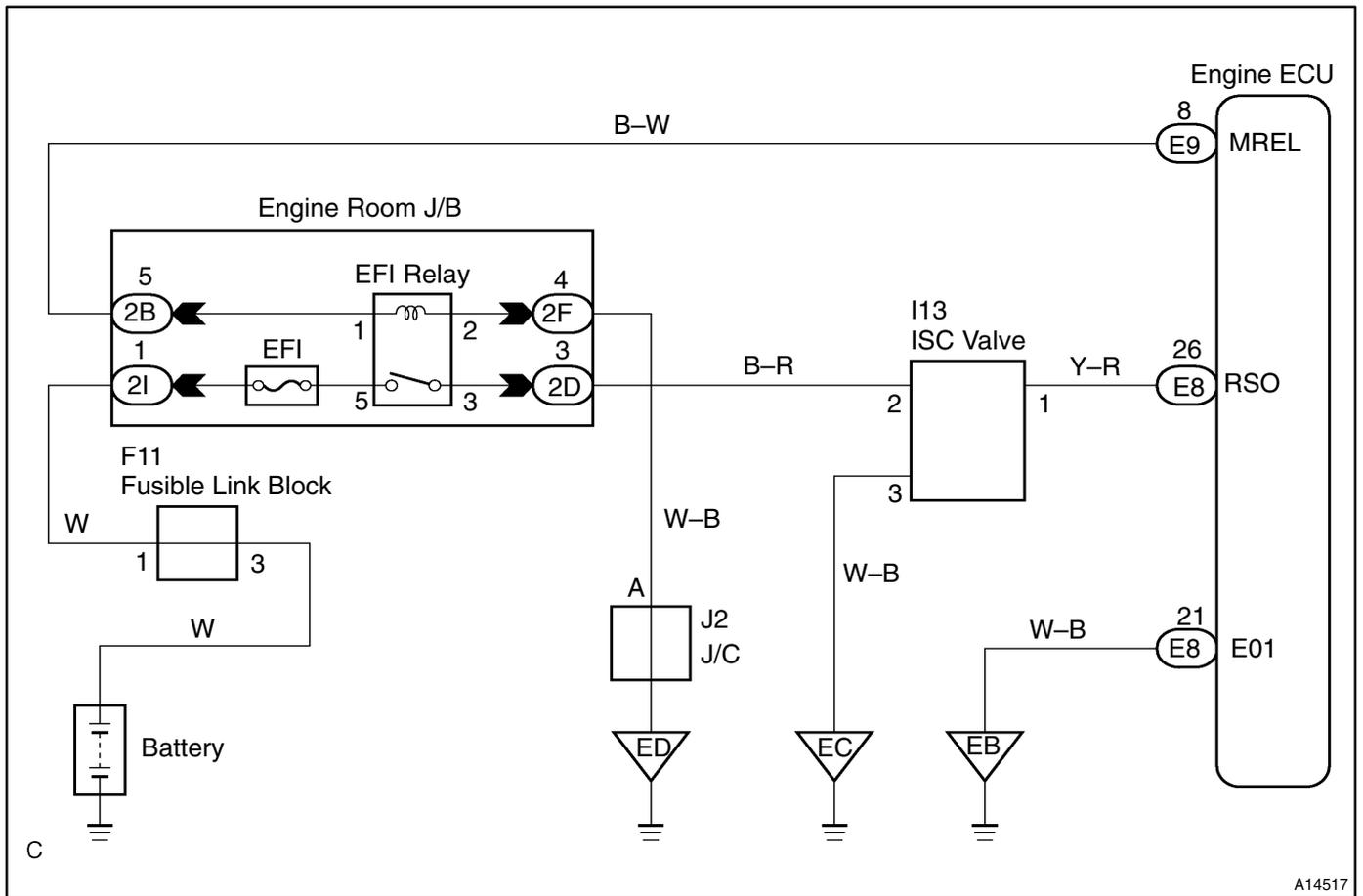
The rotary solenoid type ISC valve is located in front of the intake air chamber and intake air bypassing the throttle valve is directed to the ISC valve through a passage.

In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed.

The engine ECU operates only the ISC valve to perform idle-up and provide feedback for the target idling speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to differ greatly from the target speed (2 trip detection logic)	<ul style="list-style-type: none"> <li>• ISC valve is stuck or closed</li> <li>• Open or short in ISC valve circuit</li> <li>• Open or short in A/C switch circuit</li> <li>• Air induction system</li> <li>• Engine ECU</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

**HINT:**

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

**Hand-held tester:**

<b>1</b>	<b>Check operation of the ISC valve.</b>
----------	--

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the active test mode on the hand-held tester.

**CHECK:**

Check the engine speed when the ISC valve operated by the hand-held tester.

**OK:**

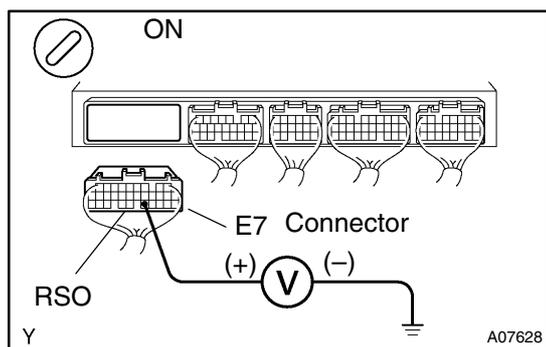
**Engine speed is increased and decreased in response to change of ISC duty ratio.**

OK

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

NG

**2** Check voltage between terminals RSO of engine ECU connector and body ground.

**PREPARATION:**

- Remove the engine ECU with the connector still connected (See page FI-70).
- Disconnect the E7 connector of the engine ECU.
- Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals RSO of the engine ECU connector and body ground,

**OK:**

**Voltage: 9 – 14 V**

OK

Go to step 4.

NG

**3** Check ISC valve (See page FI-48).

NG

Replace ISC valve.

OK

Check for open and short in harness and connector between engine room J/B and ISC valve and engine ECU (See page IN-32).

**4** Check operation of the ISC valve (See page FI-44).

NG

Repair or replace ISC valve.

OK

**5 Check the blockage of ISC valve and the passage to bypass the throttle valve.**

**NG**

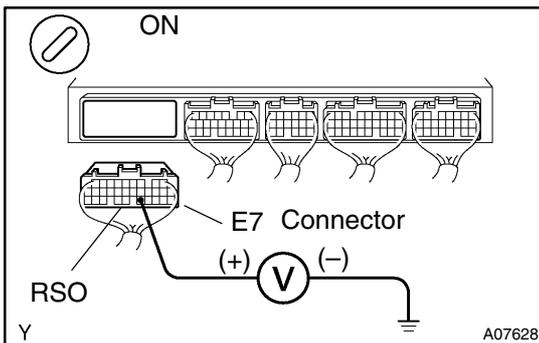
**Repair or replace ISC valve.**

**OK**

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

### OBD scan tool (excluding hand-held tester):

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



#### **PREPARATION:**

- Remove the engine ECU with the connector still connected (See page FI-70).
- Disconnect the E7 connector of the engine ECU.
- Turn the ignition switch ON.

#### **CHECK:**

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

#### **OK:**

**Voltage: 9 – 14 V**

**OK**

**Go to step 3.**

**NG**

**2 Check ISC valve (See page FI-48).**

**NG**

**Replace ISC valve.**

**OK**

**Check for open and short in harness and connector between engine room J/B and ISC valve and engine ECU (See page IN-32).**

<b>3</b>	<b>Check operation of the ISC valve (See page FI-44).</b>
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<b>NG</b>	<b>Repair or replace ISC valve.</b>
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<b>OK</b>
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<b>4</b>	<b>Check the blockage of ISC valve and the passage to bypass the throttle valve.</b>
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<b>NG</b>	<b>Repair or replace ISC valve.</b>
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<b>OK</b>
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<b>Check and replace engine ECU (See page IN-32).</b>
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<b>DTC</b>	<b>P1130</b>	<b>A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)</b>
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<b>DTC</b>	<b>P1150</b>	<b>A/F Sensor Circuit Range/Performance Malfunction (Bank 2 Sensor 1)</b>
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## CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42.

DTC No.	DTC Detecting Condition	Trouble Area
P1130 P1150	Voltage output* of A/F sensor remains at 3.8 V or more, or 2.8 V or less, during engine running after the engine is warmed up (2 trip detection logic) *: Output value changes at inside of engine ECU only	<ul style="list-style-type: none"> <li>• Open or short in A/F sensor circuit</li> <li>• A/F sensor</li> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Injector</li> <li>• Engine ECU</li> </ul>
	Voltage output* of A/F sensor does not change from 3.30 V, during engine running after the engine is warmed up (2 trip detection logic) *: Output value changes at the inside of engine ECU only	
	Open or short in A/F sensor circuit (2 trip detection logic)	

### HINT:

- After confirming DTC P1130, use the OBD scan tool or hand-held tester to confirm voltage output of 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 trim value can be read using the OBD scan tool or hand-held tester.
- The ECM controls the voltage of the AFR+, AFL+, AFR- and AFL- terminals of the engine ECU to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without the OBD scan tool or hand-held tester.
- OBD scan tool (excluding hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the hand-held tester.

## WIRING DIAGRAM

Refer to DTC P0125 on page DI-42.



<b>2</b>	<b>Check output voltage of A/F sensor.</b>
----------	--

**PREPARATION:**

- (a) Connect the OBD scan tool or 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 OBD scan tool or hand-held tester when you perform all the following conditions.

**HINT:**

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

**OK:**

Condition	A/F Sensor Voltage Value
Engine idling	<ul style="list-style-type: none"> <li>• Not remains at 3.30 V (0.660 V*)</li> <li>• Not remains at 3.8 V (0.76 V*) or more</li> <li>• Not remains at 2.8 V (0.56 V*) or less</li> </ul> *: When you use 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 normally.
- 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 scan tool (excluding hand-held tester).

OK

Go to step 9.

NG

<b>3</b>	<b>Check for open and short in harness and connector between engine ECU and A/F sensor (See page IN-32).</b>
----------	--

NG

Repair or replace harness or connector.

OK

**4** Check resistance of A/F sensor heater (See page FI-67).

**NG**

Replace A/F sensor.

**OK**

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

**NG**

Repair or replace.

**OK**

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

**NG**

Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI-5).

**OK**

**7** Check injector injection (See page FI-22).

**NG**

Replace injector.

**OK**

Replace A/F sensor.

**8** Perform confirmation driving pattern (See page DI-85).

**Go**

<b>9</b>	<b>Is there DTC P1130 or P1150 being output again?</b>
----------	--

<b>YES</b>	<b>Check and replace engine ECU (See page IN-32).</b>
------------	---

<b>NO</b>
-----------

<b>10</b>	<b>Did vehicle runs out of fuel in past?</b>
-----------	--

<b>NO</b>	<b>Check for intermittent problems (See page DI-3).</b>
-----------	---

<b>YES</b>
------------

<b>DTC P1130 or P1150 is caused by running out of fuel.</b>
---

<b>DTC</b>	<b>P1133</b>	<b>A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)</b>
------------	--------------	--

<b>DTC</b>	<b>P1153</b>	<b>A/F Sensor Circuit Response Malfunction (Bank 2 Sensor 1)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42.

DTC No.	DTC Detecting Condition	Trouble Area
P1133 P1153	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 the response characteristic of A/F sensor becomes deteriorated (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Open or short in A/F sensor circuit</li> <li>• A/F sensor</li> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Injector</li> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM

Refer to DTC P0125 on page DI-42.

## INSPECTION PROCEDURE

HINT:

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

<b>1</b>	<b>Are there any other codes (besides DTC P1133, P1153) being output?</b>
----------	---

**YES**

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

**NO**

<b>2</b>	<b>Connect OBD scan tool or hand-held tester, and read value for voltage output of A/F sensor.</b>
----------	--

### PREPARATION:

- (a) Connect the OBD scan tool or 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 scan tool or hand-held tester when you perform all the following conditions.

**HINT:**

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

**OK:**

Condition	A/F Sensor Voltage value
Engine idling	<ul style="list-style-type: none"> <li>• Not remains at 3.30 V (0.660 V*)</li> <li>• Not remains at 3.8 V (0.76 V*) or more</li> <li>• Not remains at 2.8 V (0.56 V*) or less</li> </ul> *: When you use the OBD scan tool (excluding 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 scan tool (excluding hand-held tester).

OK

Go to step 9.

NG

**3**

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

NG

Repair or replace harness or connector.

OK

**4**

Check resistance of A/F sensor heater (See page FI-67).

NG

Replace A/F sensor.

OK

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

**NG**

Repair or replace.

**OK**

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

**NG**

Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI-5).

**OK**

**7** Check injector injection (See page FI-22).

**NG**

Replace injector.

**OK**

Replace A/F sensor.

**8** Perform confirmation driving pattern (See page DI-85).

**Go**

**9** Is there DTC P1133 or P1153 being output again?

**YES**

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

**NO**

<b>10</b>	<b>Did vehicle runs out of fuel in past?</b>
-----------	--

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

**YES**

**DTC P1133 or P1153 is caused by running out of fuel.**

<b>DTC</b>	<b>P1135</b>	<b>A/F Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)</b>
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<b>DTC</b>	<b>P1155</b>	<b>A/F Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42.

DTC No.	DTC Detecting Condition	Trouble Area
P1135	When the heater operates, heater current exceeds 8 A	<ul style="list-style-type: none"> <li>• Open or short in heater circuit of A/F sensor</li> <li>• A/F sensor heater</li> </ul>
P1155	Heater current of 0.25 A or less when the heater operates	<ul style="list-style-type: none"> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM

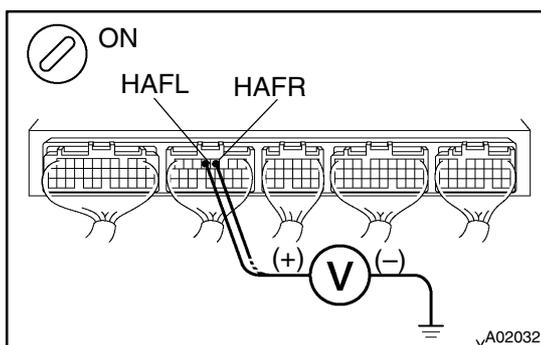
Refer to DTC P0125 on page DI-42.

## INSPECTION PROCEDURE

### HINT:

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

<b>1</b>	<b>Check voltage between terminals HAFL, HAFR of engine ECU connector and body ground.</b>
----------	--



### PREPARATION:

- Remove the glove compartment (See page FI-70).
- Turn the ignition switch ON.

### CHECK:

Measure the voltage between terminals HAFL, HAFR of the engine ECU connector and body ground.

### OK:

**Voltage: 9 – 14 V**

**OK**

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

**NG**

**2** Check resistance of A/F sensor heater (See page FI-56).

**NG**

Replace A/F sensor.

**OK**

**3** Check A/F sensor heater relay (Marking: A/F) (See page FI-56).

**NG**

Replace A/F sensor heater relay.

**OK**

Check and repair harness or connector between A/F sensor heater relay and A/F sensor, and A/F sensor and engine ECU (See page IN-32).

<b>DTC</b>	<b>P1300</b>	<b>Igniter Circuit Malfunction (No. 1)</b>
<b>DTC</b>	<b>P1305</b>	<b>Igniter Circuit Malfunction (No. 2)</b>
<b>DTC</b>	<b>P1310</b>	<b>Igniter Circuit Malfunction (No. 3)</b>
<b>DTC</b>	<b>P1315</b>	<b>Igniter Circuit Malfunction (No. 4)</b>
<b>DTC</b>	<b>P1320</b>	<b>Igniter Circuit Malfunction (No.5)</b>
<b>DTC</b>	<b>P1325</b>	<b>Igniter Circuit Malfunction (No.6)</b>

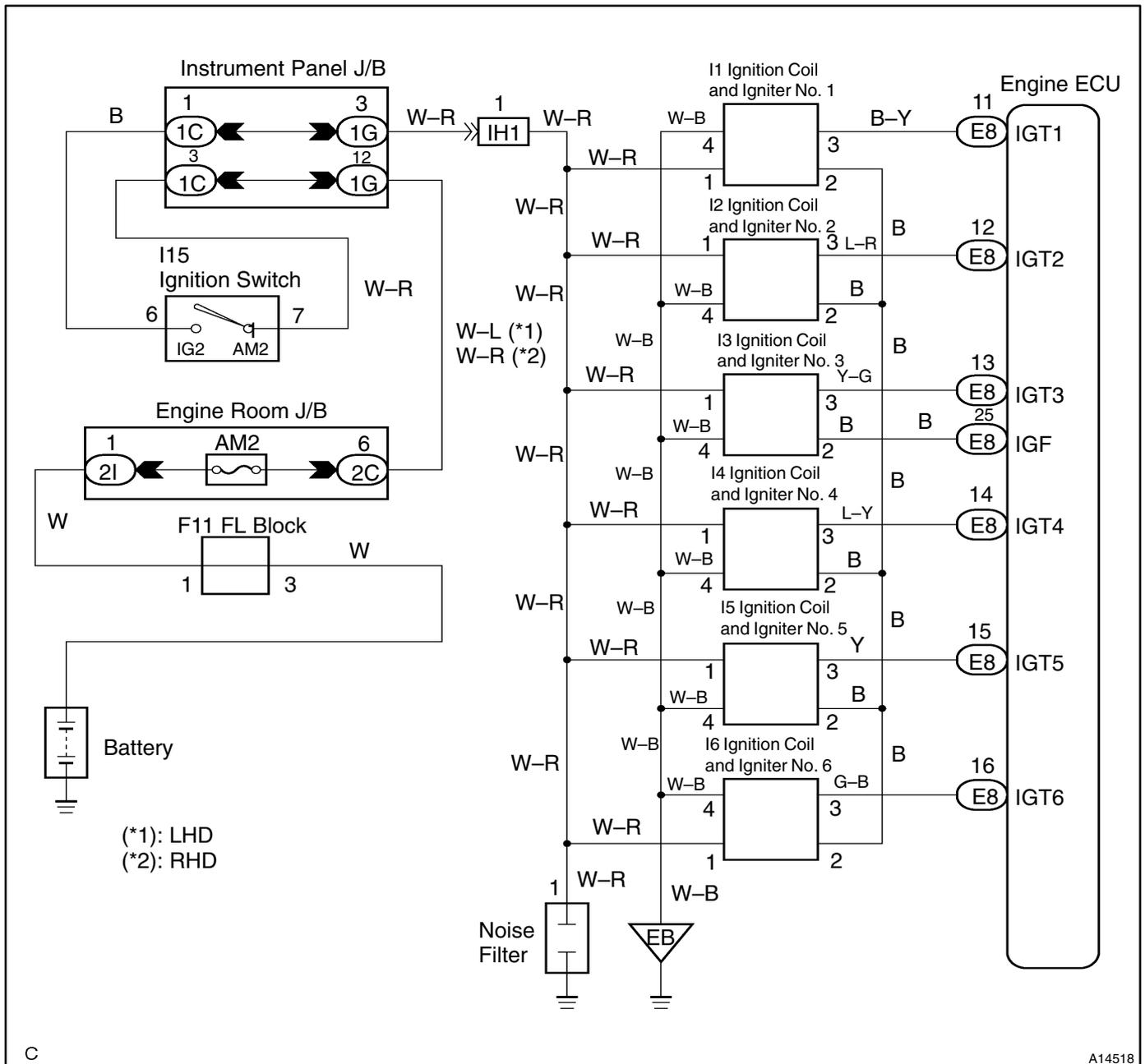
## CIRCUIT DESCRIPTION

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

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

DTC No.	DTC Detecting Condition	Trouble Area
P1300 P1305 P1310 P1315 P1320 P1325	No IGF signal to engine ECU while engine is running	<ul style="list-style-type: none"> <li>• Open or short in IGF and IGT1 – 6 circuit from ignition coil with igniter</li> <li>• No. 1 – No. 6 ignition coil with igniter</li> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM



## INSPECTION PROCEDURE

## HINT:

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

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

**NG**

**Go to step 4.**

**OK**

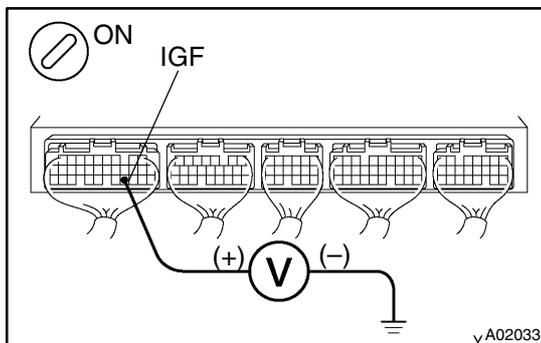
**2 Check for open and short in harness and connector in IGF and IGT signal circuit between engine ECU and ignition coil with igniter (See page IN-32).**

**NG**

**Repair or replace harness or connector.**

**OK**

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



**PREPARATION:**

- Remove the engine ECU with connector still connected (See page FI-70).
- Disconnect the ignition coil with the igniter connector.
- Turn the ignition switch ON.

**CHECK:**

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

**OK:**

**Voltage: 4.5 – 5.5 V**

**OK**

**Replace ignition coil with igniter.**

**NG**

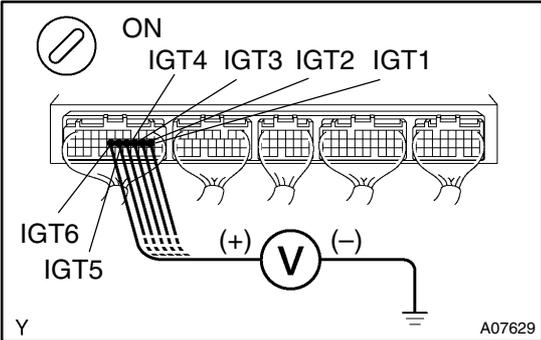
**Check and replace engine ECU (See page IN-32).**

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

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

**OK**

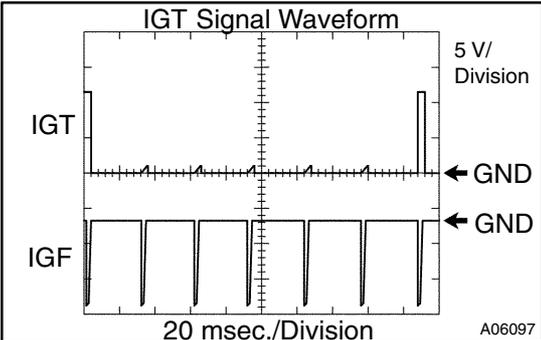
**5 Check voltage between terminals IGT1 – 6 of engine ECU connector and body ground.**



**PREPARATION:**  
Remove the engine ECU with connector still connected (See page FI-70).

**CHECK:**  
Measure voltage between terminals IGT1 – 6 of the engine ECU connector and body ground when the engine is cranked.

**OK:**  
**Voltage: More than 0.1 V and less than 4.5 V**



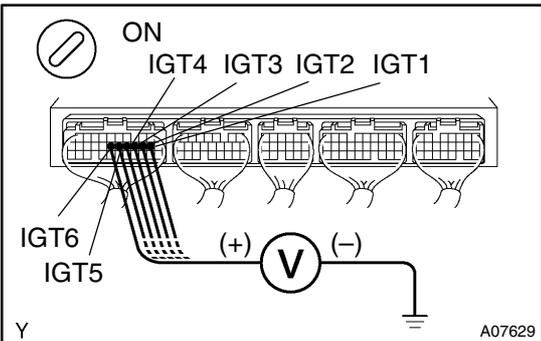
**Reference: INSPECTION USING OSCILLOSCOPE**  
During cranking or idling, check waveform between terminals IGT1 – 6 and E1 of the engine ECU connector.

**HINT:**  
Correct waveform appears as shown, with rectangle waves.

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

**OK**

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



**PREPARATION:**  
(a) Remove the engine ECU with connector still connected (See page FI-70).  
(b) Disconnect the ignition coil with the igniter connector.

**CHECK:**  
Measure voltage between terminals IGT1 – 6 of the engine ECU connector and body ground when the engine is cranked.

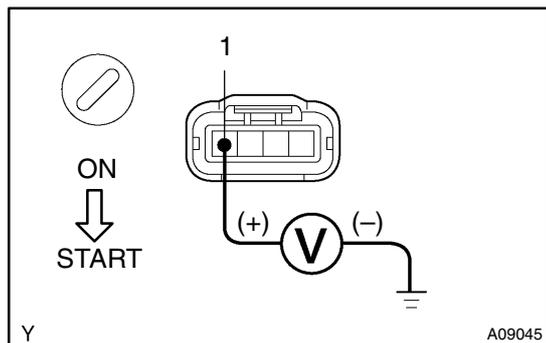
**OK:**  
**Voltage: More than 0.1 V and less than 4.5 V**

NG

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

OK

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



#### PREPARATION:

Disconnect the ignition coil the with the igniter connector.

#### CHECK:

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

#### OK:

Voltage: 9 – 14 V

OK

Repair ignition coil with igniter power source circuit.

NG

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

NG

Repair or replace harness or connector.

OK

Replace ignition coil with igniter.

<b>DTC</b>	<b>P1335</b>	<b>Crankshaft Position Sensor Circuit Malfunction (During engine running)</b>
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## CIRCUIT DESCRIPTION

Refer to DTC P0335 on page DI-67.

DTC No.	DTC Detecting Condition	Trouble Area
P1335	No crankshaft position sensor signal to engine ECU with engine speed 1,000 rpm or more	<ul style="list-style-type: none"> <li>• Open or short in crankshaft position sensor circuit</li> <li>• Crankshaft position sensor</li> <li>• Crankshaft timing pulley</li> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM

Refer to DTC P0335 on page DI-67.

## INSPECTION PROCEDURE

HINT:

Refer to DTC P0335 on page DI-67.

<b>DTC</b>	<b>P1346</b>	<b>VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)</b>
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<b>DTC</b>	<b>P1351</b>	<b>VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 2)</b>
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## CIRCUIT DESCRIPTION

VVT sensor (G(VV) signal) consist of a signal plate and pickup coil.

The G(VV) signal plate has 1 tooth on its outer circumference and is mounted on the intake camshafts.

When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.

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

DTC No.	Detection Item	Trouble Area
P1346	Deviation in crankshaft position sensor signal and VVT sensor (Bank 1) signal (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Mechanical system malfunction (Skipping teeth of timing belt, belt stretched)</li> <li>• Engine ECU</li> </ul>
P1351	Deviation in crankshaft position sensor signal and VVT sensor (Bank 2) signal (2 trip detection logic)	

## WIRING DIAGRAM

Refer to DTC P0335 on page DI-67.

## INSPECTION PROCEDURE

HINT:

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

<b>1</b>	<b>Check valve timing (Check for loose and jumping teeth of timing belt) (See page EM-22).</b>
----------	--

**NG**

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

**OK**

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

<b>DTC</b>	<b>P1349</b>	<b>VVT System Malfunction (Bank 1)</b>
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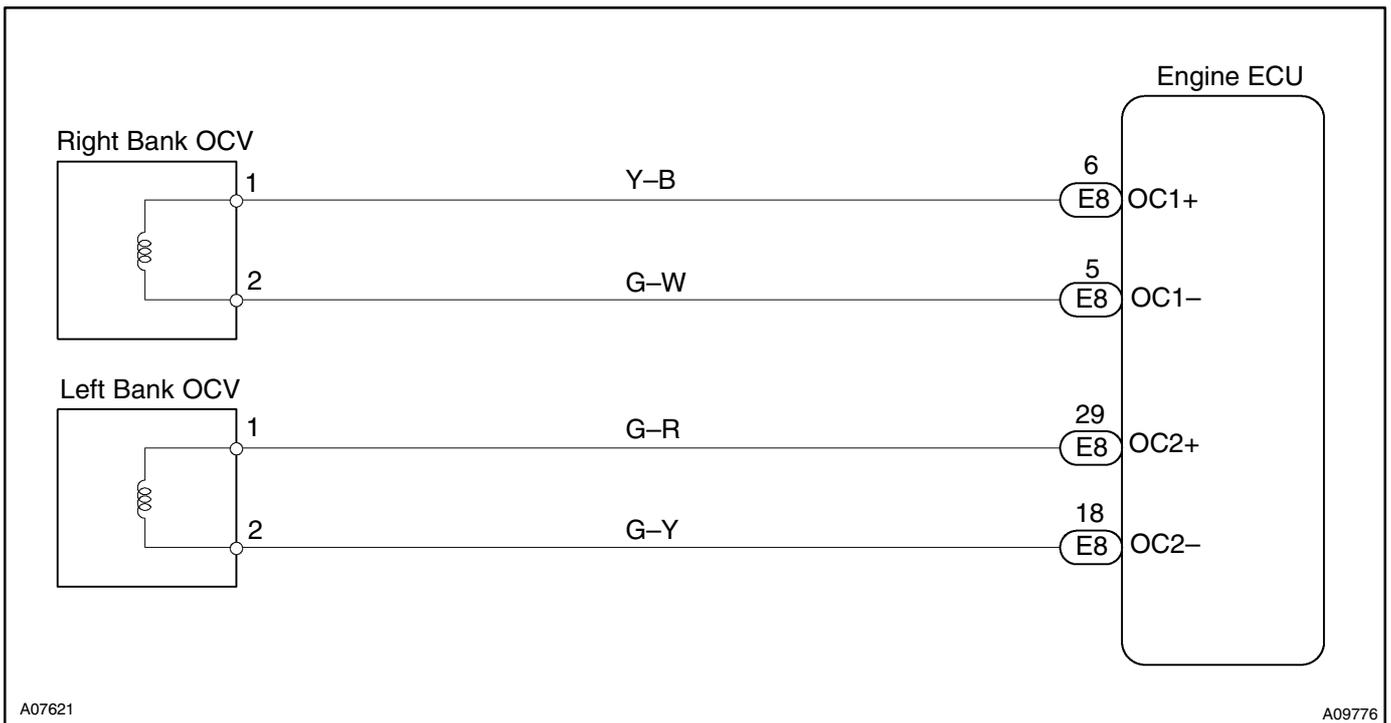
<b>DTC</b>	<b>P1354</b>	<b>VVT System Malfunction (Bank 2)</b>
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**CIRCUIT DESCRIPTION**

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

DTC No.	DTC Detecting Condition	Trouble Area
P1349 P1354	Condition (a) or (b) continues for after the engine is warmed up and engine speed at 400 – 4,000 rpm: (a) Valve timing does not change from of current valve timing (b) Current valve timing is fixed	<ul style="list-style-type: none"> <li>• Valve timing</li> <li>• Oil control valve</li> <li>• VVT controller assembly</li> <li>• Engine ECU</li> </ul>

**WIRING DIAGRAM**



A07621

A09776

**INSPECTION PROCEDURE**

**HINT:**

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

**Hand-held tester:**

<b>1</b>	<b>Check valve timing (See page EM-22).</b>
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<b>NG</b>	<b>Repair valve timing.</b>
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<b>2</b>	<b>Check operation of OCV.</b>
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**PREPARATION:**

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

**CHECK:**

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

**OK:**

**VVT system OFF to ON (OCV OFF to ON):**

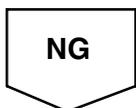
**Engine speed increases.**

**VVT system ON to OFF (OCV ON to OFF):**

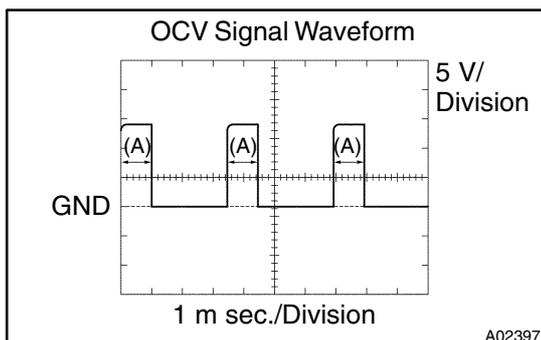
**Engine is stalled.**

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



<b>3</b>	<b>Check voltage between terminals OCV+ and OCV- of engine ECU connector.</b>
----------	---

**Reference: INSPECTION USING OSCILLOSCOPE**

Turn the ignition switch ON, and check waveform between terminals OCV+ and OCV- of the engine ECU connector.

**HINT:**

- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

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

**OK**

**4** Check valve timing controller assembly (See page EM-43).

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

**OK**

**5** Check oil control valve (See page FI-42).

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

**OK**

**6** Check blockage of oil control valve, oil check valve and oil pipe.

**NG** Repair or replace.

**OK**

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

**PREPARATION:**

- (a) Clear the DTC (See page DI-3).
- (b) Perform simulation test.

**CHECK:**

Check whether or not DTC P1349 is stored (See page DI-3).

**OK:**

**DTC P1349 is not stored**

**OK** VVT system is OK.\*

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

NG

Replace engine ECU

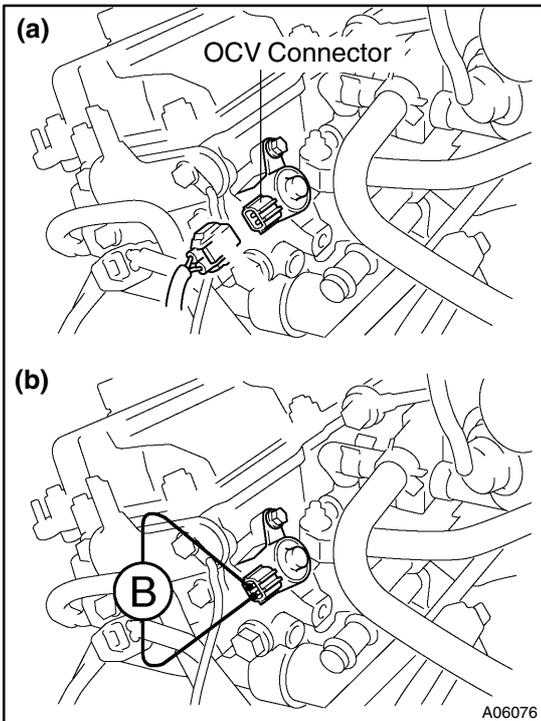
**OBD scan tool (excluding hand-held tester):**

1 Check valve timing (See page EM-22).

NG Repair valve timing.

OK

2 Check operation of OCV.



**PREPARATION:**

Start the engine.

**CHECK:**

- (a) Check the engine speed when disconnecting the OCV connector.
- (b) Check the engine speed when applying battery positive voltage between terminals of OCV.

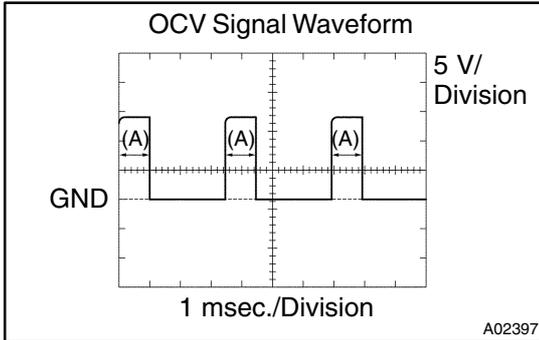
**RESULT:**

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

2 Go to step 4.

1

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



#### Reference: INSPECTION USING OSCILLOSCOPE

Turn the ignition switch ON, check waveform between terminals OCV+ and OCV- of the engine ECU connector.

#### HINT:

- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

**OK**

**VVT system is OK.\***

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

**NG**

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

### 4 Check valve timing controller assembly.

**NG**

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

**OK**

### 5 Check oil control valve (See page FI-42).

**NG**

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

**OK**

<b>6</b>	<b>Check blockage of oil control valve, oil check valve and oil pipe No. 1.</b>
----------	---

<b>NG</b>	<b>Repair or replace.</b>
-----------	---------------------------



<b>7</b>	<b>Check whether or not DTC P1349 is stored.</b>
----------	--

**PREPARATION:**

- (a) Clear the DTC (See page DI-3).
- (b) Perform simulation test.

**CHECK:**

Check whether or not DTC P1349 is stored (See page DI-3).

**OK:**

**DTC P1349 is not stored**

<b>OK</b>	<b>VVT system is OK.*</b>
-----------	---------------------------

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



<b>Replace engine ECU.</b>
----------------------------

<b>DTC</b>	<b>P1350</b>	<b>VVT Sensor/Camshaft Position Sensor Circuit Malfunction (Bank 2)</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**

Refer to DTC P1346, P1351 on page DI-102.

DTC No.	DTC Detecting Condition	Trouble Area
P1345 P1350	No VVT sensor (Camshaft position sensor) signal to engine ECU during cranking at 4 sec. or more	<ul style="list-style-type: none"> <li>• Open or short in VVT sensor (camshaft position sensor) circuit</li> <li>• VVT sensor (camshaft position sensor)</li> <li>• Camshaft timing gear</li> <li>• Engine ECU</li> </ul>
	No VVT sensor (Camshaft position sensor) signal to engine ECU with 5 sec. or more engine speed 600 rpm or more	
	While crankshaft rotates twice, VVT sensor (Camshaft position sensor) signal will be input to engine ECU 5 times.	

**WIRING DIAGRAM**

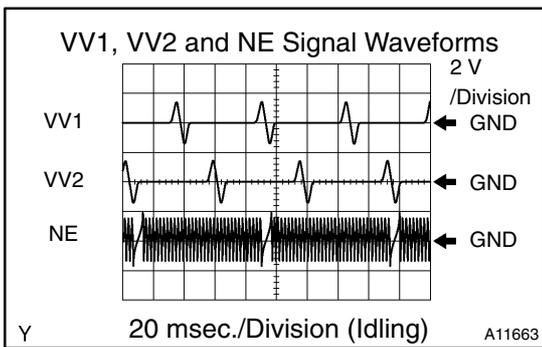
Refer to DTC P0335 on page DI-67.

**INSPECTION PROCEDURE**

HINT:

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

<b>1</b>	<b>Check resistance of VVT sensor (See page IG-1).</b>
----------	--



**Reference: INSPECTION USING OSCILLOSCOPE**

During idling, check the waveforms between terminals VV1 and NE+, and VV2 and NE- of the engine ECU connector.

HINT:

- The correct waveforms are as shown.
- The waveform frequency is shortened as the engine speed becomes higher.

<b>NG</b>	<b>Replace VVT sensor.</b>
-----------	----------------------------

<b>OK</b>
-----------

<b>2</b>	<b>Check for open and short in harness and connector between engine ECU and VVT sensor (See page IN-32).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>3</b>	<b>Inspect sensor installation and signal plate teeth of camshaft timing gear.</b>
----------	--

<b>NG</b>	<b>Tighten sensor. Replace camshaft timing gear.</b>
-----------	--

<b>OK</b>
-----------

<b>Check and replace engine ECU (See page IN-32).</b>
---

<b>DTC</b>	<b>P1520</b>	<b>Stop Light Switch Signal Malfunction</b>
------------	--------------	---

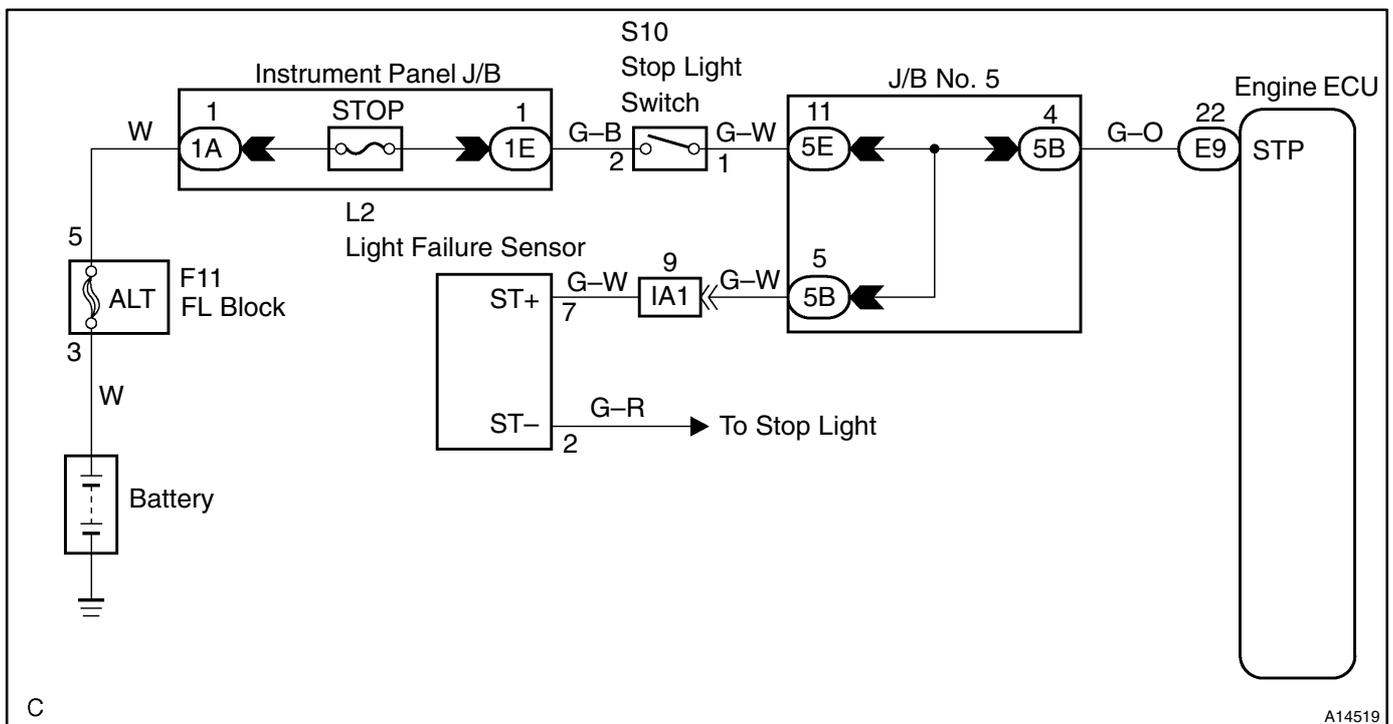
## CIRCUIT DESCRIPTION

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 when repeating driving at 30 km or more 10 time or more after depressing brake (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Short in stop light switch signal circuit</li> <li>• Stop light switch</li> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

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

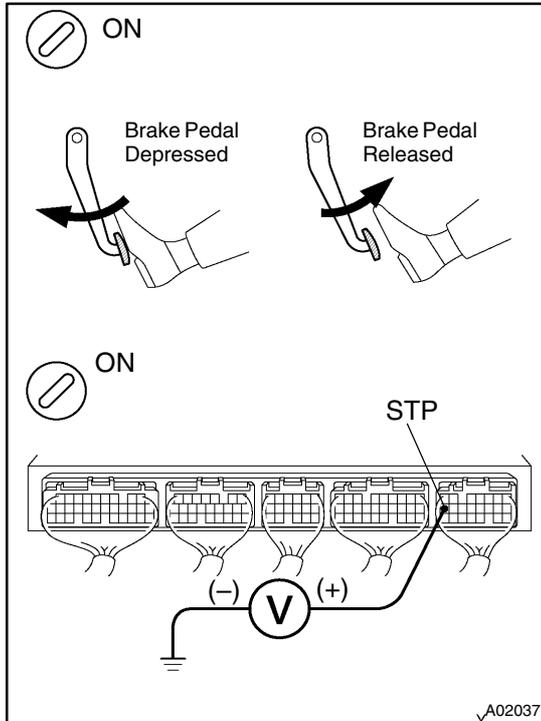
<b>1</b>	<b>Check operation of stop light.</b>
----------	---------------------------------------

### CHECK:

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



OK

**2 Check STP signal.****When using hand-held tester:****PREPARATION:**

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.

**CHECK:**

Read the STP signal on the hand-held tester.

**OK:**

Brake Pedal	STP Signal
Depressed	ON
Released	OFF

**When not using hand-held tester:****PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Check the voltage between terminal STP of the engine ECU connector and body ground.

**OK:**

Brake Pedal	Voltage
Depressed	7.5 – 14 V
Released	Below 1.5 V

OK

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

NG

**3 Check harness and connector between engine ECU and stop light switch  
(See page IN-32).**

NG

**Repair or replace harness or connector.**

OK

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

<b>DTC</b>	<b>P1600</b>	<b>ECU BATT Malfunction</b>
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### CIRCUIT DESCRIPTION

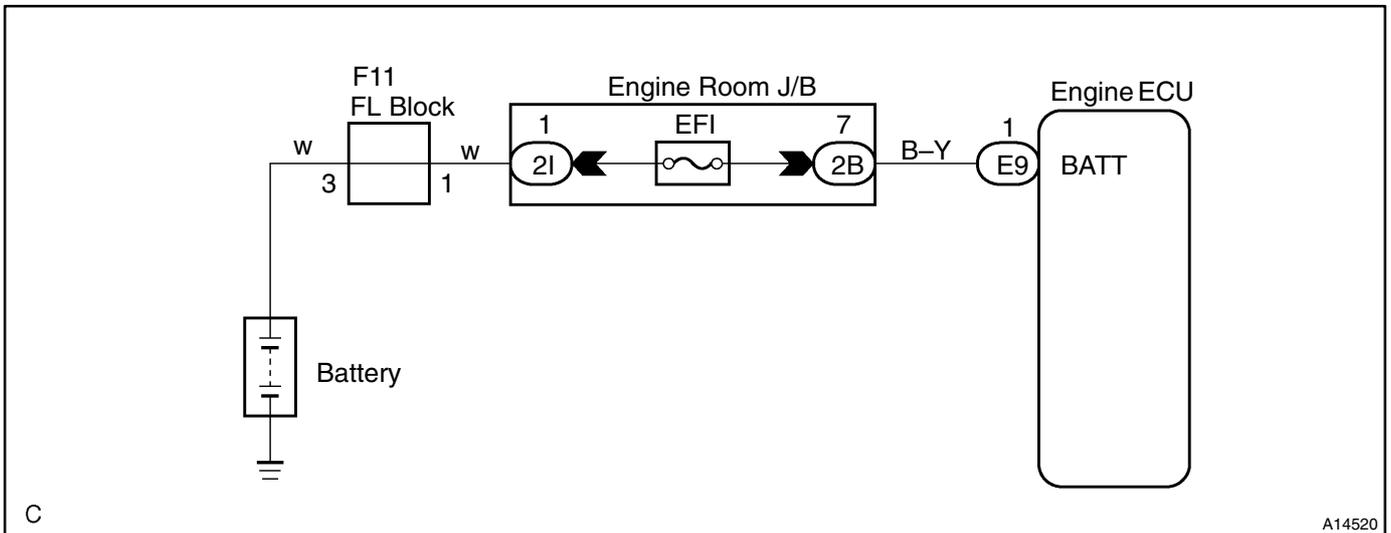
Battery positive voltage is supplied to terminal BATT of the engine ECU even when the ignition switch is OFF for use by the DTC memory and air-fuel ratio adaptive control value memory, etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1600	Open in back up power source circuit	<ul style="list-style-type: none"> <li>• Open in back up power source circuit</li> <li>• Engine ECU</li> </ul>

HINT:

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

### WIRING DIAGRAM



C

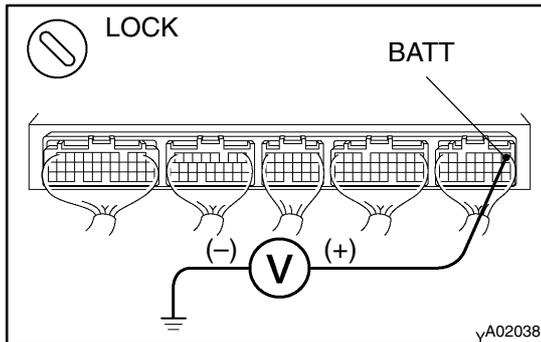
A14520

## INSPECTION PROCEDURE

### HINT:

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

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



### PREPARATION:

Remove the engine ECU with connector still connected (See page FI-70).

### CHECK:

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

### OK:

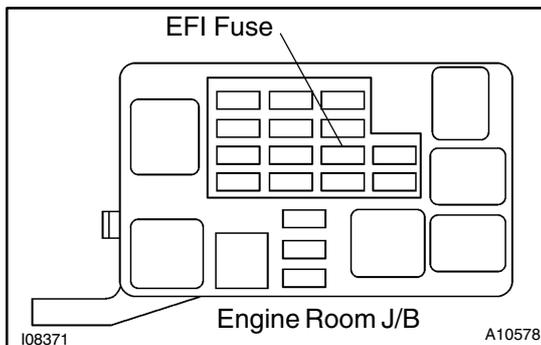
**Voltage: 9 – 14 V**

**OK**

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

**NG**

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



### PREPARATION:

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

### CHECK:

Check continuity of the EFI fuse.

### OK:

**Continuity**

**NG**

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

**OK**

**Check and repair harness or connector between battery and EFI fuse, and EFI fuse and engine ECU (See page IN-32).**

<b>DTC</b>	<b>P1645</b>	<b>Body ECU Malfunction</b>
------------	--------------	-----------------------------

### CIRCUIT DESCRIPTION

ECU receives the operating condition (ON/OFF) of A/C from A/C ECU and it also receives the electrical load information from the body ECU.

ECU uses these information to control the engine (idle up, etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P1645	Condition (a) or (b) continues for 5.0 seconds or more: (a) No communication from body ECU (b) No communication from A/C ECU	<ul style="list-style-type: none"> <li>• Body ECU</li> <li>• A/C ECU</li> <li>• Communication bus</li> </ul>

### INSPECTION PROCEDURE

Perform troubleshooting the Multiplex Communication System (See page DI-683).

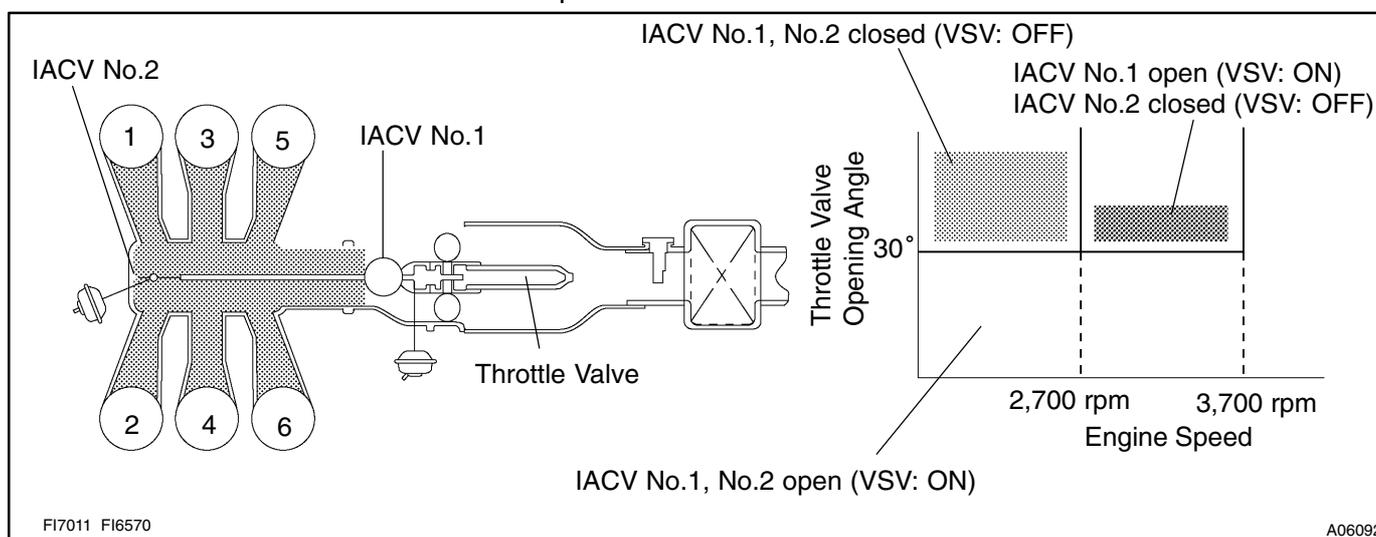
<b>DTC</b>	<b>P1651</b>	<b>VSV for ACIS Circuit Malfunction (Bank 1)</b>
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<b>DTC</b>	<b>P1666</b>	<b>VSV for ACIS Circuit Malfunction (Bank 2)</b>
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### CIRCUIT DESCRIPTION

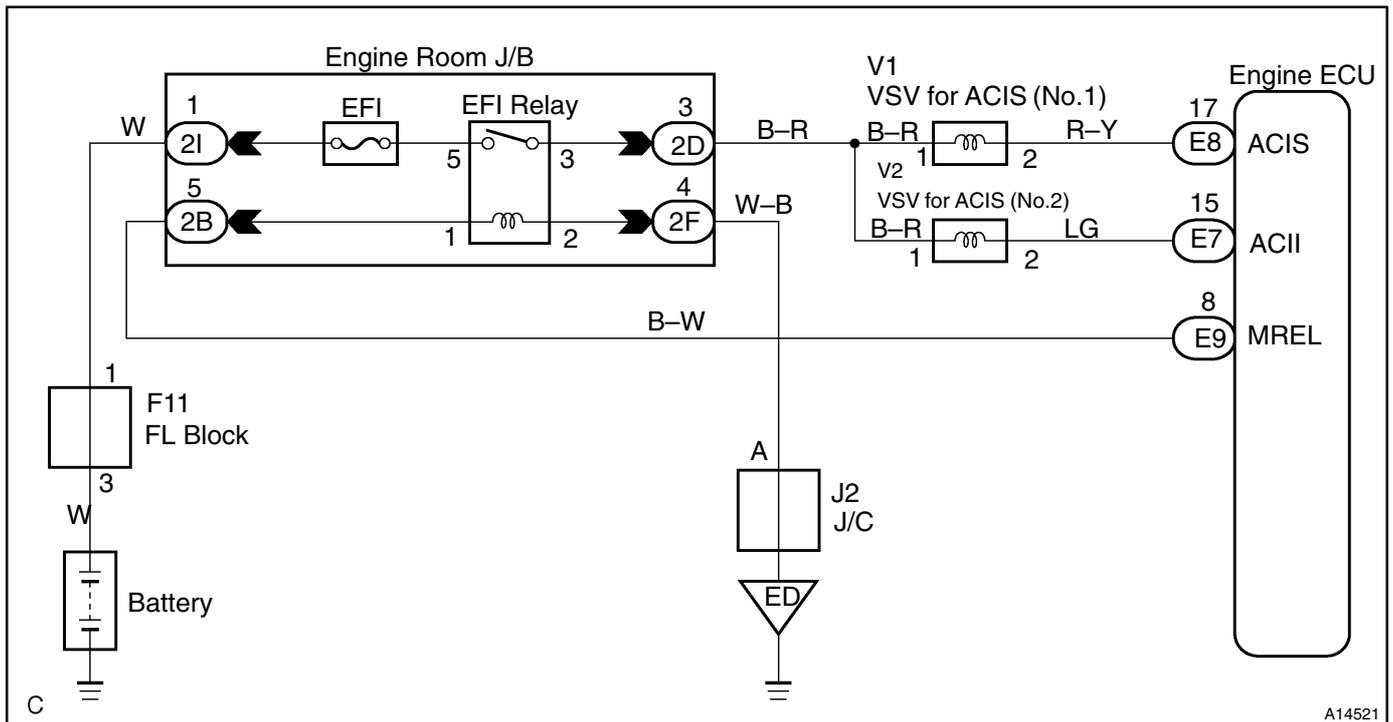
This circuit opens and closes the IACV (Intake Air Control Valve) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).

When the engine speed is 3,700 rpm or less and the throttle valve opening angle is 30° or more, the engine ECU turns the two VSV ON or OFF and operate the IACV.



DTC No.	DTC Detecting Condition	Trouble Area
P1651 P1666	Proper response to engine ECU command does not occur (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Open or short in VSV circuit for ACIS</li> <li>• VSV for ACIS</li> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM



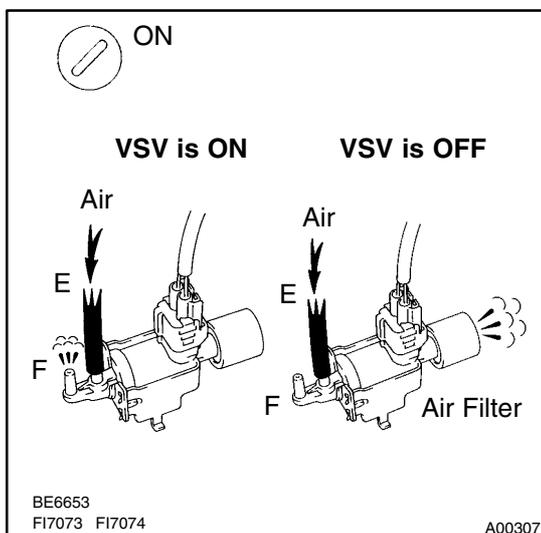
## INSPECTION PROCEDURE

### Hand-held tester:

#### HINT:

- Read freeze frame data using hand-held tester or OBD scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- If DTC P1651 displayed, check left bank VSV circuit.
- If DTC P1666 displayed, check right bank VSV circuit.

### 1 Connect hand-held tester and check operation of VSV for ACIS.



#### PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.
- Select the ACTIVE TEST mode on the hand-held tester.

#### CHECK:

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

#### OK:

##### VSV is ON:

Air from port E flows out through port F.

##### VSV is OFF:

Air from port E flows out through the air filter.

BE6653  
F17073 F17074

A00307

OK

Check for vacuum tank (See page FI-53).

NG

2 Check VSV for ACIS (See page FI-53).

NG

Replace VSV for ACIS.

OK

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

NG

Repair or replace harness or connector.

OK

Check and replace engine ECU  
(See page IN-32).**OBD scan tool (excluding hand-held tester):**

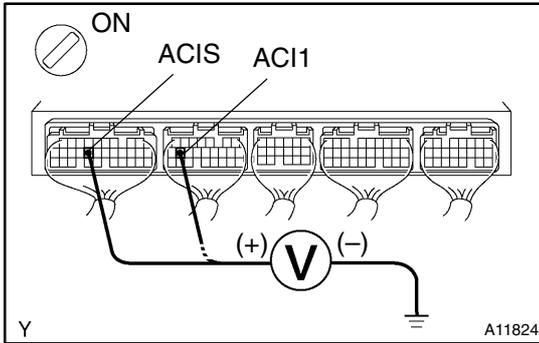
1 Check VSV for ACIS (See page FI-53).

NG

Replace VSV for ACIS.

OK

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



**PREPARATION:**

- (a) Remove the engine ECU with connector still connected (See page FI-70).
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal ACIS , ACI1 of the engine ECU connector and body ground.

**OK:**

**Voltage: 9 – 14 V**

**NG**

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

**OK**

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

<b>DTC</b>	<b>P1656</b>	<b>OCV Circuit Malfunction (bank 1)</b>
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<b>DTC</b>	<b>P1663</b>	<b>OCV Circuit Malfunction (bank 2)</b>
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## CIRCUIT DESCRIPTION

Refer to DTC P1349, P1354 on page DI-103.

DTC No.	DTC Detecting Condition	Trouble Area
P1656 P1663	Open or short in oil control valve circuit	<ul style="list-style-type: none"> <li>• Open or short in OCV circuit</li> <li>• OCV</li> <li>• Engine ECU</li> </ul>

## WIRING DIAGRAM

Refer to DTC P1349, P1354 on page DI-103.

## INSPECTION PROCEDURE

HINT:

- If DTC P1656 displayed, check left bank OCV circuit.
- If DTC P1663 displayed, check right bank OCV circuit.
- Read freeze frame data using hand-held tester or OBD scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

### Hand-held tester:

<b>1</b>	<b>Check OCV circuit.</b>
----------	---------------------------

### PREPARATION:

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

### CHECK:

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

### OK:

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

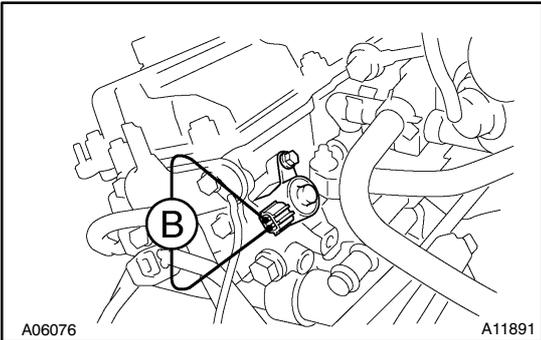
**VVT system is ON (OCV is ON): Rough idle or engine stalled**

**OK**

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

**NG**

**2 Check operation of OCV.**



**PREPARATION:**

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

**CHECK:**

Check the engine speed.

**OK:**

**Rough idle or engine stalled.**

**NG** → **Replace OCV.**

**OK**

**3 Check voltage between terminals OCV+ and OCV- of engine ECU connector (See page DI-103, step 3).**

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

**OK**

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

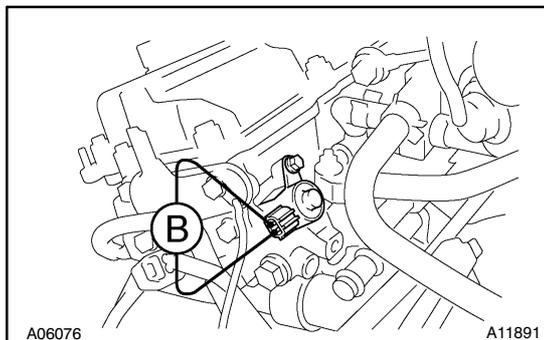
**NG** → **Repair or replace.**

**OK**

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

**OBD scan tool (excluding hand-held tester):**

<b>1</b>	<b>Check operation of OCV.</b>
----------	--------------------------------

**PREPARATION:**

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

**CHECK:**

Check the engine speed.

**OK:**

**Rough idle or engine stalled**

**NG**

**Replace OCV.**

**OK**

<b>2</b>	<b>Check voltage between terminals OCV+ and OCV- of engine ECU connector (See page DI-103, step 3).</b>
----------	---

**NG**

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

**OK**

<b>3</b>	<b>Check for open and short in harness and connector between OCV and engine ECU (See page IN-32).</b>
----------	---

**NG**

**Repair or replace.**

**OK**

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

<b>DTC</b>	<b>P1780/97</b>	<b>Park/Neutral Position Switch Malfunction</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The neutral start switch goes on when the shift lever is in the N or P shift position. When it goes on, terminal NSW of the engine ECU 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 neutral start switch goes off, so the voltage of the engine ECU. Terminal NSW becomes battery voltage, the voltage of the engine ECU 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
P1780/97	When driving under conditions (a) and (b) for 30 sec. or more the neutral start switch is ON (N position): (2 trip detection logic) (a) Vehicle speed: 40 km/h (25 mph) or more (b) Engine speed: 1,500 – 4,000 rpm	<ul style="list-style-type: none"> <li>• Short in neutral start switch circuit</li> <li>• Neutral start switch</li> <li>• engine ECU</li> </ul>

### HINT:

After confirming DTC P1780/97, use the hand-held tester to confirm the PNP switch signal from the CURRENT DATA.

## WIRING DIAGRAM

Refer to DTC P1780 on page DI-188.

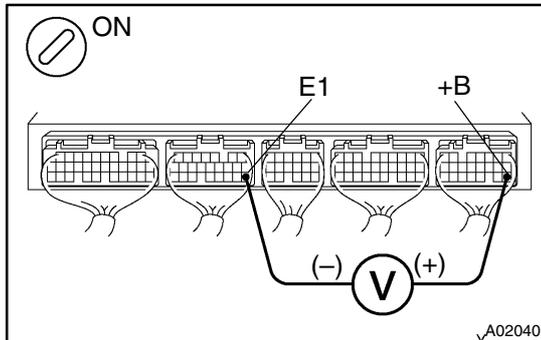
## INSPECTION PROCEDURE

Refer to DTC P1780 on page DI-188.



## INSPECTION PROCEDURE

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

**PREPARATION:**

- (a) Remove the engine ECU with connector still connected (See page FI-70).
- (b) Turn the ignition switch ON.

**CHECK:**

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

**OK:**

**Voltage: 9 – 14 V**

**OK**

**Proceed to next circuit inspection shown on problem symptoms table (See page DI-21).**

**NG**

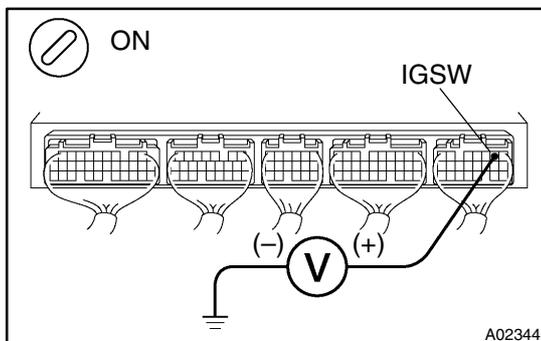
**2 Check for open in harness and connector between terminal E1 of engine ECU and body ground (See page IN-32).**

**NG**

**Repair or replace harness or connector.**

**OK**

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

**PREPARATION:**

- (a) Remove the engine ECU with connector still connected (See page FI-70).
- (b) Turn the ignition switch ON.

**CHECK:**

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

**OK:**

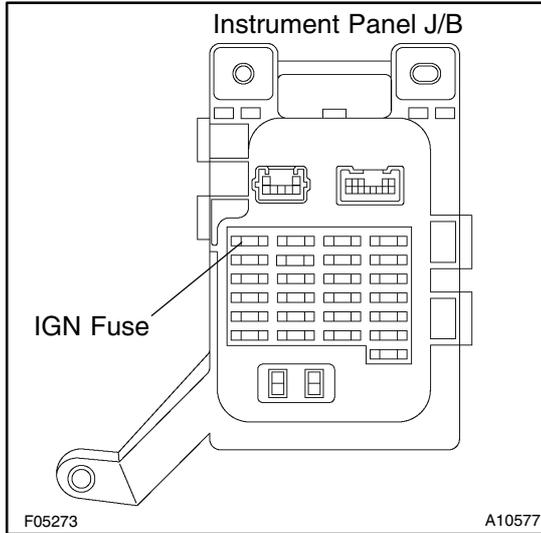
**Voltage: 9 – 14 V**

**OK**

**Go to step 6.**

**NG**

#### 4 Check IGN fuse.



#### **PREPARATION:**

Remove the IGN fuse from the instrument panel J/B.

#### **CHECK:**

Check the continuity of the IGN fuse.

#### **OK:**

**Continuity**

**NG**

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

**OK**

#### 5 Check ignition switch (See page BE-26).

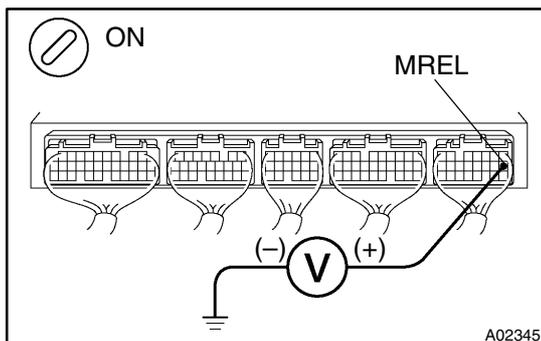
**NG**

**Replace ignition switch.**

**OK**

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

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



#### **PREPARATION:**

(a) Remove the engine ECU with connector still connected (See page FI-70).

(b) Turn the ignition switch ON.

#### **CHECK:**

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

#### **OK:**

**Voltage: 9 – 14 V**

NG

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

OK

7 Check EFI fuse (See page DI-113, step 2).

NG

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

OK

8 Check EFI main relay (Marking: EFI) (See page FI-55).

NG

Replace EFI main relay.

OK

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

NG

Repair or replace harness or connector.

OK

Check and repair harness or connector be-  
tween EFI fuse and battery.

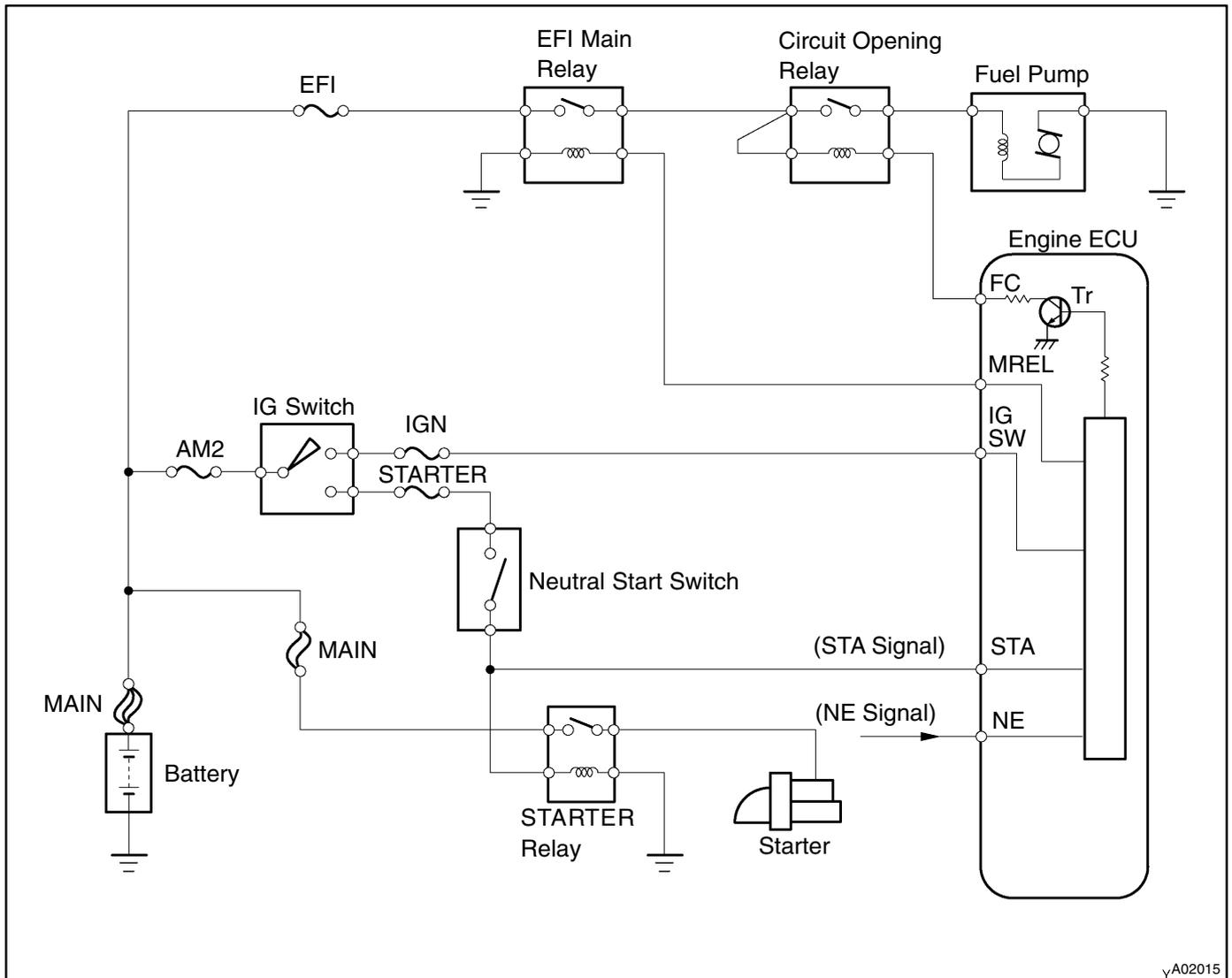
## Fuel Pump Control Circuit

### 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 and also current flows to terminal STA of engine ECU (STA signal).

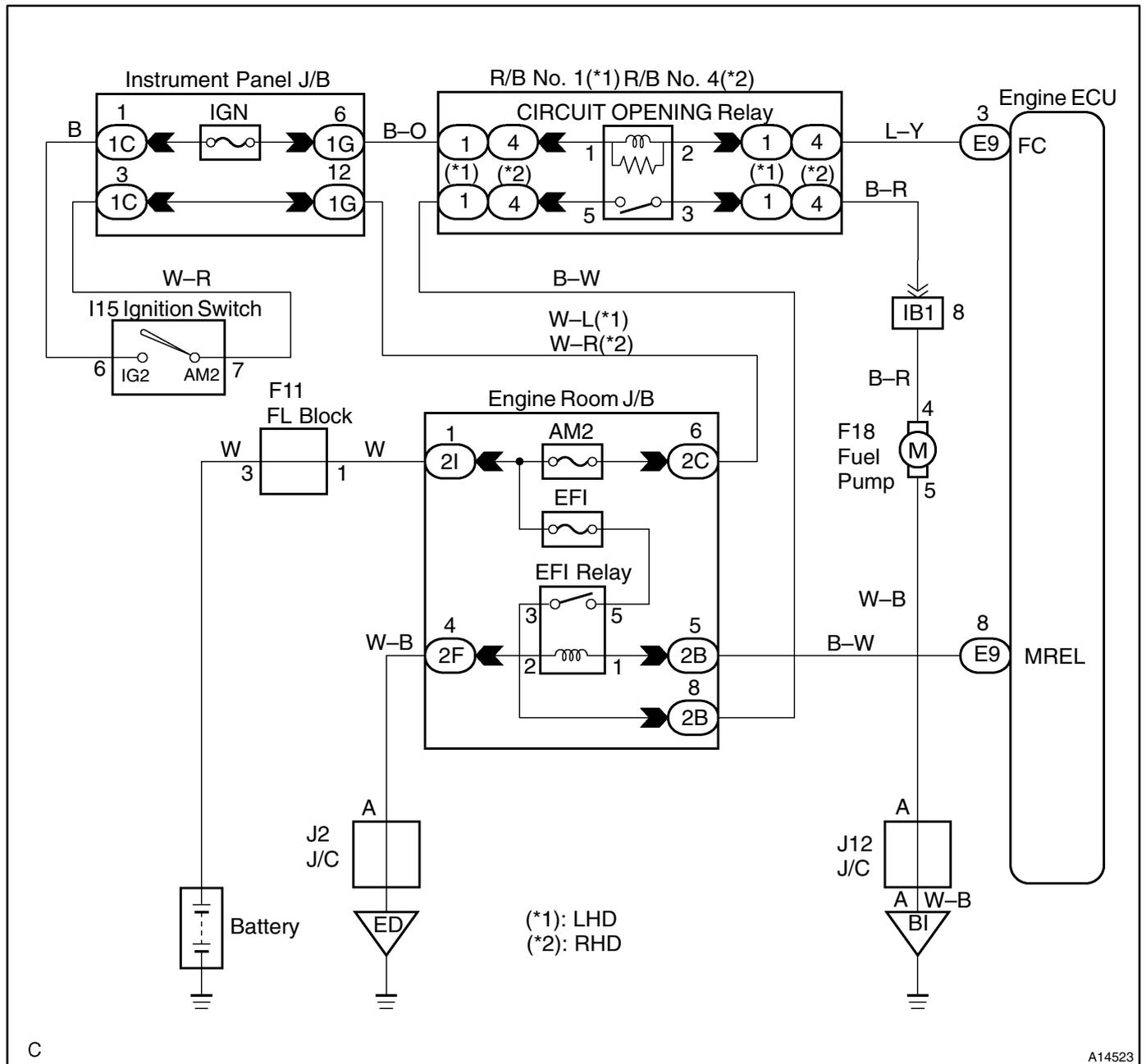
When the STA signal and NE signal are input to the engine ECU, Tr is turned ON, current flows to coil of the circuit opening relay, the relay switches on, power is supplied to the fuel pump and the fuel pump operates.

While the NE signal is generated (engine running), the engine ECU keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



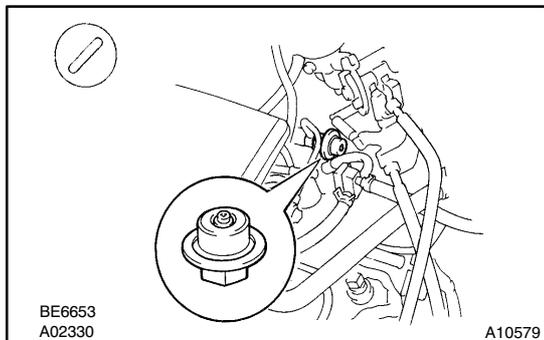
vA02015

# WIRING DIAGRAM



**INSPECTION PROCEDURE****Hand-held tester:**

**1** Connect hand-held tester, and check operation of fuel pump.

**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) Use the ACTIVE TEST mode to operate the fuel pump.

**CHECK:**

Check that the pulsation damper screw rises up when the fuel pump is operated by the hand-held tester.

**OK:**

The pulsation damper screw rises up.

OK

Check for starter signal circuit  
(See page DI-134).

NG

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

NG

Repair or replace.

OK

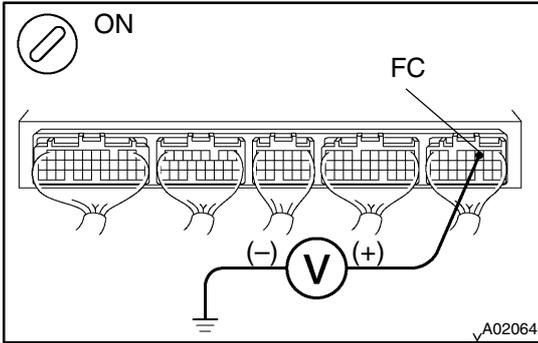
**3** Check circuit opening relay (See page FI-57).

NG

Replace circuit opening relay.

OK

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



#### PREPARATION:

- Remove the engine ECU with connector still connected (See page FI-70).
- Turn the ignition switch ON.

#### CHECK:

Measure the voltage between terminal FC of the engine ECU connector 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 engine ECU.

#### 5 Check fuel pump (See page FI-5).

NG

Repair or replace fuel pump.

OK

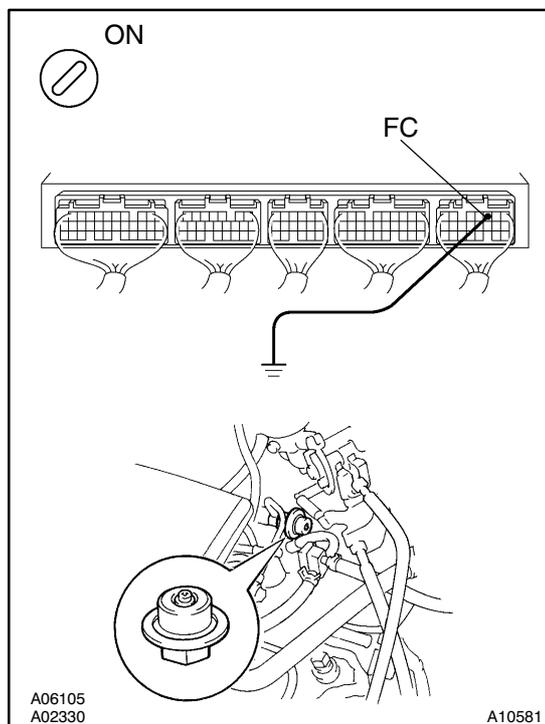
#### 6 Check for open in harness and connector between circuit opening relay and fuel pump, and fuel pump and body ground (See page IN-32).

NG

Repair or replace harness or connector.

OK

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

**OBD scan tool (excluding hand-held tester):****1 Check operation of fuel pump.****PREPARATION:**

- (a) Remove the engine ECU with connector still connected (See page FI-70).
- (b) Turn the ignition switch ON.

**CHECK:**

- (a) Connect between terminal FC of the engine ECU connector and body ground.
- (b) Check that the pulsation damper screw rises up when connecting between terminal FC of the engine ECU connector and body ground.

**OK:**

**The pulsation damper screw rises up.**

**OK**

**Check for starter signal circuit  
(See page DI-134).**

**NG**

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

**NG**

**Repair or replace.**

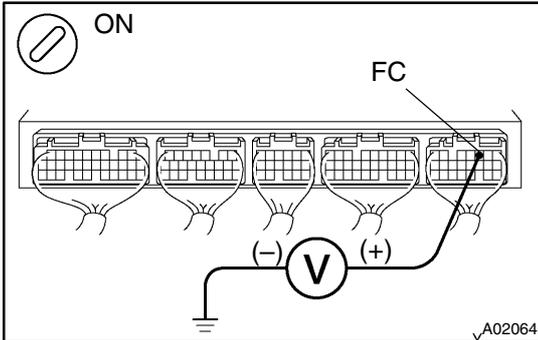
**OK**

**3 Check circuit opening relay (Marking: CIR OPN) (See page FI-57).**

**NG**

**Replace circuit opening relay.**

**OK**

**4 Check voltage between terminal FC of engine ECU connector and body ground.**
**PREPARATION:**

- (a) Remove the engine ECU with connector still connected (See page FI-70).  
 (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal FC of the engine ECU connector 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 engine ECU.**

**5 Check fuel pump (See page FI-5).**

**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-32).**

**NG**

**Repair or replace harness or connector.**

**OK**

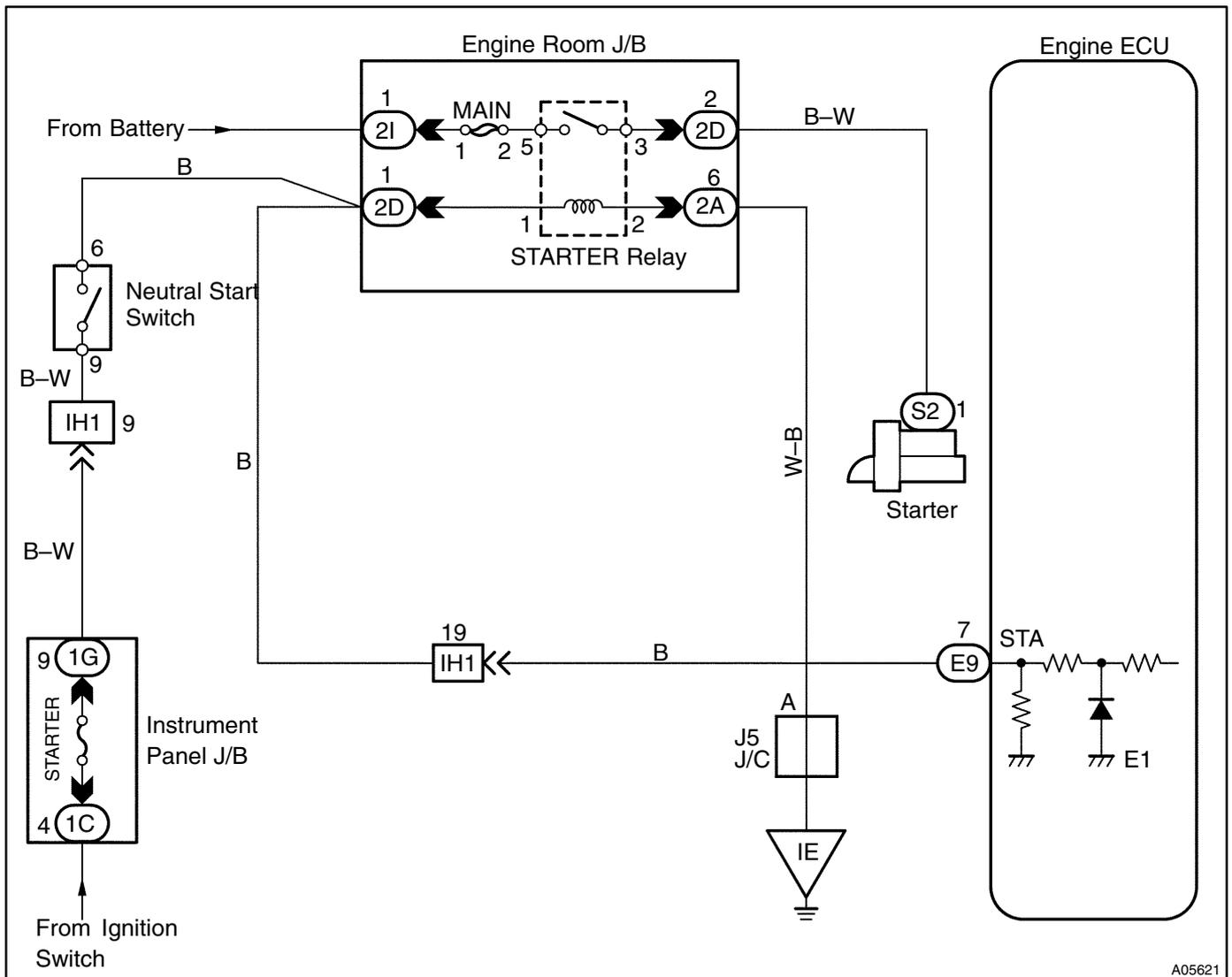
**Check and replace engine ECU (See page IN-32).**

## Starter Signal Circuit

### CIRCUIT DESCRIPTION

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

### WIRING DIAGRAM



### INSPECTION PROCEDURE

#### HINT:

This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page DI-21.

**Hand-held tester:**

<b>1</b>	<b>Connect hand-held tester, and check STA signal.</b>
----------	--

**PREPARATION:**

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

**CHECK:**

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

**OK:**

Ignition Switch Position	ON	START
STA Signal	OFF	ON

**OK** → Proceed to next circuit inspection shown on problem symptom table (See page DI-21).

**NG**

<b>2</b>	<b>Check for open in harness and connector between engine ECU and starter relay (See page IN-32).</b>
----------	---

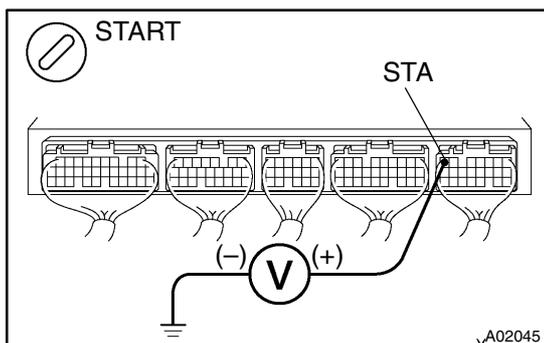
**NG** → Repair or replace harness or connector.

**OK**

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

**OBD scan tool (excluding hand-held tester):**

<b>1</b>	<b>Check voltage between terminal STA of engine ECU connector and body ground.</b>
----------	--



**PREPARATION:**

Remove the engine ECU with connector still connected (See page FI-70).

**CHECK:**

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

**OK:**

**Voltage: 6 V or more**

**OK** → Proceed to next circuit inspection shown on problem symptom table (See page DI-21).

NG

2

**Check for open in harness and connector between engine ECU and starter relay  
(See page IN-32).**

NG

**Repair or replace harness or connector.**

OK

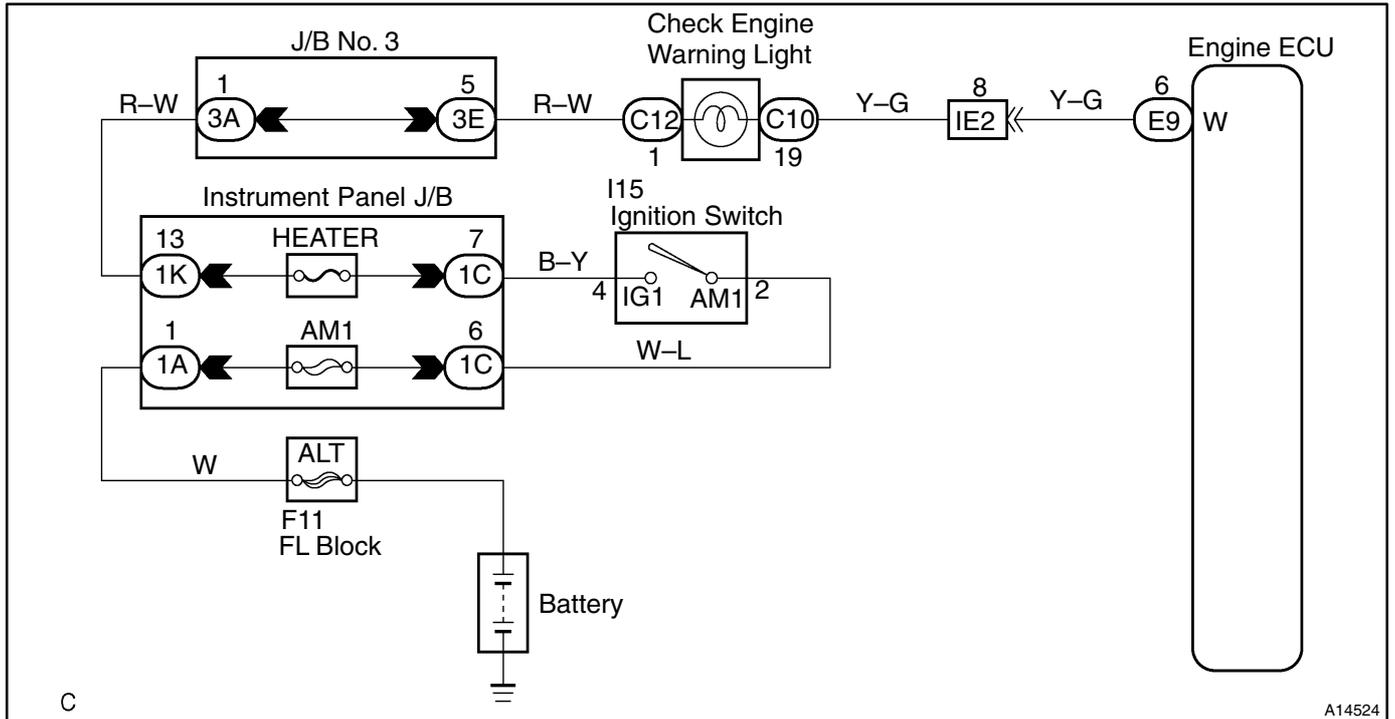
**Check and replace engine ECU  
(See page IN-32).**

# Check Engine Warning Light Circuit Malfunction

## CIRCUIT DESCRIPTION

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

## WIRING DIAGRAM



## INSPECTION PROCEDURE

HINT:

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

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

**1 Check operation of check engine warning light.****PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Switch the hand-held tester from the normal mode to the check mode.

**CHECK:**

Check if the check engine warning light blinks.

**OK:**

The check engine warning light blinks.

**OK**

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

**NG****2 Check check engine warning light.**

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

**NG**

Repair or replace bulb or combination meter assembly.

**OK****3 Check that engine ECU connectors are securely connected to engine ECU.****NO**

Connect connector to engine ECU.

**YES**

Check for open circuit in harness and connector between combination meter and engine ECU (See page IN-32).

**4** Check operation of check engine warning light (See step 1).

**OK**

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

**NG**

**5** Is DTC output?

Check DTC on page DI-3.

**YES**

Repair circuit indicated by output code.

**NO**

**6** Check HEATER fuse.

**OK**

Check for short in all harness and components connected to HEATER fuse.

**NG**

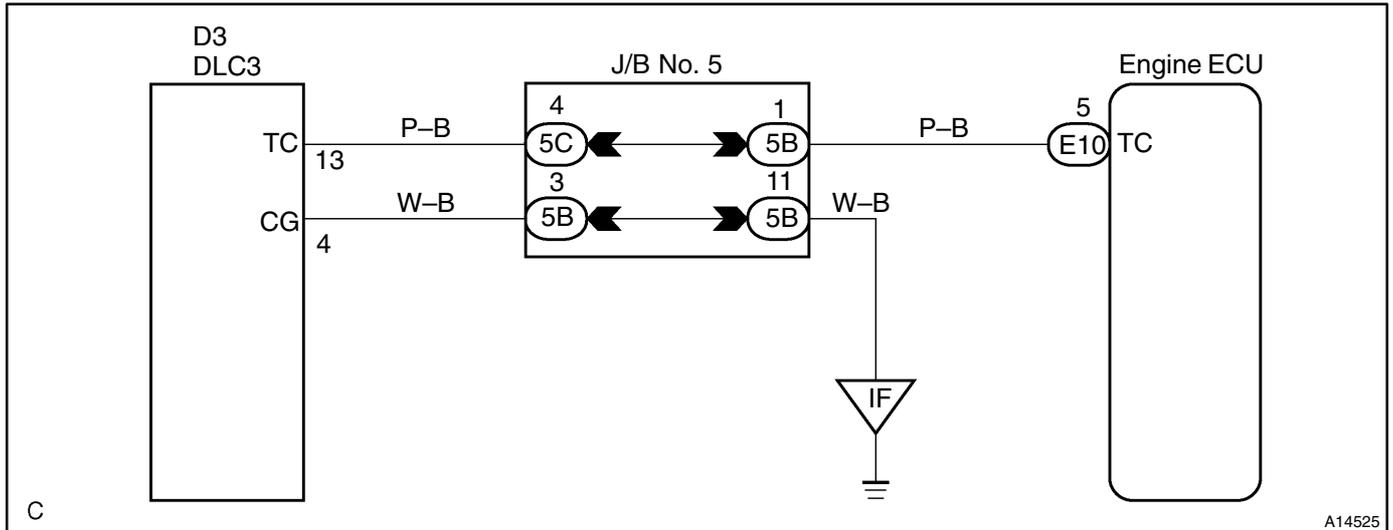
Check for short circuit in harness and connector between DLC3 and engine ECU (See page IN-32).

## TC Terminal Circuit

### CIRCUIT DESCRIPTION

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

### WIRING DIAGRAM

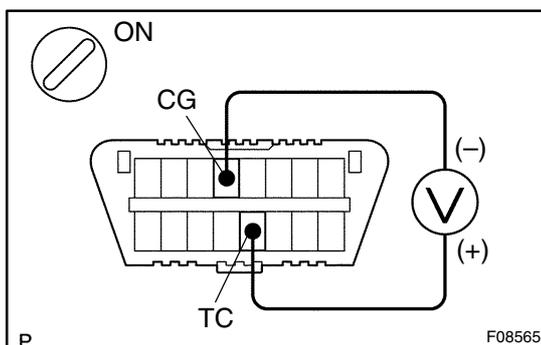


### INSPECTION PROCEDURE

#### HINT:

- Even though terminal TC is not connected with terminal CG, the check engine warning light blinks.
- For the above phenomenon, an open or short in the wire harness, or malfunction inside the engine ECU is the likely cause.

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



#### PREPARATION:

Turn the ignition switch ON.

#### CHECK:

Measure the voltage between terminals TC and CG of the DLC3.

#### OK:

**Voltage: 9 – 14 V**

**OK**

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

**NG**

<b>2</b>	<b>Check continuity between terminal CG of DLC3 and body ground.</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>3</b>	<b>Check for open and short circuit in harness and connector between engine ECU and DLC3 (See page IN-32).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

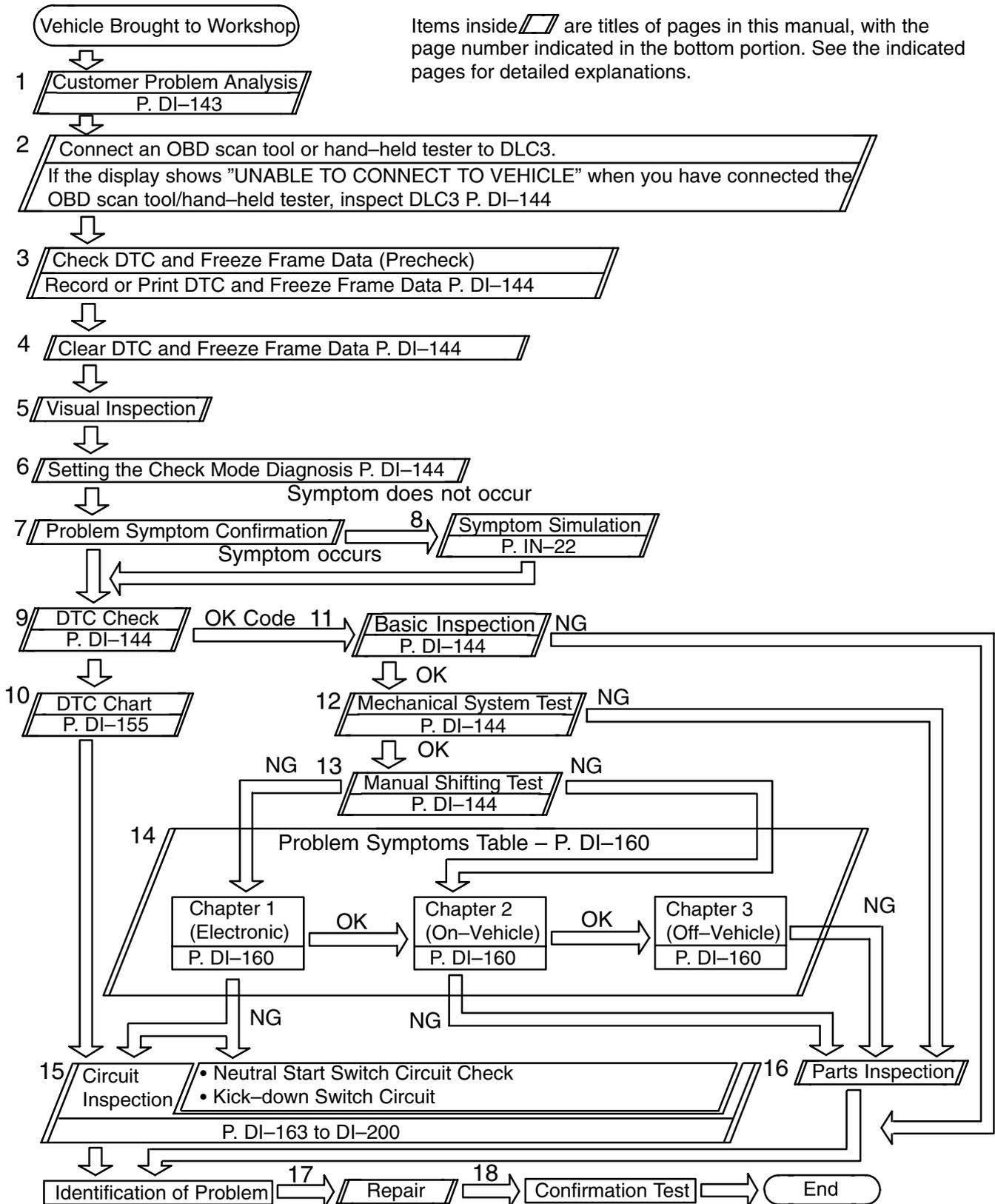
<b>OK</b>
-----------

<b>Check and replace engine ECU (See page IN-32).</b>
---

# AUTOMATIC TRANSAXLE

## HOW TO PROCEED WITH TROUBLESHOOTING

DIOSL-19



# CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transaxle System Check Sheet

Inspector's Name \_\_\_\_\_ :

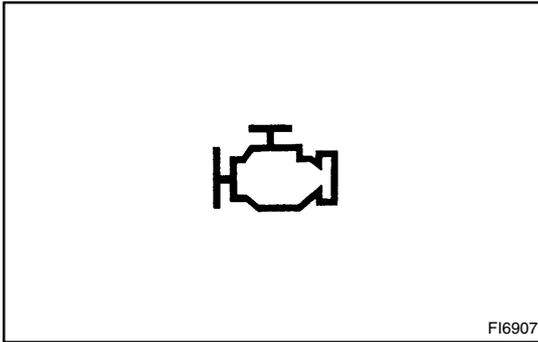
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

Date Problem Occurred	/ /
How Often Does Problem Occur?	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent ( times a day)

Symptoms	<input type="checkbox"/> Vehicle does not vome ( <input type="checkbox"/> Any range <input type="checkbox"/> Particular range)
	<input type="checkbox"/> No up-shift ( <input type="checkbox"/> 1st → 2nd <input type="checkbox"/> 2nd → 3rd <input type="checkbox"/> 3rd → 4th <input type="checkbox"/> 4th → O/D)
	<input type="checkbox"/> No down-shift ( <input type="checkbox"/> O/D → 4th <input type="checkbox"/> 4th → 3rd <input type="checkbox"/> 3rd → 2nd <input type="checkbox"/> 2nd → 1st)
	<input type="checkbox"/> Lock-up malfunction
	<input type="checkbox"/> Shift point too high or too low
	<input type="checkbox"/> Harsh engagement ( <input type="checkbox"/> N → D <input type="checkbox"/> Lock-up <input type="checkbox"/> Any drive range)
	<input type="checkbox"/> Slip or shudder
	<input type="checkbox"/> No kick-down
<input type="checkbox"/> Others ( )	

Check Item	Check Engine Warning Light (CHK ENG)	<input type="checkbox"/> Normal <input type="checkbox"/> Remains ON
------------	--------------------------------------	---

DTC Check	1st Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (DTC )
	2nd Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (DTC )



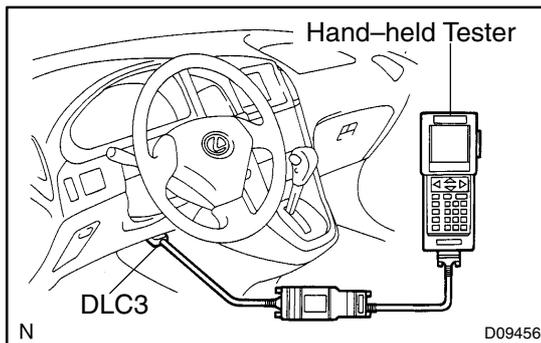
## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

#### (a) Description for EURO-OBD

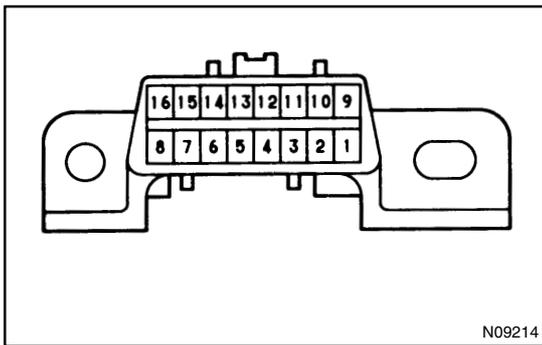
- When troubleshooting Euro-OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031-4 or hand-held tester, and read off various data output from the vehicle's engine ECU.

Euro-OBD regulations require that the vehicle's on-board computer lights up the check engine warning ignition the instrument panel when the computer detects a malfunction in the emission control system/components or in the power-train control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031-6 are recorded in the engine ECU memory (See page DI-14). If the malfunction does not repaired in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the engine ECU memory.



- To check the DTCs, connect the OBD scan tool or hand-held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand-held tester also enables you to erase the DTCs and check frozen frame data and various forms of engine data (For operating instructions, see the OBD scan tool's instruction book.). DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI-155).

- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic\* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting, the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily (Hand-held tester only) (See step 2).
- \*2 trip detection logic:  
When a malfunction is first detected, the malfunction is temporarily stored in the engine ECU memory (1st trip). If the same malfunction is detected again during the second drive test, this second detection causes the (CHK ENG) to light up (2nd trip).  
(However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.)



- (b) Check the DLC3.  
The vehicle’s engine ECU uses the ISO 9141–2 communication protocol. The terminal arrangement of DLC3 complies with ISO 15031–3 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 the OBD scan tool or hand-held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

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

## 2. INSPECT DIAGNOSIS (Normal Mode)

### (a) Check the CHK ENG.

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

#### HINT:

If the CHK ENG does not light up, troubleshoot the combination meter (See page BE-68).

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

### (b) Check the DTC using hand-held tester.

#### NOTICE:

##### Hand-held tester only:

**When the diagnosis system is switched from normal mode to check mode, it erases all DTCs and frozen frame data recorded in normal mode. So before switching modes, always check the DTCs and frozen frame data, and note them down.**

- (1) Prepare the hand-held tester.
- (2) Connect the hand-held tester to DLC3.
- (3) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (4) Use the hand-held tester to check the DTCs and frozen frame data, note them down (For operating instructions, see the hand-held tester instruction book.).
- (5) See page DI-155 to confirm the details of the DTCs.

#### NOTICE:

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

### 3. INSPECT DIAGNOSIS (Check (Test) Mode)

#### HINT:

Hand-held tester only:

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check (test) mode.

- (a) Check the DTC.
  - (1) Initial conditions
    - Battery voltage 11 V or more
    - Throttle valve fully closed.
    - Transmission in P or N range
    - A/C switched OFF
  - (2) Turn the ignition switch OFF.
  - (3) Prepare the hand-held tester.
  - (4) Connect the hand-held tester to the DLC3.
  - (5) Turn the ignition switch ON and push the hand-held tester main switch ON.
  - (6) Switch the hand-held tester from the normal mode to the check (test) mode.

#### NOTICE:

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

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

#### NOTICE:

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

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

#### HINT:

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

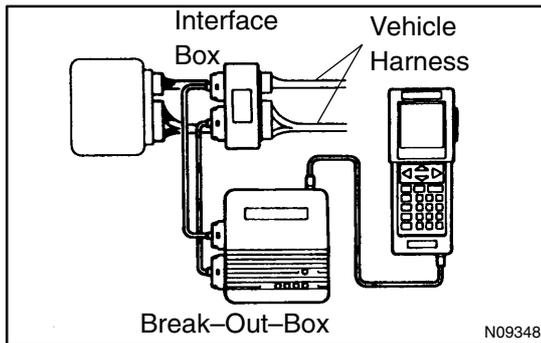
- (10) After checking the DTC, inspect the applicable circuit.
- (b) Clear the DTC.
 

The DTCs and frozen frame data will be erased by either actions.

    - (1) Operating the hand-held tester to erase the codes (See the hand-held tester's instruction book for operating instructions.).
    - (2) Disconnecting the battery terminals of EFI and ECTS fuses.

**NOTICE:**

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



## (c) Engine ECU Terminal Values Measurement Using Break-Out-Box and Hand-Held Tester

- (1) Hook up the break-out-box and hand-held tester to the vehicle.
- (2) Read the engine ECU input/output values by following the prompts on the tester screen.

**HINT:**

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

**4. ROAD TEST****NOTICE:**

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

## (a) D range test

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

- (1) Check up-shift operation.  
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-22).

**HINT:**

- O/D Gear Up-shift Prohibition Control (1. Coolant temp. is 60 °C (140 °F) or less. 2. If there is a 10 km/h (6 mph) difference between the set cruise control speed and vehicle speed.)
  - 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 range lock-up or O/D gear and check for abnormal noises and vibration.

**HINT:**

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

- (4) Check kick-down operation.  
While running in the D range, 2nd, 3rd and O/D gears, check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick-downs conform to those indicated on the automatic shift schedule (See page SS-22).
- (5) Check abnormal shock and slip at kick-down.
- (6) Check the lock-up mechanism.
  - Drive in D range, O/D gear, at a steady speed (lock-up ON) of about 80 km/h (49 mph).

- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, there is no lock-up.

(b) 2 range test

Shift into the 2 range and fully depress the accelerator pedal and check the following points:

(1) Check up-shift operation.

Check to see that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page SS-22).

HINT:

There is no O/D up-shift and lock-up in the 2 range.

(2) Check engine braking.

While running in the 2 range and 2nd gear, release the accelerator pedal and check the engine braking effect.

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

(c) L range test

Shift into the 2 range and fully depress the accelerator pedal and check the following points:

(1) Check no up-shift.

While running in the L range, check that there is no up-shift to 2nd gear.

(2) Check engine braking.

While running in the L range, release the accelerator pedal and check the engine braking effect.

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

(d) R range test

Shift into the R range and fully depress the accelerator pedal and check for slipping.

**CAUTION:**

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

(e) P range test

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

**5. BASIC INSPECTION**

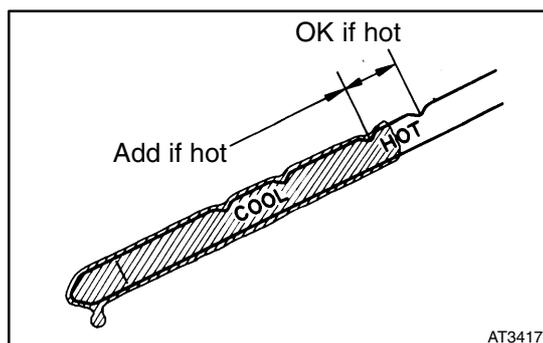
(a) Check the fluid level.

HINT:

- Drive the vehicle so that the engine and transaxle 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.



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

If the level is at the low side, add new fluid.

**Fluid type: ATF Type T-IV or equivalent**

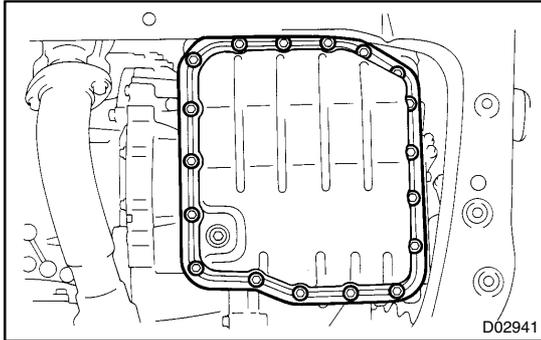
**Capacity: 3.9 liters (4.1 US qts, 3.4 Imp. qts)**

**NOTICE:**

**Do not overfill.**

(b) Check the fluid condition.

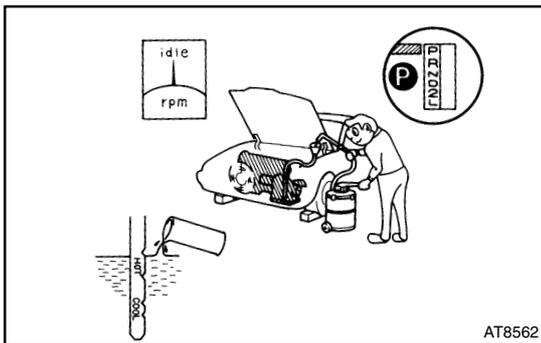
If the level is at the low side, add new fluid.



(c) Replace the ATF.

(1) Remove the drain plug and drain the fluid.

(2) Reinstall the drain plug securely.

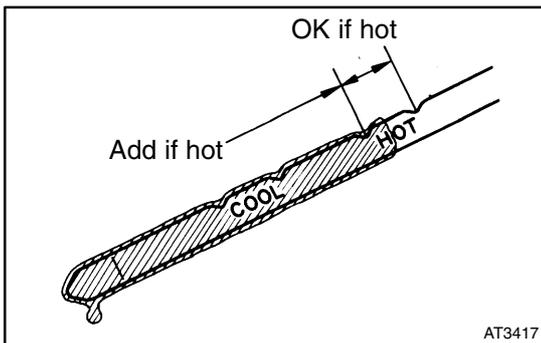


(3) With the engine OFF add new fluid through the oil filler pipe.

**Fluid type: ATF Type T-IV or equivalent**

**Capacity: 3.9 liters (4.1 US qts, 3.4 Imp. qts)**

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



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

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

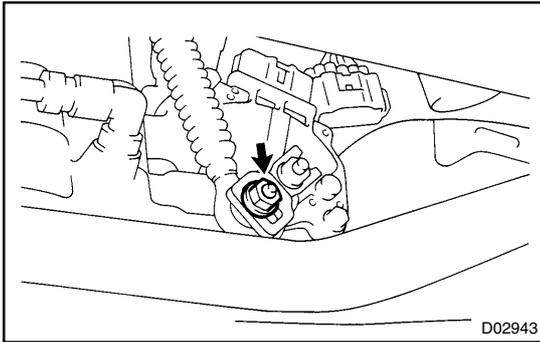
**NOTICE:**

**Do not overfill.**

(d) Check the fluid leaks.

Check for leaks in the transaxle.

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



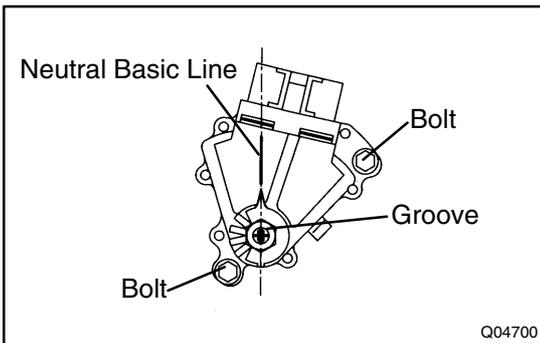
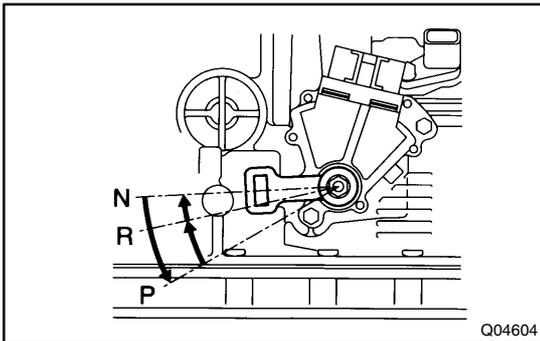
- (e) Inspect and adjust the shift lever position.  
When shifting the shift lever from the N range to other ranges, check that the lever can be shifted smoothly and accurately to each range and that the position indicator is not aligned with the correct position.

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 range.
- (4) Set the shift lever to N range.
- (5) While holding the shift lever lightly toward the R range side, tighten the shift lever nut.

**Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)**

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



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

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

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

**Torque: 5.4 N·m (55 kgf-cm, 48 in-lbf)**

For continuity inspection of the neutral start switch, see page DI-188.

- (g) Check the idle speed.

**Idle speed: 700 ± 50 rpm**

**(In N range and air conditioner OFF)**

## 6. MECHANICAL SYSTEM TESTS

- (a) Measure the stall speed.

The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R ranges.

### NOTICE:

- Do the test at normal operating 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 scan tool or hand-held tester to DLC3.
- (3) Fully apply the parking brake.
- (4) Keep your left foot pressed firmly on the brake pedal.
- (5) Start the engine.

- (6) Shift into the D range. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

**Stall speed: 2,325 – 2,775 rpm**

**Evaluation:**

Problem	Possible cause
(a) Stall speed low in D and R ranges	<ul style="list-style-type: none"> <li>• Engine output may be insufficient</li> <li>• Stator one-way clutch is operating properly</li> </ul> HINT: If more than 600 rpm below the specified value, the torque converter could be faulty.
(b) Stall speed high in D range	<ul style="list-style-type: none"> <li>• Line pressure too low</li> <li>• Forward clutch slipping</li> <li>• No. 2 one-way clutch not operating properly</li> <li>• O/D clutch slipping</li> </ul>
(c) Stall speed high in R range	<ul style="list-style-type: none"> <li>• Line pressure too low</li> <li>• Direct clutch slipping</li> <li>• 1st and reverse brake slipping</li> <li>• O/D clutch slipping</li> </ul>
(d) Stall speed high in D and R ranges	<ul style="list-style-type: none"> <li>• Line pressure too low</li> <li>• Improper fluid level</li> <li>• O/D one-way clutch not operating properly</li> </ul>

- (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 and 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) Connect an OBD scan tool or hand-held tester to DLC3.
- (2) Fully apply the parking brake.
- (3) Start the engine and check idle speed.

**Idle speed: 700 ± 50 rpm (In N range and air conditioner OFF)**

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

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

**Time lag:**

**N → D Less than 1.2 seconds**

**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	<ul style="list-style-type: none"> <li>• Line pressure too low</li> <li>• Forward clutch worn</li> <li>• O/D one-way clutch not operating</li> </ul>
N → R time lag is longer	<ul style="list-style-type: none"> <li>• Line pressure too low</li> <li>• Direct clutch worn</li> <li>• 1st and reverse brake worn</li> <li>• O/D one-way clutch not operating properly</li> </ul>

## 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 transaxle case front left side and connect SST.  
(See page AX-30 for the location to connect SST)
- SST 09992-00095 (09992-00231, 09992-00271)
- (3) Fully apply the parking brake and chock the 4 wheels.
  - (4) Connect an OBD scan tool or hand-held tester to DLC3.
  - (5) Start the engine and check idling speed.
  - (6) Keep your left foot pressed firmly on the brake pedal and shift into D range.
  - (7) Measure the line pressure when the engine is idling.
  - (8) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
  - (9) In the same manner, do the test in R range.

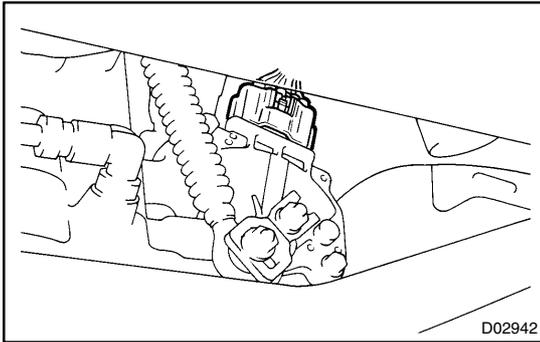
### Specified line pressure:

Condition	D range kPa (kgf/cm <sup>2</sup> , psi)	R range kPa (kgf/cm <sup>2</sup> , psi)
Idling	372 – 412 (3.8 – 4.2, 54 – 59)	672 – 742 (6.9 – 7.6, 97 – 107)
Stall	931 – 1,031 (9.5 – 10.5, 134 – 149)	1,768 – 1,968 (18.0 – 20.1, 255 – 284)

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

### Evaluation

Problem	Possible cause
If the measured values at all range are higher	<ul style="list-style-type: none"> <li>• Throttle cable out of adjustment</li> <li>• Throttle valve defective</li> <li>• Regulator valve defective</li> </ul>
If the measured values at all range are lower	<ul style="list-style-type: none"> <li>• Throttle cable out of adjustment</li> <li>• Throttle valve defective</li> <li>• Regulator valve defective</li> <li>• Oil pump defective</li> <li>• O/D direct clutch defective</li> </ul>
If pressure is low in the D range only	<ul style="list-style-type: none"> <li>• D range circuit fluid leakage</li> <li>• Forward clutch defective</li> </ul>
If pressure is low in the R range only	<ul style="list-style-type: none"> <li>• R range circuit fluid leakage</li> <li>• Direct clutch defective</li> <li>• 1st and reverse brake defective</li> </ul>



## 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 transaxle.

- (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 ranges. Check that the gear change corresponds to the shift range.

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

### HINT:

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

If any abnormality is found in the above test, the problem is in the transaxle itself.

- (c) Connect the solenoid wire.
- (d) Cancel out DTC (See page DI-144).

## 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.

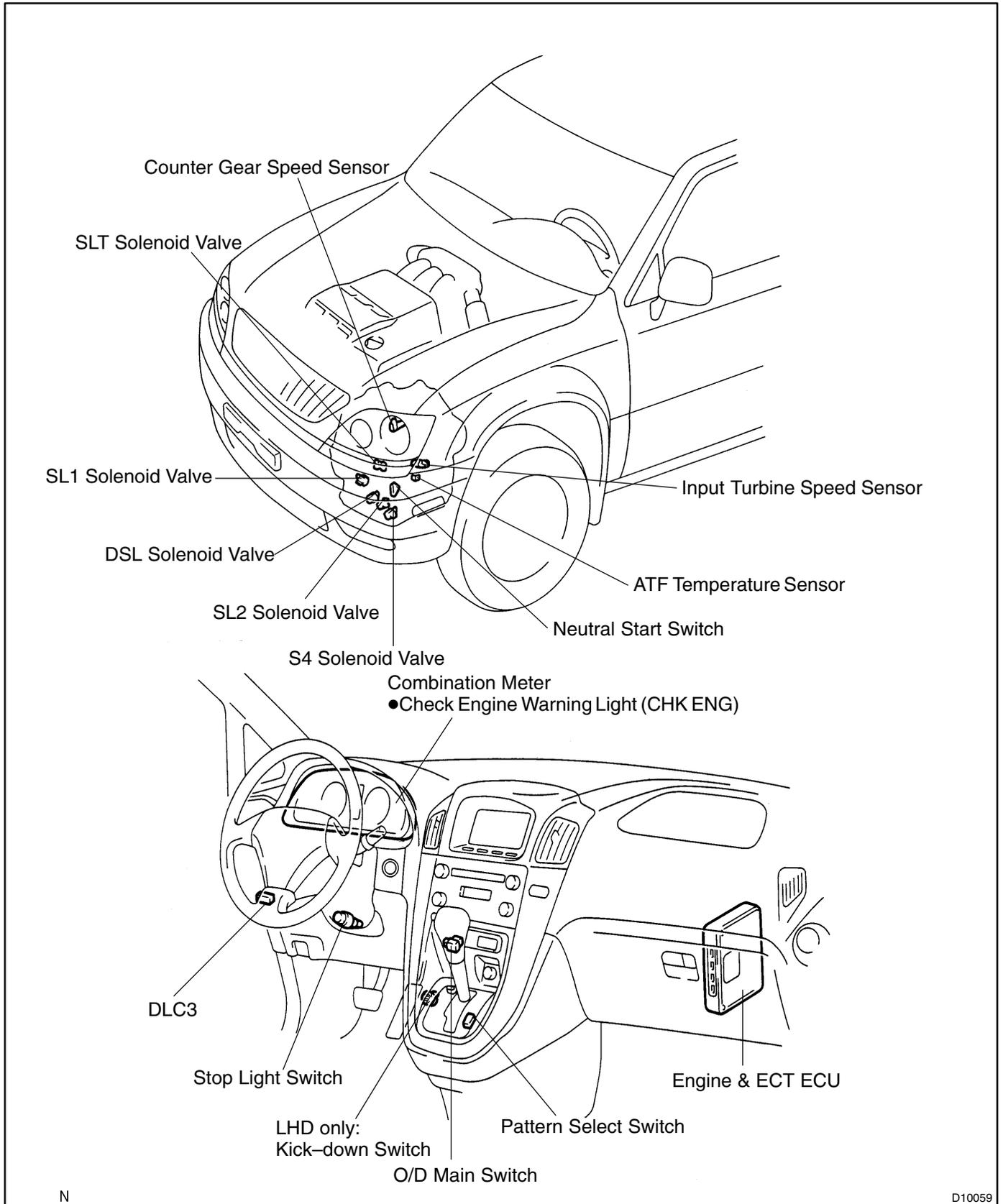
HINT:

\*: ●...Check engine warning light (CHK ENG) light up

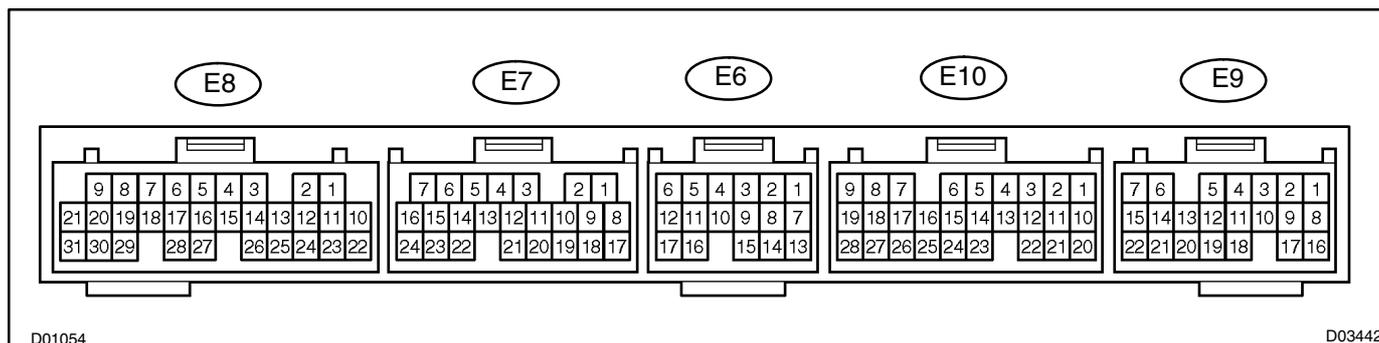
DTC No. (See Page)	Detection Item	Trouble Area	*CHK ENG	Memory
P0500 (DI-163)	Vehicle Speed Sensor Malfunction	<ul style="list-style-type: none"> <li>• Open or short in No. 1 vehicle speed sensor circuit</li> <li>• No. 1 vehicle speed sensor</li> <li>• Combinationmeter</li> <li>• Engine &amp; ECT ECU</li> <li>• Automatic transaxle assembly</li> </ul>	●	○
P0710 (DI-166)	Transmission Fluid Temperature Sensor Malfunction	<ul style="list-style-type: none"> <li>• Open or short in ATF temperature sensor circuit</li> <li>• ATF temperature sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P0711 (DI-166)	Transmission Fluid Temperature Sensor Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>• Open in ATF temperature sensor circuit</li> <li>• ATF temperature sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P0750 (DI-168)	Shift Solenoid A Malfunction (SL1 Solenoid Valve)	<ul style="list-style-type: none"> <li>• SL1 solenoid valve is stuck open or closed</li> <li>• Valve body is blocked up or stuck</li> </ul>	●	○
P0753 (DI-170)	Shift Solenoid A Electrical Malfunction (SL1 Solenoid Valve)	<ul style="list-style-type: none"> <li>• Open or short in SL1 solenoid valve circuit</li> <li>• SL1 solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P0755 (DI-168)	Shift Solenoid B Malfunction (SL2 Solenoid Valve)	<ul style="list-style-type: none"> <li>• SL2 solenoid valve is stuck open or closed</li> <li>• Valve body is blocked up or stuck</li> </ul>	●	○
P0758 (DI-170)	Shift Solenoid B Electrical Malfunction (SL2 Solenoid Valve)	<ul style="list-style-type: none"> <li>• Open or short in SL2 solenoid valve circuit</li> <li>• SL2 solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P0765 (DI-168)	Shift Solenoid D Malfunction (S4 Solenoid Valve)	<ul style="list-style-type: none"> <li>• S4 solenoid valve is stuck open or closed</li> <li>• Valve body is blocked up or stuck</li> </ul>	●	○
P0768 (DI-170)	Shift Solenoid D Electrical Malfunction (S4 Solenoid Valve)	<ul style="list-style-type: none"> <li>• Open or short in S4 solenoid valve circuit</li> <li>• S4 solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P0770 (DI-176)	Shift Solenoid E Malfunction (DSL Solenoid Valve)	<ul style="list-style-type: none"> <li>• DSL solenoid valve is stuck open or closed</li> <li>• Valve body is blocked up or stuck</li> <li>• Lock-up clutch</li> </ul>	●	○
P0773 (DI-178)	Shift Solenoid E Electrical Malfunction (DSL Solenoid Valve)	<ul style="list-style-type: none"> <li>• Open or short in DSL solenoid valve circuit</li> <li>• DSL solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P1520 (DI-180)	Stop light switch circuit	<ul style="list-style-type: none"> <li>• Open or short in stop light switch circuit</li> <li>• Stop light switch</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P1725 (DI-181)	NT Revolution Sensor Circuit Malfunction (Input Turbine Speed Sensor)	<ul style="list-style-type: none"> <li>• Open or short in input turbine speed sensor circuit</li> <li>• Input turbine speed sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P1730 (DI-183)	NC Revolution Sensor Circuit Malfunction (Counter Gear Speed Sensor)	<ul style="list-style-type: none"> <li>• Open or short in counter gear speed sensor circuit</li> <li>• Counter gear speed sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○

P1760 (DI-185)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLT Solenoid Valve)	<ul style="list-style-type: none"> <li>• Open or short in SLT solenoid valve circuit</li> <li>• SLT solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○
P1780 (DI-188)	Park/Neutral Position Switch Malfunction	<ul style="list-style-type: none"> <li>• Short in neutral start switch circuit</li> <li>• Neutral start switch</li> <li>• Engine &amp; ECT ECU</li> </ul>	●	○

# PARTS LOCATION



## TERMINALS OF ECU



D01054

D03442

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SL1+ (E8-20) ↔ SL1- (E8-19)	L-B ↔ L-W	IG ON	10 – 14
		1st or 2nd gear	10 – 14
		3rd or O/D gear	Below 1
SL2+ (E8-9) ↔ SL2- (E8-8)	R-B ↔ R-W	IG ON	Below 1
		1st or 2nd gear	10 – 14
		3rd or O/D gear	Below 1
DSL (E8-7) ↔ Body ground	R-L ↔ Body ground	IG ON	Below 1
		Vehicle driving under lock-up range	10 – 14
NC+ (E8-24) ↔ NC- (E8-23)	R ↔ G	Engine is running	Pulse signal is output Below 1 ↔ 4 – 5
NT+ (E6-5) ↔ NT- (E6-4)	L ↔ LG	Engine is running	Pulse signal is output Below 1 ↔ 4 – 5
SLT+ (E6-3) ↔ SLT- (E6-2)	G-B ↔ G	IG ON	10 – 14
OD1 (E10-24) ↔ E1 (E7-17)	Y-G ↔ BR	IG ON	5 – 6
L (E6-13) ↔ E1 (E7-17)	L-R ↔ BR	IG ON and Shift lever L range	10 – 14
		IG ON and Shift lever other than L range	Below 1
2 (E6-14) ↔ E1 (E7-17)	G-Y ↔ BR	IG ON and Shift lever 2 range	10 – 14
		IG ON and Shift lever other than 2 range	Below 1
R (E6-8) ↔ E1 (E7-17)	R-B ↔ BR	IG ON and Shift lever R range	10 – 14
		IG ON and Shift lever other than R range	Below 1
D (E6-16) ↔ E1 (E7-17)	G-R ↔ BR	IG ON and Shift lever D range	10 – 14
		IG ON and Shift lever other than D range	Below 1
N (E6-7) ↔ E1 (E7-17)	R-W ↔ BR	IG ON and Shift lever N range	10 – 14
		IG ON and Shift lever other than N range	Below 1
P (E6-9) ↔ E1 (E7-17)	G-W ↔ BR	IG ON and Shift lever P range	10 – 14
		IG ON and Shift lever other than P range	Below 1
ODLP (E9-9) ↔ E1 (E7-17)	R-W ↔ BR	IG ON and O/D OFF indicator light lights up	Below 1
		IG ON and O/D OFF indicator light goes off	10 – 14
ODMS (E6-12) ↔ E1 (E7-17)	GR-L ↔ BR	IG ON	10 – 14
		IG ON and press continuously O/D main switch	Below 1
THO (E7-13) ↔ E2 (E7-18)	G-Y ↔ BR	IG ON and ATF temperature 110 °C (230 °F)	Below 1
S4 (E6-1) ↔ E1 (E7-17)	R-Y ↔ BR	IG ON	Below 1
		IG ON and O/D gear	10 – 14
STP (E9-15) ↔ E1 (E7-17)	G-O ↔ BR	IG ON and Brake pedal is depressed	7.5 – 14
		IG ON and Brake pedal is released	Below 1.5

## DIAGNOSTICS - AUTOMATIC TRANSAXLE

*KD (E10-11) ↔ E1 (E7-17)	G-W ↔ BR	IG ON and accelerator pedal depressed	10 - 14
		IG ON and accelerator pedal released	Below 1.0

## PROBLEM SYMPTOMS TABLE

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.

**Chapter 1: Electronic Circuit Matrix Chart**

**Chapter 2: On-vehicle Repair Matrix Chart**

**Chapter 3: Off-vehicle Repair Matrix Chart**

- If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check and replace the Engine & ECT ECU.

### 1. Chapter 1: Electronic Circuit Matrix Chart

Symptom	Suspect Area	See page
No up-shift (1st → 2nd)	Engine & ECT ECU	IN-32
No up-shift (2nd → 3rd)	Engine & ECT ECU	IN-32
No up-shift (3rd → O/D)	3. O/D main switch circuit 4. O/D cancel signal circuit 5. Engine & ECT ECU	DI-197 DI-194 IN-32
No down-shift (O/D → 3rd)	Engine & ECT ECU	IN-32
No down-shift (3rd → 2nd)	Engine & ECT ECU	IN-32
No down-shift (2nd → 1st)	Engine & ECT ECU	IN-32
No lock-up or No lock-up off	Engine & ECT ECU	IN-32
Shift point too high or too low	Engine & ECT ECU	IN-32
Up-shift to 2nd while in L range	Engine & ECT ECU	IN-32
Up-shift to 3rd while in L range	Engine & ECT ECU	IN-32
Up-shift to O/D from 3rd	1. O/D main switch circuit 2. Engine & ECT ECU	DI-197 IN-32
Up-shift to O/D from 3rd while engine is cold	Engine & ECT ECU	IN-32
Harsh engagement (N → D)	Engine & ECT ECU	IN-32
Harsh engagement (Lock-up)	Engine & ECT ECU	IN-32
Harsh engagement (Any driving range)	Engine & ECT ECU	IN-32
Poor acceleration	Engine & ECT ECU	IN-32
Large shift shock or engine stalls when starting off or stopping	Engine & ECT ECU	IN-32
No pattern select	1. Pattern select switch circuit 2. Engine & ECT ECU	DI-192 IN-32
*No kick-down	1. Kick-down switch circuit 2. Engine & ECT ECU	DI-200 IN-32

\*: LHD only

## 2. Chapter 2: On-Vehicle Repair (★: U140F AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM848E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Manual valve 2. Throttle valve 3. Primary regulator valve 4. Off-vehicle repair matrix chart	★ ★ ★ –
Vehicle does not move in R range	Off-vehicle repair matrix chart	–
No up-shift (1st → 2nd)	1. 1-2 shift valve 2. Off-vehicle repair matrix chart	★ –
No up-shift (2nd → 3rd)	1. 2-3 shift valve 2. Off-vehicle repair matrix chart	★ –
No up-shift (3rd → O/D)	1. 3-4 shift valve 2. Off-vehicle repair matrix chart	★ –
No down-shift (O/D → 3rd)	3-4 shift valve	★
No down-shift (3rd → 2nd)	2-3 shift valve	★
No down-shift (2nd → 1st)	1-2 shift valve	★
No lock-up or No lock-up off	1. Lock-up relay valve 2. Off-vehicle repair matrix chart	★ –
Harsh engagement (N → D)	1. C <sub>1</sub> accumulator 2. Off-vehicle repair matrix chart	★ –
Harsh engagement (N → R)	1. C <sub>2</sub> accumulator 2. No. 1 accumulator control valve 3. Off-vehicle repair matrix chart	★ ★
Harsh engagement (N → L)	Low coast modulator valve	★
Harsh engagement (Lock-up)	1. Lock-up relay valve 2. Off-vehicle repair matrix chart	★ –
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Throttle modulator valve 2. Cut back valve 3. Throttle valve	★ ★ ★
Harsh engagement (2nd → 3rd)	C <sub>2</sub> accumulator	★
Harsh engagement (3rd → O/D)	B <sub>0</sub> accumulator	★
Harsh engagement (O/D → 3rd)	1. C <sub>0</sub> accumulator 2. B <sub>0</sub> accumulator	★ ★
Slip or shudder (Forward and reverse)	1. Throttle valve 2. Oil strainer 3. Off-vehicle repair matrix chart	★ ★ –
No engine braking (1st: L range)	1. Low coast modulator valve 2. Off-vehicle repair matrix chart	★ –
No engine braking (2nd: 2 range)	1. 2nd coast modulator valve 2. Off-vehicle repair matrix chart	★ –
*No kick-down	1. 1-2 shift valve 2. 2-3 shift valve 3. 3-4 shift valve 4. Off-vehicle repair matrix chart	★ ★ ★ –

\*: LHD only

### 3. Chapter 3: Off-Vehicle Repair (★: U140F AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM848E)

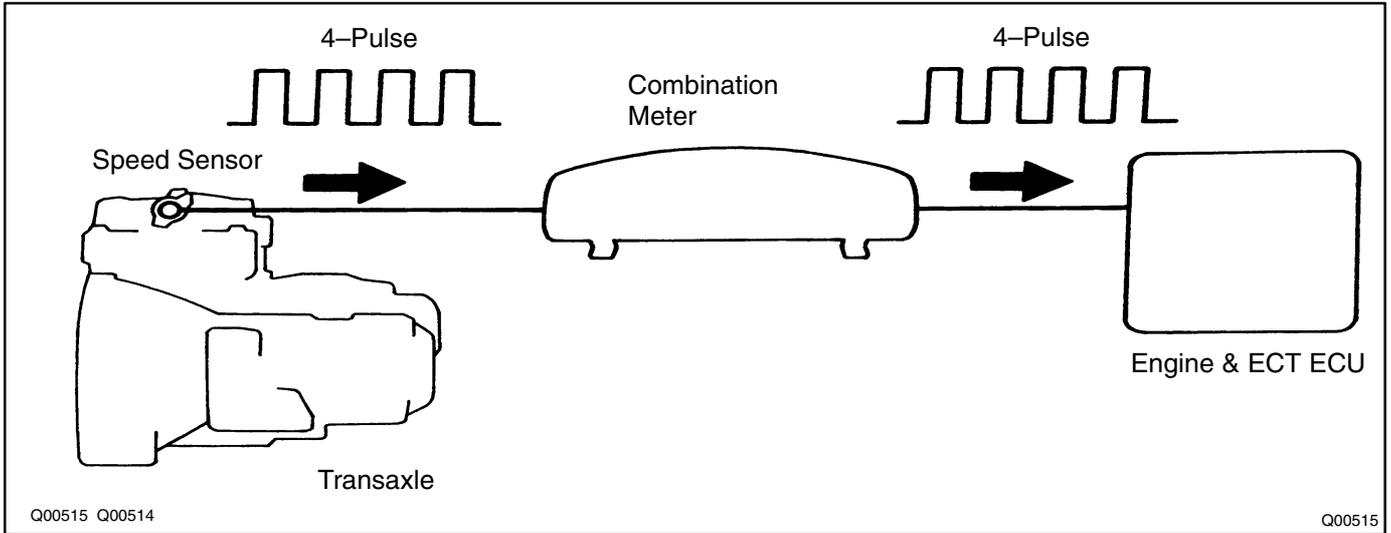
Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Front and rear planetary gear 2. U/D planetary gear 3. U/D one-way clutch (F <sub>2</sub> ) 4. Forward clutch (C <sub>1</sub> ) 5. U/D brake (B <sub>3</sub> )	★ ★ ★ ★ ★
Vehicle does not move in R range	1. Front and rear planetary gear unit 2. U/D planetary gear unit 3. Direct clutch (C <sub>2</sub> ) 4. U/D brake (C <sub>3</sub> ) 4. 1st and reverse brake (B <sub>2</sub> )	★ ★ ★ ★ ★
No up-shift (1st → 2nd)	1. No. 1 one-way clutch (F <sub>1</sub> ) 2. 2nd brake (B <sub>1</sub> )	★ ★
No up-shift (2nd → 3rd)	Direct clutch (C <sub>2</sub> )	★
No up-shift (3rd → O/D)	U/D clutch (C <sub>3</sub> )	★
No lock-up or No lock-up off	Torque converter	★
Harsh engagement (N → D)	1. Forward clutch (C <sub>1</sub> ) 2. U/D one-way clutch (F <sub>2</sub> ) 3. No. 1 one-way clutch (F <sub>1</sub> )	★ ★ ★
Harsh engagement (N → R)	1. Direct clutch (C <sub>2</sub> ) 2. 1st and reverse brake (B <sub>2</sub> )	★ ★
Harsh engagement (Lock-up)	Torque converter	★
Slip or shudder (Forward range: After warm-up)	1. Torque converter 2. Forward clutch (C <sub>1</sub> ) 3. Direct clutch (C <sub>2</sub> ) 4. U/D brake (C <sub>3</sub> ) 5. No. 1 one-way clutch (F <sub>1</sub> ) 6. U/D one-way clutch (F <sub>2</sub> )	★ ★ ★ ★ ★ ★
Slip or shudder (R range)	1. Direct clutch (C <sub>2</sub> ) 2. 1st and reverse brake (B <sub>2</sub> )	★ ★
Slip or shudder (1st)	No. 1 one-way clutch (F <sub>1</sub> )	★
Slip or shudder (2nd)	1. U/D one-way clutch (F <sub>2</sub> ) 2. 2nd brake (B <sub>1</sub> )	★ ★
Slip or shudder (3rd)	Direct clutch (C <sub>2</sub> )	★
Slip or shudder (O/D)	U/D clutch (C <sub>3</sub> )	★
No engine braking (1st ~ 3rd: D range)	U/D brake (B <sub>3</sub> )	★
No engine braking (1st: L range)	1st and reverse brake (B <sub>2</sub> )	★
No engine braking (2nd: 2 range)	2nd brake (B <sub>1</sub> )	★
Poor acceleration (All range)	1. Torque converter 2. U/D planetary gear	★ ★
Poor acceleration (O/D)	1. U/D clutch (C <sub>3</sub> ) 2. U/D planetary gear	★ ★
Large shift shock or engine stalls when starting off or stopping	Torque converter	★

# CIRCUIT INSPECTION

<b>DTC</b>	<b>P0500</b>	<b>Vehicle Speed Sensor Malfunction</b>
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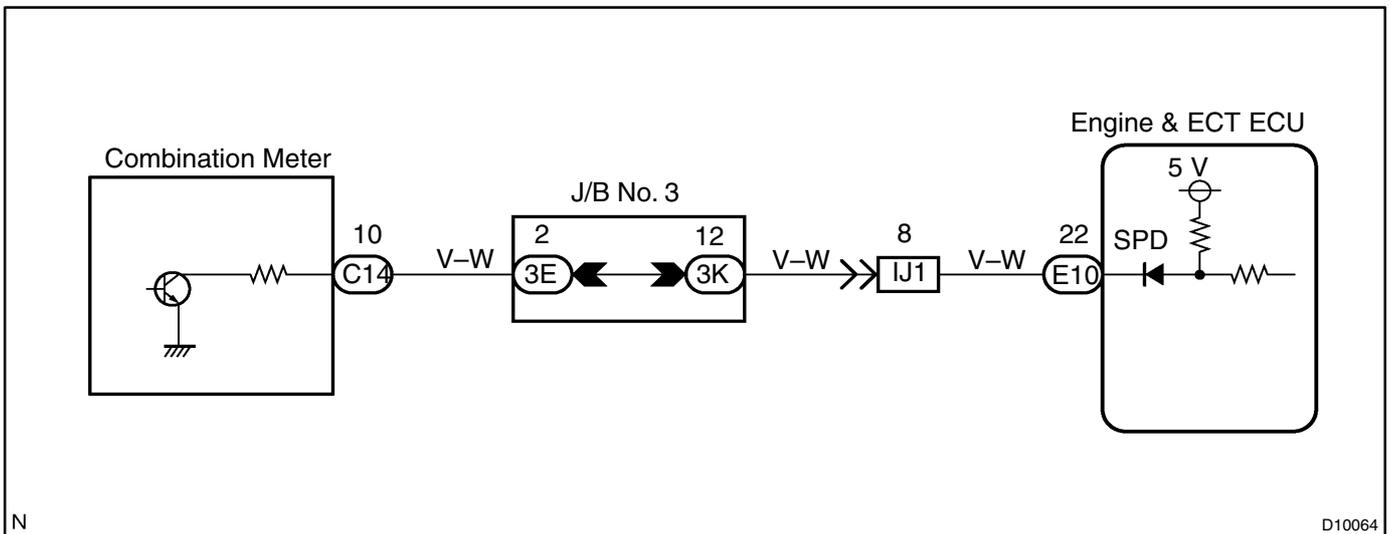
## CIRCUIT DESCRIPTION

The vehicle speed sensor outputs a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transaxle output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the Engine & ECT ECU. The Engine & ECT ECU 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 Engine & ECT ECU under conditions (a) and (b): (2 trip detection logic) (a) Neutral start switch is OFF (b) Vehicle is being driven	<ul style="list-style-type: none"> <li>• Open or short in speed sensor circuit</li> <li>• No. 1 vehicle speed sensor</li> <li>• Combinationmeter</li> <li>• Engine &amp; ECT ECU</li> <li>• Automatic transaxle assembly</li> </ul>
	Clutch or brake slips or gear is broken.	

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

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

### 1 Check operation of speedometer.

#### CHECK:

Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

#### HINT:

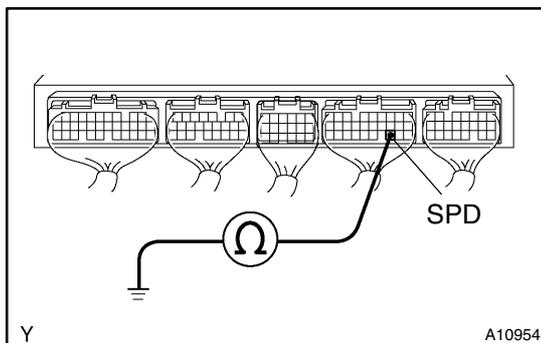
The vehicle speed sensor is operating normally if the speedometer display is normal.

NG

Check speedometer circuit.

OK

### 2 Check for short in harness and connector between terminal SPD of Engine & ECT ECU connector and body ground.



#### PREPARATION:

Remove the glove compartment (See page BO-126).

#### CHECK:

Check the continuity between terminal SPD of the Engine & ECT ECU connector and body ground.

#### OK:

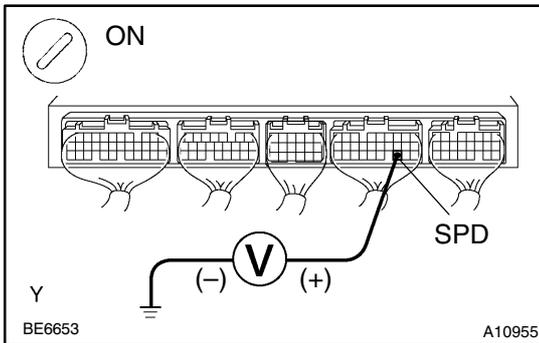
No continuity (1 MΩ or higher)

NG

Repair or replace harness or connector.

OK

**3 Check voltage between terminal SPD of Engine & ECT ECU connector and body ground.**



**PREPARATION:**

- Remove the glove compartment (See page BO-126).
- Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal SPD of the Engine & ECT ECU connector and body ground.

**OK:**

**Voltage: 0 – 5 V**

**NG**

**Check for open in harness and connector between connector (IJ1) and Engine & ECT ECU (See page IN-32).**

**OK**

**4 Check for open in harness and connector between connector (IJ1) and combination meter (See page IN-32).**

**NG**

**Repair or replace harness or connector.**

**OK**

**Check and replace Engine & ECT ECU (See page IN-32).**

<b>DTC</b>	<b>P0710</b>	<b>Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)</b>
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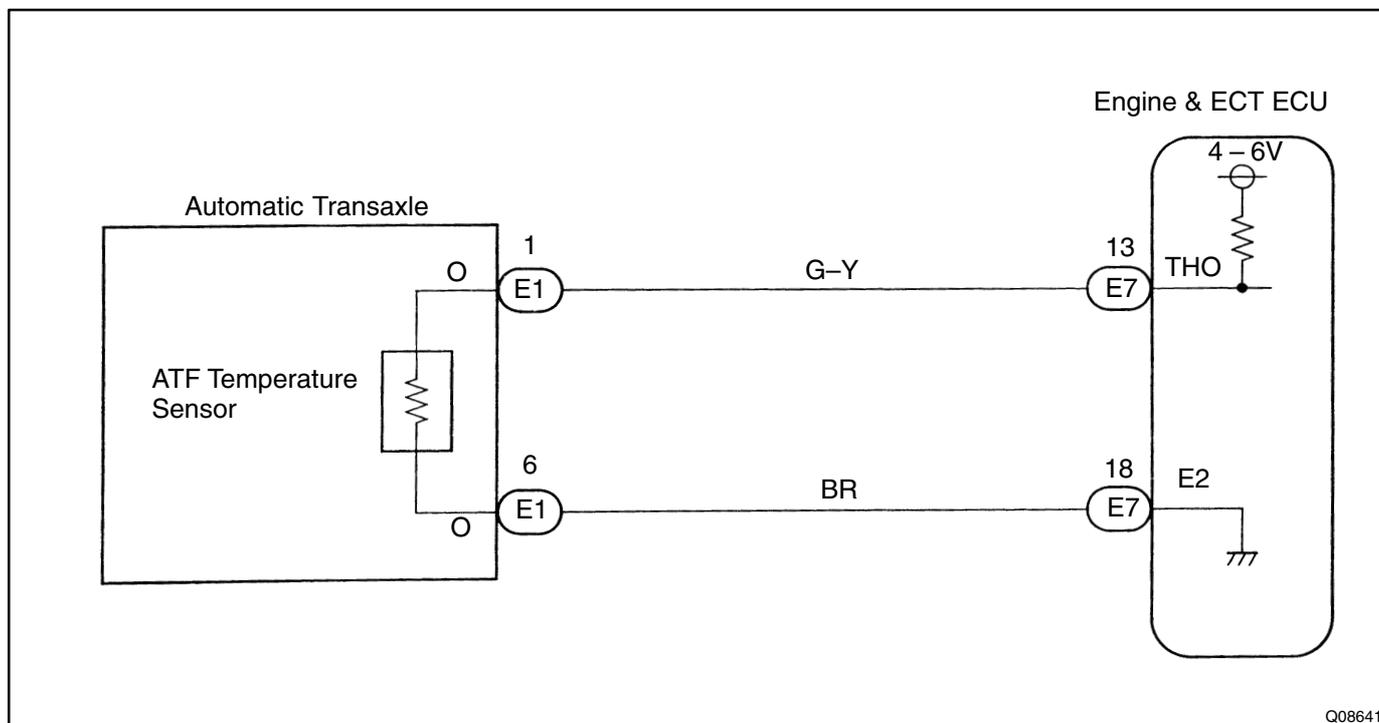
<b>DTC</b>	<b>P0711</b>	<b>Transmission Fluid Temperature Sensor Circuit Range/Performance Problem</b>
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### CIRCUIT DESCRIPTION

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

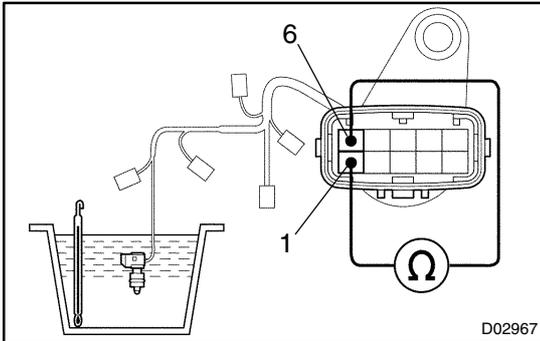
DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either a) or b) is detected for 0.5 sec. or more. (1 trip detection logic) a) Temp. sensor resistance is less than 79 Ω b) After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	<ul style="list-style-type: none"> <li>• Open or short in ATF temp. sensor</li> <li>• ATF temp. sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>
P0711	Both (a) and (b) is detected. (a) After 12 seconds of the engine start, the temp. of the atmosphere and that of the engine coolant is more than -10 °C. (b) After a normal driving for over 20 minutes and 6.2 miles (10 km), the ATF temp. is less than 10 °C.	<ul style="list-style-type: none"> <li>• Open in ATF temp. sensor circuit</li> <li>• ATF temp. sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>

### WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check ATF temperature sensor.

**PREPARATION:**

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

**CHECK:**

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

**OK:**

**Resistance (Approx.):**

25 °C (77 °F): 3.5 kΩ

110 °C (230 °F): 231 – 263 Ω

NG

Replace the ATF temperature sensor (transmission wire).

OK

## 2 Check harness and connector between ATF temperature sensor and Engine &amp; ECT ECU (See page IN-32).

NG

Repair or replace the harness or connector.

OK

Check and replace the Engine & ECT ECU  
(See page IN-32).

<b>DTC</b>	<b>P0750</b>	<b>Shift Solenoid A Malfunction (SL1 Solenoid Valve )</b>
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<b>DTC</b>	<b>P0755</b>	<b>Shift Solenoid B Malfunction (SL2 Solenoid Valve)</b>
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<b>DTC</b>	<b>P0765</b>	<b>Shift Solenoid D Malfunction (S4 Solenoid Valve)</b>
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## SYSTEM DESCRIPTION

The Engine & ECT ECU uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).

Then the Engine & ECT ECU compares the actual gear with the shift schedule in the Engine & ECT ECU memory to detect mechanical trouble of the shift solenoid valves and valve body.

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755 P0765	During normal driving, the gear required by the Engine & ECT ECU does not match the actual gear (2 trip detection logic)	<ul style="list-style-type: none"> <li>• SL1/SL2/S4 solenoid valve is stuck open or closed</li> <li>• Valve body is blocked up or stuck</li> </ul>

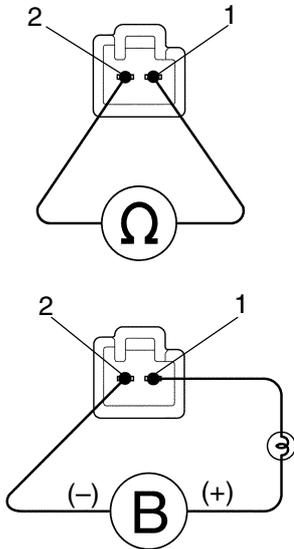
### HINT:

Check the SL1 solenoid valve when DTC P0750 is output, check the SL2 solenoid valve when DTC P0755 is output and check S4 solenoid valve when DTC P0765 is output.

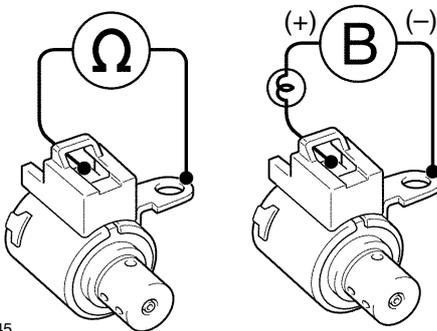
## INSPECTION PROCEDURE

## 1 Check SL1, SL2 or S4 solenoid valve.

## SL1 and SL2 Solenoid Valve



## S4 Solenoid Valve



D03445  
D03446  
D03424 D03423

D03724

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the SL1, SL2 or S4 solenoid valve.

**CHECK:**

- (a) Check the solenoid resistance.
  - (1) SL1 or SL2 solenoid valve:  
Measure resistance between terminals 1 and 2 of solenoid connector.
  - (2) S4 solenoid valve:  
Measure resistance between terminal 1 of solenoid connector and solenoid body.

**OK:****Resistance: 5.1 – 5.5 Ω**

- (b) Check the solenoid operation.
  - (1) SL1 or SL2 solenoid valve:  
Connect the positive (+) lead with an 23 W bulb to terminal 1 and the negative (-) lead to terminal 2 of solenoid connector, then check the movement of the valve.
  - (2) S4 solenoid valve:  
Connect the positive (+) lead with an 23 W bulb to terminal 1 of solenoid connector and the negative (-) lead to the solenoid valve body, then check the movement of the valve.

**OK:****The shift solenoid valve makes operation noise.****NG****Replace the solenoid valve.****OK****Check the valve body (See page DI-160).**

<b>DTC</b>	<b>P0753</b>	<b>Shift Solenoid A Electrical Malfunction (SL1 Solenoid Valve)</b>
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<b>DTC</b>	<b>P0758</b>	<b>Shift Solenoid B Electrical Malfunction (SL2 Solenoid Valve )</b>
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<b>DTC</b>	<b>P0768</b>	<b>Shift Solenoid D Electrical Malfunction (S4 Solenoid Valve)</b>
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## CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with ON and OFF of the SL1 and SL2 solenoid valves controlled by Engine & ECT ECU. If an open or short circuit occurs in either of the solenoid valves, the Engine & ECT ECU controls the remaining normal solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The Engine & ECT ECU checks for an open or short circuit in the SL1 and SL2 solenoid valves. (a) When the solenoid is energized, the duty ratio exceed 75 % (b) When the solenoid is not energized, the duty ratio is less than 3 %.	<ul style="list-style-type: none"> <li>• Open or short in SL1/SL2/S4 solenoid valve circuit</li> <li>• SL1/SL2 S4 solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>
P0768	The Engine & ECT ECU checks for an open or short circuit in the S4 solenoid valve circuit when it changes. The Engine & ECT ECU records DTC P0768 if condition (a) or (b) is detected. (a) When the solenoid is energized, the solenoid resistance is 8 Ω or less and is counted. (b) When the solenoid is not energized, the solenoid resistance is 100 kΩ or more and is counted.	

### HINT:

Check the SL1 solenoid valve when DTC P0753 is output, check the SL2 solenoid valve when DTC P0758 is output and check the S4 solenoid valve when DTC P0768 is output.

## Fail safe function:

If either of the shift solenoid valve circuits develops an open or short, the Engine & ECT ECU turns the other solenoid ON and OFF to shift to the gear positions shown in the table below. The Engine & ECT ECU also turns the DSL solenoid valve OFF at the same time. If both solenoids are malfunction, hydraulic control cannot be performed electronically and must be done manually.

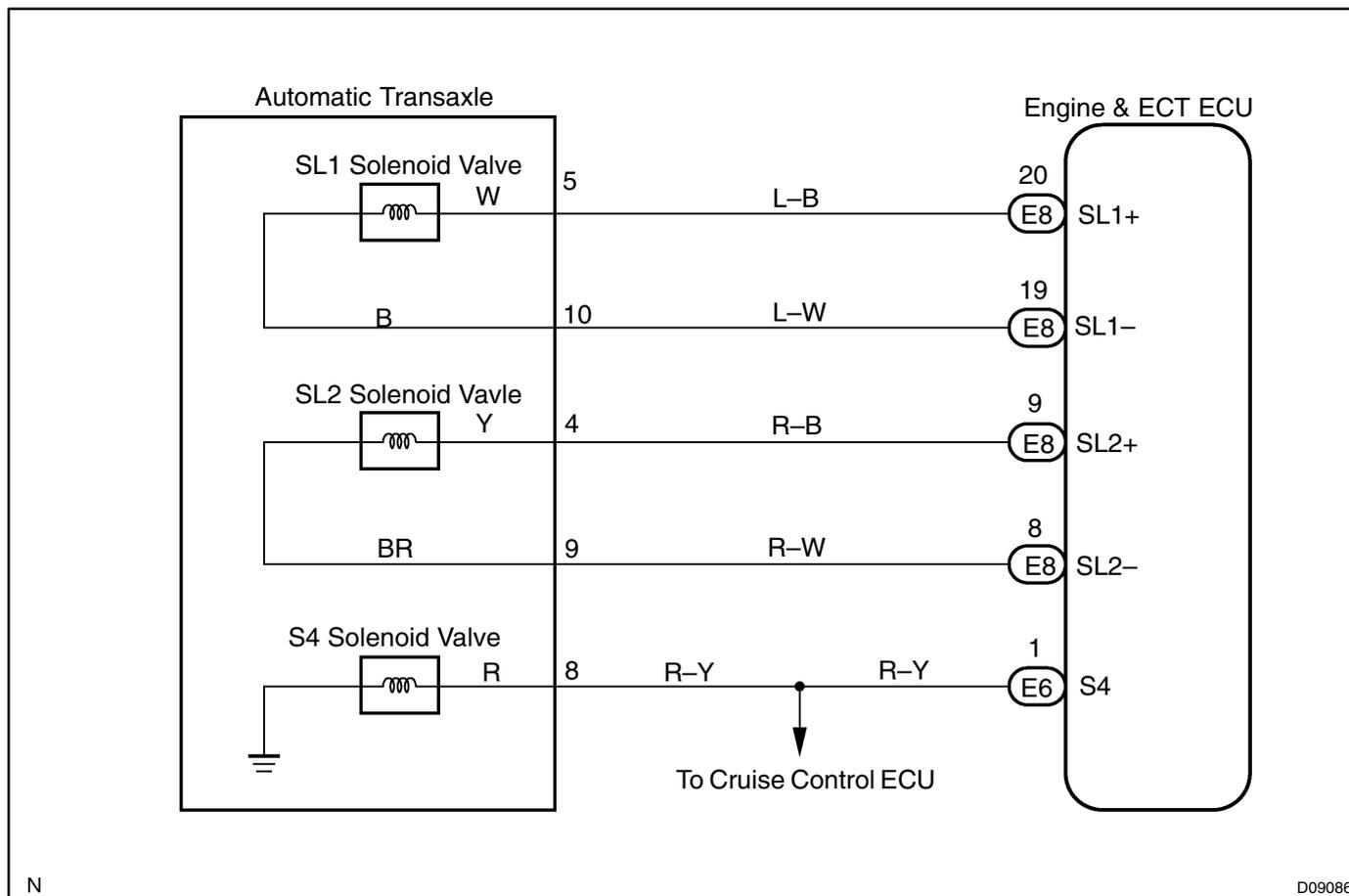
Manual shifting as shown in the following table must be done (In the case of a short circuit, the Engine & ECT ECU stops sending current to the short circuited solenoid).

NORMAL				SL1 SOLENOID MALFUNCTIONING								SL2 SOLENOID MALFUNCTIONING			
				Driving at 3rd or O/D				Driving at 1st or 2nd							
Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear
SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4	
ON	ON	OFF	1st	X	ON ↓ OFF	OFF	3rd	X	ON	OFF	2nd	ON ↓ OFF	X	OFF	3rd
OFF	ON	OFF	2nd	X	ON ↓ OFF	OFF	3rd	X	ON	OFF	2nd	OFF	X	OFF	3rd
	OFF	OFF	3rd	X	OFF	OFF	3rd	X	OFF ↓ ON	OFF ↓ ON	3rd		X	OFF	3rd
	OFF	ON	O/D	X	OFF	ON	O/D	X	OFF ↓ ON	ON	3rd		X	ON	O/D

S4 SOLENOID MALFUNCTIONING				SL1 AND SL2 SOLENOID MALFUNCTIONING				SL1 AND S4 SOLENOID MALFUNCTIONING							
								Driving at 3rd or O/D				Driving at 1st or 2nd			
Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear
SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4	
ON	ON	X	1st	X	X	OFF	3rd	X	ON ↓ OFF	X	3rd	X	ON	X	2nd
OFF	ON	X	2nd	X	X	OFF	3rd	X	ON ↓ OFF	X	3rd	X	ON	X	2nd
	OFF	X	3rd	X	X	OFF	3rd	X	OFF	X	3rd	X	OFF ↓ ON	X	2nd
	OFF	X	3rd	X	X	ON	O/D	X	OFF	X	3rd	X	OFF ↓ ON	X	2nd

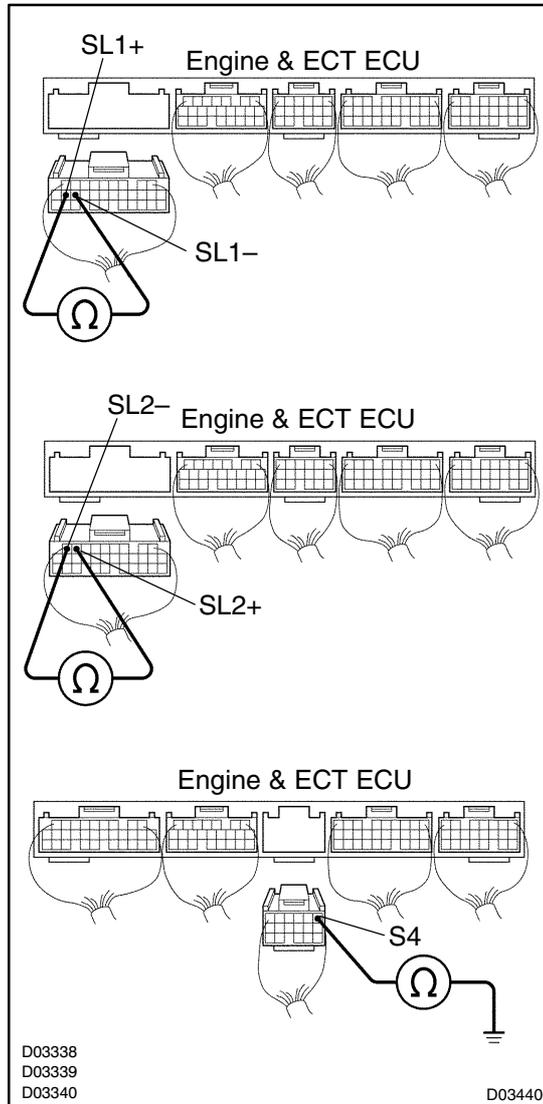
SL2 AND S4 SOLENOID MALFUNCTIONING				SL1, SL2 AND S4 SOLENOID MALFUNCTIONING			
Solenoid Valve			Gear	Solenoid Valve			Gear
SL1	SL2	S4		SL1	SL2	S4	
ON ↓ OFF	X	X	3rd	X	X	X	3rd
OFF	X	X	3rd	X	X	X	3rd
	X	X	3rd	X	X	X	3rd
	X	X	3rd	X	X	X	3rd

### WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Measure resistance between terminals of Engine &amp; ECT ECU.

**PREPARATION:**

Disconnect the connector from Engine & ECT ECU.

**CHECK:**

- Measure resistance between terminal SL1+ and SL2- of Engine & ECT ECU connector.
- Measure resistance between terminal SL2+ and SL2- of Engine & ECT ECU connector.
- Measure resistance between terminal S4 of Engine & ECT ECU connector and body ground.

**OK:****Resistance:**

SL1+ - SL1-:  $5.3 \pm 0.2 \Omega$

SL2+ - SL2-:  $5.3 \pm 0.2 \Omega$

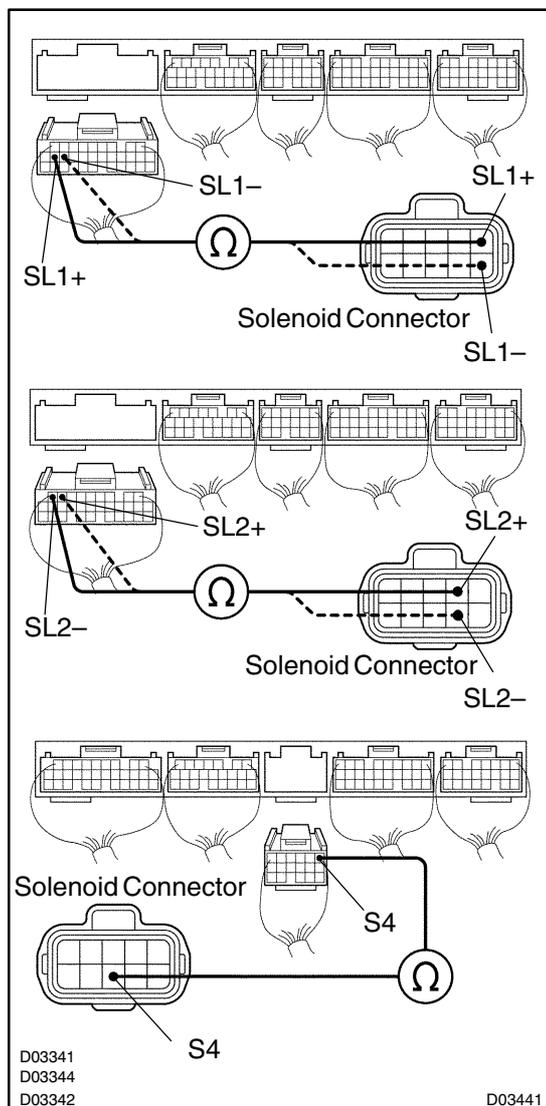
S4 - Body ground:  $13 \pm 2 \Omega$

OK

Check and replace the Engine & ECT ECU (See page IN-32).

NG

## 2 Check harness and connector between Engine & ECT ECU and automatic trans-axle solenoid connector.



### PREPARATION:

Disconnect the solenoid connector from the automatic trans-axle.

### CHECK:

- Check the harness and connector between terminal SL1+ or SL1– of Engine & ECT ECU and terminal SL1+ or SL1– of solenoid connector.
- Check the harness and connector between terminal SL2+ or SL2– of Engine & ECT ECU and terminal SL2+ or SL2– of solenoid connector.
- Check the harness and connector between terminal S4 of Engine & ECT ECU and terminal S4 of solenoid connector.

### OK:

There is no open and no short circuit.

NG

Repair or replace the harness or connector.

OK

<b>3</b>	<b>Check SL1, SL2 or S4 solenoid valve (See page DI-168).</b>
----------	---

**NG**

**Replace the solenoid valve.**

**OK**

**Repair or replace the solenoid wire.**

<b>DTC</b>	<b>P0770</b>	<b>Shift Solenoid E Malfunction (DSL Solenoid Valve)</b>
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## SYSTEM DESCRIPTION

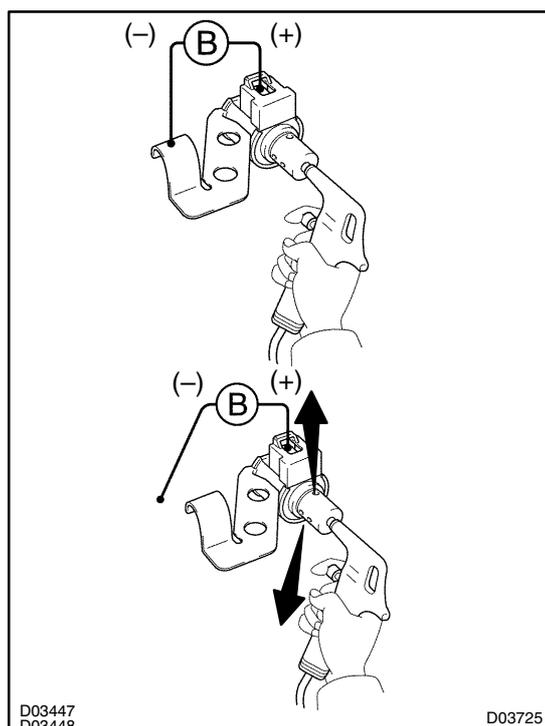
The Engine & ECT ECU uses the signals from the throttle position sensor, Air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

Then the Engine & ECT ECU compares the engagement condition of the lock-up clutch with the lock-up schedule in the Engine & ECT ECU memory to detect mechanical trouble of the DSL solenoid valve, valve body and torque converter.

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)	<ul style="list-style-type: none"> <li>• DSL solenoid valve is stuck open or closed</li> <li>• Valve body blocked up or stuck</li> <li>• Lock-up clutch</li> </ul>

## INSPECTION PROCEDURE

<b>1</b>	<b>Check DSL solenoid valve operation.</b>
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### PREPARATION:

- (a) Remove the oil pan.
- (b) Remove the DSL solenoid valve.

### CHECK:

- (a) Applying 490 kPa (5 kgf/cm<sup>2</sup>, 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

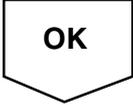
Replace the DSL solenoid valve.

OK

<b>2</b>	<b>Check valve body (See page DI-160).</b>
----------	--

**NG** 

**Repair or replace the valve body.**

**OK** 

**Replace the torque converter  
(See page DI-192).**

<b>DTC</b>	<b>P0773</b>	<b>Shift Solenoid E Electrical Malfunction (DSL Solenoid Valve)</b>
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**CIRCUIT DESCRIPTION**

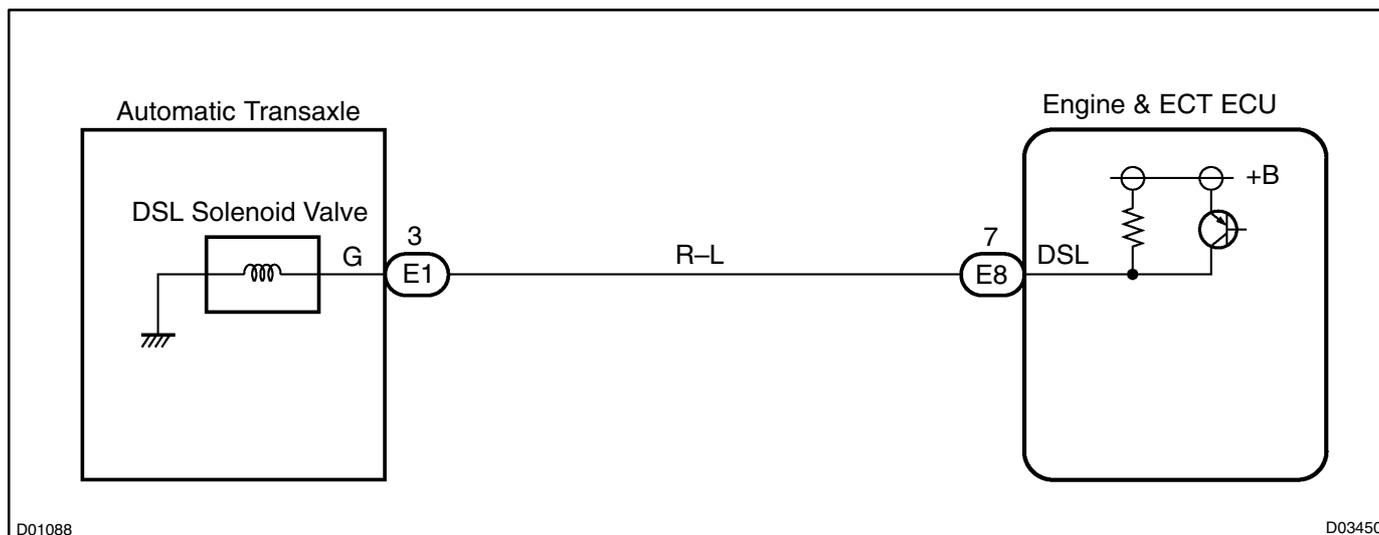
The DSL solenoid valve is turned ON and OFF by signals from the Engine & ECT ECU to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either (a) or (b) are detected for 1 time. (2 trip detection logic) (a) Solenoid resistance is 8 Ω or less short circuit when solenoid is energized. (b) Solenoid resistance is 100 kΩ or more open circuit when solenoid is not energized.	<ul style="list-style-type: none"> <li>• Open or short in DSL solenoid valve circuit</li> <li>• DSL solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>

Fail safe function:

If the Engine & ECT ECU detects a malfunction, it turns the DSL solenoid valve OFF.

**WIRING DIAGRAM**

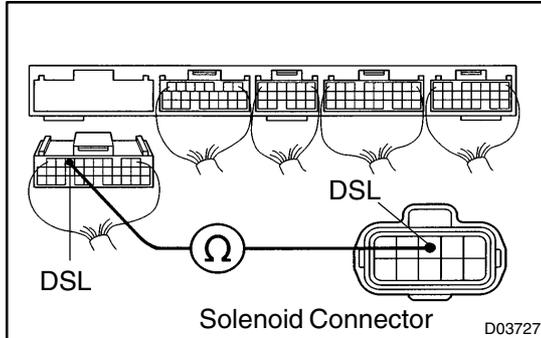


D01088

D03450

## INSPECTION PROCEDURE

- 1 Check harness and connector between Engine & ECT ECU and automatic trans-axle solenoid connector (See page IN-32).**

**PREPARATION:**

Disconnect the solenoid connector from the transaxle.

**CHECK:**

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

**OK:**

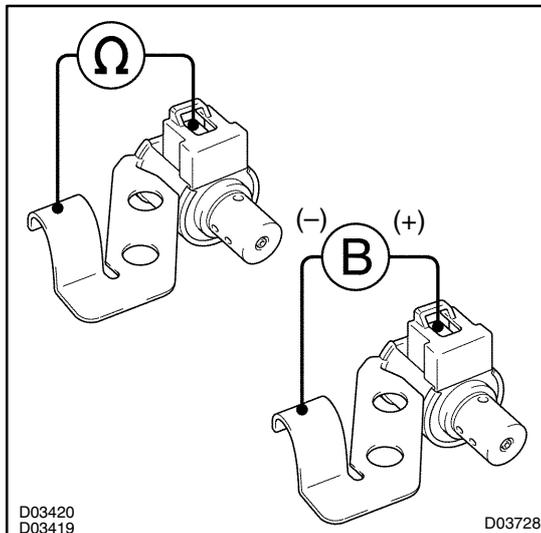
**There is continuity.**

**NG**

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

**OK**

- 2 Check DSL solenoid valve.**

**PREPARATION:**

- Jack up the vehicle.
- Remove the oil pan.
- Disconnect the DSL solenoid valve connector.
- Remove the DSL solenoid valve.

**CHECK:**

- Measure resistance between terminal DSL of solenoid valve and solenoid body.
- Connect positive  $\oplus$  lead to terminal of solenoid connector, negative  $\ominus$  lead to solenoid body.

**OK:**

**(a) Resistance: 11 – 13  $\Omega$**

**(b) The DSL solenoid valve makes operation noise.**

**NG**

**Replace the DSL solenoid valve.**

**OK**

**Check and replace or repair the solenoid wire.**

<b>DTC</b>	<b>P1520</b>	<b>Stop Light Switch Signal Malfunction</b>
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## 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 Engine & ECT ECU. Then the Engine & ECT ECU cancels operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P1520	No stop light switch signal to Engine & ECT ECU during driving. (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Open or short in stop light switch circuit</li> <li>• Stop light switch</li> <li>• Engine &amp; ECT ECU</li> </ul>

## WIRING DIAGRAM

See page DI-111.

## INSPECTION PROCEDURE

See page DI-111.

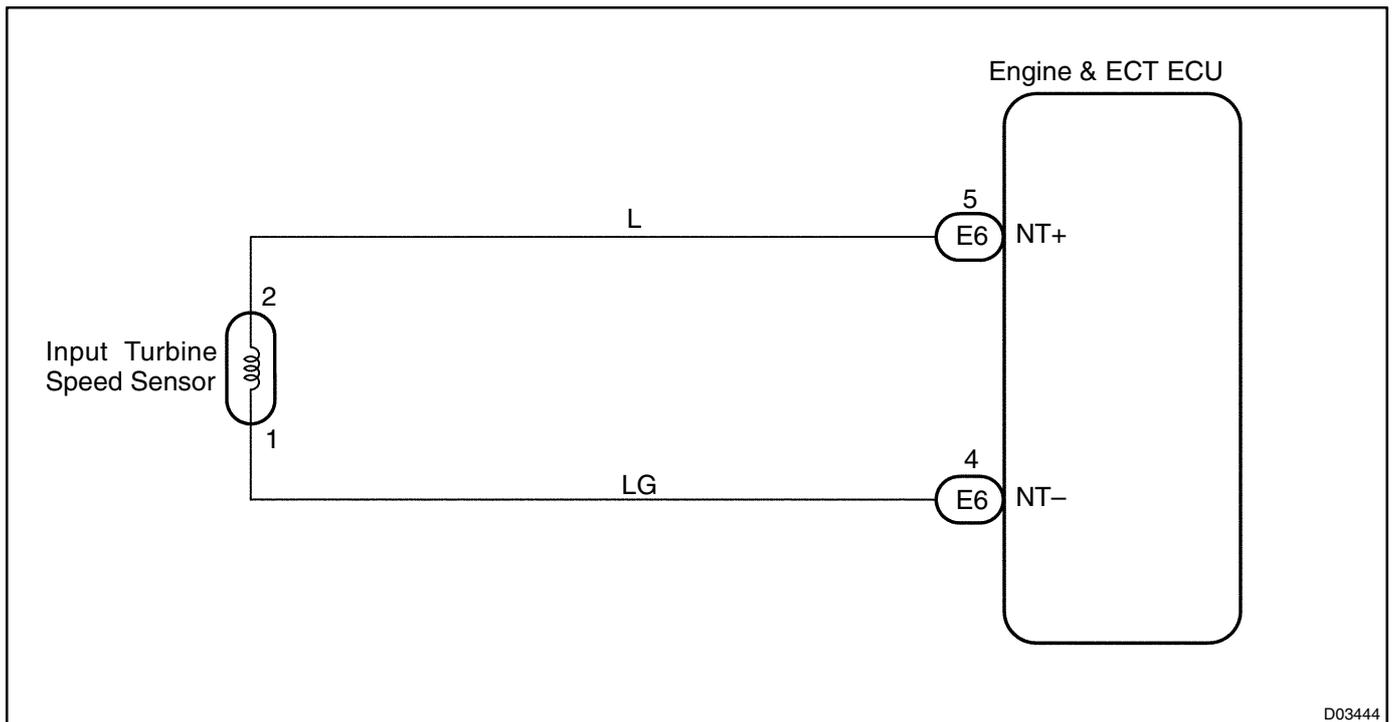
<b>DTC</b>	<b>P1725</b>	<b>NT Revolution Sensor Circuit Malfunction (Input Turbine Speed Sensor)</b>
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## CIRCUIT DESCRIPTION

This sensor detects the rotation speed of the input turbine. By comparing the input turbine speed signal (NT) and the counter gear speed sensor signal (NC), the Engine & ECT ECU detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus performing smooth gear shifting.

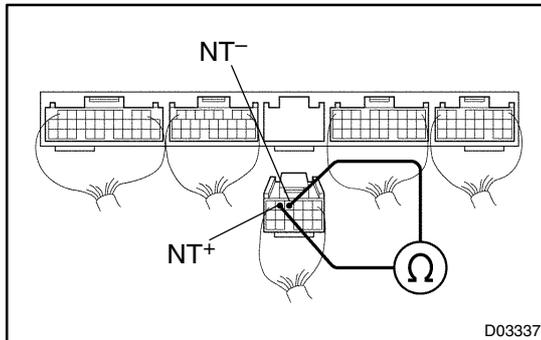
DTC No.	DTC Detecting Condition	Trouble Area
P1725	The Engine & ECT ECU detects conditions (a), (b), (c) and (d) continuity for 5 secs or more. (1 trip detection logic) (a) Vehicle speed: 50 km/h (20 mph) or more (b) 2nd, 3rd or O/D gear (c) Solenoid valves and neutral start switch are normal (d) NT < 300 rpm	<ul style="list-style-type: none"> <li>• Open or short in input turbine (NT) speed sensor circuit</li> <li>• Input turbine (NT) speed sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>

## WIRING DIAGRAM



D03444

## INSPECTION PROCEDURE

1 Check resistance between terminals NT<sup>+</sup> and NT<sup>-</sup> of Engine & ECT ECU.**PREPARATION:**

Disconnect the connector from Engine & ECT ECU.

**CHECK:**

Check resistance between terminals NT<sup>+</sup> and NT<sup>-</sup> of Engine & ECT ECU.

**OK:**

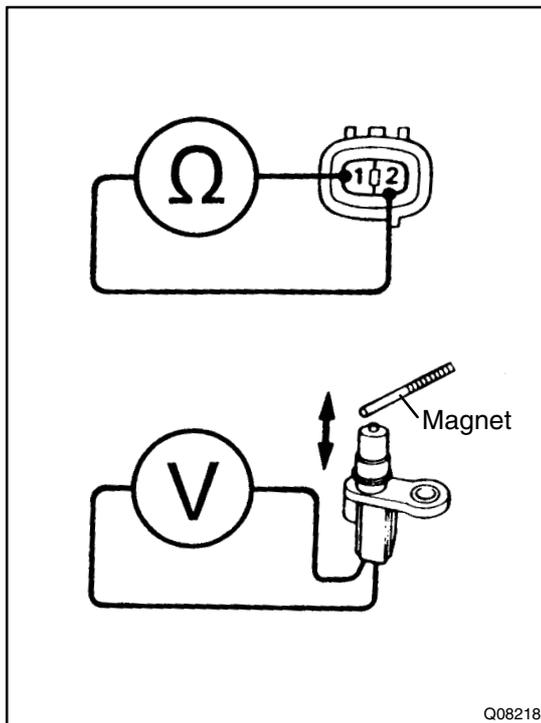
Resistance:  $620 \pm 60 \Omega$

OK

Check and replace the Engine & ECT ECU (See page IN-32).

NG

## 2 Check input turbine speed sensor.

**PREPARATION:**

Remove the input turbine speed sensor from transaxle.

**CHECK:**

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

**OK:**

(a) Resistance:  $620 \pm 60 \Omega$

(b) Voltage is generated intermittently.

**HINT:**

The voltage generated is extremely low.

NG

Replace the input turbine speed sensor.

OK

Check and repair the harness and connector between Engine & ECT ECU and input turbine speed sensor (See page IN-32).

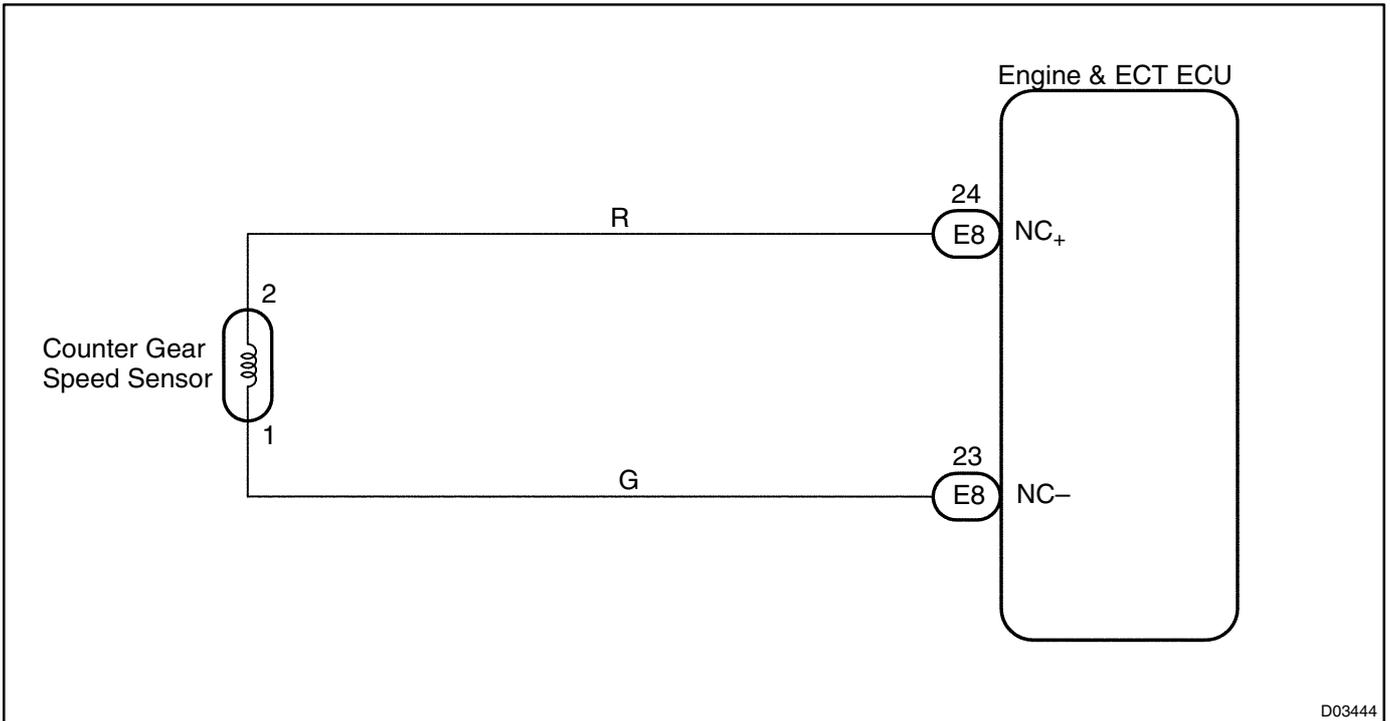
<b>DTC</b>	<b>P1730</b>	<b>NC Revolution Sensor Circuit Malfunction (Counter Gear Speed Sensor)</b>
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**CIRCUIT DESCRIPTION**

This sensor detects the rotation speed of the counter gear. By comparing the counter gear speed signal (NC) and the direct clutch speed sensor signal (NT), the Engine & ECT ECU detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus performing smooth gear shifting.

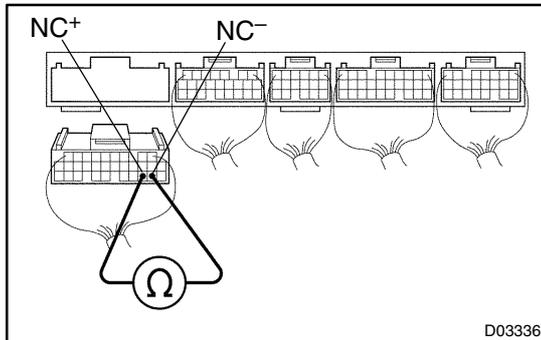
DTC No.	DTC Detecting Condition	Trouble Area
P1730	The Engine & ECT ECU detects conditions (a), (b), (c) and (d) continuity for 5 secs or more. (1 trip detection logic) (a) Vehicle speed: 50 km/h (20 mph) or more (b) 2nd, 3rd or O/D gear (c) Solenoid valves and neutral start switch are normal (d) NC < 300 rpm	<ul style="list-style-type: none"> <li>• Open or short in NC revolution sensor circuit</li> <li>• Counter gear speed sensor</li> <li>• Engine &amp; ECT ECU</li> </ul>

**WIRING DIAGRAM**



D03444

## INSPECTION PROCEDURE

1 Check resistance between terminals NC<sup>+</sup> and NC<sup>-</sup> of Engine & ECT ECU.**PREPARATION:**

Disconnect the connector from Engine & ECT ECU.

**CHECK:**

Check resistance between terminals NC<sup>+</sup> and NC<sup>-</sup> of Engine & ECT ECU.

**OK:**

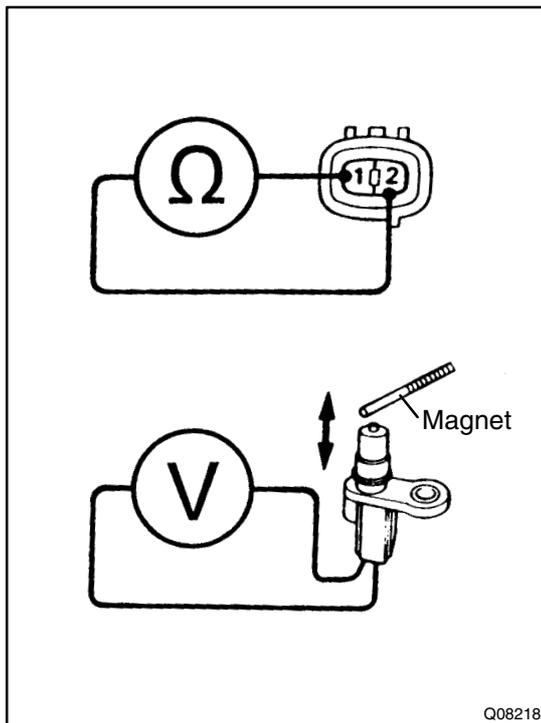
Resistance:  $620 \pm 60 \Omega$

OK

Check and replace the Engine & ECT ECU (See page IN-32).

NG

## 2 Check counter gear speed sensor.

**PREPARATION:**

Remove the counter gear speed sensor from transaxle.

**CHECK:**

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

**OK:**

(a) Resistance:  $620 \pm 60 \Omega$

(b) Voltage is generated intermittently.

**HINT:**

The voltage generated is extremely low.

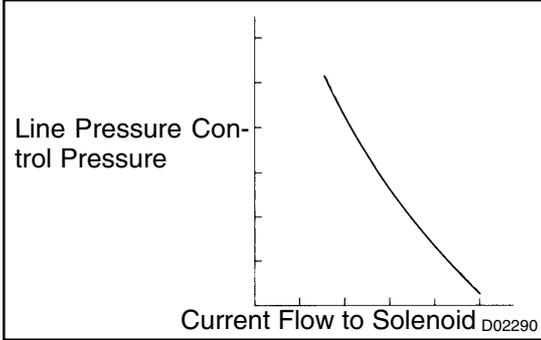
NG

Replace the counter gear speed sensor.

OK

Check and repair the harness and connector between Engine & ECT ECU and counter gear speed sensor (See page IN-32).

<b>DTC</b>	<b>P1760</b>	<b>Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT)</b>
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**CIRCUIT DESCRIPTION**

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the SLT solenoid valve, under electronic control, to precisely and minutely modulate and generate line pressure according to the accelerator pedal effort, or engine power output detected.

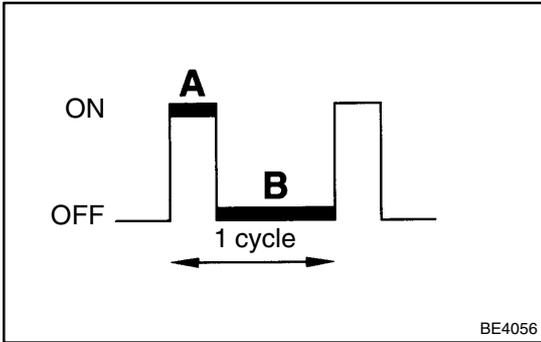
This reduces the function of line pressure and provides smooth shifting characteristics.

Upon receiving the throttle valve opening angle signal, Engine & ECT ECU controls the line pressure by sending a predetermined (\*) duty ratio to the solenoid valve, modulating the line pressure, generating throttle pressure.

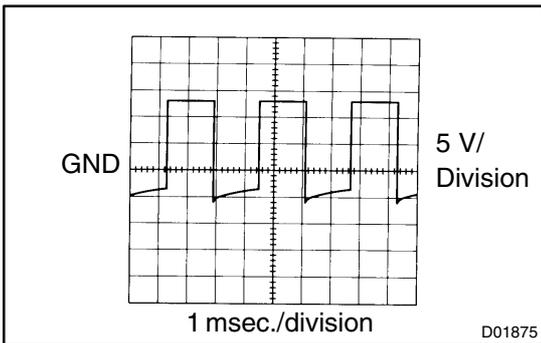
(\*) Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

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



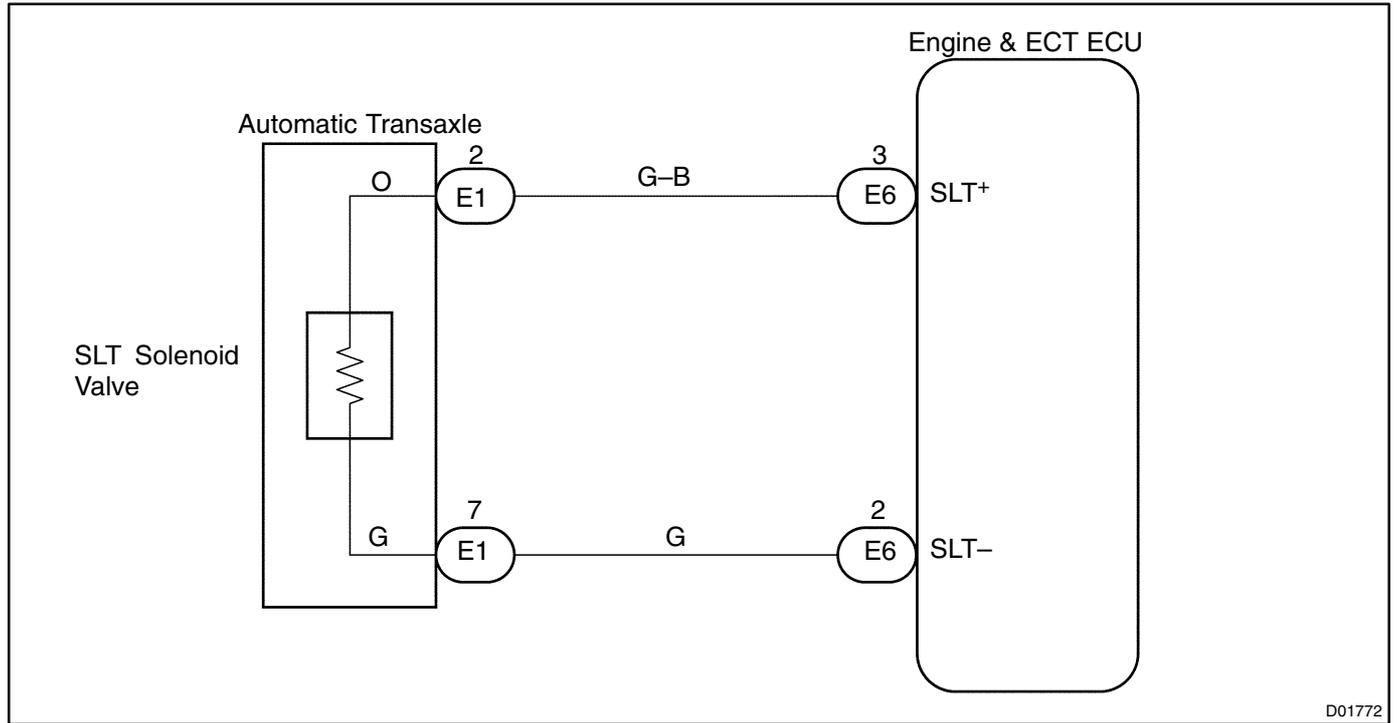
DTC No.	DTC Detecting Condition	Trouble Area
P1760	a) or b) condition below are detected 1 seconds or more. a) SLT <sup>-</sup> terminal: 0 V b) SLT <sup>-</sup> terminal: 12 V	<ul style="list-style-type: none"> <li>• Open or short in SLT solenoid valve circuit</li> <li>• SLT solenoid valve</li> <li>• Engine &amp; ECT ECU</li> </ul>



Reference:

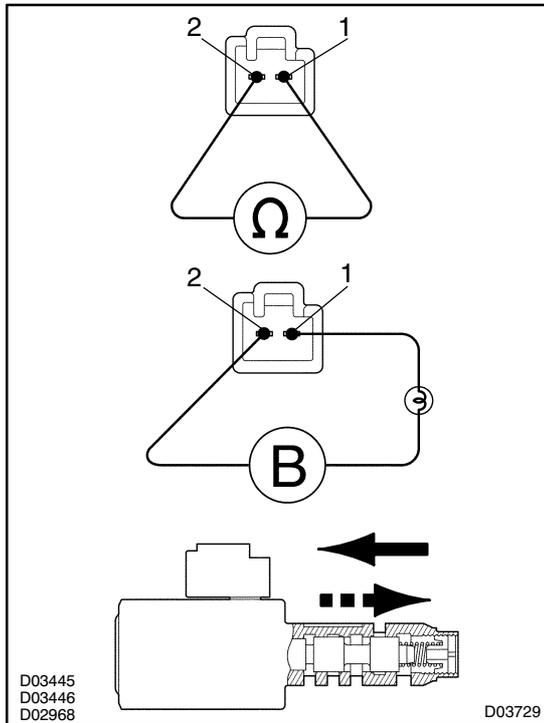
Waveform between terminals SLT<sup>+</sup> and SLT<sup>-</sup> during engine idling.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

**1 Check SLT solenoid valve.**



**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Disconnect the solenoid connector.

**CHECK:**

Check the solenoid resistance.

Measure resistance between terminals 1 and 2 of solenoid connector.

**OK:**

**Resistance: 5.0 – 5.6 Ω**

**CHECK:**

Check the solenoid operation.

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 voltage is applied.	Valve moves in  direction in illustration at left.
When battery voltage is cut off.	Valve moves in  direction in illustration at left.

**NG** **Replace SLT solenoid valve.**

**OK**

**2 Check harness and connector between SLT solenoid valve and Engine & ECT ECU (See page IN-32).**

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

**OK**

**Replace Engine & ECT ECU (See page IN-32).**

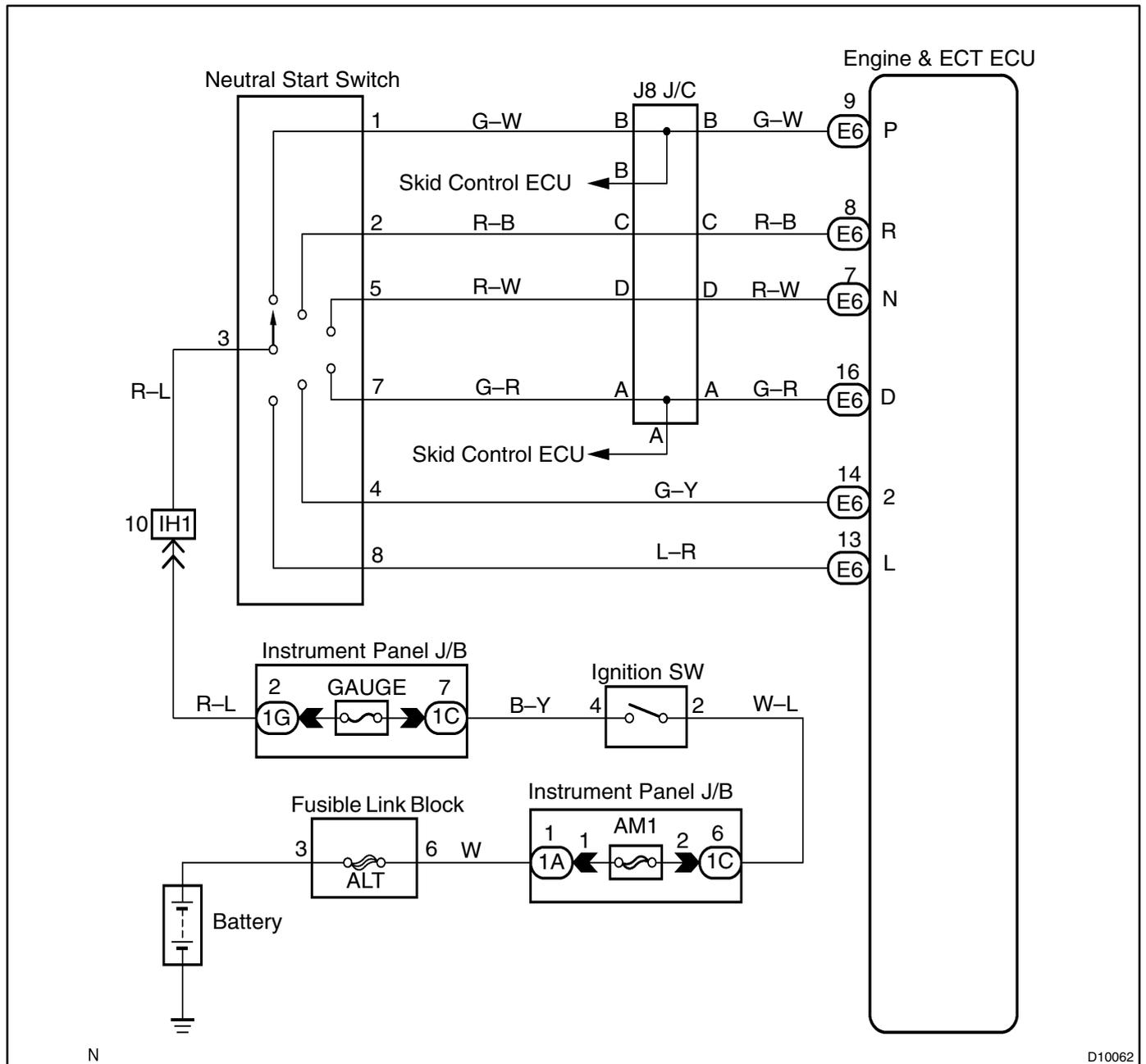
<b>DTC</b>	<b>P1780</b>	<b>Park/Neutral Position Switch Malfunction (Neutral Start Switch)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
P1780	When driving under conditions (a) and (b) for 30 seconds or more, the neutral start switch is ON (N range). (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 – 2,500 rpm	<ul style="list-style-type: none"> <li>• Short in neutral start switch circuit</li> <li>• Neutral start switch</li> <li>• Engine &amp; ECT ECU</li> </ul>

# WIRING DIAGRAM



N

D10062

## INSPECTION PROCEDURE

1	Read NSW, REVERSE, 2ND and LOW signals.
---	---

**When using hand-held tester.**

**PREPARATION:**

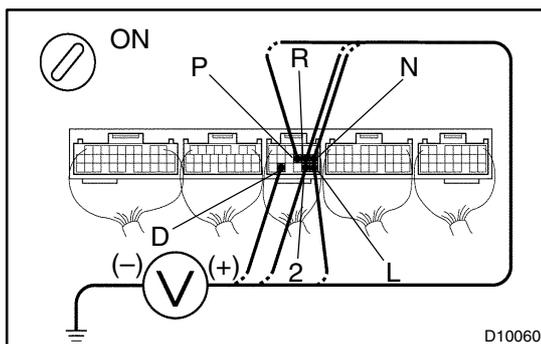
- (a) Remove the DLC3 cover.
- (b) Connect a hand-held tester to the DLC3.
- (c) Turn the ignition switch ON and hand-held tester main switch ON.

**CHECK:**

Shift lever into the P, R, N, 2 and L ranges, and read the NSW, REVERSE, 2ND and LOW signals on the hand-held tester.

**OK:**

Shift range	Signal
2	2ND OFF → ON
L	LOW OFF → ON
R	REVERSE OFF → ON
P, N	NSW 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 Engine & ECT ECU and body ground when the shift lever is shifted to the following ranges.

**OK:**

Shift range	Tester connection	Specified value
P	P – Body ground	Battery voltage
R	R – Body ground	Battery voltage
N	N – Body ground	Battery voltage
D	D – Body ground	Battery voltage
2	2 – Body ground	Battery voltage
L	L – Body ground	Battery voltage

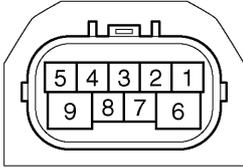
**HINT:**

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

**OK**

**Proceed to next circuit inspection shown on matrix chart (See page DI-160).**

**NG**

**2 Check neutral start switch.**

N

F13412

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the neutral start switch.

**CHECK:**

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

Shift range	Terminal No. to continuity	
P	1-3	6-9
R	2-3	-
N	3-5	6-9
D	3-7	-
2	3-4	-
L	3-8	-

**OK:**

There is continuity.

NG

Replace the neutral start switch.

OK

**3 Check harness and connector between battery and neutral start switch, neutral start switch and Engine & ECT ECU (See page IN-32).**

NG

Repair or replace the harness and connector.

OK

Check and replace the Engine & ECT ECU  
(See page IN-32).

# Pattern Select Switch Circuit

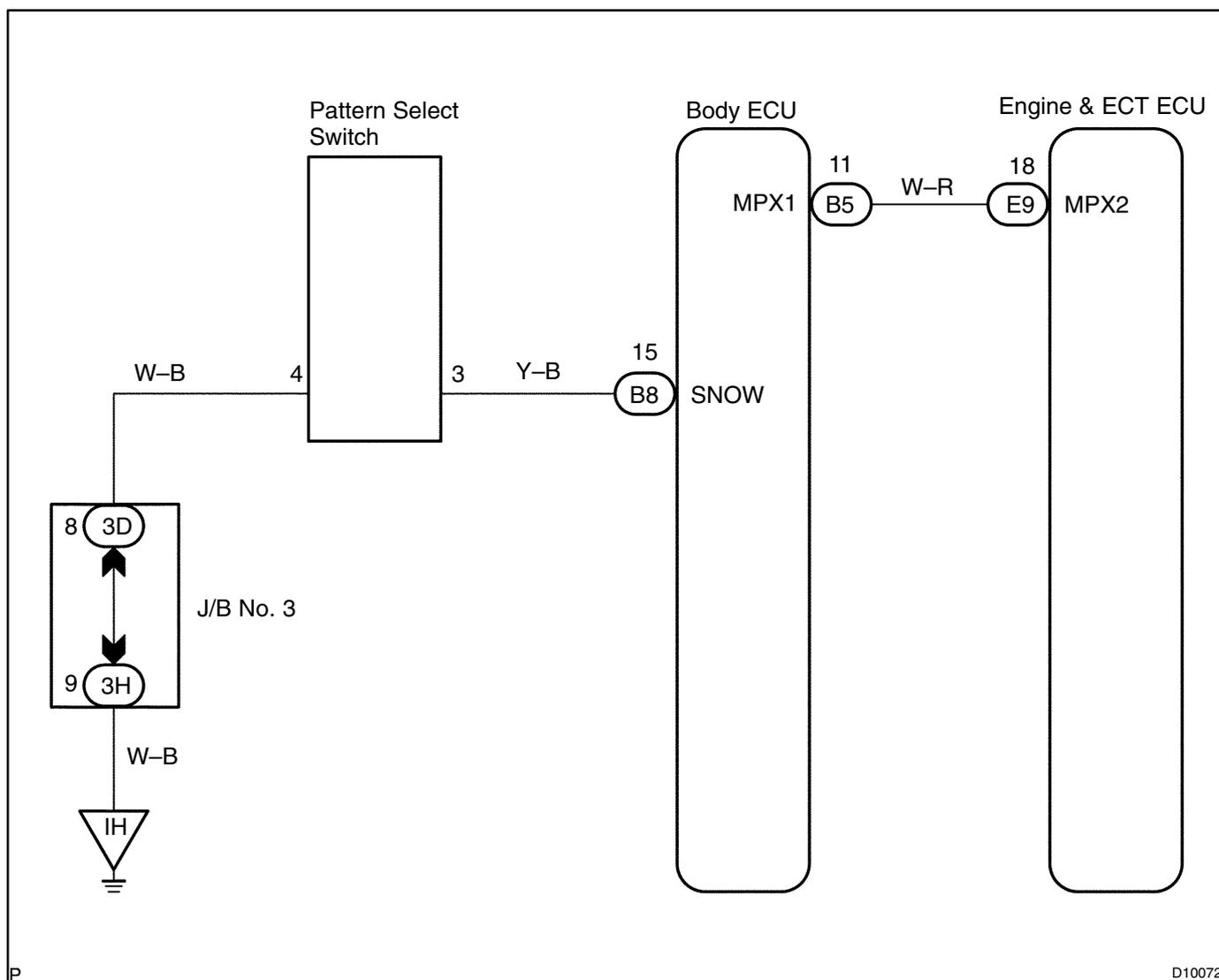
## CIRCUIT DESCRIPTION

When 2nd start mode is selected with the pattern select switch, the Engine & ECT ECU controls the solenoid valves and the transmission starts from 2nd gear.

In D range, the transmission automatically shifts up through 3rd to O/D as usual.

In 2nd range, the transmission is held in 2nd gear.

## WIRING DIAGRAM

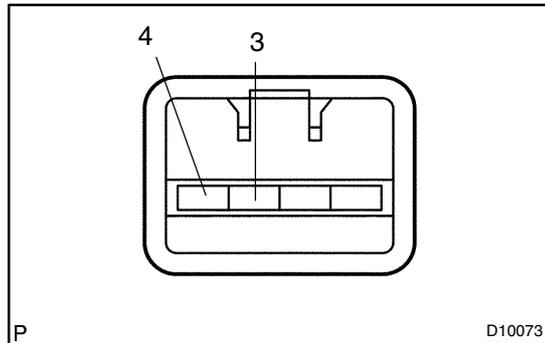


P

D10072

## INSPECTION PROCEDURE

<b>1</b>	<b>Check pattern select switch.</b>
----------	-------------------------------------



**PREPARATION:**

Disconnect the pattern select switch connector.

**CHECK:**

Check continuity between terminals 1 and 2 of pattern select switch connector when the select switch is set to SNOW positions.

**OK:**

Switch condition	Tester connection	Specified condition
SNOW	3 - 4	Continuity

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

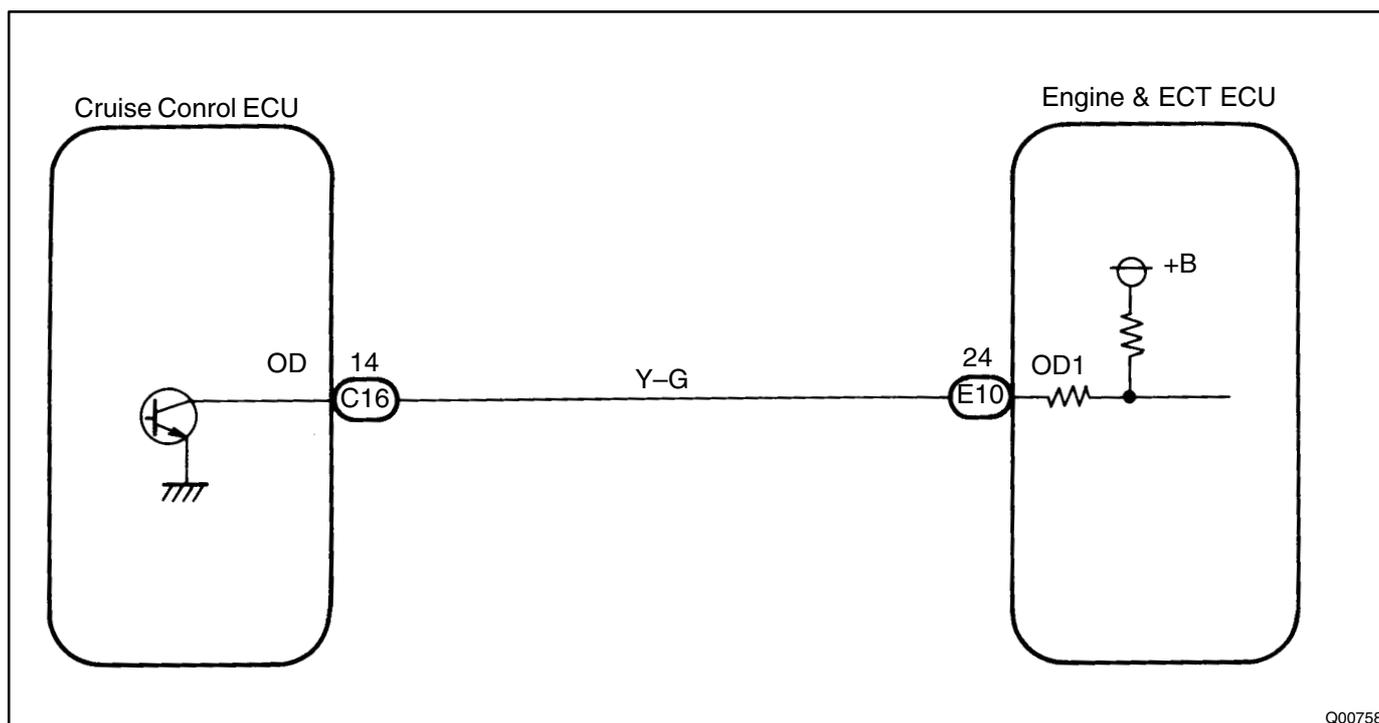
## O/D Cancel Signal Circuit

### CIRCUIT DESCRIPTION

While driving uphill with cruise control activated, in order to minimize gear shifting and provide smooth cruising overdrive may be prohibited temporarily under some condition.

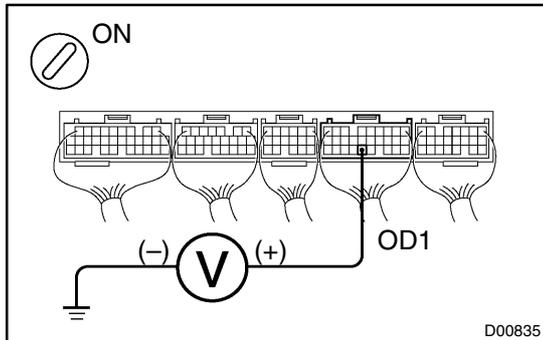
The cruise control Engine & ECT ECU sends O/D cut signals to the Engine & ECT ECU as necessary and the Engine & ECT ECU cancels overdrive shifting until these signals are discontinued.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

- 1 Check voltage between terminal OD1 of Engine & ECT ECU and body ground.

**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminal OD1 of Engine & ECT ECU and body ground.

**OK:**

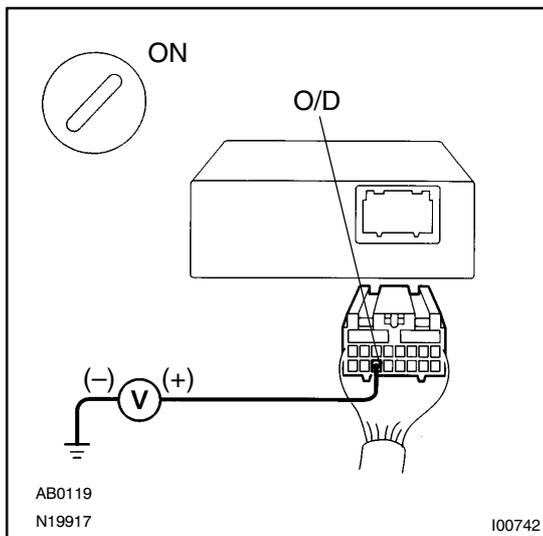
**Voltage: 10 – 14 V**

**OK**

Proceed to next circuit inspection shown on matrix chart (See page DI-160).

**NG**

- 2 Check voltage between terminal OD of cruise control ECU harness side connector and body ground.

**PREPARATION:**

(a) Disconnect the cruise control ECU connector.

(b) Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminal OD of cruise control ECU harness side connector and body ground.

**OK:**

**Voltage: 10 – 14 V**

**OK**

Check and replace the cruise control ECU.

**NG**

3	<b>Check harness and connector between cruise control ECU and Engine &amp; ECT ECU (See page IN-32).</b>
---	--

NG

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

OK

**Check and replace the Engine & ECT ECU  
(See page IN-32).**



## 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 symptoms problem tables (See page DI-160).

NG

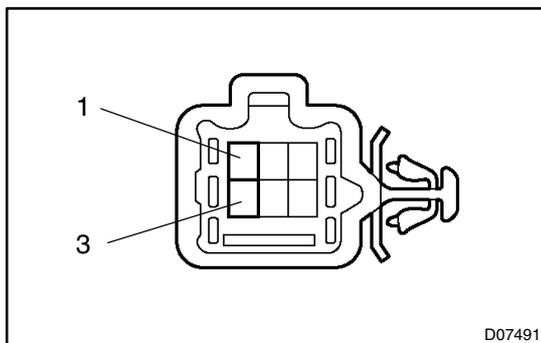
## 2 Check and replace the combination meter (See page BE-68).

NG

Replace the combination meter.

OK

## 3 Check O/D main switch.



D07491

**PREPARATION:**

Disconnect the O/D main switch connector.

**CHECK:**

Check continuity between terminals 1 and 3 of O/D main switch connector.

**OK:**

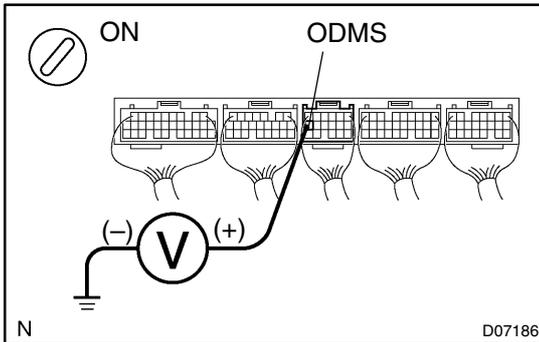
O/D main switch condition	Specified condition
Press continuously O/D main switch	Continuity
Release O/D main switch	No continuity

NG

Replace and repair O/D main switch.

OK

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



##### PREPARATION:

Turn the ignition switch ON.

##### CHECK:

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

##### OK:

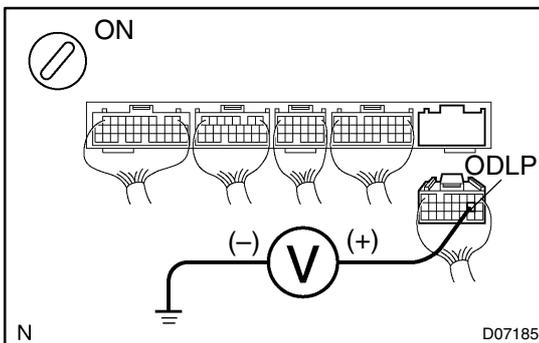
O/D main switch condition	Specified voltage
Press continuously O/D main switch	Below 1.0 V
Release O/D main switch	10 – 14 V

OK

Check and replace the Engine & ECT ECU (See page IN-22).

NG

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



##### PREPARATION:

- Disconnect the connector of Engine & ECT ECU.
- Turn the ignition switch ON.

##### CHECK:

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

##### OK:

Voltage: 7.5 – 14 V

OK

Check and replace the Engine & ECT ECU (See page IN-22).

NG

Check and replace harness and connector between combination meter and Engine & ECT ECU, O/D main switch and Engine & ECT ECU, O/D main switch and body ground (See page IN-22).

## Kick-down Switch Circuit (LHD)

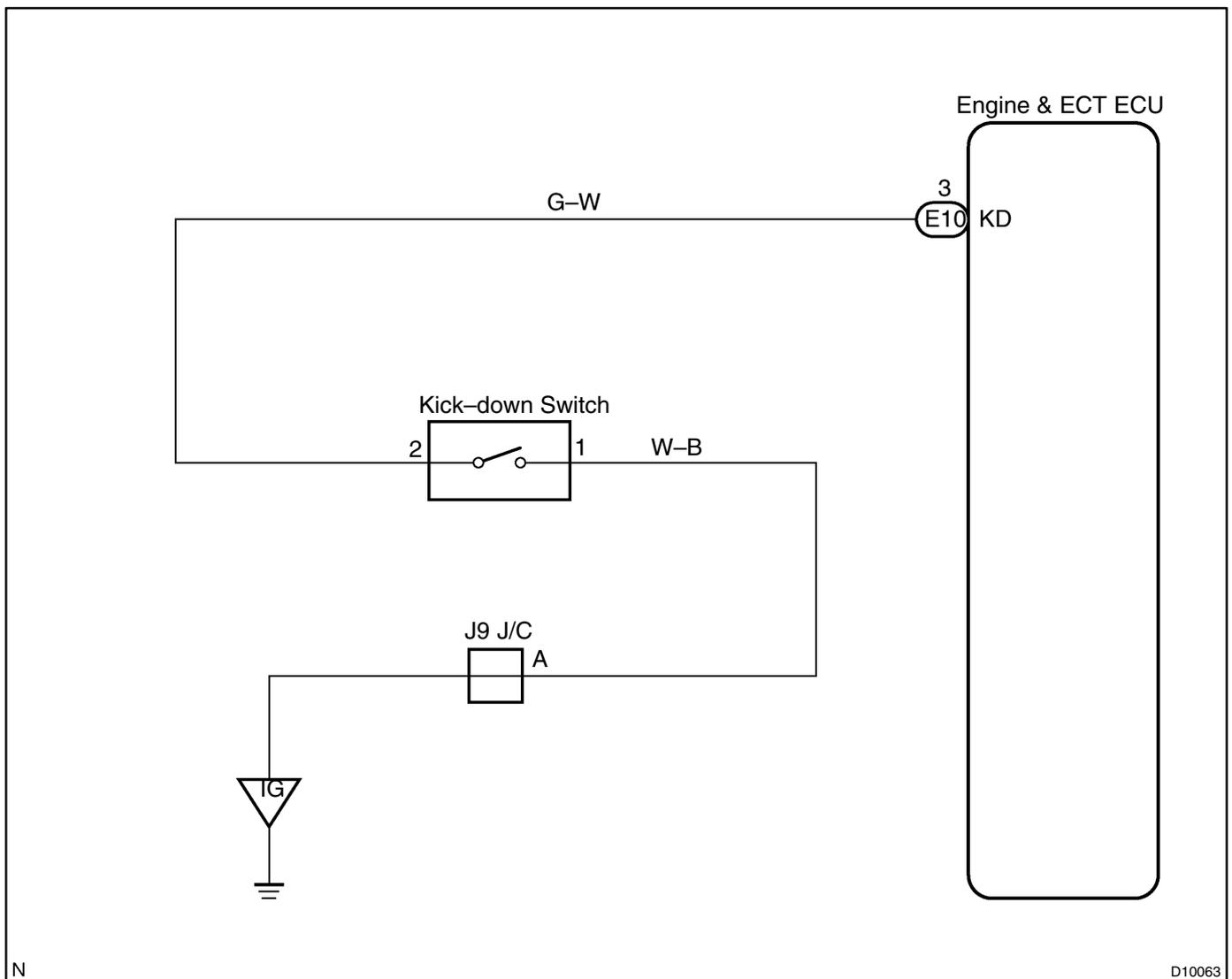
### CIRCUIT DESCRIPTION

The kick-down switch is turned ON when the accelerator pedal is depressed to the full throttle and sends signals to Engine & ECT ECU.

When the kick-down switch is turned ON, the Engine & ECT ECU controls gear shifting according to the programmed shift diagrams.

If a short circuit develops in the kick-down switch, the Engine & ECT ECU disregards the kick-down signals and controls shifting at the normal shift points.

### WIRING DIAGRAM



N

D10063

## INSPECTION PROCEDURE

## 1 Check KICK DOWN SW signal.

**When using hand-held tester:****PREPARATION:**

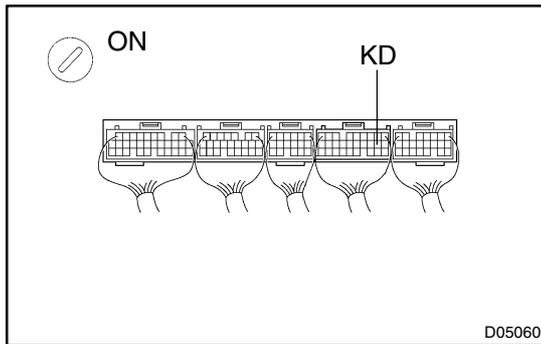
- Remove the DLC3 cover.
- Connect a hand-held tester to the DLC3.
- Turn the ignition switch ON and hand-held tester main switch ON.

**CHECK:**

Read the KICK DOWN SW signal on the hand-held tester.

**OK:**

Accelerator pedal	KICK DOWN SW signal
Fully depressed (kick-down SW is ON)	ON
Released (kick-down SW is OFF)	OFF

**When not using hand-held tester:****PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminal KD of Engine & ECT ECU connector and body ground when accelerator pedal is fully depressed or not.

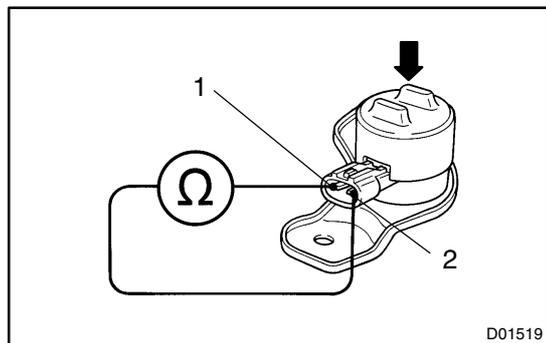
**OK:**

Accelerator pedal	Voltage
Fully depressed (kick-down SW is ON)	Below 1 V
Released (kick-down SW is OFF)	10 - 14 V

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI-160).

NG

**2 Check kick-down switch.**
**PREPARATION:**

Disconnect the kick-down switch connector.

**CHECK:**

Check continuity at each terminal of kick-down switch connector.

**OK:**

Kick-down switch	Specified condition
ON	No continuity
OFF	Continuity

**NG****Replace kick-down switch.****OK**
**3 Check harness and connector between Engine & ECT ECU and kick-down switch, kick-down switch and body ground (See page IN-32).**
**NG****Repair or replace the harness or connector.****OK**

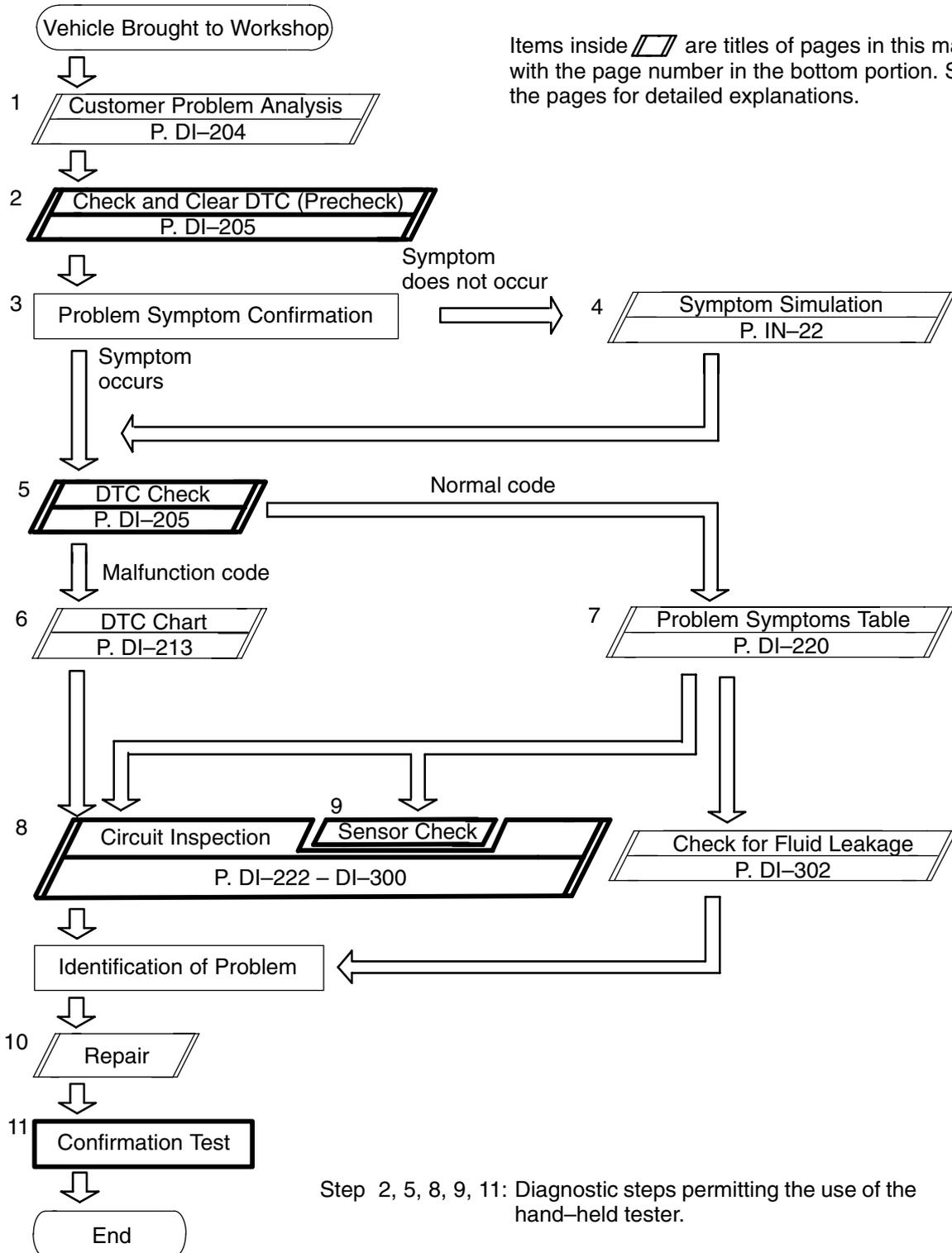
**Check and replace Engine & ECT ECU  
(See page IN-32).**

# ABS & BA & TRC & VSC SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

D10W3-08

Troubleshoot in accordance with the procedure on the following pages.



### Fail safe function:

When a failure occurs in the ABS & BA & TRC & VSC system, the respective ABS & VSC warning light is lit and the operation of ABS & BA & TRC & VSC is prohibited. (In addition to this, when the failure which disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited).

# CUSTOMER PROBLEM ANALYSIS CHECK

**ABS & BA & TRC & VSC Check Sheet**

Inspector's Name \_\_\_\_\_

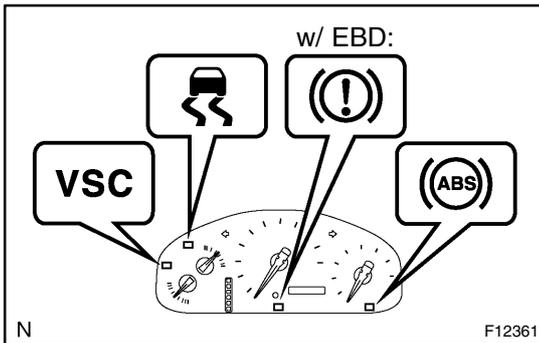
Customer's Name	_____	Registration No.	_____
		Registration Date	____ / ____ / ____
		Frame No.	_____
Date Vehicle Brought In	____ / ____ / ____	Odometer Reading	_____ km miles

Date Problem First Occurred	____ / ____ / ____
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent ( _____ times a day)

Symptoms	<input type="checkbox"/> ABS does not operate.	
	<input type="checkbox"/> ABS does not operate efficiently.	
	<input type="checkbox"/> TRC does not operate. (Wheels spin when starting rapidly.)	
	<input type="checkbox"/> VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	<input type="checkbox"/> BA does not operate.	
	ABS Warning Light Abnormal	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not Light Up
	VSC Warning Light Abnormal	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not Light Up
	SLIP Indicator Light Abnormal	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not Light Up
	Brake Warning Light Abnormal	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not Light Up

Check Item	Malfunction Indicator Light	<input type="checkbox"/> Normal <input type="checkbox"/> Does not Light Up
------------	-----------------------------	--

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code _____)
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code _____)



## PRE-CHECK

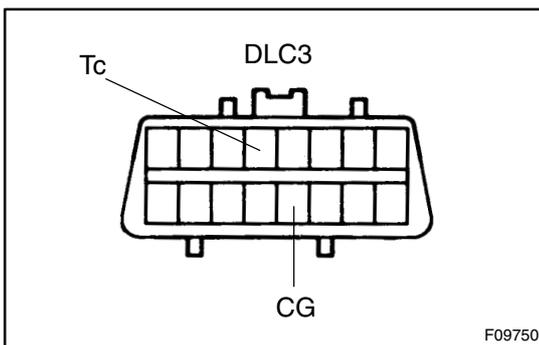
### 1. DIAGNOSIS SYSTEM

- (a) Check the warning lights.
- (1) Release the parking break pedal.
  - (2) When the ignition switch is turned ON, check that the ABS warning light, VSC warning light, brake warning light\*<sup>1</sup> and SLIP indicator light goes on for approx. 3 seconds.
- \*1: w/ EBD only

#### HINT:

- When the parking brake is applied or the level of the brake fluid is low, the brake warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, VSC warning light circuit, brake warning light circuit or SLIP indicator light circuit.

Trouble Area	See page
ABS warning light circuit	DI-287
VSC warning light circuit	DI-284
Brake warning light circuit	DI-290
SLIP indicator light circuit	DI-292

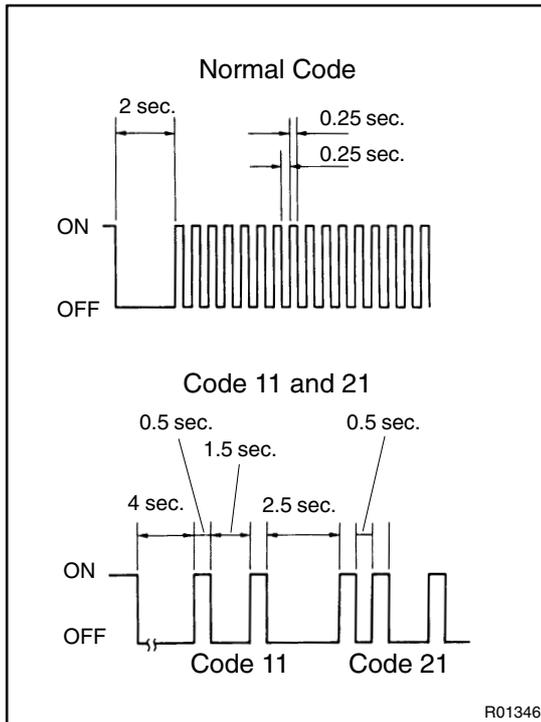


- (b) In case of not using hand-held tester:  
Check the DTC.
- (1) Using SST, connect terminals Tc and CG of DLC3.  
SST 09843-18040
  - (2) Turn the ignition switch ON.
  - (3) Read the DTC from the ABS warning light and VSC warning light on the combination meter.

#### HINT:

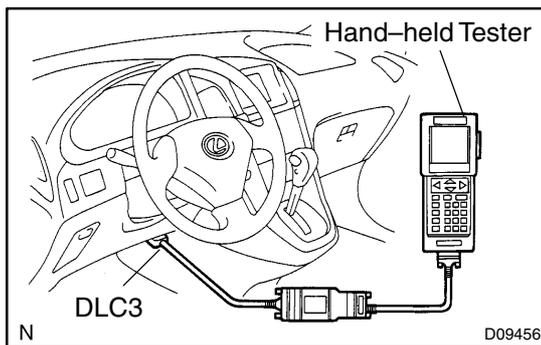
- If no code appears, inspect the diagnostic circuit, ABS warning light circuit or VSC warning light circuit.

Trouble Area	See page
Tc terminal circuit	DI-298
ABS warning light circuit	DI-287
VSC warning light circuit	DI-284



- 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-213.
  - (5) After completing the check, disconnect terminals Tc and CG, and turn off the display.

If 2 or more malfunction codes are identified at the same time, the lowest numbered DTC will be displayed 1st.



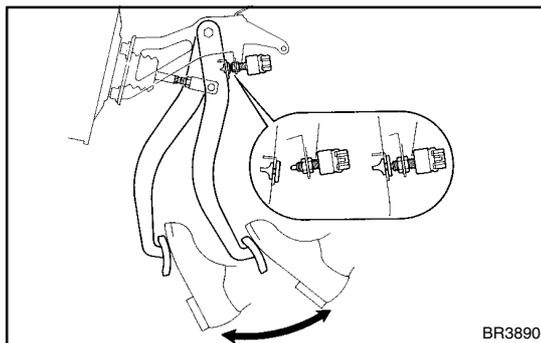
- (c) In case of using hand-held tester:

Check the DTC.

- (1) Hook up the hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Read the DTC by following the prompts on the tester screen.

HINT:

Please refer to the hand-held tester operator's manual for further details.



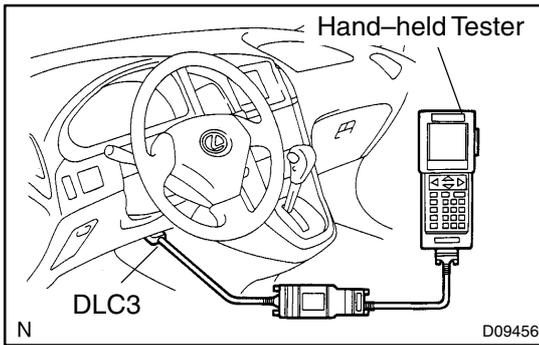
- (d) In case of not using hand-held tester:

Clear the DTC.

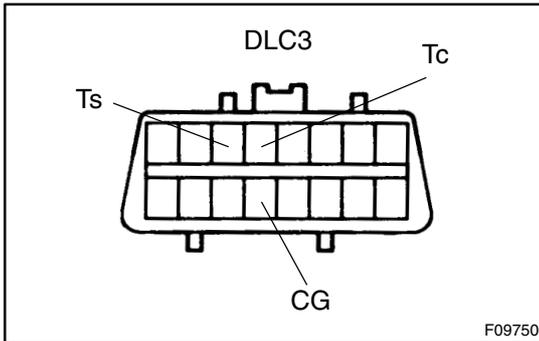
- (1) Using SST, connect terminals Tc and CG of DLC3.  
SST 09843-18040
- (2) Turn the ignition switch ON.
- (3) Clear the DTC stored in ECU by depressing the break pedal 8 times or more within 5 seconds.
- (4) Check that the warning light shows the normal code.
- (5) Remove the SST from the terminals of DLC3.  
SST 09843-18040

HINT:

Cancellation cannot be done by removing the battery cable or ECU-IG fuse.



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



## 2. SENSOR SIGNAL CHECK (TEST MODE)

### HINT:

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

- (a) In case of not using hand-held tester:  
Check the ABS sensor signal.
- (1) Turn the ignition switch OFF.
  - (2) Using SST, connect terminals Ts and CG of DLC3.  
SST 09843-18040
  - (3) Start the engine.
  - (4) Check that the ABS warning light blinks.

### HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and Ts terminal circuit (See page DI-287, DI-300).

- (5) Keep the vehicle in the stationary condition on the flat place for 1 sec. or more.
- (6) Keeping the vehicle in the stationary condition and the break pedal in free condition for 1 sec. or more, continue to depress the break pedal with 147 N (15 kgf, 33 lbf) or more for 1 sec. or more.
- (7) Keeping the vehicle in the stationary condition, depress the brake pedal with 98 N (10 kgf, 22 lbf) or more quickly.

### HINT:

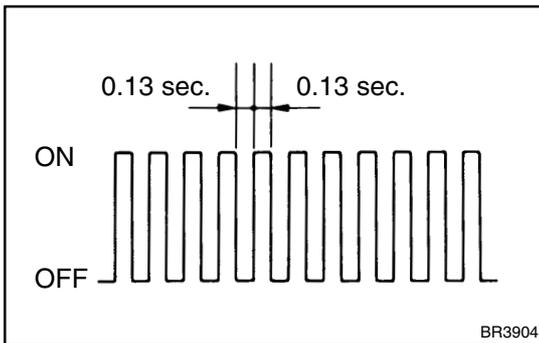
The above mentioned condition comes into existence, the ABS warning light comes ON for 3 seconds.

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

### HINT:

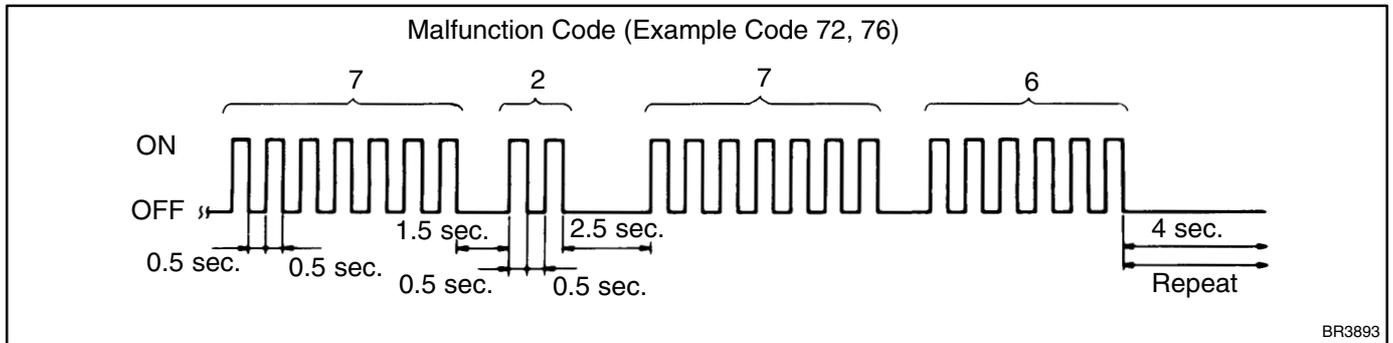
There is a case that the sensor check is not completed if the vehicle has its wheels spun or its steering wheel steered during this check.

- (9) Stop the vehicle.
- (10) Using SST, connect terminals Tc and CG of DLC3.  
SST 09843-18040
- (11) Read the number of blinks of the ABS warning light.



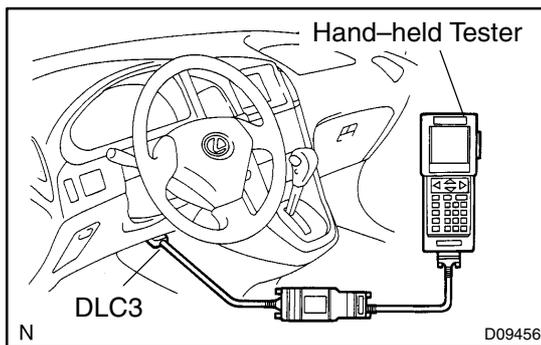
## HINT:

- See the list of DTC shown in 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.



- (12) After doing the check, disconnect terminals Ts and CG, Tc and CG of DLC3, and turn the ignition switch OFF.

SST 09843-18040



- (b) In case of using hand-held tester:

Check the ABS sensor signal.

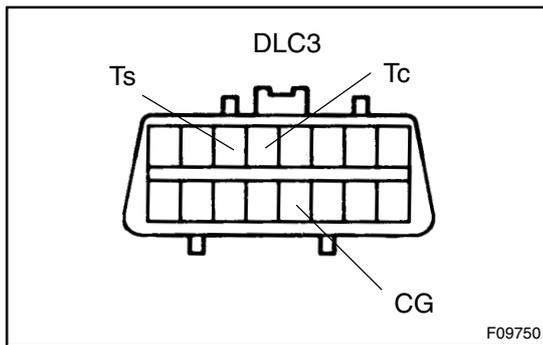
- (1) Hook up the hand-held tester to the DLC3.
- (2) Do step (3) to (9) on the previous page.
- (3) Read the DTC by following the prompts on the tester screen.

## HINT:

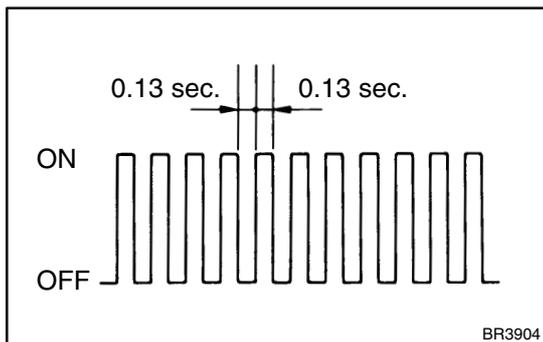
Please refer to the hand-held tester operator's manual for further details.

**DTC of ABS sensor check function:**

Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	<ul style="list-style-type: none"> <li>• Right front speed sensor</li> <li>• Sensor installation</li> <li>• Sensor rotor</li> </ul>
C1272 / 72	Low output voltage of left front speed sensor	<ul style="list-style-type: none"> <li>• Left front speed sensor</li> <li>• Sensor installation</li> <li>• Sensor rotor</li> </ul>
C1273 / 73	Low output voltage of right rear speed sensor	<ul style="list-style-type: none"> <li>• Right rear speed sensor</li> <li>• Sensor installation</li> <li>• Sensor rotor</li> </ul>
C1274 / 74	Low output voltage of left rear speed sensor	<ul style="list-style-type: none"> <li>• Left rear speed sensor</li> <li>• Sensor installation</li> <li>• Sensor rotor</li> </ul>
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	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Sensor installation</li> </ul>
C1281 / 81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor

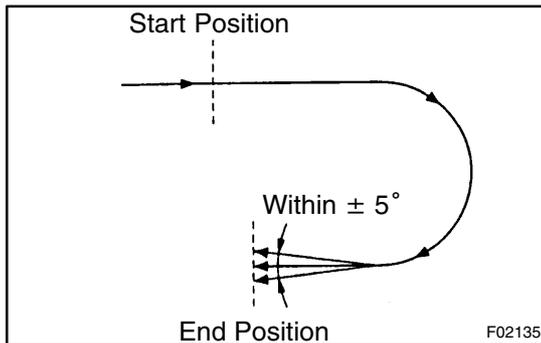


- (c) In case of not using hand-held tester:  
Check the VSC sensor signal.
- (1) Turn the ignition switch OFF.
  - (2) Check that the shift lever position is at P range, turn the steering wheel to the neutral position.
  - (3) Using SST, connect terminals Ts and CG of DLC3.  
SST 09843-18040
  - (4) Start the engine.



- (5) Check that the VSC warning light blinks.
- HINT:**  
If the VSC warning light does not blink, inspect the VSC warning light circuit and Ts terminal circuit (See page DI-284, DI-300).
- (6) After a new ECU installed, the first time only:  
Start the engine and keep the vehicle in the stationary condition on the flat place for 3 sec. or more, it's installed the zero point calibration of the yaw rate sensor.

- (7) Check the steering angle sensor.  
Turn the steering wheel to either left or right to the full lock position, from the vehicle stationary condition, and turn back the steering wheel to the neutral position.



- (8) Check the yaw rate sensor.  
Shift the shift lever to the D range and drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to left or right 90° or more, and maintain 180° circular drive for the vehicle.  
Stop the vehicle and shift the shift lever to the P range, check that the VSC buzzer sounds for 3 sec.

## HINT:

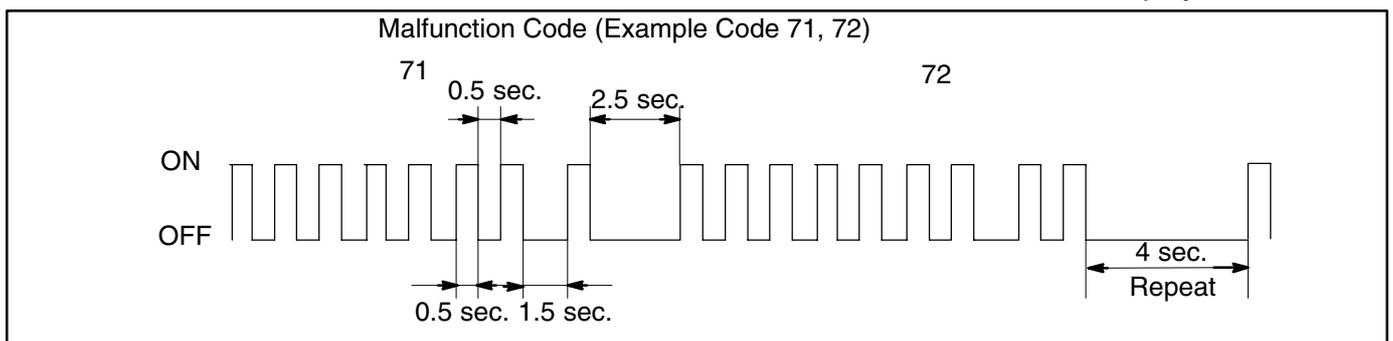
- If the VSC buzzer sounds, the sensor check is in normal completion.
- If the VSC buzzer does not sound, check the VSC buzzer circuit (See page DI-295), then do the sensor check again.
- If the VSC buzzer still won't sound, there is a malfunction in the VSC sensor, so check the DTC.
- Drive the vehicle in a 180° circle. 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.

(9) Using SST, connect terminals Tc and CG of DLC3.  
SST 09843-18040

(10) Read the number of blinks of the VSC warning light.

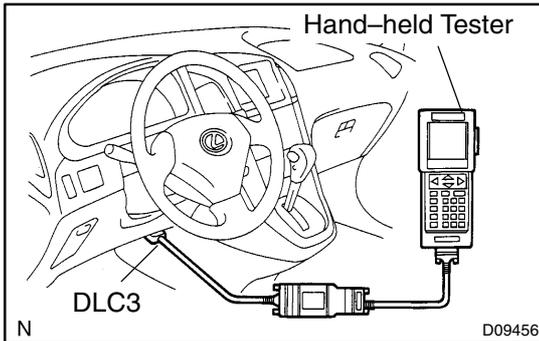
## HINT:

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



- (11) After doing the check, disconnect the SST from terminals Ts and CG, Tc and CG of DLC3 and turn the ignition switch OFF.

SST 09843-18040



- (d) In case of using hand-held tester:

Check the VSC sensor signal.

- (1) Hook up the hand-held tester to the DLC3.
- (2) Do steps (2) and (4) to (8) on the previous pages.
- (3) Read the DTC by following the prompts on the tester screen.

HINT:

Please refer to the hand-held tester operator's manual for further details.

#### DTC of VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371 / 71	Yaw rate sensor output signal malfunction	<ul style="list-style-type: none"> <li>• Yaw rate sensor</li> <li>• Yaw rate sensor circuit</li> </ul>
C1208 / 72	Steering angle sensor output signal malfunction	<ul style="list-style-type: none"> <li>• Steering angle sensor</li> <li>• Steering angle sensor circuit</li> </ul>

### 3. YAW RATE SENSOR ZERO POINT CALIBRATION

HINT:

When replacing the yaw rate sensor assembly or ECU, make sure to perform yaw rate sensor zero point calibration.

Perform yaw rate sensor zero point calibration.

- (1) Shift the shift lever in P range and turn the ignition switch ON, repeat connecting and releasing Ts and CG terminals of DLC3 4 times or more for 8 sec.

HINT:

When operation (1) is performed, DTC is deleted.

- (2) Do not move the vehicle for 15 sec. or more.

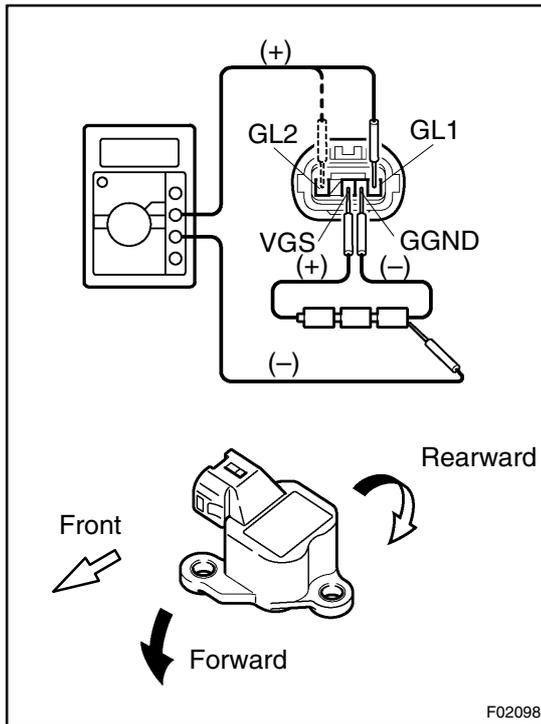
HINT:

At this time VSC warning light is on for 15 sec. and goes off, and zero point calibration for yaw rate sensor is completed.

### 4. DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM

CAUTION:

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



## 5. DECELERATION SENSOR CHECK

- (a) Connect 3 dry batteries of 1.5 V in series.
- (b) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (-) terminal, apply about 4.5 V between VGS – GGND terminals.

### NOTICE:

- When inspecting deceleration sensor, remove it with the bracket together. Do not remove the sensor from the bracket. When replacing deceleration sensor, replace the sensor with it assembled to the bracket assembly.
- Do not apply voltage of 6 V or more to terminals VGS and GGND.

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

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

### HINT:

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

## DIAGNOSTIC TROUBLE CODE CHART

### NOTICE:

Before replacing or removing the part, turn the ignition switch OFF.

### HINT:

- Using SST 09843–18040, connect the terminals Tc and CG of DLC3.
- If any abnormality is not found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed for that code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

### DTC chart of ABS:

DTC No. (See Page)	Detection Item	Trouble Area
C0200 / 31*1 (DI-222)	Right front wheel speed sensor signal malfunction	<ul style="list-style-type: none"> <li>• Right front, left front, right rear and left rear speed sensor</li> <li>• Each speed sensor circuit</li> <li>• Sensor rotor</li> </ul>
C0205 / 32*1 (DI-222)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI-222)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI-222)	Left rear wheel speed sensor signal malfunction	
C0226 / 21 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SFR circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SFRR or SFRH circuit</li> </ul>
C0236 / 22 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SFL circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SFLR or SFLH circuit</li> </ul>
C0246 / 23 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SRR circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SRRR or SRRH circuit</li> </ul>
C0256 / 24 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SRL circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SRLR or SRLH circuit</li> </ul>
C0273 / 13*1 (DI-233)	Open or short circuit of ABS motor relay circuit	<ul style="list-style-type: none"> <li>• ABS motor relay</li> <li>• ABS motor relay circuit</li> </ul>
C0274 / 14 (DI-233)	B+ short circuit of ABS motor relay circuit	
C0278 / 11 (DI-237)	Open or short circuit of ABS solenoid relay circuit	<ul style="list-style-type: none"> <li>• ABS solenoid relay</li> <li>• ABS solenoid relay circuit</li> </ul>
C0279 / 12 (DI-237)	B+ short circuit of ABS solenoid relay circuit	
C1225 / 25 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SMC1 or SMC2 circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SMC1 or SMC2 circuit</li> </ul>
C1226 / 26 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SMV1 or SMV2 circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SMV1 or SMV2 circuit</li> </ul>
C1227 / 27 (DI-229)	Open or short circuit of brake actuator solenoid circuit (SRC1 or SRC2 circuit)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SRC1 or SRC2 circuit</li> </ul>
C1235 / 35 (DI-222)	Foreign matter is attached on the tip of the right front sensor	<ul style="list-style-type: none"> <li>• Right front, left front, right rear, left rear speed sensor</li> <li>• Speed sensor rotor</li> </ul>
C1236 / 36 (DI-222)	Foreign matter is attached on the tip of the left front sensor	
C1238 / 38 (DI-222)	Foreign matter is attached on the tip of the right rear sensor	
C1239 / 39 (DI-222)	Foreign matter is attached on the tip of the left rear sensor	

C1241 / 41 (DI-263)	Low battery voltage or abnormally high battery voltage	<ul style="list-style-type: none"> <li>• Battery</li> <li>• Charging system</li> <li>• Power source circuit</li> </ul>
C1243 / 43*1 (DI-267)	Malfunction in deceleration sensor (abnormal constant output)	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Wire harness for deceleration sensor system</li> </ul>
C1244 / 44 (DI-269)	Open or short circuit of deceleration sensor circuit	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Deceleration sensor circuit</li> </ul>
C1245 / 45*1 (DI-267)	Malfunction in deceleration sensor	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Wire harness for deceleration sensor system</li> </ul>
C1246 / 46*2 (DI-271)	Malfunction in master cylinder pressure sensor	<ul style="list-style-type: none"> <li>• Master cylinder pressure sensor</li> <li>• Master cylinder pressure sensor circuit</li> </ul>
C1249 / 49 (DI-274)	Open circuit of stop light switch circuit	Stop light switch circuit
C1251 / 51*1 (DI-277)	Pump motor is locked Open circuit of pump motor circuit	ABS pump motor
Always ON (DI-281)	Malfunction in skid control ECU	<ul style="list-style-type: none"> <li>• Battery</li> <li>• Charging system</li> <li>• Power source circuit</li> <li>• Skid control ECU</li> </ul>

- \*1: These DTC will not affect to cancel the ABS warning light by repairing the trouble area, so perform the following operations.
  - (1) Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
  - (2) Clear the DTC (See page DI-205).
- \*2: These DTC will not affect to cancel the ABS warning light by repairing the trouble area, so perform the following operations.
  - (1) Keep the vehicle in the stationary condition for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
  - (2) Driving the vehicle at the vehicle speed 50 km/h (31 mph) and keep depressing the brake pedal strongly for about 3 seconds.
  - (3) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  - (4) Clear the DTC (See page DI-205).

**HINT:**

There is a case that hand-held tester cannot be used when ABS warning light is always on.

**DTC chart of VSC:**

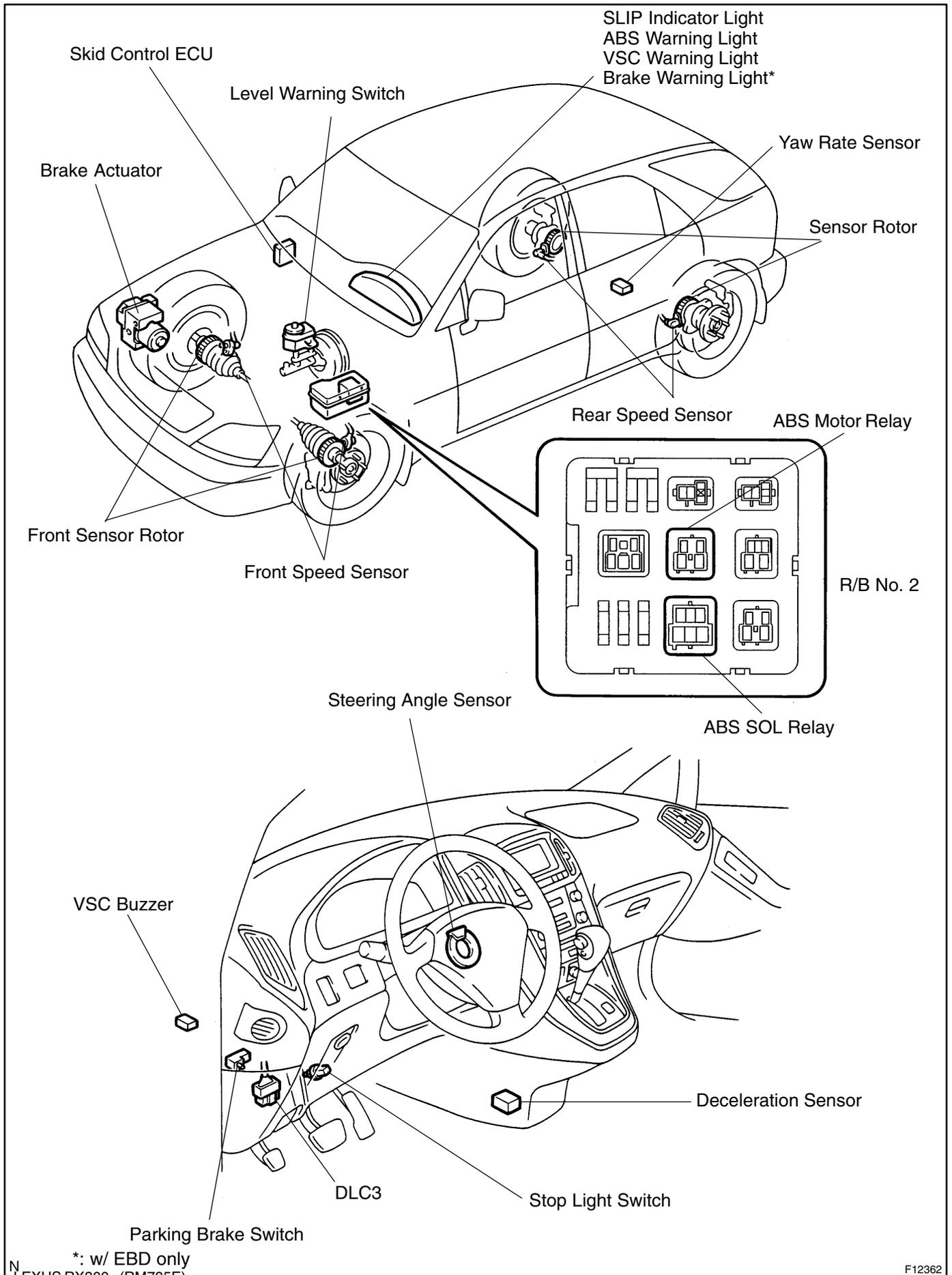
DTC No. (See page)	Detection Item	Trouble Area
C1201 / 51 (DI-242)	Engine and ECT ECU system malfunction	Engine control system
C1202 / 52 (DI-243)	Brake fluid level low Open circuit of brake fluid level warning switch circuit	<ul style="list-style-type: none"> <li>• Brake fluid level</li> <li>• Brake fluid level warning switch</li> <li>• Brake fluid level warning switch circuit</li> </ul>
C1203 / 53 (DI-245)	Engine and ETC ECU communication circuit malfunction	<ul style="list-style-type: none"> <li>• TRC+ or TRC- circuit</li> <li>• ENG+ or ENG- circuit</li> <li>• Engine and ECT ECU</li> </ul>
C1207 / 37 (DI-247)	Malfunction in neutral start switch	<ul style="list-style-type: none"> <li>• Neutral start switch</li> <li>• Neutral start switch (Park/Reverse range circuit)</li> </ul>
C1210 / 36 (DI-250)	Zero point calibration of yaw rate sensor undone	<ul style="list-style-type: none"> <li>• Yaw rate sensor</li> <li>• Yaw rate sensor circuit</li> <li>• P range switch circuit</li> </ul>

C1223 / 43 (DI-252)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI-253)	Open or short circuit of NE signal circuit	<ul style="list-style-type: none"> <li>• NEO circuit</li> <li>• Engine and ECT ECU</li> </ul>
C1231 / 31 (DI-255)	Malfunction in steering angle sensor	<ul style="list-style-type: none"> <li>• Steering angle sensor</li> <li>• Steering angle sensor circuit</li> </ul>
C1232 / 32 (DI-258)	Malfunction in deceleration sensor	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Deceleration sensor circuit</li> </ul>
C1233 / 33 (DI-260)	Open or short circuit of yaw rate sensor circuit	<ul style="list-style-type: none"> <li>• Yaw rate sensor</li> <li>• Yaw rate sensor circuit</li> </ul>
C1234 / 34 (DI-260)	Malfunction in yaw rate sensor	
C1335 / 35 (DI-279)	Malfunction in steering angle sensor communication circuit	Steering angle sensor circuit
Always ON (DI-284)	Malfunction in skid control ECU Open circuit of VSC warning indicator circuit	<ul style="list-style-type: none"> <li>• Power source circuit</li> <li>• Charging system</li> <li>• VSC warning indicator circuit</li> <li>• Skid control ECU</li> </ul>

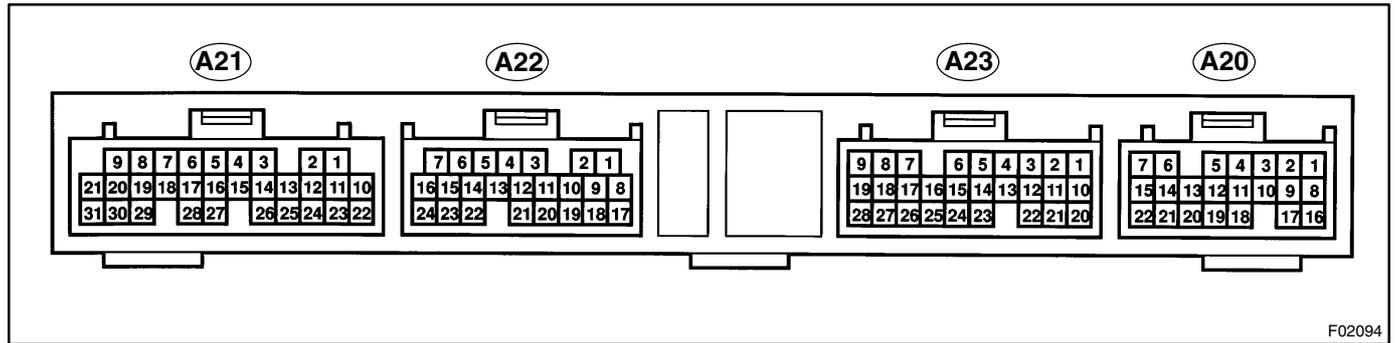
**HINT:**

There is a case that hand-held tester cannot be used when VSC warning indicator is always on.

# PARTS LOCATION



# TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SRLR (A20 - 1) - GND (A21 - 6, 31, A22 - 8, 17)	B-O ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
AST (A20 - 6) - GND (A21 - 6, 31, A22 - 8, 17)	B-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRLH (A20 - 7) - GND (A21 - 6, 31, A22 - 8, 17)	Y-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRR (A20 - 8) - GND (A21 - 6, 31, A22 - 8, 17)	BR-W ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SMV2 (A20 - 15) - GND (A21 - 6, 31, A22 - 8, 17)	R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRH (A20 - 16) - GND (A21 - 6, 31, A22 - 8, 17)	V-W ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SMV1 (A20 - 22) - GND (A21 - 6, 31, A22 - 8, 17)	W-L ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SMC1 (A21 - 2) - GND (A21 - 6, 31, A22 - 8, 17)	L-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SMC2 (A21 - 3) - GND (A21 - 6, 31, A22 - 8, 17)	G-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRC1 (A21 - 4) - GND (A21 - 6, 31, A22 - 8, 17)	R-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRC2 (A21 - 5) - GND (A21 - 6, 31, A22 - 8, 17)	GR-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFLR (A21 - 7) - GND (A21 - 6, 31, A22 - 8, 17)	R-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRH (A21 - 8) - GND (A21 - 6, 31, A22 - 8, 17)	BR-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRR (A21 - 9) - GND (A21 - 6, 31, A22 - 8, 17)	GR-L ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
VCM (A21 - 10) - GND (A21 - 6, 31, A22 - 8, 17)	B ↔ W-B	IG switch ON	4.5 - 5.5
FR+ (A21 - 14) - FR- (A21 - 13)	V ↔ P	IG switch ON, slowly turn right front wheel	ACgeneration
FL+ (A21 - 16) - FL- (A21 - 15)	LG ↔ L	IG switch ON, slowly turn left front wheel	ACgeneration
SR (A21 - 19) - R+ (A21 - 1)	Y-G ↔ GR	IG switch ON, ABS warning light OFF	10 - 14
SFLH (A21 - 21) - GND (A21 - 6, 31, A22 - 8, 17)	G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14

PMC (A21 – 22) – E2 (A21 – 23)	W ↔ R	IG switch ON, stop light switch OFF	0.3 – 0.7
E2 (A21 – 23) – GND (A21 – 6, 31, A22 – 8, 17)	R ↔ W-B	IG switch OFF	Continuity
FSS (A21 – 24) – GND (A21 – 6, 31, A22 – 8, 17)	Shielded ↔ W-B	IG switch OFF	Continuity
MT (A21 – 28) – GND (A21 – 6, 31, A22 – 8, 17)	LG-B ↔ W-B	IG switch ON (Motor relay is OFF)	Below 1.5
MR (A21 – 29) – GND (A21 – 6, 31, A22 – 8, 17)	B-W ↔ W-B	IG switch ON, ABS motor stops	10 – 14
VGS (A22 – 1) – GGND (A22 – 10)	R ↔ B	IG switch ON	4.5 – 5.5
GL1 (A22 – 2) – GGND (A22 – 10)	W ↔ B	IG switch ON, vehicle is placed on the horizontal surface	2 – 3
Tc (A22 – 3) – GND (A21 – 6, 31, A22 – 8, 17)	P-B ↔ W-B	IG switch ON	10 – 14
Ts (A22 – 4) – GND (A21 – 6, 31, A22 – 8, 17)	W-L ↔ W-B	IG switch ON	10 – 14
IG1 (A22 – 6) – GND (A21 – 6, 31, A22 – 8, 17)	B-R ↔ W-B	IG switch ON	10 – 14
NEO (A22 – 7) – GND (A21 – 6, 31, A22 – 8, 17)	L-O ↔ W-B	Engine idling	Pulse generation
GL2 (A22 – 9) – GGND (A22 – 10)	G ↔ B	IG switch ON, vehicle is placed on the level surface	2.0 – 3.0
GGND (A22 – 10) – GND (A21 – 6, 31, A22 – 8, 17)	B ↔ W-B	IG switch OFF	Continuity
RR+ (A22 – 11) – RR- (A22 – 12)	GR-R ↔ L	IG switch ON, slowly turn right rear wheel	AC generation
ENG+ (A22 – 14) – ENG- (A22 – 22)	R-Y ↔ BR-W	IG switch ON, engine idling	Pulse generation
GSS (A22 – 18) – GND (A21 – 6, 31, A22 – 8, 17)	Shielded ↔ W-B	IG switch OFF	Continuity
RL+ (A22 – 19) – RL- (A22 – 20)	L-Y ↔ L-W	IG switch ON, slowly turn left rear wheel	AC generation
PKB (A22-15) – GND (A21-6, 31, A22 – 8, 17)	R-L ↔ W-B	IG switch ON, parking brake switch ON	Below 2.0
		IG switch ON, parking brake switch OFF	10 – 14
TRC+ (A22 – 24) – TRC- (A22 – 16)	GR ↔ P-B	IG switch ON, engine idling	Pulse generation
BRL (A23 – 1) – GND (A21 – 6, 31, A22 – 8, 17)	G ↔ W-B	IG switch ON, fluid in master cylinder reservoir above MIN level and parking brake switch is OFF (Brake warning light is OFF)	10 – 14
VSCW (A23 – 4) – GND (A21 – 6, 31, A22 – 8, 17)	W-G ↔ W-B	IG switch ON, VSC warning light ON	Below 2.0
		IG switch ON, VSC warning light OFF	10 – 14
WA (A23 – 5) – GND (A21 – 6, 31, A22 – 8, 17)	B-Y ↔ W-B	IG switch ON, ABS warning light ON	Below 2.0
		IG switch ON, ABS warning light OFF	10 – 14
IND (A23 – 6) – GND (A21 – 6, 31, A22 – 8, 17)	W-L ↔ W-B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
STP (A23 – 7) – GND (A21 – 6, 31, A22 – 8, 17)	G-Y ↔ W-B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
VYS (A23 – 9) – GYAW (A23 – 27)	R-L ↔ R-W	IG switch ON	4.5 – 5.5

## DIAGNOSTICS – ABS &amp; BA &amp; TRC &amp; VSC SYSTEM

LBL (A23 – 11) – GND (A21 – 6, 31, A22 – 8, 17)	R–W ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level	About 4 – 8
SS1+ (A23 – 14) – SS1– (A23 – 23)	LG–B ↔ LG	Engine idling, slowly turn steering wheel	Pulse generation (See page DI–255)
R (A23 – 15) – GND (A21 – 6, 31, A22 – 8, 17)	R–B ↔ W–B	IG switch ON, shift lever is in R range	8 – 14
		IG switch ON, shift lever is in other than R range	Below 1.5
SP1 (A23 – 16) – GND (A21 – 6, 31, A22 – 8, 17)	R–B ↔ W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
YSS (A23 – 18) – GND (A21 – 6, 31, A22 – 8, 17)	Shielded ↔ W–B	IG switch OFF	Continuity
YD (A23 – 19) – GND (A21 – 6, 31, A22 – 8, 17)	W–R ↔ W–B	IG switch ON, VSC warning light OFF	4.5 – 5.5
BZ (A23 – 20) – GND (A21 – 6, 31, A22 – 8, 17)	G–O ↔ W–B	IG switch ON, VSC buzzer sounds	Below 1.0 ↔ 10 – 14
		IG switch ON, VSC buzzer does not sound	10 – 14
D (A23 – 22) – GND (A21 – 6, 31, A22 – 8, 17)	G–R ↔ W–B	IG switch ON, shift lever is in D range	8 – 14
		IG switch ON, shift lever is in other than D range	Below 1.5
P (A23 – 24) – GND (A21 – 6, 31, A22 – 8, 17)	G–W ↔ W–B	IG switch ON, shift lever is in P range	8 – 14
		IG switch ON, shift lever is in other than P range	Below 1.5
D/G (A23 – 25) – GND (A21 – 6, 31, A22 – 8, 17)	W ↔ W–B	IG switch ON	10 – 14
GYAW (A23 – 27) – GND (A21 – 6, 31, A22 – 8, 17)	R–W ↔ W–B	IG switch OFF	Continuity
YAW (A23 – 28) – GYAW (A23 – 27)	B ↔ R–W	IG switch ON, vehicle is in stationary condition	2 – 3

## 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	<p>Only when 1. to 4. are all normal and the problem is still occurring, replace the skid control ECU.</p> <ol style="list-style-type: none"> <li>3. Check the DTC reconfirming that the normal code is output.</li> <li>4. IG power source circuit</li> <li>5. Speed sensor circuit</li> <li>6. Check the brake actuator with a hand-held tester.</li> </ol> <p>If abnormal, check the hydraulic circuit for leakage (See page DI-302).</p>	<p>DI-205</p> <p>DI-263</p> <p>DI-222</p> <p>BR-54</p>
ABS does not operate efficiently	<p>Only when 1. to 4. are all normal and the problem is still occurring, replace the skid control ECU.</p> <ol style="list-style-type: none"> <li>1. Check the DTC reconfirming that the normal code is output.</li> <li>2. Speed sensor circuit</li> <li>3. Stop light switch circuit</li> <li>4. Check the brake actuator with a hand-held tester.</li> </ol> <p>If abnormal, check the hydraulic circuit for leakage (See page DI-302).</p>	<p>DI-205</p> <p>DI-222</p> <p>DI-274</p> <p>BR-54</p>
ABS warning light abnormal	<ol style="list-style-type: none"> <li>1. ABS warning light circuit</li> <li>2. Skid control ECU</li> </ol>	<p>DI-287</p> <p>DI-281</p>
BRAKE warning light abnormal	<ol style="list-style-type: none"> <li>1. BRAKE warning light circuit</li> <li>2. Skid control ECU</li> </ol>	DI-290
DTC check cannot be done	<p>Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the skid control ECU.</p> <ol style="list-style-type: none"> <li>1. ABS warning light circuit</li> <li>2. VCS warning indicator circuit</li> <li>3. Tc terminal circuit</li> </ol>	<p>DI-287</p> <p>DI-284</p> <p>DI-298</p>
Speed sensor signal check cannot be done	<ol style="list-style-type: none"> <li>1. Ts terminal circuit</li> <li>2. Skid control ECU</li> </ol>	<p>DI-300</p> <p>DI-281</p>
VSC does not operate	<p>Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the skid control ECU.</p> <ol style="list-style-type: none"> <li>1. Check the DTC, reconfirming that the normal code is output.</li> <li>2. IG power source circuit</li> <li>3. Check the hydraulic circuit for leakage.</li> <li>4. Speed sensor circuit</li> <li>5. Deceleration sensor circuit</li> <li>6. Yaw rate sensor circuit</li> <li>7. Steering angle sensor circuit</li> </ol>	<p>DI-205</p> <p>DI-263</p> <p>DI-302</p> <p>DI-222</p> <p>DI-269</p> <p>DI-260</p> <p>DI-255</p>
BA does not operate	Stop light switch circuit	DI-274

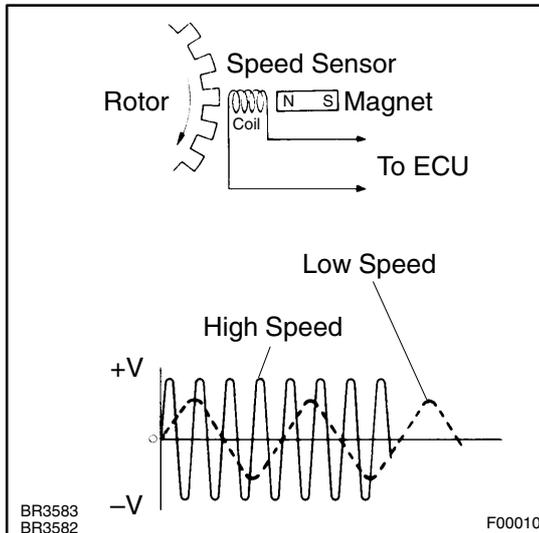
## DIAGNOSTICS – ABS &amp; BA &amp; TRC &amp; VSC SYSTEM

SLIP indicator light abnormal	SLIP indicator light circuit	DI-292
VSC warning light abnormal	<p>Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the skid control ECU.</p> <ol style="list-style-type: none"> <li>1. VSC warning indicator circuit</li> <li>2. Skid control ECU</li> </ol>	DI-284

## CIRCUIT INSPECTION

<b>DTC</b>	<b>C0200 / 31 – C1239 / 39</b>	<b>Speed Sensor Circuit</b>
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## 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 & VSC control system. The front and rear rotors each have 48 serrations.

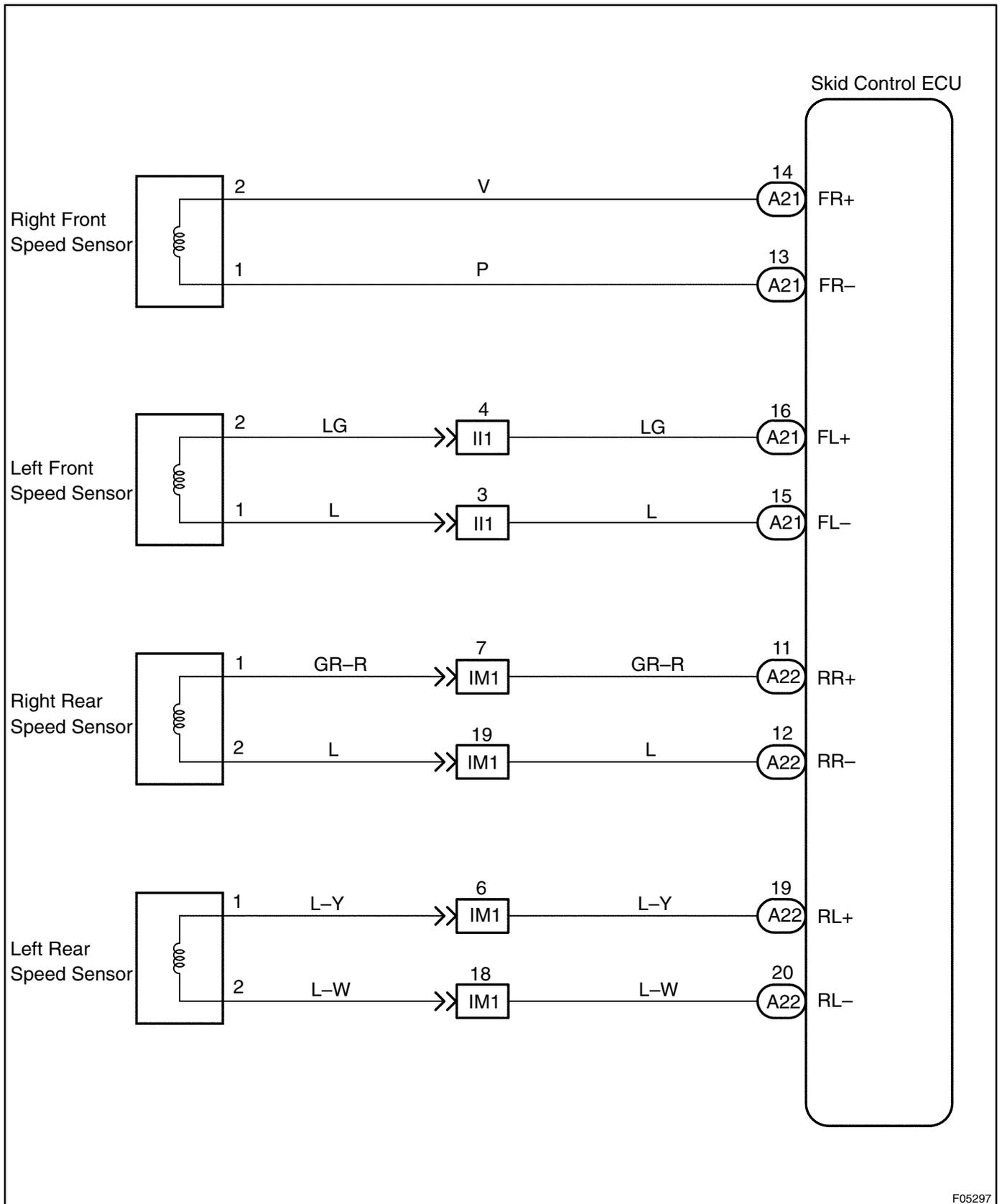
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions from 1. through 3.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. (When RL and RR wheels are faulty for 200 sec.) 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. The speed sensor signal circuit is open circuit continues for 0.5 sec. or more.	<ul style="list-style-type: none"> <li>• Right front, left front, right rear, left rear speed sensor</li> <li>• Each speed sensor circuit</li> <li>• Speed sensor rotor</li> </ul>
C1235 / 35 C1236 / 36 C1238 / 38 C1239 / 39	Continuous noise occurs in to the speed sensor signals with the vehicle speed at 20 km/h (12 mph) or more continues for 5 sec or more.	<ul style="list-style-type: none"> <li>• Right front, left front, right rear, left rear speed sensor</li> <li>• Speed sensor rotor</li> </ul>

### HINT:

- DTC No. C0200 / 31 and C1235 / 35 is for the right front speed sensor.
- DTC No. C0205 / 32 and C1236 / 36 is for the left front speed sensor.
- DTC No. C0210 / 33 and C1238 / 38 is for the right rear speed sensor.
- DTC No. C0215 / 34 and C1239 / 39 is for the left rear speed sensor.

# WIRING DIAGRAM



F05297

## 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.

<b>1</b>	<b>Check output value of speed sensor.</b>
----------	--

### PREPARATION:

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

### CHECK:

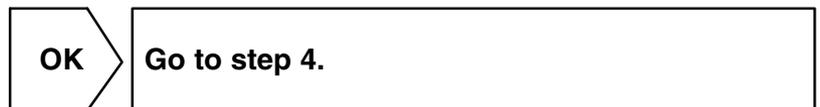
Check that there is no difference between the speed value output from the speed sensor displayed by the hand-held tester and the speed value displayed by the speedometer when driving the vehicle.

### OK:

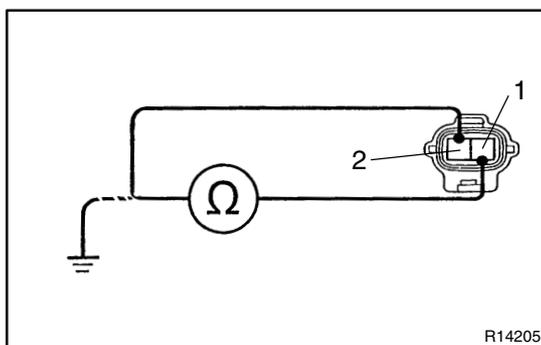
**There is almost no difference from the displayed speed value.**

### HINT:

There is tolerance of  $\pm 10\%$  in the speedometer indication.



<b>2</b>	<b>Check speed sensor.</b>
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### Front:

### PREPARATION:

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

### CHECK:

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

### OK:

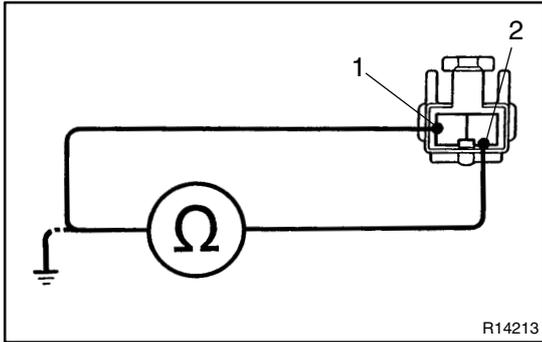
**Resistance: 1.4 – 1.8 kΩ**

### CHECK:

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

### OK:

**Resistance: 1 MΩ or higher**



**Rear:**

**PREPARATION:**

- (a) Remove the seat cushion and seatback.
- (b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- (c) Disconnect the speed sensor connector.

**CHECK:**

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

**OK:**

**Resistance: 0.6 – 1.8 kΩ**

**CHECK:**

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

**OK:**

**Resistance: 1 MΩ or higher**



**Replace speed sensor.**

**NOTICE:**

Check the speed sensor signal last (See page DI-205).



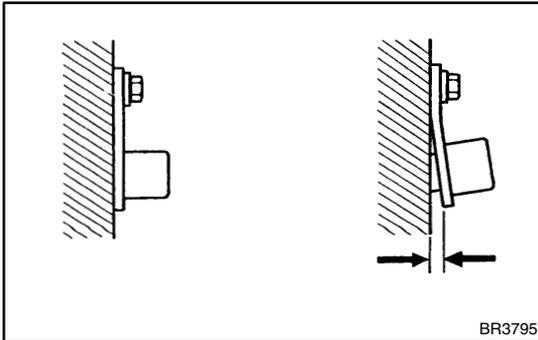
<b>3</b>	<b>Check for open and short circuit in harness and connector between each speed sensor and skid control ECU (See page IN-32).</b>
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**Repair or replace harness or connector.**



#### 4 Check sensor installation.



#### CHECK:

Check the speed sensor installation.

#### OK:

The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.

Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

NG

Replace speed sensor.

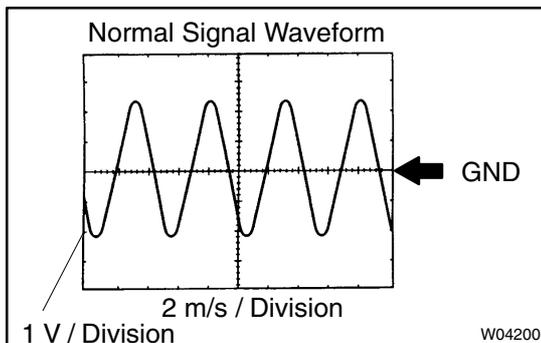
#### NOTICE:

Check the speed sensor signal last (See page DI-205).

OK

#### 5 Check speed sensor and sensor rotor serrations.

#### (REFERENCE) INSPECTION USING OSCILLOSCOPE



#### PREPARATION:

- Remove the skid control ECU with connectors still connected.
- Connect the oscilloscope to the terminals FR+ – FR–, FL+ – FL–, RR+ – RR– or RL+ – RL– of the skid control ECU.

#### CHECK:

Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

#### HINT:

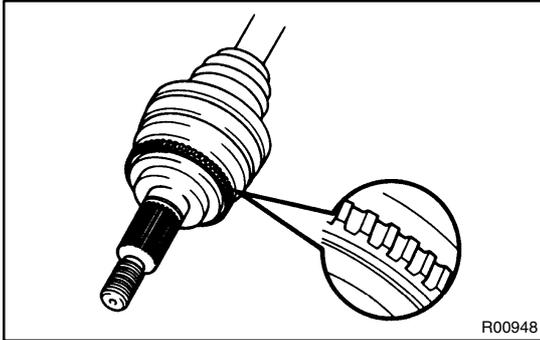
- As the vehicle speed (rpm of the wheels) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter deposited on it.

OK

Check and replace skid control ECU.

NG

## 6 Check sensor rotor and sensor tip.

**Front:****PREPARATION:**

Remove the front drive shaft (See page SA-12).

**CHECK:**

Check the sensor rotor serrations.

**OK:****No scratches, missing teeth or foreign objects.****PREPARATION:**

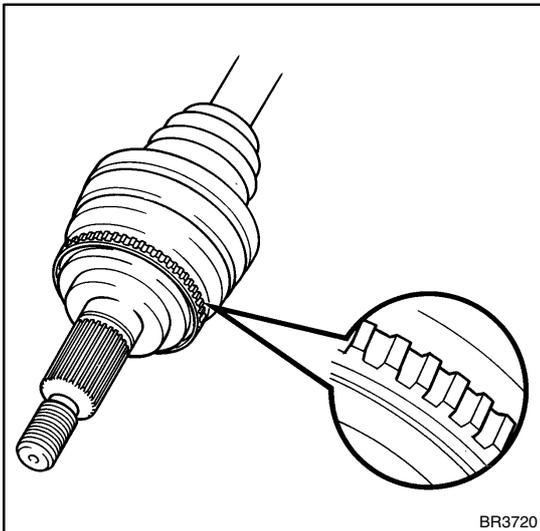
Remove the front speed sensor (See page BR-59).

**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 drive shaft (See page SA-52).

**CHECK:**

Check the sensor rotor serrations.

**OK:****No scratches, missing teeth or foreign objects.****PREPARATION:**

Remove rear speed sensor (See page BR-62).

**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-205).**

**OK**

**Check and replace skid control ECU.**

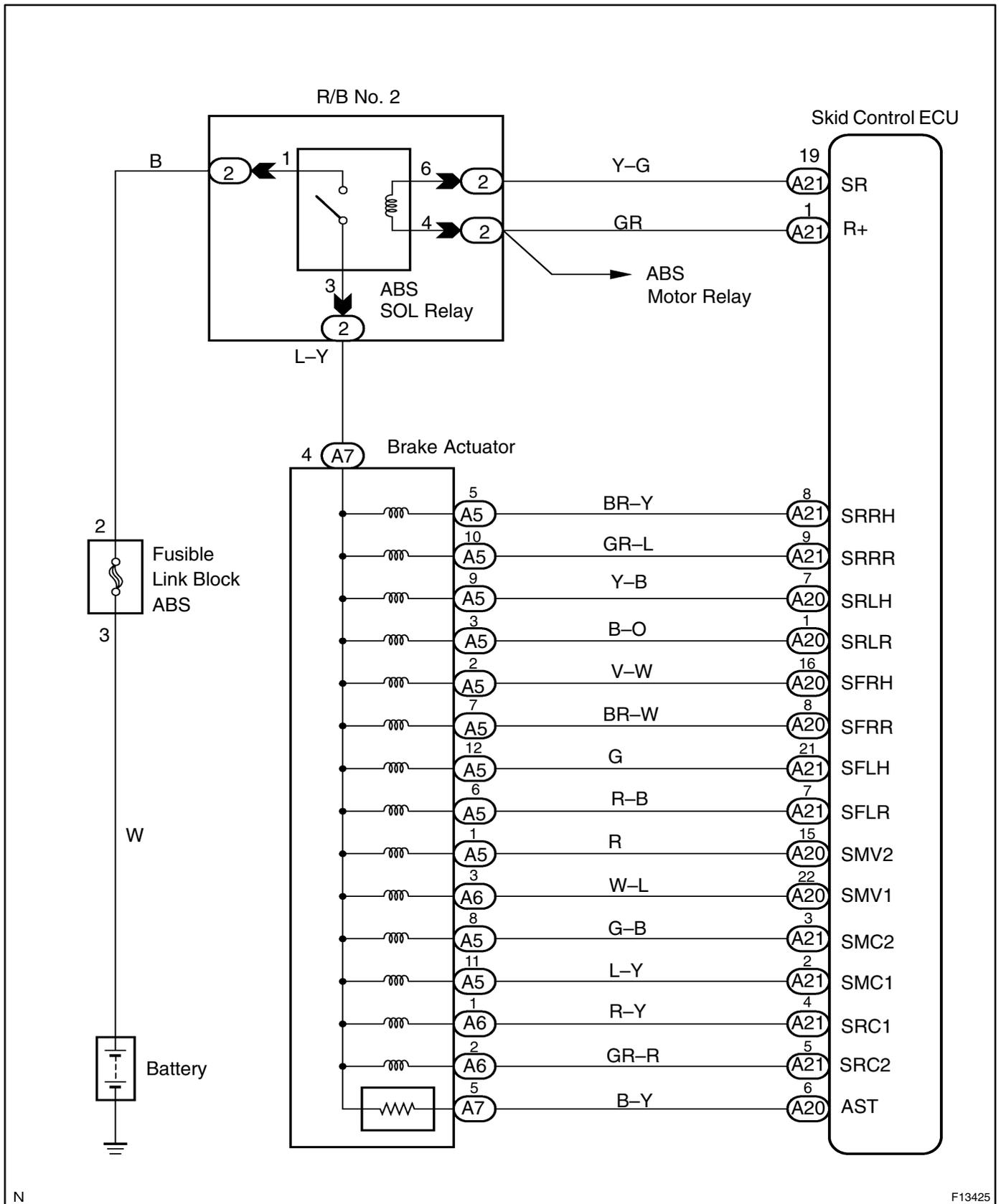
<b>DTC</b>	<b>C0226 / 21 – C1227 / 27</b>	<b>ABS Solenoid Circuit</b>
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## CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

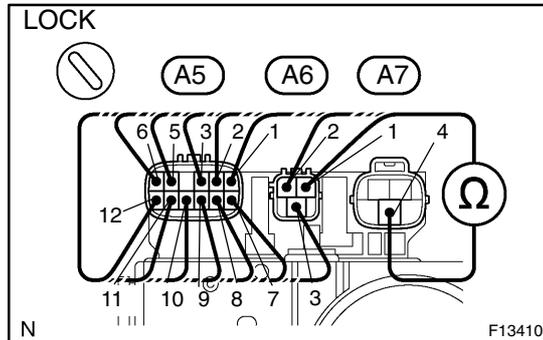
DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit for SFRH or SFRR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SFRH or SFRR circuit</li> </ul>
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SFLH or SFLR circuit</li> </ul>
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SRRH or SRRR circuit</li> </ul>
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SRLH or SRLR circuit</li> </ul>
C1225 / 25	Open or short circuit for SMC1 or SMC2 circuit continues for 0.05 sec. or more.	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SMC1 or SMC2 circuit</li> </ul>
C1226 / 26	Open or short circuit for SMV1 or SMV2 circuit continues for 0.05 sec. or more.	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SMV1 or SMV2 circuit</li> </ul>
C1227 / 27	Open or short circuit for SRC1 or SRC2 circuit continues for 0.05 sec. or more.	<ul style="list-style-type: none"> <li>• Brake actuator</li> <li>• SRC1 or SRC2 circuit</li> </ul>

WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check brake actuator solenoid.

**PREPARATION:**

Disconnect the 3 connectors from brake actuator.

**CHECK:**

Check continuity between terminal A7 – 4 and terminals A5 – 1, 2, 3, 5, 6, 7, 8, 9, 10, 11 and 12, and between terminal A7 – 4 and terminals A6 – 1, 2 and 3 of brake actuator.

**OK:****Continuity****HINT:**

(Reference)

Resistance of each solenoid

SFRH, SFLH, SRRH, SRLH: 8.0 – 10.0 Ω

SFRR, SFLR, SRRR, SRLR: 3.0 – 5.5 Ω

SRC1, SRC2: 8.6Ω

SMC1, SMC2, SMV1, SMV2: 8.8Ω

NG

Replace brake actuator.

OK

## 2 Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN-32).

NG

Repair or replace harness or connector.

OK

**3****Check voltage between terminal SR of skid control ECU and body ground.****PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

Turn the ignition switch ON, measure between terminal SR and GND.

**OK:****Voltage: 1V or less****NG****Check and repair harness or ABS solenoid relay.****OK****If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.**

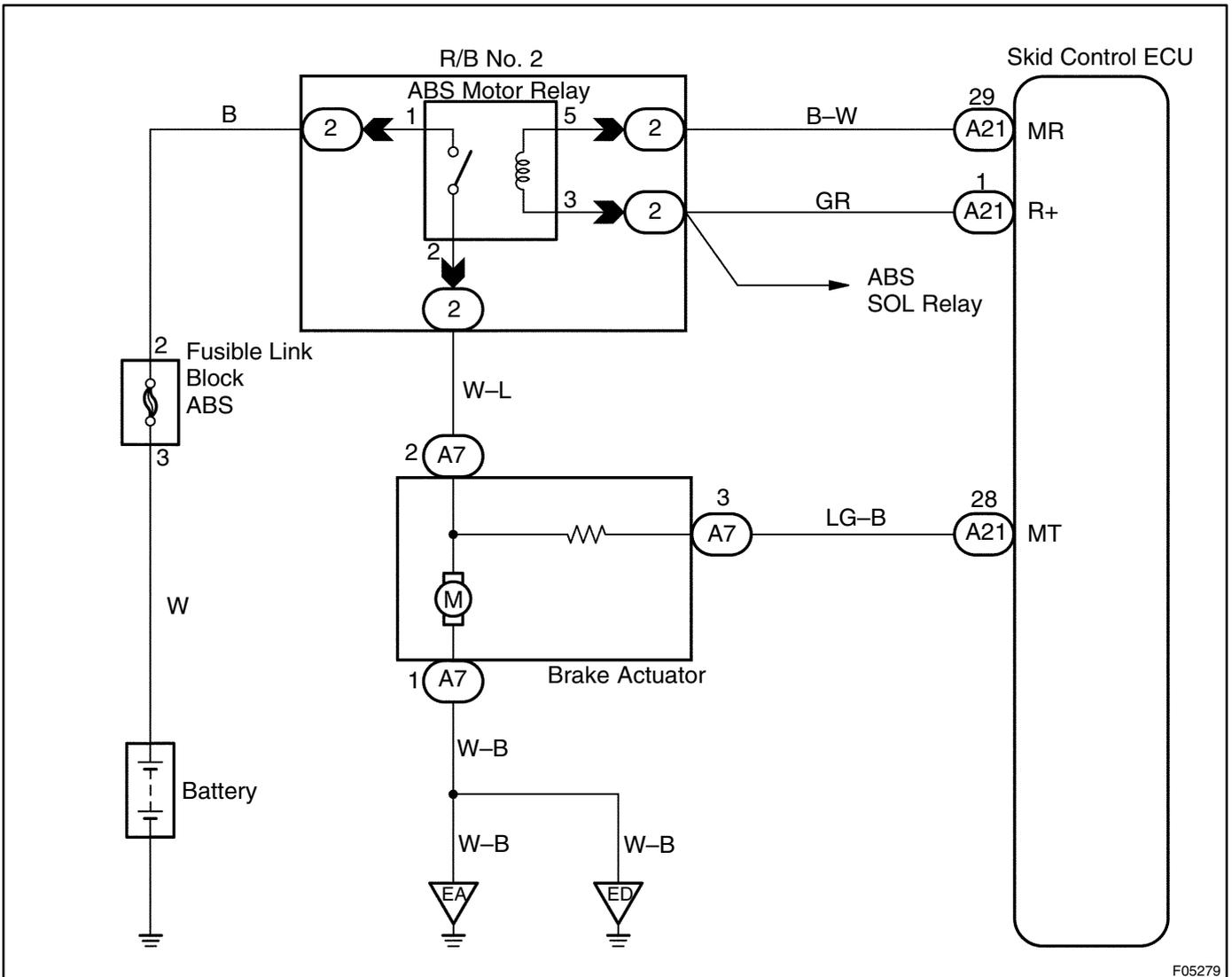
<b>DTC</b>	<b>C0273 / 13, C0274 / 14</b>	<b>ABS Motor Relay Circuit</b>
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**CIRCUIT DESCRIPTION**

The ABS motor relay supplies power to the ABS pump motor. While the ABS & BA & TRC & VSC are activated, the ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. and 2. continued for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V in the initial check or ABS, TRC or VSC are in operation, and when the motor relay is ON, however the contact point of the motor relay is OFF. 2. ECU terminal IG1 is 9.5 V or less, and when the motor relay is ON, but the contact point of the motor relay does not become ON.	<ul style="list-style-type: none"> <li>• ABS motor relay</li> <li>• ABS motor relay circuit</li> </ul>
C0274 / 14	When the motor relay is OFF, the condition that the contact point of motor relay is ON continues for 4 sec. or more.	

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

### HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using hand-held tester.

<b>1</b>	<b>Check ABS motor relay operation.</b>
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### PREPARATION:

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

### CHECK:

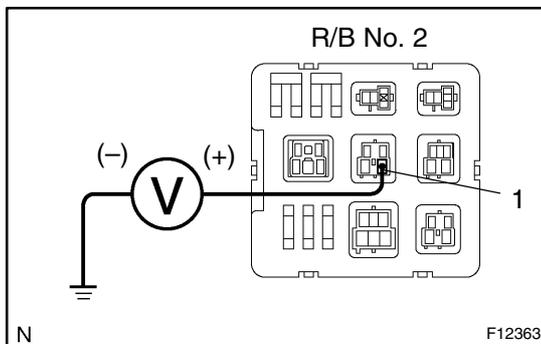
Check the operation sound of the ABS motor relay when operating it with the hand-held tester.

### OK:

The operation sound of the ABS motor relay should be heard.



<b>2</b>	<b>Check voltage between terminal 1 of R/B No. 2 (for ABS motor relay) and body ground.</b>
----------	---



### PREPARATION:

Remove the ABS motor relay from R/B No. 2.

### CHECK:

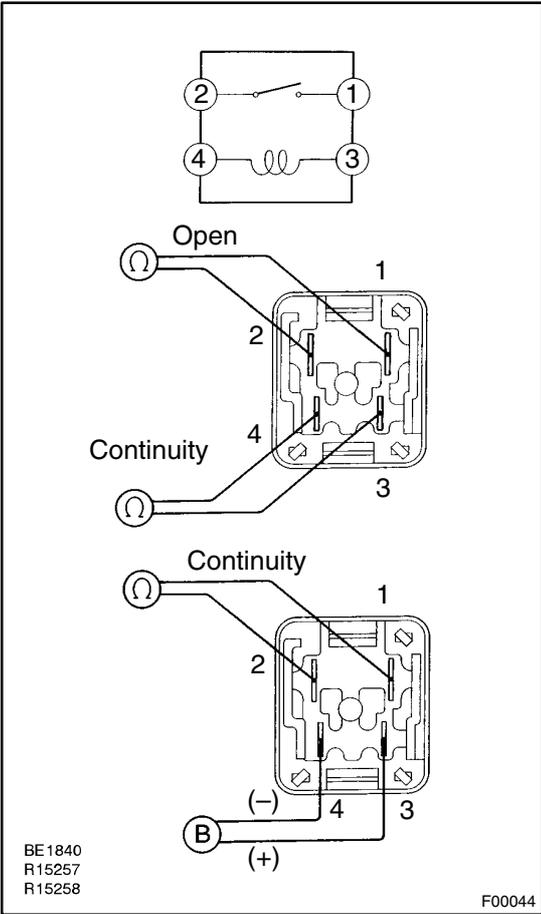
Measure voltage between terminal 1 of R/B No. 2 (for ABS motor relay) and body ground.

### OK:

**Voltage: 10 – 14 V**



**3 Check ABS motor relay.**



**CHECK:**

Check continuity between each pair of terminal of motor relay.

**OK:**

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

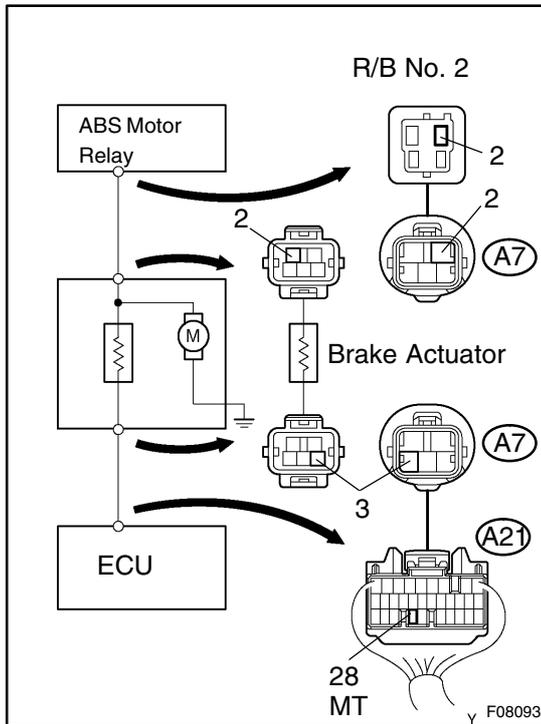
**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**OK**

**NG** Replace ABS motor relay.

**4 Check continuity between terminal 2 of ABS motor relay and terminal MT of skid control ECU.**



**CHECK:**

Check continuity between terminal 2 of R/B No. 2 (for ABS motor relay) and terminal MT of skid control ECU.

**OK:**

**Continuity**

**HINT:**

There is a resistance of 26 – 40  $\Omega$  between terminals A7 – 2 and A7 – 3 of brake actuator.

NG

Repair or replace harness or brake actuator.

OK

**5 Check for open and short circuit in harness and connector between ABS motor relay and skid control ECU (See page IN-32).**

NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

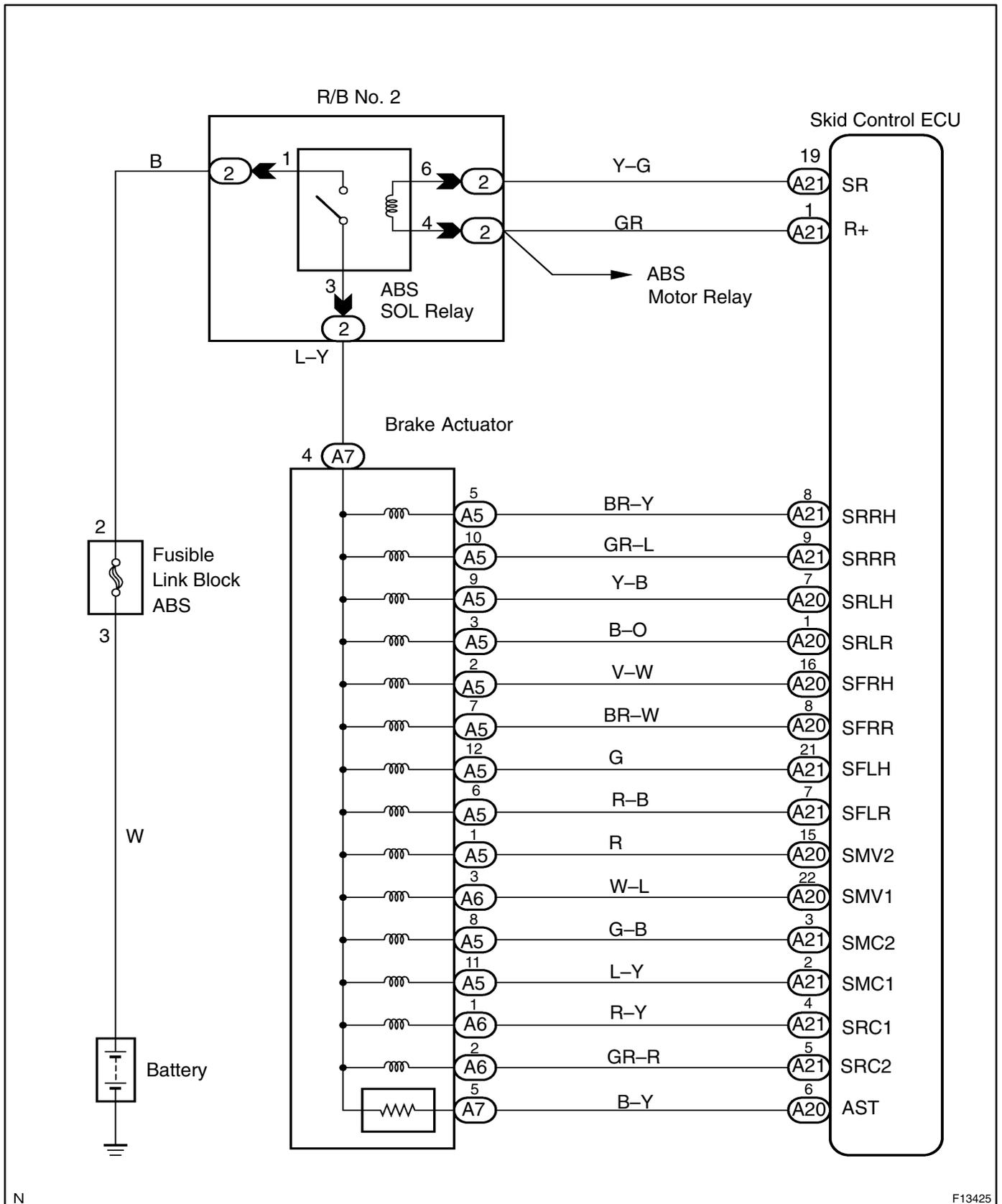
<b>DTC</b>	<b>C0278 / 11, C0279 / 12</b>	<b>ABS Solenoid Relay Circuit</b>
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## CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V and the solenoid relay is ON, however the contact point of the solenoid relay is OFF. 2. With solenoid relay ON driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	<ul style="list-style-type: none"> <li>• ABS solenoid relay</li> <li>• ABS solenoid relay circuit</li> </ul>
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however the condition that the contact point of the solenoid relay is ON 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.

<b>1</b>	<b>Check ABS solenoid relay operation.</b>
----------	--

### PREPARATION:

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

### CHECK:

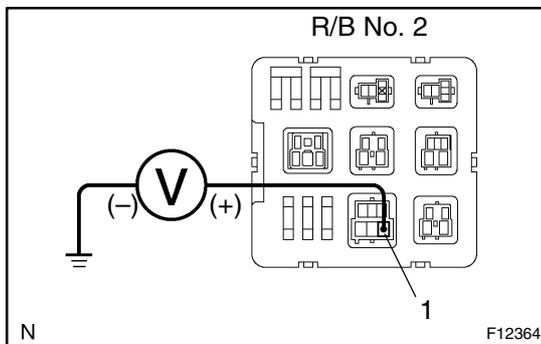
Check the operation sound of the ABS solenoid relay when operating it with the hand-held tester.

### OK:

The operation sound of the ABS solenoid relay should be heard.



<b>2</b>	<b>Check voltage between terminal 1 of R/B No. 2 (for ABS solenoid relay) and body ground.</b>
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### PREPARATION:

Remove the ABS solenoid relay from R/B No. 2.

### CHECK:

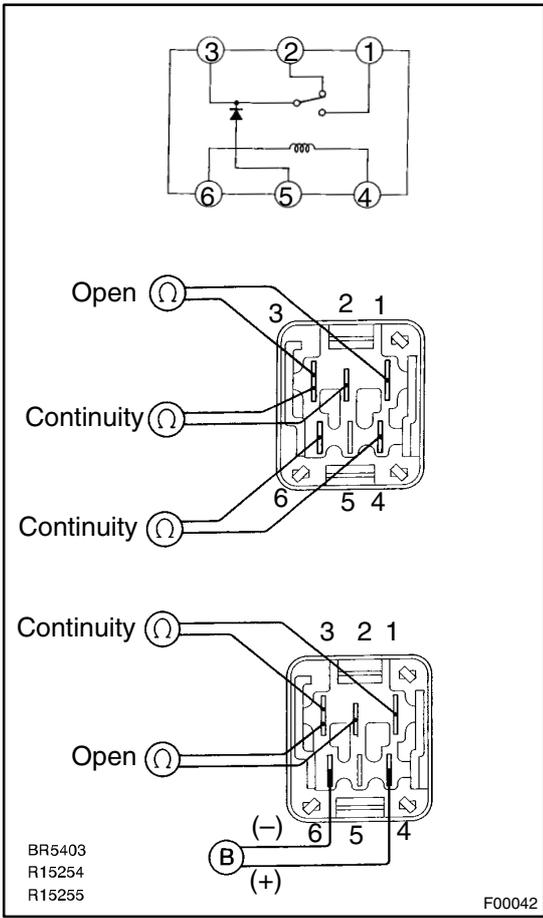
Measure the voltage between terminal 1 of R/B No. 2 (for ABS solenoid relay) and body ground.

### OK:

**Voltage: 10 – 14 V**



**3 Check ABS solenoid relay.**



**CHECK:**

Check continuity between each terminal of ABS solenoid relay.

**OK:**

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

**CHECK:**

- (a) Apply battery voltage between terminals 4 and 6.
- (b) Check continuity between each terminal of ABS solenoid relay.

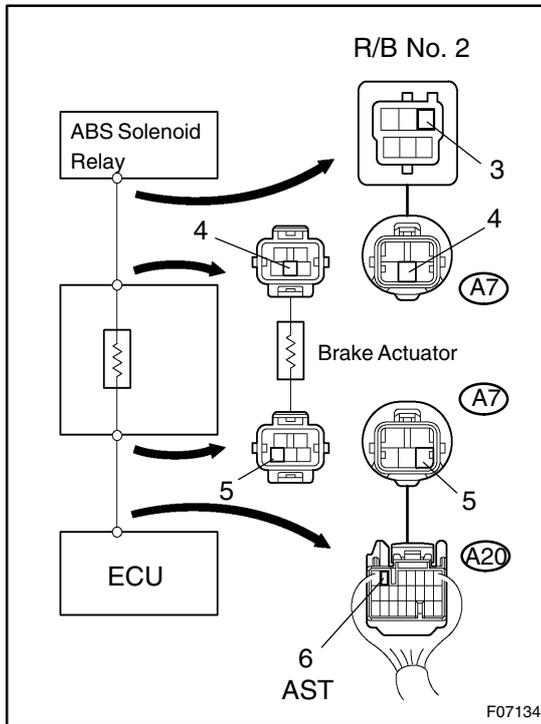
**OK:**

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

**NG** Replace ABS solenoid relay.

**OK**

**4 Check continuity between terminals 3 of ABS solenoid relay and each solenoid terminal of skid control ECU.**



**CHECK:**

Check continuity between terminal 3 of R/B No. 2 (for ABS solenoid relay) and terminal AST of skid control ECU

**OK:**

**Continuity**

**HINT:**

There is a resistance of 26 – 40  $\Omega$  between terminals A7 – 4 and A7 – 5 of brake actuator.

NG

Repair or replace harness or brake actuator.

OK

**5 Check for open and short circuit in harness and connector between ABS solenoid relay and skid control ECU (See page IN-32).**

NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

<b>DTC</b>	<b>C1201 / 51</b>	<b>Engine Control System Malfunction</b>
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## CIRCUIT DESCRIPTION

If any trouble occurs in the engine control system, the ECU prohibits BA & TRC & VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	The engine speed is 500 rpm or more and ENG malfunction signal continuously occurs for 5 sec. or more.	Engine control system

## INSPECTION PROCEDURE

<b>1</b>	<b>Check the DTC for the engine (See page DI-3).</b>
----------	--

\*1

**Repair engine control system according to the code output.**

\*2

**Check for engine and ECT ECU connected to malfunction indicator light.**

\*1: Output NG code

\*2: Malfunction indicator light remains ON

<b>DTC</b>	<b>C1202 / 52</b>	<b>Brake Fluid Level Warning Switch Circuit</b>
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**CIRCUIT DESCRIPTION**

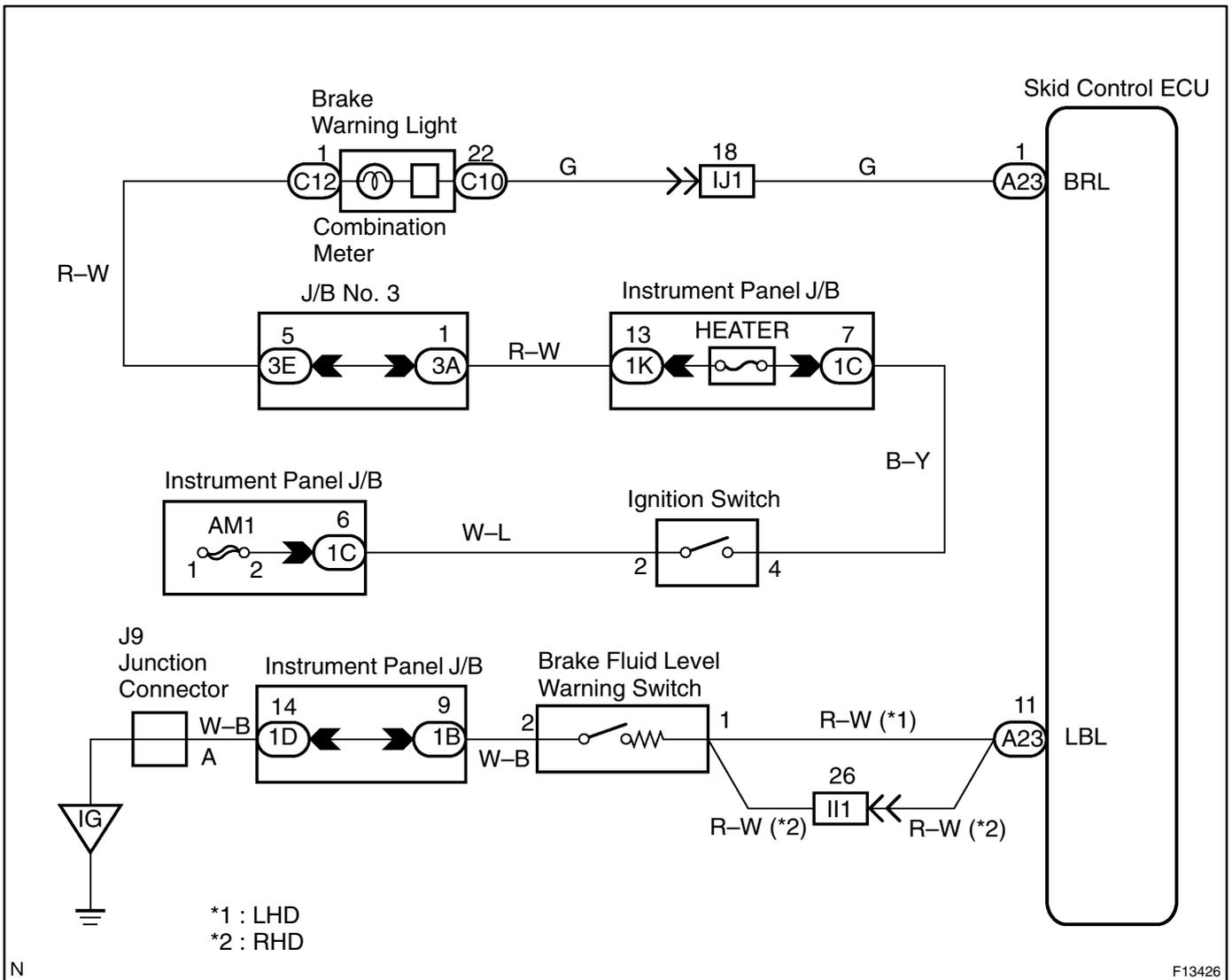
The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.

HINT:

Depress the parking brake pedal and also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

DTC No.	DTC Detecting Condition	Trouble Area
C1202 / 52	ECU terminal IG1 voltage is 9.5 V to 17.2 V and open circuit for the brake fluid level warning switch circuit continues for 2 sec. or more.	<ul style="list-style-type: none"> <li>• Brake fluid level</li> <li>• Brake fluid level warning switch</li> <li>• Brake fluid level warning switch circuit</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check brake fluid level.</b>
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**CHECK:**

Check the amount of brake fluid in the reservoir.

**NG****Check and repair brake fluid leakage and add fluid.****OK**

<b>2</b>	<b>Check brake fluid level warning switch (See page BE-68).</b>
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**NG****Replace brake fluid level warning switch.****OK**

<b>3</b>	<b>Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN-32).</b>
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**NG****Repair or replace harness or connector.****OK****Check and replace skid control ECU.**

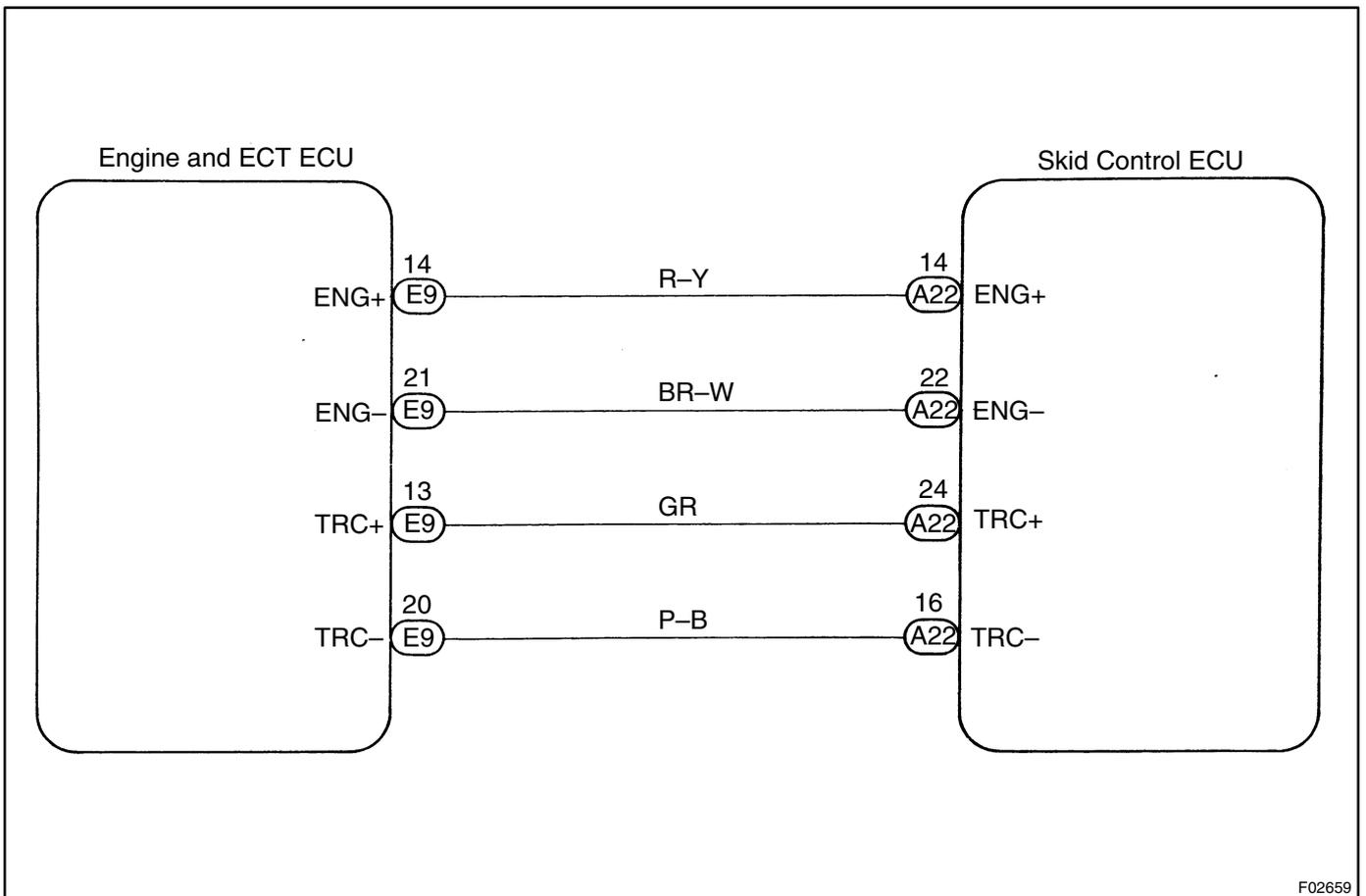
<b>DTC</b>	<b>C1203 / 53</b>	<b>Engine and ECT ECU Communication Circuit Malfunction</b>
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**CIRCUIT DESCRIPTION**

The circuit is used to send TRC & VSC control information from the skid control ECU to the engine and ECT ECU (TRC+, TRC-), and engine control information from the engine and ECT ECU to the skid control ECU (ENG+, ENG-).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either of the following 1., 2. or 3. continues for 5 sec.: 1. When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to engine and ECT ECU continues for more than 5 sec. 2. When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500rpm or more and data receipt from engine and ECT ECU is impossible. 3. The condition that data transmission and reception to/from engine and ECT ECU become impossible once or more within 5 sec. repeatedly occurs 10 times.	<ul style="list-style-type: none"> <li>• TRC+ or TRC- circuit</li> <li>• ENG+ or ENG- circuit</li> <li>• Engine and ECT ECU</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check for open and short circuit in harness and connector between each of terminals ENG+, ENG-, TRC+, TRC- of skid control ECU and engine and ECT ECU (See page IN-32).</b>
----------	--

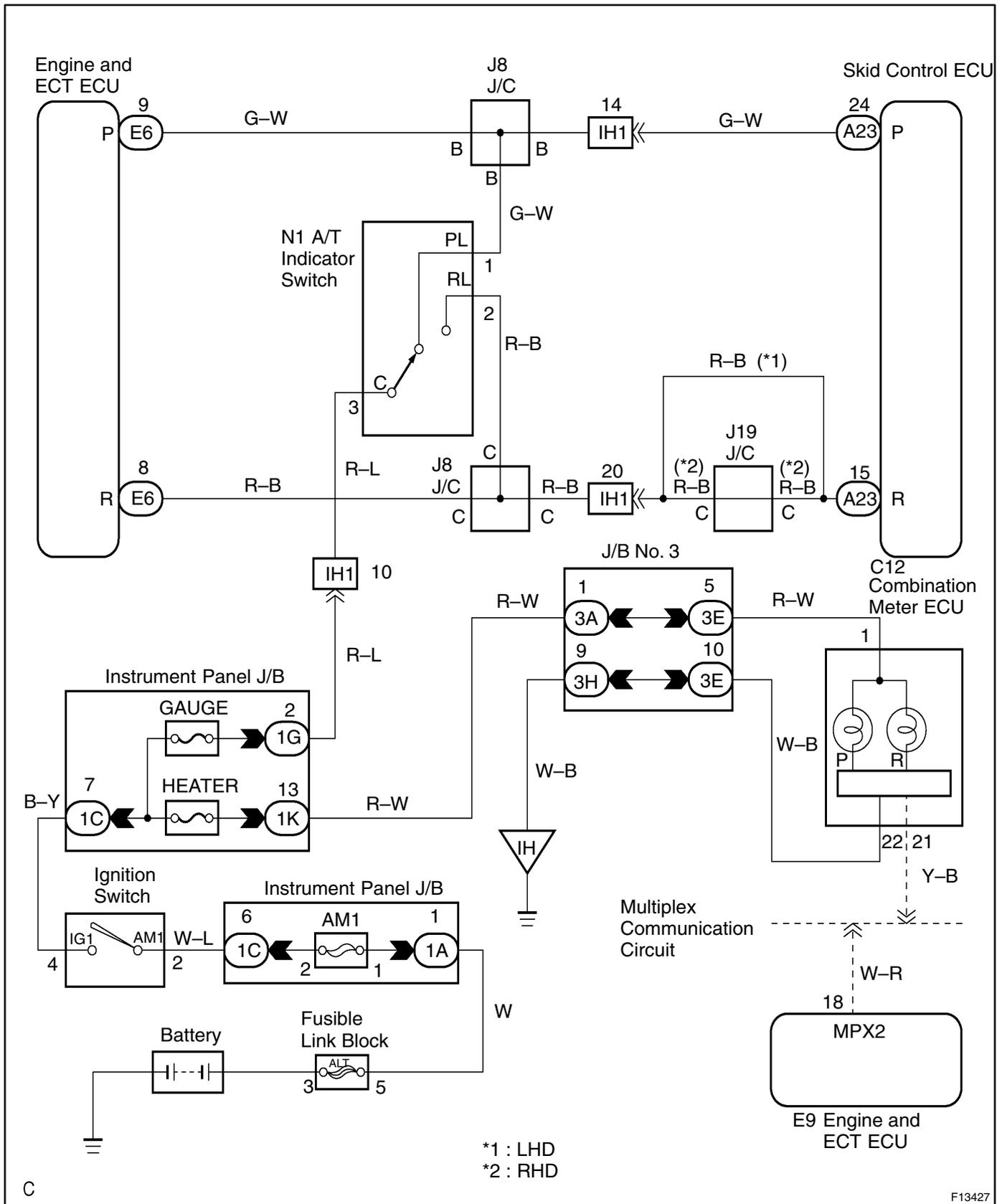
**NG****Repair or replace harness or connector.****OK****Check and replace engine and ECT ECU or skid control ECU.**

<b>DTC</b>	<b>C1207 / 37</b>	<b>Neutral Start Switch (Park/Reverse Range Circuit)</b>
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## CIRCUIT DESCRIPTION

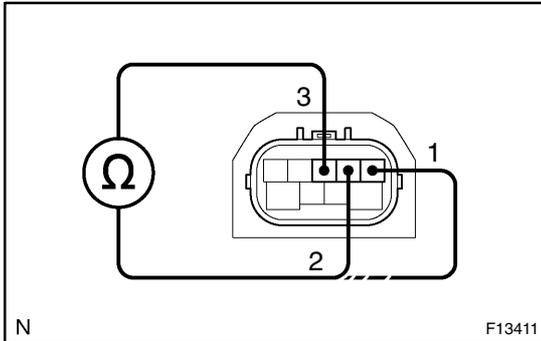
DTC No.	DTC Detection Condition	Trouble Area
C1207 / 37	<p>When any of the following 1. through 3. is detected:</p> <ol style="list-style-type: none"> <li>At vehicle speed of 15 km/h (9 mph) or less and when the condition that open circuit signal of P signal circuit of neutral start switch is ON continues 5 sec. or more.</li> <li>At vehicle speed of 15 km/h (9 mph) or more, P signal from neutral start switch is ON, the shift lever position information from the engine and ECT ECU is other than in P or N range condition continues for 60 sec. or more.</li> <li>At vehicle speed of 15 km/h (9 mph) or less and when the condition that open circuit signal of R signal circuit of neutral start switch is ON continues 2 sec. or more.</li> </ol>	<ul style="list-style-type: none"> <li>Neutral start switch</li> <li>Neutral start switch (Park/Reverse range circuit)</li> </ul>

WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check neutral start switch (Park/Reverse range switch circuit).

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Disconnect the connector from the neutral start switch.

**CHECK:**

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

**OK:**

P range switch	Terminals 3 – 1	Continuity
R range switch	Terminals 3 – 2	Continuity

NG

Replace neutral start switch.

OK

## 2 Check for open and short circuit in harness and connector between terminals P and R of skid control ECU and engine and ECT ECU connector and battery (See page IN-32).

NG

Repair or replace harness or connector.

OK

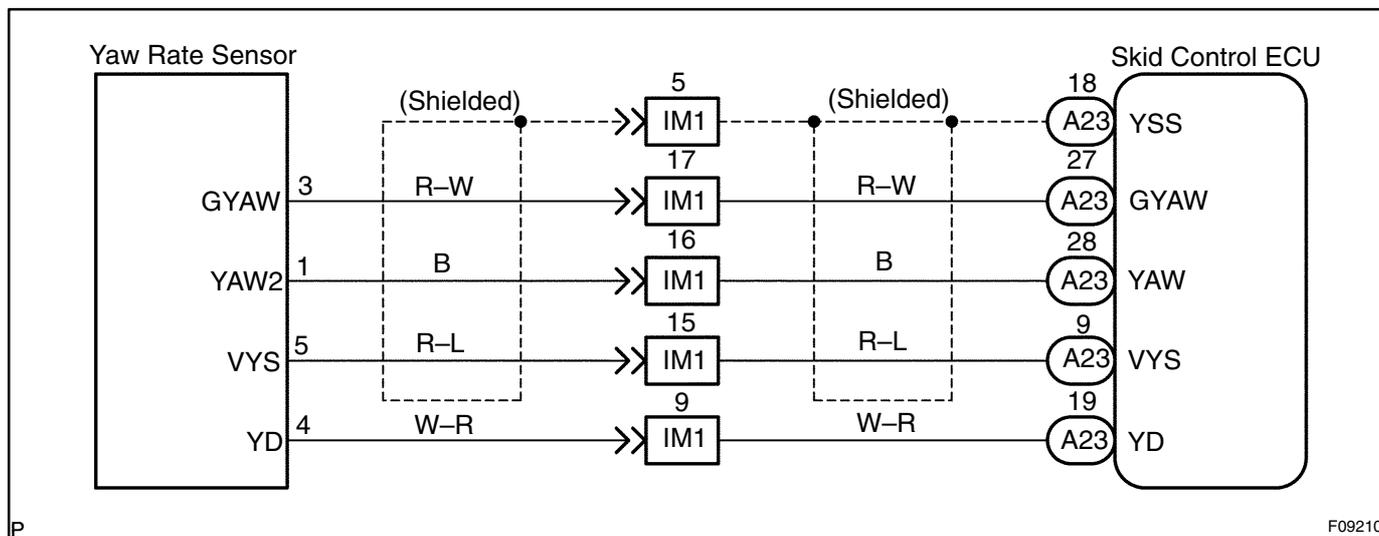
Check and replace skid control ECU or engine and ECT ECU.

<b>DTC</b>	<b>C1210 / 36</b>	<b>Zero Point Calibration of Yaw Rate Sensor Undone</b>
------------	-------------------	---

### CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1210 / 36	After battery terminal was connected, when the shift lever was moved other than to P range within 15 sec. soon after ECU terminal IG1 become ON for the first time.	<ul style="list-style-type: none"> <li>• Yaw rate sensor</li> <li>• Yaw rate sensor circuit</li> <li>• P range switch circuit</li> </ul>

### WIRING DIAGRAM



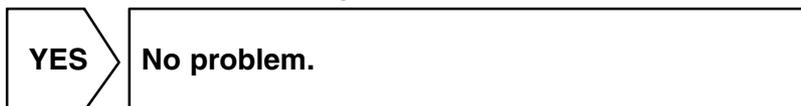
### INSPECTION PROCEDURE

<b>1</b>	<b>Check if zero point calibration of yaw rate sensor has done or not.</b>
----------	--

Obtains the zero point calibration of the yaw rate sensor (See page DI-205).

**CHECK:**

Check that the VSC indicator light comes on and the both indicators go off after 15 seconds.



**2** Check for open and short circuit in harness and connector between P range switch and skid control ECU and engine and ECT ECU (See page IN-32).

**NG**

Repair or replace harness or connector.

**OK**

**3** Check for open and short circuit in harness and connector between yaw rate sensor and skid control ECU (See page IN-32).

**NG**

Repair or replace harness or connector.

**OK**

**4** Check yaw rate sensor (See page DI-260).

**NG**

Replace yaw rate sensor assembly.

**OK**

Check and replace skid control ECU.

<b>DTC</b>	<b>C1223 / 43</b>	<b>ABS Control System Malfunction</b>
------------	-------------------	---------------------------------------

## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	ABS control system is abnormal.	ABS control system

## INSPECTION PROCEDURE

<b>1</b>	<b>Check the DTC for the ABS (See page DI-205).</b>
----------	---

\*1

**Repair ABS control system according to the code output.**

\*2

**Check for ECU connected to malfunction indicator light.**

\*1: Output NG code

\*2: Malfunction indicator light remains ON

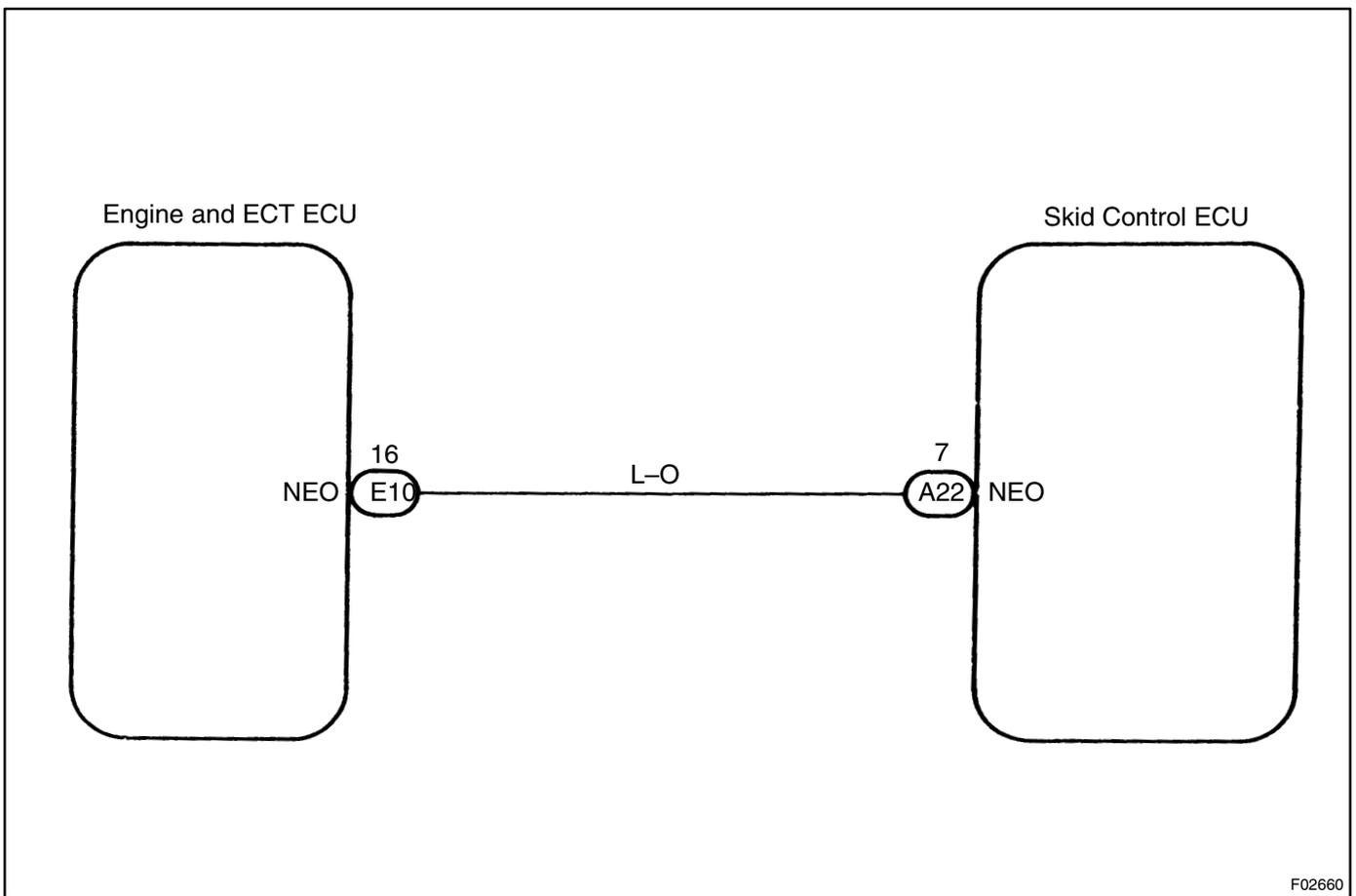
<b>DTC</b>	<b>C1224 / 44</b>	<b>NE Signal Circuit</b>
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### CIRCUIT DESCRIPTION

The skid control ECU receives engine revolution speed signals (NE signals) from the engine and ECT ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	At vehicle speed of 30 km/h (19 mph) or more, when data receiving from the engine and ECT ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more.	<ul style="list-style-type: none"> <li>• NEO circuit</li> <li>• Engine and ECT ECU</li> </ul>

### WIRING DIAGRAM



F02660

## INSPECTION PROCEDURE

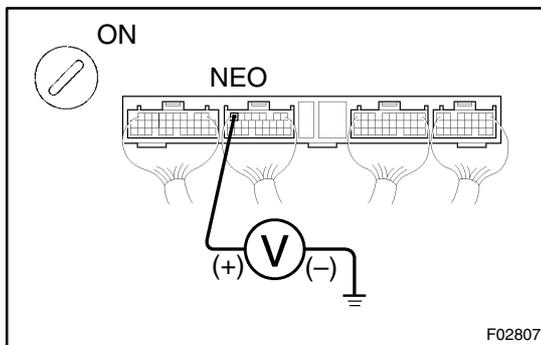
- 1** Check for open and short circuit in harness and connector between terminal NEO of skid control ECU and terminal NEO of engine and ECT ECU  
(See page IN-32).

NG

Repair or replace harness and connector.

OK

- 2** Check voltage between terminals NEO of skid control ECU and body ground.

**PREPARATION:**

- (a) Remove skid control ECU with connectors still connected.  
(b) Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal NEO of skid control ECU and body ground for the engine conditions below.

**OK:**

Enginecondition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	3 – 6 V ↔ below 1 V (Pulse)

(Reference)

3 – 6 V

Below 1 V

NG

Check and replace skid control ECU or engine and ECT ECU.

OK

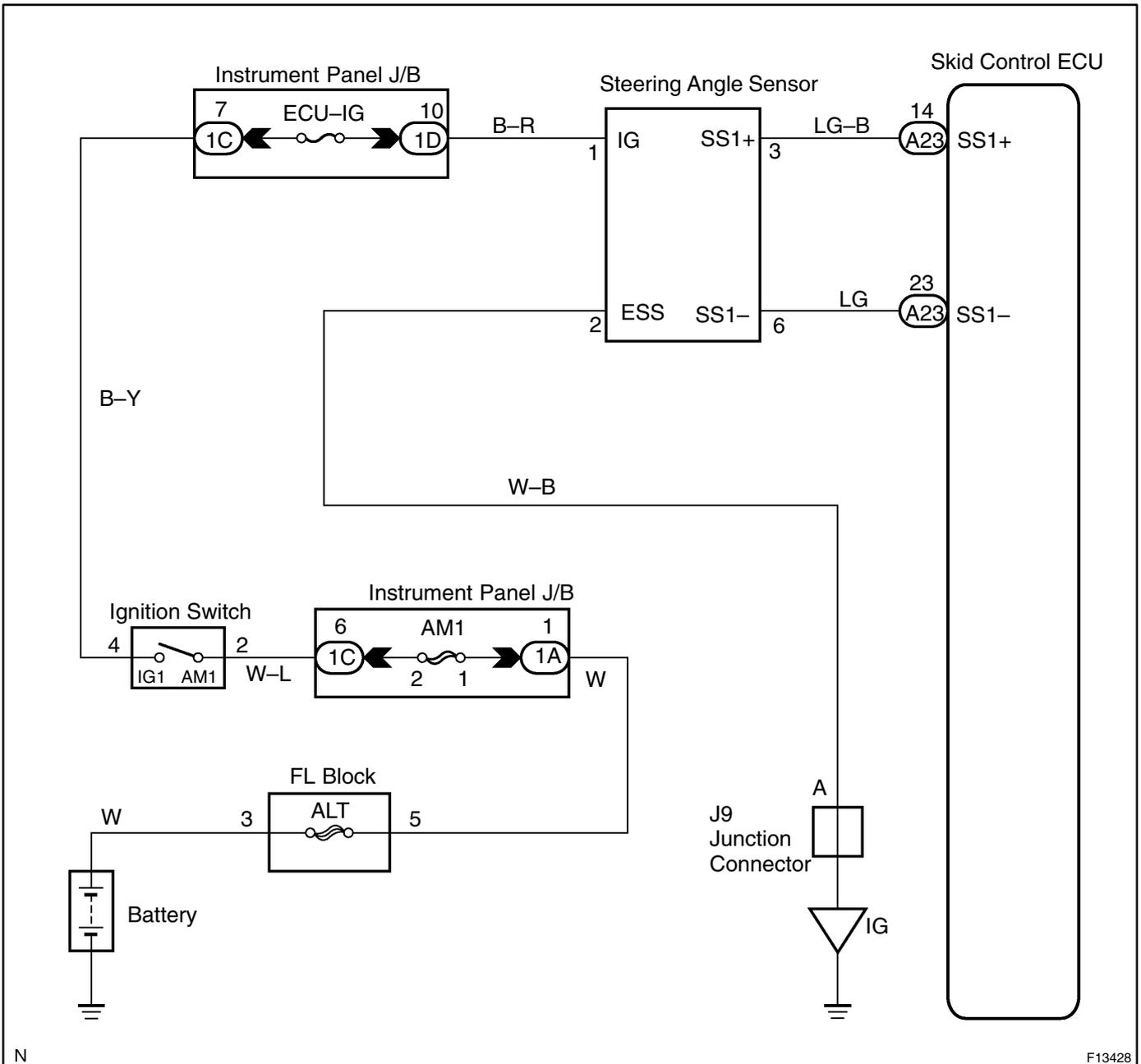
If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

<b>DTC</b>	<b>C1231 / 31</b>	<b>Steering Angle Sensor Circuit</b>
------------	-------------------	--------------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	The condition that the data is not transmitted to the steering angle sensor continues for more than 1.2 sec.	<ul style="list-style-type: none"> <li>Steering angle sensor</li> <li>Steering angle sensor circuit</li> </ul>

**WIRING DIAGRAM**



N

F13428

## 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.

<b>1</b>	<b>Check output value of the steering angle sensor.</b>
----------	---

### 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.
- (d) Drive the vehicle straight forward at 35 km/h (22 mph) or more for 1 second or longer.

### HINT:

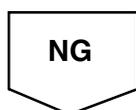
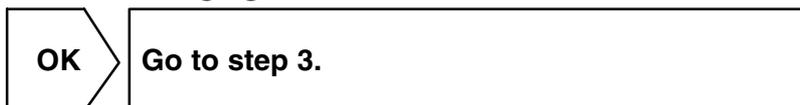
- At this time, the zero point calibration of the steering angle sensor was memorized.
- Do not stop the engine.

### CHECK:

Check that the steering wheel turning angle value of the steering angle sensor displayed by the hand-held tester is changing when turning the steering wheel.

### OK:

**Steering wheel turning angle value must be changing.**

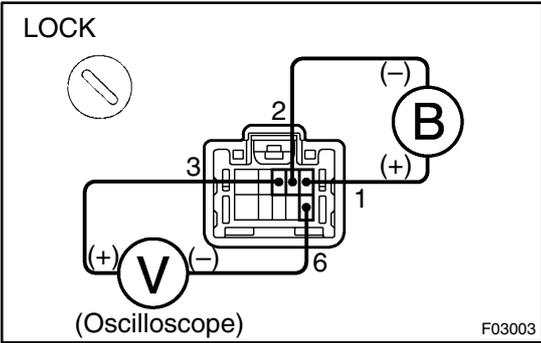


<b>2</b>	<b>Replace the skid control ECU and check whether or not the trouble occurs again.</b>
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<b>END</b>
------------

**3 Check steering angle sensor.**



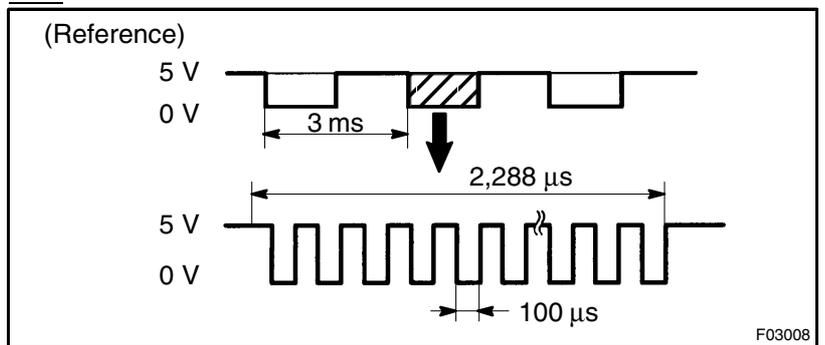
**PREPARATION:**

- (a) Remove the steering wheel lower No. 2 and No. 3 covers, steering wheel pad, steering wheel, column upper and lower covers (See page SR-10).
- (b) Disconnect the connector from the steering angle sensor.
- (c) Connect the oscilloscope to the terminals 3 and 6 of the combination switch connector (for steering angle sensor).
- (d) Apply battery voltage between terminals 1 and 2.

**CHECK:**

Turn 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 for open and short circuit in harness and connector between steering angle sensor and skid control ECU (See page IN-32).**

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

**OK**

Check and replace skid control ECU.

<b>DTC</b>	<b>C1232 / 32</b>	<b>Deceleration Sensor Circuit</b>
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## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1232 / 32	Detection of any of conditions 1. through 2. : 1. At the vehicle speed of 10 km/h (6 mph) or more, the condition that ECU terminal GL1 signal change range is less than 20 mV continues for 30 sec., and ECU terminal GL2 signal change range swings by 0.47 V 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 continues for 30 sec., and ECU terminal GL1 signal change range swings by 0.47 V or more.	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Deceleration sensor circuit</li> </ul>

## 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.

<b>1</b>	<b>Check output value of the deceleration sensor.</b>
----------	---

### PREPARATION:

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

### CHECK:

Check that the deceleration value of the deceleration sensor displayed by the hand-held tester is changing when tilting the vehicle.

### OK:

**Deceleration value must be changing.**

OK

**Check and replace skid control ECU.**

NG

<b>2</b>	<b>Check deceleration sensor (See page DI-205).</b>
----------	---

NG

**Replace deceleration sensor assembly.**

OK

<b>3</b>	<b>Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-32).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness and connector.</b>
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<b>OK</b>
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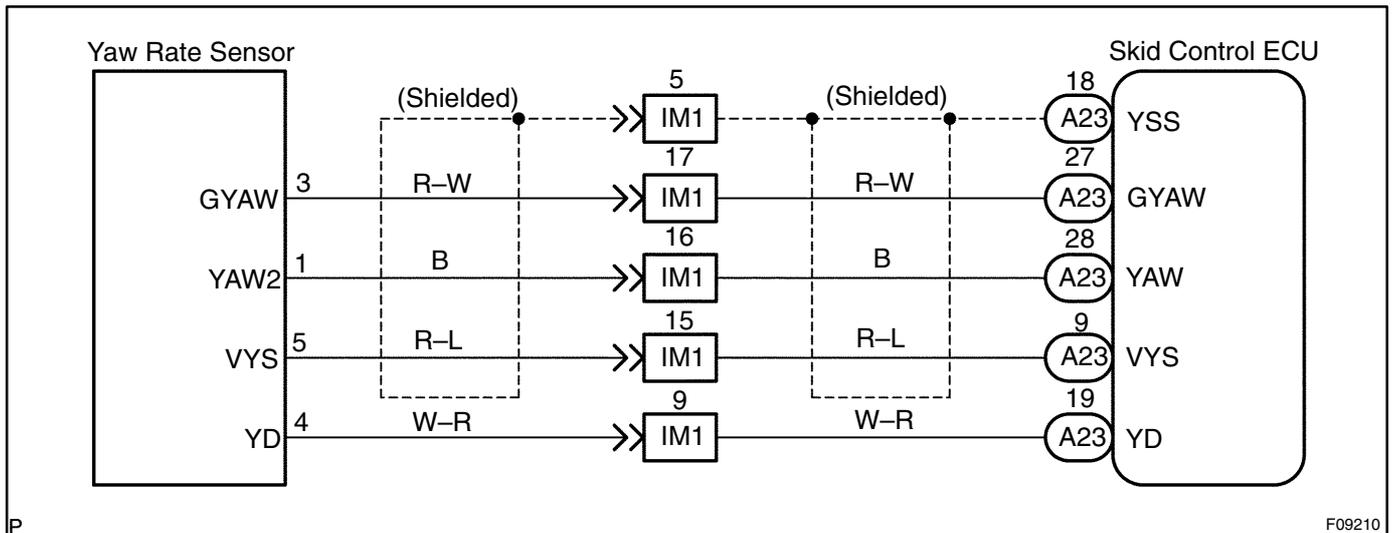
<b>Check and replace skid control ECU.</b>
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<b>DTC</b>	<b>C1233 / 33, C1234 / 34</b>	<b>Yaw Rate Sensor Circuit</b>
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### CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	When any of the following 1. through 4. is detected: 1. ECU terminal IG1 voltage is 9.5 to 17.2 V and the yaw rate sensor voltage is continuously out of the range from 0.25 to 4.75 V for 1 sec. or more. 2. ECU terminal IG1 voltage is 9.5 to 17.2 V and the yaw rate sensor open circuit detection signal remains ON for 1 sec. or more. 3. ECU terminal IG1 voltage is 9.5 to 17.2 V and the yaw rate sensor power source voltage remains out of the range from 4.4 to 5.6 V for 1 sec. or more. 4. Momentary interruption of the yaw rate sensor signal occurs 10 times or more.	<ul style="list-style-type: none"> <li>• Yaw rate sensor</li> <li>• Yaw rate sensor circuit</li> </ul>
C1234 / 34	When the condition that yaw rate sensor voltage is 4.4 V to 5.6 V and YD malfunction signal of yaw rate sensor is ON continued for 5 sec. or more.	

### WIRING DIAGRAM

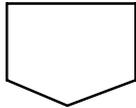


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F09210

### INSPECTION PROCEDURE

<b>1</b>	<b>Perform zero point calibration of the yaw rate sensor (See page DI-205).</b>
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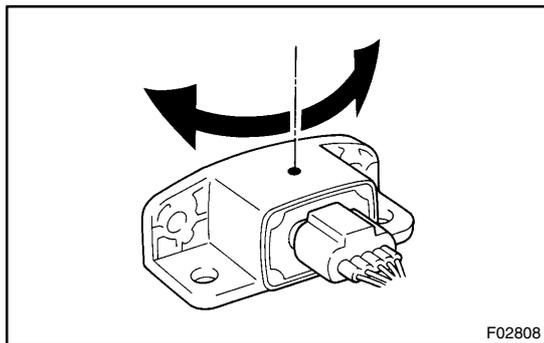
<b>2</b>	<b>Is DTC still output?</b>
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Check DTC on page DI-205.

<b>NO</b>	<b>No problem.</b>
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<b>3</b>	<b>Check output value of the yaw rate sensor.</b>
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**In case of using the hand-held tester:**

**PREPARATION:**

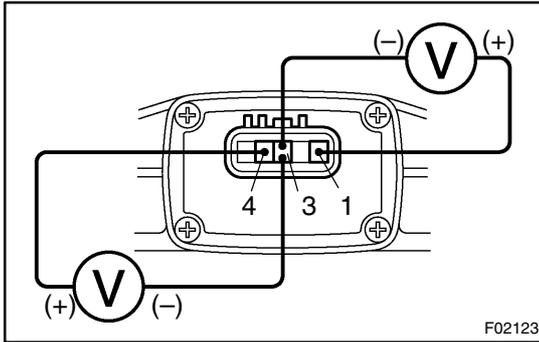
- (a) Remove the 2 bolts and yaw rate sensor with connector still connected.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (d) Select the DATALIST mode on the hand-held tester.

**CHECK:**

Check that the yaw rate value of the yaw rate sensor displayed on the hand-held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

**OK:**

**Yaw rate value must be changing.**



**In case of not using the hand-held tester:**

**PREPARATION:**

- Turn the ignition switch ON.
- Measure voltage between terminals 1 and 3, 3 and 4 of the yaw rate sensor with connector still connector.

**OK:**

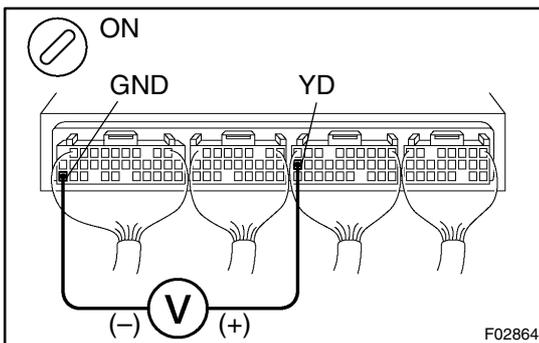
Terminals 1 and 3 (YAW – GYAW)	APPROX. 2.5 V
Terminals 3 and 4 (GYAW – YD)	APPROX. 4.5 V – 5.5 V

**NG**

**Replace yaw rate sensor.**

**OK**

**4 Check voltage between terminals YD and GND of skid control ECU.**



**PREPARATION:**

Remove the skid control ECU with the connector still connected.

**CHECK:**

- Turn the ignition switch ON.
- Measure voltage between terminals YD and GND of skid control ECU.

**OK:**

**Voltage: 4.5 – 5.3 V**

**OK**

**Check and replace skid control ECU.**

**NG**

**5 Check for open and short circuit in harness and connector between yaw rate sensor and skid control ECU (See page IN-32).**

**NG**

**Repair or replace harness or connector.**

**OK**

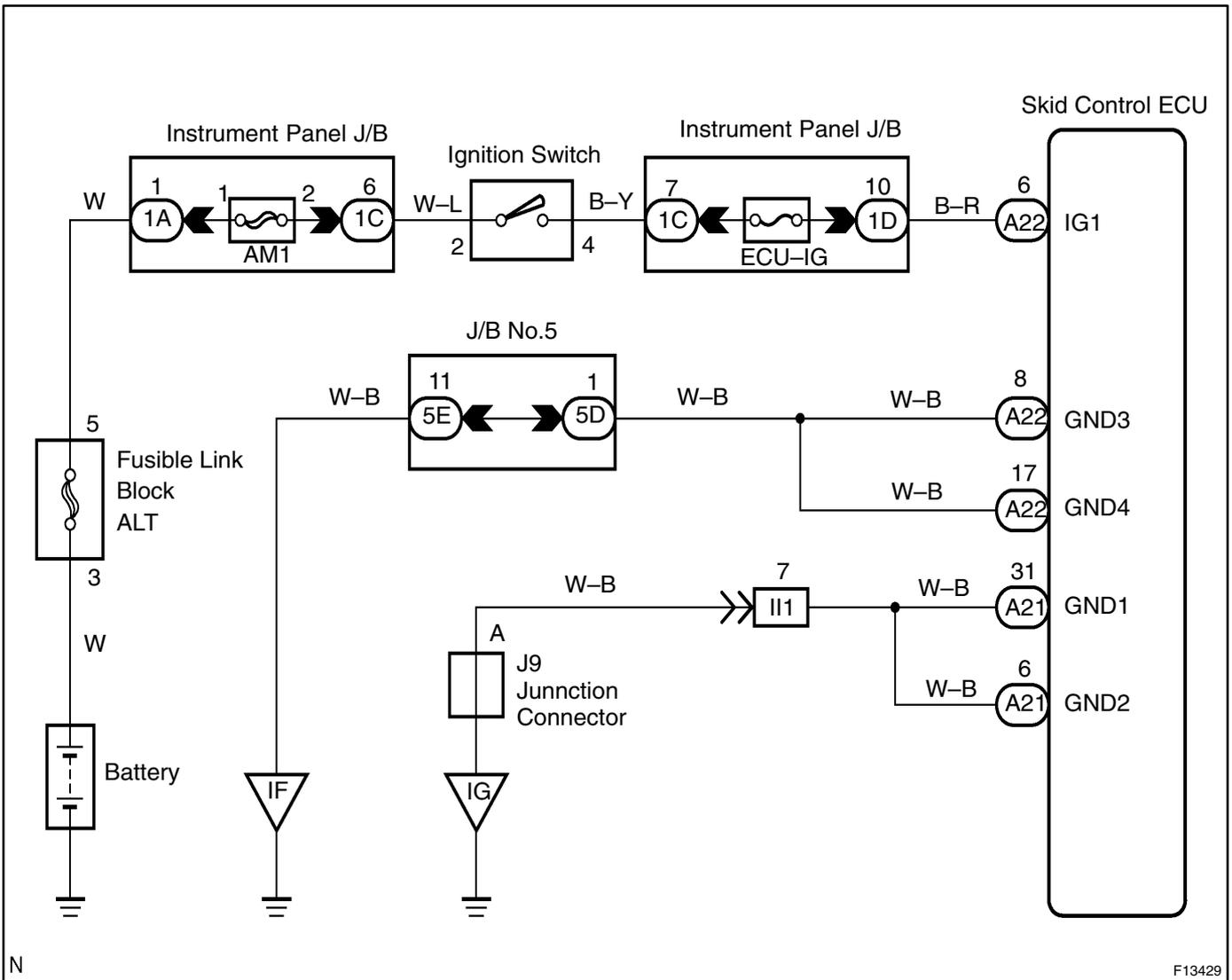
**Check and replace skid control ECU.**

<b>DTC</b>	<b>C1241 / 41</b>	<b>IG Power Source Circuit</b>
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**CIRCUIT DESCRIPTION**

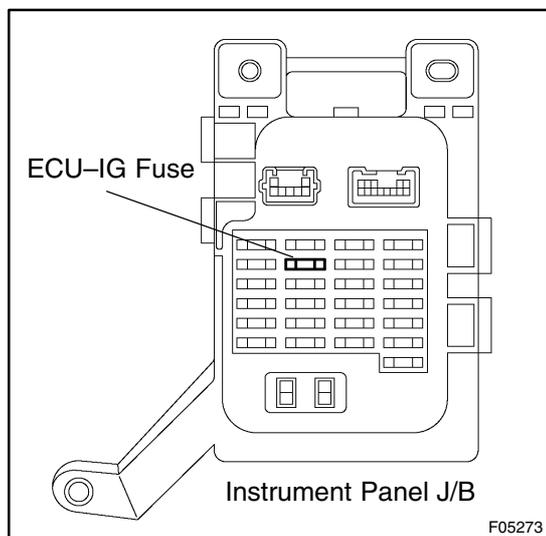
DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. or 2.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG1 remains at below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	<ul style="list-style-type: none"> <li>• Battery</li> <li>• Charging system</li> <li>• Power source circuit</li> </ul>

**WIRING DIAGRAM**



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F13429

**INSPECTION PROCEDURE****1 Check ECU-IG fuse.****PREPARATION:**

Remove the ECU-IG fuse from instrument panel J/B.

**CHECK:**

Check continuity of ECU-IG fuse.

**OK:**

**Continuity**

**NG**

**Check for short circuit in all the harness and components connected to ECU-IG fuse (See attached wiring diagram).**

**OK**

**2 Check battery voltage.****CHECK:**

Check the battery voltage.

**OK:**

**Voltage: 10 – 14 V**

**NG**

**Check and repair the charging system (See page CH-2).**

**OK**

<b>3</b>	<b>Check voltage of the ECU-IG power source.</b>
----------	--

**In case of using the hand-held tester:**

**PREPARATION:**

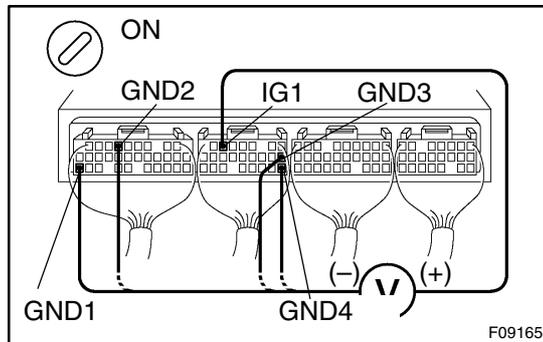
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

**CHECK:**

Check the voltage condition output from the ECU displayed on the hand-held tester.

**OK:**

**"Normal" is displayed.**



**In case of not using the hand-held tester:**

**PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

Turn the ignition switch ON, measure voltage between terminals IG1 and GND of skid control ECU connector.

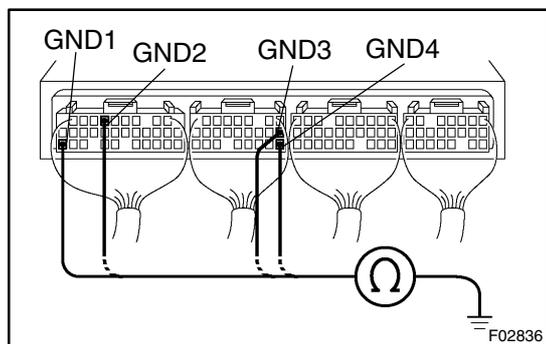
**OK:**

**Voltage: 10 – 14 V**

**OK**

**Check and replace skid control ECU.**

**NG**

**4 Check continuity between terminal GND of skid control ECU connector and body ground.****CHECK:**

Measure resistance between terminals GND of 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-32).**

<b>DTC</b>	<b>C1243 / 43, C1245 / 45</b>	<b>Malfunction in Deceleration Sensor</b>
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## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1243 / 43	While vehicle speed gets to 0 km/h (0 mph) from 30 km/h (18 mph), and the condition that GL1 and GL2 signals of ECU terminals did not change 2 LSB or more continued in a sequence 16 times.	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Wire harness for deceleration sensor system</li> </ul>
C1245 / 45	At the vehicle speed of 30 km/h (18 mph) or more, and the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more.	

## 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.

<b>1</b>	<b>Check output value of the deceleration sensor.</b>
----------	---

### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

### CHECK:

Check that the deceleration value of the deceleration sensor displayed by the hand-held tester is changing when tilting the vehicle.

### OK:

**Deceleration value must be changing.**



<b>2</b>	<b>Check deceleration sensor (See page DI-205).</b>
----------	---



<b>3</b>	<b>Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-32).</b>
----------	--

**NG**

**Repair or replace harness or connector.**

**OK**

**Check and replace skid control ECU.**

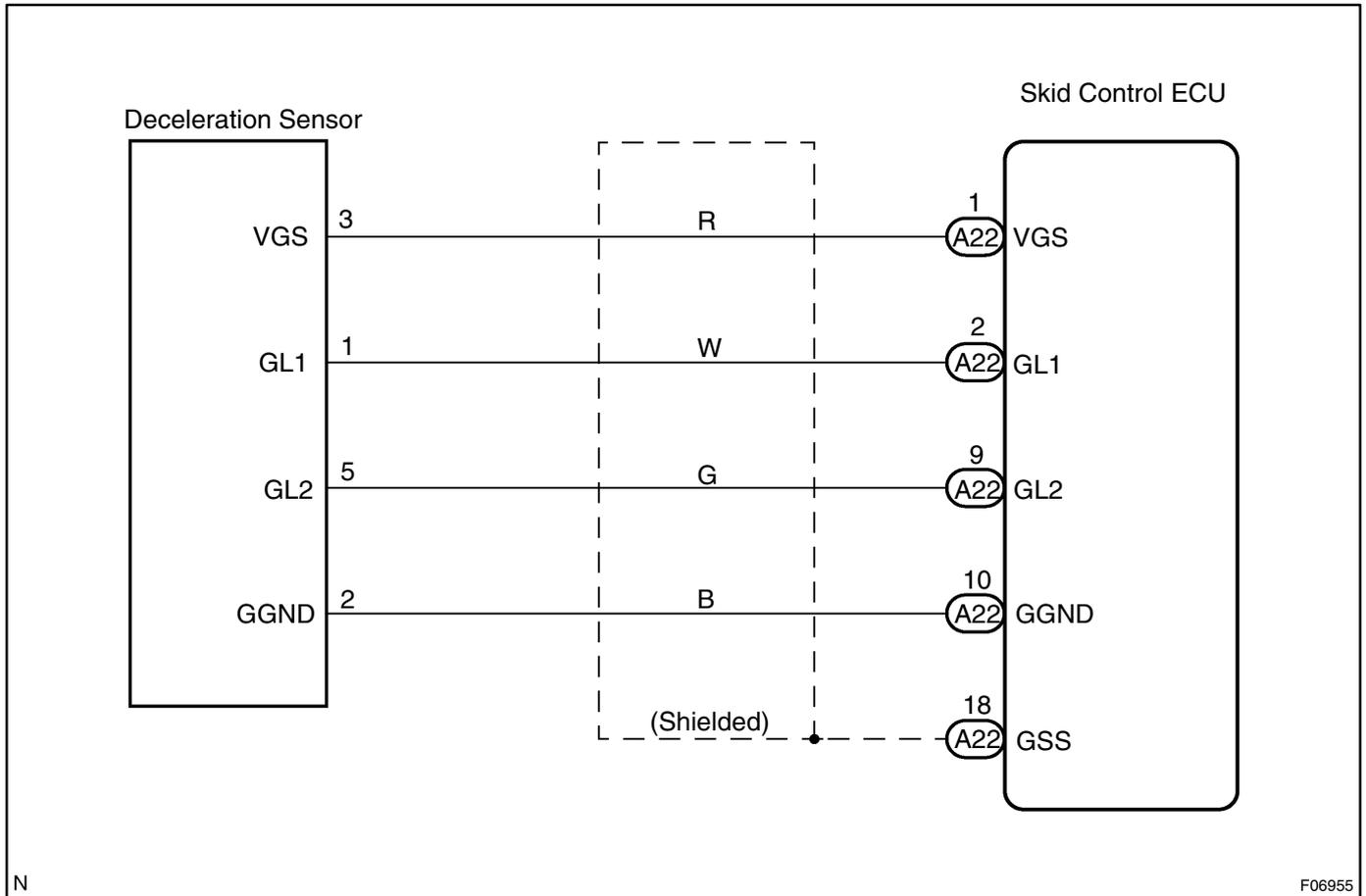
<b>DTC</b>	<b>C1244 / 44</b>	<b>Deceleration Sensor Circuit</b>
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### CIRCUIT DESCRIPTION

This sensor detects deceleration on the vehicle. The sensor signal is used in ABS & BA & TRC & VSC control. If the sensor functions abnormally, the ABS warning light comes on.

DTC No.	DTC Detecting Condition	Trouble Area
C1244 / 44	Either of the following 1., 2., 3. or 4. is detected: 1. The condition that ECU terminals GL1 and GL2 G conversion 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 absolute value of G conversion value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, and the condition that does not become 0.4 G continues for 60 sec. or more. 4. Deceleration sensor signal momentary open occurs for 7 times or more.	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Deceleration sensor circuit</li> </ul>

### WIRING DIAGRAM



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F06955

**INSPECTION PROCEDURE**

- |          |   |
|----------|---|
| <b>1</b> | <b>Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-32).</b> |
|----------|---|

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

- |          |   |
|----------|---|
| <b>2</b> | <b>Check deceleration sensor (See page DI-205).</b> |
|----------|---|

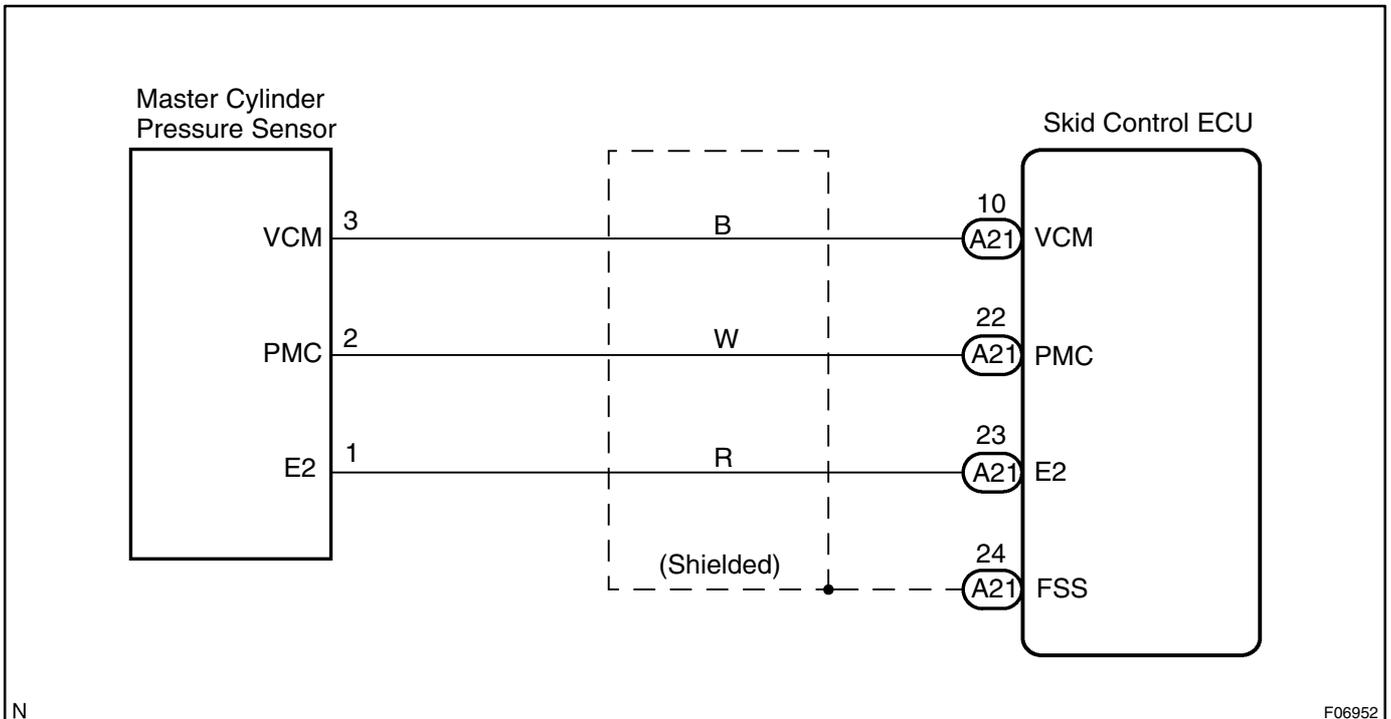
**NG****Replace deceleration sensor.****OK****Check and replace skid control ECU.**

<b>DTC</b>	<b>C1246 / 46</b>	<b>Master Cylinder Pressure Sensor Circuit</b>
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## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	<p>Either of the following 1., 2., 3., 4. or 5. is detected:</p> <ol style="list-style-type: none"> <li>When the vehicle speed is 7 km/h (4.3 mph) and ECU terminal PMC voltage is 0.86 V or more, the condition that the terminal voltage does not change by more than 0.005 V continues for 30 sec.</li> <li>The noise to ECU terminal PMC occurs 7 times for 5 secs.</li> <li>When ECU terminal STP is OFF, the condition that ECU terminal PMC voltage is 0.86 or more or 0.3 V or less continues for more than 5 sec.</li> <li>When the ECU terminal IG1 is 9.5 V to 17.2 V the condition that ECU terminal VCM voltage is out of range of 4.4 V to 5.6 V continues for 1.2 sec.</li> <li>When ECU terminal VCM voltage is 4.4 V to 5.6 V the condition that ECU terminal PMC voltage is out of range of 0.14 V to 4.85 V continues for more than 1.2 sec.</li> </ol>	<ul style="list-style-type: none"> <li>Master cylinder pressure sensor</li> <li>Master cylinder pressure sensor circuit</li> </ul>

## 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.

<b>1</b>	<b>Check output value of the master cylinder pressure sensor.</b>
----------	---

### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

### CHECK:

Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the hand-held tester is changing when depressing the brake pedal.

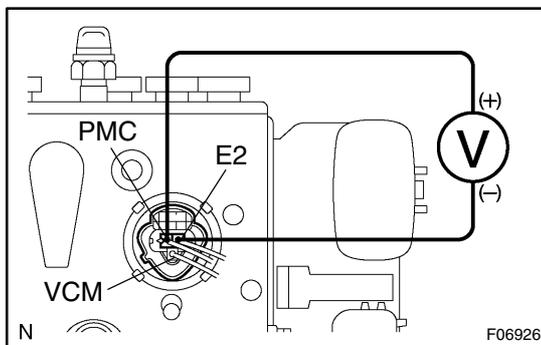
### OK:

**Brake fluid pressure value must be changing.**

<b>OK</b>	<b>Go to step 4.</b>
-----------	----------------------



<b>2</b>	<b>Check master cylinder pressure sensor.</b>
----------	---



### PREPARATION:

Install LSPV gauge to the front brake caliper bleeder plug portion, and bleed air from 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 connector still connected.

### OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kgf/cm <sup>2</sup> , 0 psi)	0.37 – 0.63 V
5,883 kPa (60 kgf/cm <sup>2</sup> , 853 psi)	1.57 – 1.83 V
11,768 kPa (120 kgf/cm <sup>2</sup> , 1,706 psi)	2.77 – 3.03 V

### HINT:

Voltage between terminals VCM and E2: 4.7 – 5.3 V

<b>NG</b>	<b>Replace brake actuator.</b>
-----------	--------------------------------



**3** Check for open and short circuit in harness and connector between master cylinder pressure sensor and skid control ECU (See page IN-32).

**NG**

Repair or replace harness or connector.

**OK**

**4** Check whether or not the ECU terminal STP input voltage is changed when the stop light switch is turned on and off.

**NO**

Check stop light switch circuit (See page BE-53).

**YES**

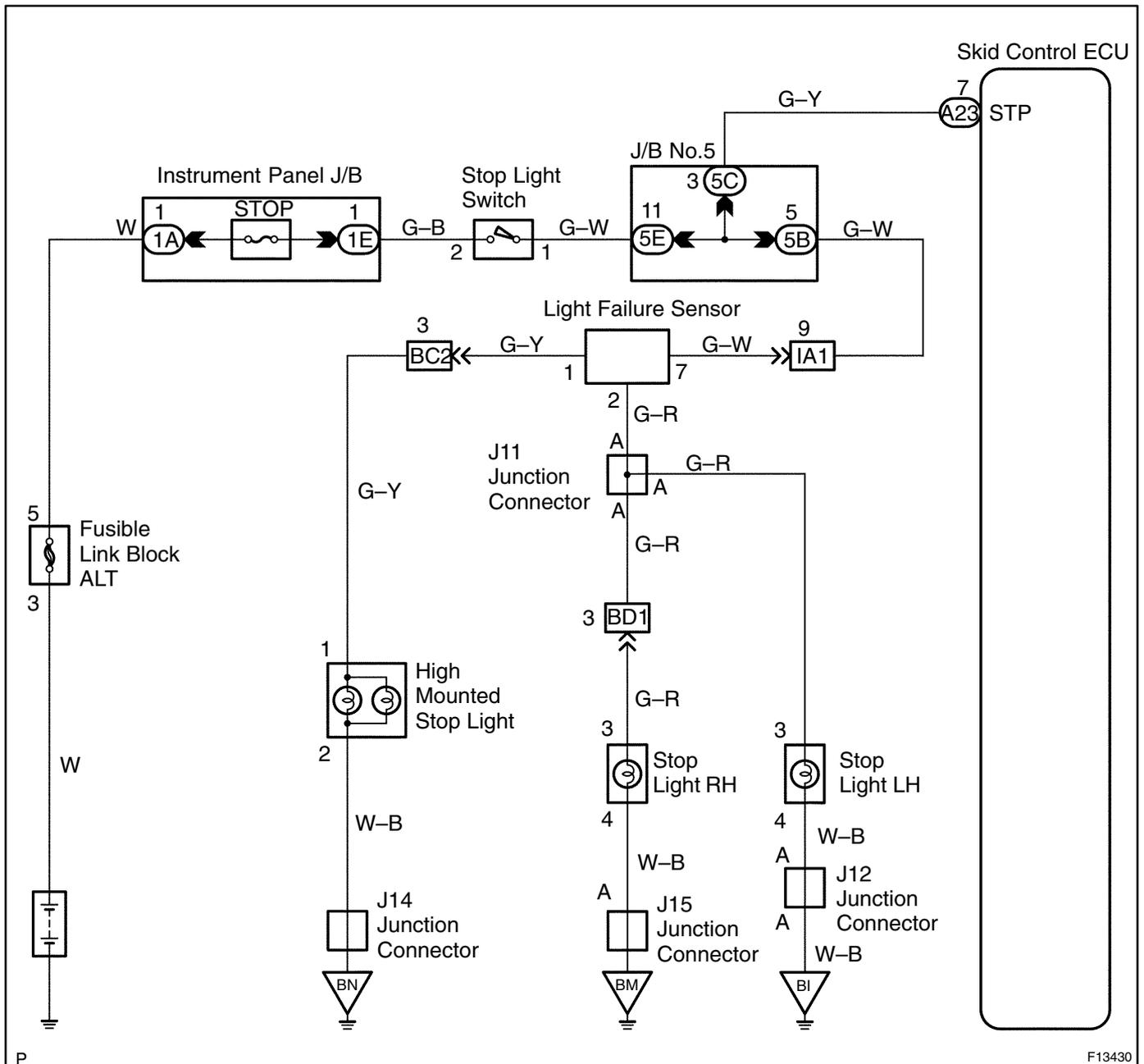
Check and replace skid control ECU.

<b>DTC</b>	<b>C1249 / 49</b>	<b>Stop Light Switch Circuit</b>
------------	-------------------	----------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non-operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	Stop light switch circuit

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

**1** Check operation of the stop light switch.

**CHECK:**

Check that the stop light lights up when brake pedal is depressed and turns off when the brake pedal is released.

**OK**

Go to step 3.

**NG**

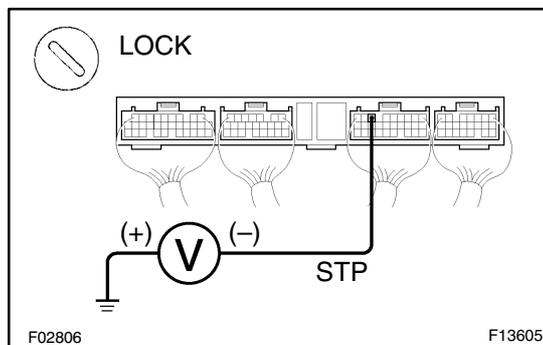
**2** Check stop light circuit (See page BE-53).

**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 connectors still connected.

**CHECK:**

Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.

**OK:**

**Voltage: 8 – 14 V**

**OK**

Check and replace skid control ECU.

**NG**

<b>4</b>	<b>Check for open circuit in harness and connector between skid control ECU and stop light switch (See page IN-32).</b>
----------	---

**NG**

**Repair or replace harness or connector.**

**OK**

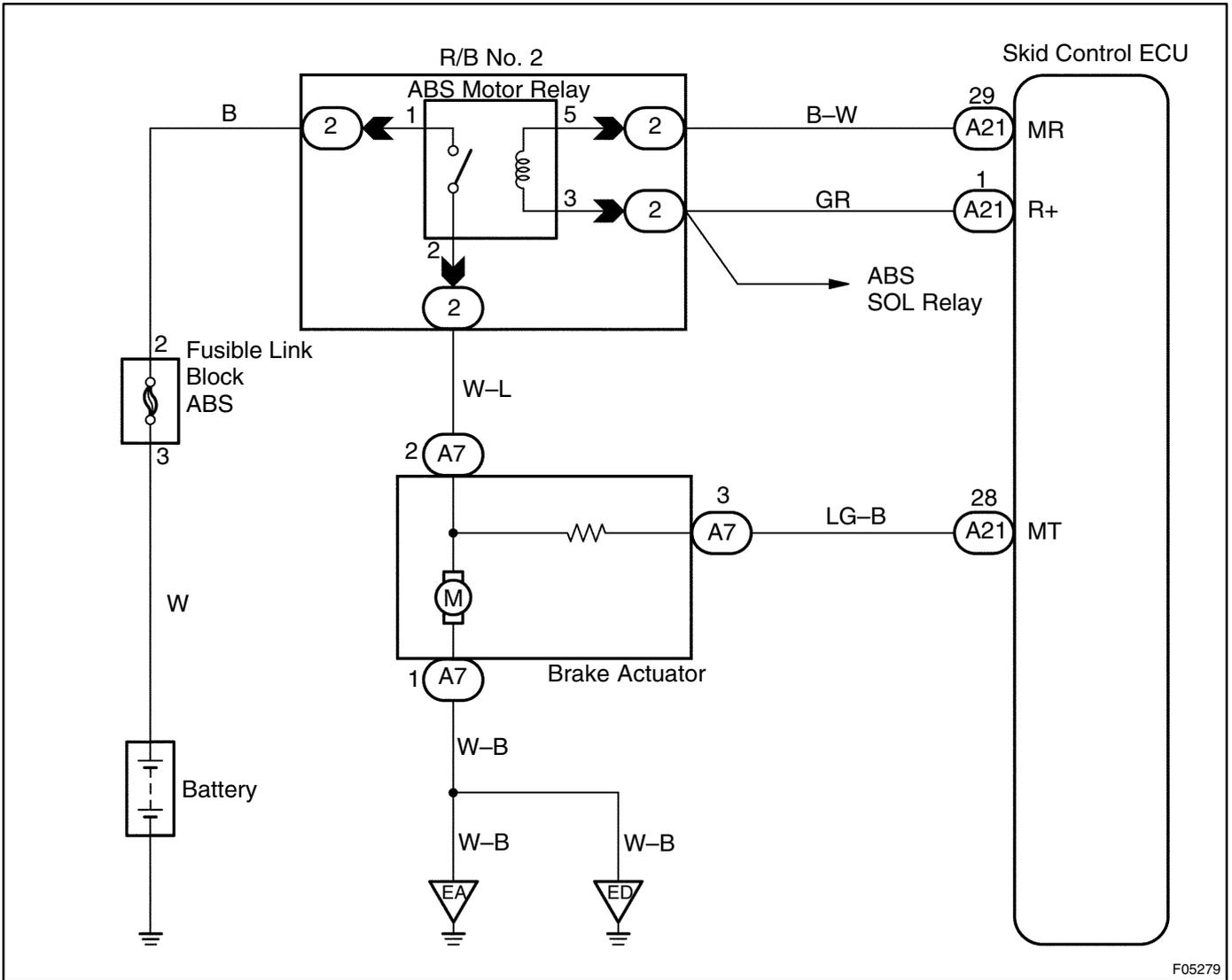
**Proceed to next circuit inspection on problem symptoms table (See page DI-220).**

<b>DTC</b>	<b>C1251 / 51</b>	<b>ABS Pump Motor Lock</b>
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**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. Brake actuator pump motor is not operating normally. 2. Open circuit condition of brake actuator pump motor continues for 2 sec. or more.	ABS pump motor

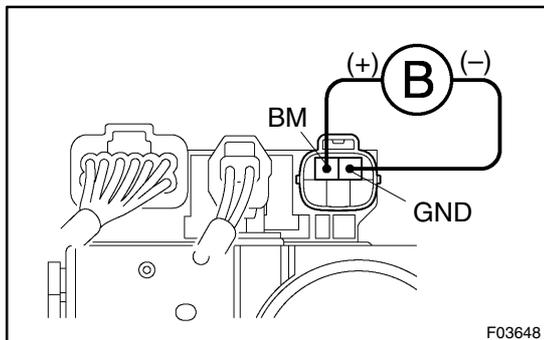
**WIRING DIAGRAM**



F05279

## INSPECTION PROCEDURE

## 1 Check operation of pump motor.

**PREPARATION:**

Disconnect the connector from the brake actuator.

**CHECK:**

Connect positive  $\oplus$  lead to BM terminal and negative  $\ominus$  lead to GND terminal of the brake actuator, check that the pump motor is operated.

**OK:**

The running sound of the pump motor should be heard.

OK

Check for open circuit in harness and connector between ABS motor relay, brake actuator and ECU (See page IN-32).

NG

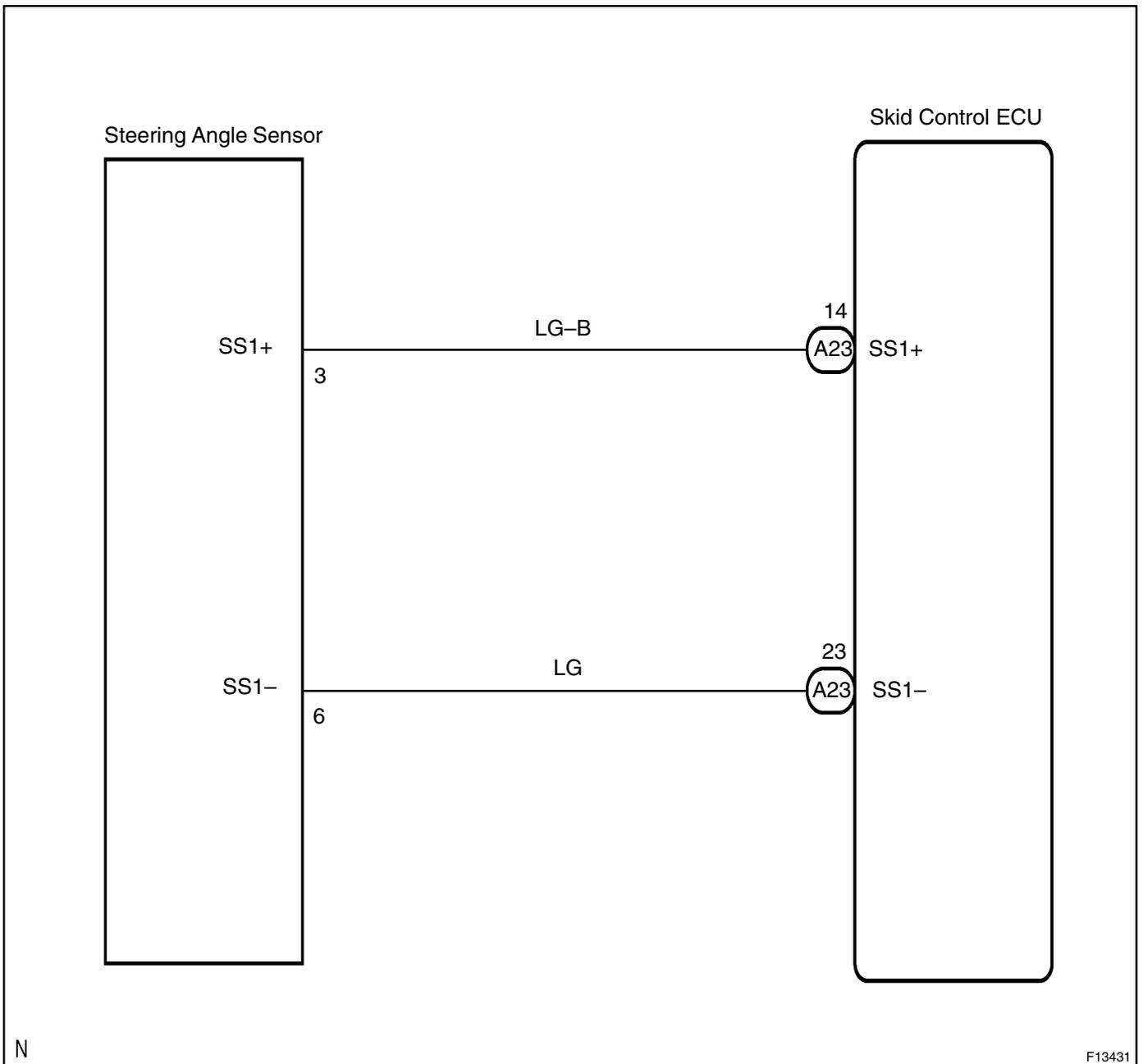
Replace brake actuator.

<b>DTC</b>	<b>C1335 / 35</b>	<b>Steering Angle Sensor Communication Circuit Malfunction</b>
------------	-------------------	--

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1335 / 35	When the condition that ECU terminal IG1 voltage is 9.5 V or more, and ECU does not receive data from steering angle sensor continues for 1 sec. or more.	Steering angle sensor circuit

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

1	<b>Check for open and short circuit in harness and connector between steering angle sensor and skid control ECU (See page IN-32).</b>
---	---

**NG****Repair or replace harness or connector.****OK****Check and replace skid control ECU.**

<b>DTC</b>	<b>Always ON*</b>	<b>Malfunction in ECU</b>
------------	-------------------	---------------------------

\*: ABS warning light

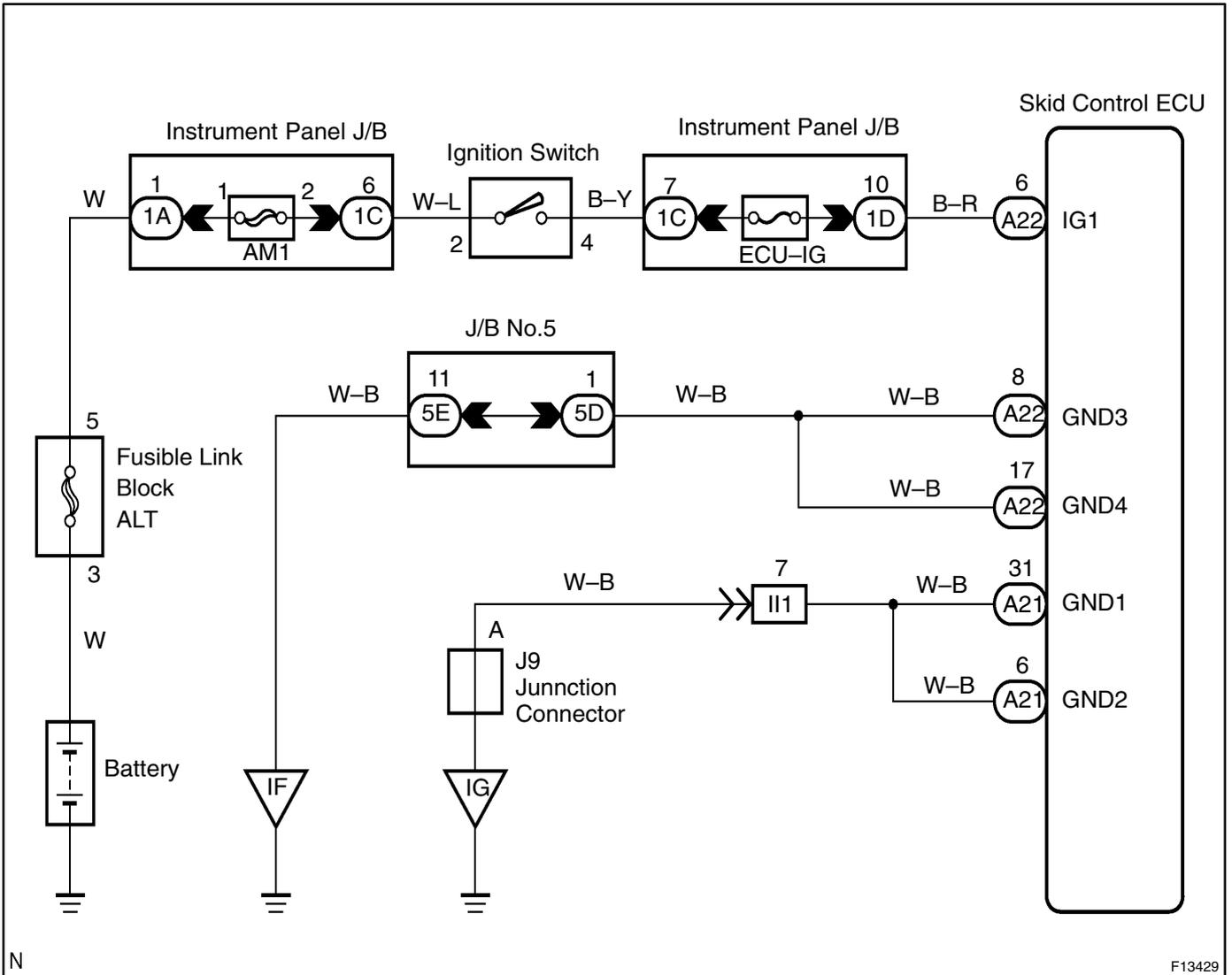
**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1., 2. or 3. is detected: 1. Voltage of ECU terminal IG1 remains at more than 17 V. 2. The ECU connectors are off from the ECU. 3. There is a malfunction in the ECU internal circuit.	<ul style="list-style-type: none"> <li>• Battery</li> <li>• Charging system</li> <li>• Power source circuit</li> <li>• Skid control ECU</li> </ul>

HINT:

There is a case that hand-held tester cannot be used when ECU is abnormal.

**WIRING DIAGRAM**



N

F13429

**INSPECTION PROCEDURE**

**1** Check that the ECU connectors are securely connected to the ECU.

**NO**

Connect the connector to the ECU.

**YES**

**2** Is DTC output?

Check DTC on page DI-205.

**YES**

Repair circuit indicated by the code output.

**NO**

**3** Does ABS warning light go off?

**YES**

Check for open and short circuit in harness and connector between ECU-IG fuse and ECU (See page IN-32).

**NO**

**4** Check battery voltage.

**CHECK:**

Check the battery voltage.

**OK:**

Voltage: 10 – 16 V

**NG**

Check and repair the charging system (See page CH-2).

**OK**

<b>5</b>	<b>Check operation of the ABS warning light.</b>
----------	--

**In case of using the hand-held tester:**

**PREPARATION:**

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

**CHECK:**

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the hand-held tester.

**In case of not using the hand-held tester:**

**PREPARATION:**

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the skid control ECU.
- (c) Turn the ignition switch ON.

**CHECK:**

Check the ABS warning light goes off.

OK

Check and replace skid control ECU.

NG

**Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC3 (See page IN-32).  
Check ABS solenoid relay circuit (See page DI-237).**

<b>DTC</b>	<b>Always ON*</b>	<b>Malfunction in ECU VSC Warning Light Circuit</b>
------------	-------------------	---

\*: VSC warning light

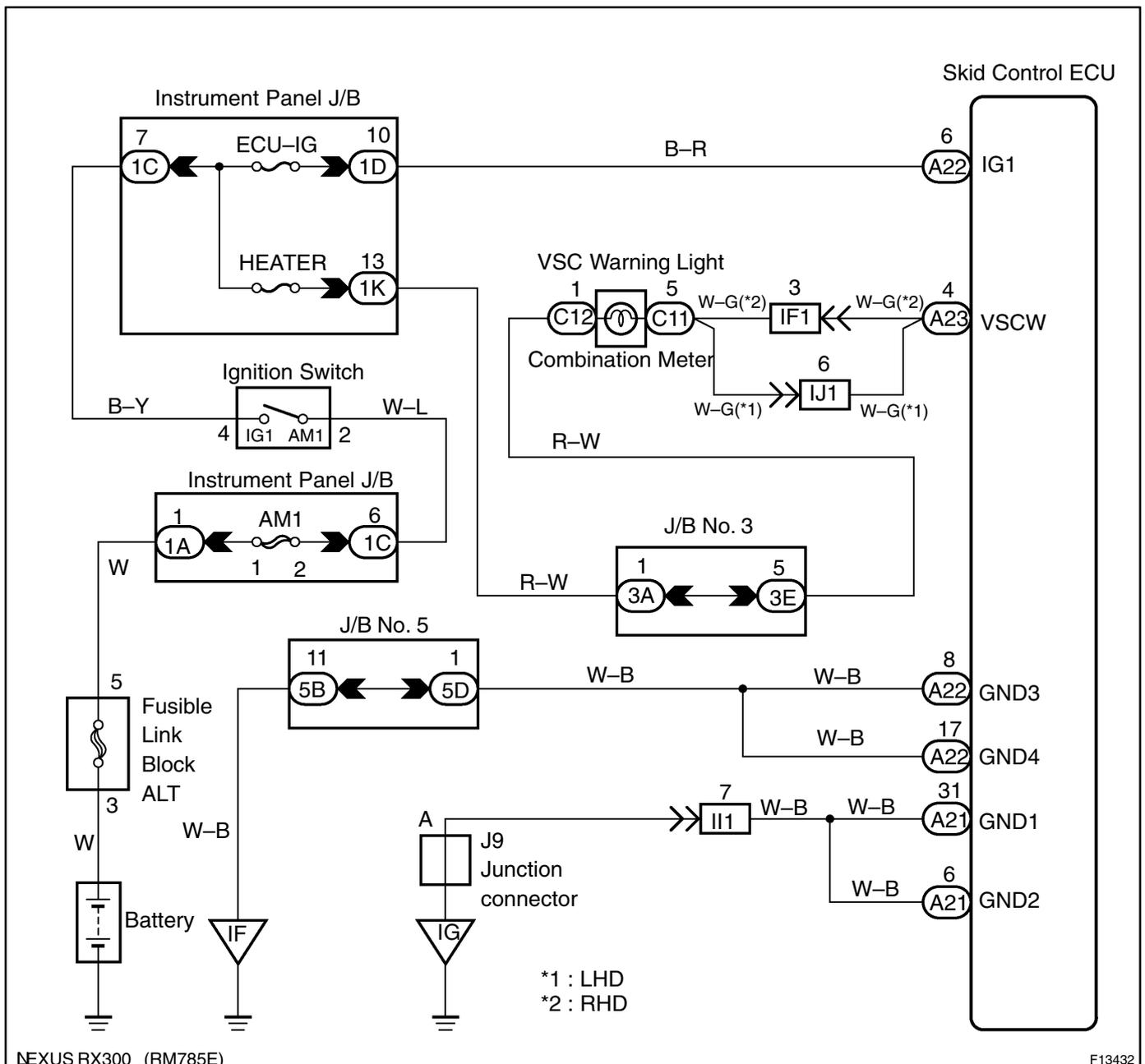
**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	<ul style="list-style-type: none"> <li>• There is a malfunction in the ECU internal circuit.</li> <li>• Malfunction in power source circuit.</li> </ul>	<ul style="list-style-type: none"> <li>• Power source circuit</li> <li>• VSC warning light circuit</li> <li>• Charging system</li> <li>• Skid control ECU</li> </ul>

**HINT:**

If the fail safe function is activated in VSC system, "VSC" indicator light lights up.

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC output for VSC?</b>
----------	-------------------------------

Check DTC on page DI-205.

**YES**

**Repair circuit indicated by the output code.**

**NO**

<b>2</b>	<b>Does VSC warning light go off?</b>
----------	---------------------------------------

**YES**

**Check for open or short circuit in harness and connector between ECU-IG fuse and ECU (See page IN-32).**

**NO**

<b>3</b>	<b>Check battery voltage.</b>
----------	-------------------------------

**CHECK:**

Check the battery voltage.

**OK:**

**Voltage: 10 – 16 V**

**NG**

**Check and repair the charging system (See page CH-2).**

**OK**

<b>4</b>	<b>Check operation of the VSC warning light.</b>
----------	--

**In case of using the hand-held tester:**

**PREPARATION:**

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

**CHECK:**

Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter 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 the VSC warning light goes off.

OK

Check and replace skid control ECU.

NG

Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC3 (See page IN-32).

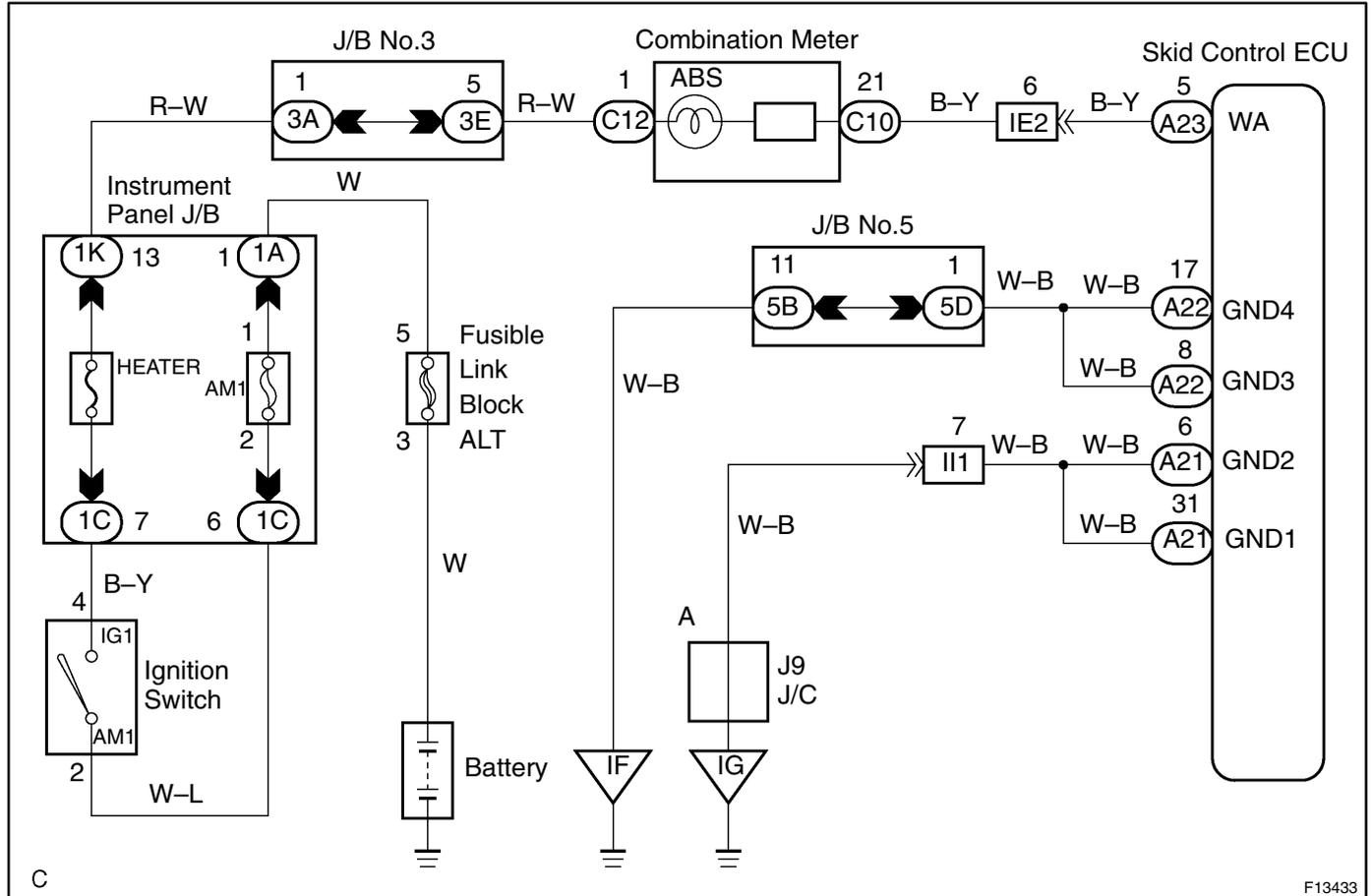
# ABS Warning Light Circuit

## CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.

Connect terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

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

ABS warning light does not light up	*1
ABS warning light remains on	*2

\*1: Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using hand-held tester.

\*2: After inspection of step 3, start the inspection from step 4 in case of using the hand-held tester and start from step 5 in case of not using hand-held tester.

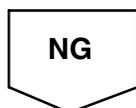
<b>1</b>	<b>Check operation of the ABS warning light.</b>
----------	--

### PREPARATION:

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

### CHECK:

Check that "ON" of the ABS warning light can be shown on the combination meter using the hand-held tester.



<b>2</b>	<b>Check ABS warning light.</b>
----------	---------------------------------

See combination meter troubleshooting on page BE-2.



<b>3</b>	<b>Check that the ECU connectors are securely connected to the skid control ECU.</b>
----------	--



Check for open circuit in harness and connector between combination meter and skid control ECU (See page IN-32).

**4** Check operation of the ABS warning light (See step 1).

**OK**

Check and replace skid control ECU.

**NG**

**5** Is DTC output?

Check DTC on page DI-205.

**YES**

Repair circuit indicated by the output code.

**NO**

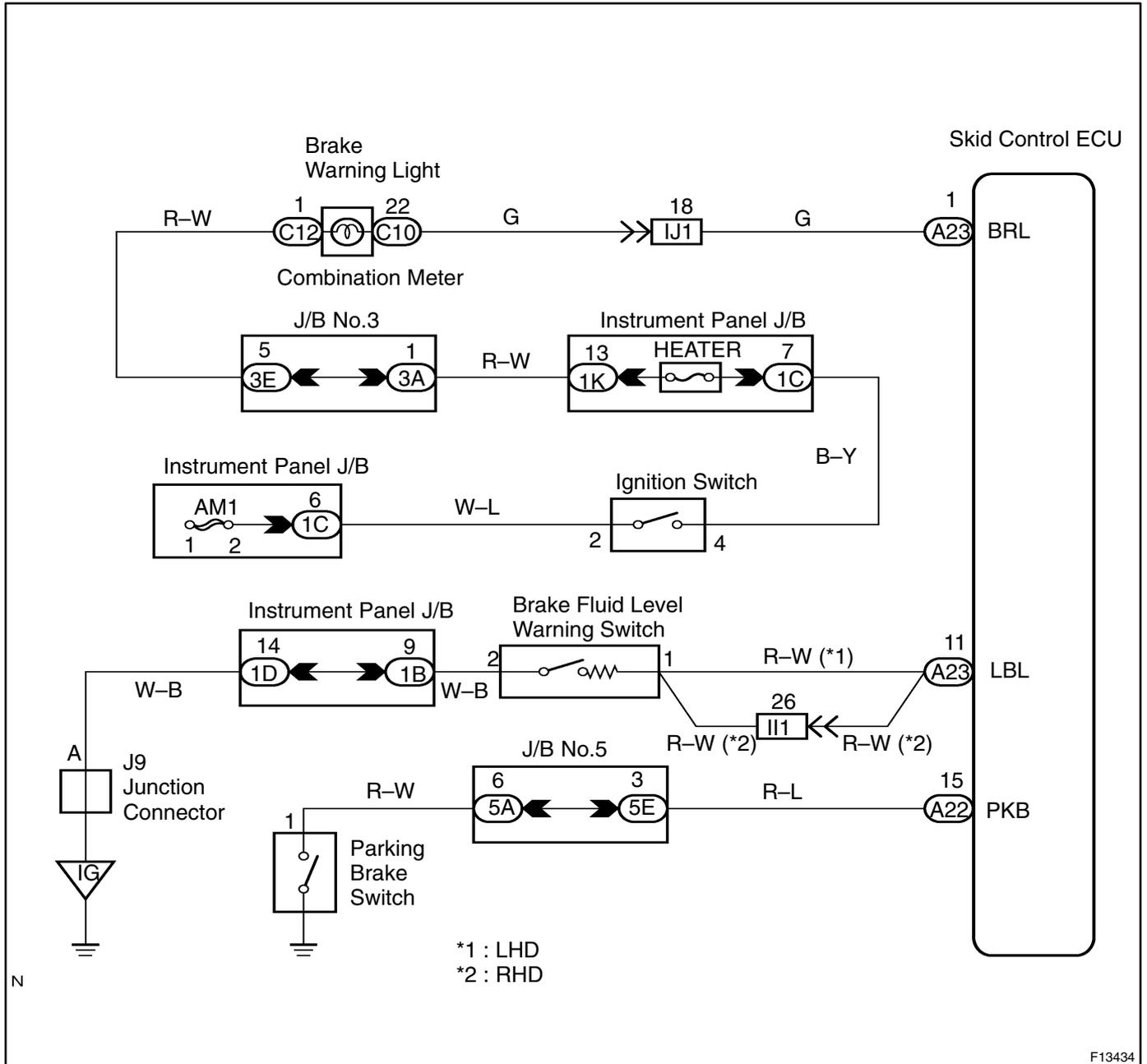
Check for short circuit in harness and connector between DLC3 and skid control ECU (See page IN-32).

# 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-2).

**NG**

Repair or replace parking brake switch circuit.

**OK**

**2** Check brake fluid level warning switch circuit (See page BE-2).

**NG**

Repair or replace brake fluid level warning switch circuit.

**OK**

**3** Is DTC output for ABS?

Check DTC on page DI-205.

**YES**

Repair circuit indicated by the output code.

**NO**

**4** Check brake warning light.

See combination meter troubleshooting on page BE-2.

**NG**

Repair or replace combination meter.

**OK**

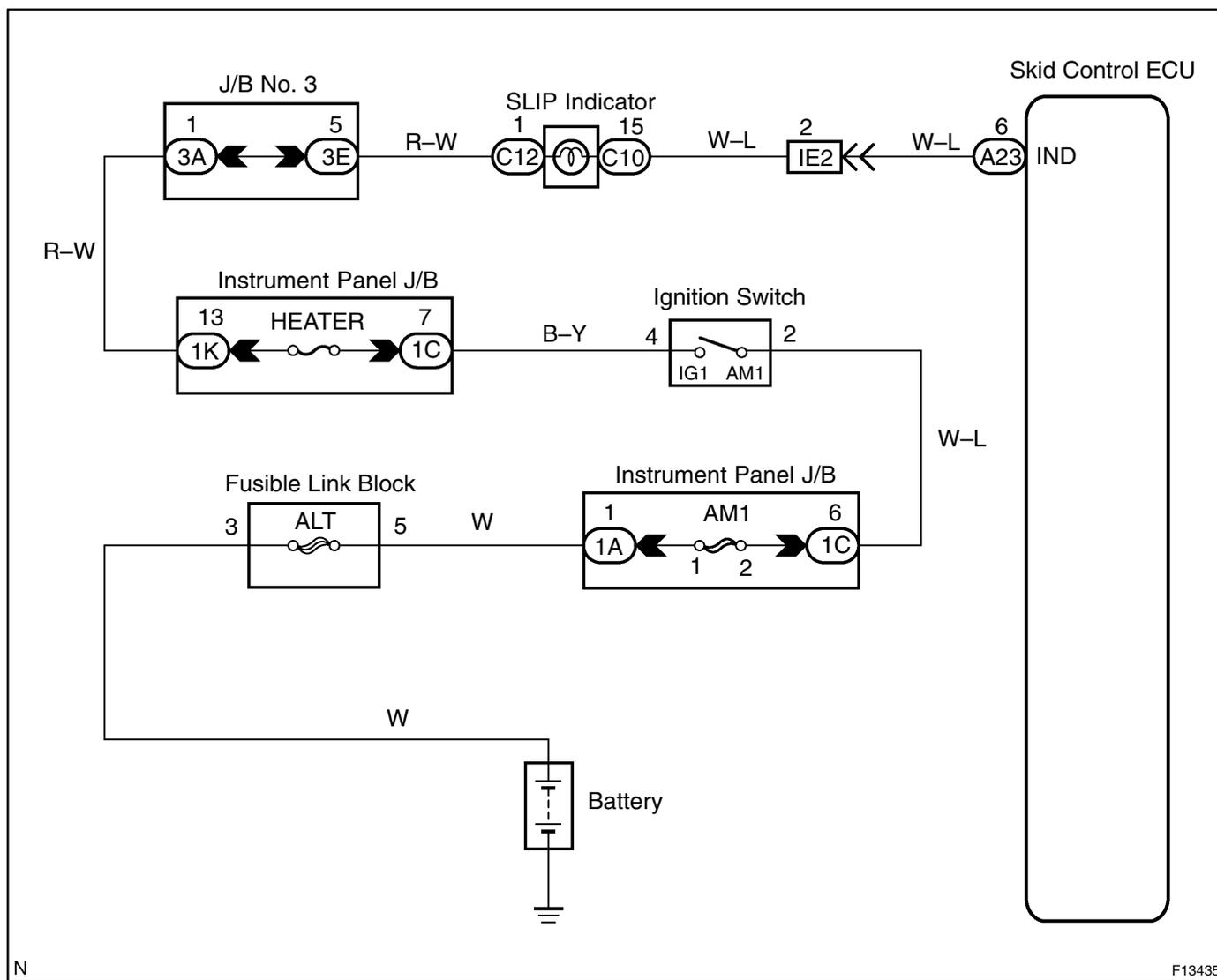
Check and replace Skid control ECU.

# SLIP Indicator Light Circuit

## CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC & VSC operation.

## WIRING DIAGRAM



N

F13435

## 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.

<b>1</b>	<b>Check operation of the SLIP indicator light.</b>
----------	---

### PREPARATION:

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

### CHECK:

Check that "ON" and "OFF" of the SLIP indicator light can be shown on the combination meter by the hand-held tester.

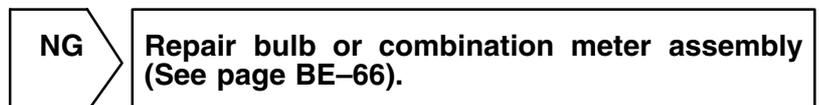


<b>2</b>	<b>Check that the SLIP indicator light is on for 3 seconds soon after ignition switch has been turned ON.</b>
----------	---



<b>3</b>	<b>Check SLIP indicator light.</b>
----------	------------------------------------

See combination meter troubleshooting on page BE-68.



4	<b>Check for open and short circuit in harness and connector between skid control ECU and SLIP indicator light (See page IN-32).</b>
---	--

NG

Repair or replace harness or connector.

OK

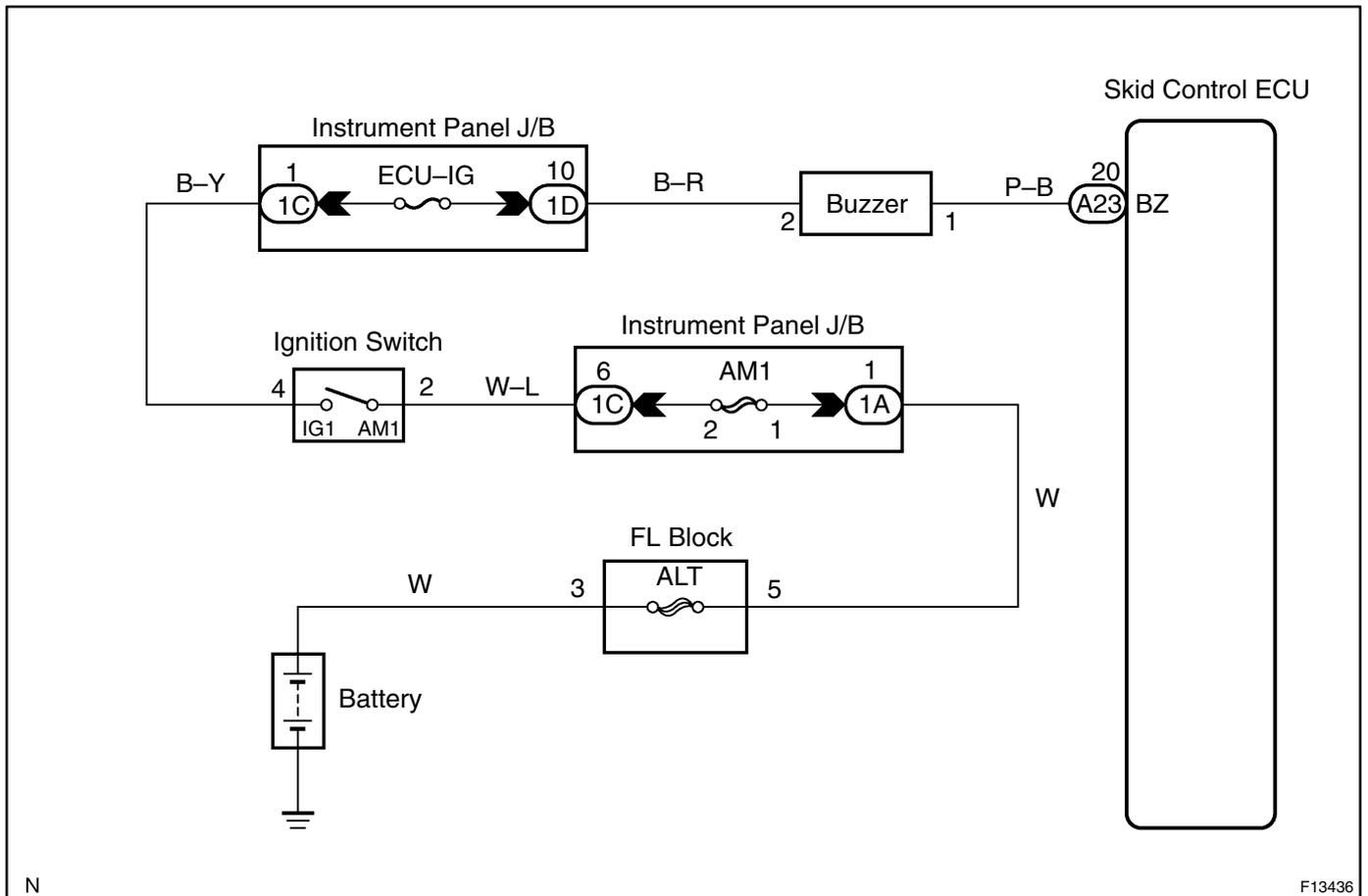
Check and replace skid control ECU.

# VSC Buzzer Circuit

## CIRCUIT DESCRIPTION

The VSC buzzer sounds during VSC operation.

## WIRING DIAGRAM



N

F13436

## INSPECTION PROCEDURE

### HINT:

Start 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.

<b>1</b>	<b>Check operation of the VSC buzzer.</b>
----------	---

### PREPARATION:

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

### CHECK:

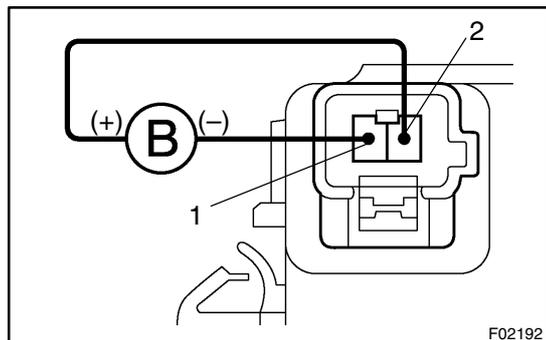
Check that VSC buzzer sounds "ON" and "OFF" with the hand-held tester.

OK

Check and replace skid control ECU.

NG

<b>2</b>	<b>Check VSC buzzer.</b>
----------	--------------------------



### PREPARATION:

Disconnect the VSC buzzer connector.

### CHECK:

Apply battery voltage to the terminals 1 and 2 of VSC buzzer connector, check that the VSC buzzer sounds.

NG

Replace VSC buzzer.

OK

<b>3</b>	<b>Check for open and short circuit in harness and connector between skid control ECU and VSC buzzer (See page IN-32).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

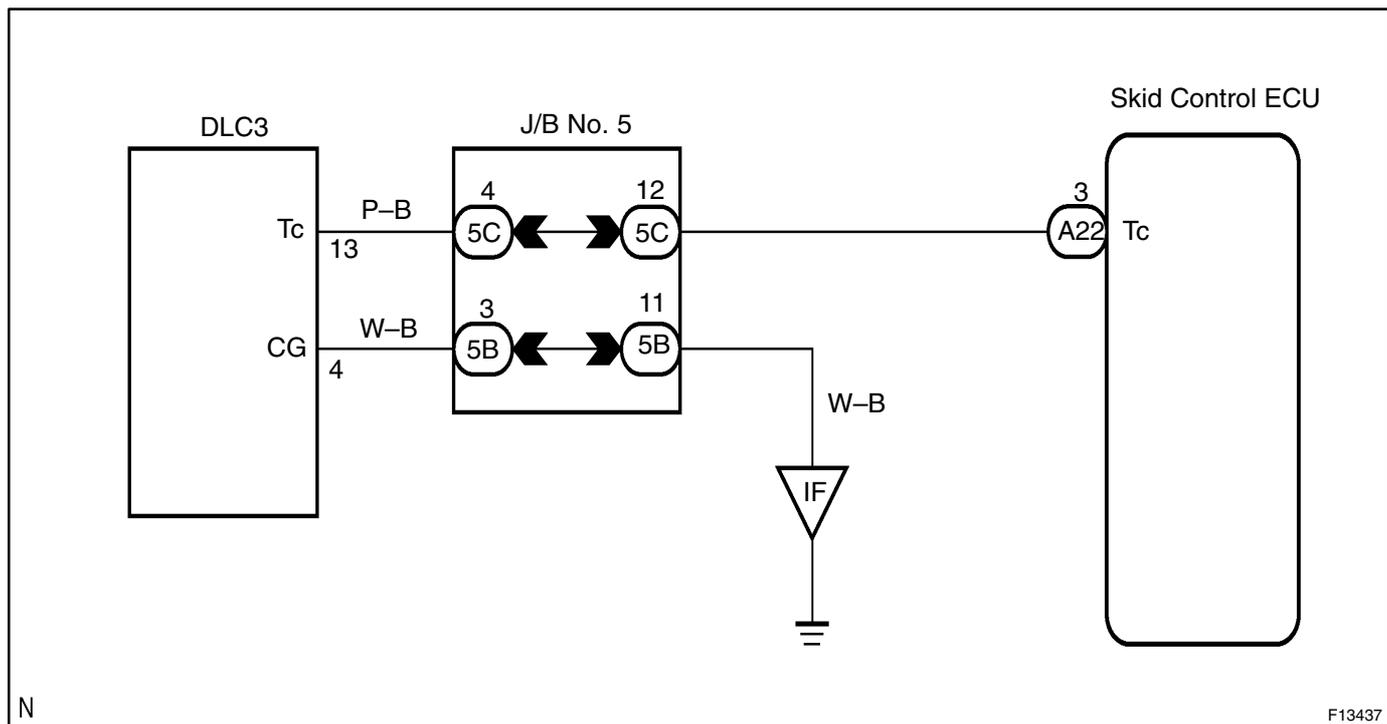
<b>Check and replace skid control ECU.</b>
--

# Tc Terminal Circuit

## CIRCUIT DESCRIPTION

Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light and VSC warning light.

## WIRING DIAGRAM

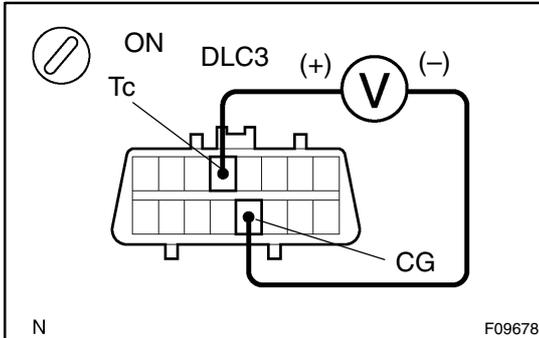


N

F13437

## INSPECTION PROCEDURE

- 1 Check voltage between terminals Tc and CG of the DLC3.

**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminal Tc and CG of DLC3.

**OK:**

**Voltage: 10 – 14 V**

OK

If ABS warning light and VSC warning light does not blink even after Tc and CG have been connected, the ECU may be defective.

NG

- 2 With ignition switch OFF, check for open and short circuit in harness and connector between skid control ECU and DLC3, DLC3 and body ground (See page IN-32).

NG

Repair or replace harness or connector.

OK

Check and replace skid control ECU.

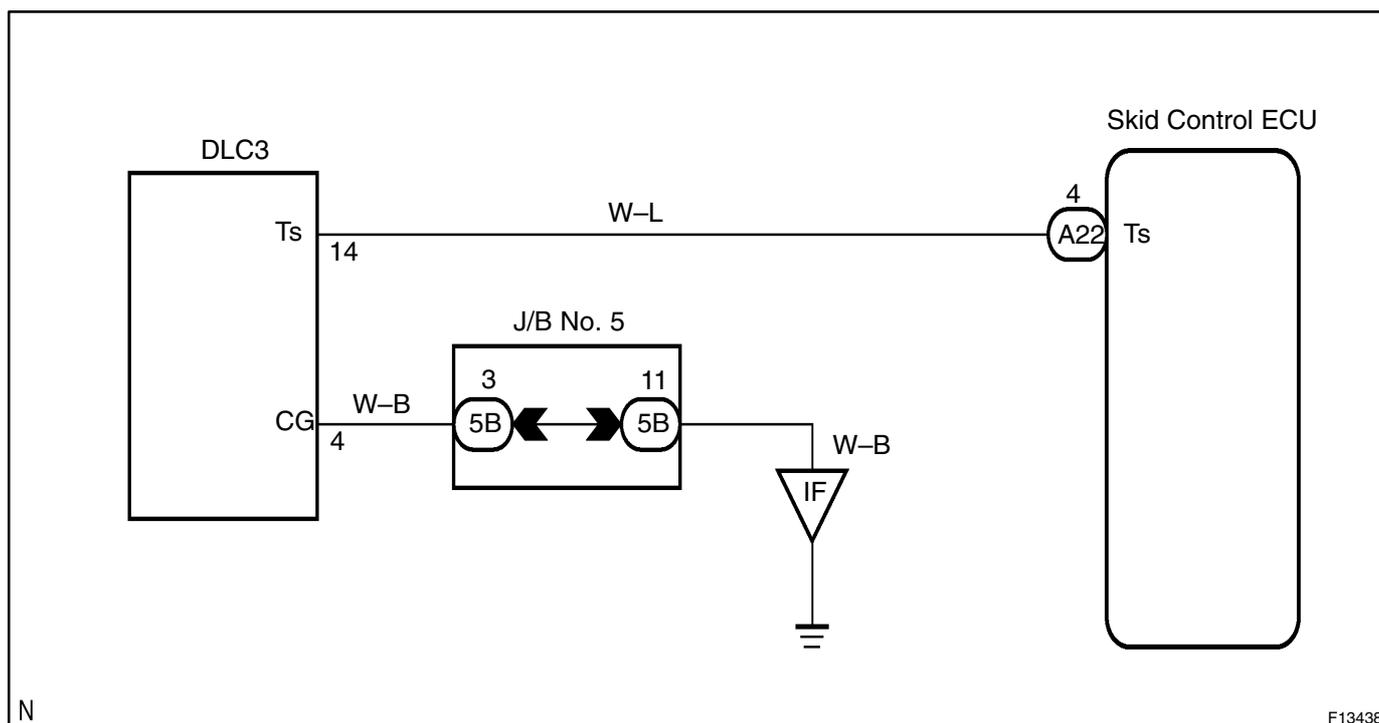
## Ts Terminal Circuit

### CIRCUIT DESCRIPTION

In the sensor check mode, a malfunction of the speed sensor that cannot be judged when the vehicle is stopped is judged while driving.

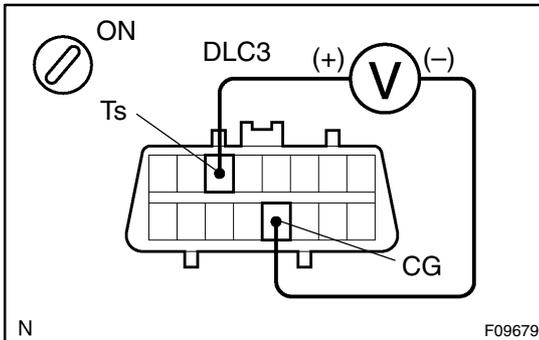
Transition to the sensor check mode can be performed by connecting terminals Ts and CG of the DLC3 and turning the ignition switch from OFF to ON.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

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

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals Ts and CG of DLC3.

**OK:**

**Voltage: 10 – 14 V**

**OK**

If ABS warning light does not blink even after Ts and CG have been connected, the ECU may be defective.

**NG**

**2** Check for open and short circuit in harness and connector between skid control ECU and DLC3, DLC3 and body ground (See page IN-32).

**NG**

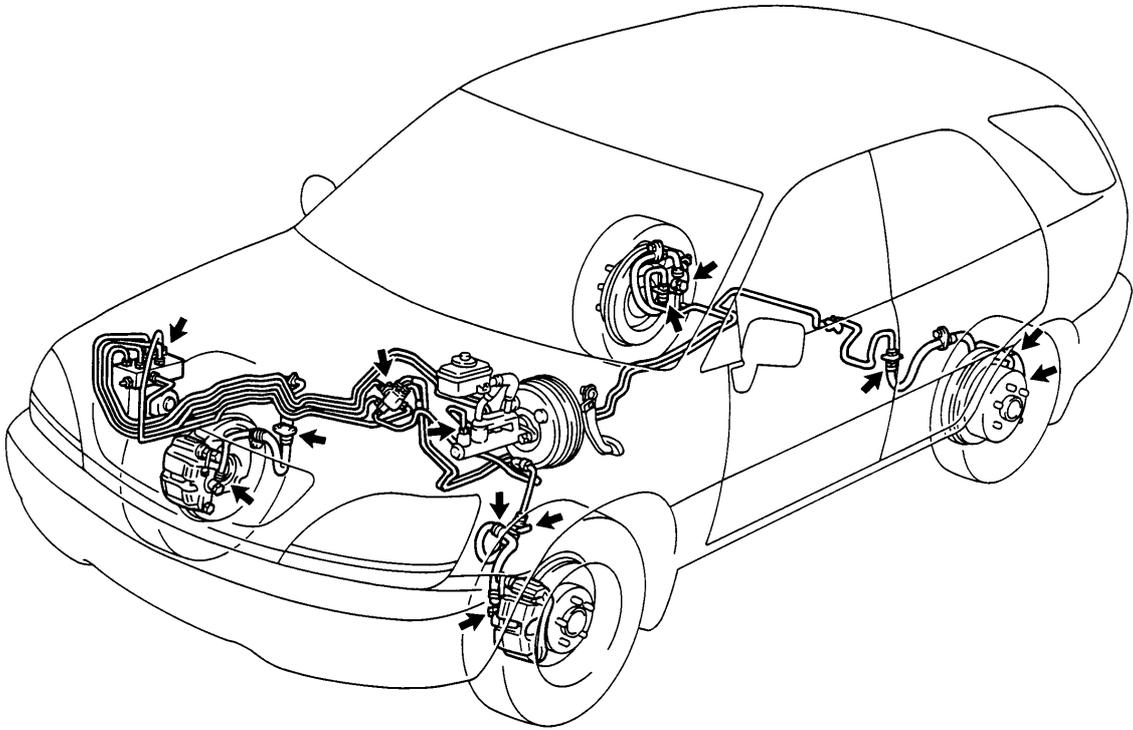
Repair or replace harness or connector.

**OK**

Check and replace skid control ECU.

## Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



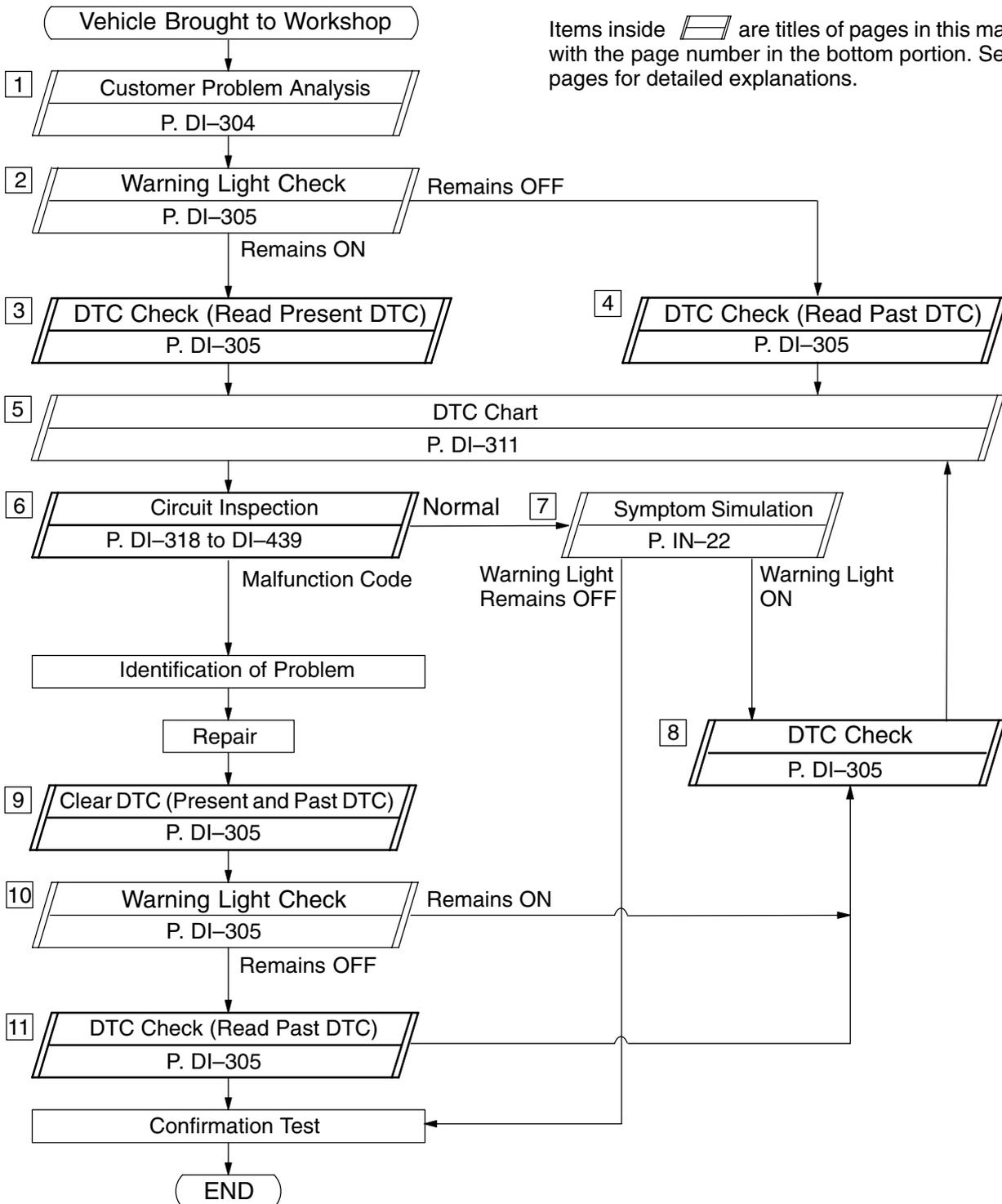
N

F13953

# SUPPLEMENTAL RESTRAINT SYSTEM

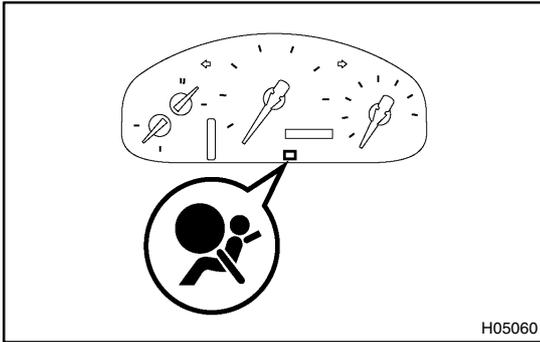
## HOW TO PROCEED WITH TROUBLESHOOTING

D160W-08



Step 3, 4, 6, 8, 9, 11 : Diagnostic steps permitting the use of the hand-held tester.





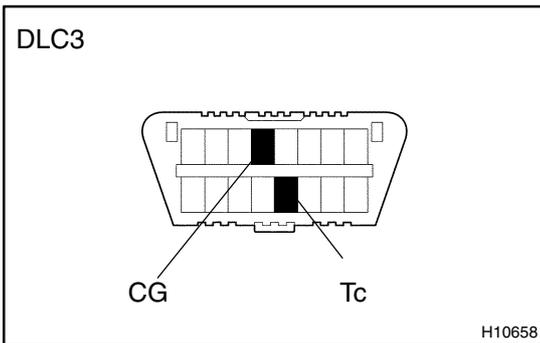
## PRE-CHECK

### 1. SRS WARNING LIGHT CHECK

- (a) Turn the ignition switch to the ON position and check that the SRS warning light lights up.
- (b) Check that the SRS warning light goes out after approx. 6 seconds.

#### HINT:

- When the ignition switch is at ON and the SRS warning light remains on or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on page DI-434.



### 2. DTC CHECK (Using diagnosis check wire)

- (a) Present troubles codes:

Output the DTC.

- (1) Turn the ignition switch to the ON position and wait for approx. 20 seconds.
- (2) Using SST, connect terminals Tc and CG of the DLC3.

SST 09843-18020

#### NOTICE:

**Pay due attention to the terminal connecting position to avoid a malfunction.**

- (b) Past troubles codes:

Output the DTC.

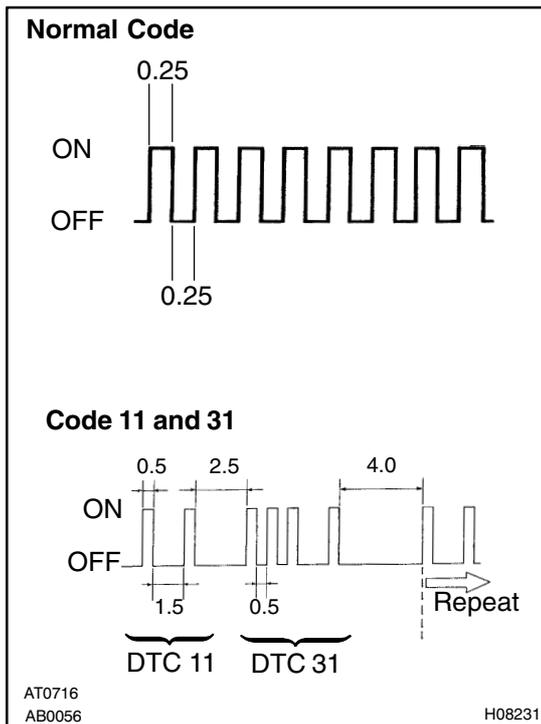
- (1) Using service wire, connect terminals Tc and CG of the DLC3.

SST 09843-18020

- (2) Turn the ignition switch to the ON position and wait for approx. 20 seconds.

#### NOTICE:

**Pay due attention to the terminal connecting position to avoid a malfunction.**

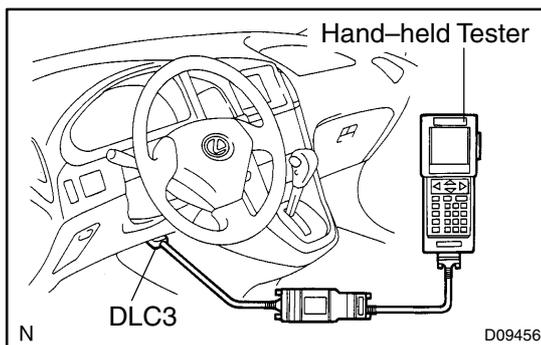


- (c) Read the DTC.
- Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.
- Normal code indication  
The light will blink 2 times per second.
  - Malfunction code indication  
The first blinking output indicates the first digit of a 2–digit DTC. After a 1.5–second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5–second pause between each code. After all the codes have been output, there will be a 4.0–second pause and they will all be repeated.

HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page DI-439.



### 3. DTC CHECK (Using hand-held tester)

- Hook up the hand-held tester to the DLC3.
- Read the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the hand-held tester operator's manual for further details.

### 4. DTC CLEARANCE (Not using service wire)

When the ignition switch is turned off, the diagnostic trouble code is cleared.

HINT:

DTC might not be cleared by turning the ignition switch OFF. In this case, proceed to the next step.

### 5. DTC CLEARANCE (Using service wire)

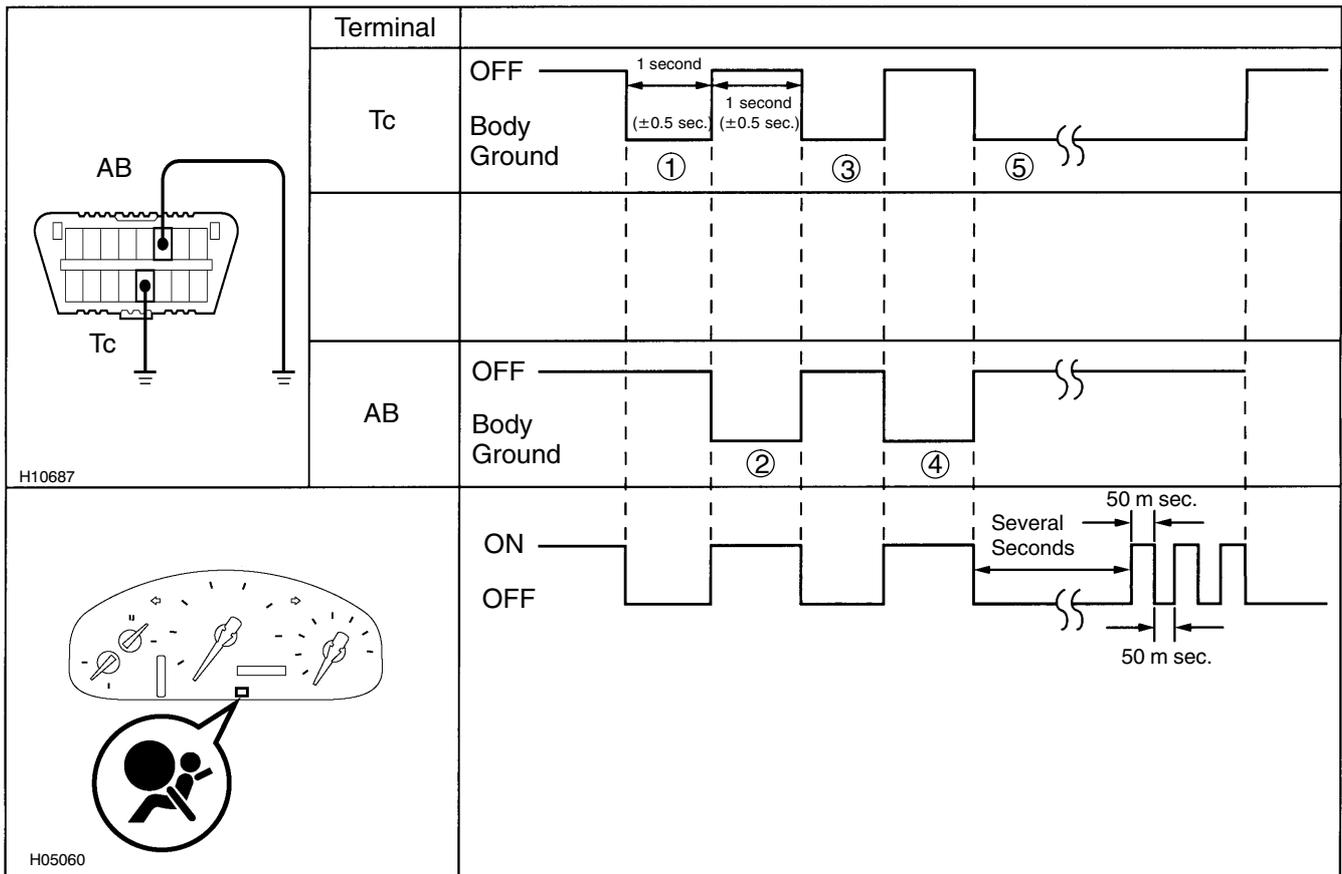
- Connect the 2 service wires to terminals Tc and A/B of DLC3.
- Turn the ignition switch to ON and wait for approx. 6 seconds.

- (c) Starting with the Tc terminal, ground alternately terminal Tc and terminal A/B twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remain grounded.

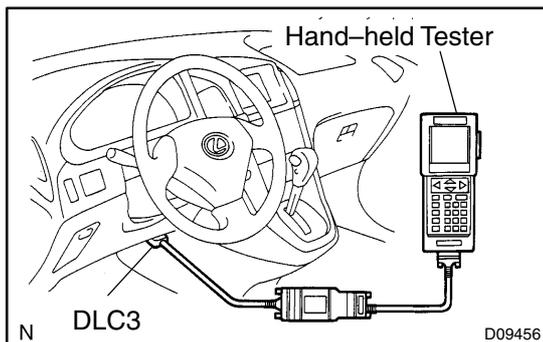
**HINT:**

When alternately grounding terminals Tc and 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 – m sec. cycle to indicate the codes which have been cleared.



**6. DTC CLEARANCE (Using hand-held tester)**

- (a) Hook up the hand-held tester to the DLC3.
- (b) Clear the DTCs by following the prompts on the tester screen.

**HINT:**

Please refer to the hand-held tester operation's manual for further details.

## **7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM**

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

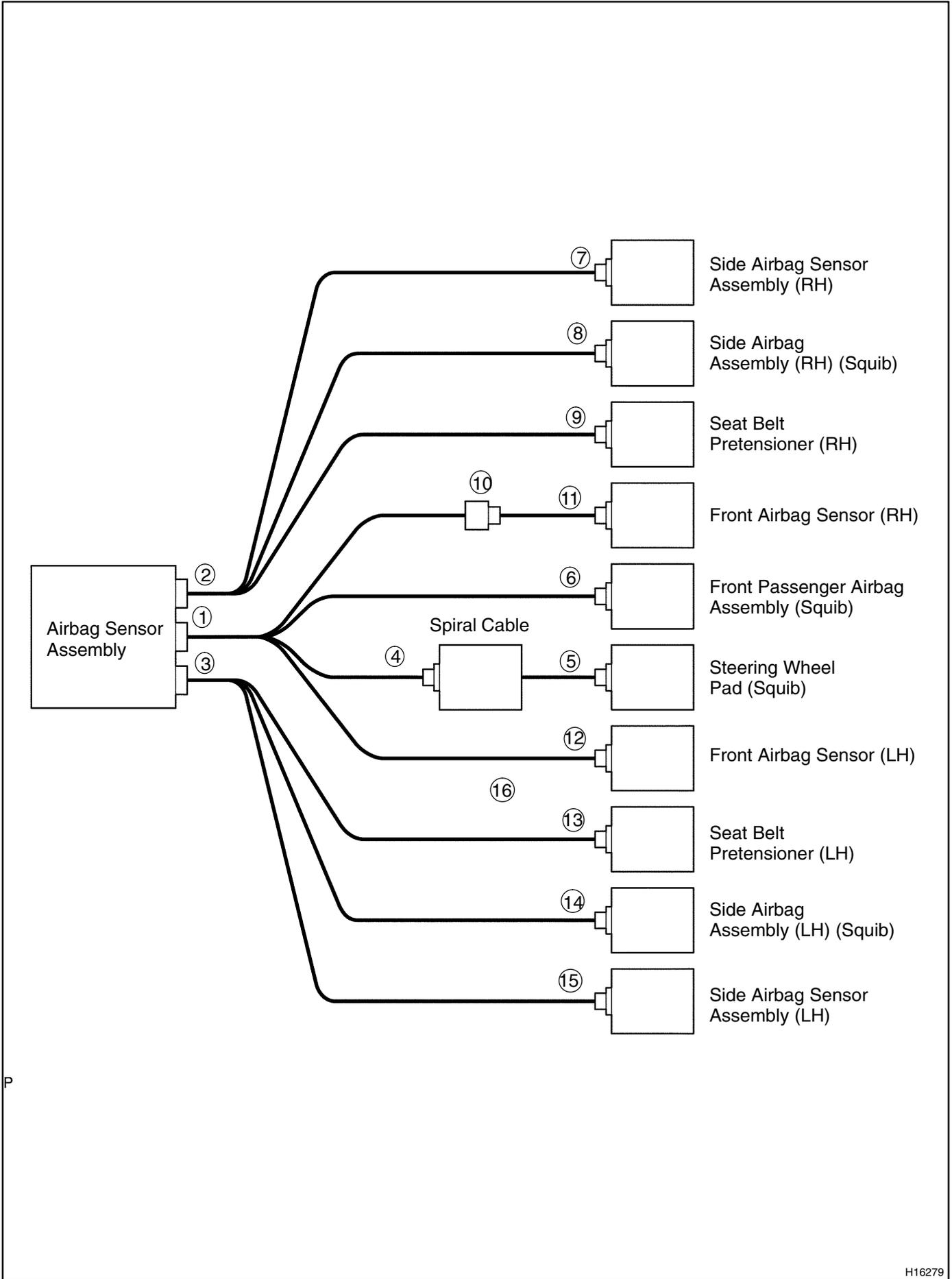
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

### **CAUTION:**

**Never release the airbag activation prevention mechanism on the squib connector.**

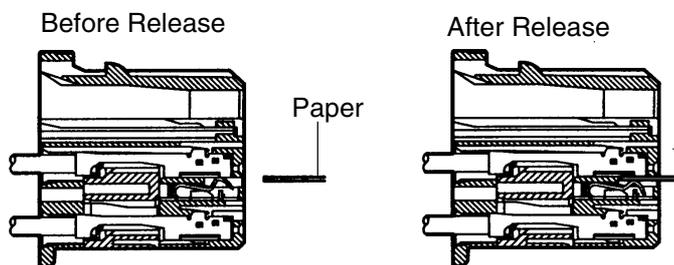
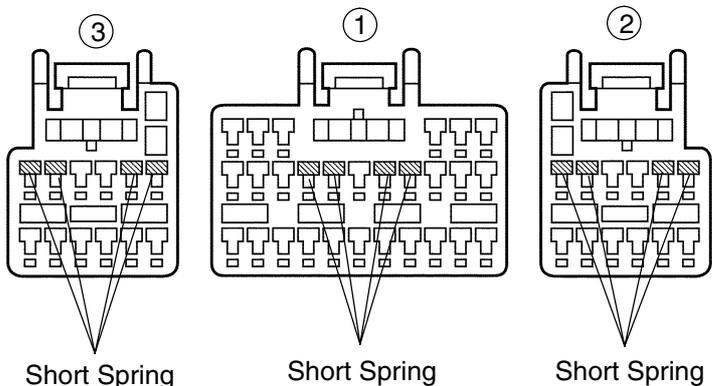
### **NOTICE:**

- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.**

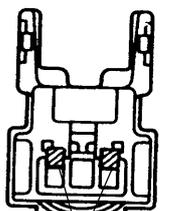


P

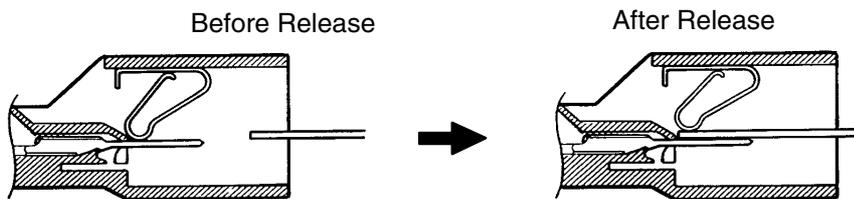
Airbag Sensor Assembly Connector



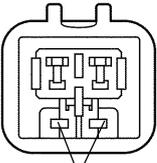
Connector ④



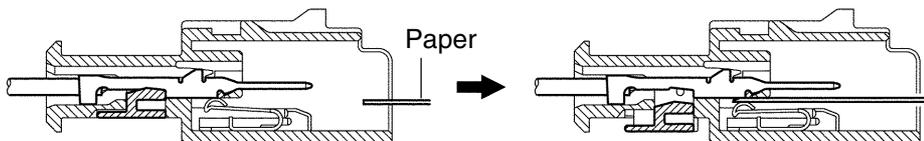
Short Spring



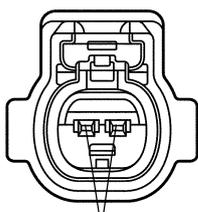
Connector ⑤ ⑥



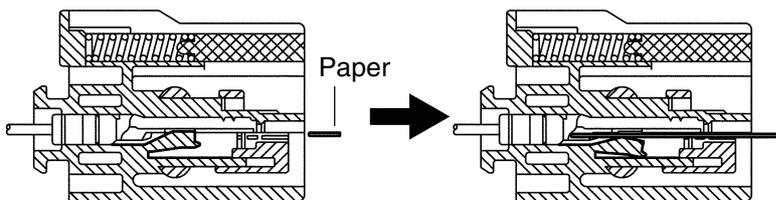
Short Spring



Connector ⑧ ⑭



Short Spring



H01356  
H01233  
AB0130 AB0045 AB0046  
H02248 H02249  
H16280 H16281

## 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.).

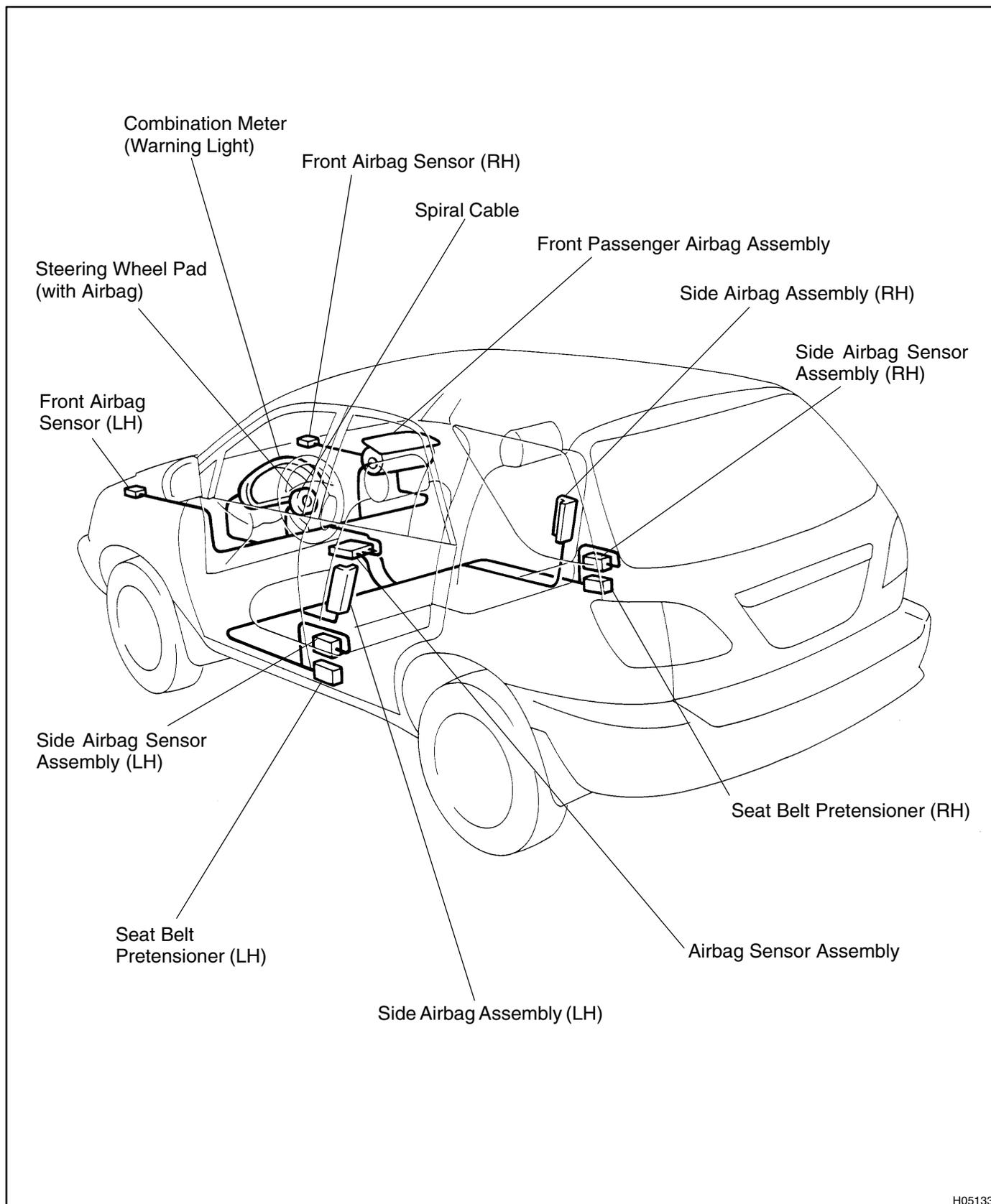
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI-318)	• Short in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI-323)	• Open in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI-327)	• Short in D squib circuit (to ground)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI-331)	• Short in D squib circuit (to B+)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI-335)	• Short in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI-339)	• Open in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0107/51 (DI-342)	• Short in P squib circuit (to ground)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0108/52 (DI-345)	• Short in P squib circuit (to B+)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0110/43 (DI-348)	• Short in side squib (RH) circuit	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0111/44 (DI-352)	• Open in side squib (RH) circuit	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0112/41 (DI-358)	• Short in side squib (RH) circuit (to ground)	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0113/42 (DI-358)	• Short in side squib (RH) circuit (to B+)	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0115/47 (DI-361)	• Short in side squib (LH) circuit	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0116/48 (DI-365)	• Open in side squib (LH) circuit	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink

DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0117/45 (DI-368)	• Short in side squib (LH) circuit (to ground)	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0118/46 (DI-371)	• Short in side squib (LH) circuit (to B+)	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0130/63 (DI-374)	• Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0131/64 (DI-378)	• Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0132/61 (DI-381)	• Short in P/T squib (RH) circuit (to ground)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0133/62 (DI-384)	• Short in P/T squib (RH) circuit (to B+)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0135/73 (DI-387)	• Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0136/74 (DI-391)	• Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0137/71 (DI-394)	• Short in P/T squib (LH) circuit (to ground)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0138/72 (DI-397)	• Short in P/T squib (LH) circuit (to B+)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B1100/31 (DI-400)	• Airbag sensor assembly malfunction	• Airbag sensor assembly	ON
B1140/32 (DI-402)	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly (RH) • Airbag sensor assembly • Wire harness	Blink
B1141/33 (DI-410)	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly (LH) • Airbag sensor assembly • Wire harness	Blink
B1156/B1157/ 15 (DI-418)	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Airbag sensor assembly • Instrument panel wire harness • Engine room No. 2 wire harness	ON
B1158/B1159/ 16 (DI-426)	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Instrument panel wire harness	ON
Normal (DI-431)	• System normal	–	OFF
	• Voltage source drop	• Battery • Airbag sensor assembly	ON

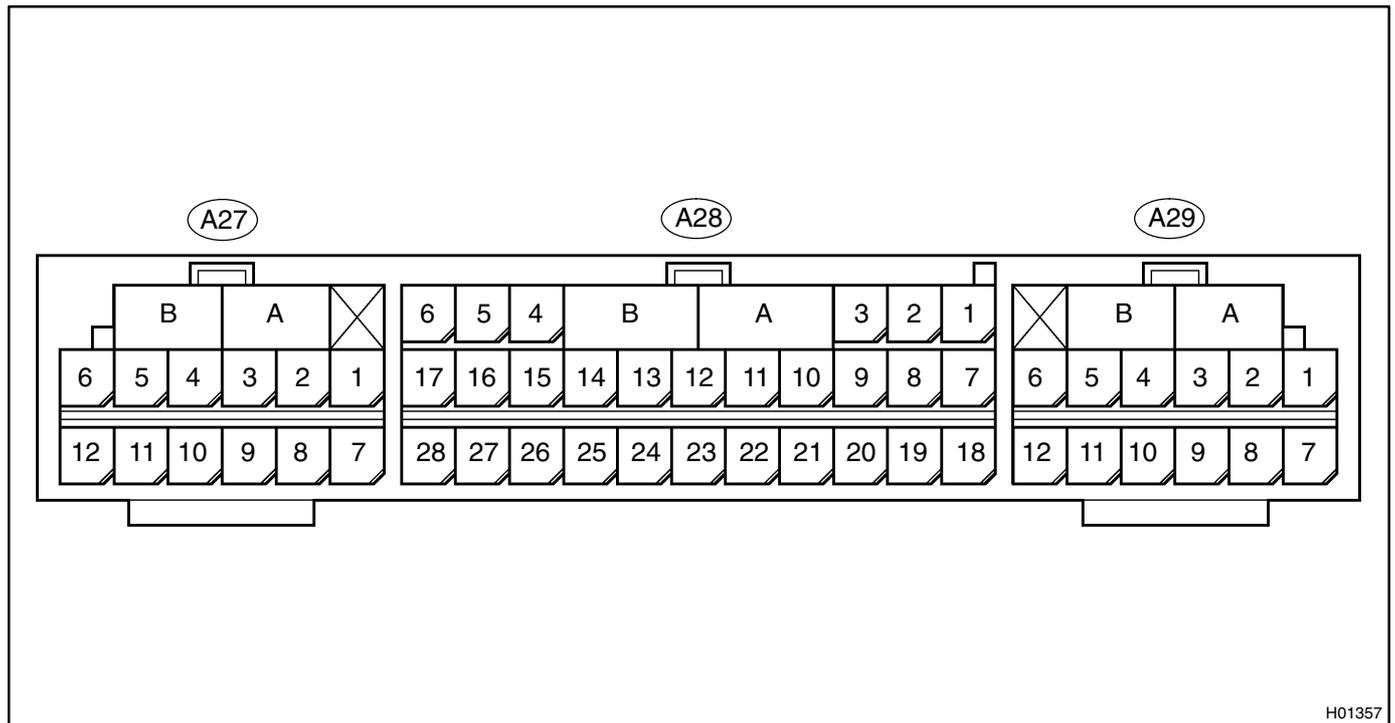
**HINT:**

- 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.

# PARTS LOCATION



# TERMINALS OF ECU



H01357

No.	Symbol	Terminal Name
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
A28 - 3	LA	SRS Warning Light
A28 - 5	IG2	Power Source
A28 - 6	IG1	Power Source
A28 - 9	+SR	Front Airbag Sensor (RH)
A28 - 10	P+	Squib (Passenger)
A28 - 11	P-	Squib (Passenger)
A28 - 12	SIL	Diagnosis
A28 - 13	D-	Squib (Driver)
A28 - 14	D+	Squib (Driver)
A28 - 15	+SL	Front Airbag Sensor (LH)
A28 - 19	Tc	Diagnosis
A28 - 20	-SR	Front Airbag Sensor (RH)
A28 - 23	GSW2	ECM
A28 - 26	-SL	Front Airbag Sensor (LH)
A28 - 27	E1	Ground
A28 - 28	E2	Ground
A27 - 1	PL-	Squib (Seat Belt Pretensioner, LH)
A27 - 2	PL+	Squib (Seat Belt Pretensioner, LH)
A27 - 5	SFL-	Squib (Side, LH)
A27 - 6	SFL+	Squib (Side, LH)
A27 - 7	VUPL	Side Airbag Sensor (LH)
A27 - 9	SSL+	Side Airbag Sensor (LH)
A27 - 10	FSL	Side Airbag Sensor (LH)

No.	Symbol	Terminal Name
A27 – 12	ESL	Side Airbag Sensor (LH)
A29 – 1	SFR+	Squib (Side, RH)
A29 – 2	SFR–	Squib (Side, RH)
A29 – 5	PR+	Squib (Pretensioner, RH)
A29 – 6	PR–	Squib (Pretensioner, RH)
A29 – 7	ESR	Side Airbag Sensor (RH)
A29 – 9	FSR	Side Airbag Sensor (RH)
A29 – 10	SSR+	Side Airbag Sensor (RH)
A29 – 12	VUPR	Side Airbag Sensor (RH)

## PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
<ul style="list-style-type: none"> <li>• With the ignition switch in ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.</li> </ul>	<ul style="list-style-type: none"> <li>• SRS warning light circuit</li> </ul>	DI-434
<ul style="list-style-type: none"> <li>• SRS warning light is always lit up even when ignition switch is in the LOCK position.</li> </ul>		
<ul style="list-style-type: none"> <li>• With the ignition switch in ON position, the SRS warning light does not light up.</li> </ul>		
<ul style="list-style-type: none"> <li>• DTC is not displayed.</li> </ul>	<ul style="list-style-type: none"> <li>• Tc terminal circuit</li> </ul>	DI-439
<ul style="list-style-type: none"> <li>• SRS warning light is always lit up at the time of DTC check procedure.</li> </ul>		
<ul style="list-style-type: none"> <li>• DTC is displayed without Tc and CG terminal connection.</li> </ul>		

# CIRCUIT INSPECTION

<b>DTC</b>	<b>B0100/13</b>	<b>Short in D Squib Circuit</b>
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## CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.

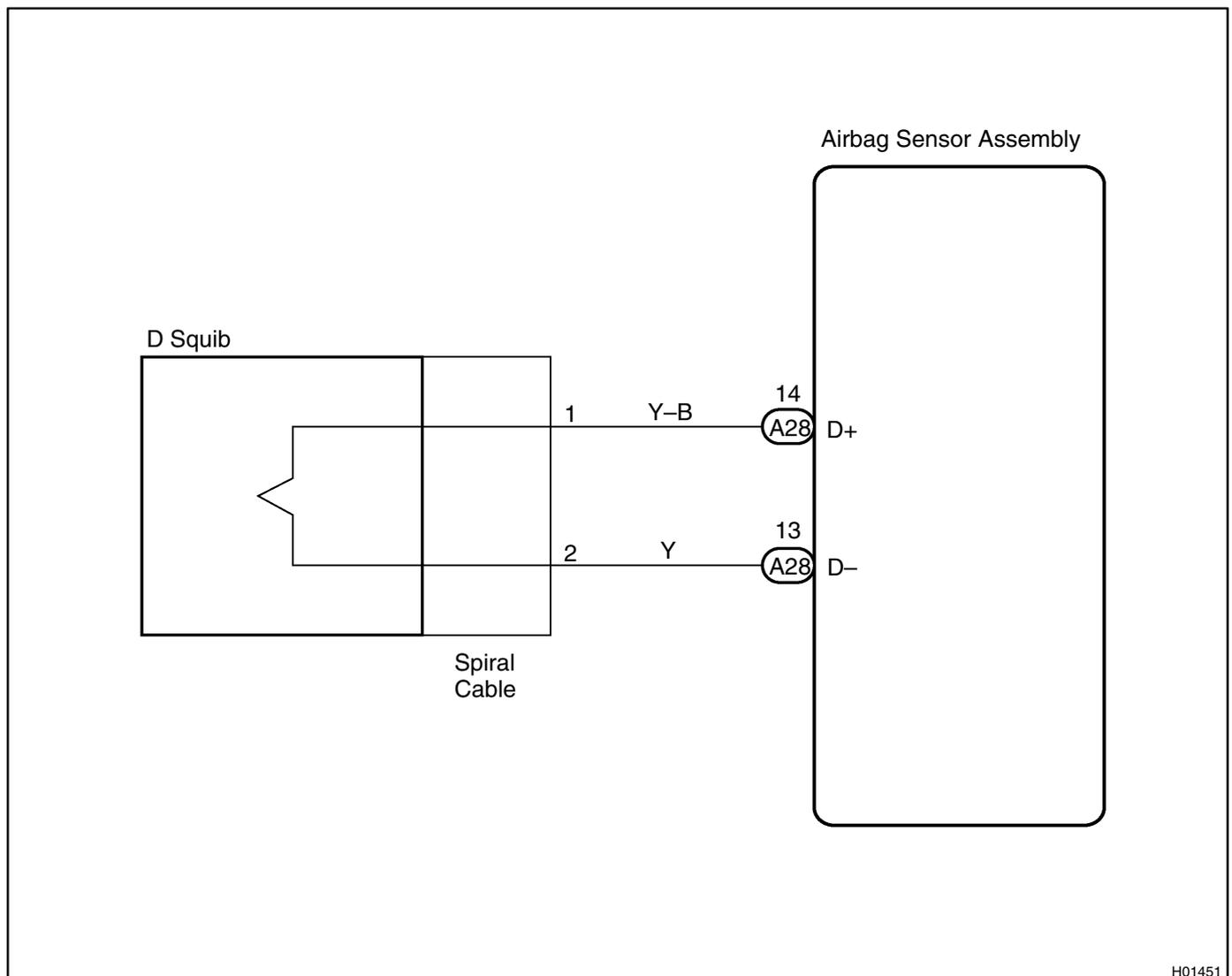
It causes the airbag to deploy when the airbag deployment conditions are satisfied.

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.

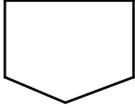
DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	<ul style="list-style-type: none"> <li>• Short circuit between D+ wire harness and D- wire harness of squib</li> <li>• D squib malfunction</li> <li>• Spiral cable malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Steering wheel pad (D squib)</li> <li>• Spiral cable</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

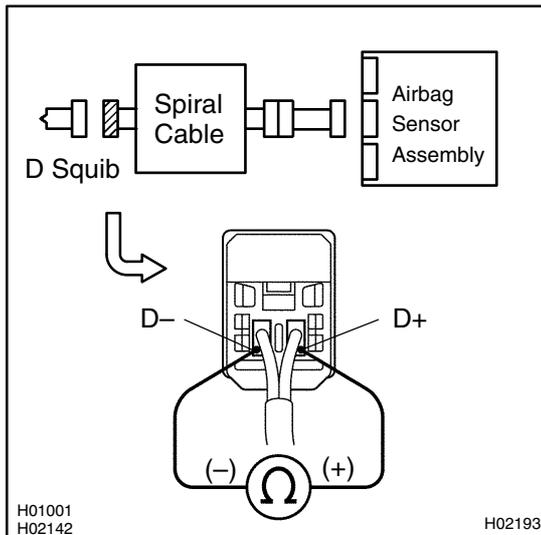


## INSPECTION PROCEDURE

**1** Prepare for inspection (See step 1 on page DI-431).



**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-305).

**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:**

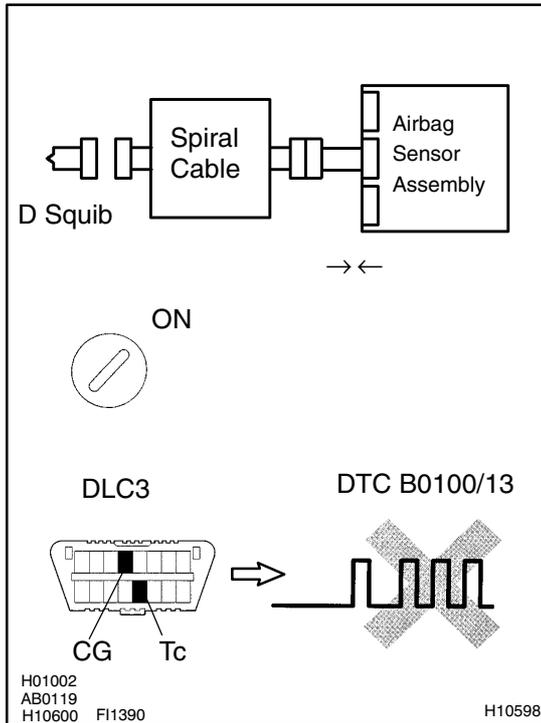
**Resistance: 1 MΩ or Higher**

**NG**

**Go to step 5.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0100/13 is not output.**

#### HINT:

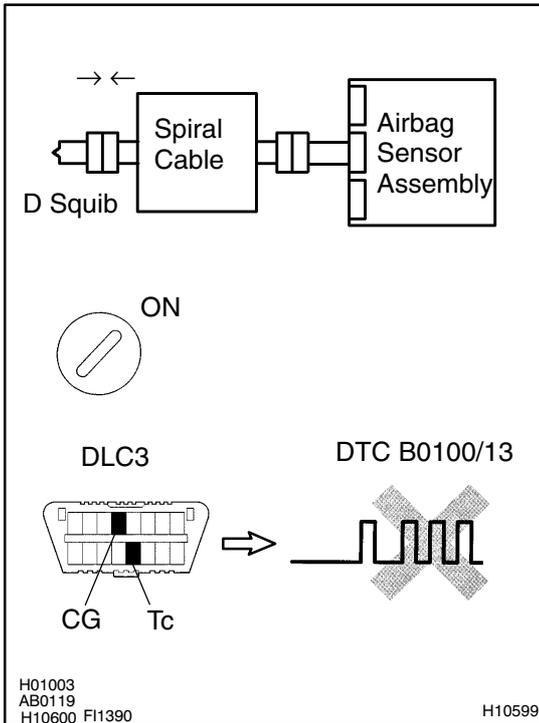
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0100/13 is not output.**

### HINT:

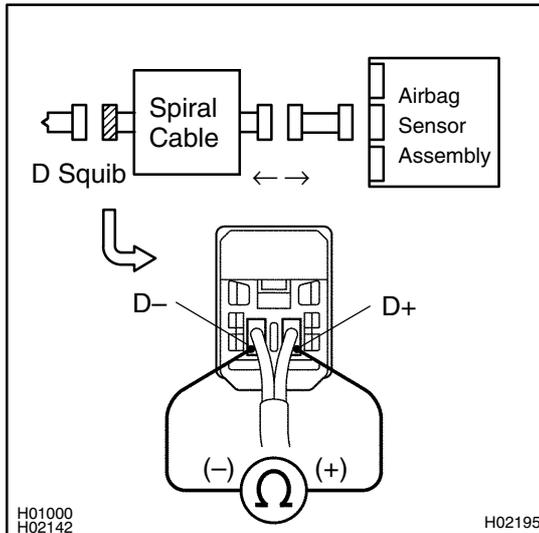
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

**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:**

- Disconnect the connector between the airbag sensor assembly and the spiral cable.
- Release the airbag activation prevention mechanism of the spiral cable connector on the airbag sensor assembly side (See page DI-305).

**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-.

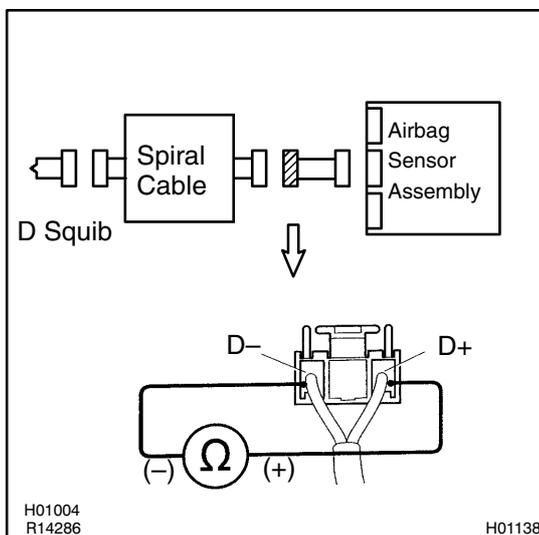
**OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace spiral cable.**

**OK3**

**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-305).

**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.**

<b>DTC</b>	<b>B0101/14</b>	<b>Open in D Squib Circuit</b>
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## 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.

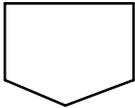
DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	<ul style="list-style-type: none"> <li>• Open circuit in D+ wire harness or D- wire harness of squib</li> <li>• D squib malfunction</li> <li>• Spiral cable malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Steering wheel pad (D squib)</li> <li>• Spiral cable</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

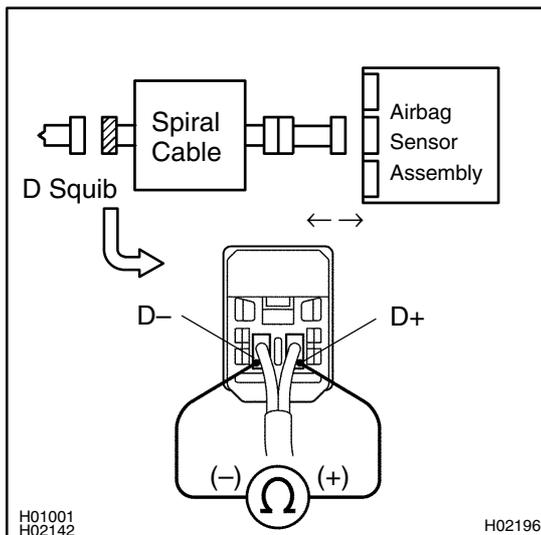
See page DI-318.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
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<b>2</b>	<b>Check D squib circuit.</b>
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### 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:

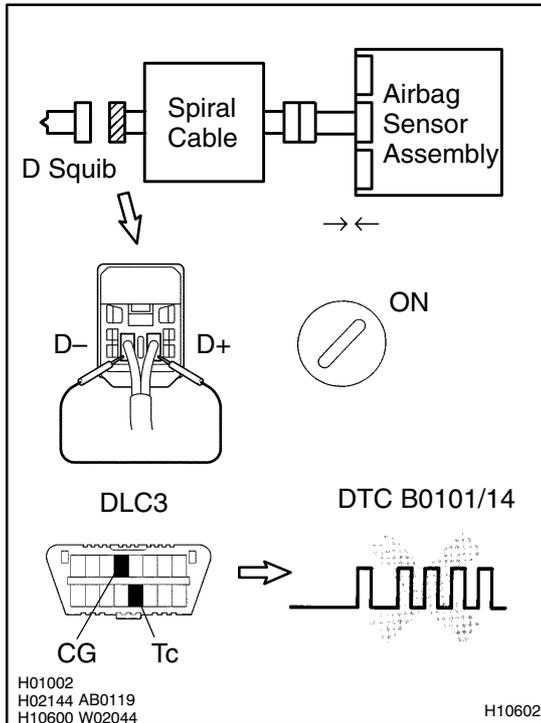
**Resistance: Below 1  $\Omega$**



**Go to step 5.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0101/14 is not output.**

#### HINT:

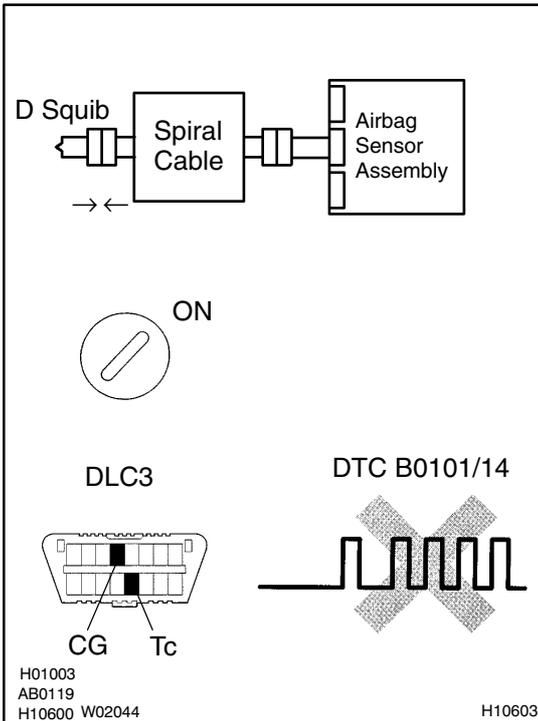
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0101/14 is not output.**

### HINT:

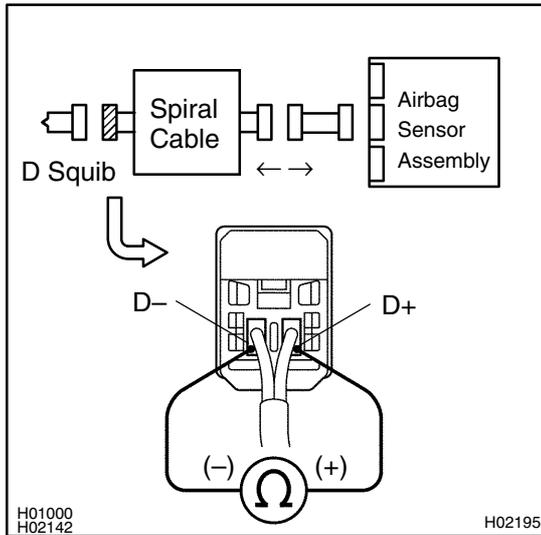
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

**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:**

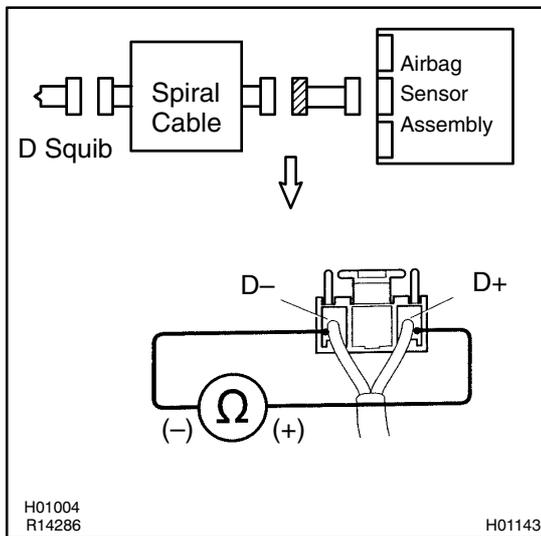
Disconnect the connector between the airbag sensor assembly and the spiral cable.

**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  $\Omega$**

**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  $\Omega$**

**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.**

<b>DTC</b>	<b>B0102/11</b>	<b>Short in D Squib Circuit (to Ground)</b>
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**CIRCUIT DESCRIPTION**

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0102/11 is recorded when a ground short is detected in the D squib circuit.

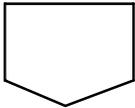
DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	<ul style="list-style-type: none"> <li>• Short circuit in D squib wire harness (to ground)</li> <li>• D squib malfunction</li> <li>• Spiral cable malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Steering wheel pad (D squib)</li> <li>• Spiral cable</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM**

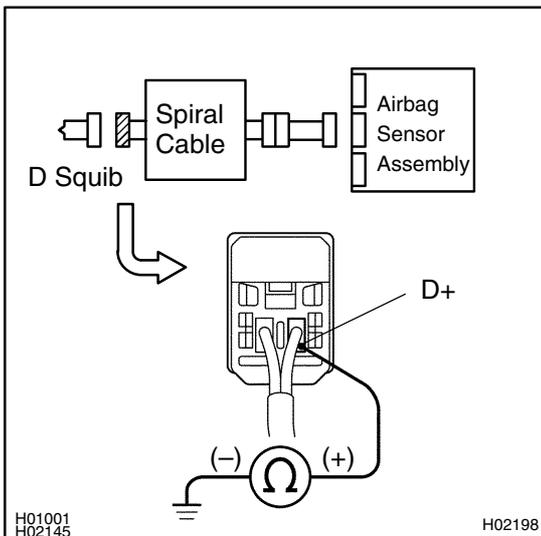
See page DI-318.

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check D squib circuit.</b>
----------	-------------------------------



**CHECK:**

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and body ground.

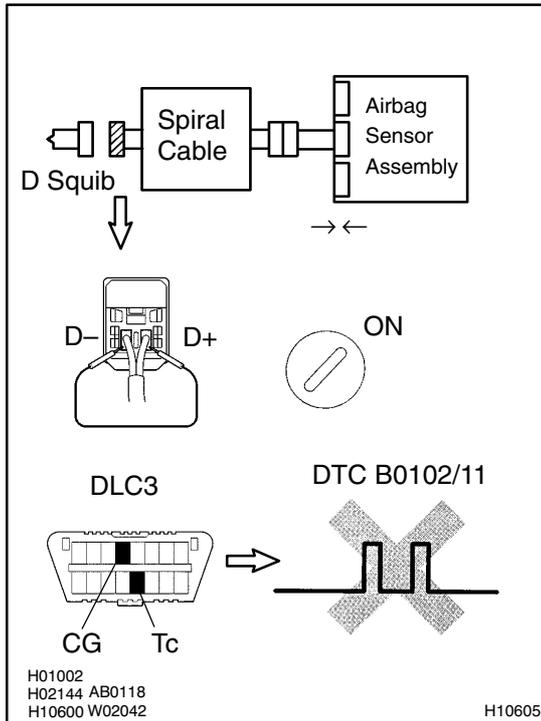
**OK:**

**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Go to step 5.</b>
-----------	----------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0102/11 is not output.**

#### HINT:

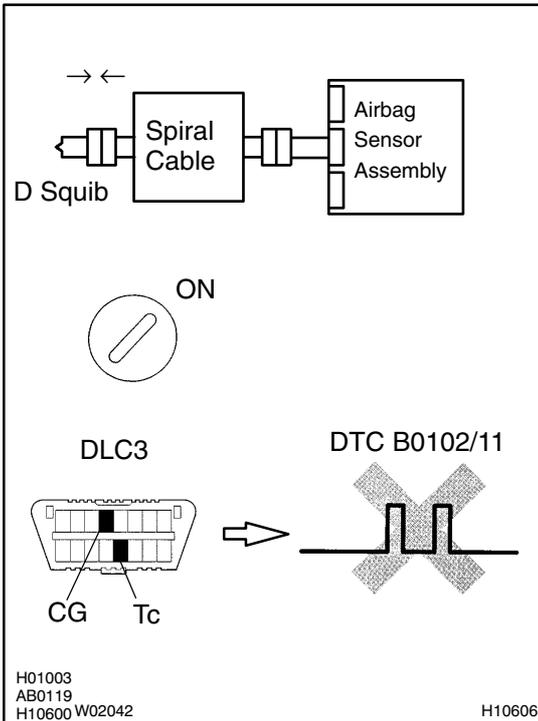
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0102/11 is not output.**

### HINT:

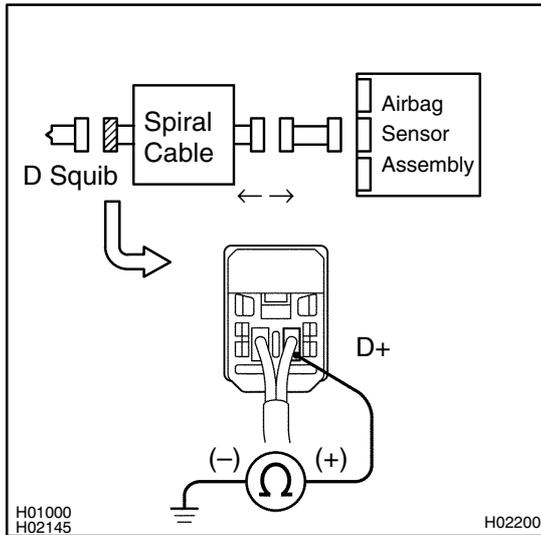
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

**NG**

**Replace steering wheel pad.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

**5 Check spiral cable.****PREPARATION:**

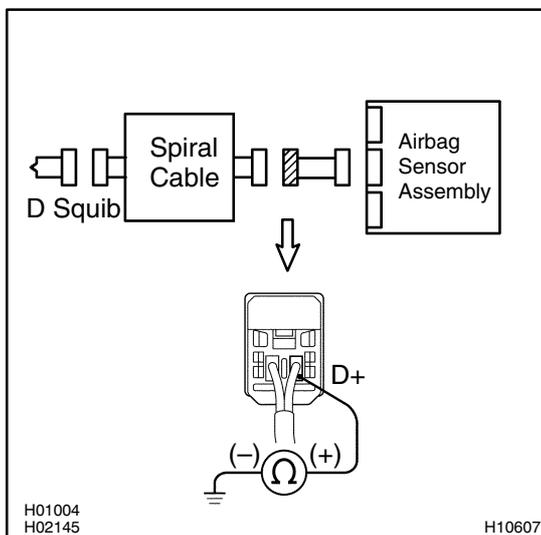
Disconnect the connector between the airbag sensor assembly and the spiral cable.

**CHECK:**

For the connector (on the spiral cable side) between the steering wheel pad and the spiral cable, measure the resistance between D+ and body ground.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace spiral cable.****OK****6 Check harness between airbag sensor assembly and spiral cable.****CHECK:**

For the connector (on the spiral cable side) between the spiral cable and the airbag sensor assembly, measure the resistance between D+ and body ground.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace harness between airbag sensor assembly and spiral cable.****OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0103/12</b>	<b>Short in D Squib Circuit (to B+)</b>
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## CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0103/12 is recorded when a B+ short is detected in the D squib circuit.

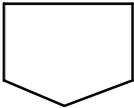
DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	<ul style="list-style-type: none"> <li>• Short circuit in D squib wire harness (to B+)</li> <li>• D squib malfunction</li> <li>• Spiral cable malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Steering wheel pad (D squib)</li> <li>• Spiral cable</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

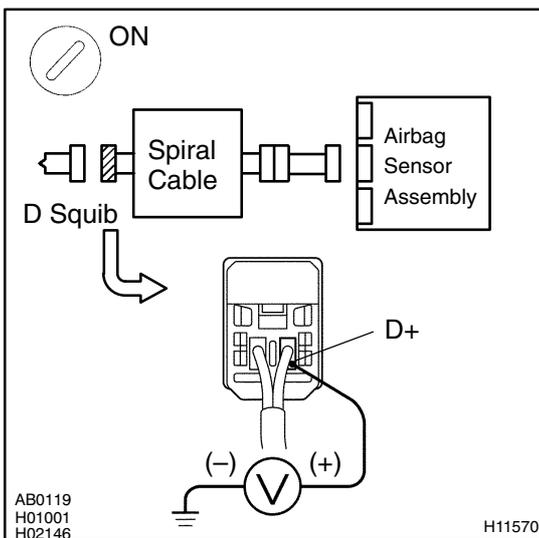
See page DI-318.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check D squib circuit.</b>
----------	-------------------------------



### CHECK:

- Turn ignition switch to ON.
- For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

### OK:

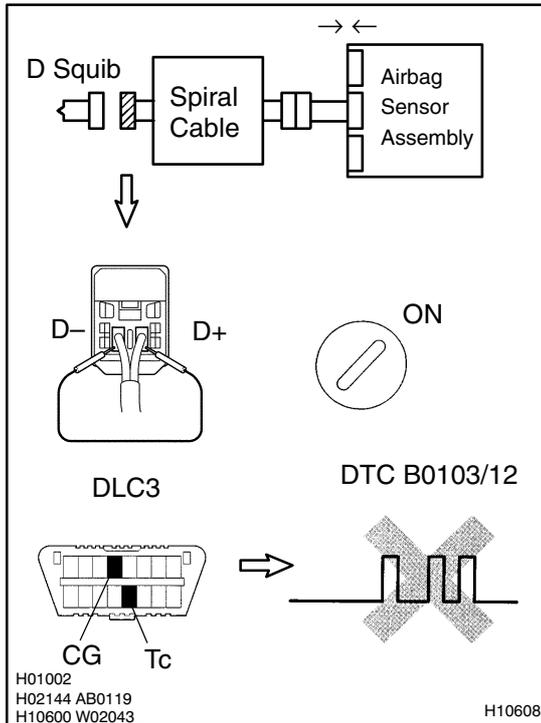
**Voltage: 0 V**



**Go to step 5.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0103/12 is not output.**

#### HINT:

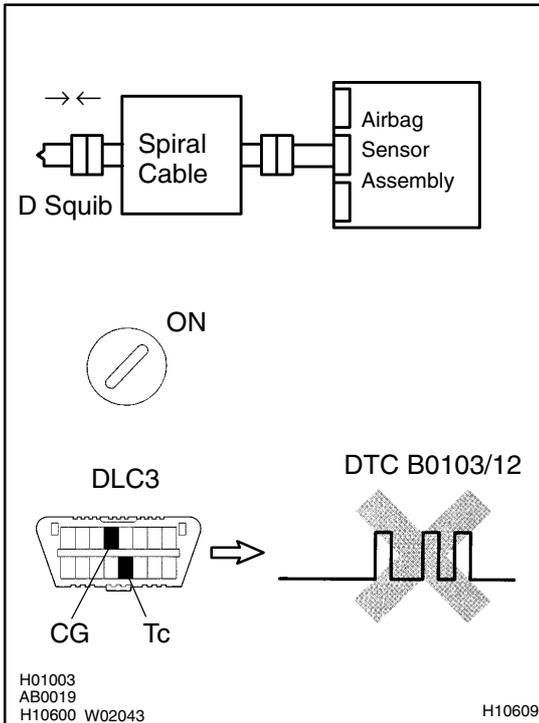
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0103/12 is not output.**

### HINT:

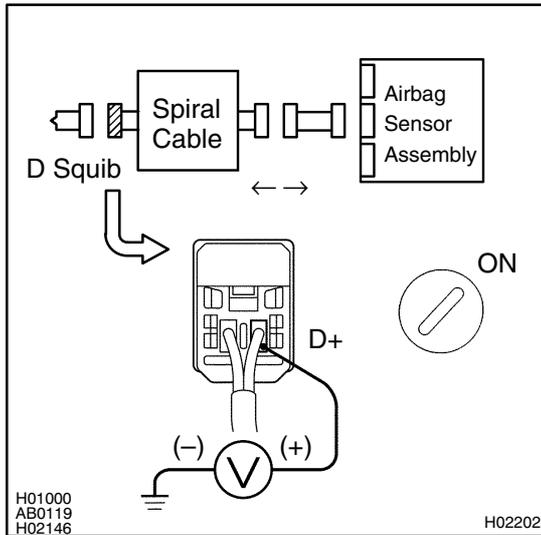
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

**NG**

**Replace steering wheel pad.**

**OK**

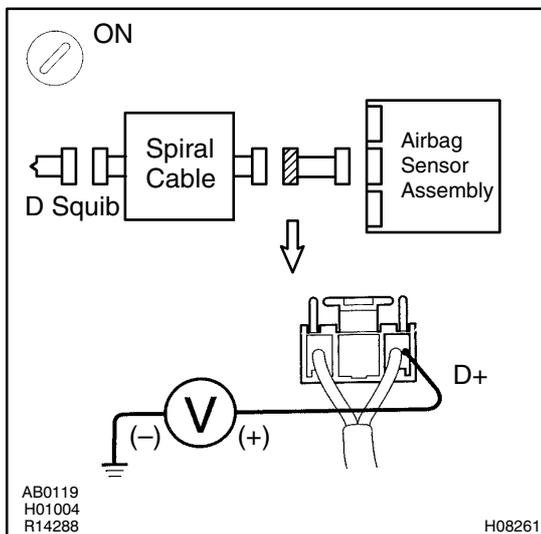
**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

**5 Check spiral cable.****PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the connector between the airbag sensor assembly and the spiral cable.

**CHECK:**

- Turn the ignition switch to ON.
- For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

**OK:****Voltage: 0 V****NG****Repair or replace spiral cable.****OK****6 Check harness between airbag sensor assembly and spiral cable.****CHECK:**

- Turn the ignition switch to ON.
- 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.**

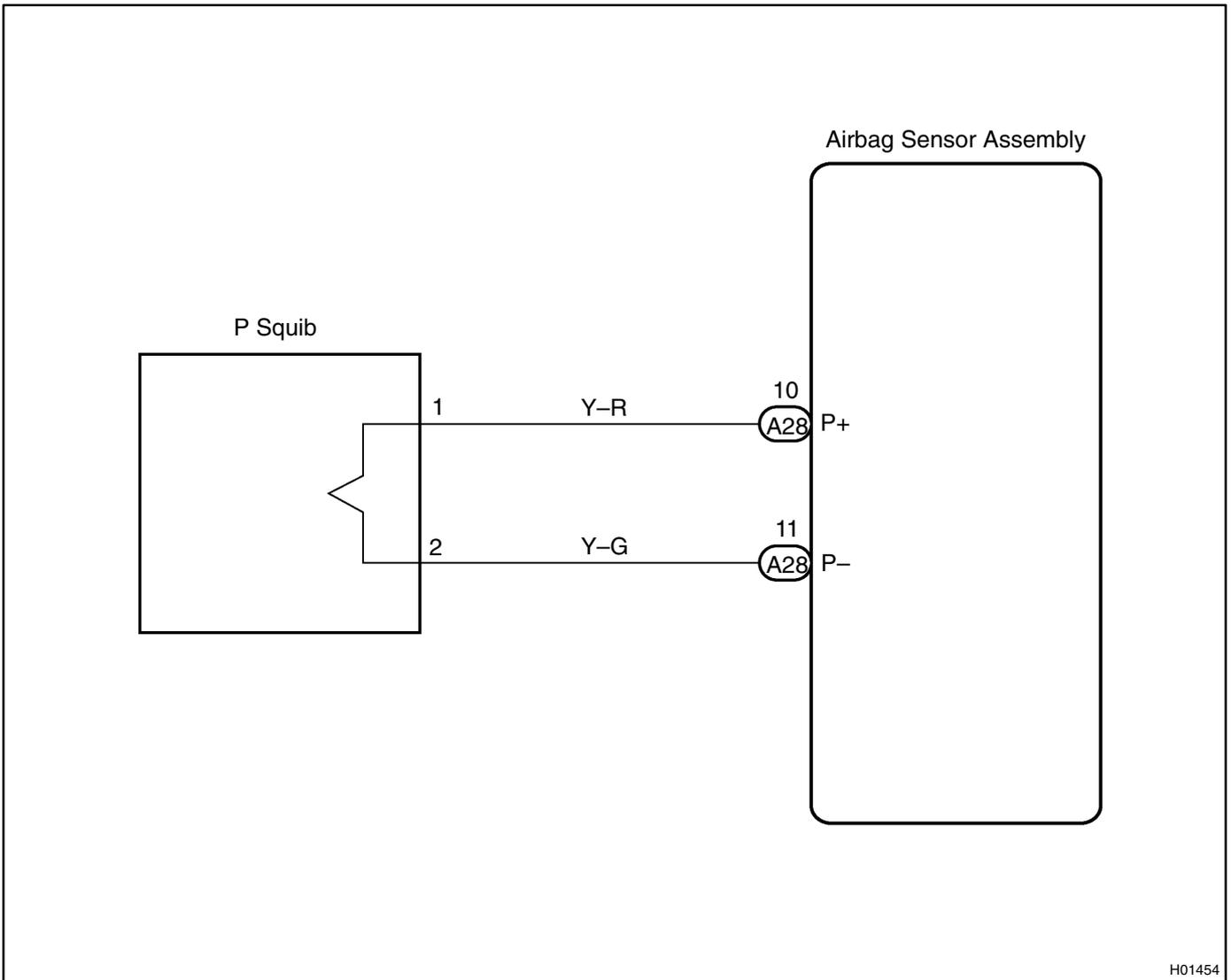
<b>DTC</b>	<b>B0105/53</b>	<b>Short in P Squib Circuit</b>
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**CIRCUIT DESCRIPTION**

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.

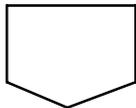
DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	<ul style="list-style-type: none"> <li>• Short circuit in P squib wire harness</li> <li>• P squib malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Front passenger airbag assembly (P squib)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM**

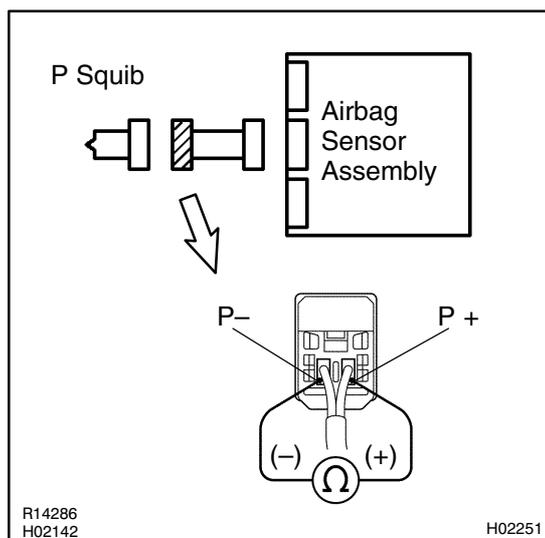


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page DI-431).



2 Check P squib circuit.

**PREPARATION:**

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the front passenger airbag assembly and the airbag sensor assembly (See page DI-305).

**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:**

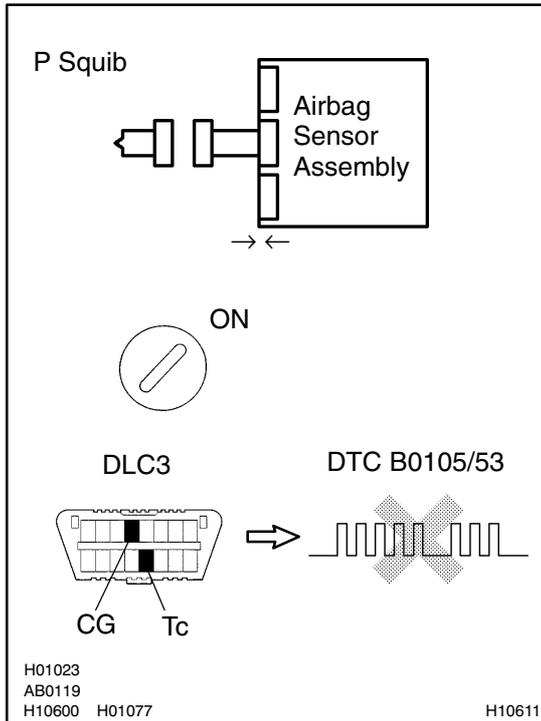
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0105/53 is not output.**

#### HINT:

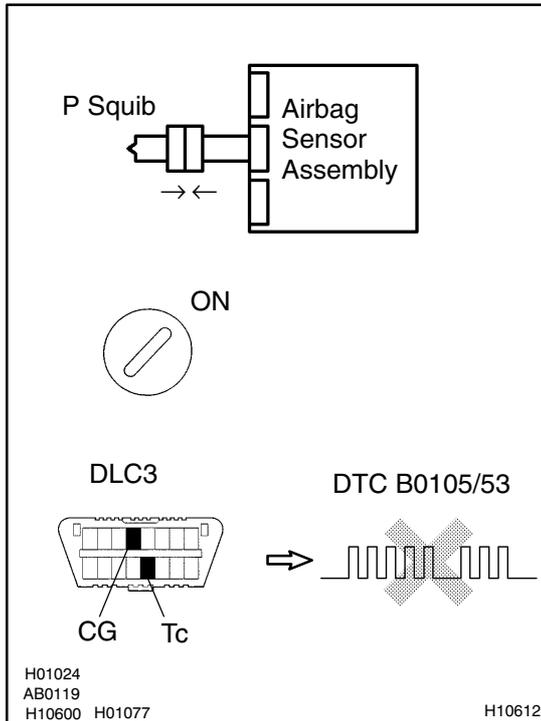
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### 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.**

<b>DTC</b>	<b>B0106/54</b>	<b>Open in P Squib Circuit</b>
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## 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.

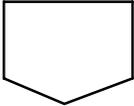
DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	<ul style="list-style-type: none"> <li>• Open circuit in P+ wire harness or P- wire harness of squib</li> <li>• P squib malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Front passenger airbag assembly (P squib)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

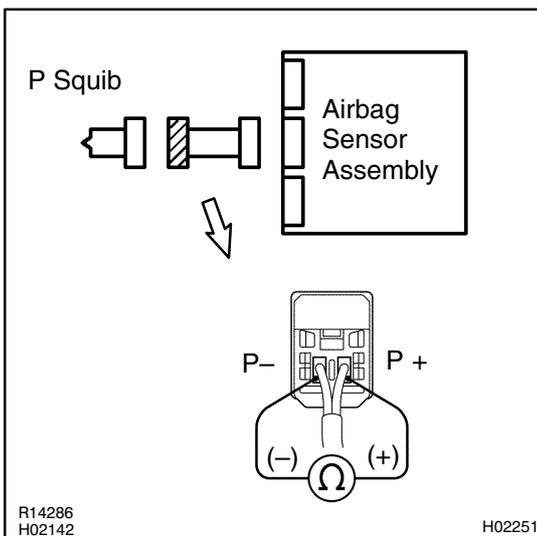
See page DI-335.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P squib circuit.</b>
----------	-------------------------------



### 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  $\Omega$**

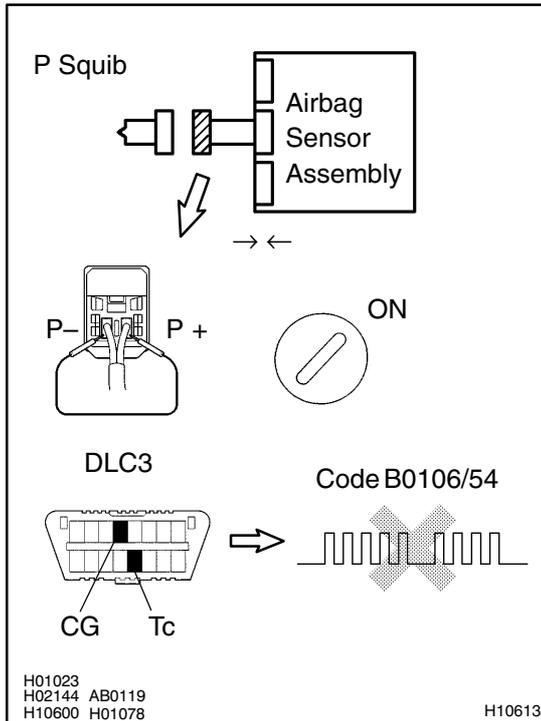
**NG**

**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0106/54 is not output.**

#### HINT:

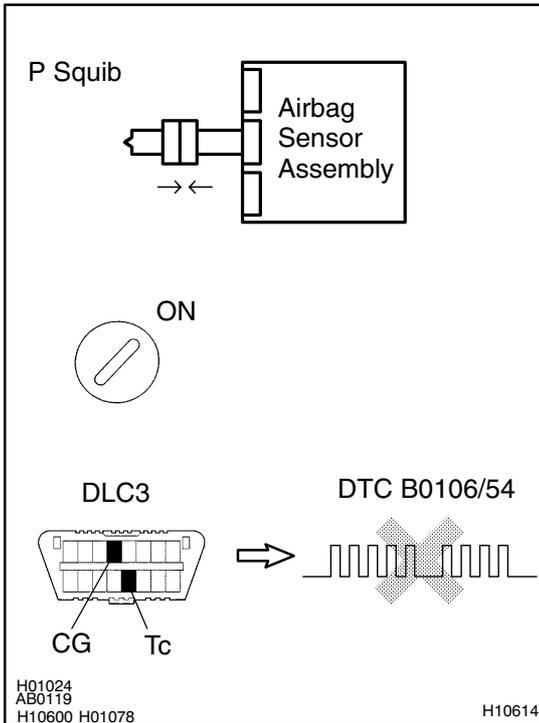
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### 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.**

<b>DTC</b>	<b>B0107/51</b>	<b>Short in P Squib Circuit (to Ground)</b>
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## CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0107/51 is recorded when ground short is detected in the P squib circuit.

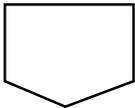
DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	<ul style="list-style-type: none"> <li>• Short circuit in P squib wire harness (to ground)</li> <li>• P squib malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Front passenger airbag assembly (P squib)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

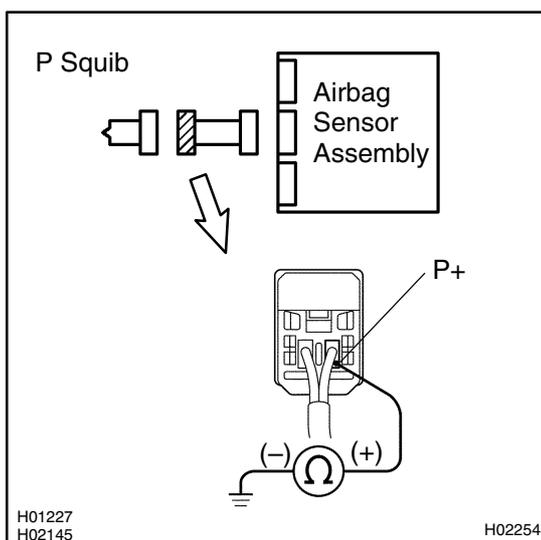
See page DI-335.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P squib circuit.</b>
----------	-------------------------------



### CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and body ground.

### OK:

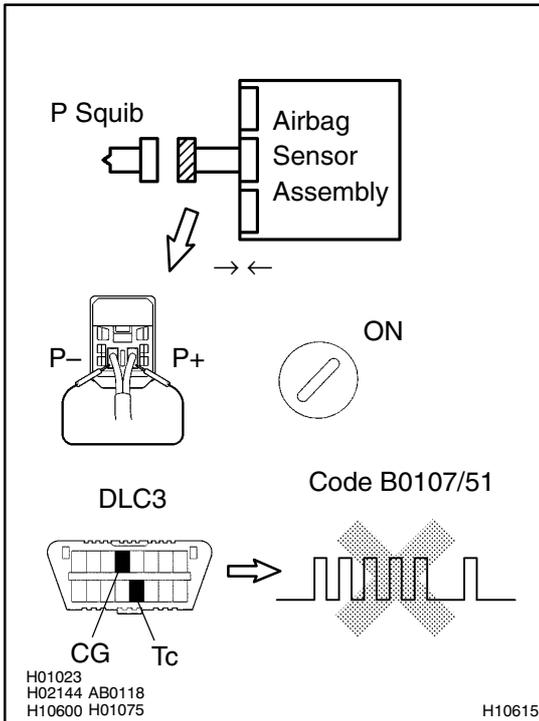
**Resistance: 1 MΩ or Higher**

### NG

**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0107/51 is not output.**

#### HINT:

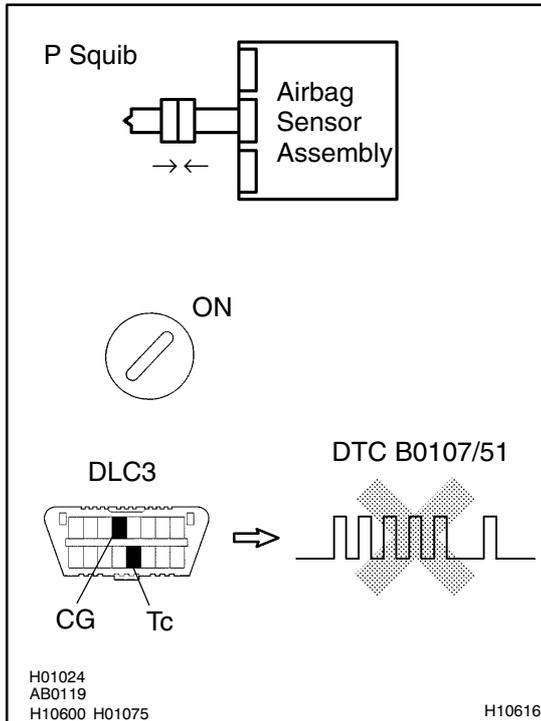
Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0107/51 is not output.**

### HINT:

Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0108/52</b>	<b>Short in P Squib Circuit (to B+)</b>
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## CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

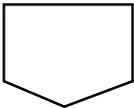
DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	<ul style="list-style-type: none"> <li>• Short circuit in P squib wire harness (to B+)</li> <li>• P squib malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Front passenger airbag assembly (P squib)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

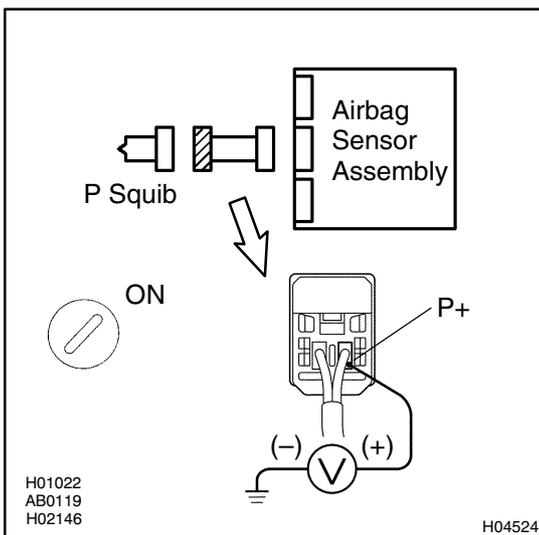
See page DI-335.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P squib circuit.</b>
----------	-------------------------------



### CHECK:

- Turn the ignition switch to ON.
- For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the voltage between the P+ and body ground.

### OK:

**Voltage: 0 V**

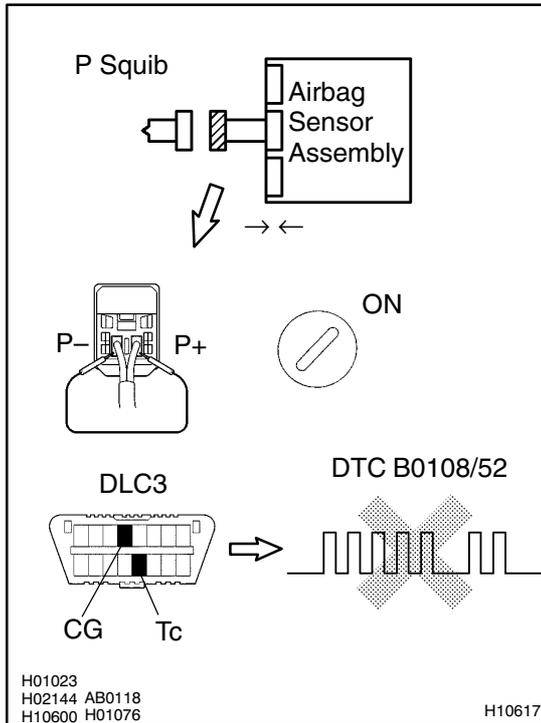
### NG

**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0108/52 is not output.**

#### HINT:

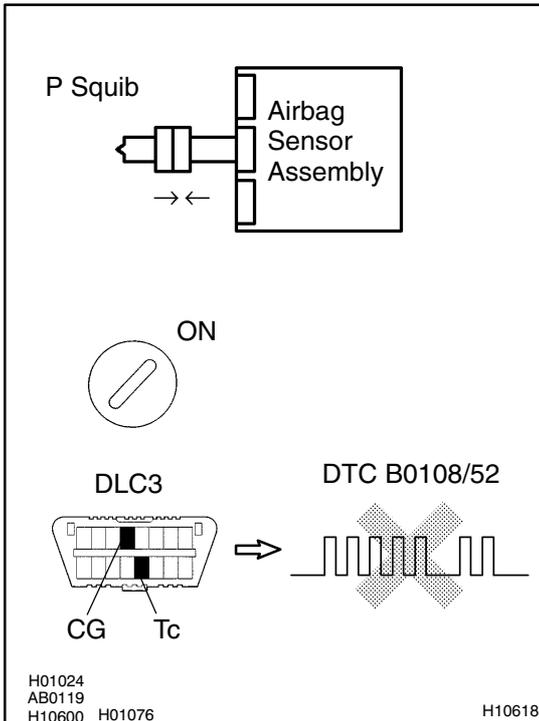
Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0108/52 is not output.**

### HINT:

Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

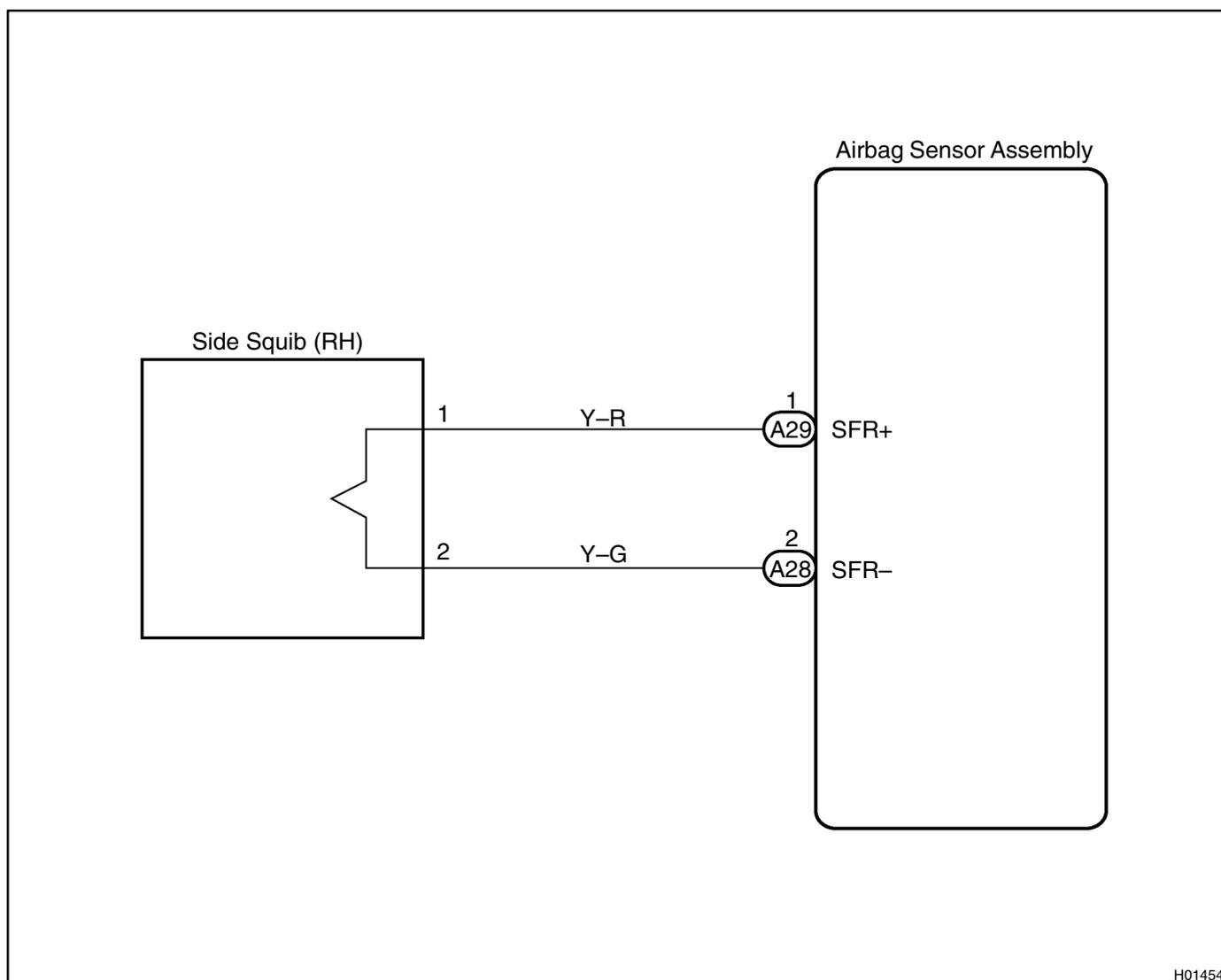
<b>DTC</b>	<b>B0110/43</b>	<b>Short in Side Squib (RH) Circuit</b>
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### CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0110/43 is recorded when a short is detected in the side squib (RH) circuit.

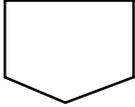
DTC No.	DTC Detecting Condition	Trouble Area
B0110/43	<ul style="list-style-type: none"> <li>• Short circuit between SFR+ wire harness and SFR- wire harness of squib</li> <li>• Side squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

### WIRING DIAGRAM

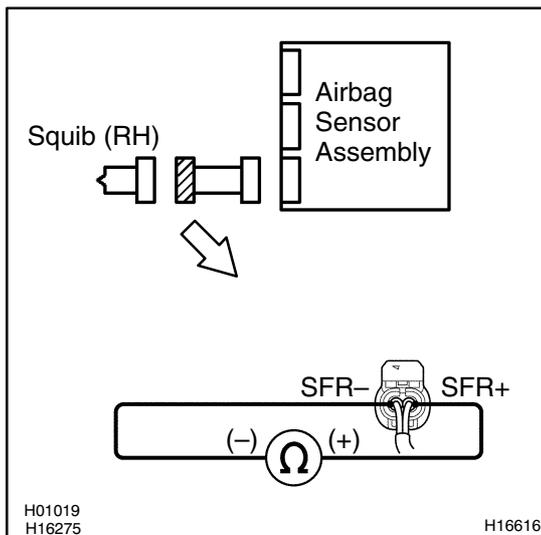


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page DI-431).



2 Check side squib (RH) circuit.

**PREPARATION:**

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the side airbag assembly (RH) (See page DI-305).

**CHECK:**

For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR-.

**OK:**

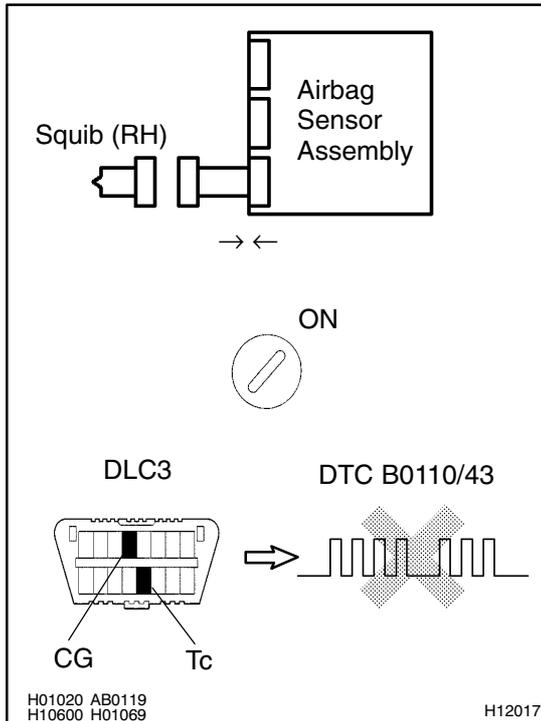
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch or ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0110/43 is not output.**

#### HINT:

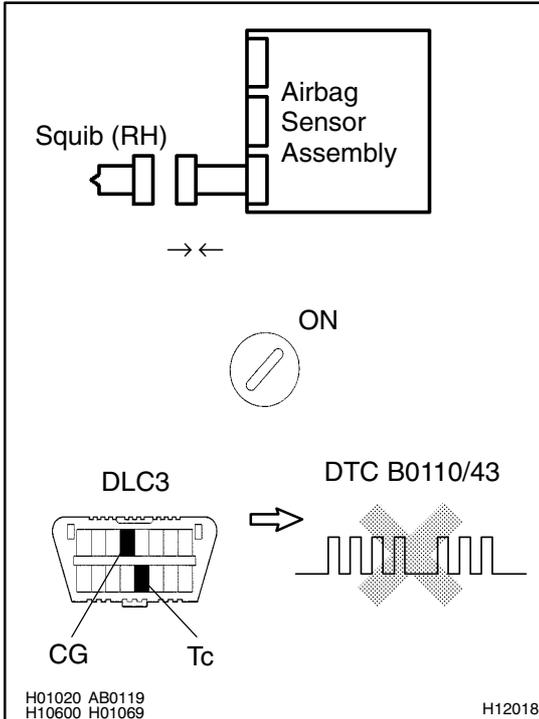
Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check side squib (RH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 second.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0110/43 is not output.**

#### HINT:

Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly (RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0111/44</b>	<b>Open in Side Squib (RH) Circuit</b>
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## CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0111/44 is recorded when an open is detected in the side squib (RH) circuit.

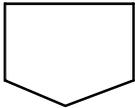
DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	<ul style="list-style-type: none"> <li>• Open circuit in SFR+ wire harness or SFR- wire harness of squib</li> <li>• Side squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

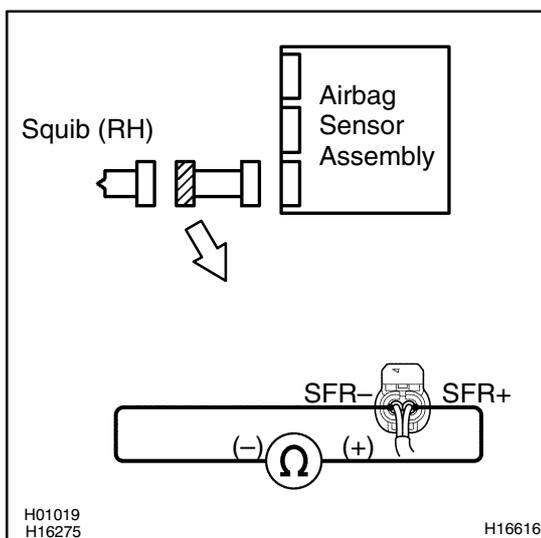
See page DI-348.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
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<b>2</b>	<b>Check front side squib (RH) circuit.</b>
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### CHECK:

For the connector (on the front side airbag assembly side) between the front side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR-.

### OK:

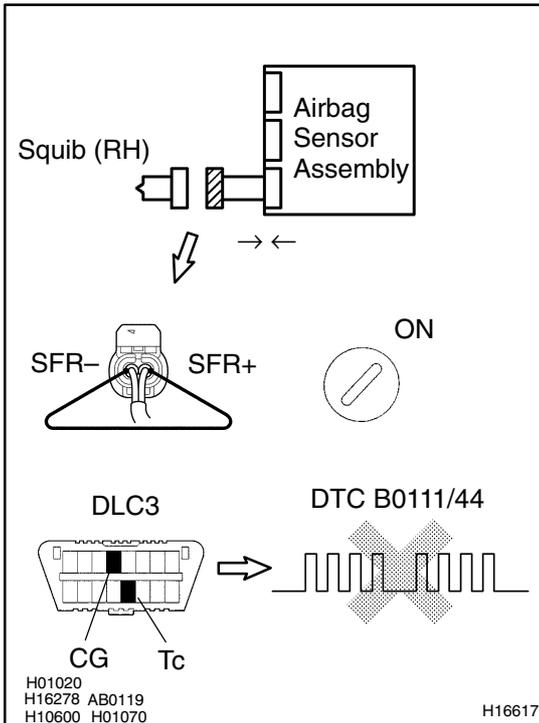
**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFR+ and SFR- of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0111/44 is not output.**

#### HINT:

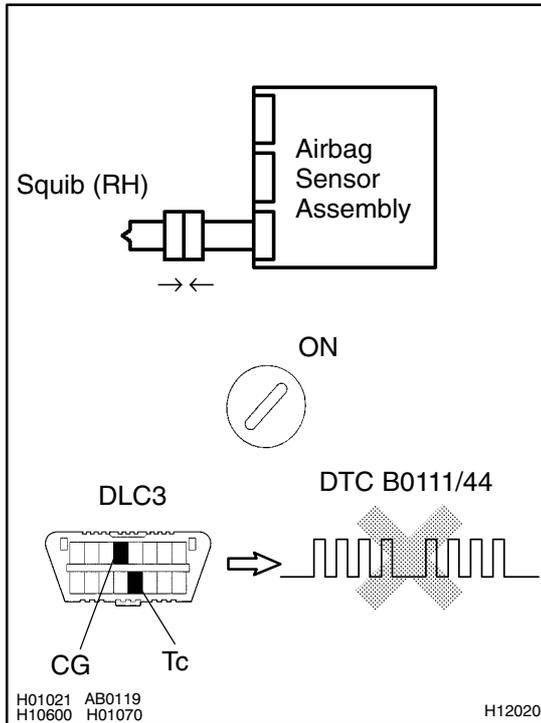
4Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check side squib (RH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0111/44 is not output.**

#### HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly (RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0112/41</b>	<b>Short in Side Squib (RH) Circuit (to Ground)</b>
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**CIRCUIT DESCRIPTION**

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0112/41 is recorded when ground short is detected in the side squib (RH) circuit.

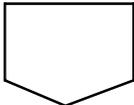
DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	<ul style="list-style-type: none"> <li>• Short circuit in side squib (RH) wire harness (to ground)</li> <li>• Side squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM**

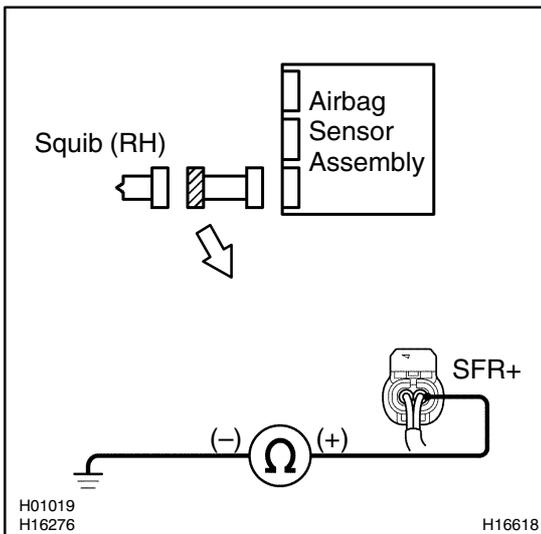
See page DI-348.

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check side squib (RH) circuit.</b>
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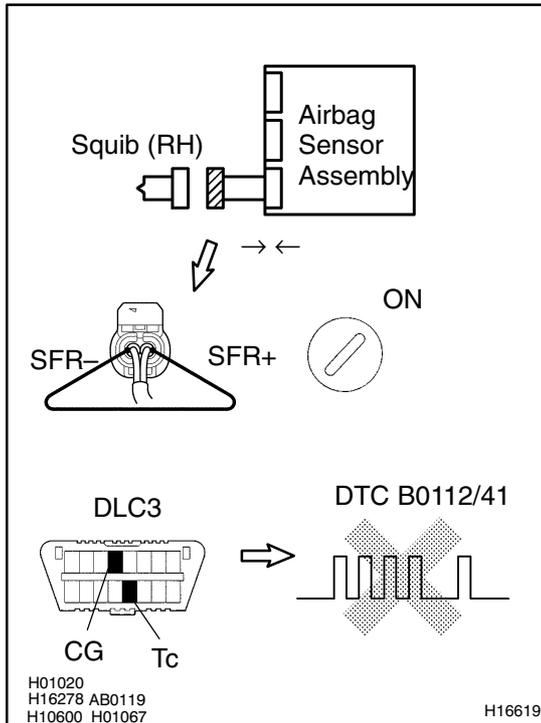
**CHECK:**  
For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and body ground.

**OK:**  
**Resistance: 1 MΩ or Higher**

**NG** → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFR+ and SFR- of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0112/41 is not output.**

#### HINT:

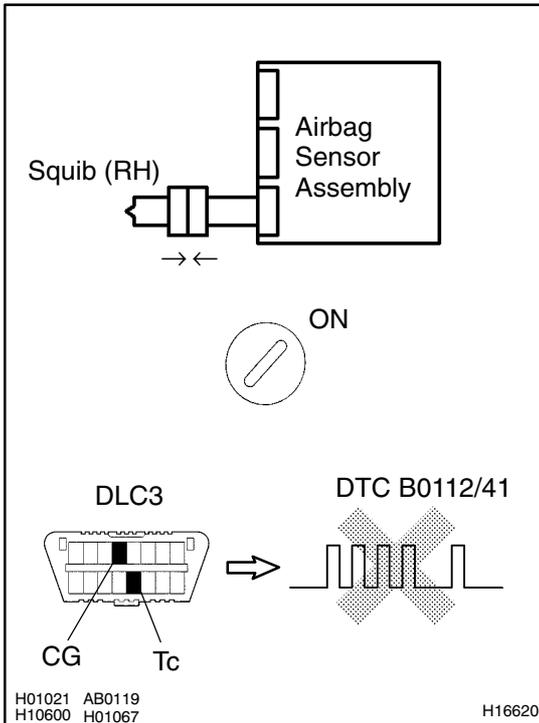
Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check side squib (RH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0112/41 is not output.**

#### HINT:

Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG

**Replace side airbag assembly (RH).**

OK

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0113/42</b>	<b>Short in Side Squib (RH) Circuit (to B+)</b>
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## CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0113/42 is recorded when a B+ short is detected in the side squib (RH) circuit.

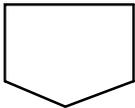
DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	<ul style="list-style-type: none"> <li>• Short circuit in side squib (RH) wire harness (to B+)</li> <li>• Side squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

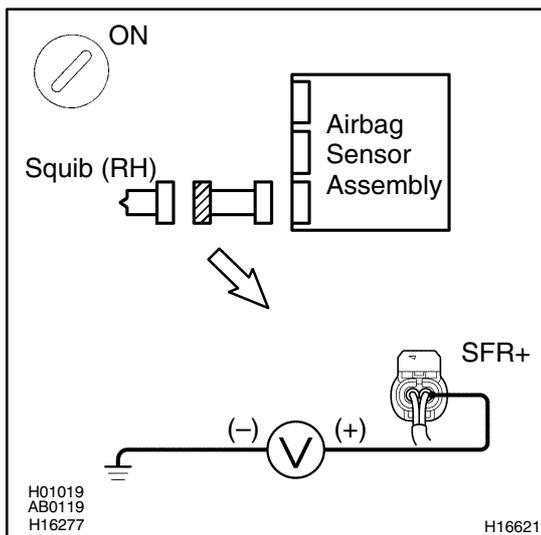
See page DI-348.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-305).</b>
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<b>2</b>	<b>Check side squib (RH) circuit.</b>
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### CHECK:

- Turn the ignition switch to ON.
- For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the voltage between SFR+ and body ground.

### OK:

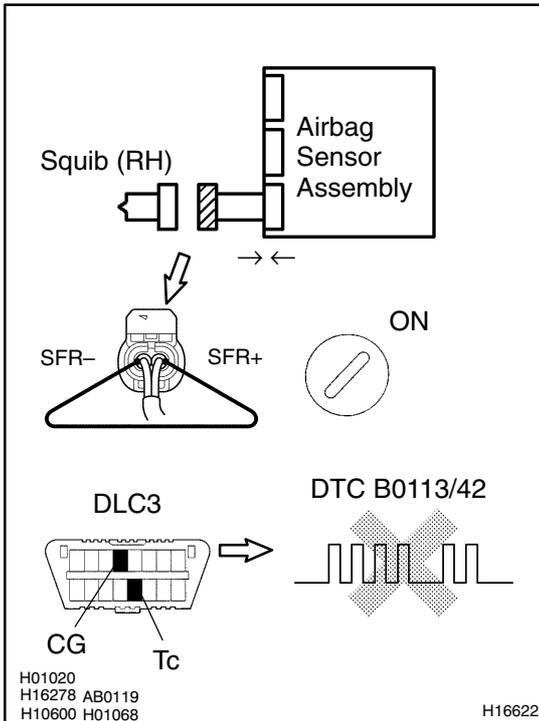
**Voltage: 0 V**



**Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFR+ and SFR- of the connector (on the front side airbag assembly side) between the front side airbag assembly (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0113/42 is not output.**

#### HINT:

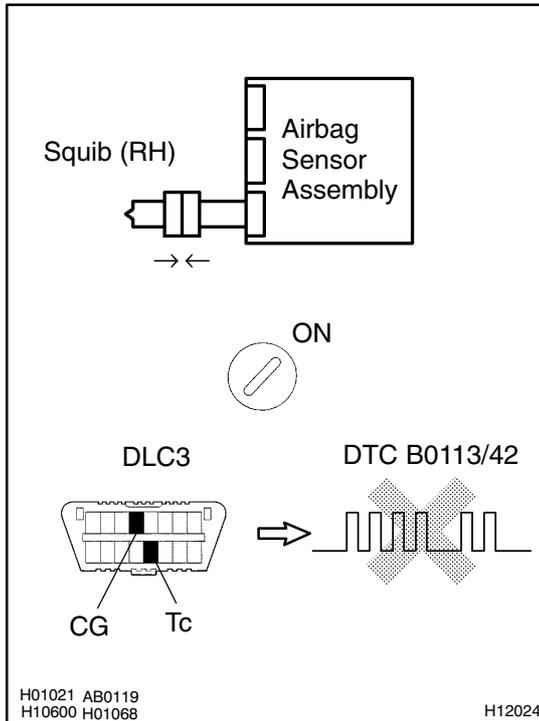
Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check side squib (RH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0113/42 is not output.**

#### HINT:

Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG

**Replace side airbag assembly (RH).**

OK

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

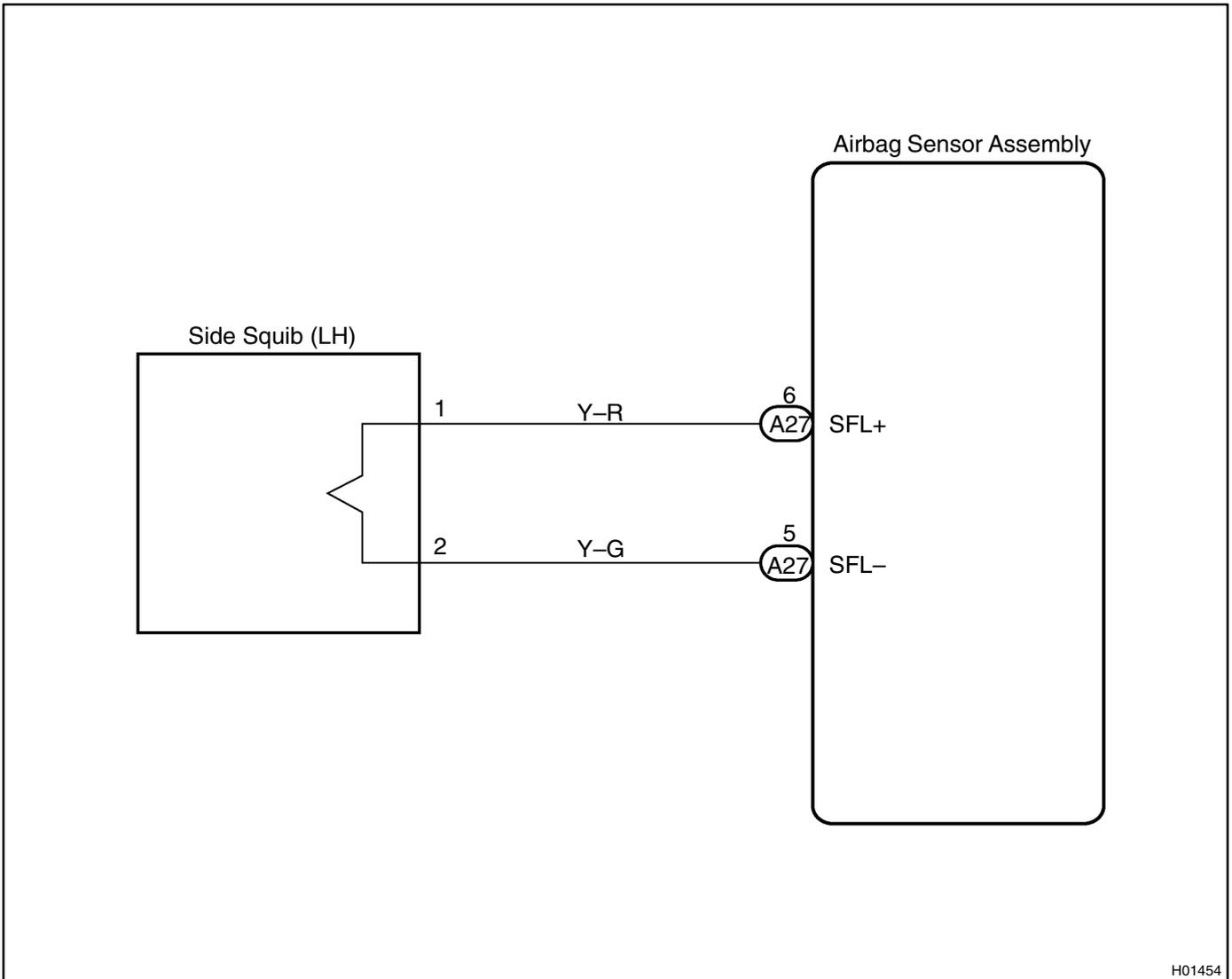
<b>DTC</b>	<b>B0115/47</b>	<b>Short in Side Squib (LH) Circuit</b>
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**CIRCUIT DESCRIPTION**

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0115/47 is recorded when a short is detected in the side squib (LH) circuit.

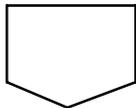
DTC No.	DTC Detecting Condition	Trouble Area
B0115/47	<ul style="list-style-type: none"> <li>• Short circuit between SFL+ wire harness and SFL- wire harness of squib</li> <li>• Side squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM**

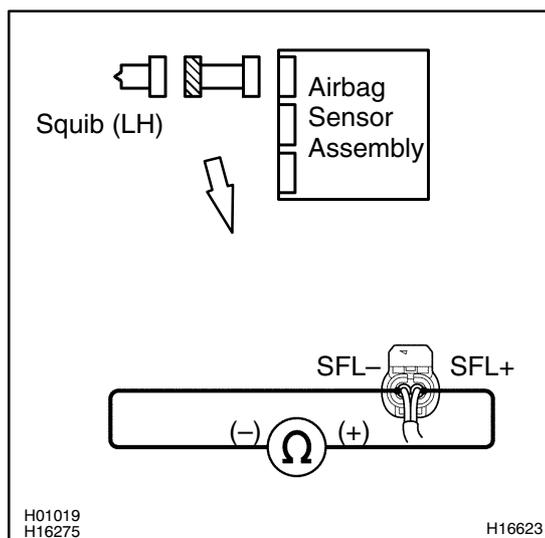


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page DI-431).



2 Check side squib (LH) circuit.

**PREPARATION:**

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the side airbag assembly (LH) (See page DI-305).

**CHECK:**

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL-.

**OK:**

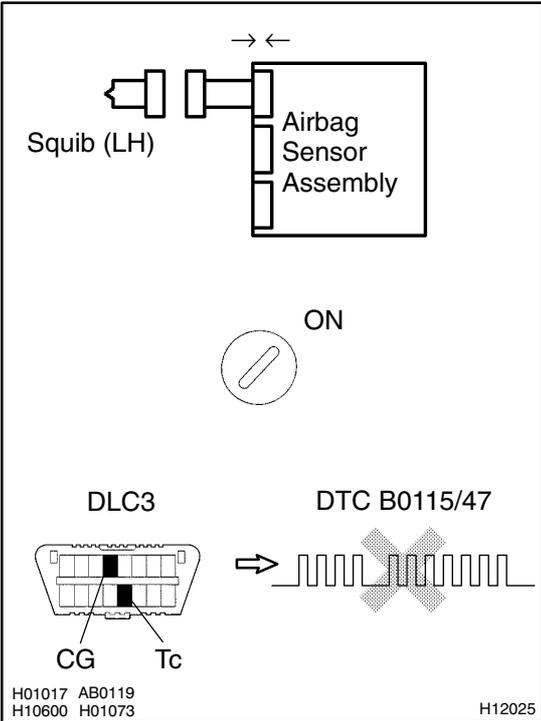
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

**OK**

**3 Check airbag sensor assembly.**



**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON and wait at least for 20 seconds.
- (b) Clear the DTC stored in memory (See page DI-305).
- (c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- (d) Turn the ignition switch or ON, and wait at least for 20 seconds.
- (e) Check the DTC (See page DI-305).

**OK:**

**DTC B0115/47 is not output.**

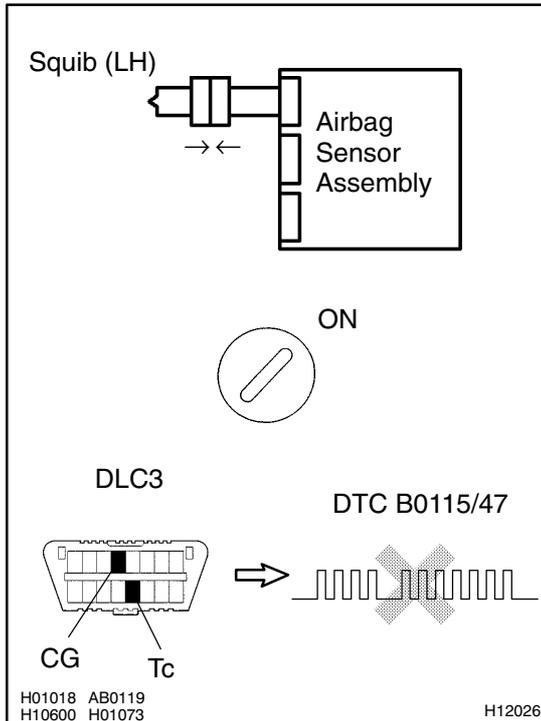
**HINT:**

Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

**NG** → **Replace airbag sensor assembly.**

**OK**

#### 4 Check side squib (LH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 second.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0115/47 is not output.**

#### HINT:

Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly (LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0116/48</b>	<b>Open in Side Squib (LH) Circuit</b>
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## CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0116/48 is recorded when an open is detected in the side squib (LH) circuit.

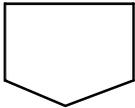
DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	<ul style="list-style-type: none"> <li>• Open circuit in SFL+ wire harness or SFL- wire harness of squib</li> <li>• Side squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

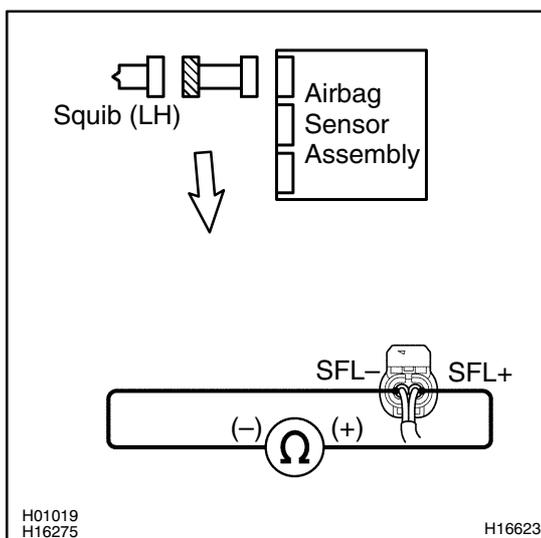
See page DI-361.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check side squib (LH) circuit.</b>
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### CHECK:

For the connector (on the front side airbag assembly side) between the front side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL-.

### OK:

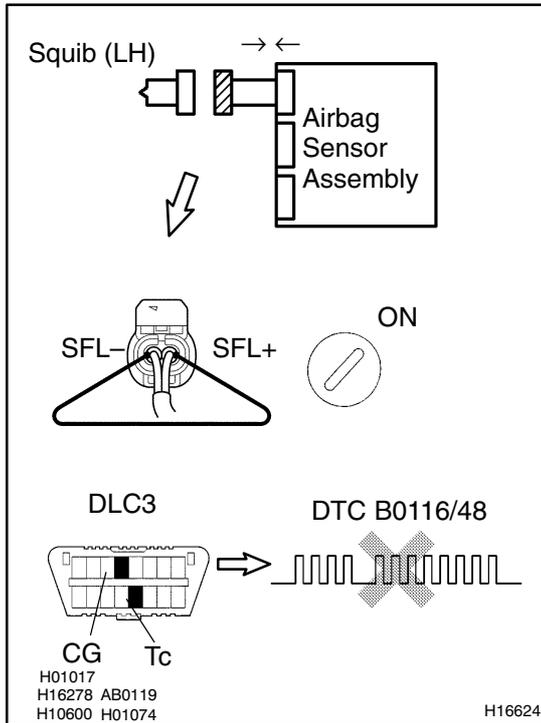
**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFL+ and SFL- of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0116/48 is not output.**

#### HINT:

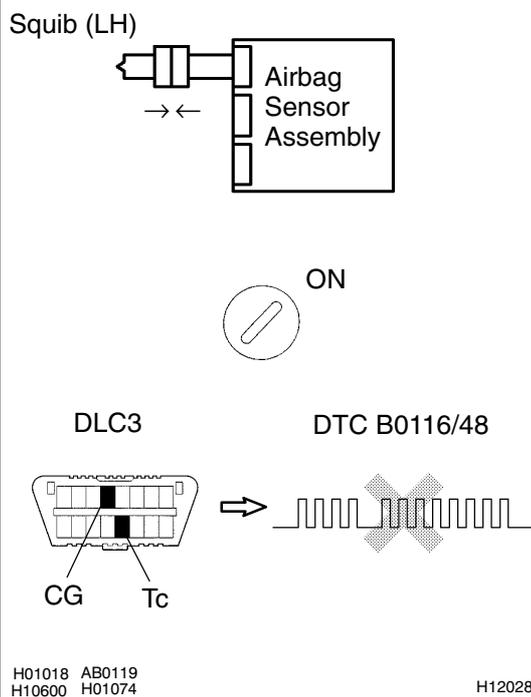
Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag sensor assembly.**

**OK**

## 4 Check side squib (LH).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0116/48 is not output.**

### HINT:

Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly (LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0117/45</b>	<b>Short in Side Squib (LH) Circuit (to Ground)</b>
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## CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0117/45 is recorded when ground short is detected in the side squib (LH) circuit.

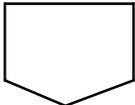
DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	<ul style="list-style-type: none"> <li>• Short circuit in side squib (LH) wire harness (to ground)</li> <li>• Side squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

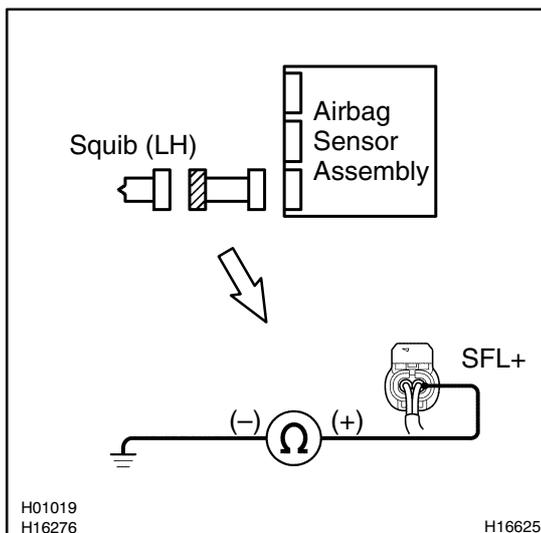
See page DI-361.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check side squib (LH) circuit.</b>
----------	---------------------------------------



### CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and body ground.

### OK:

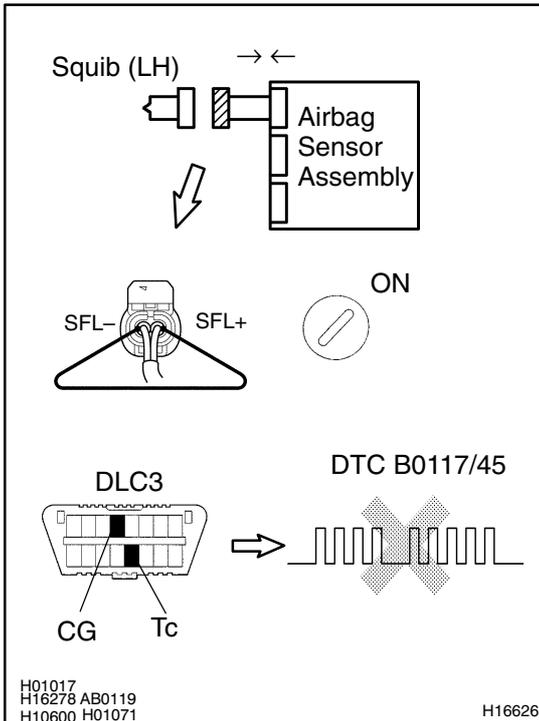
**Resistance: 1 MΩ or Higher**



**Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFL+ and SFL- of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0117/45 is not output.**

#### HINT:

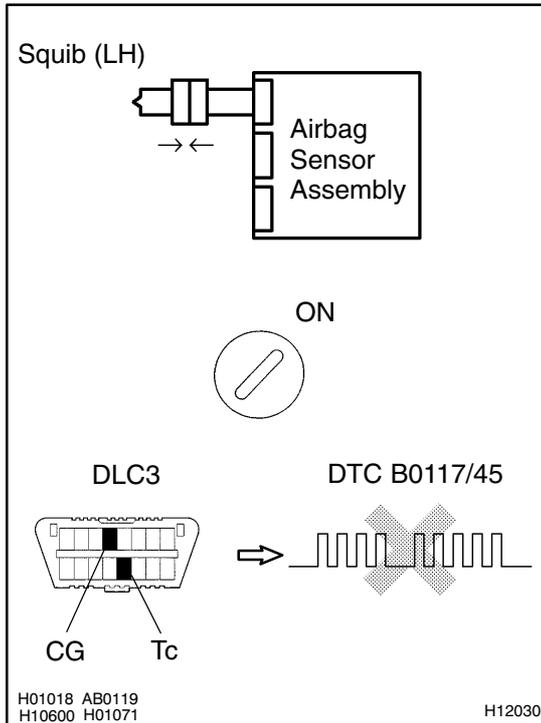
Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check side squib (LH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0117/45 is not output.**

#### HINT:

Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front side airbag assembly (LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0118/46</b>	<b>Short in Side Squib (LH) Circuit (to B+)</b>
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## CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0118/46 is recorded when a B+ short is detected in the side squib (LH) circuit.

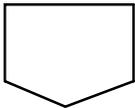
DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	<ul style="list-style-type: none"> <li>• Short circuit in side squib (LH) wire harness (to B+)</li> <li>• Side squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Side airbag assembly (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

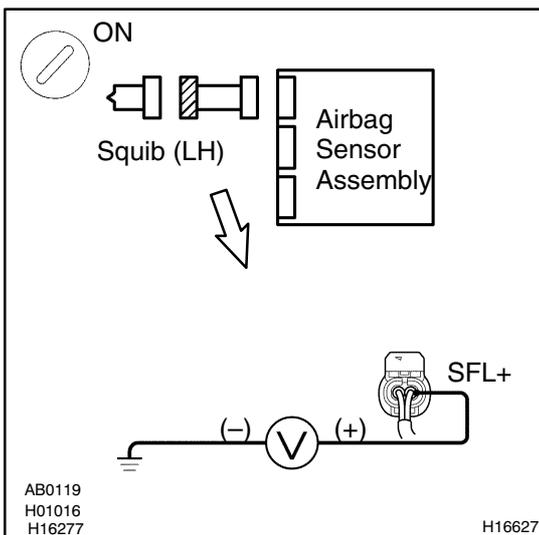
See page DI-361.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check side squib (LH) circuit.</b>
----------	---------------------------------------



### CHECK:

- Turn the ignition switch to ON.
- For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the voltage between SFL+ and body ground.

### OK:

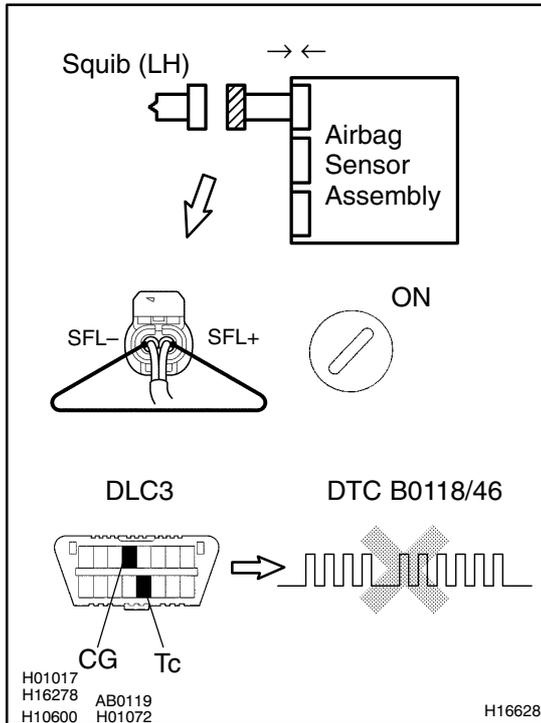
**Voltage: 0 V**

### NG

**Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFL+ and SFL- of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0118/46 is not output.**

#### HINT:

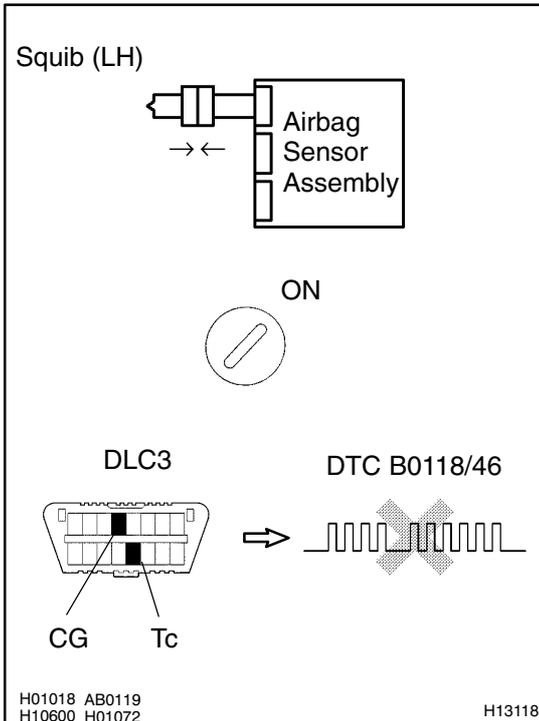
Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib (LH).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0118/46 is not output.**

### HINT:

Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG

**Replace side airbag assembly (LH).**

OK

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0130/63</b>	<b>Short in P/T Squib (RH) Circuit</b>
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## CIRCUIT DESCRIPTION

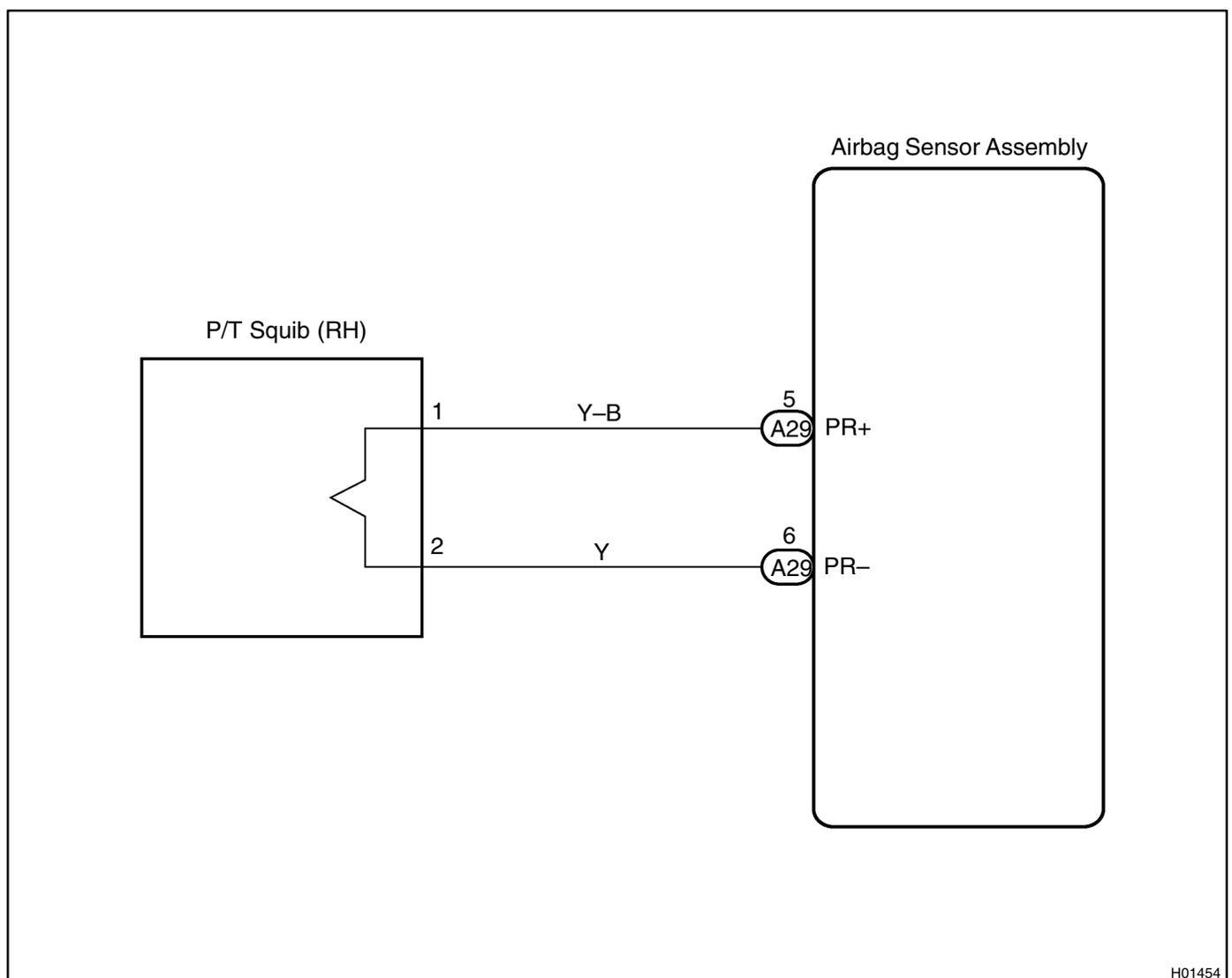
The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

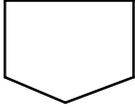
DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	<ul style="list-style-type: none"> <li>• Short circuit between PR+ wire harness and PR- wire harness of squib</li> <li>• P/T squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

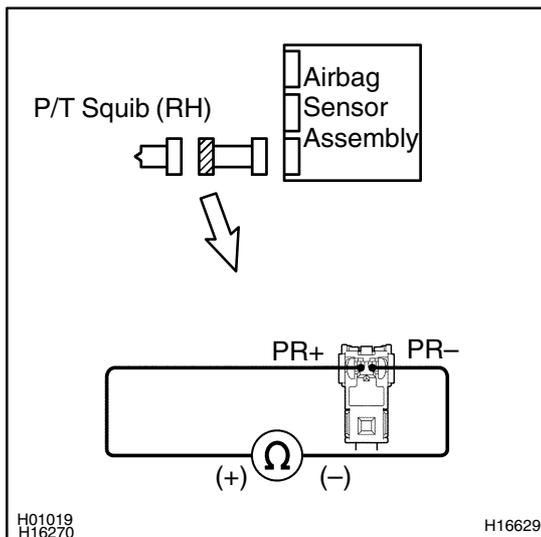


## INSPECTION PROCEDURE

**1** Prepare for inspection (See step 1 on page DI-431).



**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-305).

### 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:

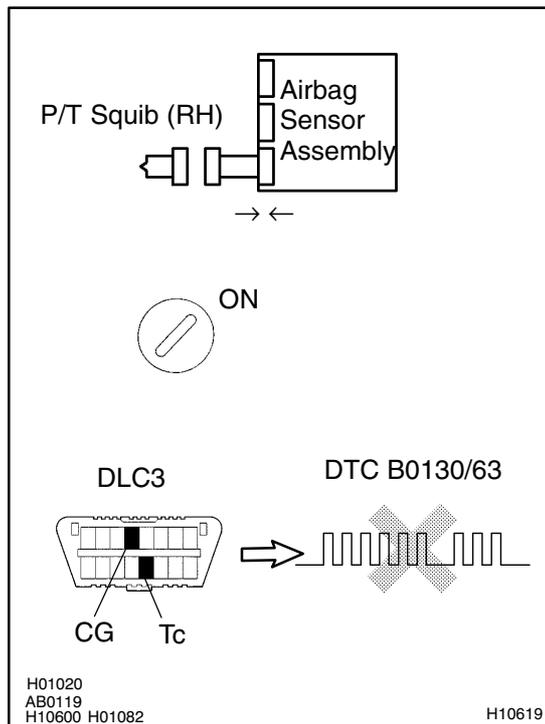
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0130/63 is not output.**

#### HINT:

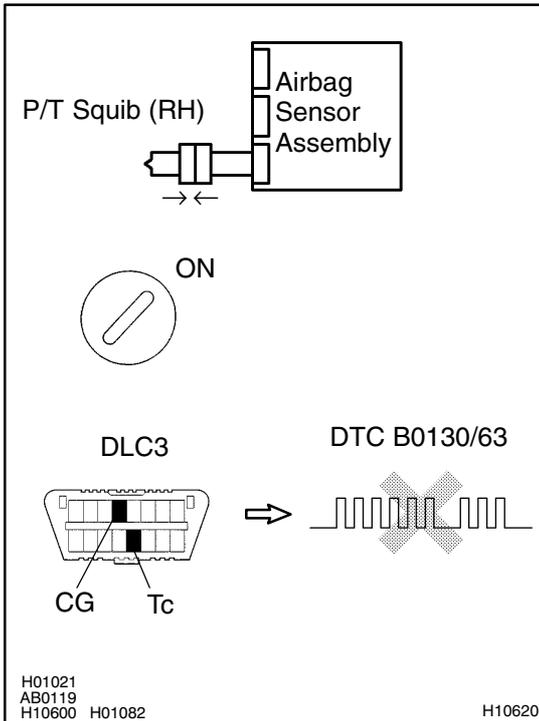
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib (RH).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### 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.**

<b>DTC</b>	<b>B0131/64</b>	<b>Open in P/T Squib (RH) Circuit</b>
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## CIRCUIT DESCRIPTION

The P/T squib circuit (RH) consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

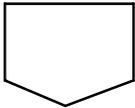
DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	<ul style="list-style-type: none"> <li>• Open circuit in PR+ wire harness or PR- wire harness of squib</li> <li>• P/T squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

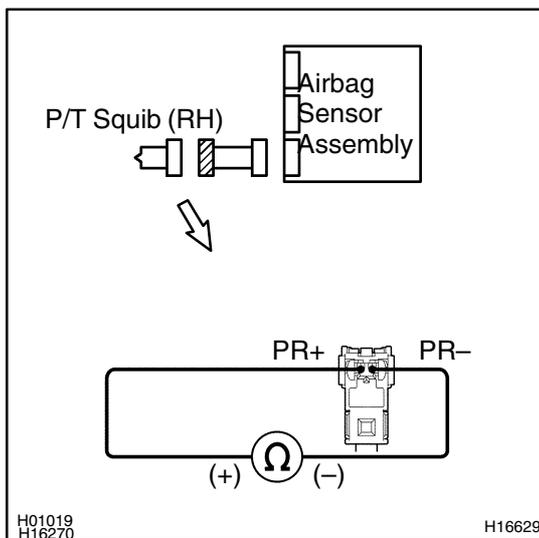
See page DI-374.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P/T squib (RH) circuit.</b>
----------	--------------------------------------



### 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:

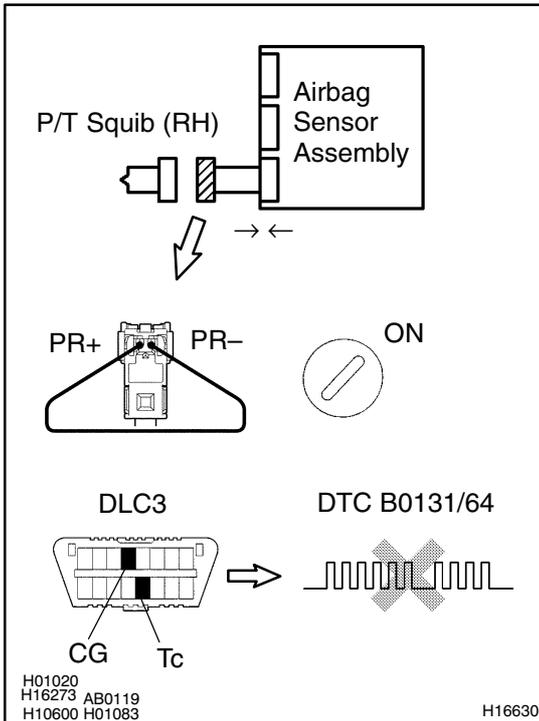
**Resistance: Below 1 Ω**

### NG

**Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0131/64 is not output.**

#### HINT:

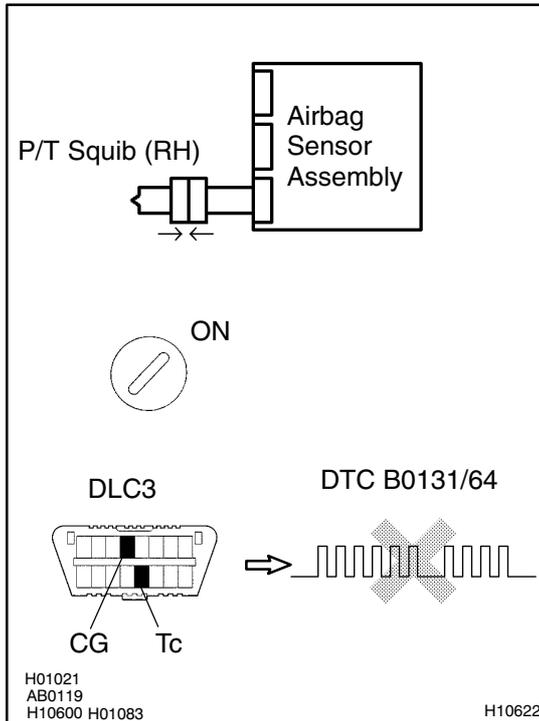
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P/T squib (RH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### 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.**

<b>DTC</b>	<b>B0132/61</b>	<b>Short in P/T Squib (RH) Circuit (to Ground)</b>
------------	-----------------	--

## CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0132/61 is recorded when a ground short is detected in the P/T squib (RH) circuit.

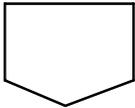
DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	<ul style="list-style-type: none"> <li>• Short circuit in P/T squib (RH) wire harness (to ground)</li> <li>• P/T squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

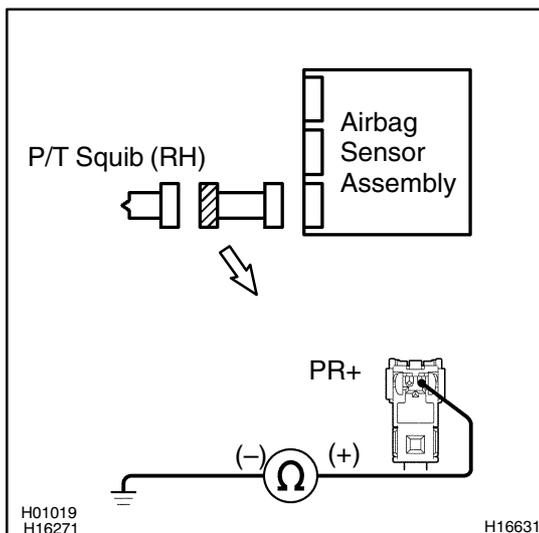
See page DI-374.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P/T squib (RH) circuit.</b>
----------	--------------------------------------



### CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and body ground.

### OK:

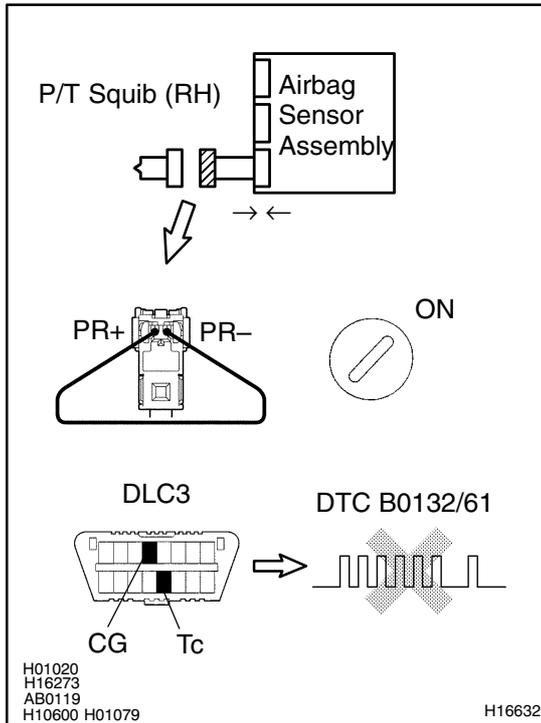
**Resistance: 1 MΩ or Higher**



**Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0132/61 is not output.**

#### HINT:

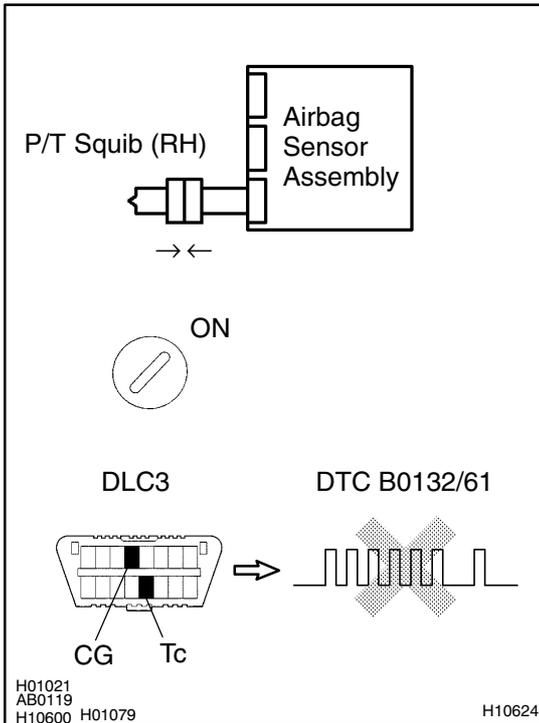
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P/T squib (RH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0132/61 is not output.**

#### HINT:

Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner (RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0133/62</b>	<b>Short in P/T Squib (RH) Circuit (to B+)</b>
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## CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0133/62 is recorded when a B+ short is detected in the P/T squib (RH) circuit.

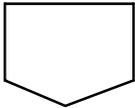
DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	<ul style="list-style-type: none"> <li>• Short circuit in seat belt pretensioner (RH) wire harness (to B+)</li> <li>• P/T squib (RH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

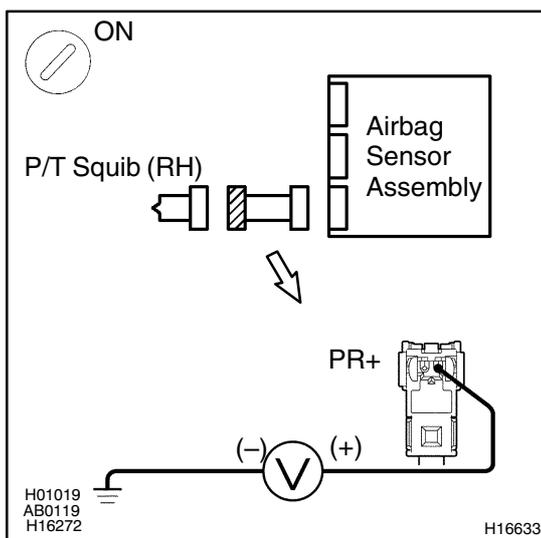
See page DI-374.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P/T squib (RH) circuit.</b>
----------	--------------------------------------



### CHECK:

- Turn the ignition switch to ON.
- For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the voltage between PR+ and body ground.

### OK:

**Voltage: 0 V**

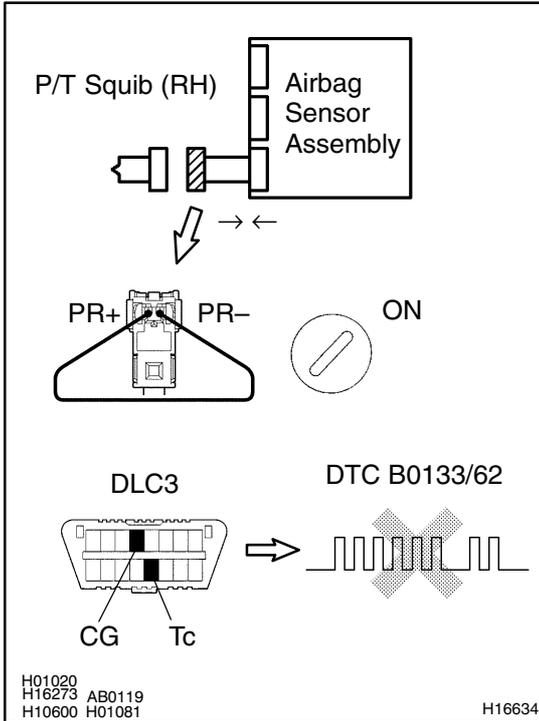
**NG**

**Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0133/62 is not output.**

#### HINT:

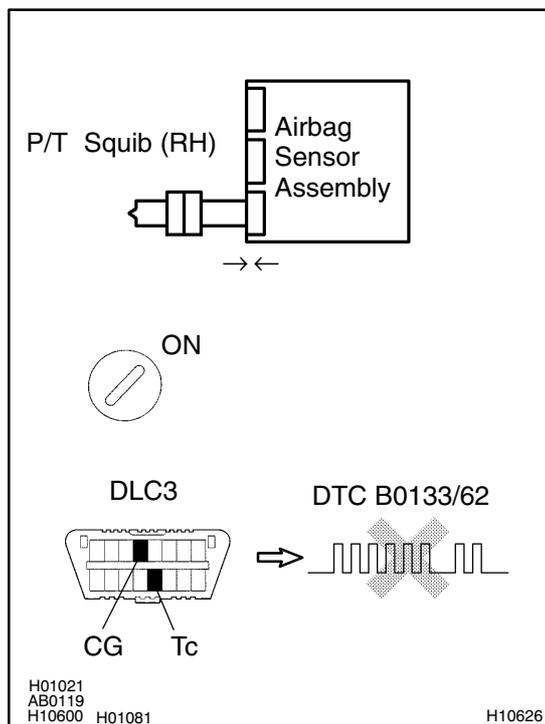
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P/T squib (RH).



#### PREPARATION:

- Turn ignition switch to LOCK.
- Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0133/62 is not output.**

#### HINT:

Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner (RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

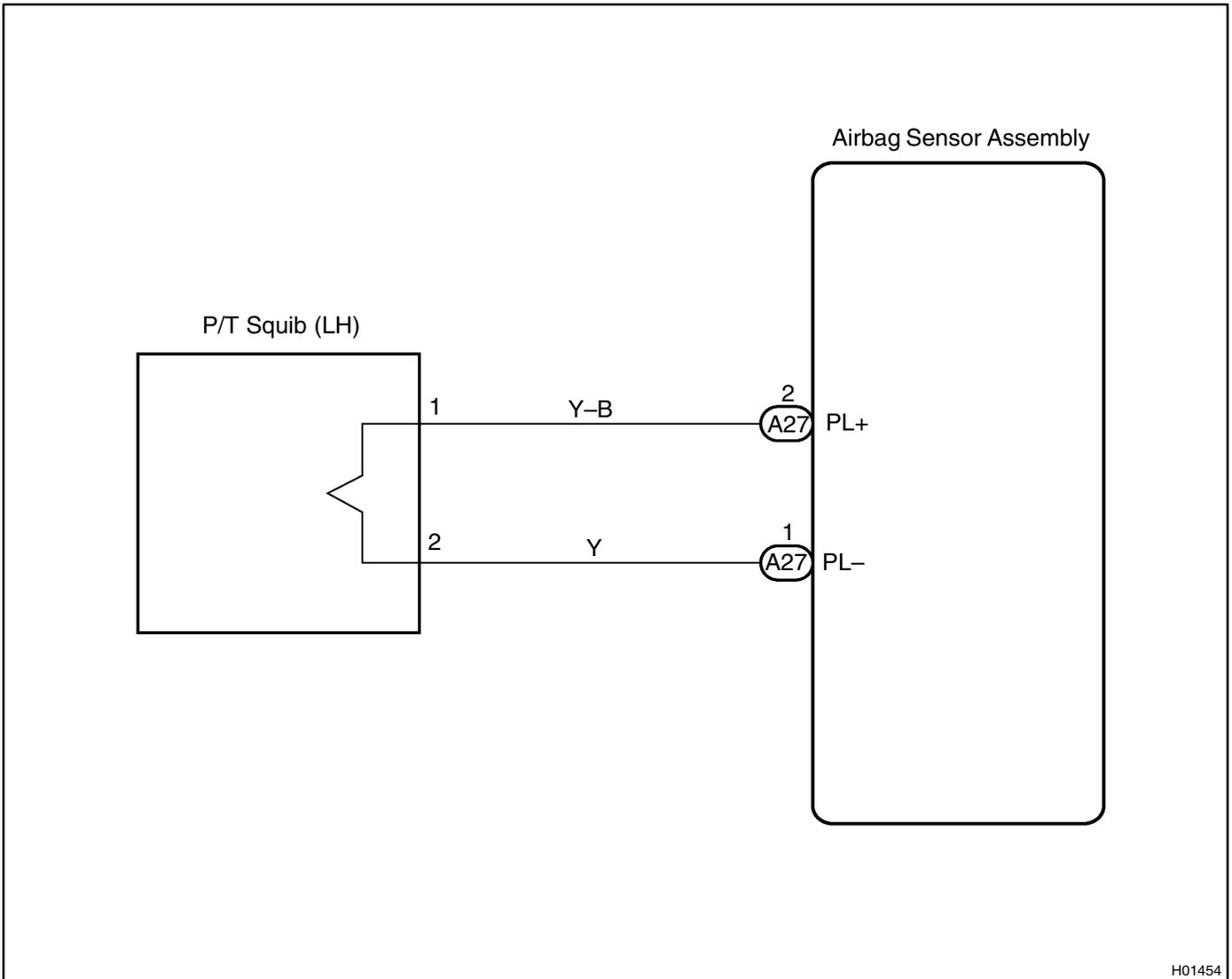
<b>DTC</b>	<b>B0135/73</b>	<b>Short in P/T Squib (LH) Circuit</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

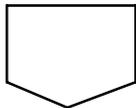
DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	<ul style="list-style-type: none"> <li>• Short circuit between PL+ wire harness and PL- wire harness of squib</li> <li>• P/T squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

**WIRING DIAGRAM**

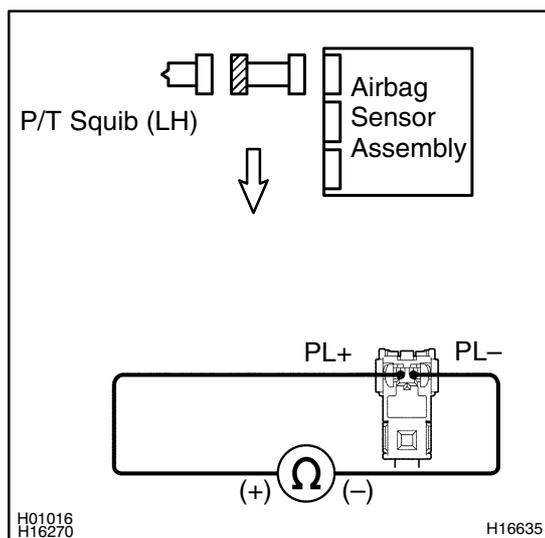


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page DI-431).



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-305).

**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:**

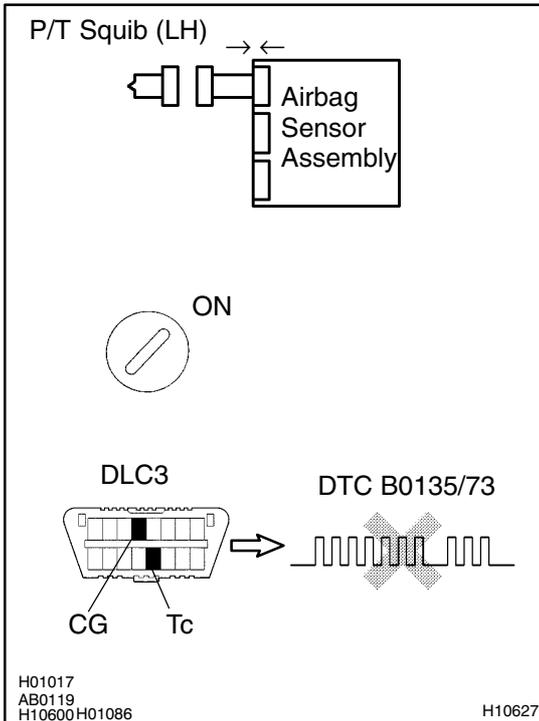
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0135/73 is not output.**

#### HINT:

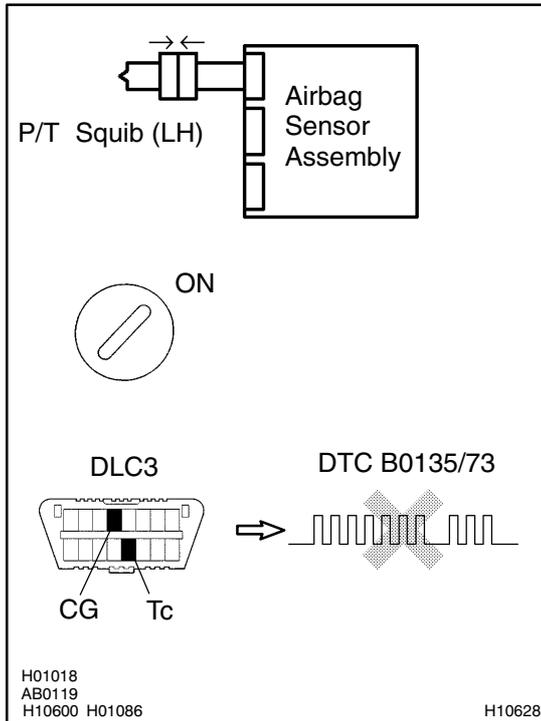
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P/T squib (LH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 second.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### 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.**

<b>DTC</b>	<b>B0136/74</b>	<b>Open in P/T Squib (LH) Circuit</b>
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## CIRCUIT DESCRIPTION

The P/T squib circuit (LH) consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

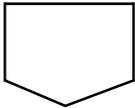
DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	<ul style="list-style-type: none"> <li>• Open circuit in PL+ wire harness or PL- wire harness of squib</li> <li>• P/T squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

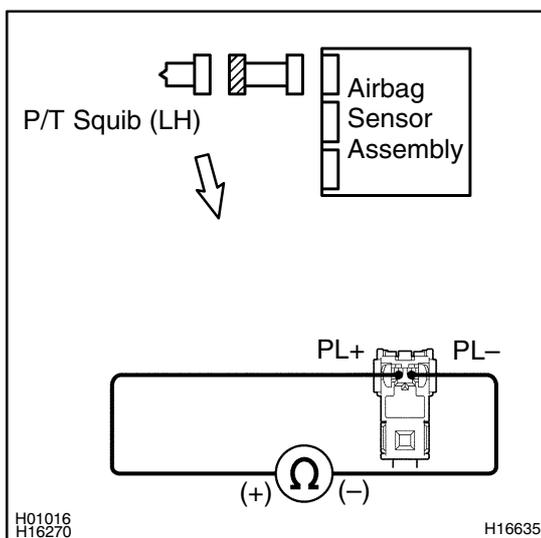
See page DI-387.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P/T squib (LH) circuit.</b>
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### 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:

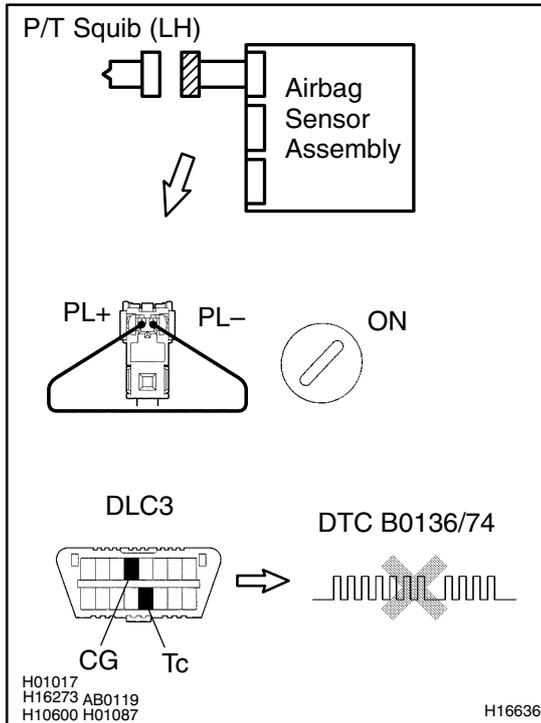
**Resistance: Below 1 Ω**

### NG

**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0136/74 is not output.**

#### HINT:

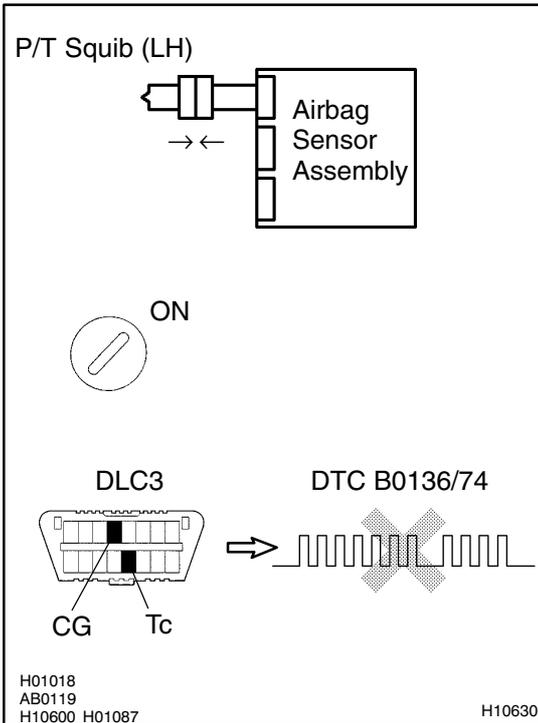
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P/T squib (LH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### 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.**

<b>DTC</b>	<b>B0137/71</b>	<b>Short in P/T Squib (LH) Circuit (to Ground)</b>
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## CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0137/71 is recorded when a ground short is detected in the P/T squib (LH) circuit.

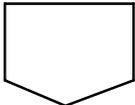
DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	<ul style="list-style-type: none"> <li>• Short circuit in P/T squib (LH) wire harness (to ground)</li> <li>• P/T squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

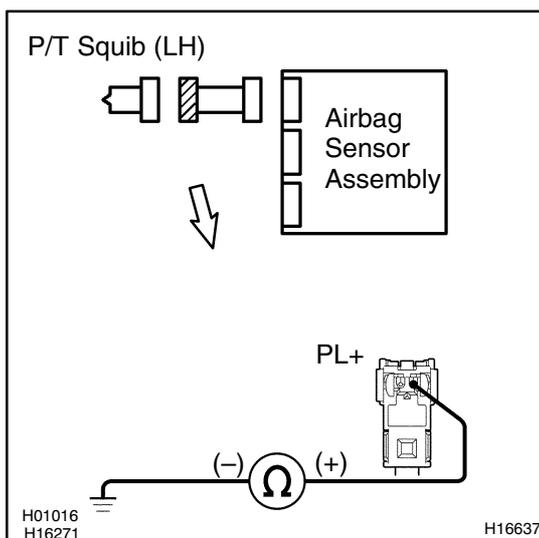
See page DI-387.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P/T squib (LH) circuit.</b>
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### CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and body ground.

### OK:

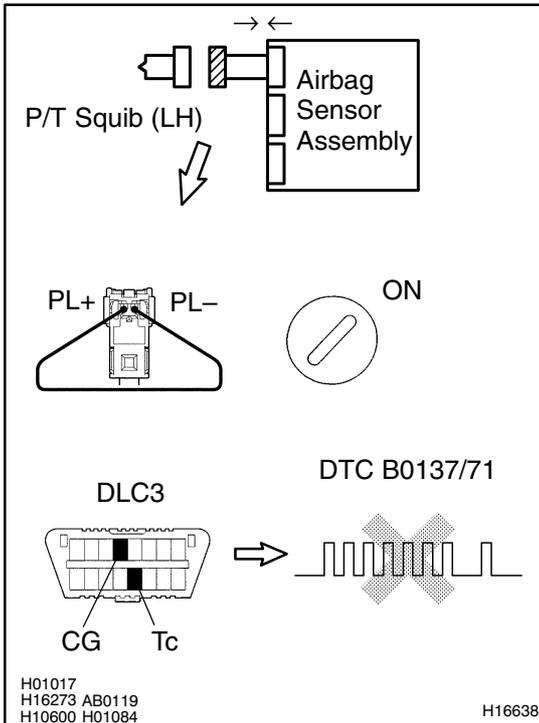
**Resistance: 1 MΩ or Higher**



**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0137/71 is not output.**

#### HINT:

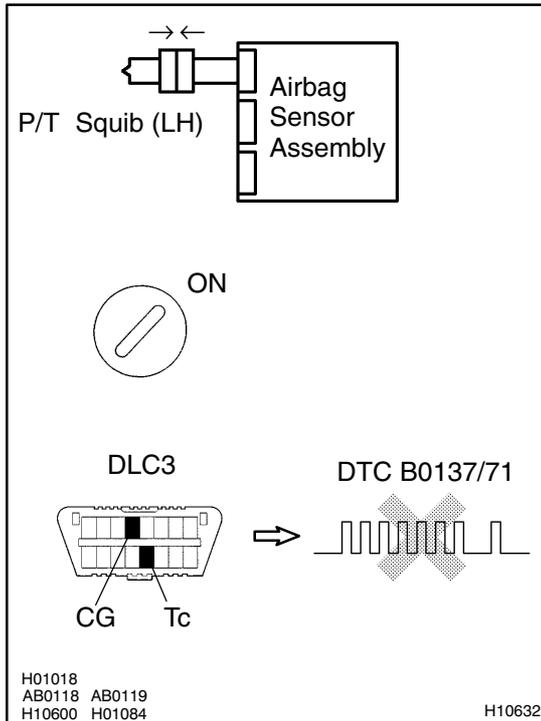
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P/T squib (LH).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0137/71 is not output.**

#### HINT:

Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG

**Replace seat belt pretensioner (LH).**

OK

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0138/72</b>	<b>Short in P/T Squib (LH) Circuit (to B+)</b>
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## CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0138/72 is recorded when a B+ short is detected in the P/T squib (LH) circuit.

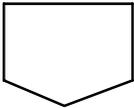
DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	<ul style="list-style-type: none"> <li>• Short circuit in seat belt pretensioner (LH) wire harness (to B+)</li> <li>• P/T squib (LH) malfunction</li> <li>• Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt pretensioner (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

## WIRING DIAGRAM

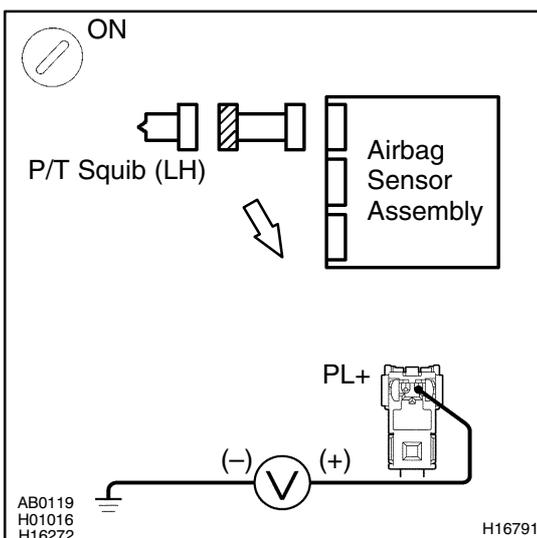
See page DI-387.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Check P/T squib (LH) circuit.</b>
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### CHECK:

- Turn the ignition switch to ON.
- For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the voltage between PL+ and body ground.

### OK:

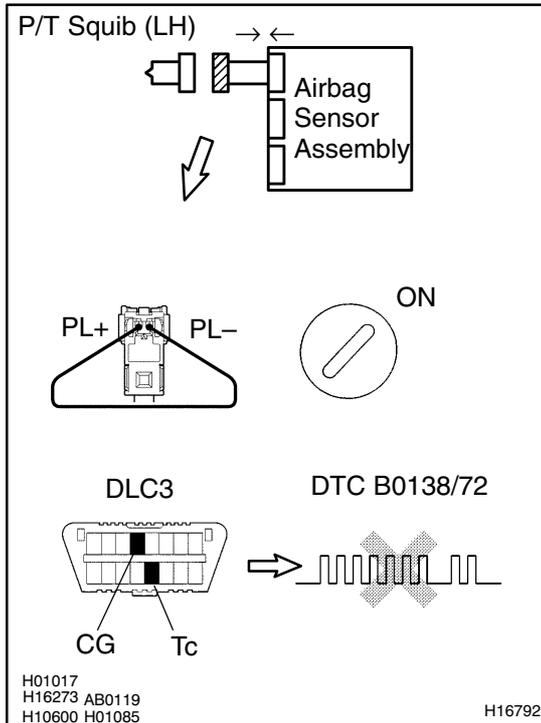
**Voltage: 0 V**



**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- 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.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

#### OK:

**DTC B0138/72 is not output.**

#### HINT:

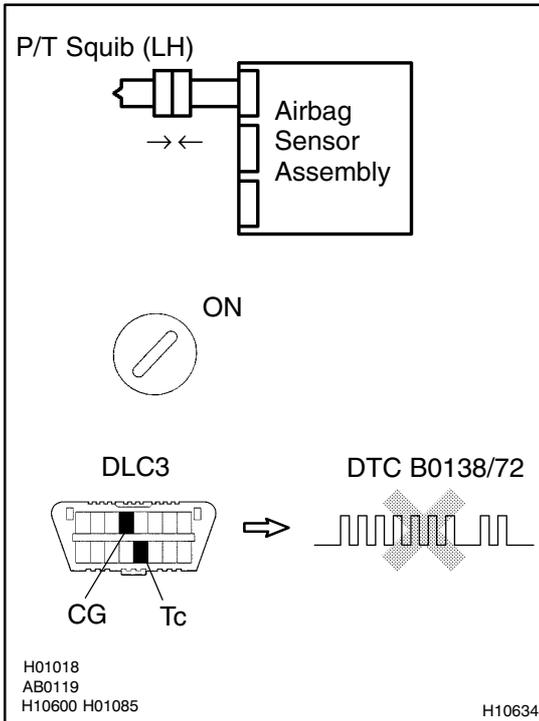
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib (LH).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B0138/72 is not output.**

### HINT:

Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG

**Replace seat belt pretensioner (LH).**

OK

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1100/31</b>	<b>Airbag Sensor Assembly Malfunction</b>
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## CIRCUIT DESCRIPTION

The airbag sensor assembly consists of an 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.

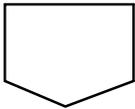
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

## INSPECTION PROCEDURE

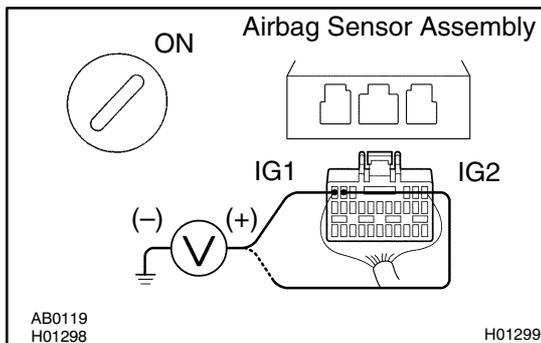
### HINT:

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.

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
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<b>2</b>	<b>Check voltage at IG1 and IG2 of airbag sensor assembly.</b>
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### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between body ground and each of terminals IG1 and IG2 of the airbag sensor assembly connector.

### OK:

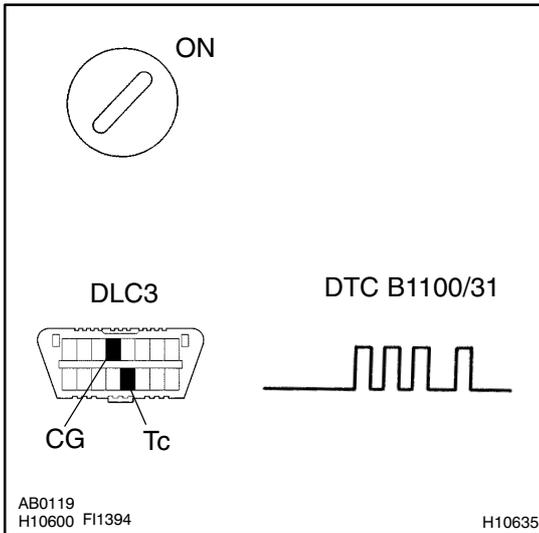
**Voltage: 10 – 14 V**



**Check that an abnormality occurs on the battery and charging system.**



### 3 Is DTC B1100/31 output again?



#### **PREPARATION:**

Clear the DTC (See step 5 on page DI-305).

#### **CHECK:**

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Repeat operation in step (a) and (b) at least 5 times.
- Check the DTC (See page DI-305).

#### **HINT:**

Codes other than code B1100/31 may be output at this time, but they are not relevant to this check.

**NO**

**Using simulation method, reproduce malfunction symptoms (See page IN-22).**

**YES**

**Replace airbag sensor assembly.**

<b>DTC</b>	<b>B1140/32</b>	<b>Side Airbag Sensor Assembly (RH) Malfunction</b>
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### CIRCUIT DESCRIPTION

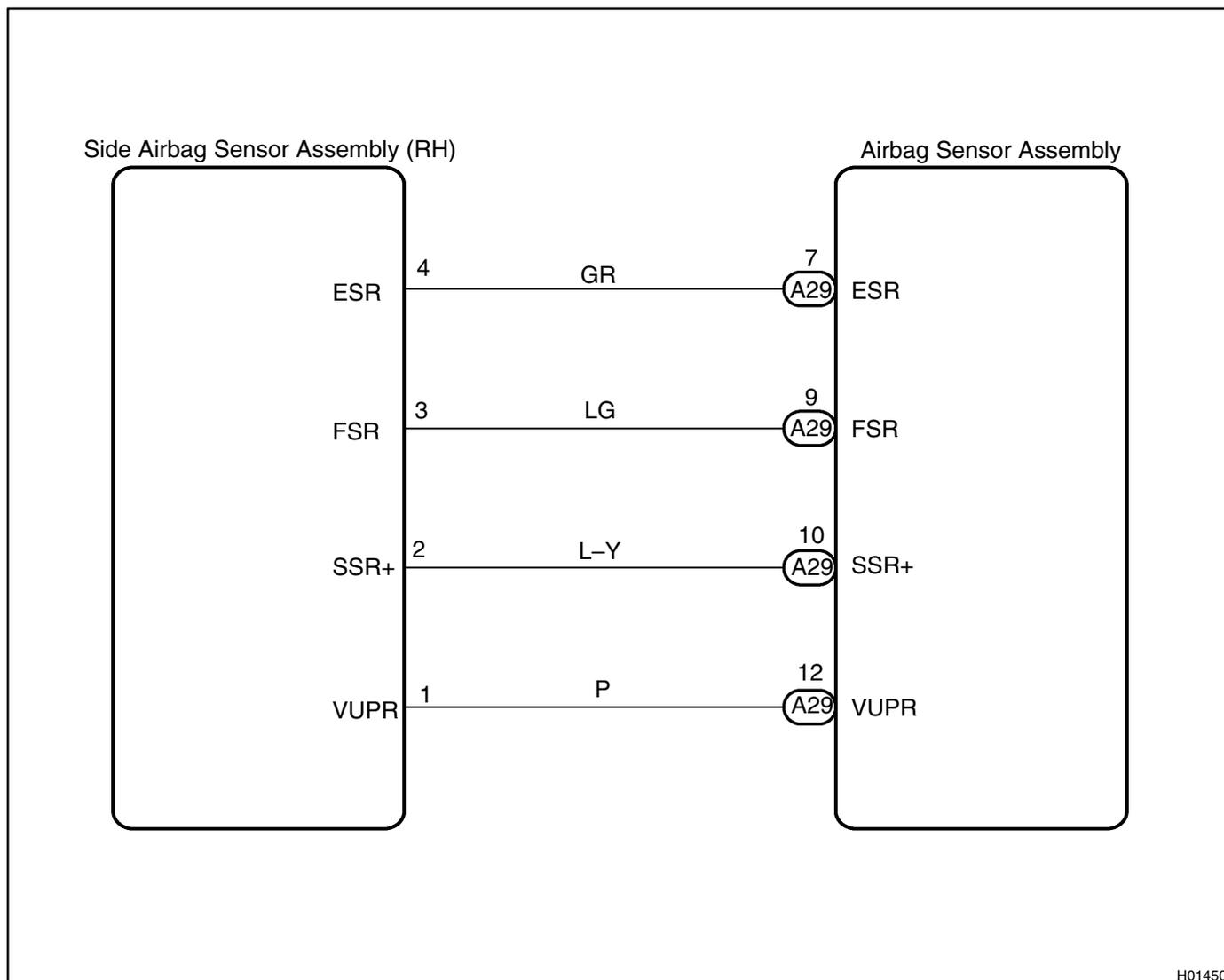
The side airbag sensor assembly (RH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1140/32 is recorded when occurrence of a malfunction in the side airbag sensor assembly (RH) is detected.

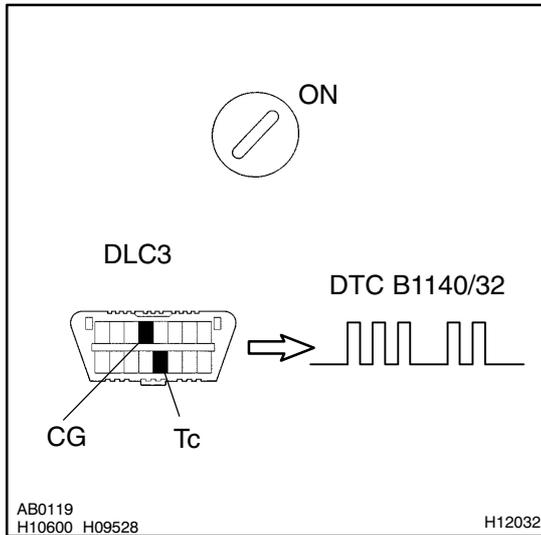
DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	• Side airbag sensor assembly (RH) malfunction	<ul style="list-style-type: none"> <li>• Side airbag sensor assembly (RH)</li> <li>• Wire harness</li> <li>• Airbag sensor assembly</li> </ul>

### WIRING DIAGRAM



## INSPECTION PROCEDURE

1 Is DTC B1140/32 out put?

**CHECK:**

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

**HINT:**

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

**YES**

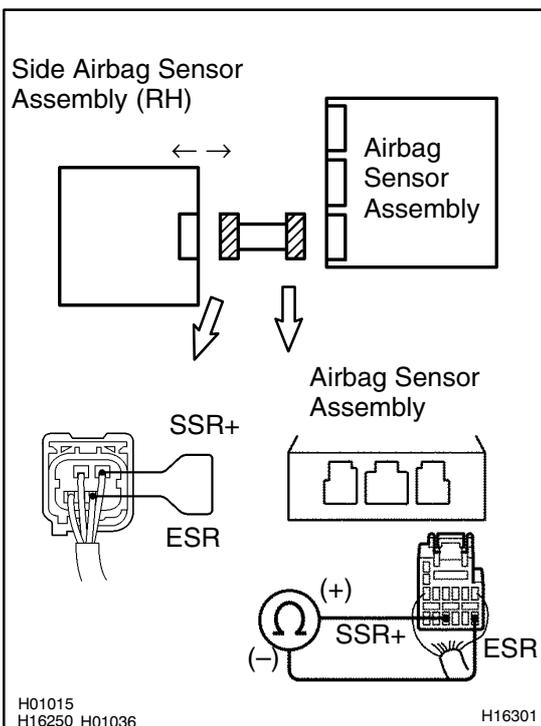
The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

**NO**

2 Is connector of side airbag sensor assembly (RH) properly connected?

3 Prepare for inspection (See step 1 on DI-431).

## 4 Check wire harness.



### PREPARATION:

- Disconnect the side airbag sensor assembly (RH) connector.
- Using a service wire, connect SSR+ and ESR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

### CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between SSR+ and ESR.

### OK:

**Resistance: Below 1  $\Omega$**

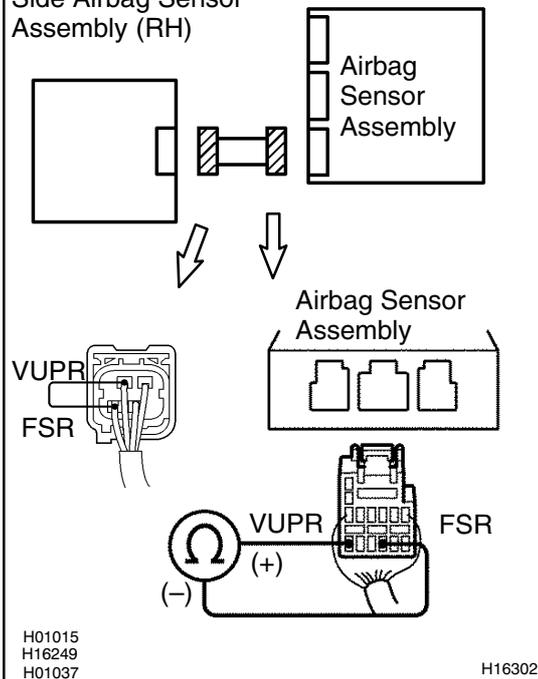
**NG**

**Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

**OK**

## 5 Check wire harness.

Side Airbag Sensor  
Assembly (RH)



### PREPARATION:

Using a service wire, connect VUPR and FSR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

### CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between VUPR and FSR.

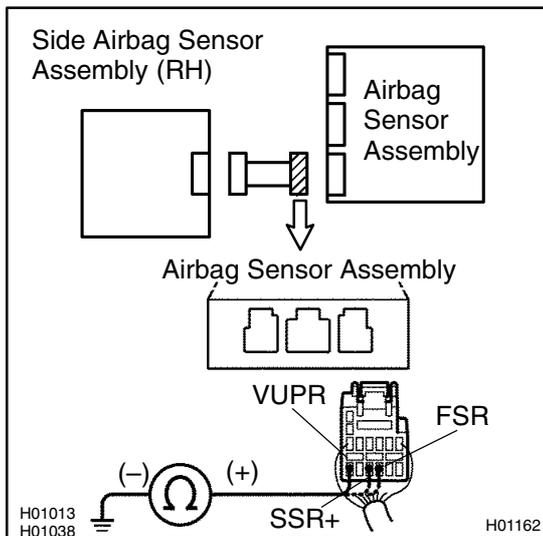
### OK:

**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

**OK**

**6 Check wire harness (to ground).****CHECK:**

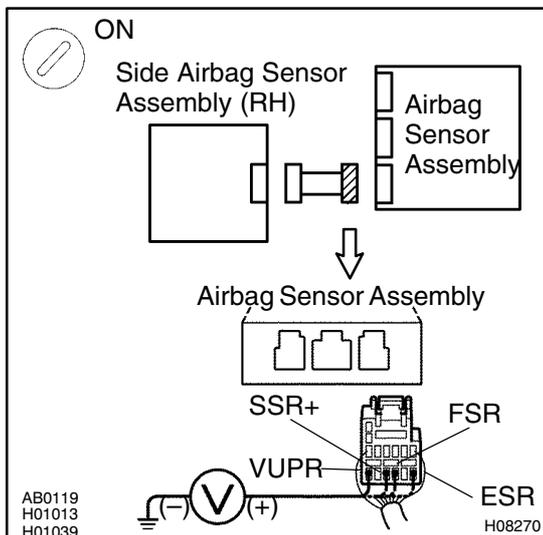
For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SSR+, VUPR and FSR.

**OK:**

**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

**OK****7 Check wire harness (to B+).****CHECK:**

- (a) Turn the ignition switch to ON.  
 (b) For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the voltage between the body ground and each of SSR+, VUPR, ESR and FSR.

**OK:**

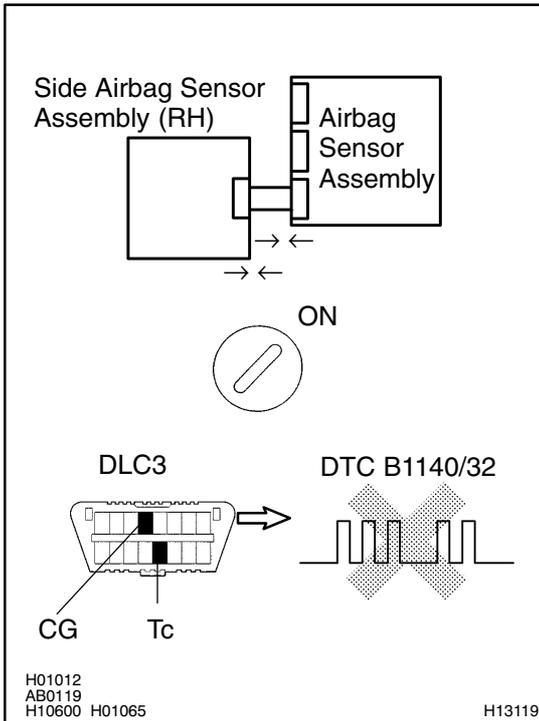
**Voltage: 0 V**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

**OK**

## 8 Is DTC B1140/32 out put again?



### PREPARATION:

- Connect the connector to the side airbag sensor assembly (RH).
- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B1140/32 is not output.**

### HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

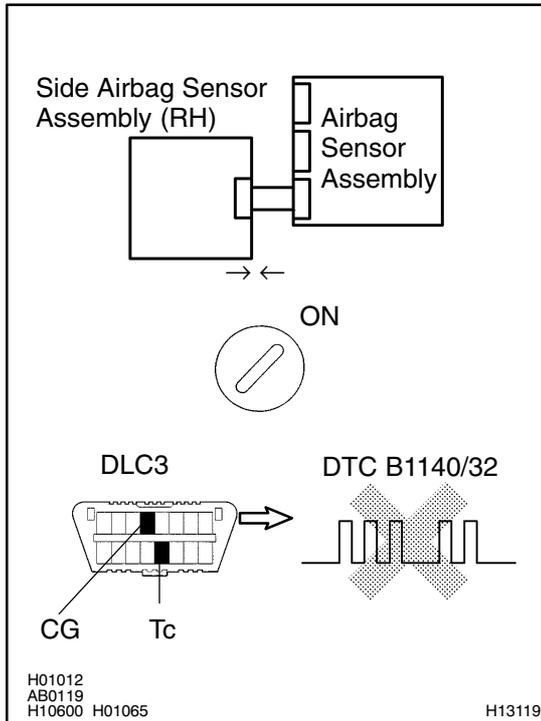
**NG**

**Go to step 9.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

## 9 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the side airbag sensor (RH) from the connector and connect the side airbag sensor (LH) to the connector.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B1140/32 is not output.**

### HINT:

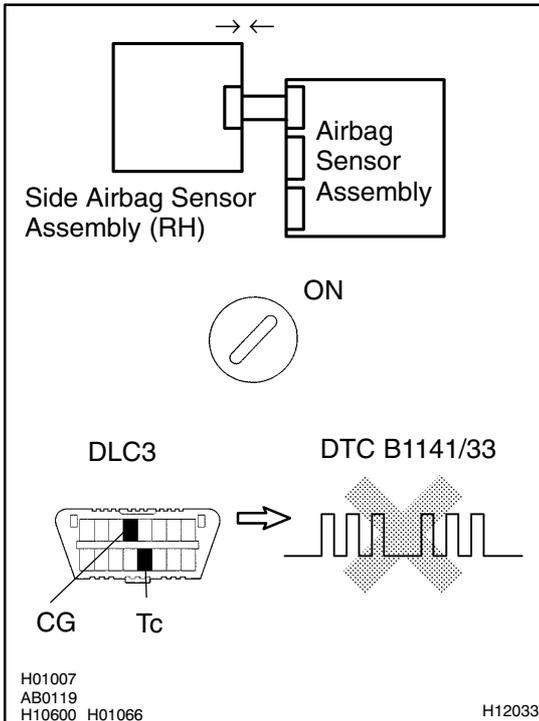
Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 10 Check side airbag sensor assembly (RH).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag sensor (RH) to the connector that the side airbag sensor (LH) was connected to.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B1141/33 is not output.**

### HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag sensor assembly (RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1141/33</b>	<b>Side Airbag Sensor Assembly (LH) Malfunction</b>
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### CIRCUIT DESCRIPTION

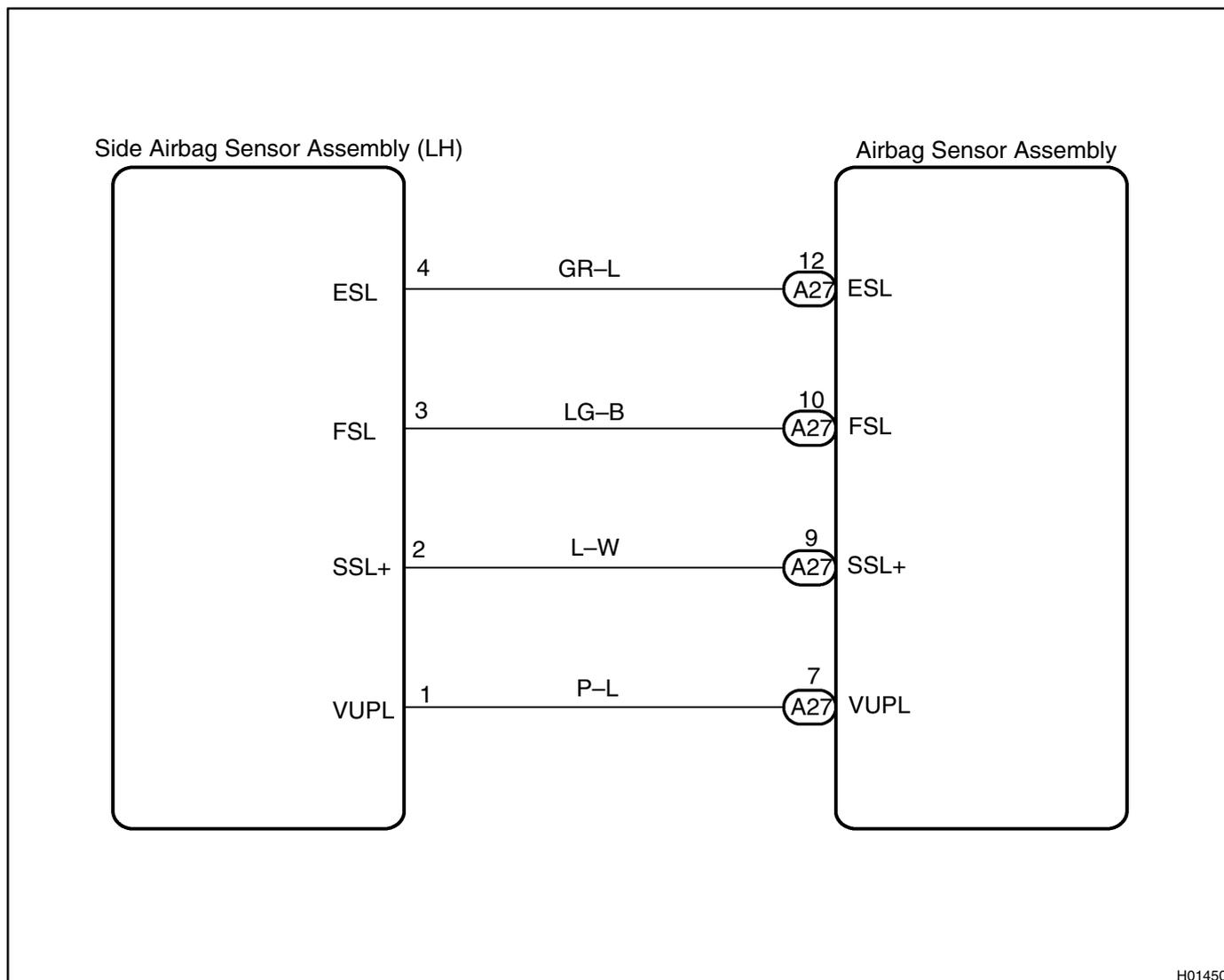
The side airbag sensor assembly (LH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1141/33 is recorded when occurrence of a malfunction in the side airbag sensor assembly (LH) is detected.

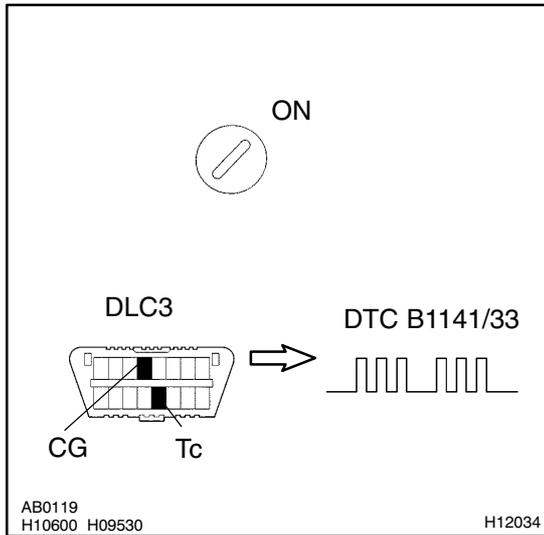
DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	• Side airbag sensor assembly (LH) malfunction	<ul style="list-style-type: none"> <li>• Side airbag sensor assembly (LH)</li> <li>• Wire harness</li> <li>• Airbag sensor assembly</li> </ul>

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Is DTC B1141/33 out put?</b>
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**CHECK:**

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

**HINT:**  
Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

<b>YES</b>	<b>The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.</b>
------------	--

**NO**

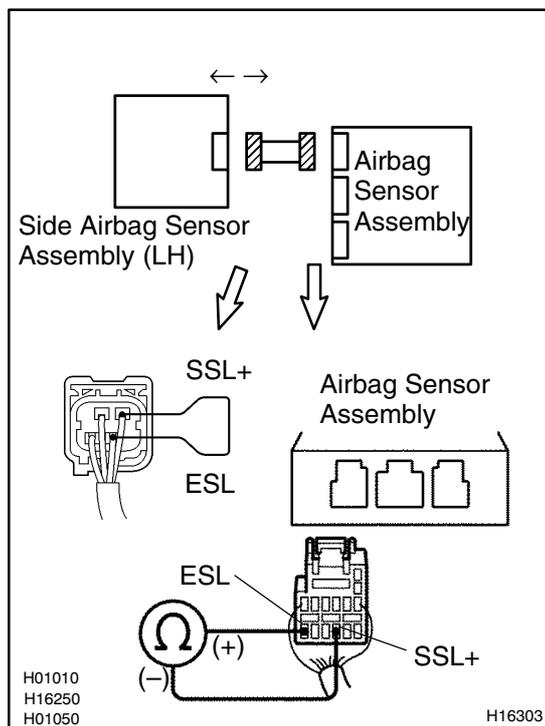
<b>2</b>	<b>Is connector of side airbag sensor assembly (LH) properly connected?</b>
----------	---

**NO**

<b>3</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--

**NO**

## 4 Check wire harness.



### PREPARATION:

- Disconnect the side airbag sensor assembly (LH).
- Using a service wire, connect SSL+ and ESL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

### CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between SSL+ and ESL.

### OK:

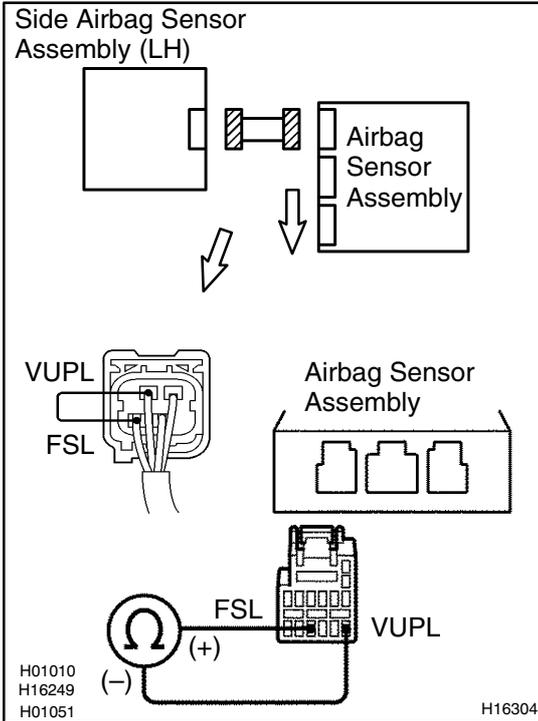
**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

**OK**

## 5 Check wire harness.



### PREPARATION:

Using a service wire, connect VUPL and FSL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

### CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between VUPL and FSL.

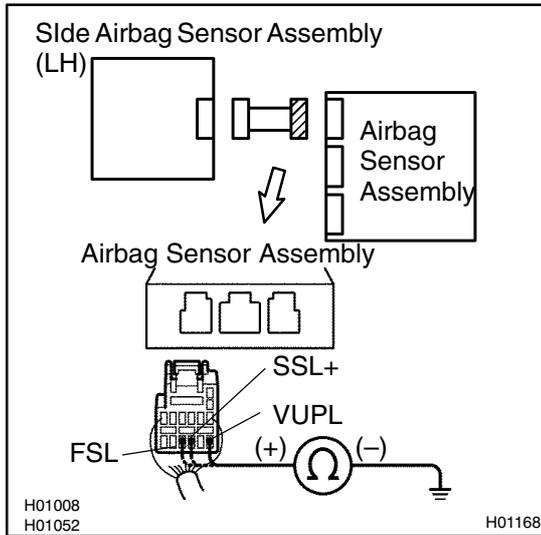
### OK:

**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

**OK**

**6 Check wire harness (to ground).****CHECK:**

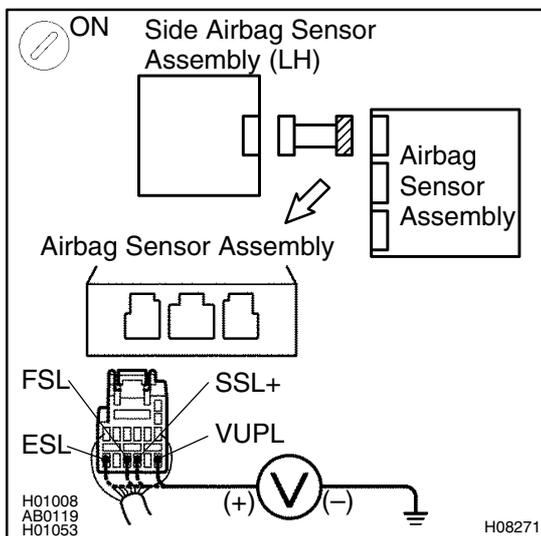
For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SSL+, VUPL and FSL.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

**OK****7 Check wire harness (to B+).****CHECK:**

- Turn the ignition switch to ON.
- For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SSL+, ESL, VUPL and FSL.

**OK:**

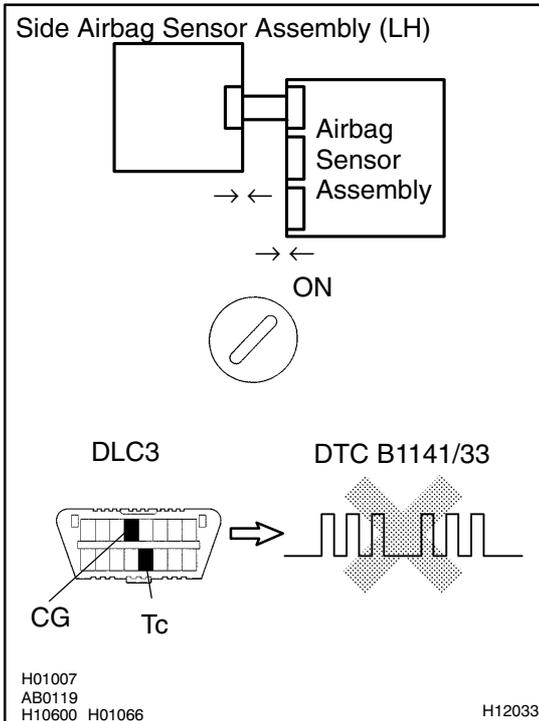
**Voltage: 0 V**

**NG**

**Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

**OK**

## 8 Is DTC B1141/33 out put again?



### PREPARATION:

- Connect the connector to the side airbag sensor assembly (LH).
- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B1141/33 is not output.**

### HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

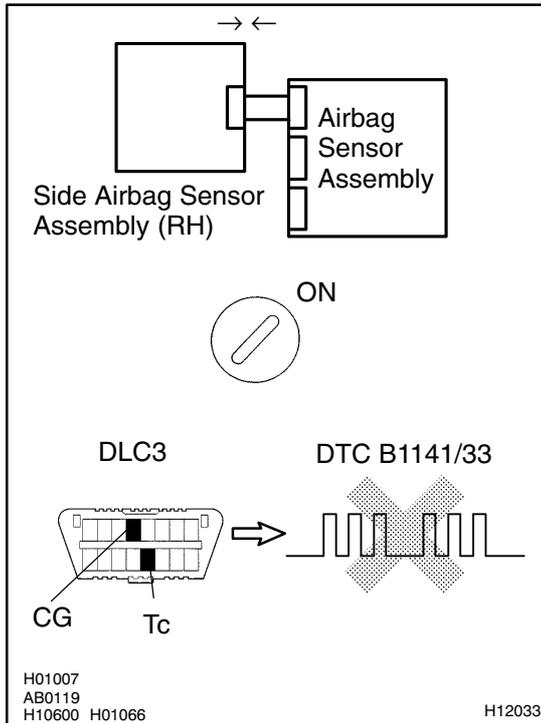
**NO**

**Go to step 9.**

**YES**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

## 9 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the side airbag sensor (LH) from the connector and connect the side airbag sensor (RH) to the connector.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B1141/33 is not output.**

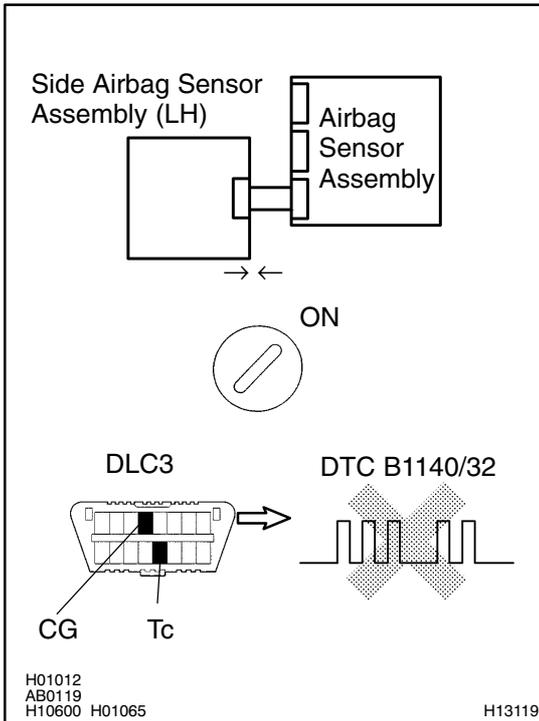
### HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

**10 Check side airbag sensor assembly (LH).**

**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag sensor (LH) to the connector that the side airbag sensor (RH) was connected to.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

**OK:**

**DTC B1140/32 is not output.**

**HINT:**

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag sensor assembly (LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1156/B1157/15</b>	<b>Front Airbag Sensor (RH) Malfunction</b>
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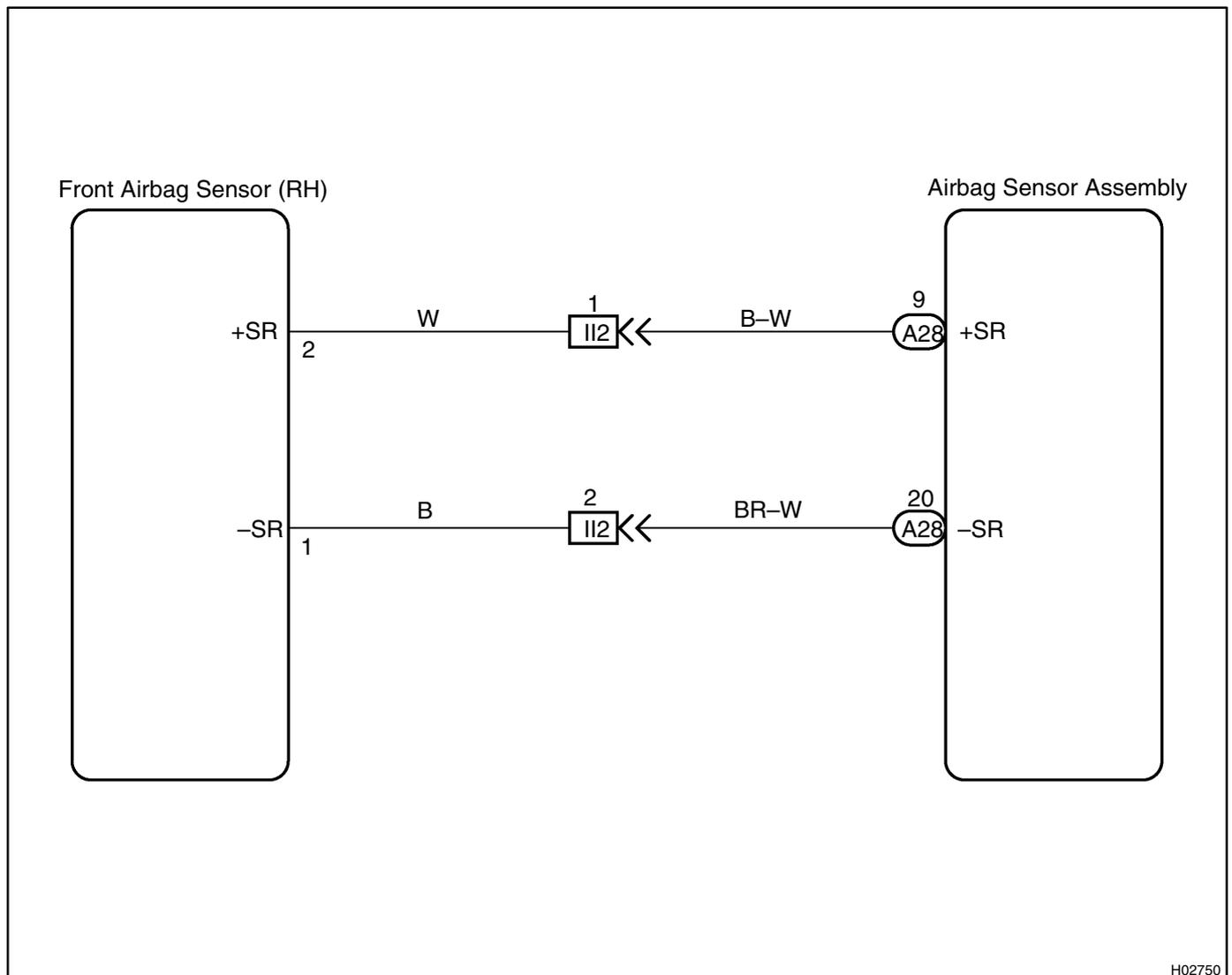
### CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH). For details of the function of each component, see OPERATION on page RS-2.

DTC B1156/B1157/15 is recorded when a malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	• Front airbag sensor (RH) malfunction	<ul style="list-style-type: none"> <li>• Front airbag sensor (RH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> <li>• Engine room No. 2 wire harness</li> </ul>

### WIRING DIAGRAM

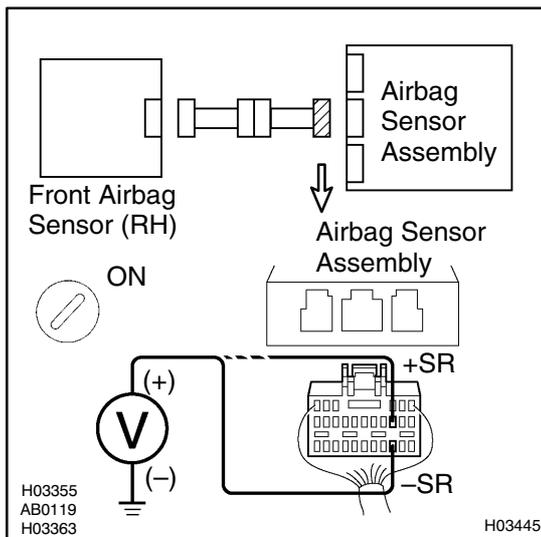


H02750

## INSPECTION PROCEDURE

**1 Prepare for inspection (See step 1 on page DI-431).**

**2 Check wire harness (to B+).**

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of +SR and -SR.

**OK:**

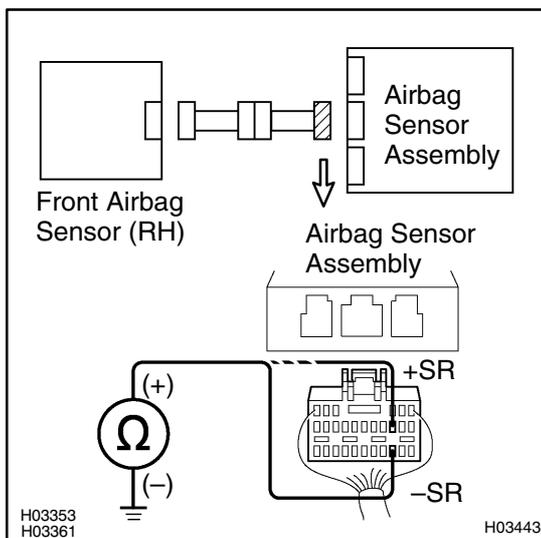
**Voltage: Below 1 V**

**NG**

**Go to step 8.**

**OK**

**3 Check wire harness (to ground).**

**CHECK:**

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of +SR and -SR.

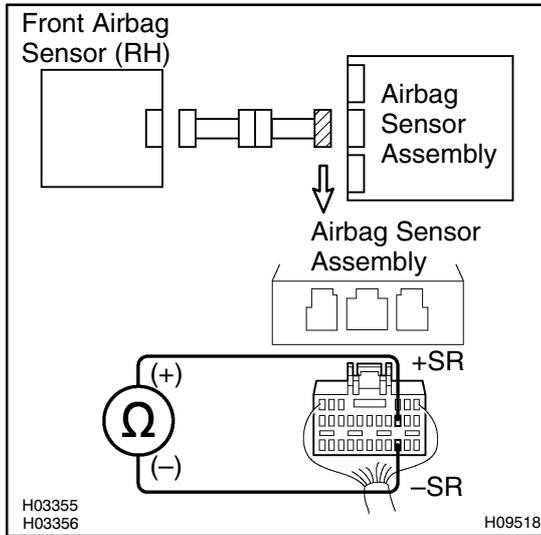
**OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Go to step 9.**

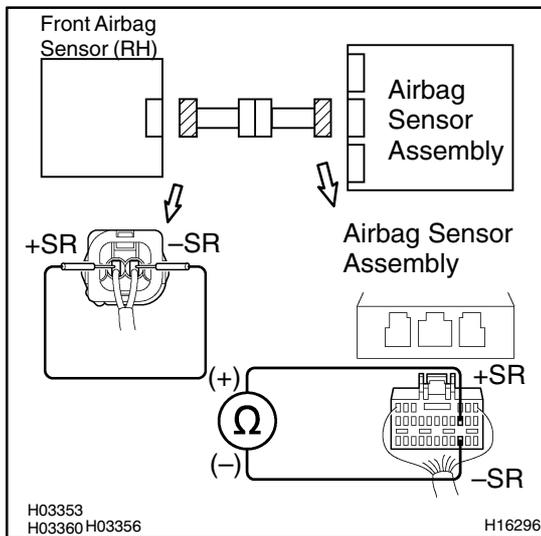
**OK**

**4 Check wire harness.****CHECK:**

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between +SR and -SR.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Go to step 10.****OK****5 Check wire harness.****PREPARATION:**

Using a service wire, connect +SR and -SR of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

**CHECK:**

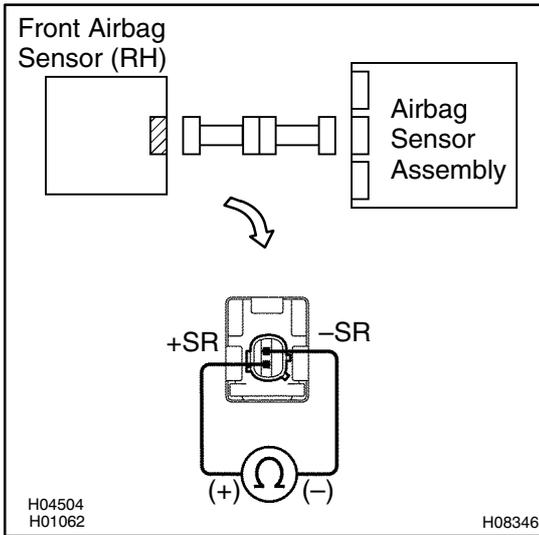
For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between +SR and -SR.

**OK:**

**Resistance: Below 1 Ω**

**NG****Go to step 11.****OK**

## 6 Check front airbag sensor (RH).



### CHECK:

For the connector of the front airbag sensor (RH), measure the resistance between +SR and -SR.

### OK:

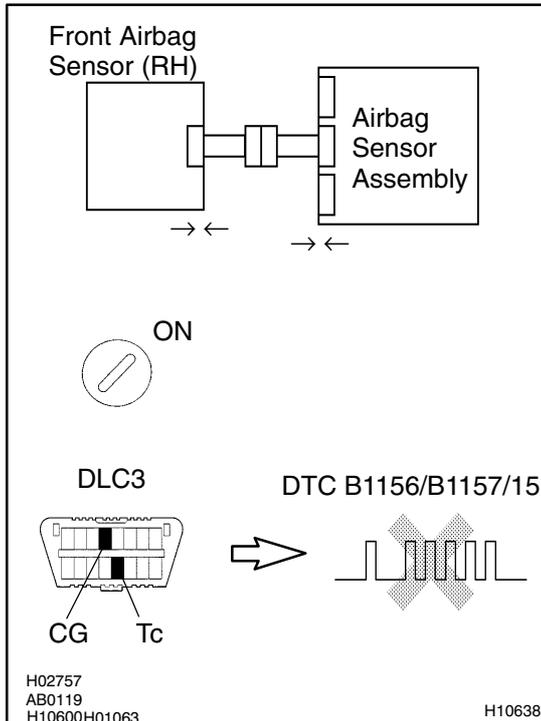
**Resistance: 300 – 1500 Ω**

**NG**

**Replace front airbag sensor (RH).**

**OK**

## 7 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front airbag sensor (RH) connector and airbag sensor assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### OK:

**DTC B1156/B1157/15 is not output.**

### HINT:

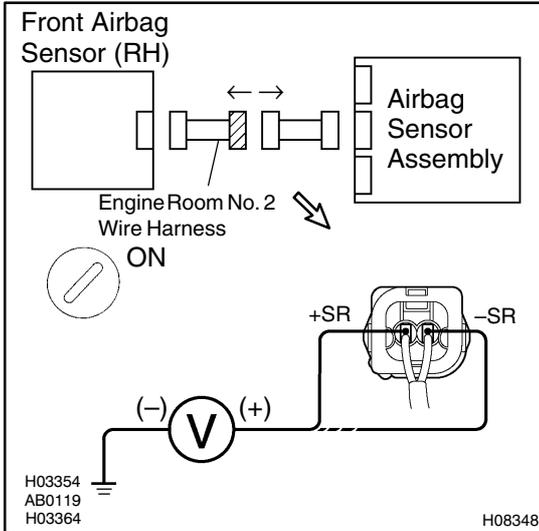
Codes other than code B1156/B1157/15 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**8 Check engine room No. 2 wire harness (to B+).****PREPARATION:**

Disconnect the engine room No. 2 wire harness connector on the airbag sensor assembly side.

**CHECK:**

- Turn the ignition switch to ON.
- For the connector (on the RH front door wire harness side) between the airbag sensor assembly and the engine room No. 2 wire harness, measure the voltage between body ground and each of +SR and -SR.

**OK:**

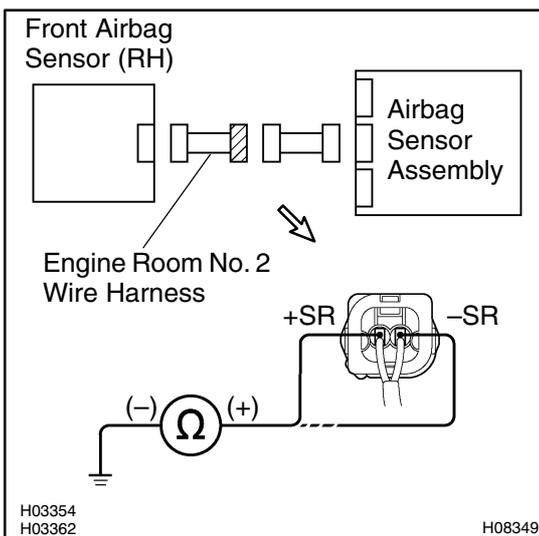
**Voltage: Below 1 V**

**NG**

**Repair or replace engine room No. 2 wire harness.**

**OK**

**Repair or replace harness or connector between airbag sensor assembly and engine room No. 2 wire harness.**

**9 Check engine room No. 2 wire harness (to ground).****PREPARATION:**

Disconnect the engine room No. 2 wire harness connector on the airbag sensor assembly side.

**CHECK:**

For the connector (on the engine room No. 2 wire harness side) between the airbag sensor assembly and the engine room No. 2 wire harness, measure the resistance between body ground and each of +SR and -SR.

**OK:**

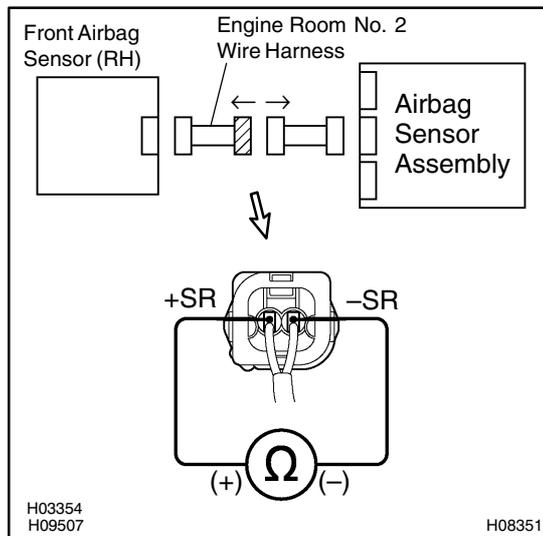
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace engine room No. 2 wire harness.**

**OK**

**Repair or replace harness or connector between airbag sensor assembly and engine room No. 2 wire harness.**

**10 Check engine room No. 2 wire harness.**

**PREPARATION:**

Disconnect the engine room No. 2 wire harness connector on the airbag sensor assembly side.

**CHECK:**

For the connector (on the engine room No. 2 wire harness side) between the airbag sensor assembly and the engine room No. 2 wire harness, measure the resistance between +SR and -SR.

**OK:**

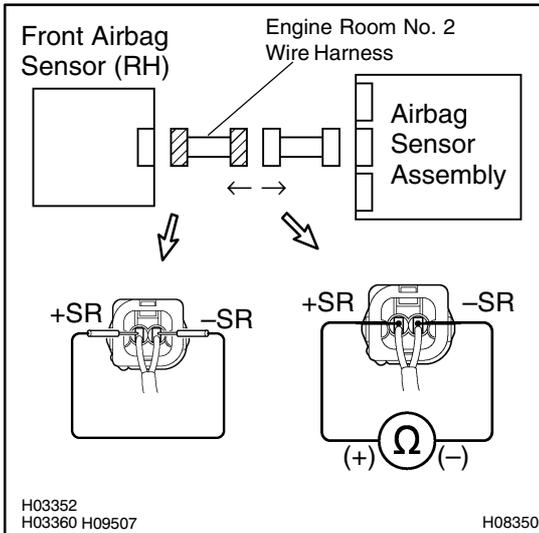
**Resistance: 1 M $\Omega$  or Higher**

**NG**

**Repair or replace engine room No. 2 wire harness.**

**OK**

**Repair or replace harness or connector between airbag sensor assembly and engine room No. 2 wire harness.**

**11 Check engine room No. 2 wire harness.**

**PREPARATION:**

- Disconnect the engine room No. 2 wire harness connector on the airbag sensor assembly side.
- Using a service wire, connect +SR and -SR of the connector (on the engine room No. 2 wire harness side) between the engine room No. 2 wire harness and the front airbag sensor (RH).

**CHECK:**

For the connector (on the engine room No. 2 wire harness side) between the airbag sensor assembly and the engine room No. 2 wire harness, measure the resistance between +SR and -SR.

**OK:**

**Resistance: Below 1 Ω**

**NG**

**Repair or replace engine room No. 2 wire harness.**

**OK**

**Repair or replace harness or connector between airbag sensor assembly and engine room No. 2 wire harness.**

<b>DTC</b>	<b>B1158/B1159/16</b>	<b>Front Airbag Sensor (LH) Malfunction</b>
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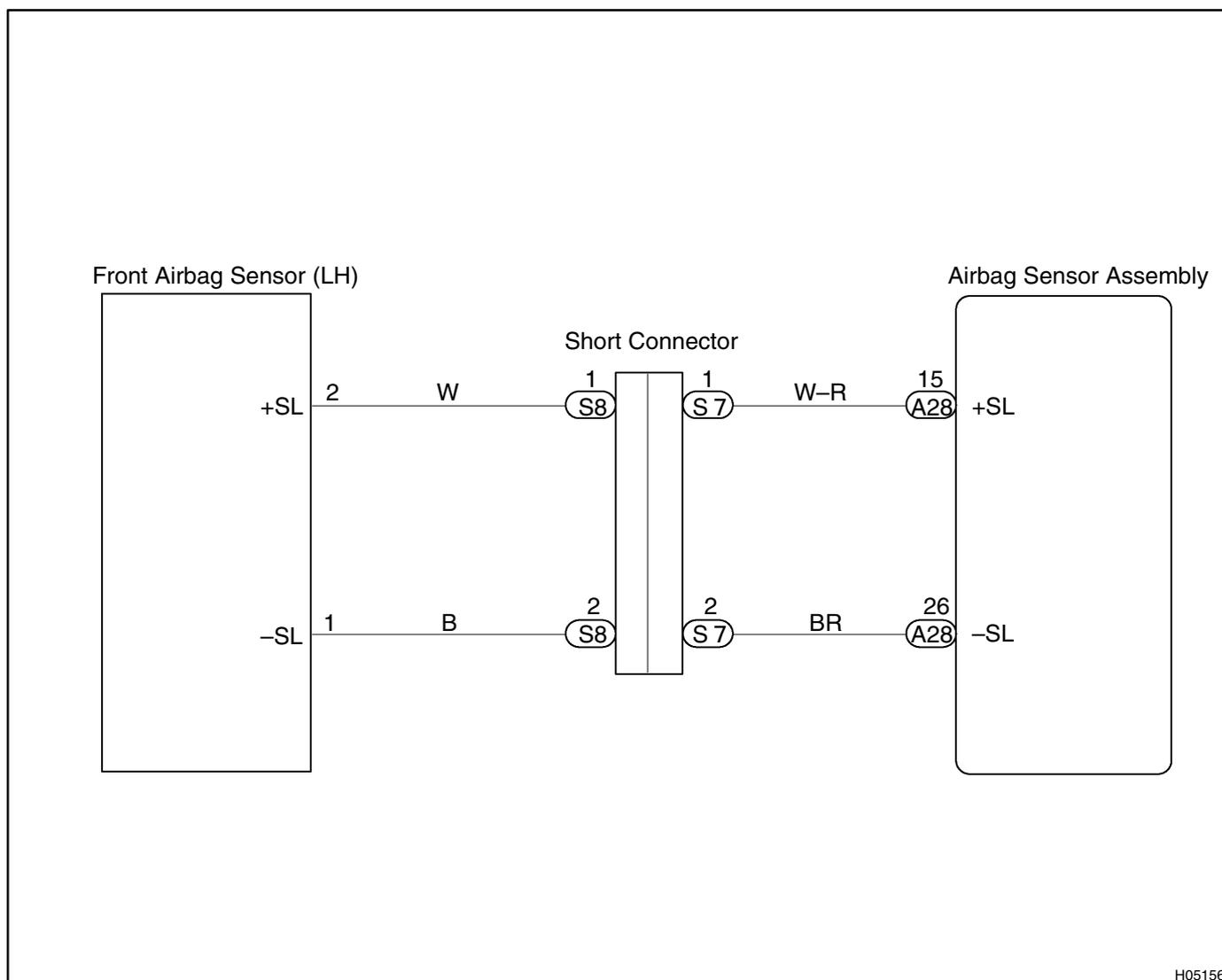
### CIRCUIT DESCRIPTION

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	<ul style="list-style-type: none"> <li>• Front airbag sensor (LH)</li> <li>• Airbag sensor assembly</li> <li>• Wire harness</li> </ul>

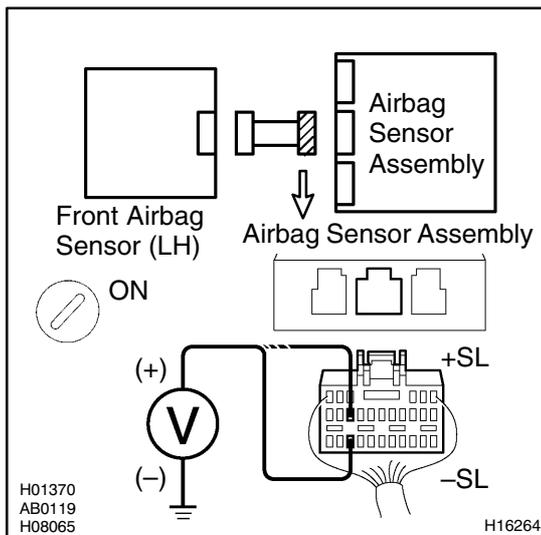
### WIRING DIAGRAM



## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page DI-431).

2 Check wire harness (to B+).

**CHECK:**

- Turn the ignition switch to ON.
- 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:**

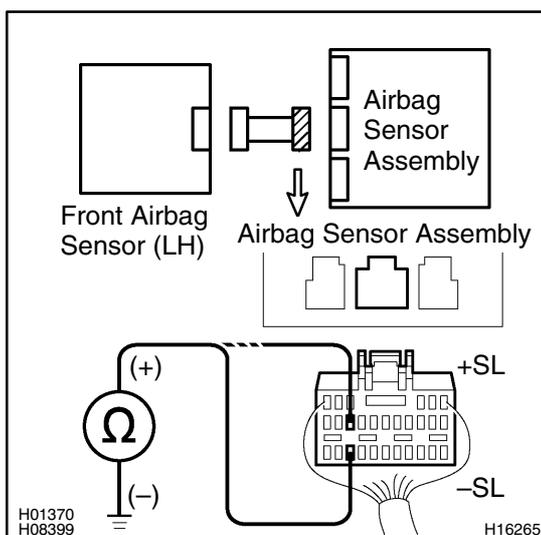
**Voltage: Below 1 V**

**NG**

**Repair or replace harness or connector between front airbag sensor (LH) 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 (LH) and the airbag sensor assembly, measure the resistance between body ground and each of +SL and -SL.

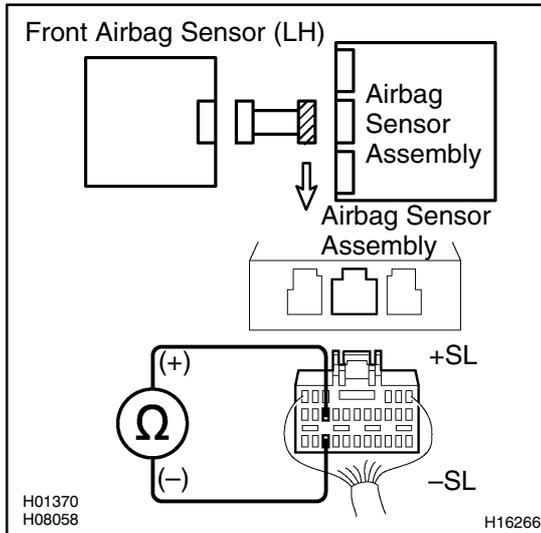
**OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector between front airbag sensor (LH) and airbag sensor assembly.**

**OK**

**4 Check wire harness.****CHECK:**

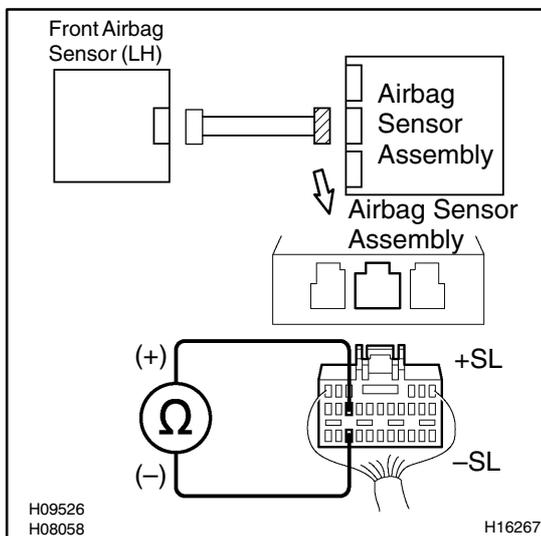
For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between +SL and -SL.

**OK:**

**Resistance: 1 M $\Omega$  or Higher**

**NG**

**Repair or replace harness or connector between front airbag sensor (LH) and airbag sensor assembly.**

**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  $\Omega$**

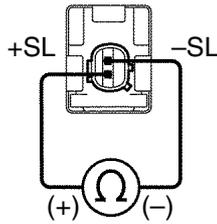
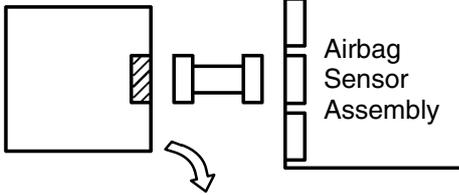
**NG**

**Repair or replace harness or connector between front airbag sensor (LH) and airbag sensor assembly.**

**OK**

## 6 Check front airbag sensor (LH).

Front Airbag Sensor (LH)

H01371  
H01009

H01155

**CHECK:.**

For the connector (on the front airbag sensor (LH)), measure the resistance between +SL and -SL.

**OK:**

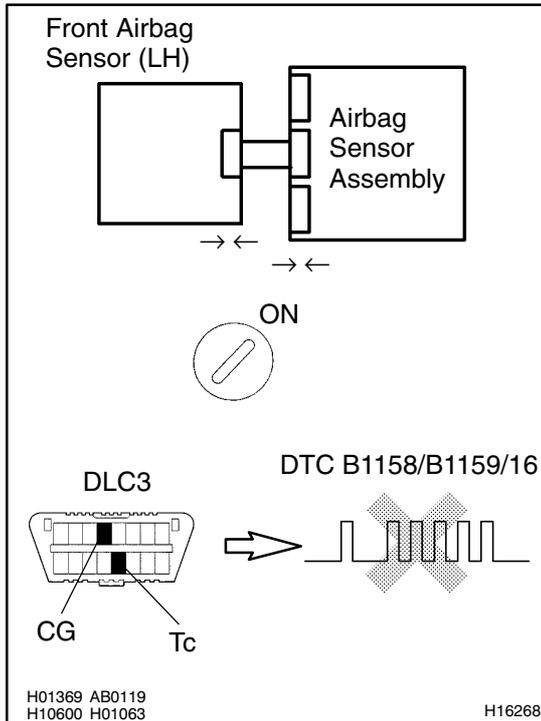
**Resistance: 300 – 1500 Ω**

**NG**

**Replace front airbag sensor (LH).**

**OK**

## 7 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page DI-305).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-305).

### 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.**

<b>DTC</b>	<b>Normal</b>	<b>Source Voltage Drop</b>
------------	---------------	----------------------------

**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.

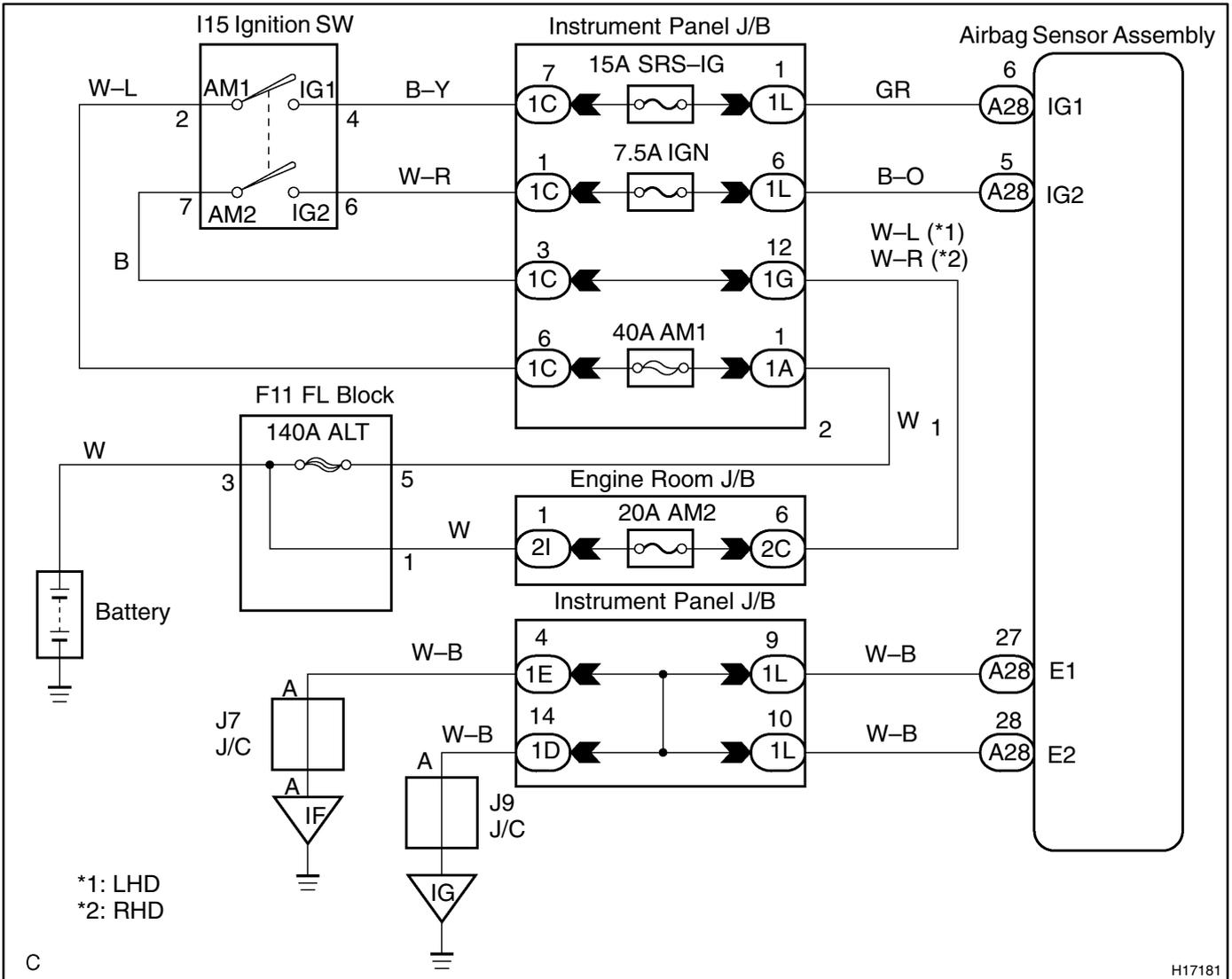
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

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**

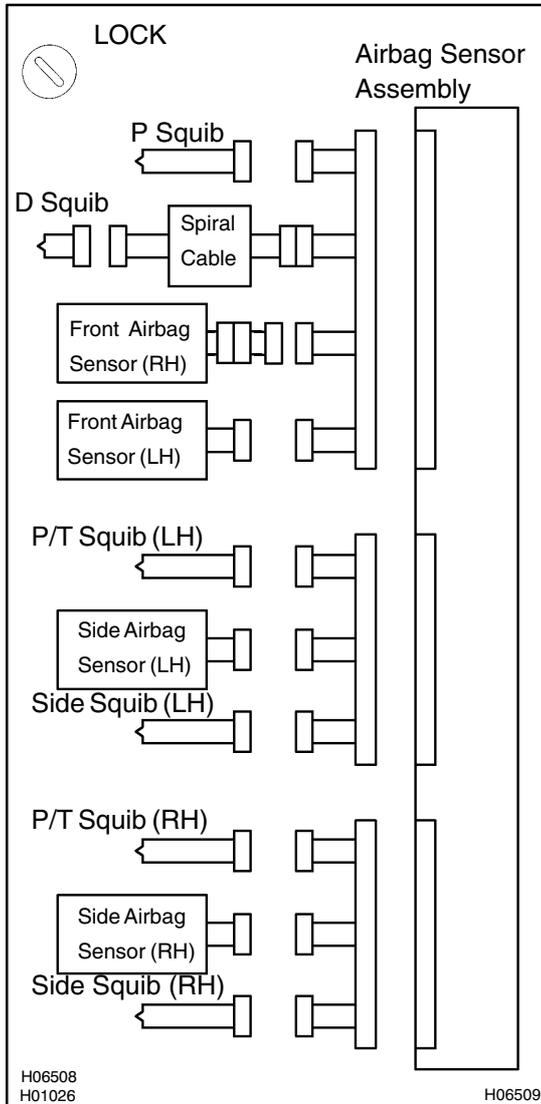


C

H17181

## INSPECTION PROCEDURE

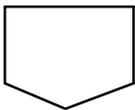
## 1 Prepare for inspection.

**PREPARATION:**

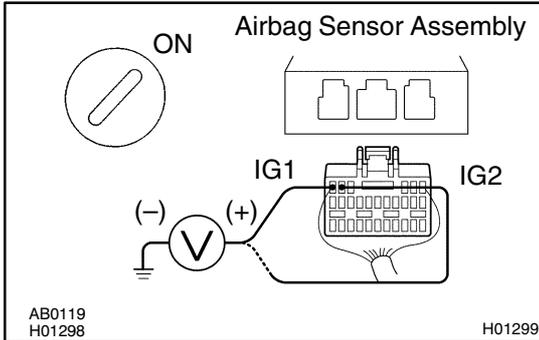
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Remove the steering wheel pad (See page SR-12).
- Disconnect the connector of the front passenger airbag assembly (See page RS-27).
- Disconnect the connector of the side airbag assembly RH and LH (See page RS-39).
- Disconnect the connector of the seat belt pretensioner RH and LH (See page BO-189).
- Disconnect the connectors of the airbag sensor assembly (See page RS-52).
- Disconnect the connector of the front airbag sensor RH and LH (See page RS-57).
- Disconnect the connector of the side airbag sensor assembly RH and LH (See page RS-62).

**CAUTION:**

**Store the steering wheel pad, front passenger airbag assembly and side airbag assembly with the front surface facing upward.**



## 2 Check source voltage.



### PREPARATION:

Connect negative (-) terminal cable to the battery.

### CHECK:

- Turn the ignition switch to ON.
- Measure the voltage between body ground and each of IG1 and IG2 on the sensor and operate electric system (defogger, wiper, headlight, heater blower, etc.).

### OK:

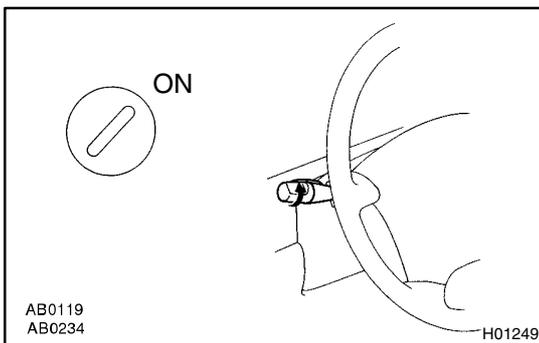
**Voltage: 10 – 14 V**

**NG**

**Check harness between battery and airbag sensor assembly, and check battery and charging system.**

**OK**

## 3 Does SRS warning light turn off?



### PREPARATION:

- Turn the ignition switch to LOCK.
- Connect the steering wheel pad connector.
- Connect the front passenger airbag assembly connector.
- Connect the side airbag assembly connectors.
- Connect the seat belt pretensioner connectors.
- Connect the airbag sensor assembly connectors.
- Connect the front airbag sensor connectors.
- Connect the side airbag sensor assembly connectors.
- Turn the ignition switch to ON.

### CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

**NO**

**Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.**

**YES**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

## SRS Warning Light Circuit Malfunction

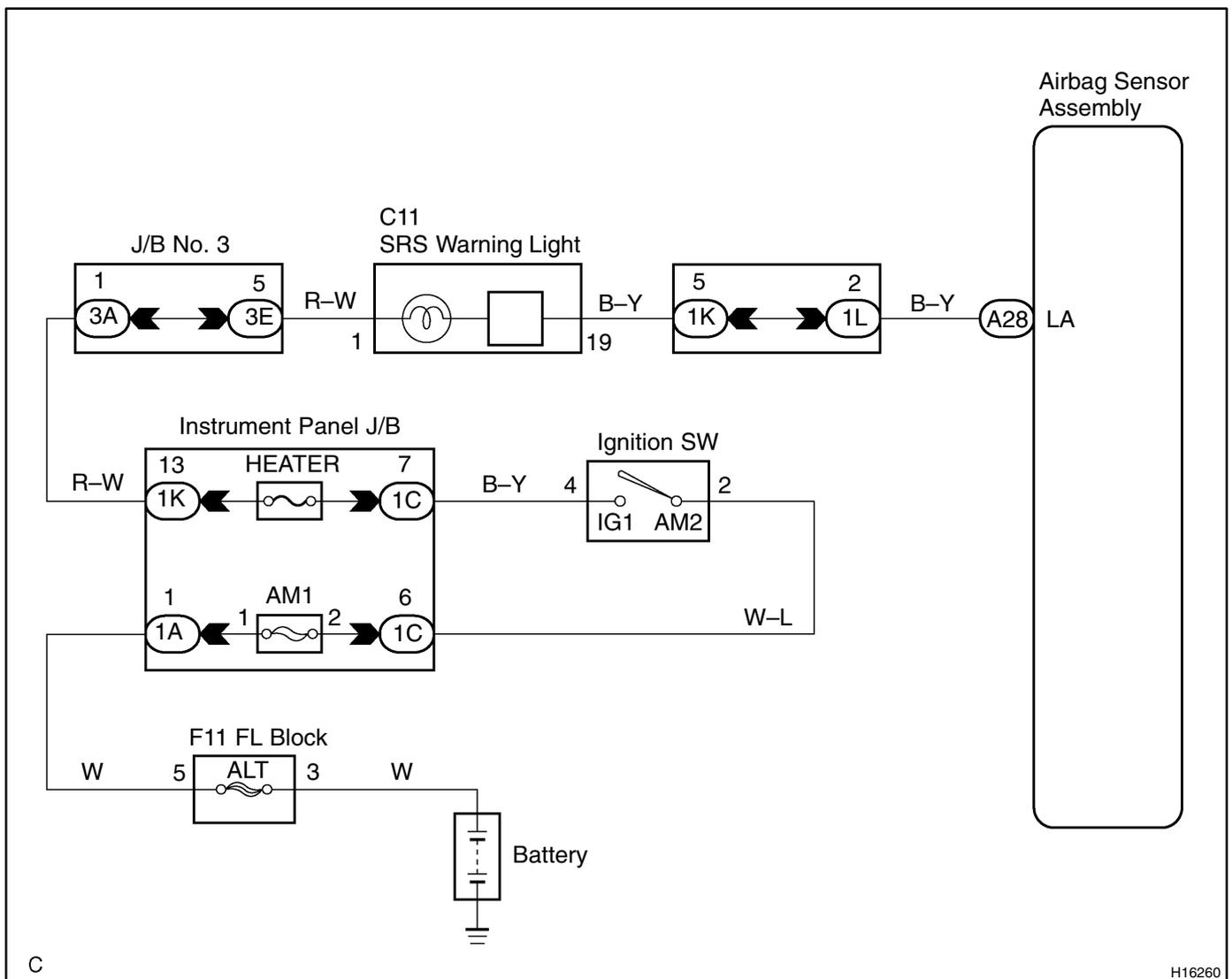
### CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.

When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to ON position, and then turns off automatically.

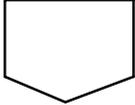
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality. When terminals Tc and CG of the DLC3 are connected, the DTC is displayed by blinking the SRS warning light.

### WIRING DIAGRAM

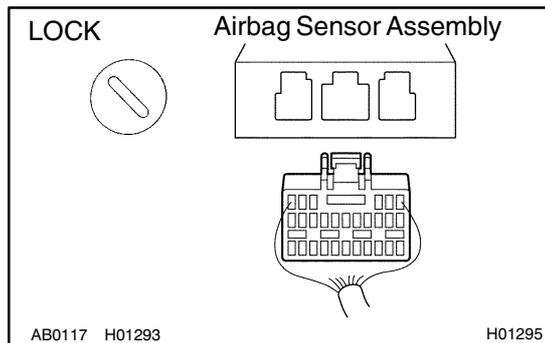


**INSPECTION PROCEDURE****Always lights up, when ignition switch is in LOCK position**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-431).</b>
----------	--



<b>2</b>	<b>Does SRS warning light turn off?</b>
----------	---

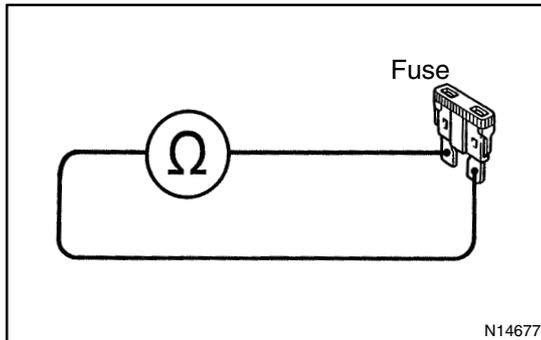
**PREPARATION:**

- (a) Turn the ignition switch to LOCK.
- (b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.
- (d) Connect negative (-) terminal cable to the battery.

**CHECK:**

Check operation of SRS warning light.

**NO****Check SRS warning light circuit or terminal AB circuit of DLC3.****YES****Replace airbag sensor assembly.**

**Does not light up, when ignition switch is turned to ON****1 Check AM2 Fuse.****PREPARATION:**

Remove the AM2 fuse.

**CHECK:**

Check continuity of the AM2 fuse.

**OK:**

**Continuity**

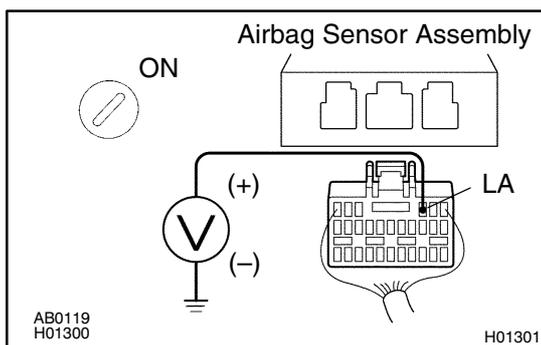
**HINT:**

- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

**NG**

**Go to step 5.**

**OK**

**2 Prepare for inspection (See step 1 on page DI-431).****3 Check SRS warning light circuit.****PREPARATION:**

- Connect negative (–) terminal cable to the battery.
- Turn the ignition switch to ON.

**CHECK:**

Measure the voltage between body ground and LA terminal of the harness side connector of the airbag sensor assembly.

**OK:**

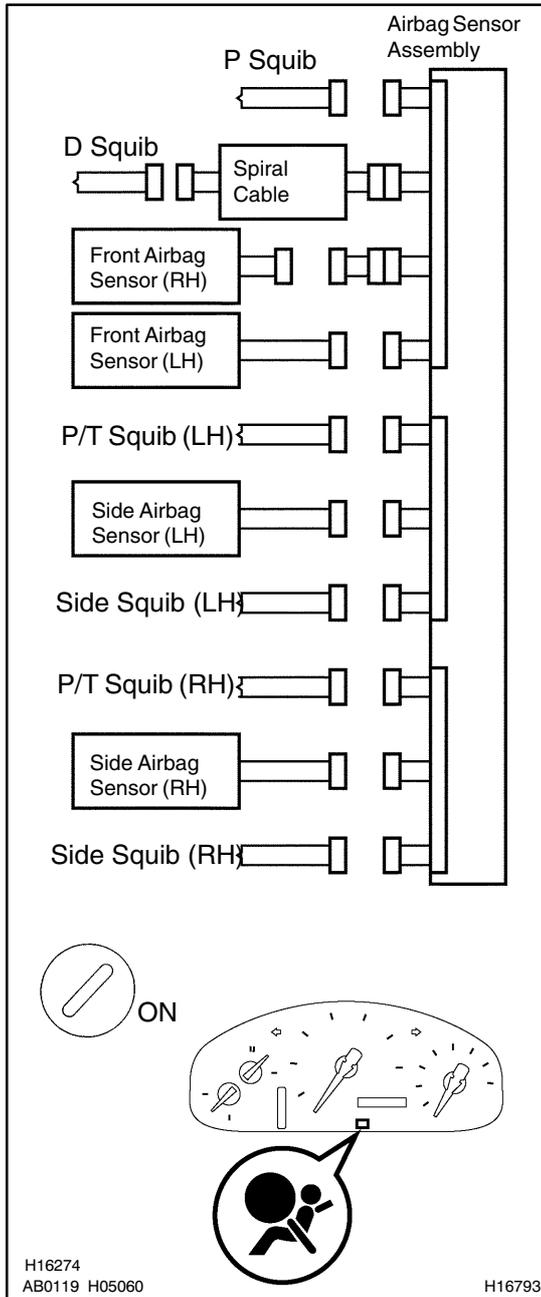
**Voltage: 10 – 14 V**

**NG**

**Check SRS warning light bulb or repair SRS warning light circuit.**

**OK**

#### 4 Does SRS warning light come on?



#### PREPARATION:

- Disconnect negative (-) terminal cable from the battery.
- Connect the airbag sensor assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.
- Turn the ignition switch to ON.

#### CHECK:

Check operation of the SRS warning light.

NO

Check terminal LA of airbag sensor assembly.  
If normal, replace airbag sensor assembly.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal.  
To make sure of this, use simulation method to check.

5	Is new AM2 fuse burnt out again?
---	----------------------------------

NO

Using simulation method, reproduce malfunction symptoms (See page IN-22).

YES

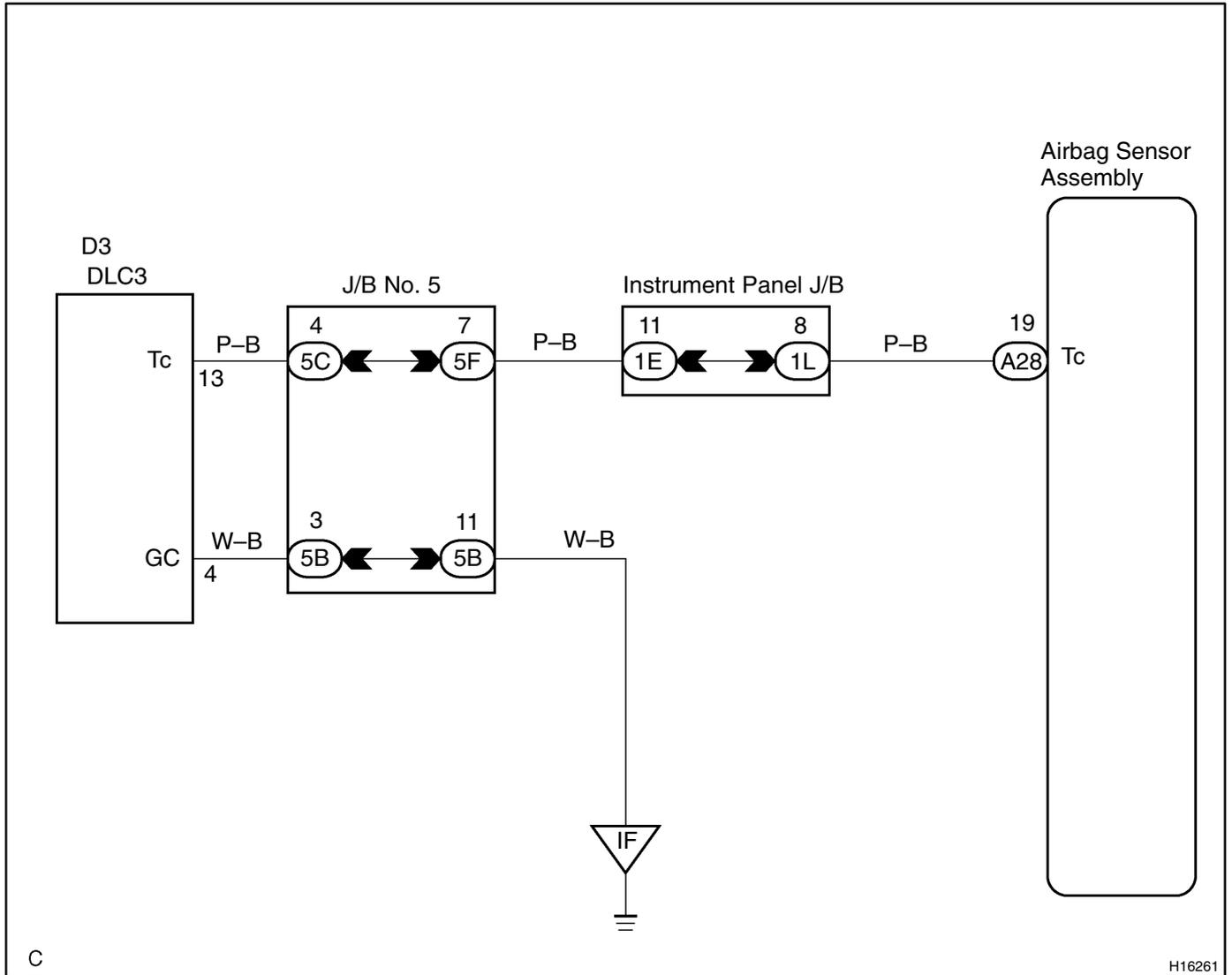
Check harness between AM2 fuse and SRS warning light.

# Tc Terminal Circuit

## CIRCUIT DESCRIPTION

By connecting terminals Tc and CG of the DLC3 the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

## WIRING DIAGRAM



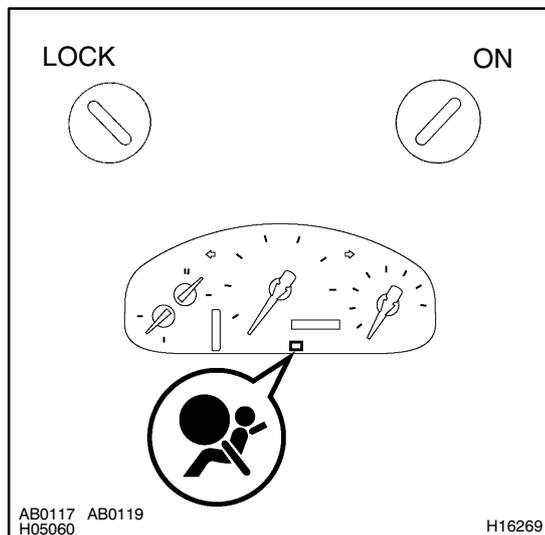
C

H16261

**INSPECTION PROCEDURE**

If the DTC is not displayed, do the following troubleshooting.

**1 Does SRS warning light light up for approx. 6 seconds?**

**PREPARATION:**

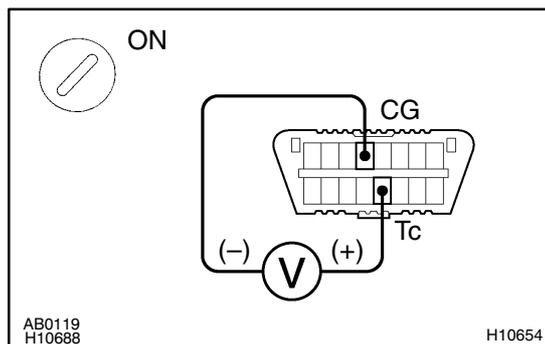
Check operation of the SRS warning light after ignition switch is turned from LOCK position to ON position.

**NO**

**Check SRS warning light system (See page DI-434).**

**YES**

**2 Check voltage between terminals Tc and CG of DLC3.**

**PREPARATION:**

Turn the ignition switch to ON.

**CHECK:**

Measure the voltage between terminals Tc and CG of DLC3.

**OK:**

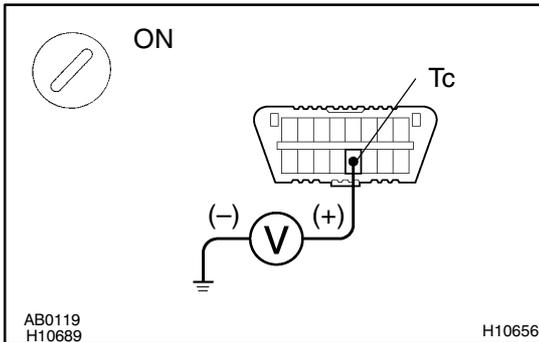
**Voltage: 10 – 14 V**

**OK**

**Go to step 4.**

**NG**

### 3 Check voltage between terminal Tc of DLC3 and body ground.

**CHECK:**

Measure the voltage between terminal Tc of DLC3 and body ground.

**OK:**

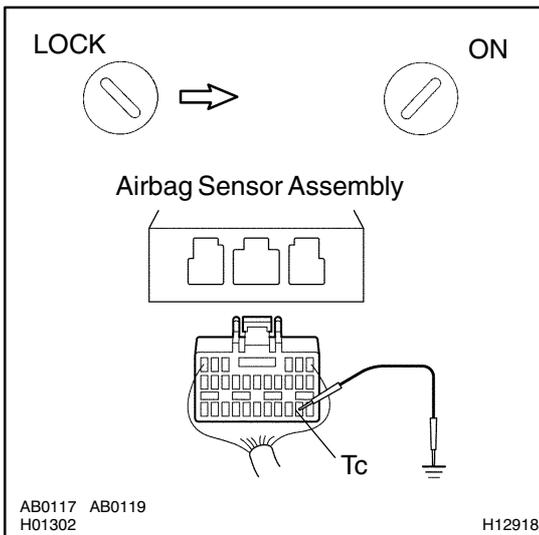
**Voltage: 10 – 14 V**

**OK**

**Check harness between terminal E1 of DLC3 and body ground.**

**NG**

### 4 Check airbag sensor assembly.

**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the airbag sensor assembly connector.
- Insert service wire into terminal Tc from back side as shown in the illustration.
- Connect the airbag sensor assembly connector with service wire.
- Connect negative (-) terminal cable to the battery.
- Turn the ignition switch to ON and wait at least for 20 seconds.
- Connect service wire of terminal Tc to body ground.

**CHECK:**

Check operation of the SRS warning light.

**OK:**

**SRS warning light comes on.**

**NOTICE:**

**Pay due attention to the terminal connecting position to avoid a malfunction.**

**OK**

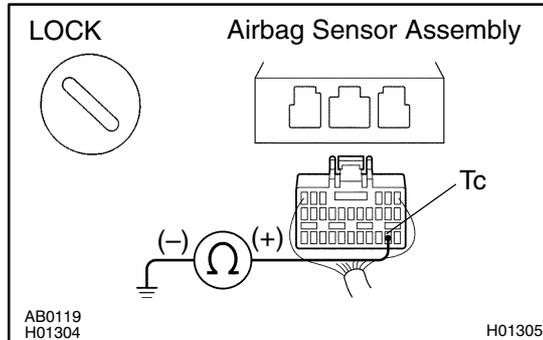
**Check harness between the airbag sensor assembly and DLC3.**

**NG**

**Replace airbag sensor assembly.**

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

- |          |  |
|----------|--|
| <b>1</b> | <b>Check resistance between terminal Tc of airbag sensor assembly and body ground.</b> |
|----------|--|



**PREPARATION:**

- (a) Turn the ignition switch to LOCK.
- (b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.

**CHECK:**

Check resistance between terminal Tc of the airbag sensor assembly connector and body ground.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector.**

**OK**

**Replace airbag sensor assembly.**

# THEFT DETERRENT SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI611-05

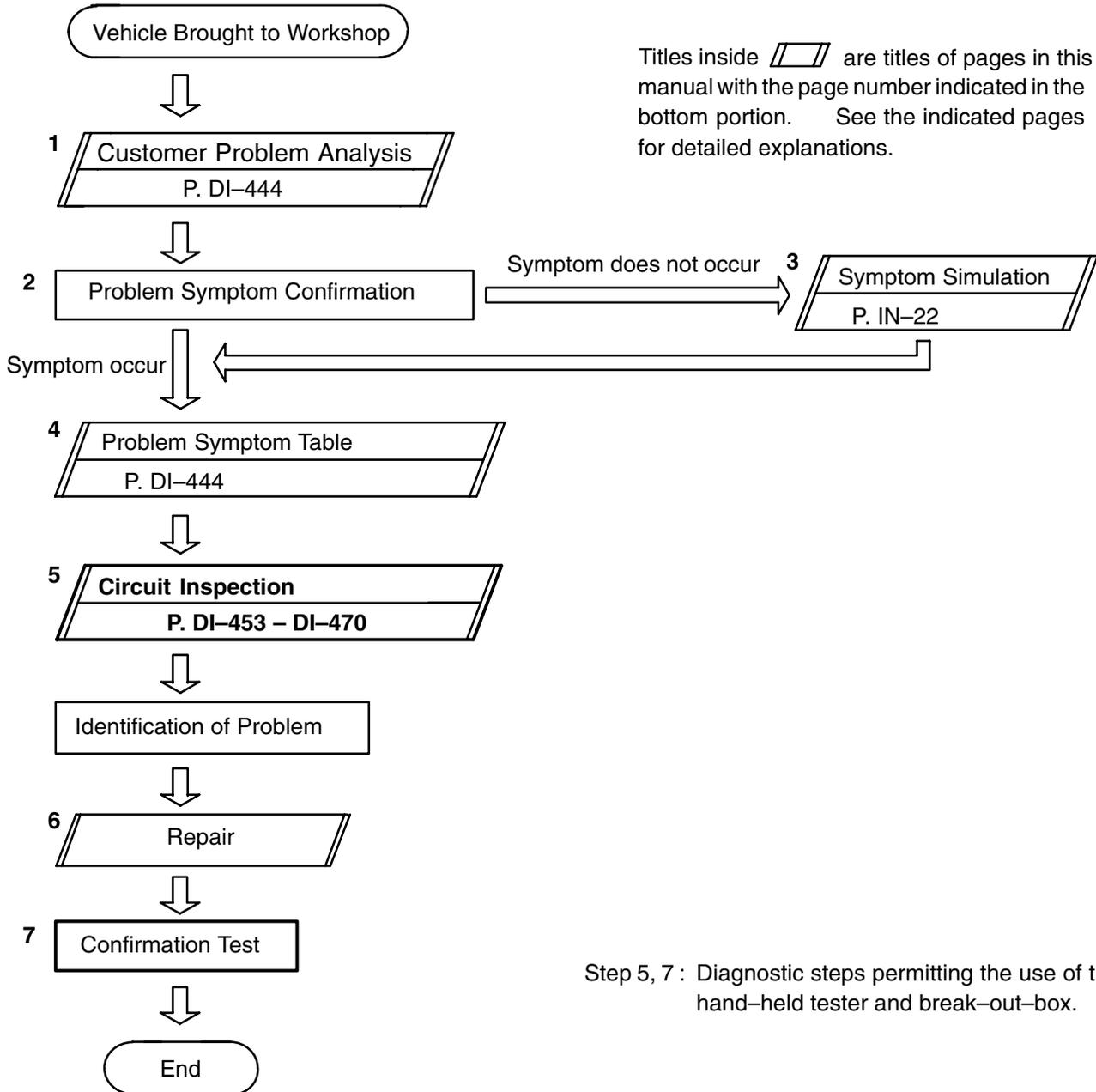
### HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

For troubleshooting use a volt/ohm meter.

Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.



Step 5, 7 : Diagnostic steps permitting the use of the hand-held tester and break-out-box.

# CUSTOMER PROBLEM ANALYSIS CHECK

**THEFT DETERRENT SYSTEM Check Sheet**

Inspector's name: \_\_\_\_\_

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

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    Times per    day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	<b>Weather</b> <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	<b>Outdoor temperature</b> <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.    °F (    °C))

<b>Problem Symptom</b>	<input type="checkbox"/> Theft deterrent system cannot be set.	
	<input type="checkbox"/> Indicator light does not flash when the theft deterrent system is set. (It stays ON or does not light at all.)	
	<input type="checkbox"/> Theft deterrent system does not operate.	<input type="checkbox"/> When unlocked using the door lock knob. <input type="checkbox"/> When the engine hood is opened.
	<b>Malfunction</b> <input type="checkbox"/> Horns only <input type="checkbox"/> Self power siren only <input type="checkbox"/> Hazard warning light only <input type="checkbox"/> Room light only <input type="checkbox"/> Door lock operation only	
	<input type="checkbox"/> System cannot be canceled once set.	<input type="checkbox"/> When door is unlocked using key or wireless door lock control system.
<input type="checkbox"/> System cannot be canceled during warning operation.	<input type="checkbox"/> When door is unlocked using key or wireless door lock control system.	
<input type="checkbox"/> Others.		

## PRE-CHECK

### 1. OUT LINE OF THEFT DETERRENT SYSTEM

When the theft deterrent system detects any theft, it informs people around with flashing lights and sound.

The performance of the theft deterrent system has been improved by adding the lights (HAZARDS) to the existing system.

### 2. PARTIAL CHANGE OF SYSTEM SETTING METHOD

There are 4 conditions in this system which are disarmed state, arming preparation, armed state and alarm sounding.

#### (1) Disarmed state

- When the alarming function does not operate.
- When theft deterrent function is not performed.

#### (2) Arming preparation

- Time until transferring to armed state.
- Theft deterrent function is not performed.

#### (3) Armed state

When theft deterrent function is possible.

#### (4) Alarm sounding:

In this condition, once theft is detected, it is informed using light and sound to people around the vehicle.

Refer to the table for alarming method or time.

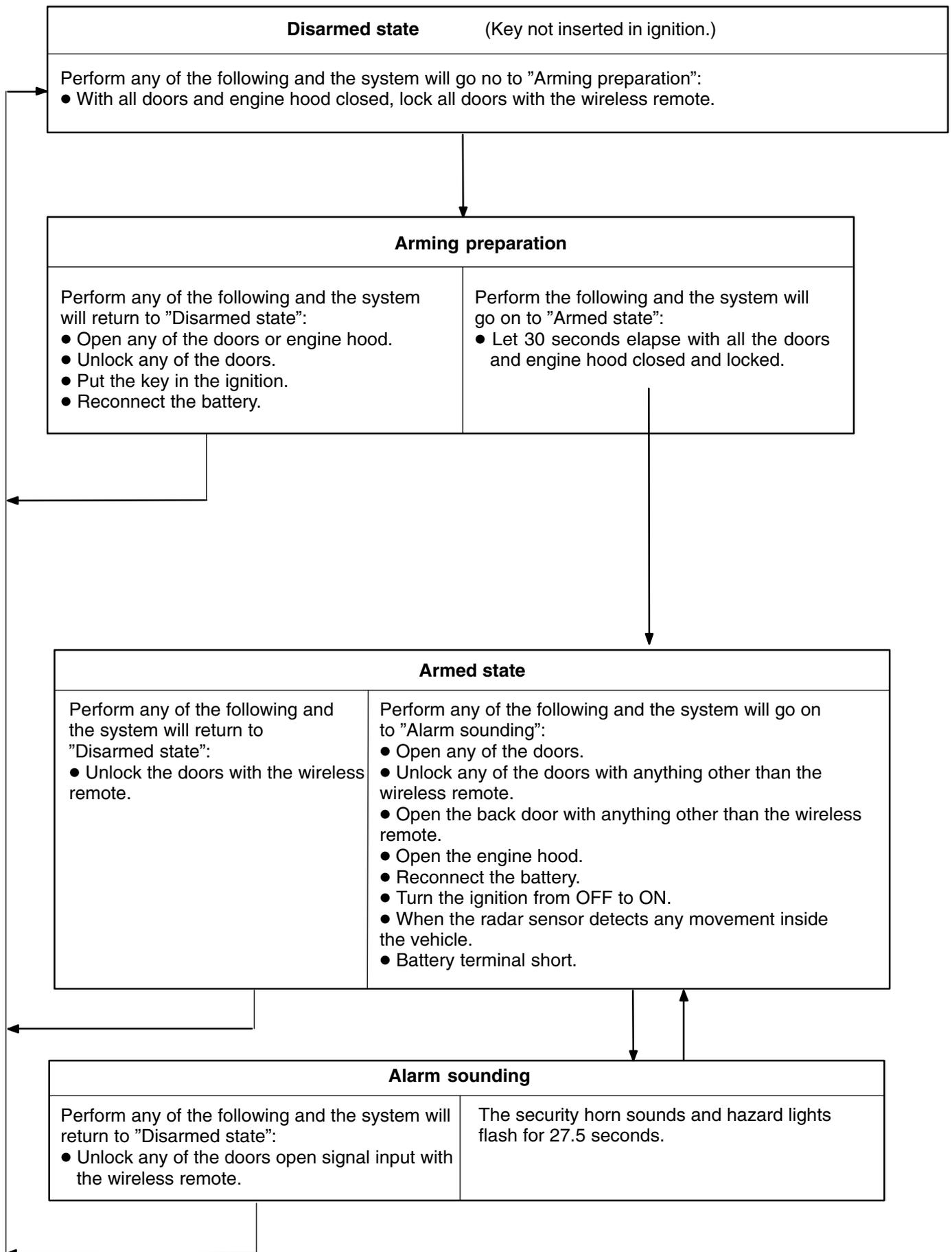
Alarming method	Horn
	Self power siren
	Room light
Alarming time	27.5 seconds
Alarming output	(Except room light flashing) Continuous 0.25 secs.: (ON) 0.25 secs.: (OFF)

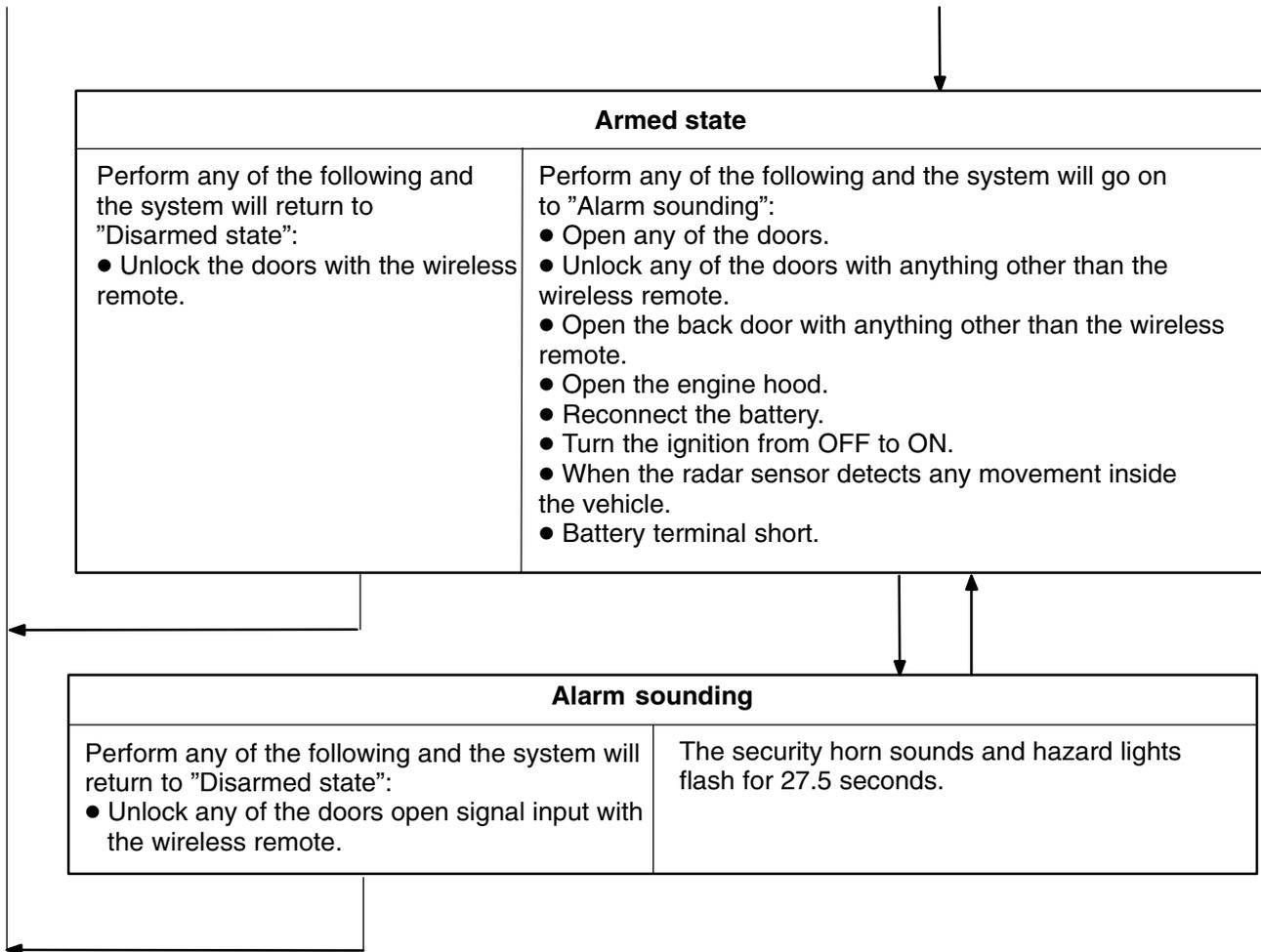
#### HINT:

Alarming output for hazard is same as the one for the hazard on the vehicle.

In the arming condition when either of doors is unlocked with key not in the key cylinder, force lock signal is output.

### 3. ACTIVE ARMING MODE





## (a) Indicator light output:

Condition		Output by alarm system	Output by immobilizer	Output by checking visually
Disarming condition	With Key	Goes off	Goes off	Goes off
	Without key		Blinks	Blinks
Disarming preparation condition		Lights up	Blinks	Lights up
Arming condition		Goes off	Blinks	Blinks
Alarming condition		Lights up	Blinks	Lights up

## HINT:

The indicator light might blink even under the disarming condition. (This is caused by output from the immobilizer)

The indicator always blink by output from the immobilizer at any time under the arming condition.

Blinking frequency:

0.2: ON 1.8 sec.: OFF

## (b) ON/OFF function of radar sensor:

## (1) Radar sensor operation condition:

Sensor operation starts:	When the condition for arming preparation condition is met.
Sensor operation stops:	When the condition is transformed to the disarming condition.

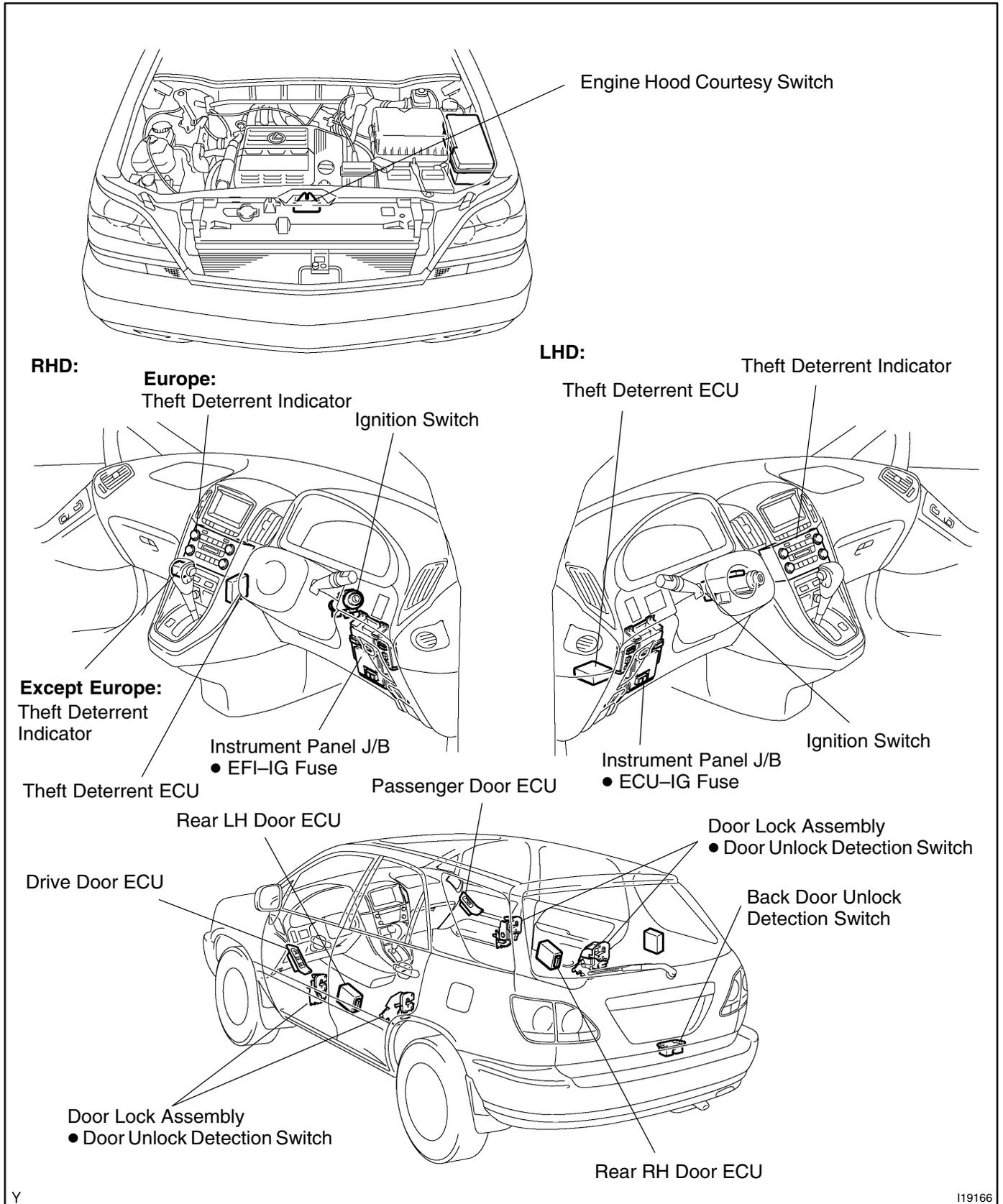
## (2) Radar sensor ON/OFF switching function:

Every time the button of the wireless door lock system is pressed under the arming preparation condition, sensor is switched ON/OFF.

- (c) Compulsion door lock function.
- (1) This is a control function to lock a door forcibly to prevent someone from invading in the vehicle when the inner door lock knob is unlocked under the arming condition, that is, when the alarming starts. In Europe, when a door is locked with a key the alarm sounds, however doors are not locked forcibly.
- (2) The setting specifications of the compulsion door lock function change as follows according to whether the double lock system is available or not.

Destination		Double lock	Compulsion door lock
Europe	RHD	○	X
	LHD	X	○
Australia / General countries		X	○

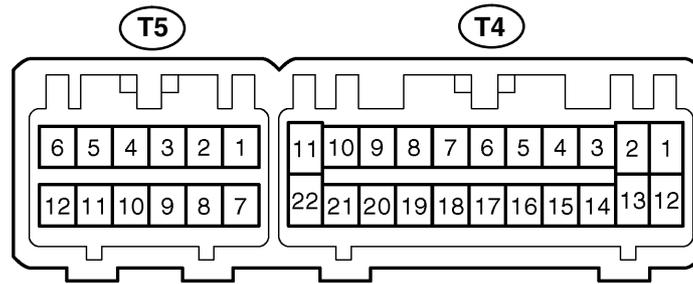
# PARTS LOCATION



Y

119166

## TERMINALS OF ECU



I01920

Symbols (Terminals No.)	Wiring Color	Condition	STD Value
DSWH ↔ E (T4-4 ↔ T4-22)	R-W ↔ W-B	Engine hood courtesy switch position is OFF. (Engine hood closed)	Below 1 V
		Engine hood courtesy switch position is ON. (Engine hood opened)	10 – 14 V
UL2 ↔ E (T4-5 ↔ T4-22)	LG-R ↔ W-B	Back door key lock and unlock switch position is LOCK.	10 – 14 V
		Back door key lock and unlock switch position is UNLOCK.	Below 1 V
S+B ↔ E (T4-8 ↔ T4-22)	R-Y ↔ W-B	Constant	10 – 14 V
IG ↔ E (T4-10 ↔ T4-22)	B-R ↔ W-B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
+B1 ↔ E (T4-11 ↔ T4-22)	G-B*1 W-L*2 ↔ W-B	Constant	10 – 14 V
L2 ↔ E (T4-13 ↔ T4-22)	L-W ↔ W-B	Back door key lock and unlock switch position is UNLOCK.	10 – 14 V
		Back door key lock and unlock switch position is LOCK.	Below 1 V
IOUT ↔ E (T4-18 ↔ T4-22)	W ↔ W-B	Radar sensor detection invader	Below 1 V
		Constant	10 – 14 V
KSW ↔ E (T4-19 ↔ T4-22)	L ↔ W-B	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
E ↔ Body ground (T4-22 ↔ Body ground)	W-B ↔ Body ground	Constant	Below 1 V
HORN ↔ E (T5-4 ↔ T4-22)	W-R ↔ W-B	Horn switch position is ON.	Below 1 V
		Horn switch position is OFF.	10 – 14 V
CLTS ↔ E (T5-9 ↔ T4-22)	L-B ↔ W-B	Theft deterrent system change condition.	One time
		Constant	10 – 14 V
TRIG ↔ E (T5-10 ↔ T4-22)	Y ↔ W-B	Theft deterrent system is alarming condition.	Below 1 V
		Constant	10 – 14 V
IND ↔ E (T5-12 ↔ T4-22)	L ↔ W-B	During set preparation.	3 – 5 V

\*1: LHD

\*2: RHD

## PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and troubleshoot for each circuit.

### HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Symptom	Suspect Area	See page
The theft deterrent system cannot be set	4. Indicator light circuit 5. ECU power source circuit 6. Key unlock warning switch circuit 7. Back door key lock and unlock switch circuit 8. Back door courtesy switch circuit 9. Door key lock and unlock switch circuit 10. Door courtesy switch circuit 11. Door unlock detection switch circuit 12. Engine hood courtesy switch circuit	DI-453 DI-455 DI-461 DI-463 DI-592 DI-610 DI-612 DI-608 DI-470
The indicator light does not blink when system is set.	Indicator light circuit	DI-453
When the system is set (The system does not operate when the rear door is unlocked).	Door unlock detection switch circuit	DI-612
When the system is set (The system does not operate when the back door is opened by a method other than the key).	Back door courtesy switch circuit	DI-592
When the system is set (The system does not operate when the engine hood is opened).	Engine hood courtesy switch circuit	DI-470
When the system is set (The system does not operate when after 30 seconds put your hand through the window and shake it near the sensor).	Radar sensor circuit	DI-468
While the system is in warning operation (Horns do not sound).	Horn relay circuit	DI-459
While the system is in warning operation (Siren does not sound).	Self power siren circuit	DI-465
While the system is in warning operation (When the siren does not sound or stops soon after it starts).	Self power siren battery	BE-109
While the system is in warning operation (Hazard lights do not flash).	Hazard switch circuit	DI-578
While the system is in warning operation (The door lock is not locked).	Door unlock detection switch circuit	DI-608
System is still set even when a rear door is open	Door courtesy switch circuit	DI-612
Even when the system is not set (Horns sound).	Horn relay circuit	DI-459
Even when the system is not set (Siren sounds).	Self power siren circuit	DI-465
Even when the system is not set (when the siren does not sound or stops soon after it starts).	Self power siren battery	BE-109
Even when the system is not set (Hazard lights do not flash).	Hazard switch circuit	DI-578

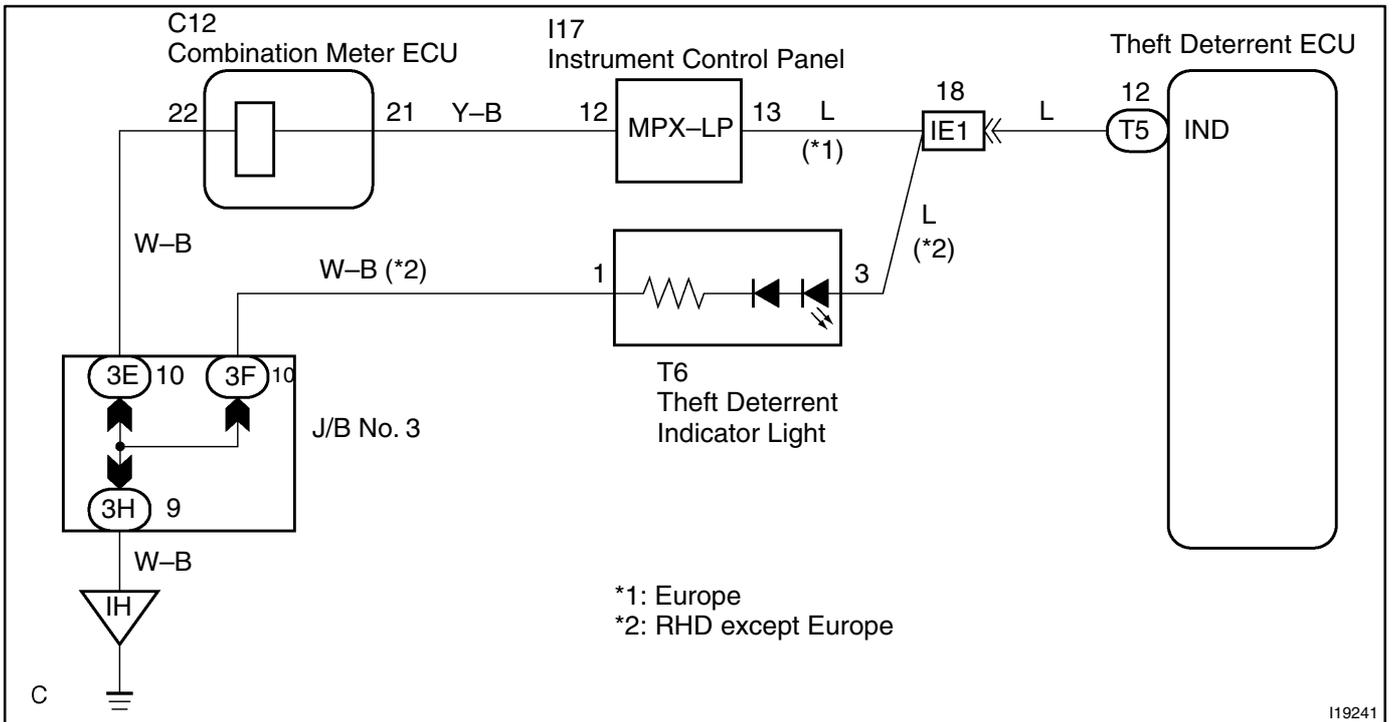
# CIRCUIT INSPECTION

## Indicator Light Circuit

### CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light ON for 1 second and turns it OFF for 1 second, thus blinking the indicator light.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check theft deterrent indicator using hand-held tester.</b>
----------	--

### PREPARATION:

(a) Connect the hand-held tester to the DLC 3.

(b) Connect terminals Tc and E1 of DLC1.

### CHECK:

Check that the theft deterrent indicator can light in an ACTIVE TEST.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI-452).

NG

<b>2</b>	<b>Check indicator light (See page BE-109).</b>
----------	---

NG

Replace the bulb or meter wire harness.

OK

<b>3</b>	<b>Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN-32).</b>
----------	---

NG

Repair or replace harness or connector.

OK

**Check and replace theft deterrent ECU.\*1**

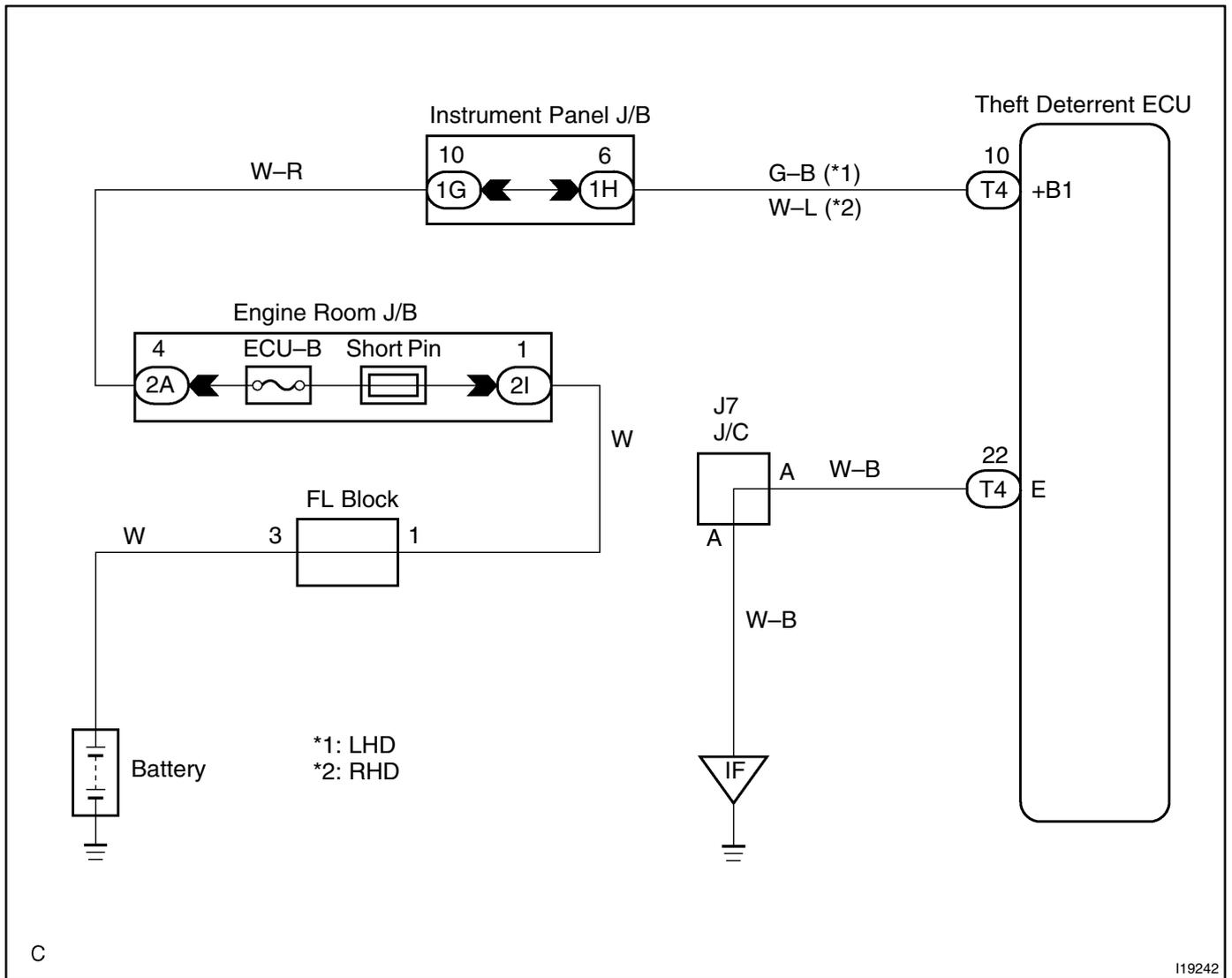
\*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI-452).

# ECU Power Source Circuit

## CIRCUIT DESCRIPTION

This circuit provides power to operate the theft deterrent ECU.

## WIRING DIAGRAM



## INSPECTION PROCEDURE

1 Check ECU-B fuse.

**PREPARATION:**

Remove ECU-B fuse from engine room junction block.

**CHECK:**

Check continuity ECU-B fuse.

**OK:**

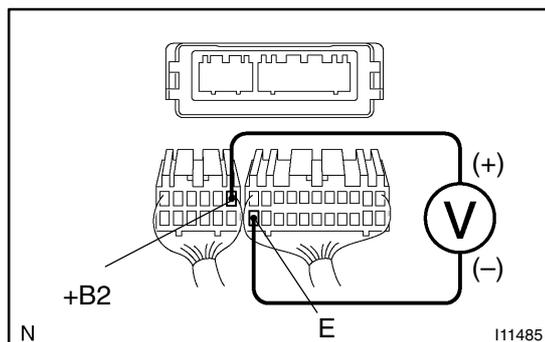
Continuity

NG

Check for short in all the harness and components connected to the ECU-B fuse (See attached wiring diagram).

OK

2 Check voltage between terminals +B2 and E of theft deterrent ECU connector.

**PREPARATION:**

Disconnect the theft deterrent ECU connector.

**CHECK:**

Measure voltage between terminals +B2 and E of theft deterrent ECU connector.

**OK:**

Voltage: 10 – 14V

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI-452).

NG

3 Check for open in harness and connector between ECU and body ground (See page IN-32).

NG

Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.



**INSPECTION PROCEDURE****1 Check ECU-IG fuse.****PREPARATION:**

- (a) Remove the fuse box opening cover.
- (b) Remove ECU-IG fuse from instrument panel junction block.

**CHECK:**

Check continuity of ECU-IG fuses.

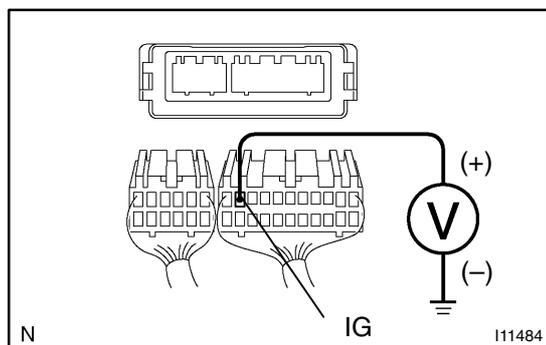
**OK:**

**Continuity**

**NG**

**Check for short in all the harness and components connected to the ECU-IG fuse (See attached wiring diagram).**

**OK**

**2 Check voltage between terminals IG of theft deterrent ECU and body ground.****PREPARATION:**

- (a) Disconnect the theft deterrent ECU connectors.
- (b) Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals IG of theft deterrent ECU connector and body ground.

**OK:**

**Voltage: 10 – 14V**

**NG**

**Check and repair harness and connector between theft deterrent ECU and battery (See page IN-32).**

**OK**

**Check and replace theft deterrent ECU.**

# Horn Relay Circuit

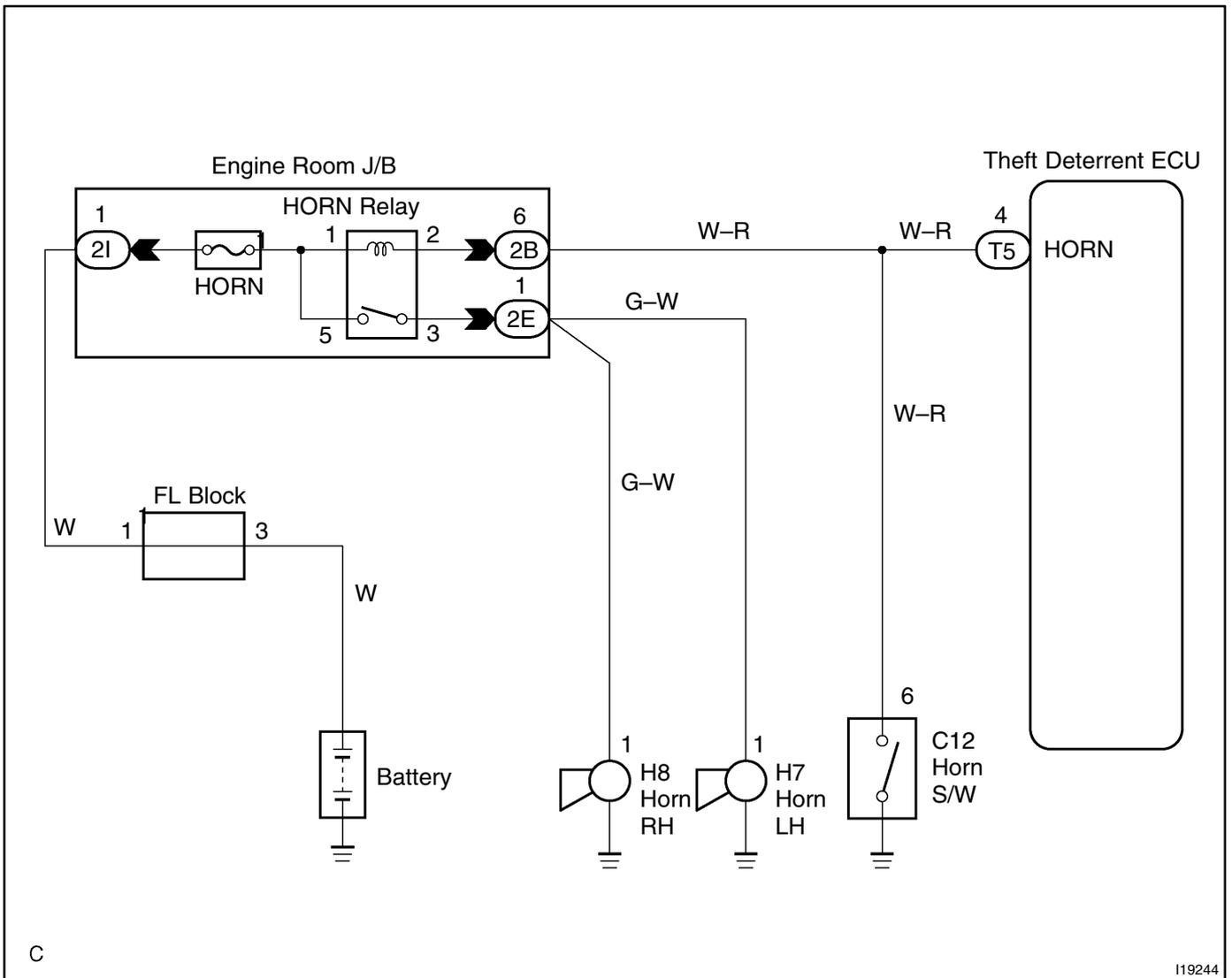
## CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF in approximately 0.4 sec. cycles. This switches the horn relay ON and OFF, thus the horns blow (See the wiring diagram below).

In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the horn relay switches OFF, thus stopping the horns from blowing:

- (1) Unlock the doors with the wireless door lock control system.
- (2) Wait for approximately 30 seconds.

## WIRING DIAGRAM



C

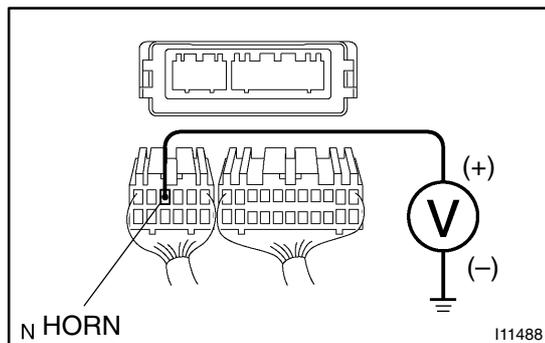
I19244

## INSPECTION PROCEDURE

### HINT:

The flow chart below is based on the premise that the horns blow normally whenever the horn switch is operated. If horn operation is not normal when the horn switch is operated, check the horn switch.

- |          |  |
|----------|--|
| <b>1</b> | <b>Check voltage between terminal HORN of theft deterrent ECU connector and body ground.</b> |
|----------|--|



### PREPARATION:

Disconnect the theft deterrent ECU connectors.

### CHECK:

Measure voltage between terminal HORN of theft deterrent ECU connector and body ground.

### OK:

**Voltage: 10 – 14V**

**NG**

**Check and repair harness and connector between theft deterrent ECU and horn relay (See page IN-32).**

**OK**

**Check and replace theft deterrent ECU (See page IN-32).**

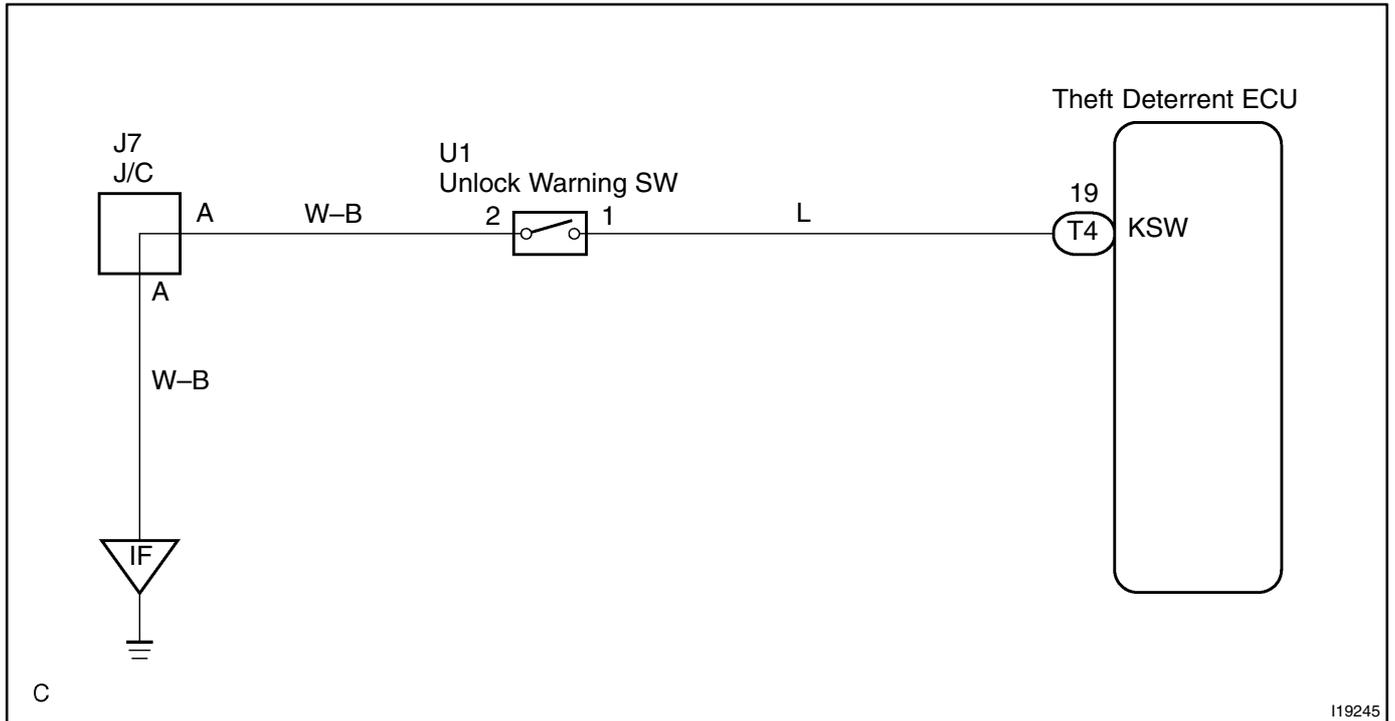
# Key Unlock Warning Switch Circuit

## CIRCUIT DESCRIPTION

The key unlock warning switch goes ON when the ignition key is inserted in the key cylinder and goes OFF when the ignition key is removed.

The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

## WIRING DIAGRAM

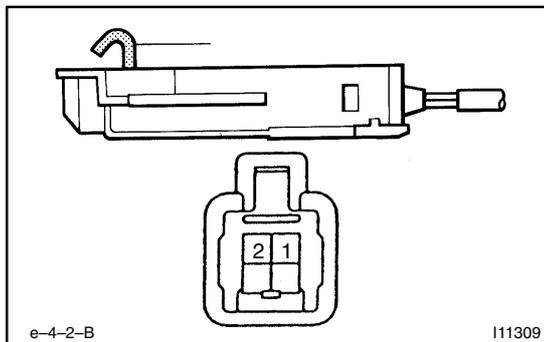


C

I19245

## INSPECTION PROCEDURE

## 1 Check key unlock warning switch.

**PREPARATION:**

Disconnect key unlock warning switch connector.

**CHECK:**

Check continuity between terminal 1 and 2 of key unlock warning switch connector, when the key is inserted into the key cylinder or removed.

**OK:**

Switch position	Tester connection	Specified condition
ON (Key inserted)	1 – 2	Continuity
OFF (Key removed)	–	No continuity

NG

Replace key unlock warning switch.

OK

## 2 Check harness and connectors between ECU and key unlock warning switch, key unlock warning switch and body ground (See page IN-32).

NG

Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.\*1

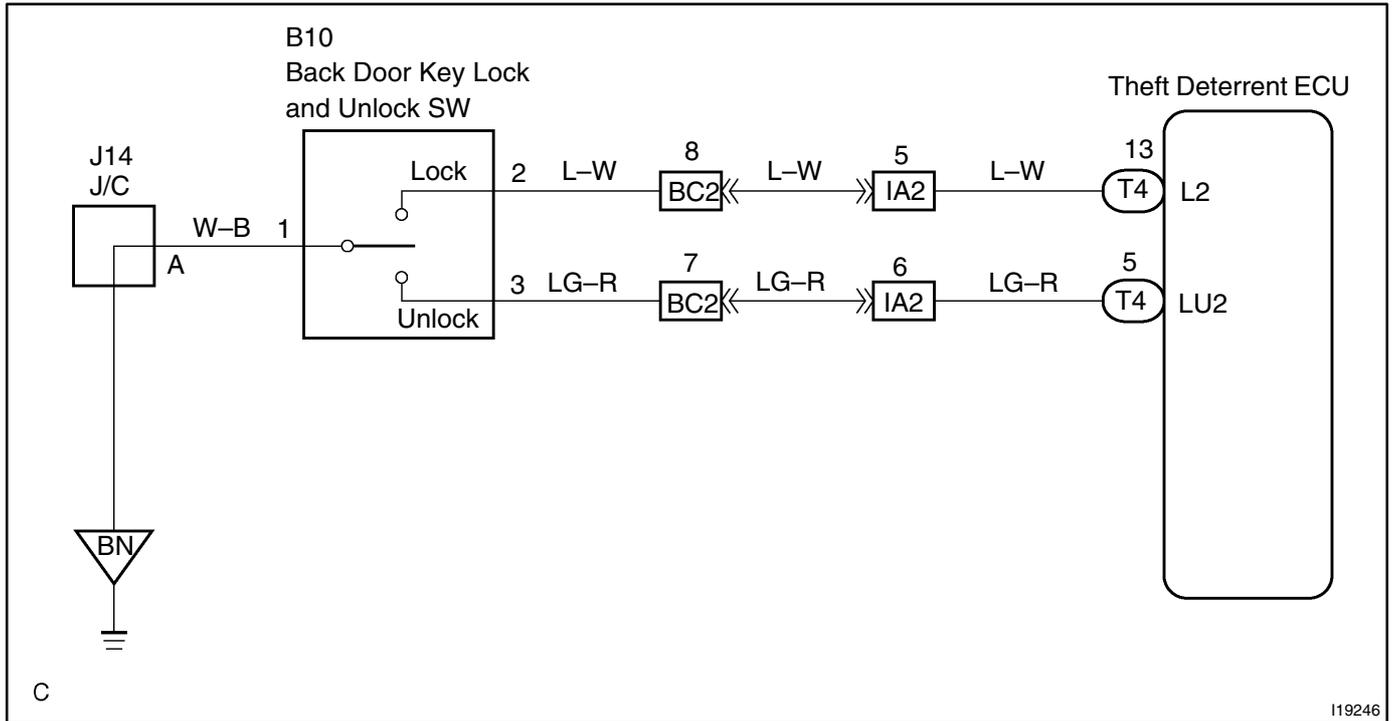
\*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI-452).

# Back Door Key Lock and Unlock Switch Circuit

## CIRCUIT DESCRIPTION

The back door key lock and unlock switch goes ON when the back door key cylinder is turned to the unlock side with the key.

## WIRING DIAGRAM



C

119246

## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check luggage compartment door lock and unlock switch using hand-held tester.</b>
----------	--

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the luggage compartment door lock and unlock switch using DATA LIST.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI-452).

NG

<b>2</b>	<b>Check back door key lock and unlock switch (See page BE-97).</b>
----------	---

NG

Repair or replace back door key lock and unlock switch.

OK

<b>3</b>	<b>Check harness and connector between theft deterrent ECU and key lock and unlock switch, key lock and unlock switch and body ground (See page IN-32).</b>
----------	---

NG

Repair or replace harness or connector.

OK

**Check and replace theft deterrent ECU.\*1**

\*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI-452).

## Self Power Siren

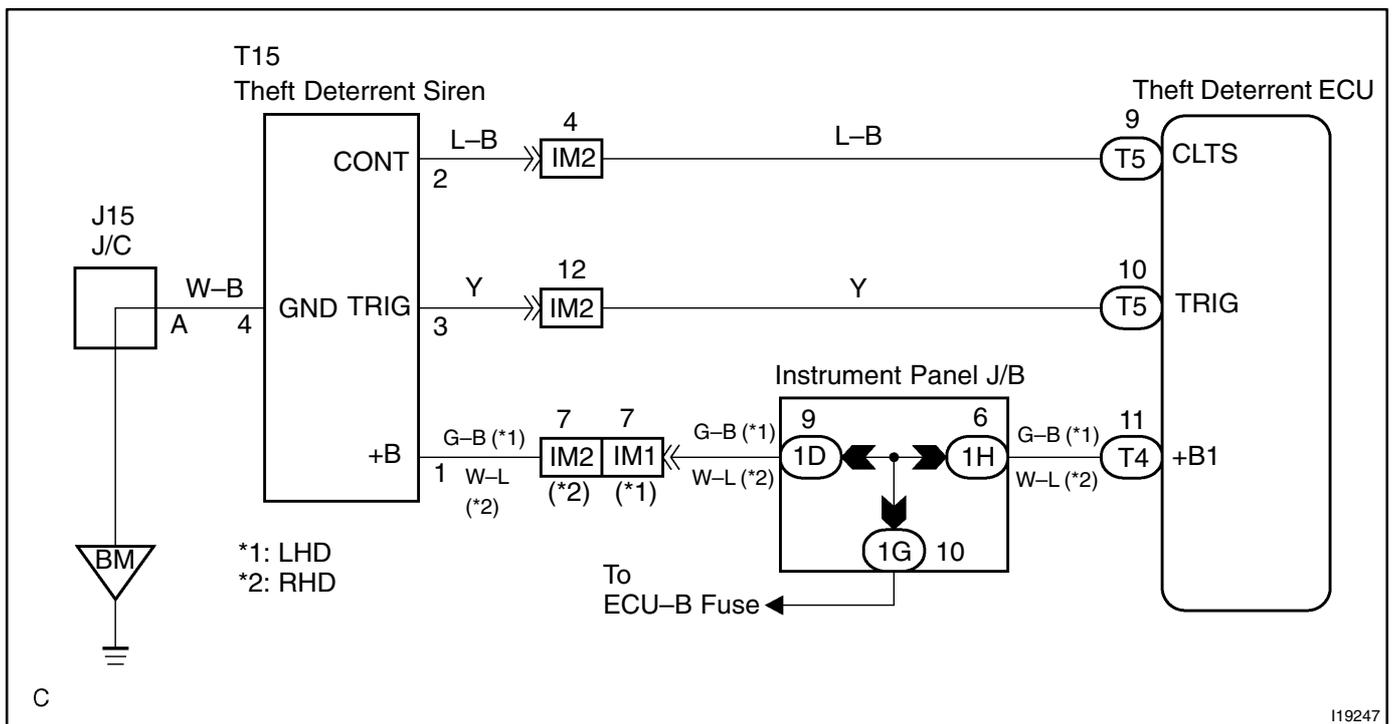
### CIRCUIT DESCRIPTION

Based on the alarm sounding state input from the theft deterrent ECU (to the TRIG terminal) an alarm is issued.

However, the armed/disarmed state is determined by the CONT terminal, which monitors vehicle status, and input to the TRIG terminal is only accepted from the ECU while armed state is ON.

Moreover, open circuit detection is only carried out while armed state is ON.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

#### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check self power siren using hand-held tester.</b>
----------	---

#### PREPARATION:

Connect the hand-held tester to the DLC 3.

#### CHECK:

Check that the self power alarm can operated in an ACTIVE TEST.

#### OK:

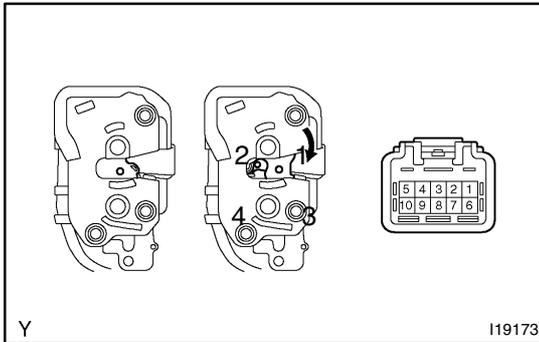
The self power alarm should sound.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI-452).

NG

## 2 Check self power siren.

**PREPARATION:**

Remove the self power siren.

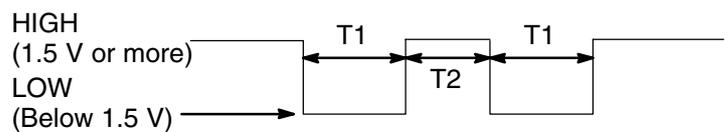
**CHECK:**

- (a) Case 1:  
Check terminal 3 in case of the system set signal is not input to the siren.
- (b) Case 2:  
Check terminal 4 in case of the siren drive signal is not input when the alarm is triggered.

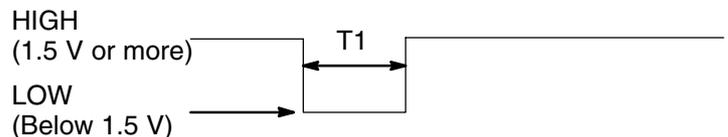
**OK:**

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery voltage
4 – Ground	Constant	No voltage
2 – Ground	When transforming from armed or arming preparation state to disarmed state.	Using an oscilloscope *1
	When transforming from the arming preparation state to armed state.	Using an oscilloscope *2
	Normal condition	Approx. 1.4 V
3 – Ground	Normal condition	Battery voltage
	Arming condition	Below 1 V

\*1: wave pattern



\*2: wave pattern



T1: 0.15 – 1.3 secs  
T2: 0.15 – 0.25 secs

OK

Replace self power siren.

NG

**3** Check harness and connector between ECU and alarm, alarm and body ground  
(See page IN-32).

**NG**

Repair or replace harness or connector.

**OK**

Proceed to next circuit inspection shown in  
problem symptom table (See page DI-452).

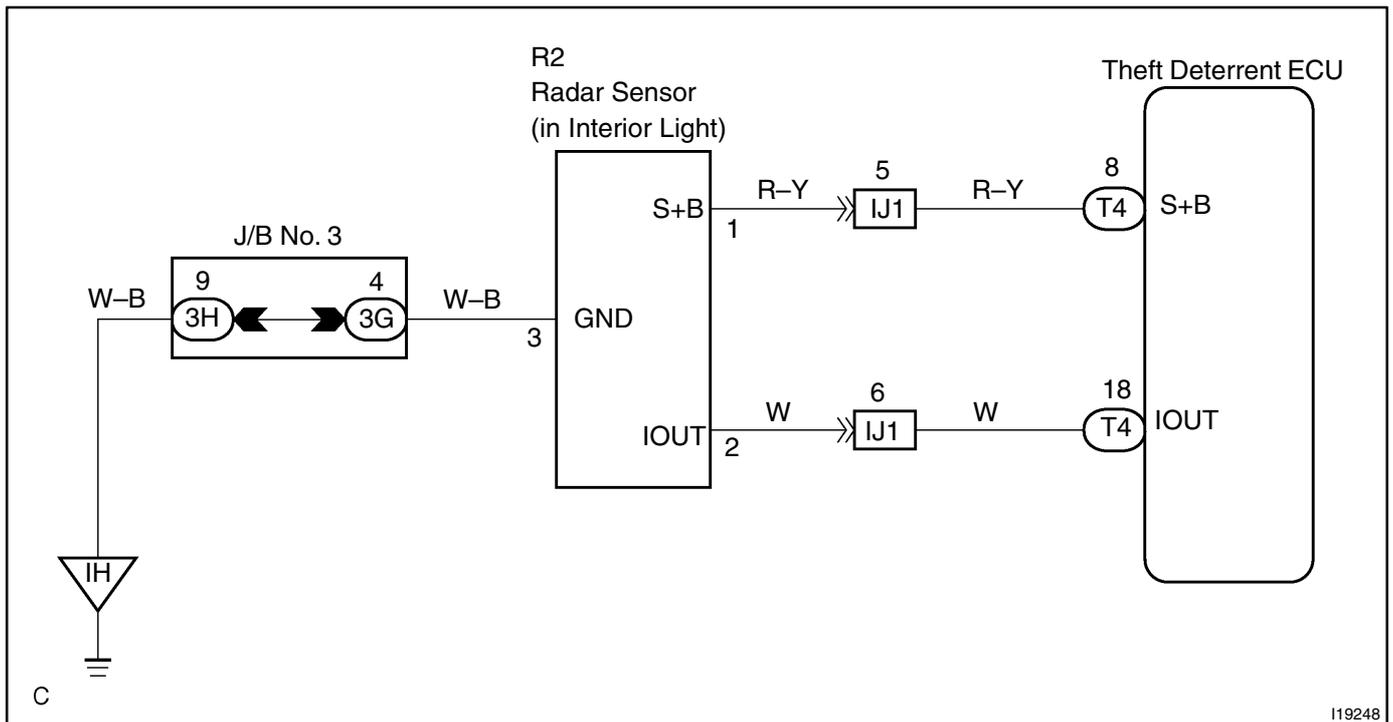
## Radar Sensor (Europe)

### CIRCUIT DESCRIPTION

A radio transmitter is integrated into the doom light.

This creates a spherical electric field inside the vehicle that detects intrusion using the Doppler effect caused by movement of an object in the vehicle, and outputs a warning trigger signal to the theft deterrent ECU.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

- 1 Check radar sensor operation.

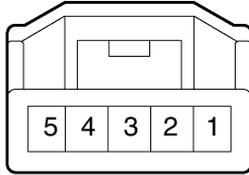
#### CHECK:

Set the system with a window open, and after 30 seconds put your hand through the window and shake it near the sensor to check if the alarm is triggered.

OK

No problem.

NG

**2 Check radar sensor.****Connector connected**

N

I11491

**PREPARATION:**

Remove the room light assembly.

**CHECK:**

Measure the voltage and continuity terminals.

**OK:**

Tester connection	Condition	Specified condition
1 – Ground	Arming preparation state or armed state.	Battery voltage
	Disarmed state.	Below 1 V
2 – Ground	When the sensor does not detect any movement.	$6.8\text{ V} \pm 2\text{ V}$
	When the sensor detects movement when in arming preparation or armed state.	Below 1 V
4 – Ground	Constant	Continuity

**NG****Replace radar sensor. (in Room light assembly)****OK****3 Check harness and connector between ECU and sensor, sensor and body ground (See page IN-32).****NG****Repair or replace harness or connector.****OK****Check and replace theft deterrent ECU.\*1**

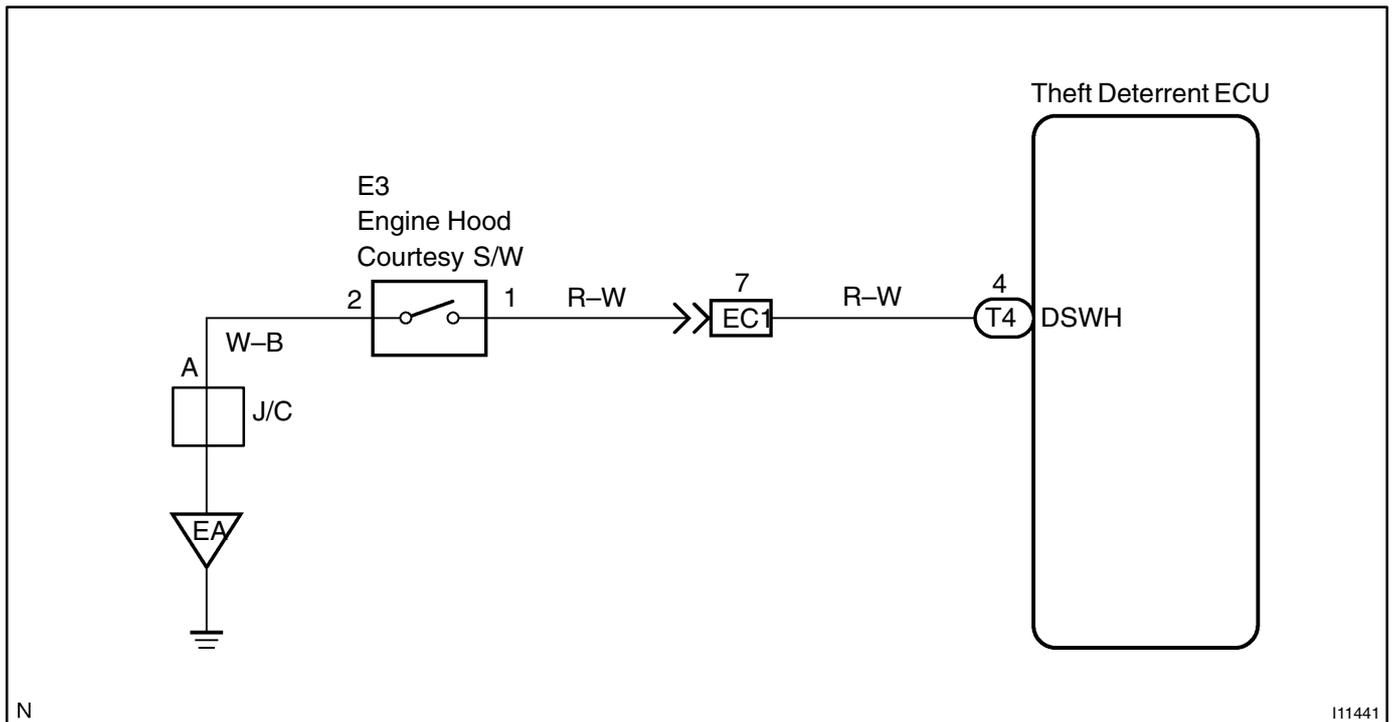
\*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI-452).

## Engine Hood Courtesy Switch Circuit

### CIRCUIT DESCRIPTION

The engine hood courtesy switch is built into the engine hood lock assembly and goes ON when the engine hood is opened and goes OFF when the engine hood is closed.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

#### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check hood courtesy switch using hand-held tester.</b>
----------	---

#### PREPARATION:

Connect the hand-held tester to the DLC 3.

#### CHECK:

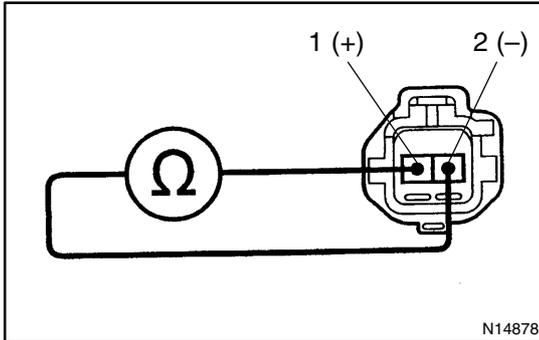
Check the hood courtesy switch using DATA LIST.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI-452).

NG

## 2 Check engine hood courtesy switch.



### PREPARATION:

- Remove engine hood lock assembly.
- Disconnect engine hood courtesy switch connector.

### CHECK:

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

### OK:

Engine hood lock	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

NG

Replace engine hood courtesy switch.

OK

## 3 Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page IN-32).

NG

Repair or replace harness or connector.

OK

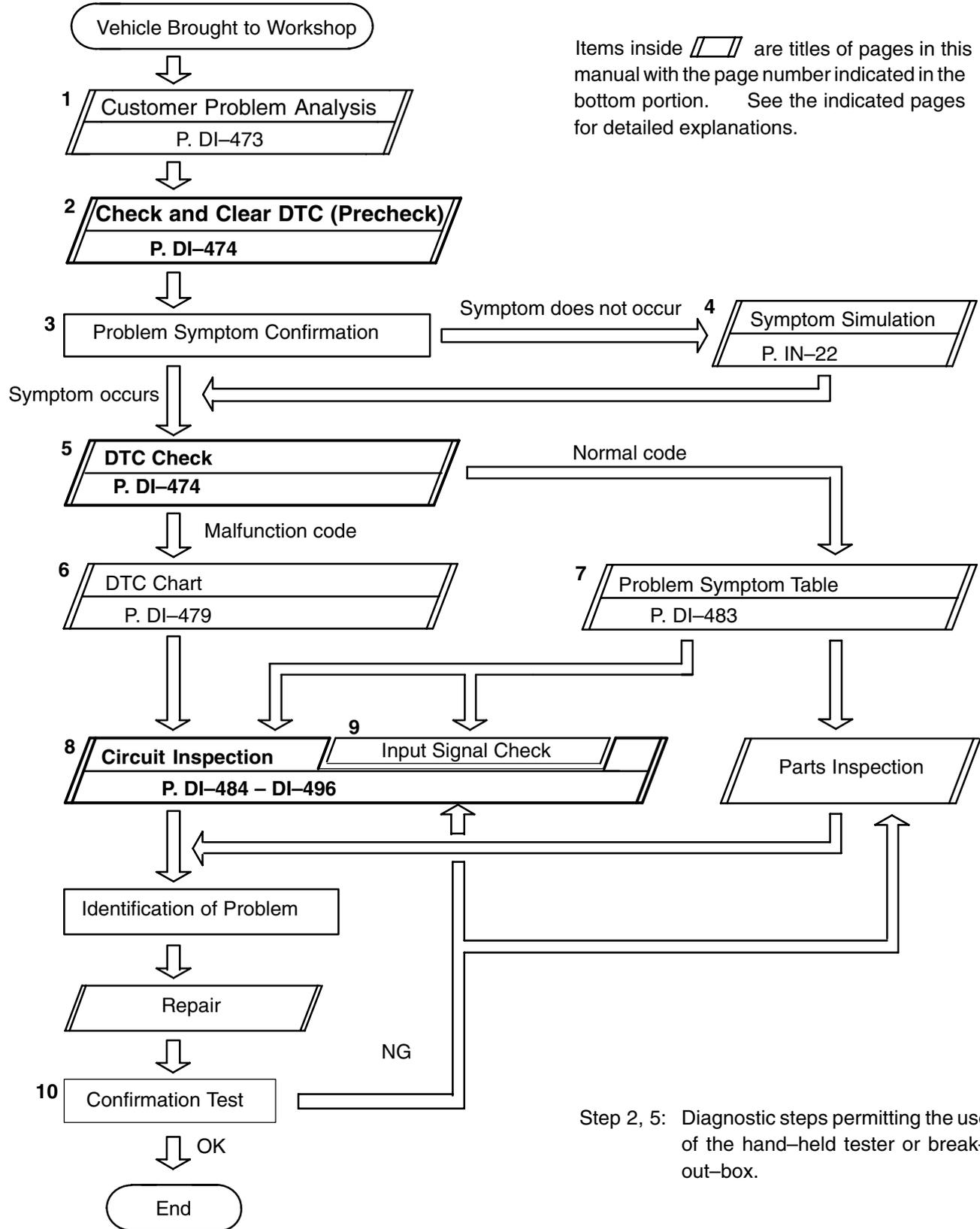
Check and replace theft deterrent ECU (See page IN-32).

# CRUISE CONTROL SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI08F-18

Troubleshoot in accordance with the procedure on the following page.



Step 2, 5: Diagnostic steps permitting the use of the hand-held tester or break-out-box.

# CUSTOMER PROBLEM ANALYSIS CHECK

**CRUISE CONTROL SYSTEM Check Sheet**

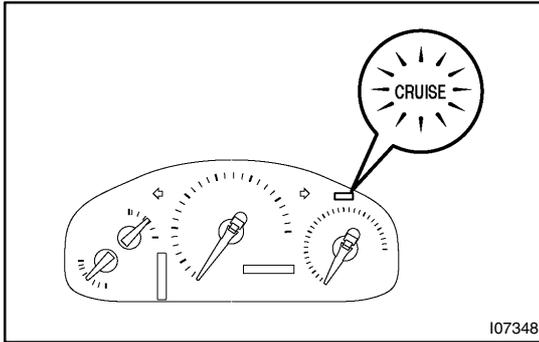
Inspector's name: \_\_\_\_\_

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

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	How Often does Problem Occurs	" " Continuous " " Intermittent ( Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	" " Auto cancel occurs	<ul style="list-style-type: none"> <li>● Driving condition                             <ul style="list-style-type: none"> <li><input type="checkbox"/> City driving <input type="checkbox"/> Freeway <input type="checkbox"/> Up hill <input type="checkbox"/> Down hill</li> </ul> </li> <li>● After cancel occurred, did the driver activate cruise control again?                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> </li> </ul>
	<input type="checkbox"/> Cancel does not occur	<input type="checkbox"/> With brake ON <input type="checkbox"/> Except D position shift <input type="checkbox"/> At 40 km/h (25 mph) or less <input type="checkbox"/> When control SW turns to CANCEL position
	<input type="checkbox"/> Cruise control malfunction	<input type="checkbox"/> Slip to acceleration side <input type="checkbox"/> Slip to deceleration side <input type="checkbox"/> Hunting occurs <input type="checkbox"/> O/D cut off does not occur <input type="checkbox"/> O/D does not return
	<input type="checkbox"/> Switch malfunction	<input type="checkbox"/> SET <input type="checkbox"/> ACCEL <input type="checkbox"/> COAST <input type="checkbox"/> RESUME <input type="checkbox"/> CANCEL
	<input type="checkbox"/> Cruise MAIN indicator light	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not light up <input type="checkbox"/> Blinking

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code )
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code )



I07348

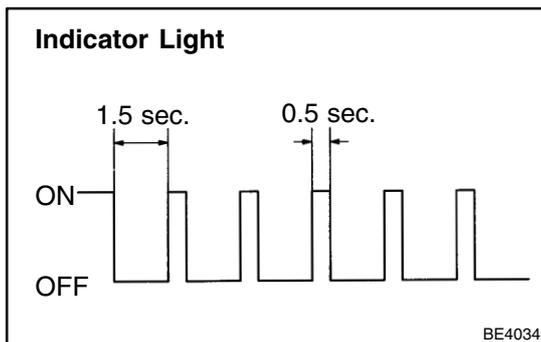
## PRE-CHECK

### 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-62) for the combination meter section.

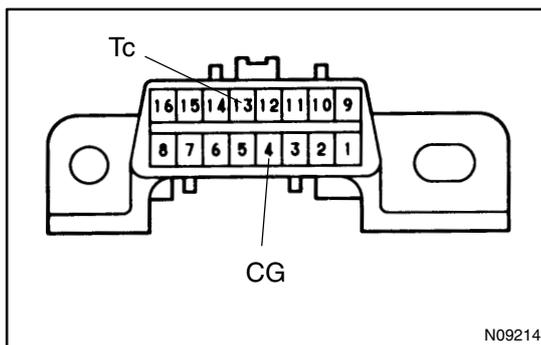


BE4034

- (b) Check the DTC.

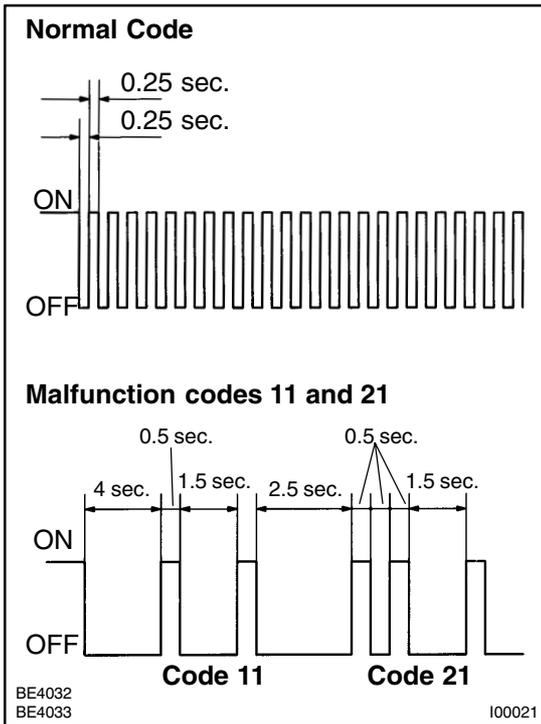
#### HINT:

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 DTC.

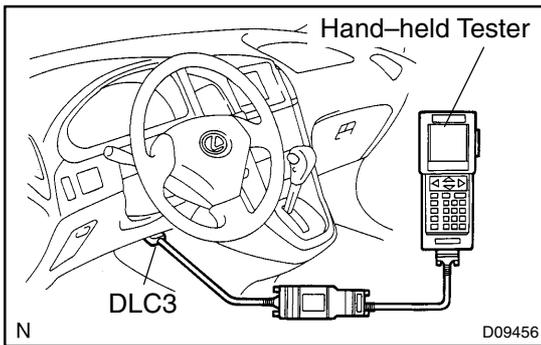


N09214

- (c) Output of DTC using diagnosis check wire.
  - (1) Turn the ignition switch ON.
  - (2) Using SST, connect terminals Tc and CG of DLC3.  
SST 09843-18020
  - (3) Read the DTC on the CRUISE MAIN indicator light.



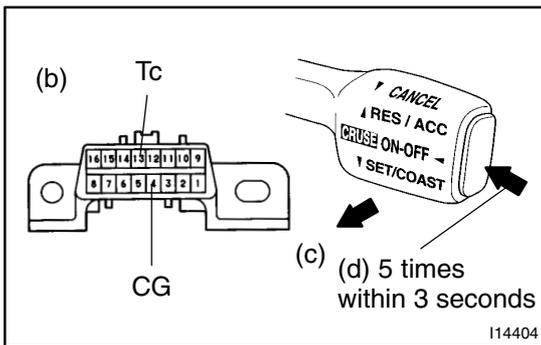
**HINT:**  
If the DTC is not output, inspect the diagnosis circuit (See page DI-514).  
As an example, the blinking patterns for codes; normal, 11 and 21 are shown in the illustration.



**2. USING HAND-HOLD TESTER**

- (a) Hook up the hand-held tester to the DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

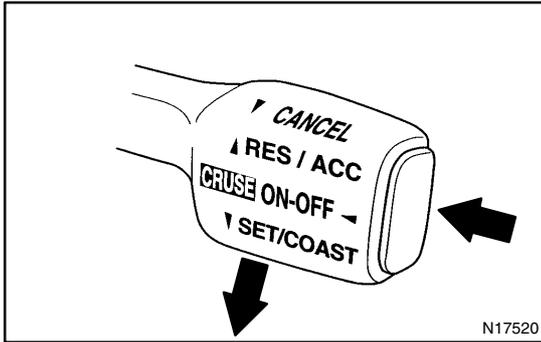
**HINT:**  
Hand-held tester has a "Snapshot" function which records the monitored data.  
Please refer to the hand-held tester operator's manual for further details.



**3. DTC CLEARANCE (ERASE MODE)**

**HINT:**  
During in the erase mode, diag detection does not work.

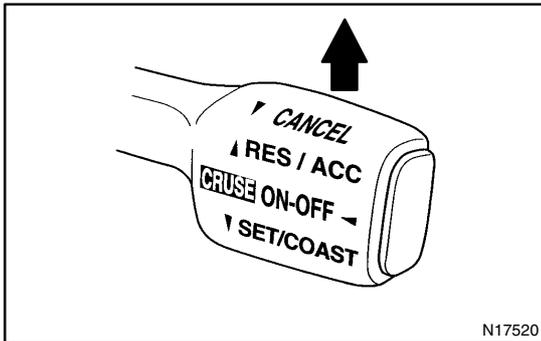
- (a) Drive at about 15 km/h or below.
- (b) Using SST, connect terminals Tc and E1 of DLC3.  
SST 09843-18020
- (c) Pull the cruise control switch to CANCEL.
- (d) On the above mentioned condition, turn on the cruise control main switch 5 times within 3 seconds.



#### 4. PROBLEM SYMPTOM CHECK (ROAD TEST)

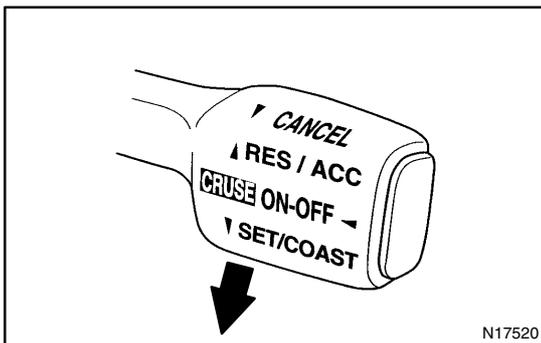
##### (a) Inspect the SET switch.

- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Press the control switch to the SET/COAST.
- (4) After releasing the switch, check that the vehicle cruises at the desired speed.



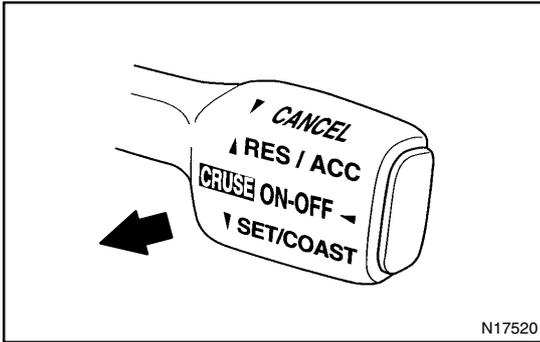
##### (b) Inspect the ACCEL switch.

- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Check that the vehicle speed increases while the control switch is turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
- (4) Momentarily raise the control switch upward to the RES/ACC position and then immediately release it. Check that the vehicle speed increases by approx. 1.5 km/h (Tap-up function).

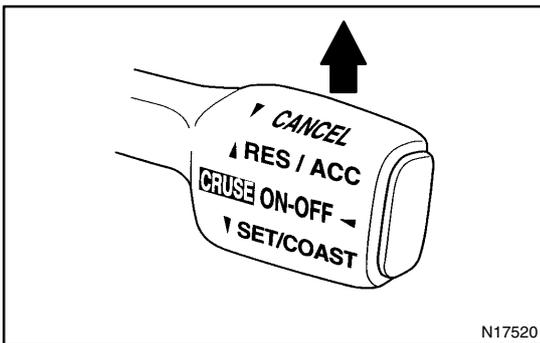


##### (c) Inspect the COAST switch.

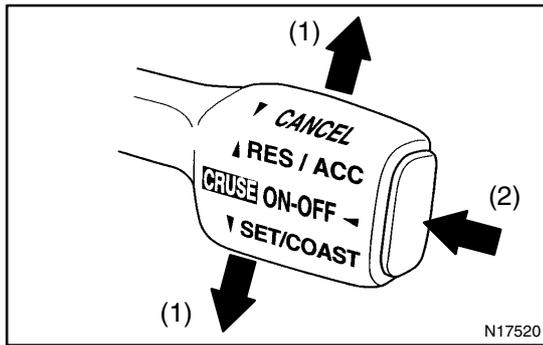
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
- (4) Momentarily pull the control switch down to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap-down function).



- (d) Inspect the CANCEL switch.
- (1) Push the main switch ON.
  - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  - (3) When operating one of the following operations, check that the cruise control system is cancelled and that the normal driving mode is reset.
    - Depress the brake pedal
    - Shift to except D position
    - Push the main switch OFF
    - Pull the cruise control switch to CANCEL



- (e) Inspect the RESUME switch.
- (1) Push the main switch ON.
  - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  - (3) When operating one of the following operations check that the cruise control system is cancelled and that the normal driving mode is reset.
    - Depress the brake pedal
    - Shift to except D position
    - Push the main switch OFF
    - Pull the cruise control switch to CANCEL
  - (4) After the control switch is turned to RES/ACC at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.



**5. INPUT SIGNAL CHECK**

HINT:

(1) For check No.1 ~ No.3:

Turn ignition switch ON.

(2) For check No.4:

- Jack up the vehicle.
- Start the engine.
- Shift to D position.

- (a) Pull the control switch to SET/COAST or RES/ACC position and hold it down or up (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 1st.

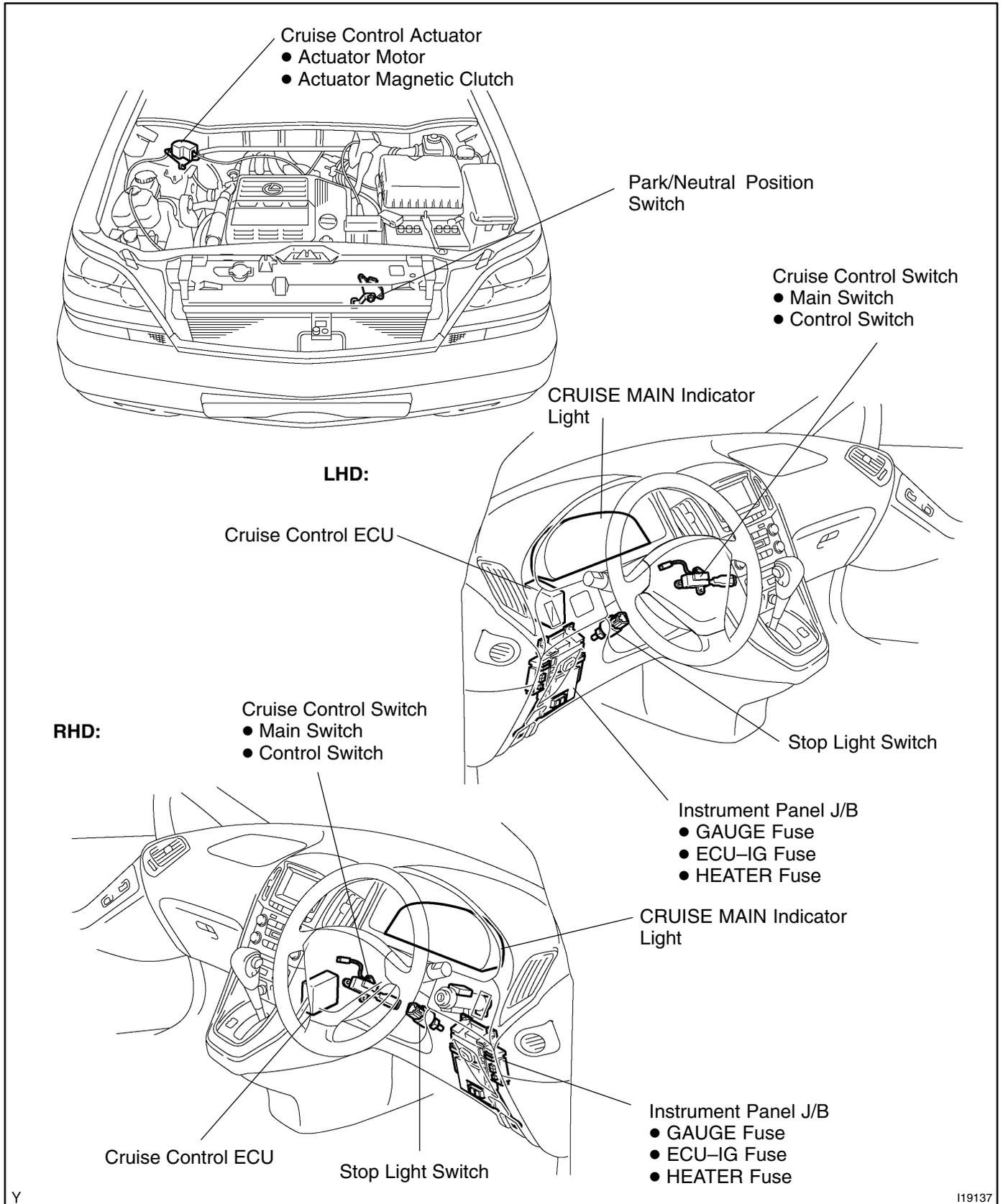
No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON		SET/COAST switch circuit is normal
2	Turn RES/ACC switch ON		RES/ACC switch circuit is normal
3	Turn CANCEL switch ON		CANCEL switch circuit is normal
	Turn stop light switch ON Depress brake pedal		Stop light switch circuit is normal
	Turn PNP switch OFF (Shift to except D position)		PNP switch circuit is normal
4	Drive at about 40 km/h (25 mph) or higher		Vehicle Speed Sensor is normal
	Drive at about 40 km/h (25 mph) or below		

## DIAGNOSTIC TROUBLE CODE CHART

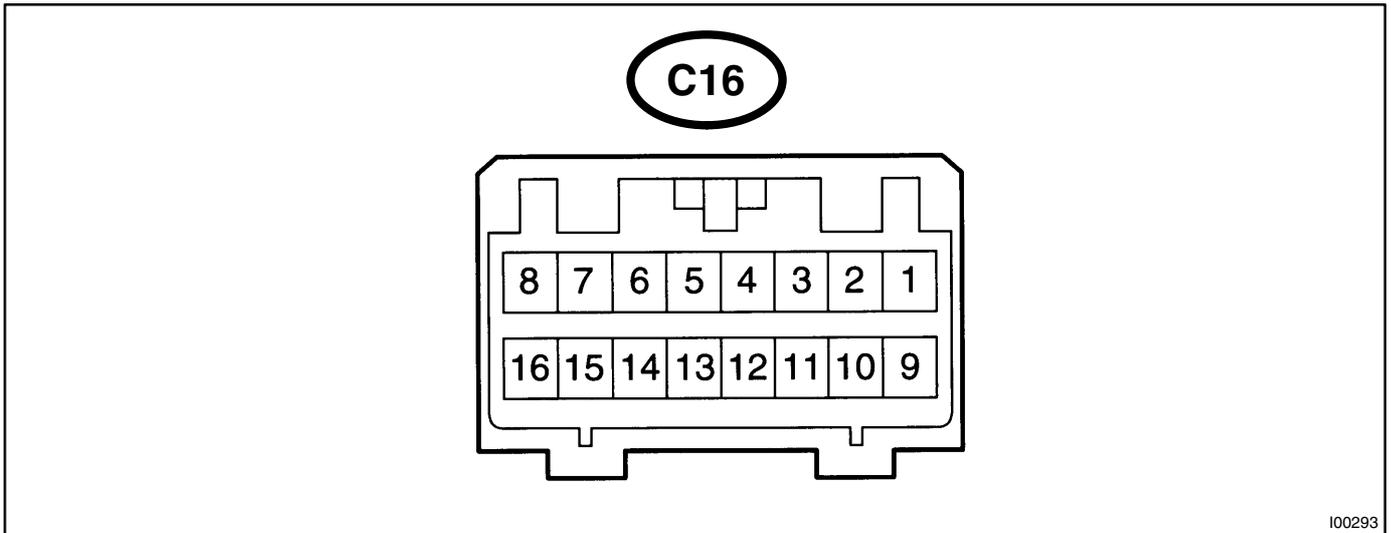
If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See Page)	Circuit Inspection	Trouble Area
11, 15 (DI-484)	Actuator Motor Circuit	<ul style="list-style-type: none"> <li>• Actuator motor</li> <li>• Harness or connector between cruise control ECU and actuator motor</li> <li>• Cruise control ECU</li> </ul>
12 (DI-486)	Actuator Magnetic Clutch Circuit	<ul style="list-style-type: none"> <li>• STOP Fuse</li> <li>• Stop light switch</li> <li>• Actuator magnetic clutch</li> <li>• Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground</li> <li>• Cruise control ECU</li> </ul>
14 (DI-490)	Actuator Mechanical Malfunction	<ul style="list-style-type: none"> <li>• Actuator motor (actuator lock: motor, arm)</li> <li>• Cruise control ECU</li> </ul>
21 (DI-492)	Open in Vehicle Speed Sensor Circuit	<ul style="list-style-type: none"> <li>• Combination meter</li> <li>• Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor</li> <li>• Vehicle speed sensor</li> <li>• Cruise control ECU</li> </ul>
23 (DI-495)	Vehicle Speed Signal Abnormal	<ul style="list-style-type: none"> <li>• Vehicle speed sensor</li> <li>• Cruise control ECU</li> </ul>
41	Cruise control ECU	<ul style="list-style-type: none"> <li>• Cruise control ECU</li> </ul>
42	Source voltage drop	<ul style="list-style-type: none"> <li>• Power source</li> </ul>
51 (DI-496)	Idle Signal Circuit	<ul style="list-style-type: none"> <li>• Throttle position sensor</li> <li>• Harness or connector between Engine and ECT ECU and throttle position sensor</li> <li>• Harness or connector between cruise control ECU and ECM</li> <li>• Cruise control ECU</li> </ul>

# PARTS LOCATION



## TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ GND (C16-3 ↔ C16-16)	G-W ↔ BR	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
D ↔ GND (C16-4 ↔ C16-16)	G-B ↔ BR	Shift to positions except D	Below 1 V
		Shift to D position	10 – 16 V
PI ↔ GND (C16-5 ↔ C16-16)	W-G ↔ BR	Ignition switch ON Cruise control main switch ON	Below 1.2 V
		Ignition switch ON Cruise control main switch OFF	10 – 16 V
TC ↔ GND (C16-10 ↔ C16-16)	P-B ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON Connect terminals Tc and E1 of diagnostic check connector	Below 1 V
ECT ↔ GND (C16-6 ↔ C16-16)	R-Y ↔ BR	During driving Gear position 3rd	10 – 16 V
		During driving Gear position O/D	Below 1 V
MC ↔ GND (C16-7 ↔ C16-16)	L-R ↔ BR	During cruise control driving COAST switch held ON	9 – 15 V
		During cruise control driving ACC switch held ON	Below 1 V
L ↔ GND (C16-8 ↔ C16-16)	L-Y ↔ BR	During cruise control driving	9 – 15 V
		Except during cruise control driving	Below 1 V
B ↔ GND (C16-2 ↔ C16-16)	B-R ↔ BR	Ignition switch ON	10 – 16 V
CCS ↔ GND (C16-11 ↔ C16-16)	L ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch held ON	6.0 – 11.0 V
		Ignition switch ON SET/COAST switch held ON	4.0 – 7.9 V
		Ignition switch ON RES/ACC switch held ON	2.0 – 4.6 V
		Ignition switch ON MAIN switch held ON	Below 0.5 V

SPD ↔ GND (C16-12 ↔ C16-16)	V-W ↔ BR	Engine start Car stoppage.	Below 1.5 V or 4.7 – 16 V
		During driving (Pulse generated).	3 – 7 V
IDL ↔ GND (C16-13 ↔ C16-16)	B-Y ↔ BR	Ignition switch ON Throttle valve fully opened.	10 – 16 V
		Ignition switch ON Throttle valve fully closed.	Below 1.5 V
OD ↔ GND (C16-14 ↔ C16-16)	Y-G ↔ BR	During cruise control driving OD switch ON.	10 – 16 V
		During cruise control driving OD switch OFF (3rd driving)	Below 1 V
MO ↔ GND (C16-15 ↔ C16-16)	L-B ↔ BR	During cruise control driving ACC switch hold ON	9 – 15 V
		During cruise control driving COAST switch hold ON	Below 1 V
GND ↔ Body Ground (C16-16 ↔ Body Ground)	BR ↔ Body Ground	Constant	Below 1 V

## PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	13.Main Switch Circuit (Cruise control switch) 14.Vehicle Speed Sensor 15.Control Switch Circuit (Cruise control switch) 16.Stop Light Switch Circuit 17.Neutral Start Switch Circuit 18.Actuator Motor Circuit 19.Cruise Control Cable 20.Cruise Control ECU	DI-502 DI-492 DI-502 DI-505 DI-507 DI-484 DI-516 IN-32
SET not occurring or CANCEL occurring. (DTC dose not output)	1. ECU Power Source Circuit 2. Cruise Control ECU	DI-499 IN-32
Actual vehicle speed deviates above or below the set speed.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Electronically Controlled Transmission CommunicationCircuit 4. Actuator Motor Circuit 5. Idle Signal Circuit (Main throttle position sensor) 6. Cruise Control ECU	DI-516 DI-492 DI-517 DI-484 DI-496 IN-32
Gear shifting frequent between 3rd O/D when driving on uphill road. (Hurting)	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI-517 IN-32
Cruise control not cancelled, even when brake pedal is depressed.	1. Cruise Control Cable 2. Stop Light Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-516 DI-505 DI-484 IN-32
Cruise control not cancelled, even when transmission is shifted to "N" position.	1. Cruise Control Cable 2. Neutral Start Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-516 DI-507 DI-484 IN-32
Cruise control not cancelled, even when clutch pedal is depressed.	1. Cruise Control Cable 2. Actuator Motor Circuit 3. Cruise Control ECU	DI-516 DI-484 IN-32
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Cable 2. Control Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-516 DI-510 DI-484 IN-32
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-516 DI-495 DI-484 IN-32
Poor response is in ACCEL and RESUME modes.	1. Cruise Control Cable 2. Electronically Controlled Transmission CommunicationCircuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-516 DI-517 DI-484 IN-32
O/D does not resume, even though the road is not uphill.	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI-517 IN-32
DTC memory is erased.	Cruise Control ECU	IN-32
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Cruise Control ECU	DI-514 IN-32
Cruise MAIN indicator light remains ON or falls to light up.	Cruise MAIN Indicator Light Switch Circuit	DI-514

# CIRCUIT INSPECTION

<b>DTC</b>	<b>11, 15</b>	<b>Actuator Motor Circuit</b>
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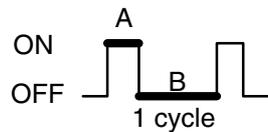
## CIRCUIT DESCRIPTION

The actuator motor is operated by signals from the ECU. Acceleration and deceleration signals are transmitted according to changes in the Duty Ratio (See below).

### Duty Ratio

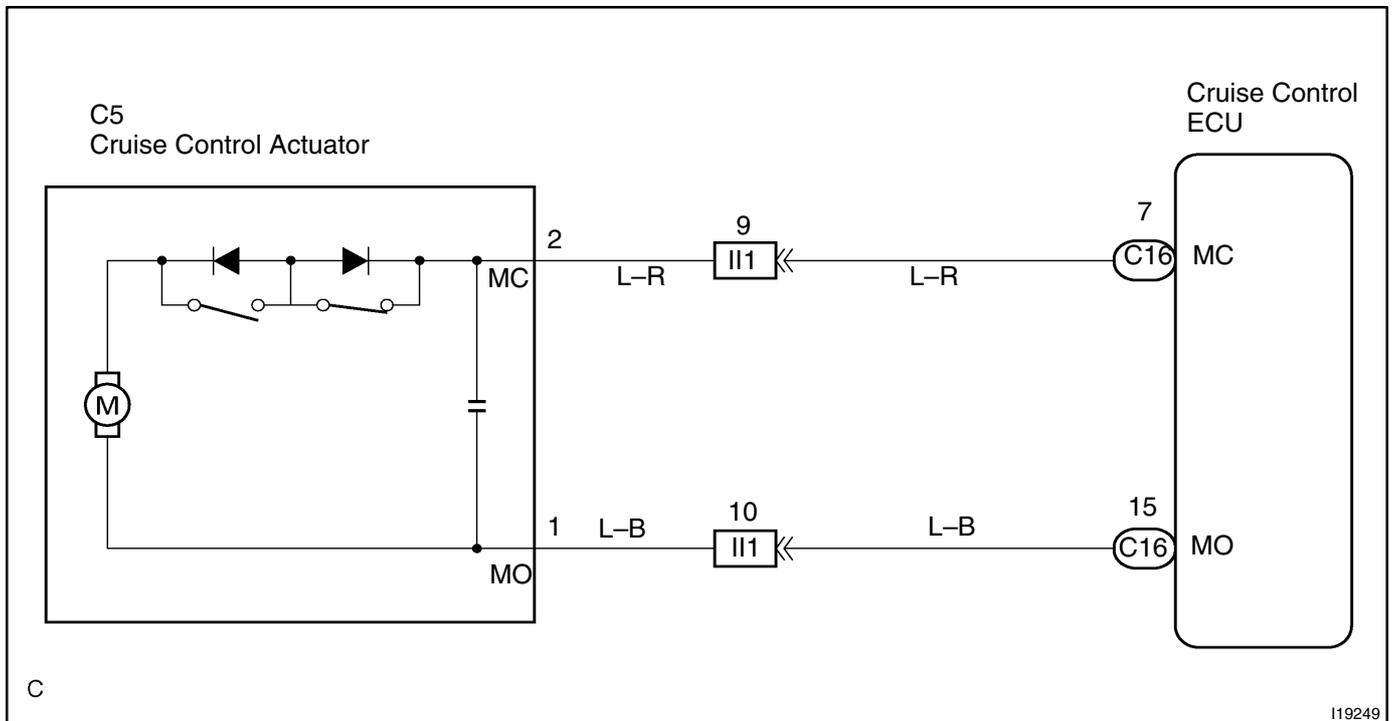
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity.

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



DTC No.	Detection Item	Trouble Area
11	Short in actuator motor circuit.	<ul style="list-style-type: none"> <li>• Actuator motor</li> <li>• Harness or connector between cruise control ECU and actuator motor</li> <li>• Cruise control ECU</li> </ul>
15	Open in actuator motor circuit.	<ul style="list-style-type: none"> <li>• Actuator motor</li> </ul>

## WIRING DIAGRAM

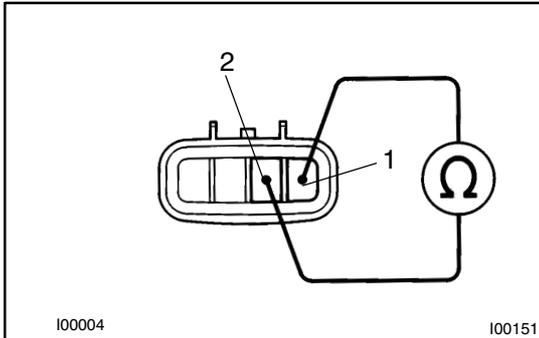


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## INSPECTION PROCEDURE

**1** Check resistance between terminals MO and MC of actuator motor.

**PREPARATION:**

- (a) Turn ignition switch OFF.
- (b) Disconnect the actuator connector.

**CHECK:**

Measure resistance between terminals 1 and 2.

**HINT:**

If control plate is in fully opened or fully closed positions, resistance can not be measured.

**OK:**

**Resistance: more than 4.2 Ω**

**NG**

**Replace cruise control actuator.**

**OK**

**2** Check for open and short in harness and connectors between cruise control ECU and actuator motor (See page IN-32).

**NG**

**Repair or replace harness or connector.**

**OK**

**Check and replace cruise control ECU.  
(See page IN-32).**

<b>DTC</b>	<b>12</b>	<b>Actuator Magnetic Clutch Circuit</b>
------------	-----------	---

## CIRCUIT DESCRIPTION

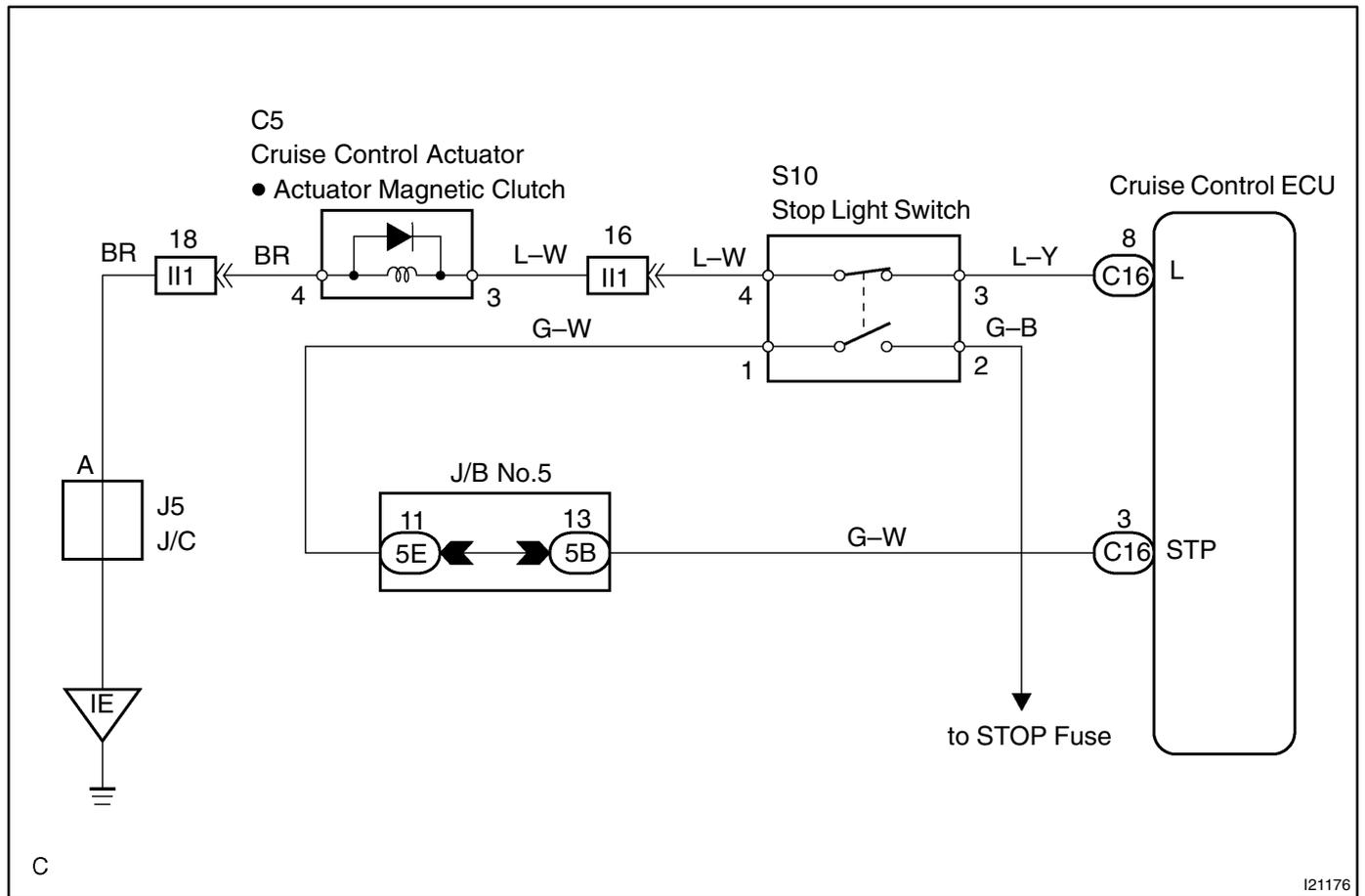
This circuit turns on the magnetic clutch inside the actuator during cruise control operation according to the signal from the ECU. If a malfunction occurs in the actuator or speed sensor, etc. during cruise control operation, the rotor shaft between the motor and control plate is released.

When the brake pedal is depressed, the stop light switch turns on, supplying electrical power to the stop light. Power supply to the magnetic clutch is mechanically cut and the magnetic clutch is turned OFF.

When driving downhill, if the vehicle speed exceeds the set speed by 8 km/h (5 mph), the ECU turns the safety magnet clutch OFF. If the vehicle speed later drops to within 5 km/h (3 mph), cruise control at the set speed is resumed.

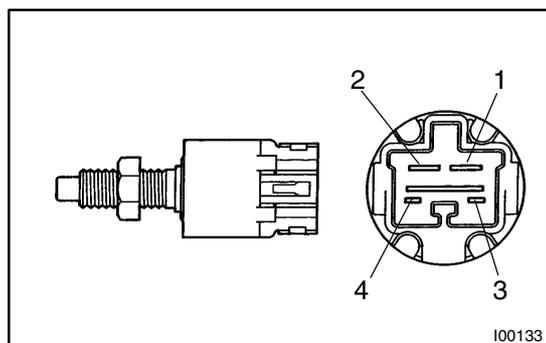
DTC No.	Detection Item	Trouble Area
12	Short in actuator magnetic clutch circuit. Open (0.8 sec.) in actuator magnetic clutch circuit.	<ul style="list-style-type: none"> <li>• STOP Fuse</li> <li>• Stop light switch</li> <li>• Actuator magnetic clutch</li> <li>• Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground</li> <li>• Cruise control ECU</li> </ul>

# WIRING DIAGRAM



## INSPECTION PROCEDURE

**1 Check stop light switch.**



**PREPARATION:**

Disconnect the stop light switch connector.

**CHECK:**

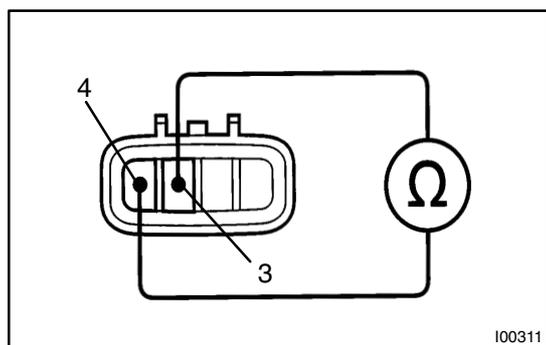
Check continuity between terminals.

Switch position	Continuity
Switch pin free (Brake pedal depressed)	1 – 2
Switch pin pushed in (Brake pedal released)	3 – 4

**NG** Replace stop light switch.

**OK**

**2 Check resistance between terminals L and GND of actuator magnetic clutch.**



**PREPARATION:**

- (a) Turn ignition switch OFF.
- (b) Disconnect the actuator connector.

**CHECK:**

Measure resistance between terminals 3 and 4.

**OK:**

**Resistance: 34.65 – 42.35 Ω.**

**NG** Replace cruise control actuator.

**OK**

3	<b>Check for open and short in harness and connectors between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground (See page IN-32).</b>
---	---

NG

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page IN-32).

<b>DTC</b>	<b>14</b>	<b>Actuator Mechanical Malfunction</b>
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## CIRCUIT DESCRIPTION

The circuit detects the rotation position of the actuator control plate and sends a signal to the ECU.

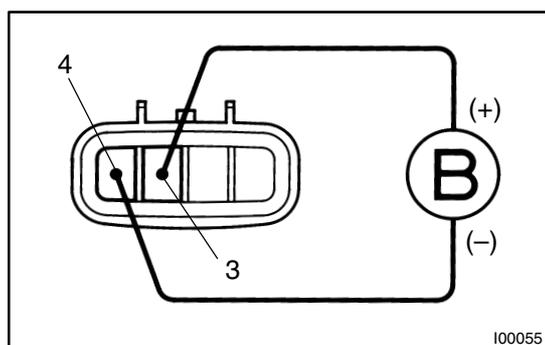
DTC No.	Detection Item	Trouble Area
14	Cruise control actuator mechanical malfunction.	<ul style="list-style-type: none"> <li>• Actuator lock: (motor, arm)</li> <li>• Actuator motor</li> <li>• Cruise control ECU</li> </ul>

## WIRING DIAGRAM

See page DI-486.

## INSPECTION PROCEDURE

<b>1</b>	<b>Check cruise control actuator arm locking operation</b>
----------	--



### PREPARATION:

- (a) Turn ignition switch OFF.
- (b) Disconnect the actuator connector.

### CHECK:

Connect the positive (+) lead from the battery to the terminal 3 of actuator and the negative (-) lead to terminal 4.

### NOTICE:

**Do not connect the high tension cables to the wrong battery terminal. The cruise control actuator will be damaged.**  
Move the control plate by hand.

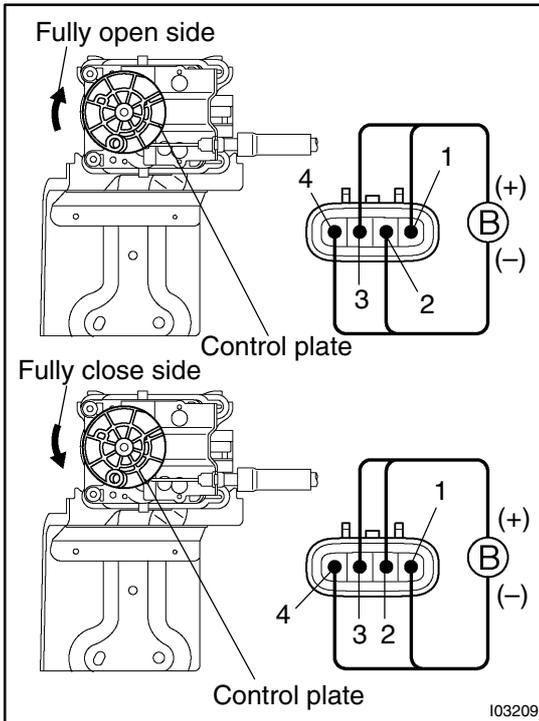
### OK:

**Control plate doesn't move.**

<b>NG</b>	<b>Replace cruise control actuator.</b>
-----------	---



## 2 Check cruise control actuator operation.



### PREPARATION:

- Turn ignition switch OFF.
- Disconnect the actuator connector.

### CHECK:

Connect the positive (+) lead from the battery to terminals 1 and 3 of actuator, connect the negative (-) lead to terminals 2 and 4 of actuator.

### OK:

Control arm moves to fully open side

### CHECK:

Connect the positive (+) lead from the battery to terminals 2 and 3 of actuator, connect the negative (-) lead to terminals 1 and 4 of actuator.

### OK:

Control arm moves to fully closed side

NG

Replace cruise control actuator.

OK

## 3 Check harness and connector between cruise control ECU and cruise control actuator (See page IN-32).

NG

Repair or replace harness or connector.

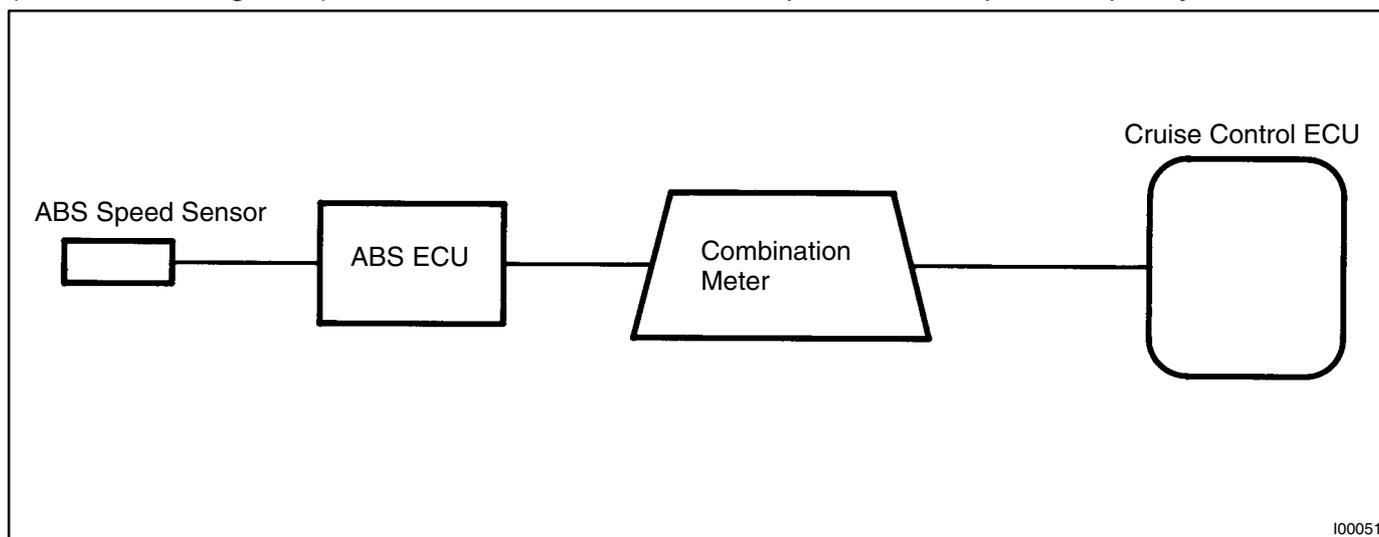
OK

Check and replace cruise control ECU (See page IN-32).

<b>DTC</b>	<b>21</b>	<b>Open in Vehicle Speed Sensor Circuit</b>
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**CIRCUIT DESCRIPTION**

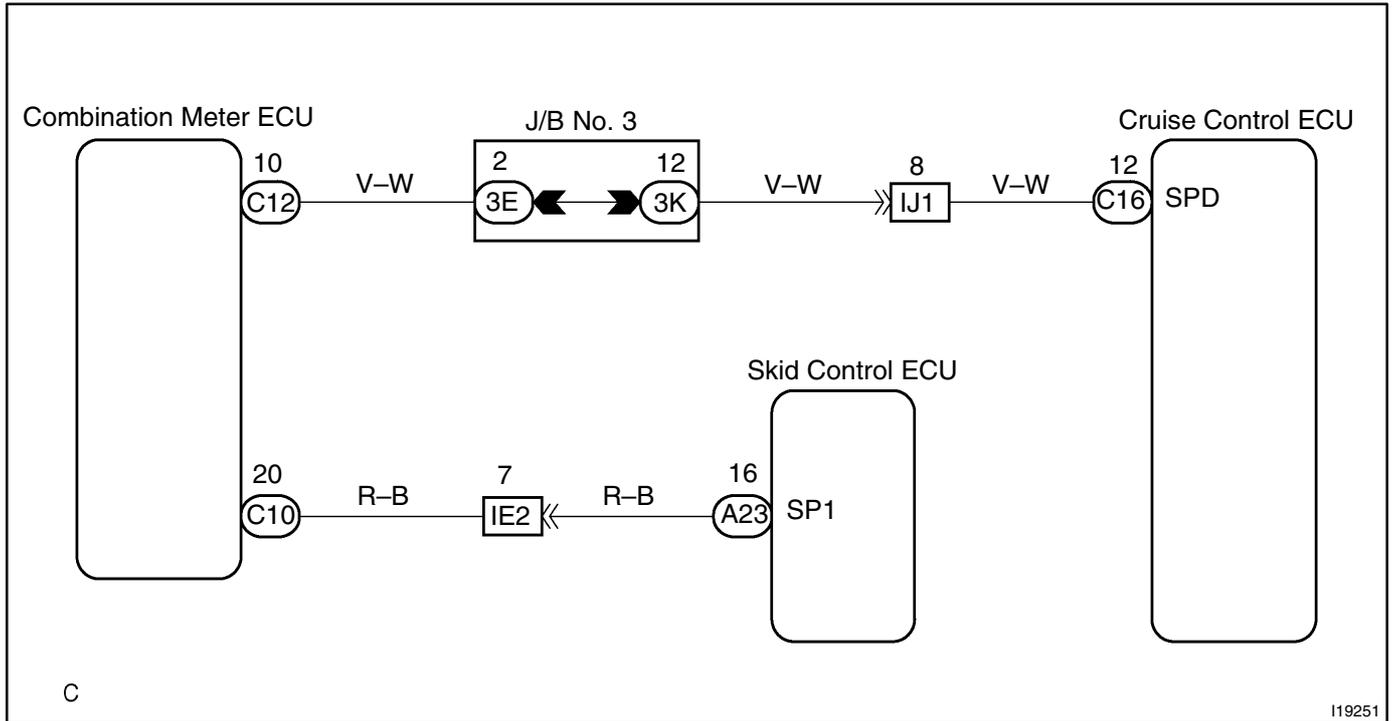
The vehicle speed sensor circuit is sent to cruise control ECU as vehicle speed signal. For each rotation of the shaft, the vehicle speed sensor sends a signal through the combination meter to the cruise control ECU (See the following chart). The ECU calculates the vehicle speed from this pulse frequency.



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DTC No.	Detection Item	Trouble Area
21	Speed signal is not input to the cruise control ECU while cruise control is set.	<ul style="list-style-type: none"> <li>• Combinationmeter</li> <li>• Harness or connector between cruise control ECU and combinationmeter, combination meter and vehicle speed sensor</li> <li>• Vehicle speed sensor</li> <li>• Cruise control ECU</li> </ul>

### WIRING DIAGRAM



### INSPECTION PROCEDURE

<b>1</b>	<b>Input signal check.</b>
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Input Signal	Indicator Light Blinking Pattern
Drive at about 40 km/h (25 mph) or below	Light ON OFF
Drive at about 40 km/h (25 mph) or higher	Light ON OFF

**CHECK:**

- (a) See input signal check on page DI-474.
- (b) Check indicator light operation when driving with vehicle speed above 40 km/h (25 mph), and with vehicle speed below 40 km/h (25 mph).

**OK:**

**Vehicle speed above 40 km/h (25 mph):**  
**Indicator light blinks**

**Vehicle speed below 40 km/h (25 mph):**  
**Indicator light stays on**

OK

Check and replace cruise control ECU (See page IN-32).

NG

**2** Check speedometer circuit (See Combination meter troubleshooting on page BE-62).

NG

Repair or replace harness, connector or combination meter assembly.

OK

**3** Check harness and connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor (See page IN-32).

NG

Repair or replace harness or connector.

OK

**4** Check vehicle speed sensor (See page BE-68).

NG

Replace vehicle speed sensor.

OK

Check and replace cruise control ECU (See page IN-32).

<b>DTC</b>	<b>23</b>	<b>Vehicle Speed Signal Abnormal</b>
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## CIRCUIT DESCRIPTION

See page DI-492.

DTC No.	Detection Item	Trouble Area
23	Vehicle speed sensor pulse is abnormal.	<ul style="list-style-type: none"> <li>• Vehicle speed sensor</li> <li>• Cruise control ECU</li> </ul>

## WIRING DIAGRAM

See page DI-492.

## INSPECTION PROCEDURE

1	Check vehicle speed sensor (See page BE-68).
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NG

Replace vehicle speed sensor.

OK

Check and replace cruise control ECU (See page IN-32).

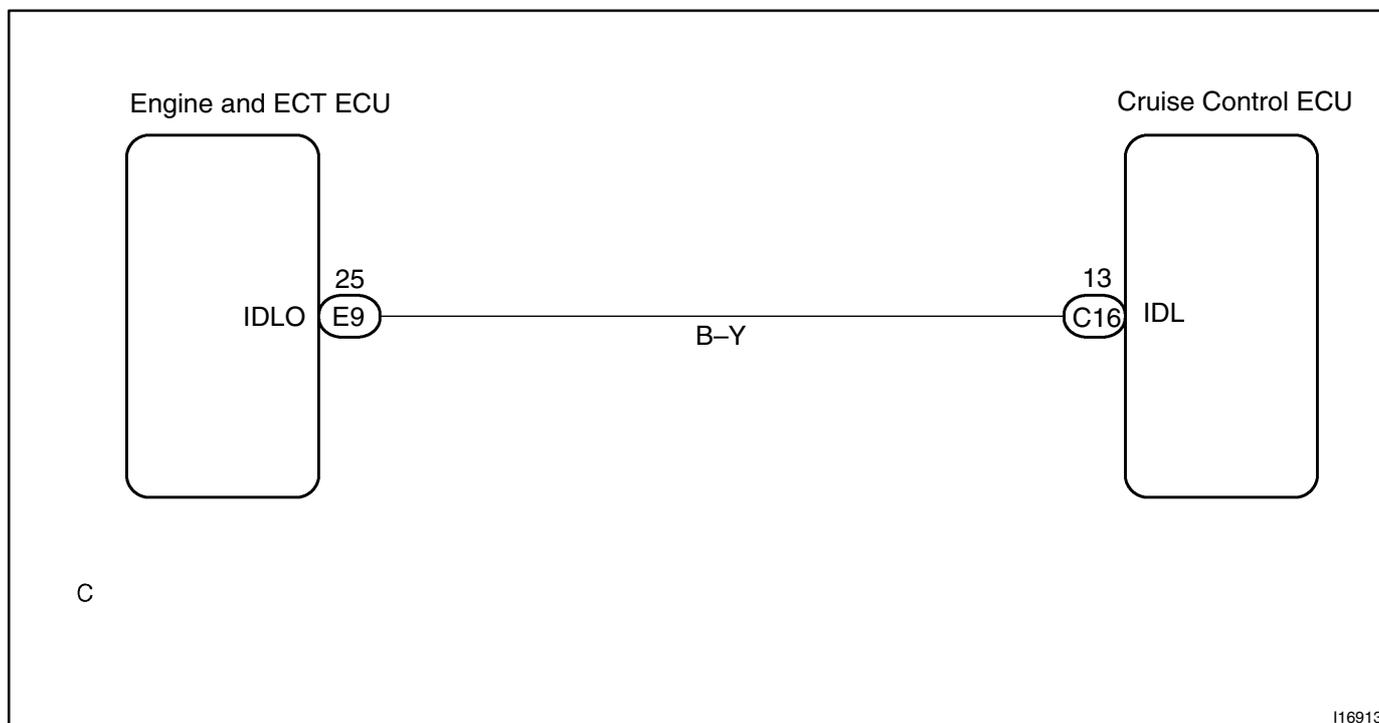
<b>DTC</b>	<b>51</b>	<b>Idle Signal Circuit</b>
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### CIRCUIT DESCRIPTION

When the idle switch is turned ON, a signal is sent to the ECU. The ECU uses this signal to correct the discrepancy between the throttle valve position and the actuator position sensor value to enable accurate cruise control at the set speed. If the idle switch is malfunctioning, problem symptoms also occur in the engine, so also inspect the engine.

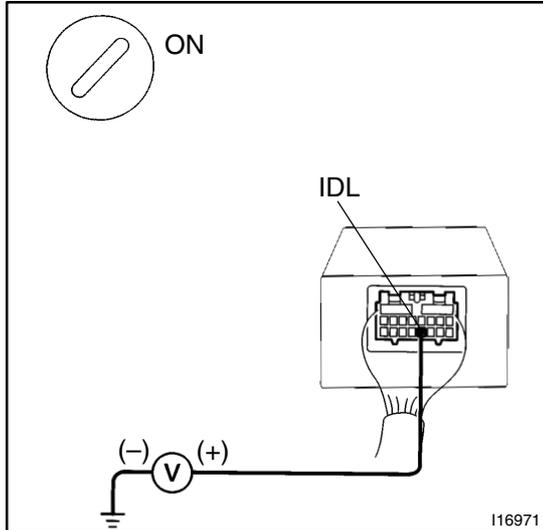
DTC No.	Detection Item	Trouble Area
51	Short in idle signal circuit.	<ul style="list-style-type: none"> <li>• Harness or connector between Engine and ECT ECU and throttle position sensor</li> <li>• Harness on connector between cruise control ECU and Engine and ECT ECU</li> <li>• Cruise control ECU</li> </ul>

### WIRING DIAGRAM



## INSPECTION PROCEDURE

- 1 Check voltage between terminal IDL of cruise control ECU connector and body ground.**

**PREPARATION:**

- Remove the ECU with connector still connected.
- Disconnect the engine and ECT ECU connector.
- Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal IDL of ECU connector and body ground when the throttle valve is fully closed and fully opened.

**OK:**

Throttle valve position	Voltage
Fully opened	10 – 14 V
Fully closed	Below 1.5 V

**OK**

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

**NG**

- 2 Check harness and connector between engine and ECT ECU and throttle position sensor (See page IN-32).**

**NG**

Repair or replace harness or connector.

**OK**

- 3 Check throttle position sensor circuit.**

**NG**

Replace throttle position sensor.

**OK**

<b>4</b>	<b>Check for open and short in harness and connector between cruise control ECU and engine and ECT ECU (See page IN-32).</b>
----------	--

**NG**

**Repair or replace harness or connector.**

**OK**

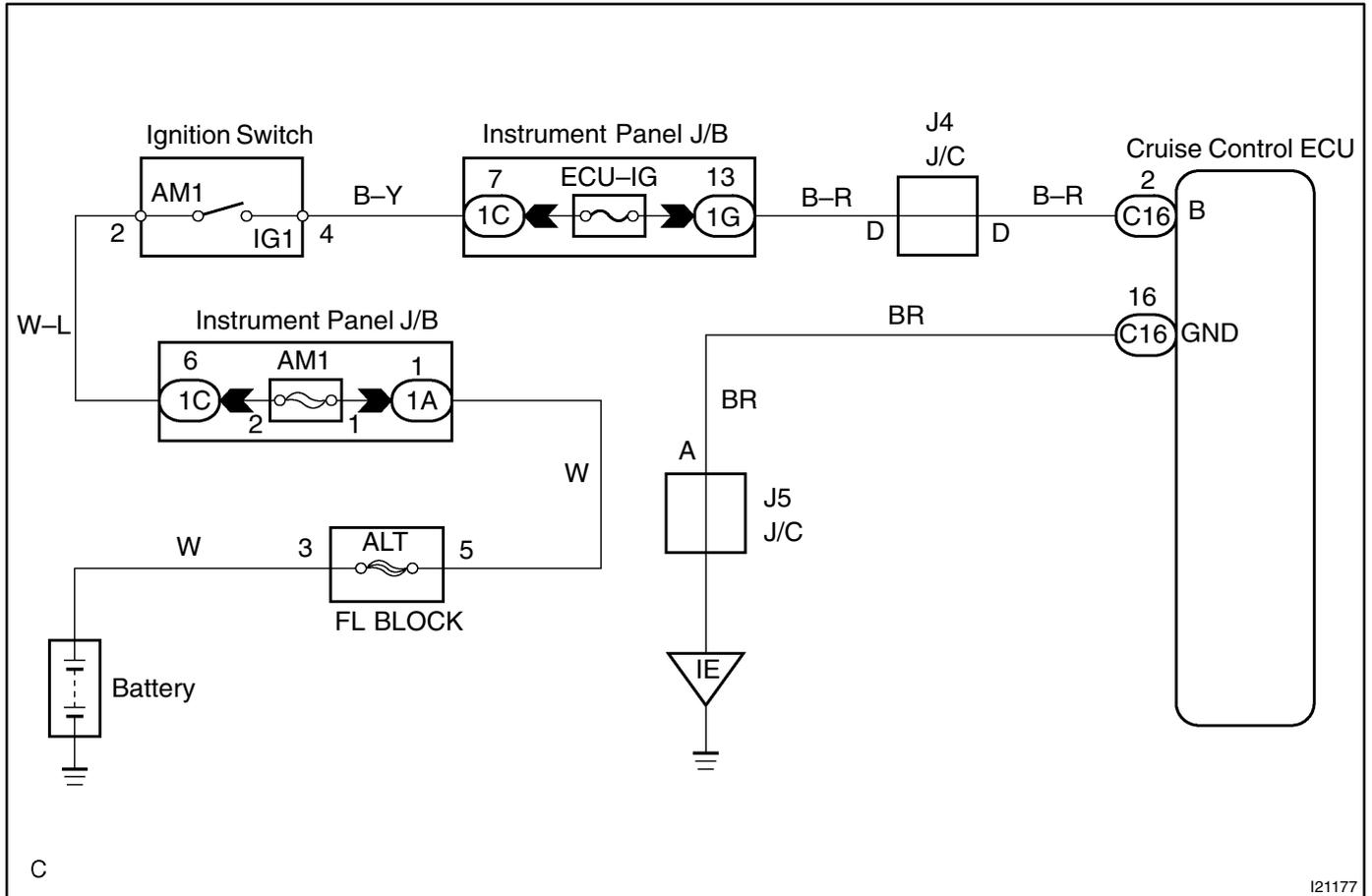
**Check and replace cruise control ECU (See page IN-32).**

# ECU Power Source Circuit

## CIRCUIT DESCRIPTION

The ECU power source supplies power to the actuator and sensors, etc, when terminal GND and the cruise control ECU case are grounded.

## WIRING DIAGRAM



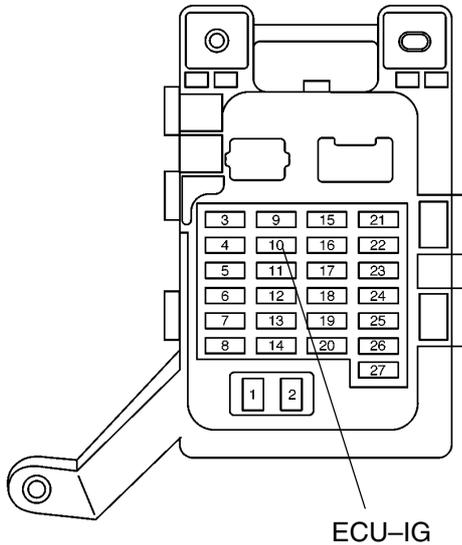
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I21177

## INSPECTION PROCEDURE

## 1 Check ECU-IG fuse.

## Instrument Panel J/B



I07347

**PREPARATION:**

Remove the ECU-IG fuse from driver side junction block.

**CHECK:**

Check continuity of ECU-IG fuse.

**OK:**

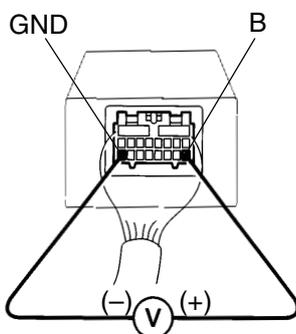
Continuity

NG

Check for short in all the harness and components connected to ECU-IG fuse.

OK

## 2 Check voltage between terminals B and GND of cruise control ECU connector.



I16977

**PREPARATION:**

(a) Remove the ECU with connector still connected.

(b) Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals B and GND of ECU connector.

**OK:**

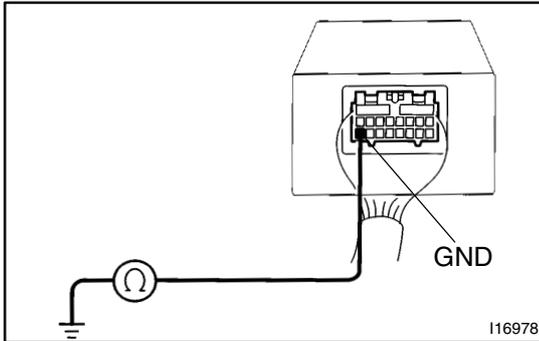
Voltage: 10 – 14 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

NG

**3** Check resistance between terminal GND of cruise control ECU connector and body ground.

**CHECK:**

Measure resistance between terminal GND of ECU connector and body ground.

**OK:**

**Resistance: Below 1  $\Omega$**

NG

**Repair or replace harness or connector.**

OK

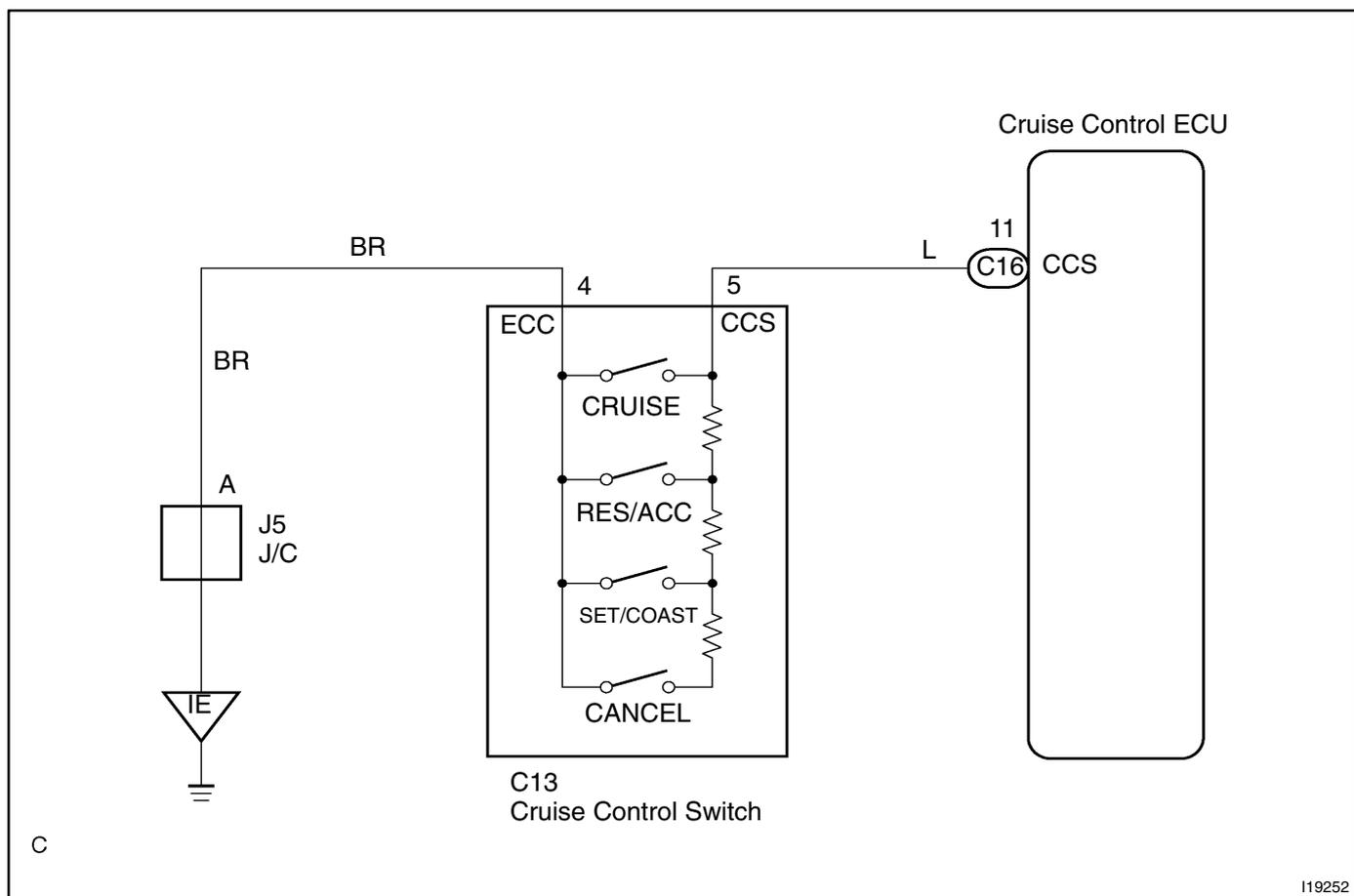
**Check and repair harness and connector between cruise control ECU and battery (See page IN-32).**

# Control Switch Circuit (Cruise Control Switch)

## CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signals (each voltage) to the ECU.

## WIRING DIAGRAM

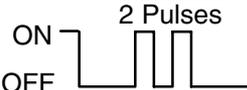


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I19252

### INSPECTION PROCEDURE

**1** Input signal check.

Input Signal	Indicator Light Blinking Pattern
SET/COAST switch	ON  OFF
RESUME/ACCEL switch	ON  OFF
CANCEL switch	ON  OFF 

**PREPARATION:**

See input signal check on page DI-474.

**CHECK:**

Check the indicator light operation when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned on.

**OK:**

**SET/COAST, RESUME/ACCEL switch**

The signals shown in the table on the left should be output when each switch is ON. The signal should disappear when the switch is turned OFF.

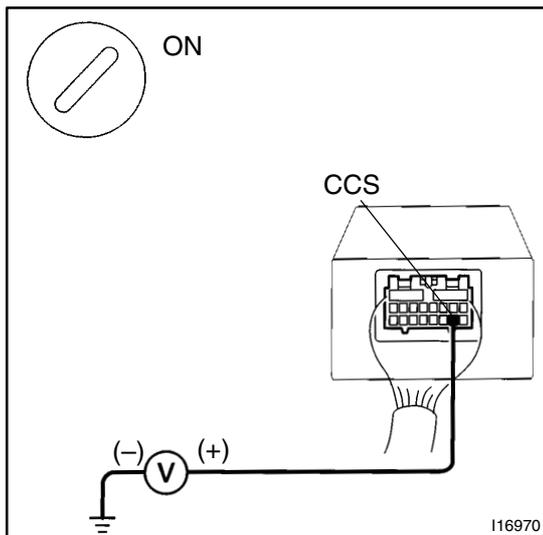
**CANCEL switch**

The indicator light goes off when the cancel switch is turned ON.

**OK** Wait and see.

**NG**

**2** Check voltage between terminals CCS of cruise control ECU connector and body ground.



**PREPARATION:**

- (a) Remove the ECU with connector still connected.
- (b) Turn ignition switch ON.

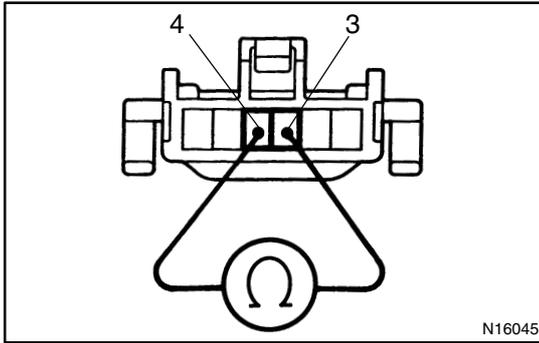
**CHECK:**

Measure voltage between terminals 18 of ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 - 16 V
MAIN	Below 0.5 V
RES/ACC	2.0 - 4.6 V
SET/COAST	4.0 - 7.9 V
CANCEL	6.0 - 11.0 V

**NG** Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

**OK**

**3 Check control switch.****PREPARATION:**

- (a) Remove steering wheel center pad.
- (b) Disconnect the control switch connector.

**CHECK:**

Measure resistance between terminals 3 and 4 of control switch connector when control switch is operated.

Switch position	Resistance ( $\Omega$ )
Neutral	$\infty$ (No continuity)
RES/ACC	220 – 260
SET/COAST	610 – 650
CANCEL	1520 – 1560

**NG****Replace control switch.****OK****4 Check harness and connector between cruise control ECU and cruise control switch, cruise control switch and body ground (See page IN-32).****NG****Repair or replace harness or connector.****OK****5 Input signal check (See step 1).****OK****Wait and see.****NG**

**Check and replace cruise control ECU (See page IN-32).**

# Stop Light Switch Circuit

## CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECU. When the ECU receives this signal, it cancels the cruise control. A fail-safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit. The cancel conditions are: Battery positive voltage at terminal STP-. When the brake is ON, battery positive voltage normally is applied through the STOP fuse and stop light switch to terminal STP- of the ECU, and the ECU turns the cruise control OFF.

If the harness connected to terminal STP- has an open circuit, terminal STP- will have battery positive voltage and the cruise control will be turned OFF.

Also, when the brake is ON, the magnetic clutch circuit is cut mechanically by the stop light switch, turning the cruise control OFF. (See page DI-486 for operation of the magnetic clutch)

## WIRING DIAGRAM

Refer to DTC 12 on page DI-486.

## INSPECTION PROCEDURE

<b>1</b>	<b>Check operation of stop light.</b>
----------	---------------------------------------

**CHECK:**

Check that stop light comes ON when brake pedal is depressed, and turns OFF when brake pedal is released.

**NG** → **Check stop light system (See page BE-2).**

**OK**

<b>2</b>	<b>Input signal check.</b>
----------	----------------------------

**CHECK:**

- (a) See input signal check on DI-474.
- (b) Check the indicator light when the brake pedal is depressed.

**OK:**

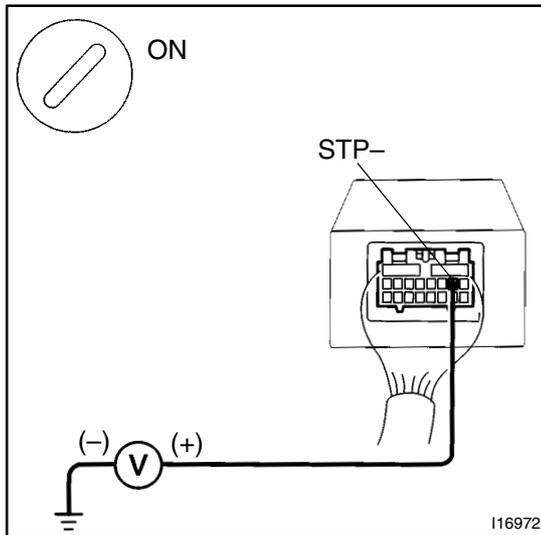
**The indicator light goes OFF when the brake pedal is depressed.**

Input Signal	Indicator Light Blinking Pattern
Stop Light switch ON	<p>Light OFF SW OFF ON SW ON</p>

**OK** → **Proceed to next circuit inspection shown in problem symptom table (See page DI-483).**

**NG**

**3 Check voltage between terminal STP- of cruise control ECU connector and body ground.**



**PREPARATION:**

- (a) Remove the ECU with connectors still connected.
- (b) Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal STP- of cruise control ECU connector and body ground, when the brake pedal is depressed and released.

**OK:**

Depressed	10 – 14 V
Released	Below 1 V

**OK**

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

**NG**

**4 Check for open in harness and connectors between terminal STP- of cruise control ECU and stop light switch (See page IN-32).**

**NG**

Repair or replace harness or connector.

**OK**

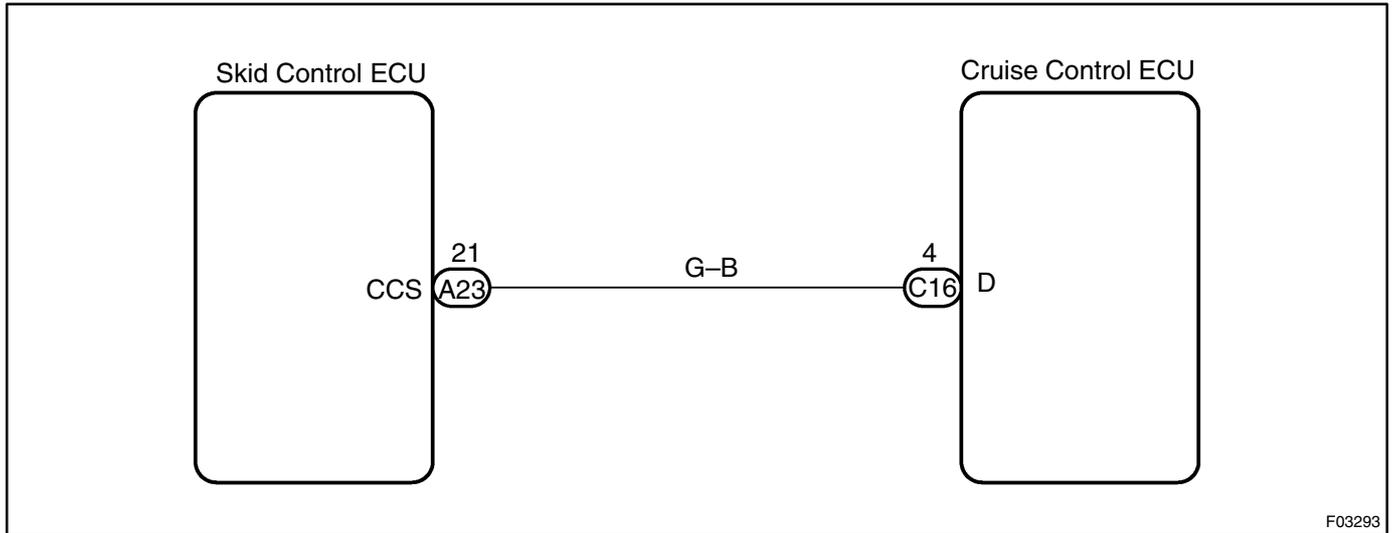
Check and replace cruise control ECU (See page IN-32).

# Neutral Start Switch Circuit

## CIRCUIT DESCRIPTION

When the shift position is except D, a signal is sent from the neutral start switch to the ECU. When this signal is input during cruise control driving, the ECU cancels the cruise control.

## WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check starter operation.</b>
----------	---------------------------------

**CHECK:**

Check that the starter operates normally and that the engine starts.

**NG**

**Replace starter.**

**OK**

<b>2</b>	<b>Input signal check.</b>
----------	----------------------------

Input Signal	Indicator Light Blinking Pattern
Turn PNP switch OFF (Shift to positions except D)	Light $\begin{matrix} \text{ON} & \text{SW ON} \\ \text{OFF} & \text{---} & \text{SW OFF} \end{matrix}$

**PREPARATION:**

See input signal check on page DI-474.

**CHECK:**

Check the indicator light when shifting into positions except D.

**OK:**

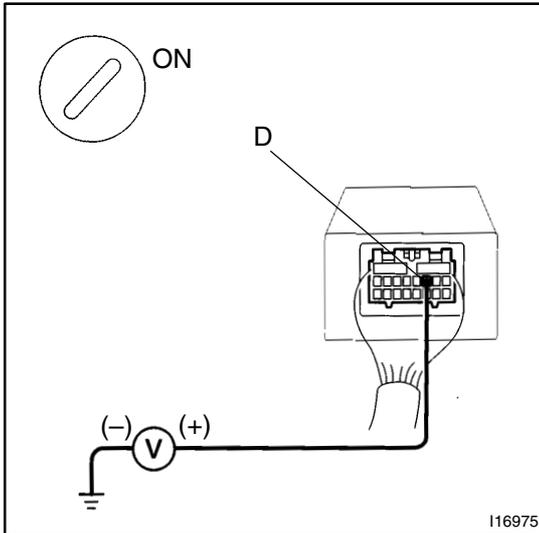
**The indicator light goes off when shifting into positions except D.**

**OK**

**Proceed to next circuit inspection shown in problem symptom table (See page DI-483).**

**NG**

**3 Check voltage between terminal D of cruise control ECU connector and body ground.**



**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal D of ECU connector and body ground when shifting into D range and other positions.

**OK:**

Shift Position	Voltage
D position	10 – 14 V
Other positions	Below 1 V

**OK**

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

**NG**

**4 Check harness and connector between cruise control ECU and neutral start switch (See page IN-32).**

**NG**

Repair or replace harness or connector.

**OK**

Check and replace cruise control ECU (See page IN-32).

## Clutch Switch Circuit

### CIRCUIT DESCRIPTION

When the clutch pedal is depressed, the clutch switch sends a signal to the cruise control ECU. When the signal is input to the cruise control ECU during cruise control driving, the cruise control ECU cancels cruise control.

### WIRING DIAGRAM

Refer to neutral start switch circuit on page DI-507.

### INSPECTION PROCEDURE

**1** Check starter operation.

#### CHECK:

Check that the starter operates normally and that the engine starts.

NG

Proceed to engine troubleshooting.

OK

**2** Input signal check.

Input Signal	Indicator Light Blinking Pattern
Clutch switch OFF (Depress clutch pedal)	Light ON SW ON OFF-----SW OFF

#### PREPARATION:

See input signal check on page DI-474.

#### CHECK:

Check the indicator lights when clutch pedal is depressed.

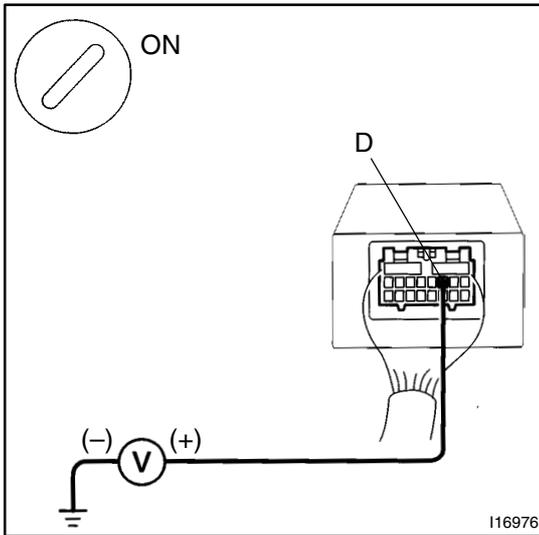
#### OK:

The indicator light goes off when shifting into clutch pedal is depressed.

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

NG

**3 Check voltage between terminal D of cruise control ECU and body ground.**
**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal D of cruise control ECU connector and body ground when clutch pedal is depressed and pushed in.

**OK:**

Shift Position	Voltage
Clutch pedal depressed	10 – 14 V
Clutch pedal pushed in	Below 1 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

NG

**4 Check for open in harness and connector between ECU and GAUGE fuse (See page IN-32).**

NG

Repair or replace harness or connector.

OK

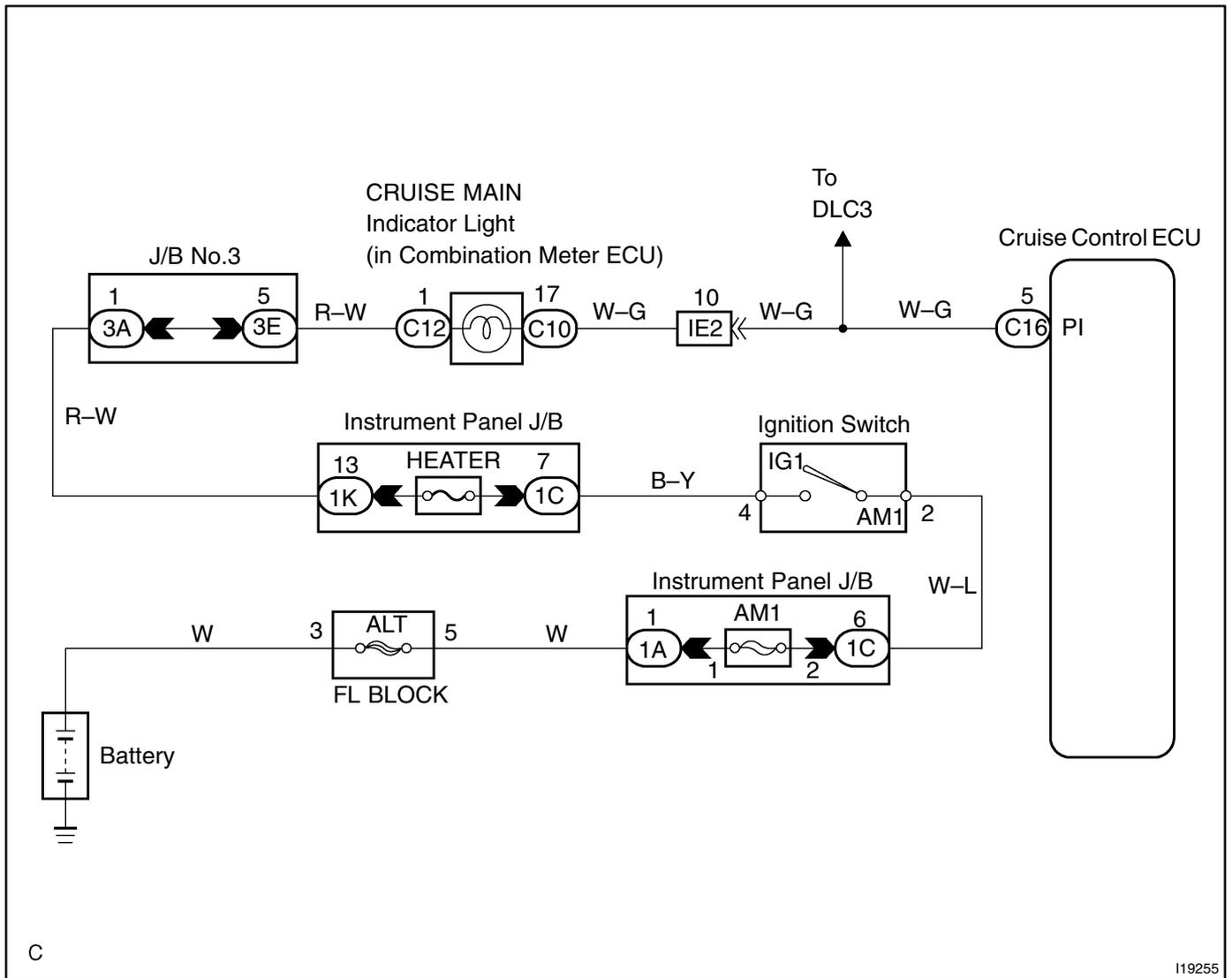
Check and replace cruise control ECU (See page IN-32).

# CRUISE MAIN Indicator Light Circuit

## CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

## WIRING DIAGRAM

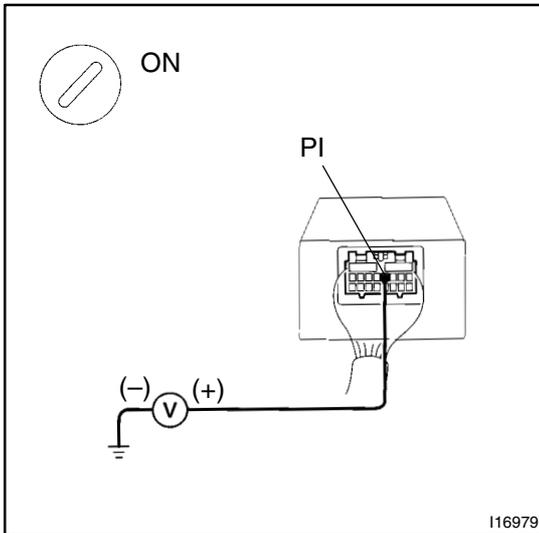


C

I19255

## INSPECTION PROCEDURE

- 1 Check voltage between terminals PI and GND of cruise control ECU connector.

**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals PI and GND of cruise control ECU connector when main switch is ON and OFF.

**OK:**

Switch position	Voltage
OFF	10 – 16 V
ON	Below 1.2 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

NG

- 2 Check combination meter (See page BE-68).

NG

Replace combination meter.

OK

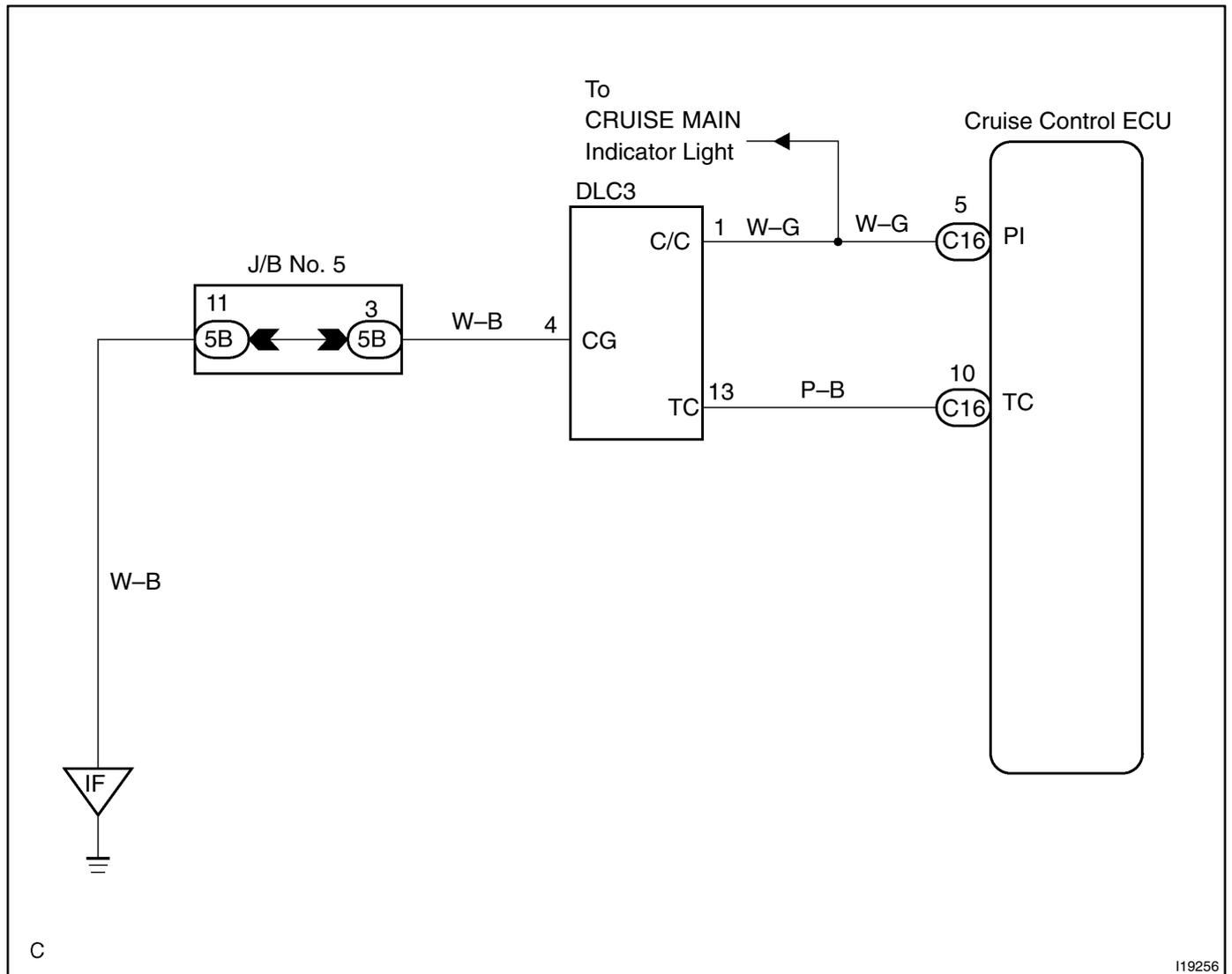
Check and replace cruise control ECU (See page IN-32).

## Diagnosis Circuit

### CIRCUIT DESCRIPTION

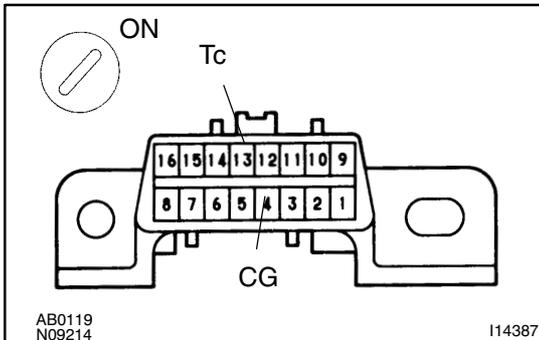
This circuit sends a signal to the ECU that outputs DTC.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

- 1** Check voltage between terminals Tc and CG of DLC3.

**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals Tc and CG of DLC3.

**OK:**

**Voltage: 10 – 14 V**

**OK**

Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

**NG**

- 2** Check harness and connector between cruise control ECU and DLC3, DLC3 and body ground (See page IN-32).

**NG**

Repair or replace harness or connector.

**OK**

Check and replace cruise control ECU (See page IN-32).

## Actuator Control Cable

### INSPECTION PROCEDURE

<b>1</b>	<b>Actuator control cable inspection</b>
----------	--

**OK:**

- (a) Check that the actuator and control cable throttle link are properly installed and that the cable and link are connected correctly.
- (b) Check that the actuator and bell crank operate smoothly.
- (c) Check that the cable is not loose or too tight.

**OK:**

**Freeplay: less than 10 mm**

**HINT:**

- If the control cable is very loose, the vehicle's loss of speed going uphill will be large.
- If the control cable is too tight, the idle RPM will become high.

## Electronically Controlled Transmission Communication Circuit

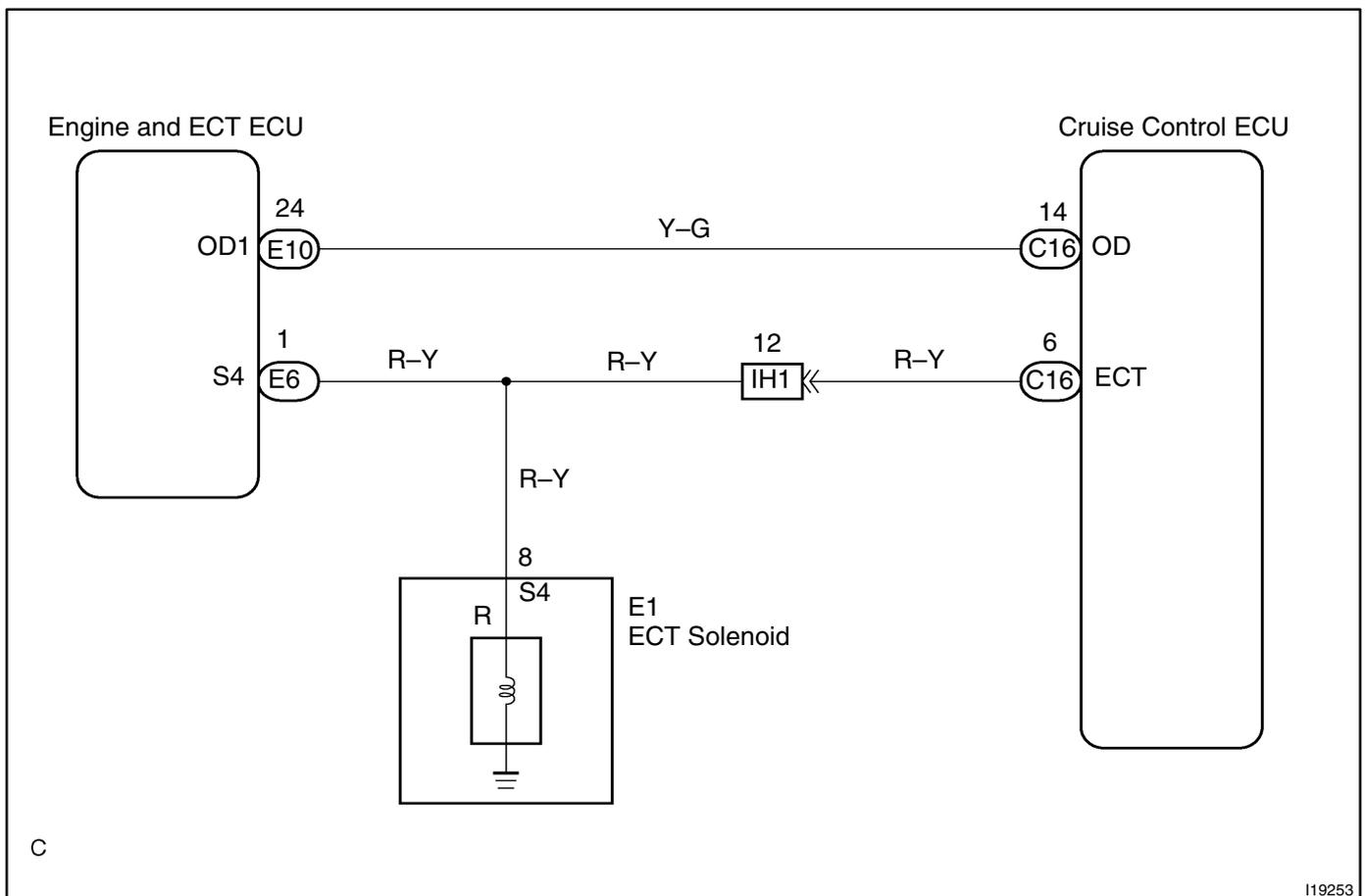
### CIRCUIT DESCRIPTION

When driving uphill under the cruise control, in order to reduce shifting due to ON-OFF overdrive operation and to provide smooth driving, when down shifting in the electronically controlled transmission occurs, a signal to prevent upshift until the end of the uphill slope is sent from the cruise control ECU to the electronically controlled transmission.

Terminal ECT of the cruise control ECU detects the shift change signal (output to electronically controlled transmission No. 2 solenoid) from the engine and ECT ECU.

If the vehicle speeds down, also when terminal ECT of the cruise control ECU receives down shifting signal, it sends a signal from terminal OD to ECM to cut overdrive until the end of the uphill slope, and the gear shifts are reduced and gear shift points in the electronically controlled transmission are changed.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check operation of overdrive.</b>
----------	--------------------------------------

**PREPARATION:**

Test drive after engine warms up.

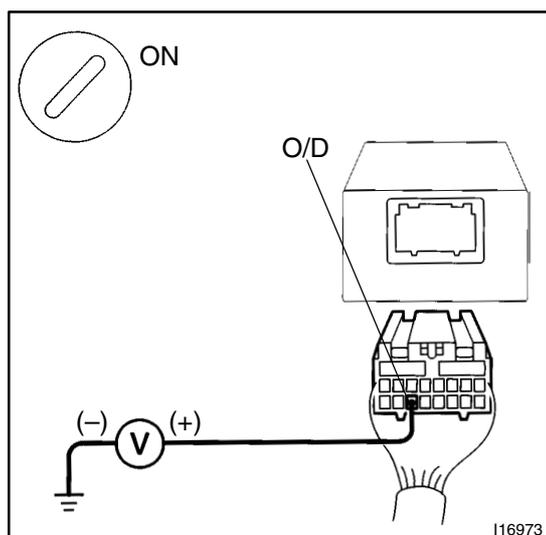
**CHECK:**

Check that overdrive ON ↔ OFF occurs by operation of OD switch ON–OFF.

<b>NG</b>	<b>Check and repair electronically controlled transmission (See page DI-142).</b>
-----------	---

<b>OK</b>
-----------

<b>2</b>	<b>Check voltage between terminal OD of harness side connector of cruise control ECU and body ground.</b>
----------	---

**PREPARATION:**

- (a) Remove the ECU with connector still connected.
- (b) Turn ignition switch ON.
- (c) Disconnect the ECU connector.

**CHECK:**

Measure voltage between terminal OD of harness side connector of ECU and body ground.

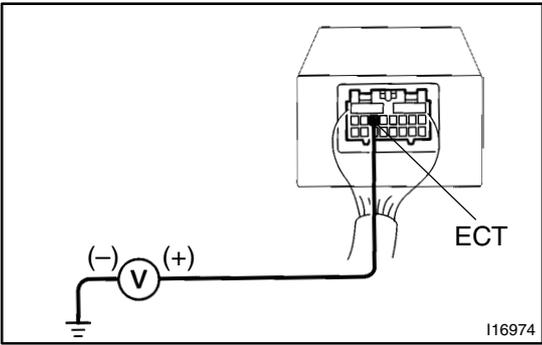
**OK:**

**Voltage: 10 – 14 V**

<b>NG</b>	<b>Go to step 5.</b>
-----------	----------------------

<b>OK</b>
-----------

**3 Check voltage between terminal ECT of cruise control ECU connector and body ground (On test drive).**



**PREPARATION:**

- (a) Connect the ECU connector.
- (b) Test drive after engine warms up.

**CHECK:**

Check voltage between terminal ECT of ECU connector and body ground when OD switch is ON and OFF.

**OK:**

OD switch position	Voltage
ON	8 - 14 V
OFF	Below 0.5 V

**OK** Proceed to next circuit inspection shown in problem symptom table (See page DI-483).

**NG**

**4 Check harness and connector between terminal ECT of cruise control ECU and electronically controlled transmission solenoid (See page IN-32).**

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

**OK**

Check and replace cruise control ECU.

**5 Check harness and connector between terminal OD of cruise control ECU and terminal OD1 of engine and ECT ECU (See page IN-32).**

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

**OK**

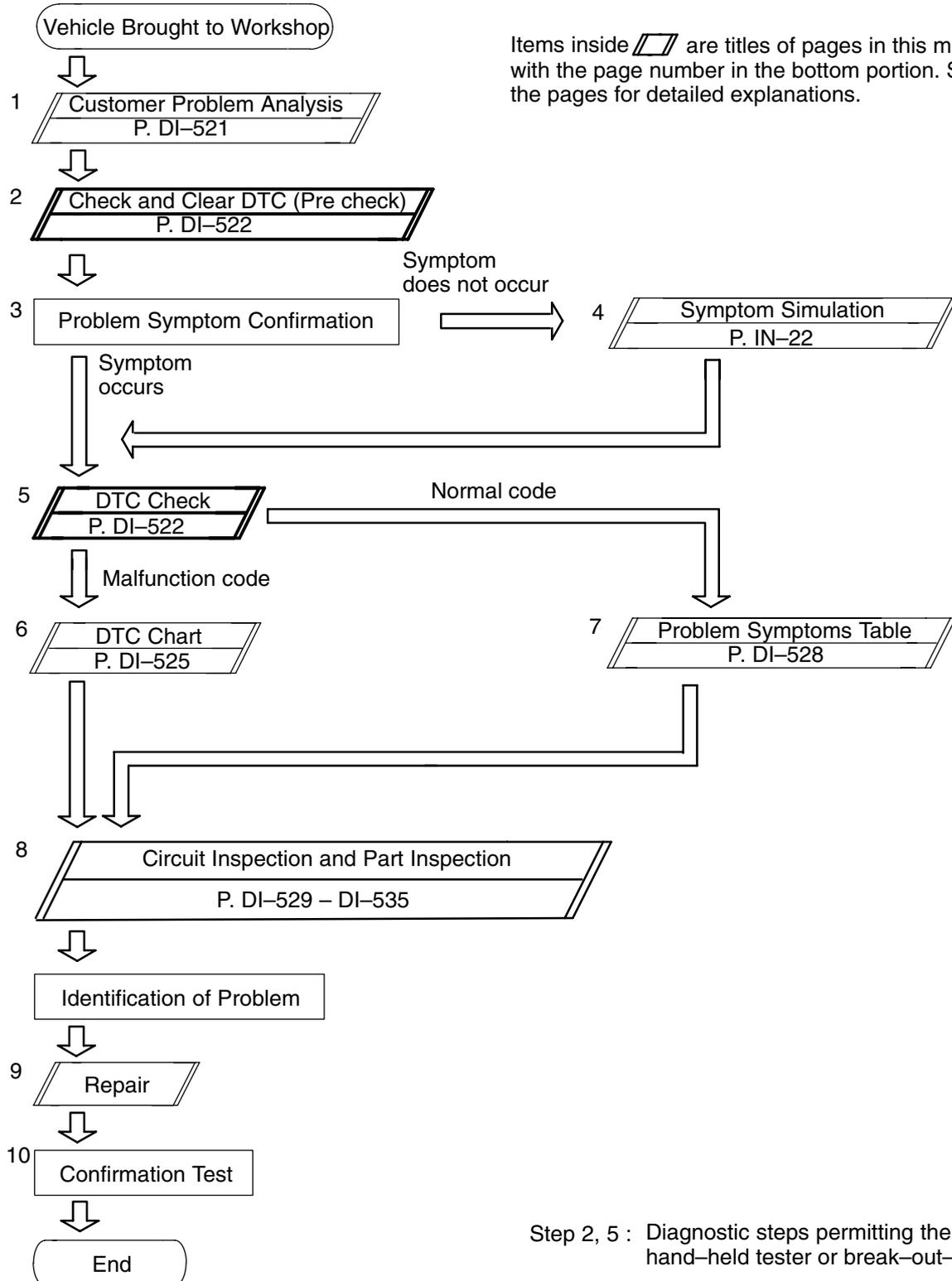
Check and replace cruise control ECU (See page IN-32).

# ENGINE IMMOBILISER SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

D11AJ-23

Troubleshooting in accordance with the procedure on the following pages.



Step 2, 5 : Diagnostic steps permitting the use of the hand-held tester or break-out-box.

# CUSTOMER PROBLEM ANALYSIS CHECK

## ENGINE IMMOBLISER Check Sheet

 Inspector's  
Name : \_\_\_\_\_

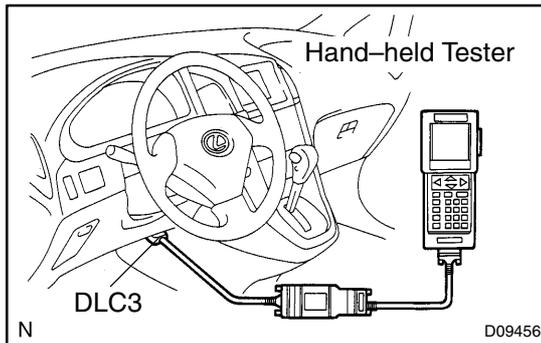
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (    times a day)

Symptoms	<input type="checkbox"/> Immobiliser is not set. (Engine starts with key codes other than the registered key code,)
	<input type="checkbox"/> Engine does not start

Check Item	Malfunction Indicator Lamp	<input type="checkbox"/> Normal <input type="checkbox"/> Remains ON <input type="checkbox"/> Does not Light Up
------------	----------------------------	--

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )



## PRE-CHECK

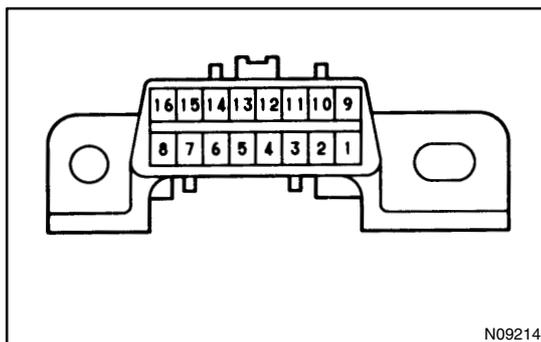
### 1. DIAGNOSIS SYSTEM

#### (a) Description

Engine & ECT ECU controls the function of immobiliser on this vehicle.

Data of the immobiliser or DTC can be read from DLC3 of the vehicle. When a trouble occurs on immobiliser, check engine warning light does not light on but DTC inspection is performed.

Therefore when there seems to be a trouble on immobiliser, use hand-held tester or SST to check and trouble-shoot it.



#### (b) Inspect the DLC3.

The vehicle's engine & ECT ECU 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

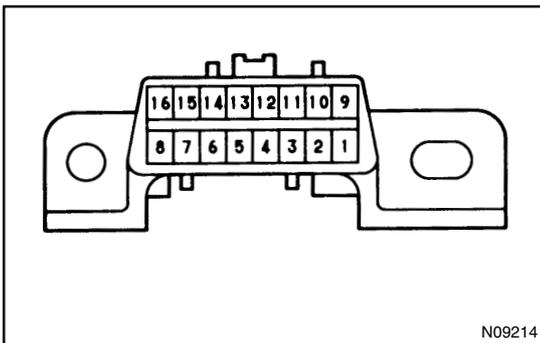
#### HINT:

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

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

**2. INSPECT DIAGNOSIS**

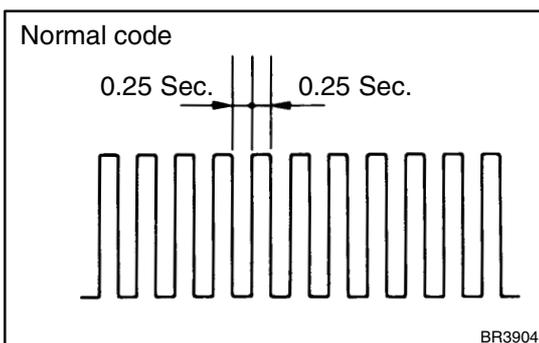
- (a) Check the DTC (Using hand-held tester)
- (1) Prepare the hand-held tester.
  - (2) Connect the hand-held tester to DLC3 under the instrument panel lower pad.
  - (3) Turn the ignition switch ON and turn the hand-held tester switch ON.
  - (4) Use the hand-held tester to check the DTCs and freeze frame data; note them down. (For operating instructions, see the OBD II scan tool's instruction book.)
  - (5) See page DI-525 to confirm the details of the DTCs.



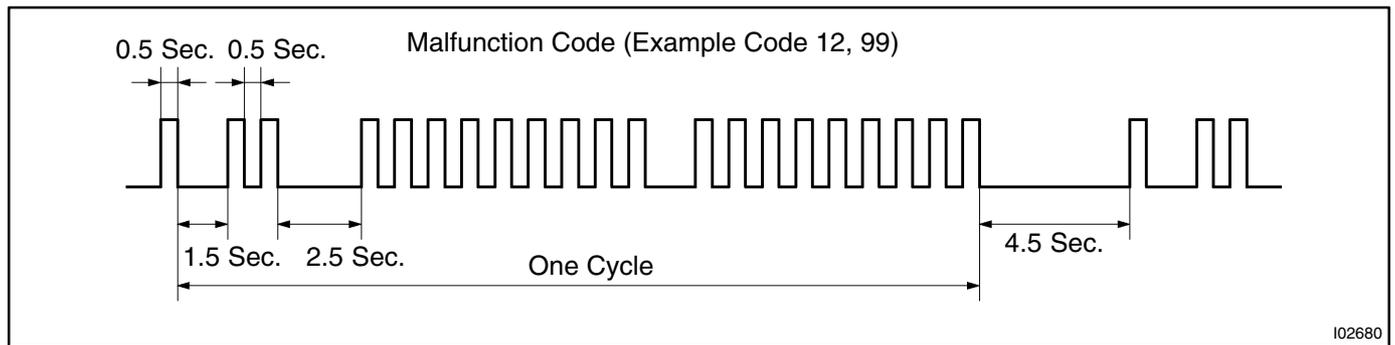
- (b) Check the DTC (Using diagnosis check wire)
- (1) Turn ignition switch ON.
  - (2) Using SST, connect between terminals 13 (TC) and 4 (CG) of DLC 1.
- SST 09843-18040
- (3) Read the diagnostic trouble code from check engine warning light.

**HINT:**

- If a diagnostic trouble code is not output, check the Tc terminal circuit.
- Engine & ECT ECU controls the immobiliser function on this vehicle, DTC is out put with engine data.



- As an example, the blinking patterns for codes; normal, 12 and 99 are shown in the illustration.



- (4) When DTC "99" is output, there is a trouble of 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 actions will erase the DTCs and freeze frame data.

- (1) Operating the hand-held tester to erase the codes.
- (2) Disconnecting the battery terminals or EFI fuse.

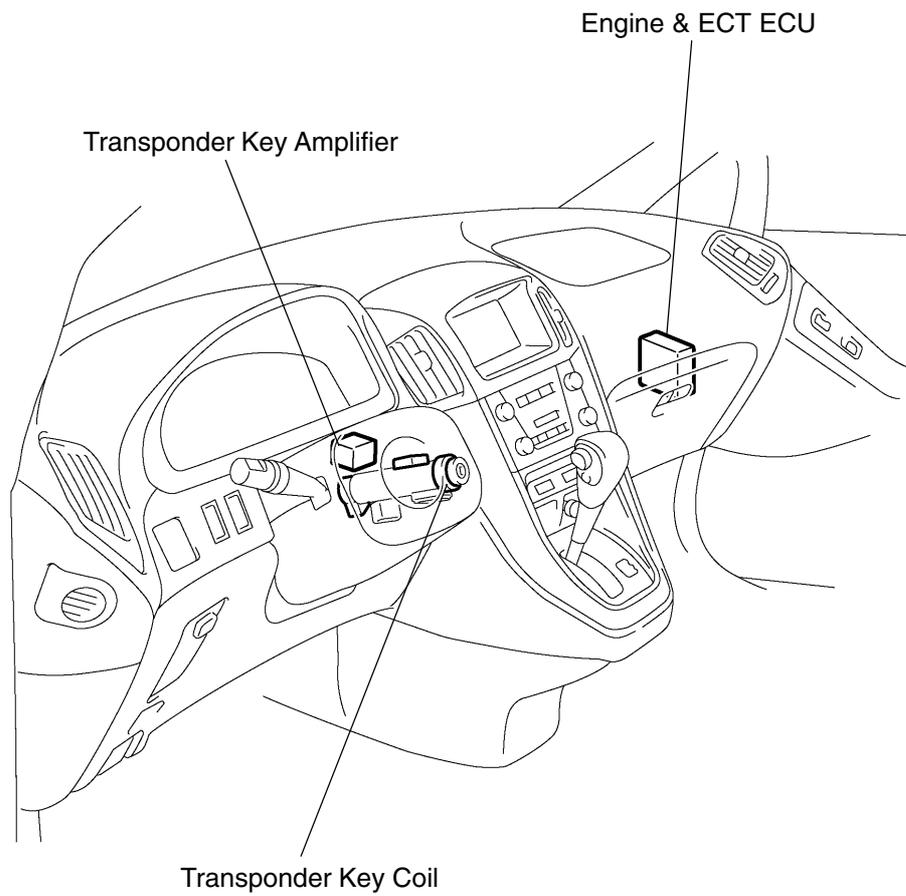
**DIAGNOSTIC TROUBLE CODE CHART**

DTC No. (See page)	Detection Item	Trouble Area
B2795 (DI-529)	Unmatched key code	<ul style="list-style-type: none"> <li>• Key</li> <li>• Unregistered key inserted before</li> </ul>
B2796 (DI-530)	No communication in immobiliser system	<ul style="list-style-type: none"> <li>• Key</li> <li>• Transponder key coil</li> <li>• Amplifier</li> <li>• Wireharness</li> <li>• Engine &amp; ECT ECU</li> </ul>
B2797 (DI-533)	Communication malfunction No.1	<ul style="list-style-type: none"> <li>• Communication contests</li> <li>• Unregistered key inserted before</li> </ul>
B2798 (DI-535)	Communication malfunction No.2	<ul style="list-style-type: none"> <li>• Key</li> <li>• Transponder key coil</li> <li>• Amplifier</li> <li>• Wireharness</li> <li>• Engine &amp; ECT ECU</li> </ul>

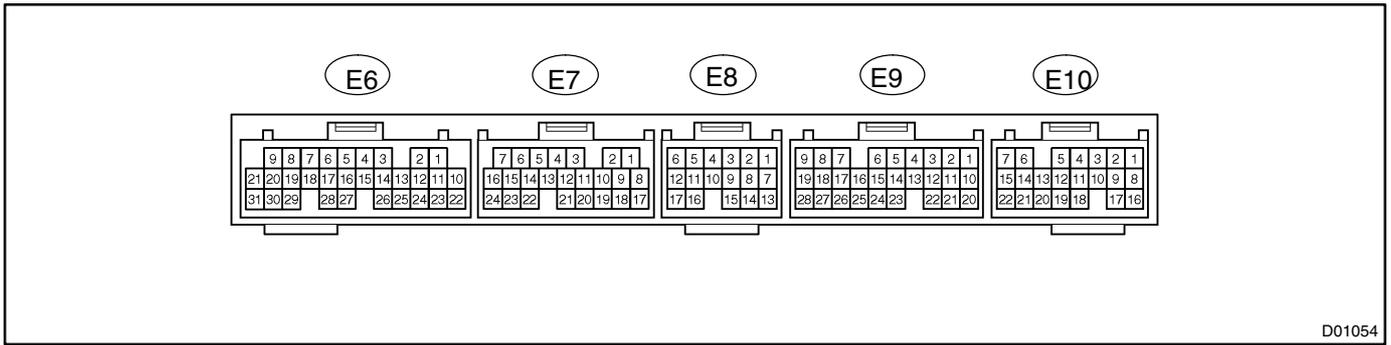
**HINT:**

To reduce the unnecessary exchange of engine & ECT ECU, check that a trouble occurs with the original engine & ECT ECU at the time of exchanging engine & ECT ECU and the trouble will disappear with a new engine & ECT ECU.

# PARTS LOCATION



## TERMINALS OF ECU



D01054

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TXCT – E1 (E10-18 ↔ E7-17)	GR ↔ BR	Ignition Switch ON	10 – 14
RXCK – E1 (E10-19 ↔ E7-17)	P ↔ BR	Ignition Switch ON	10 – 14
KSW – E1 (E10-23 ↔ E7-17)	L ↔ BR	Ignition Switch ON	10 – 14
CODE – E1 (E10-28 ↔ E7-17)	V ↔ BR	Ignition Switch ON	10 – 14

**PROBLEM SYMPTOMS TABLE**

Symptom	Suspect Area	See page
Immobiliser is not set. (Engine starts with key codes other than the registered key code.)	1. Engine & ECT ECU	IN-32
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. Engine & ECT ECU	*1 IN-32 BE-190 IN-32
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. Engine & ECT ECU	*2 IN-32 IN-32
Security indicator is always ON. (Although code has been registered in the automatic registration mode, indicator is not OFF.)	1. Wire harness 2. Transponder key coil 3. Amplifier 4. Engine & ECT ECU	IN-32 BE-190 IN-32
Security indicator is OFF (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key coil 3. Amplifier 4. Engine & ECT ECU	IN-32 BE-190 IN-32
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. Engine & ECT ECU	IN-32 IN-32
Security indicator is abnormal blinking.	1. Wire harness 2. Engine & ECT ECU	IN-32 IN-32

\*1 : Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key codes.

\*2 : Finish the automatic registration mode because the mode might still remain.

## CIRCUIT INSPECTION

<b>DTC</b>	<b>B2795/99</b>	<b>Unmatched Key Code</b>
------------	-----------------	---------------------------

## 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. (Engine & ECU is normal.)

Inquire a customer the condition of using the system to find the cause of the trouble.

(Example: Another key has been inserted, etc..)

DTC No.	DTC Detecting Condition	Trouble Area
B2795/99	No communication	• Key

## INSPECTION PROCEDURE

<b>1</b>	<b>Delete DTC and insert all the presently available keys to check whether the engine starts or not.</b>
----------	--

HINT:

When inserting the key that does not start the engine, DTC (B 2795) is stored in memory.

### RESULT:

OK	All keys starts the engine.
NG	A specific key does not start the engine.

<b>OK</b>	<b>No problem.</b>
-----------	--------------------

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.



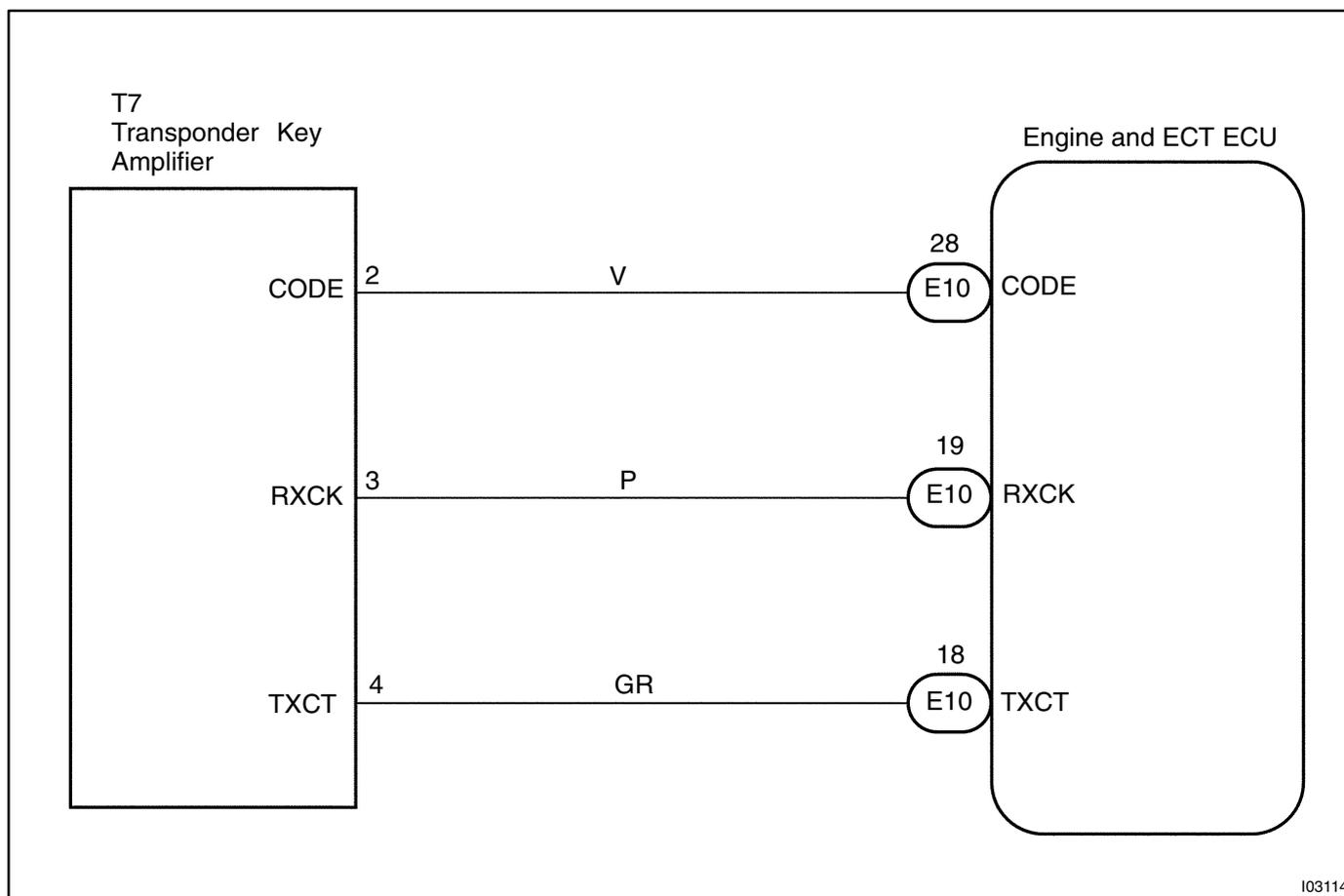
<b>Register the key that does not start the engine.</b>
---

<b>DTC</b>	<b>B2796/99</b>	<b>No Communication in Immobiliser system</b>
------------	-----------------	---

### CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	<ul style="list-style-type: none"> <li>• Key</li> <li>• Transponder Key Coil</li> <li>• Transponder Key Amplifier</li> <li>• Wire harness</li> <li>• Engine &amp; ECT ECU</li> </ul>

### WIRING DIAGRAM



I03114

### INSPECTION PROCEDURE

<b>1</b>	<b>Delete DTC and insert all the presently available keys to check whether the engine starts or not</b>
----------	---

**RESULT:**

A	All keys start the engine.
B	A specific key does not start the engine. In this case, DTC (B 2796) is stored in memory.
C	All keys do not start the engine. In this case, DTC (B 2796) is stored in memory.

<b>A</b>	<b>No problem at this time.</b>
----------	---------------------------------

**HINT:**

If the result is "A", please confirm whether or not customers have ever inserted the key (without transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

<b>B</b>	<b>The transponder chip of a specific key is defective. Replace the key.</b>
----------	--

<b>C</b>
----------

<b>2</b>	<b>Check transponder key coil (See page BE-190).</b>
----------	--

<b>NG</b>	<b>Replace transponder key coil</b>
-----------	-------------------------------------

<b>OK</b>
-----------

<b>3</b>	<b>Check harness and connector between transponder key amplifier and engine &amp; ECT ECU.</b>
----------	--

<b>NG</b>	<b>Repair or replace harness and connector</b>
-----------	--

<b>OK</b>
-----------

<b>4</b>	<b>Does it operate normally after replacement of transponder key amplifier?</b>
----------	---

<b>Yes</b>	<b>Replace transponder key amplifier.</b>
------------	---

<b>No</b>
-----------

<b>Replace engine and ECT ECU.</b>
------------------------------------

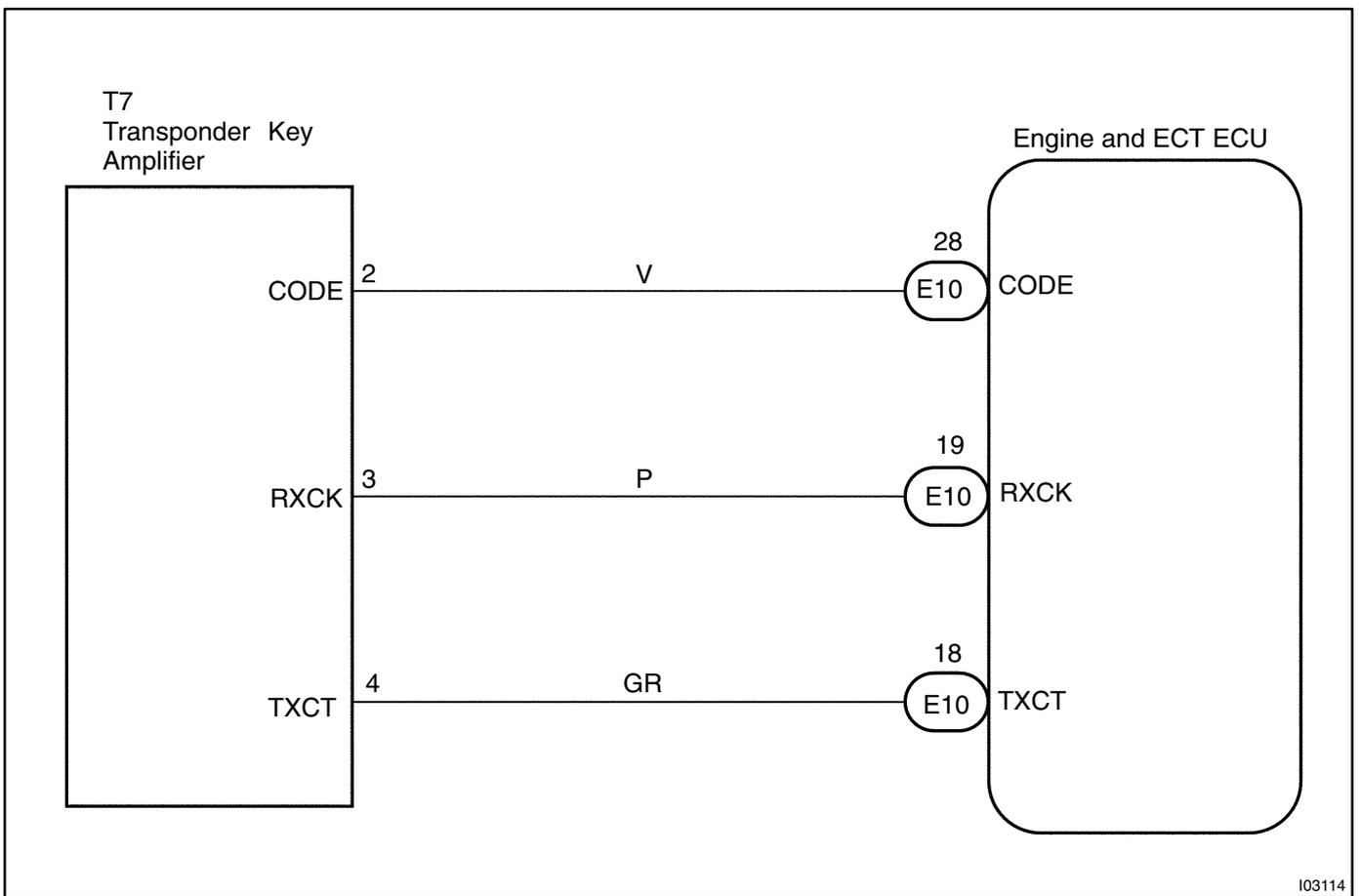
<b>DTC</b>	<b>B2797/99</b>	<b>Communication Malfunction No.1</b>
------------	-----------------	---------------------------------------

### CIRCUIT DESCRIPTION

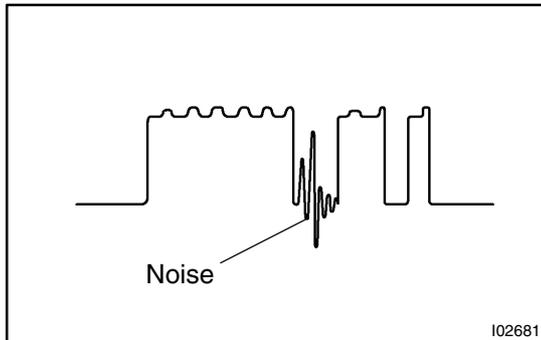
This code is detected when although the communication has been performed normally, an error occurs. (Example. Some noise is included in communication line.)

DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	<ul style="list-style-type: none"> <li>• Wire Harness</li> <li>• Transponder Key Amplifier</li> <li>• Engine &amp; ECT ECU</li> </ul>

### WIRING DIAGRAM



I03114

**INSPECTION PROCEDURE****1 Noise check****PREPARATION:**

Insert already registered master key in the key cylinder.

**CHECK:**

Using an oscilloscope or hand-held tester, check that noise is included in the CODE terminal of engine & ECT ECU.

**OK:**

No noise is detected.

**NG**

Try to find the cause of the noise and remove it.

**OK****2 Does it operate normally after replacement of transponder key amplifier?****Yes**

Replace transponder key amplifier.

**No**

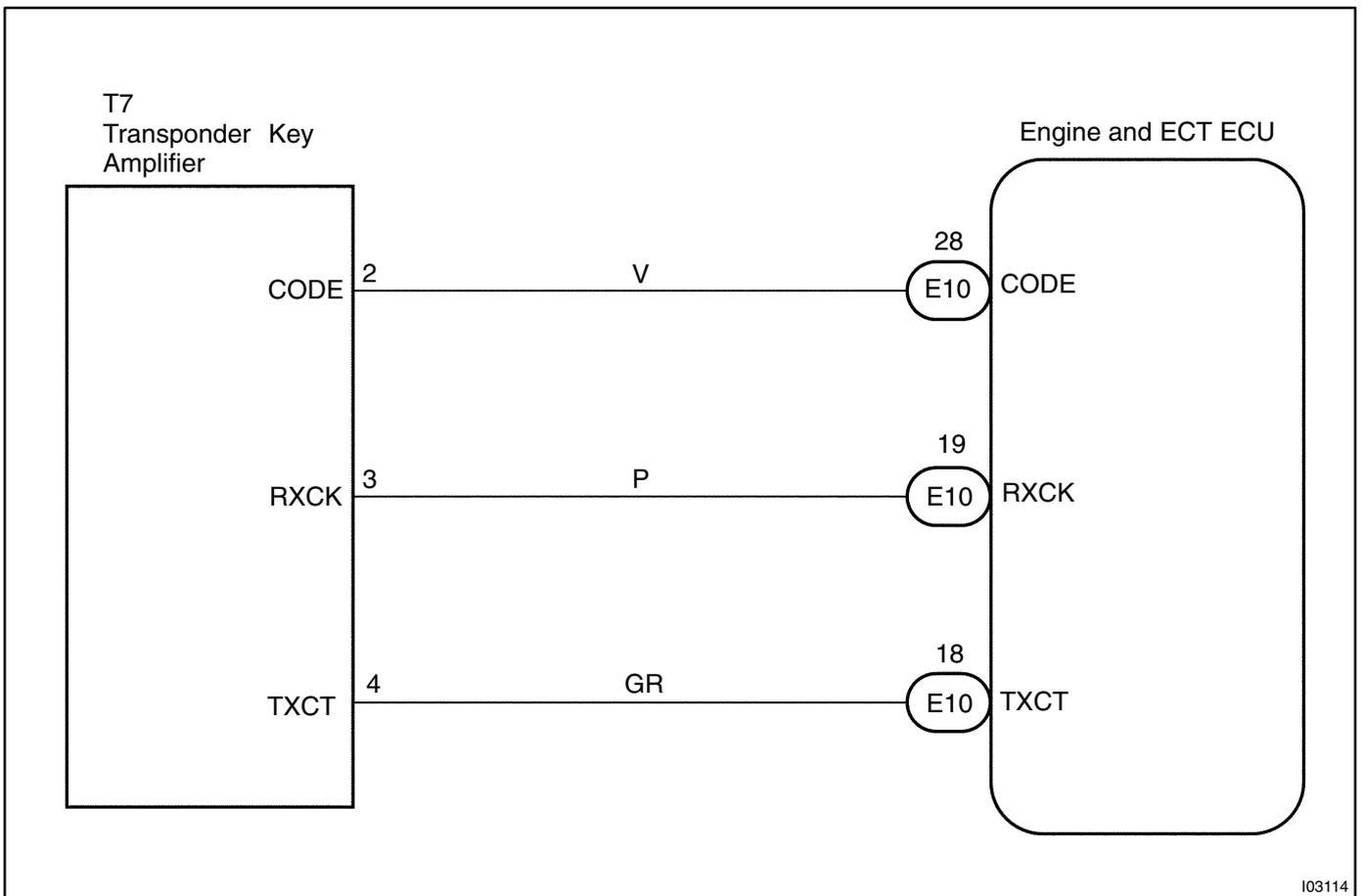
Replace engine & ECT ECU.

<b>DTC</b>	<b>B2798/99</b>	<b>Communication malfunction No.2</b>
------------	-----------------	---------------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
B2798/99	Communication error	<ul style="list-style-type: none"> <li>• Key</li> <li>• Transponder Key Coil</li> <li>• Transponder Key Amplifier</li> <li>• Wire harness</li> <li>• Engine &amp; ECT ECU</li> </ul>

**WIRING DIAGRAM**



I03114

**INSPECTION PROCEDURE**

<b>1</b>	<b>Check transponder key coil (See page BE-190).</b>
----------	--

<b>NG</b>	<b>Replace transponder key coil</b>
-----------	-------------------------------------

<b>OK</b>
-----------

<b>2</b>	<b>Check harness and connector between transponder key amplifier and engine &amp; ECT ECU.</b>
----------	--

<b>NG</b>	<b>Repair or replace harness and connector</b>
-----------	--

<b>OK</b>
-----------

<b>3</b>	<b>Does it operate normally after replacement of transponder key amplifier?</b>
----------	---

<b>Yes</b>	<b>Replace transponder key amplifier.</b>
------------	---

<b>No</b>
-----------

<b>Rplace engine and ECT ECU.</b>
-----------------------------------

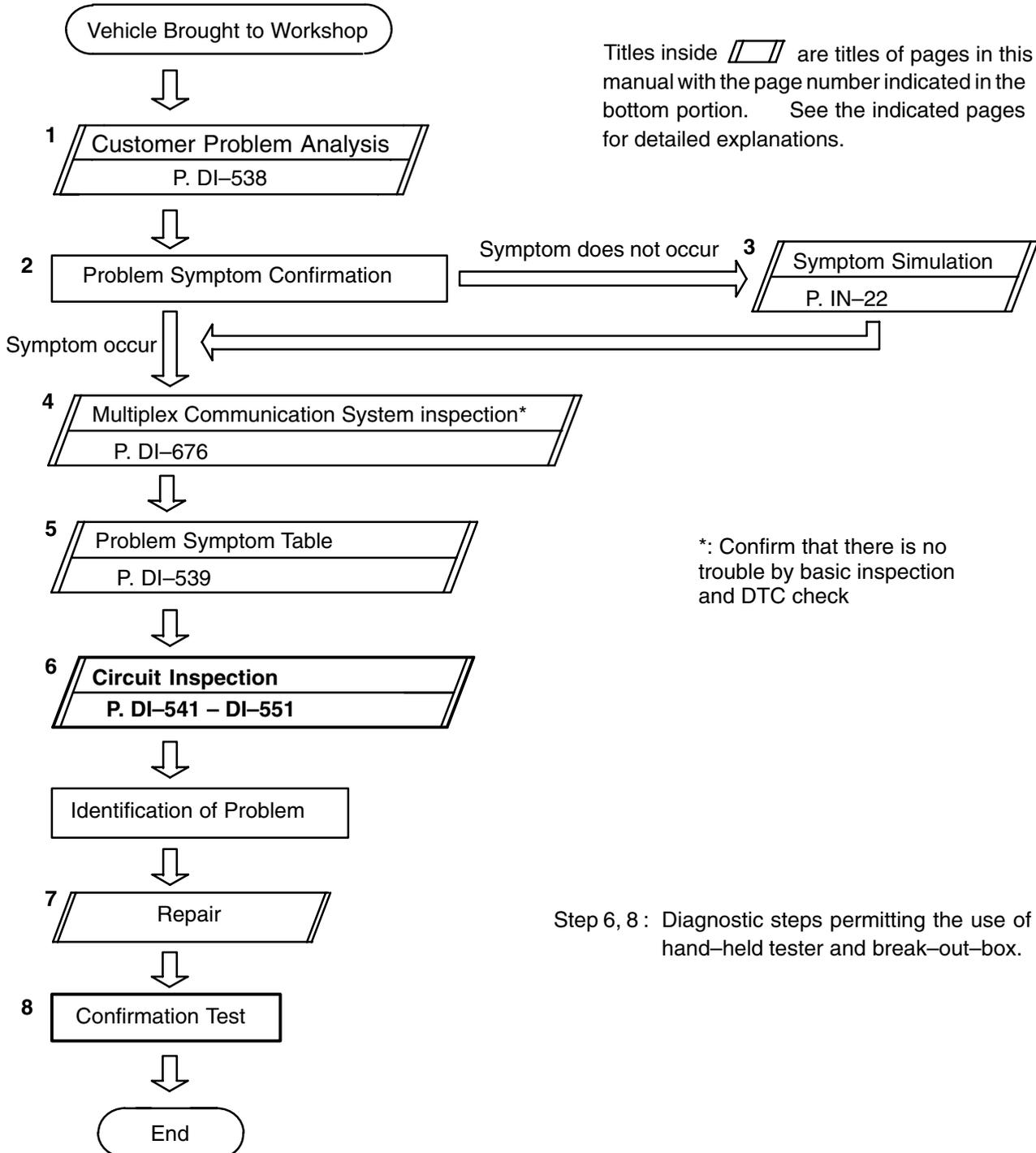
# COMBINATION METER SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI1R8-04

### HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



# CUSTOMER PROBLEM ANALYSIS CHECK

**COMBINATION METER SYSTEM Check Sheet**

Inspector's name: \_\_\_\_\_

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

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    Times per    day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	<b>Weather</b> <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	<b>Outdoor temperature</b> <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.    °F (    °C))

Problem Symptom	Gauge	<input type="checkbox"/> Speedometer does not operate or abnormal operation.
		<input type="checkbox"/> Tachometer does not operate or abnormal operation.
		<input type="checkbox"/> Fuel Gauge does not operate or abnormal operation.
		<input type="checkbox"/> Engine Coolant Temperature Gauge does not operate or abnormal operation.
	Indicator Light and Warning Light	<input type="checkbox"/> Shift indicator light does not light up.
		<input type="checkbox"/> Open door warning light does not light up.
		<input type="checkbox"/> Driver seat belt warning does not light up.
		<input type="checkbox"/> Low oil pressure warning light does not light up.
		<input type="checkbox"/> Discharge warning does not light up.
		<input type="checkbox"/> Brake warning light does not light up.
		<input type="checkbox"/> Taillight indicator light does not light up.
		<input type="checkbox"/> CRUISE MAIN indicator light does not light up.
		<input type="checkbox"/> ECT SNOW indicator light does not light up.
		<input type="checkbox"/> ECT PWR indicator light does not light up.
		<input type="checkbox"/> TRAC OFF indicator light does not light up.
		<input type="checkbox"/> Washer Level warning light does not light up.
		<input type="checkbox"/> Rear Lights warning light does not light up.
		<input type="checkbox"/> Others.

## PROBLEM SYMPTOMS TABLE

### GAUGE:

Symptom	Suspect Area	See page
Speedometer does not operate or abnormal operation.	1. Speedometer 2. Skid Control ECU	DI-541 -
Tachometer does not operate or abnormal operation.	1. Tachometer 2. Igniter Signal Circuit	DI-543 DI-547
Fuel Gauge does not operate or abnormal operation.	1. Fuel Gauge 2. Wire Harness 3. Combination Meter	DI-544 IN-32
Engine Coolant Temperature Gauge does not operate.	1. Engine Coolant Temperature Gauge 2. Wire Harness 3. Combination Meter	DI-546 IN-32

### INDICATOR LIGHT AND WARNING LIGHT:

Symptom	Suspect Area	See page
Shift indicator lights does not light up.	1. Bulb circuit 2. A/T shift indicator light 3. Transmission control switch	DI-551 BE-62 DI-188
Open door warning light does not light up.	1. Bulb circuit 2. Door courtesy switch	DI-551 BE-48
Passenger seat belt warning light does not light up.	1. Bulb circuit 2. Passenger seat belt buckle switch	DI-551 BE-48
Driver seat belt warning light does not light up.	1. Bulb circuit 2. Driver seat belt buckle switch	DI-551 BE-48
Low oil pressure warning light does not light up.	1. Bulb circuit 2. Low oil pressure warning switch	DI-551 BE-68
Discharge warning light does not light up.	1. Bulb circuit 2. Alternator	DI-551 CH-2
Brake warning light does not light up.	1. Bulb circuit 2. Parking brake switch 3. Brake fluid level warning switch 4. Combination meter	DI-551 BE-68 BE-68 IN-32
Headlight indicator light does not light up. (USA models)	1. Bulb circuit 2. Headlight and Taillight System 3. Combination meter	DI-551 BE-2 IN-32
Taillight indicator light does not light up. (CANADA models)	1. Bulb circuit 2. Headlight and Taillight System 3. Combination meter	DI-551 BE-2 IN-32
CRUISE MAIN indicator light does not light up.	1. Bulb circuit 2. Cruise control switch 3. Combination meter	DI-551 DI-474 IN-32
ECT SNOW indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter	DI-551 - IN-32
ECT PWR indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter	DI-551 - IN-32
TRAC OFF indicator light does not light up.	1. Bulb circuit 2. Skid Control ECU 3. Combination meter	DI-551 DI-203 IN-32

Washer level warning light does not light up.	<ol style="list-style-type: none"> <li>1. Bulb circuit</li> <li>2. Window washer level warning switch</li> <li>3. Combination meter</li> </ol>	DI-551 BE-68 IN-32
Rear Lights warning light does not light up.	<ol style="list-style-type: none"> <li>1. Bulb circuit</li> <li>2. Light failure relay</li> <li>3. Combination meter</li> </ol>	DI-551 BE-68 IN-32
Engine oil level warning light does not light up.	<ol style="list-style-type: none"> <li>1. Bulb circuit</li> <li>2. Engine oil level warning sensor</li> <li>3. Combination meter</li> </ol>	DI-551 BE-68 IN-32
Any indicator lights does not light up.	<ol style="list-style-type: none"> <li>1. Bulb circuit</li> <li>2. Combination meter ECU power source circuit</li> <li>3. Combination meter</li> </ol>	DI-551 DI-549 IN-32

# CIRCUIT INSPECTION

## Speedometer

### INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

<b>1</b>	<b>Perform active test.</b>
----------	-----------------------------

**PREPARATION:**

Connect the hand-held tester to the DLC3.

**CHECK:**

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that the probe moves as hand-held tester directs in each range.

**OK:**

The meter operates normally.

**OK** → **Replace A/C and combination meter integrated ECU.**

**NG**

<b>2</b>	<b>Is any of DTC 31 to 35 output from ABS system?</b>
----------	---

Check DTC on page DI-205.

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

**NO**

<b>3</b>	<b>Check for open or short circuit in harness and connector between A/C and combination meter integrated ECU and ABS &amp; BA &amp; TRC &amp; VSC ECU.</b>
----------	--

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

**OK**

4	Check speedometer (See page BE-68).
---	-------------------------------------



# Tachometer

## INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

**1 Perform active test.**

### PREPARATION:

Connect the hand-held tester to the DLC3.

### CHECK:

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that the probe moves as hand-held tester directs in each range.

### OK:

The meter operates normally.

OK

Replace A/C and combination meter integrated ECU.

NG

**2 Check igniter signal circuit (See page DI-547).**

NG

Check and repair igniter signal circuit.

OK

**3 Check tachometer (See page BE-68).**

NG

Replace tachometer.

OK

Check and replace combination meter circuit plate.

## Fuel gauge

### INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

<b>1</b>	<b>Perform active test.</b>
----------	-----------------------------

#### PREPARATION:

Connect the hand-held tester to the DLC3.

#### CHECK:

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that the probe moves as hand-held tester directs in each range.

#### OK:

The gauge operates normally.

OK

Replace A/C and combination meter integrated ECU.

NG

<b>2</b>	<b>Check fuel sender gauge (See page BE-68).</b>
----------	--

NG

Replace fuel sender gauge.

OK

<b>3</b>	<b>Check for short circuit (B+) in harness and connector between A/C and combination meter integrated ECU and fuel sender gauge (see page IN-32).</b>
----------	---

NG

Repair or replace harness or connector.

OK

<b>4</b>	<b>Check fuel receiver gauge (See page BE-68).</b>
----------	--

**NG** 

**Replace fuel receiver gauge.**

**OK** 

**Check and replace combination meter circuit plate.**

## Engine Coolant Temperature Gauge

### INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

**1 Perform active test.**

#### PREPARATION:

Connect the hand-held tester to the DLC3.

#### CHECK:

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that the probe moves as hand-held tester directs in each range.

#### OK:

The gauge operates normally.

OK

Replace A/C and combination meter integrated ECU.

NG

**2 Is any of DTC P0115/22 or P0116/22 output from engine?**

Check DTC on page DI-3.

YES

Repair circuit indicated by output code.

NO

**3 Check engine coolant temperature receiver gauge (See page BE-68).**

NG

Replace engine coolant temperature receiver gauge.

OK

Check and replace combination meter circuit plate.

## Igniter Signal Circuit

### INSPECTION PROCEDURE

When using hand-held tester:

<b>1</b>	<b>Check tachometer value.</b>
----------	--------------------------------

#### PREPARATION:

Connect the hand-held tester to the DLC3.

#### CHECK:

- (a) Enter into DATALIST function of hand-held tester.
- (b) When driving the vehicle, check that parameter value of "Tachometer" changes on the screen of the hand-held tester.

OK

Replace combination meter  
(See page IN-32).

NG

<b>2</b>	<b>Check harness and connector between combination meter and Engine &amp; ECT ECU (See page IN-32).</b>
----------	---

NG

Repair or replace harness or connector.

OK

Check and repair ignition coil and wire harness.

**When not using hand-held tester:**

<b>1</b>	<b>Check harness and connector between combination meter and Engine &amp; ECT ECU (See page IN-32).</b>
----------	---



<b>2</b>	<b>Check igniter circuit (See page DI-96).</b>
----------	--



**Check and repair ignition coil and wire harness.**

# Combination Meter ECU Power Source Circuit

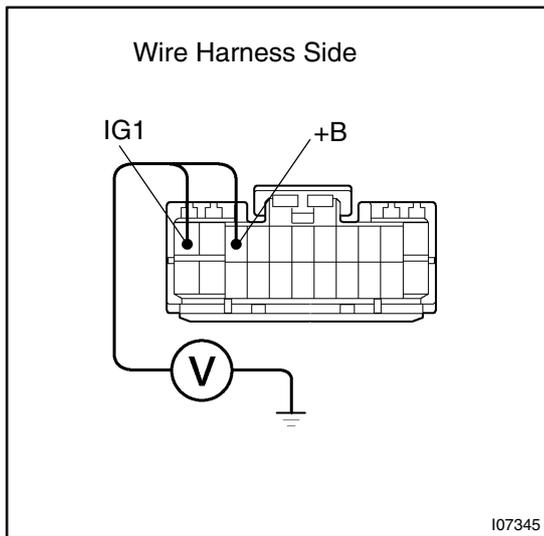
## INSPECTION PROCEDURE

<b>1</b>	<b>Check fuses. (HEATER and ECU-B fuse)</b>
----------	---

<b>NG</b>	<b>Replace fuse.</b>
-----------	----------------------

<b>OK</b>
-----------

<b>2</b>	<b>Check voltage between terminals +B and of combination meter connector and body ground.</b>
----------	---



**PREPARATION:**

- (a) Remove combination meter.
- (b) Disconnect the combination meter connector.

**CHECK:**

Measure voltage between terminals, +B, and IG1 of combination meter connector and body ground.

**OK:**

**Voltage: 10 – 14 V**

<b>OK</b>	<b>Proceed to next circuit inspection shown on problem symptom table (See page DI-539).</b>
-----------	---

<b>NG</b>
-----------

<b>3</b>	<b>Check for open in harness and connector between terminal GND of combination meter and body ground. (See page IN-32).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

**Check and repair harness and connector between combination meter and battery.**

## Bulb Circuit

### INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

<b>1</b>	<b>Perform active test.</b>
----------	-----------------------------

#### PREPARATION:

Connect the hand-held tester to the DLC3.

#### CHECK:

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that light turns ON or OFF as the hand-held tester directs.

HINT:

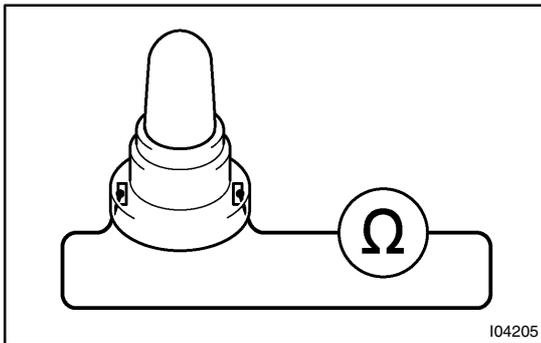
All lights flush except shift indicator.

OK

Proceed to next circuit inspection shown on problem symptom table. (See page DI-539).

NG

<b>2</b>	<b>Check bulb.</b>
----------	--------------------



#### CHECK:

Apply the tester as shown to test for continuity.

#### OK:

Continuity

NG

Replace bulb.

OK

3	Check combination meter circuit plate (See page BE-68).
---	---

NG

Replace combination meter circuit plate.

OK

Replace A/C and combination meter integrated ECU.

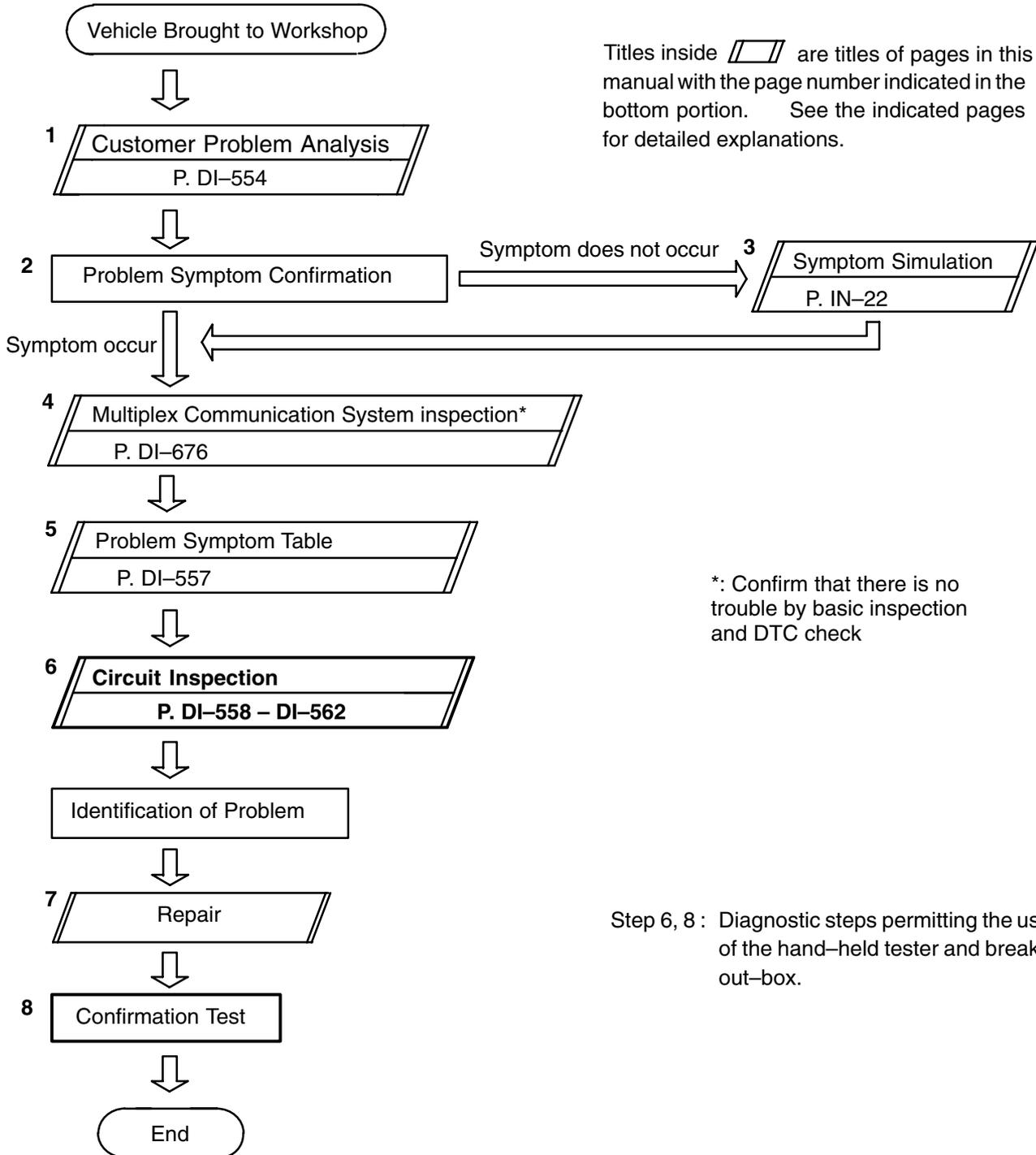
# SLIDING ROOF SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI1RK-04

### HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



# CUSTOMER PROBLEM ANALYSIS CHECK

## SLIDING ROOF CONTROL SYSTEM Check Sheet

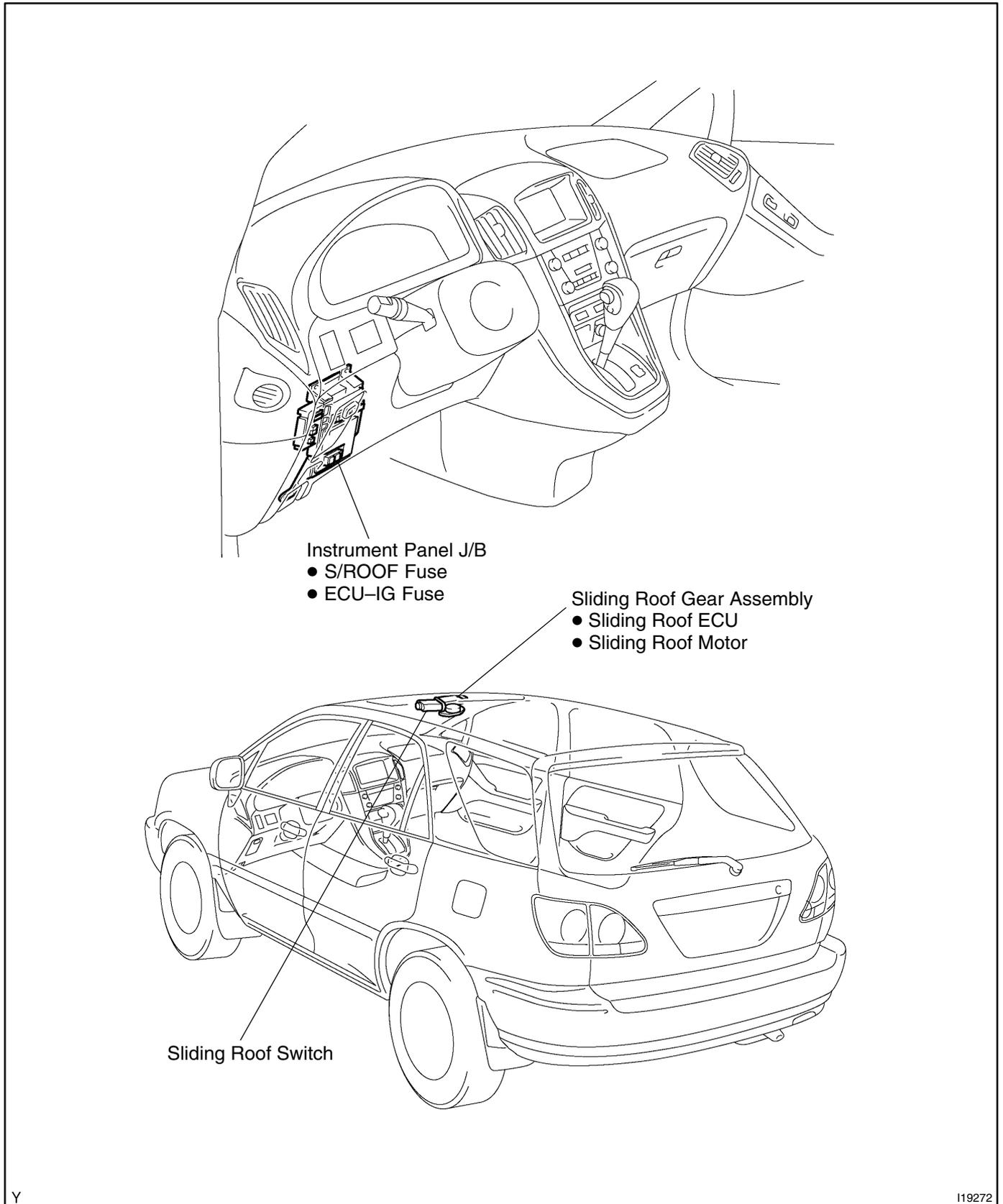
Inspector's name: \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

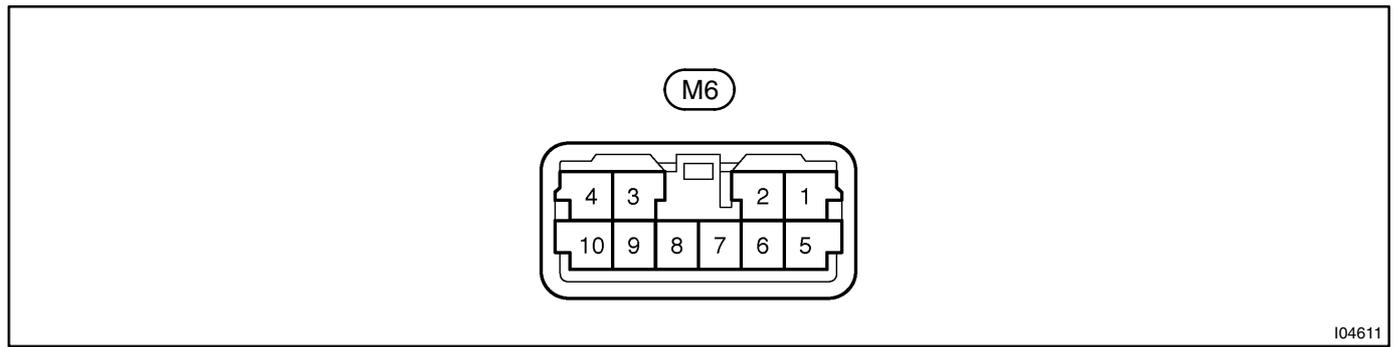
Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    Times per    day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	<b>Weather</b> <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	<b>Outdoor temperature</b> <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.    °F (    °C))

Problem Symptom	<input type="checkbox"/> Sliding roof control system does not operate.
	<input type="checkbox"/> Sliding roof operates abnormally or stops half way.
	<input type="checkbox"/> Jam protection system does not operate.

# PARTS LOCATION



## TERMINALS OF ECU



I04611

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
B ↔ E (M6-5 ↔ M6-7)	L-O ↔ W-B	Always	10 – 14 V
E ↔ Body ground (M6-7 ↔ Body ground)	W-B ↔ Body Ground	Always	10 – 14 V
IG ↔ E (M6-8 ↔ M6-7)	B-R ↔ W-B	Ignition switch ON	10 – 14 V
		Ignition switch OFF or ACC	Below 1 V
OPN ↔ E (M6-9 ↔ M6-7)	P ↔ W-B	Sliding roof control switch OPEN	10 – 14 V
		Others	Below 1 V
CLS ↔ E (M6-10 ↔ M6-7)	G-Y ↔ W-B	Sliding roof control switch CLOSE	10 – 14 V
		Others	Below 1 V

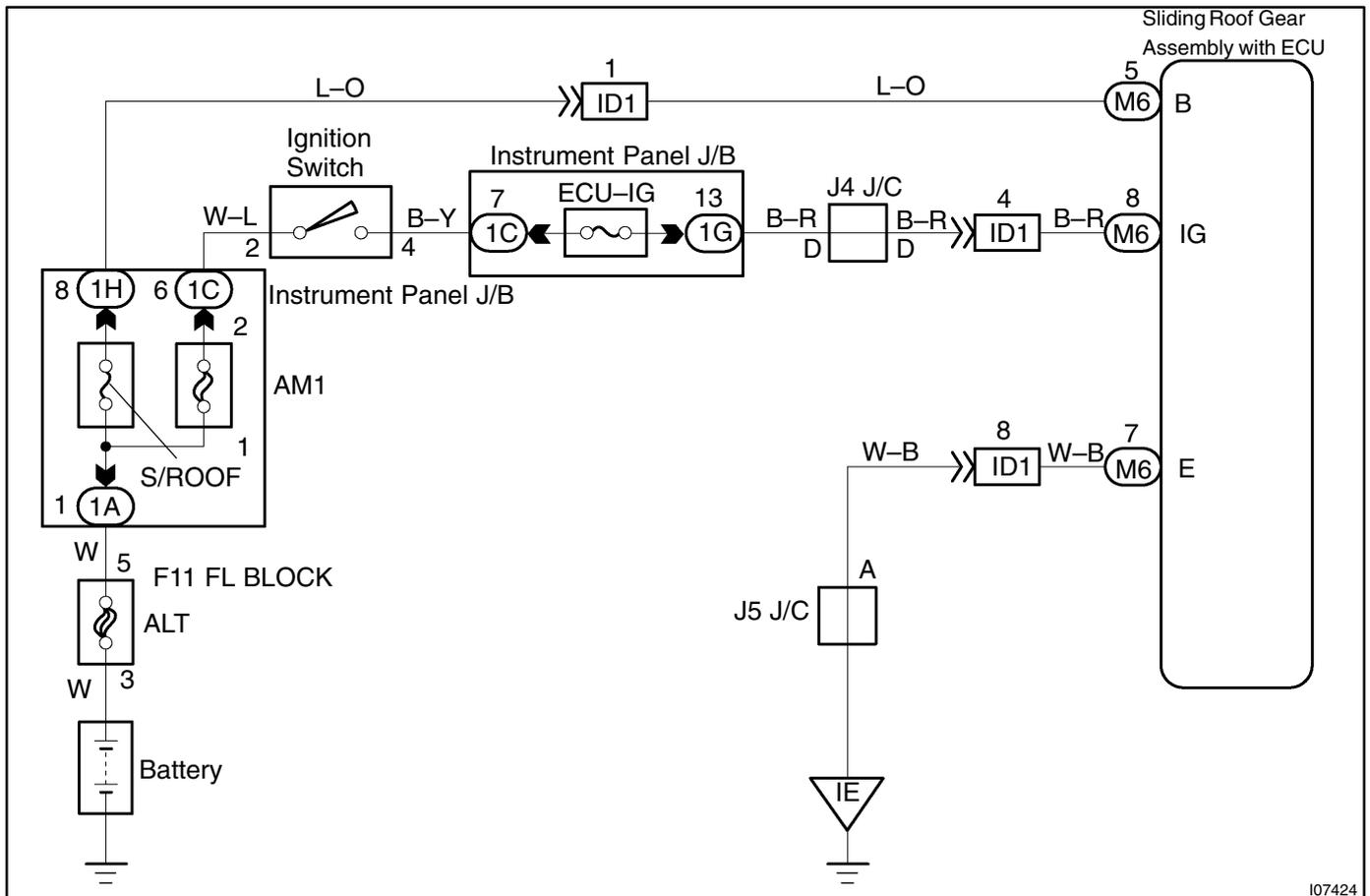
**PROBLEM SYMPTOMS TABLE**

Symptom	Suspect Area	See page
Sliding roof control system does not operate.	1. Sliding Roof Gear Assembly with ECU Circuit 2. Sliding Roof Control Switch Circuit	DI-558 DI-560
Sliding roof operates abnormally or stops half way.	1. Sliding Roof Limit Switch Circuit	DI-562
Jam protection system does not operate.	1. Sliding Roof Gear Assembly with ECU Circuit	DI-558

## CIRCUIT INSPECTION

### Sliding Roof Gear Assembly with ECU Circuit

#### WIRING DIAGRAM



I07424

#### INSPECTION PROCEDURE

##### HINT:

If there is not the hand-held tester, replace sliding roof drive gear assembly.

<b>1</b>	<b>Perform active test.</b>
----------	-----------------------------

##### PREPARATION:

Connect the hand-held tester to the DLC3.

##### CHECK:

- Enter into ACTIVE TEST function of hand-held tester.
- Check that "Slide roof motor" operates as the hand-held tester directs.

**OK:**

The motor operates normally.

**NOTICE:**

**Caution is necessary not to be caught in as the jam protection system does not operate during conducting ACTIVE TEST.**

**HINT:**

With one ACTIVE direction, the sliding roof can be slidden and tilted continuously.

**OK**

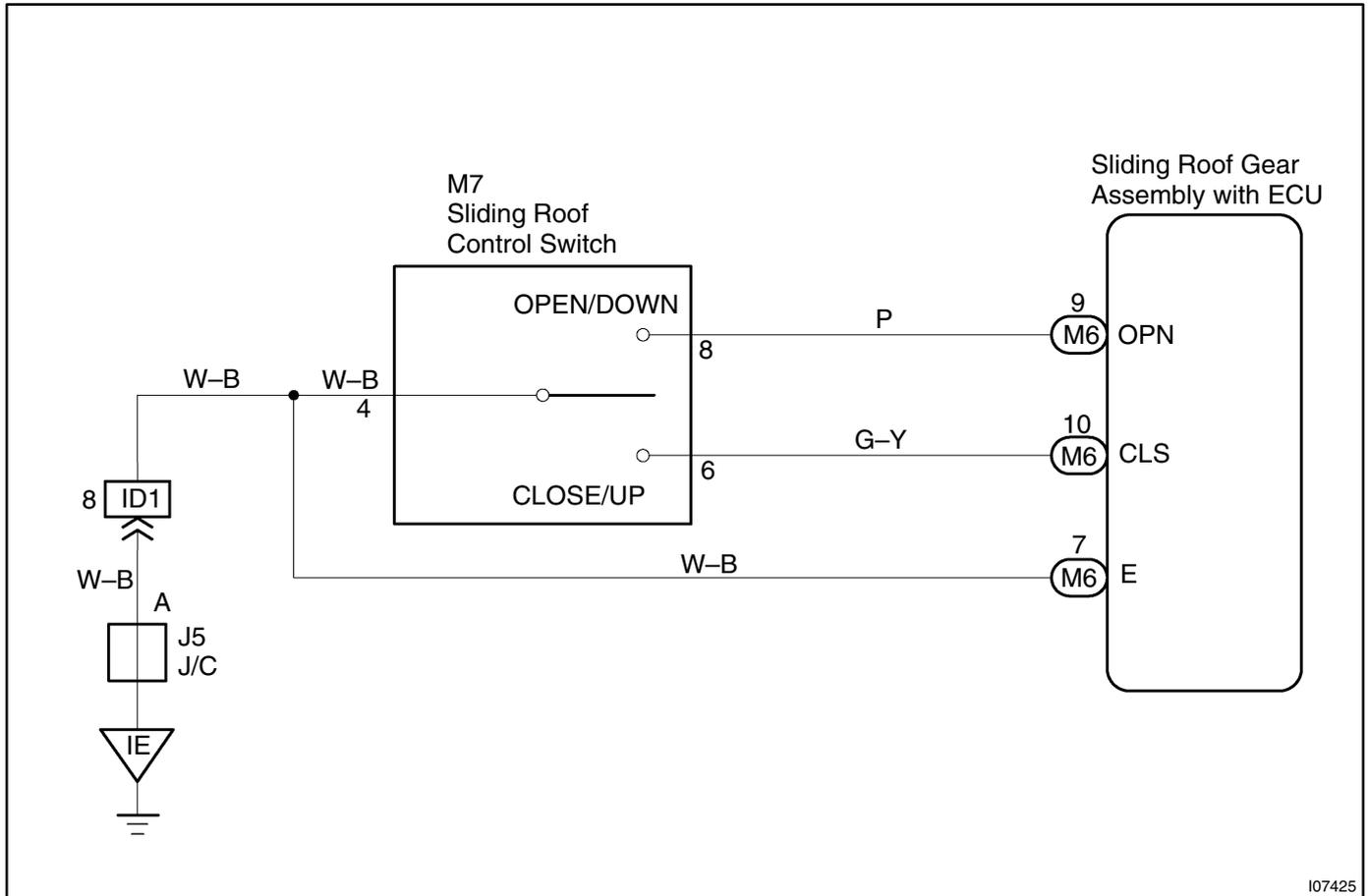
**Proceed to next circuit inspection shown on problem symptom table (See page DI-557).**

**NG**

**Replace sliding roof drive gear assembly  
(See page IN-32).**

## Sliding Roof Control Switch Circuit

### WIRING DIAGRAM



I07425

### INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

<b>1</b>	<b>Check sliding roof control switch operation.</b>
----------	---

#### PREPARATION:

Connect the hand-held tester to the DLC3.

#### CHECK:

- Enter into DATALIST function of hand-held tester.
- Check that switch status (ON/OFF) changes on the screen of hand-held tester as the sliding roof control switch of the vehicle is turned.

#### OK:

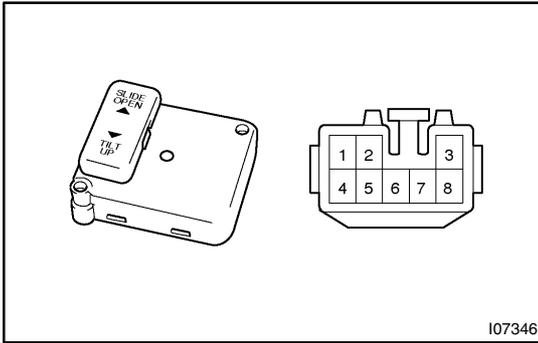
The motor operates normally.

NG

Replace sliding roof gear assembly  
(See page DI-557).

OK

LEXUS RX300 (RM785E)

**2 Check sliding roof control switch.****PREPARATION:**

Remove sliding roof control switch.

**CHECK:**

Check continuity between terminals when switch operated.

**OK:**

Switch position	Tester connection	Specified condition
SLIDE OPEN	4 - 8	Continuity
SLIDE OFF	-	No continuity
SLIDE CLOSE	4 - 6	Continuity
TILT DOWN	4 - 8	Continuity
TILT OFF	-	No continuity
TILT UP	4 - 6	Continuity

**NG****Replace sliding roof control switch.****OK****3 Check for open and short in harness and connectors between sliding roof gear assembly and sliding roof control switch (See page IN-32).****NG****Repair and replace harness or connector.****OK**

**Proceed to next circuit inspection shown on problem symptom table (See page DI-557).**

## Sliding Roof Limit Switch Circuit

### WIRING DIAGRAM

See page DI-558.

### INSPECTION PROCEDURE

HINT:

If there is not the hand-held tester, begin with STEP 2.

<b>1</b>	<b>Check sliding roof control switch operation (See page DI-560 on step 1).</b>
----------	---

NG

**Check sliding roof control switch circuit.  
(See page DI-560)**

OK

<b>2</b>	<b>Check sliding roof limit switch operation.</b>
----------	---

#### PREPARATION:

Connect the hand-held tester to the DLC3.

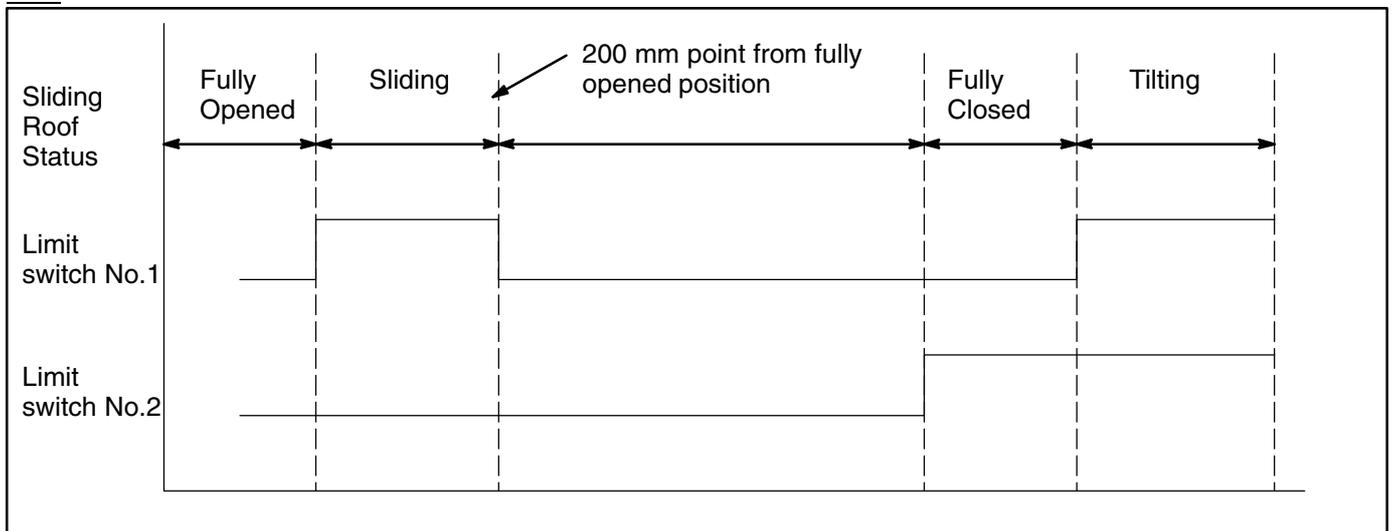
#### CHECK:

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that "Sliding Roof" operates as the hand-held tester directs.
- (c) At this time, check that status (ON/OFF) of limit switch No.1 and No.2 changes on the hand-held tester screen as shown in the illustration below.

#### NOTICE:

**Caution is necessary not to be caught in as the jam protection system does not operate during conducting ACTIVE TEST.**

#### OK:



NG

Replace sliding roof gear assembly  
(See page DI-557).

OK

**3** Check sliding roof motor status.

**PREPARATION:**

Connect the hand-held tester to the DLC3.

**CHECK:**

- (a) Enter into ACTIVE TEST function of hand-held tester.
- (b) Check that "Sliding Roof" operates as the hand-held tester directs.
- (c) As this time, check that motor status changes on the screen of hand-held tester as the sliding roof switch of the vehicle is turned.

**OK:**

The motor operates normally.

NG

Replace sliding roof gear assembly  
(See page DI-557).

OK

**4** Check sliding roof glass alignment. (Mechanical malfunction)  
(See page BO-118).

NG

Adjustment sliding roof (See page BO-118).

OK

Replace sliding roof gear assembly  
(See page DI-557).

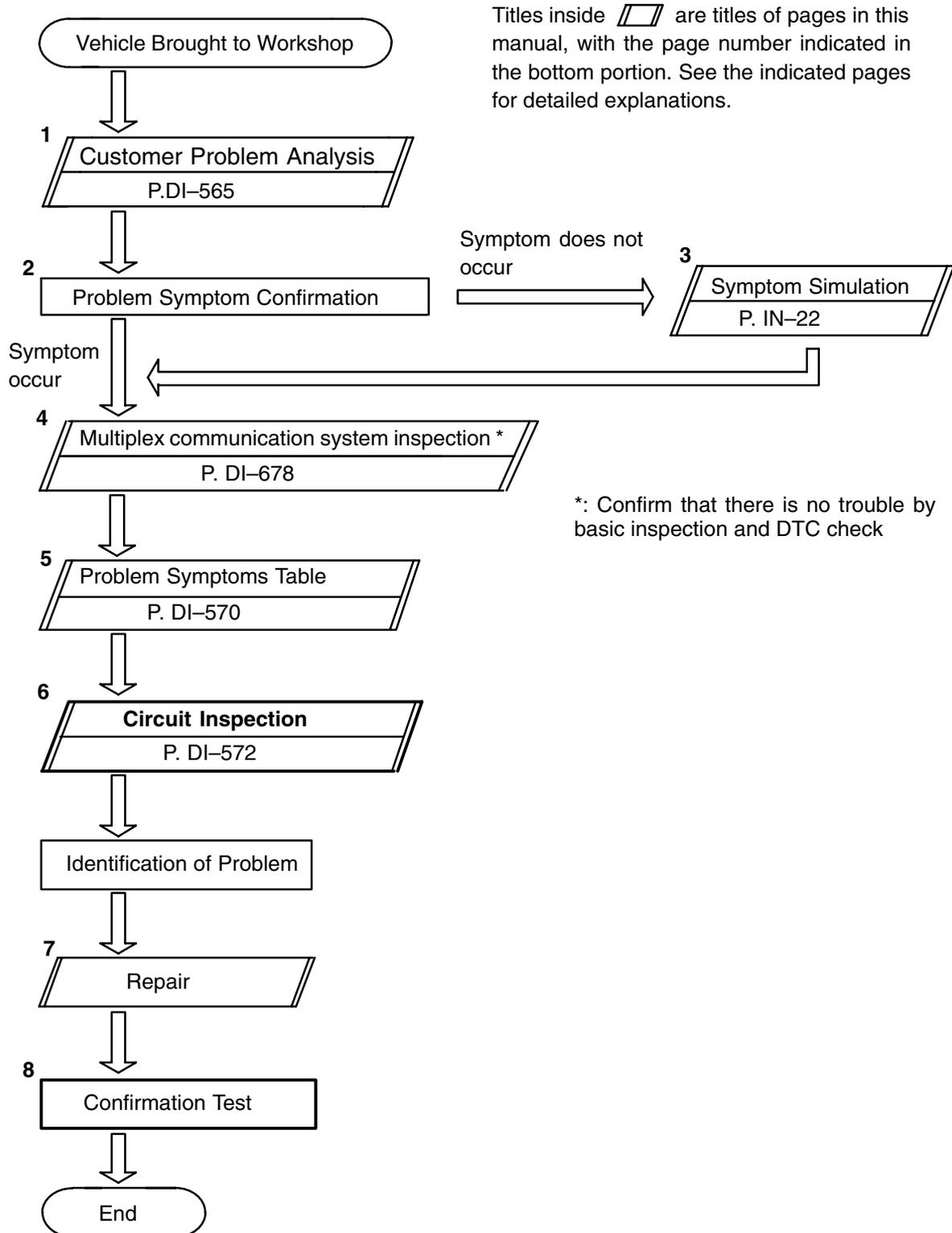
# BODY CONTROL SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI10D-12

### HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the trouble shooting.



Step 6, 8 : Diagnostic steps permitting the use of the hand-held tester .

# CUSTOMER PROBLEM ANALYSIS CHECK

**BODY CONTROL SYSTEM Check Sheet**

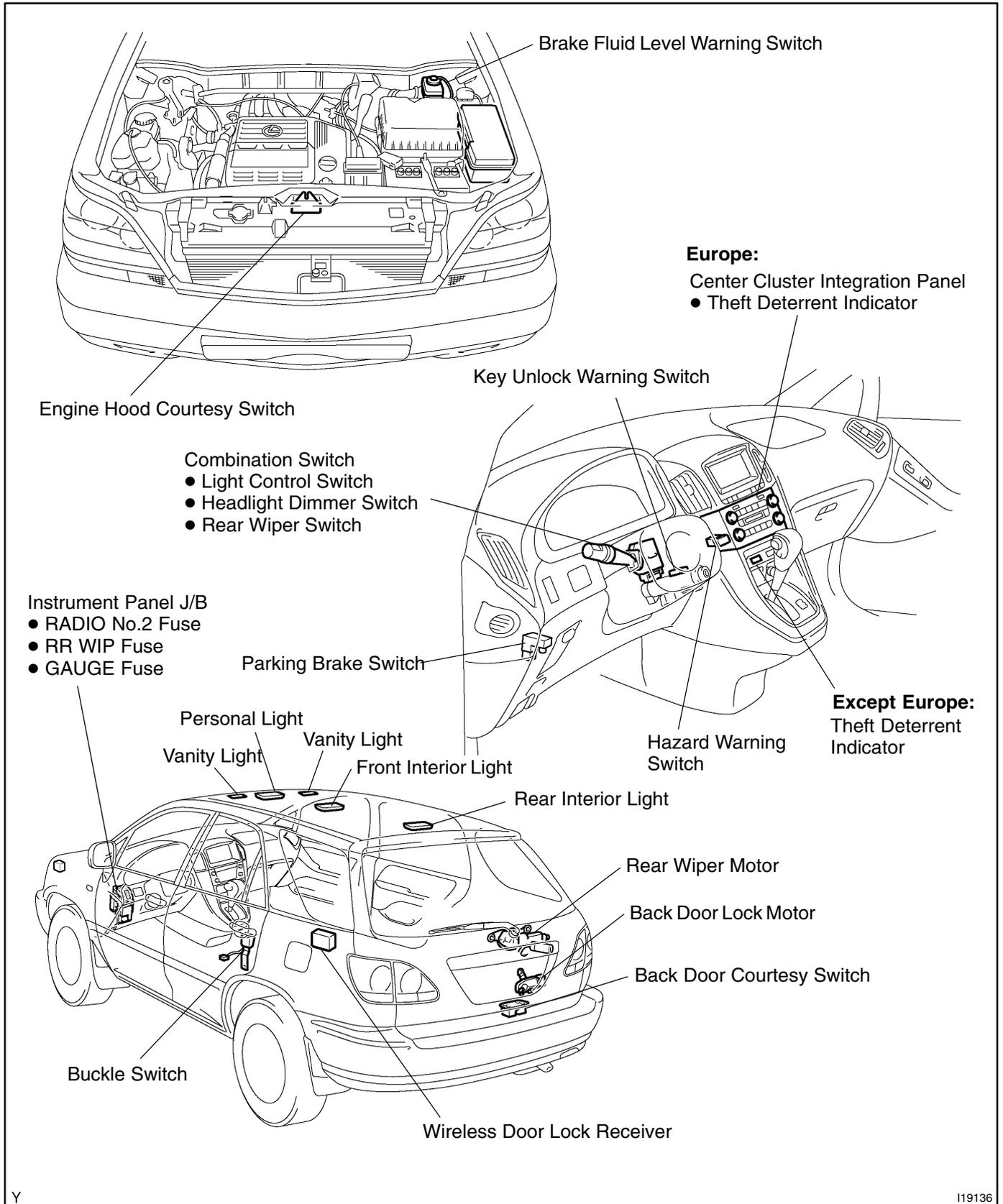
Inspector's name: \_\_\_\_\_

<b>Customer's Name</b>		<b>Registration No.</b>	
		<b>Registration Year</b>	
		<b>Frame No.</b>	
<b>Date Vehicle Brought in</b>	/ /	<b>Odometer Reading</b>	<b>km Mile</b>

<b>Date Problem First Occurred</b>	/ /	
<b>Frequency Problem Occurs</b>	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    times per    day, month) <input type="checkbox"/> Once only	
<b>Weather Conditions When Problem Occurred</b>	<b>Weather</b>	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/ Others
	<b>Outdoor Temperature</b>	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.    °F (    °C))

<b>Malfunction System</b>	<input type="checkbox"/> Key Reminder System
	<input type="checkbox"/> Headlight and Taillight System
	<input type="checkbox"/> Light Control System
	<input type="checkbox"/> Illuminated Entry System
	<input type="checkbox"/> Wiper and Washer System
	<input type="checkbox"/> Seat Belt Warning
	<input type="checkbox"/> Power Window Control System
	<input type="checkbox"/> Power Door Lock Control System
	<input type="checkbox"/> Theft Deterrent System
	<input type="checkbox"/> Wireless Door Lock Control System
	<input type="checkbox"/> Others

# PARTS LOCATION





RWLS ↔ GND1, 2 (B7-12 ↔ B5-9, B8-2)	R-L ↔ W-B	Ignition switch ON, rear wiper switch OFF, WASH1 or INT	10 – 14
		Ignition switch ON, rear wiper switch ON or WASH2	Below 1.0
RWW ↔ GND1, 2 (B7-13 ↔ B5-9, B8-2)	L-Y ↔ W-B	Ignition switch ON, rear wiper switch OFF, ON or INT	10 – 14
		Ignition switch ON, rear wiper switch WASH1 or 2	Below 1.0
STP1 ↔ GND1, 2 (B7-18 ↔ B5-9, B8-2)	G-O ↔ W-B	Stop light switch OFF	Below 1.0
		Stop light switch ON	10 – 14
PKB ↔ GND1, 2 (B7-19 ↔ B5-9, B8-2)	R-B ↔ W-B	Ignition switch ON, PKB switch OFF	10 – 14
		Ignition switch ON, PKB switch ON	Below 1.0
HF <sup>*1</sup> ↔ GND1, 2 (B7-20 ↔ B5-9, B8-2)	R ↔ W-B	Headlight dimmer switch LOW or HI	10 – 14
		Headlight dimmer switch FLASH	Below 1.0
RWC1 ↔ GND1, 2 (B7-21 ↔ B5-9, B8-2)	R ↔ W-B	Ignition switch ON, rear wiper switch except INT	10 – 14
		Ignition switch ON, rear wiper switch INT	Below 1.0
A ↔ GND1, 2 (B6-4 ↔ B5-9, B8-2)	P ↔ W-B	Light control switch except AUTO	10 – 14
		Light control switch except AUTO	Below 1.0
HU <sup>*1</sup> ↔ GND1, 2 (B6-5 ↔ B5-9, B8-2)	R-W ↔ W-B	Headlight dimmer switch LOW	10 – 14
		Headlight dimmer switch HI or FLASH	Below 1.0
FFOG ↔ GND1, 2 (B6-7 ↔ B5-9, B8-2)	G-Y ↔ W-B	Headlight dimmer switch LOW, fog light switch OFF	10 – 14
		Headlight dimmer switch LOW, fog light switch ON	Below 1.0
RFGO ↔ GND1, 2 (B6-11 ↔ B5-9, B8-2)	G-W ↔ W-B	Rear fog light OFF	10 – 14
		Rear fog light ON	Below 1.0
RDR+ ↔ GND1, 2 (B5-1 ↔ B5-9, B8-2)	L-B ↔ W-B	Back door lock motor is activated to lock	Below 1.0
		Back door lock motor is not operated	10 – 14
BECU ↔ GND1, 2 (B5-2 ↔ B5-9, B8-2)	G-B <sup>*1</sup> ↔ W-B W-L <sup>*2</sup>	Constant	10 – 14
RWLM ↔ GND1, 2 (B5-3 ↔ B5-9, B8-2)	L ↔ W-B	Rear wiper switch OFF	Below 1.0
		Rear wiper switch ON, ignition switch ON	10 – 14
RWIG ↔ GND1, 2 (B5-4 ↔ B5-9, B8-2)	L-W ↔ W-B	Ignition switch OFF	Below 1.0
		Ignition switch ON	10 – 14
RDR- ↔ GND1, 2 (B5-6 ↔ B5-9, B8-2)	L-R ↔ W-B	Back door lock motor is activated to unlock	Below 1.0
		Back door lock motor is not operated	10 – 14
RWSW ↔ GND1, 2 (B5-7 ↔ B5-9, B8-2)	L-O ↔ W-B	Rear wiper operated	10 – 14
		Rear wiper STOP	Below 1.0
WIG ↔ GND1, 2 (B5-8 ↔ B5-9, B8-2)	L-Y ↔ W-B	Ignition switch OFF	Below 1.0
		Ignition switch ON	10 – 14
GND1 ↔ Body ground (B5-9 ↔ Body ground)	W-B	Constant	Below 1.0
DIM <sup>*1</sup> ↔ GND1, 2 (B5-10 ↔ B5-9, B8-2)	G ↔ W-B	Headlight dimmer switch LOW	10 – 14
		Headlight dimmer switch HI or FLASH	Below 1.0
HRLY ↔ GND1, 2 (B5-12 ↔ B5-9, B8-2)	R ↔ W-B	Light control switch OFF or TAIL	10 – 14
		Light control switch HEAD	Below 1.0
DRL <sup>*1</sup> ↔ GND1, 2 (B5-14 ↔ B5-9, B8-2)	G-Y ↔ W-B	Engine running and PKB switch OFF	Below 1.0
		Engine running and PKB switch ON or light control switch HEAD	10 – 14
HEAD ↔ GND1, 2 (B5-15 ↔ B5-9, B8-2)	R-L ↔ W-B	Light control switch OFF or TAIL	10 – 14
		Light control switch HEAD	Below 1.0
TAIL ↔ GND1, 2 (B5-16 ↔ B5-9, B8-2)	G-R ↔ W-B	Light control switch OFF	10 – 14
		Light control switch TAIL or HEAD	Below 1.0

## DIAGNOSTICS - BODY CONTROL SYSTEM

LSWA ↔ GND1, 2 (B5-17 ↔ B5-9, B8-2)	GR ↔ W-B	Back door locked	10 - 14
		Back door unlocked	Below 1.0

\*1: LHD

\*2: RHD

**PROBLEM SYMPTOMS TABLE****DOOR LOCK CONTROL**

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control S/W.	1. Driver ECU (or passenger ECU) 2. Body ECU	– –
Door key linked function does not operate.	1. Driver Door ECU (or Passenger Door ECU) 2. Body ECU	– –
Key confinement prevention function does not operate.	1. Key unlock switch circuit 2. Body ECU	DI-590

**WIRELESS DOOR LOCK CONTROL**

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate.	1. Transmitter 2. Wireless tuner circuit 3. Key unlock warning switch circuit 4. Body ECU	BE-116 DI-584 DI-590
Lock (or unlock) function does not operate.	1. Door unlock detection switch circuit  2. Any door ECU 3. Body ECU	DI-608 DI-630 DI-653 DI-670
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system .	1. Door courtesy switch circuit  2. Any door ECU 3. Body ECU	DI-612 DI-634 DI-655 DI-672
Buzzer sound, but wireless door lock function does not operate.	1. Body ECU	

**REAR WIPER AND WASHER**

Symptom	Suspect Area	See page
Rear wiper does not operate.	1. Wiper switch circuit 2. Rear wiper motor circuit 3. Body ECU	BE-56 BE-56
Rear washer does not operate.	1. Washer switch circuit 2. Washer motor 3. Wire harness	BE-56 BE-56

**LIGHT CONTROL**

Symptom	Suspect Area	See page
Automatic light control does not operate	1. Light sensor circuit 2. Headlight control switch circuit 3. Body ECU	DI-714 DI-575
Auto turn-off does not operate	1. Door courtesy switch circuit (Driver side) 2. Ignition switch 3. Driver door ECU 4. Body ECU	DI-612 BE-26

**OTHERS**

Symptom	Suspect Area	See page
Does not operate the illuminated entry	1. Illumination circuit 2. Body ECU	DI-588
A/C panel and multi display does not deteriorate.	1. Rheostat light control circuit 2. Body ECU	BE-68

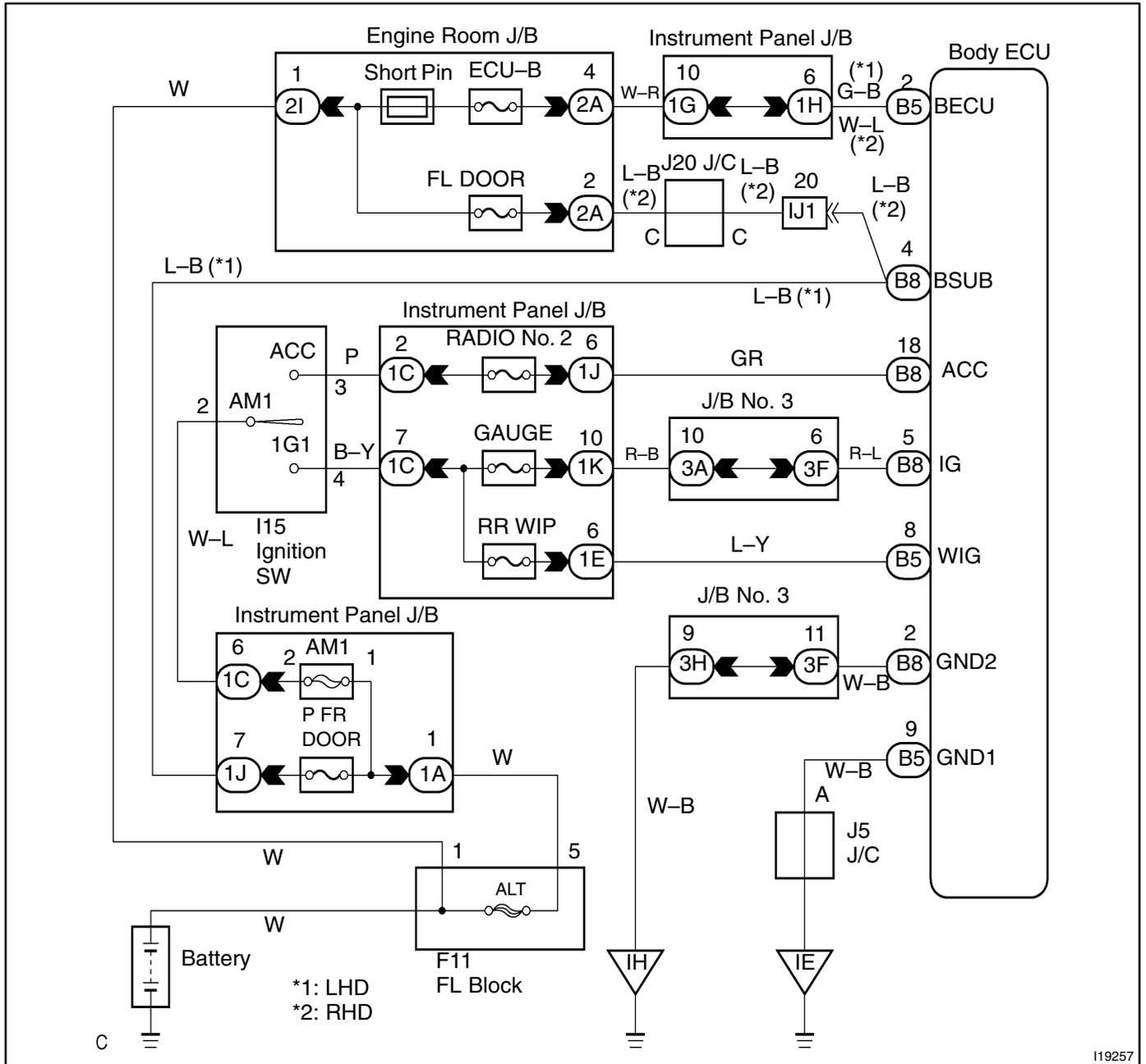
# CIRCUIT INSPECTION

## Power source circuit

### CIRCUIT DESCRIPTION

This circuit provides power to operate the Body ECU.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check RR WIPER, RADIO No.2, DOOR and GAUGE fuse.</b>
----------	---

**CHECK:**

Check continuity of RR WIPER, RADIO No. 2, DOOR and GAUGE fuse.

**OK:**

Continuity



<b>2</b>	<b>Check voltage between terminals WIG, ACC, BSUB, BECU and IG and GND1 or GND2 of Body ECU connector.</b>
----------	--

**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals WIG, ACC, IG, and GND1, GND2.

**OK:**

**Voltage: 10 – 14V**

**PREPARATION:**

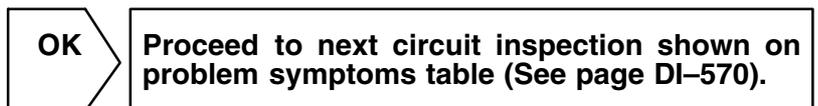
- (a) Turn ignition switch OFF.
- (b) Disconnect the Body ECU connector.

**CHECK:**

Measure voltage between terminals BSUB, BECU and GND1, GND2.

**OK:**

**Voltage: 10 – 14V**

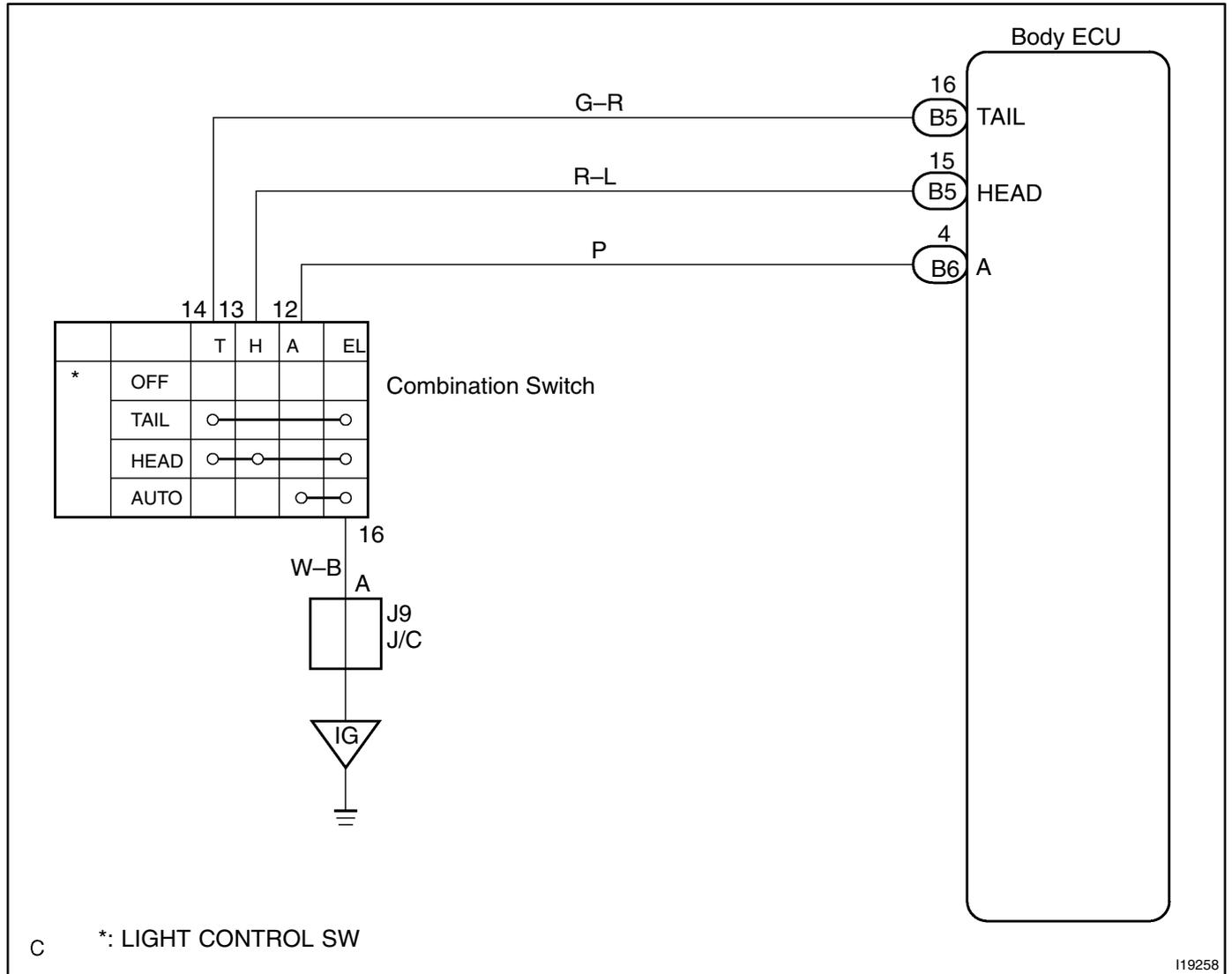


3	<b>Check wireharness and connector between Body ECU and body ground.</b>
---	--

**NG****Repair or replace wireharness or connector.****OK****Check and repair wireharness and connector between Body ECU and battery.**

# Light control switch circuit

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check headlight control switch using hand-held tester.</b>
----------	---

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the headlight control switch using DATA LIST.

### OK:

Terminal (tester display) Switch position	Headlight switch (Tail)	Headlight switch (Head)	Auto light switch
OFF	OFF	OFF	OFF
TAIL	ON	OFF	OFF
HEAD	ON	ON	OFF
AUTO	OFF	OFF	ON

**OK**

**Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).**

**NG**

<b>2</b>	<b>Check headlight control switch (See page BE-31).</b>
----------	---

**NG**

**Replace the headlight control switch.**

**OK**

<b>3</b>	<b>Check wireharness and connector between headlight control switch and Body ECU.</b>
----------	---

<b>NG</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

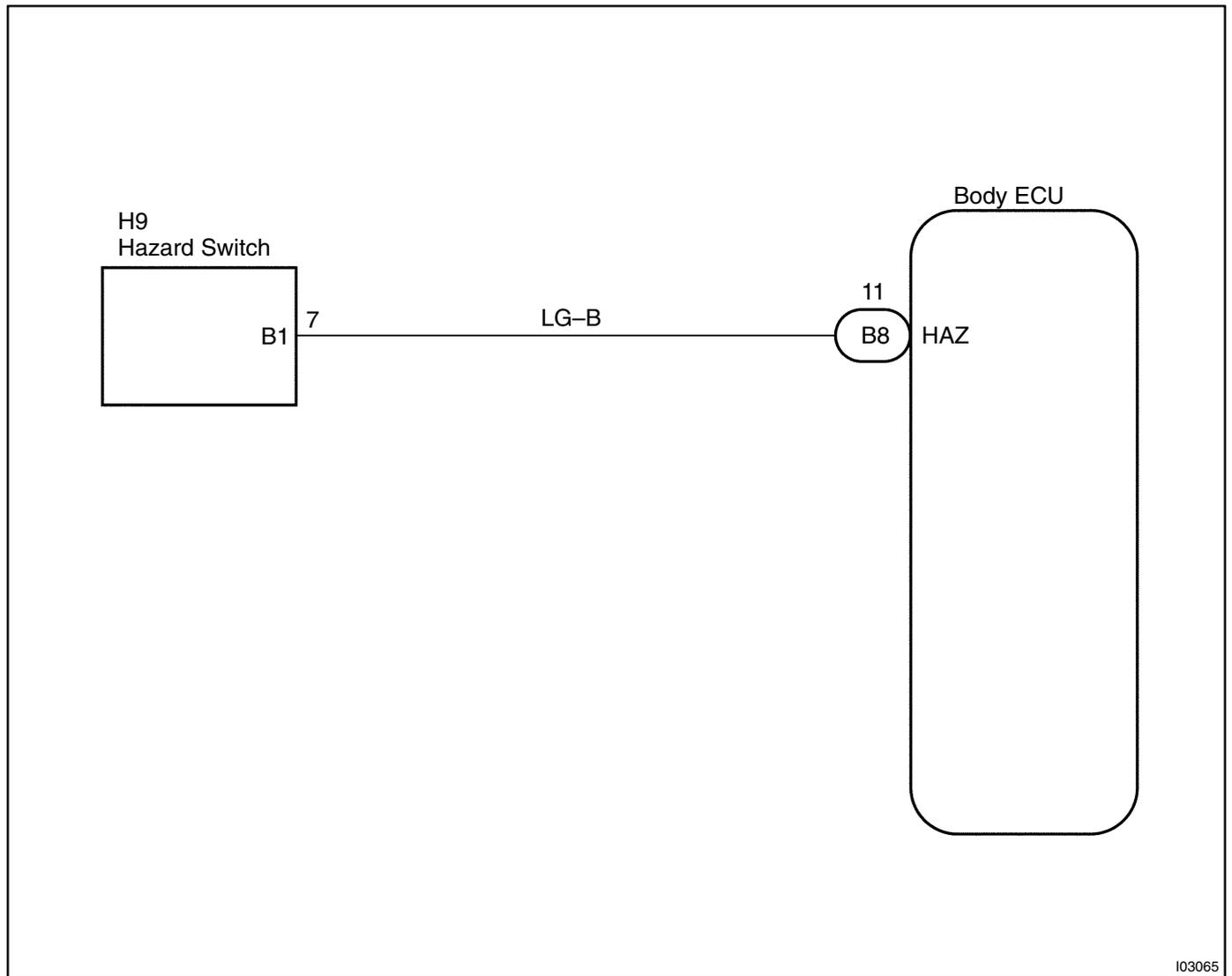
<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
--

## Hazard switch circuit

### CIRCUIT DESCRIPTION

Body ECU activates the flasher relay during warning of the theft deterrent system and flashes the hazard.

### WIRING DIAGRAM



I03065

### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check hazard operation using hand-held tester.</b>
----------	---

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check that the hazard can operate in an ACTIVE TEST.

<b>OK</b>	<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
-----------	--

<b>NG</b>
-----------

<b>2</b>	<b>Check hazard switch (See page BE-44).</b>
----------	--

<b>NG</b>	<b>Replace the hazard switch.</b>
-----------	-----------------------------------

<b>OK</b>
-----------

<b>3</b>	<b>Check wireharness and connector between hazard switch and Body ECU.</b>
----------	--

<b>NG</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
--



### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check taillight relay using hand-held tester.</b>
----------	--

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check that the taillight relay can operate in an ACTIVE TEST.

**OK** → Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

**NG**

<b>2</b>	<b>Check taillight relay (See page BE-31).</b>
----------	--

**NG** → Replace the taillight relay.

**OK**

<b>3</b>	<b>Check wireharness and connector between taillight relay and Body ECU, battery and taillight relay.</b>
----------	---

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

**OK**

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check headlight relay using hand-held tester.</b>
----------	--

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check that the headlight relay can operate in an ACTIVE TEST.

### OK:

If the head light relay is normal, the head light comes "ON". In the case that the head light relay activates but the head light will not come on, check the head light circuit.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

NG

<b>2</b>	<b>Check headlight relay (See page BE-31).</b>
----------	--

NG

Replace the headlight relay.

OK

<b>3</b>	<b>Check wireharness and connector between headlight relay and Body ECU, battery and headlight relay.</b>
----------	---

NG

Repair or replace wireharness or connector.

OK

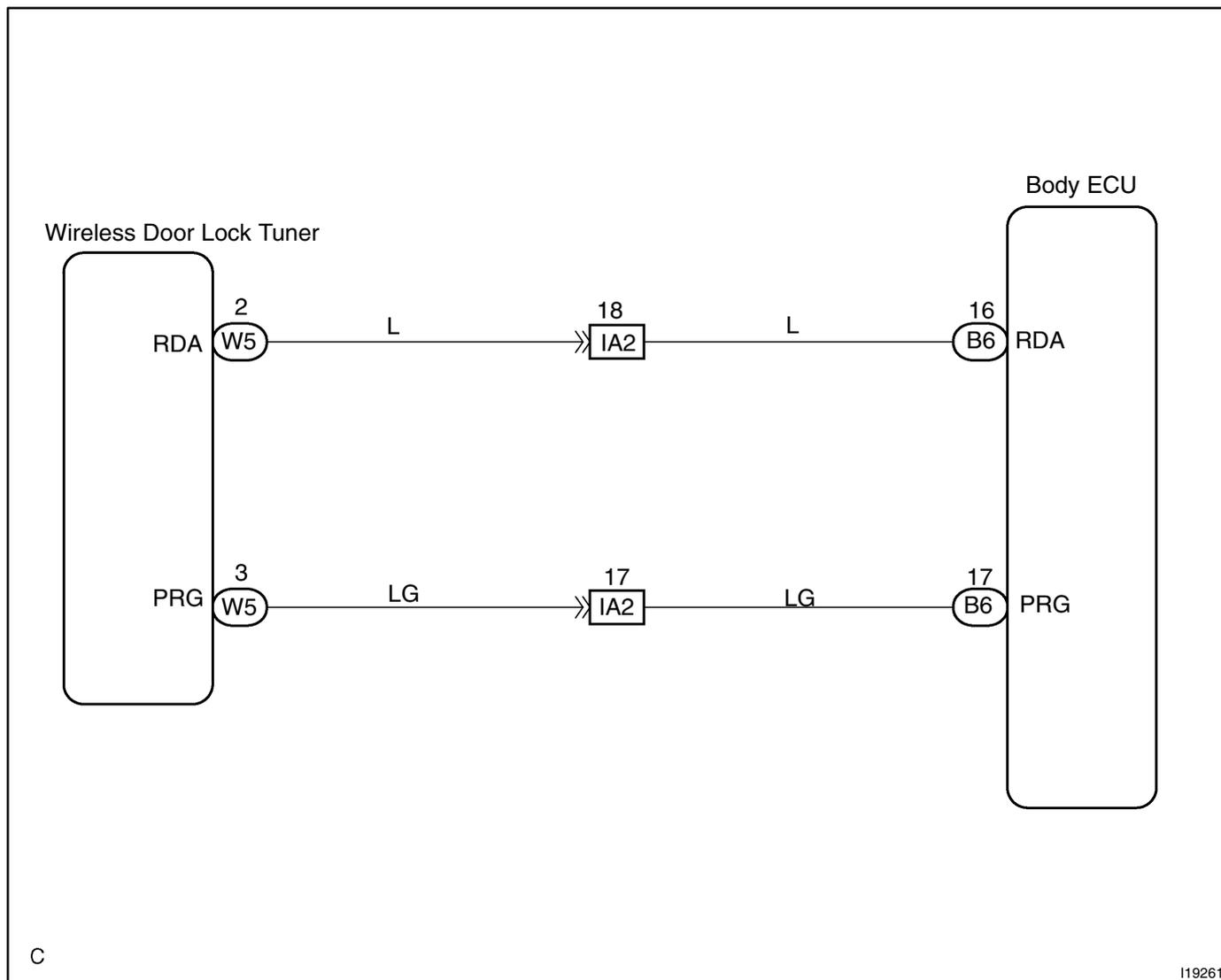
Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

# Wireless door lock tuner circuit

## CIRCUIT DESCRIPTION

The signal from the transmitter will be input to the body ECU through RDA line. RDA line is diagnosed by the Body ECU, so check DTC also in case of the failure of the wireless function.

## WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check that DTC 42 is not output.</b>
----------	---

<b>NG</b>	<b>Check the RDA line.</b>
-----------	----------------------------

<b>OK</b>
-----------

<b>2</b>	<b>Check wireharness.</b>
----------	---------------------------

**PREPARATION:**

Disconnect connectors of wireless door lock tuner and Body ECU.

**CHECK:**

Check continuity between terminals RCO of wireless door lock tuner and RCO of Body ECU.

**OK:**

Continuity

<b>NG</b>	<b>Repair or replace wireharness.</b>
-----------	---------------------------------------

<b>OK</b>
-----------

<b>3</b>	<b>Check the wireless door lock tuner.</b>
----------	--

**CHECK:**

Replace the wireless door lock tuner and check if it recovers normally.

**OK:**

Must be recovered normally.

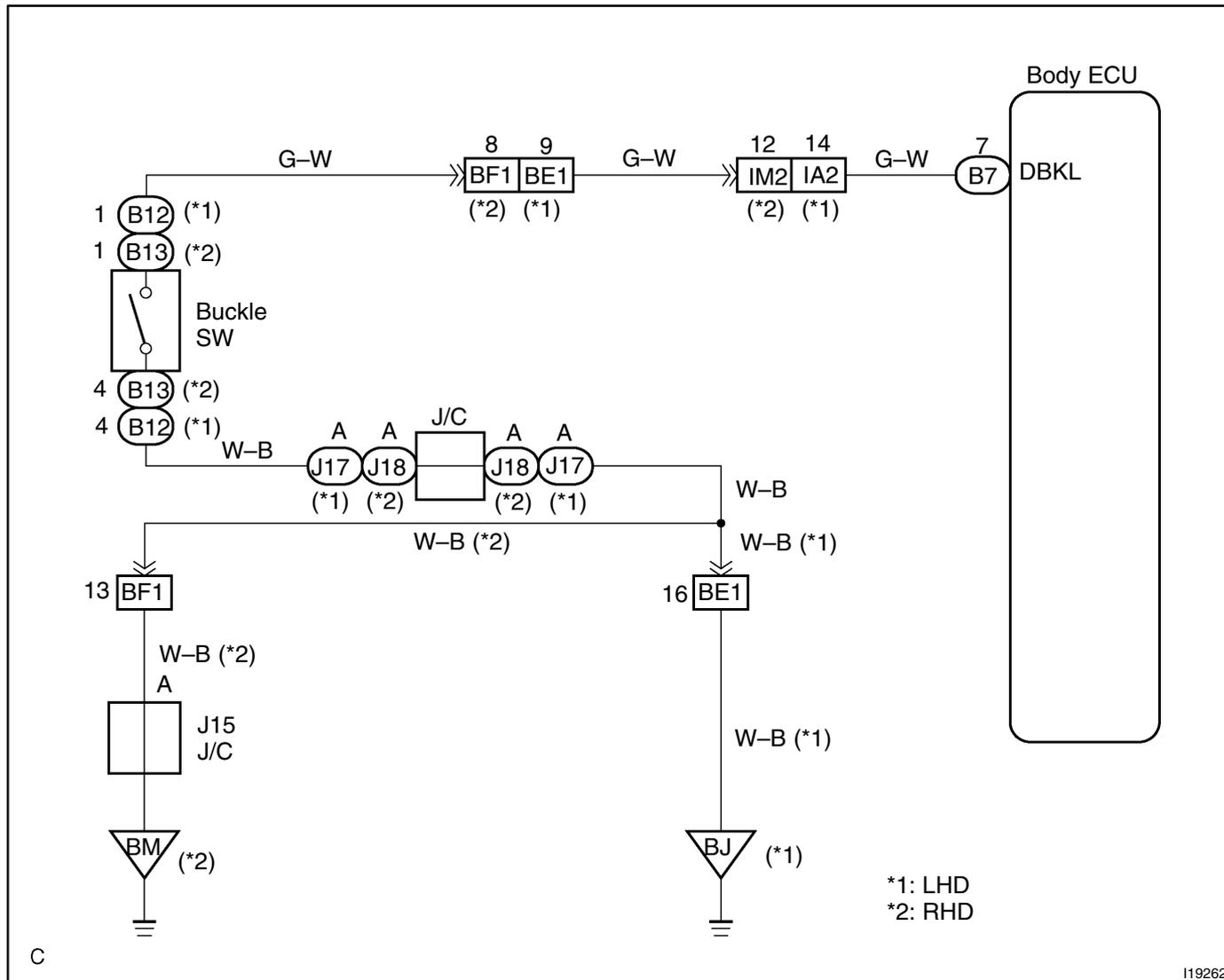
<b>NG</b>	<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
-----------	--

<b>OK</b>
-----------

<b>Failure of the original wireless door lock tuner.</b>
--

# Driver buckle switch circuit

## WIRING DIAGRAM



### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check driver buckle switch using hand-held tester.</b>
----------	---

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check the driver buckle switch using DATA LIST.

**OK** → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).**

**NG**

<b>2</b>	<b>Check driver buckle switch (See page BE-68).</b>
----------	---

**NG** → **Replace the driver buckle switch.**

**OK**

<b>3</b>	<b>Check wireharness and connector between driver buckle switch and body ground.</b>
----------	--

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

**OK**

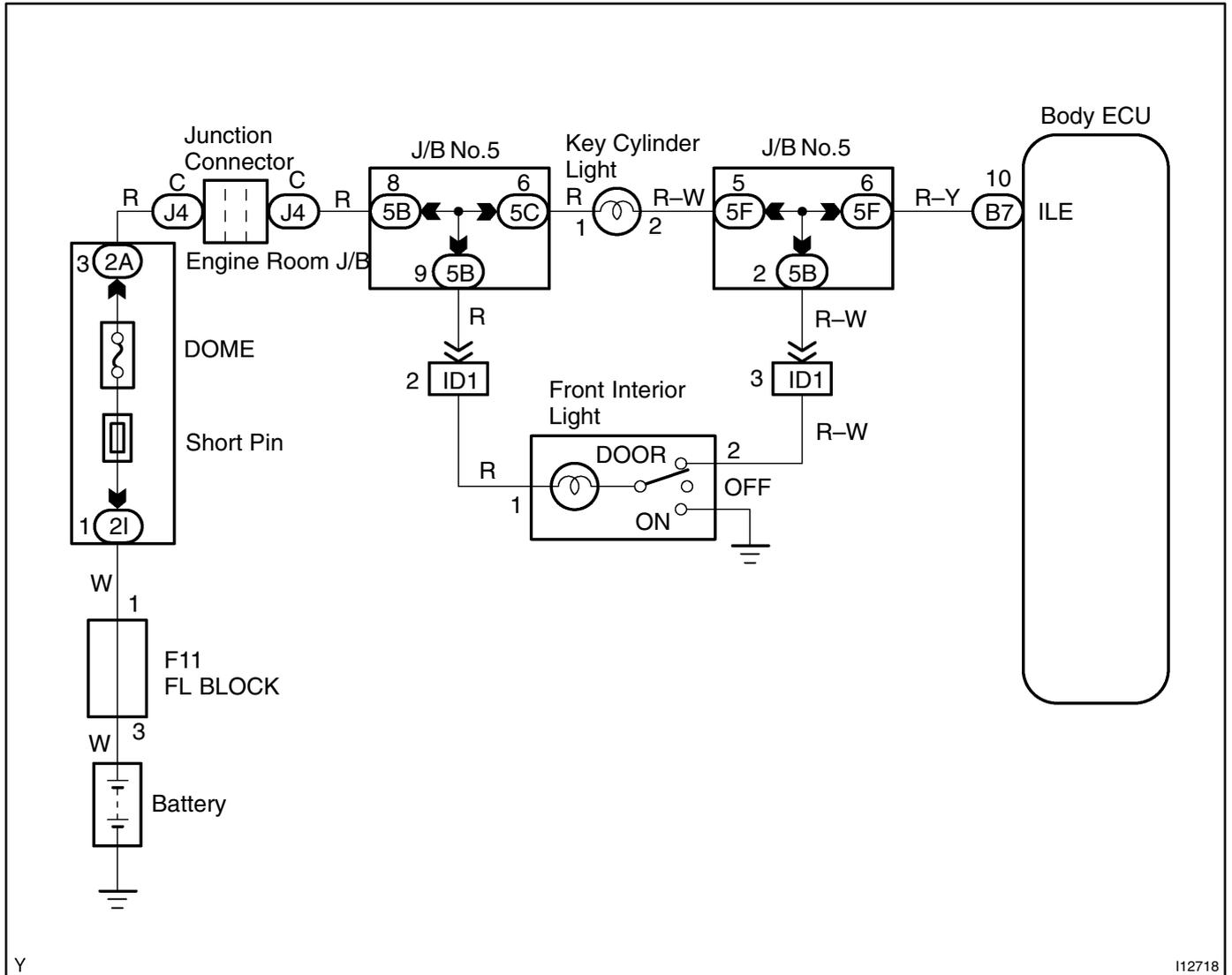
**Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).**

# Illumination circuit

## CIRCUIT DESCRIPTION

Receiving the courtesy signal from either of the door ECU, the Body ECU will make the front interior light and ignition light, come on.

## WIRING DIAGRAM



Y

I12718

### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check illumination (interior light, ignition switch light) using hand-held tester.</b>
----------	---

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check that the illumination can light in an ACTIVE TEST.

**OK:**

All the illumination should light on.

**OK** → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).**

**NG**

<b>2</b>	<b>Check illumination light.</b>
----------	----------------------------------

**NG** → **Replace the failure light.**

**OK**

<b>3</b>	<b>Check wireharness and connector between each illumination light and Body ECU, battery and each illumination light .</b>
----------	--

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

**OK**

**Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).**

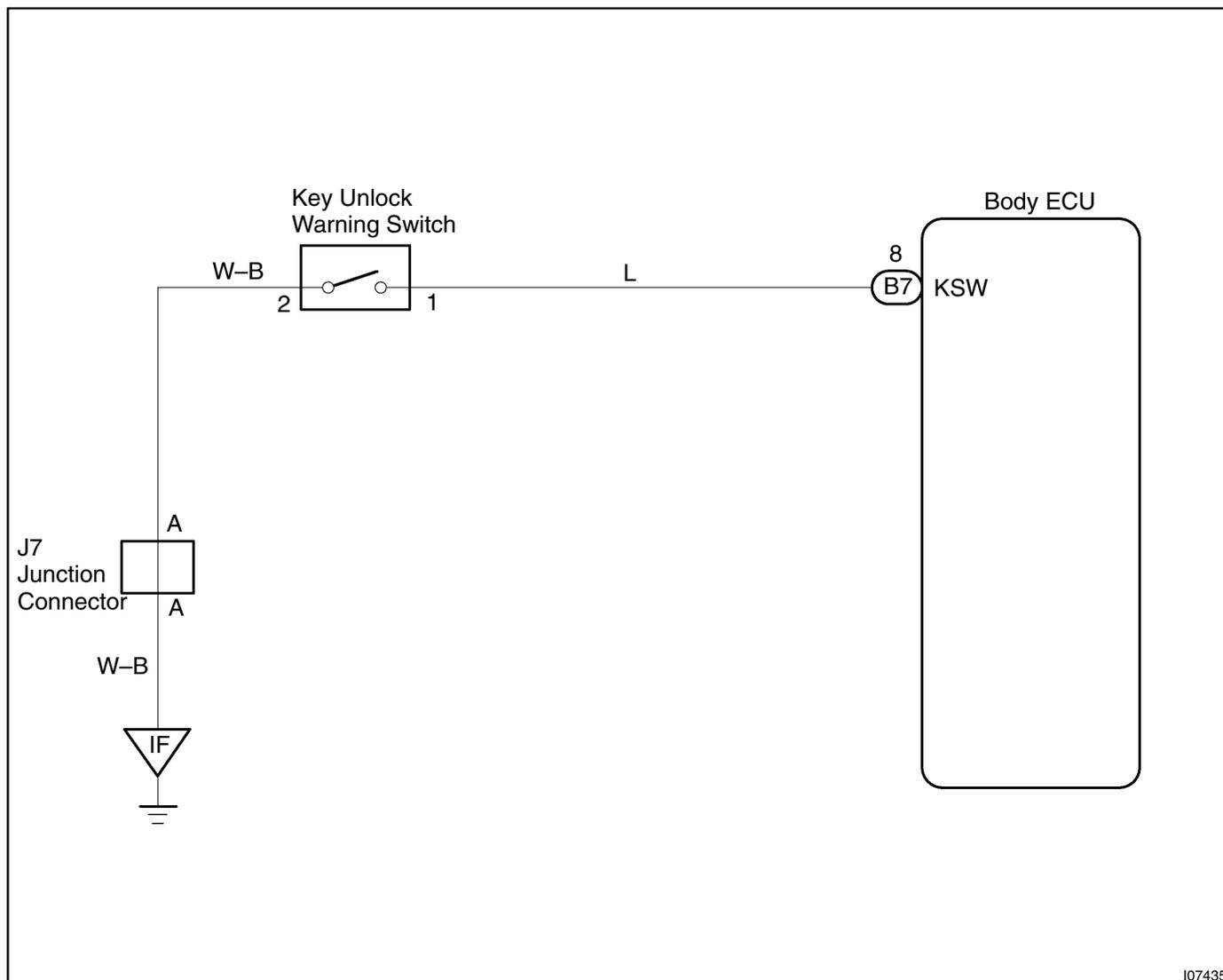
## Key unlock warning switch circuit

### CIRCUIT DESCRIPTION

The key unlock warning switch goes on when the ignition key is inserted in the key cylinder and goes off when the ignition key is removed.

The ECU operates the key confinement prevention function while the key unlock warning switch is on.

### WIRING DIAGRAM



I07435

**INSPECTION PROCEDURE**

**1** Check key unlock warning switch (See page BE-26).

**NG**

Replace the key unlock warning switch.

**OK**

**2** Check wireharness and connector between key unlock warning switch and Body ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

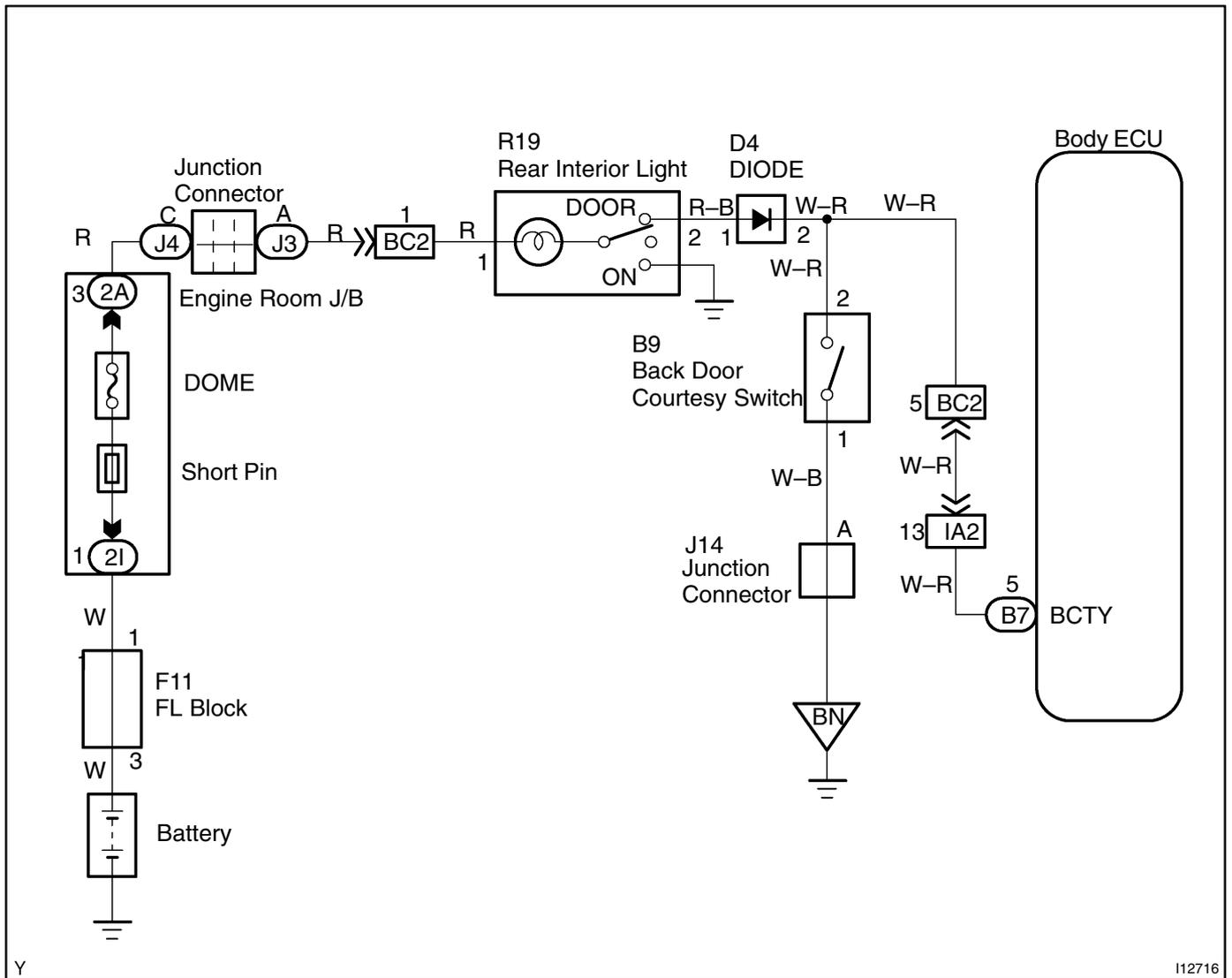
Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

## Rear interior light and back door courtesy switch circuit

### CIRCUIT DESCRIPTION

The back door courtesy switch goes on when back door is opened and goes off when back door is closed.

### WIRING DIAGRAM



Y

I12716

## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check back door courtesy switch using hand-held tester.</b>
----------	--

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the back door courtesy switch using DATA LIST.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

NG

<b>2</b>	<b>Check back door courtesy switch (See page BE-109).</b>
----------	---

NG

Replace the back door courtesy switch.

OK

<b>3</b>	<b>Check wireharness and connector between back door courtesy switch and Body ECU.</b>
----------	--

NG

Repair or replace wireharness or connector.

OK

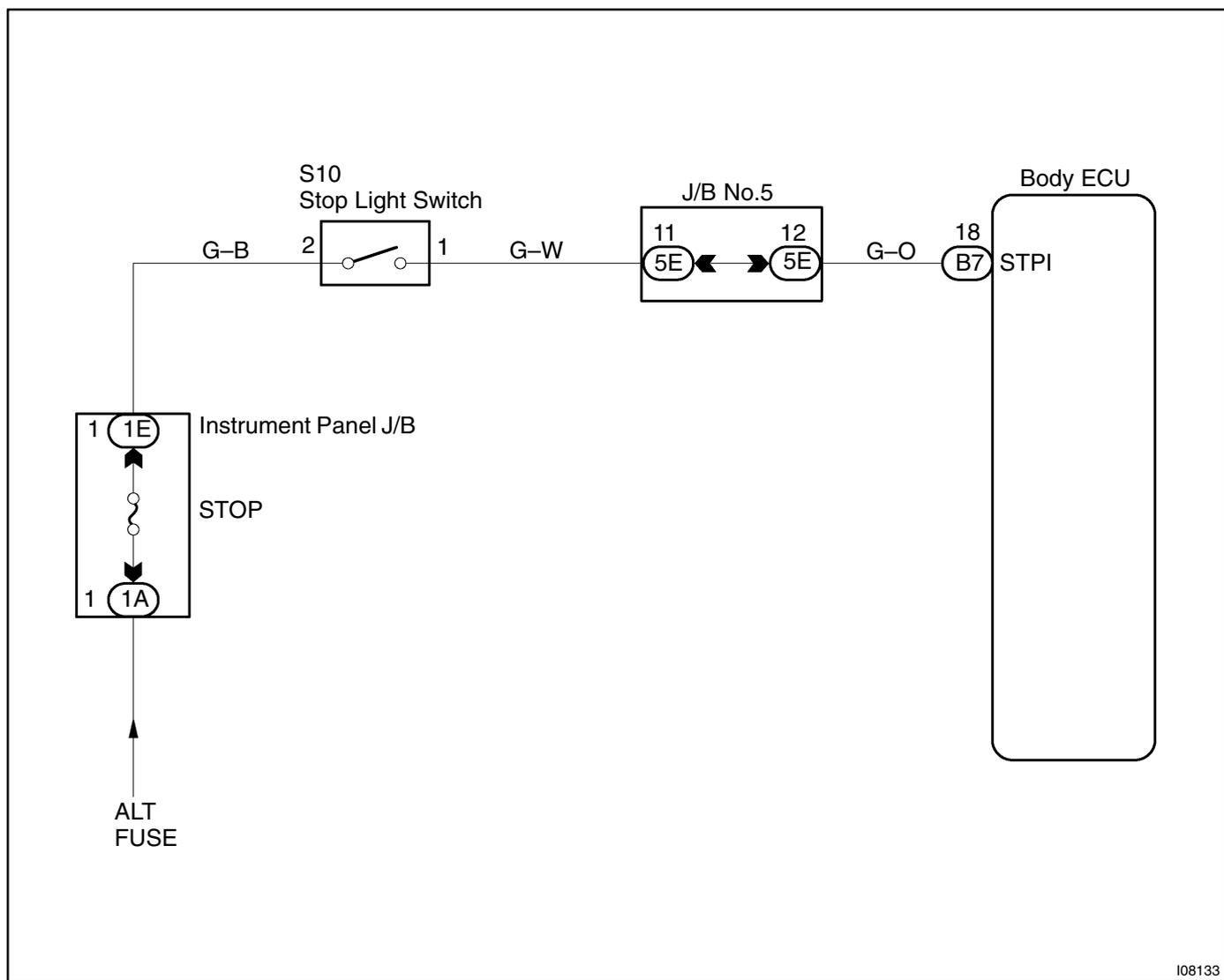
Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

# Stop light switch circuit

## CIRCUIT DESCRIPTION

The Body ECU is detecting the condition of the stop light switch.

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check stop light switch using hand-held tester.</b>
----------	--

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the stop light switch using DATA LIST.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

NG

<b>2</b>	<b>Check stop light switch (See page BE-53).</b>
----------	--

NG

Replace the stop light switch.

OK

<b>3</b>	<b>Check wireharness and connector between stop light switch and Body ECU, battery and stop light switch.</b>
----------	---

NG

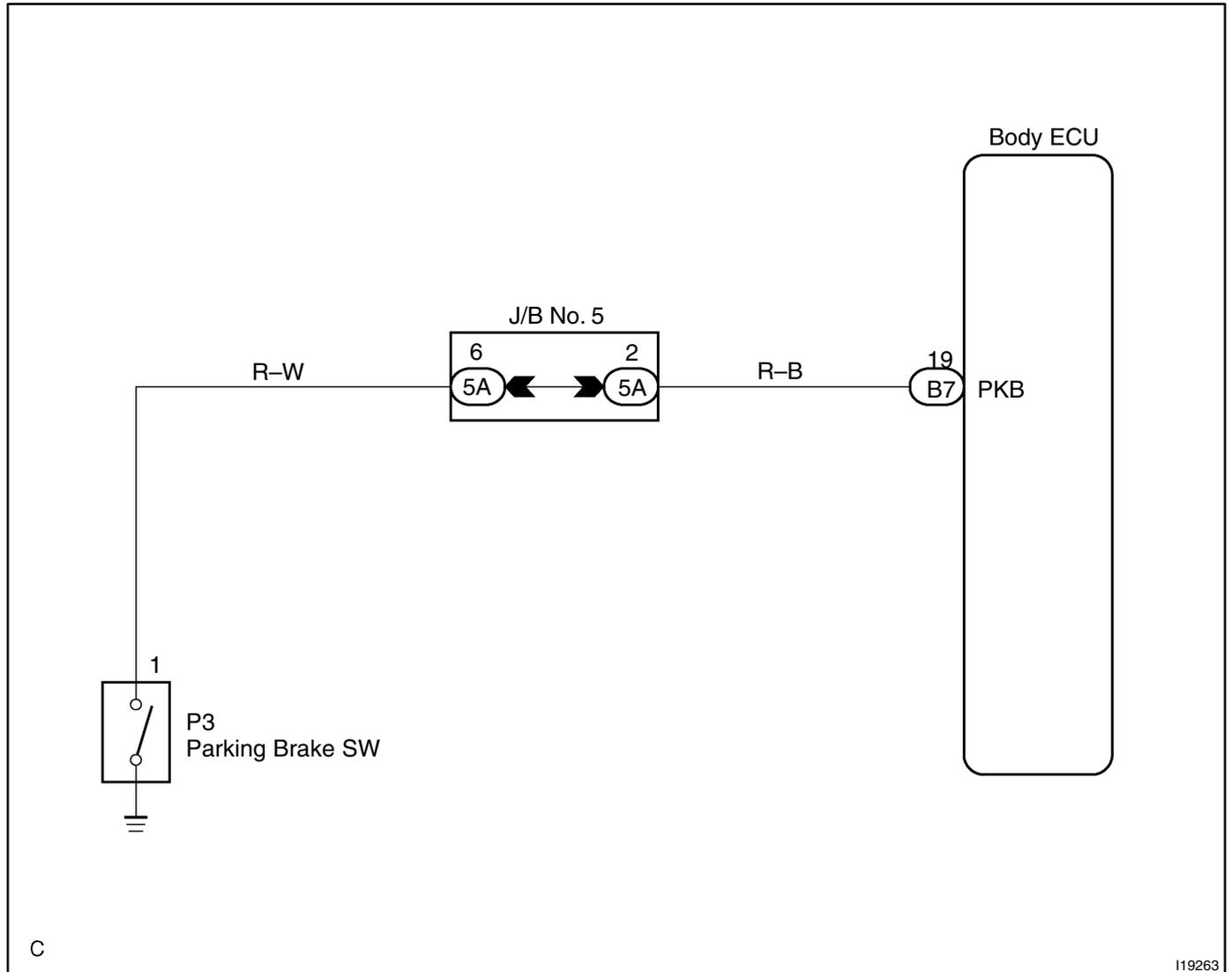
Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

# Parking brake switch circuit

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check parking brake switch using hand-held tester.</b>
----------	---

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the parking brake switch using DATA LIST.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

NG

<b>2</b>	<b>Check parking brake switch (See page BE-68).</b>
----------	---

NG

Replace the parking brake switch.

OK

<b>3</b>	<b>Check wireharness and connector between parking brake switch and Body ECU.</b>
----------	---

NG

Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

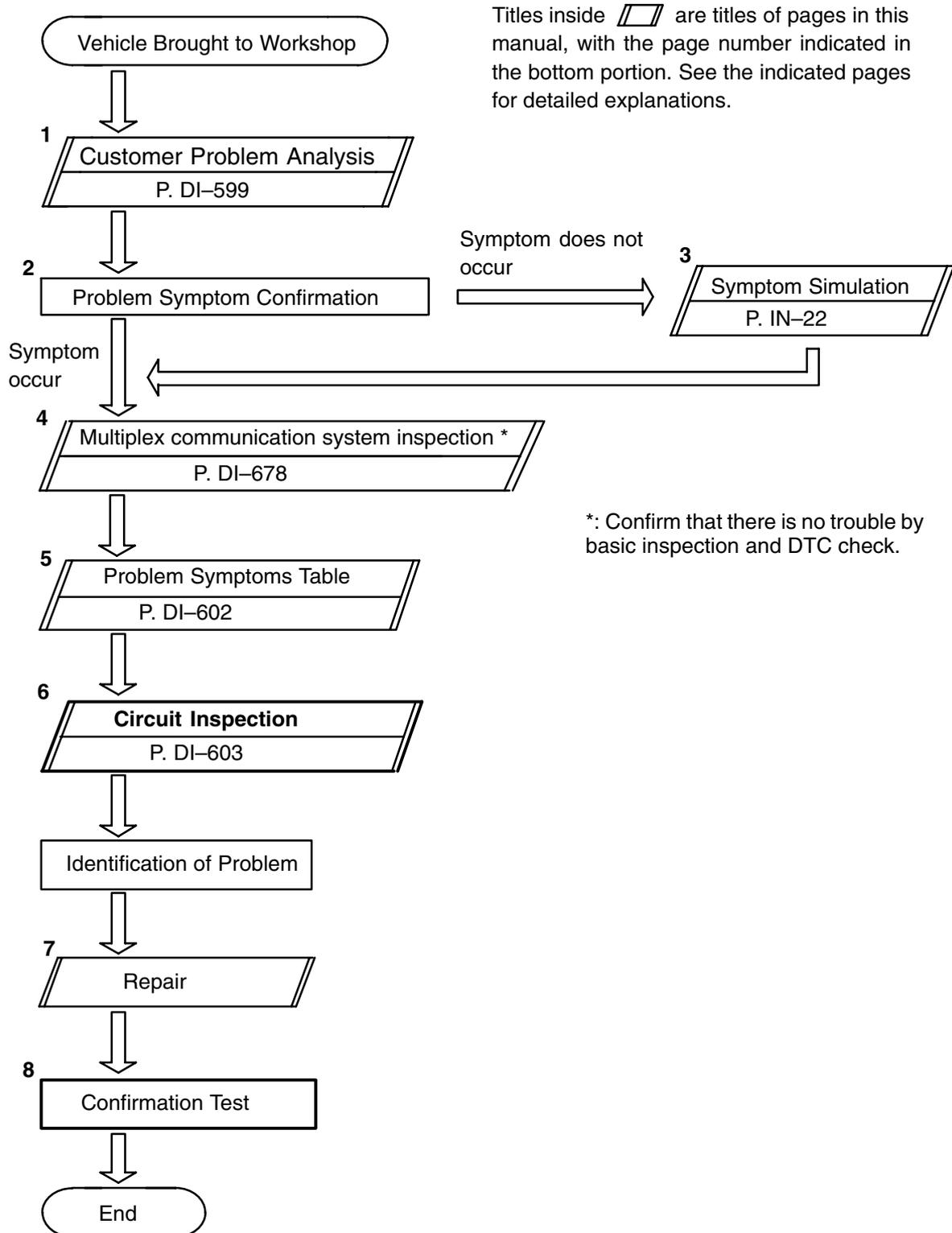
# DRIVER DOOR CONTROL SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI2BH-12

### HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the hand-held tester.

# CUSTOMER PROBLEM ANALYSIS CHECK

**DRIVER DOOR CONTROL SYSTEM Check Sheet**

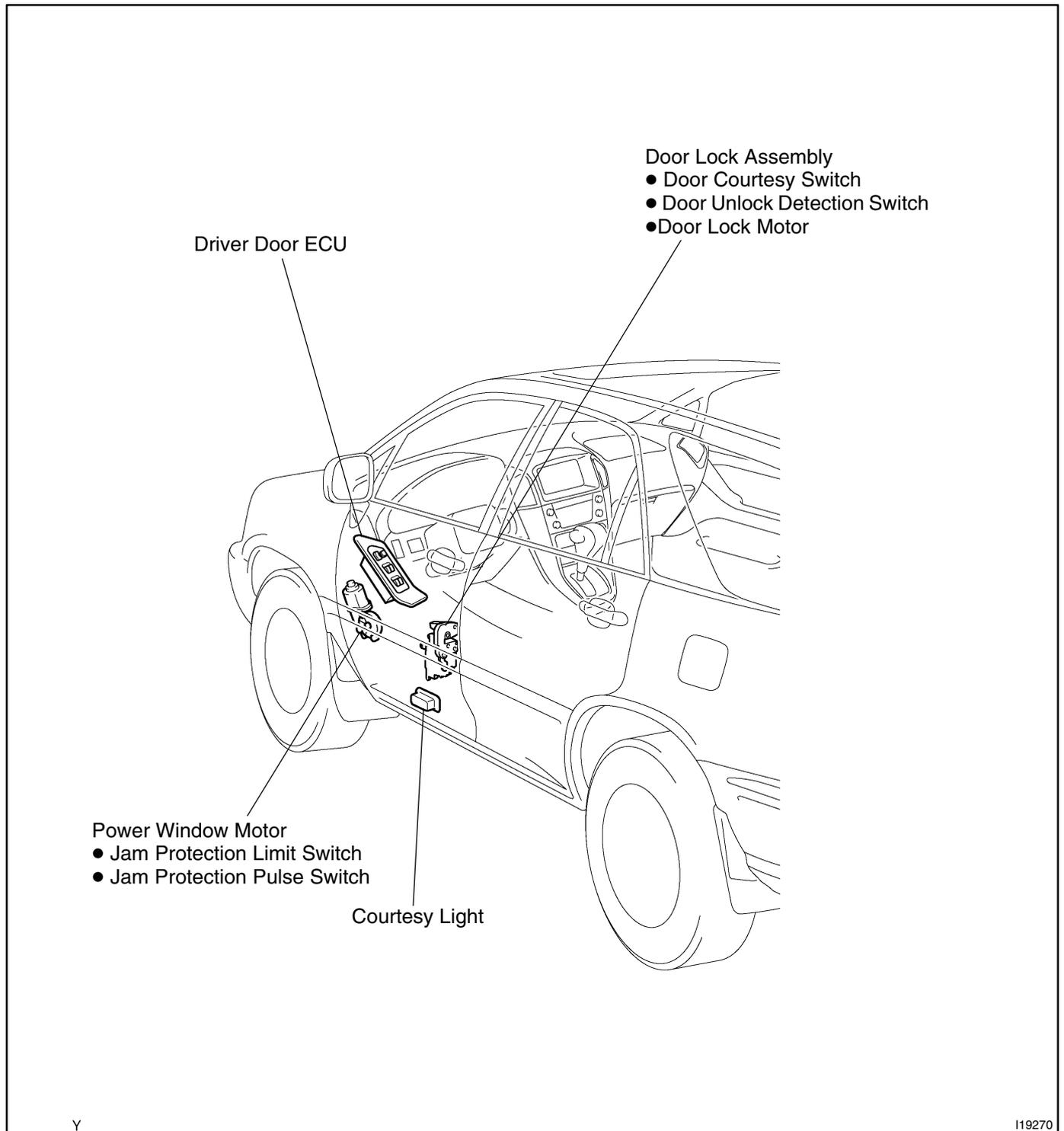
Inspector's name: \_\_\_\_\_

<b>Customer's Name</b>		<b>Registration No.</b>	
		<b>Registration Year</b>	
		<b>Frame No.</b>	
<b>Date Vehicle Brought in</b>	/ /	<b>Odometer Reading</b>	<b>km Mile</b>

<b>Date Problem First Occurred</b>	/ /	
<b>Frequency Problem Occurs</b>	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    times per    day, month) <input type="checkbox"/> Once only	
<b>Weather Conditions When Problem Occurred</b>	<b>Weather</b>	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/ Others
	<b>Outdoor Temperature</b>	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.    °F (    °C))

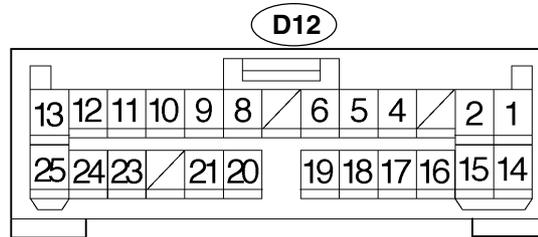
<b>Malfunction System</b>	<input type="checkbox"/> Power Window Control System
	<input type="checkbox"/> Power Door Lock Control System
	<input type="checkbox"/> Theft Deterrent System
	<input type="checkbox"/> Jam Protection System
	<input type="checkbox"/> Others

# PARTS LOCATION



# TERMINALS OF ECU

## DRIVER DOOR ECU



I07350

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
UP ↔ GND (D12-1 ↔ D12-25)	R ↔ W-B	Ignition switch ON and driver's window switch OFF	Below 1.0
		Ignition switch ON and driver's window switch UP	10 - 14
A- ↔ GND (D12-2 ↔ D12-25)	L-Y ↔ W-B	Door lock switch OFF or LOCK	Below 1.0
		Door lock switch UNLOCK	10 - 14
SIG ↔ GND (D12-5 ↔ D12-25)	R-L ↔ W-B	Ignition switch ON	10 - 14
KL ↔ GND (D12-6 ↔ D12-25)	P ↔ W-B	Door key lock and unlock switch OFF or UNLOCK	10 - 14
		Door key lock and unlock switch LOCK	Below 1.0
LMT ↔ SGND (D12-8 ↔ D12-12)	LG ↔ LG-R	Driver's door window fully-closed position	10 - 14
		Driver's door window except fully-closed position	Below 1.0
A+ ↔ GND (D12-13 ↔ D12-25)	L-R ↔ W-B	Door lock switch OFF or UNLOCK	Below 1.0
		Door lock switch LOCK	10 - 14
BDR ↔ GND (D12-14 ↔ D12-25)	L-B ↔ W-B	Constant	10 - 14
DN ↔ GND (D12-15 ↔ D12-25)	G ↔ W-B	Ignition switch ON and driver's window switch OFF	Below 1.0
		Ignition switch ON and driver's window switch DOWN	10 - 14
LSW ↔ GND (D12-16 ↔ D12-25)	GR ↔ W-B	Driver's door is locked	10 - 14
		Driver's door is unlocked	Below 1.0
CTY ↔ GND (D12-17 ↔ D12-25)	R-W ↔ W-B	Driver's door is closed	10 - 14
		Driver's door is open	Below 1.0
CPUB ↔ GND (D12-18 ↔ D12-25)	G-B *1 ↔ W-B W-L *2	Constant	10 - 14
KUL ↔ GND (D12-19 ↔ D12-25)	P-L ↔ GR-R	Door key lock and unlock switch OFF or LOCK	10 - 14
		Door key lock and unlock switch UNLOCK	Below 1.0
PLS ↔ SGND (D12-20 ↔ D12-12)	LG-B ↔ W-B	During the driver's door power window is operate.	Pulse generation
		Driver's door power window not operate with switch ON	Below 1.0
		Driver's door power window not operate with switch OFF	10 - 14
CTYB ↔ CYL (D12-21 ↔ D12-4)	L-B ↔ G-W	Driver's door closed	Below 1.0
		Driver's door open	10 - 14

\*: Power window master switch

\*1: LHD \*2: RHD

LEXUS RX300 (RM785E)

**PROBLEM SYMPTOMS TABLE****POWER WINDOW CONTROL SYSTEM**

Symptom	Suspect Area	See page
All the power windows does not operate.	1. Driver door ECU with master switch	–
Power window does not operate.	1. Driver door ECU with master switch	–
Auto up (or down) function does not operate.	1. Driver door ECU with master switch	–
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switch circuit 3. Driver door ECU with master switch	DI-616 DI-618 –

**OTHERS**

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Driver door ECU with master switch	DI-603

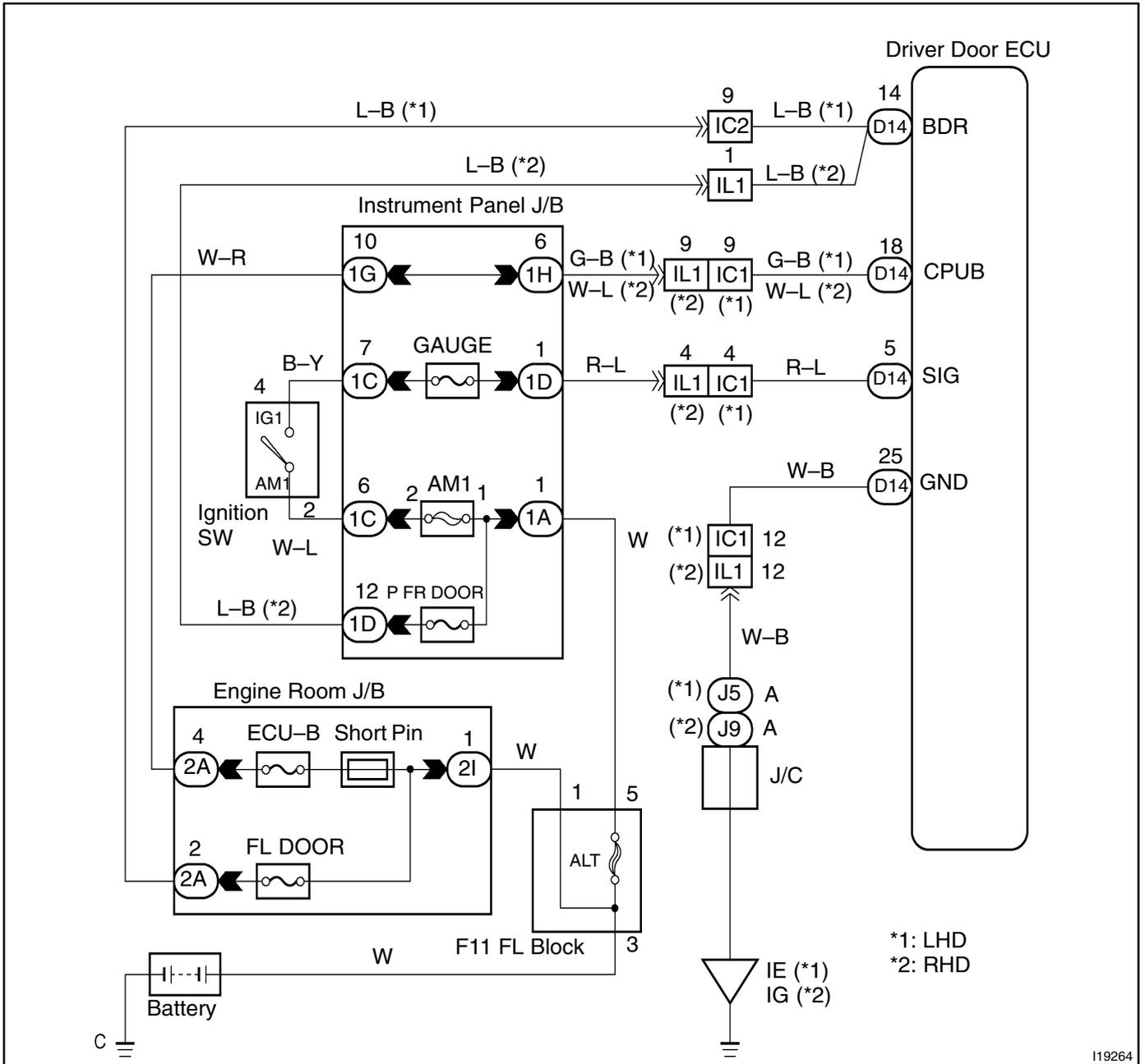
# CIRCUIT INSPECTION

## Power source circuit

### CIRCUIT DESCRIPTION

This circuit provides power to operate the driver door ECU.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check ECU-B, GAUGE and FR DOOR fuse.</b>
----------	---

**CHECK:**

Check continuity of ECU-B, GAUGE and FR DOOR fuse.

**OK:**

Continuity



<b>2</b>	<b>Check voltage between terminals BDR, CPUB, SIG and GND of driver door ECU connector.</b>
----------	---

**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals SIG, and GND.

**OK:**

**Voltage: 10 – 14V**

**PREPARATION:**

(a) Turn ignition switch OFF.

(b) Disconnect the driver door ECU connector.

**CHECK:**

Measure voltage between terminals BDR, CPUB and GND.

**OK:**

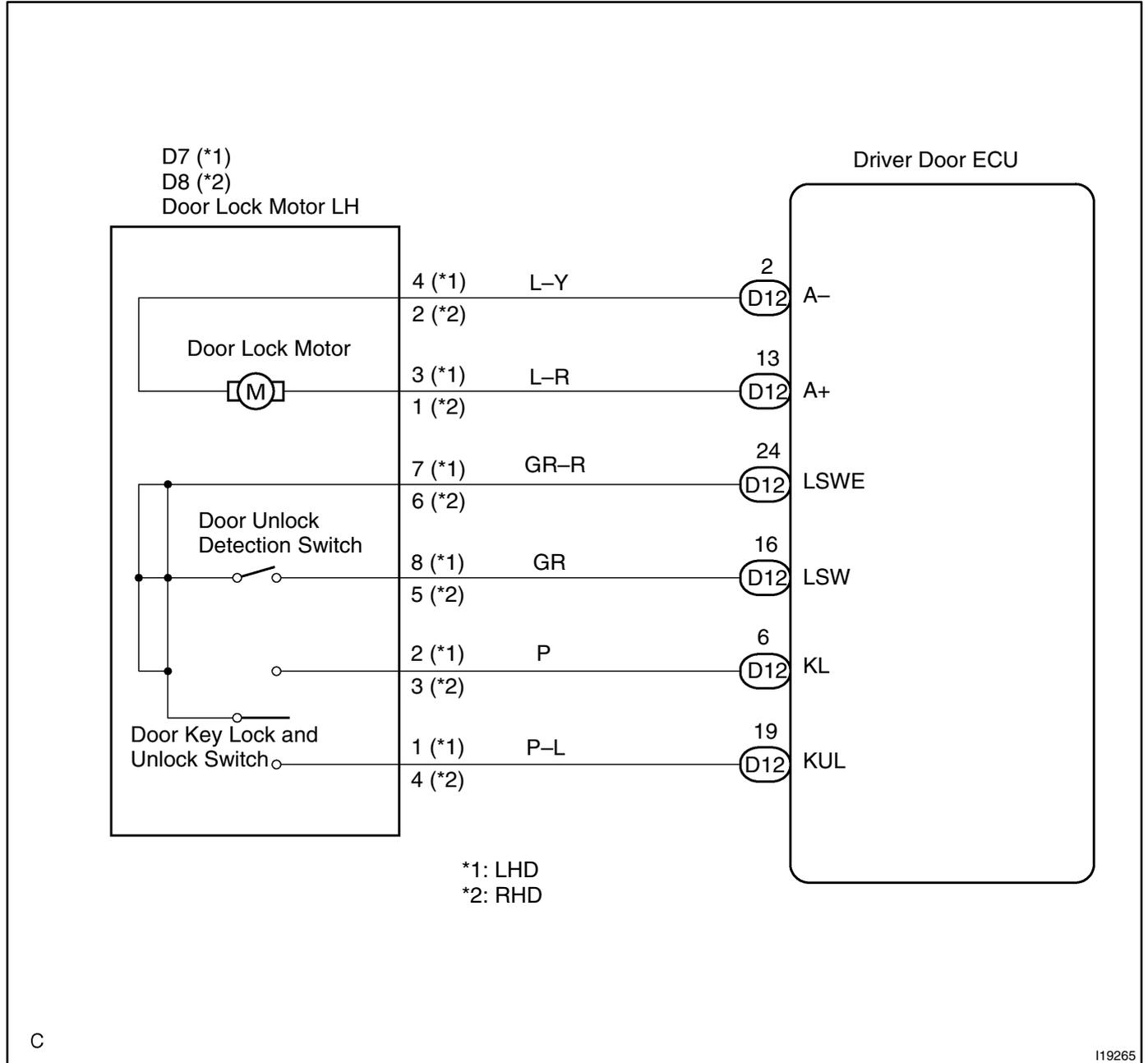
**Voltage: 10 – 14V**



**3****Check wireharness and connector between ECU and body ground.****NG****Repair or replace wireharness or connector.****OK****Check and repair wireharness and connector  
between ECU and battery.**

# Door lock motor circuit

## WIRING DIAGRAM



C

### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check door lock motor using hand-held tester.</b>
----------	--

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check that the door lock motor can operate in an ACTIVE TEST.

<b>OK</b>	<b>Proceed to next circuit inspection shown on problem symptom table (See page DI-570).</b>
-----------	---

<b>NG</b>
-----------

<b>2</b>	<b>Check door lock motor (See page BE-97).</b>
----------	--

<b>NG</b>	<b>Replace the door lock motor.</b>
-----------	-------------------------------------

<b>OK</b>
-----------

<b>3</b>	<b>Check wireharness and connector between door lock motor and driver door ECU.</b>
----------	---

<b>NG</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

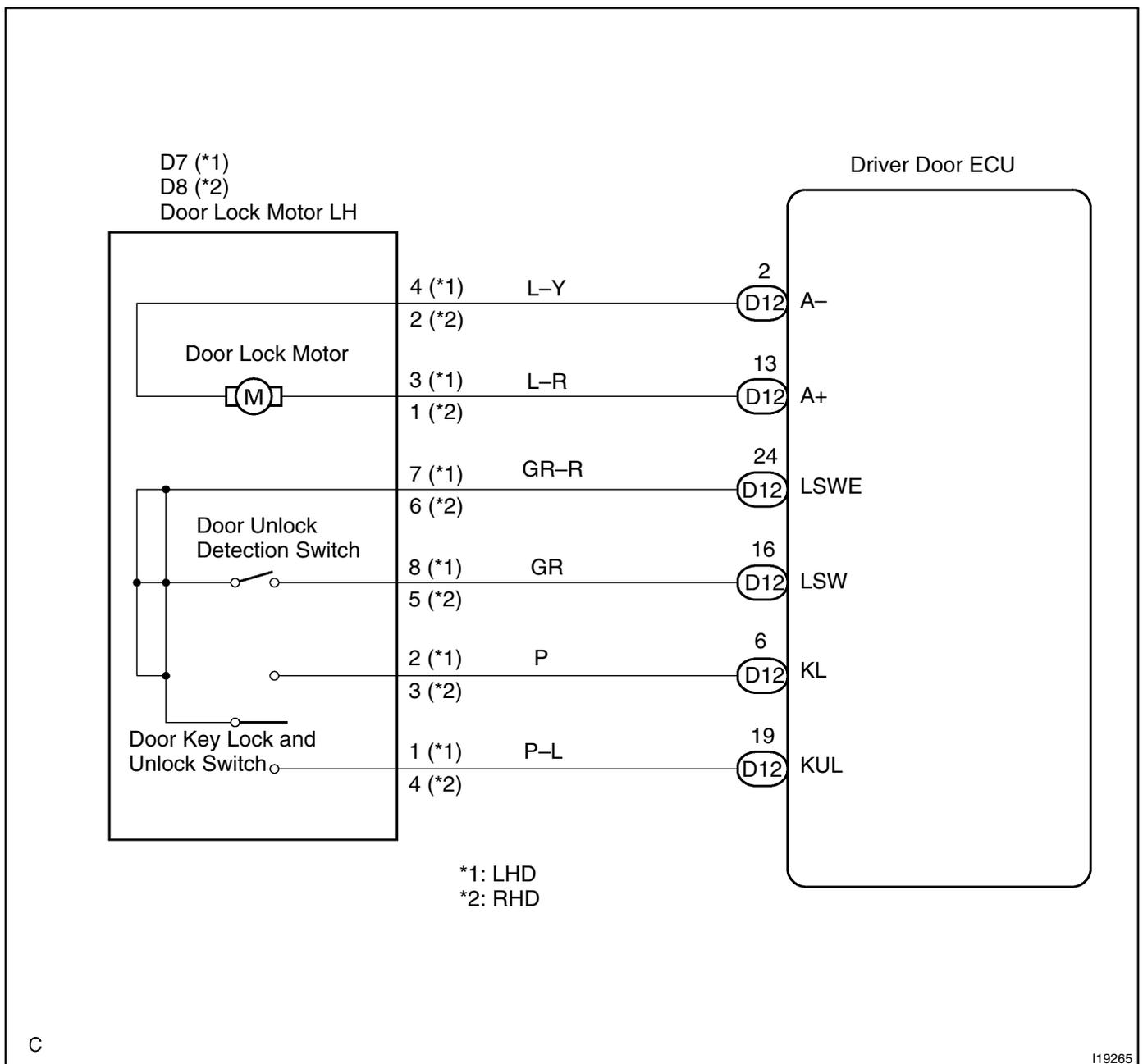
<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
--

## Door unlock detection switch circuit

### CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check door unlock detection switch using hand-held tester.</b>
----------	---

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the door unlock detection switch using DATA LIST.

OK

Proceed to next circuit inspection shown on problem symptom table (See page DI-570).

NG

<b>2</b>	<b>Check door unlock detection switch (See page BE-97).</b>
----------	---

NG

Replace the door lock motor.

OK

<b>3</b>	<b>Check wireharness and connector between door unlock detection switch and driver door ECU.</b>
----------	--

NG

Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

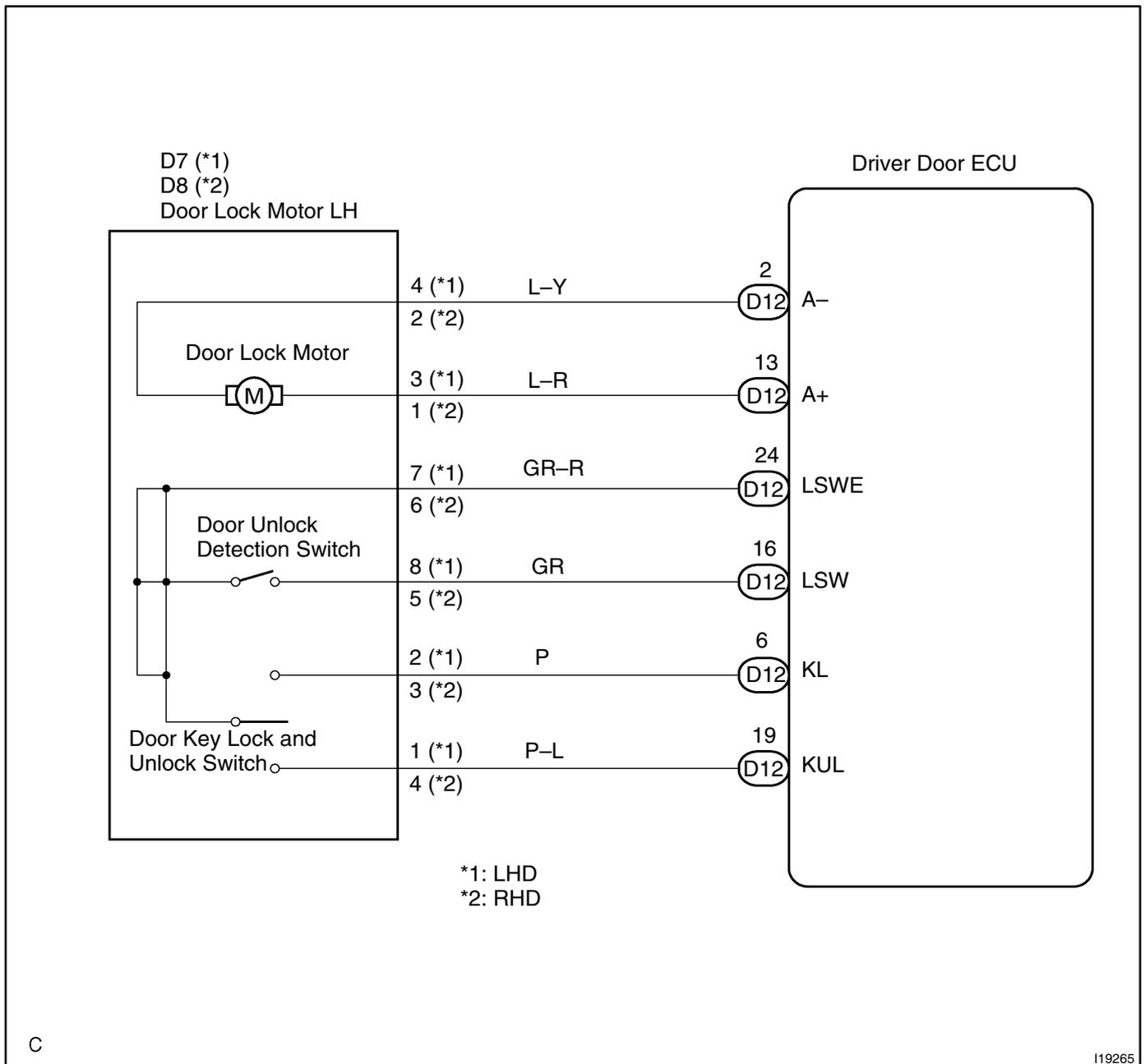
## Door key lock and unlock switch circuit

### CIRCUIT DESCRIPTION

The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 3 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.

Door key lock and unlock switch can be checked using DTC check. (Refer to DI-708)

### WIRING DIAGRAM



C

I19265

**INSPECTION PROCEDURE**

<b>1</b>	<b>Check the door key lock and unlock switch using DTC check (See page DI-708).</b>
----------	---

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

NG

<b>2</b>	<b>Check the door key lock and unlock switch (See page BE-97).</b>
----------	--

NG

Replace the door key lock and unlock switch.

NG

<b>3</b>	<b>Check wireharness and connector between door key lock and unlock switch and driver door ECU.</b>
----------	---

NG

Repair or replace wireharness or connector.

OK

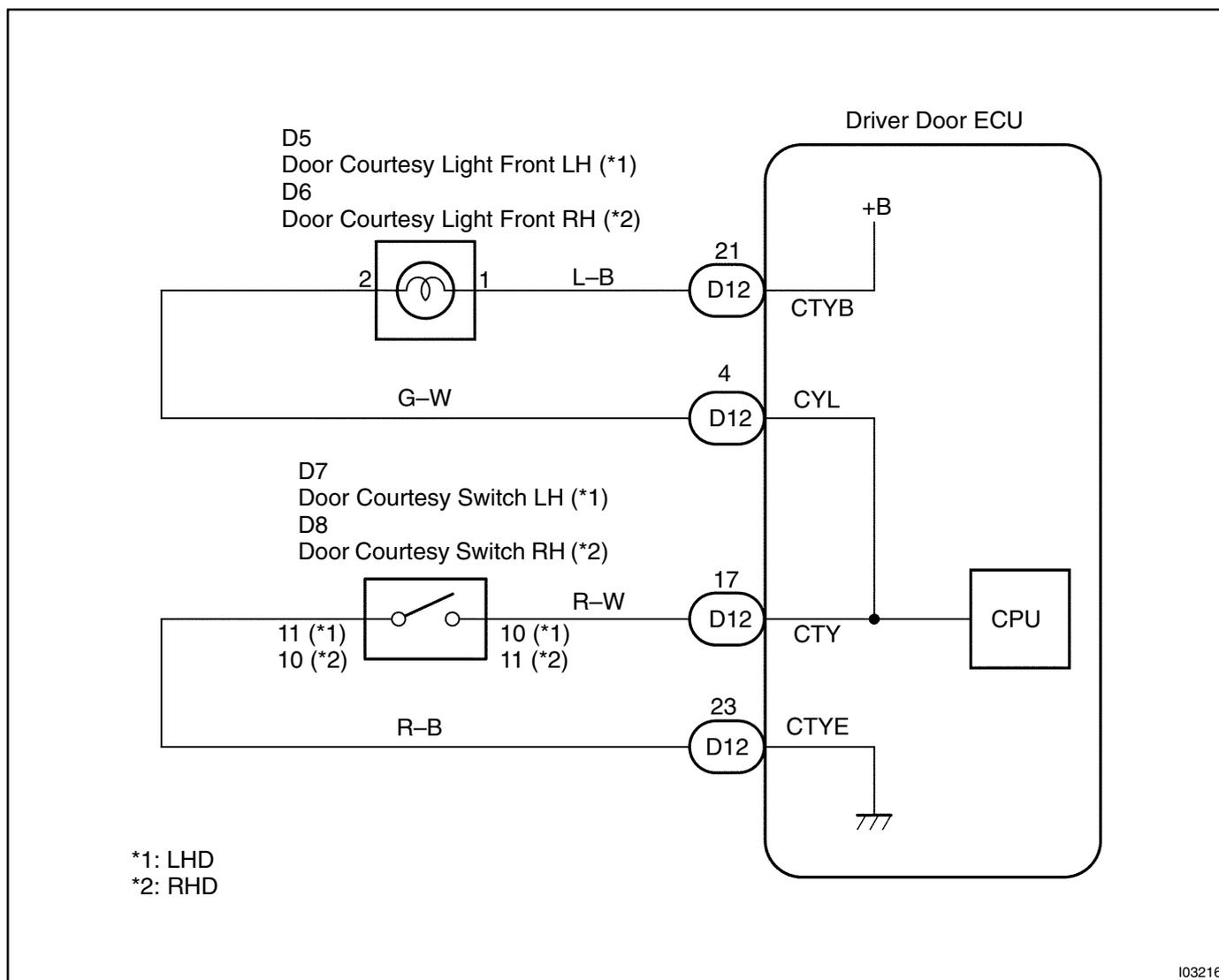
Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

## Door courtesy light and courtesy switch circuit

### CIRCUIT DESCRIPTION

The door courtesy switch goes on when the door is opened and goes off when door is closed.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

<b>1</b>	<b>Check operation of door courtesy light.</b>
----------	--

**CHECK:**

Check that door courtesy light comes on when door opened, and goes off when door is closed.

**OK:**

Must be operated normally.

<b>OK</b>	<b>Proceed to next circuit inspection shown on problem symptom table (See page DI-570).</b>
-----------	---

<b>NG</b>
-----------

<b>2</b>	<b>Check courtesy light (See page BE-48).</b>
----------	---

<b>NG</b>	<b>Replace the courtesy light.</b>
-----------	------------------------------------

<b>OK</b>
-----------

<b>3</b>	<b>Check courtesy switch (See page BE-48).</b>
----------	--

<b>NG</b>	<b>Replace the courtesy switch.</b>
-----------	-------------------------------------

<b>OK</b>
-----------

<b>4</b>	<b>Check wireharness and connector between courtesy light and driver door ECU, courtesy switch and driver door ECU.</b>
----------	---

<b>NG</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
--

## Power window motor circuit

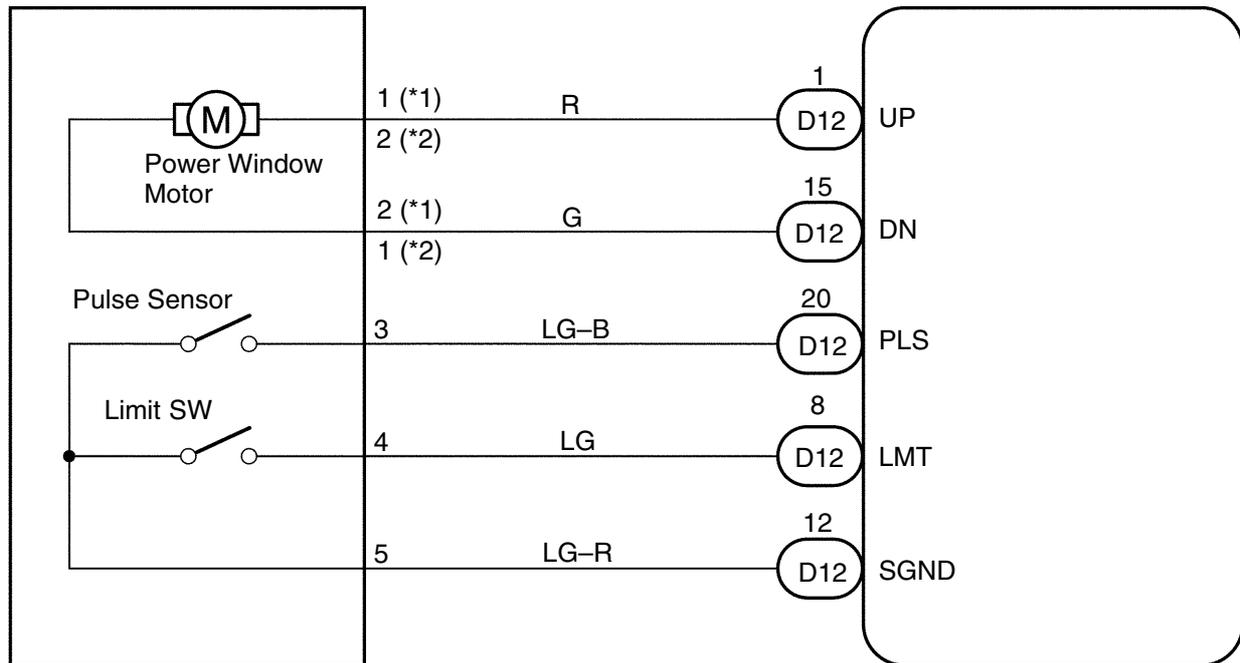
### WIRING DIAGRAM

P7

Power Window Motor Front LH (\*1)

P8

Power Window Motor Front RH (\*2)



\*1: LHD  
\*2: RHD

### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check power window motor using hand-held tester.</b>
----------	---

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check that the power window motor can operate in an ACTIVE TEST.

<b>OK</b>	<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-602).</b>
-----------	--

<b>NG</b>
-----------

<b>2</b>	<b>Check power window motor (See page BE-84).</b>
----------	---

<b>NG</b>	<b>Replace the power window motor.</b>
-----------	--

<b>OK</b>
-----------

<b>3</b>	<b>Check wireharness and connector between power window motor and driver door ECU.</b>
----------	--

<b>NG</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

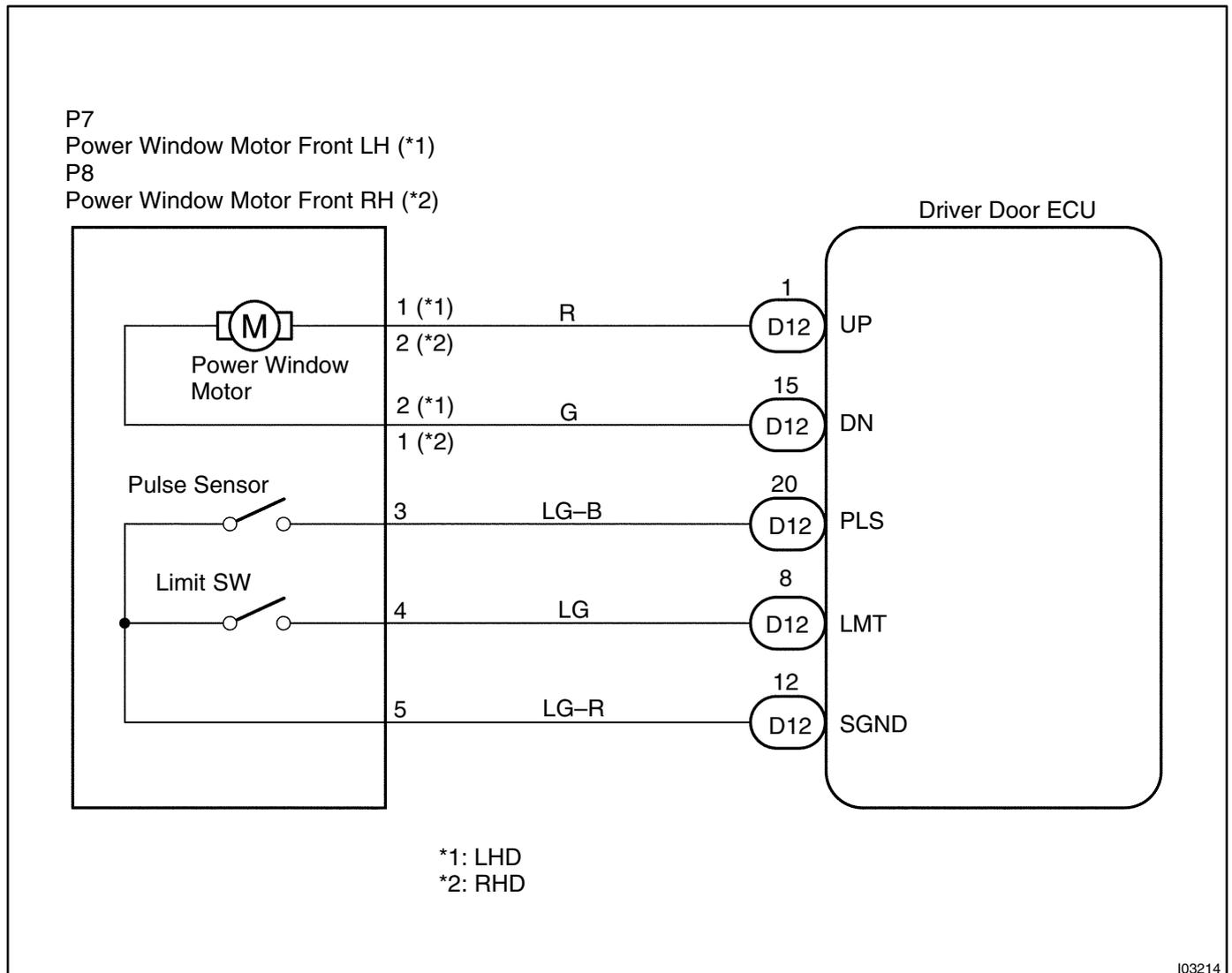
<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-602).</b>
--

## Jam protection limit switch circuit

### CIRCUIT DESCRIPTION

Jam protection limit switch is built-in the power window motor. This switch functions to turn "OFF" before the top dead center, and ECU reads this "OFF" signal resulting in closing the window fully.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

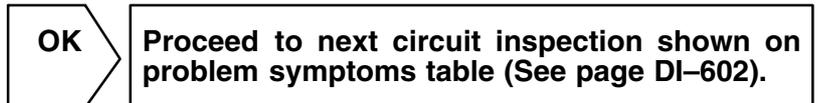
<b>1</b>	<b>Check jam protection limit switch using hand-held tester.</b>
----------	--

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the jam protection limit switch using DATA LIST.



<b>2</b>	<b>Check jam protection limit switch (See page BE-84).</b>
----------	--



<b>3</b>	<b>Check wireharness and connector between jam protection limit switch and driver door ECU.</b>
----------	---



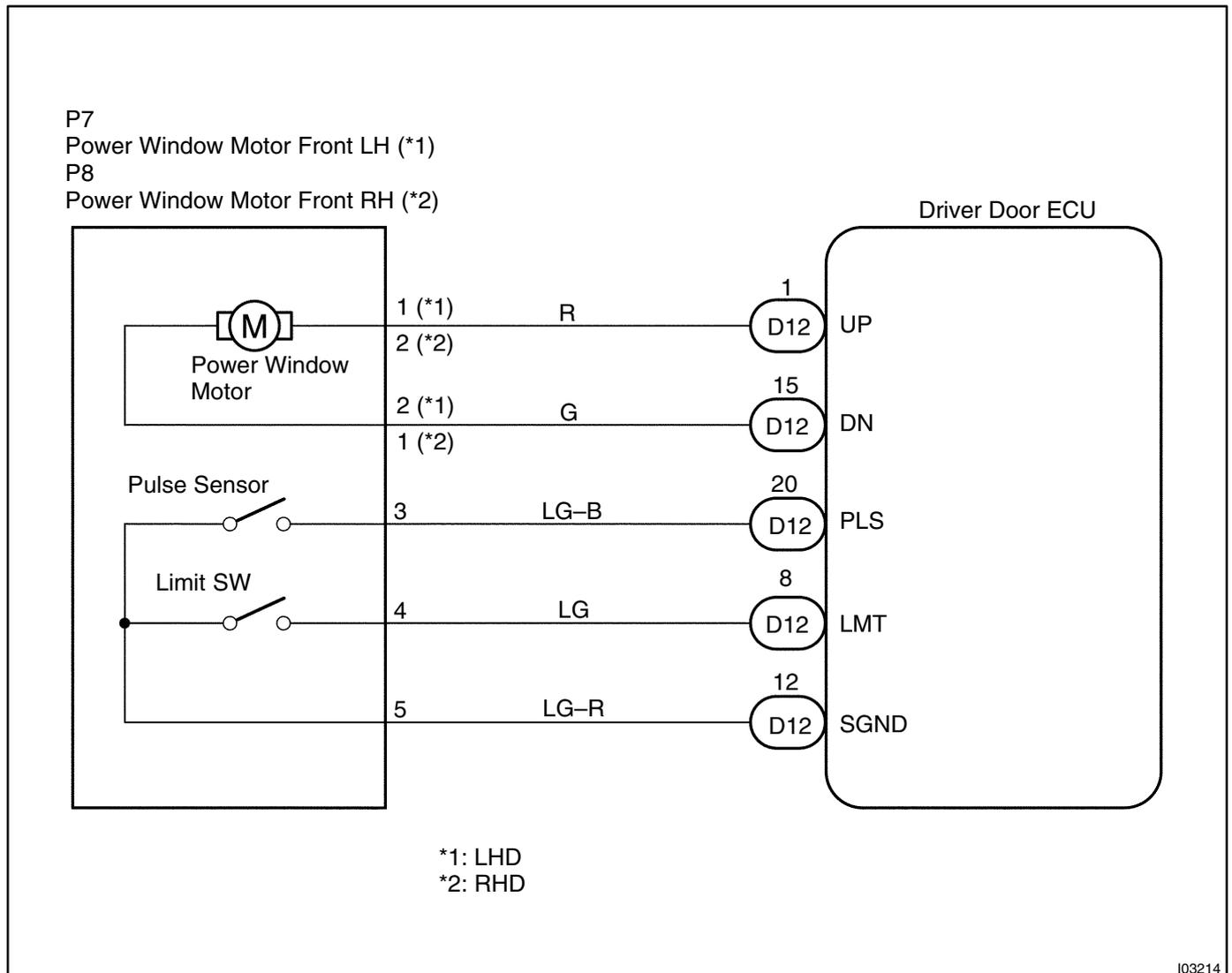
<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-602).</b>
--

## Jam protection pulse switch circuit

### CIRCUIT DESCRIPTION

Jam protection pulse switch is built-in the power window motor. Pulse switch outputs ON/OFF pulse when the motor rotates.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

**1** Check jam protection pulse switch (See page BE-84).

**NG**

Replace the power window motor.

**OK**

**2** Check wireharness and connector between jam protection pulse switch and driver door ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

Proceed to next circuit inspection shown on problem symptoms table (See page DI-602).

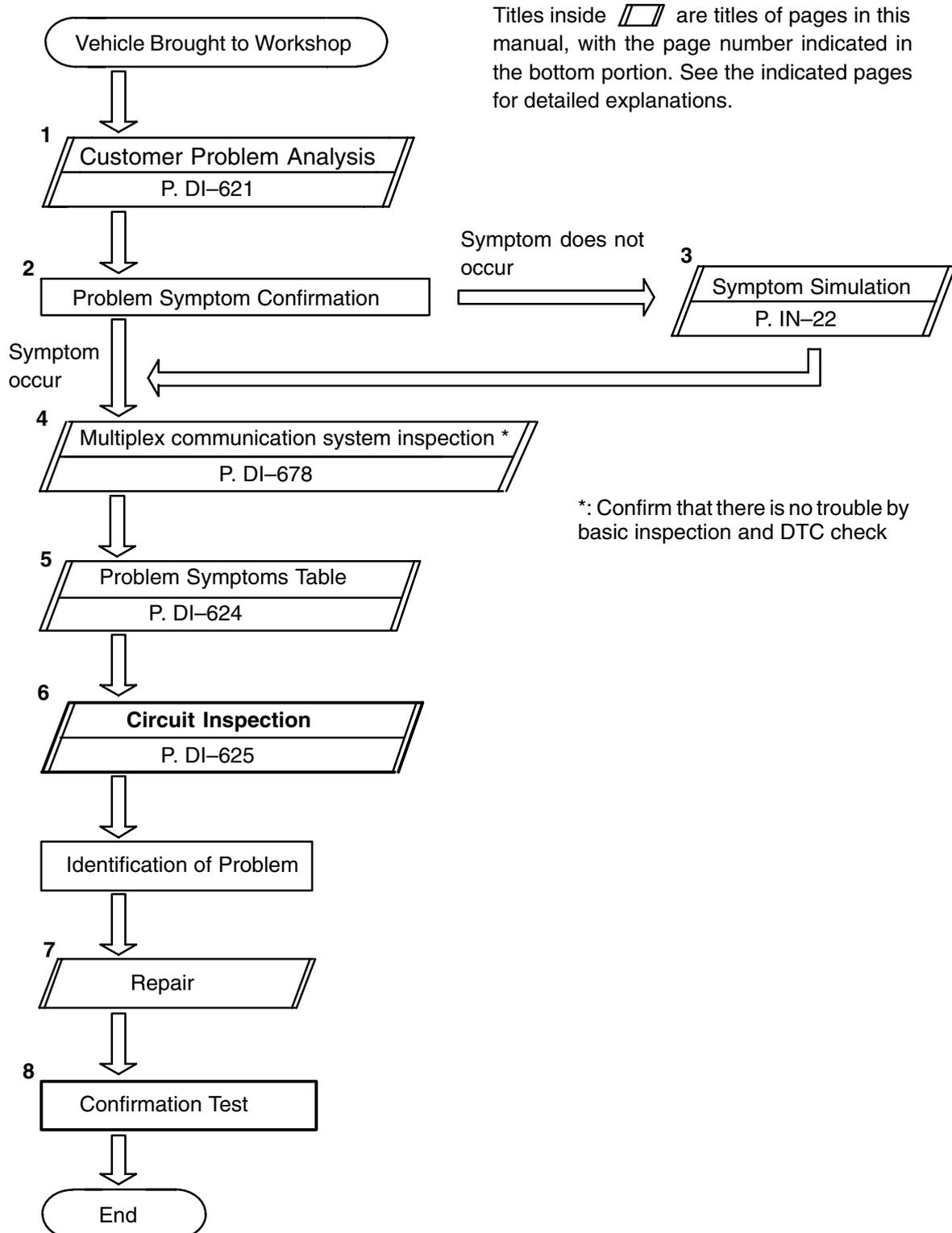
# PASSENGER DOOR CONTROL SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI2ES-08

### HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the hand-held tester.

# CUSTOMER PROBLEM ANALYSIS CHECK

**PASSENGER DOOR CONTROL SYSTEM Check Sheet**

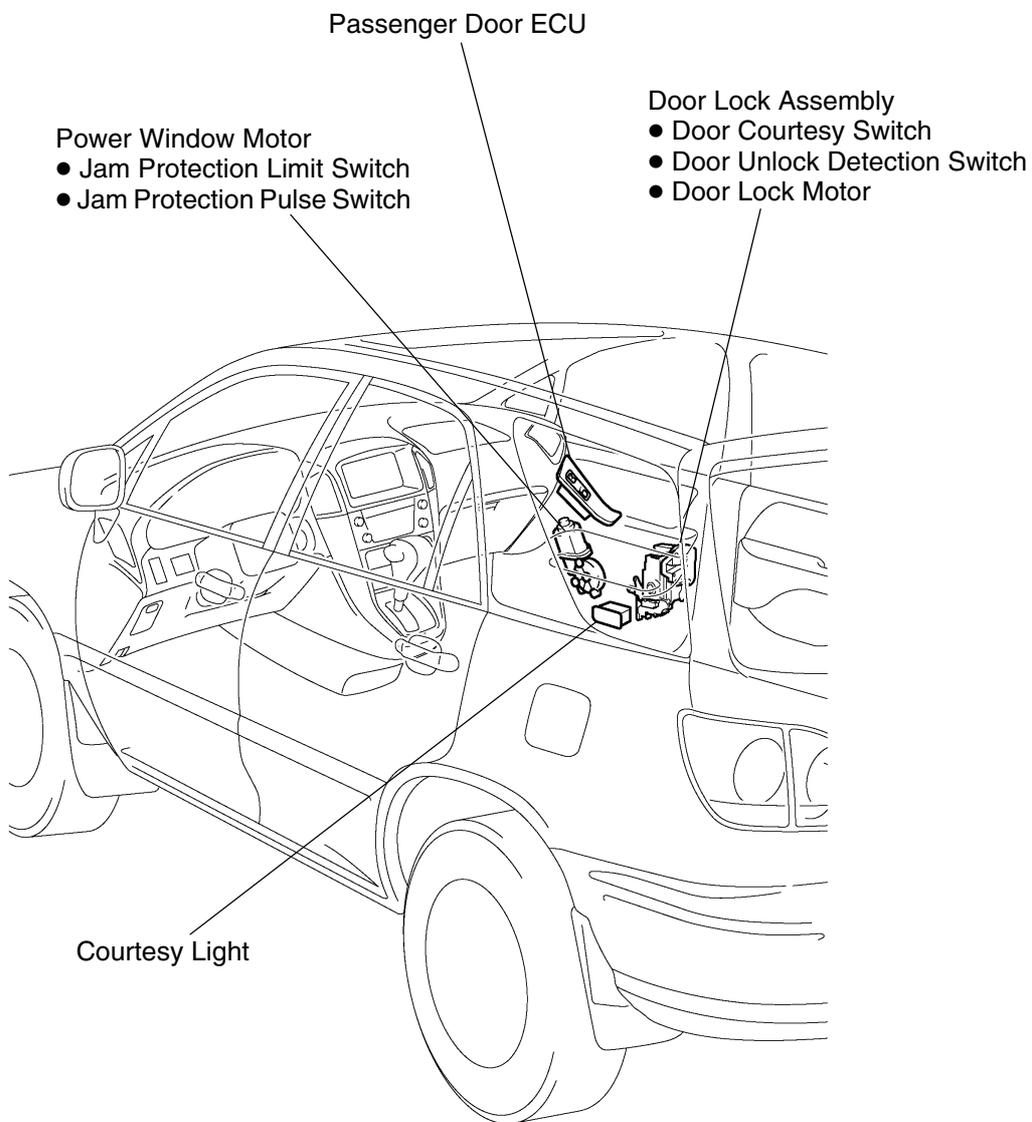
Inspector's name: \_\_\_\_\_

<b>Customer's Name</b>		<b>Registration No.</b>	
		<b>Registration Year</b>	
		<b>Frame No.</b>	
<b>Date Vehicle Brought in</b>	/ /	<b>Odometer Reading</b>	<b>km Mile</b>

<b>Date Problem First Occurred</b>	/ /
<b>Frequency Problem Occurs</b>	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    times per    day, month) <input type="checkbox"/> Once only
<b>Weather Conditions When Problem Occurred</b>	<b>Weather</b> <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/ Others
	<b>Outdoor Temperature</b> <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.    °F (    °C))

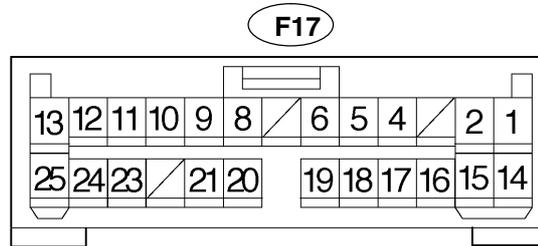
<b>Malfunction System</b>	<input type="checkbox"/> Power Window Control System
	<input type="checkbox"/> Power Mirror Control System
	<input type="checkbox"/> Power Door Lock Control System
	<input type="checkbox"/> Theft Deterrent System
	<input type="checkbox"/> Jam Protection System
	<input type="checkbox"/> Others

# PARTS LOCATION



# TERMINALS OF ECU

## PASSENGER DOOR ECU



I07350

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
UP ↔ GND (F17-1 ↔ F17-25)	R ↔ W-B	Ignition switch ON and driver's window switch OFF	Below 1.0
		Ignition switch ON and driver's window switch UP	10 - 14
A- ↔ GND (F17-2 ↔ F17-25)	L-Y ↔ W-B	Door lock switch OFF or LOCK	Below 1.0
		Door lock switch UNLOCK	10 - 14
SIG ↔ GND (F17-5 ↔ F17-25)	R-L ↔ W-B	Ignition switch ON	10 - 14
KL ↔ GND (F17-6 ↔ F17-25)	P ↔ W-B	Door key lock and unlock switch OFF or UNLOCK	10 - 14
		Door key lock and unlock switch LOCK	Below 1.0
LMT ↔ SGND (F17-8 ↔ F17-12)	LG ↔ LG-R	Driver's door window fully-closed position	10 - 14
		Driver's door window except fully-closed position	Below 1.0
A+ ↔ GND (F17-13 ↔ F17-25)	L-R ↔ W-B	Door lock switch OFF or UNLOCK	Below 1.0
		Door lock switch LOCK	10 - 14
BDR ↔ GND (F17-14 ↔ F17-25)	L-B ↔ W-B	Constant	10 - 14
DN ↔ GND (F17-15 ↔ F17-25)	G ↔ W-B	Ignition switch ON and driver's window switch OFF	Below 1.0
		Ignition switch ON and driver's window switch DOWN	10 - 14
LSW ↔ GND (F17-16 ↔ F17-25)	GR ↔ W-B	Driver's door is locked	10 - 14
		Driver's door is unlocked	Below 1.0
CTY ↔ GND (F17-17 ↔ F17-25)	R-W ↔ W-B	Driver's door is closed	10 - 14
		Driver's door is open	Below 1.0
CPUB ↔ GND (F17-18 ↔ F17-25)	W-L ↔ W-B	Constant	10 - 14
KUL ↔ GND (F17-19 ↔ F17-25)	P-L ↔ W-B	Door key lock and unlock switch OFF or LOCK	10 - 14
		Door key lock and unlock switch UNLOCK	Below 1.0
PLS ↔ SGND (F17-20 ↔ F17-12)	LG-B ↔ LG-R	During the driver's door power window is operate.	Pulse generation
		Driver's door power window not operate with switch ON	Below 1.0
		Driver's door power window not operate with switch OFF	10 - 14
CTYB ↔ CYL (F17-21 ↔ F17-4)	L-B ↔ G-W	Driver's door closed	Below 1.0
		Driver's door open	10 - 14

**PROBLEM SYMPTOMS TABLE****POWER WINDOW CONTROL SYSTEM**

Symptom	Suspect Area	See page
Power window does not operate.	1. Passenger door ECU with power window switch	–
Auto up (or down) function does not operate.	1. Passenger door ECU with power window switch	–
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switch circuit 3. Passenger door ECU with power window switch	DI-638 DI-640 –

**OTHERS**

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Passenger door ECU	DI-625

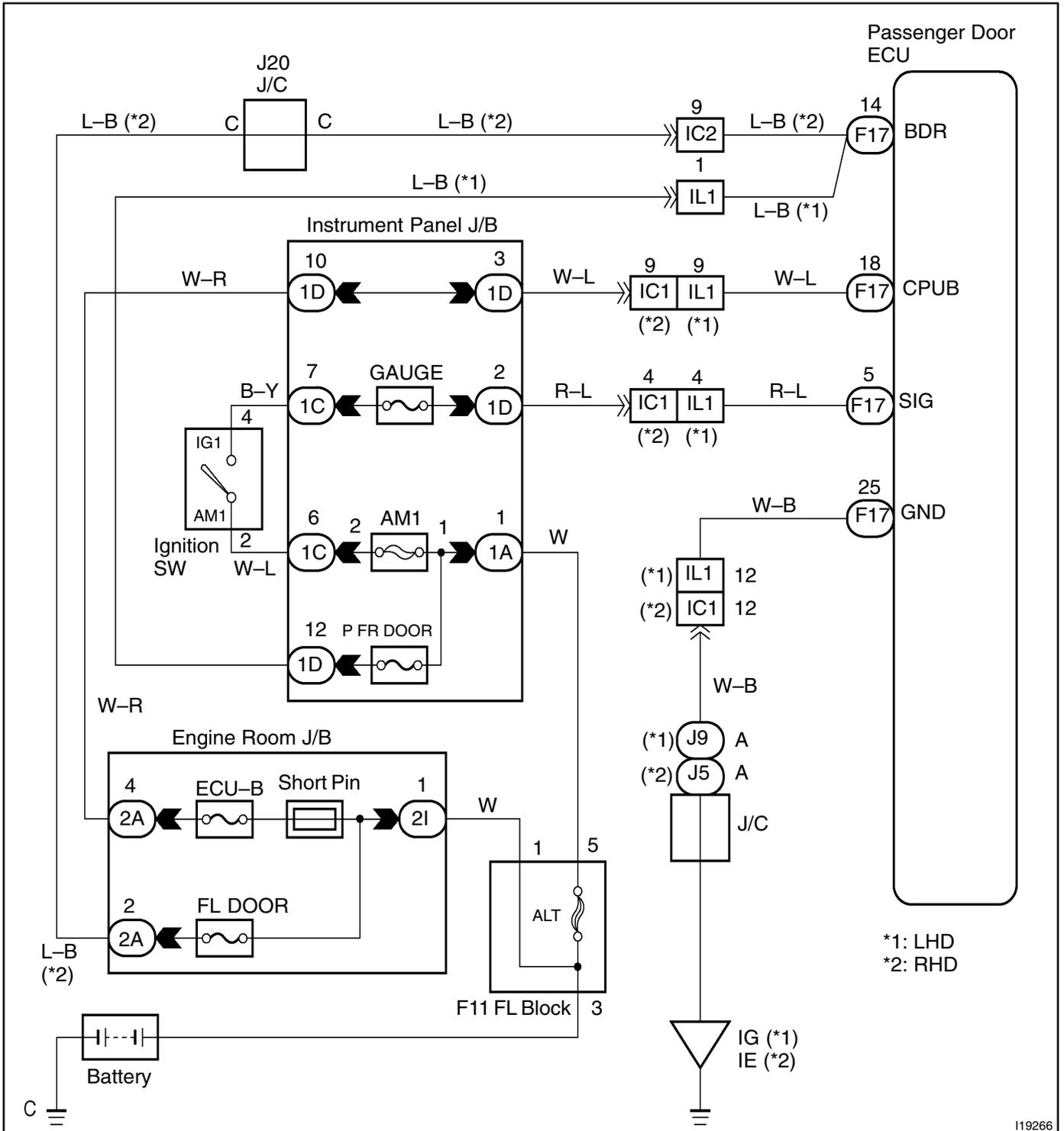
# CIRCUIT INSPECTION

## Power source circuit

## CIRCUIT DESCRIPTION

This circuit provides power to operate the passenger door ECU.

## WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check ECU-B, GAUGE and P FR DOOR fuse.</b>
----------	---

**CHECK:**

Check continuity of ECU-B,GAUGE and P FR DOOR fuse.

**OK:**

Continuity



<b>2</b>	<b>Check voltage between terminals BDR,CPUB, SIG and GND of passenger door ECU connector.</b>
----------	---

**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals SIG, and GND.

**OK:**

**Voltage: 10 – 14V**

**PREPARATION:**

- (a) Turn ignition switch OFF.
- (b) Disconnect the passenger door ECU connector.

**CHECK:**

Measure voltage between terminals BDR, CPUB and GND.

**OK:**

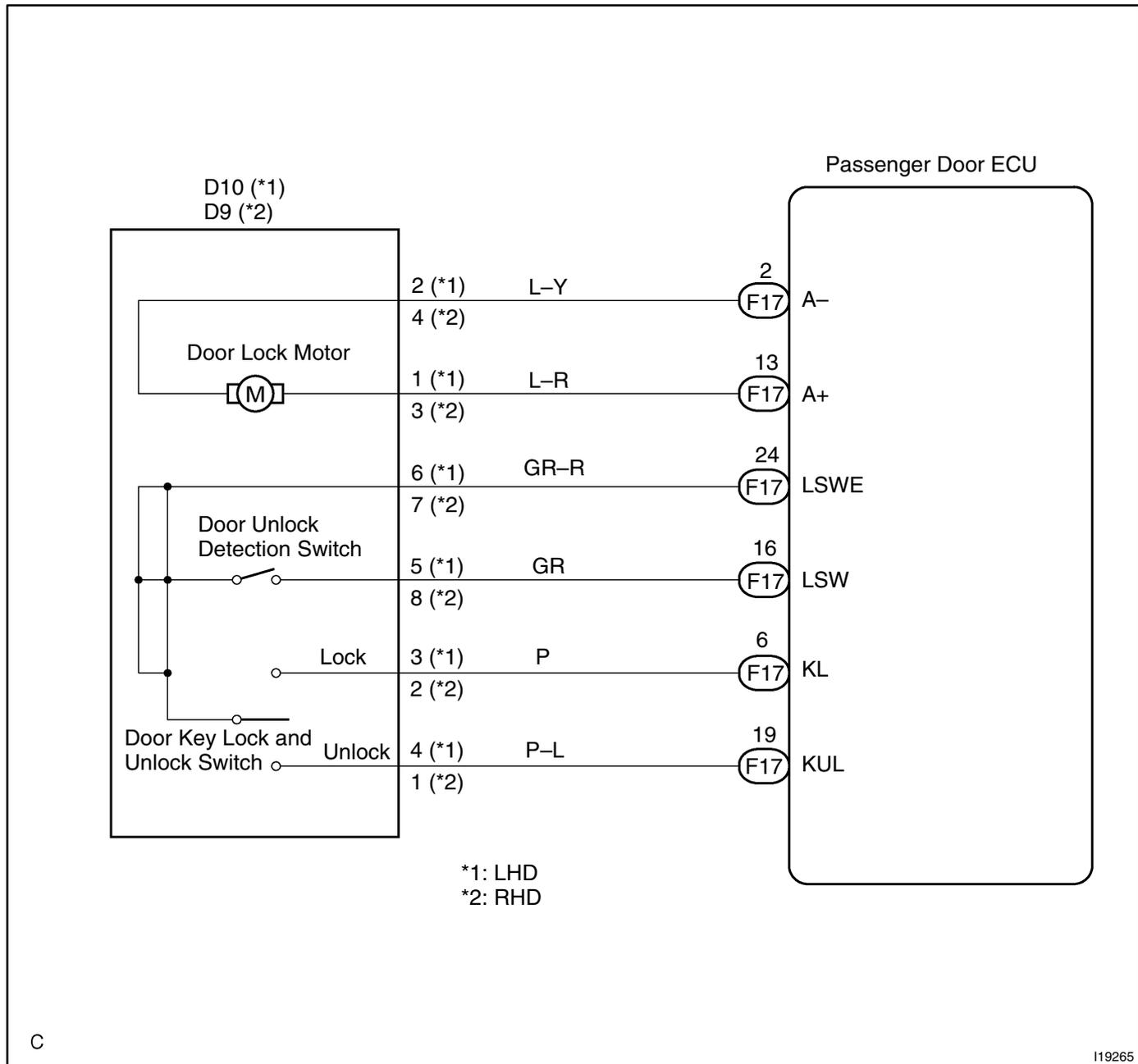
**Voltage: 10 – 14V**



**3****Check wireharness and connector between ECU and body ground.****NG****Repair or replace wireharness or connector.****OK****Check and repair wireharness and connector  
between ECU and battery.**

# Door lock motor circuit

## WIRING DIAGRAM



C

## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check door lock motor using hand-held tester.</b>
----------	--

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check that the door lock motor can operate in an ACTIVE TEST.

OK

Proceed to next circuit inspection shown on problem symptom table (See page DI-570).

NG

<b>2</b>	<b>Check door lock motor (See page BE-97).</b>
----------	--

NG

Replace the door lock motor.

OK

<b>3</b>	<b>Check wireharness and connector between door lock motor and driver door ECU.</b>
----------	---

NG

Repair or replace wireharness or connector.

OK

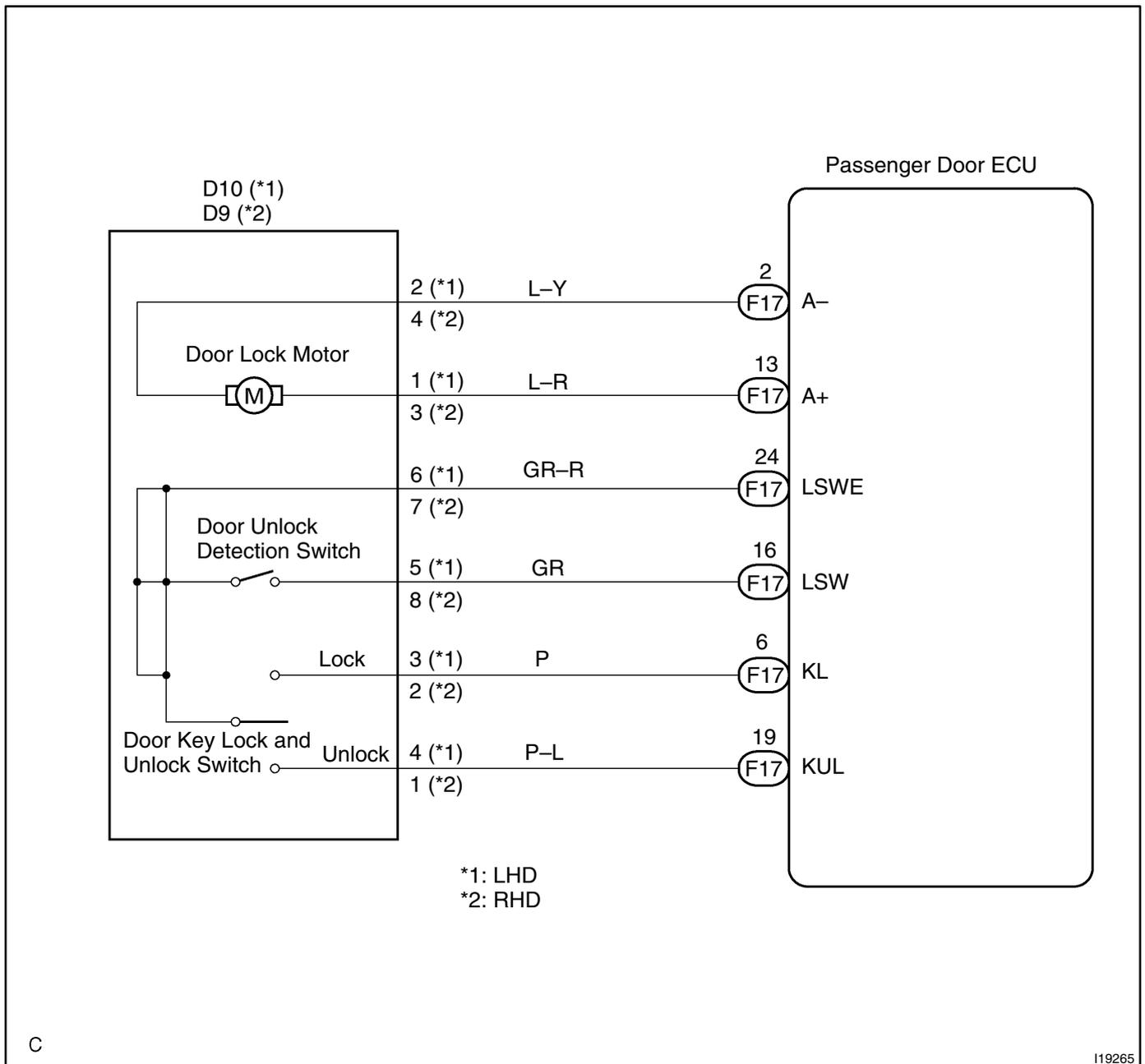
Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

## Door unlock detection switch

### CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check door unlock detection switch using hand-held tester.</b>
----------	---

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

Check the door unlock detection switch using DATA LIST.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

NG

<b>2</b>	<b>Check door unlock detection switch (See page BE-97).</b>
----------	---

NG

Replace the door lock motor.

OK

<b>3</b>	<b>Check wireharness and connector between door unlock detection switch and passenger door ECU.</b>
----------	---

NG

Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

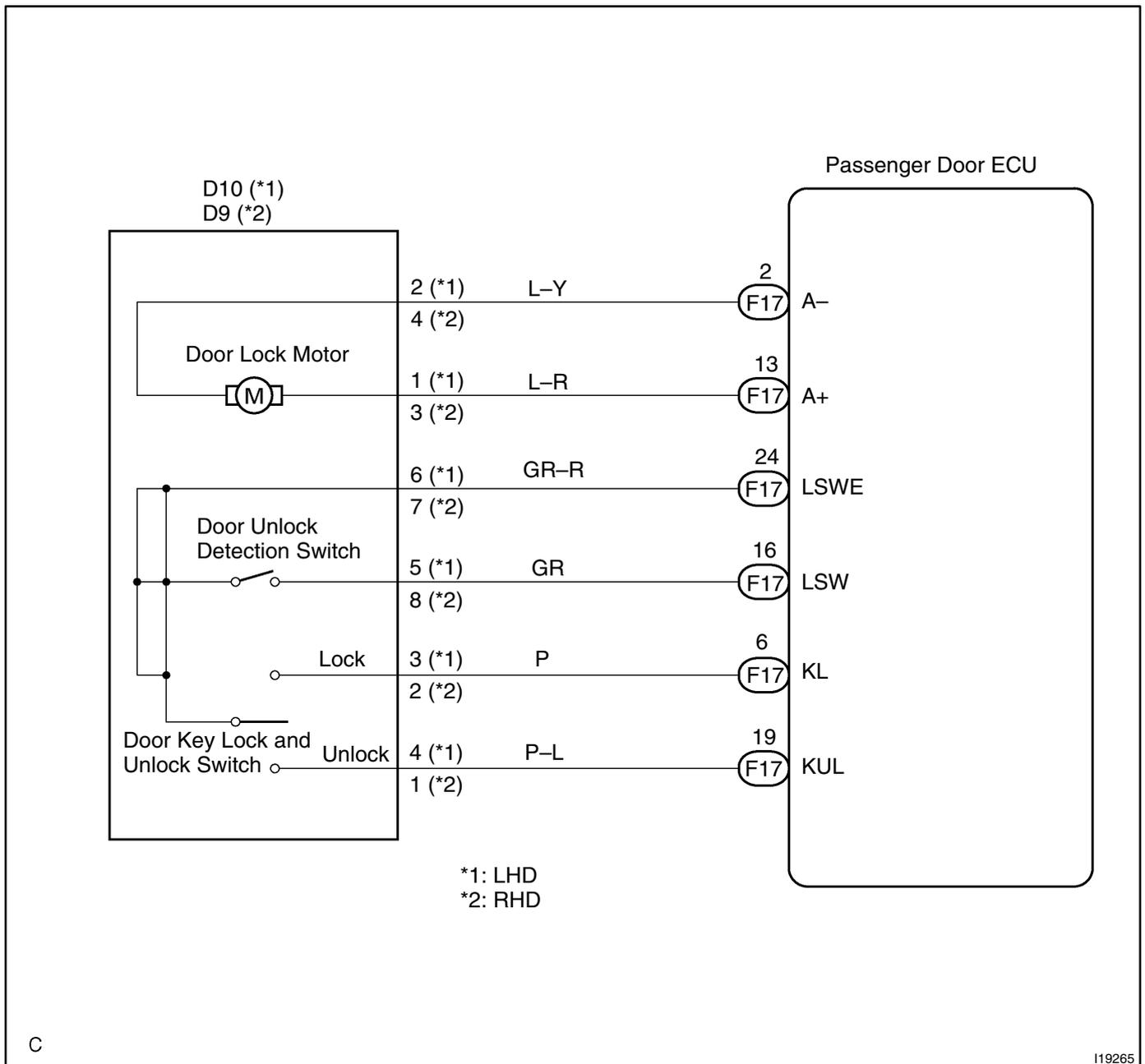
## Door key lock and unlock switch circuit

### CIRCUIT DESCRIPTION

The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 3 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.

Door key lock and unlock switch can be checked using DTC check. (Refer to DI-708)

### WIRING DIAGRAM



### INSPECTION PROCEDURE

<b>1</b>	<b>Check the door key lock and unlock switch using DTC check (See page DI-708).</b>
----------	---

**OK** → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).**

**NG**

<b>2</b>	<b>Check the door key lock and unlock switch (See page BE-97).</b>
----------	--

**NG** → **Replace the door key lock and unlock switch.**

**NG**

<b>3</b>	<b>Check wireharness and connector between door key lock and unlock switch and passenger door ECU.</b>
----------	--

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

**OK**

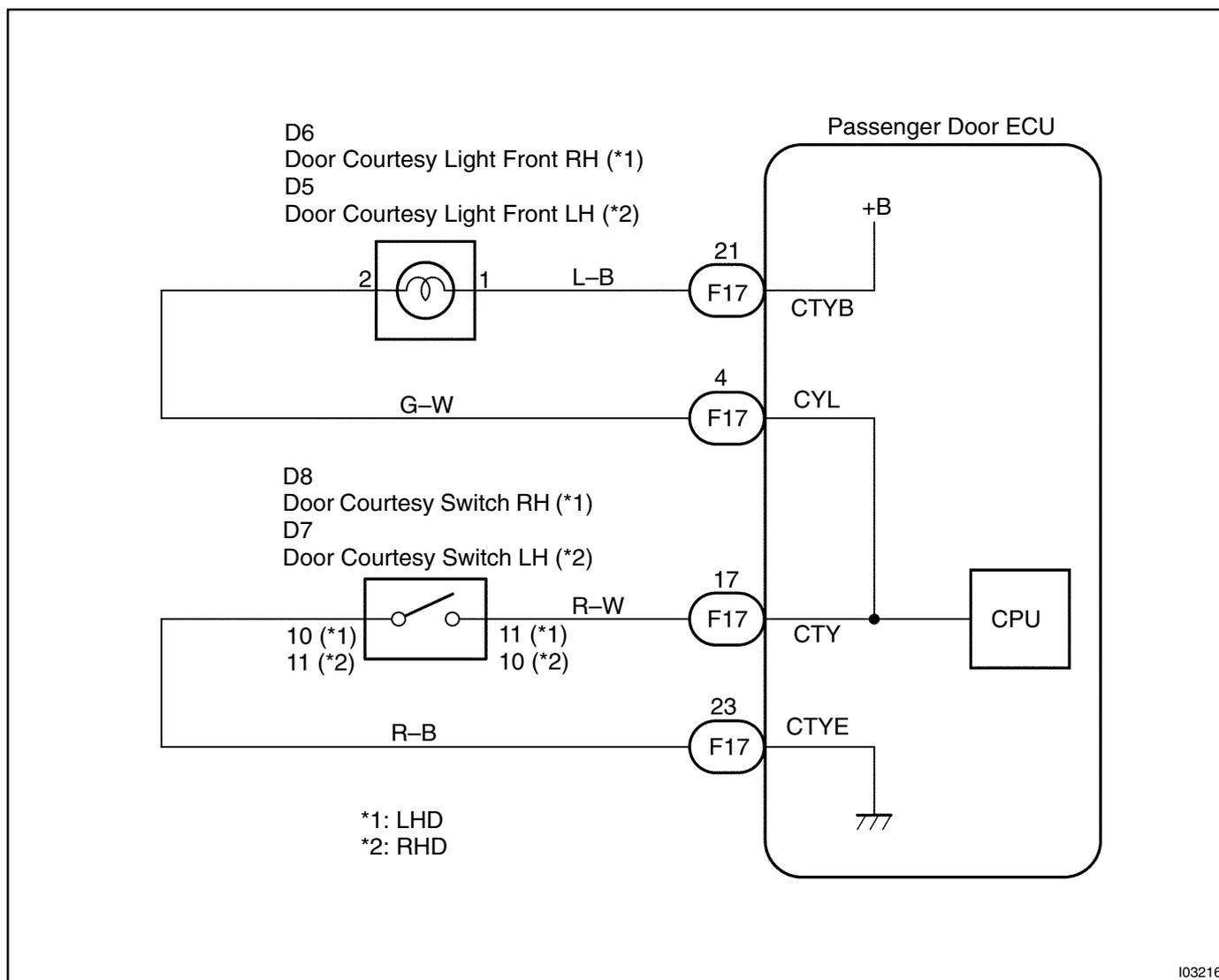
<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
--

## Door courtesy light and courtesy switch circuit

### CIRCUIT DESCRIPTION

The door courtesy switch goes on when the door is opened and goes off when door is closed.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

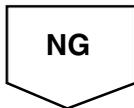
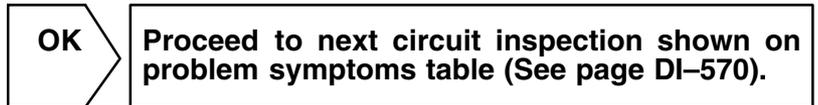
<b>1</b>	<b>Check operation of door courtesy light.</b>
----------	--

**CHECK:**

Check that door courtesy light comes on when door opened, and goes off when door is closed.

**OK:**

Must be operated normally.



<b>2</b>	<b>Check courtesy light (See page BE-48).</b>
----------	---



<b>3</b>	<b>Check courtesy switch (See page BE-48).</b>
----------	--



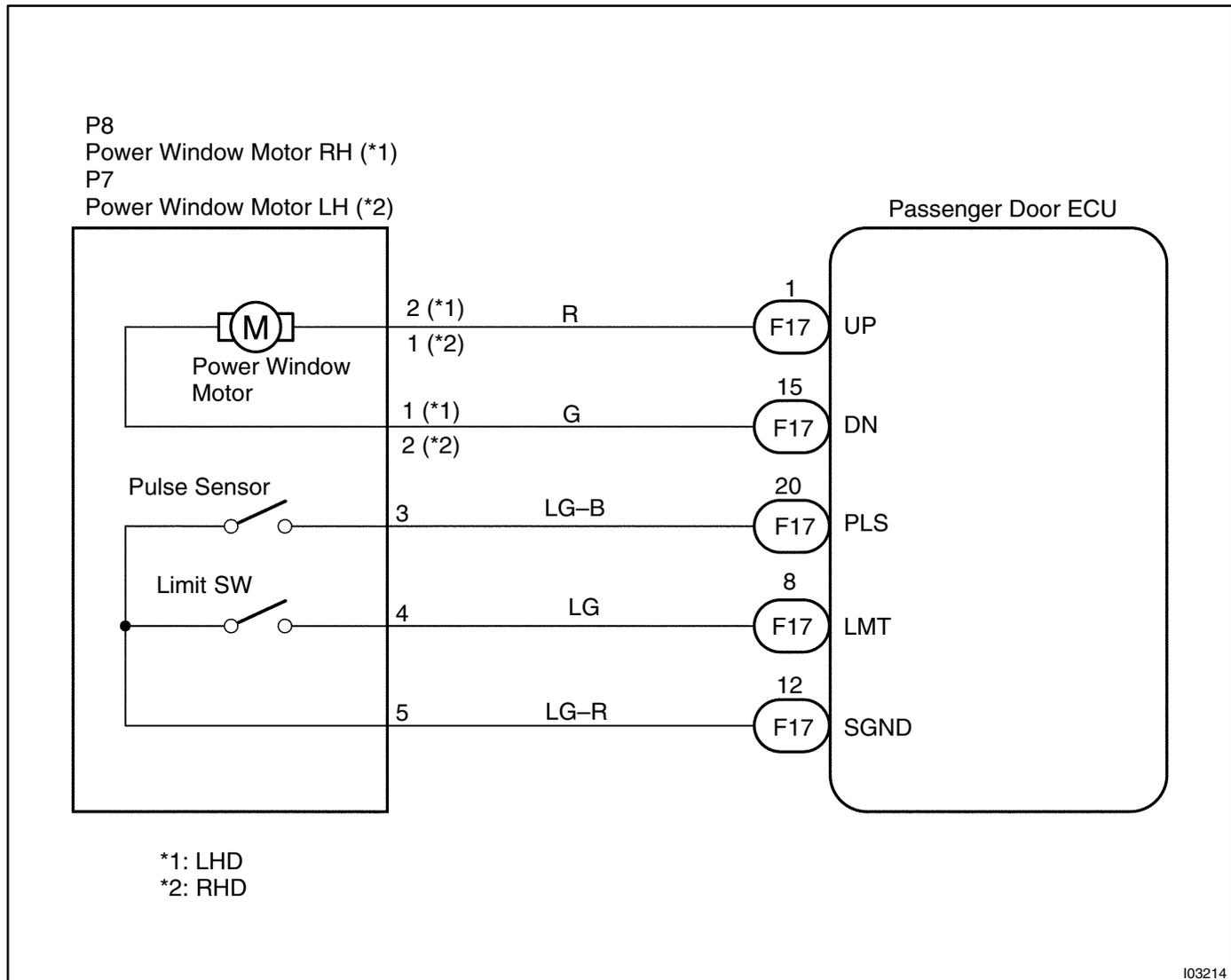
<b>4</b>	<b>Check wireharness and connector between courtesy light and passenger door ECU, courtesy switch and passenger door ECU.</b>
----------	---



<b>Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).</b>
--

# Power window motor circuit

## WIRING DIAGRAM



### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check power window motor using hand-held tester.</b>
----------	---

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check that the power window motor can operate in an ACTIVE TEST.

**OK** → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-624).**

**NG**

<b>2</b>	<b>Check power window motor (See page BE-84).</b>
----------	---

**NG** → **Replace the power window motor.**

**OK**

<b>3</b>	<b>Check wireharness and connector between power window motor and passenger door ECU.</b>
----------	---

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

**OK**

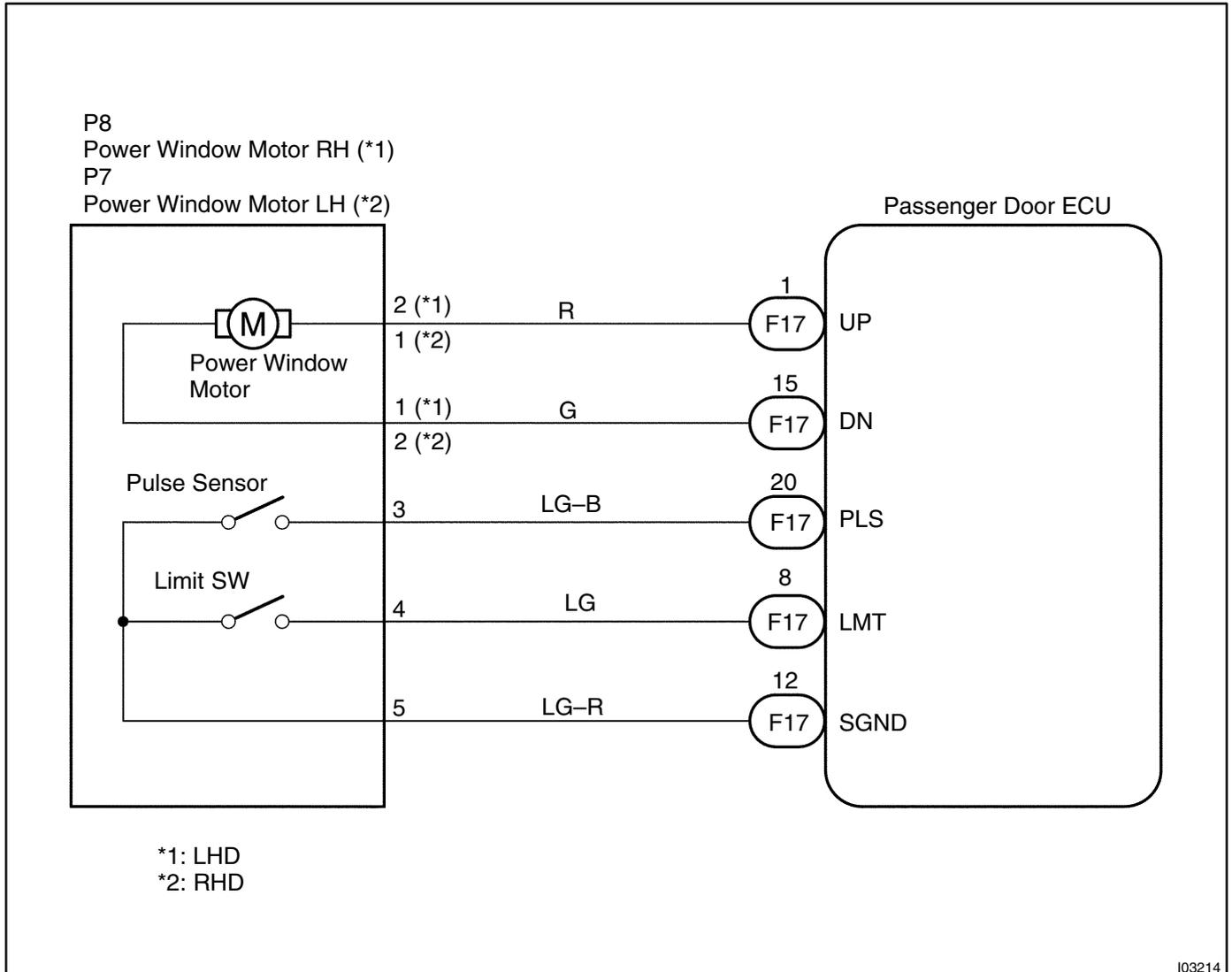
**Proceed to next circuit inspection shown on problem symptoms table (See page DI-624).**

## Jam protection limit switch circuit

### CIRCUIT DESCRIPTION

Jam protection limit switch is built-in the power window motor. This switch functions to turn "OFF" before the top dead center, and ECU reads this "OFF" signal resulting in closing the window fully.

### WIRING DIAGRAM



**INSPECTION PROCEDURE****HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check jam protection limit switch using hand-held tester.</b>
----------	--

**PREPARATION:**

Connect the hand-held tester to the DLC 3.

**CHECK:**

Check the jam protection limit switch using DATA LIST.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-624).

NG

<b>2</b>	<b>Check jam protection limit switch (See page BE-84).</b>
----------	--

NG

Replace the power window motor.

OK

<b>3</b>	<b>Check wireharness and connector between jam protection limit switch and passenger door ECU.</b>
----------	--

NG

Repair or replace wireharness or connector.

OK

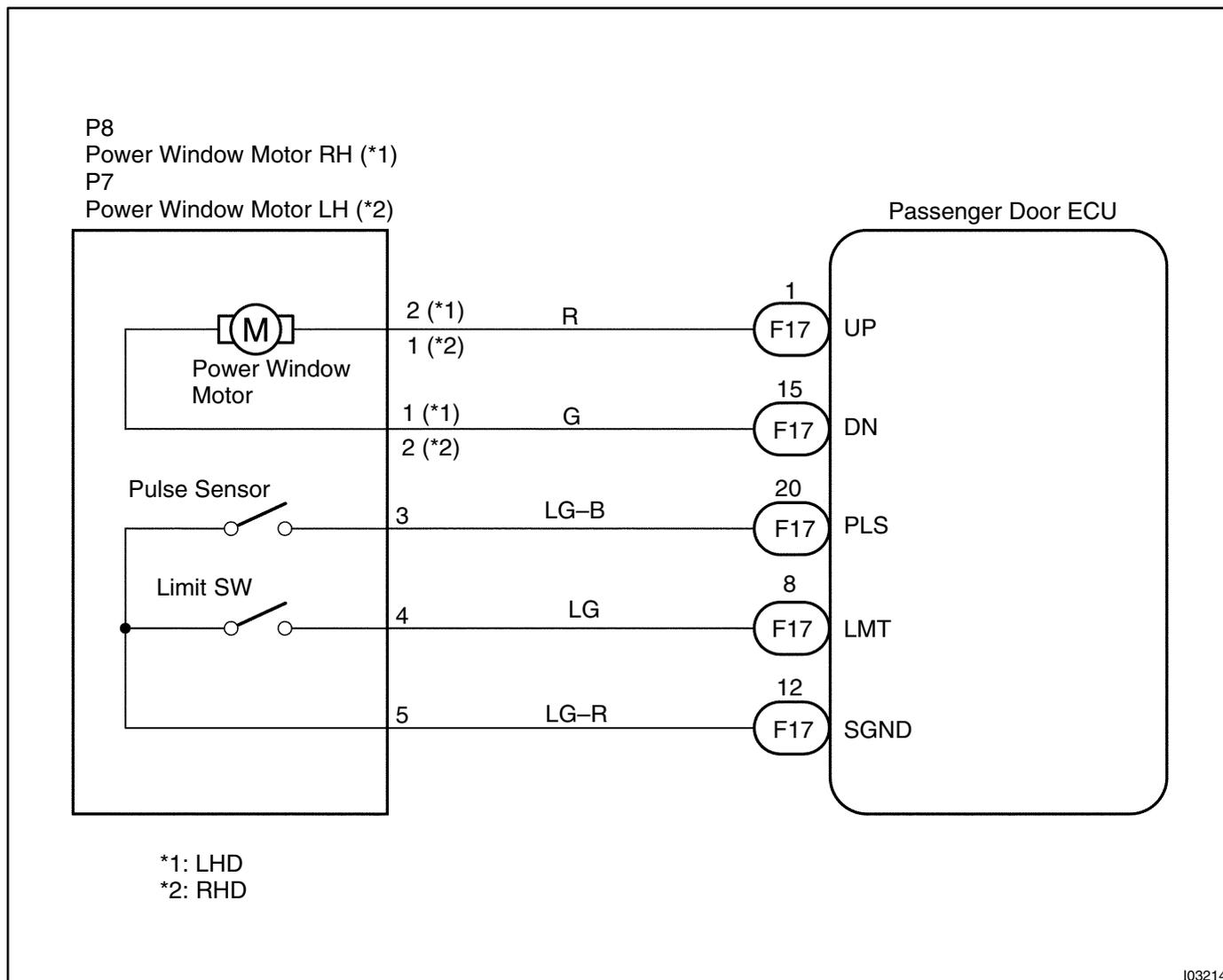
Proceed to next circuit inspection shown on problem symptoms table (See page DI-624).

## Jam protection pulse switch circuit

### CIRCUIT DESCRIPTION

Jam protection pulse switch is built-in the power window motor. Pulse switch outputs ON/OFF pulse when the motor rotates.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

**1** Check jam protection pulse switch (See page BE-84).

**NG**

Replace the power window motor.

**OK**

**2** Check wireharness and connector between jam protection pulse switch and passenger door ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

Proceed to next circuit inspection shown on problems symptoms table (See page DI-624).

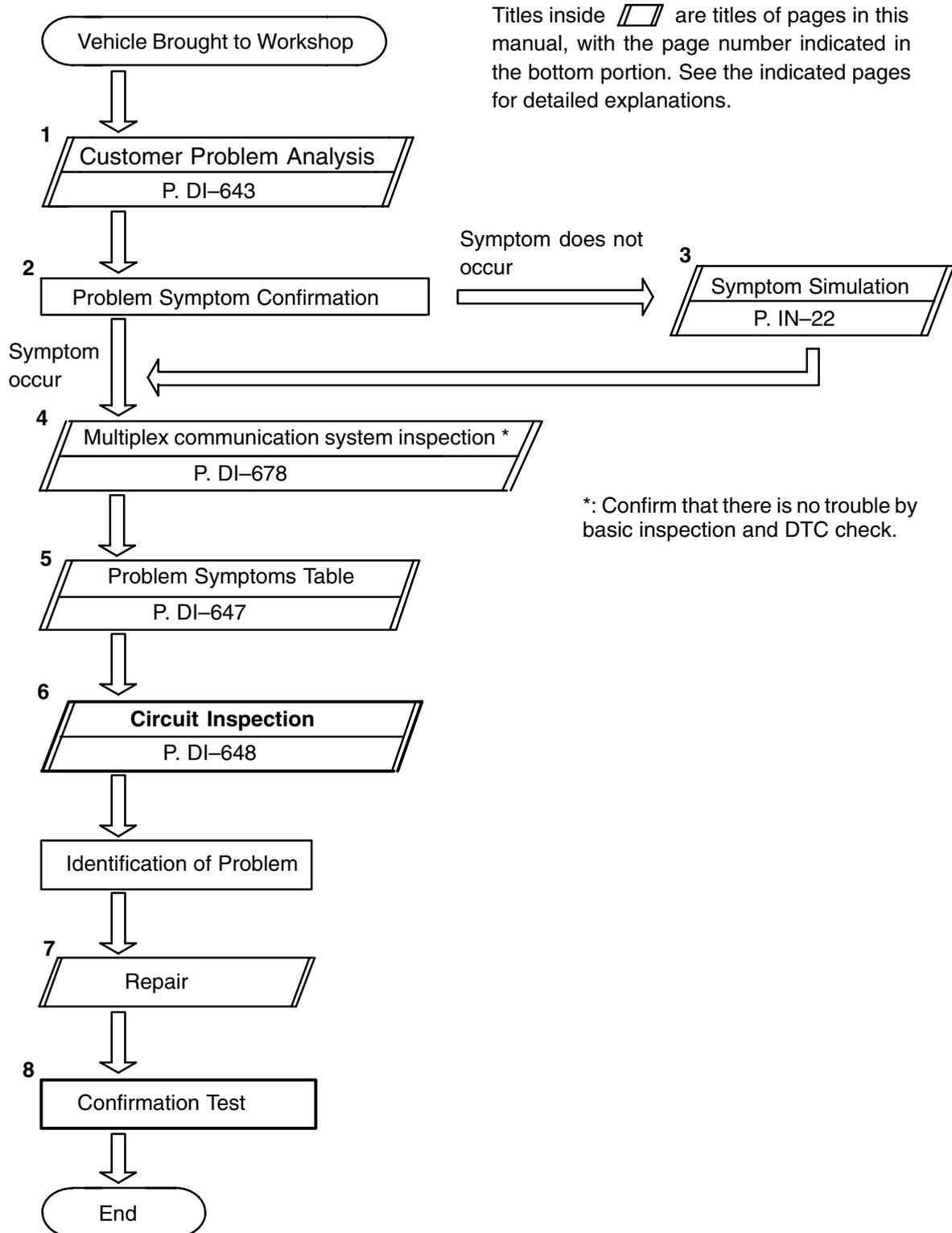
# REAR LEFT DOOR CONTROL SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI2F9-07

### HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the troubleshooting.



Step 6, 8 : Diagnostic steps permitting the use of the hand-held tester.

# CUSTOMER PROBLEM ANALYSIS CHECK

**REAR LEFT DOOR CONTROL SYSTEM Check Sheet**

Inspector's name: \_\_\_\_\_

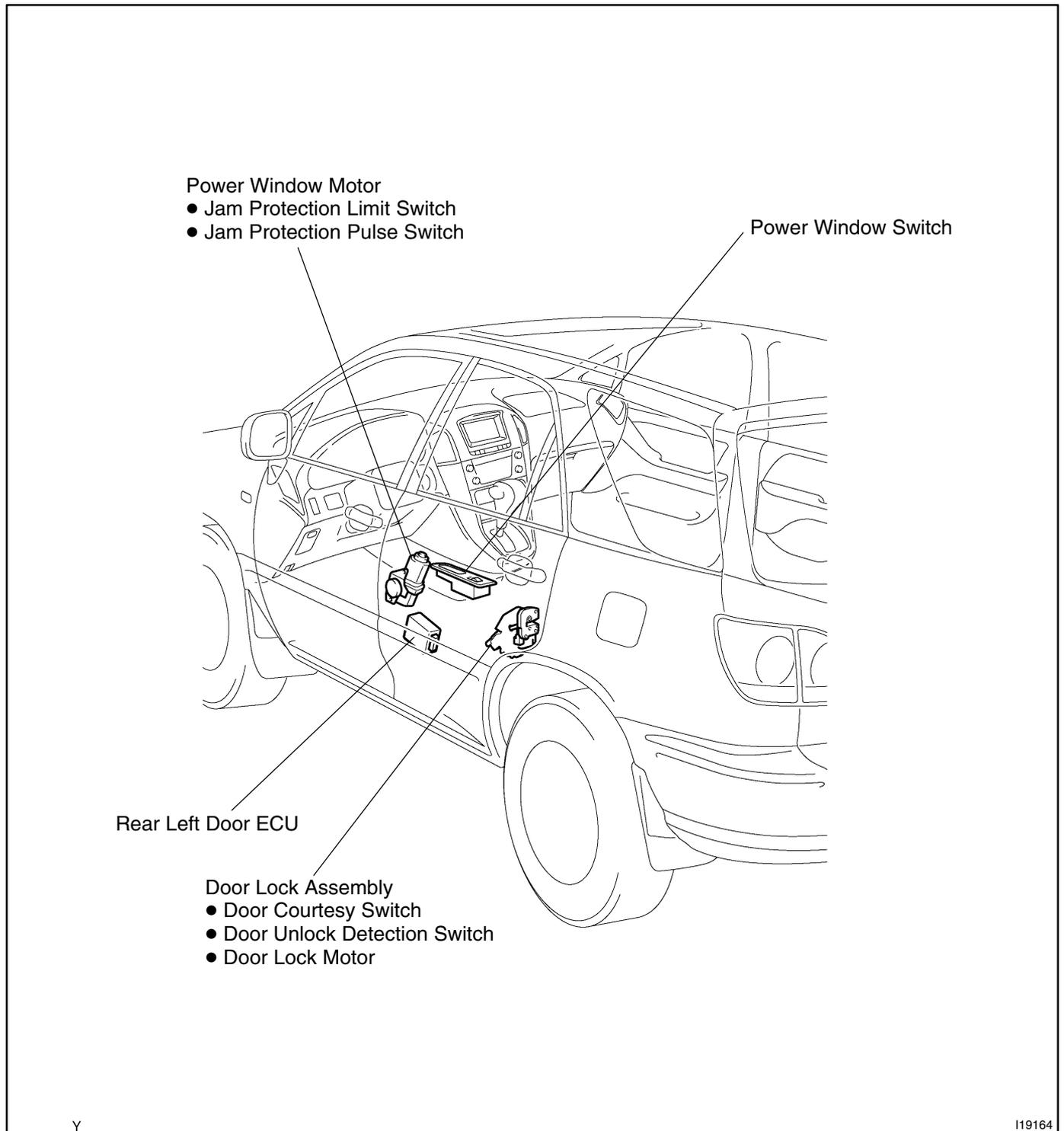
<b>Customer's Name</b>		<b>Registration No.</b>	
		<b>Registration Year</b>	
		<b>Frame No.</b>	
<b>Date Vehicle Brought in</b>	/ /	<b>Odometer Reading</b>	<b>km Mile</b>

<b>Date Problem First Occurred</b>	/ /
<b>Frequency Problem Occurs</b>	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (    times per    day, month) <input type="checkbox"/> Once only
<b>Weather Conditions When Problem Occurred</b>	<b>Weather</b>
	<b>Outdoor Temperature</b>

Fine     Cloudy     Rainy     Snowy  
 Various/ Others  
 Hot     Warm     Cool  
 Cold (Approx.    °F (    °C))

<b>Malfunction System</b>	<input type="checkbox"/> Power Window Control System
	<input type="checkbox"/> Power Door Lock Control System
	<input type="checkbox"/> Theft Deterrent System
	<input type="checkbox"/> Jam Protection System
	<input type="checkbox"/> Others

## PARTS LOCATION

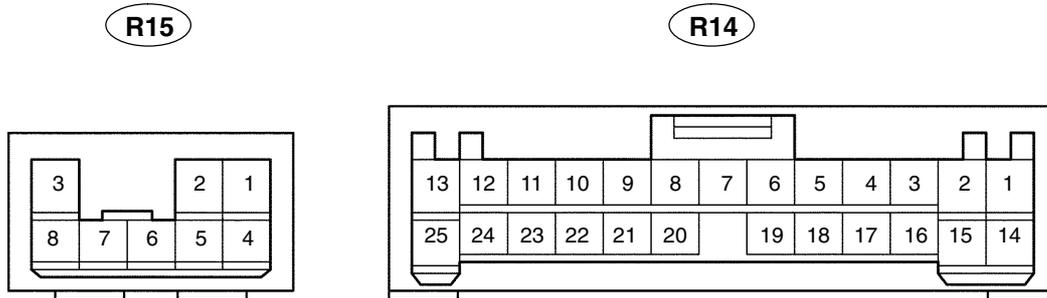


Y

I19164

# TERMINALS OF ECU

## REAR LEFT DOOR ECU



I03226

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
A- ↔ GND (R14-1 ↔ R14-25)	L-B ↔ W-B	Door lock switch OFF or LOCK	Below 1.0
		Door lock switch UNLOCK	10 - 14
CTY ↔ GND (R14-8 ↔ R14-25)	R-W ↔ W-B	Rear LH door closed	10 - 14
		Rear LH door open	Below 1.0
SIG ↔ GND (R14-9 ↔ R14-25)	R-L ↔ W-B	Constant	10 - 14
PCTO ↔ GND (R14-10 ↔ R14-25)	L-O ↔ W-B	Window lock switch UNLOCK*	10 - 14
		Window lock switch LOCK*	Below 1.0
PCTI ↔ GND (R14-11 ↔ R14-25)	Y-B ↔ W-B	Window lock switch UNLOCK*	10 - 14
		Window lock switch LOCK*	Below 1.0
A+ ↔ GND (R14-13 ↔ R14-25)	L-R ↔ W-B	Door lock switch OFF or UNLOCK	Below 1.0
		Door lock switch LOCK	10 - 14
BDR ↔ GND (R14-14 ↔ R14-25)	L-Y ↔ W-B	Constant	10 - 14
CPUB ↔ GND (R14-15 ↔ R14-25)	G-B ↔ W-B	Constant	10 - 14
LSW ↔ GND (R14-17 ↔ R14-25)	GR ↔ W-B	Rear LH door is locked	10 - 14
		Rear LH door is unlocked	Below 1.0
AUTO ↔ GND (R14-22 ↔ R14-25)	Y ↔ W-B	Ignition switch ON and power window switch OFF, UP or DOWN	Below 1.0
		Ignition switch ON and power window switch AUTO UP or DOWN	10 - 14
MDN ↔ GND (R14-23 ↔ R14-25)	Y-R ↔ W-B	Ignition switch ON and power window switch OFF or UP	Below 1.0
		Ignition switch ON and power window switch DOWN	10 - 14
MUP ↔ GND (R14-24 ↔ R14-25)	Y-G ↔ W-B	Ignition switch ON and power window switch OFF or DOWN	Below 1.0
		Ignition switch ON and power window switch UP	10 - 14
DN ↔ GND (R15-1 ↔ R14-25)	G ↔ W-B	Ignition switch ON and power window switch OFF or UP	Below 1.0
		Ignition switch ON and power window switch DOWN	10 - 14
LMT ↔ GND (R15-2 ↔ R14-25)	Y ↔ W-B	Window fully - close position	10 - 14
		Window except fully - close position	Below 1.0

UP ↔ GND (R15-3 ↔ R14-25)	R ↔ W-B	Ignition switch ON and power window switch OFF or DOWN	Below 1.0
		Ignition switch ON and power window switch UP	10 – 14
PLS ↔ GND (R15-7 ↔ R14-25)	L ↔ W-B	During power window is operate.	Pulsegeneration
		Power window is not operate with switch ON	Below 1.0
		Power window is not operate with switch OFF	10 – 14

\*: Power window master switch

**PROBLEM SYMPTOMS TABLE****POWER WINDOW CONTROL SYSTEM**

Symptom	Suspect Area	See page
Power window does not operate.	1. Power window switch circuit 2. Power window motor circuit 3. Rear left door ECU	DI-657 BE-84
Auto up (or down) function does not operate.	1. Power window switch circuit 2. Rear left door ECU	DI-657
Jam protection function and auto up (or down) function does not operate.	1. Jam protection limit switch circuit 2. Jam protection pulse switch circuit 3. Rear left door ECU	BE-84 BE-84

**OTHERS**

Symptom	Suspect Area	See page
Parts of the door does not function.	1. Power source circuit 2. Rear left door ECU.	DI-648

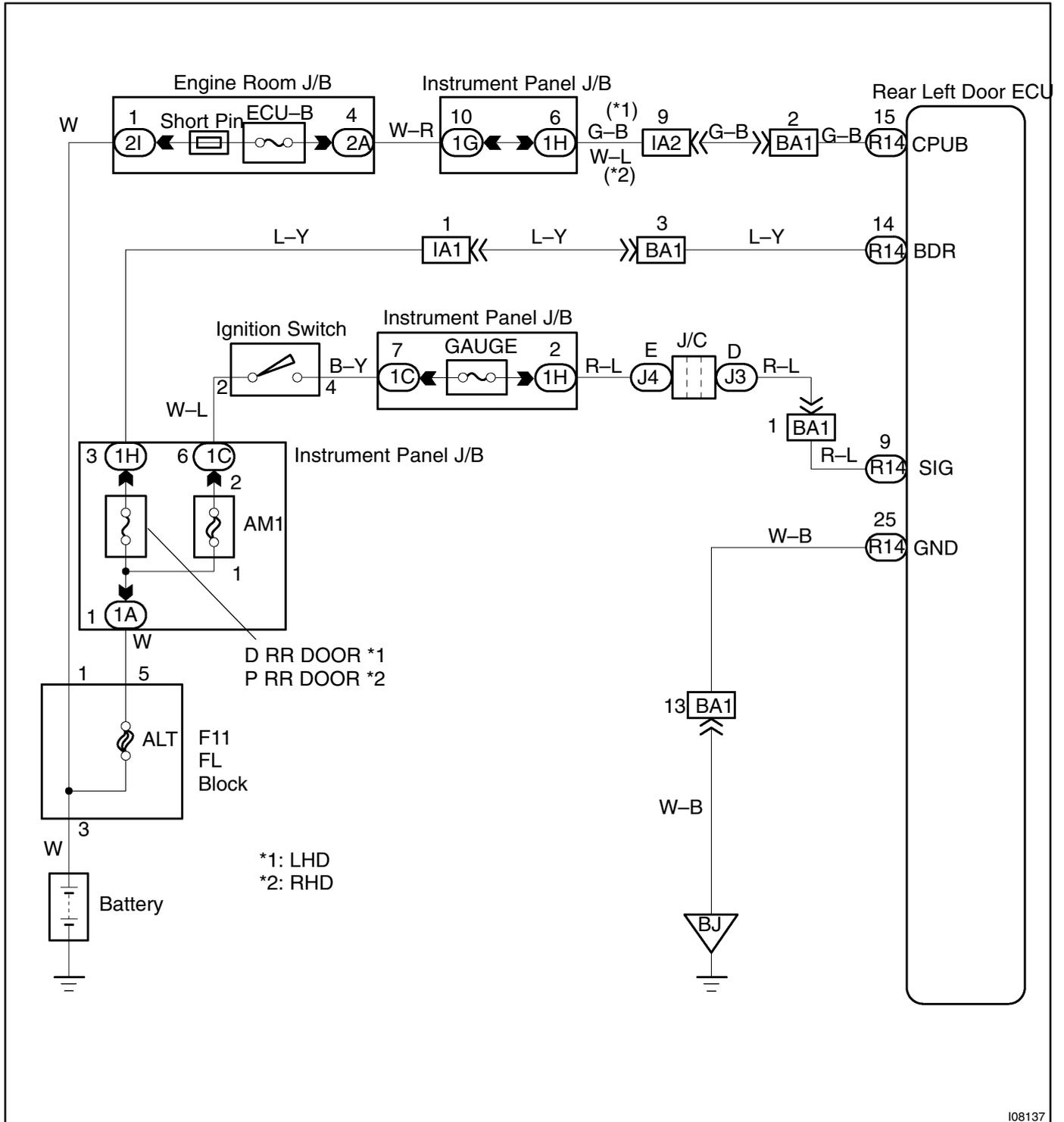
# CIRCUIT INSPECTION

## Power source circuit

### CIRCUIT DESCRIPTION

This circuit provides power to operate the rear left door ECU.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check ECU-B, GAUGE and D RR DOOR fuse.</b>
----------	---

**CHECK:**

Check continuity of ECU-B,GAUGE and D RR DDOR fuse.

**OK:**

Continuity



<b>2</b>	<b>Check voltage between terminals BDR,CPUB, SIG and GND of rear left door ECU connector.</b>
----------	---

**PREPARATION:**

Turn ignition switch ON.

**CHECK:**

Measure voltage between terminals SIG, and GND.

**OK:**

**Voltage: 10 – 14V**

**PREPARATION:**

(a) Turn ignition switch OFF.

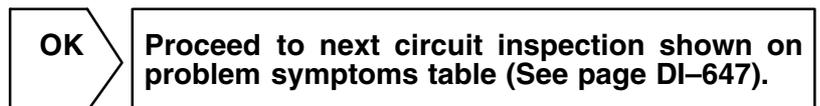
(b) Disconnect the rear left door ECU connector.

**CHECK:**

Measure voltage between terminals BDR, CPUB and GND.

**OK:**

**Voltage: 10 – 14V**



<b>3</b>	<b>Check wireharness and connector between ECU and body ground.</b>
----------	---

**NG**

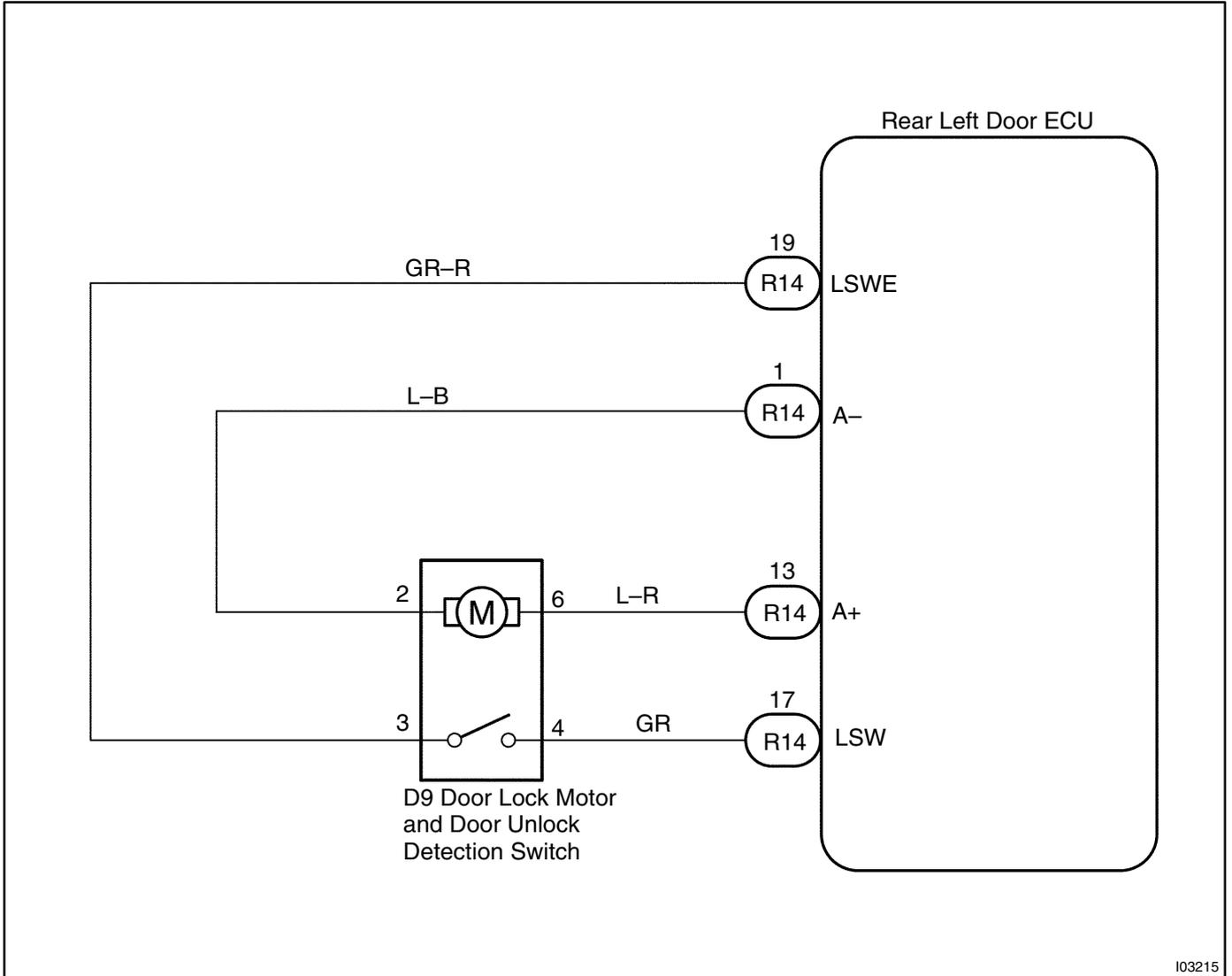
**Repair or replace wireharness or connector.**

**OK**

**Check and repair wireharness and connector between ECU and battery.**

# Door lock motor circuit

## WIRING DIAGRAM



**INSPECTION PROCEDURE**

**1** Check door lock motor (See page BE-97).

**NG**

Replace the door lock motor.

**OK**

**2** Check wireharness and connector between door lock motor and rear left door ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

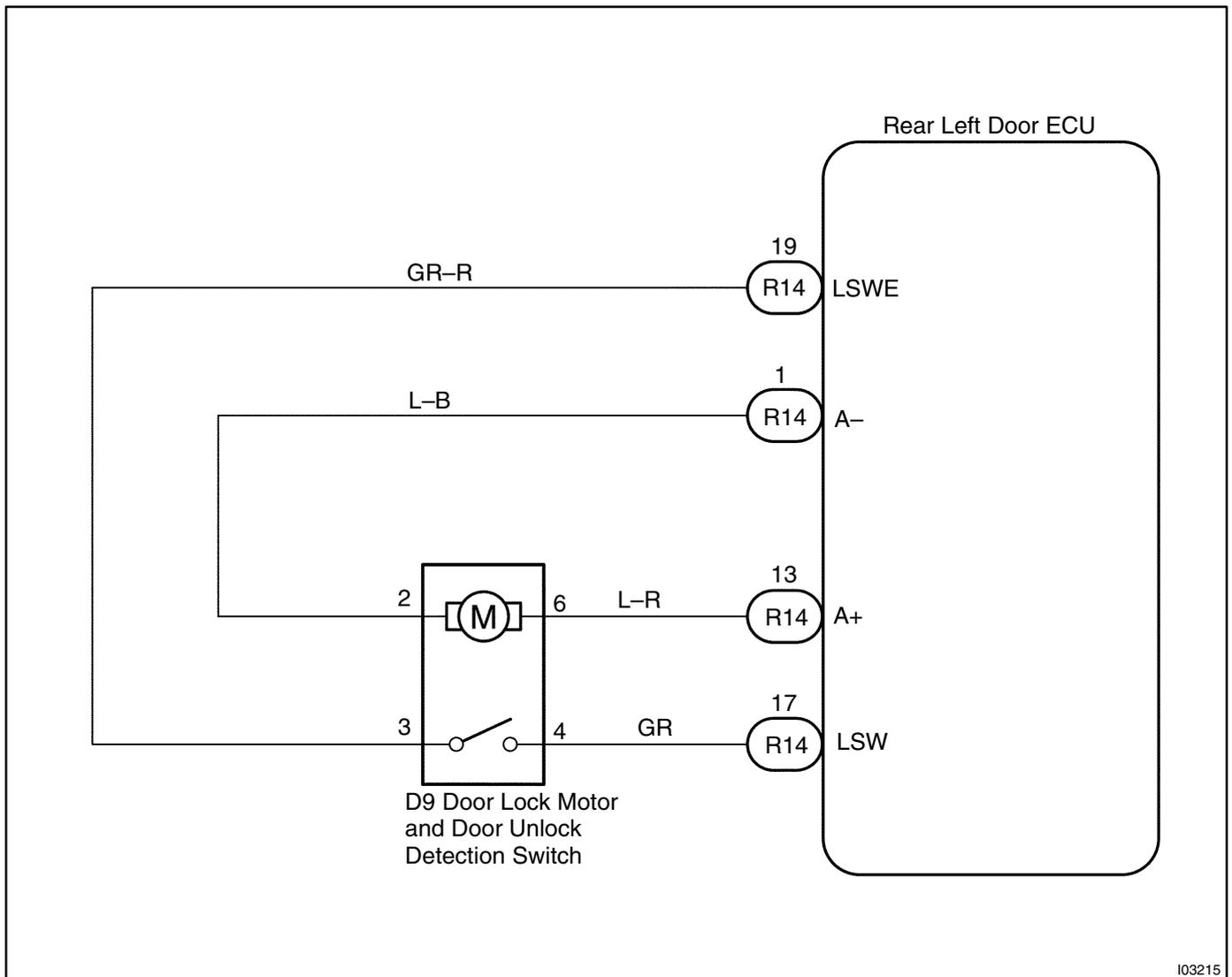
Proceed to next circuit inspection shown on  
problem symptoms table  
(See page DI-570).

## Door unlock detection switch

### CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function.

### WIRING DIAGRAM



**INSPECTION PROCEDURE**

**1** Check door unlock detection switch (See page BE-97).

**NG**

Replace the door lock motor.

**OK**

**2** Check wireharness and connector between door unlock detection switch and rear left door ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

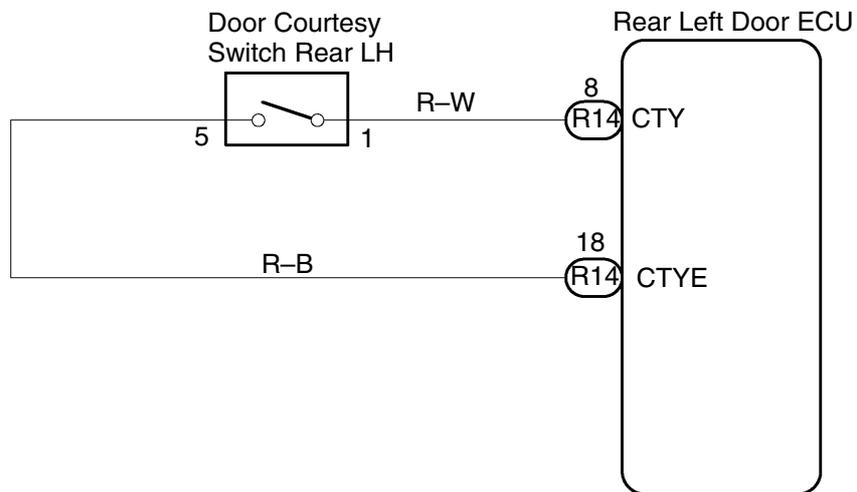
Proceed to next circuit inspection shown on problems symptoms table (See page DI-570).

# Door courtesy switch circuit

## CIRCUIT DESCRIPTION

The door courtesy switch turns on when the door is opened and turns off when door is closed.

## WIRING DIAGRAM



**INSPECTION PROCEDURE**

**1** Check door courtesy switch (See page BE-48).

**NG**

Replace the courtesy switch.

**OK**

**2** Check wireharness and connector between courtesy light and rear left door ECU, courtesy switch and rear left door ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

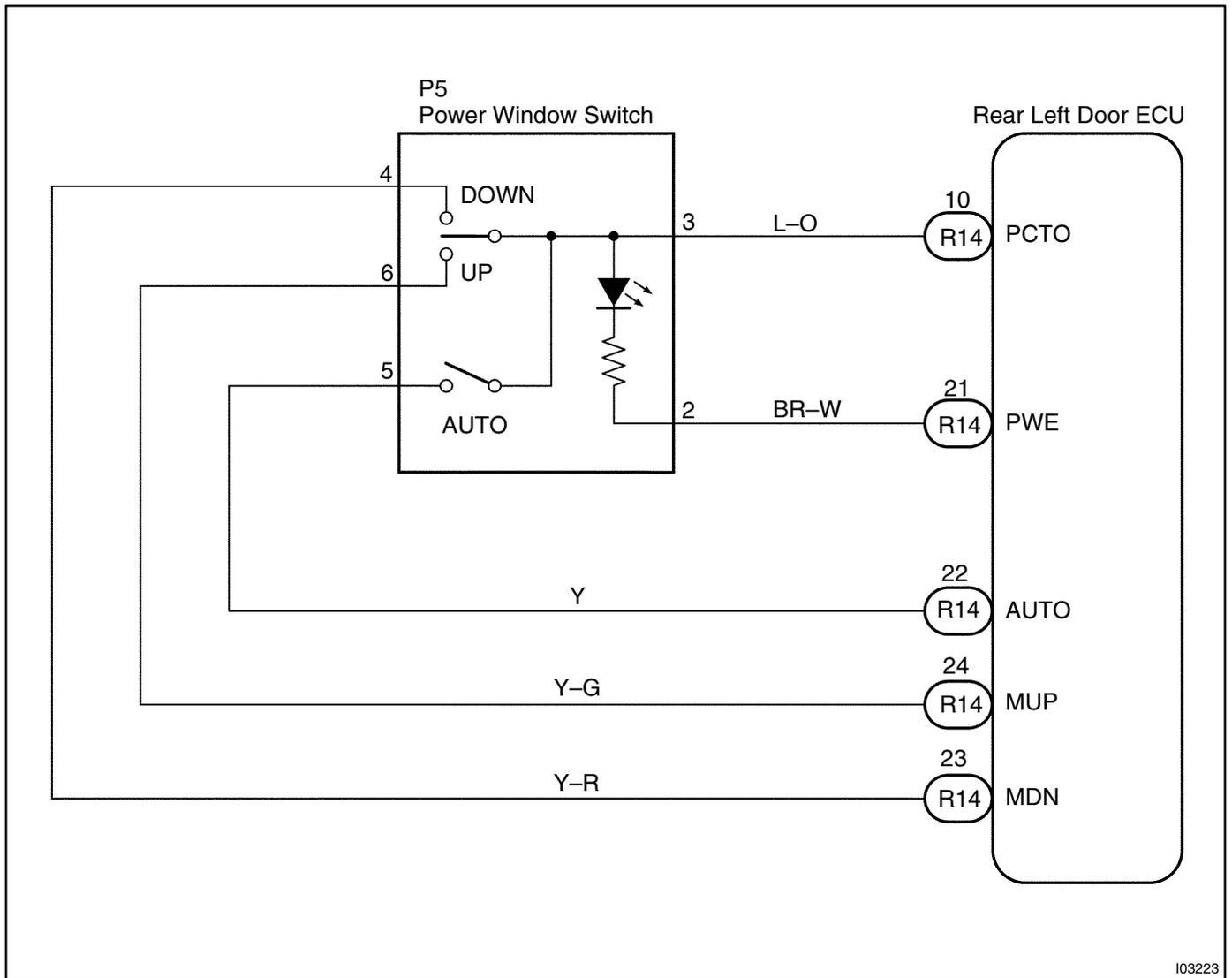
Proceed to next circuit inspection shown on problem symptoms table (See page DI-570).

# Power window switch circuit

## CIRCUIT DESCRIPTION

Power window switch circuit can be checked using DTC check. (Refer to DI-708)

## WIRING DIAGRAM



I03223

**INSPECTION PROCEDURE**

**1** Check the power window switch circuit using DTC check (See page DI-708).

**OK**

Proceed to next circuit inspection shown on problem symptoms table (See page DI-647).

**OK**

**2** Check the power window switch (See page BE-84).

**NG**

Replace the power window switch.

**OK**

**3** Check wireharness and connector between power window switch and rear left door ECU.

**NG**

Repair or replace wireharness or connector.

**OK**

**4** Check wireharness and connector between power window switch and power window master switch.

**NG**

Repair or replace wireharness or connector.

**OK**

Proceed to next circuit inspection shown on problem symptoms table (See page DI-647).