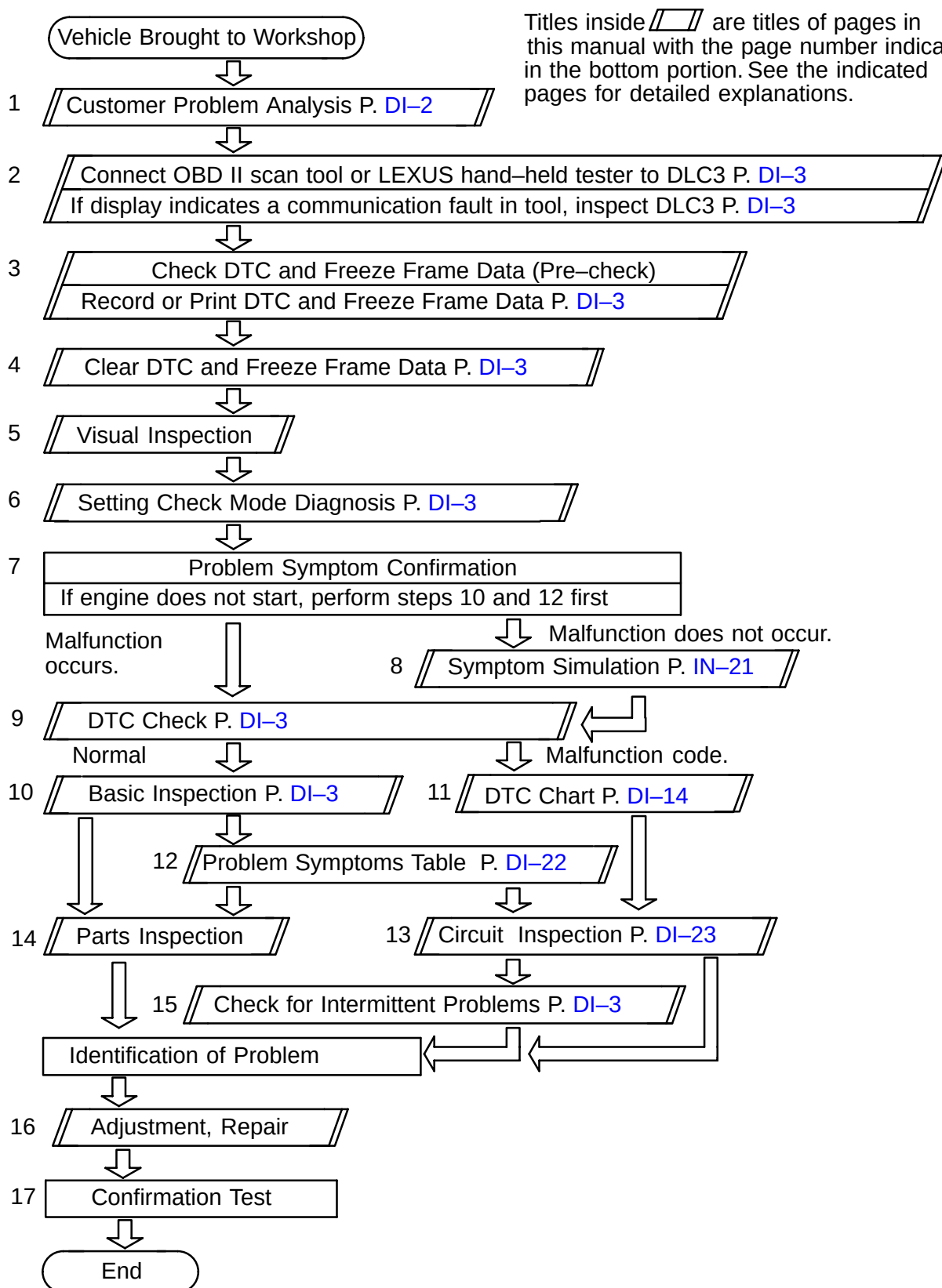


ENGINE

HOW TO PROCEED WITH TROUBLESHOOTING

DI094-08

Troubleshoot in accordance with the procedure on the following page.



CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's
Name

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

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

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

Condition of MIL		☐ Remains on ☐ Sometimes lights up ☐ Does not light up	
DTC Inspection	Normal Mode (Precheck)	☐ Normal ☐ Malfunction code(s) (code) ☐ Freeze frame data ()	
	Check Mode	☐ Normal ☐ Malfunction code(s) (code) ☐ Freeze frame data ()	

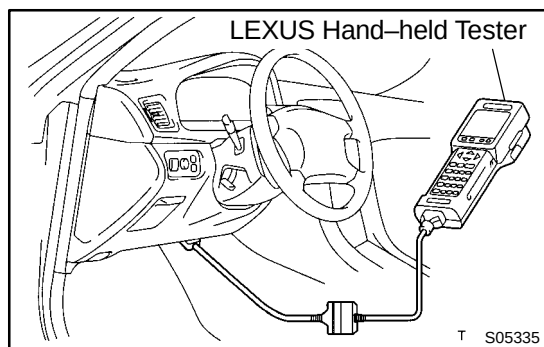
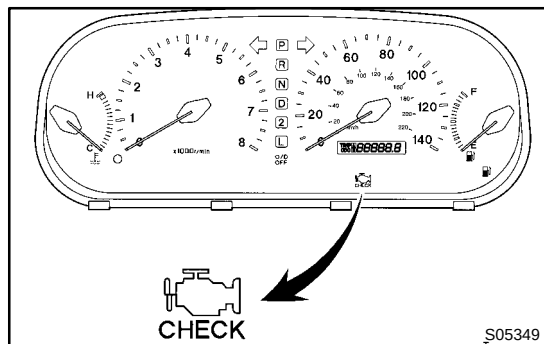
PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect the vehicle to the OBD II scan tool complying with SAE J1978 or LEXUS hand-held tester, and read off various data output from the vehicle's ECM.
- OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the MIL lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by SAE J2012 is recorded in the ECM memory (See page DI-14).

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



- To check the DTC, connect the OBD II scan tool or LEXUS hand-held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD II scan tool or LEXUS hand-held tester also enables you to erase the DTC and check freeze frame data and various forms of engine data (For operating instructions, see the OBD II scan tool's instruction book.). DTC include SAE controlled codes and manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI-14).

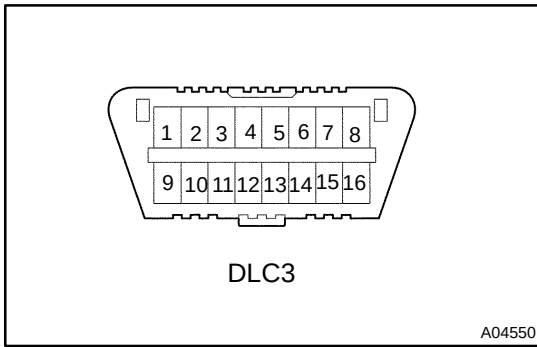
- The diagnosis system operates in the normal mode during the normal vehicle use. It also has the check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTC use 2 trip detection logic* to prevent erroneous detection, which ensures the malfunction detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily (LEXUS hand-held tester only) (See step 2).
- *2 trip detection logic:
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected again during the second drive test, this second detection causes the MIL to light up (2nd trip). The 2 trip repeats the same mode a 2nd time (however, the ignition switch must be turned OFF between the 1st 2 trip and 2nd 2 trip.).
- Freeze frame data:
Freeze frame data records the engine condition when a misfire (DTCs P0300 – P0306) or fuel trim malfunction (DTCs P0171 and P0172) or other malfunction (first malfunction only), is detected. Freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Priorities for troubleshooting:

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

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

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



(b) Check the DLC3.

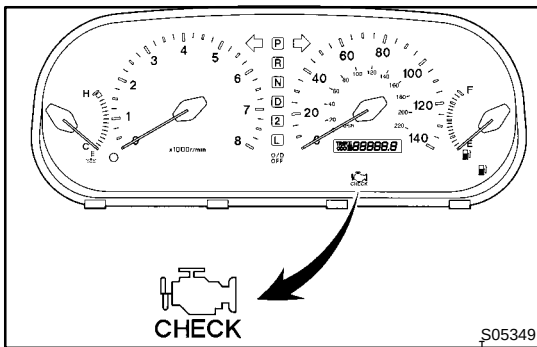
The vehicle's ECM uses ISO 9141–2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141–2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus $\ominus$ Line/Pulse generation	During transmission
4	Chassis Ground – Body Ground/1 Ω or less	Always
5	Signal Ground – Body Ground/1 Ω or less	Always
16	Battery Positive – Body Ground/9 – 14 V	Always

HINT:

If your display shows **UNABLE TO CONNECT TO VEHICLE** when you have connected the cable of the OBD II scan tool or LEXUS 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 the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

**2. Normal Mode:****INSPECT DIAGNOSIS**

(a) Check the MIL.

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

HINT:

If the MIL does not light up, troubleshoot the combination meter (See page [BE-65](#)).

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

(b) Check the DTC.

NOTICE:

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

- **LEXUS hand-held tester only:**

When the diagnosis system is switched from the normal mode to the check mode, all the DTC and freeze frame data recorded in the normal mode will be erased. So before switching modes, always check the DTC and freeze frame data, and note them down.

- (1) Prepare the OBD II scan tool (complying with SAE J 1978) or LEXUS hand-held tester.
- (2) Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3 at the lower center of the instrument panel.
- (3) Turn the ignition switch ON, and push the OBD II scan tool or LEXUS hand-held tester switch ON.
- (4) Use the OBD II scan tool or LEXUS hand-held tester to check the DTC and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book.).
If there is no DTC in the normal mode, check the 1st trip DTC using Continuous Test Results function (Mode 7 for SAE J1979) on the OBD II scan tool or TOYOTA hand-held tester.
- (5) See page [DI-14](#) to confirm the details of the DTC.

NOTICE:

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

(c) **Clear the DTC.**

The DTCs and freeze frame data will be erased by either action.

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

NOTICE:

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

3. Check Mode: INSPECT DIAGNOSIS

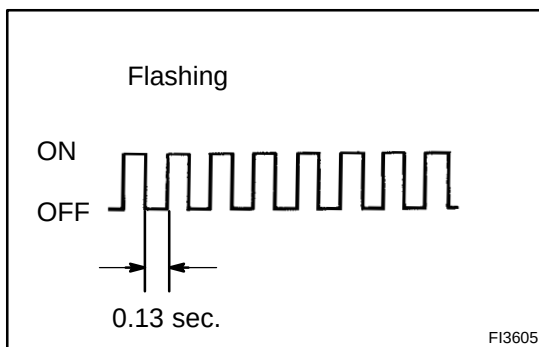
HINT:

LEXUS hand-held tester only:

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions. Furthermore, the same diagnostic items as ones detected in the normal mode can also be detected in the check mode.

Check the DTC.

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



- (7) Check if the MIL blinks.

NOTICE:

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

- (8) Start the engine (The MIL goes off after the engine starts.).
- (9) Simulate the conditions of the malfunction described by the customer.

NOTICE:

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

- (10) After simulating the malfunction conditions, use the LEXUS hand-held tester diagnosis selector to check the DTC 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 the check mode to the normal mode, so all the DTC, etc. will be erased.

- (11) After checking the DTC, inspect the applicable circuit.

4. FAIL-SAFE CHART

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

DTC No.	Fail-safe Operation	Fail-safe Deactivation Conditions
P0100	Ignition timing fixed at 10° BTDC	Returned to normal condition
P0110	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
P0115	Engine coolant temp. is fixed at 80°C (176°F)	Returned to normal condition
P0120	VTA is fixed at 0°	The following condition must be repeated at least 2 times consecutively 0.1 V ~ VTA ~ 0.95 V, SPD = 0 km/h
P0135 P0141 P0155 P1135 P1155	The heater circuit in which an abnormality is detected is turned off	Ignition switch OFF
P0325 P0330	Max. timing retardation	Ignition switch OFF
P1300	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HINT:

LEXUS hand-held tester only:

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

- Clear the DTC (See step 2).
- Set the check mode (See step 3).
- Perform a simulation test (See page [IN-21](#)).
- Check the connector and terminal (See page [IN-31](#)).
- Handle the connector (See page [IN-31](#)).

6. BASIC INSPECTION

When the malfunction code is not confirmed in the DTC check, troubleshooting should be performed in all the possible circuits considered as the cause 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, it is essential to use this check in the engine troubleshooting.

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

NO

Charge or replace battery.

YES

2 Is engine cranked?

NO

Proceed to page **ST-19**, and continue to troubleshoot.

YES

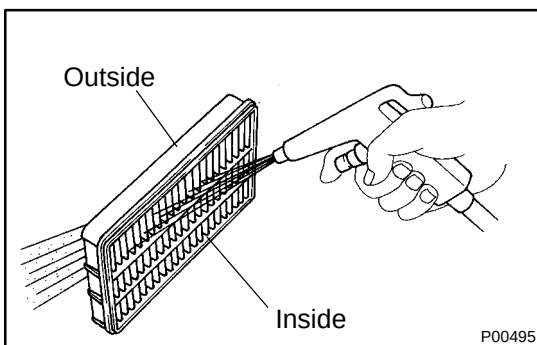
3 Does engine start?

NO

Go to step 7.

YES

4 Check air filter.



PREPARATION:

Remove the air filter.

CHECK:

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

HINT:

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

NG

Repair or replace.

OK

5 Check idle speed.

PREPARATION:

- Warm up the engine to the normal operating temperature.
- Switch off all the accessories.
- Switch off the A/C.
- Shift the transmission into the N position.
- Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3 on the vehicle.

CHECK:

Use the CURRENT DATA to check the idle speed.

OK:

Idle speed: 650 – 750 rpm

2001 LEXUS ES300 (RM831U)

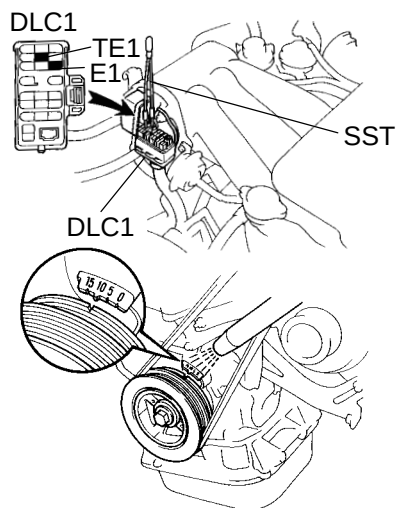
NG

Proceed to problem symptoms table in page [DI-22](#).

OK

6

Check ignition timing.



PREPARATION:

- Warm up engine to the normal operating temperature.
- Switch off all the accessories.
- Switch off the A/C.
- Shift the transmission into the N position.
- Keep the engine speed at idle.
- Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843 – 18020
- Using a timing light, connect the tester to check wire.

CHECK:

Check the ignition timing.

OK:

Ignition timing: 10° BTDC at idle

NG

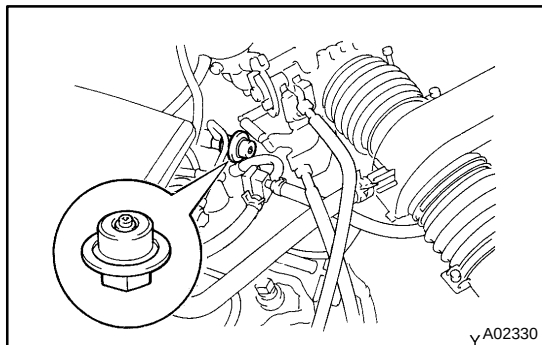
Proceed to page [IG-1](#), and continue to trouble-shoot.

OK

Proceed to problem symptoms table in page [DI-22](#).

7

Check fuel pressure.



PREPARATION:

- Be sure that there is enough fuel in the tank.
- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and push LEXUS hand-held tester main switch ON.
- Use the ACTIVE TEST mode to operate the fuel pump.
- If you have no LEXUS hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page [SF-6](#)).

CHECK:

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

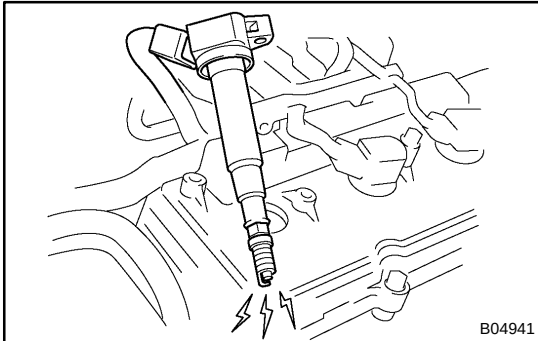
NG

Proceed to page [SF-6](#), and continue to troubleshoot.

OK

8

Check for spark.



PREPARATION:

- Remove the ignition coil from the spark plug.
- Remove the spark plug.
- Install the spark plug to the ignition coil.
- Disconnect the injector connector.
- Be sure to ground the screw of the spark plug securely.

CHECK:

Check if spark occurs while the engine is being cranked.

NOTICE:

- Do not crash the electrode gap.
- To prevent excess fuel from being injected from the injectors during this test, don't crank the engine for more than 5 – 10 seconds at one time.

NG

Proceed to page [IG-1](#) and continue to troubleshoot.

OK

Proceed to problem symptoms table in page [DI-22](#).

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 differ from those listed here. So do not depend solely on the "Normal Condition" here when deciding whether the part is faulty or not.

(a) CARB mandated signals.

LEXUS 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 10 – 25.0°
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to Ambient Temp.
MAF	Air Flow Rate Through Mass Air Flow Meter	Idling: 3.3 – 4.7 gm/sec. Racing without load (2,500 rpm): 10.4 – 15.4 gm/sec.
THROTTLE POS	Output Voltage 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 %
O2FT B1 S1	Oxygen Sensor Fuel Trim Bank 1 Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2S B1 S2	Output Voltage of Oxygen Sensor Bank 1 Sensor 2	Driving 50 km/h (31 mph): 0.05 – 0.95 V
O2FT B2 S1	Oxygen Sensor Fuel Trim Bank 2 Sensor 1 (Same as SHORT FT #2)	0 ± 20 %
A/FS B1 S1	Output Voltage of A/F Sensor Bank 1 Sensor 1	Idling: 2.8 – 3.8 V
A/FS B2 S1	Output Voltage 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 %

*: If "Idling" conditions are not specified, it means the shift lever is at the N or P position, the A/C switch is OFF and all the accessory switches are OFF.

(b) LEXUS Enhanced Signals.

LEXUS hand-held tester display	Measurement Item	Normal Condition*
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0: 0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0: 0 g/r
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.6 – 2.9 ms
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
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

DIAGNOSTICS – ENGINE

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 "Idling" conditions are not specified, it means the shift lever is at the N or P position, the A/C switch is OFF and all the accessory switches are OFF.

DIAGNOSTIC TROUBLE CODE CHART

HINT:

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

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

SAE CONTROLLED

DTC No. (See page)	Detection Item	Trouble Area	MIL*1	Memory
P0100 (DI-23)	Mass Air Flow Circuit Malfunction	Open or short in mass air flow meter circuit Mass air flow meter ECM		
P0101 (DI-27)	Mass Air Flow Circuit Range/Performance Problem	Mass air flow meter		
P0110 (DI-28)	Intake Air Temp. Circuit Malfunction	Open or short in intake air temp. sensor circuit Intake air temp. sensor (built in mass air flow meter) ECM		
P0115 (DI-32)	Engine Coolant Temp. Circuit Malfunction	Open or short in engine coolant temp. sensor circuit Engine coolant temp. sensor ECM		
P0116 (DI-36)	Engine Coolant Temp. Circuit Range/Performance Problem	Cooling system Engine coolant temp. sensor		
P0120 (DI-38)	Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction	Open or short in throttle position sensor circuit Throttle position sensor ECM		
P0121 (DI-42)	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem	Throttle position sensor		
P0125 (DI-43)	Insufficient Coolant Temp. for Closed Loop Fuel Control	Open or short in A/F sensor (bank 1, 2 sensor 1) circuit A/F sensor (bank 1, 2 sensor 1) Air induction system Fuel pressure Injector Gas leakage on exhaust system ECM		
P0128 (DI-48)	Thermostat Malfunction	Thermostat		
P0136 (DI-49)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	Open or short in heated oxygen sensor circuit Heated oxygen sensor		
P0141 (DI-51)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	Open or short in heater circuit of heated oxygen sensor Heated oxygen sensor heater ECM		
P0171 (DI-53)	System too Lean (Fuel Trim)	Air induction system Injector blockage Mass air flow meter Engine coolant temp. sensor Fuel pressure Gas leak on exhaust system Open or short in A/F sensor (bank 1, 2 sensor 1) circuit A/F sensor (bank 1, 2 sensor 1) ECM		

DIAGNOSTICS – ENGINE

P0172 (DI-53)	System too Rich (Fuel Trim)	Injector leak, blockage Mass air flow meter Engine coolant temp. sensor Ignition system Fuel pressure Gas leak on exhaust system Open or short in A/F sensor (bank 1, 2 sensor 1) circuit A/F sensor (bank 1, 2 sensor 1) ECM	○	○
P0174 (DI-53)	System too Lean (A/F Lean malfunction, Bank 2)	Same as DTS No. P0171	○	○
P0175 (DI-53)	System too Lean (A/F Rich malfunction, Bank 2)	Same as DTS No. P0172	○	○
P0300 (DI-58)	Random/Multiple Cylinder Misfire Detected	Open or short in engine wire Connector connection Vacuum hose connection Ignition system Injector Fuel pressure Mass air flow meter Engine coolant temp. sensor Compression pressure Valve clearance Valve timing ECM	○*2	○
P0301 (DI-58)	Cylinder 1 Misfire Detected			
P0302 (DI-58)	Cylinder 2 Misfire Detected			
P0303 (DI-58)	Cylinder 3 Misfire Detected			
P0304 (DI-58)	Cylinder 4 Misfire Detected			
P0305 (DI-58)	Cylinder 5 Misfire Detected			
P0306 (DI-58)	Cylinder 6 Misfire Detected			
P0325 (DI-64)	Knock Sensor 1 Circuit Malfunction (Bank 1)	Open or short in knock sensor 1 circuit Knock sensor 1 (looseness) ECM	○	○
P0330 (DI-64)	Knock Sensor 2 Circuit Malfunction (Bank 2)	Open or short in knock sensor 2 circuit Knock sensor 2 (looseness) ECM	○	○
P0335 (DI-67)	Crankshaft Position Sensor "A" Circuit Malfunction	Open or short in crankshaft position sensor circuit Crankshaft position sensor Crankshaft timing pulley ECM	○	○
P0340 (DI-69)	Camshaft Position Sensor Circuit Malfunction	Open or short in camshaft position sensor circuit Camshaft position sensor Camshaft timing gear ECM	○	○
P0420 (DI-71)	Catalyst System Efficiency Below Threshold (Bank 1)	Gas leak on exhaust system A/F sensor (bank 1, 2 sensor 1) Heated oxygen sensor (bank 1 sensor 2) Three-way catalytic converter	○	○

P0440 (DI-74)	Evaporative Emission Control System Malfunction	Hose or tube cracked, holed, damaged or insufficient seal Fuel tank cap incorrectly installed Fuel tank cap cracked or damaged Vacuum hose cracked, holed, blocked, damaged or disconnected Fuel tank cracked, holed or damaged Charcoal canister cracked, holed or damaged Open or short in vapor pressure sensor circuit Vapor pressure sensor Fuel tank over fill check valve cracked or damaged ECM	○	○
P0441 (DI-83)	Evaporative Emission Control System Incorrect Purge Flow	Vacuum hose cracked, holed blocked, damaged or disconnected ((1), (2), (3), (4), (5), (6), (7), (8), (9), (10) and (11) in Fig. 1) Fuel tank cap incorrectly installed Fuel tank cap cracked or damaged Open or short in vapor pressure sensor circuit Vapor pressure sensor Open or short in VSV circuit for EVAP VSV for EVAP Open or short in VSV circuit for CCV VSV for CCV Open or short in VSV circuit for pressure switching valve VSV for pressure switching valve Fuel tank cracked, holed or damaged Charcoal canister cracked, holed or damaged Fuel tank over fill check valve cracked or damaged ECM	○	○
P0442 (DI-74)	Evaporative Emission Control System Leak Detected (Small Leak)	Same as DTC No. P0440	○	○
P0446 (DI-83)	Evaporative Emission Control System Vent Control Malfunction	Same as DTC No. P0441	○	○
P0450 (DI-101)	Evaporative Emission Control System Pressure Sensor Malfunction	Open or short in vapor pressure sensor circuit Vapor pressure sensor ECM	○	○
P0451 (DI-101)	Evaporative Emission Control System Pressure Sensor Range/Performance			
P0500 (DI-103)	Vehicle Speed Sensor Malfunction	Combination meter Open or short in vehicle speed sensor circuit Vehicle speed sensor ECM	○	○
P0505 (DI-106)	Idle Control System Malfunction	Open or short in IAC valve circuit IAC valve is stuck or closed Open or short in A/C signal circuit Air induction system ECM	○	○

*1: MIL lights up

*2: MIL light up or blinking

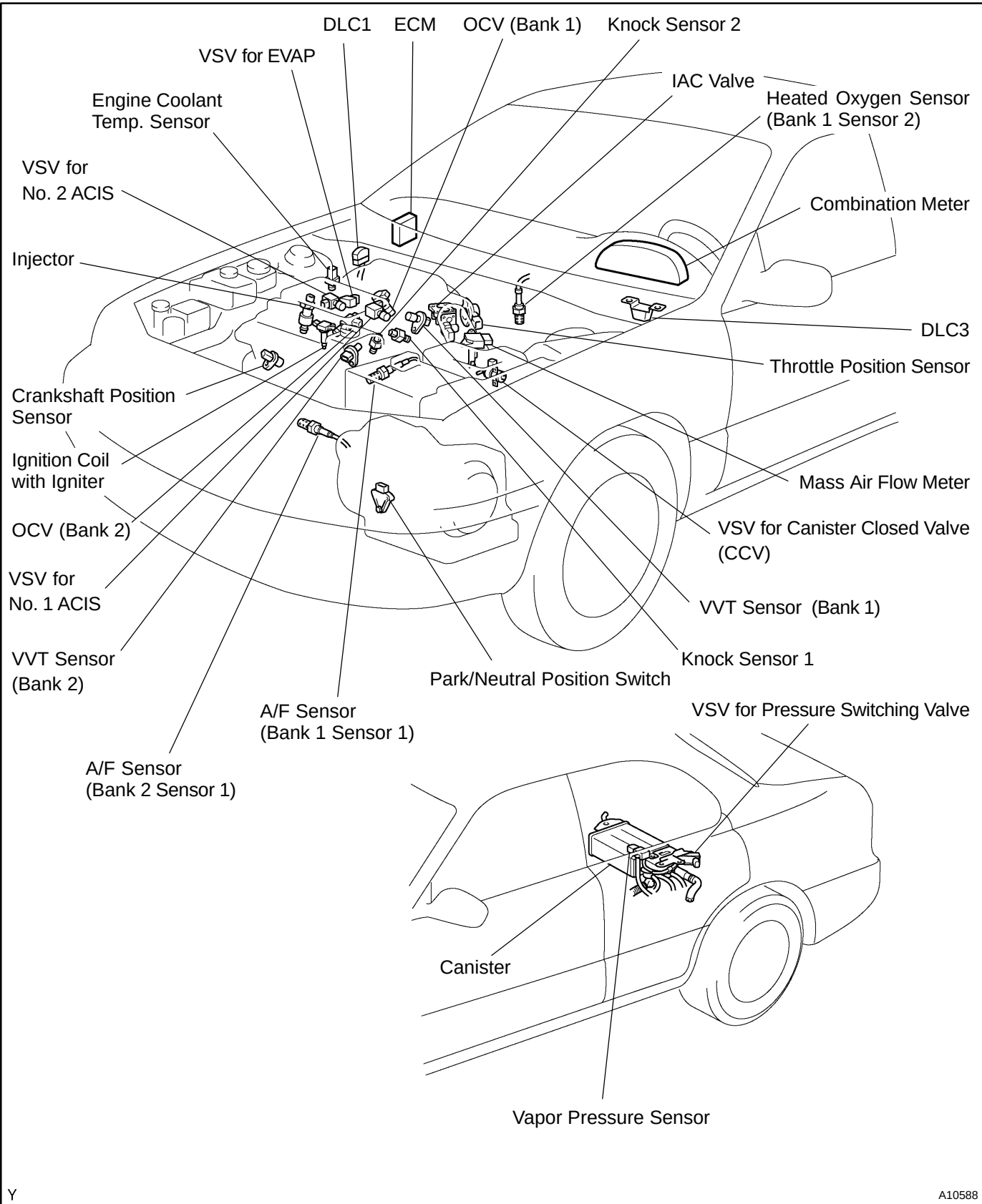
MANUFACTURER CONTROLLED

DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P1130 (DI-110)	A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)	Open or short in A/F sensor circuit A/F sensor Air induction system Fuel pressure Injector ECM	○	○
P1133 (DI-115)	A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)	Open or short in A/F sensor circuit A/F sensor Air induction system Fuel pressure Injector ECM	○	○
P1135 (DI-119)	A/F Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	Open or short in heater circuit of A/F sensor A/F sensor heater ECM	○	○
P1150 (DI-110)	A/F Sensor Circuit Range/Performance Malfunction (Bank 2 Sensor 1)	Same as DTC No. P1130	○	○
P1153 (DI-115)	A/F Sensor Circuit Response Malfunction (Bank 2 Sensor 1)	Same as DTC No. P1133	○	○
P1155 (DI-119)	A/F Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	Same as DTC No. P1135	○	○
P1300 (DI-121)	Igniter Circuit Malfunction (No. 1)	Ignition system Open or short in IGF1 or IGT1 circuit from No. 1 ignition coil with igniter to ECM No. 1 ignition coil with igniter ECM	○	○
P1305 (DI-121)	Igniter Circuit Malfunction (No. 2)	Ignition system Open or short in IGF2 or IGT2 circuit from No. 2 ignition coil with igniter to ECM No. 2 ignition coil with igniter ECM	○	○
P1310 (DI-121)	Igniter Circuit Malfunction (No. 3)	Ignition system Open or short in IGF2 or IGT3 circuit from No. 3 ignition coil with igniter to ECM No. 3 ignition coil with igniter ECM	○	○
P1315 (DI-121)	Igniter Circuit Malfunction (No. 4)	Ignition system Open or short in IGF1 or IGT4 circuit from No. 4 ignition coil with igniter to ECM No. 4 ignition coil with igniter ECM	○	○
P1320 (DI-121)	Igniter Circuit Malfunction (No. 5)	Ignition system Open or short in IGF2 or IGT5 circuit from No. 5 ignition coil with igniter to ECM No. 5 ignition coil with igniter ECM	○	○
P1325 (DI-121)	Igniter Circuit Malfunction (No. 6)	Ignition system Open or short in IGF1 or IGT6 circuit from No. 6 ignition coil with igniter to ECM No. 6 ignition coil with igniter ECM	○	○

P1335 (DI-127)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	Open or short in crankshaft position sensor circuit Crankshaft position sensor Camshaft timing gear ECM	–	○
P1346 (DI-128)	VVT Sensor/Crankshaft position Sensor Circuit Range/Performance Problem (Bank 1)	Mechanical system (Jumping teeth of timing belt, belt stretched) ECM	○	○
P1349 (DI-129)	VVT System Malfunction (Bank 1)	Valve timing OCV VVT controller assembly ECM	○	○
P1350 (DI-135)	VVT Sensor/Camshaft position Sensor Circuit Malfunction (Bank 2)	Open or short in VVT sensor (camshaft position Sensor) circuit VVT sensor (camshaft position Sensor) ECM	○	○
P1351 (DI-128)	VVT Sensor/Crankshaft position Sensor Circuit Range/Performance Problem (Bank 2)	Same as DTC No. P1346	○	○
P1354 (DI-129)	VVT System Malfunction (Bank 2)	Same as DTC No. P1349	○	○
P1520 (DI-137)	Stop Light Switch Signal Malfunction	Short in stop light switch signal circuit Stop light switch ECM	○	○
P1600 (DI-139)	ECM BATT Malfunction	Open in back up power source circuit ECM	○	○
P1656 (DI-141)	OCV Circuit Malfunction (Bank 1)	Open or short in OCV circuit OCV ECM	○	○
P1663 (DI-141)	OCV Circuit Malfunction (Bank 2)			
P1780 (DI-144)	Park/Neutral Position Switch Malfunction	Short in park/neutral position switch circuit Park/neutral position switch ECM	○	○
B2795 (DI-695)	Unmatched Key Code	Immobiliser system	–	○
B2796 (DI-696)	No Communication in Immobiliser System	Immobiliser system	–	○
B2797 (DI-698)	Communication Malfunction No.1	Immobiliser system	–	○
B2798 (DI-700)	Communication Malfunction No.2	Immobiliser system	–	○

*: ○ ~ MIL lights up. – ~ MIL does not light up.

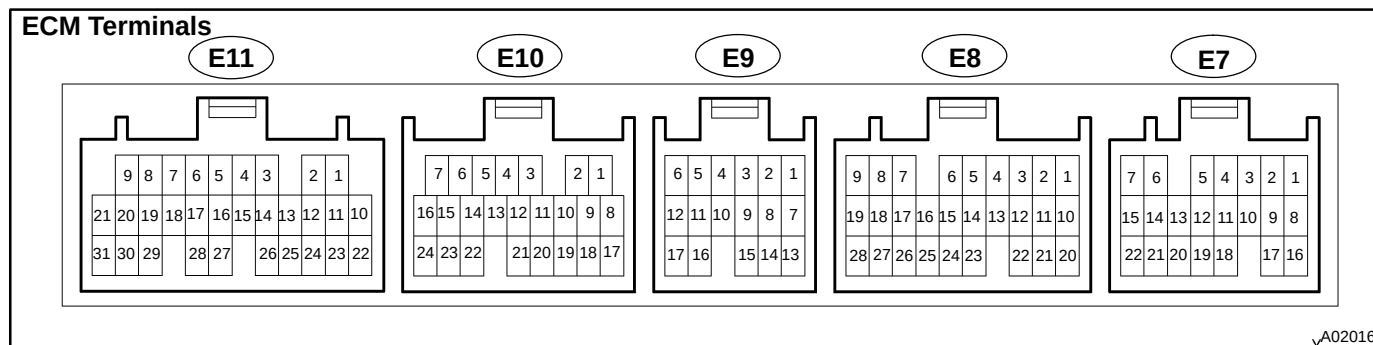
PARTS LOCATION



Y

A10588

TERMINALS OF ECM



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E7-1) – E1 (E10-17)	B-Y – BR	Always	9 – 14
+B (E7-16) – E1 (E10-17)	B-Y – BR	IG switch ON	9 – 14
VC (E10-2) – E2 (E10-18)	Y – BR	IG switch ON	4.5 – 5.5
VTA1 (E10-23) – E2 (E10-18)	L – BR	IG switch ON Throttle valve fully closed	0.3 – 1.0
		IG switch ON Throttle valve fully open	2.7 – 5.2
VG (E10-10) – E2G (E10-19)	P – R-B	Idling A/C switch OFF	1.1 – 1.5
VV1+ (E11-10) – NE- (E10-24)	O – BR	Idling	Pulse generation (See page DI-135)
VV2+ (E11-22) – NE- (E10-24)	L – BR		
NE+ (E10-16) – NE- (E10-24)	B-R – BR	Idling	Pulse generation (See page DI-135)
OC1+ (E11-6) – OC1- (E11-5)	G – G-W	IG switch ON	Pulse generation (See page DI-129)
OC2+ (E11-29) – OC2- (E11-18)	G-R – G-Y		
THA (E10-22) – E2 (E10-18)	L-Y – BR	Idling Intake air temp. 20°C (68°F)	0.5 – 3.4
THW (E10-14) – E2 (E10-18)	G-B – BR	Idling Engine coolant temp. 80°C (176°F)	0.2 – 1.0
STA (E7-7) – E1 (E10-17)	GR – BR	Cranking	6.0 or more
#10 (E10-5) – E01 (E11-21) #20 (E10-6) – E01 (E11-21) #30 (E11-1) – E01 (E11-21) #40 (E11-2) – E01 (E11-21) #50 (E11-3) – E01 (E11-21) #60 (E11-4) – E01 (E11-21)	L – BR R – BR Y – BR W – BR R-W – BR G – BR	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI-58)
IGT1 (E11-11) – E1 (E10-17)	L-B – BR	Idling	Pulse generation (See page DI-121)
IGT2 (E11-12) – E1 (E10-17)	L-W – BR		
IGT3 (E11-13) – E1 (E10-17)	L-R – BR		
IGT4 (E11-14) – E1 (E10-17)	L-Y – BR		
IGT5 (E11-15) – E1 (E10-17)	L – BR		
IGT6 (E11-16) – E1 (E10-17)	LG – BR		
IGF (E11-25) – E1 (E10-17)	W-R – BR	IG switch ON	4.5 – 5.5
		Idling	Pulse generation (See page DI-121)
ACIS (E11-17) – E01 (E11-21)	R-Y – BR	IG switch ON	9 – 14
FC (E7-3) – E01 (E11-21)	G-R – BR	IG switch ON	9 – 14
		Idling	0 – 3.0
EVP1 (E10-7) – E01 (E11-21)	LG – BR	IG switch ON	9 – 14

DIAGNOSTICS – ENGINE

CCV (E7-10) – E01 (E11-21)	L-R – BR	IG switch ON	9 – 14
RSO (E11-26) – E01 (E11-21)	R-W – BR	IG switch ON Disconnect E11 connector from ECM	9 – 14
OXS (E8-8) – E1 (E10-17)	B – BR	Maintain engine speed at 2,500 rpm for 3 min. after warming up	Pulse generation (See page DI-71)
HTS (E8-9) – E03 (E11-30)	P-B – BR	Idling	9 – 14
		IG switch ON	Below 3.0
KNKR (E11-27) – E1 (E10-17)	W – BR	Idling	Pulse generation (See page DI-64)
KNKL (E11-28) – E1 (E10-17)	W – BR		
NSW (E8-20) – E1 (E10-17)	B-W – BR	IG switch ON Other shift position in P, N	9 – 14
		IG switch ON Shift position in P, N	0
TACH (E8-27) – E1 (E10-17)	B-O – BR	Idling	Pulse generation
TBP (E8-3) – E01 (E11-21)	V – BR	IG switch ON Disconnect vacuum hose from vapor pressure sensor	9 – 14
PTNK (E7-17) – E2 (E10-18)	P – BR	IG switch ON	2.9 – 3.7
		IG switch ON Apply vacuum 4.0 kPa (30 mmHg, 1.18 in.Hg)	0.5 or less
SIL (E7-4) – E1 (E10-17)	W – BR	During transmission	Pulse generation
STP (E7-15) – E1 (E10-17)	G-W – BR	IG switch ON Brake pedal depressed	7.5 – 14
		IG switch ON Brake pedal released	Below 1.5
AFR+ (E10-11) – E1 (E10-17)	G – BR	IG switch ON	3.0 – 3.6
AFL+ (E10-12) – E1 (E10-17)	L – BR		
AFR- (E10-20) – E1 (E10-17)	R – BR	IG switch ON	2.7 – 3.3
AFL- (E10-21) – E1 (E10-17)	B-W – BR		
HAFL (E10-4) – E05 (E10-8)	B-W – BR	Idling	Below 3.0
	B-R – BR	IG switch ON	9 – 14
KSW (E8-23) – E1 (E10-17)	L-B – BR	At time of inserting key	Below 1.5
		In condition without key inserted	4 – 5
CODE (E8-28) – E1 (E10-17)	G-W – BR	At time of inserting key	Pulse generation
IGSW (E7-2) – E1 (E10-17)	B-R – BR	IG switch ON	9 – 14
TXCT (E8-18) – E1 (E10-17)	L-Y – BR	At time of inserting key	Pulse generation
IMLD (E7-22) – E1 (E10-17)	R-Y – BR	In condition without key inserted	Pulse generation
MREL (E7-8) – E1 (E10-17)	B-W – BR	IG switch ON	9 – 14
SPD (E8-22) – E1 (E10-17)	V-W – BR	IG switch ON Rotate driving wheel slowly	Pulse generation

PROBLEM SYMPTOMS TABLE

When the malfunction is not confirmed in the DTC check and the problem still can not be confirmed in the basic inspection either, proceed to this problem symptoms table and troubleshoot according to the number given below.

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	11. Starter 12. Starter relay	ST-19 ST-21
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	DI-148 DI-152 IN-31
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-152
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-145 DI-152 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-145 DI-152
Hot engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-145 DI-152
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	DI-758 DI-148
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	DI-758 DI-152
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM-3 DI-152
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	DI-148 DI-152
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. A/T faulty	DI-152 DI-161
Surging (Poor driveability)	1. Fuel pump control circuit	DI-152
Soon after starting (Engine stall)	1. Fuel pump control circuit	DI-152
During A/C operation (Engine stall)	1. A/C signal circuit (Compressor circuit) 2. ECM	DI-758 IN-31
Unable to refuel/ Difficult to refuel	1. ORVR system	EC-6

CIRCUIT INSPECTION

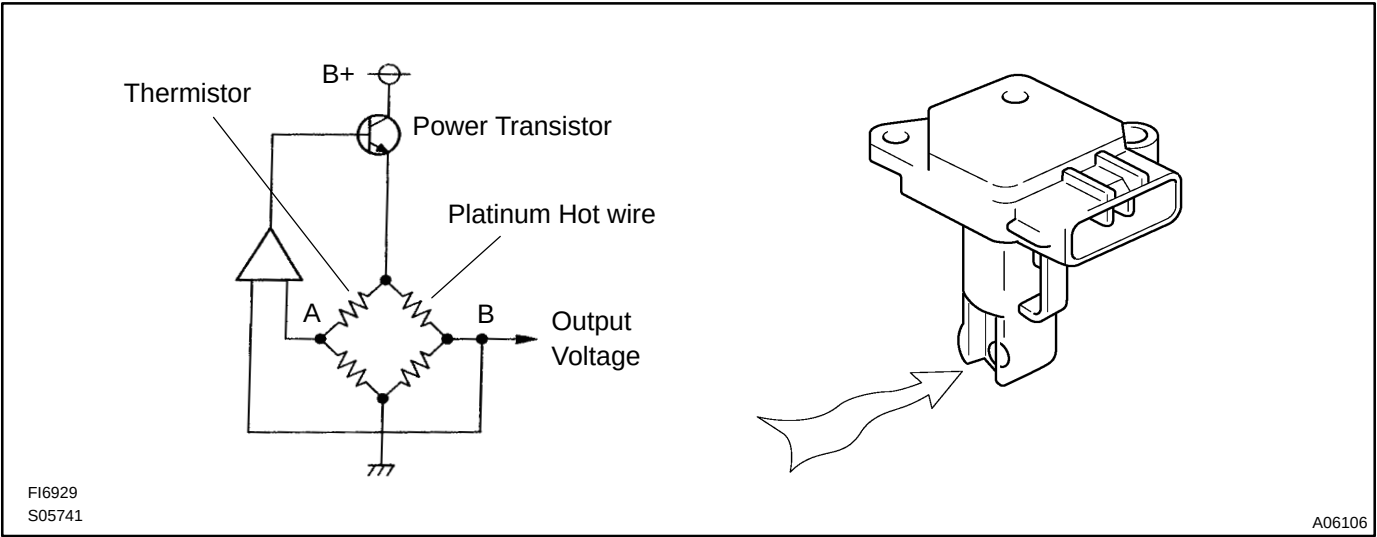
DTC	P0100	Mass Air Flow Circuit Malfunction

CIRCUIT DESCRIPTION

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

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

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



DTC No.	DTC Detecting Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit with more than 3 sec. engine speed 4,000 rpm or less	●Open or short in mass air flow meter circuit ●Mass air flow meter ●ECM

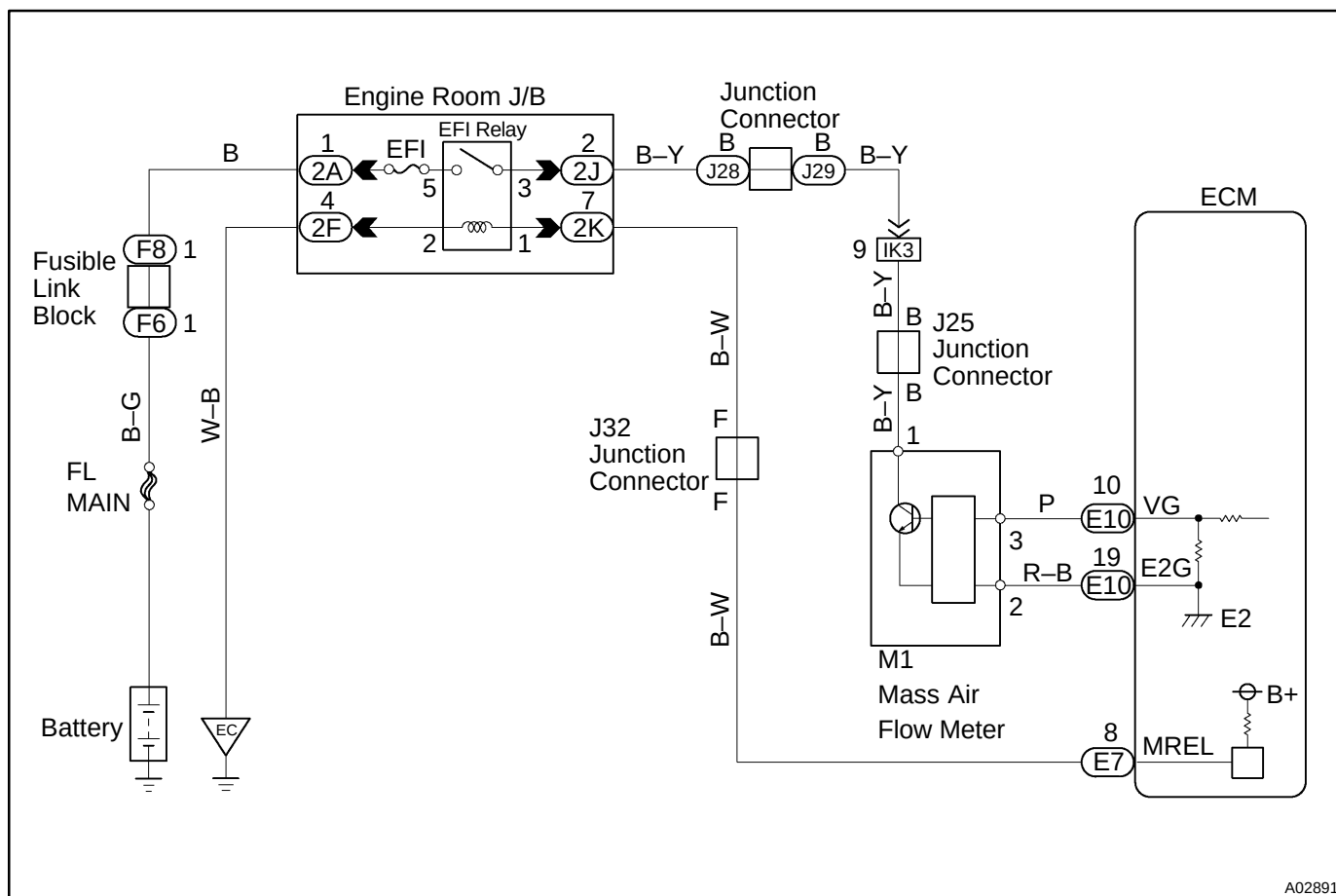
If the ECM detects DTC P0100 it operates the fail-safe function, keeping the ignition timing and injection volume constantly and making it possible to drive the vehicle.

HINT:

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

Mass Air Flow Value (gm/sec.)	Malfunction
0.0	●Mass air flow meter power source circuit open ●VG circuit open or short
271.0 or more	●E2G circuit open

WIRING DIAGRAM



A02891

INSPECTION PROCEDURE

HINT:

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

1	Connect OBD II scan tool or LEXUS hand-held tester, and read value of mass air flow rate.

PREPARATION:

- Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and push the OBD II scan tool or LEXUS hand-held tester main switch ON.
- Start the engine.

CHECK:

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

RESULT:

	Type I	Type II
Mass Air Flow Rate (gm/sec.)	0.0	271.0 or more

Type I

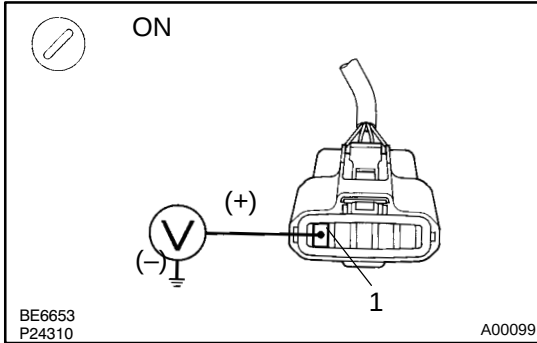
Go to step 2.

Type II

Go to step 5.

2

Check voltage of mass air flow meter power source.

**PREPARATION:**

- (a) Disconnect the mass air flow meter connector.
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

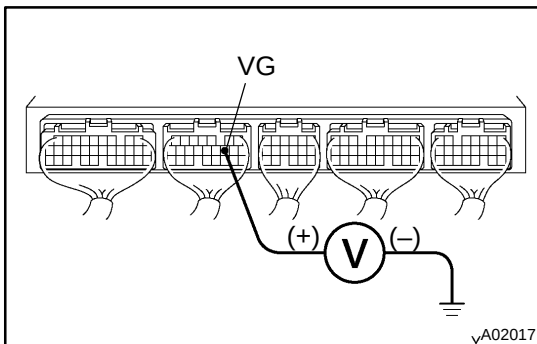
NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and mass air flow meter (See page [IN-31](#)).

OK

3

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

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Start the engine.

CHECK:

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

OK:

Voltage:

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

OK

Check and replace ECM (See page [IN-31](#)).

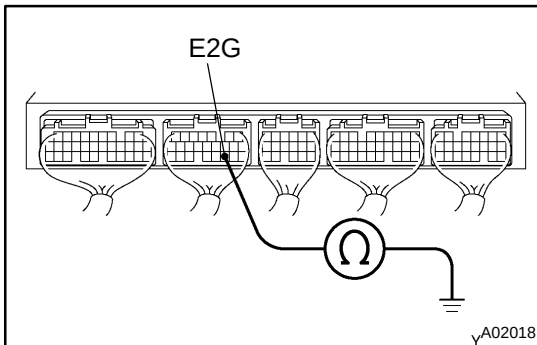
NG

4

Check for open and short in harness and connector between mass air flow meter and ECM (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK**Replace mass air flow meter.****5 Check continuity between terminal E2G of ECM connector and body ground.****PREPARATION:**Remove the glove compartment (See page [SF-79](#)).**CHECK:**

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

OK:**Continuity (1 Ω or less)****NG****Check and replace ECM (See page [IN-31](#)).****OK****6 Check for open in harness and connector between mass air flow meter and ECM (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK****Replace mass air flow meter.**

DTC	P0101	Mass Air Flow Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0100 on page [DI-23](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0101	Conditions (a), (b) and (c) continue 10 sec. or more with engine speed NE < 900: (2 trip detection logic) (a) Throttle valve fully closed (b) Mass air flow meter output $\ominus$ 2.2 V (c) THW $\geq$ 70°C	●Mass air flow meter
	Conditions (a) and (b) continue 10 sec. or more with engine speed 1,500 rpm or more: (2 trip detection logic) (a) VTA $\geq$ 0.63 V (b) Mass air flow meter output $\sim$ 1.06 V	

INSPECTION PROCEDURE

HINT:

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

1	Are there any other codes (besides DTC P0101) being output?

NO

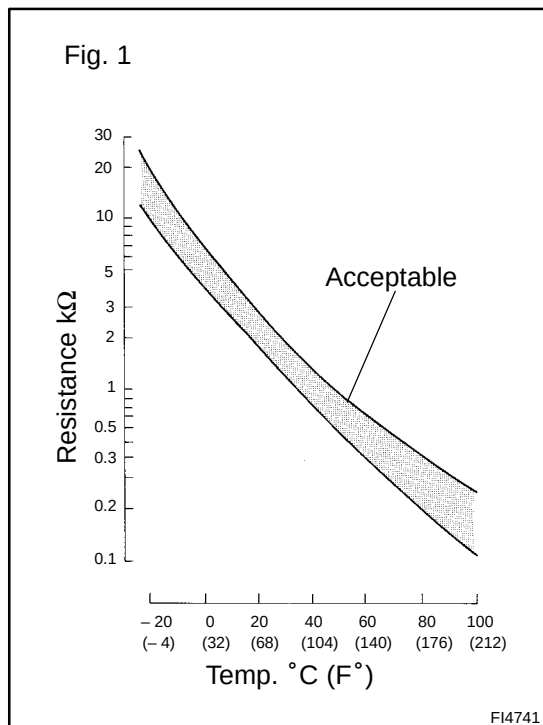
Replace mass air flow meter.

YES

Go to relevant DTC chart.

DTC	P0110	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION



The intake air temperature sensor is built in mass air flow meter and senses the intake air temperature.

A thermistor built in the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature, the greater the thermistor resistance value is, and the higher the intake air temperature, the lower the thermistor resistance value is (See Fig. 1).

The intake air temperature sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the intake air temperature sensor from terminal THA via resistor R. That is, resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in proportion to the changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during the cold engine operation.

If the ECM detects the DTC P0110, it operates the fail-safe function in which the intake air temperature is assumed to be 20°C (68°F).

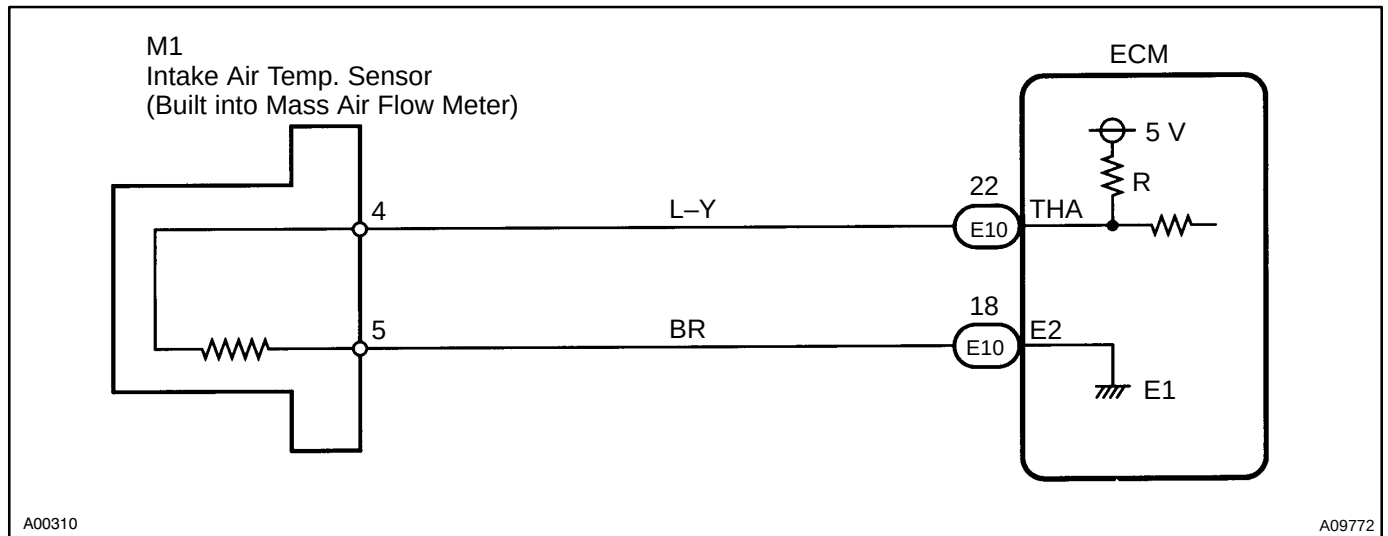
DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temp. sensor circuit	●Open or short in intake air temp. sensor circuit ●Intake air temp. sensor (built in mass air flow meter) ●ECM

HINT:

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

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120 and P1410 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Connect OBD II scan tool or LEXUS hand-held tester, and read value of intake air temperature.

PREPARATION:

- Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and push the OBD II scan tool or LEXUS hand-held tester main switch ON.

CHECK:

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

OK:

Same value as the actual intake air temperature.

HINT:

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

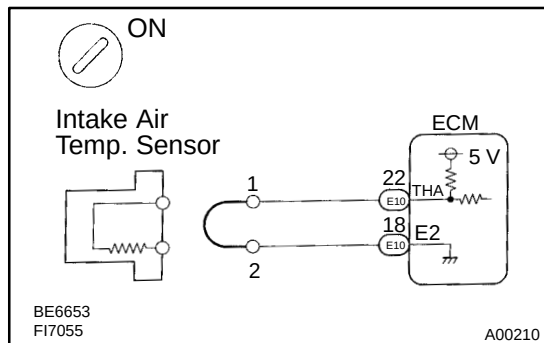
NG

-40°C (-40°F) ... Go to step 2.
 140°C (284°F) or more ... Go to step 4.

OK

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

2 Check for open in harness or ECM.



PREPARATION:

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

CHECK:

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

OK:

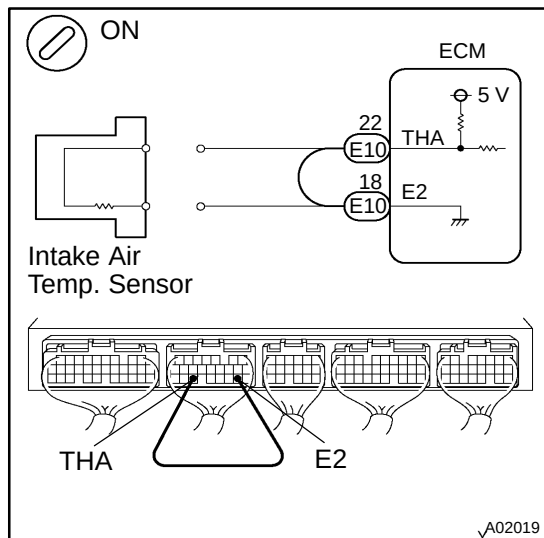
Temperature value: 140°C (284°F) or more

OK

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

NG

3 Check for open in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Connect the terminals THA and E2 of the ECM connector.

HINT:

The mass air flow meter connector is disconnected. Before checking, do a visual and contact check of the pressure for the ECM connector (See page [IN-31](#)).

CHECK:

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

OK:

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

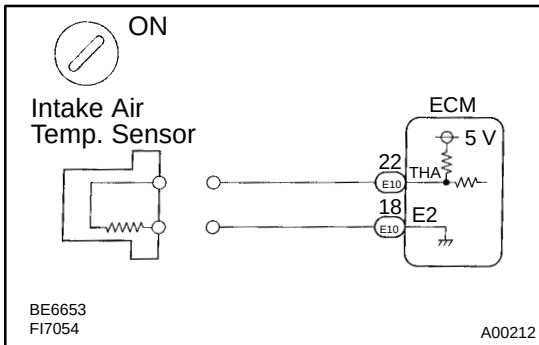
OK

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

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page [IN-31](#)).

4 Check for short in harness and ECM.



PREPARATION:

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

CHECK:

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

OK:

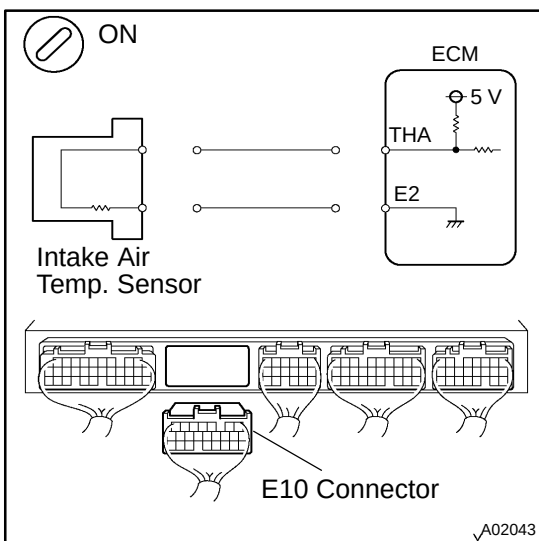
Temperature value: -40°C (-40°F)

OK

Replace mass air flow meter.

NG

5 Check for short in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Disconnect the E10 connector from the ECM.

HINT:

Mass air flow meter connector is disconnected.

- Turn the ignition switch ON.

CHECK:

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

OK:

Temperature value: -40°C (-40°F)

OK

Repair or replace harness or connector.

NG

Check and replace ECM (See page [IN-31](#)).

DTC	P0115	Engine Coolant Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built in the engine coolant temperature sensor changes the resistance value by to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as one in the intake air temperature circuit malfunction shown in page [DI-28](#).

If the ECM detects the DTC P0115, it operates the fail-safe function in which the engine coolant temperature is assumed to be 80°C (176°C).

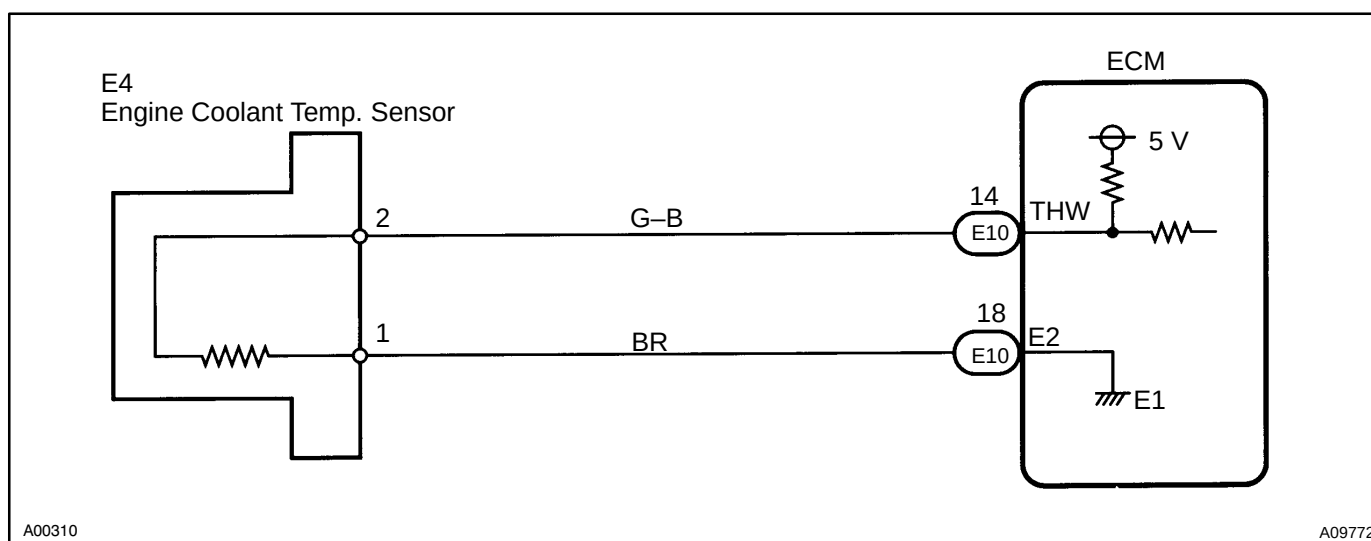
DTC No.	Detection Item	Trouble Area
P0115	Open or short in engine coolant temp. sensor circuit	●Open or short in engine coolant temp. sensor circuit ●Engine coolant temp. sensor ●ECM

HINT:

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

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120 and P1410 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich etc. at the time of the malfunction.

- 1** Connect OBD II scan tool or LEXUS hand-held tester, and read value of engine coolant temperature.

PREPARATION:

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

CHECK:

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

OK:

Same value as the actual engine coolant temperature.

HINT:

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

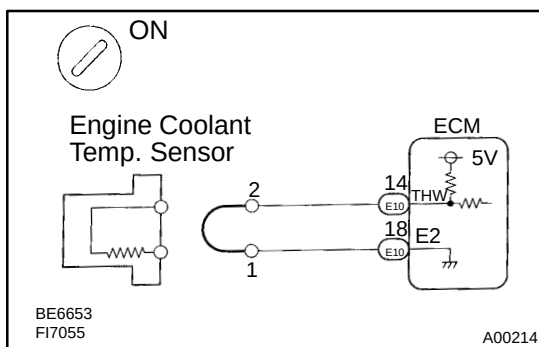
NG

-40°C (-40°F) ... Go to step 2.
 140°C (284°F) or more ... Go to step 4.

OK

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

- 2** Check for open in harness or ECM.

**PREPARATION:**

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

CHECK:

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

OK:

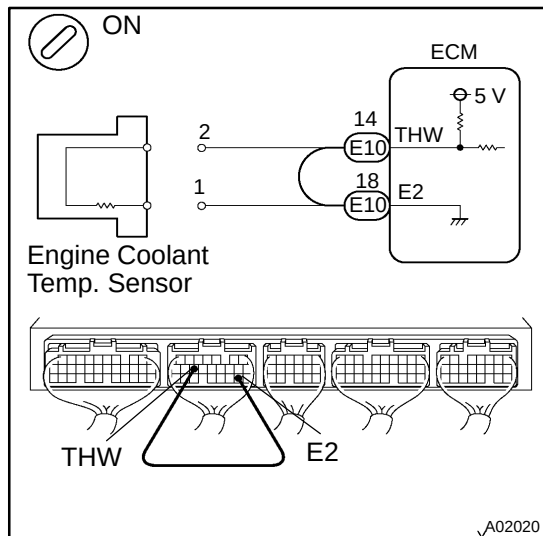
Temperature value: 140°C (284°F) or more

OK

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

NG

3 Check for open in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Connect terminals THW and E2 of the ECM connector.

HINT:

The engine coolant temperature sensor connector is disconnected. Before checking, do a visual and contact check of the pressure for the ECM connector (See page [IN-31](#)).

- Turn the ignition switch ON.

CHECK:

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

OK:

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

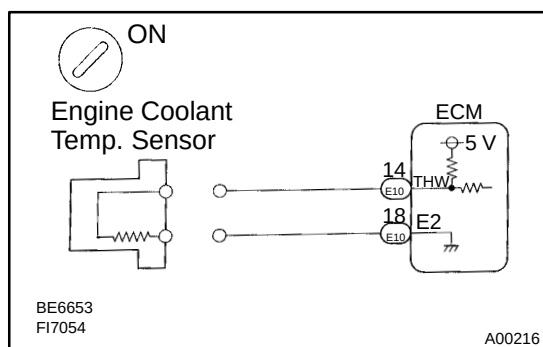
OK

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

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page [IN-31](#)).

4 Check for short in harness and ECM.



PREPARATION:

- Disconnect the engine coolant temperature sensor connector.
- Turn the ignition switch ON.

CHECK:

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

OK:

Temperature value: -40°C (-40°F)

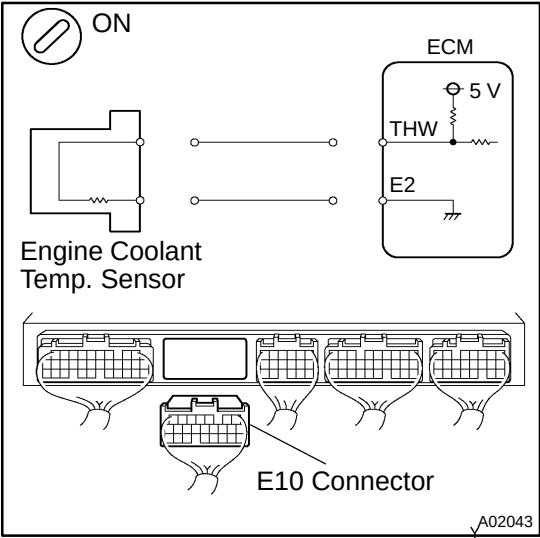
OK

Replace engine coolant temperature sensor.

NG

5

Check for short in harness or ECM.



PREPARATION:

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Disconnect the E10 connector from the ECM.

HINT:

The engine coolant temperature sensor connector is disconnected.

- (c) Turn the ignition switch ON.

CHECK:

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

OK:

Temperature value: -40°C (-40°F)

OK

Repair or replace harness or connector.

NG

Check and replace ECM (See page [IN-31](#)).

DTC	P0116	Engine Coolant Temp. Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page [DI-32](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0116	If THW $\geq -7^{\circ}\text{C}$ (19.4°F), 20 min. or more after starting engine, engine coolant temp. sensor value is 20°C (68°F) or less (2 trip detection logic)	●Cooling system ●Engine coolant temp. sensor
	If THW $\geq -7^{\circ}\text{C}$ (19.4°F), and $<10^{\circ}\text{C}$ (50°F), 5 min. or more after starting engine, engine coolant temp. sensor value is 20°C (68°F) or less (2 trip detection logic)	
	If THW $\geq 10^{\circ}\text{C}$ (50°F), 2 min. or more after starting engine, engine coolant temp. sensor value is 30°C (86°F) or less (2 trip detection logic)	
	When THW $\sim 35^{\circ}\text{C}$ (95°F) or more and less than 60°C (140°F), and THA $\sim -6.7^{\circ}\text{C}$ (19.9°F) or more, when starting engine, conditions (a) and (b) continue (2 trip detection logic) (a) Vehicle speed is changing (Not stable) (b) THW change is lower than 3°C (37.5°F) from THW since when starting engine	
	In case that reading value of water temp. sensor will not change more than 1°C (33.8°F) even after repeating 6 trips (detection logic) of adjusting speed pattern with THW more than 60°C (140°F) when engine starts.	

INSPECTION PROCEDURE

HINT:

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

1	Are there any other codes (besides DTC P0116) being output?

YES

Go to relevant DTC chart.

NO

2	Check thermostat (See page CO-11).

NG

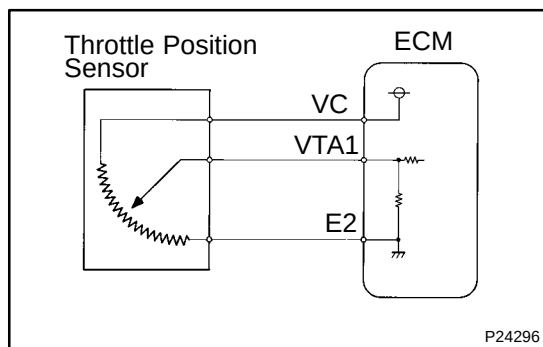
Replace thermostat.

OK

Replace engine coolant temperature sensor.

DTC	P0120	Throttle/Pedal position Sensor/Switch "A" Circuit Malfunction

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 approximately 0.7 V is applied to terminal VTA1 of the ECM. The voltage applied to terminals VTA1 of the ECM increases in proportion to the opening angle of the throttle valve and becomes approximately 2.7 – 5.2 V when the throttle valve is fully opened. The ECM judges the vehicle driving conditions by these signals output from terminals VTA1 and uses them as one of the conditions for deciding the air–fuel ratio correction, power increase correction and fuel–cut control etc.

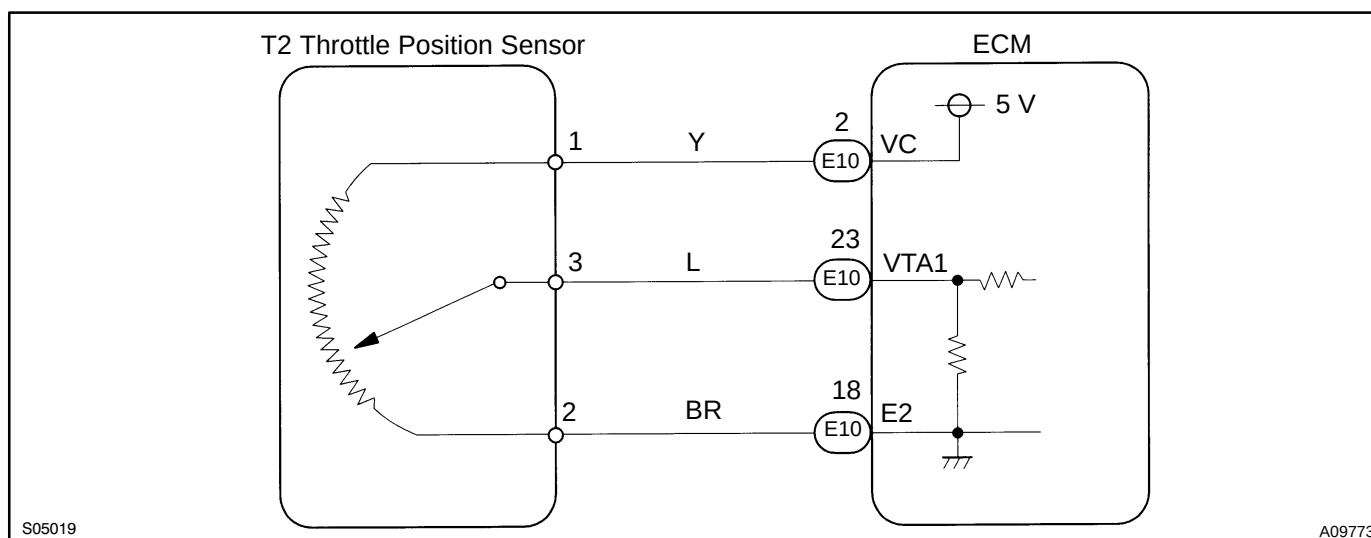
DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a) or (b) continues: (a) VTA1 $\geq$ 0.1 V (b) VTA1 $\geq$ 4.9 V	•Open or short in throttle position sensor circuit •Throttle position sensor •ECM

HINT:

After confirming DTC P0120, use the OBD II scan tool or LEXUS 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 circuit open •VTA circuit open or short
Approx. 100 %	Approx. 100 %	•E2 circuit open

WIRING DIAGRAM

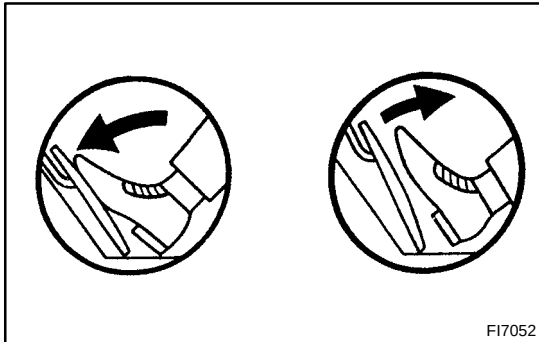


INSPECTION PROCEDURE

HINT:

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

- 1 Connect OBD II scan tool or LEXUS hand-held tester, and read throttle valve opening percentage.**



PREPARATION:

- Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and push the OBD II scan tool or LEXUS hand-held tester main switch ON.

CHECK:

Read the throttle valve opening percentage.

OK:

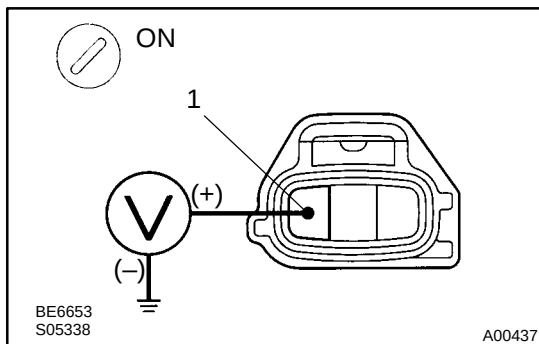
Throttle Valve	Throttle valve opening position expressed as percentage
Fully open	Approx. 75 %
Fully closed	Approx. 10 %

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:

- Disconnect the throttle position sensor connector.
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 4.5 – 5.5 V

NG

Go to step 5.

OK

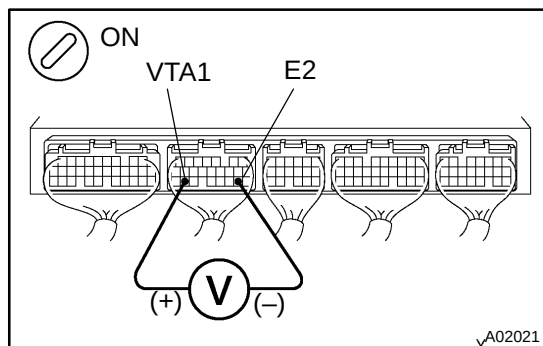
3 Check throttle position sensor (See page [SF-31](#)).

NG

Replace throttle position sensor.

OK

4 Check voltage between terminals VTA1 and E2 of ECM connector.

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VTA1 and E2 of the ECM connector.

OK:

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

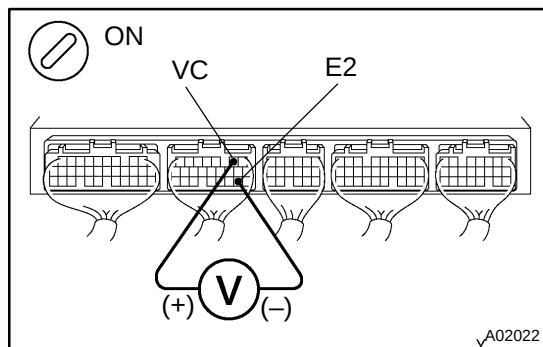
OK

Check and replace ECM (See page [IN-31](#)).

NG

Check for open and short in harness and connector in VTA1 circuit between ECM and throttle position sensor (See page [IN-31](#)).

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

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 4.5 – 5.5 V

OK

Check and replace ECM (See page [IN-31](#)).

NG

Check for open in harness and connector in VC circuit between ECM and sensor (See page [IN-31](#)).

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

CIRCUIT DESCRIPTION

Refer to DTC P0120 on page [DI-38](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0121	After vehicle speed has been exceeded 30 km/h (19 mph) even once, output value of throttle position sensor is out of applicable range while vehicle speed between 30 km/h (19 mph) and 0 km/h (0 mph) (2 trip detection logic)	Throttle position sensor

INSPECTION PROCEDURE

HINT:

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

1	Are there any other codes (besides DTC P0121) being output?

YES

Go to relevant DTC chart.

NO

Replace throttle position sensor.

DTC	P0125	Insufficient Coolant Temp. for Closed Loop Fuel Control

CIRCUIT DESCRIPTION

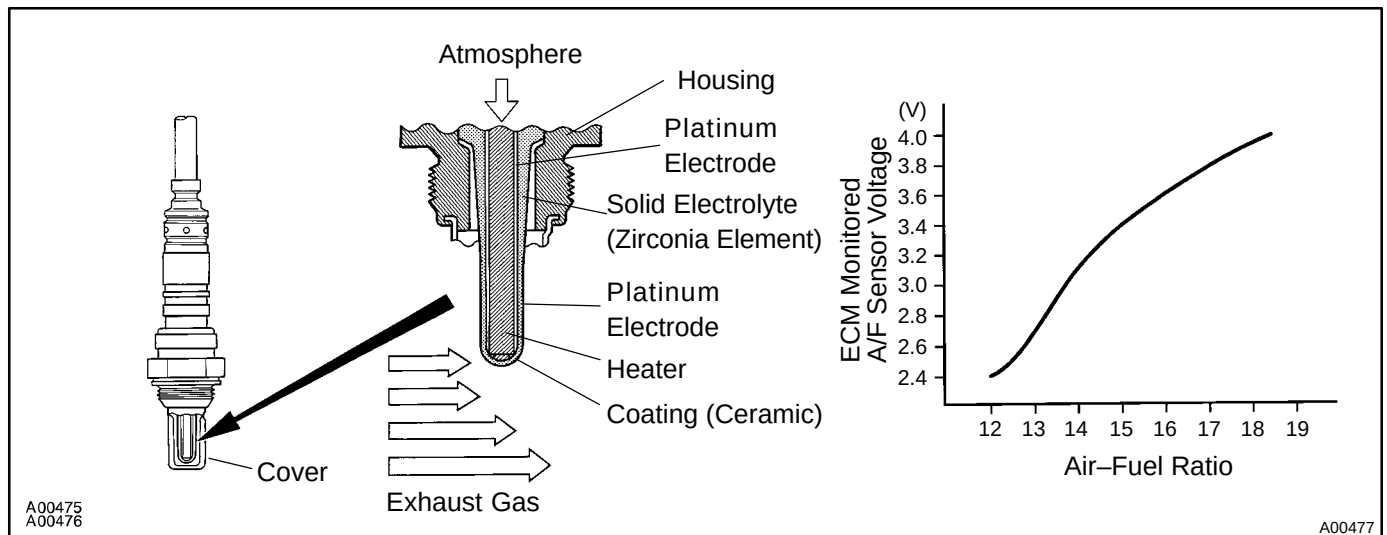
To obtain a high purification rate of the CO, HC and NO_x components of the exhaust gas, a three-way catalytic converter is used. For the most efficient use of the three-way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel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

The A/F sensor has the characteristic that it provides output voltage* being approximately proportional to the existing air–fuel ratio. The A/F sensor output voltage* is used to provide feedback for the ECM to control the air–fuel ratio.

By the A/F sensor output voltage, the ECM can determine the deviation amount from the stoichiometric air–fuel ratio and control the proper injection time immediately. If the A/F sensor is malfunctioning, ECM is unable to perform the accurate air–fuel ratio control.

The A/F sensor is equipped with a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low), the current flows to the heater to heat the sensor for the accurate oxygen concentration detection.

*: The voltage value changes at the inside of the ECM only.



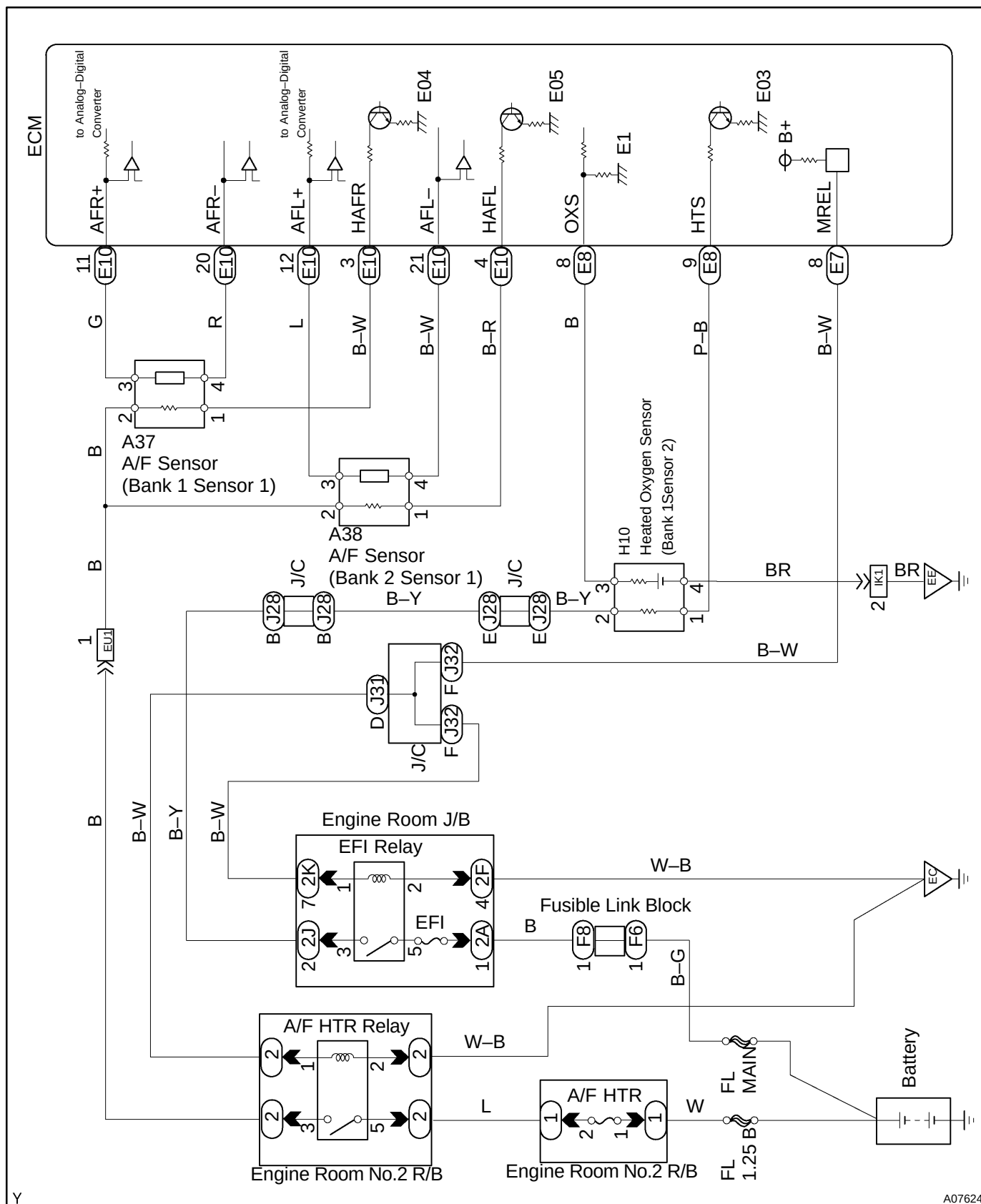
DTC No.	DTC Detecting Condition	Trouble Area
P0125	After engine is warmed up, A/F sensor output* does not change when conditions (a), (b), (c) and (d) continue for at least 1.5 min: *: Output value changes at inside of the ECM only (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 – 100 km/h (25 – 62 mph) (c) Throttle valve is not fully closed (d) 140 sec. or more after starting engine	●Open or short in A/F sensor (bank 1, 2 sensor 1) circuit ●A/F sensor (bank 1, 2 sensor 1) ●Air induction system ●Fuel pressure ●Injector ●Gas leak on exhaust system ●ECM

HINT:

- After confirming DTC P0125, use the OBD II scan tool or LEXUS hand–held tester to confirm output voltage of the A/F sensor (bank 1, 2 sensor 1) from the CURRENT DATA.
- The ECM controls the voltage of the AFR+, AFL+, AFR– and AFL– terminals of the ECM to the fixed voltage, therefore it is impossible to confirm the A/F sensor output voltage without the OBDII scan tool or LEXUS hand–held tester.

- OBD II scan tool (excluding LEXUS hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the LEXUS hand-held tester.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

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

YES

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

NO

2	Connect the OBD II scan tool or LEXUS hand-held tester, and read value for output voltage of A/F sensor (bank 1, 2 sensor 1).

PREPARATION:

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

CHECK:

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

HINT:

The voltage of the AFR+ or AFL+ terminal of the ECM 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 ECM.

OK:

Condition	A/F Sensor Voltage Value
Engine idling	● Not remains at 3.30 V (0.660 V*) ● Not remains at 3.8 V (0.76 V*) or more ● Not remains at 2.8 V (0.56 V*) or less *: When you use OBD II scan tool (excluding LEXUS 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 operating throttle valve open and close	

HINT:

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

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

OK

Go to step 9.

NG

3 Check for open and short in harness and connector between ECM and A/F sensor (bank 1, 2 sensor 1) (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

4 Check resistance of A/F sensor heater (bank 1, 2 sensor 1) (See page [SF-76](#)).

NG

Replace A/F sensor.

OK

5 Check air induction system (See page [SF-1](#)).

NG

Repair or replace.

OK

6 Check fuel pressure (See page [SF-6](#)).

NGCheck and repair fuel pump, pressure regulator, fuel pipe line and filter (See page [SF-1](#)).**OK**

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

NG

Replace injector.

OK

8 Check gas leak on exhaust system.

NG

Repair or replace

OK

Replace A/F sensor (bank 1, 2 sensor 1).

9 Perform confirmation driving pattern (See page [DI-110](#)).

Go

10 Is there DTC P0125 being output again?

YES

Check and replace ECM (See page [IN-31](#)).

NO

11 Did vehicle runs out of fuel in past?

NO

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

YES

DTC P0125 is caused by shortage of fuel.

DTC	P0128	Thermostat Malfunction

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting condition	Trouble Area
P0128	Conditions (a), (b) or (c): (2 trip detection logic) (a) Even cold start (b) After engine is warmed up (c) THW < 75°C (167°F)	●Thermostat ●Cooling system ●Engine coolant temp. sensor ●ECM

INSPECTION PROCEDURE

HINT:

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

1	Check thermostat (See page CO-11).

NG

Replace thermostat.

YES

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

YES

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

NG

Check and replace ECM (See page [IN-31](#)).

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page [DI-43](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0136	Output voltage of heated oxygen sensor remains at 0.4 V or more or 0.6 V or less when vehicle is driven at 50 km/h (31 mph) or more after engine is warmed up (2 trip detection logic)	●Open or short in heated oxygen sensor circuit ●Heated oxygen sensor

HINT:

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

WIRING DIAGRAM

Refer to DTC P0125 on page [DI-43](#).

INSPECTION PROCEDURE

HINT:

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

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

YES

Go to relevant DTC chart.

NO

2	Check for open and short in harness and connector between ECM and heated oxygen sensor (See page IN-31).

NG

Repair or replace harness or connector.

OK

3	Check output voltage of heated oxygen sensor.

PREPARATION:

- (a) Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3.
- (b) Warm up the engine to the normal operating temperature.

CHECK:

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

HINT:

Perform quick racing at 4,000 rpm 3 minutes by using the accelerator pedal.

OK:

Heated oxygen sensor output voltage: Alternates from 0.4 V or less to 0.6 V or more.

OK

Check that each connector is properly connected.

NG

Replace heated oxygen sensor.

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

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page [DI-43](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0141	When heater operates, heater current exceeds 2.35 A	●Open or short in heater circuit of heated oxygen sensor ●Heated oxygen sensor heater ●ECM
	Heater current of 0.2 A or less when heater operates	

HINT:

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

WIRING DIAGRAM

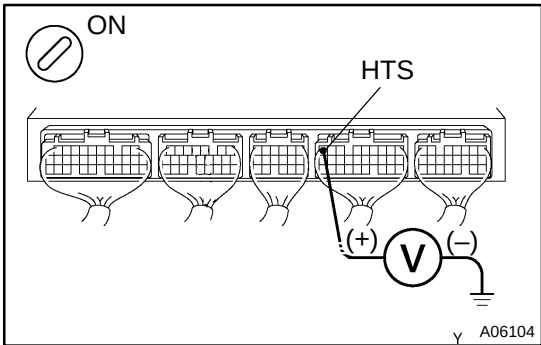
Refer to DTC P0125 on page [DI-43](#).

INSPECTION PROCEDURE

HINT:

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

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



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Turn the ignition switch ON.

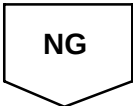
CHECK:

Measure the voltage between terminal HTS of the ECM connector and the body ground.

OK:

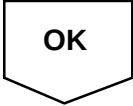
Voltage: 9 – 14 V

OK	Check and replace ECM (See page IN-31).



2	Check resistance of heated oxygen sensor heater (See page SF-78).

NG	Replace heated oxygen sensor.

A rectangular button with a black border and the text "OK" in the center.

Check and repair harness or connector between EFI main relay (Marking: EFI) and heated oxygen sensor, and heated oxygen sensor and ECM (See page [IN-31](#)).

DTC	P0171	System too Lean (Fuel Trim)

DTC	P0172	System too Rich (Fuel Trim)

DTC	P0174	System too Lean (Fuel Trim, Bank 2)

DTC	P0175	System too Rich (Fuel Trim, Bank 2)

CIRCUIT DESCRIPTION

Fuel trim is related to the feedback compensation value, not to the basic injection time. Fuel trim includes short-term fuel trim and long-term fuel trim.

Short-term fuel trim is the short-term fuel compensation used to maintain the air–fuel ratio at its ideal theoretical value. The signal from the A/F sensor is approximately proportional to the existing air–fuel ratio, and ECM comparing it with the ideal theoretical value, the ECM reduces fuel volume immediately if the air–fuel ratio is RICH and increases fuel volume if it is LEAN.

Long-term fuel trim compensates 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 are LEAN or RICH beyond exceed a certain value, it is detected as a malfunction and the MIL 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)	●Air induction system ●Injector blockage ●Mass air flow meter ●Engine coolant temp. sensor ●Fuel pressure ●Gas leakage on exhaust system ●Open or short in A/F sensor (bank 1, 2 sensor 1) circuit ●A/F sensor (bank 1, 2 sensor 1) ●ECM
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)	●Injector leak, blockage ●Mass air flow meter ●Engine coolant temp. sensor ●Ignition system ●Fuel pressure ●Gas leakage on exhaust system ●Open or short in A/F sensor (bank 1, 2 sensor 1) circuit ●A/F sensor (bank 1, 2 sensor 1) ●ECM

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 MIL then lights up.
- If the total of the short–term fuel trim value and long–term fuel trim value is within $\pm 35\%$ (80°C (176°F) or more), the system is functioning normally.
- The A/F sensor (bank 1, 2 sensor 1) output voltage and the short–term fuel trim value can be read by using the OBD II scan tool or LEXUS hand–held tester.
- The ECM controls the voltage of the AF+ and AF– terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBDII scan tool or LEXUS hand–held tester.
- OBD II scan tool (excluding LEXUS hand–held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the LEXUS hand–held tester.

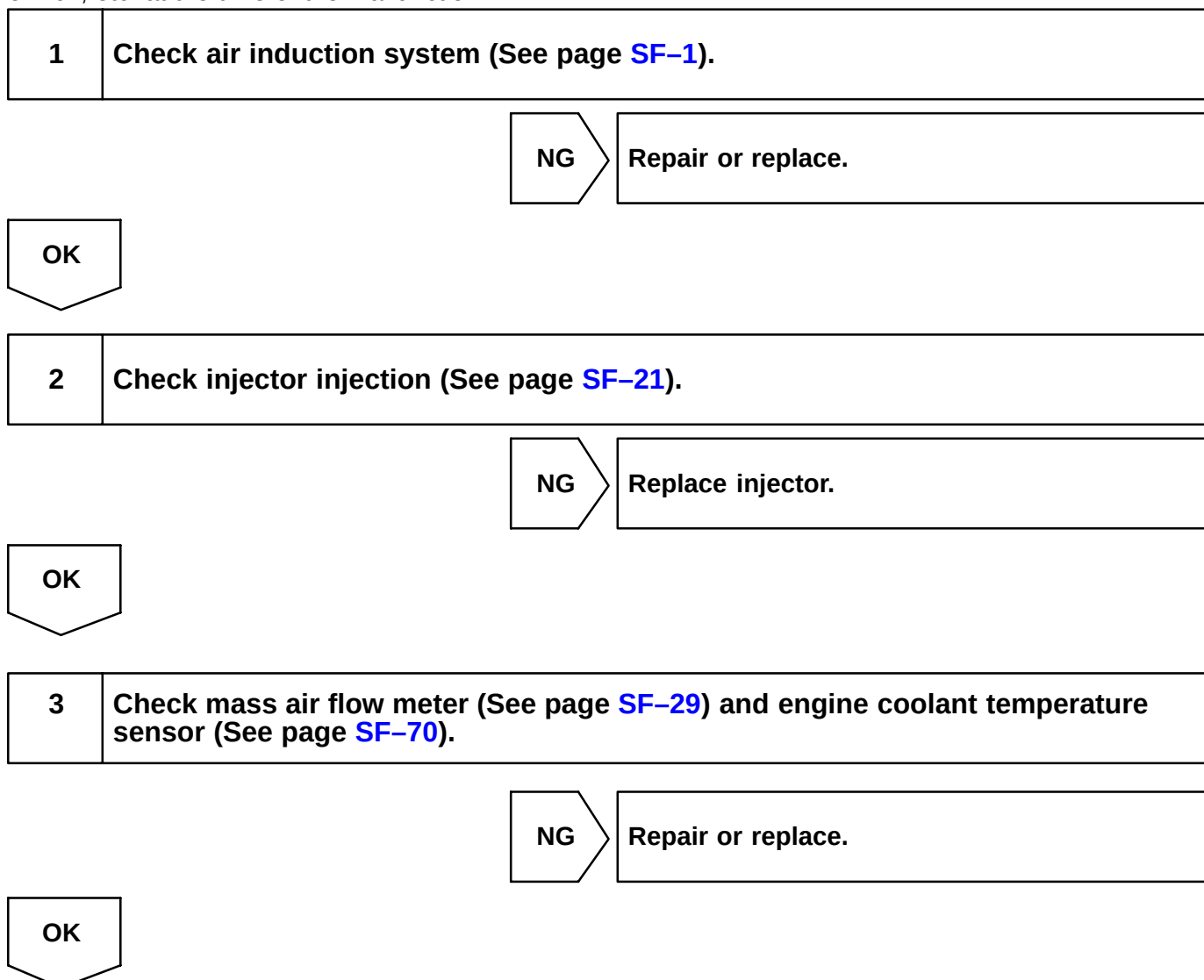
WIRING DIAGRAM

Refer to DTC P0125 on page [DI-43](#).

INSPECTION PROCEDURE

HINT:

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



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

NG

Repair or replace.

OK

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

NG

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

OK

6	Check gas leak in exhaust system.

NG

Repair or replace.

OK

7	Check output voltage A/F sensor (bank 1, 2 sensor 1).

PREPARATION:

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

HINT:

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

OK:

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

2001 LEXUS ES300 (RM831U)

HINT:

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

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

OK

Go to step 9.

NG

8

Check for open and short in harness and connector between ECM and A/F sensors (bank 1, 2 sensor 1) (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Replace A/F sensor.

9

Perform confirmation driving pattern (See page [DI-110](#)).

Go

10

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

YES

Check and replace ECM (See page [IN-31](#)).

NO

11

Did vehicle runs out of fuel in past?

NO

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

YES

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

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

CIRCUIT DESCRIPTION

Misfire: The ECM uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation of each cylinder.

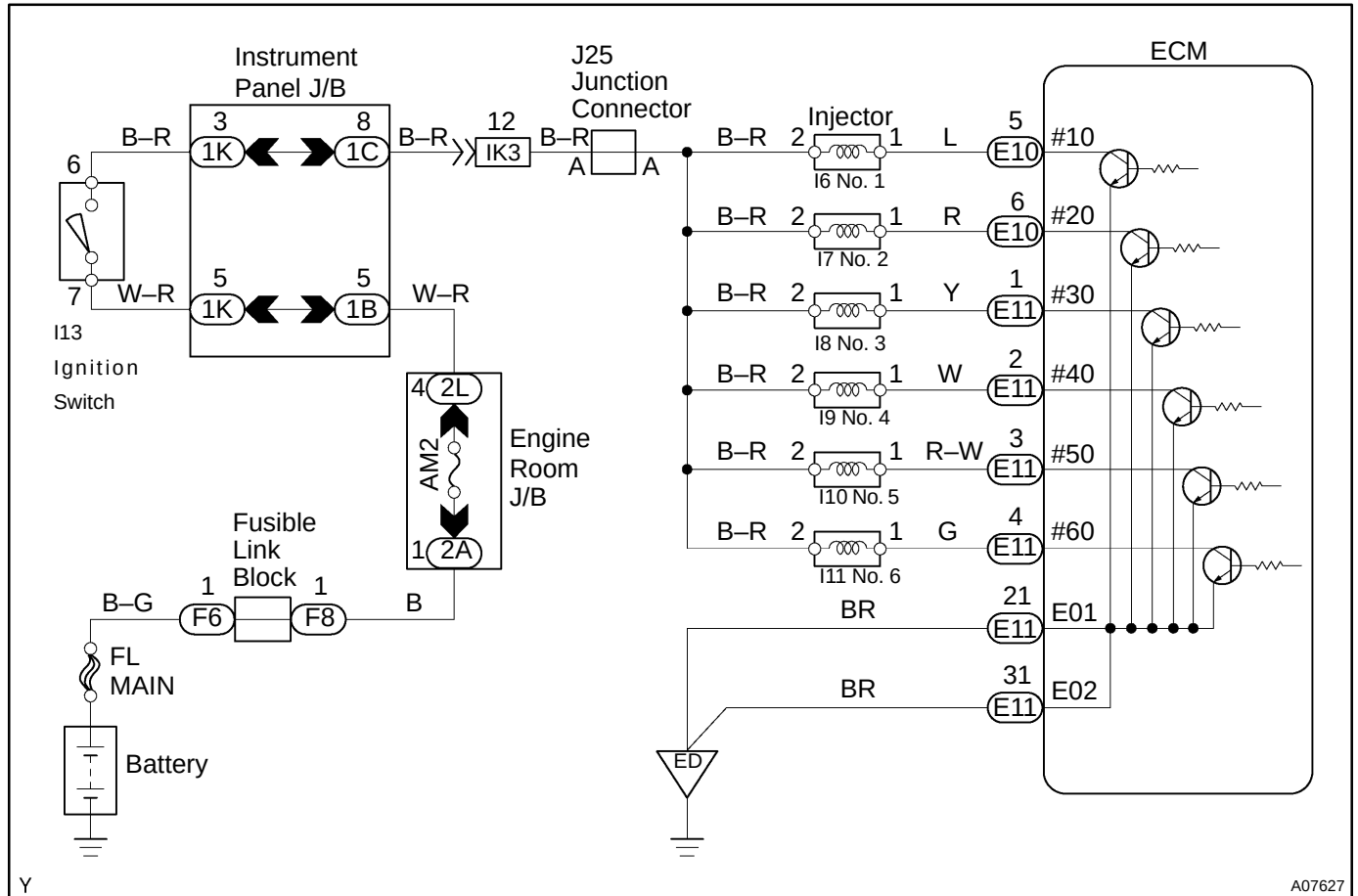
The ECM counts the number of times the engine speed change rate indicates that misfire has occurred. When the misfire rate equals to or exceeds the count, indicating that the engine condition has deteriorated, the MIL lights up.

If the misfire rate is high enough and the driving conditions will cause the catalyst to overheat, the MIL blinks when the misfire occurs.

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

HINT:

When the 2 or more codes for a misfiring cylinder are recorded repeatedly but no Random Misfire code is recorded, it is indicated that the misfires were detected and recorded at different times.

WIRING DIAGRAM**CONFIRMATION DRIVING PATTERN**

- Connect the LEXUS hand-held tester or OBD II scan tool.
- Record the DTC and freeze frame data.
- Use the LEXUS hand-held tester to set to the check mode. (See page [DI-3](#))
- Drive the vehicle several times with the engine speed, load and its surrounding range shown with the ENGINE SPD, CALC LOAD in the freeze frame data or the MISFIRE RPM, MISFIRE LOAD in the data list.

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

HINT:

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

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

- Check whether there is misfire or not by monitoring the DTC and freeze frame data, and then record them.

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

INSPECTION PROCEDURE

HINT:

- If the other DTC, besides misfire are memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- If the misfire is not occurred when the vehicle is brought to the workshop, it can be confirmed by reproducing the condition of the freeze frame data. 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 over 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°C (176°F), there is a possibility of misfire only during warming up.
- In case that the misfire cannot be reproduced, the reason may be because of the driving with the shortage of fuel, the use of improper fuel, a stain of ignition plug and etc.

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

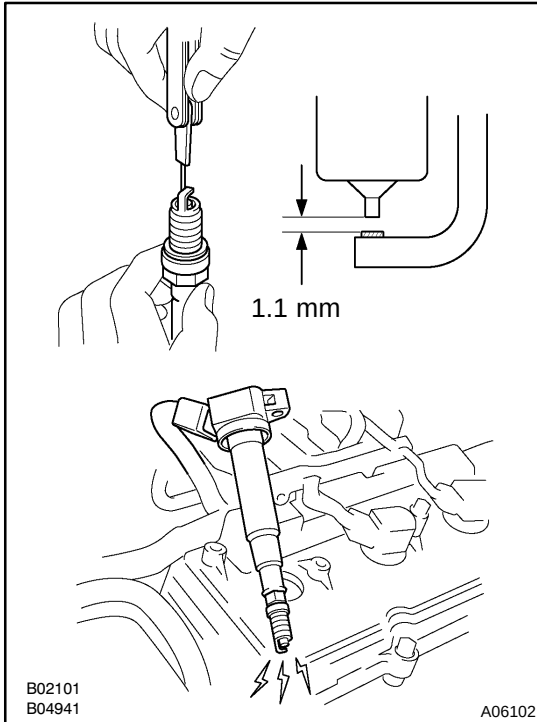
CHECK:

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

NG

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

OK

2**Check spark plug and spark of misfiring cylinder.****PREPARATION:**

- (a) Remove the ignition coil (See page [IG-5](#)).
- (b) Remove the spark plug.

CHECK:

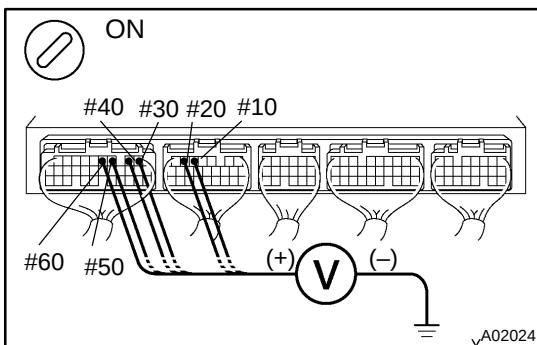
- (a) Check spark plug type.
- (b) Check the electrode for carbon deposits.
- (c) Check electrode gap.

OK:**(a) Iridium-tipped spark plug****Recommended spark plug:****DENSO made: SK20R11****NGK made: IFR6A11****(b) No large carbon deposit present.****Not wet with gasoline or oil.****(c) Electrode gap: 1.1 mm (0.043 in.)****PREPARATION:**

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

CHECK:

Check if spark occurs while engine is being cranked.

OK:**Spark jumps across electrode gap.****NG****Replace or check ignition system (See page [IG-1](#)).****OK****3****Check voltage of ECM terminal for injector of failed cylinder.****PREPARATION:**

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

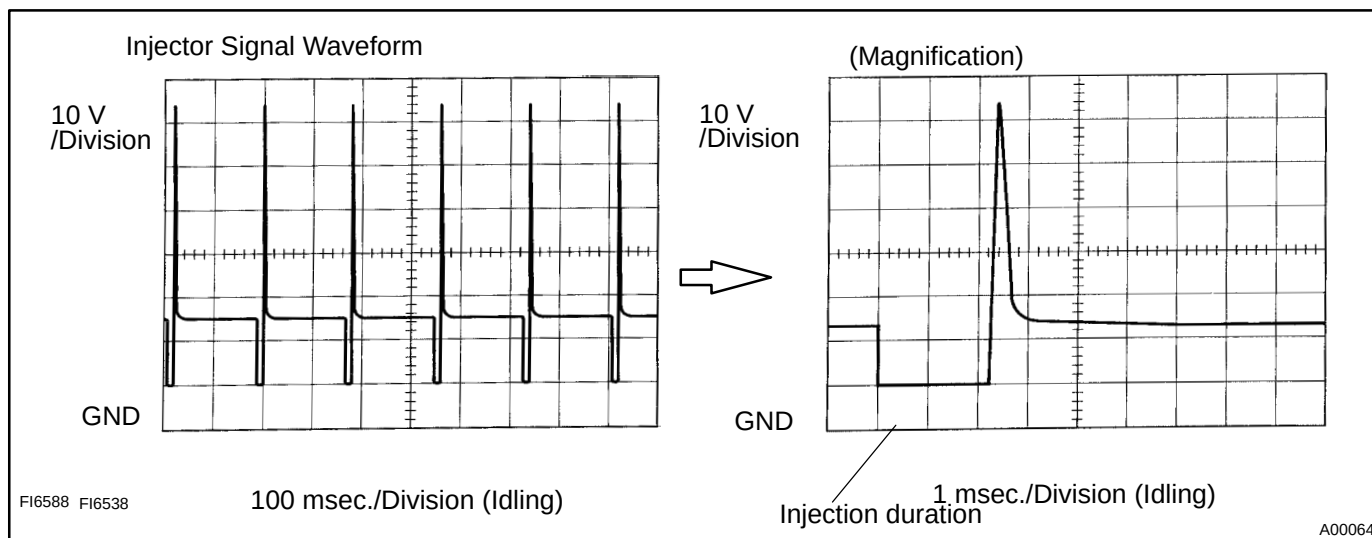
OK:**Voltage: 9 – 14 V**

Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

The correct waveform is as shown below.



OK

Go to step 5.

NG

4

Check resistance of injector of misfiring cylinder (See page [SF-17](#)).

NG

Replace injector.

OK

Check for open and short in harness and connector between injector and ECM (See page [IN-31](#)).

5

Check fuel pressure (See page [SF-6](#)).

NG

Check and repair fuel pump, fuel pipe line and filter (See page [SF-1](#)).

OK

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

NG

Replace injector.

OK

7	Check mass air flow meter (See page SF-29) and engine coolant temperature sensor (See page SF-70).

NG

Repair or replace.

OK

Check compression pressure (See page [EM-3](#)), valve clearance (See page [EM-4](#)) and valve timing (See page [EM-10](#)).

DTC	P0325	Knock Sensor 1 Circuit Malfunction (Bank 1)

DTC	P0330	Knock Sensor 2 Circuit Malfunction (Bank 2)

CIRCUIT DESCRIPTION

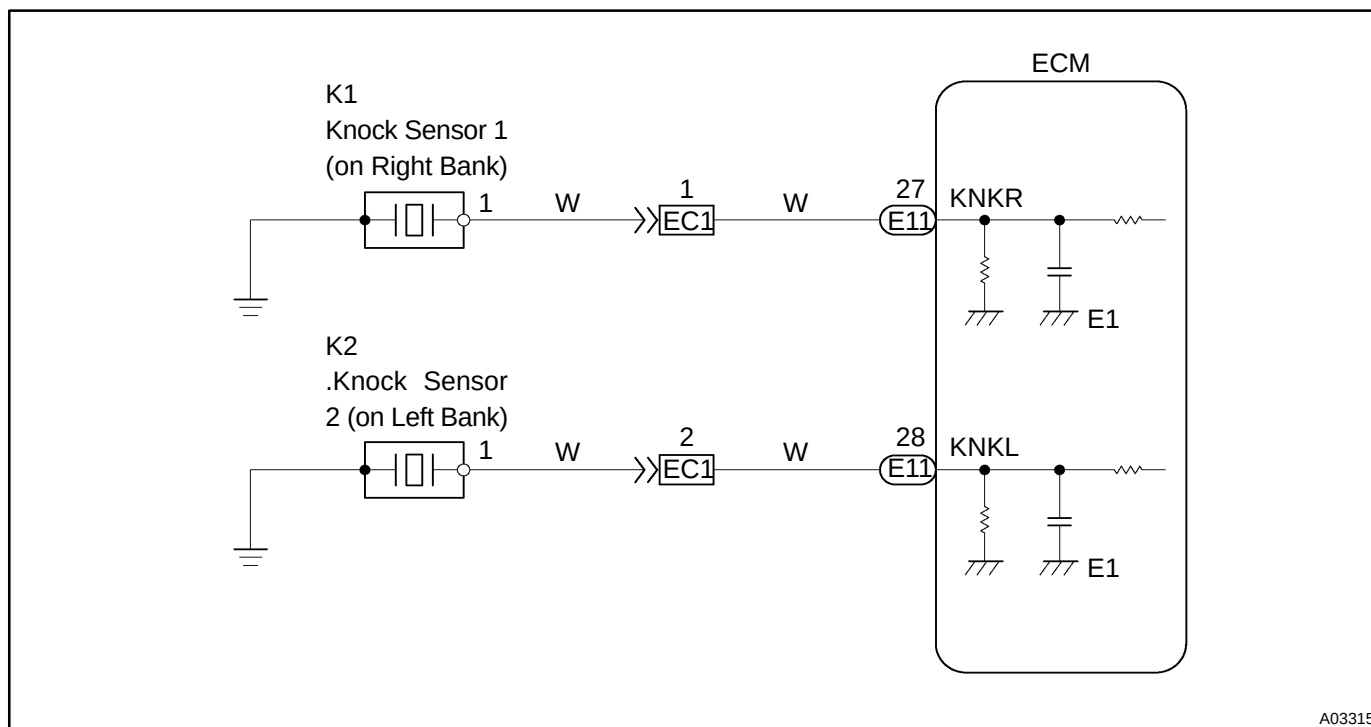
Each of knock sensor is fitted to the right bank and left bank of the cylinder block to detect the engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If the engine knocking occurs,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

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed between 2,000 rpm and 5,600 rpm	●Open or short in knock sensor 1 circuit ●Knock sensor 1 (looseness) ●ECM
P0330	No knock sensor 2 signal to ECM with engine speed between 2,000 rpm and 5,600 rpm	●Open or short in knock sensor 2 circuit ●Knock sensor 2 (looseness) ●ECM

HINT:

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

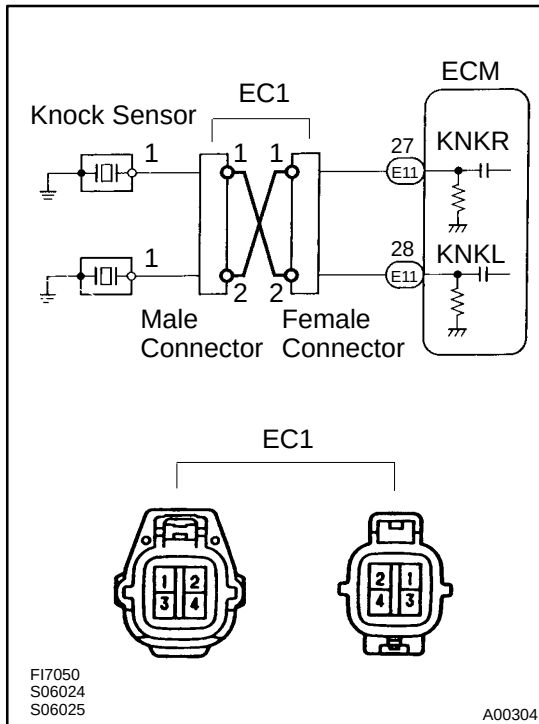
INSPECTION PROCEDURE

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

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



PREPARATION:

- Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3.
- Disconnect the wire to wire connector EC1.
- Connect the terminals of the disconnected EC1 male connector and EC1 female as follows.

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

- Turn the ignition switch ON and push the OBD II scan tool or LEXUS 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:

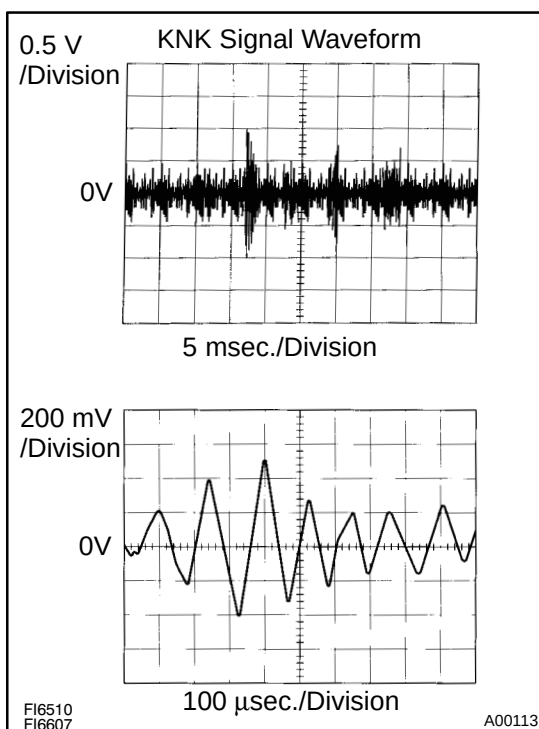
Type I	DTC same as when vehicle brought in P0325 → P0325 or P0330 → P0330
Type II	DTC different to when vehicle brought in P0325 → P0330 or P0330 → P0325

Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

The correct waveform is as shown.



Type II

Go to step 3.

Type I**2****Check for open and short in harness and connector between EC1 connector and ECM (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK****Check and replace ECM (See page [IN-31](#)).****3****Check for open and short in harness and connector between EC1 connector and knock sensor (See page [IN-31](#)).****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.**

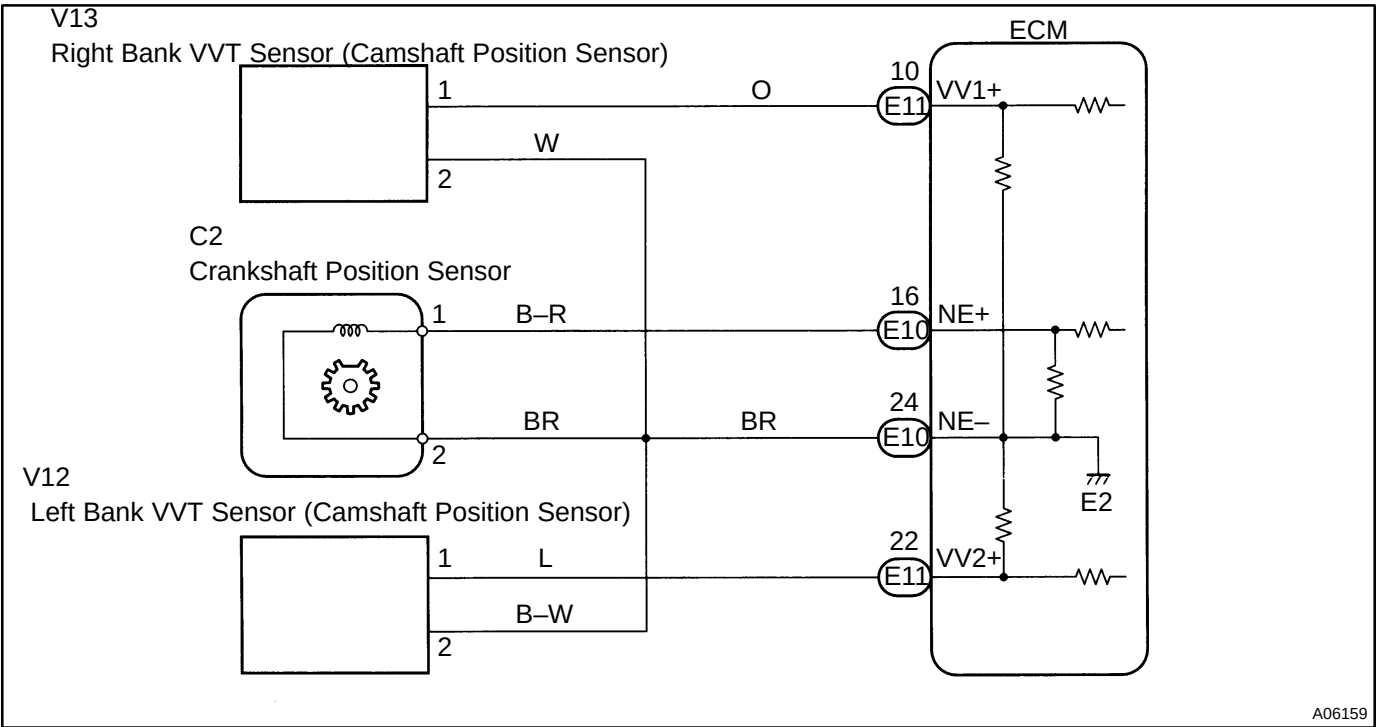
DTC	P0335	Crankshaft Position Sensor "A" Circuit Malfunction

CIRCUIT DESCRIPTION

Crankshaft position sensor (NE signal) consists of a magnet, iron core and pickup coil. The NE signal plate has 34 teeth and is installed the crankshaft timing pulley. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G (VV) signal, and the actual crankshaft angle and the engine speed by the NE signal.

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

WIRING DIAGRAM

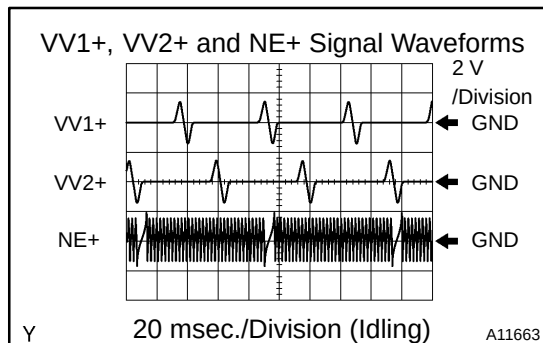


INSPECTION PROCEDURE

HINT:

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

1 Check resistance of crankshaft position sensor (See page [IG-9](#)).



Reference: INSPECTION USING OSCILLOSCOPE

During cranking or idling, check the waveforms between terminals VV1+ and NE–, VV2+ and NE–, and NE+ and NE– of the ECM connectors.

HINT:

The correct waveforms are as shown in the illustration.

NG

Replace crankshaft position sensor.

OK

2 Check for open and short in harness and connector between ECM and crankshaft position sensor (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

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

NG

Tighten sensor securely. Replace crankshaft timing pulley.

OK

Check and replace ECM (See page [IN-31](#)).

DTC	P0340	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft position sensor (G (VV) signal) consists of a magnet, iron core and pickup coil. The G (VV) signal plate has 3 teeth, on the outside and is installed the camshaft timing gear. When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil changes, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.

The NE signal plate has 34 teeth and is installed in the crankshaft timing pulley. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G (VV) signal and the actual crankshaft angle and the engine speed by the NE signal.

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

WIRING DIAGRAM

Refer to DTC P0335 on page [DI-67](#).

INSPECTION PROCEDURE

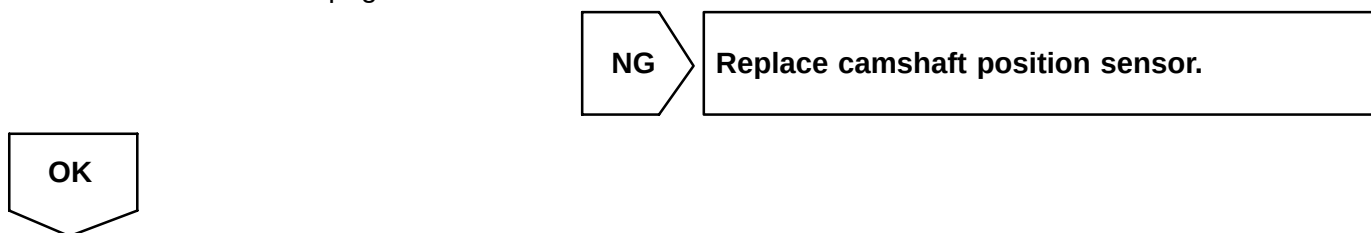
HINT:

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

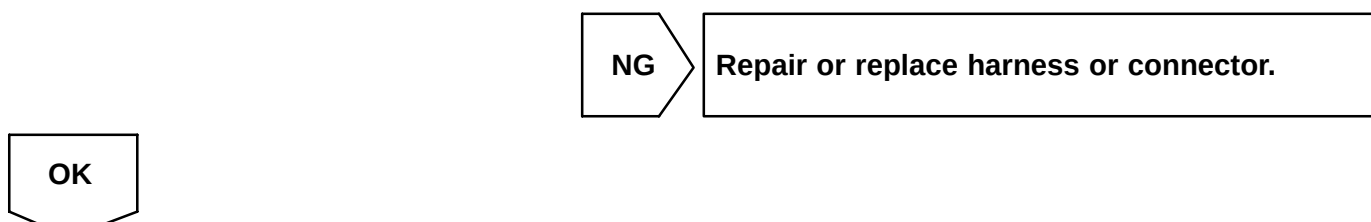
1	Check resistance of camshaft position sensor (See page IG-1).

Reference: INSPECTION USING OSCILLOSCOPE

Refer to DTC P0335 on page [DI-67](#).



2	Check for open and short in harness and connector between ECM and camshaft position sensor (See page IN-31).



3	Inspect sensor installation and signal plate teeth of camshaft timing gear.

NG**Tighten sensor securely. Replace camshaft timing gear.****OK****Check and replace ECM (See page [IN-31](#)).**

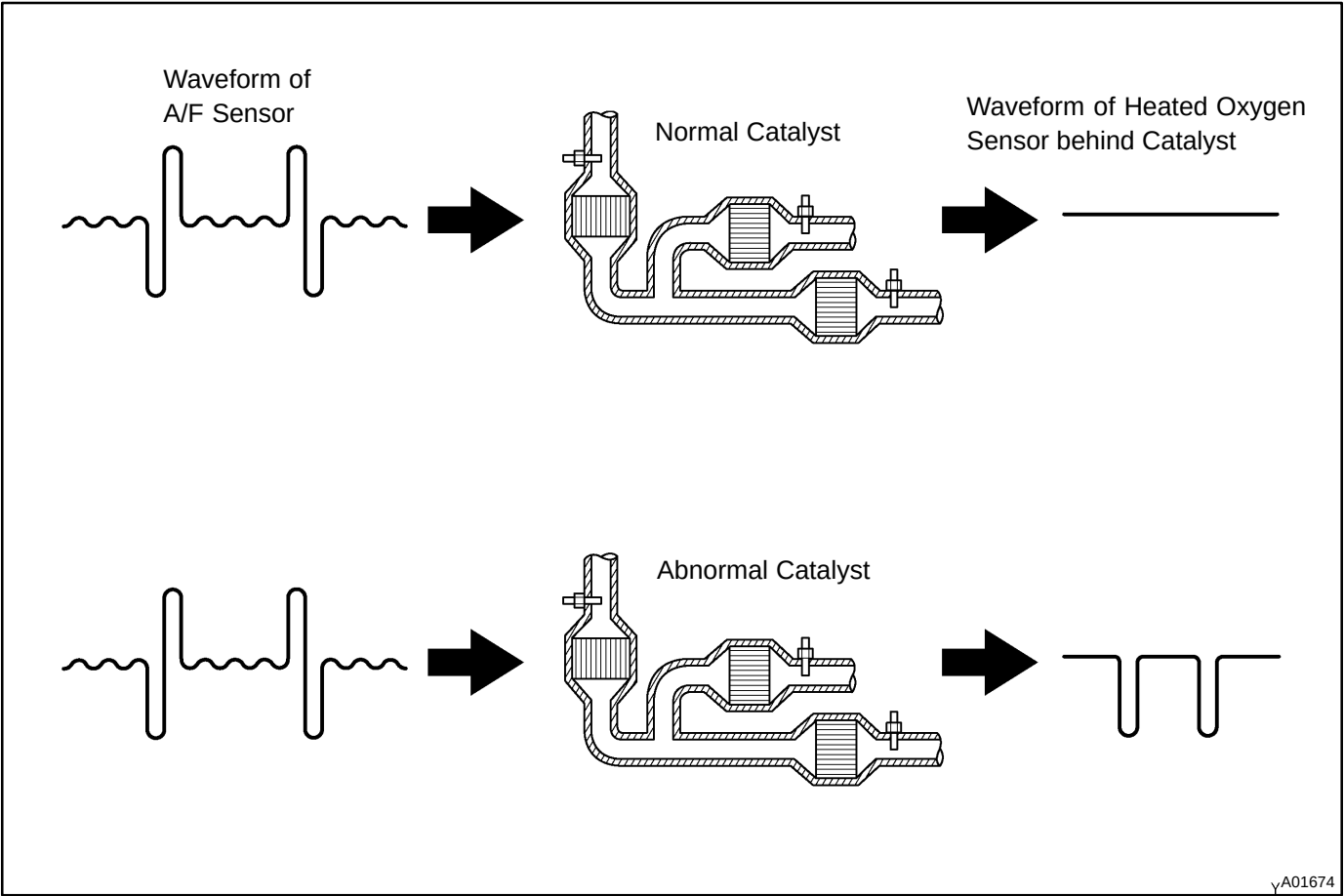
DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)

CIRCUIT DESCRIPTION

The ECM observes the waveform of the heated oxygen sensor located behind the catalyst to determine whether the catalyst performance has deteriorated.

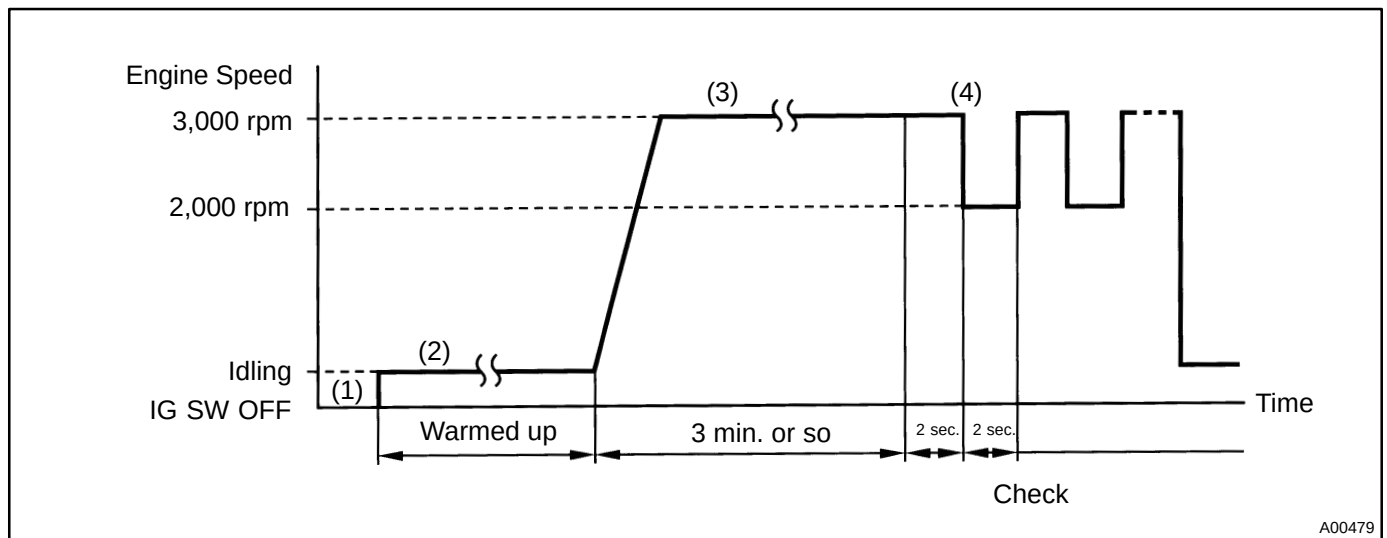
If the catalyst is functioning normally, the waveform of the heated oxygen sensor located behind the catalyst switches back and forth between rich and lean much more slowly.

When the waveform of the heated oxygen sensor located behind the catalyst alternates flatteringly between rich and lean, it indicates that catalyst performance has deteriorated.



DTC No.	DTC Detecting Condition	Trouble Area
P0420	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of heated oxygen sensor (bank 1 sensor 2) alternates flatteringly between rich and lean (2 trip detection logic)	●Gas leakage on exhaust system ●A/F sensor (bank 1, 2 sensor 1) ●Heated oxygen sensor (bank 1 sensor 2) ●Three-way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



A00479

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

INSPECTION PROCEDURE

HINT:

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

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

YES

Go to relevant DTC chart.

NO

2	Check gas leak on exhaust system.

NG

Repair or replace.

OK

3	Check A/F sensor (bank 1, 2 sensor 1) (See page SF-76).

NG	Repair or replace.

OK

4	Check heated oxygen sensor (bank 1 sensor 2) (See page SF-78).

NG	Repair or replace.

OK

Replace three-way catalytic converter.

DTC	P0440	Evaporative Emission Control System Malfunction

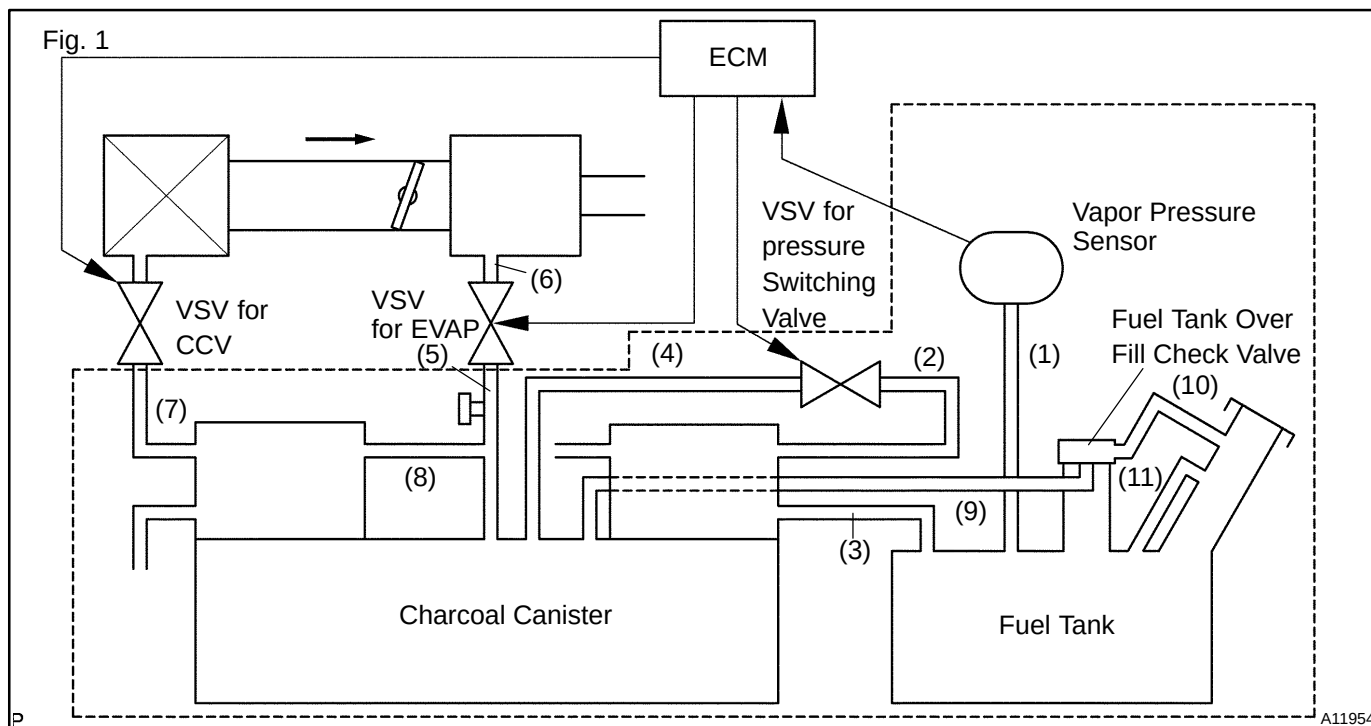
DTC	P0442	Evaporative Emission Control System Leak Detected (Small Leak)

CIRCUIT DESCRIPTION

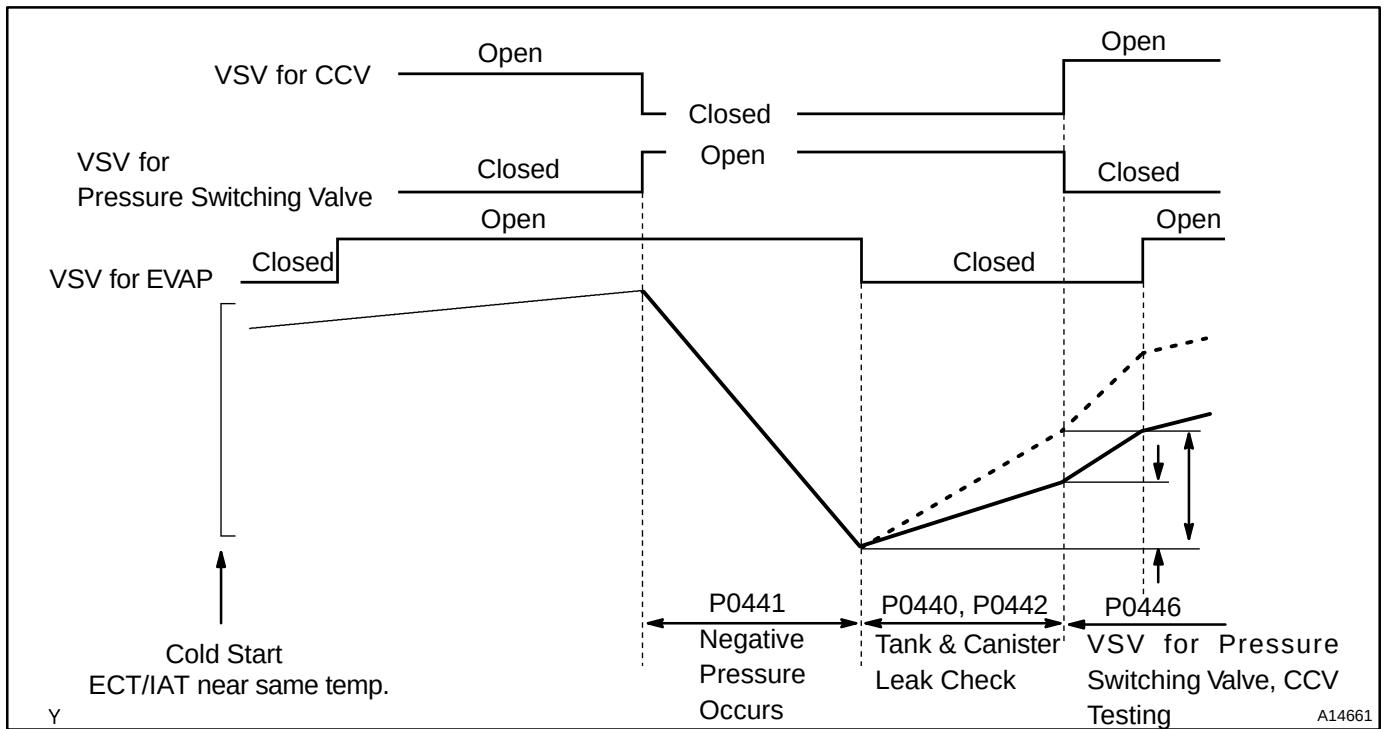
The vapor pressure sensor, VSV for Canister Closed Valve (CCV) and VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether or not there is an abnormality in the evaporative emission control system by the vapor pressure sensor signal.

DTC P0440 or P0442 is recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or vapor pressure sensor if self.

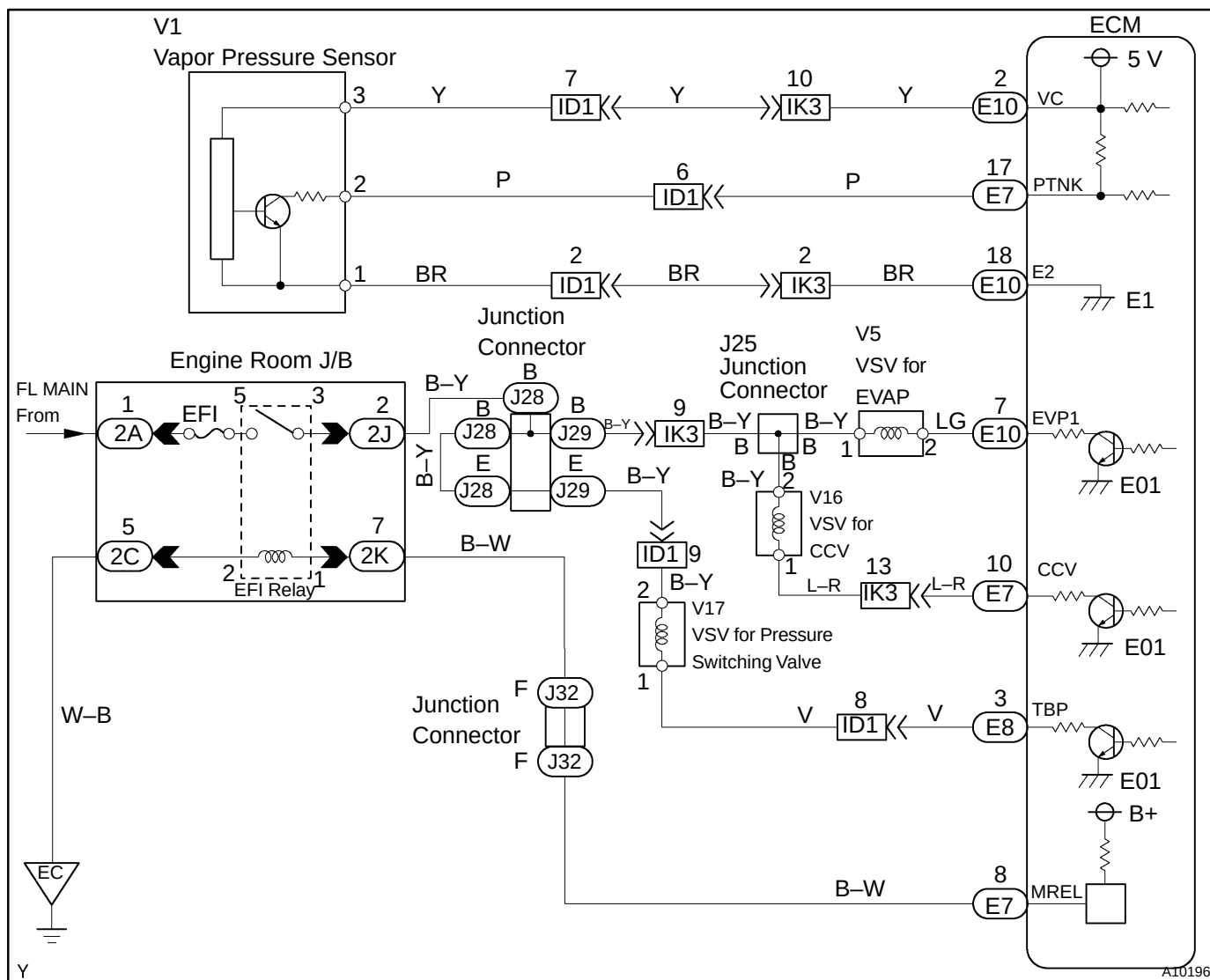


DIAGNOSTICS – ENGINE



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

WIRING DIAGRAM



CONFIRMATION READINESS TEST

First Trip Procedure

- Vehicle must be cold, ambient temperature approximately between 50°F – 95°F.
- Intake Air Temp. (IAT) and Engine Coolant Temp. (ECT) sensor almost same value.

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

A15402

- Clear DTC's.
 - Disconnecting the battery terminals or EFI fuse.
 - Readiness tests will show INCMPL (incomplete).
- Drive the vehicle according to LA#4 drive cycle. Note the state of Readiness Tests. They will change to COMPL as the evaluation monitors operate and if the system passes. This procedure may take approximately 20 minutes or more.

NOTICE:

Do not shut off the engine – the results will be invalid.

READINESS TESTS

```

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

```

A15403

Pass Condition – No Problem Found by the ECM

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

NOTICE:

Do not shut off the engine – the results will be invalid.

NON-CONTINUOUS TESTS

```

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

```

A15404

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

READINESS TESTS

```

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

```

A15405

Fail Condition – Problem Detected by the ECM

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

NON-CONTINUOUS TESTS

```

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

```

A15406

- (1) If all Tests show Pass, the following may have occurred.
 - The EVAP evaluation monitor did not operate.
 - The EVAP evaluation monitor did not finish.
 - The ECM withheld judgement.
- (2) If one or more of the tests in the time \$02 category show Fail, the EVAP evaluation monitor did operate and the ECM detected a problem.

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

NOTICE:

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

CONTINUOUS TESTS

ECU: \$10 (Engine)
Number of Tests: 3

P0440
EVAP Control System Malfunction

P0441
EVAP Control System Incorrect
Purge Flow

P0446
EVAP Control System Vent Control
Circuit Malfunction

A15407

READINESS TESTS

```

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

```

A15403

Second Trip Procedure

- Vehicle must be cold, ambient temperature approximately between 50°F – 95°F.
- Go to Readiness Tests screen.
- Drive the vehicle according to LA#4 drive cycle. Note the state of EVAP evaluation monitor. This procedure may take approximately 20 minutes or more.

NOTICE:

Do not shut off the engine – the results will be invalid.

CONTINUOUS TESTS

ECU: \$10 (Engine)
Number of Tests: 3

P0440
EVAP Control System Malfunction

P0441
EVAP Control System Incorrect
Purge Flow

P0446
EVAP Control System Vent Control
Circuit Malfunction

A15407

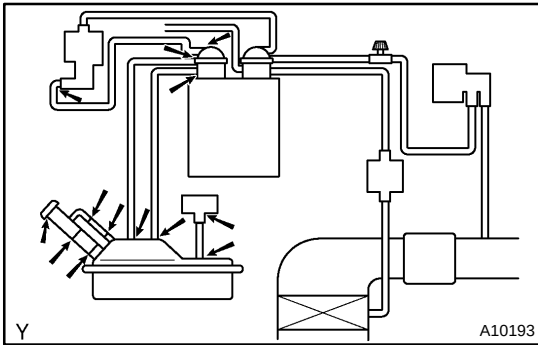
- If Readiness Tests changes to COMPL, the EVAP evaluation monitor has operated. Check for any stored DTC's.
 - If a DTC has stored, the problem has been detected and confirmed by the ECM.
 - If no DTC was found, the EVAP monitor operated but no problem was detected.

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442, first troubleshoot DTC P0441, P0446, P0450 or P0451. If no other malfunctions than them are detected, troubleshoot DTC P0440 or P0442 next.
- Ask the customer whether or not , after the MIL came on, the customer found the fuel tank cap was loose and tightened it. Also ask the customer whether the fuel tank cap was loose when refuelling. If the fuel tank cap was loose, it was the cause of the DTC. If the fuel tank cap was not loose or if the customer was not sure if it was loose, troubleshoot according to the following procedure.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

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

**CHECK:**

Check for cracks, deformation and loose connection of the following parts:

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

NG**Repair or replace.****OK**

- 2 Check that fuel tank cap is LEXUS genuine parts.**

NG**Replace to LEXUS genuine parts.****OK**

- 3 Check that fuel tank cap is correctly installed.**

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

- 4 Check fuel tank cap (See page [EC-6](#)).**

NG**Replace fuel tank cap.****OK**

5	Check filler neck for damage.

PREPARATION:

Remove the fuel tank cap.

CHECK:

Visually inspect the filler neck for damage.

NG**Replace filler pipe.****OK**

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

CHECK:

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

NG**Repair or replace.****OK**

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

CHECK:

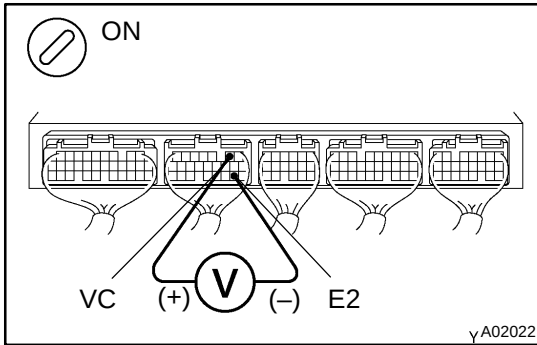
- (a) Check for proper connection of the fuel tank and fuel EVAP pipe (See page [EC-6](#)), fuel EVAP pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

NG**Repair or replace.****OK**

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

NG**Replace charcoal canister.**

OK

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

- (a) Remove the groove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

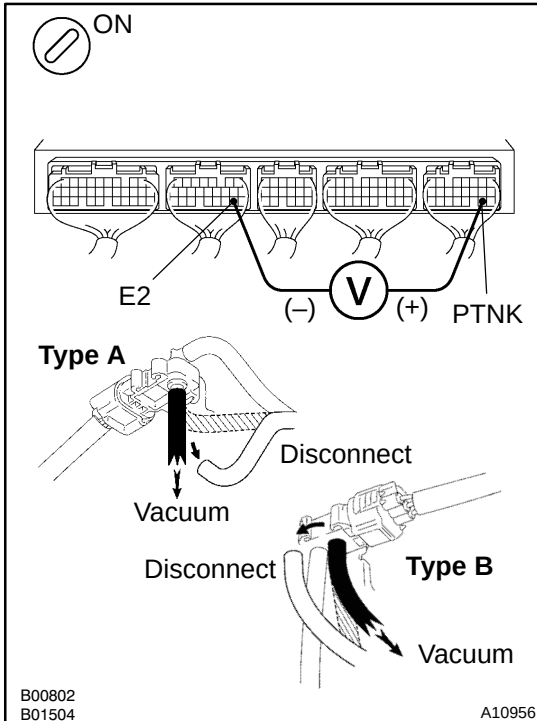
OK:

Voltage: 4.5 – 5.5 V

NG

Check and replace ECM (See page [IN-31](#)).

OK

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

- (a) Remove the groove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

NOTICE:

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

OK:

- (1) Voltage: 2.9 – 3.7 V
- (2) Voltage: 0.5 V or less

OK

Go to step 12.

NG

11	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

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

NG

Replace fuel tank or fuel tank over fill check valve.

OK

There is a possibility that vehicle user did not properly close fuel tank cap. Please explain to customer how to properly install fuel tank cap.

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

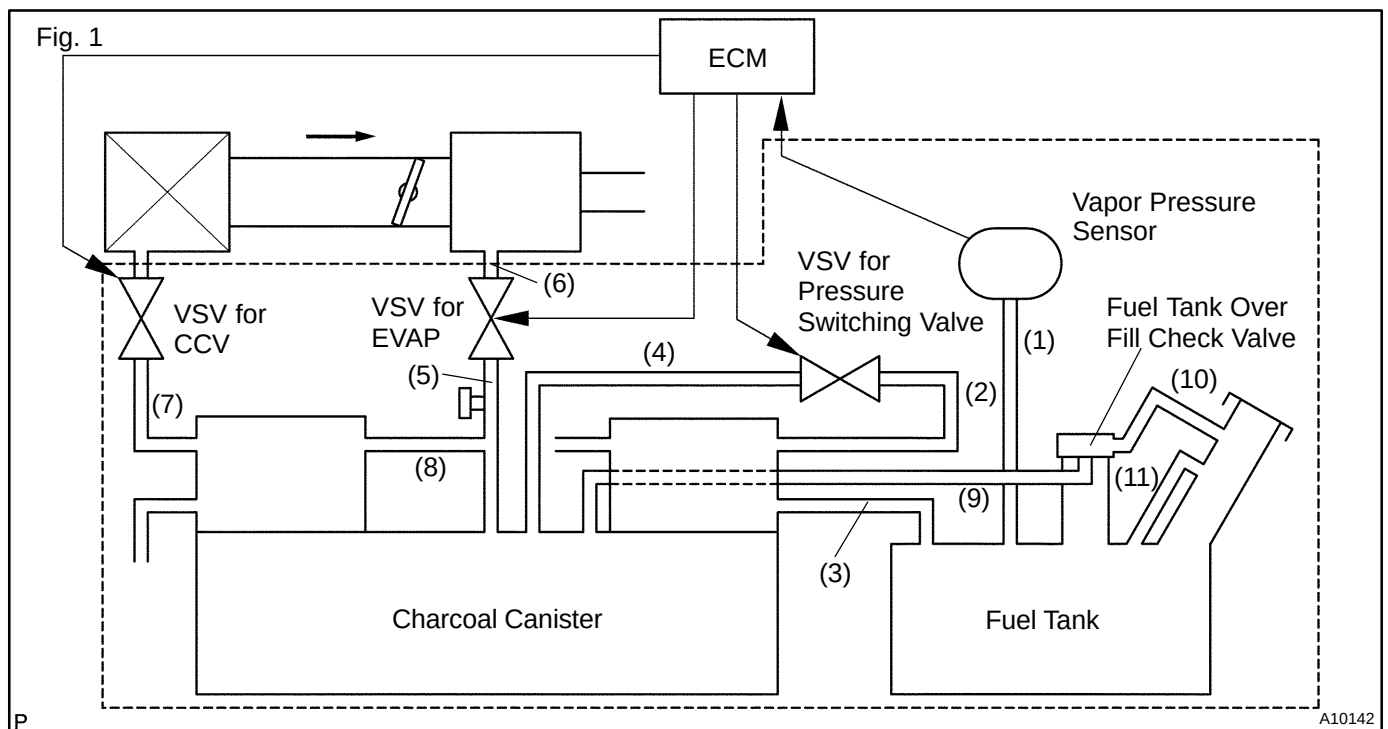
DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

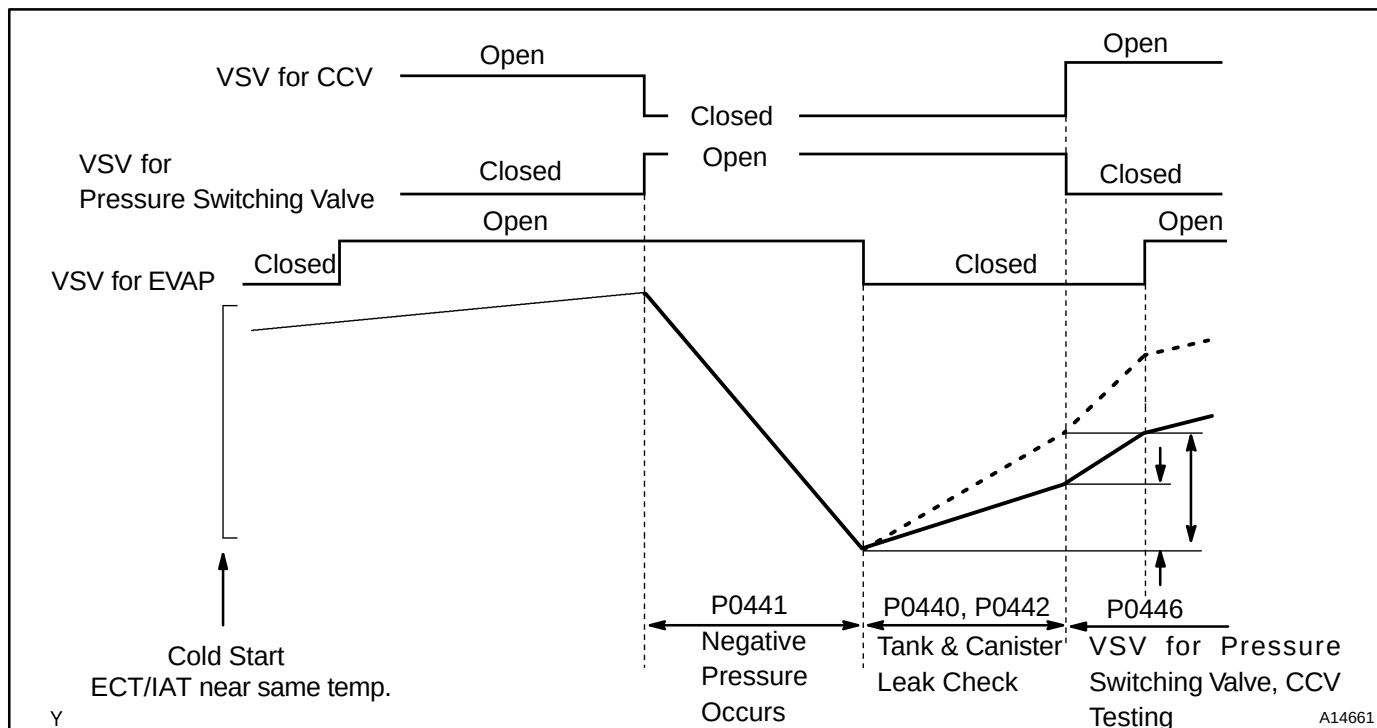
CIRCUIT DESCRIPTION

The vapor pressure sensor, VSV for Canister Closed Valve (CCV), VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system by the vapor pressure sensor signal.

DTCs P0441 and P0446 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when there is a malfunction in either the VSV for EVAP, the VSV for pressure switching valve or in the vapor pressure sensor itself.





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

WIRING DIAGRAM

Refer to DTC P0440 or P0442 on page [DI-74](#).

CONFIRMATION READINESS TEST

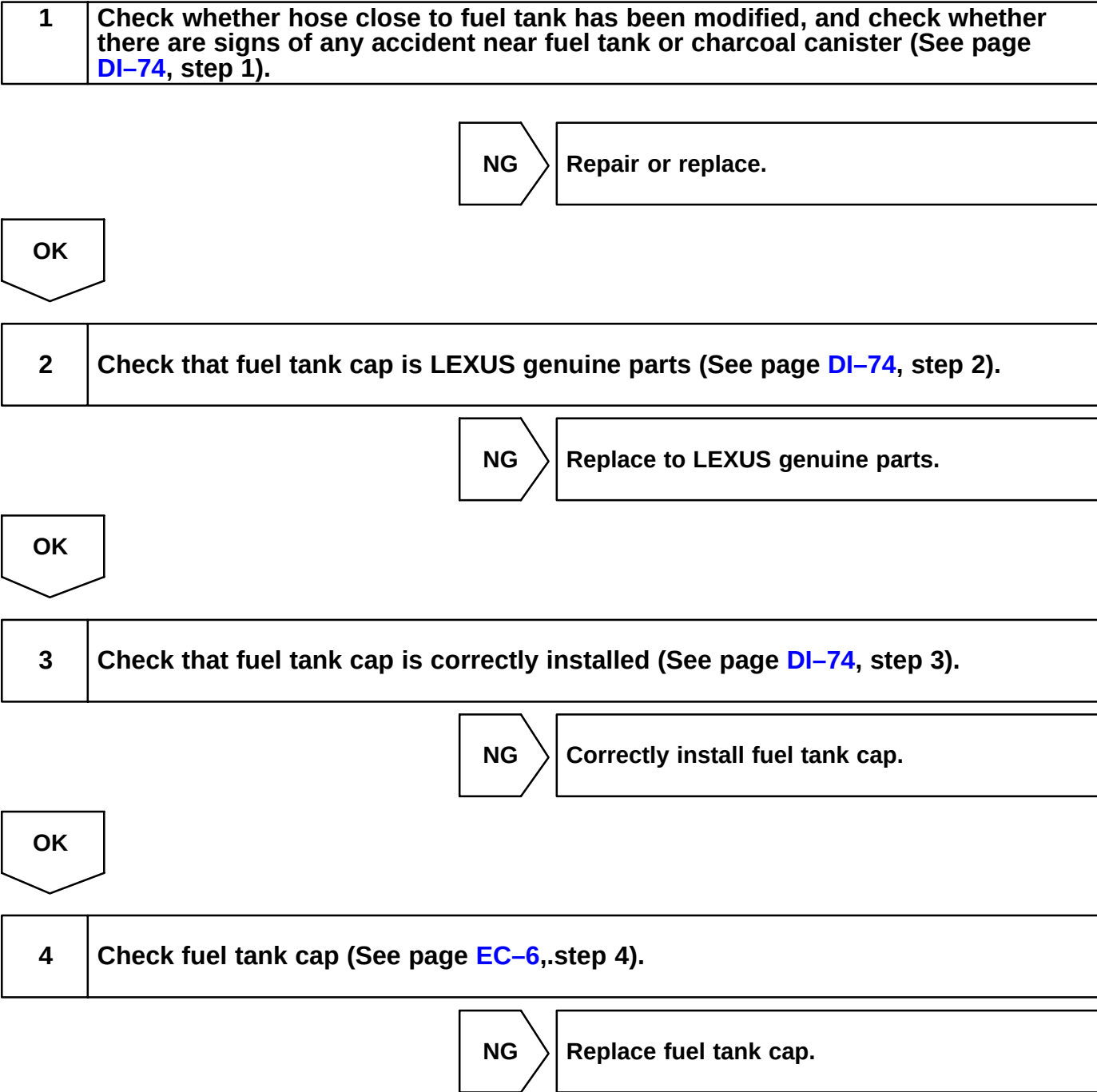
Refer to DTC P0440, P0442 on page [DI-74](#).

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442,first troubleshoot DTC P0441, P0446, P0450 or P0451. If no other malfunctions than them malfunction is detected, trouble-shoot DTC P0440 or P0442 next.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

LEXUS hand-held tester:



OK

5 Check filler neck for damage (See page [DI-74](#), step 5).

NG

Replace filler pipe.

OK

6 Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page [DI-74](#), step 6).

NG

Repair or connect VSV or sensor connector.

OK

7 Check hose and tube between fuel tank and charcoal canister (See page [DI-74](#), step 7).

NG

Repair or replace.

OK

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

NG

Repair or connect VSV or sensor connector.

OK

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

CHECK:

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

NG**Repair or replace.****OK**

10	Check voltage between terminals VC and E2 of ECM connector (See page DI-74, step 9).

NG**Check and replace ECM (See page [IN-31](#)).****OK**

11	Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-74, step 10).

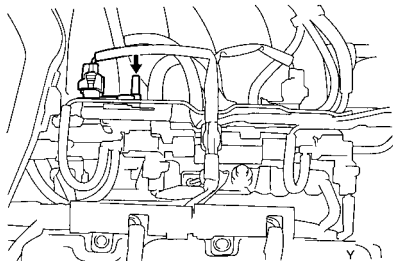
OK**Go to step 13.****NG**

12	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-31).

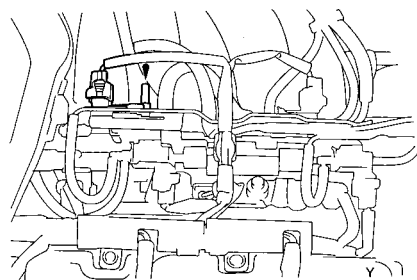
NG**Repair or replace harness or connector.****OK****Replace vapor pressure sensor.**

13 Check purge flow.

VSV is ON



VSV is OFF



A00230

PREPARATION:

- Connect the LEXUS hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- Disconnect the vacuum hose for the VSV for the EVAP from the charcoal canister.
- Start the engine.

CHECK:

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

OK:

VSV is ON:

Disconnected hose applies suction to your finger.

VSV is OFF:

Disconnected hose applies no suction to your finger.

OK

Go to step 17.

NG

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

CHECK:

- Check that the vacuum hose is connected correctly.
- Check the vacuum hose for looseness and disconnection.
- Check the vacuum hose for cracks, hole, damage and blockage.

NG

Repair or replace.

OK

15 Check operation of VSV for EVAP (See page EC-6).

OK

Go to step 16.

NG

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

- 16** Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page [IN-31](#)).

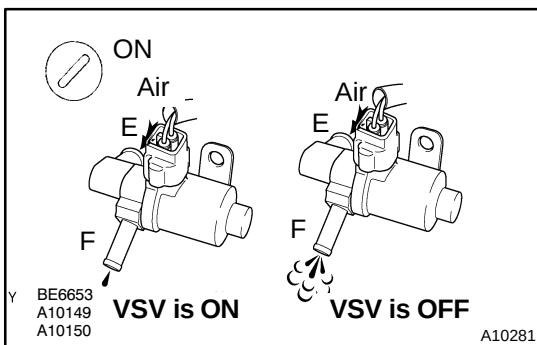
NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

- 17** Check VSV for CCV.



PREPARATION:

- Connect the LEXUS hand-held tester to the DLC3.
- Disconnect the vacuum hoses for the VSV for the CCV from the charcoal canister.
- Turn the ignition switch ON and push the LEXUS hand-held tester main switch ON.
- Select the ACTIVE TEST mode on the LEXUS hand-held tester.

CHECK:

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

OK:

VSV is ON:

Air does not flow from port E to port F.

VSV is OFF:

Air from port E flows out through port F.

OK

Go to step 21.

NG

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

CHECK:

- Check that the vacuum hose is connected correctly.

- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole damage, and blockage.

NG

Repair or replace.

OK

19

Check operation of VSV for CCV).

OK

Go to step 20.

NG

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

20

Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page [IN-31](#)).

NG

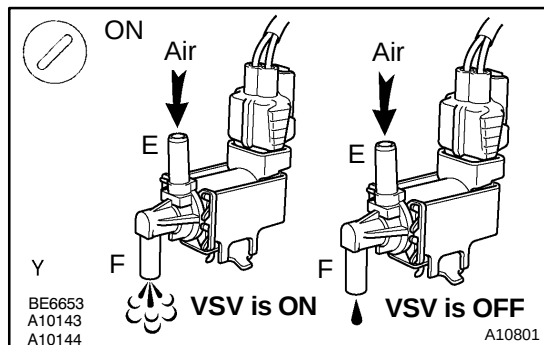
Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

21

Check VSV for pressure switching valve.

**PREPARATION:**

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

CHECK:

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

OK:**VSV is ON:****Air from port E flows out through port F.****VSV is OFF:****Air does not flow from port E to port F.****OK****Go to step 24.****NG****22****Check operation of VSV for pressure switching valve.****OK****Go to step 23.****NG**

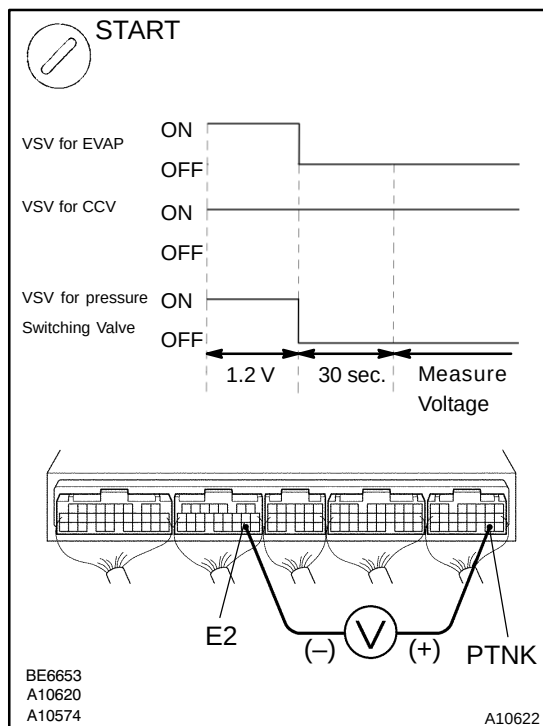
Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

23

Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page [IN-31](#)).

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

Check and replace ECM (See page [IN-31](#)).

24**Check fuel tank.****PREPARATION:**

- Remove the grove compartment (See page [SF-79](#)).
- Connect the LEXUS hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- Start the engine.
- Switch the VSV for the CCV is ON by the LEXUS hand-held tester.
- Switch the VSV for the EVAP and the VSV for the pressure switching valve are ON by the LEXUS hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

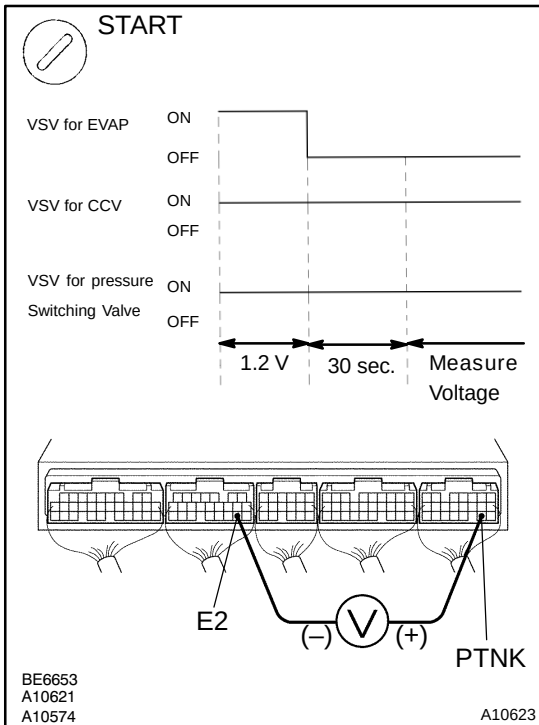
Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP and the VSV for the pressure switching valve from ON to OFF.

OK:**Voltage:**

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

NG**Replace fuel tank.****OK****25****Remove charcoal canister and check it (See page [EC-6](#)).****NG****Replace charcoal canister.****OK****26****Check fuel tank over fill check valve (See page [EC-6](#)).**

27 Check charcoal canister.



PREPARATION:

- Remove the grove compartment (See page [SF-79](#)).
- Connect the LEXUS hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- Start the engine.
- Switch the VSV for the CCV and the VSV for the pressure switching valve are ON by the LEXUS hand-held tester.
- Switch the VSV for the EVAP is ON by the LEXUS hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

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

OK:

Voltage:

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

NG

Replace charcoal canister.

OK

28 Remove charcoal canister and check it (See page [EC-6](#)).

NG

Replace charcoal canister.

OK

29 Check fuel tank over fill check valve (See page [EC-6](#)).

NG

Replace fuel tank over fill check valve or fuel tank.

OK

Check and replace charcoal canister (See page [IN-31](#)).

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

- 1 Check whether hose close to fuel tank has been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page [DI-74](#), step 1).

NG

Repair or replace.

OK

- 2 Check that fuel tank cap is LEXUS genuine parts (See page [DI-74](#), step 2).

NG

Replace to LEXUS genuine parts.

OK

- 3 Check that fuel tank cap is correctly installed (See page [DI-74](#), step 3).

NG

Correctly install fuel tank cap.

OK

- 4 Check fuel tank cap (See page [EC-6](#), step 4).

NG

Replace fuel tank cap.

OK

- 5 Check filler neck for damage (See page [DI-74](#), step 5).

NG

Replace filler pipe.

OK

6

Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page [DI-74](#), step 6).

NG

Repair or connect VSV or sensor connector.

OK

7

Check hose and tube between fuel tank and charcoal canister (See page [DI-74](#), step 7).

NG

Repair or replace.

OK

8

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

NG

Repair or connect VSV or sensor connector.

OK

9

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

CHECK:

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

NG

Repair or replace.

OK

10

Check voltage between terminals VC and E2 of ECM connector (See page [DI-74](#), step 9).

NG

Check and replace ECM (See page [IN-31](#)).

OK

11

Check voltage between terminals PTNK and E2 of ECM connectors (See page [DI-74](#), step 10).

OK

Go to step 13.

NG

12

Check for open and short in harness and connector between vapor pressure sensor and ECM (See page [IN-31](#)).

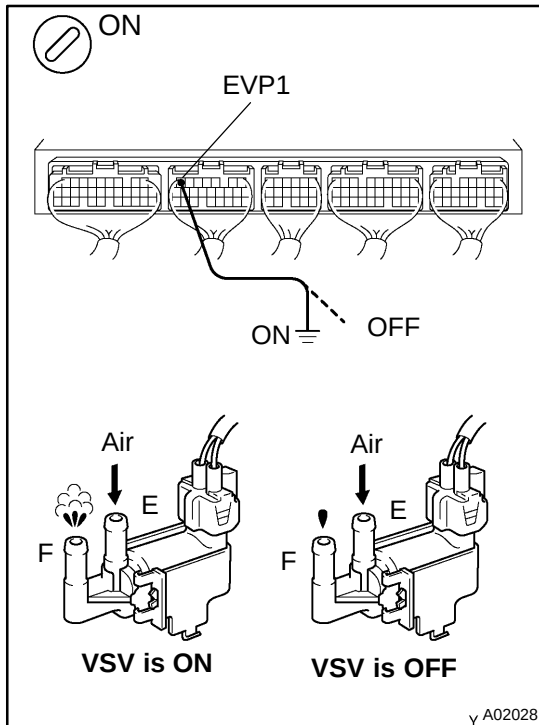
NG

Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

13 Check VSV for EVAP.



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect terminal EVP1 of the ECM connector the body ground (ON).
- Disconnect between terminal EVP1 of the ECM connector and the body ground (OFF).

OK:

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

OK

Go to step 16.

NG

14 Check operation of VSV for EVAP (See page [SF-62](#)).

OK

Go to step 15.

NG

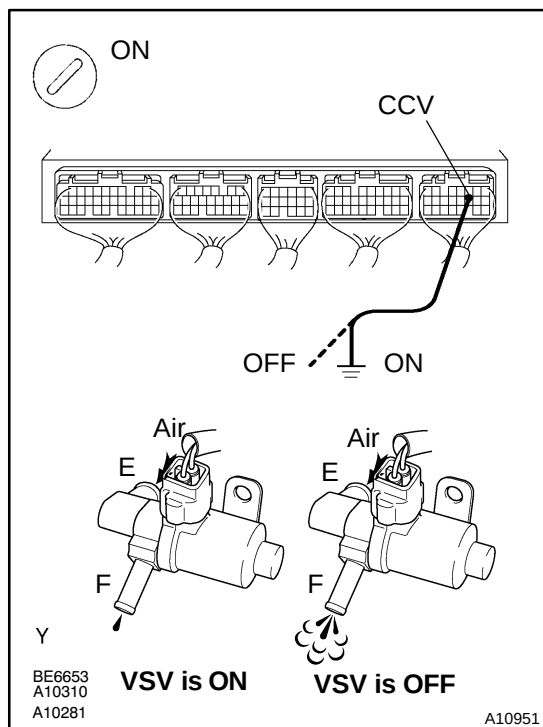
Replace VSV and clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister, and then check charcoal canister.

15 Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).**16 Check VSV for CCV.****PREPARATION:**

- Remove the groove compartment (See page [SF-79](#)).
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect terminal CCV of the ECM connector body ground (ON).
- Disconnect between terminal CCV of the ECM connector and the body ground (OFF).

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

OK

Go to step 19.

NG

17 Check operation of VSV for CCV (See page [SF-67](#)).

OK

Go to step 18.

NG

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

- 18** Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page [IN-31](#)).

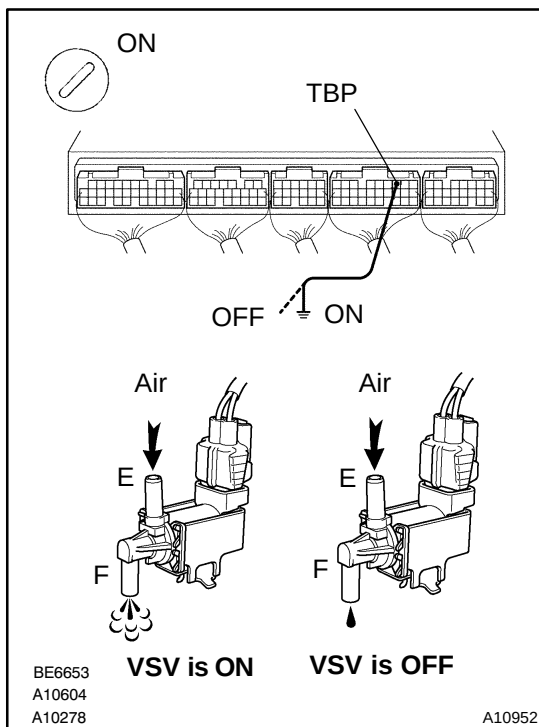
NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

- 19** Check VSV for pressure switching valve.

**PREPARATION:**

- Remove the groove compartment (See page [SF-79](#)).
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect terminal TBP of the ECM connector the body ground (ON).
- Disconnect between terminal TBP of the ECM connector and the body ground (OFF).

OK:

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

OK

Go to step 22.

NG

- 20** Check operation of VSV for pressure switching valve (See page [SF-69](#)).

OK

Go to step 21.

NG

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

21	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

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

NG

Replace fuel tank over fill check valve or fuel tank.

OK

Check and replace charcoal canister (See page [IN-31](#)).

DTC	P0451	Evaporative Emission Control System Pressure Sensor Range/Performance

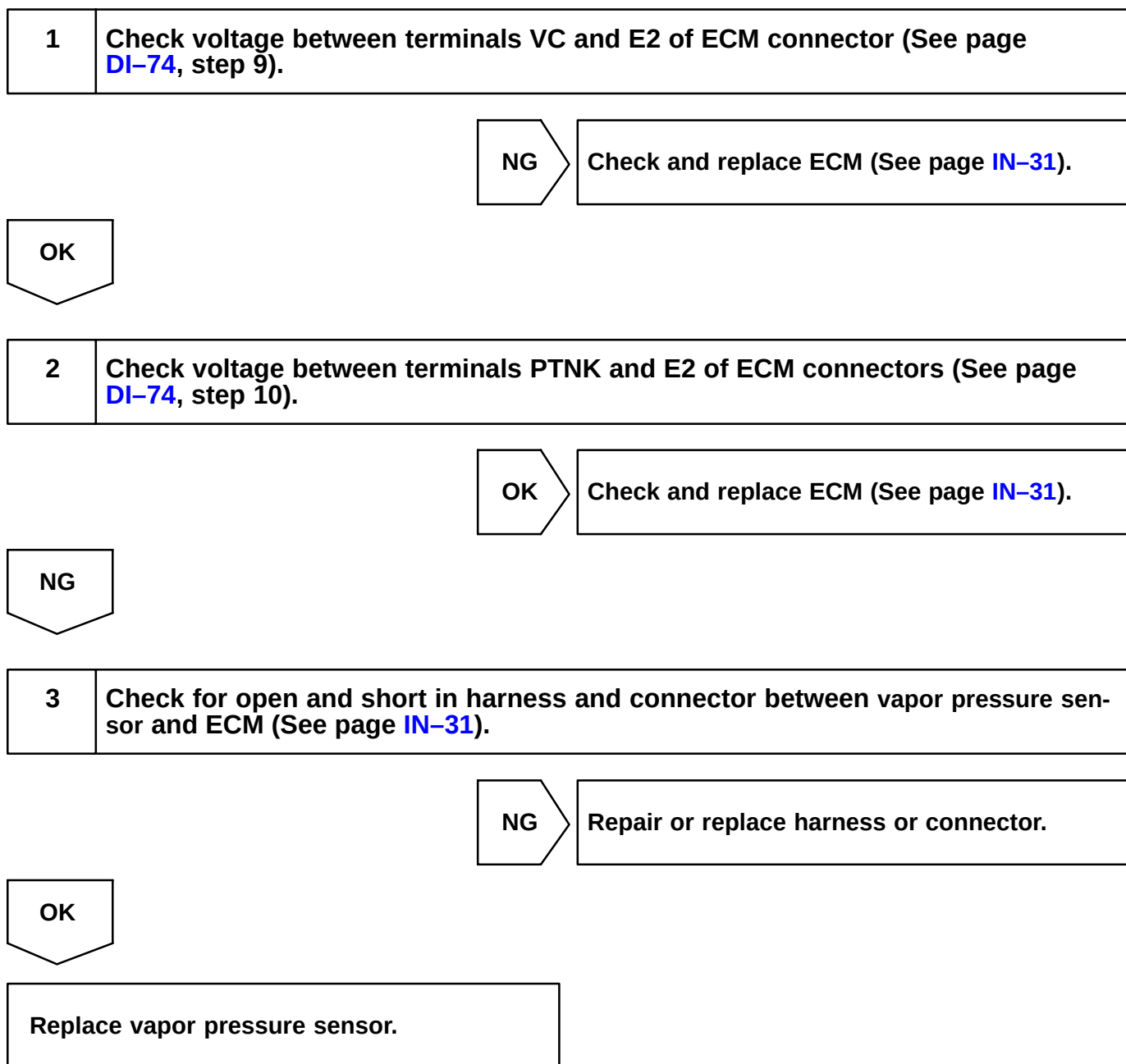
WIRING DIAGRAM

Refer to DTC P0440 or P0442 on page [DI-74](#).

INSPECTION PROCEDURE

HINT:

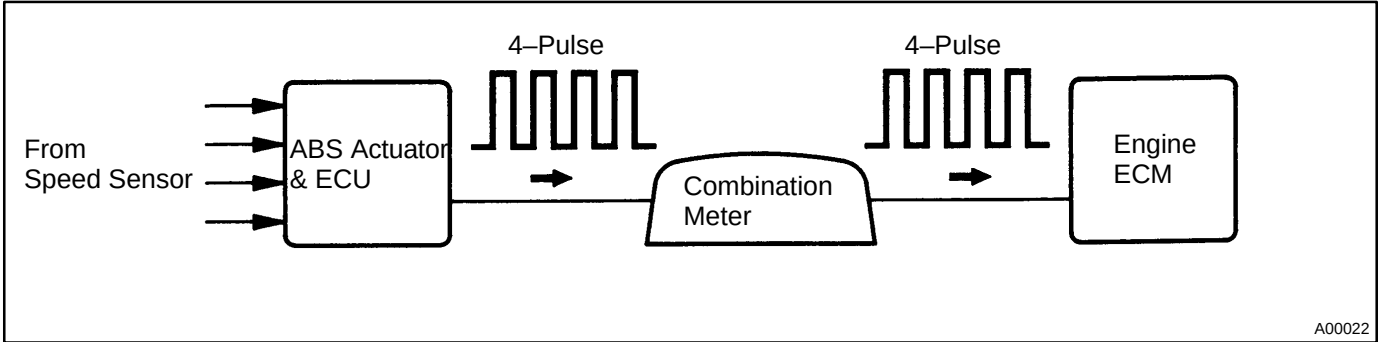
- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442, first trouble shoot DTC P0441, P0446 P0450 or P0451. If no other malfunctions than them are detected, troubleshoot DTC P0440 or P0442 next.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.



DTC	P0500	Vehicle Speed Sensor Malfunction

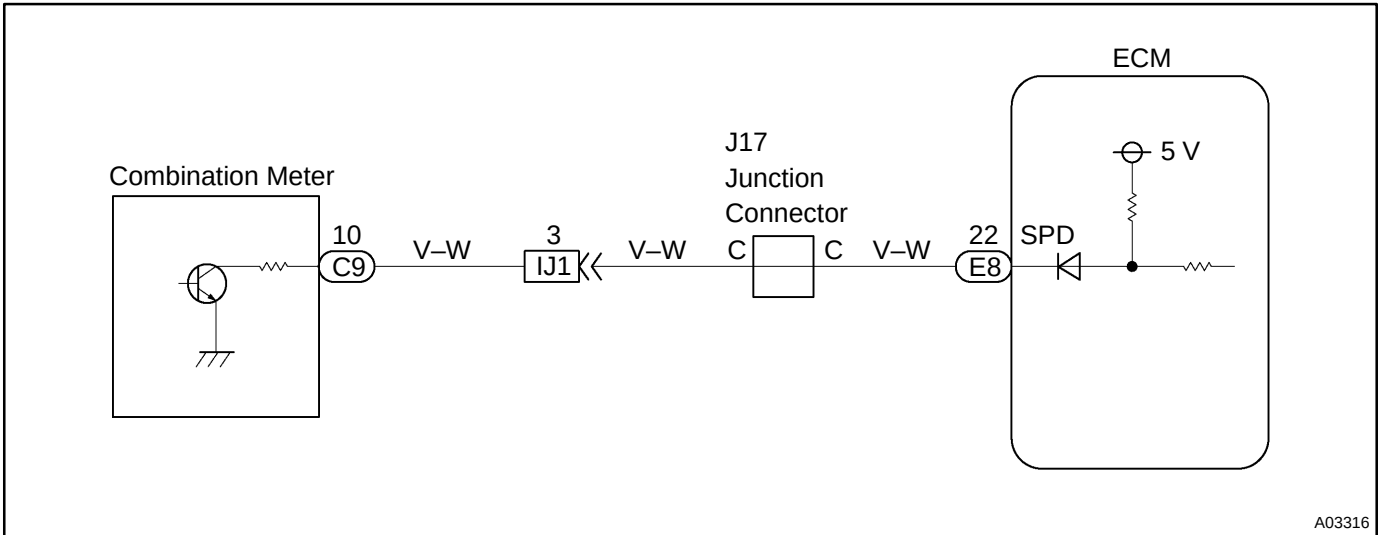
CIRCUIT DESCRIPTION

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



DTC No.	DTC Detecting Condition	Trouble Area
P0500	No vehicle speed sensor signal to Engine & ECT ECU under following conditions Vehicle is being driven	●Combination meter ●Open or short in speed sensor circuit ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 Check operation of speedometer.

CHECK:

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

HINT:

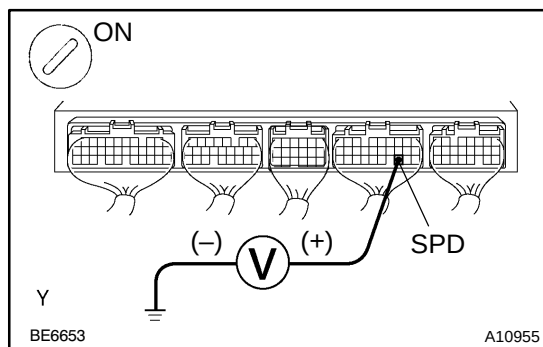
The vehicle speed sensor is operating normally if the speedometer display is normal.

NG

Check speedometer circuit. See combination meter troubleshooting (See page [BE-99](#)).

OK

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



PREPARATION:

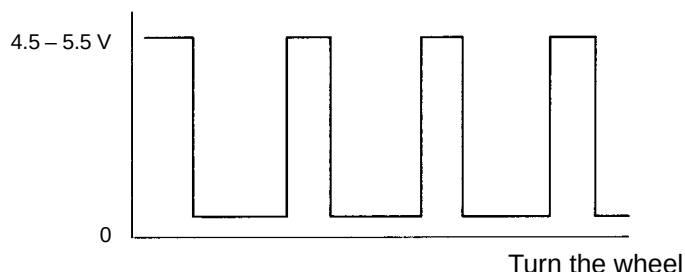
- Remove glove compartment (See page [BO-82](#)).
- Shift the shift lever to neutral.
- Jack up one of the front wheels.
- Turn ignition switch ON.

CHECK:

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

OK:

Voltage is generated intermittently.



AT7809

NG

Check and repair harness and connector between combination meter and ECM (See page [IN-31](#)).

OK

3	Check ECM (See page IN-31).

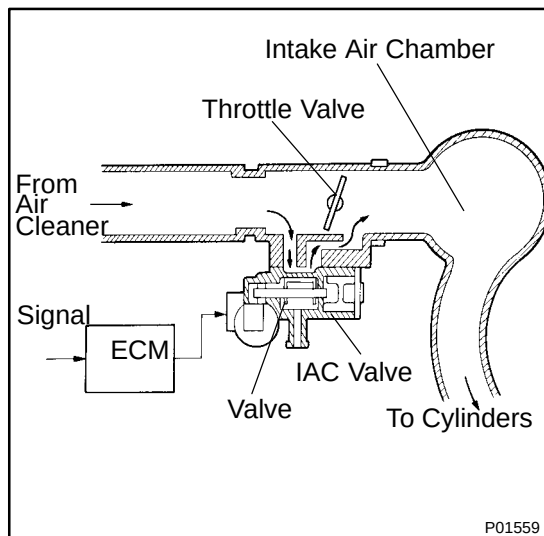
NG	Replace ECM.

OK

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

DTC	P0505	Idle Control System Malfunction

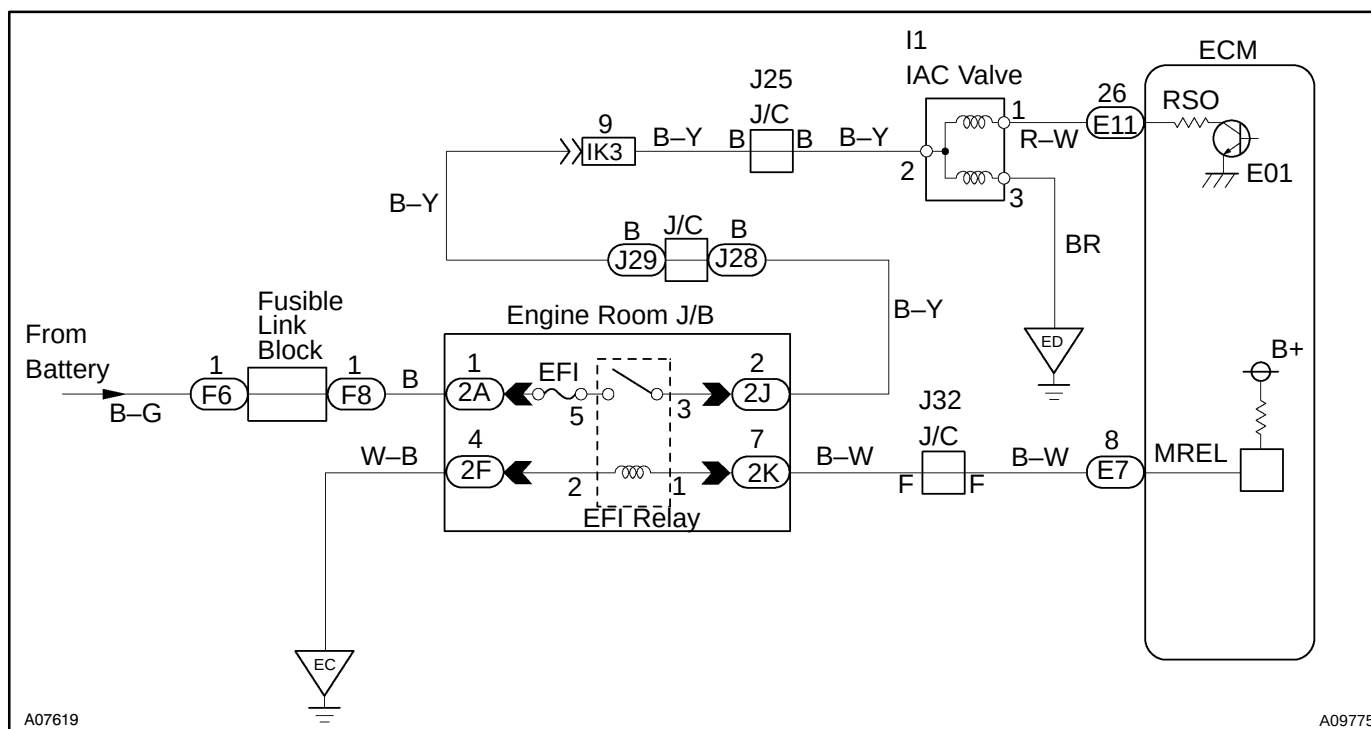
CIRCUIT DESCRIPTION



The rotary solenoid type IAC valve is located in front of the intake air chamber and intake air bypassing the throttle valve is directed to the IAC valve through the passage. In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed. The ECM operates the IAC valve only to perform idle-up and provide feedback for the target idling speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from the target speed (2 trip detection logic)	•Open or short in IAC valve circuit •IAC valve is stuck or closed •Open or short in A/C signal circuit •Air induction system •ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	Check idle speed.

When using LEXUS hand-held tester:

PREPARATION:

- (a) Warm up the engine to the normal operating temperature.
- (b) Switch off all the accessories.
- (c) Switch off the A/C.
- (d) Shift transmission into the P range or neutral position.
- (e) Connect the LEXUS hand-held tester to the DLC3 on the vehicle and select the ACTIVE TEST mode.

CHECK:

Check the difference of the engine speed between the ones, less than 5 seconds and more than 5 seconds after switching the TE1 from OFF to ON by the LEXUS hand-held tester.

OK:

Difference of engine speed: More than 100 rpm

When not using LEXUS hand-held tester:

PREPARATION:

- (a) Warm up the engine to normal operating temperature.
- (b) Switch off all the accessories.
- (c) Switch off the A/C.
- (d) Shift transmission into the P range or neutral position.
- (e) Connect the OBDII scan tool to DLC3 on the vehicle.
- (f) Using SST, connect terminals TE1 and E1 of the DLC1.

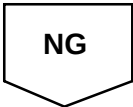
SST 09843-18020

CHECK:

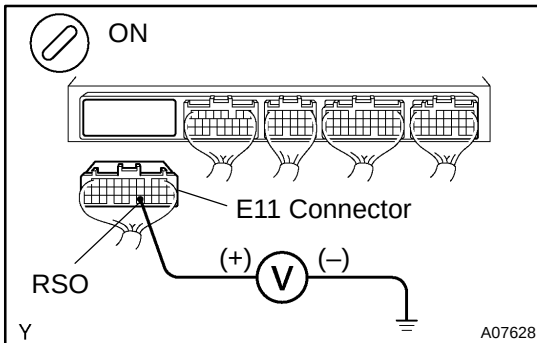
Check the difference of engine speed between the ones, less than 5 seconds and more than 5 seconds after connecting terminals TE1 and E1 of the DLC1.

OK:

Difference of engine speed: More than 100 rpm



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



PREPARATION:

- (a) Remove the glove compartment (See page [SF-80](#)).
- (b) Disconnect the E11 connector from the ECM.
- (c) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal RSO of the ECM connector and body ground.

OK:

Voltage: 9 – 14 V

OK

Go to step 4.

NG

3 Check IAC valve (See page [SF-41](#)).

NG

Replace IAC valve.

OK

Check for open and short in harness and connector between engine room J/B and IAC valve, and IAC valve and ECM (See page [IN-31](#)).

4 Check operation of IAC valve (See page [SF-44](#)).

NG

Repair or replace IAC valve.

OK

5 Check blockage of IAC valve and passage to bypass throttle valve.

NG

Repair or replace IAC valve.



Check and replace ECM (See page [IN-31](#)).

Check for A/C signal circuit (See page [DI-758](#)).



Repair or replace.

OK

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

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

DTC	P1150	A/F Sensor Circuit Range/Performance Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page [DI-43](#).

DTC No.	DTC Detecting Condition	Trouble Area
P1130 P1150	Output voltage* 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 ECM only	●Open or short in A/F sensor circuit ●A/F sensor ●Air induction system ●Fuel pressure ●Injector ●ECM
	Output voltage* 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 ECM only	
	Open or short in A/F sensor circuit (2 trip detection logic)	

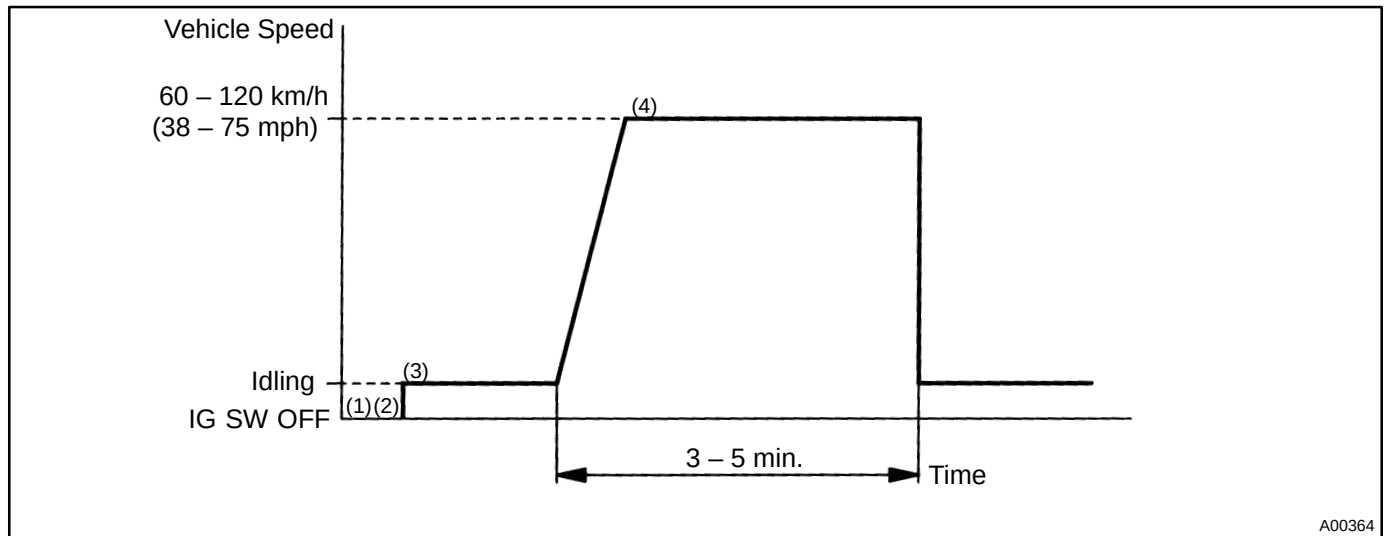
HINT:

- After confirming DTC P1130 and P1150, use the OBD II scan tool or LEXUS hand-held tester to confirm output voltage 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 by using the OBD II scan tool or LEXUS hand-held tester.
- The ECM controls the voltage of the AFR+, AFL+, AFR- and AFL- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without the OBDII scan tool or LEXUS hand-held tester.
- OBD II scan tool (excluding LEXUS hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the LEXUS hand-held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page [DI-43](#).

CONFIRMATION DRIVING PATTERN



- (1) Connect the LEXUS hand-held tester to the DLC3.
- (2) Switch the LEXUS hand-held tester from the normal mode to the check mode (See page DI-3).
- (3) Start the engine and warm it up with all the accessory switches OFF.
- (4) Drive the vehicle at 60 – 120 km/h (38 – 75 mph) and engine speed at 1,400 – 3,200 rpm for 3 – 5 minutes.

HINT:

If a malfunction exists, the MIL will light up during step (d).

NOTICE:

If the conditions in this test are not strictly followed, the detection of the malfunction is impossible. If you do not have a LEXUS hand-held tester, turn the ignition switch OFF after performing steps (c) and (d) once, then perform steps (c) and (d) again.

INSPECTION PROCEDURE

HINT:

- If DTC P1130 is displayed, check Bank 1 Sensor 1 circuit.
- If DTC P1150 is displayed, check Bank 2 Sensor 1 circuit.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P1130, P1150) being output?

YES

Go to relevant DTC chart.

NO

2	Check output voltage of A/F sensor.

PREPARATION:

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

CHECK:

Read the voltage value of A/F sensor on the screen of OBDII scan tool or LEXUS hand-held tester when performing all the following conditions.

HINT:

The voltage of the AFR+ or AFL+ terminal of the ECM 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 ECM.

OK:

Condition	A/F Sensor Voltage Value
Engine idling	● Not remains at 3.30 V (0.660 V*) ● Not remains at 3.8 V (0.76 V*) or more ● Not remains at 2.8 V (0.56 V*) or less *: When you use OBD II scan tool (excluding LEXUS 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:

- Although, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*) during fuel enrichment, it is normal.
- Although, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*) during fuel cut, 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 II scan tool (excluding LEXUS hand-held tester).

OK

Go to step 9.

NG

3

Check for open and short in harness and connector between ECM and A/F sensor (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

4

Check resistance of A/F sensor heater (See page [SF-76](#)).

NG

Replace A/F sensor.

OK

5

Check air induction system (See page [SF-1](#)).

NG

Repair or replace.

OK

6

Check fuel pressure (See page [SF-6](#)).

NG

Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page [SF-1](#)).

OK

7

Check injector injection (See page [SF-21](#)).

NG

Replace injector.

OK

Replace A/F sensor.

8

Perform confirmation driving pattern (See page [DI-110](#)).

Go

9

Is there DTC P1130 or P1150 being output again?

YESCheck and replace ECM (See page [IN-31](#)).**NO****10**

Did vehicle runs out of fuel in past?

NOCheck for intermittent problems (See page [DI-3](#)).**YES**

DTC P1130 or P1150 is caused by running out of fuel.

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

DTC	P1153	A/F Sensor Circuit Response Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page [DI-43](#).

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, the response characteristic of A/F sensor becomes deteriorated (2 trip detection logic)	●Open or short in A/F sensor circuit ●A/F sensor ●Air induction system ●Fuel pressure ●Injector ●ECM

WIRING DIAGRAM

Refer to DTC P0125 on page [DI-43](#).

INSPECTION PROCEDURE

HINT:

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

1	Are there any other codes (besides DTC P1133, P1153) being output?

YES

Go to relevant DTC chart.

NO

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

PREPARATION:

- Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3.
- Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 90 seconds.

CHECK:

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

HINT:

The voltage of the AFR+ or AFL+ terminal of the ECM 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 ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	●Not remains at 3.30 V (0.660 V*) ●Not remains at 3.8 V (0.76 V*) or more ●Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding LEXUS 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:

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

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

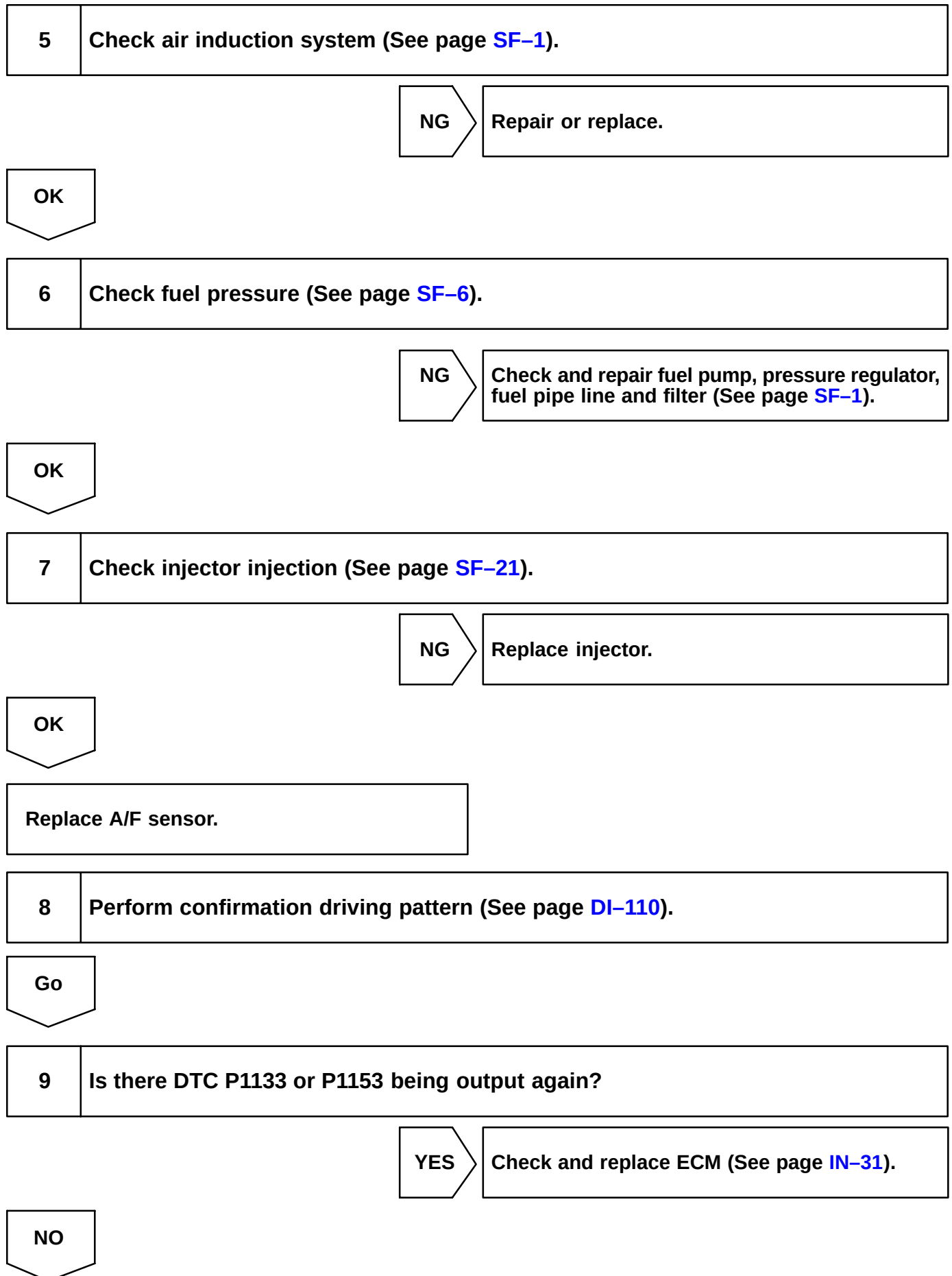
OK**Go to step 9.****NG****3**

Check for open and short in harness and connector between ECM and A/F sensor (See page [IN-31](#)).

NG**Repair or replace harness or connector.****OK****4**

Check resistance of A/F sensor heater (See page [SF-76](#)).

NG**Replace A/F sensor.****OK**



10	Did vehicle runs out of fuel in past?

NO

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

YES

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

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

DTC	P1155	A/F Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page [DI-43](#).

DTC No.	DTC Detecting Condition	Trouble Area
P1135	When the heater operates, heater current exceeds 8 A	●Open or short in heater circuit of A/F sensor ●A/F sensor heater ●ECM
P1155	Heater current is 0.25 A or less when the heater operates	

WIRING DIAGRAM

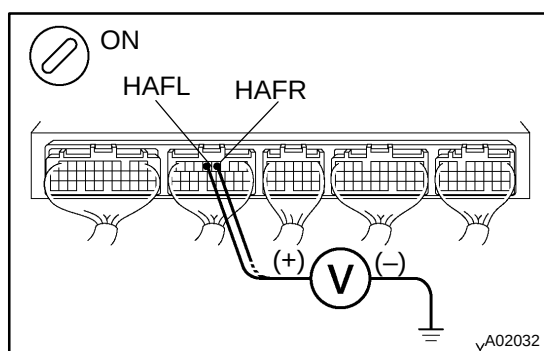
Refer to DTC P0125 on page [DI-43](#).

INSPECTION PROCEDURE

HINT:

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

1	Check voltage between terminals HAFL, HAFL of ECM connector and body ground.



PREPARATION:

- Remove the glove compartment (See page [SF-80](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK

Check and replace ECM (See page [IN-31](#)).

NG

2	Check resistance of A/F sensor heater (See page SF-76).

NG

Replace A/F sensor.

OK

3

Check A/F sensor heater relay (Marking: A/F HTR) (See page [SF-59](#)).

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 ECM (See page [IN-31](#)).

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

CIRCUIT DESCRIPTION

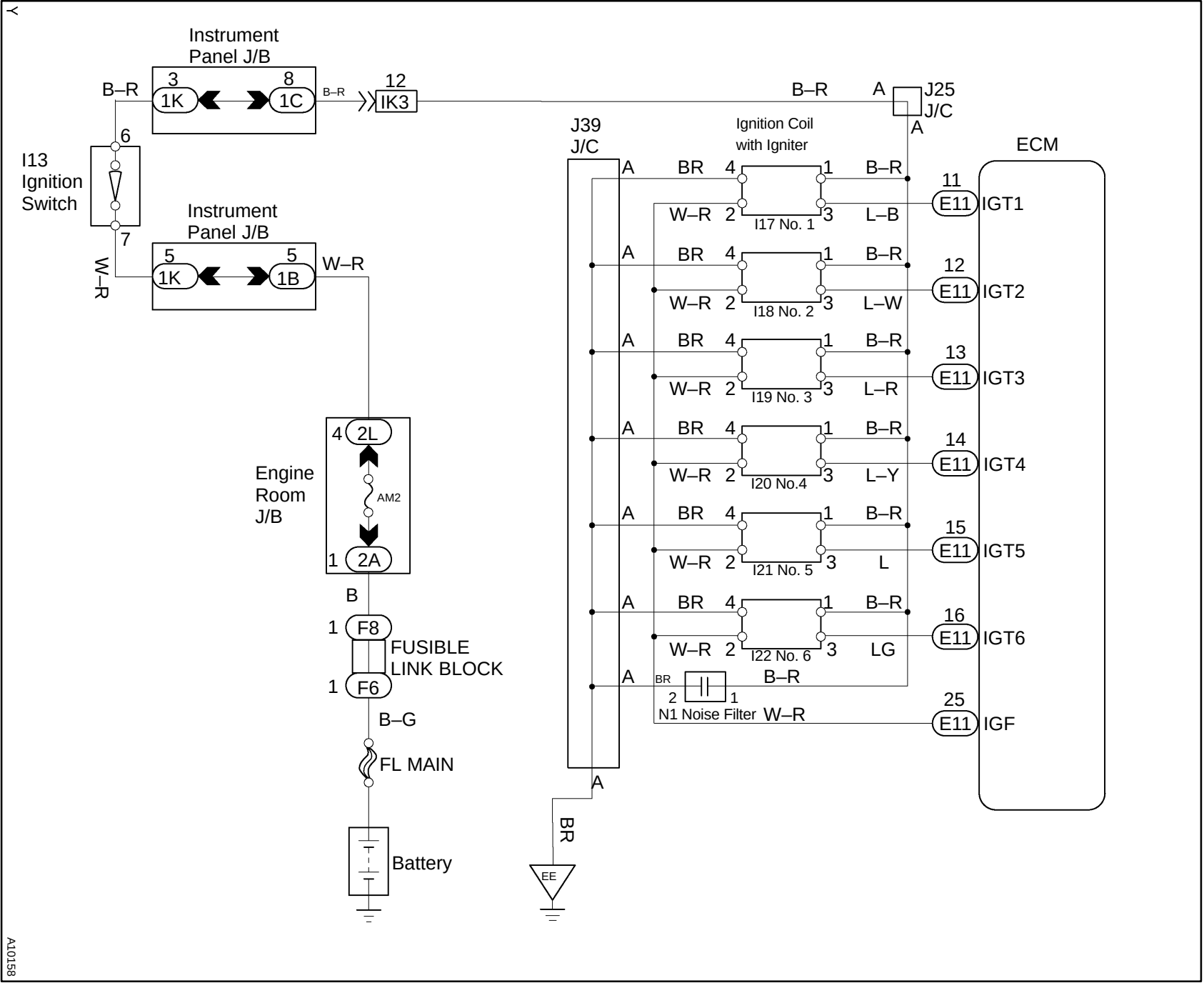
A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces the high-voltage loss, and enhances the the overall reliability of the ignition system by eliminating the distributor.

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 ECM determines ignition timing and outputs the ignition signal (IGT) for each cylinder. Based on IGT signal, the igniter controls the primary ignition signal (IGC) for all ignition coils. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail-safe measure to the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
P1300 P1305 P1310 P1315 P1320 P1325	Condition (a) is repeated 3 times consecutively during 6 consecutively IGT signals while engine is running (a) IGF signal is not input to ECM for 2 or more ignitions	● Ignition system ● Open or short in IGF or IGT circuit from ignition coil with igniter ● Ignition coil with igniter ● ECM

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

1 Check spark plug and spark (See page [DI-58](#)).

NG

Go to step 4.

OK

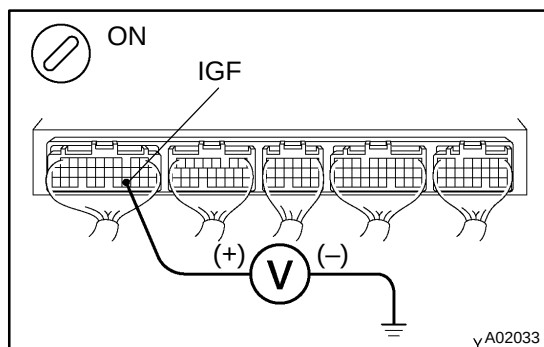
2 Check for open and short in harness and connector in IGF and IGT signal circuits between ECM and ignition coil with igniter (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

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



PREPARATION:

- Remove the glove compartment (See page [SF-80](#)).
- Disconnect the ignition coil with the igniter connector.
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 4.5 – 5.5 V

OK

Replace ignition coil with igniter.

NG

Check and replace ECM (See page [IN-31](#)).

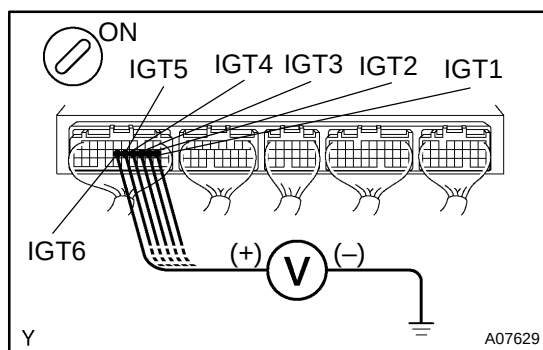
- 4 Check for open and short in harness and connector in IGT signal circuit between ECM and ignition coil with igniter (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

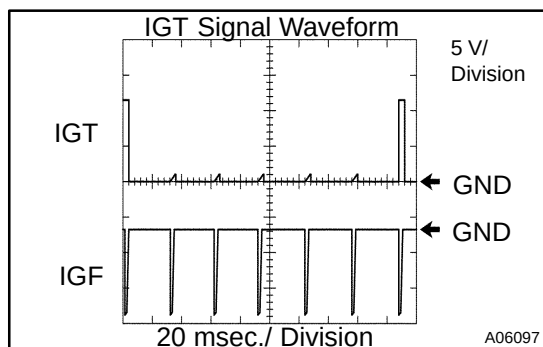
- 5 Check voltage between terminals IGT1 – IGT6 of ECM connector and body ground.

**PREPARATION:**Remove the glove compartment (See page [SF-80](#)).**CHECK:**

Measure the voltage between terminals IGT1 – IGT6 of the ECM connector and the body ground when the engine is cranked.

OK:

Voltage: More than 0.1 V and less than 4.5 V

**Reference: INSPECTION USING OSCILLOSCOPE**

During cranking or idling, check the waveform between terminals IGT1 – IGT6 and E1 of the ECM connector.

HINT:

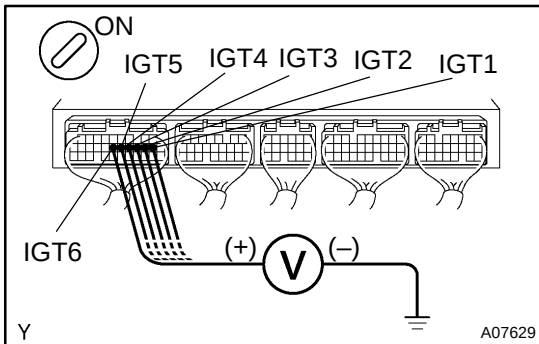
Correct waveform appears as shown in the illustration, with rectangle waves.

NG

Check and replace ECM (See page [IN-31](#)).

OK

- 6 Disconnect ignition coil with igniter connector, and check voltage between terminals IGT1 – IGT6 of ECM connector and body ground.**

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-80](#)).
 (b) Disconnect the ignition coil with the igniter connector.

CHECK:

Measure the voltage between terminals IGT1 – IGT6 of the ECM connector and the body ground when the engine is cranked.

OK:

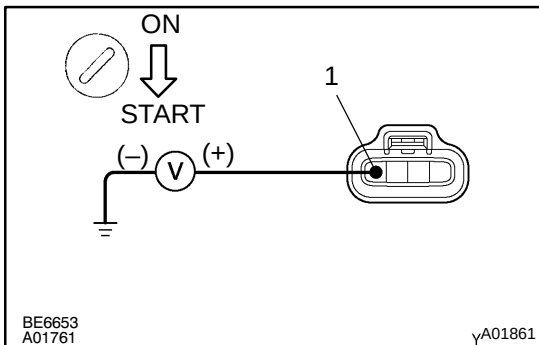
Voltage: More than 0.1 V and less than 4.5 V

NG

Check and replace ECM (See page [IN-31](#)).

OK

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

**PREPARATION:**

Disconnect the ignition coil with the igniter connector.

CHECK:

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

OK:

Voltage: 9 – 14 V

NG

Repair ignition coil with igniter power source circuit.

OK

- 8 Check for open and short in harness and connector between ignition switch and ignition coil with igniter (See page [IN-31](#)).**

NG

Repair or replace harness or connector.

OK

Replace ignition coil with igniter.

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

CIRCUIT DESCRIPTION

Refer to DTC P0335 on page [DI-67](#).

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

WIRING DIAGRAM

Refer to DTC P0335 on page [DI-67](#).

INSPECTION PROCEDURE

Refer to DTC P0335 on page [DI-67](#).

HINT:

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

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

DTC	P1351	VVT Sensor/Crankshaft Position Sensor Circuit Range/Performance Problem (Bank 2)

CIRCUIT DESCRIPTION

Refer to DTC P1350 on page [DI-135](#).

DTC No.	Detection Item	Trouble Area
P1346	Deviation in crankshaft position sensor signal and VVT sensor (bank 1) signal (2 trip detection logic)	●Mechanical system malfunction (Jumping teeth of timing belt, belt stretched) ●ECM
P1351	Deviation in crankshaft position sensor signal and VVT sensor (bank 2) signal (2 trip detection logic)	

WIRING DIAGRAM

Refer to DTC P1350 on page [DI-135](#).

INSPECTION PROCEDURE

HINT:

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

1	Check valve timing (Check for loose and jumping teeth of timing belt) (See page EM-15).

NG

Adjust valve timing (Repair or replace timing belt).

OK

Check and replace ECM (See page [IN-31](#)).

DTC	P1349	VVT System Malfunction (Bank 1)

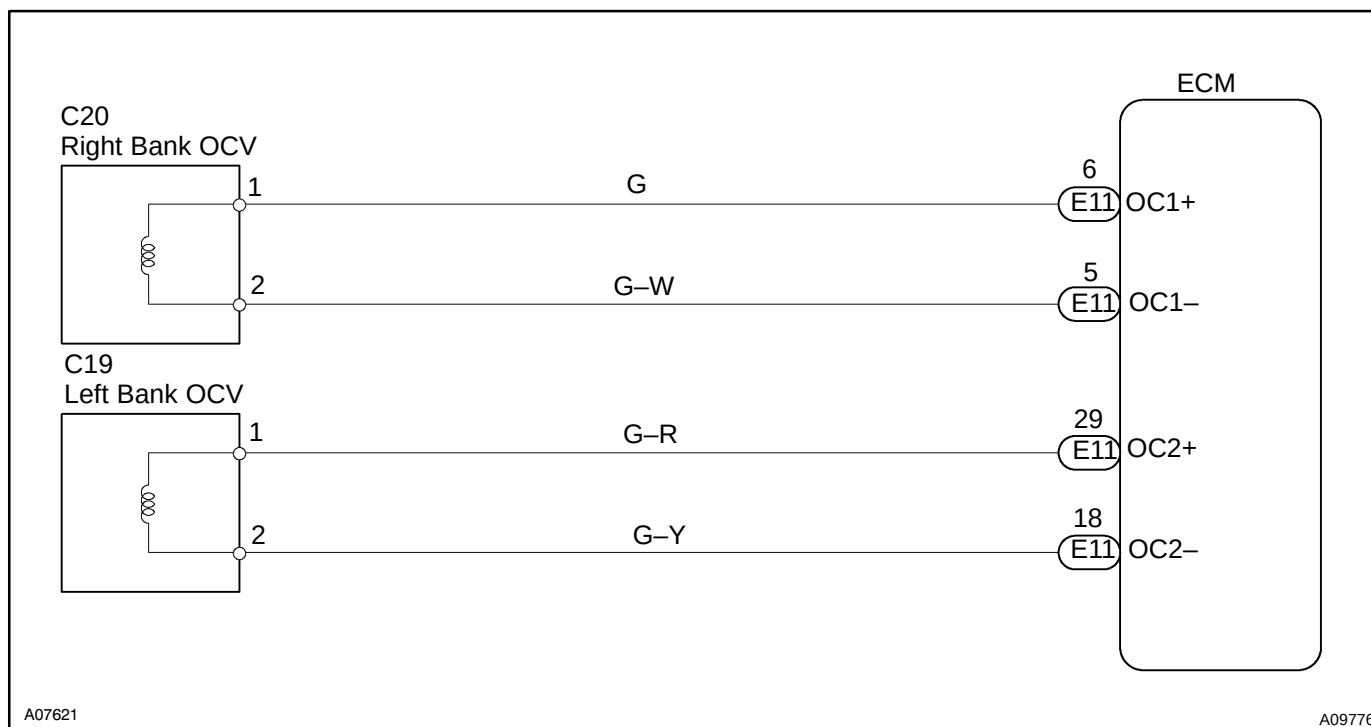
DTC	P1354	VVT System Malfunction (Bank 2)

CIRCUIT DESCRIPTION

The VVT system constantly adjusts intake valve timing based upon operating conditions. The ECM system controls the Oil Control Valve (OCV) with a variable duty cycle. The Oil Control Valve then supplies oil to the advance or retard side of the VVT Controller. The oil applied to the VVT Controller will cause the intake cam to advance or retard depending on the position of the Oil Control Valve. The ECM verifies that the desired camshaft angle has been achieved by monitoring the camshaft position sensor.

DTC No.	DTC Detecting Condition	Trouble Area
P1349 P1354	Condition (a) or (b) continues after the engine is warmed up and engine speed at 400 – 4,000 rpm: (2 trip detection logic) (a) Valve timing does not change from current valve timing (b) Current valve timing is fixed	●Valve timing ●OCV ●VVT controller assembly ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1349 is displayed, check right bank VVT system circuit.
- If DTC P1354 is displayed, check left bank VVT system circuit.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

LEXUS hand-held tester:

1	Check valve timing (See page EM-15).

NG

Repair valve timing.

OK

2	Check operation of OCV.

PREPARATION:

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

CHECK:

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

OK:

OCV is OFF: Normal engine speed

OCV is ON: Rough idle or engine stall

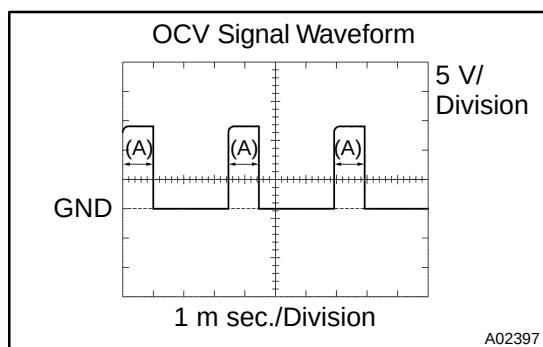
OK

VVT system is OK.*

*: DTCs P1349 and P1354 are also output when a foreign object is defected in some parts of the system in the engine oil, and then the system returns to normal in a short time. As ECM is controlled to eject a foreign objects, there is no problem on the VVT. There is also no problem no the VVT as the oil filter should catch the foreign object in the engine oil.

NG

3	Check voltage between terminals OCV+ and OCV- of ECM connector.

**Reference: INSPECTION USING OSCILLOSCOPE**

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

HINT:

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

NG

Check and replace ECM (See page [IN-31](#)).

OK

4 Check VVT controller assembly.

PREPARATION:

- (a) Remove the timing belt (See page [EM-15](#)).
- (b) Remove the cylinder head cover.
- (c) Remove the OCV (See page [EM-31](#)).
- (d) Drain oil into the VVT controller assembly (See page [EM-31](#)).

CHECK:

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

OK:

The oil into VVT controller assembly is drained.

NG

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

OK

5 Check OCV (See page [SF-49](#)).

NG

Replace OCV, and then go to step 6.

OK

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

NG

Repair or replace.

OK

7 Check whether or not DTC P1349/P1354 is stored.

PREPARATION:

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

CHECK:

Check whether or not DTC P1349/P1354 is stored (See page [DI-3](#)).

OK:

DTC P1349/P1354 is not stored.

OK

VVT system is OK.*

*: DTCs P1349 and P1354 are also output when a foreign object is detected in some parts of the system in the engine oil, and then the system returns to normal in a short time. As ECM is controlled to eject a foreign objects, there is no problem on the VVT. There is also no problem on the VVT as the oil filter should catch the foreign object in the engine oil.

NG

Replace ECM.

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

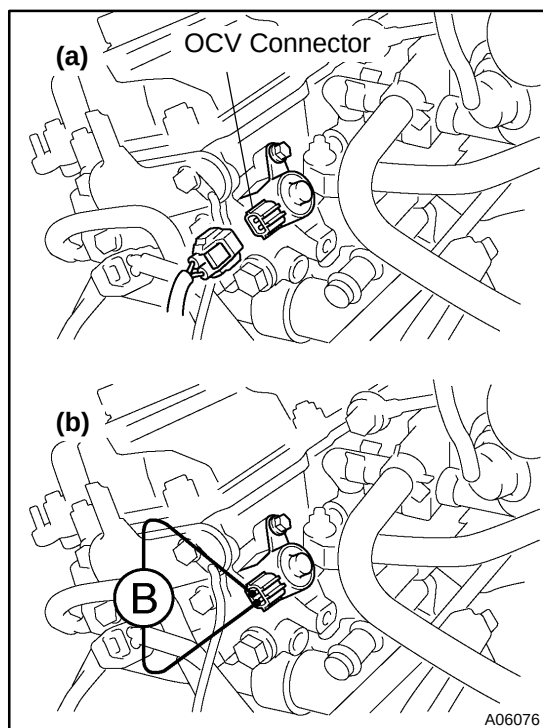
1 Check valve timing (See page [EM-15](#)).

NG

Repair valve timing.

OK

2 Check operation of OCV.



PREPARATION:

Start the engine.

CHECK:

- Check the engine speed when disconnecting the OCV connector.
- Check the engine speed while applying battery positive voltage to the terminals of the OCV.

RESULT:

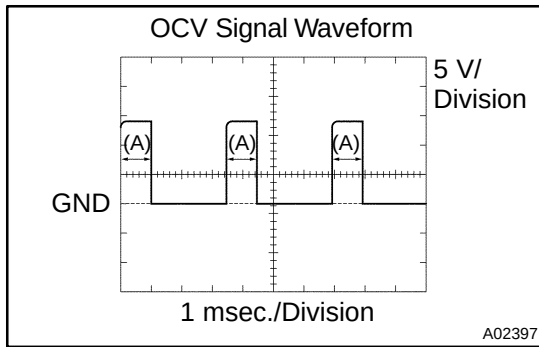
Result	Check (a)	Check (b)
1	Normal engine speed	Rough idle or engine stall
2	Except 1	

2

Go to step 4.

1

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



Reference: INSPECTION USING OSCILLOSCOPE

Turn the ignition switch ON, check the waveform between terminals OCV+ and OCV– of the ECM connector.

HINT:

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

OK

VVT system is OK.*

*: DTCs P1349 and P1354 are also output when a foreign object is defected in some parts of the system in the engine oil, and then the system returns to normal in a short time. As ECM is controlled to eject a foreign objects, there is no problem on the VVT. There is also no problem on the VVT as the oil filter should catch the foreign object in the engine oil.

NG

Check and replace ECM (See page [IN-31](#)).

4 Check VVT controller assembly.

PREPARATION:

- Remove the timing belt (See page [EM-15](#)).
- Remove the cylinder head cover.
- Remove the OCV (See page [EM-31](#)).
- Drain oil into the VVT controller assembly (See page [EM-31](#)).

CHECK:

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

OK:

The oil into VVT controller assembly is drained.

NG

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

OK

5	Check OCV (See page SF-49).

NG

Replace OCV, and then go to step 6.

OK

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

NG

Repair or replace.

OK

7	Check whether or not DTC P1349/P1354 is stored.

PREPARATION:

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

CHECK:Check whether or not DTC P1349/P1354 is stored (See page [DI-3](#)).**OK:**

DTC P1349/P1354 is not stored.

OK

VVT system is OK.*

*: DTCs P1349 and P1354 are also output when a foreign object is defected in some parts of the system in the engine oil, and then the system returns to normal in a short time. As ECM is controlled to eject a foreign objects, there is no problem on the VVT. There is also no problem on the VVT as the oil filter should get the foreign object in the engine oil.

NG

Replace ECM.

DTC	P1350	VVT Sensor/Camshaft Position Sensor Circuit Malfunction (Bank 2)

CIRCUIT DESCRIPTION

VVT sensor (VV signal) consists of a magnet, iron core and pickup coil.

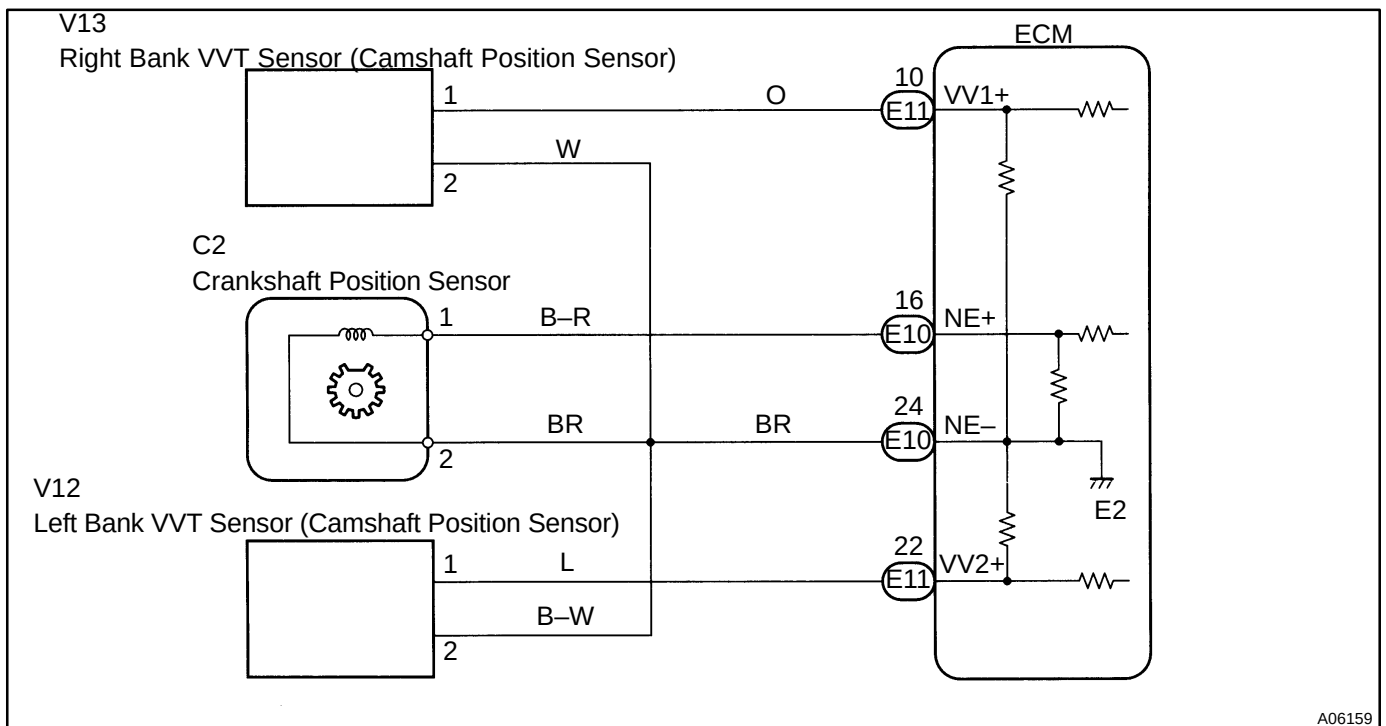
The VV signal plate has 3 teeth on its outer circumference and is installed the camshaft timing gear.

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 ECM to control the intake valve timing in response to during condition.

DTC No.	DTC Detecting Condition	Trouble Area
P1350	No VVT sensor (Camshaft position sensor) signal to ECM during cranking at 4 sec. or more (2 trip detection logic)	•Open or short in VVT sensor (camshaft position sensor) circuit •VVT sensor (camshaft position sensor) •Camshaft timing gear •ECM
	No VVT sensor (Camshaft position sensor) signal to ECM 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 ECM 5 times.	

WIRING DIAGRAM

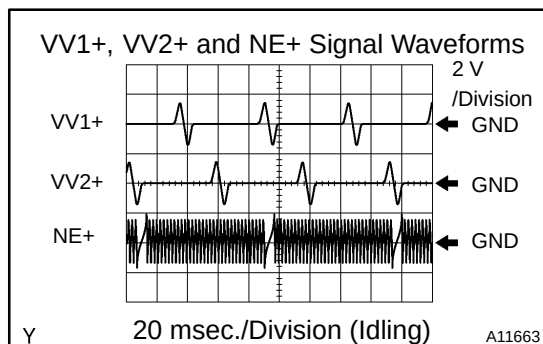


INSPECTION PROCEDURE

HINT:

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

1 Check resistance of VVT sensor (See page IG-7).



Reference: INSPECTION USING OSCILLOSCOPE

During idling, check the waveforms between terminals VV1+ and NE+, and VV2+ and NE– of the ECM connector.

HINT:

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

NG

Replace VVT sensor.

OK

2 Check for open and short in harness and connector between ECM and VVT sensor (See page IN-31).

NG

Repair or replace harness or connector.

OK

3 Inspect sensor installation and signal plate teeth of camshaft timing gear.

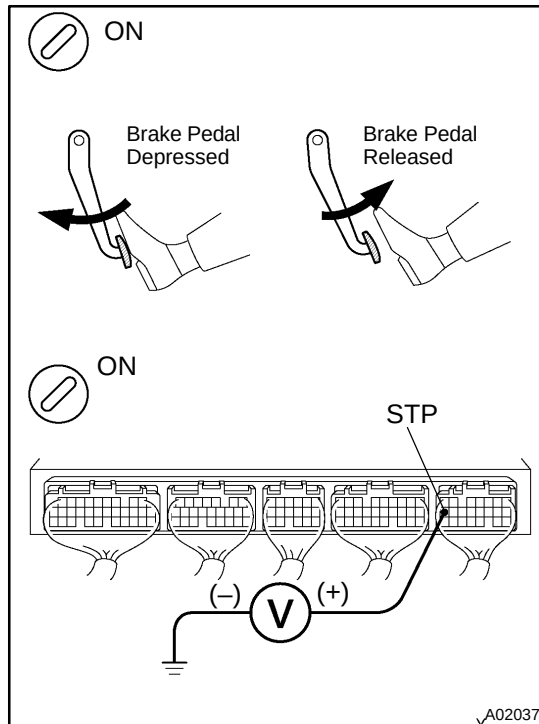
NG

Tighten sensor. Replace camshaft timing gear.

OK

Check and replace ECM (See page IN-31).

OK

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

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

CHECK:

Read the STP signal on the LEXUS hand-held tester.

OK:

Brake Pedal	STP Signal
Depressed	ON
Released	OFF

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

Turn the ignition switch ON.

CHECK:

Check the voltage between terminal STP of the ECM connector and the 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 ECM and stop light switch (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-31).

DTC	P1600	ECM BATT Malfunction

CIRCUIT DESCRIPTION

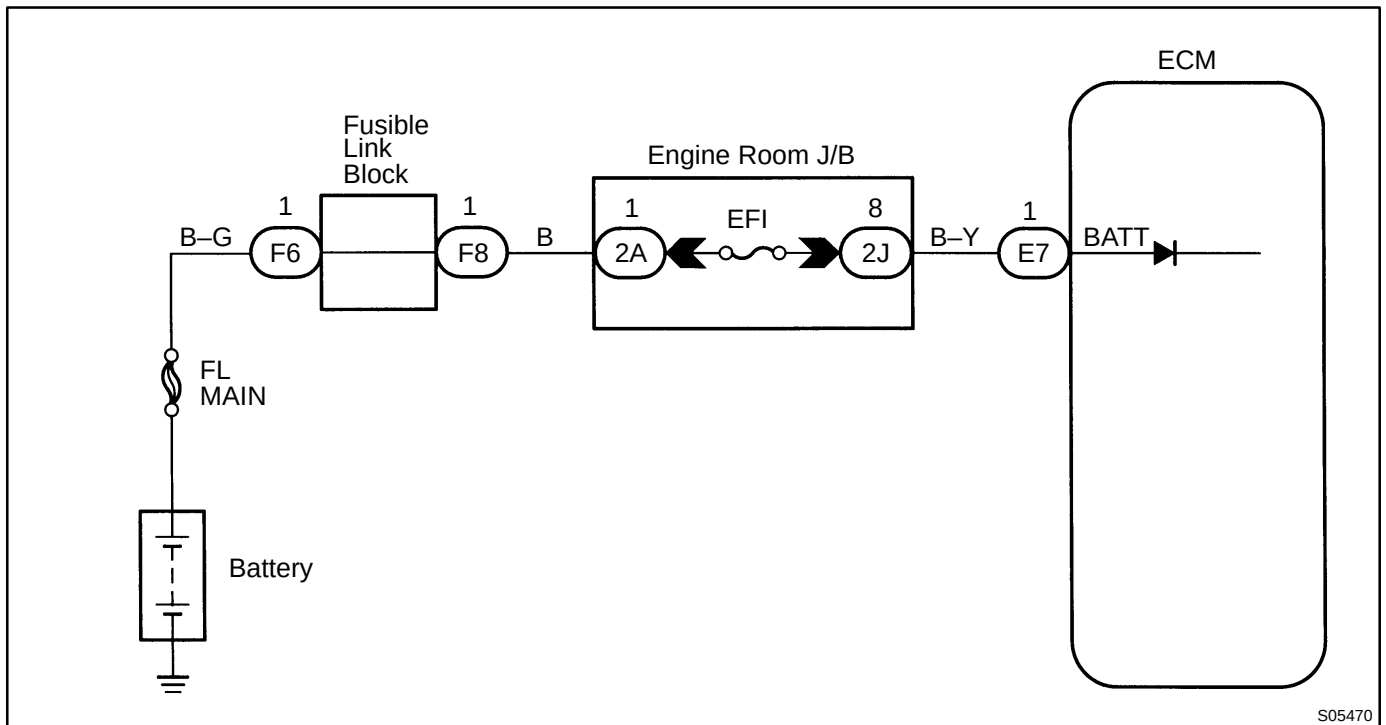
Battery positive voltage is applied to terminal BATT of the ECM even when the ignition switch is OFF for use by the DTC memory and air–fuel ratio adaptive control value memory, etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1600	Open in back up power source circuit	●Open in back up power source circuit ●ECM

HINT:

If DTC P1600 is displayed, the ECM does not store another DTC.

WIRING DIAGRAM



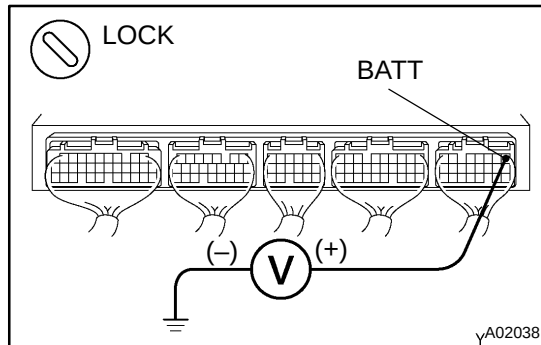
S05470

INSPECTION PROCEDURE

HINT:

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

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



PREPARATION:

Remove the glove compartment (See page [SF-79](#)).

CHECK:

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

OK:

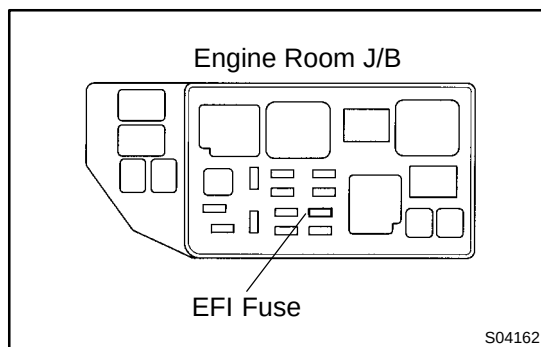
Voltage: 9 – 14 V

OK

Check and replace ECM (See page [IN-31](#)).

NG

2 Check EFI fuse.



PREPARATION:

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

CHECK:

Check the continuity of the EFI fuse.

OK:

Continuity

NG

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

OK

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

DTC	P1656	OCV Circuit Malfunction (bank 1)

DTC	P1663	OCV Circuit Malfunction (bank 2)

CIRCUIT DESCRIPTION

Refer to DTC P1349, P1354 on page [DI-129](#).

DTC No.	DTC Detecting Condition	Trouble Area
P1656 P1663	Open or short in oil control valve circuit	•Open or short in OCV circuit •OCV •ECM

WIRING DIAGRAM

Refer to DTC P1349, P1354 on page [DI-129](#).

INSPECTION PROCEDURE

HINT:

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

LEXUS hand-held tester:

1	Check OCV circuit.

PREPARATION:

- Start the engine and warmed it up.
- Connect the LEXUS hand-held tester and select the VVT an the ACTIVE TEST menu.

CHECK:

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

OK:

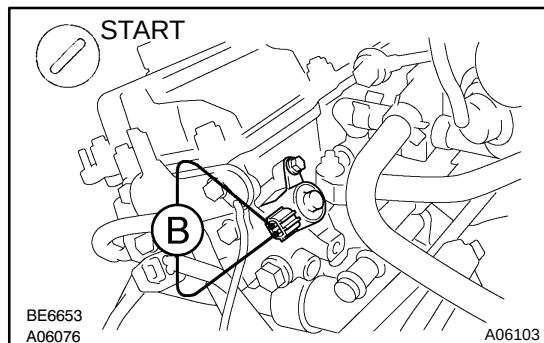
VVT system is OFF (OCV is OFF): Normal engine speed

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:

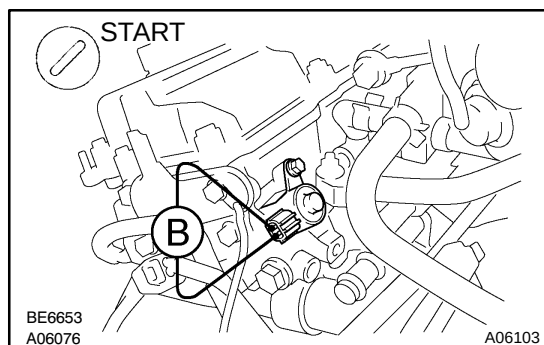
Check the engine speed.

OK:

Rough idle or engine stalled.

NG**Replace OCV.****OK****3 Check voltage between terminals OCV+ and OCV- of ECM connector (See page [DI-129](#), step 3).****NG****Check and replace ECM (See page [IN-31](#)).****OK****4 Check for open and short in harness and connector between OCV and ECM (See page [IN-31](#)).****NG****Repair or replace.****OK**

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

OBD II scan tool (excluding LEXUS hand-held tester):**1 Check operation of OCV.****PREPARATION:**

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

CHECK:

Check the engine speed.

OK:

Rough idle or engine stalled

NG

Replace OCV.

OK

2 Check voltage between terminals OCV+ and OCV- of ECM connector (See page [DI-129](#), step 3).

NG

Check and replace ECM (See page [IN-31](#)).

OK

3 Check for open and short in harness and connector between OCV and ECM (See page [IN-31](#)).

NG

Repair or replace.

OK

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

DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for N, 2, L and R positions (2 trip detection logic)	●Short in park/neutral position switch circuit ●Park/neutral position switch ●ECM
	When driving under conditions (a) and (b) for 30 sec. or more the park/neutral position 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	

HINT:

After confirming DTC P1780, use the LEXUS hand–held tester to confirm the PNP switch signal from the CURRENT DATA.

WIRING DIAGRAM

Refer to DTC P1780 on page [DI-203](#).

INSPECTION PROCEDURE

Refer to DTC P1780 on page [DI-203](#).

HINT:

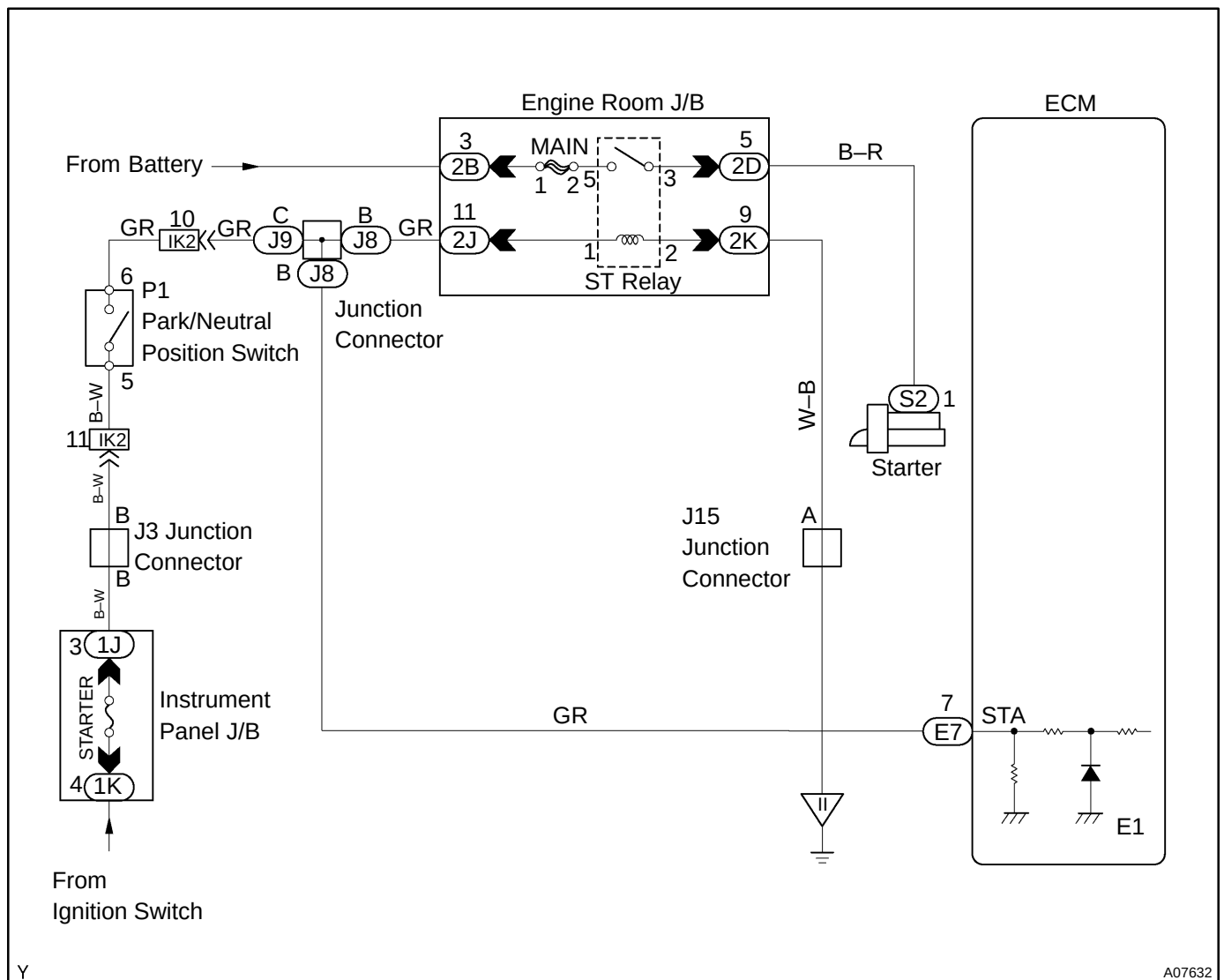
Read freeze frame data using LEXUS hand–held tester or OBD II scan tool, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio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

Starter Signal Circuit

CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after-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 in page [DI-22](#).

LEXUS hand-held tester:

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

PREPARATION:

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

CHECK:

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

OK:

Ignition Switch Position	ON	START
STA Signal	OFF	ON

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-22](#)).

NG

2	Check for open in harness and connector between ECM and starter relay (See page IN-31).

NG

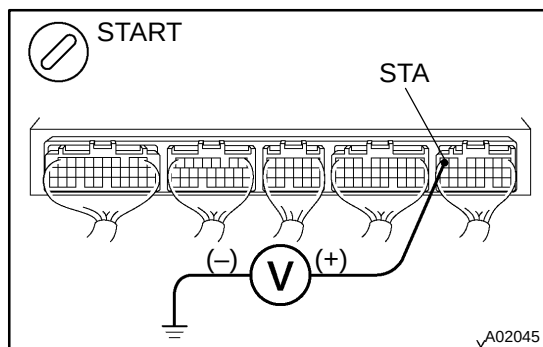
Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

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

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

**PREPARATION:**

Remove the glove compartment (See page [SF-80](#)).

CHECK:

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

OK:

Voltage: 6 V or more

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-22](#)).

NG**2****Check for open in harness and connector between ECM and starter relay (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK****Check and replace ECM (See page [IN-31](#)).**

ECM Power Source Circuit

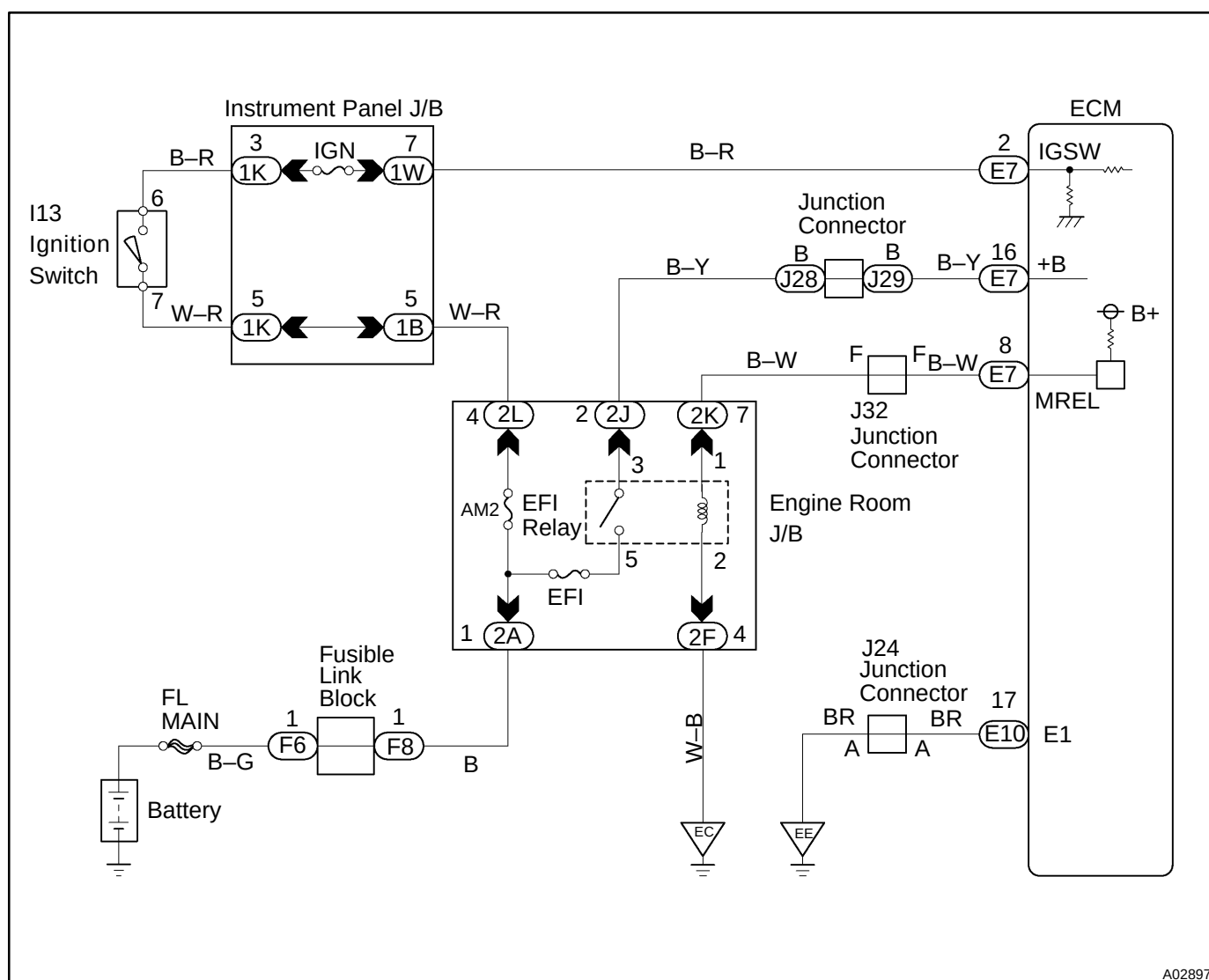
CIRCUIT DESCRIPTION

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

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

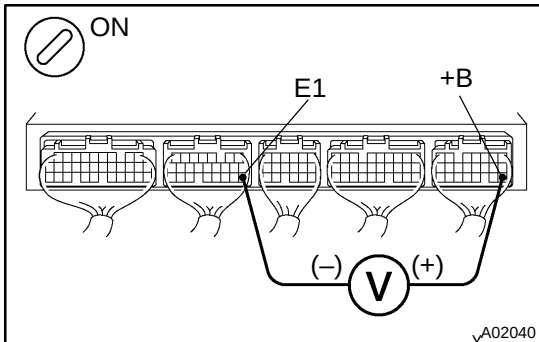
If the ignition switch is turned off, the ECM continues to switch on the EFI main relay for a maximum of 2 seconds for the initial setting of the IAC valve.

WIRING DIAGRAM



INSPECTION PROCEDURE

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



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK

Proceed to next circuit inspection shown in problem symptoms table (See page [DI-22](#)).

NG

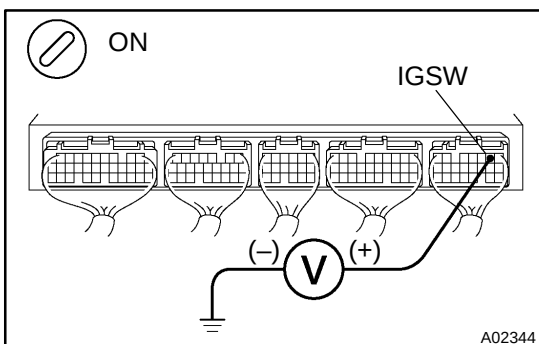
2 Check for open in harness and connector between terminal E1 of ECM and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

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



PREPARATION:

- Remove the glove compartment (See page [SF-79](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

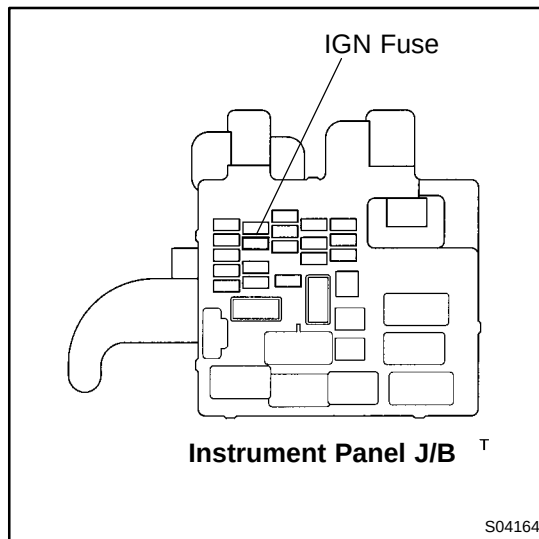
Voltage: 9 – 14 V

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 the harness and components connected to IGN fuse.

OK

5 Check ignition switch (See page [BE-21](#)).

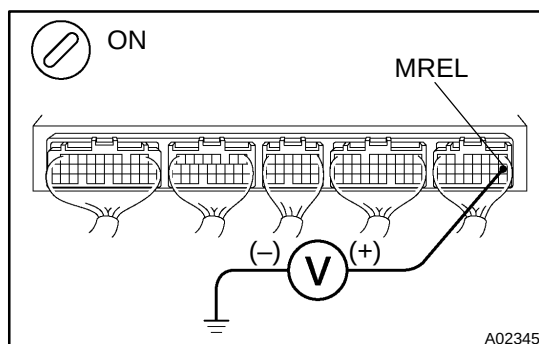
NG

Replace ignition switch.

OK

Check and repair harness and connector between battery and ignition switch, and ignition switch and ECM.

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



PREPARATION:

(a) Remove the glove compartment (See page [SF-79](#)).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal MREL of the ECM connector and the body ground.

OK:

Voltage: 9 – 14 V

NG

Check and replace ECM (See page [IN-31](#)).

OK

7 Check EFI fuse (See page [DI-139](#), step 2).

NG

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

OK

8 Check EFI main relay (Marking: EFI) (See page [SF-58](#)).

NG

Replace EFI main relay.

OK

9 Check for open and short in harness and connector between terminal MREL of ECM and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

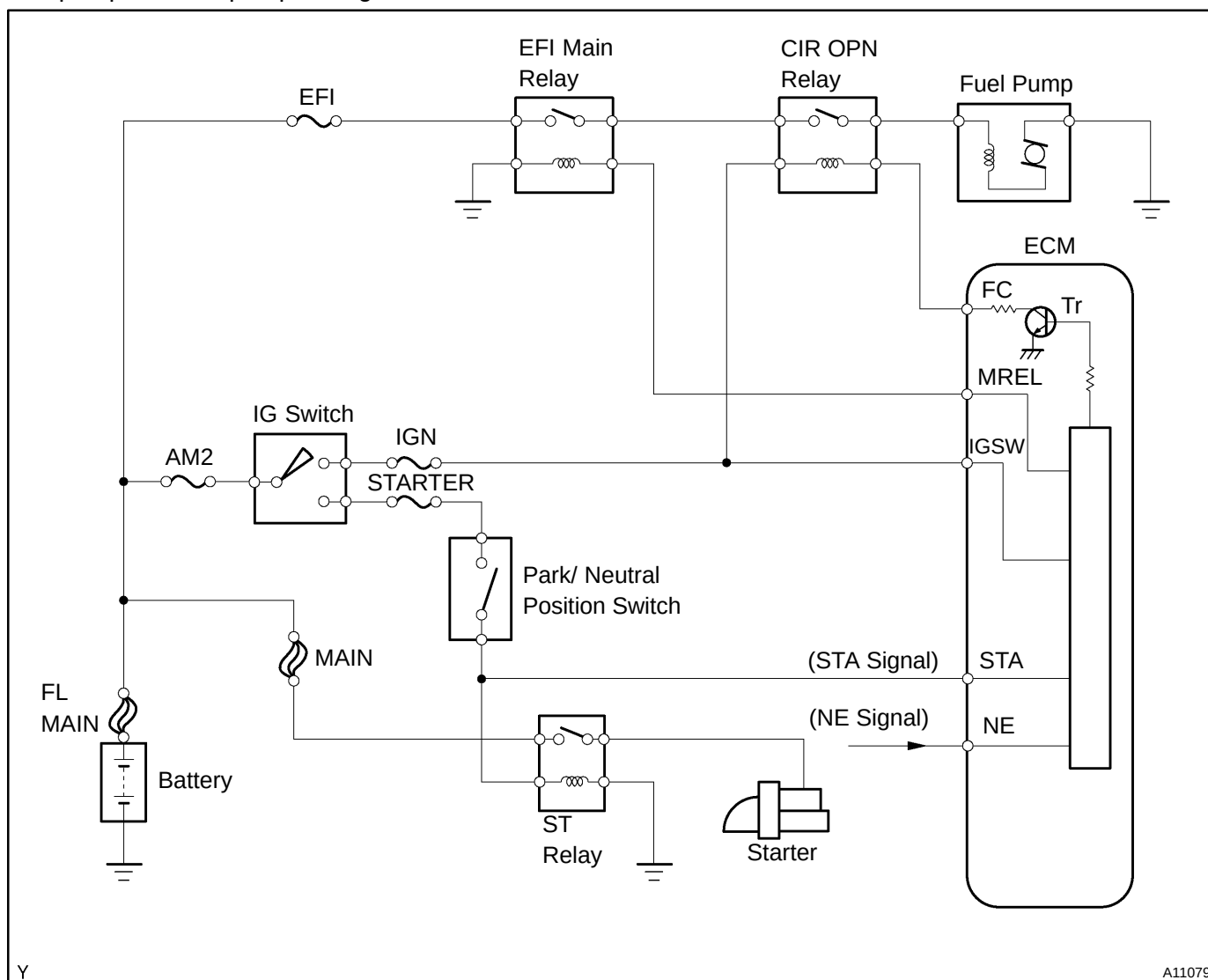
Check and repair harness or connector between EFI fuse and battery.

Fuel Pump Control Circuit

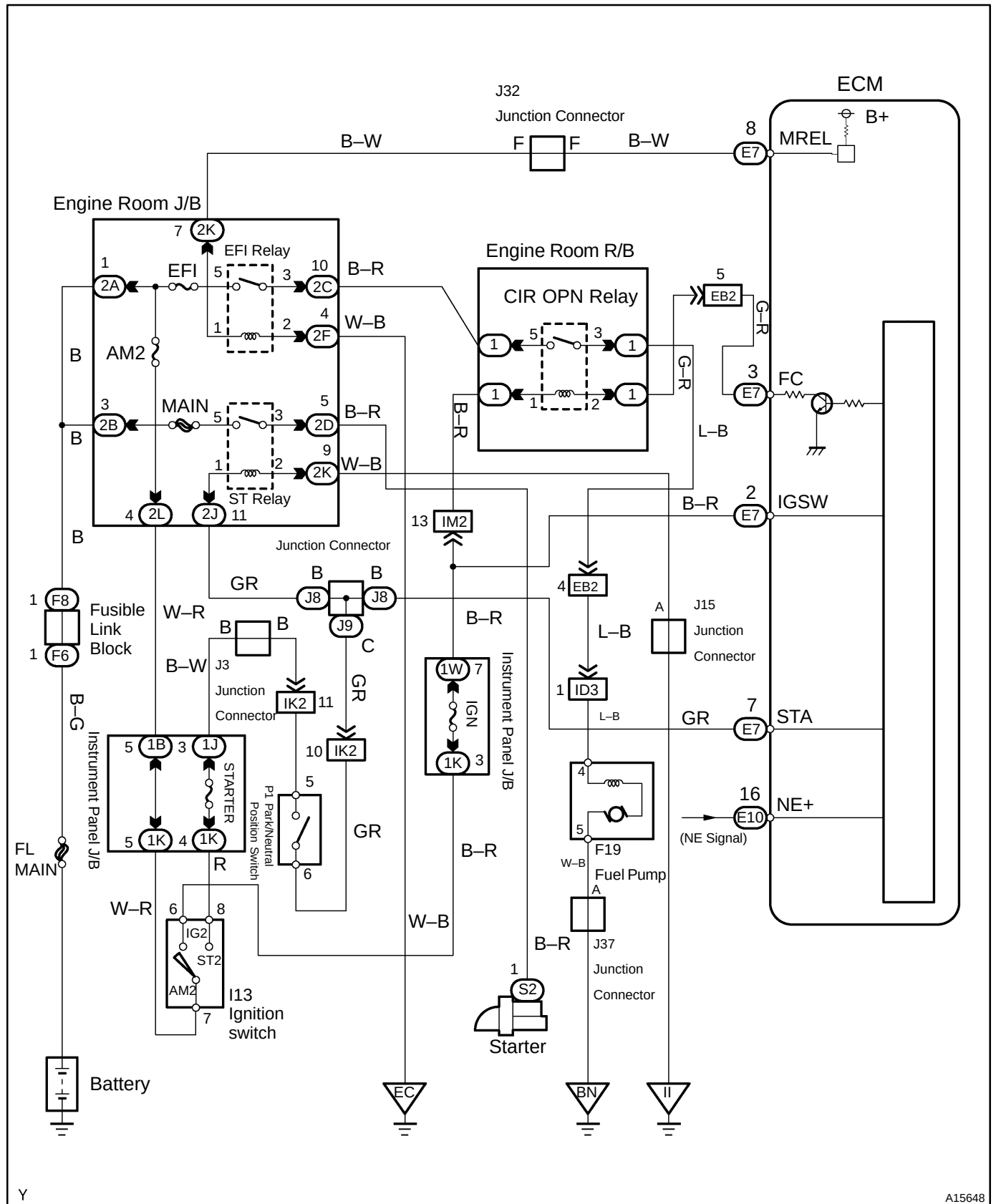
CIRCUIT DESCRIPTION

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 ECM (STA signal).

When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to the 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 ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



WIRING DIAGRAM

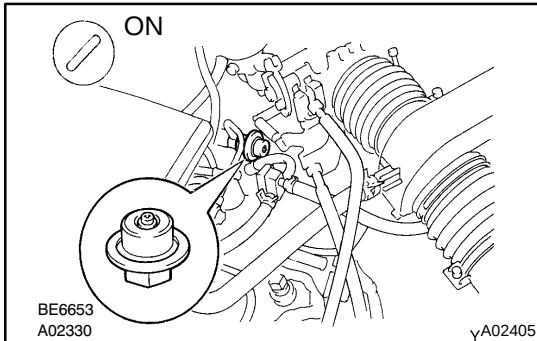


Y

A15648

INSPECTION PROCEDURE**LEXUS hand-held tester:**

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

**PREPARATION:1**

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

OK:

The pulsation damper screw rises up.

OK

Check for starter signal circuit
(See page [DI-145](#)).

NG

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

NG

Repair or replace.

OK

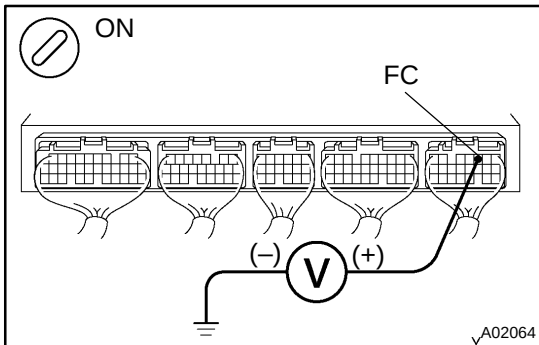
3	Check circuit opening relay (Marking: CIR OPN) (See page SF-60).

NG

Replace circuit opening relay.

OK

4 Check voltage between terminal FC of ECM connector and body ground.



PREPARATION:

- (a) Remove the glove compartment (See page [SF-80](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK

Go to step 5.

NG

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

5 Check fuel pump (See page [SF-6](#)).

NG

Repair or replace fuel pump.

OK

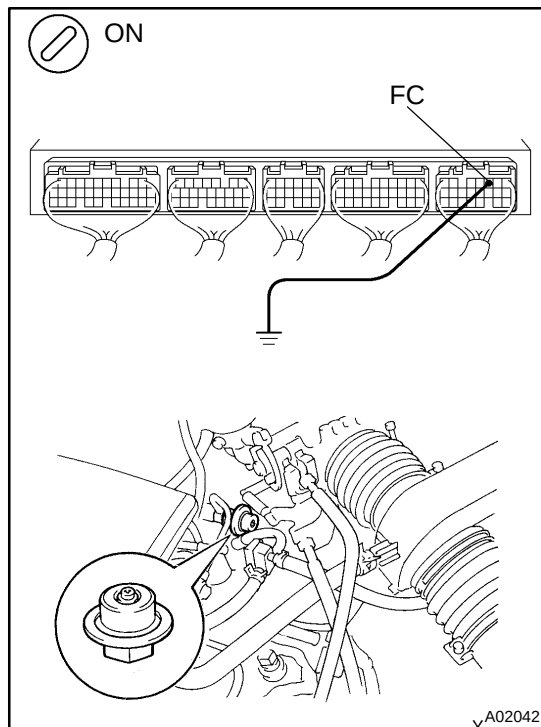
6 Check for open in harness and connector between circuit opening relay (Marking: CIR OPN) and fuel pump, and fuel pump and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

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

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

The pulsation damper screw rises up.

OK

Check for starter signal circuit
(See page [DI-145](#)).

NG

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

NG

Repair or replace.

OK

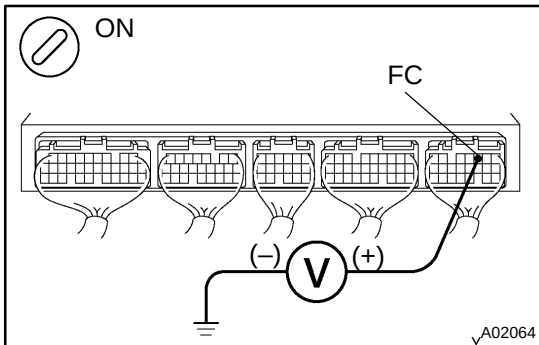
3 Check circuit opening relay (Marking: CIR OPN) (See page [SF-60](#)).

NG

Replace circuit opening relay.

OK

4 Check voltage between terminal FC of ECM connector and body ground.



PREPARATION:

- (a) Remove the glove compartment (See page [SF-80](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

OK

Go to step 5.

NG

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

5 Check fuel pump (See page [SF-6](#)).

NG

Repair or replace fuel pump.

OK

6 Check for open in harness and connector between circuit opening relay (Marking: CIR OPN) and fuel pump, and fuel pump and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

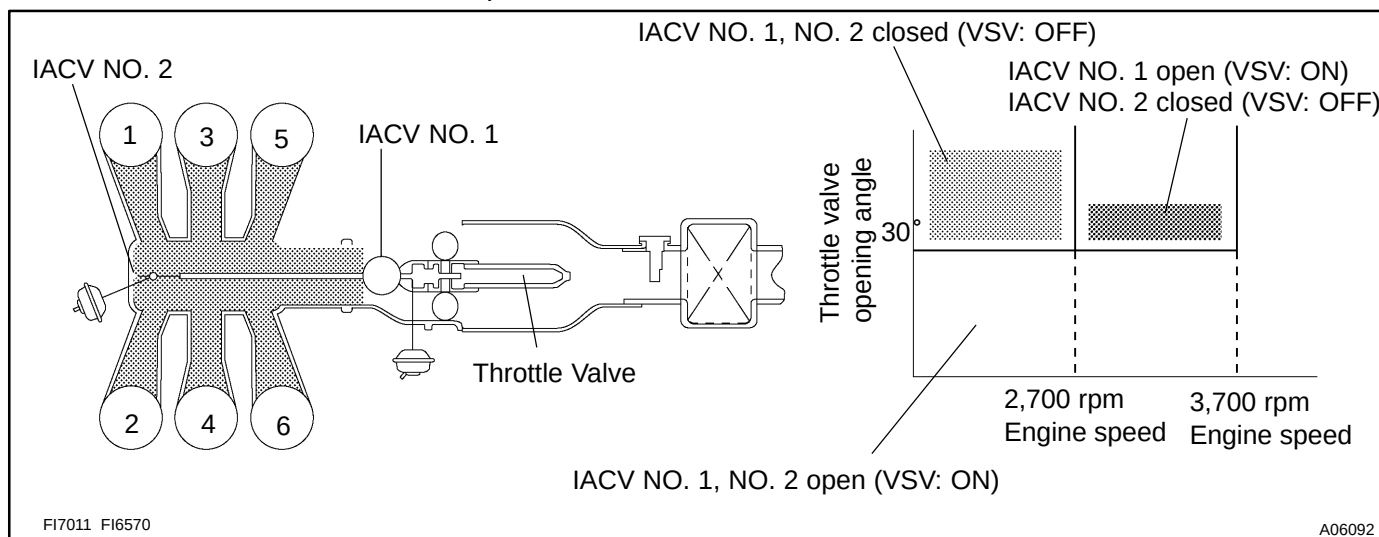
Check and replace ECM (See page [IN-31](#)).

IACV Control Circuit

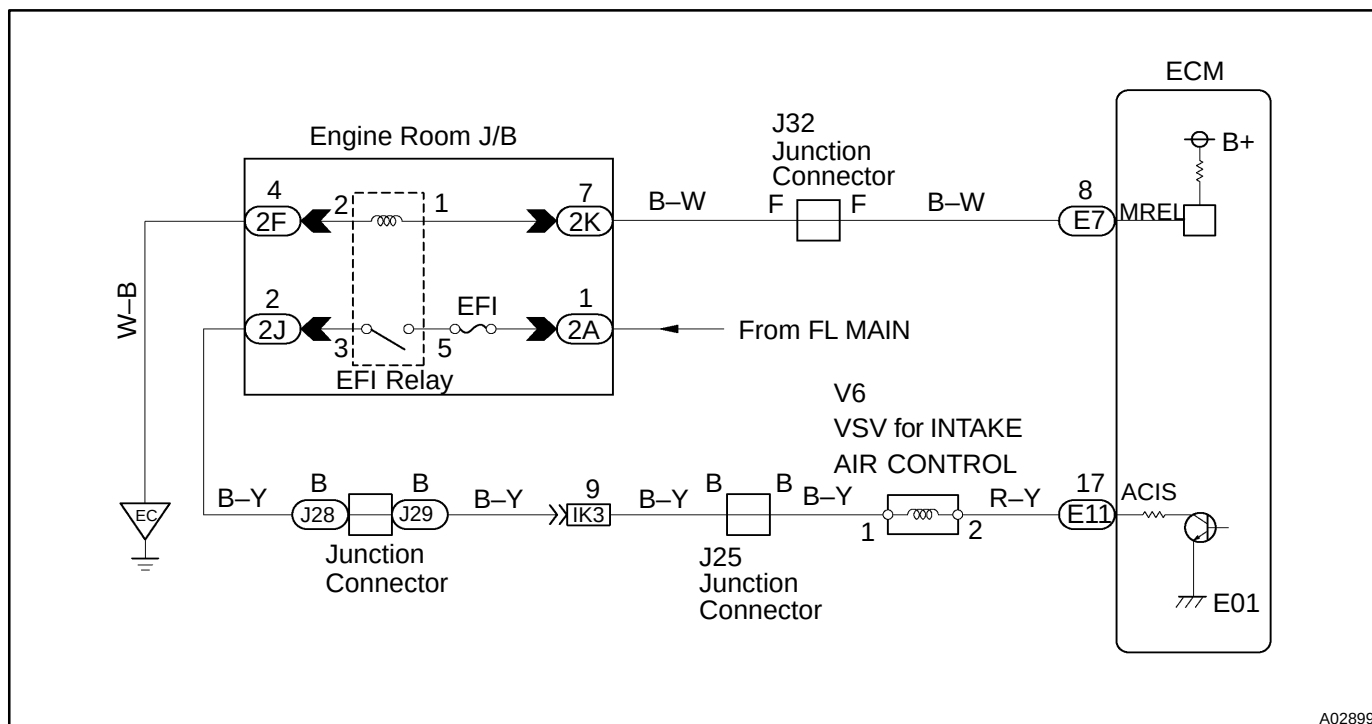
CIRCUIT DESCRIPTION

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

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

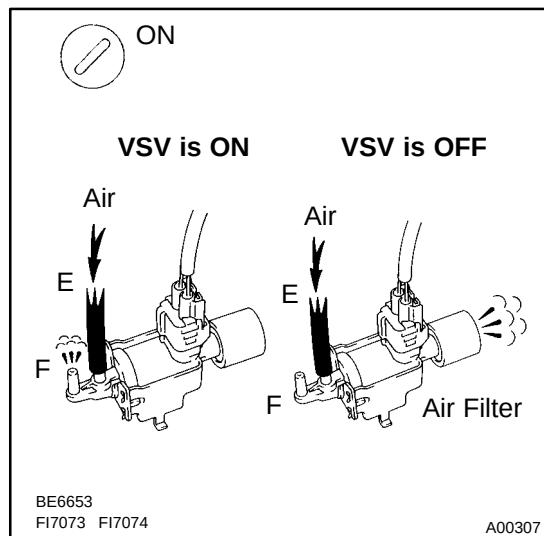


WIRING DIAGRAM



INSPECTION PROCEDURE**LEXUS hand-held tester:**

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

**PREPARATION:**

- Remove the fuse cover on the instrument panel.
- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and LEXUS hand-held tester main switch ON.
- Select the INTAKE CTRL VSV from the ACTIVE TEST menu on the LEXUS hand-held tester.

CHECK:

Check the operation of the VSV when the VSV is operated by the LEXUS 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.

OK

Check vacuum tank (See page [SF-44](#)).

NG

2	Check VSV for ACIS (See page SF-65).

NG

Replace VSV for ACIS.

OK

3	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

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

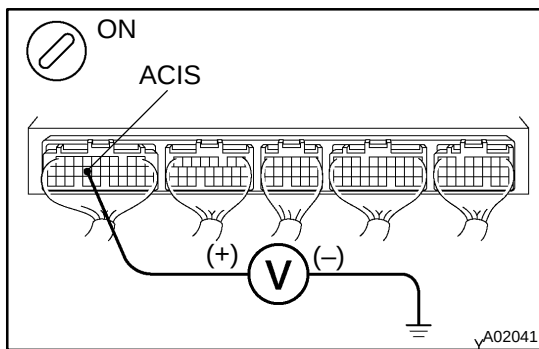
1 Check VSV for ACIS (See page [SF-65](#)).

NG

Replace VSV for ACIS.

OK

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

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-79](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V

NG

Check for open and short in harness and connector between EFI main relay (Marking: EFI) and ECM (See page [IN-31](#)).

OK

3 Check vacuum tank (See page [SF-56](#)).

NG

Repair or replace.

OK

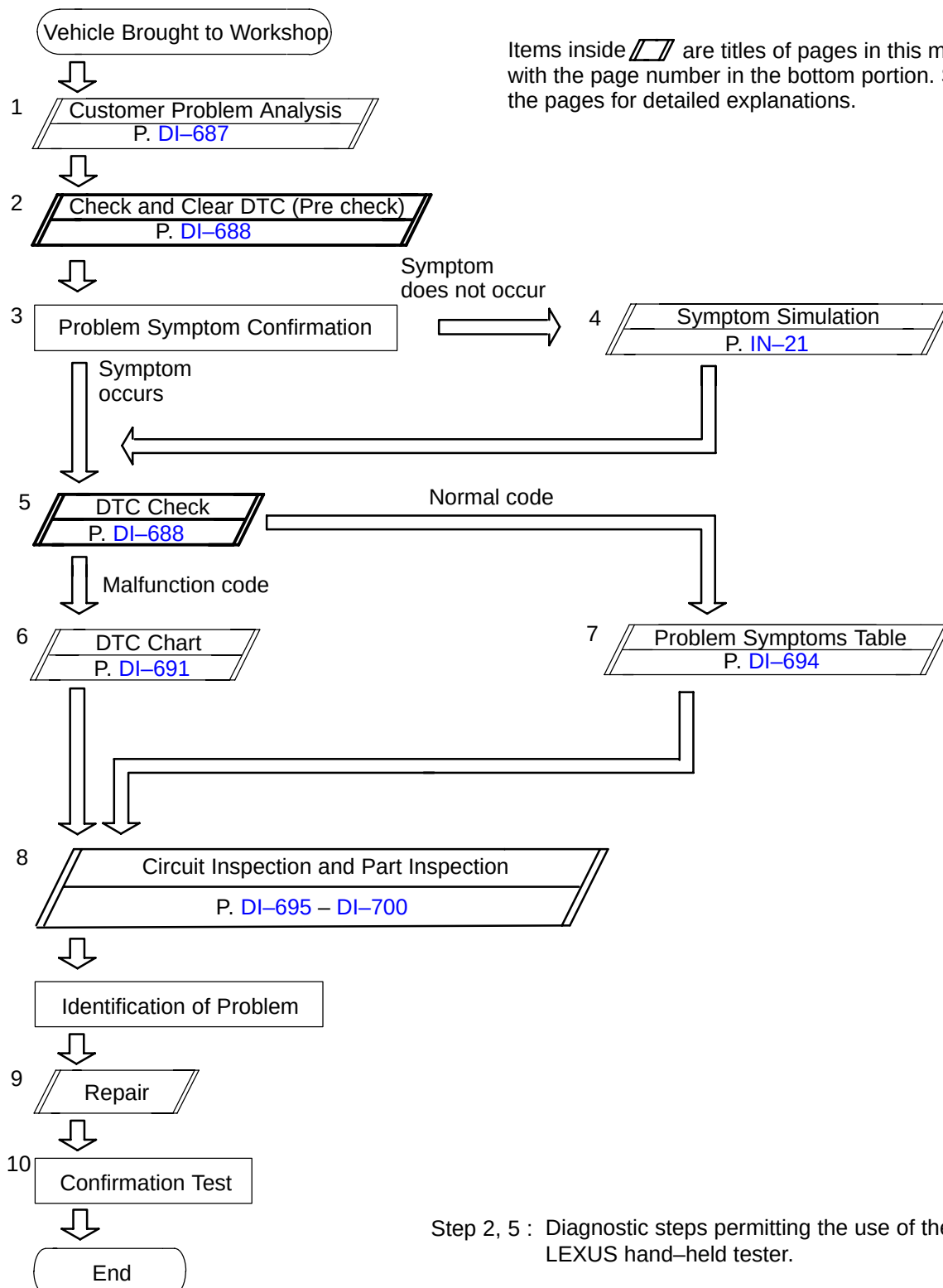
Check and replace ECM (See page [IN-31](#)).

ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1A3-28

Troubleshooting in accordance with the procedure on the following pages.



CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBLISER Check SheetInspector's
Name _____

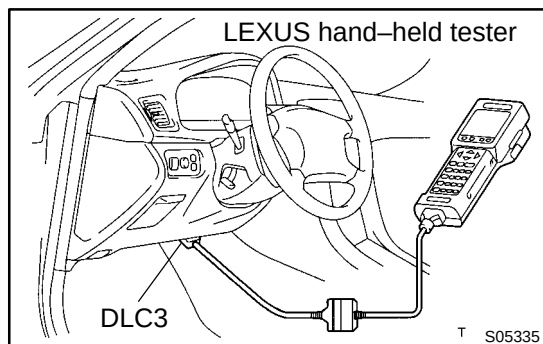
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

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

Symptoms	☐ Immobiliser is not set. (Engine starts with key codes other than the registered key code,)
	☐ Engine does not start

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains ON ☐ Does not Light Up

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

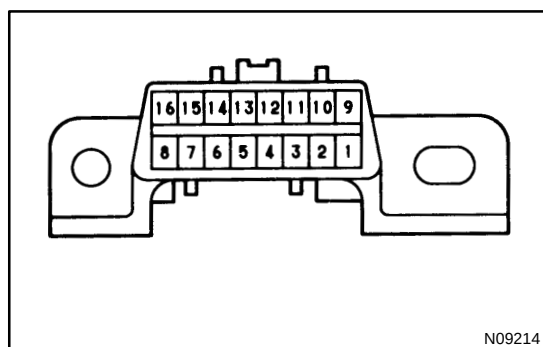


PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

ECM controls the function of immobiliser on this vehicle. Data of the immobiliser or DTC can be read from DLC3 of the vehicle. When a trouble occurs on immobiliser, MIL does not light on but DTC inspection is performed. Therefore when there seems to be a trouble on immobiliser, use LEXUS hand-held tester or SST to check and troubleshoot it.



(b) Inspect the DLC3.

The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141-2 format.

Tester connection	condition	Specified condition
7 (Bus ~ Line) – 5 (Signal ground)	During communication	Pulse generation
4 (chassis Ground) – Body	Always	1 Ω or less
5 (Signal Ground) – Body	Always	1 Ω or less
16 (B+) – Body	Always	9 – 14 V

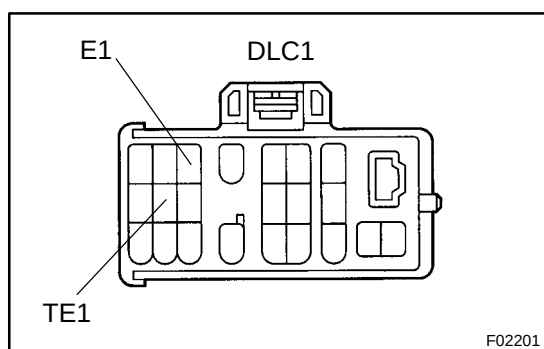
HINT:

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

- 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

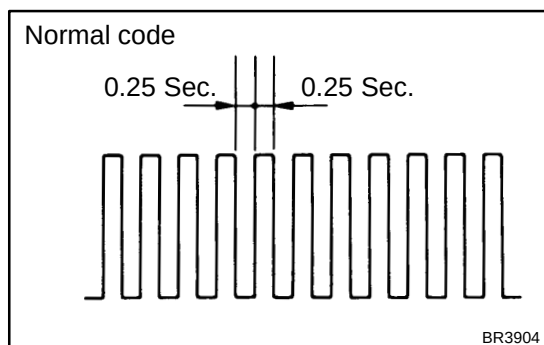
- (a) Check the DTC (Using LEXUS hand-held tester).
- (1) Prepare the OBD II scan tool (complying with SAEJ 1978) or LEXUS hand-held tester.
 - (2) Connect the OBD II scan tool or LEXUS hand-held tester to DLC3 under the instrument panel lower pad.
 - (3) Turn the ignition switch ON and turn the OBD II scan tool or LEXUS hand-held tester switch ON.
 - (4) Use the OBD II scan tool or LEXUS hand-held tester to check the DTCs and freeze frame data; note them down. (For operating instructions, see the OBD II scan tool's instruction book.)
 - (5) See page [DI-691](#) to confirm the details of the DTCs.



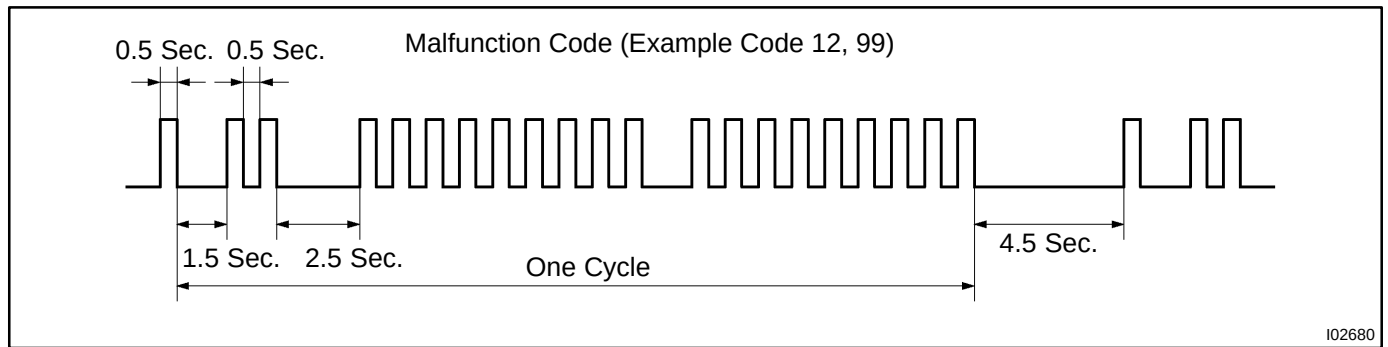
- (b) Check the DTC (Using diagnosis check wire).
- (1) Turn ignition switch ON.
 - (2) Using SST, connect between terminals 8 (TE1) and 3 (E1) of DLC 1.
- SST 09843-18040
- (3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit.
- ECM controls the immobiliser function on this vehicle, DTC is out put with engine data.



- As an example, the blinking patterns for codes; normal, 12 and 99 are shown in the 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 OBD II scan tool (complying with SAEJ1978) or LEXUS hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
- (2) Disconnecting the battery terminals or EFI fuse.

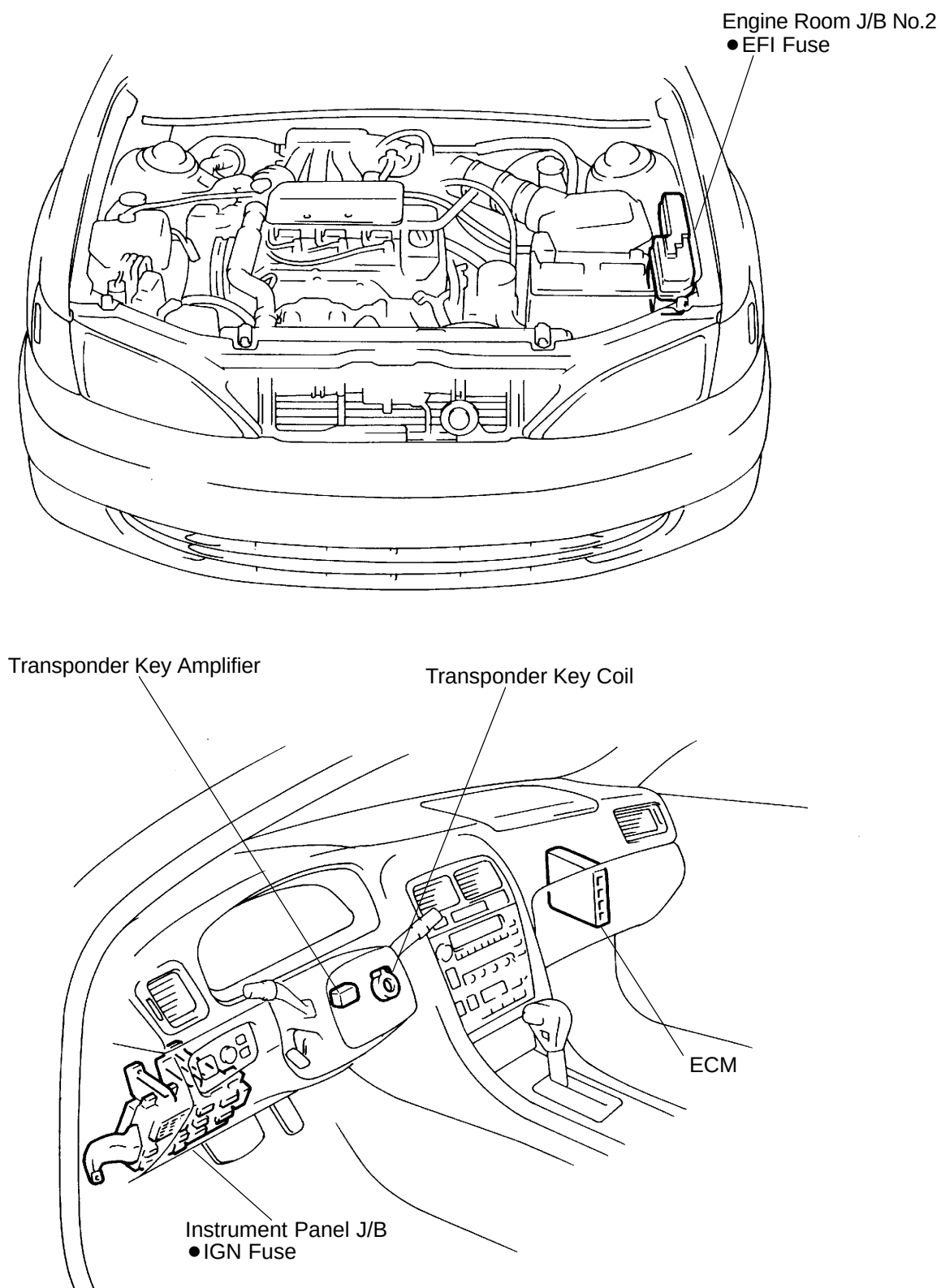
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See page)	Detection Item	Trouble Area
B2795 (DI-695)	Unmatched key code	●Key ●Unregistered key inserted before
B2796 (DI-696)	No communication in immobiliser system	●Key ●Transponder key coil ●Amplifier ●Wireharness ●ECM
B2797 (DI-698)	Communication malfunction No.1	●Communication contests ●Unregistered key inserted before
B2798 (DI-700)	Communication malfunction No.2	●Key ●Transponder key coil ●Amplifier ●Wireharness ●ECM

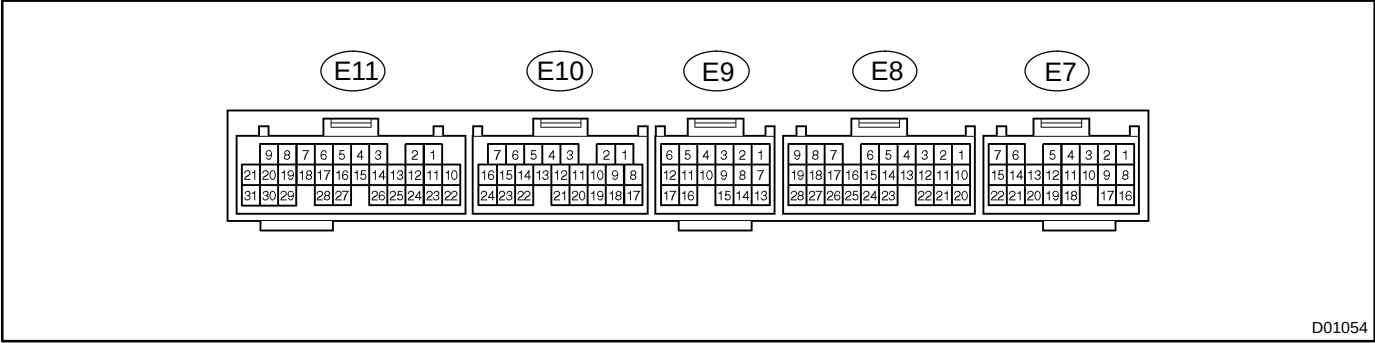
HINT:

To reduce the unnecessary exchange of ECM, check that a trouble occurs with the original ECM at the time of exchanging ECM and the trouble will disappear with a new ECM.

PARTS LOCATION



TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CODE – E1 (E8 – 28 ↔ E10–17)	G–W ↔ BR	Ignition Switch ON	10 – 14
TXCT – E1 (E8 – 18 ↔ E10–17)	L–Y ↔ BR	Ignition Switch ON	10 – 14
RXCK – E1 (E8 – 19 ↔ E10–17)	R–L ↔ 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. ECM	IN-31
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. ECM	*1 IN-31 BE-231 IN-31
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. ECM	*2 IN-31 IN-31
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. ECM	IN-31 BE-231 IN-31
Security indicator is OFF (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key coil 3. Amplifier 4. ECM	IN-31 BE-231 IN-31
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. ECM	IN-31 IN-31
Security indicator is abnormal blinking.	1. Wire harness 2. ECM	IN-31 IN-31

*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

DTC	B2795/99	Unmatched Key Code

This DTC is output when an unregistered key is inserted. When this DTC is output, delete DTC and insert the key that a customer keeps to check that B2795 is output.

When a key that outputs B2795 is found, register this key. when B2795 is not output, there is a possibility that the unregistered key has been inserted before. (ECM is normal.)

Inquire a customer the condition of using the system to find the cause of the trouble.

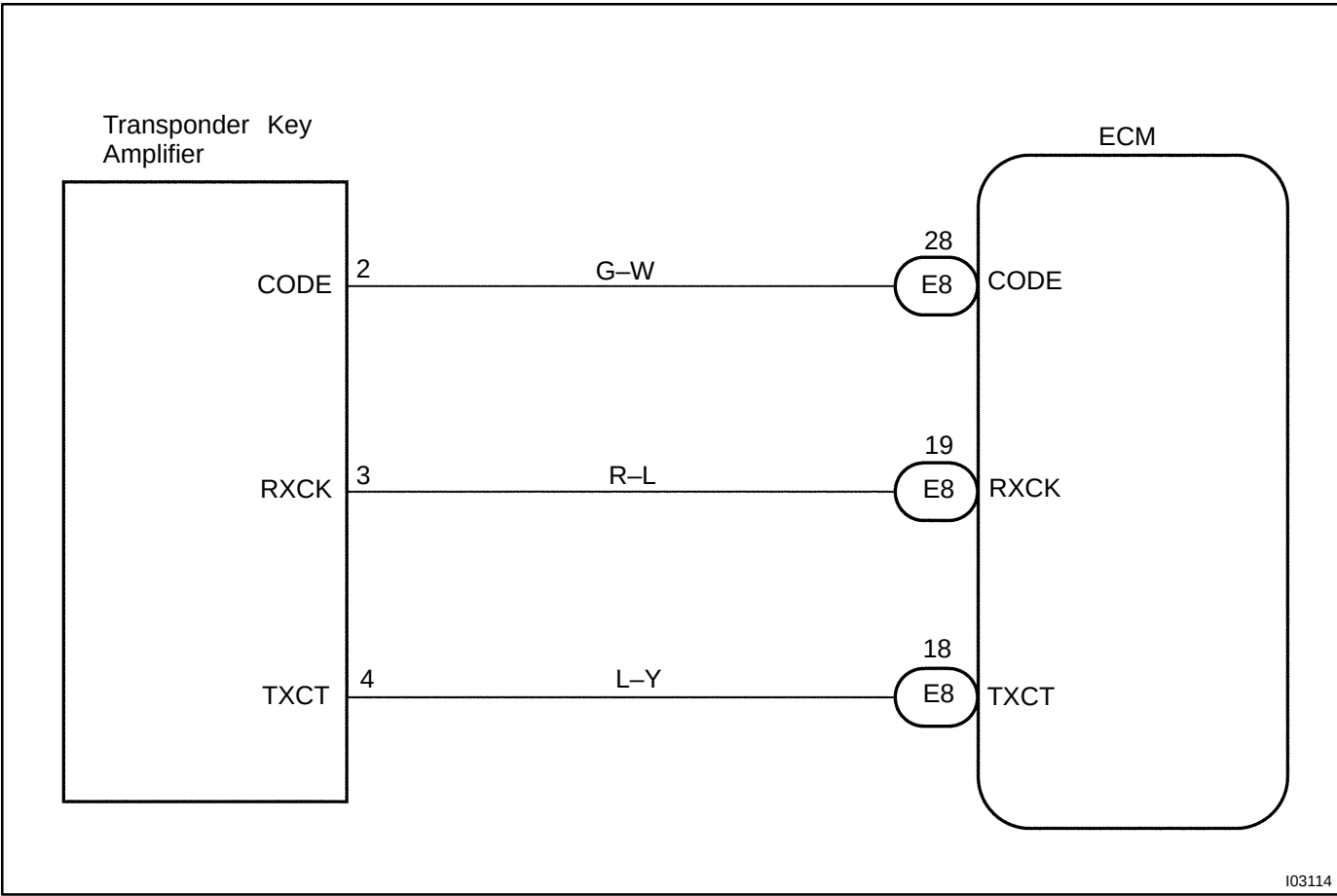
(Example: Another key has been inserted, etc..)

DTC	B2796/99	No Communication in Immobiliser system

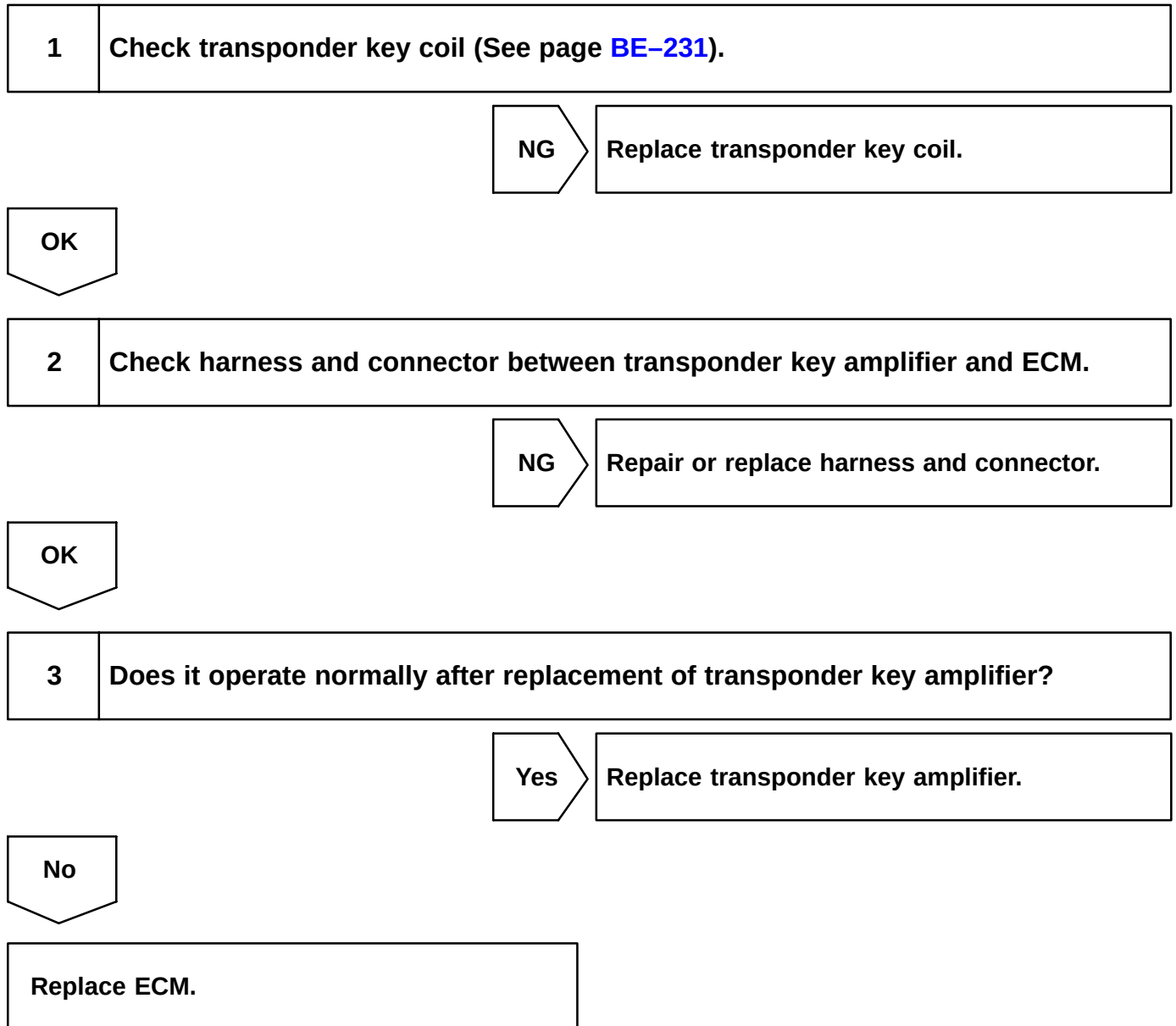
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	●Key ●Transponder Key Coil ●Transponder Key Amplifier ●Wire harness ●ECM

WIRING DIAGRAM



I03114

INSPECTION PROCEDURE

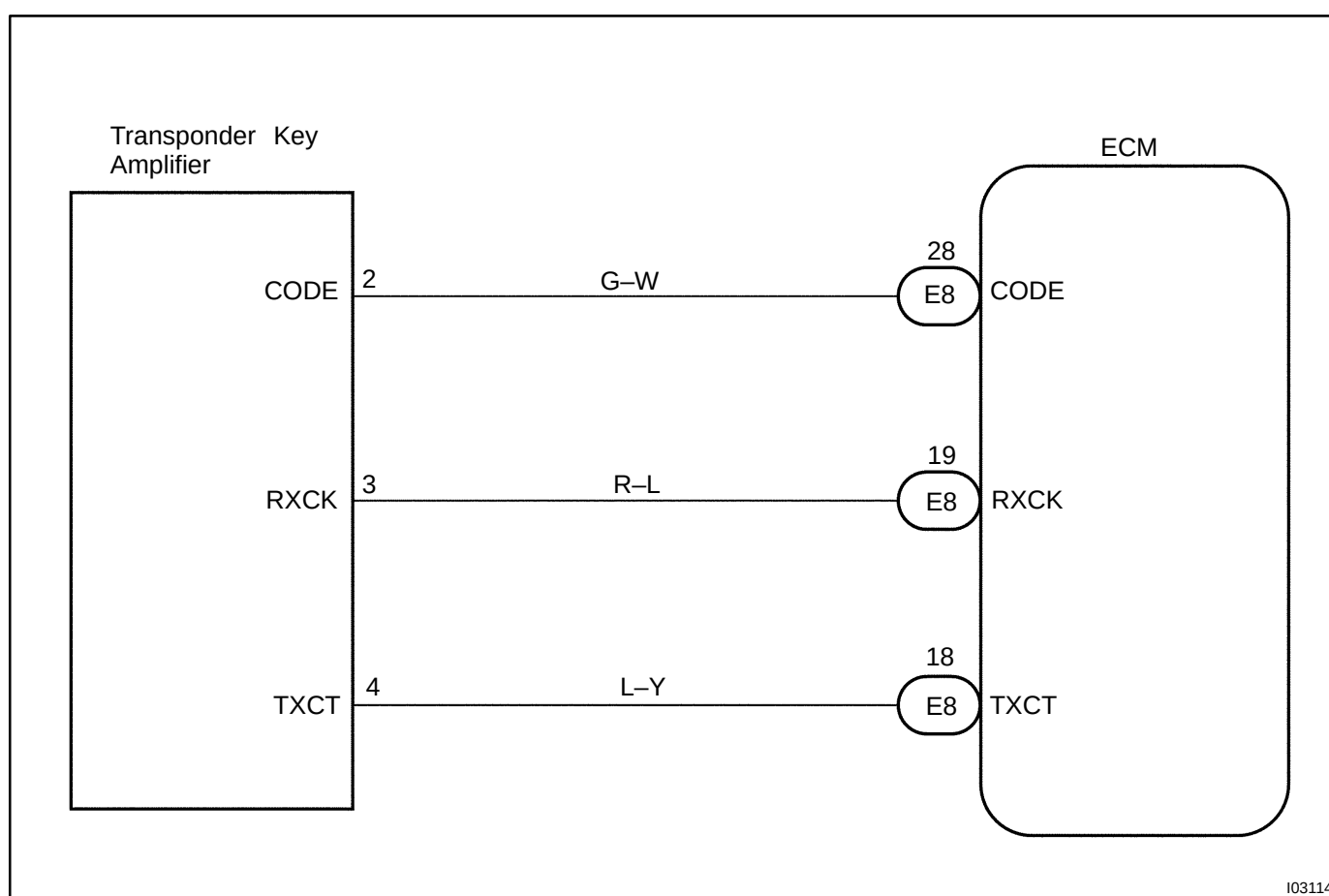
DTC	B2797/99	Communication Malfunction No.1

CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs.
(Example. Some noise is included in communication line.)

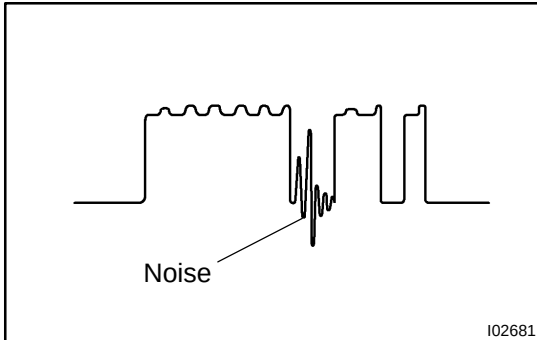
DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	•Wire Harness •Transponder Key Amplifier •ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Noise check



PREPARATION:

Insert already registered master key in the key cylinder.

CHECK:

Using an oscilloscope or LEXUS hand-held tester, check that noise is included in the CODE terminal of EMC.

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

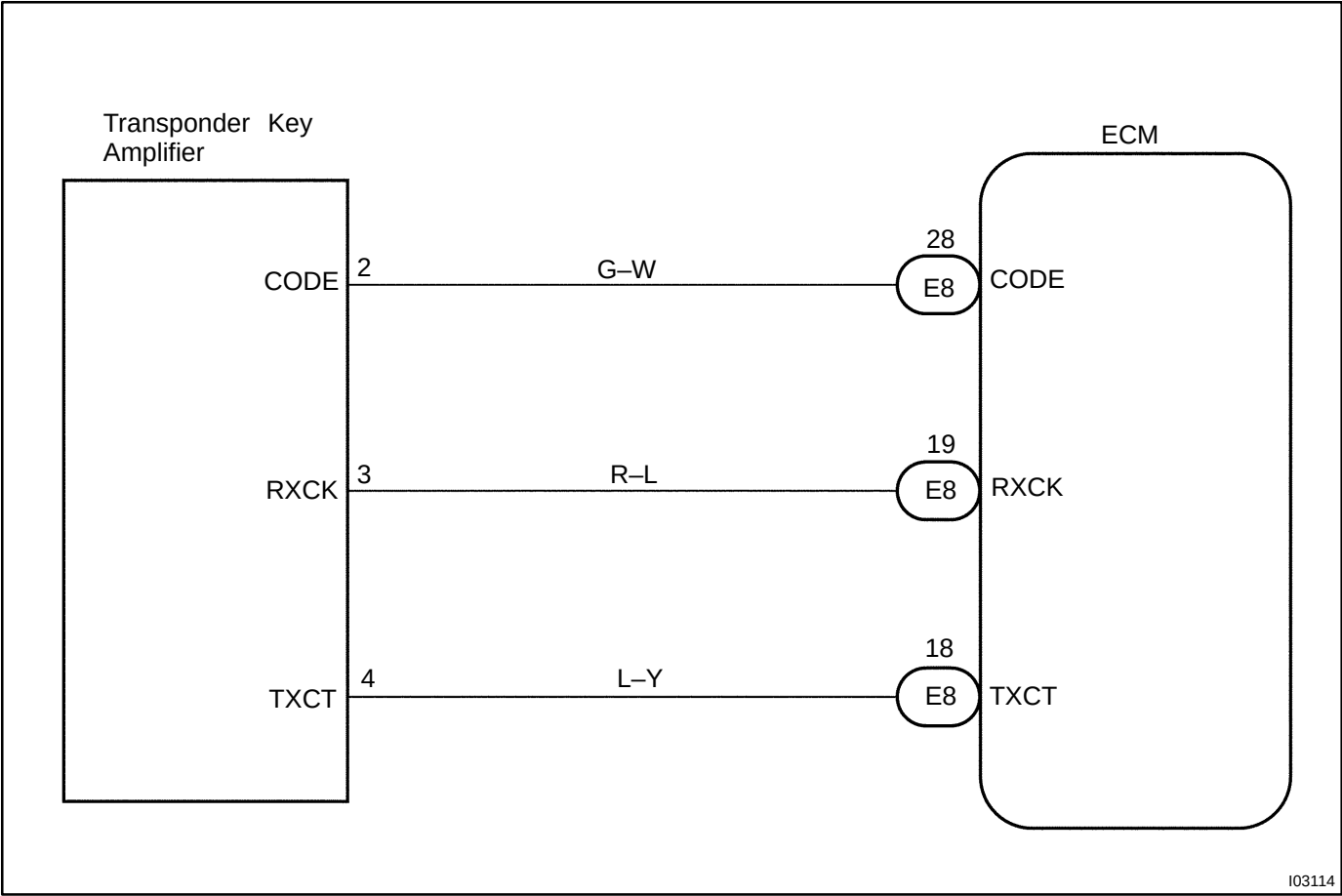
Replace ECM.

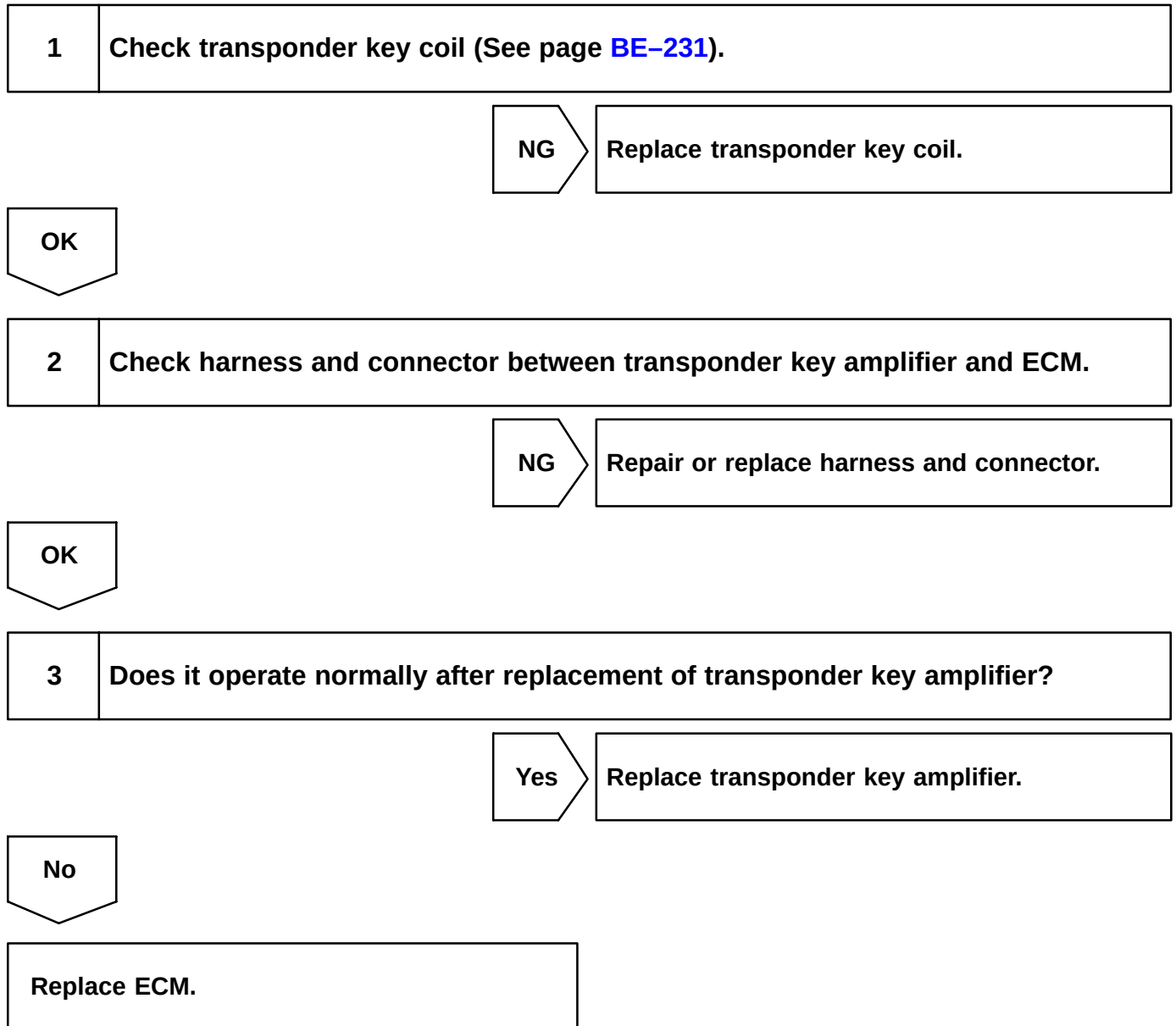
DTC	B2798/99	Communication malfunction No.2

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2798/99	Communication error	●Key ●Transponder Key Coil ●Transponder Key Amplifier ●Wire harness ●ECM

WIRING DIAGRAM



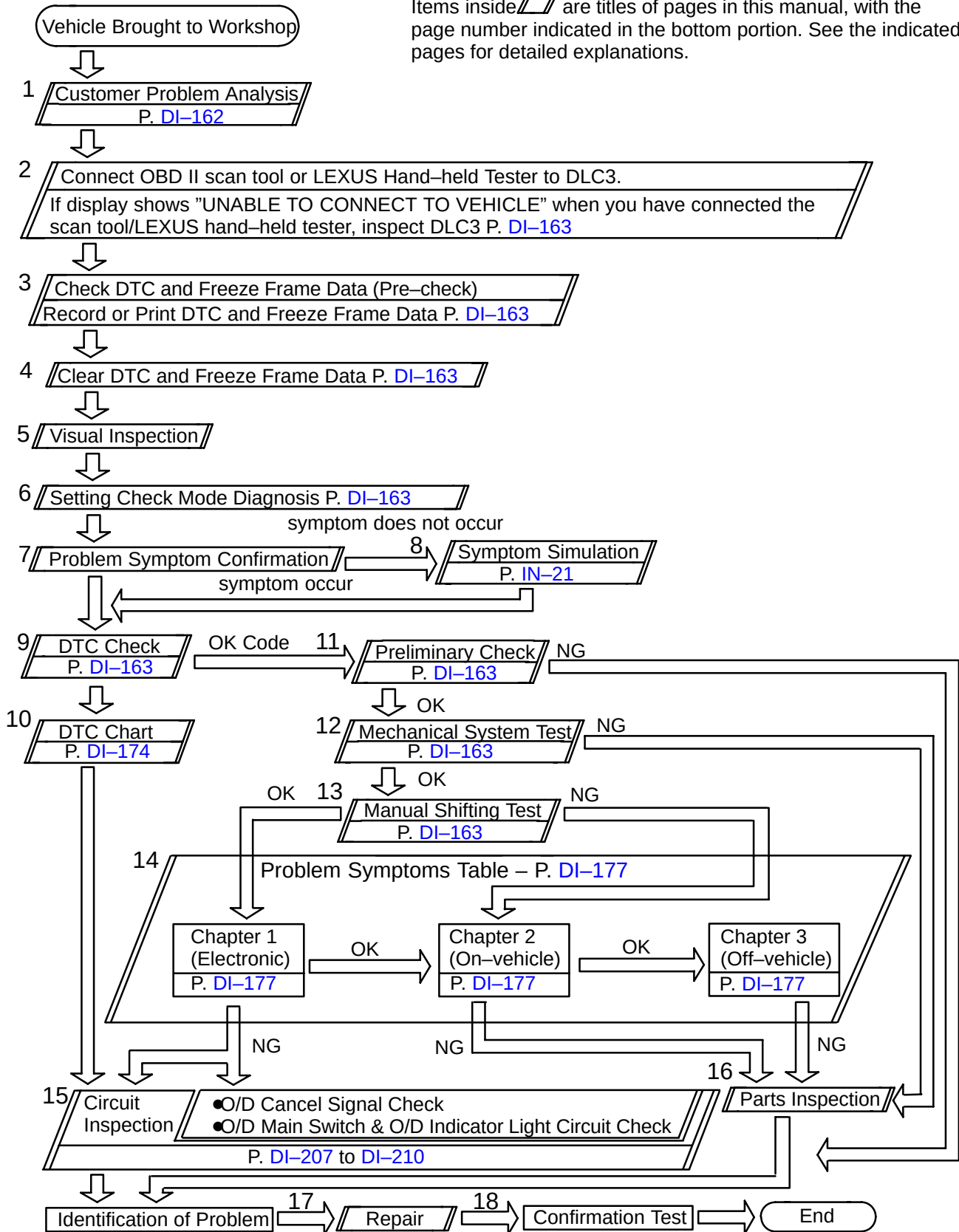
INSPECTION PROCEDURE

AUTOMATIC TRANSAXLE (U140E)

HOW TO PROCEED WITH TROUBLESHOOTING

DI4YY-04

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



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?	☐ Continuous ☐ Intermittent (times a day)

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

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains on

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

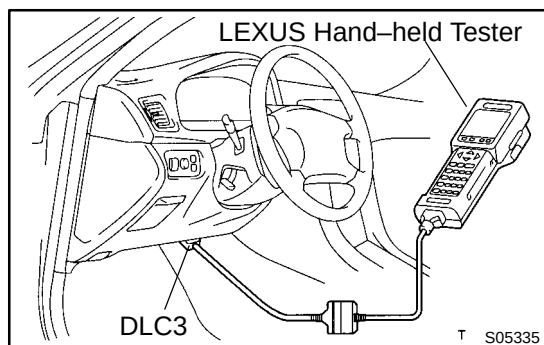
PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you need to connect to the vehicle an OBD II scan tool complying with SAE J1987 or LEXUS hand-held tester, and read off various data output from the vehicle's ECM.
- OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in the drive system components which affect the vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page [DI-14](#)).

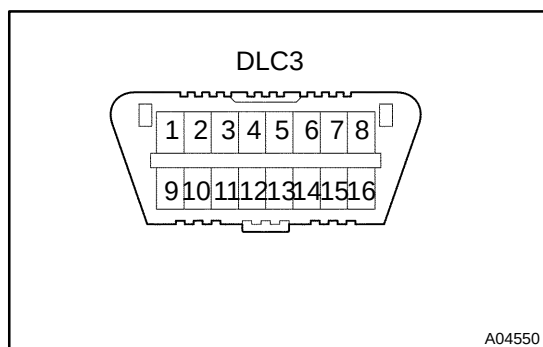
If the malfunction only occurs in 3 consecutive trips, the MIL goes off but the DTCs remain in the ECM memory.



- To check the DTCs, connect the OBD II scan tool or the LEXUS hand-held tester to DLC3 of the vehicle. The OBD II scan tool or LEXUS hand-held tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For instruction book).
- The DTCs include SAE controlled codes and Manufacturer controlled codes. SAE controlled codes must be set as the codes prescribed by the SAE, while Manufacturer controlled codes can be set freely by a manufacturer within the prescribed limits (See the DTC chart on page [DI-174](#)).

- The diagnosis system operates in the normal mode during the normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2-trip detection logic (*) to prevent erroneous detection. By switching the ECM to the check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily (LEXUS hand-held tester) (See page [DI-163](#)).
- *2-trip detection logic:
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory.

If the same malfunction is detected again during the second test drive, this second detection causes the MIL to light up .



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

Tester connection	Condition	Specified condition
7 (Bus ~ Line) – 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) – Body	Always	1 Ω or less
5 (Signal Ground) – Body	Always	1 Ω or less
16 (B+) – Body	Always	9 – 14 V

HINT:

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

- If the communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If the communication is still impossible when the tool is connected 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. Normal Mode:

INSPECT DIAGNOSIS

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

HINT:

If the MIL does not light up, troubleshoot the combination meter (See page [BE-94](#)).

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

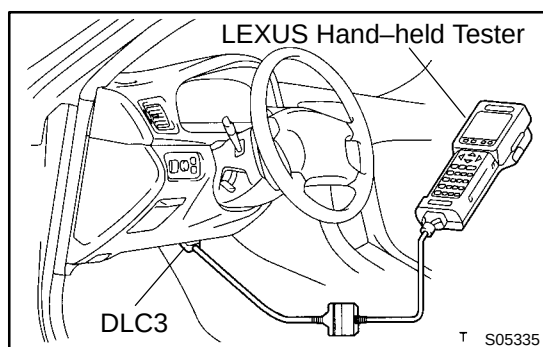
- (b) Check the DTC.

NOTICE:

LEXUS hand-held tester only:

When the diagnostic system is switched from normal mode to check mode, all the DTCs and freeze frame data recorded in the normal mode will be erased. So before switching modes, always check the DTCs and freeze frame data, and note them down.

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



- (2) Connect the OBD II scan tool or LEXUS hand-held tester to the DLC3 at the lower of the instrument panel.
- (3) Turn the ignition switch ON and push the OBD II scan tool or LEXUS hand-held tester switch ON.
- (4) Use the OBD II scan tool or LEXUS hand-held tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).
- (5) See page [DI-174](#) to confirm the details of the DTCs.

NOTICE:

When simulating symptoms with an OBD II scan tool (excluding LEXUS hand-held tester) to check the DTCs, use the normal mode. For codes on the DTCs chart subject to "2-trip detection logic", turn the ignition switch OFF after the symptoms is simulated once. Then repeat the simulation process again. When the program has been simulated twice, the MIL is indicated on the instrument panel and the DTCs are recorded in the ECM.

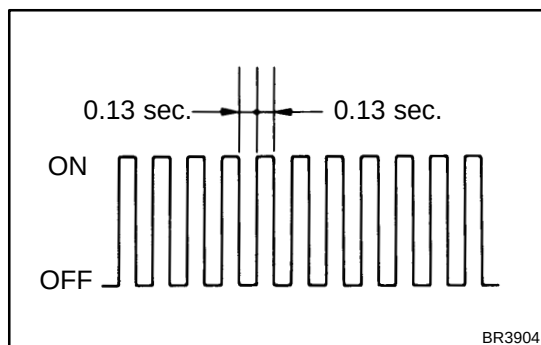
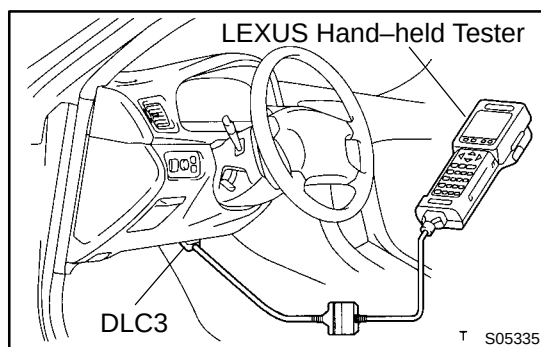
3. Check Mode: INSPECT DIAGNOSIS

HINT:

LEXUS hand-held tester only:

Compared to the normal mode, the check mode has more sensitive ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

- (a) Check the DTC.
 - (1) Check the initial conditions.
 - Battery positive voltage 11 V or more.
 - Throttle valve fully closed.
 - Transaxle in P position.
 - Air conditioning switched OFF.
 - (2) Turn the ignition switch OFF.
 - (3) Prepare a LEXUS hand-held tester.



- (4) Connect the LEXUS hand-held tester to the DLC3 at the lower of the instrument panel.
- (5) Turn the ignition switch ON and push the LEXUS hand-held tester switch ON.
- (6) Switch the LEXUS hand-held tester from the normal mode to the check mode (Check that the MIL flashes).
- (7) Start the engine (MIL goes off after the engine starts).
- (8) Simulate the conditions of the malfunction described by the customer.

NOTICE:

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

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

HINT:

Take care not to turn the ignition switch OFF, as turning it OFF the diagnosis system from the check mode to the normal mode, which erases all the DTCs, etc.

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

- (b) Clear the DTC.

When operating an OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester to erase the codes, the DTCs and freeze frame data will be erased (See the OBD II scan tool's instruction book for operating instructions.).

NOTICE:

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

4. PROBLEM SYMPTOM CONFIRMATION

Taking into consideration the results of the customer problem analysis, try to reproduce the symptoms of the trouble. If the problem is that the transaxle does not up-shift, down-shift, or the shift point is too high or too low, conduct the following road test to confirm the automatic shift schedule and simulate the problem symptoms.

5. ROAD TEST

NOTICE:

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

- (a) D position test

Shift into the D position, depress the accelerator pedal fully and then check the following points.

- (1) Check the up-shift operation.

Check to see that 1 → 2, 2 → 3 and 3 → O/D, up-shift takes place and that the shift points conform to the automatic shift schedule (See page [SS-23](#)).

HINT:

- O/D Gear Up-shift Prohibition Control (1. Coolant temp. is 60 °C (140 °F) or less. 2. If there is a difference of 10 km/h (6 mph) 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 up-shift operation of 1 → 2, 2 → 3 and 3 → O/D.
- (3) Check for abnormal noise and vibration.
Drive in the D position lock-up or O/D gear and check for abnormal noise and vibration.

HINT:

The check of the cause of abnormal noise and vibration must be made very thoroughly, as it could be due to the loss of balance in the differential torque converter clutch, etc.

- (4) Check the kick-down operation.

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

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

- (6) Check the lock-up mechanism.

- Drive in the D position, O/D gear, at steady speed (lock-up ON) of about 60 km/h (37 mph).
- Depress the accelerator pedal lightly and check that the engine speed does not change abruptly.

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

(b) 2 position test

Shift into the 2 position, depress the accelerator pedal fully and check the following points.

(1) Check up–shift operation.

Check that the up–shift operation of 1 → 2 is taken place and that the shift point conforms to the automatic shift schedule (See page [SS-23](#)).

HINT:

There is no O/D up–shift and lock–up in the 2 position.

(2) Check the engine braking.

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

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

(c) L position test

Shift into the L position, depress the accelerator pedal fully and check the following points.

(1) Check no up–shift.

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

(2) Check the engine braking.

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

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

(d) R position test

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

CAUTION:

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

(e) P position test

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

6. BASIC INSPECTION

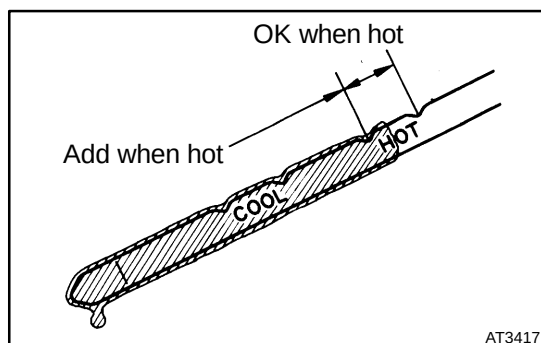
(a) Check the fluid level.

HINT:

- Drive the vehicle so that the engine and transaxle are at normal operating temperature.

Fluid temp.: 70 – 80 °C (158 – 176 °F)

- 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 positions from P to L position and return it to the P position.
- (3) Pull out the dipstick and wipe it out.
- (4) Push the dipstick back fully into the pipe.
- (5) Pull the dipstick 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

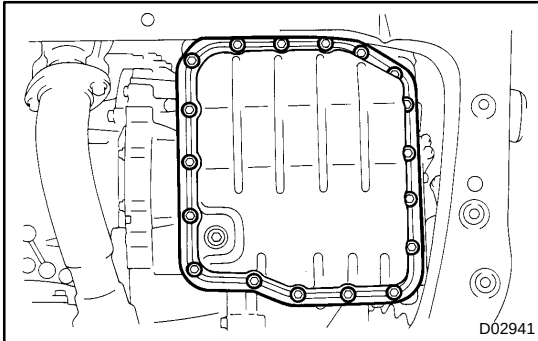
Capacity: 3.5 liters (3.7 US qts, 3.1 Imp. qts)

NOTICE:

Do not overfill.

(b) Check the fluid condition.

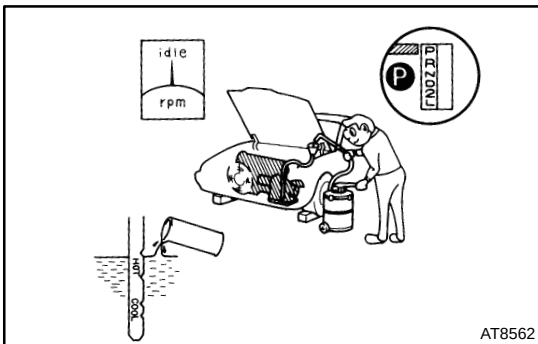
If condition of the fluid has deteriorated replace the fluid.



(c) Replace the ATF.

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

(2) Reinstall the drain plug securely.

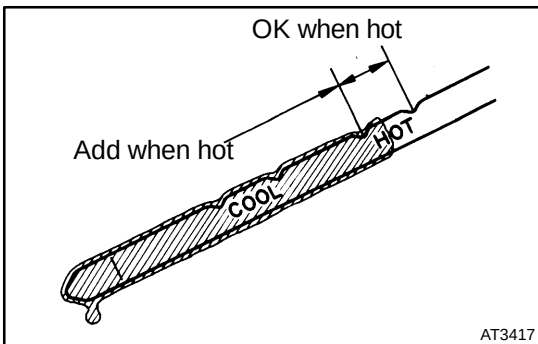


(3) With the engine OFF, add new fluid through the oil filler pipe.

Fluid type: ATF Type T-IV

Capacity: 3.5 liters (3.7 US qts, 3.1 Imp. qts)

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



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

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

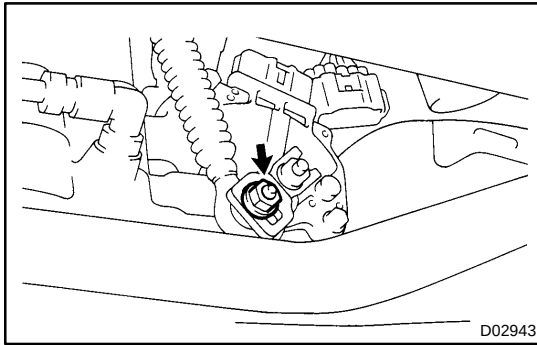
NOTICE:

Do not overfill.

(d) Check the fluid leak.

Check for leak in the transaxle.

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



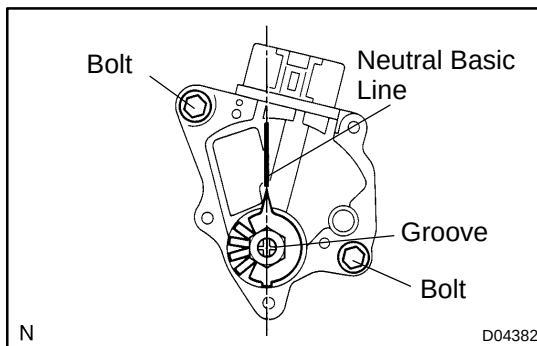
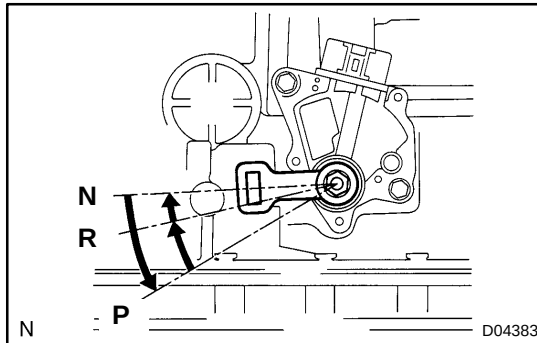
- (e) Inspect and adjust the shift lever position.
When shifting the shift lever from the N position to the other positions, check that the lever can be shifted smoothly and accurately into each position and that the position indicator is not aligned with the correct position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

- (1) Loosen the nut on the shift lever.
- (2) Push the control shaft fully downward.
- (3) Return the control shaft lever by 2 notches to the N position.
- (4) Set the shift lever into the N position.
- (5) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

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



- (f) Inspect and adjust the park/neutral position.
Check that the engine can be started with the shift lever only in the N or P position, but never in the other positions. If it is not as stated above, carry out the following adjustment procedures.

- (1) Loosen the park/neutral position switch bolt and set the shift lever into the N position.
- (2) Align the groove with the neutral basic line.
- (3) Hold in position and tighten the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

For further inspection of the park/neutral position switch, see page [DI-203](#).

- (g) Check the idle speed.

Idle speed: 700 ± 50 rpm

(In N position and air conditioner OFF)

7. 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 positions.

NOTICE:

- Do the test at the normal operating fluid temperature of 50 – 80 °C (122 – 176 °F).
- Do not continuously run this test longer than 10 seconds.
- To ensure safety, conduct this test in a wide, clear and level area which provide 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) Check the 4 wheels.
- (2) Connect an OBD II scan tool or LEXUS hand-held tester to the 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 position. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 2,350 – 2,800 rpm

Evaluation:

Problem	Possible cause
(a) Stall speed low in D and R positions	●Engine output may be insufficient ●Stator one-way clutch is operating properly HINT: If more than 600 rpm below the specified value, the torque converter clutch could be faulty.
(b) Stall speed high in D position	●Line pressure too low ●Forward clutch slipping ●No. 2 one-way clutch not operating properly ●O/D clutch slipping
(c) Stall speed high in R position	●Line pressure too low ●Direct clutch slipping ●1st and reverse brake slipping ●O/D clutch slipping
(d) Stall speed high in D and R positions	●Line pressure too low ●Improper fluid level ●O/D one-way clutch not operating properly

- (b) Measure the time lag.

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

NOTICE:

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

- (1) Connect an OBD II scan tool or LEXUS hand-held tester to the DLC3.
- (2) Fully apply the parking brake.
- (3) Start the engine and check idle speed.

Idle speed: 700 ± 50 rpm (In N position and air conditioner OFF)

- (4) Shift the shift lever from the N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.
- (5) Measure the time lag for N → R in the same way.

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	●Line pressure too low ●Forward clutch worn ●O/D one-way clutch not operating
N → R time lag is longer	●Line pressure too low ●Direct clutch worn ●1st and reverse brake worn ●O/D one-way clutch not operating properly

8. HYDRAULIC TEST

Measure the line pressure.

NOTICE:

- Do the test at the normal operation fluid temperature of 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-14](#) for the location to connect SST).

SST 09992-00095 (09992-00231, 09992-00271)

(3) Fully apply the parking brake and check the 4 wheels.

(4) Connect an OBD II scan tool or LEXUS hand-held tester to the DLC3.

(5) Start the engine and check the idling speed.

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

(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 the engine speed reaches the stall speed.

(9) Do the test in the R position in the same way.

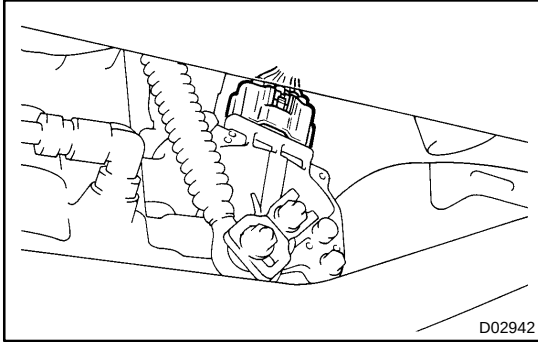
Specified line pressure:

Condition	D position kPa (kgf/cm ² , psi)	R position kPa (kgf/cm ² , 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 does not reach specified value, recheck the throttle cable adjustment and then retest.

Evaluation

Problem	Possible cause
If the measured values at all position are higher	• Throttle valve defective • Regulator valve defective
If the measured values at all position are lower	• Throttle valve defective • Regulator valve defective • Oil pump defective • O/D direct clutch defective
If pressure is low in the D position only	• D position circuit fluid leak • Forward clutch defective
If pressure is low in the R position only	• R position circuit fluid leak • Direct clutch defective • 1st and reverse brake defective



9. MANUAL SHIFTING TEST

HINT:

With this test, it can be determined whether the trouble occurs in 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 positions. Check that the gear change corresponds to the shift position.

Shift Position	Gear Position
P	Pawl Lock
R	Reverse
D	O/D
2	O/D
L	1st

HINT:

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

If any abnormalities are found in the above test, the problem is in the transaxle itself.

(c) Connect the solenoid wire.

(d) Clear the DTC (See page [DI-163](#)).

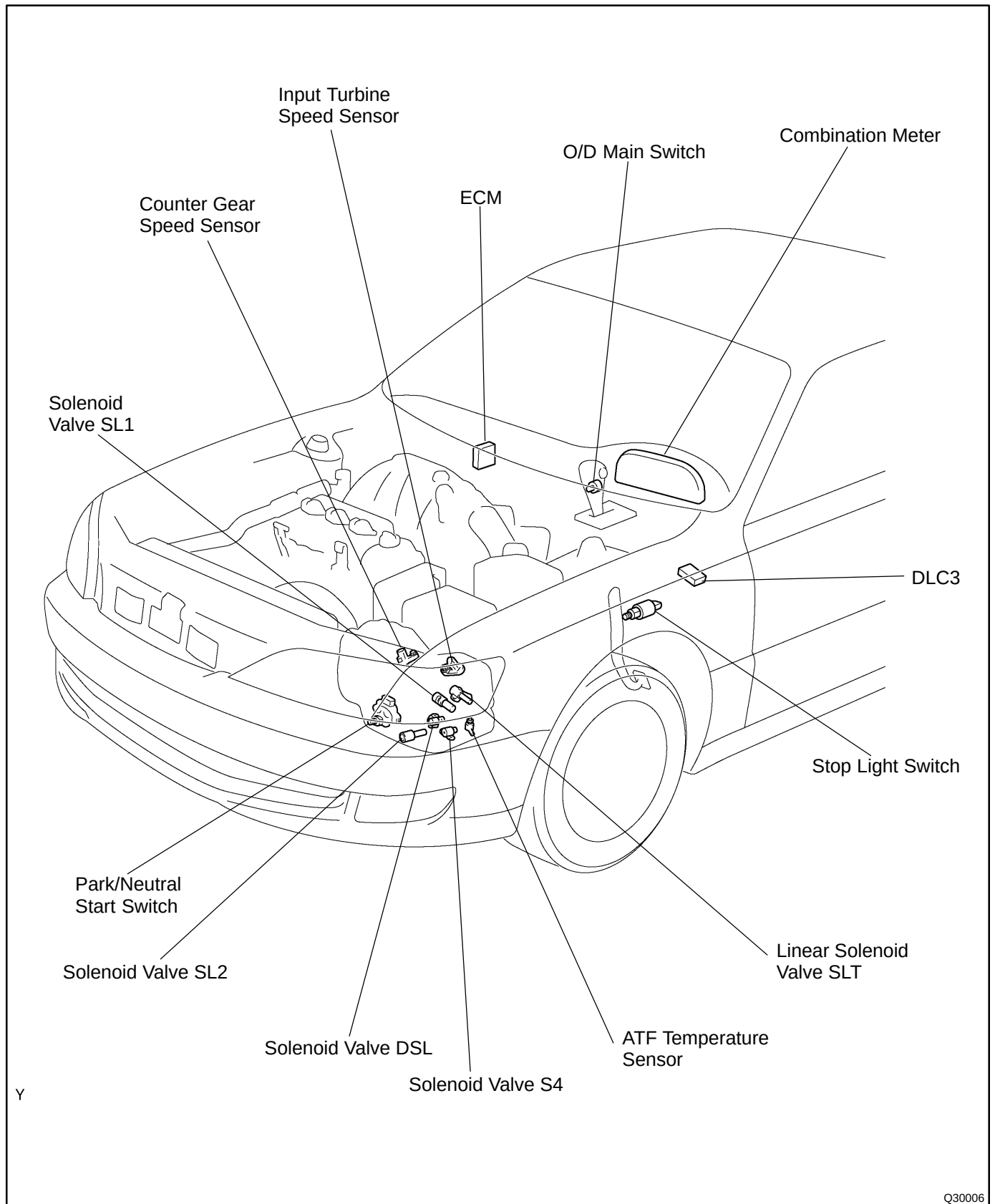
DIAGNOSTIC TROUBLE CODE CHART

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

* : –...MIL does not light /●...MIL light up

DTC No. (See Page)	Detection Item	Trouble Area	MIL *	Memory
P0710 (DI-180)	Transmission Fluid Temperature Sensor Malfunction	Open or short in ATF temperature sensor circuit ATF temperature sensor ECM	●	○
P0750 (DI-182)	Shift Solenoid A Malfunction (Shift Solenoid Valve SL1)	Shift solenoid valve SL1 is stuck open or closed Valve body is blocked or stuck	●	○
P0753 (DI-184)	Shift Solenoid A Electrical Malfunction (Shift Solenoid Valve SL1)	Open or short in shift solenoid valve SL1 circuit Shift solenoid valve SL1 ECM	●	○
P0755 (DI-182)	Shift Solenoid B Malfunction (Shift Solenoid Valve SL2)	Shift solenoid valve SL2 is stuck open or closed Valve body is blocked up or stuck	●	○
P0758 (DI-184)	Shift Solenoid B Electrical Malfunction (Shift Solenoid Valve SL2)	Open or short in shift solenoid valve SL2 circuit Shift solenoid valve SL2 ECM	●	○
P0765 (DI-182)	Shift Solenoid D Malfunction (Shift Solenoid Valve S4)	Shift solenoid valve S4 is stuck open or closed Valve body is blocked up or stuck	●	○
P0768 (DI-184)	Shift Solenoid D Electrical Malfunction (Shift Solenoid Valve S4)	Open or short in shift solenoid valve S4 circuit Shift solenoid valve S4 ECM	●	○
P0770 (DI-190)	Shift Solenoid E Malfunction (Shift Solenoid Valve DSL)	Shift solenoid valve DSL is stuck open or closed Valve body is blocked up or stuck Lock-up clutch	●	○
P0773 (DI-192)	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve DSL)	Open or short in shift solenoid valve DSL circuit Shift solenoid valve DSL ECM	●	○
P1520 (DI-195)	Stop Light Switch Circuit	Open or short in stop light switch circuit Stop light switch ECM	●	○
P1725 (DI-196)	NT Revolution Sensor Circuit Malfunction (Input Turbine Speed Sensor)	Open or short in input turbine speed sensor circuit Input turbine speed sensor ECM	●	○
P1730 (DI-198)	NC Revolution Sensor Circuit Malfunction (Counter Gear Speed Sensor)	Open or short in counter gear speed sensor circuit Counter gear speed sensor ECM	●	○
P1760 (DI-200)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (Shift Solenoid Valve SLT)	Open or short in shift solenoid valve SLT circuit Shift solenoid valve SLT ECM	●	○
P1780 (DI-203)	Park/Neutral Position Switch Malfunction	Short in park/neutral position switch circuit Park/neutral position switch ECM	●	○

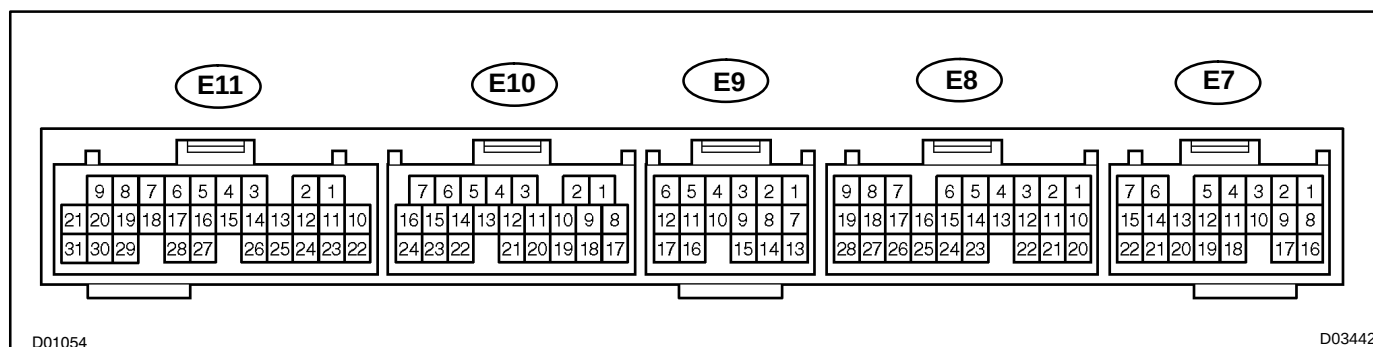
PARTS LOCATION



Y

Q30006

TERMINALS OF ECM



D01054

D03442

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
SPD (E8-22) – E1 (E10-17)	V – W – BR	IG switch ON Rotate driving wheel slowly	Pulse generation
SL1+ (E11-20) – SL1– (E11-19)	B – Y – Y	IG switch ON	10 – 14
		1st or 2nd gear	10 – 14
		3rd or O/D gear	Below 1
SL2+ (E11-9) – SL2– (E11-8)	P – L – W – L	IG switch ON	Below 1
		1st or 2nd gear	10 – 14
		3rd or O/D gear	Below 1
DSL (E11-7) – Body ground	V – Body ground	IG switch ON	Below 1
		Vehicle driving under lock-up position	10 – 14
NC+ (E11-24) – NC– (E11-23)	R – G	Engine is running	Pulse signal is output Below 1 ↔ 4 – 5
NT+ (E9-5) – NT– (E9-4)	L – LG	Engine is running	Pulse signal is output Below 1 ↔ 4 – 5
SLT+ (E9-3) – SLT– (E9-2)	L – R – G – Y	IG switch ON	10 – 14
OD1 (E8-24) – E1 (E10-17)	Y – B – BR	IG switch ON	5 – 6
L (E9-13) – E1 (E10-17)	Y – BR	IG switch ON Shift lever L position	10 – 14
		IG switch ON Shift lever other than L position	Below 1
2 (E9-14) – E1 (E10-17)	L – W – BR	IG switch ON Shift lever 2 position	10 – 14
		IG switch ON Shift lever other than 2 position	Below 1
R (E9-8) – E1 (E10-17)	R – B – BR	IG switch ON Shift lever R position	10 – 14
		IG switch ON Shift lever other than R position	Below 1
D (E9-16) – E1 (E10-17)	B – R – BR	IG switch ON Shift lever D position	10 – 14
		IG switch ON Shift lever other than D position	Below 1
NSW (E8-20) – E1 (E10-17)	B – W – BR	IG switch ON Shift lever P or N position	10 – 14
		IG switch ON Shift lever other than P or N position	Below 1
THO (E10-13) – E2 (E10-18)	B – BR	IG switch ON ATF temperature 110 °C (230 °F)	Below 1
S4 (E9-1) – E1 (E10-17)	L – B – BR	IG switch ON	Below 1
		IG switch ON O/D gear	10 – 14
ODLP (E7-9) – E1 (E10-17)	P – BR	IG switch ON O/D OFF indicator light lights up	Below 1
		IG switch ON O/D OFF indicator light goes off	10 – 14
ODMS (E9-12) – E1 (E10-17)	G – O – BR	IG switch ON	10 – 14
		IG switch ON Press continuously O/D main switch	Below 1

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the diagnostic trouble code check although 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 of 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, check and replace the ECM.

Chapter 1: Electronic Circuit Matrix Chart

Symptom	Suspect Area	See page
No up-shift (A particular gear, from 1st to 3rd gear, is not up-shifted)	ECM	IN-31
No up-shift (3rd → O/D)	2. O/D main switch circuit 3. O/D cancel signal circuit 4. ECM	DI-210 DI-207 IN-31
No down-shift (O/D → 3rd)	ECM	IN-31
No down-shift (A particular gear, from 3rd to 1st gear, is not down-shifted)	ECM	IN-31
No lock-up or No lock-up off	ECM	IN-31
Shift point too high or too low	ECM	IN-31
Up-shift to 2nd while in L position	ECM	IN-31
Up-shift to 3rd while in L position	ECM	IN-31
Up-shift to O/D from 3rd while O/D main switch is OFF	1. O/D main switch circuit 2. ECM	DI-210 IN-31
Up-shift to O/D from 3rd while engine is cold	ECM	IN-31
Harsh engagement (N → D)	ECM	IN-31
Harsh engagement (Lock-up)	ECM	IN-31
Harsh engagement (Any driving position)	ECM	IN-31
Poor acceleration	ECM	IN-31
Engine stalls when starting off or stopping	ECM	IN-31

Chapter 2: On-Vehicle Repair**(● : U140E automatic transaxle repair manual Pub. No. RM633U)**

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Manual valve 2. Primary regulator valve 3. Off-vehicle repair matrix chart	● ● –
Vehicle does not move in R position	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 ₁ accumulator 2. Off-vehicle repair matrix chart	● –
Harsh engagement (N → R)	1. C ₂ accumulator 2. Off-vehicle repair matrix chart	●
Harsh engagement (Lock-up)	1. Lock-up relay valve 2. Off-vehicle repair matrix chart	● –
Harsh engagement (2nd → 3rd)	C ₂ accumulator	●
Harsh engagement (3rd → O/D)	B ₀ accumulator	●
Harsh engagement (O/D → 3rd)	1. C ₀ accumulator 2. B ₀ accumulator	● ●
Slip or shudder (Forward and reverse)	1. Oil strainer 2. Off-vehicle repair matrix chart	● –
No engine braking (1st: L position)	Off-vehicle repair matrix chart	–
No engine braking (2nd: 2 position)	Off-vehicle repair matrix chart	–
No kick-down	1. 1-2 shift valve 2. 2-3 shift valve 3. 3-4 shift valve	● ● ●

Chapter 3: Off-Vehicle Repair**(● : U140E automatic transaxle repair manual Pub. No. RM633U)**

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Front and rear planetary gear 2. U/D planetary gear 3. U/D one-way clutch (F ₂) 4. Forward clutch (C ₁) 5. U/D brake (B ₃)	● ● ● ● ●
Vehicle does not move in R position	1. Front and rear planetary gear unit 2. U/D planetary gear unit 3. Direct clutch (C ₂) 4. U/D brake (C ₃) 5. 1st & reverse brake (B ₂)	● ● ● ● ●
No up-shift (1st → 2nd)	1. No. 1 one-way clutch (F ₁) 2. 2nd brake (B ₁)	● ●
No up-shift (2nd → 3rd)	Direct clutch (C ₂)	●
No up-shift (3rd → O/D)	U/D clutch (C ₃)	●
No lock-up or No lock-up off	Torque converter clutch	AX-24
Harsh engagement (N → D)	1. Forward clutch (C ₁) 2. U/D one-way clutch (F ₂) 3. No. 1 one-way clutch (F ₁)	● ● ●
Harsh engagement (N → R)	1. Direct clutch (C ₂) 2. 1st and reverse brake (B ₂)	● ●
Harsh engagement (Lock-up)	Torque converter clutch	AX-24
Slip or shudder (Forward position: After warm-up)	1. Torque converter clutch 2. Forward clutch (C ₁) 3. Direct clutch (C ₂) 4. U/D brake (C ₃) 5. No. 1 one-way clutch (F ₁) 6. U/D one-way clutch (F ₂)	AX-24 ● ● ● ● ●
Slip or shudder (R position)	1. Direct clutch (C ₂) 2. 1st and reverse brake (B ₂)	● ●
Slip or shudder (1st)	No. 1 one-way clutch (F ₁)	●
Slip or shudder (2nd)	1. U/D one-way clutch (F ₂) 2. 2nd brake (B ₁)	● ●
Slip or shudder (3rd)	Direct clutch (C ₂)	●
Slip or shudder (O/D)	U/D clutch (C ₃)	●
No engine braking (1st – 3rd: D position)	U/D brake (B ₃)	●
No engine braking (1st: L position)	1st and reverse brake (B ₂)	●
No engine braking (2nd: 2 position)	2nd brake (B ₁)	●
Poor acceleration (All position)	1. Torque converter clutch 2. U/D planetary gear	AX-24 ●
Poor acceleration (O/D)	1. U/D clutch (C ₃) 2. U/D planetary gear	● ●
Large shift shock or engine stalls when starting off or stopping	Torque converter clutch	AX-24

CIRCUIT INSPECTION

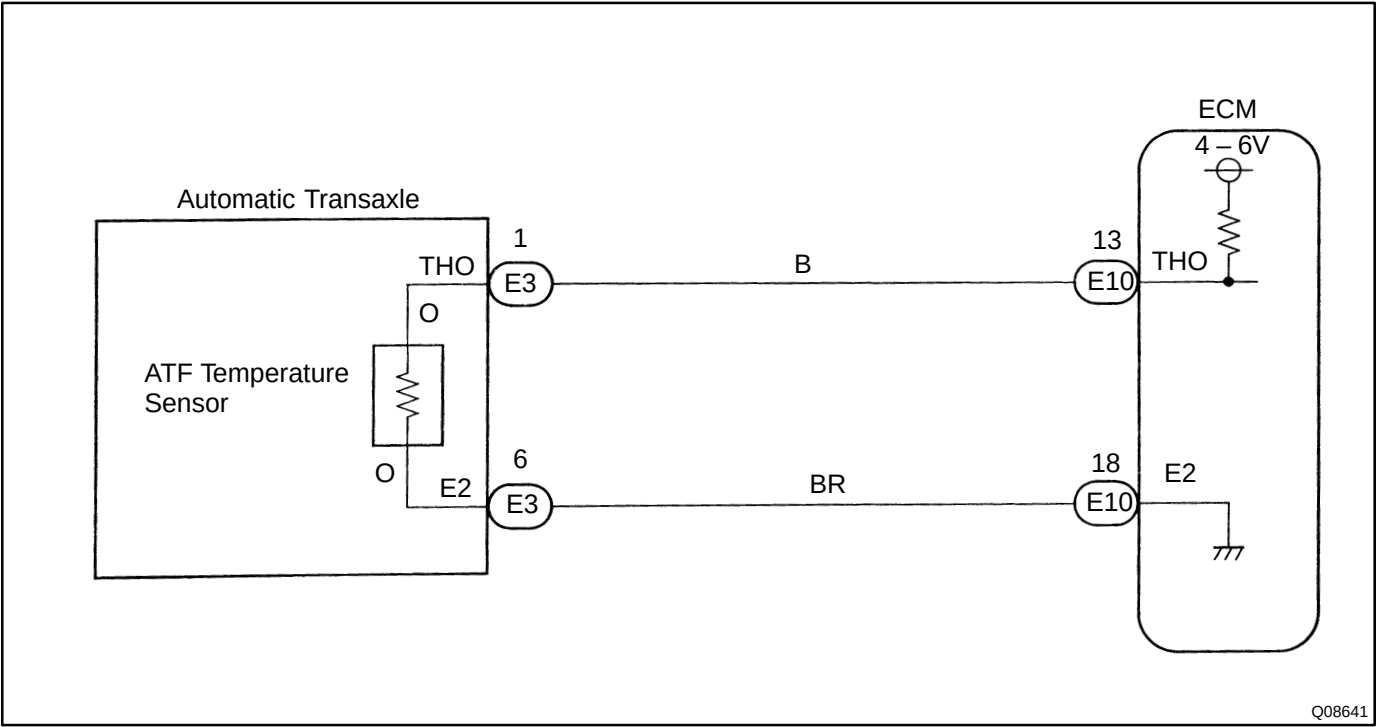
DTC	P0710	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the ECM.

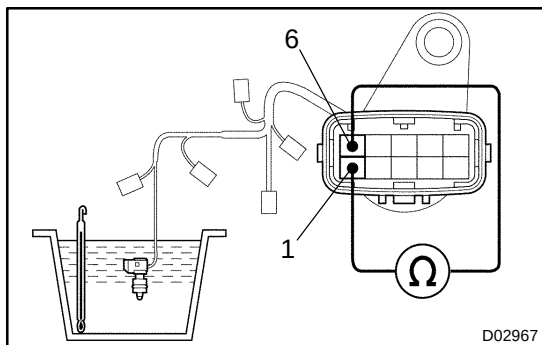
DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either (a) or (b) is detected for 0.5 sec. or more (1-trip detection logic) (a) Temp. sensor resistance is less than 79 Ω. (b) After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ.	●Open or short in ATF temp. sensor ●ATF temp. sensor ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check ATF temperature sensor.

**PREPARATION:**

- (a) Disconnect the solenoid wire connector.
- (b) Remove the oil pan (See page [AX-7](#)).
- (c) Disconnect all solenoid valve connectors.
- (d) Remove the transmission wire harness.

CHECK:

Measure the resistance between terminals 1 and 6 of the 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 ATF temperature sensor (transmission wire).

OK

2 Check harness and connector between ATF temperature sensor and ECM (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-31](#)).

DTC	P0750	Shift Solenoid A Malfunction (Shift Solenoid Valve SL1)

DTC	P0755	Shift Solenoid B Malfunction (Shift Solenoid Valve SL2)

DTC	P0765	Shift Solenoid D Malfunction (Shift Solenoid Valve S4)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical troubles 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 ECM does not match the actual gear (2-trip detection logic)	●Shift solenoid valve SL1, SL2, S4 is stuck open or closed ●Valve body is blocked up or stuck

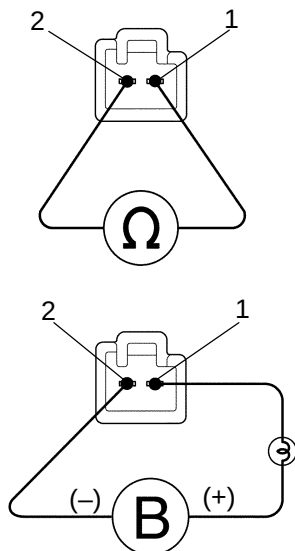
HINT:

- Check the shift solenoid valve SL1 when DTC P0750 is output.
- Check the shift solenoid valve SL2 when DTC P0755 is output.
- Check the shift solenoid valve S4 when DTC P0765 is output.

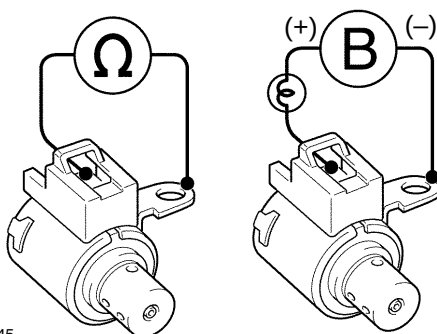
INSPECTION PROCEDURE

1 Check shift solenoid valve SL1, SL2 or S4 operation.

Shift solenoid valve SL1 and SL2



Shift solenoid valve S4



D03445
D03446
D03424 D03423

D03724

PREPARATION:

- Jack up the vehicle.
- Remove the oil pan (See page [AX-7](#)).
- Remove the shift solenoid valve SL1, SL2 or S4.

Check solenoid resistance:**CHECK:**

- Shift solenoid valve SL1 or SL2:
Measure the resistance between terminals 1 and 2 of the solenoid connector.
- Shift solenoid valve S4:
Measure the resistance between terminal 1 of the solenoid connector and the solenoid body.

OK:**Resistance: 5.1 – 5.5 Ω****Check solenoid operation:****CHECK:**

- Shift solenoid valve SL1 or SL2:
Connect the positive (+) lead with an 23-W bulb to terminal 1 and the negative (–) lead to the terminal 2 of the solenoid connector, then check the movement of the valve.
- Shift solenoid valve S4:
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 the operation noise.****NG****Replace shift solenoid valve SL1, SL2 or S4.****OK****Check valve body (See page [DI-177](#)).**

DTC	P0753	Shift Solenoid A Electrical Malfunction (Shift Solenoid Valve SL1)

DTC	P0758	Shift Solenoid B Electrical Malfunction (Shift Solenoid Valve SL2)

DTC	P0768	Shift Solenoid D Electrical Malfunction (Shift Solenoid Valve S4)

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with ON and OFF operation of the shift solenoid valves SL1 and SL2 which is controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	ECM checks for an open or short circuit in shift solenoid valves SL1 and SL2. (a) When solenoid is energized, duty ratio exceed 75 %. (b) When solenoid is not energized, duty ratio is less than 3 %.	
P0768	ECM checks for an open or short circuit in shift solenoid valve S4 circuit when it changes. ECM records DTC P0768 if condition (a) or (b) is detected. (a) When solenoid is energized, solenoid resistance is 8 Ω or less and it is counted. (b) When solenoid is not energized, solenoid resistance is 100 k Ω or more and it is counted.	●Open or short in shift solenoid valve SL1, SL2, S4 circuit ●Shift solenoid valve SL1, SL2, S4 ●ECM

HINT:

- Check the shift solenoid valve SL1 when DTC P0753 is output.
- Check the shift solenoid valve SL2 when DTC P0758 is output.
- Check the shift solenoid valve S4 when DTC P0768 is output.

Fail safe function:

If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF in order to shift into the gear positions shown in the table below. The ECM also turns the shift solenoid valve DSL OFF at the same time. If both solenoids malfunction, hydraulic control cannot be performed electronically, and so it must be done manually.

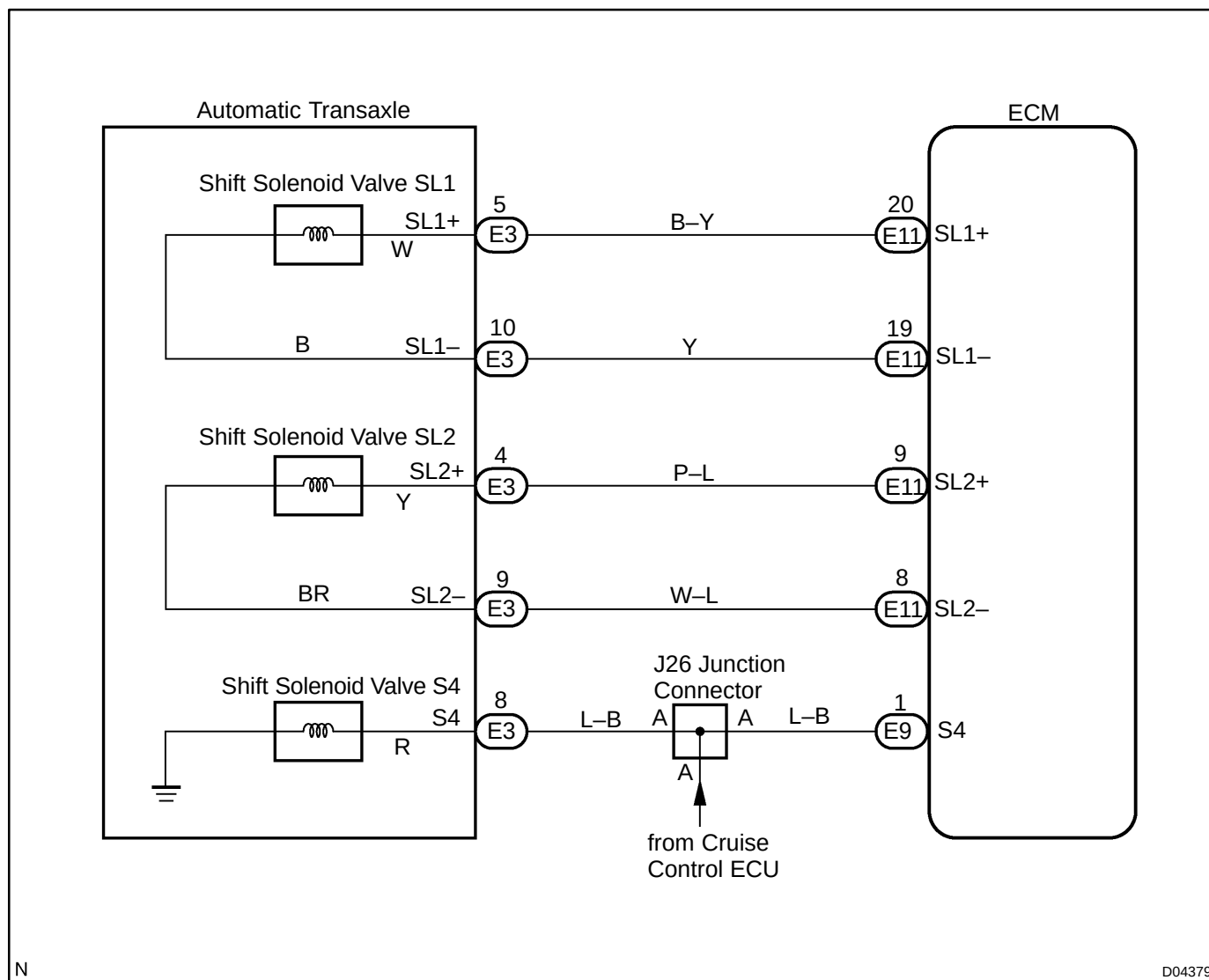
Manual shifting as shown in the following table must be done (In case of a short circuit, the ECM stops sending the current to the short circuited solenoid).

NORMAL				SHIFT SOLENOID SL1 MALFUNCTIONING								SHIFT SOLENOID SL2 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

SHIFT SOLENOID S4 MALFUNCTIONING				SHIFT SOLENOID SL1 AND SL2 MALFUNCTIONING				SHIFT SOLENOID SL1 AND S4 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

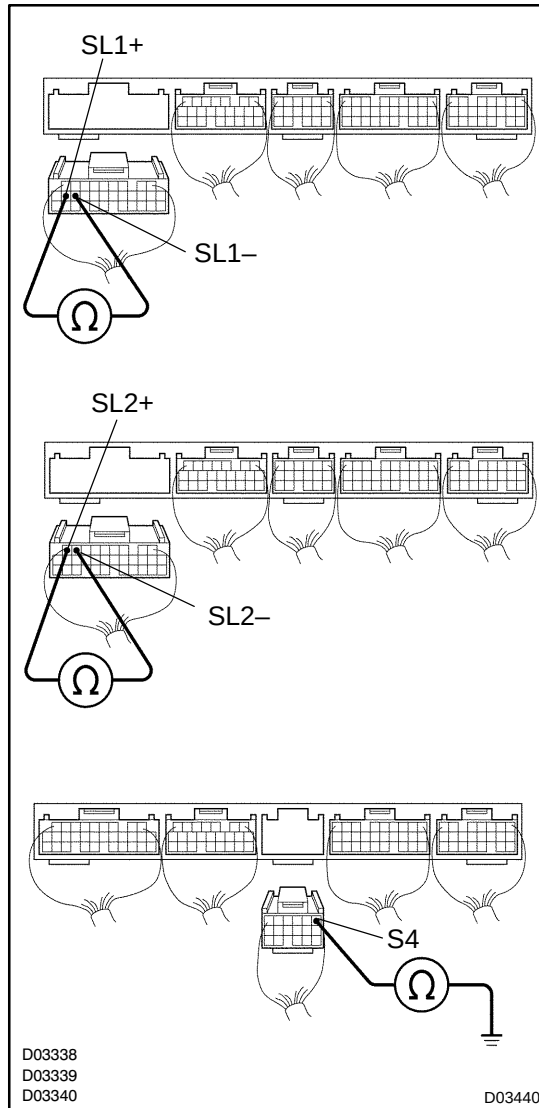
SHIFT SOLENOID SL2 AND S4 MALFUNCTIONING				SHIFT SOLENOID SL1, SL2 AND S4 MALFUNCTIONING			
Solenoid Valve			Gear	Solenoid Valve			Gear
SL1	SL2	S4		SL1	SL2	S4	
ON ↓ OFF	X	X	3rd	X	X	X	3rd
OFF	X	X	3rd	X	X	X	3rd
	X	X	3rd	X	X	X	3rd
	X	X	3rd	X	X	X	3rd

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Measure resistance between terminals of ECM.

**PREPARATION:**

Disconnect the connector from ECM.

CHECK:

- Measure the resistance between terminals SL1+ and SL1- of the ECM connector.
- Measure the resistance between terminals SL2+ and SL2- of the ECM connector.
- Measure the resistance between terminal S4 of the ECM connector and the body ground.

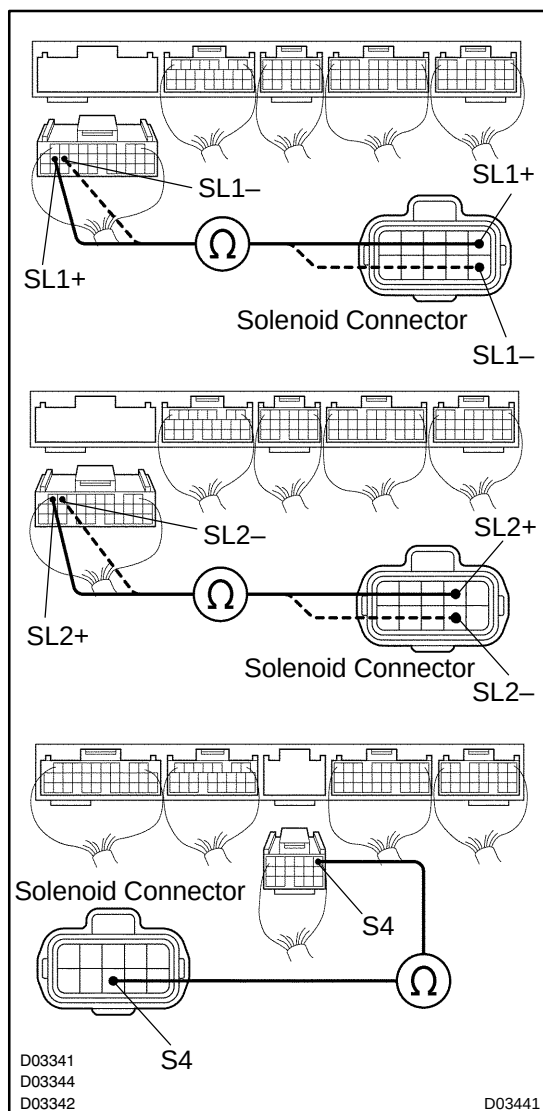
OK:**Resistance:**

- 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 ECM.

NG

2**Measure harness and connector between ECM and automatic transaxle solenoid connector.****PREPARATION:**

- (a) Disconnect the solenoid connector from the automatic transaxle.
- (b) Disconnect the connector from the ECM.

CHECK:

- (a) Measure the harness and connector between terminal SL1+ or SL1- of the ECM and terminal SL1+ or SL1- of the solenoid connector.
- (b) Measure the harness and connector between terminal SL2+ or SL2- of the ECM and terminal SL2+ or SL2- of the solenoid connector.
- (c) Measure the harness and connector between terminal S4 of the ECM and terminal S4 of the solenoid connector.

OK:**0 Ω****OK****NG****Repair or replace harness or connector.**

3	Check shift solenoid valve SL1, SL2 or S4 (See page DI-182).

NG	Replace shift solenoid valve.

OK

Repair or replace solenoid wire, harness and connector between ECM and automatic transaxle solenoid connector.

DTC	P0770	Shift Solenoid E Malfunction (Shift Solenoid Valve DSL)

SYSTEM DESCRIPTION

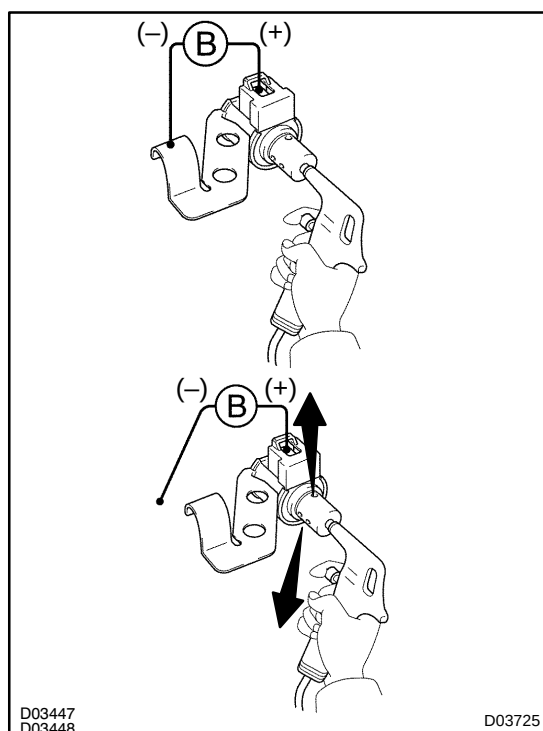
The ECM uses the signals from the throttle position sensor, air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve DSL, valve body and torque converter clutch.

DTC No.	DTC Detecting Condition	Trouble Area
P0770	Lock-up does not occur when driving in lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in the lock-up OFF range (2-trip detection logic)	●Shift solenoid valve DSL is stuck open or closed ●Valve body blocked up or stuck ●Lock-up clutch

INSPECTION PROCEDURE

1	Check solenoid valve DSL operation.



PREPARATION:

- Remove the oil pan (See page [AX-7](#)).
- Remove the shift solenoid valve DSL.

CHECK:

- Applying 490 kPa (5 kgf/cm², 71 psi) of compressed air, check that the solenoid valve does not leak air.
- When battery positive voltage is supplied to the shift solenoid valve, check that the solenoid valve opens.

OK:

- Solenoid valve does not leak air.
- Solenoid valve opens.

NG

Replace solenoid valve DSL.

OK

2	Check valve body (See page DI-177).

NG	Repair or replace valve body.

OK

Replace torque converter clutch
(See page [AX-14](#)).

DTC	P0773	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve DSL)

CIRCUIT DESCRIPTION

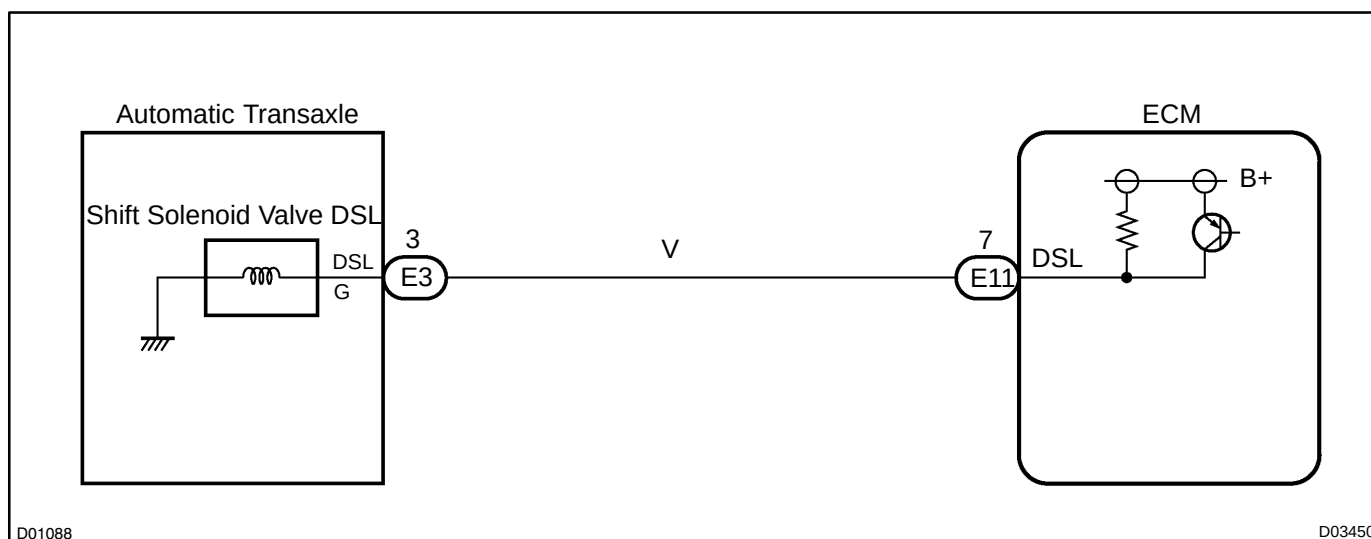
The shift solenoid valve DSL is turned ON and OFF by signals from the ECM in order to control the hydraulic pressure acting on the lock-up relay valve, which then controls the operation of the lock-up clutch.

DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either (a) or (b) are detected at 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 k Ω or more open circuit when solenoid is not energized.	•Open or short in shift solenoid valve DSL circuit •Shift solenoid valve DSL •ECM

Fail safe function:

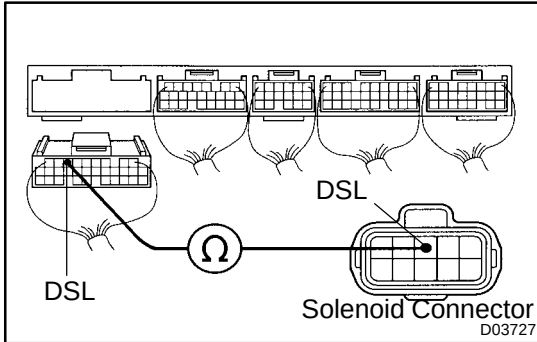
If the ECM detects a malfunction, it turns the shift solenoid valve DSL OFF.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check harness and connector between ECM and automatic transaxle solenoid connector.

**PREPARATION:**

- (a) Disconnect the solenoid connector from the transaxle.
- (b) Disconnect the connector from the ECM.

CHECK:

Measure the harness and connector between terminal DSL of the ECM and terminal DSL of the solenoid connector.

OK:

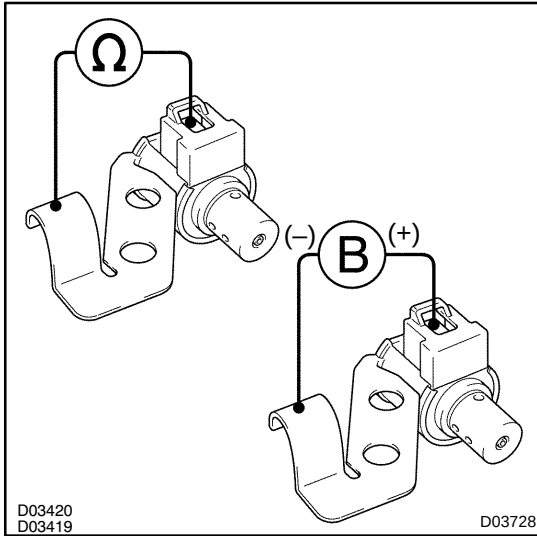
There is continuity.

NG

Repair or replace harness or connector.

OK

2 Check shift solenoid valve DSL.



PREPARATION:

- Jack up the vehicle.
- Remove the oil pan (See page [AX-7](#)).
- Disconnect the shift solenoid valve DSL connector.
- Remove the shift solenoid valve DSL.

CHECK:

- Measure the resistance between terminal DSL of the shift solenoid valve and the solenoid body.
- Connect the positive (+) lead to terminal of the solenoid connector, the negative (-) lead to the solenoid body.

OK:

- Resistance: 11 – 15 Ω
- The shift solenoid valve DSL makes operation noise.

NG

Replace shift solenoid valve DSL.

OK

Check and replace or repair solenoid wire.

DTC	P1520	Stop Light Switch Signal Malfunction

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in lock-up condition, when brakes are suddenly applied.

When the brake pedal is operated, this switch sends a signals to the ECM. Then the ECM cancels the 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 ECM during driving (2-trip detection logic)	●Open or short in stop light switch circuit ●Stop light switch ●ECM

WIRING DIAGRAM

See page [DI-137](#).

INSPECTION PROCEDURE

See page [DI-137](#).

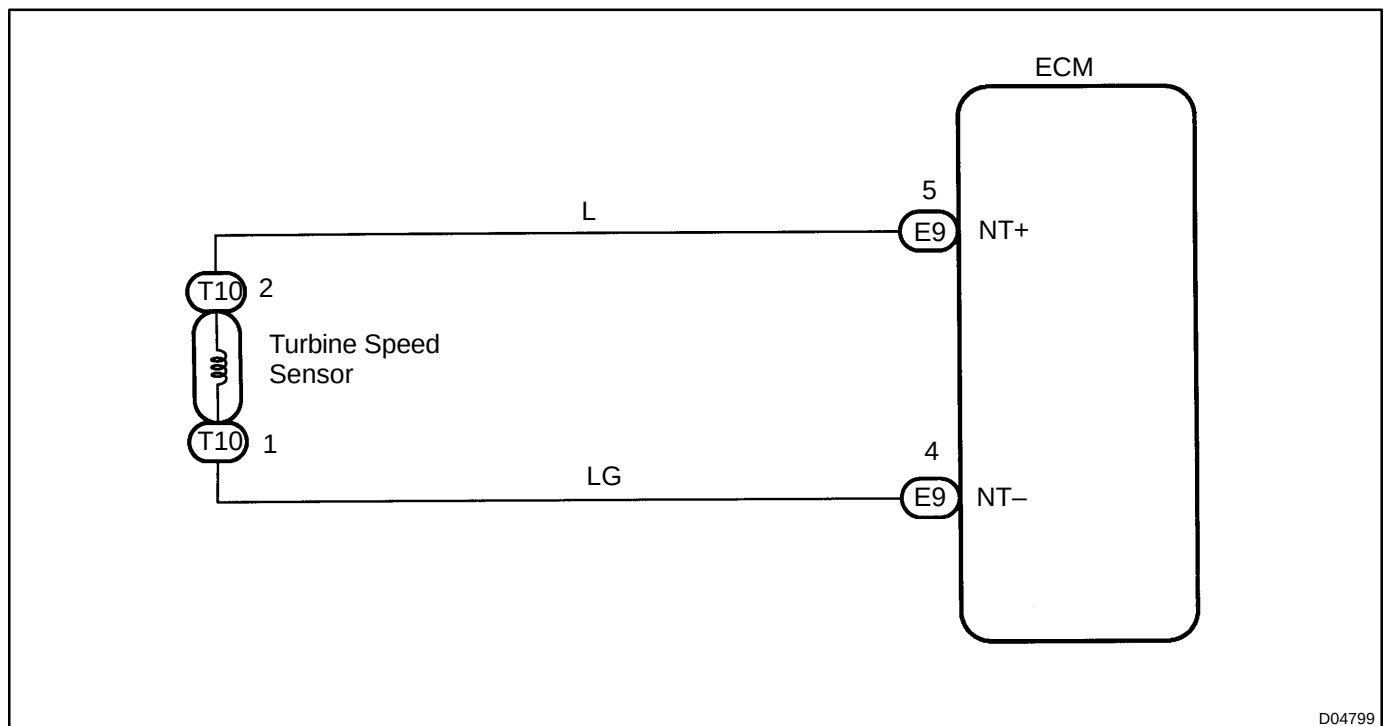
DTC	P1725	NT Revolution Sensor Circuit Malfunction (Input Turbine Speed Sensor)

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 ECM 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	ECM detects conditions (a), (b), (c) and (d) continuity for 5 sec. 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	●Open or short in input turbine (NT) speed sensor circuit ●Input turbine (NT) speed sensor ●ECM

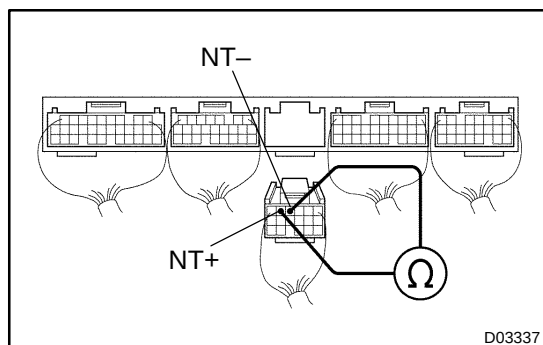
WIRING DIAGRAM



D04799

INSPECTION PROCEDURE

1 Check resistance between terminals NT+ and NT- of ECM.

**PREPARATION:**

Disconnect the connector from ECM.

CHECK:

Check the resistance between terminals NT+ and NT- of the ECM.

OK:

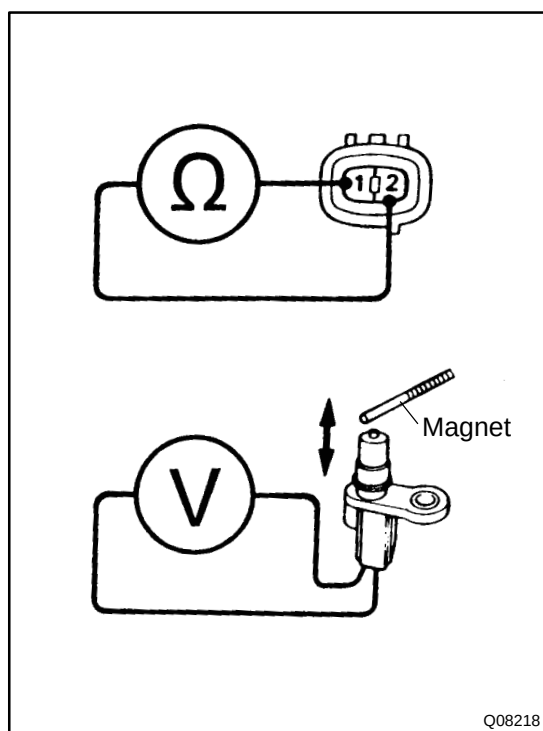
Resistance: $620 \pm 60 \Omega$

OK

Check and replace ECM (See page [IN-31](#)).

NG

2 Check NT revolution speed sensor.

**PREPARATION:**

Remove the NT revolution speed sensor from transaxle.

CHECK:

- (a) Measure the resistance between terminals 1 and 2 of the speed sensor.
- (b) Check the 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 NT revolution speed sensor.

OK

Check and repair harness and connector between ECM and NT revolution speed sensor (See page [IN-31](#)).

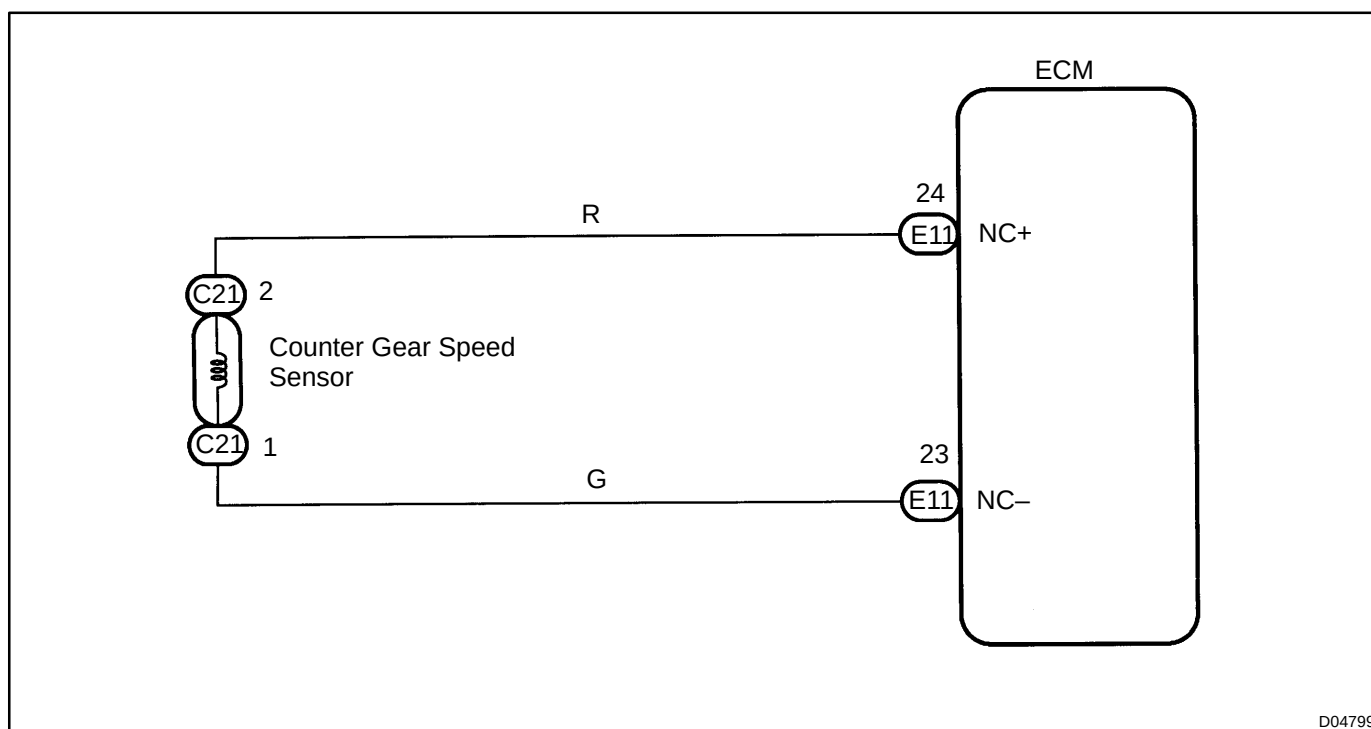
DTC	P1730	NC Revolution Sensor Circuit Malfunction (Counter Gear Speed Sensor)

CIRCUIT DESCRIPTION

This sensor detects the rotation speed of the counter gear. By comparing the counter gear speed signal (NC) and the input turbine speed sensor signal (NT), the ECM 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.

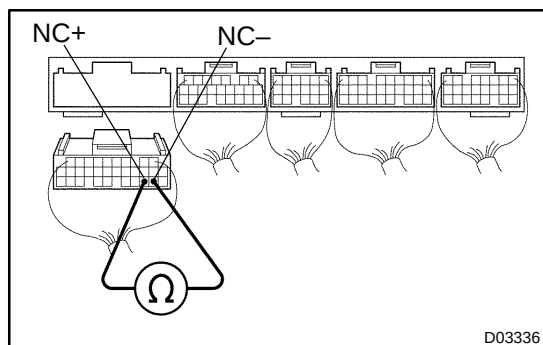
DTC No.	DTC Detecting Condition	Trouble Area
P1730	ECM detects conditions (a), (b), (c) and (d) continuity for 5 sec. or more (1-trip detection logic) (a) Vehicle speed: 50 km/h (20 mph) or more (b) 2nd, 3rd or O/D gear (c) Solenoid valves and park/neutral position switch are normal (d) NC < 300 rpm	●Open or short in NC revolution sensor circuit ●NC revolution speed sensor ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check resistance between terminals NC+ and NC- of ECM.

**PREPARATION:**

Disconnect the connector from the ECM.

CHECK:

Check the resistance between terminals NC+ and NC- of the ECM.

OK:

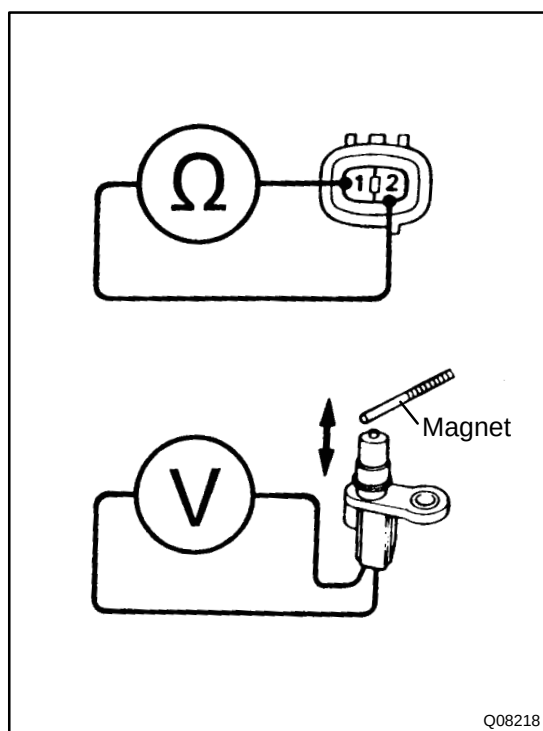
Resistance: $620 \pm 60 \Omega$

OK

Check and replace ECM (See page [IN-31](#)).

NG

2 Check NC revolution speed sensor.

**PREPARATION:**

Remove the NC revolution speed sensor from transaxle.

CHECK:

- Measure the resistance between terminals 1 and 2 of the speed sensor.
- Check the 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.

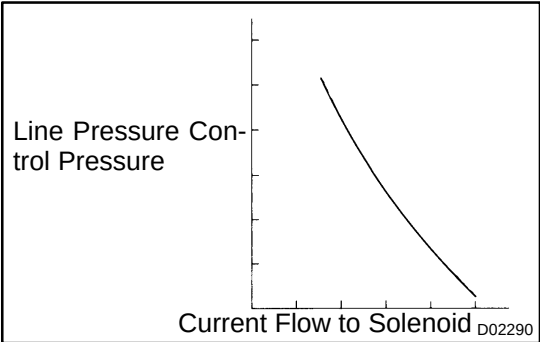
NG

Replace NC revolution speed sensor.

OK

Check and repair harness and connector between ECM and NC revolution speed sensor (See page [IN-31](#)).

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



CIRCUIT DESCRIPTION

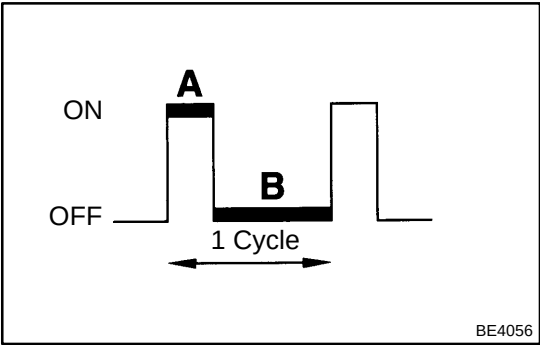
The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the solenoid valve SLT, under electronic control, to precisely and minutely modulate and generate line pressure according to the accelerator pedal effort, or engine power output detected. This reduces the function of line pressure and provides smooth shifting characteristics.

Upon receiving the throttle valve opening angle signal, ECM controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure, generating throttle pressure.

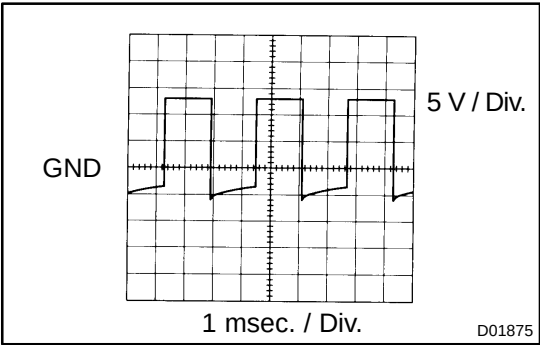
(*) Duty Ratio

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

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

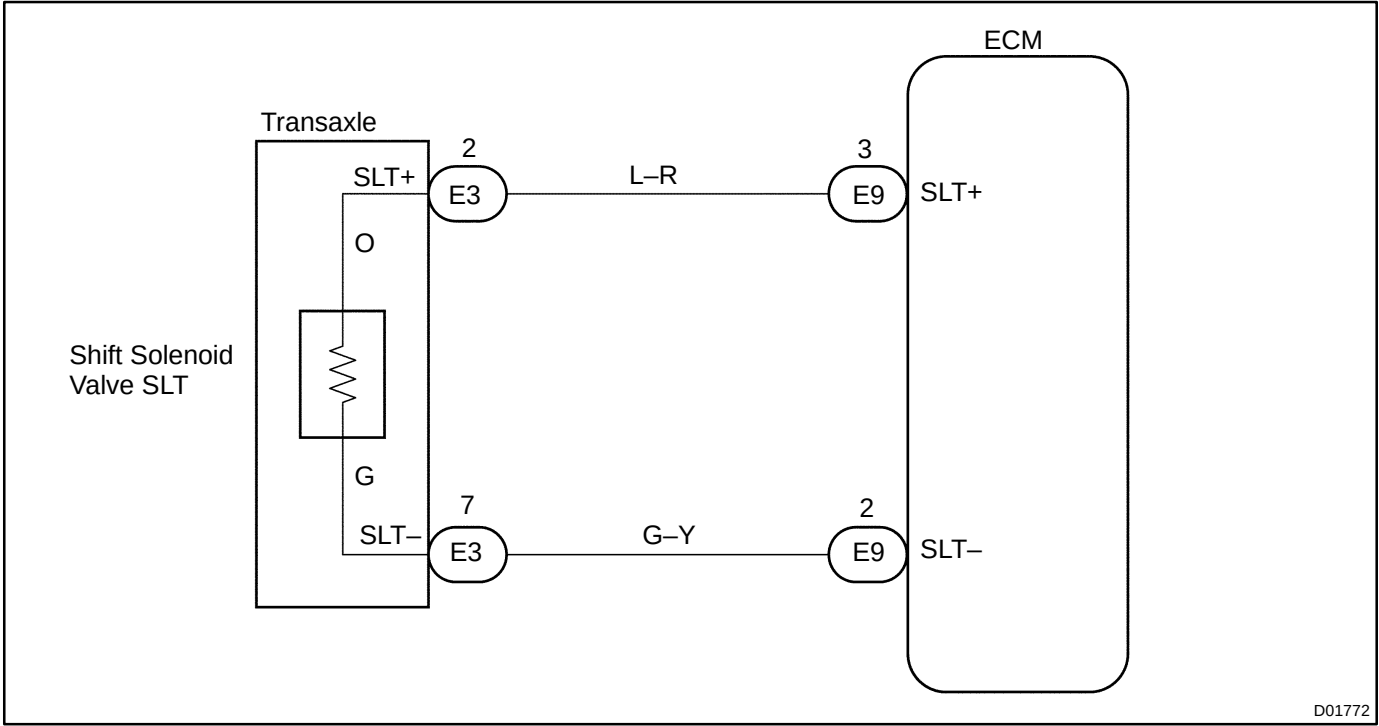


DTC No.	DTC Detecting Condition	Trouble Area
P1760	(a) or (b) condition below are detected 1 sec. or more. (a) SLT- terminal: 0V (b) SLT- terminal: 12V	●Open or short in shift solenoid valve SLT circuit ●Shift solenoid valve SLT ●ECM



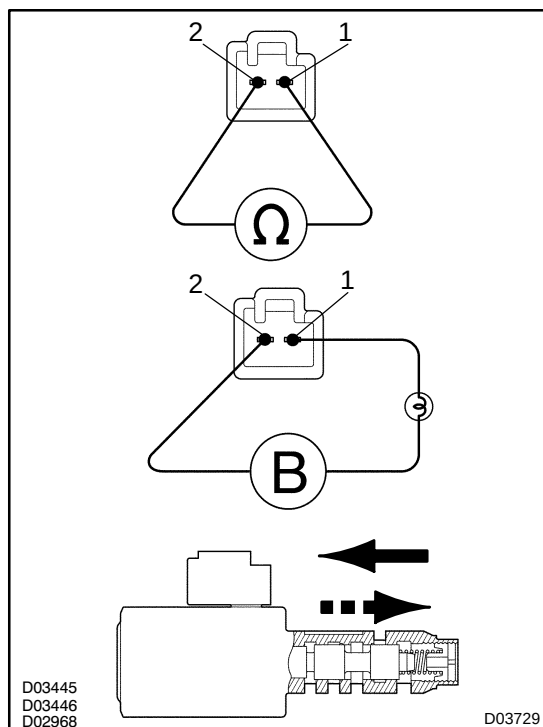
Reference:
Waveform between terminals SLT+ and SLT- during engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check shift solenoid valve SLT.

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan (See page [AX-7](#)).
- (c) Disconnect the solenoid connector.

Check solenoid resistance:**CHECK:**

Measure the resistance between terminals 1 and 2 of the solenoid connector.

OK:

Resistance: 5.0 – 5.6 Ω

Check solenoid operation:**CHECK:**

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

OK:

When battery positive voltage is applied.	Valve moves in  direction in illustration at right.
When battery positive voltage is cut off.	Valve moves in  direction in illustration at left.

NG

Replace shift solenoid valve SLT.

OK

2 Check harness and connector between shift solenoid valve SLT and ECM (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Replace ECM.

DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

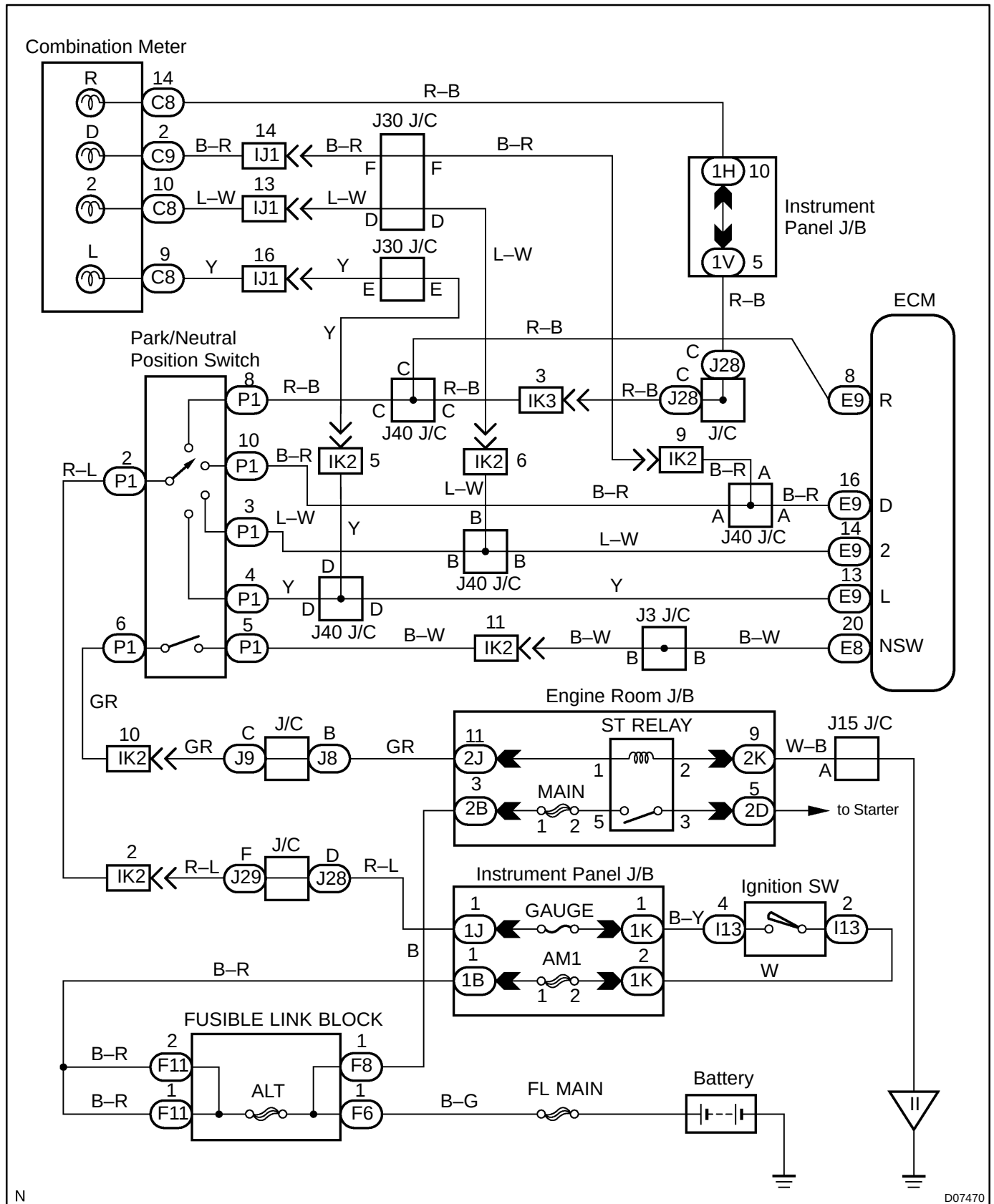
The park/neutral position switch detects the shift lever position and sends signals to the ECM.

The ECM receives signals (PNP, REVERSE, DRIVE, 2ND and LOW) from the park/neutral position switch.

When the signal is not sent to the ECM from the park/neutral position switch, the ECM judges that the shift lever is in the D position.

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

WIRING DIAGRAM



N

D07470

INSPECTION PROCEDURE

- 1 Read PNP SW, REVERSE, 2ND and LOW signals.

When using LEXUS hand-held tester:

PREPARATION:

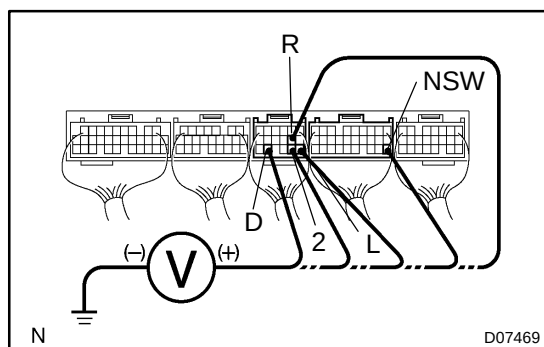
- Remove the DLC3 cover.
- Connect a LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and push the LEXUS hand-held tester main switch ON.

CHECK:

Shift the shift lever into the P, R, N, D, 2 and L positions, and read the signals of the PNP, REVERSE, 2ND DRIVE and LOW signals on the LEXUS hand-held tester.

OK:

Shift position	Signal
P, N	NSW OFF → ON
R	REVERSE OFF → ON
D	DRIVE OFF → ON
2	2ND OFF → ON
L	LOW OFF → ON



When not using LEXUS hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between each of terminal NSW, R, D, 2 and L of the ECM and the body ground when the shift lever is shifted into the following positions.

OK:

Position	NSW–Body ground	R–Body ground	D–Body ground	2–Body ground	L–Body ground
P, N	0 V	0 V	0 V	0 V	0 V
R	9 – 14 V*	7.5 – 14 V*	0 V	0 V	0 V
D	9 – 14 V	0 V	7.5 – 14 V	0 V	0 V
2	9 – 14 V	0 V	0 V	7.5 – 14 V	0 V
L	9 – 14 V	0 V	0 V	0 V	7.5 – 14 V

HINT:

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

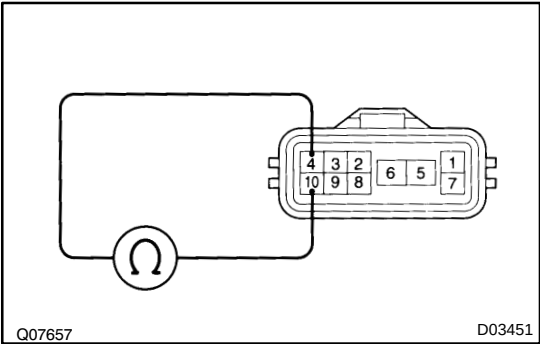
OK

Check and replace ECM (See page DI-177).

NG

2

Check park/neutral position switch.



PREPARATION:

- (a) Jack up the vehicle.
- (b) Remove the park/neutral position switch.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved into each position.

Shift position	Terminal No. to continuity	
P	2 – 7	5 – 6
R	2 – 8	–
N	2 – 9	5 – 6
D	2 – 10	–
2	2 – 3	–
L	2 – 4	–

OK:

There is continuity.

NG

Replace park/neutral position switch.

OK

Repair or replace harness and connector between battery and park/neutral position switch, and park/neutral position switch and ECM (See page [IN-31](#)).

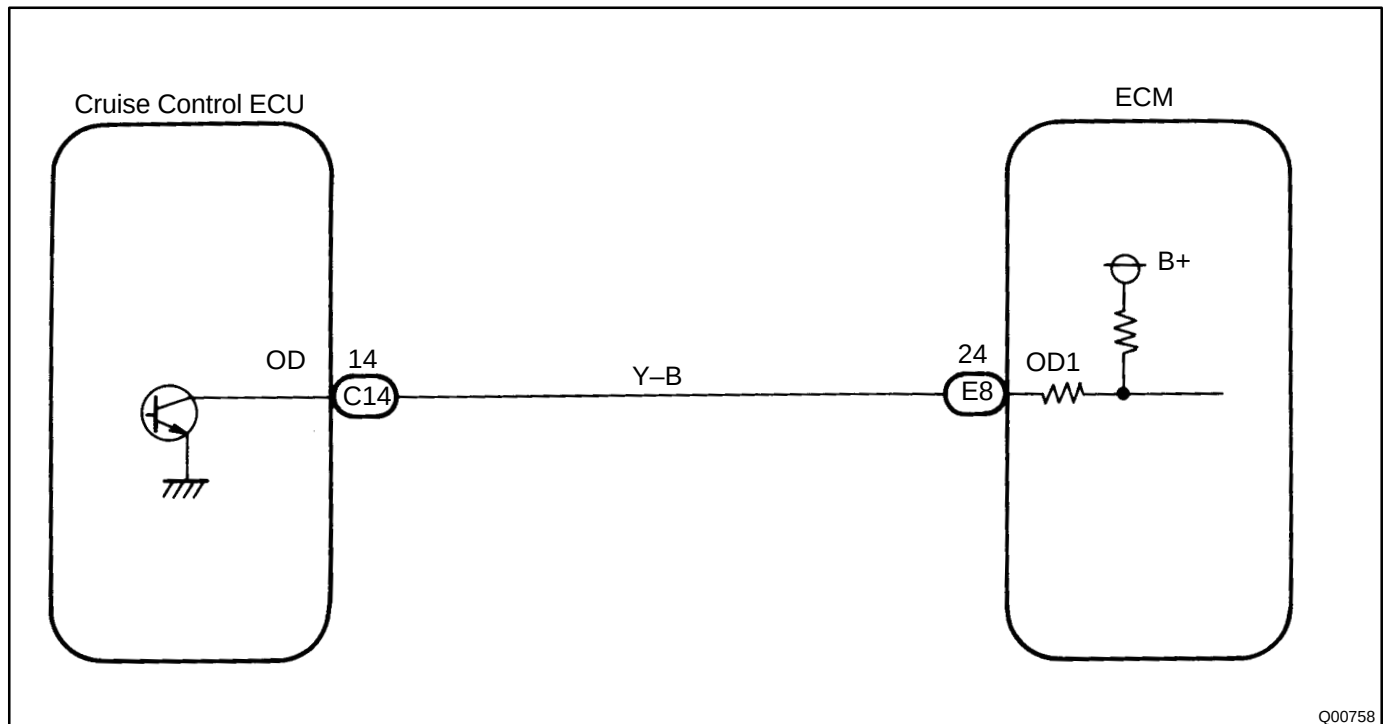
O/D Cancel Signal Circuit

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 ECU sends O/D cut signals to the ECM as necessary and the ECM cancels overdrive shifting until these signals are discontinued.

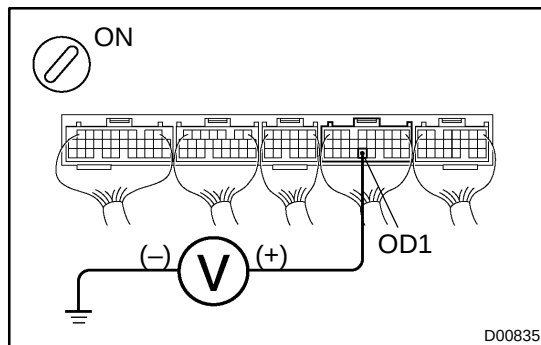
WIRING DIAGRAM



Q00758

INSPECTION PROCEDURE

1	Check voltage between terminal OD1 of ECM and body ground.

**PREPARATION:**

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal OD1 of the ECM and the body ground.

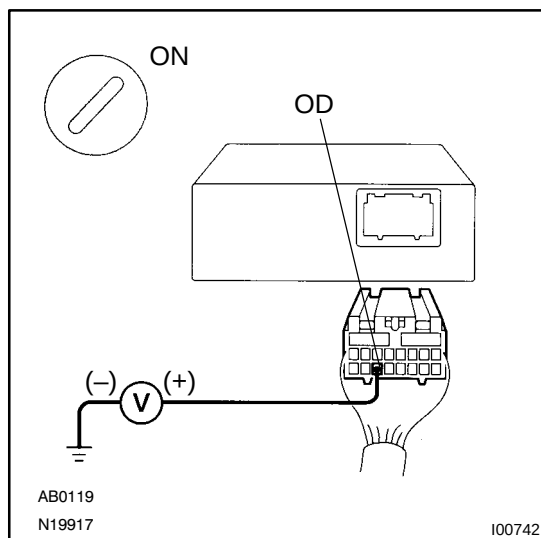
OK:**Voltage: 10 – 14 V**

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-177](#)).

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 the voltage between terminal OD of the cruise control ECU harness side connector and the body ground.

OK:**Voltage: 10 – 14 V**

OK

Check and replace cruise control ECU. (See page [DI-638](#))

NG

Check harness and connector between cruise control ECU and ECM (See page IN-31).

Repair or replace harness or connector.

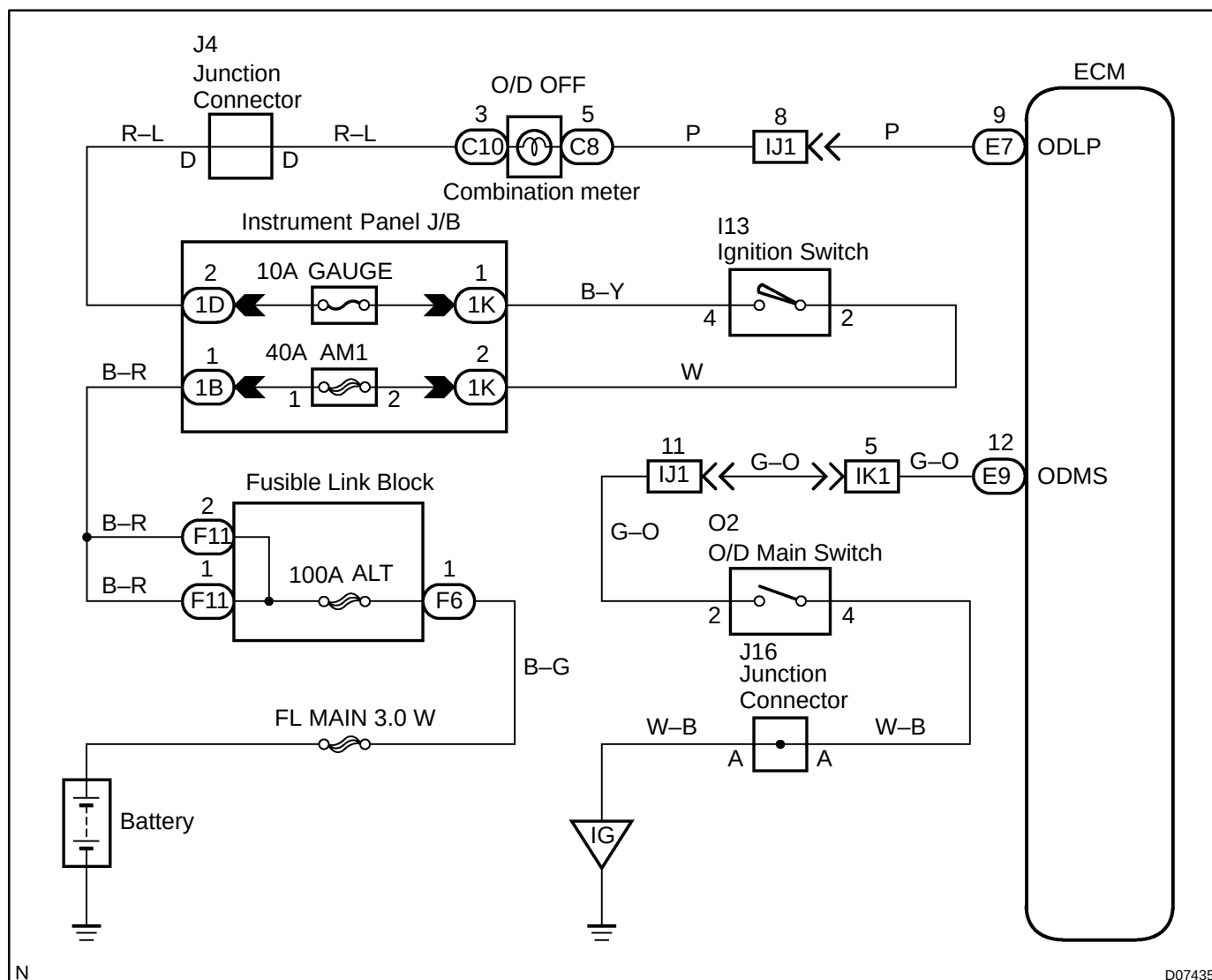
Check and replace ECM (See page IN-31).

O/D Main Switch & O/D OFF Indicator Light Circuit

CIRCUIT DESCRIPTION

The O/D main switch is a momentary type switch. When pressing the O/D main switch, the O/D OFF indicator light lights up and the ECM prohibits shifting into O/D, and when pressing it once again, the O/D OFF indicator light goes off and the ECM allows shifting into O/D. Turning the IG switch OFF will reset the O/D OFF indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of O/D main switch.

PREPARATION:

Turn the ignition switch ON.

CHECK:

- (a) Check the O/D OFF indicator light when the O/D main switch is pressed into ON.
- (b) Check the O/D OFF indicator light when the O/D main switch is pressed once again.

OK:

- (a) O/D OFF indicator light lights up.
- (b) O/D OFF indicator light goes off.

OK

Proceed to next inspection shown on problem symptoms table (See page [DI-177](#)).

NG

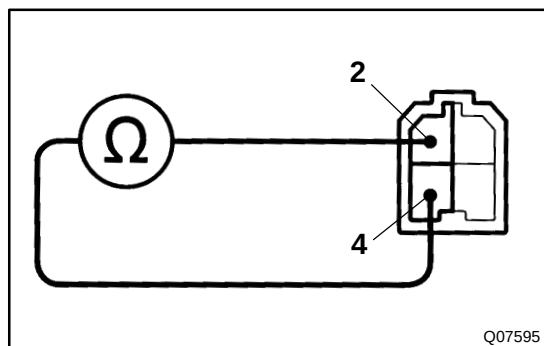
2 Check and replace combination meter (See page [BE-65](#)).

NG

Replace combination meter.

OK

3 Check O/D main switch.

**PREPARATION:**

Disconnect the O/D main switch connector.

CHECK:

Check continuity between terminals 2 and 4 of the O/D main switch connector.

OK:

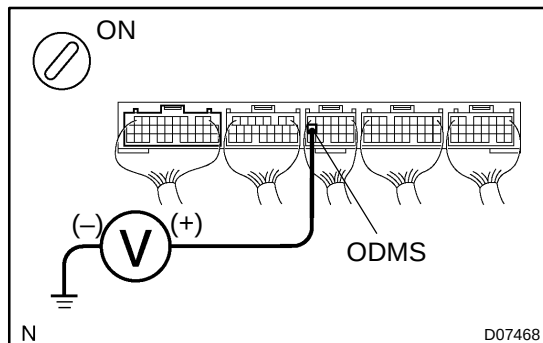
O/D main switch condition	Specified condition
Press continuously O/D main switch	Continuity
Release O/D main switch	No continuity

NG

Replace and repair O/D main switch.

OK

4 Check voltage between terminal ODMS of ECM and body ground.

**PREPARATION:**

Turn the ignition switch ON.

CHECK:

Check the voltage between terminal ODMS of the ECM and the body ground when the O/D main switch is ON and OFF.

OK:

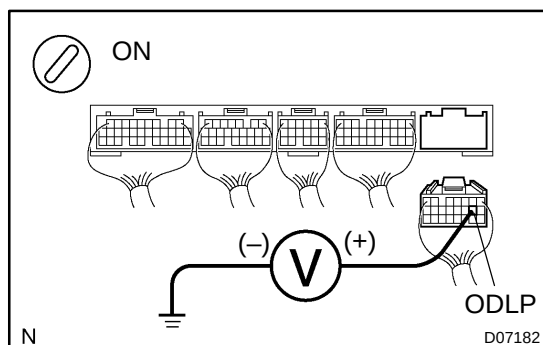
O/D main switch condition	Specified voltage
Press continuously O/D main switch	Below 1.0 V
Release O/D main switch	10 – 14 V

OK

Check and replace ECM (See page [IN-31](#)).

NG

5 Check voltage between terminal ODLP of ECM and body ground.

**PREPARATION:**

- (a) Disconnect the connector of the ECM.
- (b) Turn the ignition switch ON.

CHECK:

Check the voltage between terminal ODLP of the ECM and the body ground.

OK:

Voltage: 7.5 – 14 V

OK

Check and replace ECM (See page [IN-31](#)).

NG

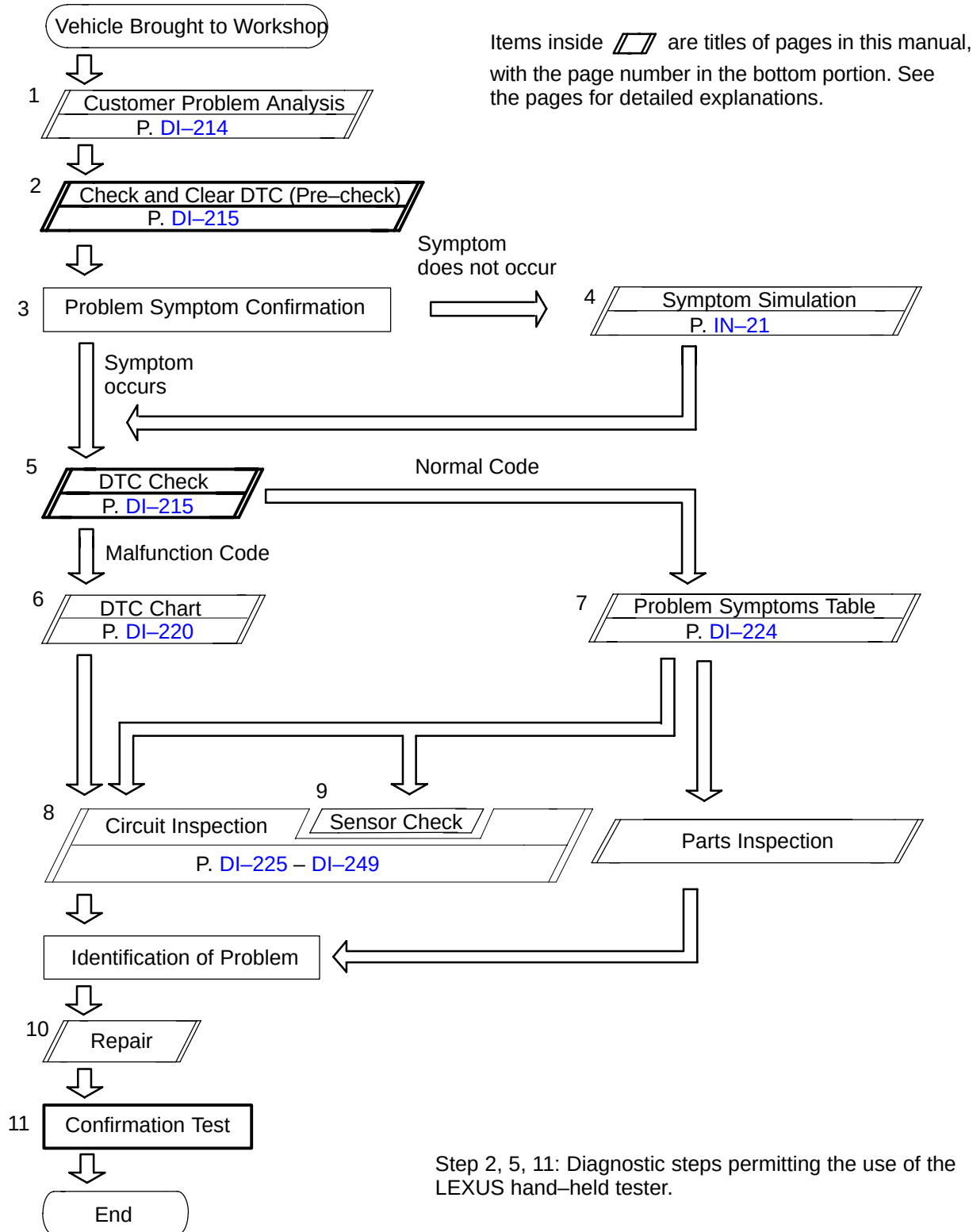
Check and replace harness and connector between combination meter and ECM, O/D main switch and ECM, O/D main switch and body ground (See page [IN-31](#)).

ELECTRONIC MODULATED SUSPENSION

HOW TO PROCEED WITH TROUBLESHOOTING

D10AB-05

Troubleshooting in accordance with the procedure on the following pages.



CUSTOMER PROBLEM ANALYSIS CHECK

ELECTRONIC MODULATED SUSPENSION Check Sheet

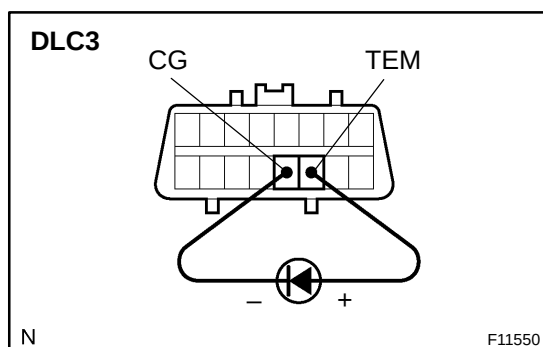
Inspector's :
Name _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought in		Odometer Reading	

Date Problem First Occurred		
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Conditions at Time of Problem Occurrence	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F(°C))
	Place	☐ Highway ☐ Suburbs ☐ Inner City ☐ Hill (Up, Down) ☐ Rough Road ☐ Others ()

Symptoms	☐ Malfunction in damping force control ☐ Others	☐ Anti-roll control does not operate ☐ Anti-squat control does not operate ☐ Anti-dive control does not operate ☐ High speed control does not operate ☐ Bounding control does not operate ☐ Others ()

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



PRE-CHECK

1. DIAGNOSIS SYSTEM

- (a) Check the TEM output (LED lightening check).
- (1) Connect the LED to terminals TEM and CG of the DLC3.

NOTICE:

If connected reversely, the LED does not light.

HINT:

Use the LED whose recommended operating current is 10 – 20 mA.

- (2) Turn the ignition switch ON, and check that the LED lights for about 2 seconds.

HINT:

If the LED does not light, inspect the TEM circuit (See page [DI-245](#)).

- (b) DTC the check.

- (1) Check the battery positive voltage.
Battery positive voltage: 10 – 14 V (When the engine stopped)
- (2) After driving the vehicle, using SST, connect terminals Tc and E1 of the DLC1, or terminals Tc and CG of the DLC3.

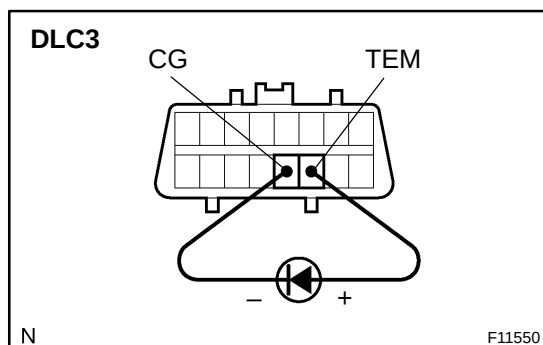
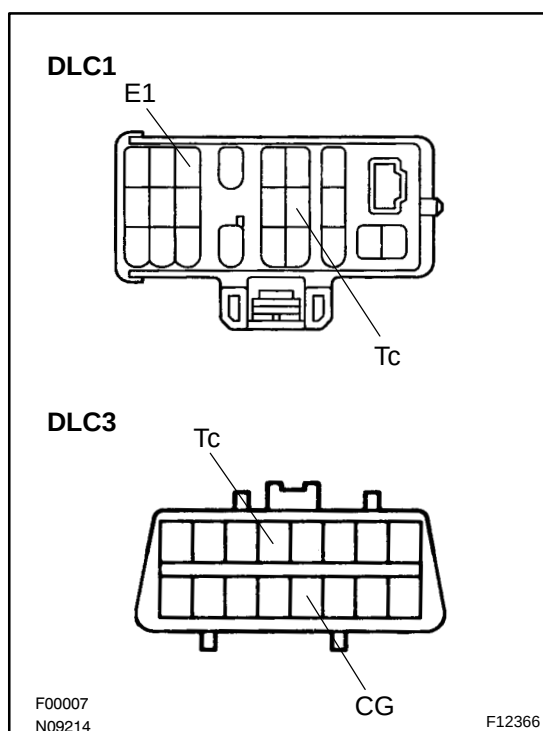
SST 09843-18020 or 09843-18040

HINT:

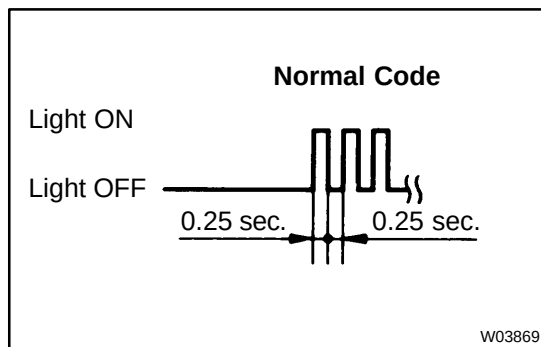
- Do not stop the engine.
- Under this condition, the ignition switch is ON.

NOTICE:

Wrong connection of the connector may cause a malfunction. With extreme caution, connect the connector.



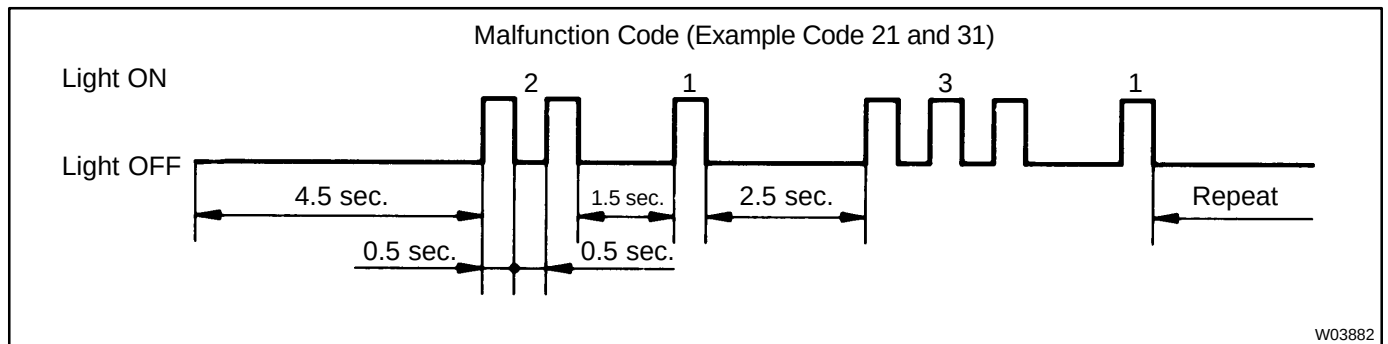
- (3) Connect the LED to terminals TEM and CG of DLC3.



(4) Check the number that the LED blinks.

HINT:

- When the code is normal, the LED keeps on for 0.25 seconds and off for 0.25 seconds repeatedly.
- When more than 2 diagnosis codes are detected, the diagnosis codes are displayed in order from the smallest number.
- If no code appears, inspect the diagnostic circuit (See page [DI-247](#)).
- Codes are explained in the code table on page [DI-220](#).

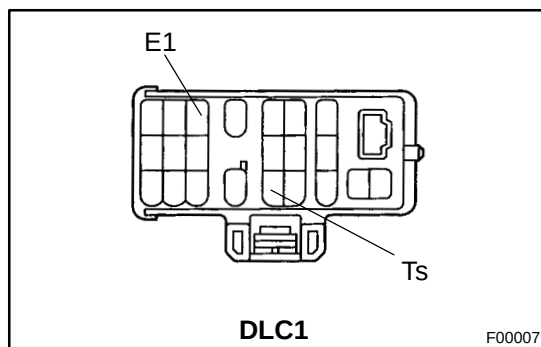


(5) Disconnect the SST from terminals Tc and E1 of the DLC1, or terminals Tc and CG of the DLC3.

SST 09843-18020 or 09843-18040

Confirm that the connected LED is off.

(6) When an abnormal code is output, inspect the function, absorber control ECU and input signal.



(c) Check the damping force controlling condition.

(1) Using SST, connect terminals Ts and E1 of the DLC1 with the ignition switch OFF (TEST mode).

SST 09843-18020

(2) Start the engine.

Under this condition, the absorber control actuator position becomes 1 (Soft).

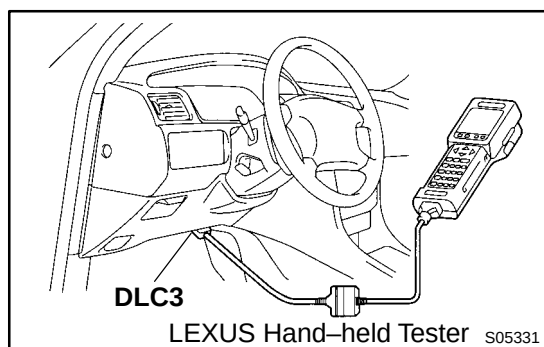
(3) Starting from the above mentioned position, as the brake pedal is depressed, the absorber control actuator position increase (1 → 2 → 3 → ... 15 → 16). At this time, bounce the vehicle and check that the shock absorber is becoming harder.

HINT:

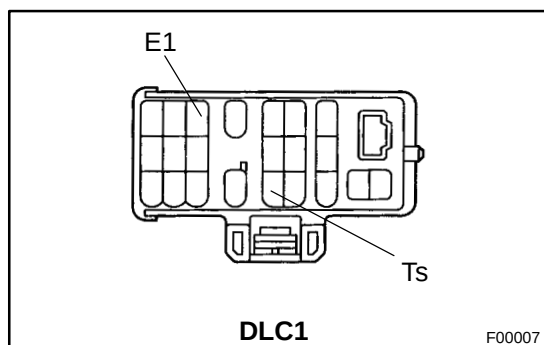
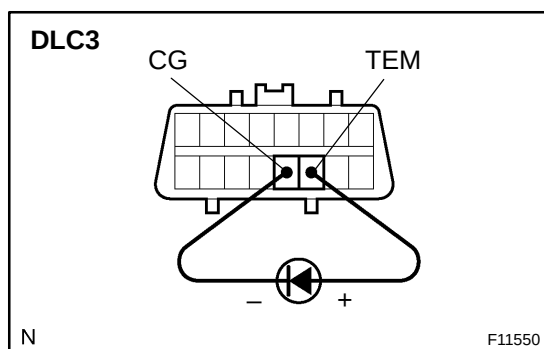
- To hold the shock absorber control actuator at a specific position, adjust it to the position using the above mentioned procedure then increase the vehicle speed to over 5 km/h.

After that the shock absorber control actuator position does not change until the ignition switch is turned OFF.

- If the absorber control actuator does not operate, inspect the absorber control actuator circuit and absorber control ECU.
- (4) Disconnect the SST from terminals Ts and E1 of the DLC1.
- SST 09843-18020



- (d) Using LEXUS hand-held tester, check the DTC.
- (1) Connect the LEXUS hand-held tester to the DLC2.
 - (2) Monitor the ECU data by following the prompts on the tester screen.
Please refer to the LEXUS hand-held tester operator's manual.
LEXUS hand-held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
- (e) Clear the DTC.
The diagnosis memory is erased by turning the ignition switch OFF.
- (f) Check the input signal (TEST mode check).
This function checks if signals from the steering sensor and stop light switch etc. are being input normally to the ECU.
- (1) Check the battery positive voltage.
Battery positive voltage: 10 – 14 V (When the engine stopped)
 - (2) Turn ignition switch OFF.



- (3) Connect the LED to terminals TEM and CG of the DLC3.
 - (4) Set each of the check items in the table below to the condition of operation (A).
- (5) Using SST, connect terminals Ts and E1 of the DLC1 (TEST mode).
SST 09843-18020
- (6) Start the engine.
 - (7) Each of the check items is set to the condition of operation (B).

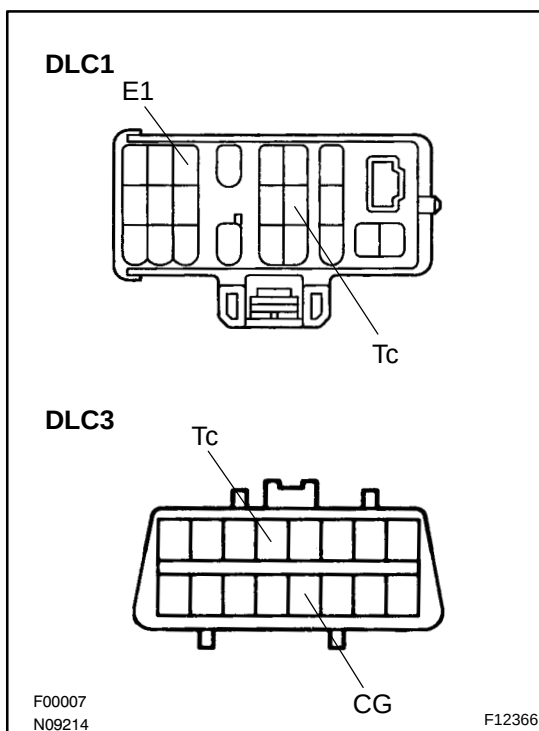
HINT:

- The LED lights for 1 sec. before it blinks.
- If operation (B) has not been done, DTC will indicate.

NOTICE:

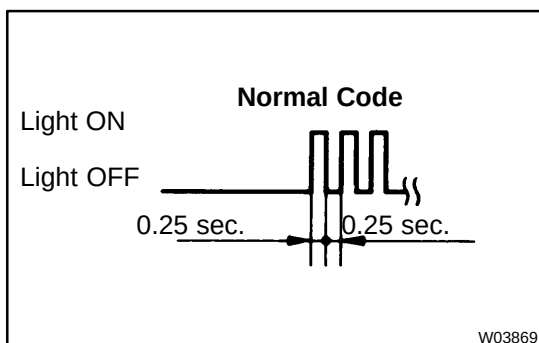
Do not turn off the ignition switch OFF. Diagnosis code are erased by turning the ignition switch OFF.

Check Item	Operation (A)	Operation (B)
Steering Sensor Signal	Steering wheel straight ahead	Steering wheel angle 36° degrees or larger
Vehicle Speed Sensor Signal	Vehicle speed below 12 mph (20 km/h)	Vehicle speed 12 mph (20 km/h) or higher
Stop Light Switch Signal	OFF (Brake pedal not depressed)	ON (Brake pedal depressed)
Crankshaft Position Sensor Signal	Engine speed below 2,000 rpm or more	Engine speed 2,000 rpm or higher
Absorber Control Switch Signal	—	Slowly move the absorber control switch "COMFORT" ↔ "SPORT" both ways once



- (8) Using SST, connect terminals Tc and E1 of the DLC1, or terminals Tc and CG of the DLC3.

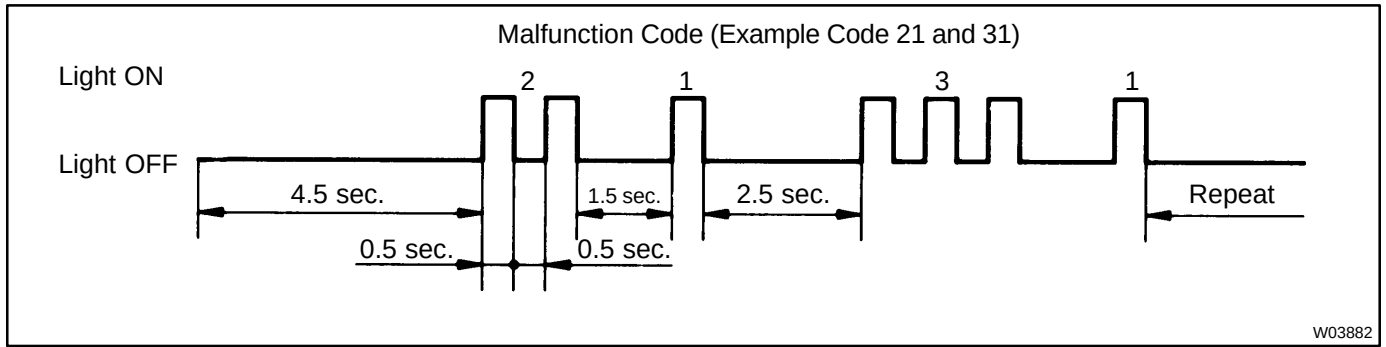
SST 09843-18020 or 09843-18040



- (9) Check the number that the LED blinks.

HINT:

When the code is normal, the LED keeps on for 0.25 sec. and off for 0.25 sec. repeatedly.



- (g) Desert from the input signal check mode.
 With the ignition switch OFF, disconnect the SST from the
 DLC1 or DLC3.
 SST 09843-18020 or 09843-18040

2. FAIL-SAFE FUNCTION

When short circuit of the shock absorber control actuator is detected, the shock absorber control actuator located on the other side of the detected shock absorber is held at step 8. The shock absorber control actuator remains uninterrogated until the ignition switch becomes OFF.

DIAGNOSTIC TROUBLE CODE CHART

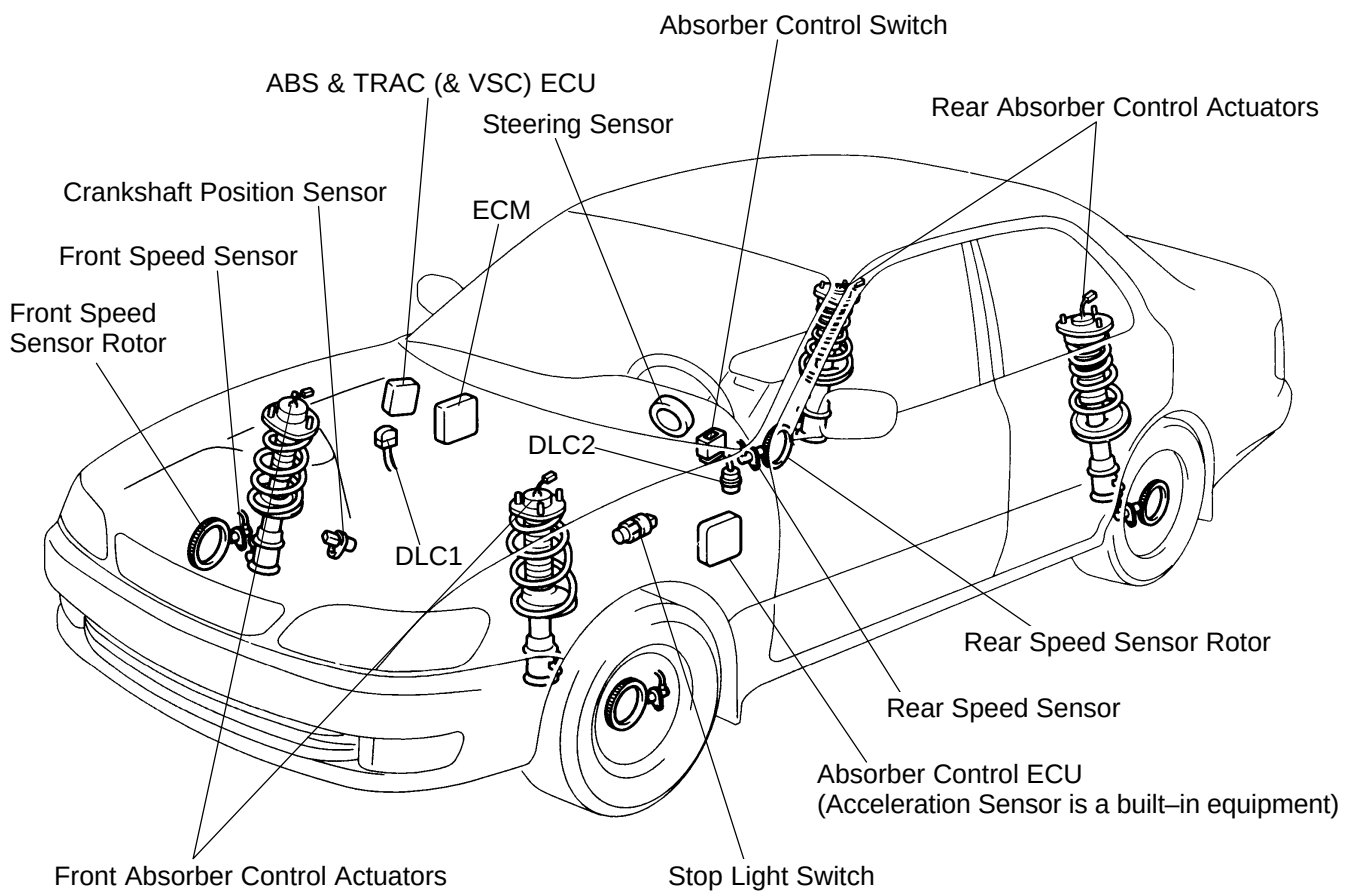
If a malfunction code is displayed during the DTC check, identify the DTC code and check the circuit listed in code. For details of each code, refer to the "See page" under respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
21 (DI-225)	Short circuit in front absorber control actuator circuit	●Left front, right front, left rear and right rear absorber control actuator ●Short circuit in between absorber control actuator and absorber control ECU ●Absorber control ECU
23 (DI-225)	Short circuit in rear absorber control actuator circuit	
31 (DI-229)	Acceleration sensor signal malfunction	●Absorber control ECU (Acceleration sensor is a built-in equipment)
34 (DI-230)	Front speed sensor signal malfunction	●Right front and right rear speed sensor ●Open or short circuit in between absorber control ECU and ABS & TRAC (& VSC) ECU ●Open or short circuit in between ABS & TRAC (& VSC) ECU and ABS speed sensor ●Error in other system that uses the same speed sensor signal ●ABS & TRAC (& VSC) ECU ●Absorber control ECU
35 (DI-230)	Rear speed sensor signal malfunction	
36 (DI-232)	Steering sensor signal malfunction	●Battery ●Steering sensor ●Open or short circuit in between absorber control ECU and steering sensor ●Absorber control ECU
41 (DI-235)	Crankshaft position sensor signal malfunction	●Open or short circuit in between absorber control ECU and ECM ●ECM ●Absorber control ECU
42 (DI-237)	Stop light switch signal does not input	●Stop light switch ●Open or short circuit in between absorber control ECU and stop light switch ●Error in other system that uses the same stop light switch ●Absorber control ECU
52 (DI-239)	Absorber control switch signal malfunction	●Absorber control switch ●Open or short circuit in between absorber control switch and absorber control ECU ●Absorber control ECU

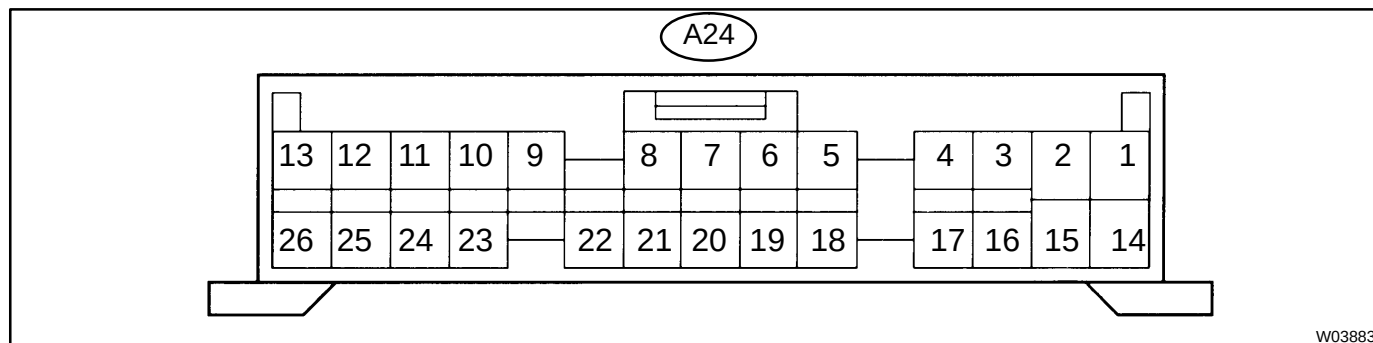
HINT:

- DTCs 36, 42, and 52 can be detected only in the input signal inspecting mode.
- All the DTCs are erased when the ignition switch is turned OFF.

PARTS LOCATION



TERMINALS OF ECU



W03883

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
GND (A24 – 1) – Body ground	W-B – Body ground	Always	Continuity
+B (A24 – 2) – Body ground	B-R – Body ground	IG switch ON	10 – 14
SW2 (A24 – 3) – Body ground	V – Body ground	IG switch ON Absorber control switch 1	8 V or more
		IG switch ON Absorber control switch 2	Below 1.5
TEM (A24 – 4) – Body ground	P – Body ground	Connect terminals TEM and E1 of DLC2 for 2 sec. after the ignition	10 – 14
RB– (A24 – 5) – Body ground	R – Body ground	Always	Continuity
RB+ (A24 – 6) – Body ground	R-Y – Body ground	Always	Continuity
RA– (A24 – 7) – Body ground	R-W – Body ground	Always	Continuity
RA+ (A24 – 8) – Body ground	L-R – Body ground	Always	Continuity
FB– (A24 – 10) – Body ground	L-B – Body ground	Always	Continuity
FB+ (A24 – 11) – Body ground	L – Body ground	Always	Continuity
FA– (A24 – 12) – Body ground	L-W – Body ground	Always	Continuity
FA+ (A24 – 13) – Body ground	L-Y – Body ground	Always	Continuity
NEO (A24 – 14) – Body ground	B-O – Body ground	Start the engine Make it run at idle	1 – 14
SS1 (A24 – 16) – Body ground	R – Body ground	IG switch ON Steering wheel is being turned slowly	1.2 – 14
SS2 (A24 – 17) – Body ground	R-G – Body ground	IG switch ON Steering wheel is being turned slowly	1.2 – 14
RRO (A24 – 18) – Body ground	GR-L – Body ground	While driving	1.5 – 14
Ts (A24 – 19) – Body ground	R-Y – Body ground	IG switch ON , Connect terminals Ts and E1 of DLC1	Below 1.5
		IG switch ON Disconnect terminals Ts and E1 of DLC1	10 – 14
FRO (A24 – 20) – Body ground	GR-R – Body ground	While driving	1.5 – 14

DIAGNOSTICS – ELECTRONIC MODULATED SUSPENSION

SW1 (A24 – 21) – Body ground	Y – Body ground	IG switch ON Absorber control switch 1	Below 1.5
		IG switch ON Absorber control switch 4	8 V or more
Tc (A24 – 22) – Body ground	LG–R – Body ground	IG switch ON Connect terminals Tc and E1 of DLC1	Below 1.5
		IG switch ON Disconnect terminals Tc and E1 of DLC1	10 – 14
STP (A24 – 26) – Body ground	G–W – Body ground	IG switch ON Brake pedal is released	10 – 14
		IG switch ON Brake pedal is depressed	Below 1.5

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Inspection Circuit	See page
Damping force control does not operate at all	1. Absorber control actuator circuit 2. Ts terminal circuit 3. Shock absorber 4. Absorber control ECU	DI-225 DI-249 SA-24 SA-49 –
Only anti-roll control does not operate	1. Steering sensor circuit 2. Speed sensor circuit 3. Absorber control ECU	DI-232 DI-230 –
Only anti-squat control does not operate	1. Crankshaft position sensor circuit 2. Speed sensor circuit 3. Absorber control ECU	DI-235 DI-230 –
Only anti-dive control does not operate	1. Stop light switch circuit 2. Speed sensor circuit 3. Absorber control ECU	DI-237 DI-230 –
Only semi-active control does not operate	1. Speed sensor circuit 2. Absorber control ECU (Deceleration sensor is a built-in equipment)	DI-230 –
Only speed sensing control does not operate	1. Speed sensor circuit 2. Absorber control ECU	DI-230 –
Only unsprung damping control does not operate	1. Speed sensor circuit 2. Absorber control ECU	DI-230 –

CIRCUIT INSPECTION

DTC	21, 23	Absorber Control Actuator Circuit

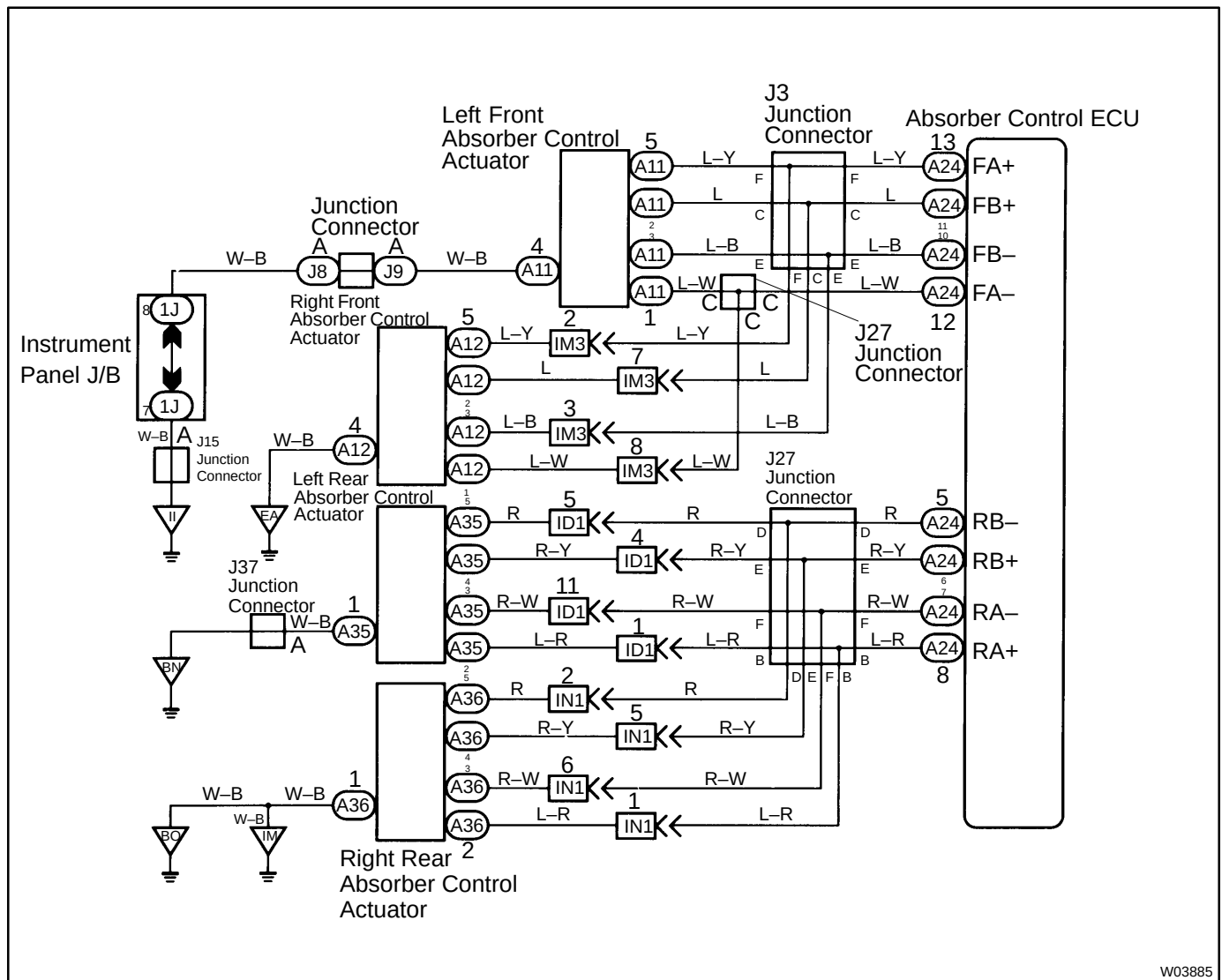
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
*121, *223	When the absorber control actuator is activated, over current flows through the front or rear driving circuit.	•Left front, right front, left rear and right rear absorber control actuator •Short circuit in between absorber control actuator and absorber control ECU •Absorber control ECU

*1: Code 21 corresponds to the left front and right front absorber control actuator circuit.

*2: Code 23 corresponds to the left rear and right rear absorber control actuator circuit.

WIRING DIAGRAM



W03885

INSPECTION PROCEDURE

1	Check operation of absorber control actuator.

CHECK:

Using the same method as used for the clamping force control, check that clamping force of the absorber control actuator changes.

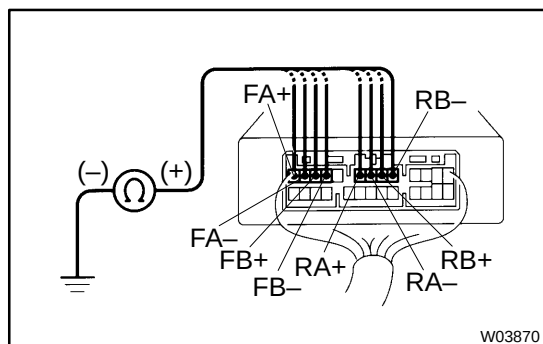
OK:

Bounce the vehicle and check that the shock absorber is becoming harder.

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI-224).

NG

2	Check continuity between terminals RB–, RB+, RA–, RA+, FB–, FB+, FA– and FA+ of absorber control ECU connector and body ground.

**PREPARATION:**

Remove the No.1 lower panel (See page [BO-82](#)).

CHECK:

Check the continuity between terminals RB–, RB+, RA–, RA+, FB–, FB+, FA–, and FA+ of the absorber control ECU connector and the body ground.

OK:

Continuity

NG	Check and replace absorber control ECU

OK

3

Check absorber control actuator.

FRONT ABSORBER CONTROL ACTUATOR

PREPARATION:

- Remove the shock absorber cap (See page [SA-25](#)).
- Remove the absorber control actuator connector.

CHECK:

Measure the resistance between each terminal of the front absorber control actuator.

OK:

Front absorber control actuator:

Terminal A11 or A12 – 1 and A11 or A12 – 2	13.4 – 15.0 Ω
Terminal A11 or A12 – 1 and A11 or A12 – 3	13.4 – 15.0 Ω
Terminal A11 or A12 – 1 and A11 or A12 – 4	13.4 – 15.0 Ω
Terminal A11 or A12 – 1 and A11 or A12 – 5	13.4 – 15.0 Ω

REAR ABSORBER CONTROL ACTUATOR

PREPARATION:

- Remove the rear seat cushion, rear seat back, roof side inner garnish, high mounted stop light and seat belt.
- Remove the absorber control actuator connector (See page [SA-50](#)).

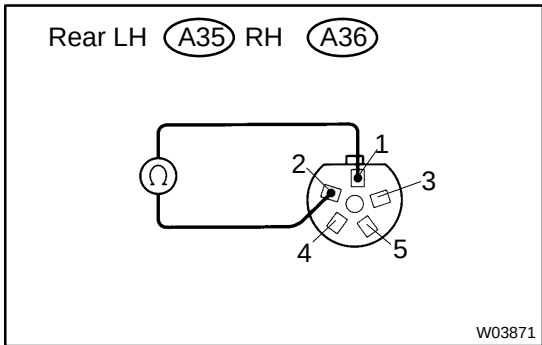
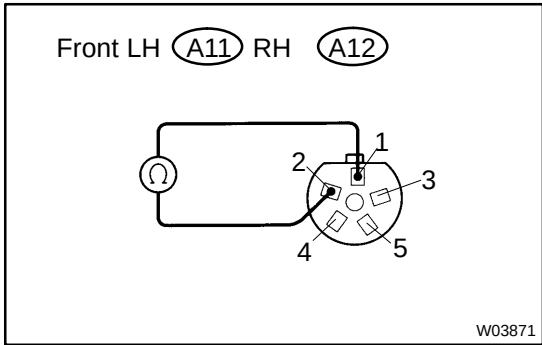
CHECK:

Measure the resistance between each terminal of the rear absorber control actuator.

OK:

Rear absorber control actuator:

Terminal A35 or A36 – 1 and A35 or A36 – 2	13.4 – 15.0 Ω
Terminal A35 or A36 – 1 and A35 or A36 – 3	13.4 – 15.0 Ω
Terminal A35 or A36 – 1 and A35 or A36 – 4	13.4 – 15.0 Ω
Terminal A35 or A36 – 1 and A35 or A36 – 5	13.4 – 15.0 Ω



NG

Replace absorber control actuator.

OK

4	Check harness and connectors between absorber control ECU and absorber control actuator, absorber control actuator and body ground (See page IN-31).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on
problem symptoms table
(See page [DI-224](#)).*

*: When DTC 21 or 23 is displayed, check and replace the absorber control ECU.

DTC	31	Acceleration Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
31	Acceleration sensor signal malfunction.	•Absorber control ECU (Acceleration sensor is a built-in equipment)

INSPECTION PROCEDURE

As the acceleration sensor is a built-in equipment for the absorber control ECU, replace them as a unit.

DTC	34, 35	Speed Sensor Circuit

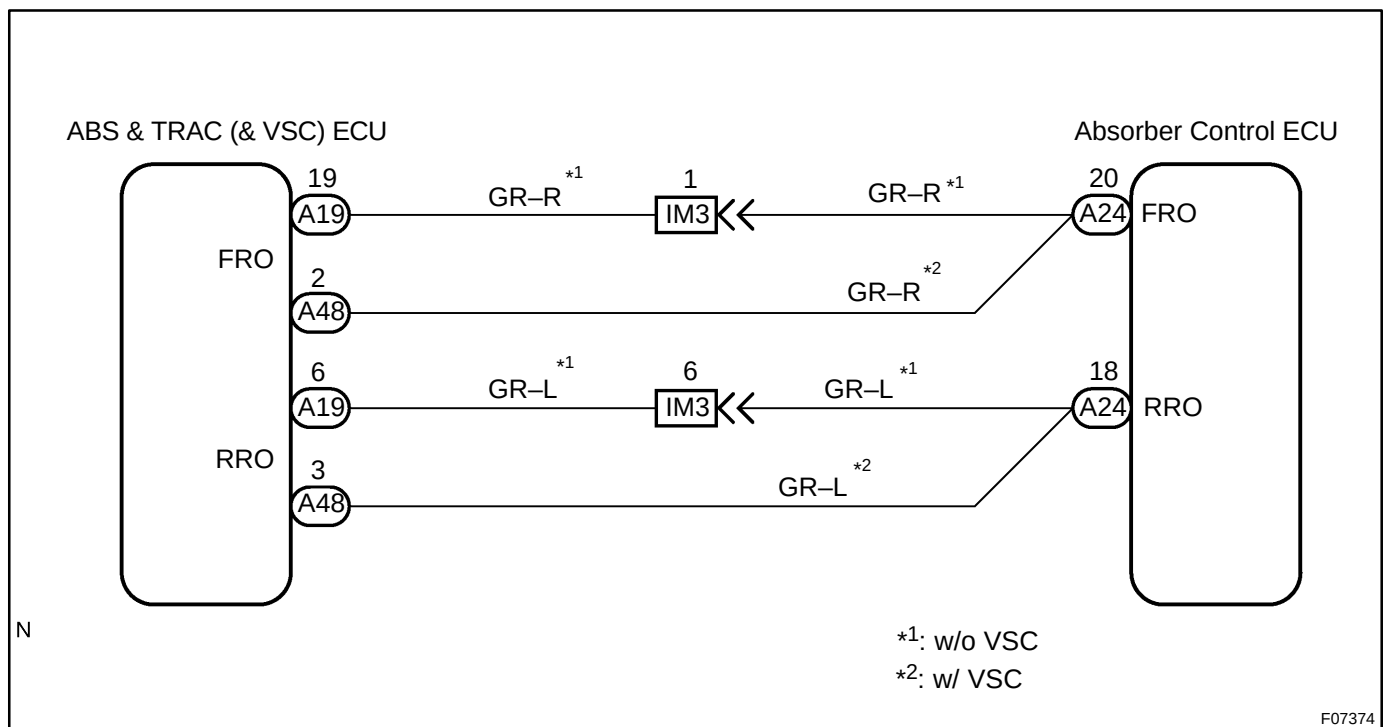
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
34* ¹ , 35* ²	When vehicle speed is less than 20 km/h (12 mph), or any signal is not input at all.	●Right front and right rear speed sensor ●Open or short circuit in between absorber control ECU and ABS & TRAC (& VSC) ECU ●Open or short circuit in between ABS & TRAC (& VSC) ECU and ABS speed sensor ●Error in other system that uses the same speed sensor signal ●ABS & TRAC (& VSC) ECU ●Absorber control ECU

*1: Code 34 corresponds to the right front speed sensor circuit.

*2: Code 35 corresponds to the right rear speed sensor circuit.

WIRING DIAGRAM

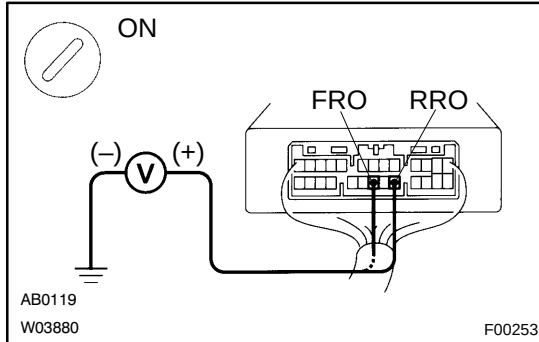


INSPECTION PROCEDURE

HINT:

- When DTC 34 is displayed, check the right front speed sensor circuit.
- When DTC 35 is displayed, check the right rear speed sensor circuit.

1 Check voltage between terminals RRO and FRO of absorber control ECU connector and body ground.



PREPARATION:

- Remove the No.1 lower panel (See page [BO-82](#)).
- Start the engine.

CHECK:

Measure the voltage between terminals RRO and FRO of the absorber control ECU connector and the body ground while driving.

OK:

Voltage: 1.5 – 8 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

2 Check speed sensor (See page [DI-253](#) or [DI-368](#)).

NG

Repair or replace harness, connector, speed sensor or rotor.

OK

3 Check harness and connectors between absorber control ECU and ABS & TRAC (& VSC) ECU (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

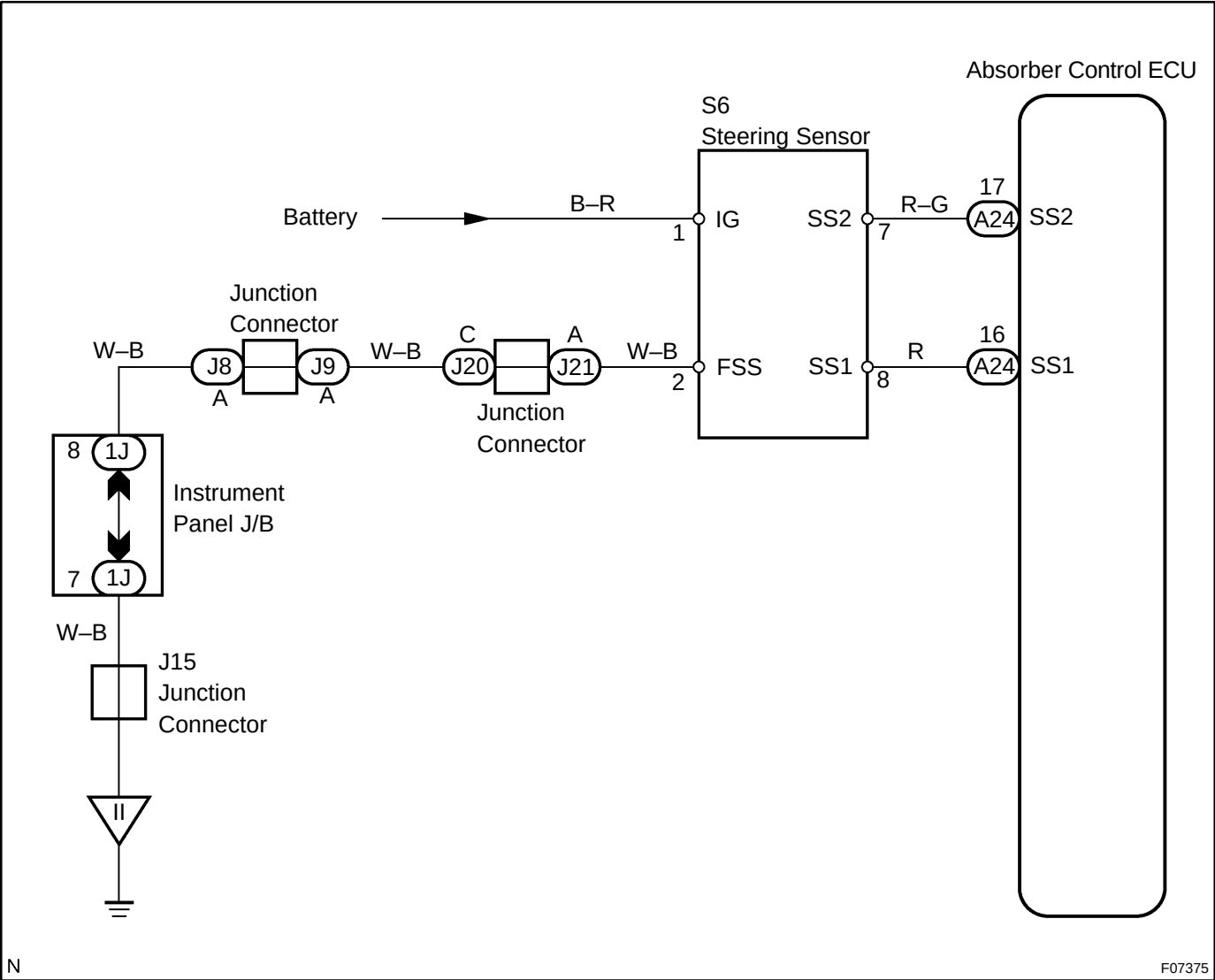
Check and replace absorber control ECU or ABS & TRAC (& VSC) ECU.

DTC	36	Steering Sensor Circuit

CIRCUIT DESCRIPTION

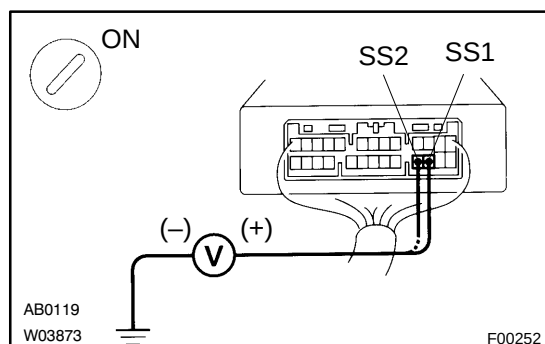
DTC No.	DTC Detecting Condition	Trouble Area
36	When steering angle is less than 36°, or any signal is not input at all.	●Battery ●Steering sensor ●Open or short circuit in between absorber control ECU and steering sensor ●Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals SS1 and SS2 of absorber control ECU connector and body ground.

**PREPARATION:**

- Remove the No.1 lower panel (See page [BO-82](#)).
- Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals SS1 and SS2 of the absorber control ECU connector and the body ground when the steering wheel is turned slowly.

OK:

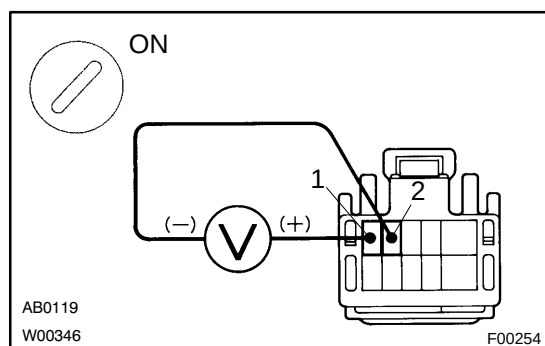
Changes between 1 V and approx. 3.5 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

2	Check voltage between terminals 1 and 2 of steering sensor connector.

**PREPARATION:**

- Remove the steering wheel lower No.2 and No.3 covers, steering wheel pad, steering wheel column upper and lower covers (See page [SR-11](#)).
- Disconnect the steering sensor connector.
- Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals 1 and 2 of the steering sensor connector.

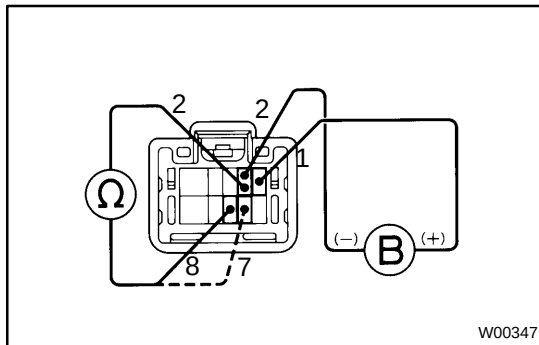
OK:

Voltage: 10 – 14 V

NG

Check and repair harness and connectors between battery and steering sensor.

OK

3 Check steering sensor.**PREPARATION:**

Apply battery positive voltage in between terminals 1 and 2.

CHECK:

Measure the resistance between terminal 2 and terminals 7 and 8 of the steering sensor connector when the rotating part of the steering sensor is turned slowly.

OK:

Changes between 0 Ω and $\infty \Omega$

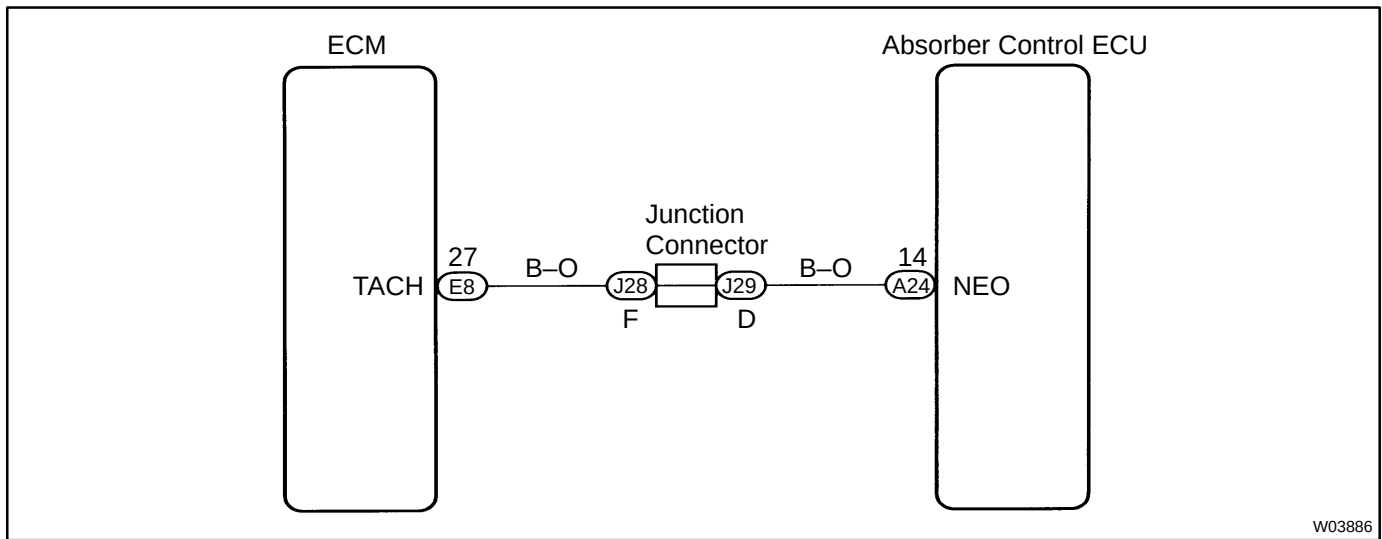
NG**Replace steering sensor.****OK****4 Check harness and connectors between absorber control ECU and steering sensor (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK****Check and replace absorber control ECU.**

DTC	41	Crankshaft Position Sensor Circuit

CIRCUIT DESCRIPTION

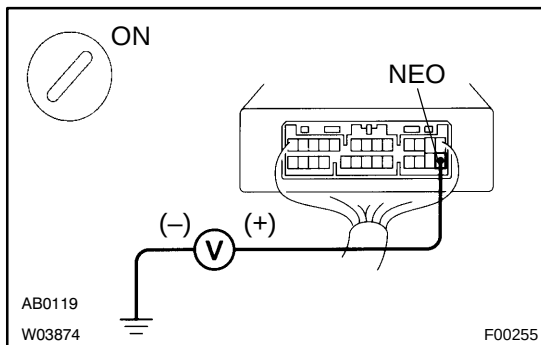
DTC No.	DTC Detecting Condition	Trouble Area
41	When engine speed is less than 2,000 rpm, or any signal is not input at all.	•Open or short circuit in between absorber control ECU and ECM •ECM •Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal NEO of absorber control ECU connector and body ground.



PREPARATION:

- Remove the No. 1 lower panel (See page [BO-82](#)).
- Start the engine, make it run at idle.

CHECK:

Measure the voltage between terminal NEO of the absorber control ECU connector and the body ground.

OK:

Voltage: 1 – 8 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

2	Check crankshaft position sensor (See page DI-67).

OK

Go to step 4.

NG

3	Check harness and connectors between absorber control ECU and ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace absorber control ECU.

4	Does malfunction disappear when a well-known good absorber control ECU is installed?

YES

Check and replace absorber control ECU.

NO

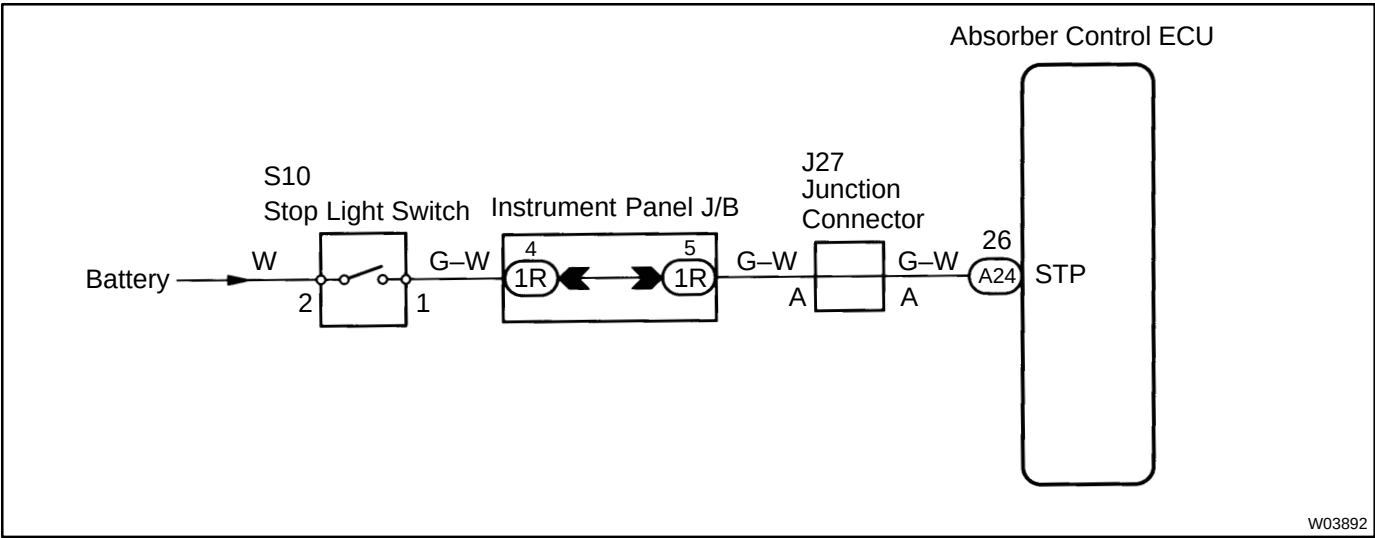
Check and replace ECM.

DTC	42	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
42	Stop light switch signal does not change.	•Stop light switch •Open or short circuit in between absorber control ECU and stop light switch •Error in other system that uses the same stop light switch •Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of stop light.

CHECK:

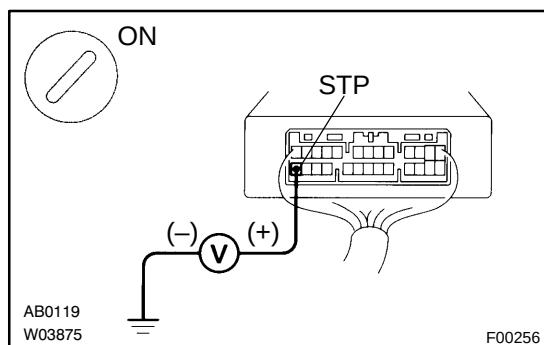
Check that the stop light comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

NG

Check stop light circuit (See page [BE-58](#)).

OK

2 Check voltage between terminal STP of absorber control ECU connector and body ground.



PREPARATION:

- (a) Remove the No. 1 lower panel (See page [BO-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal STP of the absorber control ECU connector and the body ground when the brake pedal is released and depressed.

OK:

Released	10 – 14 V
Depressed	Below 1.5 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

3 Check harness and connectors between absorber control ECU and stop light switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

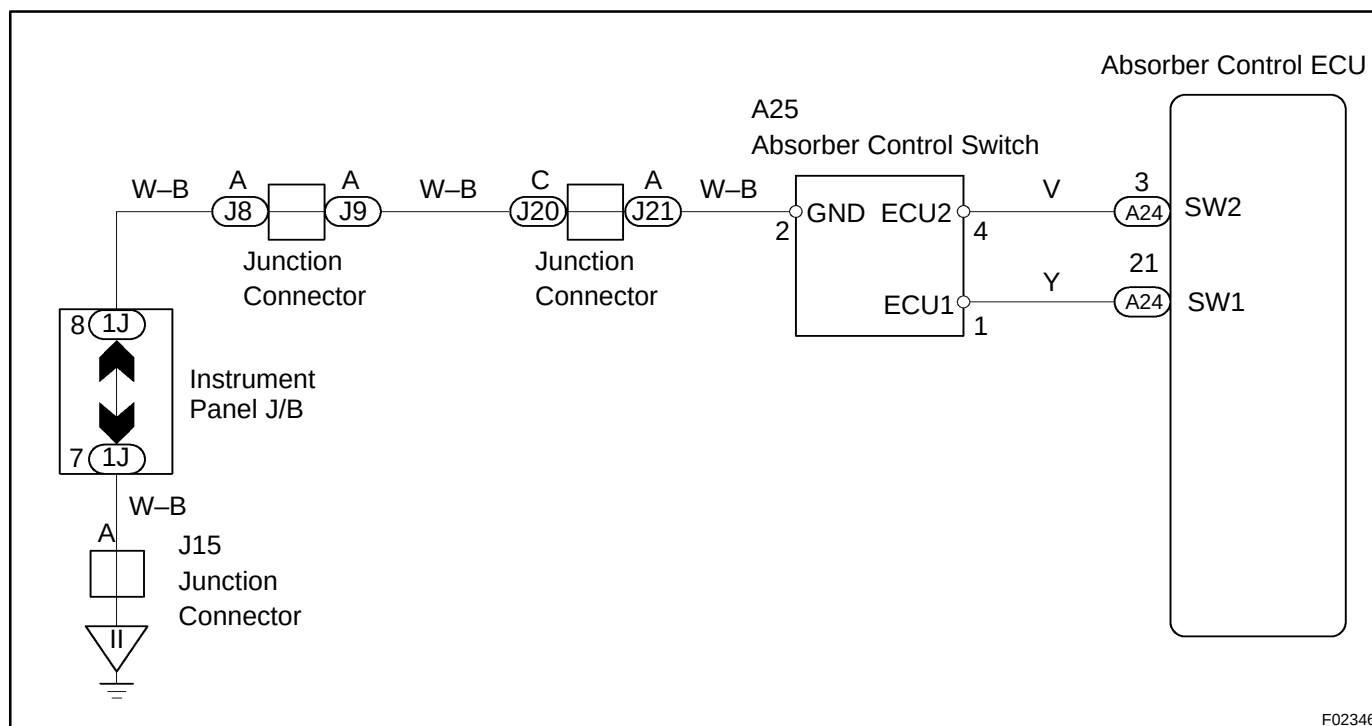
Check and replace absorber control ECU.

DTC	52	Absorber Control Switch Circuit

CIRCUIT DESCRIPTION

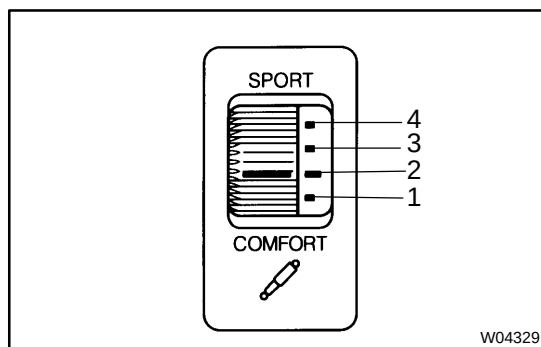
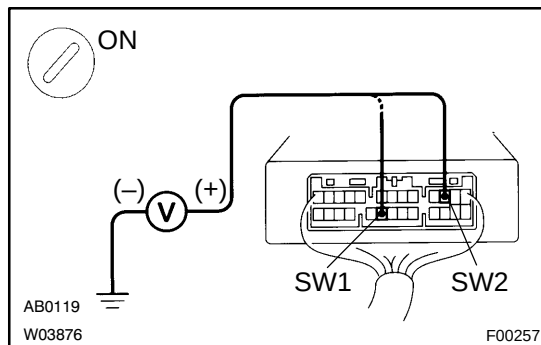
DTC No.	DTC Detecting Condition	Trouble Area
52	SW1 and SW2 of absorber control switch signals do not change.	●Absorber control switch ●Open or short circuit in between absorber control switch and absorber control ECU ●Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of stop light.

**PREPARATION:**

- Remove the No. 1 lower panel (See page [BO-82](#)).
- Using SST, connect terminals Ts and E1 of the DLC1.
SST 09843-18020
- Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals SW1 and SW2 of the absorber control ECU connector and the body ground when move slowly moving the absorber control switch "COMFORT" ↔ "SPORT" both ways one.

OK:**SW1:**

Absorber control switch 4	8 V or more
Absorber control switch 1	Below 1.5 V

SW2:

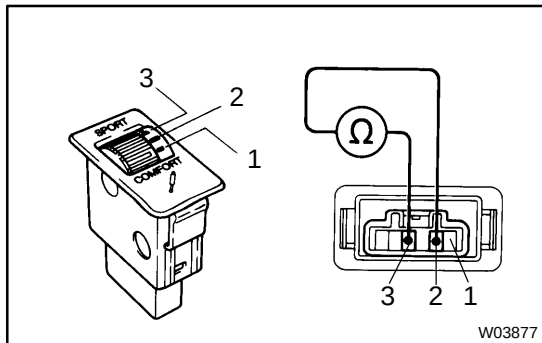
Absorber control switch 1	8 V or more
Absorber control switch 2	Below 1.5 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

2 Check absorber control switch.



PREPARATION:

- (a) Remove the upper control panel (See page [BO-82](#)).
- (b) Disconnect the absorber control switch connector.

CHECK:

Check the continuity between each terminal of the absorber control switch at each switch position.

OK:

Absorber control switch 3:

Terminals 2 and 3	Continuity

Absorber control switch 2:

Terminals 1 and 2	Continuity
Terminals 2 and 3	Continuity

Absorber control switch 1:

Terminals 1 and 2	Continuity

NG

Replace absorber control switch.

OK

3 Check harness and connectors between absorber control ECU and absorber control switch and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

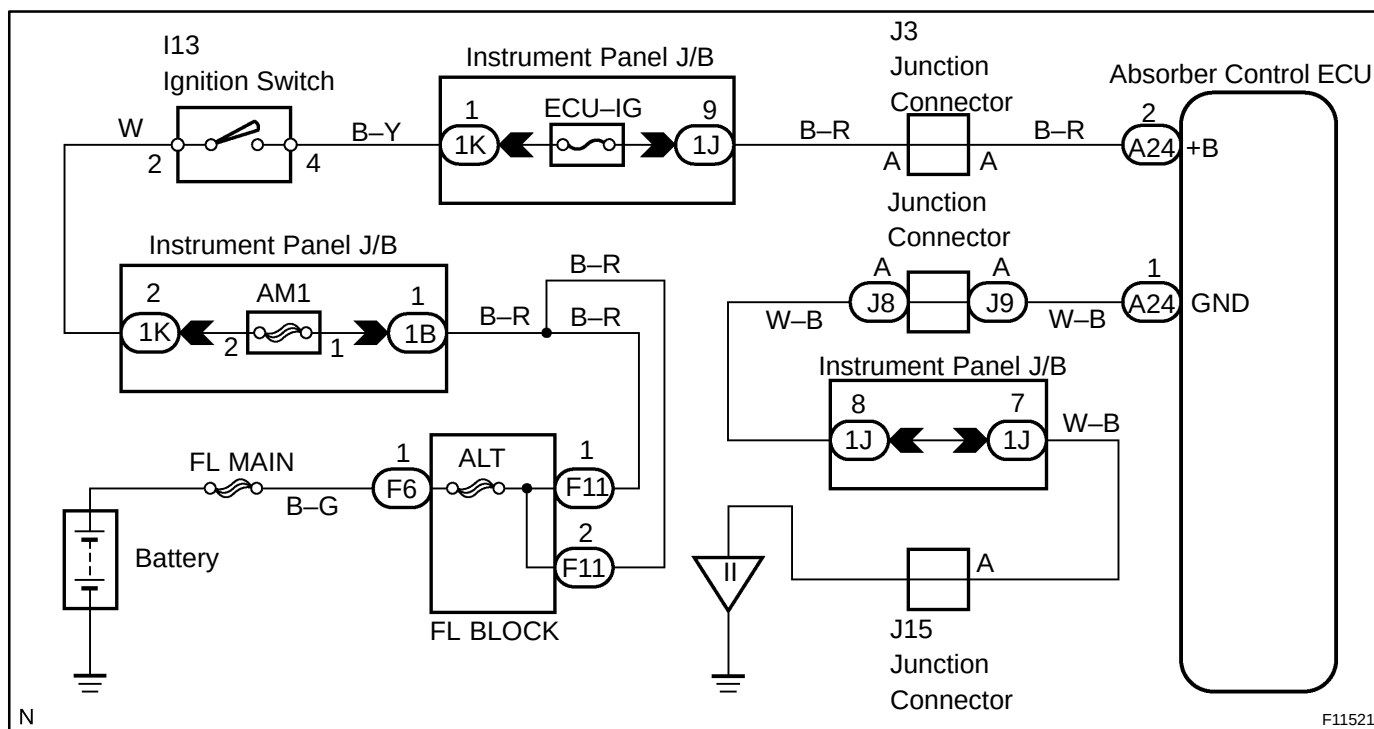
Check and replace absorber control ECU.

Power Source Circuit

CIRCUIT DESCRIPTION

This is the power source for the absorber control ECU, and the absorber control actuator.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check battery positive voltage.

OK:

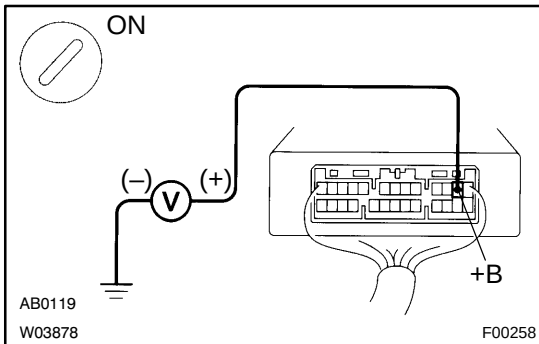
Voltage: 10 – 14 V

NG

Charge or replace battery.

OK

2 Check voltage between terminal +B of absorber control ECU connector and body ground.



PREPARATION:

- (a) Remove the No.1 lower panel (See page [BO-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal +B of the absorber control ECU and the body ground.

OK:

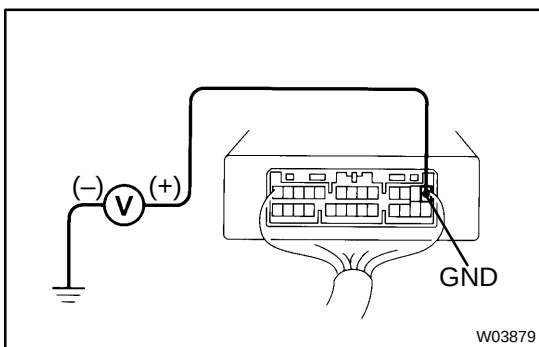
Voltage: 10 – 14 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

3 Check continuity between terminal GND of absorber control ECU connector and body ground.



CHECK:

Measure the continuity between terminal GND of the absorber control ECU connector and the body ground.

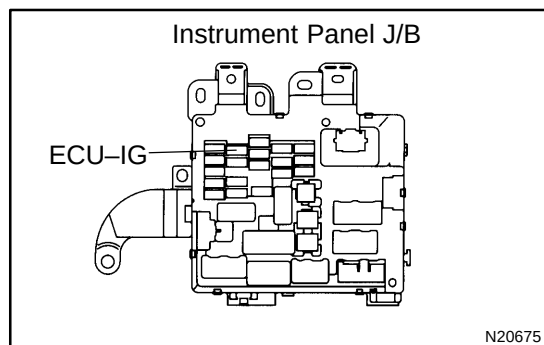
OK:

Continuity

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

4 Check ECU-IG fuse.**PREPARATION:**

Remove the ECU-IG fuse from the instrument panel J/B.

CHECK:

Check the continuity of the ECU-IG fuse.

OK:

Continuity

NG

Check for short in all harness and components connected to ECU-IG fuse (See attached wiring diagram).

OK

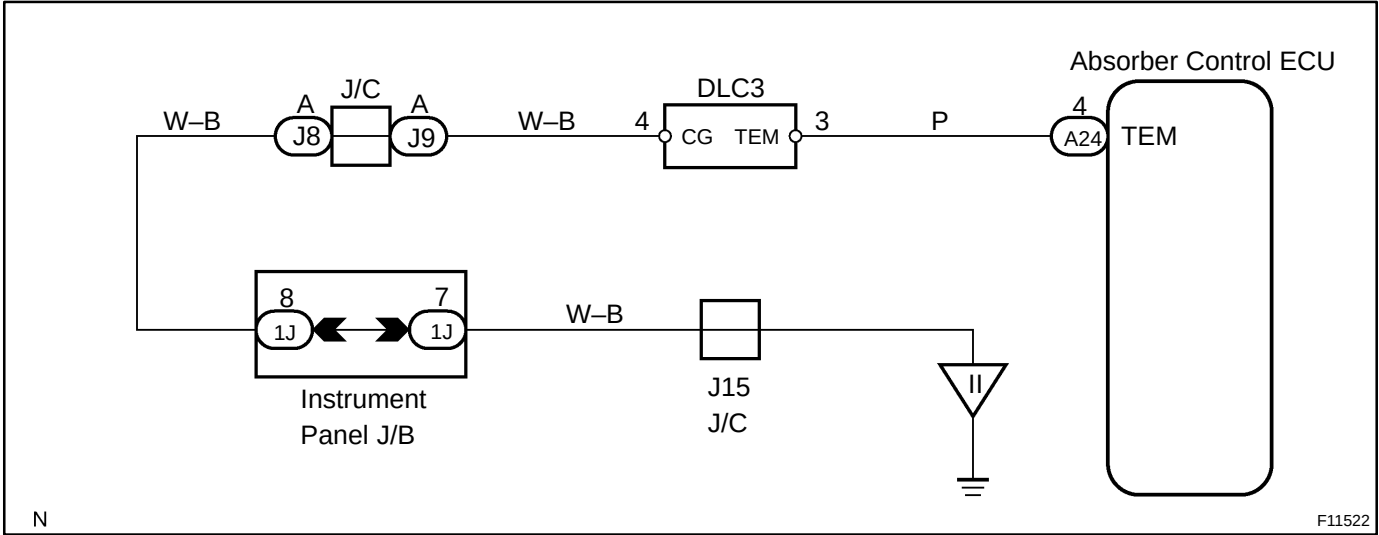
Check for open in harness and connector between absorber control ECU and battery (See page [IN-31](#)).

TEM Terminal Circuit

CIRCUIT DESCRIPTION

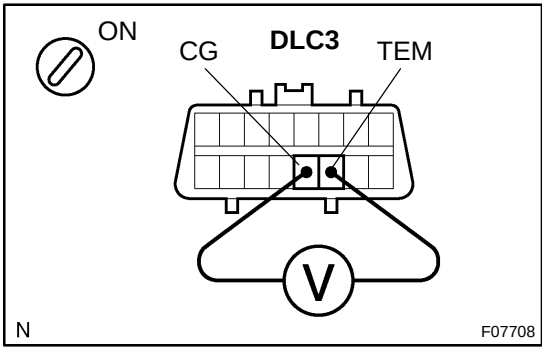
By connecting the LED between terminals TEM and CG of the DLC3, a TEM output check can be performed (See page [DI-215](#)).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TEM and CG of DLC3.



CHECK:
Measure the voltage between terminals TEM and CG of the DLC3 for 2 seconds after the ignition switch is ON.

OK:
Voltage: 10 – 14 V

OK Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

2	Check for open in harness and connectors between terminals CG of DLC3 and body ground (See page IN-31).

OK

NG

Repair or replace harness or connector.

3

Check harness and connectors between absorber control ECU and DLC3
(See page [IN-31](#)).

OK

NG

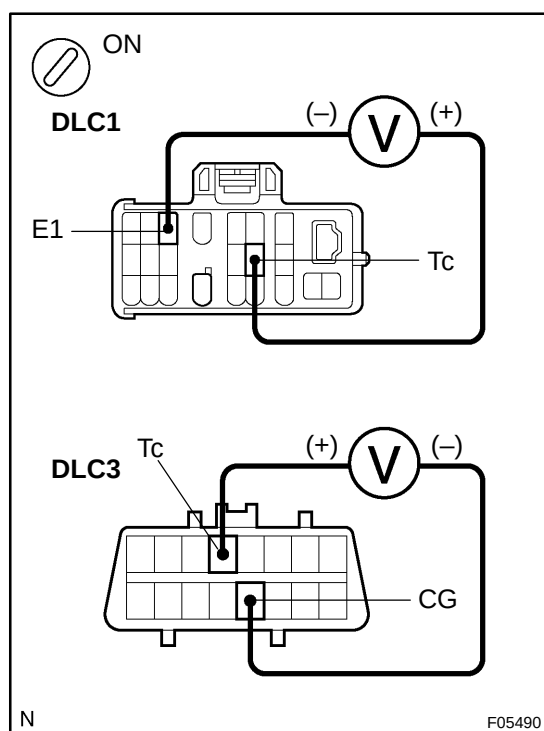
Repair or replace harness or connector.

Check replace absorber control ECU.

CIRCUIT DESCRIPTION

By connecting terminal Tc and E1 of the DLC1 or DLC3, the DTC check mode can be performed.

1	Check voltage between terminals Tc and E1 of DLC1 or TC and CG of DLC3.



Voltage: 10 – 14 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-224).

NG

2	Check for open in harness and connectors between terminals E1 of DLC1, DLC3 and body ground (See page IN-31).

NG

Repair or replace harness or connector.

OK

3	Check harness and connectors between absorber control ECU and DLC1 absorber control ECU and DLC3 (See page IN-31).

NG

Repair or replace harness or connector.

OK

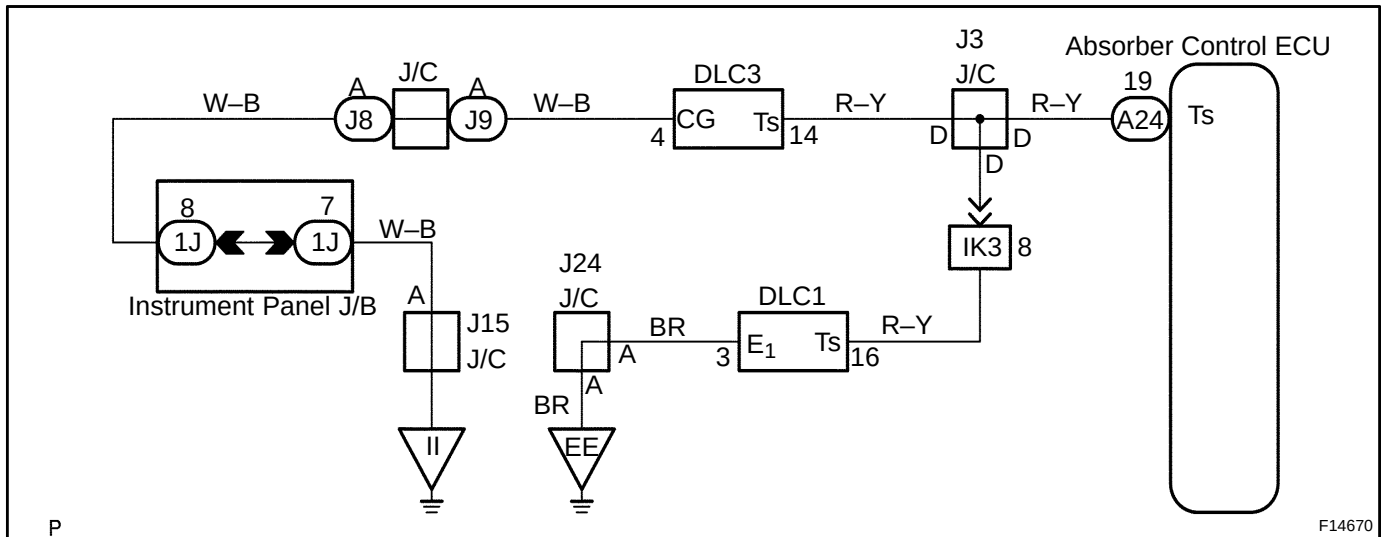
Check and replace absorber control ECU.

Ts Terminal Circuit

CIRCUIT DESCRIPTION

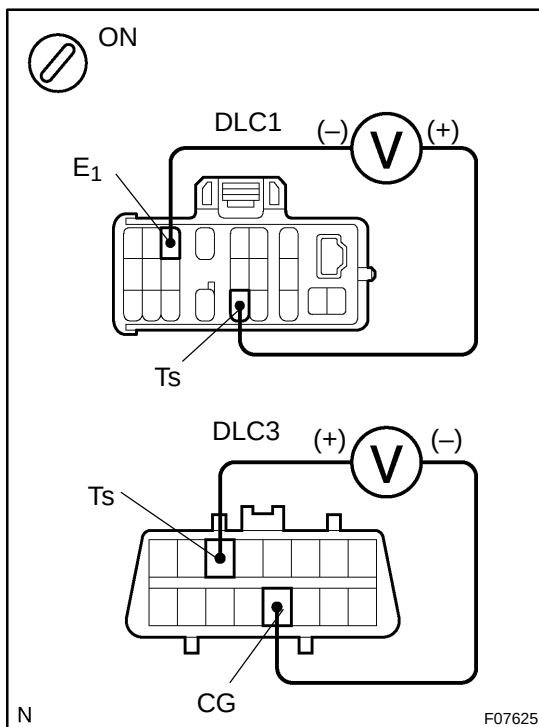
By connecting terminals Ts and E1 of the DLC1 or DLC3, an input signal check can be performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals Ts and E₁ of DLC1 or Ts and CG of DLC3.



CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals Ts and E₁ of the DLC1, or terminals Ts and CG of the DLC3.

OK:

Voltage: 10 – 14 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-224](#)).

NG

2

Check for open and short circuit in harness and connector between absorber control ECU and DLC1 or DLC3, DLC1 or DLC3 and body ground
(See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

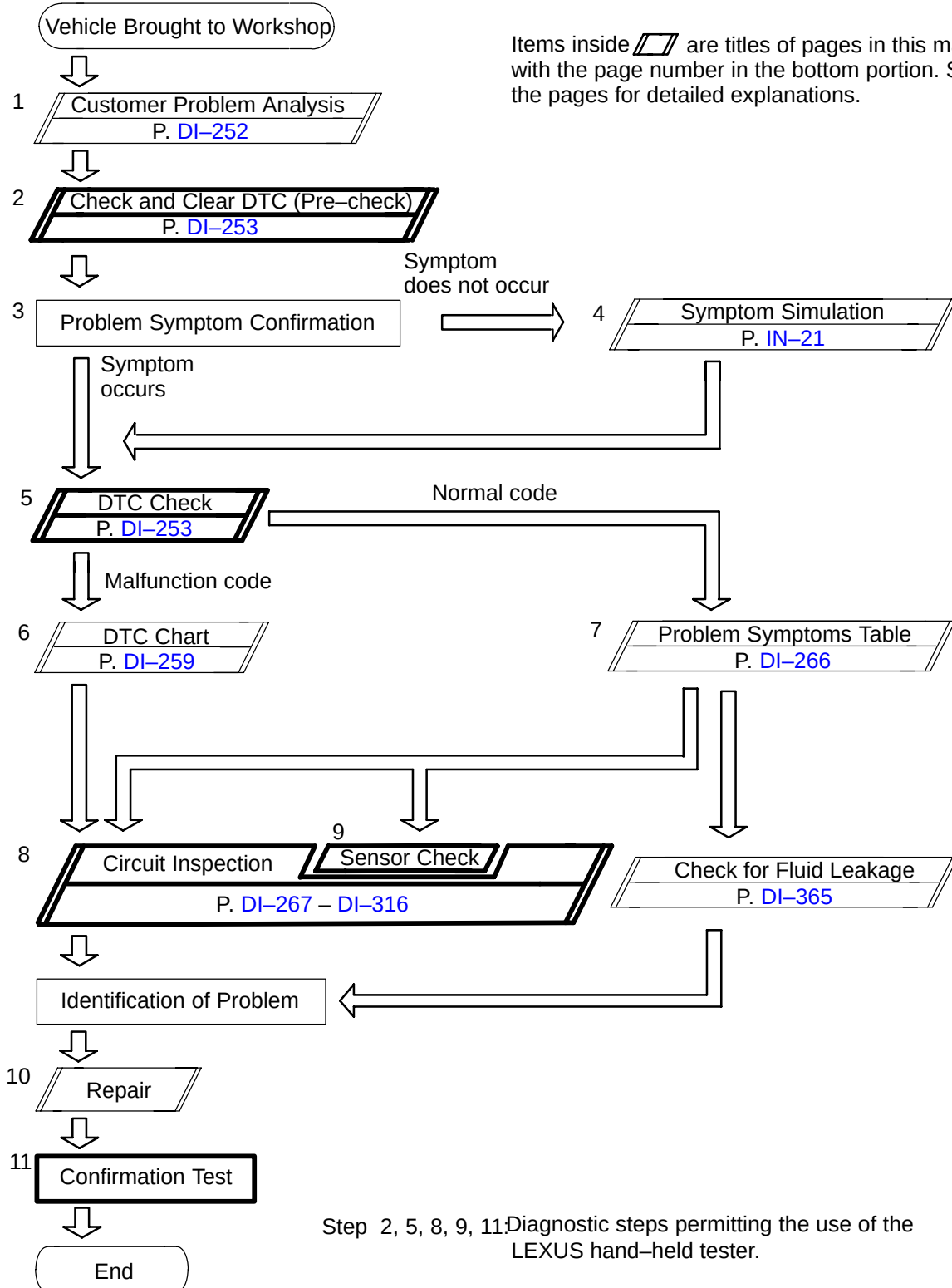
Check and replace absorber control ECU.

ANTI-LOCK BRAKE SYSTEM (Include w/ VSC)

HOW TO PROCEED WITH TROUBLESHOOTING

DI0W3-10

Troubleshoot in accordance with the procedure on the following pages.



CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

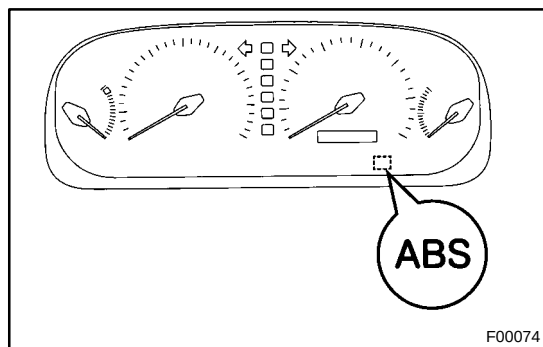
Inspector's :
Name _____

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

Date Problem First Occurred	/ /
Frequency the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains on ☐ Does not light up

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



PRE-CHECK

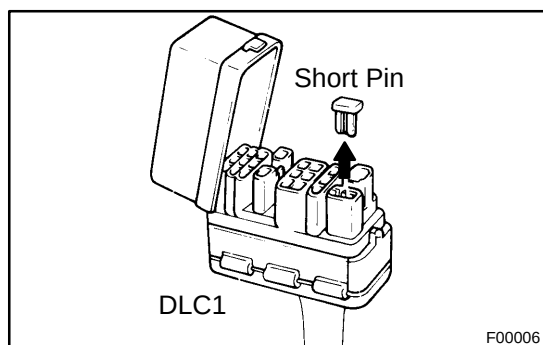
1. DIAGNOSIS SYSTEM

(a) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light comes on for 3 seconds.

HINT:

If the indicator check result is not normal, proceed to the troubleshooting for the ABS warning light circuit (See page [DI-309](#)).



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

(1) Disconnect the short pin from the DLC1.

(2) Using SST, connect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3.

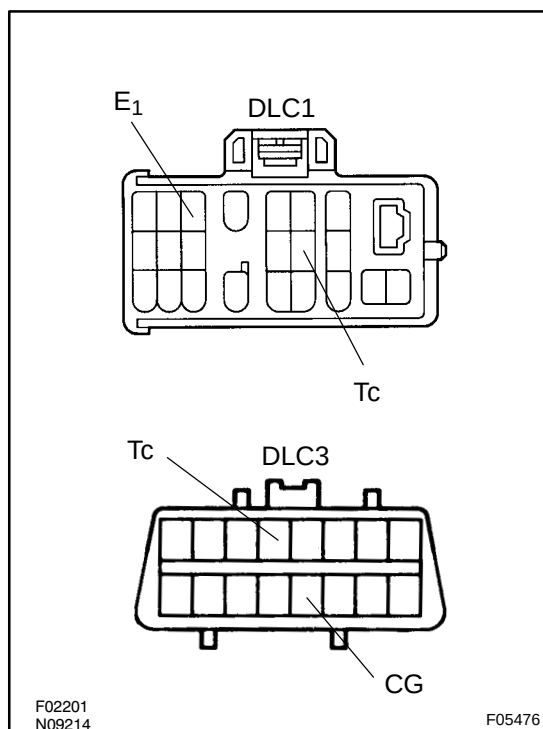
SST 09843-18020 or 09843-18040

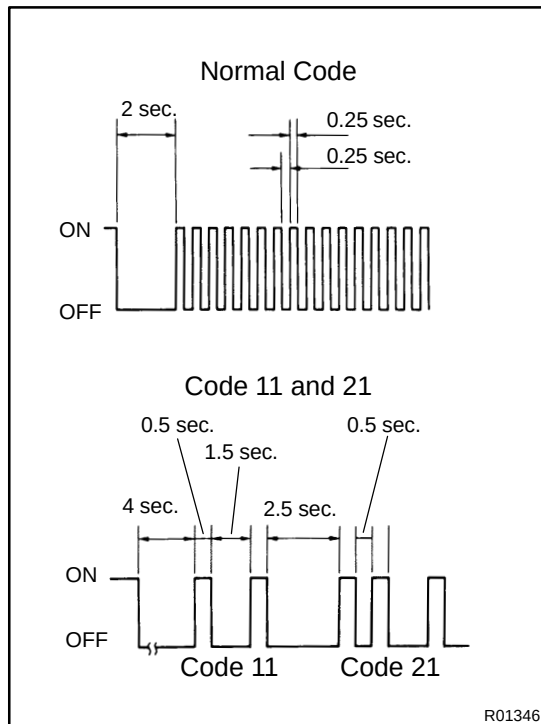
(3) Turn the ignition switch ON.

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

HINT:

- If no code appears, inspect the diagnostic circuit or ABS warning light circuit (See page [DI-314](#) or [DI-309](#)).

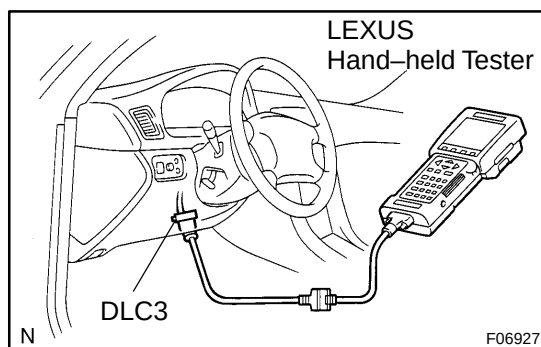




- As an example, the blinking patterns for the normal code and codes 11 and 21 are shown in the illustration.

- (5) Codes are explained in the code table on page [DI-259](#).
- (6) After completing the check, disconnect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3, and turn off the display.

If 2 or more malfunctions are indicated simultaneously the lowest numbered DTC will be displayed first.

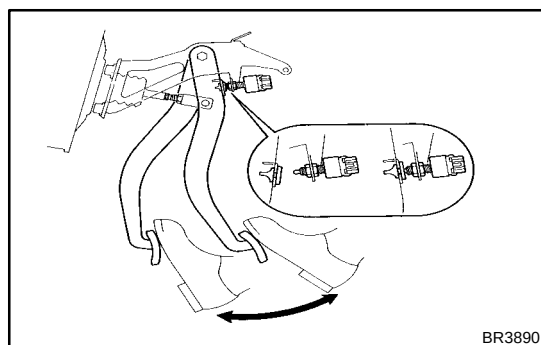


- (c) In case of using LEXUS hand-held tester:
Check the DTC.

- (1) Connect the LEXUS 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 LEXUS hand-held tester operator's manual for further details.



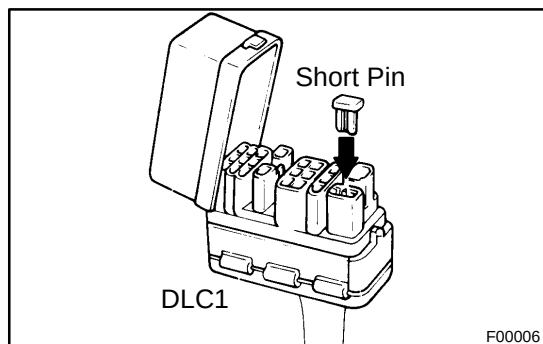
- (d) In case of not using LEXUS hand-held tester:
Clear the DTC.

- (1) Using SST, connect terminals Tc and E₁ of the DLC1 or terminals Tc and CG of the DLC3, and remove the short pin from the DLC1.

SST 09843-18020 or 09843-18040

- (2) Turn the ignition switch ON.
- (3) Clear the DTC stored in the ECU by depressing the brake pedal 8 or more times within 5 seconds.
- (4) Check that the warning light shows the normal code.
- (5) Remove the SST from the DLC1 or the DLC3.

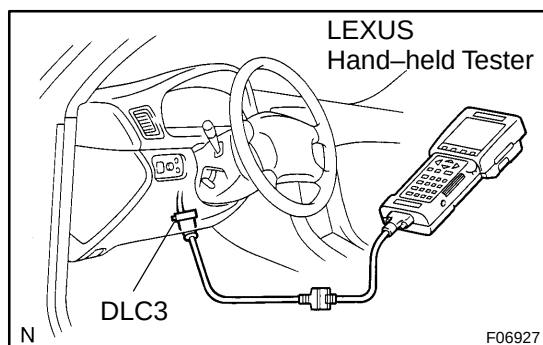
SST 09843-18020 or 09843-18040



- (6) Connect the short pin to the DLC1.

HINT:

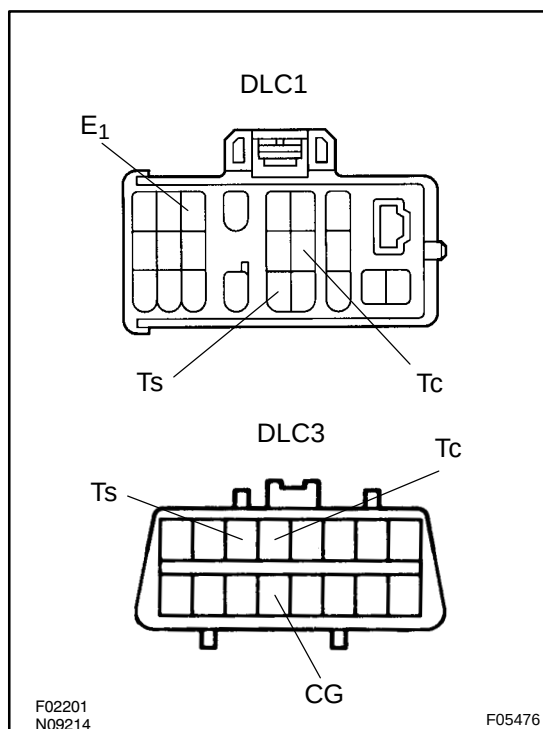
The DTC stored in the ECU will be not erased when the battery terminal is disconnected for the troubleshooting.



- (e) In case of using LEXUS hand-held tester:
Clear the DTC.

- (1) Connect the LEXUS hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Operate the LEXUS hand-held tester to erase the codes.

(See the LEXUS hand-held tester operator's manual.)



2. Test Mode:

SENSOR SIGNAL CHECK

HINT:

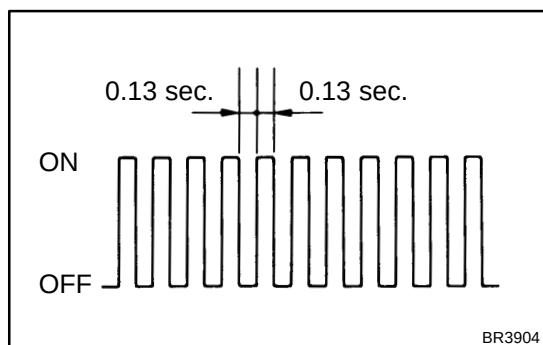
If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.

- (a) In case of not using LEXUS hand-held tester:
Check the sensor signal.

- (1) Turn the ignition switch OFF.
- (2) Using SST, connect terminals Ts and E₁ of the DLC1 or terminals Ts and CG of the DLC3.

SST 09843-18020 or 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-309](#), [DI-316](#)).

- (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 brake pedal in free condition for 1 sec. or more, continue to depress the brake 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 the 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.

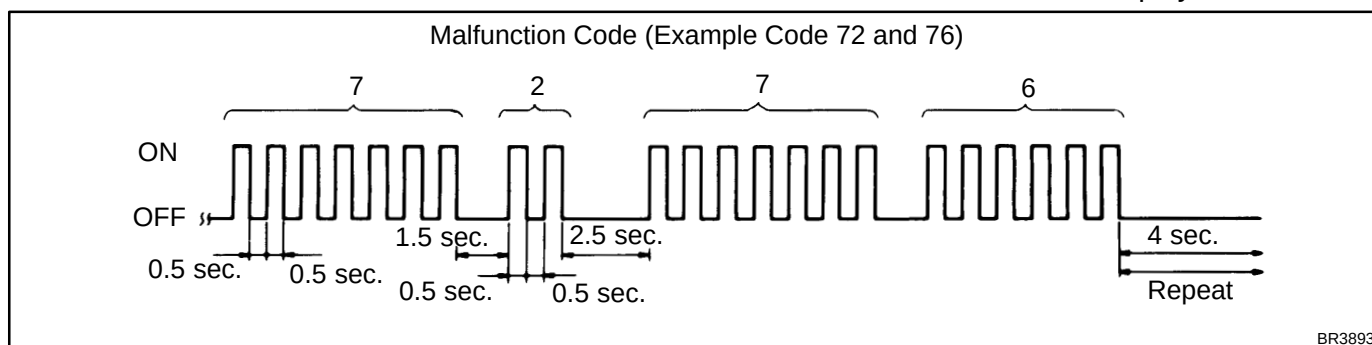
HINT:

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

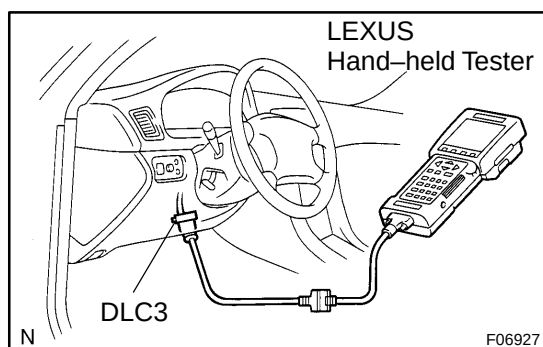
- (9) Stop the vehicle.
- (10) Using SST, connect terminals Tc and E₁ of the DLC1 or terminals Tc and CG of the DLC3.
SST 09843-18020 or 09843-18040
- (11) Read the number of blinks of the ABS warning light.

HINT:

- See the DTC list shown in the bottom of this page.
- If every sensor is normal, a normal code is output (A cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated).
- If 2 or more malfunctions are indicated simultaneously, the lowest numbered code will be displayed first.



- (12) After doing the check, disconnect the SST from terminals Ts and E₁, Tc and E₁ of the DLC1 or terminals Ts and CG, Tc and CG of the DLC3, and turn the ignition switch OFF.
SST 09843-18020 or 09843-18040



- (b) In case of using LEXUS hand-held tester:
Check the sensor signal.
- (1) Connect the LEXUS 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 LEXUS hand-held tester operator's manual for further details.

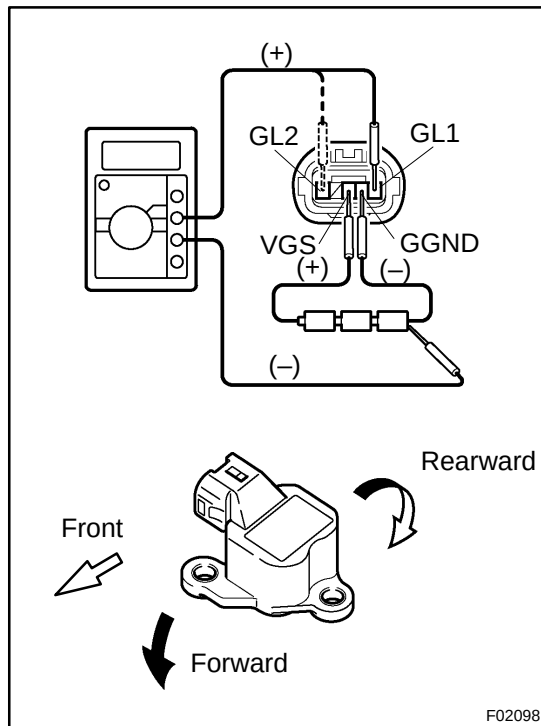
DTC of sensor check function:

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

*: w/ VSC only

3. w/ VSC:**DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM****CAUTION:**

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



4. w/ VSC:

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 09843-18020 or 09843-18040, connect terminals Tc and E₁ of the DLC1 or terminals Tc and CG of the DLC3, and remove the short pin.
- If no abnormality is found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed by code. For details of each code, refer to the "See page" under respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
C0278 / 11 (DI-281)	Open or short circuit of ABS solenoid relay circuit	●ABS solenoid relay ●ABS solenoid relay circuit
C0279 / 12 (DI-281)	B+ short circuit of ABS solenoid relay circuit	
C0273 / 13*1 (DI-277)	Open or short circuit of ABS motor relay circuit	●ABS motor relay ●ABS motor relay circuit
C0274 / 14 (DI-277)	B+ short circuit of ABS motor relay circuit	●ABS motor relay ●ABS motor relay circuit
C0226 / 21 (DI-273)	Open or short circuit of ABS (& BA & TRAC & VSC) actuator solenoid circuit (SFR circuit)	●ABS (& BA & TRAC & VSC) actuator ●SFR or SFRH circuit
C0236 / 22 (DI-273)	Open or short circuit of ABS (& BA & TRAC & VSC) actuator solenoid circuit (SFL circuit)	●ABS (& BA & TRAC & VSC) actuator ●SFL or SFLH circuit
C0246 / 23 (DI-273)	Open or short circuit of ABS (& BA & TRAC & VSC) actuator solenoid circuit (SRR circuit)	●ABS (& BA & TRAC & VSC) actuator ●SRR or SRRH circuit
C0256 / 24 (DI-273)	Open or short circuit of ABS (& BA & TRAC & VSC) actuator solenoid circuit (SRL circuit)	●ABS (& BA & TRAC & VSC) actuator ●SRL or SRLH circuit
C1225 / 25*3 (DI-287)	Open or short circuit of ABS & BA & TRAC & VSC actuator solenoid circuit (SMC1 or SMC2 circuit)	●ABS & BA & TRAC & VSC actuator ●SMC1 or SMC2 circuit
C1226 / 26*3 (DI-287)	Open or short circuit of ABS & BA & TRAC & VSC actuator solenoid circuit (SMV1 or SMV2 circuit)	●ABS & BA & TRAC & VSC actuator ●SMV1 or SMV2 circuit
C1227 / 27*3 (DI-287)	Open or short circuit of ABS & BA & TRAC & VSC actuator solenoid circuit (SRC1 or SRC2 circuit)	●ABS & BA & TRAC & VSC actuator ●SRC1 or SRC2 circuit
C0200 / 31*1 (DI-267)	Right front wheel speed sensor signal malfunction	●Right front, left front, right rear and left rear speed sensor ●Each speed sensor circuit ●Sensor rotor
C0205 / 32*1 (DI-267)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI-267)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI-267)	Left rear wheel speed sensor signal malfunction	
C1241 / 41 (DI-290)	Low battery positive voltage or abnormally high battery positive voltage	●Battery ●Charging system ●Power source circuit

C1243 / 43*1, *3 (DI-294)	Malfunction in deceleration sensor (abnormal constant output)	●Deceleration sensor ●Wire harness for deceleration sensor system
C1244 / 44*3 (DI-294)	Open or short circuit of deceleration sensor circuit	●Deceleration sensor ●Deceleration sensor circuit
C1245 / 45*1, *3 (DI-294)	Malfunction in deceleration sensor	●Deceleration sensor ●Wire harness for deceleration sensor system
C1246 / 46*2, *3 (DI-298)	Malfunction in master cylinder pressure sensor	●Master cylinder pressure sensor ●Master cylinder pressure sensor circuit
C1249 / 49 (DI-301)	Open circuit of stop light switch circuit	Stop light switch circuit
C1251 / 51*1 (DI-304)	Pump motor is locked Open circuit of pump motor circuit	ABS pump motor
Always ON (DI-306)	Malfunction in ABS (& BA & TRAC & VSC) ECU	●Battery ●Charging system ●Power source circuit ●ECU

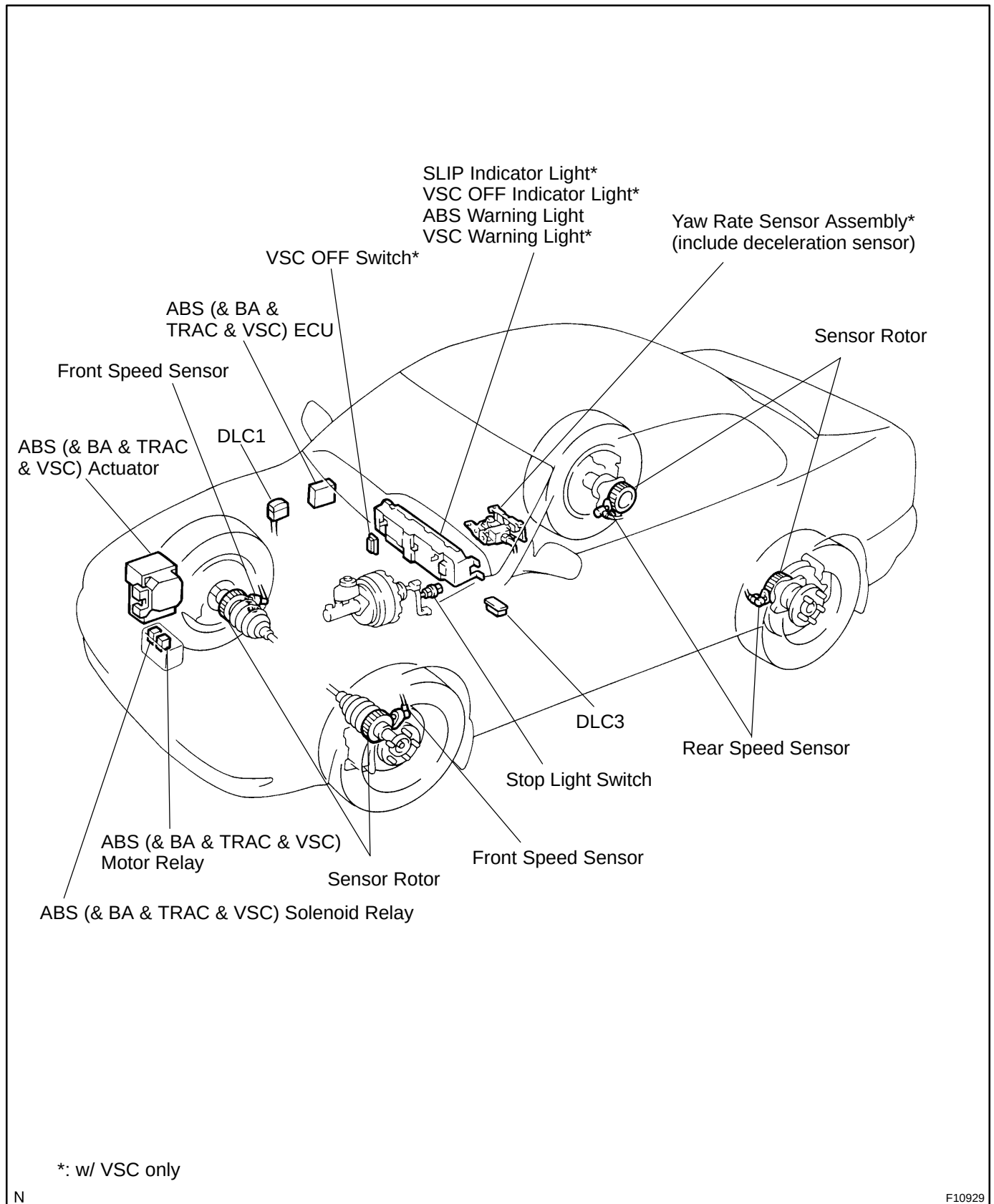
*1, *2: These DTC will not affect to cancel the ABS warning light by repairing the trouble area, so perform the following operations.

- *1:
 - (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-253).
- *2:
 - (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-253).
- *3: w/ VSC only

HINT:

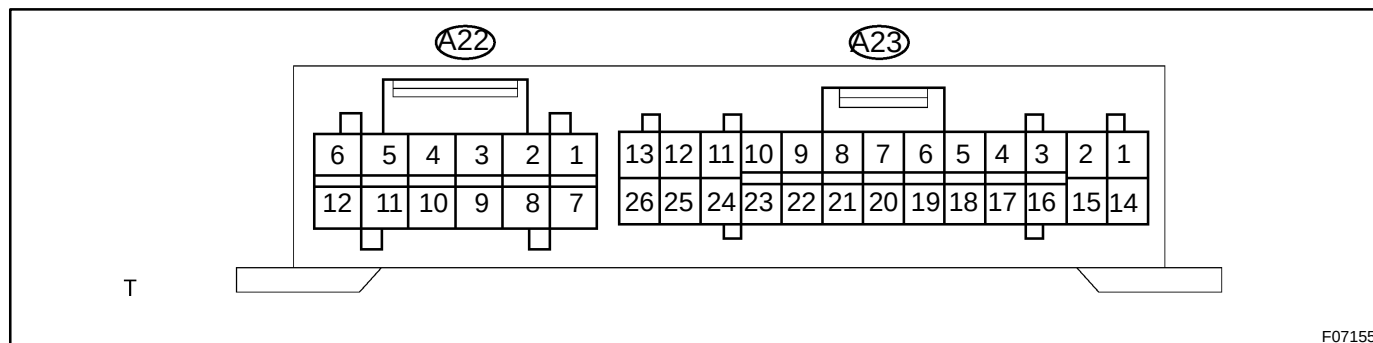
There is a case that LEXUS hand-held tester cannot be used when the ABS warning light is always on.

PARTS LOCATION



TERMINALS OF ECU

(ABS only):



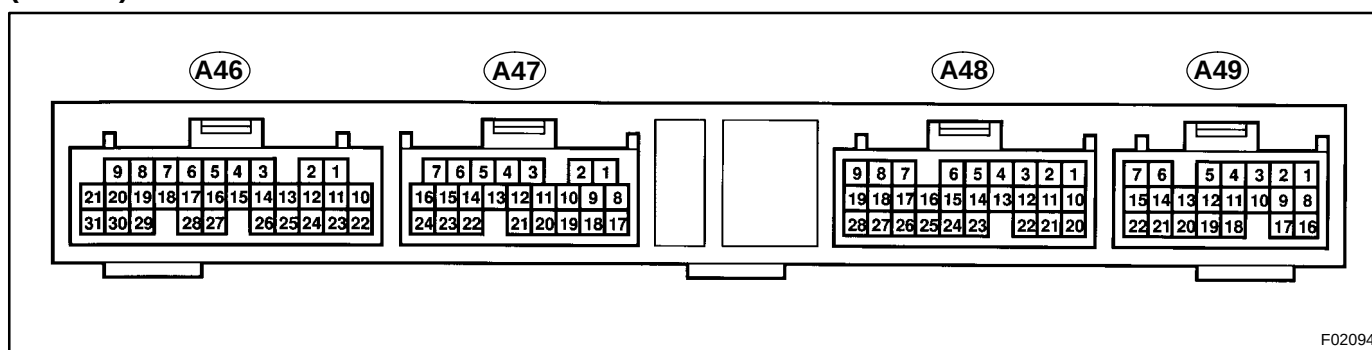
F07155

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IG1 (A23 – 13) – GND (A23 – 12, 25)	B–R – W–B	IG switch ON	10 – 14
R+ (A23 – 26) – SR (A22 – 7)	GR–R – GR	IG switch ON ABS warning light OFF	9 – 14
R+ (A23 – 26) – MR (A22 – 1)	GR–R – GR–L	IG switch ON	Below 1.0
SFRR (A23 – 1) – GND (A23 – 12, 25)	W–R – W–B	IG switch ON ABS warning light OFF	10 – 14
SFRH (A23 – 2) – GND (A23 – 12, 25)	R–B – W–B	IG switch ON ABS warning light OFF	10 – 14
SFLR (A22 – 6) – GND (A23 – 12, 25)	W–L – W–B	IG switch ON ABS warning light OFF	10 – 14
SFLH (A22 – 5) – GND (A23 – 12, 25)	L–B – W–B	IG switch ON ABS warning light OFF	10 – 14
SRRR (A22 – 12) – GND (A23 – 12, 25)	R–G – W–B	IG switch ON ABS warning light OFF	10 – 14
SRRH (A22 – 11) – GND (A23 – 12, 25)	W–R – W–B	IG switch ON ABS warning light OFF	10 – 14
SRLR (A23 – 14) – GND (A23 – 12, 25)	LG–B – W–B	IG switch ON ABS warning light OFF	10 – 14
SRLH (A23 – 15) – GND (A23 – 12, 25)	G–Y – W–B	IG switch ON ABS warning light OFF	10 – 14
WA (A23 – 11) – GND (A23 – 12, 25)	G–B – W–B	IG switch ON ABS warning light ON	Below 2.0
		IG switch ON ABS warning light OFF	10 – 14
STP (A23 – 5) – GND (A23 – 12, 25)	G–W – W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
D/G (A23 – 24) – GND (A23 – 12, 25)	W – W–B	IG switch ON ABS warning light OFF	10 – 14
Tc (A23 – 8) – GND (A23 – 12, 25)	LG–R – W–B	IG switch ON	8 – 14
Ts (A23 – 21) – GND (A23 – 12, 25)	R–Y – W–B	IG switch ON	8 – 14
FR+ (A22 – 3) – FR– (A22 – 9)	W – B	IG switch ON Slowly turn right front wheel	AC generation
FL+ (A22 – 8) – FL– (A22 – 2)	R – G	IG switch ON Slowly turn left front wheel	AC generation
RR+ (A23 – 10) – RR– (A23 – 23)	W – B	IG switch ON Slowly turn right rear wheel	AC generation

DIAGNOSTICS – ANTI-LOCK BRAKE SYSTEM (Include w/ VSC)

RL+ (A23 – 22) – RL– (A23 – 9)	R ↔ G	IG switch ON	Slowly turn left rear wheel	AC generation
MT (A22 – 10) – GND (A23 – 12, 25)	R–W – W–B	IG switch ON		Below 1.5

(w/ VSC):



F02094

Symbols (Terminals No.)	Wiring Color	Condition		STD Voltage (V)
SMC1 (A46 – 2) – GND (A46 – 6, 31, A47 – 8, 17)	Y–R – W–B	IG switch ON	ABS warning light OFF	10 – 14
SMC2 (A46 – 3) – GND (A46 – 6, 31, A47 – 8, 17)	Y–B – W–B	IG switch ON	ABS warning light OFF	10 – 14
SRC1 (A46 – 4) – GND (A46 – 6, 31, A47 – 8, 17)	B–R – W–B	IG switch ON	ABS warning light OFF	10 – 14
SRC2 (A46 – 5) – GND (A46 – 6, 31, A47 – 8, 17)	B–Y – W–B	IG switch ON	ABS warning light OFF	10 – 14
SFLR (A46 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	W–L – W–B	IG switch ON	ABS warning light OFF	10 – 14
SRRH (A46 – 8) – GND (A46 – 6, 31, A47 – 8, 17)	W–R – W–B	IG switch ON	ABS warning light OFF	10 – 14
SRRR (A46 – 9) – GND (A46 – 6, 31, A47 – 8, 17)	R–G – W–B	IG switch ON	ABS warning light OFF	10 – 14
VCM (A46 – 10) – GND (A46 – 6, 31, A47 – 8, 17)	R – W–B	IG switch ON		4.5 – 5.5
FR+ (A46 – 14) – FR– (A46 – 13)	W – B	IG switch ON	Slowly turn right front wheel	AC generation
FL+ (A46 – 16) – FL– (A46 – 15)	R – G	IG switch ON	Slowly turn left front wheel	AC generation
SR (A46 – 19) – R+ (A46 – 1)	GR – GR–R	IG switch ON	ABS warning light OFF	10 – 14
SFLH (A46 – 21) – GND (A46 – 6, 31, A47 – 8, 17)	L–B – W–B	IG switch ON	ABS warning light OFF	10 – 14
PMC (A46 – 22) – E2 (A46 – 23)	B – W	IG switch ON	Stop light switch OFF	0.3 – 0.7
E2 (A46 – 23) – GND (A46 – 6, 31, A47 – 8, 17)	W – W–B	IG switch OFF		Continuity

FSS (A46 – 24) – GND (A46 – 6, 31, A47 – 8, 17)	Shielded – W–B	IG switch OFF	Continuity
MT (A46 – 28) – GND (A46 – 6, 31, A47 – 8, 17)	R–W – W–B	IG switch ON Motor relay is OFF	Below 1.5
MR (A46 – 29) – GND (A46 – 6, 31, A47 – 8, 17)	GR–L – W–B	IG switch ON, ABS motor stops	10 – 14
VGS (A47 – 1) – GGND (A47 – 10)	W – R	IG switch ON	4.5 – 5.5
GL1 (A47 – 2) – GGND (A47 – 10)	G – R	IG switch ON Vehicle is placed on the horizontal surface	2 – 3
Tc (A47 – 3) – GND (A46 – 6, 31, A47 – 8, 17)	LG–R – W–B	IG switch ON	10 – 14
Ts (A47 – 4) – GND (A46 – 6, 31, A47 – 8, 17)	R–Y – W–B	IG switch ON	10 – 14
IG1 (A47 – 6) – GND (A46 – 6, 31, A47 – 8, 17)	B–R – W–B	IG switch ON	10 – 14
NEO (A47 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	BR–W – W–B	Engine idling	Pulse generation
GL2 (A47 – 9) – GGND (A47 – 10)	B – R	IG switch ON Vehicle is placed on the level surface	2.0 – 3.0
GGND (A47 – 10) – GND (A46 – 6, 31, A47 – 8, 17)	R – W–B	IG switch OFF	Continuity
RR+ (A47 – 11) – RR– (A47 – 12)	W – B	IG switch ON, Slowly turn right rear wheel	AC generation
ENG+ (A47 – 14) – ENG– (A47 – 22)	W – B	IG switch ON Engine idling	Pulse generation
GSS (A47 – 18) – GND (A46 – 6, 31, A47 – 8, 17)	Shielded – W–B	IG switch OFF	Continuity
RL+ (A47 – 19) – RL– (A47 – 20)	R – G	IG switch ON Slowly turn left rear wheel	AC generation
TRC+ (A47 – 24) – TRC– (A47 – 16)	LG – L	IG switch ON Engine idling	Pulse generation
LBLO (A48 – 1) – GND (A46 – 6, 31, A47 – 8, 17)	R–W – 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
FRO (A48 – 2) – GND (A46 – 6, 31, A47 – 8, 17)	GR–R – W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
RRO (A48 – 3) – GND (A46 – 6, 31, A47 – 8, 17)	GR–L – W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
VSCW (A48 – 4) – GND (A46 – 6, 31, A47 – 8, 17)	R–L – W–B	IG switch ON VSC warning light ON	Below 2.0
		IG switch ON VSC warning light OFF	10 – 14
WA (A48 – 5) – GND (A46 – 6, 31, A47 – 8, 17)	G–B – W–B	IG switch ON ABS warning light ON	Below 2.0
		IG switch ON ABS warning light OFF	10 – 14
IND (A48 – 6) – GND (A46 – 6, 31, A47 – 8, 17)	LG – W–B	IG switch ON SLIP indicator light ON	Below 2.0
		IG switch ON SLIP indicator light OFF	10 – 14
STP (A48 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	G–W – W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
VYS (A48 – 9) – GYAW (A48 – 27)	R – W–B	IG switch ON	4.5 – 5.5
LBL– (A48 – 11) – GND (A46 – 6, 31, A47 – 8, 17)	R–W – W–B	IG switch ON Fluid in master cylinder reservoir above MIN level	About 4 – 8

DIAGNOSTICS – ANTI-LOCK BRAKE SYSTEM (Include w/ VSC)

WT (A48 – 13) – GND (A46 – 6, 31, A47 – 8, 17)	L – W–B	IG switch ON	VSC OFF indicator light ON	Below 2.0
		IG switch ON	VSC OFF indicator light OFF	10 – 14
SS1+ (A48 – 14) – SS1– (A48 – 23)	P – V	Engine idling	Slowly turn steering wheel	Pulse generation (See page DI-343)
R (A48 – 15) – GND (A46 – 6, 31, A47 – 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 (A48 – 16) – GND (A46 – 6, 31, A47 – 8, 17)	L – W–B	Vehicle driving at about 20 km/h (12 mph)		Pulse generation
YSS (A48 – 18) – GND (A46 – 6, 31, A47 – 8, 17)	Shielded – W–B	IG switch OFF		Continuity
YD (A48 – 19) – GND (A46 – 6, 31, A47 – 8, 17)	B–L – W–B	IG switch ON	VSC warning light OFF	4.5 – 5.5
BZ (A48 – 20) – GND (A46 – 6, 31, A47 – 8, 17)	P–B – W–B	IG switch ON	VSC buzzer sounds	Below 1.0 ↔ 10 – 14
		IG switch ON	VSC buzzer does not sound	10 – 14
P (A48 – 24) – GND (A46 – 6, 31, A47 – 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 (A48 – 25) – GND (A46 – 6, 31, A47 – 8, 17)	W – W–B	IG switch ON		10 – 14
CSW (A48 – 26) – GND (A46 – 6, 31, A47 – 8, 17)	LG – W–B	IG switch ON	VSC cut switch pushed in	Below 1.5
		IG switch ON	VSC cut switch released	8 – 14
GYAW (A48 – 27) – GND (A46 – 6, 31, A47 – 8, 17)	B – W–B	IG switch OFF		Continuity
YAW (A48 – 28) – GYAW (A48 – 27)	W – B	IG switch ON	Vehicle is in stationary condition	2 – 3
SRLR (A49 – 1) – GND (A46 – 6, 31, A47 – 8, 17)	LG–B – W–B	IG switch ON	ABS warning light OFF	10 – 14
AST (A49 – 6) – GND (A46 – 6, 31, A47 – 8, 17)	R – W–B	IG switch ON	ABS warning light OFF	10 – 14
SRLH (A49 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	G–Y – W–B	IG switch ON	ABS warning light OFF	10 – 14
SFRR (A49 – 8) – GND (A46 – 6, 31, A47 – 8, 17)	W–R – W–B	IG switch ON	ABS warning light OFF	10 – 14
SMV2 (A49 – 15) – GND (A46 – 6, 31, A47 – 8, 17)	Y–G – W–B	IG switch ON	ABS warning light OFF	10 – 14
SFRH (A49 – 16) – GND (A46 – 6, 31, A47 – 8, 17)	R–B – W–B	IG switch ON	ABS warning light OFF	10 – 14
SMV1 (A49 – 22) – GND (A46 – 6, 31, A47 – 8, 17)	L–R – W–B	IG switch ON	ABS warning light OFF	10 – 14

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below, and proceed to the relevant troubleshooting page.

NOTICE:

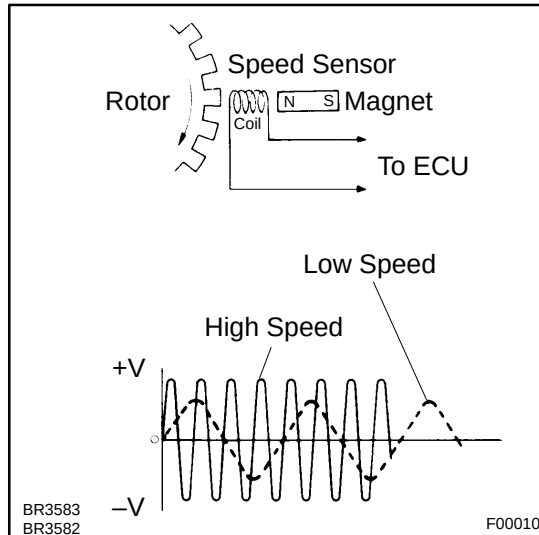
When replacing ABS (& BA & TRAC & VSC) ECU, sensor or etc., turn the ignition switch OFF.

Symptom	Suspected Area	See page
ABS does not operate	Only when 1 to 4 are all normal but the problem still occurs, replace the ABS (& BA & TRAC & VSC) ECU. 3. Check the DTC reconfirming that the normal code is output 4. IG power source circuit 5. Speed sensor circuit 6. Check the ABS (& BA & TRAC & VSC) actuator with a LEXUS hand-held tester If abnormal, check the hydraulic circuit for leakage (See page DI-365).	DI-253 DI-290 DI-267 BR-54 BR-60
ABS does not operate efficiently	Only when 1 to 4 are all normal but the problem still occurs, replace the ABS (& BA & TRAC & VSC) ECU. 1. Check the DTC reconfirming that the normal code is output 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the ABS (& BA & TRAC & VSC) actuator with a LEXUS hand-held tester If abnormal, check the hydraulic circuit for leakage (See page DI-365).	DI-253 DI-267 DI-301 BR-54 BR-60
ABS warning light is abnormal	1. ABS warning light circuit 2. ABS (& BA & TRAC & VSC) ECU	DI-309 DI-306
DTC check is impossible	Only when 1 and 2 are all normal but the problem still occurs, replace the ABS (& BA & TRAC & VSC) ECU. 1. ABS warning light circuit 2. Tc terminal circuit	DI-309 DI-314
Speed sensor signal check is impossible	1. Ts terminal circuit 2. ABS (& BA & TRAC & VSC) ECU	DI-316 DI-306

CIRCUIT INSPECTION

DTC	C0200 / 31 to C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



Speed sensor detects the wheel speed and sends the appropriate signals to the ECU. These signals are used for control of the ABS (& BA & TRAC & VSC) control system. The front and rear rotors each has 48 serrations.

When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1 to 4: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. The condition that the continuous noise occurs in the speed sensor signal with the vehicle speed of 20 km/h (12 mph) or more continues for 5 sec. or more. 4. The condition that the speed signal circuit is open continues for 0.5 sec. or more.	●Right front, left front, right rear and left rear speed sensor ●Each speed sensor circuit ●Sensor rotor

HINT:

DTC No. C0200 / 31 is for the right front speed sensor.

DTC No. C0205 / 32 is for the left front speed sensor.

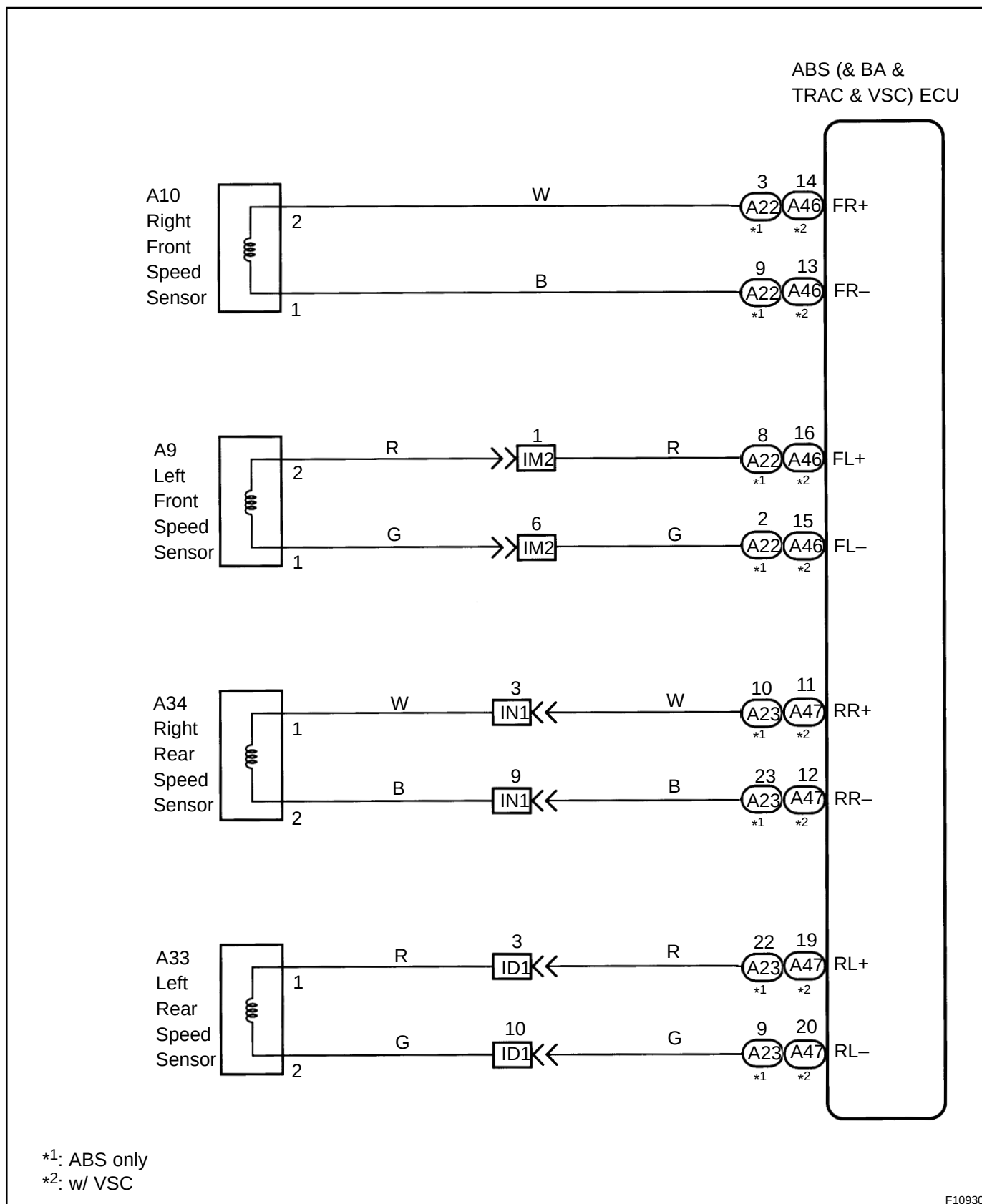
DTC No. C0210 / 33 is for the right rear speed sensor.

DTC No. C0215 / 34 is for the left rear speed sensor.

Fail safe function:

If a trouble has occurred in the speed sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

1	Check output value of speed sensor.

PREPARATION:

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

CHECK:

Check that there is no change between the speed value output from each speed sensor displayed by the LEXUS hand-held tester and the speed value displayed by the speedometer when the vehicle is driven.

OK:

There is almost no difference from the displayed speed value.

HINT:

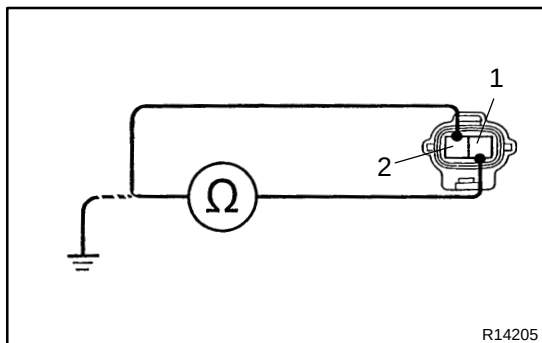
There is tolerance of $\pm 10\%$ in the speedometer indication.

OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

NG

2 Check speed sensor.



Front:

PREPARATION:

- (a) Remove front fender liner.
- (b) Disconnect speed sensor connector.

CHECK:

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

OK:

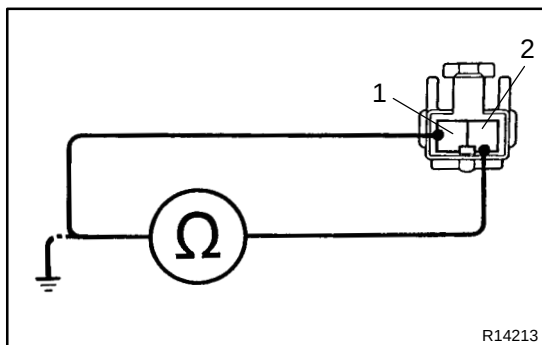
Resistance: 0.6 – 2.5 kΩ

CHECK:

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

OK:

Resistance: 1 MΩ or higher



Rear:

PREPARATION:

- (a) Remove the seat cushion and seat back.
- (b) Disconnect speed sensor connector.

CHECK:

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

OK:

Resistance: 1.2 – 2.3 kΩ

CHECK:

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

OK:

Resistance: 1 MΩ or higher

NG

Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-253](#)).

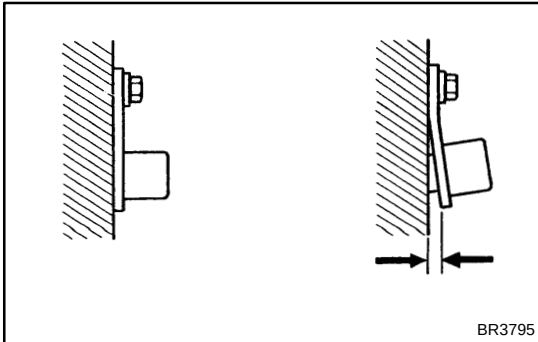
OK

3 Check for open and short circuit in harness and connector between each speed sensor and ABS (& BA & TRAC & VSC) ECU (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

4 Check sensor installation.**CHECK:**

Check the speed sensor installation.

OK:

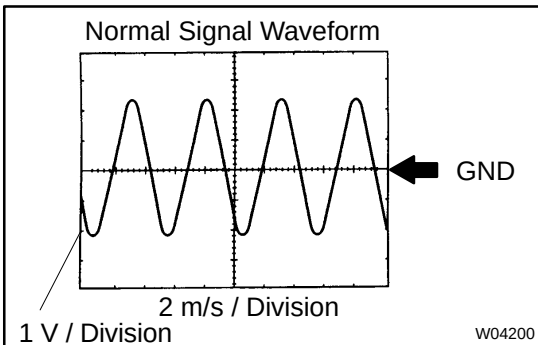
The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.

NG

Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-253](#)).

OK**5 Check speed sensor and sensor rotor serrations.****REFERENCE: INSPECTION USING OSCILLOSCOPE****PREPARATION:**

- Remove the ABS (& BA & TRAC & VSC) ECU.
- Connect an oscilloscope to terminals FR+, FL+, RR+ or RL+ and GND of the ABS (& BA & TRAC & VSC) ECU harness side connector.

CHECK:

Drive the vehicle at about 20 km/h (12 mph), and check the signal waveform.

HINT:

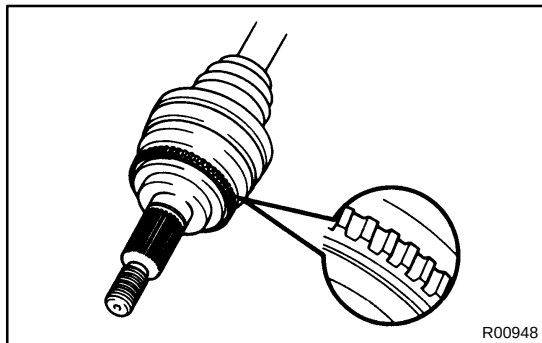
Check the foreign objects sticking to the sensor tip when noise occurs.

OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

NG

6	Check sensor rotor and sensor tip.

**Front:****PREPARATION:**

Remove front drive shaft (See page [SA-16](#)).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, no missing teeth or no foreign objects.

PREPARATION:

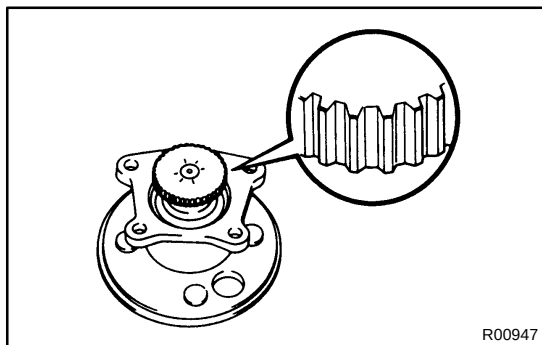
Remove the front speed sensor (See page [BR-65](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or no foreign objects on the sensor tip.

**Rear:****PREPARATION:**

Remove the rear axle hub (See page [SA-45](#)).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, no missing teeth or no foreign objects.

PREPARATION:

Remove rear speed sensor (See page [BR-68](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or no foreign objects on the sensor tip.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal last (See page [DI-253](#)).

OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

DTC	C0226 / 21 to C0256 / 24	ABS Solenoid Circuit

CIRCUIT DESCRIPTION

This solenoid comes on when receiving signals from the ECU controlled and controls the pressure acting on the wheel cylinders, thus the braking force is controlled.

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.)	●ABS (& BA & TRAC & VSC) actuator ●SFRH or SFRR circuit
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	●ABS (& BA & TRAC & VSC) actuator ●SFLH or SFLR circuit
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	●ABS (& BA & TRAC & VSC) actuator ●SRRH or SRRR circuit
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more. (When the solenoid is normally ON.)	●ABS (& BA & TRAC & VSC) actuator ●SRLH or SRLR circuit

Fail safe function:

If a trouble has occurred in the actuator solenoid circuit, the ECU cuts off current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

Engine Room R/B No. 3

ABS (& BA & TRAC & VSC) ECU

ABS (& BA & TRAC & VSC) Actuator

B-G W-B

W-L

W-B

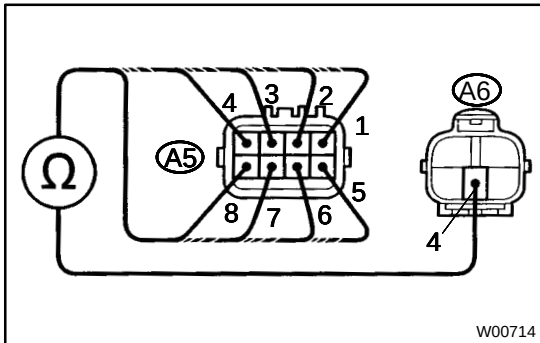
FL Block ALT F9 F6 B-G FL MAIN Battery EA EB

*1: ABS only
*2: w/ VSC

F10927

INSPECTION PROCEDURE

1 Check brake actuator solenoid.

**ABS only:****PREPARATION:**

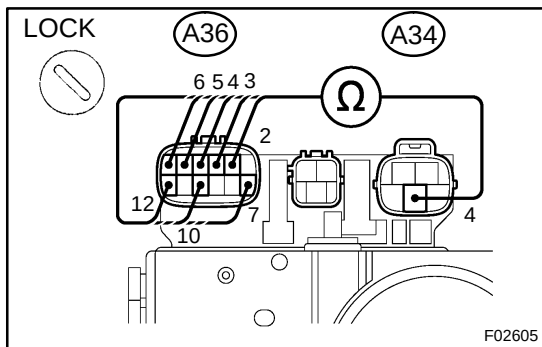
Disconnect the 2 connectors from the ABS actuator.

CHECK:

Check the continuity between terminals A6 – 4 and A5 – 1, 2, 3, 4, 5, 6, 7 and 8 of the ABS actuator.

OK:**Continuity****HINT:**

Resistance of each solenoid coil is 1.2 Ω.

**w/ VSC:****PREPARATION:**

Disconnect the 2 connectors from THE ABS & BA & TRAC & VSC actuator.

CHECK:

Check the continuity between terminal A34 – 4 and each of A36 – 2, 3, 4, 5, 6, 7, 10 and 12 of the ABS & BA & TRAC & VSC 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

NG**Replace ABS (& BA & TRAC & VSC) actuator.****OK**2 Check for open and short circuit in harness and connector between ABS (& BA & TRAC & VSC) ECU and ABS (& BA & TRAC & VSC) actuator (See page [IN-31](#)).**NG****Repair or replace harness or connector.****OK**

3	Check voltage between terminal SR of ABS (& BA & TRAC & VSC) ECU and body ground.

PREPARATION:

Remove the ABS (& BA & TRAC & VSC) 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

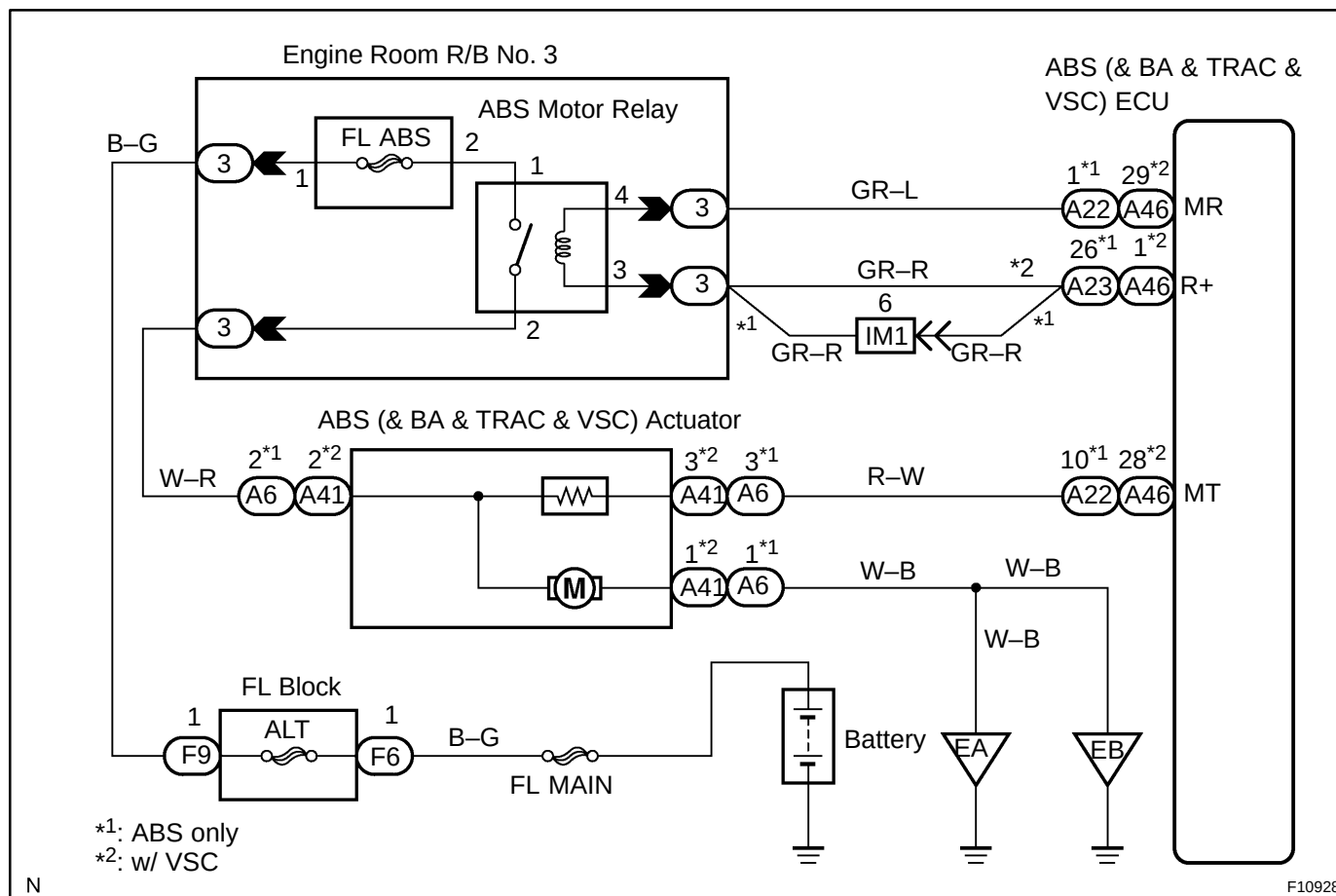
If same code is still output after DTC is deleted, check contact condition of each connection. If connections are normal, ECU may be defective.

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1 and 2 continue 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, TRAC 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,	●ABS motor relay ●ABS motor relay circuit
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.	

If a trouble has occurred in the ABS motor relay circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using LEXUS hand-held tester.

1 Check ABS motor relay operation.

PREPARATION:

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

CHECK:

Check the operation sound of the ABS motor relay when operating it with the LEXUS hand-held tester.

OK:

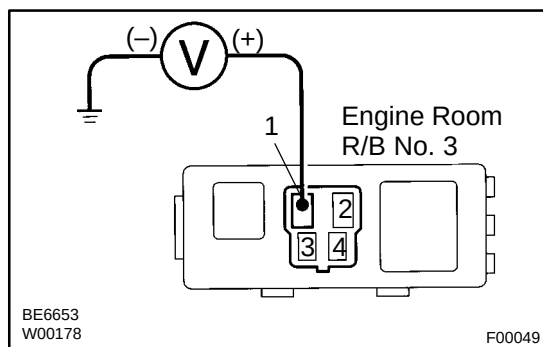
The operation sound of the ABS motor relay should be heard.

OK

Go to step 4.

NG

2 Check voltage between terminal 1 of engine room R/B No. 3 (for ABS motor relay) and body ground.



PREPARATION:

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

CHECK:

Measure the voltage between terminal 1 of the engine room R/B No. 3 (for the ABS motor relay) and the body ground.

OK:

Voltage: 10 – 14 V

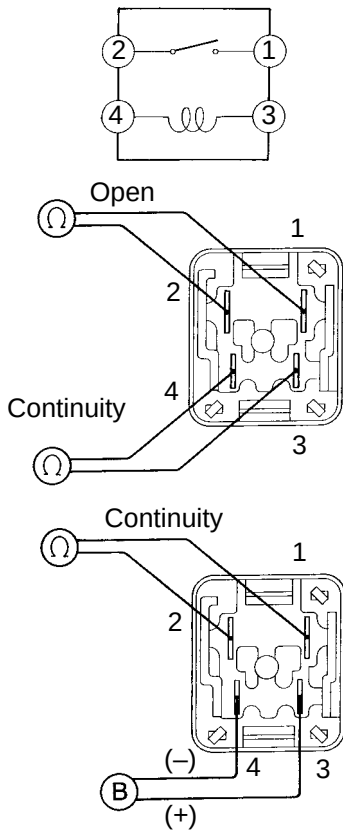
NG

Check and repair harness or connector.

OK

3

Check ABS motor relay.



CHECK:

Check the continuity between each pair of terminals of the motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

- Apply battery positive voltage to terminals 3 and 4.
- Check the continuity between terminals of the ABS motor relay.

OK:

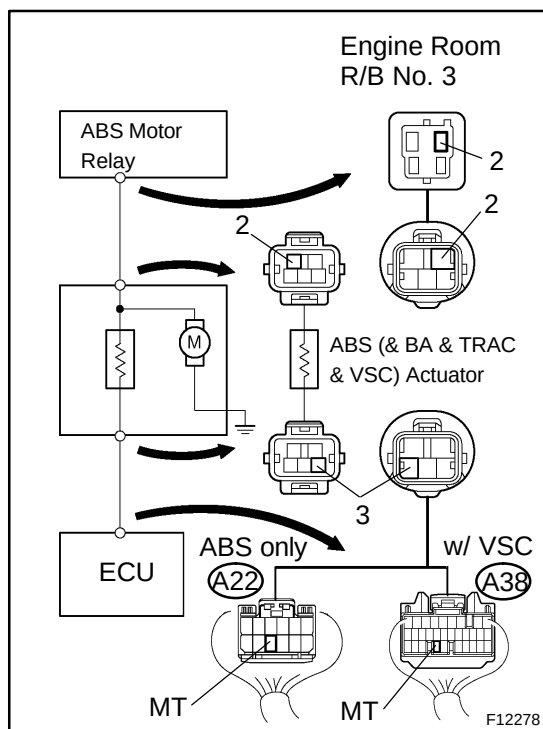
Terminals 1 and 2	Continuity

NG

Replace ABS motor relay.

OK

4 Check continuity between terminal 2 of ABS motor relay and terminal MT of ABS (& BA & TRAC & VSC) ECU.



CHECK:

Check the continuity between terminal 2 of the engine room R/B No. 3 (for the ABS motor relay) and terminal MT of the ABS (& BA & TRAC & VSC) ECU.

OK:

Continuity

HINT:

ABS only:

There is a resistance of 4 – 6 Ω between terminals A6 – 2 and A6 – 3 of the ABS actuator.

w/ VSC:

There is a resistance of 26 – 40 Ω between terminals A41 – 2 and A41 – 3 of the ABS & BA & TRAC & VSC actuator.

NG

Repair or replace harness or ABS (& BA & TRAC & VSC) actuator.

OK

5 Check for open and short circuit in harness and connector between ABS motor relay and ABS (& BA & TRAC & VSC) ECU (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

If same code is still output after DTC is deleted, check contact condition of each connection. If connections are normal, ECU may be defective.

DTC	C0278 / 11, C0279 / 12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

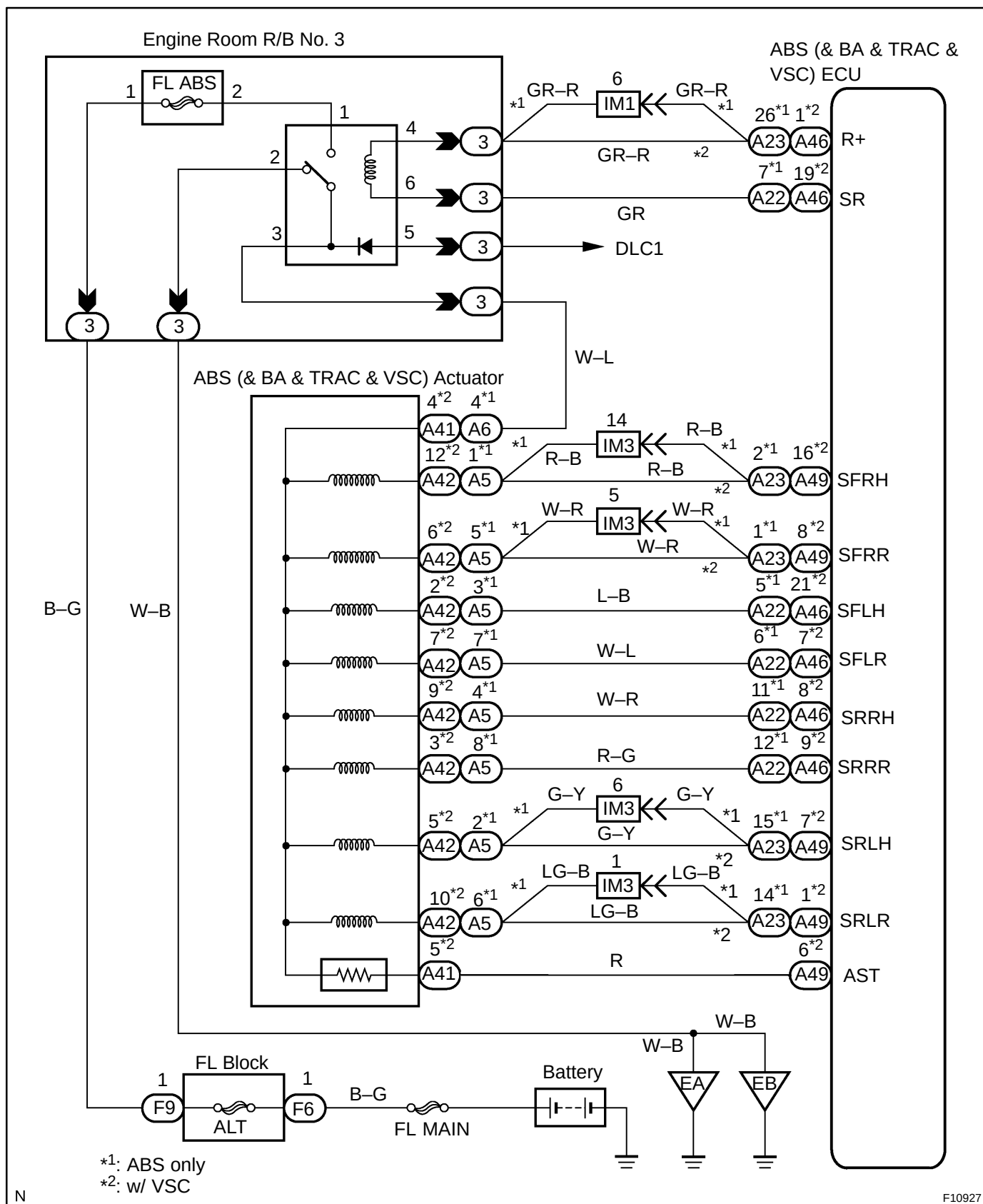
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay comes on.

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 onN driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become on.	●ABS solenoid relay ●ABS solenoid relay circuit
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.	

Fail safe function:

If a trouble has occurred in the ABS solenoid relay circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

1	Check ABS solenoid relay operation.

PREPARATION:

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

CHECK:

Check the operation sound of the ABS solenoid relay when operating it with the LEXUS hand-held tester.

OK:

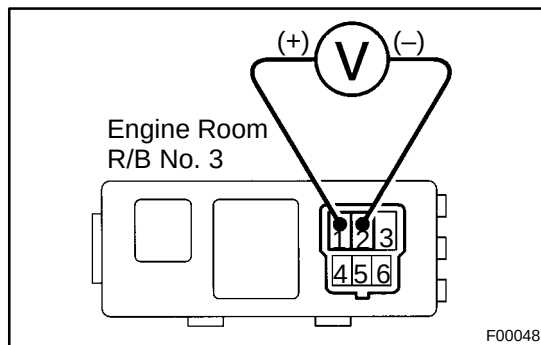
The operation sound of the ABS solenoid relay should be heard.

OK

Go to step 4.

NG

2	Check voltage between terminals 1 and 2 of engine room R/B (for ABS solenoid relay).



PREPARATION:

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

CHECK:

Measure the voltage between terminals 1 and 2 of the engine room R/B No. 3 (for the ABS solenoid relay).

OK:

Voltage: 10 – 14 V

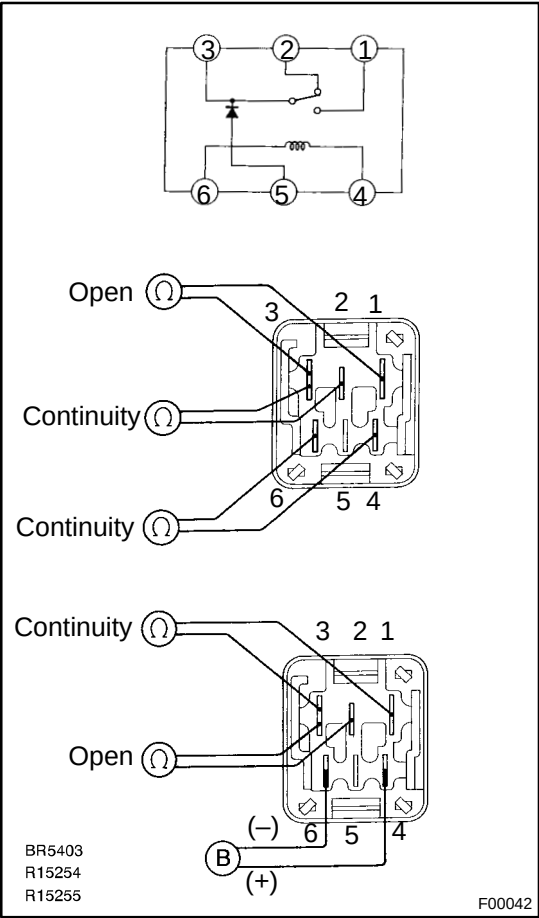
NG

Check and repair harness or connector.

OK

3

Check ABS solenoid relay.



CHECK:
Check the continuity between each terminal of the 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 positive voltage between terminals 4 and 6.
(b) Check the continuity between each terminal of the ABS solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

OK

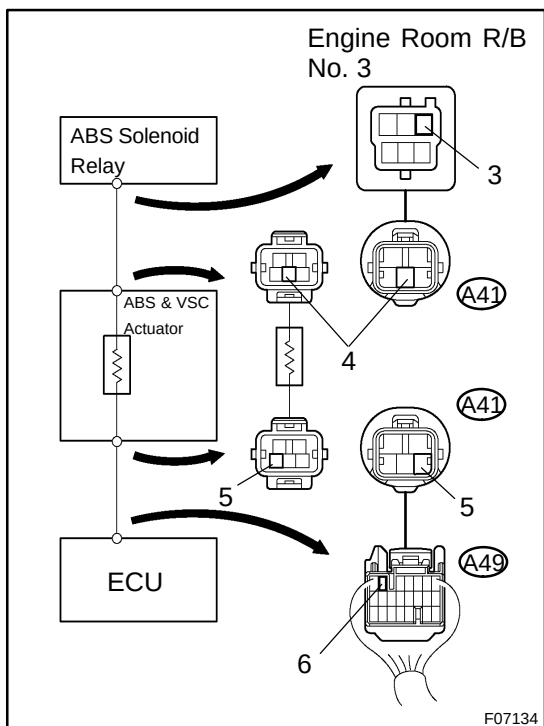
NG

Replace ABS solenoid relay.

The diagram illustrates the electrical connections for the ABS system. It shows the following components and their interconnections:

- ABS Solenoid Relay:** Connected to the ABS Actuator and the ECU.
- ABS Actuator:** Connected to the ABS Solenoid Relay and the ECU.
- ECU (Electronic Control Unit):** The central control unit, connected to the ABS Solenoid Relay, ABS Actuator, and various sensors/switches.
- Connectors and Sensors:**
 - A6:** A 4-pin connector connected to the ABS Solenoid Relay.
 - A5:** A 12-pin connector connected to the ABS Actuator.
 - A22:** A 12-pin connector connected to the ECU.
- Wiring Details:**
 - The ABS Solenoid Relay is connected to the ABS Actuator via a single wire.
 - The ABS Actuator is connected to the ECU via a single wire.
 - The ECU is connected to the A22 connector, which is further connected to the A5 connector.
 - The A5 connector is connected to the A6 connector.
 - The A6 connector is connected to the ABS Solenoid Relay.
 - The A22 connector is connected to the ECU.
 - The A5 connector is connected to the A6 connector.
 - The A6 connector is connected to the ABS Solenoid Relay.
 - The A22 connector is connected to the ECU.
 - The A5 connector is connected to the A6 connector.
 - The A6 connector is connected to the ABS Solenoid Relay.

Resistance of each solenoid coil
SRLR, SRRR, SFLR, SFRR: 4.3 Ω
SRLH, SRRH, SFLH, SFRH: 8.8 Ω



There is a resistance of 26 – 40 Ω between terminals 4 and 5 of the ABS & BA & TRAC & VSC actuator.

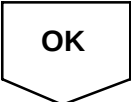
Repair or replace harness or ABS (& BA & TRAC & VSC) actuator.

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5	Check for open and short circuit in harness and connector between ABS solenoid relay and ABS (& BA & TRAC & VSC) ECU (See page IN-31).

NG

Repair or replace harness or connector.

OK

If same code is still output after DTC is deleted, check contact condition of each connection. If connections are normal, ECU may be defective.

DTC	C1225 / 25 to C1227 / 27	BA & TRAC & VSC Solenoid Circuit

CIRCUIT DESCRIPTION

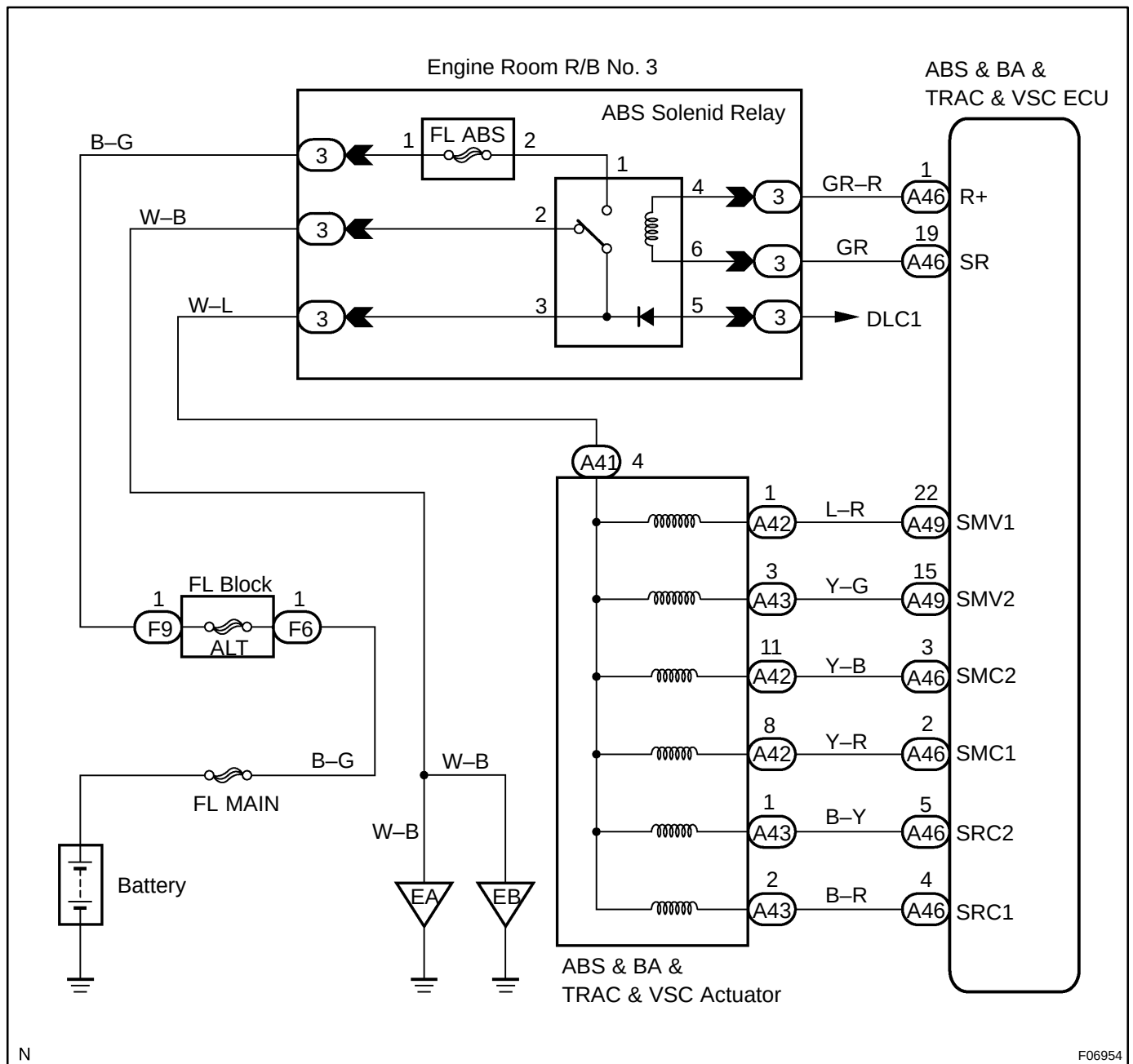
TRAC & VSC solenoid operates in accordance with signals from the ECU and raises the fluid pressure in and releases it from the brake cylinders.

DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Open or short circuit for SMC1 or SMC2 circuit continues for 0.05 sec. or more.	●ABS & BA & TRAC & VSC actuator ●SMC1 or SMC2 circuit
C1226 / 26	Open or short circuit for SMV1 or SMV2 circuit continues for 0.05 sec. or more.	●ABS & BA & TRAC & VSC actuator ●SMV1 or SMV2 circuit
C1227 / 27	Open or short circuit for SRC1 or SRC2 circuit continues for 0.05 sec. or more.	●ABS & BA & TRAC & VSC actuator ●SRC1 or SRC2 circuit

Fail safe function:

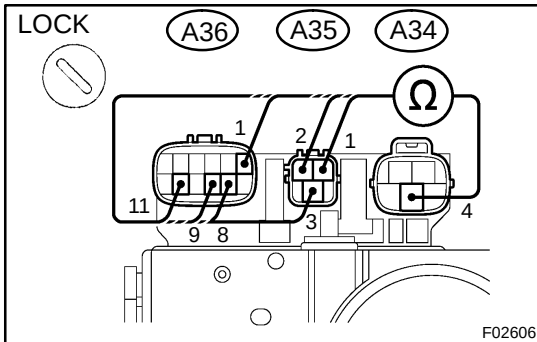
If a trouble has occurred in the actuator solenoid circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS & BA & TRAC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check TRAC & VSC solenoid.

**PREPARATION:**

Disconnect the 3 connectors from the ABS & BA & TRAC & VSC actuator.

CHECK:

Check the continuity between terminal A34 – 4 and each of A35 – 1, 2, 3, A36 – 1, 8, 9, 11 of the ABS & BA & TRAC & VSC actuator.

OK:**Continuity**

HINT:

(Reference)

Resistance of each solenoid

SRC1, SRC2: 8.6 Ω

SMC1, SMC2, SMV1, SMV2: 8.8 Ω

NG

Replace ABS & BA & TRAC & VSC actuator.

OK

2 Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and ABS & BA & TRAC & VSC actuator (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

If same code is still output after DTC is deleted, check contact condition of each connection. If connections are normal, ECU may be defective.

DTC	C1241 / 41	IG Power Source Circuit

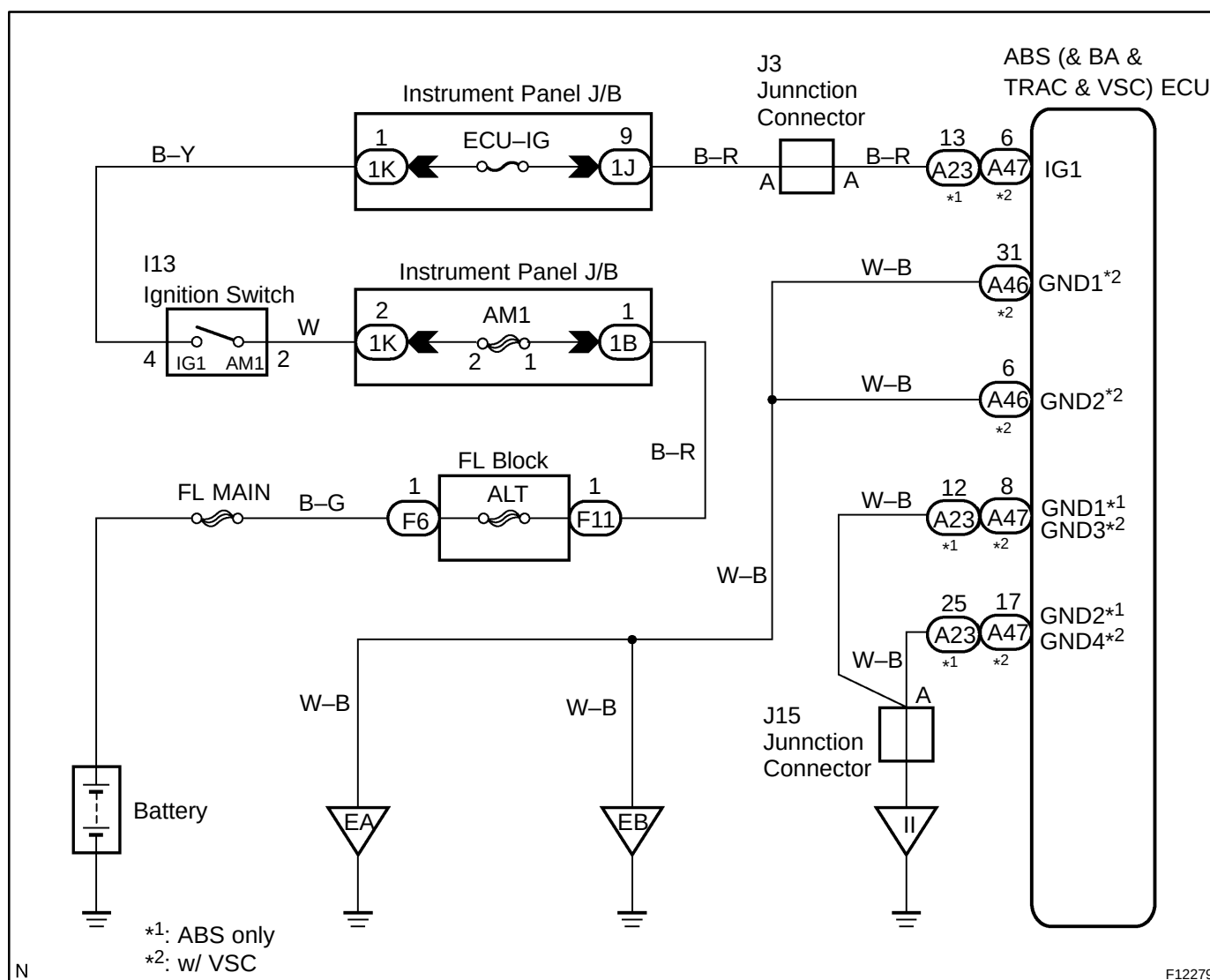
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of conditions 1 or 2: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains below 9.5 V for more than 10 sec. 2. While the condition that the 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.	●Battery ●Charging system ●Power source circuit

Fail safe function:

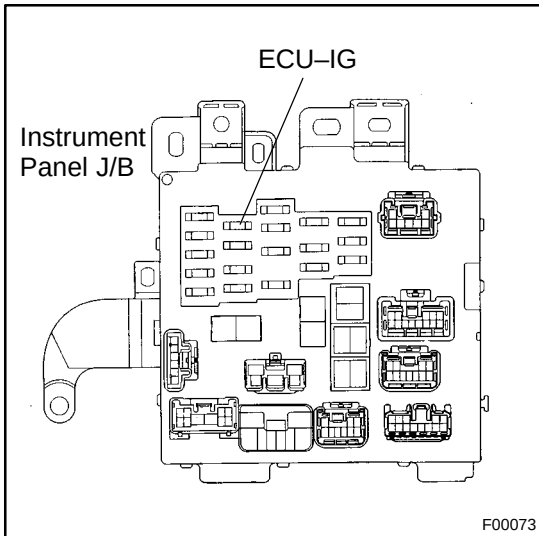
If a trouble occurred in the power source circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check ECU-IG fuse.

**PREPARATION:**

Remove the ECU-IG fuse from the instrument panel J/B.

CHECK:

Check the continuity of the ECU-IG fuse.

OK:

Continuity

NG

Check for short circuit in all harness and components connected to ECU-IG fuse (See attached wiring diagram).

OK

2 Check battery positive voltage.

OK:

Voltage: 10 – 14 V

NG

Check and repair charging system (See page [CH-2](#)).

OK

3	Check voltage of ECU-IG power source.

In case of using the LEXUS hand-held tester:

PREPARATION:

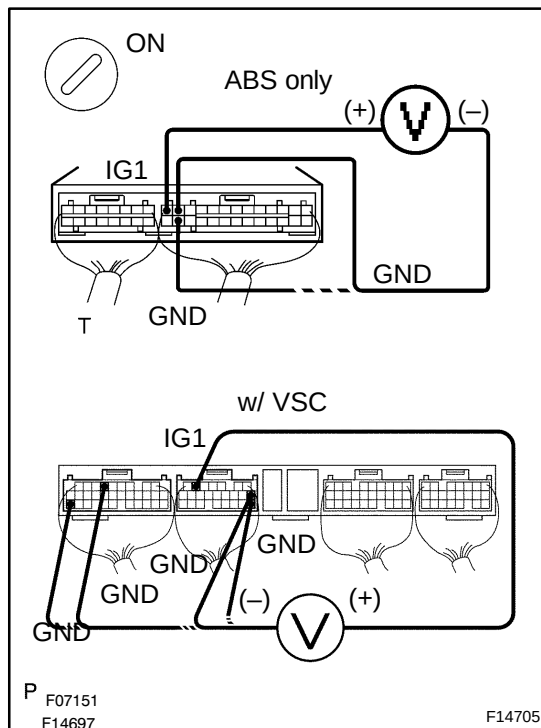
- (a) Connect the LEXUS hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.
- (c) Select the DATALIST mode on the LEXUS hand-held tester.

CHECK:

Check the voltage condition output from the ECU displayed on the LEXUS hand-held tester.

OK:

"Normal" is displayed.



In case of not using the LEXUS hand-held tester:

PREPARATION:

Remove the ABS (& BA & TRAC & VSC) ECU with the connectors still connected.

CHECK:

Turn the ignition switch ON, measure the voltage between terminals IG1 and GND of the ABS (& BA & TRAC & VSC) ECU connector.

OK:

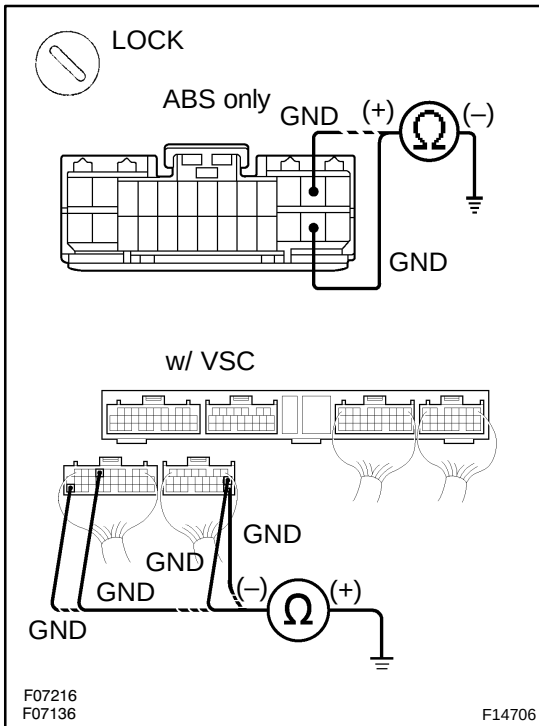
Voltage: 10 – 14 V

OK

Ignition switch OFF, check and replace ABS (& BA & TRAC & VSC) ECU.

NG

4 Check continuity between terminal GND of ABS (& BA & TRAC & VSC) ECU connector and body ground.



PREPARATION:

Disconnect the 2 connectors from the ABS (& BA & TRAC & VSC) ECU.

CHECK:

Measure the resistance between terminals GND of the ABS (& BA & TRAC & VSC) ECU connector and the body ground.

OK:

Resistance: 1 Ω or less

NG

Repair or replace harness or connector.

OK

Check for open circuit in harness and connector between ABS (& BA & TRAC & VSC) ECU and battery (See page [IN-31](#)).

DTC	C1243 / 43, C1245 / 45	Malfunction in Deceleration Sensor

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 10 mV or more continued in a sequence 16 times.	●Deceleration sensor ●Wire harness for deceleration sensor system
C1245 / 45	At the vehicle speed of 30 km/h (18 mph) or more, and the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more.	

Fail safe function:

If a trouble has occurred in the deceleration sensor circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS & BA & TRAC & VSC controls and the brake system becomes normal.

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

1	Check output value of deceleration sensor.

PREPARATION:

- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.
- Select the DATALIST mode on the LEXUS hand-held tester.

CHECK:

Check that the deceleration value of the deceleration sensor displayed by the LEXUS hand-held tester is changing when tilting the vehicle.

OK:

Deceleration value must be changing.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

2 Check deceleration sensor (See page [DI-253](#)).

NG

Replace YAW rate sensor assembly (Include deceleration sensor).

OK

3 Check for open or short circuit in harness and connector between deceleration sensor and ABS & BA & TRAC & VSC ECU (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1244 / 44	Deceleration Sensor Circuit

CIRCUIT DESCRIPTION

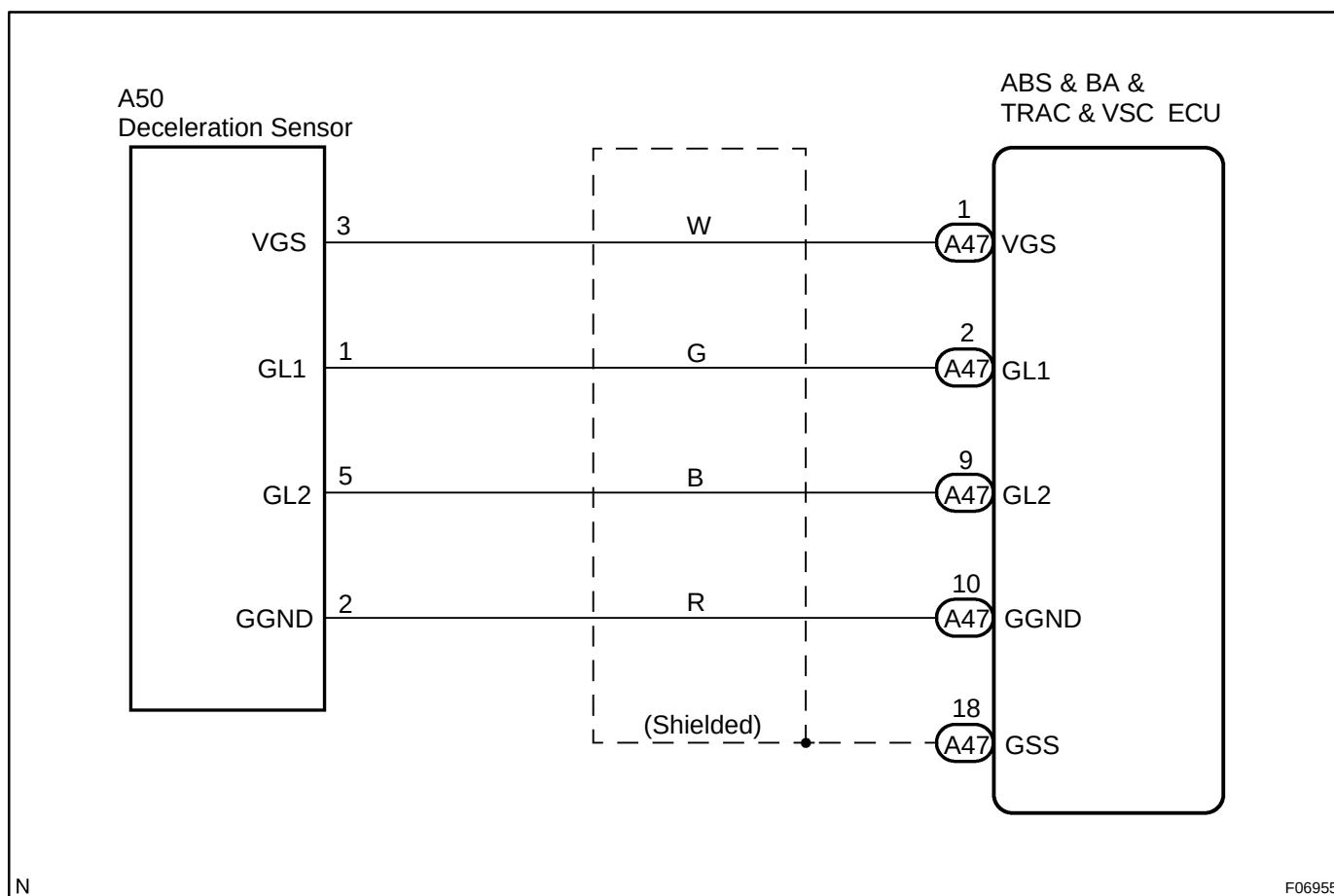
This sensor detects deceleration on the vehicle. The sensor signal is used in the ABS & BA & TRAC & VSC control. If the sensor functions abnormally, the ABS warning light comes on.

DTC No.	DTC Detecting Condition	Trouble Area
C1244 / 44	Either of the following 1, 2, 3, or 4 is detected: - 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. - Condition that deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. - At vehicle speed of 0 km/h (0 mph), after difference of output absolute value of G conversion value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, and condition that does not become 0.4 G continues for 60 sec. or more. - Deceleration sensor signal momentary open occurs for 7 times or more.	●Deceleration sensor ●Deceleration sensor circuit

Fail safe function:

If a trouble has occurred in the deceleration sensor circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS & BA & TRAC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between deceleration sensor and ABS & BA & TRAC & VSC ECU (See page IN-31).

NG

Repair or replace harness or connector.

OK

2	Check deceleration sensor (See page DI-253).

NG

Replace YAW rate sensor assembly (Include deceleration sensor).

OK

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

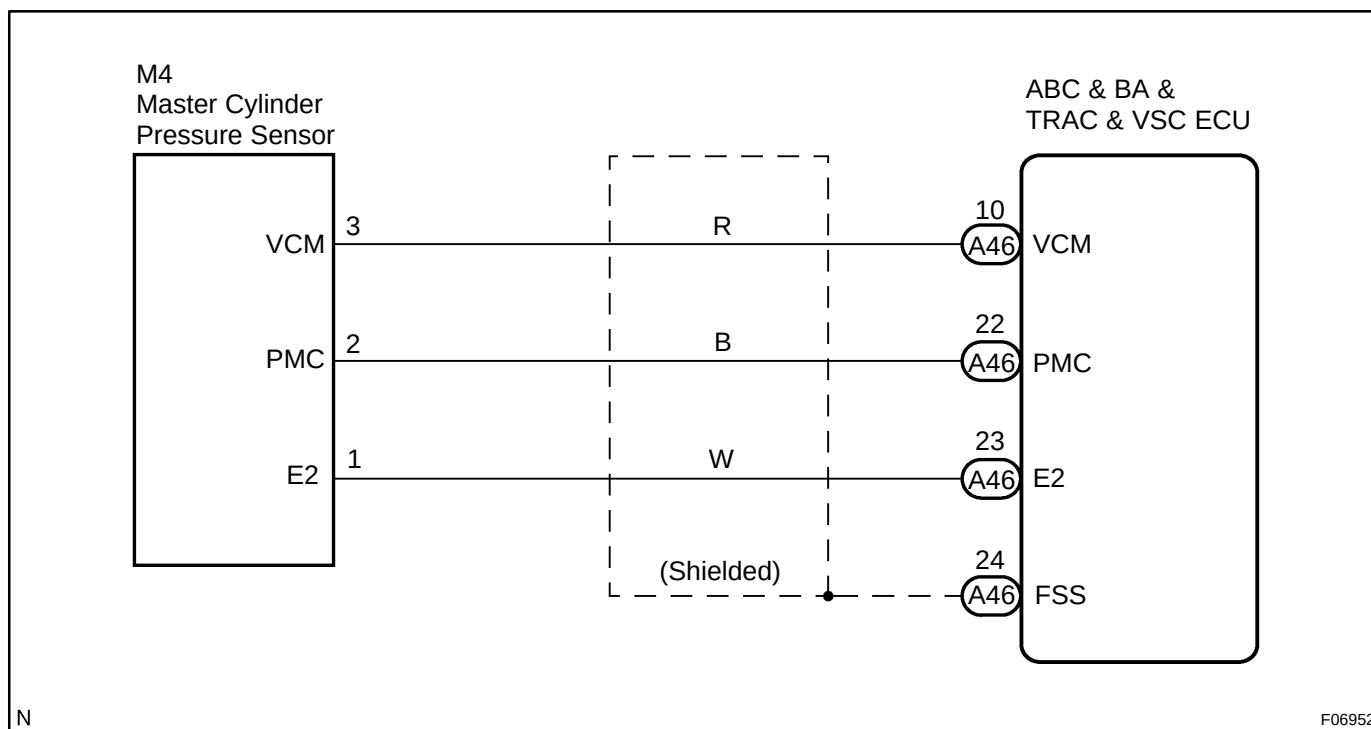
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Either of the following 1, 2, 3, 4 or 5 is detected: - 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. - The noise to ECU terminal PMC occurs 7 times for 5 sec. - 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. - 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. - 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.	●Master cylinder pressure sensor ●Master cylinder pressure sensor circuit

Fail safe function:

If a trouble has occurred in the master cylinder pressure sensor circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABC & BA & TRAC & VSC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

1 Check output value of master cylinder pressure sensor.

PREPARATION:

- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.
- Select the DATALIST mode on the LEXUS hand-held tester.

CHECK:

Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the LEXUS hand-held tester is changing when depressing the brake pedal.

OK:

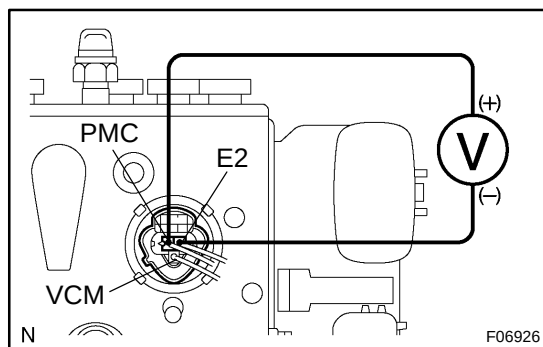
Brake fluid pressure value must be changing.

OK

Go to step 4.

NG

2 Check master cylinder pressure sensor.



PREPARATION:

Install LSPV gauge to the front brake caliper bleeder plug portion, and bleed air from the 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 Kg/cm ² , 0 psi)	0.37 – 0.63 V
5,883 kPa (60 kg/cm ² , 853 psi)	1.57 – 1.83 V
11,768 kPa (120 kg/cm ² , 1,706 psi)	2.77 – 3.03 V

HINT:

Voltage between terminals VCM and E2: 4.7 – 5.3 V

NG

Replace ABS & BA & TRAC & VSC actuator.

OK

3	Check for open and short circuit in harness and connector between master cylinder pressure sensor and ABC & BA & TRAC & VSC ECU (See page IN-31).

NG

Repair or replace harness or connector.

OK

4	Check whether or not ECU terminal STP input voltage is changed when stop light switch is turned on and off.

NO

Check stop light switch circuit (See page [BE-58](#)).

YES

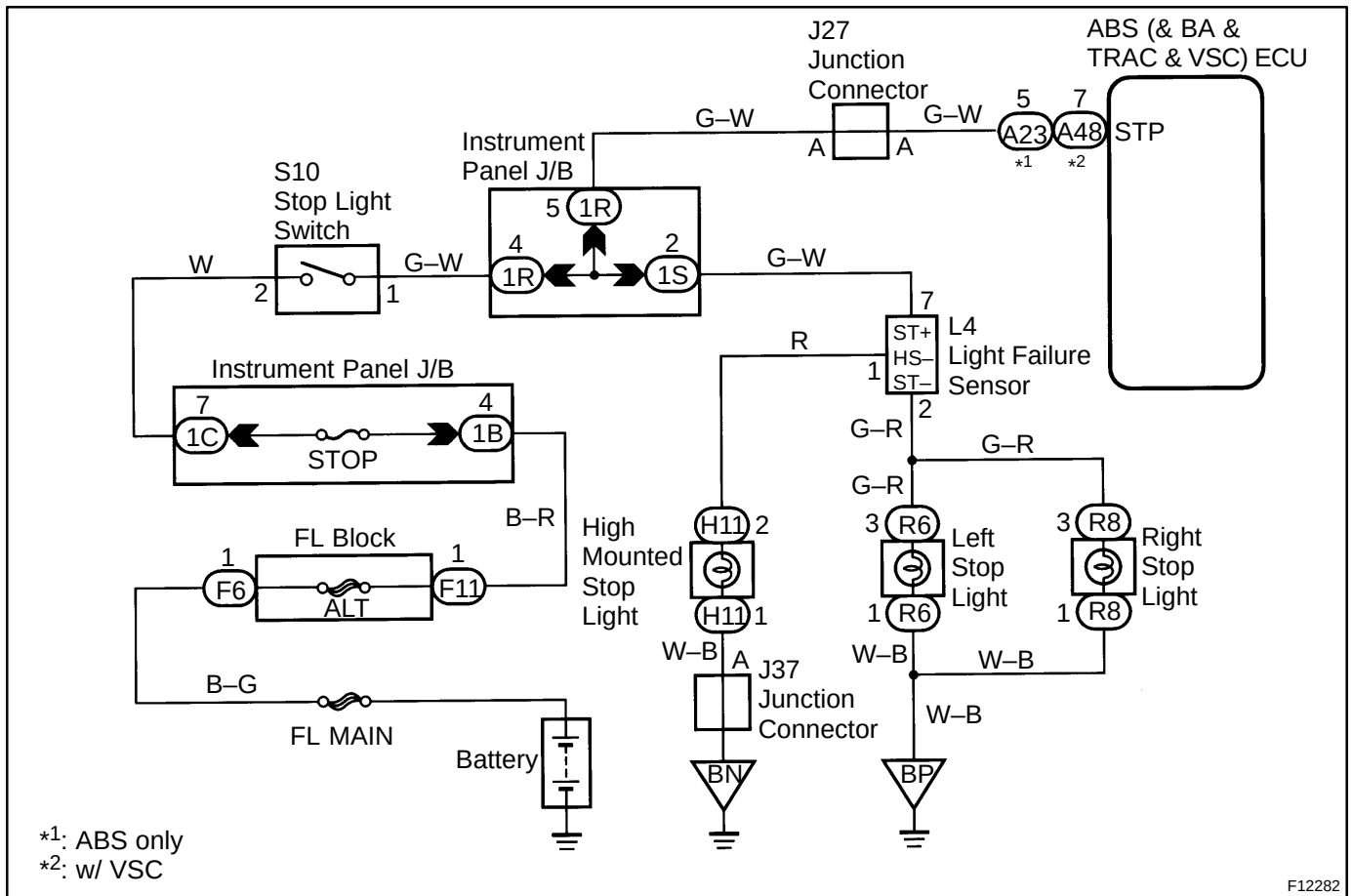
Check and replace ABC & BA & TRAC & VSC ECU.

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non-operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	Stop light switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of stop light switch.

CHECK:

Check that the stop light lights up when the brake pedal is depressed, and turns off when the brake pedal is released.

OK

Go to step 3.

NG

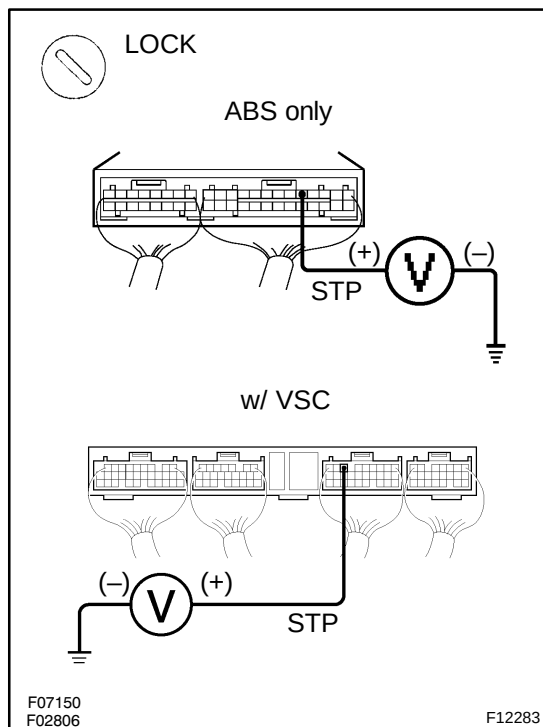
2 Check stop light circuit (See page [BE-58](#)).

NG

Repair or replace stop light circuit.

OK

3 Check voltage between terminal STP of ABS (& BA & TRAC & VSC) ECU and body ground.

**PREPARATION:**

Remove the ABS (& BA & TRAC & VSC) ECU with the connectors still connected.

CHECK:

Measure the voltage between terminal STP of the ABS (& BA & TRAC & VSC) ECU and the body ground when the brake pedal is depressed.

OK:

Voltage: 8 – 14 V

OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

NG

4

Check for open circuit in harness and connector between ABS (& BA & TRAC & VSC) ECU and stop light switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection on problem symptoms table (See page [DI-266](#)).

DTC	C1251 / 51	ABS Pump Motor Lock

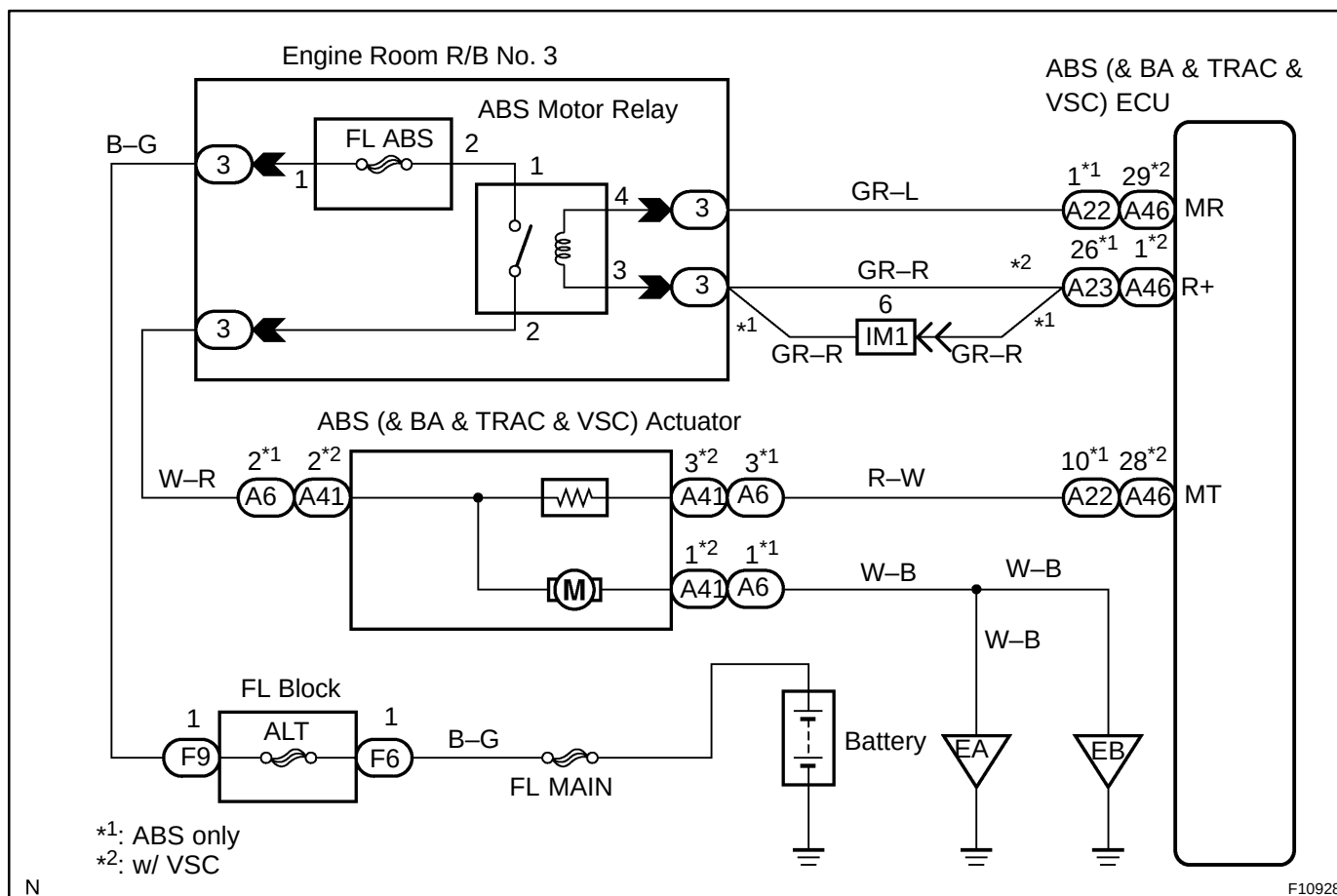
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1 or 2 is detected: 6. ABS actuator pump motor is not operating normally. 7. Open circuit condition of ABS actuator pump motor continues for 2 sec. or more.	ABS pump motor

Fail safe function:

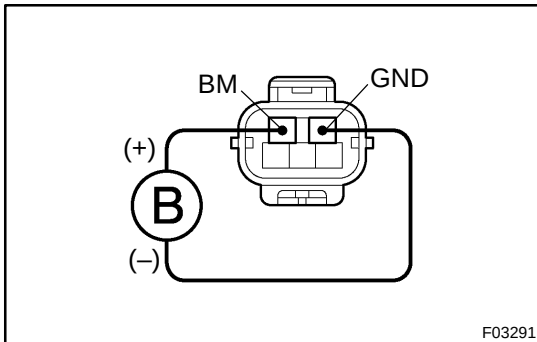
If a trouble has occurred in the ABS pump motor, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of pump motor.

**PREPARATION:**

Disconnect the connector from the ABS (& BA & TRAC & VSC) actuator.

CHECK:

Connect positive (+) lead to BM terminal and negative (-) lead to GND terminal of the ABS (&BA & TRAC & VSC) 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 motor relay, actuator and ABS (& BA & TRAC & VSC) ECU (See page [IN-31](#)).

NG

Replace ABS (& BA & TRAC & VSC) actuator.

DTC	Always ON	Malfunction in ECU

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.	●Battery ●Charging system ●Power source circuit ●ECU

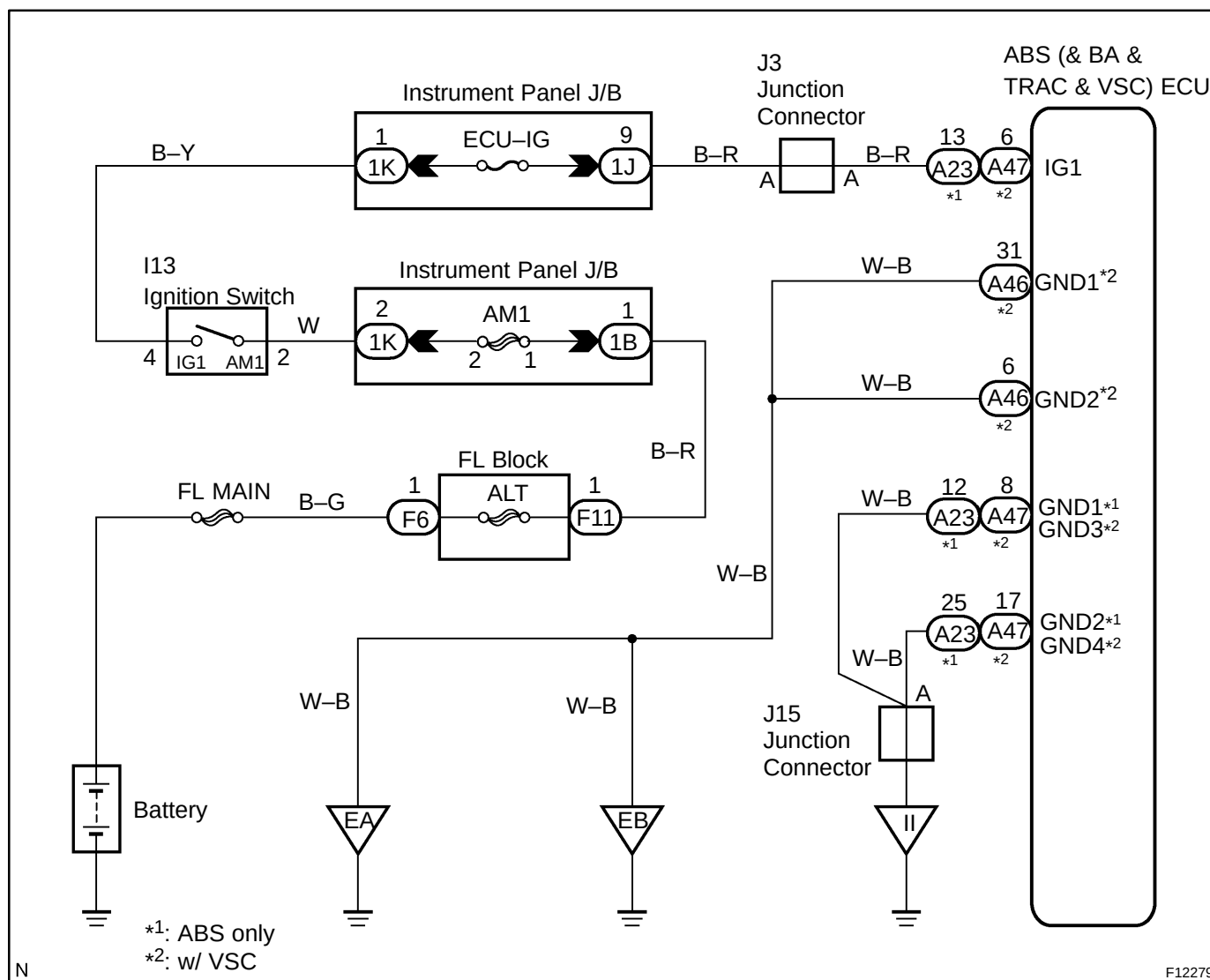
HINT:

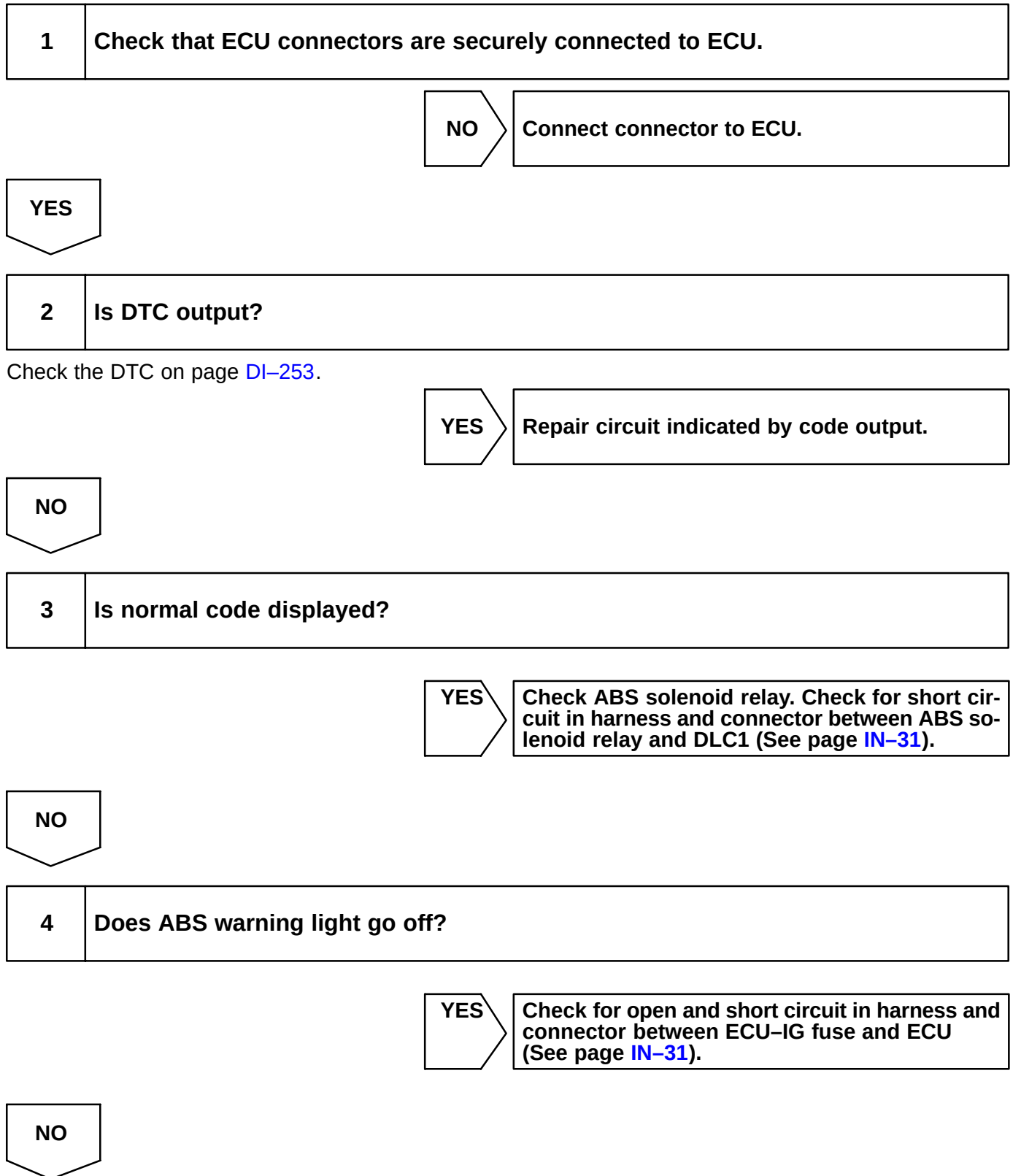
There is a case that LEXUS hand-held tester cannot be used when ECU is abnormal.

Fail safe function:

If a trouble has occurred in the ECU, the ECU cuts off the current to the ABS solenoid relay and prohibits the ABS (& BA & TRAC & VSC) controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

5	Check battery positive voltage.

CHECK:

Check the battery positive voltage.

OK:

Voltage: 10 – 16 V

NG	Check and repair charging system (See page CH-2).

OK

6	Check operation of ABS warning light.

In case of using the LEXUS hand-held tester:

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the LEXUS hand-held tester.

In case of not using the LEXUS hand-held tester:

PREPARATION:

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the ABS (& BA & TRAC & VSC) ECU.
- (c) Turn the ignition switch ON.

CHECK:

Check the ABS warning light condition when pushing in and pulling out the short pin from the DLC1.

OK:

When the short pin is pulled out: ABS warning light goes off

When the short pin is pushed in: ABS warning light comes on

OK	Check and replace ABS (& BA & TRAC & VSC) ECU.

NG

Check for short circuit in harness and connector between combination meter and ABS (& BA & TRAC & VSC) ECU, combination meter and DLC1 (See page IN-31). Check ABS solenoid relay circuit (See page DI-281).

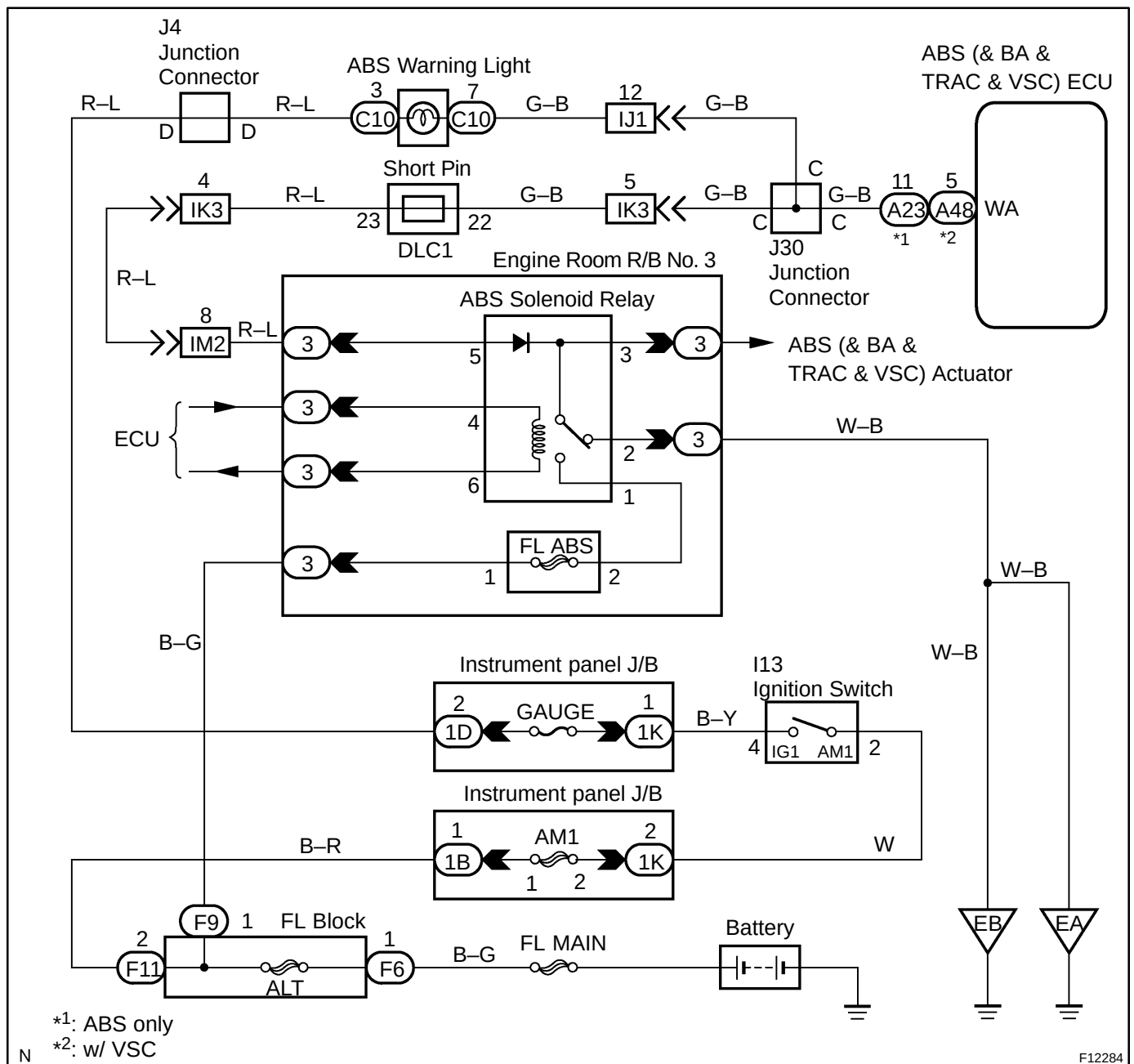
ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects a trouble, it lights the ABS warning light, and prohibits the ABS control simultaneously. At this time, the ECU records a DTC in memory.

After removing the short pin of the DLC1, connect terminals Tc and E₁ of the DLC1 or Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

ABS warning light does not light up	*1
ABS warning light remains on	*2

*1: Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using LEXUS hand-held tester.

*2: After inspection with step 4, start the inspection from step 5 in case of using the LEXUS hand-held tester and start from step 6 in case of not using LEXUS hand-held tester.

1	Check operation of ABS warning light.

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the LEXUS hand-held tester.

OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

NG

2	Check ABS warning light.

See the combination meter troubleshooting on page [BE-65](#).

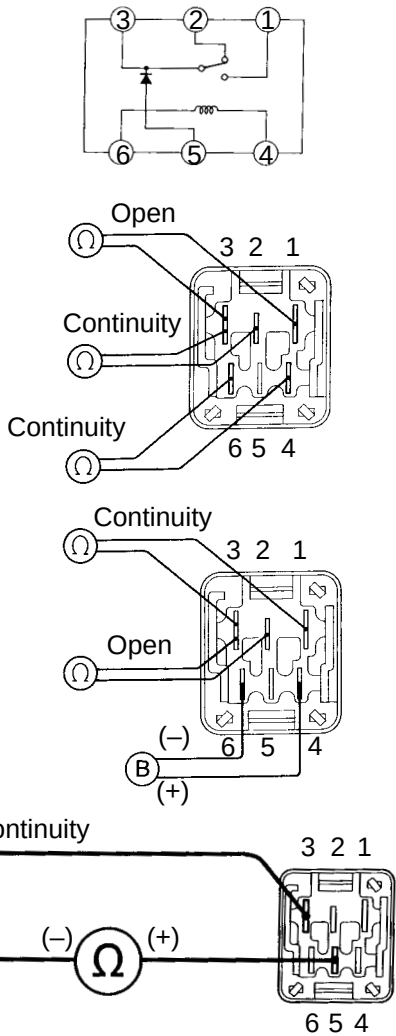
NG

Repair bulb or combination meter assembly.

OK

3

Check ABS solenoid relay.



BR5403
R15254
R15255
R15964

F00043

PREPARATION:

Remove the ABS solenoid relay from the engine room R/B.

CHECK:

Check the continuity between each terminal of the ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

- Apply battery positive voltage between terminals 4 and 6.
- Check the continuity between each terminal of the ABS solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

CHECK:

Connect positive (+) test lead to terminal 5 and negative (-) lead to terminal 3. Check the continuity between the terminals.

OK:

Continuity

If there is no continuity, connect negative (-) test lead to terminal 5 and positive (+) lead to terminal 3. Check continuity between the terminals.

NG

Replace ABS solenoid relay.

OK

Repair or replace and check for open circuit in harness and connector between DLC1 and ABS solenoid relay and body ground (See page IN-31).

4	Check that ECU connectors are securely connected to ECU.

NO**Connect connector to ECU.****YES**

5	Check operation of ABS warning light (See step 1).

OK**Check and replace ABS (& BA & TRAC & VSC) ECU.****NG**

6	Is DTC output?

Check the DTC on page [DI-253](#).**YES****Repair circuit indicated by code output.****NO**

7	Does ABS warning light go off if short pin is removed?

NO**Check for short circuit in harness and connector between warning light and DLC1 and ECU (See page [IN-31](#)).****YES**

8 Check ABS solenoid relay (See step 3).

NG

Replace ABS solenoid relay.

OK

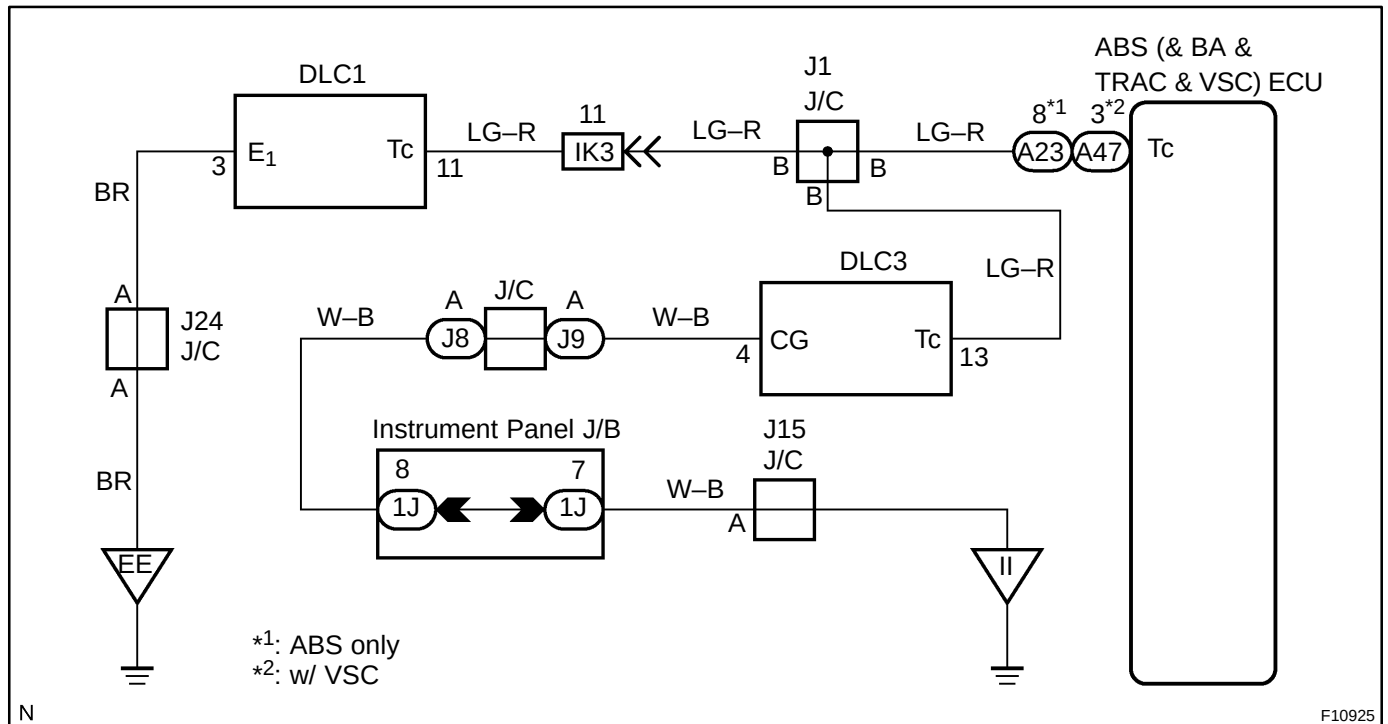
Check for short circuit in harness and connector between DLC1 and ABS solenoid relay (See page [IN-31](#)).

Tc Terminal Circuit

CIRCUIT DESCRIPTION

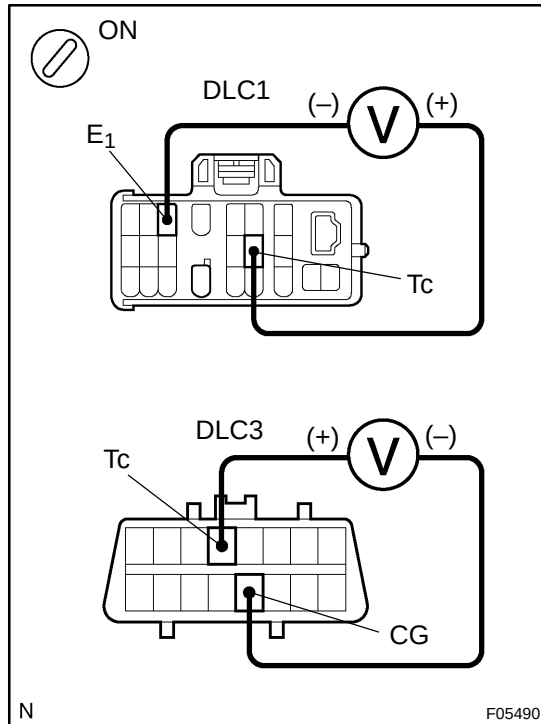
Connecting terminals Tc and E₁ of the DLC1 or Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E ₁ of DLC1 or Tc and CG of the DLC3.

**PREPARATION:**

Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal Tc and E₁ of the DLC1 or Tc and CG of the DLC3.

OK:

Voltage: 10 – 14 V

OK

If ABS warning light does not blink even after Tc and E₁ or 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 ABS (& BA & TRAC & VSC) ECU and DLC1 or DLC3, DLC1 or DLC3 and body ground (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

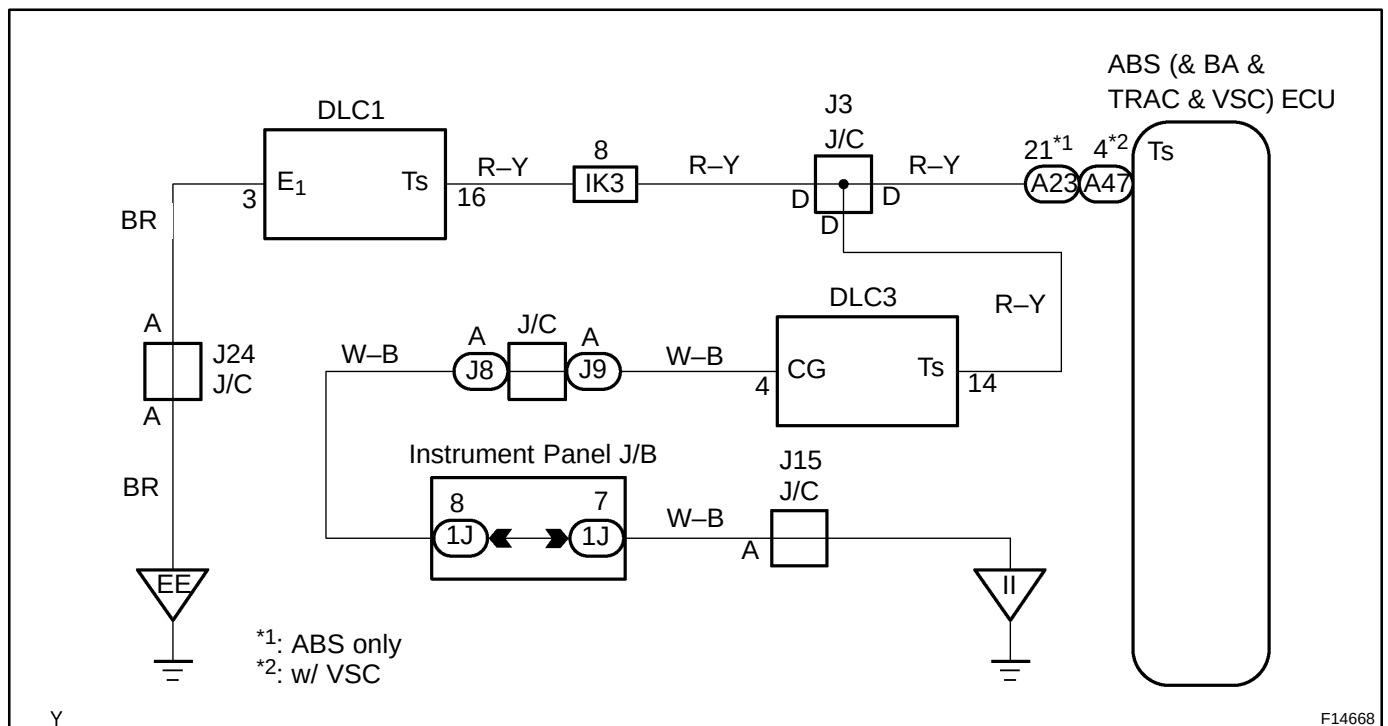
Ts Terminal Circuit

CIRCUIT DESCRIPTION

In the sensor check mode, a malfunction of the speed sensor that can not be judged when the vehicle is stopped is judged while driving.

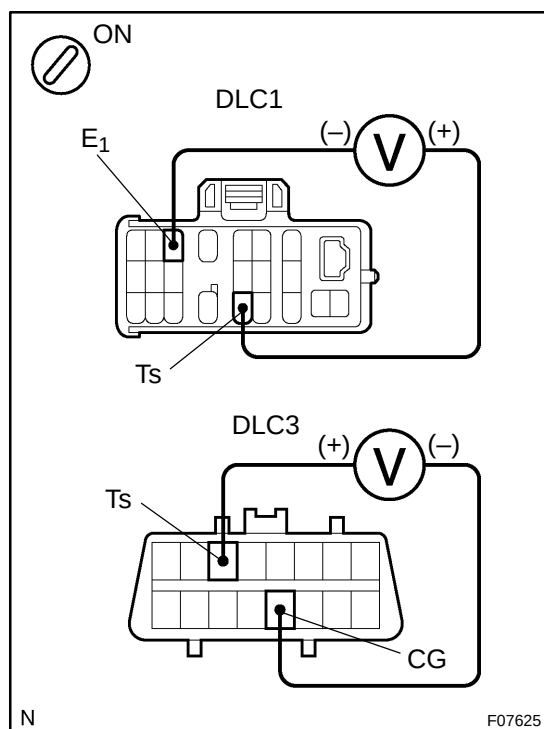
Transition to the sensor check mode can be performed by connecting terminals Ts and E₁ of the DLC1 or Ts and CG of the DLC3 and turning the ignition switch from OFF to ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and E₁ of DLC1 or Ts and CG of DLC3.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals Ts and E₁ of the DLC1 or Ts and CG of the DLC3.

OK:

Voltage: 10 – 14 V

OK

If ABS warning light does not blink even after Ts and E₁ or Ts 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 ABS (& BA & TRAC & VSC) ECU and DLC1 or DLC3, DLC1 or DLC3 and body ground (See page IN-31).

NG

Repair or replace harness or connector.

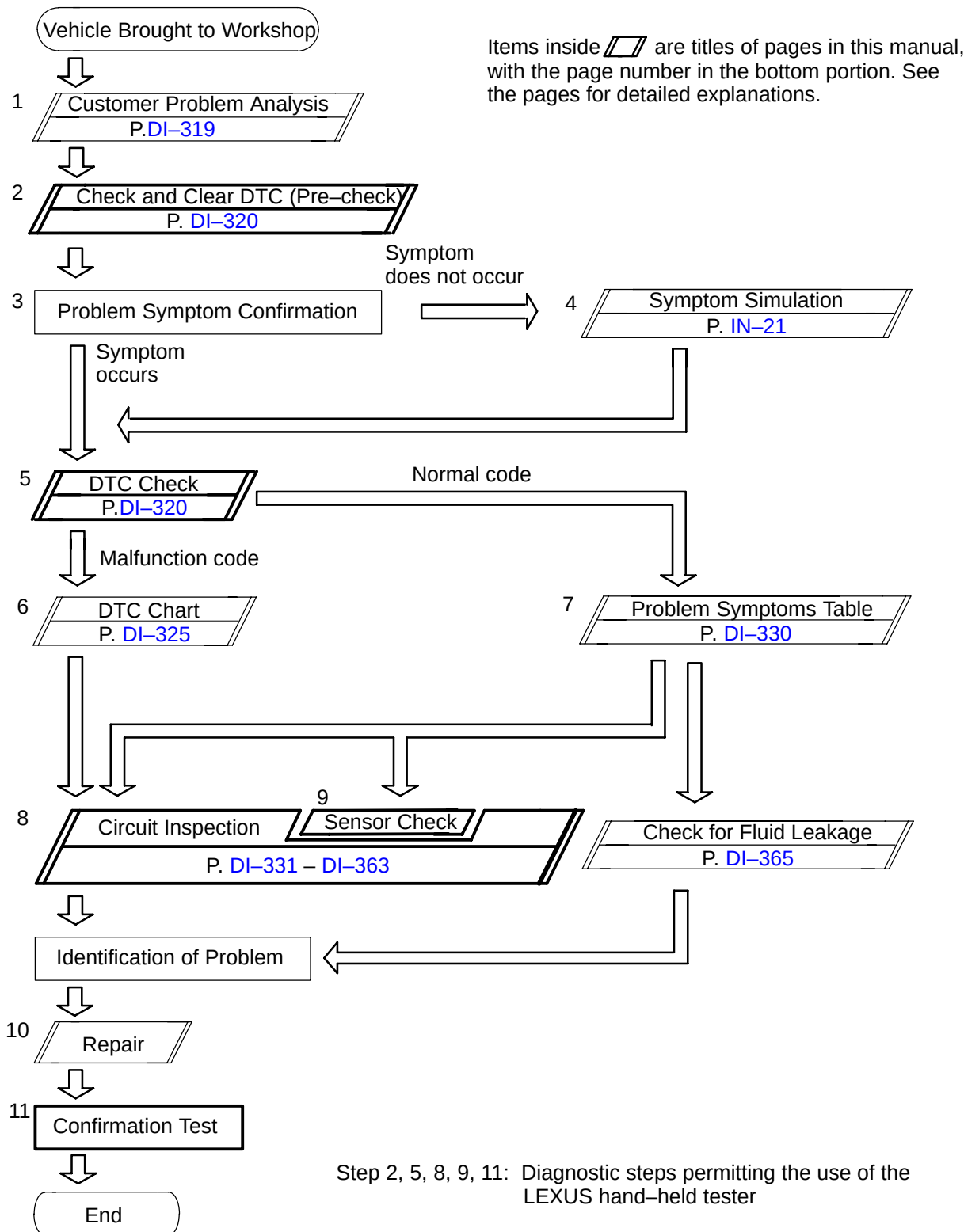
OK

Check and replace ABS (& BA & TRAC & VSC) ECU.

VEHICLE SKID CONTROL (VSC) & BRAKE ASSIST (BA) SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1GR-08



CUSTOMER PROBLEM ANALYSIS CHECK

ABS & BA & VSC Check Sheet

Inspector's
Name

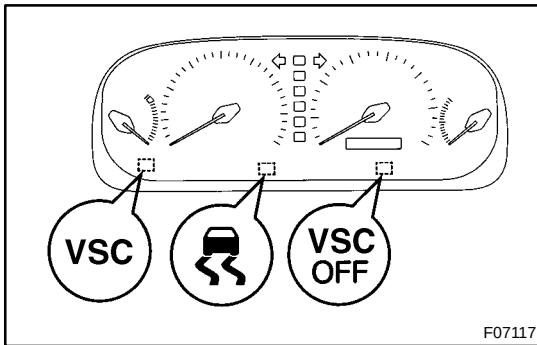
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ BA does not operate.	
	☐ TRAC does not operate.	
	☐ VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	VSC OFF Indicator Light Abnormal	☐ Remains on ☐ Does not light up
	VSC Warning Indicator Abnormal	☐ Displays ☐ Does not display
	SLIP Indicator Light Abnormal	☐ Remains on ☐ Does not light up

Check Item	ABS Warning Light	☐ Normal ☐ Malfunction code (code)
	Malfunction Indicator Light	☐ Normal ☐ Malfunction code (code)

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



PRE-CHECK

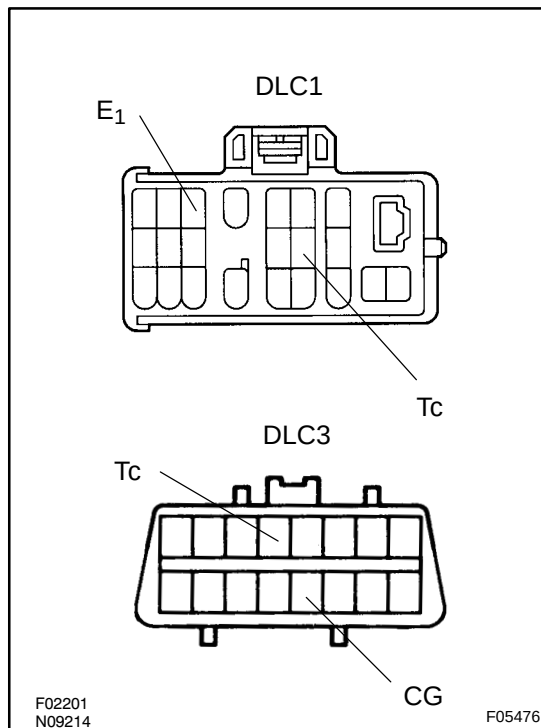
1. DIAGNOSIS SYSTEM

(a) Check the indicator.

When the ignition switch is turned ON, check that the VSC warning light, VSC OFF indicator light and SLIP indicator light comes on for about 3 seconds.

HINT:

- If the ECU stores DTC, VSC warning light and VSC OFF indicator light are on.
- If the indicator check result is not normal, proceed to troubleshooting for the VSC warning light circuit, VSC OFF indicator light circuit, and SLIP indicator light circuit (See page [DI-353](#), [DI-357](#), [DI-360](#)).



(b) In case of not using LEXUS hand-held tester: Check the DTC

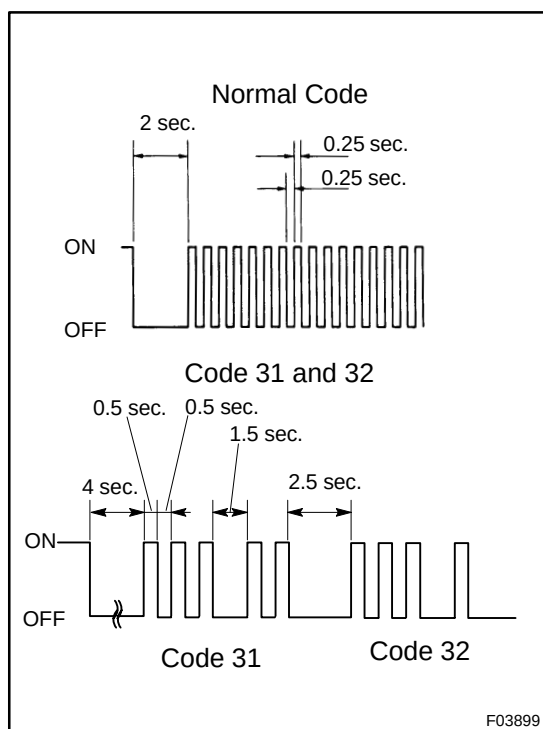
- (1) Using SST, connect terminals Tc and E₁ of the DLC1 or terminals Tc and CG of the DLC3.

SST 09843-18020 or 09843-18040

- (2) Turn the ignition switch ON.
- (3) Read the DTC from the VSC warning light on the combination meter.

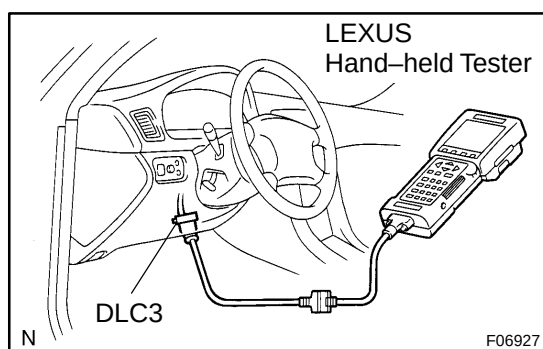
HINT:

- If no code appears, inspect the diagnostic circuit or VSC warning light circuit (See page [DI-353](#) or [DI-314](#)).



- As an example, the blinking patterns for the normal code and code 31 and 32 are shown in the illustration.
- (4) Codes are explained in the code table on page [DI-325](#).
- (5) After completing the check, disconnect terminals Tc and E₁ of the DLC1 or Tc and CG of the DLC3, and turn OFF the display.

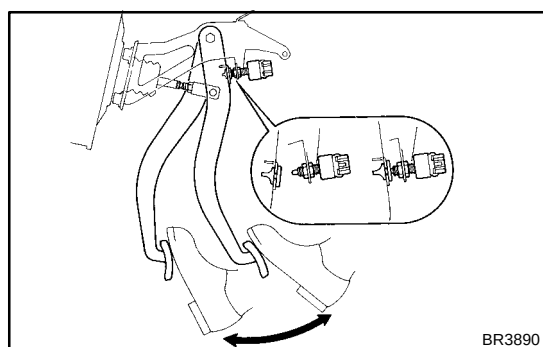
If 2 or more malfunctions are indicated simultaneously, the lowest numbered DTC will be displayed first.



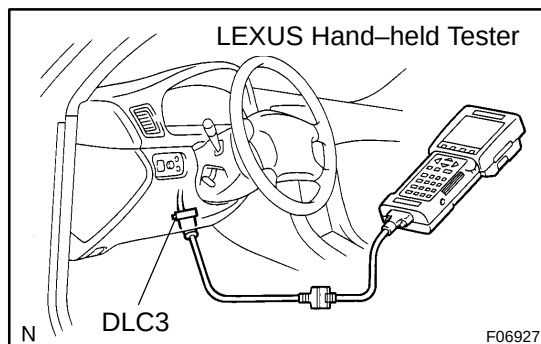
- (c) In case of using LEXUS hand-held tester:
Check the DTC.
- Connect the LEXUS hand-held tester to the DLC3.
 - Turn the ignition switch ON.
 - Read the DTC by following the prompts on the tester screen.

HINT:

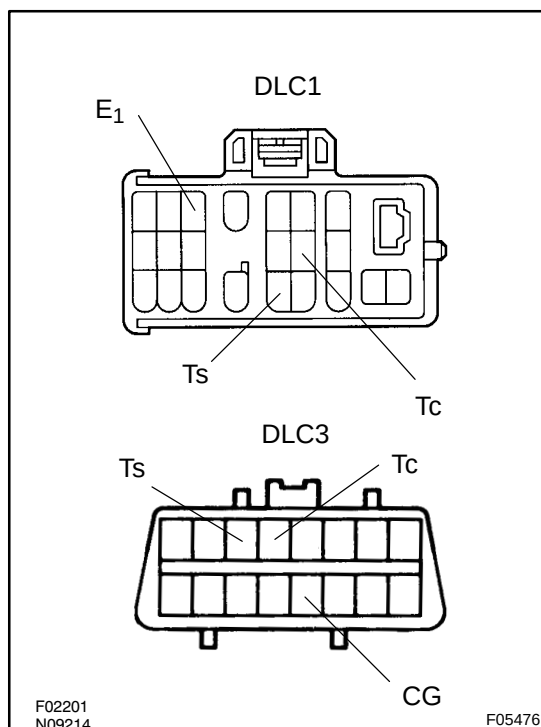
Please refer to the LEXUS hand-held tester operator's manual for further details.



- (d) In case of not using LEXUS hand-held tester:
Clear the DTC.
- Using SST, connect terminals Tc and E₁ of the DLC1 or Tc and CG of the DLC3.
- SST 09843-18020 or 09843-18040
- Turn the ignition switch ON.
 - Clear the DTC stored in the ECU by depressing the brake pedal 8 or more times within 5 seconds.
 - Check that the warning light shows the normal code.
 - Remove the SST from the terminals of the DLC1 or the DLC3.
- SST 09843-18020 or 09843-18040



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



2. Test Mode: VSC SENSOR CHECK

HINT:

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

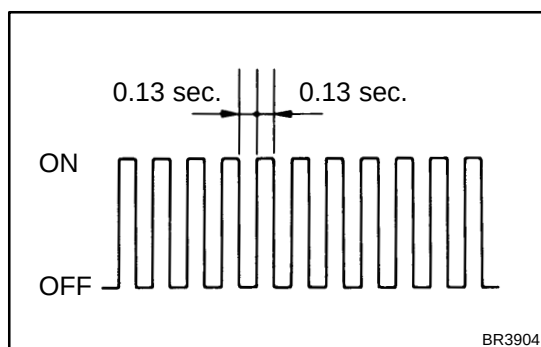
- (a) In case of not using LEXUS hand-held tester:
Check the VSC sensor signal.
- (1) Turn the ignition switch OFF.
 - (2) Check that the shift lever position is at P range, turn the steering wheel to the neutral position.
 - (3) Using SST, connect terminals Ts and E₁ of the DLC1 or terminals Ts and CG of the DLC3.
SST 09843-18020 or 09843-18040
 - (4) Start the engine.

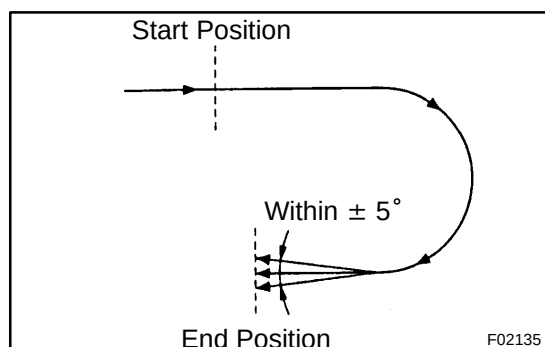
- (5) Check that the VSC warning light blinks.

HINT:

If the VSC warning light does not blink, inspect the VSC warning light circuit and Ts terminal circuit (See page [DI-353](#), [DI-316](#)).

- (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, 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 front wheels.

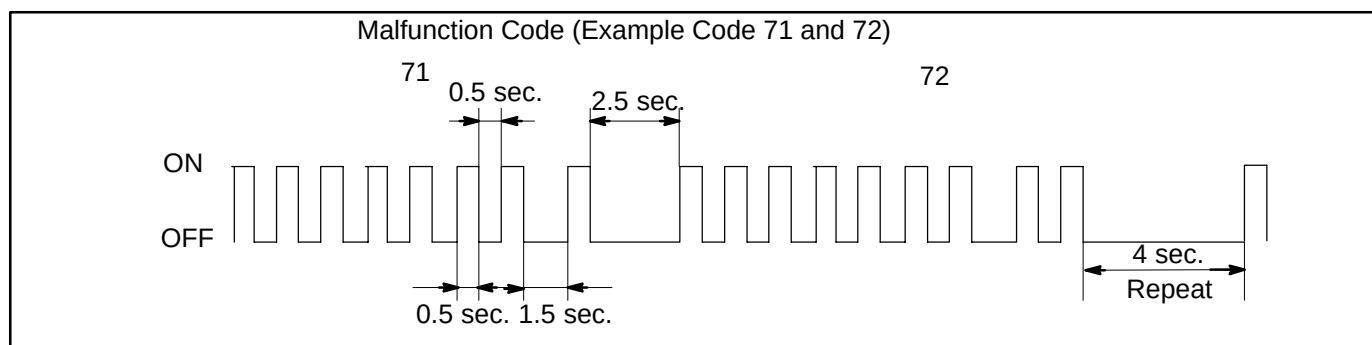
- (9) Using SST, connect terminals Tc and E₁ of the DLC1 or terminals Tc and CG of the DLC3.

SST 09843-18020 or 09843-18040

- (10) Read the number of blinks of the VSC warning light.

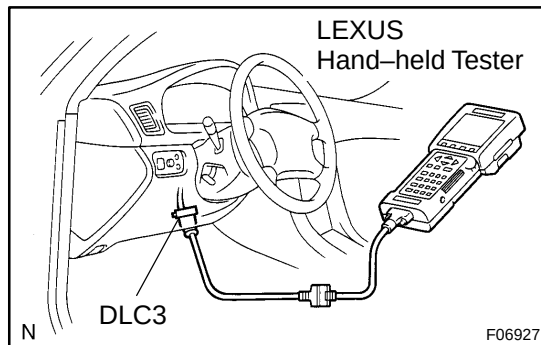
HINT:

- See the DTC list shown at the bottom on this page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated.)
- If 2 or more malfunctions are indicated simultaneously, the lowest numbered code will be displayed first.



- (11) After doing the check, disconnect the SST from terminals Ts and E₁, Tc and E₁ of the DLC1 or Ts and CG, Tc and CG of the DLC3 and turn the ignition switch OFF.

SST 09843-18020 or 09843-18040



- (b) In case of using LEXUS hand-held tester:
Check the VSC sensor signal.
- (1) Connect the LEXUS 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 LEXUS hand-held tester operator's manual for further details.

DTC of VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371 / 71	Yaw rate sensor output signal malfunction	●Yaw rate sensor ●Yaw rate sensor circuit
C1208 / 72	Steering angle sensor output signal malfunction	●Steering angle sensor ●Steering angle sensor circuit

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.

- (a) When replacing the ECU:

After replacing ECU, shift the shift lever in P position and turn the ignition switch ON. Do not move the vehicle for 15 sec. or more.

HINT:

At this time, VSC warning light and VSC OFF indicator light are on for 15 seconds and go off.

- (b) When replacing the yaw rate sensor assembly:

Shift the shift lever in P position and turn the ignition switch ON, repeat connecting and releasing Ts and E1 terminals of the DLC1 4 times or more for 8 sec. After that do not move the vehicle for 15 sec. or more.

HINT:

When the operation (b) is performed, DTC is deleted.

At this time, ABS warning light flashes. VSC OFF light lights up for 15 sec., then goes off. VSC warning light lights up for approx. 15 sec., then flashes to indicate DTC.

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843–18020 or 09843–18040, connect terminals Tc and E₁ of the DLC1 or Tc and CG of the DLC3.
- If no abnormality is found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed by code. For details of each code, refer to the "See page" under the respective "DTC No." in the DTC chart.

DTC No. (See page)	Detection Item	Trouble Area
C1231 / 31 (DI-343)	Malfunction in steering angle sensor	●Steering angle sensor ●Steering angle sensor circuit
C1233 / 33 (DI-347)	Open or short circuit of yaw rate sensor circuit	●Yaw rate sensor ●Yaw rate sensor circuit
C1234 / 34 (DI-347)	Malfunction in yaw rate sensor	●Yaw rate sensor ●Yaw rate sensor circuit
C1207 / 37 (DI-337)	Malfunction in Park/Neutral position switch	●Park/Neutral position switch ●Park/Neutral position switch (Park/Reverse position circuit)
C1223 / 43 (DI-340)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI-341)	Open or short circuit of NE signal circuit	●NEO circuit ●ECM
C1201 / 51* (DI-331)	ECM system malfunction	Engine control system
C1202 / 52 (DI-332)	Brake fluid level low Open circuit of brake fluid level warning switch circuit	●Brake fluid level ●Brake fluid level warning switch ●Brake fluid level warning switch circuit
C1203 / 53 (DI-335)	ECM communication circuit malfunction	●TRC+ or TRC– circuit ●ENG+or ENG– circuit ●ECM
Always ON (DI-353)	Malfunction in ABS & BA & TRAC & VSC ECU Open circuit of VSC warning indicator circuit	●Power source circuit ●ABS & BA & TRAC & VSC ECU ●VSC warning indicator circuit ●Charging system

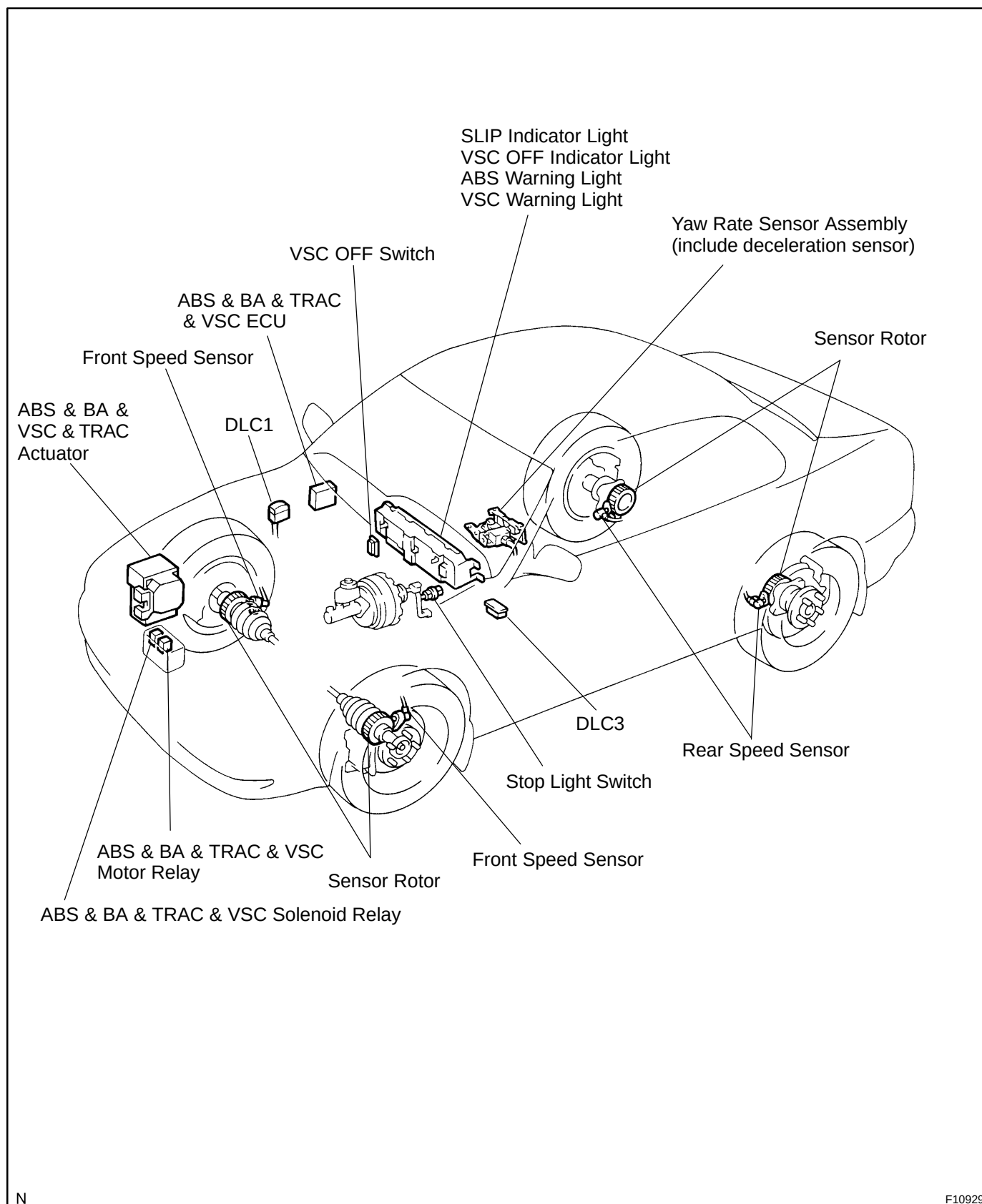
* : At the same time, when the check engine light lights up, there is a malfunction in the engine system.

At the same time, when the check engine light goes off, BA & TRAC & VSC system is normal.

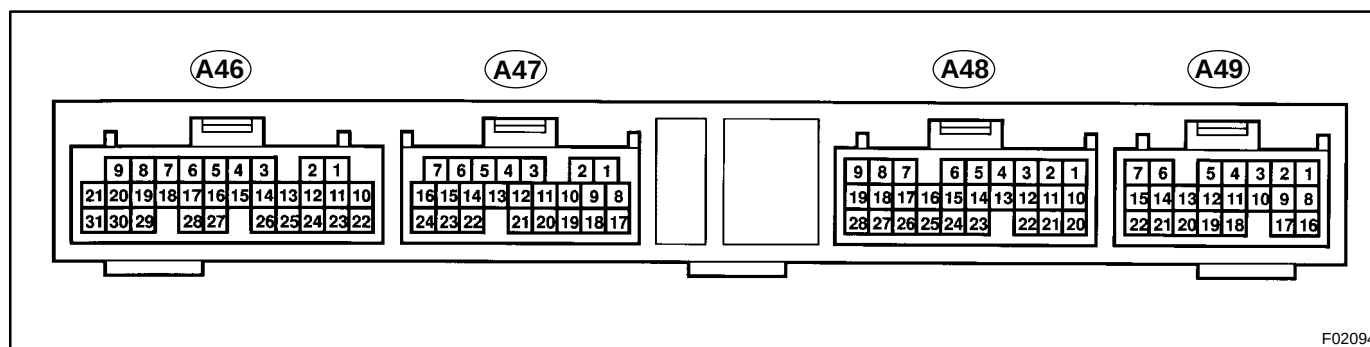
HINT:

There is a case that LEXUS hand-held tester cannot be used when the VSC warning indicator is always on.

PARTS LOCATION



TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
SMC1 (A46 – 2) – GND (A46 – 6, 31, A47 – 8, 17)	Y–R – W–B	IG switch ON ABS warning light OFF	10 – 14
SMC2 (A46 – 3) – GND (A46 – 6, 31, A47 – 8, 17)	Y–B – W–B	IG switch ON ABS warning light OFF	10 – 14
SRC1 (A46 – 4) – GND (A46 – 6, 31, A47 – 8, 17)	B–R – W–B	IG switch ON ABS warning light OFF	10 – 14
SRC2 (A46 – 5) – GND (A46 – 6, 31, A47 – 8, 17)	B–Y – W–B	IG switch ON ABS warning light OFF	10 – 14
SFLR (A46 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	W–L – W–B	IG switch ON ABS warning light OFF	10 – 14
SRRH (A46 – 8) – GND (A46 – 6, 31, A47 – 8, 17)	W–R – W–B	IG switch ON ABS warning light OFF	10 – 14
SRRR (A46 – 9) – GND (A46 – 6, 31, A47 – 8, 17)	R–G – W–B	IG switch ON ABS warning light OFF	10 – 14
VCM (A46 – 10) – GND (A46 – 6, 31, A47 – 8, 17)	R – W–B	IG switch ON	4.5 – 5.5
FR+ (A46 – 14) – FR– (A46 – 13)	W – B	IG switch ON Slowly turn right front wheel	AC generation
FL+ (A46 – 16) – FL– (A46 – 15)	R – G	IG switch ON Slowly turn left front wheel	AC generation
SR (A46 – 19) – R+ (A46 – 1)	GR – GR–R	IG switch ON ABS warning light OFF	10 – 14
SFLH (A46 – 21) – GND (A46 – 6, 31, A47 – 8, 17)	L–B – W–B	IG switch ON ABS warning light OFF	10 – 14
PMC (A46 – 22) – E2 (A46 – 23)	B – W	IG switch ON Stop light switch OFF	0.3 – 0.7
E2 (A46 – 23) – GND (A46 – 6, 31, A47 – 8, 17)	W – W–B	IG switch OFF	Continuity
FSS (A46 – 24) – GND (A46 – 6, 31, A47 – 8, 17)	Shielded – W–B	IG switch OFF	Continuity
MT (A46 – 28) – GND (A46 – 6, 31, A47 – 8, 17)	R–W – W–B	IG switch ON Motor relay is OFF	Below 1.5
MR (A46 – 29) – GND (A46 – 6, 31, A47 – 8, 17)	GR–L – W–B	IG switch ON ABS motor stops	10 – 14
VGS (A47 – 1) – GGND (A47 – 10)	W – R	IG switch ON	4.5 – 5.5
GL1 (A47 – 2) – GGND (A47 – 10)	G – R	IG switch ON Vehicle is placed on the level surface	2 – 3

Tc (A47 – 3) – GND (A46 – 6, 31, A47 – 8, 17)	LG–R – W–B	IG switch ON	10 – 14
Ts (A47 – 4) – GND (A46 – 6, 31, A47 – 8, 17)	R–Y – W–B	IG switch ON	10 – 14
IG1 (A47 – 6) – GND (A46 – 6, 31, A47 – 8, 17)	B–R – W–B	IG switch ON	10 – 14
NEO (A47 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	BR–W – W–B	Engine idling	Pulse generation
GL2 (A47 – 9) – GGND (A47 – 10)	B – R	IG switch ON Vehicle is placed on the level surface	2.0 – 3.0
GGND (A47 – 10) – GND (A46 – 6, 31, A47 – 8, 17)	R – W–B	IG switch OFF	Continuity
RR+ (A47 – 11) – RR– (A47 – 12)	W – B	IG switch ON Slowly turn right rear wheel	AC generation
ENG+ (A47 – 14) – ENG– (A47 – 22)	W – B	IG switch ON Engine idling	Pulse generation
GSS (A47 – 18) – GND (A46 – 6, 31, A47 – 8, 17)	Shielded – W–B	IG switch OFF	Continuity
RL+ (A47 – 19) – RL– (A47 – 20)	R – G	IG switch ON Slowly turn left rear wheel	AC generation
TRC+ (A47 – 24) – TRC– (A47 – 16)	LG – L	IG switch ON Engine idling	Pulse generation
LBLO (A48 – 1) – GND (A46 – 6, 31, A47 – 8, 17)	R–W – 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
FRO (A48 – 2) – GND (A46 – 6, 31, A47 – 8, 17)	GR–R – W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
RRO (A48 – 3) – GND (A46 – 6, 31, A47 – 8, 17)	GR–L – W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
VSCW (A48 – 4) – GND (A46 – 6, 31, A47 – 8, 17)	R–L – W–B	IG switch ON VSC warning light ON	Below 2.0
		IG switch ON VSC warning light OFF	10 – 14
WA (A48 – 5) – GND (A46 – 6, 31, A47 – 8, 17)	G–B – W–B	IG switch ON ABS warning light ON	Below 2.0
		IG switch ON ABS warning light OFF	10 – 14
IND (A48 – 6) – GND (A46 – 6, 31, A47 – 8, 17)	LG – W–B	IG switch ON SLIP indicator light ON	Below 2.0
		IG switch ON SLIP indicator light OFF	10 – 14
STP (A48 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	G–W – W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
VYS (A48 – 9) – GYAW (A48 – 27)	R – B	IG switch ON	4.5 – 5.5
LBL– (A48 – 11) – GND (A46 – 6, 31, A47 – 8, 17)	R–W – W–B	IG switch ON Fluid in master cylinder reservoir above MIN level	About 4 – 8
WT (A48 – 13) – GND (A46 – 6, 31, A47 – 8, 17)	L – W–B	IG switch ON VSC OFF indicator light ON	Below 2.0
		IG switch ON VSC OFF indicator light OFF	10 – 14
SS1+ (A48 – 14) – SS1– (A48 – 23)	P – V	Engine idling Slowly turn steering wheel	Pulse generation (See page DI-343)
R (A48 – 15) – GND (A46 – 6, 31, A47 – 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 (A48 – 16) – GND (A46 – 6, 31, A47 – 8, 17)	L – W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation

YSS (A48 – 18) – GND (A46 – 6, 31, A47 – 8, 17)	Shielded – W–B	IG switch OFF	Continuity
YD (A48 – 19) – GND (A46 – 6, 31, A47 – 8, 17)	B–L – W–B	IG switch ON VSC warning light OFF	4.5 – 5.5
BZ (A48 – 20) – GND (A46 – 6, 31, A47 – 8, 17)	P–B – W–B	IG switch ON VSC buzzer sounds	Below 1.0 ↔ 10 – 14
		IG switch ON VSC buzzer does not sound	10 – 14
P (A48 – 24) – GND (A46 – 6, 31, A47 – 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 (A48 – 25) – GND (A46 – 6, 31, A47 – 8, 17)	W – W–B	IG switch ON	10 – 14
CSW (A48 – 26) – GND (A46 – 6, 31, A47 – 8, 17)	LG – W–B	IG switch ON VSC cut switch pushed in	Below 1.5
		IG switch ON VSC cut switch released	8 – 14
GYAW (A48 – 27) – GND (A46 – 6, 31, A47 – 8, 17)	B – W–B	IG switch OFF	Continuity
YAW (A48 – 28) – GYAW (A48 – 27)	W – B	IG switch ON Vehicle is in stationary condition	2 – 3
SRLR (A49 – 1) – GND (A46 – 6, 31, A47 – 8, 17)	LG–B – W–B	IG switch ON ABS warning light OFF	10 – 14
AST (A49 – 6) – GND (A46 – 6, 31, A47 – 8, 17)	R – W–B	IG switch ON ABS warning light OFF	10 – 14
SRLH (A49 – 7) – GND (A46 – 6, 31, A47 – 8, 17)	G–Y – W–B	IG switch ON ABS warning light OFF	10 – 14
SFRR (A49 – 8) – GND (A46 – 6, 31, A47 – 8, 17)	W–R – W–B	IG switch ON ABS warning light OFF	10 – 14
SMV2 (A49 – 15) – GND (A46 – 6, 31, A47 – 8, 17)	Y–G – W–B	IG switch ON ABS warning light OFF	10 – 14
SFRH (A49 – 16) – GND (A46 – 6, 31, A47 – 8, 17)	R–B – W–B	IG switch ON ABS warning light OFF	10 – 14
SMV1 (A49 – 22) – GND (A46 – 6, 31, A47 – 8, 17)	L–R – W–B	IG switch ON ABS warning light OFF	10 – 14

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

NOTICE:

When replacing ABS & BA & TRAC & VSC ECU, sensor or etc., turn the IG switch OFF.

Symptom	Suspected Area	See page
TRAC does not operate	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & BA & TRAC & VCS ECU. 1. Check the DTC, reconfirming that the normal code is output 2. IG power source circuit 3. Check the hydraulic circuit for leakage 4. Speed sensor circuit	DI-320 DI-290 DI-365 DI-267
VSC does not operate	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & BA & TRAC & VCS ECU. 1. Check the DTC, reconfirming that the normal code is output 2. IG power source circuit 3. Check the hydraulic circuit for leakage 4. Speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit	DI-320 DI-290 DI-365 DI-267 DI-296 DI-347 DI-343
BA does not operate	Stop light switch circuit	DI-301
SLIP indicator light is abnormal	SLIP indicator light circuit	DI-360
VSC OFF indicator is abnormal	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & BA & TRAC & VCS ECU. 1. VSC OFF indicator light circuit 2. VSC OFF switch circuit	DI-357 DI-357
DTC check is impossible	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & BA & TRAC & VCS ECU. 1. VSC warning indicator circuit 2. Tc terminal circuit	DI-353 DI-314
VSC warning light is abnormal	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & BA & TRAC & VCS ECU. 1. VSC warning indicator circuit 2. ABS & BA & TRAC & VCS ECU	DI-353 DI-353

CIRCUIT INSPECTION

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If a trouble has occurred in the engine control system, the ECU prohibits the BA & TRAC & VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51*	When any of the following 1 or 2 is detected: 1. When the engine rotation is 500 rpm or more and ENG malfunction signal is sent or during TRAC controlling, TRAC control prohibition request from ECM continues for more than 0.048 sec. 2. When ECM has memory of ECM malfunction had occurred, TRAC control prohibition request from ECM continues for more than 1 sec.	Engine control system

* :

At the same time, when the check engine light lights up, there is a malfunction in the engine system.
At the same time, when the check engine light goes off, BA & TRAC & VSC system is normal.

INSPECTION PROCEDURE

1	Check DTC for engine (See page DI-3).

***1**

Repair engine control system according to code output.

***2**

Check for ECM connected to malfunction indicator light.

*1: Output NG code

*2: Malfunction indicator light remains ON

DTC	C1202 / 52	Brake Fluid Level Warning Switch Circuit

CIRCUIT DESCRIPTION

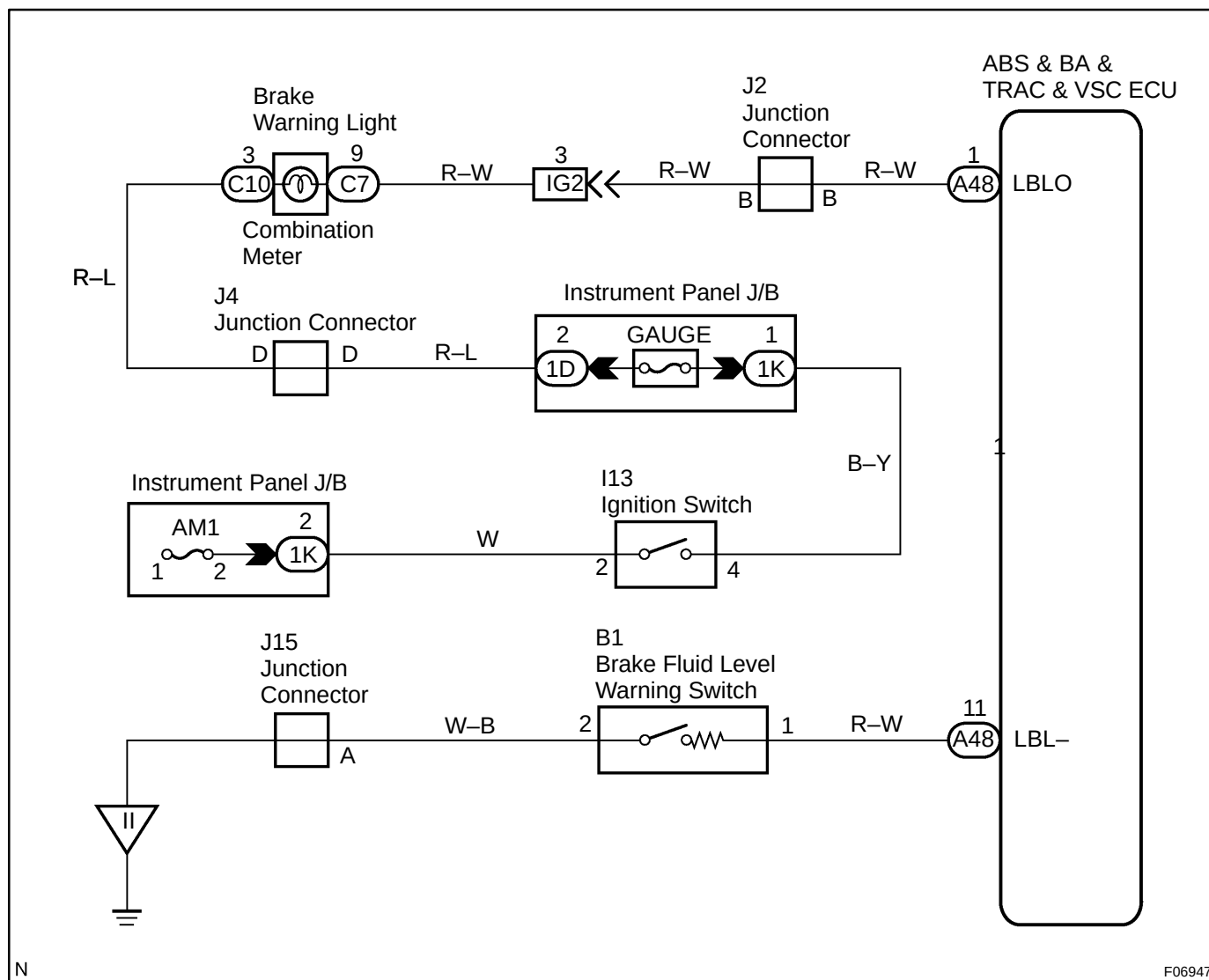
The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.

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. ●While driving, the condition that the brake fluid low level signal is ON and the force compounded by the centrifugal force in lateral and the back and forth direction is 0.28 G or less continues for 60 sec. ●With the vehicle stationary, the condition that the brake fluid low level signal is ON continues for 30 sec.	●Brake fluid level ●Brake fluid level warning switch ●Brake fluid level warning switch circuit

HINT:

Depress the parking brake pedal and also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

WIRING DIAGRAM



N

F06947

INSPECTION PROCEDURE

1	Check brake fluid level.

CHECK:

Check the amount of fluid in the brake reservoir.

NG

Check and repair brake fluid leakage and add fluid.

OK

2	Check brake fluid level warning switch (See page BE-99).

NG

Replace brake fluid level warning switch.

OK

3	Check for open circuit in all harness and components connected to brake fluid level warning light (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1203 / 53	ECM Communication Circuit Malfunction

CIRCUIT DESCRIPTION

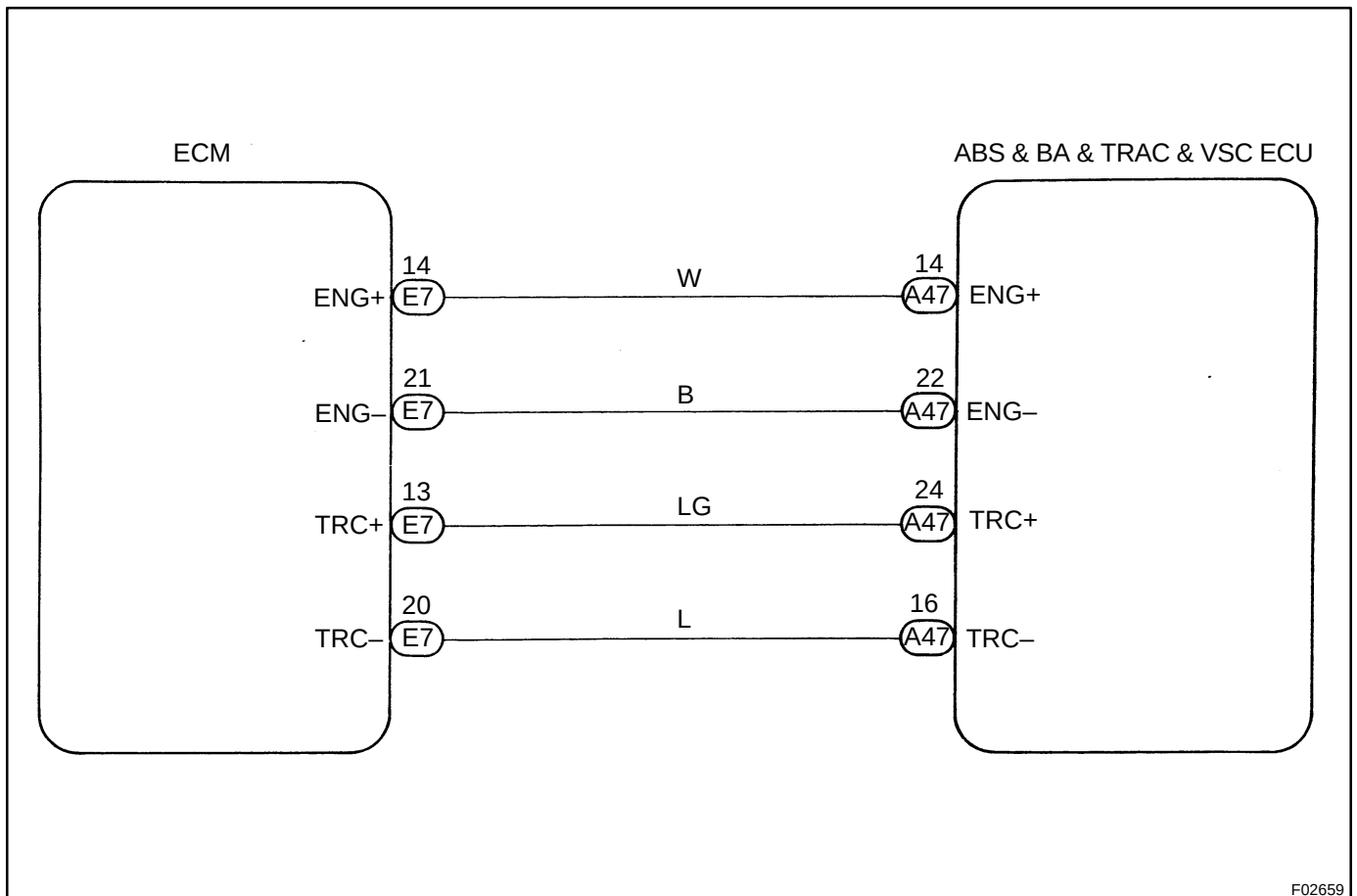
The circuit is used to send TRAC & VSC control information from the ABS & BA & TRAC & VSC ECU to the ECM (TRC+, TRC–), and engine control information from the ECM to the ABS & BA & TRAC & VSC ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either of the following 1, 2 or 3 continues for 5 sec.: - When ECU terminal IG1 voltage is 9.5 V or more, condition that data is not transmitted to ECM continues for more than 5 sec. - When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500rpm or more and data receipt from ECM is impossible. - The condition that data sent from ECM becomes repeatedly normal and abnormal occurs 10 times or more for 60 sec.	•TRC+ or TRC– circuit •ENG+ or ENG– circuit •ECM

Fail safe function:

If a trouble has occurred in the ECM communication circuit, the ECU prohibits the BA & TRAC & VSC controls.

WIRING DIAGRAM



F02659

INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between each of terminals ENG+, ENG–, TRC+, TRC– of ABS & BA & TRAC & VSC ECU and ECM (See page IN-31).

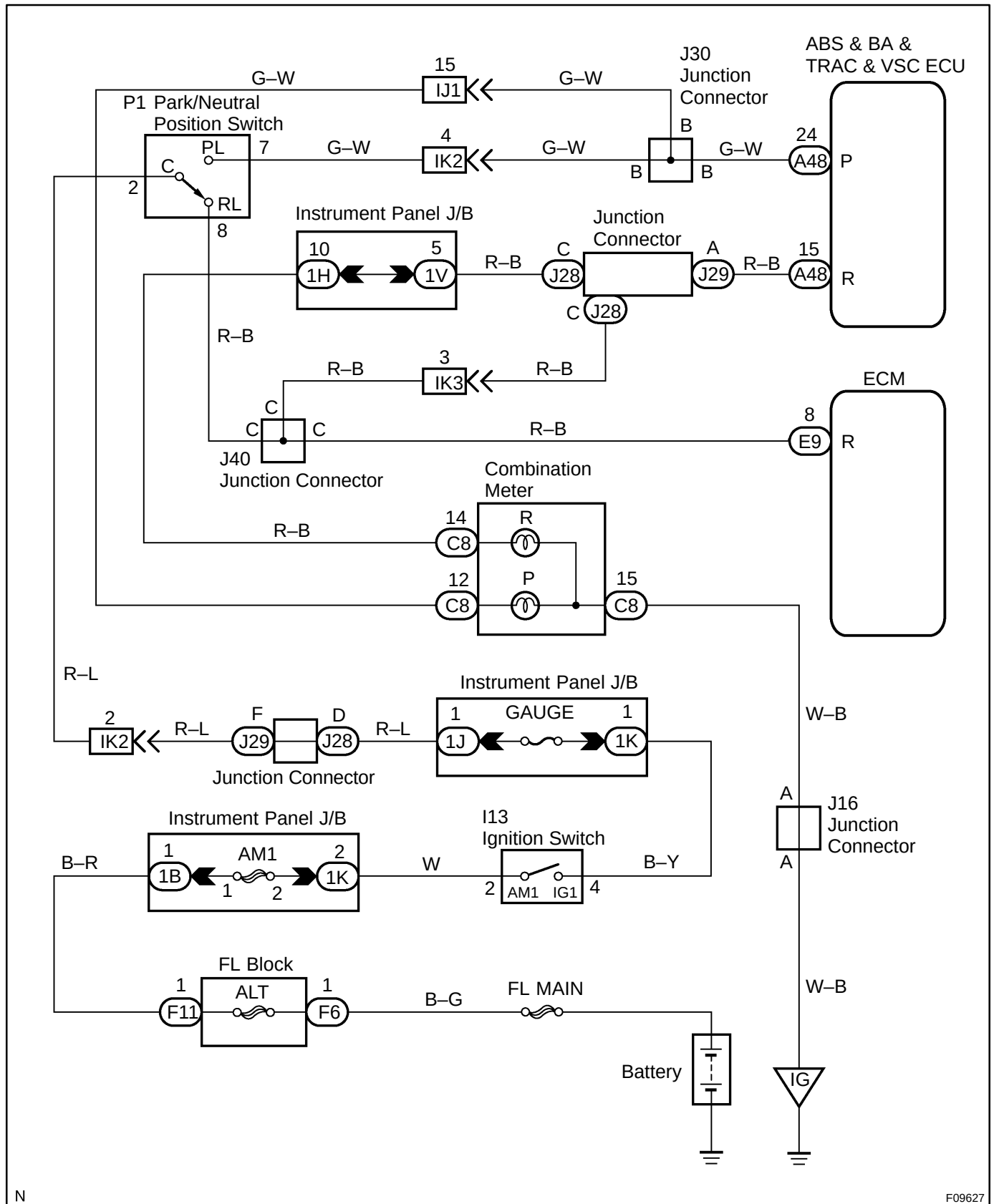
NG**Repair or replace harness or connector.****OK****Check and replace ECM or ABS & BA & TRAC & VSC ECU.**

DTC	C1207 / 37	Park/Neutral Position Switch (Park/Reverse Position Circuit)

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1207 / 37	When any of the following 1 to 3 is detected: 1. At vehicle speed of 15 km/h (9 mph) or less and when the condition that open circuit signal of P signal circuit of park/neutral position switch is ON continues 5 sec. or more. 2. At vehicle speed of 15 km/h (9 mph) or more, P signal from park/neutral position switch is ON, the shift lever position information from the ECM is other than in P or N range condition continues for 60 sec. or more. 3. At vehicle speed of 15 km/h (9 mph) or less and when the condition that open circuit signal of R signal circuit of park/neutral position switch is ON continues 2 sec. or more.	●Park/Neutral position switch ●Park/Neutral position switch (Park/Reverse position circuit)

WIRING DIAGRAM

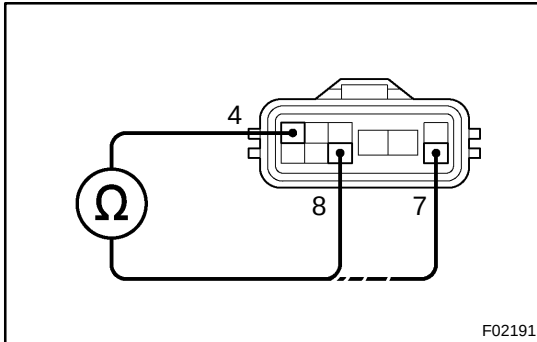


N

F09627

INSPECTION PROCEDURE

1 Check park/neutral position switch (Park/Reverse position switch circuit).



PREPARATION:

- (a) Jack up the vehicle.
- (b) Disconnect the connector from the park/neutral position switch.

CHECK:

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

OK:

P position switch	Terminals 4 – 7	Continuity
R position switch	Terminals 4 – 8	Continuity

NG

Replace park/neutral position switch.

OK

2 Check for open and short circuit in harness and connector between terminals P and R of ABS & BA & TRAC & VSC ECU and ECM connector and battery (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU or ECM.

DTC	C1223 / 43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	ABS control system is abnormal.	ABS control system

INSPECTION PROCEDURE

1	Check DTC for ABS (See page DI-253).

1*Repair ABS control system according to code output.*****2****Check for ECU connected to malfunction indicator light.**

*1: Output NG code

*2: Malfunction indicator light remains ON

DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

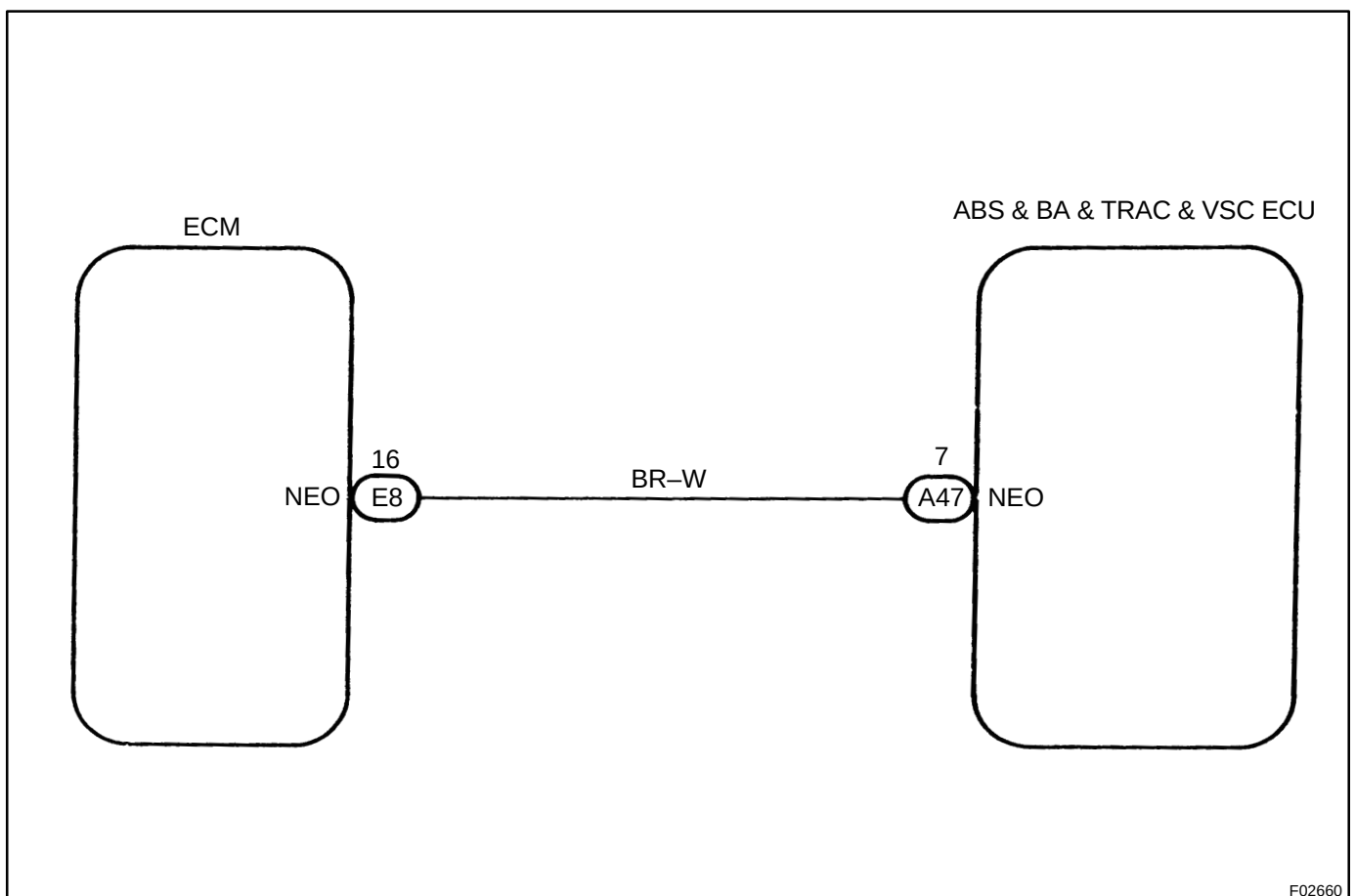
ABS & BA & TRAC & VSC ECU receives engine revolution speed signals (NE signals) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When any of the following 1 to 2 is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, when data receiving from the ECM is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRAC is operating and when open or short circuit for engine revolution signal circuit continues for 0.24 sec. or more.	•NEO circuit •ECM

Fail safe function:

If a trouble has occurred in the NE signal circuit, the ECU prohibits the BA & TRAC & VSC controls.

WIRING DIAGRAM



F02660

INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminal NEO of ABS & BA & TRAC & VSC ECU and terminal NEO of ECM (See page IN-31).

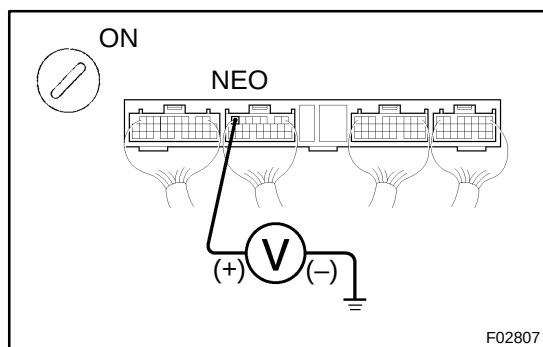
NG

Repair or replace harness and connector.

OK

2

Check voltage between terminals NEO of ABS & BA & TRAC & VSC ECU and body ground.

**PREPARATION:**

- (a) Remove the ABS & BA & TRAC & VSC ECU with connectors still connected.
- (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal NEO of the ABS & BA & TRAC & VSC ECU and the body ground for the engine conditions below.

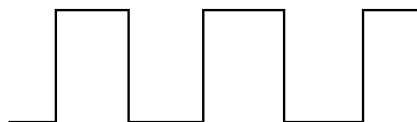
OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	3 – 6 V ↔ below 1 V (Pulse)

(Reference)

3 – 6 V

Below 1 V



F03007

NG

Check and replace ABS & BA & TRAC & VSC ECU or ECM.

OK

If same codes is still output after DTC is deleted, check contact condition of each connection.

DTC	C1231 / 31	Steering Angle Sensor Circuit

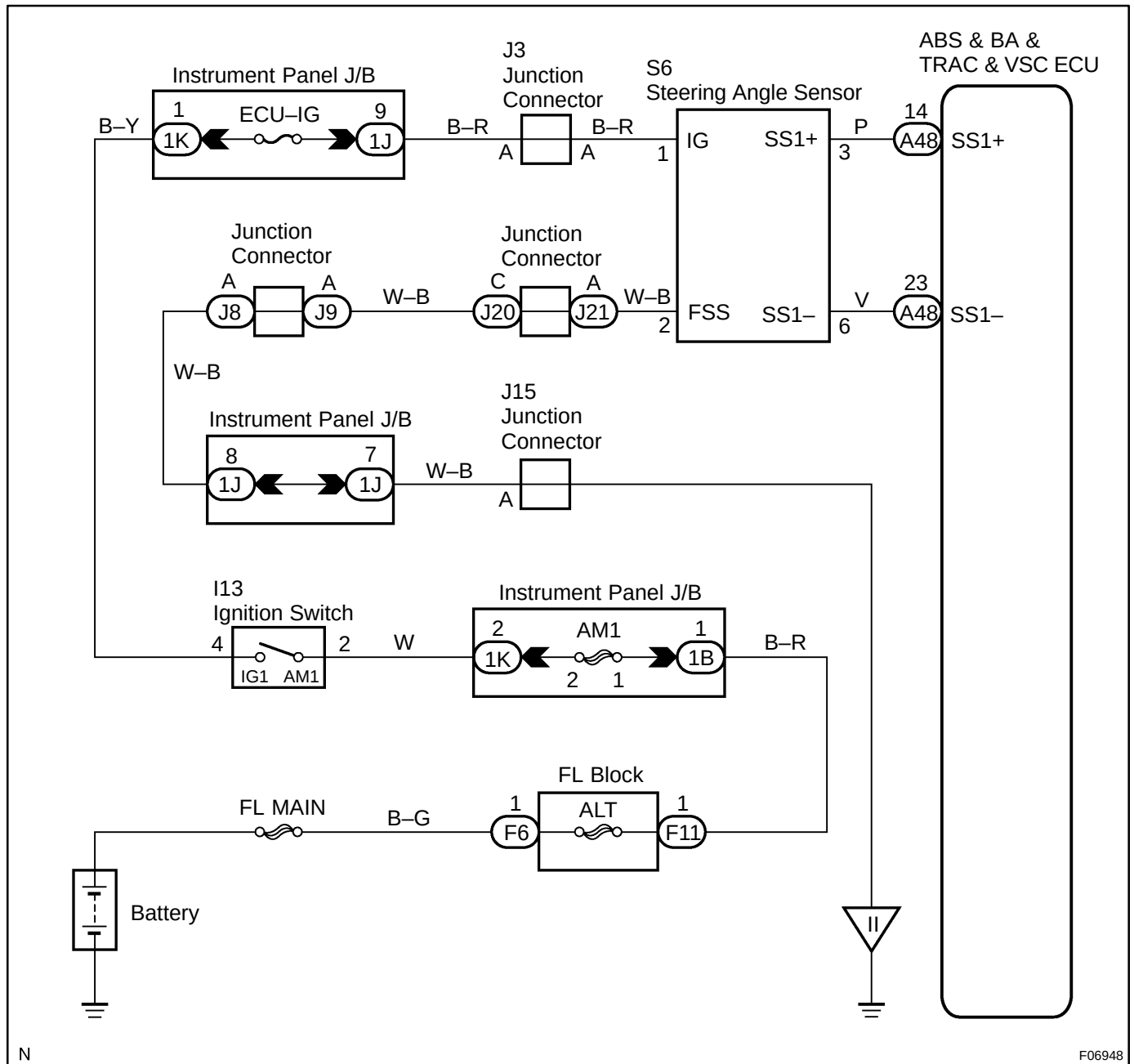
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	●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. ●Although the presumed wheel angle value obtained from the yaw rate sensor and deceleration sensor value changes, the wheel angle value does not change. ●When SSC signal is ON or OFF, the steering angle sensor value changes by 360° or more. ●The difference between the steering angle when SSC signal edge occurs and when the range of 355.5° to 364.5°, which occurs three times or more. ●Reception from the steering sensor is abnormal or steering angle changes by 360° or more.	●Steering angle sensor ●Steering angle sensor circuit

Fail safe function:

If a trouble has occurred in the steering angle sensor circuit, the ECU prohibits the BA & TRAC & VSC controls.

WIRING DIAGRAM



N

F06948

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 3 in case of not using the LEXUS hand-held tester.

1	Check output value of steering angle sensor.

PREPARATION:

- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and push the LEXUS hand-held tester main switch ON.
- Select the DATALIST mode on the LEXUS hand-held tester.
- 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 LEXUS hand-held tester is changing when turning the steering wheel.

OK:

Steering wheel turning angle value must be changing.

OK

Go to step 3.

NG

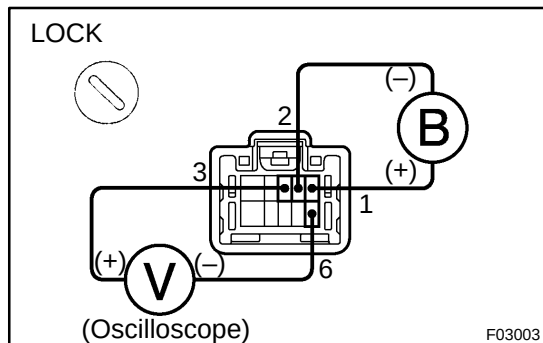
2	Replace ABS & BA & TRAC & VSC ECU and check whether or not trouble occurs again.

YES

Replace steering angle sensor.

NO

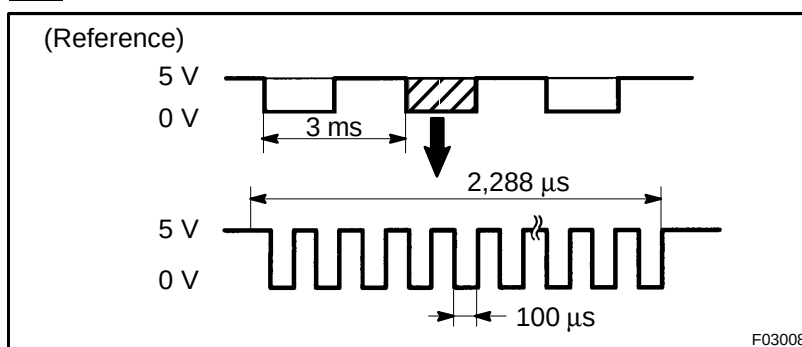
END

3 Check steering angle sensor.**PREPARATION:**

- Remove the steering wheel lower No. 2 and No. 3 covers, steering wheel pad, steering wheel, column upper and lower covers (See page [SR-9](#)).
- Disconnect the connector from the steering angle sensor.
- Connect the oscilloscope to the terminals 3 and 6 of the combination switch connector (for steering angle sensor).
- Apply battery positive 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 ABS & BA & TRAC & VSC ECU (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK**

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1233 / 33, C1234 / 34	Yaw Rate Sensor Circuit

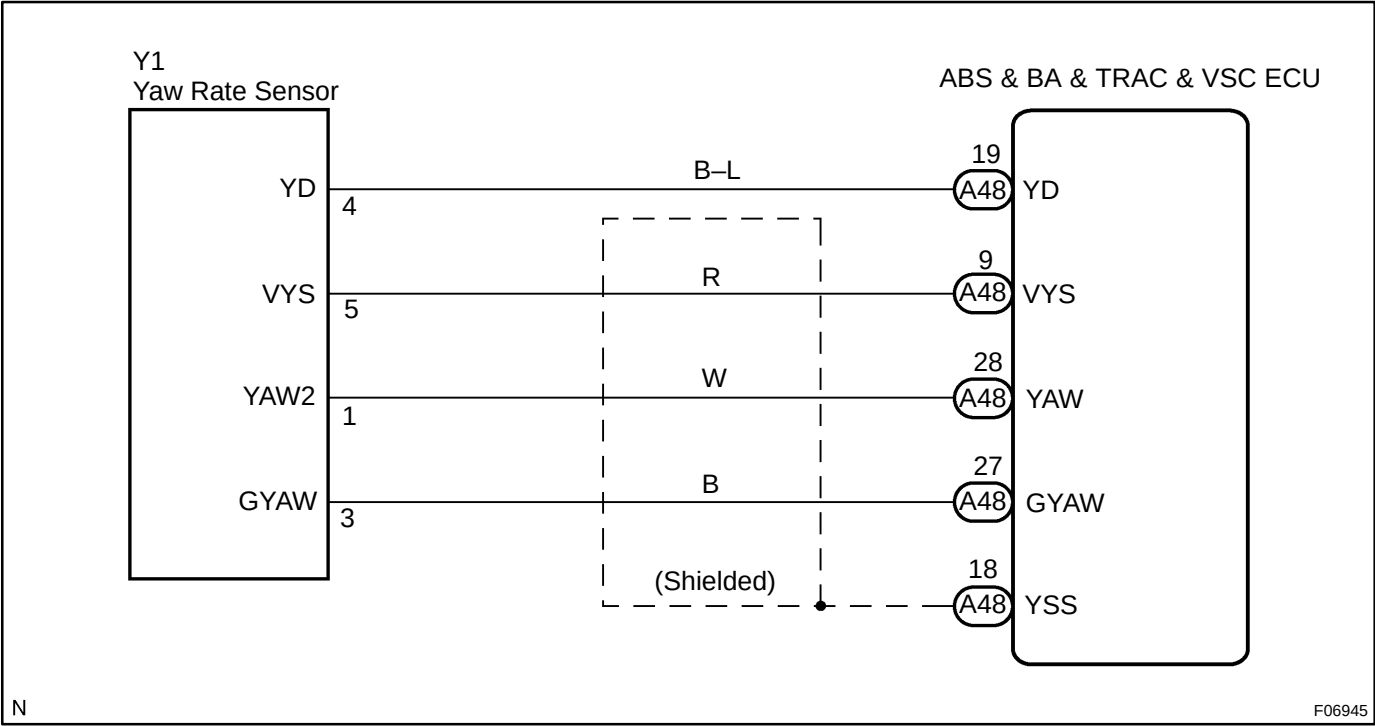
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	When any of the following 1 to 4 is detected: 1. The condition that ECU terminal IG1 voltage is 9.5 V to 17.2 V, and yaw rate sensor voltage is out of the range from 0.25 V to 4.75 V continues for 1 sec. or more. 2. The condition that yaw rate sensor open circuit detect signal is ON continues for 1 sec. or more. 3. The condition that yaw rate sensor power source voltage is out of the range from 4.4 V to 5.6 V continues for 1 sec. or more. 4. The condition that yaw rate sensor signal is momentary open occurs 10 times or more.	
C1234 / 34	When any of the following 1 to 6 is detected: 1. The condition that yaw rate sensor VYS terminal voltage is 4.4 V to 5.6 V and YD malfunction signal of yaw rate sensor is ON continues for 5 sec. or more. 2. With the vehicle speed 15 km/h or more, the difference obtained from the presumed yaw rate value and the wheel speed is larger than the specified value and the presumed yaw rate sensor obtained from the yaw rate sensor value and lateral centrifugal force is larger than the specified value. 3. When there is a large change in yaw rate, the condition that the difference between the yaw rate sensor value and the presumed yaw rate value is large continues for 1.5 sec. or more. 4. When a change in the rate obtained from the steering angle and vehicle is larger than the specified, the yaw rate sensor value does not change. 5. With the vehicle speed 5 km/h or more, when 45 minutes have elapsed since the ignition switch was turned ON, the relearned value of yaw rate zero point is 5 deg/s or more. 6. When the shift position is in P range, the yaw rate output voltage is out of the range of 2.4 to 2.6 V or the condition that the vehicle speed is 15 km/h or more after the difference from the yaw rate zero point compensation voltage has been 0.008 V or more repeats three times or more.	●Yaw rate sensor ●Yaw rate sensor circuit

Fail safe function:

If a trouble has occurred in the yaw rate sensor circuit, the ECU prohibits the BA & TRAC & VSC controls.

WIRING DIAGRAM

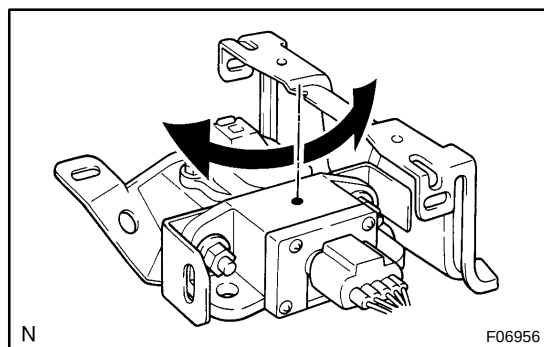


INSPECTION PROCEDURE

HINT:

- Do not remove the yaw rate sensor from the bracket because the accuracy of the yaw rate sensor is secured by the bracket assembly. At the time of inspection, remove it with the bracket together.
- Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 5 in case of not using the LEXUS hand-held tester.

1 Check output value of yaw rate sensor.



PREPARATION:

- Remove the 3 nuts and yaw rate sensor assembly with connector still connected.
- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.
- Select the DATALIST mode on the LEXUS hand-held tester.

CHECK:

Check that the yaw rate value of the yaw rate sensor displayed by the LEXUS hand-held tester is changing:

The assembled yaw rate sensor is placed on the ground, and the sensor rotates horizontally.

OK:

Yaw rate value must be changing.

HINT:

(Reference)

When the yaw rate sensor is stationary output value: ± 4 deg/s

NG

Go to step 5.

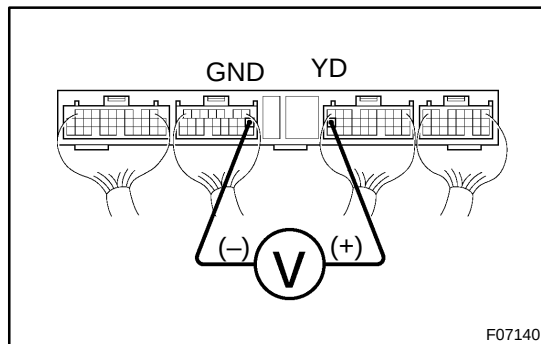
OK

2 Check whether there is a continuity between terminal YD of yaw rate sensor and terminal YD of ABS & BA & TRAC & VSC ECU.

NG

Repair or replace harness or connector.

OK

3 Check yaw rate sensor assembly (See page DI-320).**NG****Replace yaw rate sensor assembly.****OK****4 Check voltage between terminals YD and GND of ABS & BA & TRAC & VSC ECU.****PREPARATION:**

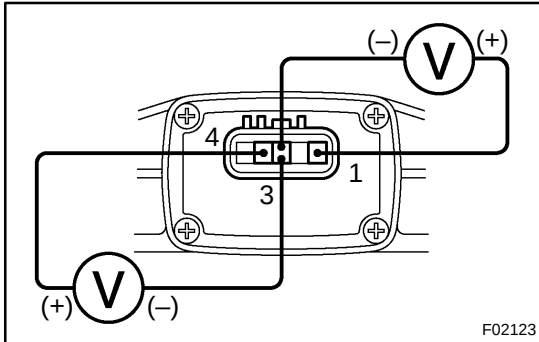
Remove the ABS & BA & TRAC & VSC ECU with connectors still connected.

CHECK:

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals YD and GND of the ABS & BA & TRAC & VSC ECU.

OK:**Voltage: 4.5 – 5.3 V****NG****Repair or replace harness or connector.****OK****Check and replace ABS & BA & TRAC & VSC ECU.**

5 Check yaw rate sensor.



CHECK:

- Connect the connector to the yaw rate sensor.
- Turn the IG switch ON.
- Measure the voltage between terminals 1 and 3, 3 and 4 of the yaw rate sensor with connector still connected.

OK:

Terminals 1 and 3 (YAW2 – GYAW)	About 2.42 – 2.58 V
Terminals 3 and 4 (GYAW – YD)	About 4.5 V – 5.3 V

NG

Replace yaw rate sensor assembly.

OK

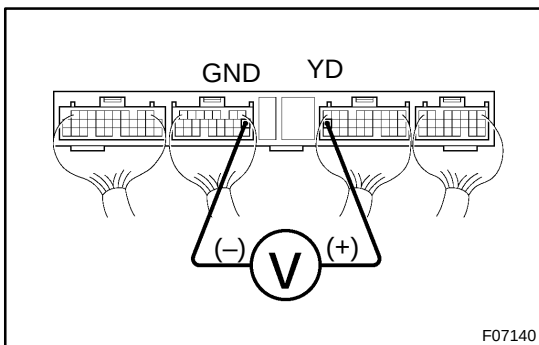
6 Check yaw rate sensor assembly (See page DI-320).

NG

Replace yaw rate sensor assembly.

OK

7 Check voltage between terminals YD and GND of ABS & BA & TRAC & VSC ECU.



PREPARATION:

Remove the ABS & BA & TRAC & VSC ECU with connectors still connected.

CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals YD and GND of the ABS & BA & TRAC & VSC ECU.

OK:

Voltage: 4.5 – 5.3 V

NG

Repair or replace harness or connector.

OK

8**Check for open and short circuit in harness and connector between yaw rate sensor and ABS & BA & TRAC & VSC ECU (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK****Check and replace ABS & BA & TRAC & VSC ECU.**

DTC	Always ON	Malfunction in ECU VSC Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	•There is a malfunction in the ECU internal circuit. •Malfunction in power source circuit.	•Power source circuit •ABS & BA & TRAC & VSC ECU •VSC warning light circuit •Charging system

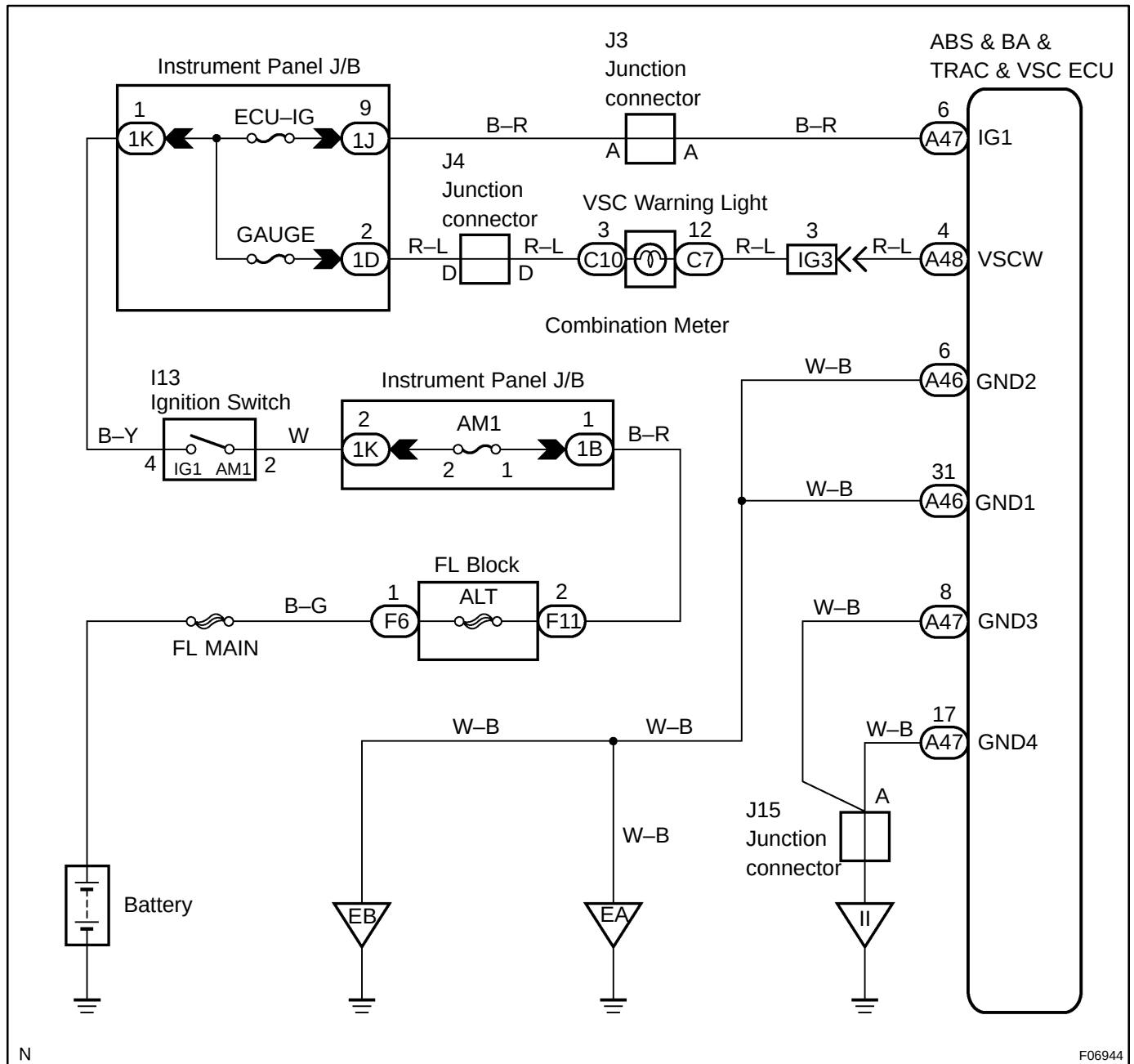
Fail safe function:

If a trouble has occurred in the ECU, the ECU prohibits the ABS & BA & TRAC & VSC controls and the brake system becomes normal.

HINT:

If the fail safe function is activated in VSC system, "VSC OFF" indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC output for VSC?

Check the DTC on page [DI-320](#).

YES

Repair circuit indicated by output code.

NO

2	Is normal code displayed?

YES

Check ABS solenoid relay. Check for short circuit in harness and connector between ABS solenoid relay and DLC1 (See page [IN-31](#)).

NO

3	Does VSC warning light go off?

YES

Check for open or short circuit in harness and connector between ECU-IG fuse and ECU (See page [IN-31](#)).

NO

4	Check battery positive voltage.

CHECK:

Check the battery positive voltage.

OK:

Voltage: 10 – 16 V

NG

Check and repair the charging system (See page [CH-2](#)).

OK

5	Check operation of VSC warning light.

In case of using the LEXUS hand-held tester:

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter on the LEXUS hand-held tester.

In case of not using the LEXUS hand-held tester:

PREPARATION:

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the ABS & BA & TRAC & VSC ECU.
- (c) Turn the ignition switch ON.

CHECK:

Check the VSC warning light goes off.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

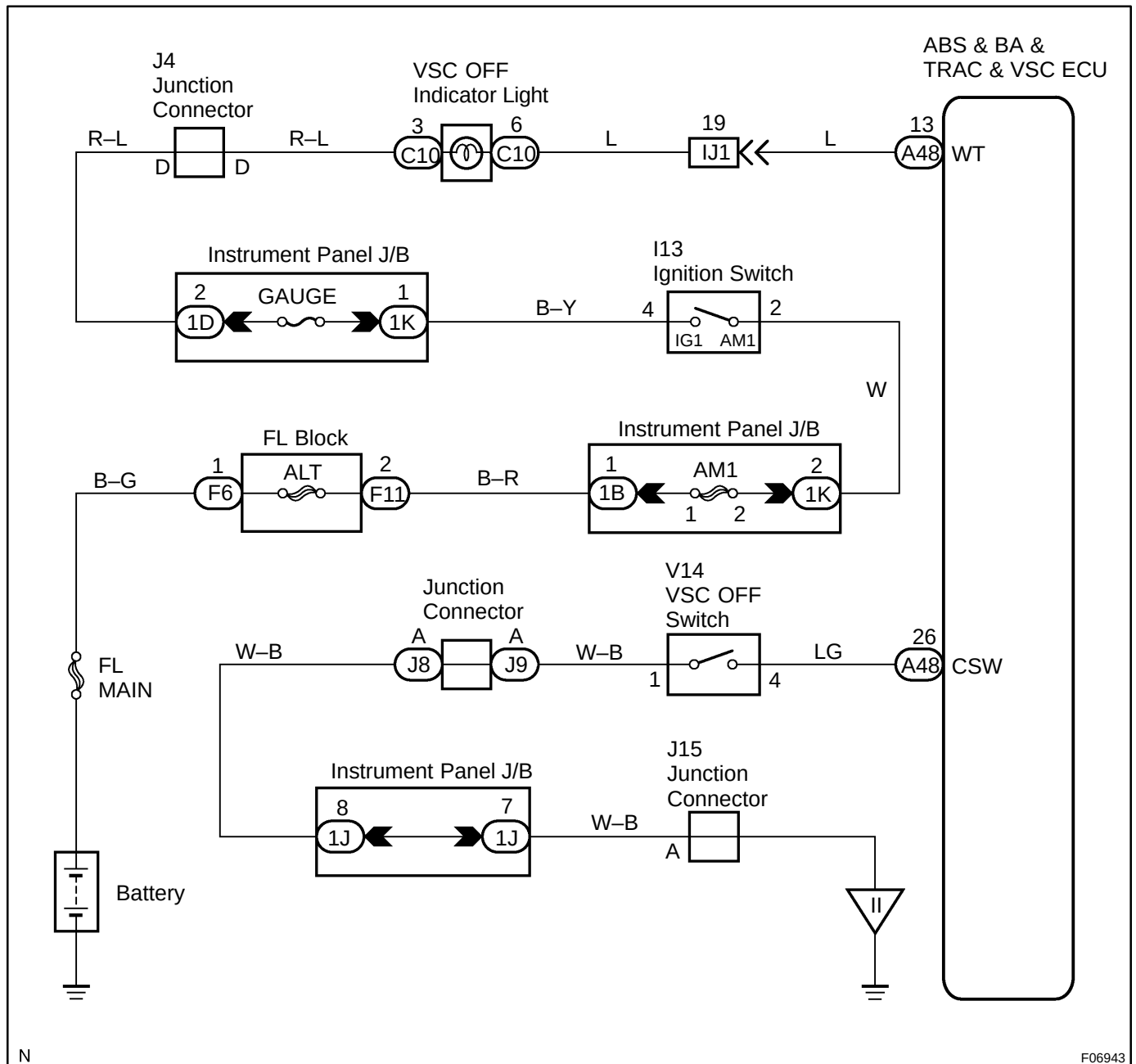
Check for short circuit in harness and connector between combination meter and ABS & BA & TRAC & VSC ECU, combination meter and DLC1 (See page [IN-31](#)).

VSC OFF Indicator Light, VSC OFF Switch Circuit

CIRCUIT DESCRIPTION

This is the TRAC & VSC control main switch. When the VSC OFF switch is pushed, TRAC & VSC control is not activated and VSC OFF indicator light lights up. When the switch is pressed again, VSC OFF indicator light goes off, and the control is actuated. Turn the ignition switch OFF, TRAC & VSC control surely comes on when the ignition switch turns ON next time.

WIRING DIAGRAM



N

F06943

INSPECTION PROCEDURE**HINT:**

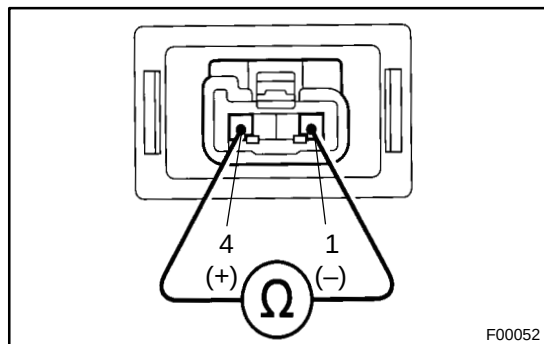
Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

1 Check operation of VSC OFF indicator light.**PREPARATION:**

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

CHECK:

Check that "ON" and "OFF" of the VSC OFF indicator light can be shown on the combination meter by the LEXUS hand-held tester.

NG**Go to step 4.****OK****2 Check VSC OFF switch.****PREPARATION:**

- (a) Remove the VSC OFF switch.
- (b) Disconnect the VSC OFF switch connector.

CHECK:

Measure the resistance between terminals 1 and 4 of the VSC OFF switch when the VSC OFF switch is on and off.

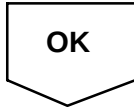
OK:

VSC OFF switch	Resistance
Pushed in	Continuity
Released	1MΩ or higher

NG**Replace VSC OFF switch.****OK**

3	Check for open and short circuit in harness and connector between terminal CSW of ABS & BA & TRAC & VSC ECU and VSC OFF switch and body ground (See page IN-31).

NG	Repair or replace harness or connector.



4	Check VSC OFF indicator light.

See the combination meter troubleshooting on page [BE-65](#).

NG	Repair or replace combination meter (See page BE-96).



5	Check for open and short circuit in harness and connector between terminal WT of ABS & BA & TRAC & VSC ECU and VSC OFF indicator light (See page IN-31).

NG	Repair or replace harness or connector.



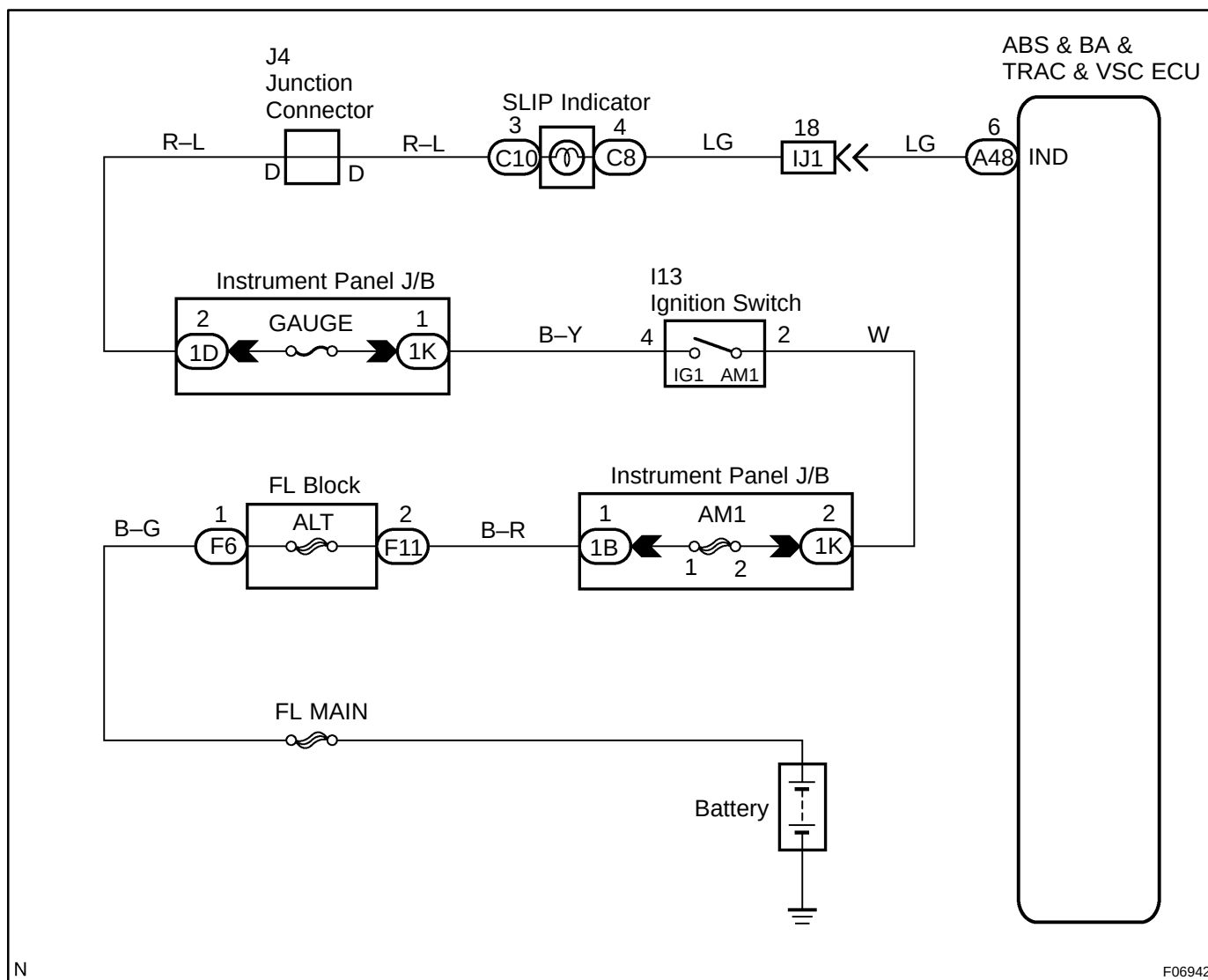
Check and replace ABS & BA & TRAC & VSC ECU.

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRAC & VSC operation.

WIRING DIAGRAM



N

F06942

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

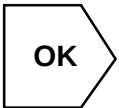
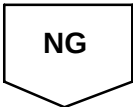
1	Check operation of SLIP indicator light.

PREPARATION:

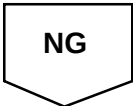
- (a) Connect the LEXUS hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the LEXUS hand-held tester.

CHECK:

Check that "ON" and "OFF" of the SLIP indicator light can be shown on the combination meter by the LEXUS hand-held tester.

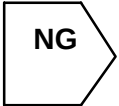
OK**Go to step 4.**NG

2	Check that SLIP indicator light is on for 3 seconds soon after ignition switch has been turned ON.

OK**Check and replace ABS & BA & TRAC & VSC ECU.**NG

3	Check SLIP indicator light.

See the combination meter troubleshooting on page [BE-65](#).

NG**Repair bulb or combination meter assembly (See page [BE-96](#)).**OK

4	Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and SLIP indicator light (See page IN-31).

NG

Repair or replace harness or connector.

OK

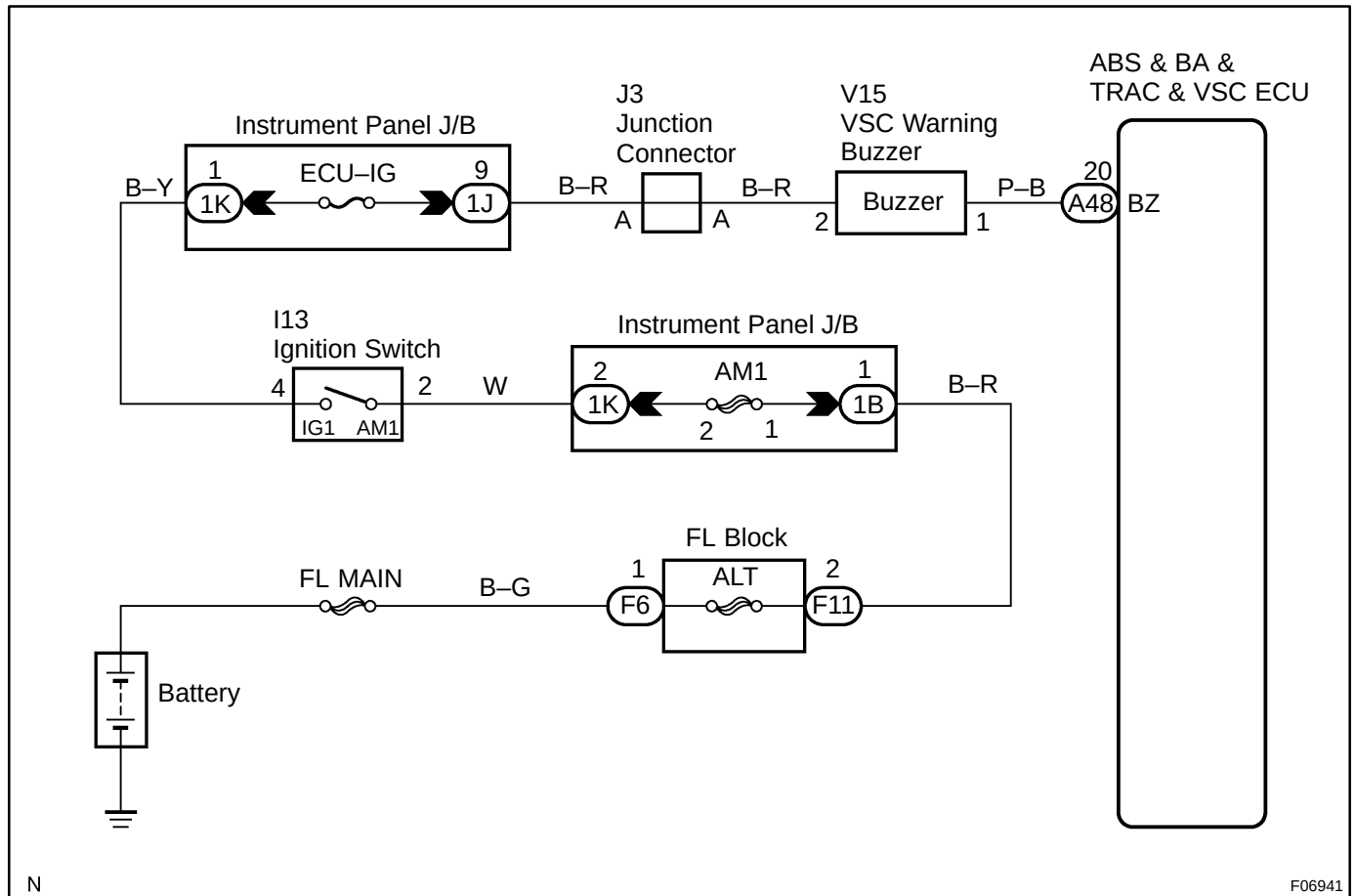
Check and replace ABS & BA & TRAC & VSC ECU.

VSC Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC buzzer sounds during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start inspection from step 1 in case of using the LEXUS hand-held tester and start from step 2 in case of not using the LEXUS hand-held tester.

1	Check operation of VSC buzzer.

PREPARATION:

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

CHECK:

Check that VSC buzzer sounds "ON" and "OFF" with the LEXUS hand-held tester.

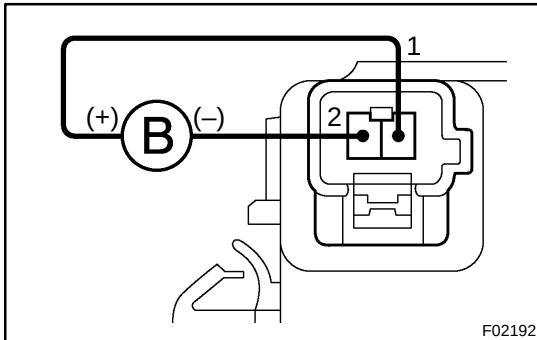
OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

2

Check VSC buzzer.

**PREPARATION:**

Disconnect the VSC buzzer connector.

CHECK:

Apply battery positive voltage to the terminals 1 and 2 of the VSC buzzer connector, check that the VSC buzzer sounds.

NG

Replace VSC buzzer.

OK

3

Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and VSC buzzer (See page [IN-31](#)).

NG

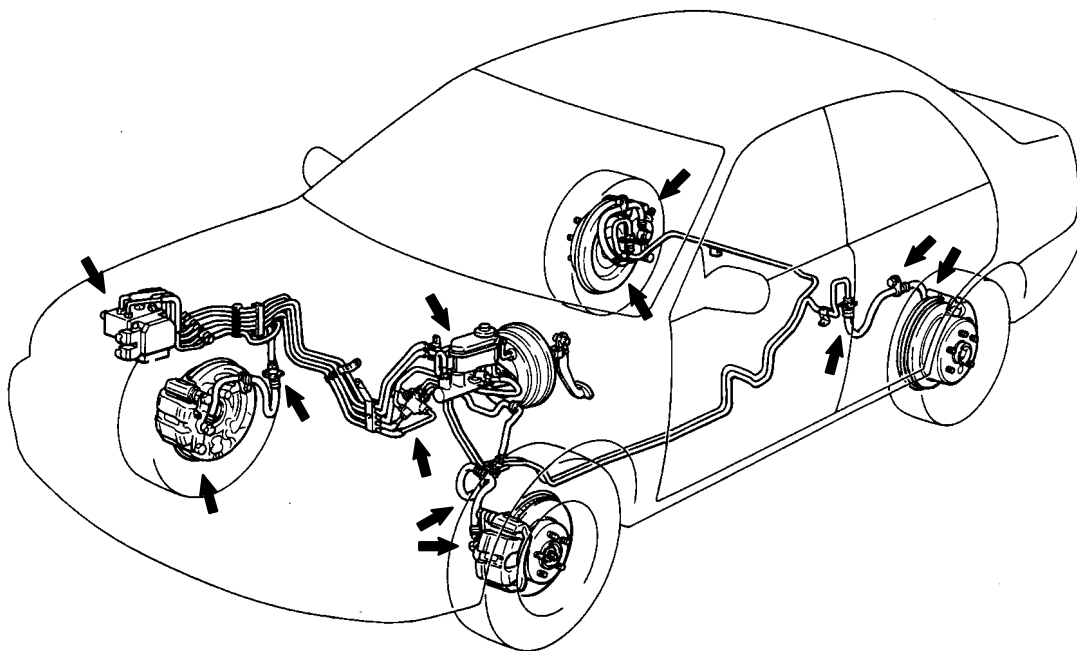
Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

Check for Fluid Leakage

Check fluid leaks from the actuator or hydraulic lines.



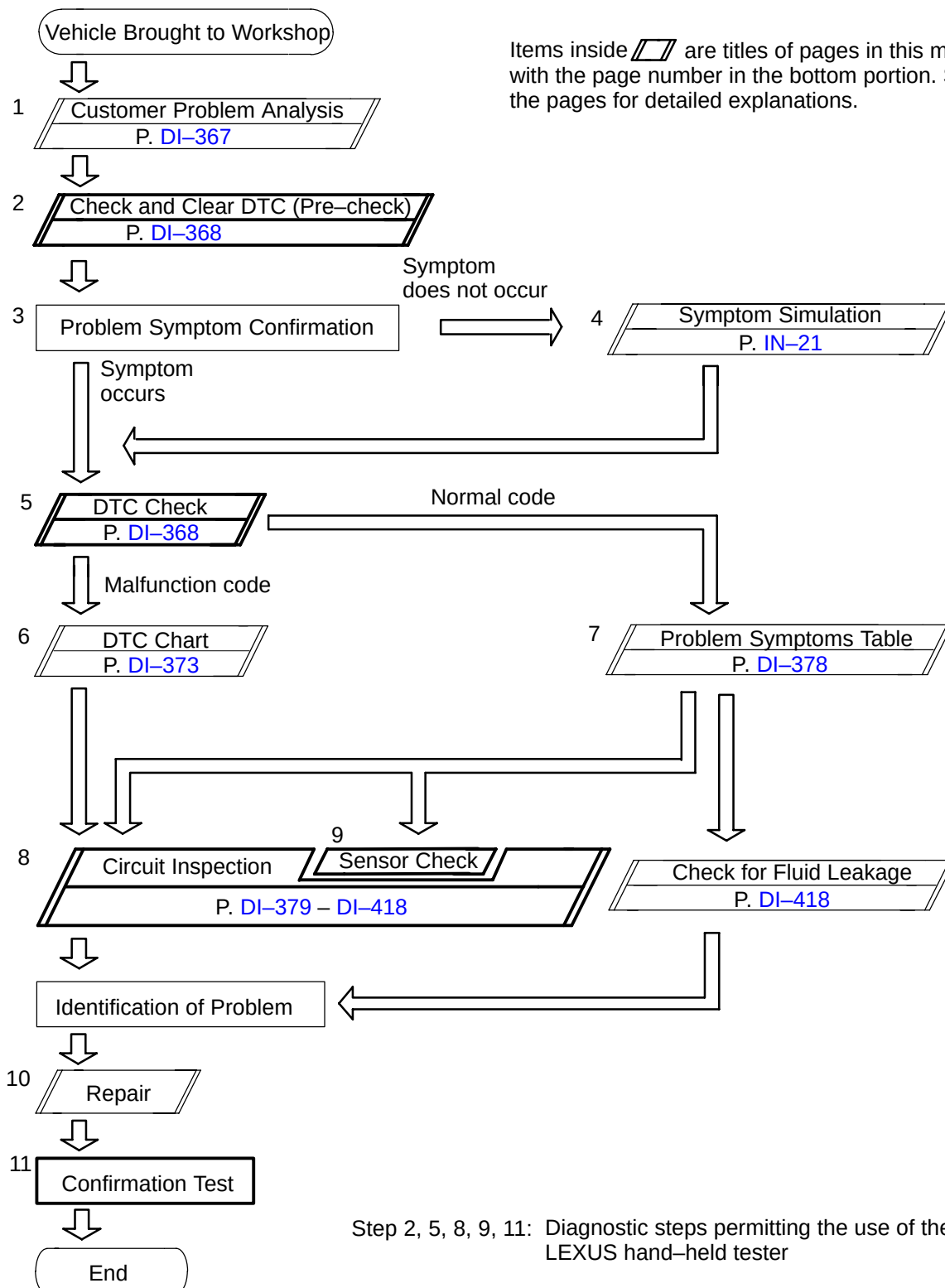
F00070

ABS & TRACTION CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DIOBV-07

Troubleshoot in accordance with the procedure on the following pages.



CUSTOMER PROBLEM ANALYSIS CHECK

ABS & TRAC Check Sheet

Inspector's
Name _____

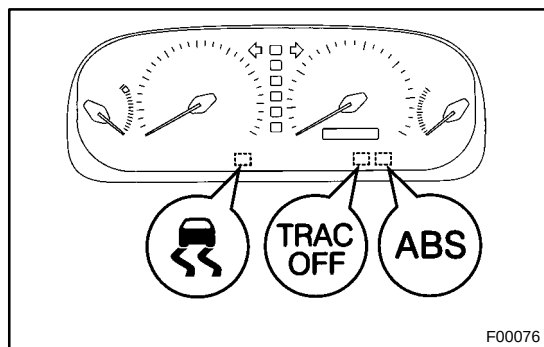
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ TRAC does not operate. (Wheels spin when starting rapidly.)	
	ABS Warning Light Abnormal	☐ Remains on ☐ Does not light up
	TRAC OFF Indicator Light Abnormal	☐ Remains on ☐ Blinks ☐ Does not light up
	SLIP Indicator Light Abnormal	☐ Remains on ☐ Does not light up

Check Item	ABS Warning Light	☐ Normal ☐ Malfunction code (code)
	Malfunction Indicator Light	☐ Normal ☐ Malfunction code (code)

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



PRE-CHECK

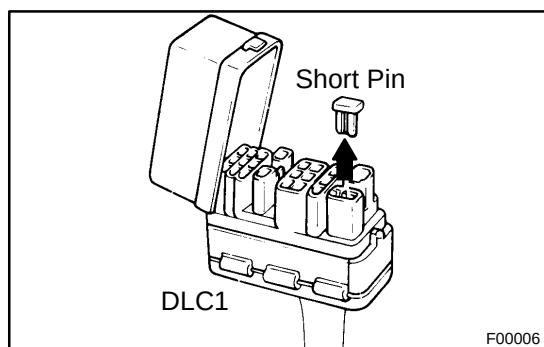
1. DIAGNOSIS SYSTEM

(a) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light, TRAC OFF indicator light and SLIP indicator light come on for 3 seconds.

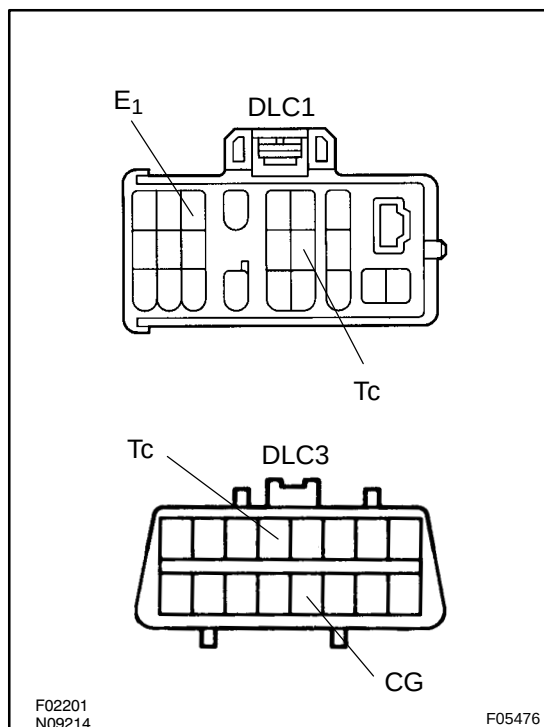
HINT:

If the indicator check result is not normal, proceed to the troubleshooting for the ABS warning light circuit, TRAC OFF indicator light circuit and SLIP indicator light circuit (See page [DI-407](#), [DI-410](#), [DI-413](#)).



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

(1) Disconnect the short pin from the DLC1.



(2) Using SST, connect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3.

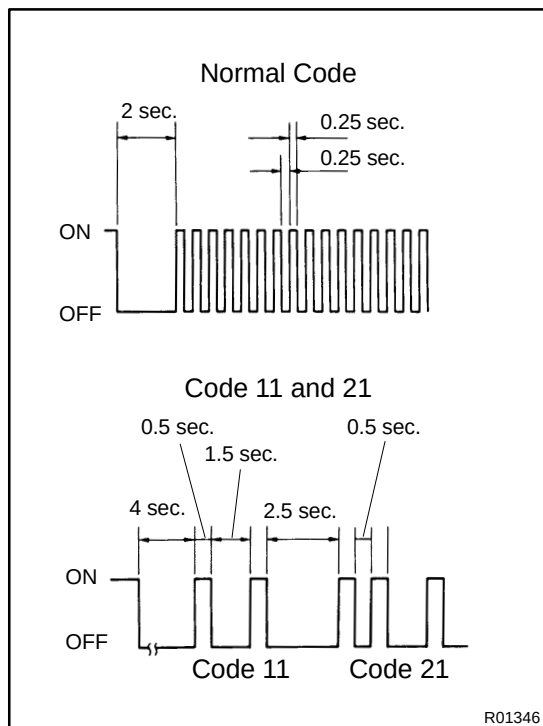
SST 09843-18020 or 09843-18040

(3) Turn the ignition switch ON.

(4) Read the DTC from the ABS warning light and TRAC OFF indicator light on the combination meter.

HINT:

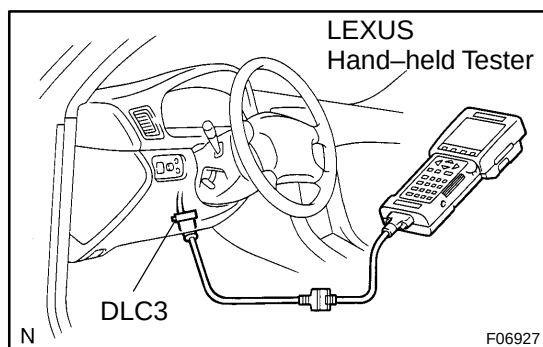
- If no code appears, inspect the diagnostic circuit, ABS warning light circuit or TRAC OFF indicator light circuit (See page [DI-407](#), [DI-410](#), [DI-413](#)).



- As an example, the blinking patterns of the normal code and codes 11 and 21 are shown in the illustration.

- Codes are explained in the code table on page [DI-373](#).
- After completing the check, disconnect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3, and turn off the display.

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

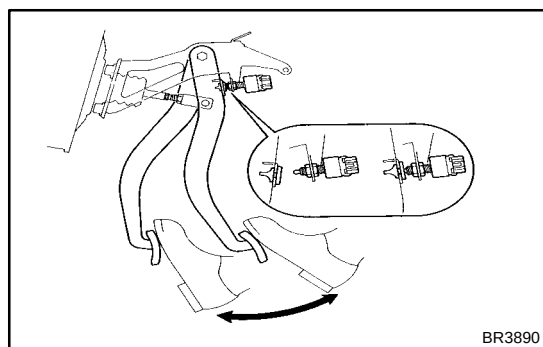


- In case of using LEXUS hand-held tester:
Check the DTC.

- Connect the LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON.
- Read the DTC by following the prompts on the tester screen.

HINT:

Please refer to the LEXUS hand-held tester operator's manual for further details.



- In case of not using LEXUS hand-held tester:
Clear the DTC.

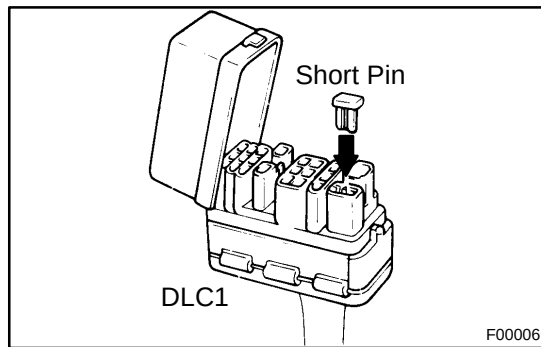
- Using SST, connect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3 and remove the short pin from DLC1.

SST 09843-18020 or 09843-18040

- Turn the ignition switch ON.
- Clear the DTC stored in the ECU by depressing the brake pedal 8 or more times within 5 seconds.
- Check that the warning light shows the normal code.

- Remove the SST from the of the DLC1 or DLC3.

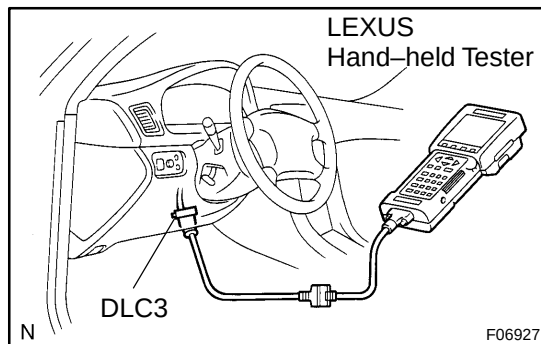
SST 09843-18020 or 09843-18040



(e) Connect the short pin to the DLC1.

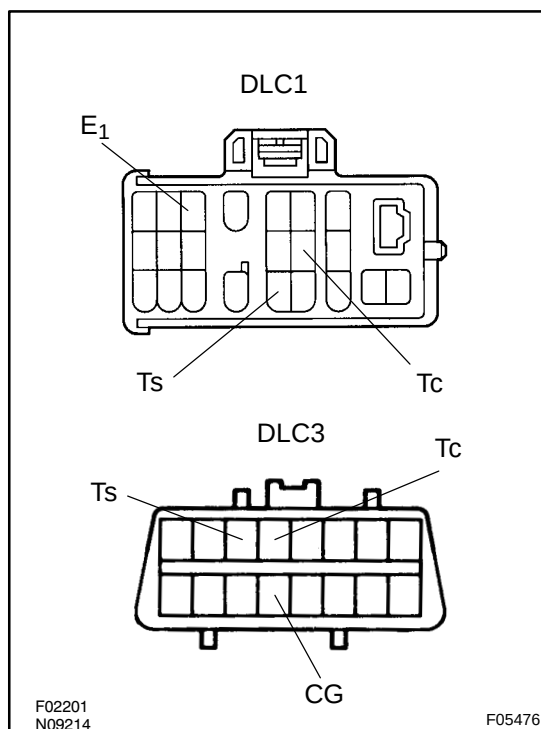
HINT:

The DTC stored in the ECU will be erased when the battery terminal is disconnected for the troubleshooting.



(f) In case of using LEXUS hand-held tester:
Clear the DTC.

- (1) Hook up the LEXUS hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Operate the LEXUS hand-held tester to erase the codes (See LEXUS hand-held tester operator's manual.).



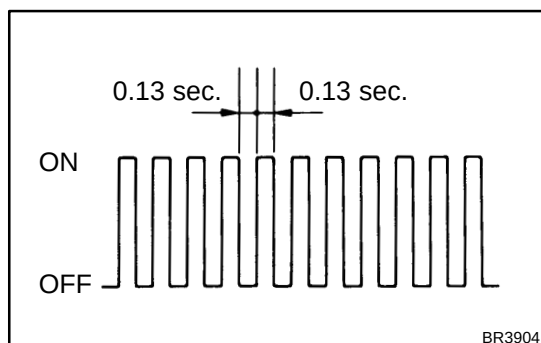
2. SPEED SENSOR SIGNAL CHECK

(a) In case of not using LEXUS hand-held tester:
Check the speed sensor signal.

- (1) Turn the ignition switch OFF.
- (2) Using SST, connect terminals Ts and E₁ of the DLC1 or terminals Ts and CG of the DLC3.

SST 09843-18020 or 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 (See page [DI-407](#)).

- (5) Drive the vehicle straight forward.
Drive the vehicle faster than 45 km / h (28 mph) for several seconds.
- (6) Stop the vehicle.

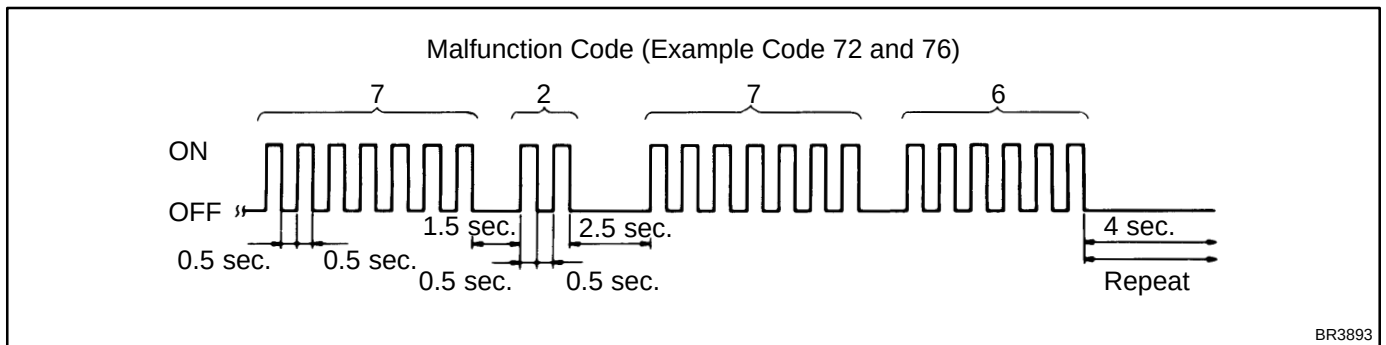
- (7) Using SST, connect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3.

SST 09843-18020 or 09843-18040

- (8) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC list shown on the next page.
- If every sensor is normal, the normal code is output (A cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated).
- If 2 or more malfunctions are indicated simultaneously, the lowest numbered code will be displayed first.



- (9) After doing the check, disconnect the SST from terminals Ts and E₁ Tc and E₁ of the DLC1, or terminals Ts and CG, Tc and CG of the DLC3, and turn the ignition switch OFF.

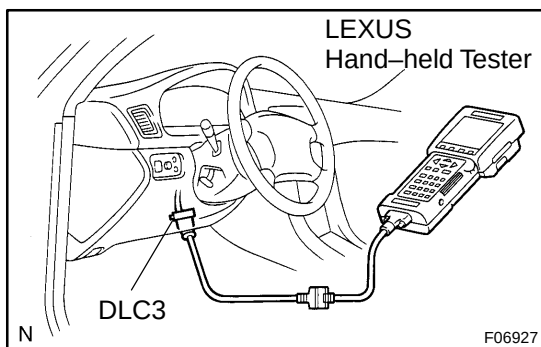
SST 09843-18020 or 09843-18040

- (b) In case of using LEXUS hand-held tester:

Check the speed sensor signal.

- (1) Connect the LEXUS hand-held tester to the DLC3.
- (2) Do step (3) to (6) on the previous page.
- (3) Read the DTC by following the prompts on the tester screen.

Please refer to the LEXUS hand-held tester operator's manual for further details.



DTC of speed sensor check function:

Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	●Right front speed sensor ●Sensor installation ●Right front speed sensor rotor
C1272 / 72	Low output voltage of left front speed sensor	●Left front speed sensor ●Sensor installation ●Left front speed sensor rotor
C1273 / 73	Low output voltage of right rear speed sensor	●Right rear speed sensor ●Sensor installation ●Right rear speed sensor rotor
C1274 / 74	Low output voltage of left rear speed sensor	●Left rear speed sensor ●Sensor installation ●Left rear speed sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	●Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of left front speed sensor	●Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	●Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of left rear speed sensor	●Left rear speed sensor rotor

DIAGNOSTIC TROUBLE CODE CHART

HINT:

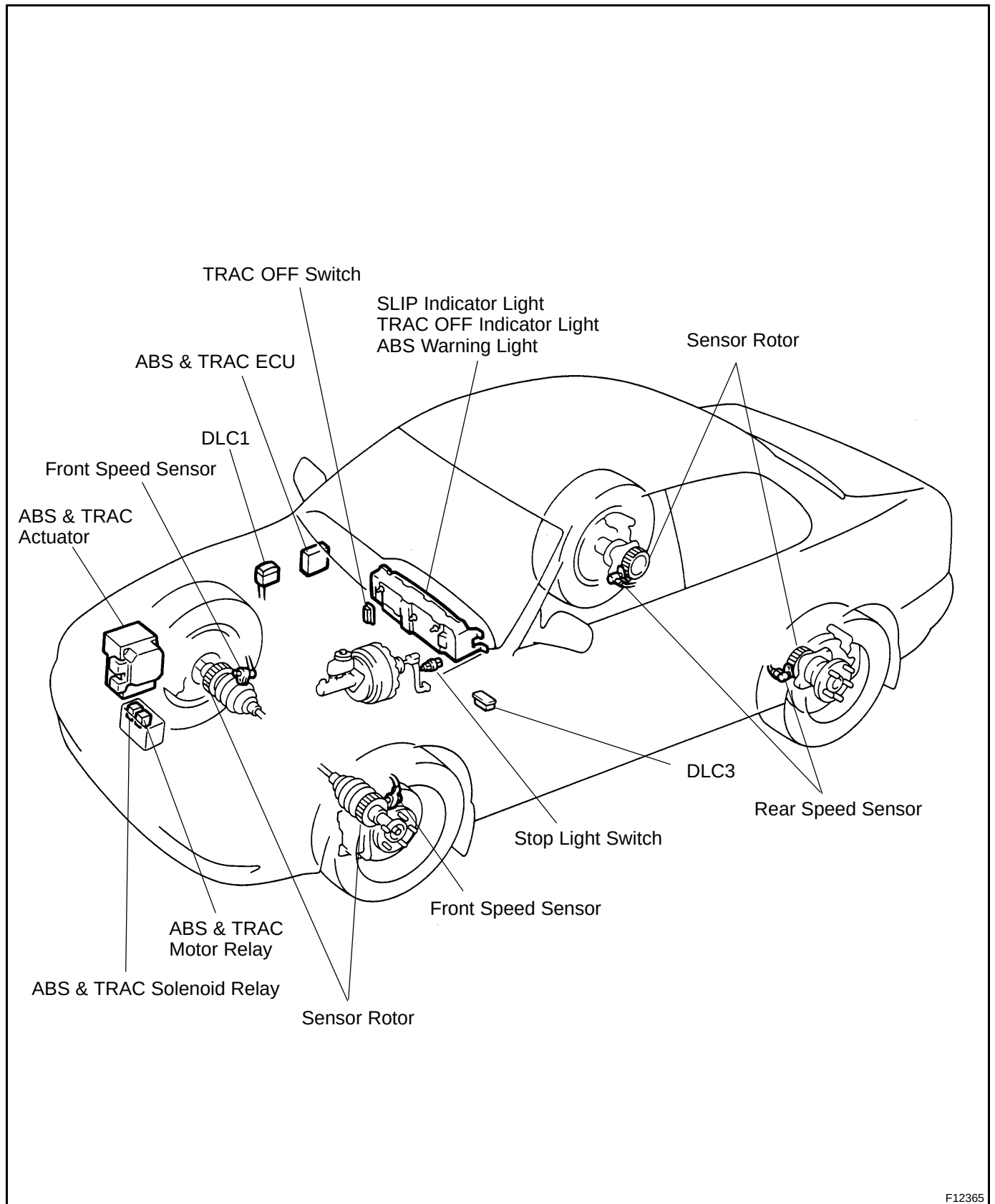
- Using SST 09843–18020 or 09843–18040, connect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3, and remove the short pin.
- If a malfunction code is displayed during the DTC check, check the circuit listed for the code. For details of each code, refer to the "See page" under respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
C0278 / 11 (DI-379)	Open circuit of ABS & TRAC solenoid relay circuit	●ABS & TRAC solenoid relay ●ABS & TRAC solenoid relay circuit ●ECU
C0279 / 12 (DI-379)	Short circuit of ABS & TRAC solenoid relay circuit	
C0273 / 13 (DI-382)	Open circuit of ABS & TRAC motor relay circuit	●ABS & TRAC motor relay ●ABS & TRAC motor relay circuit ●ECU
C0274 / 14 (DI-382)	Short circuit of ABS & TRAC motor relay circuit	
C0226 / 21 (DI-385)	Open or short circuit of right front solenoid circuit	●ABS & TRAC actuator ●SFRF or SFRH circuit ●ECU
C0236 / 22 (DI-385)	Open or short circuit of left front solenoid circuit	●ABS & TRAC actuator ●SFLR or SFLH circuit ●ECU
C0246 / 23 (DI-385)	Open or short circuit of right rear solenoid circuit	●ABS & TRAC actuator ●SRRR or SRRH circuit ●ECU
C0256 / 24 (DI-385)	Open or short circuit of left rear solenoid circuit	●ABS & TRAC actuator ●SRLR or SRLH circuit ●ECU
C1225 / 25 (DI-385)	Open or short circuit of SMC1 circuit	●ABS & TRAC actuator ●SMC1 circuit ●ECU
C1226 / 26 (DI-385)	Open or short circuit of SMC2 circuit	●ABS & TRAC actuator ●SMC2 circuit ●ECU
C1227 / 27 (DI-385)	Open or short circuit of SRC1 circuit	●ABS & TRAC actuator ●SRC1 circuit ●ECU
C1228 / 28 (DI-385)	Open or short circuit of SRC2 circuit	●ABS & TRAC actuator ●SRC2 circuit ●ECU
C0200 / 31 (DI-388)	Right front wheel speed sensor signal malfunction	●Right front, left front, right rear and left rear speed sensor ●Each speed sensor circuit ●Speed sensor rotor ●ECU
C0205 / 32 (DI-388)	Left front wheel speed sensor signal malfunction	
C0210 / 33 (DI-388)	Right rear wheel speed sensor signal malfunction	
C0215 / 34 (DI-388)	Left rear wheel speed sensor signal malfunction	
C1241 / 41 (DI-393)	Low battery positive voltage or abnormally high battery positive voltage	●Battery ●Charging system ●Power source circuit ●ECU

C1223 / 43* (DI-396)	Malfunction in ABS control system	ABS control system
C1224 / 44* (DI-397)	Open or short circuit of NE signal circuit	●NEO circuit ●ECM ●ECU
C1249 / 49 (DI-399)	Open circuit of stop light switch circuit	●Stop light switch ●Stop light switch circuit ●ECU
C1251 / 51 (DI-401)	Pump motor is locked	ABS pump motor
C1203 / 53* (DI-403)	Malfunction in ECM communication circuit	●TRC+ or TRC– circuit ●EFI+ or EFI– circuit ●ECM ●ECU
C1201 / 61* (DI-404)	Malfunction in engine control system	Engine control system
Always ON (DI-405)	Malfunction in ECU	ECU

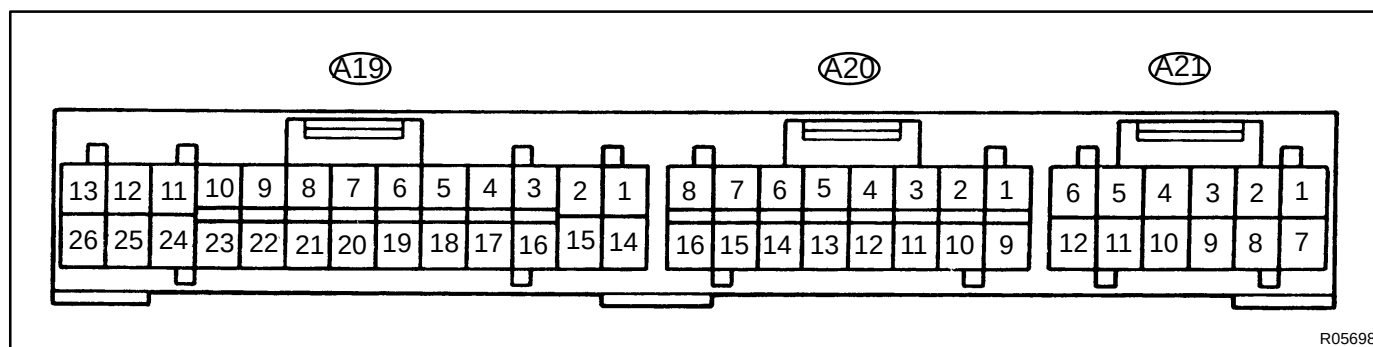
*: When the TRAC OFF indicator light lights up or flushes, a malfunction occurs. The code is displayed by flushing of the TRAC OFF indicator light.

PARTS LOCATION



F12365

TERMINALS OF ECU



R05698

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
IG1 (A20-8) – GND (A19-15, A21-9,10)	B-R – W-B	IG switch ON	10 – 14
R+ (A19-1) – SR (A19-11)	GR-R – GR	IG switch ON ABS warning light OFF	10 – 14
R+ (A19-1) – MR (A19-24)	GR-R – GR-L	IG switch ON	Below 1.0
SFRR (A19-26) – GND (A19-15, A21-9,10)	W-R – W-B	IG switch ON ABS warning light OFF	10 – 14
SFRH (A19-13) – GND (A19-15, A21-9,10)	R-B – W-B	IG switch ON ABS warning light OFF	10 – 14
SFLR (A21-1) – GND (A19-15, A21-9,10)	W-L – W-B	IG switch ON ABS warning light OFF	10 – 14
SFLH (A21-2) – GND (A19-15, A21-9,10)	L-B – W-B	IG switch ON ABS warning light OFF	10 – 14
SRRR (A21-7) – GND (A19-15, A21-9,10)	R-G – W-B	IG switch ON ABS warning light OFF	10 – 14
SRRH (A21-8) – GND (A19-15, A21-9,10)	W-R – W-B	IG switch ON ABS warning light OFF	10 – 14
SRLR (A19-12) – GND (A19-15, A21-9,10)	LG-B – W-B	IG switch ON ABS warning light OFF	10 – 14
SRLH (A19-25) – GND (A19-15, A21-9,10)	G-Y – W-B	IG switch ON ABS warning light OFF	10 – 14
AST (A19-10) – GND (A19-15, A21-9,10)	R – W-B	IG switch ON ABS warning light OFF	10 – 14
WA (A20-4) – GND (A19-15, A21-9,10)	G-B – W-B	IG switch ON ABS warning light ON	Below 2.0
		IG switch ON ABS warning light OFF	10 – 14
STP (A20-16) – GND (A19-15, A21-9,10)	G-W – W-B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
D/G (A19-22) – GND (A19-15, A21-9,10)	R-L – W-B	IG switch ON ABS warning light ON	10 – 14
Tc (A19-9) – GND (A19-15, A21-9,10)	LG-R – W-B	IG switch ON	8 – 14
Ts (A19-23) – GND (A19-15, A21-9,10)	R-Y – W-B	IG switch ON	8 – 14
FR+ (A19-17) – FR- (A19-18)	W – B	IG switch ON Slowly turn right front wheel	AC generation
FL+ (A19-5) – FL- (A19-4)	R – G	IG switch ON Slowly turn left front wheel	AC generation
RR+ (A20-9) – RR- (A20-10)	W – B	IG switch ON Slowly turn right rear wheel	AC generation
RL+ (A20-2) – RL- (A20-1)	R – G	IG switch ON Slowly turn left rear wheel	AC generation

DIAGNOSTICS – ABS & TRACTION CONTROL SYSTEM

MT (A19-14) – GND (A19-15, A21-9,10)	R-W – W-B	IG switch ON	Below 1.5
SRC1 (A21-5) – GND (A19-15, A21-9,10)	B-R – W-B	IG switch ON TRAC OFF indicator light OFF	10 – 14
SRC2 (A21-4) – GND (A19-15, A21-9,10)	B-R – W-B	IG switch ON TRAC OFF indicator light OFF	10 – 14
SMC1 (A21-12) – GND (A19-15, A21-9,10)	Y-R – W-B	IG switch ON TRAC OFF indicator light OFF	10 – 14
SMC2 (A21-6) – GND (A19-15, A21-9,10)	Y-B – W-B	IG switch ON TRAC OFF indicator light OFF	10 – 14
NEO (A20-15) – GND (A19-15, A21-9,10)	BR-W – W-B	Idling	Pulse generation
EFI+ (A20-6) – GND (A19-15, A21-9,10)	W – W-B	IG switch ON	Pulse generation
EFI- (A20-14) – GND (A19-15, A21-9,10)	B – W-B	IG switch ON	Pulse generation
TRC+ (A20-13) – GND (A19-15, A21-9,10)	LG – W-B	TRAC control active	Pulse generation
TRC- (A20-5) – GND (A19-15, A21-9,10)	L – W-B	TRAC control active	Pulse generation
IND (A20-3) – GND (A19-15, A21-9,10)	LG – W-B	IG switch ON SLIP indicator light ON	Below 2.0
		IG switch ON SLIP indicator light OFF	10 – 14
WT (A20-12) – GND (A19-15, A21-9,10)	L – W-B	IG switch ON TRAC OFF indicator light ON	Below 2.0
		IG switch ON TRAC OFF indicator light OFF	10 – 14
CSW (A20-11) – GND (A19-15, A21-9,10)	LG – W-B	IG switch ON TRAC cut switch pushed in	Below 2.0
		IG switch ON TRAC cut switch released	8 – 14

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Suspect Area	See page
ABS does not operate	Only when 1 to 4 are all normal but the problem still occurs, replace the ABS & TRAC ECU. 7. Check the DTC reconfirming that the normal code is output 8. IG power source circuit 9. Speed sensor circuit 10. Check the ABS & TRAC actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page DI-418)	DI-368 DI-393 DI-388 BR-54
ABS does not operate efficiently	Only when 1 to 4 are all normal but the problem still occurs, replace the ABS & TRAC ECU. 1. Check the DTC reconfirming that the normal code is output 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the ABS & TRAC actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page DI-418)	DI-368 DI-388 DI-399 BR-54
ABS warning light abnormal	1. ABS warning light circuit 2. ABS & TRAC ECU	DI-407 DI-405
DTC check is impossible	Only when 1 and 2 are all normal but the problem is still occurs, replace the ABS & TRAC ECU. 1. ABS warning light circuit 2. TRAC OFF indicator light circuit 3. Tc terminal circuit	DI-407 DI-410 DI-414
Speed sensor signal check is impossible	1. Ts terminal circuit 2. ABS & TRAC ECU	DI-416 DI-405
TRAC does not operate	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & TRAC ECU. 1. Check the DTC, reconfirming that the normal code is output 2. IG power source circuit 3. Check the hydraulic circuit for leakage 4. Speed sensor circuit	DI-368 DI-393 DI-418 DI-388
SLIP indicator light abnormal	SLIP indicator light circuit	DI-413
TRAC OFF indicator light abnormal	Only when inspection circuits for each problem symptom are all normal but the problem still occurs, replace the ABS & TRAC ECU. 1. TRAC OFF indicator light circuit 2. TRAC cut switch circuit	DI-410 DI-410

DTC	C0278 / 11, C0279 / 12	ABS & TRAC Solenoid Relay Circuit

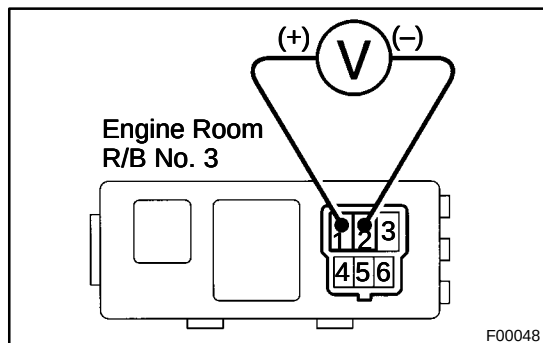
This relay supplies power to each ABS & TRAC solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

Fail safe function:

If a trouble has occurred in the ABS & TRAC solenoid relay circuit, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

INSPECTION PROCEDURE

1	Check voltage between terminals 1 and 2 of engine room R/B No. 3 (for ABS & TRAC solenoid relay).

**PREPARATION:**

Remove the ABS & TRAC solenoid relay from the engine room R/B No. 3.

CHECK:

Measure the voltage between terminals 1 and 2 of the engine room R/B No. 3 (for the ABS & TRAC solenoid relay).

OK:

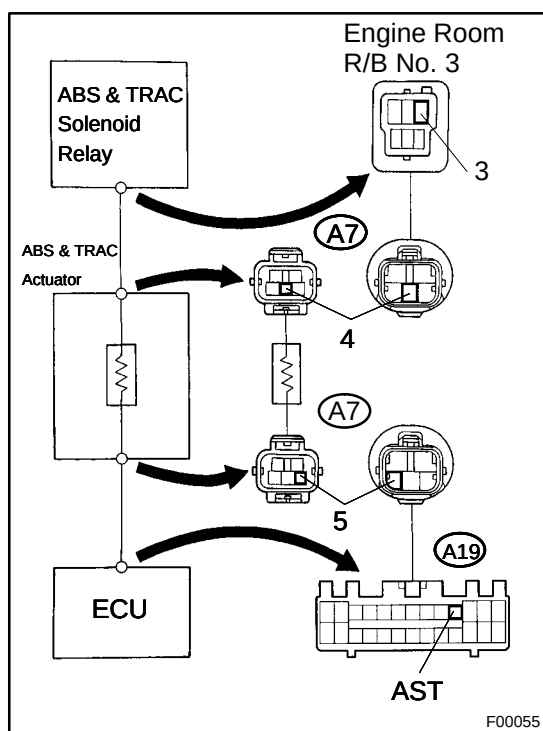
Voltage: 10 – 14 V

NG

Check and repair harness or connector.

OK

2	Check continuity between terminal 3 of ABS & TRAC solenoid relay and terminal AST of ABS & TRAC ECU.

**CHECK:**

Check the continuity between terminal 3 of engine room R/B No. 3 (for the ABS & TRAC solenoid relay) and terminal AST of the ABS & TRAC ECU.

OK:

Continuity

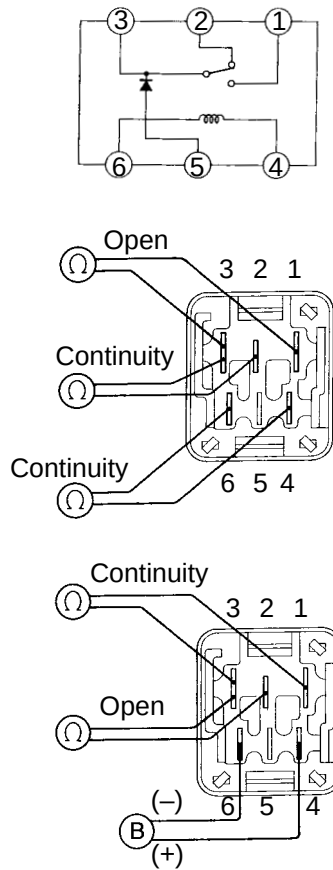
HINT:

There is a resistance of 4 ~ 6 Ω between terminals A7 – 4 and A7 – 5 of the ABS actuator.

NG

Repair or replace harness or ABS & TRAC actuator.

OK

3 Check ABS & TRAC solenoid relay.**CHECK:**

Check the continuity between each terminal of the ABS & TRAC solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

- Apply battery positive voltage between terminals 4 and 6.
- Check the continuity between each terminal of the ABS & TRAC solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG**Replace ABS & TRAC solenoid relay.****OK****4 Check for open and short circuit in harness and connector between ABS & TRAC solenoid relay and ABS & TRAC ECU (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK**

If same code is still output after DTC is deleted, check contact conditions of each connection. If connections are normal, ECU may be defective.

DTC	C0273 / 13, C0274 / 14	ABS & TRAC Motor Relay Circuit

CIRCUIT DESCRIPTION

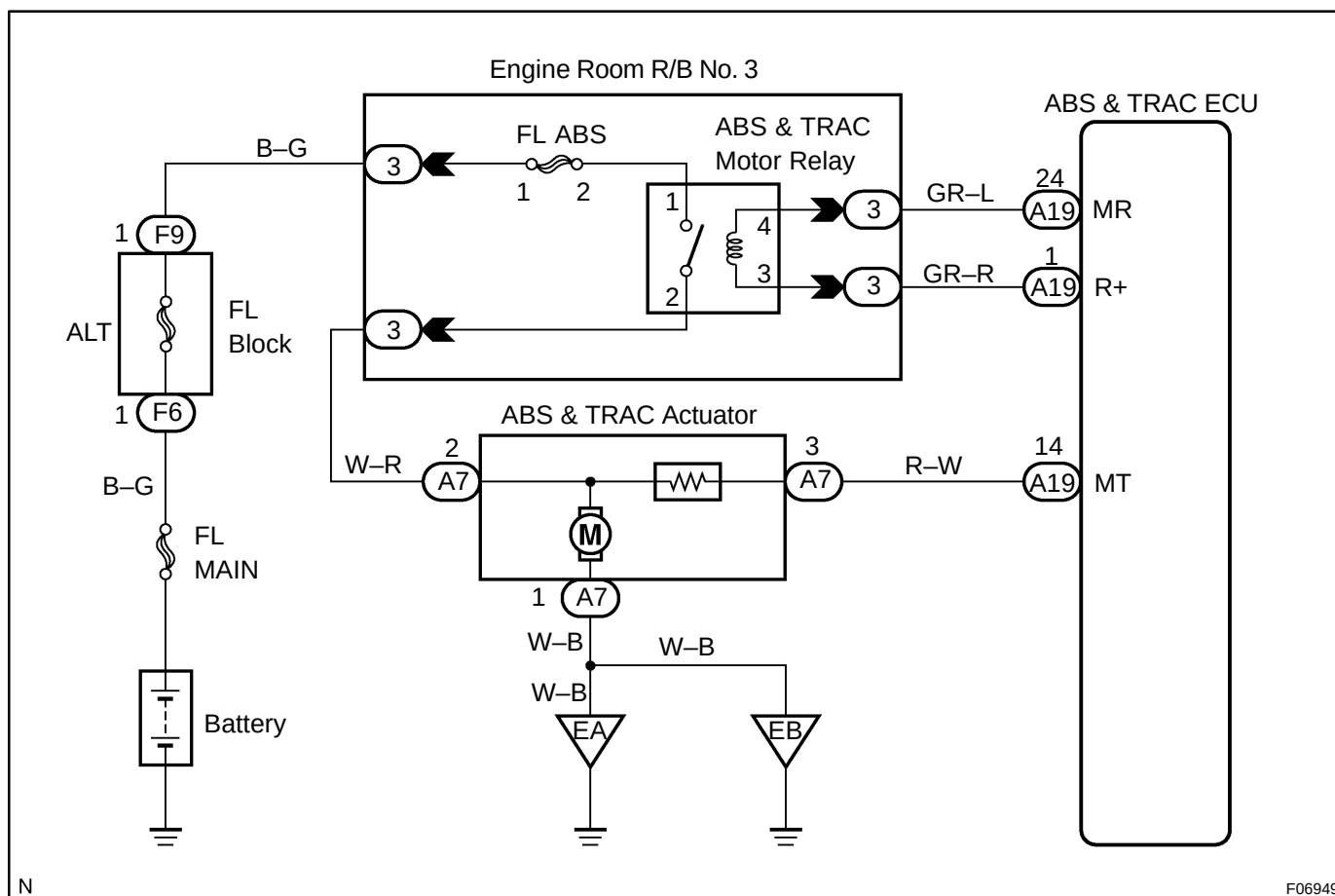
ABS & TRAC motor relay supplies power to the ABS & TRAC pump motor. While the ABS is activated, the ECU switches the ABS & TRAC motor relay on and operates the ABS & TRAC pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. to 3. are detected: 1. Malfunction of motor relay monitor 2. Battery voltage will not be more than 17.0 V within 2.16 sec. 3. Battery voltage will not become less than 9.5 V within 2.16 sec., or after the motor relay is on and motor relay monitor will not be on.	●ABS & TRAC motor relay ●ABS & TRAC motor relay circuit ●ABS & TRAC ECU
C0274 / 14	Motor relay is off, and motor relay monitor is on, which continues for 20.16 sec. or more.	

Fail safe function:

If a trouble has occurred in the ABS & TRAC motor relay circuit, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

WIRING DIAGRAM

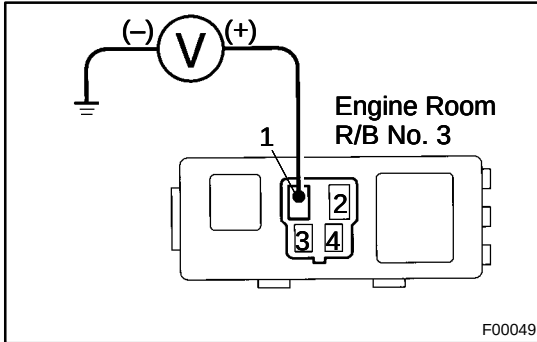


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F06949

INSPECTION PROCEDURE

1	Check voltage between terminal 1 of engine room R/B No. 3 (for ABS & TRAC motor relay) and body ground.

**PREPARATION:**

Remove the ABS & TRAC motor relay from the engine room R/B No. 3.

CHECK:

Measure the voltage between terminal 1 of the engine room R/B No. 3 (for the ABS & TRAC motor relay) and the body ground.

OK:

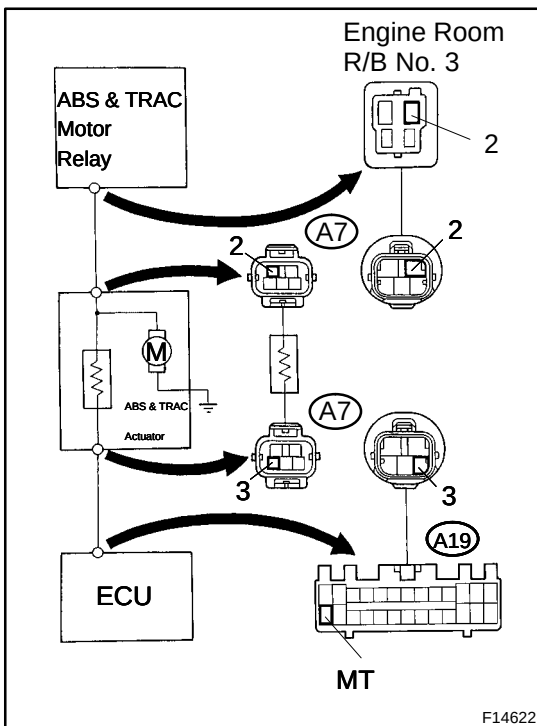
Voltage: 10 – 14 V

NG

Check and repair harness or connector.

OK

2	Check continuity between terminal 2 of ABS & TRAC motor relay and terminal MT of ABS & TRAC ECU.

**CHECK:**

Check the continuity between terminal 2 of the engine room R/B No. 3 (for the ABS & TRAC motor relay) and terminal MT of the ABS & TRAC ECU.

OK:

Continuity

HINT:

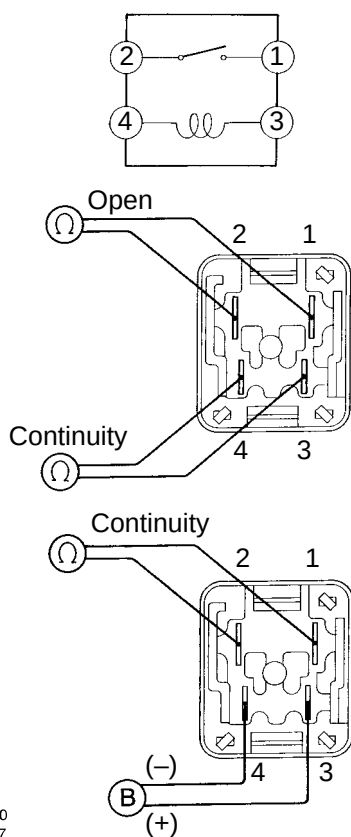
There is a resistance of 4 ~ 6 Ω between terminals A7 – 2 and A7 – 3 of the ABS & TRAC actuator.

NG

Repair or replace harness or ABS & TRAC actuator.

OK

3 Check ABS & TRAC motor relay.



BE1840
R15257
R15258

F00044

CHECK:

Check the continuity between each terminal of the ABS & TRAC motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

- Apply battery positive voltage between terminals 3 and 4.
- Check the continuity between terminals of the ABS & TRAC motor relay.

OK:

Terminals 1 and 2	Continuity

NG**Replace ABS & TRAC motor relay.****OK**

4 Check for open and short circuit in harness and connector between ABS & TRAC motor relay and ABS & TRAC ECU (See page [IN-31](#)).

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

If same code is still output after DTC is deleted, check contact conditions of each connection. If connections are normal, ECU may be defective.

DTC	C0226 / 21 – C1228 / 28	ABS & TRAC Actuator Solenoid Circuit

CIRCUIT DESCRIPTION

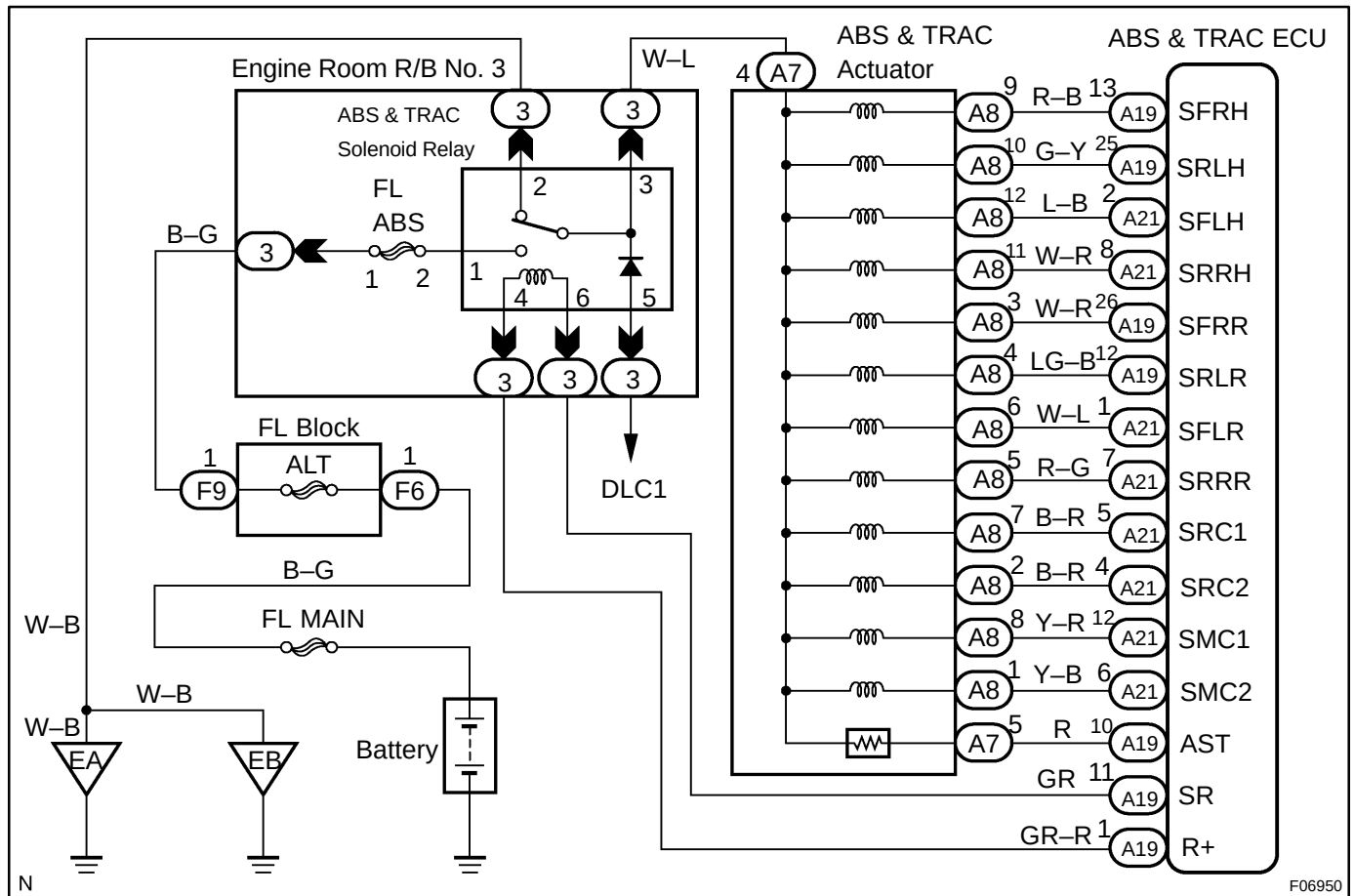
This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	When solenoid relay is in normal operation and the condition that solenoid output of each wheel and monitor value do not accord with continued for 0.05 sec.	●ABS & TRAC actuator ●SFRR or SFRH circuit ●ECU
C0236 / 22		●ABS & TRAC actuator ●SFLR or SFLH circuit ●ECU
C0246 / 23		●ABS & TRAC actuator ●SRRR or SRRH circuit ●ECU
C0256 / 24		●ABS & TRAC actuator ●SRLR or SRLH circuit ●ECU
C1225 / 25	When solenoid relay is in normal operation and the condition that output of switching solenoid and monitor value do not accord with continued for 0.05 sec.	●ABS & TRAC actuator ●SMC1 circuit ●ECU
C1226 / 26		●ABS & TRAC actuator ●SMC2 circuit ●ECU
C1227 / 27		●ABS & TRAC actuator ●SRC1 circuit ●ECU
C1228 / 28		●ABS & TRAC actuator ●SRC2 circuit ●ECU

Fail safe function:

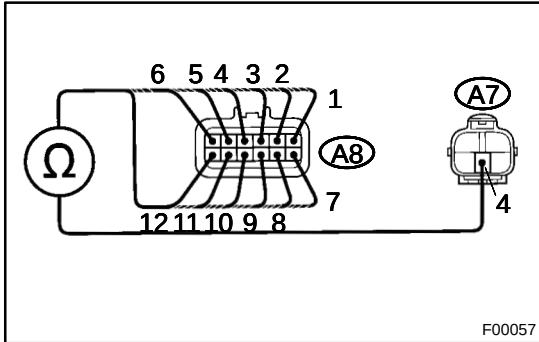
If a trouble has occurred in the actuator solenoid circuit, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check ABS & TRAC actuator solenoid.

**PREPARATION:**

Disconnect the 2 connectors from the ABS & TRAC actuator.

CHECK:

Check the continuity between terminals A7 – 4 and each of A8 – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 of the ABS & TRAC actuator connector.

OK:**Continuity****HINT:**

Resistance of each solenoid coil is 1.2 Ω.

NG

Replace ABS & TRAC actuator.

OK

2 Check for open and short circuit in harness and connector between ABS & TRAC ECU and actuator (See page [IN-31](#)).

NG

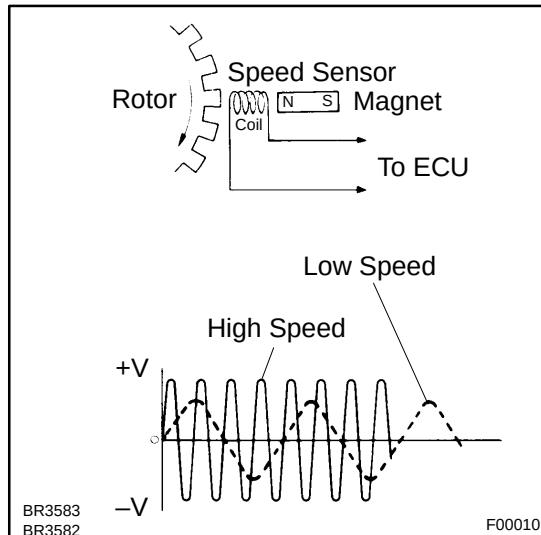
Repair or replace harness or connector.

OK

If same code is still output after DTC is deleted, check contact conditions of each connection.
If connections are normal, ECU may be defective.

DTC	C0200 / 31 – C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



Speed sensor detects the wheel speed and sends the appropriate signals to the ECU. These signals are used to control the ABS and TRAC system. The front and rear rotors each has 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 to 3: 1. The condition that ABS is in non-operation, wheel speed is 10 km/h or more, one eighth of maximum wheel speed is greater than minimum wheel speed is shown continuously for 30 sec. or more. 2. ABS is in non-operation, momentary interruption of speed sensor occurs 7 times or more in mean time of switching ignition switch on and off. 3. ABS non-operation, momentary interruption of speed sensor occurs 7 times or more in mean time of switching ignition switch on and off or vehicle speed is 20 km/h (12 mph) or more and the condition of noise interference or non-noise interference occurs 75 times or more within 5 sec.	●Right front, left front, right rear, left rear speed sensor ●Each speed sensor circuit ●Speed sensor rotor ●ECU

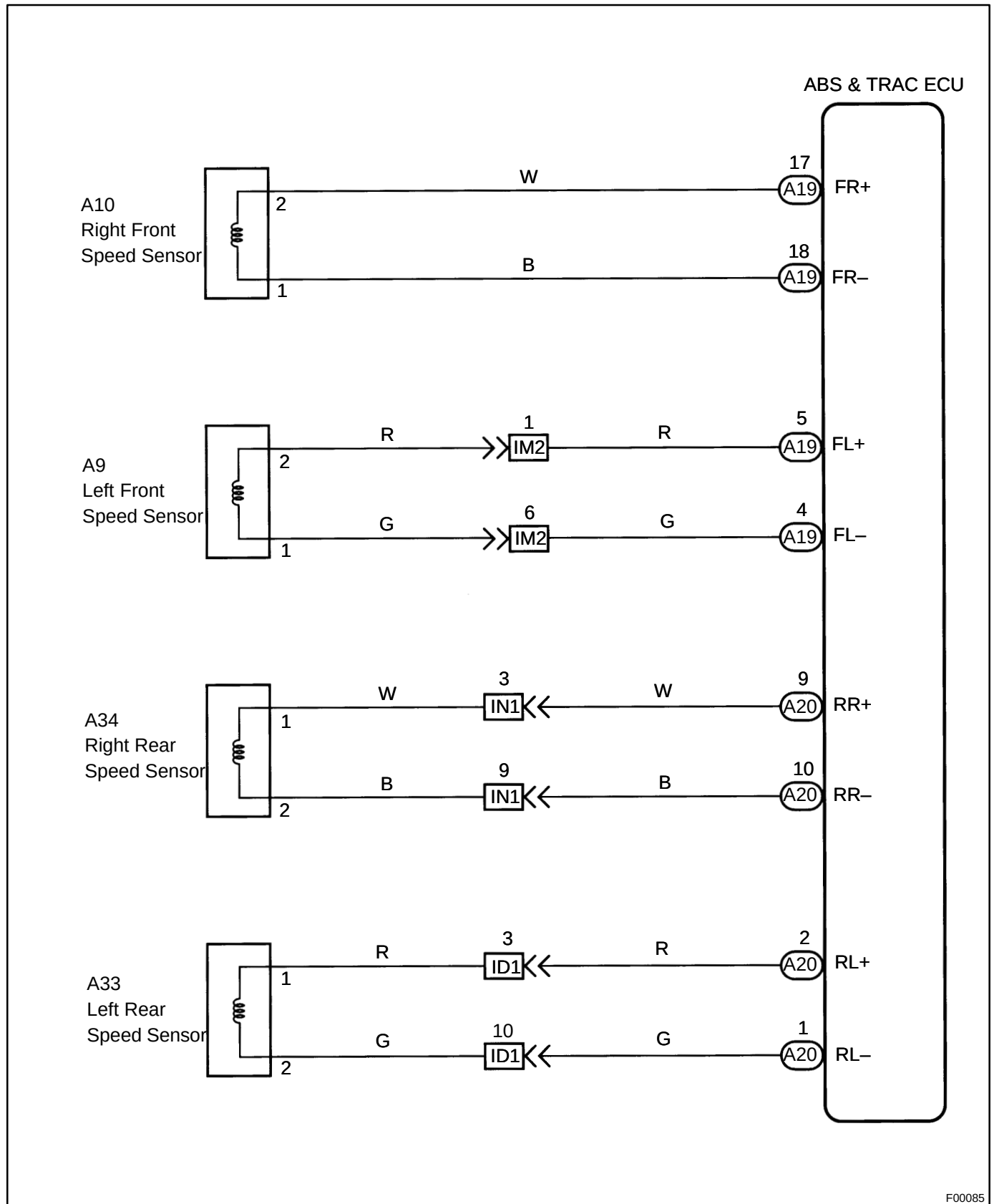
HINT:

- DTC No. C0200 / 31 is for the right front speed sensor.
- DTC No. C0205 / 32 is for the left front speed sensor.
- DTC No. C0210 / 33 is for the right rear speed sensor.
- DTC No. C0215 / 34 is for the left rear speed sensor.

Fail safe function:

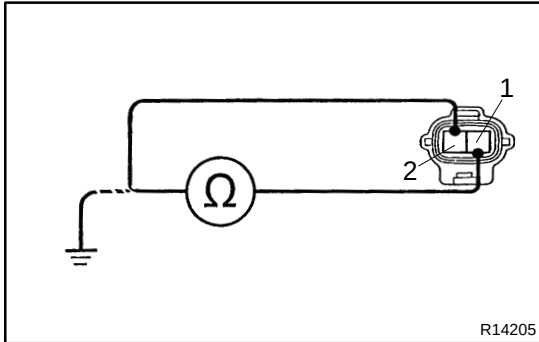
If a trouble has occurred in the speed sensor circuit, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check speed sensor.

**Front:****PREPARATION:**

- (a) Remove front fender liner.
- (b) Disconnect speed sensor connector.

CHECK:

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

OK:

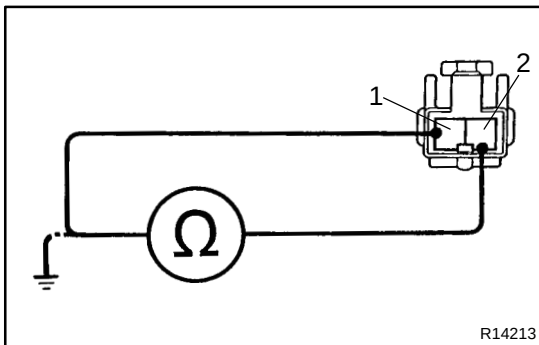
Resistance: 0.6 – 2.5 kΩ

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and the body ground.

OK:

Resistance: 1 MΩ or higher

**Rear:****PREPARATION:**

- (a) Remove the seat cushion and seat back.
- (b) Disconnect speed sensor connector.

CHECK:

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

OK:

Resistance: 1.2 – 2.3 kΩ

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and the body ground.

OK:

Resistance: 1 MΩ or higher

NG

Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-368](#)).

OK

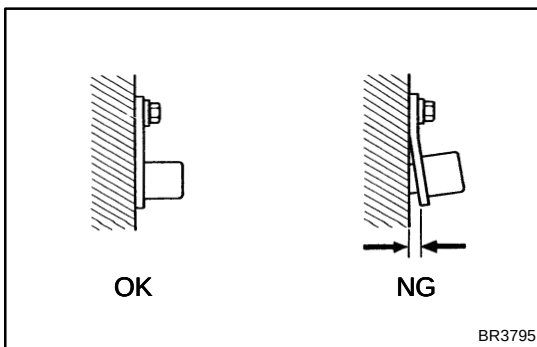
- 2 Check for open and short circuit in harness and connector between each speed sensor and ECU (See page IN-31).**

NG

Repair or replace harness or connector.

OK

- 3 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 the rear axle carrier.

NG

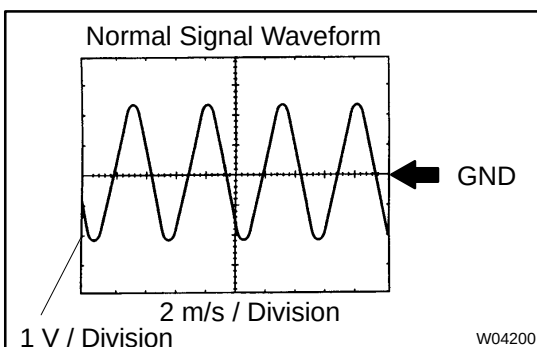
Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page DI-368).

OK

- 4 Check speed sensor and sensor rotor serrations.**

**REFERENCE: INSPECTION USING OSCILLOSCOPE****PREPARATION:**

- Remove the ABS & TRAC ECU.
- Connect an oscilloscope to terminals FR+, FL+, RR+ or RL+ and GND of the ABS & TRAC ECU harness side connector.

CHECK:

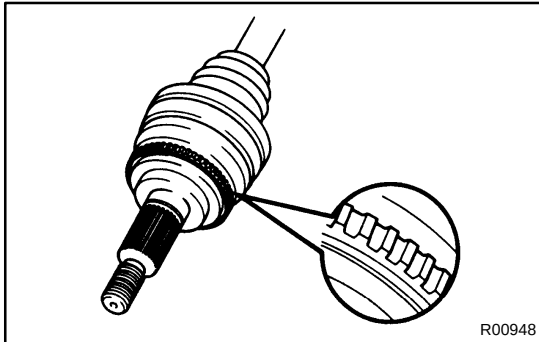
Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

OK

Check and replace ABS & TRAC ECU.

NG

5	Check sensor rotor and sensor tip.

**Front:****PREPARATION:**

Remove the front drive shaft (See page [SA-16](#)).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, no missing teeth or no foreign objects.

PREPARATION:

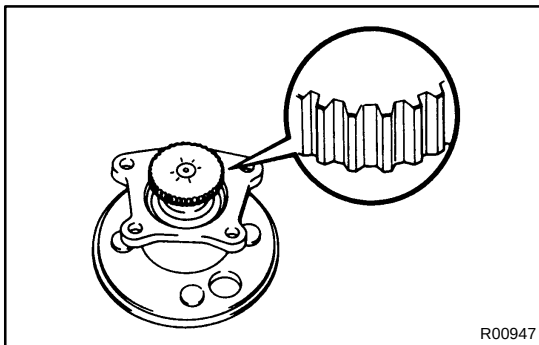
Remove the front speed sensor (See page [BR-65](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or no foreign objects on the sensor tip.

**Rear:****PREPARATION:**

Remove the rear axle hub (See page [SA-45](#)).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, no missing teeth or no foreign objects.

PREPARATION:

Remove the rear speed sensor (See page [BR-68](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or no foreign objects on the sensor tip.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal last (See page [DI-368](#)).

OK

Check and replace ABS & TRAC ECU.

DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

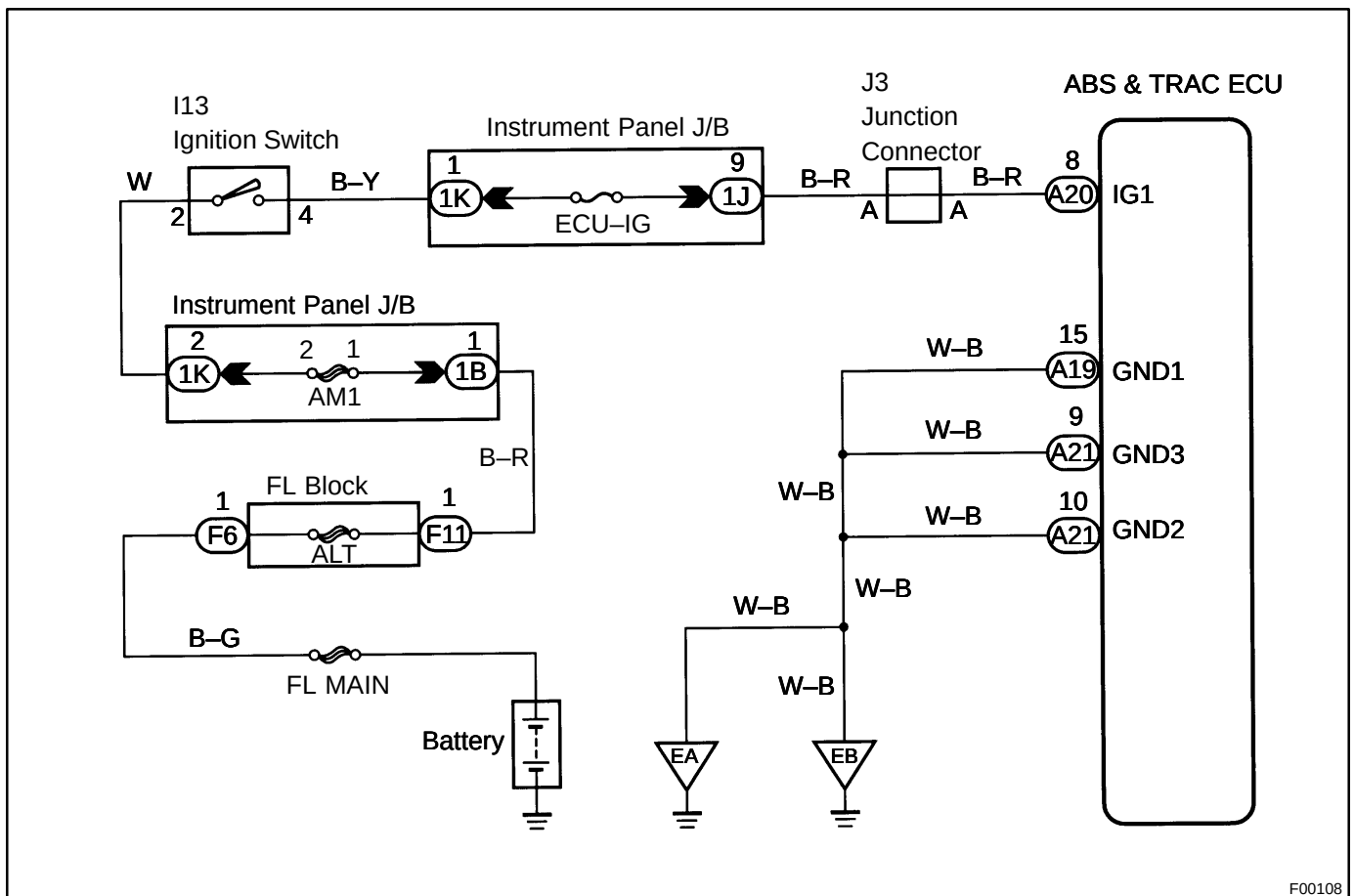
This is the power source for the ECU, and the actuators.

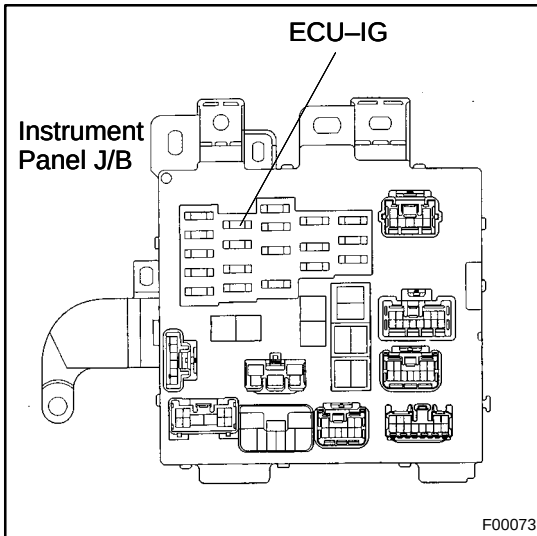
DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any conditions from 1 to 4: 1. Vehicle speed is 3 km/h (1.9 mph) or more and battery voltage is less than 9.5 V continues for 10 sec. or more. 2. Under the condition that the IG voltage down continued for 0.2 sec. or more and when there was a case that the motor relay turned on in the past and the signals of the motor rely and monitor have no accord for 0.02 sec. 3. Under the condition that the IG voltage down, continued for 0.2 sec. or more and when there was a case that the solenoid relay turned on in the past and the signals of the solenoid rely and monitor have no accord for 0.02 sec. 4. Under the condition that the IG voltage down continued for 0.2 sec. or more, the solenoid output and monitor signal have no accord continued for 0.05 sec. or more.	●Battery ●Charging system ●Power source circuit ●ECU

Fail safe function:

If a trouble has occurred in the power source circuit, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE**1 Check ECU-IG fuse.****PREPARATION:**

Remove the ECU-IG fuse from the instrument panel J/B.

CHECK:

Check the continuity of the ECU-IG fuse.

OK:

Continuity

NG

Check for short circuit in all harness and components connected to ECU-IG fuse (See attached wiring diagram).

OK

2 Check battery positive voltage.**OK:**

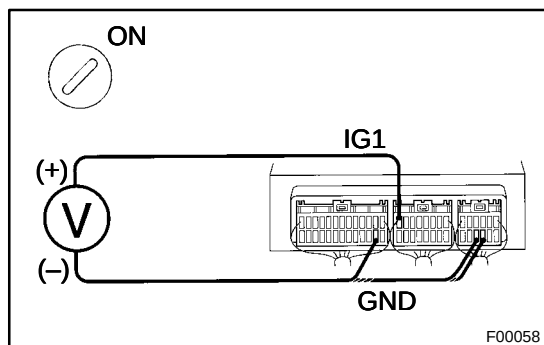
Voltage: 10 – 14 V

NG

Check and repair charging system (See page [CH-2](#)).

OK

3 Check voltage between terminals IG1 and GND of ABS & TRAC ECU connector.

**PREPARATION:**

Remove the ABS & TRAC ECU with the connectors still connected.

CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals IG1 and GND of the ABS & TRAC ECU connector.

OK:

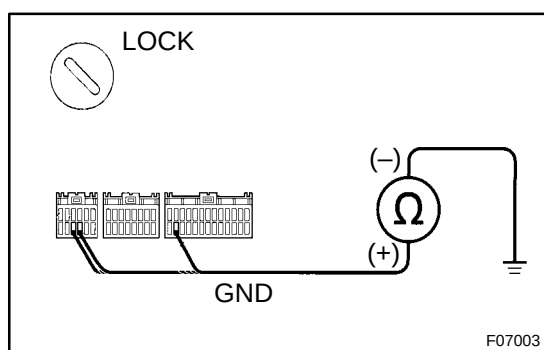
Voltage: 10 – 14 V

OK

Check and replace ABS & TRAC ECU.

NG

4 Check continuity between terminals GND of ABS & TRAC ECU connector and body ground.

**PREPARATION:**

Disconnect the connector from the ABS & TRAC ECU.

CHECK:

Measure the resistance between terminal GND of the ABS & TRAC ECU connector and the body ground.

OK:

Resistance: 1 Ω or less

NG

Repair or replace harness or connector.

OK

Check for open circuit in harness and connector between ABS & TRAC ECU and battery (See page [IN-31](#)).

DTC	C1223 / 43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	Detection of any conditions from 1 to 8: 1. While TRAC is in non-operation and DTC of ABS is output, but TRAC is not during initial light check, terminal WA of ECU is on and engine speed is 500 rpm or more, which continue for 1 sec. or more. 2. Solenoid relay circuit is open or short. 3. Motor relay circuit is open or short. 4. ABS solenoid circuit is open or short. 5. TRAC solenoid circuit is open or short. 6. Speed sensor is under malfunction condition. 7. IG power source is down or raised. 8. Pump motor is locked.	●ABS control system

INSPECTION PROCEDURE

1	Check DTC for ABS (See page DI-368).

*1

Repair ABS control system according to code output.

*2

Check for ECU connected to malfunction indicator light.

*1: Output NG code

*2: Malfunction indicator light remains on.

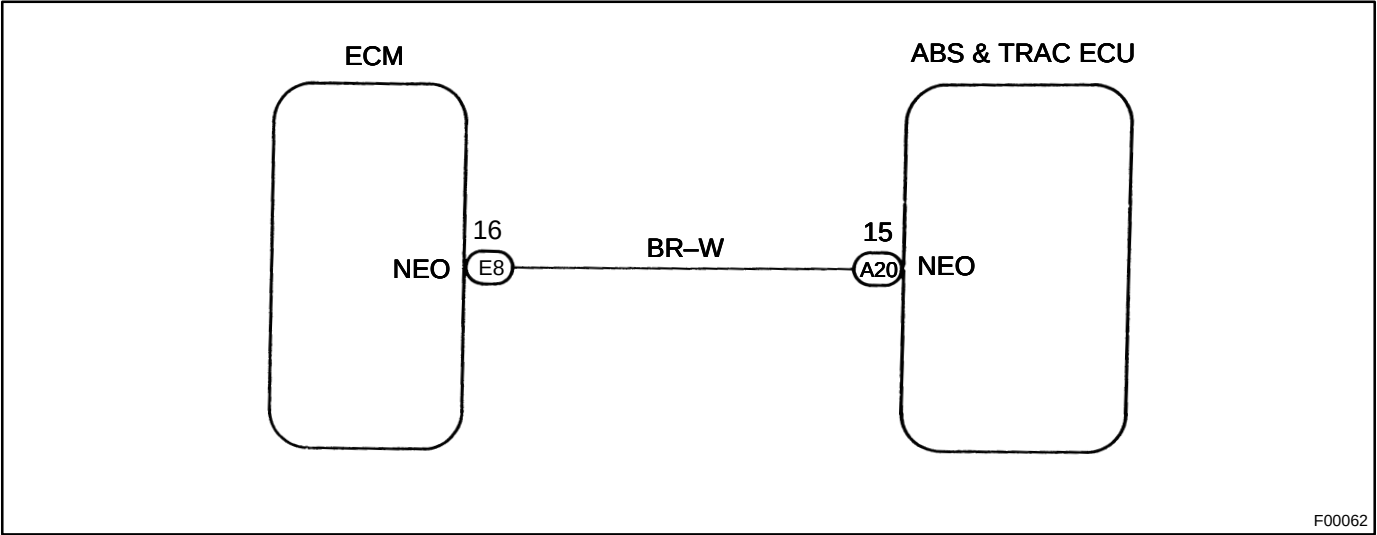
DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

ABS & TRAC ECU receives engine speed signals (NE signals) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	Condition 1 or 2 is detected: 1. TRAC is in operation and engine speed is 0 rpm continue for 2.4 sec. or more. 2. TRAC is in non-operation, shift lever is not in P or N position, both the front right and left wheels' speed is 30 km/h (19 mph) or more, engine speed is 0 rpm and does not have communication malfunction, and malfunction information of engine system is off.	•NEO circuit •ECM •ABS & TRAC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

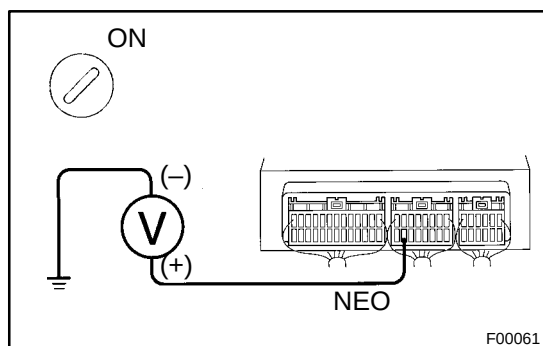
- 1 Check for open and short circuit in harness and connector between terminal NEO of ABS & TRAC ECU and terminal NEO of ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

- 2 Check voltage between terminal NEO of ABS & TRAC ECU and body ground.

**PREPARATION:**

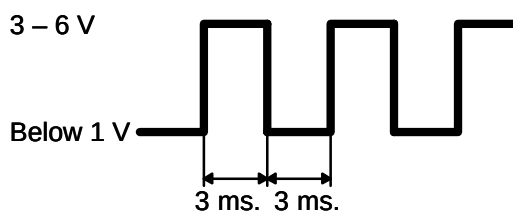
- (a) Remove the ABS & TRAC ECU with the connectors still connected.
 (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal NEO of the ABS & TRAC ECU and the body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	2 – 3 V (Pulse)

(Reference)

IG

Check and replace ABS & TRAC ECU or ECM.

OK

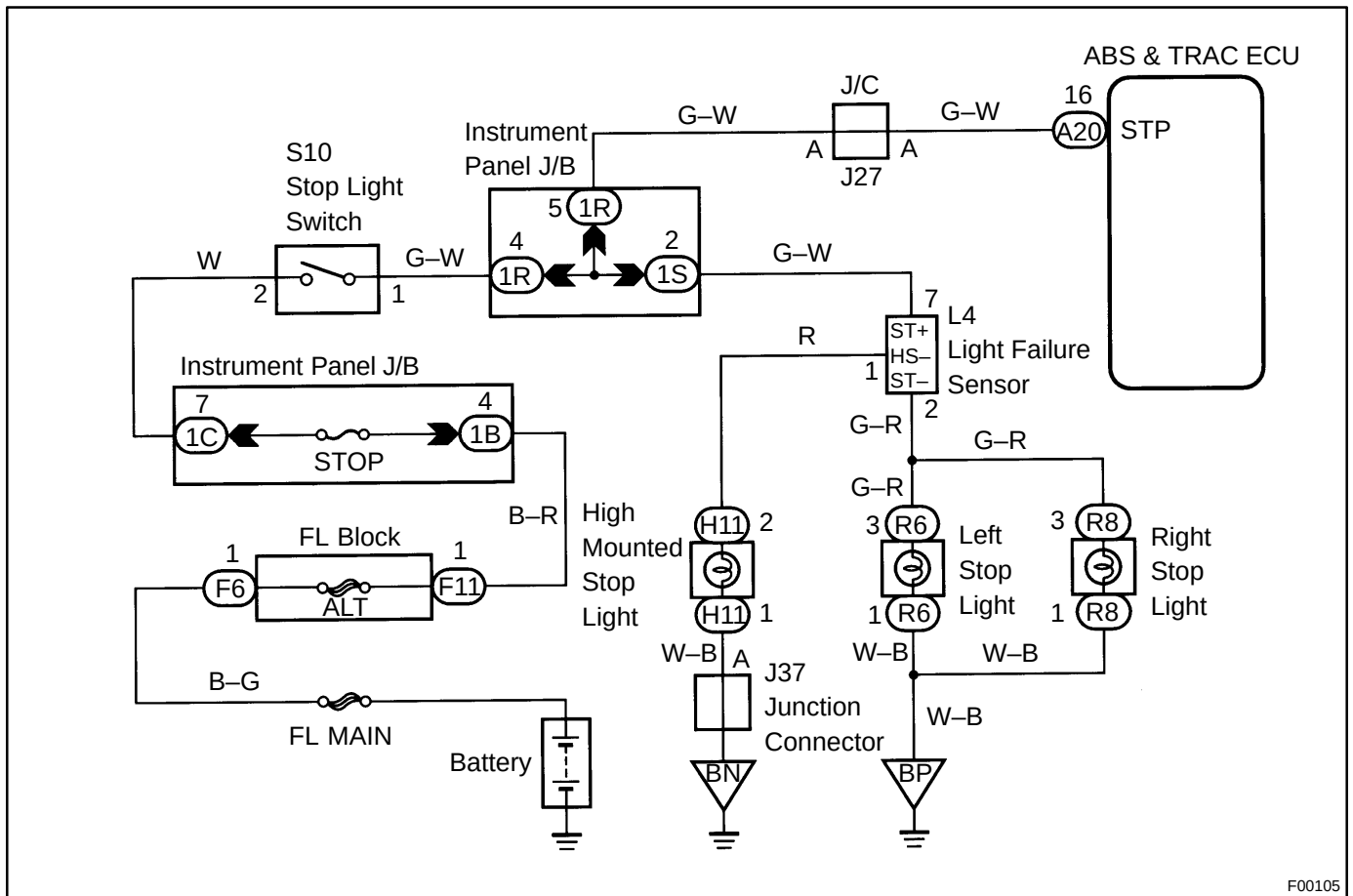
If same code is still output after DTC is deleted, check contact conditions of each connection.

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	The condition that the battery voltage has never been more than 17.0 V and become less than 9.5 V within 2.16 sec. and STP terminal voltage of ECU is under open circuit detection limit continue for 3 sec. or more.	• Stop light switch • Stop light switch circuit • ABS & TRAC ECU

WIRING DIAGRAM



F00105

INSPECTION PROCEDURE

1 Check operation of stop light.

CHECK:

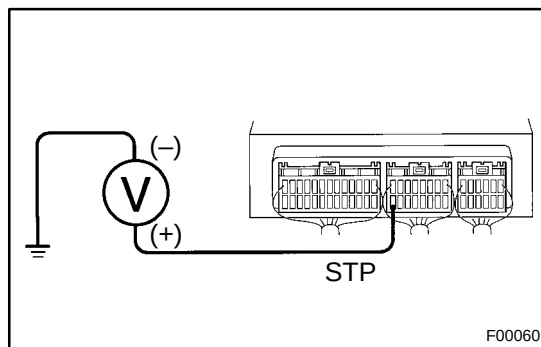
Check that stop light lights up when brake pedal is depressed and turns off when brake pedal is released.

NG

Repair stop light circuit (See page [BE-58](#)).

OK

2 Check voltage between terminal STP of ABS & TRAC ECU and body ground.

**PREPARATION:**

Remove the ABS & TRAC ECU with the connectors still connected.

CHECK:

Measure the voltage between terminal STP of the ABS & TRAC ECU and the body ground when the brake pedal is depressed.

OK:

Voltage: 8 – 14 V

OK

Check and replace ABS & TRAC ECU.

NG

3 Check for open circuit in harness and connector between ABS & TRAC ECU and stop light switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-378](#)).

DTC	C1251 / 51	ABS Pump Motor Lock

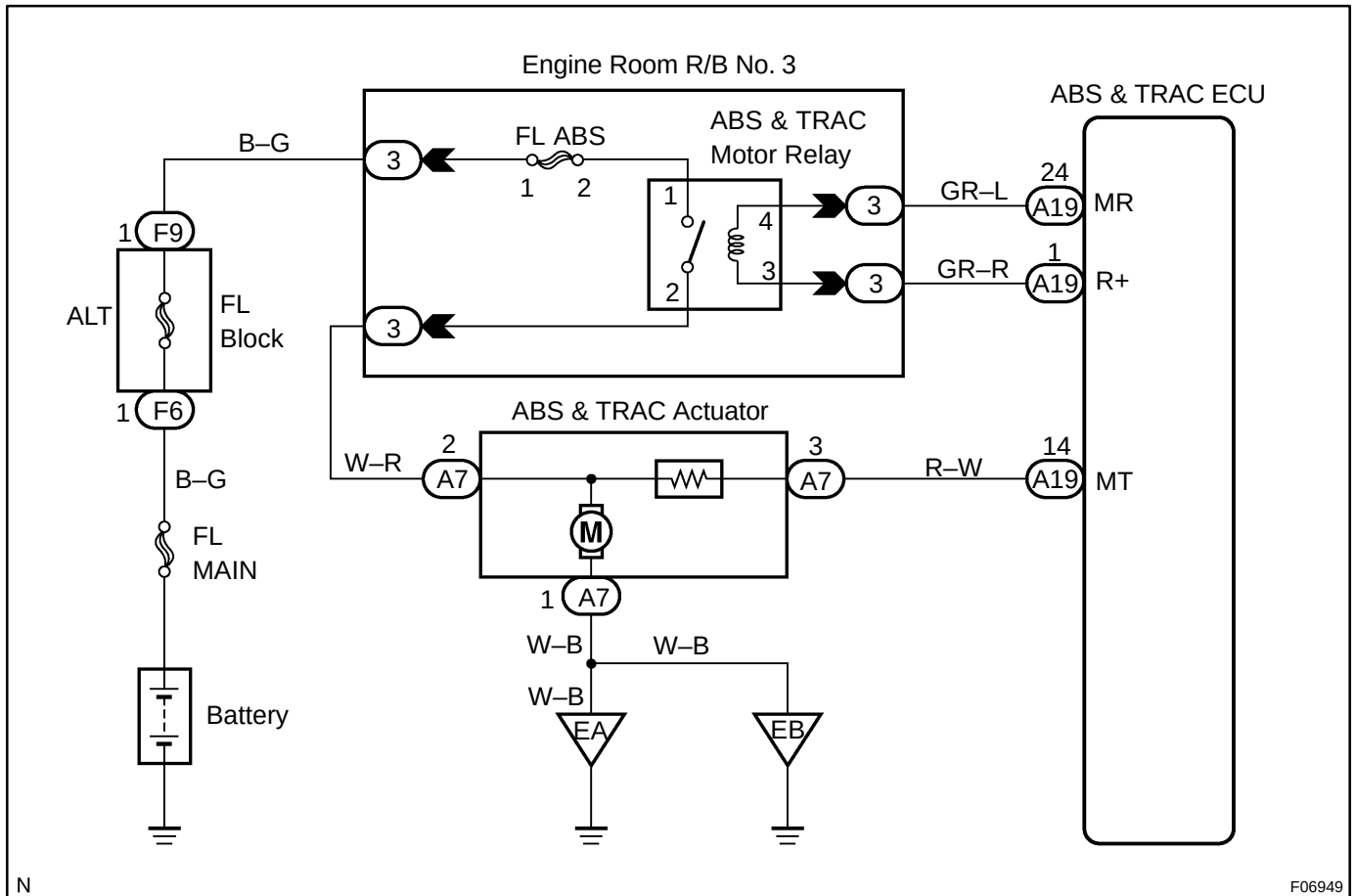
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	In the midst of initial check, after the current flows to the motor for 3 sec. and motor relay is turned off, then within 0.66 sec., the condition that the motor relay monitor is off continues for 0.24 sec. or more.	ABS pump motor

Fail safe function:

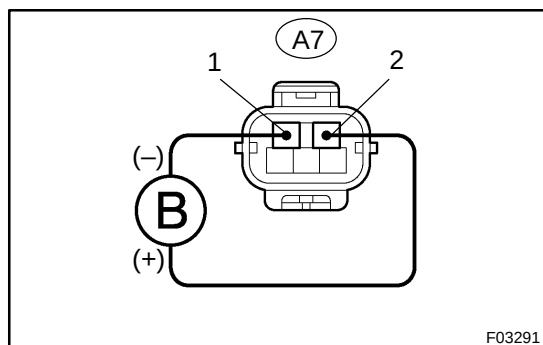
If a trouble has occurred in the ABS & TRAC pump motor, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of ABS & TRAC pump motor.

**PREPARATION:**

Disconnect the ABS & TRAC actuator connector.

CHECK:

Connect the positive (+) lead to terminal A7 – 2 and the negative (-) lead to terminal A7 – 1 of the ABS & TRAC actuator connector, check that the pump motor operates.

OK:

The running sound of the pump motor should be heard.

OK

Check for open circuit in harness and connector between ABS & TRAC motor relay, ABS & TRAC actuator and ECU (See page [IN-31](#)).

NG

Replace ABS & TRAC actuator.

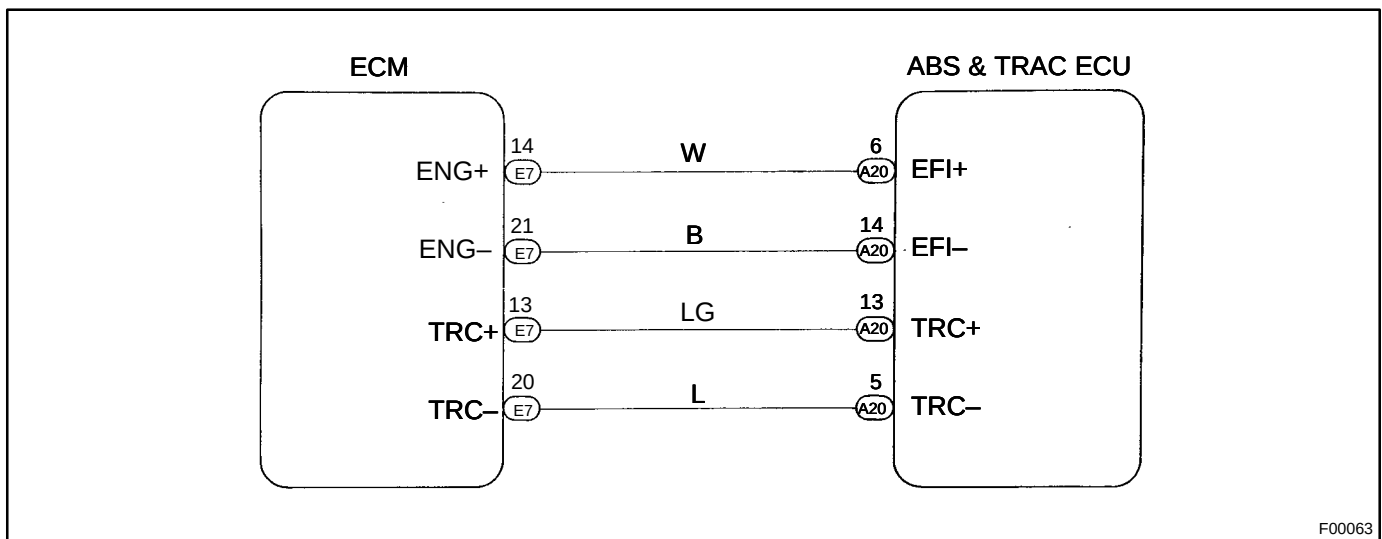
DTC	C1203 / 53	ECM Communication Circuit Malfunction

CIRCUIT DESCRIPTION

This circuit is used to send the TRAC control information to the ECM (TRC+, TRC–) from the ABS & TRAC ECU, and engine control information to the ABS & TRAC ECU (EFI+, EFI–) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	ECM communication data malfunction is detected.	•TRC+ or TRC– circuit •EFI+ or EFI– circuit •ECM •ABS & TRAC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals EFI+, EFI–, TRC+, TRC– of ABS & TRAC ECU and ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace ECM or ABS & TRAC ECU.

DTC	C1201 / 61	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If a trouble has occurred in the engine control system, the ECU will prohibits the TRAC control.

DTC No.	DTC Detection Condition	Trouble Area
C1201 / 61	Conditions 1 and 2 are detected: 1. ECM communication is normal, malfunction information of engine system is on, and engine speed is 500 rpm or more, which continues for 0.48 sec. or more, and TRAC operation start condition is concluded. 2. ECM communication is normal, malfunction information of engine system is on, engine speed is 500 rpm and more, which continues for 1 sec. or more, and the engine system memorizes DTC.	Engine control system

INSPECTION PROCEDURE

1	Check DTC for the engine (See page DI-3).

*1

Repair engine control system according to code output.

*2

Check for ECU connected to malfunction indicator light.

*1: Output NG code

*2: Malfunction indicator light remains ON.

DTC	Always ON	ABS & TRAC ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	ABS & TRAC ECU internal malfunction is detected.	ECU

Fail safe function:

If a trouble has occurred in the power source circuit, the ECU cuts off the current to the ABS & TRAC solenoid relay and prohibits the ABS & TRAC controls.

INSPECTION PROCEDURE

1	Is DTC output?

Check the DTC on page [DI-368](#).

YES

Repair circuit indicated by code output.

NO

2	Is normal code displayed?

YES

Check solenoid relay. Check for short circuit in harness and connector between solenoid relay and DLC1 (See page [IN-31](#)).

NO

3	Does ABS warning light go off?

YES

Check for open or short circuit in harness and connector between ECU-IG fuse and ABS & TRAC ECU (See page [IN-31](#)).

NO

4 Check battery positive voltage.**CHECK:**

Check the battery positive voltage.

OK:

10 – 14 V

NG

Check and repair charging system
(See page [CH-2](#)).

OK**5 Check ABS warning light.****PREPARATION:**

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the ABS & TRAC ECU.
- (c) Turn the ignition switch ON.

CHECK:

Check the ABS warning light goes off.

OK

Check and replace ABS & TRAC ECU.

NG

Check for short circuit in harness and connector between ABS warning light, DLC1, and ABS & TRAC ECU (See page [IN-31](#)).

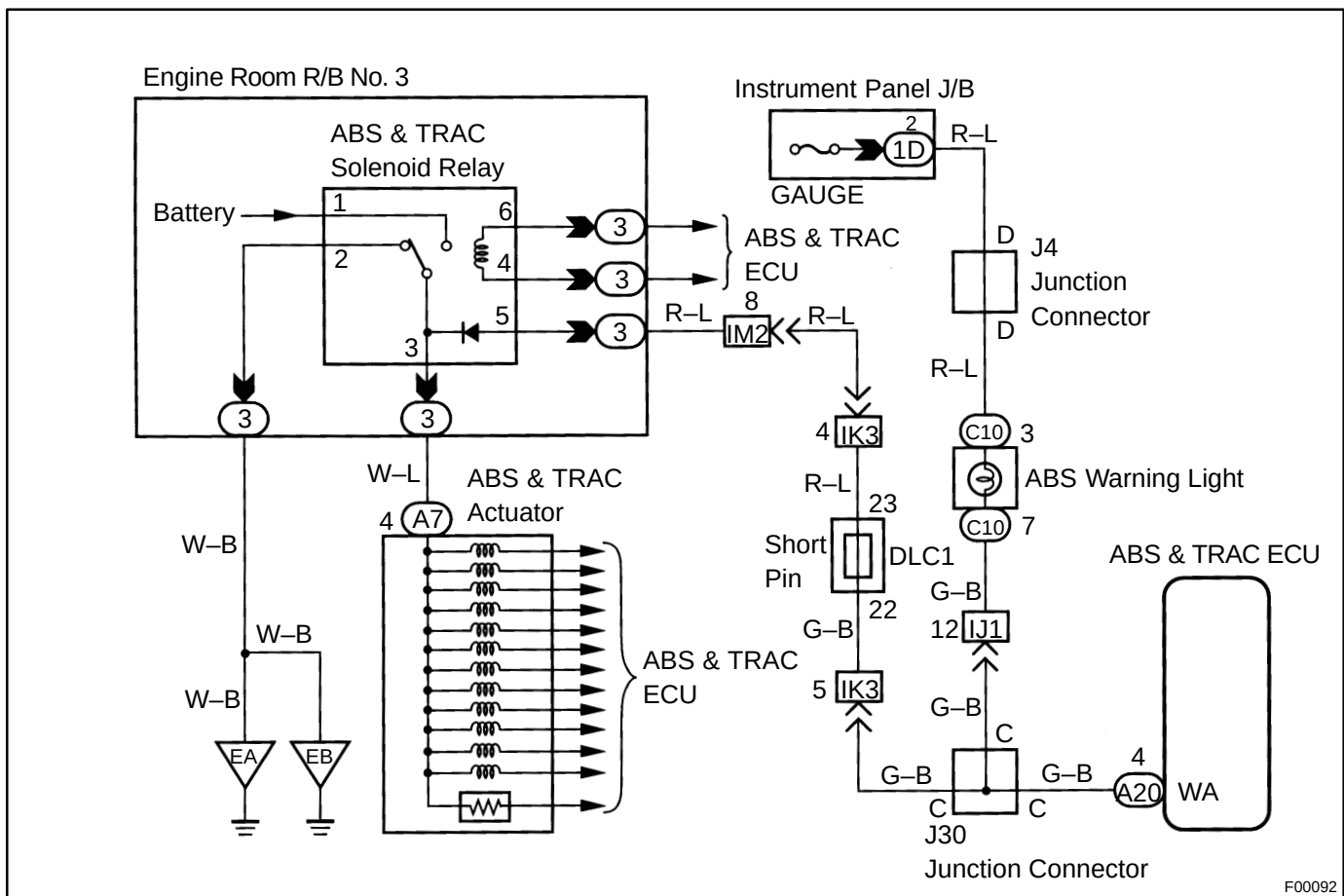
ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU has detected a trouble, it lights the ABS warning light and prohibits the ABS control at the same time. At this time, the ECU records a DTC in the memory.

Connect terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

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

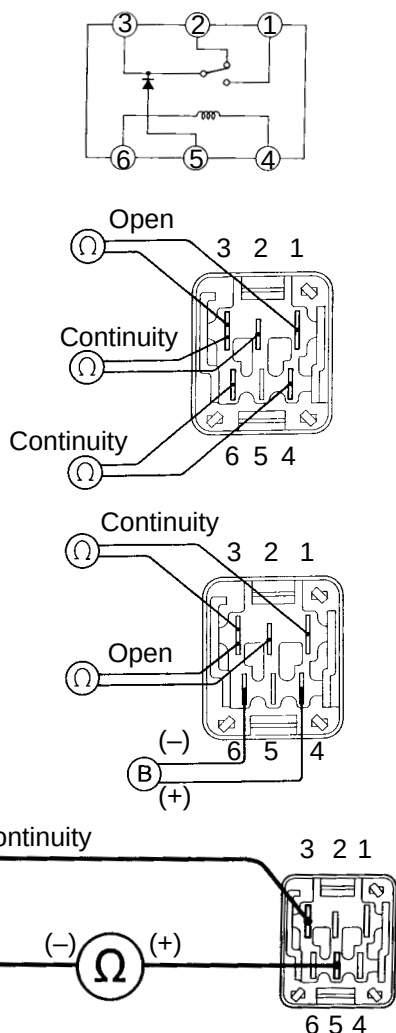
ABS warning light does not light up	Go to step 1
ABS warning light remains on	Go to step 3
1	Check ABS warning light.

See the combination meter troubleshooting on page [BE-65](#).

NG

Repair bulb or combination meter assembly
(See page [BE-96](#)).

OK

2 Check ABS & TRAC solenoid relay.

BR5403
R15254
R15255
R15964

F00043

PREPARATION:

Remove the ABS & TRAC solenoid relay from the engine room R/B No. 3.

CHECK:

Check the continuity between each terminal of the ABS & TRAC solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

- Apply battery positive voltage between terminals 4 and 6.
- Check the continuity between each terminal of the ABS & TRAC solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

CHECK:

- Connect the positive (+) test lead to terminal 5 and the negative (–) lead to terminal 3.
- Check continuity between the terminals.

OK:**Continuity**

If there is no continuity, connect the negative (–) test lead to terminal 5 and the positive (+) lead to terminal 3. Check continuity between terminals.

NG

Replace ABS & TRAC solenoid relay.

OK

Check for open circuit in harness and connector between DLC1, ABS & TRAC solenoid relay and body ground (See page [IN-31](#)).

3 Is DTC output?

Check the DTC on page [DI-368](#).

YES**Repair circuit indicated by code output.****NO****4 Does ABS warning light go off?****NO****Check for short circuit in harness and connector between ABS warning light, DLC1 and ABS & TRAC ECU (See page [IN-31](#)).****YES****5 Check ABS & TRAC solenoid relay (See step 2).****NG****Replace ABS & TRAC solenoid relay.****OK**

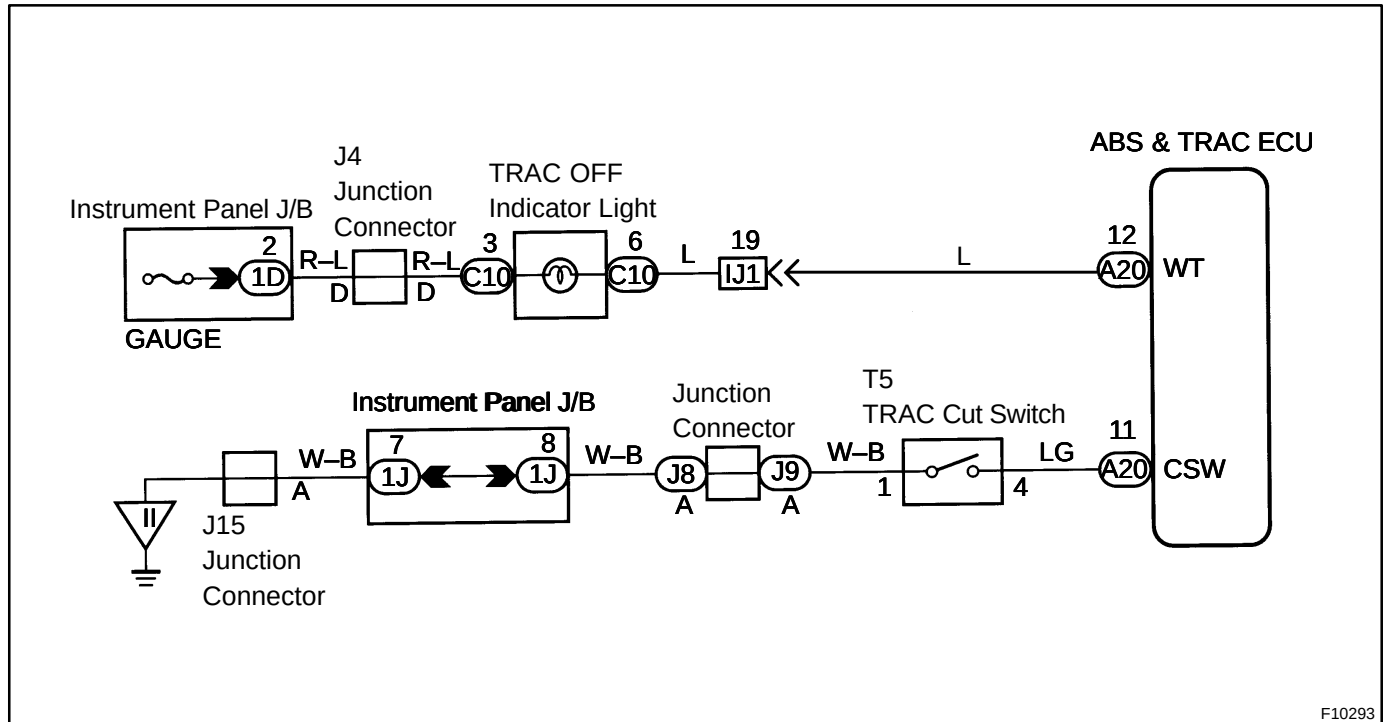
Check for short circuit in harness and connector between DLC1 and ABS & TRAC solenoid relay (See page [IN-31](#)).

TRAC OFF Indicator, TRAC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRAC control main switch. When the TRAC cut switch is pushed on, TRAC control goes off and the TRAC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

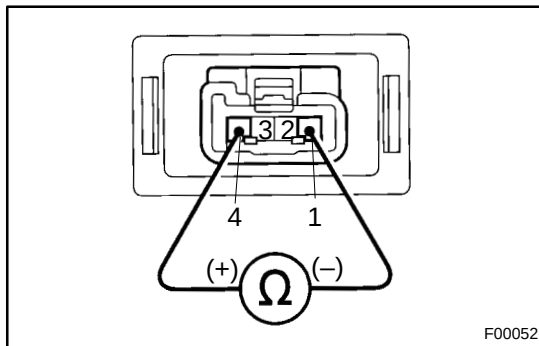
WIRING DIAGRAM



F10293

INSPECTION PROCEDURE**1 Check DTC.**

Check the DTC on page [DI-368](#).

YES**Repair circuit indicated by code output.****NO****2 Check TRAC cut switch.****PREPARATION:**

- (a) Remove the TRAC cut switch.
- (b) Disconnect the TRAC cut switch connector.

CHECK:

Measure the resistance between terminals 1 and 4 of the TRAC cut switch when the TRAC cut switch is on and off.

OK:

TRAC cut switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG**Replace TRAC cut switch.****OK****3 Check for open and short circuit in harness and connector between terminal CSW of ABS & TRAC ECU and TRAC cut switch and body ground (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK**

4	Check TRAC OFF indicator light.

See the combination meter troubleshooting on page [BE-65](#).

NG

Repair or replace combination meter
(See page [BE-96](#)).

OK

5	Check for open and short circuit in harness and connector between terminal WT of ABS & TRAC ECU and TRAC OFF indicator light (See page IN-31).

NG

Repair or replace harness or connector.

OK

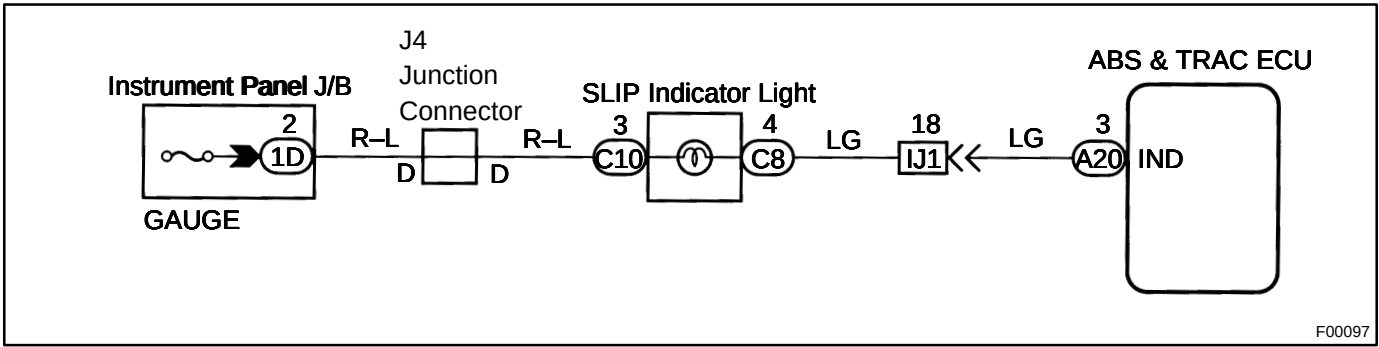
Check and replace ABS & TRAC ECU.

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during the TRAC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check SLIP indicator light.

See the combination meter troubleshooting on page [BE-65](#).

NG

Repair or replace combination meter (See page [BE-96](#)).

OK

2	Check for short circuit in harness and connector between ABS & TRAC ECU and SLIP indicator light (See page IN-31).

NG

Repair or replace harness or connector.

OK

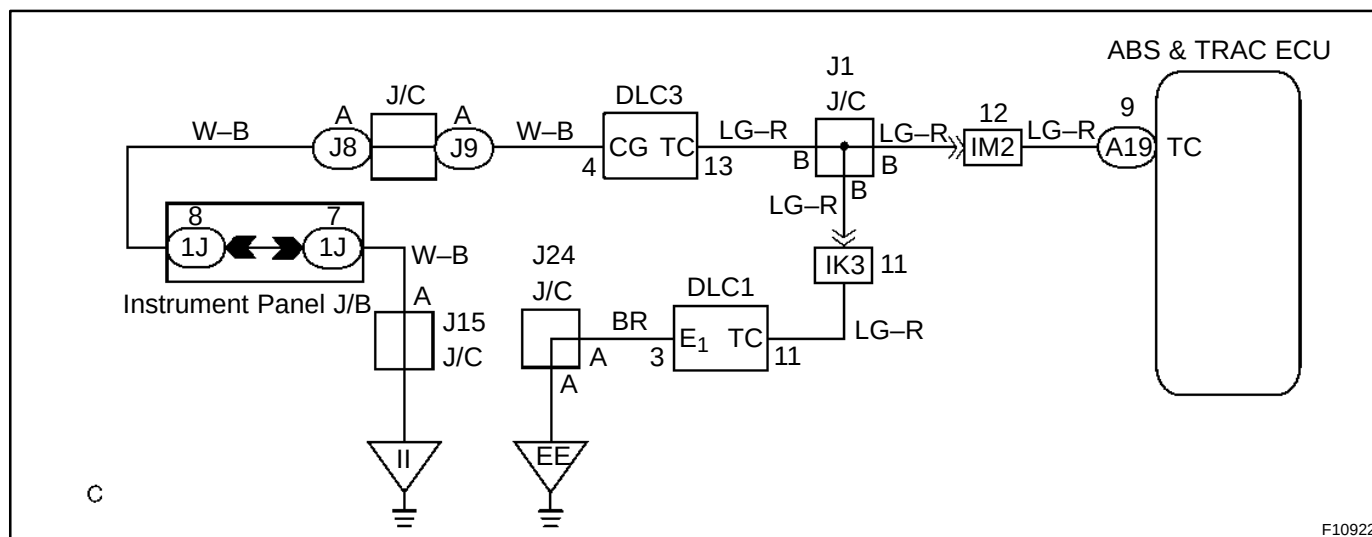
Check and replace ABS & TRAC ECU.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

Connecting terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3 causes the ECU to display the DTC by blinking the ABS warning light and TRAC OFF indicator light.

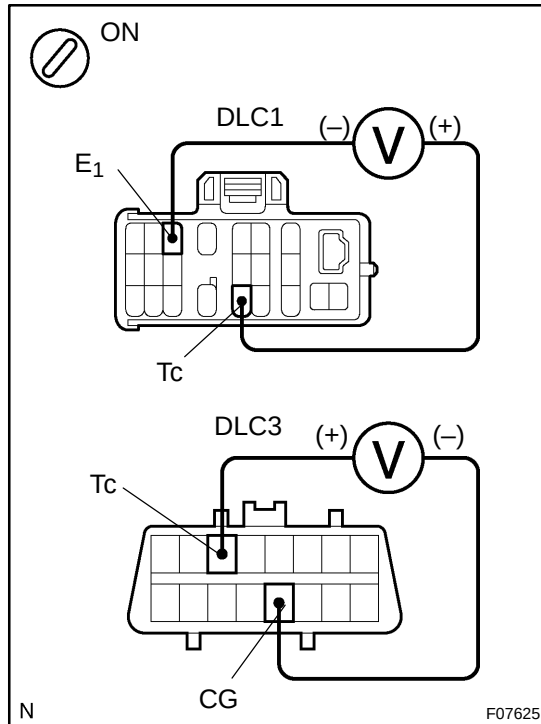
WIRING DIAGRAM



F10922

INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E ₁ of DLC1 or Tc and CG of DLC3.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals Tc and E₁ of the DLC1, or terminals Tc and CG of the DLC3.

OK:

Voltage: 10 – 14 V

OK

If ABS warning light does not blink even after Tc and E₁ or Tc and CG have been connected, ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & TRAC ECU and DLC1 or DLC3, DLC1 or DLC3 and body ground (See page IN-31).

NG

Repair or replace harness or connector.

OK

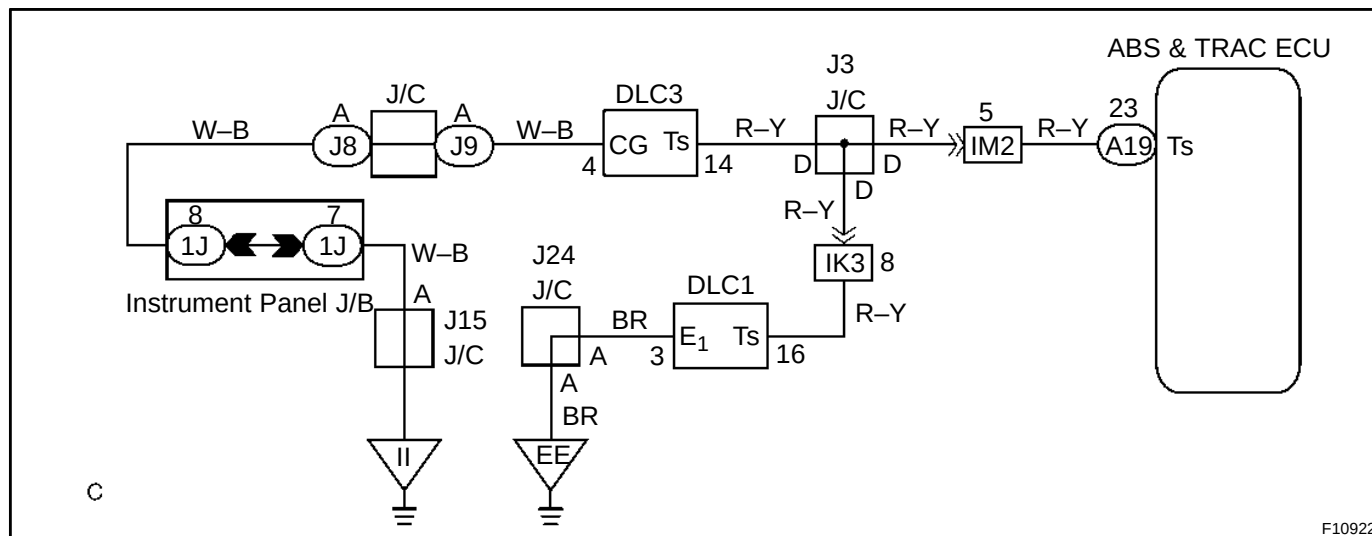
Check and replace ABS & TRAC ECU.

Ts Terminal Circuit

CIRCUIT DESCRIPTION

The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check. Connect terminals Ts and E₁ of the DLC1, or terminals Ts and CG of the DLC3 in the engine compartment starts the check.

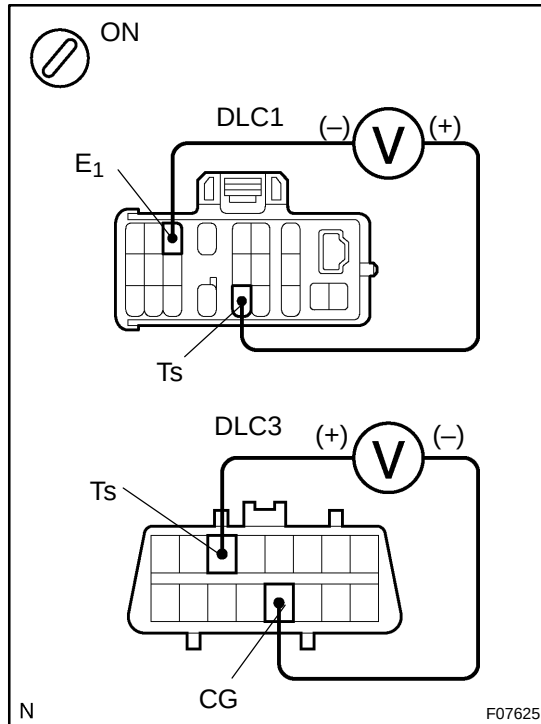
WIRING DIAGRAM



F10922

INSPECTION PROCEDURE

1	Check voltage between terminals Ts and E ₁ of DLC1 or Ts and CG of DLC3.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals Ts and E₁ of the DLC1, or terminals Ts and CG of the the DLC3.

OK:

Voltage: 10 – 14 V

OK

If ABS warning light does not blink even after Ts and E₁ or Ts and CG have been connected, ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & TRAC ECU and DLC1 or DLC3, DLC1 or DLC3 and body ground (See page IN-31).

NG

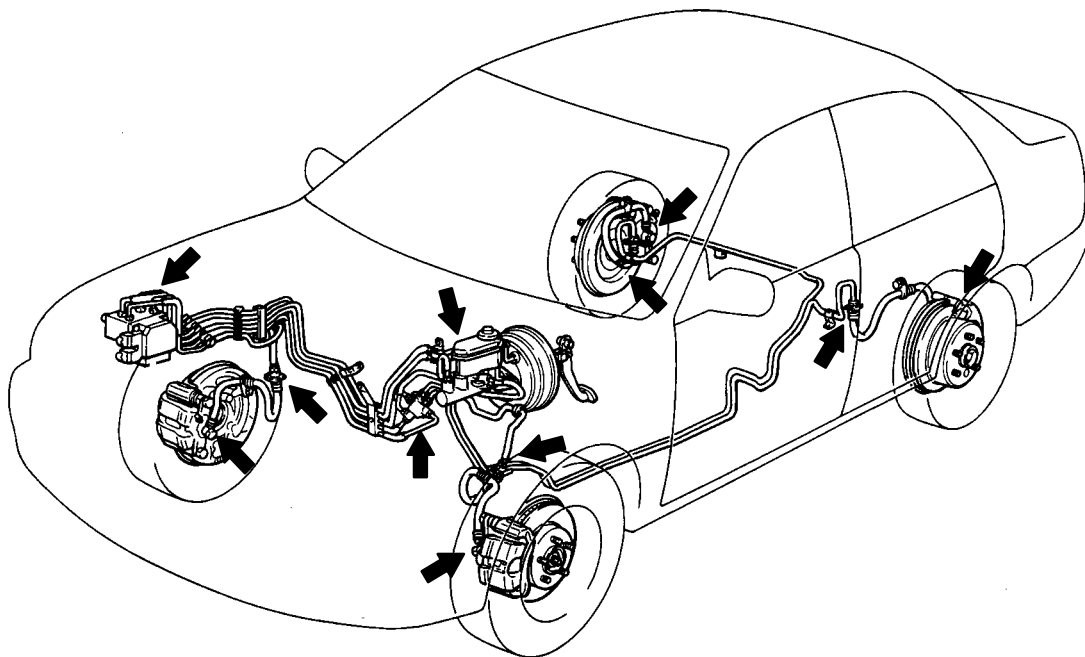
Repair or replace harness or connector.

OK

Check and replace ABS & TRAC ECU.

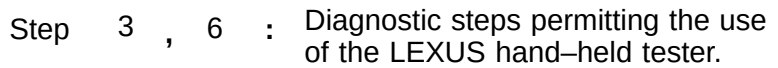
Check for Fluid Leakage

Check fluid leaks from the actuator or hydraulic lines.



F00070

DI1AX-18



CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

 Inspector's
Name

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

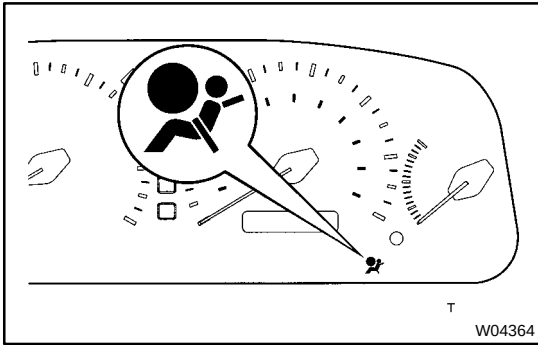
Date Problem Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	Approx.

Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	1st Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
DTC Inspection	1st Time	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]



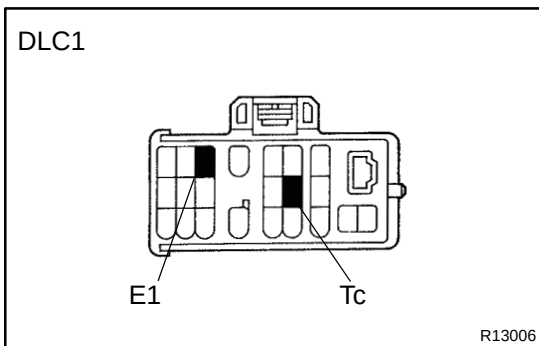
PRE-CHECK

1. SRS WARNING LIGHT CHECK

- Turn the ignition switch to the ACC or ON position and check that the SRS warning light lights up.
- Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the SRS warning light remains ON or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on pages [DI-551](#), [DI-554](#).



2. DTC CHECK (Using diagnosis check wire)

- Present troubles codes:

Output the DTC.

- Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.
- Using SST, connect terminals Tc and E1 of the DLC1.

SST 09843-18020

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

- Past troubles codes:

Output the DTC.

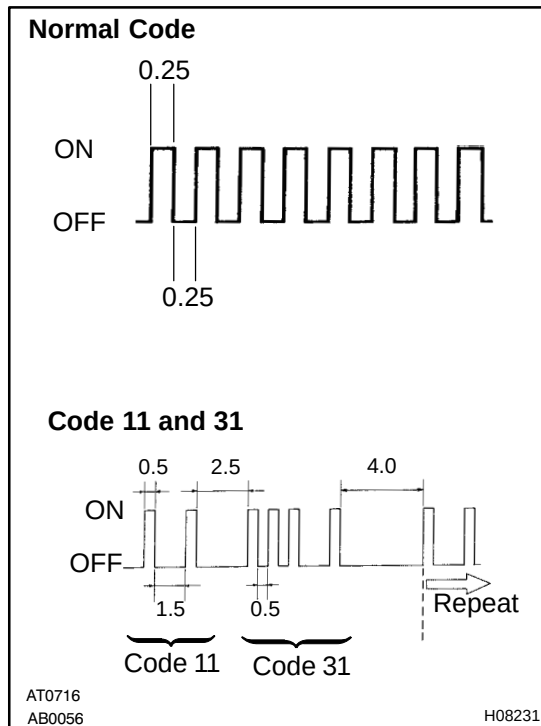
- Using a service wire, connect Terminals Tc and E1 of the DLC1.

SST 09843-18020

- Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.



(c) Read the DTC.

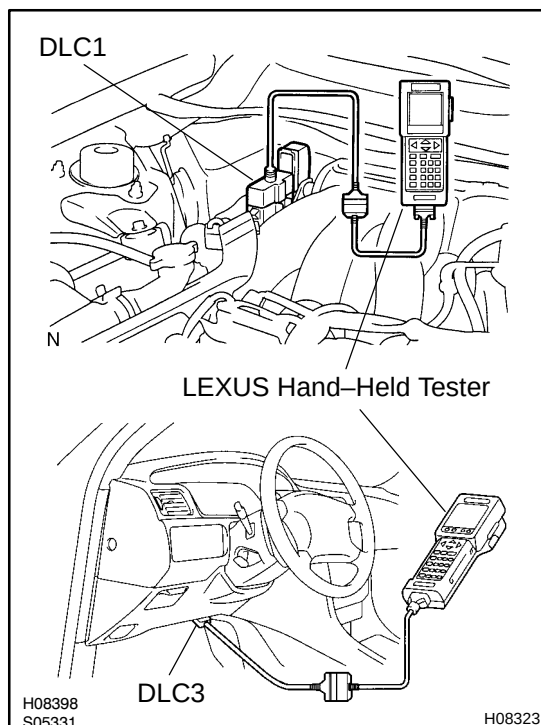
Read the 2-digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- Normal code indication
The light will blink 2 times per second.
- Malfunction code indication
The first blinking output indicates the first digit of a 2-digit DTC. After a 1.5-second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5-second pause between each code. After all the codes have been output, there will be a 4.0-second pause and they will all be repeated.

HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page [DI-558](#).

**3. DTC CHECK (Using LEXUS hand-held tester)**

- Hook up the LEXUS hand-held tester to the DLC1 or the DLC3.
- Read the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the LEXUS 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)

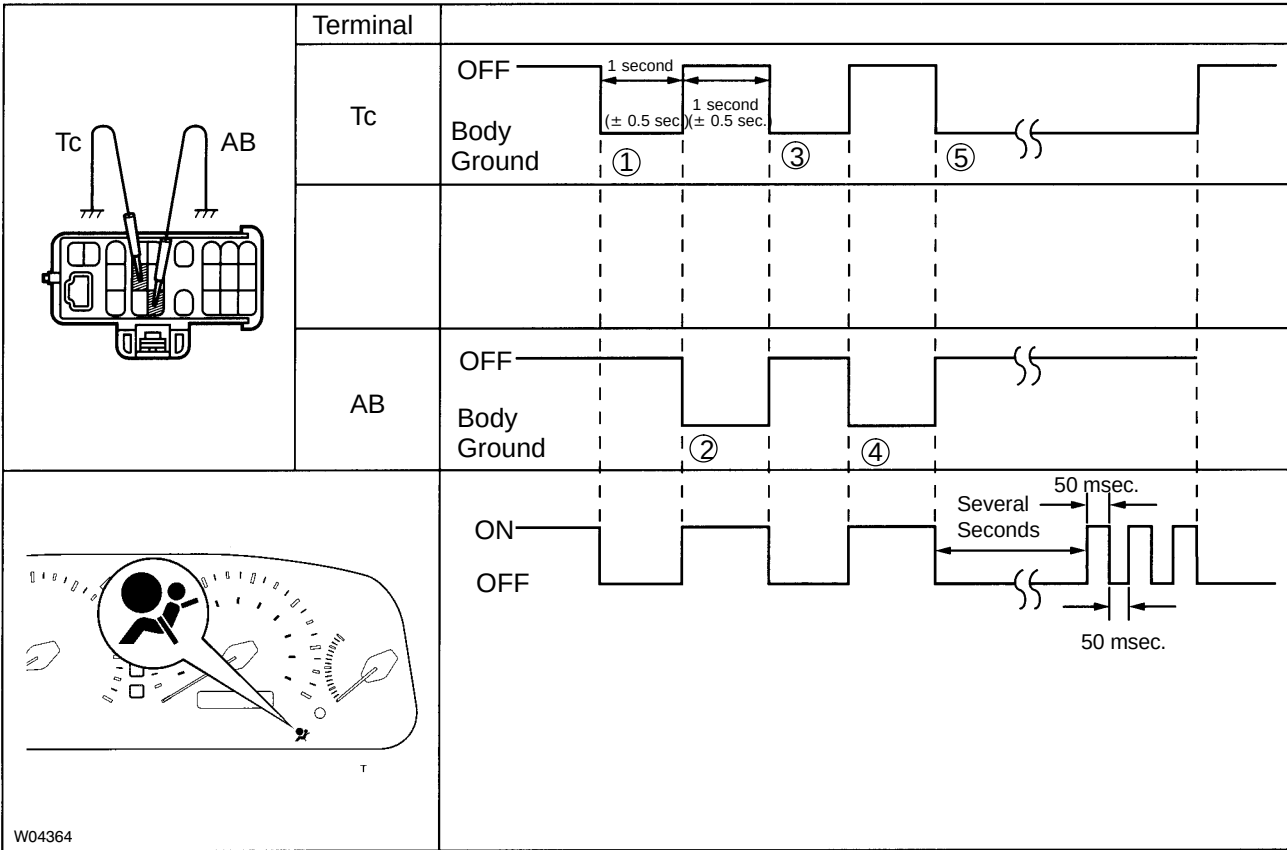
- Connect the 2 service wires to terminals Tc and AB of DLC1.
- Turn the ignition switch to ACC or ON and wait for approx. 6 seconds.

- (c) Starting with the Tc terminal, ground alternately terminal Tc and terminal AB twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remains grounded.

HINT:

When alternately grounding terminals Tc and AB, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

If DTCs are not cleared, repeat the above procedure until the codes are cleared.



- (d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50–msec. cycle to indicate the codes which have been cleared.

**6. Past trouble codes:
DTC CLEARANCE (See step 5.)**

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

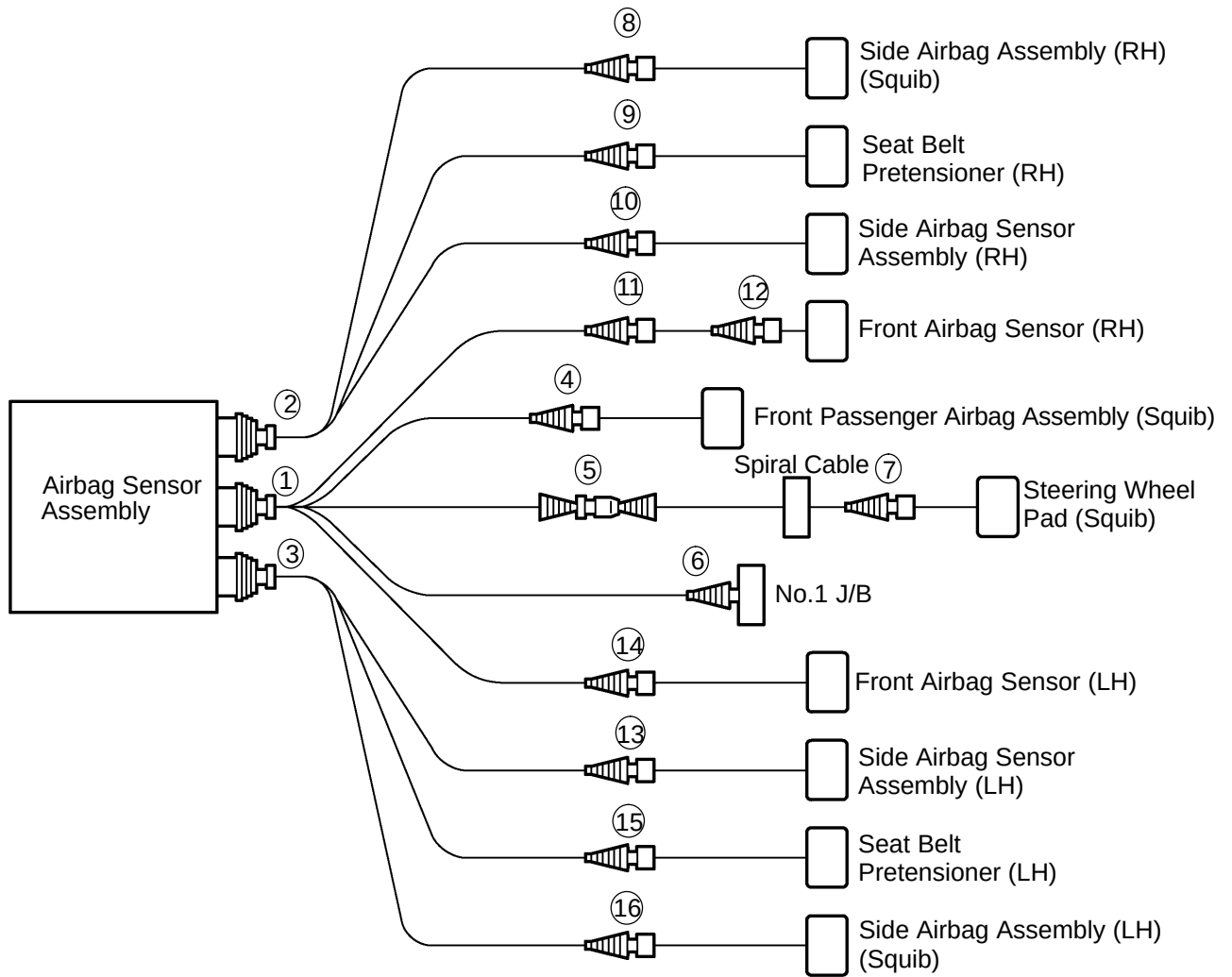
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustrations of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

CAUTION:

Never release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.

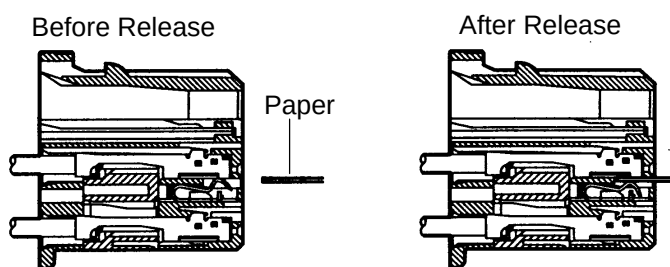
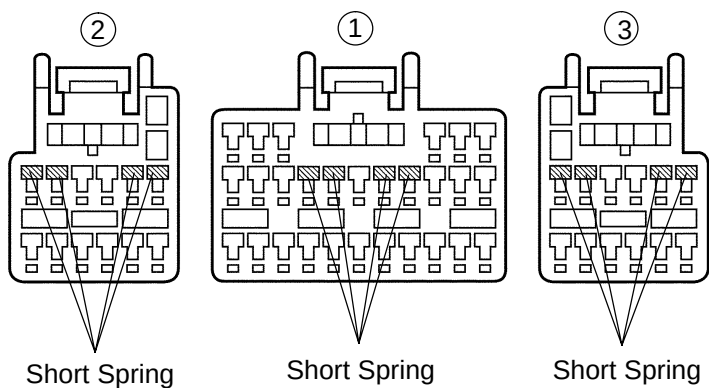
NOTICE:

If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.

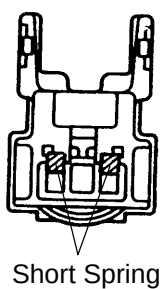


H05063

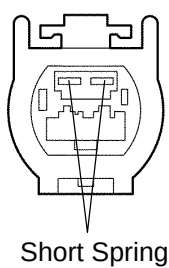
Airbag Sensor Assembly Connector



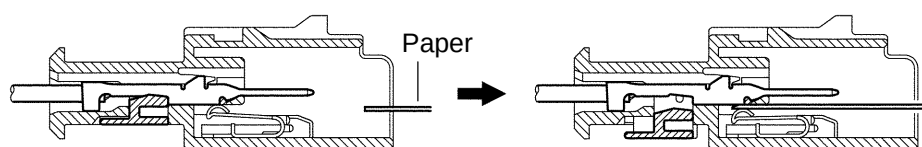
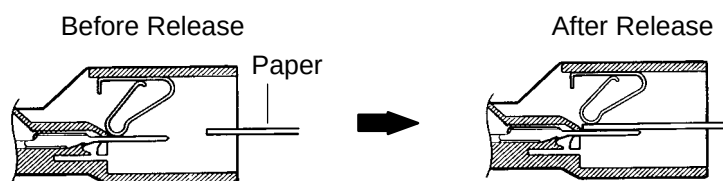
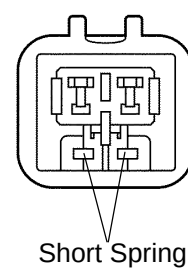
Connector ⑤ ⑦



Connector ⑧ ⑯



Connector ④



H01356
H01233
AB0130 H00992
AB0045 AB0046
H02249 H02248

H01358

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.).

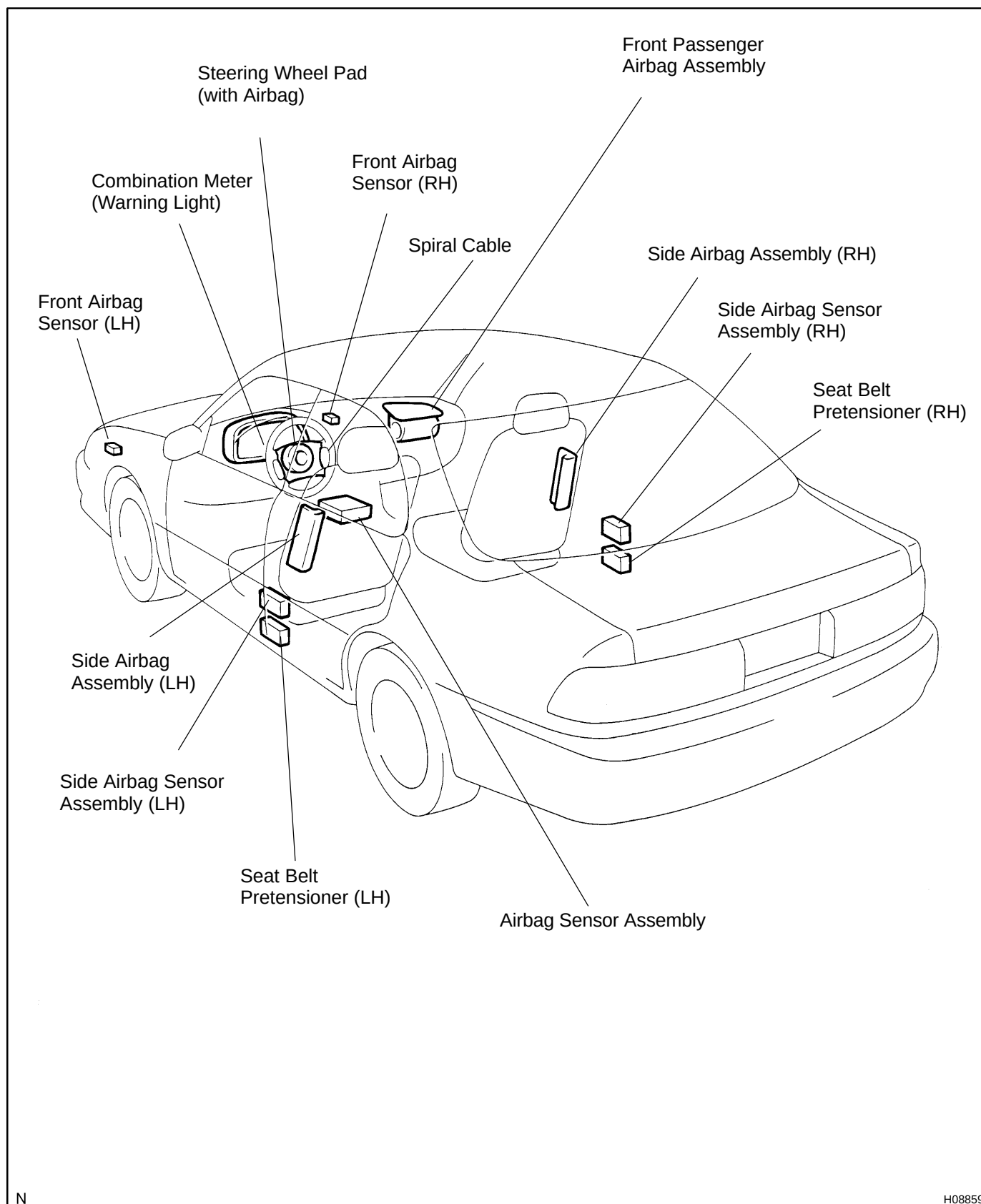
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI-434)	●Short in D squib circuit	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0101/14 (DI-439)	●Open in D squib circuit	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0102/11 (DI-443)	●Short in D squib circuit (to Ground)	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0103/12 (DI-447)	●Short in D squib circuit (to B+)	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0105/53 (DI-451)	●Short in P squib circuit	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0106/54 (DI-455)	●Open in P squib circuit	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0107/51 (DI-458)	●Short in P squib circuit (to Ground)	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0108/52 (DI-461)	●Short in P squib circuit (to B+)	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0110/43 (DI-464)	●Short in side squib (RH) circuit	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0111/44 (DI-468)	●Open in side squib (RH) circuit	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0112/41 (DI-471)	●Short in side squib (RH) circuit (to Ground)	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0113/42 (DI-474)	●Short in side squib (RH) circuit (to B+)	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0115/47 (DI-477)	●Short in side squib (LH) circuit	●Side airbag assembly LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0116/48 (DI-481)	●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-484)	●Short in side squib (LH) circuit (to Ground)	●Side airbag assembly LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0118/46 (DI-487)	●Short in side squib (LH) circuit (to B+)	●Side airbag assembly LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0130/63 (DI-490)	●Short in P/T squib (RH) circuit	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0131/64 (DI-494)	●Open in P/T squib (RH) circuit	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0132/61 (DI-497)	●Short in P/T squib (RH) circuit (to Ground)	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0133/62 (DI-500)	●Short in P/T squib (RH) circuit (to B+)	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0135/73 (DI-503)	●Short in P/T squib (LH) circuit	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0136/74 (DI-507)	●Open in P/T squib (LH) circuit	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0137/71 (DI-510)	●Short in P/T squib (LH) circuit (to Ground)	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0138/72 (DI-513)	●Short in P/T squib (LH) circuit (to B+)	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B1100/31 (DI-516)	●Airbag sensor assembly malfunction	●Airbag sensor assembly	ON
B1140/32 (DI-518)	●Side airbag sensor assembly (RH) malfunction	●Side airbag sensor assembly (RH) ●Airbag sensor assembly ●Wire harness	Blink
B1141/33 (DI-526)	●Side airbag sensor assembly (LH) malfunction	●Side airbag sensor assembly (LH) ●Airbag sensor assembly ●Wire harness	Blink
B1156/B1157/ 15 (DI-534)	●Front airbag sensor (RH) malfunction	●Front airbag sensor (RH) ●Airbag sensor assembly ●Wire harness ●Engine room main wire haness	ON
B1158/B1159/ 16 (DI-542)	●Front airbag sensor (LH) malfunction	●Front airbag sensor (LH) ●Airbag sensor assembly ●Wire harness	ON
Normal (DI-547)	●System normal	–	OFF
	●Voltage source drop	●Battery ●Airbag sensor assembly	ON

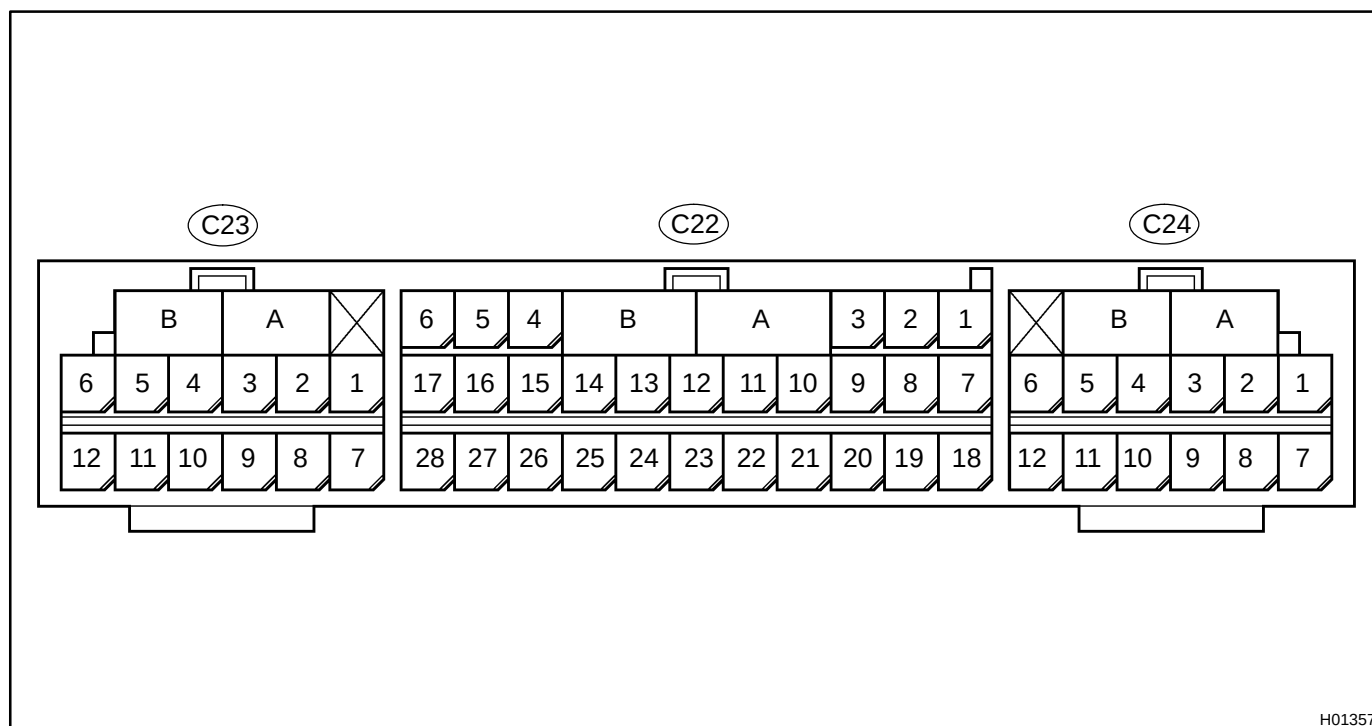
HINT:

- 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
C22 – 3	LA	SRS Warning Light
C22 – 5	IG2	Power Source (IGN Fuse)
C22 – 6	ACC	Power Source (CIG Fuse)
C22 – 9	SR+	Front Airbag Sensor (RH)
C22 – 10	P+	Squib (Passenger)
C22 – 11	P–	Squib (Passenger)
C22 – 12	SIL	Diagnosis
C22 – 13	D–	Squib (Driver)
C22 – 14	D+	Squib (Driver)
C22 – 15	SL+	Front Airbag Sensor (LH)
C22 – 19	Tc	Diagnosis
C22 – 20	SR–	Front Airbag Sensor (RH)
C22 – 26	SL–	Front Airbag Sensor (LH)
C22 – 27	E1	Ground
C22 – 28	E2	Ground
C23 – 1	PL–	Squib (Seat Belt Pretensioner, LH)
C23 – 2	PL+	Squib (Seat Belt Pretensioner, LH)
C23 – 5	SFL+	Squib (Side, LH)
C23 – 6	SFL–	Squib (Side, LH)
C23 – 7	ESL	Side Airbag Sensor (LH)
C23 – 9	FSL	Side Airbag Sensor (LH)
C23 – 10	SSL+	Side Airbag Sensor (LH)
C23 – 12	VUPL	Side Airbag Sensor (LH)

No.	Symbol	Terminal Name
C24 – 1	SFR–	Squib (Side, RH)
C24 – 2	SFR+	Squib (Side, RH)
C24 – 5	PR+	Squib (Seat Belt Pretensioner, RH)
C24 – 6	PR–	Squib (Seat Belt Pretensioner, RH)
C24 – 7	ESR	Side Airbag Sensor (RH)
C24 – 9	FSR	Side Airbag Sensor (RH)
C24 – 10	SSR+	Side Airbag Sensor (RH)
C24 – 12	VUPR	Side Airbag Sensor (RH)

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
•With the ignition switch at ACC or ON, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.	•SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	DI-551
•SRS warning light is always lit up even when ignition switch is in the LOCK position.		
•With the ignition switch at ACC or ON, the SRS warning light does not light up.	•SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	DI-554
•DTC is not displayed.	•Tc terminal circuit	DI-558
•SRS warning light is always lit up at the time of DTC check procedure.		
•DTC is displayed without Tc and E1 terminals connection.		

CIRCUIT INSPECTION

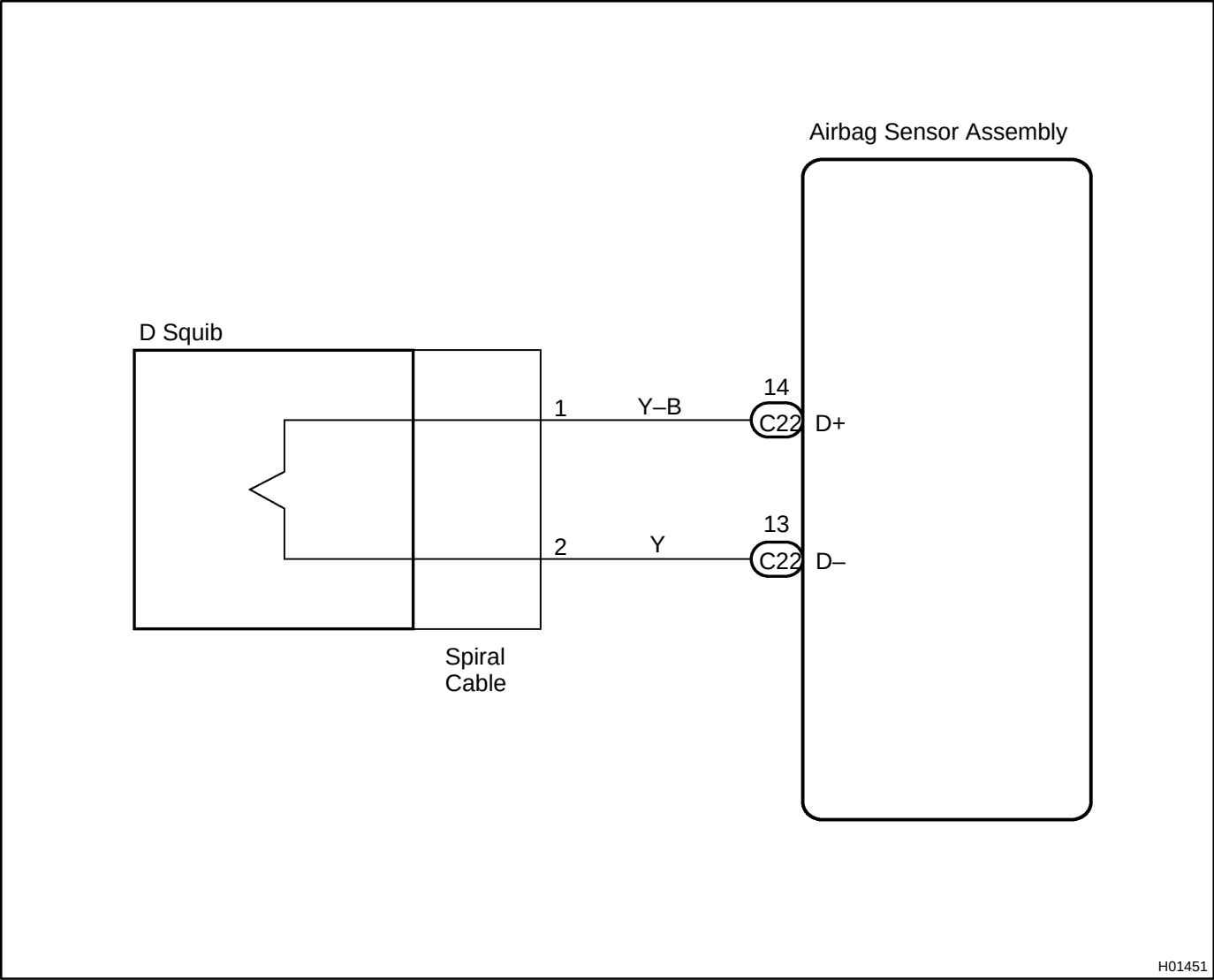
DTC	B0100/13	Short in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0100/13 is recorded when a short is detected in the D squib circuit.

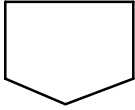
DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	•Short circuit between D+ wire harness and D– wire harness of squib •D squib malfunction •Spiral cable malfunction •Airbag sensor assembly malfunction	•Steering wheel pad (D squib) •Spiral cable •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

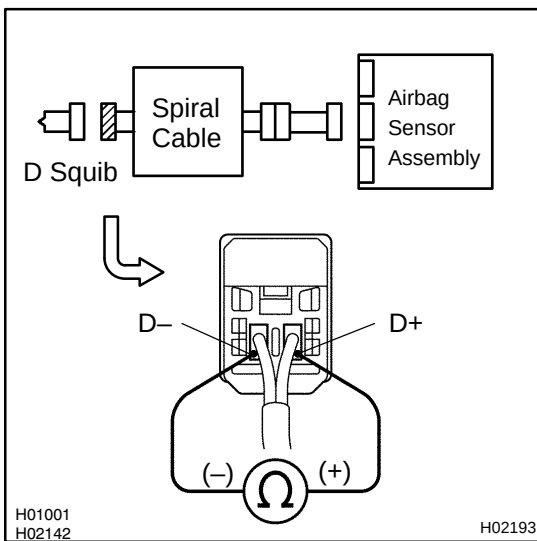


INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-547](#)).



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-421](#)).

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:

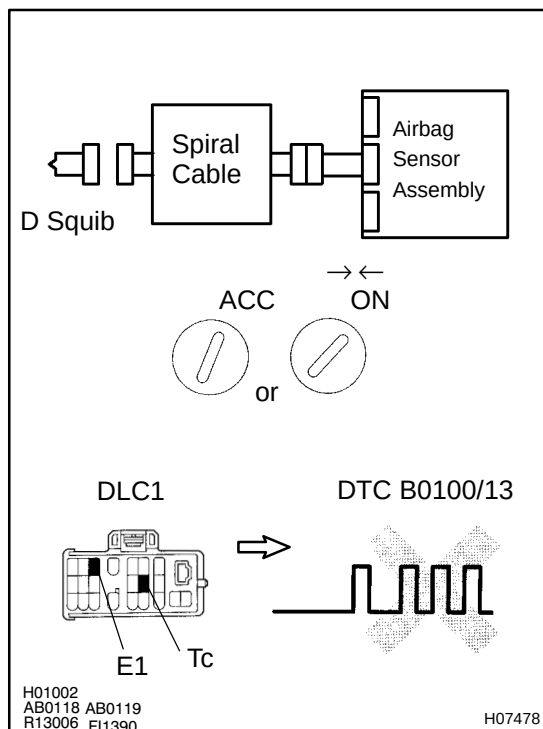
Resistance: 1 MΩ or Higher

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory (See page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

OK:

DTC B0100/13 is not output.

HINT:

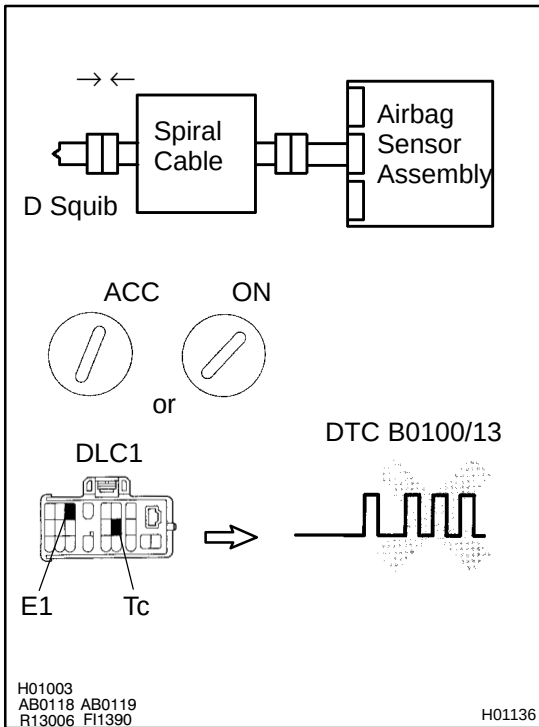
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn 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 ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

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.

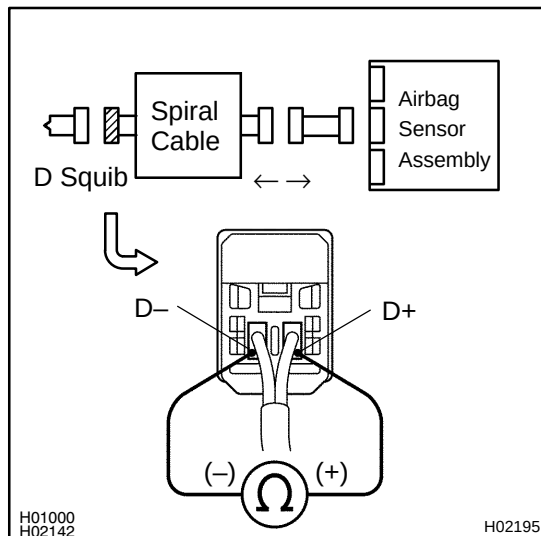
NG

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-421](#)).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

OK:

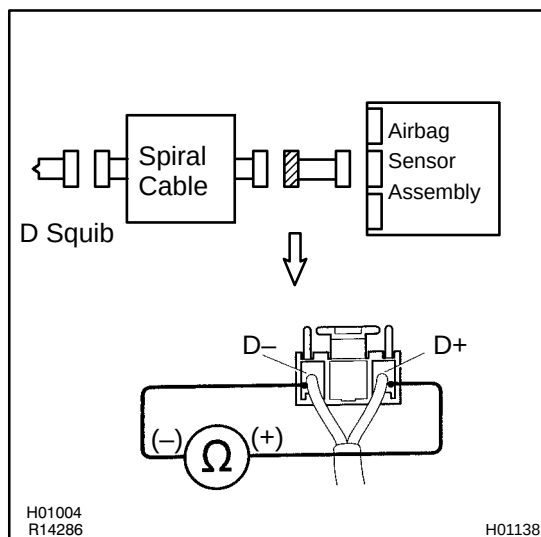
Resistance: 1 MΩ or Higher

NG

Repair or replace spiral cable.

OK

6 Check harness between airbag sensor assembly and spiral cable.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable (See page [DI-421](#)).

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.

DTC	B0101/14	Open in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0101/14 is recorded when an open is detected in the D squib circuit.

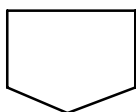
DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	•Open circuit in D+ wire harness or D– wire harness of squib •D squib malfunction •Spiral cable malfunction •Airbag sensor assembly malfunction	•Steering wheel pad (D squib) •Spiral cable •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

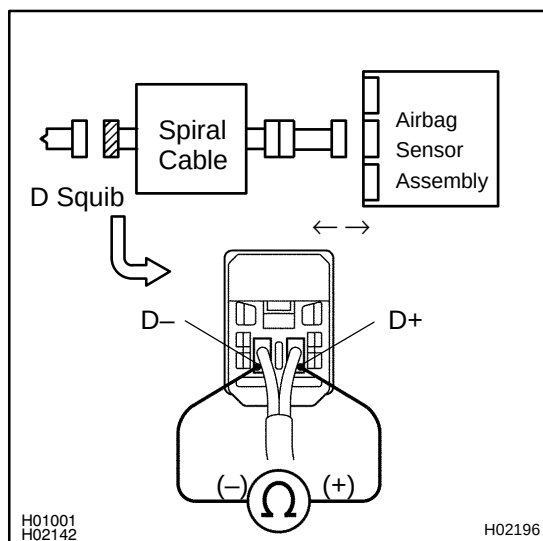
See page DI-434.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-547).



2	Check D squib circuit.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

OK:

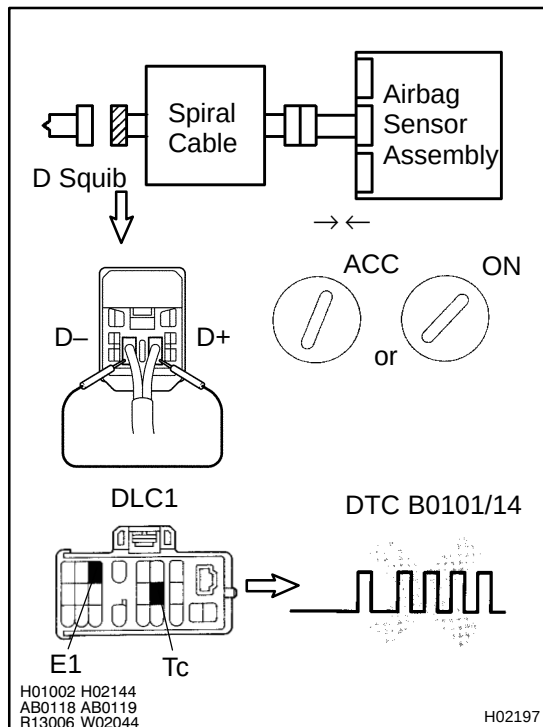
Resistance: Below 1 Ω

NG

Go to step 5.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

OK:

DTC B0101/14 is not output.

HINT:

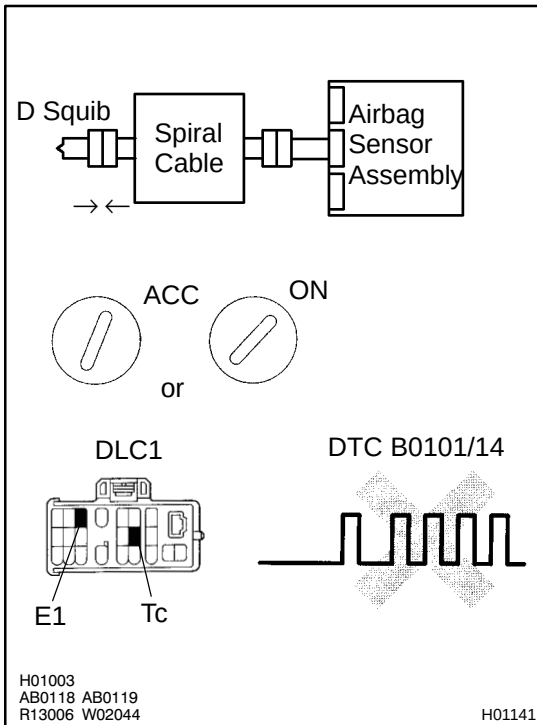
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

OK:

DTC B0101/14 is not output.

HINT:

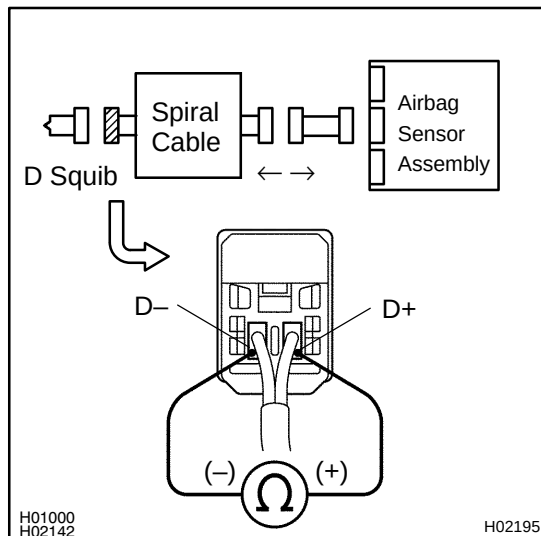
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG

Replace steering wheel pad.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5 Check spiral cable.**PREPARATION:**

Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

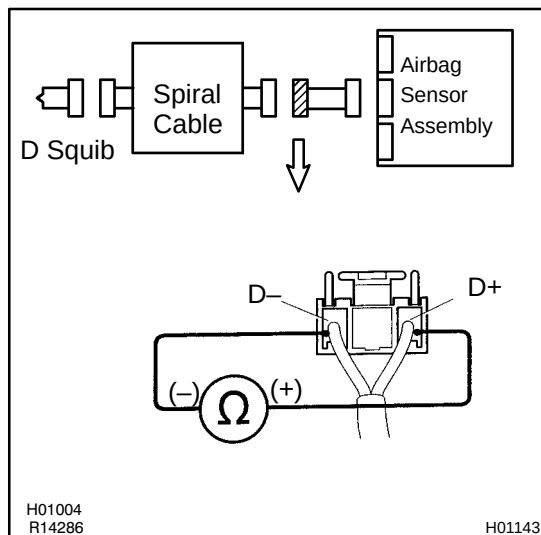
OK:

Resistance: Below 1 Ω

NG

Repair or replace spiral cable.

OK

6 Check harness between airbag sensor assembly and spiral cable.**CHECK:**

For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D-.

OK:

Resistance: Below 1 Ω

NG

Repair or replace harness or connector between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0102/11	Short in D Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0102/11 is recorded when a ground short is detected in the D squib circuit.

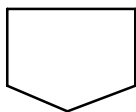
DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	•Short circuit in D squib wire harness (to ground) •D squib malfunction •Spiral cable malfunction •Airbag sensor assembly malfunction	•Steering wheel pad (D squib) •Spiral cable •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

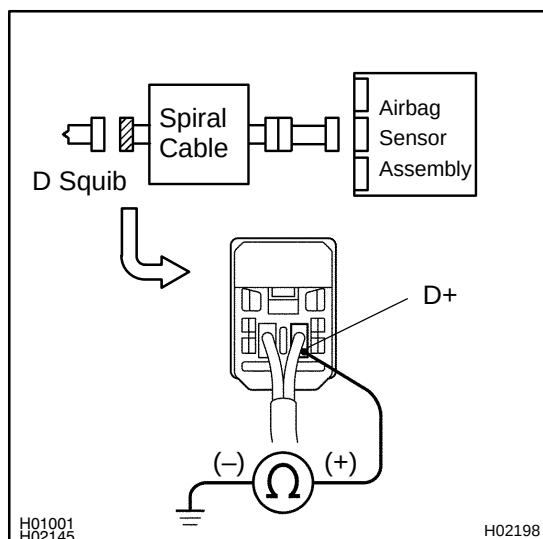
See page DI-434.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-547).



2	Check D squib circuit.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and body ground.

OK:

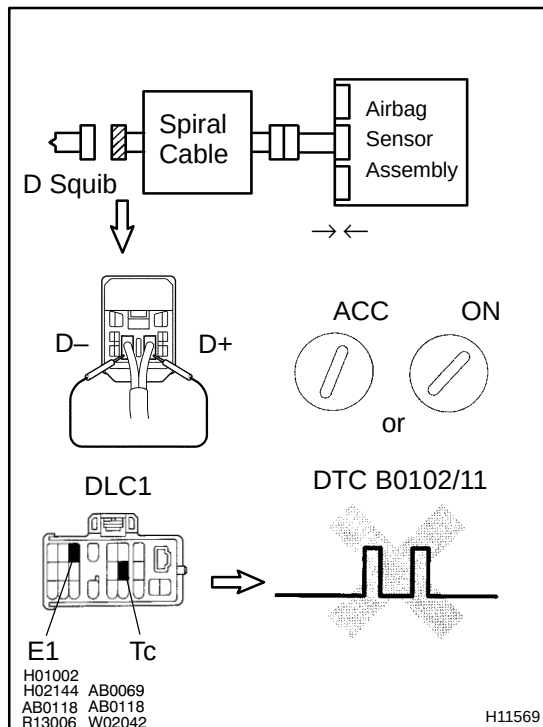
Resistance: 1 MΩ or Higher

NG

Go to step 5.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See step 5 on page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

OK:

DTC B0102/11 is not output.

HINT:

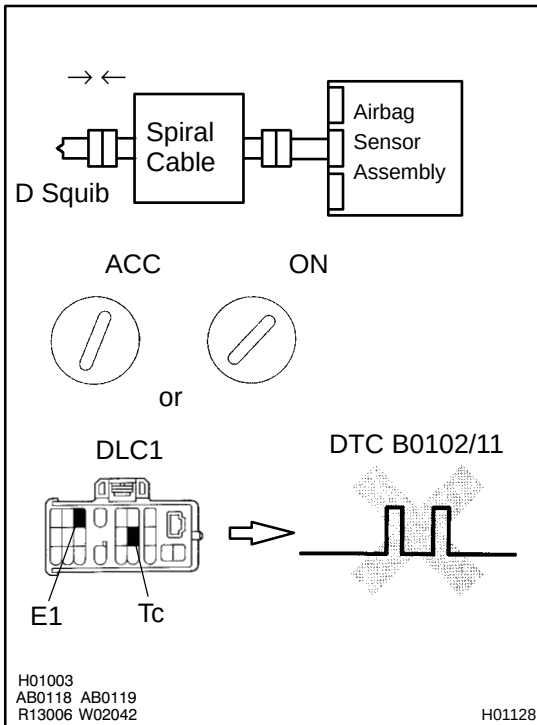
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See step 5 on page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

OK:

DTC B0102/11 is not output.

HINT:

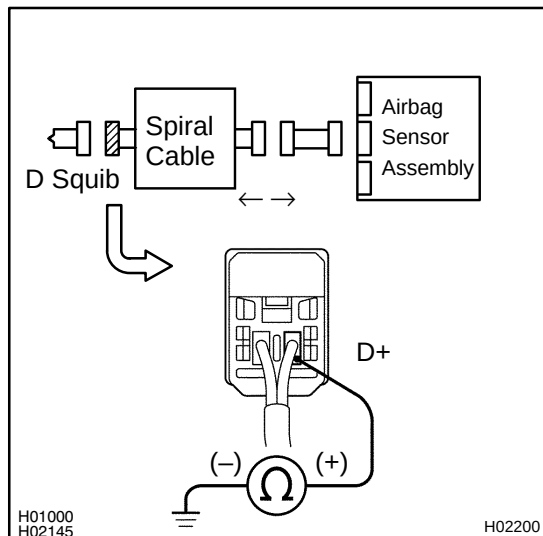
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

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:**

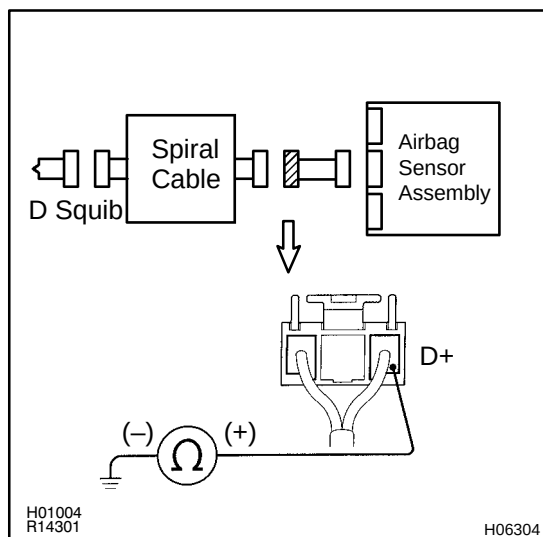
Disconnect the connector between the airbag sensor assembly and the spiral cable.

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.

DTC	B0103/12	Short in D Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0103/12 is recorded when a B+ short is detected in the D squib circuit.

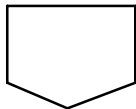
DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	•Short circuit in D squib wire harness (to B+) •D squib malfunction •Spiral cable malfunction •Airbag sensor assembly malfunction	•Steering wheel pad (D squib) •Spiral cable •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

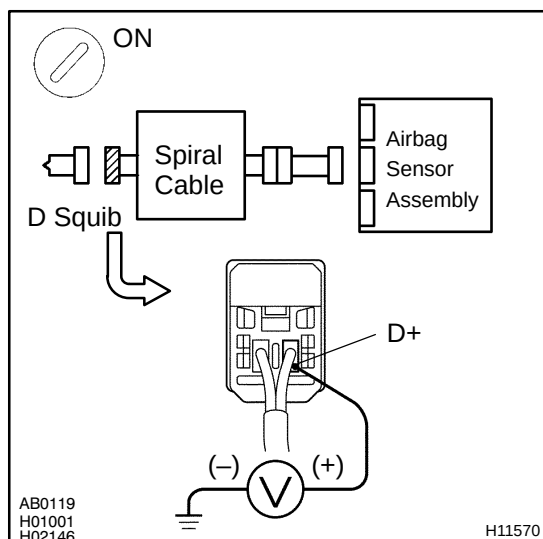
See page DI-434.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-547).



2	Check D squib circuit.



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:

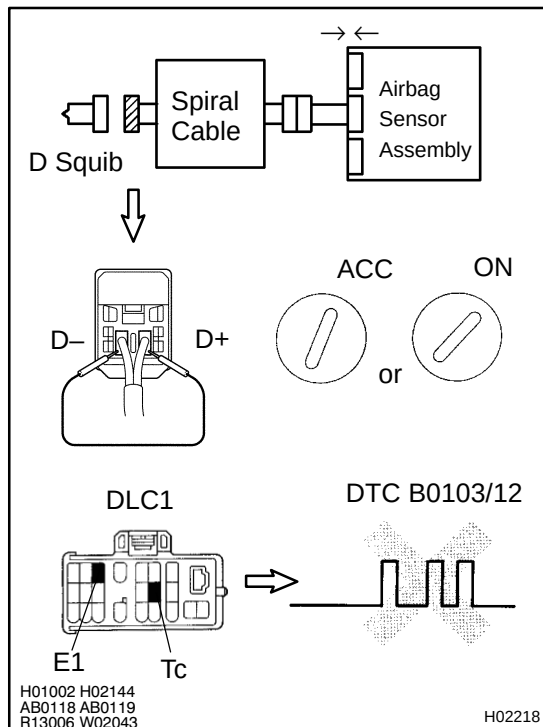
Voltage: 0 V

NG

Go to step 5.

OK

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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See step 5 on page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

OK:

DTC B0103/12 is not output.

HINT:

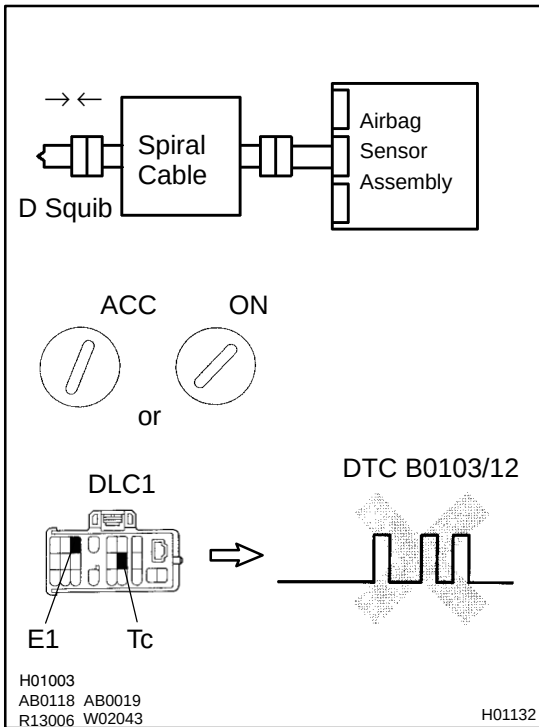
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See step 5 on page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

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.

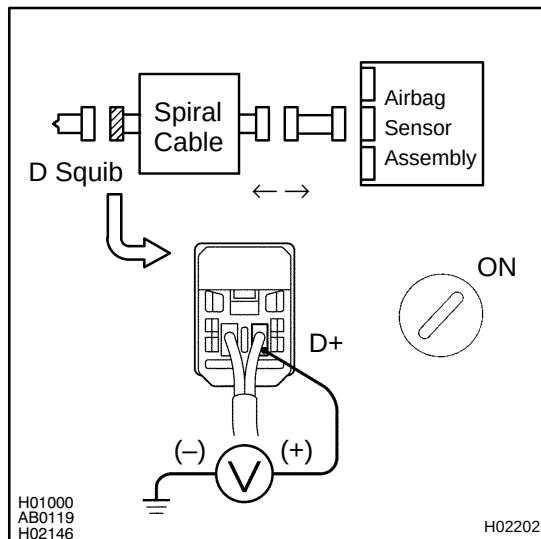
NG

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 ignition switch to LOCK.
- Disconnect the connector between the airbag sensor assembly and the spiral cable.

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:

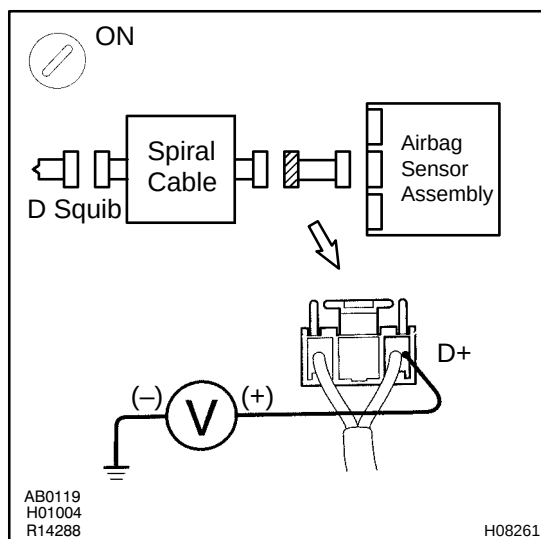
Voltage: 0 V

NG

Repair or replace spiral cable.

OK

6 Check harness between airbag sensor assembly and spiral cable.



CHECK:

- Turn 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.

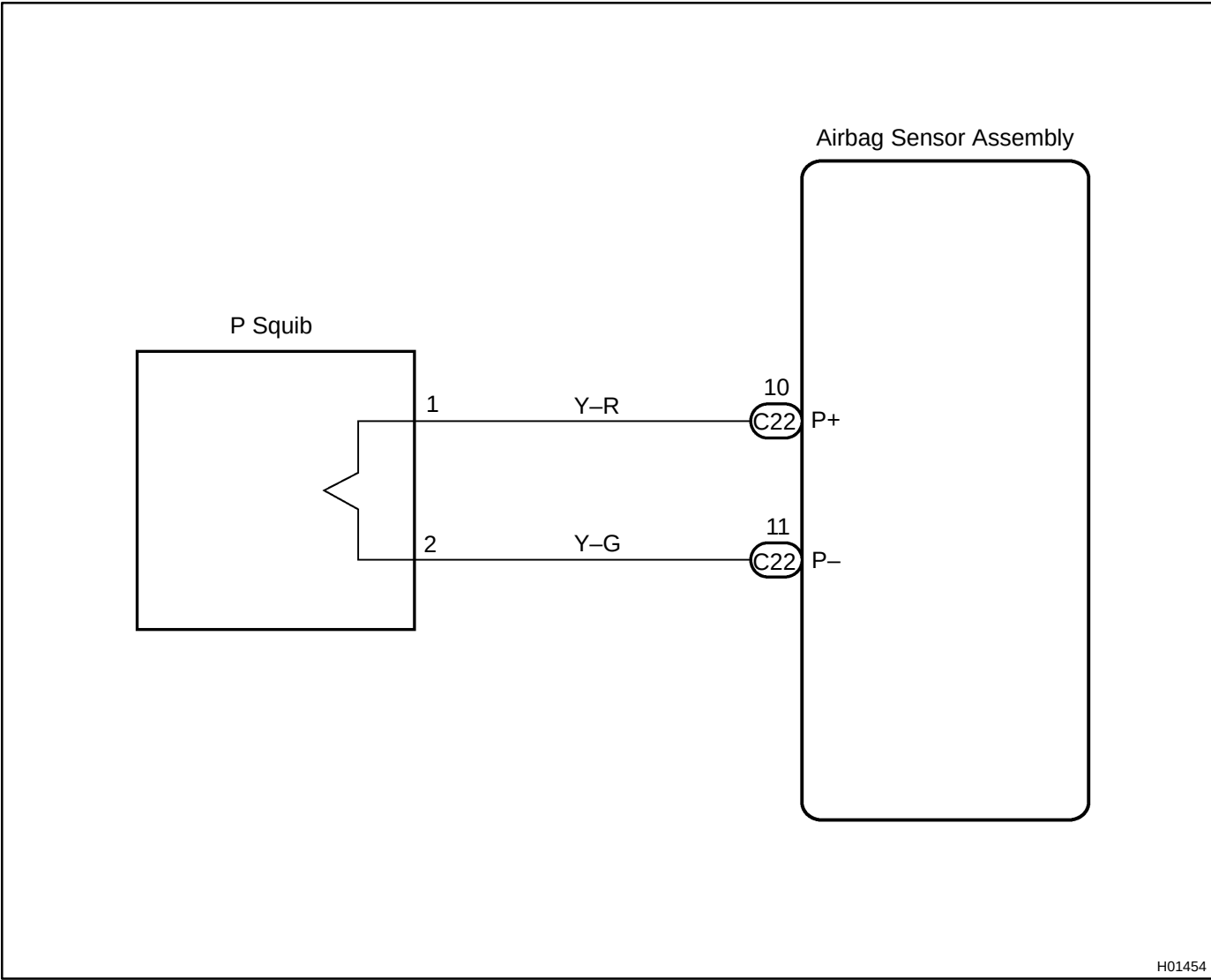
DTC	B0105/53	Short in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0105/53 is recorded when a short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	•Short circuit in P squib wire harness •P squib malfunction •Airbag sensor assembly malfunction	•Front passenger airbag assembly (P squib) •Airbag sensor assembly •Wire harness

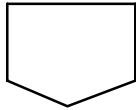
WIRING DIAGRAM



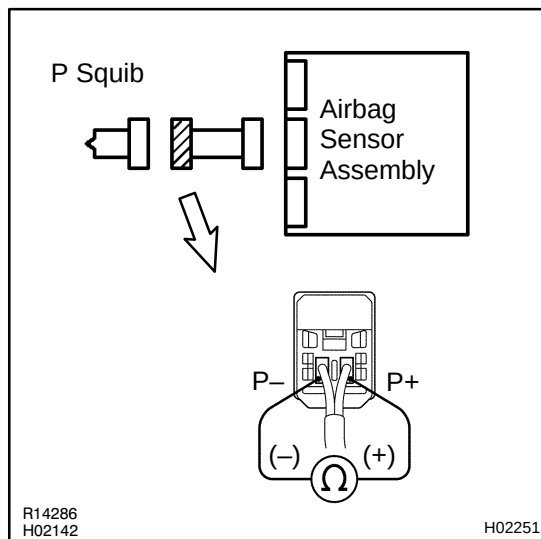
H01454

INSPECTION PROCEDURE

1 Prepare for inspection. (See step 1 on page [DI-547](#))



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-421](#))

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:

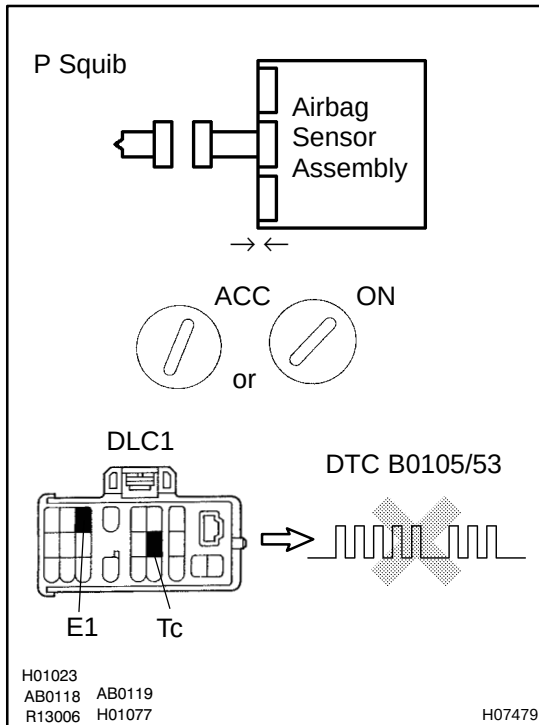
Resistance: 1 MΩ or Higher

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0105/53 is not output.

HINT:

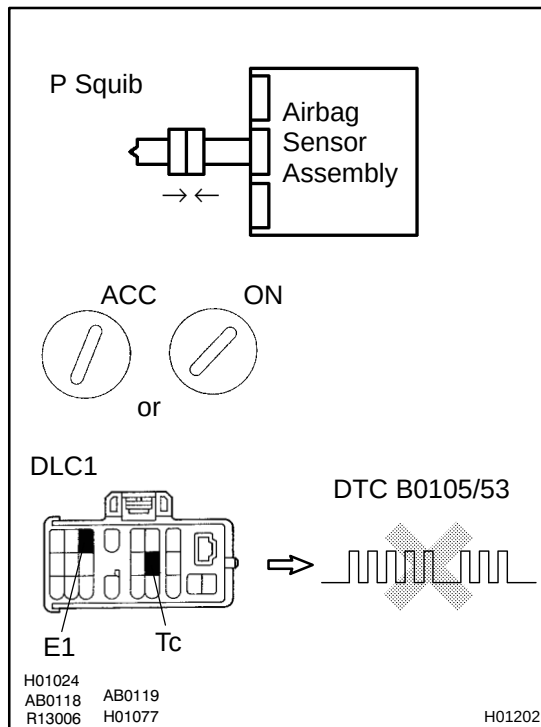
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn 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 ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0106/54	Open in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0106/54 is recorded when an open is detected in the P squib circuit.

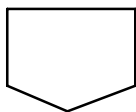
DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	●Open circuit in P+ wire harness or P– wire harness of squib ●P squib malfunction ●Airbag sensor assembly malfunction	●Front passenger airbag assembly (P squib) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

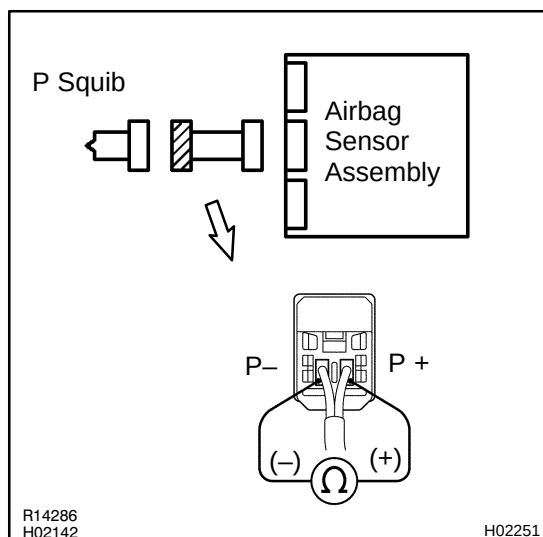
See page DI-451.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

OK:

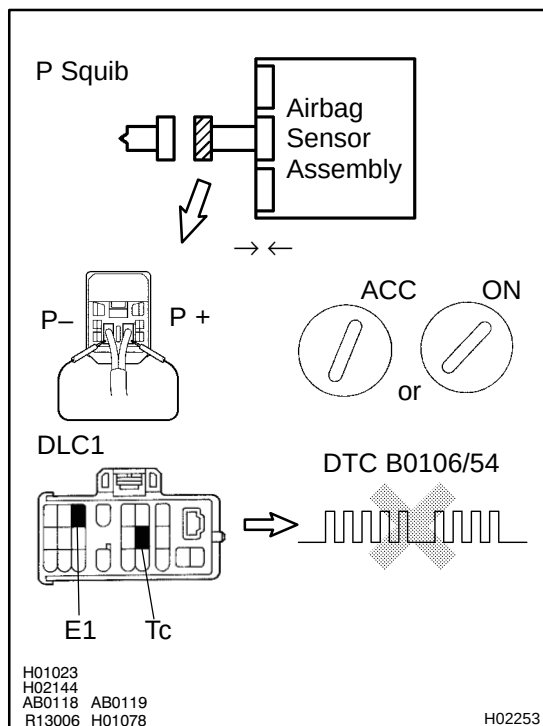
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0106/54 is not output.

HINT:

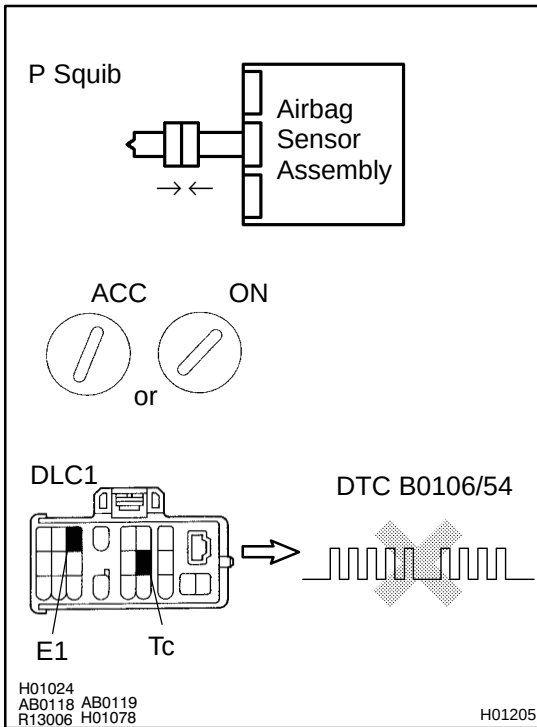
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0107/51	Short in P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0107/51 is recorded when a ground short is detected in the P squib circuit.

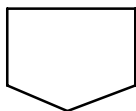
DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	•Short circuit in P squib wire harness (to ground) •P squib malfunction •Airbag sensor assembly malfunction	•Front passenger airbag assembly (P squib) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

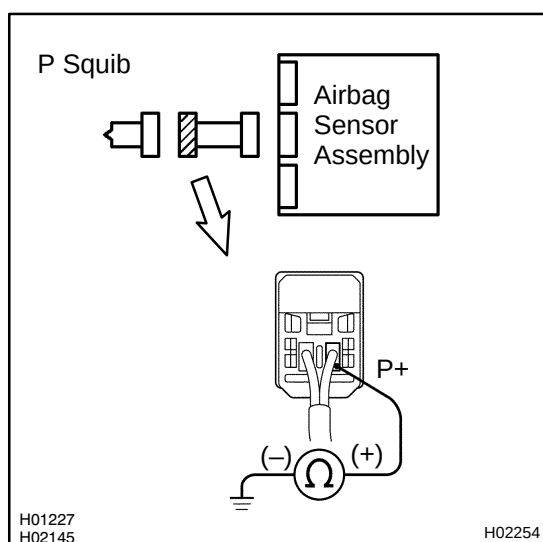
See page DI-451.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and body ground.

OK:

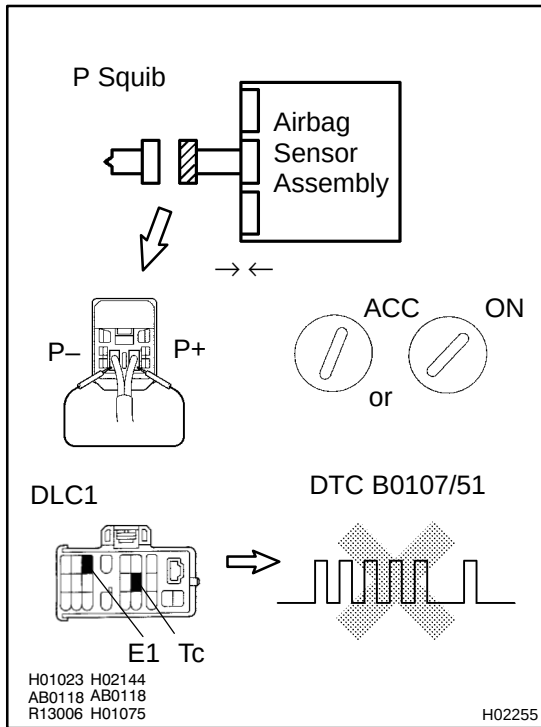
Resistance: 1 MΩ or Higher



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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0107/51 is not output.

HINT:

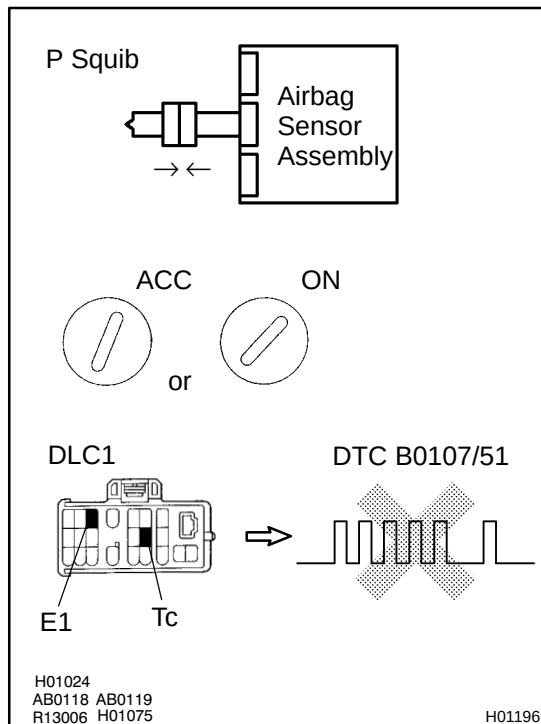
Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0107/51 is not output.

HINT:

Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG

Replace front passenger airbag assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B0108/52	Short in P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

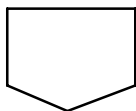
DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	•Short circuit in P squib wire harness (to B+) •P squib malfunction •Airbag sensor assembly malfunction	•Front passenger airbag assembly (P squib) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

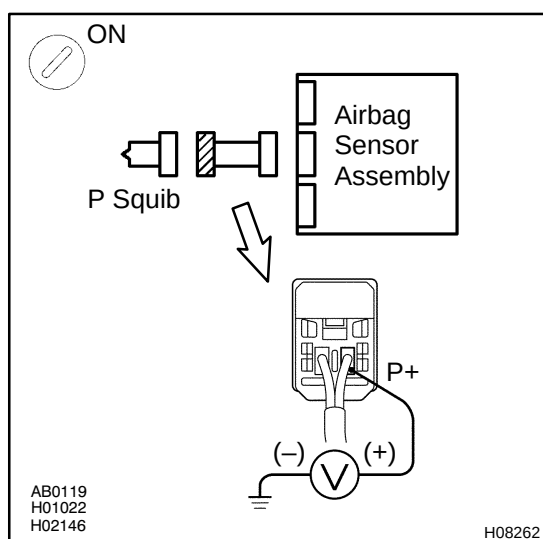
See page DI-451.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P squib circuit.



CHECK:

- Turn 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:

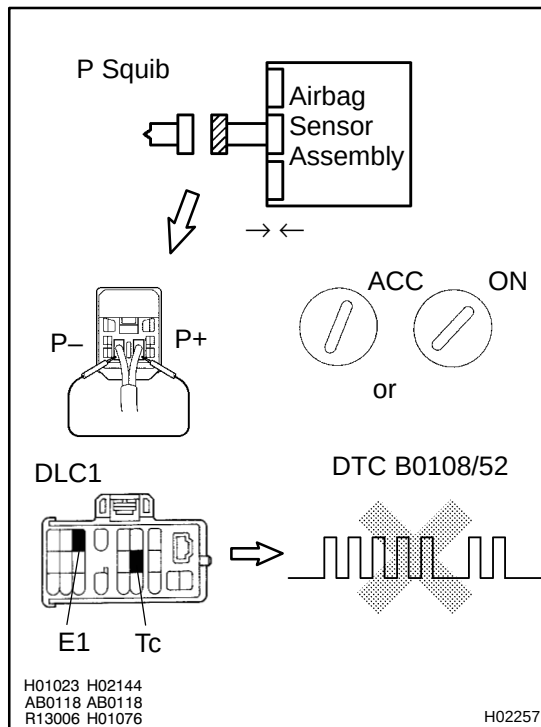
Voltage: 0 V

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0108/52 is not output.

HINT:

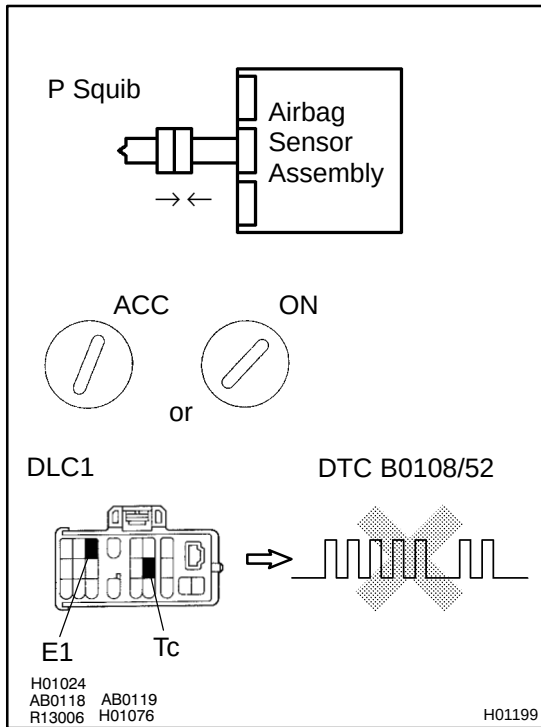
Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

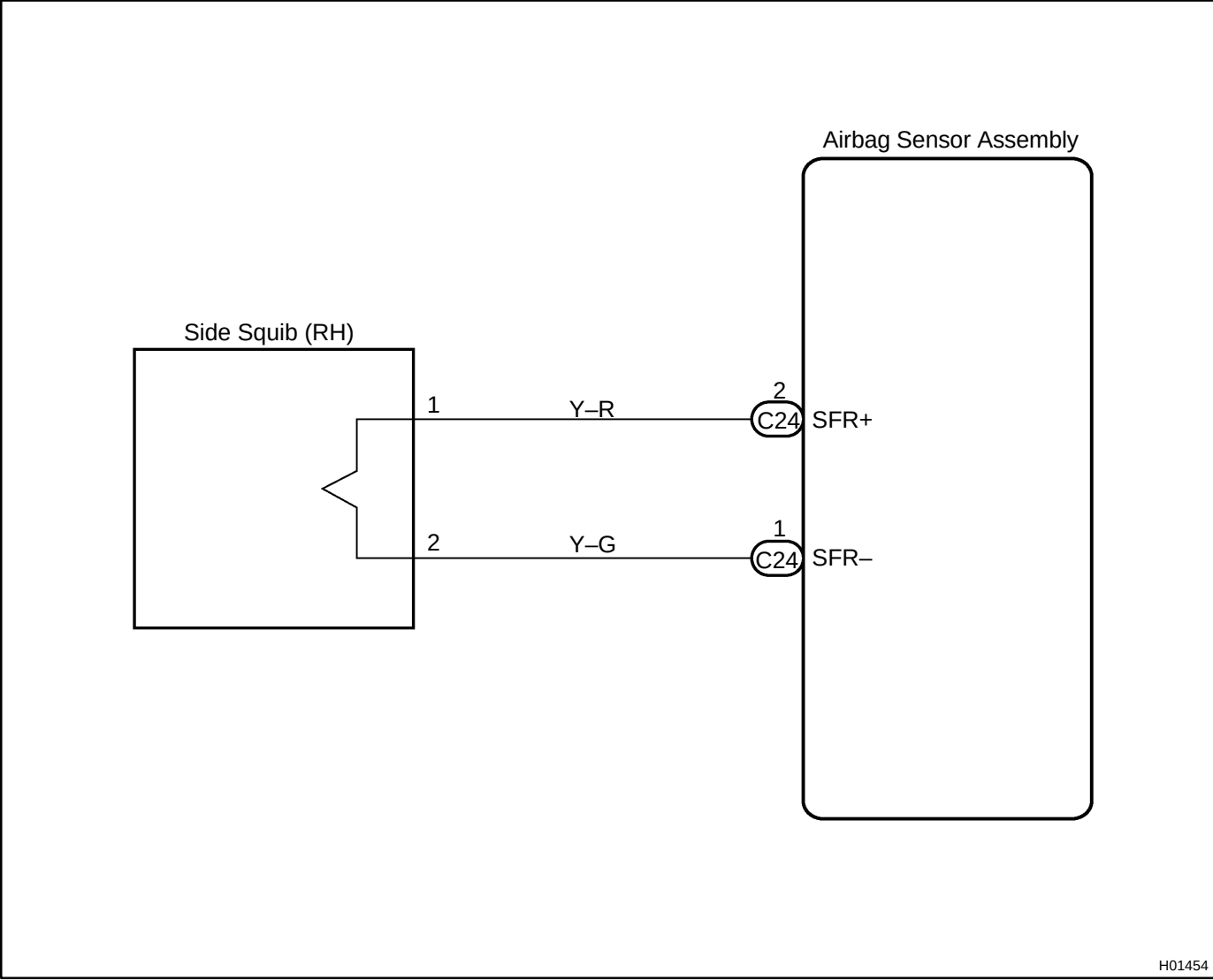
DTC	B0110/43	Short in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0110/43 is recorded when a short is detected in the side squib (RH) circuit.

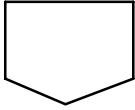
DTC No.	DTC Detecting Condition	Trouble Area
B0110/43	•Short circuit between SFR+ wire harness and SFR- wire harness of squib •Side squib (RH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

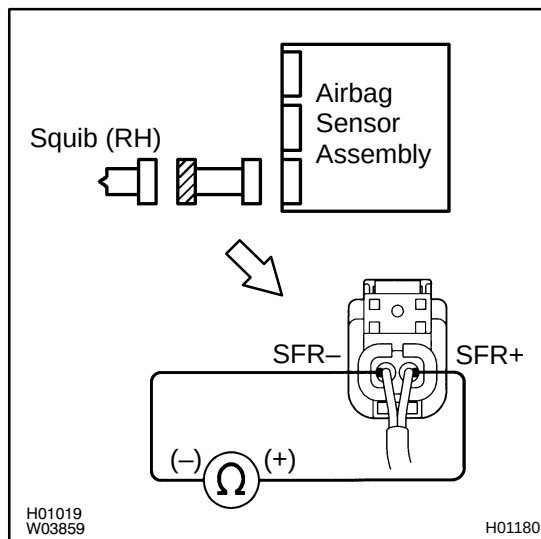


INSPECTION PROCEDURE

- 1 Prepare for inspection. (See step 1 on page [DI-547](#))



- 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-421](#))

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:

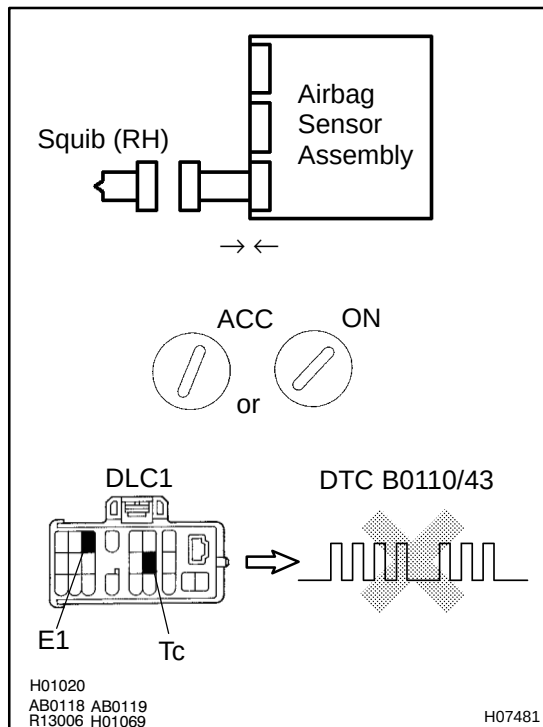
Resistance: 1 MΩ or Higher

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0110/43 is not output.

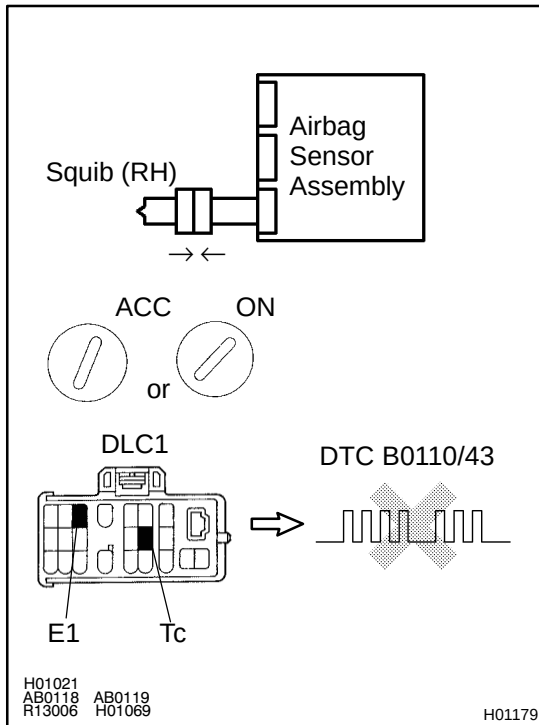
HINT:

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 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 ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0111/44	Open in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib circuit consists of the airbag sensor assembly and side airbag assembly (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0111/44 is recorded when an open is detected in the side squib (RH) circuit.

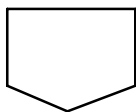
DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	●Open circuit in SFR+ wire harness or SFR- wire harness of squib ●Side squib (RH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (RH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

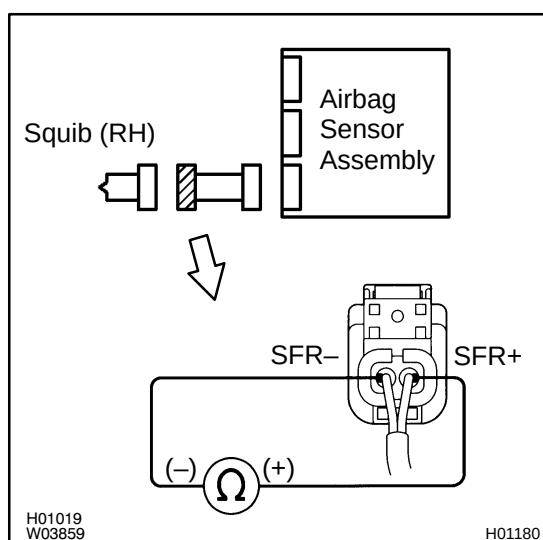
See page DI-464.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check side squib (RH) circuit.



CHECK:

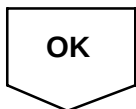
For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR-.

OK:

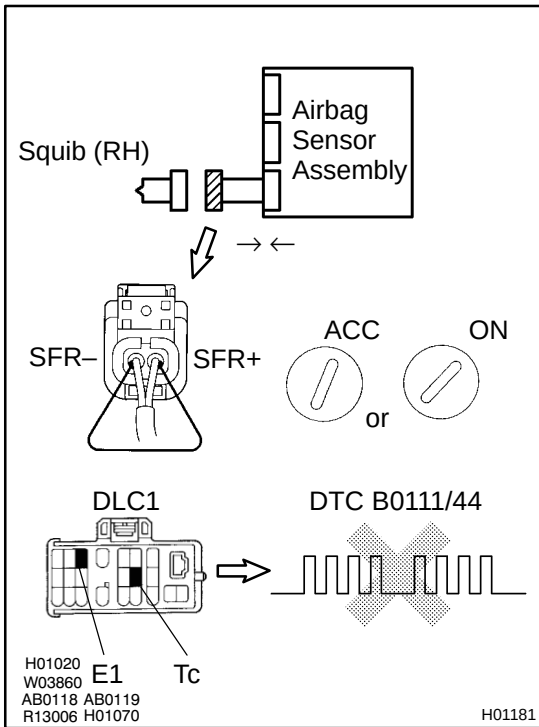
Resistance: Below 1 Ω



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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0111/44 is not output.

HINT:

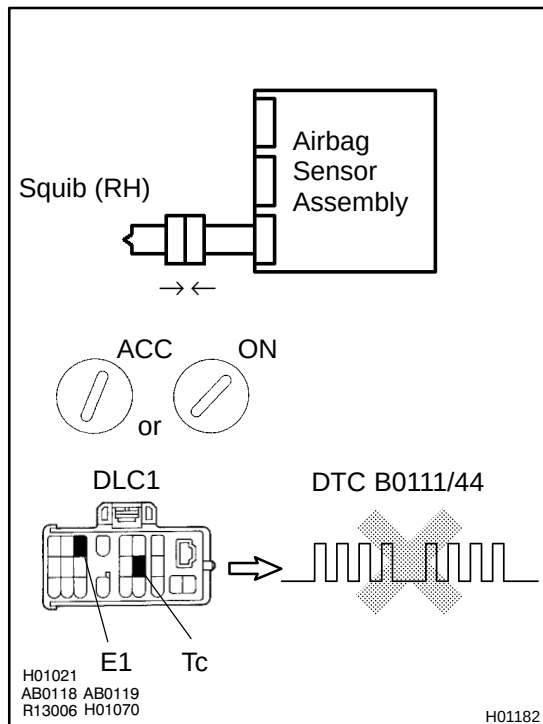
Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0111/44 is not output.

HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG

Replace side airbag assembly (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0112/41	Short in Side Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib circuit consists of the airbag sensor assembly and side airbag assembly (RH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0112/41 is recorded when a ground short is detected in the side squib (RH) circuit.

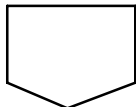
DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	•Short circuit in side squib (RH) wire harness (to ground) •Side squib (RH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

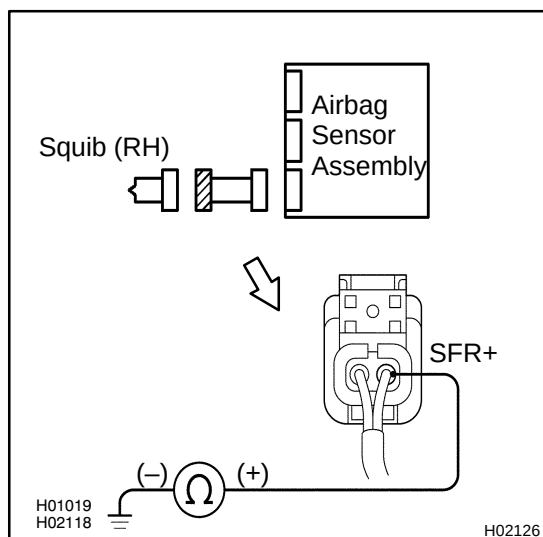
See page DI-464.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check side squib (RH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and body ground.

OK:

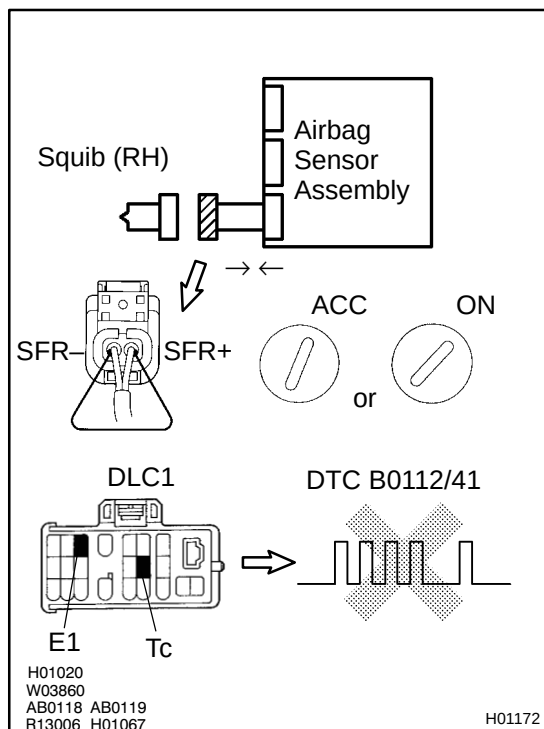
Resistance: 1 MΩ or Higher



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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0112/41 is not output.

HINT:

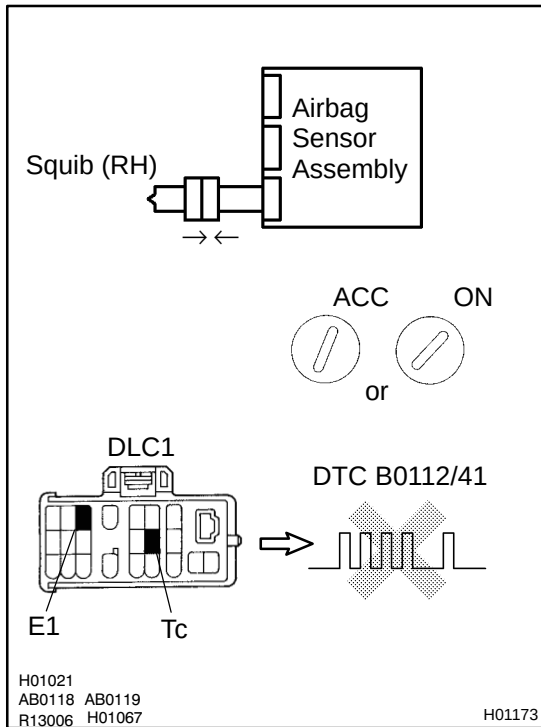
Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0113/42	Short in Side Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib circuit consists of the airbag sensor assembly and side airbag assembly (RH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0113/42 is recorded when a B+ short is detected in the side squib (RH) circuit.

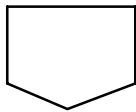
DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	•Short circuit in side squib (RH) wire harness (to B+) •Side squib (RH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

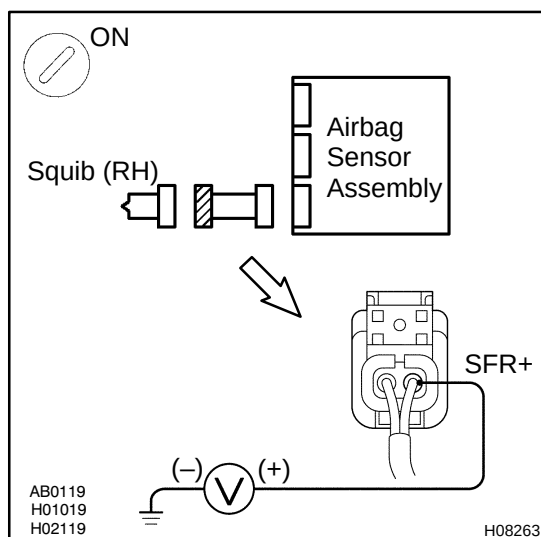
See page DI-464.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check side squib (RH) circuit.



CHECK:

- Turn 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:

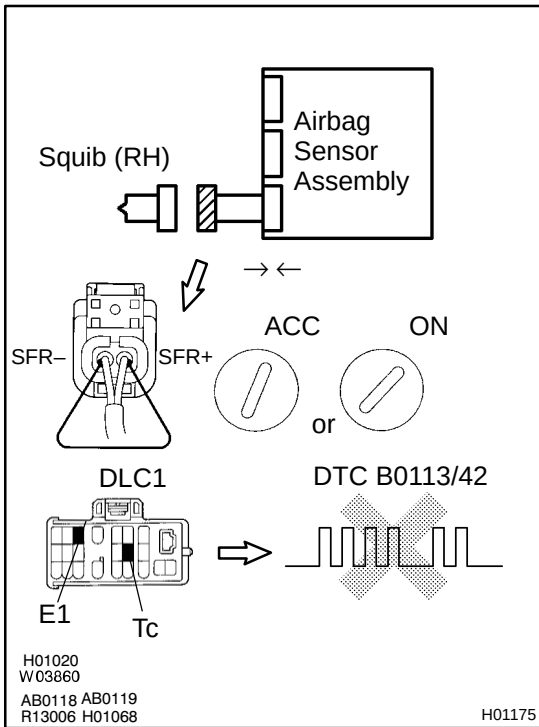
Voltage: 0 V

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.
- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0113/42 is not output.

HINT:

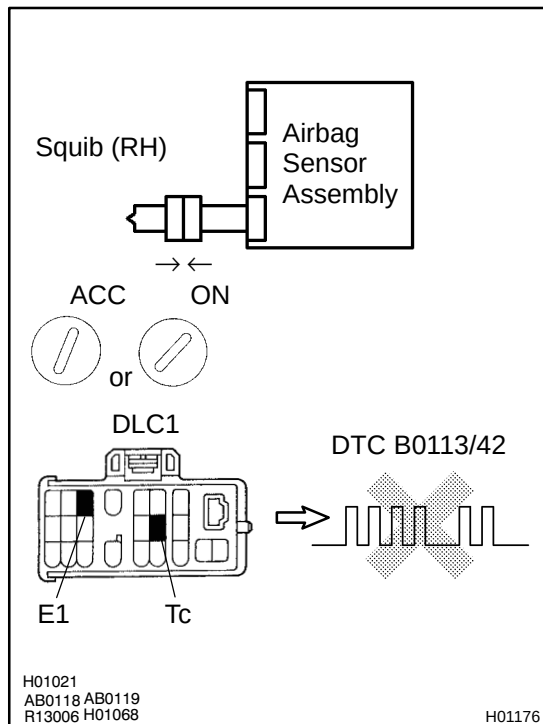
Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

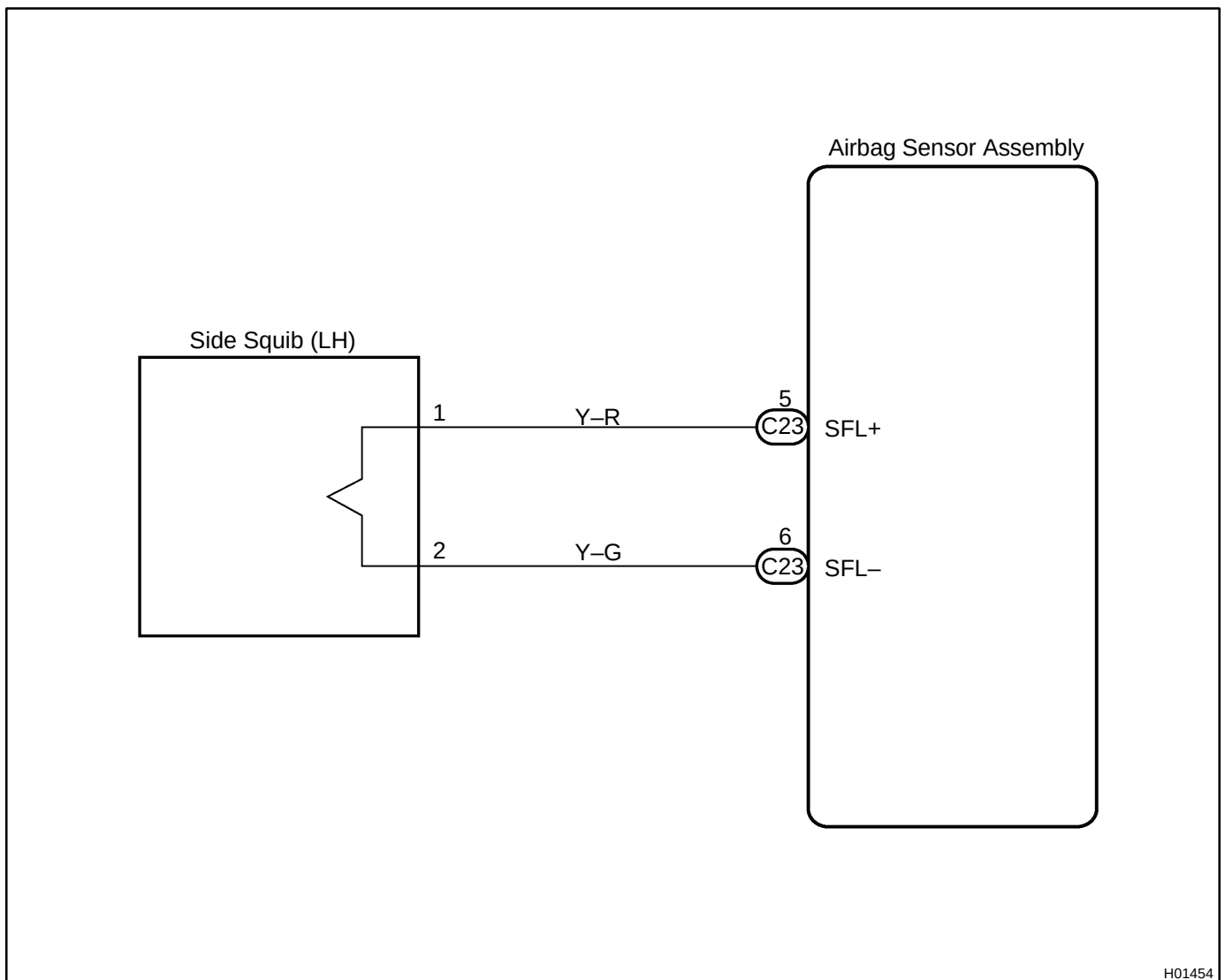
DTC	B0115/47	Short in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page [RS-2](#). DTC B0115/47 is recorded when a short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0115/47	●Short circuit between SFL+ wire harness and SFL– wire harness of squib ●Side squib (LH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (LH) ●Airbag sensor assembly ●Wire harness

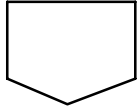
WIRING DIAGRAM



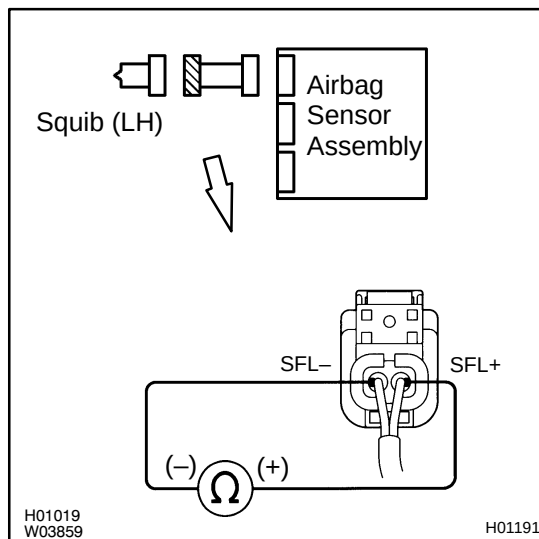
H01454

INSPECTION PROCEDURE

- 1 Prepare for inspection. (See step 1 on page [DI-547](#))



- 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-421](#))

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:

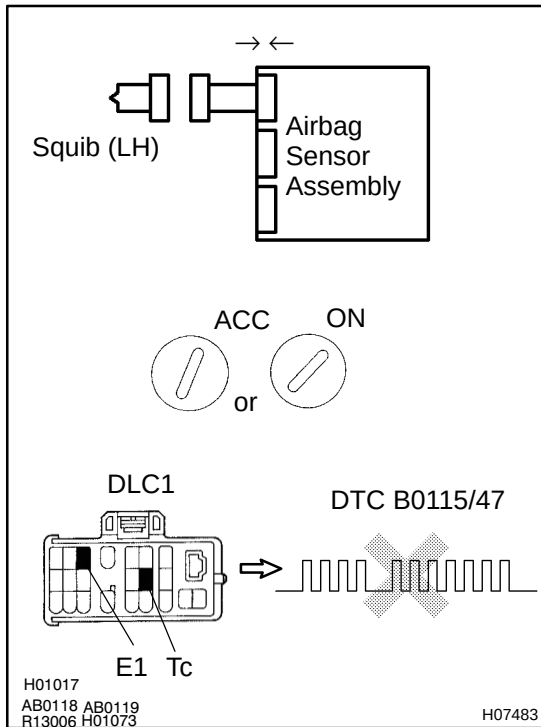
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0115/47 is not output.

HINT:

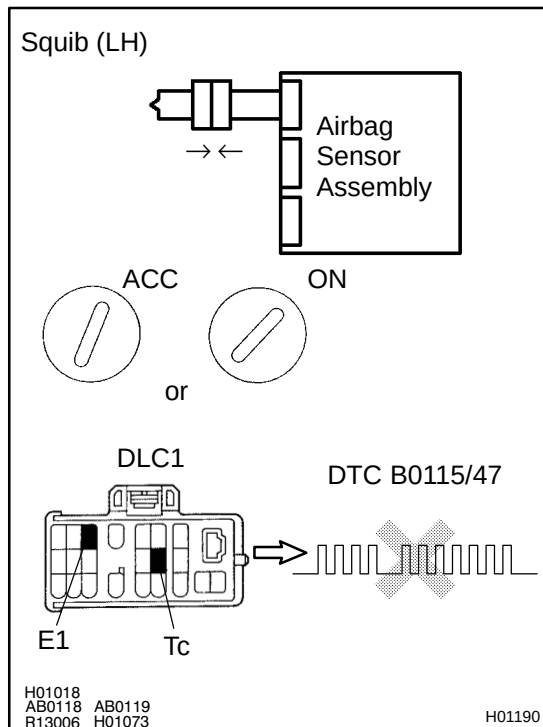
Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn 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 ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0116/48	Open in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib circuit consists of the airbag sensor assembly and side airbag assembly (LH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0116/48 is recorded when an open is detected in the side squib (LH) circuit.

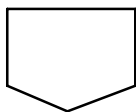
DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	●Open circuit in SFL+ wire harness or SFL– wire harness of squib ●Side squib (LH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

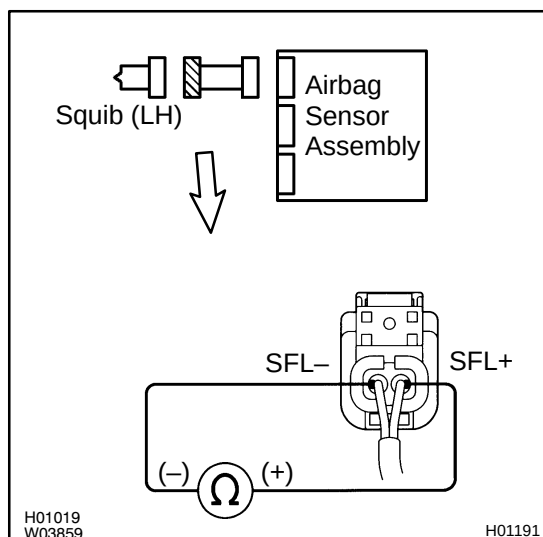
See page DI-477.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check side squib (LH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL–.

OK:

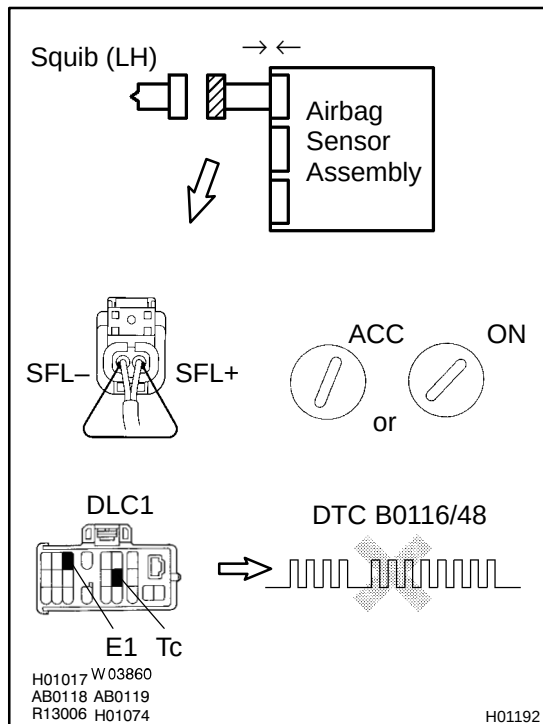
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0116/48 is not output.

HINT:

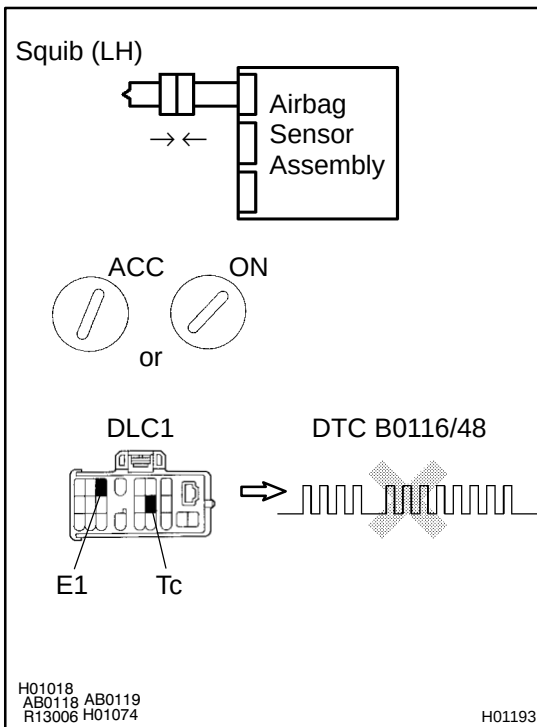
Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0117/45	Short in Side Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib circuit consists of the airbag sensor assembly and side airbag assembly (LH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0117/45 is recorded when a ground short is detected in the side squib (LH) circuit.

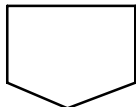
DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	●Short circuit in side squib (LH) wire harness (to ground) ●Side squib (LH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

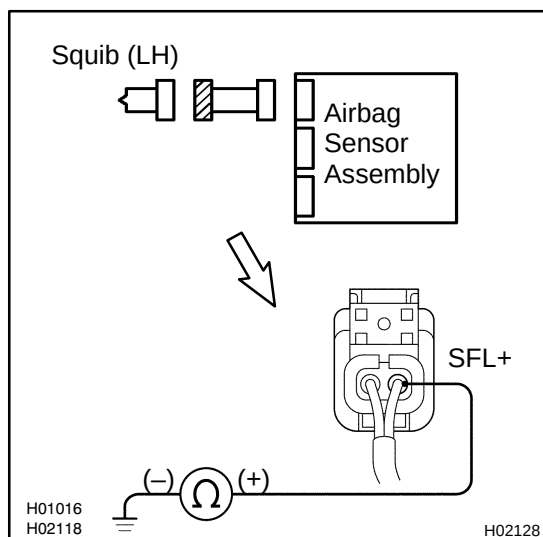
See page DI-477.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check side squib (LH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and body ground.

OK:

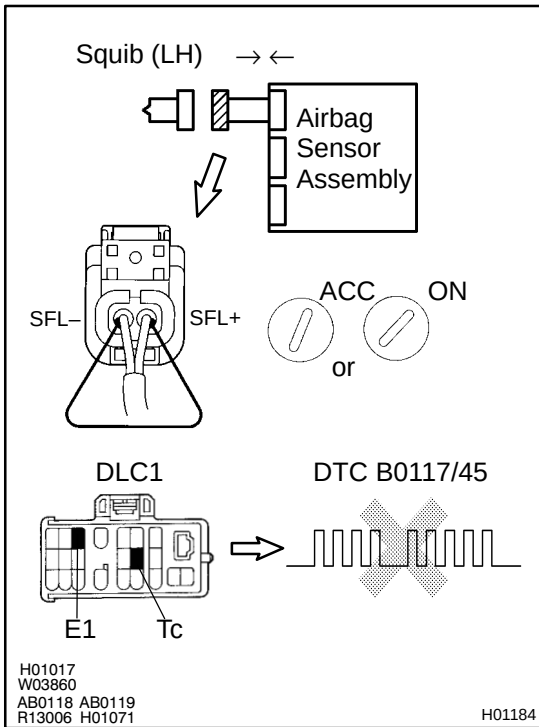
Resistance: 1 MΩ or Higher



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 (LH) and the airbag sensor assembly).
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0117/45 is not output.

HINT:

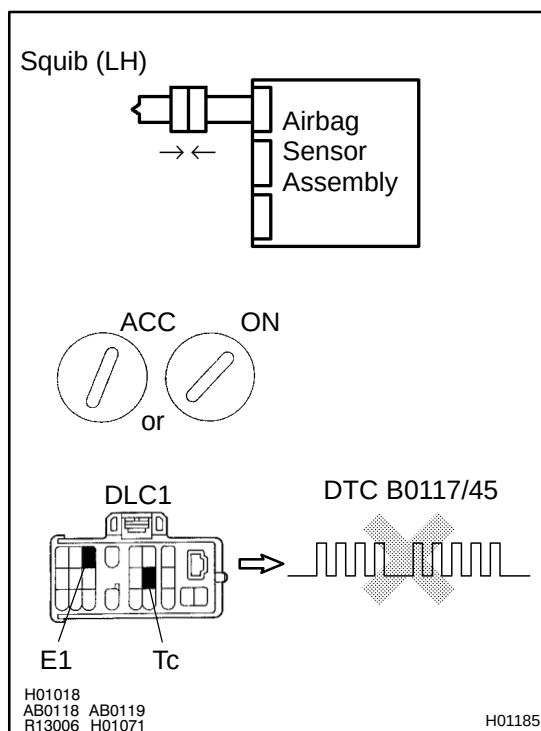
Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0117/45 is not output.

HINT:

Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG

Replace side airbag assembly (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B0118/46	Short in Side Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib circuit consists of the airbag sensor assembly and side airbag assembly (LH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0118/46 is recorded when a B+ short is detected in the side squib (LH) circuit.

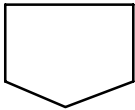
DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	•Short circuit in side squib (LH) wire harness (to B+) •Side squib (LH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (LH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

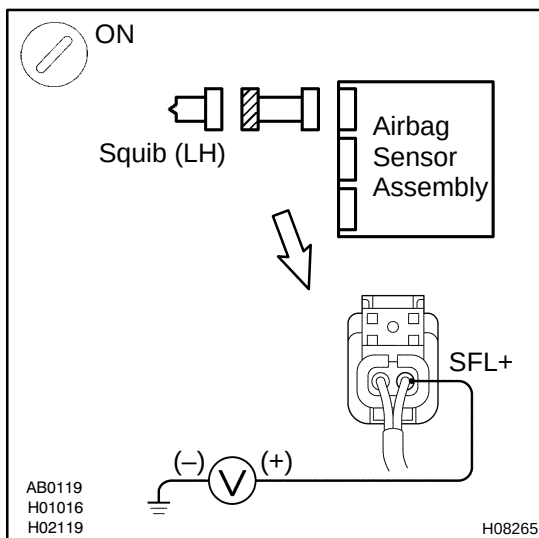
See page DI-477.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check side squib (LH) circuit.



CHECK:

- Turn 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:

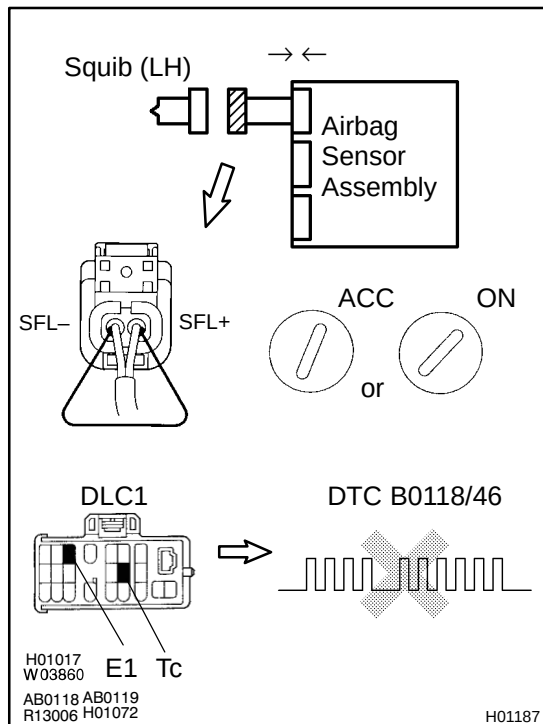
Voltage: 0 V



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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0118/46 is not output.

HINT:

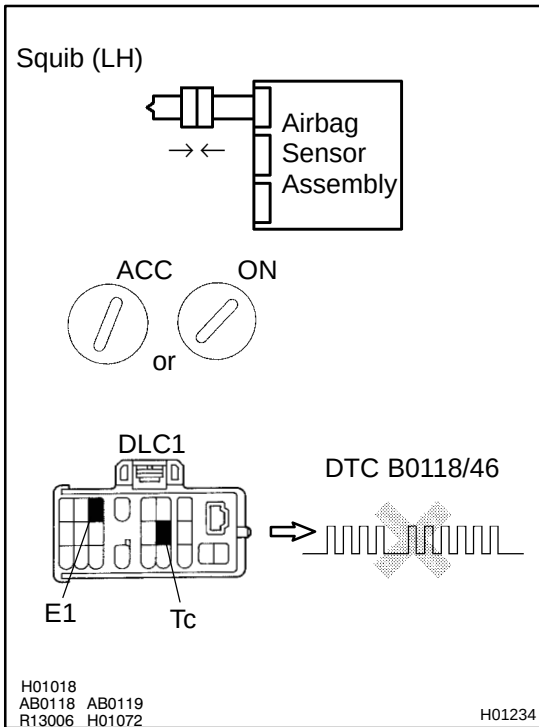
Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

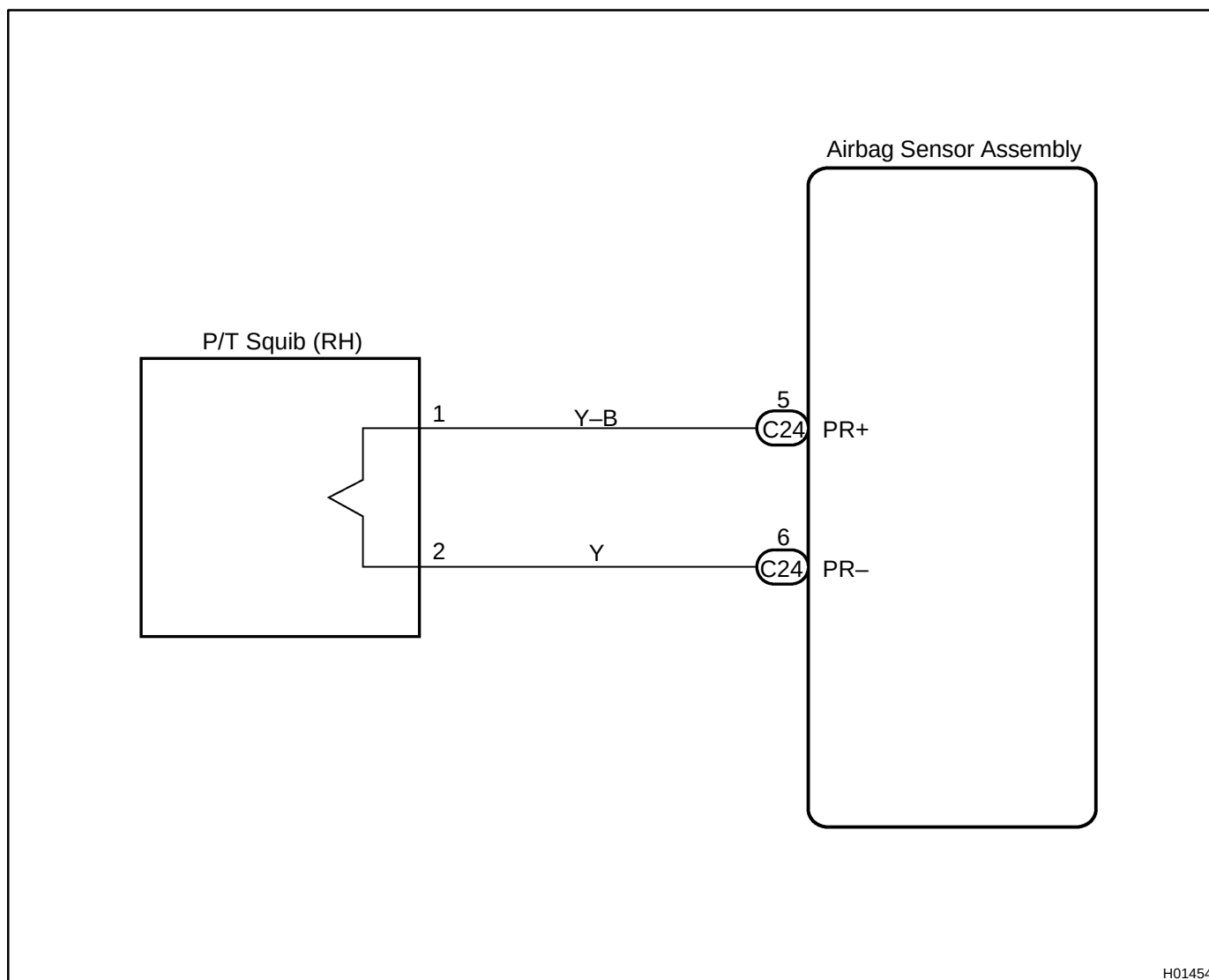
The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page [RS-2](#).

DTC B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	●Short circuit between PR+ wire harness and PR– wire harness of squib ●P/T squib (RH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (RH) ●Airbag sensor assembly ●Wire harness

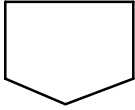
WIRING DIAGRAM



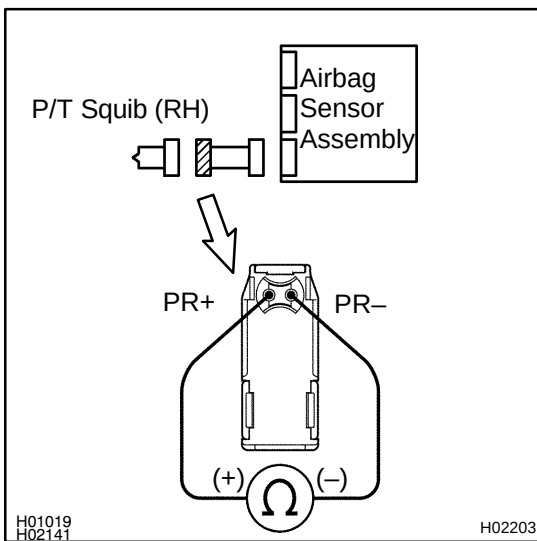
H01454

INSPECTION PROCEDURE

- 1 Prepare for inspection. (See step 1 on page [DI-547](#))



- 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-421](#))

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:

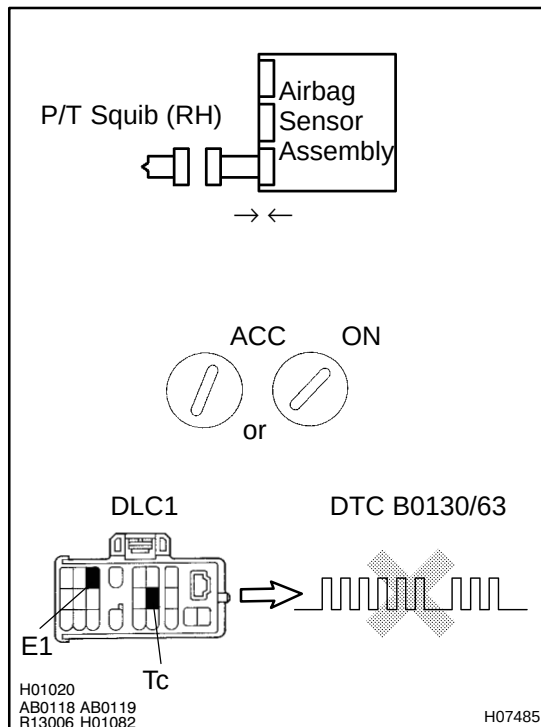
Resistance: 1 MΩ or Higher

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0130/63 is not output.

HINT:

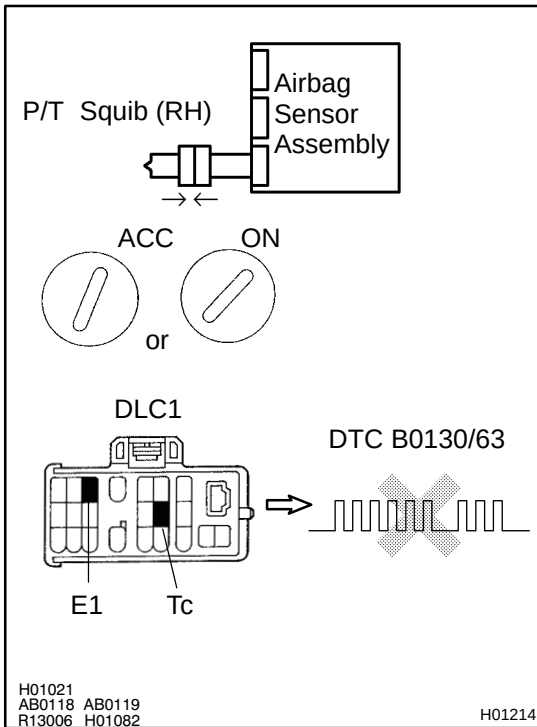
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn 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 ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0131/64	Open in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (RH) consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

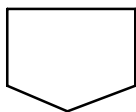
DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	●Open circuit in PR+ wire harness or PR- wire harness of squib ●P/T squib (RH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (RH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

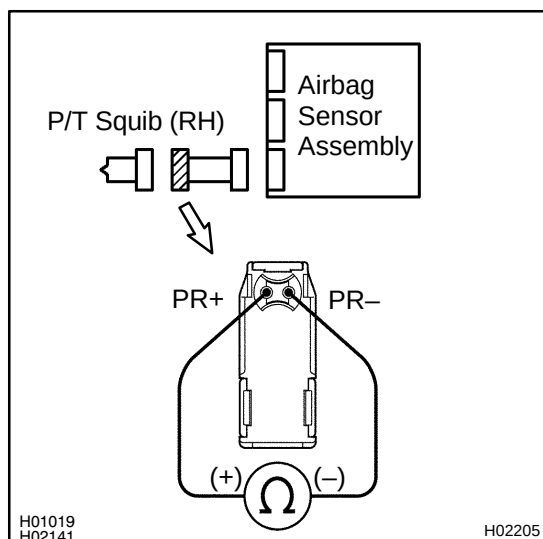
See page DI-490.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR-.

OK:

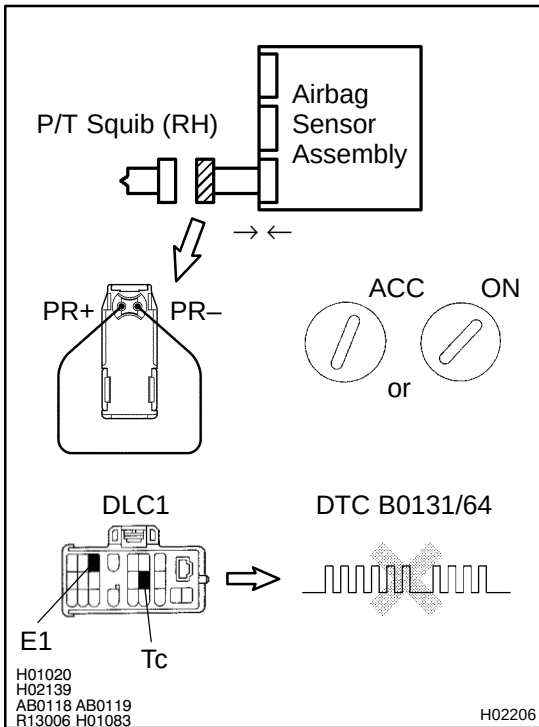
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0131/64 is not output.

HINT:

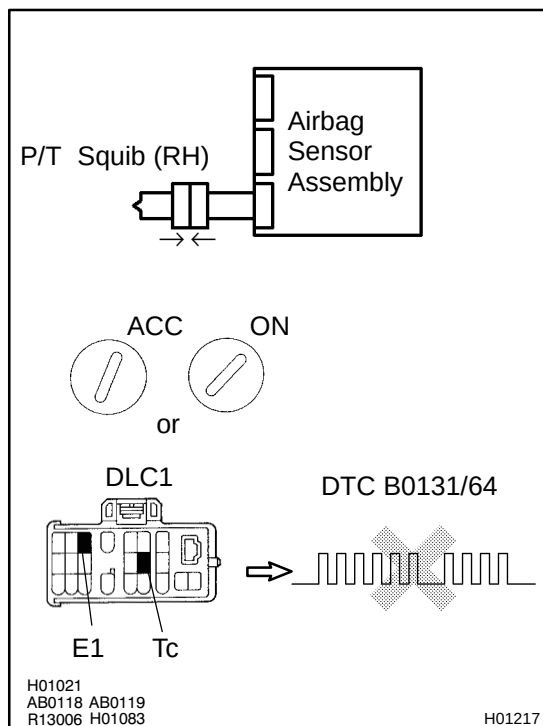
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0131/64 is not output.

HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG

Replace seat belt pretensioner (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0132/61	Short in P/T Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0132/61 is recorded when a ground short is detected in the P/T squib (RH) circuit.

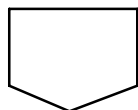
DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	•Short circuit in P/T squib (RH) wire harness (to ground) •P/T squib (RH) malfunction •Airbag sensor assembly malfunction	•Seat belt pretensioner (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

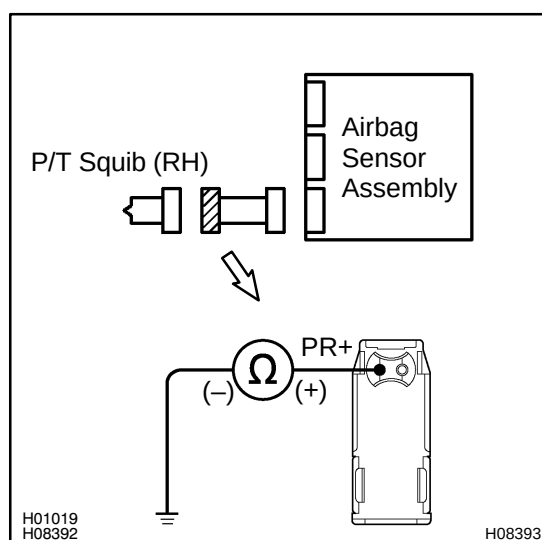
See page DI-490.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and body ground.

OK:

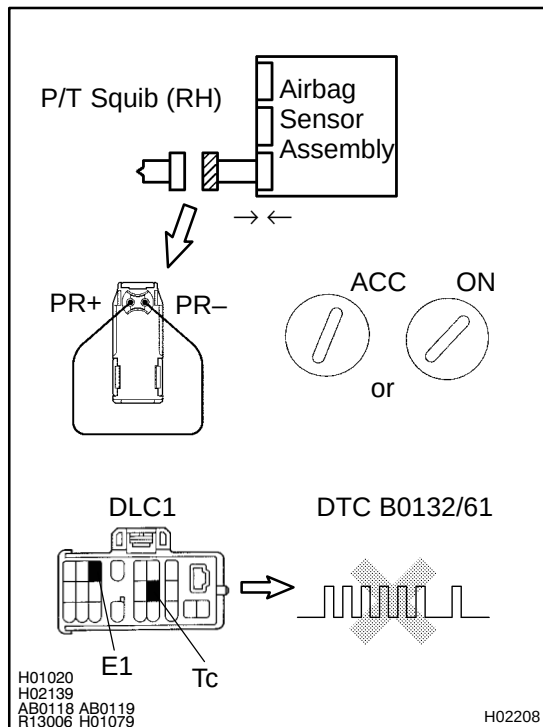
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0132/61 is not output.

HINT:

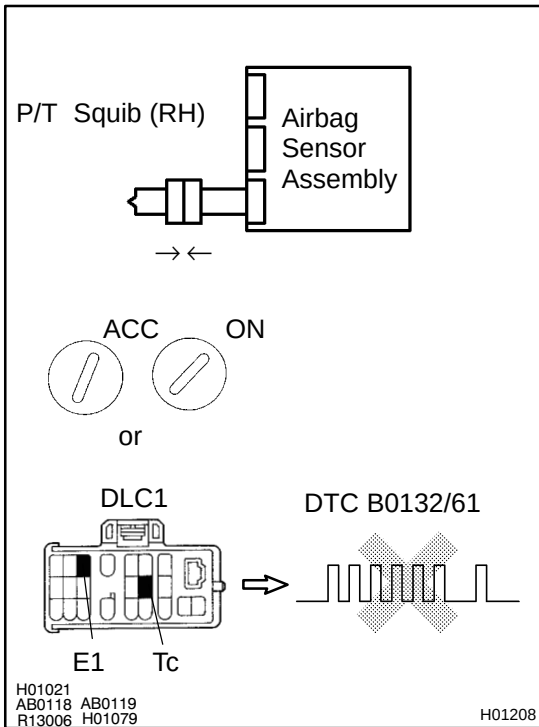
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0133/62	Short in P/T Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0133/62 is recorded when a B+ short is detected in the P/T squib (RH) circuit.

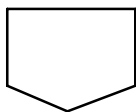
DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	•Short circuit in seat belt pretensioner (RH) wire harness (to B+) •P/T squib (RH) malfunction •Airbag sensor assembly malfunction	•Seat belt pretensioner (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

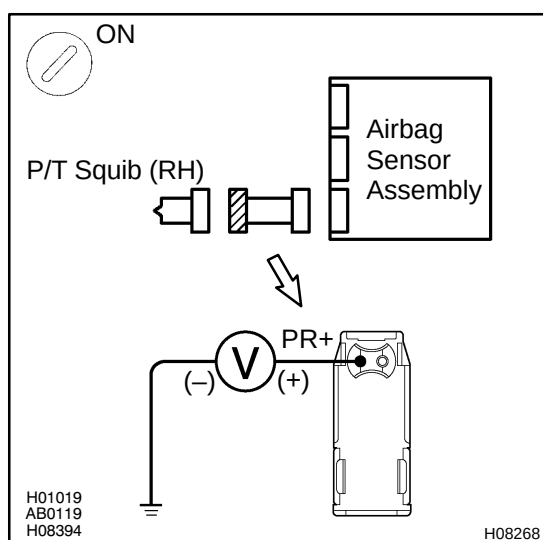
See page DI-490.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P/T squib (RH) circuit.



CHECK:

- Turn 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:

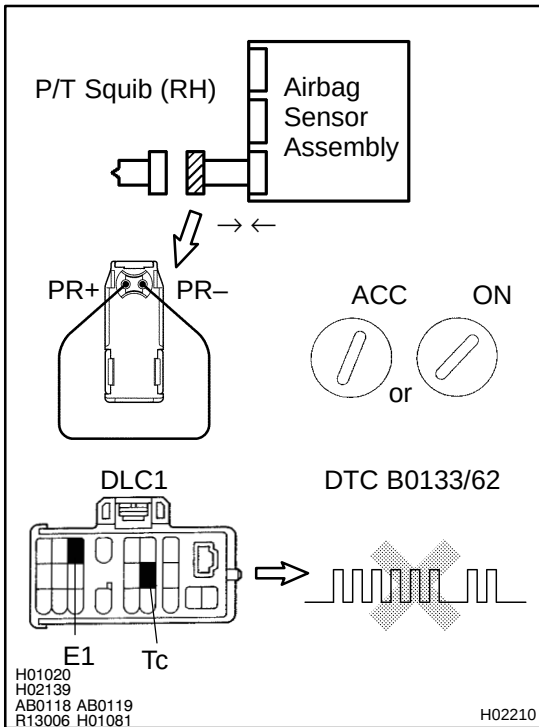
Voltage: 0 V

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0133/62 is not output.

HINT:

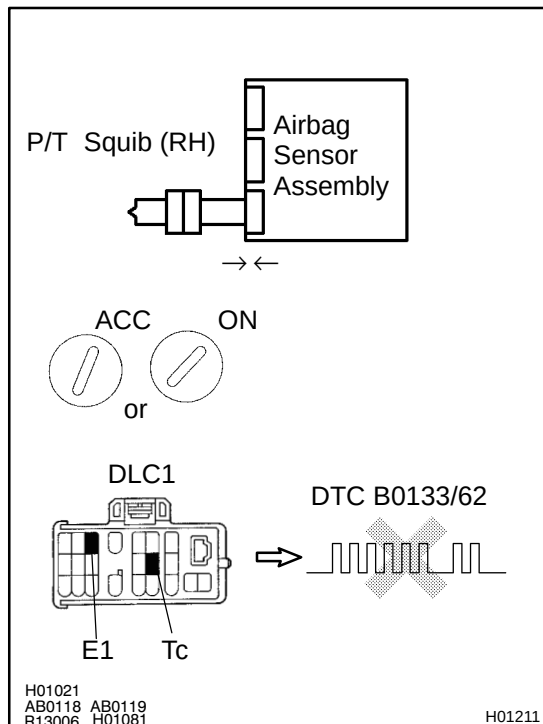
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

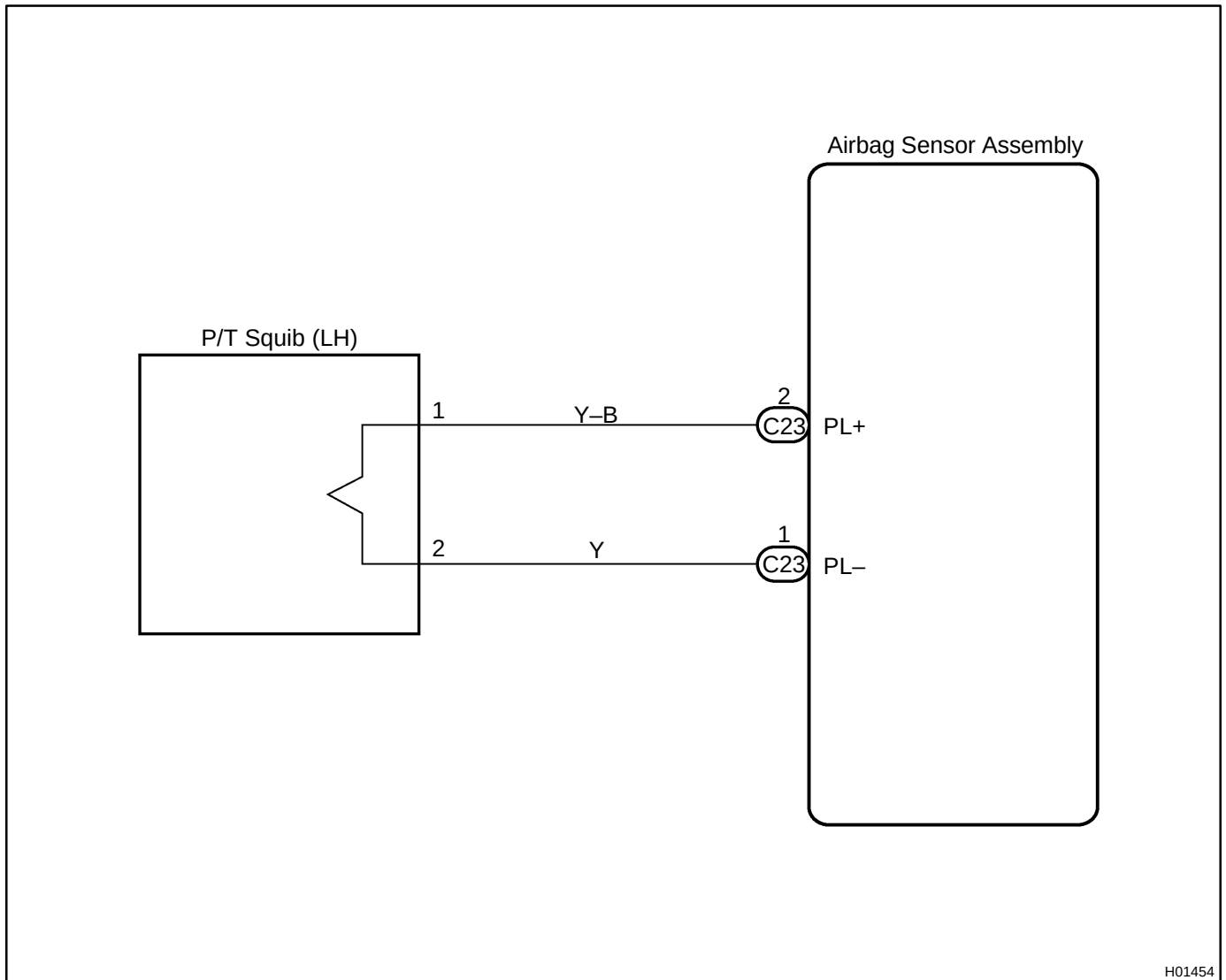
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

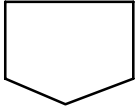
DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	●Short circuit between PL+ wire harness and PL– wire harness of squib ●P/T squib (LH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

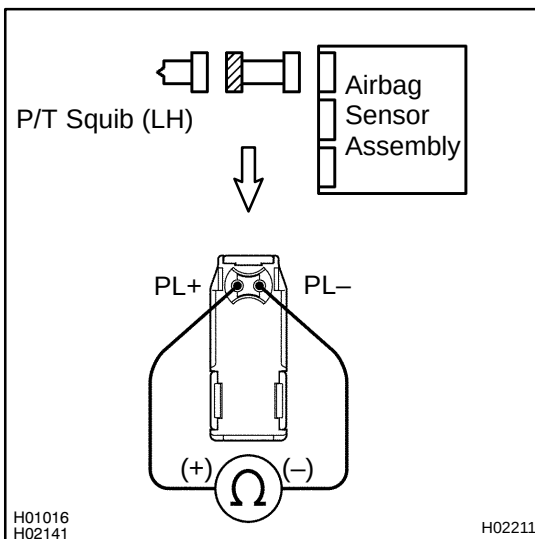


INSPECTION PROCEDURE

- 1 Prepare for inspection. (See step 1 on page [DI-547](#))



- 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-421](#))

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:

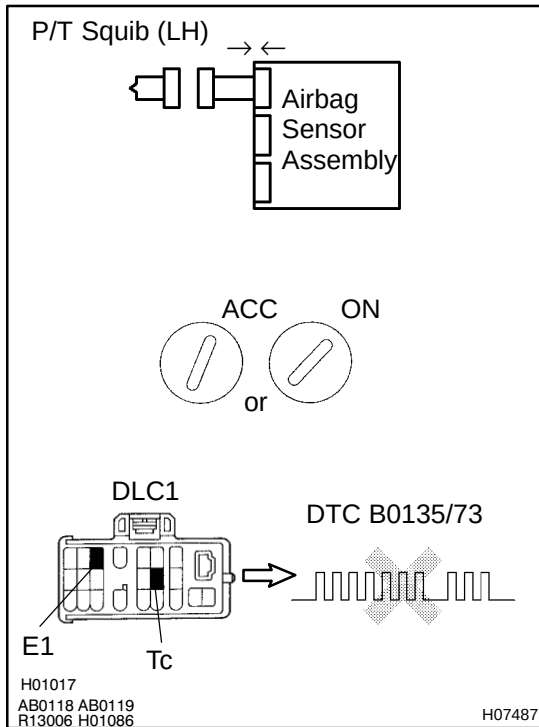
Resistance: 1 MΩ or Higher

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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0135/73 is not output.

HINT:

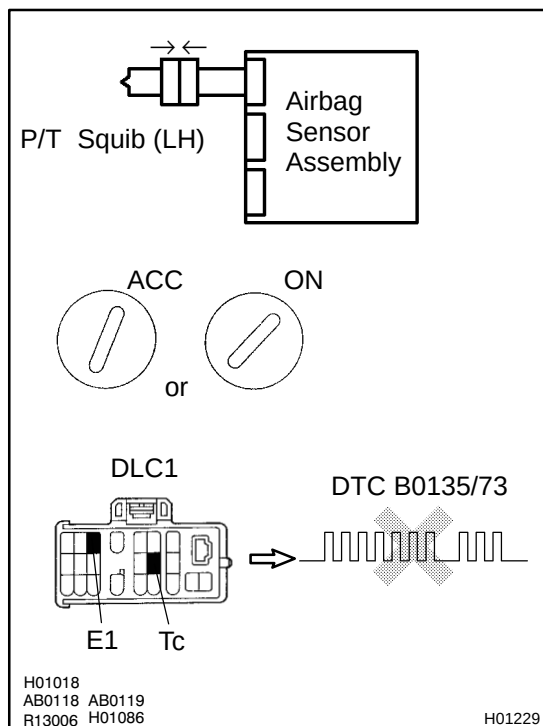
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn 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 ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0135/73 is not output.

HINT:

Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG

Replace seat belt pretensioner (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0136/74	Open in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (LH) consists of the airbag sensor assembly and seat belt pretensioner (LH). It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-2. DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

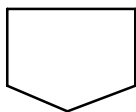
DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	●Open circuit in PL+ wire harness or PL- wire harness of squib ●P/T squib (LH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

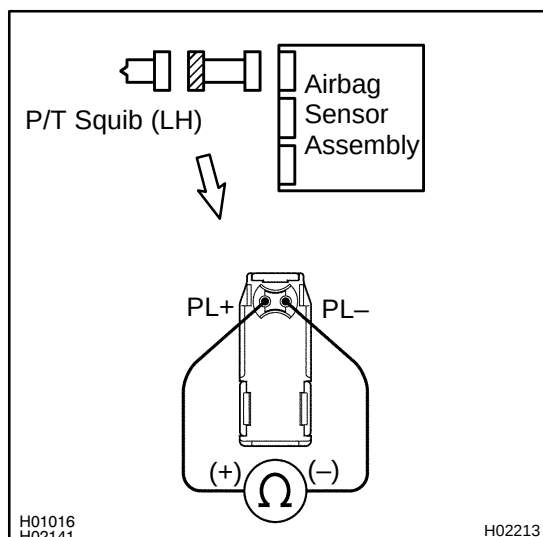
See page DI-503.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P/T squib (LH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL-.

OK:

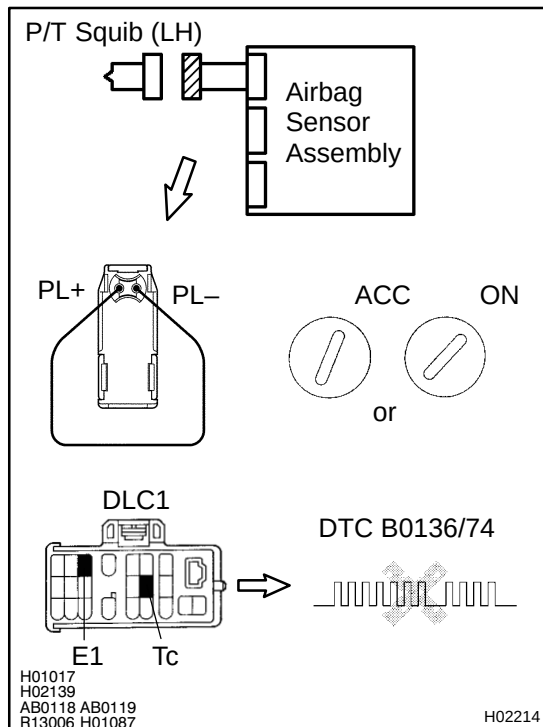
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0136/74 is not output.

HINT:

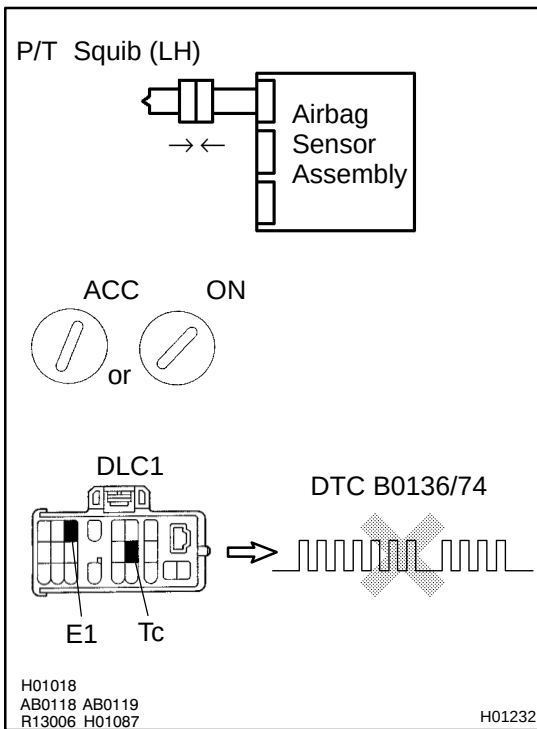
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0136/74 is not output.

HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG

Replace seat belt pretensioner (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B0137/71	Short in P/T Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0137/71 is recorded when a ground short is detected in the P/T squib (LH) circuit.

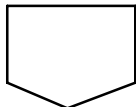
DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	•Short circuit in P/T squib (LH) wire harness (to ground) •P/T squib (LH) malfunction •Airbag sensor assembly malfunction	•Seat belt pretensioner (LH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

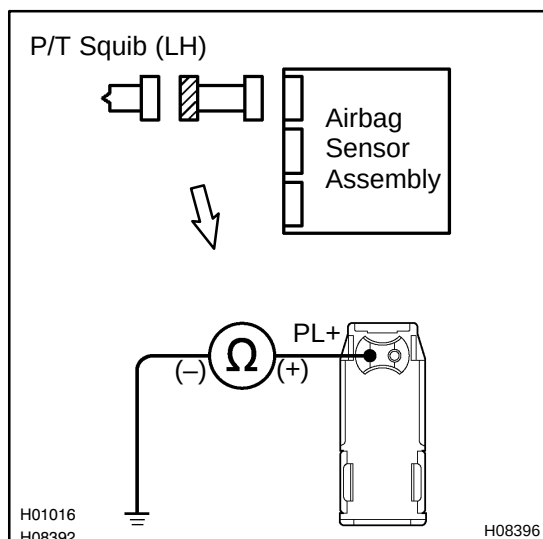
See page DI-503.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P/T squib (LH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and body ground.

OK:

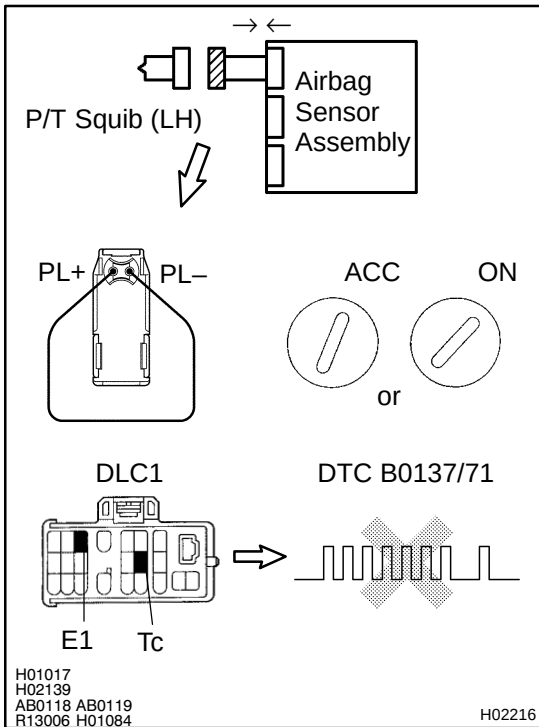
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory. (See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC. (See page [DI-421](#))

OK:

DTC B0137/71 is not output.

HINT:

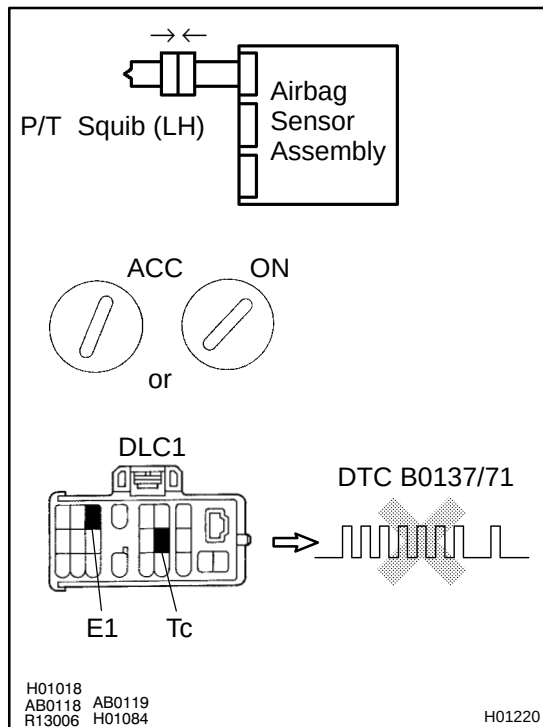
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B0138/72	Short in P/T Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-2.

DTC B0138/72 is recorded when a B+ short is detected in the P/T squib (LH) circuit.

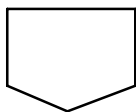
DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	●Short circuit in seat belt pretensioner (LH) wire harness (to B+) ●P/T squib (LH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

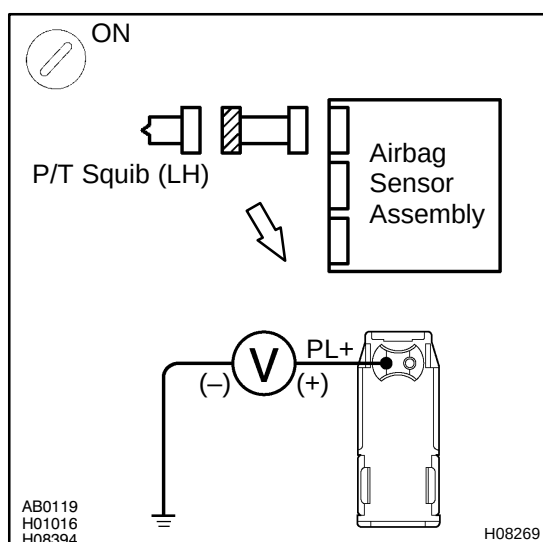
See page DI-503.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check P/T squib (LH) circuit.



CHECK:

- Turn 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:

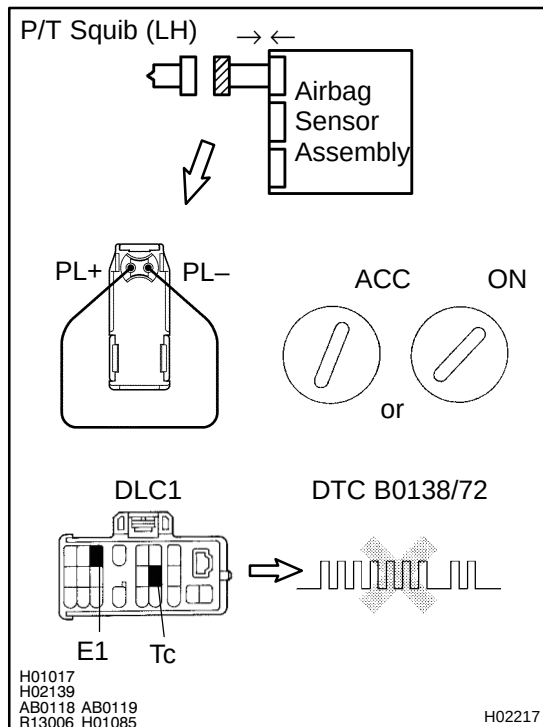
Voltage: 0 V

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.
- 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 ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0138/72 is not output.

HINT:

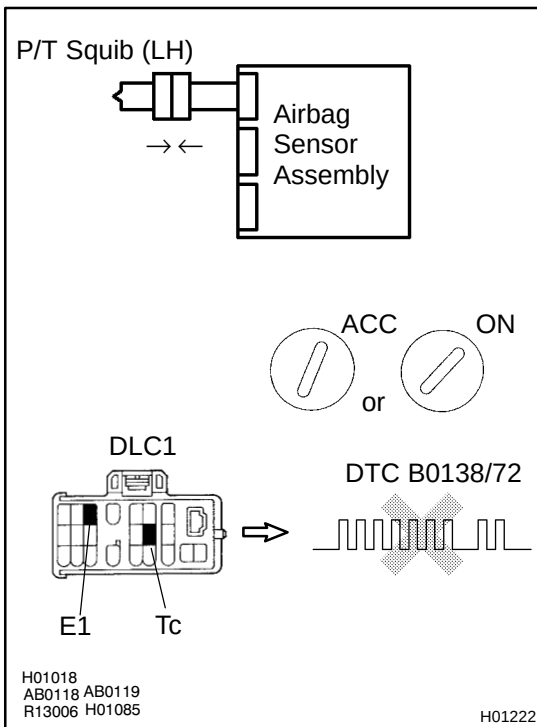
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B0138/72 is not output.

HINT:

Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG

Replace seat belt pretensioner (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B1100/31	Airbag Sensor Assembly Malfunction

CIRCUIT DESCRIPTION

The airbag sensor assembly consists of the airbag sensor, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.

It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

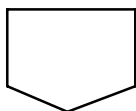
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	●Airbag sensor assembly malfunction	●Airbag sensor assembly

INSPECTION PROCEDURE

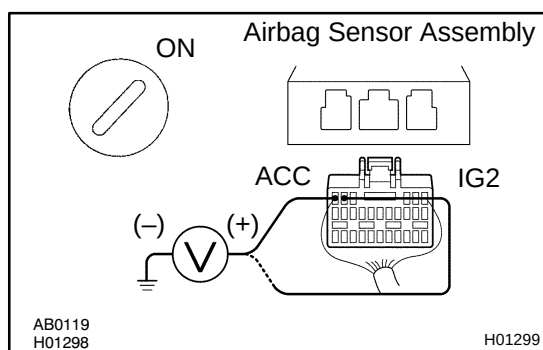
HINT:

When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

1	Prepare for inspection. (See step 1 on page DI-547)



2	Check voltage at IG2 and ACC of airbag sensor assembly.



CHECK:

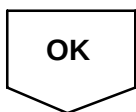
- Turn ignition switch to ON.
- Measure the voltage between body ground and each of terminals IG2 and ACC of the airbag sensor assembly connector.

OK:

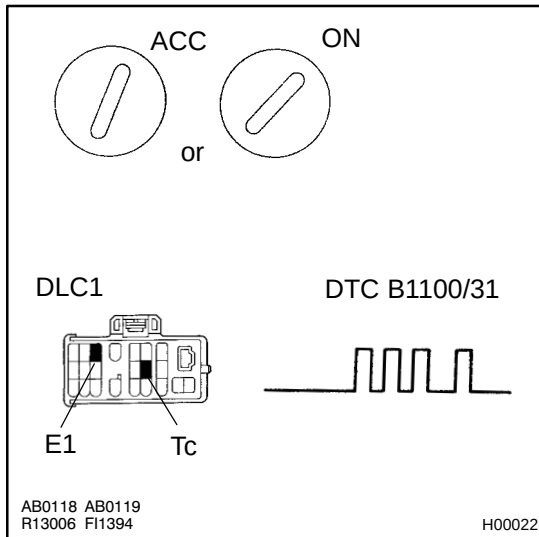
Voltage: 10 – 14 V

NG

Check that an abnormality occurs the battery and charging system.



3 Is DTC B1100/31 output again?



PREPARATION:

Clear DTC.

(See step 5 on page [DI-421](#))

CHECK:

- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Repeat operation in step (a) and (b) at least 5 times.
- Check DTC.
(See page [DI-421](#))

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-21](#))

YES

Replace airbag sensor assembly.

DTC	B1140/32	Side Airbag Sensor Assembly (RH) Malfunction

CIRCUIT DESCRIPTION

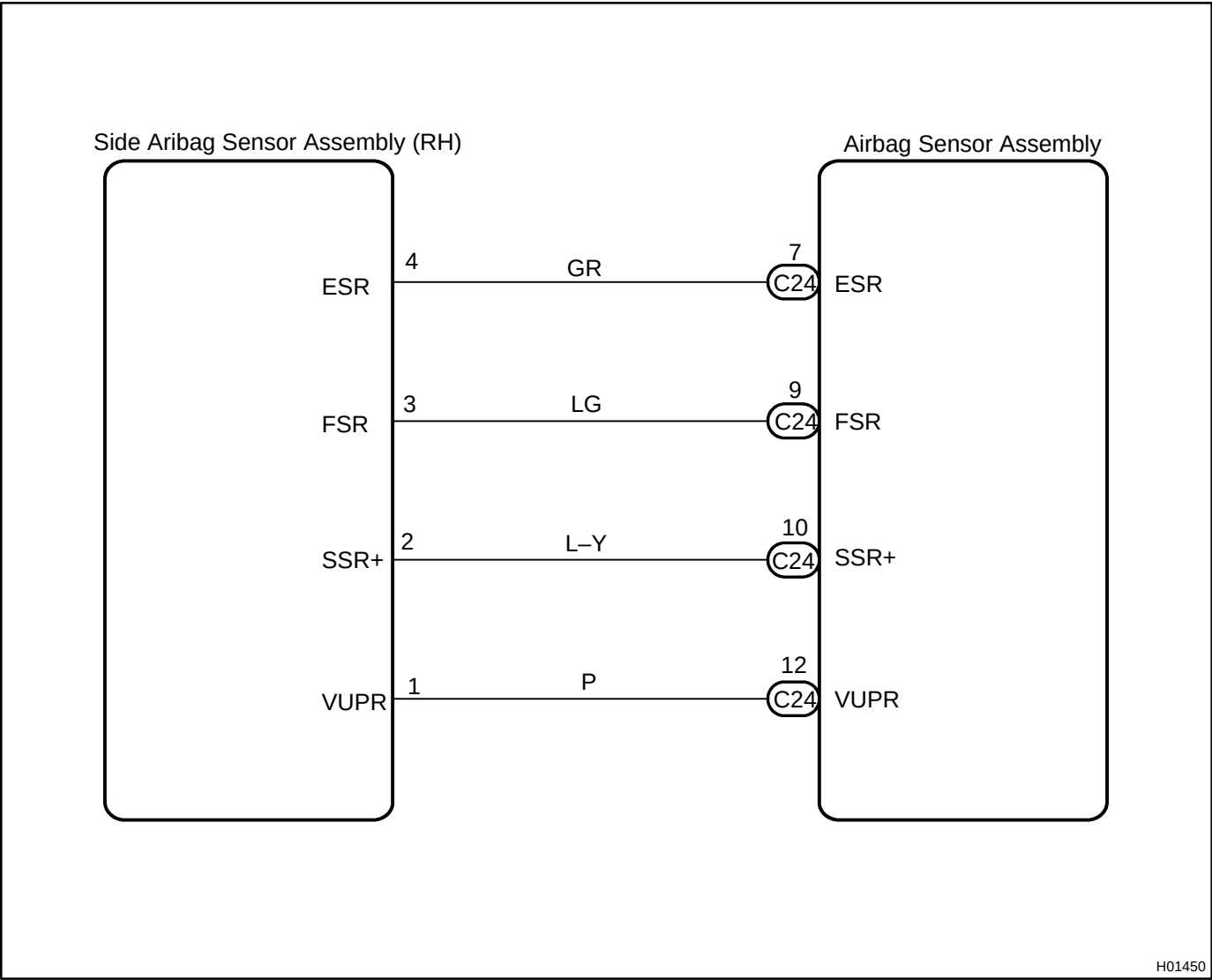
The side airbag sensor assembly (RH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and diagnosis system malfunction.

DTC B1140/32 is recorded when occurrence of a malfunction in the side airbag sensor assembly (RH) is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	●Side airbag sensor assembly (RH) malfunction	●Side airbag sensor assembly (RH) ●Airbag sensor assembly ●Wire harness

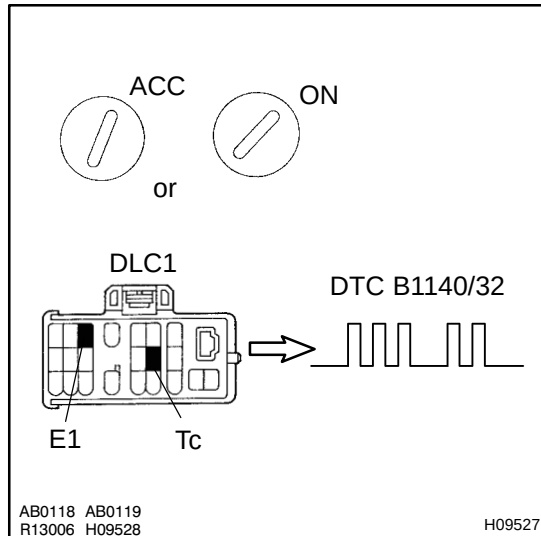
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1 Is DTC B1140/32 out put?

**CHECK:**

- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

YES

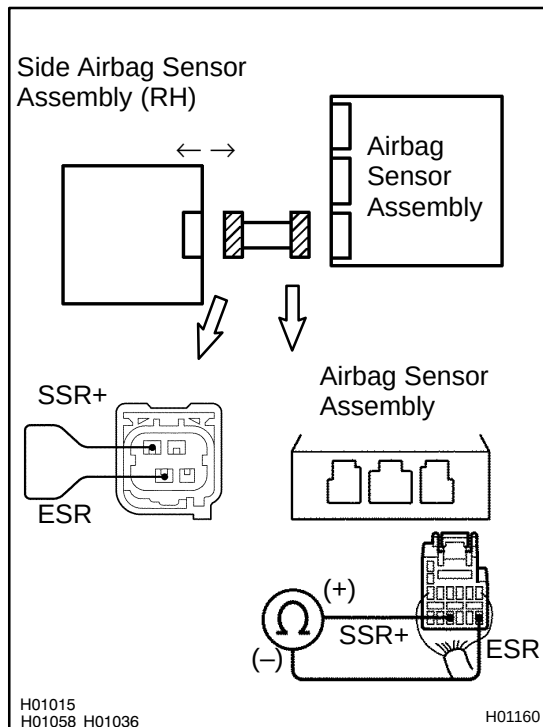
The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

NO

2 Is connector of side airbag sensor assembly (RH) properly connected?

3 Prepare for inspection. (See step 1 on [DI-547](#))

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 Ω

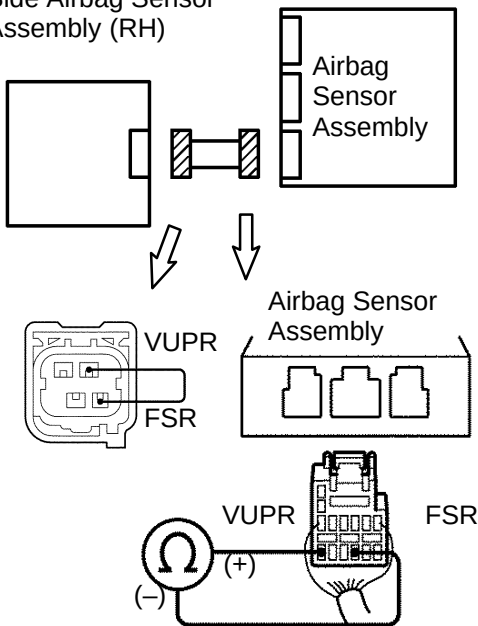
NG

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)



H01015
H01059
H01037

H01161

PREPARATION:

Using a service wire, connect VUPR and FSR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between VUPR and FSR.

OK:

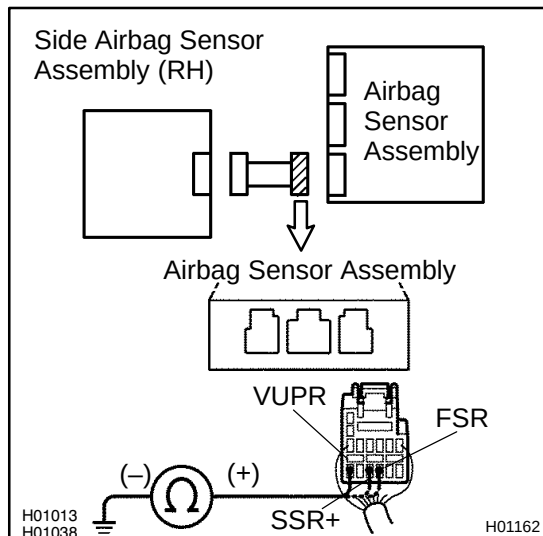
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.

OK

6 Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SSR+, VUPR and FSR.

OK:

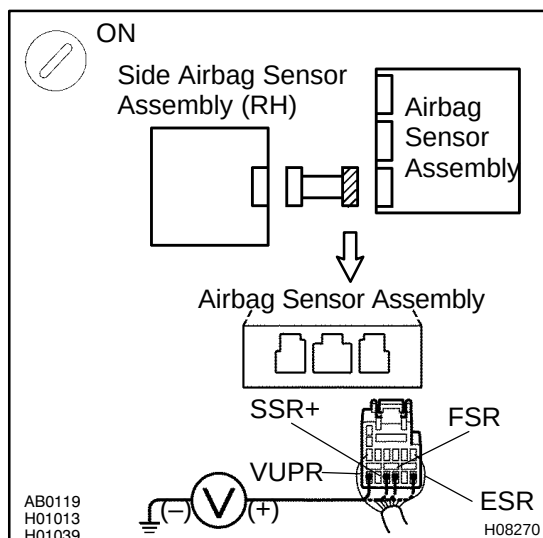
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.

OK

7 Check wire harness (to B+).



CHECK:

- Turn ignition switch to ON.
- 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:

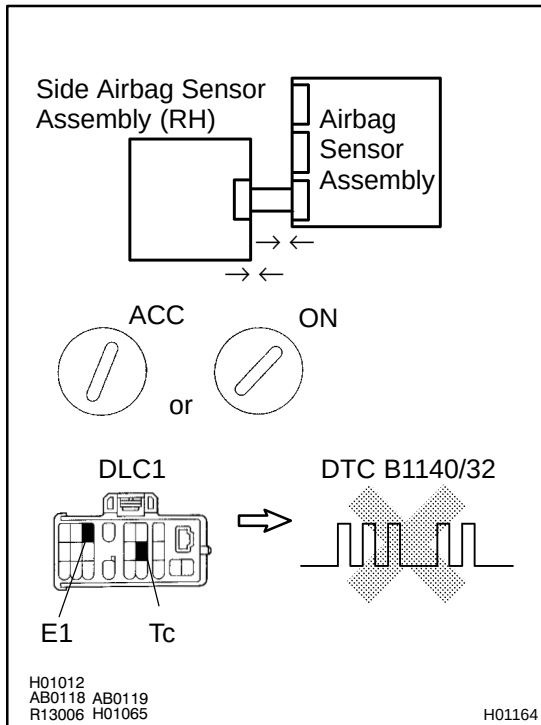
Voltage: 0 V

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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

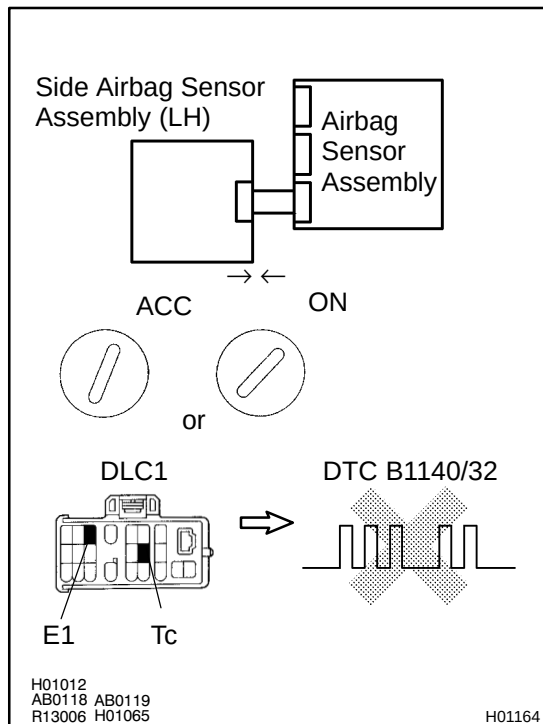
NG

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 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B1140/32 is not output.

HINT:

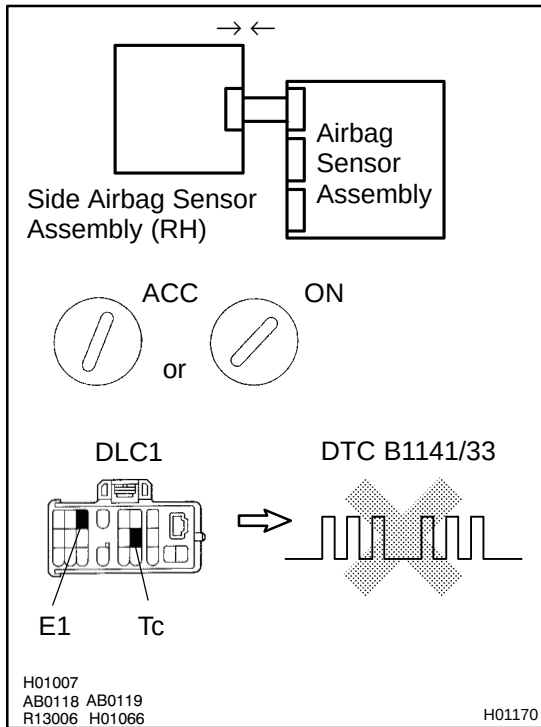
Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

10 Check side airbag sensor assembly (RH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B1141/33	Side Airbag Sensor Assembly (LH) Malfunction

CIRCUIT DESCRIPTION

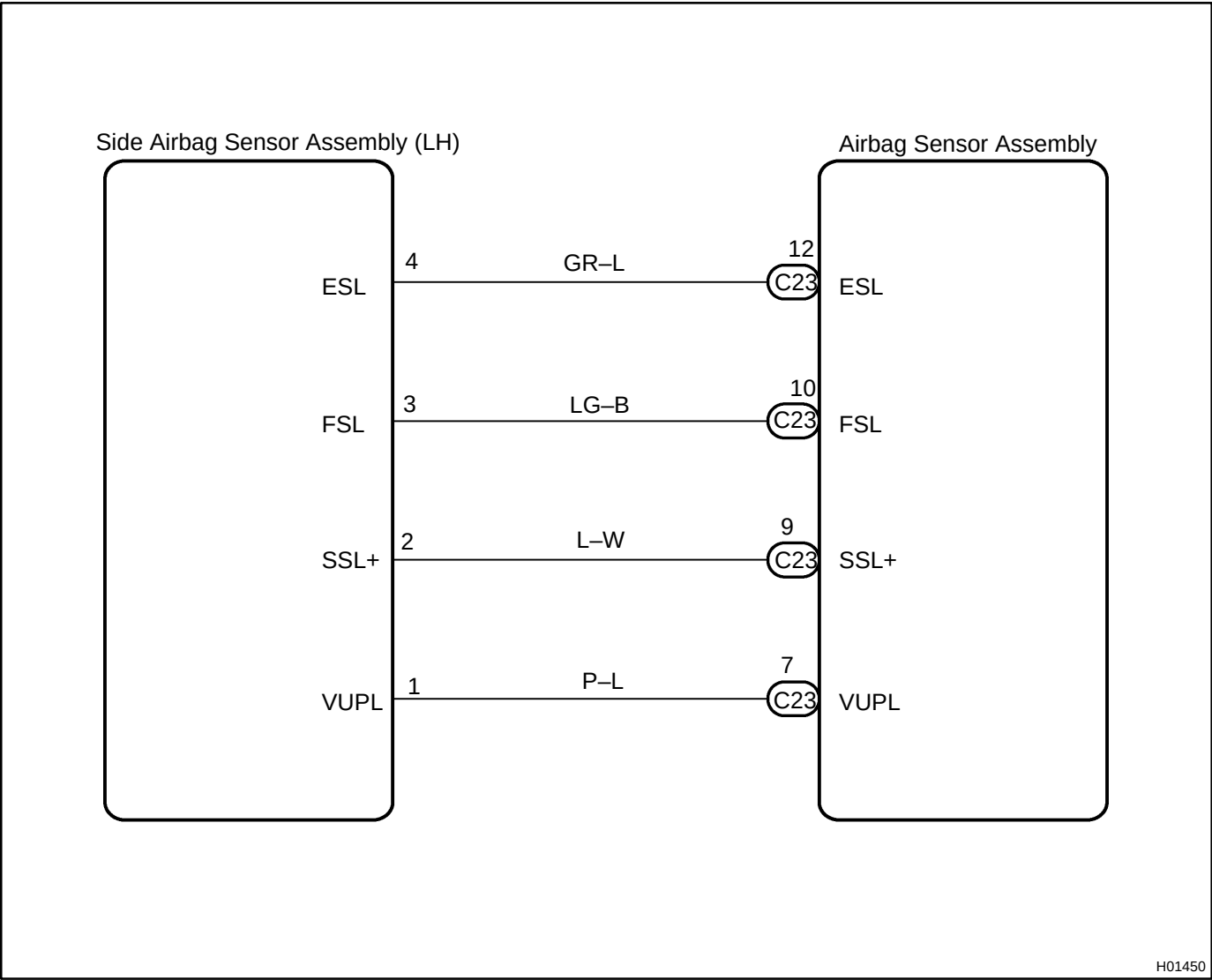
The side airbag sensor assembly (LH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and diagnosis system malfunction.

DTC B1141/33 is recorded when occurrence of a malfunction in the side airbag sensor assembly (LH) is detected.

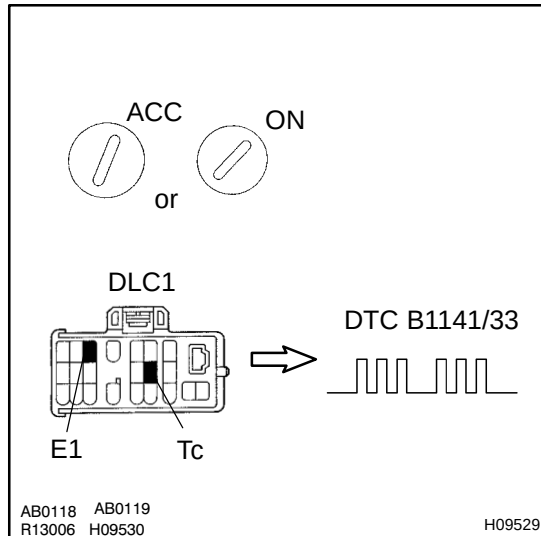
DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	●Side airbag sensor assembly (LH) malfunction	●Side airbag sensor assembly (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Is DTC B1141/33 out put?

**CHECK:**

- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

YES

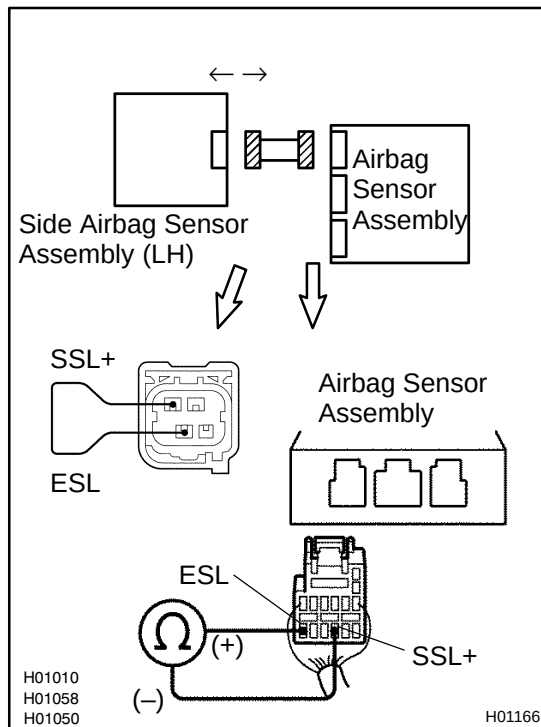
The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

NO

2 Is connector of side airbag sensor assembly (LH) properly connected?

3 Prepare for inspection. (See step 1 on page [DI-547](#))

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:

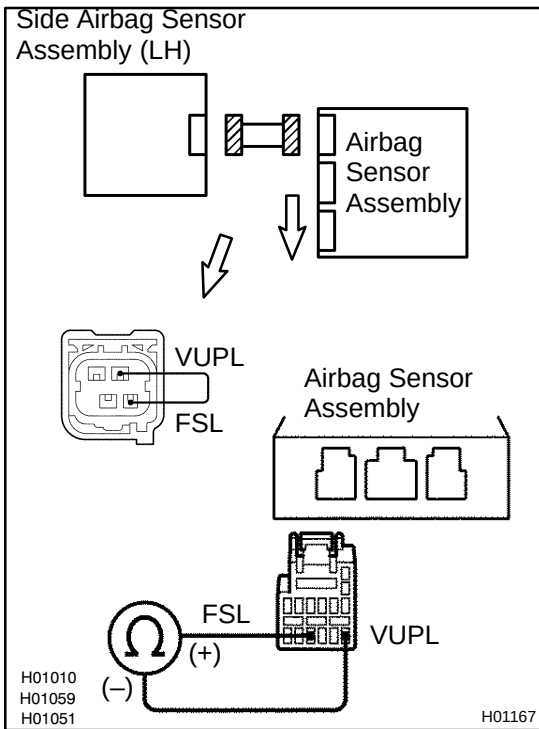
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.

OK

5 Check wire harness.



PREPARATION:

Using a service wire, connect VUPL and FSL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between VUPL and FSL.

OK:

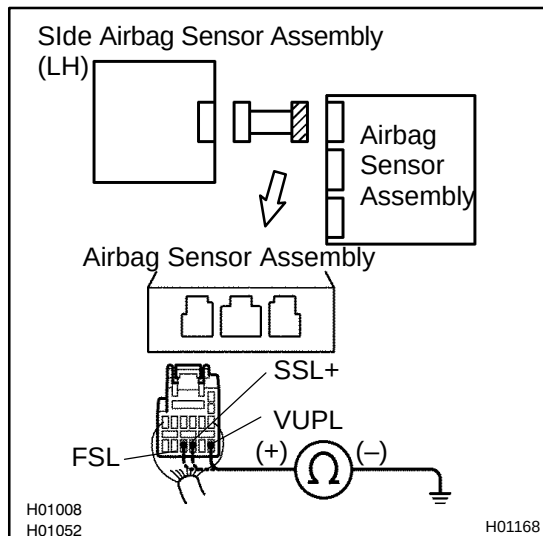
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.

OK

6 Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SSL+, VUPL and FSL.

OK:

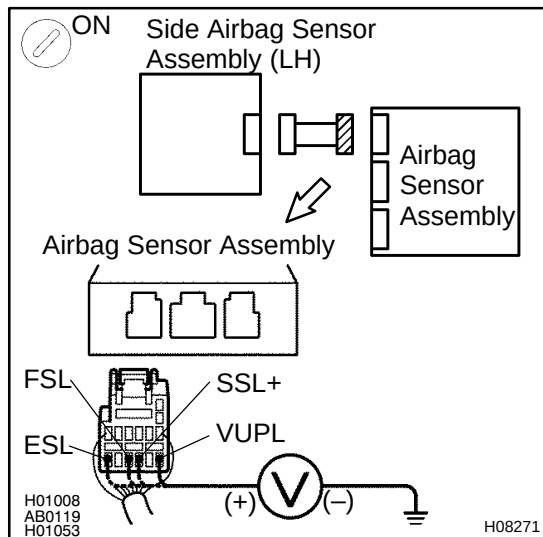
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.

OK

7 Check wire harness (to B+).



CHECK:

- Turn 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:

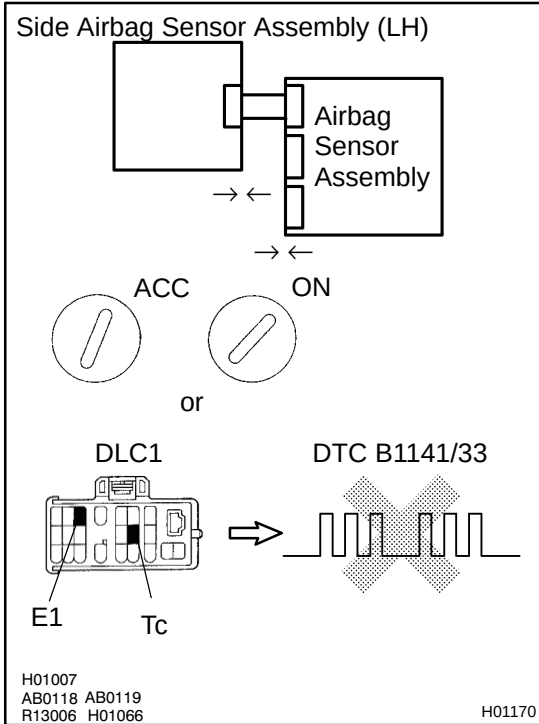
Voltage: 0 V

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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

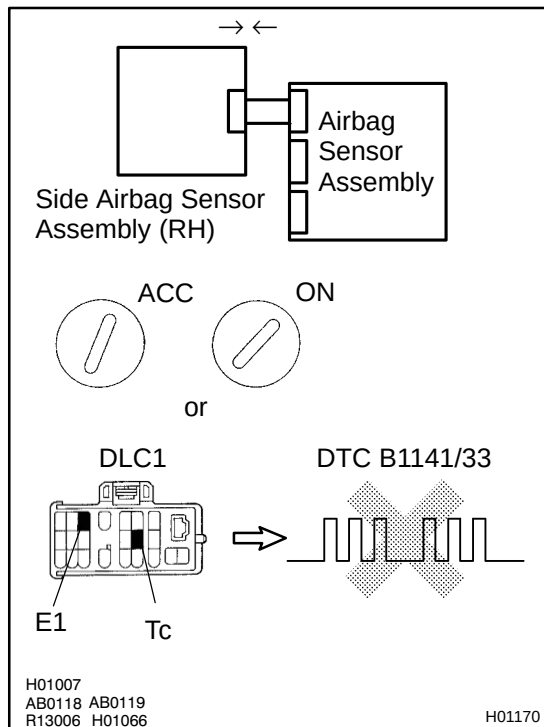
NO

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 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See step 5 on page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B1141/33 is not output.

HINT:

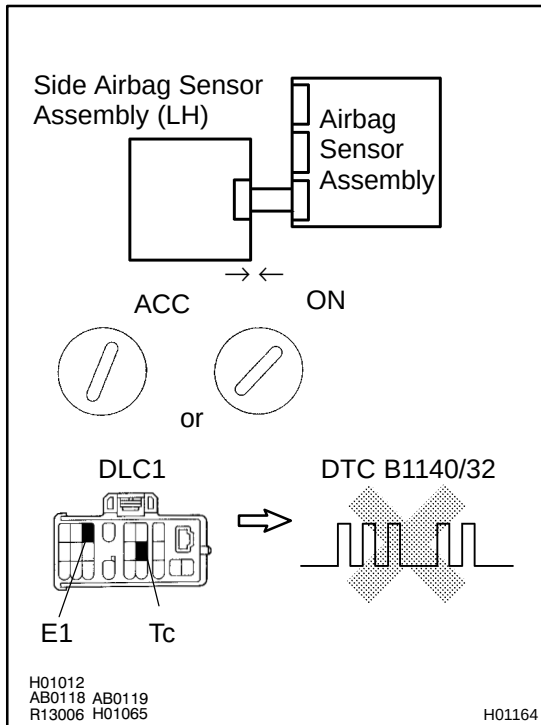
Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

10 Check side airbag sensor assembly (LH).



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

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.

DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

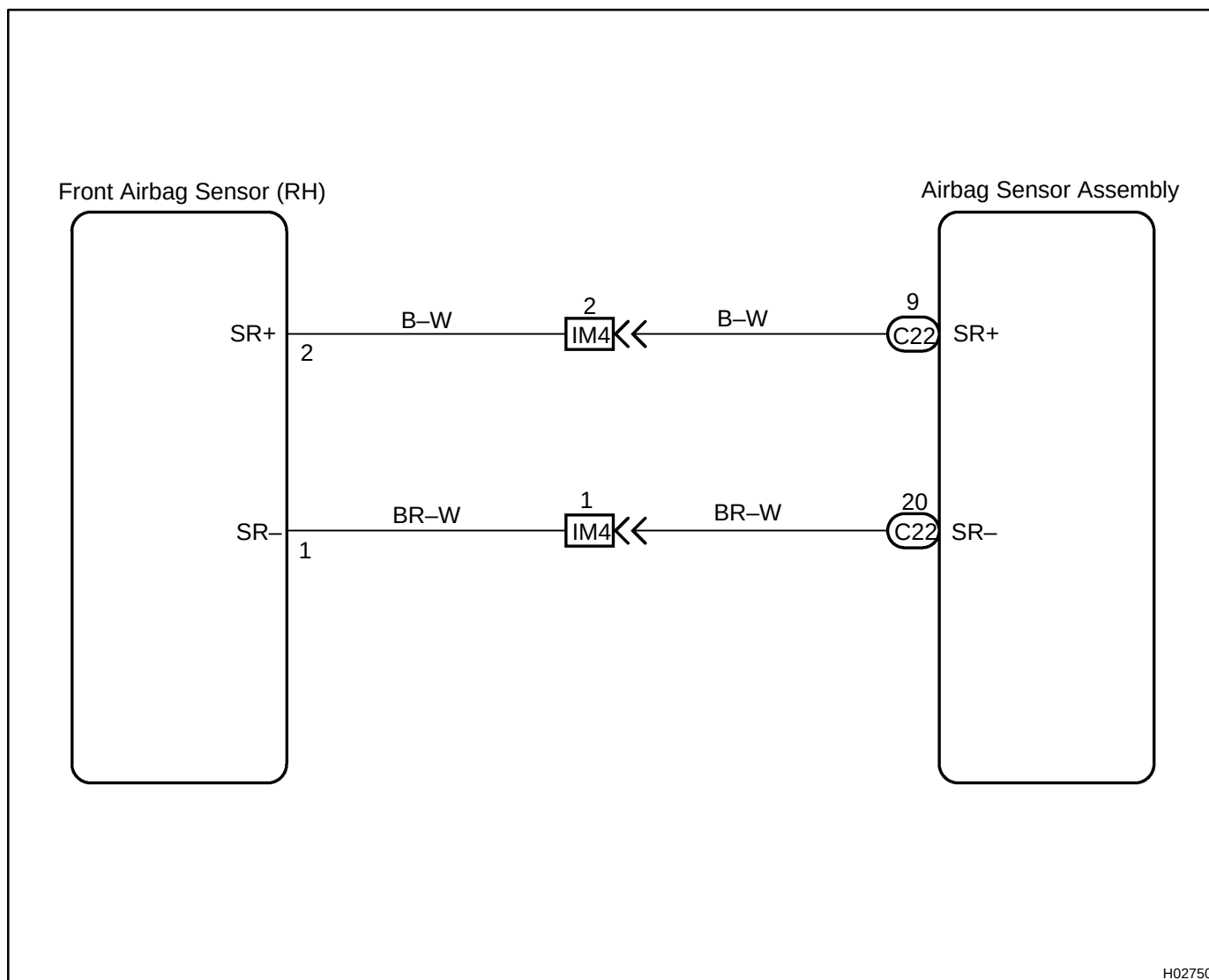
CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH). For details of the function of each component, see OPERATION on page [RS-2](#).

DTC B1156/B1157/15 is recorded when malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	●Front airbag sensor (RH) malfunction	●Front airbag sensor (RH) ●Airbag sensor assembly ●Wire harness ●Engine room main wire harness

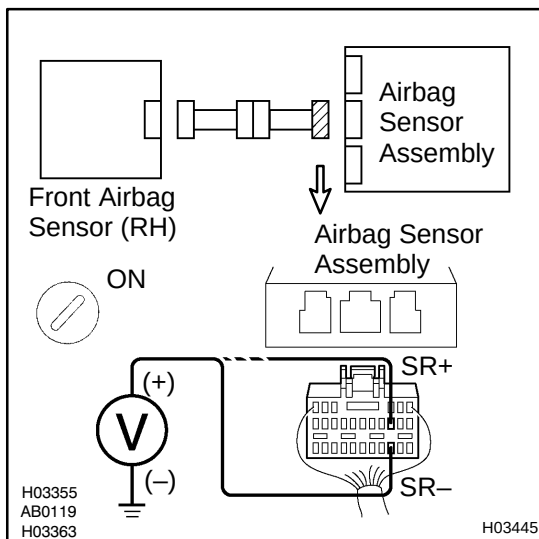
WIRING DIAGRAM



INSPECTION PROCEDURE

1 Prepare for inspection. (See step 1 on page [DI-547](#))

2 Check wire harness (to B+).

**CHECK:**

- (a) Turn ignition switch to ON.
- (b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of SR+ and SR-.

OK:

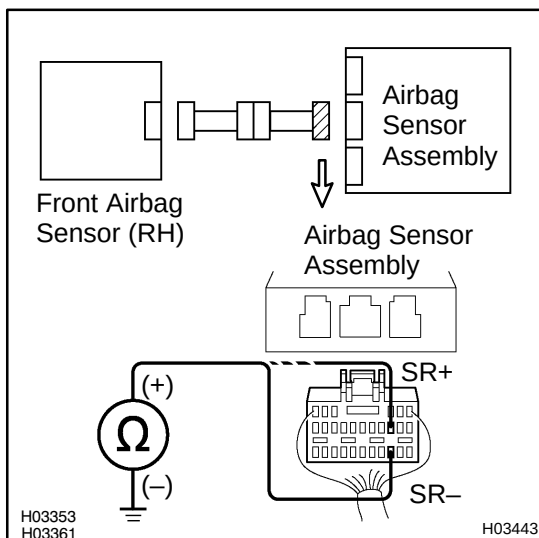
Voltage: Below 1 V

NG

Go to step 8.

OK

3 Check wire harness (to ground).

**CHECK:**

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SR+ and SR-.

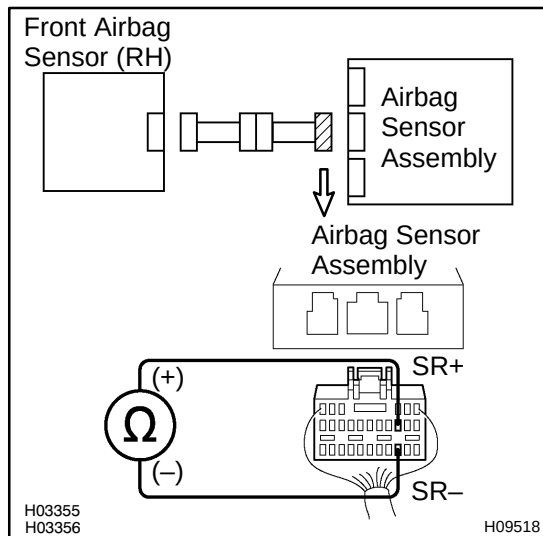
OK:

Resistance: 1 MΩ or Higher

NG

Go to step 9.

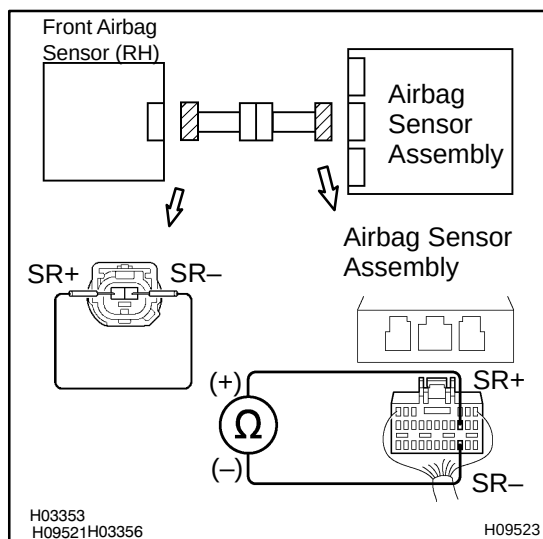
OK

4 Check wire harness.**CHECK:**

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR-.

OK:

Resistance: 1 MΩ or Higher

NG**Go to step 10.****OK****5 Check wire harness.****PREPARATION:**

Using a service wire, connect SR+ and SR- of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

CHECK:

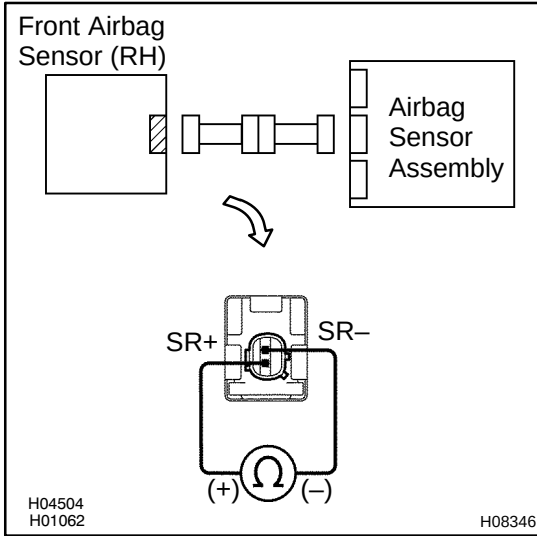
For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR-.

OK:

Resistance: Below 1 Ω

NG**Go to step 11.****OK**

6 Check front airbag sensor (RH).



CHECK:

For the connector (on the front airbag sensor (RH)), measure the resistance between SR+ and SR-.

OK:

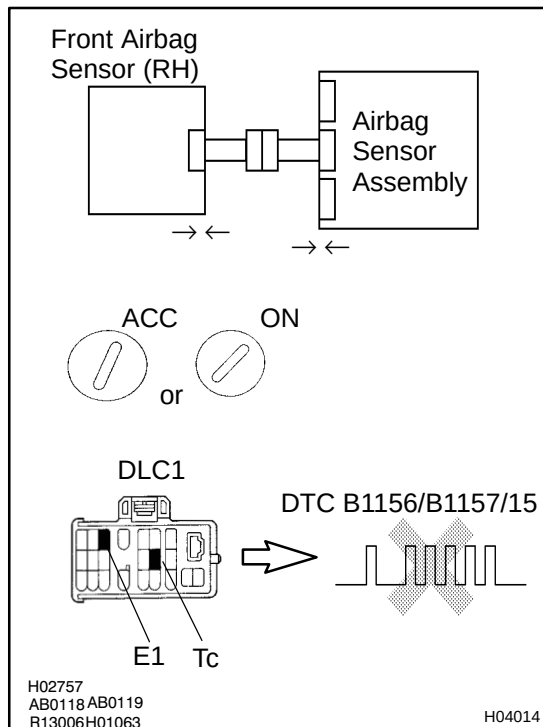
Resistance: 300 – 1500 Ω

NG

Replace front airbag sensor (RH).

OK

7 Check airbag sensor assembly.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory.
(See page [DI-421](#))
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC.
(See page [DI-421](#))

OK:

DTC B1156/B1157/15 is not output.

HINT:

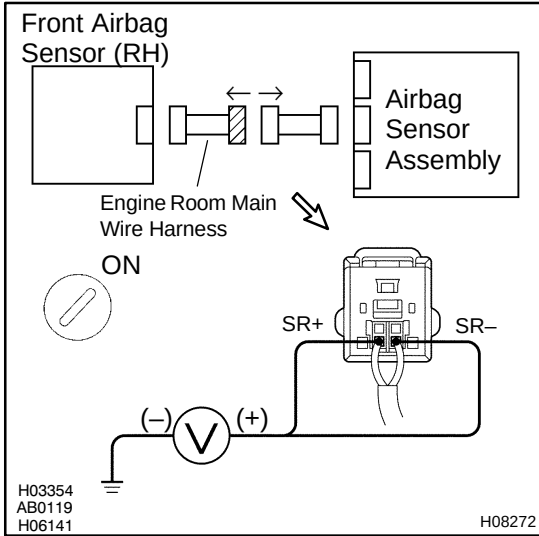
Codes other than code B1156/B1157/15 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8 Check engine room main wire harness (to B+).**PREPARATION:**

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

- Turn ignition switch to ON.
- For the connector (on the RH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SR+ and SR-.

OK:

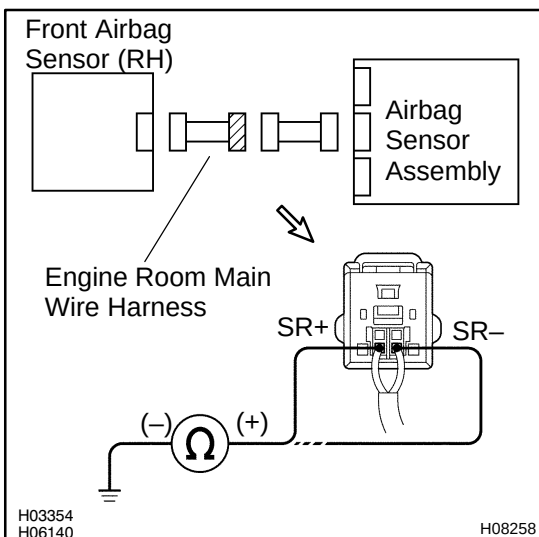
Voltage: Below 1 V

NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9 Check engine room main wire harness (to ground).**PREPARATION:**

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SR+ and SR-.

OK:

Resistance: 1 MΩ or Higher

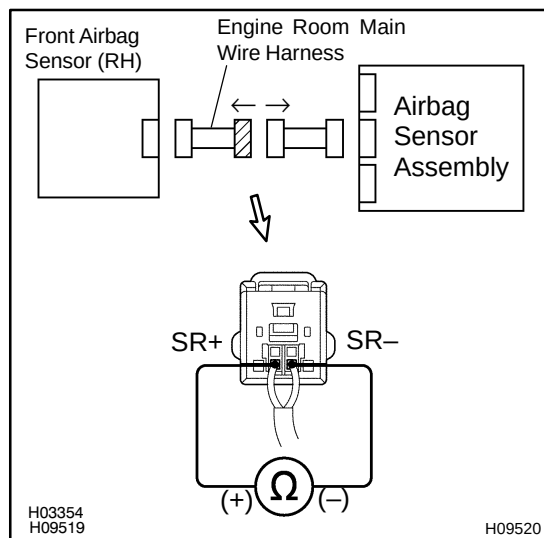
NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10 Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SR+ and SR-.

OK:

Resistance: 1 M Ω or Higher

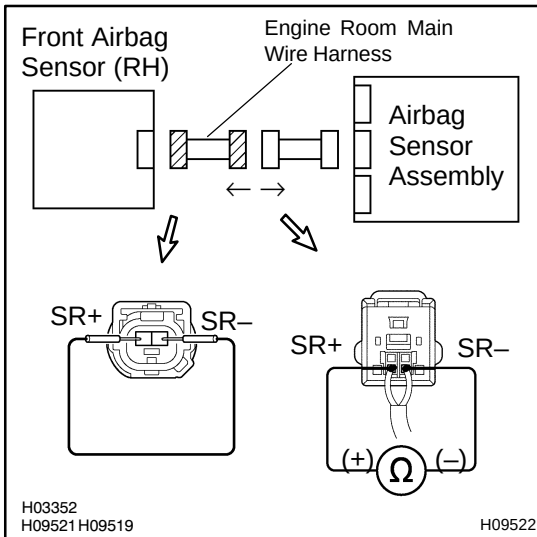
NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11 Check engine room main wire harness.



PREPARATION:

- Disconnect the engine room main wire harness connector on the airbag sensor assembly side.
- Using a service wire, connect SR+ and SR- of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (RH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SR+ and SR-.

OK:

Resistance: Below 1 Ω

NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

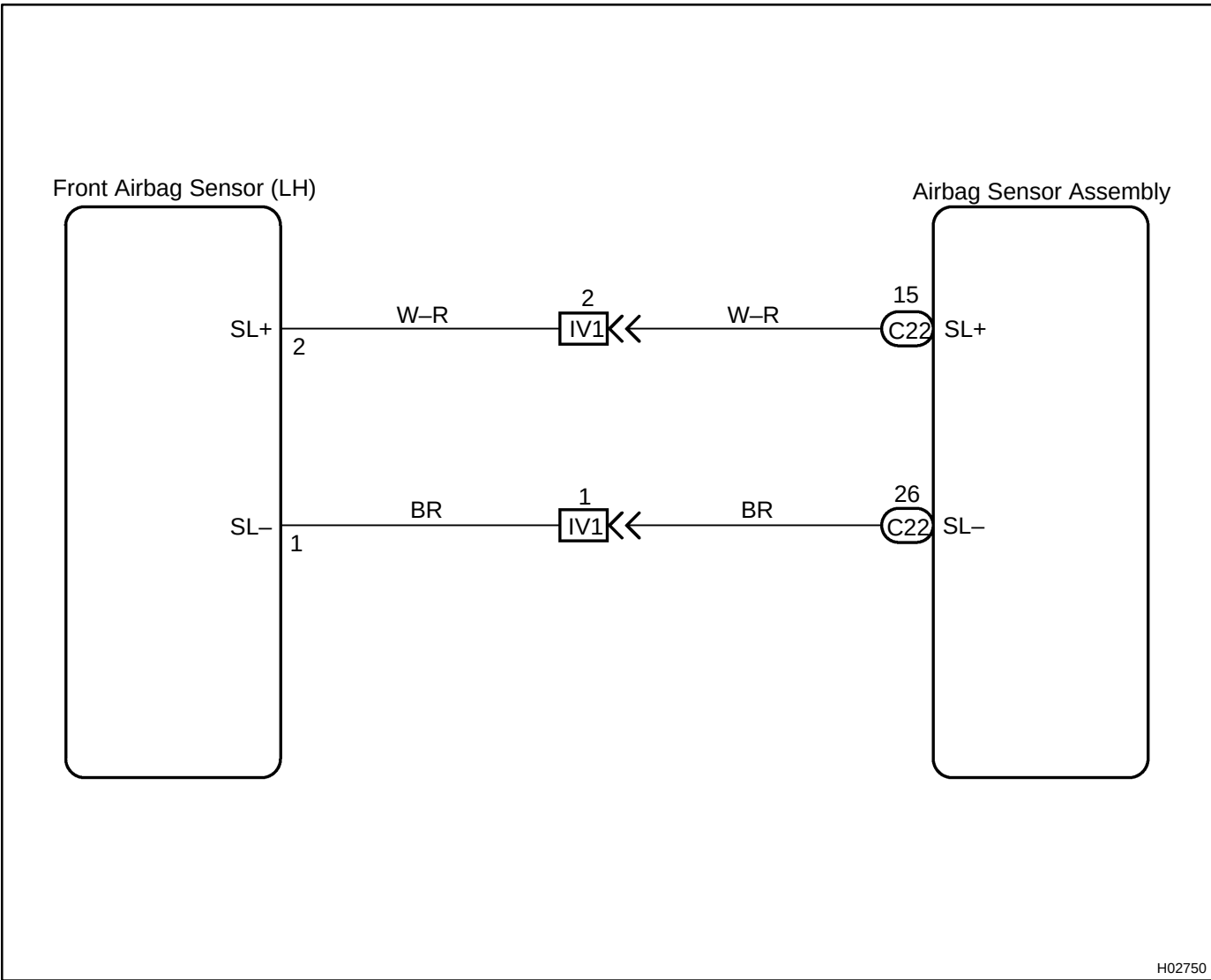
DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (LH) circuit consists of the airbag sensor assembly and front airbag sensor (LH). For details of the function of each component, see OPERATION on page RS-2.
DTC B1158/B1159/16 is recorded when malfunction is detected in the front airbag sensor (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/B1159/16	●Front airbag sensor (LH) malfunction	●Front airbag sensor (LH) ●Wire harness ●Airbag sensor assembly

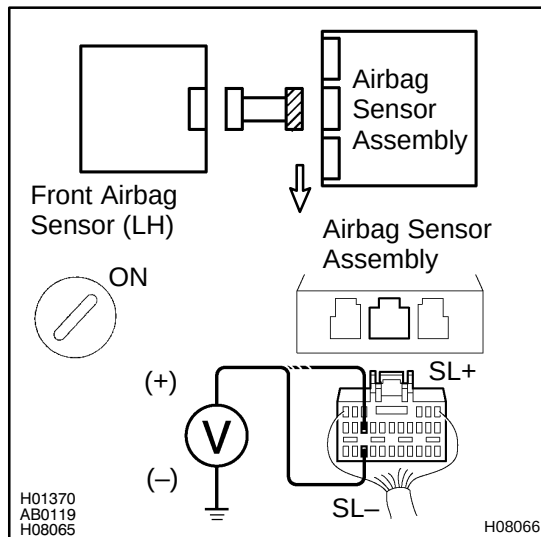
WIRING DIAGRAM



INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page DI-547).

2 Check wire harness (to B+).

**CHECK:**

- (a) Turn ignition switch to ON.
- (b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SL+ and SL-.

OK:

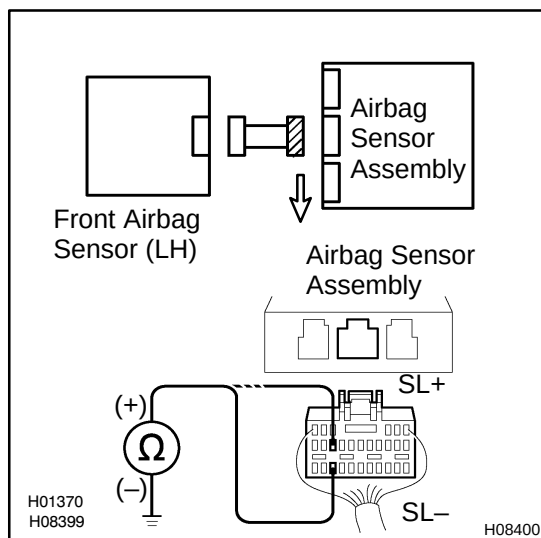
Voltage: Below 1 V

NG

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-.

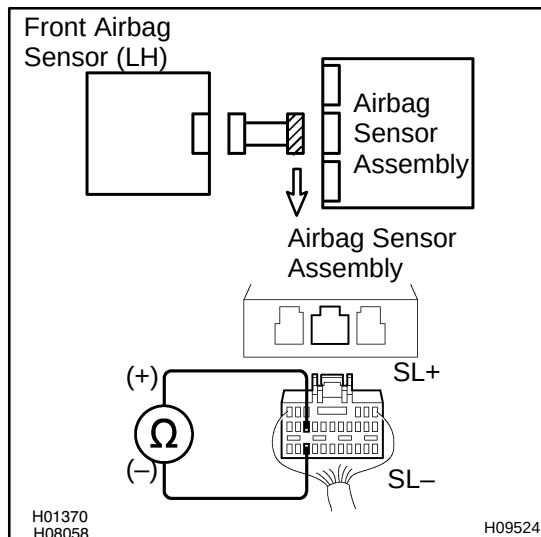
OK:

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-.

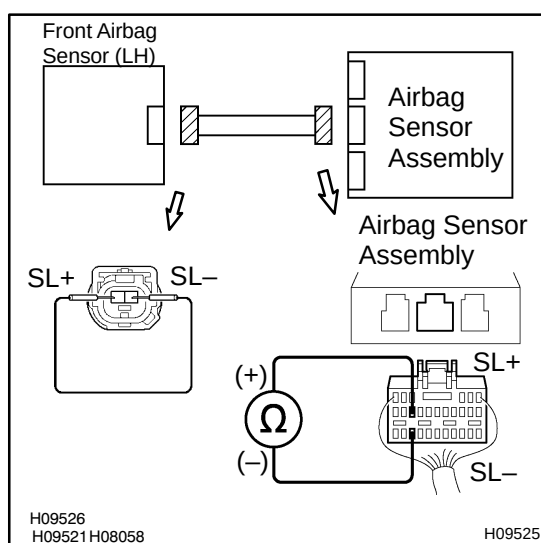
OK:

Resistance: 1 MΩ 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:

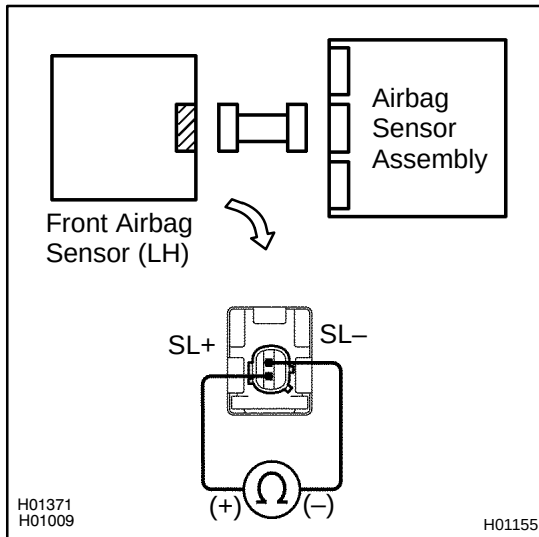
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between front airbag sensor (LH) and airbag sensor assembly.

OK

6 Check front airbag sensor (LH).



CHECK:

For the connector (on the front airbag sensor (LH)), measure the resistance between SL+ and SL-.

OK:

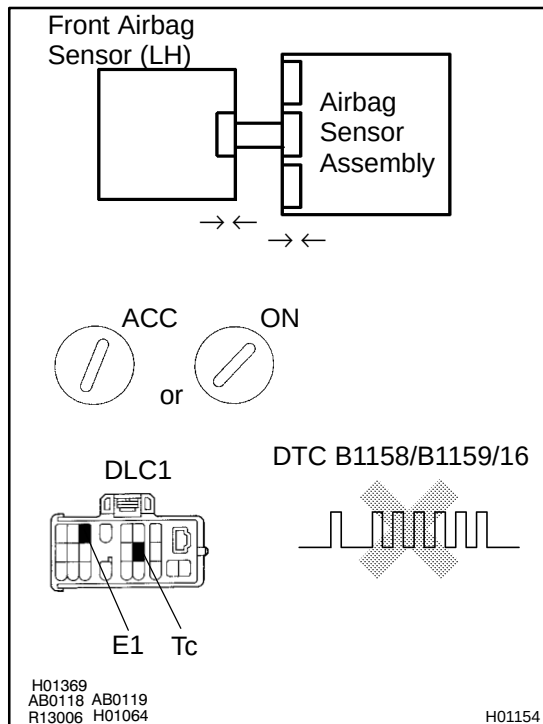
Resistance: 300 – 1500 Ω

NG

Replace front airbag sensor (LH).

OK

7 Check airbag sensor assembly.



PREPARATION:

- Turn 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 ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear DTC stored in memory (See page [DI-421](#)).
- Turn ignition switch to LOCK, and wait at least for 20 seconds.
- Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-421](#)).

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.

DTC	Normal	Source Voltage Drop

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag sensor assembly in case the source voltage drops.

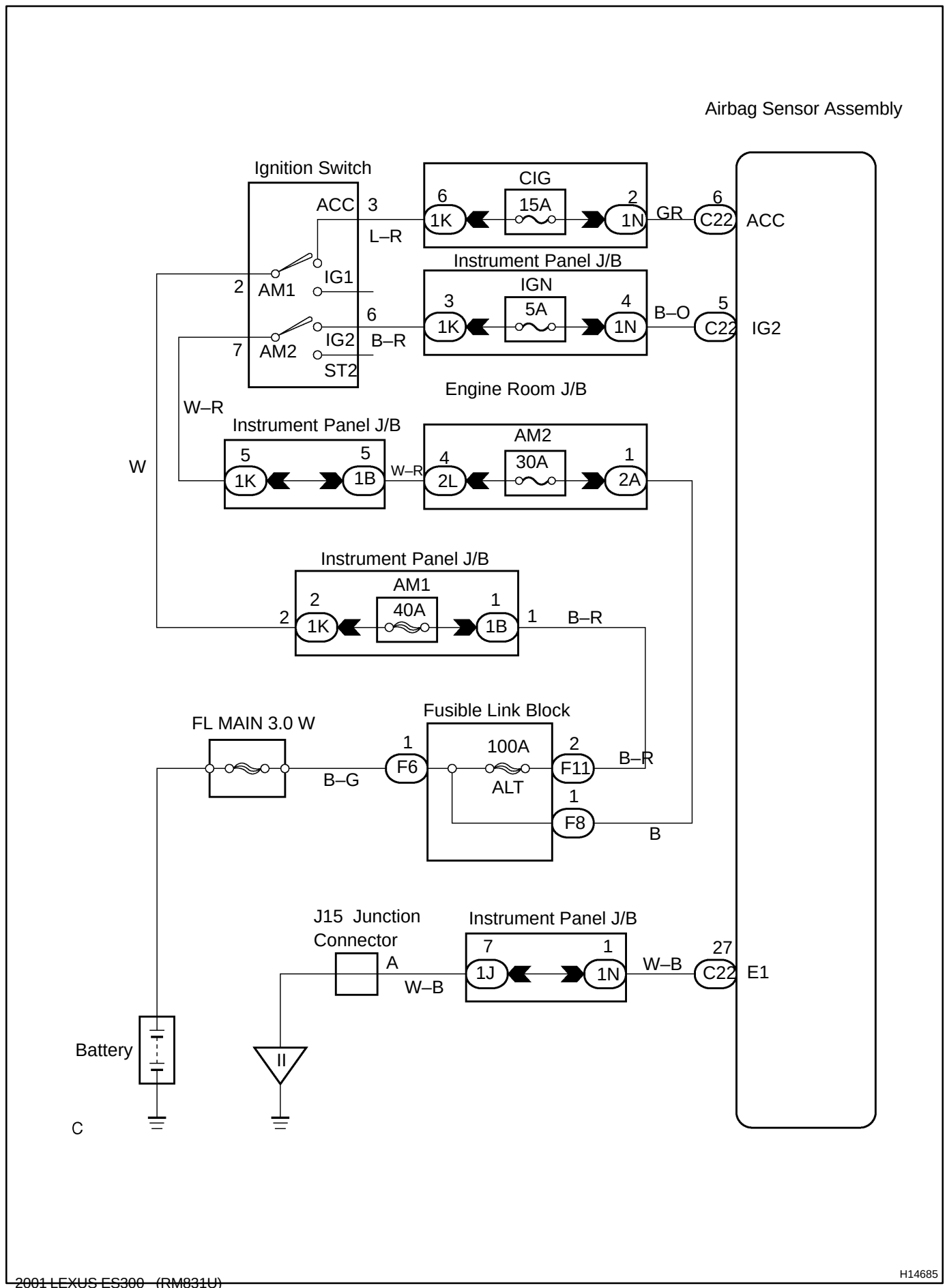
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

The diagnosis system malfunction display for this circuit is different from other circuits that is when the SRS warning light remains lit up and the DTC is a normal code, source voltage drop is indicated.

Malfunction in this circuit is not recorded in the airbag sensor assembly, and the source voltage returns to normal, the SRS warning light automatically goes off.

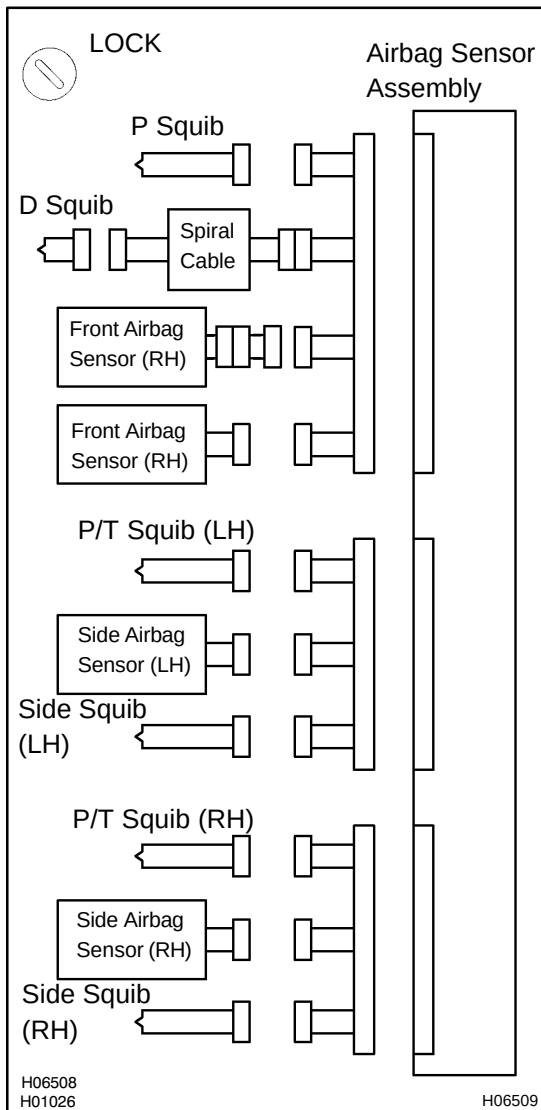
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

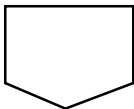
1 Prepare for inspection.

**PREPARATION:**

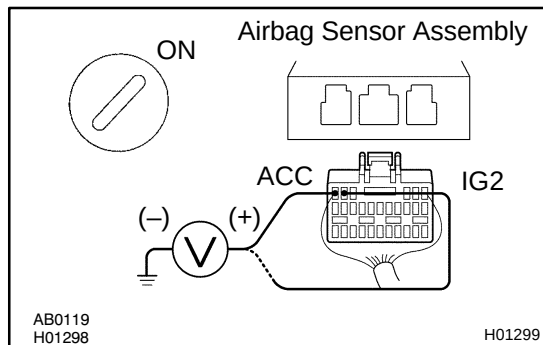
- Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- Remove the steering wheel pad. (See page [SR-11](#))
- Disconnect the connector of the front passenger airbag assembly. (See page [RS-28](#))
- Disconnect the connectors of the side airbag assembly RH and LH. (See page [RS-40](#))
- Disconnect the connector of the airbag sensor assembly. (See page [RS-52](#))
- Disconnect the connectors of the front airbag sensor RH and LH. (See page [RS-57](#))
- Disconnect the connectors of the seat belt pretensioner RH and LH. (See page [BO-119](#))
- Disconnect the connectors of the side airbag sensor assembly RH and LH. (See page [RS-62](#))

CAUTION:

Store the steering wheel pad with the front surface facing upward.



2 Check source voltage.

**PREPARATION:**

Connect negative (–) terminal cable to the battery.

CHECK:

- Turn ignition switch to ON.
- Measure the voltage between each of IG2 and ACC and body ground, then operate electric system. (defogger, wiper, headlight, heater blower, etc.)

OK:

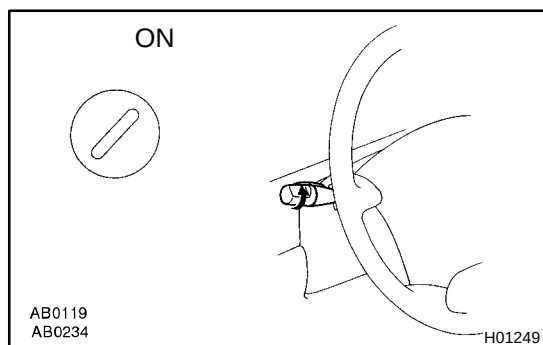
Voltage: 10 – 14 V

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 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 connector.
- Connect the front airbag sensor connectors.
- Connect the side airbag sensor assembly connectors.
- Turn ignition switch to ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO

Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

SRS Warning Light Circuit Malfunction (Always lights up, when ignition switch is in LOCK position.)

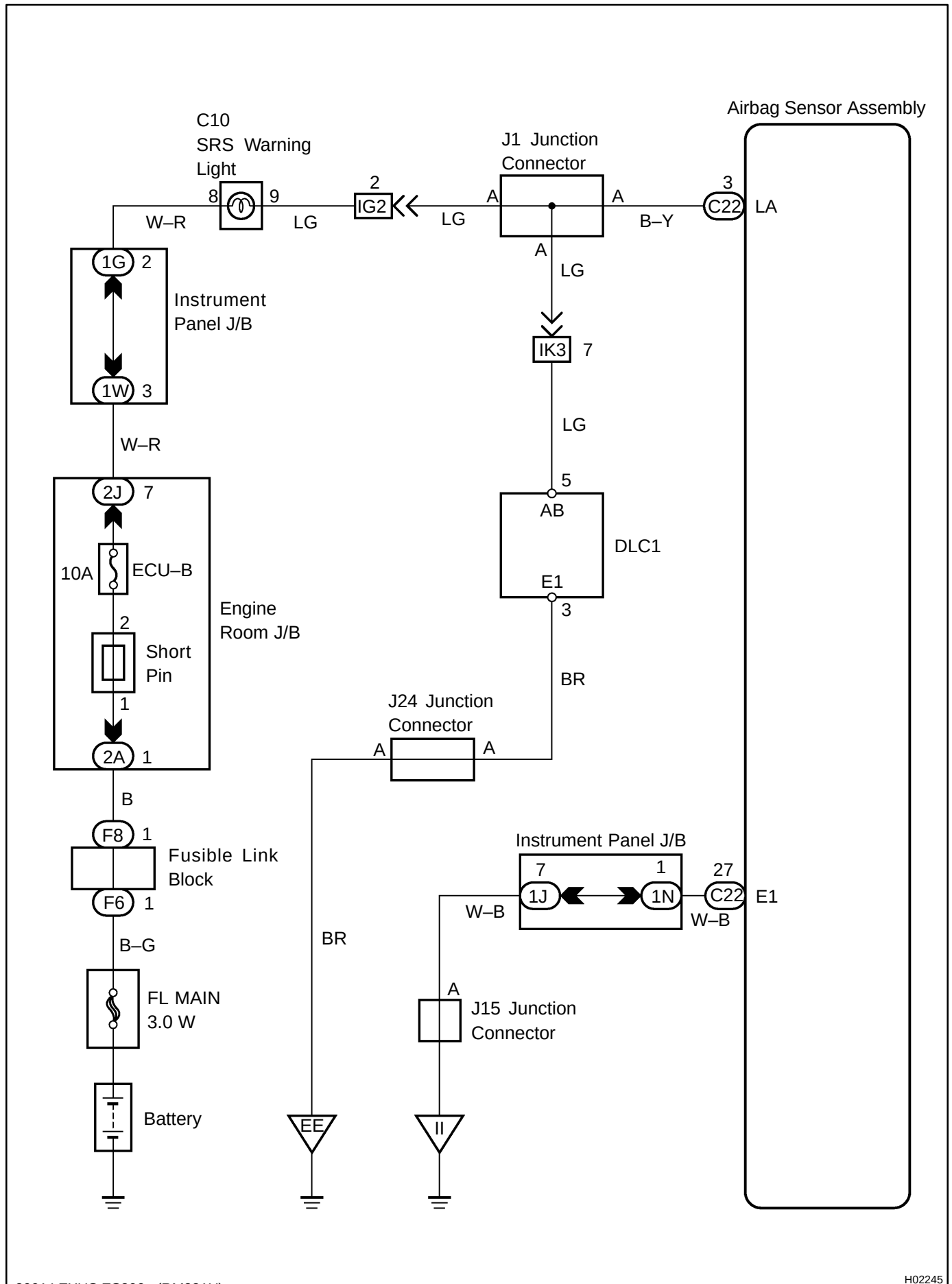
CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.

When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to ACC or ON position, and then turns off automatically.

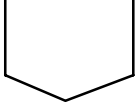
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality. When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

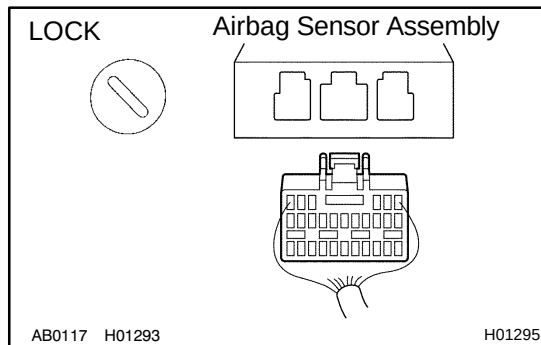


INSPECTION PROCEDURE

1 Prepare for inspection. (See step 1 on page [DI-547](#))



2 Does SRS warning light turn off?

**PREPARATION:**

- (a) Turn ignition switch to LOCK.
- (b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.
- (d) Connect negative (–) terminal cable to the battery.

CHECK:

Check operation of SRS warning light.

NO

Check SRS warning light circuit or terminal AB circuit of DLC1.

YES

Replace airbag sensor assembly.

SRS Warning Light Circuit Malfunction (Does not light up, when ignition switch is turned to ACC or ON.)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.

When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.

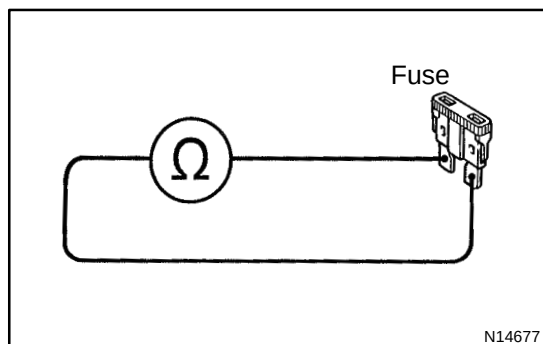
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality. When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

See page [DI-551](#).

INSPECTION PROCEDURE

1 Check ECU-B Fuse.



PREPARATION:

Remove ECU-B fuse.

CHECK:

Check continuity of ECU-B fuse.

OK:

Continuity

HINT:

- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

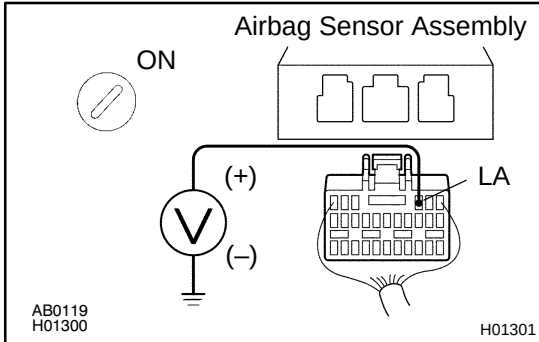
NG

Go to step 5.

OK

2 Prepare for inspection. (See step 1 on page [DI-547](#))

3 Check SRS warning light circuit.



PREPARATION:

- (a) Connect negative (–) terminal cable to the battery.
- (b) Turn ignition switch to ACC or ON.

CHECK:

Measure the voltage LA terminal of the harness side connector of the airbag sensor assembly.

OK:

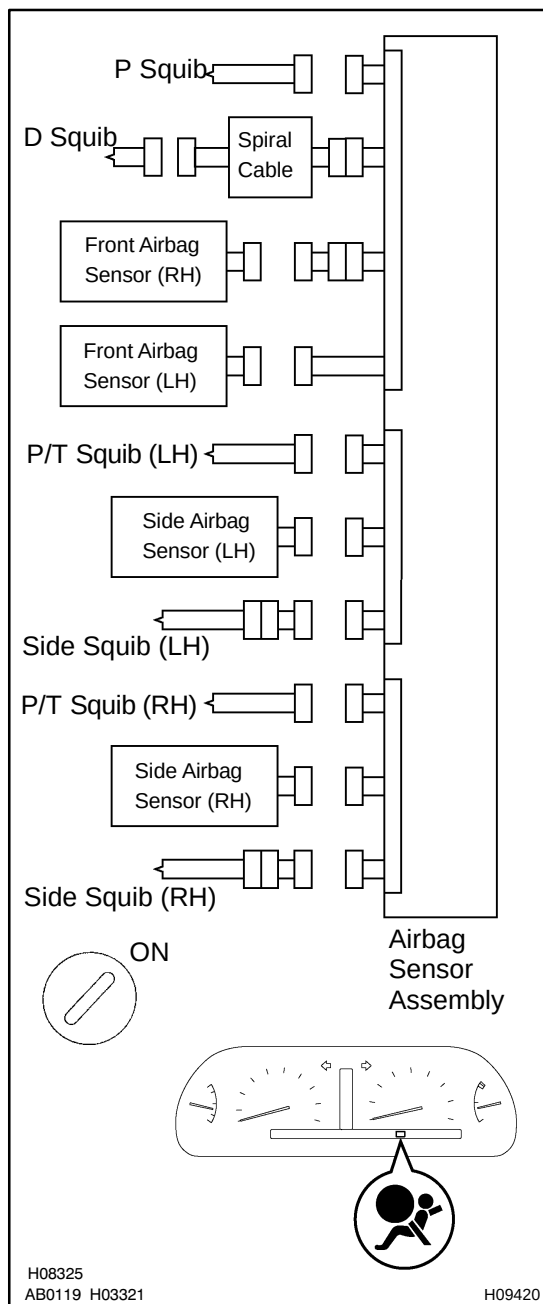
Voltage: 10 – 14 V

NG

Check SRS warning light bulb or repair SRS warning light circuit.

OK

4 Does SRS warning light come on?



PREPARATION:

- 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 ignition switch to ACC or ON.

CHECK:

Check operation of SRS warning light.

NO

Check terminal LA of airbag sensor assembly.
If normal, replace airbag sensor assembly.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal.
To make sure of this, use simulation method to check.

5	Is new ECU-B fuse burnt out again?

NO

Using simulation method, reproduce malfunction symptoms. (See page [IN-21](#))

YES

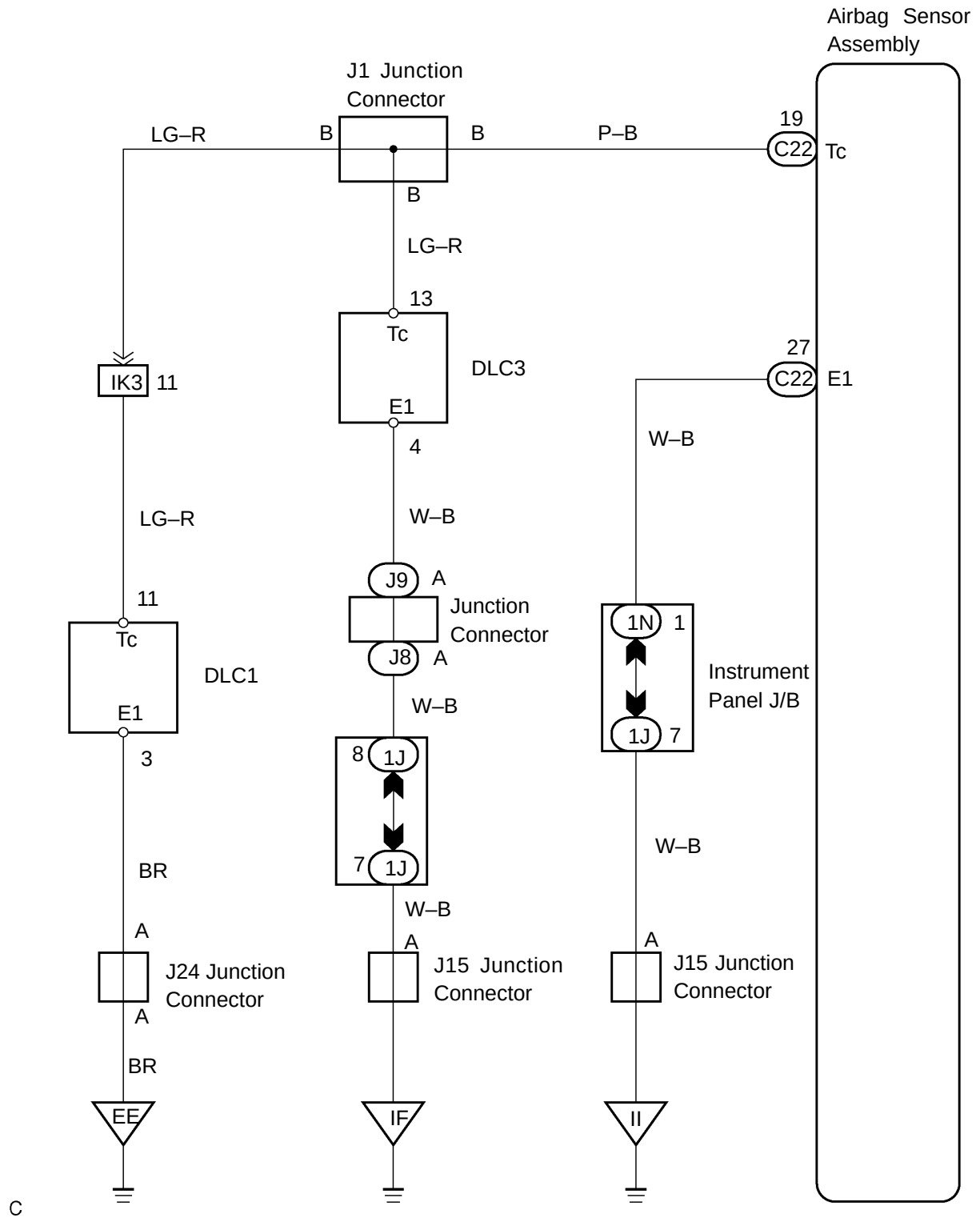
Check harness between ECU-B fuse and SRS warning light.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E1 of the DLC1 the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

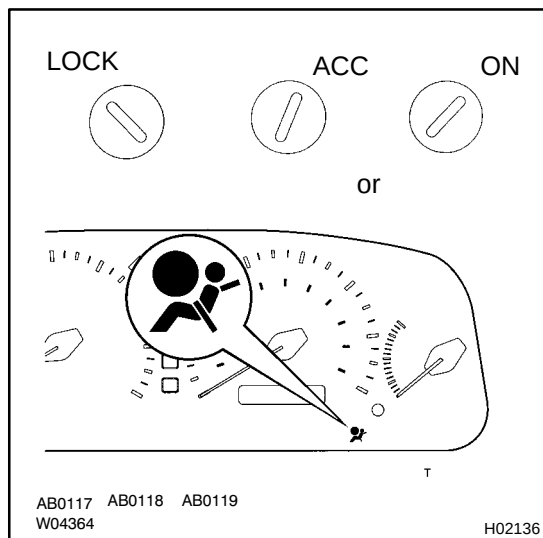
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

- 1 Does SRS warning light light up for approx. 6 seconds?**

**PREPARATION:**

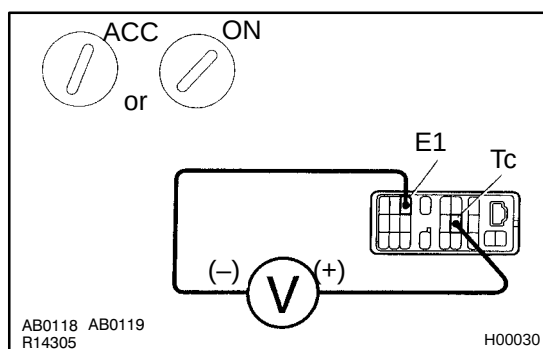
Check operation of the SRS warning light after ignition switch has been turned from LOCK position to ACC or ON position.

NO

Check SRS warning light system.
(See page [DI-421](#))

YES

- 2 Check voltage between terminals Tc and E1 of DLC1.**

**PREPARATION:**

Turn ignition switch to ACC or ON.

CHECK:

Measure the voltage between terminals Tc and E1 of DLC1.

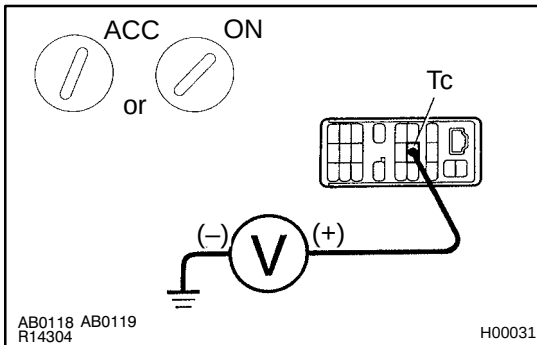
OK:

Voltage: 10 – 14 V

OK

Go to step 4.

NG

3 Check voltage between terminal Tc of DLC1 and body ground.**CHECK:**

Measure the voltage between terminal Tc of DLC1 and body ground.

OK:

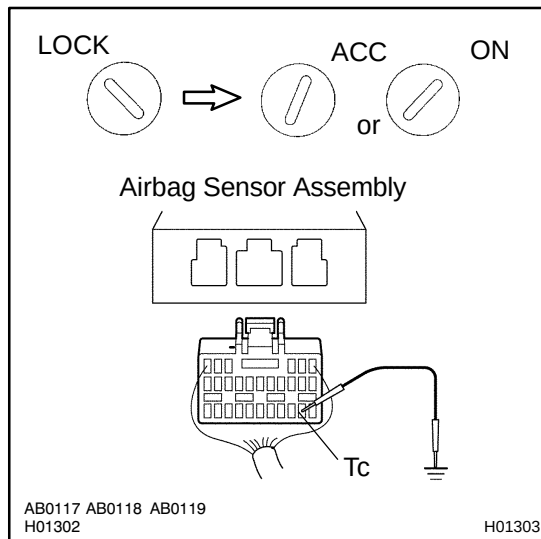
Voltage: 10 – 14 V

OK

Check harness between terminal E1 of DLC1 and body ground.

NG

4 Check airbag sensor assembly.



PREPARATION:

- Turn 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 a service wire into terminal Tc from back side as shown in the illustration.
- Connect the airbag sensor assembly connector with a service wire.
- Connect negative (–) terminal cable to the battery.
- Turn ignition switch to ACC or ON and wait at least for 20 seconds.
- Connect a service wire of terminal Tc to body ground.

CHECK:

Check operation of SRS warning light.

OK:

SRS warning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

OK

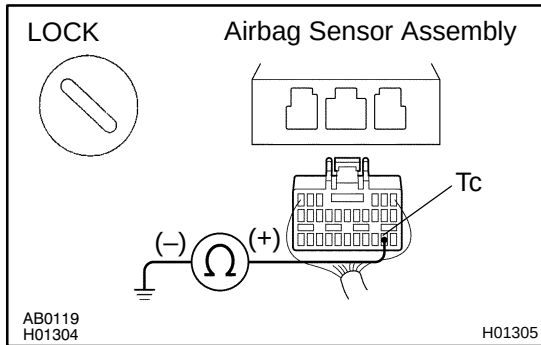
Check harness between the airbag sensor assembly and DLC1.

NG

Replace airbag sensor assembly.

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

1	Check resistance between terminal Tc of airbag sensor assembly and body ground.



PREPARATION:

- (a) Turn ignition switch to LOCK.
- (b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.

CHECK:

Check resistance between terminal Tc of the airbag sensor assembly connector and body ground.

OK:

Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector.

OK

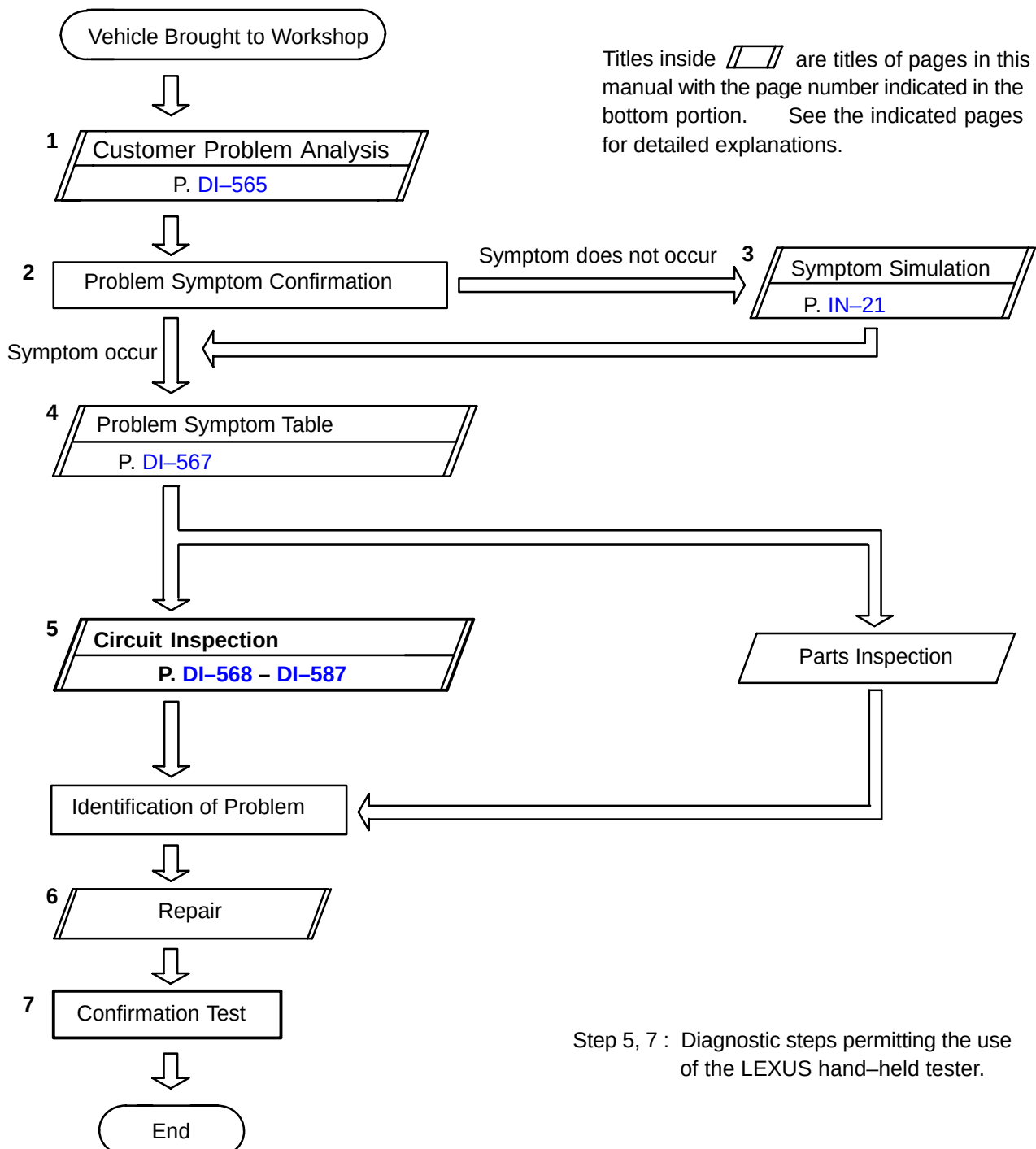
Replace airbag sensor assembly.

POWER SEAT CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DIOFP-09

Perform troubleshooting in accordance with the procedure on the following page.



CUSTOMER PROBLEM ANALYSIS CHECK

POWER SEAT CONTROL SYSTEM Check Sheet

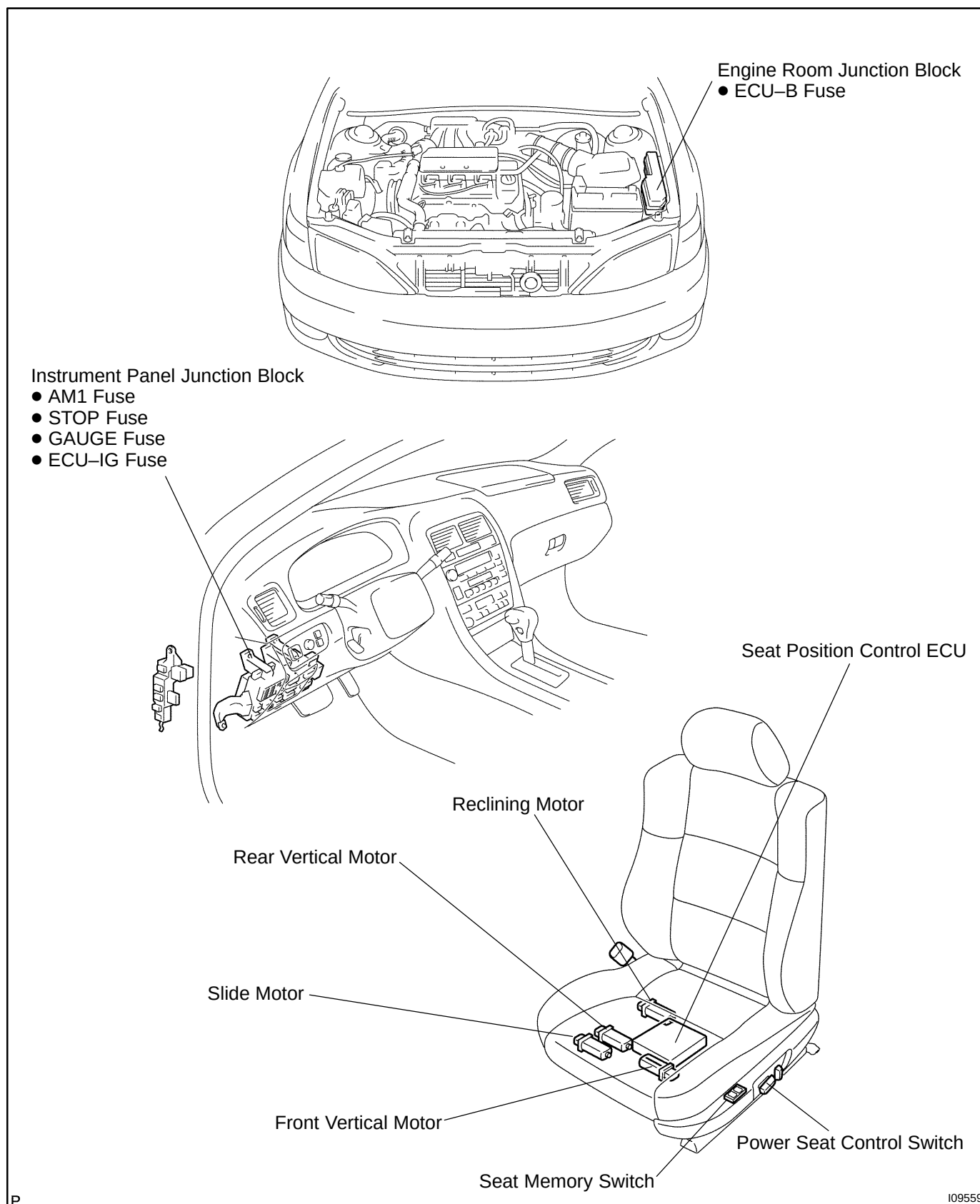
Inspector's name: _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

Date Problem First Occurred	/ /
How Often Problem Occurs	☐ Continuous ☐ Intermittent (Times a day)

Problem Symptom	☐ Manual Function does not operate.	☐ Slide ☐ Front Vertical ☐ Rear Vertical ☐ Reclining
	☐ Return Function does not operate.	☐ Slide ☐ Front Vertical ☐ Rear Vertical ☐ Does not operate in any conditions ☐ Only with key inserted ☐ Only with key not inserted ☐ Only with memory & return switch 1 or 2
	☐ Memory function does not operate.	
	☐ Position return function does not stop when brake pedal is depressed.	

PARTS LOCATION



PROBLEM SYMPTOMS TABLE

Perform troubleshooting of the circuits for the applicable problem symptom in the order given in the chart below. Proceed to the page located for each circuit.

HINT:

- If the instruction "Proceed to next circuit inspection shown on problem symptom table" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check and replace the Seat Position Control ECU as the last step.

Symptom	Suspect Area	See page
Both manual & return functions do not operate(All functions).	3. +B power source circuit 4. Power seat control switch circuit 5. Motor circuit 6. Power seat control ECU	DI-568 DI-587 DI-572 IN-31
Both manual & return functions do not operate(One function only).	1. Motor circuit 2. Power seat control ECU	DI-572 IN-31
One or all functions do not operate for manual operation only.	1. Power seat control switch circuit 2. Power seat control ECU	DI-587 IN-31
Memory function does not operate.	1. Power seat memory switch circuit 2. Ignition switch circuit 3. Park/neutral position switch circuit 4. Power seat control ECU	DI-587 DI-583 DI-581 IN-31
Return operation does not stop when brake pedal is depressed.	1. Stop light switch circuit 2. Power seat control ECU	DI-579 IN-31
Only return function does not operate or operates a little, then stops (All return functions).	1. Power seat memory switch circuit 2. ECU power source circuit 3. Position sensor power source circuit 4. Power seat control ECU	DI-587 DI-570 DI-575 IN-31
Only return function does not operate or operates a little, then stops (Only one return function).	1. Position sensor circuit 2. Power seat control ECU	DI-577 IN-31

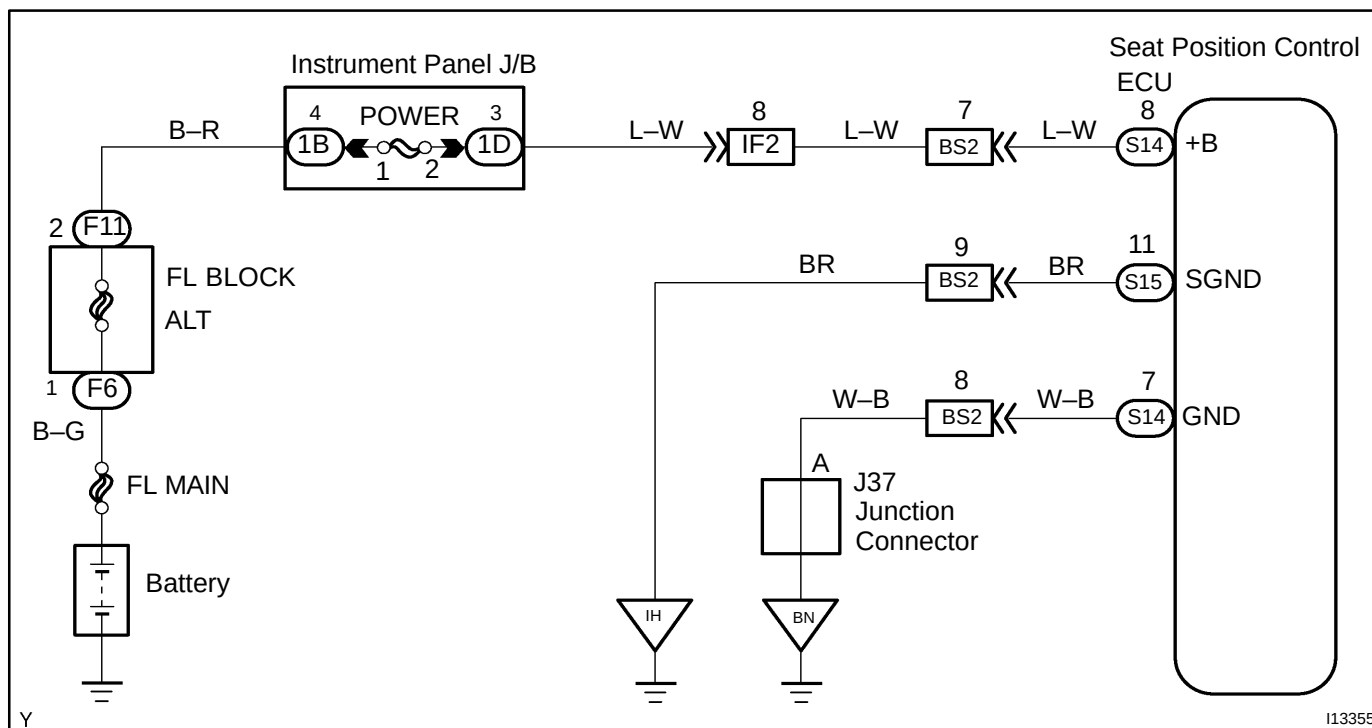
CIRCUIT INSPECTION

+B Power Source Circuit

CIRCUIT DESCRIPTION

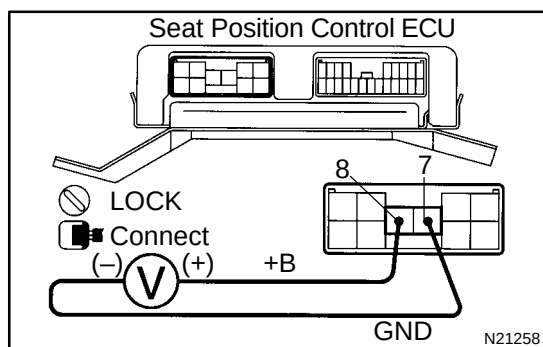
This is the power source for motors such as the slide motor, reclining motor, front vertical motor and rear vertical motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals +B and GND of Seat Position Control ECU connector.



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminals +B and GND of Seat Position Control ECU connector.

OK:

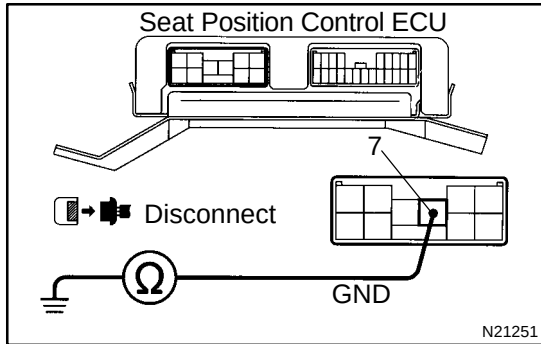
Voltage: 10 – 14 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-567](#)).

NG

- 2** Check continuity between terminals GND of Seat Position Control ECU connector and body ground.

**CHECK:**

Measure resistance between terminals GND of Seat Position Control ECU connector and body ground.

OK:

Resistance: Continuity (below 1 Ω)

NG

Repair or replace harness or connector.

OK

- 3** Check AM1 fuse and POWER fuse.

NG

Check for short in all the harness and components connected to the AM1 and POWER fuse, and repair them (See attached wiring diagram).

OK

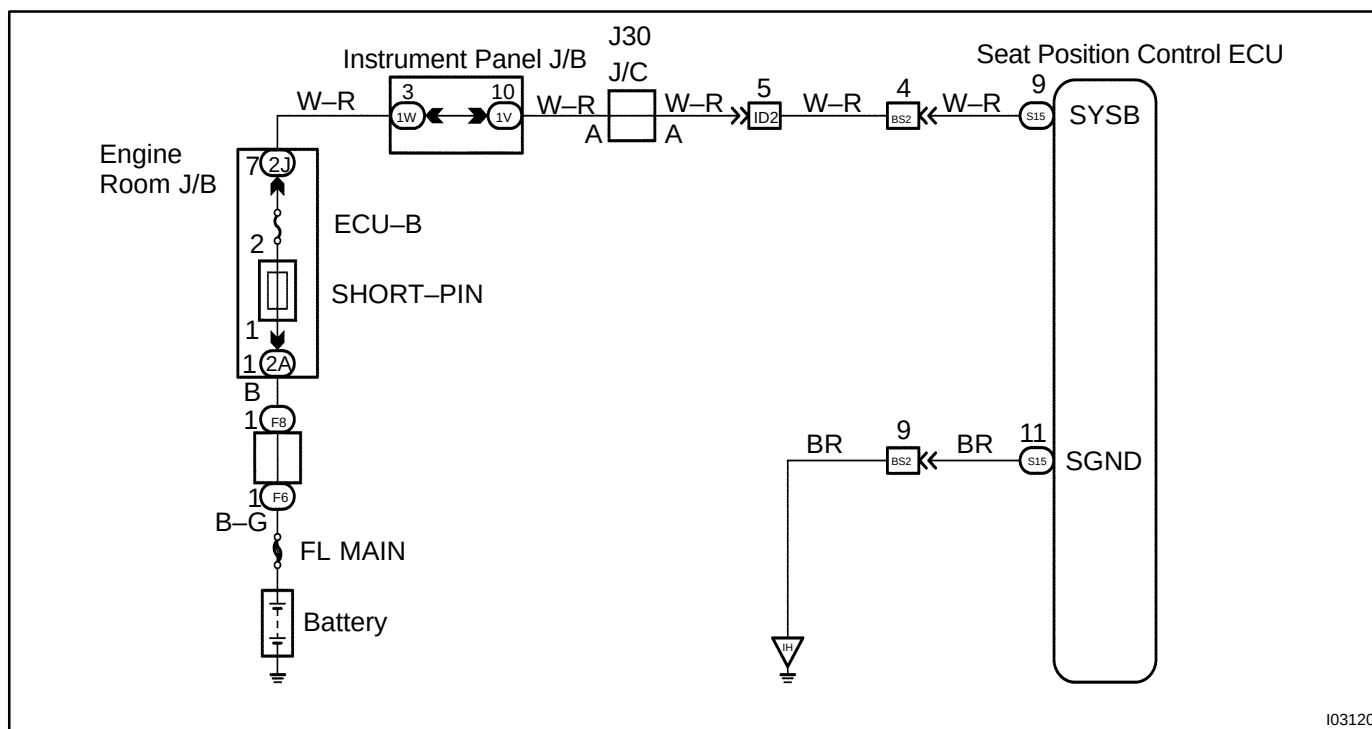
Check and repair harness or connector between Seat Position Control ECU and battery.

ECU Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power for ECU operation and is also the power source for the sensor.

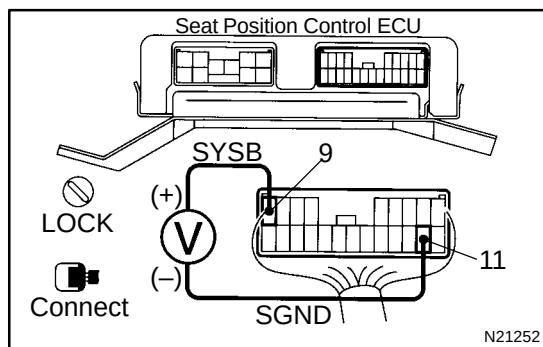
WIRING DIAGRAM



I03120

INSPECTION PROCEDURE

- 1 Check voltage between terminals SYSB and SGND of Seat Position Control ECU connector.



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminals SYSB and SGND of Seat Position Control ECU connector.

OK:

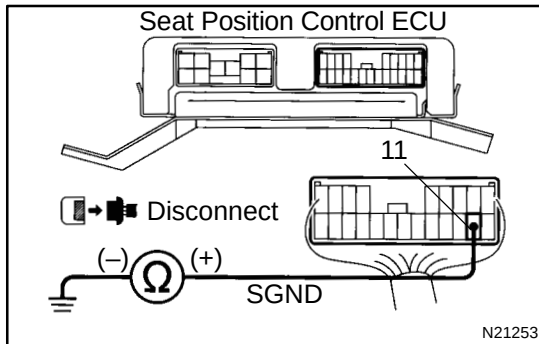
Voltage: 10 – 14 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-567](#)).

NG

2 Check continuity between terminals SGND of Seat Position Control ECU connector and body ground.



CHECK:

Measure resistance between terminal SGND of Seat Position Control ECU connector and body ground.

OK:

Resistance: Continuity (below 1 Ω)

NG

Repair or replace harness or connector.

OK

3 Check ECU-B fuse.

NG

Check for short in all the harness and components connected to ECU-B fuse and repair them (See attached wiring diagram).

OK

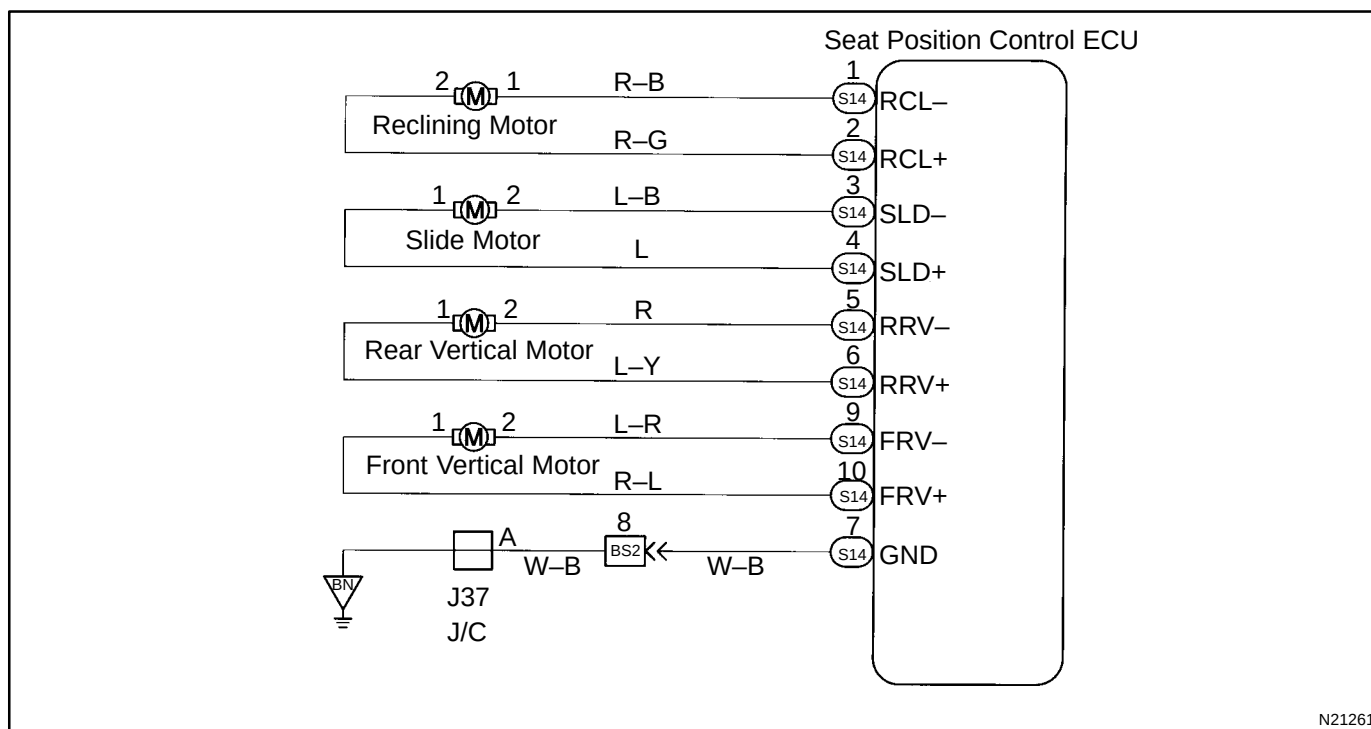
Check and repair harness or connector between Seat Position Control ECU and battery.

Motor Circuit

CIRCUIT DESCRIPTION

The Seat Position Control ECU controls the 4 motors for slide, front vertical, rear vertical and reclining.

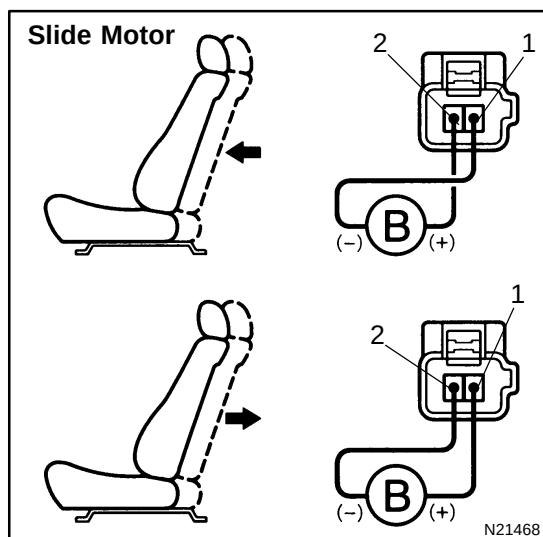
WIRING DIAGRAM



N21261

INSPECTION PROCEDURE

1 Check motor.



PREPARATION:

- Remove seat.
- Disconnect each motor connector.

CHECK:

Check seat movement when battery positive voltage is applied to each motor.

Slide Motor

CHECK:

Connect battery ~ to terminal 2 and battery $\ominus$ to terminal 1 of the slide motor connector.

OK:

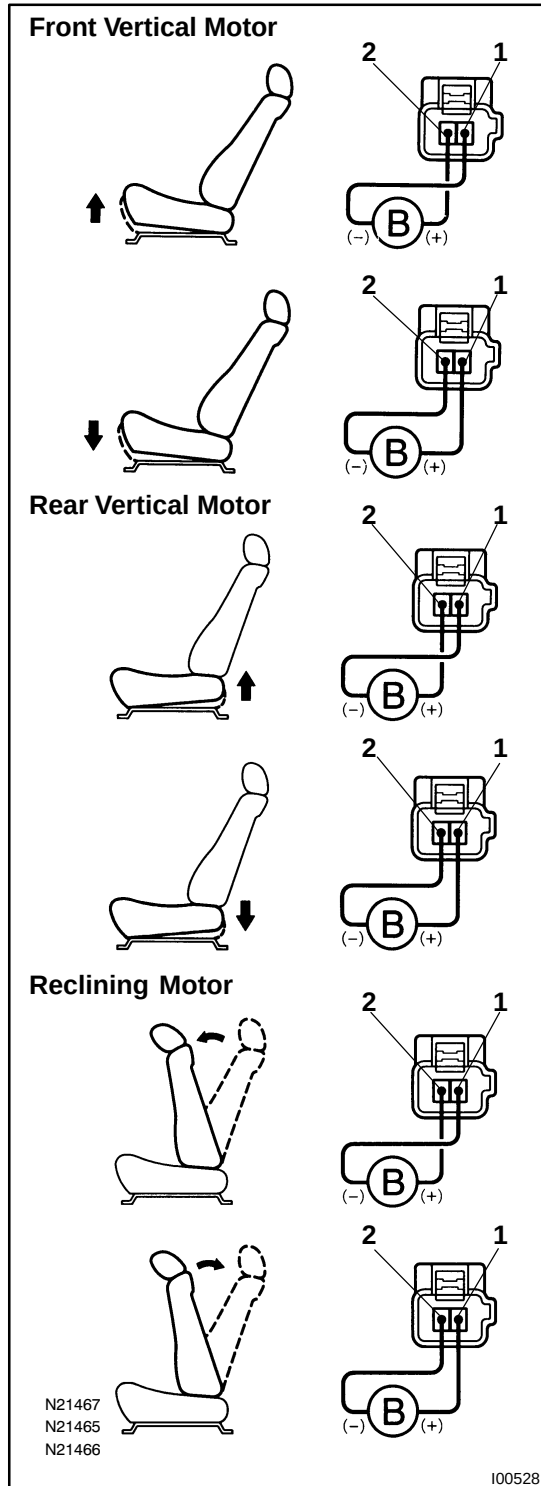
The seat moves forward.

CHECK:

Connect battery $\ominus$ to terminal 2 and battery ~ to terminal 1 of the slide motor connector.

OK:

The seat moves backward.

**Front Vertical Motor****CHECK:**

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the front vertical motor connector.

OK:

The front of the seat cushion rises.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the front vertical motor connector.

OK:

The front of the seat cushion lowers.

Rear Vertical Motor**CHECK:**

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the rear vertical motor connector.

OK:

The front of the seat cushion rises.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the rear vertical motor connector.

OK:

The front of the seat cushion lowers.

Reclining Motor**CHECK:**

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the reclining motor connector.

OK:

The seat back returns to up right.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the reclining motor connector.

OK:

The seat back is reclining.

NG

Replace motor.

OK

2	Check harness and connector between Seat Position Control ECU and motor (See page IN-31).

NG

Repair or replace harness or connector.

OK

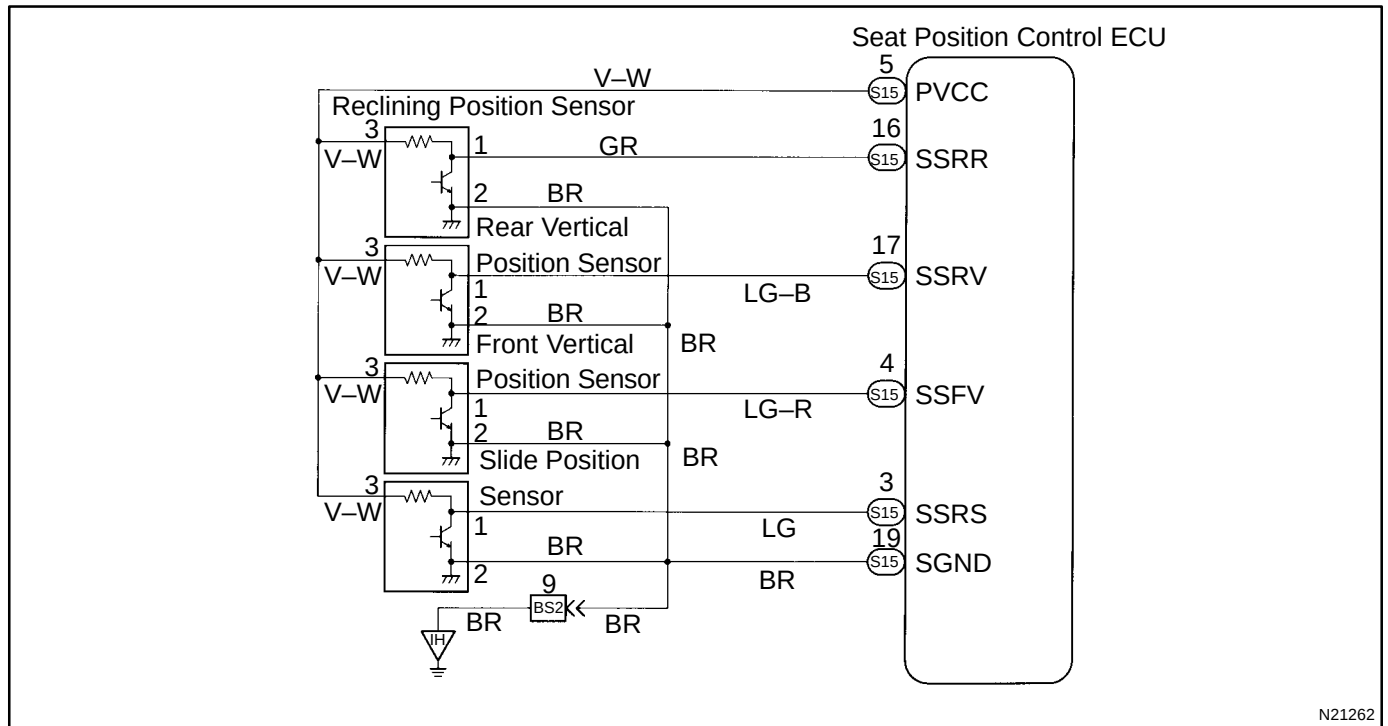
Proceed to next circuit inspection shown on problem symptom table (See page [DI-567](#)).

Position Sensor Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to the slide, front vertical and reclining position sensors.

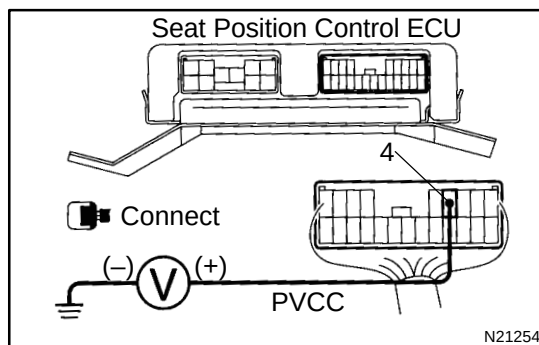
WIRING DIAGRAM



N21262

INSPECTION PROCEDURE

- 1 Check voltage between terminal PVCC of Seat Position Control ECU connector and body ground.



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

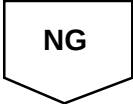
While operating the Power Seat Control Switch and moving the seat, check voltage between terminal PVCC of Seat Position Control ECU connector and body ground.

OK:

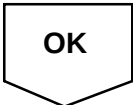
Voltage: 7.2 – 8.8 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-567](#)).

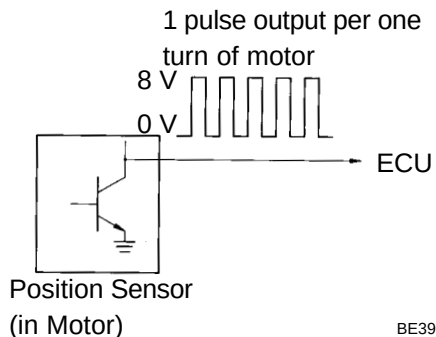
NG**2****Check harness and connector connected to terminal PVCC of Seat Position Control ECU (See page [IN-31](#)).****CHECK:**

Check for open or short in the harness and check connectors for the position sensor power source circuit outlined in the diagram with a thick line (–).

NG**Repair or replace harness or connector.**OK**Check and replace Seat Position Control ECU.**

Position Sensor Circuit

CIRCUIT DESCRIPTION



The position sensor senses movement of the seat and send pulse signals to the ECU. The position sensor sends pulse to the ECU in proportion to the amount of seat movement, as shown in the diagram on the left.

The ECU uses the number of pulses to constantly calculate the position relative to the memory position and returns the seat to the memorized position.

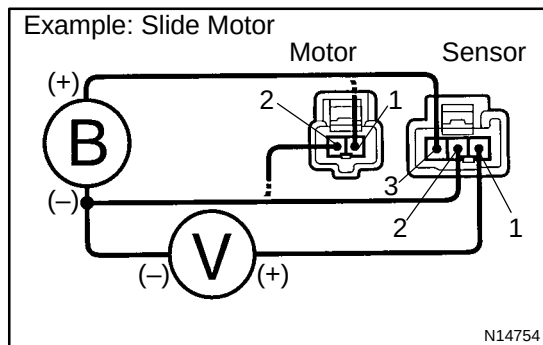
If a malfunction occurs in a position sensor and a sensor signal is not input to the ECU even when the motor operates, the ECU prohibits return operation.

WIRING DIAGRAM

See page [DI-575](#).

INSPECTION PROCEDURE

1 Check position sensor.



PREPARATION:

Disconnect the connector of the sensor and the connector of the motor leading to the sensor.

CHECK:

- Connect positive ~ lead to terminal 3 of sensor and negative $\ominus$ lead to terminal 2.
- Measure voltage between terminal 1 of sensor and body ground when battery positive voltage is applied between terminals 1 and 2 of motor connector.

HINT:

When the battery positive voltage is applied to the motor connector terminals, ~ and $\ominus$ are interchangeable.

OK:

Condition	Voltage
Motor stopped (Check several times with the motor in a different position each time.)	0 V or battery positive voltage according to stop position.
with motor turning	half of battery positive voltage

NG

Replace position sensor.

OK

2	Check harness and connectors between Seat Position Control ECU and position sensors (See page IN-31).

NG

Repair or replace harness or connectors.

OK

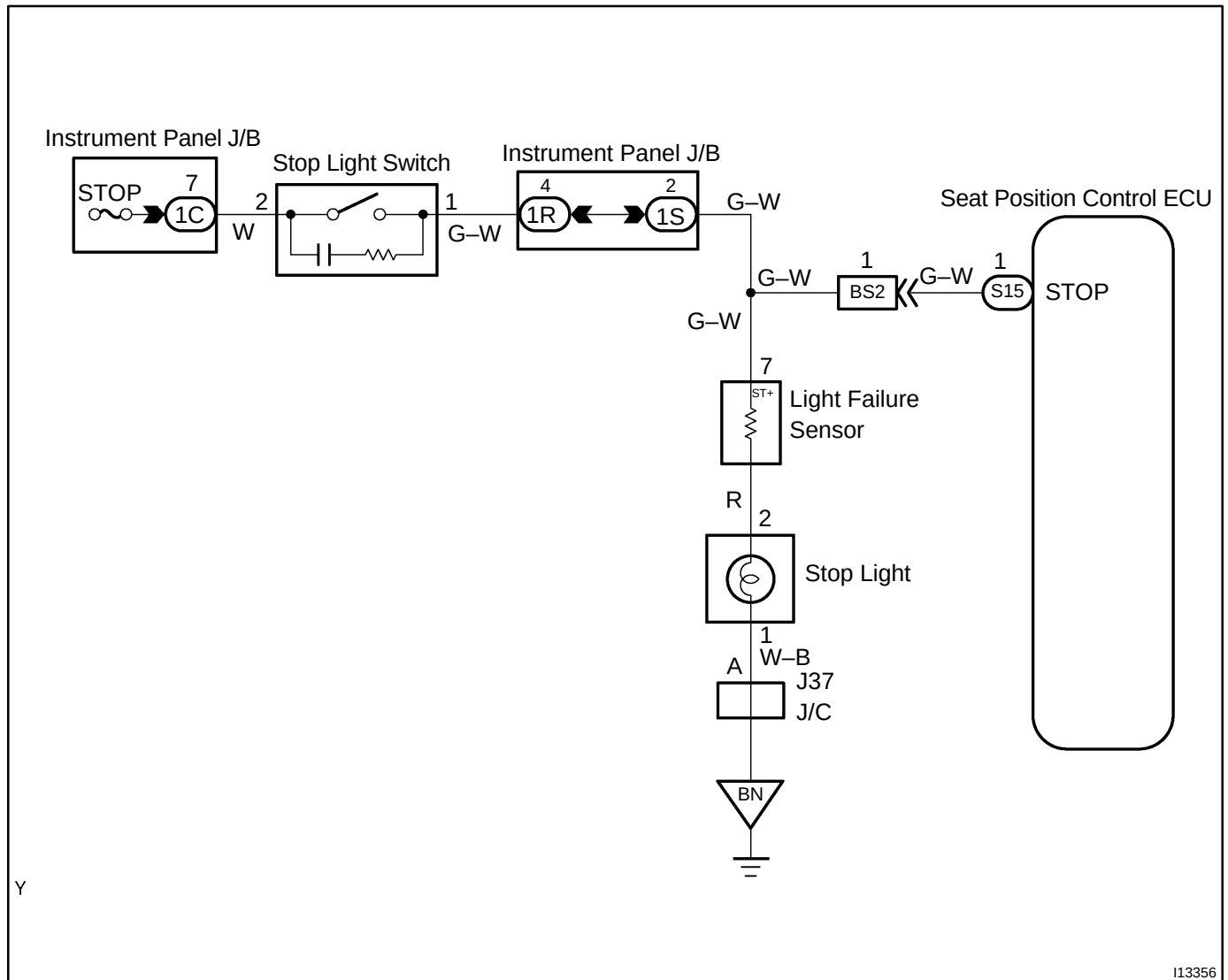
Check and replace Seat Position Control ECU.

Stop Light Switch Circuit

CIRCUIT DESCRIPTION

The stop light switch sends a brake ON or OFF signal to the ECU. When the ECU receives a brake ON signal, it prohibits return operation of the seat.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check stop light operation.

CHECK:

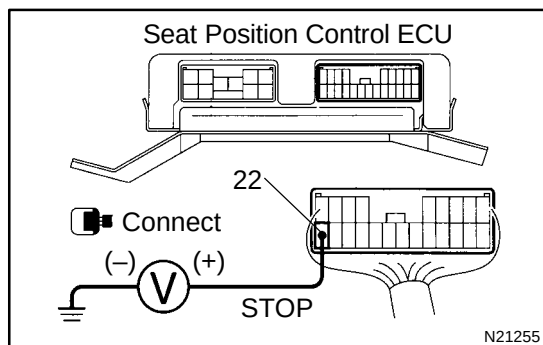
Check that the stop light comes on when the brake pedal is depressed, and turns off when the pedal is released.

NG

Check stop light circuit (See page [BE-3](#)).

OK

2 Check voltage between terminal STOP of Seat Position Control ECU connector and body ground.

**PREPARATION:**

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminal STOP of Seat Position Control ECU and body ground when the brake pedal is depressed and released.

OK:

Brake pedal	Voltage
Depressed	10 – 14 V
Released	0 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-567](#)).

NG

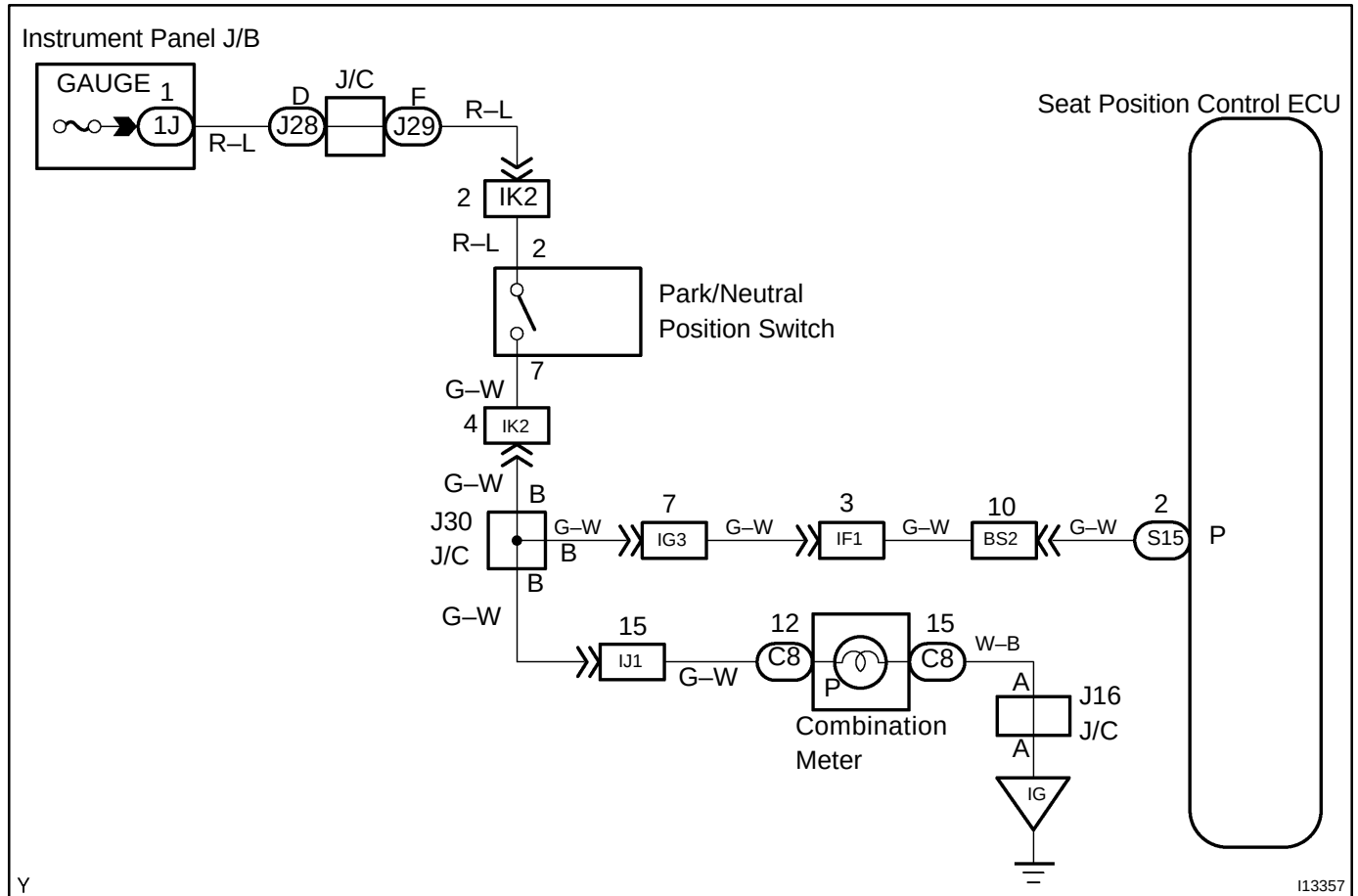
Check and repair harness and connector between Seat Position Control ECU and stop light switch.

Park/Neutral Position Switch Circuit

CIRCUIT DESCRIPTION

The park/neutral position switch detects the P position when the lever is shifted into P and sends a signal to the ECU. When the return switch is turned ON with the IG SW ON and the shift in P position, the ECU performs return operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check shift position indicator.

CHECK:

Check that P lights up on the shift indicator when P position is shifted into, and that P is OFF when shifting into another position.

NG

Check shift position indicator circuit (See page [BE-3](#)).

NG

2	Check voltage between terminal P of Seat Position Control ECU connector and body ground.

PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

- (a) Turn ignition switch ON.
- (b) Measure voltage between terminal P of Seat Position Control ECU connector and body ground when the shift lever is positioned in the following ranges.

OK:

Shift position	Voltage
P	10 ~ 14 V
Other than P	0 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-567](#)).

NG

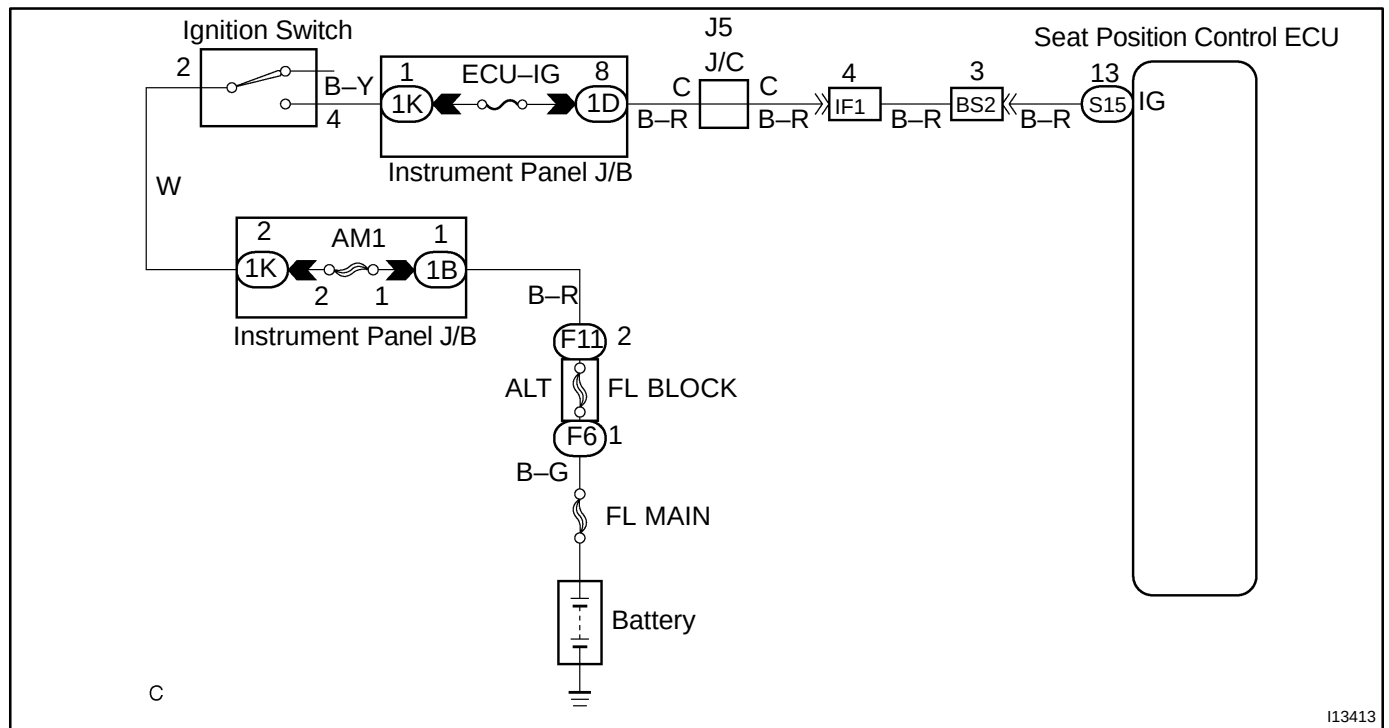
Check and repair harness and connector between Seat Position Control ECU and park/neutral position switch.

Ignition Switch Circuit

CIRCUIT DESCRIPTION

This circuit sends an ignition switch ON or OFF signal to the ECU.

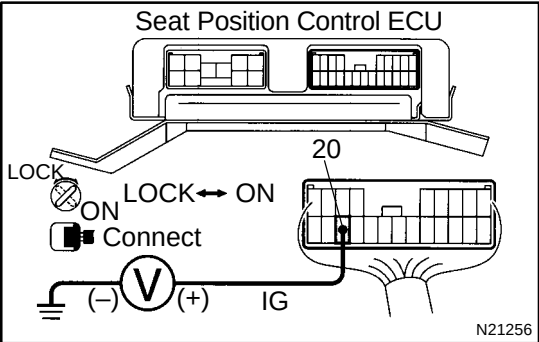
WIRING DIAGRAM



INSPECTION PROCEDURE

- 1

Check voltage between terminal IG of Seat Position Control ECU connector and body ground.



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminal IG of Seat Position Control ECU connector and body ground when ignition switch is ON and OFF.

OK:

Ignition switch	Voltage
ON	10 – 14 V
OFF	0 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-567](#)).

NG

- 2

Check ECU-IG fuse.

NG

Check for short in all the harness and components connected to ECU-IG fuse.

NG

Check and repair harness or connector between Seat Position Control ECU and battery.

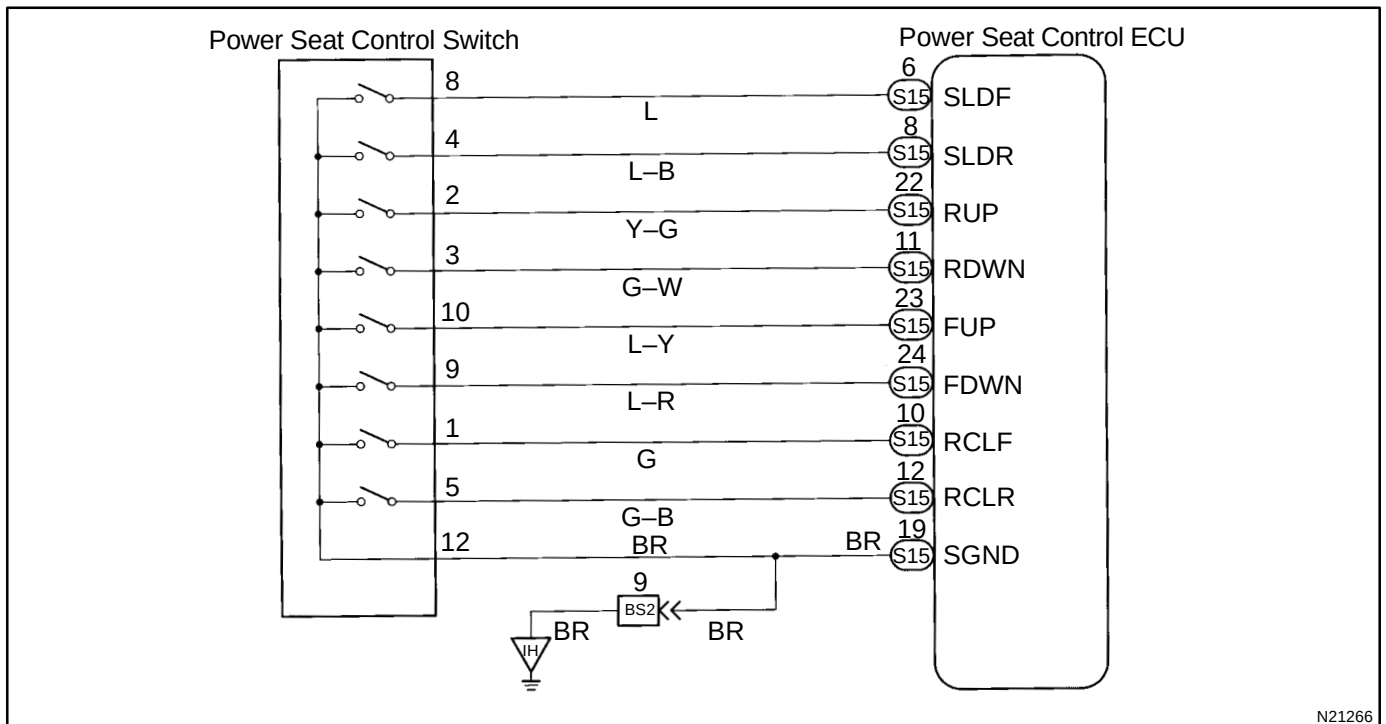
Power Seat Control Switch Circuit

CIRCUIT DESCRIPTION

When the power seat control switch is operated, a signal is sent from the power seat control switch to the ECU and the ECU sends a signal to the motor to make it operate.

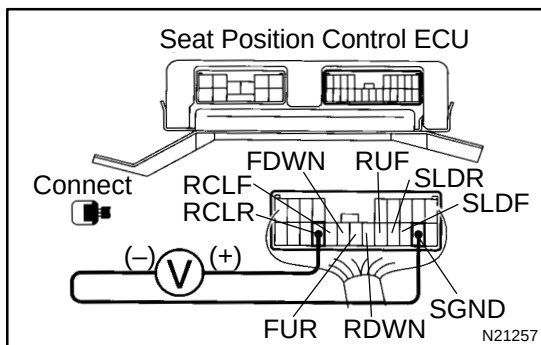
Even if a malfunction should occur with the position sensor and return operation is prohibited, manual operation will occur as normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between each terminal of the Power Seat Control Switch and SGND of Seat Position Control ECU connector.



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between each terminal of the Power Seat Control Switch and SGND of Seat Position Control ECU connector. (The illustration shows inspection of the reclining as an example.)

OK:

At each terminal with switch ON	0 V
At each terminal with switch OFF	10 – 14 V

OK

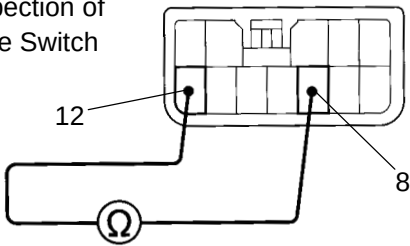
Proceed to next circuit inspection shown in problem symptom table (See page [DI-567](#)).

NG

2

Check power seat control switch.

(Example)
Inspection of
Slide Switch



PREPARATION:

Disconnect power seat control switch connector.

CHECK:

Check continuity of each terminal.

OK:

Switch position	Terminal
Neutral	–
Slide switch FRONT	8 – 12
Slide switch BACK	4 – 12
Front vertical switch UP	10 – 12
Front vertical switch DOWN	10 – 12
Rear vertical switch UP	2 – 12
Rear vertical switch DOWN	3 – 12
Reclining switch FORWARD	1 – 12
Reclining switch REARWARD	5 – 12

NG

Replace power seat control switch.

OK

3

Check harness and connectors between Seat Position Control ECU and power seat control switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

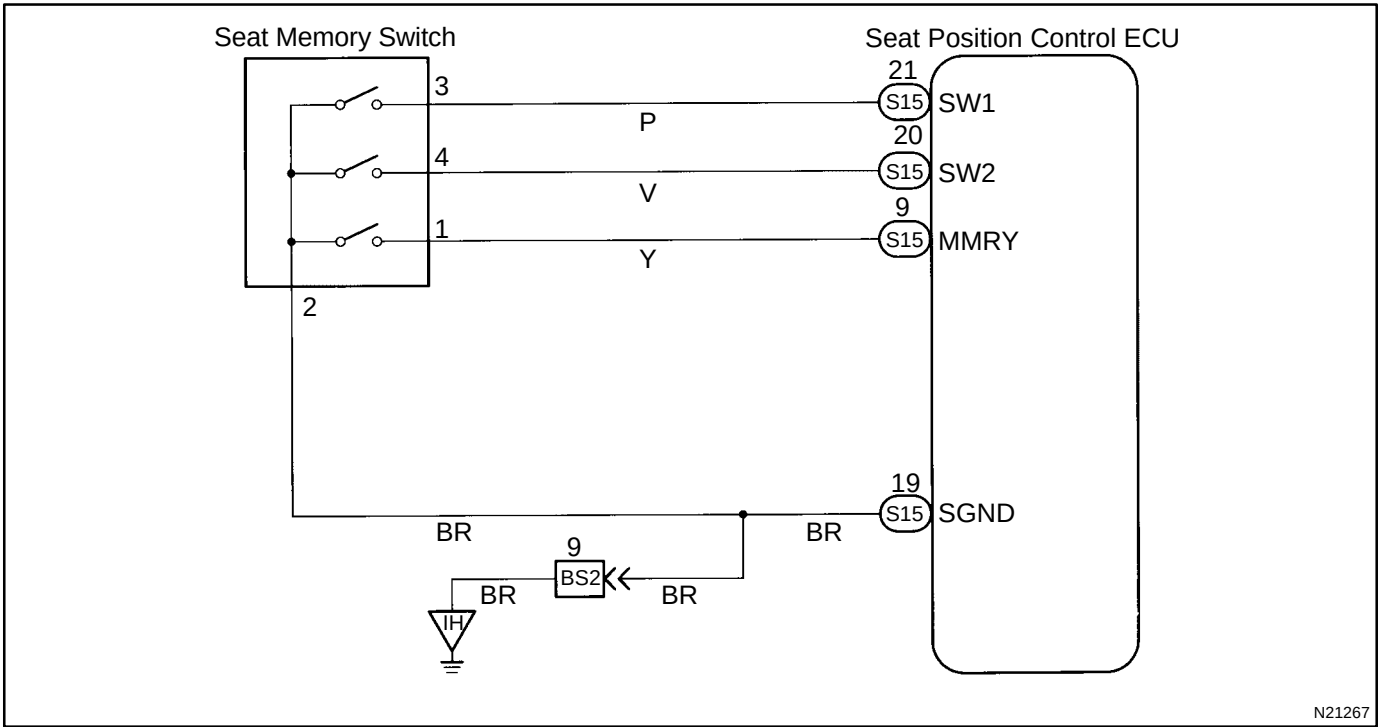
Check and replace Seat Position Control ECU.

Seat Memory Switch

CIRCUIT DESCRIPTION

Seat memory switch send memory and return signals to the seat position control ECU.

WIRING DIAGRAM

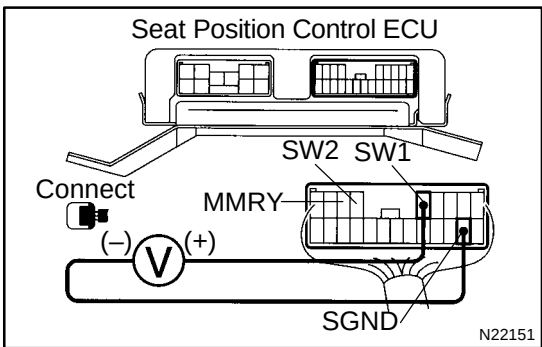


N21267

INSPECTION PROCEDURE

1

Check voltage between each terminal of the seat memory switch and SGND of Seat Position Control ECU connector.



N22151

PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminal of the seat memory switch and SGND of Seat Position Control ECU connector. (The illustration shows inspection of the Memory 1 as an example.)

OK:

At each terminal with switch ON	0 V
At each terminal with switch OFF	10 – 14 V

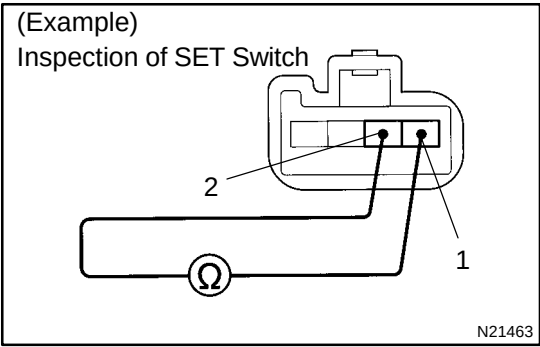
OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-567](#)).

NG

2

Check seat memory switch.



PREPARATION:
Disconnect seat memory switch connector.

CHECK:
Check continuity of each terminal.

OK:

Switch position	Terminal
SET switch ON	1 – 2
Memory switch 1	2 – 3
Memory switch 2	2 – 4

NG

Replace seat memory switch.

OK

3

Check harness and connectors between Seat Position Control ECU and seat memory switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace Seat Position Control ECU.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI01P-14

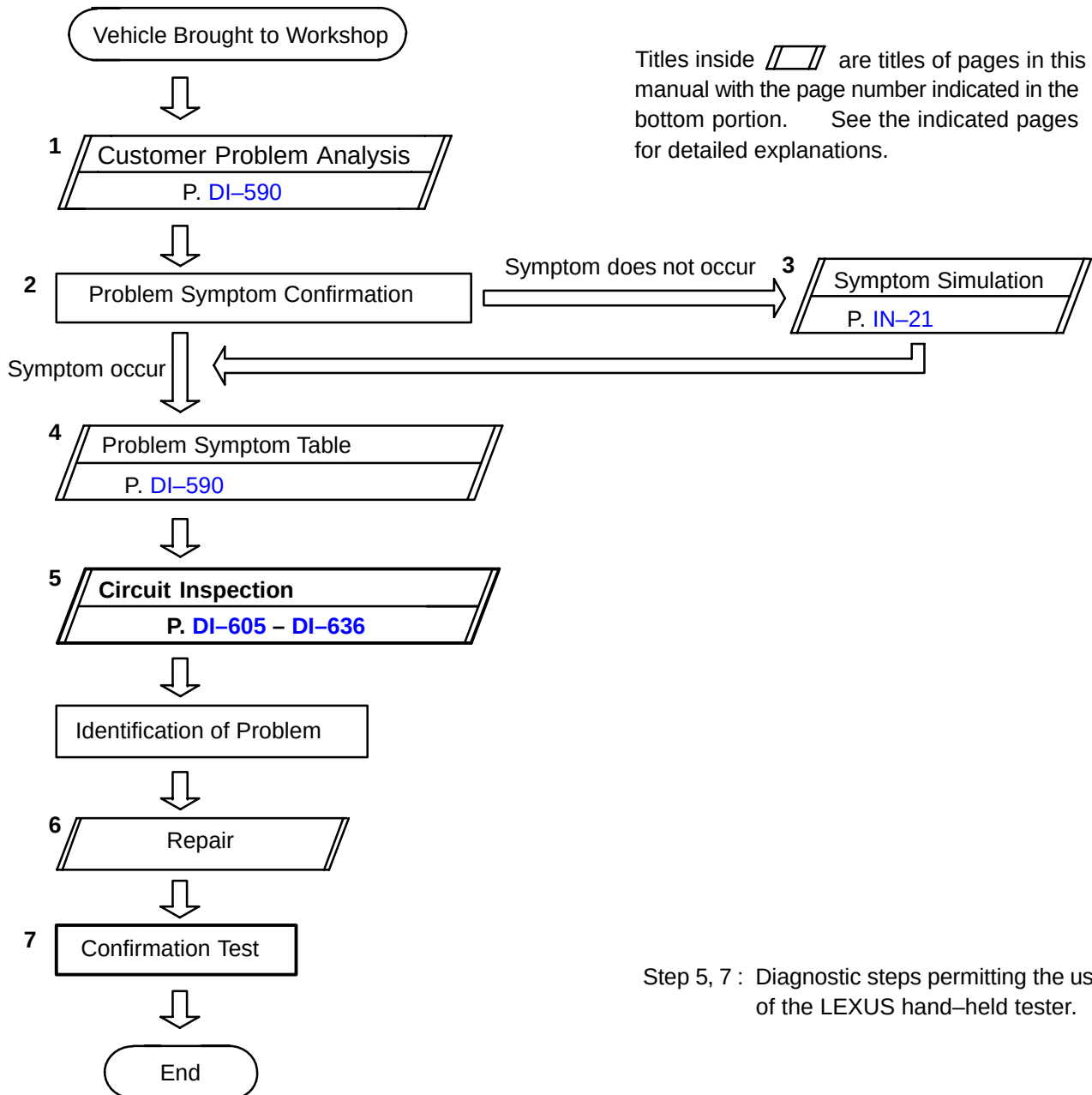
HINT:

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.



CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: _____

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

Date Problem First Occurred	/ /		
Frequency Problem Occurs	• Constant • Sometimes (Times per day, month) • Once only		
Weather Conditions When Problem Occurred	Weather	• Fine • Cloudy • Rainy • Snowy • Various/Others	
	Outdoor temperature	• Hot • Warm • Cool • Cold (Approx. °F (°C))	

Problem Symptom	• Theft deterrent system cannot be set.		
	• Indicator light does not flash when the theft deterrent system is set. (It stays ON or does not light at all.)		
	• Theft deterrent system does not operate.	• When unlocked using the door lock knob. • When the engine hood is opened.	<u>Malfunction</u> • Horns only • Theft deterrent horn only • Headlights only • Taillights only • Starter cut only • Door lock operation only
	• System cannot be canceled once set.	• When door is unlocked using key or wireless door lock control system. • When the key is inserted in the ignition key cylinder and turned to ACC or ON position. (However, only when the system has never operated) • When the luggage compartment door is opened with the key.	
	• System cannot be canceled during warning operation.	• When door is unlocked using key or wireless door lock control system. • When the key is inserted in the ignition key cylinder and turned to ACC or ON position.	
	• Warning operation starts when the system is set and the door or luggage compartment door is opened with the key.		
• Others.			

PRE-CHECK

1. THEFT DETERRENT SYSTEM

When the system is set to the theft deterrent mode and any of the following conditions are met, the system sounds the horns and flashes the headlights and the taillights for approx. 1 minute.

At the same time the system locks all doors (If all door are not locked at once, the system repeats door locking operation every 6.38 seconds during the one minute alarm time).

There are 2 modes in this system, which are active mode and passive mode.

All initial setting are performed in active mode. It can be switched to passive mode by specified operation. (See step 4. CHANGING METHOD OF PASSIVE MODE)

Condition:

Any of the doors (Including the engine hood and luggage compartment door) is unlocked or opened without the key. *1

The battery terminal is disconnected and reconnected.

The system receives panic signal from remote keyless entry. *2

*1: Only active arming mode.

*2: When the ignition key is not inserted in the key cylinder.

There are 4 conditions in this system which are disarming condition, disarming preparation condition, arming condition and alarming condition.

(a) Disarming condition:

- (1) When a user is near the vehicle.
- (2) When the alarming function does not operate.
- (3) When theft deterrent function is not performed.

(b) Disarming preparation condition:

- (1) Time from a user locks a door to be leaves the vehicle.
- (2) Time until transferring to disarming condition.
- (3) Theft deterrent function is not performed.

(c) Arming condition:

- (1) When a user leaves the vehicle completely.
- (2) When theft deterrent function is possible.

(d) Alarming condition:

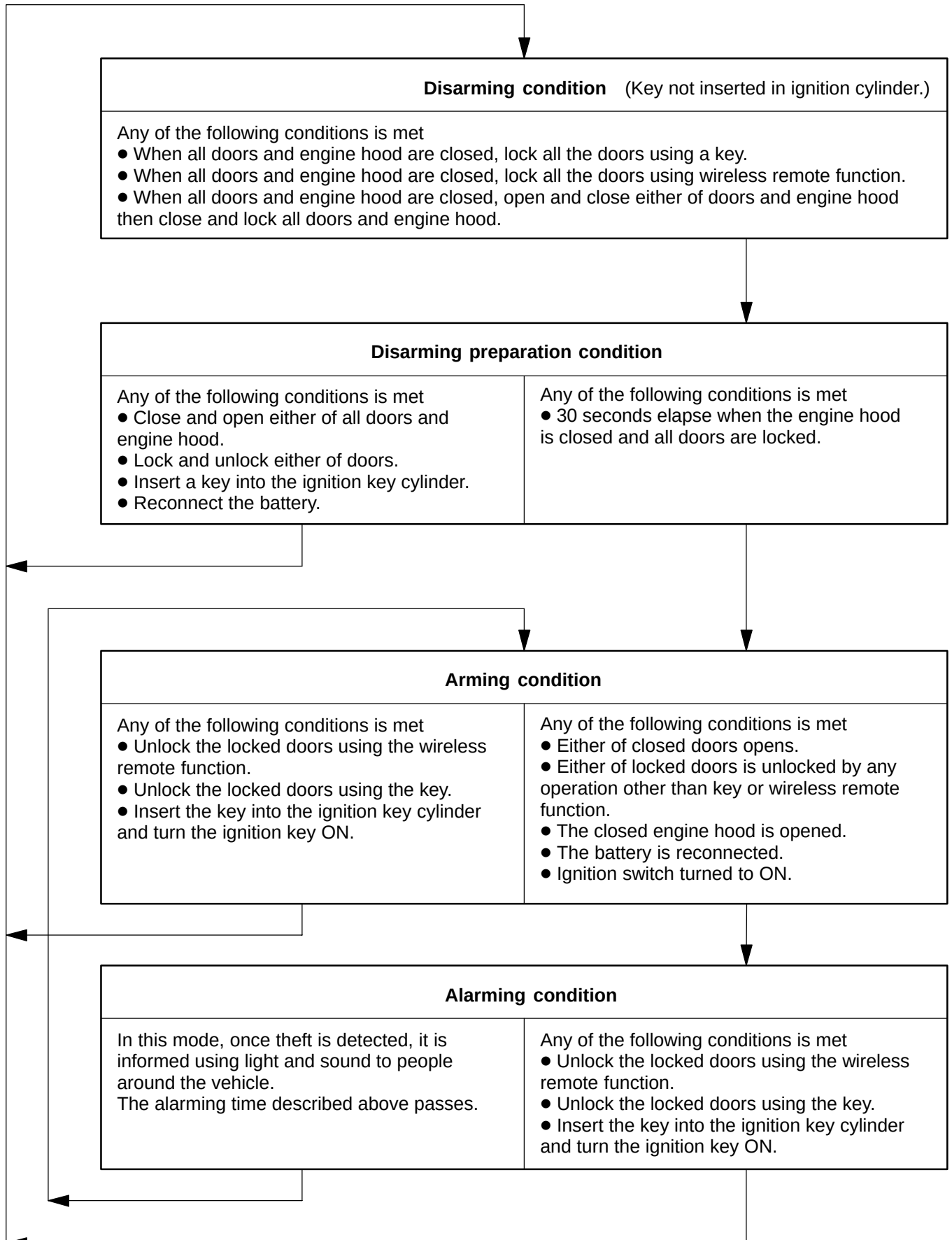
Is this condition, once theft is detected, it is informed using light and sound to people around the vehicle.

Refer to the table for alarming method or time.

Alarming method	Horn
	Security horn
	Headlight
	Taillight
Alarming time	60 seconds
Alarming output	Continuous 0.40 secs. (ON)
	0.40 secs. (OFF)

In the arming condition when either of doors is unlocked and with not key in the key cylinder, force lock signal is output.

2. ACTIVE ARMING MODE



Indicator light output:

Condition	Indicator light
Disarming condition	OFF
Arming preparation condition	ON
Arming condition	OFF
Alarming condition	ON

HINT:

Even in disarming condition, the indicator light flash. (Due to the signal output from immobilizer system). The indicator always flashes receiving the signal from the immobilizer system at any time in the arming condition.

Flashing frequency:

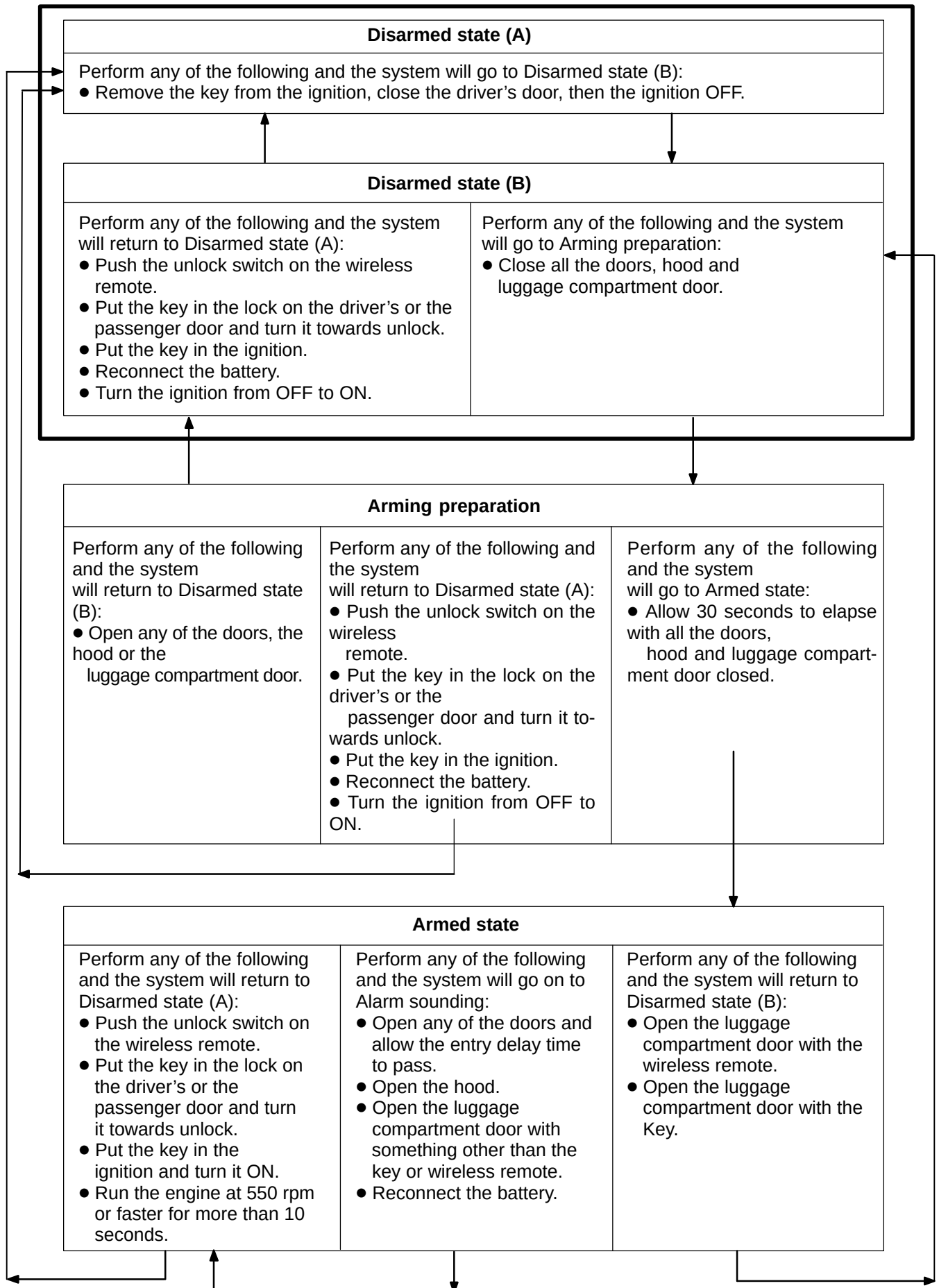
0.2 seconds (ON)

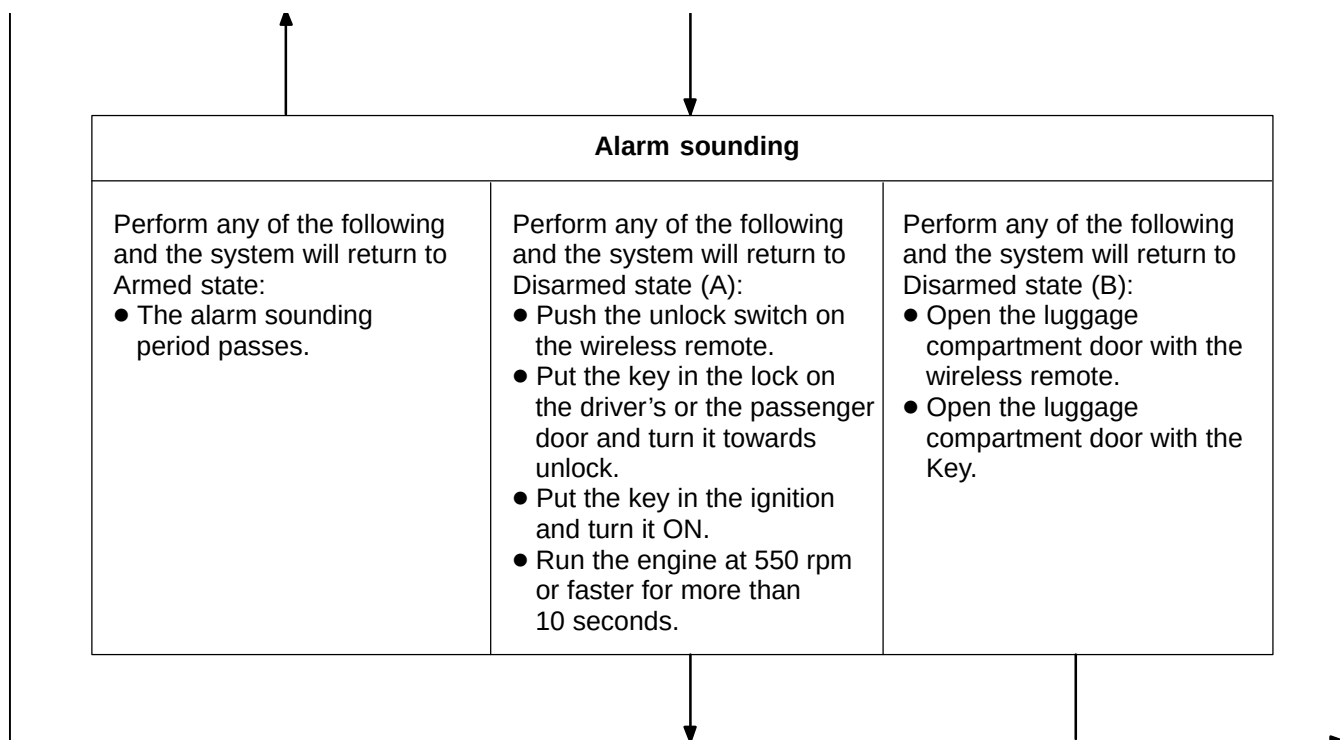
1.8 seconds (OFF)

3. PASSIVE ARMING MODE

This mode can be switched according to the specified operation.

All initially set modes (when shipped from factory) are active mode. (No passive mode)



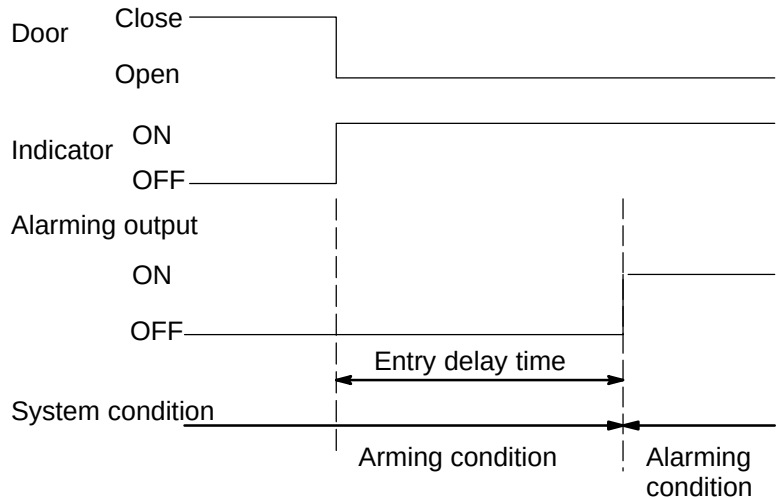


HINT:

In arming condition either closed door is opened, entry delay occurs. (14 secs.)

During this time, the mode transfers to disarming condition when the condition described above * is met.

When the condition is not met, the system judges theft occurs, the mode transfers to alarming condition.

**Indicator light output:**

Condition	Indicator light
Disarming condition	OFF
Arming preparation condition	ON
Arming condition (Entry delay time)	OFF (ON)
Alarming condition	ON

HINT:

Even in disarming condition, the indicator light flash. (Due to the signal output from immobilizer system). The indicator always flashes receiving the signal from the immobilizer system at any time in the arming condition.

Flashing frequency:

0.2 seconds (ON)

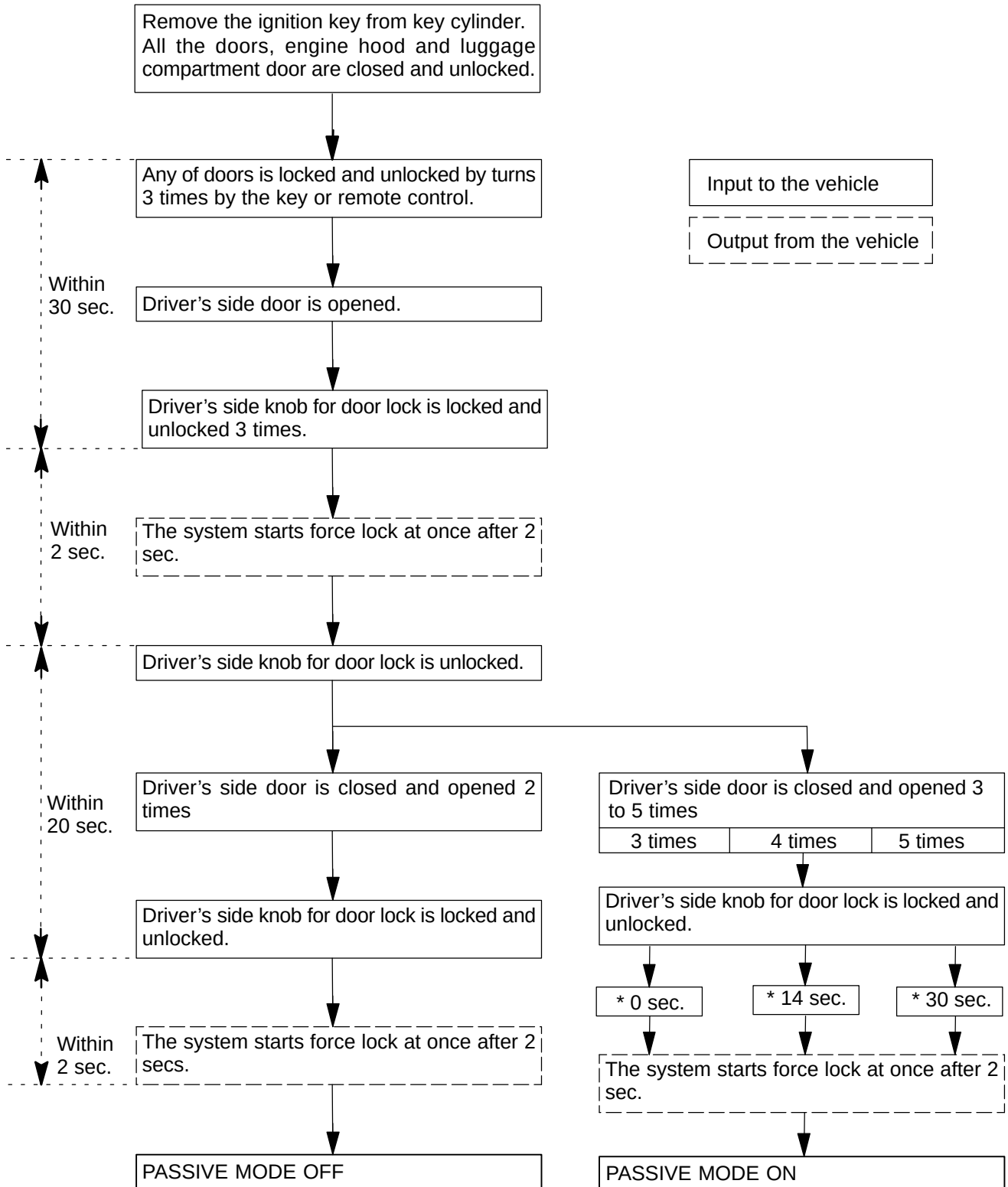
1.8 seconds (OFF)

Transfer to active mode:

In each passive mode, when "disarming condition of active mode → arming preparation transfer condition" is met, the active mode transfers to each condition. In this case, active mode continues till disarming condition.

Passive mode when transfer condition is met.	Active mode transfer condition
Disarming condition	Arming preparation condition
Arming preparation condition	Arming preparation condition
Arming condition (During entry delay time)	Arming condition (After alarming time has elapsed, arming condition)
Alarming condition	After alarming time has elapsed, arming condition

4. CHANGING METHOD OF PASSIVE MODE (ON or OFF)

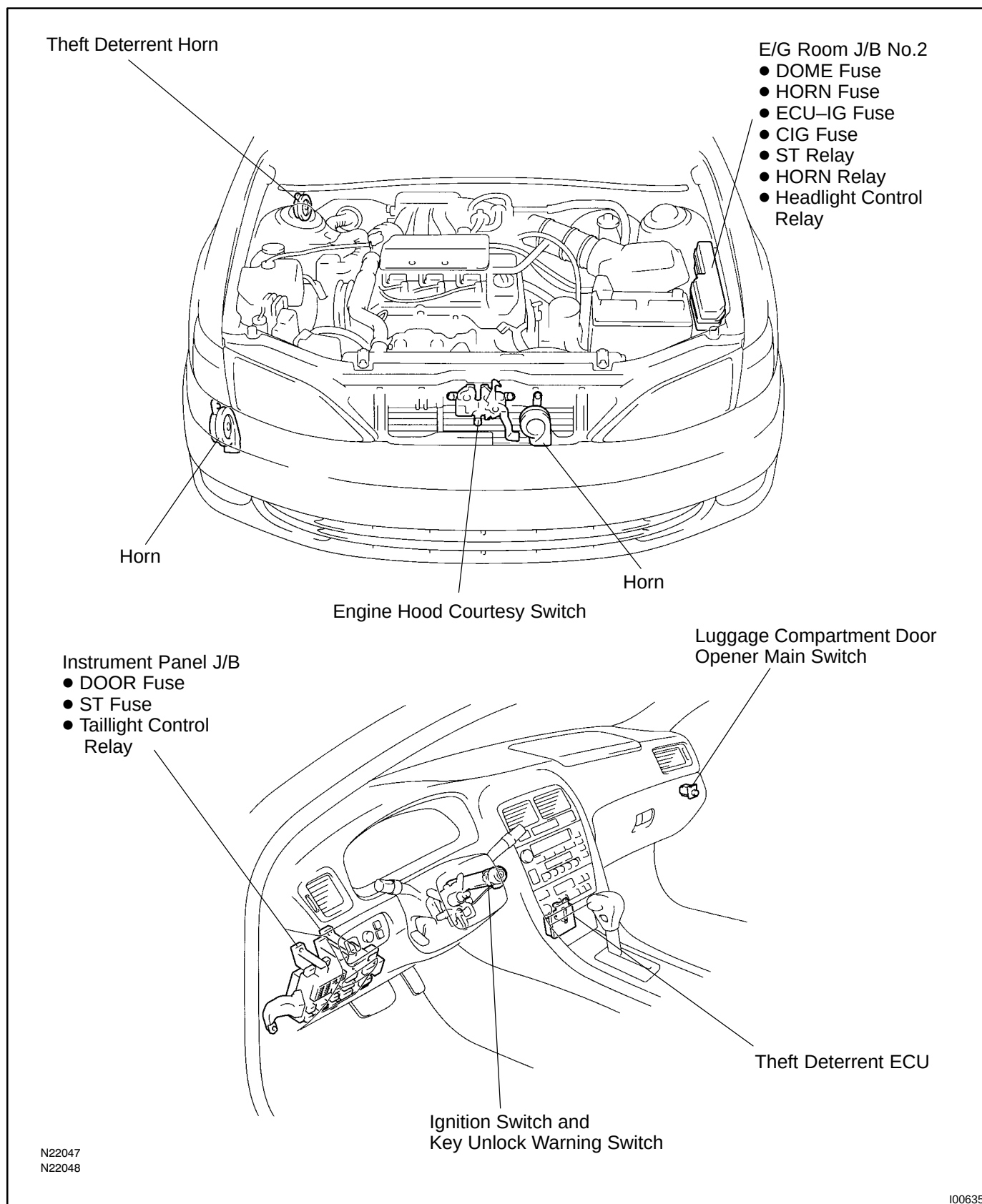


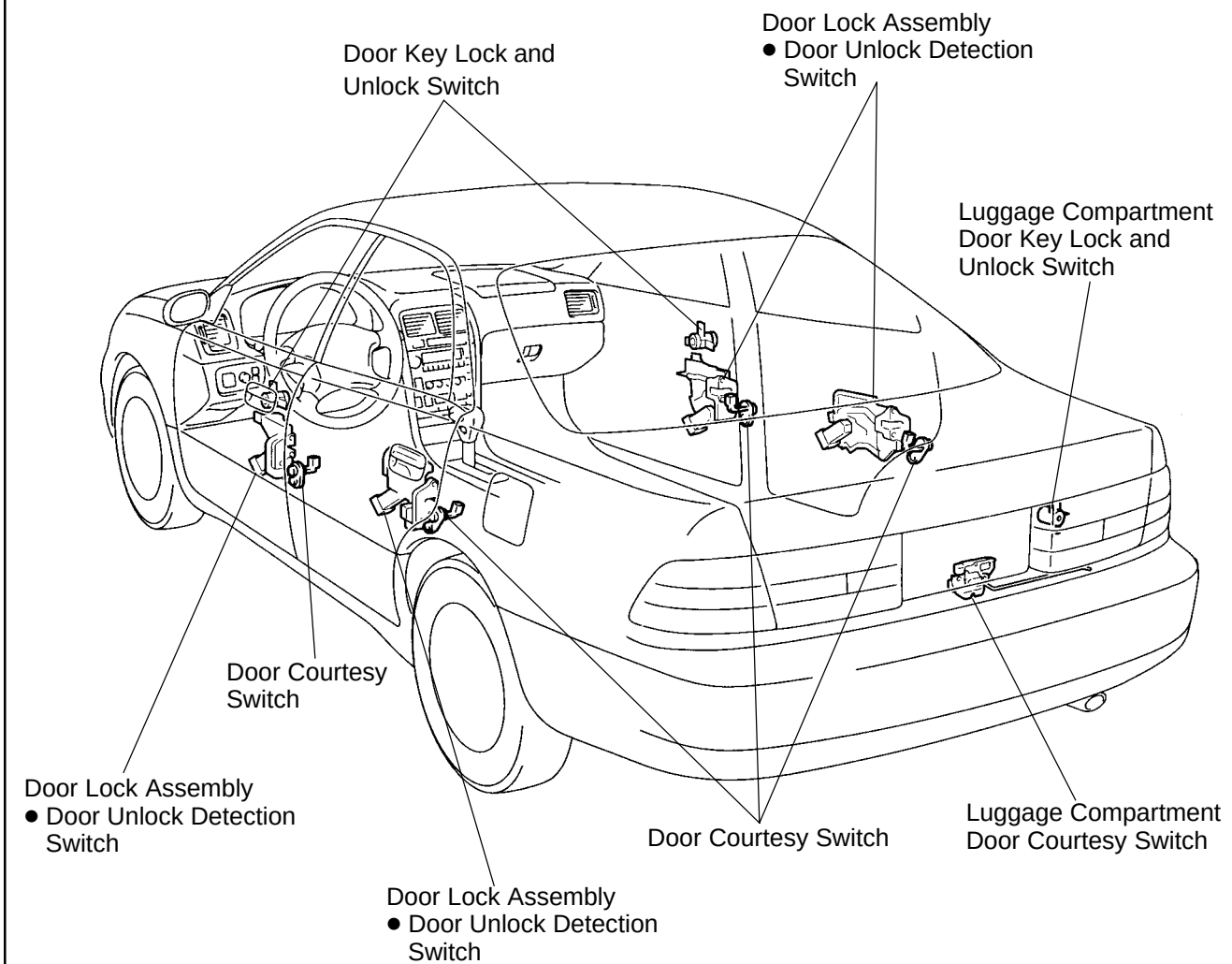
HINT:

- Initial mode is PASSIVE MODE OFF.
- If there is a different signal in the middle of changing. It is invalid.

*: Entry delay time

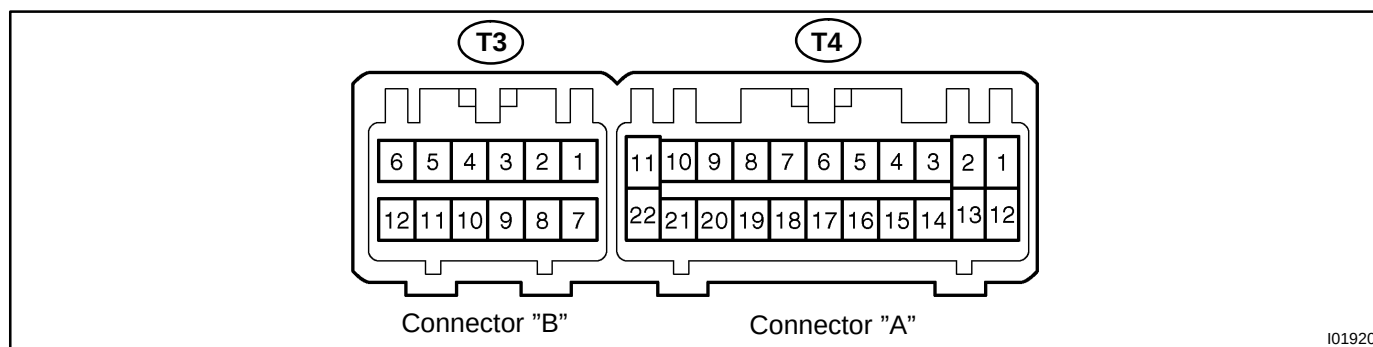
PARTS LOCATION





N22049

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Value
CTY ↔ E (A1 ↔ B7)	R-W ↔ W-B	Door courtesy switch "ON" (Rear door opened)	Below 1 Ω
		Door courtesy switch "OFF" (Rear door closed)	1 MΩ or higher
DSWL ↔ E (A2 ↔ B7)	R-Y ↔ W-B	Luggage compartment door courtesy switch "ON" (Luggage compartment door opened)	Below 1 Ω
		Luggage compartment door courtesy switch "OFF" (Luggage compartment door closed)	1 MΩ or higher
DSWH ↔ E (A3 ↔ B7)	B ↔ W-B	Engine hood courtesy switch "ON" (Engine hood opened)	Below 1 Ω
		Engine hood courtesy switch "OFF" (Engine hood closed)	1 MΩ or higher
DSWD ↔ E (A4 ↔ B7)	R-G ↔ W-B	Door courtesy switch "ON" (Driver's door opened)	Below 1 Ω
		Door courtesy switch "OFF" (Driver's door Closed)	1 MΩ or higher
DSWP ↔ E (A5 ↔ B7)	R-G ↔ W-B	Door courtesy switch "ON" (Passenger's door opened)	Below 1 Ω
		Door courtesy switch "OFF" (Passenger's door closed)	1 MΩ or higher
KSW ↔ E (A6 ↔ B7)	L-B ↔ W-B	Key unlock warning switch "ON" (Key inserted)	Below 1 Ω
		Key unlock warning switch "OFF" (Key removed)	1 MΩ or higher
LUG ↔ E (A7 ↔ B7)	G-W ↔ W-B	Luggage compartment door key lock and unlock switch "ON"	Below 1 Ω
		Luggage compartment door key lock and unlock switch "OFF"	1 MΩ or higher
L2 ↔ E (A8 ↔ B7)	L-W ↔ W-B	Door key lock and unlock switch "LOCK" (Driver's and passenger's door)	Below 1 Ω
		Door key lock and unlock switch "UNLOCK" (Driver's and passenger's door)	1 MΩ or higher
UL3 ↔ E (A9 ↔ B7)	R-G ↔ W-B	Door key lock and unlock switch "UNLOCK" (Driver's door)	Below 1 Ω
		Door key lock and unlock switch "LOCK" (Driver's door)	1 MΩ or higher
UL2 ↔ E (A10 ↔ B7)	L ↔ W-B	Door key lock and unlock switch "UNLOCK" (passenger's door)	Below 1 Ω
		Door key lock and unlock switch "LOCK" (passenger's door)	1 MΩ or higher

DIAGNOSTICS – THEFT DETERRENT SYSTEM

+B1 ↔ Body ground (A11 ↔ Body ground)	R–Y ↔ Body ground	Always	10 – 14 V
IG ↔ E (A13 ↔ B7)	B–R ↔ W–B	Ignition switch is turned to "ON" position	10 – 14 V
LSWD ↔ E (A14 ↔ B7)	L–R ↔ W–B	Door unlock detection switch "ON" (Driver's door)	Below 1 Ω
		Door unlock detection switch "OFF" (Driver's door)	1 MΩ or higher
LSWP ↔ E (A15 ↔ B7)	Y ↔ W–B	Door unlock detection switch "ON" (Passenger's door)	Below 1 Ω
		Door unlock detection switch "OFF" (Passenger's door)	1 MΩ or higher
LSWR ↔ E (A16 ↔ B7)	L–Y ↔ W–B	Door unlock detection switch "ON" (Rear door)	Below 1 Ω
		Door unlock detection switch "OFF" (Rear door)	1 MΩ or higher
TSW ↔ E (A17 ↔ B7)	L–Y ↔ W–B	Luggage compartment door opener switch "ON"	Below 1 Ω
		Luggage compartment door opener switch "OFF"	1 MΩ or higher
+B2 ↔ Body ground (B1 ↔ Body ground)	L–W ↔ Body ground	Always	10 – 14 V
TO ↔ E (B3 ↔ B7)	L ↔ W–B	Luggage compartment door opener switch "Pulled"	10 – 14 V
		Luggage compartment door opener switch "Not pulled"	Below 1 V
IND ↔ E (B6 ↔ B7)	R–Y ↔ W–B	During set preparation	3 – 5 V
E ↔ Body ground (B7 ↔ Body ground)	W–B ↔ Body ground	Always	10 – 14 V
SH ↔ E (B9 ↔ B7)	W–L ↔ W–B	Always	10 – 14 V
HEAD ↔ E (B10 ↔ B7)	R–B ↔ W–B	Light control switch "HEAD"	10 – 14 V
TAIL ↔ E (B11 ↔ B7)	G–R ↔ W–B	Light control switch "TAIL" or "HEAD"	10 – 14 V
HORN ↔ E (B12 ↔ B7)	G–B ↔ W–B	Horn switch "OFF"	10 – 14 V

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and trouble-shoot for each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Details of Problem			Inspecting Circuit*1	See page
The theft deterrent system cannot be set			1. Indicator light circuit	DI-605
			2. ECU power source circuit	DI-607
			3. Key unlock warning switch circuit	DI-620
			4. Luggage compartment door key lock and unlock switch circuit	DI-622
			5. Luggage compartment door courtesy switch circuit	DI-624
			6. Door key lock and unlock switch circuit	DI-630
			7. Door courtesy switch circuit	DI-634
			8. Door unlock detection switch circuit	DI-632
			9. Engine hood courtesy switch circuit	DI-636
The indicator light does not blink when system is set			Indicator light circuit	DI-605
When the system is set	When the rear door is unlocked	The system does not operate	Door unlock detection switch circuit	DI-632
	When the luggage compartment door is opened by a method other than the key		Luggage compartment door courtesy switch circuit	DI-624
	When the engine hood is opened		Engine hood courtesy switch circuit	DI-636
While the system is in warning operation	Horns do not sound		Horn relay circuit	DI-612
	Theft deterrent horn does not sound		Theft deterrent horn circuit	DI-610
	Headlights do not flash		Headlight control relay circuit	DI-614
	Taillights do not flash		Taillight control relay circuit	DI-616
	The door lock is not locked		Door unlock detection switch circuit	DI-632
When the system is set	It is not canceled when the ignition key is turned to ACC or ON position		Ignition switch circuit	DI-618
	It still operates when the luggage compartment door is opened with the key		Luggage compartment door key lock and unlock switch circuit	DI-622
System is still set even when a rear door is open			Door courtesy switch circuit	DI-634
Even when the system is not set	Horns sound		Horn relay circuit	DI-612
	Theft deterrent horn sounds		Theft deterrent horn circuit	DI-610
	Headlights stay on		Headlight control relay circuit	DI-614
	Taillights stay on		Taillight control relay circuit	DI-616

*1: If numbers are given to the circuit proceed with troubleshooting in the order indicated by those numbers.

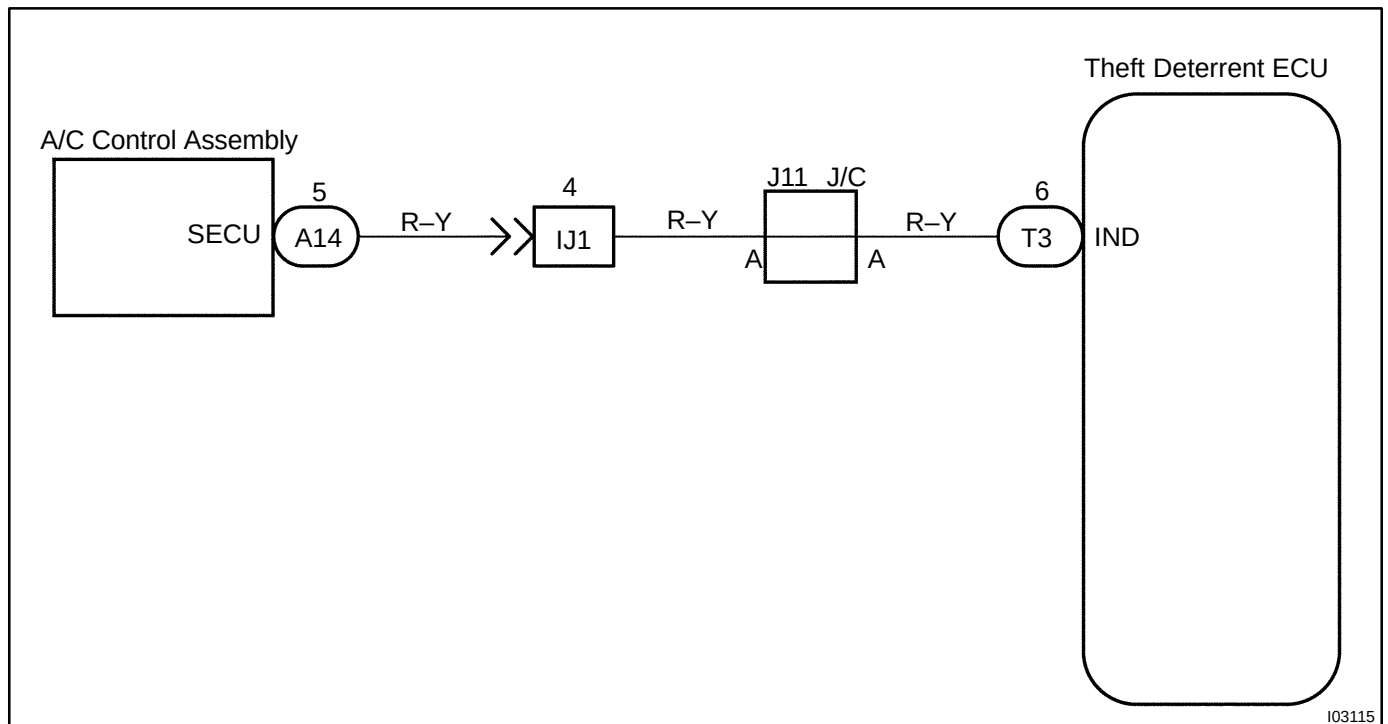
CIRCUIT INSPECTION

Indicator Light Circuit

CIRCUIT DESCRIPTION

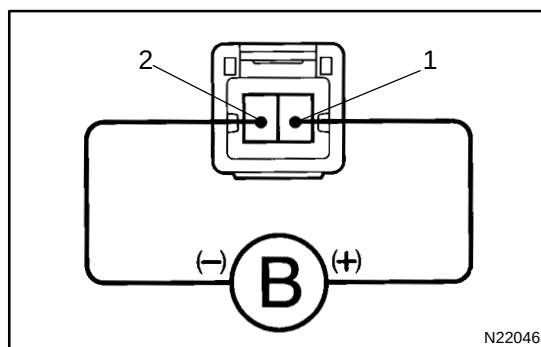
When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light ON for 1 second and turns it OFF for 1 second, thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check indicator light.



PREPARATION:

- (a) Remove A/C control assembly.
- (b) Disconnect indicator light connector.

CHECK:

Connect the positive (+) lead to terminal 1 and the negative (-) lead to terminal 2 of indicator light connector.

OK:

Indicator light comes on.

NG

Replace indicator light.

OK

2

Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

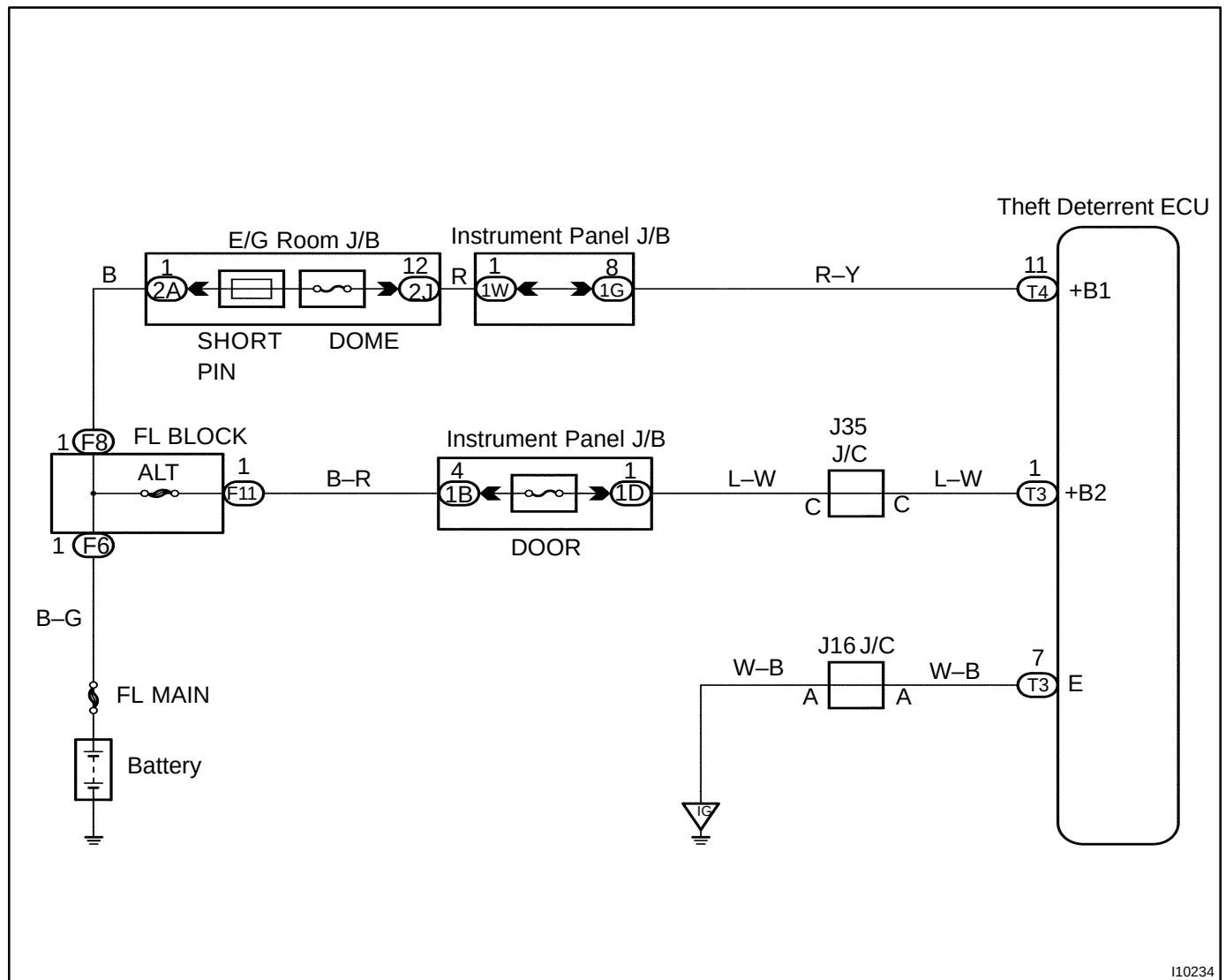
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-604](#)).

ECU Power Source Circuit

CIRCUIT DESCRIPTION

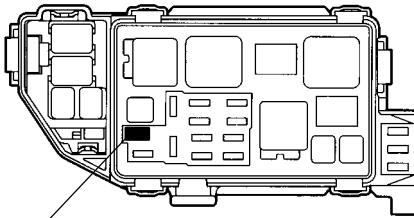
This circuit provides power to operate the theft deterrent ECU.

WIRING DIAGRAM



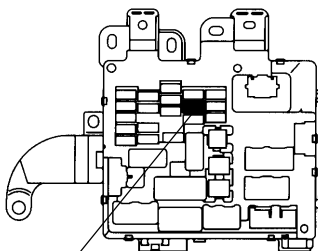
INSPECTION PROCEDURE**1 Check DOME and DOOR fuse.**

E/G Room J/B No.2



DOME Fuse

Instrument Panel J/B



DOOR Fuse

N20674
N20675

Y

100632

PREPARATION:

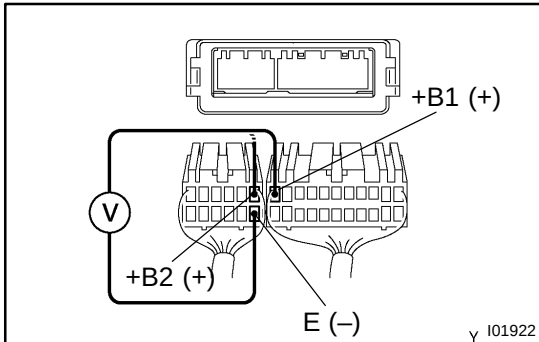
- (a) Remove DOME fuse from engine room junction block No.2.
- (b) Remove DOOR fuse from instrument panel junction block No.1.

CHECK:

Check continuity of DOME and DOOR fuse.

OK:**Continuity****NG****Check for short in all the harness and components connected to the DOME and DOOR fuse (See attached wiring diagram).****OK**

- 2 Check voltage between terminals +B1, +B2 and E of theft deterrent ECU connector.**

**PREPARATION:**

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminals +B1, +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-604](#)).

NG

- 3 Check for open in harness and connector between ECU and body ground (See page [IN-31](#)).**

NG

Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.

Theft Deterrent Horn Circuit

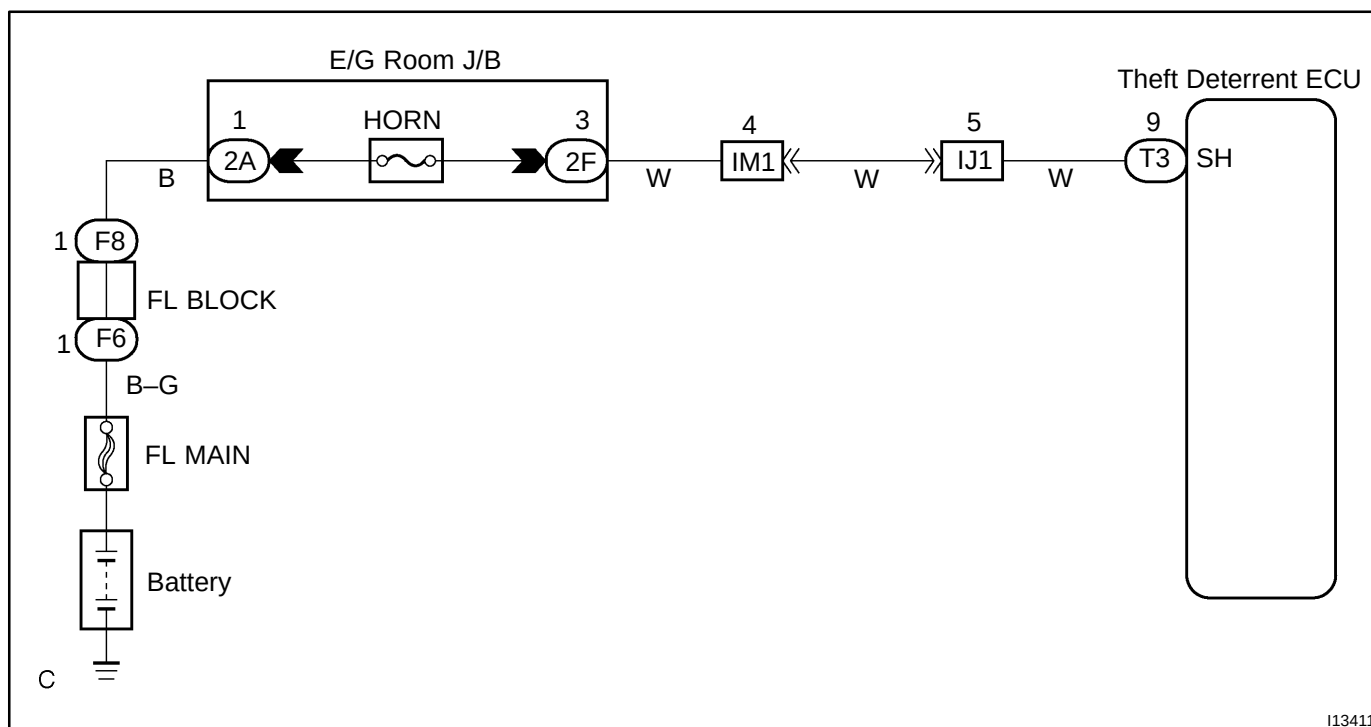
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, the relay in the ECU turns ON and OFF cycles of approximately 0.2 sec., causing the theft deterrent horn to blow (See the wiring diagram below).

In this condition, if any of the following operations is done, the relay in the ECU turns OFF, thus stopping the theft deterrent horn from blowing:

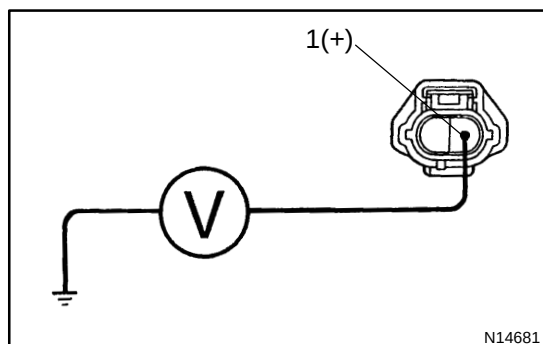
- (1) Unlock the front LH or RH door with a key.
- (2) Turn the ignition switch to ACC or ON position.
- (3) Unlock the doors with the wireless door lock control system.
- (4) Wait for approximately 60 seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal 1 of theft deterrent horn connector and body ground.



PREPARATION:

Remove the theft deterrent horn and disconnect the connector.

CHECK:

Measure voltage between terminal 1 of theft deterrent horn connector and body ground.

OK:

Voltage: 10 – 14V

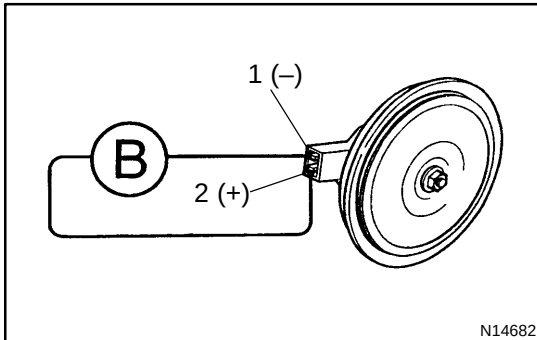
NG

Check and repair harness and connector between HORN fuse and theft deterrent horn.

OK

2

Check theft deterrent horn.

**CHECK:**

Connect positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2 of theft deterrent horn connector.

OK:

Theft deterrent horn blows.

NG

Replace theft deterrent horn.

OK

3

Check harness and connector between theft deterrent ECU and theft deterrent horn (See page [IN-31](#)).

NG

Check and repair harness or connector.

OK

Check and replace theft deterrent ECU.

Horn Relay Circuit

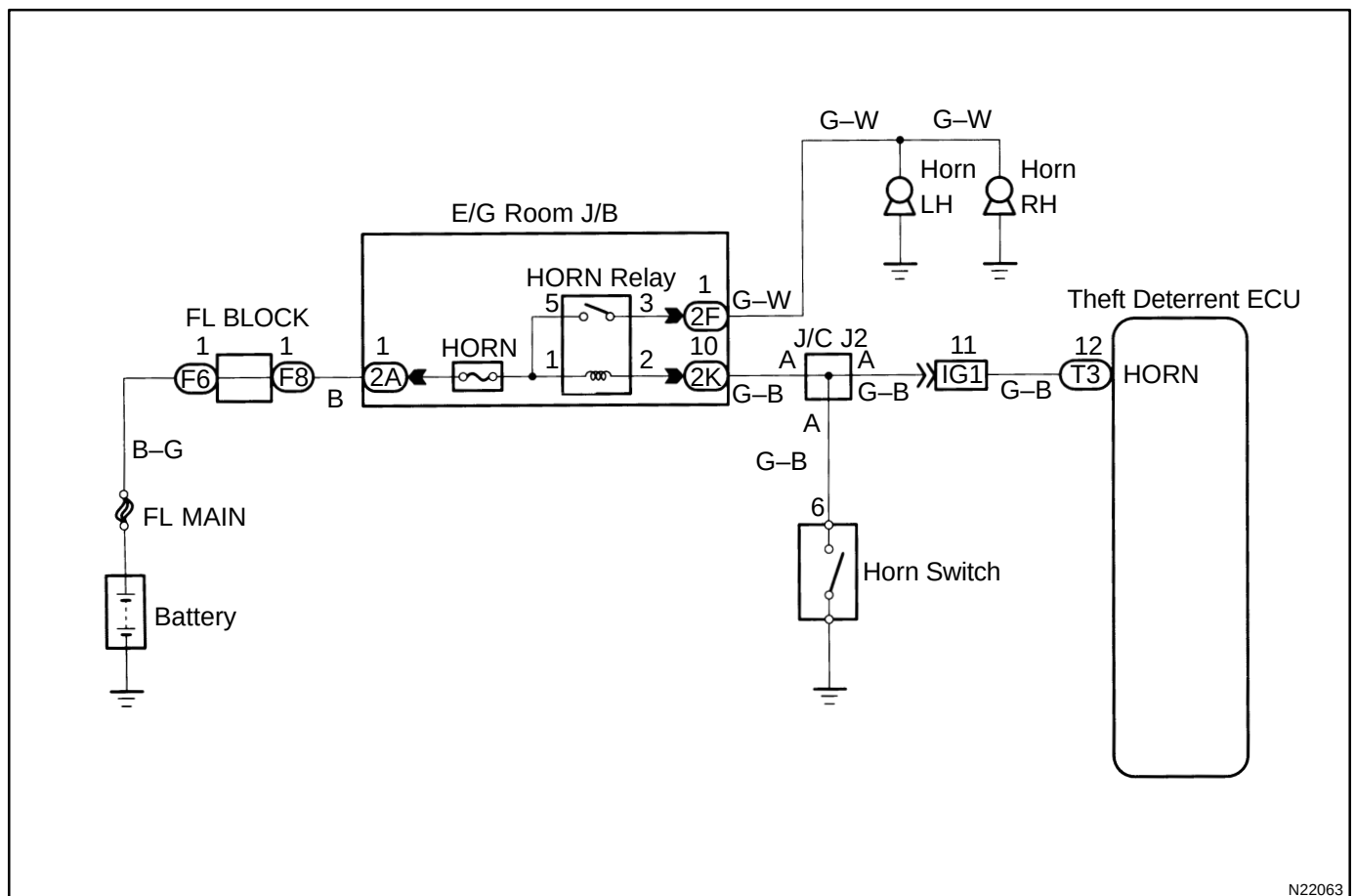
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the Tr 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 Tr in the ECU goes OFF and the horn relay switches OFF, thus stopping the horns from blowing:

- (1) Unlock the front LH or RH door with key.
- (2) Turn the ignition switch to ACC or ON position.
- (3) Unlock the doors with the wireless door lock control system.
- (4) Wait for approximately 60 seconds.

WIRING DIAGRAM

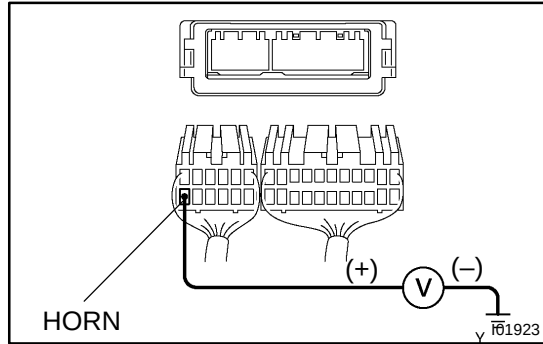


INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the horns blow normally whenever the horn switch is operated. If horn operation is not normal when the horn switch is operated, check the horn switch.

- 1 Check voltage between terminal HORN of theft deterrent ECU connector and body ground.



PREPARATION:

Disconnect the theft deterrent ECU connectors.

CHECK:

Measure voltage between terminal HORN of theft deterrent ECU connector and body ground.

OK:

Voltage: 10 – 14V

NG

Check and repair harness and connector between theft deterrent ECU and horn relay.

OK

Check and replace theft deterrent ECU.

Headlight Control Relay Circuit

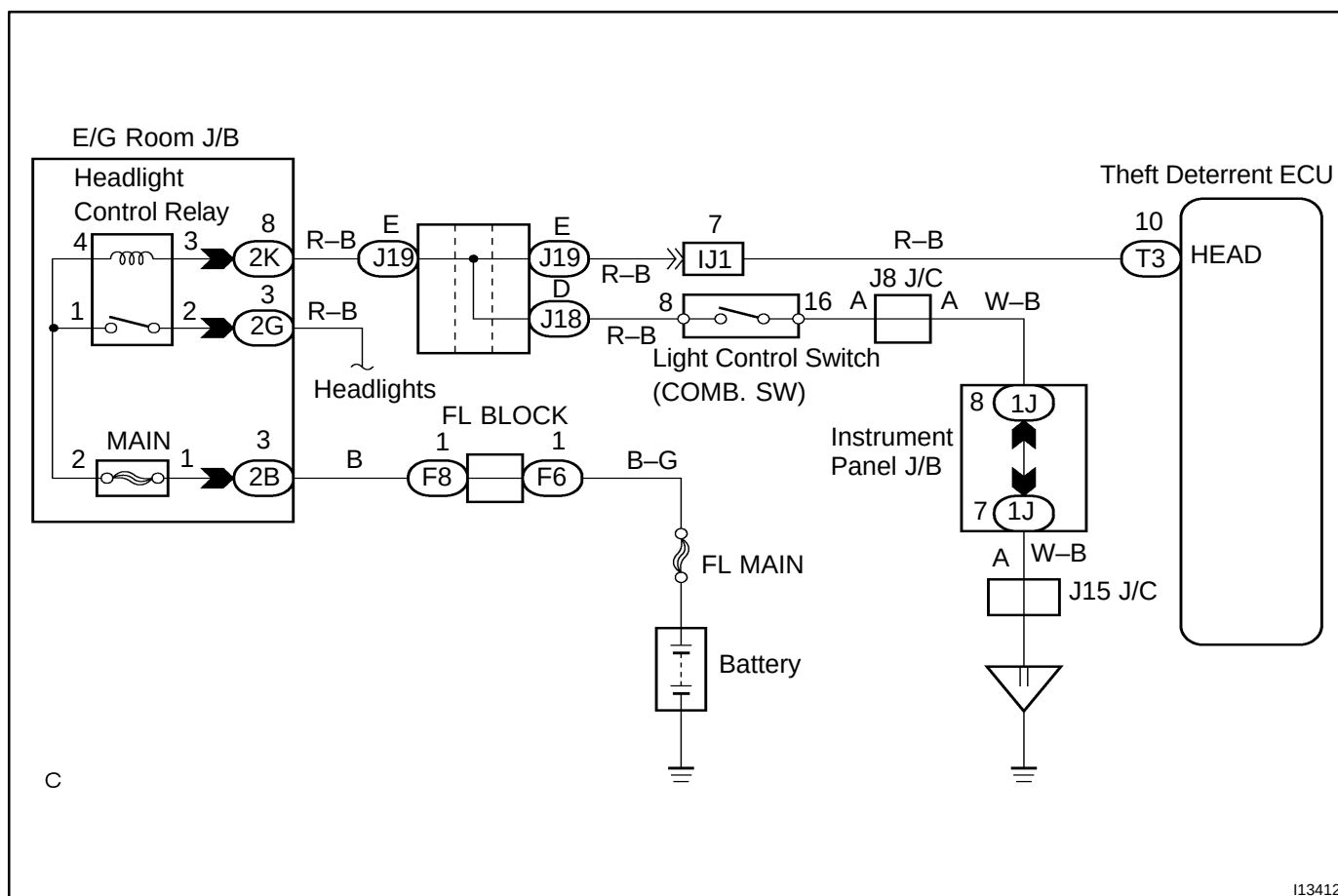
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the Tr in the ECU to switch ON and OFF at approximately 0.4 sec. intervals. This switches the headlight control relay ON and OFF, thus flashing the headlights (See the wiring diagram below).

In this condition, if any of the following operations is done, the Tr in the ECU goes OFF and the headlight control relay switches OFF, thus stopping the headlights flashing:

- (1) Unlock the front LH or RH door with a key.
- (2) Turn the ignition switch to ACC or ON position.
- (3) Unlock the doors with the wireless door lock control system.
- (4) Wait for approximately 60 seconds.

WIRING DIAGRAM



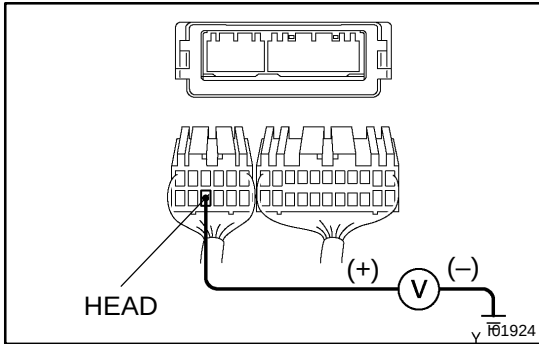
I13412

INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the headlights light up normally whenever the light control switch is operated. If headlight operation is not normal when the light control switch is operated, proceed to troubleshooting on page [BE-3](#).

1	Check voltage between terminal HEAD of theft deterrent ECU connector and body ground.



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal HEAD of theft deterrent ECU connector and body ground.

OK:

Voltage: 10 – 14V

NG

Check and repair harness and connector between theft deterrent ECU and headlight control relay (See page [IN-31](#)).

OK

Check and replace theft deterrent ECU.

Taillight Control Relay Circuit

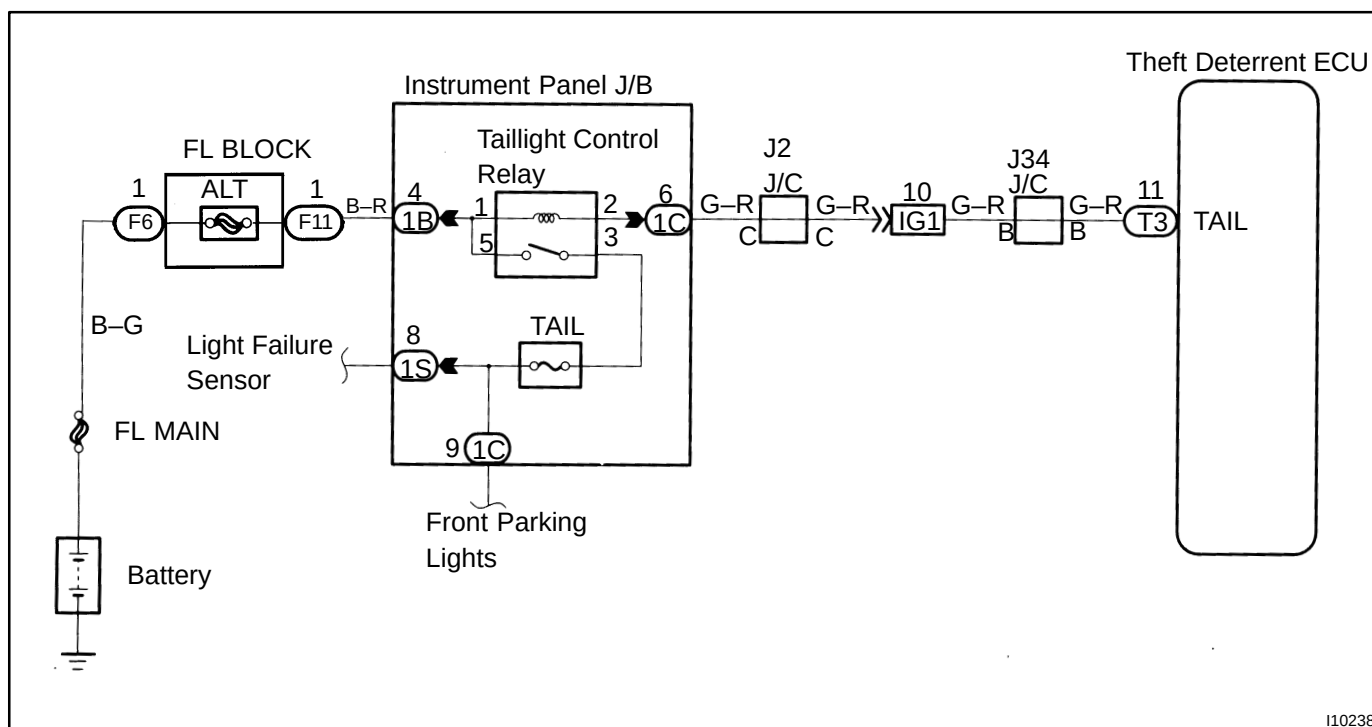
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the Tr in the ECU to switch ON and OFF at approximately 0.4 sec. intervals. This switches the taillight control relay ON and OFF, thus flashing the taillights (See the wiring diagram below).

In this condition, if any of the following operations is done, the Tr in the ECU goes OFF and the taillight control relay switches OFF, thus stopping the taillights flashing:

- (1) Unlock the front LH or RH door with a key.
- (2) Turn the ignition switch to ACC or ON position.
- (3) Unlock the doors with the wireless door lock control system.
- (4) Wait for approximately 60 seconds.

WIRING DIAGRAM



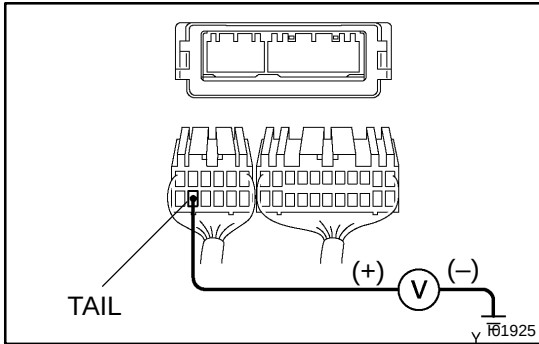
I10238

INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the taillights light up normally whenever the light control switch is operated. If taillight operation is not normal when the light control switch is operated, proceed to troubleshooting on page [BE-3](#).

1	Check voltage between terminal TAIL of theft deterrent ECU connector and body ground.



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal TAIL of theft deterrent ECU connector and body ground.

OK:

Voltage: 10 – 14V

NG

Check and repair harness and connector between theft deterrent ECU and taillight control relay (See page [IN-31](#)).

OK

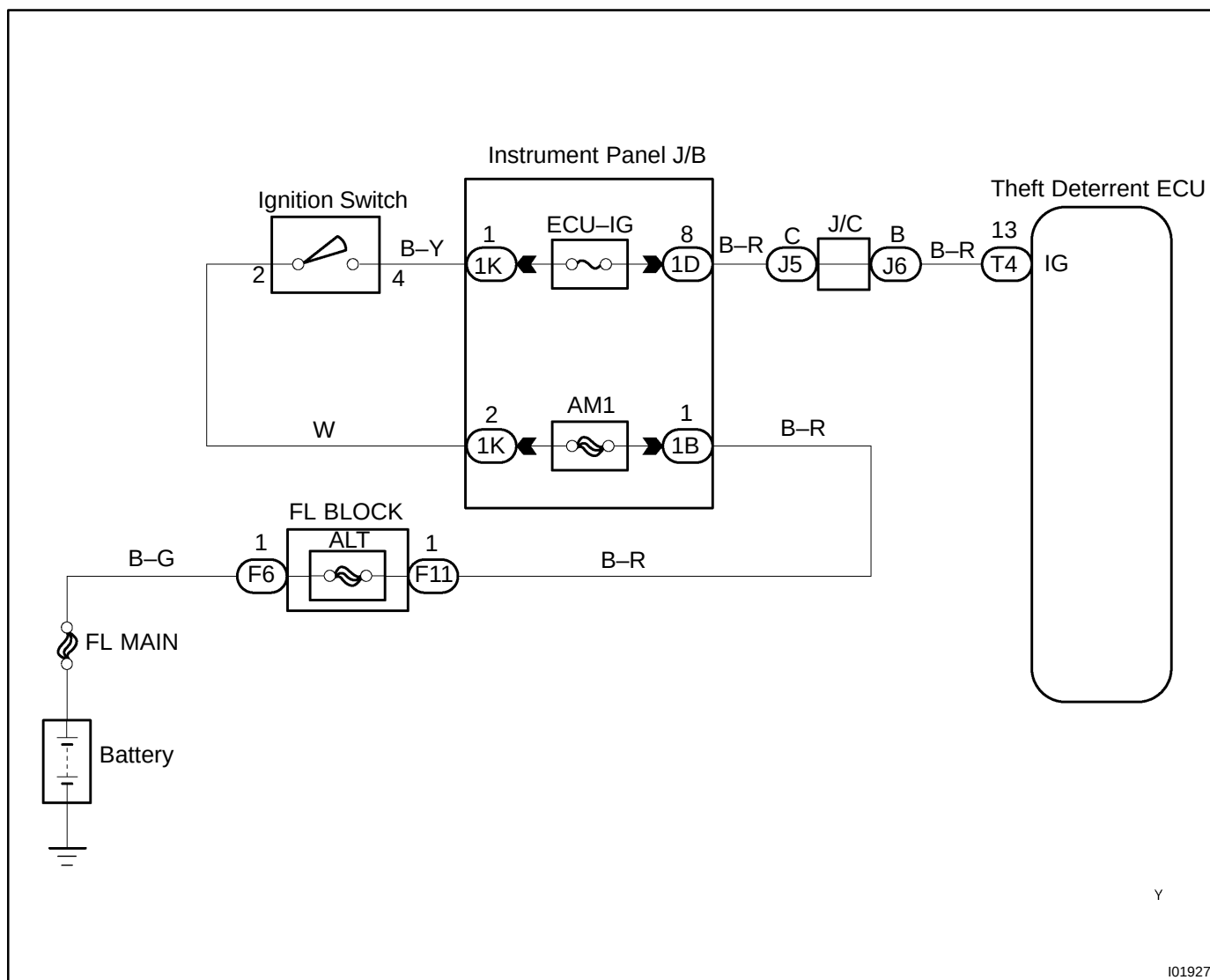
Check and replace theft deterrent ECU.

Ignition Switch Circuit

CIRCUIT DESCRIPTION

When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU. Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU. When the battery positive voltage is applied to the terminal ACC of the ECU while the theft deterrent system is activated, the warning stops. Furthermore, power supplied from the terminals ACC and IG of the ECU is used as power for the door courtesy switch, and position switch, etc.

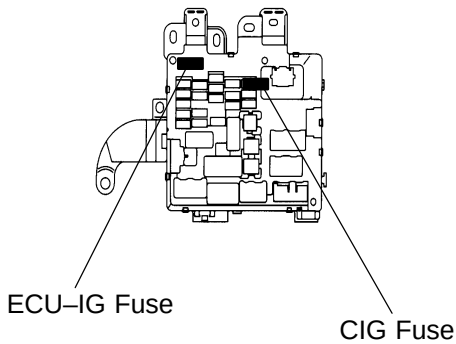
WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check CIG and ECU-IG fuses.

Instrument Panel J/B

**PREPARATION:**

- (a) Remove the fuse box opening cover.
- (b) Remove CIG and ECU-IG fuses from instrument panel junction block.

CHECK:

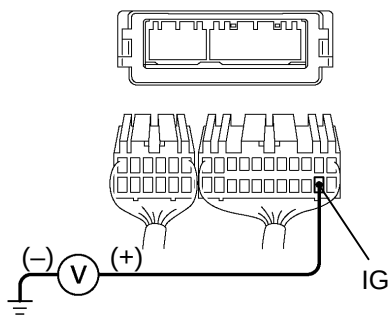
Check continuity of CIG and ECU-IG fuses.

OK:

Continuity

NG

Check for short in all the harness and components connected to the CIG and ECU-IG fuses (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 and ACC 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-31](#)).

OK

Check and replace theft deterrent ECU.

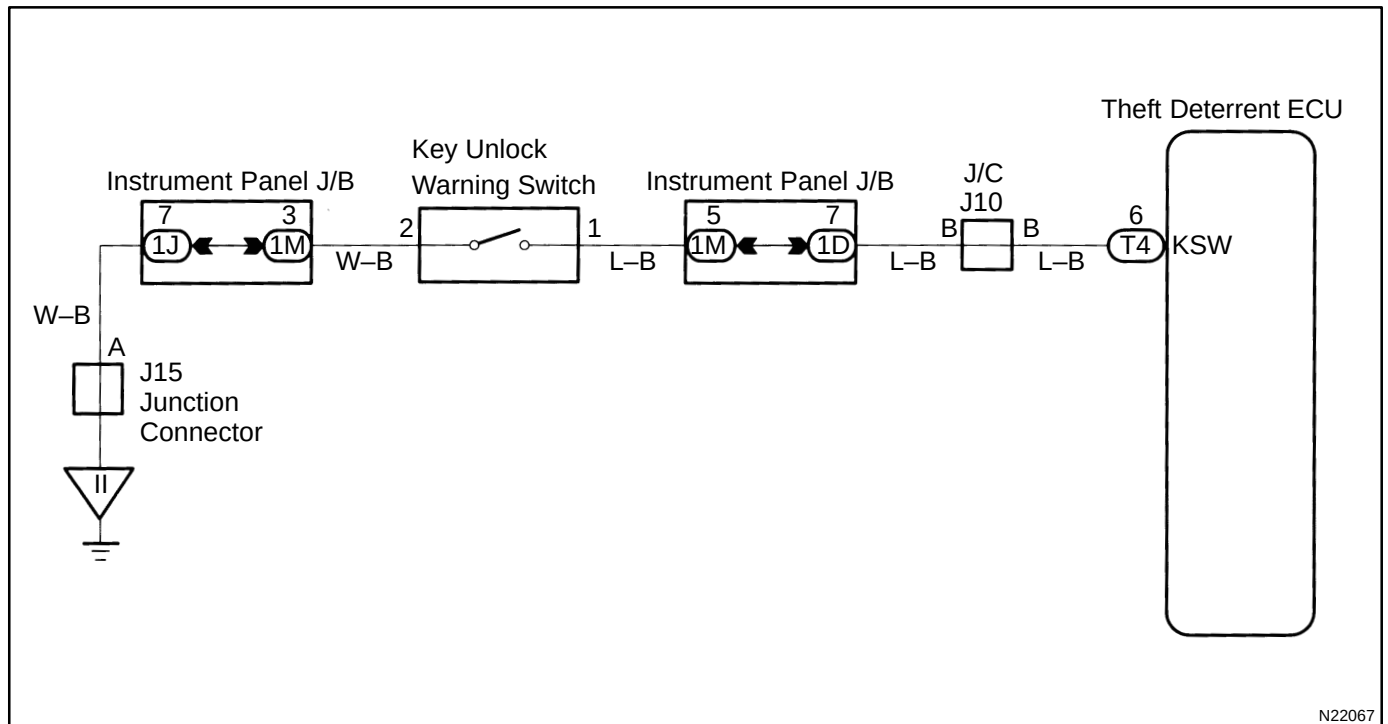
Key Unlock Warning Switch Circuit

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.

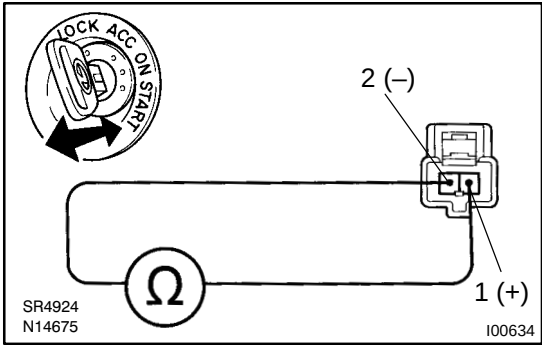
WIRING DIAGRAM



N22067

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-31).

NG	Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

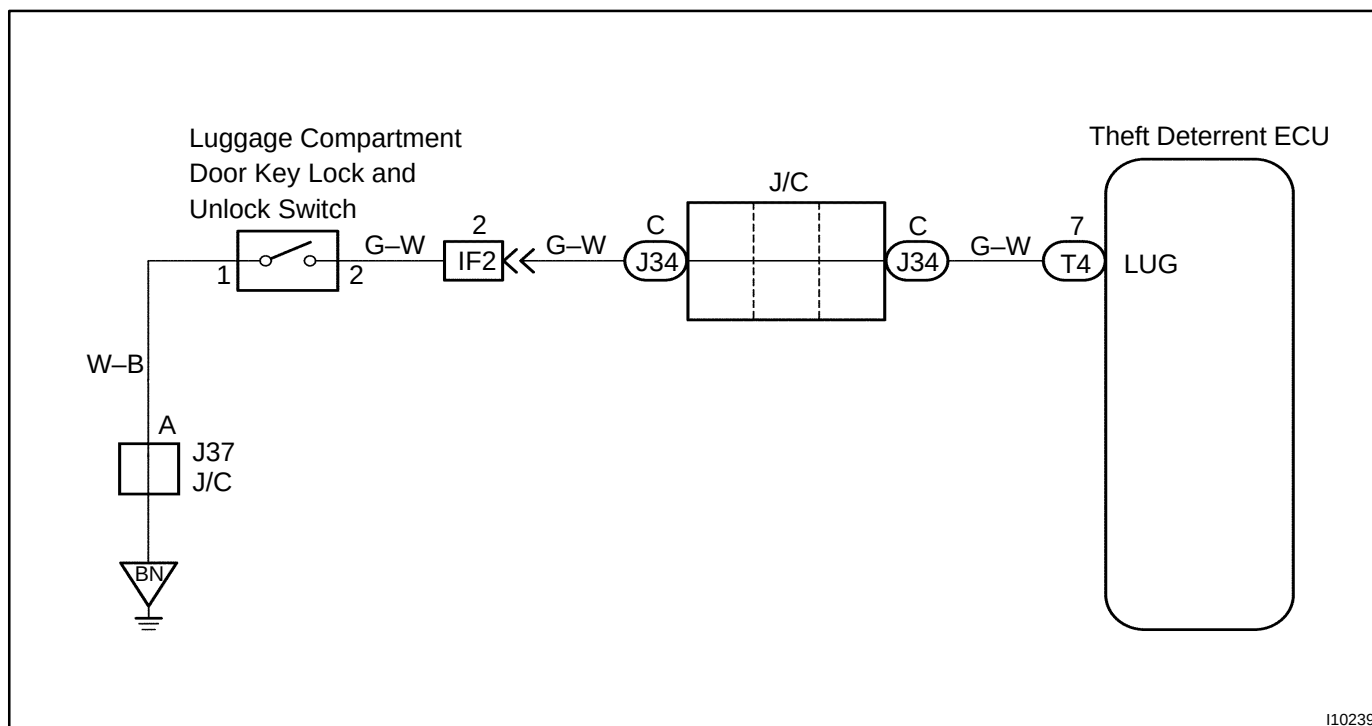
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-604](#)).

Luggage Compartment Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

The luggage compartment door key lock and unlock switch goes ON when the luggage compartment door key cylinder is turned to the unlock side with the key.

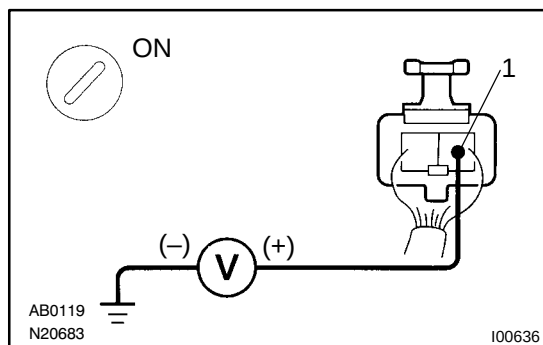
WIRING DIAGRAM



I10239

INSPECTION PROCEDURE

- 1 Check voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground.



PREPARATION:

- (a) Remove luggage compartment door trim.
- (b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground, when the key is turned to the unlock side and not turned.

OK:

Key operation	Voltage
Turned to the unlock side	0 V
Not turned	Battery positive voltage

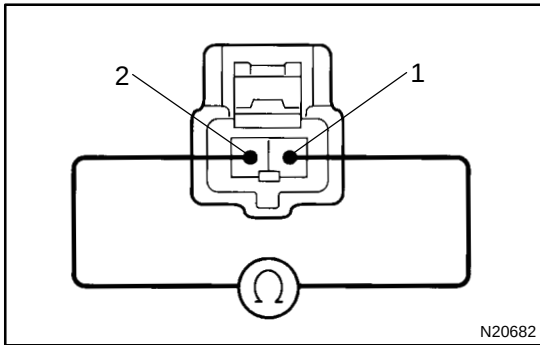
OK

Check and replace theft deterrent ECU.*1

NG

2

Check luggage compartment door key lock and unlock switch.



PREPARATION:

Disconnect luggage compartment door key lock and unlock switch connector.

CHECK:

Check continuity between terminals 1 and 2, when the key is turned to the unlock side and not turned.

OK:

Key operation	Tester connection	Specified condition
Turned to unlock	1 – 2	Continuity
Not turned	–	No continuity

NG

Repair or replace luggage compartment door key lock and unlock switch.

OK

3

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-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.

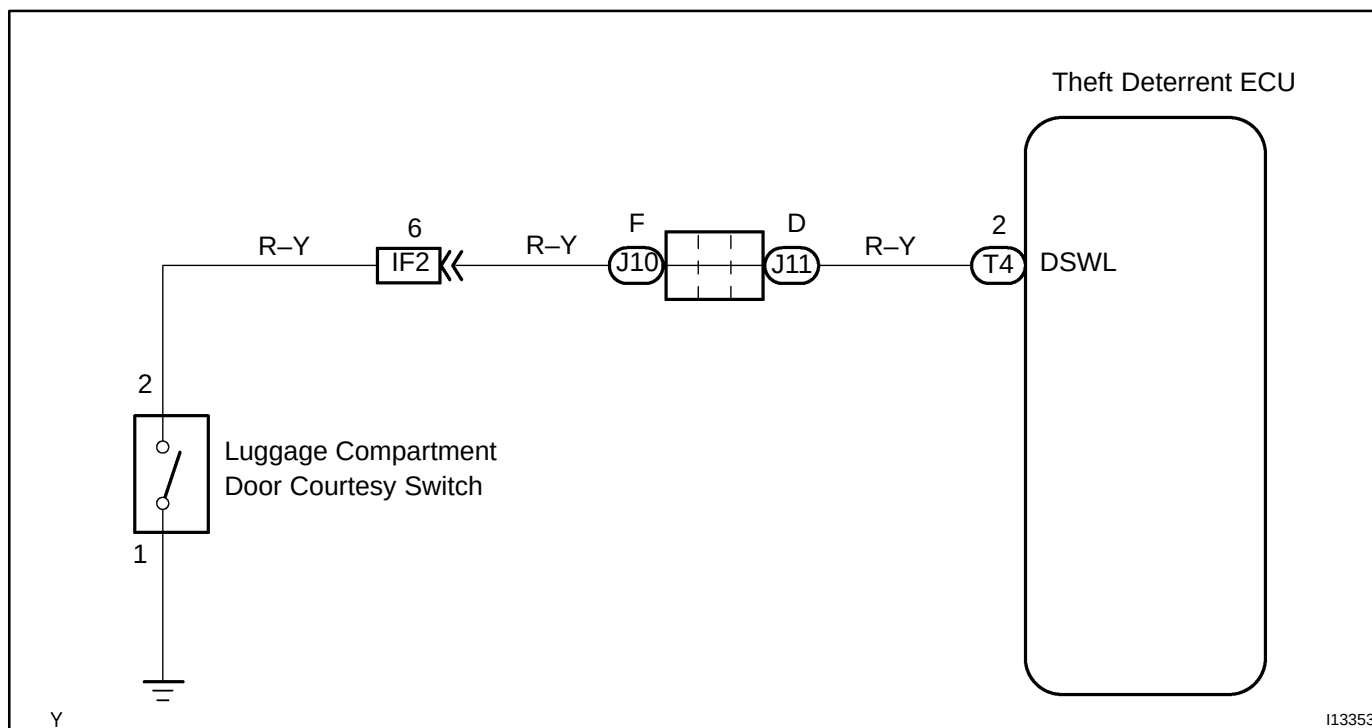
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-604](#)).

Luggage Compartment Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The luggage compartment door courtesy switch goes ON when luggage compartment door is opened and goes OFF when the luggage compartment door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check operation of luggage compartment door courtesy light.

CHECK:

Check that luggage compartment door courtesy light goes OFF when luggage compartment door courtesy switch is pushed, and comes ON when switch is not pushed.

NG

Check and repair luggage compartment door courtesy light circuit (See page [BE-53](#)).

OK

2	Check for open in harness and connector between theft deterrent ECU and luggage compartment door courtesy switch (See page IN-31).

NG

Repair or replace harness or connectors.

OK

Check and replace theft deterrent ECU.*1

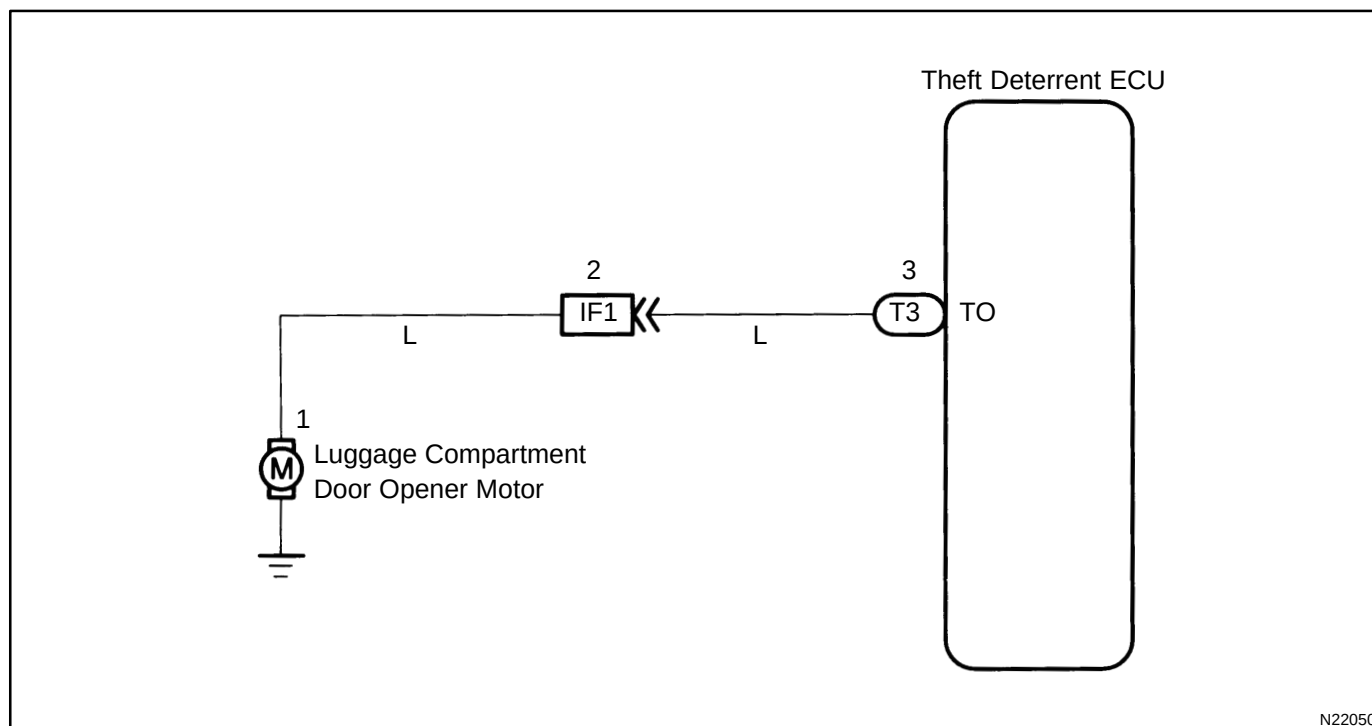
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-604](#)).

Luggage Compartment Door Opener Motor Circuit

CIRCUIT DESCRIPTION

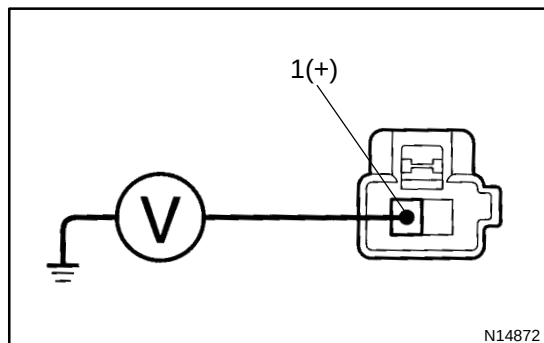
This circuit unlocks the luggage compartment door when the ECU sends signals to the luggage compartment door opener motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminal 1 of luggage compartment door opener motor and body ground.**

**PREPARATION:**

Disconnect the courtesy switch and opener motor connector.

CHECK:

Measure voltage between terminal 1 of luggage compartment door opener motor and body ground, when opener switch is pulled and not pulled.

OK:

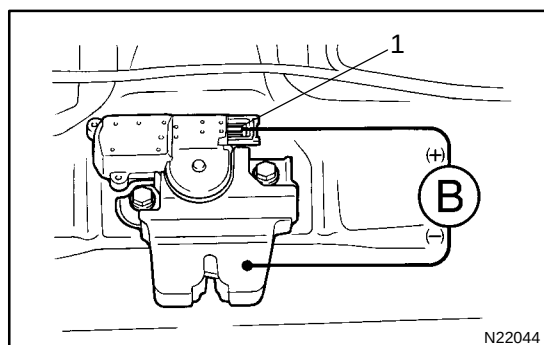
Opener switch	Voltage
Pulled	5 – 14 V
Not pulled	Below 1 V

NG

Check harness and connectors between ECU and luggage compartment door opener motor (See page IN-31).

OK

- 2 Check luggage compartment door opener motor.**

**PREPARATION:**

Disconnect luggage compartment door courtesy switch and opener motor connector.

CHECK:

Connect positive (+) lead from the battery to terminal 1 and the negative (–) lead to the body ground.

OK:

Operated motor shaft and gear.

HINT:

Perform inspection in a short time (within 1 second).

NG

Replace luggage compartment door opener motor.

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI-604).

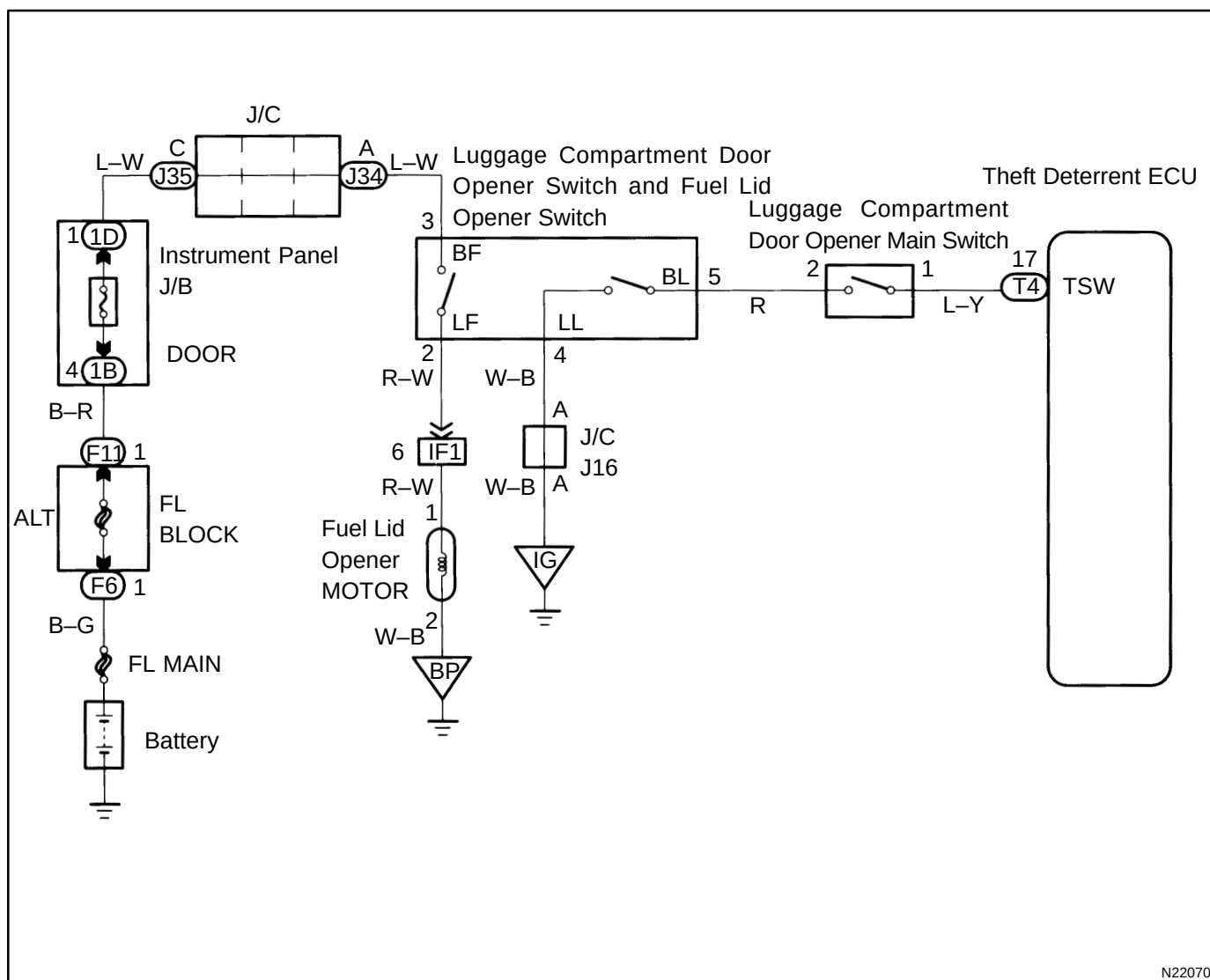
Luggage Compartment Door Opener Main Switch and Opener Switch Circuit

CIRCUIT DESCRIPTION

The luggage compartment door opener main switch is OFF when it is pushed in, and the luggage compartment door opener switch is ON when it is pulled.

The ECU energizes the luggage compartment door opener solenoid only when the main switch and opener switch are ON together.

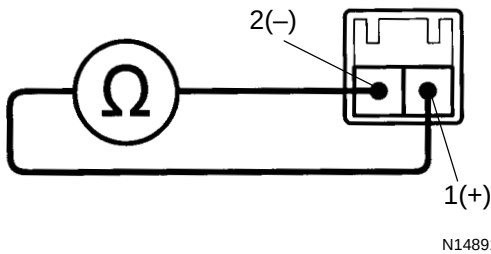
WIRING DIAGRAM



N22070

INSPECTION PROCEDURE

1 Check luggage compartment door opener main switch and opener switch.

Luggage Compartment
Door Opener Main Switch**PREPARATION:**

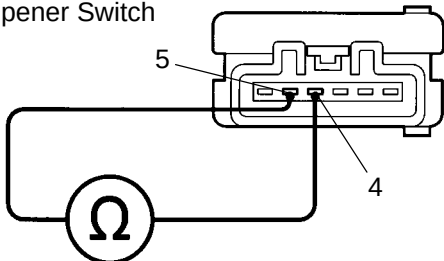
Disconnect the luggage compartment door opener main switch and opener switch connector.

CHECK:

- (a) Check luggage compartment door opener main switch.
- (b) Check continuity between terminals of main switch connector.

OK:

Switch position	Tester connection	Specified condition
ON	1 – 2	Continuity
OFF	–	No continuity

Luggage Compartment Door
Opener Switch**CHECK:**

- (a) Check luggage compartment door opener switch.
- (b) Check continuity between terminals of main switch and opener switch connector.

OK:

Switch position	Tester connection	Specified condition
ON	4 – 5	Continuity
OFF	–	No continuity

NG

Replace luggage compartment door opener main switch and/or opener switch.

OK

2 Check harness and connector between ECU and main switch, opener switch and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

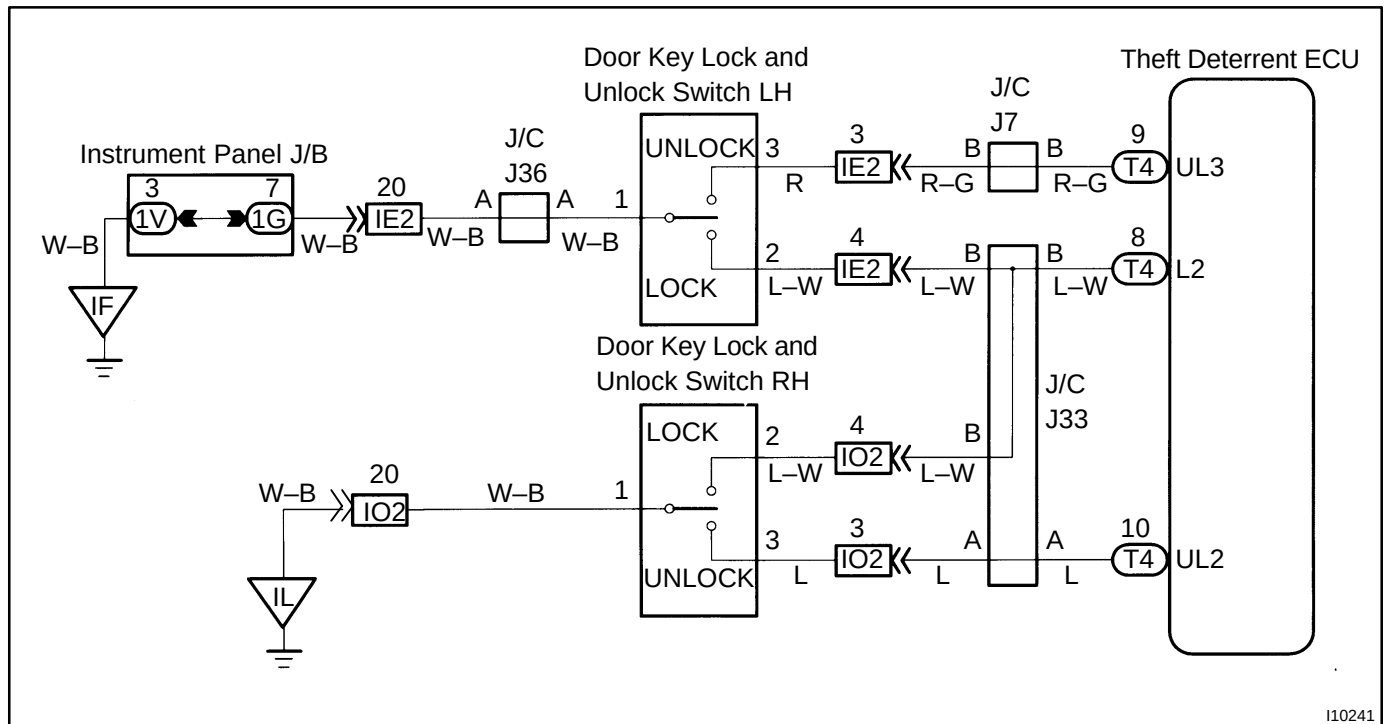
Proceed to next circuit inspection shown in problem symptom table (See page [DI-604](#)).

Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

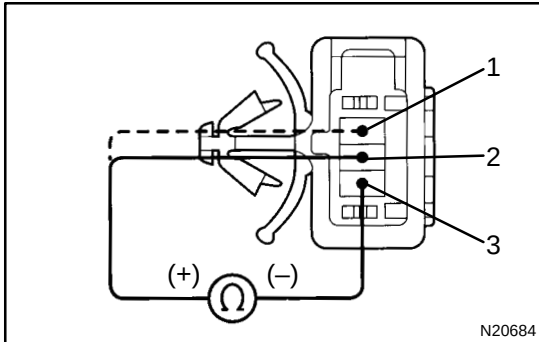
The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 1 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.

WIRING DIAGRAM



I10241

INSPECTION PROCEDURE

1 Check door key lock and unlock switch.**PREPARATION:**

- (a) Remove the door trim and service hole cover.
- (b) Disconnect the door key lock and unlock switch connector.

CHECK:

Check continuity between terminals 1, 2 and 3 of door key lock and unlock switch connector, when door key lock and unlock switch is turned to the lock side, unlock side and not turned.

OK:

Switch position	Tester connection	Specified condition
Lock side	2 – 3	Continuity
Unlock side	1 – 3	Continuity
OFF	–	No continuity

NG**Replace door key lock and unlock switch.****OK****2 Check harness and connectors between ECU and switch, switch and body ground (See page IN-31).****NG****Repair or replace harness or connector.****OK****Check and replace theft deterrent ECU.*1**

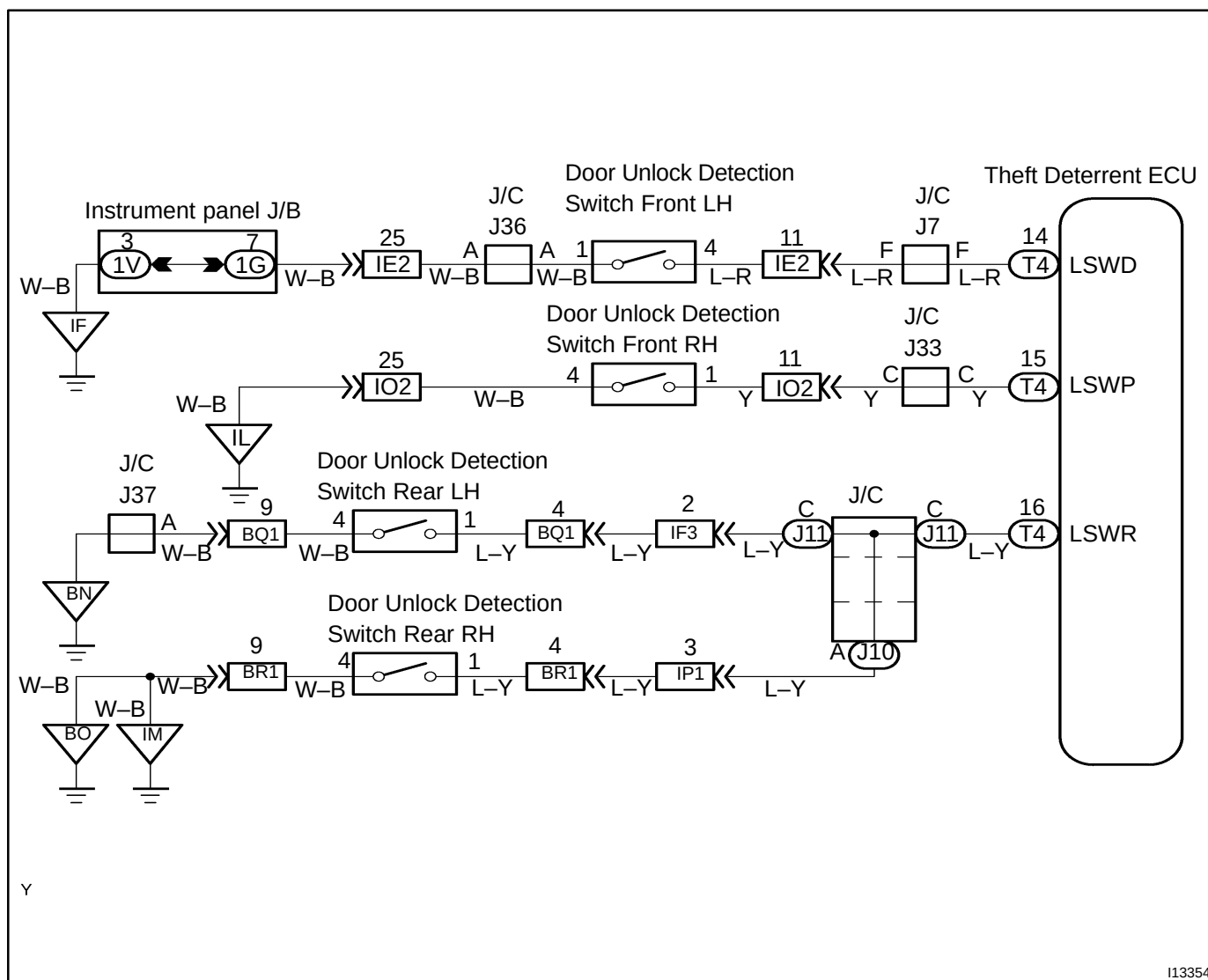
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI-604).

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 from this circuit. It is used as one of the operating conditions for the key confinement prevention function.

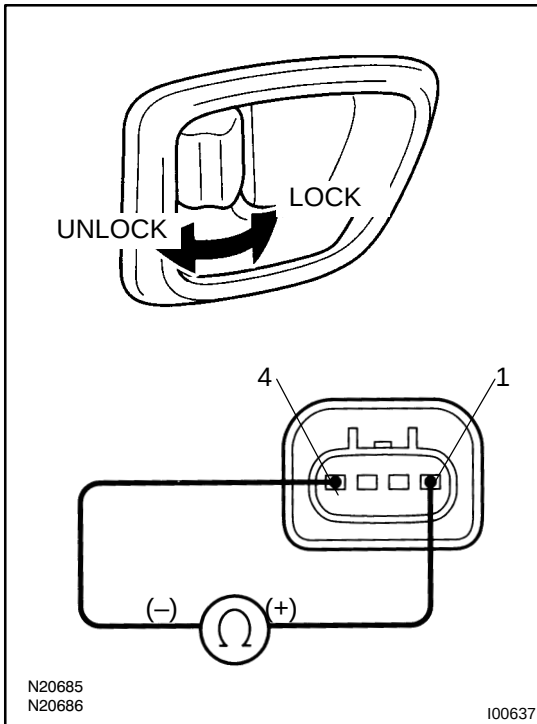
WIRING DIAGRAM



I13354

INSPECTION PROCEDURE

1 Check Door Unlock Detection Switch.

**PREPARATION:**

- (a) Remove the door trim and service hole cover.
- (b) Disconnect door unlock detection switch connector.

CHECK:

Check continuity between terminals 1 and 4 of door unlock detection switch connector, when the door lock knob is operated to the lock side and unlock side.

OK:

Switch Condition	Tester connection	Specified condition
Door unlock	1 – 4	Continuity
Door lock	–	No continuity

NG

Replace door unlock detection switch.

OK

2 Check harness and connectors between ECU and door unlock detection switch, door unlock detection switch and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

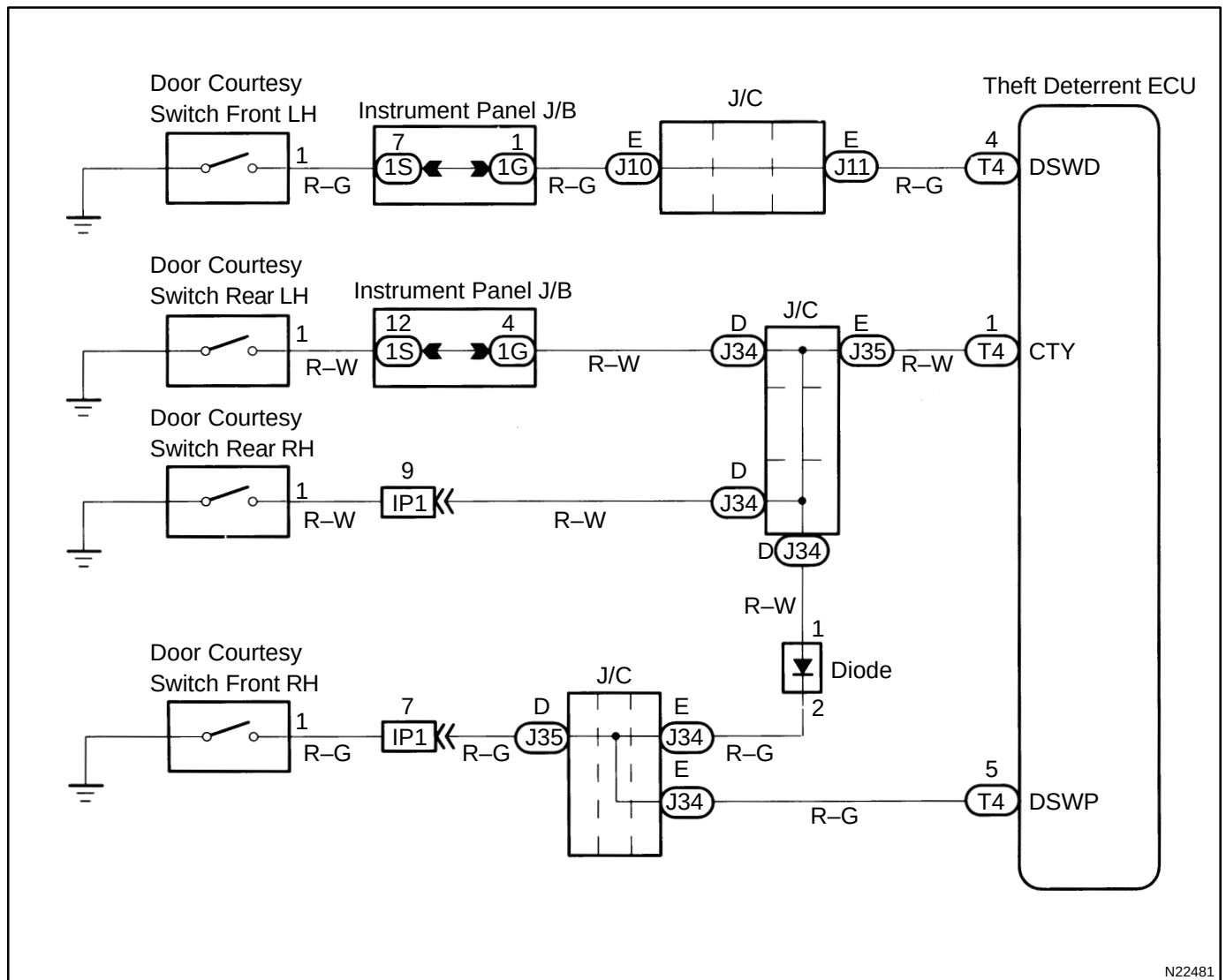
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-604](#)).

Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The door courtesy switch goes ON when the door is opened and goes OFF when the door is closed.

WIRING DIAGRAM



N22481

INSPECTION PROCEDURE

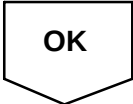
1	Check operation of open door warning light.

CHECK:

Check that open door warning light comes ON when each door is opened, and goes OFF when all doors are closed.


NG

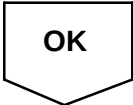
Check and repair open door warning light circuit.


OK

2	Check for open in harness and connector between theft deterrent ECU and door courtesy switch (See page IN-31).


NG

Repair or replace harness or connector.


OK

Check and replace theft deterrent ECU.*1

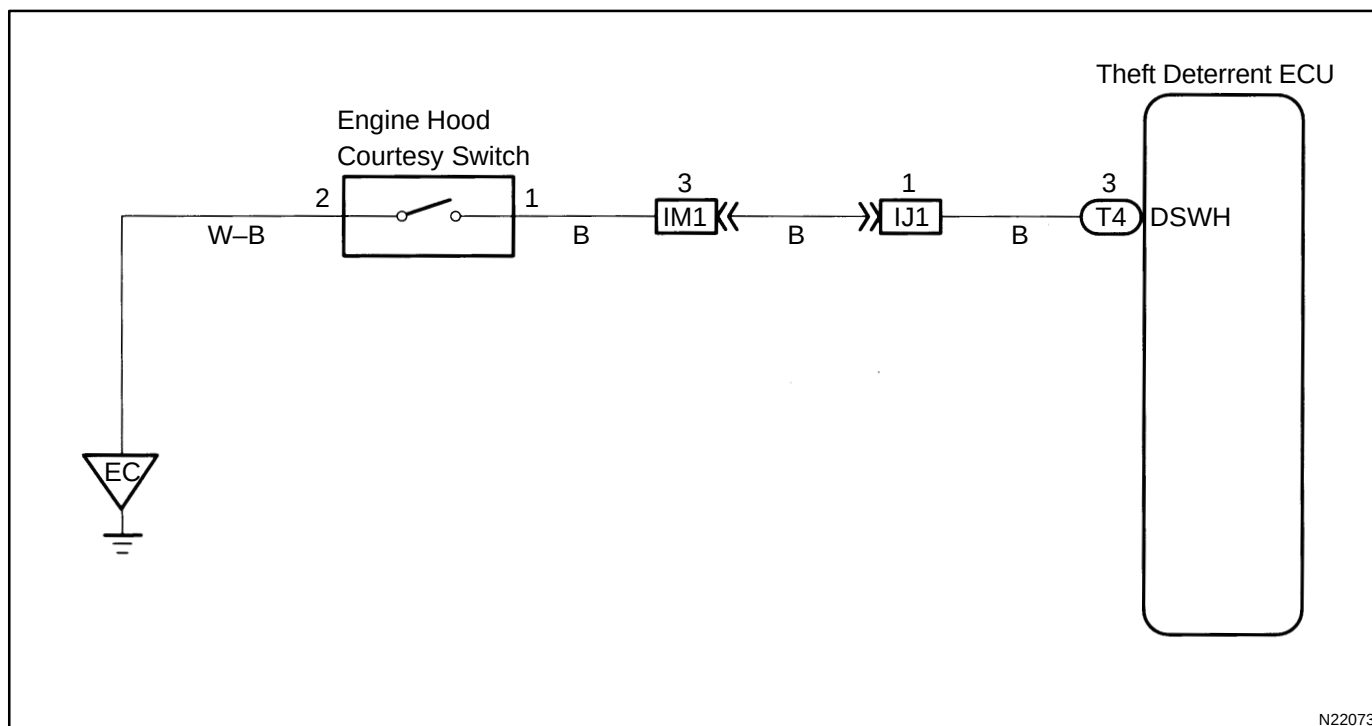
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-604](#)).

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.

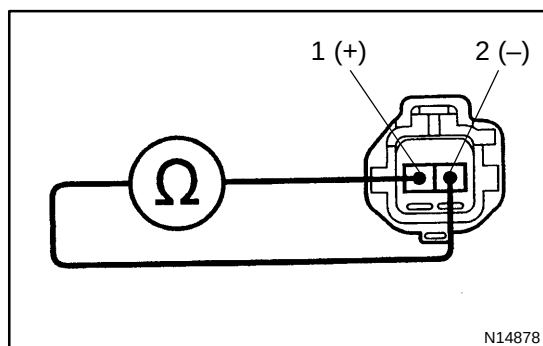
WIRING DIAGRAM



N22073

INSPECTION PROCEDURE

- 1 Check engine hood courtesy switch.



N14878

PREPARATION:

- (a) Remove engine hood lock assembly.
- (b) Disconnect engine hood courtesy switch connector.

CHECK:

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK:

Engine hood lock	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

NG

Replace engine hood courtesy switch.

OK

2

Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

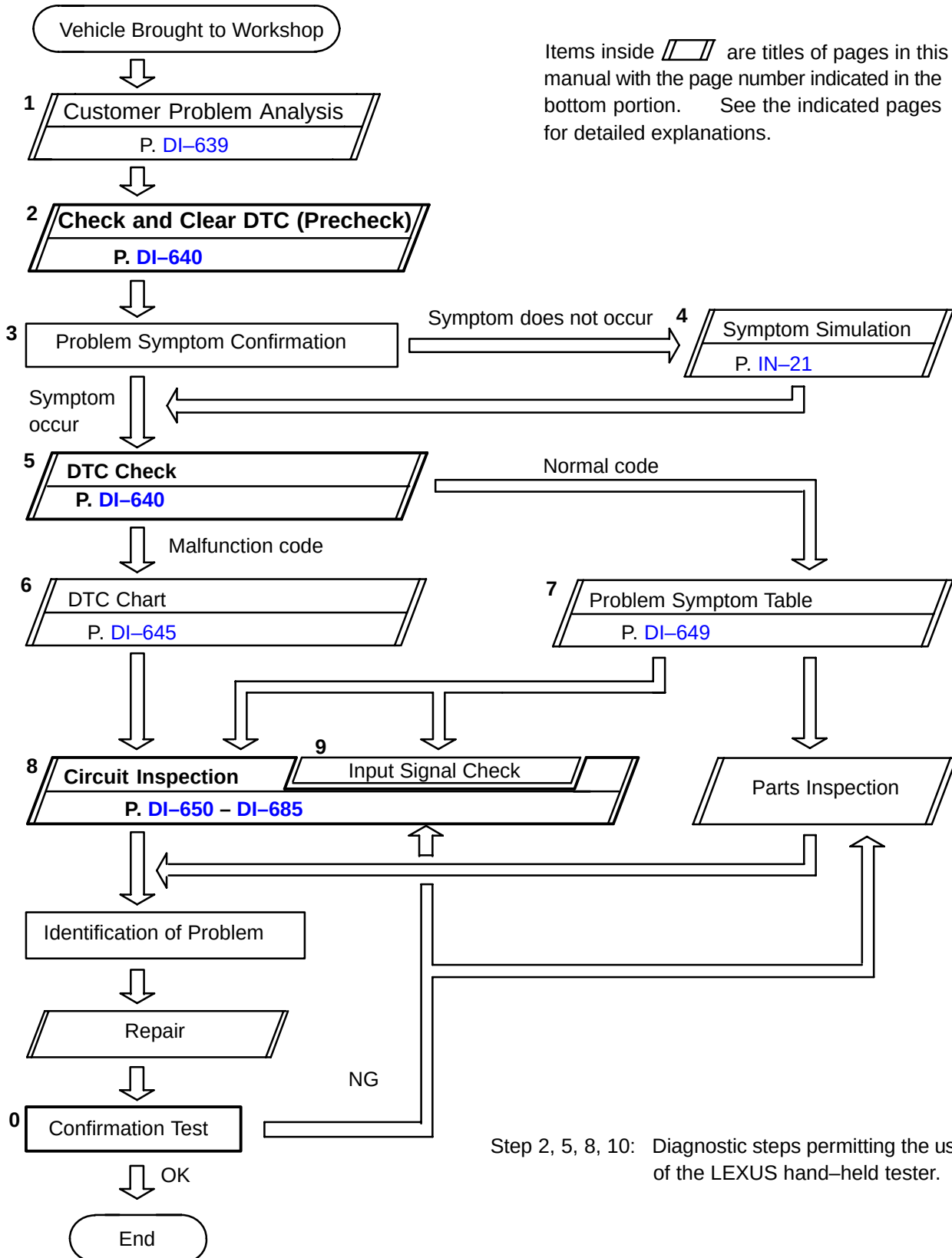
OK

Check and replace theft deterrent ECU (See page [IN-31](#)).

CRUISE CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DIOEF-07



CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

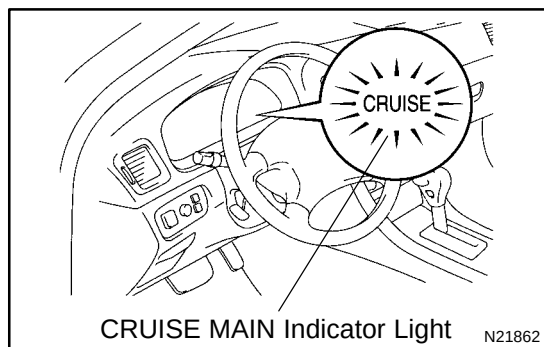
Inspector's name: _____

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 Occur?	☐ Continuous ☐ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	☐ Auto cancel occurs	- Driving condition City driving Freeway Up hill Down hill - After cancel occurred, did the driver activate cruise control again? Yes No
	Cancel does not occur	With brake ON Except D position shift At 40 km/h (25 mph) or less When control SW turns to CANCEL position
	Cruise control malfunction	Slip to acceleration side Slip to deceleration side Hunting occurs O/D cut off does not occur O/D does not return
	Switch malfunction	SET ACCEL COAST RESUME CANCEL
	CRUISE main indicator light	Remains ON Does not light up Blinking

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



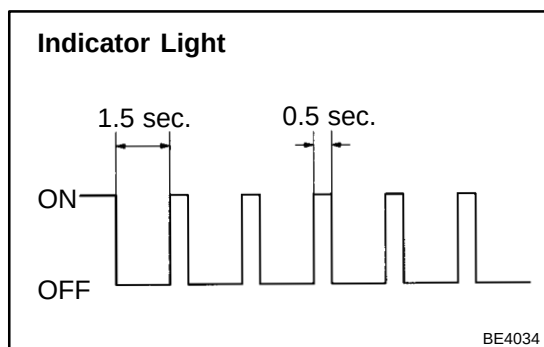
PRE-CHECK

1. DIAGNOSIS SYSTEM

- (a) Check the indicator.
 - (1) Turn the ignition switch to ON.
 - (2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT:

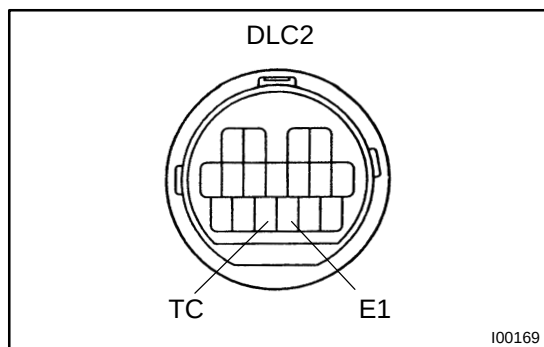
If the indicator check result is not normal, proceed to troubleshooting (See page [BE-3](#)) for the combination meter section.



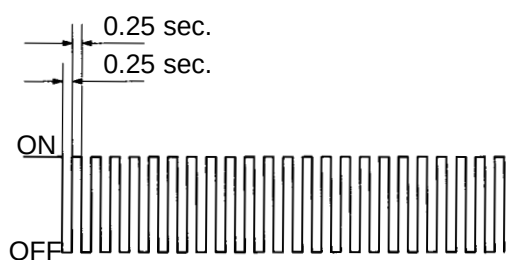
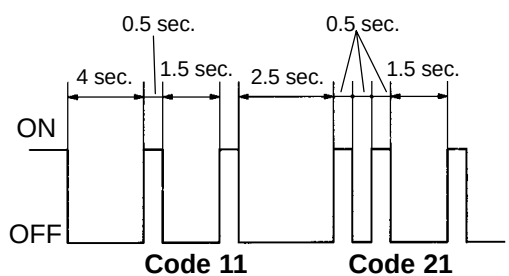
- (b) Check the DTC.

HINT:

If a malfunction occurs in the No. 1 vehicle speed sensors or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns ON and OFF the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



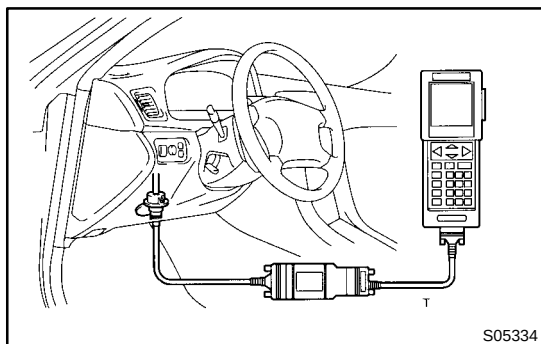
- (c) Output DTC using diagnosis check wire.
 - (1) Turn the ignition switch ON.
 - (2) Using SST, connect terminals Tc and E₁ of DLC2.
SST 09843-18020
 - (3) Read the DTC on the CRUISE MAIN indicator light.

Normal Code**Malfunction codes 11 and 21**BE4032
BE4033

I00021

HINT:

- If the DTC is not output, inspect the diagnosis circuit (See page [DI-683](#)).
- As an example, the blinking patterns for codes; normal, 11 and 21 are shown in the illustration.

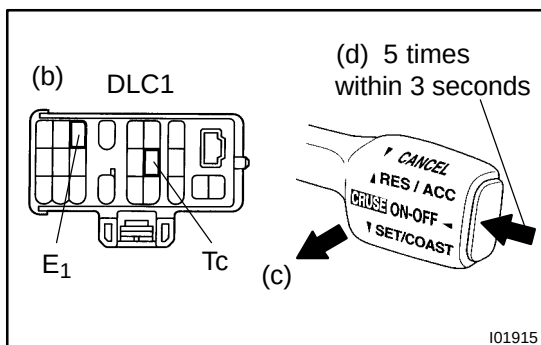
**2. USING LEXUS HAND-HELD TESTER**

- Hook up the LEXUS hand-held tester to the DLC2.
- Monitor the ECU data by following the prompts on the tester screen.

HINT:

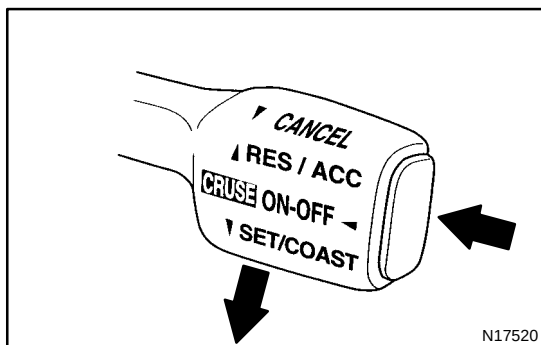
LEXUS hand-held tester has a "Snapshot" function which records the monitored data.

Please refer to the LEXUS hand-held tester operator's manual for further details.

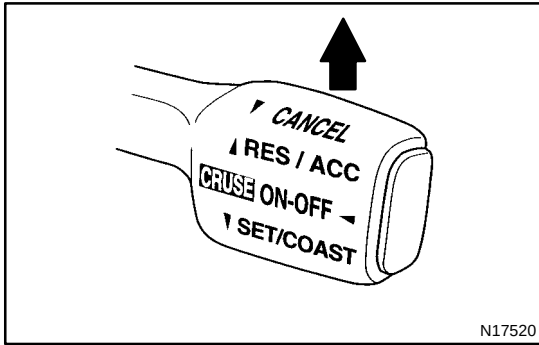
**3. DTC CLEARANCE (ERASE MODE)****HINT:**

During in the erase mode, diag detection dose not work.

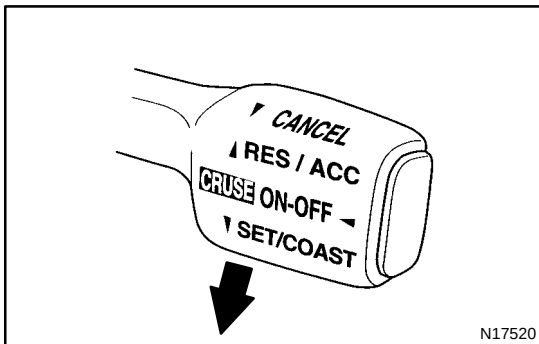
- Drive at about 15 km/h or below.
- Using SST, connect terminals Tc and E₁ of DLC1
SST 09843-18020
- Pull the cruise control switch to CANCEL.
- On the above metioned condition, turn on the cruise control main switch 5 times within 3 seconds.

**4. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)**

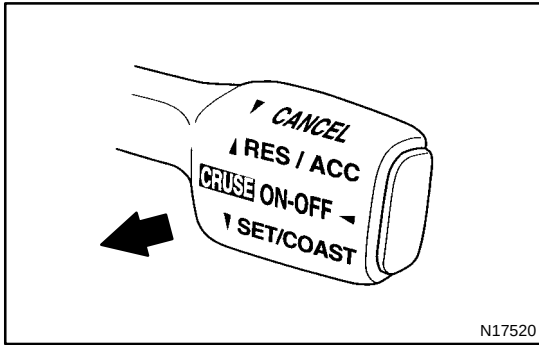
- Inspect the SET switch.
 - Push the main switch ON.
 - Drive at a desired speed (40 km/h (25 mph) or higher).
 - Press the control switch to the SET/COAST.
 - After releasing the switch, check that the vehicle cruises at the desired speed.



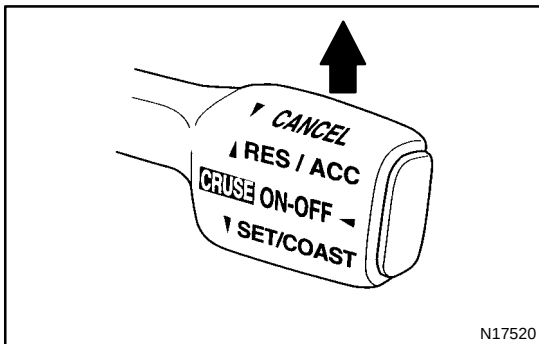
- (b) Inspect the ACCEL switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Check that the vehicle speed increases while the control switch is turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
 - (4) Momentarily press the control switch upward in the RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap-up function).



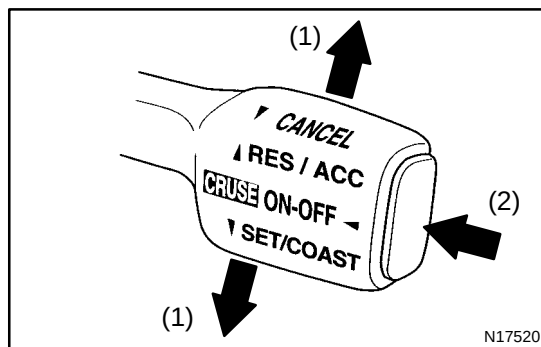
- (c) Inspect the COAST switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
 - (4) Momentarily press the control switch is turned to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap-down function).



- (d) Inspect the CANCEL switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
 - Depress the brake pedal
 - Shift to except D 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 followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
 - Depress the brake pedal
 - Shift to except D 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.

- Press the control switch to SET/COAST or RES/ACC position and hold it down or hold it up "1".
- Push the main switch ON "2".
- Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.
- Turn the SET/COAST or RES/ACC switch OFF.
- Operate each switch as listed in the table below.
- Read the blinking pattern of the CRUISE MAIN indicator light.
- After performing the check, turn the main switch OFF.

HINT:

When 2 or more signals are input to the ECU, the lowest numbered code will be displayed first.

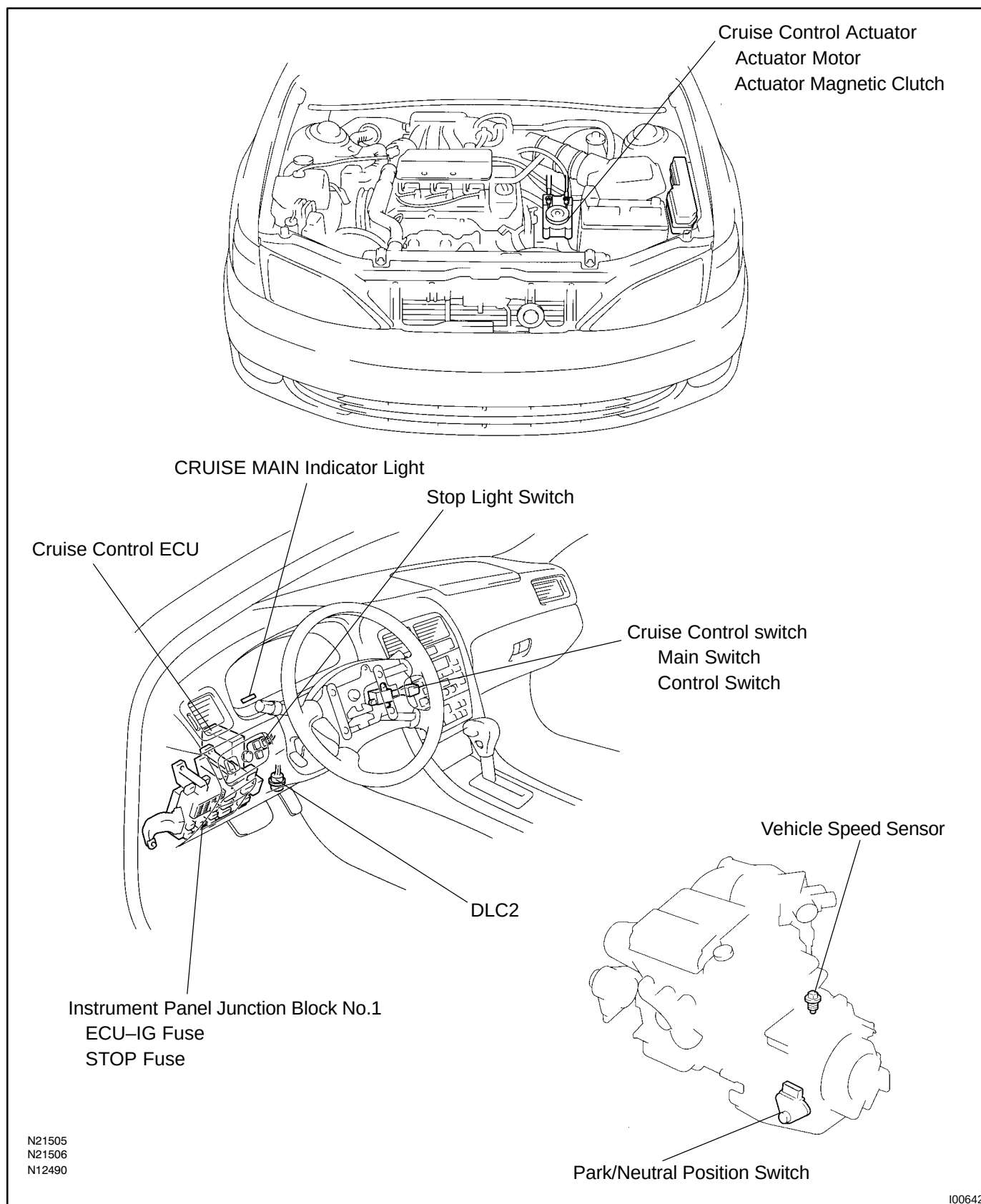
No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON		SET/COAST switch circuit is normal
2	Turn RES/ACC switch ON		RES/ACC switch circuit is normal
3	Turn CANCEL switch ON		CANCEL switch circuit is normal
	Turn stop light switch ON Depress brake pedal		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

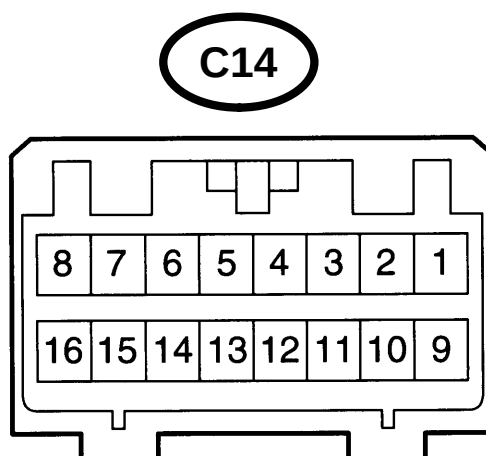
If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See Page)	Circuit Inspection	Trouble Area
11, 15 (DI-650)	●Actuator Motor Circuit	●Actuator motor ●Harness or connector between cruise control ECU and actuator motor ●Cruise control ECU
12 (DI-652)	●Actuator Magnetic Clutch Circuit	●STOP Fuse ●Stop light switch ●Actuator magnetic clutch ●Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground ●Cruise control ECU
14 (DI-655)	●Actuator Mechanical Malfunction	●Actuator motor (actuator lock: motor, arm) ●Cruise control ECU
21 (DI-655)	●Open in Vehicle Speed Sensor Circuit	●Combination meter ●Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor ●Vehicle speed sensor ●Cruise control ECU
23 (DI-660)	●Vehicle Speed Signal Abnormal	●Vehicle speed sensor ●Cruise control ECU
32 (DI-661)	●Control Switch Circuit	●Cruise control switch ●Harness or connector between cruise control ECU and cruise control switch, cruise control switch and body ground ●Cruise control ECU
41	●Cruise control ECU	●Cruise control ECU
42	●Source voltage drop	●Power source
51 (DI-664)	●Idle Signal Circuit	●Throttle position sensor ●Harness or connector between ECM and throttle position sensor ●Harness or connector between cruise control ECU and ECM ●Cruise control ECU

PARTS LOCATION



TERMINALS OF ECU



I00293

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP- ↔ GND (C14-2 ↔ C14-16)	G-W ↔ W-B	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
D ↔ GND (C14-3 ↔ C14-16)	B-R ↔ W-B	Shift to except D position	Below 1 V
		Shift to D position	10 – 16 V
PI ↔ GND (C14-4 ↔ C14-16)	O ↔ W-B	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 (C14-5 ↔ C14-16)	LG-R ↔ W-B	Ignition switch ON	10 – 16 V
		Ignition switch ON Connect terminals TC and E1 of diagnostic check connector	Below 1 V
ECT ↔ GND (C14-6 ↔ C14-16)	L-B ↔ W-B	During driving Gear position 3rd	10 – 16 V
		During driving Gear position O/D	Below 1 V
MC ↔ GND (C14-7 ↔ C14-16)	R-B ↔ W-B	During cruise control driving COAST switch held ON	9 – 15 V
		During cruise control driving ACC switch held ON	Below 1 V
L ↔ GND (C14-8 ↔ C14-16)	G-B ↔ W-B	During cruise control driving	9 – 15 V
		Except during cruise control driving	Below 1 V
B ↔ GND (C14-9 ↔ C14-16)	B-R ↔ W-B	Ignition switch ON	10 – 16 V
CCS ↔ GND (C14-10 ↔ C14-16)	W ↔ W-B	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch held ON	4.2 – 8.8 V
		Ignition switch ON SET/COAST switch held ON	2.5 – 6.3 V
		Ignition switch ON RES/ACC switch held ON	0.8 – 3.7 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CMS ↔ GND (C14-11 ↔ C14-16)	W-L ↔ W-B	Ignition switch ON Main switch OFF	10 – 16 V
		Ignition switch ON Main switch ON	Below 0.5 V
SPD ↔ GND (C14-12 ↔ C14-16)	V-W ↔ W-B	Engine start Car stoppage.	Below 1.5 V or 4.7 – 16 V
		During driving (Pulse generated).	3 – 7 V
IDL ↔ GND (C14-13 ↔ C14-16)	L-R ↔ W-B	Ignition switch ON Throttle valve fully opened.	10 – 16 V
		Ignition switch ON Throttle valve fully closed.	Below 1.5 V
OD ↔ GND (C14-14 ↔ C14-16)	Y-B ↔ W-B	During cruise control driving OD switch ON.	10 – 16 V
		During cruise control driving OD switch OFF (3rd driving)	Below 1 V
MO ↔ GND (C14-15 ↔ C14-16)	R-G ↔ W-B	During cruise control driving ACC switch held ON	9 – 15 V
		During cruise control driving COAST switch held ON	Below 1 V
GND ↔ Body Ground (C14-16 ↔ Body Ground)	W-B ↔ Body Ground	Constant	Below 1 V

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Main Switch Circuit (Cruise control switch) 2. Vehicle Speed Sensor 3. Control Switch Circuit (Cruise control switch) 4. Stop Light Switch Circuit 5. Park/Neutral Position Switch Circuit 6. Actuator Motor Circuit 7. Cruise Control Cable 8. Cruise Control ECU	DI-679 DI-657 DI-661 DI-667 DI-673 DI-650 DI-685 IN-31
SET not occurring or CANCEL occurring. (DTC dose not output)	1. ECU Power Source Circuit 2. Cruise Control ECU	DI-676 IN-31
Actual vehicle speed deviates above or below the set speed.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Electronically Controlled Transmission Communication Circuit 4. Actuator Motor Circuit 5. Idle Signal Circuit (main throttle position sensor) 6. Cruise Control ECU	DI-685 DI-660 DI-670 DI-650 DI-664 IN-31
Gear shifting frequent between 3rd and O/D when driving on uphill road. (Hurting)	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI-670 IN-31
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-685 DI-667 DI-650 IN-31
Cruise control not cancelled, even when transmission is shifted to "N" position.	1. Cruise Control Cable 2. Park/Neutral Position Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-685 DI-673 DI-650 IN-31
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-685 DI-661 DI-650 IN-31
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-685 DI-660 DI-650 IN-31
Poor response is ACCEL and RESUME modes.	1. Cruise Control Cable 2. Electronically Controlled Transmission Communication Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-685 DI-670 DI-650 IN-31
O/D does not RESUME, even though the road is not uphill.	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI-670 IN-31
DTC memory is erased.	1. Cruise Control ECU	IN-31
DTC is not output, or is output when it should not be.	1. Diagnosis Circuit 2. Cruise Control ECU	DI-683 IN-31
Cruise MAIN indicator light remains ON or falls to light up.	1. Cruise MAIN Indicator Light Switch Circuit 2. Cruise Control ECU	DI-681 IN-31

CIRCUIT INSPECTION

DTC	11, 15	Actuator Motor Circuit

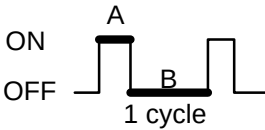
CIRCUIT DESCRIPTION

The actuator motor is operated by signals from the ECU. Acceleration and deceleration signals are transmitted by changes in the Duty Ratio (See below).

Duty Ratio

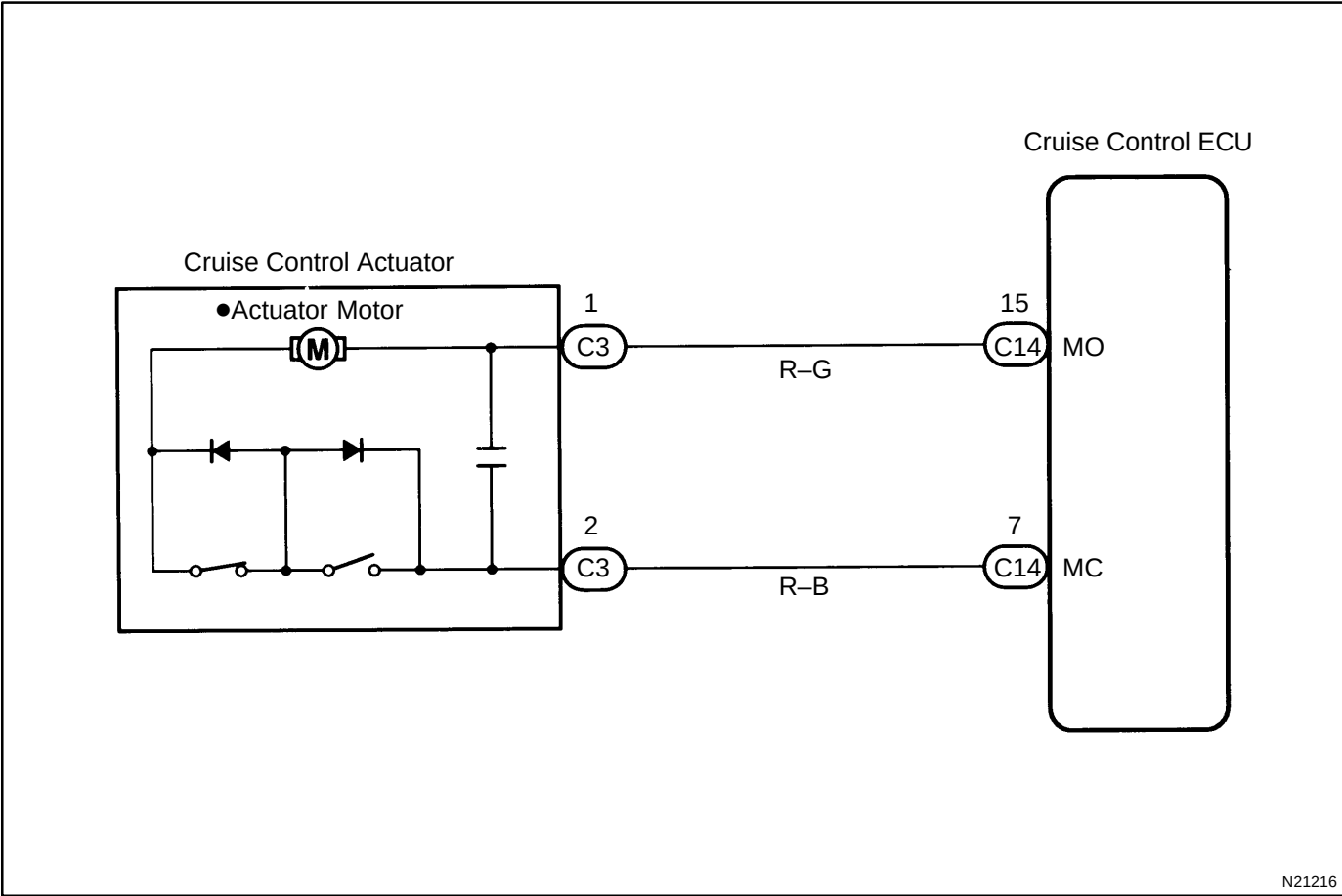
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then.

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



DTC No.	Detection Item	Trouble Area
11	Short in actuator motor circuit.	Actuator motor Harness or connector between cruise control ECU and actuator motor Cruise control ECU
15	Open in actuator motor circuit.	Actuator motor

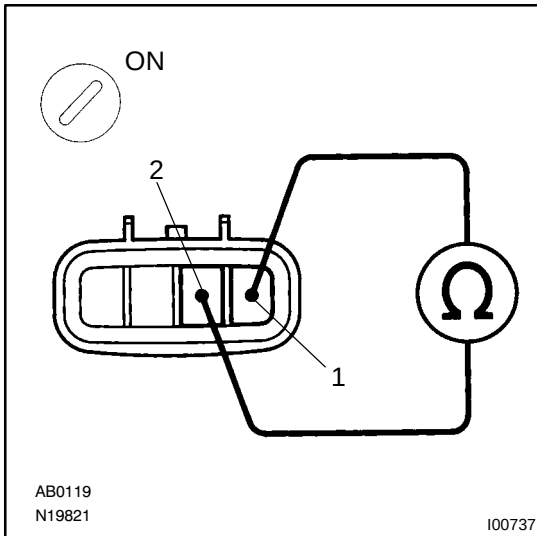
WIRING DIAGRAM



N21216

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 position is fully opened or fully closed, 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-31).

NG	Repair or replace harness or connector.

OK

Check and replace cruise control ECU. (See page IN-31).

DTC	12	Actuator Magnetic Clutch Circuit

CIRCUIT DESCRIPTION

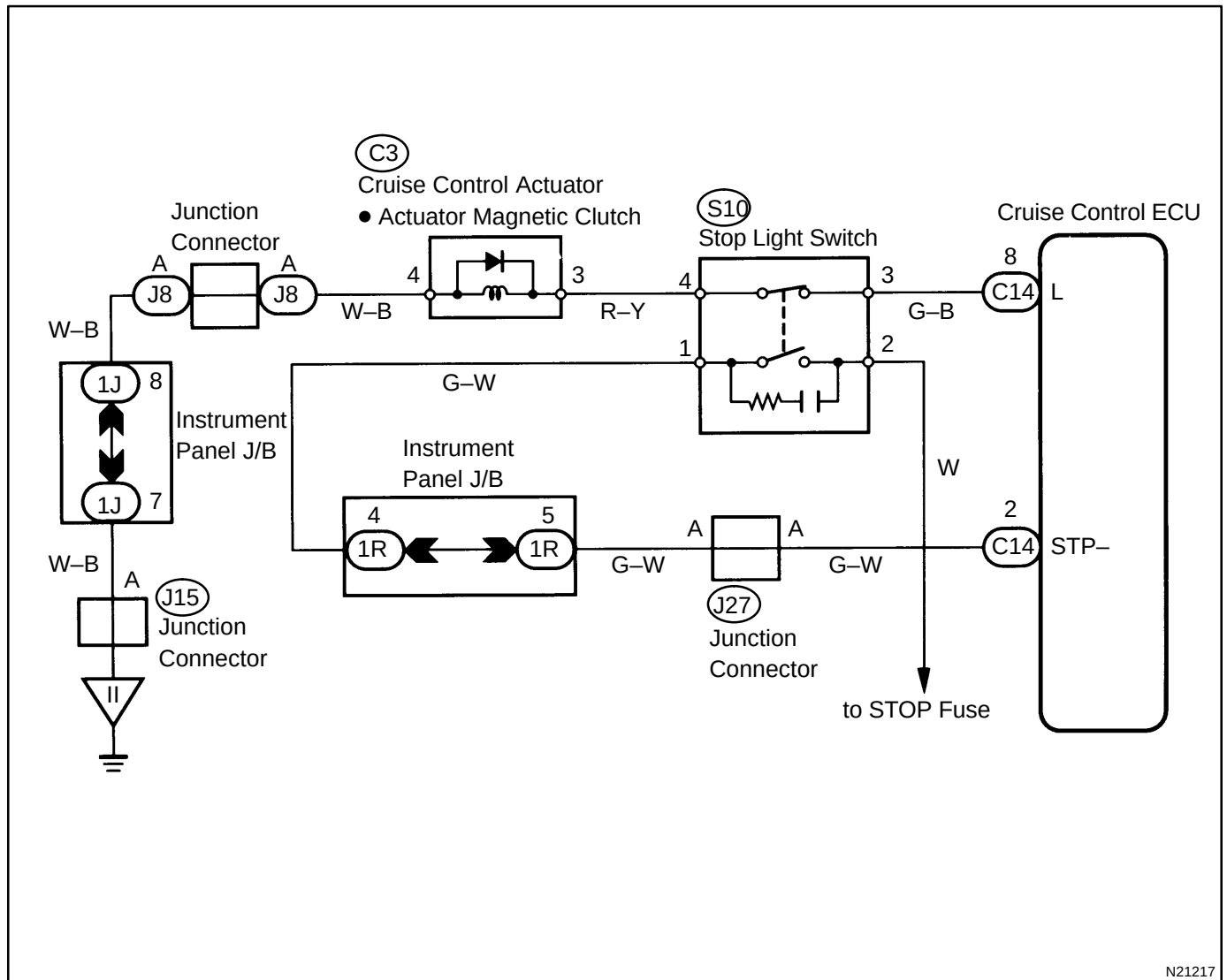
This circuit turns on the magnetic clutch inside the actuator during cruise control operation according to the signal from the ECU. If a malfunction occurs in the actuator or speed sensor, etc. during cruise control operation, the rotor shaft between the motor and control plate is released.

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 15 km/h (9 mph), the ECU turns the safety magnet clutch OFF. If the vehicle speed later drops to within 10 km/h (6 mph) above the set speed, then cruise control at the set speed is resumed.

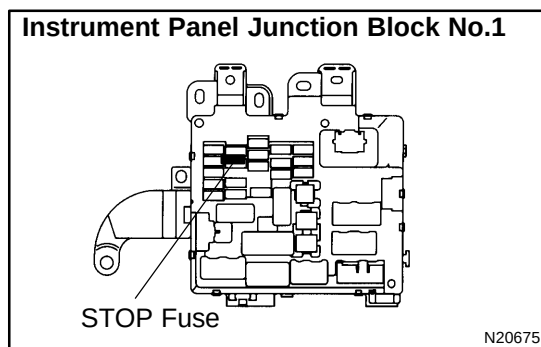
DTC No.	Detection Item	Trouble Area
12	Short in actuator magnetic clutch circuit. Open (0.8 sec.) in actuator magnetic clutch circuit.	STOP Fuse Stop light switch Actuator magnetic clutch Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check STOP fuse.

**PREPARATION:**

- Turn ignition switch OFF.
- Remove the STOP fuse from instrument panel junction block No.1.

CHECK:

Check fuse continuity.

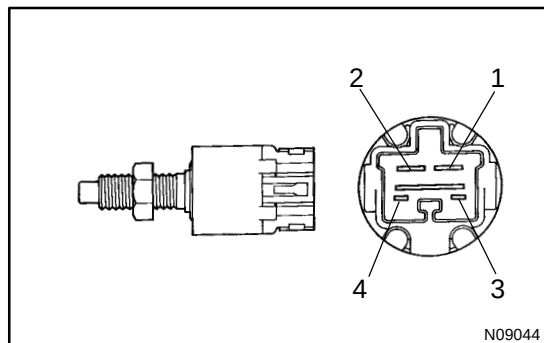
OK:

There is continuity.

NG

Replace STOP fuse.

OK

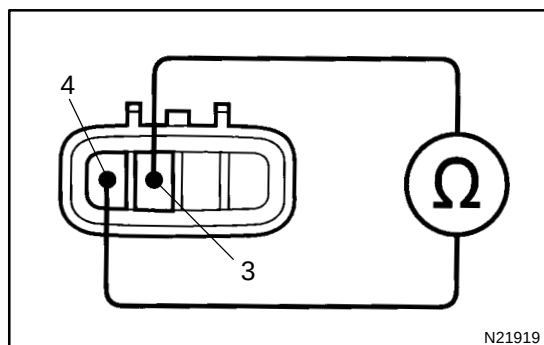
2 Check stop light switch.**PREPARATION:**

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****3 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****4 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-31).****NG****Repair or replace harness or connector.****OK**

Check and replace cruise control ECU (See page IN-31).

DTC	14	Actuator Mechanical Malfunction

CIRCUIT DESCRIPTION

The circuit detects the rotation position of the actuator control plate and sends a signal to the ECU.

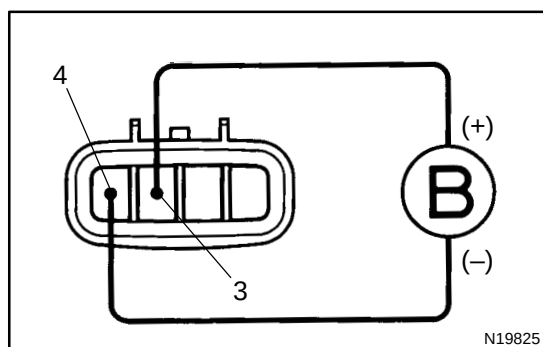
DTC No.	Detection Item	Trouble Area
14	●Cruise control actuator mechanical malfunction.	●Actuator lock: (motor, arm) ●Actuator motor ●Cruise control ECU

WIRING DIAGRAM

See page [DI-650](#).

INSPECTION PROCEDURE

1	Check cruise control actuator arm locking operation



PREPARATION:

- Turn ignition switch OFF.
- 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. You will damage the cruise control actuator.

- Move the control plate by hand.

OK:

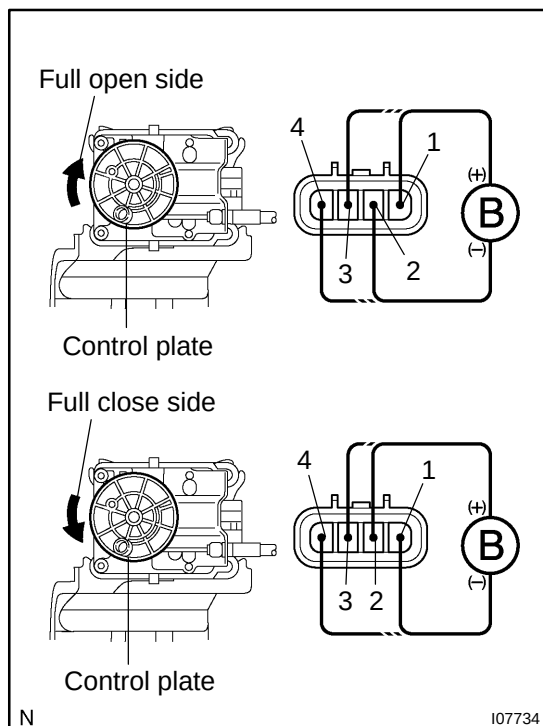
Control plate doesn't move.

NG

Replace cruise control actuator.

OK

2 Check cruise control actuator operation.



PREPARATION:

- (a) Turn ignition switch OFF.
- (b) 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 full 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 full close side

NG

Replace cruise control actuator.

OK

3 Check harness and connector between cruise control ECU and cruise control actuator (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page [IN-31](#)).

DTC	21	Open in Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

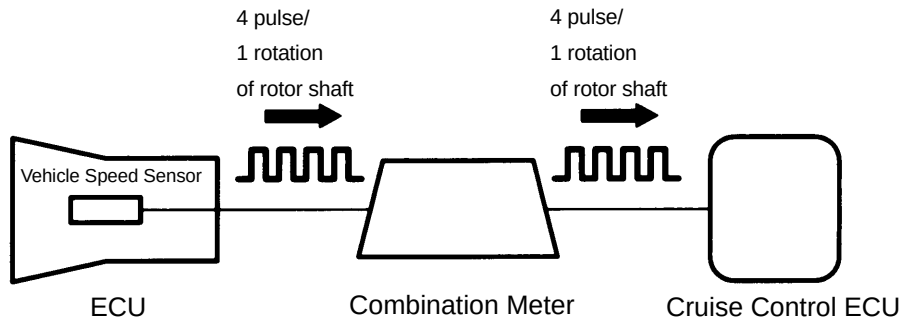
The vehicle speed sensor circuit is sent to cruise control ECU as vehicle speed signal.

The rotor shaft is driven by the gear of the transmission.

For each rotation of the shaft, the vehicle speed sensor sends a 4-pulse signal through the combination meter to the cruise control ECU (See the following chart).

This signal is converted inside the combination meter and sent as a 4-pulse signal to the cruise control ECU.

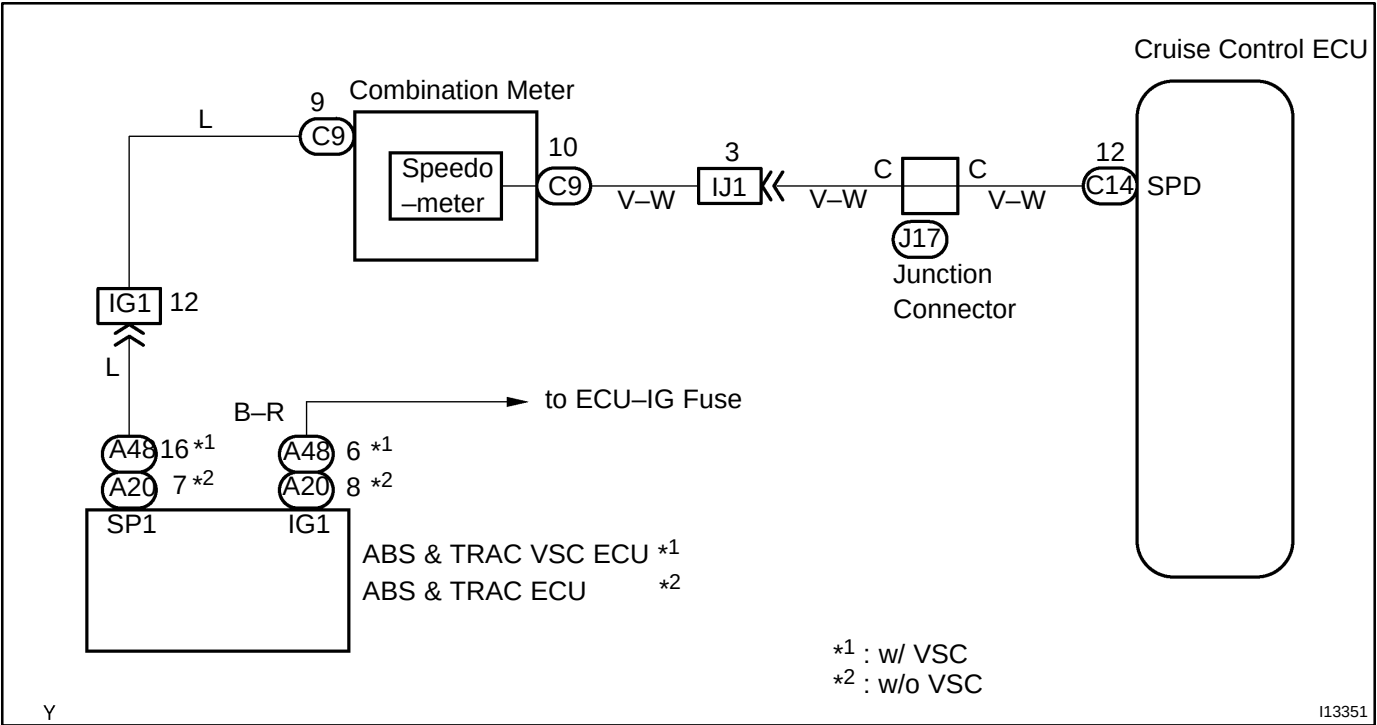
The ECU calculates the vehicle speed from this pulse frequency.



I00292

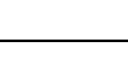
DTC No.	Detection Item	Trouble Area
21	Speed signal is not input to the cruise control ECU while cruise control is set.	- Combination meter - Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor - Vehicle speed sensor - Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Input signal check.

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-640](#).
 (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-31](#)).

NG

2	Check speedometer circuit (See Combination meter troubleshooting on page BE-3).

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-31).

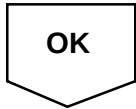
NG

Repair or replace harness or connector.

OK

4	Check vehicle speed sensor (See page BE-99).

NG	Replace vehicle speed sensor.



Check and replace cruise control ECU (See page IN-31).

DTC	23	Vehicle Speed Signal Abnormal

CIRCUIT DESCRIPTION

See page [DI-657](#).

DTC No.	Detection Item	Trouble Area
23	●Vehicle speed sensor pulse is abnormal.	●Vehicle speed sensor ●Cruise control ECU

WIRING DIAGRAM

See page [DI-657](#).

INSPECTION PROCEDURE

1	Check vehicle speed sensor (See page BE-99).

NG

Replace vehicle speed sensor.

OK

Check and replace cruise control ECU (See page [IN-31](#)).

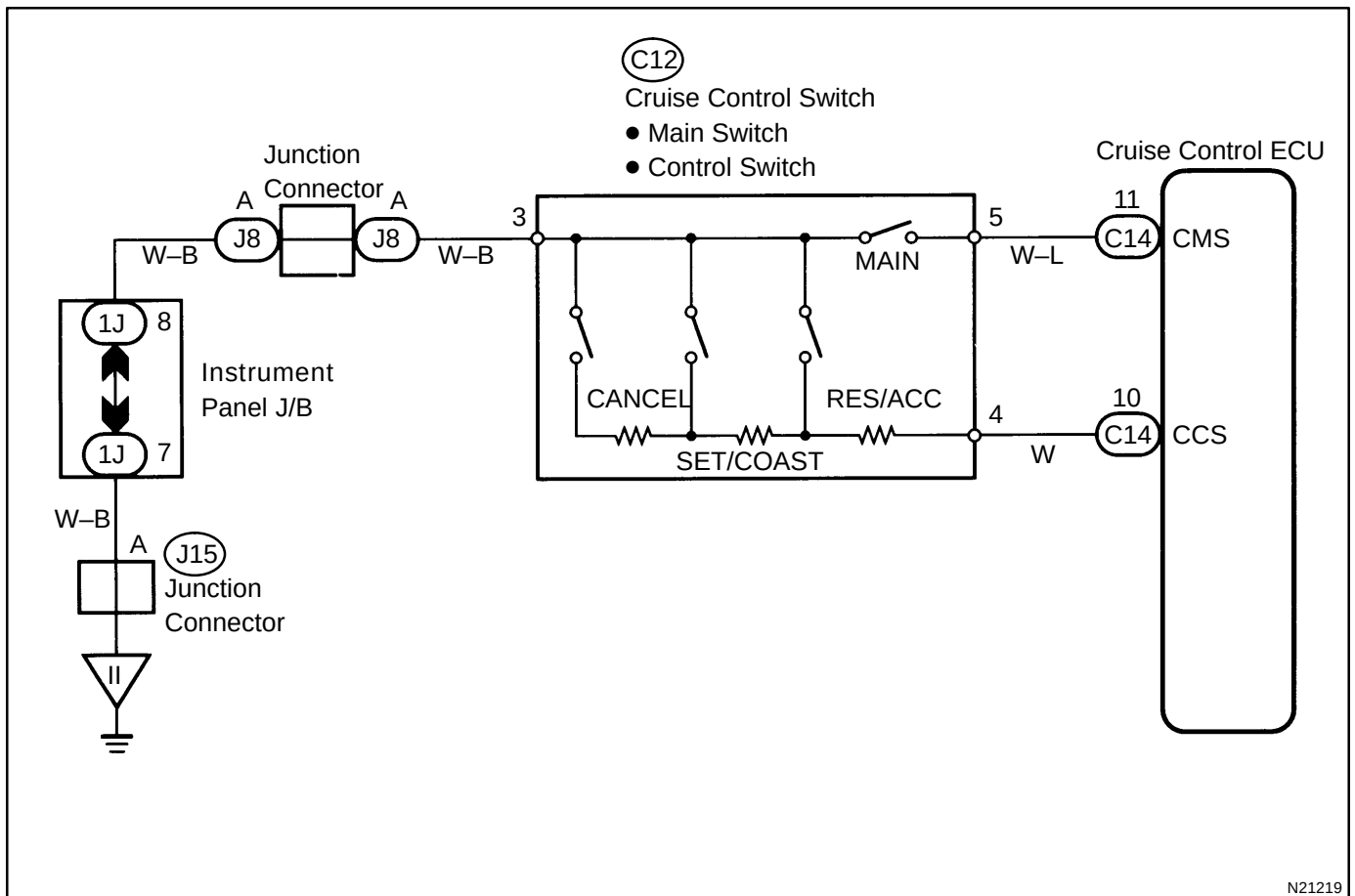
DTC	32	Control Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signals (each voltage) to the ECU.

DTC No.	Detection Item	Trouble Area
32	Short in control switch circuit.	Cruise control switch Harness or connector between cruise control ECU and cruise control switch, cruise control switch and body ground Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Input signal check.

Input Signal	Indicator Light Blinking Pattern
SET/COAST switch	ON OFF 2 Pulses
RESUME/ACCEL switch	ON OFF 3 Pulses
CANCEL switch	ON SW OFF OFF SW ON

PREPARATION:

See input signal check on page [DI-640](#).

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

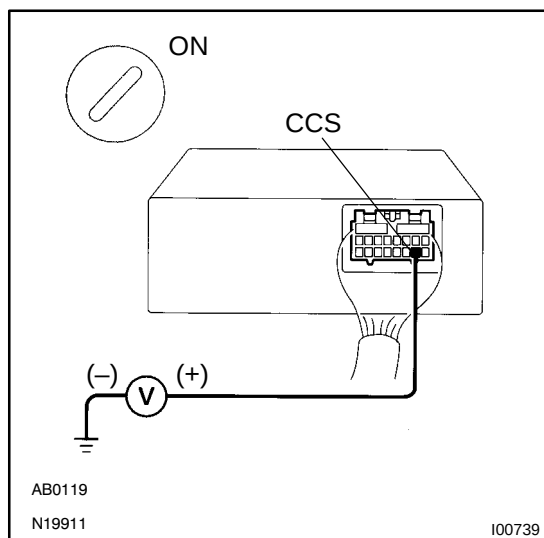
The indicator light goes off when the cancel switch is turned ON.

OK

Wait and see.

NG

2 Check voltage between terminals CCS of cruise control ECU connector and body ground.

**PREPARATION:**

- Remove the ECU with connector still connected.
- 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.

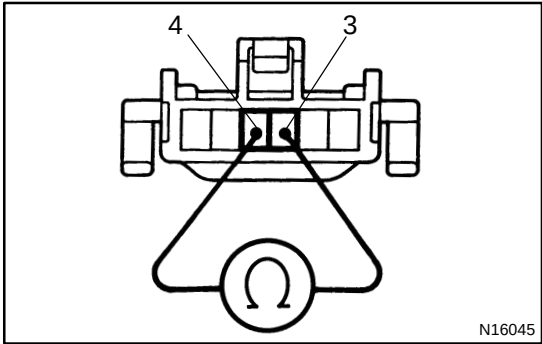
Switch position	Resistance (V)
Neutral	10 – 16 V
RES/ACC	0.6 – 2.3 V
SET/COAST	1.9 – 4.7 V
CANCEL	3.4 – 7.2 V

NG

Proceed to next circuit inspection shown on problem symptom table (See page [DI-649](#)).

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 (Ω)
Neutral	∞ (No continuity)
RES/ACC	50 – 80
SET/COAST	180 – 220
CANCEL	400 – 440

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-31).

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-31).

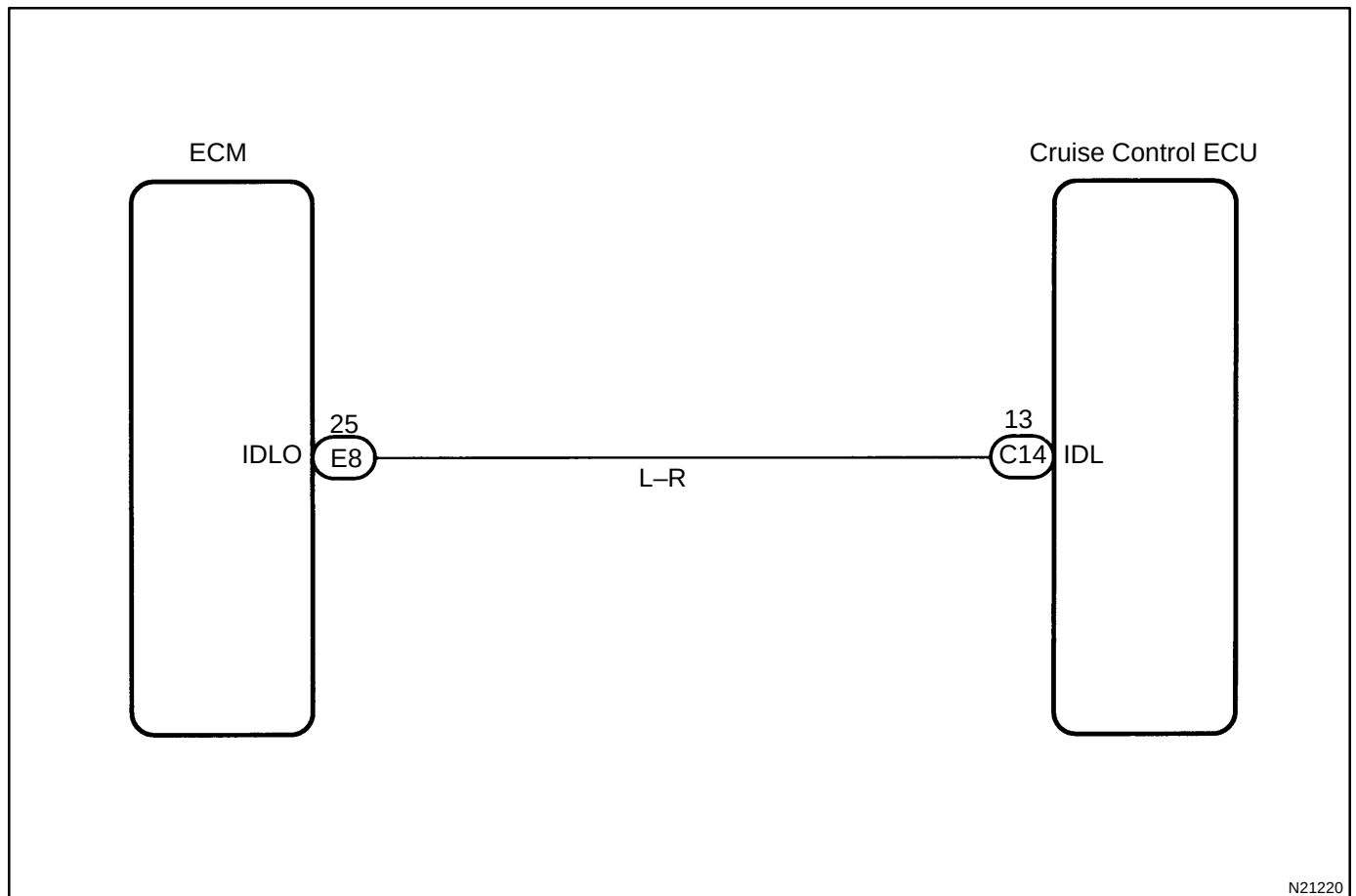
DTC	51	Idle Signal Circuit

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 values 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.	•Harness or connector between ECM and throttle position sensor •Throttle position sensor •Harness or connector between cruise control ECU and ECM •Cruise control ECU

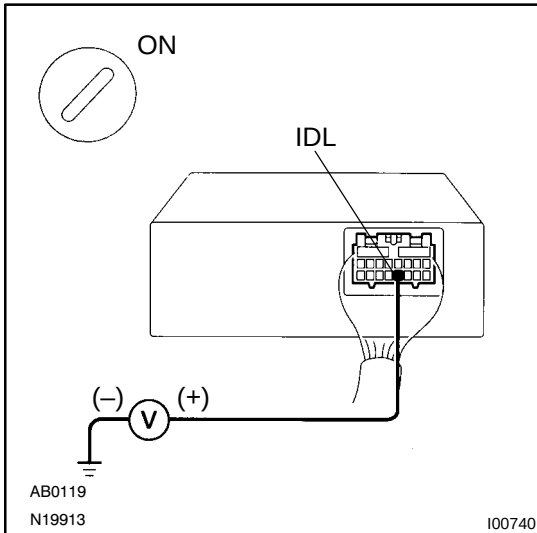
WIRING DIAGRAM



N21220

INSPECTION PROCEDURE

1	Check voltage between terminal IDL of cruise control ECU connector and body ground.

**PREPARATION:**

- (a) Remove the ECU with connector still connected.
- (b) Disconnect the ECM connector.
- (c) 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-649](#)).

NG

2	Check harness and connector between ECM and throttle position sensor (See page IN-31).

NG

Repair or replace harness or connector.

OK

3	Check throttle position sensor circuit (See page DI-38).

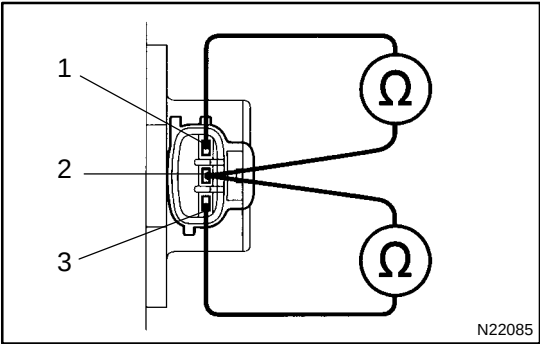
NG

Replace throttle position sensor.

OK

4

Check throttle position sensor.



PREPARATION:

Disconnect the throttle position sensor connector.

CHECK:

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

OK:

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

NG

Replace throttle position sensor.

OK

5

Check for open and short in harness and connector between cruise control ECU and ECM (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page [IN-31](#)).

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 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-652](#) for operation of the magnetic clutch)

WIRING DIAGRAM

See page [DI-652](#).

INSPECTION PROCEDURE

1	Check operation of stop light.

CHECK:

Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

NG

Check stop light system (See page [BE-3](#)).

OK

2	Input signal check.

Input Signal	Indicator Light Blinking Pattern
Stop Light switch ON	SW OFF Light ON OFF ----- SW ON

CHECK:

- (a) See input signal check on [DI-640](#).
- (b) Check the indicator light when the brake pedal is depressed.

OK:

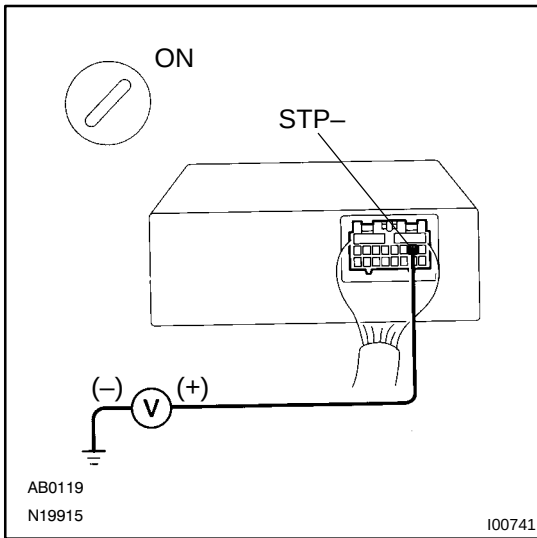
The indicator light goes off when the brake pedal is depressed.

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-649](#)).

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-649](#)).

NG

4 Check for open in harness and connectors between terminal STP- of cruise control ECU and stop light switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page [IN-31](#)).

Electronically Controlled Transmission Communication Circuit

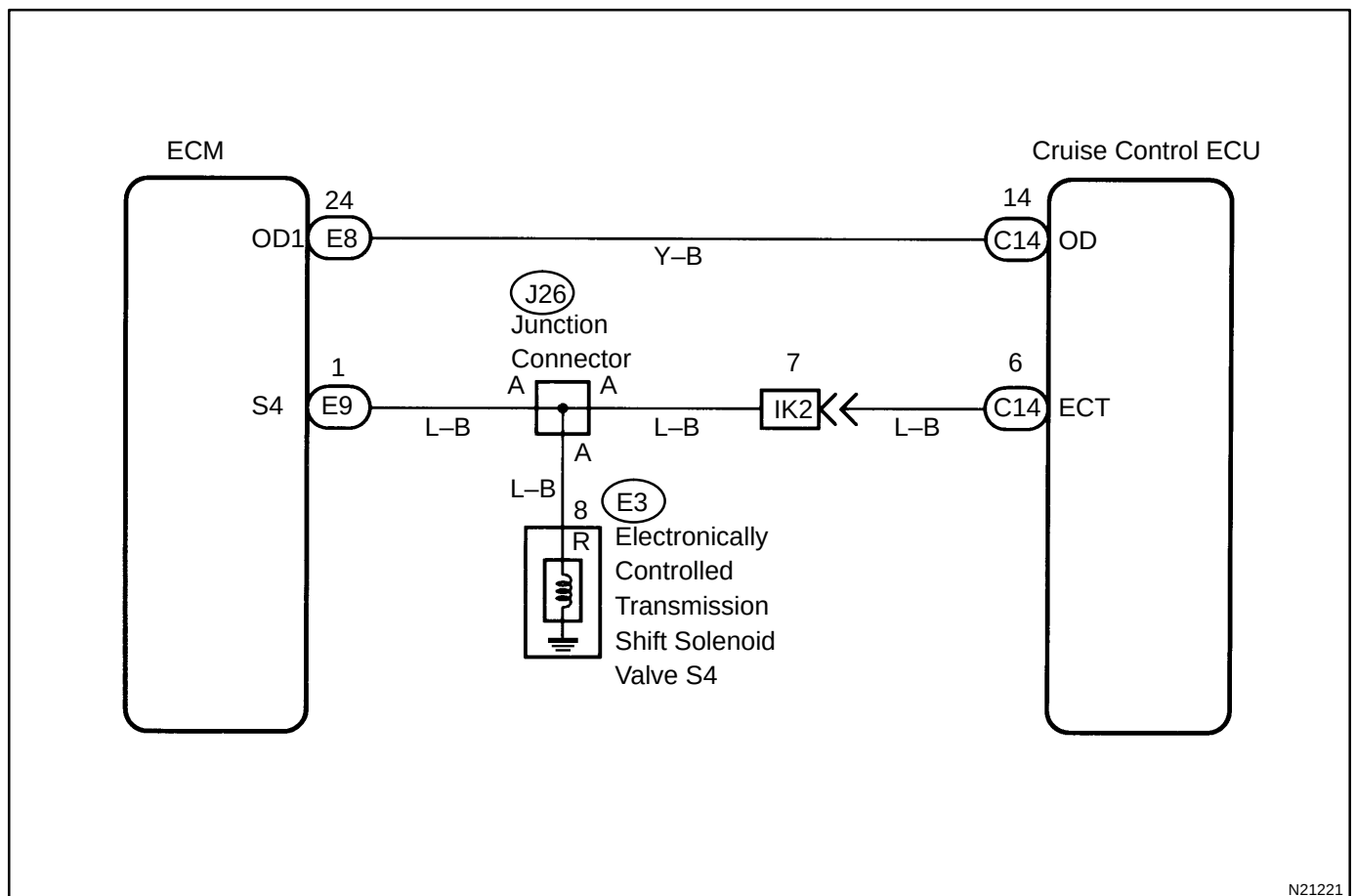
CIRCUIT DESCRIPTION

When driving uphill under 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 shift solenoid valve S4) from the ECM.

If vehicle speeds down, also when terminal OD 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

1 Check operation of overdrive.

PREPARATION:

Perform the test drive after engine warms up.

CHECK:

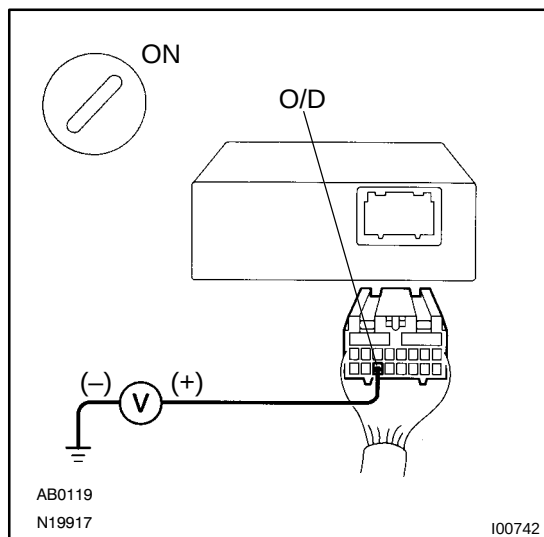
Check that overdrive ON ↔ OFF occurs with operation of OD switch ON–OFF.

NG

Check and repair electronically controlled transmission (See page [DI-163](#)).

OK

2 Check voltage between terminal OD of harness side connector of cruise control ECU and body ground.



PREPARATION:

- Remove the ECU with the connector still connected.
- Turn ignition switch ON.
- Disconnect the ECU connector.

CHECK:

Measure voltage between terminal OD of harness side connector of ECU and body ground.

OK:

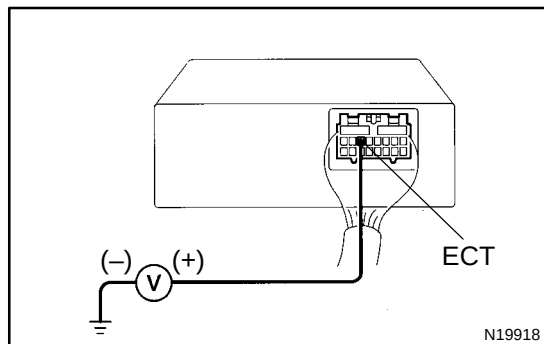
Voltage: 10 – 14 V

NG

Go to step 5.

OK

3 Check voltage between terminal ECT of cruise control ECU connector and body ground (On test drive).



PREPARATION:

- (a) Connect the ECU connector.
- (b) Perform the 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-649](#)).

NG

4 Check harness and connector between terminal ECT of cruise control ECU and electronically controlled transmission solenoid (See page [IN-31](#)).

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 ECM (See page [IN-31](#)).

NG

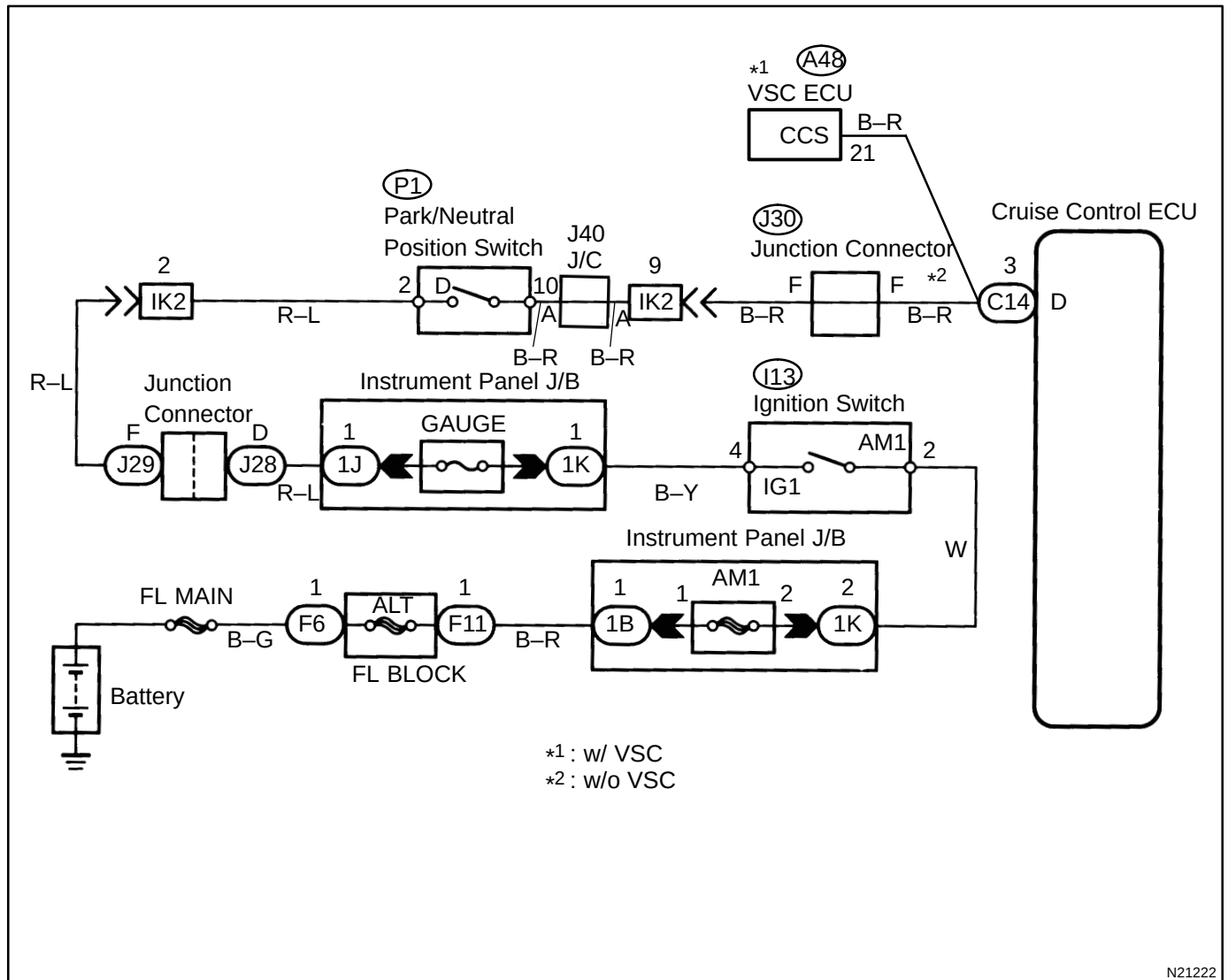
Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page [IN-31](#)).

CIRCUIT DESCRIPTION

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check starter operation.

CHECK:

Check that the starter operates normally and that the engine starts.

NG

Proceed to starting system (See page [ST-1](#)).

OK

2	Input signal check.

Input Signal	Indicator Light Blinking Pattern
Turn PNP switch OFF (Shift to except D position)	

PREPARATION:

See input signal check on page [DI-640](#).

CHECK:

Check the indicator light when shifting into except D position.

OK:

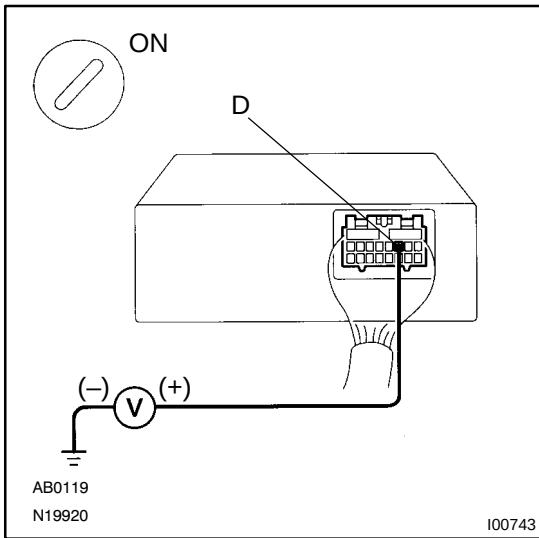
The indicator light goes off when shifting into except D position.

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-649](#)).

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 position 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-649](#)).

NG

4 Check harness and connector between cruise control ECU and park/neutral position switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

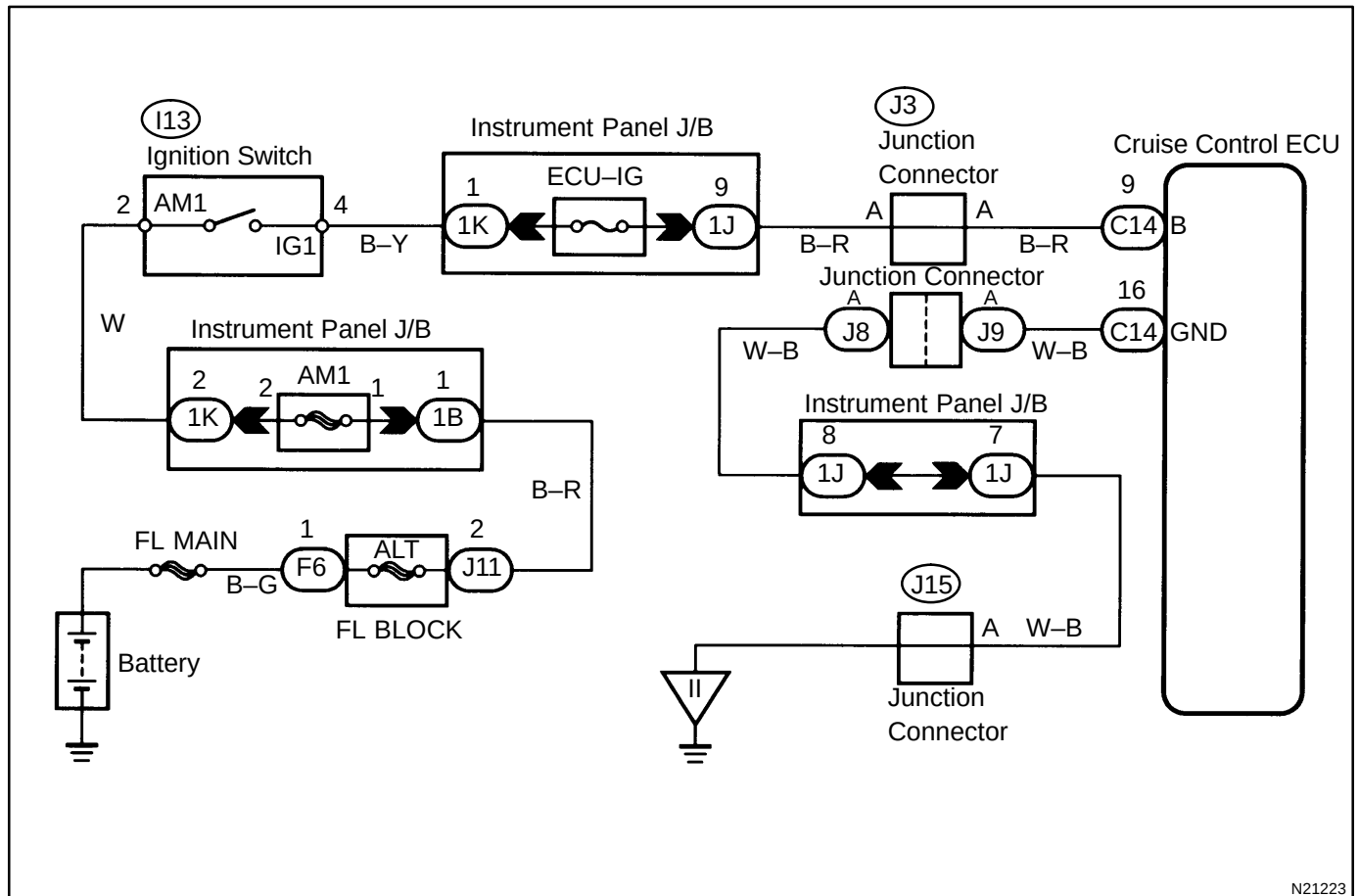
Check and replace cruise control ECU (See page [IN-31](#)).

ECU Power Source Circuit

CIRCUIT DESCRIPTION

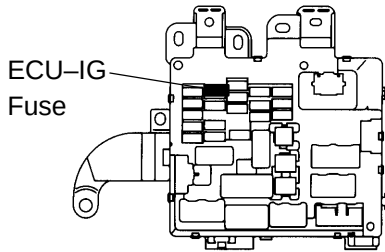
The ECU power source supplies power to the actuator and sensors, etc. When terminal GND and the case of the cruise control ECU are grounded.

WIRING DIAGRAM



N21223

INSPECTION PROCEDURE

1 Check ECU-IG fuse.**Instrument Panel Junction Block No.1**

N20675

PREPARATION:

Remove the ECU-IG fuse from instrument panel junction block No.1.

CHECK:

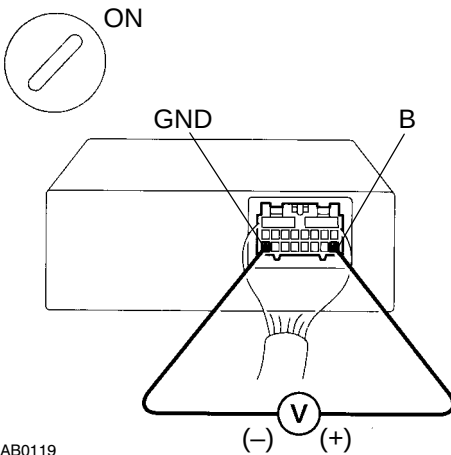
Check continuity of ECU-IG fuse.

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.**AB0119
N19921

I00744

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:

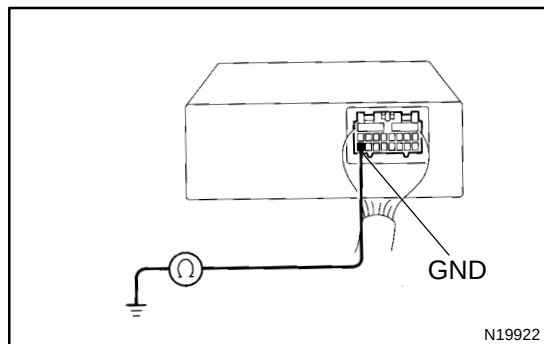
10 – 14 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-649](#)).

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 Ω

NG

Repair or replace harness or connector.

OK

Check and repair harness and connector between cruise control ECU and battery (See page [IN-31](#)).

Main Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

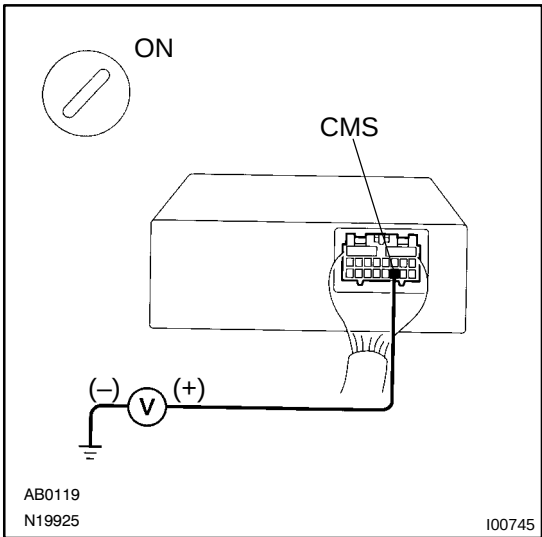
When the cruise control main switch is turned off, the cruise control does not operate.

WIRING DIAGRAM

See page [DI-661](#).

INSPECTION PROCEDURE

- 1 Check voltage between terminal CMS 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 terminal CMS of cruise control ECU connector when main switch is held ON and OFF.

OK:

Main switch	Voltage
OFF	10 – 14 V
ON	Below 0.5 V

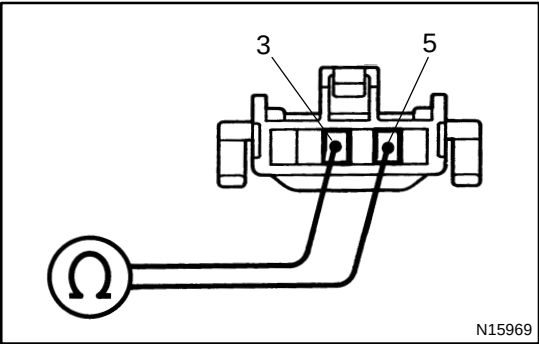
OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-649](#)).

NG

2

Check main switch continuity.



PREPARATION:

- (a) Remove steering wheel center pad (See page [SR-11](#)).
- (b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 3 and 5 of control switch connector when main switch is held ON and OFF.

OK:

Switch position	Tester connection	Specified condition
OFF	3 – 5	No continuity
Hold ON	3 – 5	Continuity

NG

Replace control switch.

OK

3

Check harness and connector between cruise control ECU and main switch (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

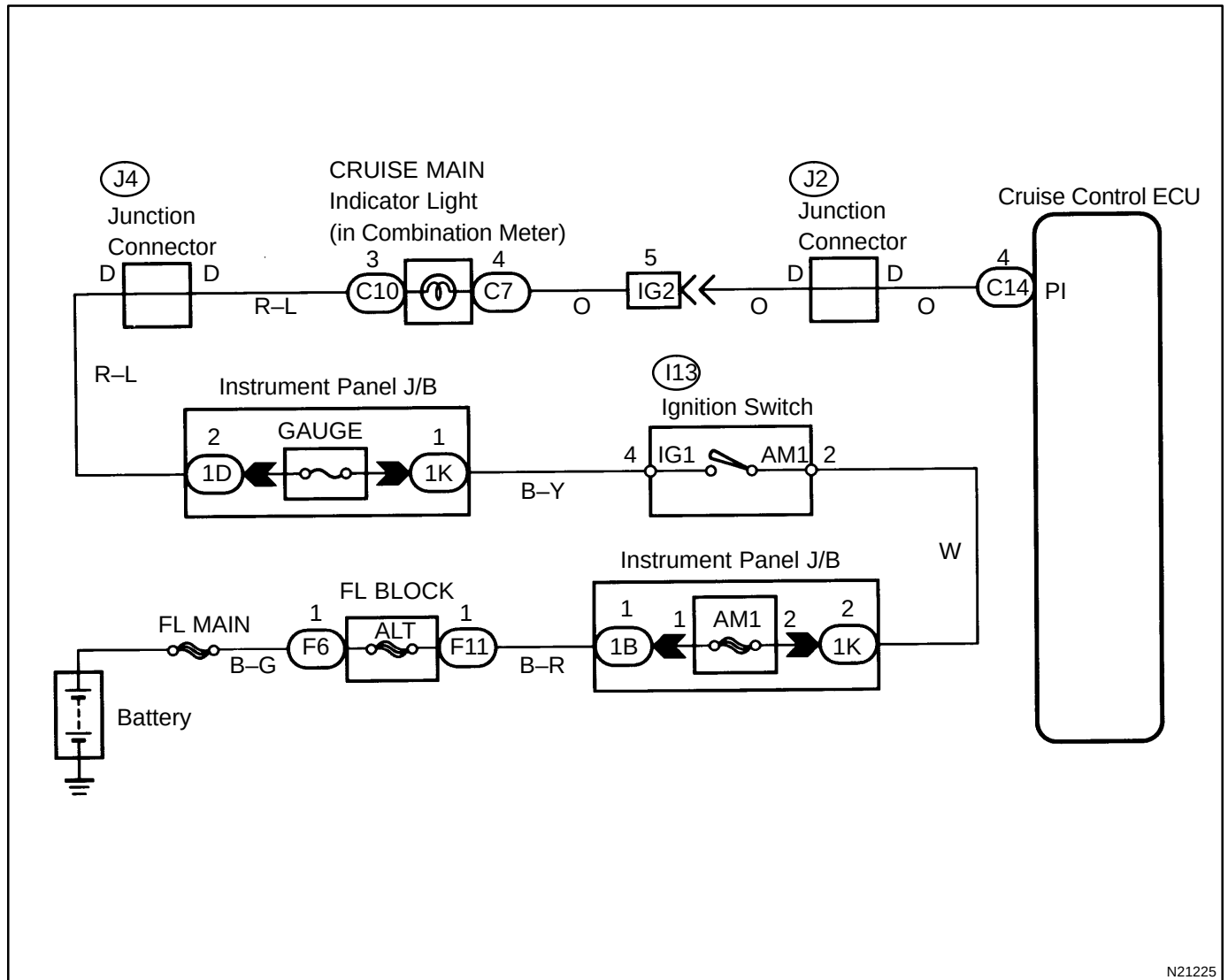
Check and replace cruise control ECU (See page [IN-31](#)).

CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM

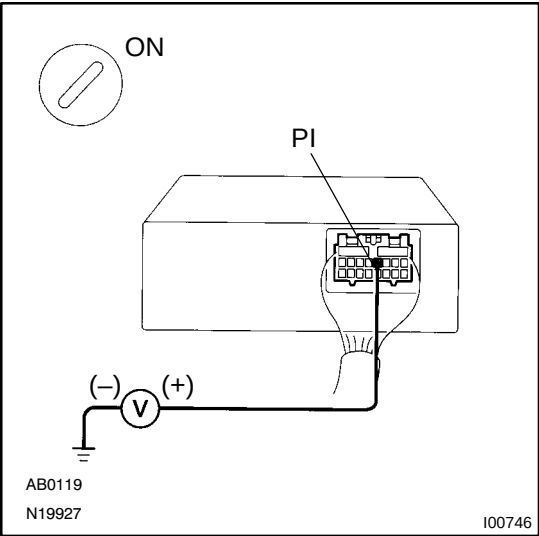


N21225

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 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-649](#)).

NG

2

Check combination meter (See page [BE-3](#)).

NG

Replace combination meter.

OK

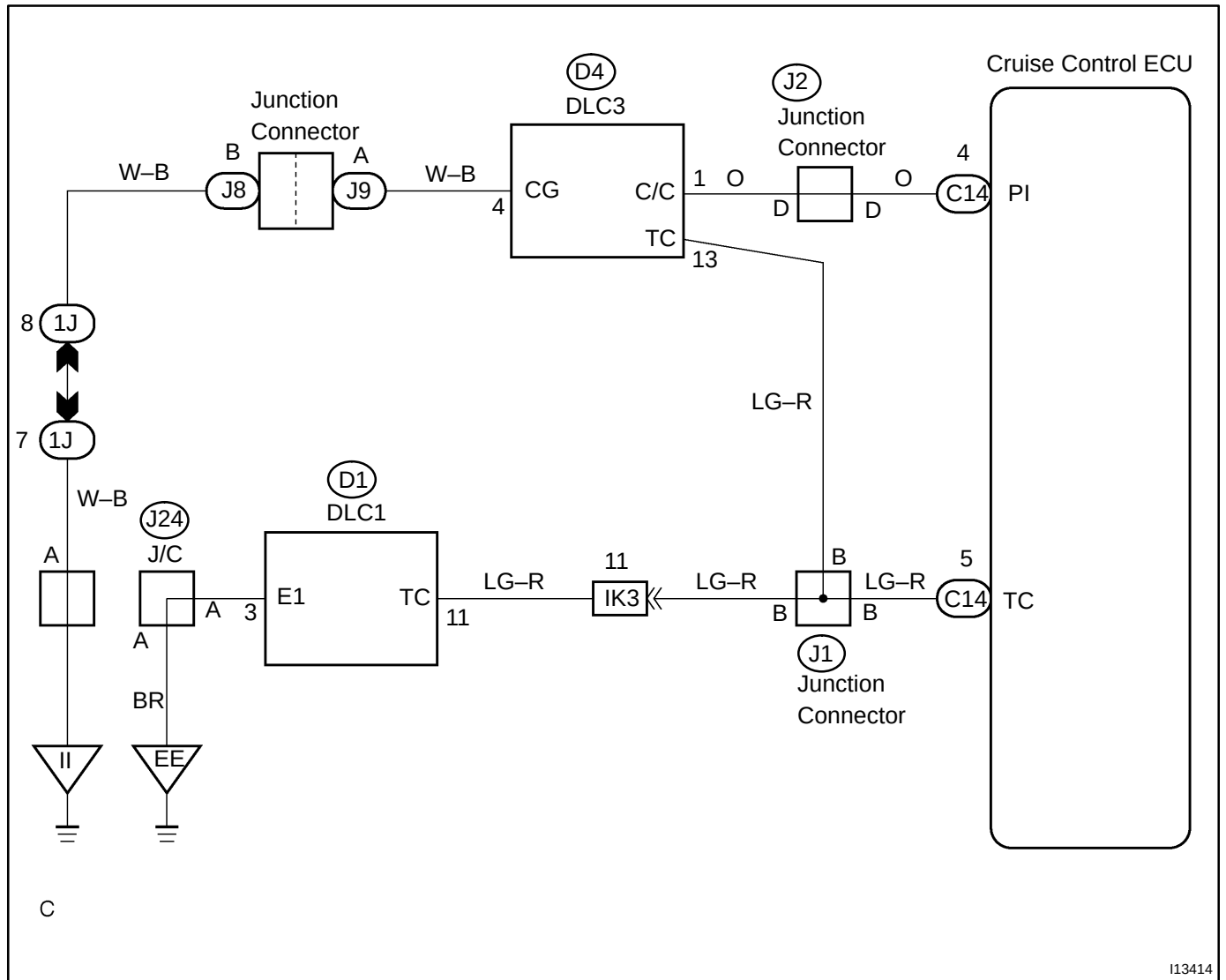
Check and replace cruise control ECU (See page [IN-31](#)).

Diagnosis Circuit

CIRCUIT DESCRIPTION

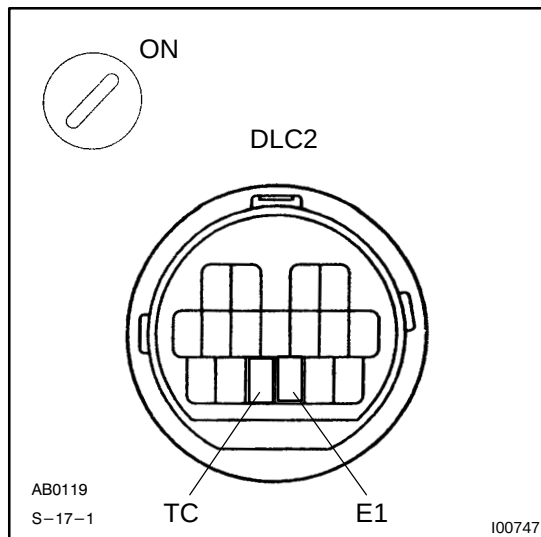
This circuit sends a signal to the ECU that DTC output is required.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E₁ of DLC2.

**PREPARATION:**

Turn ignition switch ON.

CHECK:Measure voltage between terminals Tc and E₁ of DLC2.**OK:****Voltage: 10 – 14 V****OK**Proceed to next circuit inspection shown in problem symptom table (See page [DI-649](#)).**NG**

2	Check harness and connector between cruise control ECU and DLC2, DLC2 and body ground (See page IN-31).

NG

Repair or replace harness or connector.

OKCheck and replace cruise control ECU
(See page [IN-31](#)).

Actuator Control Cable

INSPECTION PROCEDURE

1	Actuator control cable inspection

OK:

- (a) Check that the actuator, control cable throttle link are properly installed and that the cable and link are connected correctly.
- (b) Check that the actuator and bell crank are operating smoothly.
- (c) Check that the cable is not loose or too tight.

OK:

Freeplay: less than 10 mm

HINT:

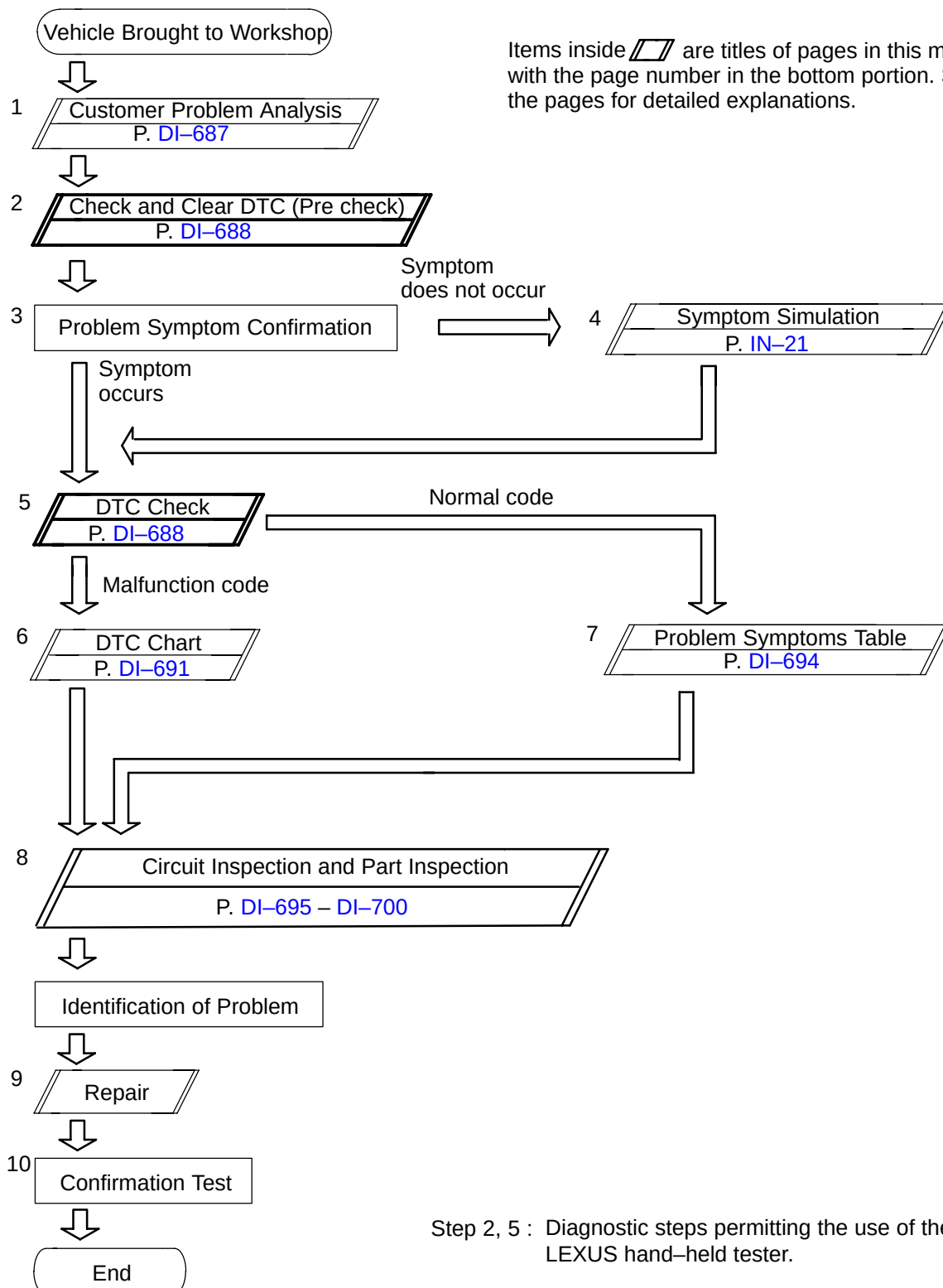
- If the control cable is very loose, the vehicle's loss of speed going uphill will be large.
- If the control cable is too tight, the idle RPM will become high.

ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1A3-28

Troubleshooting in accordance with the procedure on the following pages.



CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBLISER Check SheetInspector's
Name _____

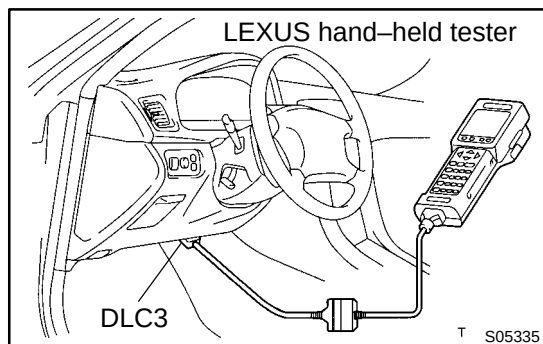
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

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

Symptoms	☐ Immobiliser is not set. (Engine starts with key codes other than the registered key code,)
	☐ Engine does not start

Check Item	Malfunction Indicator Lamp ☐ Normal ☐ Remains ON ☐ Does not Light Up

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

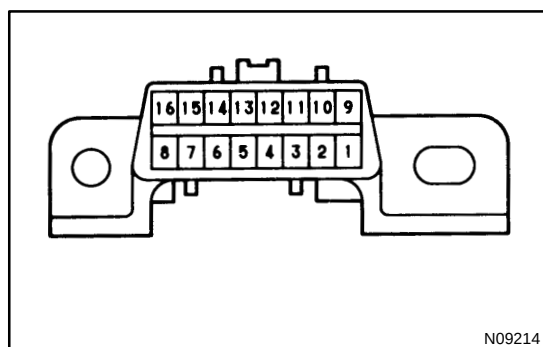


PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

ECM controls the function of immobiliser on this vehicle. Data of the immobiliser or DTC can be read from DLC3 of the vehicle. When a trouble occurs on immobiliser, MIL does not light on but DTC inspection is performed. Therefore when there seems to be a trouble on immobiliser, use LEXUS hand-held tester or SST to check and troubleshoot it.



(b) Inspect the DLC3.

The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141-2 format.

Tester connection	condition	Specified condition
7 (Bus ~ Line) – 5 (Signal ground)	During communication	Pulse generation
4 (chassis Ground) – Body	Always	1 Ω or less
5 (Signal Ground) – Body	Always	1 Ω or less
16 (B+) – Body	Always	9 – 14 V

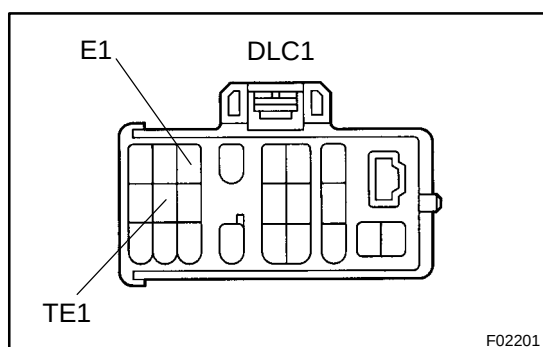
HINT:

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

- 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

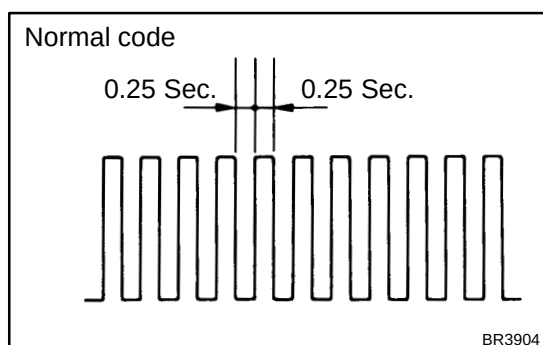
- (a) Check the DTC (Using LEXUS hand-held tester).
- (1) Prepare the OBD II scan tool (complying with SAEJ 1978) or LEXUS hand-held tester.
 - (2) Connect the OBD II scan tool or LEXUS hand-held tester to DLC3 under the instrument panel lower pad.
 - (3) Turn the ignition switch ON and turn the OBD II scan tool or LEXUS hand-held tester switch ON.
 - (4) Use the OBD II scan tool or LEXUS hand-held tester to check the DTCs and freeze frame data; note them down. (For operating instructions, see the OBD II scan tool's instruction book.)
 - (5) See page [DI-691](#) to confirm the details of the DTCs.



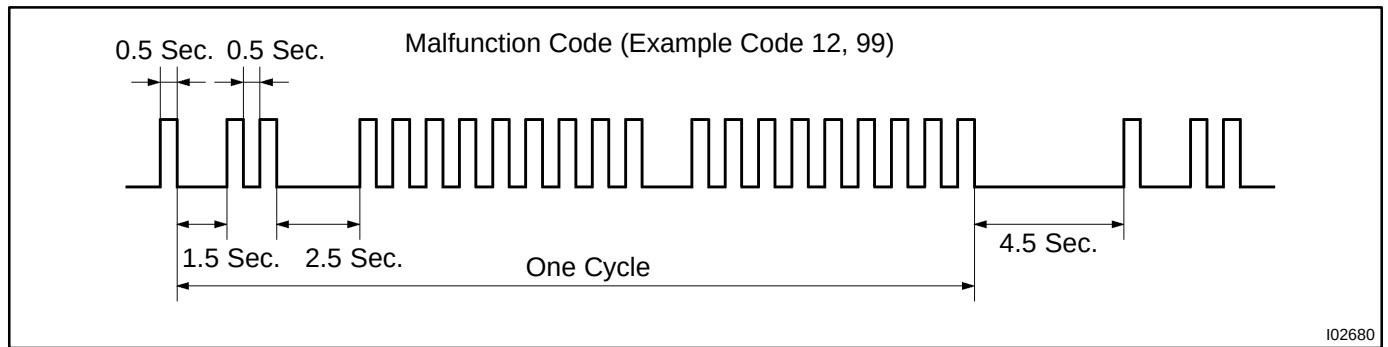
- (b) Check the DTC (Using diagnosis check wire).
- (1) Turn ignition switch ON.
 - (2) Using SST, connect between terminals 8 (TE1) and 3 (E1) of DLC 1.
- SST 09843-18040
- (3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit.
- ECM controls the immobiliser function on this vehicle, DTC is out put with engine data.



- As an example, the blinking patterns for codes; normal, 12 and 99 are shown in the 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 OBD II scan tool (complying with SAEJ1978) or LEXUS hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
- (2) Disconnecting the battery terminals or EFI fuse.

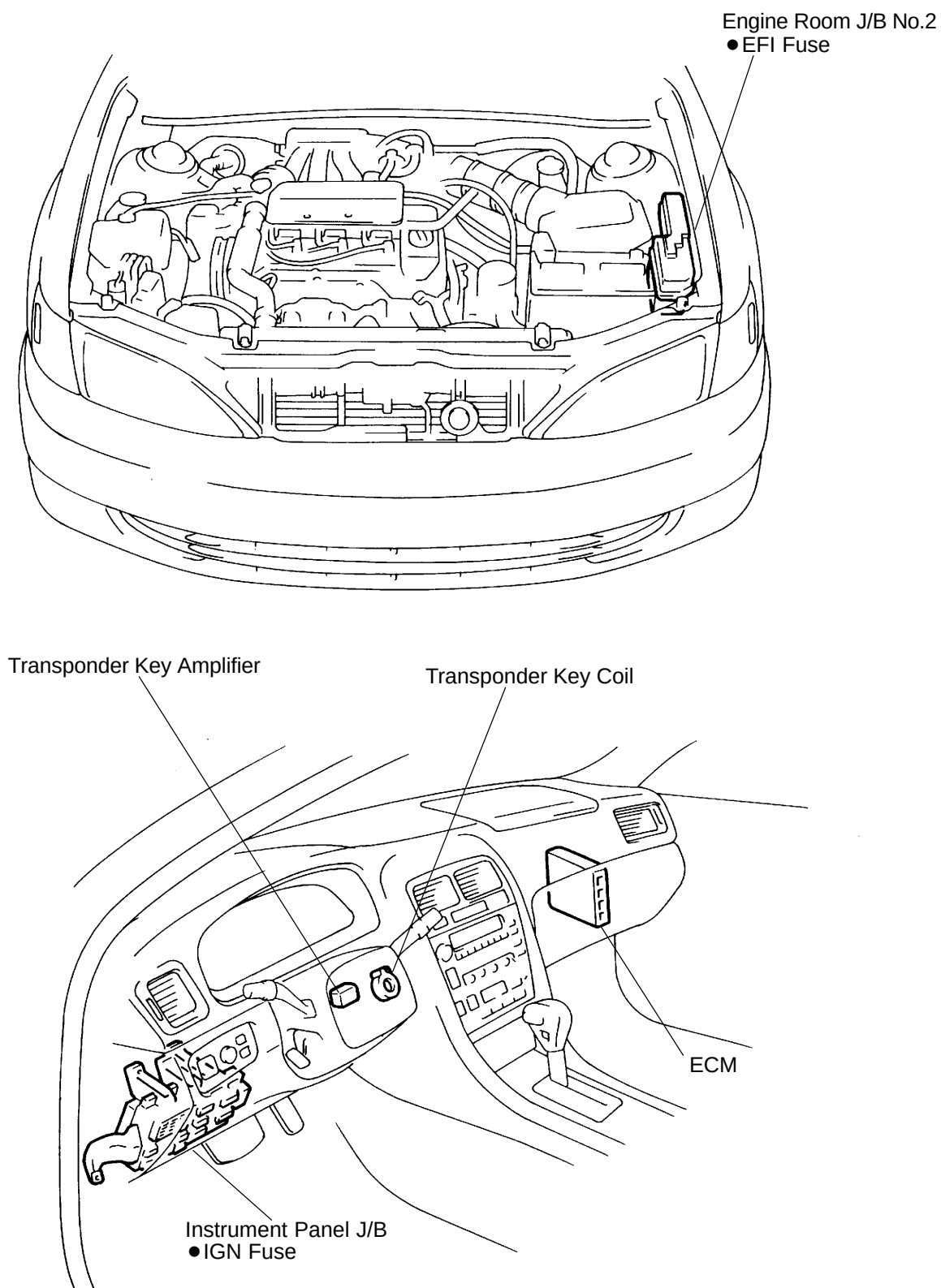
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See page)	Detection Item	Trouble Area
B2795 (DI-695)	Unmatched key code	●Key ●Unregistered key inserted before
B2796 (DI-696)	No communication in immobiliser system	●Key ●Transponder key coil ●Amplifier ●Wireharness ●ECM
B2797 (DI-698)	Communication malfunction No.1	●Communication contests ●Unregistered key inserted before
B2798 (DI-700)	Communication malfunction No.2	●Key ●Transponder key coil ●Amplifier ●Wireharness ●ECM

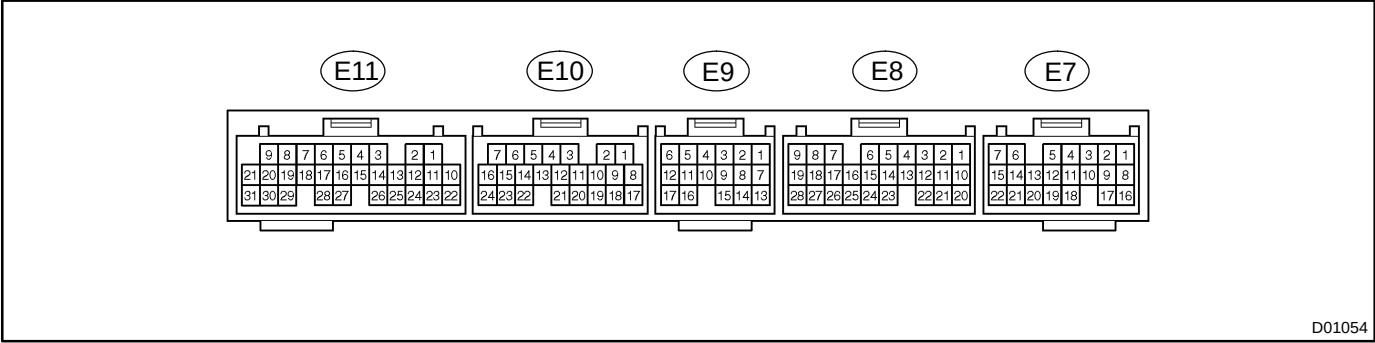
HINT:

To reduce the unnecessary exchange of ECM, check that a trouble occurs with the original ECM at the time of exchanging ECM and the trouble will disappear with a new ECM.

PARTS LOCATION



TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CODE – E1 (E8 – 28 ↔ E10–17)	G–W ↔ BR	Ignition Switch ON	10 – 14
TXCT – E1 (E8 – 18 ↔ E10–17)	L–Y ↔ BR	Ignition Switch ON	10 – 14
RXCK – E1 (E8 – 19 ↔ E10–17)	R–L ↔ 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. ECM	IN-31
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. ECM	*1 IN-31 BE-231 IN-31
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. ECM	*2 IN-31 IN-31
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. ECM	IN-31 BE-231 IN-31
Security indicator is OFF (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key coil 3. Amplifier 4. ECM	IN-31 BE-231 IN-31
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. ECM	IN-31 IN-31
Security indicator is abnormal blinking.	1. Wire harness 2. ECM	IN-31 IN-31

*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

DTC	B2795/99	Unmatched Key Code

This DTC is output when an unregistered key is inserted. When this DTC is output, delete DTC and insert the key that a customer keeps to check that B2795 is output.

When a key that outputs B2795 is found, register this key. when B2795 is not output, there is a possibility that the unregistered key has been inserted before. (ECM is normal.)

Inquire a customer the condition of using the system to find the cause of the trouble.

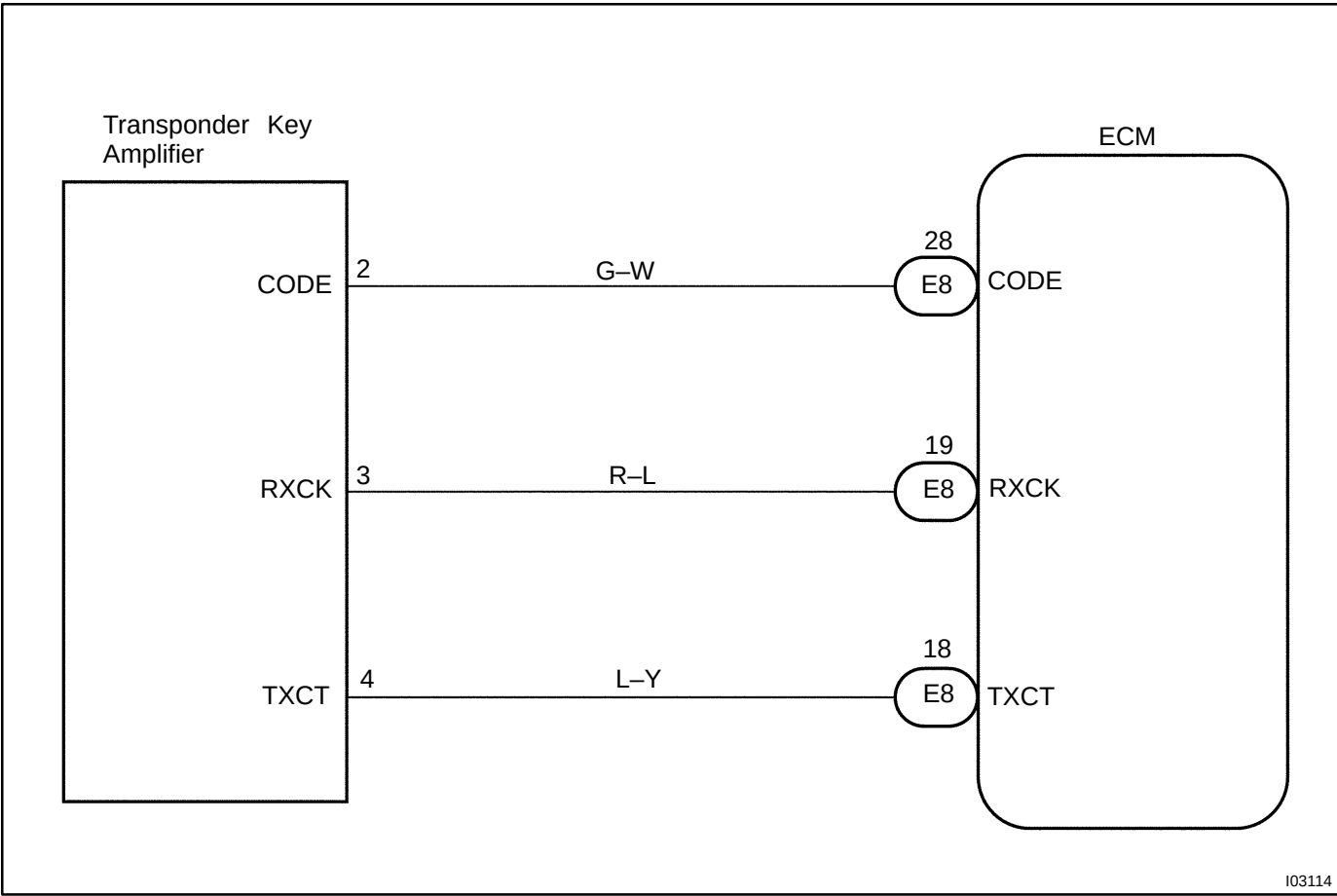
(Example: Another key has been inserted, etc..)

DTC	B2796/99	No Communication in Immobiliser system

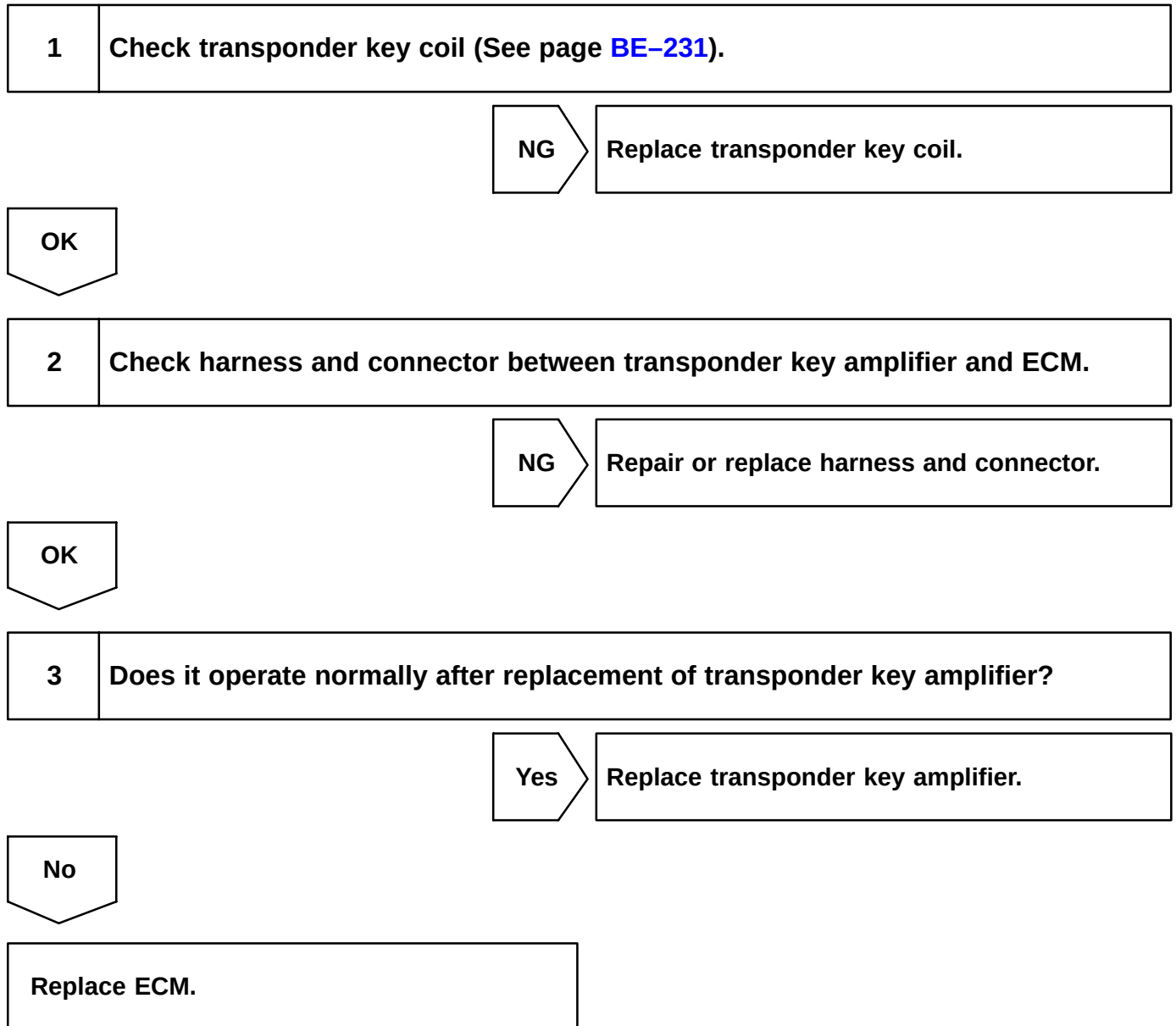
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	●Key ●Transponder Key Coil ●Transponder Key Amplifier ●Wire harness ●ECM

WIRING DIAGRAM



I03114

INSPECTION PROCEDURE

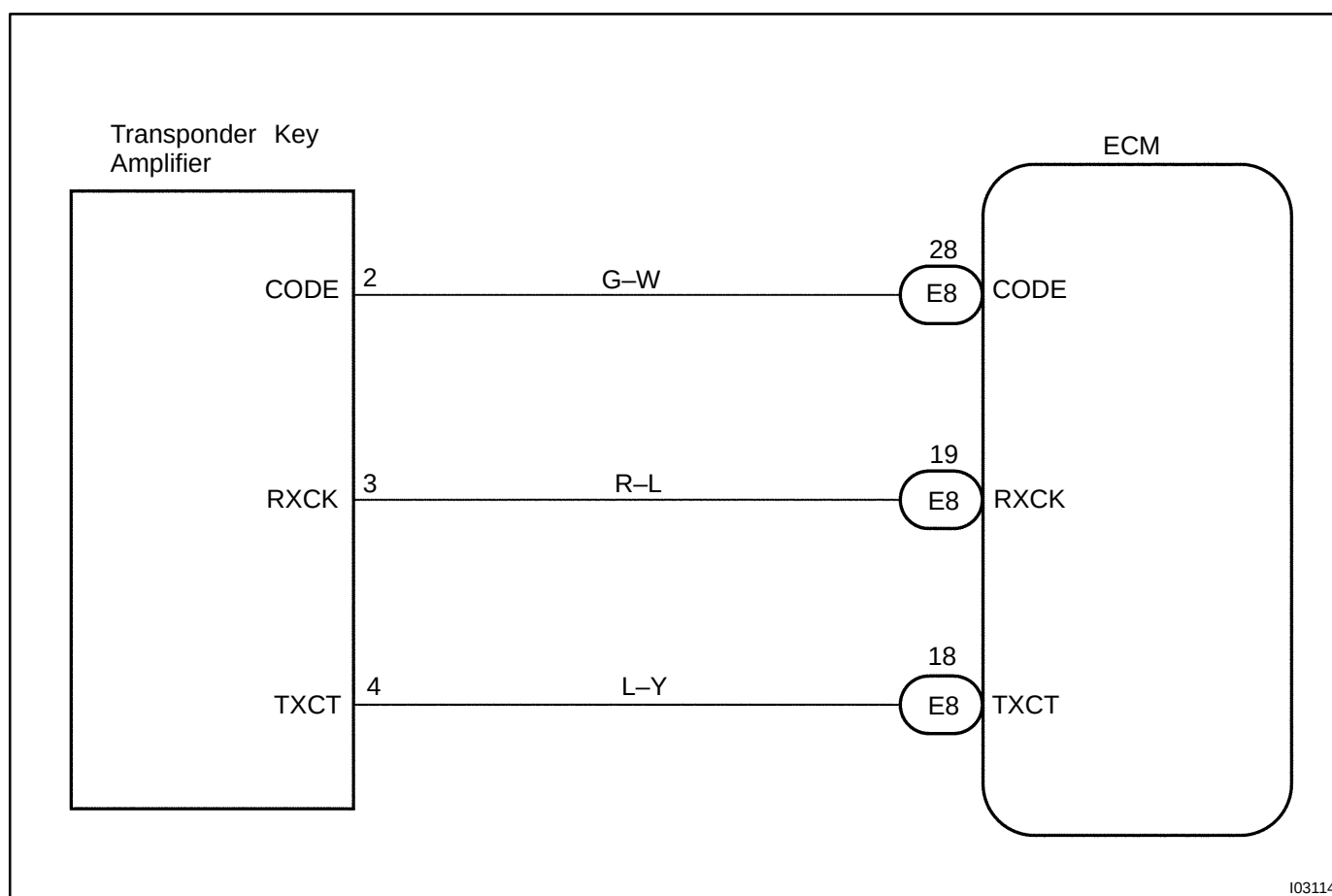
DTC	B2797/99	Communication Malfunction No.1

CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs.
(Example. Some noise is included in communication line.)

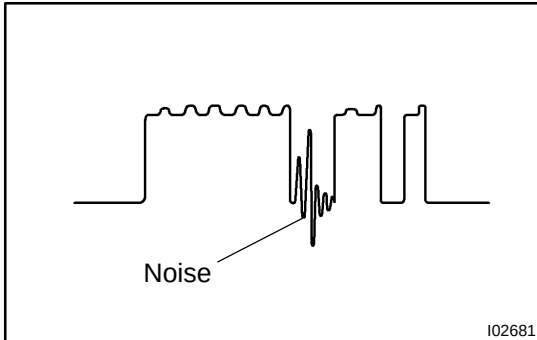
DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	•Wire Harness •Transponder Key Amplifier •ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Noise check



PREPARATION:

Insert already registered master key in the key cylinder.

CHECK:

Using an oscilloscope or LEXUS hand-held tester, check that noise is included in the CODE terminal of EMC.

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

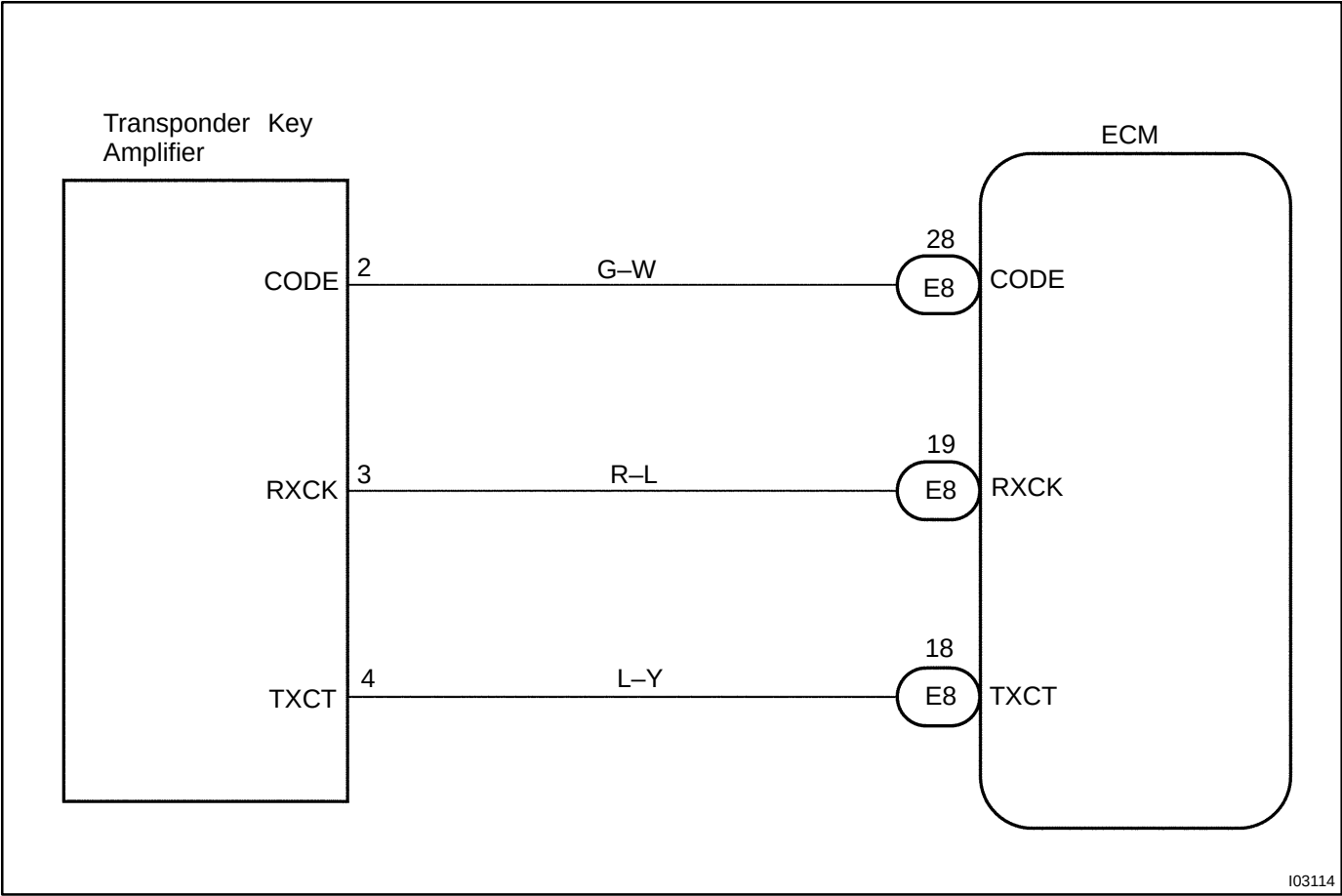
Replace ECM.

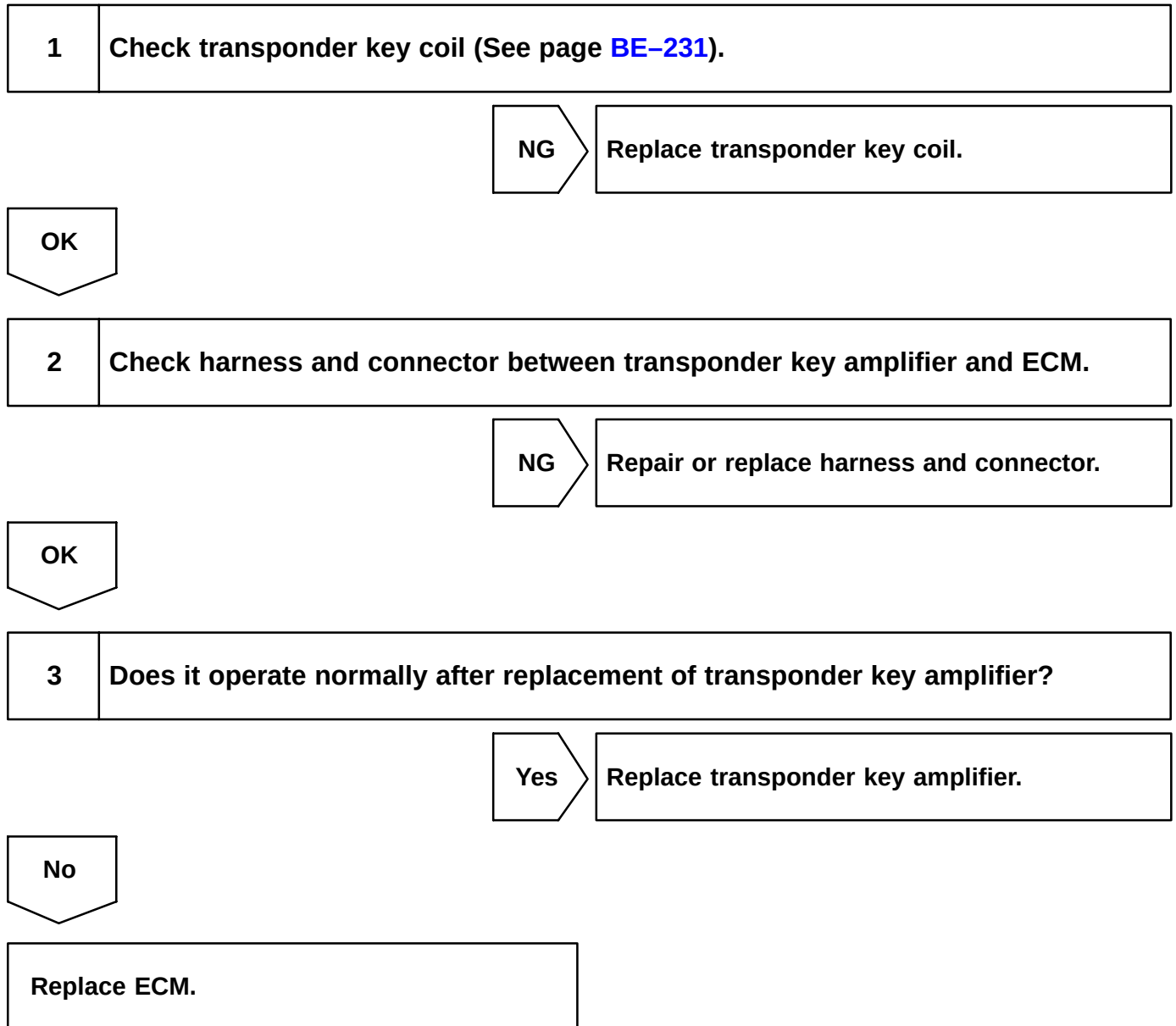
DTC	B2798/99	Communication malfunction No.2

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
B2798/99	Communication error	●Key ●Transponder Key Coil ●Transponder Key Amplifier ●Wire harness ●ECM

WIRING DIAGRAM



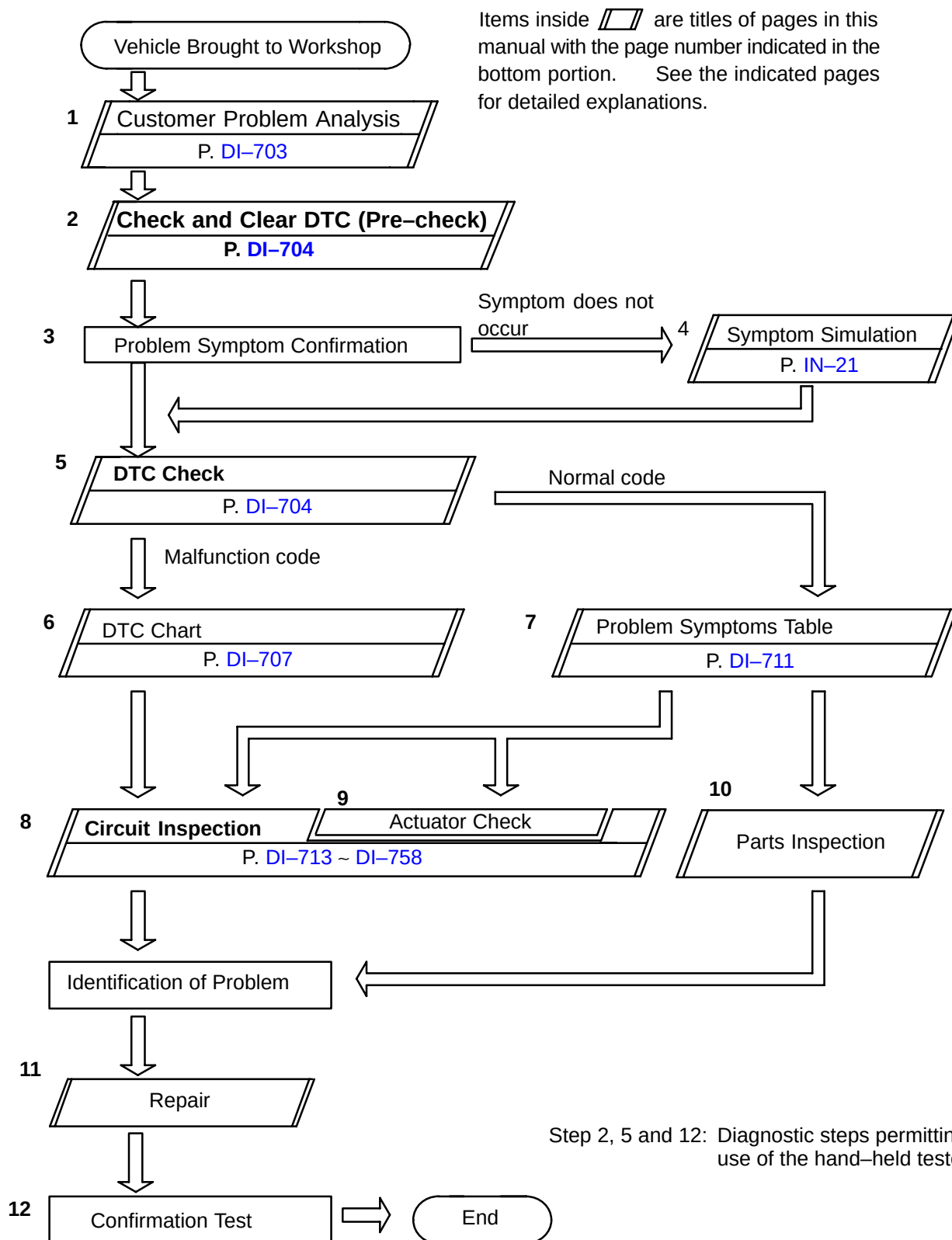
INSPECTION PROCEDURE

AIR CONDITIONING SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI18X-03

Perform troubleshooting in accordance with the procedure on the following page.



CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

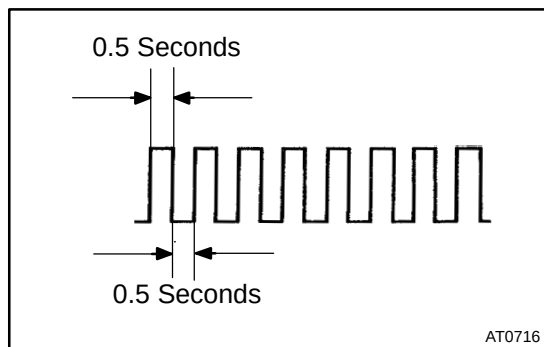
Inspector's name: _____

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

Date of Problem Occurrence	/ /
How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)
Weather	☐ Fine ☐ Cloudy ☐ Snowy ☐ Various / Other
Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F °C)

Symptoms	Air Flow Control is Faulty	- Blower motor does not operation - Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	- Cabin temperature does not go down - Cabin temperature does not rise - Response is slow
	Air Inlet Control is Faulty	Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Vent Control is Faulty	- Mode will not change - Will not enter the desired mode

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



PRE-CHECK

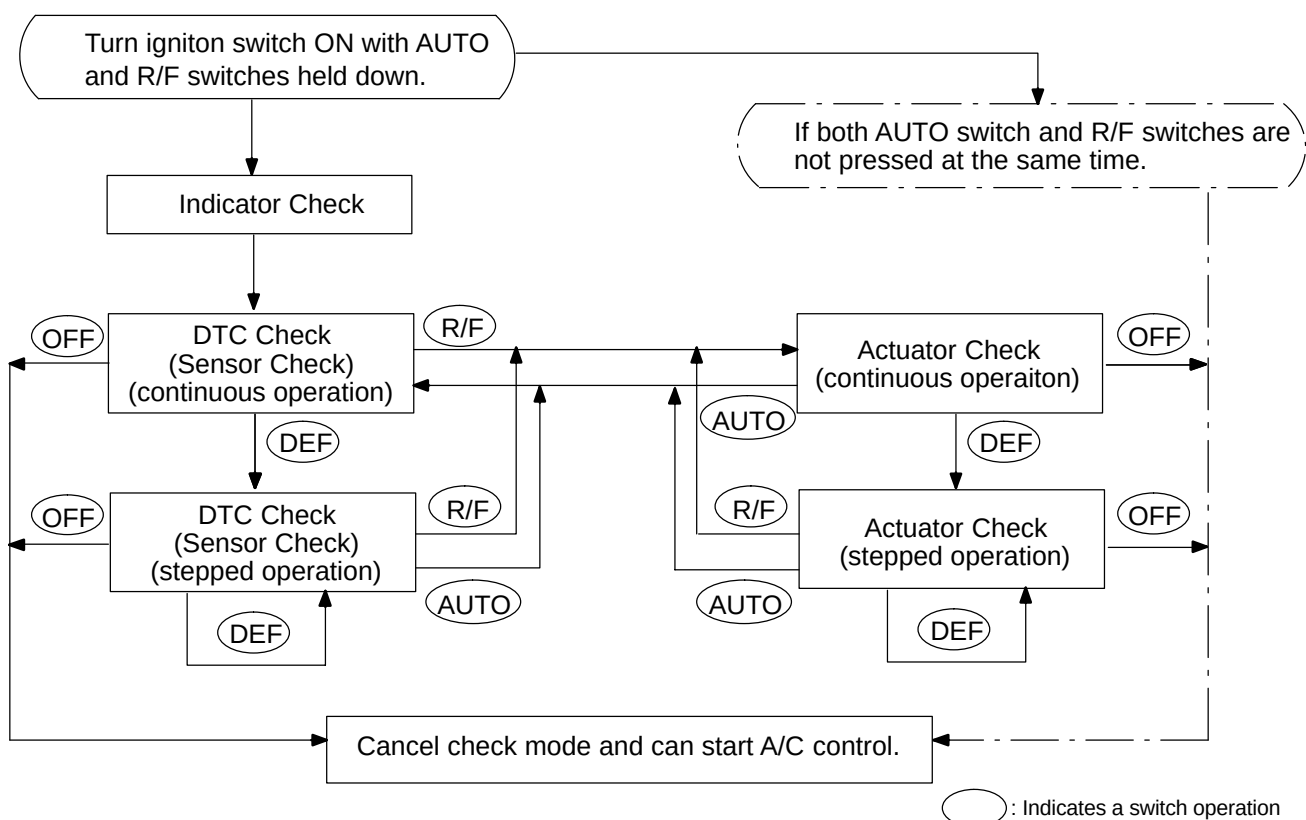
1. WARNING FOR A/C COMPRESSOR LOCK

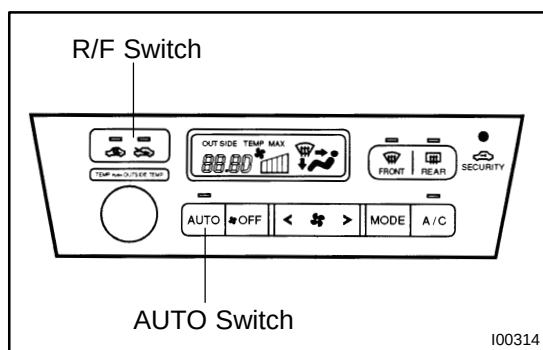
If compressor lock occurs during A/C operation, the A/C switch indicator on the A/C control assembly starts blinking to warn the driver.

When this occurs, check for compressor lock (DTC B1422/22) using DTC check then proceed to inspect the circuit or the component (See page [DI-727](#)).

2. LIST OF OPERATION METHODS

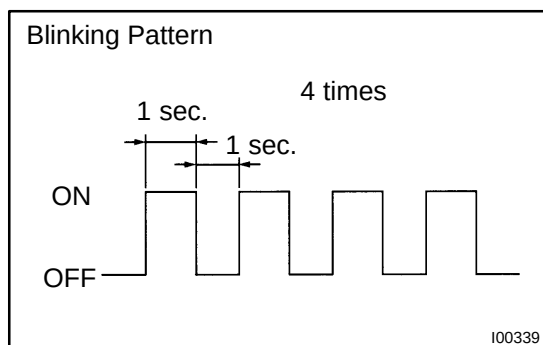
By operating each of the A/C control switches as shown the diagram below, it is possible to enter the diagnosis check mode.





3. INDICATOR CHECK

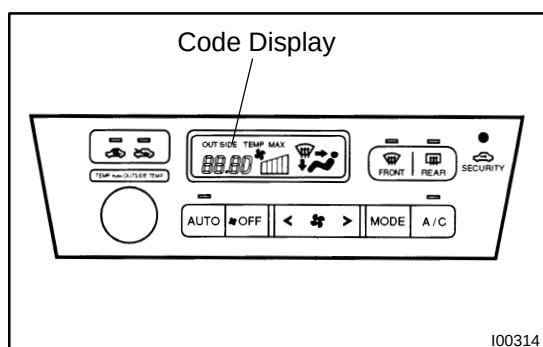
- (a) Turn the ignition switch ON while pressing the A/C control AUTO switch and R/F switch simultaneously.



- (b) Check that the indicators light up and go off at second intervals 4 times in succession.

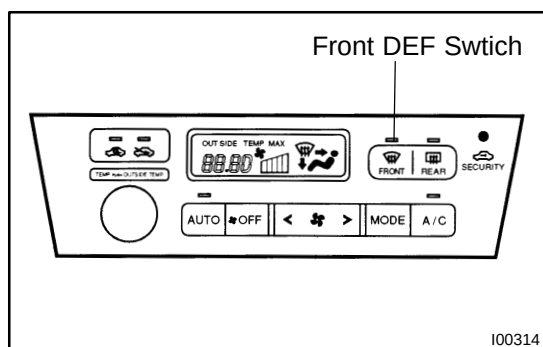
HINT:

- After the indicator check is completed, the system enters the DTC begins automatically.
- Press the OFF switch when desiring to cancel the check mode.

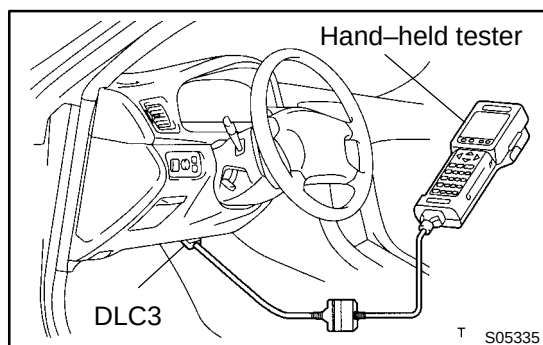


4. DTC CHECK (SENSOR CHECK)

- (a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.
- (b) Read the code displayed on the panel. Refer to the list of codes on page [DI-707](#) when reading the codes. (Trouble code are output at the temperature display.)

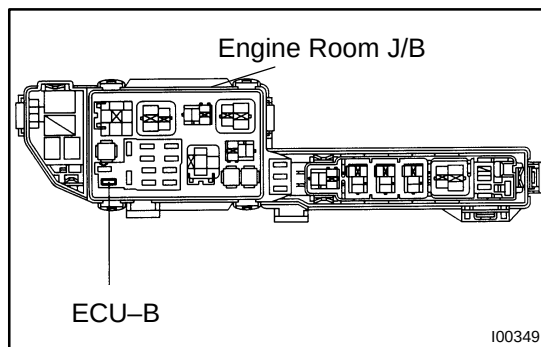


- (c) If the slower display is desired, press the front DEF switch and change it to stepped operation. Each time the front DEF switch is pressed, the display changes by 1 step.



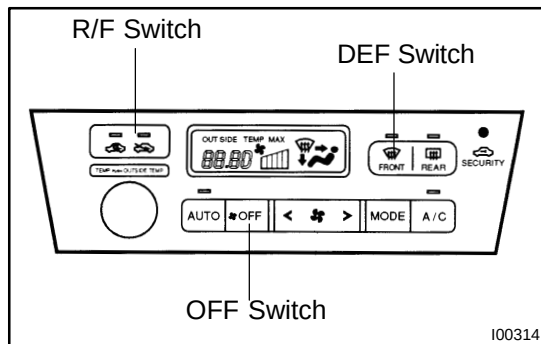
5. DTC CHECK USING HAND-HELD TESTER

- (a) Hook up the hand-held tester to the DLC3.
- (b) Read the diagnostic trouble codes by following the prompts on the tester screen. Please refer to the hand-held tester operator's manual for further details.



6. CLEARING DTC

- Pull out the ECU-B fuse in engine room J/B for 10 sec. or longer to clear the DTC memory.
- After reinserting the fuse, check that the normal code is output.



7. ACTUATOR CHECK

- After entering the DTC check mode (Sensor Check Mode) press the R/F switch.
- Since each damper, motor and relay automatically operates at 1 sec. intervals beginning in order from 10 in the temperature display, check the temperature and air flow visually and by hand.

If the slower display is desired, press the DEF switch and change it to step operation. Each time the DEF switch is pressed, the display changes by 1 step.

HINT:

- Code are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the OFF switch.

Step No.	Display Code	Conditions				
		Blower Motor	Air Flow Vent	Air Inlet Damper	Magnetic Clutch	Air Mix Damper
1	0	OFF	FACE	FRESH	OFF	Cool side (0 % open)
2	1	1	FACE	FRESH	OFF	Cool side (0 % open)
3	2	3	FACE	FRESH	ON	Cool side (0 % open)
4	3	3	FACE	FRS/REC	ON	Cool side (0 % open)
5	4	3	FACE	RECIRC	ON	Cool/Hot (50 % open)
6	5	3	BI-LEVEL	RECIRC	ON	Cool/Hot (50 % open)
7	6	3	FOOT	RECIRC	ON	Hot side (100 % open)
8	7	3	FOOT	RECIRC	ON	Hot side (100 % open)
9	8	3	FOOT/DEF	RECIRC	ON	Hot side (100 % open)
10	9	5	DEF	RECIRC	ON	Hot side (100 % open)

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check (sensor check), check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

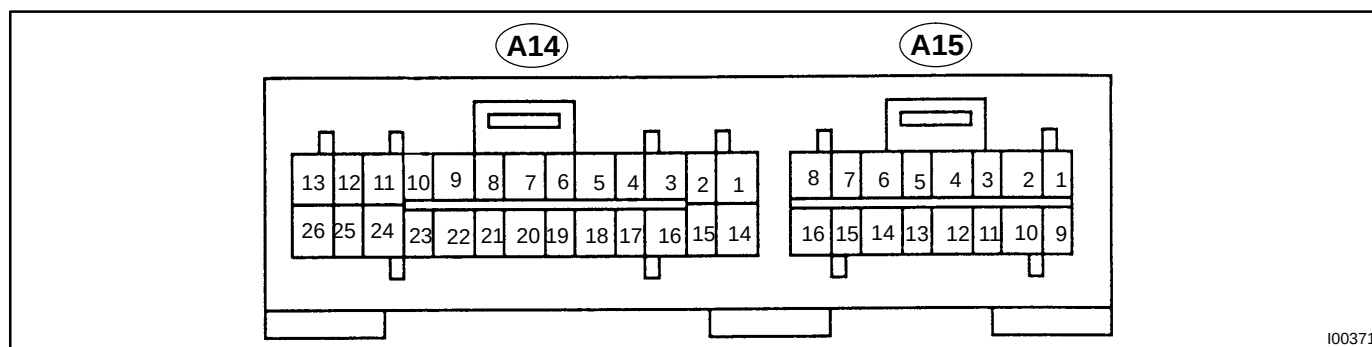
DTC No. (See Page)	Detection Item	Trouble Area	Memory
00	Normal	–	–
B1411/11* ¹ (DI-713)	Room temperature sensor circuit	●Room temp. sensor ●A/C control assembly ●Harness or connector between room temp. sensor and A/C control assembly	(8.5 min. or more)
B1412/12* ² (DI-716)	Ambient temperature sensor circuit	●Ambient temp. sensor ●Harness or connector between ambient temp. sensor and A/C control assembly ●A/C control assembly	(8.5 min. or more)
B1413/13 (DI-719)	Evaporator temperature sensor circuit	●Evaporator temp. sensor ●Harness or connector between evaporator temp. sensor and A/C control assembly ●A/C control assembly	(8.5 min. or more)
B1414/14 (DI-722)	Engine coolant temperature sensor circuit	●Engine coolant temp. sensor ●Harness or connector between engine coolant temp. sensor and A/C control assembly ●Harness or connector between ECM and A/C control assembly ●A/C control assembly	–
B1421/21* ³ (DI-724)	Solar sensor circuit (short)	●Solar sensor ●Harness or connector between solar sensor and A/C control assembly	(8.5 min. or more)
	Solar sensor circuit (open)	●A/C control assembly	–
B1422/22* ⁴ (DI-727)	Compressor lock sensor circuit	●Compressor drive belt ●Compressor lock sensor ●Compressor ●Harness or connector between compressor and A/C control assembly, compressor lock sensor ●A/C control assembly	–
B1423/23 (DI-729)	Pressure sensor circuit	●Pressure switch ●Harness or connector between pressure switch and A/C control assembly ●Refrigerant pipe line ●A/C control assembly	–
B1431/31 (DI-732)	Air mix damper position sensor circuit	●Air mix damper position sensor ●A/C control assembly ●Harness or connector between air mix damper position sensor and A/C control assembly	(1 min. or more)
B1432/32 (DI-735)	Air inlet damper position sensor circuit	●Air inlet damper position sensor ●A/C control assembly ●Harness or connector between air inlet damper position sensor and A/C control assembly	(1 min. or more)

B1441/41 (DI-732, DI-738)	Air mix control servomotor	●Air mix control servomotor ●Air mix damper position sensor ●Harness or connector between air mix damper servomotor and A/C control assembly ●A/C control assembly	(15 sec.)
B1442/42 (DI-735, DI-741)	Air inlet control servomotor	●Air inlet control servomotor ●Air inlet damper position sensor ●Harness or connector between air inlet damper, servomotor and A/C control assembly ●A/C control assembly	(15 sec.)

HINT:

- *1: If the room temp. is approx. -18.6°C (-3.7°F) or lower, trouble code 11 may be output even though the system is normal.
- *2: If the ambient temp. is approx. -52.9°C (-61.4°F) or lower, a malfunction code may be output even though the system is normal.
- *3: If the check is being performed in a dark place, DTC B1421/21 (solar sensor circuit abnormal) could be displayed.
- *4: Compressor lock (DTC B1422/22) is indicated only for a current occurring malfunction (See page DI-727). To confirm DTC B1422/22, perform the following steps.
 - (1) With the engine ON, enter the DTC check mode.
 - (2) Press the F/R switch to enter actuator check mode, and set the operation to step No.3.
 - (3) Press the AUTO switch to return to DTC check mode.
 - (4) The DTC is displayed after approx. 3 secs..
- *5: The A/C control assembly memorizes the DTC of the respective malfunction it has occurred for the period of the time indicated in the brackets.

TERMINALS OF ECU



I00371

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TAM ↔ SG (A15-3 ↔ A14-1)	Y ↔ W-R	IG ON. Ambient Temp. : 25°C (77°F)	1.35 – 1.75 V
		IG ON. Ambient Temp. : 40°C (104°F)	0.85 – 1.25 V
TR ↔ SG (A15-4 ↔ A14-1)	G-Y ↔ W-R	IG ON. Room Temp. : 25°C (77°F)	1.8 – 2.2 V
		IG ON. Room Temp. : 40°C (104°F)	1.2 – 1.6 V
TS ↔ SG (A15-5 ↔ A14-1)	W ↔ W-R	IG ON. Solar sensor subjected to electrical light.	1 V or more
		IG ON. Solar sensor covered by cloth	Below 1 V
TE ↔ SG (A15-6 ↔ A14-1)	L-W ↔ W-R	IG ON. Evaporator Temp. : 0°C (32°F)	2.0 – 2.4 V
		IG ON. Evaporator Temp. : 15°C (59°F)	1.4 – 1.8 V
TPI ↔ SG (A15-7 ↔ A14-1)	P-L ↔ W-R	Push REC switch	3.5 – 4.5 V
		Push FRESH switch	0.5 – 1.8 V
TP ↔ SG (A15-8 ↔ A14-1)	B-Y ↔ W-R	Set Temp. : Max. Cool	3.5 – 4.5 V
		Set Temp. : Max. Hot	0.5 – 1.8 V
PSW ↔ GND (A15-9 ↔ A14-14)	L-B ↔ W-B	IG ON.	Below 1 V
A/Ci ↔ GND (A15-10 ↔ A14-14)	LG-B ↔ W-B	Start the Engine (Idling). Operate the Compressor	10 – 14 V
		Start the Engine (Idling). Do not operate Compressor	Below 1.5 V
AC1 ↔ GND (A15-13 ↔ A14-14)	B-Y ↔ W-B	Start the engine. A/C Switch ON.	Below 1 V
		Start the engine. A/C Switch OFF.	More than 1 V
TW2 ↔ SG (A15-14 ↔ A14-1)	V ↔ W-R	IG ON.	Pulse Generation
BLW ↔ GND (A15-16 ↔ A14-14)	B-W ↔ W-B	IG ON. Operate the Blower Motor	Below 1.5 V
SG ↔ Body (A14-1 ↔ Body Ground)	W-R ↔ Body Ground	Always	1 Ω or less
ILL ↔ GND (A14-2 ↔ A14-14)	B ↔ W-B	Turn the Light Control Switch to TAIL position.	10 – 14 V
LOCK ↔ GND (A14-3 ↔ A14-14)	W-L ↔ W-B	IG OFF. at 20°C (68°F)	65 – 125 Ω
FACE ↔ GND (A14-4 ↔ A14-14)	L-W ↔ W-B	IG ON. Air Flow : FACE	Below 1 V
SECU ↔ GND (A14-5 ↔ A14-14)	R-Y ↔ W-B	IG ON.	Below 1 V
AIF ↔ AIR (A14-6 ↔ A14-7)	L-Y ↔ R	IG ON.	13 – 19 Ω
AMC ↔ AMH (A14-8 ↔ A14-14)	P ↔ W-B	IG ON.	13 – 19 Ω

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
HR ↔ GND (A14-10 ↔ A14-14)	L-W ↔ W-B	IG ON. Operate the Blower Motor	Below 1 V
		IG ON. Do not operate the Blower Motor	10 – 14 V
S5 ↔ SG (A14-11 ↔ A14-1)	L ↔ W-R	IG ON.	4 – 6 V
S5 ↔ TS (A14-11 ↔ A15-5)	L ↔ W	IG ON. Sensor Subjected to Electrical Light.	Below 4 V
		IG ON. Sensor Covered by a Cloth.	4 – 4.5 V
ILL+ ↔ GND (A14-12 ↔ A14-14)	G ↔ W-B	Turn the Light Control Switch to TAIL position.	10 – 14 V
B+ ↔ GND (A14-13 ↔ A14-14)	W-R ↔ W-B	IF OFF.	10 – 14 V
GND ↔ Body Ground (A14-14 ↔ Body Ground)	W-B ↔ Body Ground	Always	1 Ω or less
IGN ↔ GND (A14-16 ↔ A14-14)	B-O ↔ W-B	Start the Engine	10 – 14 V
B/L ↔ GND (A14-17 ↔ A14-14)	L ↔ W-B	IG ON. Air Flow : BI-LEVEL.	Below 1 V
FOOT ↔ GND (A14-18 ↔ A14-14)	L-R ↔ W-B	IG ON. Air Flow : FOOT.	Below 1 V
F/D ↔ GND (A14-19 ↔ A14-14)	B-L ↔ W-B	IG ON. Air Flow : FOOT/DEF	Below 1 V
DEF ↔ GND (A14-20 ↔ A14-14)	L-O ↔ W-B	IG ON. Air Flow : DEF	Below 1 V
RDFG ↔ GND (A14-23 ↔ A14-14)	L-G ↔ W-B	Rear Defogger Switch ON.	Below 1 V
		Rear Defogger Switch OFF.	10 – 14 V
TELI ↔ GND (A14-24 ↔ A14-14)	L-R ↔ W-B	IG ON. Hand Free Telephone ON.	Below 1 V
TC ↔ GND (A14-25 ↔ A14-14)	B-R ↔ W-B	Light Control Switch Position : TAIL. Rheostat Volume : Most Upward	10 – 14 V
		Light Control Switch Position : TAIL. Rheostat Volume : Most Downward	Below 1 V
IG+ ↔ GND (A14-16 ↔ A14-14)	B-O ↔ W-B	IG ON.	10 – 14 V

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate.	1. IG power source circuit 2. A/C control assembly	DI-746 IN-31
Air Flow Control : No blower operation	1. Heater main relay circuit 2. Blower motor circuit 3. Engine coolant temperature sensor circuit 4. IG power source circuit 5. A/C control assembly	DI-751 DI-754 DI-722 DI-746 IN-31
Air Flow Control : No blower control	1. Blower motor circuit 2. IG power source circuit 3. Heater main relay circuit	DI-754 DI-746 DI-751
Air Flow Control : Insufficient air out	Blower motor circuit	DI-754
Temperature Control : No cool air comes out	1. Volume of refrigerant 2. Drive belt tension 3. Inspect refrigeration system with manifold gauge set 4. Compressor lock sensor circuit 5. Compressor circuit 6. Pressure switch circuit 7. Igniter circuit 8. Air mix control servomotor circuit 9. Air mix damper position sensor circuit 10. Room temp. sensor circuit 11. Ambient temp. sensor circuit 12. A/C control assembly	AC-3 AC-14 AC-3 DI-727 DI-758 DI-729 DI-756 DI-732, DI-738 DI-735 DI-713 DI-716 IN-31
Temperature Control : No warm air comes out	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. Ambient temp. sensor circuit 4. Room temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C control assembly 7. Heater radiator	DI-732, DI-738 DI-735 DI-716 DI-713 DI-719 IN-31 AC-23
Temperature Control : Output air is warmer or cooler than the set temperature or response is slow.	1. Volume of refrigerant 2. Drive belt tension 3. Inspect refrigeration system with manifold gauge set 4. Cooling fan system 5. Ambient temp. sensor circuit 6. Evaporator temp. sensor circuit 7. Solar sensor circuit 8. Air mix damper position sensor circuit 9. Engine coolant temp. sensor 10. Air mix control servomotor circuit 11. Compressor 12. Condenser 13. Receiver 14. Evaporator 15. Heater radiator (in heater unit) 16. Expansion valve 17. A/C control assembly	AC-3 AC-14 AC-3 AC-105 DI-716 DI-719 DI-724 DI-735 DI-722 DI-732, DI-738 AC-35 AC-45 AC-42 AC-49 AC-23 AC-56 IN-31
Temperature Control : No temperature control (only Max. cool or Max. warm)	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. A/C control assembly	DI-732, DI-738 DI-735 IN-31

Symptom	Suspect Area	See page
No air inlet control	1. Air inlet damper position sensor circuit 2. Air inlet control servomotor circuit 3. A/C control assembly	DI-735 DI-735, DI-741 IN-31
No air outlet control	1. Air outlet control servomotor circuit 2. A/C control assembly	DI-744 IN-31
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. Igniter circuit 3. A/C control assembly	DI-758 DI-756 IN-31
Blinking of A/C switch indicator.	1. Compressor lock sensor circuit 2. A/C control assembly	DI-727 IN-31
Set temperature value displayed does not much up with operation of temperature control switch.	A/C control assembly	IN-31
Brightness does not changes when rheostat volume or light control switch it turned.	1. Illumination light system 2. A/C control assembly	BE-3 IN-31
Unable to access the diagnosis mode.	A/C control seembly	IN-31
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back-up power source circuit 2. A/C control assembly	DI-749 IN-31

CIRCUIT INSPECTION

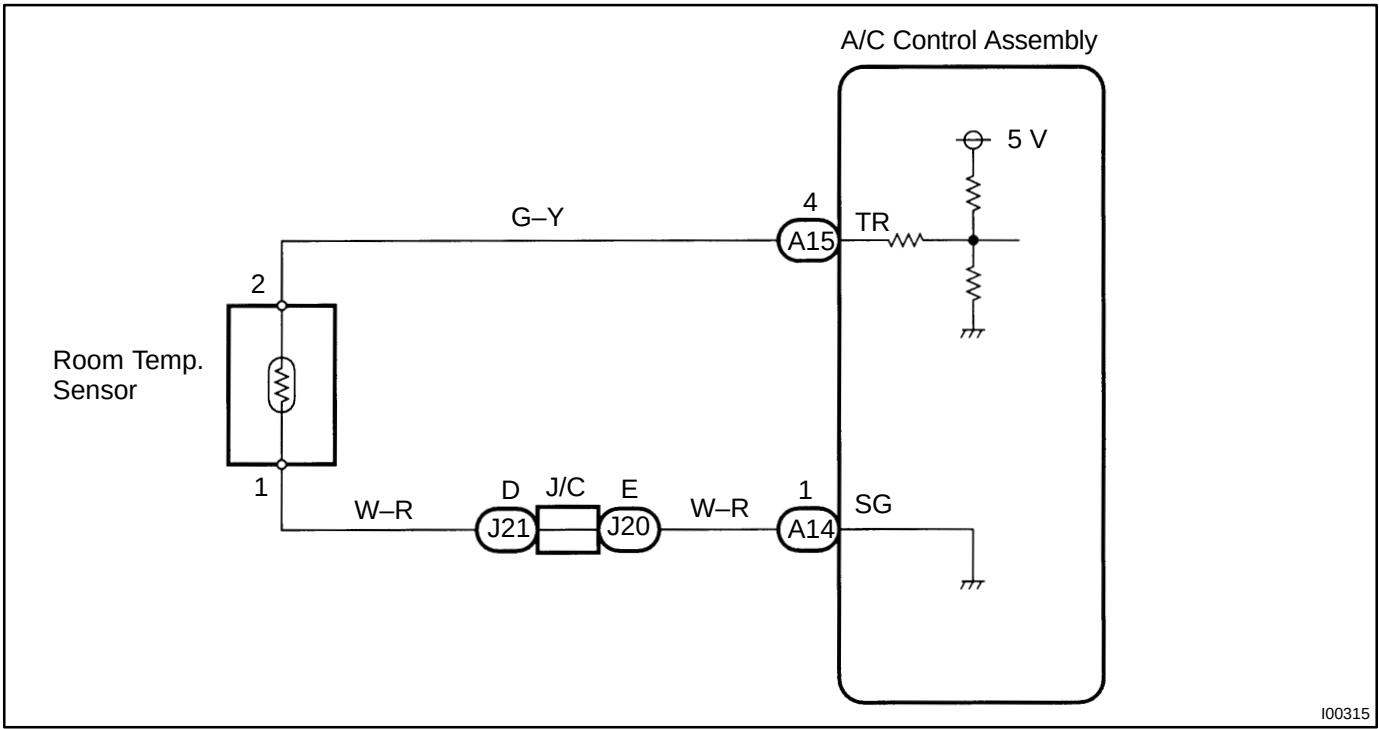
DTC	B1411/11	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1411/11	Open or short in room temperature sensor circuit.	- Room temperature sensor. - Harness or connector between room temp. sensor and A/C control assembly. - A/C control assembly.

WIRING DIAGRAM



I00315

INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection step 1 and in case of not using the hand-held tester, start from step 2.

1	Check room temp. sensor using hand-held tester.

PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

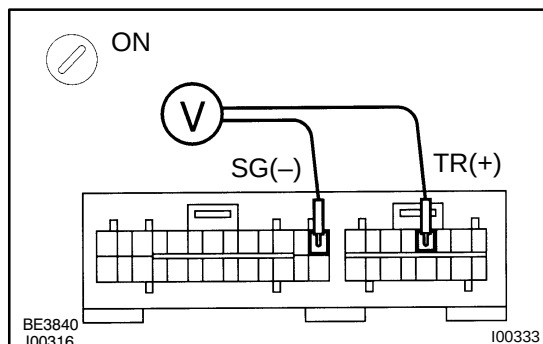
Check the room temp. sensor using DATA LIST.

OK

Check or replace A/C control assembly.

NG

2	Check voltage between terminals TR and SG of A/C control assembly connector.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Turn the ignition switch ON.

CHECK:

Check voltage between terminals TR and SG of A/C control assembly connector at each temperature.

OK:

at 25 °C (77 °F) : 1.8 – 2.2 V

at 40 °C (104 °F) : 1.2 – 1.6 V

HINT:

As the temperature increases, the voltage decreases.

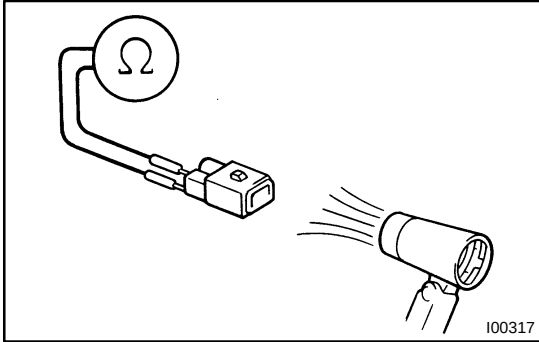
NG

Go to step 3.

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC B1411/11 is displayed, check and replace A/C control assembly.

3 Check room temperature sensor.



PREPARATION:

- (a) Remove room temperature sensor from safety pad NO.2 (See page [BO-79](#)).
- (b) Disconnect room temperature sensor connector.

CHECK:

Check resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.

OK:

- at 25 °C (77 °F) : 1.6 – 1.8 kΩ
- at 40 °C (104 °F) : 0.5 – 1.7 kΩ

HINT:

As the temperature increases, the resistance decreases.

NG

Replace room temperature sensor.

OK

4 Check harness and connector between A/C control assembly and room temperature sensor (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

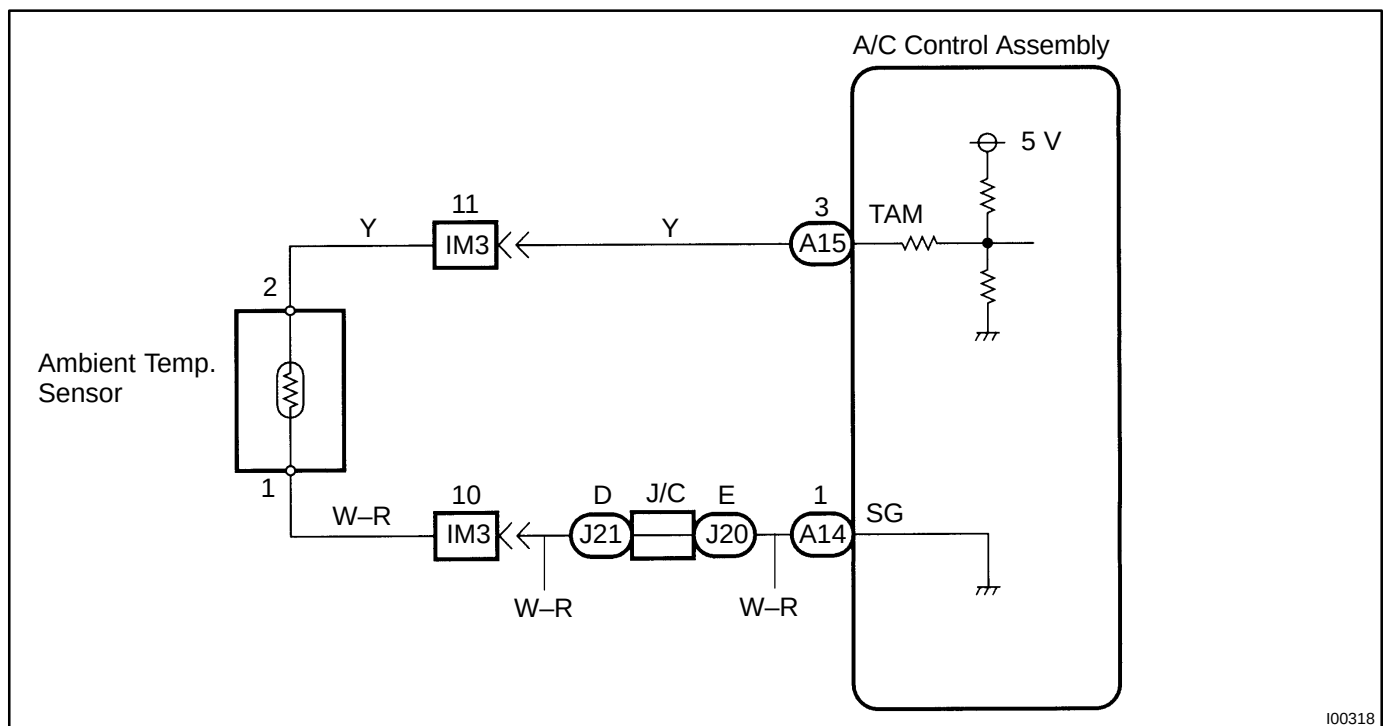
DTC	B1412/12	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1412/12	Open or short in ambient temperature sensor circuit.	●Ambient temperature sensor. ●Harness or connector between ambient temperature sensor and A/C control assembly. ●A/C control assembly.

WIRING DIAGRAM



I00318

INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection step 1 and in case of not using the hand-held tester, start from step 2.

1	Check ambient temp. sensor using hand-held tester.

PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

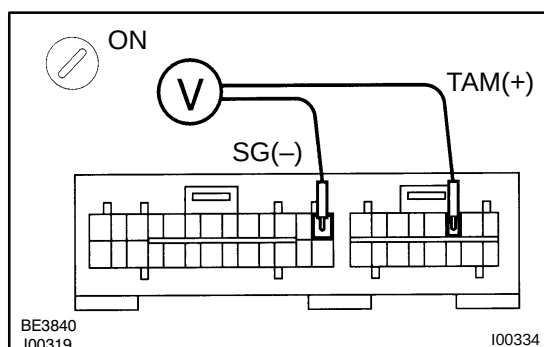
Check the ambient temp. sensor using DATA LIST.

OK

Check or replace A/C control assembly.

NG

2	Check voltage between terminals TAM and SG of A/C control assembly connector.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Turn ignition switch ON.

CHECK:

Check voltage between terminals TAM and SG of A/C control assembly connector at each temperature .

OK:

Voltage

at 25 °C (77 °F) : 1.35 – 1.75 V

at 40 °C (104 °F) : 0.85 – 1.25 V

HINT:

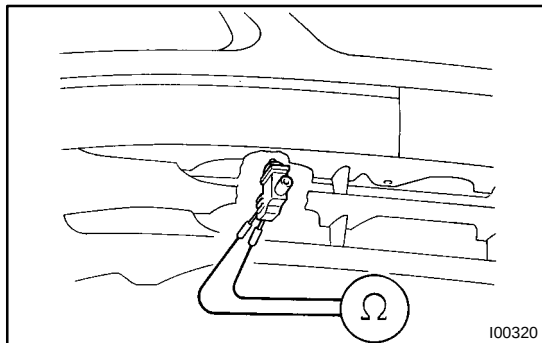
As the temperature increases, the voltage decreases.

NG

Go to step 3.

OK

Proceed to the next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC B1412/12 is displayed, check and replace A/C control assembly.

3 Check ambient temperature sensor.**PREPARATION:**

Disconnect ambient temperature sensor connector.

CHECK:

Check resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.

OK:**Resistance**

at 25 °C (77 °F) : 1.6 – 1.8 kΩ

at 40 °C (104 °F) : 0.5 – 0.7 kΩ

HINT:

As the temperature increases, the resistance decreases.

NG**Replace ambient temperature sensor.****OK****4 Check harness and connector between A/C control assembly and ambient temperature sensor (See page [IN-31](#)).****NG****Repair or replace harness or connector.****OK****Check and replace A/C control assembly.**

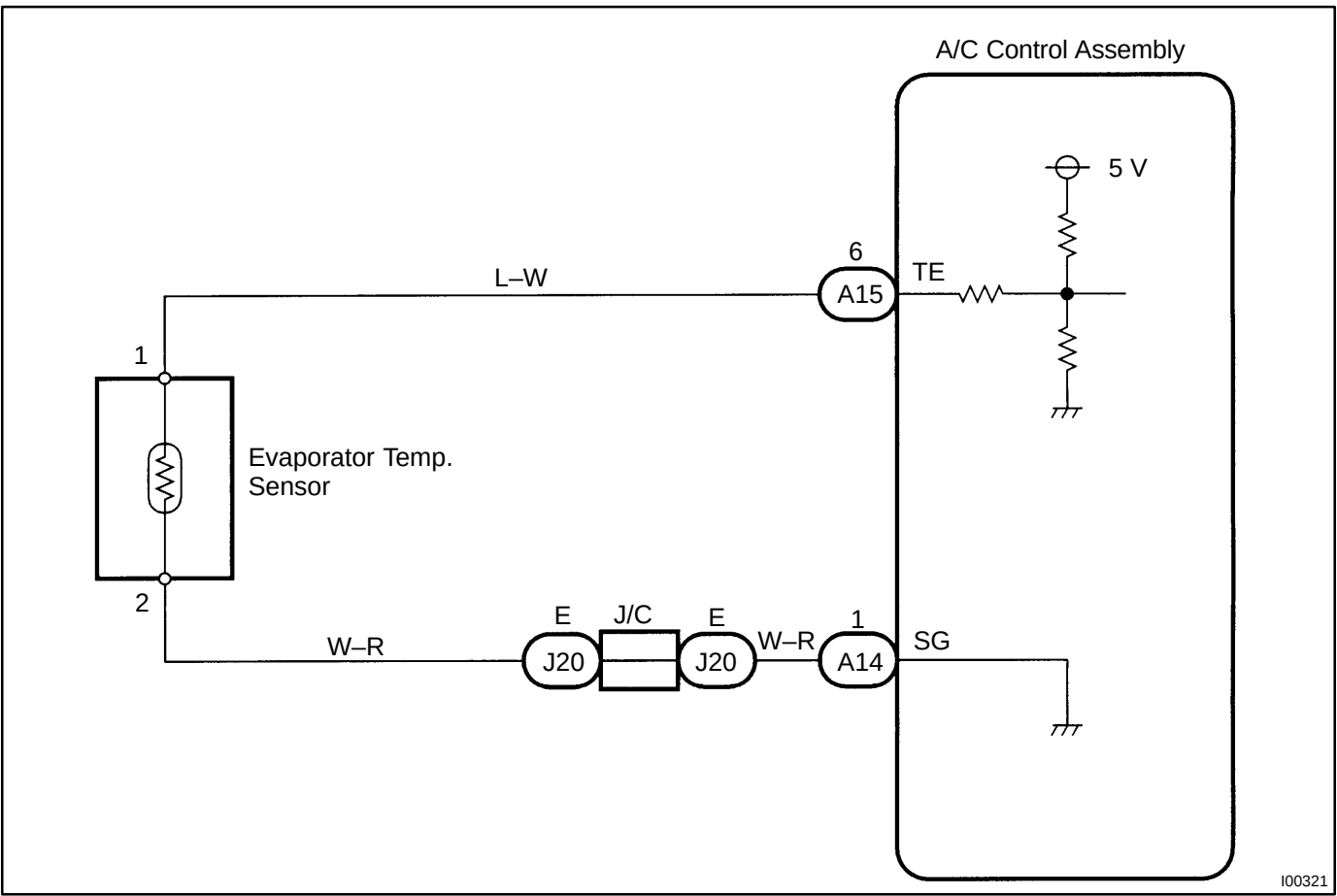
DTC	B1413/13	Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1413/13	Open or short in evaporator temperature sensor circuit.	•Evaporator temperature sensor. •Harness or connector between evaporator temperature sensor and A/C control assembly. •A/C control assembly.

WIRING DIAGRAM



I00321

INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection step 1 and in case of not using the hand-held tester, start from step 2.

1	Check evaporator temp. sensor using hand-held tester.

PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

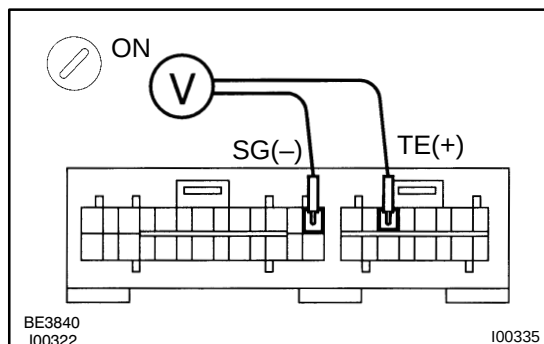
Check the evaporator temp. sensor using DATA LIST.

OK

Check or replace A/C control assembly.

NG

2	Check voltage between terminals TE and SG of A/C control assembly connector.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Turn ignition switch to ON.

CHECK:

Measure voltage between terminals TE and SG of A/C control assembly connector at each temperature.

OK:

Voltage

at 0 °C (32 °F) : 2.0 – 2.4 V

at 15 °C (59 °F) : 1.4 – 1.8 V

HINT:

As the temperature increases, the voltage decreases.

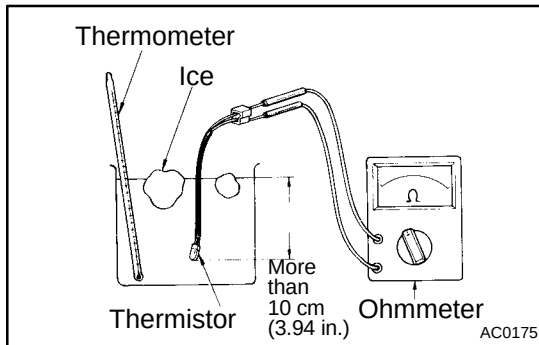
NG

Go to step 3.

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC B1413/13 is displayed, check and replace A/C control assembly.

3 Check evaporator temperature sensor.



PREPARATION:

Remove evaporator temperature sensor (See page [AC-89](#)).

CHECK:

Check resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.

OK:

Resistance

at 0 °C (32 °F) : 4.6. – 5.1 kΩ

at 15 °C (59 °F) : 2.1 – 2.6 kΩ

HINT:

As the temperature increases, the voltage decreases.

NG

Replace evaporator temperature sensor.

OK

4 Check harness and connector between A/C control assembly and evaporator temperature sensor (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

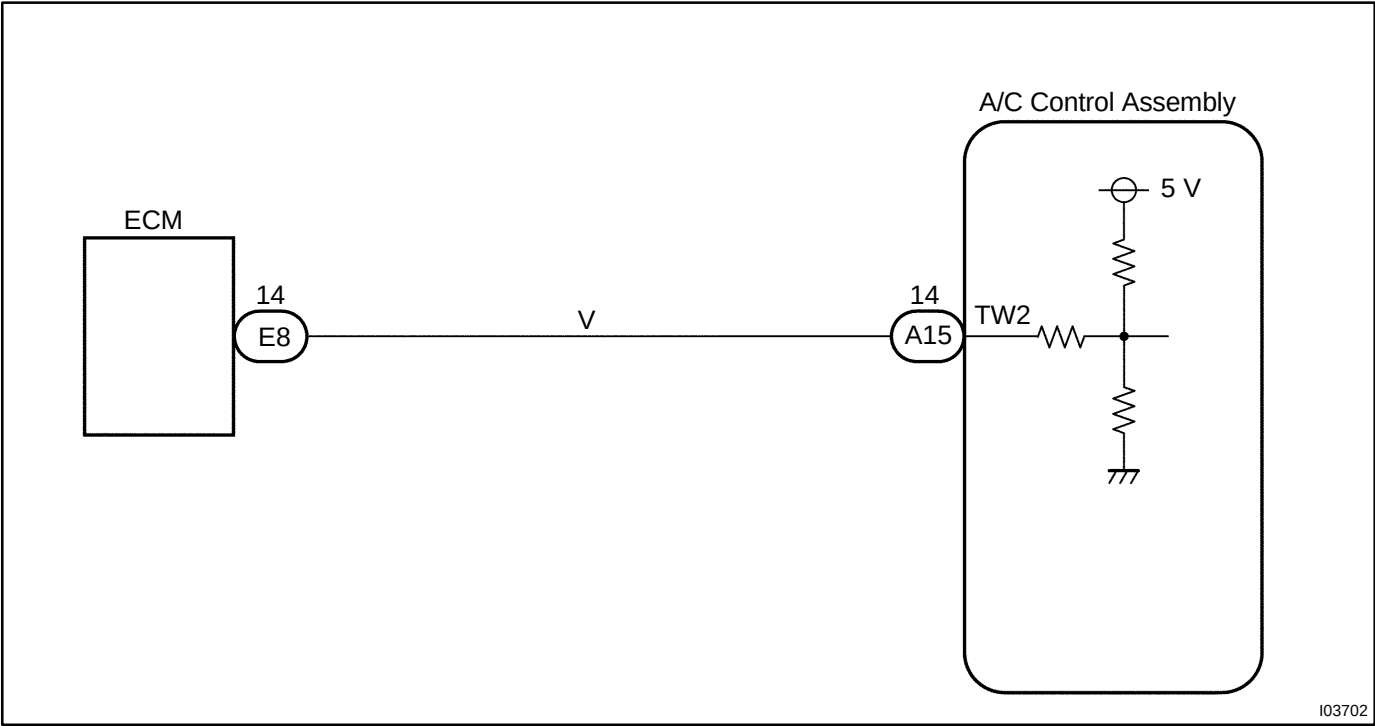
DTC	B1414/14	Engine Coolant Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the engine coolant temperature and sends the appropriate signals to the A/C control assembly. These signals are used for warm up control when the engine is cold.

DTC No.	Detection Item	Trouble Area
B1414/14	Open or short in engine coolant temperature sensor circuit.	●Engine coolant temperature sensor ●Harness or connector between engine coolant temp. sensor and ECM ●Harness or connector between ECM and A/C control assembly ●A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection step 1 and in case of not using the hand-held tester, start from step 2.

1	Check engine coolant temp. sensor using hand-held tester.

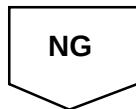
PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

Check the evaporator temp. sensor using DATA LIST.

OK	Check or replace A/C control assembly.



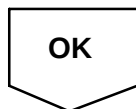
2	Check engine coolant temperature sensor circuit (See page DI-32).

NG	Replace engine coolant temperature sensor.



3	Check harness and connector between A/C control assembly and ECM (See page IN-31).

NG	Repair or replace harness or connector.

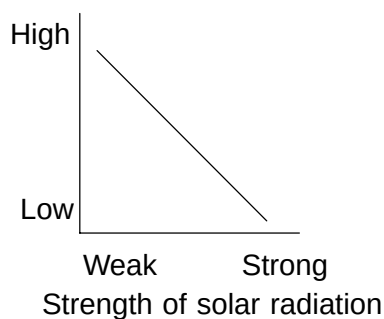


Check and replace A/C control assembly.

DTC	B1421/21	Solar Sensor Circuit

CIRCUIT DESCRIPTION

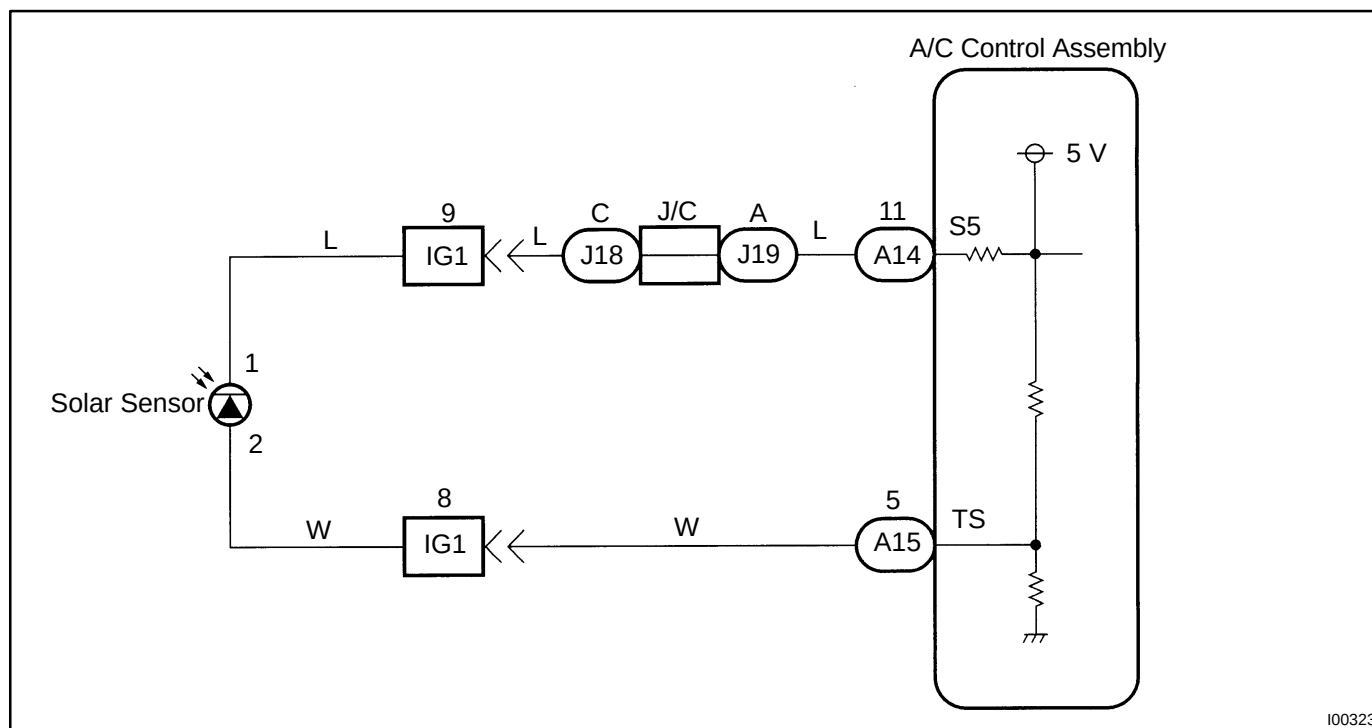
Resistance of photodiode



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1421/21	Open or short in solar sensor circuit. (Please note that display of DTC B1421/21 is not abnormal when the sensor is not receiving solar radiation.)	●Solar sensor ●Harness or connector between solar sensor and A/C control assembly. ●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection step 1 and in case of not using the hand-held tester, start from step 2.

1 Check solar sensor using hand-held tester.

PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

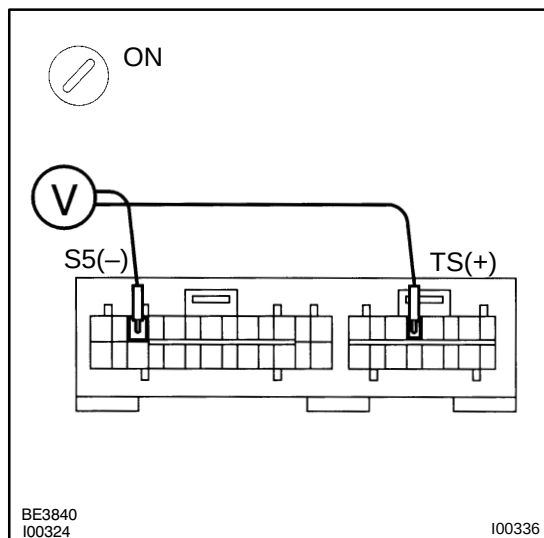
Check the solar sensor using DATA LIST.

OK

Check and replace A/C control assembly.

NG

2 Check voltage between terminals S5 and TS of A/C control assembly connector.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Turn ignition switch to ON.

CHECK:

Measure voltage between terminals S5 and TS of A/C control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

OK:

Condition	Voltage
Sensor subjected to electric light	Below 4.0 V
Sensor covered by a cloth	4.0 – 4.5 V

HINT:

As the inspection light is gradually moved away from the sensor, the voltage increases.

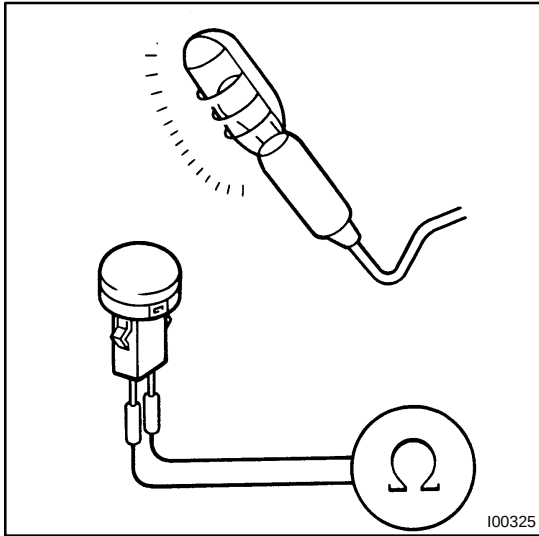
NG

Go to step 3.

NG

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC B1421/21 is displayed, check and replace A/C control assembly.

3 Check solar sensor.



PREPARATION:

- (a) Remove instrument panel (See page [BO-79](#)).
- (b) Disconnect solar sensor connector.

CHECK:

- (a) Cover the sensor by a cloth.
- (b) Measure resistance between terminals 1 and 2 of solar sensor connector.

HINT:

Connect positive (+) lead of ohmmeter to terminal 2 and negative (–) lead to terminal 1 of the solar sensor.

OK:

Resistance : $\infty \Omega$ (No continuity)

PREPARATION:

Remove the cloth from the solar sensor and subject the sensor to electric light.

CHECK:

Measure resistance.

OK:

Resistance : Below 10 k Ω (Continuity)

HINT:

As the electric light is moved gradually away from the sensor, the resistance increases.

NG

Replace solar sensor.

OK

4 Check harness and connector between A/C control assembly and solar sensor (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

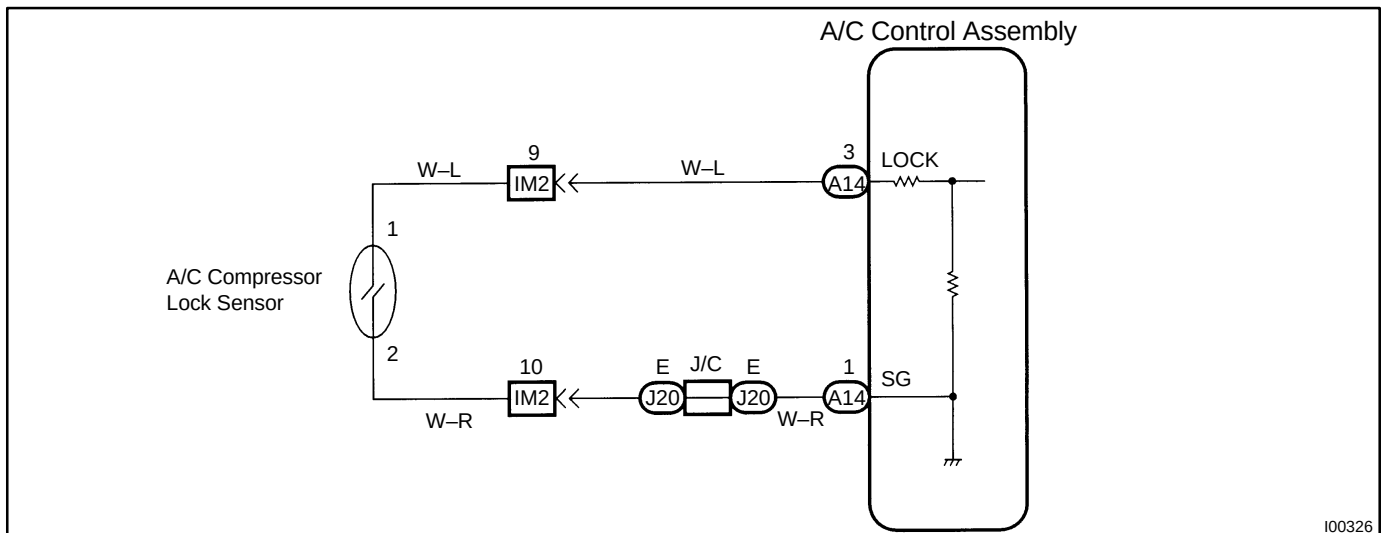
DTC	B1422/22	Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

This sensor sends 4 pulses per engine revolution to the A/C control assembly. If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the A/C control assembly turns the compressor off. And, the indicator flashes at about 1 sec. intervals.

DTC No.	Detection Item	Trouble Area
B1422/22	All conditions below are detected for 3 secs. or more. (a) Engine speed : 450 rpm or more. (b) Ratio between engine and compressor speed deviates 20 % or more in comparison to normal operation.	●Compressor. ●Compressor drive belt. ●Compressor lock sensor. ●Harness and connector between compressor and A/C control assembly. ●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check compressor.

PREPARATION:

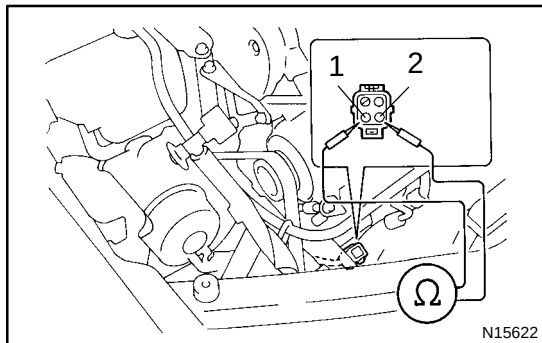
- Check compressor drive belt tension (See page [AC-14](#)).
- Check if the compressor does not lock during operation with engine started and blower switch and A/C switch ON.

NG

Adjust drive belt tension or check compressor.

OK

2 Check compressor lock sensor.



PREPARATION:

Disconnect compressor lock sensor connector.

CHECK:

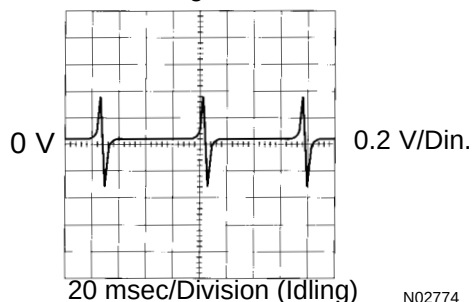
Measure resistance between terminals 1 and 2 of compressor lock sensor connector.

OK:

Resistance : at 20 °C (68 °F) : 65 – 125 Ω

Reference : Inspection using oscilloscope

LOCK IN signal waveform



During cranking or idling, measure voltage between terminals LOCK IN and SG of A/C control assembly.

HINT:

The correct waveform appears as shown in the illustration on the left.

NG

Replace compressor lock sensor.

OK

3 Check harness and connector between A/C control assembly and compressor lock sensor (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC 22 is displayed, check and replace A/C control assembly.

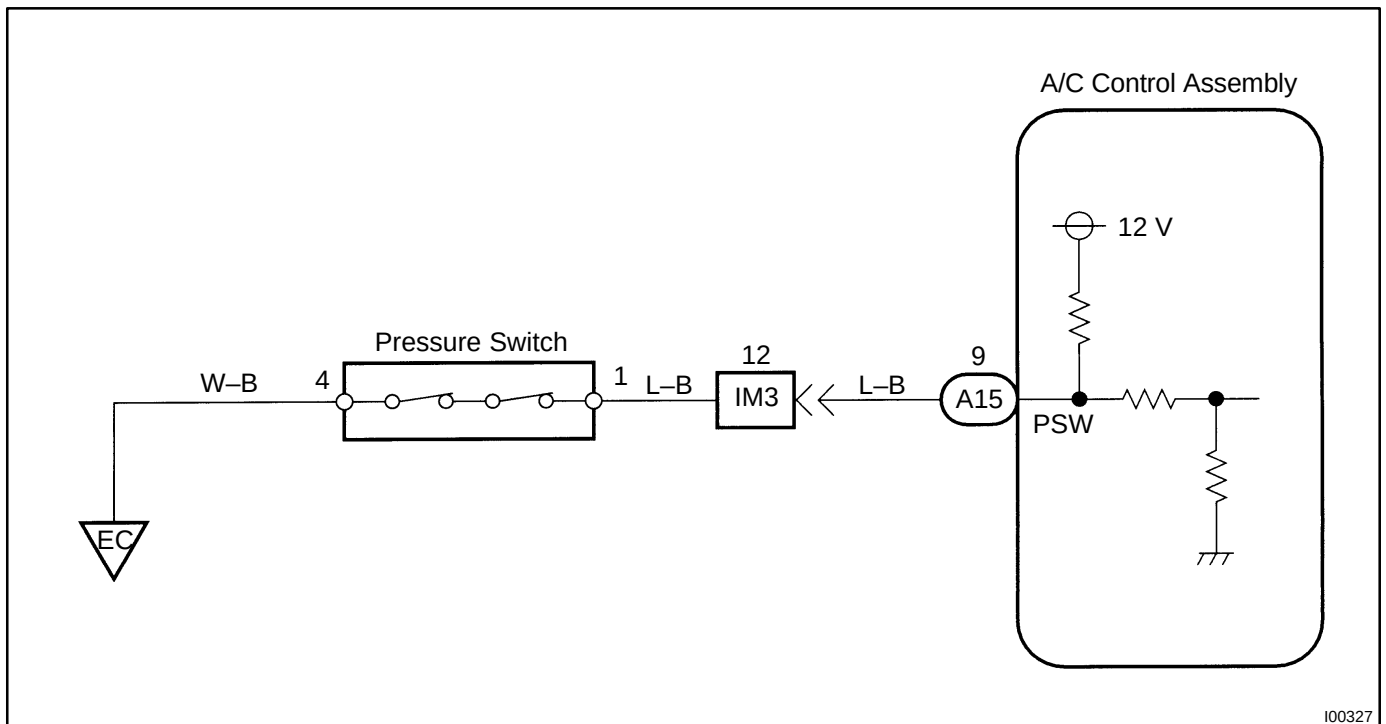
DTC	B1423/23	Pressure Switch Circuit

CIRCUIT DESCRIPTION

This pressure switch sends the appropriate signals to the A/C control assembly when the A/C refrigerant pressure drops too low or rises too high. When the A/C control assembly receives these signals, it outputs signals via the ECM to switch off the compressor relay and turns the magnetic clutch off.

DTC No.	Detection Item	Trouble Area
B1423/23	●Open in pressure sensor circuit. ●Abnormal refrigerant pressure. below 196 kPa (2.0 kgf/cm². 28 psi) over 3,140 kPa (32.0 kgf/cm². 455 psi)	●Pressure switch. ●Harness or connector between pressure switch and A/C control assembly. ●Refrigerant pipe line. ●A/C control assembly.

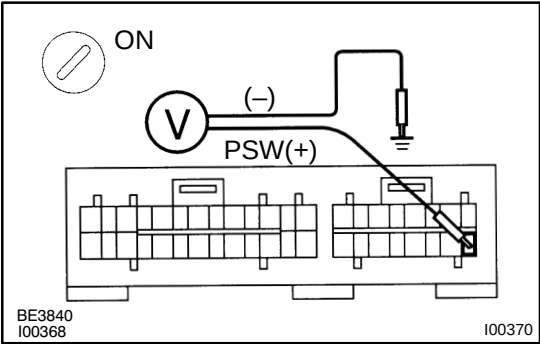
WIRING DIAGRAM



INSPECTION PROCEDURE

1

Check voltage between terminals PSW of A/C control assembly and body ground.



PREPARATION:

- (a) Install the manifold gauge set (See page AC-10).
- (b) Turn ignition switch to ON.

CHECK:

Check voltage between terminals PSW of A/C control assembly connector and body ground when A/C gas pressure is changed.

OK:

The voltage changes with gas pressure, as shown in the diagram below.

Low Pressure Cut Side	Referaence : High Pressure Cut Side
ON (0 V) 196 kPa OFF (12V) 225 kPa	ON (0 V) 2,550 kPa 3,140 kPa OFF (12V)

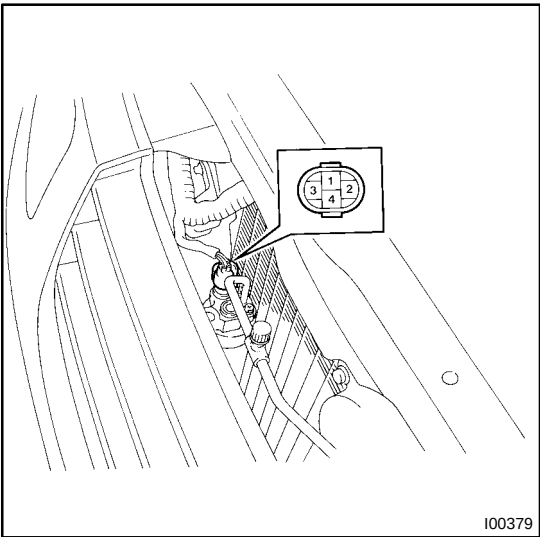
OK

Proceed to next circuit inspection shown on matrix chart (See page DI-711).

NG

2

Check pressure switch.



PREPARATION:

Disconnect pressure switch connector.

CHECK:

Check continuity between terminals 1 and 4 of pressure switch when A/C gas pressure is changed.

OK:

The continuity changes with gas pressure as shown below.

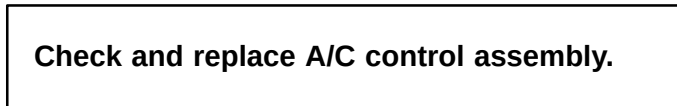
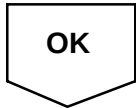
Low Pressure Cut Side	Referaence : High Pressure Cut Side
ON (continuity) 196 kPa OFF (no continuity) 225 kPa	ON (continuity) 2,550 kPa 3,140 kPa OFF (nocontinuity)

NG

Replace pressure switch.

OK

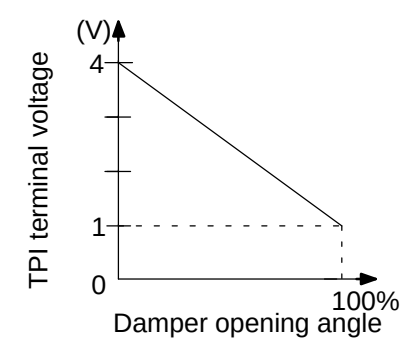
3	Check harness and connector between A/C control assembly and pressure switch, pressure switch and body ground (See page IN-31).



DTC	B1431/31	Air Mix Damper Position Sensor Circuit

DTC	B1441/41	Air Mix Damper Position Sensor Circuit

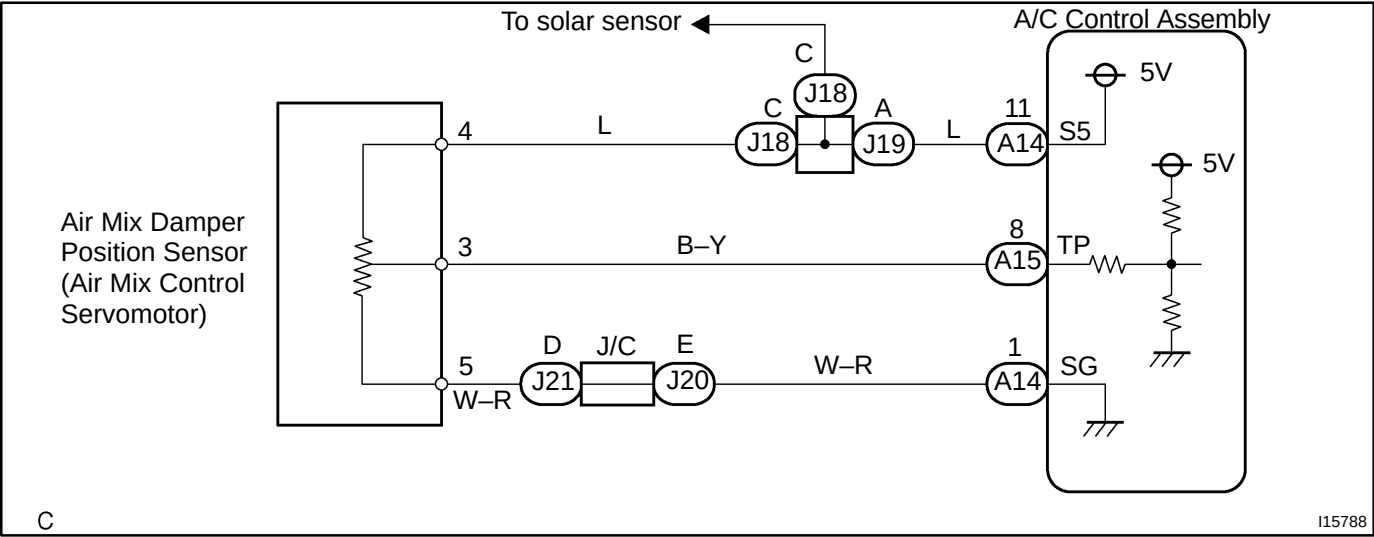
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air mix control servomotor.

DTC No.	Detection Item	Trouble Area
B1431/31	Short to ground or power source circuit in air mix damper position sensor circuit.	●Air mix damper position sensor. ●Harness of connector between air mix control servomotor and A/C control assembly.
B1441/41	Air mix damper position sensor value does not change even if ECM operates air mix control servomotor.	●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection from step1 and in case of not using the hand-held tester, start from step2.

1 Check air mix damper position using hand-held tester.

PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

Check the current position of air mix damper and the target position of air mix damper.

OK:

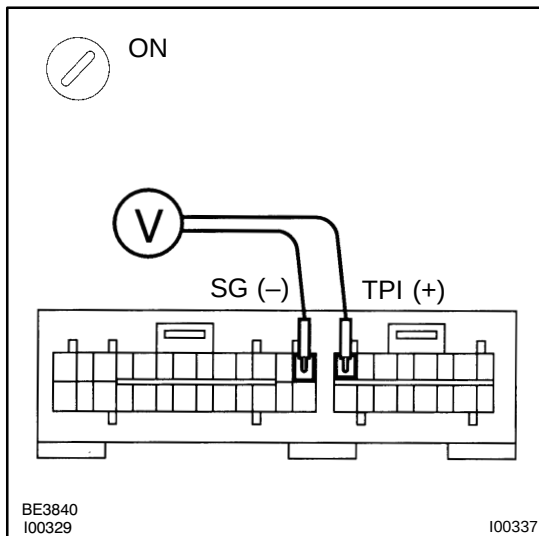
The current position and target position are almost similar.

OK

Check and replace A/C control assembly.

NG

2 Check voltage between terminals TP and SG of A/C control assembly connector.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Turn ignition switch ON.

CHECK:

Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SG of A/C control assembly connector each time when the set temperature is changed.

OK:

Set Temperature	Voltage
Max. cool	3.5 – 4.5 V
Max. hot	0.5 – 1.8 V

HINT:

As the set temperature increases, the voltage decreases gradually without interruption.

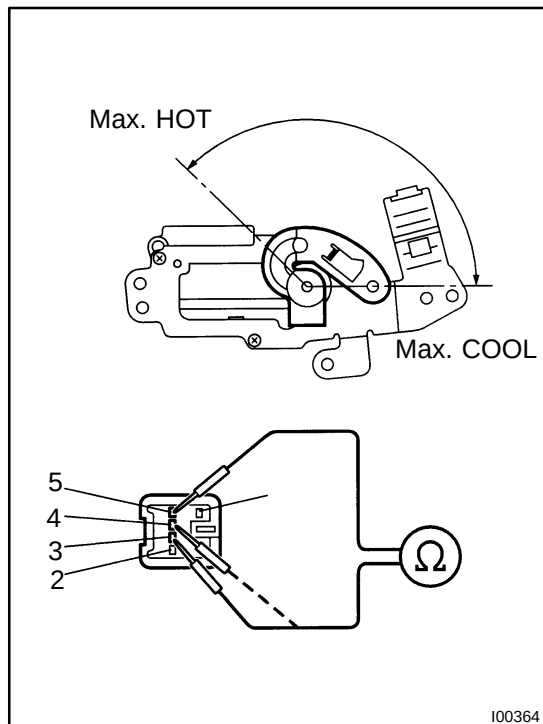
NG

Go to step 3.

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC B1431/31 or B1441/41 is displayed, check and replace A/C control assembly.

3 Check air mix damper position sensor.



PREPARATION:

- (a) Remove air mix control servomotor (See page AC-74).
- (b) Disconnect air mix control servomotor connector.

CHECK:

Measure resistance between terminals 4 and 5 of air mix control servomotor connector.

OK:

Resistance : 4.8 – 7.2 kΩ

CHECK:

While operating air mix control servomotor as shown in the procedure on page DI-738, measure resistance between terminals 3 and 5 of air mix control servomotor connector.

OK:

Position	Resistance
Max. cool	3.8 – 5.8 kΩ
Max. hot	0.95 – 1.45 kΩ

HINT:

As the air mix control servomotor moves from cool side to hot side, the resistance decreases gradually without interruption.

NG

Replace air mix control servomotor.

OK

4 Check harness and connector between A/C control assembly and air mix control servomotor (See page IN-31).

NG

Repair or replace harness or connector.

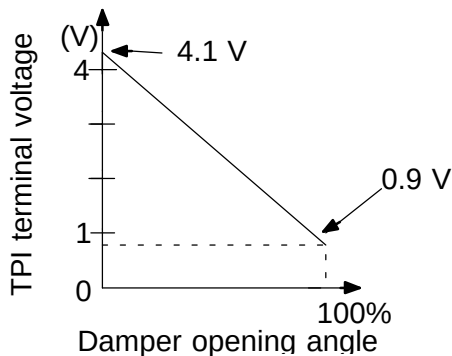
OK

Check and replace A/C control assembly.

DTC	B1432/32	Air Inlet Damper Position Sensor Circuit

DTC	B1442/42	Air Inlet Damper Position Sensor Circuit

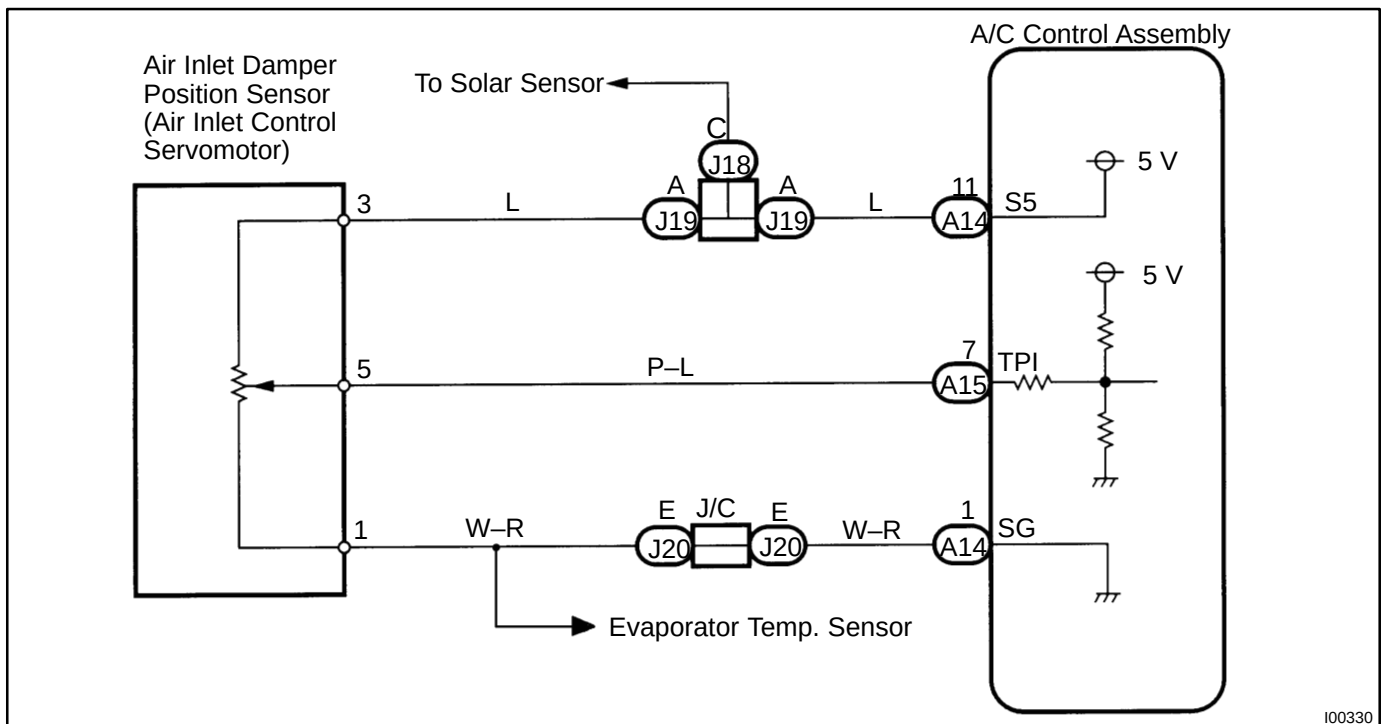
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air inlet control servomotor.

DTC No.	Detection Item	Trouble Area
B1432/32	Short to ground or power source circuit in air inlet damper position sensor circuit.	●Air inlet damper position sensor. ●Harness or connector between air inlet control servomotor and A/C control assembly.
B1442/42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	●A/C assembly.

WIRING DIAGRAM



100330

INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection from step1 and in case of not using the hand-held tester, start from step2.

1 Check air inlet damper position using hand-held tester.

PREPARATION:

Connect the hand-held tester to the DLC3.

CHECK:

Check the current position of air mix damper and the target position of air mix damper.

OK:

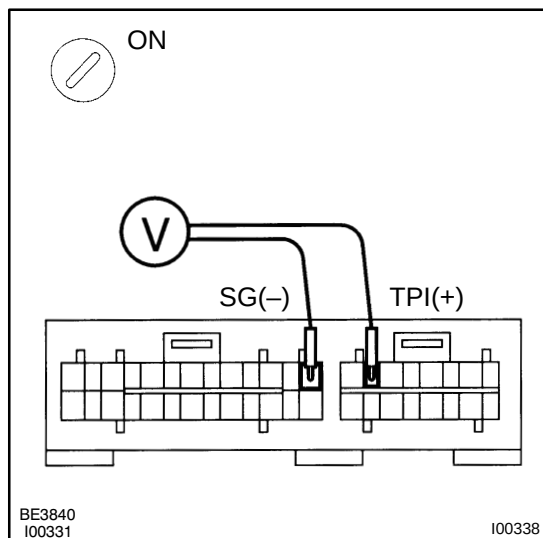
The current position and target position are almost similar.

OK

Check or replace A/C control assembly.

NG

2 Check voltage between terminals TPI and SG of A/C control assembly connector.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Turn ignition switch ON.

CHECK:

Press REC/FRS switch to change air inlet between fresh and recirculation air, and measure voltage between terminals TPI and SG of A/C control assembly when the air inlet servomotor operates.

OK:

REC/FRS Switch	Voltage
REC	3.5 – 4.5 V
FRS	0.5 – 1.8 V

HINT:

As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

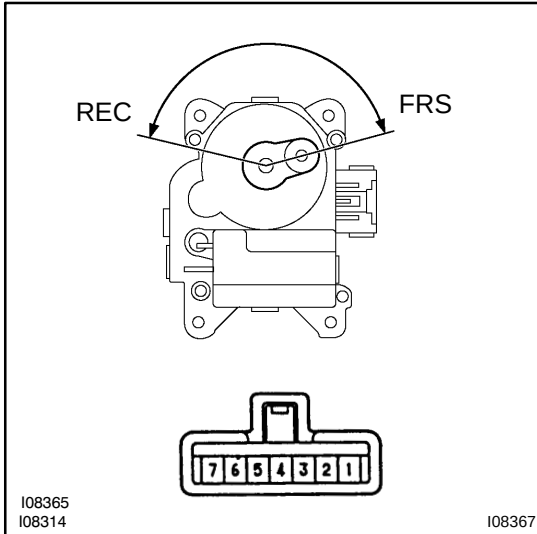
NG

Go to step 3.

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)). However, if DTC B1432/32 or B1442/42 is displayed, check and replace A/C control assembly.

3 Check air inlet damper position sensor.



PREPARATION:

- Remove air inlet control servomotor (See page [AC-71](#)).
- Disconnect air inlet control servomotor connector.

CHECK:

Measure resistance between terminals 1 and 3 of air inlet control servomotor connector.

OK:

Resistance : 4.2 – 7.8 kΩ

CHECK:

While operating air inlet control servomotor as in the procedure on page, measure resistance between terminals 1 and 5 of air inlet control servomotor connector.

OK:

Resistance :

Damper Position	Resistance
REC side	3.4 – 6.4 kΩ
FRS side	0.76 – 1.4 kΩ

HINT:

As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

NG

Replace air mix control servomotor.

OK

4 Check harness and connector between A/C control assembly and air inlet control servomotor. (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

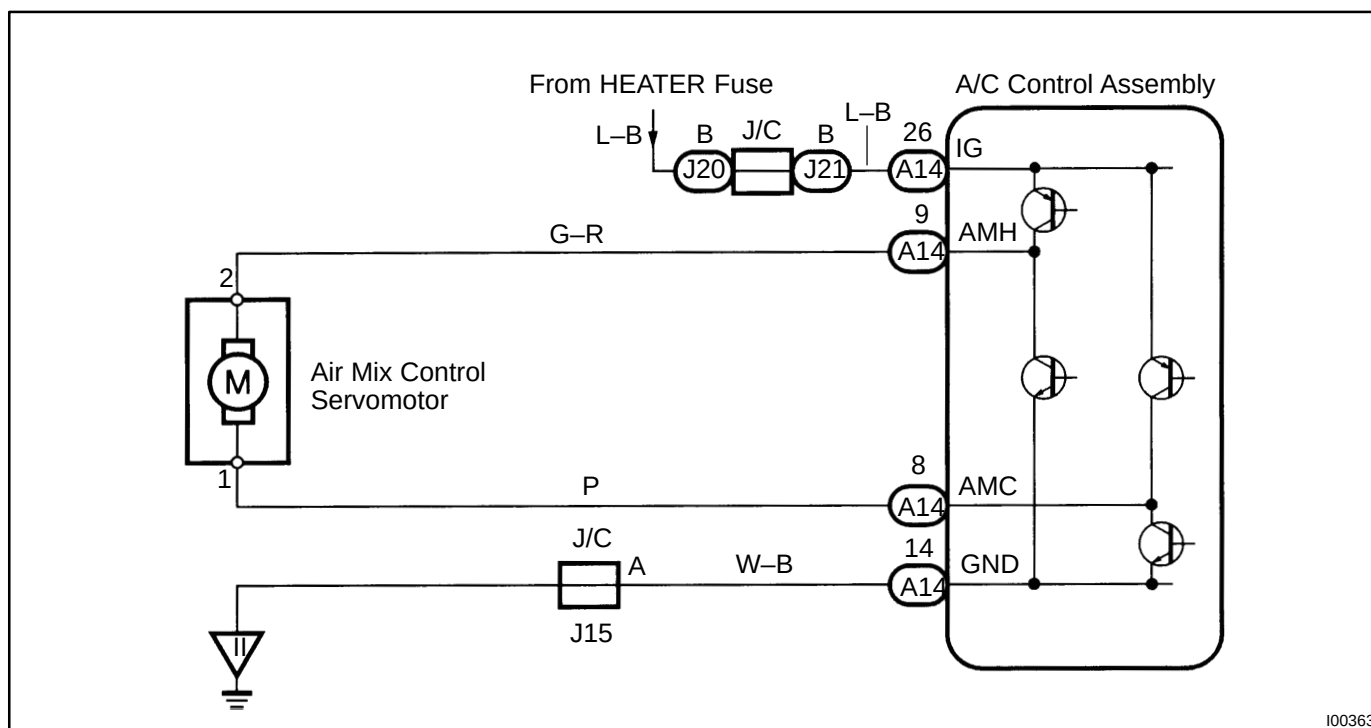
DTC	B1441/41	Air Mix Control Servomotor Circuit

CIRCUIT DESCRIPTION

This air mix control servomotor is controlled by the A/C control assembly and moves the air mix damper to the desired position.

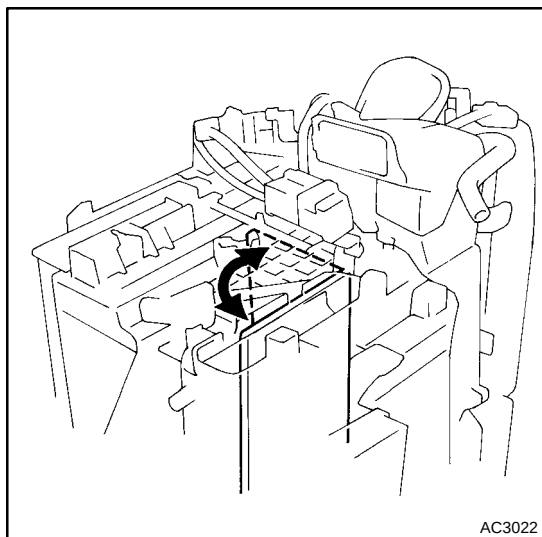
DTC No.	Detection Item	Trouble Area
B1441/41	Air mix damper position sensor value does not change even if A/C control assembly operates air mix control servomotor.	●Air mix control servomotor. ●Air mix damper position sensor. ●Harness or connector between A/C control assembly and air mix control servomotor, air mix damper position sensor. ●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Actuator check.

**PREPARATION:**

- (a) Warm up the engine.
- (b) Set to the actuator check mode (See page [DI-704](#)).
- (c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation of the air mix damper and the condition of the blower.

OK:

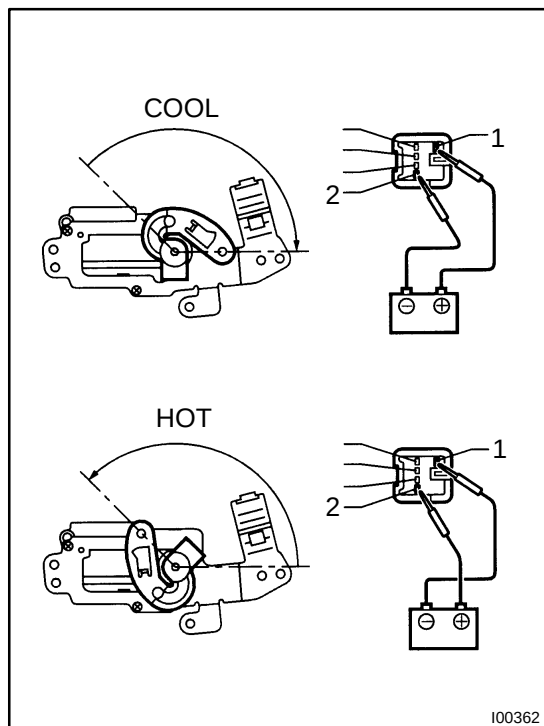
Display Code	Air Mix Damper	Condition
0 – 3	0 % (Fully closed)	Cool air comes out
4 – 5	50 %	
6 – 9	100 % (Fully opened)	Warm air comes out

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

NG

2 Check air mix control servomotor.

**PREPARATION:**

Remove air mix control servomotor (See page [AC-74](#)).

CHECK:

Connect positive (+) lead to terminal 1 and the negative (–) lead to terminal 2.

OK:

The lever turns smoothly to COOL side.

CHECK:

Connect negative (–) lead to terminal 1 and positive (+) lead to terminal 2.

OK:

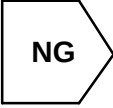
The lever turns smoothly to HOT side.

NG

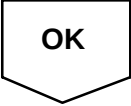
Repair or replace harness or connector.

OK

3	Check harness and connector between A/C control assembly and air mix control servomotor (See page IN-31).

NG

Repair or replace harness or connector.

OK

Check and replace A/C control assembly
(See page [IN-31](#)).

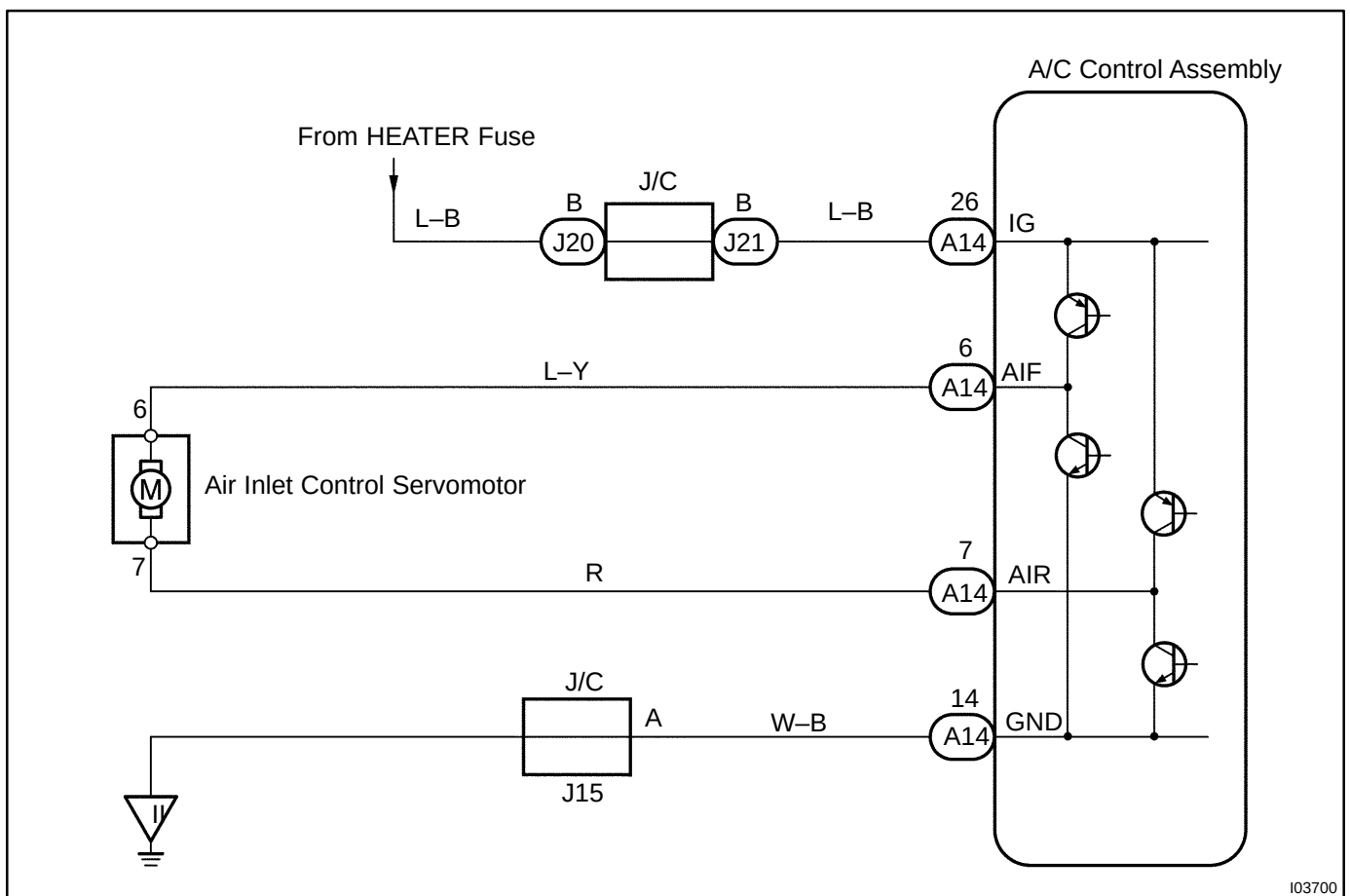
DTC	B1442/42	Air Inlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air inlet control servomotor is controlled by the A/C control assembly and moves the air inlet damper to the desired position.

DTC No.	Detection Item	Trouble Area
B1442/42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	•Air inlet damper position sensor. •Harness or connector between air inlet control servomotor and A/C control assembly. •A/C control assembly.

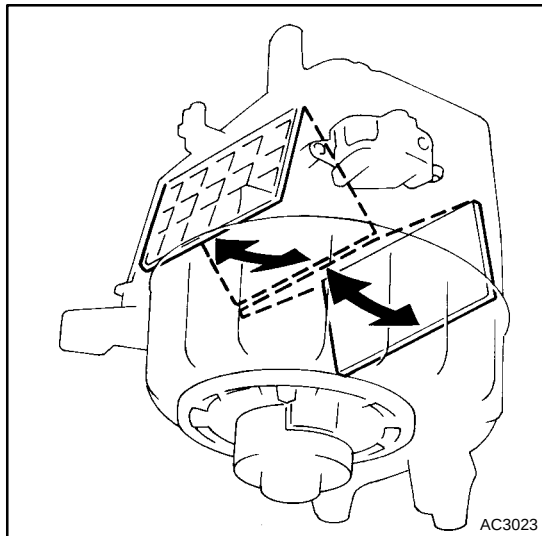
WIRING DIAGRAM



I03700

INSPECTION PROCEDURE

1 Actuator check.

**PREPARATION:**

- (a) Remove glove box to see and check the air inlet damper operation.
- (b) Set to the actuator check mode (See page [DI-704](#)).
- (c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation air inlet damper.

OK:

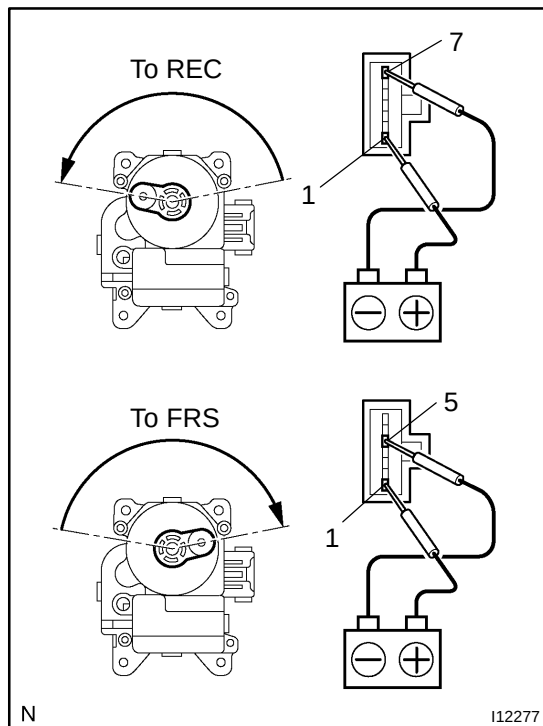
Display Code	Air Inlet Damper
0 – 2	FRS
3	REC/FRS
4 – 9	REC

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

NG

2 Check air inlet control servomotor.

**PREPARATION:**

Remove air inlet control servomotor (See page [AC-71](#)).

CHECK:

Connect positive (+) lead to terminal 1 and negative (–) lead to terminal 7.

OK:

The lever moves smoothly to REC position.

CHECK:

Connect negative (–) lead to terminal 5 and positive (+) lead to terminal 1.

OK:

The lever moves smoothly to FRS position.

NG

Replace air inlet control servomotor assembly.

OK

3

Check harness and connector between A/C control assembly and air inlet control servomotor. (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

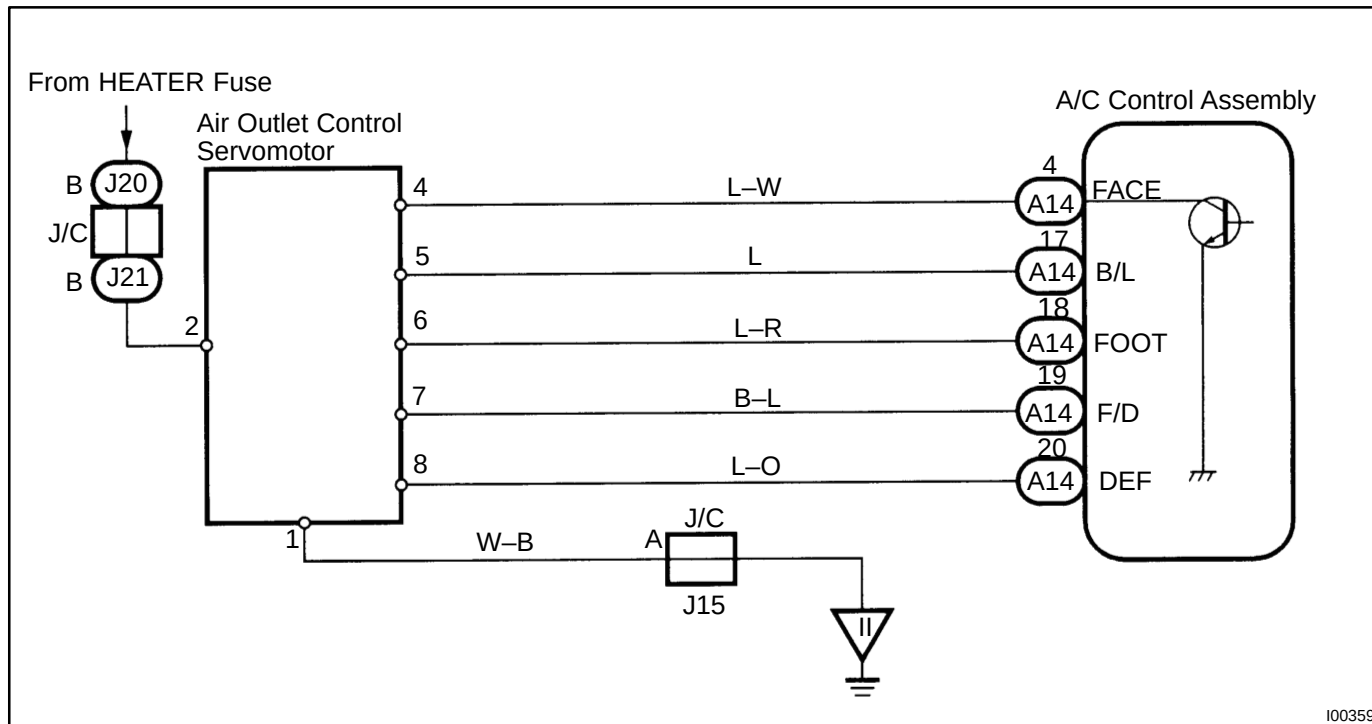
Check and replace A/C control assembly.

Air Outlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by signals from the A/C control assembly. When the AUTO switch is ON, the A/C control assembly changes the mode automatically between FACE, BI-LEVEL and FOOT according to the temperature setting.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Actuator check.

Display Code	Air Flow Mode
0 – 4	FACE
5	BI-LEVEL
6 – 7	FOOT
8	FOOT DEF
9	DEF

PREPARATION:

- Set to the actuator check mode (See page [DI-704](#)).
- Press the DEF switch and change to step operation.

CHECK:

Press the DEF switch in order and check the condition of air flow mode.

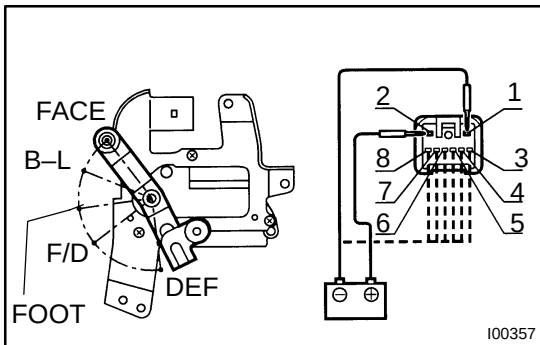
OK:

The mode changes with the change in the temperature display as shown in the table.

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

NG

2 Check air outlet control servomotor.**PREPARATION:**

Remove air outlet control servomotor (See page [AC-77](#)).

CHECK:

- Connect positive (+) lead to terminal 2 and negative (–) lead to terminal 1.
- Check the lever operation when the negative (–) lead is connected to the terminals shown below.

OK:

The lever moves smoothly to the position for each mode.

Ground Terminals	Mode
4	FACE
5	BI-LEVEL
6	FOOT
7	FOOT DEF
8	DEF

NG

Replace air outlet control servomotor.

OK

3 Check harness and connector between A/C control assembly and air outlet control servomotor, air outlet control servomotor and battery, air outlet control servomotor and body ground (See page [IN-31](#)).

NG

Repair or replace harness or connector.

OK

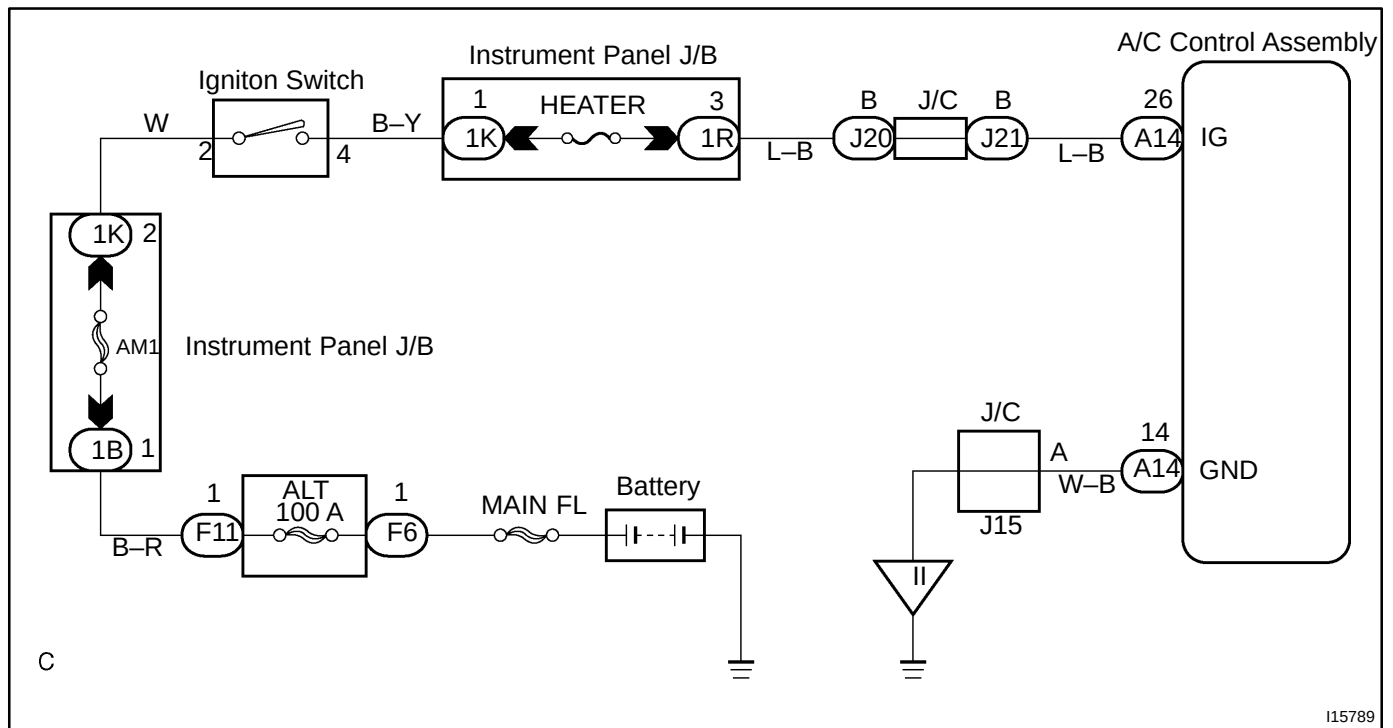
Repair or replace A/C control assembly.

IG Power Source Circuit

CIRCUIT DESCRIPTION

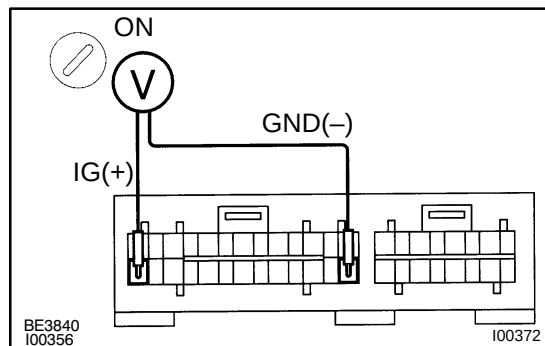
This is the power source for the A/C control assembly (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals IG and GND of A/C control assembly connector.

**PREPARATION:**

- (a) Remove front ash receptacle (See page [BO-79](#)).
- (b) Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- (c) Turn ignition switch ON.

CHECK:

Measure voltage between terminals IG and GND of A/C control assembly.

OK:

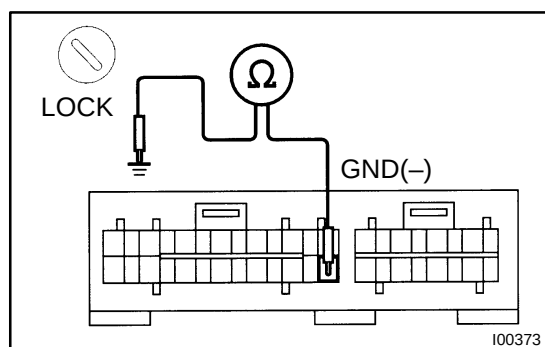
Voltage : 10 – 14 V

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

NG

2	Check continuity between terminal GND of A/C control assembly and body ground.

**CHECK:**

Measure resistance between terminal GND of A/C control assembly and body ground.

OK:

Resistance : Below 1 Ω

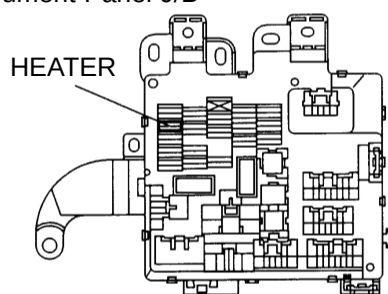
NG

Repair or replace harness or connector.

OK

3 Check HTR fuse.

Instrument Panel J/B



100348

PREPARATION:

Remove HEATER fuse in Instrument Panel J/B.

CHECK:

Check continuity of HEATER fuse.

OK:

Continuity exists.

NG

Check for short in all the harness and components connected to the HEATER fuse (See page [DI-746](#)).

OK

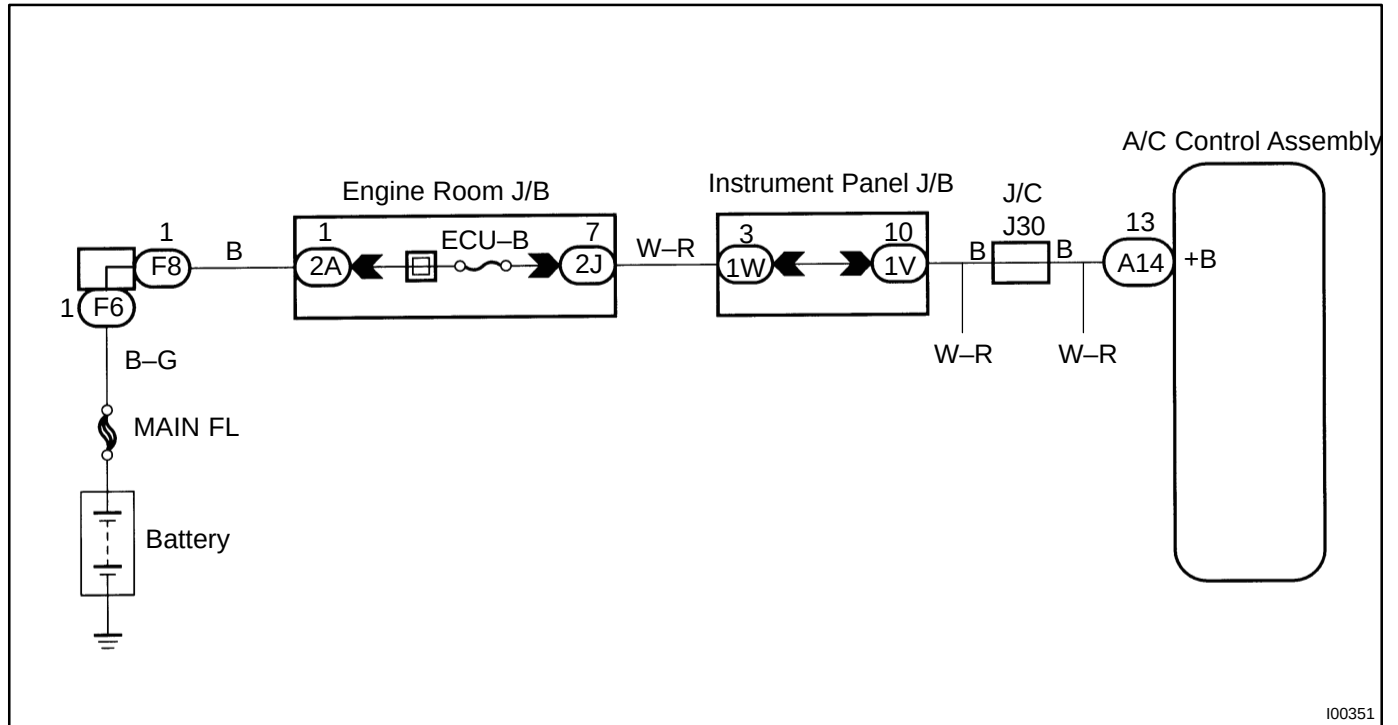
Check and repair harness and connector between A/C control assembly and battery.

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

This is the back-up power source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for DTC memory, etc..

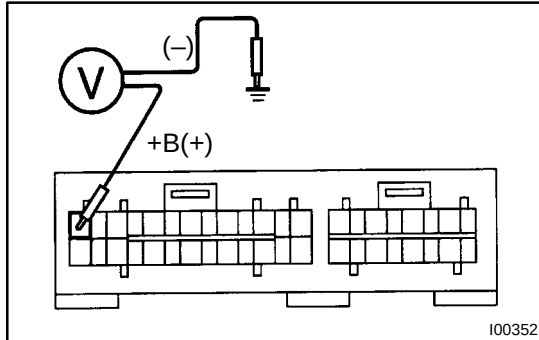
WIRING DIAGRAM



I00351

INSPECTION PROCEDURE

1	Check voltage between terminal +B of A/C control assembly connector and body ground.

**PREPARATION:**

- (a) Remove front ash receptacle (See page [BO-79](#)).
- (b) Remove A/C control assembly with connectors still connected (See page [BO-79](#)).

CHECK:

Measure voltage between terminal +B of A/C control assembly connector and body ground.

OK:

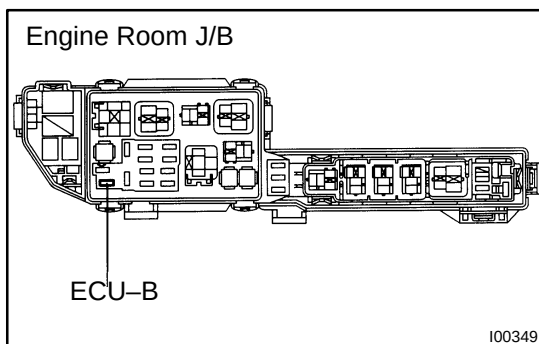
Voltage : 10 – 14 V

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

NG

2	Check ECU-B fuse.

**PREPARATION:**

Remove ECU-B fuse from Engine Room J/B.

CHECK:

Check continuity of ECU-B fuse.

OK:

There is continuity.

NG

Check for short in all the harness and components connected to the ECU-B fuse (See page [DI-749](#)).

OK

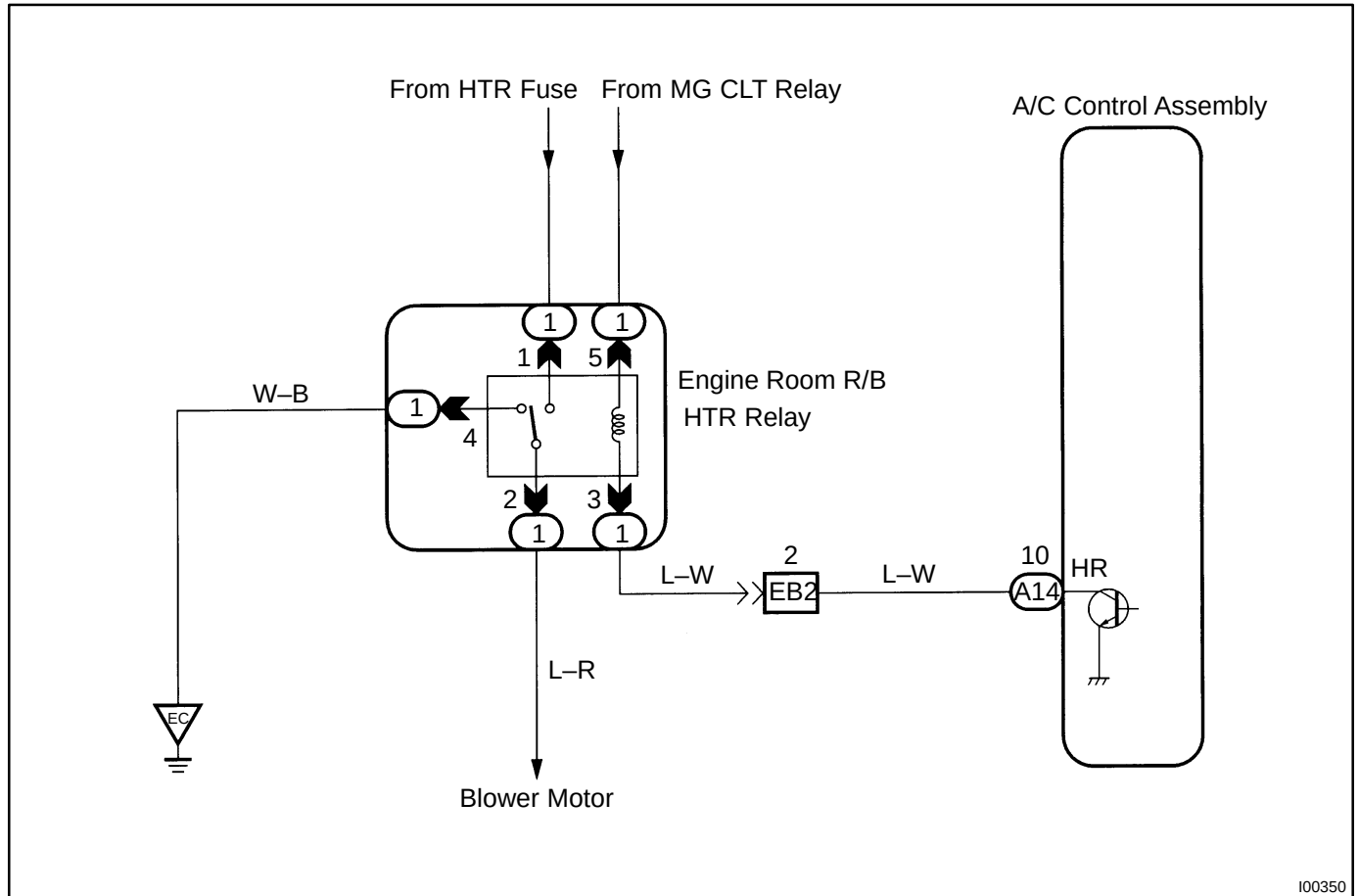
Check and repair harness and connector between A/C control assembly and battery.

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

The heater main relay is switched on by signals from the A/C control assembly. It supplies power to the blower motor.

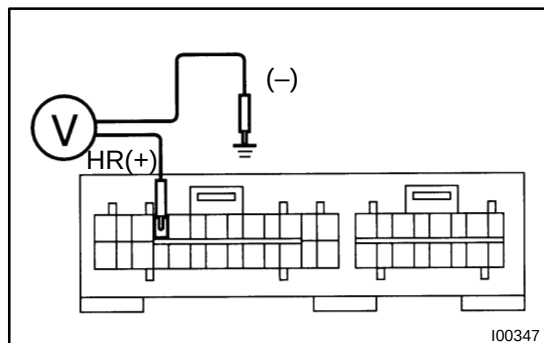
WIRING DIAGRAM



I00350

INSPECTION PROCEDURE

1	Check voltage between terminal HR of A/C control assembly connector and body ground.

**PREPARATION:**

- Remove front ash receptacle (See page [BO-79](#)).
- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).

CHECK:

Measure voltage between terminal HR of A/C control assembly and body ground when ignition switch is ON and OFF.

OK:

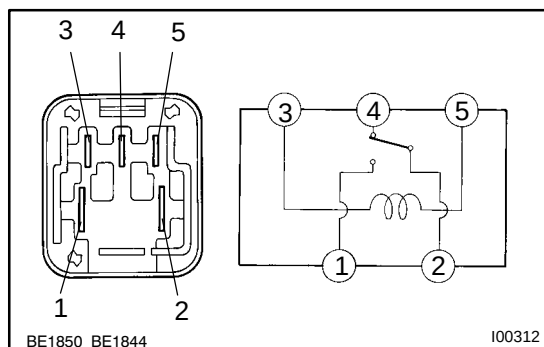
Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

OK

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

NG

2	Check heater main relay.

**PREPARATION:**

Remove heater main relay from.

CHECK:

Check continuity between each pair of terminals of heater main relay shown below.

OK:

Tester connection	Specified condition
1 – 4	No continuity
2 – 4	Continuity
3 – 5	62.5 – 90.9 Ω

PREPARATION:

Apply battery positive voltage between terminals 3 and 5.

CHECK:

Check continuity between each pair of terminal shown below.

OK:

Tester connection	Specified condition
1 – 2	Continuity
2 – 4	No continuity

NG

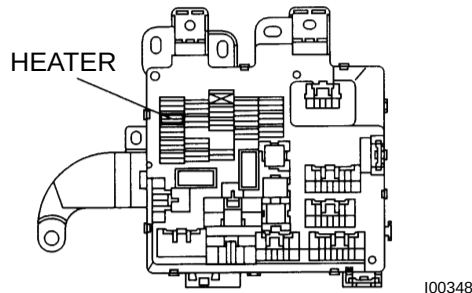
Replace hater main relay.

OK

3

Check HEATER fuse.

Instrument Panel J/B

**PREPARATION:**

Remove HEATER fuse from Instrument Panel J/B.

CHECK:

Check continuity of HEATER fuse.

OK:

Continuity exists.

NG

Check for short in all the harness and components connected to the HEATER fuse (See page [DI-751](#)).

OK

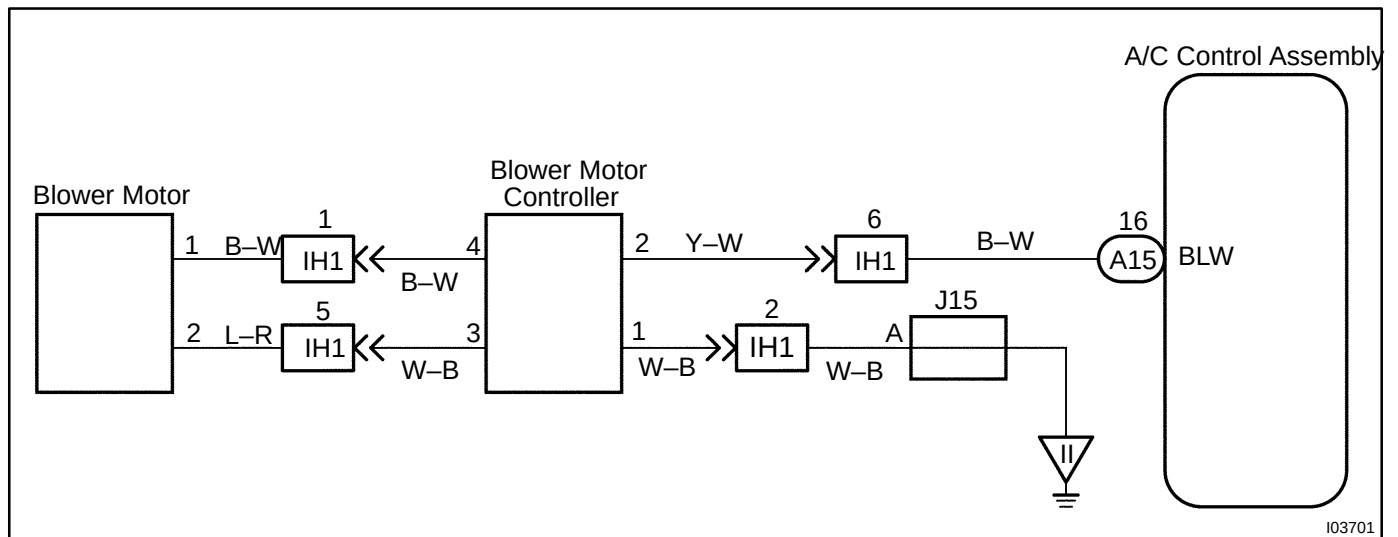
Check and repair harness and connector between A/C control assembly and battery.

Blower Motor Circuit

CIRCUIT DESCRIPTION

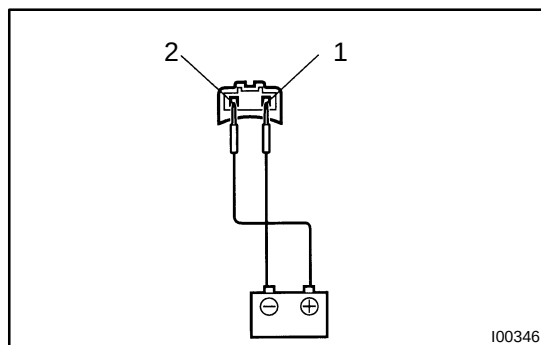
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check blower motor.



PREPARATION:

Remove blower motor (See page [AC-62](#)).

CHECK:

Connect positive (+) lead connected to terminal 2 of blower motor connector, negative (-) lead to terminal 1.

OK:

Blower motor operates smoothly.

NG

Replace blower motor.

OK

2	Check harness and connector between battery and blower motor, blower motor and body ground (See page IN-31).

NG	Repair or replace harness or connector.

OK

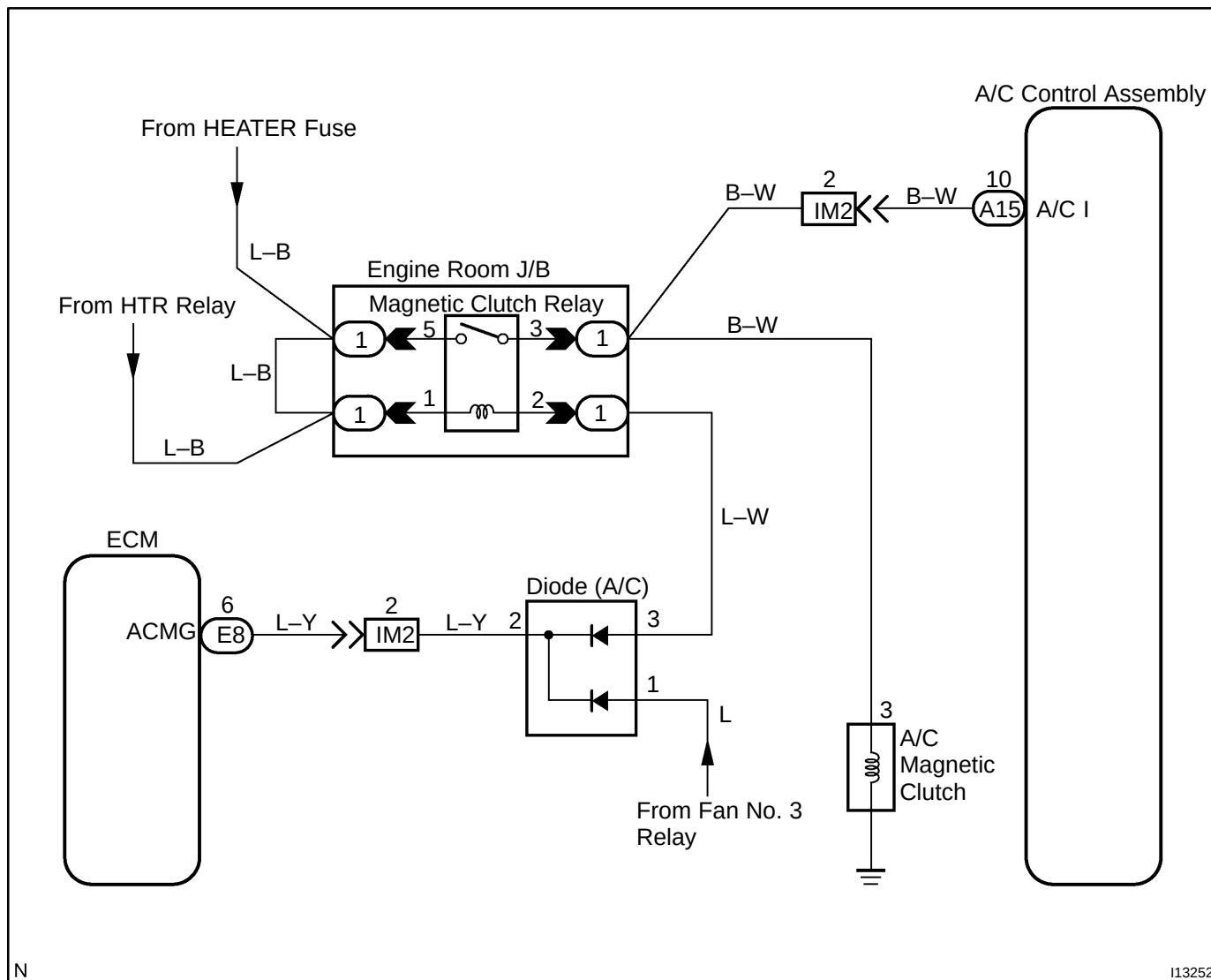
Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

Compressor Circuit

CIRCUIT DESCRIPTION

The A/C control assembly outputs the magnetic clutch ON signal from terminal AC1 to the ECM. When the ECM receives this signal, it sends a signal from terminal MGC and switches the A/C magnetic clutch relay ON, thus turning on the A/C magnetic clutch.

WIRING DIAGRAM

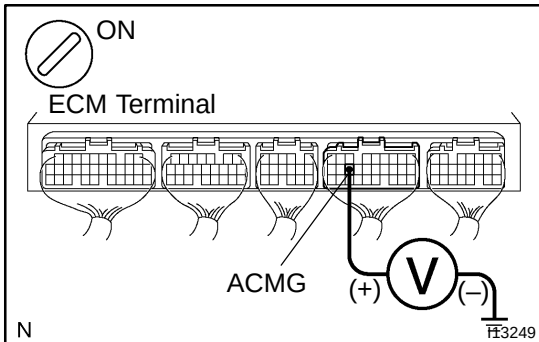


N

I13252

INSPECTION PROCEDURE

1 Check voltage between terminal ACMG of ECM

**CHECK:**

- (a) Start engine.
- (b) Push AUTO SW.
- (c) Measure voltage between terminal ACMG of ECM connector and body ground when A/C switch is On and OFF.

OK:

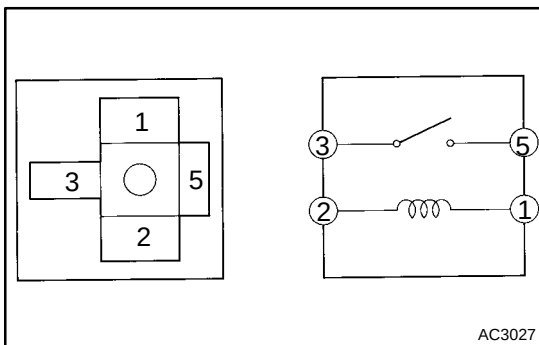
A/C switch	Voltage
ON	10 – 14 V
OFF	0 V

NG

Go to step 5.

OK

2 Check magnetic clutch relay.

**PREPARATION:**

Remove magnetic clutch relay from R/B No.5.

CHECK:

Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK:

Tester connection	Specified condition
1 – 2	62.5 – 90.9 Ω
3 – 5	No continuity

PREPARATION:

Apply battery positive (+) voltage between terminals 1 and 2.

CHECK:

Check continuity between terminals 3 and 5.

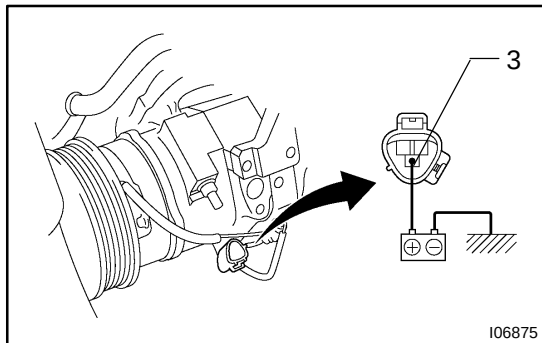
OK:

There is continuity.

NG

Replace magnetic clutch relay.

OK

3 Check A/C magnetic clutch.**PREPARATION:**

Disconnect magnetic clutch connector.

CHECK:

Connect positive (+) lead connected to battery to magnetic clutch connector terminal 3.

OK:

Magnetic clutch is energized.

NG

Repair A/C magnetic clutch.

OK

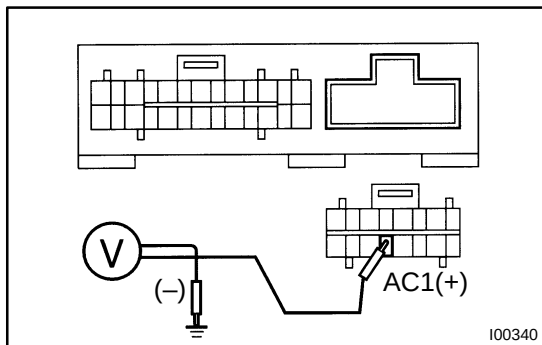
4 Check harness and connector between magnetic clutch relay and ECM, A/C compressor and body ground (See page IN-31).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on matrix chart (See page DI-711).

5 Check voltage between terminal AC1 of A/C control assembly connector side and body ground.**PREPARATION:**

(a) Disconnect A/C control connector.

(b) Ignition switch to ON.

CHECK:

Check voltage between terminal AC1 of A/C control assembly harness side connector.

OK:

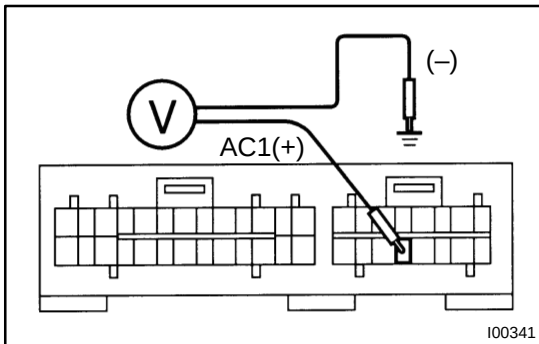
Voltage : 10 – 14 V

NG

Check and replace ECM.

OK

6 Check voltage between terminal AC1 of A/C control assembly connector and body ground.



PREPARATION:

- Remove A/C control assembly with connector still connected (See page [BO-79](#)).
- Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal AC1 of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.

OK:

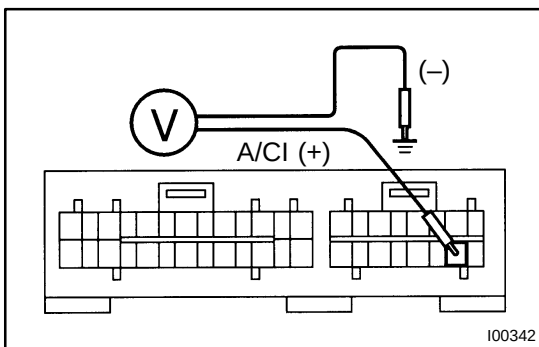
Magnetic clutch	Voltage
ON	Below 1 V
OFF	10 – 14 V

NG

Check and replace A/C control assembly.

OK

7 Check voltage between terminal A/CI of A/C control assembly and body ground.



PREPARATION:

- Remove A/C control assembly with connectors still connected (See page [BO-79](#)).
- Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal A/CI of A/C control assembly and body ground.

OK:

Magnetic clutch	Voltage
ON	10 – 14 V
OFF	Below 1.5 V

NG

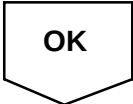
Check and replace A/C magnetic clutch.

OK

8	Check voltage between terminal A/C1 of A/C control assembly connector and body ground (See page DI-20).

NG

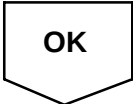
Check and replace A/C control assembly.

OK

9	Check harness and connector between A/C control assembly and ECM (See page IN-31).

NG

Repair or replace harness or connector.

OK

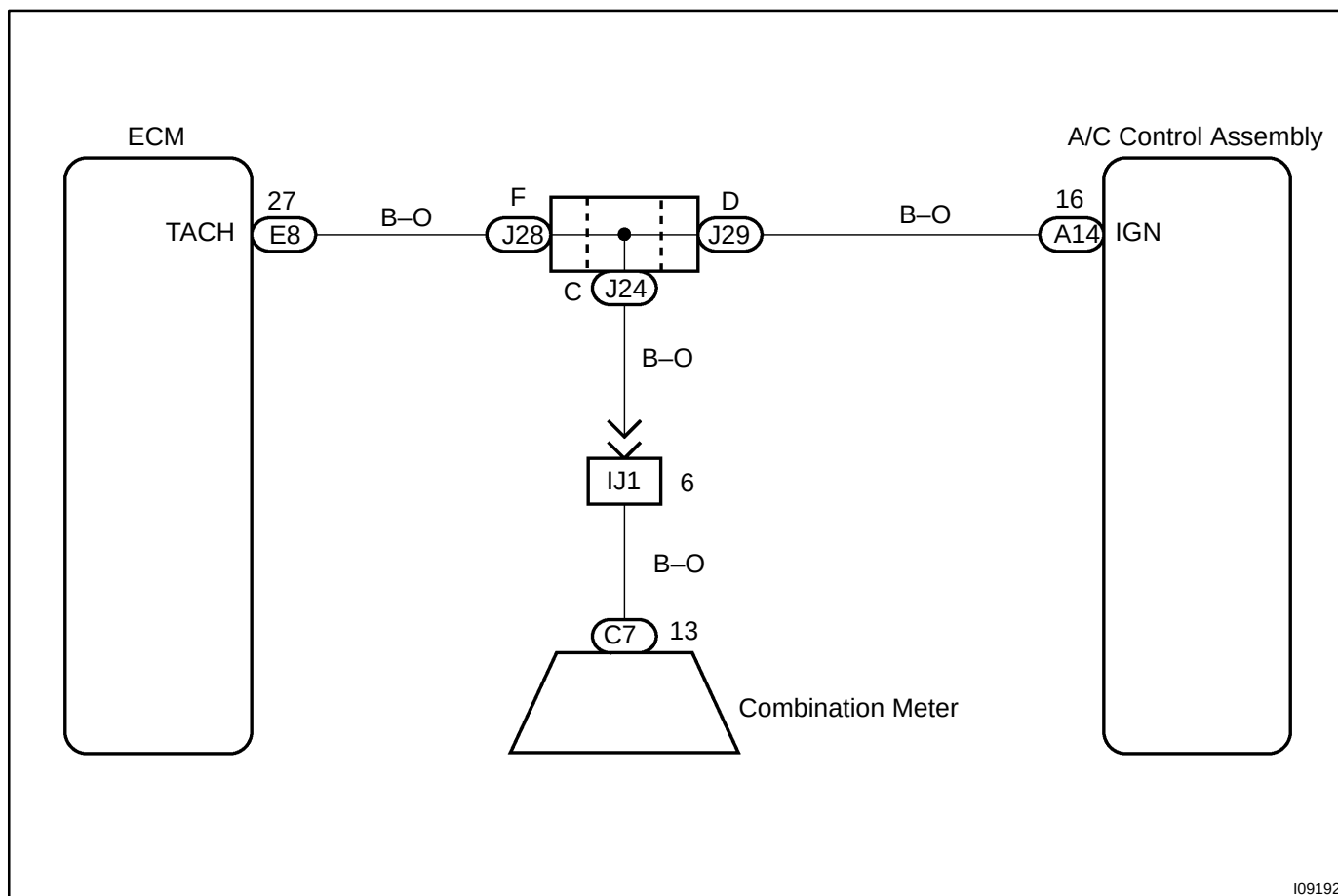
Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).

Igniter Circuit

CIRCUIT DESCRIPTION

This A/C control assembly monitors the engine speed through signals sent from the igniter. The A/C control assembly uses these signals and compressor speed signals to detect the compressor lock condition.

WIRING DIAGRAM



I09192

INSPECTION PROCEDURE

- 1 Check operation of tachometer.

CHECK:

Check that the tachometer operates normally.

NG

Proceed to combination meter troubleshooting
(See page [BE-65](#)).

OK

Check harness and connector between A/C control assembly and igniter (See page IN-31).

Repair or replace harness or connector.

Proceed to next circuit inspection shown on matrix chart (See page [DI-711](#)).