

CIRCUIT DESCRIPTION

Connecting terminals Tc and E₁ of the DLC1 makes the ABS warning light blink and output the DTC.

[illegible]

INSPECTION PROCEDURE

Troubleshooting 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 2

1	Check ABS warning light.

See combination meter troubleshooting on page [BE-2](#) .

NG

Repair bulb or combination meter assembly.

OK

2	Check active lamp relay.

NG

Replace active lamp relay.

OK

Check for open circuit in harness and connector between GAUGE fuse and active lamp relay, ECU-IG No. 2 fuse and active lamp relay, short circuit between active lamp relay and ABS ECU (See page [IN-30](#)).

3	Is DTC output?

Check the DTC on page [DI-212](#) .

YES

Repair circuit indicated by the code output.

NO

Check for short circuit in harness and connector and active lamp relay, ECU-IG No. 2 fuse and active lamp relay, short circuit between active lamp relay and ABS ECU (See page [IN-30](#)).

DTC	Always ON	ABS ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1., 2. or 3. is detected: 1. The ECU connectors are OFF the ECU. 2. There is a malfunction in the ECU internal circuit. 3. There is a malfunction in ABS warning light circuit.	●Charging system ●ABS warning light circuit

INSPECTION PROCEDURE

1	Check that the ECU connectors are securely connected to the ECU.

NO

Connect the connector to the ECU.

YES

2	Is DTC output?

Check DTC on page [DI-212](#) .

YES

Repair circuit indicated by the output code.

NO

3	Does ABS warning light go off?

YES

Check for open or short circuit in harness and connector between ECU-IG fuse and ECU (See page [IN-30](#)).

NO

4 Check battery positive voltage.**PREPARATION:**

Start the engine.

CHECK:

Check the battery positive voltage.

OK:

Voltage: 10 - 16 V

NG

Check and repair the charging system (See page [CH-1](#)).

OK**5 Check operation of the ABS warning light.****PREPARATION:**

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the ABS ECU.
- (c) Turn the ignition switch ON.

CHECK:

Check the ABS warning light goes on.

OK

Check and replace combination meter (See page [BE-2](#)).

NG**6 Check for short circuit in harness and connector between active lamp relay and ABS ECU (See page [IN-30](#)).****NG**

Repeir or replace harness or connector.

OK

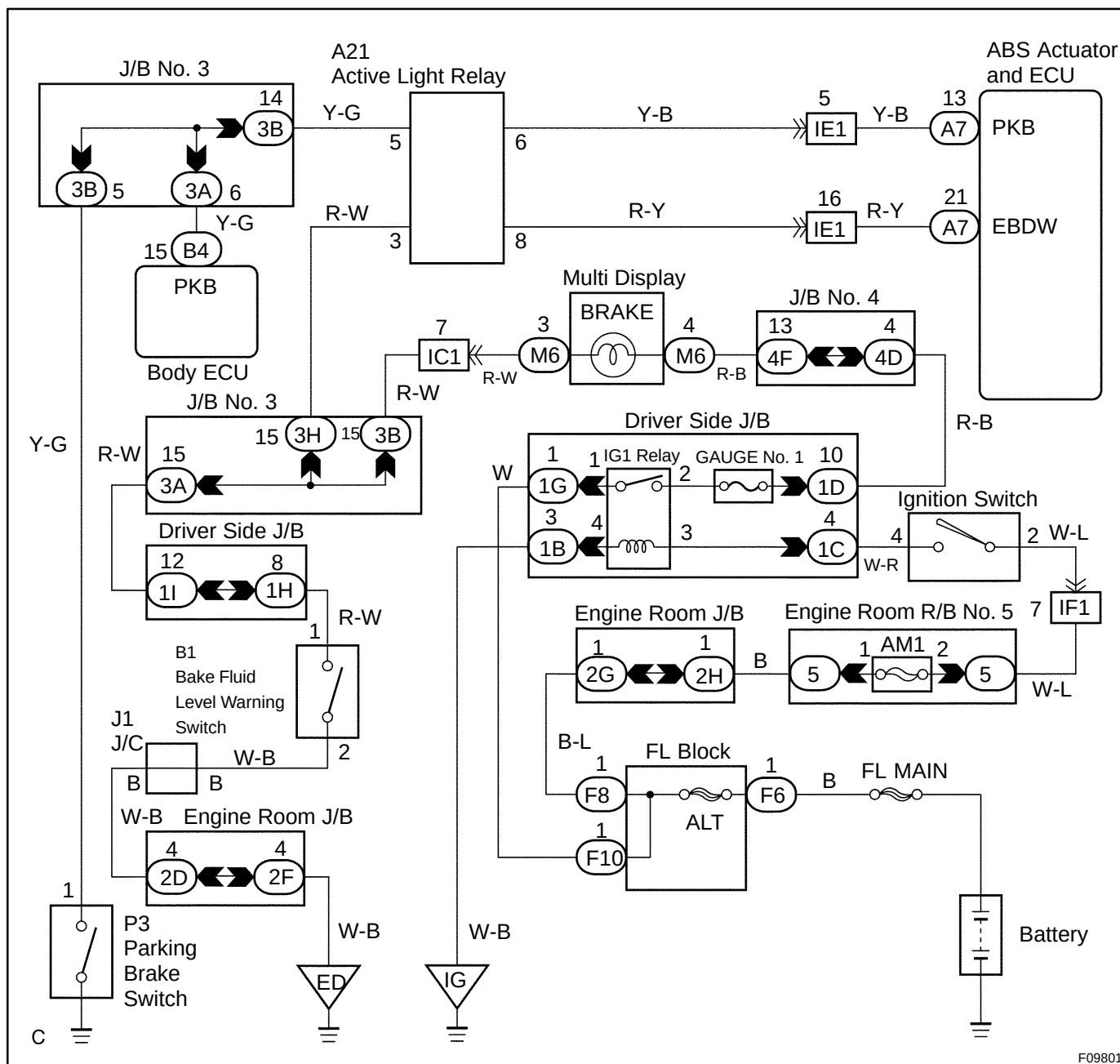
Check and replace ABS ECU.

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

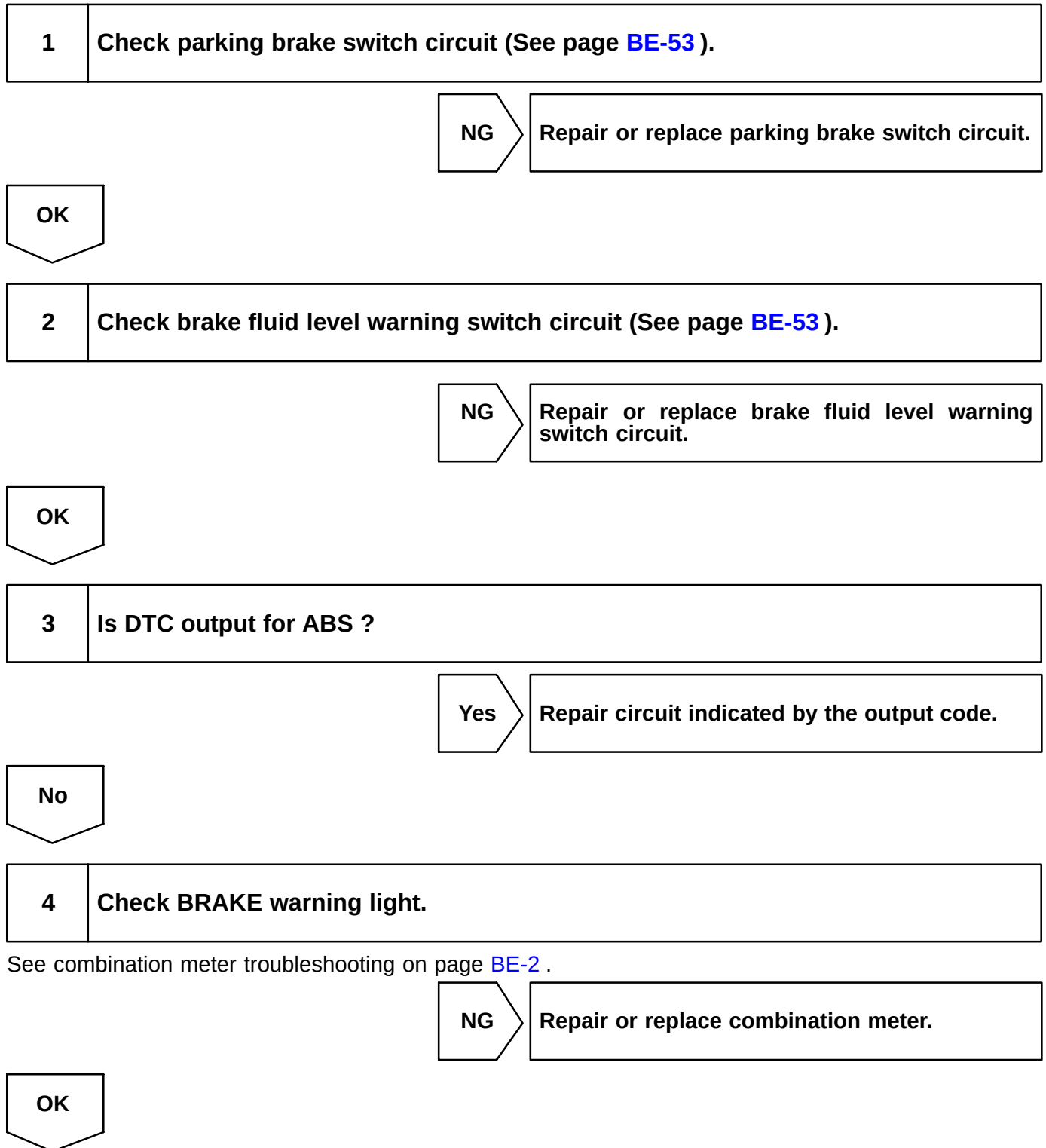
The BRAKE warning light lights up when the brake fluid is insufficient, parking brake is applied or the EBD is defective.

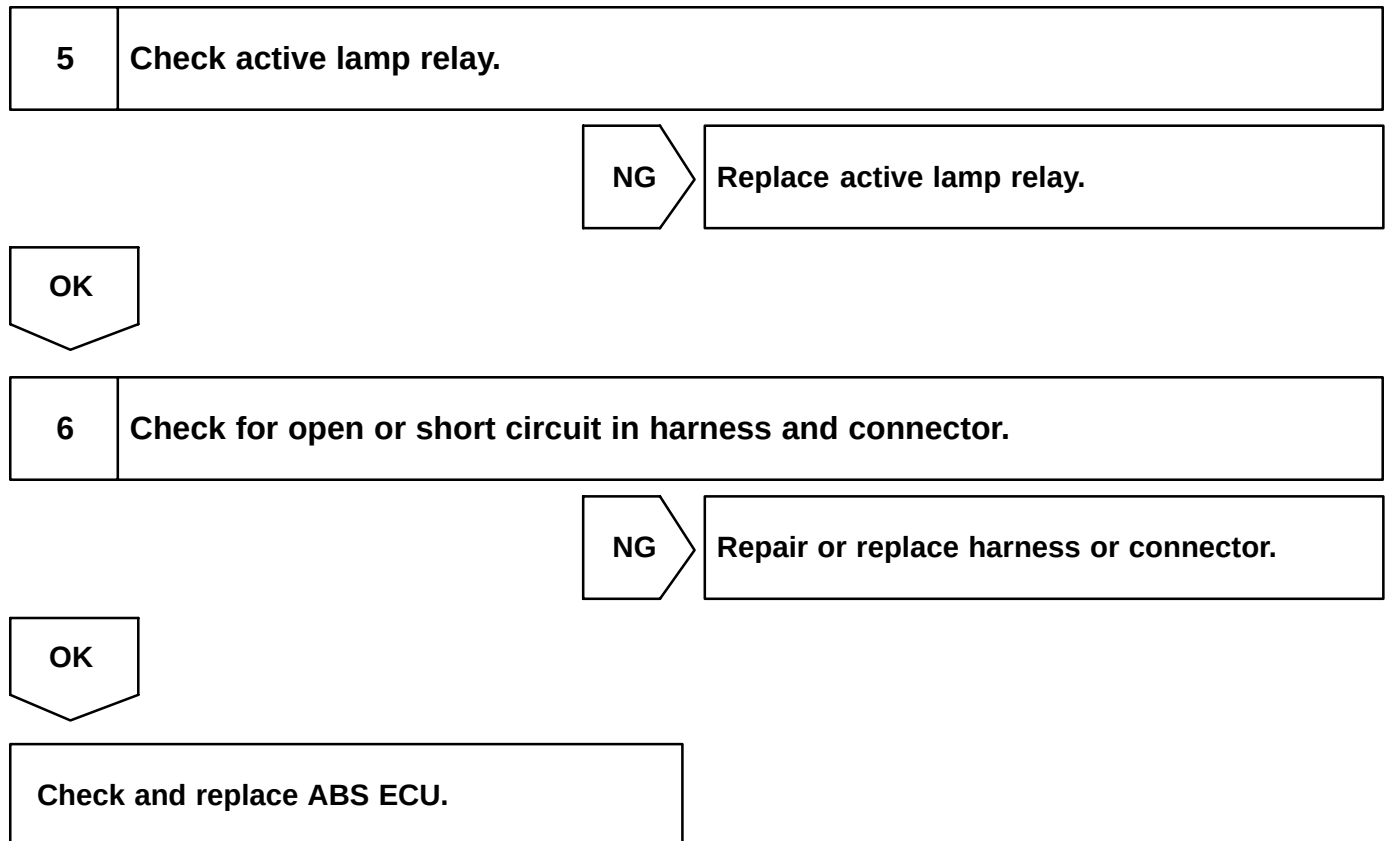
WIRING DIAGRAM



F09801

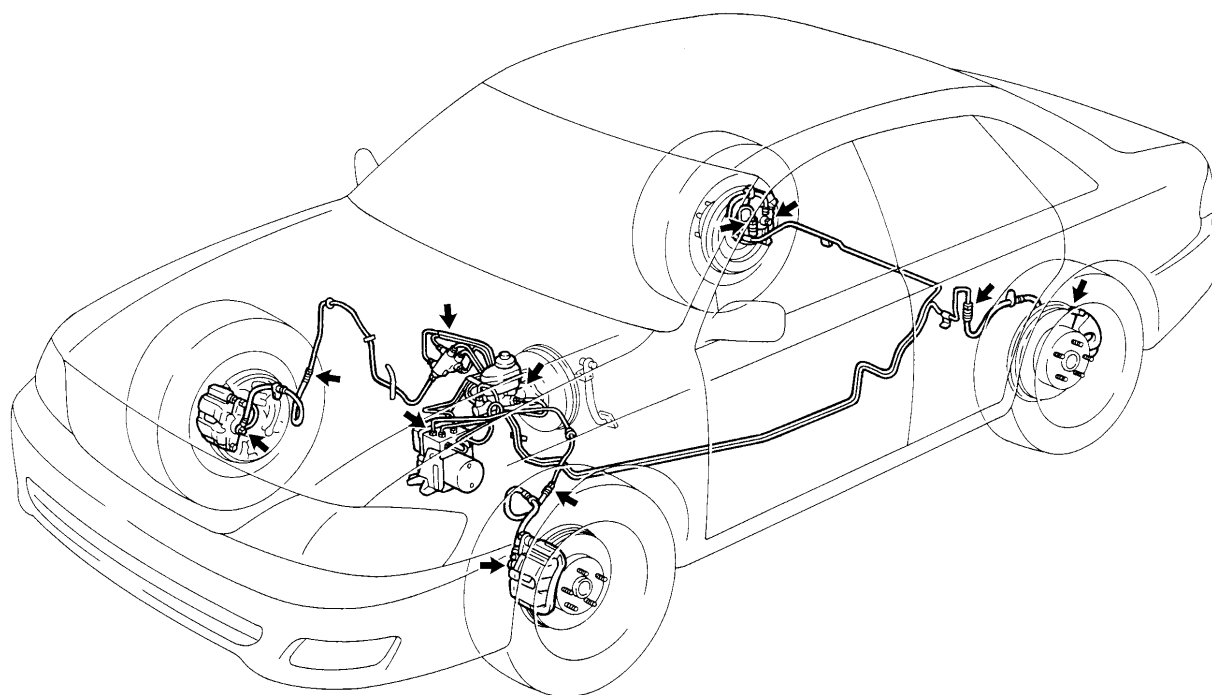
INSPECTION PROCEDURE





Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



N

F07888

CIRCUIT INSPECTION

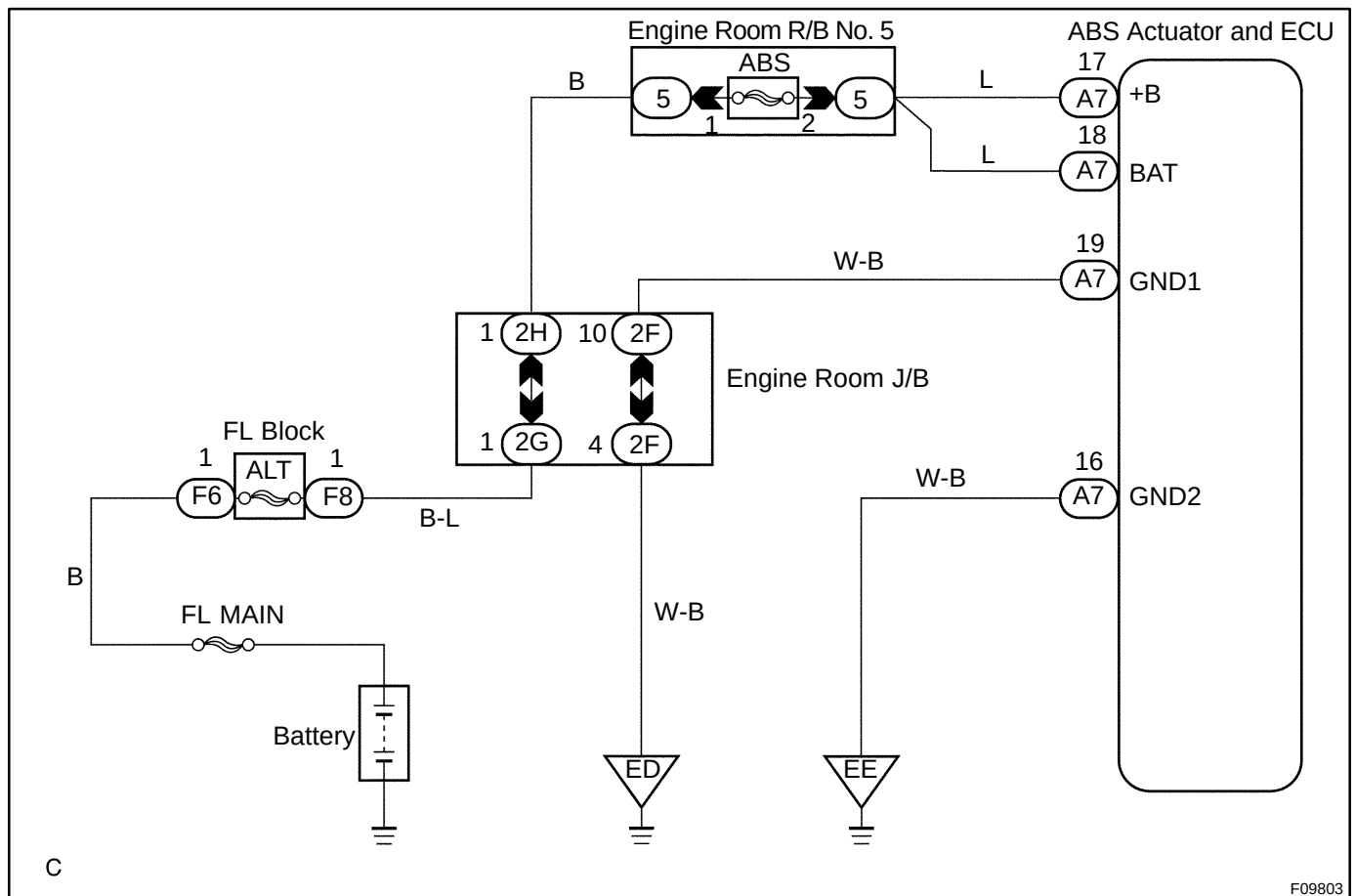
DTC	11	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

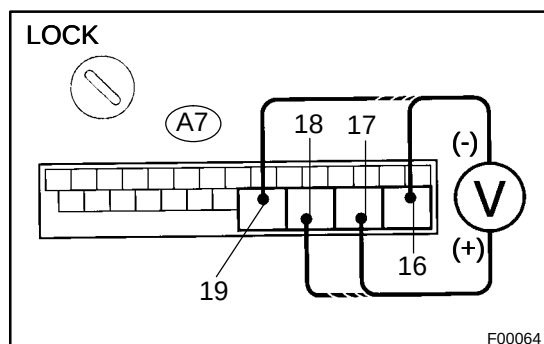
DTC No.	DTC Detecting Condition	Trouble Area
11	When any of the following 1. through 3. is detected: 1. 3 or more solenoids are shown faulty in response and simultaneously solenoid supply voltage is detected faulty. 2. Solenoid relay will not be switched OFF. 3. Solenoid relay is frozen in spite of its high valve relay supply voltage.	●ABS solenoid relay ●ABS solenoid relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals +B (A7 - 17, 18) and GND (A7 - 16, 19) of ABS actuator connector.

**PREPARATION:**

Disconnect the connector from the ABS actuator.

CHECK:

Measure the voltage between terminals A7 - 17, 18 and A7 - 16, 19 of ABS actuator harness side connector.

OK:

Voltage: 10 - 14 V

NG

**Check and replace fuses.
Check and repair harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

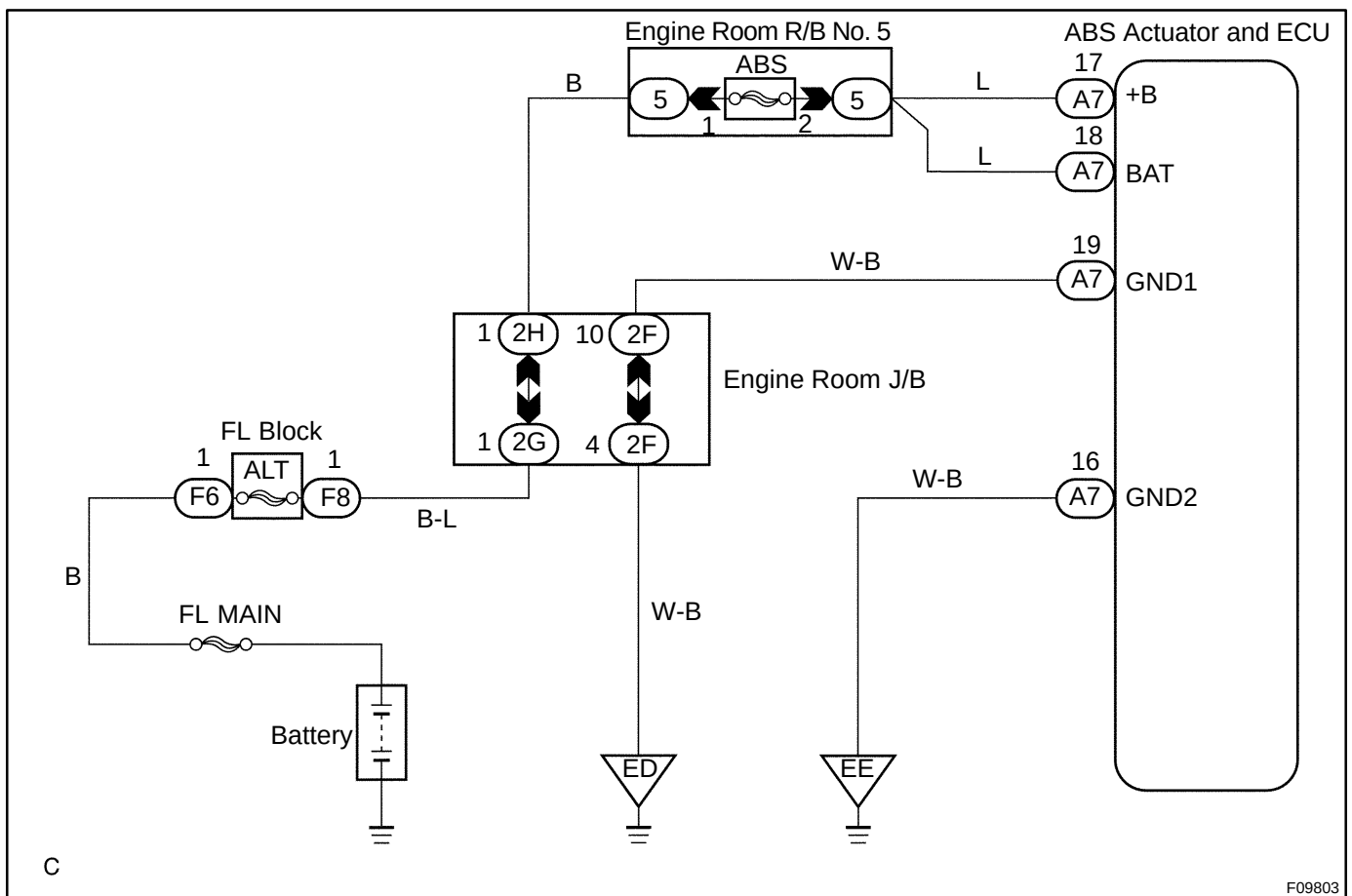
DTC	13	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. When the ABS is activated, the ECU switches the ABS motor relay ON and operates the ABS pump motor.

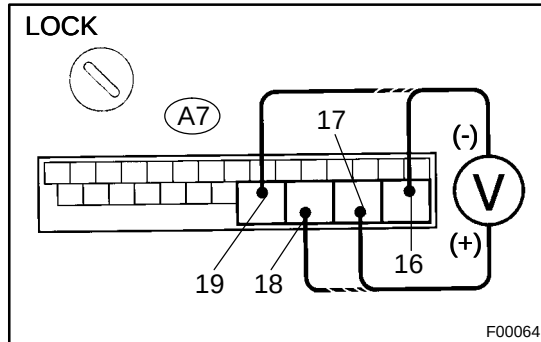
DTC No.	DTC Detecting Condition	Trouble Area
13	When any of the following 1. through 3. is detected: 1. Pump motor voltage is not supplied within 0.06 sec. after actuation of the motor relay. 2. Pump motor voltage is high, and the motor relay will not actuate for 2.5 sec. or more. 3. Pump motor voltage remains low for longer 0.4 sec. or more and the pump repeats activating for 0.7 sec. 3 times maximally. After the last activation, the pump motor is deactivated gone dead because of short circuit.	●ABS motor relay ●ABS motor relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals +B (A7 - 17, 18) and GND (A7 - 16, 19) of brake actuator connector.

**PREPARATION:**

Disconnect the connector from the brake actuator.

CHECK:

Measure the voltage between terminals A7 - 17, 18 and A7 - 16, 19 of brake actuator harness side connector.

OK:

Voltage: 10 - 14 V

NG

**Check and replace fuses.
Check and repair harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

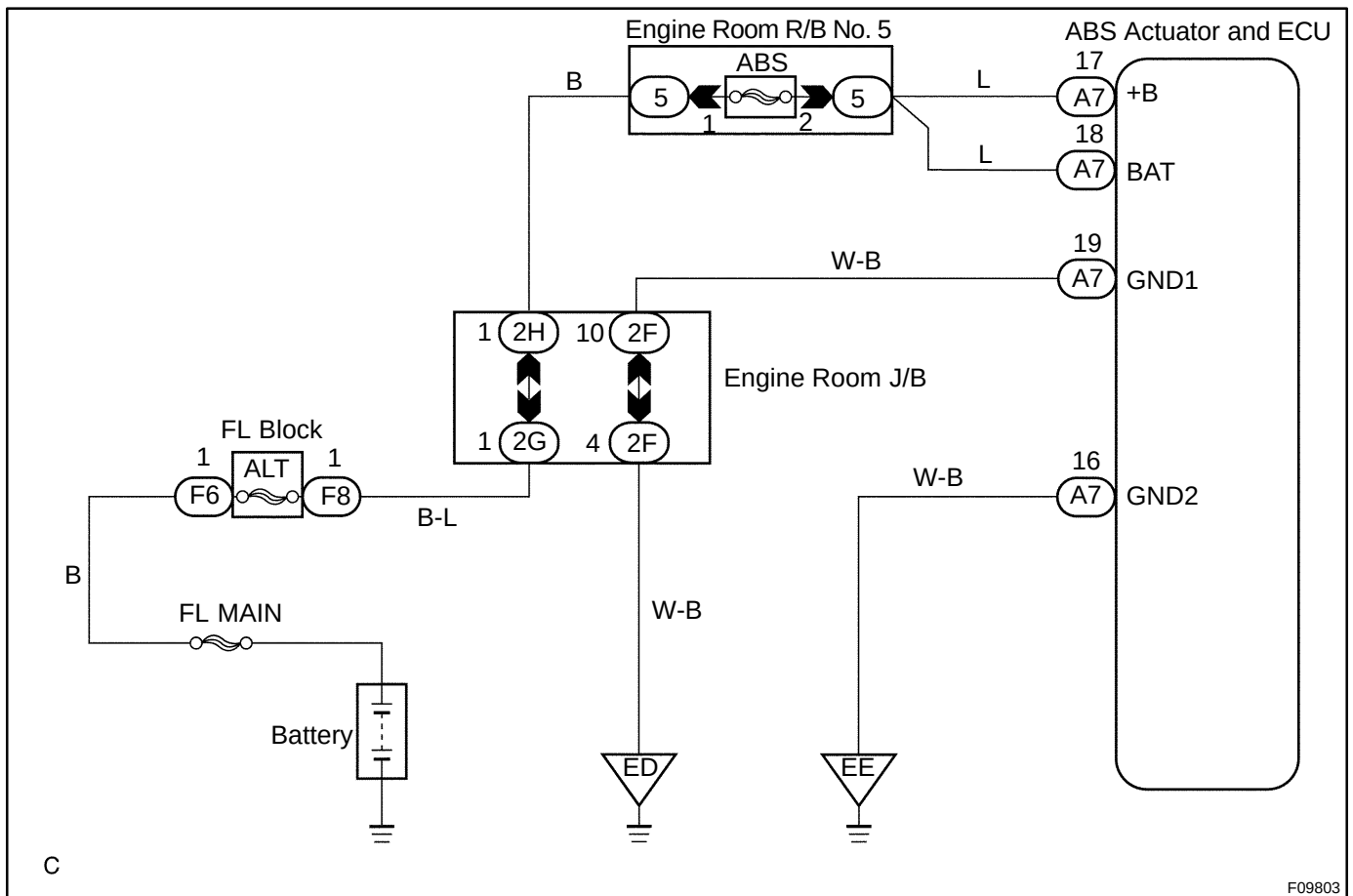
DTC	21 - 24	ABS Solenoid Circuit

CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU, and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
21, 22, 23, 24	Solenoid signal does not match the check result.	• Brake actuator • Each solenoid circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the DTC once more.

PREPARATION:

- (a) Clear the DTC (See page [DI-212](#)).
- (b) Turn the ignition switch OFF.

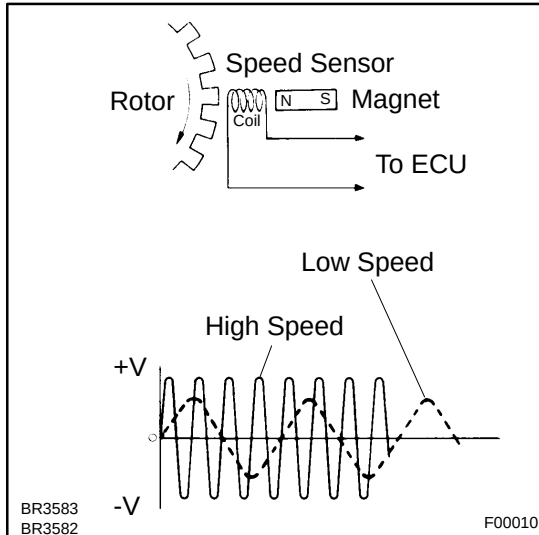
CHECK:

Turn the ignition switch ON, and check if the same DTC is stored in the memory.

NO**No problem.****YES****Replace ABS ECU.**

DTC	31 - 36, 38, 39	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the ABS system. Each of the front and rear rotors has 48 serrations.

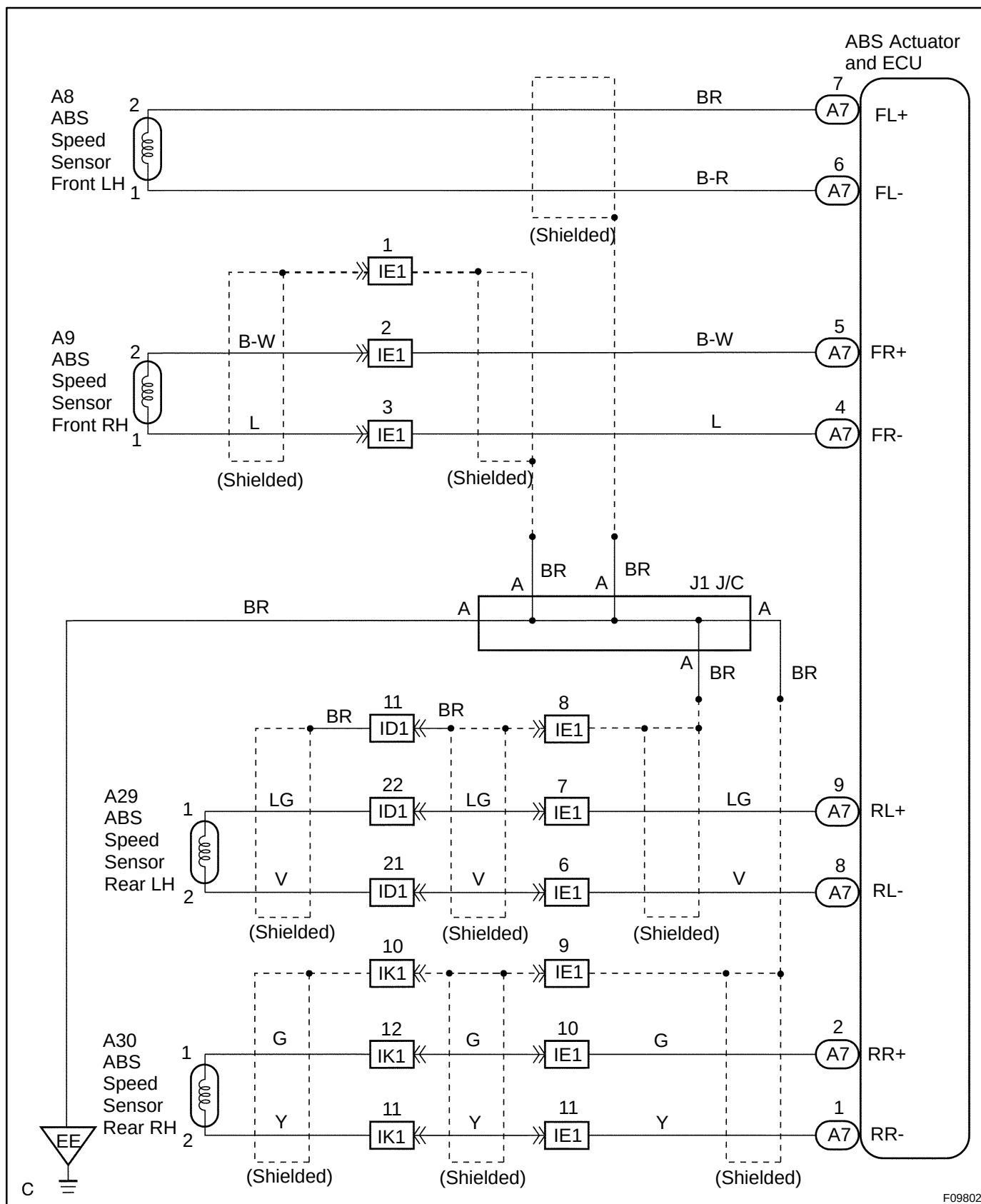
When the rotors rotate, a magnetic field emitted by a permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
31, 32, 33, 34	When any of the following 1. through 3. is detected: 1. Vehicle speed is more than 40 km/h (25 mph), and pulses are not input for 0.01 sec. 2. After the initial start or restart and when the vehicle speed has reached 12 km/h (7 mph), the wheel speed of 0 km/h (0 mph) is detected. 3. After the initial start or restart and when the vehicle speed has reached 18 km/h (11 mph), the front wheel speed of 0 km/h (0 mph) is detected.	•Right front, left front, right rear, left rear speed sensor •Each speed sensor circuit •Sensor installation
35, 36, 38, 39	Detecting abnormality in the resistance value of each speed sensor.	•Right front, left front, right rear, left rear speed sensor •Each speed sensor circuit

HINT:

- DTC No. 31 and 35 are for the right front speed sensor.
- DTC No. 32 and 36 are for the left front speed sensor.
- DTC No. 33 and 38 are for the right rear speed sensor.
- DTC No. 34 and 39 are for the left rear speed sensor.

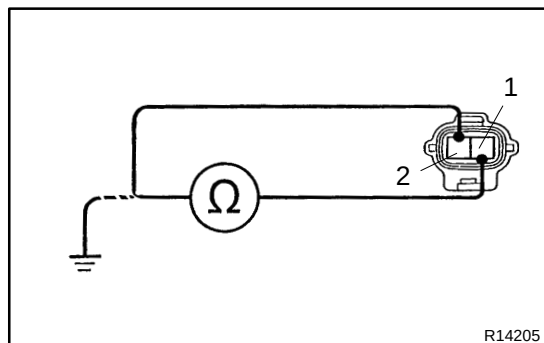
WIRING DIAGRAM



F09802

INSPECTION PROCEDURE

1 Check speed sensor.



Front:

PREPARATION:

- (a) Remove the front fender liner.
- (b) Disconnect the speed sensor connector.

CHECK:

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

OK:

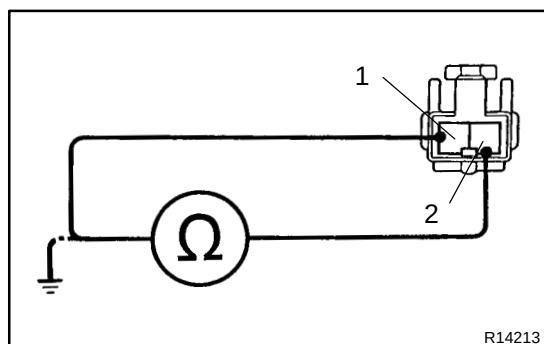
Resistance: 0.6 - 2.5 kΩ (1.6 ± 0.2 kΩ at 20 °C)

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher



Rear:

PREPARATION:

- (a) Remove the seat cushion and seatback.
- (b) Disconnect the speed sensor connector.

CHECK:

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

OK:

Resistance: 1.2 - 2.3 kΩ (1.6 ± 0.1 kΩ at 20 °C)

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG

Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-212](#)).

OK

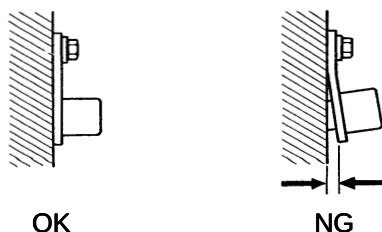
- 2 Check for open and short circuit in harness and connector between each speed sensor and ABS ECU (See page IN-30).**

NG

Repair or replace harness or connector.

OK

- 3 Check speed sensor installation.**



BR3795

CHECK:

Check the speed sensor installation.

OK:

The installation bolt shall be tightened properly and there is no clearance is allowed between the sensor and front steering knuckle or rear axle carrier.

NG

Replace speed sensor.

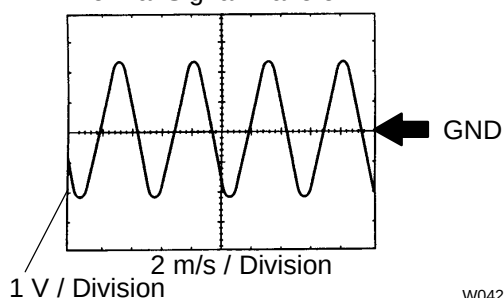
NOTICE:

Check the speed sensor signal last (See page DI-212).

OK

- 4 Check speed sensor and sensor rotor serrations.**

Normal Signal Waveform

**REFERENCE: INSPECTION USING OSCILLOSCOPE****PREPARATION:**

- Disconnect the connector from the brake actuator.
- Connect the oscilloscope to the terminals FR+, FL+, RR+ or RL+ and GND of the ABS ECU harness side connector.

CHECK:

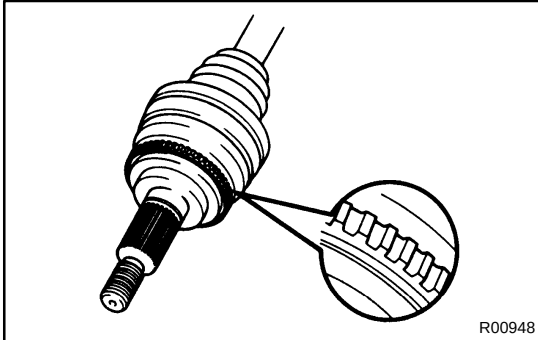
Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

OK

Check and replace ABS 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, missing teeth or foreign objects.

PREPARATION:

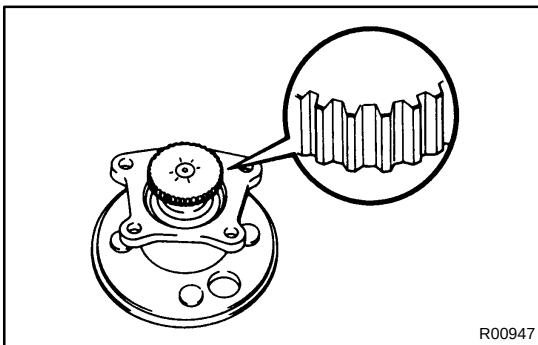
Remove the front speed sensor (See page [BR-60](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.



Rear:

PREPARATION:

Remove the axle hub (See page [SA-45](#)).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor (See page [BR-63](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

NG

Replace sensor rotor or speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-212](#)).

OK

Check and replace ABS ECU.

DTC	37	Speed Sensor Rotor Faulty

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
37	When any of the following 1. through 3. is detected: 1. Occurrence of wheel speed difference between the front and rear wheels of either left or right side of the vehicle and the front left and right wheels. (Detection of mini tire size, spinning wheel or decelerating wheel.) 2. Continuous ABS control for 60 sec. or more. 3. Interference on 1 or more wheels for 20 sec. with the brake pedal depressed, or for 5 sec. when the brake pedal is not depressed.	●Speed sensor ●Sensor rotor

INSPECTION PROCEDURE

1	Check sensor rotor (See page DI-225).

NG

Replace sensor rotor.

OK

2	Check speed sensor (See page DI-225).

NG

Replace speed sensor.

OK

3	Check for open or short circuit in harness and connector between speed sensor and ABS ECU (See page IN-30).

NG

Repair or replace harness and connector.

OK

Check and replace ABS ECU.

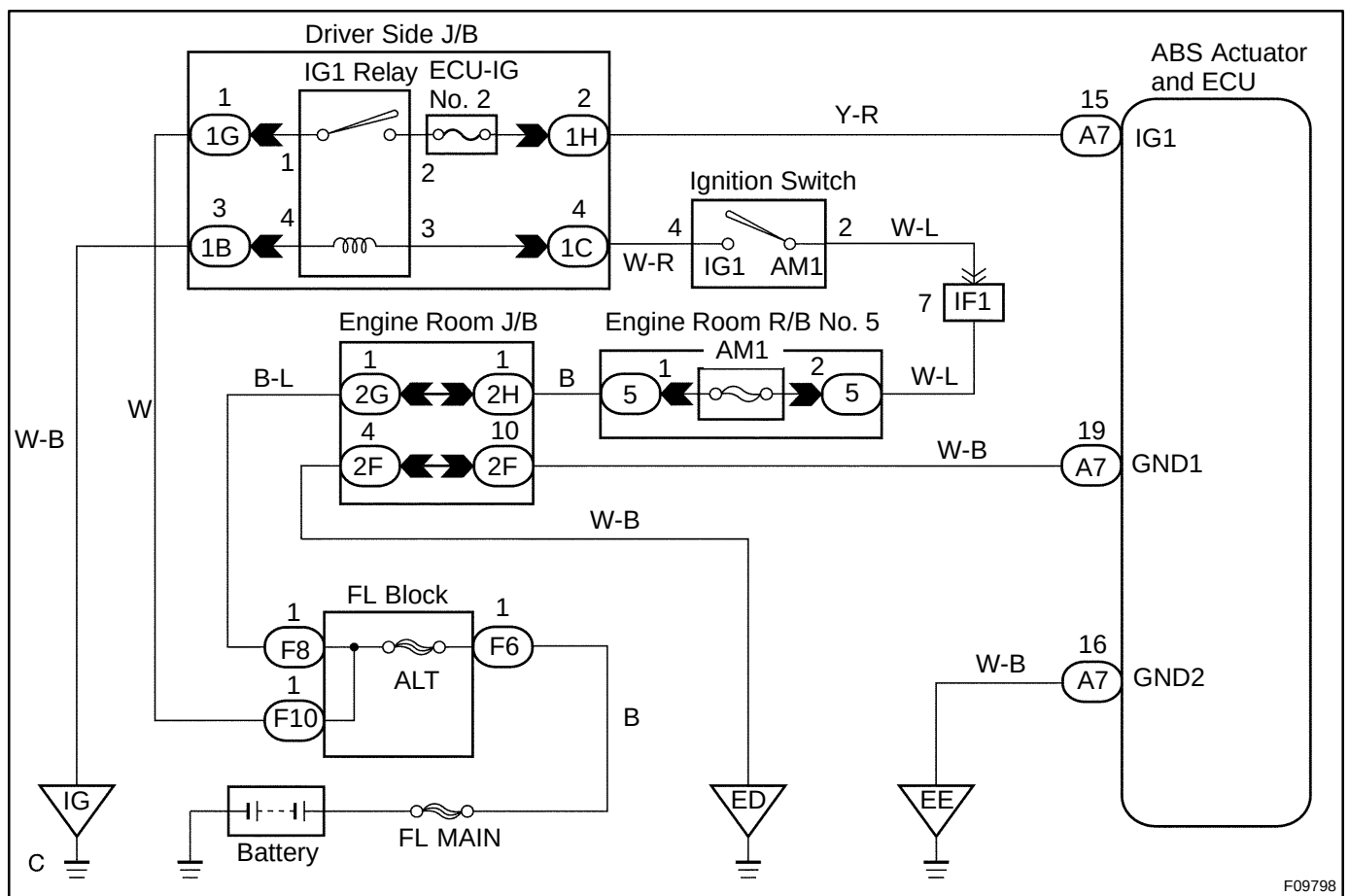
DTC	41	Power Source Circuit

CIRCUIT DESCRIPTION

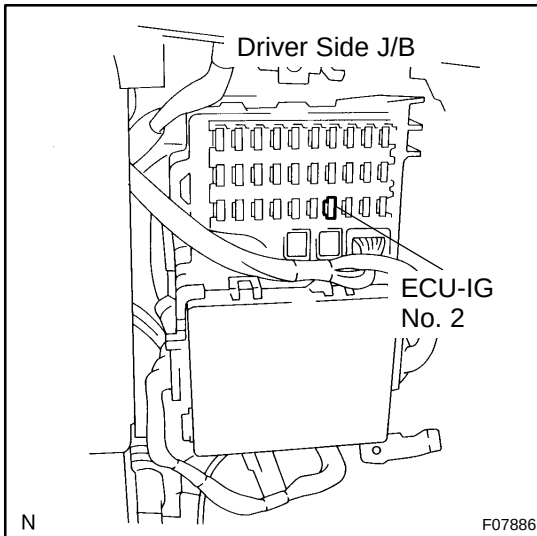
This is the power source for the ECU, hence the actuators.

DTC No.	DTC Detecting Condition	Trouble Area
41	At a vehicle speed of about 6 km/h (4 mph), low battery voltage is less than 9.4 V during non-operation of ABS control or less than 8.8 V during operation of ABS control, and high battery voltage is more than 17.4 V.	•Battery •Charging system •Power source circuit

WIRING DIAGRAM



F09798

INSPECTION PROCEDURE**1 Check ECU-IG No. 2 fuse.****PREPARATION:**

Remove ECU-IG No. 2 fuse from driver side J/B.

CHECK:

Check continuity of ECU-IG No. 2 fuse.

OK:

Continuity

NG

Check for short circuit in all the harness and components connected to ECU-IG No. 2 fuse (See attached wiring diagram).

OK

2 Check battery positive voltage.**OK:**

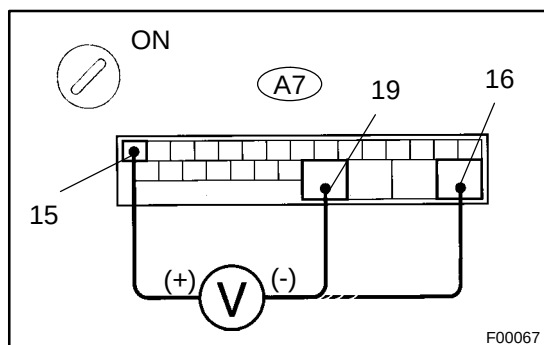
Voltage: 10 - 14 V

NG

Check and repair the charging system (See page [CH-1](#)).

OK

3 Check voltage between terminals IG1 (A7 - 15) and GND (A7 - 16, 19) of the brake actuator connector.



PREPARATION:

Disconnect the connector from the brake actuator.

CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals A7 - 15 and A7 - 16, 19 of the brake actuator harness side connector.

OK:

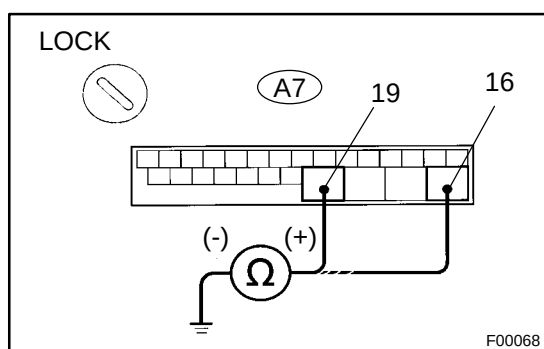
Voltage: 10 - 14 V

OK

Check and replace ABS ECU.

NG

4 Check continuity between terminals GND (A7 - 16, 19) of brake actuator connector and body ground.



CHECK:

Measure the resistance between terminal A7 - 16, 19 of brake actuator harness side connector and body ground.

OK:

Resistance: 1 Ω or less

NG

Repair or replace harness or connector.

OK

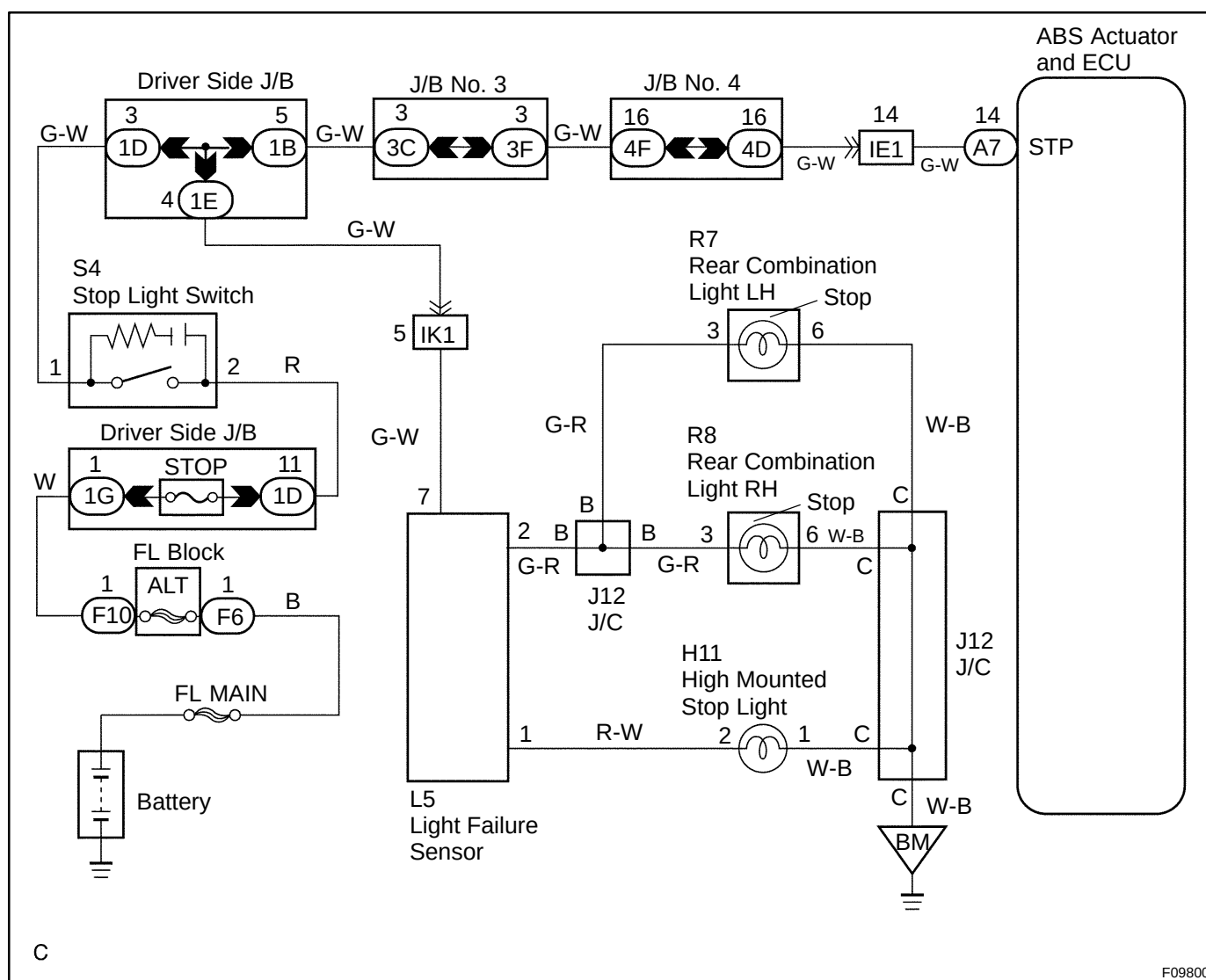
Check for open circuit in harness and connector between terminal IG1 of brake actuator and ECU-IG fuse (See page [IN-30](#)).

DTC	58	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
58	Stop light switch circuit is open, and stop light switch voltage is in the level between 55 % and 75 % of the battery voltage.	●Stop light switch ●Stop light switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of stop light.

CHECK:

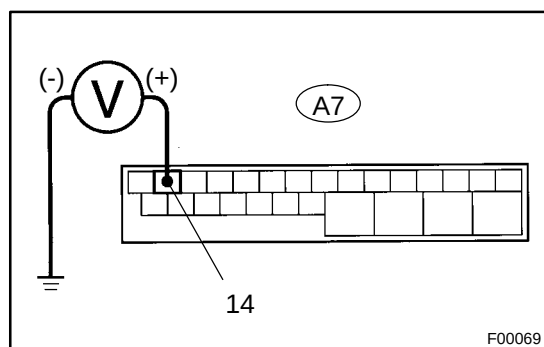
Check that the stop light lights up when the brake pedal is depressed and turns off when the brake pedal is released.

NG

Repair stop light circuit (See page [BE-36](#)).

OK

2	Check voltage between terminal STP (A7 - 14) of brake actuator and body ground.



PREPARATION:

Disconnect the connector from the brake actuator.

CHECK:

Measure the voltage between terminal A7 - 14 of brake actuator harness side connector and body ground when the brake pedal is depressed.

OK:

Voltage: 8 - 14 V

OK

Check and replace ABS ECU.

NG

3	Check for open circuit in harness and connector between terminal STP of brake actuator and stop light switch (See page IN-30).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page [DI-218](#)).

DTC	62	ABS ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
62	ABS ECU continuously detects the proper operation of ABS.	ABS ECU

INSPECTION PROCEDURE

1	Is DTC output?

Check the DTC on page [DI-212](#) .

YES

Repair circuit indicated by the code output.

NO

2	Is normal code displayed?

YES

Check for short circuit in harness and connector between DLC1 or DLC2 and ABS ECU (See page [IN-30](#)).

NO

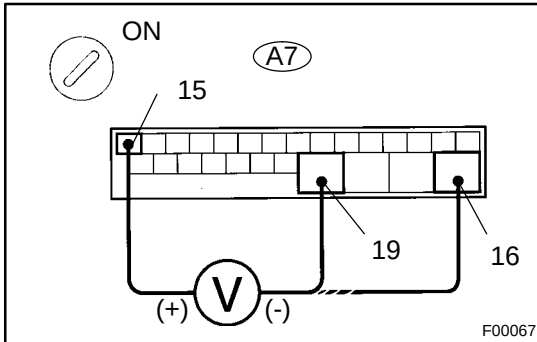
3	Is ABS warning light off?

YES

Check open and short circuit of the harness and connector in the Tc circuit between ABS ECU and DLC2 or DLC1.

NO

4 Check voltage between terminals IG1 (A7 - 15) and GND (A7 - 16, 19) of brake actuator connector.



PREPARATION:

Disconnect the connector from the brake actuator.

CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals A7 - 15 and A7 - 16, 19 of brake actuator harness side connector.

OK:

Voltage: 10 - 14 V

NG

Check for open or short circuit in harness and connector between ECU-IG fuse and IG1 of brake actuator (See page [IN-30](#)).

OK

5 Check connection of brake actuator connector.

CHECK:

Check the connection of the brake actuator connector and check the ABS warning light goes off.

OK

Repair or replace harness or connector.

NG

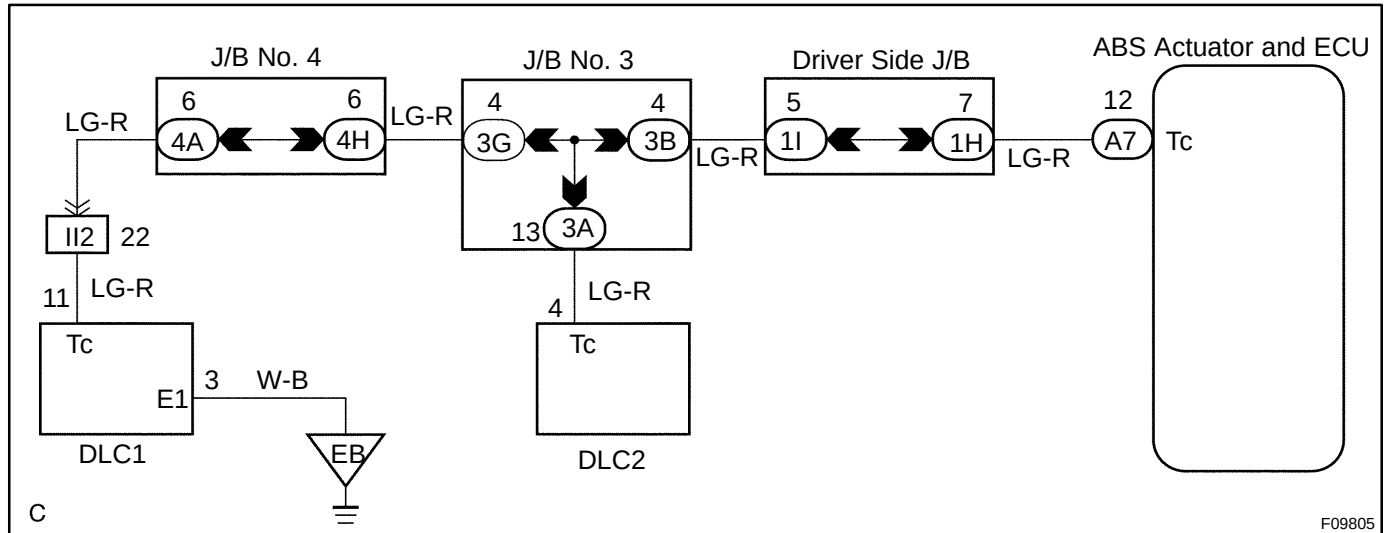
Check and replace ABS ECU.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

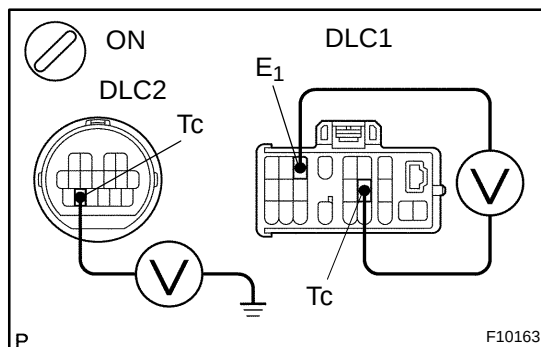
Connecting between terminals Tc and E₁ of the DLC1 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals Tc and E₁.



CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals Tc and E₁ of DLC1 or terminal Tc of DLC2 and body ground.

OK:

Voltage: 10 - 14 V

OK

If ABS warning light does not blink even after Tc and E₁ are connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS ECU and DLC2 or DLC1, DLC2 or DLC1 and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ABS ECU.

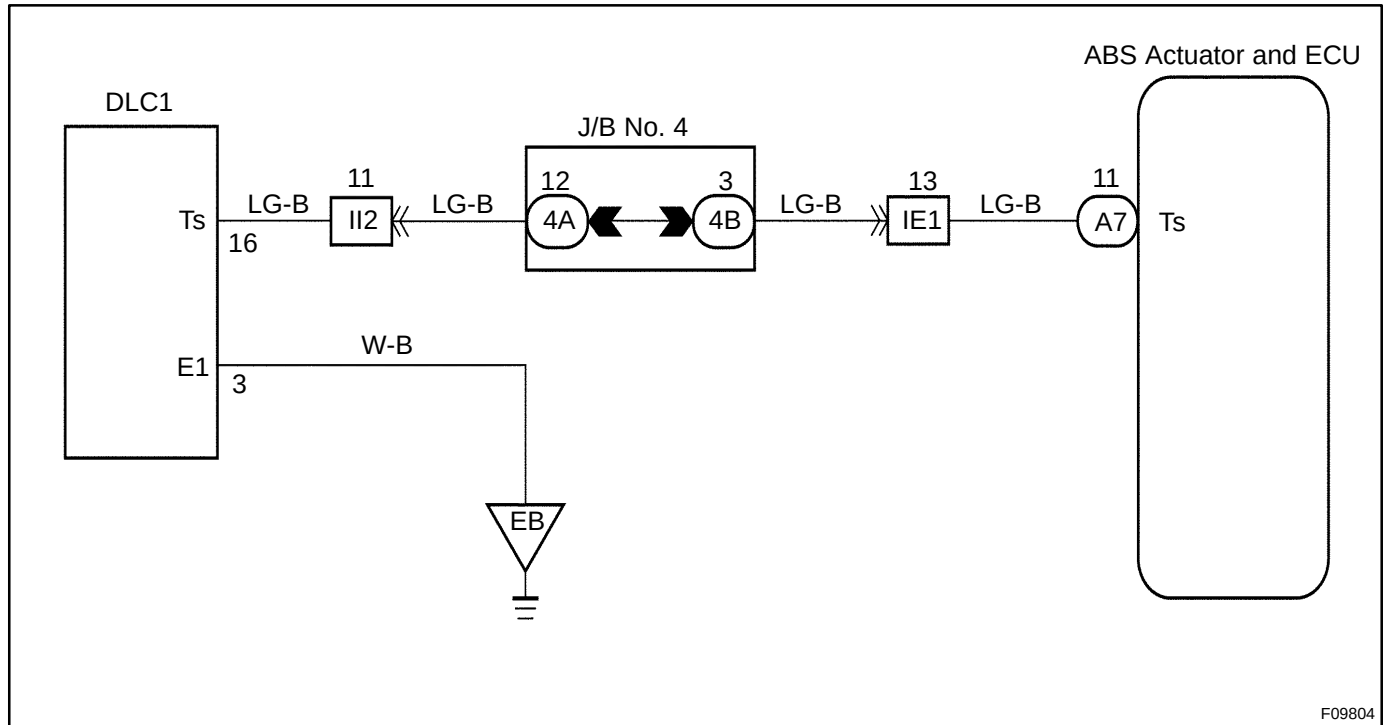
Ts Terminal Circuit

CIRCUIT DESCRIPTION

The sensor check circuit detects abnormality in the speed sensor signal which cannot be detected by the DTC check.

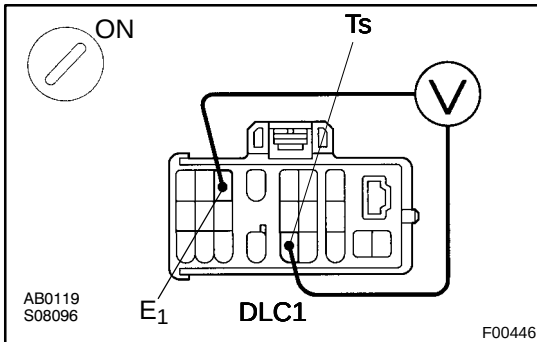
Connecting terminals Ts and E₁ of the DLC1 starts the check.

WIRING DIAGRAM



F09804

INSPECTION PROCEDURE

1 Check voltage between terminals Ts and E₁ of DLC1.**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals Ts and E₁ of DLC1.

OK:**Voltage: 10 - 14 V****OK**

If ABS warning light does not blink even after Ts and E₁ are connected, the ECU may be defective.

NG**2 Check for open and short circuit in harness and connector between ABS ECU and DLC1, DLC1 and body ground (See page [IN-30](#)).****NG**

Repair or replace harness or connector.

OK

Check and replace ABS ECU.

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's :
Name _____

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

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

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate intermittently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE 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)

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843-18020, connect the terminals Tc and E₁.
- If any abnormality is found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed under the code. For details of each code, refer to the page under respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
11 (DI-219)	Open or short circuit in ABS solenoid relay circuit	●ABS solenoid relay ●ABS solenoid relay circuit
13 (DI-221)	Open or short circuit in ABS pump motor circuit	●ABS motor relay ●ABS motor relay circuit
21 (DI-223)	Open or short circuit in brake actuator	●Brake actuator ●SFRR or SFRH circuit
22 (DI-223)	Open or short circuit in brake actuator	●Brake actuator ●SFLR or SFLH circuit
23 (DI-223)	Open or short circuit in brake actuator	●Brake actuator ●SRRR or SRRH circuit
24 (DI-223)	Open or short circuit in brake actuator	●Brake actuator ●SRLR or SRLH circuit
31* (DI-225)	Right front wheel speed sensor signal malfunction	●Right front, left front, right rear and left rear speed sensor ●Each speed sensor circuit ●Sensor installation
32* (DI-225)	Left front wheel speed sensor signal malfunction	
33* (DI-225)	Right rear wheel speed sensor signal malfunction	
34* (DI-225)	Left rear wheel speed sensor signal malfunction	
35* (DI-225)	Open circuit in right front wheel speed sensor circuit	●Right front, left front speed sensor ●Each speed sensor circuit
36* (DI-225)	Open circuit in left front wheel speed sensor circuit	
37 (DI-230)	Speed sensor rotor has wrong number of teeth on one of the 4 wheels	●Speed sensor ●Sensor rotor
38* (DI-225)	Open circuit in right rear wheel speed sensor circuit	●Right rear, left rear speed sensor ●Each speed sensor circuit
39* (DI-225)	Open circuit in left rear wheel speed sensor circuit	
41 (DI-231)	Low and high battery positive voltage	●Battery ●Charging system ●Power source circuit
58 (DI-234)	Open circuit in stop light switch circuit	●Stop light switch ●Stop light switch circuit
62 (DI-236)	Malfunction in ABS ECU	ABS ECU
Always ON (DI-238)	Malfunction in ABS ECU	●Charging system ●ABS warning light circuit

*: As the DTC cannot only be erased by replacing parts, do either of the following operations.

(1) Clear DTC (See page [DI-212](#)).

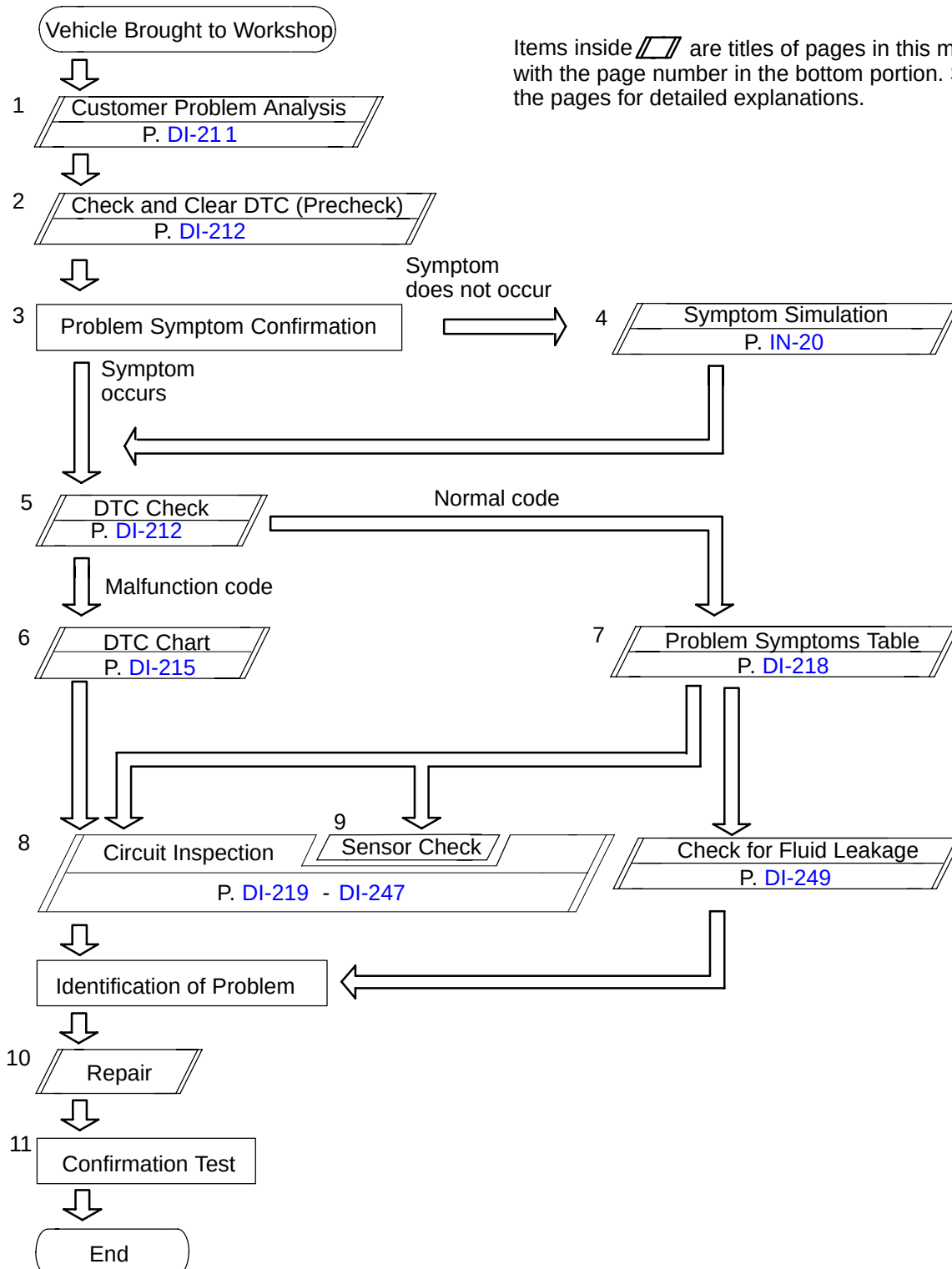
(2) At a vehicle speed of 20 km/h (12 mph), drive the vehicle for 30 sec. or more.

ANTI-LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)

D16N5-01

HOW TO PROCEED WITH TROUBLESHOOTING

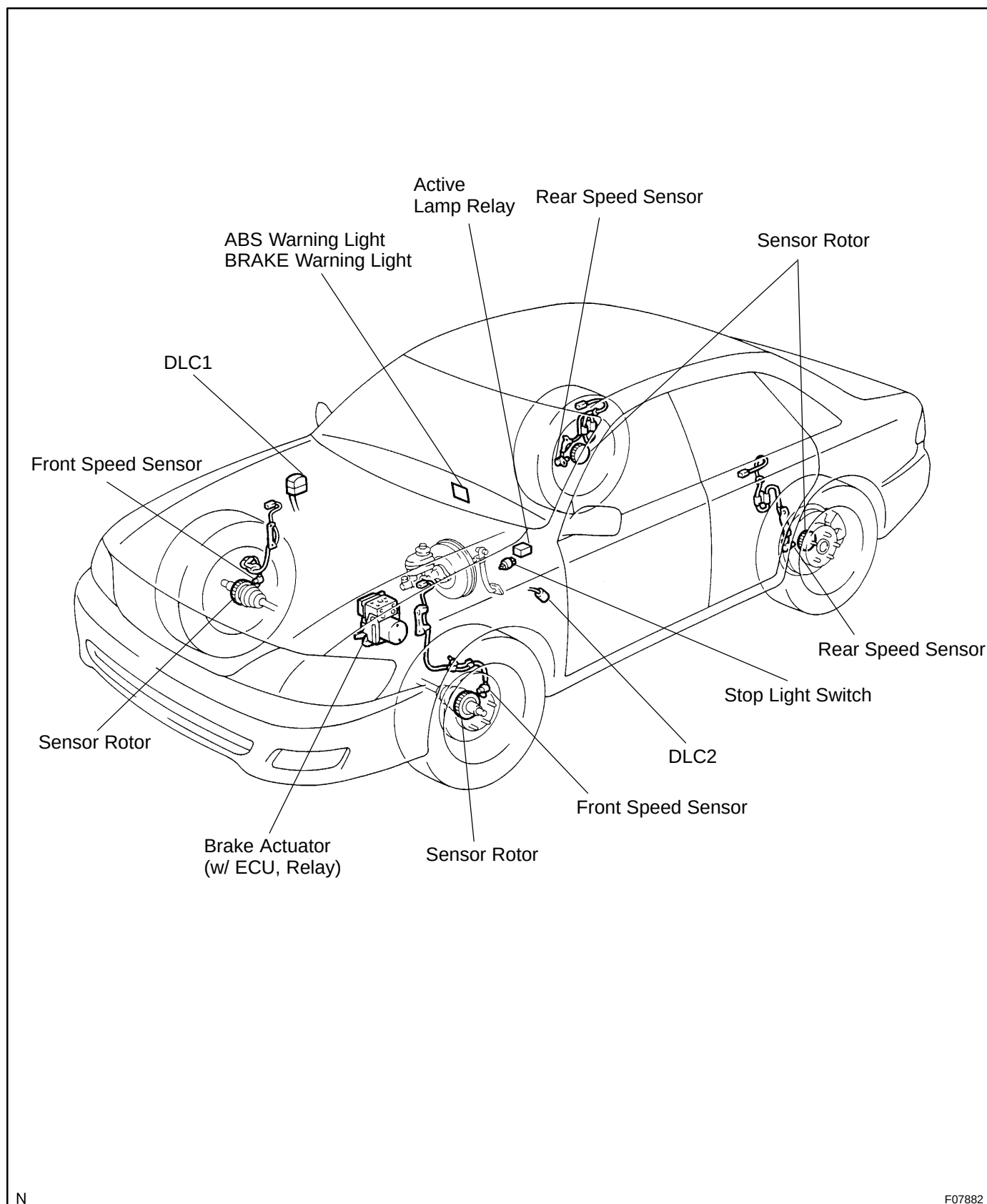
Troubleshoot in accordance with the procedure on the following pages.

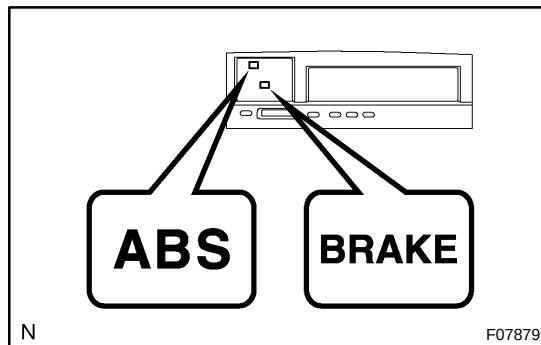


Fail safe function:

When a failure occurs in the ABS system, the ABS warning light is lit and the ABS operation is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light is lit as well and EBD operation is prohibited.

PARTS LOCATION





PRE-CHECK

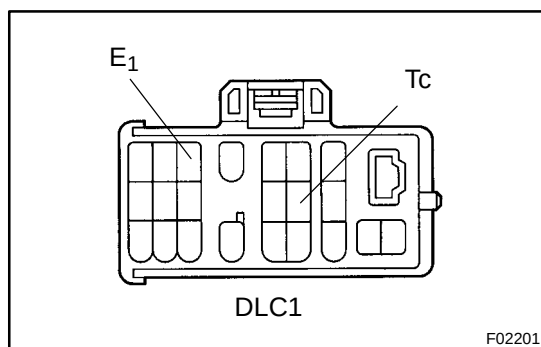
1. DIAGNOSIS SYSTEM

- (a) Release the parking brake pedal.
- (b) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light and BRAKE warning light goes on for approx. 3 seconds.

HINT:

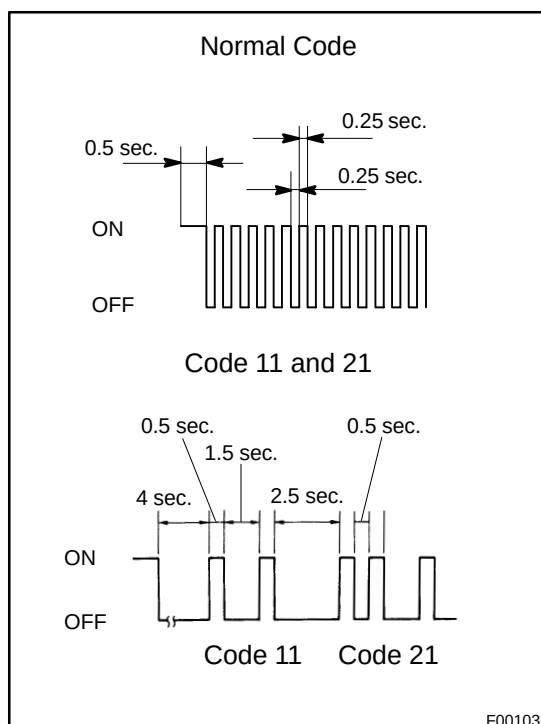
- When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit or BRAKE warning light circuit (See page [DI-243](#) , [DI-240](#)).



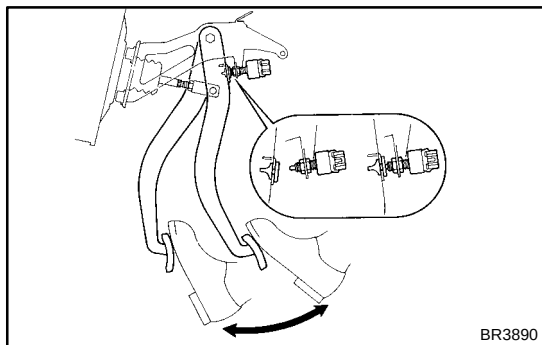
- (c) Check the DTC.
 - (1) Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
 - (2) Turn the ignition switch ON and read the DTC from the ABS warning light on the combination meter.

HINT:

- If no codes appears, inspect the diagnostic circuit or ABS warning light circuit (See page [DI-245](#) or [DI-243](#)).



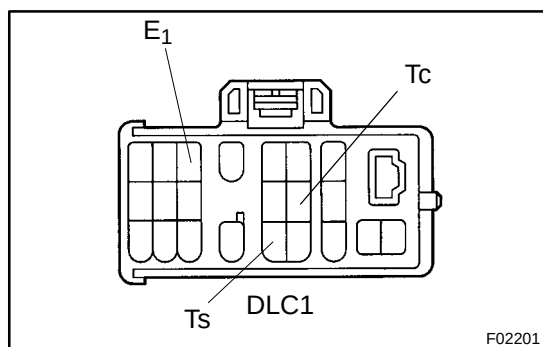
- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.
- (3) Codes are explained in the code table on page [DI-215](#) .
 - (4) After completing the check, disconnect terminals Tc and E₁, and turn off the display.
If 2 or more malfunction codes are identified at the same time, the lowest numbered DTC will be displayed 1st.



- (d) Clear the DTC.
- (1) Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
 - (2) Turn the ignition switch ON.
 - (3) Clear the DTC stored in ECU by depressing the brake pedal 8 times or more within 5 seconds.
 - (4) Check that the warning light shows the normal code.
 - (5) Remove the SST from the terminals of DLC1.
SST 09843-18020

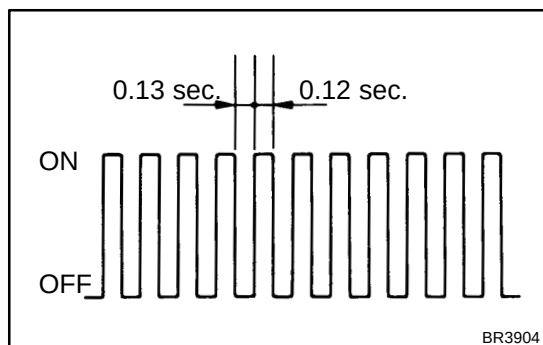
HINT:

Cancellation cannot be done by removing the battery cable or ECU-IG fuse.



2. SPEED SENSOR SIGNAL CHECK (TEST MODE)

- (a) Check the sensor signal.
- (1) Using SST, connect terminals Ts and E₁ of DLC1.
SST 09843-18020
 - (2) Start the engine.



- (3) 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-243](#)).

- (4) Drive vehicle straight forward.
- (5) Drive vehicle at a speed faster than 45 km/h (28 mph) for several seconds.

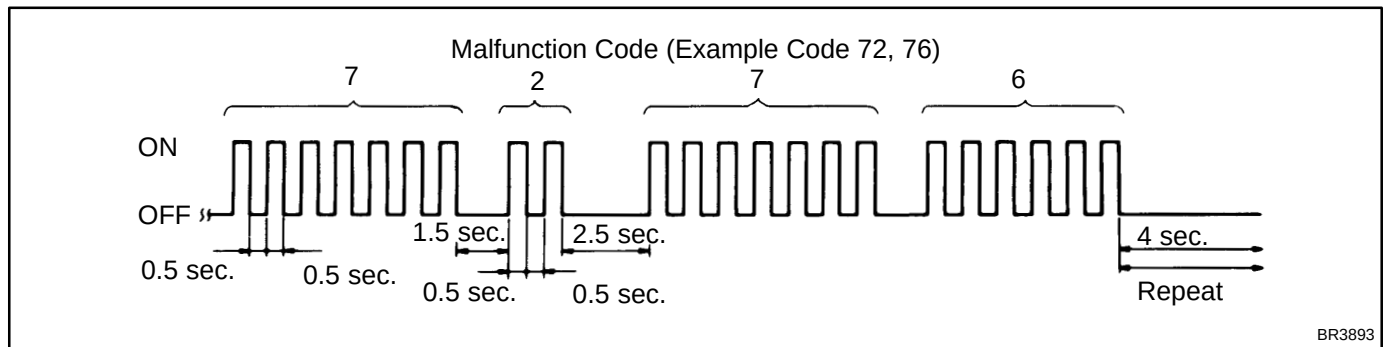
HINT:

If the brake is applied during the check, the check routine must be started again.

- (6) Stop the vehicle.
- (7) Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
- (8) Read the number of blinks of the ABS warning light.

HINT:

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



- (9) After completing the check, disconnect the SST from terminals Tc and E₁ of DLC1, and turn the ignition switch OFF.

SST 09843-18020

DTC of speed sensor check function:

Code No.	Diagnosis	Trouble Area
71	Low output voltage of right front speed sensor	●Right front speed sensor ●Sensor installation ●Right front speed sensor rotor
72	Low output voltage of left front speed sensor	●Left front speed sensor ●Sensor installation ●Left front speed sensor rotor
73	Low output voltage of right rear speed sensor	●Right rear speed sensor ●Sensor installation ●Right rear speed sensor rotor
74	Low output voltage of left rear speed sensor	●Left rear speed sensor ●Sensor installation ●Left rear speed sensor rotor
75	Abnormal change in output voltage of right front speed sensor	●Right front speed sensor rotor
76	Abnormal change in output voltage of left front speed sensor	●Left front speed sensor rotor
77	Abnormal change in output voltage of right rear speed sensor	●Right rear speed sensor rotor
78	Abnormal change in output voltage of left rear speed sensor	●Left rear speed sensor rotor

PROBLEM SYMPTOMS TABLE

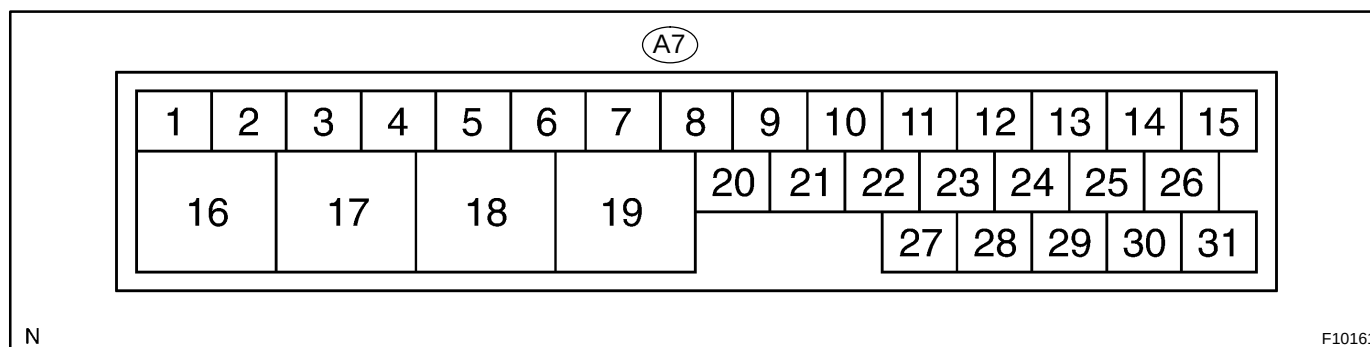
If a normal code is displayed during DTC check but a problem still occurs, check the circuits corresponding to each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

NOTICE:

When replacing ABS ECU, sensor or etc., turn the IG switch OFF.

Symptom	Suspect Area	See page
ABS does not operate	Only when 1. - 4. are all normal and the problem is still occurring, replace the ABS ECU. 5. Check the DTC reconfirming that the normal code is output. 6. Power source circuit 7. Speed sensor circuit 8. Check the hydraulic circuit for leakage.	DI-212 DI-231 DI-225 DI-249
ABS does not operate intermittently	Only when 1. - 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the hydraulic circuit for leakage.	DI-212 DI-225 DI-234 DI-249
ABS warning light abnormal	1. ABS warning light circuit 2. ABS ECU	DI-243
BRAKE warning light abnormal	1. BRAKE warning light circuit 2. ABS ECU	DI-240
DTC check cannot be done	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS ECU. 1. ABS warning light circuit 2. Tc terminal circuit	DI-243 DI-245
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. ABS ECU	DI-247

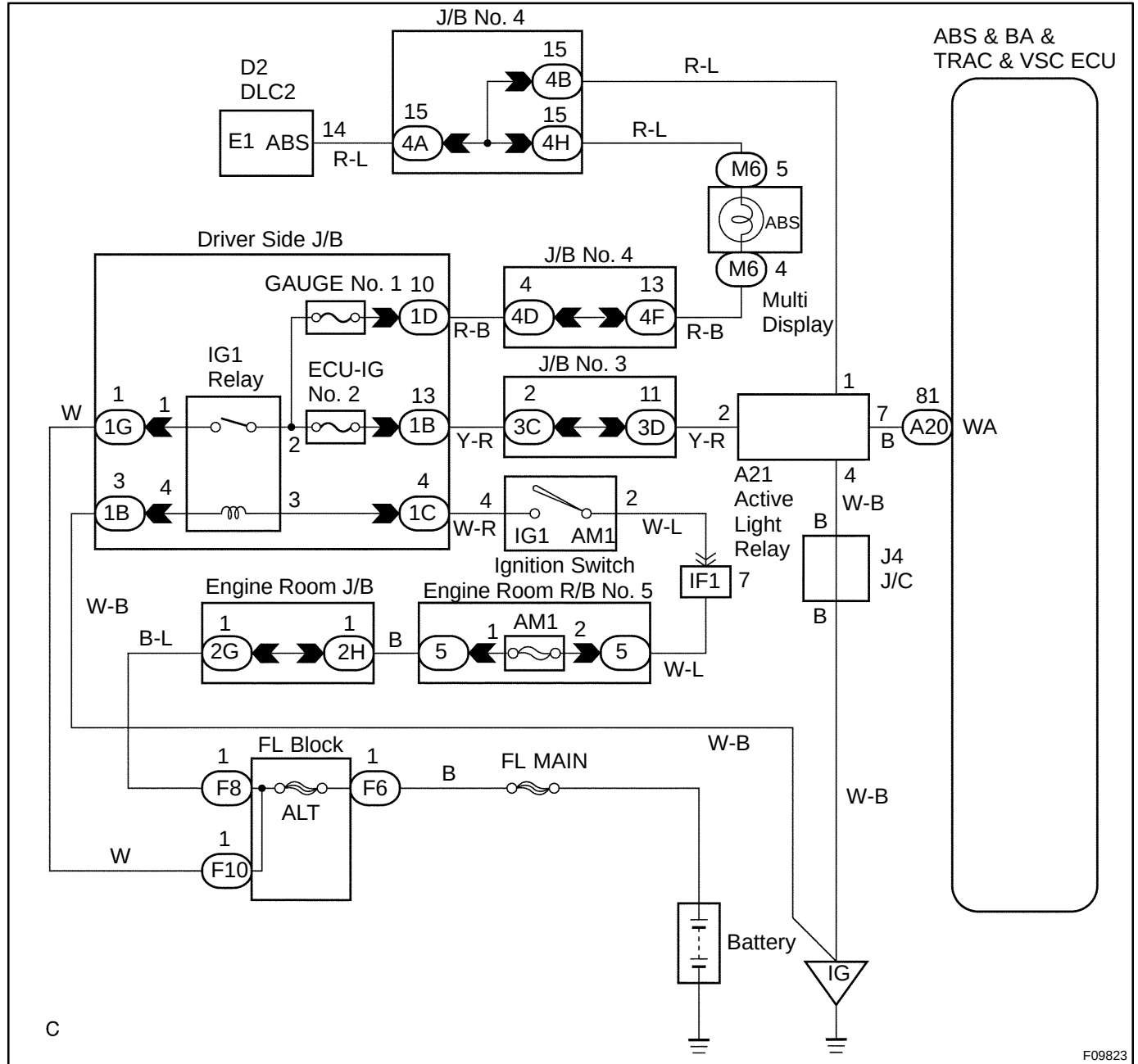
TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
RR+ (A7 - 2) - RR- (A7 - 1)	G ↔ Y	IG switch ON Slowly turn right rear wheel	AC generation
FR+ (A7 - 5) - FR- (A7 - 4)	B-W ↔ L	IG switch ON Slowly turn right front wheel	AC generation
FL+ (A7 - 7) - FL- (A7 - 6)	BR ↔ B-R	IG switch ON Slowly turn left front wheel	AC generation
RL+ (A7 - 9) - RL- (A7 - 8)	LG ↔ V	IG switch ON Slowly turn left rear wheel	AC generation
Ts (A7 - 11) - GND (A7 - 16, 19)	LG-B ↔ W-B	IG switch ON	5.7 - 8.1
Tc (A7 - 12) - GND (A7 - 16, 19)	LG-R ↔ W-B	IG switch ON	5.7 - 8.1
STP (A7 - 14) - GND (A7 - 16, 19)	G-W ↔ W-B	Stop light switch pushed in	Below 1.5
		Stop light switch released	5 - 14
IG1(A7 - 15) - GND (A7 - 16, 19)	Y-R ↔ W-B	IG switch ON	10 - 14
+B (A7 - 17) - GND (A7 - 16, 19)	L ↔ W-B	Always	10 - 14
BAT (A7 - 18) - GND (A7 - 16, 19)	L ↔ W-B	Always	10 - 14
WA (A7 - 20) - GND (A7 - 16, 19)	B ↔ W-B	IG switch ON, ABS warning light ON	Below 2.6
		IG switch ON, ABS warning light OFF	10 - 14
EBDW (A7 - 21) - GND (A7 - 16, 19)	R-Y ↔ W-B	IG switch ON, BRAKE warning light ON	Below 2.6
		IG switch ON, BRAKE warning light OFF	10 - 14
PN (A7 - 23) - GND (A7 - 16, 19)	L-W ↔ W-B	IG switch ON, Shift lever is Por N range	10 - 14
		IG switch ON, Shift lever is not Por N range	Below 2.0

ABS Warning Light Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

ABS warning light does not light up	*
ABS warning light remains on	Go to step 2

*: Start the inspection from step 1 in case of using a TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1	Check operation of the ABS warning light.

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter on the TOYOTA hand-held tester.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

2	Check ABS warning light.

See combination meter troubleshooting on page [BE-2](#) .

NG

Replace bulb or repair combination meter assembly.

OK

3	Check active lamp relay.

NG

Replace active lamp relay.

OK

Repair or replace and check for open or short circuit in harness and connector.

DTC	Always ON	Malfunction in ECU VSC Warning Light Circuit

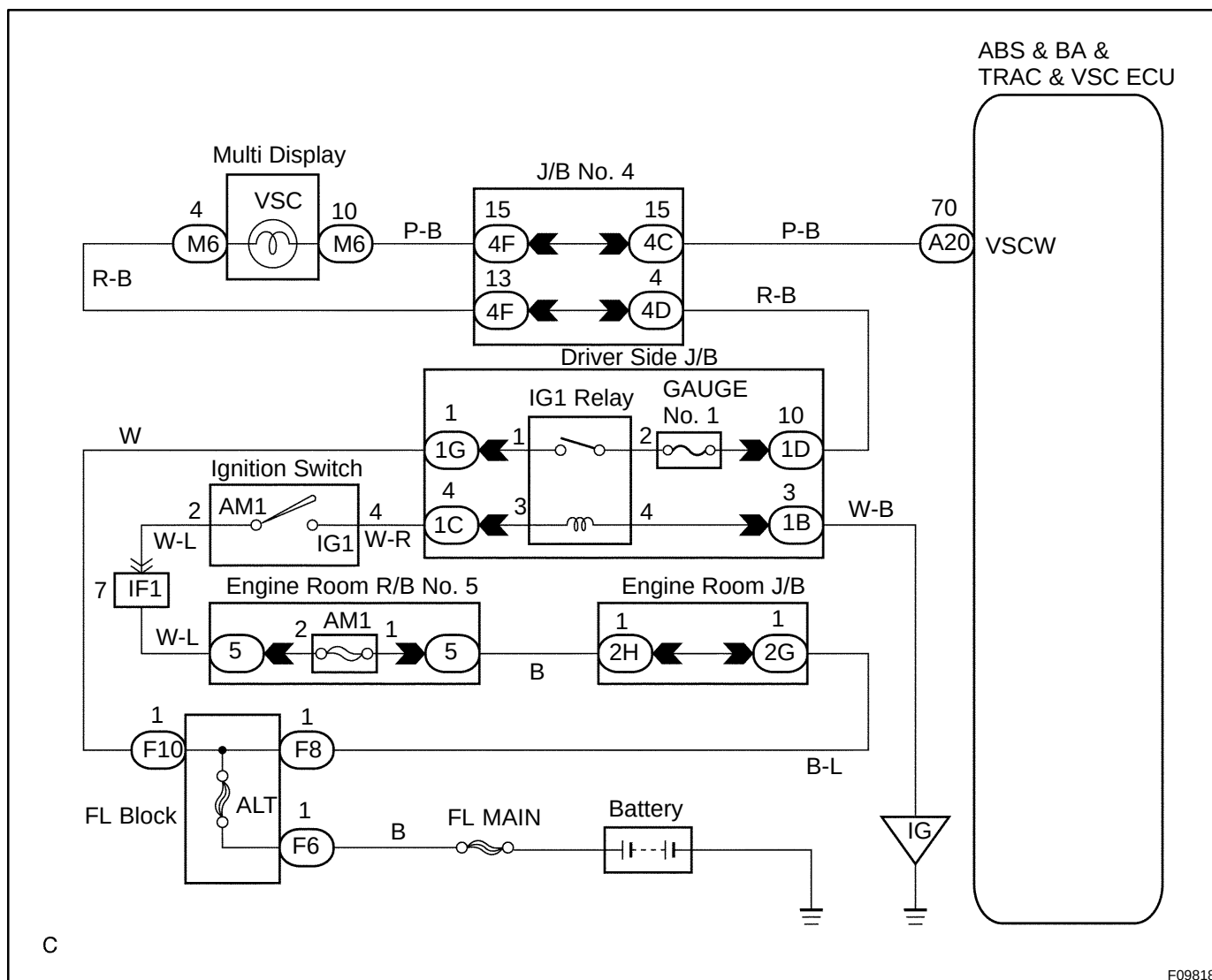
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1. or 2. is detected: 1. There is a malfunction in the ECU internal circuit. 2. There is a malfunction in VSC warning light circuit.	•Charging system •VSC warning light circuit

HINT:

TOYOTA hand-held tester may not be able to be used when ECU is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that the ECU connectors are securely connected to the ECU.

NO

Connect the connector to the ECU.

YES

2	Is DTC output?

Check DTC on page [DI-252](#) .

YES

Repair circuit indicated by the output code .

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-30](#)).

NO

4	Check battery positive voltage.

PREPARATION:

Start the engine.

CHECK:

Check the battery positive voltage.

OK:

Voltage: 10 - 16 V

NG

Check and repair the charging system (See page [CH-1](#)).

OK

5	Check operation of the VSC warning light.

In case of using the TOYOTA hand-held tester:

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter by the TOYOTA hand-held tester.

In case of not using the TOYOTA 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.

NG

Check and replace combination meter (See page [BE-2](#)).

OK

6	Check for short circuit in harness and connector between combination meter and ABS & BA & TRAC & VSC ECU, combination meter and DLC1 (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	Always ON	Malfunction in ECU ABS Warning Light Circuit

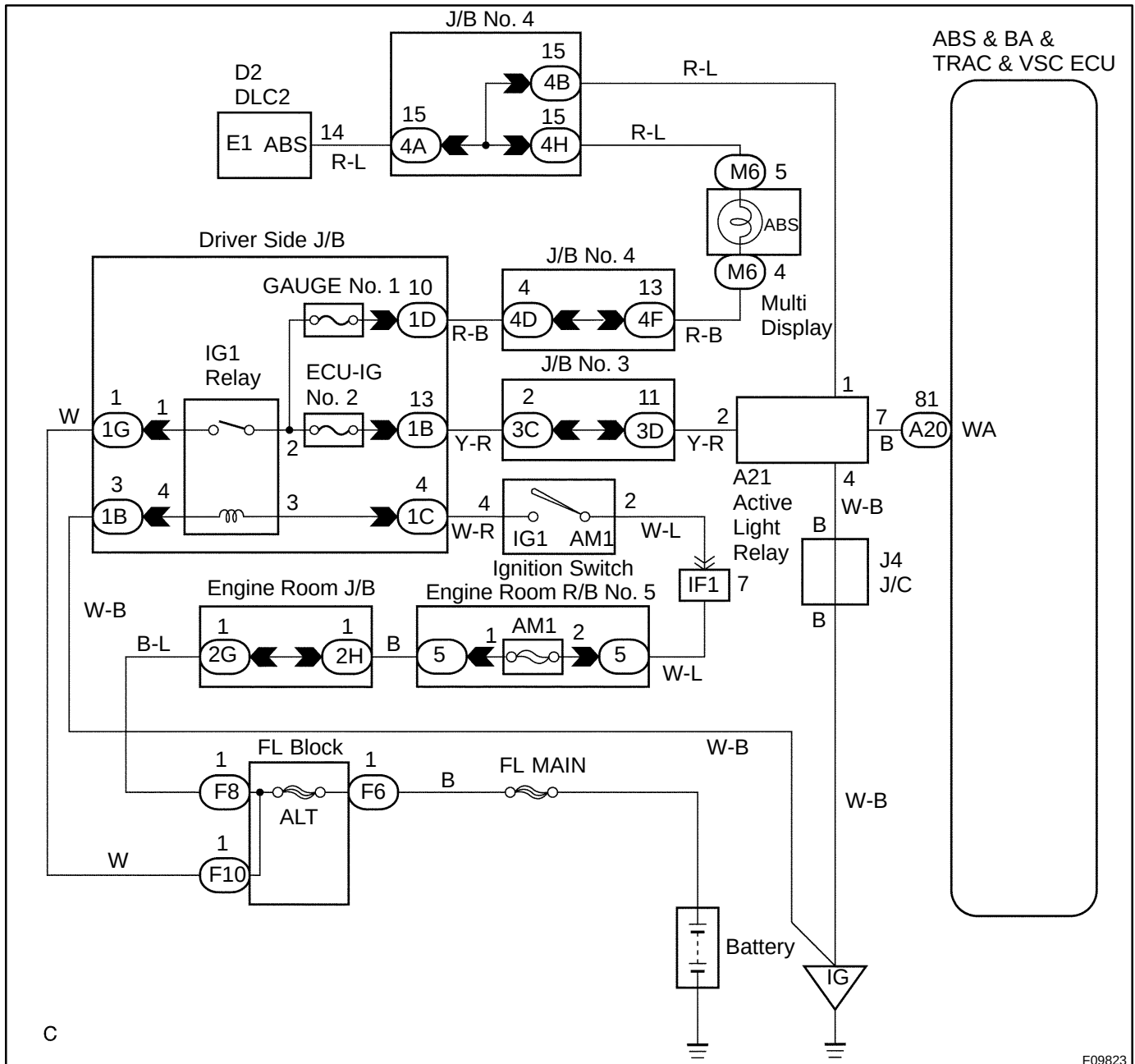
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1., 2. or 3. is detected: 1. The ECU connectors are OFF the ECU. 2. There is a malfunction in the ECU internal circuit. 3. There is a malfunction in ABS warning light circuit.	•Charging system •ABS warning light circuit

HINT:

TOYOTA hand-held tester may not be able to be used when the ECU is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that the ECU connectors are securely connected to the ECU.

NO**Connect the connector to the ECU.****YES**

2	Is DTC output?

Check DTC on page [DI-252](#) .**YES****Repair circuit indicated by the output code .****NO**

3	Does ABS warning light go off?

YES**Check for open or short circuit in harness and connector between ECU-IG fuse and ECU (See page [IN-30](#)).****NO**

4	Check battery positive voltage.

PREPARATION:

Start the engine.

CHECK:

Check the battery positive voltage.

OK:**Voltage: 10 - 16 V****NG****Check and repair the charging system (See page [CH-1](#)).****OK**

5	Check operation of the ABS warning light.

In case of using the TOYOTA hand-held tester:

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the TOYOTA hand-held tester.

In case of not using the TOYOTA 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 goes on.

OK

Check and replace combination meter (See page [BE-2](#)).

NG

6	Check for short circuit in harness and connector between active lamp relay and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

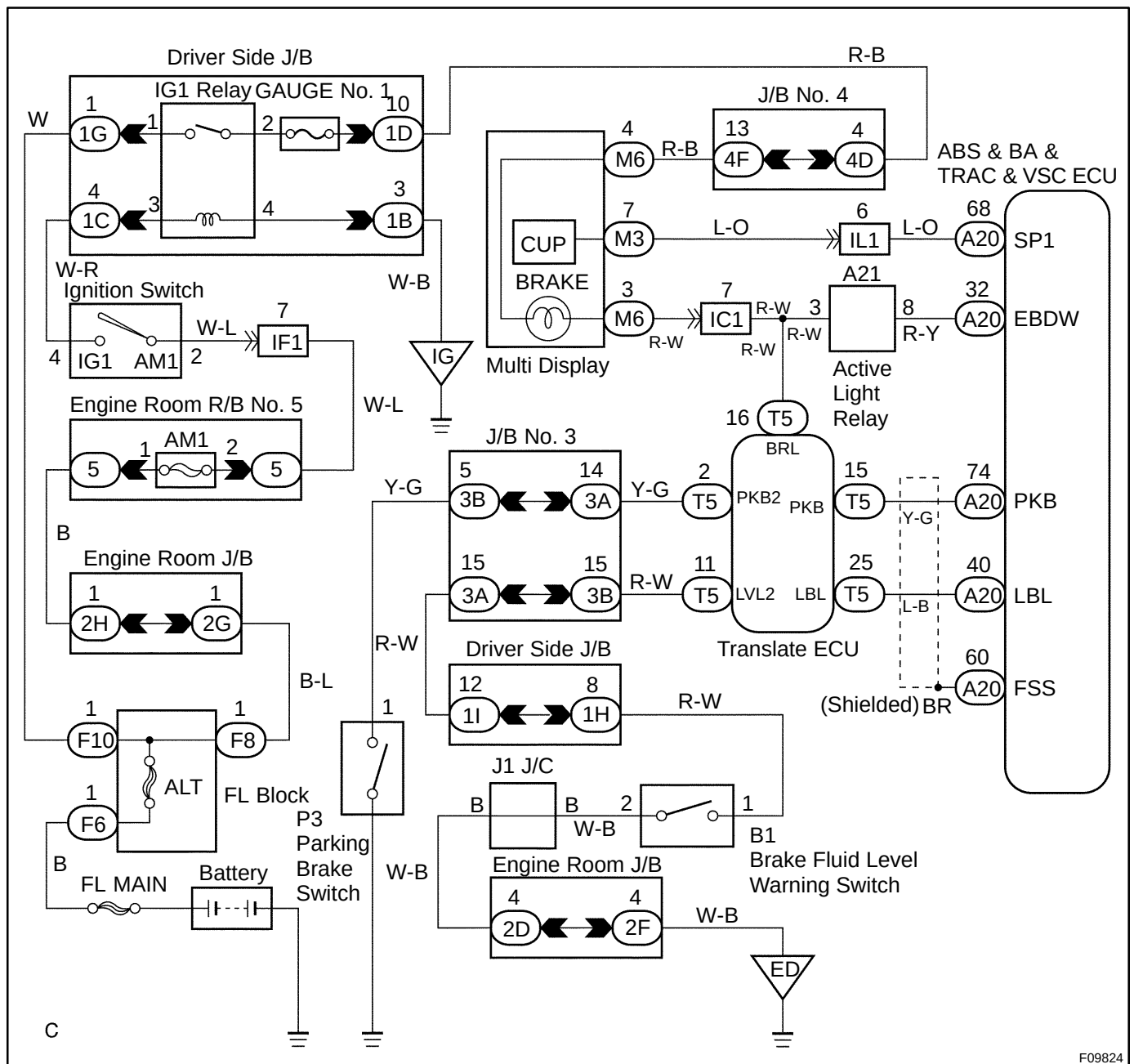
Check and replace ABS & BA & TRAC & VSC ECU.

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

- The BRAKE warning light lights up when the brake fluid is insufficient, when the parking brake is applied or when the EBD is defective.
- If the translate ECU detects trouble, it makes VSC warning light lights up while prohibiting VSC & TRAC control. At this time, the ECU records a DTC in memory. Connect terminals Tc and E₁ of the DLC1 or DLC2 to make BRAKE warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check parking brake switch circuit (See page [BE-53](#)).

NG

Repair or replace parking brake switch circuit.

OK

2 Check brake fluid level warning switch circuit (See page [BE-53](#)).

NG

Repair or replace brake fluid level warning switch circuit.

OK

3 Is DTC output for ABS ?

YES

Repair circuit indicated by the output code.

No

4 Check BRAKE warning light.

See combination meter troubleshooting on page [BE-2](#) .

NG

Repair or replace combination meter.

OK

5	Check active lamp relay.

NG

Replace active lamp relay.

OK

6	Check for open or short circuit in harness and connector between combination meter and active lamp relay (See page IN-30).

NG

Repair or replace harness or connector.

OK

7	Check for open or short circuit in harness and connector between active lamp relay and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

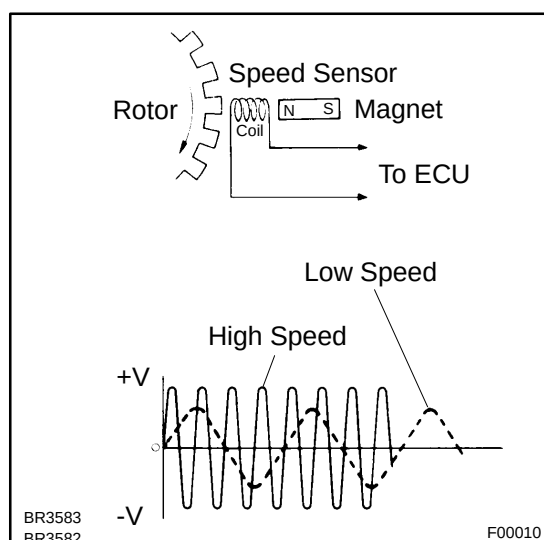
Check and replace ABS & BA & TRAC & VSC ECU.

CIRCUIT INSPECTION

DTC	C0200 / 31 - C1331 / 36	Speed Sensor Circuit

DTC	C1332 / 38, C1333 / 39	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects a wheel speed and sends the appropriate signals to the ECU. These signals are used to control of the ABS and VSC system. Each of the front and rear rotors has 48 serrations.

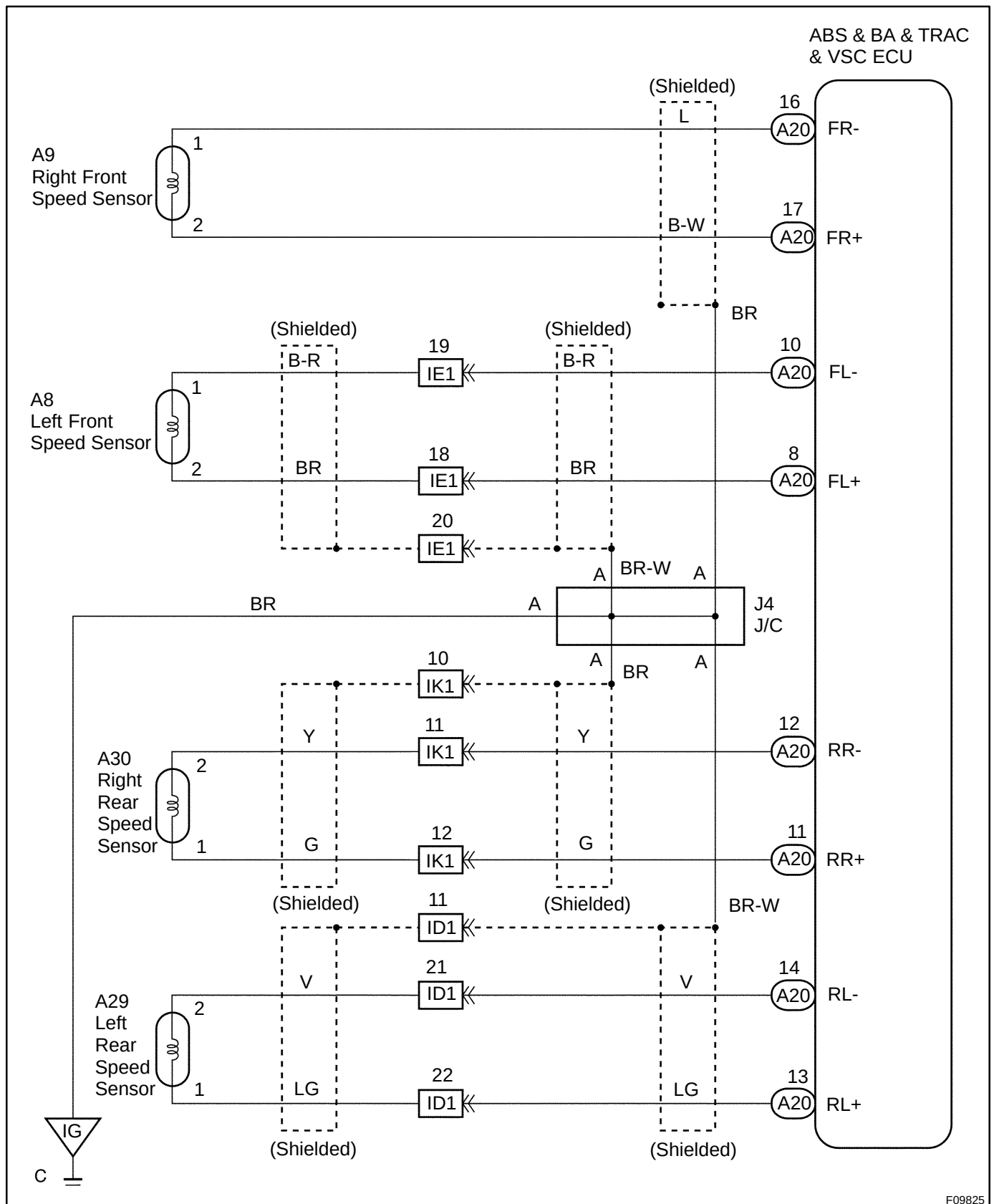
When the rotors rotate, a magnetic field emitted by a permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	When any of the following 1. to 3. is detected : 1. Vehicle speed is more than 40 km/h (25 mph), pulses are not input for 0.01 sec. 2. After the initial start or restart and when the vehicle speed has reached 12 km/h (7 mph), the wheel speed of 0 km/h (0 mph) is detected. 3. After the initial start or restart and when the vehicle speed has reached 18 km/h (11 mph), the front wheel speed of 0 km/h (0 mph) is detected.	•Right front, left front, right rear, left rear speed sensor •Each speed sensor circuit •Sensor installation
C1330 / 35 C1331 / 36 C1332 / 38 C1333 / 39	Detecting abnormality in the resistance value of each speed sensor.	•Right front, left front, right rear, left rear speed sensor •Each speed sensor circuit

HINT:

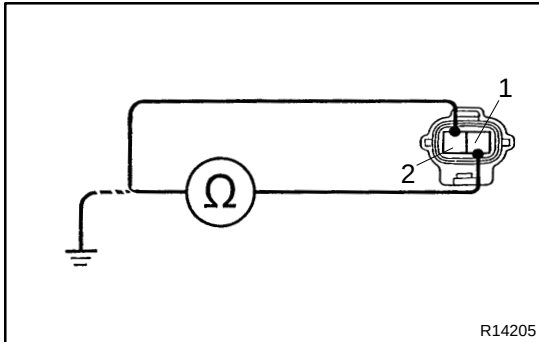
- DTC No. C0200 / 31 and C1330 / 35 are for the right front speed sensor.
- DTC No. C0205 / 32 and C1331 / 36 are for the left front speed sensor.
- DTC No. C0210 / 33 and C1332 / 38 are for the right rear speed sensor.
- DTC No. C0215 / 34 and C1333 / 39 are for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check speed sensor.

**Front:****PREPARATION:**

- (a) Remove the front fender liner.
- (b) Disconnect the speed sensor connector.

CHECK:

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

OK:

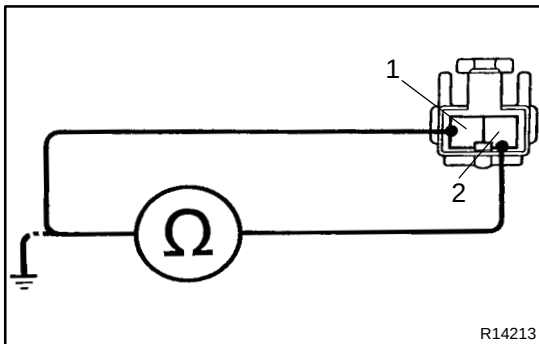
Resistance: 0.6 - 2.5 kΩ (1.6 ± 0.2 kΩ at 20 °C)

CHECK:

Measure the resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

**Rear:****PREPARATION:**

- (a) Remove the seat cushion and seatback.
- (b) Disconnect the speed sensor connector.

CHECK:

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

OK:

Resistance: 1.2 - 2.3 kΩ (1.6 ± 0.1 kΩ at 20 °C)

CHECK:

Measure the resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG

Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-252](#)).

OK

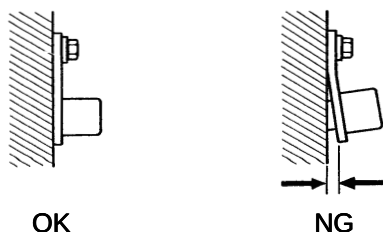
- 2** Check for open and short circuit in harness and connector between each speed sensor and ABS & BA & TRAC & VSC ECU (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

- 3** Check speed sensor installation.



BR3795

CHECK:

Check the speed sensor installation.

OK:

The installation bolt shall be tightened properly and no clearance is allowed between the sensor and front steering knuckle or rear axle carrier.

NG

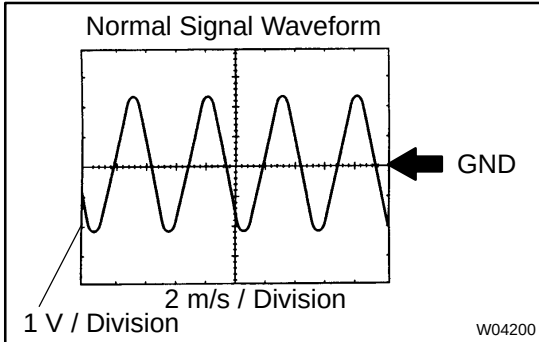
Replace speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-252](#)).

OK

4 Check speed sensor and sensor rotor serrations.



REFERENCE: INSPECTION USING OSCILLOSCOPE

PREPARATION:

- Disconnect the connector from the ABS & BA & TRAC & VSC ECU.
- Connect the oscilloscope to the terminals FR+, FL+, RR+ or RL+ and GND of the ECU harness side connector.

CHECK:

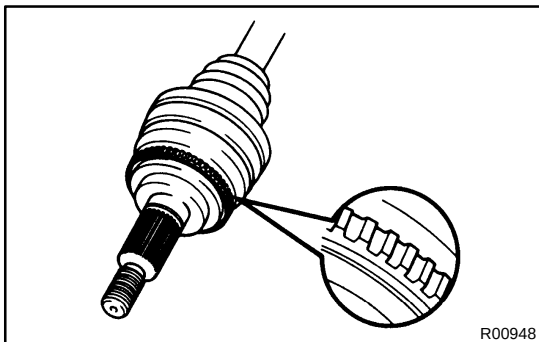
Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

OK

Check and replace ABS & BA & TRAC & VSC 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, missing teeth or foreign objects.

PREPARATION:

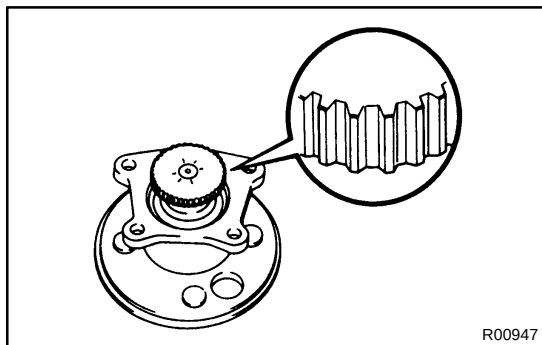
Remove the front speed sensor (See page [BR-60](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

**Rear:****PREPARATION:**

Remove the axle hub (See page [SA-45](#)).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor (See page [BR-63](#)).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

NG

Replace sensor rotor or speed sensor.

NOTICE:

Check the speed sensor signal last (See page [DI-252](#)).

OK

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C0226 / 21 - C1228 / 28	Brake 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	Open or short in SFRR or SFRH circuit.	● Brake actuator ● SFRR or SFRH circuit
C0236 / 22	Open or short in SFLR or SFLH circuit.	● Brake actuator ● SFLR or SFLH circuit
C0246 / 23	Open or short in SRRR or SRRH circuit.	● Brake actuator ● SRRR or SRRH circuit
C0256 / 24	Open or short in SRLR or SRLH circuit.	● Brake actuator ● SRLR or SRLH circuit
C1225 / 25	Open or short circuit for SMC1 circuit.	● Brake actuator ● SMC1 circuit
C1226 / 26	Open or short circuit for SMC2 circuit.	● Brake actuator ● SMC2 circuit
C1227 / 27	Open or short circuit for SRC1 circuit.	● Brake actuator ● SRC1 circuit
C1228 / 28	Open or short circuit for SRC2 circuit.	● Brake actuator ● SRC2 circuit

The diagram illustrates the wiring for the ABS & BA & TRAC & VSC ECU. It shows the following components and their connections:

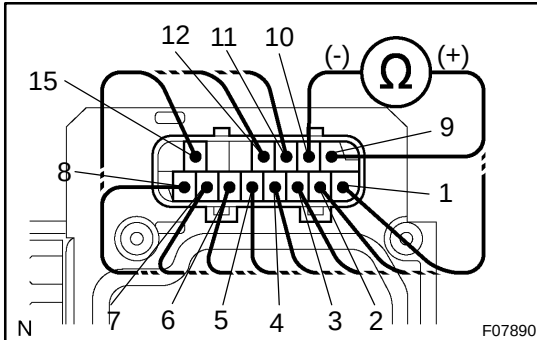
- Battery:** Connected to the ground (ED) and the main power line (B).
- Alternator (ALT):** Connected to the main power line (B) and the fuse block (FL MAIN).
- Fuse Block (FL MAIN, FL BLOCK):** Contains fuses F6, F8, and F9. F6 is connected to the main power line (B). F8 and F9 are connected to the ABS & BA & TRAC & VSC ECU.
- ABS & BA & TRAC & VSC ECU:** The central control unit with multiple pins (A5, A6, A20) and wire connections (B-W, W-G, W-R, G-O, GR, G-R, Y-B, L-Y, G-Y, V-W, B-Y, R-B).
- ABS Solenoid Relay:** A relay with pins 1, 2, 3, 4, 6, and 19. It is connected to the ECU and the ABS & BA & TRAC & VSC Actuator.
- ABS & BA & TRAC & VSC Actuator:** The actuator unit with pins 2, 9, 11, 7, 8, 4, 5, 1, 3, 3, 5, 2, 5, 4, 12, 13, 14, 4, and 6. It is connected to the ECU and the ABS Solenoid Relay.

The diagram is labeled with component names, pin numbers, and wire colors. The connections are as follows:

- Battery:** Connected to the ground (ED) and the main power line (B).
- Alternator (ALT):** Connected to the main power line (B) and the fuse block (FL MAIN).
- Fuse Block (FL MAIN, FL BLOCK):** Contains fuses F6, F8, and F9. F6 is connected to the main power line (B). F8 and F9 are connected to the ABS & BA & TRAC & VSC ECU.
- ABS & BA & TRAC & VSC ECU:** The central control unit with multiple pins (A5, A6, A20) and wire connections (B-W, W-G, W-R, G-O, GR, G-R, Y-B, L-Y, G-Y, V-W, B-Y, R-B).
- ABS Solenoid Relay:** A relay with pins 1, 2, 3, 4, 6, and 19. It is connected to the ECU and the ABS & BA & TRAC & VSC Actuator.
- ABS & BA & TRAC & VSC Actuator:** The actuator unit with pins 2, 9, 11, 7, 8, 4, 5, 1, 3, 3, 5, 2, 5, 4, 12, 13, 14, 4, and 6. It is connected to the ECU and the ABS Solenoid Relay.

INSPECTION PROCEDURE

1 Check brake actuator solenoid.

**PREPARATION:**

Disconnect the connector from brake actuator.

CHECK:

Check continuity between terminals 10 and each of 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 15 of brake actuator connector.

OK:

Continuity

NG

Replace brake actuator.

OK

2 Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and brake actuator (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

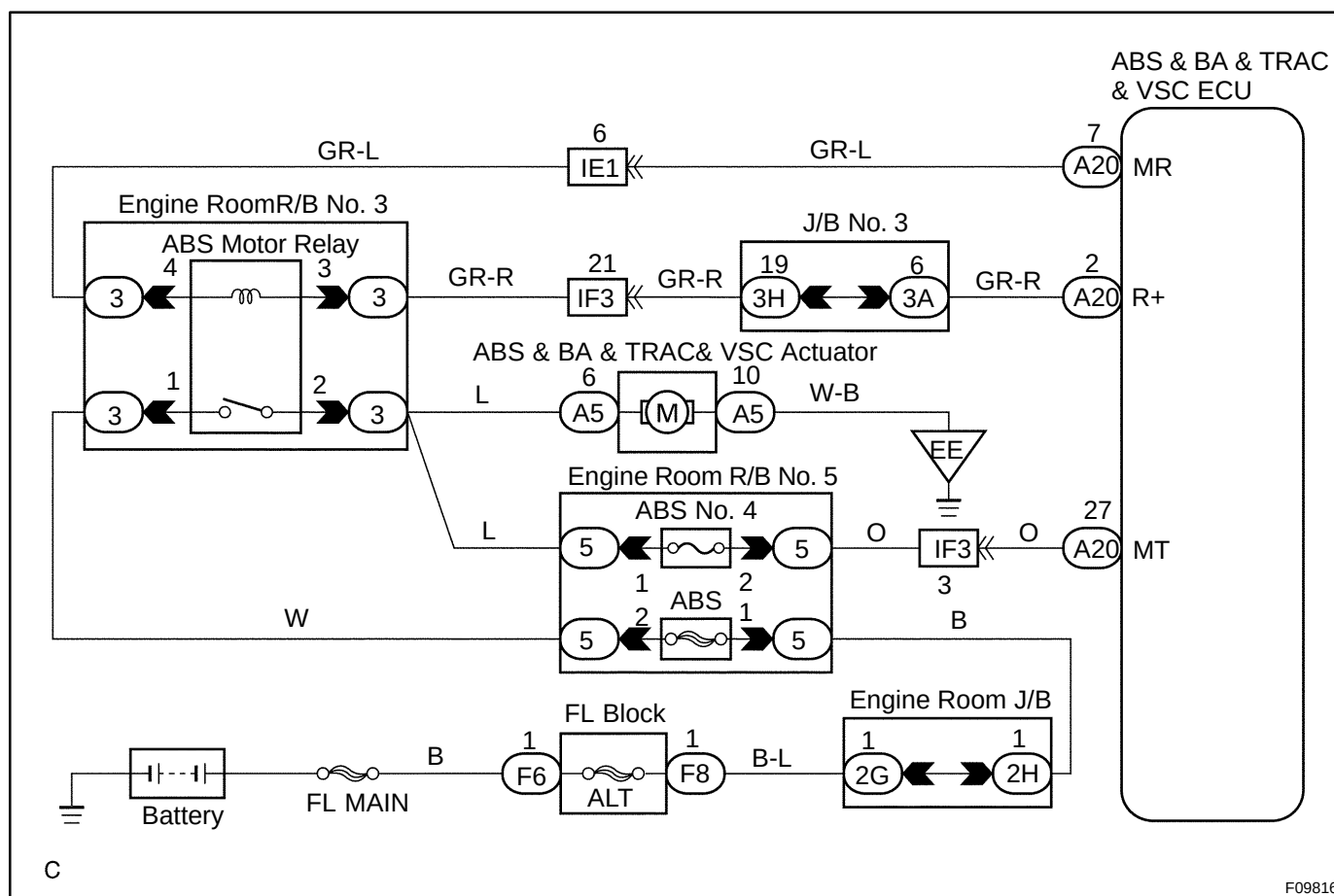
DTC	C0273 / 13	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

The ABS motor relay supplies power to the brake actuator pump motor. While the ABS & BA & TRAC & VSC are activated, the ECU switches the motor relay ON and operates the brake actuator pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Open or short circuit is detected.	●ABS motor relay ●ABS motor relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1	Check ABS motor relay operation.

PREPARATION:

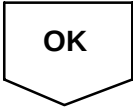
- (a) Connect the TOYOTA hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

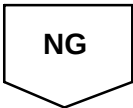
Check the operation sound of the ABS motor relay individually when operating it with the TOYOTA hand-held tester.

OK:

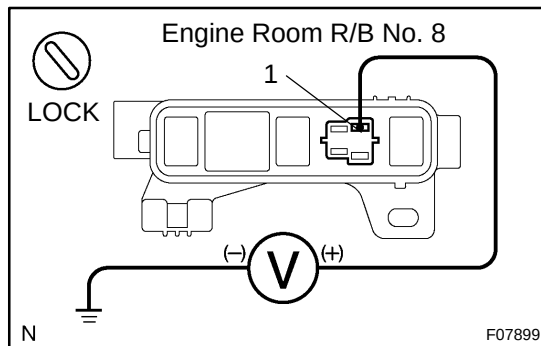
The operation sound of the ABS motor relay should be heard.



2	Check for short circuit in harness and connector between BM of motor relay and brake actuator and MT of ABS & BA & TRAC & VSC ECU (See page IN-30).



3 Check voltage between terminal 1 of engine room R/B No. 8 (for ABS motor relay) and body ground.



PREPARATION:

Remove ABS motor relay from engine room R/B No. 8.

CHECK:

Measure the voltage between terminal 1 of engine room R/B No. 8 (for ABS motor relay) and body ground.

OK:

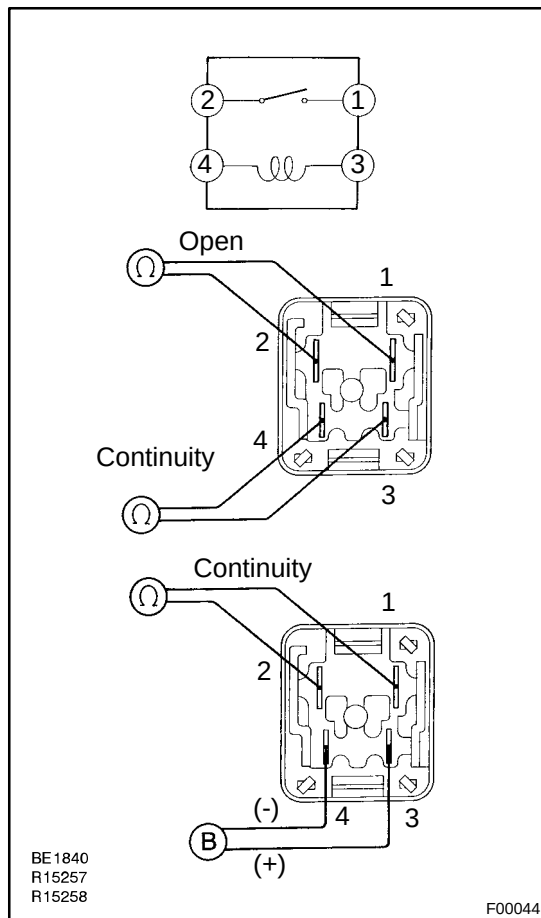
Voltage: 10 - 14 V

NG

Check and repair harness or connector.

OK

4 Check ABS motor relay.



CHECK:

Check continuity between following terminals of 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 continuity between terminals.

OK:

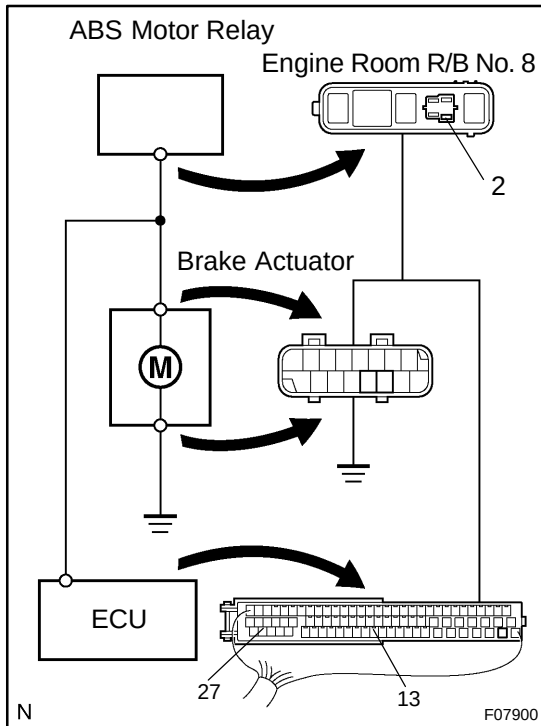
Terminals 1 and 2	Continuity

NG

Replace ABS motor relay.

OK

- 5 Check continuity between terminal BM (2) of engine room R/B No. 8 (for ABS motor relay) and terminal MT (27) of ABS & BA & TRAC & VSC ECU.**

**PREPARATION:**

Disconnect the connector from the ABS & BA & TRAC & VSC ECU.

CHECK:

- Check continuity between terminal BM (2) of engine room R/B No. 8 and terminal GND (28) of ABS & BA & TRAC & VSC ECU.
- Check continuity between terminal BM (2) of engine room R/B No. 8 and terminal MT (27) of ABS & BA & TRAC & VSC ECU.

OK:

Continuity

NG

Repair or replace harness or brake actuator.

OK

- 6 Check for open and short circuit in harness and connector between ABS motor relay and ABS & BA & TRAC & VSC ECU (See page [IN-30](#)).**

NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DTC	C0278 / 11	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

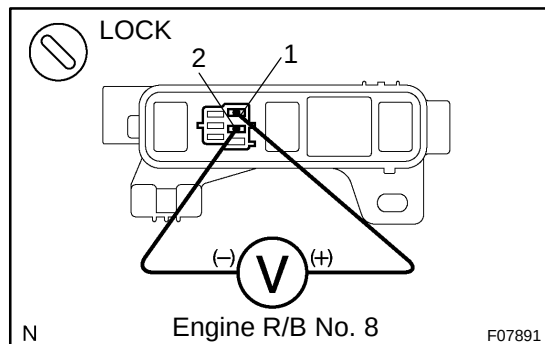
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Detection of any conditions from 1. through 2.: 1. 3 or more solenoids are show faulty in response and simultaneously solenoid supply voltage is detected faulty. 2. Solenoid relay will not be switched OFF.	●ABS solenoid relay ●ABS solenoid relay circuit

[illegible]

INSPECTION PROCEDURE

1	Check voltage between terminals 1 and 2 of engine room R/B No. 8 (for ABS solenoid relay).

**PREPARATION:**

Remove the ABS solenoid relay from engine room R/B No. 8.

CHECK:

Measure the voltage between terminals 1 and 2 of engine room R/B No. 8 (for ABS solenoid relay).

OK:

Voltage: 10 - 14 V

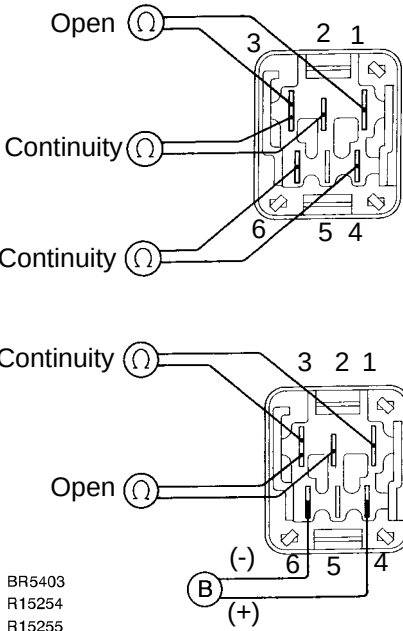
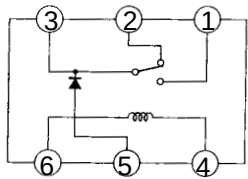
NG

Check and repair harness or connector.

OK

2

Check ABS solenoid relay.



BR5403
R15254
R15255

F00042

CHECK:

Check continuity between following terminals of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

- Apply battery positive voltage between terminals 4 and 6.
- Check continuity between following terminals of ABS solenoid relay.

OK:

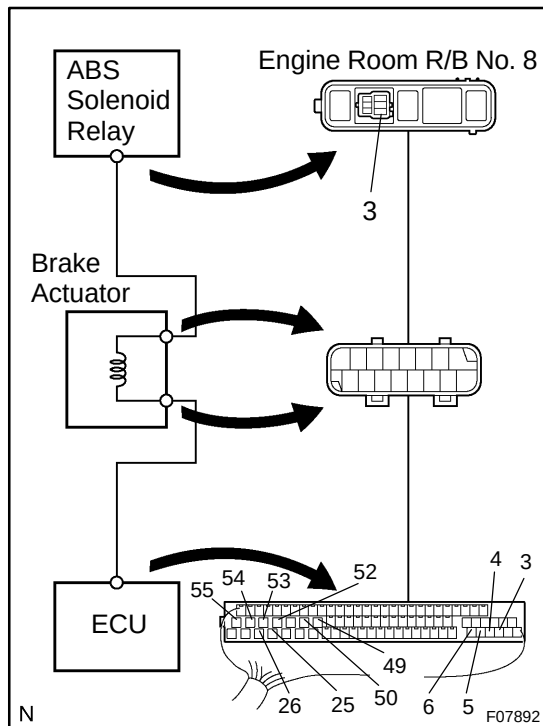
Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG

Replace ABS solenoid relay.

OK

3 Check continuity between terminal 3 of engine room R/B No. 8 (for ABS solenoid relay) and each solenoid terminal of ABS & BA & TRAC & VSC ECU.



PREPARATION:

Disconnect the connector from the ABS & BA & TRAC & VSC ECU.

CHECK:

Check continuity between terminal 3 of engine room R/B No. 8 and each terminal, 3, 4, 5, 6, 25, 26, 49, 50, 52, 53, 54 and 55 of ECU harness side connector.

OK:

Continuity

HINT:

Resistance of each solenoid coil.

SFLH (5), SRRH (6), SFRH (26), SMC1 (49), SMC2 (50), SRLH (53): 8 - 9.1 Ω

SFLR (3), SRRR (4), SRLR (25), SRC2 (52), SRC1 (54), SFRR (55): 4.0 - 4.6 Ω

NG

Repair or replace harness or brake actuator.

OK

4 Check for open and short circuit in harness and connector between ABS solenoid relay and ABS & BA & TRAC & VSC ECU (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

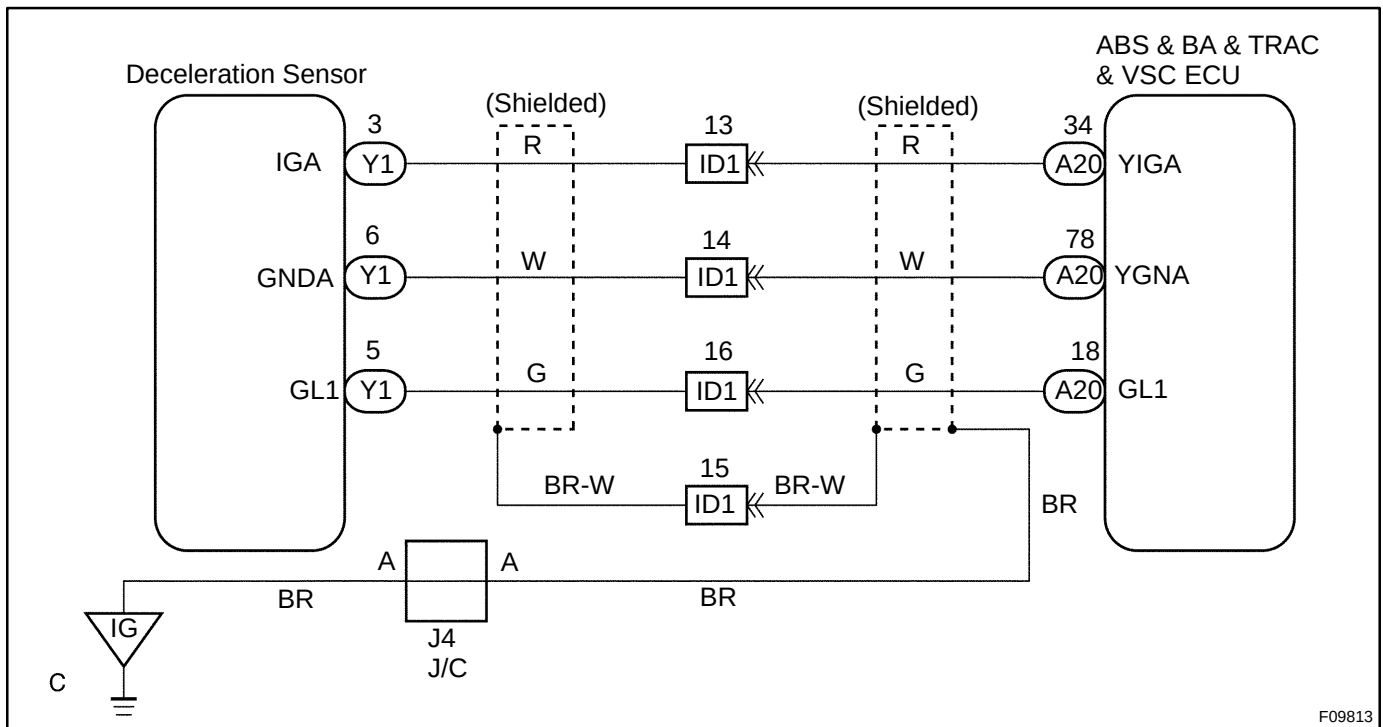
DTC	C0365 / 43	Deceleration Sensor Circuit

CIRCUIT DESCRIPTION

Deceleration sensor is combined with yaw rate sensor.

DTC No.	DTC Detecting Condition	Trouble Area
C0365 / 43	Detection of any of conditions from 1. through 4.: 1. The sensor signal is out of range, less than 0.25 V or more than 4.75 V. 2. Deceleration difference between sensor signal and reference value is large. 3. Offset value of sensor signal is higher than the standard value. 4. sensor signal change rapidly higher than the value at the normal condition.	•Deceleration sensor •Deceleration sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1	Check output value of the deceleration sensor.

PREPARATION:

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

CHECK:

Check that the deceleration value of the deceleration sensor displayed on the TOYOTA 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-252).

NG

Replace 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-30).

NG

Repair or replace harness and connector.

OK

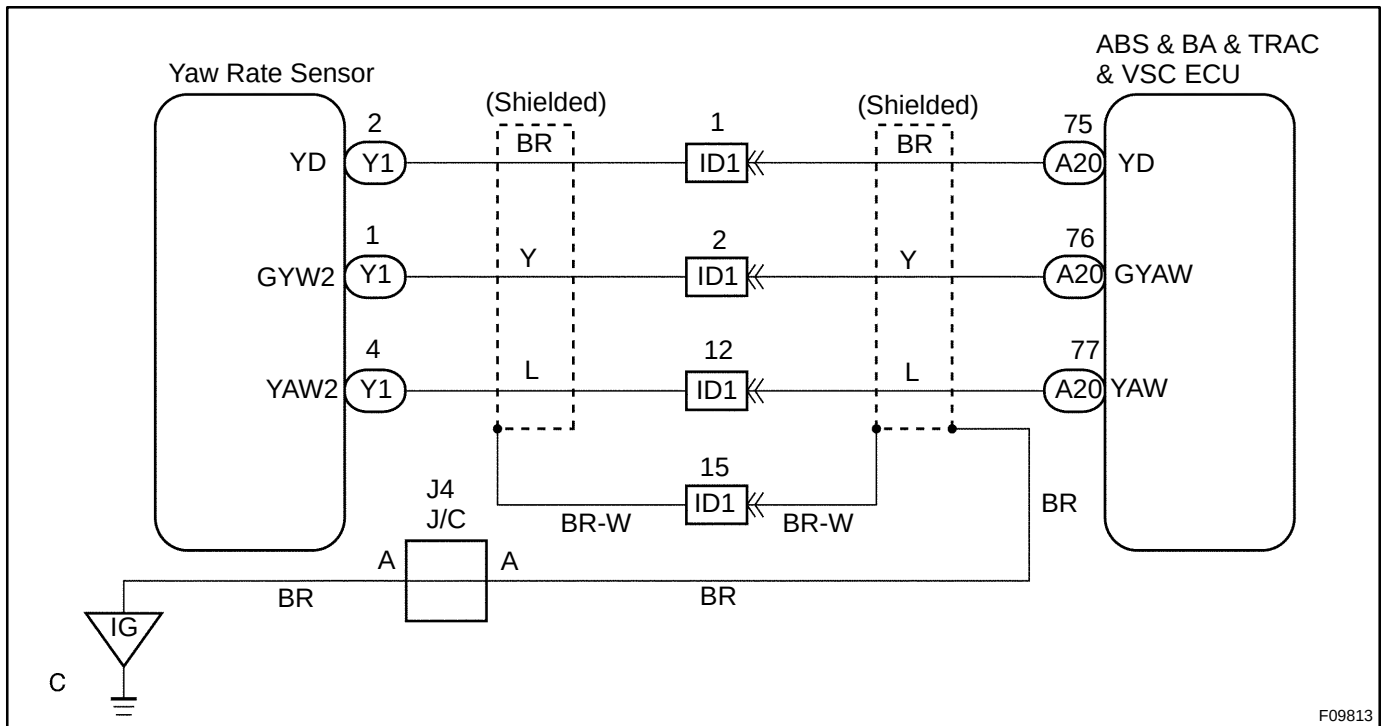
Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C0371 / 55	Yaw Rate Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C0371 / 55	Detection of any of conditions from 1. through 4.: 1. The voltage of sensor signal is out of range. 2. The offset value of sensor signal is outside the plausible range. 3. Sensor signal change rapidly under normal driving. 4. Sensor is more or worse sensitivity than reference yaw rate during cornering.	●Yaw rate sensor ●Yaw rate sensor circuit

WIRING DIAGRAM



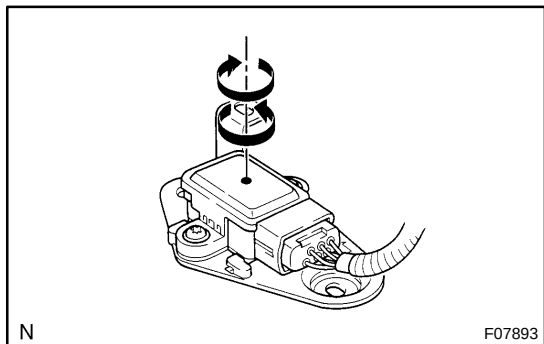
F09813

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1 Check output value of the yaw rate sensor.



PREPARATION:

- Remove the 2 bolts and yaw rate sensor with connector still connected.
- Connect the TOYOTA hand-held tester to the DLC3.
- Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- Select the DATALIST mode on the TOYOTA hand-held tester.

CHECK:

Check that the yaw rate value of the yaw rate sensor displayed on the TOYOTA hand-held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.

OK

Go to step 3.

NG

2 Check whether continuity exists between terminal YD of yaw rate sensor and terminal YD of ABS & BA & TRAC & VSC ECU.

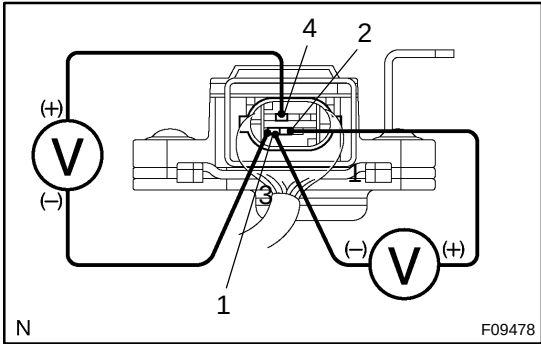
NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

3 Check yaw rate sensor.



CHECK:

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals IGA (3) and GYW2 (1), YAW2 (4) and GYW2 (1) of the yaw rate sensor with connector still connected.

OK:

Terminals 3 and 1 (IGA - GYW2)	Approx. 12 V
Terminals 4 and 1 (YAW2 - GYW2)	Approx. 2.5 V

NG

Replace yaw rate sensor.

OK

4 Check for open and short circuit in harness and connector between yaw rate sensor and ABS & BA & TRAC & VSC ECU (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1202 / 44	Brake Fluid Level Warning Switch Circuit

CIRCUIT DESCRIPTION

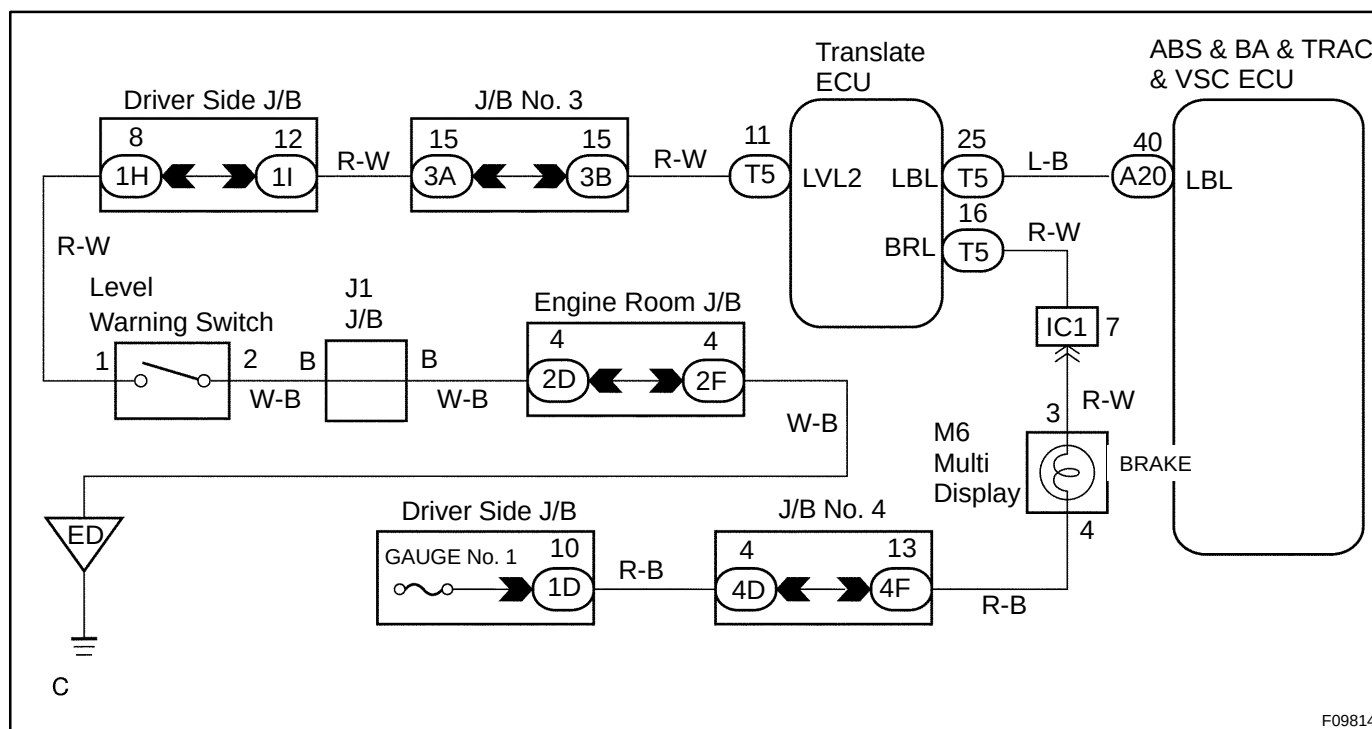
The brake fluid level warning switch sends appropriate signals to the ECU when the brake fluid level is lowered.

HINT:

Depressing the parking brake pedal turns on the brake warning light, but this DTC No. C1202/44 is not output.

DTC No.	DTC Detecting Condition	Trouble Area
C1202 / 44	Fluid level in the brake master cylinder reservoir tank remains low for 60 sec. or more. This means brake fluid warning switch likes on.	●Brake fluid level ●Brake fluid level warning switch ●Brake fluid level warning switch circuit

WIRING DIAGRAM

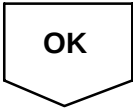
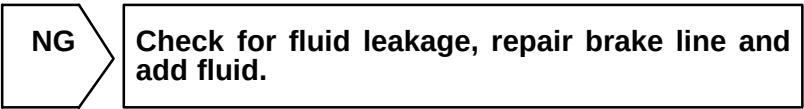


INSPECTION PROCEDURE

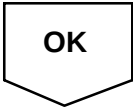
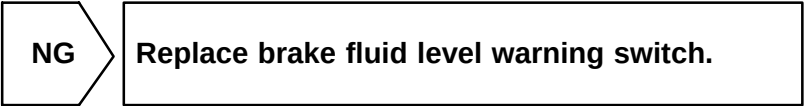
1	Check brake fluid level.

CHECK:

Check the amount of fluid in the brake reservoir.



2	Check brake fluid level warning switch (See page BE-53).



3	Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN-30).



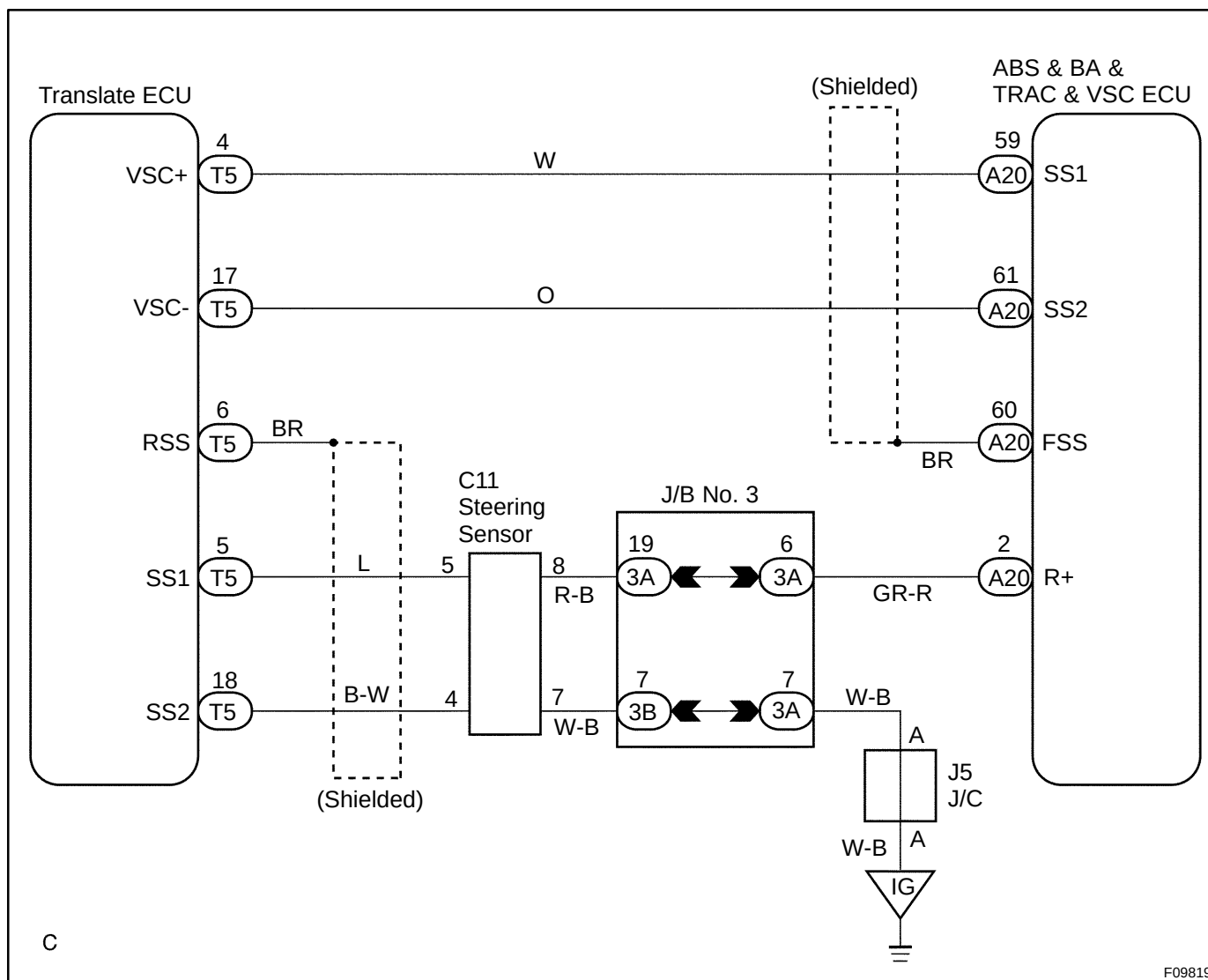
Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1208 / 54	Steering Angle Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1208 / 54	Detection of any of conditions 1. through 7: 1. When the condition that ECU terminal IG1 voltage is 9.8 v or more, and does not receive data from steering angle sensor continues for 0.1 sec. or more. 2. Sensor internal failure. 3. The offset value is out of range. 4. Sensor signal change higher. 5. Steering angle value difference between measured and reference is out of range. 6. Steering sensor is not centered. 7. Steering sensor signal is out of range.	●Steering angle sensor ●Steering angle sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1	Check output value of the steering angle sensor.

PREPARATION:

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

CHECK:

Check that the steering wheel turning angle value of the steering angle sensor displayed on the TOYOTA hand-held tester is appropriate when turning the steering wheel.

OK:

Steering wheel turning angle value must be appropriate.

OK

Go to step 4.

NG

2	Check the installation condition of steering angle sensor and adapter.

NG

Repair or replace steering angle sensor (See page [SR-12](#)).

OK

3	Check for open and short circuit in harness and connector between steering angle sensor, transverse ECU and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

4	Calibrate the steering angle sensor (See page DI-252).

NG**Replace steering angle sensor.****OK**

5	Is DTC still output?

Check DTC on page [DI-252](#) .**NO****No problem.****YES**

6	Replace steering angle sensor. Is DTC still output?

NOTICE:When replacing the steering angle sensor, perform the zero point calibration (See page [DI-252](#)).**NO****No problem.****YES****Replace skid control ECU.****NOTICE:**When replacing the skid control ECU, perform the zero point calibration (See page [DI-252](#)).

DTC	C1237 / 37	Wrong Number of Teeth at 1 of 4 Wheels

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1237 / 37	Detection of any of conditions from 1. through 4.: - When the ignition switch is ON, the speed difference between the rear right and rear left wheels is 5 km/h (3mph) or more (vehicle speed: 100 km/h (62 mph) or less). - When the ignition switch is ON, the slip difference between the reference wheel and any other wheels is 6 % or more (vehicle speed: 100 km/h (62 mph) or more). - Continuous ABS control for 60 sec. or more. - Interference on 1 or more wheels for 20 sec. with the brake pedal depressed, or for 5 sec. when the brake pedal is not depressed.	•Tire size •Speed sensor rotor

INSPECTION PROCEDURE

1	Check tire size.

NG

Replace tires so that all 4 tires are the same in size.

OK

2	Check sensor rotor (See page DI-267).

NG

Replace speed sensor rotor.

OK

3	Check speed sensor (See page DI-267).

NG

Replace speed sensor.

OK

4	Check for open and short circuit in harness and connector between front speed sensor, rear speed sensor and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness and connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

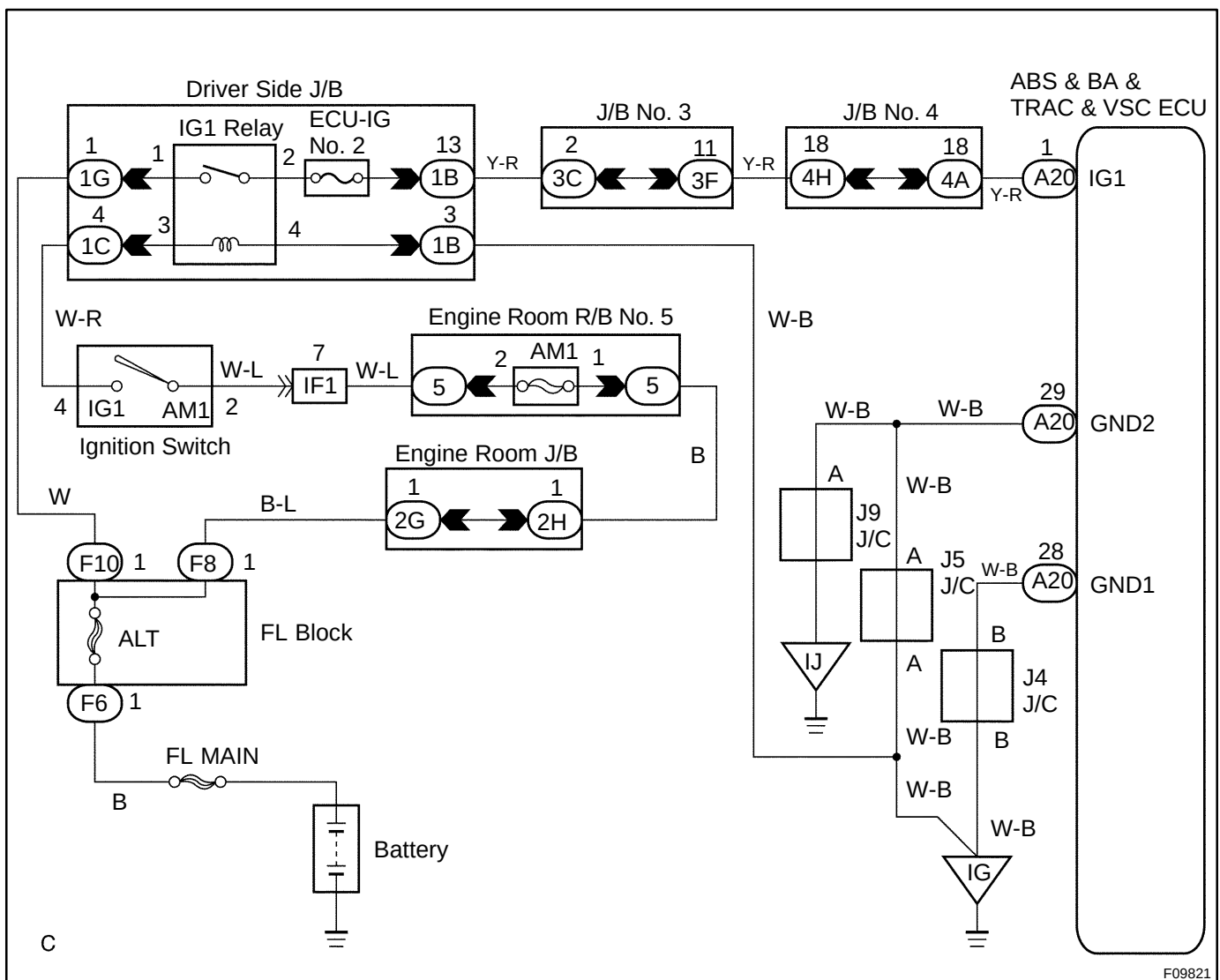
DTC	C1241 / 41	IG Power Source Circuit

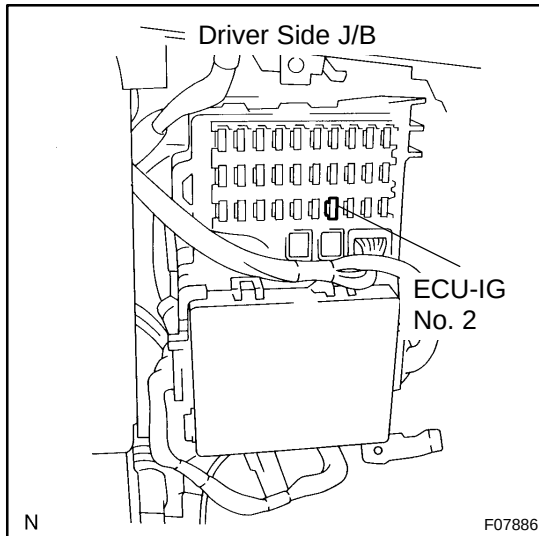
CIRCUIT DESCRIPTION

This is the power source for the ECU, hence the brake actuators.

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	At a vehicle speed of 6 km/h (4 mph) or more, the condition that low battery voltage is 9.8 V or less (during non-operation of ABS control) or 9.4 V or less (during operation of ABS control) and high battery voltage is more than 17.4 V, continues for 0.5 sec. or more.	•Battery •Charging system •Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE**1 Check ECU-IG No. 2 fuse.****PREPARATION:**

Remove the ECU-IG No. 2 fuse from the driver side J/B.

CHECK:

Check continuity of the ECU-IG No. 2 fuse.

OK:

Continuity

NG

Check for short circuit in all the harness and components connected to ECU-IG No. 2 fuse (See attached wiring diagram).

OK

2 Check battery positive voltage.**OK:**

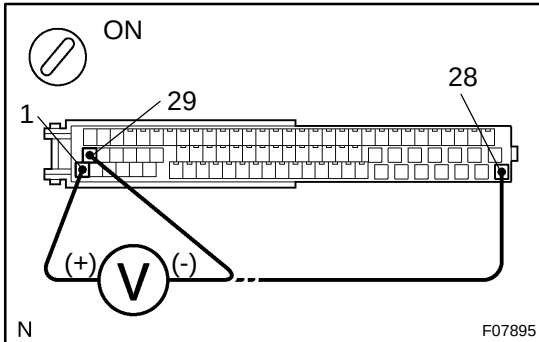
Voltage: 10 - 14 V

NG

Check and repair the charging system (See page [CH-1](#)).

OK

3 Check voltage between terminals IG1 (1) and GND (28, 29) of ABS & BA & TRAC & VSC ECU.



PREPARATION:

Disconnect the connector from the ABS & BA & TRAC & VSC ECU.

CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals 1 and 28, 29 of ABS & BA & TRAC & VSC ECU harness side connector.

OK:

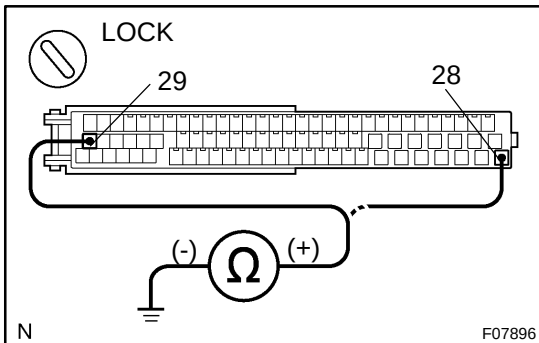
Voltage: 10 - 14 V

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

4 Check continuity between terminals GND (28, 29) of ABS & BA & TRAC & VSC ECU and body ground.



CHECK:

Measure the resistance between terminal 28, 29 of ABS & BA & TRAC & VSC ECU harness side connector and body ground.

OK:

Resistance: 1 Ω or less

NG

Repair or replace harness or connector.

OK

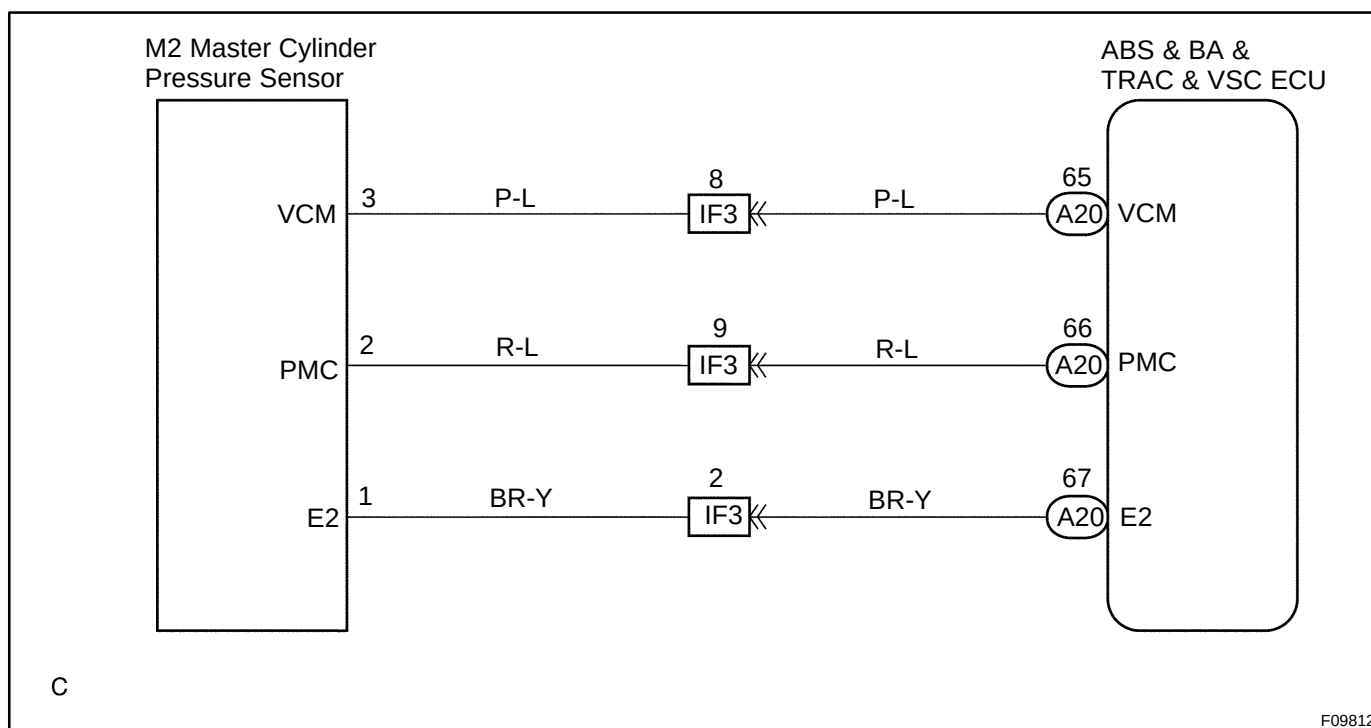
Check for open circuit in harness and connector between ABS & BA & TRAC & VSC ECU and ECU-IG fuse (See page [IN-30](#)).

DTC	C1246 / 53	Master Cylinder Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 53	When any of the following 1. through 3. is detected: 1. The voltage of sensor signal is out of range (less than 0.25 V, more than 4.75 V). 2. The sensor supply voltage is out of range (above 5.6 V, below 4.4 V). 3. The sensor signal offset value is out of range.	●Master cylinder pressure sensor ●Master cylinder pressure sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1, in case of using the TOYOTA hand-held tester and start from step 2, in case of not using the TOYOTA hand-held tester.

1 Check output value of the master cylinder pressure sensor.

PREPARATION:

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

CHECK:

Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the TOYOTA hand-held tester is changing when depressing the brake pedal.

OK:

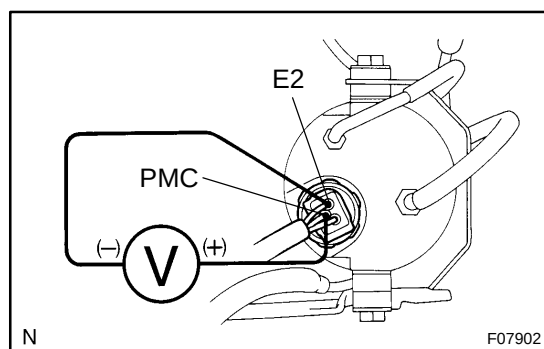
Brake fluid pressure value must be changing.

OK

Go to step 4.

NG

2 Check master cylinder pressure sensor.



PREPARATION:

Install LSPV gauge to the front caliper bleeder plug portion, and bleed the air from LSPV gauge.

SST 09709-29018

CHECK:

Start the engine and depress the brake pedal, then check the relation between the fluid pressure and voltage of PMC and E2 terminals of the master cylinder pressure sensor with connector still connected.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kg/cm ² , 0 psi)	0.44 - 0.76 V
5,883 kPa (60 kg/cm ² , 853 psi)	1.34 - 1.66 V
11,768 kPa (120 kg/cm ² , 1,706 psi)	2.24 - 2.56 V

HINT:

Voltage between terminals VCM and E2: 4.7 - 5.3 V

NG

Replace master cylinder pressure sensor.

OK

3	Check for open and short circuit in harness and connector between master cylinder pressure sensor and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

4	Check whether or not the ECU terminal STP input voltage is changed when the stop light switch is turned on and off.

NO

Check the stop light switch circuit (See page [BE-36](#)).

YES

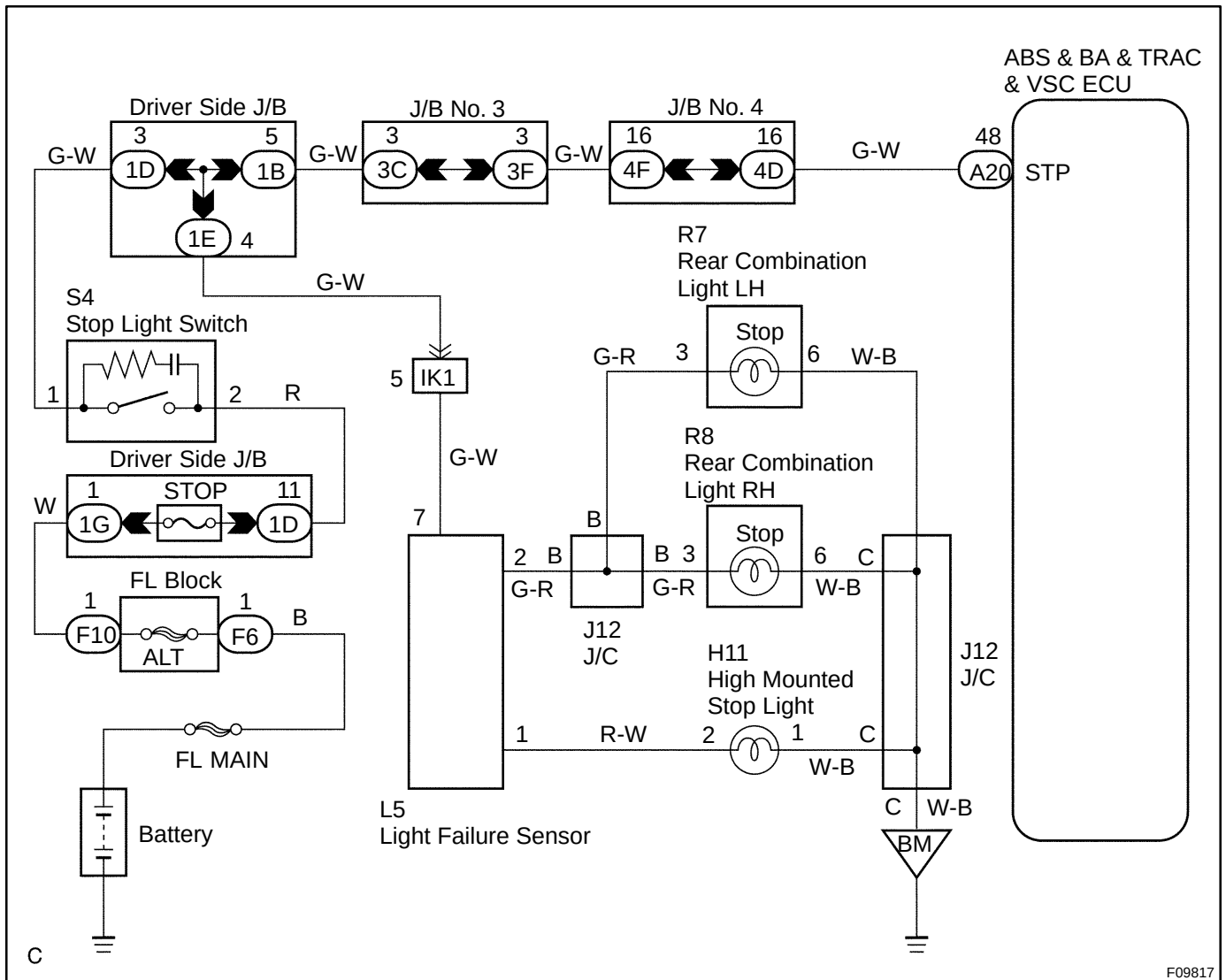
Check and replace ABS & BA & TRAC & VSC ECU.

DTC	C1249 / 58	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 58	After the ignition switch is turned ON, the condition that the STP terminal voltage of ECU is 55 % to 75 % of supplied voltage, continues for 1 sec. or more.	• Stop light switch • Stop light switch circuit

WIRING DIAGRAM



F09817

INSPECTION PROCEDURE

1 Check operation of stop light.

CHECK:

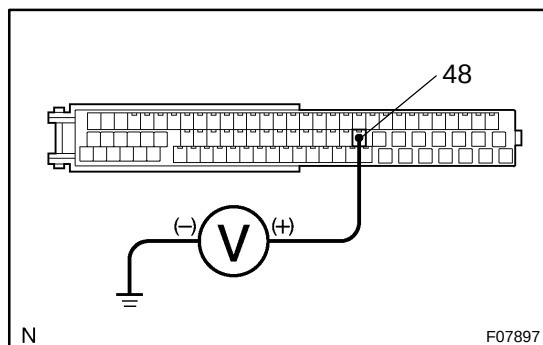
Check that the stop light lights up when the brake pedal is depressed and turns off when the brake pedal is released.

NG

Repair stop light circuit (See page [BE-36](#)).

OK

2 Check voltage between terminal STP (48) of ABS & BA & TRAC & VSC ECU and body ground.

**PREPARATION:**

Disconnect the connector from the ABS & BA & TRAC & VSC ECU.

CHECK:

Measure the voltage between terminal 48 of ABS & BA & TRAC & VSC ECU harness side connector and body ground when the brake pedal is depressed.

OK:

Voltage: 7.5 - 14 V

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

3 Check for open circuit in harness and connector between terminal STP of ABS & BA & TRAC & VSC ECU and stop light switch (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page [DI-266](#)).

DTC	C1300 / 62	ABS & BA & TRAC & VSC ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1300 / 62	ABS & BA & TRAC & VSC ECU internal malfunction is detected.	●ABS & BA & TRAC & VSC ECU

INSPECTION PROCEDURE

1	Check the DTC for the ABS and VSC (See page DI-252).

***1**

Repair ABS and VSC control system according to the code output.

***2**

Check if ECU is connected to malfunction indicator light.

*1: Output NG code

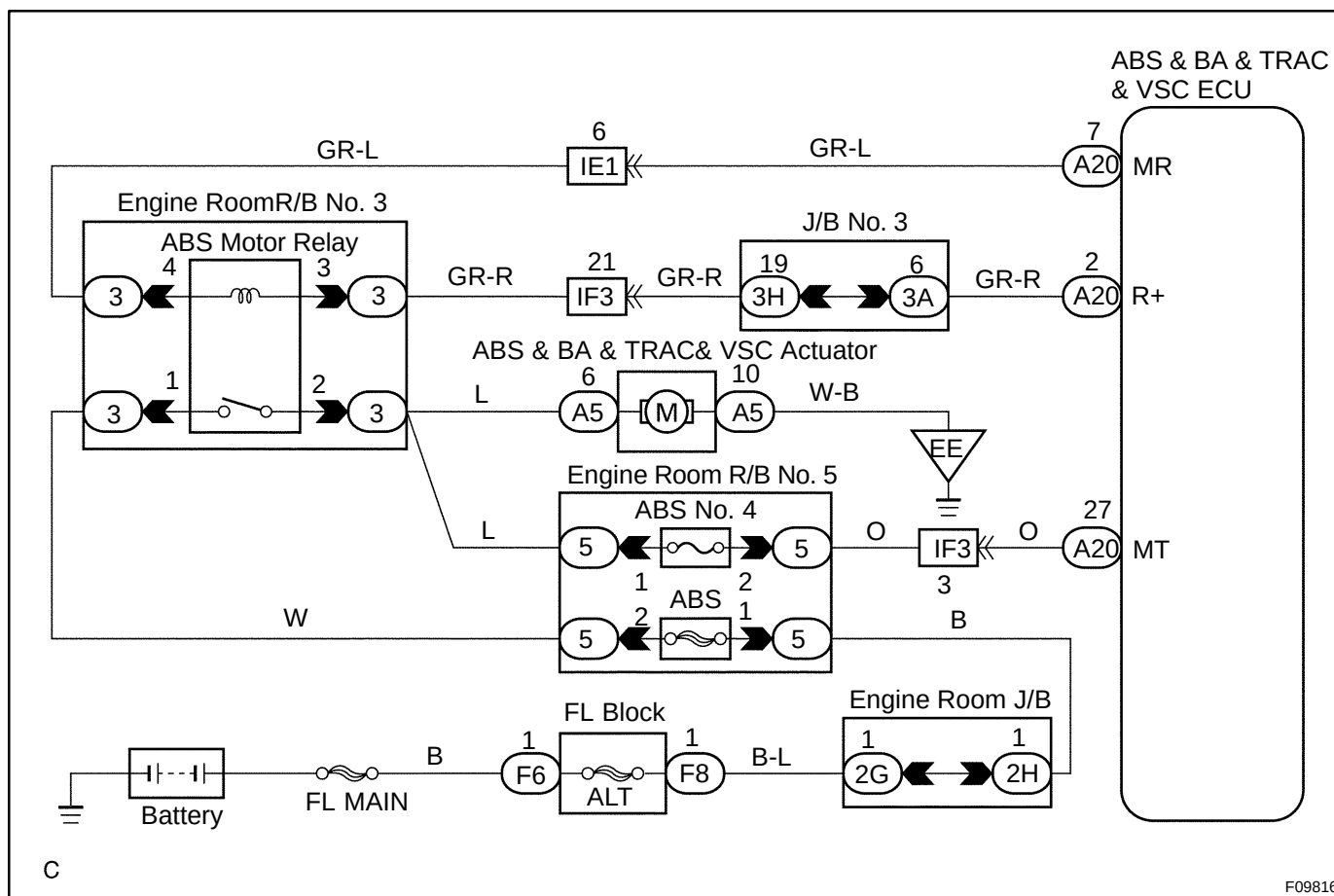
*2: Malfunction indicator light remains ON

DTC	C1350 / 51	Brake Actuator Pump Motor Failure

CIRCUIT DESCRIPTION

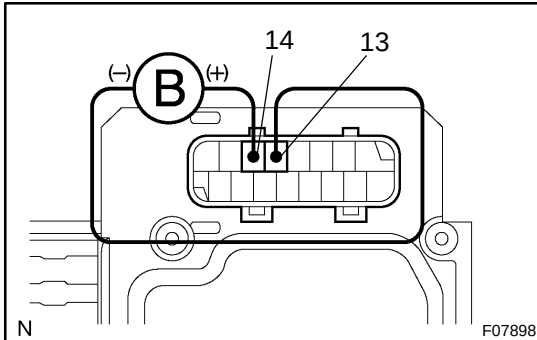
DTC No.	DTC Detecting Condition	Trouble Area
C1350 / 51	When any of the following 1. through 3. is detected. 1. No motor voltage supply after actuator of the motor relay. 2. A high level of motor voltage with no actuator of the motor relay. 3. The pump motor voltage is high level for a certain time after the motor relay has elapsed.	● Brake actuator pump motor ● Brake actuator pump motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of brake actuator pump motor.

**PREPARATION:**

Disconnect the connector from the brake actuator.

CHECK:

Connect positive $\leq$ lead to terminal 14 and negative $>$ lead to terminal 13 of the brake actuator connector, check that the pump motor is operated.

OK:

The running sound of the pump motor should be heard.

OK

Check for open circuit in harness and connector between ABS motor relay, brake actuator and ECU (See page [IN-30](#)).

NG

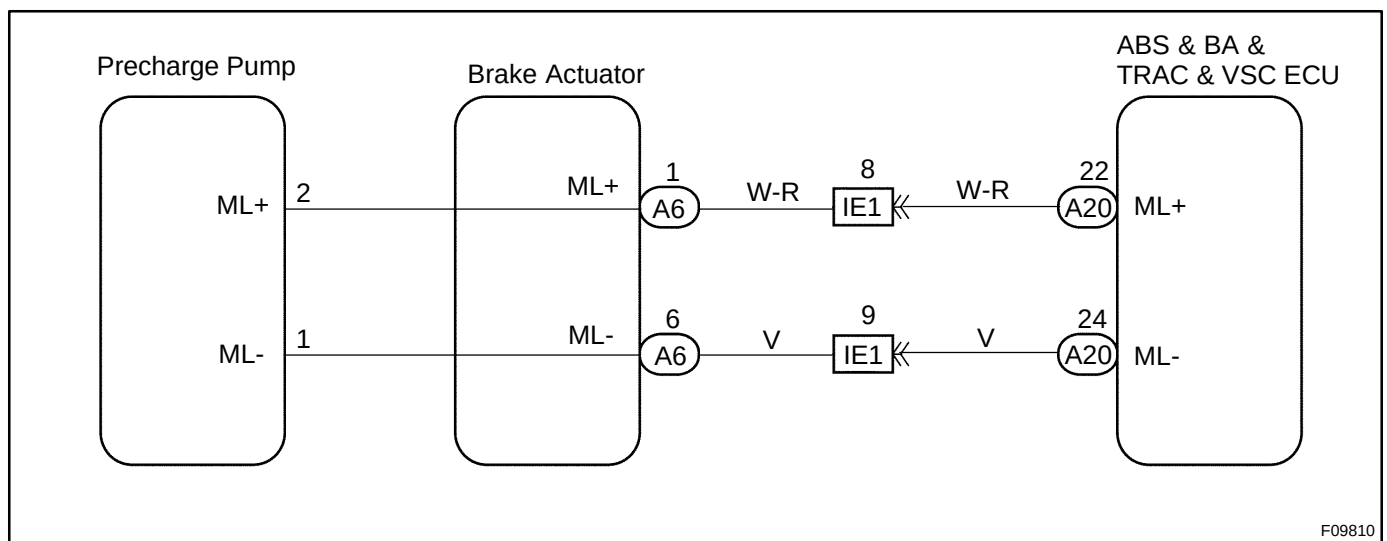
Replace brake actuator.

DTC	C1351 / 52	Precharge Pump Motor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1351 / 52	When any of the following 1. or 2. is detected: 1. After the ignition switch is turned ON, an open or short circuit continues for 0.06 sec. or more. 2. The precharge pump motor voltage is out of range when precharge pump is off.	●Precharge pump motor ●Precharge pump motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using TOYOTA hand-held tester.

1 Check precharge pump motor operation.

PREPARATION:

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

CHECK:

Check the operation sound of the precharge pump motor when operating it with the TOYOTA hand-held tester.

OK:

The operation sound of the precharge pump motor should be heard.

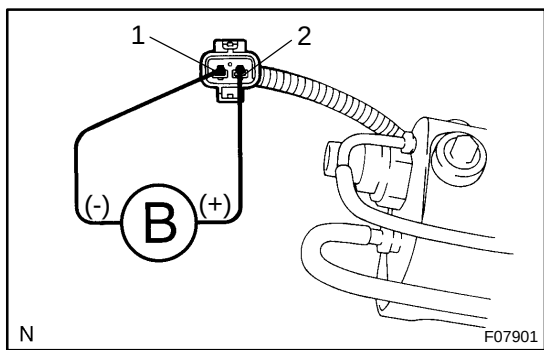
NG

Go to step 3.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

2 Check precharge pump motor operation.



PREPARATION:

Disconnect the connector from the precharge pump motor.

CHECK:

Connect ML+ (2) terminal to the battery positive (+) and ML- (1) terminal to the battery negative (-).

OK:

The operation sound of the pump motor should be heard.

NG

Check and replace precharge pump.

OK

3	Check for open and short circuit in harness and connector between precharge pump and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness and connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

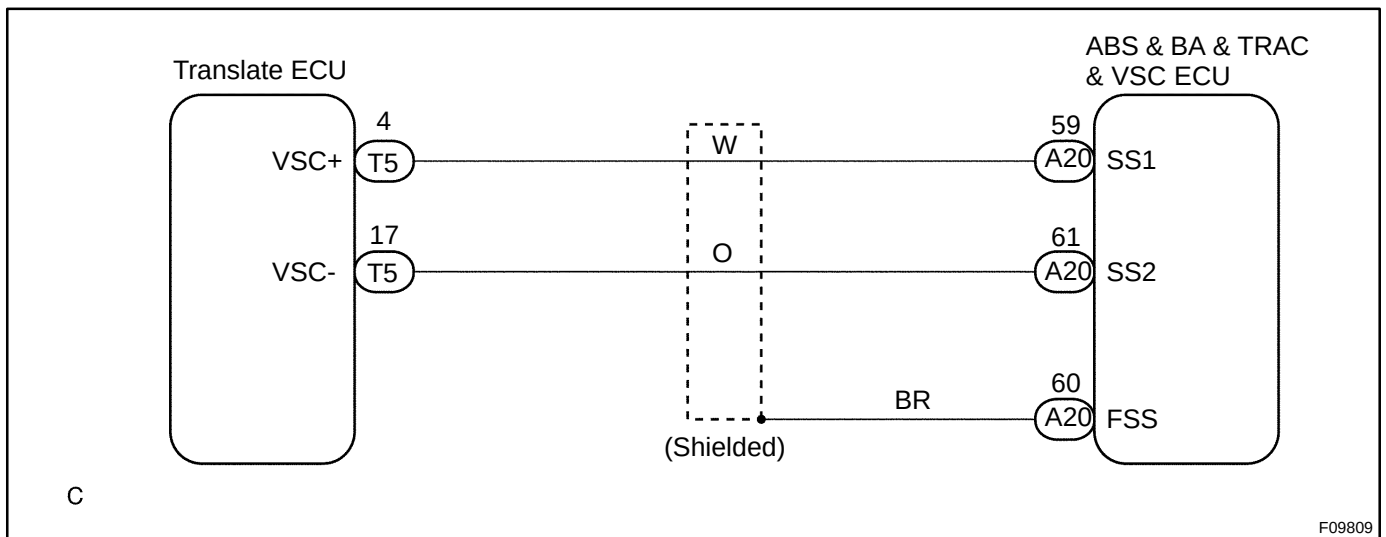
DTC	42	ECU Communication System Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRAC & VSC control information from ABS & BA & TRAC & VSC ECU to the translate ECU (VSC+, VSC-), engine control information and steering angle information from translate ECU to ABS & BA & TRAC & VSC ECU

DTC No.	DTC Detecting Condition	Trouble Area
42	IG1 voltage is 9.5 V or more, and the condition that data from ECU can not be received continues for 5 sec. or more.	•VSC+ or VSC- circuit •Translate ECU •ABS & BA & TRAC & VSC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check DTC of translate ECU.

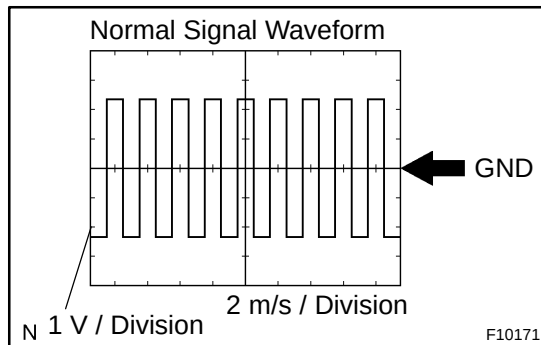
Check DTC on page [DI-252](#) .

***1**

Repair circuit indicated by the output code.

***2**

2	Check transrate ECU communication.

**REFERENCE: INSPECTION USING OSCILLOSCOPE****PREPARATION:**

- (a) Remove the translate ECU.
- (b) Connect the oscilloscope to the terminal VSC+ (4) and GND (14) of the translate ECU harness side connector.

CHECK:

Start the engine, and check the signal waveform.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

3	Check for open and short circuit in harness and connector between each of terminals VSC+ and VSC- of translate ECU and ABS & BA & TRAC & VSC ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

*1: Output NG code

*2: Output normal code

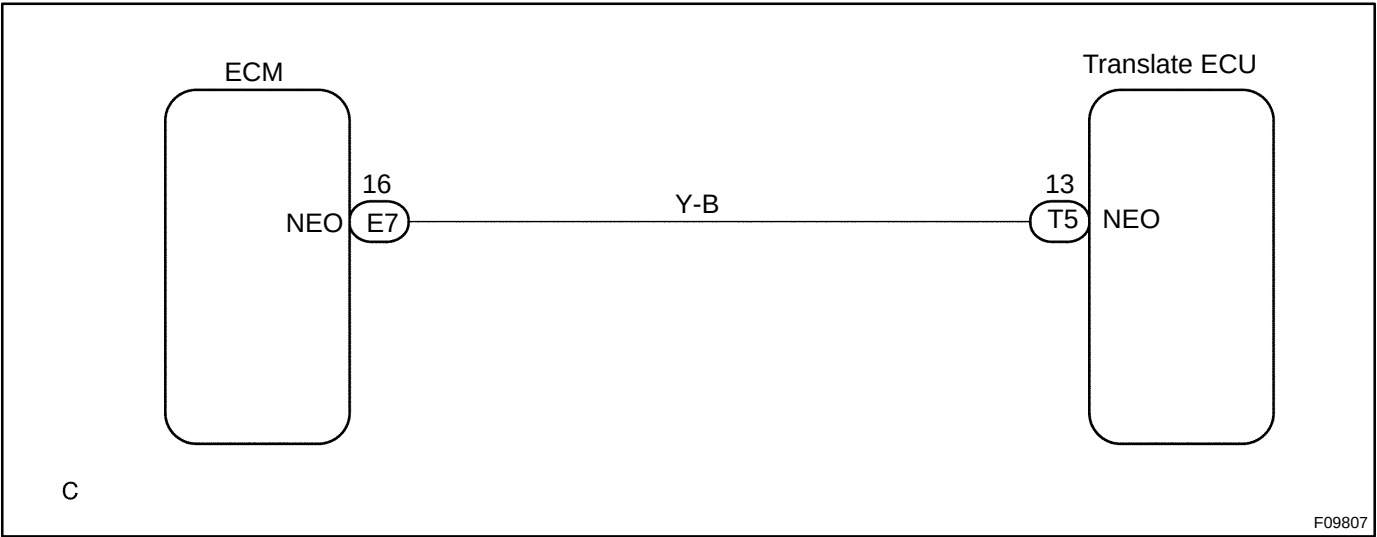
DTC	44	NEO Signal Circuit

CIRCUIT DESCRIPTION

The ABS & BA & TRAC & VSC ECU receives engine revolution speed signals (NEO signal) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
44	When either of the following 1. or 2. is detected: 1. The vehicle speed is 30 km/h (19 mph) or more, and open or short condition of the engine revolution signal under the normal communication condition with ECU continues for 10 secs. or more. 2. While cancel of cruise control is instructed from VSC ECU, open or short condition of the engine revolution signal continues for 0.24 sec. or more.	•NEO circuit •ECM •Translate ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

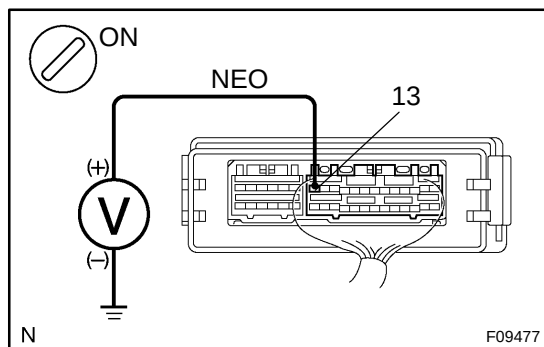
- 1 Check for open and short circuit in harness and connector between terminal NEO of translate ECU and terminal NEO of ECM (See page [IN-30](#)).

NG

Repair or replace harness and connector.

OK

- 2 Check voltage between terminal NEO (13) of translate ECU and body ground.

**PREPARATION:**

Remove the translate ECU with connectors still connected.

CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminal 13 of the translate ECU and body ground under the engine conditions below.

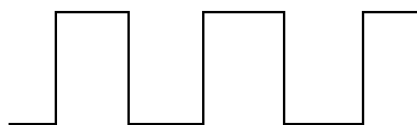
OK:

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 ECM.

OK

Check and replace transrate ECU.

If the same code is still output after the DTC is deleted, check the contact condition of each connection.

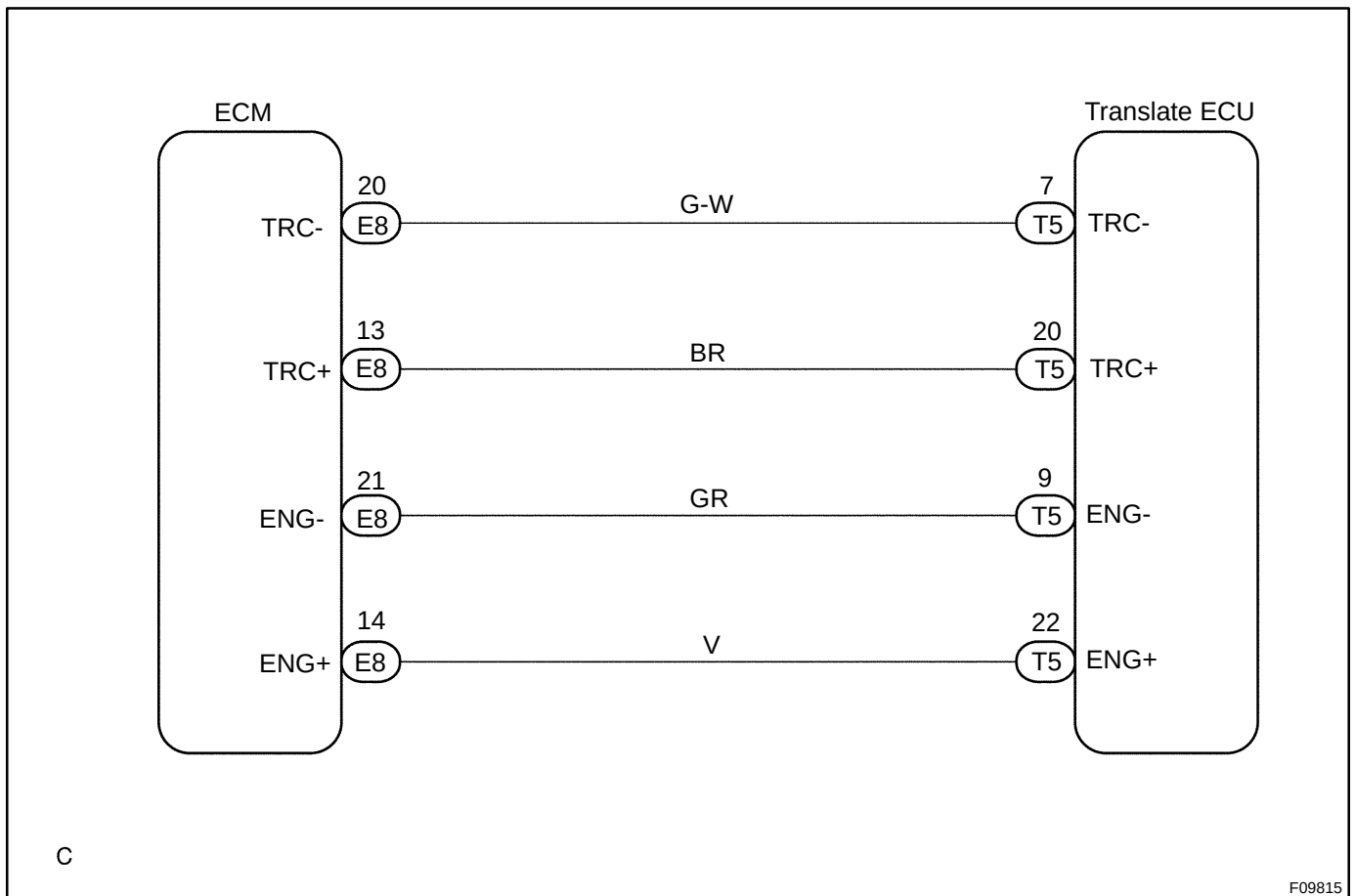
DTC	53	ECM Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRAC & VSC control information from the translate ECU to the ECM (TRC+, TRC-), and engine control information from the ECM to the translate ECU (ENG+, ENG-).

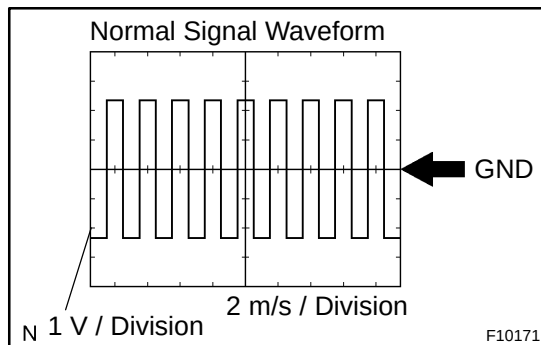
DTC No.	DTC Detecting Condition	Trouble Area
53	When any of the following 1. through 3. is detected : 1. IG1 voltage is 8.5 V or more, and the condition that data can not be sent to ECM continues for 5 sec. or more. 2. IG1 voltage is 8.5 V or more, engine speed is 500 r.p.m or more, and the condition that data can not be received from ECM continues for 5 sec. or more. 3. The condition that data can not be transmitted between the translate ECU and ECM occurs at least once within 5 sec. continues 10 consecutive times.	•TRC+ or TRC- circuit •ENG+ or ENG- circuit •ECM •Translate ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check translate ECU communication.

**REFERENCE: INSPECTION USING OSCILLOSCOPE****PREPARATION:**

- (a) Remove the translate ECU.
- (b) Connect the oscilloscope to each of the terminals ENG+ or TRC+ and GND of the translate ECU harness side connector.

CHECK:

Start the engine, and check the signal waveform.

OK

Check and replace translate ECU.

NG

2 Check for open and short circuit in harness and connector between each of terminals ENG+, ENG-, TRC+ and TRC- of translate ECU and ECM (See page [IN-30](#)).

NG

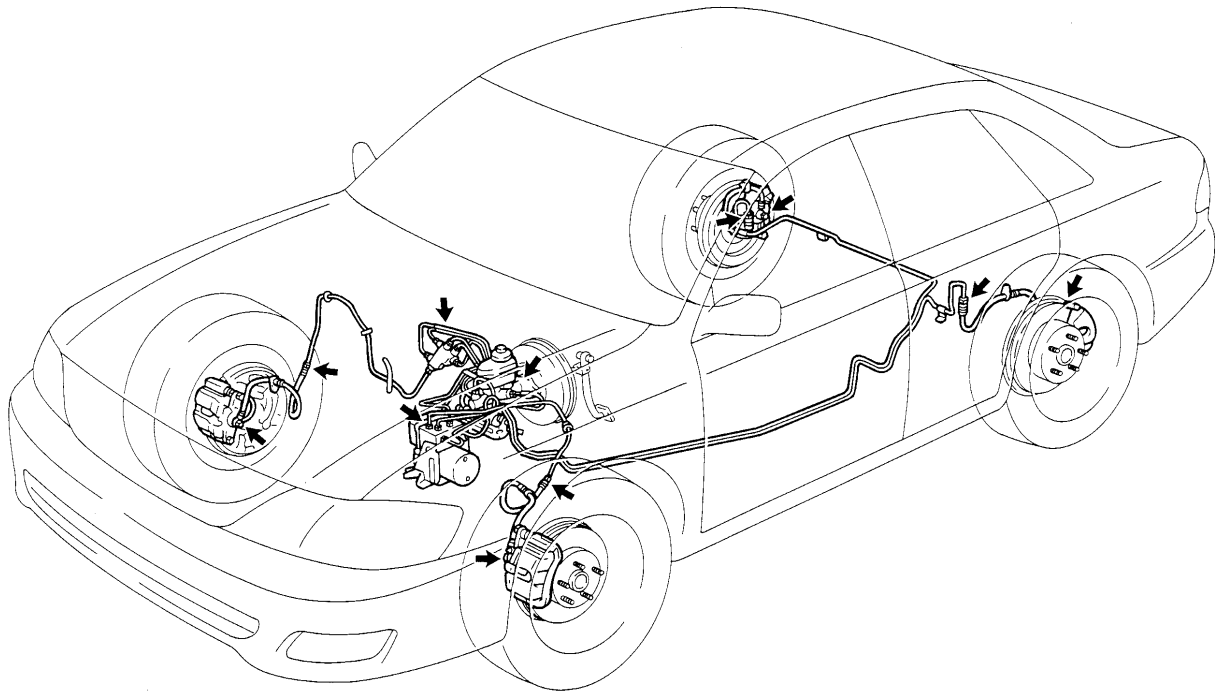
Repair or replace harness or connector.

OK

Check and replace ECM.

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



N

F07889

DTC	Non Code	Translate ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Non Code	Translate ECU internal malfunction is detected.	•Tc terminal circuit •Brake warning light circuit •Translate ECU

INSPECTION PROCEDURE

1	Check the BRAKE warning light circuit (See page DI-330).

NG

Repair or replace the BRAKE warning light circuit.

OK

2	Check the Tc terminal circuit (See page DI-342).

NG

Repair or replace the Tc terminal circuit.

OK

Check and replace Translate ECU.

DTC	Normal Code	Malfunction in ECM

CIRCUIT DESCRIPTION

If any trouble occurs in the ECM control system, the ECU prohibits ABS & VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
Normal Code	Conditions 1., 2., 3, or 4, continue for 5 sec. or more: 1. Engine malfunction signal is sent from ECM. 2. Shift malfunction signal is sent from ECM 3. The shift position is other than P and N range input voltage is 8 V or more. 4. The shift position is PN or rev and D range input voltage is 8 V or more.	•ECM circuit •ECM •Brake fluid level •Brake fluid level warning switch circuit •Steering angle sensor •ABS & BA & TRAC & VSC ECU

INSPECTION PROCEDURE

1	Is DTC out put for ECM?

Check DTC on page [DI-3](#).

YES

Repair engine control system according to the output code.

NO

2	Check the DTC for the ABS and VSC (See page DI-252).

*1

Repair ABS and VSC control system according to the code output.

*2

Check and replace translate ECU.

*1: Output NG code except for DTC of VSC system C1301/42

*2: Output NG code DTC of VSC system C1301/42 only

CIRCUIT DESCRIPTION

The SLIP indicator light blinks during TRAC & VSC operation.

Wiring diagram for the 2000 Nissan Xterra 2.5L engine, showing the power distribution from the battery to various components.

Legend:

- W: White
- W-L: White with Blue
- B-L: Blue with Black
- W-B: White with Black
- R-B: Red with Black

Components and Connections:

- Battery:** Connected to the **FL MAIN** fuse.
- FL MAIN:** Connected to the **FL Block**.
- FL Block:** Contains the **ALT** (Alternator) and is connected to fuses **F6**, **F8**, and **F10**.
- Fuses:**
 - F6:** 1A, connected to the **ALT**.
 - F8:** 1A, connected to the **ALT**.
 - F10:** 1A, connected to the **ALT**.
- Engine Room J/B:** Contains fuses **2G** and **2H**, connected to the **FL Block**.
- Engine Room R/B No. 5:** Contains fuse **5**, connected to the **Engine Room J/B**.
- Driver Side J/B:** Contains fuses **1D**, **1B**, **1G**, and **1C**, connected to the **Engine Room R/B No. 5**.
- Ignition Switch:** Contains the **IG1** (Ignition) and **AM1** (Accessory) terminals, connected to the **Driver Side J/B**.
- Multi Display:** Contains the **SLIP** (Slip) terminal, connected to the **Driver Side J/B**.
- J/B No. 4:** Contains fuses **4D** and **4F**, connected to the **Multi Display**.
- ABS & BA & TRAC & VSC ECU:** Connected to the **J/B No. 4** and the **Multi Display**.

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1, in case of using the TOYOTA hand-held tester and start from step 2, in case of not using the TOYOTA hand-held tester.

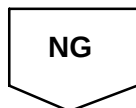
1	Check operation of the SLIP indicator light.

PREPARATION:

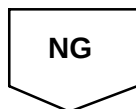
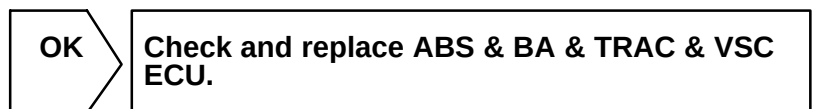
- (a) Connect the TOYOTA hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check that "ON" and "OFF" of the SLIP indicator light can be shown on the combination meter with the TOYOTA hand-held tester.



2	Check that the SLIP indicator light is ON for 3 seconds immediately after ignition switch is turned ON.

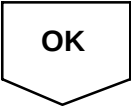
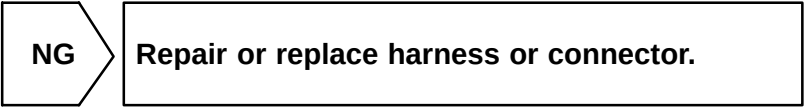


3	Check SLIP indicator light.

See combination meter troubleshooting on page [BE-2](#) .



4	Check for open and short circuit in harness and connector between ABS & BA TRAC & VSC ECU and SLIP indicator light (See page IN-30).



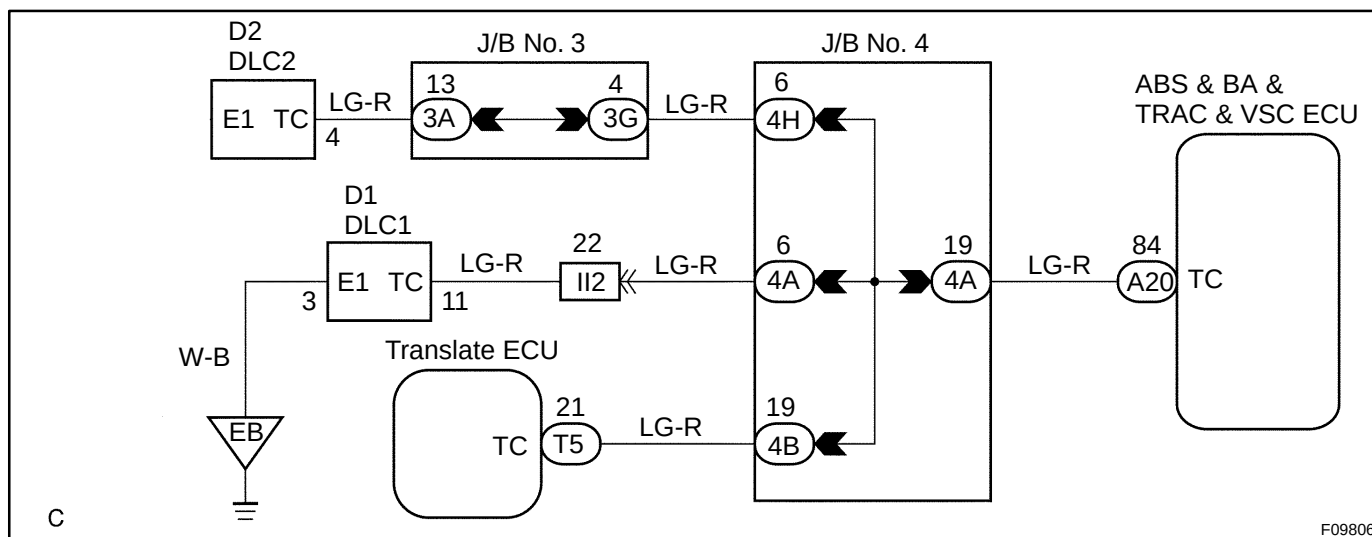
Check and replace ABS & BA & TRAC & VSC ECU.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

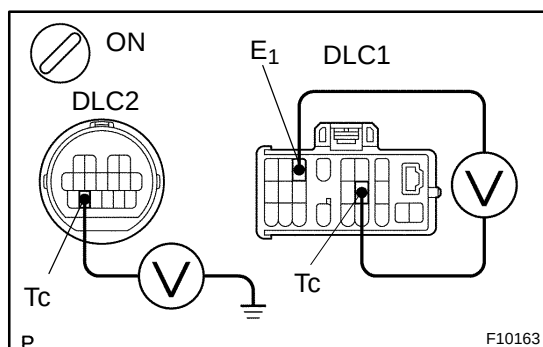
Connecting between terminals Tc and E₁ of the DLC1 or the DLC2 causes the ECU to display DTC by blinking the ABS warning light, VSC warning light and BRAKE warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals Tc and E₁.



CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals Tc and E₁ of or DLC1 or terminal Tc of DLC2 and body ground.

OK:

Voltage: 10 - 14 V

OK

If each warning light does not blink even after Tc and E₁ are connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and DLC2 or DLC1, DLC2 or DLC1 and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

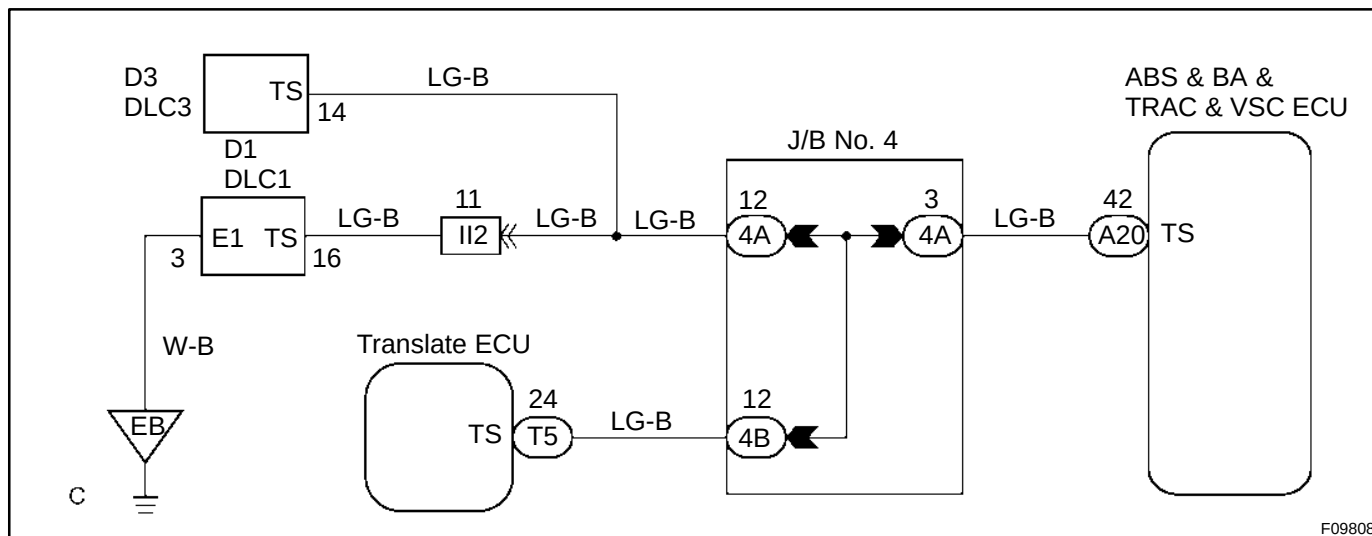
Ts Terminal Circuit

CIRCUIT DESCRIPTION

The sensor check circuit detects abnormality in the speed sensor signal which cannot be detected with the DTC check.

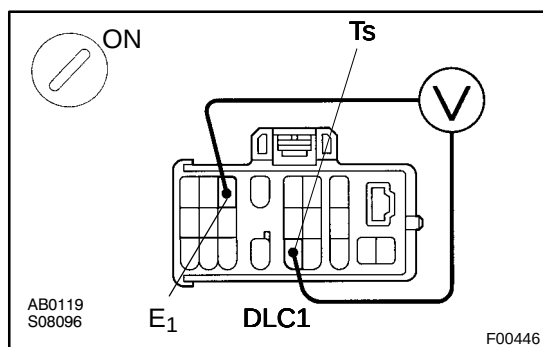
Connecting terminals Ts and E₁ of the DLC1 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals Ts and E₁ of DLC1.



CHECK:

- Turn the ignition switch ON.
- Measure the voltage between terminals Ts and E₁ of DLC1.

OK:

Voltage: 10 - 14 V

OK

If ABS warning light does not blink even after Ts and E₁ are connected, the ECU may be defective.

NG

NG	Repair or replace harness or connector.

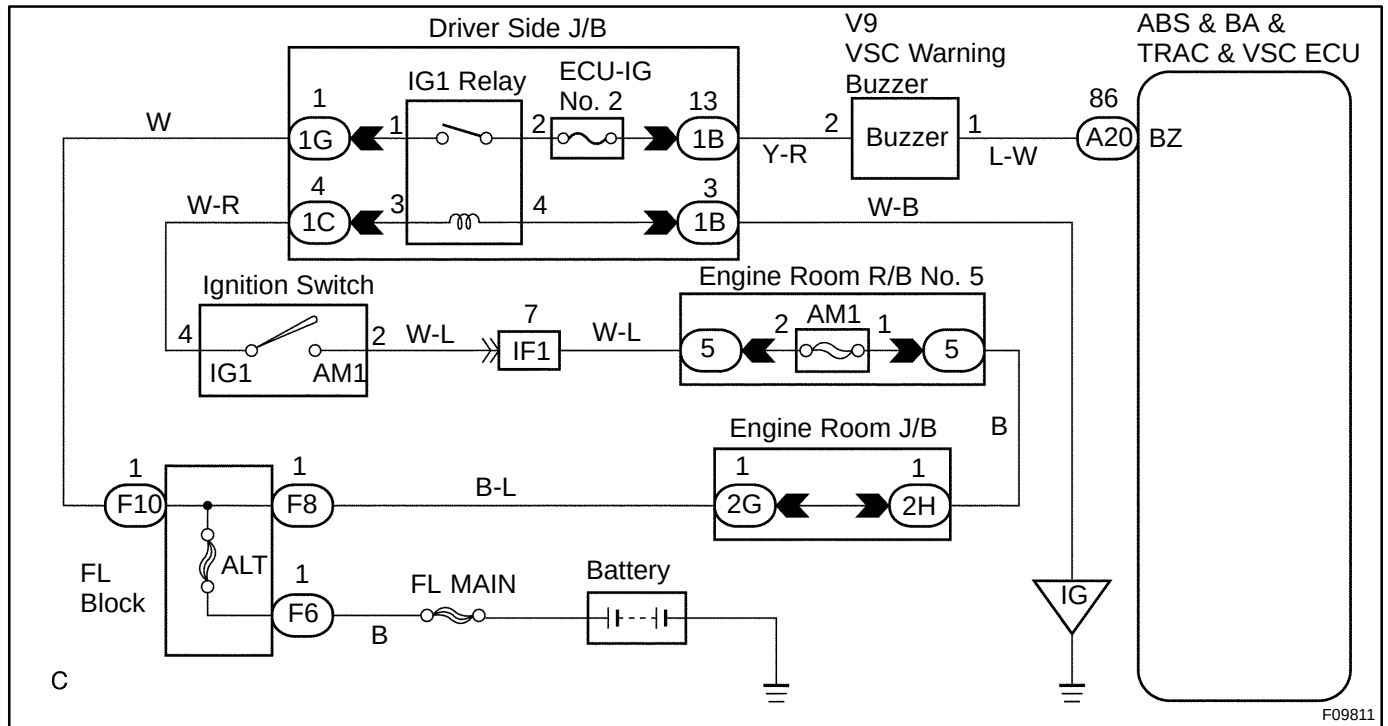
Check and replace ABS & BA & TRAC & VSC ECU.

VSC Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC buzzer sounds during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 3 in case of not using the TOYOTA hand-held tester.

1	Check operation of the VSC buzzer.

PREPARATION:

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

CHECK:

Check "ON-OFF" function of the VSC buzzer with the TOYOTA hand-held tester.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

2 Check voltage between terminal 1 of VSC buzzer and body ground.**PREPARATION:**

Disconnect the connector from VSC buzzer.

CHECK:

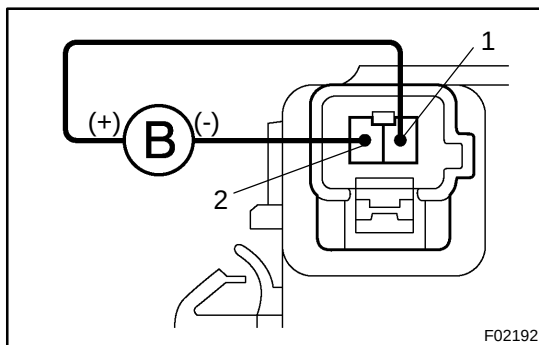
- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminal (1) of VSC buzzer and body ground.

OK:

Voltage: 10 - 14 V

NG

Repair or replace harness or connector from voltage supply to VSC buzzer.

OK**3 Check VSC buzzer.****PREPARATION:**

Disconnect the VSC buzzer connector.

CHECK:

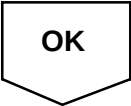
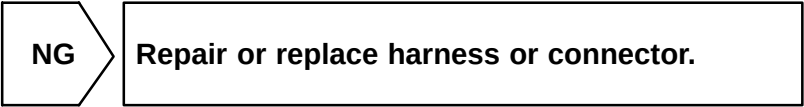
Apply battery positive voltage to the terminals 1 and 2 of VSC buzzer connector, and check that the VSC buzzer sounds.

NG

Replace VSC buzzer.

OK

4	Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and VSC buzzer (See page IN-30).



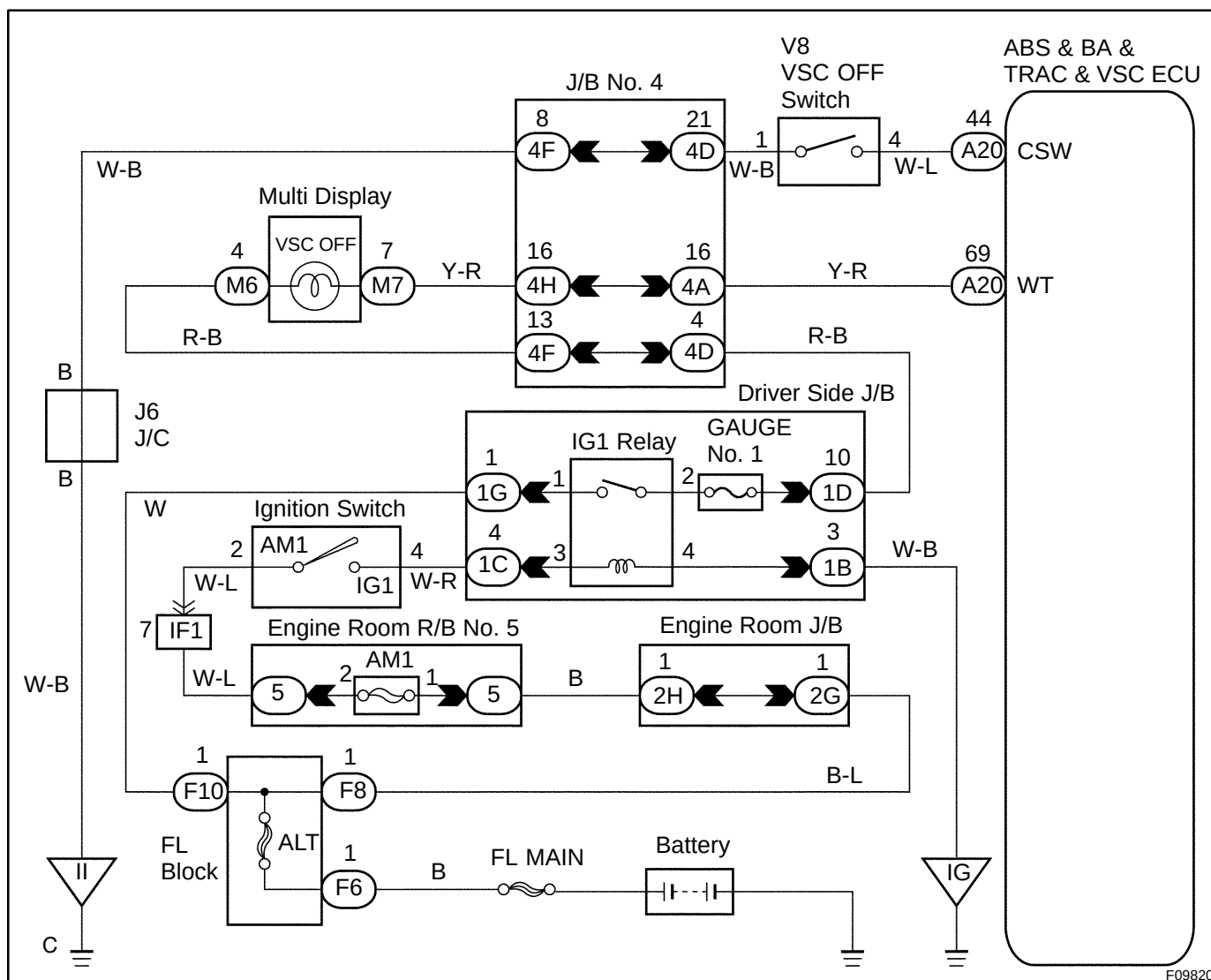
Check and replace ABS & BA & TRAC & VSC ECU.

VSC OFF Indicator Light, VSC OFF Switch Circuit

CIRCUIT DESCRIPTION

This is the TRAC & VSC control main switch. When the VSC OFF switch is pressed, TRAC & VSC control is deactivated and the VSC OFF indicator light lights up. By turning off the ignition switch, TRAC & VSC control is surely activated when the ignition switch turns ON next time. Also, the VSC OFF indicator light turns "ON" when the ECU prohibit TRAC & VSC controls.

WIRING DIAGRAM



F09820

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1 Check operation of the VSC OFF indicator light.

PREPARATION:

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

CHECK:

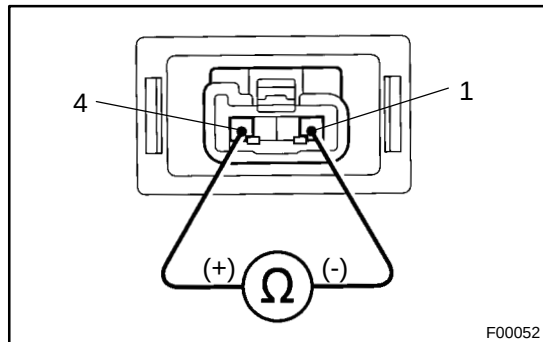
Check that "ON" and "OFF" of the VSC OFF indicator light can be shown on the combination meter with the TOYOTA hand-held tester.

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
Pressed	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-30).

NG

Repair or replace harness or connector.

OK

4	Check VSC OFF indicator light.

See combination meter troubleshooting on page [BE-2](#).

NG

Repair or replace combination meter.

OK

5	Check for open and short circuit in harness and connector between terminal WT of ABS & BA & TRAC & VSC ECU and VSC OFF indicator light (See page IN-30).

NG

Repair or replace harness or connector.

OK

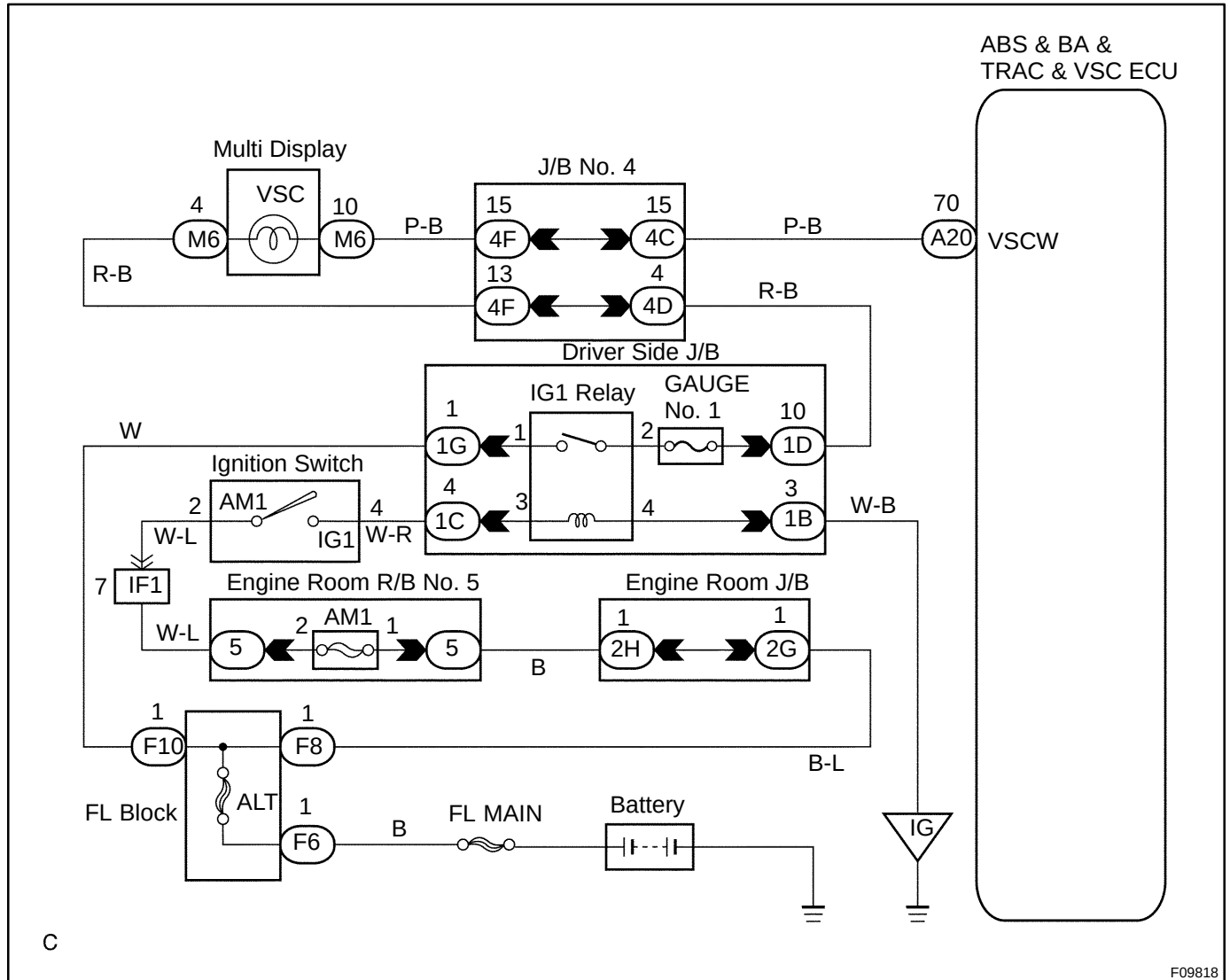
Check and replace ABS & BA & TRAC & VSC ECU.

VSC Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU stores DTC to be necessary to shut down VSC operation, the VSC warning light lights on the combination meter.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the TOYOTA hand-held tester and start from step 2 in case of not using the TOYOTA hand-held tester.

1	Check operation of the VSC warning light.

PREPARATION:

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

CHECK:

Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter with the TOYOTA hand-held tester.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

NG

2	Is DTC output?

YES

Repair circuit indicated by the output code.

NO

3	Check for open and short circuit in harness and connector between ABS & BA & TRAC & VSC ECU and VSC warning light (See page IN-30).

NG

Repair or replace harness or connector.

OK

4	Check VSC warning light.

See the combination meter troubleshooting on page [BE-2](#) .

NG

Repair or replace combination meter.

OK

Check and replace ABS & BA & TRAC & VSC ECU.

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & BA & VSC Check Sheet

 Inspector's
Name : _____

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

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

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ TRAC does not operate.	
	☐ VSC does not operate. (Wheels spin when starting rapidly.)	
	☐ BA does not operate.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC OFF Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	Malfunction Indicator Light	☐ Normal ☐ Does not Light Up

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

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

- When removing the part, turn the ignition switch OFF.
- When replacing the steering angle sensor or ECU, make sure to perform steering angle sensor zero point calibration.

HINT:

- Using SST 09843-18020, connect the terminals Tc and E₁.
- If any abnormality is not found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit corresponding the code. For details of each code, refer to the page under respective "DTC No." in the DTC chart.

DTC chart of ABS system:

DTC No. (See Page)	Detection Item	Trouble Area
C0278 / 11 (DI-280)	Open or short circuit in ABS solenoid relay circuit	●ABS solenoid relay ●ABS solenoid relay circuit
C0273 / 13 (DI-276)	Open or short circuit in ABS motor relay circuit	●ABS motor relay ●ABS motor relay circuit
C0226 / 21 (DI-273)	Open or short circuit in brake actuator	●Brake actuator ●SFRR or SFRH circuit
C0236 / 22 (DI-273)	Open or short circuit in brake actuator	●Brake actuator ●SFLR or SFLH circuit
C0246 / 23 (DI-273)	Open or short circuit in brake actuator	●Brake actuator ●SRRR or SRRH circuit
C0256 / 24 (DI-273)	Open or short circuit in brake actuator	●Brake actuator ●SRLR or SRLH circuit
C0200 / 31* (DI-267)	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
C0205 / 32* (DI-267)	Left front wheel speed sensor signal malfunction	
C0210 / 33* (DI-267)	Right rear wheel speed sensor signal malfunction	
C0215 / 34* (DI-267)	Left rear wheel speed sensor signal malfunction	
C1330 / 35* (DI-267)	Open circuit in right front speed sensor circuit	●Right front speed sensor ●Right front speed sensor circuit
C1331 / 36* (DI-267)	Open circuit in left front speed sensor circuit	●Left front speed sensor ●Left front speed sensor circuit
C1237 / 37 (DI-295)	Front tires are different from rear in size.	●Tire size ●Speed sensor rotor
C1332 / 38* (DI-267)	Open circuit in right rear speed sensor circuit	●Right rear speed sensor ●Right rear speed sensor circuit
C1333 / 39* (DI-267)	Open circuit in left rear speed sensor circuit	●Left rear speed sensor ●Left rear speed sensor circuit
C1241 / 41 (DI-297)	Low battery positive voltage or abnormally high battery positive voltage	●Battery ●Charging system ●Power source circuit
C1249 / 58 (DI-303)	Open circuit in stop light switch circuit	●Stop light switch ●Stop light switch circuit

C1300 / 62 (DI-305)	Malfunction in ABS & BA & TRAC & VSC ECU	ABS & BA & TRAC & VSC ECU
Always ON (DI-319)	Malfunction in ABS & BA & TRAC & VSC ECU Open circuit in ABS warning light circuit	●Charging system ●ABS warning light circuit

*: As the DTC cannot be erased only by replacing parts, do either of the following operations.

(1) Clear DTC (See page DI-252).

(2) At a vehicle speed of 20 km/h (12 mph), drive the vehicle for 30 sec. or more.

DTC chart of VSC system:

DTC No. (See Page)	Detection Item	Trouble Area
C1225 / 25 (DI-273)	Open or short circuit in brake actuator solenoid circuit (SMC1 circuit)	●Brake actuator ●SMC1 circuit
C1226 / 26 (DI-273)	Open or short circuit in brake actuator solenoid circuit (SMC2 circuit)	●Brake actuator ●SMC2 circuit
C1227 / 27 (DI-273)	Open or short circuit in brake actuator solenoid circuit (SRC1 circuit)	●Brake actuator ●SRC1 circuit
C1228 / 28 (DI-273)	Open or short circuit in brake actuator solenoid circuit (SRC2 circuit)	●Brake actuator ●SRC2 circuit
C1301 / 42*	Malfunction in communication with the translate ECU	●Brake fluid level warning switch circuit ●Translate ECU ●Translate ECU circuit ●ECM ●ECM circuit
C0365 / 43 (DI-285)	Malfunction in deceleration sensor (combined in yaw rate sensor)	●Deceleration sensor ●Deceleration sensor circuit
C1202 / 44 (DI-290)	Brake fluid level low Open circuit in brake fluid level warning switch circuit	●Brake fluid level ●Brake fluid level warning switch ●Brake fluid level warning switch circuit
C1350 / 51 (DI-306)	Pump motor is locked Open circuit in pump motor ground	●Brake actuator pump motor ●Brake actuator pump motor circuit
C1351 / 52 (DI-308)	VSC pump motor is locked Open or short circuit in VSC pump motor circuit	●Precharge pump motor ●Precharge pump motor circuit
C1246 / 53 (DI-300)	Malfunction in master cylinder pressure sensor	●Master cylinder pressure sensor ●Master cylinder pressure sensor circuit
C1208 / 54 (DI-292)	Malfunction in steering angle sensor	●Steering angle sensor ●Steering angle sensor circuit
C0371 / 55 (DI-287)	Malfunction in yaw rate sensor circuit	●Yaw rate sensor ●Yaw rate sensor circuit
Always ON (DI-322)	Malfunction in ABS & BA & TRAC & VSC ECU Open circuit in VSC warning light circuit	●Charging system ●VSC warning light circuit

*: Troubleshoot according to the DTC chart of the translate ECU.

DTC chart of translate ECU(output NG code DTC of VSC system C1301/42 only):

DTC No. (See Page)	Detection Item	Trouble Area
Normal code* (DI-317)	Malfunction in ECM control system	●ECM circuit ●ECM ●Brake fluid level ●Brake fluid level warning switch circuit ●Steering angle sensor ●ABS & BA & TRAC & VSC ECU
42 (DI-311)	Malfunction in communication with the ABS & BA & TRAC & VSC ECU	●VSC+ or VSC- circuit ●Translate ECU ●ABS & BA & TRAC & VSC ECU
44 (DI-313)	Open or short circuit in NEO circuit	●NEO circuit ●ECM ●Translate ECU
53 (DI-315)	Malfunction in communication with the ECM	●TRC+ or TRC- circuit ●ENG+ or ENG- circuit ●ECM ●Translate ECU
Non code (DI-318)	Malfunction in translate ECU	●Tc terminal circuit ●BRAKE warning light circuit ●Translate ECU

*: Translate ECU is normal.

HINT:

The BRAKE warning light does not turn on due to an error in VSC.

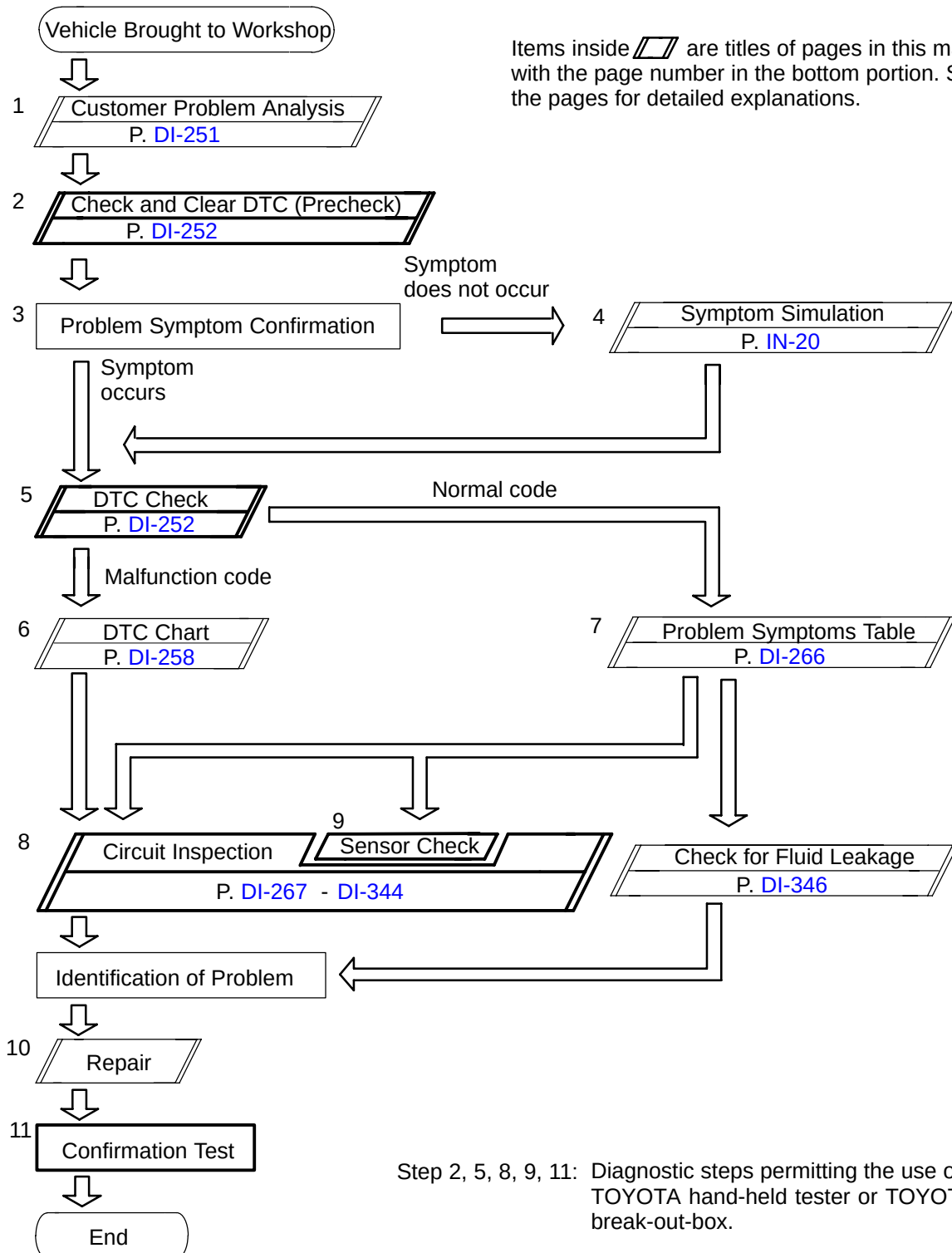
If it is on, check that the parking brake pedal is released, the brake fluid level is normal and no malfunction is identified in the fluid level warning switch system.

ABS WITH EBD & BA & TRAC & VSC SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

D16NQ-01

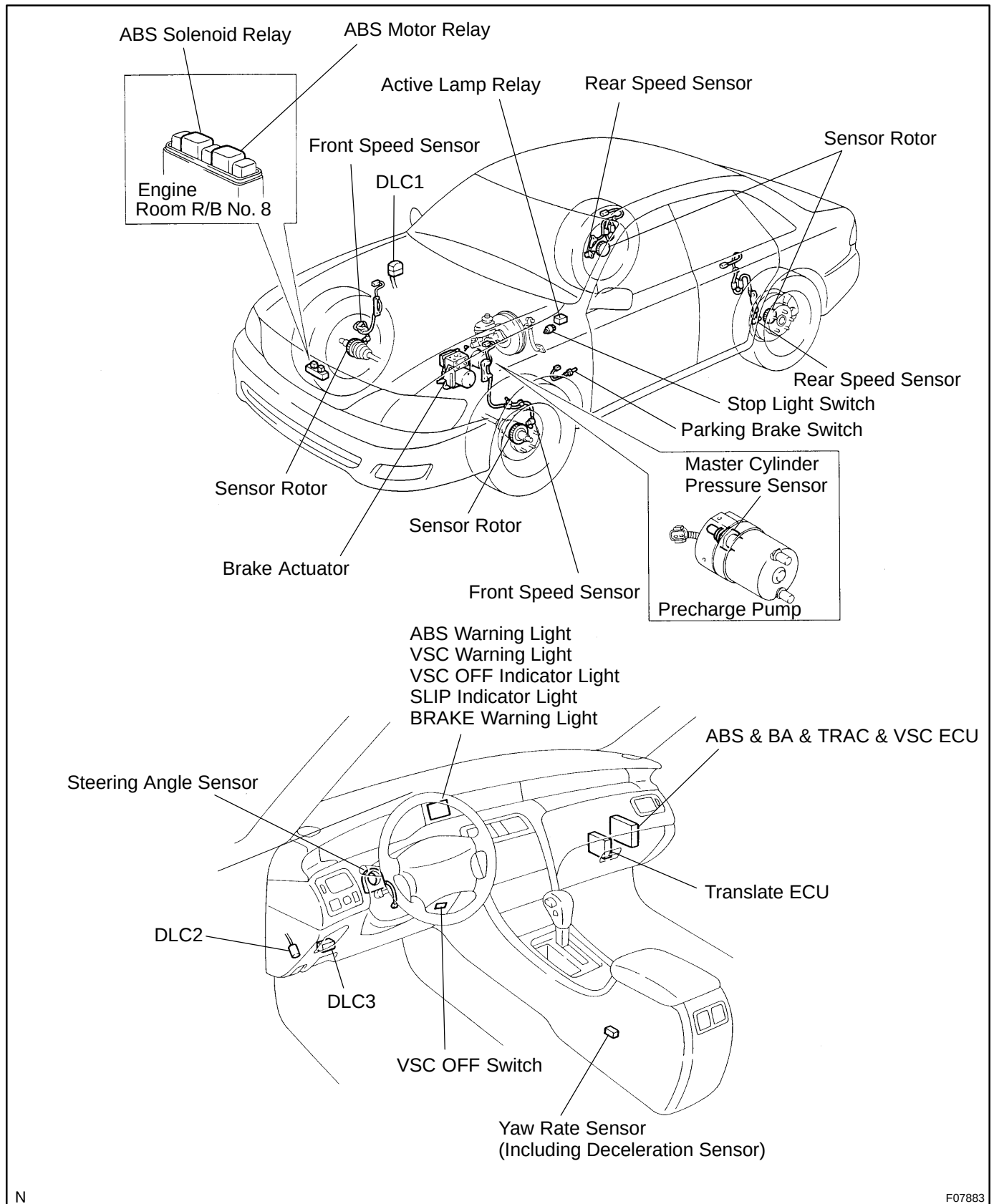
Troubleshoot in accordance with the procedure on the following pages.



Fail safe function:

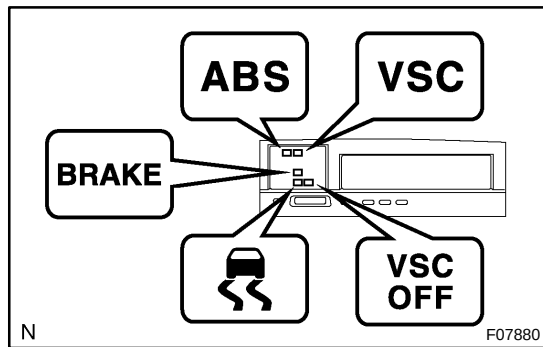
When a failure occurs in the ABS & BA & TRAC & VSC system, the respective warning light (ABS, VSC) is lit and the operation of ABS & BA & TRAC & VSC is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited.

PARTS LOCATION



N

F07883



PRE-CHECK

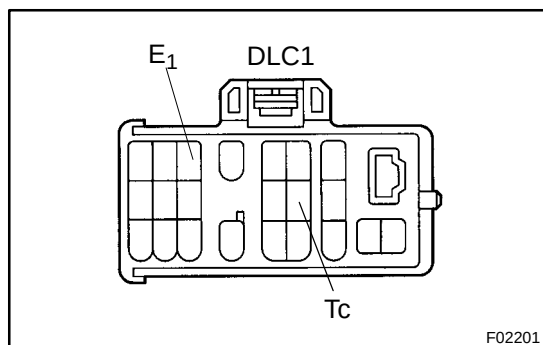
1. DIAGNOSIS SYSTEM

- (a) Check the warning lights.
- (1) Release the parking brake pedal.
 - (2) When the ignition switch is turned ON, check that the ABS warning light, VSC warning light, VSC OFF indicator light, BRAKE warning light and SLIP indicator light goes on for approx. 3 seconds.

HINT:

- When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, VSC warning light circuit, VSC OFF indicator light circuit, BRAKE warning light circuit or SLIP indicator light circuit.

Trouble Area	See page
ABS warning light circuit	DI-325
VSC warning light circuit	DI-327
VSC OFF indicator light circuit	DI-336
BRAKE warning light circuit	DI-330
SLIP indicator light circuit	DI-333

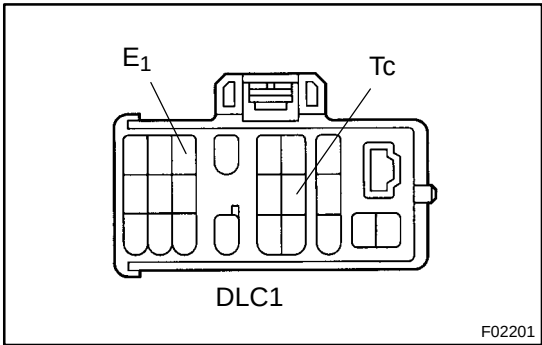
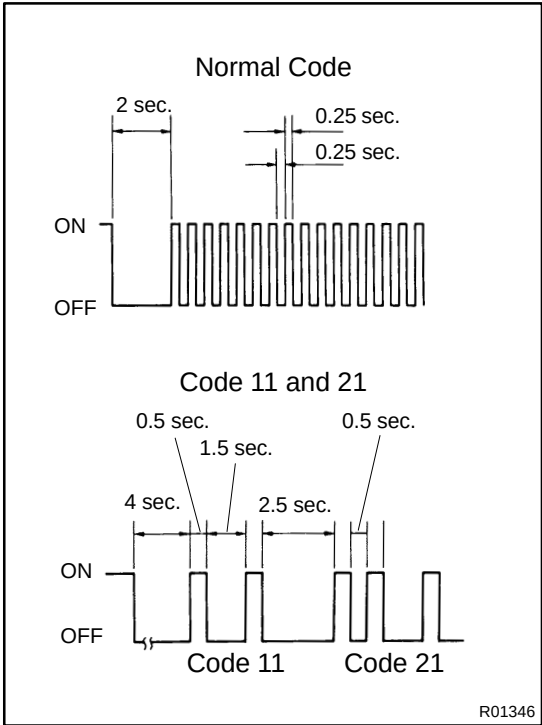


- (b) In case of not using TOYOTA hand-held tester:
Check the DTC of ABS & BA & TRAC & VSC ECU.
- (1) Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
 - (2) Turn the ignition switch ON.
 - (3) Read the DTC from the ABS warning light and VSC warning light on the combination meter.

HINT:

- If no code appears, inspect the diagnostic circuit, ABS warning light circuit or VSC warning light circuit.

Trouble Area	See page
Tc terminal circuit	DI-342
ABS warning light circuit	DI-325
VSC warning light circuit	DI-327



- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.
- (4) Codes are explained in the code table on page [DI-258](#).
- (5) After completing the check, disconnect terminals Tc and E₁, and turn off the display.

If 2 or more malfunction codes are identified at the same time, the lowest numbered DTC will be displayed 1st.

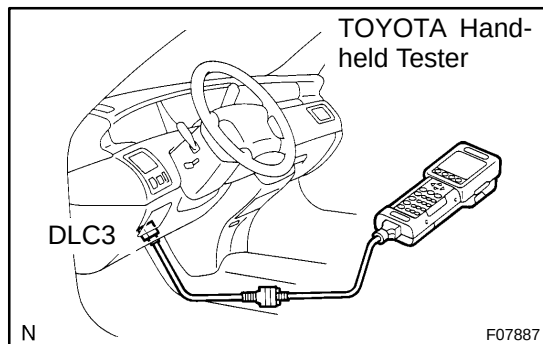
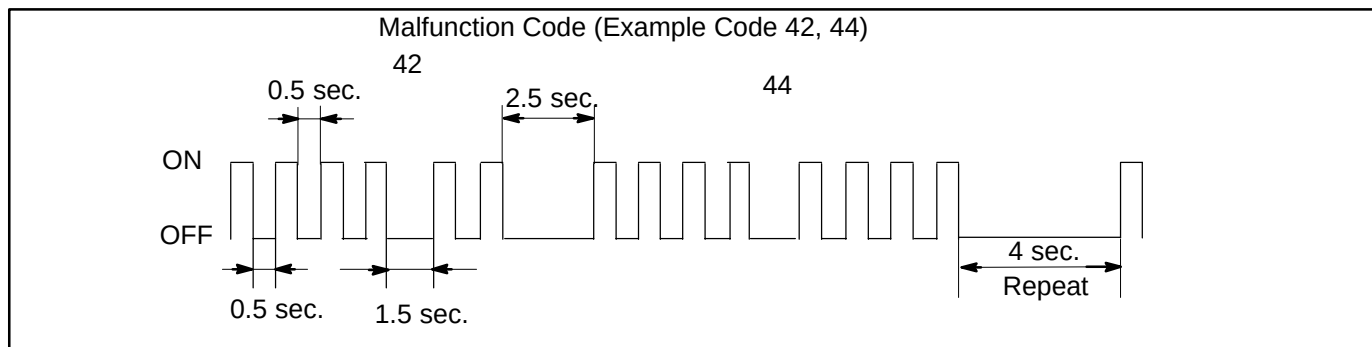
- (c) In case of not using TOYOTA hand-held tester:
- Check the DTC of translate ECU.
- Release the parking brake pedal.
 - Check the brake fluid level.
 - Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
 - Turn the ignition switch ON.
 - Read the DTC from the BRAKE warning light.

HINT:

- If no code appears, inspect the diagnostic circuit, and BRAKE warning light circuit.

Trouble Area	See page
Tc terminal circuit	DI-342
BRAKE warning light circuit	DI-330

- When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light is lit.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)
- If 2 or more malfunction codes are identified at the same time, the lowest numbered code will be displayed 1st.

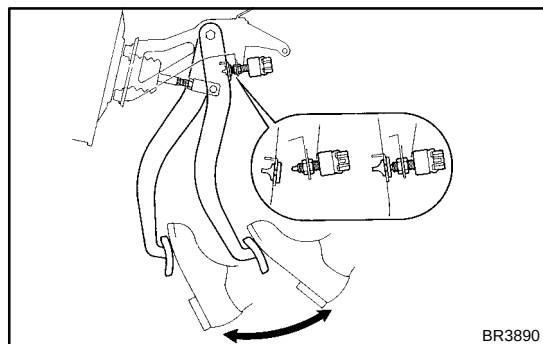


(d) In case of using TOYOTA hand-held tester:
Check the DTC.

- (1) Hook up the TOYOTA 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 TOYOTA hand-held tester operator's manual for further details.

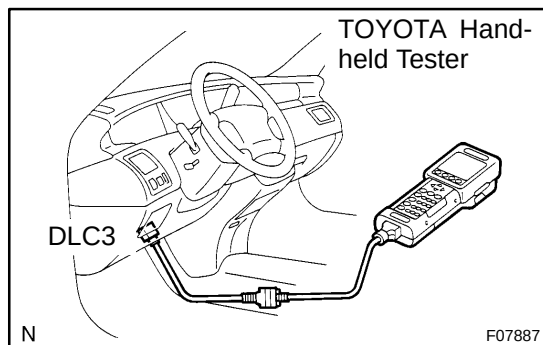


(e) In case of not using TOYOTA hand-held tester:
Clear the DTC.

- (1) Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
- (2) Turn the ignition switch ON.
- (3) Clear the DTC stored in ECU by depressing the brake pedal 8 times or more within 5 seconds.
- (4) Check that the warning light shows the normal code.
- (5) Remove the SST from the terminals of DLC1.
SST 09843-18020

HINT:

Cancellation cannot be done by removing the battery cable or ECU-IG fuse.

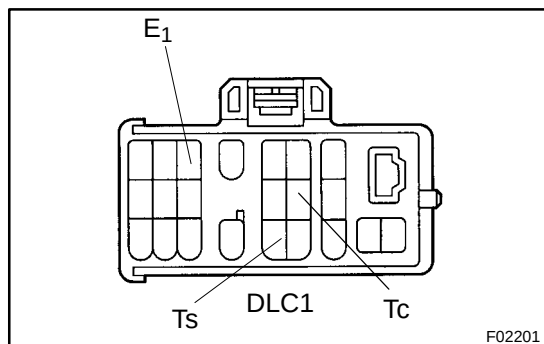


(f) In case of using TOYOTA hand-held tester:
Clear the DTC.

- (1) Hook up the TOYOTA hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Operate the TOYOTA hand-held tester to erase the codes.

HINT:

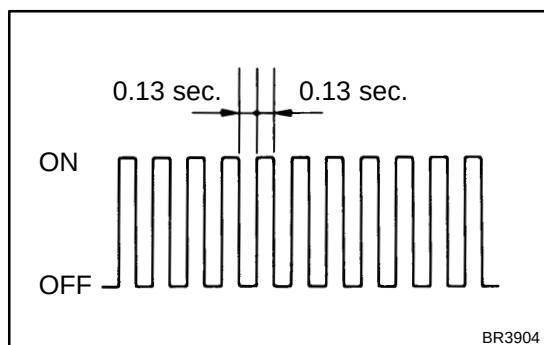
Please refer to the TOYOTA hand-held tester operator's manual for further details.



2. SPEED SENSOR SIGNAL CHECK (TEST MODE)

(a) In case of not using TOYOTA hand-held tester:
Check the sensor signal.

- (1) Turn the ignition switch OFF.
- (2) Using SST, connect terminals Ts and E₁ of DLC1.
SST 09843-18020
- (3) Start the engine.



- (4) Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit (See page DI-325).

- (5) Drive vehicle straight forward.
Drive vehicle at a speed faster than 45 km/h (28 mph) for several seconds.

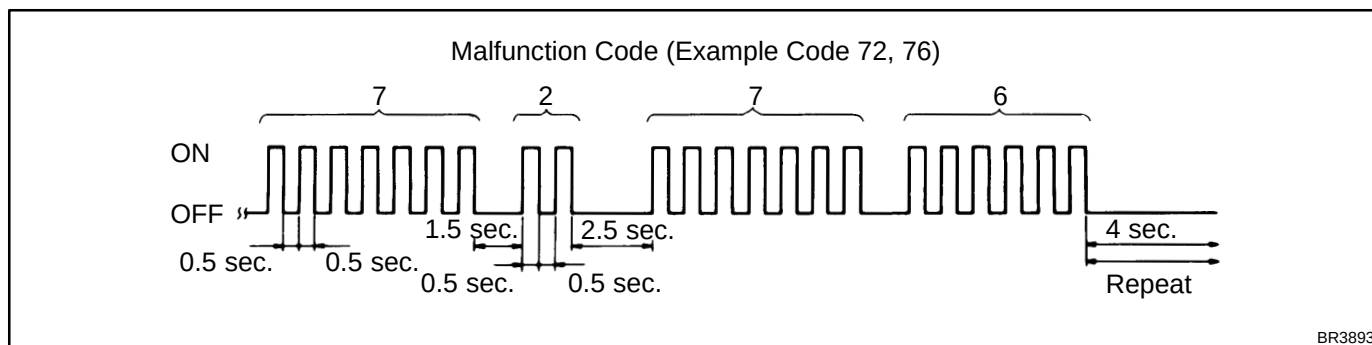
HINT:

The sensor check may not be completed if the front wheels are spun or the steering wheel is steered during this check.

- (6) Stop the vehicle.
- (7) Using SST, connect terminals Tc and E₁ of DLC1.
SST 09843-18020
- (8) Read the number of blinks of the ABS warning light.

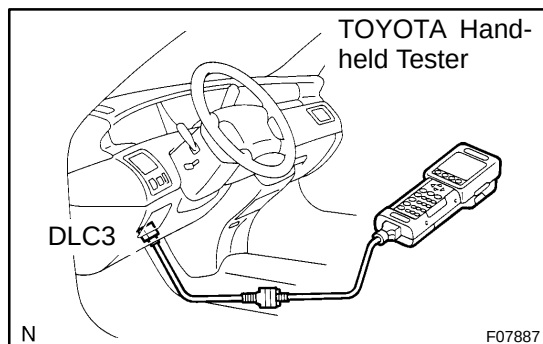
HINT:

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



- (9) After doing the check, disconnect the SST from terminals Ts and E₁, Tc and E₁ of DLC1, and turn the ignition switch OFF.

SST 09843-18020



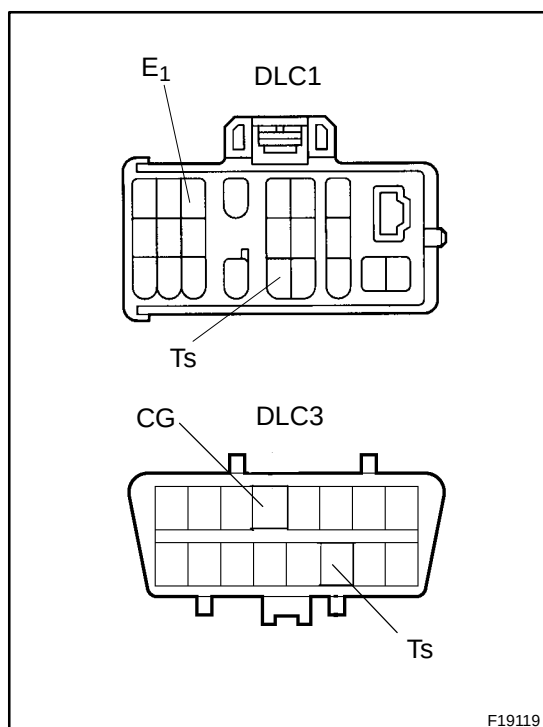
- (b) In case of using TOYOTA hand-held tester:
Check the sensor signal.
- (1) Hook up the TOYOTA hand-held tester to the DLC3.
 - (2) Do step (3) - (6) on the previous page.
 - (3) Read the DTC by following the prompts on the tester screen.

HINT:

Please refer to the TOYOTA 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 signal of right front speed sensor	Right front speed sensor rotor
C1276 / 76	Abnormal change in output signal of left front speed sensor	Left front speed sensor rotor
C1277 / 77	Abnormal change in output signal of right rear speed sensor	Right rear speed sensor rotor
C1278 / 78	Abnormal change in output signal of left rear speed sensor	Left rear speed sensor rotor

**3. STEERING ANGLE SENSOR ZERO POINT CALIBRATION****NOTICE:**

Make sure to perform steering angle sensor zero point calibration when:

- Replacing the steering angle sensor or ECU.
 - Adjusting the front wheel alignment of the steering wheel center point in accordance with removal and installation or replacement of the suspension, axle or steering parts.
- (a) Using the SST, connect terminals Ts and E₁ of DLC1 or Ts and CG of DLC3.
SST DLC1: 09843-18020
DLC3: 09843-18040
 - (b) Turn the ignition switch to the ON position, without starting the engine.
 - (c) Make sure the steering wheel off center angle is within 3 degrees of center before attempting calibration.

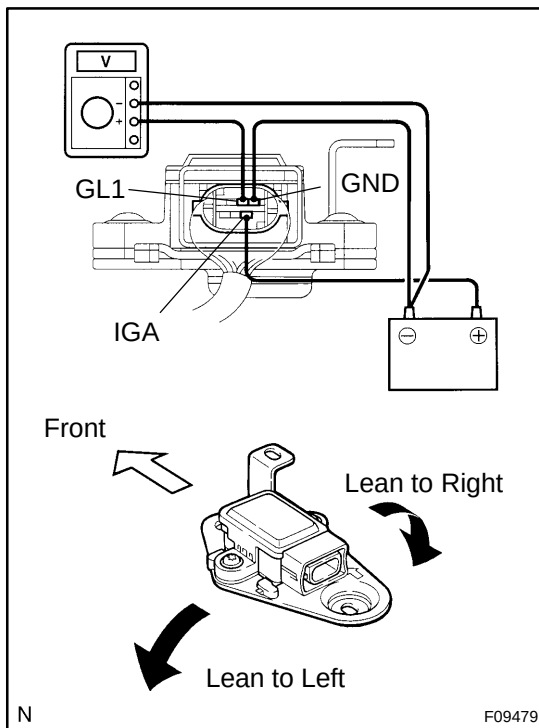
HINT:

If the off center angle is greater than 3 degrees from center, further adjustments to the tie rods may be necessary.

- (d) Shift the gear selector switch to the P range.
- (e) Press the VSC OFF switch and hold it while depressing the brake pedal 3 times within 2 seconds.
- (f) Continue to hold the VSC OFF switch until the VSC buzzer (repeated beeping) sounds.
- (g) Release the VSC OFF switch. The VSC buzzer will continue to sound for 3 seconds confirming the operation is complete.

HINT:

If the procedure is done correctly and VSC buzzer does not sound, there may be a malfunction of the steering angle sensor.

**4. DECELERATION SENSOR CHECK**

- (a) Apply battery positive voltage.
- (b) Connect IGA terminal to the battery positive (+) terminal, and GND terminal to the battery negative (-) terminal, and apply about 12 V between IGA and GND terminals.
- (c) Check the output voltage of GL1 terminal.

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.5 V
GL1	Lean right down	About 2.3 V - 4V
GL1	Lean left down	1 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.

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.

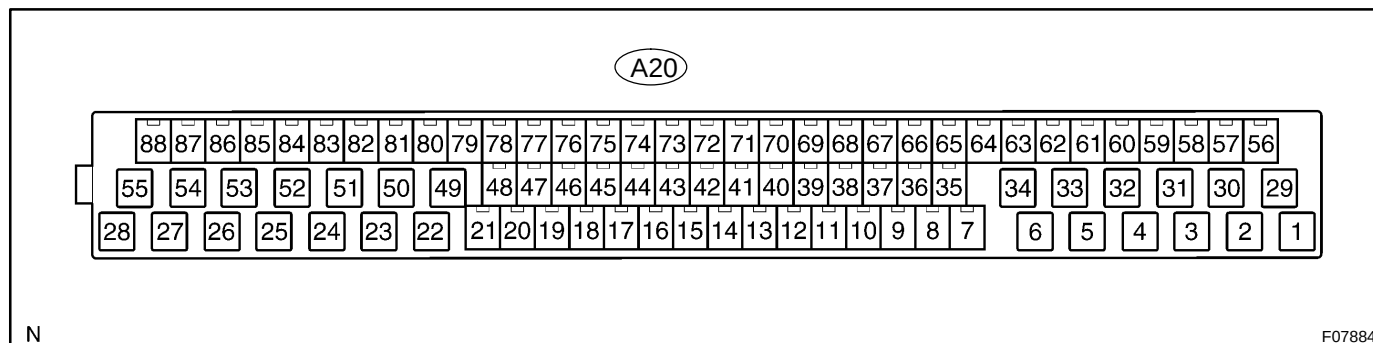
NOTICE:

When replacing ABS & BA & TRAC & VSC ECU, sensor, etc., turn the IG switch OFF.

Symptom	Suspect Area	See page
ABS does not operate	Only when 1. - 4. are all normal and the problem is still occurring, replace the ABS & BA & TRAC & VSC ECU. 4. Check the DTC, reconfirming that the normal code is output. 5. IG power source circuit 6. Speed sensor circuit 7. Check the brake actuator with a hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI-346).	DI-252 DI-297 DI-267 BR-52
ABS does not operate efficiently	Only when 1. - 4. are all normal and the problem is still occurring, 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 brake actuator with a hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI-346).	DI-252 DI-267 DI-303 BR-52
ABS warning light abnormal	1. ABS warning light circuit 2. ABS & BA & TRAC & VSC ECU	DI-325
DTC check cannot be done	Only when 1. - 4. are all normal and the problem is still occurring, replace the ABS & BA & TRAC & VSC ECU. 1. ABS warning light circuit 2. VSC warning light circuit 3. Tc terminal circuit	DI-325 DI-327 DI-342
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. ABS & BA & TRAC & VSC ECU	DI-344
VSC does not operate	Only when circuits inspected for each problem symptom are all normal and the problem is still occurring, replace the ABS & BA & TRAC & VSC ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Hydraulic circuit for leakage 4. Speed sensor circuit	DI-252 DI-297 DI-346 DI-267
BA does not operate	Stop light switch circuit	DI-303
SLIP indicator light abnormal	SLIP indicator light circuit	DI-333
BRAKE warning light abnormal	1. BRAKE warning light circuit 2. ABS & BA & TRAC & VSC ECU	DI-330
VSC OFF indicator light abnormal	Only when circuits inspected for each problem symptom are all normal and the problem is still occurring, replace the ABS & BA & TRAC & VSC ECU. 1. VSC OFF indicator light circuit 2. VSC OFF switch circuit	DI-336 DI-336

TERMINALS OF ECU

ABS & BA & TRAC & VSC ECU:



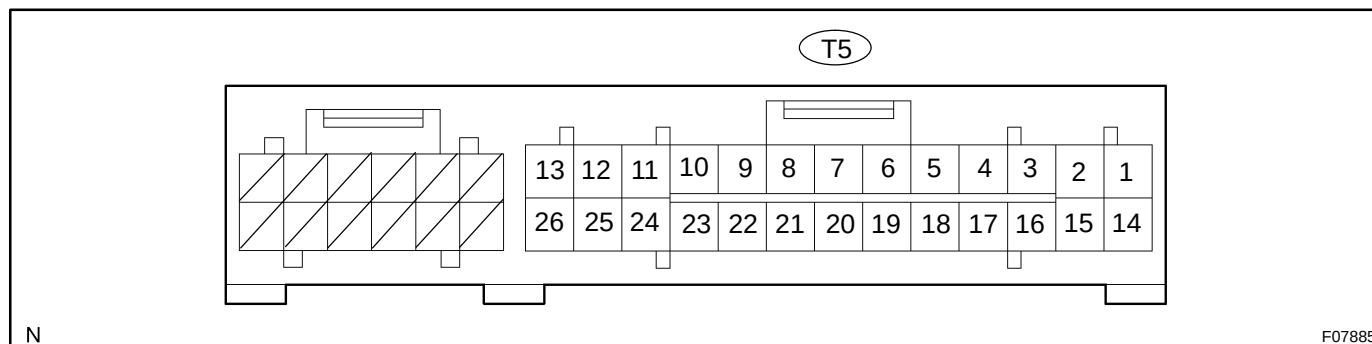
Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IG1 (A20 - 1) - GND (A20 - 28, 29)	Y-R ↔ W-B	IG switch ON	10 - 14
R+ (A20 - 2) - SR (A20 - 36)	GR-R ↔ R	IG switch ON, ABS warning light OFF	10 - 14
R+ (A20 - 2) - MR (A20 - 7)	GR-R ↔ GR-L	IG switch ON	Below 1.0
SFLR (A20 - 3) - GND (A20 - 28, 29)	G-O ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRR (A20 - 4) - GND (A20 - 28, 29)	G-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFLH (A20 - 5) - GND (A20 - 28, 29)	W-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRH (A20 - 6) - GND (A20 - 28, 29)	GR ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
FL+ (A20 - 8) - FL- (A20 - 10)	BR ↔ B-R	IG switch ON, slowly turn left front wheel	AC generation
RR+ (A20 - 11) - RR- (A20 - 12)	G ↔ Y	IG switch ON, slowly turn right rear wheel	AC generation
RL+ (A20 - 13) - RL- (A20 - 14)	LG ↔ V	IG switch ON, slowly turn left rear wheel	AC generation
FR+ (A20 - 17) - FR- (A20 - 16)	B-W ↔ L	IG switch ON, slowly turn right front wheel	AC generation
GL1 (A20 - 18) - GND (A20 - 28, 29)	G ↔ W-B	IG switch ON	0.5 - 4.5
ML+ (A20 - 22) - ML- (A20 - 24)	W-R ↔ V	IG switch ON	10 - 14
SRLR (A20 - 25) - GND (A20 - 28, 29)	L-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRH (A20 - 26) - GND (A20 - 28, 29)	B-W ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
MT (A20 - 27) - GND (A20 - 28, 29)	O ↔ W-B	IG switch ON, ABS warning light OFF	Below 1.5
IND (A20 - 31) - GND (A20 - 28, 29)	V ↔ W-B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 - 14
EBDW (A20 - 32) - GND (A20 - 28, 29)	R-Y ↔ W-B	IG switch ON, BRAKE warning light OFF	Below 1.5
		IG switch ON, BRAKE warning light ON	10 - 14
LBL (A20 - 40) - GND (A20 - 28, 29)	L-B ↔ W-B	IG switch ON, fluid level switch ON	Below 1.0

DIAGNOSTICS - ABS WITH EBD & BA & TRAC & VSC SYSTEM

Ts (A20 - 42) - GND (A20 - 28, 29)	LG-B ↔ W-B	IG switch ON	10 - 14
CSW (A20 - 44) - GND (A20 - 28, 29)	W-L ↔ W-B	IG switch ON, VSC OFF indicator ON	Below 1.5
		IG switch ON, VSC OFF indicator OFF	8 - 14
D/G (A20 - 46) - GND (A20 - 28, 29)	W ↔ W-B	IG switch ON	10 - 14
STP (A20 - 48) - GND (A20 - 28, 29)	G-W ↔ W-B	Stop light switch ON (Brake pedal pushed)	8 - 14
		Stop light switch OFF (Brake pedal released)	Below 1.5
SMC1 (A20 - 49) - GND (A20 - 28, 29)	G-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SMC2 (A20 - 50) - GND (A20 - 28, 29)	V-W ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
BAT (A20 - 51) - GND (A20 - 28, 29)	W-L ↔ W-B	IG switch OFF	10 - 14
SRC2 (A20 - 52) - GND (A20 - 28, 29)	R-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRLH (A20 - 53) - GND (A20 - 28, 29)	Y-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRC1 (A20 - 54) - GND (A20 - 28, 29)	B-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRR (A20 - 55) - GND (A20 - 28, 29)	W-G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SS1 (A20 - 59) - GND (A20 - 28, 29)	W ↔ W-B	IG switch ON	Pulse generation
FSS (A20 - 60) - GND (A20 - 28, 29)	BR ↔ W-B	IG switch OFF	Continuity
SS2 (A20 - 61) - GND (A20 - 28, 29)	O ↔ W-B	IG switch ON	Pulse generation
VCM (A20 - 65) - GND (A20 - 28, 29)	P-L ↔ W-B	IG switch ON	4.5 - 5.5
PMC (A20 - 66) - GND (A20 - 28, 29)	R-L ↔ W-B	IG switch ON, brake pedal released	0.3 - 0.8
E ₂ (A20 - 67) - GND (A20 - 28, 29)	BR-Y ↔ W-B	IG switch OFF	Continuity
SP1 (A20 - 68) - GND (A20 - 28, 29)	L-O ↔ W-B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
WT (A20 - 69) - GND (A20 - 28, 29)	Y-R ↔ W-B	IG switch ON, VSC OFF indicator light ON	Below 2.0
		IG switch ON, VSC OFF indicator light OFF	10 - 14
VSCW (A20 - 70) - GND (A20 - 28, 29)	P-B ↔ W-B	IG switch ON, VSC warning light ON	Below 2.0
		IG switch ON, VSC warning light OFF	10 - 14
PKB (A20 - 74) - GND (A20 - 28, 29)	Y-G ↔ W-B	IG switch ON, parking brake switch ON	Below 2.0
		IG switch ON, parking brake switch OFF	10 - 14
YD (A20 - 75) - GND (A20 - 28, 29)	BR ↔ W-B	IG switch ON, VSC warning light OFF	4.5 - 5.5
GYAW (A20 - 76) - GND (A20 - 28, 29)	Y ↔ W-B	IG switch OFF	Continuity
YAW (A20 - 77) - GND (A20 - 28, 29)	L ↔ W-B	IG switch ON, vehicle stationary condition	2 - 3

WA (A20 - 81) - GND (A20 - 28, 29)	B ↔ W-B	IG switch ON, ABS warning light ON	10 - 14
		IG switch ON, ABS warning light OFF	Below 2.0
Tc (A20 - 84) - GND (A20 - 28, 29)	LG-R ↔ W-B	IG switch ON	10 - 14
Bz (A20 - 86) - GND (A20 - 28, 29)	L-W ↔ W-B	IG switch ON, VSC buzzer sounds	Below 1.0 ↔ 10 - 14
		IG switch ON, VSC buzzer does not sound	10 - 14

Translate ECU:



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IG1(T5 - 1) - GND (T5 - 14)	Y-R ↔ W-B	IG switch ON	10 - 14
PKB2 (T5 - 2) - GND (T5 - 14)	Y-G ↔ W-B	IG switch ON, parking brake switch ON	Below 2.0
		IG switch ON, parking brake switch OFF	10 - 14
VSC+ (T5 - 4) - VSC- (T5 - 17)	W ↔ O	Engine idling	Pulse generation
SS1 (T5 - 5) - SS2 (T5 - 18)	L ↔ B-W	Engine idling	Pulse generation
RSS (T5 - 6) - GND (T5 - 14)	BR ↔ W-B	IG switch OFF	Continuity
P (T5 - 10) - GND (T5 - 14)	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
LVL2 (T5 - 11) - GND (T5 - 14)	R-W ↔ W-B	IG switch ON, fluid level switch ON	Below 1.5
D (T5 - 12) - GND (T5 - 14)	Y-R ↔ W-B	IG switch ON, shift lever is in D range	8 - 14
		IG switch ON, shift lever is in other than D range	Below 1.5
NEO (T5 - 13) - GND (T5 - 14)	Y-B ↔ W-B	Engine idling	Pulse generation
PKB (T5 - 15) - GND (T5 - 14)	Y-G ↔ W-B	IG switch OFF, parking brake switch ON	Below 2.0
BRL (T5 - 16) - GND (T5 - 14)	R-W ↔ W-B	IG switch ON, BRAKE warning light ON	Below 2.0
		IG switch ON, BRAKE warning light OFF	10 - 14
TRC+ (T5 - 20) - TRC- (T5 - 7)	BR ↔ W-B	Engine idling	Pulse generation
Tc (T5 - 21) - GND (T5 - 14)	LG-R ↔ W-B	IG switch ON	10 - 14
ENG+ (T5 - 22) - ENG- (T5 - 9)	V ↔ GR	Engine idling	Pulse generation
Ts (T5 - 24) - GND (T5 - 14)	LG-B ↔ W-B	IG switch ON	10 - 14
LBL (T5 - 25) - GND (T5 - 14)	L-B ↔ W-B	IG switch ON, fluid level switch ON	Below 1.0
CCS (T5 - 26) - GND (T5 - 14)	Y-R ↔ W-B	IG switch ON	Below 2.0

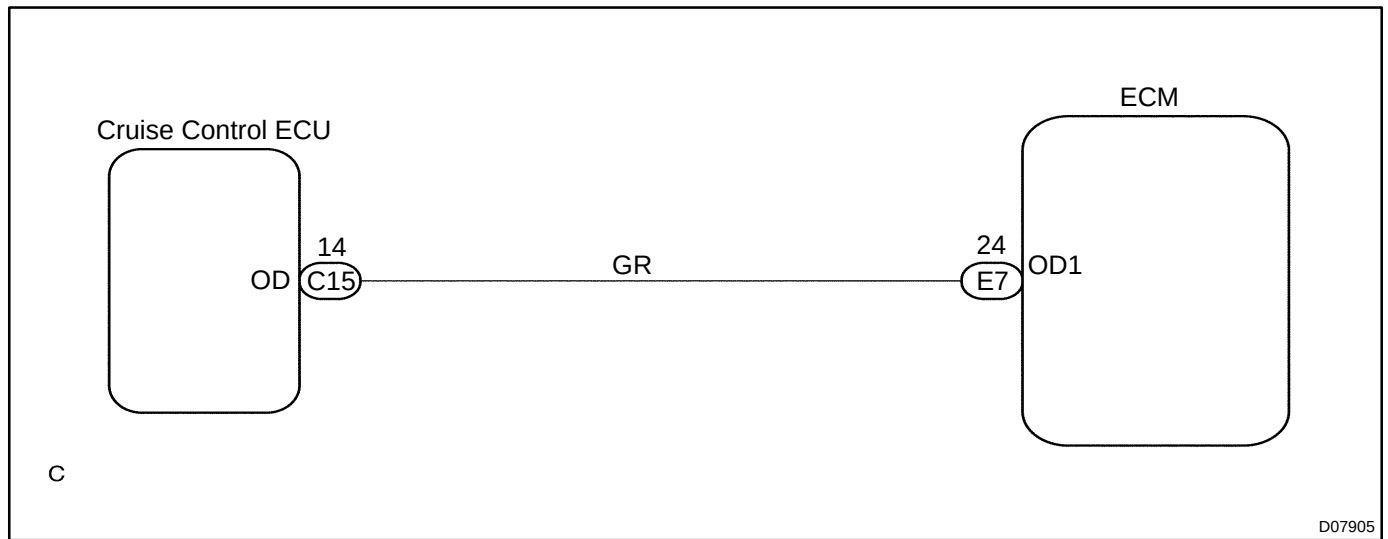
O/D Cancel Signal Circuit

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.

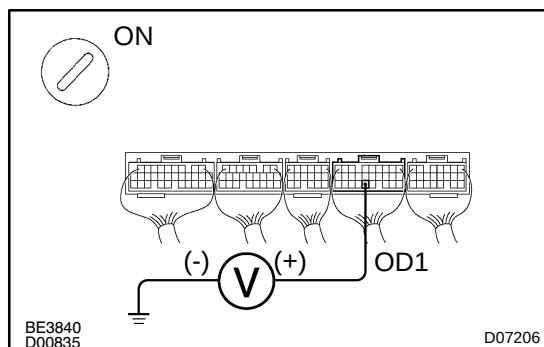
The cruise control ECU sends O/D cut signals to the ECM as necessary and the ECM cancels overdrive shifting until these signals are discontinued.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal OD1 of ECM and body ground.

**PREPARATION:**

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

CHECK:

Measure voltage between terminal OD1 of ECM and body ground.

OK:

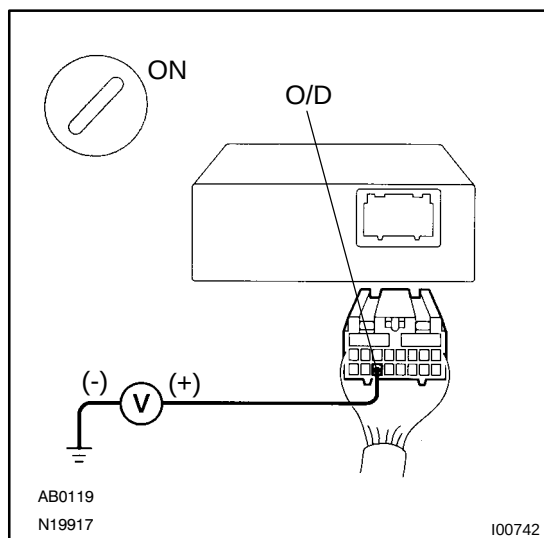
Voltage: 10 - 14 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-175](#)).

NG

2	Check voltage between terminal OD of cruise control ECU harness side connector and body ground.

**PREPARATION:**

- (a) Disconnect the cruise control ECU connector.
- (b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal OD of cruise control ECU harness side connector and body ground.

OK:

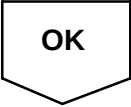
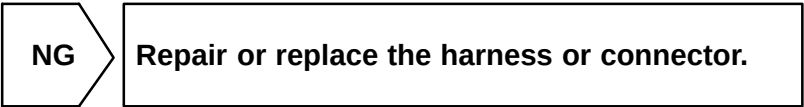
Voltage: 10 - 14 V

OK

Check and replace the cruise control ECU (See page [IN-30](#)).

NG

3	Check harness and connector between cruise control ECU and ECM (See page IN-30).



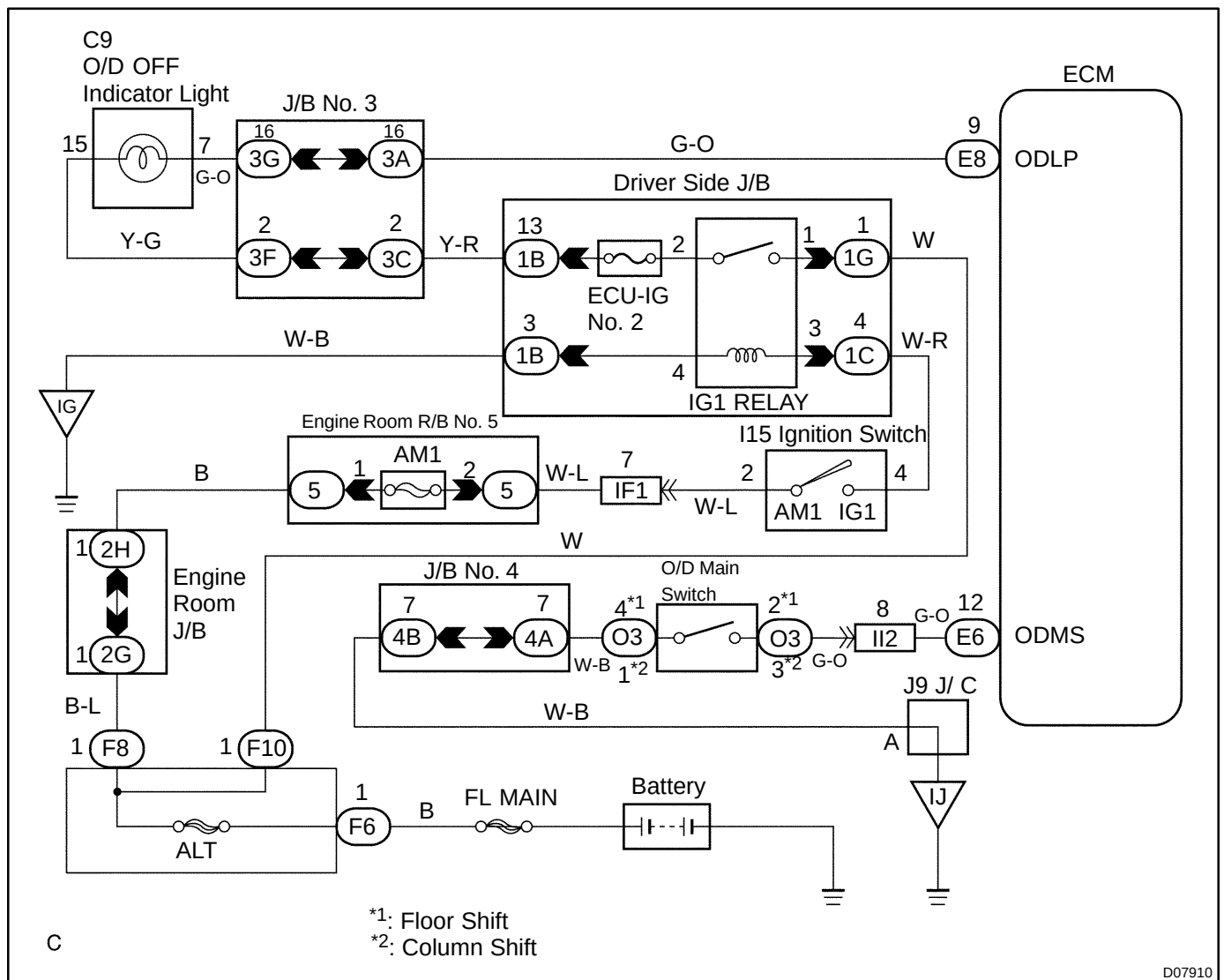
Check and replace the ECM
(See page [IN-30](#)).

O/D Main Switch & O/D OFF Indicator Light Circuit

CIRCUIT DESCRIPTION

The O/D main switch is a momentary type switch. When pressing the O/D OFF main switch, the O/D OFF indicator light lights up and ECM prohibits shifting to O/D, and when pressing it again, the O/D OFF indicator light goes off and ECM allows shifting to O/D. Turning the IG switch OFF will reset the O/D OFF indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of O/D main switch.

PREPARATION:

Turn the ignition switch ON.

CHECK:

- (a) Check O/D OFF indicator light when O/D main switch is pushed in to ON.
- (b) Check O/D OFF indicator light when O/D main switch is pushed again.

OK:

- (a) O/D OFF indicator light lights up.
- (b) O/D OFF indicator light goes off.

OK

Proceed to next inspection shown on symptoms problem tables (See page [DI-175](#)).

NG

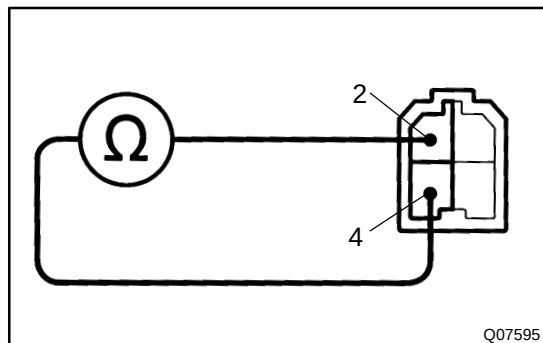
2	Check and replace the combination meter (See page BE-2).

NG

Replace the combination meter.

OK

3 Check O/D main switch.

**PREPARATION:**

Disconnect the O/D main switch connector.

CHECK:

- (a) Floor shift:
Check continuity between terminals 2 and 4 of O/D main switch connector.
- (b) Column shift:
Check continuity between terminals 1 and 3 of O/D main switch connector.

OK:

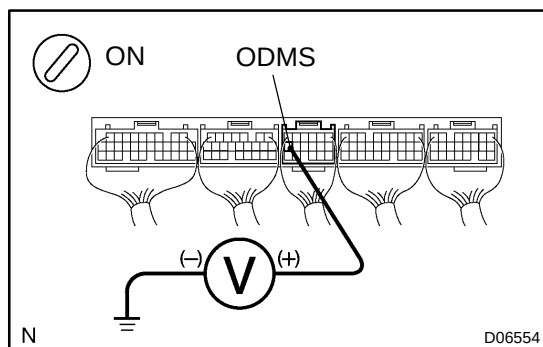
O/D main switch condition	Specified condition
Press continuously O/D main switch	Continuously
Release O/D main switch	No continuously

NG

Replace and repair O/D main switch.

OK

4 Check voltage between terminal ODMS of ECM and body ground.

**PREPARATION:**

Turn the ignition switch ON.

CHECK:

Check voltage between terminal ODMS of ECM and body ground when O/D main switch is ON and OFF.

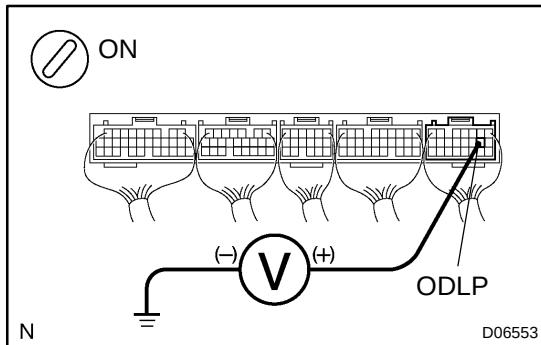
OK:

O/D main switch condition	Specified condition
Press continuously O/D main switch	Below 1.0 V
Release O/D main switch	10 - 14 V

OK

Check and replace the ECM (See page [IN-30](#)).

NG

5**Check voltage between terminal ODLP of ECM and body ground.****PREPARATION:**

- (a) Disconnect the connector of ECM.
- (b) Turn the ignition switch ON.

CHECK:

Check voltage between terminal ODLP of ECM and body ground.

OK:

Voltage: 7.5 - 14 V

OK

Check and replace the ECM (See page [IN-30](#)).

NG

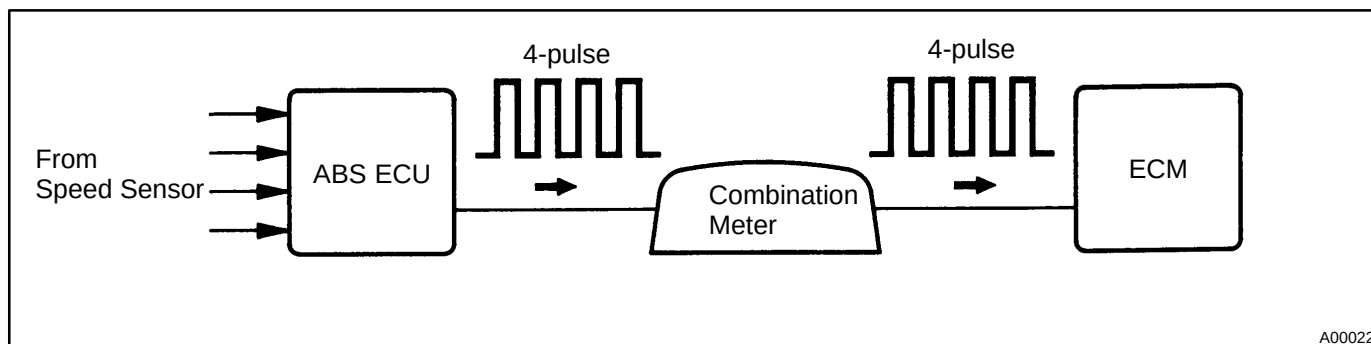
Check and replace harness and connector between combination meter and ECM, O/D main switch and ECM, O/D main switch and body ground. (See page [IN-30](#)).

CIRCUIT INSPECTION

DTC	P0500	Vehicle Speed Sensor Malfunction

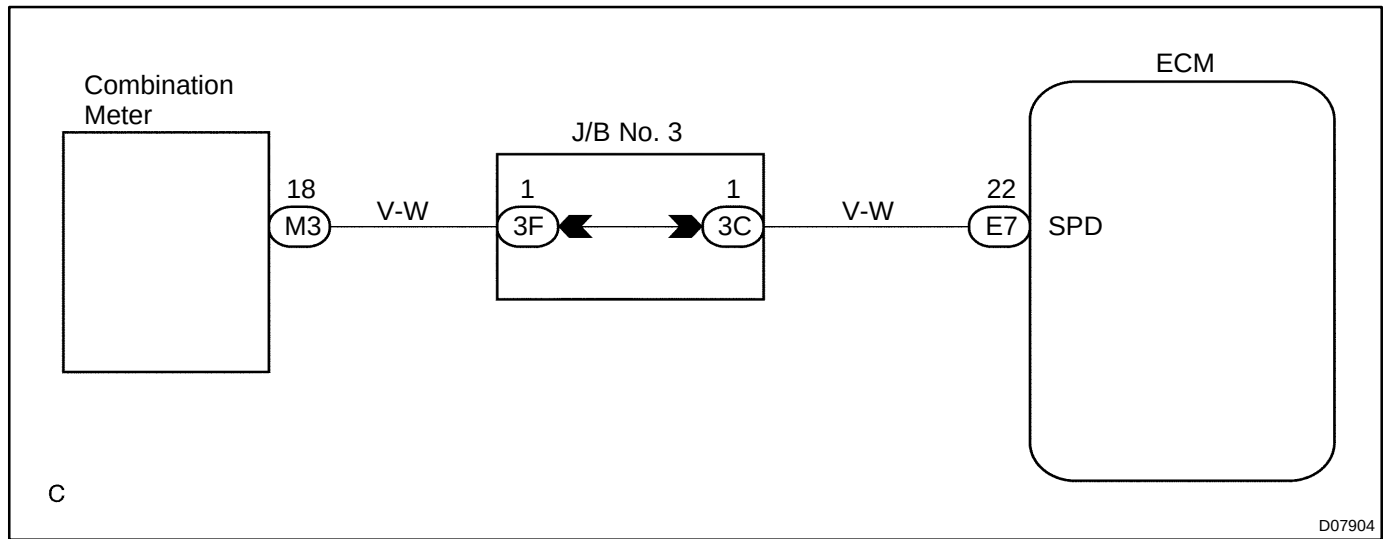
CIRCUIT DESCRIPTION

The speed sensor for ABS detects the wheel speed and sends the appropriate signals to the ABS ECU. The ECU converts these signals in to a 4-pulse signal and outputs it to the combination meter. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	Satisfying all of the following conditions, 2 sec. (Intake air temperature: -10 °C or more) or 8 sec. (Intake air temperature: less than -10 °C) elapsed. (c) After 2 sec. (the engine coolant temperature: 20 °C or more) or 30 sec. (the engine coolant temperature: less than 20 °C) with the park/neutral position switch set to P, N position. (d) No abnormality of the throttle position sensor is detected. (e) After 0.5 sec. or more with the ignition switch turned ON. (f) No vehicle speed is signal to ECM. (g) The engine rpm is equal to the speed sensor rpm or more when the throttle opening angle is as shown below. - The throttle opening angle is less than 13° and the engine rpm is 2,350 or more. - The throttle opening angle is less than 21° and the engine rpm is 2,680 or more. - The throttle opening angle is less than 30° and the engine rpm is 2,835 or more. - The throttle opening angle is less than 30° and the engine rpm is 3,145 or more. Clutch or brake slips or gear is broken (2-trip detection logic)	●Open or short in vehicle speed sensor circuit ●ABS speed sensor ●Combination meter ●ECM ●ABS ECU ●Automatic transaxle (clutch, brake or gear etc.)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of speedometer.

CHECK:

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

HINT:

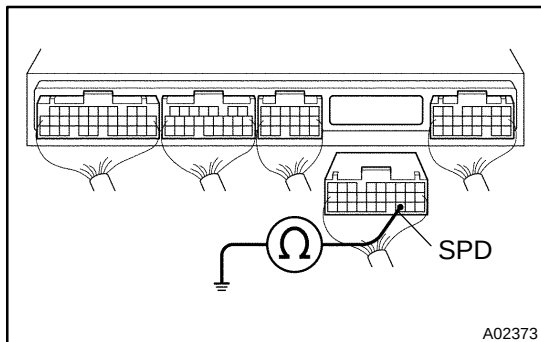
The vehicle speed sensor is operating normally if the speedometer display is normal.

NG

Check speedometer circuit.

OK

2 Check for short in harness and connector between terminal SPD of ECM and body ground.



PREPARATION:

- Remove the glove compartment (See page [BO-90](#)).
- Disconnect the connector from ECM.

CHECK:

Check continuity between terminal SPD of ECM and body ground.

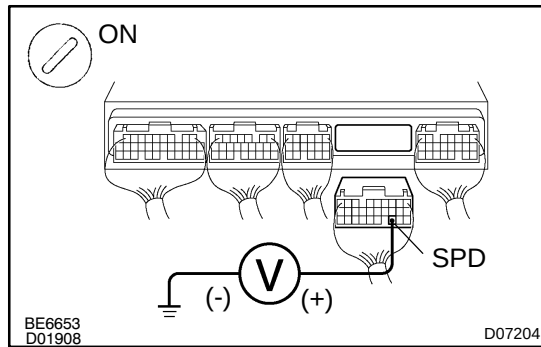
OK:

No continuity

NG

Repair or replace harness or connector.

OK

3 Check voltage between terminal SPD of ECM connector and body ground.**PREPARATION:**

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal SPD of ECM connector and body ground.

OK:**Voltage: 9 - 14 V**

NG

Check for open in harness and connector between J/B No. 3 and ECM (See page [IN-30](#)).

OK

4 Check for open in harness and connector between J/B No. 3 and combination meter (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

5 Check ECM (See page [IN-30](#)).

NG

Replace ECM.

OK

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

DTC	P0750, P0755	Shift Solenoid A/B Malfunction (Shift Solenoid Valve No.1/No.2)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and direct clutch speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical trouble of the shift solenoid valves, valve body or automatic transaxle (clutch, brake or gear etc.).

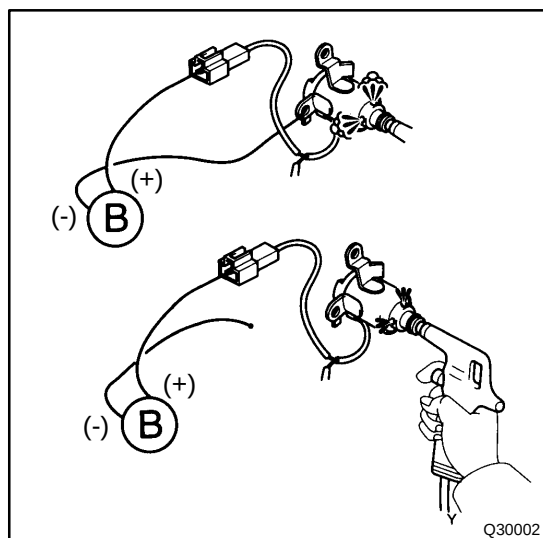
DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the ECM does not match the actual gear (2-trip detection logic)	●Shift solenoid valve No.1/No.2 is stuck open or closed ●Valve body is blocked up or stuck ●Automatic transaxle (clutch, brake or gear etc.)

HINT:

Check the shift solenoid valve No.1 when DTC P0750 is output and check the shift solenoid valve No.2 when DTC P0755 is output.

INSPECTION PROCEDURE

1	Check shift solenoid valve No.1 or No.2 operation.



PREPARATION:

- Remove the oil pan.
- Remove the shift solenoid valve No.1 or No.2.

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 valve opens.

OK:

- Solenoid valve does not leak air.
- Solenoid valve opens.

NG

Replace the shift solenoid valve No.1 or No.2.

OK

2	Check the valve body (See page DI-175).

NG

Repair or replace the valve body.

OK

Repair the transaxle.

DTC	P0753, P0758	Shift Solenoid A/B Electrical Malfunction (Shift Solenoid Valve No.1/No.2)

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with ON and OFF of the shift solenoid valves No.1 and No.2 controlled by ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

Fail safe function:

If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table below. The ECM also turns the shift solenoid valve SL OFF at the same time. If both solenoids are malfunctioning, hydraulic control cannot be performed electronically and must be done manually.

Manual shifting as shown in the following table must be done (In the case of a short circuit, the ECM stops sending current to the short circuited solenoid).

Position	NORMAL			SHIFT SOLENOID NO.1 MALFUNCTIONING			SHIFT SOLENOID NO.2 MALFUNCTIONING			BOTH SOLENOIDS MAL- FUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	No.1	No.2		No.1	No.2		No.1	No.2		
D	ON	OFF	2nd	X	ON	3rd	ON	X	1st	O/D
	ON	ON	1st	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	O/D
2	ON	OFF	2nd	X	ON	3rd	ON	X	1st	O/D
	ON	ON	1st	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st

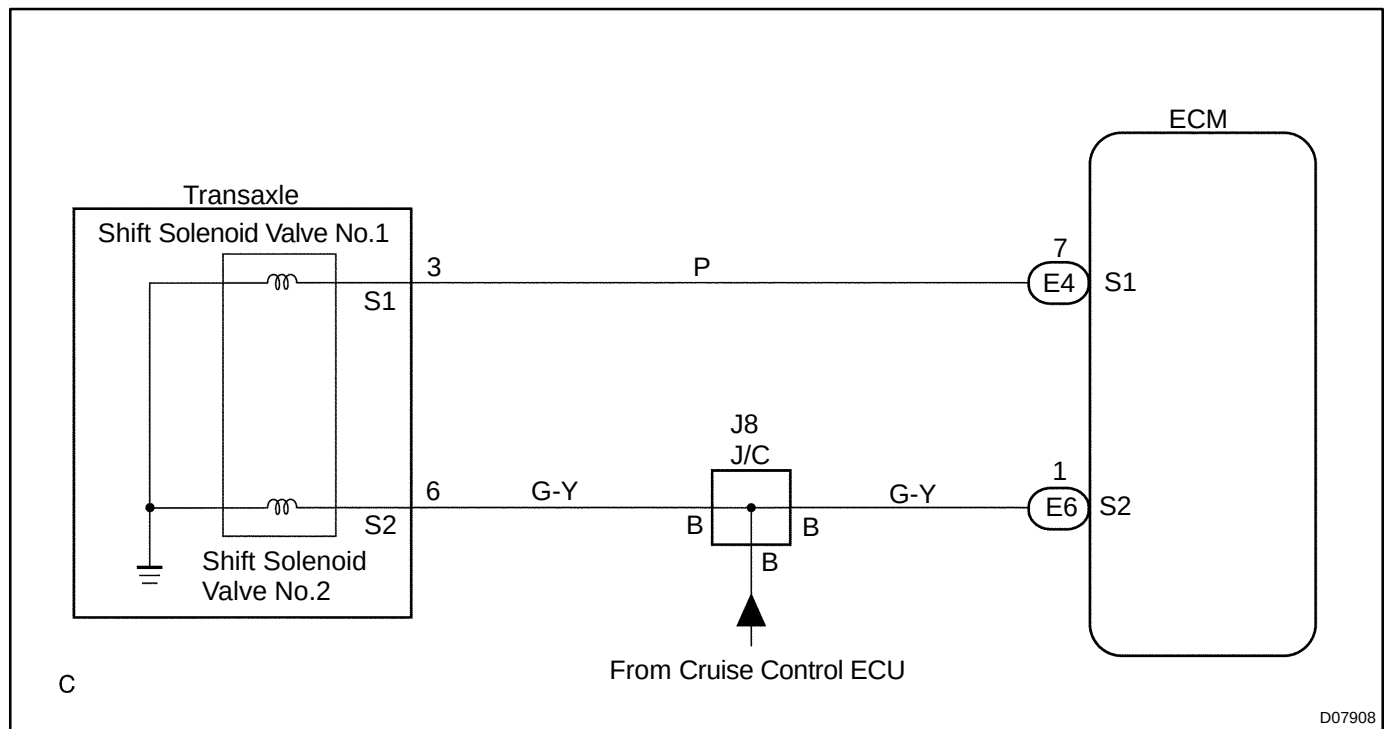
X: Malfunctions

HINT:

Check the shift solenoid valve No.1 when DTC P0753 is output and check the shift solenoid valve No.2 when DTC P0758 is output.

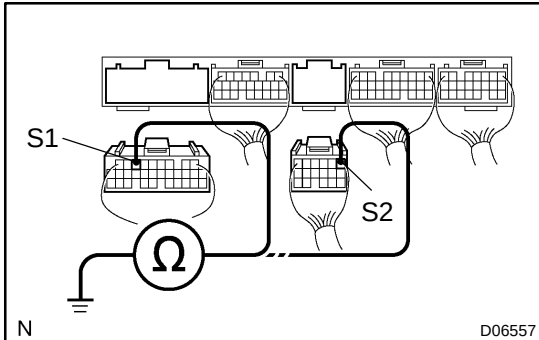
DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The ECM checks for an open or short circuit in the shift solenoid valve No.1 and/or No.2 circuit when it changes. The ECM records DTC P0753 or P0758 if condition (a) or (b) is detected once, but it does not light up MIL. After ECM detects condition (a) or (b) continuously 8 times or more in a trip and the MIL lights up. (a) When the solenoid is energized, the solenoid resistance is 8 Ω or less and is counted. (b) When the solenoid is not energized, the solenoid resistance is 100 kΩ or more and is counted.	●Open or short in shift solenoid valve No.1/No.2 circuit ●Shift solenoid valve No.1/No.2 ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Measure resistance between terminal S1 or S2 of ECM and body ground.

**PREPARATION:**

- (a) Remove the glove compartment (See page [BO-90](#)).
- (b) Disconnect the connector from ECM.

CHECK:

Measure resistance between terminal S1 or S2 of ECM and body ground.

OK:

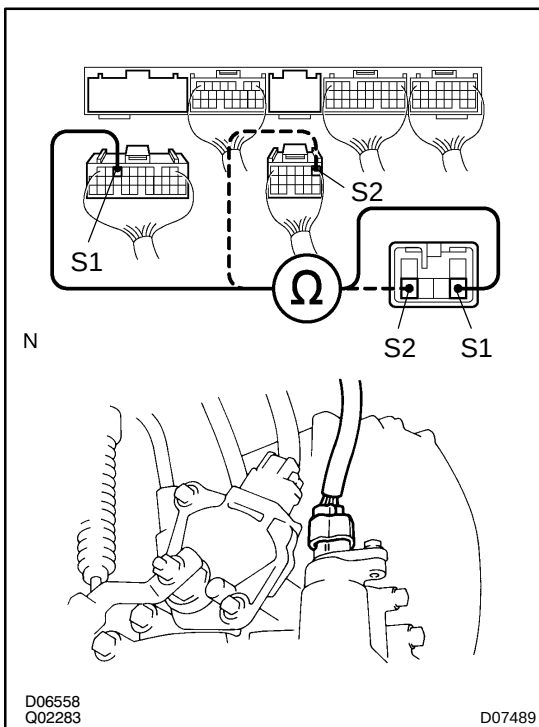
Resistance: 11 - 15 Ω

OK

Check and replace the ECM (See page [IN-30](#)).

NG

2	Measure resistance of harness and connector between ECM and automatic transaxle solenoid connector.

**PREPARATION:**

Disconnect the solenoid connector from the automatic trans-axle.

CHECK:

Measure resistance of the harness and connector between terminal S1 or S2 of ECM and terminal S1 or S2 of solenoid connector.

OK:

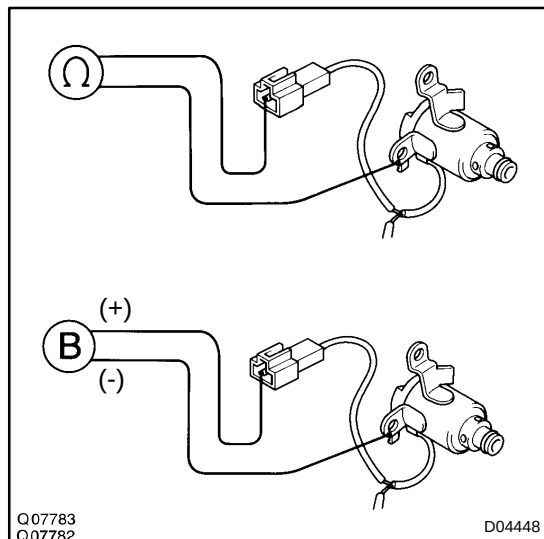
Resistance: 0 Ω

NG

Repair or replace the harness or connector.

OK

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



PREPARATION:

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Disconnect the solenoid connector.
- (d) Remove the shift solenoid valve No.1 or No.2.

CHECK:

- (a) Measure resistance between solenoid connector and body ground.
- (b) Connect the positive $\leq$ lead to terminal of solenoid connector, negative $>$ lead to solenoid body.

OK:

- (a) Resistance: 11 - 15 Ω
- (b) The solenoid makes an operating noise.

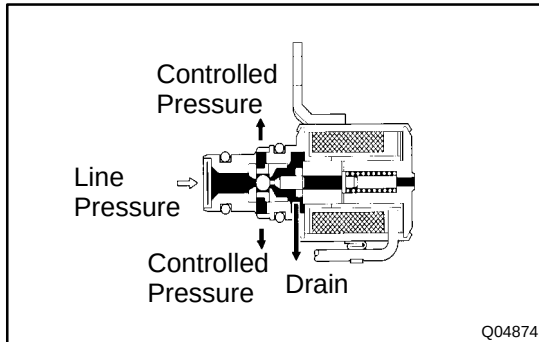
NG

Replace the solenoid valve.

OK

Repair or replace the solenoid wire.

DTC	P0770	Shift Solenoid E Malfunction (Shift Solenoid Valve SL)



SYSTEM DESCRIPTION

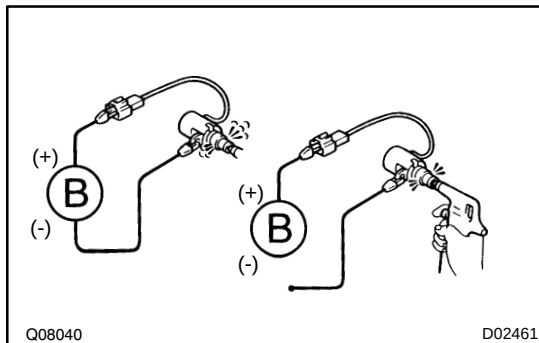
The ECM uses the signals from the throttle position sensor, air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

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 SL, valve body, torque converter clutch or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0770	- Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in the lock-up OFF range. (2-trip detection logic) - When lock-up is ON, clutch or brake slips or gear is broken.	- Shift solenoid valve SL is stuck open or closed - Valve body blocked up or stuck - Lock-up clutch - Automatic transaxle (clutch, brake or gear etc.)

INSPECTION PROCEDURE

1	Check solenoid valve SL operation.



PREPARATION:

- Remove the oil pan.
- Remove the shift solenoid valve SL.

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 the solenoid valve SL.

OK

2	Check valve body (See page DI-175).

NG

Repair or replace the valve body.

OK

3	Check the torque converter clutch (See page AX-43).

NG

Replace the torque converter clutch.

OK

Repair the transaxle (See page [AX-33](#)).

DTC	P0773	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve SL)

CIRCUIT DESCRIPTION

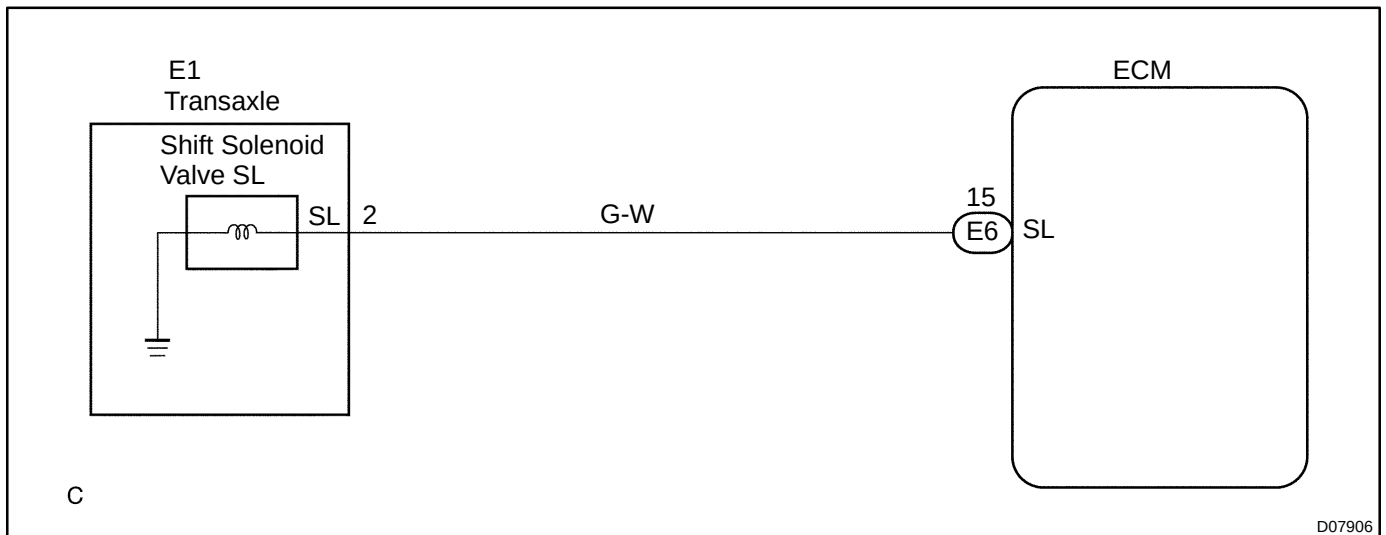
The shift solenoid valve SL is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

Fail safe function:

If the ECM detects a malfunction, it turns the shift solenoid valve SL OFF.

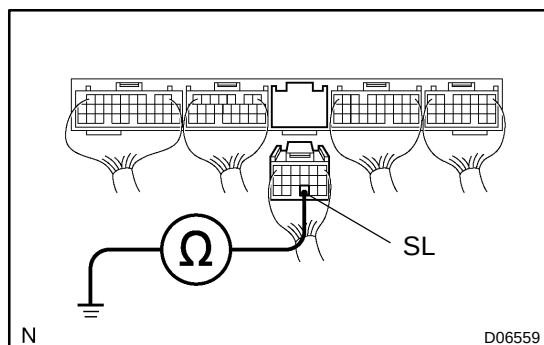
DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either (a) or (b) is detected for 1 time. (2-trip detection logic) (a) Solenoid resistance is 8 Ω or less short when solenoid is energized. (b) Solenoid resistance is 100 k Ω or more when solenoid is not energized.	●Open or short in shift solenoid valve SL circuit ●Shift solenoid valve SL ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Measure resistance between terminal SL of ECM and body ground.

**PREPARATION:**

- (a) Remove the glove compartment (See page [BO-90](#)).
- (b) Disconnect the connector from ECM.

CHECK:

Measure resistance between terminal SL of ECM and body ground.

OK:

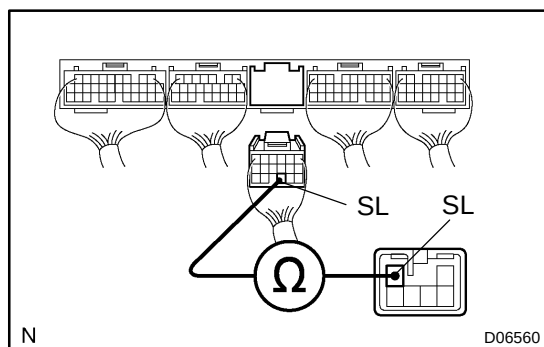
Resistance: 11 - 15 Ω at 20 °C (68 °F)

OK

Check and replace the ECM (See page [IN-30](#)).

NG

2	Measure resistance of harness and connector between ECM and automatic transaxle solenoid connector.

**PREPARATION:**

Disconnect the solenoid connector from the transaxle.

CHECK:

Measure resistance of the harness and connector between terminal SL of ECM and terminal SL of solenoid connector.

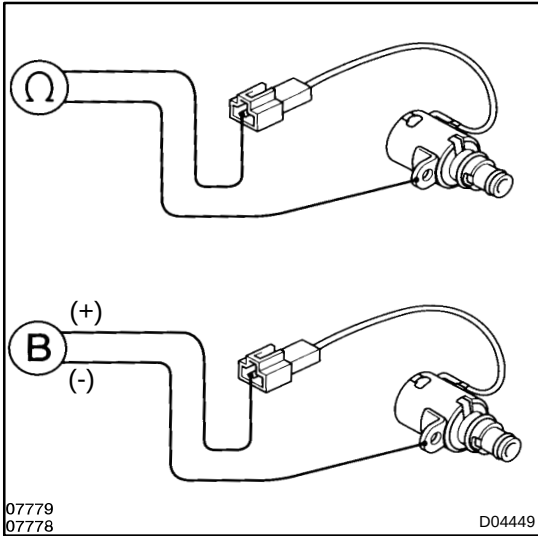
OK:

Resistance: 0 Ω

NG

Repair or replace the harness or connector.

OK

3**Check shift solenoid valve SL.****PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Disconnect the shift solenoid valve SL connector.
- (d) Remove the shift solenoid valve SL.

CHECK:

- (a) Measure resistance between terminal SL of shift solenoid valve and solenoid body.
- (b) Connect positive $\oplus$ lead to terminal of solenoid connector, negative $\ominus$ lead to solenoid body.

OK:

- (a) Resistance: 11 - 15 Ω at 20 °C (68 °F)
- (b) The shift solenoid valve SL makes operation noise.

NG**Replace the shift solenoid valve SL.****OK**

Replace or repair the solenoid wire, harness and connector between ECM and automatic transaxle solenoid connector.

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 signal to ECM. Then the ECM cancels operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P1520	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

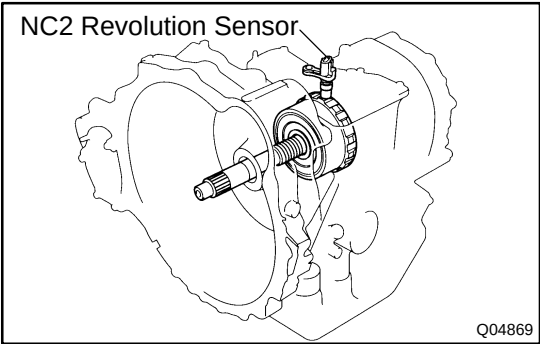
See page [DI-134](#) .

INSPECTION PROCEDURE

See page [DI-134](#) .

DTC	P1705	NC2 Revolution Sensor Circuit Malfunction (Direct Clutch Speed Sensor)

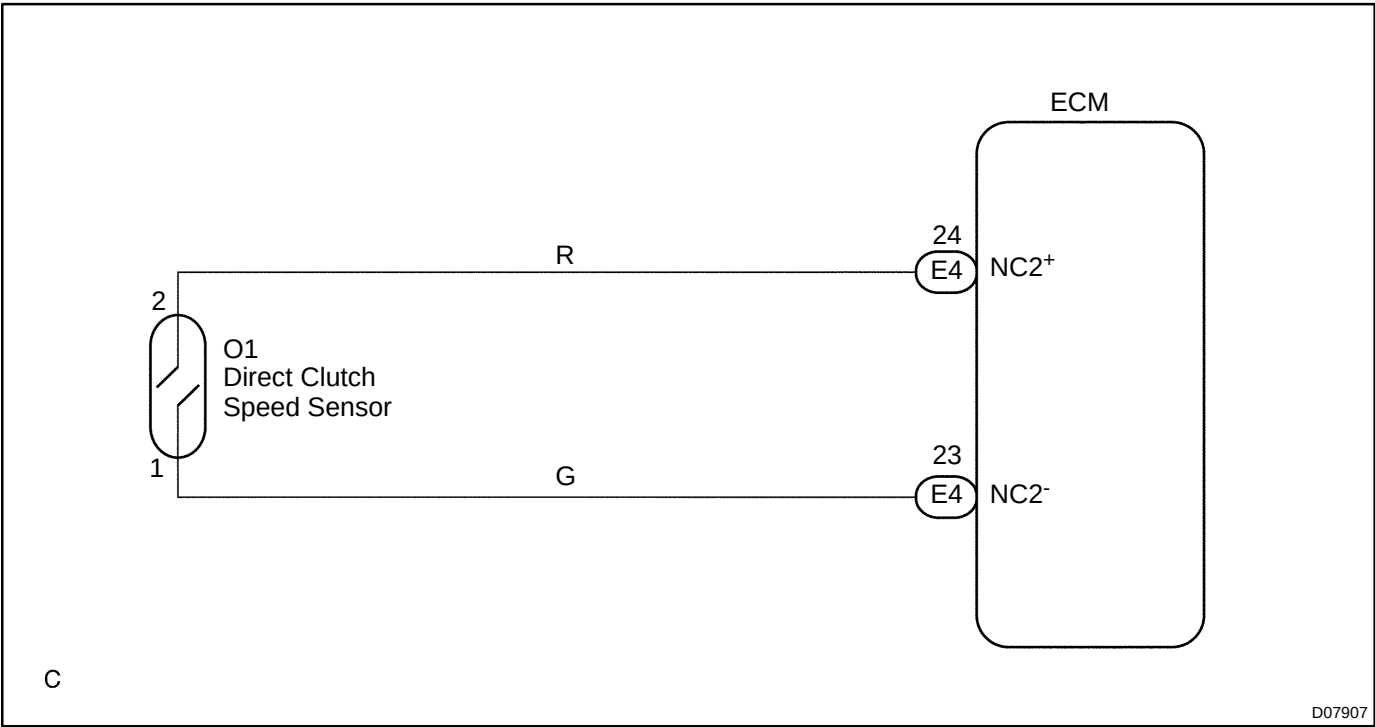
CIRCUIT DESCRIPTION



This sensor detects the rotation speed of the direct clutch drum. By comparing the direct clutch speed signal with the vehicle speed sensor signal, 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.

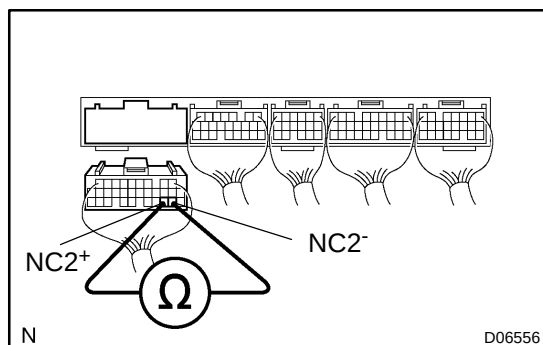
DTC No.	DTC Detecting Condition	Trouble Area
P1705	The ECM detects conditions (a), (b), (c), (d), (e) and (f) continuity for 4 secs. or more. (2-trip detection logic) (a) Gear change not being performed (b) Gear position: 1st, 2nd 3rd or O/D (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Park/neutral position switch: OFF (f) Shift solenoid valves No. 1, No. 2, SL and vehicle speed sensor are in normal operation.	●Open or short in direct clutch speed sensor circuit ●Direct clutch speed sensor ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check resistance between terminals NC2 ⁺ and NC2 ⁻ of ECM.

**PREPARATION:**

- (a) Remove the glove compartment.
- (b) Disconnect the connector from ECM.

CHECK:

Check resistance between terminals NC2⁺ and NC2⁻ of ECM.

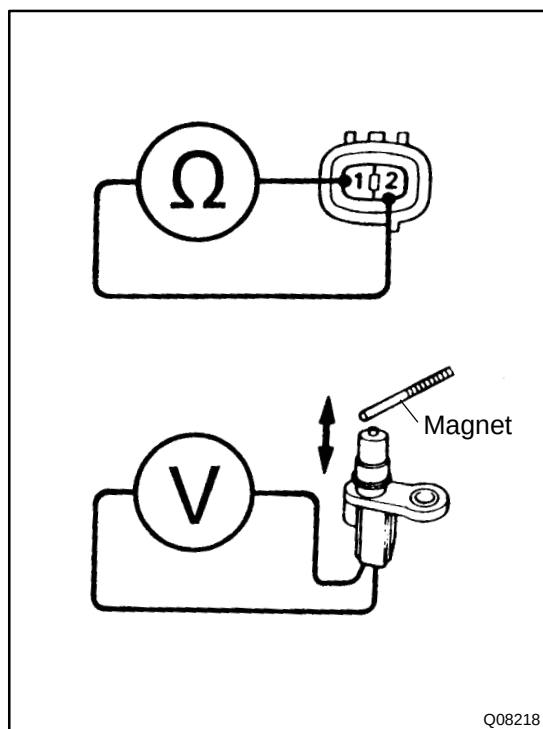
OK:

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

OK	Check and replace the ECM (See page IN-30).

NG

2	Check direct clutch speed sensor.

**PREPARATION:**

Remove the Direct clutch speed sensor from transaxle.

CHECK:

- (a) Measure resistance between terminals 1 and 2 of speed sensor.
- (b) Check voltage between terminals 1 and 2 of the speed sensor when a magnet is put close to the front end of the speed sensor then taken away quickly.

OK:

(a) Resistance: 560 - 680 Ω at 20 °C (68 °F)

(b) Voltage is generated intermittently.

HINT:

The voltage generated is extremely low.

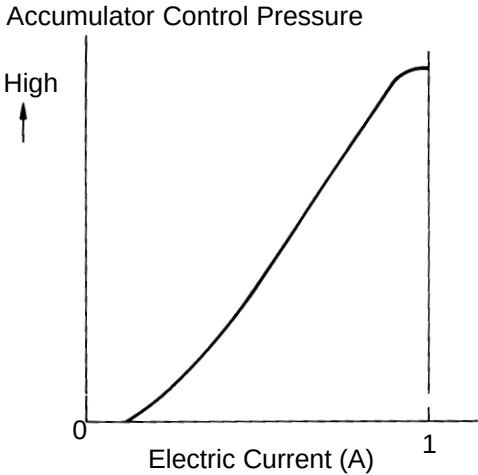
NG	Replace the direct clutch speed sensor.

OK

Check and repair the harness and connector between ECM and direct clutch speed sensor (See page IN-30).

DTC	P1765	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (Shift Solenoid Valve SLN)

CIRCUIT DESCRIPTION



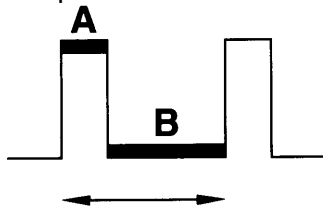
AT5608

(*) 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

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



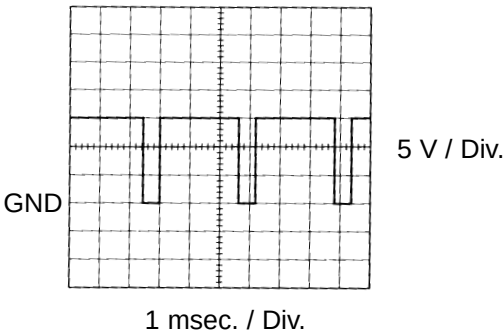
D00061 BE4056

D00060

DTC No.	DTC Detecting Condition	Trouble Area
P1765	After the engine is warmed up, the current flows to the shift solenoid valve SLN for 1 sec or more under condition (a) or (b): (a) Engine speed: 500 rpm or more (b) Park/neutral position switch: ON (P or N position)	●Open or short in shift solenoid valve SLN circuit ●Shift solenoid valve SLN ●ECM

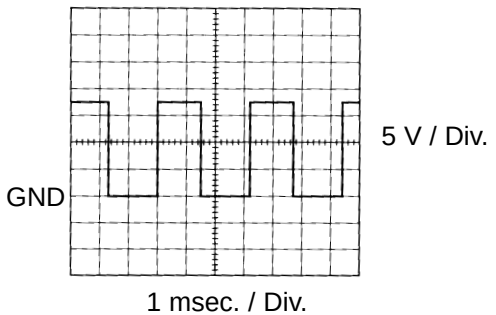
Reference

Waveform between terminals SLN⁺ and SLN⁻ when engine is idling.



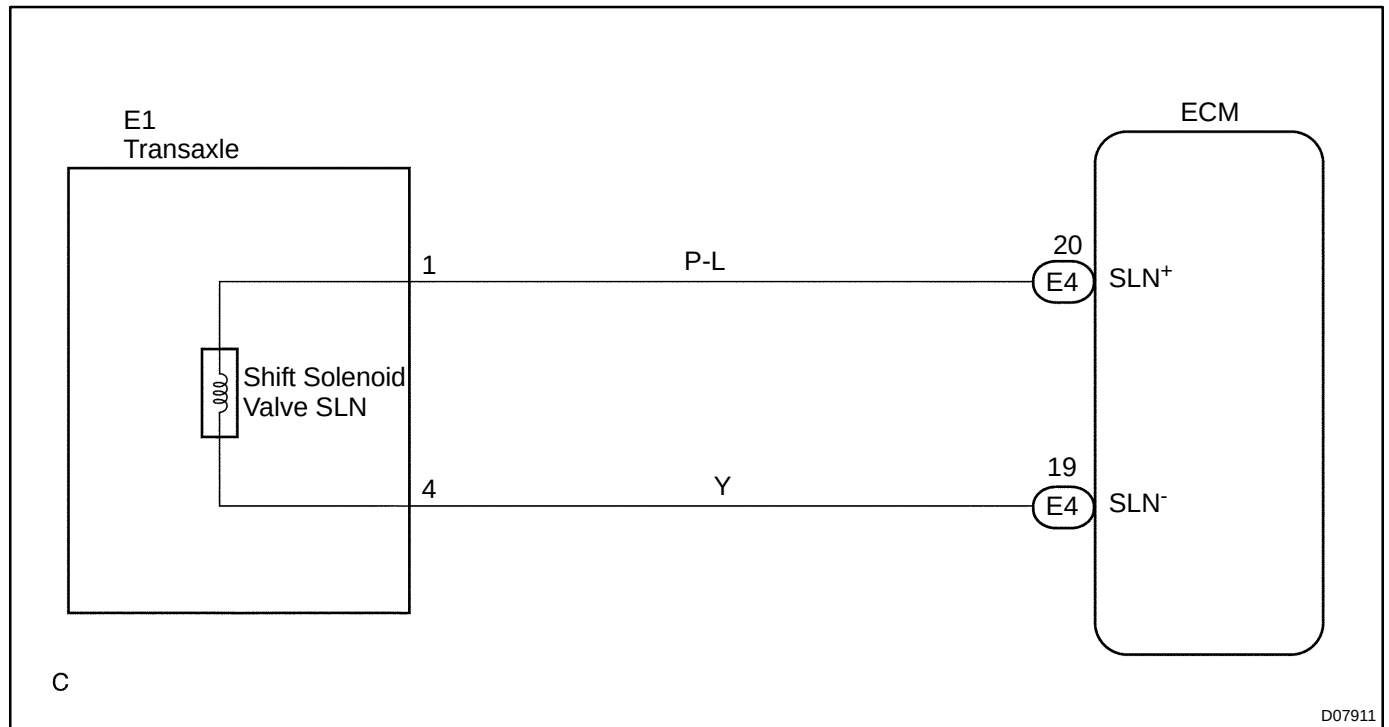
AT 8764 AT 8766

Waveform between terminals SLN⁺ and SLN⁻ during shift change.



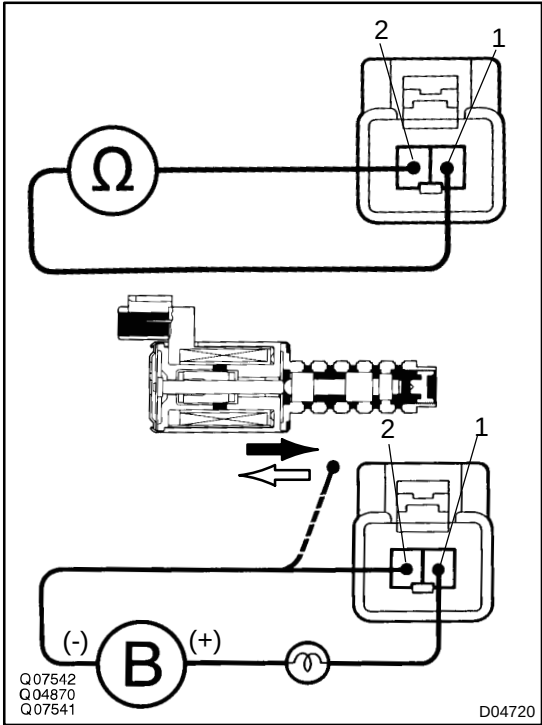
D00062

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check shift solenoid valve SLN.



Check solenoid resistance and operation:

PREPARATION:

Disconnect the shift solenoid valve SLN connector.

CHECK:

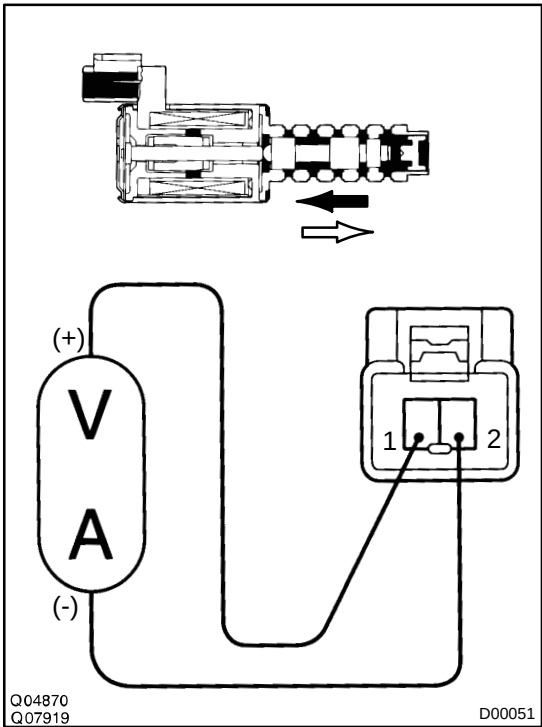
- Measure resistance between terminals 1 and 2 of solenoid connector.
- Connect positive $\oplus$ lead with an 8 - 10 W bulb to terminal 1 of solenoid connector and negative $\ominus$ lead to terminal 2, then check the movement of the valve.

OK:

(a) Resistance: 5.1 - 5.5 Ω

(b)

When battery positive voltage is supplied.	Valve moves in direction shown in illustration. (on the left)
When battery positive voltage is cut off.	Valve moves in direction shown in illustration. (on the right)



Check solenoid operation:

PREPARATION:

Connect positive $\oplus$ lead of the variable power supply to terminal 1 of solenoid connector and negative $\ominus$ lead to terminal 2.

CHECK:

- Check the movement of the valve when the voltage is gradually increased.
(A current greater than 1A should not be supplied.)
- Check the movement of the valve when the voltage is cut off.

OK:

(a) As the voltage is increased, the valve should move slowly in the $\leftarrow$ direction.

(b) The valve should return in the $\Rightarrow$ direction.

NG

Replace the shift solenoid valve SLN.

OK

2	Check harness and connector between battery and shift solenoid valve SLN, shift solenoid valve SLN and ECM (See page IN-30).

NG

Repair or replace the harness or connector.

OK

Check and replace the ECM (See page [IN-30](#)).

DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

The ECM receives signals (NSW, R, 2 and L) from the park/neutral position switch. When the signal is not sent to the ECM from the park/neutral position switch, the ECM judges that the shift lever is in D position.

DTC No.	DTC Detection Condition	Trouble Area
P1780	When driving under conditions (a) and (b) for 30 seconds 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 for the 2001 AVALON (RM008U) showing the electrical system from the battery to the ECM. The diagram includes components like the J5 J/C, P1 Park/Neutral Position switch, C9 Combination Meter, J/B No. 3, J/B No. 4, ECU-ACC, IG1 RELAY, FUSIBLE LINK BLOCK, Engine Room J/B, Engine Room R/B No. 5, I15 Ignition Switch, and ECM. It also shows ground points and various wire colors and gauges. Notes at the bottom indicate *1: Floor Shift and *2: Column Shift.

INSPECTION PROCEDURE

1 Read PNP, REVERSE, 2ND and LOW signals.

When using TOYOTA hand-held tester:**PREPARATION:**

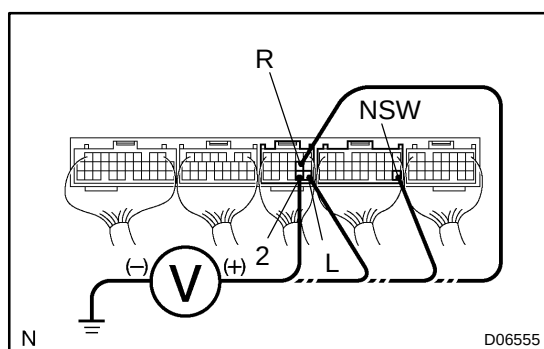
- (a) Remove the DLC3 cover.
- (b) Connect a TOYOTA hand-held tester to the DLC3.
- (c) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

Shift lever into the P, R, N, 2 and L positions, and read the PNP, REVERSE, 2ND and LOW signals on the TOYOTA hand-held tester.

OK:

Shift position	Signal
2	2ND OFF → ON
L	LOW OFF → ON
R	REVERSE OFF → ON
P, N	NSW OFF → ON

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

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

CHECK:

Measure voltage between each of terminals NSW, 2, L and R of ECM and body ground when the shift lever is shifted to the following positions.

OK:

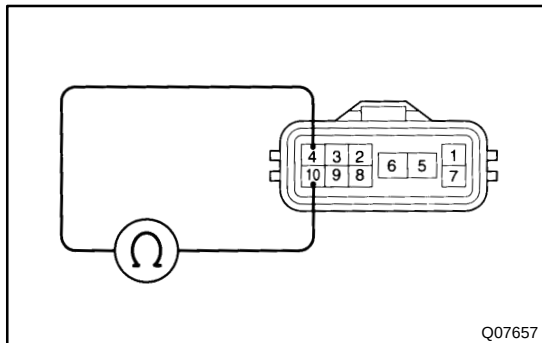
Position	NSW-Body ground	R-Body ground	2-Body ground	L-Body ground
P, N	0 V	0 V	0 V	0 V
R	9 - 14 V*	9 - 14 V*	0 V	0 V
D	9 - 14 V	0 V	0 V	0 V
2	9 - 14 V	0 V	9 - 14 V	0 V
L	9 - 14 V	0 V	0 V	9 - 14 V

HINT:

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

OK**Check and replace the ECM (See page [IN-30](#)).****NG**

2 Check park/neutral position switch.

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the park/neutral position switch (See page [AX-4](#)).

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to 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 the park/neutral position switch.

OK

Repair or replace harness and connector between battery and park/neutral position switch, park/neutral position switch and ECM (See page [IN-30](#)).

NG

Repair or replace the harness and connector.

OK

Check and replace the ECM (See page [IN-30](#)).

CUSTOMER PROBLEM ANALYSIS CHECK

Transaxle Control
System Check Sheet

Inspector's
Name :

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

Date Problem Occurred	/ /
Frequency problem occurs	☐ Continuous ☐ Intermittent (times a day)

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

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains ON

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

DIAGNOSTIC TROUBLE CODE CHART

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

*: ● ...MIL lights up

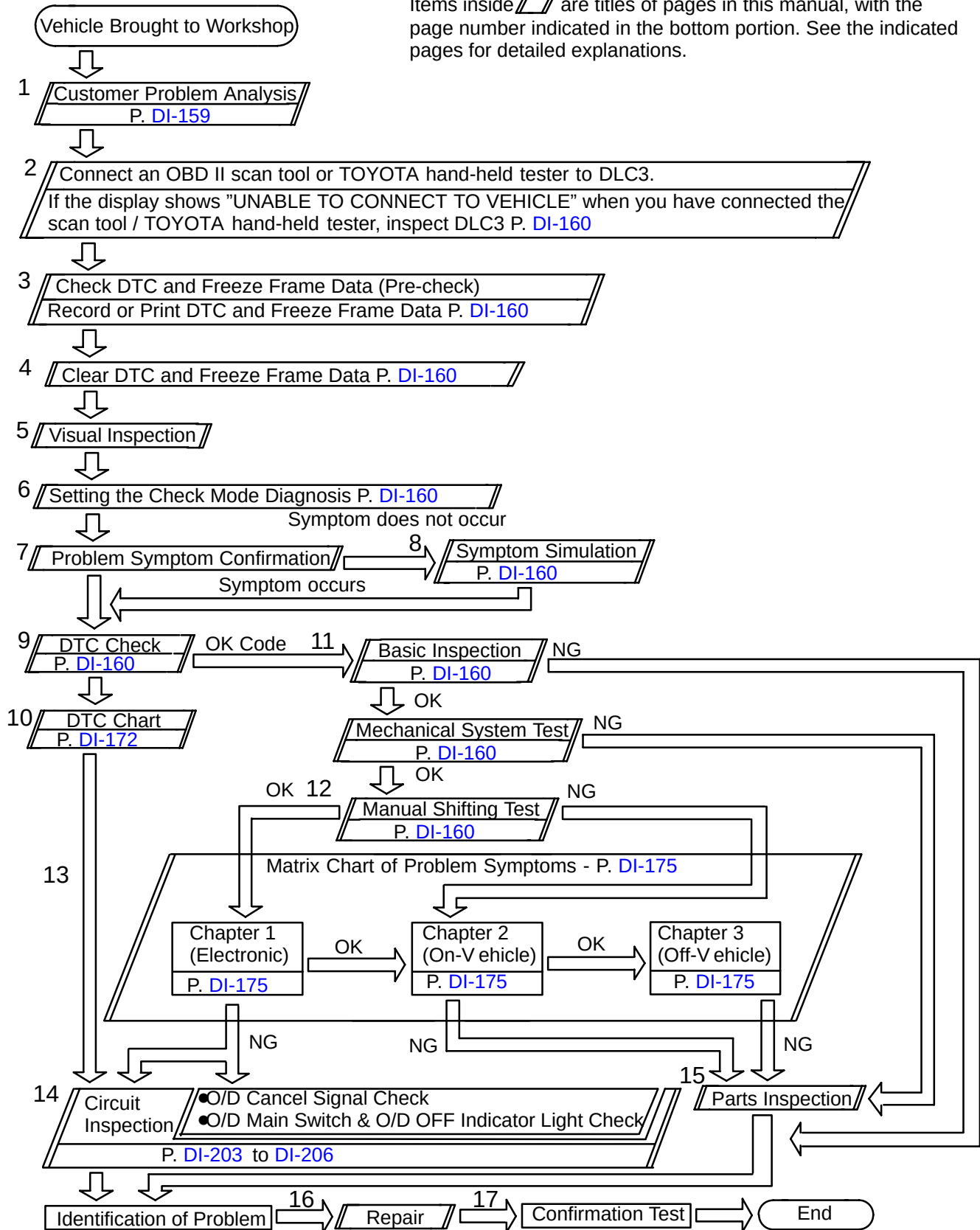
DTC No. (See Page)	Detection Item	Trouble Area	MIL *	Memory
P0500 (DI-178)	Vehicle Speed Sensor Malfunction (Vehicle Speed Sensor)	☐ Open or short in vehicle speed sensor circuit ☐ Vehicle speed sensor ☐ Combination meter ☐ ECM ☐ Automatic transaxle (clutch, brake or gear etc.)	●	○
P0750 (DI-181)	Shift Solenoid A Malfunction (Shift Solenoid Valve No.1)	☐ Shift solenoid valve No.1 is stuck open or closed ☐ Valve body is blocked up or stuck ☐ Automatic transaxle (clutch, brake or gear etc.)	●	○
P0753 (DI-183)	Shift Solenoid A Electrical Malfunction (Shift Solenoid Valve No.1)	☐ Open or short in shift solenoid valve No.1 circuit ☐ Shift solenoid valve No.1 ☐ ECM	●	○
P0755 (DI-181)	Shift Solenoid B Malfunction (Shift Solenoid Valve No.2)	☐ Shift solenoid valve No.2 is stuck open or closed ☐ Valve body is blocked up or stuck ☐ Automatic transaxle (clutch, brake or gear etc.)	●	○
P0758 (DI-183)	Shift Solenoid B Electrical Malfunction (Shift Solenoid Valve No.2)	☐ Open or short in shift solenoid valve No.2 circuit ☐ Shift solenoid valve No.2 ☐ ECM	●	○
P0770 (DI-187)	Shift Solenoid E Malfunction (Shift Solenoid Valve SL)	☐ Shift solenoid valve SL is stuck open or closed ☐ Valve body is blocked up or stuck ☐ Lock-up clutch ☐ Automatic transaxle (clutch, brake or gear etc.)	●	○
P0773 (DI-189)	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve SL)	☐ Open or short in shift solenoid valve SL circuit ☐ Shift solenoid valve SL ☐ ECM	●	○
P1520 (DI-192)	Stop Light Switch Signal Malfunction	☐ Open or short in stop light switch circuit ☐ Stop light switch ☐ ECM	●	○
P1705 (DI-193)	NC2 Revolution Sensor Circuit Malfunction (Direct Clutch Speed Sensor)	☐ Open or short in direct clutch speed sensor circuit ☐ Direct clutch speed sensor ☐ ECM	●	○
P1765 (DI-195)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (Shift Solenoid Valve SLN)	☐ Open or short in shift solenoid valve SLN circuit ☐ Shift solenoid valve SLN ☐ ECM	●	○
P1780 (DI-199)	Park/Neutral Position Switch Malfunction	☐ Short in park/neutral position switch circuit ☐ Park/neutral position switch ☐ ECM	●	○

AUTOMATIC TRANSAXLE

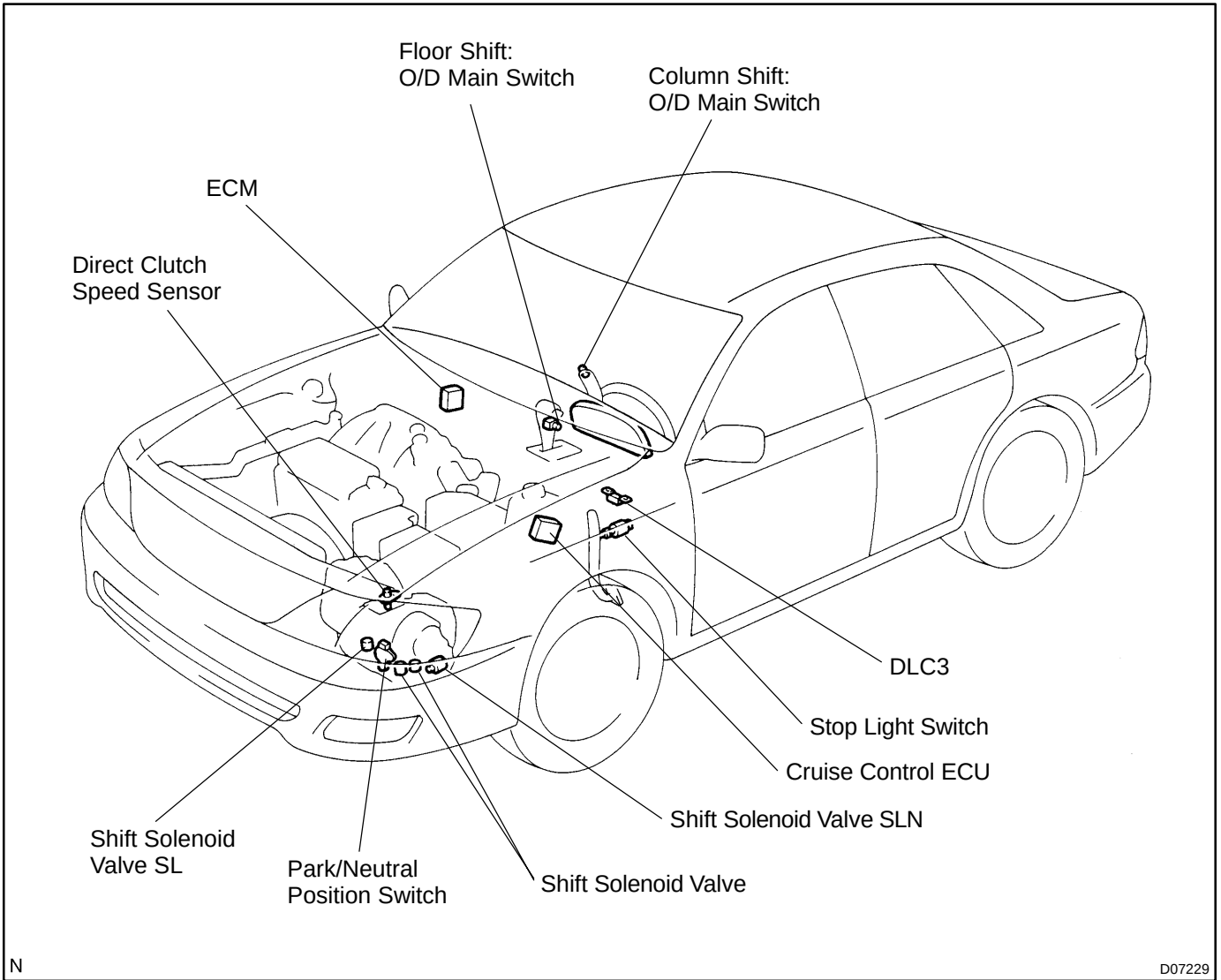
HOW TO PROCEED WITH TROUBLESHOOTING

DI02C-06

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.



PARTS LOCATION



N

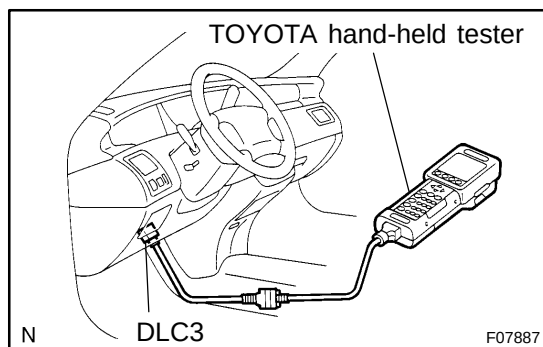
D07229

PRE-CHECK

1. DIAGNOSIS SYSTEM

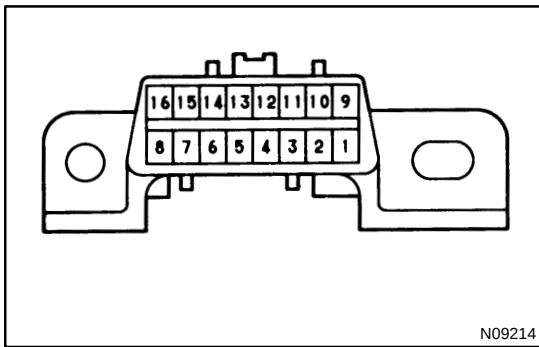
(a) Description

- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle an OBD II scan tool complying with SAE J1987 or TOYOTA hand-held tester, and read off various data output from the vehicle's ECM.
- OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page [DI-14](#)).
If the malfunction only occurs in 3-trip, the MIL goes off but the DTCs remain recorded in the ECM memory.



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

- The diagnosis system operates in normal mode during normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2-trip detection logic(*) to prevent erroneous detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up and for a malfunction that is only detected once or momentarily (TOYOTA hand-held tester) (See page [DI-160](#)).
- *2-trip detection logic:
When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the MIL to light up.



(b) Inspect the DLC3.

The vehicle's ECM uses 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 $\leq$ Line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) - Body	Always	1 Ω or less
5 (Signal Ground) - Body	Always	1 Ω or less
16 (B+) - Body	Always	9 - 14 V

HINT:

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

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



2. INSPECT DIAGNOSIS (NORMAL MODE)

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

HINT:

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

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

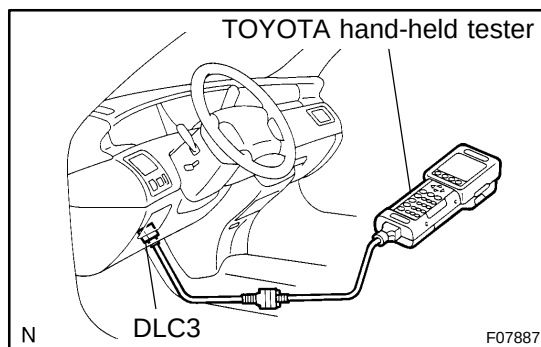
- (b) Check the DTC.

NOTICE:

TOYOTA hand-held tester only:

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

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



- (2) Connect the OBD II scan tool or TOYOTA hand-held tester to DLC3 at the lower of the instrument panel.
- (3) Turn the ignition switch ON and turn the OBD II scan tool or TOYOTA hand-held tester switch ON.
- (4) Use the OBD II scan tool or TOYOTA hand-held tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).
- (5) See page [DI-172](#) to confirm the details of the DTCs.

NOTICE:

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

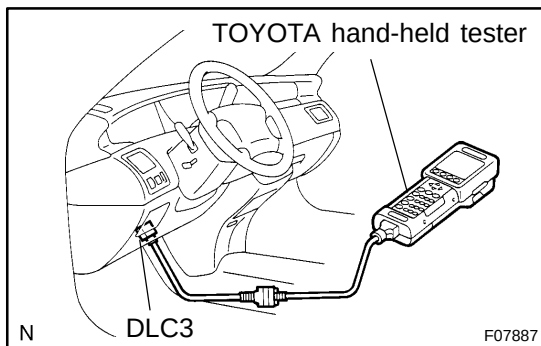
3. INSPECT DIAGNOSIS (CHECK MODE)

HINT:

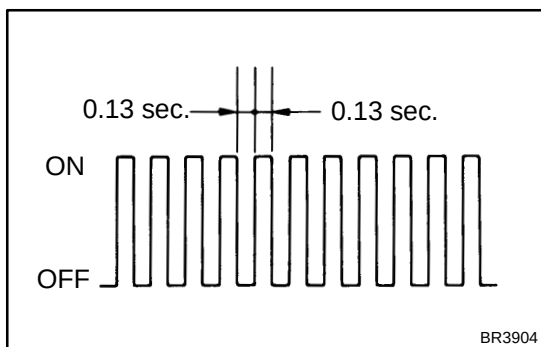
TOYOTA hand-held tester only: Compared to the normal mode, the check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in Normal mode can also be detected in Check mode.

(a) Check the DTC.

- (1) Check the initial conditions.
 - Battery positive voltage 11 V or more
 - Throttle valve fully closed
 - Transaxle in P position
 - Air conditioning switched OFF
- (2) Turn the ignition switch OFF
- (3) Prepare a TOYOTA hand-held tester



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



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

NOTICE:

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

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

HINT:

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

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

- (b) Clearance the DTC.

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

4. ROAD TEST

NOTICE:

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

- (a) D position test

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

- (1) Check 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-24](#)).

HINT:

- O/D Gear Up-shift Prohibition Control (1. Coolant temp. is 60 °C (140 °F) or less. 2. If there is a 10 km/h (6 mph) difference between the set cruise control speed and vehicle speed.)
 - O/D Gear Lock-up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60 °C (140 °F) or less.)
- (2) Check for shift shock and slip.
Check for shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up-shifts.
- (3) Check for abnormal noises and vibration.
Run at the D position lock-up or O/D gear and check for abnormal noises and vibration.

HINT:

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

- (4) Check kick-down operation.

While running in the D position, 2nd, 3rd and O/D gears, check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick-downs conform to those indicated in the automatic shift schedule (See page [SS-24](#)).

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

- (6) Check the lock-up mechanism.

- Drive in D position, O/D gear, at a steady speed (lock-up ON) of about 60 km/h (37 mph).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

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

- (b) 2 position test

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

- (1) Check up-shift operation.

Check to see that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page [SS-24](#)).

HINT:

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

- (2) Check engine braking.

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

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

(c) L position test

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

- (1) Check no up-shift.
While running in the L position, check that there is no up-shift to 2nd gear.
- (2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration.

(d) R position test

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

CAUTION:

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

(e) P position test

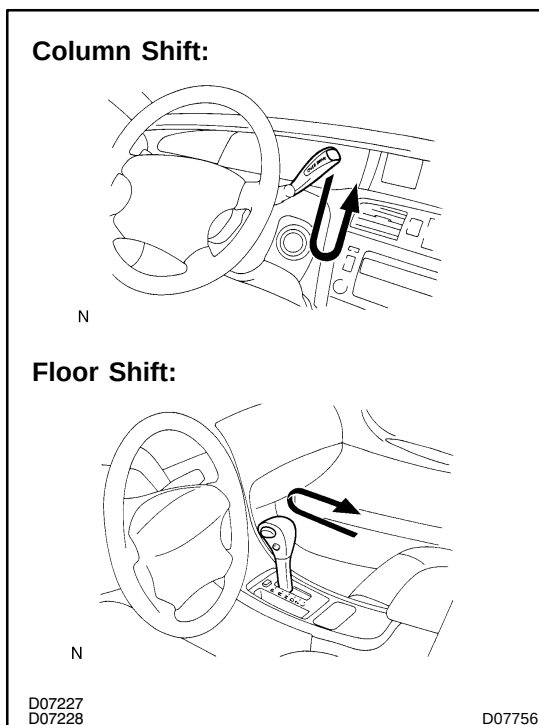
Stop the vehicle on a grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.

5. BASIC INSPECTION

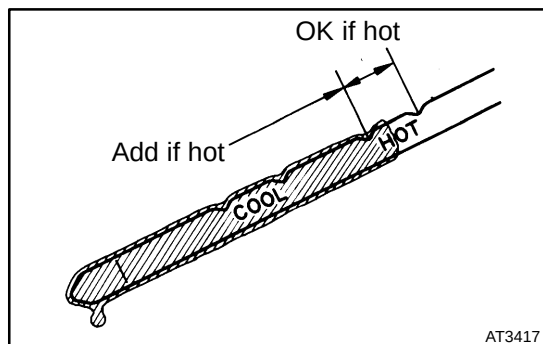
(a) Check the fluid level.

HINT:

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



- (1) Park the vehicle on a level surface and set the parking brake.
- (2) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from P to L position and return to P position.



- (3) Pull out the dipstick and wipe it clean.
- (4) Push it back fully into the pipe.
- (5) Pull it out and check that the fluid level is in the HOT range.

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

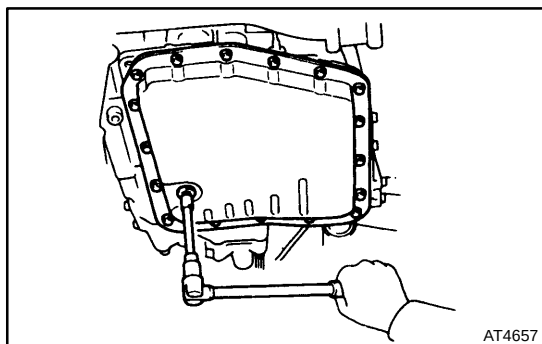
Fluid type: ATF D-II or DEXRON®III (DEXRON®II)

NOTICE:

- **Do not overfill.**
- **After filling ATF, check the oil level securely then drive a vehicle.**

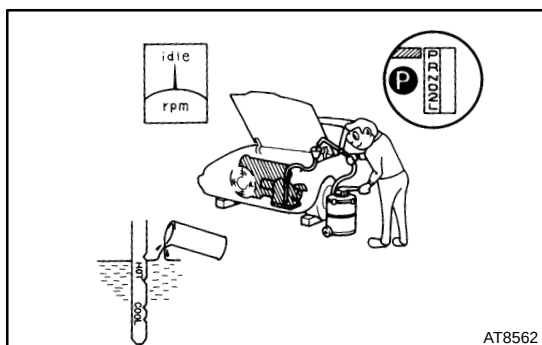
- (b) Check the fluid condition.

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



- (c) Replace the ATF.

- (1) Remove the drain plug and drain the fluid.
- (2) Reinstall the drain plug securely.

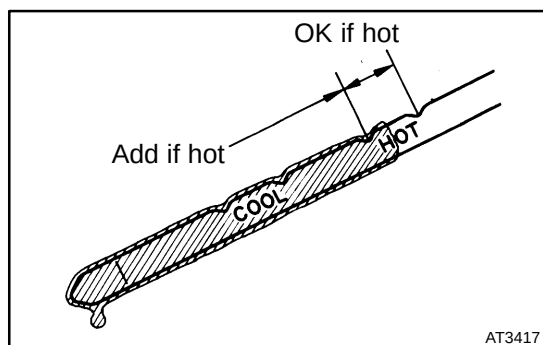


- (3) With the engine OFF add new fluid through the oil filler pipe.

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

Capacity: 4.75 liters (5.0 US qts, 4.2 Imp. qts)

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



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

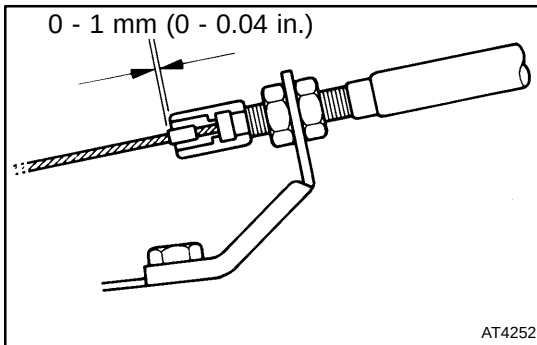
NOTICE:

Do not overfill.

(d) Check the fluid leaks.

Check for leaks in the transaxle.

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

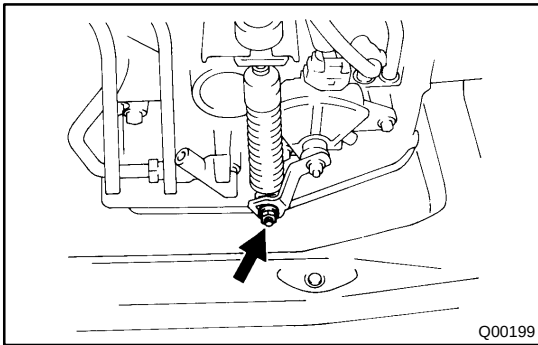


(e) Inspect and adjust the throttle cable.

- (1) Check that the accelerator pedal is fully released.
- (2) Check that the inner cable is not slack.
- (3) Measure the distance between the outer cable end and stopper on the cable.

Standard distance: 0 - 1 mm (0 - 0.04 in.)

If the distance is not the standard, adjust the cable by adjusting nuts.



(f) Inspect and adjust the shift lever position.

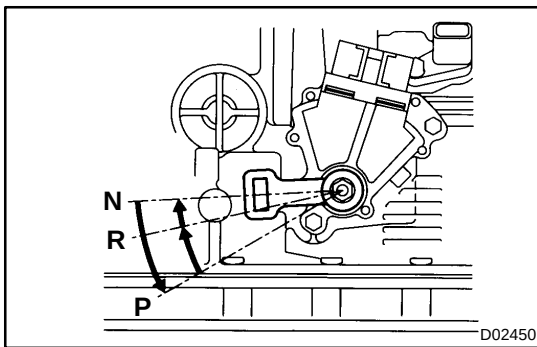
When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator is aligned with the correct position.

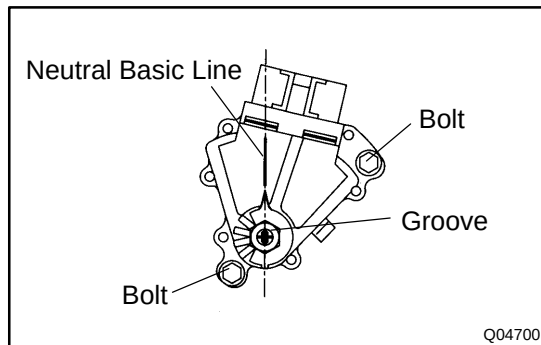
If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

- (1) Loosen the nut on the shift lever.
- (2) Push the control shaft fully downward.
- (3) Return the control shaft lever 2 notches to N position.
- (4) Set the shift lever to N position.
- (5) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

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





- (g) Inspect and adjust the park/neutral position.
Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.
If it is not as stated above, carry out the following adjustment procedures.

- (1) Loosen the park/neutral position switch bolt and set the shift lever to the N position.
- (2) Align the groove and neutral basic line.
- (3) Hold in position and tighten the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

For continuity inspection of the park/neutral position switch, see page [DI-199](#).

- (h) Check the idle speed.

Idle speed: 700 ± 50 rpm

(In N position and air conditioner OFF)

6. MECHANICAL SYSTEM TESTS

- (a) Measure the stall speed.

The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- Do the test at normal operating fluid temperature 50 - 80 °C (122 - 176 °F).
 - Do not continuously run this test longer than 5 seconds.
 - To ensure safety, conduct this test in a wide, clear level area which provides good traction.
 - The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.
- (1) Chock the 4 wheels.
 - (2) Connect an OBD II scan tool or TOYOTA hand-held tester to DLC3.
 - (3) Fully apply the parking brake.
 - (4) Keep your left foot pressing firmly on the brake pedal.
 - (5) Start the engine.
 - (6) Shift into the D position. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 2,325 – 2,775 rpm

- (7) Do the same test in R position.

Stall speed: 2,325 – 2,775 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 & 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 normal operating fluid temperature 50 - 80 °C (122 - 176 °F).**
- **Be sure to allow 1 minute interval between tests.**
- **Take 3 measurements and take the average value.**

- (1) Connect an OBD II scan tool or TOYOTA hand-held tester to DLC3.
- (2) Fully apply the parking brake.
- (3) Start the engine and check idle speed.

Idle speed: 700 ± 50 rpm (In N position and air conditioner OFF)

- (4) Shift the shift lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

Time lag: N → D Less than 1.2 seconds

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

Time lag: N → R Less than 1.5 seconds

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

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

7. HYDRAULIC TEST

Measure the line pressure.

NOTICE:

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

(1) Warm up the ATF.

(2) Remove the test plug on the transaxle case front left side and connect SST (See page [AX-33](#) for the location to connect SST).

SST 09992-00095 (09992-00231, 09992-00271)

(3) Fully apply the parking brake and chock the 4 wheels.

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

(5) Start the engine and check idling speed.

(6) Keep your left foot pressing firmly on the brake pedal and shift into D 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 engine speed reaches stall speed.

(9) In the same manner, do the test in R position.

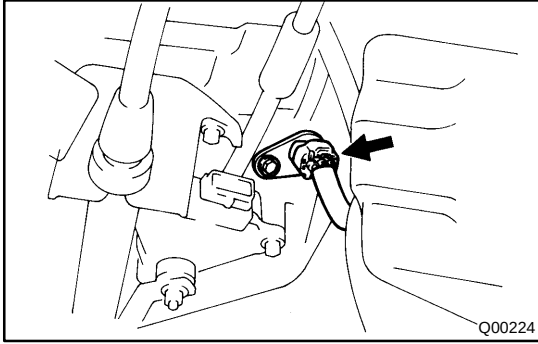
Specified line pressure:

Condition	D position kPa (kgf/cm ² , psi)	R position kPa (kgf/cm ² , psi)
Idling	401 - 461 (4.1 - 4.7, 58 - 66)	804 - 882 (8.2 - 9.0, 117 - 128)
Stall	1,138 - 1,236 (11.6 - 12.6, 165 - 179)	1,716 - 1,854 (17.5 - 18.9, 249 - 269)

If the measured pressure is not up to the specified value, recheck the throttle cable adjustment and retest.

Evaluation:

Problem	Possible cause
If the measured values at all positions are higher	• Throttle cable out of adjustment • Throttle valve defective • Regulator valve defective
If the measured values at all positions are lower	• Throttle cable out of adjustment • 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 leakage • Forward clutch defective
If pressure is low in the R position only	• R position circuit fluid leakage • Direct clutch defective • 1st & reverse brake defective



8. MANUAL SHIFTING TEST

HINT:

With this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the 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
D	O/D
2	O/D
L	1st
R	Reverse
P	Pawl Lock

HINT:

If the L, 2 and D position gear positions are difficult to positions are difficult to distinguish, do the above read test.

If any abnormality is found in the above test, the problem is in the transaxle itself.

- (c) Connect the solenoid wire.
- (d) Cancel out the DTC (See page [DI-160](#)).

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the diagnostic trouble code check but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

Chapter 1: Electronic circuit matrix chart

Chapter 2: On-vehicle repair matrix chart

Chapter 3: Off-vehicle repair matrix chart

If the instruction "Proceed to next circuit inspection shown in matrix chart" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.

If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check and replace the ECM.

Chapter 1: Electronic circuit matrix chart

Symptom	Suspect Area	See page
No up-shift (A particular gear, from 1st to 3rd gear, is not up-shifted)	ECM	IN-30
No up-shift (3rd → O/D)	1. O/D main switch & O/D OFF indicator light circuit 2. O/D cancel signal circuit 3. ECM	DI-206 DI-203 IN-30
No down-shift (O/D → 3rd)	ECM	IN-30
No down-shift (A particular gear, from 3rd to 1st gear, is not down-shifted)	ECM	IN-30
No lock-up or No lock-up off	ECM	IN-30
Shift point too high or too low	ECM	IN-30
Up-shift to 2nd while in L position	ECM	IN-30
Up-shift to 3rd while in 2 position	ECM	IN-30
Up-shift to O/D from 3rd while O/D main switch is OFF	1. O/D main switch & O/D OFF indicator light circuit 2. ECM	DI-206 IN-30
Up-shift to O/D from 3rd while engine is cold	ECM	IN-30
Harsh engagement (N → D)	ECM	IN-30
Harsh engagement (Any driving position)	ECM	IN-30
Poor acceleration	ECM	IN-30
Engine stalls when starting off or stopping	ECM	IN-30
No kick-down	ECM	IN-30

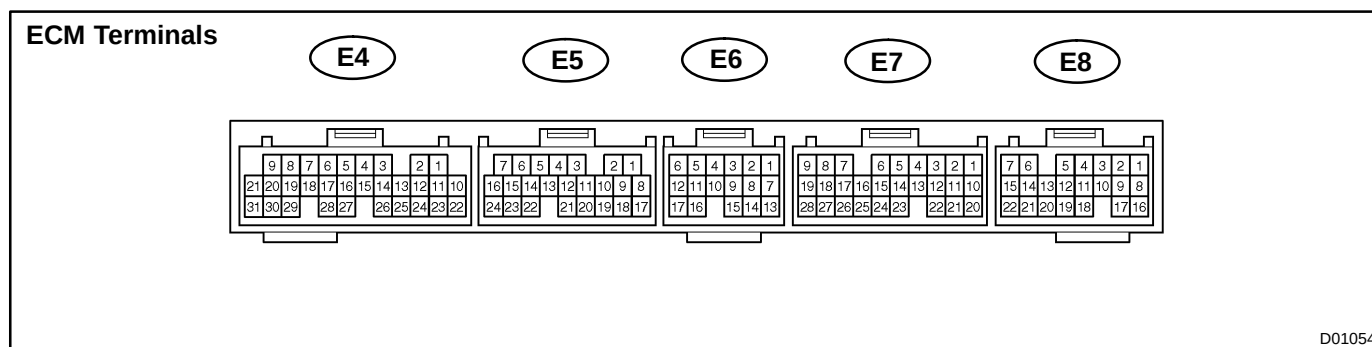
Chapter 2: On-vehicle repair**(● : A541E automatic transaxle repair manual Pub. No. RM741U)**

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Manual valve 2. Throttle valve 3. Primary regulator valve 4. 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. No.1 accumulator control valve 3. Off-vehicle repair matrix chart	● ● -
Harsh engagement (N → L)	Low coast modulator valve	●
Harsh engagement (Lock-up)	1. Lock-up relay valve 2. Off-vehicle repair matrix chart	● -
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Throttle modulator valve 2. Cut back valve 3. Throttle valve	● ● ●
Harsh engagement (2nd → 3rd)	C 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. Throttle valve 2. Oil strainer 3. Off-vehicle repair matrix chart	● ● -
No engine braking (1st: L position)	1. Low coast modulator valve 2. Off-vehicle repair matrix chart	● -
No engine braking (2nd: 2 position)	1. 2nd coast modulator valve 2. Off-vehicle repair matrix chart	● -
No kick-down	1. 1-2 shift valve 2. 2-3 shift valve 3. 3-4 shift valve	● ● ●

Chapter 3: Off-vehicle repair**(● : A541E automatic transaxle repair manual Pub. No. RM741U)**

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Front and rear planetary gear 2. O/D planetary gear 3. O/D one-way clutch (F ₀) 4. O/D direct clutch (C ₀) 5. Forward clutch (C ₁) 6. O/D brake (B ₀)	● ● ● ● ● ●
Vehicle does not move in R position	1. Front and rear planetary gear unit 2. Direct clutch (C ₂) 3. O/D direct clutch (C ₀) 4. 1st & reverse brake (B ₃)	● ● ● ●
No up-shift (1st → 2nd)	1. No. 1 one-way clutch (F ₁) 2. 2nd brake (B ₂)	● ●
No up-shift (2nd → 3rd)	Direct clutch (C ₂)	●
No up-shift (3rd → O/D)	O/D brake (B ₀)	●
No lock-up or No lock-up off	Torque converter clutch	-
Harsh engagement (N → D)	1. Forward clutch (C ₁) 2. O/D one-way clutch (F ₀) 3. No. 2 one-way clutch (F ₂)	● ● ●
Harsh engagement (N → R)	1. Direct clutch (C ₂) 2. 1st & reverse brake (B ₃)	● ●
Harsh engagement (Lock-up)	Torque converter clutch	-
Slip or shudder (Forward position: After warm-up)	1. Torque converter clutch 2. O/D direct clutch (C ₀) 3. Forward clutch (C ₁) 4. O/D one-way clutch (F ₀)	● ● ● ●
Slip or shudder (R position)	1. Direct clutch (C ₂) 2. 1st & reverse brake (B ₃) 3. O/D direct clutch (C ₀)	● ● ●
Slip or shudder (1st)	No. 2 one-way clutch (F ₂)	●
Slip or shudder (2nd)	1. No. 1 one-way clutch (F ₁) 2. 2nd brake (B ₂)	● ●
Slip or shudder (3rd)	Direct clutch (C ₂)	●
Slip or shudder (O/D)	O/D brake (B ₀)	●
No engine braking (1st ~ 3rd: D position)	2nd brake (B ₂)	●
No engine braking (1st: L position)	1st & reverse brake (B ₃)	●
No engine braking (2nd: 2 position)	2nd coast brake (B ₁)	●
Poor acceleration (All position)	1. Torque converter clutch 2. O/D planetary gear	- ●
Poor acceleration (O/D)	1. O/D direct clutch (C ₀) 2. O/D planetary gear	● ●
Large shift shock or engine stalls when starting off or stopping	Torque converter clutch	-

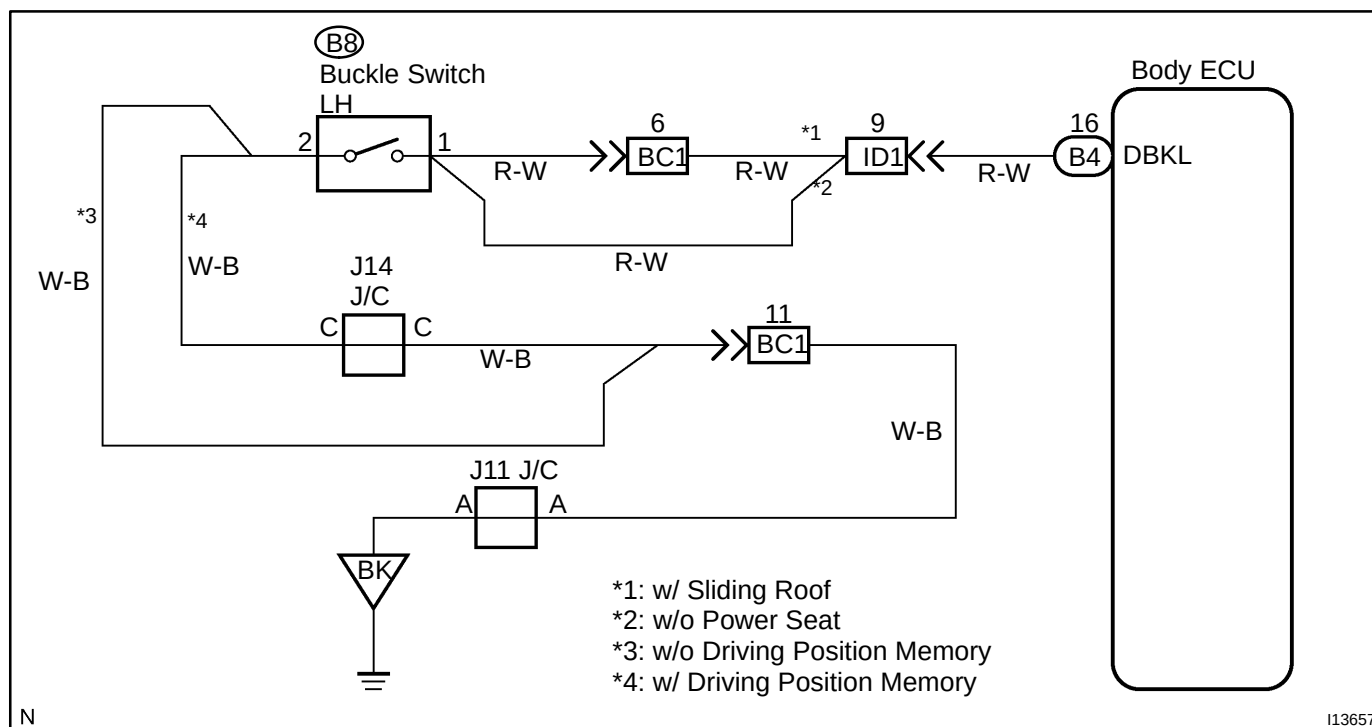
TERMINALS OF ECM



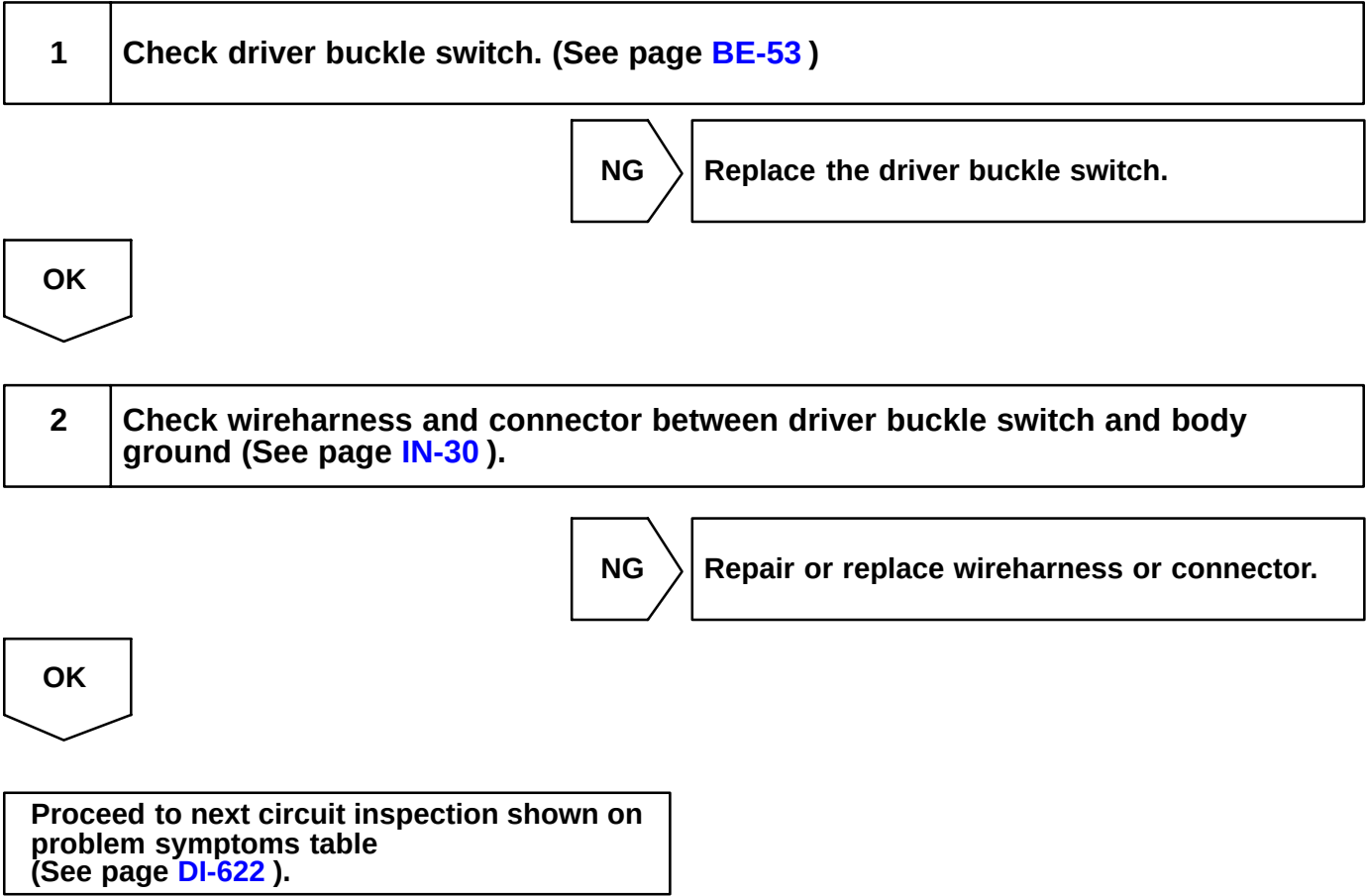
Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S1 (E4-7) ↔ E1 (E5-17)	P ↔ BR	IG ON	10 - 14
		1st or 2nd gear	10 - 14
		3rd or O/D gear	Below 1
S2 (E6-1) ↔ E1 (E5-17)	G-Y ↔ BR	IG ON	Below 1
		2nd or 3rd gear	10 - 14
		1st or O/D gear	Below 1
SL (E6-15) ↔ E1 (E5-17)	G-W ↔ BR	IG ON	Below 1
		Vehicle driving under lock-up position	10 - 14
NC2 ⁺ (E4-24) ↔ NC2 ⁻ (E4-23)	R ↔ G	Engine is running (Except 2nd gear)	Pulse signal is output Below 1 ↔ 4 - 5
SLN ⁺ (E4-20) ↔ SLN ⁻ (E4-19)	P-L ↔ Y	IG ON	10 - 14
OD1 (E7-24) ↔ E1 (E5-17)	GR ↔ BR	IG ON	5 - 6
ODLP (E8-9) ↔ E1 (E5-17)	G-O ↔ BR	Except O/D gear	10 - 14
		O/D gear	Below 1
L (E6-13) ↔ E1 (E5-17)	Y ↔ BR	IG ON and Shift lever L position	10 - 14
		IG ON and Shift lever other than L position	Below 1
2 (E6-14) ↔ E1 (E5-17)	G-Y ↔ BR	IG ON and Shift lever 2 position	10 - 14
		IG ON and Shift lever other than 2 position	Below 1
R (E6-8) ↔ E1 (E5-17)	R-B ↔ BR	IG ON and Shift lever R position	10 - 14
		IG ON and Shift lever other than R position	Below 1
NSW (E7-20) ↔ E1 (E5-17)	B-W ↔ BR	IG ON and Shift lever P or N position	10 - 14
		IG ON and Shift lever other than P or N position	Below 1
ODMS (E6-12) ↔ E1 (E5-17)	G-O ↔ BR	IG ON	10 - 14
		IG ON and Press continuously O/D main switch	Below 1.5
SPD (E7-22) ↔ E1 (E5-17)	V-W ↔ BR	IG ON and vehicle stationary	Below 1.5
		IG ON and one front wheel is turned slowly	Pulse signal is output Below 1.5 ↔ 4 - 5

Driver buckle switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

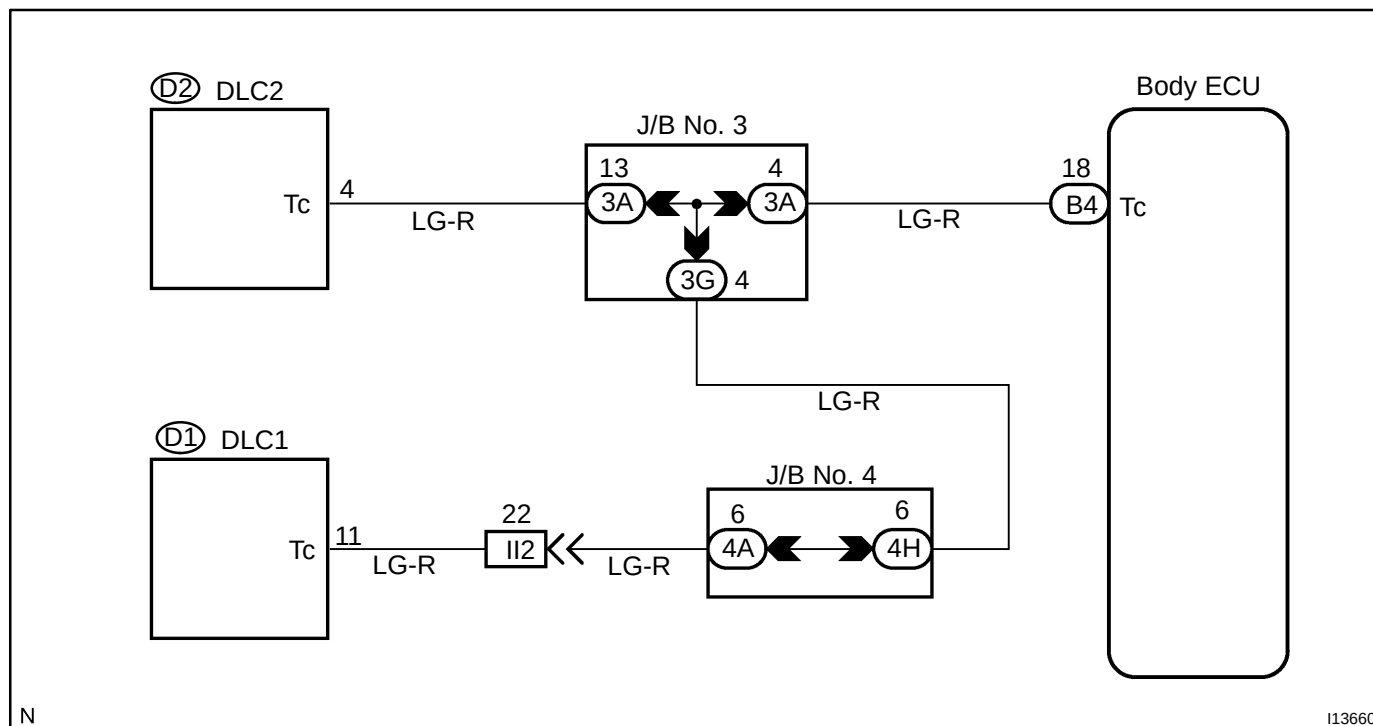


Diagnosis Circuit

CIRCUIT DESCRIPTION

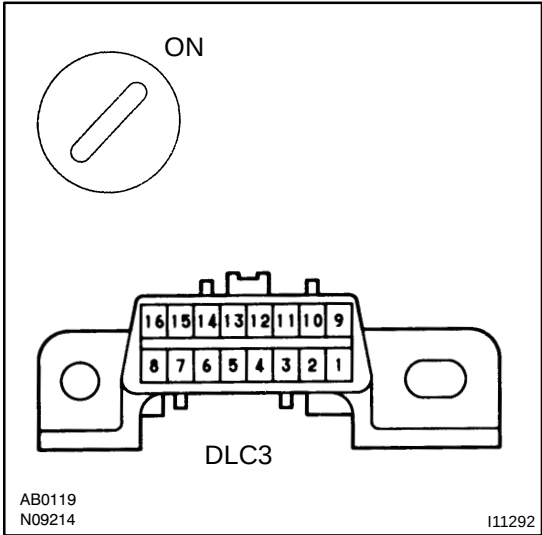
This circuit sends a signal to the ECU that DTC output is required.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E ₁ of DLC3.



PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminals SIL(7) and CG(4) of DLC3.

OK:

Voltage: 10 - 14 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-622](#)).

NG

2	Check harness and connector between body control ECU and DLC3, DLC3 and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

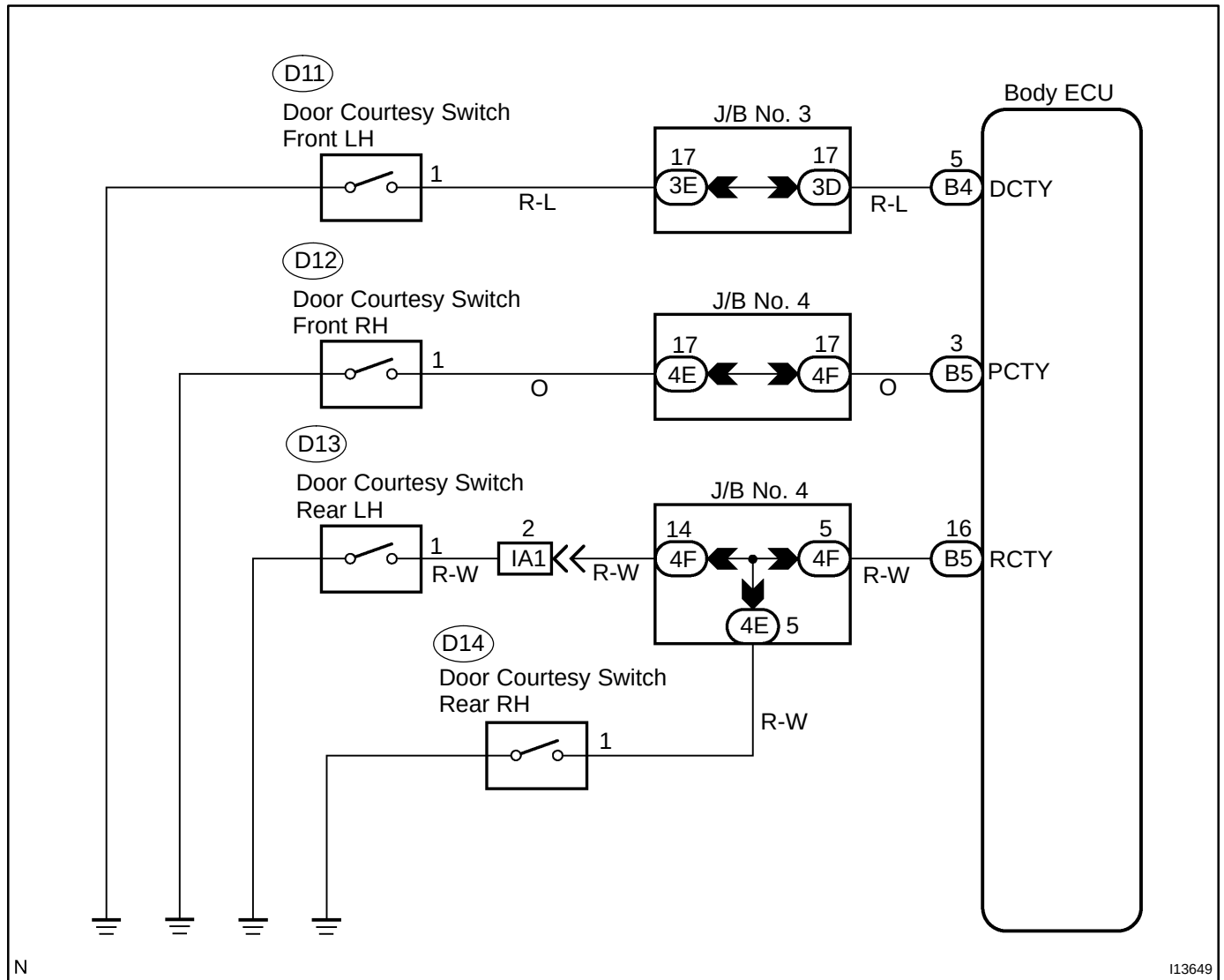
Check and replace Body Control ECU
(See page [IN-30](#)).

Door courtesy switch circuit

CIRCUIT DESCRIPTION

The door courtesy switch goes on when the door is opened and goes off when door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of door courtesy light.

CHECK:

Check that door courtesy light comes on when door opened, and goes off when door is closed.

OK:

Must be operated normally.

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-622](#)).

NG

2	Check courtesy switch (See page BE-31).

NG

Replace the courtesy switch.

OK

3	Check wireharness and connector between courtesy light and body ECU, courtesy switch and body door ECU (See page IN-30).

NG

Repair or replace wireharness or connector.

OK

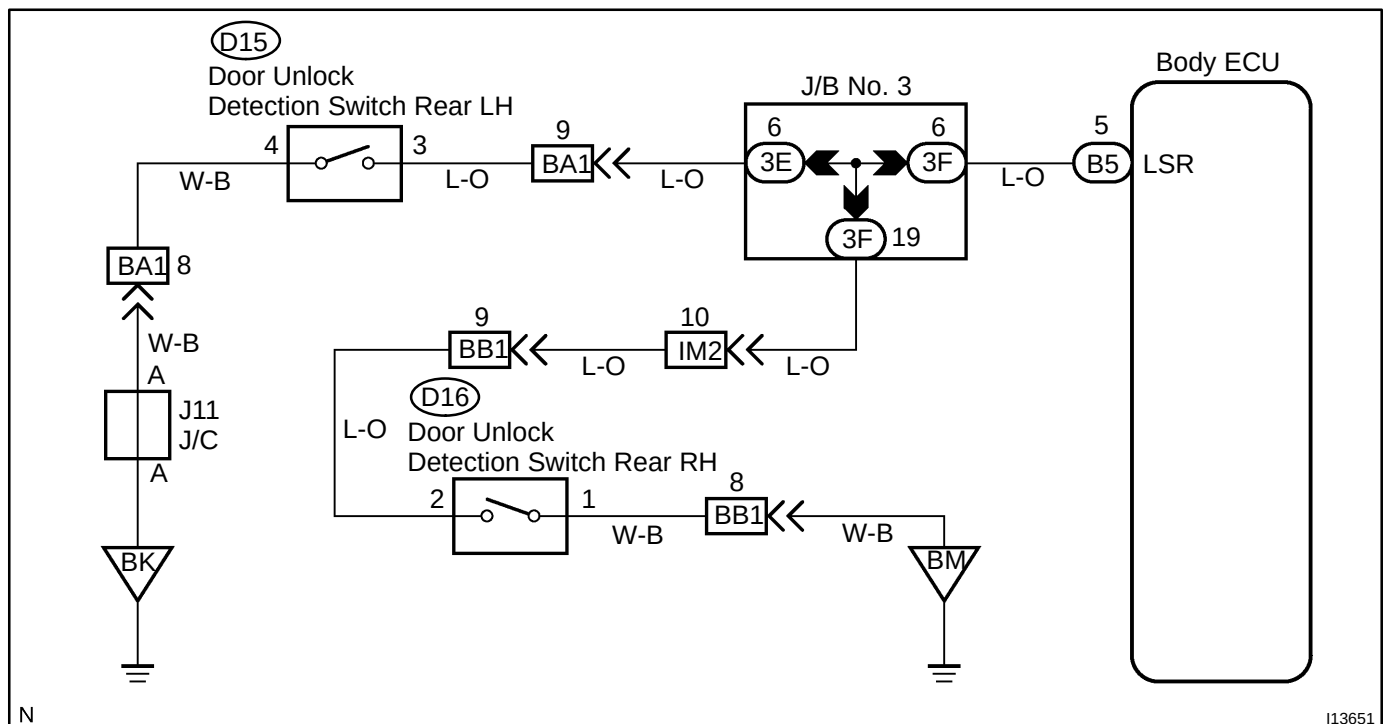
Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).

Rear door unlock detection switch circuit

CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function.

WIRING DIAGRAM



N

I13651

INSPECTION PROCEDURE

1	Check door unlock detection switch. (See page BE-82)

NG

Replace the door lock motor.

OK

2	Check wireharness and connector between door unlock detection switch and body ECU. (See page IN-30)

NG

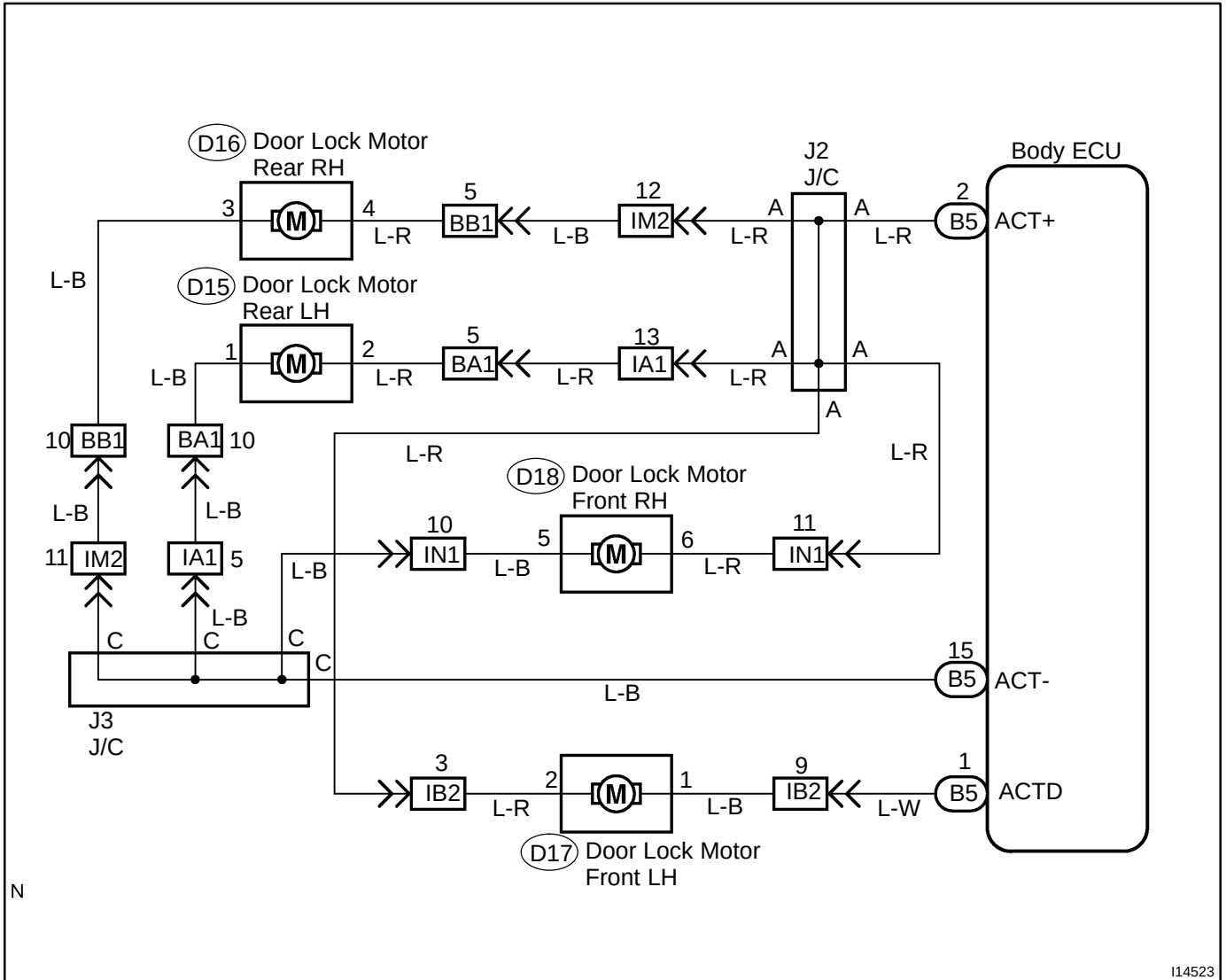
Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page [DI-622](#))

Door lock motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door lock motor. (See page BE-82)

NG

Replace the door lock motor.

OK

2	Check wireharness and connector between door lock motor and body ECU. (See page IN-30)

NG

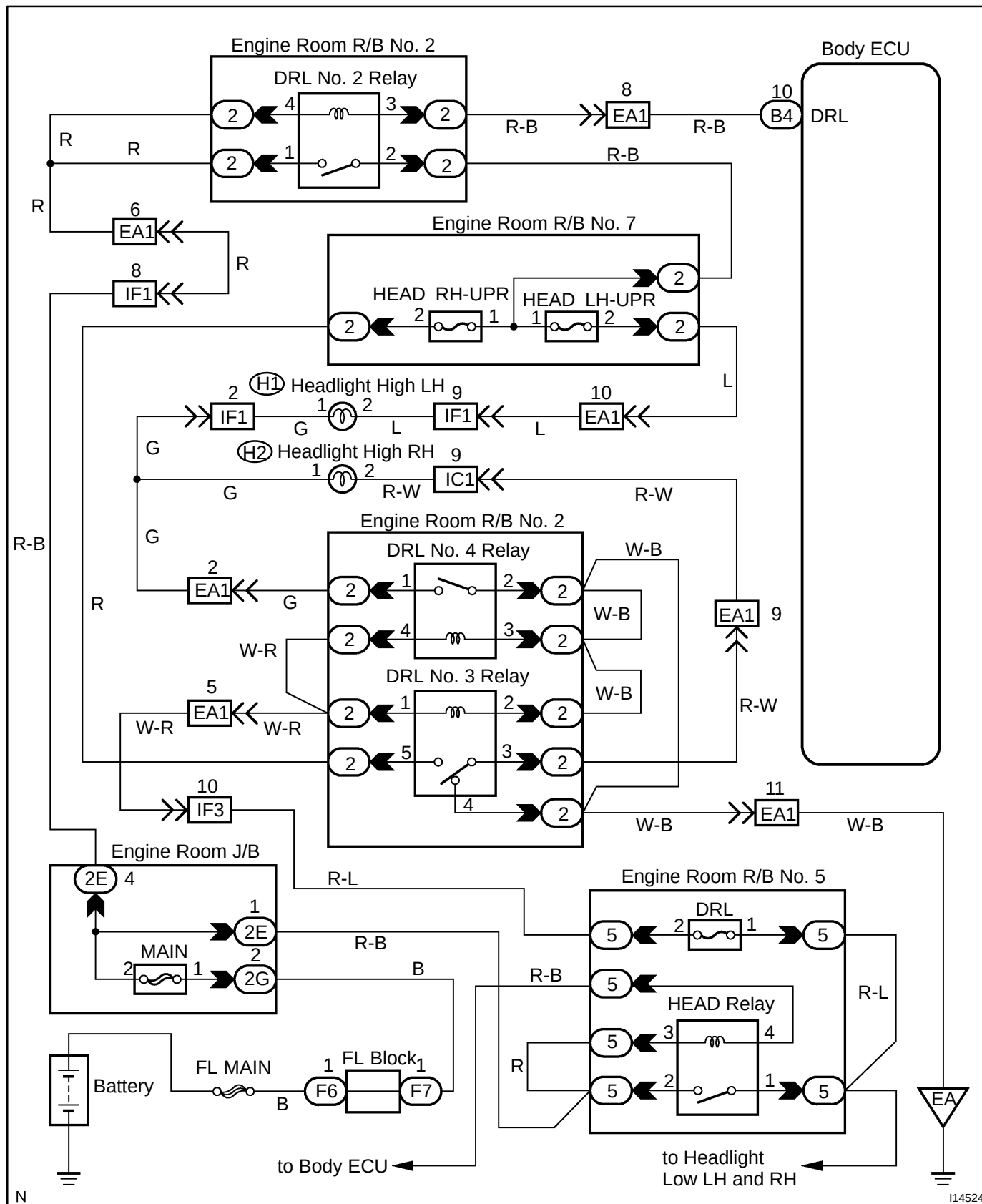
Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page [DI-622](#))

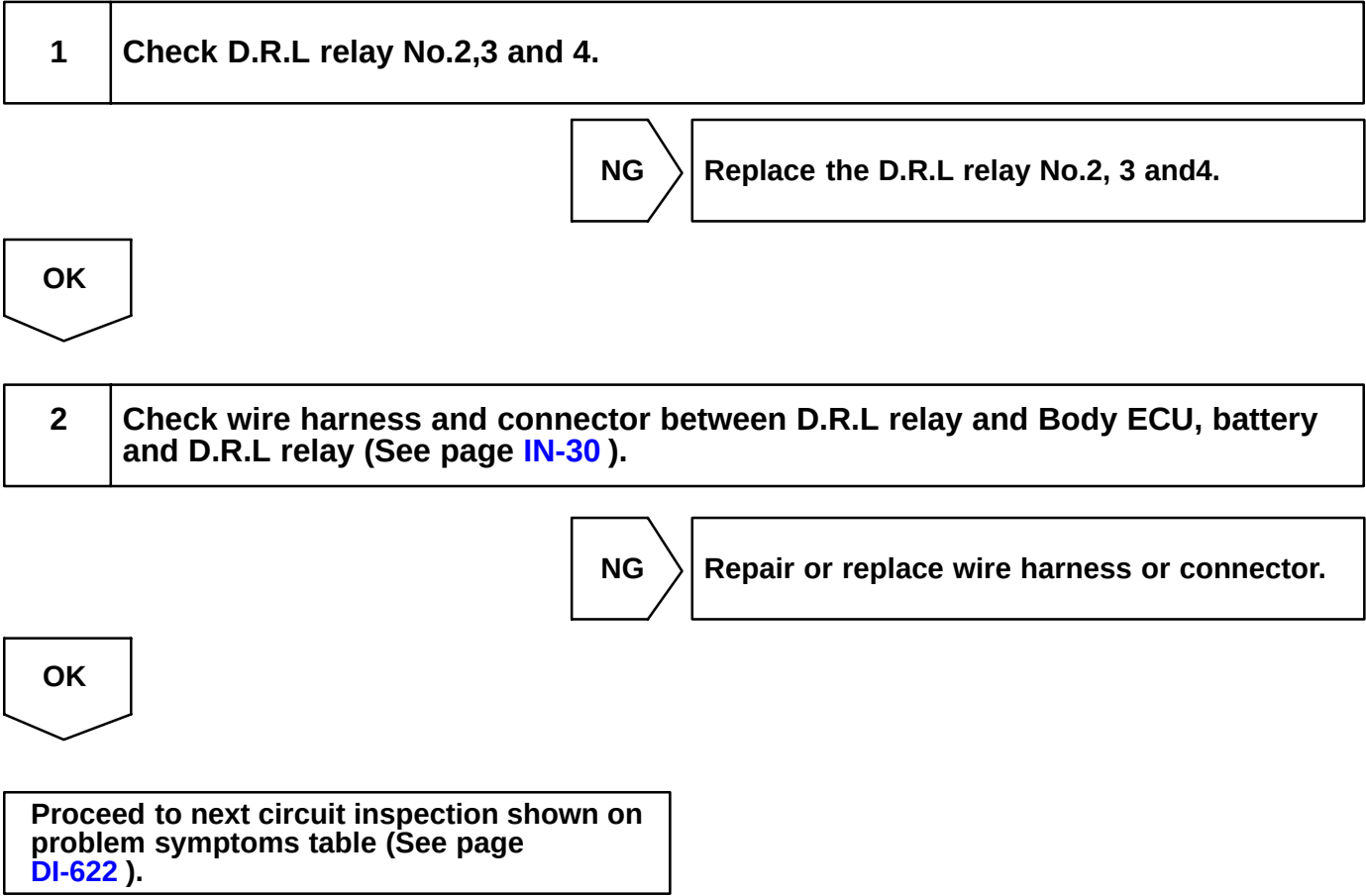
Daytime running light No.2, 3 and 4 relay circuit

WIRING DIAGRAM



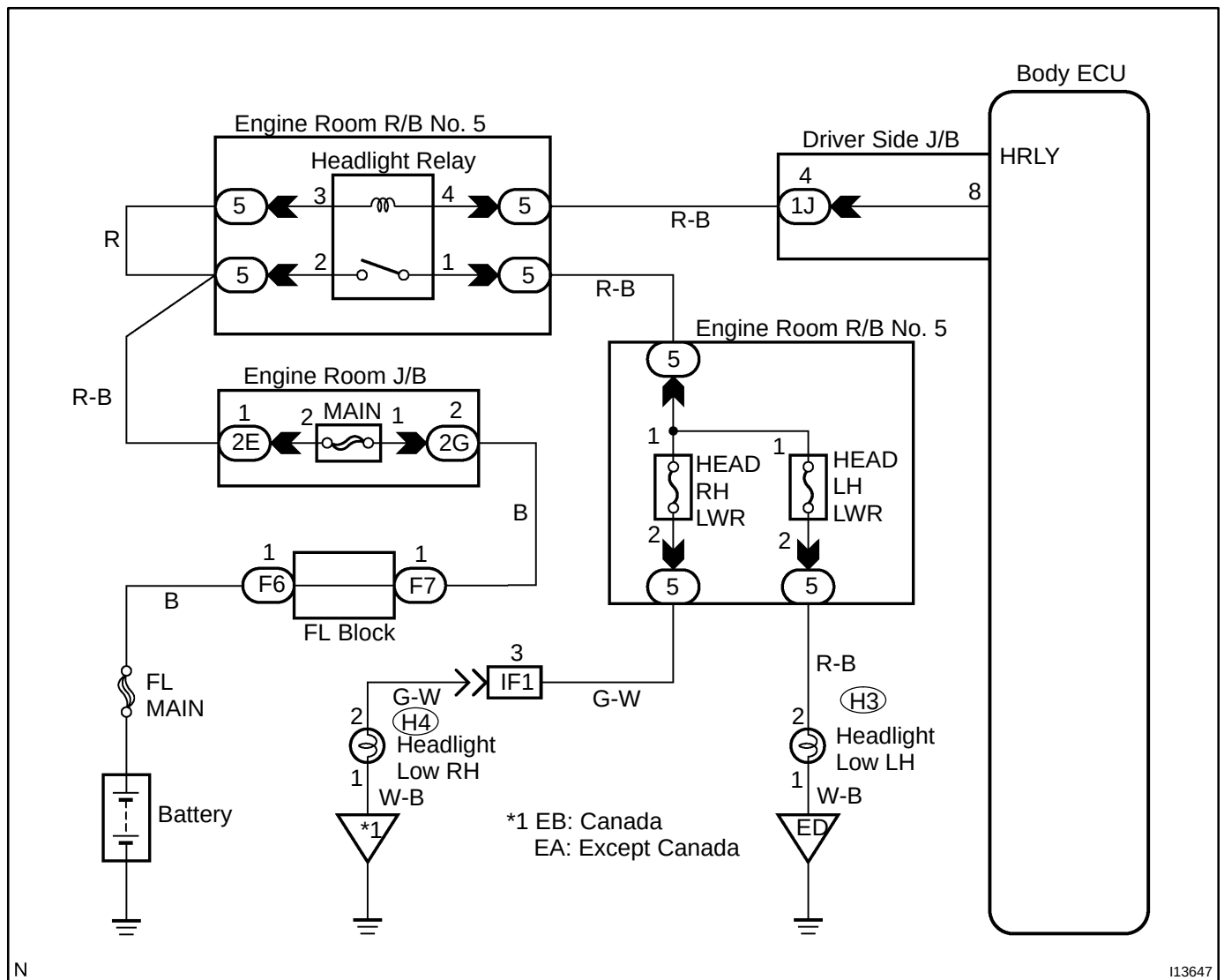
I14524

INSPECTION PROCEDURE

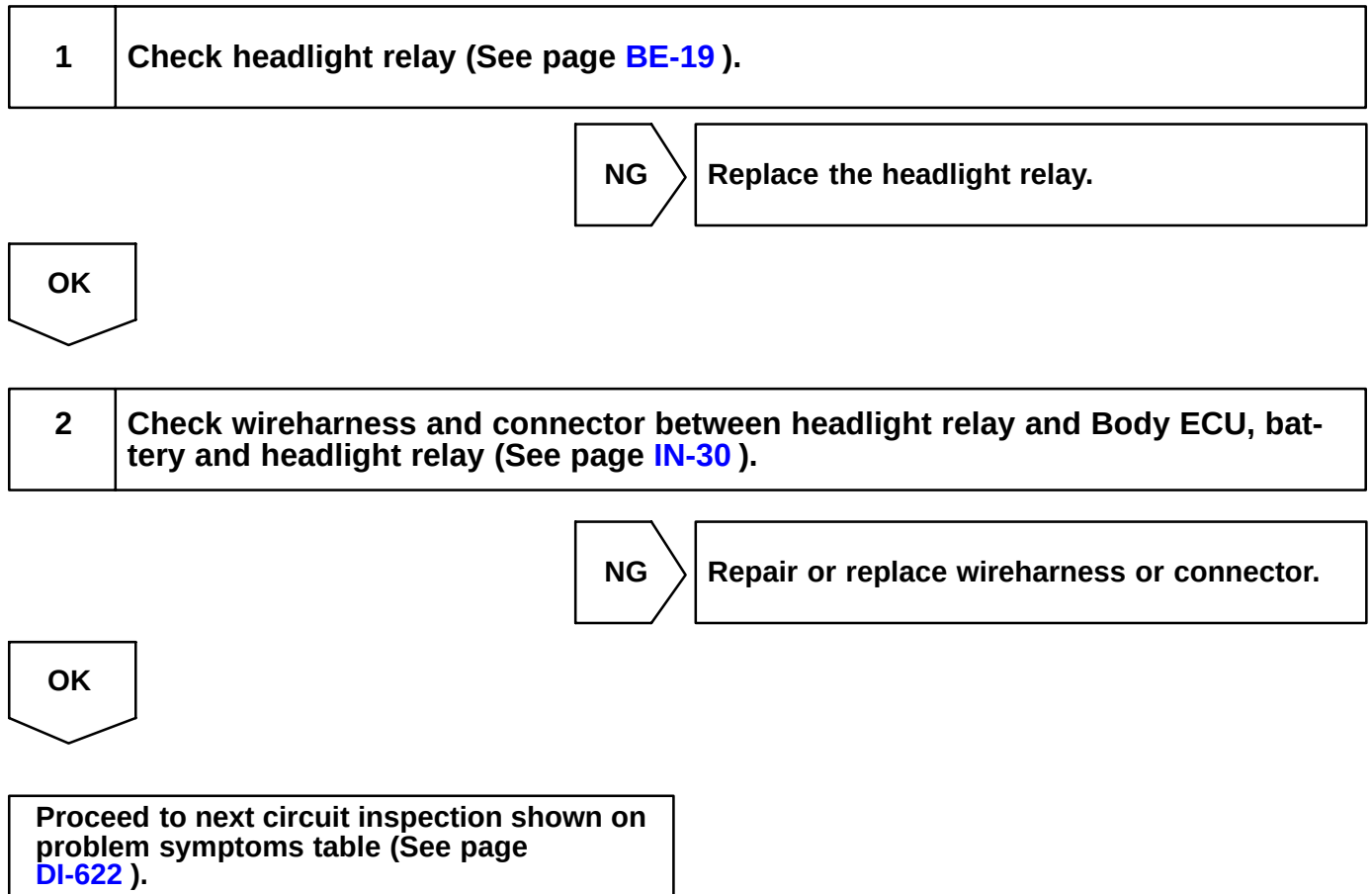


CIRCUIT DESCRIPTION

WIRING DIAGRAM



INSPECTION PROCEDURE

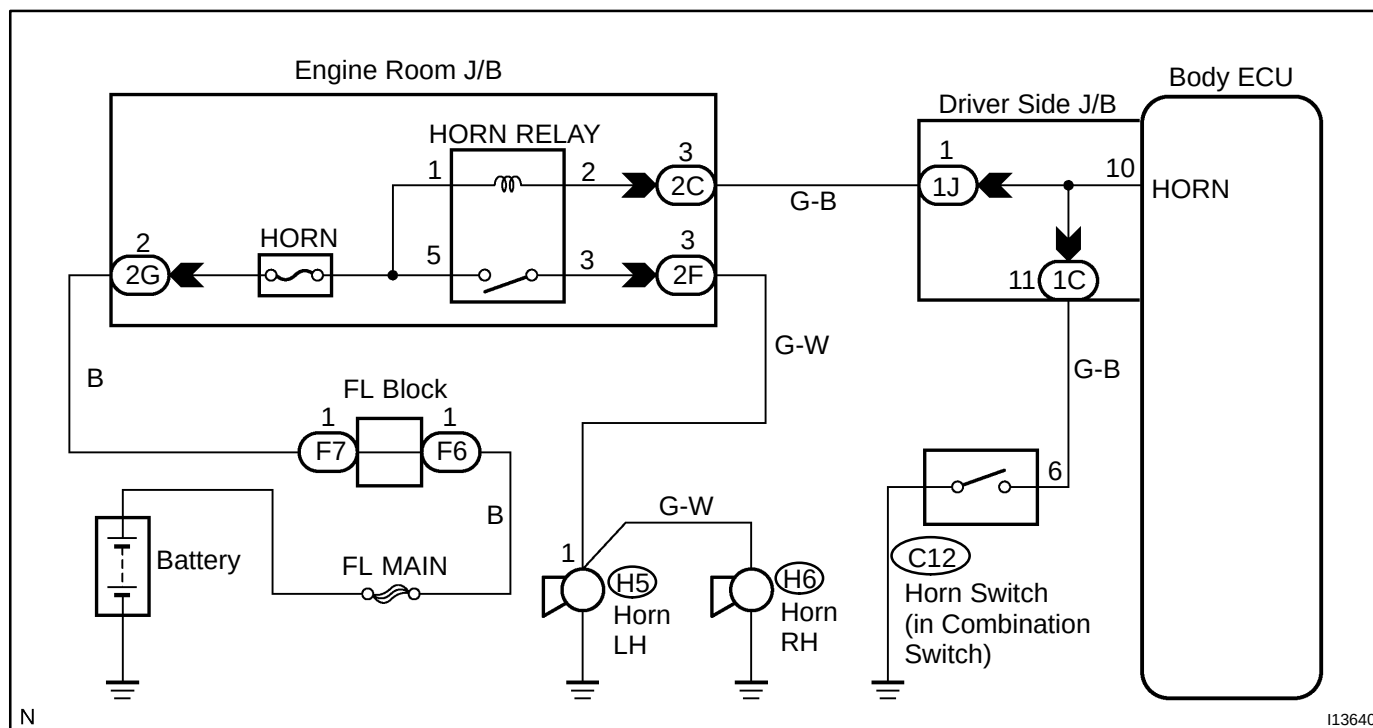


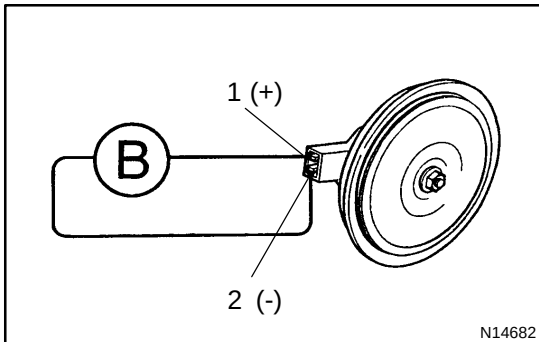
Horn circuit

CIRCUIT DESCRIPTION

The horn is connected to the body ECU and activated by the body ECU during warning of the theft deterrent system.

WIRING DIAGRAM



INSPECTION PROCEDURE**1 Check horn.****PREPARATION:**

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 the horn.****OK****2 Check wireharness and connector between horn relay and body ECU, battery and horn relay. (See page [IN-30](#))****NG****Repair or replace wireharness or connector.****OK**

**Proceed to next circuit inspection shown on problem symptoms table.
(See page [DI-622](#))**

Illumination circuit

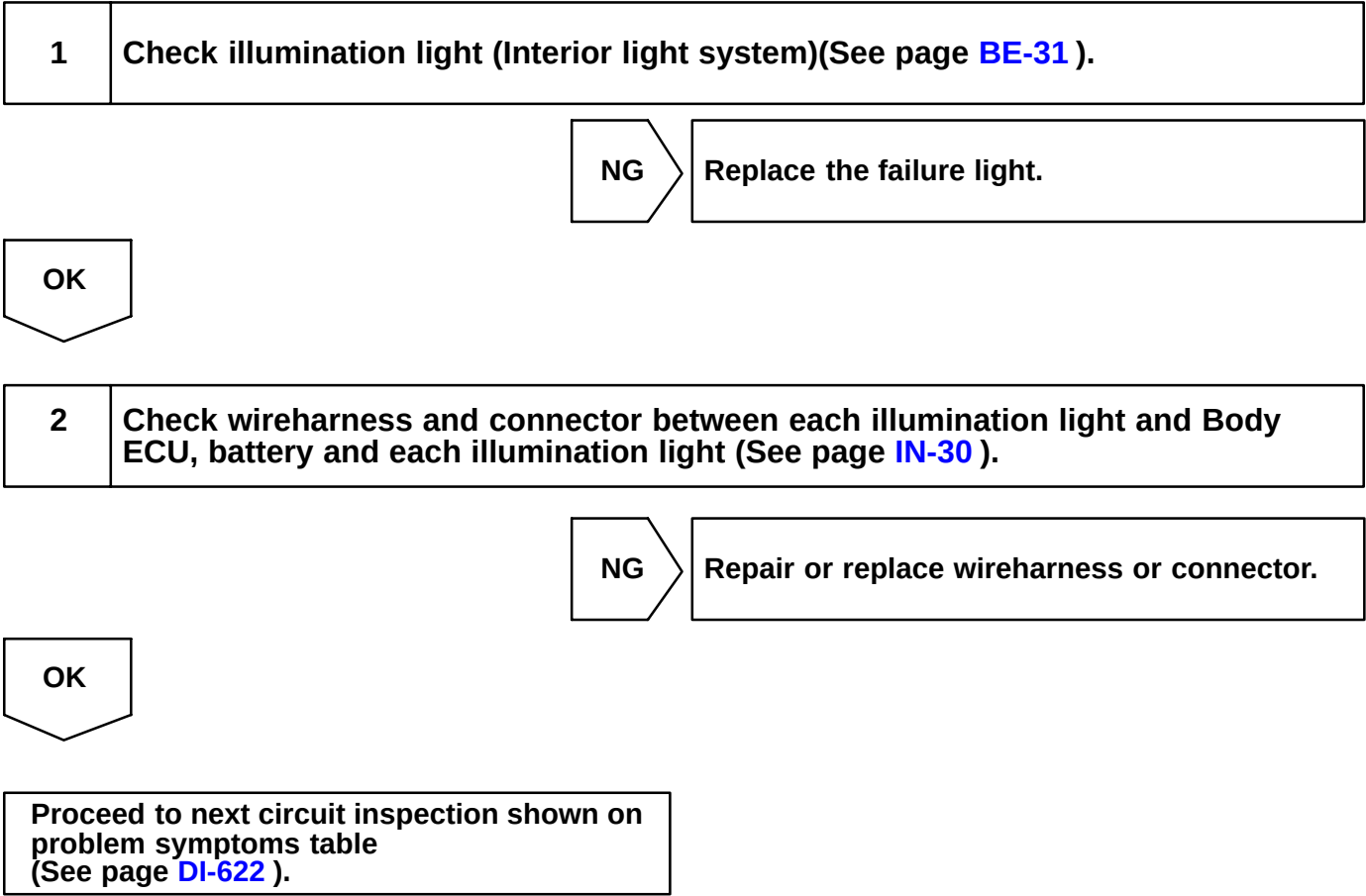
CIRCUIT DESCRIPTION

Receiving the courtesy signal from either of the door ECU, the Body ECU will make the interior light, ignition light, and foot light come on.

The diagram illustrates the electrical system for interior lighting and related components. Key elements include:

- Battery:** The main power source, connected to the FL MAIN line.
- Engine Room J/B:** Contains fuses F7, F6, and F8, and a fuse block (FL MAIN).
- Driver Side J/B:** Contains fuses 4D, 4F, 13, and 10.
- Engine Room R/B No.5:** Contains fuses 5, 2, and 1.
- Ignition Switch (I15):** Controls the Ignition Relay (IG1) and the Ignition (IG) line.
- Ignition Relay (IG1):** Controls the Ignition (IG) line and the Ignition Key Cylinder Light.
- Interior Lights:**
 - V10: Vanity Light RH
 - V11: Vanity Light RH
 - P9: Personal Light
 - I17: Interior Light
- Multi Display:** Includes Open Door, Driver Seat Belt, and Passenger Seat Belt indicators.
- Body ECU:** Controls the Multi Display and the Ignition (IG) line.
- Wiring Lines:** Various colored lines (P-L, W-B, R-B, W-R, W-L, B, G-R, G-W, B-L) connect the components.

INSPECTION PROCEDURE



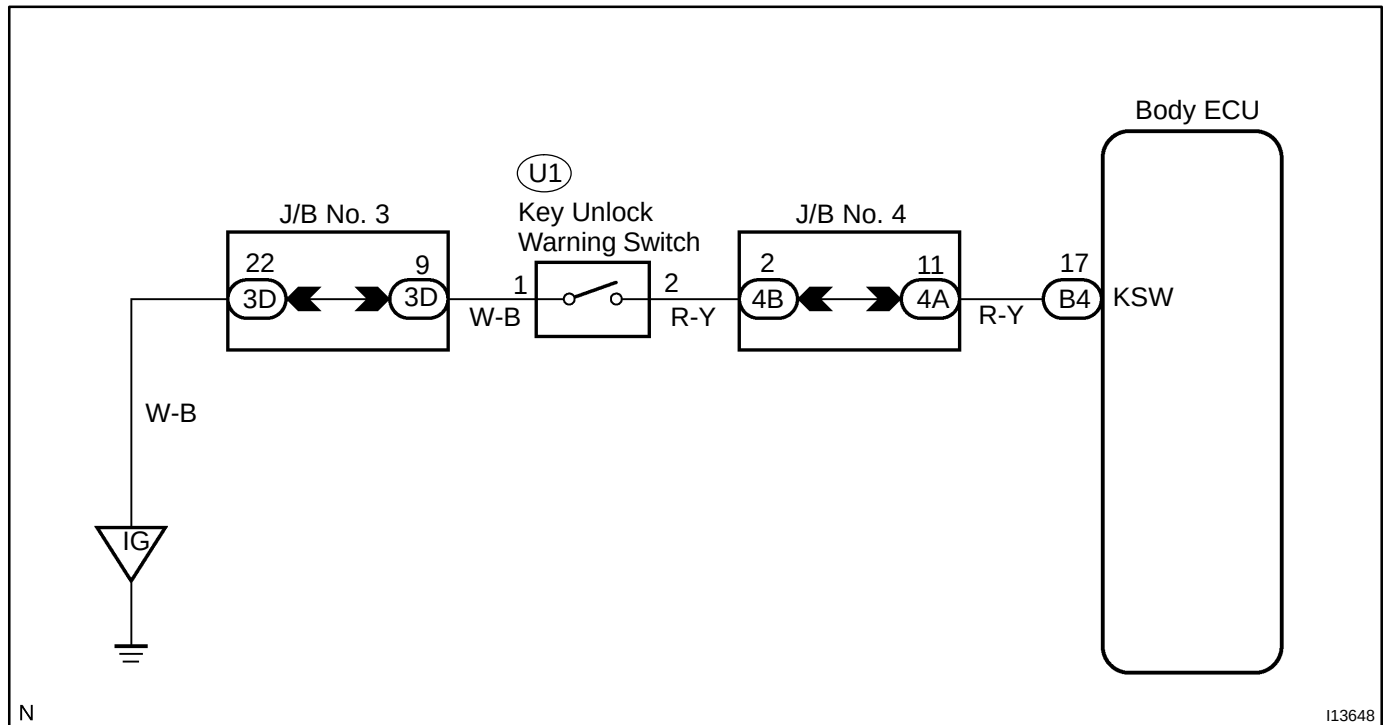
Key unlock warning switch circuit

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



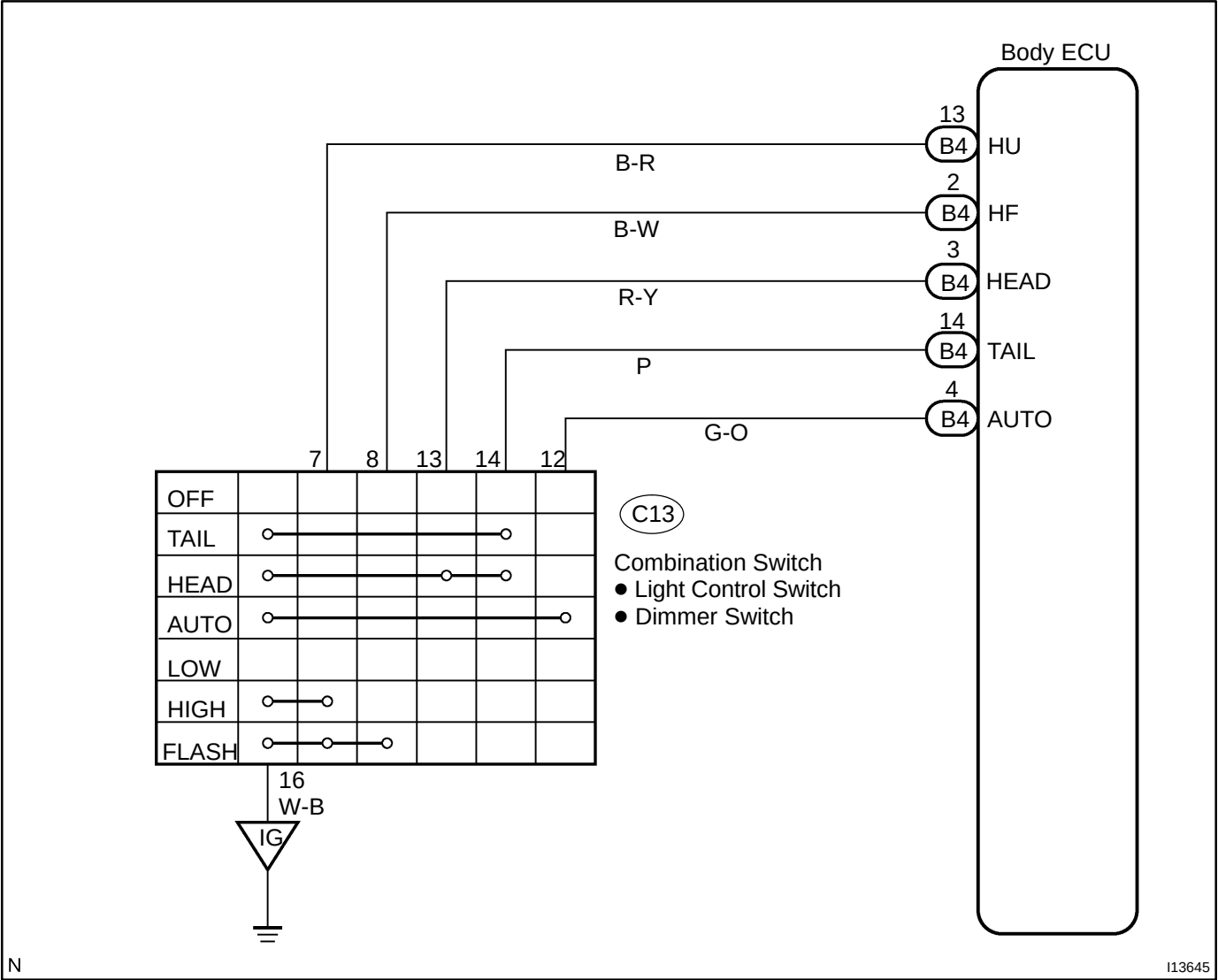
I13648

INSPECTION PROCEDURE

1**Check key unlock warning switch (See page [BE-16](#)).****NG****Replace the key unlock warning switch.****OK****2****Check wireharness and connector between key unlock warning switch and Body ECU (See page [IN-30](#)).****NG****Repair or replace wireharness or connector.****OK****Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).**

Light control switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check headlight control switch (See page BE-19).

NG

Replace the headlight control switch.

OK

2	Check wireharness and connector between headlight control switch and Body ECU (See page IN-30).

NG

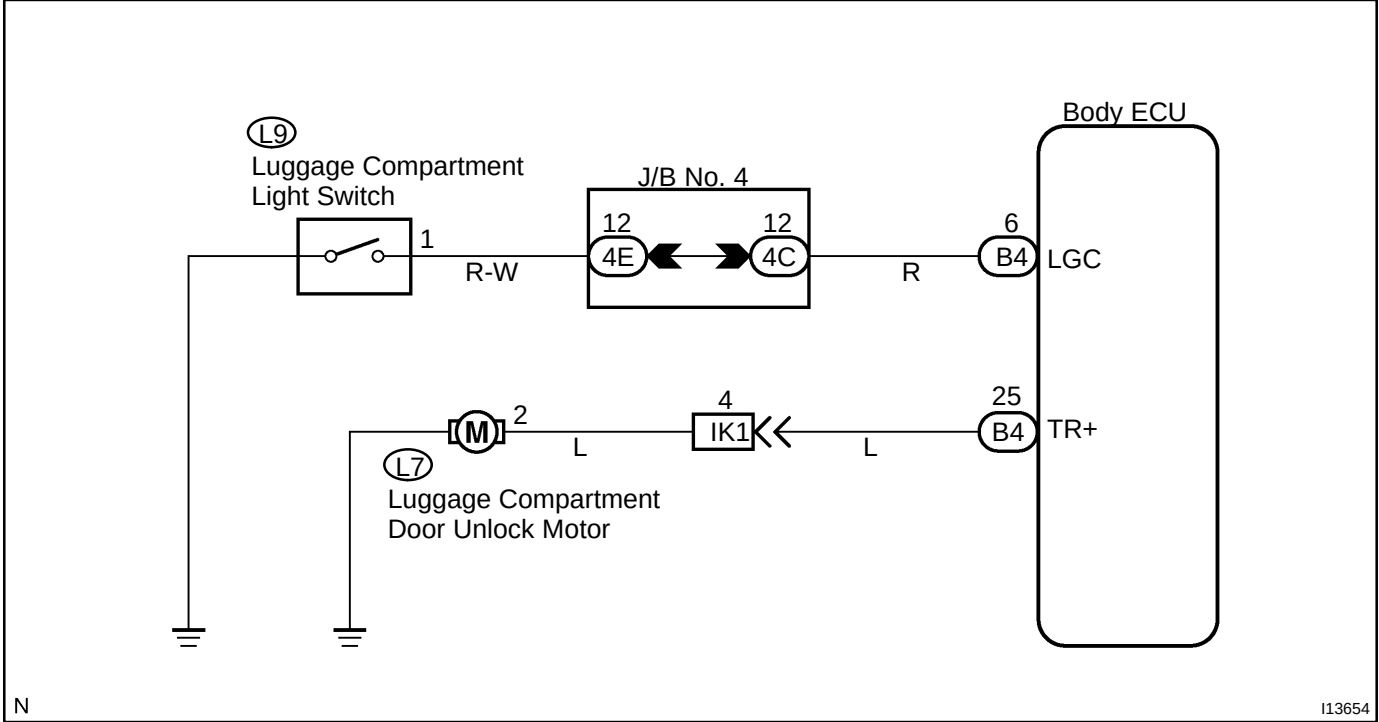
Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).

Luggage opener motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check luggage opener motor. (See page BE-82)

NG

Replace the luggage opener motor.

OK

2	Check wireharness and connector between luggage opener motor and body ECU. (See page IN-30)

NG

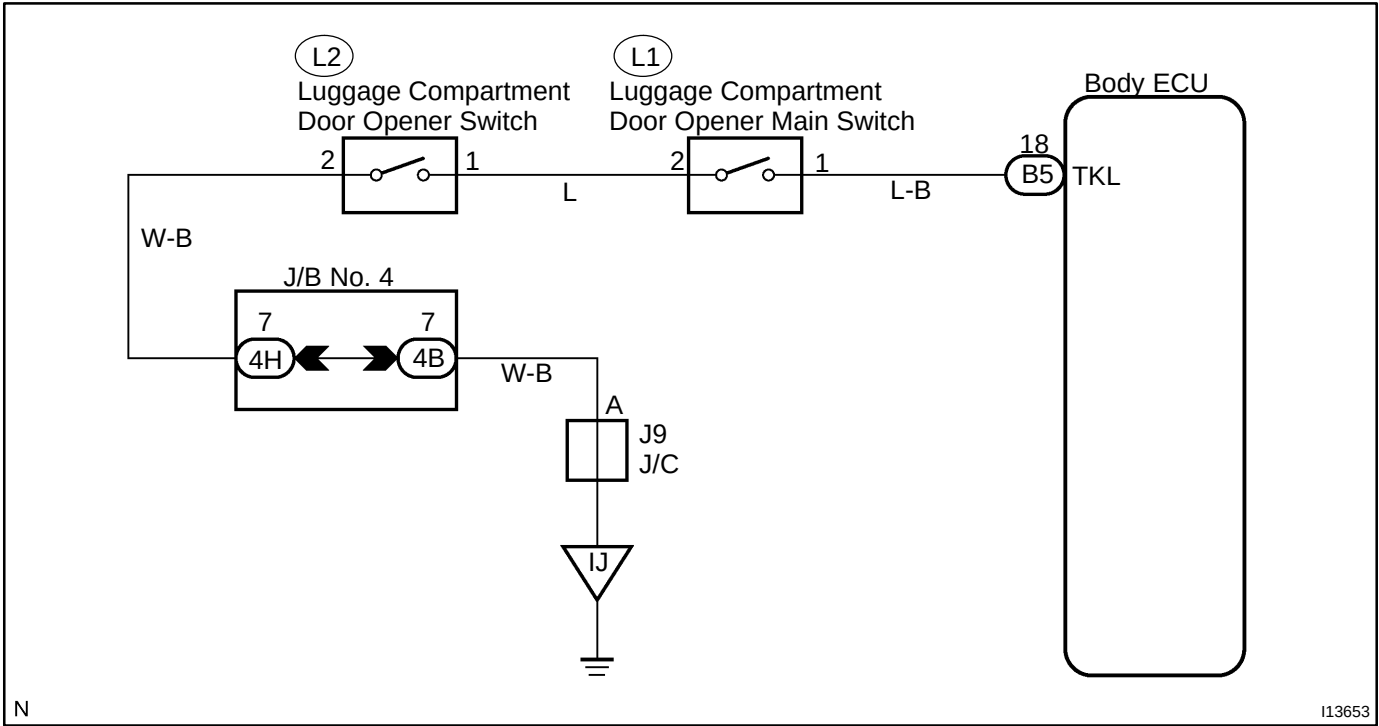
Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table.
(See page [DI-622](#))

Luggage opener switch circuit

WIRING DIAGRAM

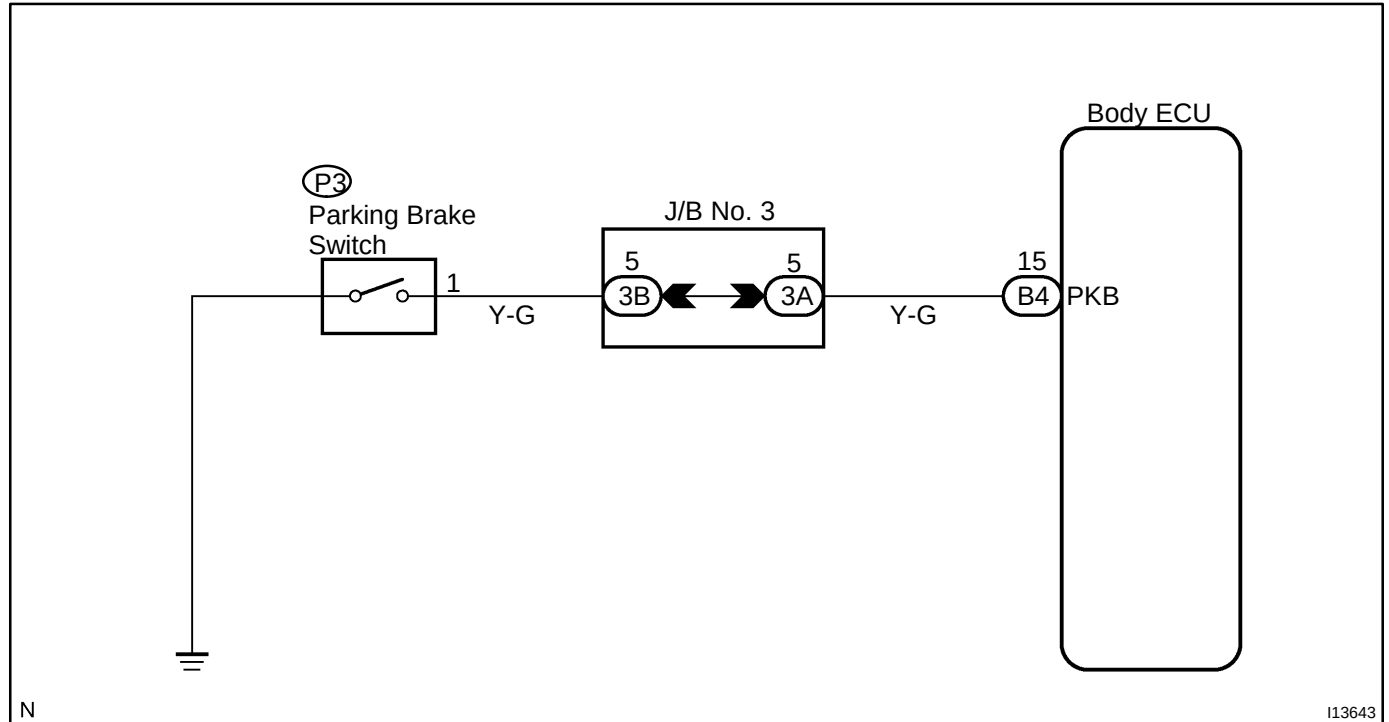


INSPECTION PROCEDURE

1**Check luggage opener switch and main switch (See page [BE-82](#)).****NG****Replace the luggage opener switch and main switch.****OK****2****Check wireharness and connector between luggage opener switch and Body ECU (See page [IN-30](#)).****NG****Repair or replace wireharness or connector.****OK****Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).**

Parking brake switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check parking brake switch (See page BE-53).

NG

Replace the parking brake switch.

OK

2	Check wireharness and connector between parking brake switch and body ECU. (See page IN-30)

NG

Repair or replace wireharness or connector.

OK

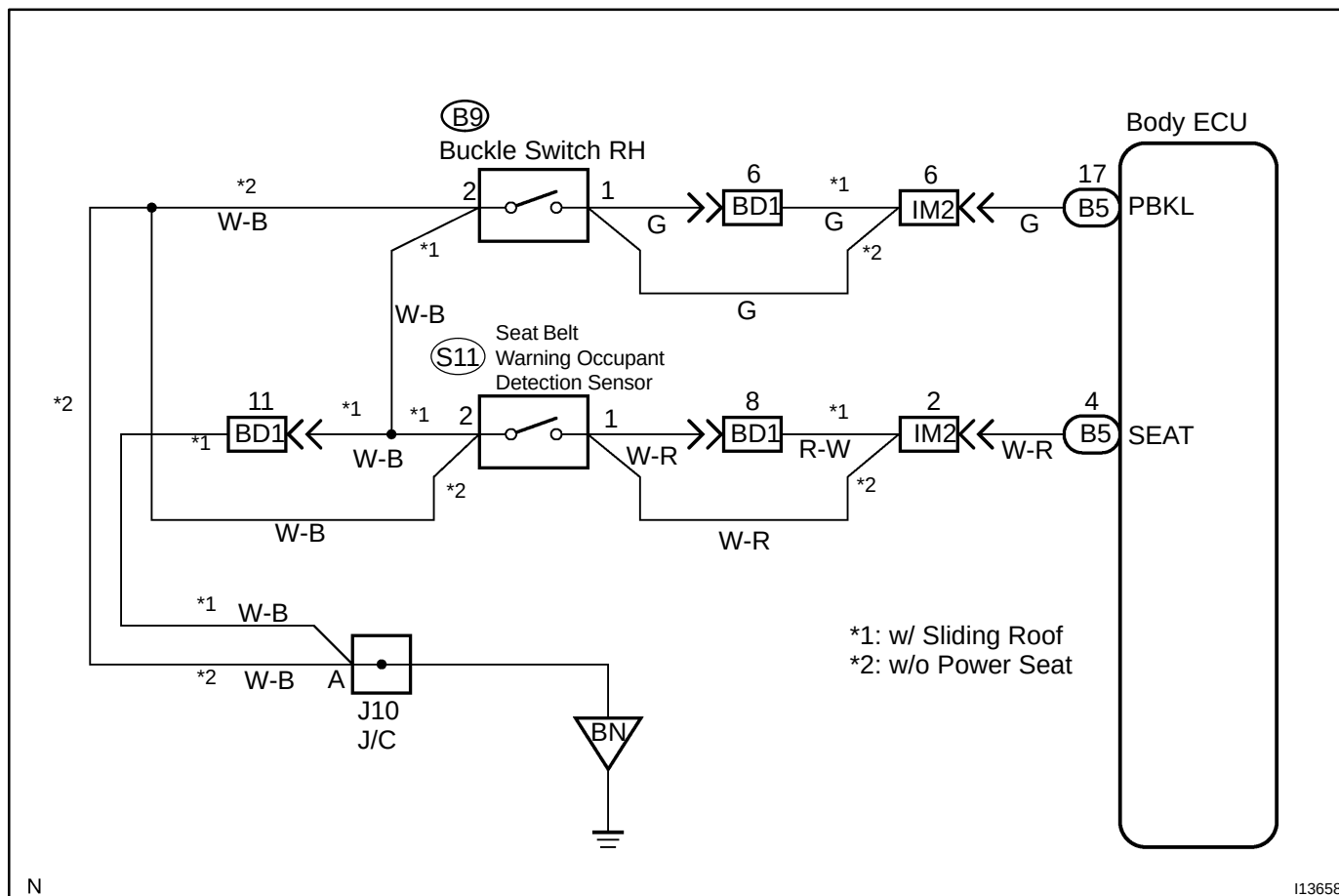
Proceed to next circuit inspection shown on problem symptoms table.
(See page [DI-622](#))

Passenger buckle switch and seat belt warning occupant detection sensor

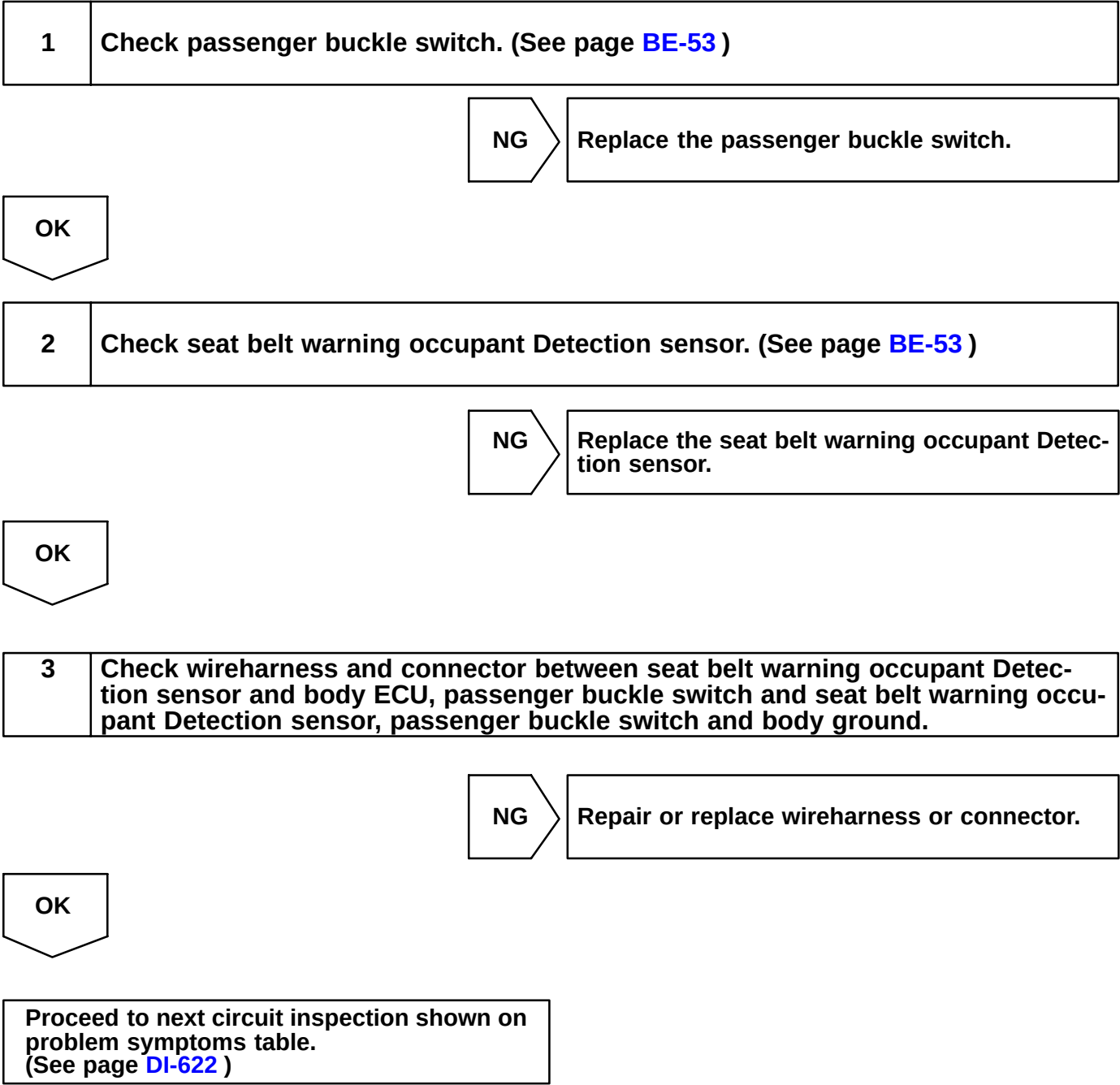
CIRCUIT DESCRIPTION

This circuit detects the conditions of the passenger buckle switch and the seat belt warning occupant detection sensor, and makes the passenger seat belt warning flash.

WIRING DIAGRAM



INSPECTION PROCEDURE

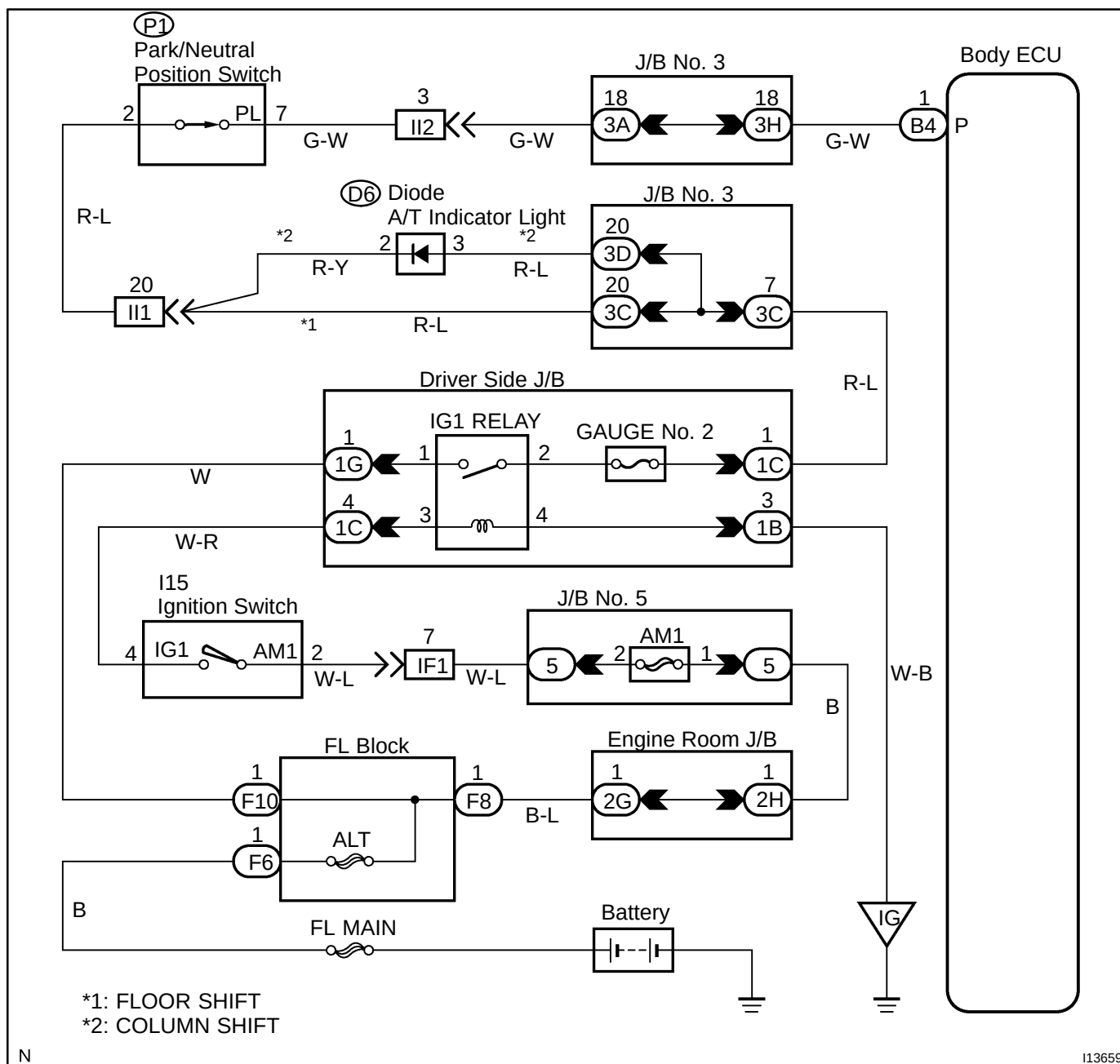


Park/Neutral Position Switch Circuit

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever p position and sends signals to the Body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check A/T shift operation.

CHECK:

Check that the A/T shift operates normally.

NG

**Proceed to AT troubleshooting.
(See page [DI-158](#))**

OK

2	Check harness and connector between Body ECU and park/neutral position switch (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace Body ECU (See page [IN-30](#)).

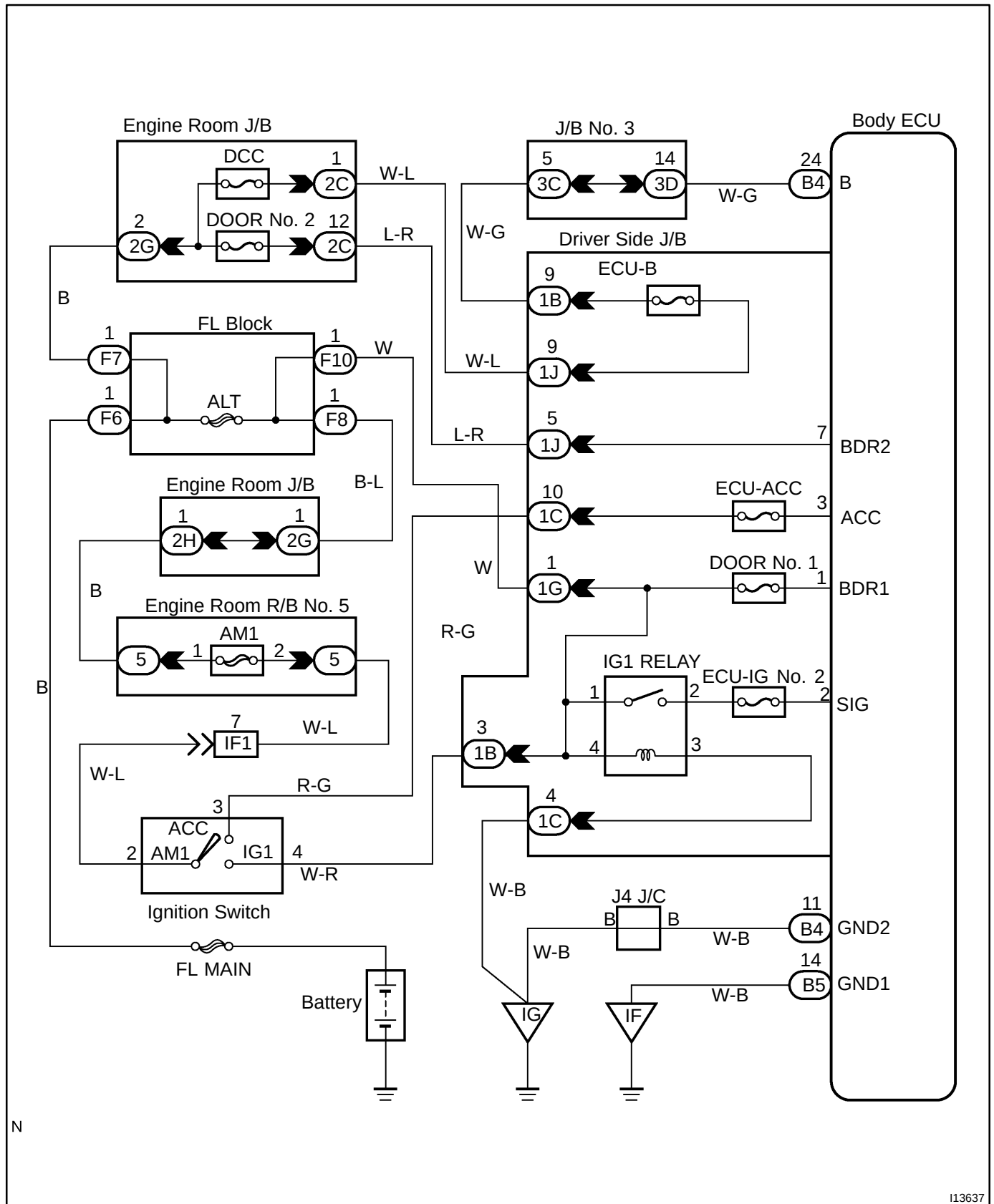
CIRCUIT INSPECTION

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the Body ECU.

WIRING DIAGRAM



I13637

INSPECTION PROCEDURE

1	Check ECU-ACC, DOOR No. 1, DOOR No. 2, ECU-IG No. 2, ECU-B No. 1 and ECU-B No. 2 fuse.

CHECK:

Check continuity of ECU-ACC, DOOR No. 1, DOOR No. 2, ECU-IG No. 2, ECU-B No. 1 and ECU-B No. 2 fuse.

OK:

Continuity

NG

Replace the failure fuse.

OK

2	Check voltage between terminals ACC, B, BDR 1, BDR 2, SIG and GND or GND2 of Body ECU connector.

PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminals ACC, SIG, BDR 1, and GND, GND2.

OK:

Voltage: 10 - 14V

PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the Body ECU connector.

CHECK:

Measure voltage between terminals B, BDR 2, BSUB and GND, GND2.

OK:

Voltage: 10 - 14V

OK

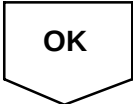
Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).

NG

3	Check wireharness and connector between Body ECU and body ground (See page IN-30).

NG

Repair or replace wireharness or connector.

OK

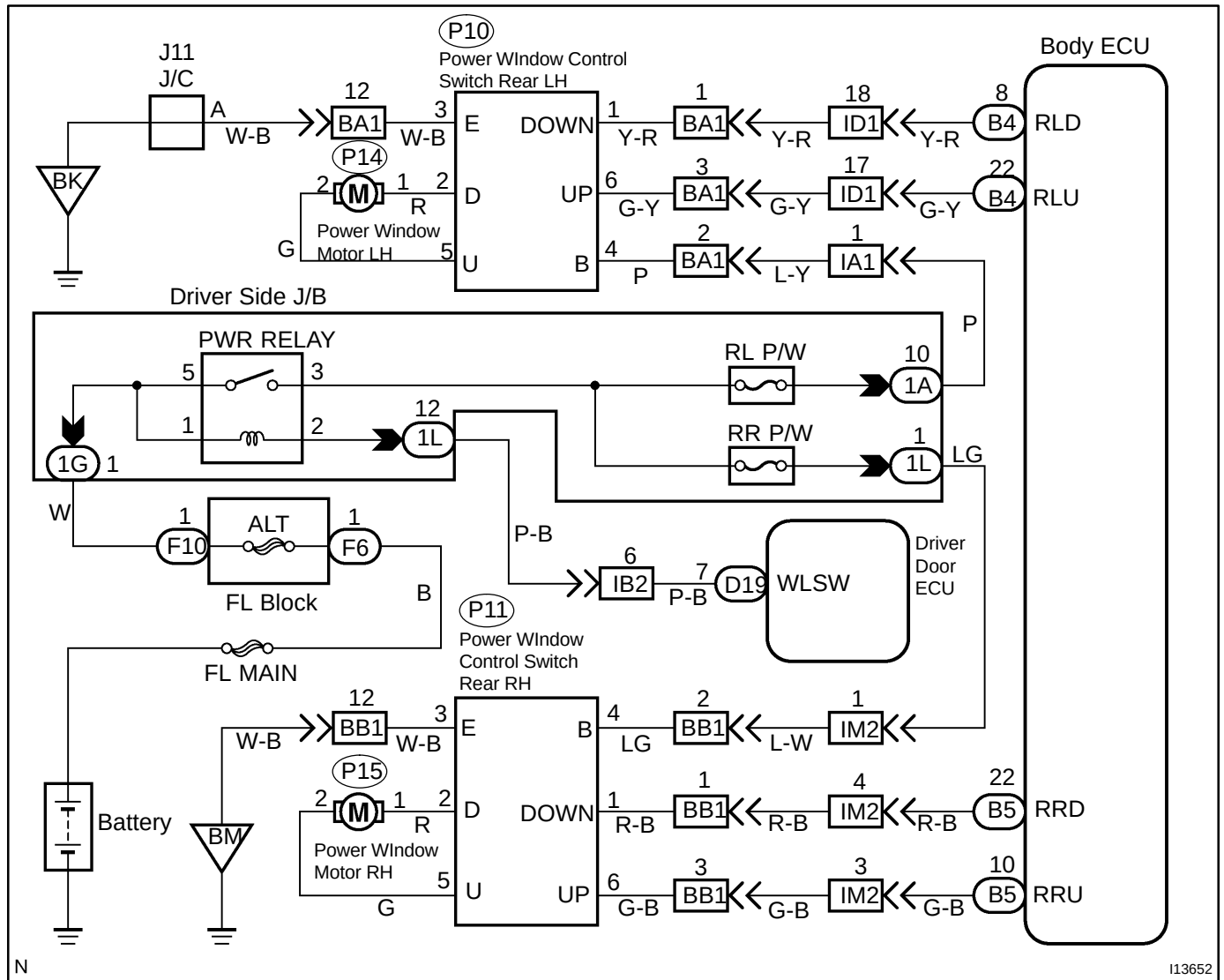
Check and repair wireharness and connector between Body ECU and battery (See page [IN-30](#)).

Rear power window switch circuit

CIRCUIT DESCRIPTION

Power window switch circuit can be checked using DTC check. (Refer to [DI-738](#))

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the power window switch. (See page BE-73)

NG**Replace the power window switch.****OK**

2	Check wireharness and connector between power window switch and Body ECU. (See page IN-30)

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

3	Check wireharness and connector between power window switch and power window master switch. (See page IN-30)

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

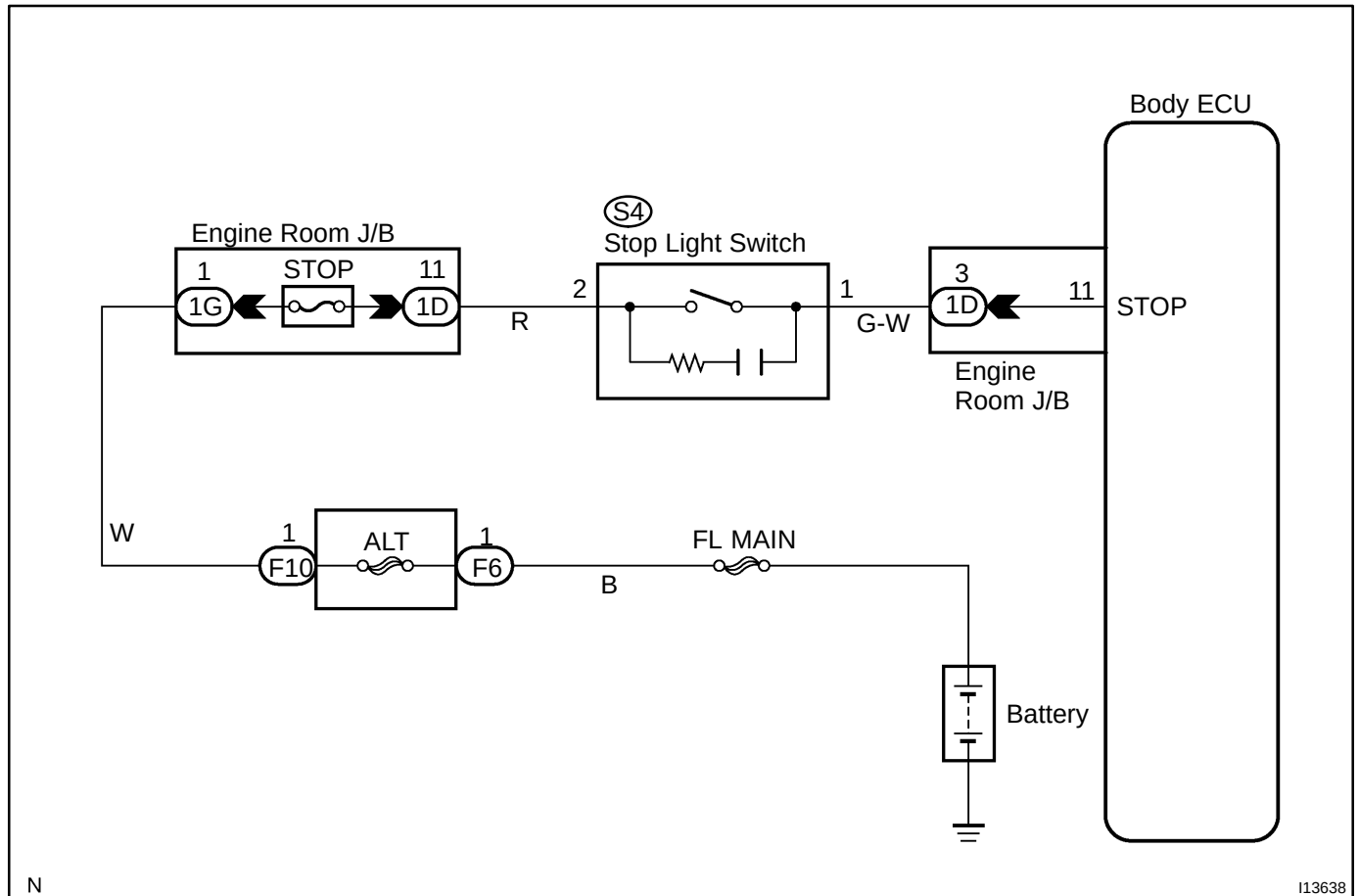
**Proceed to next circuit inspection shown on problem symptoms table.
(See page [DI-622](#))**

Stop light switch circuit

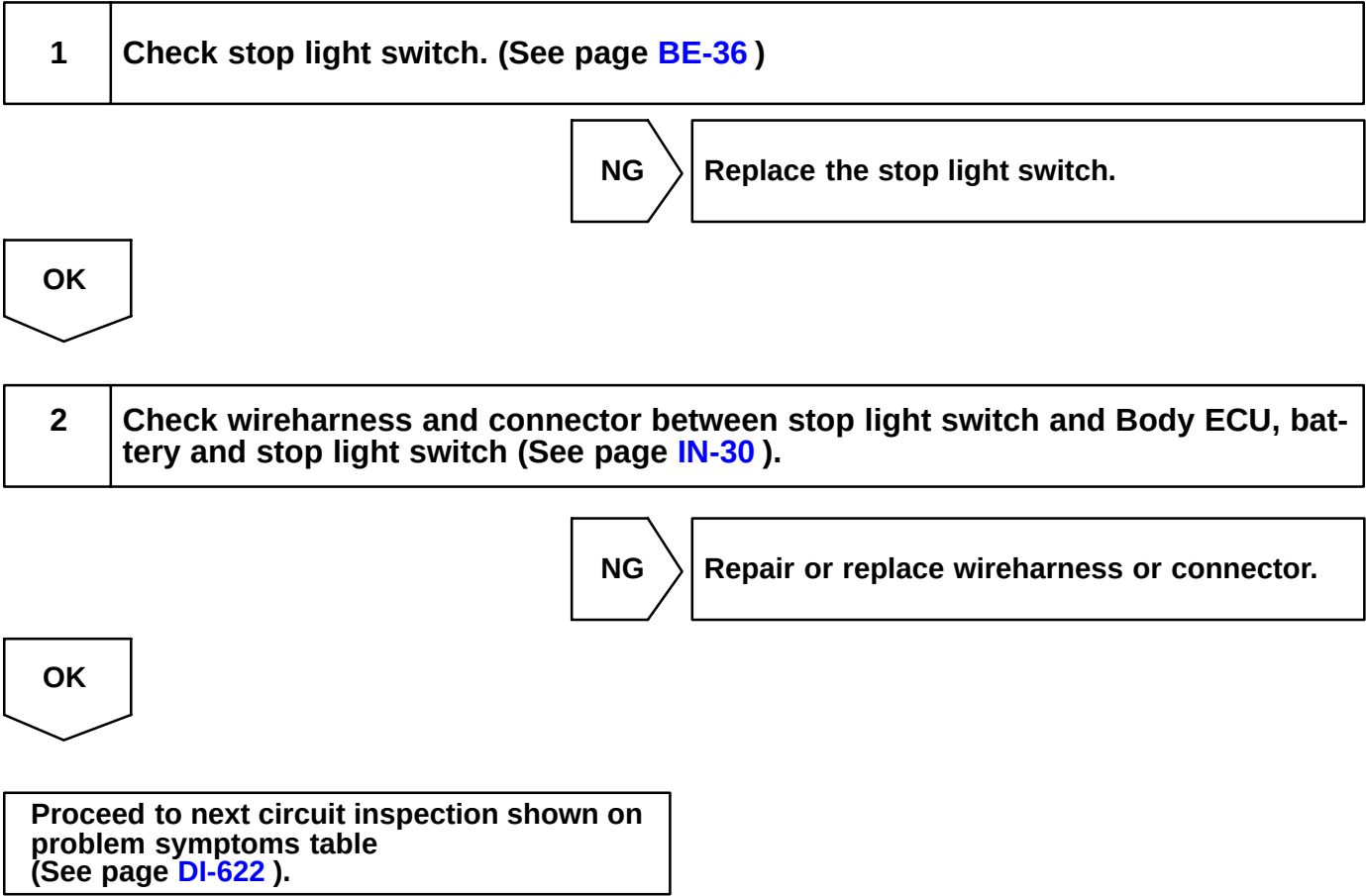
CIRCUIT DESCRIPTION

The Body ECU is detecting the condition of the stop light switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

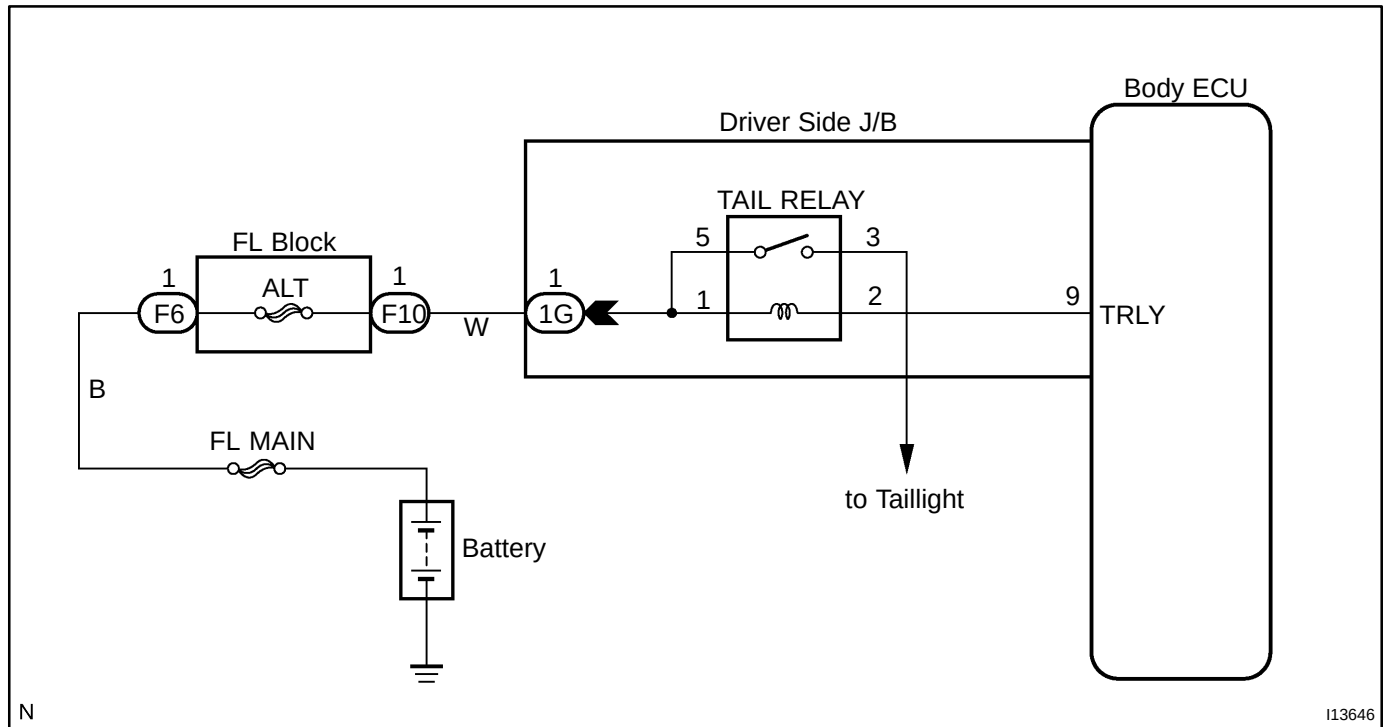


Taillight relay circuit

CIRCUIT DESCRIPTION

Taillight relay will be "ON" by operating the taillight switch. The transistor which activates the tail light relay has two sorts: one activates by the tail light switch for fail safe and the other activates by CPU.

WIRING DIAGRAM



N

I13646

INSPECTION PROCEDURE

1	Check taillight relay (See page BE-19).

NG	Replace the taillight relay.

OK

2	Check wireharness and connector between taillight relay and Body ECU, battery and taillight relay (See page IN-30).

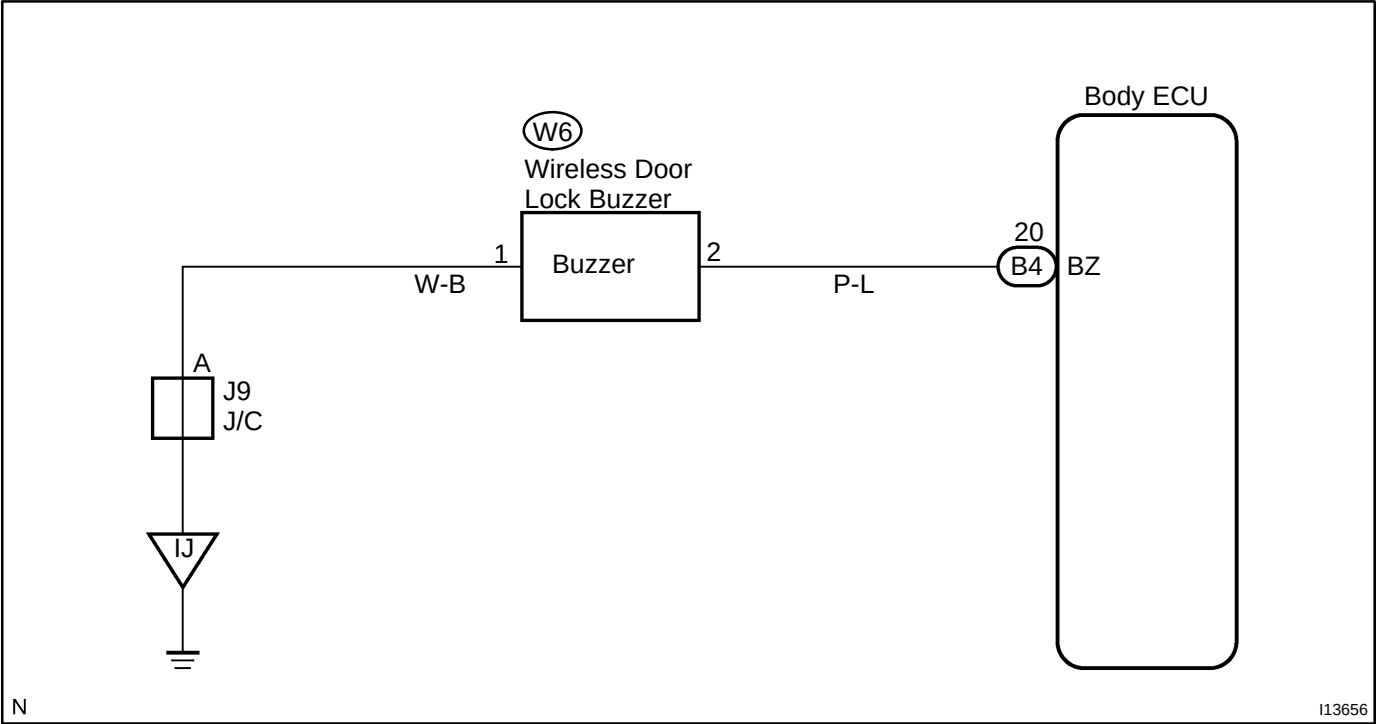
NG	Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-622).

Wireless door lock buzzer circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check wireless door lock buzzer. (See page [BE-91](#))

NG

Replace the wireless door lock buzzer.

OK

2 Check wireharness and connector between wireless door lock buzzer and Body ECU, Body ECU and wireless door lock buzzer (See page [IN-30](#)).

NG

Repair or replace wireharness or connector.

OK

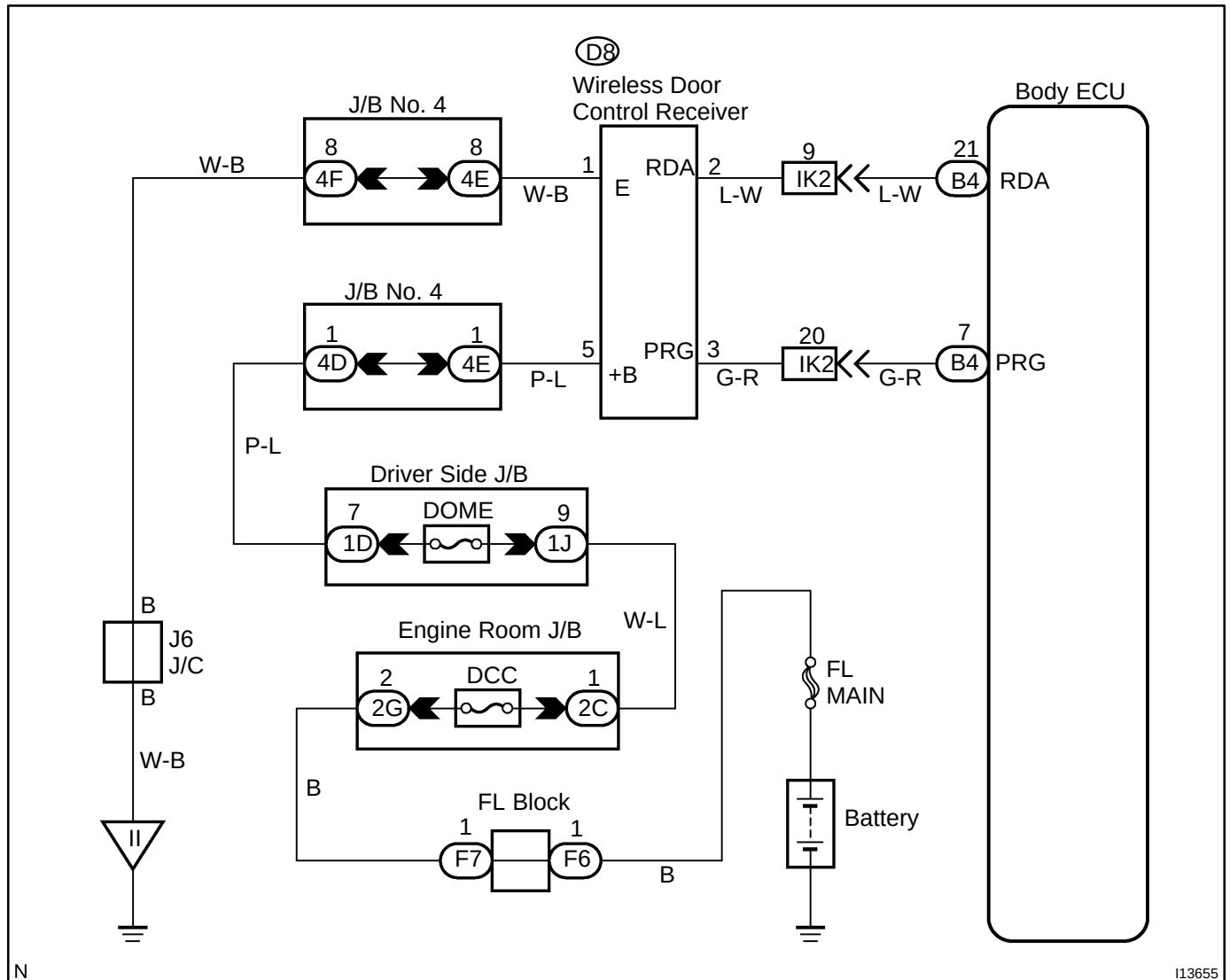
Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).

Wireless door lock tuner circuit

CIRCUIT DESCRIPTION

The signal from the transmitter will be input to the body ECU through RDA line. RDA line is diagnosed by the Body ECU, so check DTC also in case of the failure of the wireless function.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that DTC 42 is not output.

NG**Check the RDA line.****OK**

2	Check wireharness.

PREPARATION:

Disconnect connectors of wireless door lock tuner and Body ECU.

CHECK:

Check continuity between terminals PRG of wireless door lock tuner and PRG of Body ECU.

OK:**Continuity****NG****Repair or replace wireharness.****OK**

3	Check the wireless door lock tuner.

CHECK:

Replace the wireless door lock tuner and check if it recovers normally.

OK:**Must be recovered normally.****NG****Proceed to next circuit inspection shown on problem symptoms table (See page [DI-622](#)).****OK****Failure of the original wireless door lock tuner.**

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

Inspector's name: _____

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

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	Weather ☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature ☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Malfunction System	☐ Key Unlock Warning System
	☐ Headlight and Taillight System (Light Auto Turn-off system Daytime Running Light System)
	☐ Combination Meter
	☐ Luggage Compartment Door Opener System
	☐ Automatic Light Control System
	☐ Illuminated Entry System
	☐ Theft Deterrent System
	☐ Seat Belt Warning
	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Auto Lock/Unlock System
	☐ Wireless Door Lock Control System
	☐ Others (Buzzer etc.)

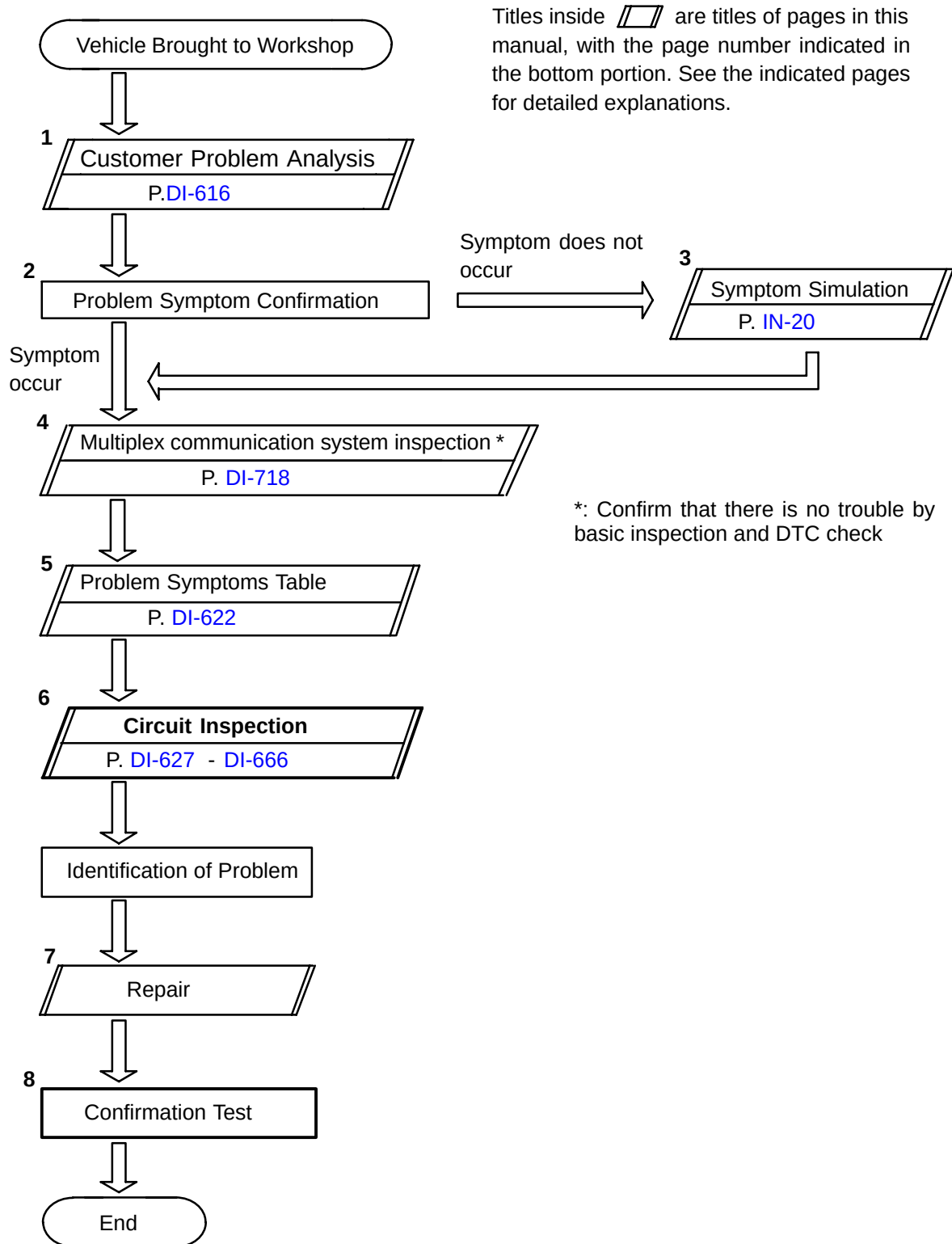
BODY CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

D16LF-01

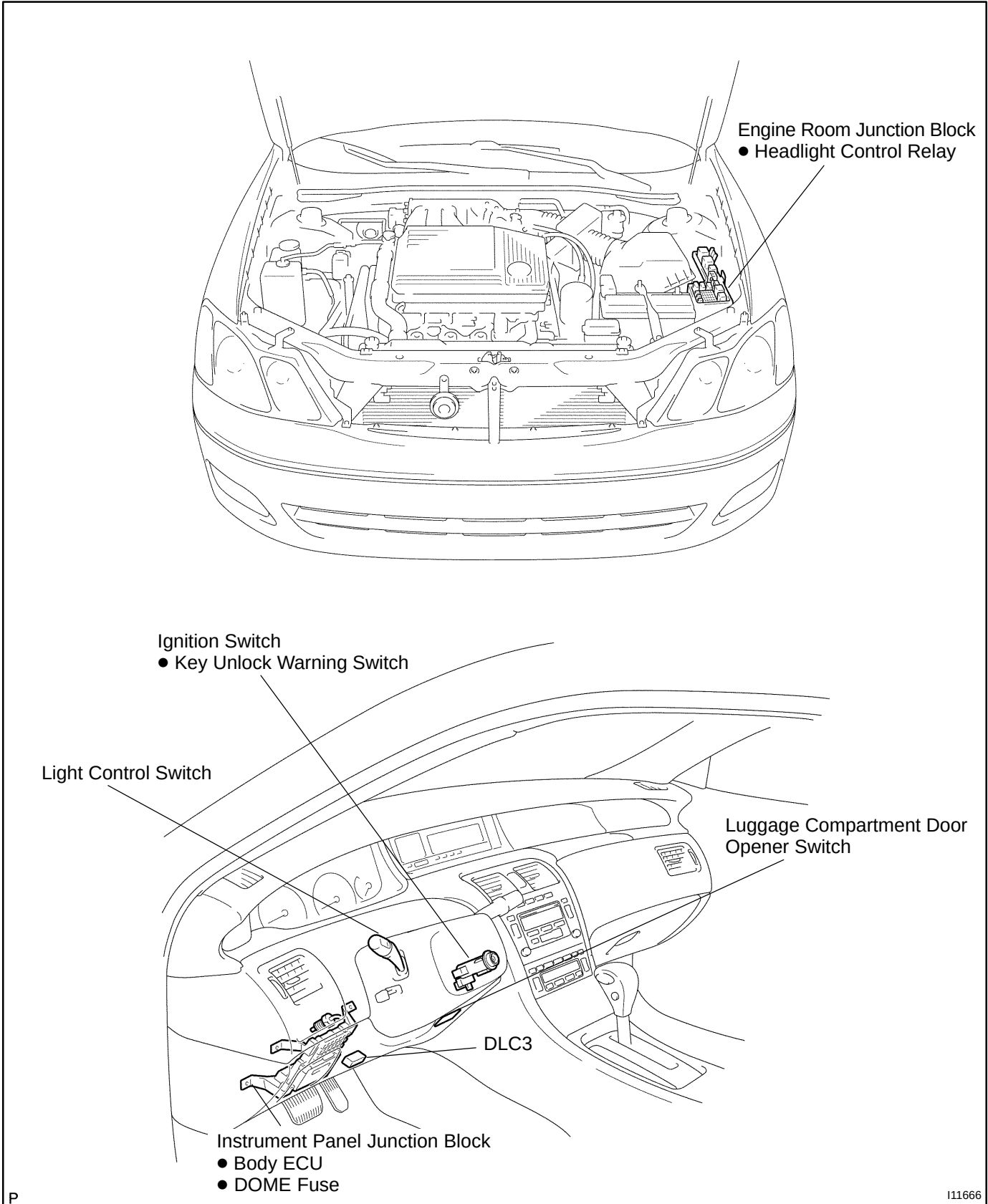
HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the trouble shooting.



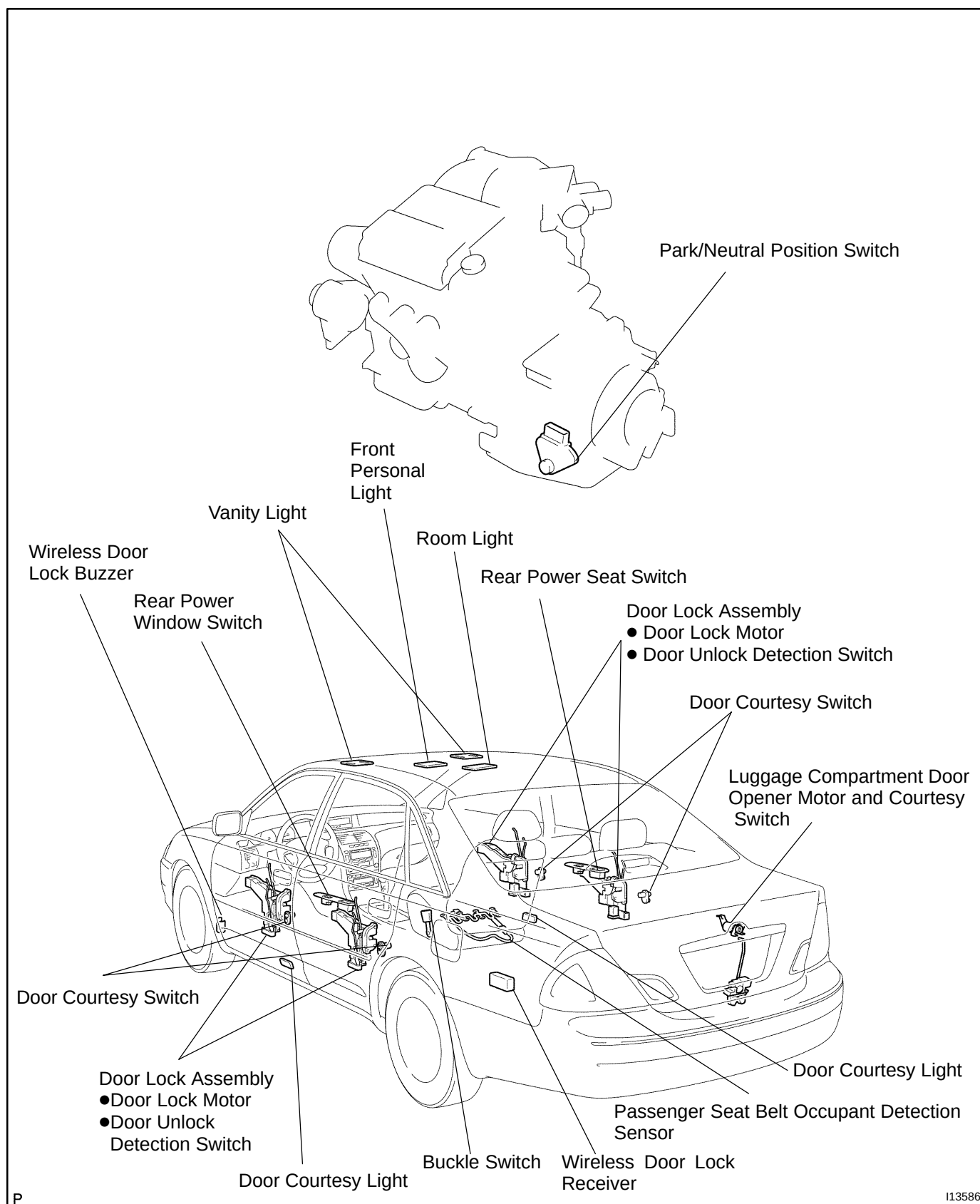
Step 6, 8 : Diagnostic steps permitting the use of the hand-held tester .

PARTS LOCATION



P

I11666



PROBLEM SYMPTOMS TABLE

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH:

Symptom	Suspect Area	See page
Ignition switch is not set to each position.	1. Ignition switch 2. Power source circuit	BE-16 DI-627
Key unlock warning system does not operate. (The buzzer does not sound when the driver's door is opened with the ignition OFF and key inserted)	1. Power source circuit 2. Key unlock warning switch circuit 3. Door courtesy switch circuit 4. Driver door ECU 5. Multiplex communication circuit 6. Body ECU 7. Wire harness	DI-627 DI-637 DI-639 DI-676 DI-718 IN-30 IN-30
Key unlock warning system does not operate. (The buzzer sounds when the ignition key is ACC or ON)	1. Ignition switch 2. Power source circuit 3. Wire harness	BE-16 DI-627 IN-30

HEADLIGHT AND TAILLIGHT SYSTEM (USA):

Symptom	Suspect Area	See page
Only one side headlight does not light.	1. HEAD-(LH, RH) fuse 2. Headlight bulb 3. Wire harness	BE-9 - IN-30
Headlight does not light.	1. HEAD-(LH, RH) fuse 2. Headlight control relay circuit 3. Light control switch circuit 4. Headlight bulb 5. Wire harness	BE-9 DI-635 DI-631 - IN-30
"Lo-Beam" does not light.	1. Headlight bulb 2. Headlight dimmer switch 3. Light control switch circuit 4. Wire harness	- DI-631 DI-631 IN-30
"Hi-Beam" does not light.	1. Headlight bulb 2. Headlight dimmer switch 3. Light control switch circuit 4. Wire harness	- DI-631 DI-631 IN-30
"Flash" does not light.	1. Headlight dimmer switch 2. Wire harness	DI-631 IN-30
Only one side taillight does not light.	1. Taillight bulb 2. Wire harness	- IN-30
Taillight does not light.	1. TAIL fuse 2. Taillight control relay circuit 3. Light control switch circuit 4. Body ECU 5. Wire harness	BE-9 DI-633 DI-631 IN-30 IN-30
Rear Combination light does not light.	1. Bulb 2. Light failure sensor 3. Wire harness	- BE-53 IN-30

HEADLIGHT AND TAILLIGHT SYSTEM (CANADA):

Symptom	Suspect Area	See page
Only one side headlight does not light.	1. Headlight bulb 2. HEAD LWR (LH, RH) fuse 3. Wire harness	- BE-9 IN-30
Headlight does not light.	1. Headlight bulb 2. Headlight control relay circuit 3. Light control switch circuit 4. Wire harness	- DI-635 DI-631 IN-30
"Lo-Beam" does not light.	1. Headlight bulb 2. HEAD LWR (LH, RH) fuse 3. Headlight control relay circuit 4. Headlight dimmer switch 5. Wire harness	- BE-9 DI-635 DI-631 IN-30
"Hi-Beam" does not light.	1. Headlight bulb 2. HEAD UPR (LH, RH) fuse 3. DRL fuse 4. D.R.L. relay No.2, 3 and 4 relay circuit 5. Headlight dimmer switch 6. Wire harness	- BE-9 BE-9 DI-668 DI-631 IN-30
"Flash" does not light.	1. Headlight bulb 2. HEAD UPR (LH, RH) fuse 3. DRL fuse (R/B No.7) 4. D.R.L. relay No.2, 3 and 4 relay circuit 5. Headlight dimmer switch 6. Wire harness	- BE-9 BE-9 DI-668 DI-631 IN-30
Headlight does not light with engine running and light control SW OFF.	1. DOME fuse 2. GAUGE fuse 3. DRL fuse 4. Parking brake switch circuit 5. Generator 6. Wire harness	BE-9 BE-9 BE-9 DI-670 CH-9 IN-30
Only one side taillight does not light.	1. Bulb 2. Wire harness	- IN-30
Taillight does not light.	1. TAIL fuse 2. Taillight control relay circuit 3. Light control switch circuit 4. Body ECU 5. Wire harness	BE-9 DI-633 DI-631 IN-30 IN-30
Rear Combination light does not light.	1. Taillight bulb 2. Light failure sensor 3. Wire harness	- BE-53 IN-30

AUTO TURN OFF SYSTEM:

Symptom	Suspect Area	See page
"Auto turn-off system" does not operate.	1. Drivers door courtesy switch circuit 2. Driver door ECU 3. Multiplex communication circuit 4. Body ECU	DI-639 DI-676 DI-718 IN-30

INTERIOR LIGHT SYSTEM:

Symptom	Suspect Area	See page
Only one light does not light up.	1. Bulb 2. Wire harness	- IN-30
Room light does not light up (All).	1. DOME fuse 2. Body ECU 3. Wire harness	BE-9 IN-30 IN-30
Room light does not light up (Room light only).	1. Bulb 2. Room light assembly 3. Wire harness	- BE-31 IN-30
"Illuminated Entry System" does not operate.	1. Illumination circuit 2. Door courtesy switch circuit 3. Door unlock detection switch circuit 4. Body ECU 5. Wire harness	DI-655 DI-639 DI-643 DI-686 DI-708 IN-30 IN-30
Front personal light does not light up.	1. Bulb 2. Front personal light 3. Body ECU 4. Wire harness	- BE-31 IN-30 IN-30
Rear personal light does not light up.	1. Bulb 2. Rear personal light	- BE-31
Vanity light does not light up.	1. Bulb 2. Vanity light 3. Wire harness	- BE-31 IN-30
Luggage room light does not light up.	1. Bulb 2. Luggage compartment light 3. Luggage compartment door courtesy switch circuit 4. Body ECU 5. Wire harness	- BE-31 BE-31 IN-30 IN-30

COMBINATION METER:

Symptom	Suspect Area	See page
Seat Belt warning light does not light up.	1. Warning light bulb 2. Buckle switch circuit 3. Body ECU 4. Meter circuit plate 5. Wire harness	BE-43 BE-53 IN-30 BE-43 IN-30
Open Door warning light does not light up.	1. DOME fuse 2. Warning light bulb 3. Door courtesy switch circuit 4. Illumination circuit 5. Meter circuit plate 6. Wire harness	BE-9 BE-43 DI-639 DI-655 BE-43 IN-30

POWER WINDOW CONTROL SYSTEM:

Symptom	Suspect Area	See page
All power window system does not operate.	1. Power main relay 2. Driver door control system 3. Passenger door control system	BE-73 DI-676 DI-677
Driver door window system does not operate.	1. Driver door control ECU 2. Door lock motor circuit (Driver) 3. Body ECU 4. Wire harness	DI-692 DI-692 DI-641 -
Passenger door window system does not operate.	1. Passenger door control ECU 2. Door lock motor circuit (Passenger) 3. Body ECU 4. Wire harness	DI-714 DI-714 DI-641 -
Rear power window control system does not operate. (Both left and right)	1. Body ECU 2. Wire harness	IN-30 IN-30
Rear power window control system does not operate. (Only one side)	1. Rear power window switch circuit 2. Body ECU 3. Wire harness	DI-645 IN-30 IN-30

POWER DOOR LOCK CONTROL SYSTEM:

Symptom	Suspect Area	See page
"Door lock system" does not operate at all.	1. GAUGE Fuse 2. DOOR Fuse 3. Driver door control ECU 4. Body ECU 5. Wire Harness	- - DI-676 IN-30 -
Door lock system does not operate by manual switch.	1. Driver door control ECU 2. Body ECU 3. Wire Harness	DI-676 IN-30 -
Door lock system does not operate by door key.	1. Door Key Lock and Unlock Switch circuit 2. Body ECU 3. Wire Harness 4. Door Lock Link Disconnected	DI-637 IN-30 - -
Fault in 2-Operation unlock function of Driver's side door key lock and unlock switch.	1. Door Key Lock and Unlock Switch circuit 2. Body ECU 3. Wire Harness	DI-637 IN-30 -
Only one door lock does not operate.	1. Door Lock Motor circuit 2. Wire Harness	DI-641 -
Key confinement prevention function does not operate.	1. Key unlock warning switch circuit 2. Driver door control system 3. Passenger door control system	DI-637 DI-676 DI-677
Auto lock/unlock system does not operate.	1. Door lock motor circuit 2. Driver door control system 3. Passenger door control system	DI-641 DI-676 DI-677

LUGGAGE COMPARTMENT DOOR OPENER SYSTEM:

Symptom	Suspect Area	See page
Luggage compartment door opener system does not operate.	1. Luggage door switch circuit 2. Luggage door motor circuit 3. Body ECU	DI-647 DI-649 IN-30

WIRELESS DOOR LOCK CONTROL SYSTEM:

Symptom	Suspect Area	See page
All functions of wireless door lock control system do not operate.	1. Wireless door lock control receiver circuit 2. Key unlock warning switch circuit 3. Body ECU	DI-651 DI-637 IN-30
Lock or unlock function does not operate.	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Body ECU	DI-688 DI-710 DI-686 DI-708 IN-30
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system.	1. Door courtesy switch circuit 2. Body ECU	DI-639 IN-30
Wireless door lock operates, but the buzzer does not sound.	1. Wireless door lock buzzer circuit 2. Wireless door lock receiver circuit 3. Body ECU	DI-653 DI-651 IN-30
Buzzer sound, but wireless door lock function does not operate.	1. Wireless door lock receiver circuit 2. Body ECU	DI-651 IN-30
Luggage compartment door opener wireless function.	1. Luggage compartment door opener motor circuit 2. Body ECU	DI-649 IN-30

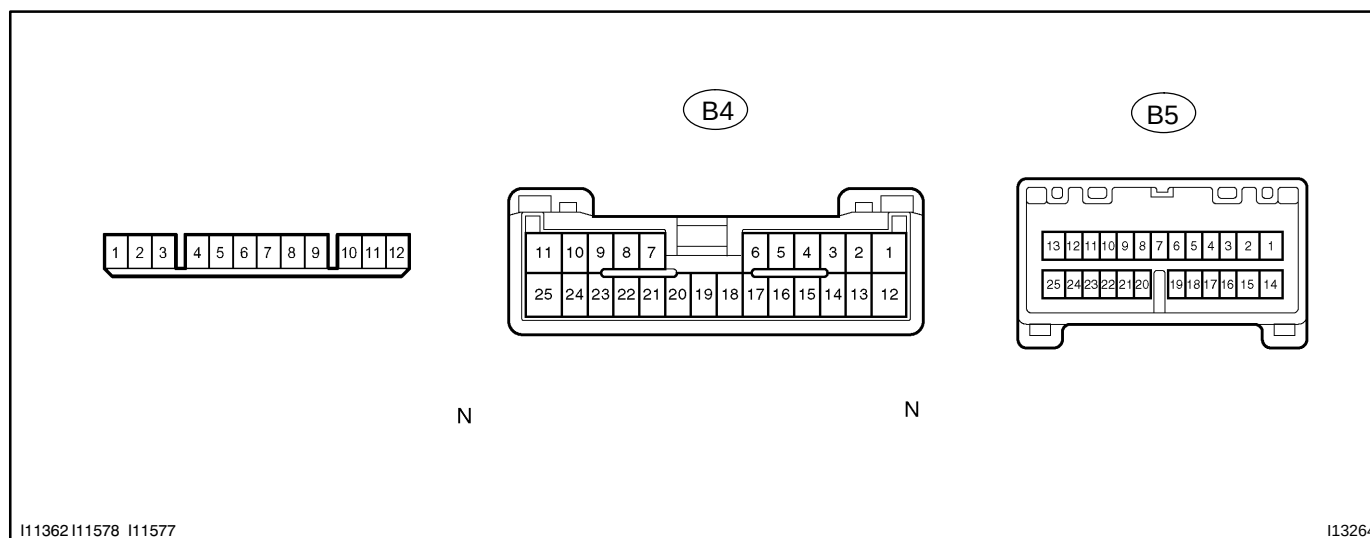
POWER MIRROR CONTROL SYSTEM:

Symptom	Suspect Area	See page
Mirror does not operate.	1. CIG/RAD fuse 2. Mirror switch circuit 3. Mirror motor 4. Body ECU 5. Wire harness	BE-9 DI-515 BE-114 IN-30 IN-30
Mirror operates abnormally.	1. Mirror switch circuit 2. Mirror motor 3. Body ECU 4. Wire harness	DI-515 BE-114 IN-30 IN-30

HORN SYSTEM:

Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN fuse 2. Horn circuit 3. Wire harness	BE-9 DI-672 IN-30
Horns blow all the time.	1. Horn circuit 2. Wire harness	DI-672 IN-30
One horn operates but the other horn does not operate.	1. Horn circuit 2. Wire harness	DI-672 IN-30
Horns operate abnormally.	1. Horn circuit 2. Wire harness	DI-672 IN-30

TERMINALS OF ECU



Terminal No. (Symbols)	Wiring Color	Condition	STD Voltage (V)
1 ↔ B5-14 (BDR1 ↔ GND1)	- ↔ W-B	Constant	10 - 14 V
2 ↔ B5-14 (SIG ↔ GND1)	- ↔ W-B	Ignition switch OFF or ACC	Below 1 V
		Ignition switch ON	10 - 14 V
3 ↔ B5-14 (ACC ↔ GND1)	- ↔ W-B	Ignition switch OFF	Below 1 V
		Ignition switch ACC or ON	10 - 14 V
5 ↔ B5-14 (ILL ↔ GND1)	- ↔ W-B	Each door are opened	Below 1 V
		All door are closed	10 - 14 V
7 ↔ B5-14 (BDR2 ↔ GND1)	- ↔ W-B	Constant	10 - 14 V
8 ↔ B5-14 (HEAD ↔ GND1)	- ↔ W-B	Ignition switch ON and light control switch HEAD	Below 2 V
		Ignition switch ON and light control switch OFF	10 - 14 V
9 ↔ B5-14 (TRLY ↔ GND1)	- ↔ W-B	Ignition switch ON and light control switch TAIL	Below 2 V
		Ignition switch ON and light control switch OFF	10 - 14 V
10 ↔ B5-14 (HORN ↔ GND1)	- ↔ W-B	Horn switch position is ON	Below 1 V
		Horn switch position is OFF	10 - 14 V
11 ↔ B5-14 (STOP ↔ GND1)	- ↔ W-B	Brake pedal is pushed	10 - 14 V
		Brake pedal is released	Below 1 V
B4-1 ↔ B5-14 (P ↔ GND1)	G-W ↔ W-B	Park/neutral position switch is except P position	10 - 14 V
		Park/neutral position switch is P position	Below 1 V
B4-2 ↔ B5-14 (HF ↔ GND1)	B-W ↔ W-B	Headlight control switch position is FLASH	Below 1 V
		Headlight control switch position is except FLASH	10 - 14 V
B4-3 ↔ B5-14 (HEAD ↔ GND1)	R-Y ↔ W-B	Light control switch HEAD	Below 2 V
		Light control switch OFF or TAIL	10 - 14 V
B4-4 ↔ B5-14 (AUTO ↔ GND1)	G-O ↔ W-B	Light control switch AUTO	Below 2 V
		Light control switch OFF, TAIL or HEAD	10 - 14 V
B4-5 ↔ B5-14 (DCTY ↔ GND1)	R-L ↔ W-B	Driver door closed	10 - 14 V
		Driver door opened	Below 1 V
B4-6 ↔ B5-14 (LGC ↔ GND1)	R ↔ W-B	Luggage compartment door is opened	Below 1 V
		Luggage compartment door is closed	10 - 14 V

B4-7 ↔ B5-14 (PRG ↔ GND1)	G-R ↔ W-B	Wireless door lock receiver communication circuit	-
B4-8 ↔ B5-14 (RLD ↔ GND1)	Y-R ↔ W-B	Rear left side power window DOWN operation	Below 1 V
B4-9 ↔ B5-14 (MPX2 ↔ GND1)	G-W ↔ W-B	Multiplex communication circuit	-
B4-10 ↔ B5-14 (DRL ↔ GND1)	R-B ↔ W-B	Daytime running light system is operating	Below 1 V
		Constant	10 - 14 V
B4-11 ↔ Body ground (GND2 ↔ Body ground)	W-B	Constant	Below 1 V
B4-13 ↔ B5-14 (HU ↔ GND1)	B-R ↔ W-B	Headlight control switch position is HI beam or FLASH	Below 1 V
		Headlight control switch position is except HI beam or FLASH	10 - 14 V
B4-14 ↔ B5-14 (TAIL ↔ GND1)	P ↔ W-B	Light control switch TAIL or HEAD	Below 2 V
		Light control switch OFF	10 - 14 V
B4-15 ↔ B5-14 (PKB ↔ GND1)	Y-G ↔ W-B	Parking brake is used	Below 1 V
		Parking brake is not used	10 - 14 V
B4-16 ↔ B5-14 (DBKL ↔ GND1)	R-W ↔ W-B	With seat belt ON	Below 1 V
		No seat belt ON	10 - 14 V
B4-17 ↔ B5-14 (KSW ↔ GND1)	R-Y ↔ W-B	Key is inserted	Below 1 V
		Key is not inserted	10 - 14 V
B4-18 ↔ B5-14 (TC ↔ GND1)	LG-R ↔ W-B	DLC3 communication circuit	-
B4-19 ↔ B5-14 (GSW ↔ GND1)	L ↔ W-B	Normal condition	2 - 3.5 V
		When wire harness is open	4 - 6 V
B4-20 ↔ B5-14 (BZ ↔ GND1)	P-L ↔ W-B	Buzzer sound	10 - 14 V
		Buzzer does not sound	Below 1 V
B4-21 ↔ B5-14 (RDA ↔ GND1)	L-W ↔ W-B	Wireless door lock control system is operated	Below 1 V
		Wireless door lock control system is not operated	10 - 14 V
B4-22 ↔ B5-14 (RLU ↔ GND1)	G-Y ↔ W-B	Rear left side power window UP operation	Below 1 V
B4-23 ↔ B5-14 (MPX1 ↔ GND1)	V ↔ W-B	Multiplex communication circuit	-
B4-24 ↔ B5-14 (B ↔ GND1)	W-G ↔ W-B	Constant	10 - 14 V
B4-25 ↔ B5-14 (TR+ ↔ GND1)	L ↔ W-B	Luggage compartment door opener switch is operated	Below 1 V
		Luggage compartment door opener switch is not operated	10 - 14 V
B5-1 ↔ B5-14 (ACTD ↔ GND1)	L-W ↔ W-B	Driver door lock is operating	10 - 14 V
B5-2 ↔ B5-15 (ACT+ ↔ ACT-)	L-R ↔ L	Door lock is operating	10 - 14 V
B5-3 ↔ B5-14 (PCTY ↔ GND1)	O ↔ W-B	Driver door closed	10 - 14 V
		Driver door opened	Below 1 V
B5-4 ↔ B5-14 (SEAT ↔ GND1)	W-R ↔ W-B	Passenger seat switch OFF	10 - 14 V
		Passenger seat switch ON	Below 1 V
B5-5 ↔ B5-14 (LSW ↔ GND1)	L-O ↔ W-B	Rear door locked	Below 2 V
		Rear door unlocked	10 - 14 V

DIAGNOSTICS - BODY CONTROL SYSTEM

B5-6 ↔ B5-14 (ALTL ↔ GND1)	R-L ↔ W-B	Ignition switch ON	10 - 14 V
		Engine running	Below 1 V
B5-7 ↔ B5-14 (CLTE ↔ GND1)	Y-B ↔ W-B	Automatic light control sensor communication circuit	-
B5-8 ↔ B5-14 (CLTS ↔ GND1)	LG ↔ W-B	Automatic light control sensor communication circuit	-
B5-9 ↔ B5-14 (MPX3 ↔ GND1)	R-Y ↔ W-B	Multiplex communication circuit	-
B5-10 ↔ B5-14 (RRU ↔ GND1)	G-B ↔ W-B	Rear right side power window UP operation	Below 1 V
B5-11 ↔ B5-14 (PBEW ↔ GND1)	G-R ↔ W-B	Passenger seat belt unfastened	Below 1 V
		Passenger seat belt fastened	10 - 14 V
B5-13 ↔ Body ground (CLTC ↔ Body ground)	W-B ↔ Body ground	Constant	Below 1 V
B5-14 ↔ Body ground (GND1 ↔ Body ground)	W-B ↔ -	Constant	Below 1 V
B5-16 ↔ B5-14 (RCTY ↔ GND1)	R-W ↔ W-B	Rear door closed	10 - 14 V
		Rear door opened	Below 1 V
B5-17 ↔ B5-14 (PBKL ↔ GND1)	G ↔ W-B	Passenger seat belt unfastened	Below 1 V
		Passenger seat belt fastened	10 - 14 V
B5-18 ↔ B5-14 (TKU ↔ GND1)	L-B ↔ W-B	Luggage compartment door opener switch is operated	Below 1 V
		Luggage compartment door opener switch is not operated	10 - 14 V
B5-20 ↔ B5-14 (CLTB ↔ GND1)	L ↔ W-B	Automatic light control sensor communication circuit	-
B5-21 ↔ B5-14 (MPX4 ↔ GND1)	G-B ↔ W-B	Multiplex communication circuit	-
B5-22 ↔ B5-14 (RRD ↔ GND1)	R-B ↔ W-B	Rear right side power window DOWN operation	Below 1 V
B5-23 ↔ B5-14 (DBEW ↔ GND1)	G-W ↔ W-B	Passenger seat belt unfastened	Below 1 V
		Passenger seat belt fastened	10 - 14 V
B5-25 ↔ B5-14 (AJAR- ↔ GND1)	R ↔ W-B	Each door closed	10 - 14 V
		Each door opened	Below 1 V

CIRCUIT INSPECTION

DTC	11, 15	Actuator Motor Circuit

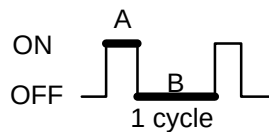
CIRCUIT DESCRIPTION

The actuator motor is operated by signals from the ECU. Acceleration and deceleration signals are transmitted according to changes in the Duty Ratio (See below).

Duty Ratio

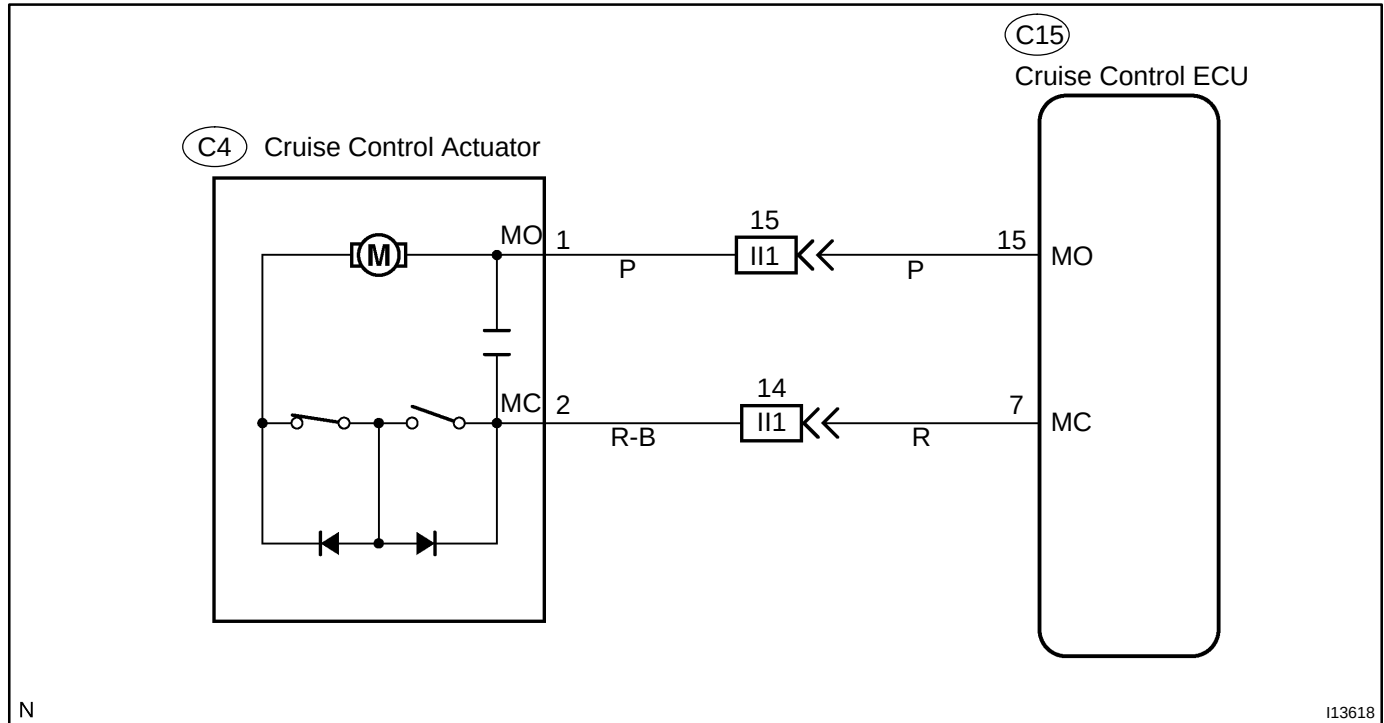
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity.

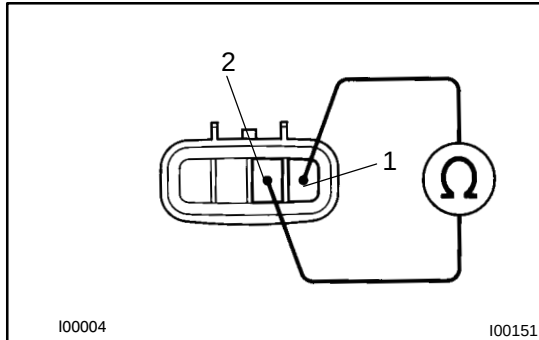
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100 (\%)$$



DTC No.	Detection Item	Trouble Area
11	Short in actuator motor circuit.	●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



INSPECTION PROCEDURE**1 Check resistance between terminals MO and MC of actuator motor.****PREPARATION:**

- (a) Turn ignition switch OFF.
- (b) Disconnect the actuator connector.

CHECK:

Measure resistance between terminals 1 and 2.

HINT:

If control plate is in fully opened or fully closed positions, resistance can not be measured.

OK:

Resistance: more than 4.2 Ω

NG**Replace cruise control actuator.****OK****2 Check for open and short in harness and connectors between cruise control ECU and actuator motor (See page [IN-30](#)).****NG****Repair or replace harness or connector.****OK**

Check and replace cruise control ECU
(See page [IN-30](#)).

DTC	12	Actuator Magnetic Clutch Circuit

CIRCUIT DESCRIPTION

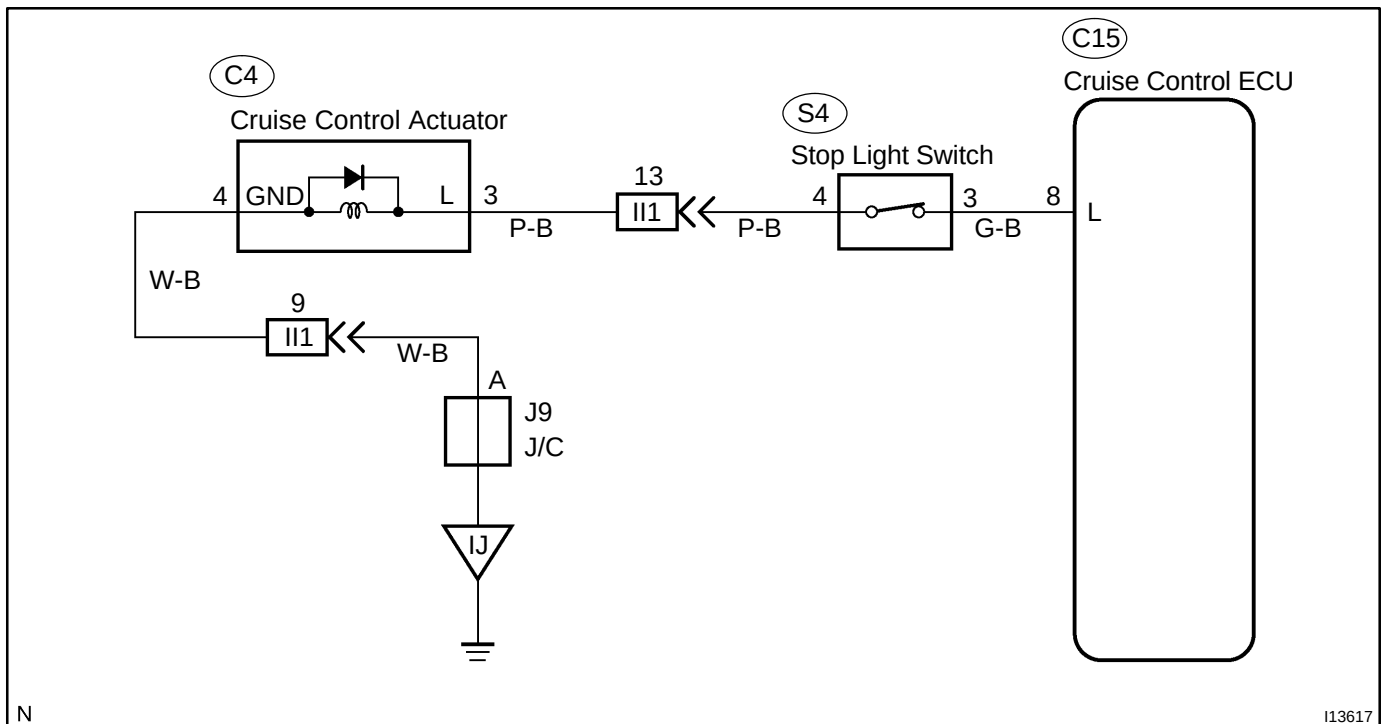
This circuit turns on the magnetic clutch inside the actuator during cruise control operation according to the signal from the ECU. If a malfunction occurs in the actuator or speed sensor, etc. during cruise control operation, the rotor shaft between the motor and control plate is released.

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), cruise control at the set speed is resumed.

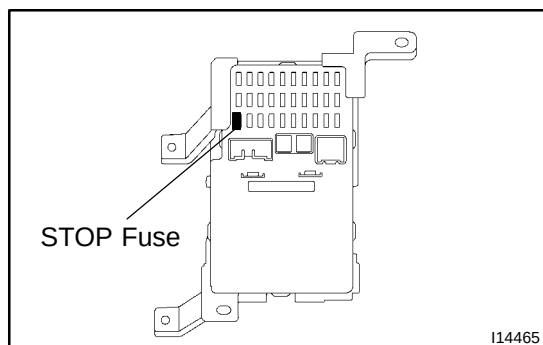
DTC No.	Detection Item	Trouble Area
12	Short in actuator magnetic clutch circuit. Open (0.8 sec.) in actuator magnetic clutch circuit.	●STOP Fuse ●Stop light switch ●Actuator magnetic clutch ●Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground ●Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check STOP fuse.

**PREPARATION:**

- (a) Turn ignition switch OFF.
- (b) Remove the STOP fuse from instrument panel junction block.

CHECK:

Check fuse continuity.

OK:

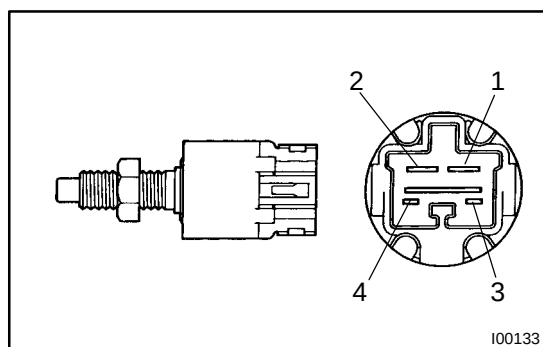
There is continuity.

NG

Replace STOP fuse.

OK

2 Check stop light switch.

**PREPARATION:**

Disconnect the stop light switch connector.

CHECK:

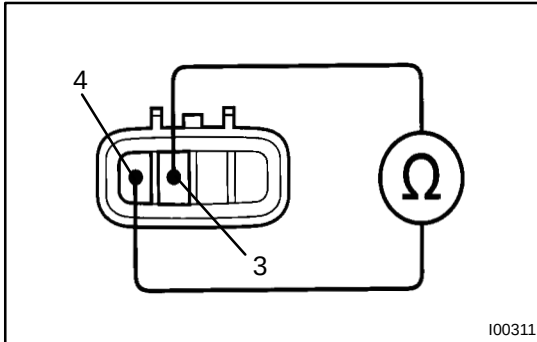
Check continuity between terminals.

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-30](#)).****NG****Repair or replace harness or connector.****OK**

Check and replace cruise control ECU (See page [IN-30](#)).

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.

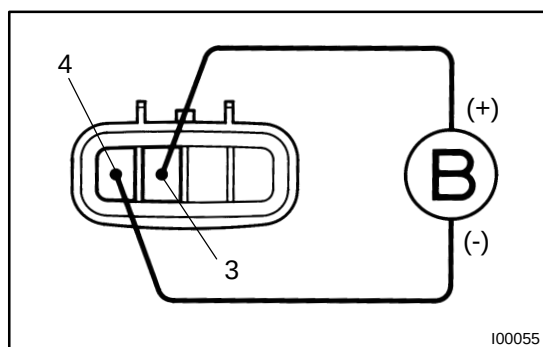
DTC No.	Detection Item	Trouble Area
14	Cruise control actuator mechanical malfunction.	●Actuator lock: (motor, arm) ●Actuator motor ●Cruise control ECU

WIRING DIAGRAM

See page [DI-563](#) .

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. The cruise control actuator will be damaged.

- Move the control plate by hand.

OK:

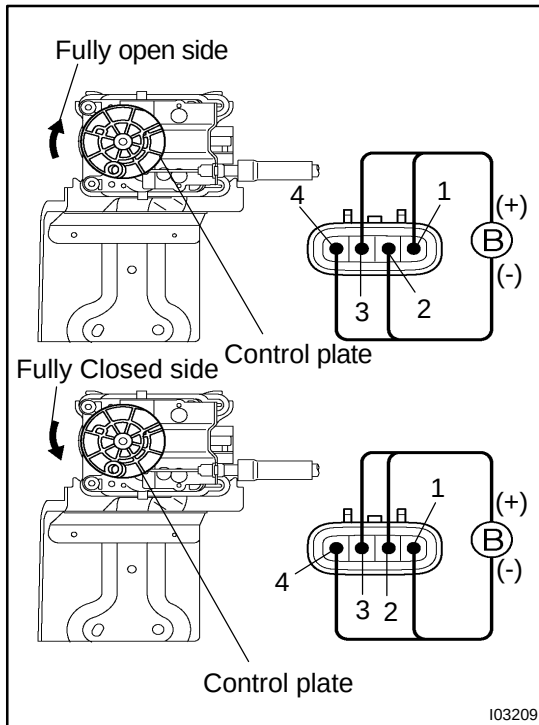
Control plate doesn't move.

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 fully open side

CHECK:

Connect the positive (+) lead from the battery to terminals 2 and 3 of actuator, connect the negative (-) lead to terminals 1 and 4 of actuator.

OK:

Control arm moves to fully closed side

NG

Replace cruise control actuator.

OK

3 Check harness and connector between cruise control ECU and cruise control actuator (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page IN-30).

DTC	21	Open in Vehicle Speed Sensor Circuit

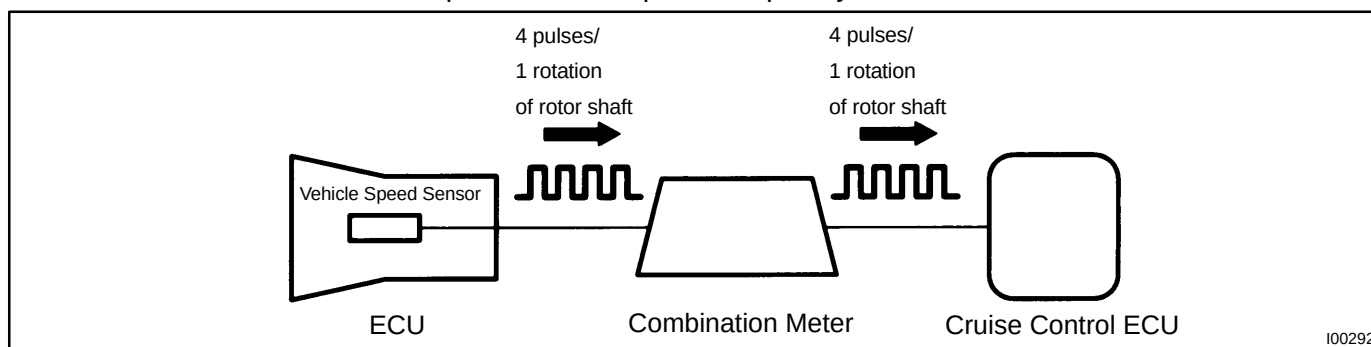
CIRCUIT DESCRIPTION

The signal from 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.

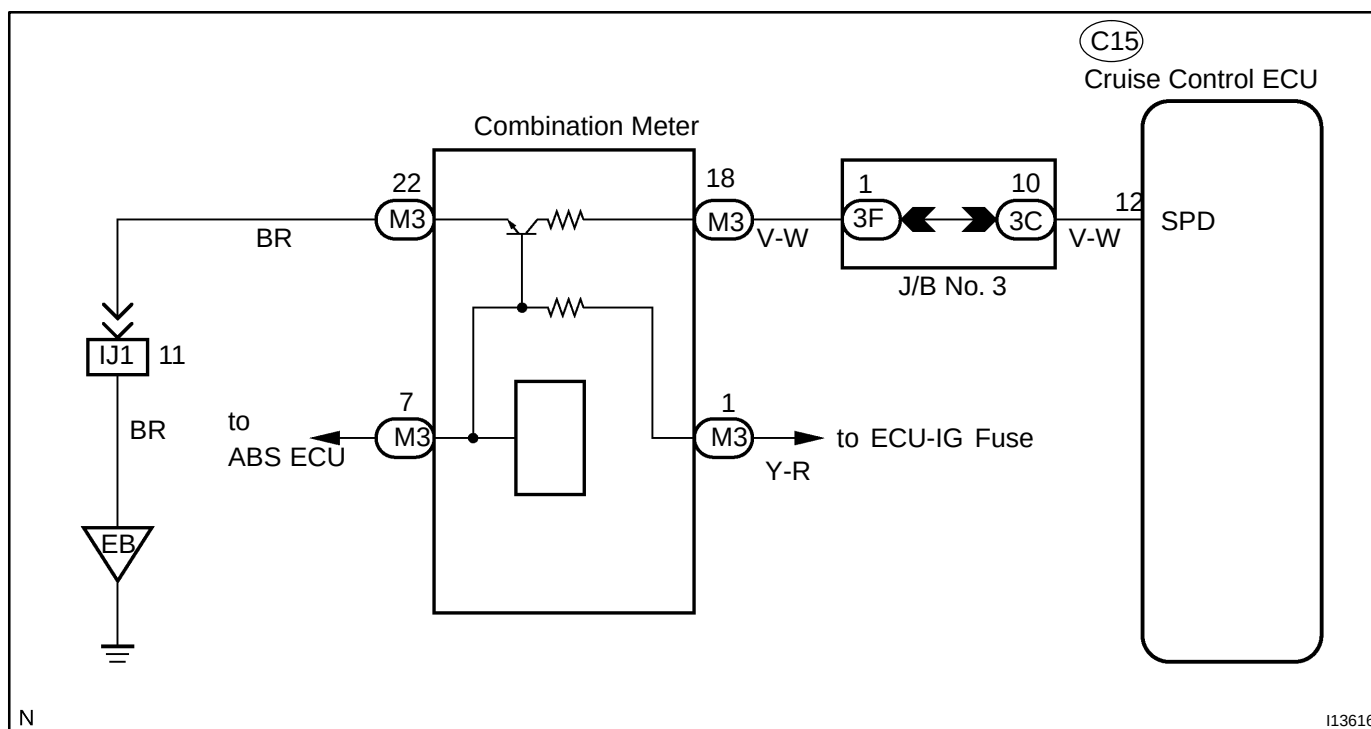
For each rotation of the shaft, the vehicle speed sensor sends a 4-pulse signal through the combination meter to the cruise control ECU (See the following installation).

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.



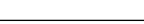
DTC No.	Detection Item	Trouble Area
21	Speed signal is not input to the cruise control ECU while cruise control is set.	●Combination meter ●Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor ●Vehicle speed sensor ●Cruise control ECU

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-551](#) .
- (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-30](#)).

NG

2	Check speedometer circuit (See Combination meter troubleshooting on page BE-2).

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-30).

NG

Repair or replace harness or connector.

OK

4	Check vehicle speed sensor (See page BE-53).

NG

Replace vehicle speed sensor.

OK

Check and replace cruise control ECU (See page [IN-30](#)).

DTC	23	Vehicle Speed Signal Abnormal

CIRCUIT DESCRIPTION

See page [DI-568](#) .

DTC No.	Detection Item	Trouble Area
23	Vehicle speed sensor pulse is abnormal.	●Vehicle speed sensor ●Cruise control ECU

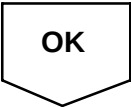
WIRING DIAGRAM

See page [DI-568](#) .

INSPECTION PROCEDURE

1	Check vehicle speed sensor (See page BE-53).

NG	Replace vehicle speed sensor.



Check and replace cruise control ECU (See page IN-30).

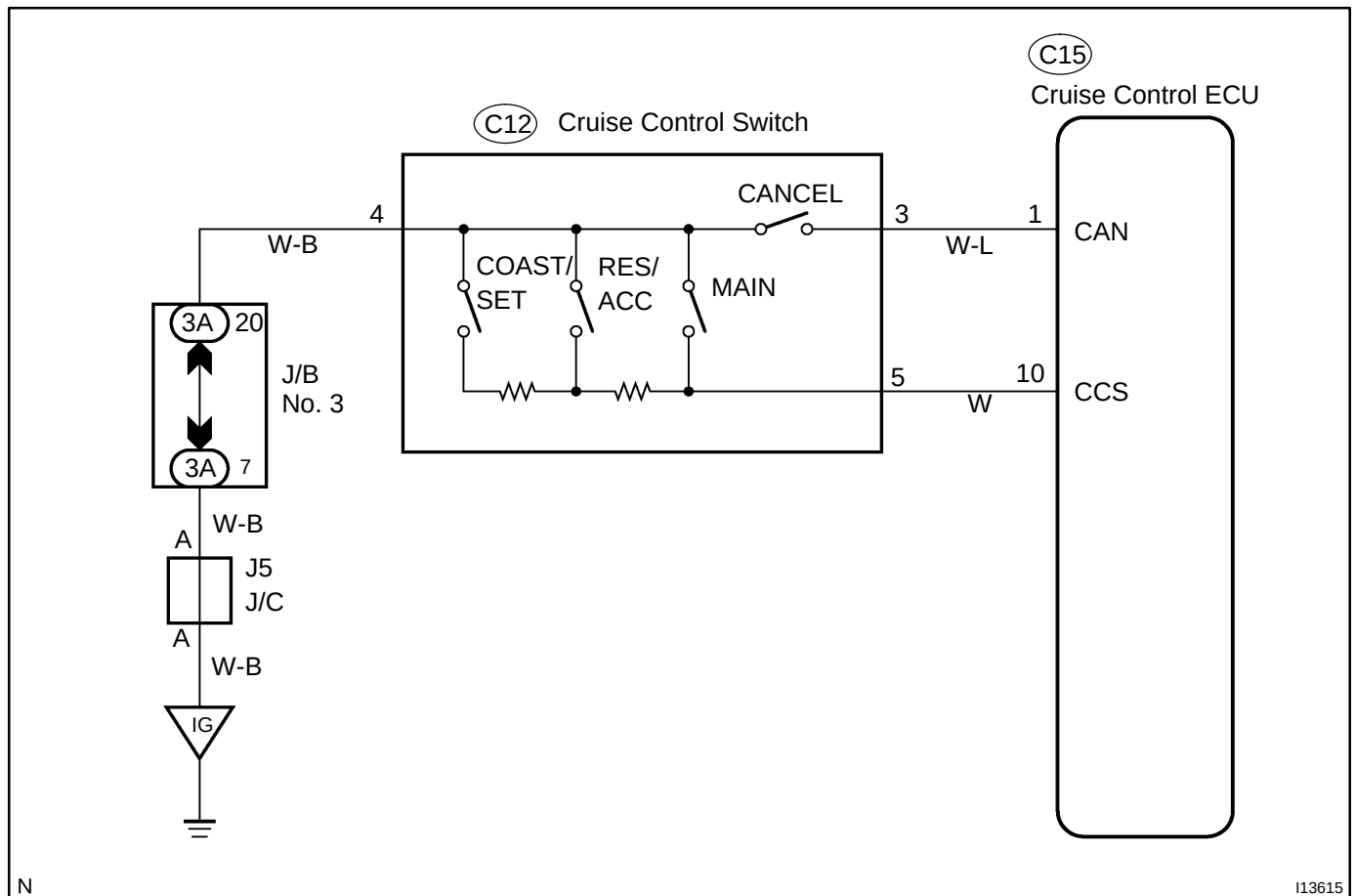
DTC	32	Control Switch Circuit (Cruise Control Switch)

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



N

I13615

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-551](#) .

CHECK:

Check the indicator light operation when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned on.

OK:**SET/COAST, RESUME/ACCEL switch**

The signals shown in the table on the left should be output when each switch is ON. The signal should disappear when the switch is turned OFF.

CANCEL switch

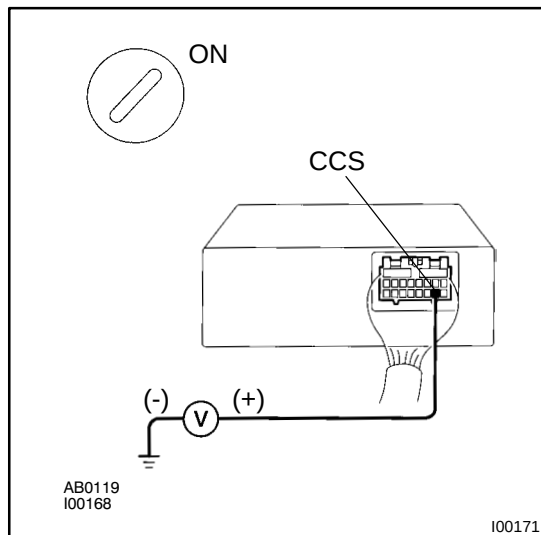
The indicator light goes off when the cancel switch is turned ON.

OK

Wait and see.

NG

2 Check voltage between terminals CCS of cruise control ECU connector and body ground.

**PREPARATION:**

(a) Remove the ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals 18 of ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 - 16 V
MAIN	Below 1V
REST/ACC	4.7 - 7.7 V
SET/COAST	2.6 - 4.2 V

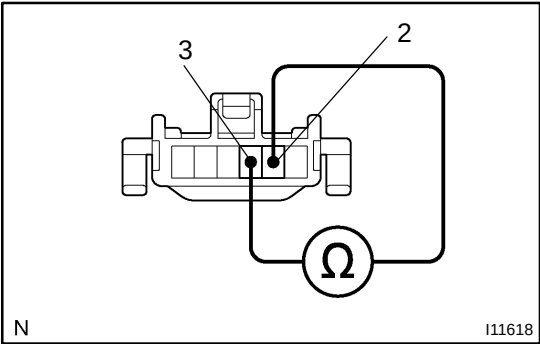
NG

Proceed to next circuit inspection shown in problem symptom table (See page [DI-560](#))

OK

3

Check control switch.



PREPARATION:

- (a) Remove steering wheel center pad.
- (b) Disconnect the control switch connector.

CHECK:

Measure resistance between terminals 2 and 3 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
MAIN	0 Ω (Continuity)
RES/ACC	240
SET/COAST	630

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-30](#)).

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-30](#)).

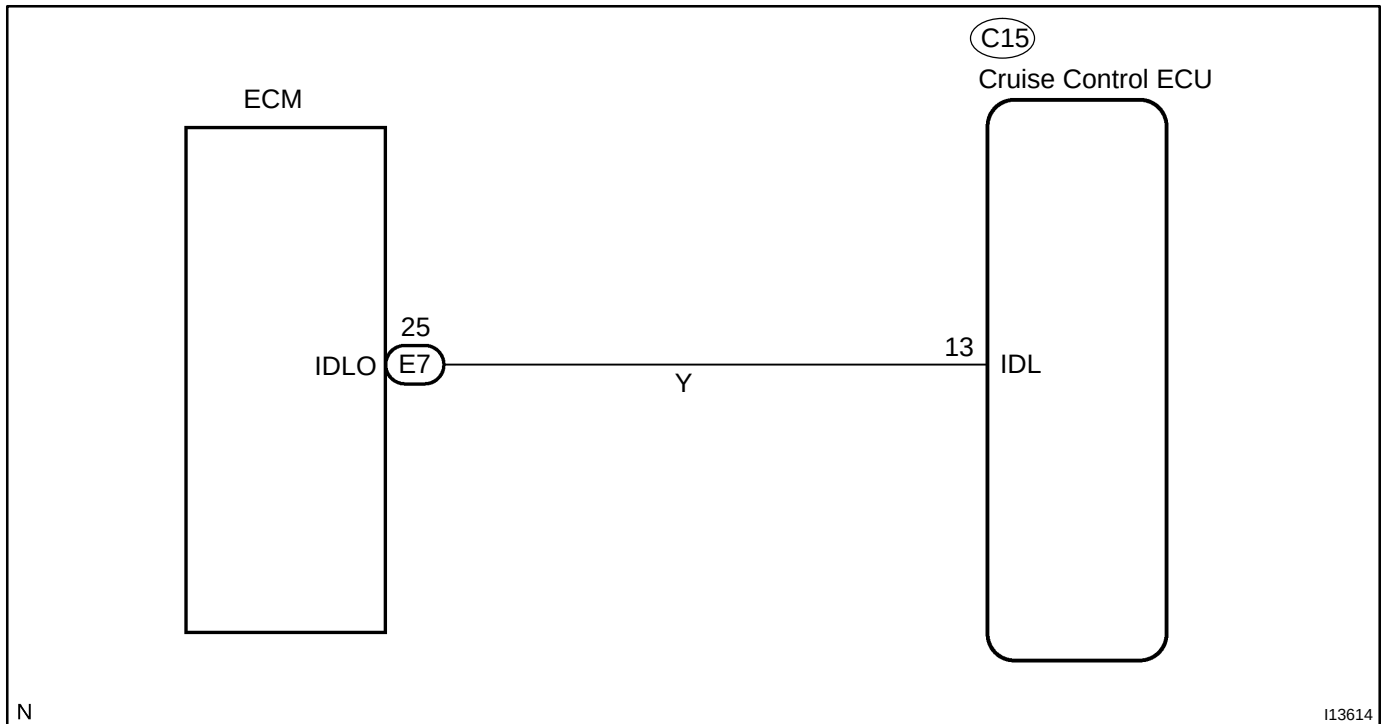
DTC	51	Idle Signal Circuit

CIRCUIT DESCRIPTION

When the idle switch is turned ON, a signal is sent to the ECM. The ECM uses this signal to correct the discrepancy between the throttle valve position and the actuator position sensor value to enable accurate cruise control at the set speed. If the idle switch is malfunctioning, problem symptoms also occur in the engine, so also inspect the engine.

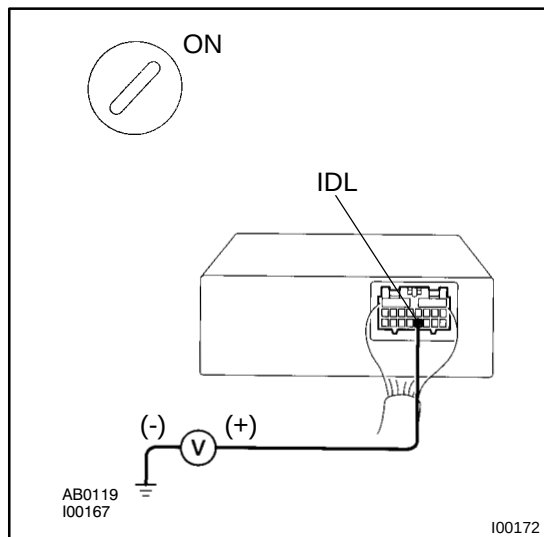
DTC No.	Detection Item	Trouble Area
51	Short in idle signal circuit.	●Harness or connector between ECM and throttle position sensor ●Throttle position sensor ●Harness or connector between cruise control ECU and ECM ●Cruise control ECU

WIRING DIAGRAM



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 2 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-560](#)).

NG

2	Check harness and connector between ECM and throttle position sensor (See page IN-30).

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.

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-30).

NG	Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page IN-30).

Actuator Control Cable

INSPECTION PROCEDURE

1	Actuator control cable inspection

OK:

- (a) Check that the actuator and control cable throttle link are properly installed and that the cable and link are connected correctly.
- (b) Check that the actuator and bell crank operate smoothly.
- (c) Check that the cable is not loose or too tight.

OK:

Freeplay: less than 10 mm

HINT:

- If the control cable is very loose, the vehicle's loss of speed going uphill will be large.
- If the control cable is too tight, the idle RPM will become high.

Cancel Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

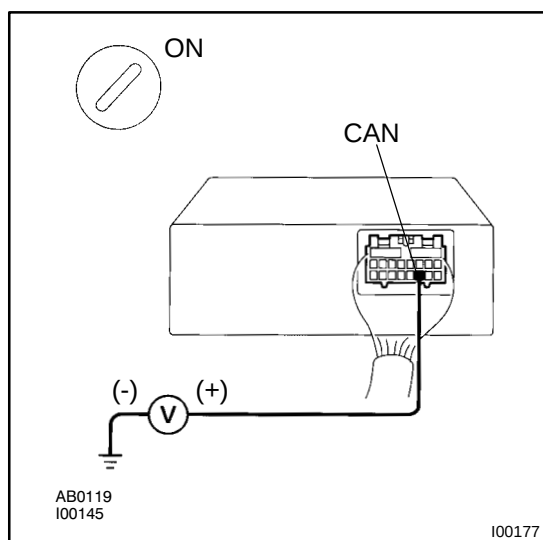
When the cruise control cancel switch is turned ON, the cruise control does not operate.

WIRING DIAGRAM

See page [DI-572](#) .

INSPECTION PROCEDURE

1	Check voltage between terminal CAN 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 CAN of cruise control ECU connector when main switch is held ON and OFF.

OK:

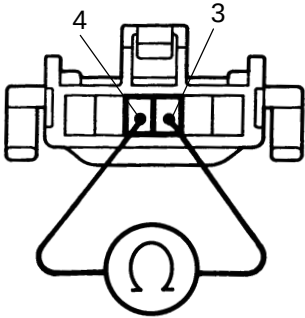
Main switch	Voltage
OFF	10 - 14 V
ON	Below 0.5 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-560](#)).

NG

2 Check cancel switch continuity.



PREPARATION:

- (a) Remove steering wheel center pad (See page [SR-12](#)).
- (b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 3 and 4 of control switch connector when cancel switch is held ON and OFF.

OK:

Switch position	Tester connection	Specified condition
OFF	3 - 4	No continuity
Hold ON	3 - 4	Continuity

NG

Replace control switch.

OK

3 Check harness and connector between cruise control ECU and cancel switch (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

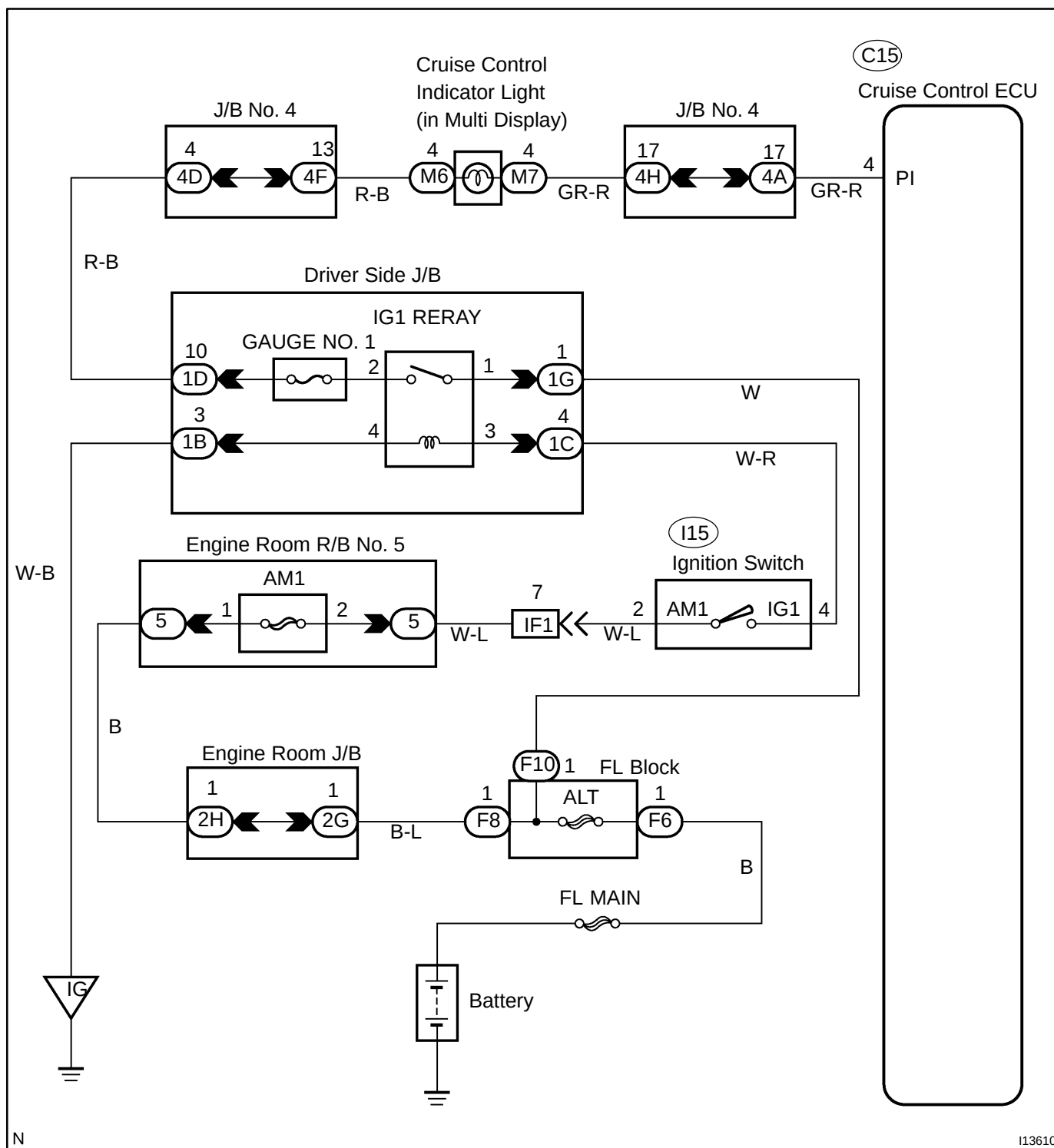
Check and replace cruise control ECU (See page [IN-30](#)).

CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

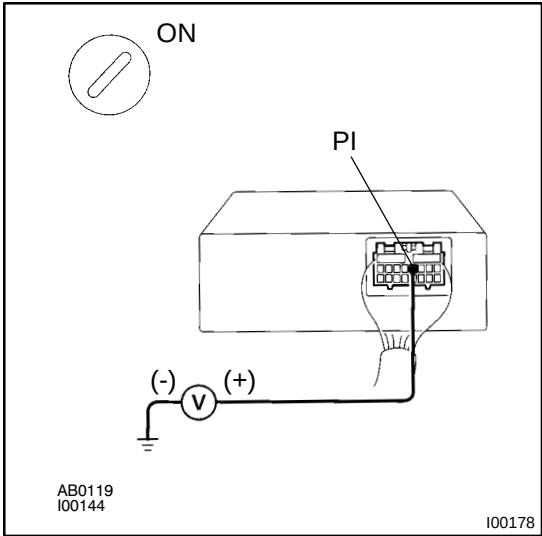
When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals PI and GND of cruise control ECU connector.



PREPARATION:

Tun ignition switch ON.

CHECK:

Measure voltage between terminals PI and GND of cruise control ECU connector when main switch is ON and OFF.

OK:

Switch position	Voltage
OFF	10 - 16 V
ON	Below 1.2 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-560](#)).

NG

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

NG

Replace combination meter.

OK

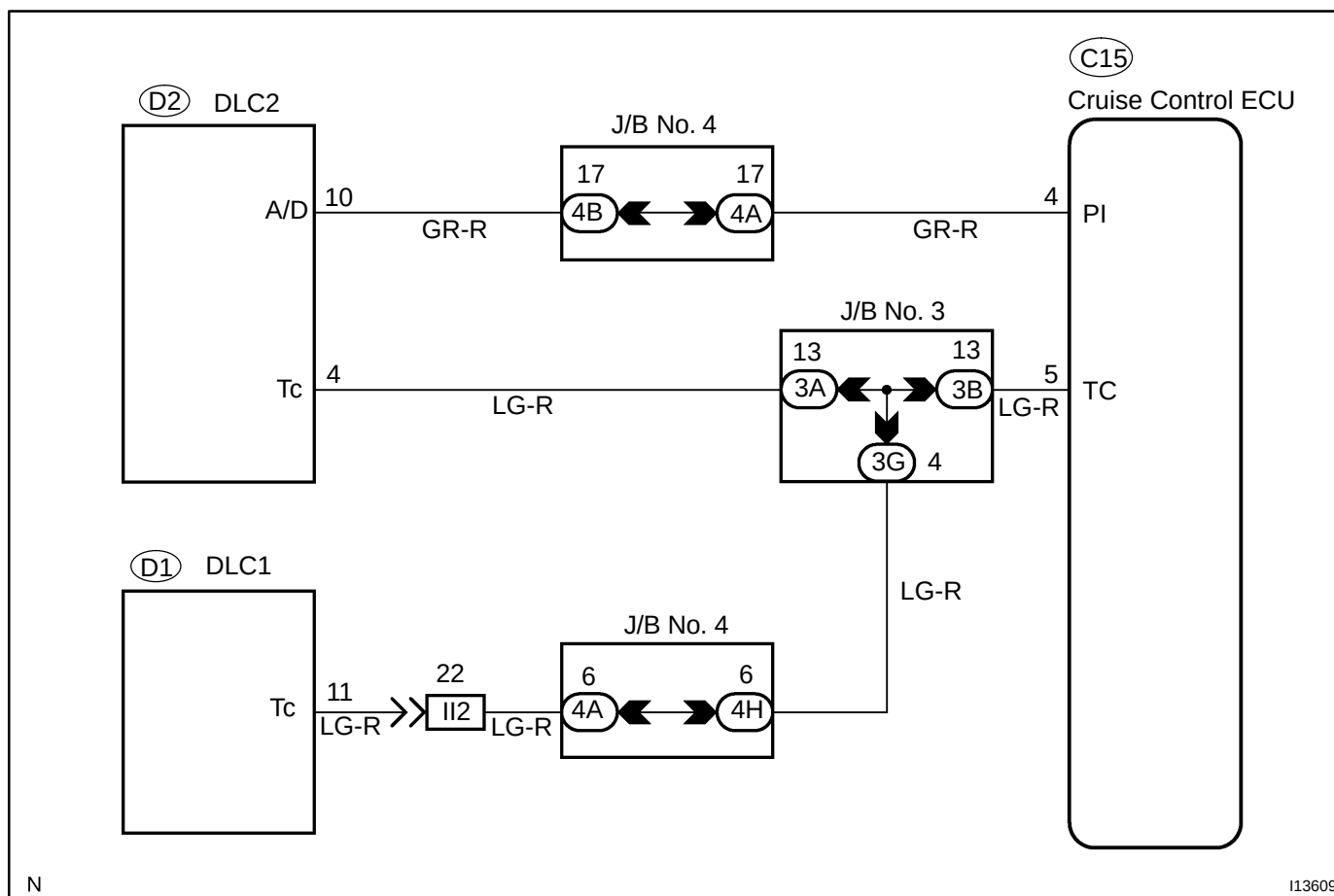
Check and replace cruise control ECU (See page [IN-30](#)).

Diagnosis Circuit

CIRCUIT DESCRIPTION

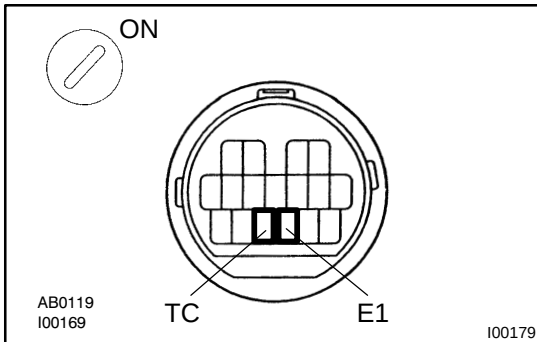
This circuit sends a signal to the ECU that outputs DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1** Check voltage between terminals Tc and 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-560](#)).

NG

- 2** Check harness and connector between cruise control ECU and DLC2, DLC2 and body ground (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

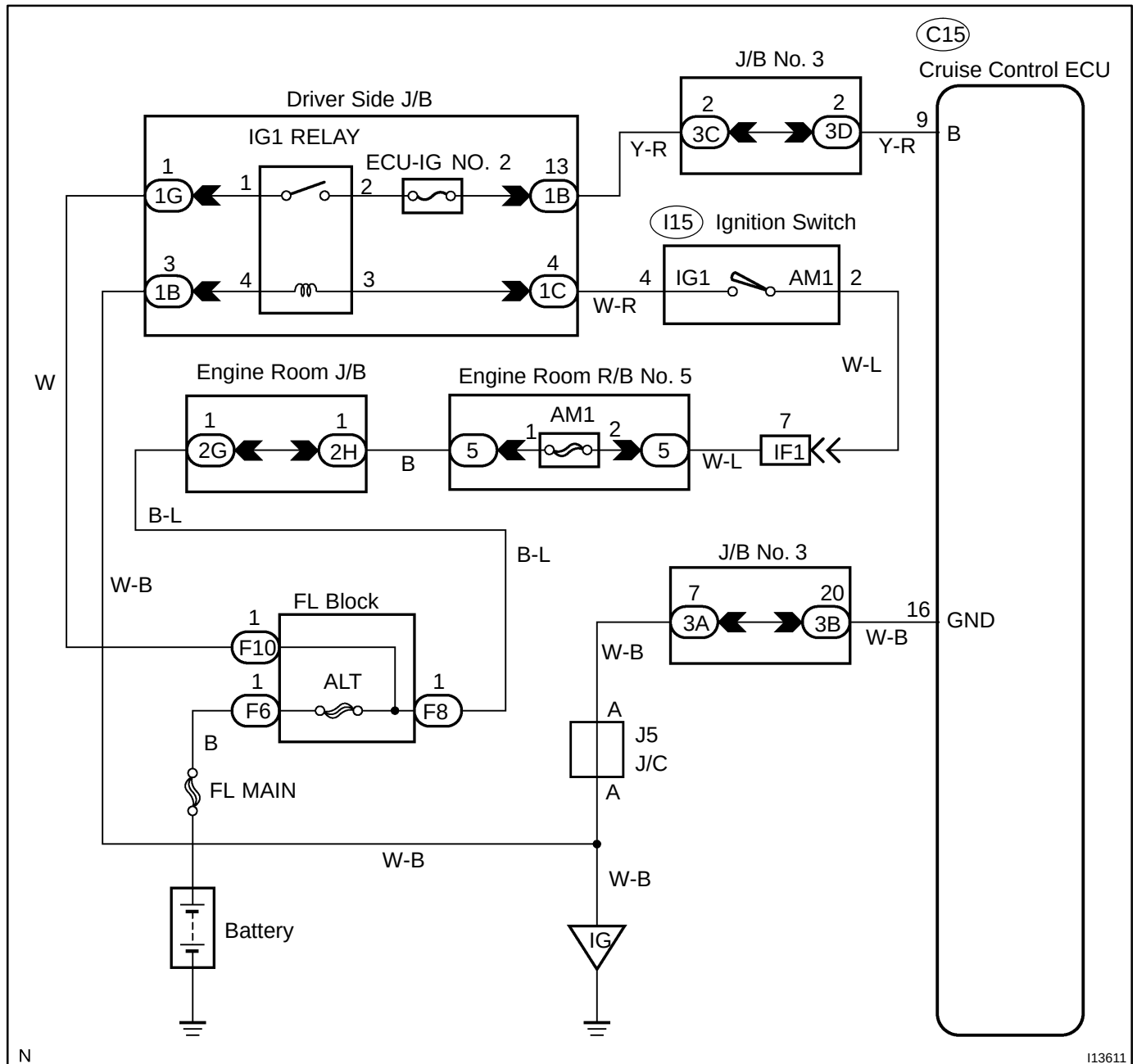
Check and replace cruise control ECU (See page [IN-30](#)).

ECU Power Source Circuit

CIRCUIT DESCRIPTION

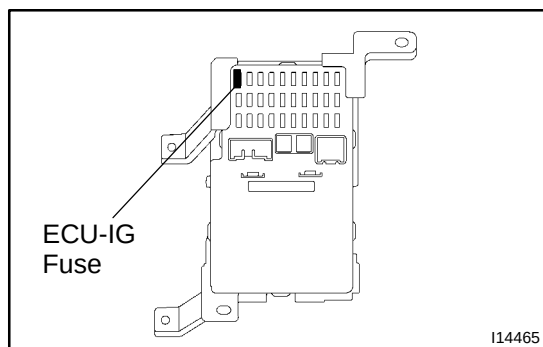
The ECU power source supplies power to the actuator and sensors, etc, when terminal GND and the cruise control ECU case are grounded.

WIRING DIAGRAM



N

I13611

INSPECTION PROCEDURE**1 Check ECU-IG fuse.****PREPARATION:**

Remove the ECU-IG fuse from instrument panel junction block.

CHECK:

Check continuity of ECU-IG fuse.

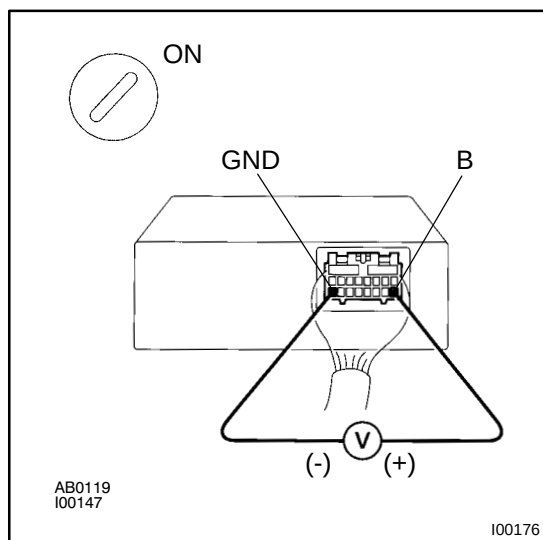
OK:

Continuity

NG

Check for short in all the harness and components connected to ECU-IG fuse.

OK

2 Check voltage between terminals B and GND of cruise control ECU connector.**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.

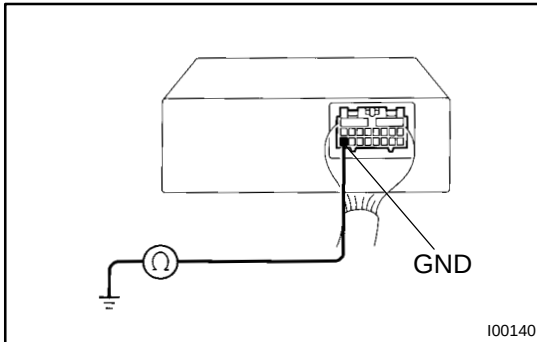
OK:

10 - 14 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-560](#)).

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 [DI-560](#)).

Electronically Controlled Transmission Communication Circuit

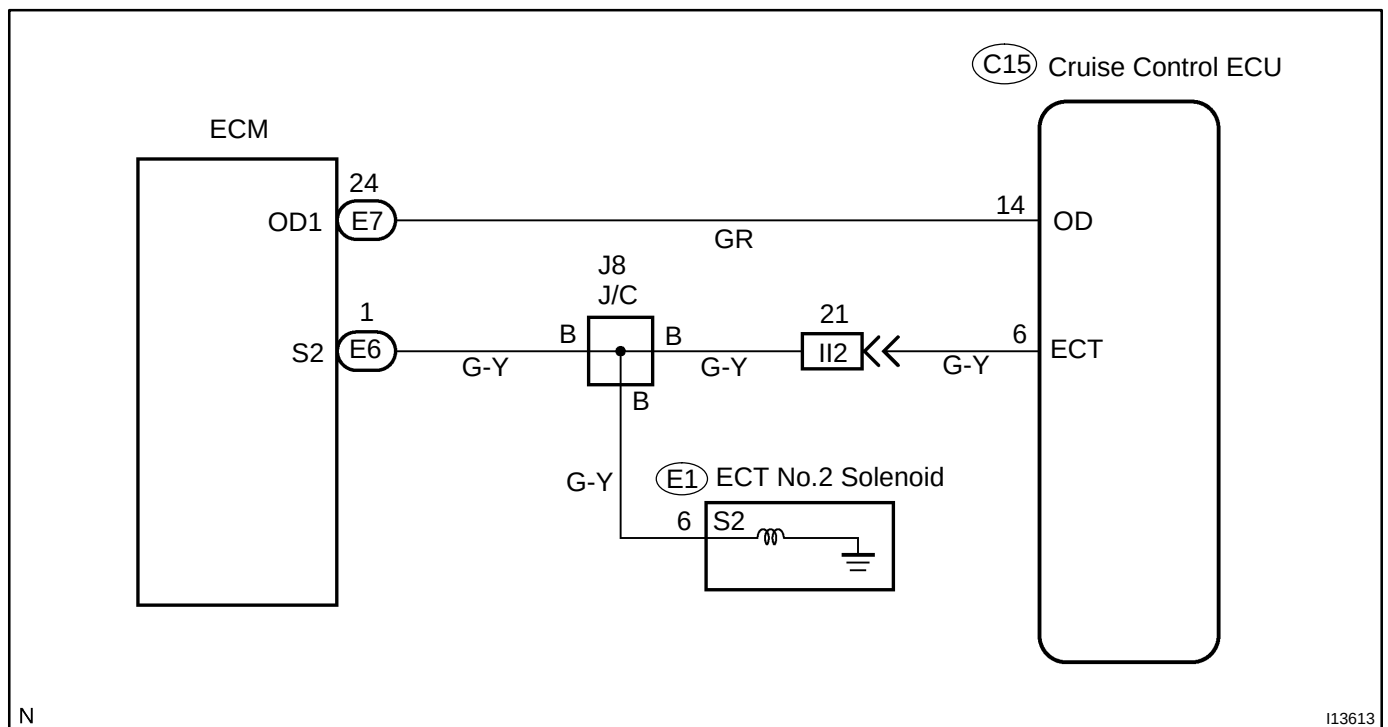
CIRCUIT DESCRIPTION

When driving uphill under the cruise control, in order to reduce shifting due to ON-OFF overdrive operation and to provide smooth driving, when down shifting in the electronically controlled transmission occurs, a signal to prevent upshift until the end of the uphill slope is sent from the cruise control ECU to the electronically controlled transmission.

Terminal ECT of the cruise control ECU detects the shift change signal (output to electronically controlled transmission No. 2 solenoid) from the ECM.

If the vehicle speeds down, also when terminal ECT of the cruise control ECU receives down shifting signal, it sends a signal from terminal OD to ECM to cut overdrive until the end of the uphill slope, and the gear shifts are reduced and gear shift points in the electronically controlled transmission are changed.

WIRING DIAGRAM



N

I13613

INSPECTION PROCEDURE**1 Check operation of overdrive.****PREPARATION:**

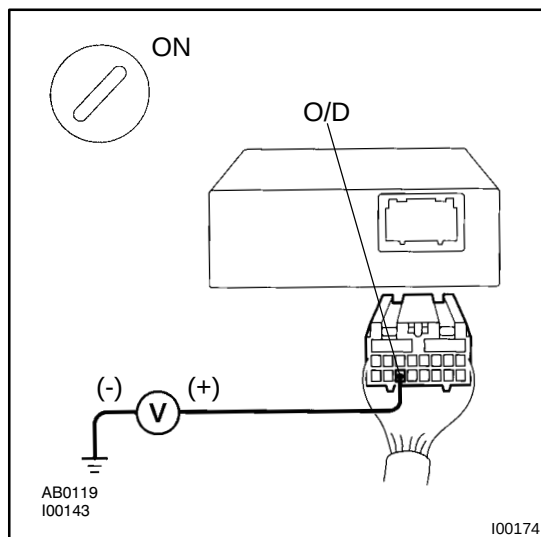
Test drive after engine warms up.

CHECK:

Check that overdrive ON ↔ OFF occurs by operation of OD switch ON-OFF.

NG

Check and repair electronically controlled transmission (See page [DI-158](#)).

OK**2 Check voltage between terminal OD of harness side connector of cruise control ECU and body ground.****PREPARATION:**

- (a) Remove the ECU with connector still connected.
- (b) Turn ignition switch ON.
- (c) Disconnect the ECU connector.

CHECK:

Measure voltage between terminal OD of harness side connector of ECU and body ground.

OK:

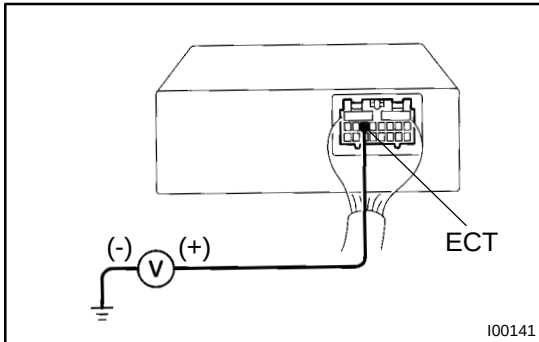
Voltage: 10 - 14 V

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) 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-560](#)).

NG

4 Check harness and connector between terminal ECT of cruise control ECU and electronically controlled transmission solenoid (See page [IN-30](#)).

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-30](#)).

NG

Repair or replace harness or connector.

OK

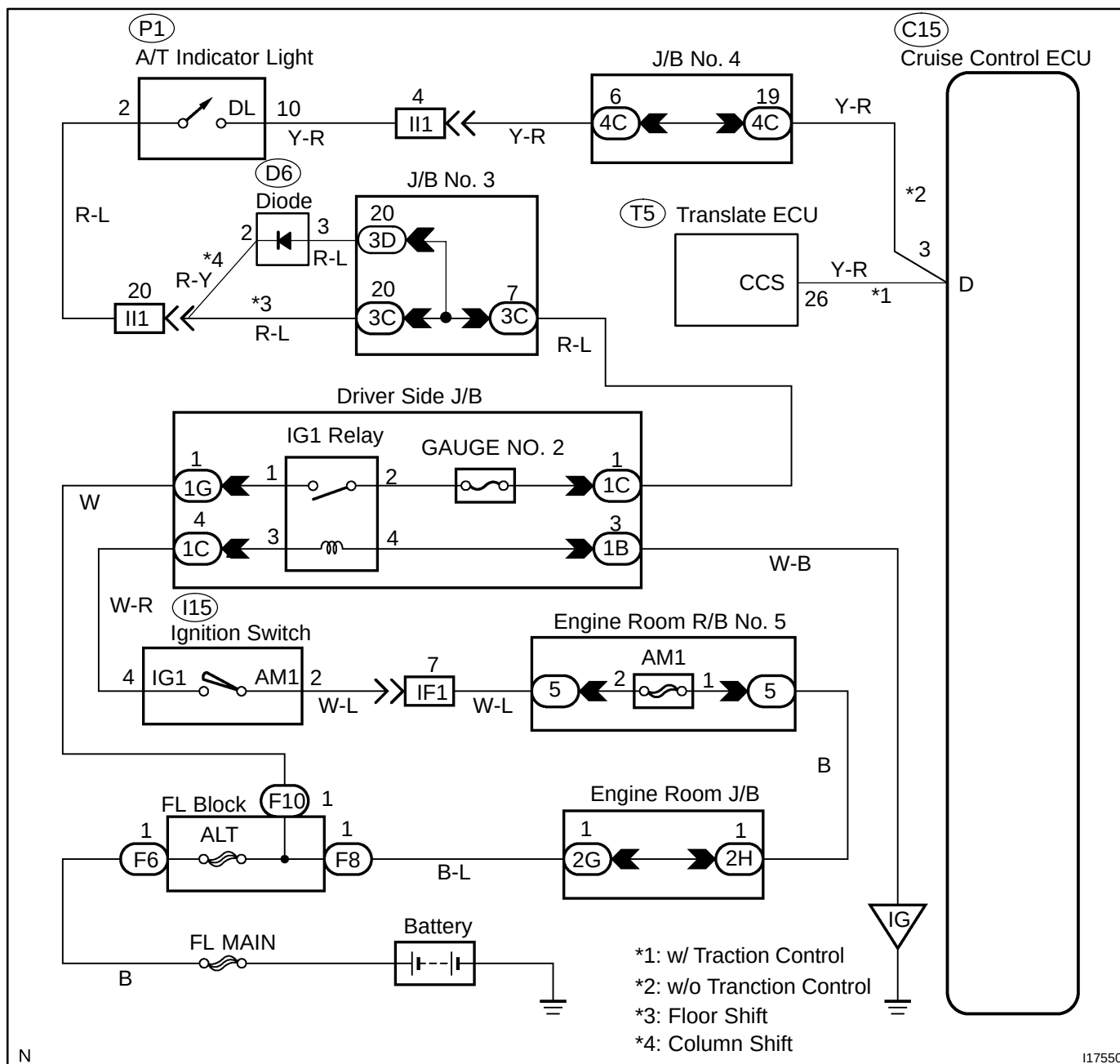
Check and replace cruise control ECU (See page [IN-30](#)).

Park/Neutral Position Switch Circuit

CIRCUIT DESCRIPTION

When the shift position is except D, a signal is sent from the park/neutral position switch to the ECU. When this signal is input during cruise control driving, the ECU cancels the cruise control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check starter operation.

CHECK:

Check that the starter operates normally and that the engine starts.

NG	Proceed to engine troubleshooting.

OK

2	Input signal check.

Input Signal	Indicator Light Blinking Pattern
Turn PNP switch OFF (Shift to positions except D)	

PREPARATION:

See input signal check on page [DI-551](#) .

CHECK:

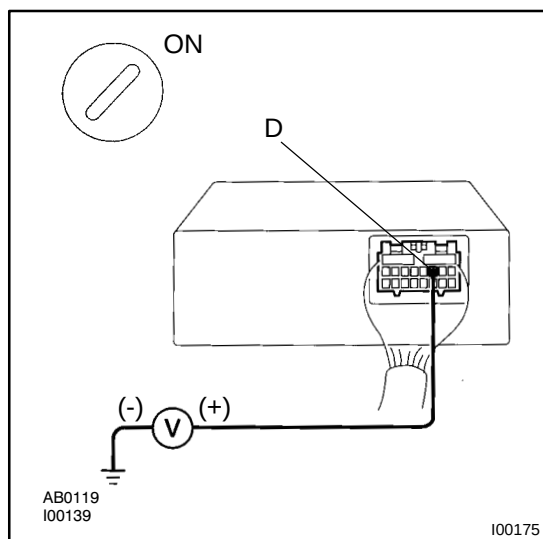
Check the indicator light when shifting into positions except D.

OK:

The indicator light goes off when shifting into positions except D.

OK	Proceed to next circuit inspection shown in problem symptom table (See page DI-560).

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-560](#)).

NG**4 Check harness and connector between cruise control ECU and park/neutral position switch (See page [IN-30](#)).****NG**

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page [IN-30](#)).

Stop Light Switch Circuit

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECU. When the ECU receives this signal, it cancels the cruise control.

A fail-safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.

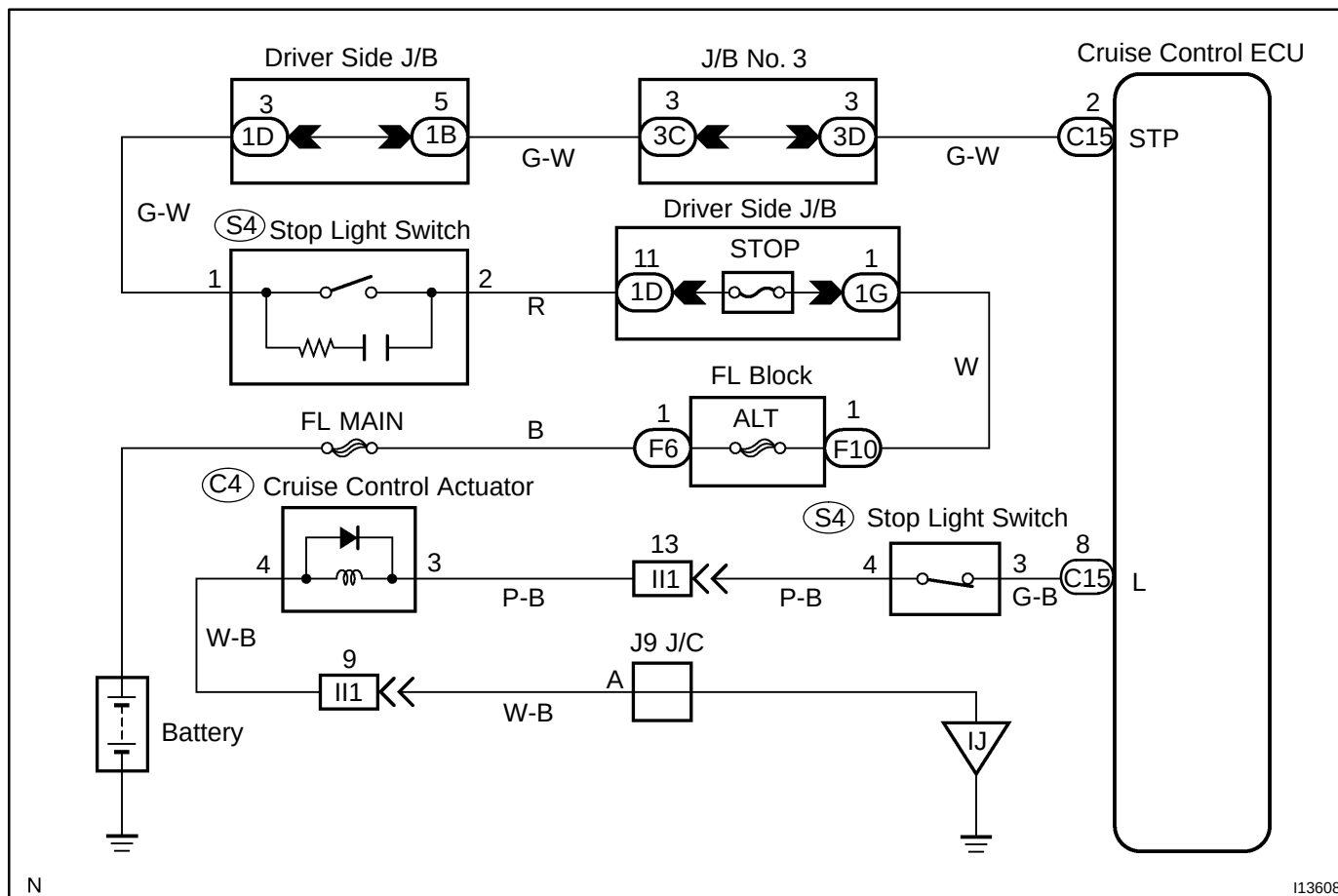
The cancel conditions are: Battery positive voltage at terminal STP-

When the brake is ON, battery positive voltage normally is applied through the STOP fuse and stop light switch to terminal STP- of the ECU, and the ECU turns the cruise control OFF.

If the harness connected to terminal STP- has an open circuit, terminal STP- will have battery positive voltage and the cruise control will be turned OFF.

Also, when the brake is ON, the magnetic clutch circuit is cut mechanically by the stop light switch, turning the cruise control OFF. (See page [DI-563](#) for operation of the magnetic clutch)

WIRING DIAGRAM



INSPECTION PROCEDURE**1 Check operation of stop light.****CHECK:**

Check that stop light comes ON when brake pedal is depressed, and turns OFF when brake pedal is released.

NG

Check stop light system (See page [BE-2](#)).

OK**2 Input signal check.****CHECK:**

- (a) See input signal check on [DI-551](#) .
- (b) Check the indicator light when the brake pedal is depressed.

OK:

The indicator light goes OFF when the brake pedal is depressed.

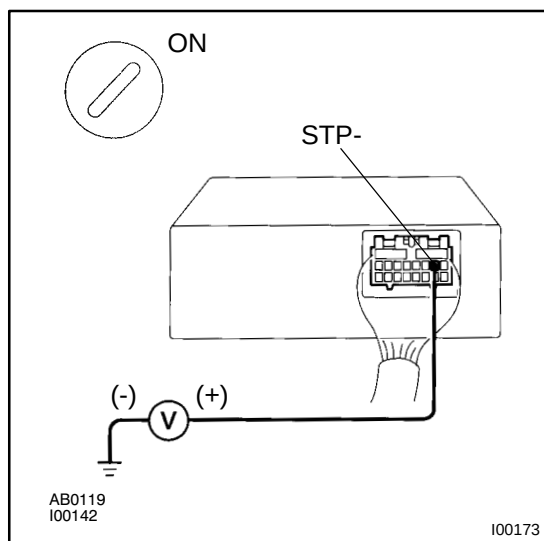
Input Signal	Indicator Light Blinking Pattern
Stop Light switch ON	

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-560](#)).

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-560](#)).

NG

4 Check for open in harness and connectors between terminal STP- of cruise control ECU and stop light switch (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

Check and replace cruise control ECU (See page [IN-30](#)).

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

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

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	How Often does Problem Occurs	☐ Continuous ☐ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	☒ Auto cancel occurs	- 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)

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.

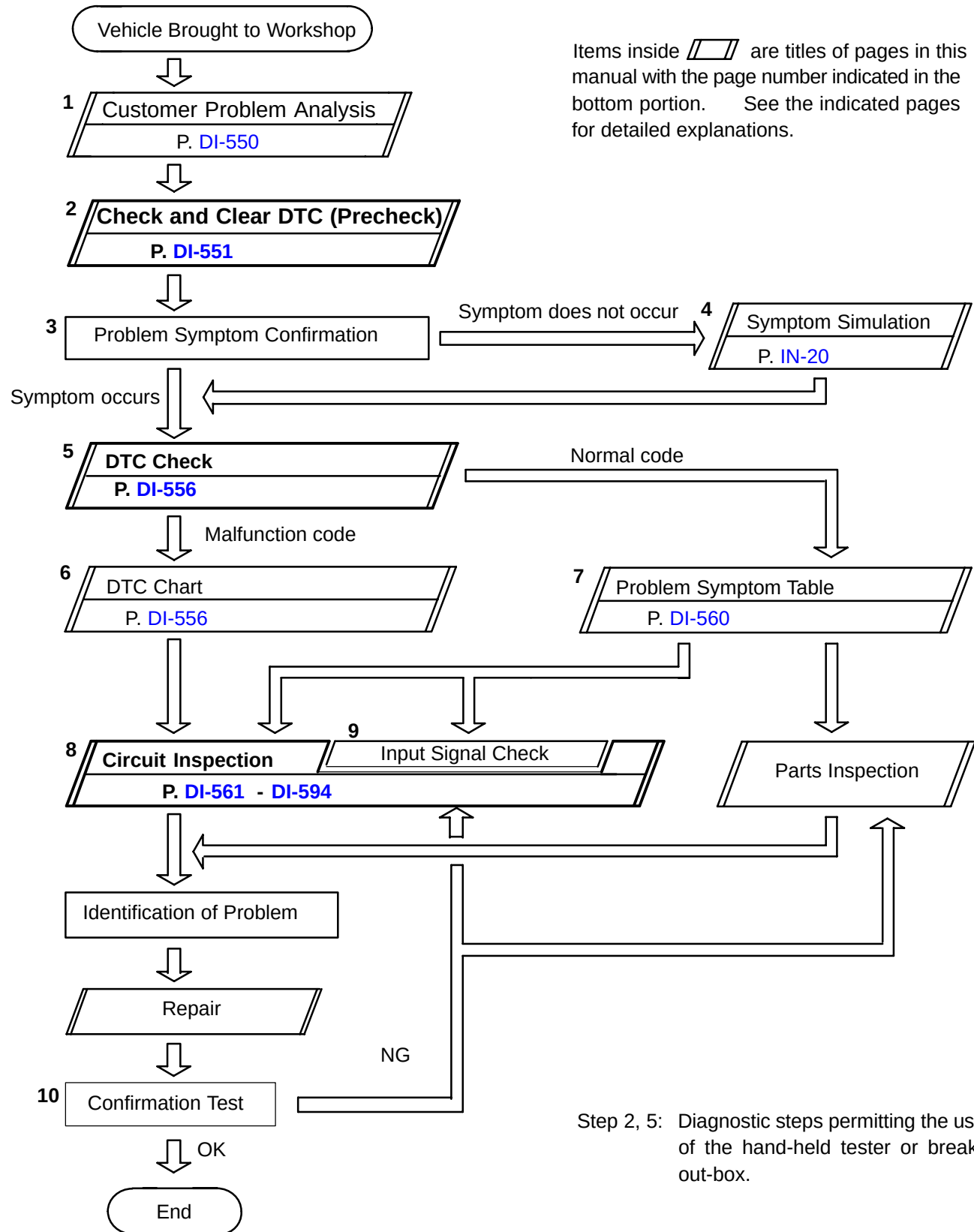
DTC No. (See Page)	Circuit Inspection	Trouble Area
11, 15 (DI-561)	Actuator Motor Circuit	●Actuator motor ●Harness or connector between cruise control ECU and actuator motor ●Cruise control ECU
12 (DI-563)	Actuator Magnetic Clutch Circuit	●STOP Fuse ●Stop light switch ●Actuator magnetic clutch ●Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground ●Cruise control ECU
14 (DI-566)	Actuator Mechanical Malfunction	●Actuator motor (actuator lock: motor, arm) ●Cruise control ECU
21 (DI-568)	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-571)	Vehicle Speed Signal Abnormal	●Vehicle speed sensor ●Cruise control ECU
32 (DI-572)	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-575)	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

CRUISE CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

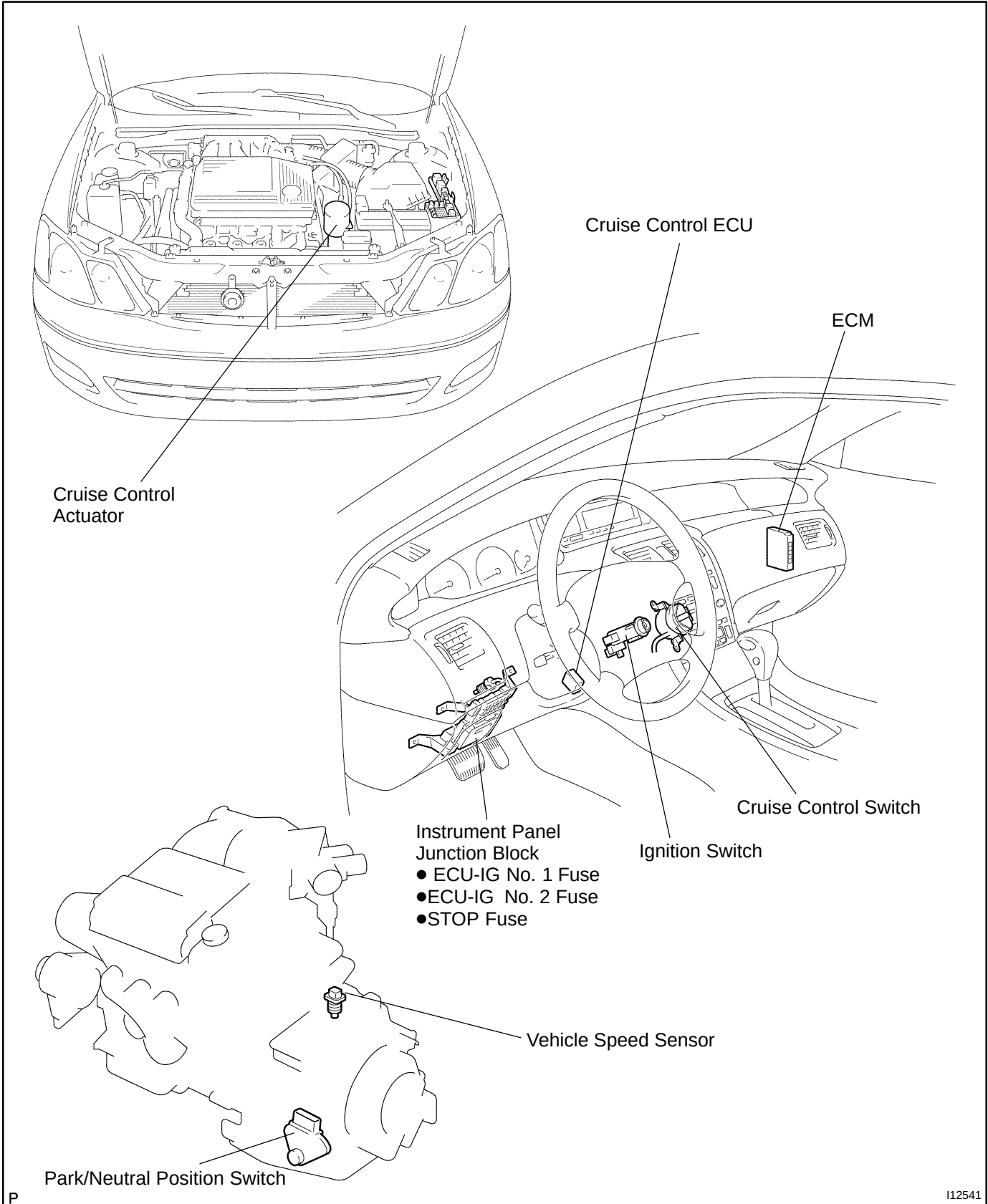
DI08F-13

Troubleshoot in accordance with the procedure on the following page.

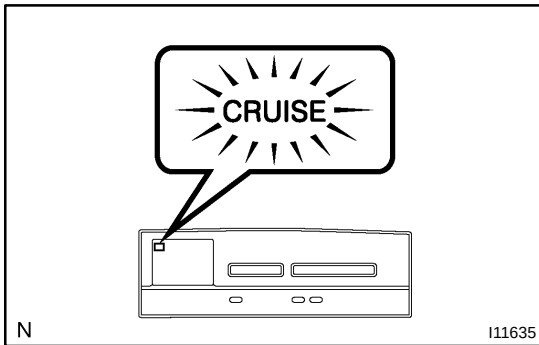


Step 2, 5: Diagnostic steps permitting the use of the hand-held tester or break-out-box.

PARTS LOCATION



I12541



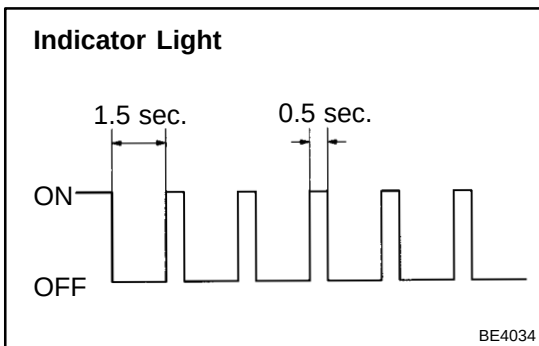
PRE-CHECK

1. DIAGNOSIS SYSTEM

- (a) Check the indicator.
 - (1) Turn the ignition switch ON.
 - (2) Check that the CRUISE MAIN indicator light comes ON when the cruise control main switch is turned ON, and that the indicator light goes OFF when the main switch is turned OFF.

HINT:

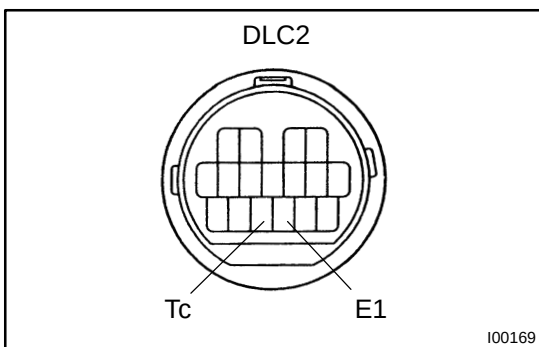
If the indicator check result is not normal, proceed to troubleshooting (See page [BE-43](#)) for the combination meter section.



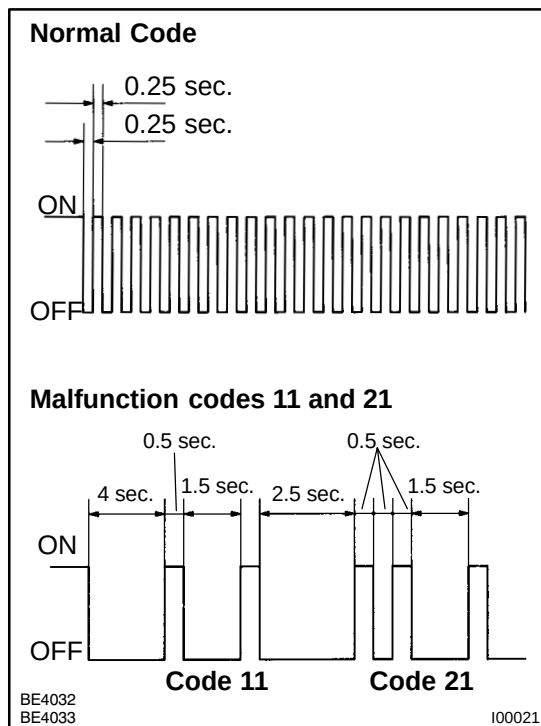
- (b) Check the DTC.

HINT:

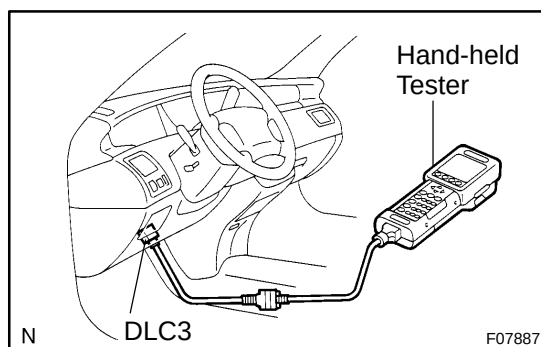
If a malfunction occurs in the No. 1 vehicle speed sensor or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns on and off the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a DTC.



- (c) Output of 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.

**HINT:**

- If the DTC is not output, inspect the diagnosis circuit (See page [DI-594](#)).
- As an example, the blinking patterns for codes; normal, 11 and 21 are shown in the illustration.

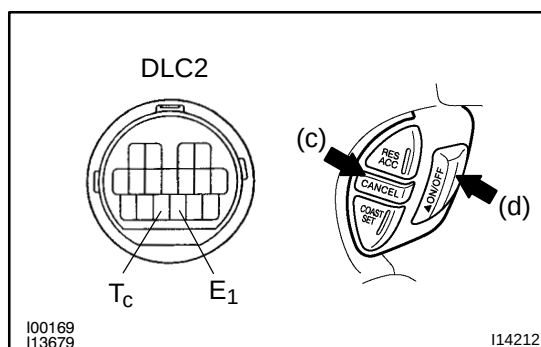
**2. USING HAND-HELD TESTER**

- Hook up the hand-held tester to the DLC3.
- Monitor the ECU data by following the prompts on the tester screen.

HINT:

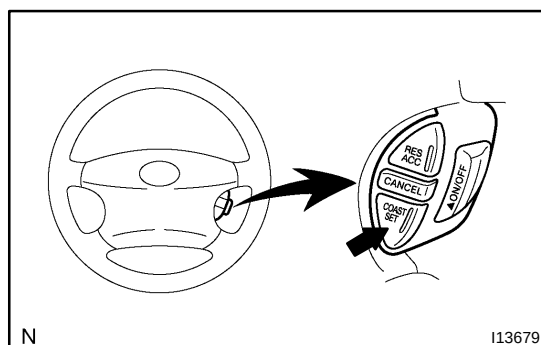
Hand-held tester has a "Snapshot" function which records the monitored data.

Please refer to the hand-held tester operator's manual for further details.

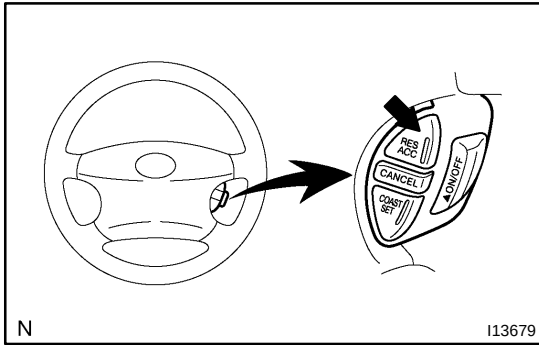
**3. DTC CLEARANCE (ERASE MODE)****HINT:**

During in the erase mode, diag detection does not work.

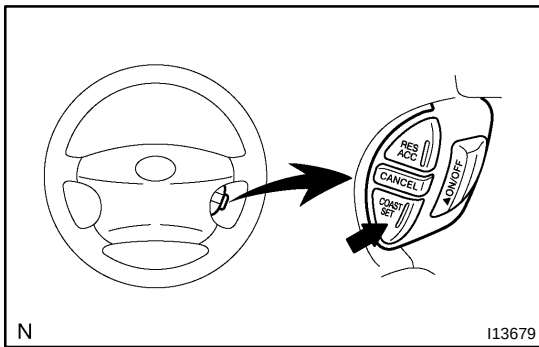
- Drive at about 15 km/h or below.
- Using SST, connect terminals T_c and E₁ of DLC2.
SST 09843-18020
- Push the cruise control switch to CANCEL.
- On the above mentioned condition, turn on the cruise control main switch 5 times within 3 seconds.

**4. PROBLEM SYMPTOM CHECK (ROAD TEST)**

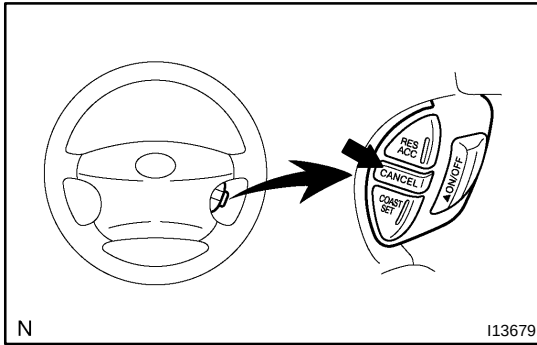
- Inspect the SET switch.
 - Push the main switch ON.
 - Drive at a desired speed (40 km/h (25 mph) or higher).
 - Press the control switch to the SET/COAST.
 - After releasing the switch, check that the vehicle cruises at the desired speed.



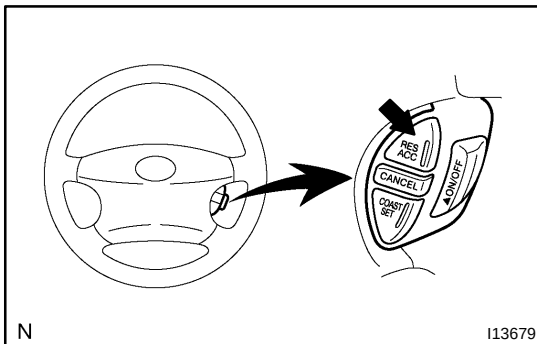
- (b) Inspect the ACCEL switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Check that the vehicle speed increases while the control switch is pushed to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
 - (4) Momentarily raise the control switch push to the RES/ACC position and then immediately release it. Check that the vehicle speed increases by approx. 1.5 km/h (Tap-up function).



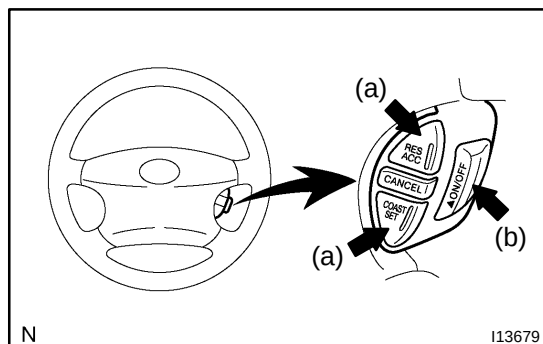
- (c) Inspect the COAST switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
 - (4) Momentarily push the control switch down to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap-down function).



- (d) Inspect the CANCEL switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) When operating one of the following operations, check that the cruise control system is cancelled and that the normal driving mode is reset.
 - Depress the brake pedal
 - Shift to except D position
 - Push the main switch OFF
 - Push the cruise control switch to CANCEL



- (e) Inspect the RESUME switch.
- (1) Push the main switch ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) When operating one of the following operations check that the cruise control system is cancelled and that the normal driving mode is reset.
 - Depress the brake pedal
 - Shift to except D position
 - Push the main switch OFF
 - Push the cruise control switch to CANCEL
 - (4) After the control switch is pushed to RES/ACC at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.



5. INPUT SIGNAL CHECK

HINT:

(1) For check No.1 ~ No.3:

Turn ignition switch ON.

(2) For check No.4:

- Jack up the vehicle.
- Start the engine.
- Shift to D position.

- (a) Push the control switch to SET/COAST or RES/ACC position and hold it down or up.
- (b) Push the main switch ON.
- (c) Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.
- (d) Push the SET/COAST or RES/ACC switch OFF.
- (e) Operate each switch as listed in the table below.
- (f) Read the blinking pattern of the CRUISE MAIN indicator light.
- (g) After performing the check, turn the main switch OFF.

HINT:

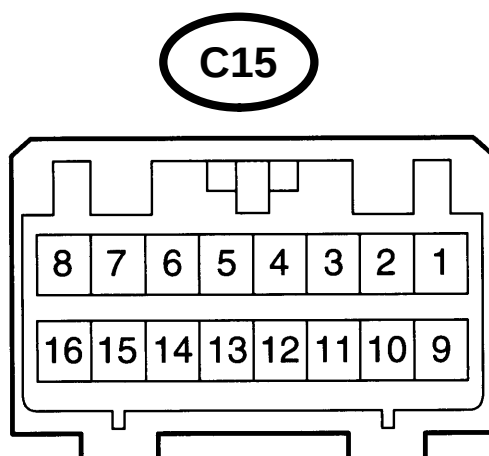
When 2 or more signals are input to the ECU, the lowest numbered code will be displayed 1st.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Push SET/COAST switch ON		SET/COAST switch circuit is normal
2	Push RES/ACC switch ON		RES/ACC switch circuit is normal
3	Push 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
	Turn clutch switch OFF (Depress clutch pedal)		Clutch 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		

PROBLEM SYMPTOMS TABLE

Symptom	Suspect AreaSuspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Vehicle Speed Sensor 2. Control Switch Circuit (Cruise control switch) 3. Stop Light Switch Circuit 4. Park/Neutral Position Switch Circuit 5. Actuator Motor Circuit 6. Cruise Control Cable 7. Cruise Control ECU	DI-568 DI-572 DI-578 DI-584 DI-561 DI-596 IN-30
SET not occurring or CANCEL occurring. (DTC dose not output)	1. ECU Power Source Circuit 2. Cruise Control ECU	DI-587 IN-30
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-596 DI-568 DI-581 DI-581 DI-561 DI-575 IN-30
Gear shifting frequent between 3rd O/D when driving on uphill road. (Hurting)	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI-581 DI-581 IN-30
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-596 DI-578 DI-561 IN-30
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-596 DI-584 DI-561 IN-30
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-596 DI-572 DI-561 IN-30
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-596 DI-568 DI-561 IN-30
Poor response is in ACCEL and RESUME modes.	1. Cruise Control Cable 2. Electronically Controlled Transmission Communication Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI-596 DI-581 DI-581 DI-561 IN-30
O/D does not resume, even though the road is not uphill.	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI-581 DI-581 IN-30
DTC memory is erased.	1. Cruise Control ECU	IN-30
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Cruise Control ECU	DI-594 IN-30
Cruise MAIN indicator light remains ON or falls to light up.	1. Cruise MAIN Indicator Light Switch Circuit	DI-592

TERMINALS OF ECU



I00293

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ GND (C15-2 ↔ C15-16)	G-W ↔ W-B	Depress brake pedal	10 - 16 V
		Release brake pedal	Below 1 V
D ↔ GND (C15-3 ↔ C15-16)	Y-R ↔ W-B	Shift to positions except D	Below 1 V
		Shift to D position	10 - 16 V
PI ↔ GND (C15-4 ↔ C15-16)	GR-R ↔ 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 (C15-5 ↔ C15-16)	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 (C15-6 ↔ C15-16)	G-Y ↔ W-B	During driving Gear position 3rd	10 - 16 V
		During driving Gear position O/D	Below 1 V
MC ↔ GND (C15-7 ↔ C15-16)	R ↔ 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 (C15-8 ↔ C15-16)	G-B ↔ W-B	During cruise control driving	9 - 15 V
		Except during cruise control driving	Below 1 V
B ↔ GND (C15-9 ↔ C15-16)	Y-R ↔ W-B	Ignition switch ON	10 - 16 V
CCS ↔ GND (C15-10 ↔ C15-16)	W ↔ W-B	Ignition switch ON	10 - 16 V
		Ignition switch ON MAIN switch held ON	Below 1 V
		Ignition switch ON SET/COAST switch held ON	4.7 - 7.7 V
		Ignition switch ON RES/ACC switch held ON	2.6 - 4.2 V

DIAGNOSTICS - CRUISE CONTROL SYSTEM

CAN ↔ GND (C15-1 ↔ C15-16)	W-L ↔ W-B	Ignition switch ON Cancel switch OFF	10 - 16 V
		Ignition switch ON Cancel switch ON	Below 1 V
SPD ↔ GND (C15-12 ↔ C15-16)	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 (C15-13 ↔ C15-16)	Y ↔ 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 (C15-14 ↔ C15-16)	GR ↔ 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 (C15-15 ↔ C15-16)	P ↔ W-B	During cruise control driving ACC switch hold ON	9 - 15 V
		During cruise control driving COAST switch hold ON	Below 1 V
GND ↔ Body Ground (C15-16 ↔ Body Ground)	W-B ↔ Body Ground	Constant	Below 1 V

ECM Power Source Circuit

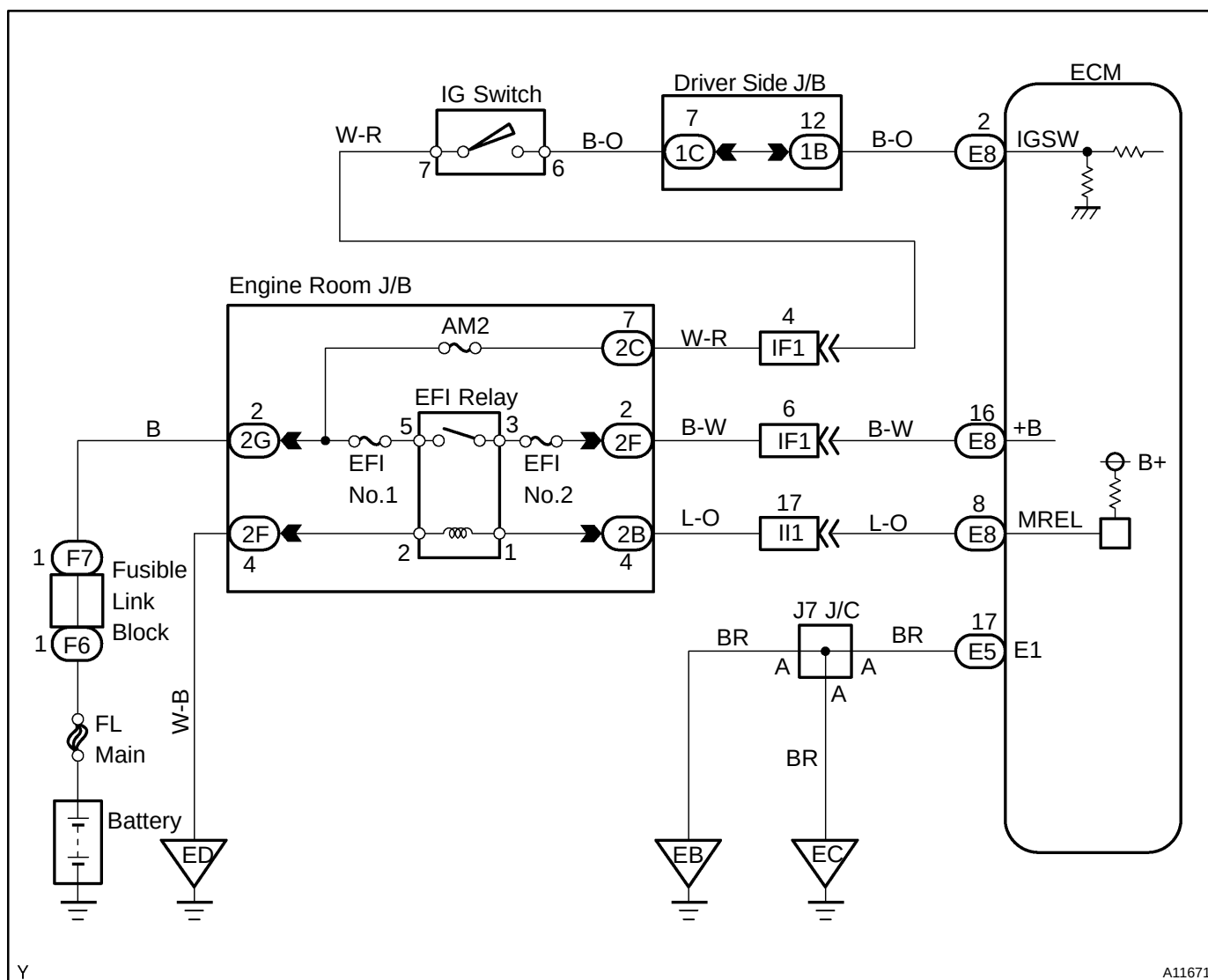
CIRCUIT DESCRIPTION

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 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

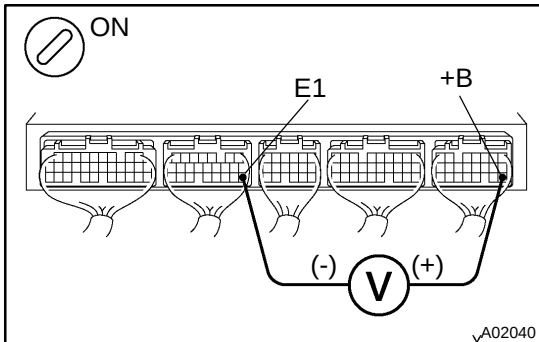


Y

A11671

INSPECTION PROCEDURE

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

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

OK

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

NG

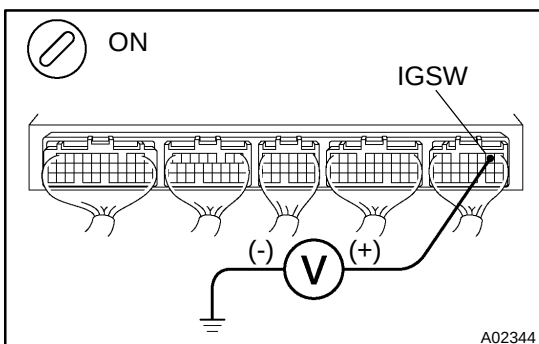
2	Check for open in harness and connector between terminal E1 of ECM and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

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

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

OK

Go to step 5.

NG

4 Check AM2 fuse (See page [DI-117](#), step 10).

NG

Check for short in all harness and components connected to AM2 fuse.

OK

5 Check ignition switch (See page [BE-16](#)).

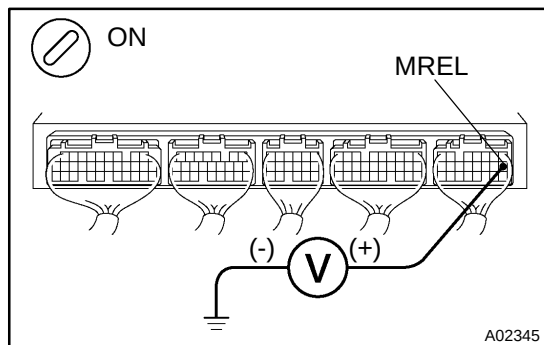
NG

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-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

NG

Check and replace ECM (See page [IN-30](#)).

OK

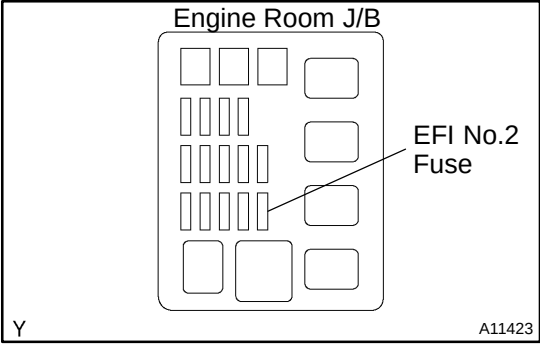
7 Check EFI No.1 fuse (See page [DI-136](#) , step 2).

NG

Check for short in all harness and components connected to EFI No.1 fuse.

OK

8 Check EFI No.2 fuse.



PREPARATION:

Remove the EFI No.2 fuse from the engine room J/B.

CHECK:

Check the continuity of the EFI No.2 fuse.

OK:

Continuity

NG Check for short in all harness and components connected to EFI No.2 fuse.

OK

9 Check EFI main relay (Marking: EFI) (See page [SF-60](#)).

NG Replace EFI main relay.

OK

10 Check for open and short in harness and connector between terminal MREL of ECM and body ground (See page [IN-30](#)).

NG Repair or replace harness or connector.

OK

Check and repair harness or connector between EFI No.1 fuse and battery.

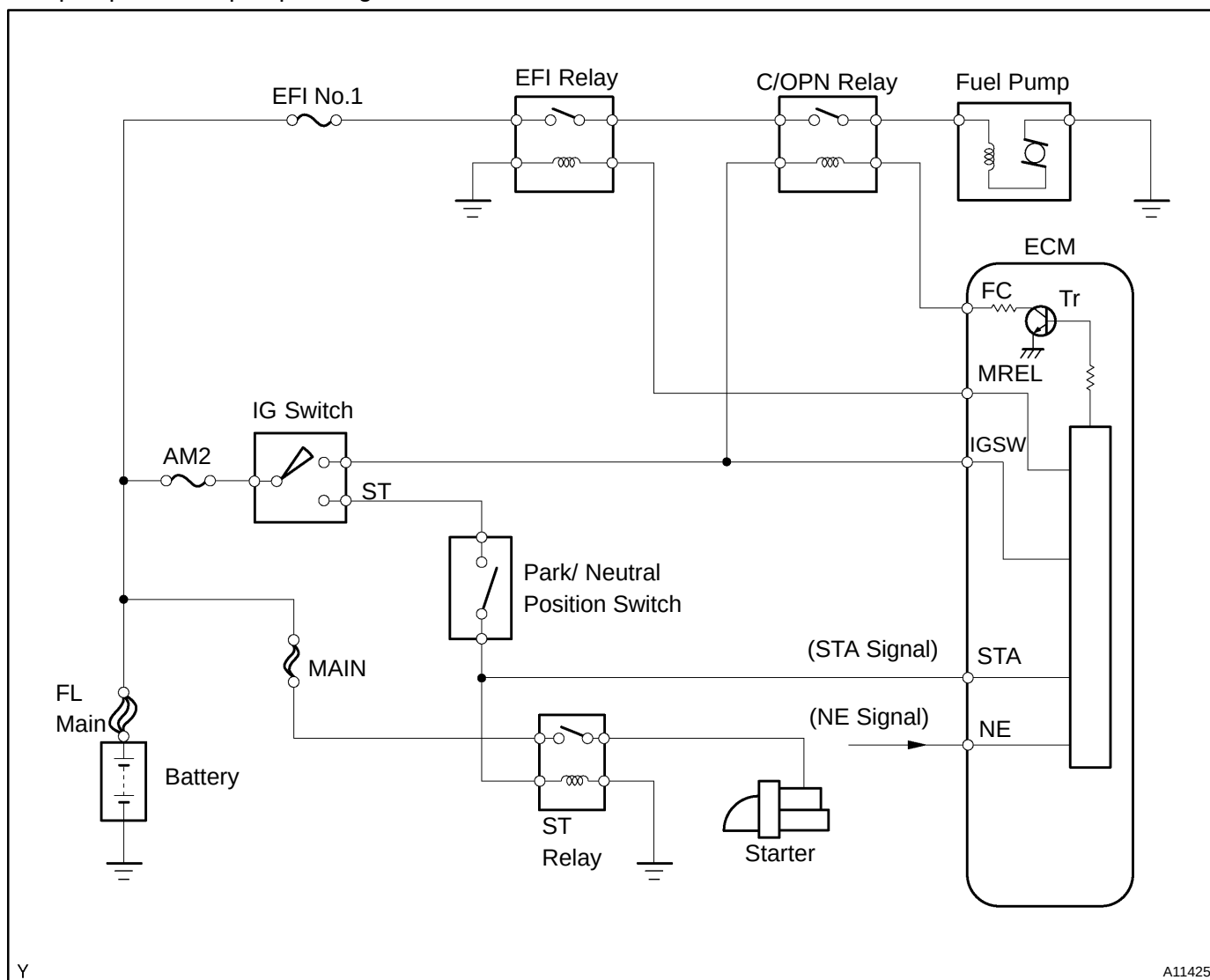
Fuel Pump Control Circuit

CIRCUIT DESCRIPTION

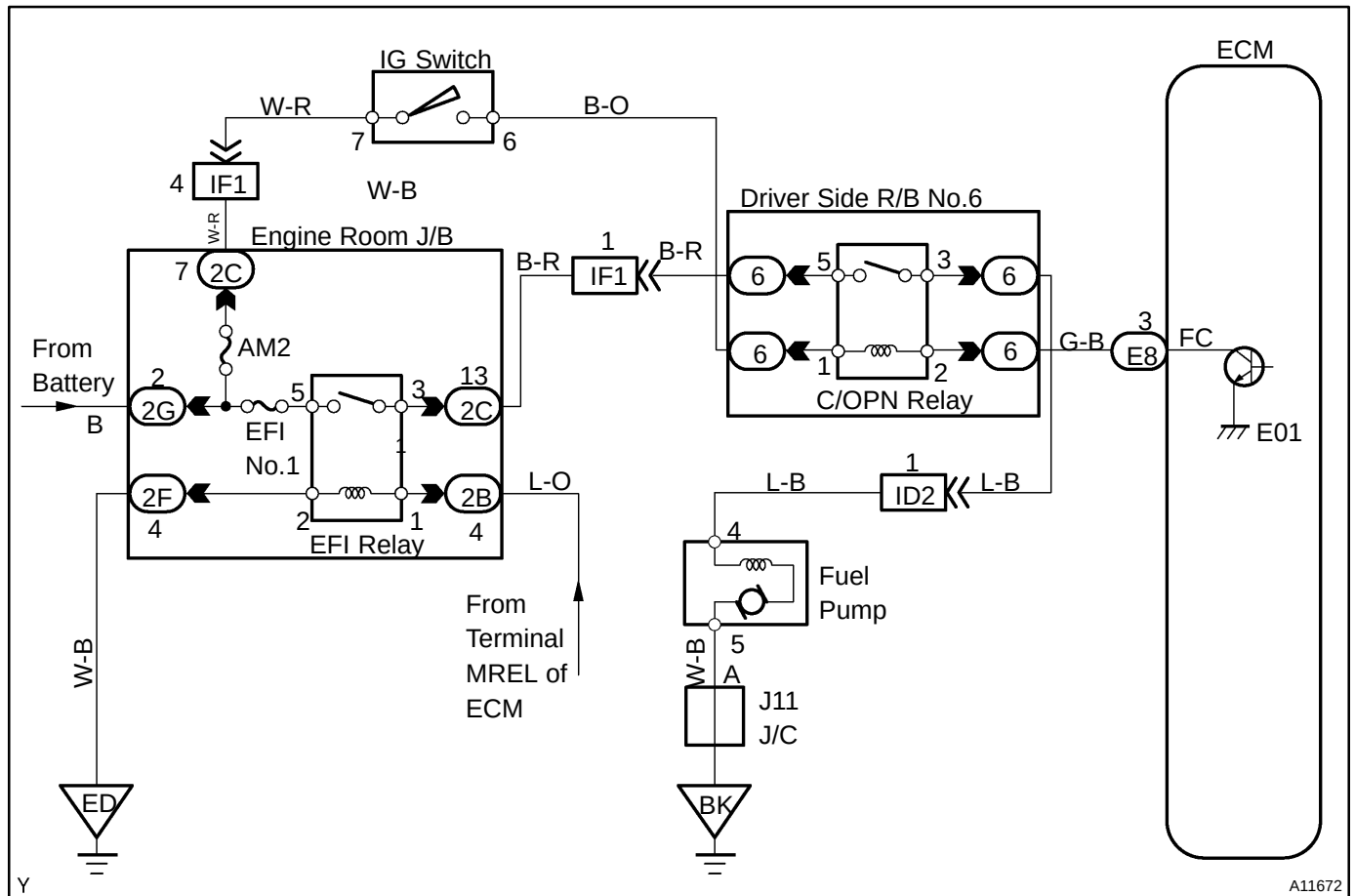
In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay (Marking: ST) coil and also current flows to terminal STA of ECM (STA signal).

When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to coil of the circuit opening relay (Marking: C/OPN), 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.



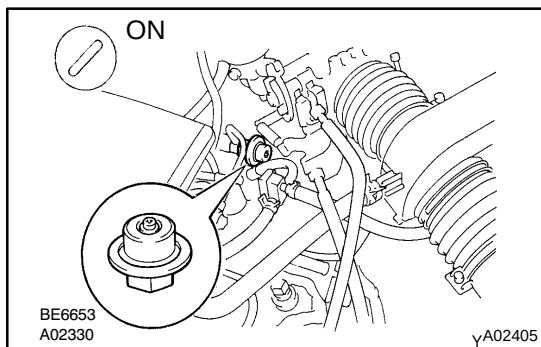
WIRING DIAGRAM



INSPECTION PROCEDURE

TOYOTA hand-held tester:

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



PREPARATION:1

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

OK:

The pulsation damper screw rises up.

OK

Check for starter signal circuit
(See page [DI-142](#)).

NG

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

NG

Repair or replace.

OK

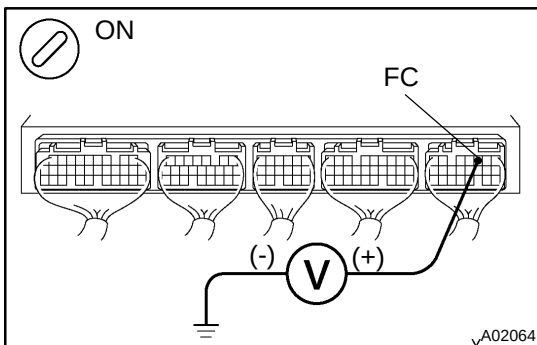
3 Check circuit opening relay (Marking: C/OPN) (See page [SF-63](#)).

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-83](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

OK

Go to step 5.

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and circuit opening relay (Marking: C/OPN), and circuit opening relay and ECM (See page [IN-30](#)).

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: C/OPN) and fuel pump, and fuel pump and body ground (See page IN-30).

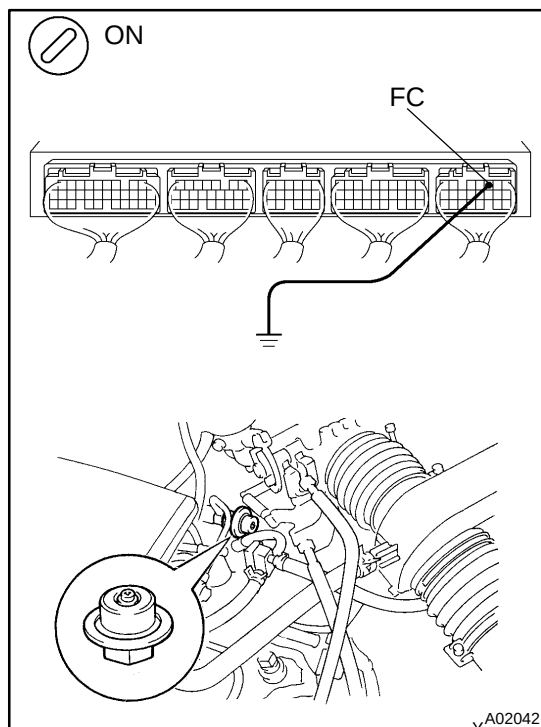
NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).**OBD II scan tool (excluding TOYOTA hand-held tester):**

1	Check operation of fuel pump.

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

The pulsation damper screw rises up.

OK

Check for starter signal circuit (See page [DI-142](#)).

NG

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

NG

Repair or replace.

OK

3

Check circuit opening relay (Marking: C/OPN) (See page [SF-63](#)).

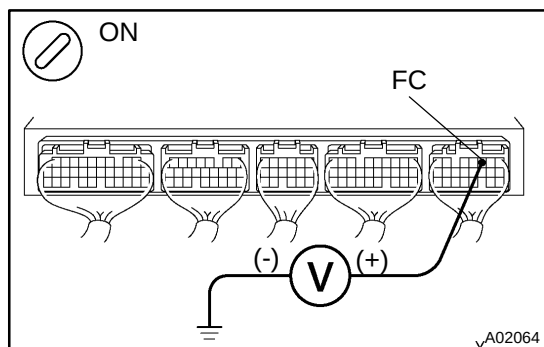
NG

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-83](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

OK

Go to step 5.

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and circuit opening relay (Marking: C/OPN), and circuit opening relay and ECM (See page [IN-30](#)).

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: C/OPN) and fuel pump, and fuel pump and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

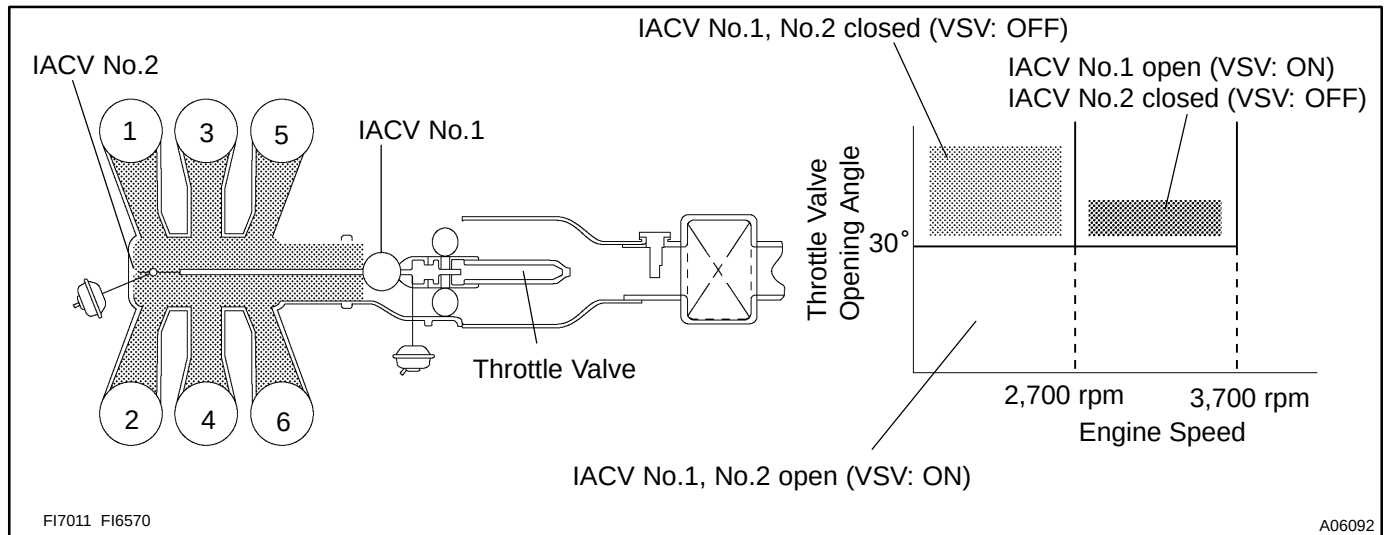
Check and replace ECM (See page [IN-30](#)).

IACV Control Circuit

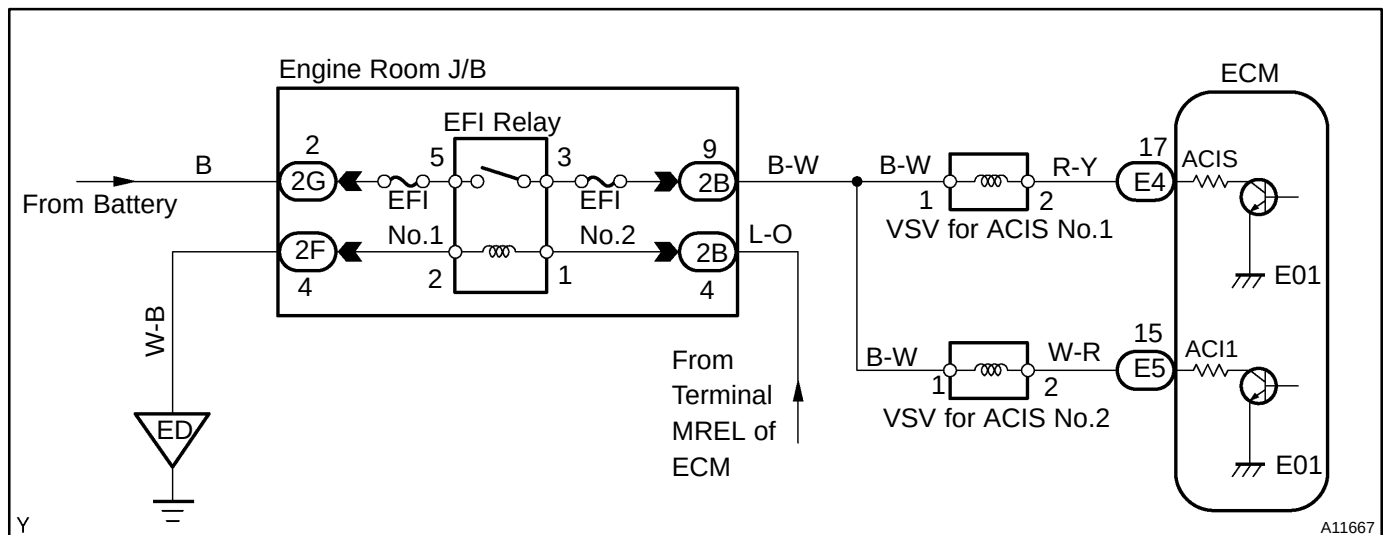
CIRCUIT DESCRIPTION

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.

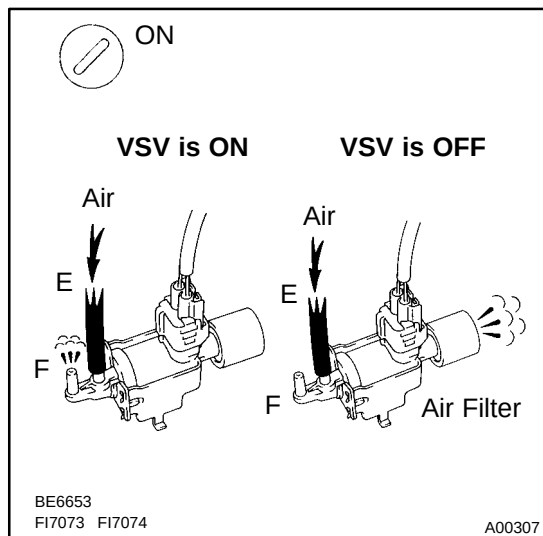


WIRING DIAGRAM



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

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

**PREPARATION:**

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

CHECK:

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

OK:**VSV is ON:**

Air from port E flows out through port F.

VSV is OFF:

Air from port E flows out through the air filter.

OK**Check vacuum tank (See page [SF-46](#)).****NG**

2	Check VSV for ACIS (See page SF-68).

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-30).

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

Check and replace ECM (See page [IN-30](#)).

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

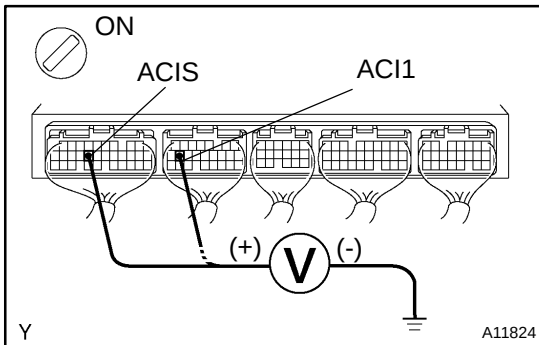
1 Check VSV for ACIS (See page [SF-68](#)).

NG

Replace VSV for ACIS.

OK

2 Check voltage between terminals ACIS, ACI1 of ECM connector and body ground.



PREPARATION:

- (a) Remove the glove compartment (See page [SF-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals ACIS, ACI1 of the ECM connector and body ground.

OK:

Voltage: 9 - 14 V

NG

Check for open and short in harness and connector between EFI main relay (Marking: EFI) and ECM (See page [IN-30](#)).

OK

3 Check vacuum tank (See page [SF-58](#)).

NG

Repair or replace.

OK

Check and replace ECM (See page [IN-30](#)).

CIRCUIT INSPECTION

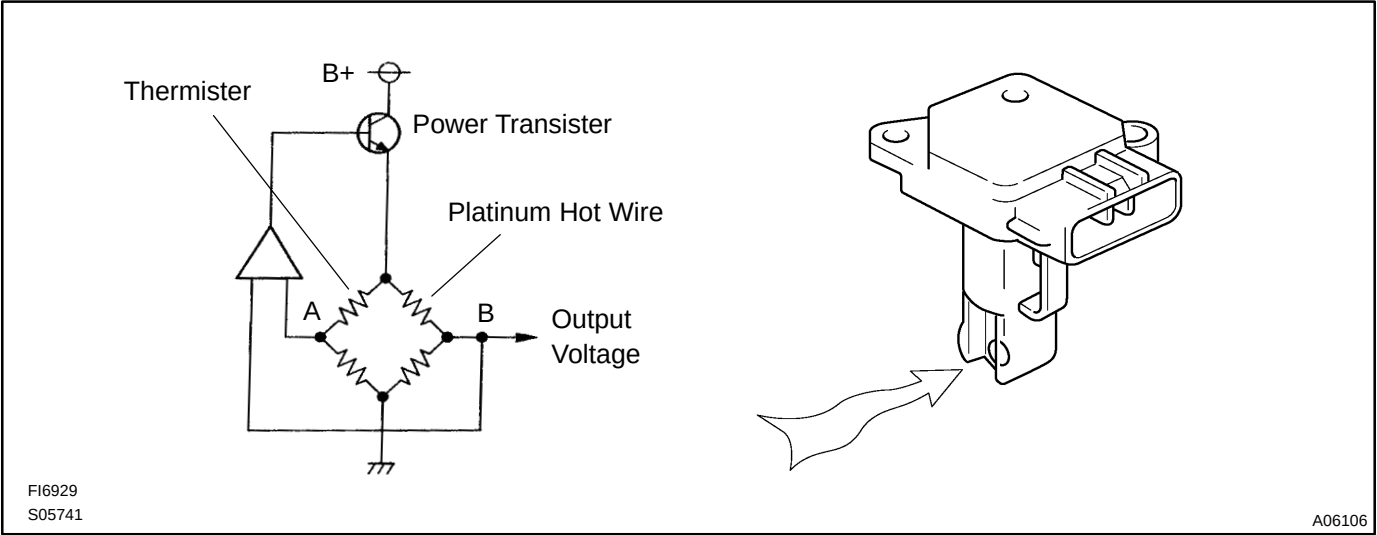
DTC	P0100	Mass Air Flow Circuit Malfunction

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 on the principle that the hot wire and thermistor located in the intake air bypass of the housing detect any changes in the intake air temperature.

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

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



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

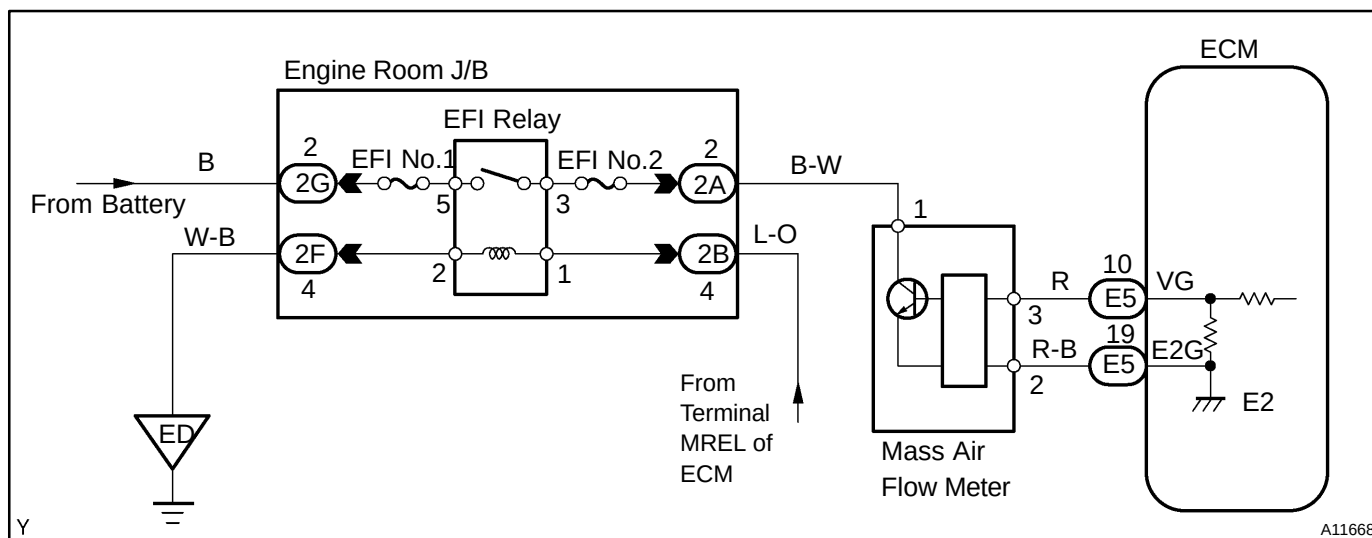
If the ECM detects DTC P0100 it operates the fail-safe function, keeping the ignition timing and injection volume constantly and making it possible to drive the vehicle.

HINT:

After confirming DTC P0100, use the OBD II scan tool or TOYOTA 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



INSPECTION PROCEDURE

HINT:

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

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

PREPARATION:

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

CHECK:

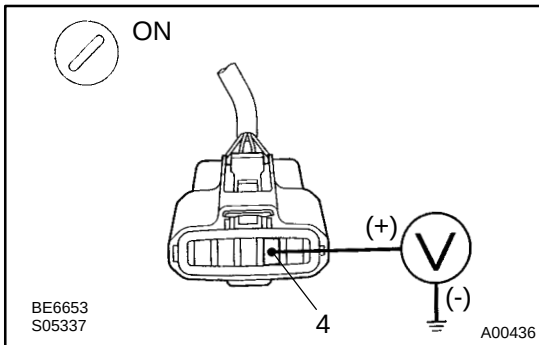
Read the mass air flow rate on the OBD II scan tool or TOYOTA hand-held tester.

RESULT:

	Type I	Type II
Mass Air Flow 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:

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

CHECK:

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

OK:

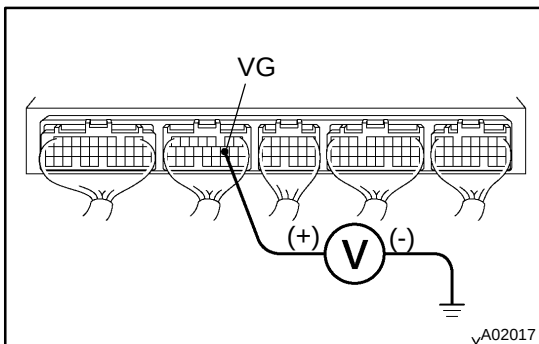
Voltage: 9 - 14 V

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and mass air flow meter (See page [IN-30](#)).

OK

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



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Start the engine.

CHECK:

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

OK:

Voltage:

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

OK

Check and replace ECM (See page [IN-30](#)).

NG

4 Check for open and short in harness and connector between mass air flow meter and ECM (See page [IN-30](#)).

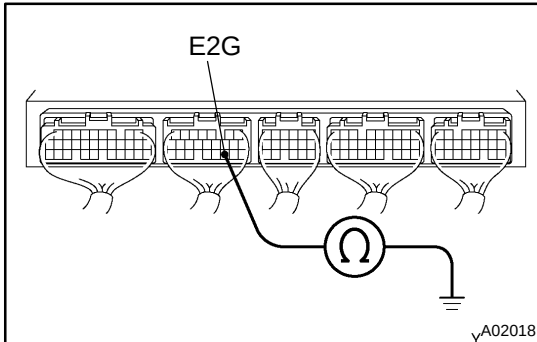
NG

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-82](#)).

CHECK:

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

OK:

Continuity (1 Ω or less)

NG

Check and replace ECM (See page [IN-30](#)).

OK

6 Check for open in harness and connector between mass air flow meter and ECM (See page [IN-30](#)).

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 > 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 $\leq$ 1.06 V	

INSPECTION PROCEDURE

HINT:

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

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

NO

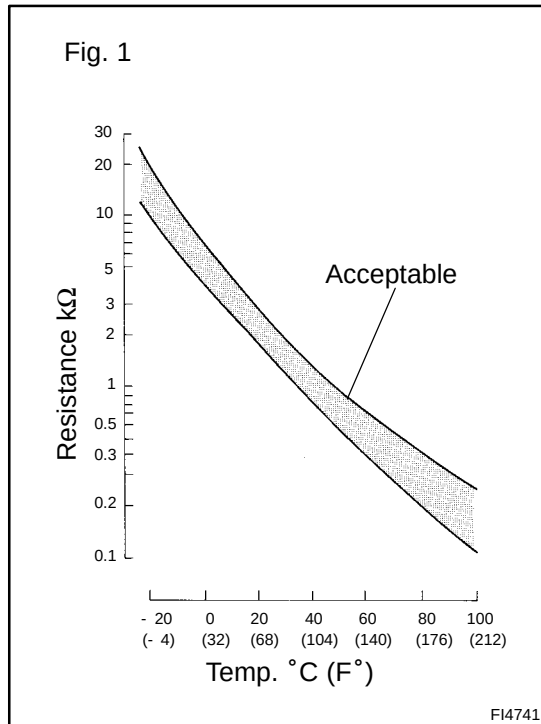
Replace mass air flow meter.

YES

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

DTC	P0110	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION



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

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

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

The intake air temperature sensor is connected to the ECM. 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 accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation.

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

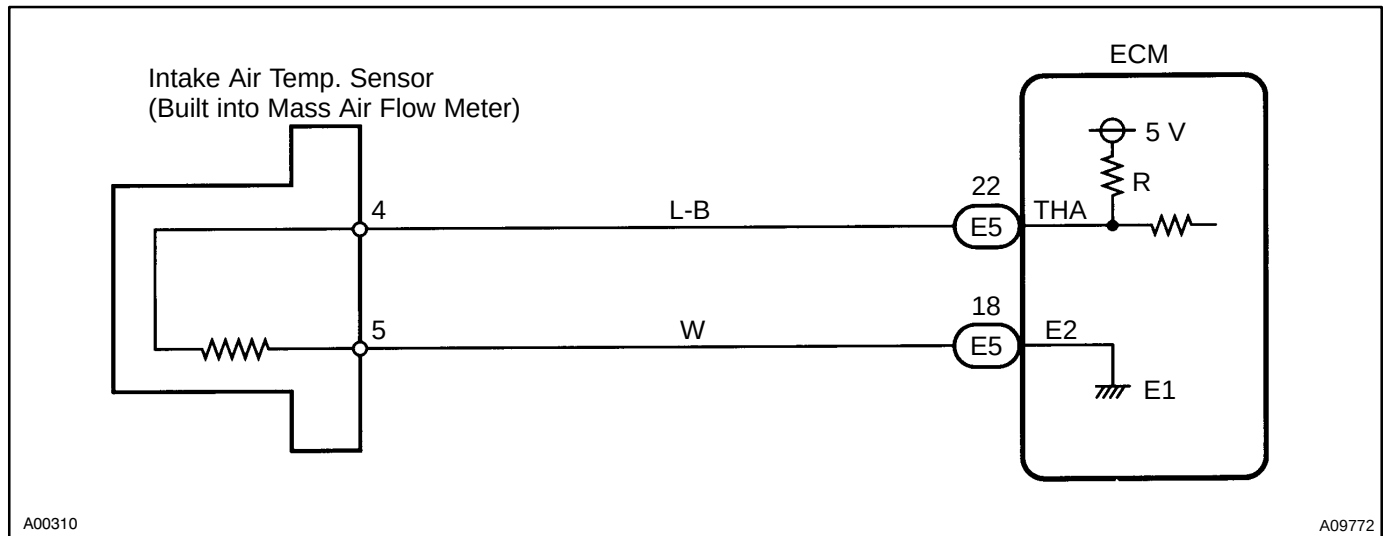
DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temp. sensor circuit	●Open or short in intake air temp. sensor circuit ●Intake air temp. sensor (built into mass air flow meter) ●ECM

HINT:

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

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

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

PREPARATION:

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

CHECK:

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

OK:

Same as actual intake air temperature.

HINT:

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

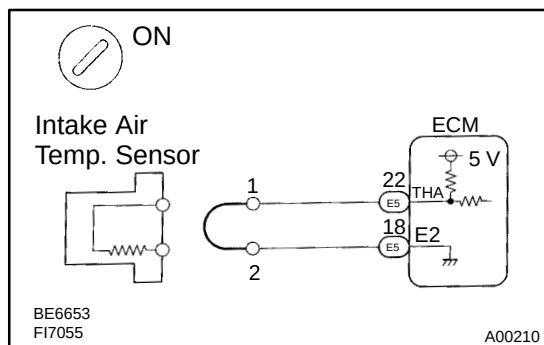
NG

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

OK

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

2 Check for open in harness or ECM.



PREPARATION:

- 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 TOYOTA hand-held tester.

OK:

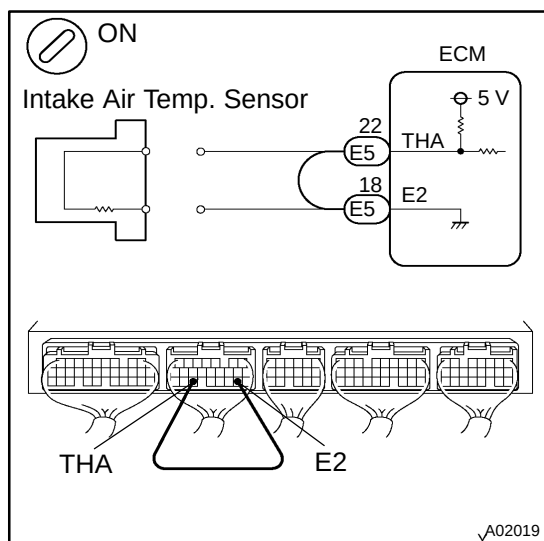
Temperature value: 140°C (284°F) or more

OK

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

NG

3 Check for open in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Connect between terminals THA and E2 of the ECM connector.

HINT:

The mass air flow meter connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page [IN-30](#)).

- Turn the ignition switch ON.

CHECK:

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

OK:

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

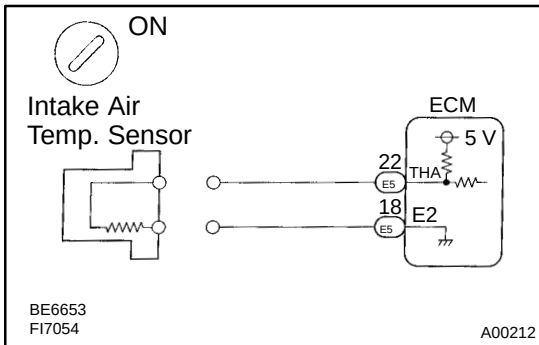
OK

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

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page [IN-30](#)).

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 TOYOTA hand-held tester.

OK:

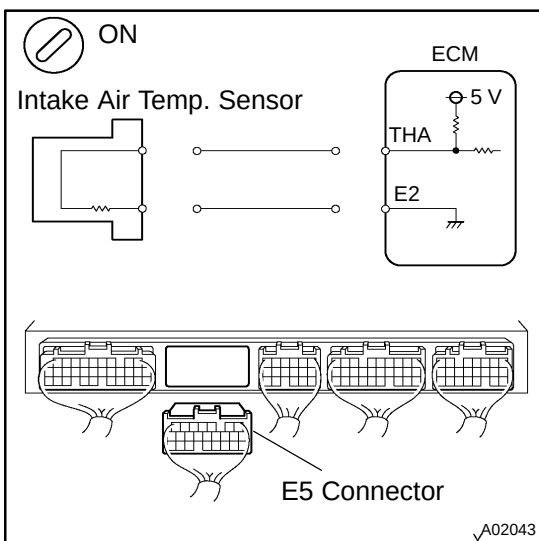
Temperature value: -40°C (-40°F)

OK

Replace mass air flow meter.

NG

5 Check for short in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Disconnect the E5 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 TOYOTA hand-held tester.

OK:

Temperature value: -40°C (-40°F)

OK

Repair or replace harness or connector.

NG

Check and replace ECM (See page [IN-30](#)).

DTC	P0115	Engine Coolant Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

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

The structure of the sensor and connection to the ECM is the same as in the intake air temperature circuit malfunction shown on 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).

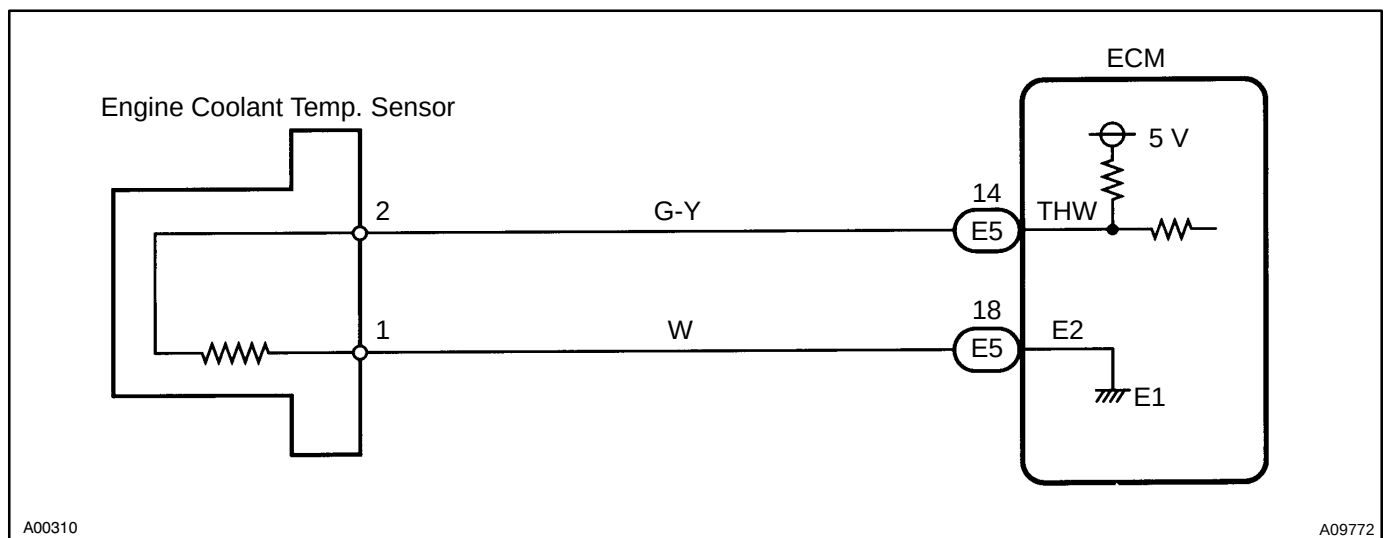
DTC No.	DTC Detecting Condition	Trouble Area
P0115	Open or short in engine coolant temp. sensor circuit	●Open or short in engine coolant temp. sensor circuit ●Engine coolant temp. sensor ●ECM

HINT:

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

Temperature Displayed	Malfunction
-40 °C (-40°F)	Open circuit
140 °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 TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich etc. at the time of the malfunction.

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

PREPARATION:

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

CHECK:

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

OK:

Same as actual engine coolant temperature.

HINT:

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

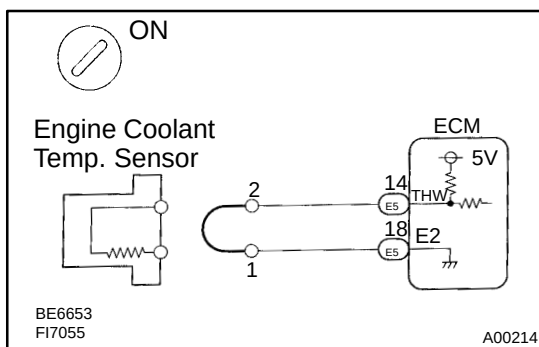
NG

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

OK

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

2	Check for open in harness or ECM.

**PREPARATION:**

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

CHECK:

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

OK:

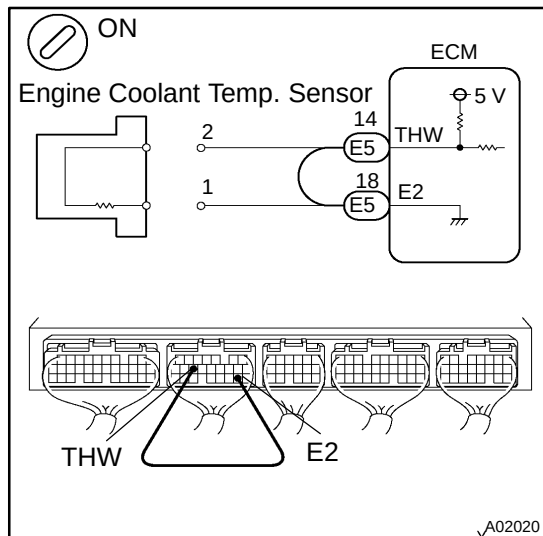
Temperature value: 140°C (284°F) or more

OK

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

NG

3 Check for open in harness or ECM.



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Connect between terminals THW and E2 of the ECM connector.

HINT:

The engine coolant temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page [IN-30](#)).

- Turn the ignition switch ON.

CHECK:

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

OK:

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

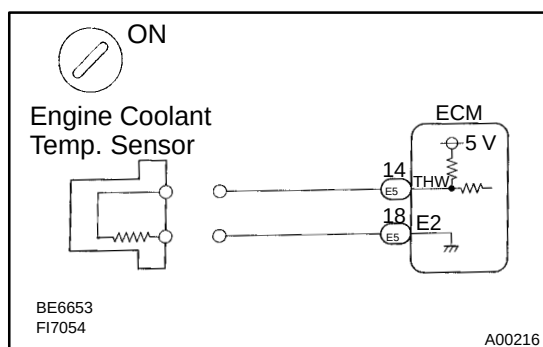
OK

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

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page [IN-30](#)).

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 TOYOTA hand-held tester.

OK:

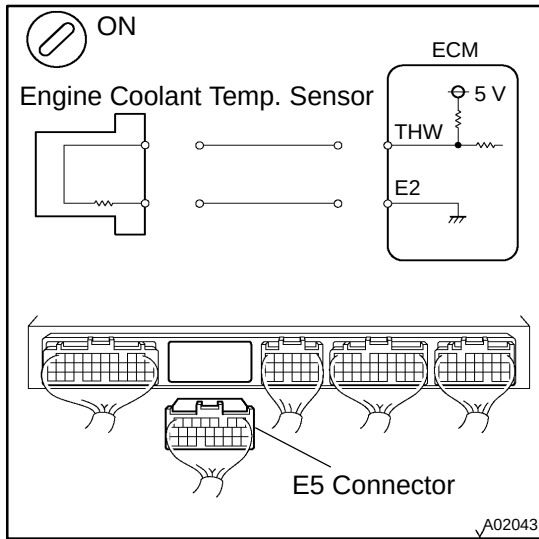
Temperature value: -40°C (-40°F)

OK

Replace engine coolant temperature sensor.

NG

5 Check for short in harness or ECM.



PREPARATION:

- (a) Remove the glove compartment (See page [SF-82](#)).
- (b) Disconnect the E5 connector from the ECM.

HINT:

The engine coolant temperature sensor connector is disconnected.

- (c) Turn the ignition switch ON.

CHECK:

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

OK:

Temperature value: -40°C (-40°F)

OK

Repair or replace harness or connector.

NG

Check and replace ECM (See page [IN-30](#)).

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 (95°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 $\leq 35^{\circ}\text{C}$ (95°F) or more and less than 60°C (140°F), and THA $\leq -6.7^{\circ}\text{C}$ (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 (5.4°F) from THW since when starting engine	
	In case that reading value of water temp. sensor will not change more than 1°C (1.8°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 troubleshooting of DTC P0115 first.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

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

YES

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

NO

2	Check thermostat (See page CO-11).

NG

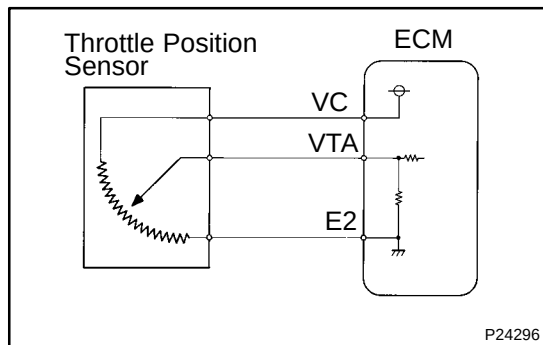
Replace thermostat.

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 VTA of the ECM. The voltage applied to terminals VTA 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 from these signals input from terminals VTA and uses them as one of the conditions for deciding the air-fuel ratio correction, power increase correction and fuel-cut control etc.

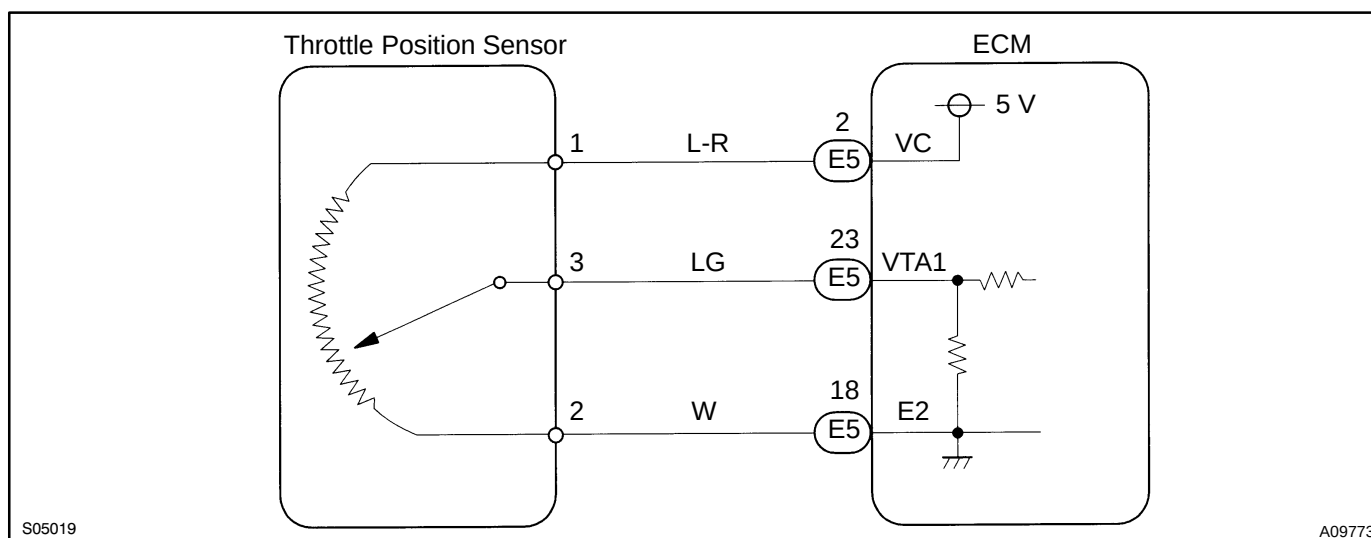
DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a) or (b) continues: (a) VTA $\leq$ 0.1 V (b) VTA $\geq$ 4.9 V	•Open or short in throttle position sensor circuit •Throttle position sensor •ECM

HINT:

After confirming DTC P0120, use the OBD II scan tool or TOYOTA 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



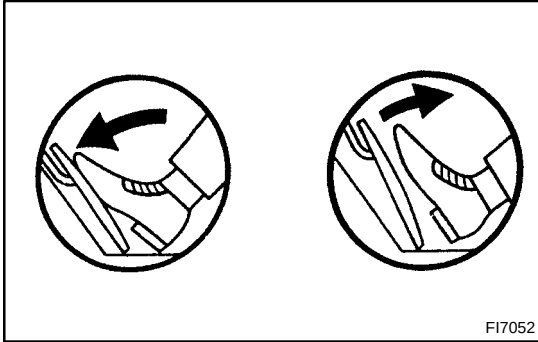
INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115 and P0120 are output simultaneously, E2 (sensor ground) may be open.

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

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



PREPARATION:

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

CHECK:

Read the throttle valve opening percentage.

OK:

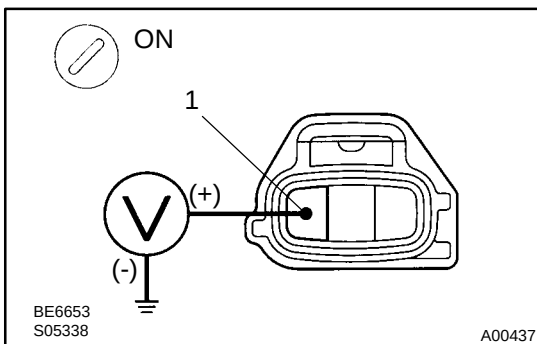
Throttle Valve	Throttle valve opening position expressed as percentage
Fully open	Approx. 75 %
Fully closed	Approx. 10 %

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 body ground.

OK:

Voltage: 4.5 - 5.5 V

NG

Go to step 5.

OK

3 Check throttle position sensor (See page [SF-33](#)).

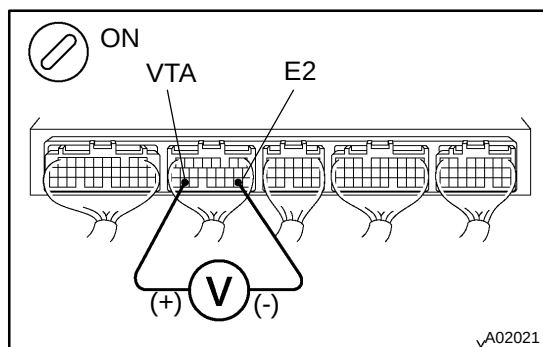
NG

Replace throttle position sensor.

OK

4

Check voltage between terminals VTA and E2 of ECM connector.

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-82](#)).
- (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

NG

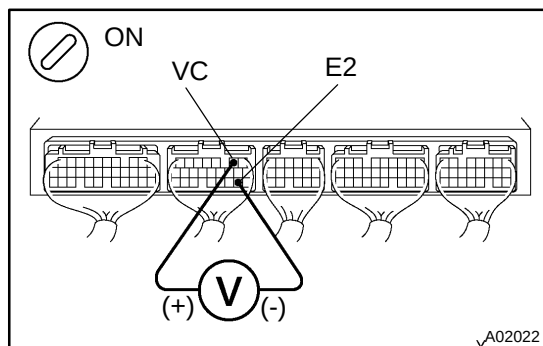
Check for open and short in harness and connector in VTA circuit between ECM and throttle position sensor (See page [IN-30](#)).

OK

Check and replace ECM (See page [IN-30](#)).

5

Check voltage between terminals VC and E2 of ECM connector.

**PREPARATION:**

- (a) Remove the glove compartment (See page [SF-82](#)).
- (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-30](#)).

OK

Check for open in harness and connector in VC circuit between ECM and throttle position sensor (See page [IN-30](#)).

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)	Throttle position sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the 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 (See page [DI-14](#)).

NO

Replace throttle position sensor.

DTC	P0125	Insufficient Coolant Temp. for Closed Loop Fuel Control

CIRCUIT DESCRIPTION

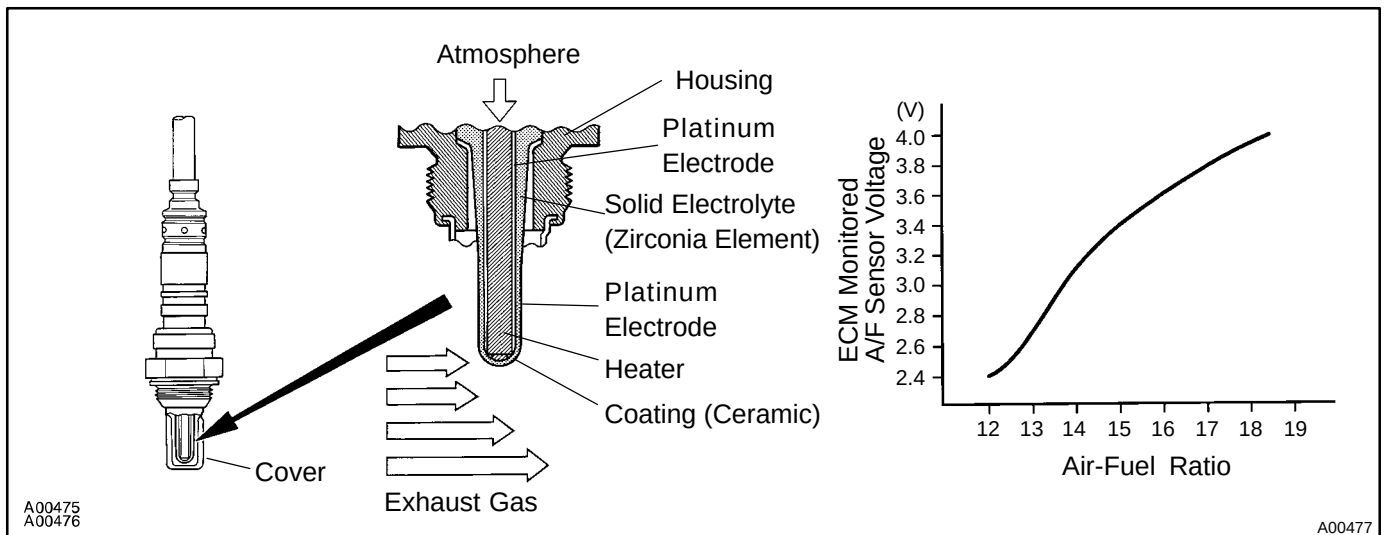
To obtain a high purification rate for the CO, HC and NO_x components of the exhaust gas, a three-way catalytic converter is used, but for the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel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

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

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

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

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



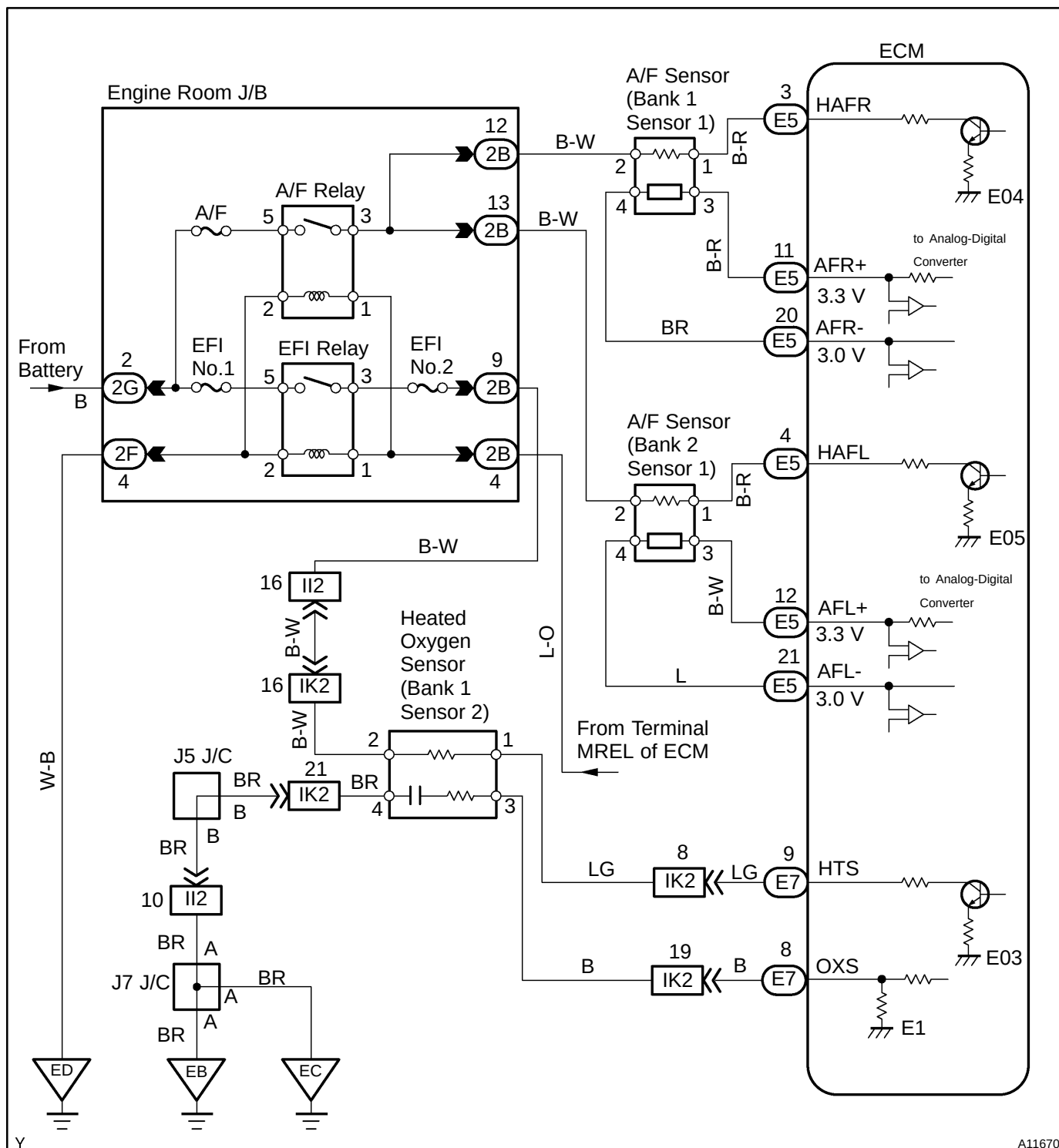
DTC No.	DTC Detecting Condition	Trouble Area
P0125	After engine is warmed up, A/F sensor output* does not change when conditions (a), (b), (c) and (d) continue for at least 1.5 min: *: Output value changes at inside of the ECM only (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 - 100 km/h (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 leakage on exhaust system ●ECM

HINT:

- After confirming DTC P0125, use the OBD II scan tool or TOYOTA hand-held tester to confirm voltage output 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 TOYOTA hand-held tester.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

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

YES

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

NO

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

PREPARATION:

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

CHECK:

Read the voltage value of the A/F sensor on the screen of OBDII scan tool or TOYOTA 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 TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

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

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

OK

Go to step 9.

NG

3	Check for open and short in harness and connector between ECM and A/F sensor (bank 1, 2 sensor 1) (See page IN-30).

NG

Repair or replace harness or connector.

OK

4	Check resistance of A/F sensor heater (bank 1, 2 sensor 1) (See page SF-79).

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](#)).

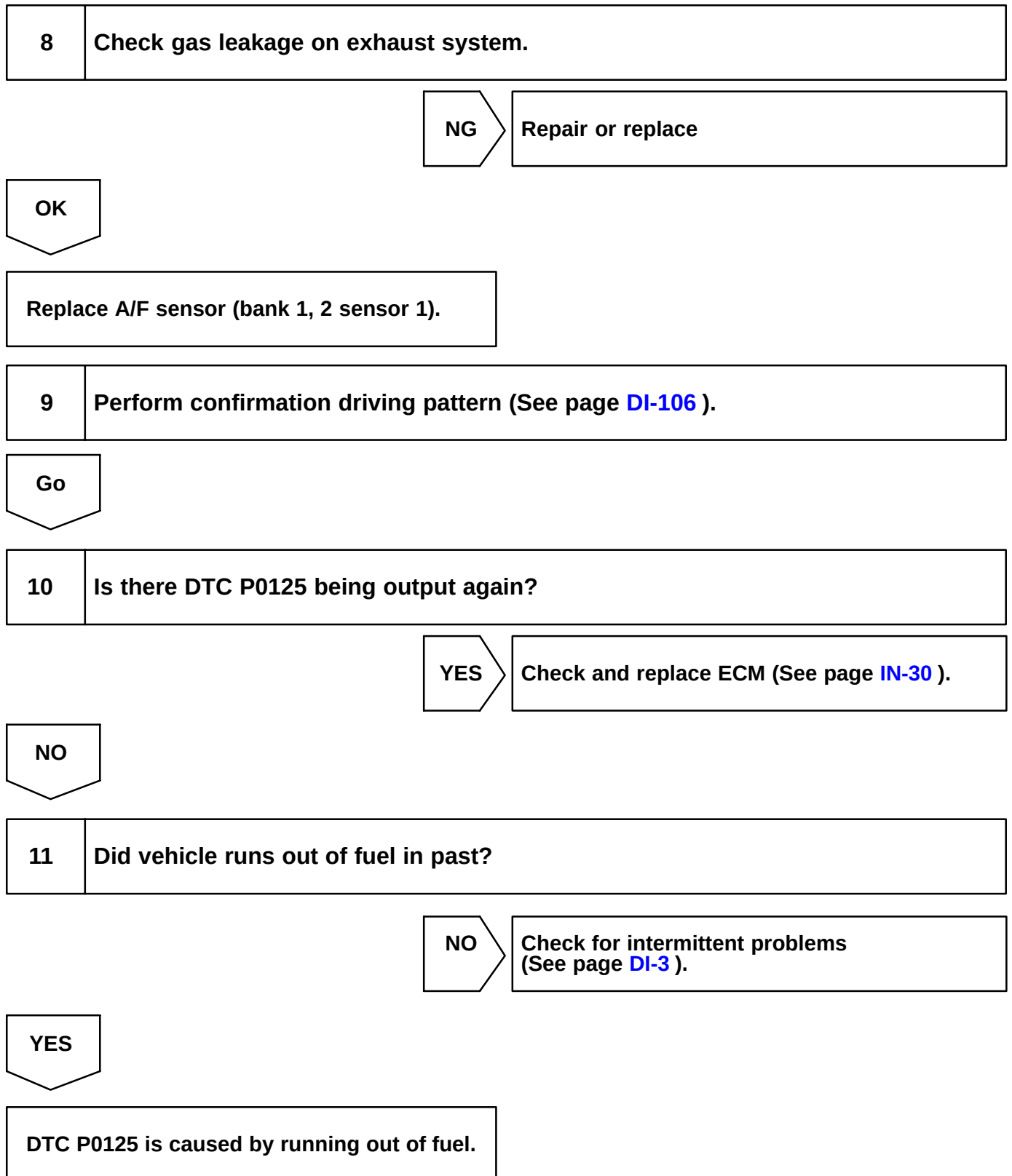
OK

7	Check injector injection (See page SF-23).

NG

Replace injector.

OK



DTC	P0128	Thermostat Malfunction

CIRCUIT DESCRIPTION

If the water temperature becomes 75°C (167°F) or more, it is abnormal.

If not due to the thermostat malfunction, it is abnormal.

DTC No.	DTC Detecting Condition	Trouble Area
P0128	Condition (a), (b) or (c): (a) After starting engine at 20°C (68°F) (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 TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check thermostat (See page CO-11).

NG

Replace thermostat.

YES

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

YES

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

NG

Check and replace ECM (See page [IN-30](#)).

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	Voltage output of heated oxygen sensor remains at 0.4 V or more or 0.55 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 farther away from the engine body.

WIRING DIAGRAM

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

INSPECTION PROCEDURE

HINT:

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

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

YES

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

NO

2	Check for open and short in harness and connector between ECM and heated oxygen sensor (See page IN-30).

NG

Repair or replace harness or connector.

OK

3	Check output voltage of heated oxygen sensor.

PREPARATION:

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

CHECK:

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

HINT:

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

OK:

Heated oxygen sensor output voltage: Alternates from 0.4 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 (2 trip detection logic)	●Open or short in heater circuit of heated oxygen sensor ●Heated oxygen sensor heater ●ECM
	Heater current of 0.2 A or less when heater operates (2 trip detection logic)	

HINT:

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

WIRING DIAGRAM

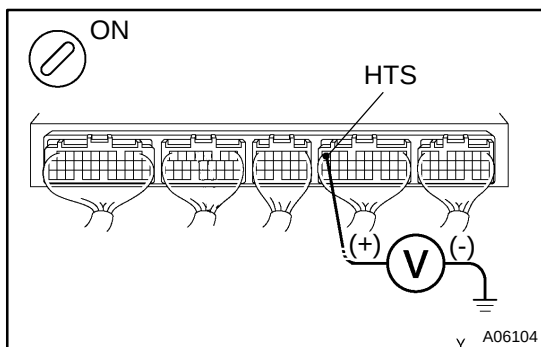
Refer to DTC P0125 on page [DI-43](#) .

INSPECTION PROCEDURE

HINT:

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

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



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

OK

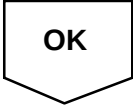
Check and replace ECM (See page [IN-30](#)).

NG

2	Check resistance of heated oxygen sensor heater (See page SF-81).

NG

Replace heated oxygen sensor.

A rectangular button with a black border and a black outline, containing the text "OK" in a bold, sans-serif font.

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-30](#)).

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

CIRCUIT DESCRIPTION

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

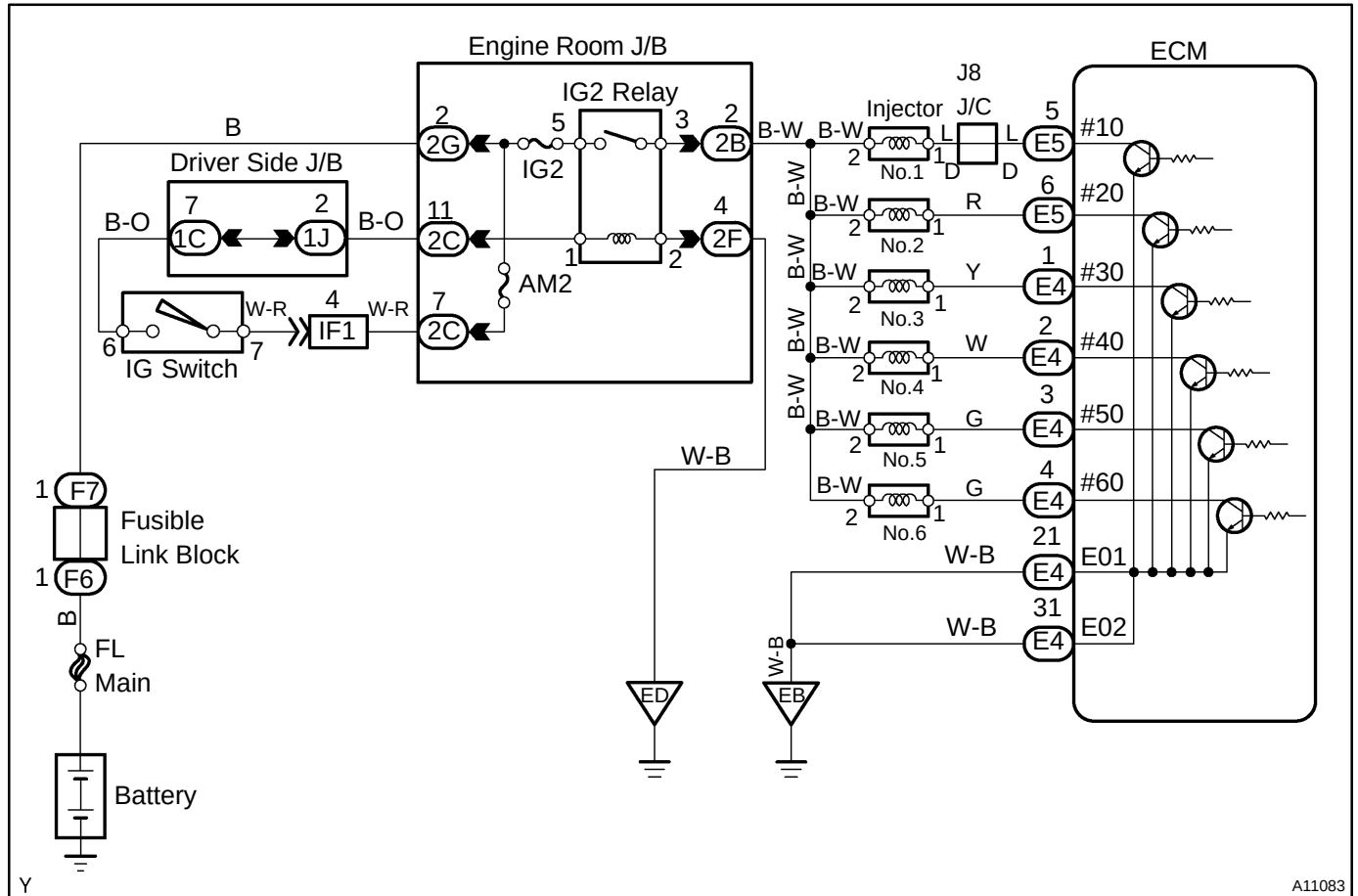
The ECM counts the number of times the engine speed change rate indicates that misfire has occurred. When the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the MIL lights up.

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

DTC No.	DTC Detecting Condition	Trouble Area
P0300	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions	●Open or short in engine wire ●Connector connection ●Vacuum hose 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	For any particular 200 revolutions for engine, misfiring is detected which can cause catalyst overheating (This causes MIL to blink)	
P0305 P0306	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emission (2 trip detection logic)	

HINT:

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

WIRING DIAGRAM**CONFIRMATION DRIVING PATTERN**

- Connect the TOYOTA hand-held tester or OBD II scan tool.
- Record the DTC and the freeze frame data.
- Use the TOYOTA 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 TOYOTA hand-held tester, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again.

HINT:

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

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

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

INSPECTION PROCEDURE

HINT:

- If is case that DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition or freeze frame data. Also, after finishing the repair, confirm that there is no misfire. (See the confirmation driving pattern)
- When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is besides the range of $\pm 20\%$, there is a possibility that the air-fuel ratio is inclining either to "rich" (-20% or less) or "lean" ($+20\%$ or more).
- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility or misfire only during warming up.
- In the case that misfire cannot be reproduced, the reason may be because of the driving with lack or fuel, the use of improper fuel, a stain of ignition plug, and etc.

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

CHECK:

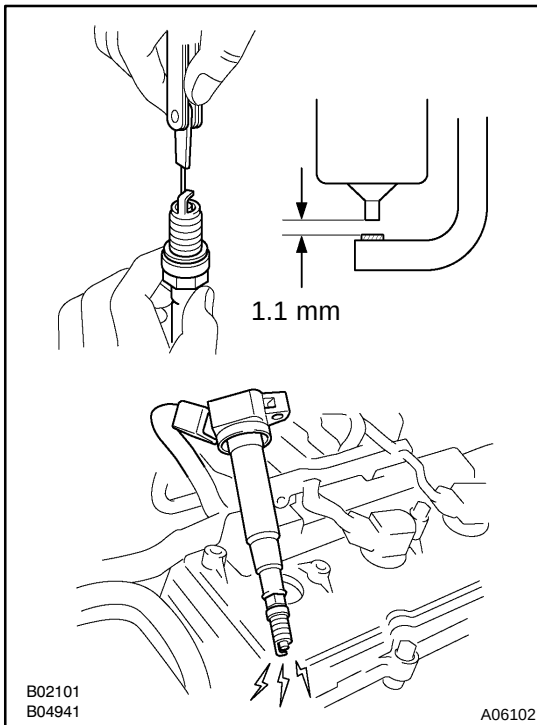
- (a) Check the connection conditions of wire harness and connector.
- (b) Check the disconnection, piping and break of vacuum hose.

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:

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

CHECK:

- Check spark plug type.
- Check the electrode for carbon deposits.
- 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:

- Install the spark plug to the ignition coil, and connect the ignition coil connector.
- Disconnect the injector connector.
- Ground the spark plug.

CHECK:

Check if spark occurs while engine is being cranked.

OK:

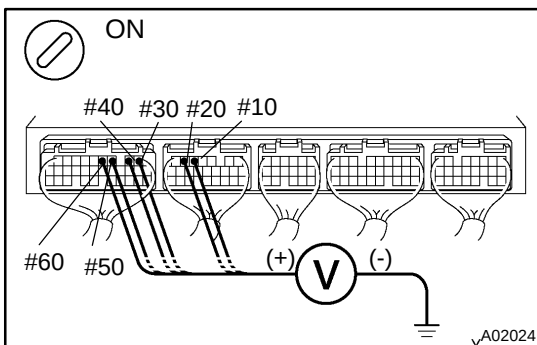
Spark jumps across electrode gap.

NG

Replace or check ignition system (See page [IG-1](#)).

OK

3 Check voltage of ECM terminal for injector of failed cylinder.



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

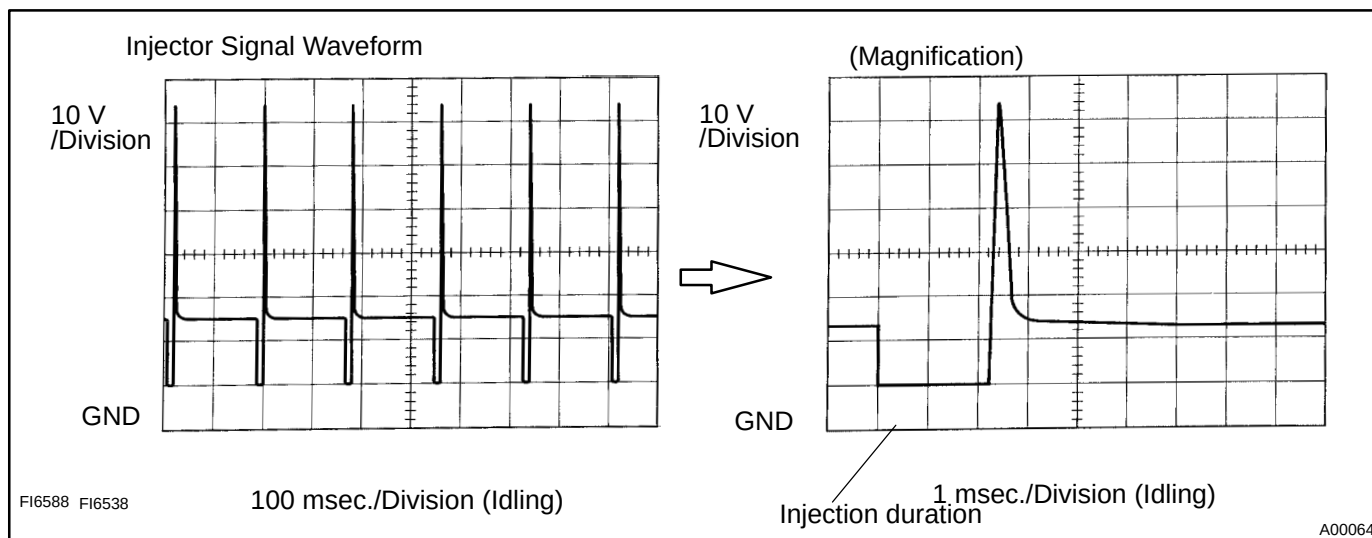
Voltage: 9 - 14 V

Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

The correct waveform is as shown.



OK

Go to step 5.

NG

4

Check resistance of injector of misfiring cylinder (See page [SF-19](#)).

NG

Replace injector.

OK

Check for open and short in harness and connector between injector and ECM (See page [IN-30](#)).

5

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

NG

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



6	Check injector injection (See page SF-23).



Replace injector.



7	Check mass air flow meter (See page SF-31) and engine coolant temperature sensor (See page SF-73).



Repair or replace.

OK

Check compression pressure (See page EM-3), valve clearance (See page EM-4) and valve timing (See page EM-21).

DTC	P0325	Knock Sensor 1 Circuit Malfunction (Bank 1)

DTC	P0330	Knock Sensor 2 Circuit Malfunction (Bank 2)

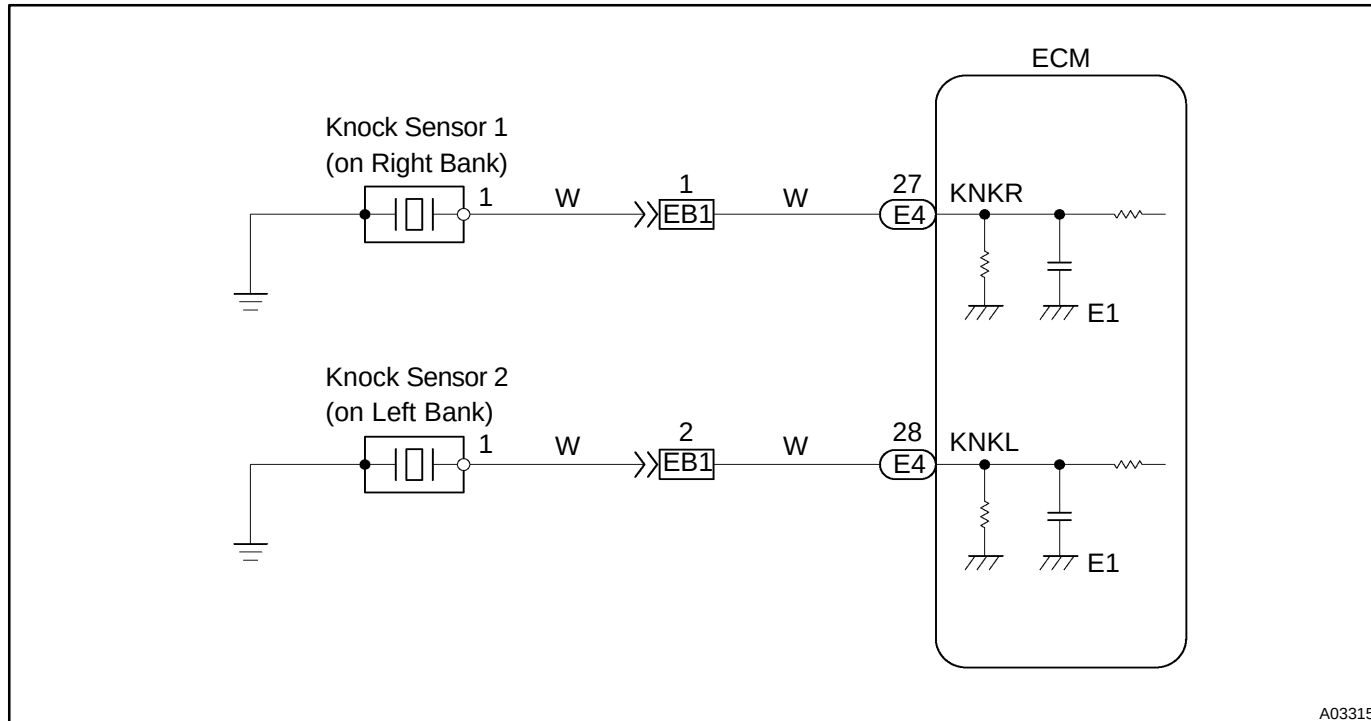
CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed between 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

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

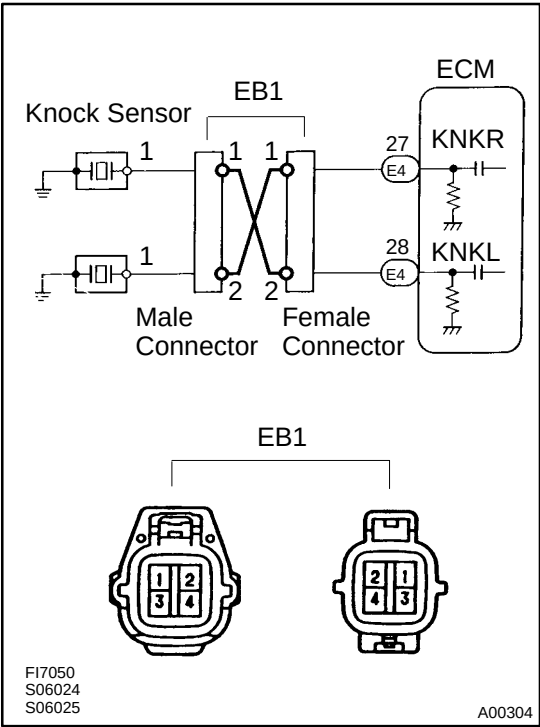
INSPECTION PROCEDURE

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

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



PREPARATION:

- Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
- Disconnect the wire from wire connector EB1.
- Connect the terminals of the disconnected EB1 male connector and EB1 female as follows.

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

- Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.
- After the engine is warmed up, perform quick racing to 4,000 rpm 3 times.

CHECK:

Check the DTC.

RESULT:

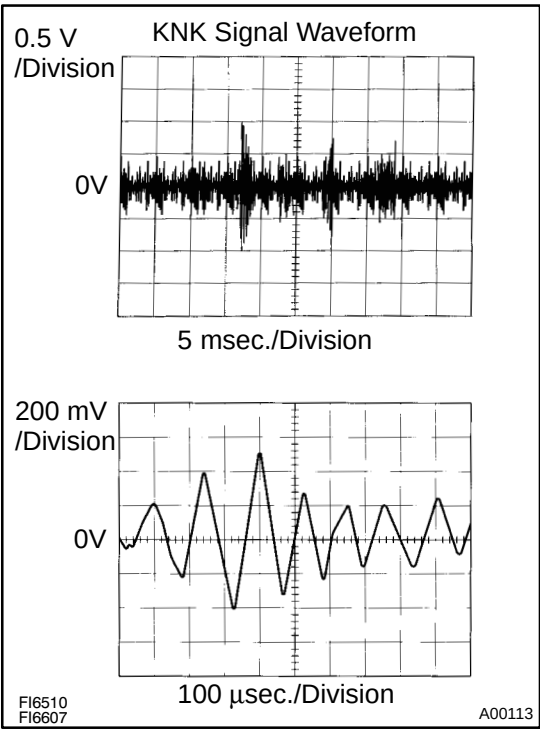
Type I	DTC same as when vehicle brought in P0325 → P0325 or P0330 → P0330
Type II	DTC different to when vehicle brought in P0325 → P0330 or P0330 → P0325

Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

The correct waveform is as shown.



- Spread the time on the horizontal axis, and confirm that period of the wave is 141 µsec. (Normal mode vibration frequency of knock sensor: 7.1 kHz)

HINT:

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

Type II	Go to step 3.

Type I**2****Check for open and short in harness and connector between EB1 connector and ECM (See page [IN-30](#)).****NG****Repair or replace harness or connector.****OK****Check and replace ECM (See page [IN-30](#)).****3****Check for open and short in harness and connector between EB1 connector and knock sensor (See page [IN-30](#)).****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.**

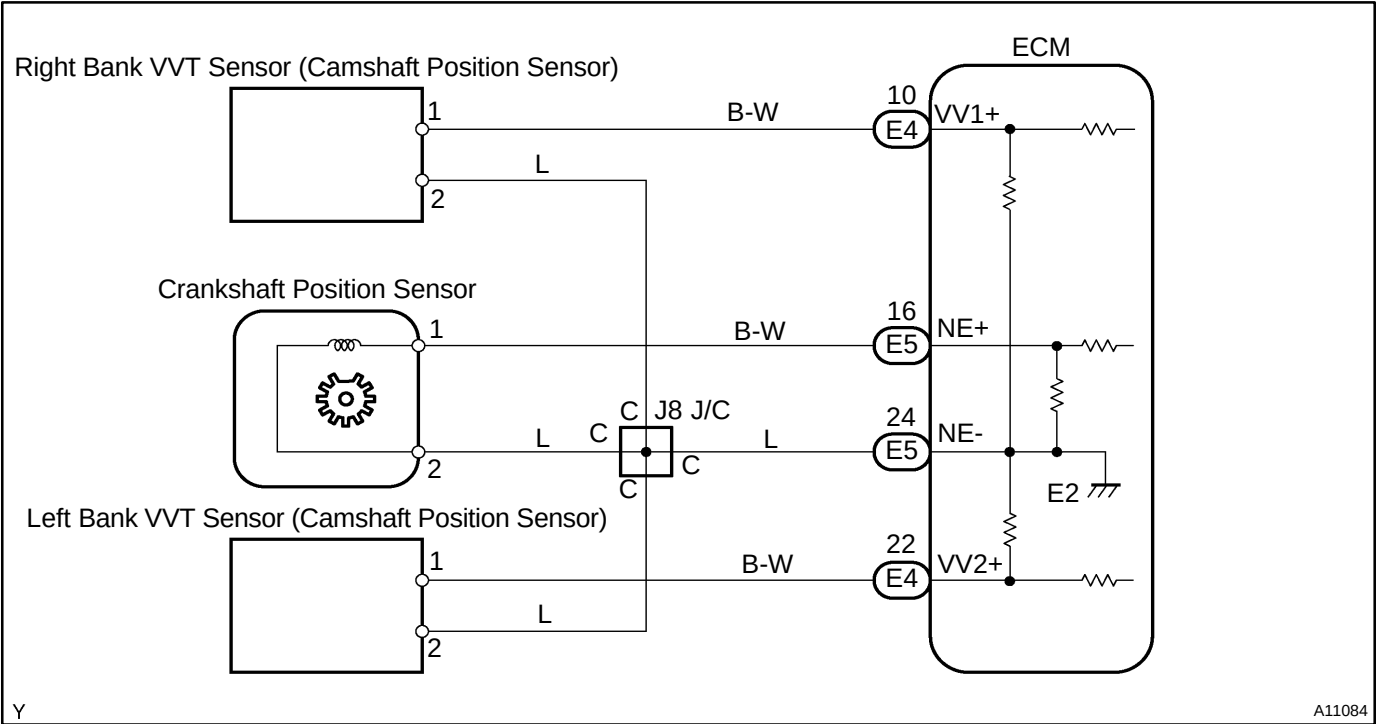
DTC	P0335	Crankshaft Position Sensor "A" Circuit Malfunction

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

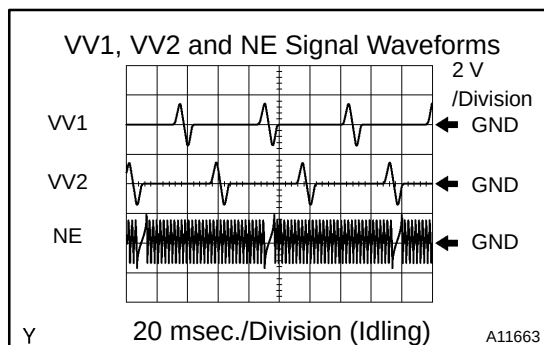


INSPECTION PROCEDURE

HINT:

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

1 Check resistance of crankshaft position sensor (See page [IG-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.

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-30](#)).

NG

Repair or replace harness or connector.

OK

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

NG

Tighten sensor. Replace crankshaft timing pulley.

OK

Check and replace ECM (See page [IN-30](#)).

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 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 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
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

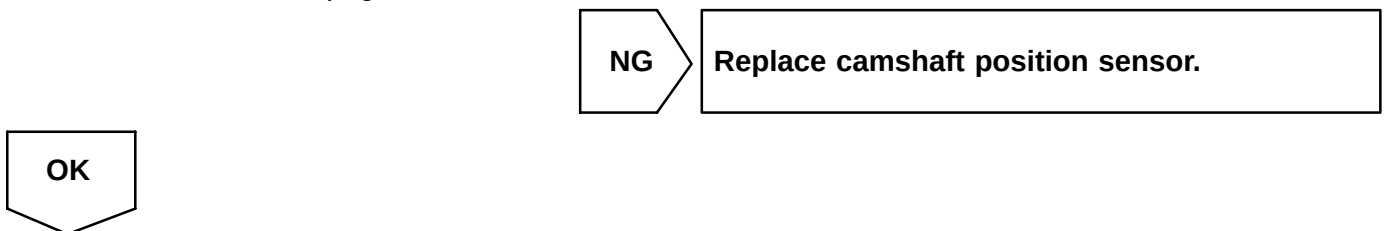
HINT:

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

1	Check resistance of 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-30).



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-30](#)).

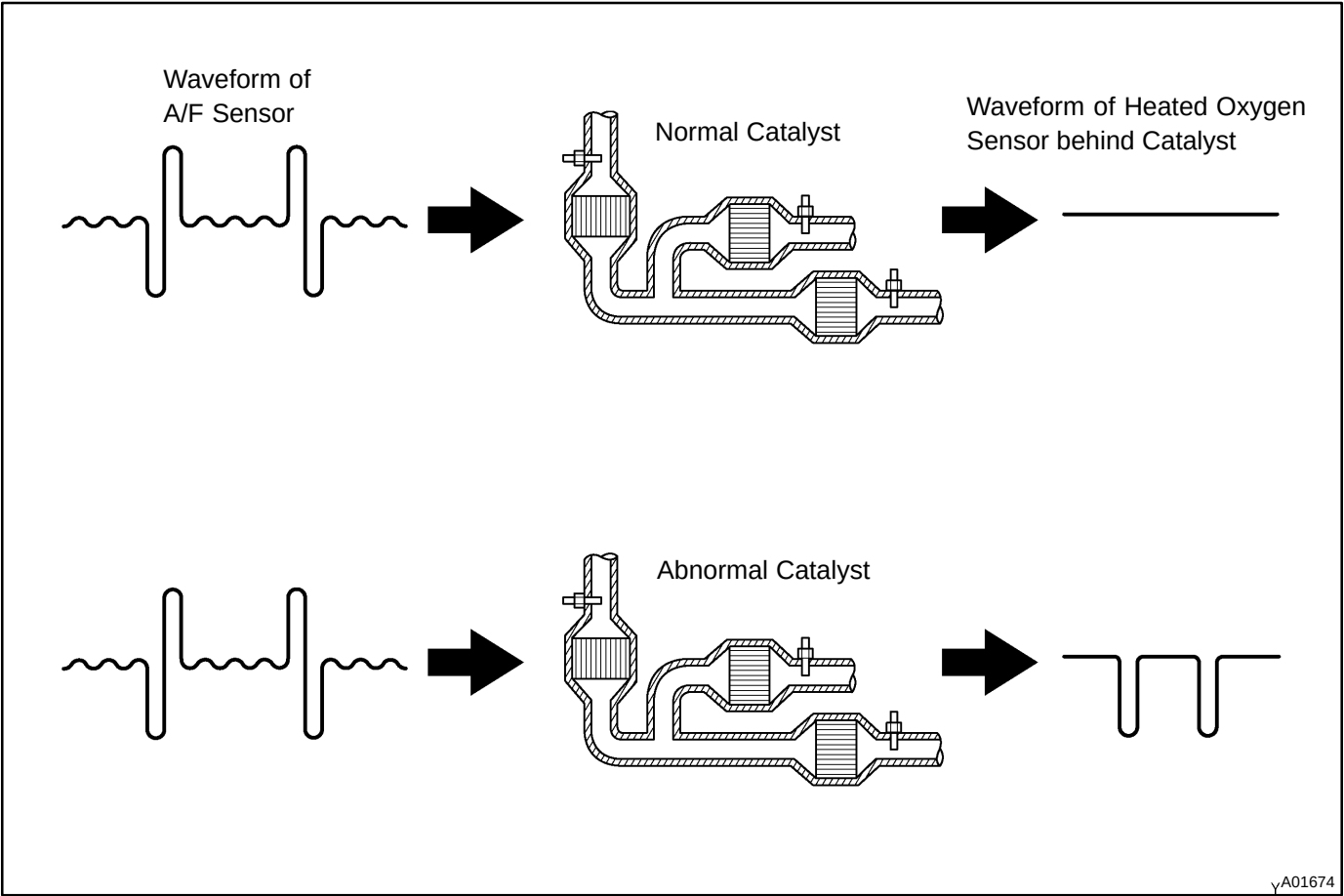
DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)

CIRCUIT DESCRIPTION

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

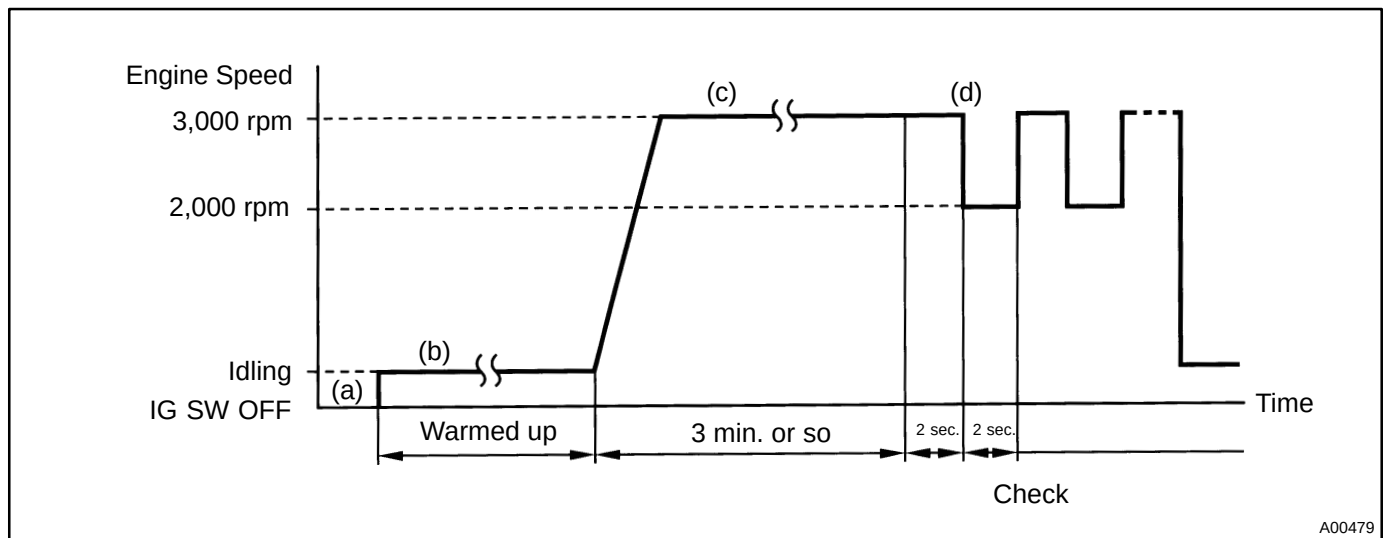
If the catalyst is functioning normally, the waveform of the heated oxygen sensor located behind the catalyst switches back and forth between rich and lean much more slowly.

When the waveform of the heated oxygen sensor located behind the catalyst alternates flutteringly 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 flutteringly 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



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

INSPECTION PROCEDURE

HINT:

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

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

YES

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

NO

2	Check gas leakage on exhaust system.

NG

Repair or replace.

OK

3	Check A/F sensor (bank 1, 2 sensor 1) (See page SF-79).

NG	Repair or replace.

OK

4	Check heated oxygen sensor (bank 1 sensor 2) (See page SF-81).

NG	Repair or replace.

OK

Replace three-way catalytic converter (See page [EC-15](#)).

DTC	P0440	Evaporative Emission Control System Malfunction

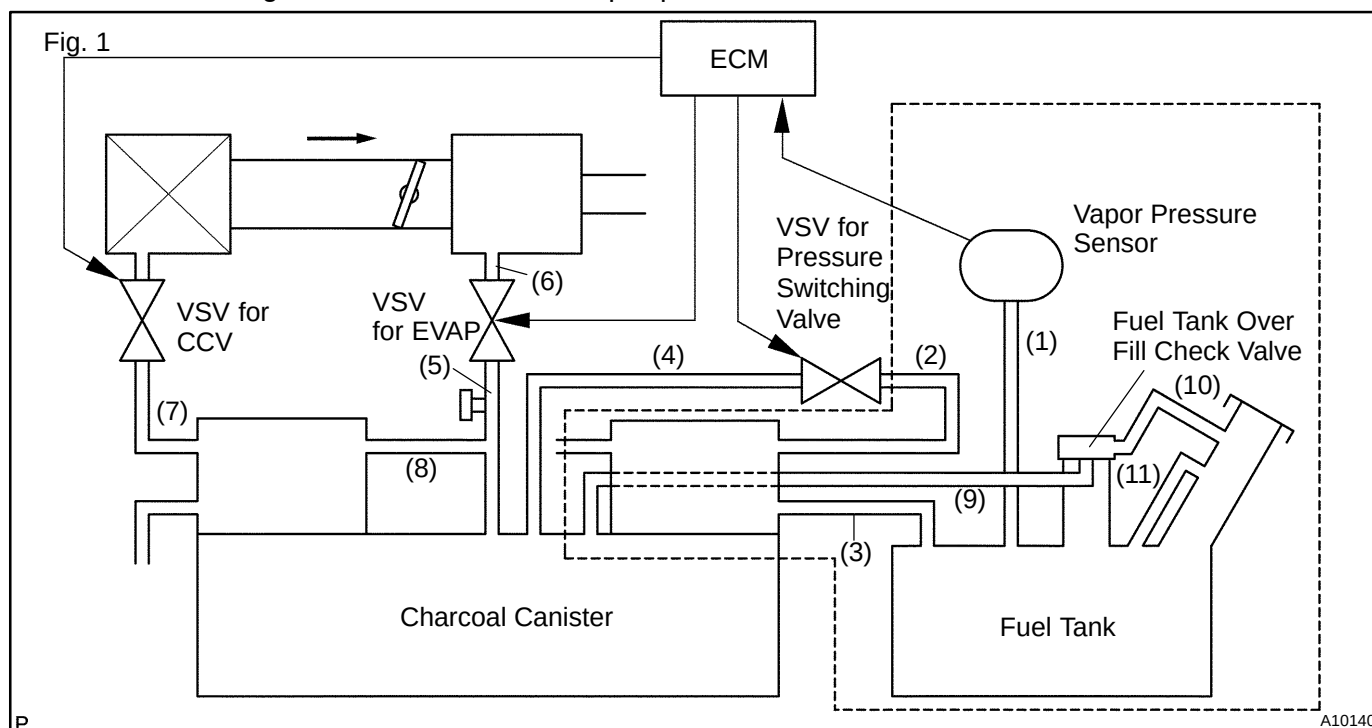
DTC	P0442	Evaporative Emission Control System Leak Detected (Small Leak)

CIRCUIT DESCRIPTION

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

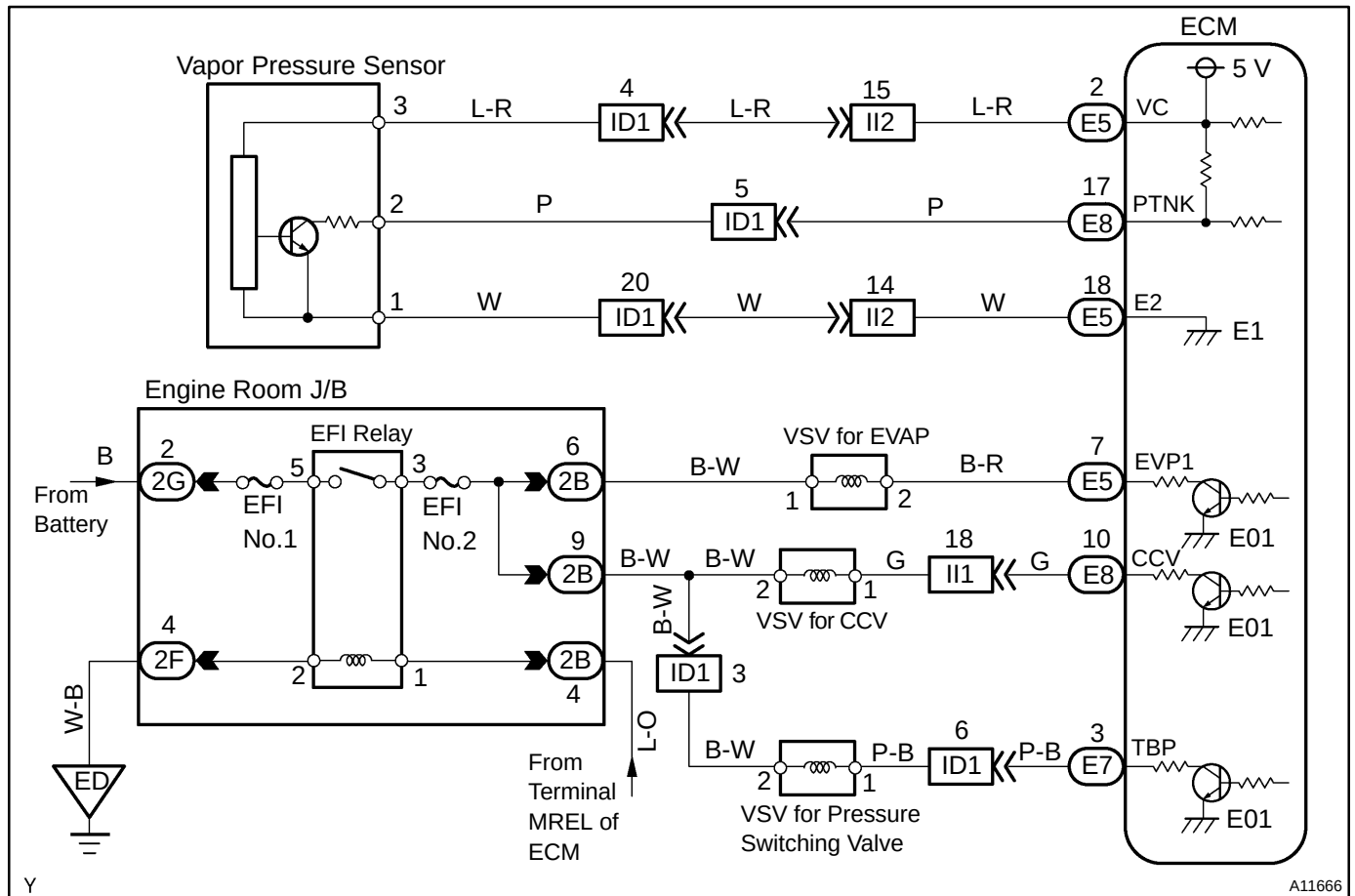
The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

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



DTC No.	DTC Detecting Condition	Trouble Area
P0440 P0442	After cold starting and when generating certain swift pressure value in fuel tank enabling not to hold that value (2 trip detection logic)	●Hose or tube cracked, hole, damaged or loose seal ((3) in Fig. 1) ●Fuel tank cap incorrectly installed ●Fuel tank cap cracked or damaged ●Vacuum hose cracked, holed, blocked, damaged or disconnected ((1) or (2) in Fig. 1) ●Fuel tank cracked, holed or damaged ●Charcoal canister cracked, holed or damaged ●Open or short in vapor pressure sensor circuit ●Vapor pressure sensor ●Fuel tank over fill check valve cracked or damaged ●ECM

WIRING DIAGRAM

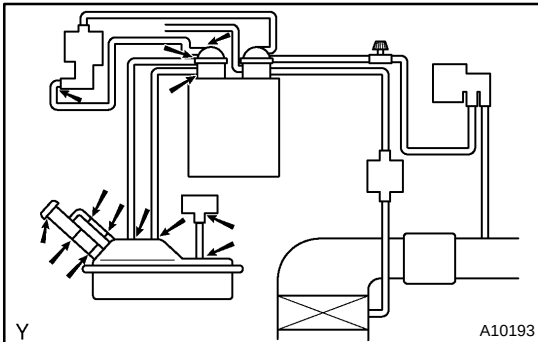


INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442, first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 or P0442 next.
- Ask the customer whether, after the MIL came on, the customer found the fuel tank cap loose and tightened it. Also ask the customer whether the fuel tank cap was loose when refuelling. If the fuel tank cap was loose, it was the cause of the DTC. If the fuel tank cap was not loose or if the customer was not sure if it was loose, troubleshoot according to the following procedure.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

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

**CHECK:**

Check for cracks, deformation and loose connection of 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 TOYOTA genuine parts.**

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

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

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

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

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

5	Check filler neck for damage.

PREPARATION:

Remove the fuel tank cap.

CHECK:

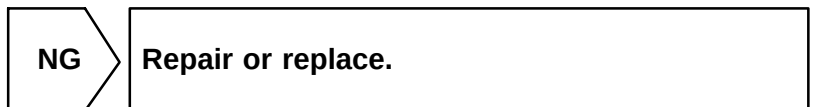
Visually inspect the filler neck for damage.



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:

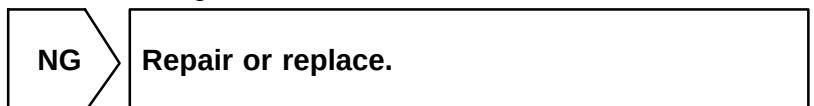
- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole and damage.



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

CHECK:

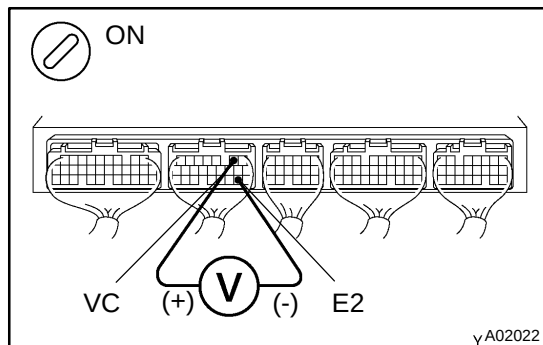
- (a) Check for proper connection of the fuel tank and fuel evap pipe (See page [EC-6](#)), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.



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



OK

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

- (a) Remove the groove compartment (See page [SF-82](#)).
- (b) Turn the ignition switch ON.

CHECK:

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

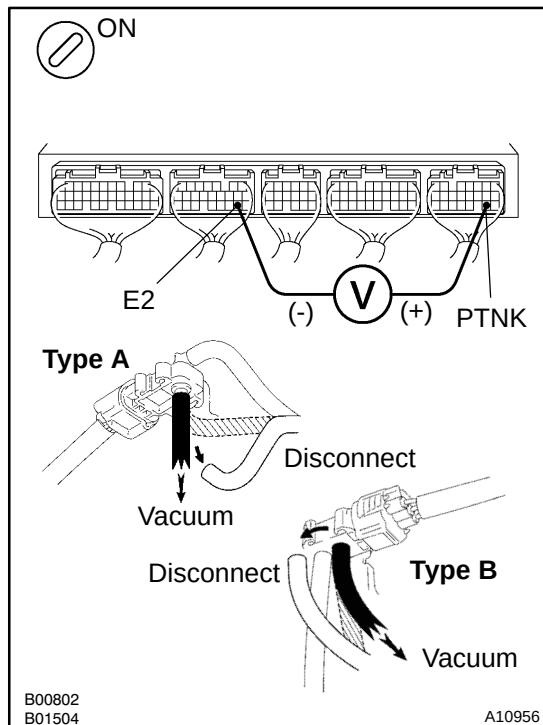
OK:

Voltage: 4.5 - 5.5 V

NG

Check and replace ECM (See page [IN-30](#)).

OK

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

- (a) Remove the groove compartment (See page [SF-82](#)).
- (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-30).

NG

Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

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

NG

Replace fuel tank or fuel tank over fill check valve.

OK

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

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

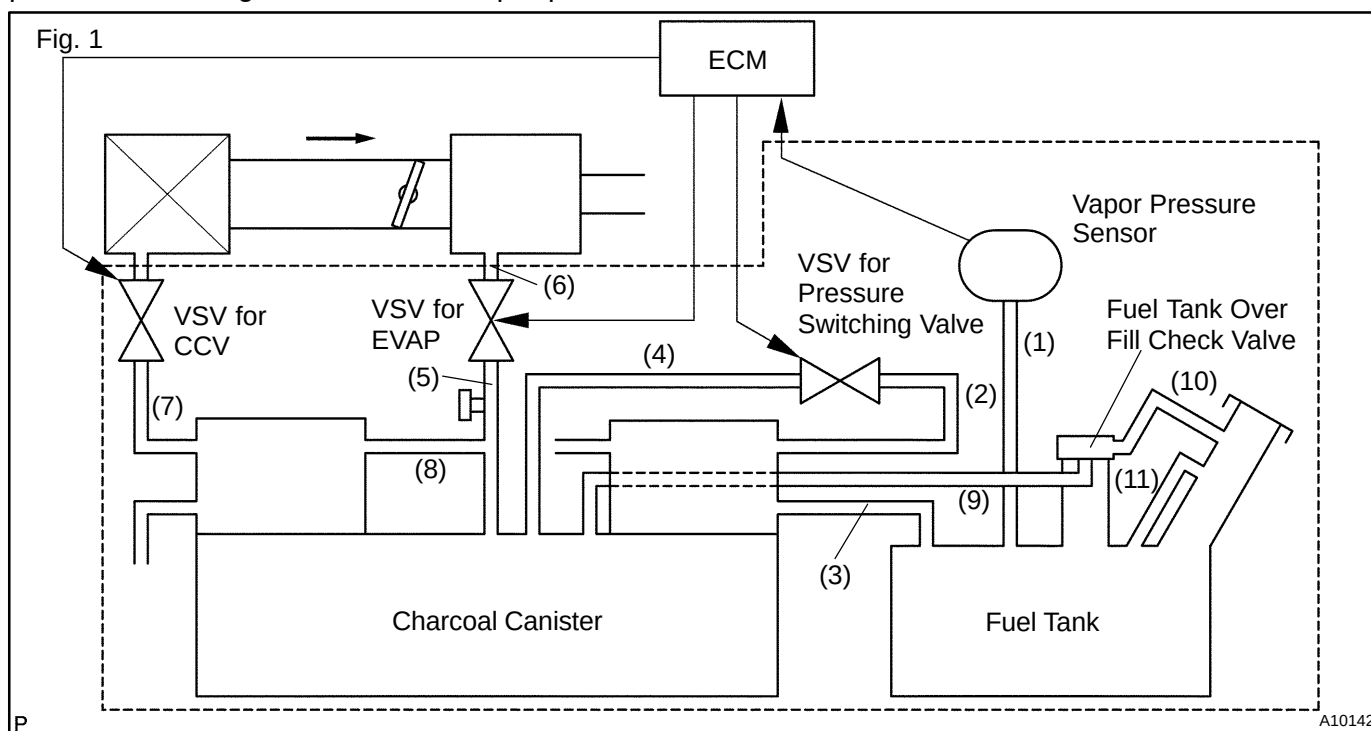
DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

CIRCUIT DESCRIPTION

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

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

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



DTC No.	DTC Detecting Condition	Trouble Area
P0441	Pressure in charcoal canister and fuel tank does not drop 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)
	During purge cut-off, negative pressure incomming in the charcoal canister and fuel tank will not stop. (2 trip detection logic)	● Fuel tank cap incorrectly installed ● Fuel tank cap cracked or damaged ● Open or short in vapor pressure sensor circuit
P0446	When VSV for pressure switching valve is ON, ECM judges that there is no continuity between vapor pressure sensor, fuel tank and charcoal canister (2 trip detection logic)	● Vapor pressure sensor ● Open or short in VSV circuit for EVAP ● VSV for EVAP
	When VSV for pressure switching valve is turned OFF, pressure in fuel tank is maintained at atmospheric pressure (2 trip detection logic)	● 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
	When VSV for CCV is ON, pressure in charcoal canister and fuel tank is maintained at atmospheric pressure (2 trip detection logic)	● 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](#).

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442, first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 or P0442 next.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

TOYOTA hand-held tester:

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

NG

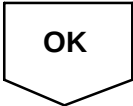
Repair or replace.

OK

2	Check that fuel tank cap is TOYOTA genuine parts (See page DI-74 , step 2).

NG

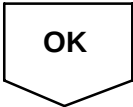
Replace to TOYOTA genuine parts.

OK

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

NG

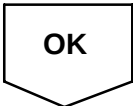
Correctly install fuel tank cap.

OK

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

NG

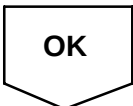
Replace fuel tank cap.

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-30](#)).

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-30](#)).

NG

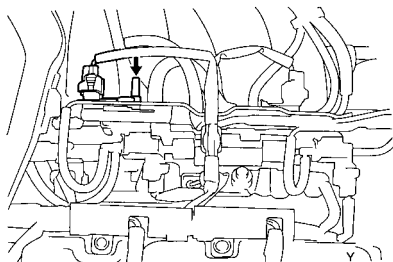
Repair or replace harness or connector.

OK

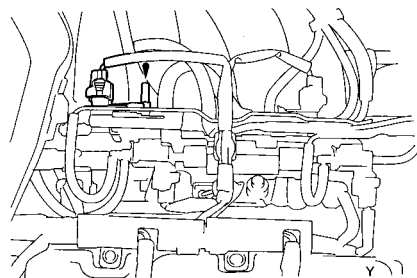
Replace vapor pressure sensor.

- 13** Check purge flow.

VSV is ON



VSV is OFF



A00230

PREPARATION:

- Connect the TOYOTA hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the TOYOTA 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 TOYOTA hand-held tester, check whether the disconnected hose applies suction to your finger.

OK:

VSV is ON:

Disconnected hose applies suction to your finger.

VSV is OFF:

Disconnected hose applies no suction to your finger.

OK

Go to step 17.

NG

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

CHECK:

- Check that the vacuum hose is connected correctly.

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

NG

Repair or replace.

OK

15

Check operation of VSV for EVAP (See page [SF-65](#)).

OK

Go to step 16.

NG

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

16

Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page [IN-30](#)).

NG

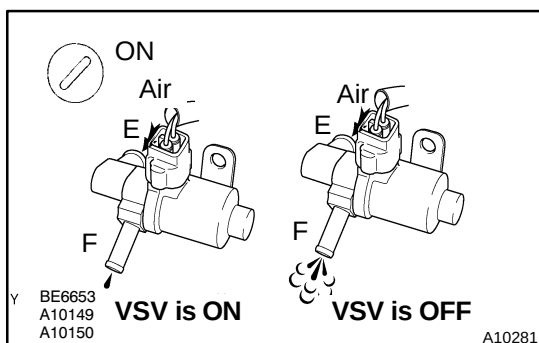
Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

17

Check VSV for CCV.

**PREPARATION:**

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

CHECK:

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

OK:

VSV is ON:

Air does not flow from port E to port F.

VSV is OFF:

Air from port E flows out through port F.

OK**Go to step 21.****NG****18****Check vacuum hose between VSV for CCV and charcoal canister.****CHECK:**

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

NG**Repair or replace.****OK****19****Check operation of VSV for CCV (See page [SF-70](#)).****OK****Go to step 20.****NG**

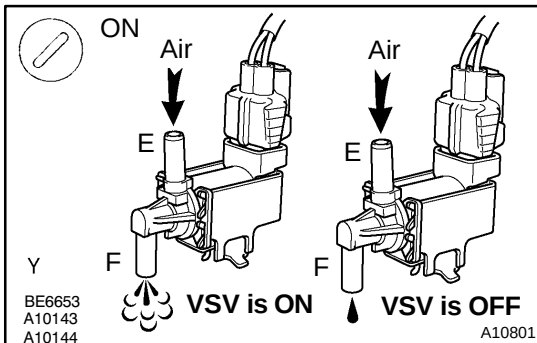
Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

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-30](#)).****NG****Repair or replace harness or connector.**

OK

Check and replace ECM (See page [IN-30](#)).

21 Check VSV for pressure switching valve.



PREPARATION:

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

CHECK:

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

OK:

VSV is ON:

Air from port E flows out through port F.

VSV is OFF:

Air does not flow from port E to port F.

OK

Go to step 24.

NG

22 Check operation of VSV for pressure switching valve (See page [SF-72](#)).

OK

Go to step 23.

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.

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-30](#)).

NG

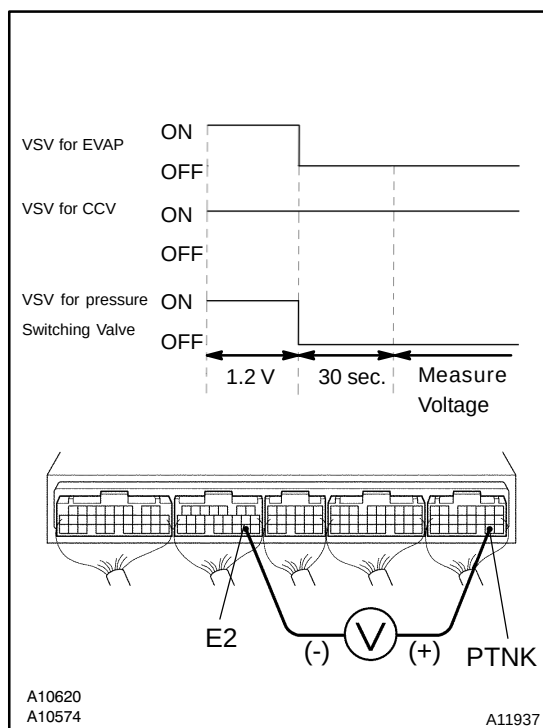
Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

24

Check fuel tank.

**PREPARATION:**

- Remove the grove compartment (See page [SF-82](#)).
- Connect the TOYOTA hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
- Start the engine.
- The VSV for the CCV is ON by the TOYOTA hand-held tester.
- The VSV for the EVAP and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

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

OK:**Voltage:**

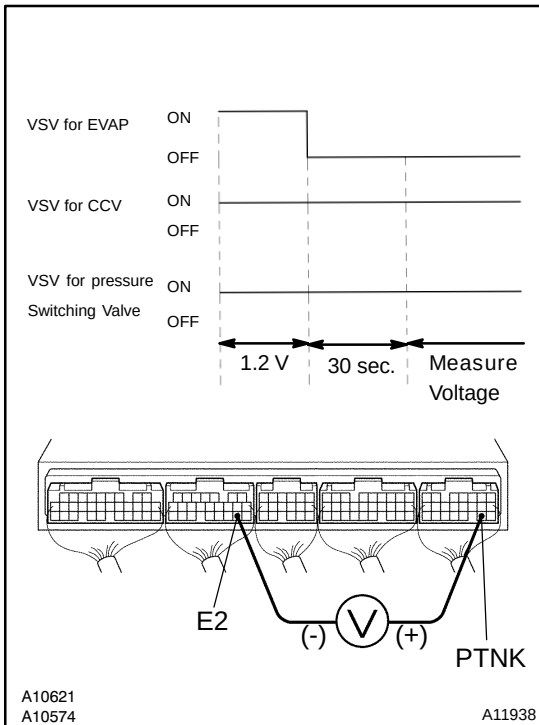
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG

Replace fuel tank.

OK

25 Check charcoal canister.



PREPARATION:

- Remove the grove compartment (See page [SF-82](#)).
- Connect the TOYOTA hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
- Start the engine.
- The VSV for the CCV and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester.
- The VSV for the EVAP is ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

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

OK:

Voltage:

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

NG

Replace charcoal canister.

OK

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

NG

Replace charcoal canister.

OK

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

NG

Replace fuel tank over fill check valve or fuel tank.

OK

Check and replace charcoal canister (See page [IN-30](#)).

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

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

NG

Repair or replace.

OK

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

NG

Replace to TOYOTA 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).

OK

NG

Replace filler pipe.

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).

OK

NG

Repair or connect VSV or sensor connector.

7

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

OK

NG

Repair or replace.

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.

OK

NG

Repair or connect VSV or sensor connector.

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.

OK

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-30](#)).

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-30](#)).

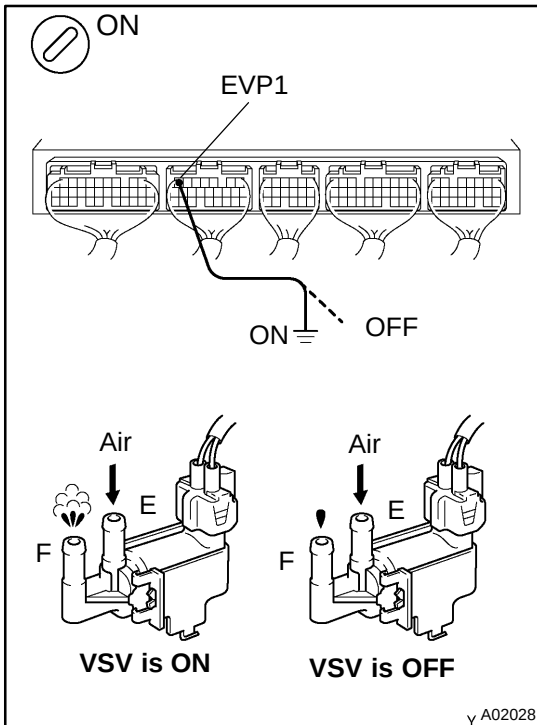
NG

Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

13 Check VSV for EVAP.



PREPARATION:

- Remove the glove compartment (See page [SF-82](#)).
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect between terminal EVP1 of the ECM connector and body ground (ON).
- Disconnect between terminal EVP1 of the ECM connector and 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-65](#)).

OK

Go to step 15.

NG

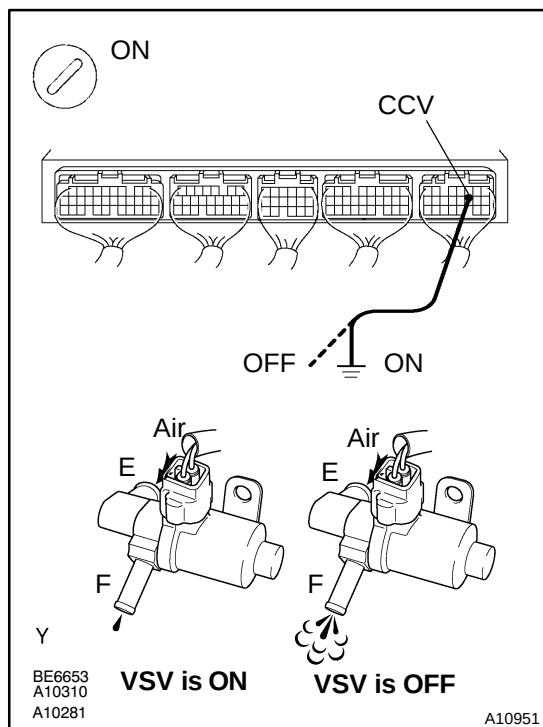
Replace VSV and clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister, and then check charcoal canister.

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-30](#)).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).**16 Check VSV for CCV.****PREPARATION:**

- Remove the groove compartment (See page [SF-82](#)).
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

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

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

OK

Go to step 19.

NG

17 Check operation of VSV for CCV (See page [SF-70](#)).

OK

Go to step 18.

NG

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

- 18** Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page [IN-30](#)).

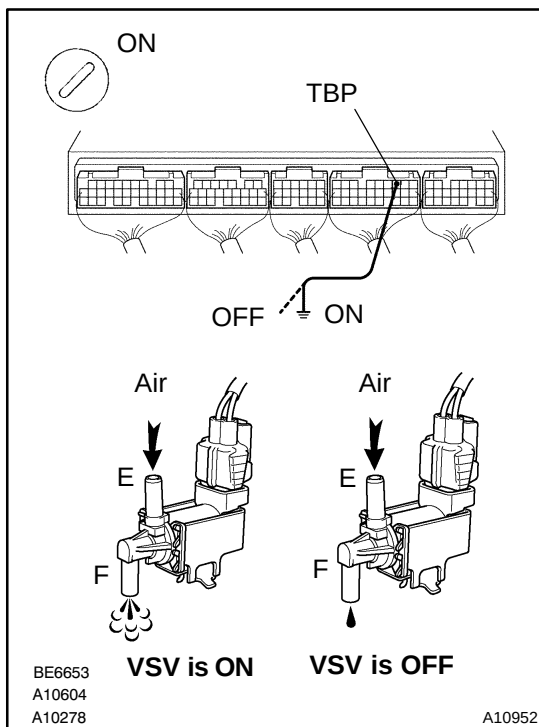
NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

- 19** Check VSV for pressure switching valve.

**PREPARATION:**

- Remove the groove compartment (See page [SF-82](#)).
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect between terminal TBP of the ECM connector and body ground (ON).
- Disconnect between terminal TBP of the ECM connector and 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 22.

NG

- 20** Check operation of VSV for pressure switching valve (See page [SF-72](#)).

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-30).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

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-30](#)).

DTC	P0450	Evaporative Emission Control System Pressure Sensor Malfunction

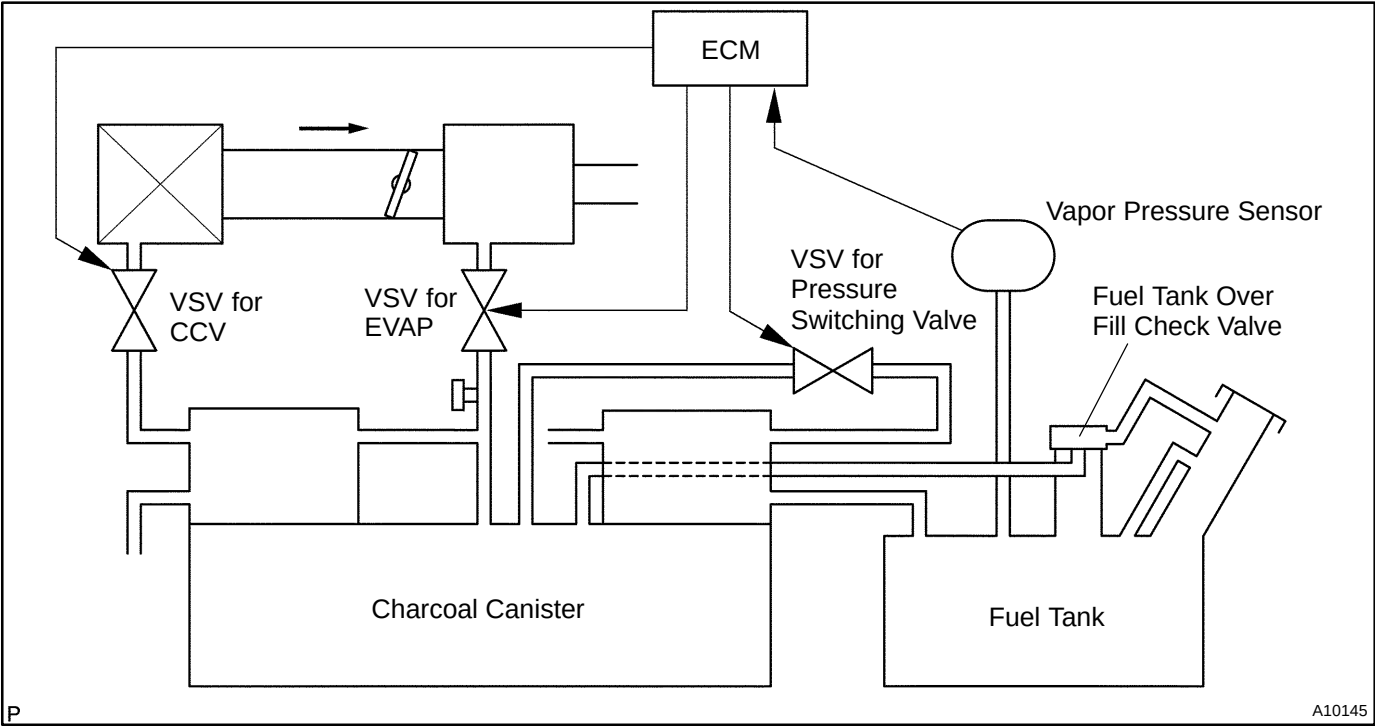
DTC	P0451	Evaporative Emission Control System Pressure Sensor Range/Performance

CIRCUIT DESCRIPTION

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

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

DTC P0450 or P0451 is recorded by the ECM when the vapor pressure sensor malfunction.



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

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 malfunction is detected, troubleshoot DTC P0440 or P0442 next.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the VSV for EVAP, charcoal canister and vapor pressure sensor.

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

NG

Check and replace ECM (See page [IN-30](#)).

OK

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

OK

Check and replace ECM (See page [IN-30](#)).

NG

3	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-30).

NG

Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

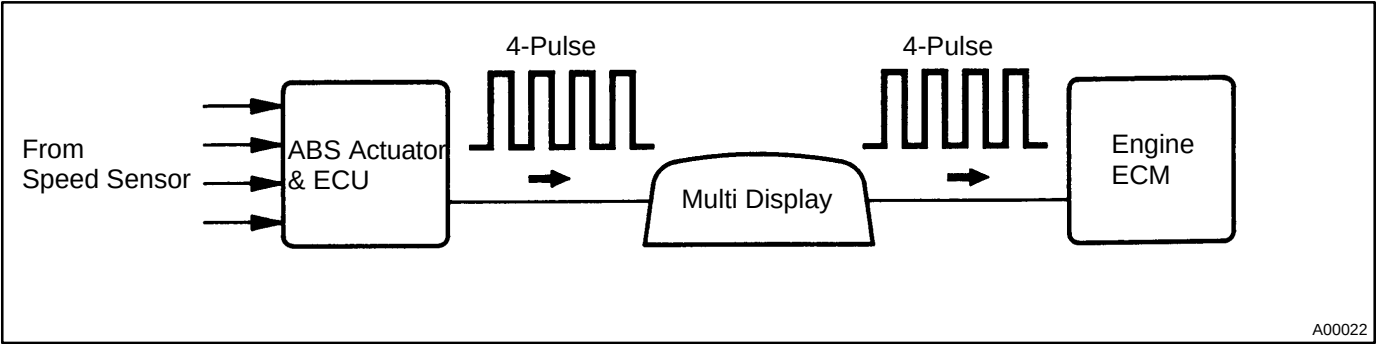
DTC	P0500	Vehicle Speed Sensor Malfunction

CIRCUIT DESCRIPTION

This sensor is mounted in the combination meter. It contains a magnet which is rotated by the speedometer cable.

Turning the reed switch ON and OFF 4 times for every revolution of the speedometer.

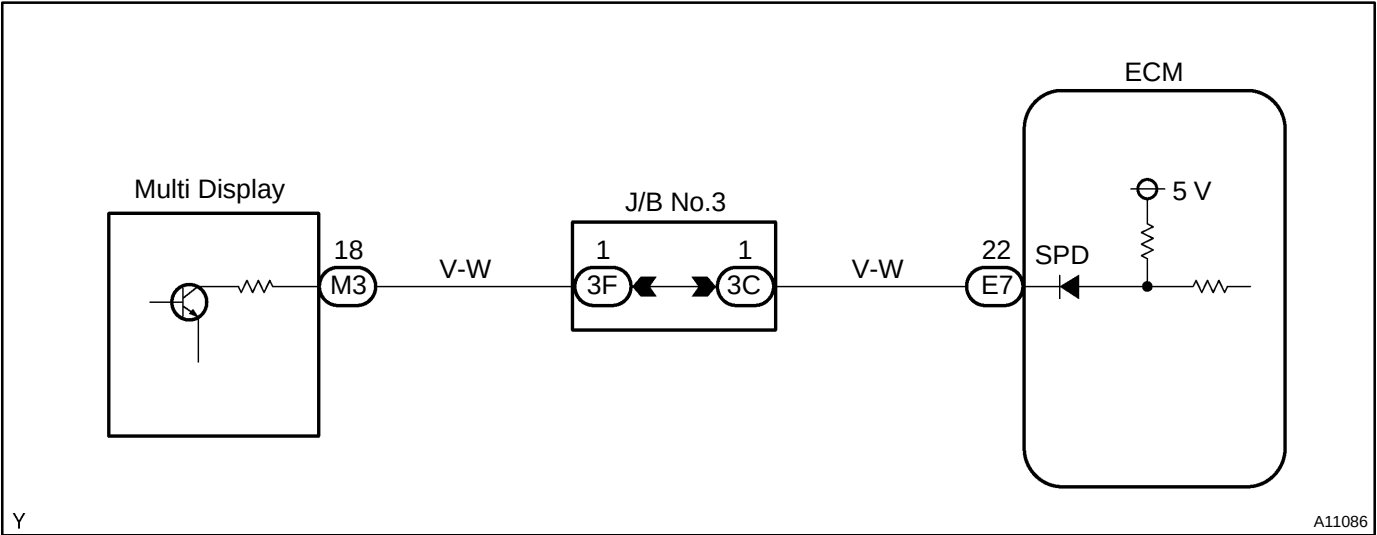
It is then transmitted to the Engine ECM. The Engine ECM determines the vehicle speed based on the frequency of these pulse signals.



A00022

DTC No.	DTC Detecting Condition	Trouble Area
P0500/61	No vehicle speed sensor signal to Engine & ECT ECU under the following conditions: (2 trip detection logic) Vehicle is being driven	●Combination meter ●Open or short in speed sensor circuit ●ECM

WIRING DIAGRAM



Y

A11086

INSPECTION PROCEDURE

HINT:

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

1 Check operation of speedometer.

CHECK:

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

HINT:

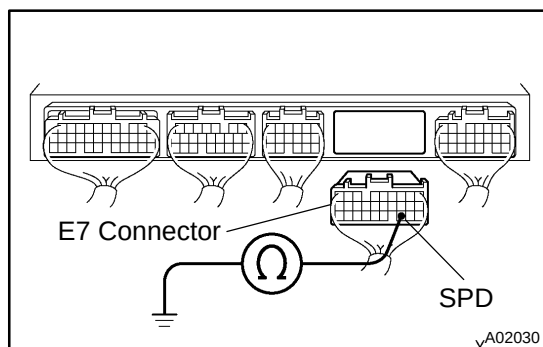
The vehicle speed sensor is operating normally if the speedometer display is normal.

NG

Check speedometer circuit (See page [BE-43](#)).

OK

2 Check for short in harness and connector between terminal SPD of ECM and body ground.



PREPARATION:

- Remove the glove compartment (See page [SF-83](#)).
- Disconnect the E7 connector from the ECM.

CHECK:

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

OK:

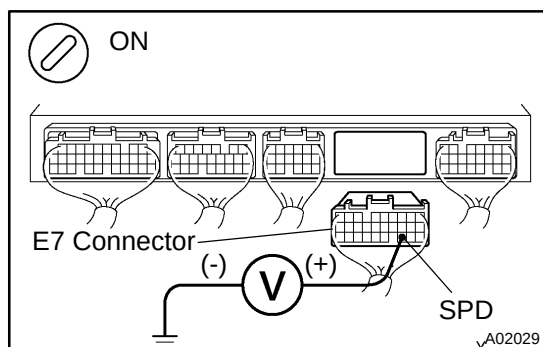
No continuity (1 MΩ or higher)

NG

Repair or replace harness or connector.

OK

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



PREPARATION:

- Remove the glove compartment (See page [SF-83](#)).
- Disconnect the E7 connector from the ECM.
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

NG

Check for open in harness and connector between J/B No.3 and ECM (See page [IN-30](#)).

OK

4	Check for open in harness and connector between J/B No.3 and combination meter (See page IN-30).

NG

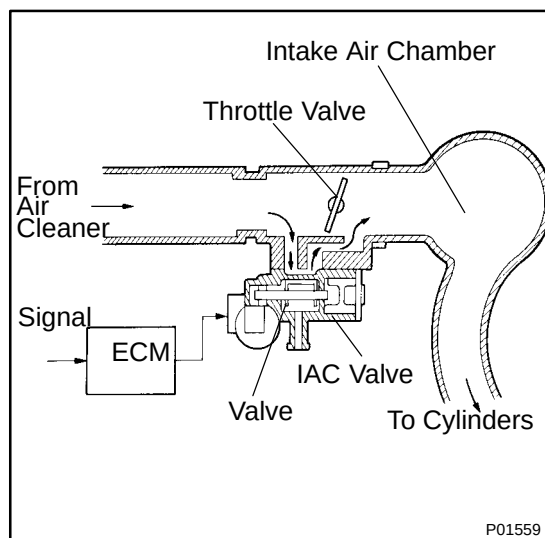
Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

DTC	P0505	Idle Control System Malfunction

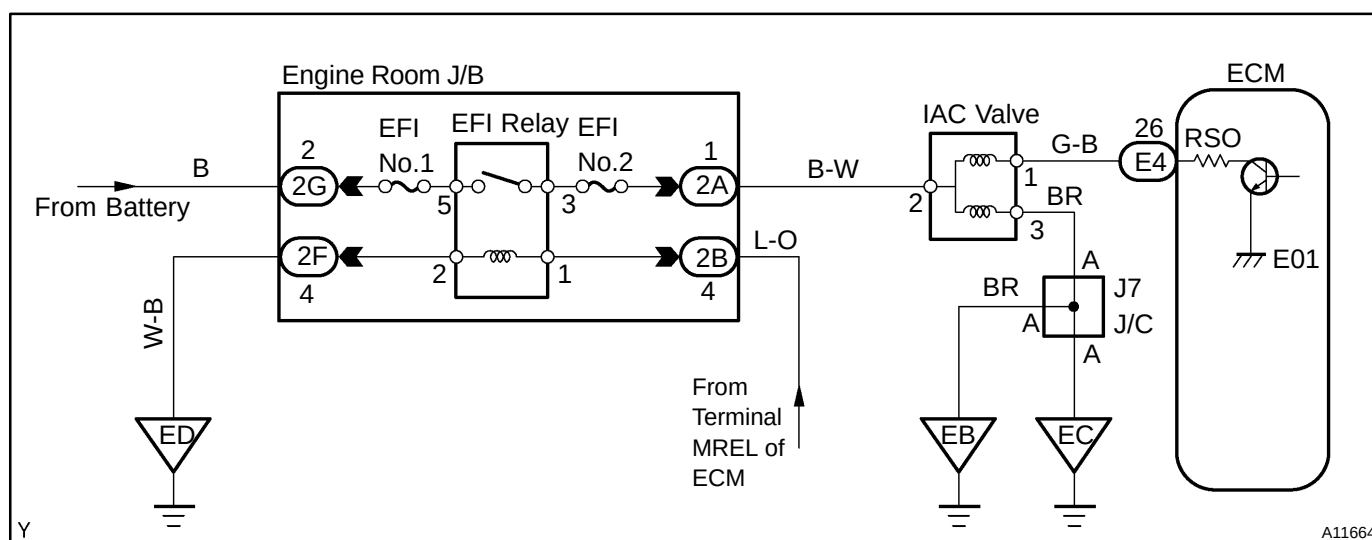
CIRCUIT DESCRIPTION



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 a passage. In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed. The ECM operates only the IAC valve to perform idle-up and provide feedback for the target idling speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to 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 TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check idle speed.

When using TOYOTA 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 N range or neutral position.
- (e) Connect the TOYOTA 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 sec. and more than 5 sec. after switching the TE1 from OFF to ON by the TOYOTA hand-held tester.

OK:

Difference of engine speed: More than 100 rpm

When not using TOYOTA 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 N 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 sec. and more than 5 sec. after connecting terminals TE1 and E1 of the DLC1.

OK:

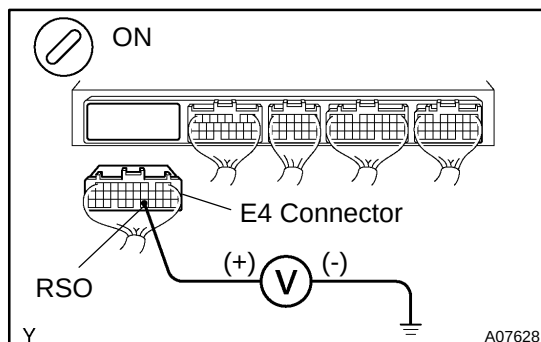
Difference of engine speed: More than 100 rpm

OK

Go to step 6.

NG

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



PREPARATION:

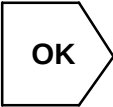
- (a) Remove the glove compartment (See page [SF-83](#)).
- (b) Disconnect the E4 connector from the ECM.
- (c) Turn the ignition switch ON.

CHECK:

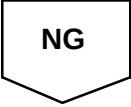
Measure the voltage between terminal RSO of the ECM connector and body ground.

OK:

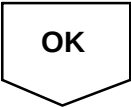
Voltage: 9 - 14 V

OK

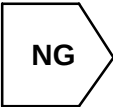
Go to step 4.

NG**3**Check IAC valve (See page [SF-43](#)).NG

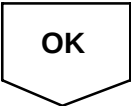
Replace IAC valve.

OK

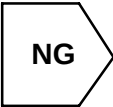
Check for open and short in harness and connector between engine room J/B and IAC valve, and IAC valve and ECM (See page [IN-30](#)).

4Check operation of IAC valve (See page [SF-46](#)).NG

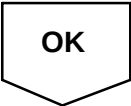
Repair or replace IAC valve.

OK**5**

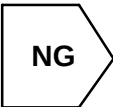
Check blockage of IAC valve and passage to bypass throttle valve.

NG

Repair or replace IAC valve.

OK

Check and replace ECM (See page [IN-30](#)).

6Check for A/C signal circuit (See page [DI-824](#)).NG

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	Voltage output* of A/F sensor remains at 3.8 V or more, or 2.8 V or less, during engine running after the engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	●Open or short in A/F sensor circuit ●A/F sensor ●Air induction system ●Fuel pressure ●Injector ●ECM
	Voltage output* of A/F sensor does not change from 3.30 V, during engine running after 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)	

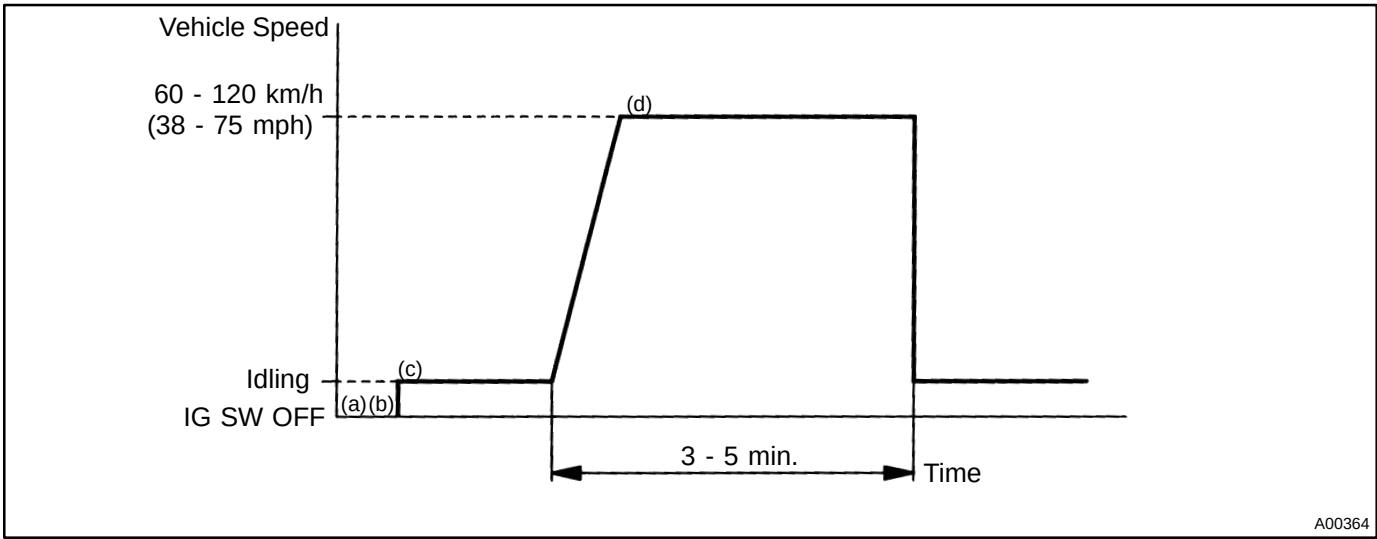
HINT:

- After confirming DTC P1130, use the OBD II scan tool or TOYOTA hand-held tester to confirm voltage output of A/F sensor (AFS B1 S1/O2S B1 S1) from the CURRENT DATA.
- The A/F sensor's output voltage and the short-term fuel trim value can be read using the OBD II scan tool or TOYOTA 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 TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM

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

CONFIRMATION DRIVING PATTERN



- (a) Connect the TOYOTA hand-held tester to the DLC3.
 - (b) Switch the TOYOTA hand-held tester from the normal mode to the check mode (See page [DI-3](#)).
 - (c) Start the engine and warm it up with all the accessory switches OFF.
 - (d) Drive the vehicle at 60 - 120 km/h (38 - 75 mph) and engine speed at 1,400 - 3,200 rpm for 3 - 5 min.
- HINT:

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

NOTICE:

If the conditions in this test are not strictly followed, detection of the malfunction will not be possible. If you do not have a TOYOTA hand-held tester, turn the ignition switch OFF after performing steps (c) and (d), 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 TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

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

YES

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

NO

2	Check output voltage of A/F sensor.

PREPARATION:

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

CHECK:

Read the voltage value of the A/F sensor on the screen of OBDII scan tool or TOYOTA 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 TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

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

*: When you use the OBD II scan tool (excluding TOYOTA 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-30).

NG

Repair or replace harness or connector.

OK

4	Check resistance of A/F sensor heater (See page SF-79).

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-23).

NG	Replace injector.

OK

Replace A/F sensor.

8	Perform confirmation driving pattern (See page DI-106).

Go

9	Is there DTC P1130 or P1150 being output again?

YES

Check and replace ECM (See page [IN-30](#)).

NO

10	Did vehicle runs out of fuel in past?

NO

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

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

YES

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

NO

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

PREPARATION:

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

CHECK:

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

HINT:

The voltage of the 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 TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

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

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

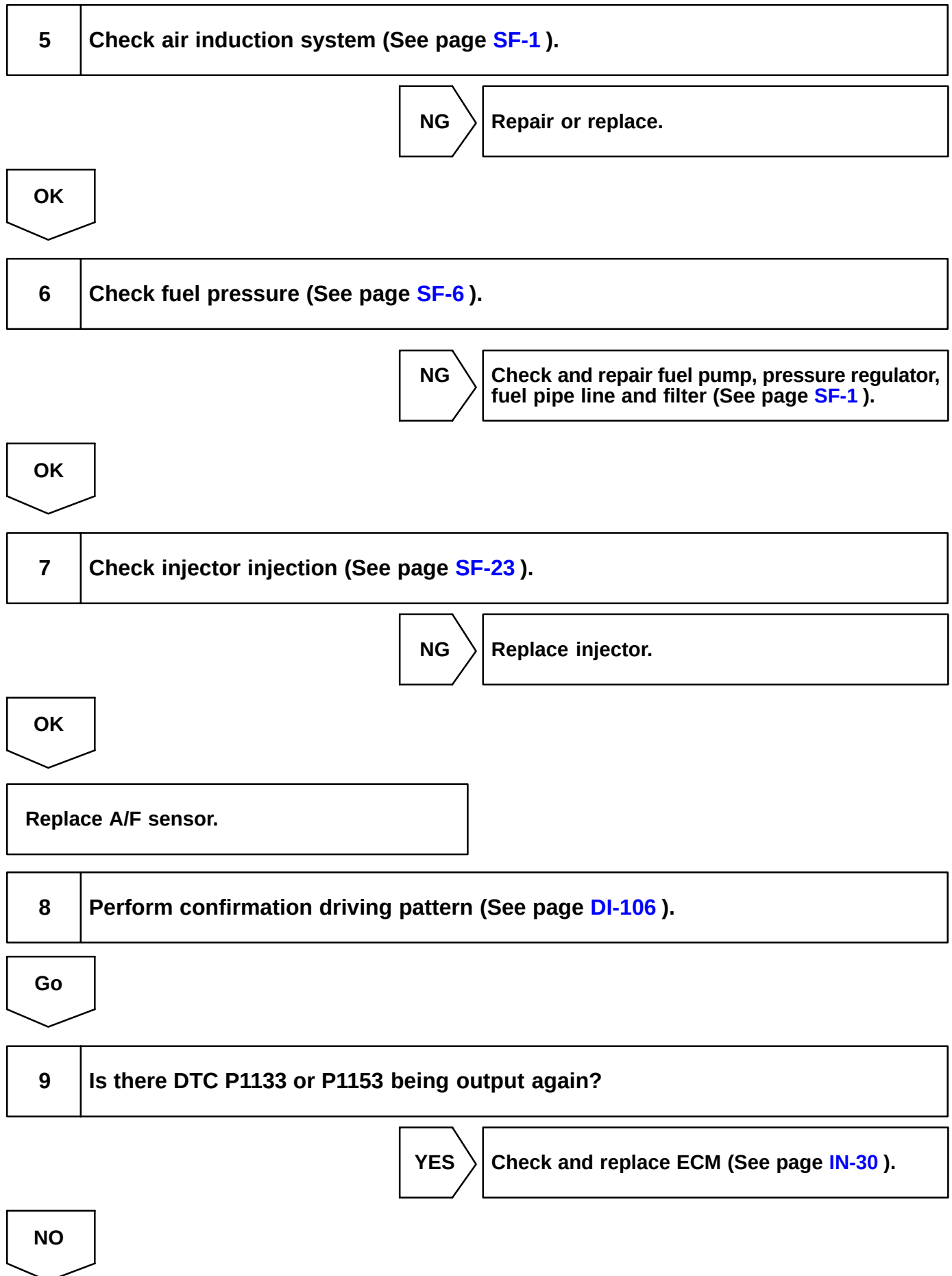
OK**Go to step 9.****NG****3**

Check for open and short in harness and connector between ECM and A/F sensor (See page [IN-30](#)).

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

Check resistance of A/F sensor heater (See page [SF-79](#)).

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 (2 trip detection logic)	●Open or short in heater circuit of A/F sensor ●A/F sensor heater ●ECM
P1155	Heater current of 0.25 A or less when the heater operates (2 trip detection logic)	

WIRING DIAGRAM

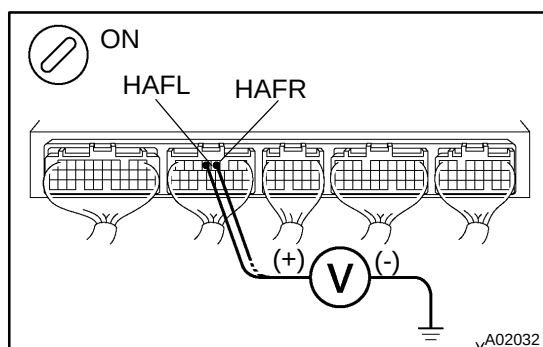
Refer to DTC P0125 on page [DI-43](#) .

INSPECTION PROCEDURE

HINT:

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

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



PREPARATION:

- Remove the glove compartment (See page [SF-83](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 - 14 V

OK

Check and replace ECM (See page [IN-30](#)).

NG

2	Check resistance of A/F sensor heater (See page SF-79).

NG

Replace A/F sensor.

OK

3

Check A/F sensor heater relay (Marking: A/F) (See page [SF-61](#)).

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-30](#)).

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)

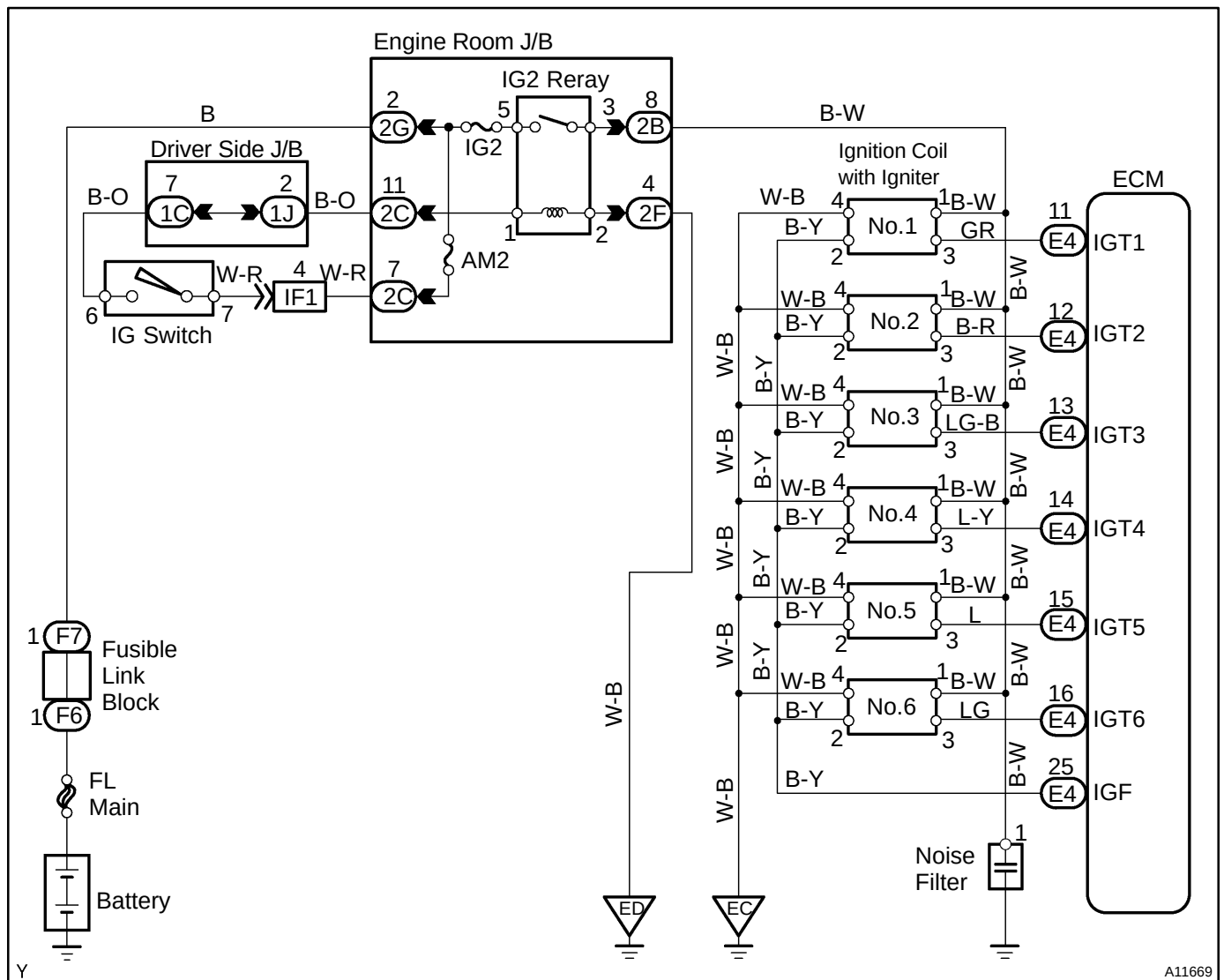
CIRCUIT DESCRIPTION

A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces 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 signals (IGT) for each cylinder. Based on IGT signals, the power transistors in the igniter cuts off the current to the primary coil in the ignition coil is supplied to the spark plug that are connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail-safe measure to the 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.
- If DTCs P1300, P1315 and P1325, are output simultaneously, IGF1 circuit may be open or short.
- If DTCs P1305, P1310 and P1320, are output simultaneously, IGF2 circuit may be open or short.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1 Check 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-30](#)).

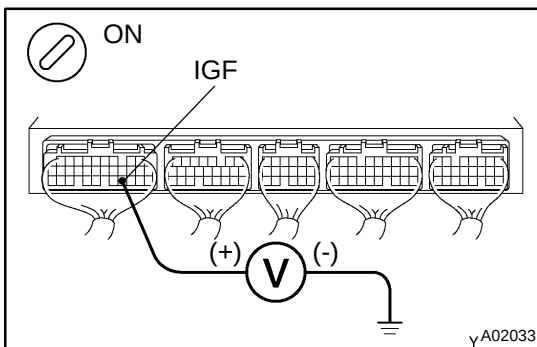
NG

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:**

- (a) Remove the glove compartment (See page [SF-83](#)).
- (b) Disconnect the ignition coil with the igniter connector.
- (c) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 4.5 - 5.5 V

OK

Replace ignition coil with igniter.

NG

Check and replace ECM (See page [IN-30](#)).

4

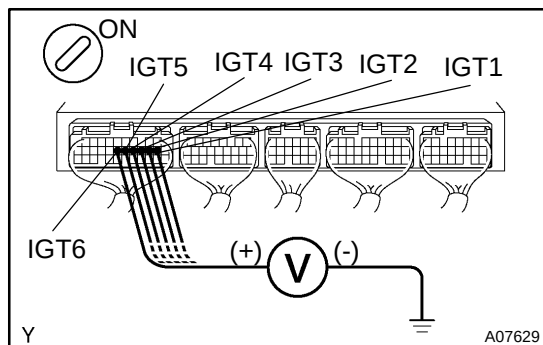
Check for open and short in harness and connector in IGT signal circuit between ECM and ignition coil with igniter (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

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



PREPARATION:

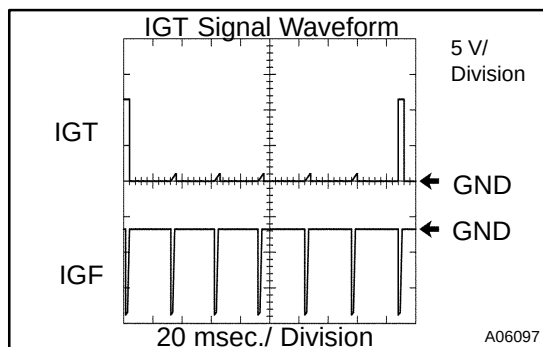
- Remove the glove compartment (See page [SF-83](#)).
- Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: More than 0.1 V and less than 4.5 V



Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

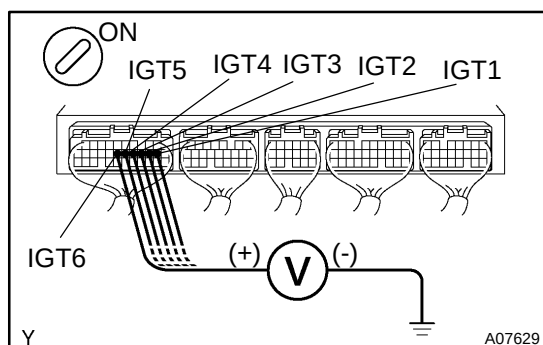
Correct waveform appears as shown, with rectangle waves.

NG

Check and replace ECM (See page [IN-30](#)).

OK

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



PREPARATION:

- Remove the glove compartment (See page [SF-83](#)).
- Disconnect the ignition coil with the igniter connector.
- Turn the ignition switch ON.

CHECK:

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

OK:

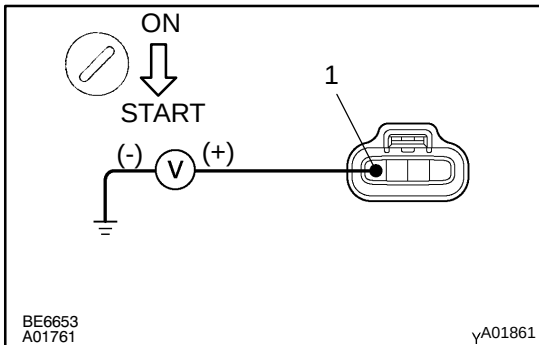
Voltage: More than 0.1 V and less than 4.5 V

NG

Check and replace ECM (See page [IN-30](#)).

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 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

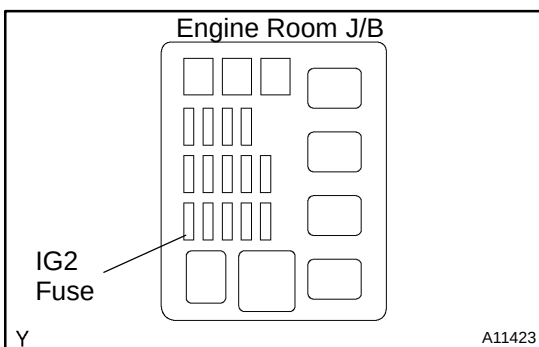
8 Check for open and short in harness and connector between ignition switch and ignition coil with igniter (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

9 Check IG2 fuse.



PREPARATION:

Remove the IG2 fuse from the engine room J/B.

CHECK:

Check the continuity of the IG2 fuse.

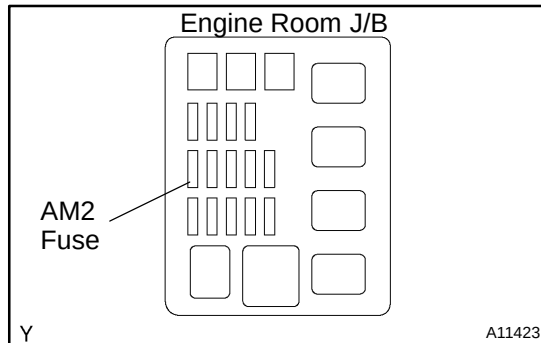
OK:

Continuity

NG

Check for short in all harness and components connected to IG2 fuse.

OK

10 Check AM2 fuse.**PREPARATION:**

Remove the AM2 fuse from the engine room J/B.

CHECK:

Check the continuity of the AM2 fuse.

OK:**Continuity****NG**

Check for short in all harness and components connected to AM2 fuse.

OK**11 Check ignition relay (Marking: IG2) (See page [IG-10](#)).****NG**

Replace ignition relay.

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

DTC	P1345	VVT Sensor/Camshaft Position Sensor Circuit Malfunction (Bank 1)

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
P1345 P1350	No VVT sensor (Camshaft position sensor) signal to ECM during cranking at 4 sec. or more	●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

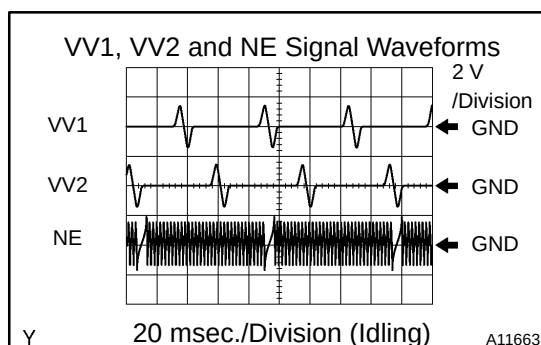
Refer to DTC P0335 on page [DI-67](#) .

INSPECTION PROCEDURE

HINT:

- If DTC P1345 is displayed, check left bank VVT sensor (camshaft position sensor).
- If DTC P1350 is displayed, check right bank VVT sensor (camshaft position sensor).
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check resistance of 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-30).

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-30).

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

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

CIRCUIT DESCRIPTION

Refer to DTC P1345, P1350 on page [DI-124](#) .

DTC No.	DTC Detection Condition	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 P1345, P1350 on page [DI-124](#) .

INSPECTION PROCEDURE

HINT:

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

1	Check 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-30](#)).

DTC	P1349	VVT System Malfunction (Bank 1)

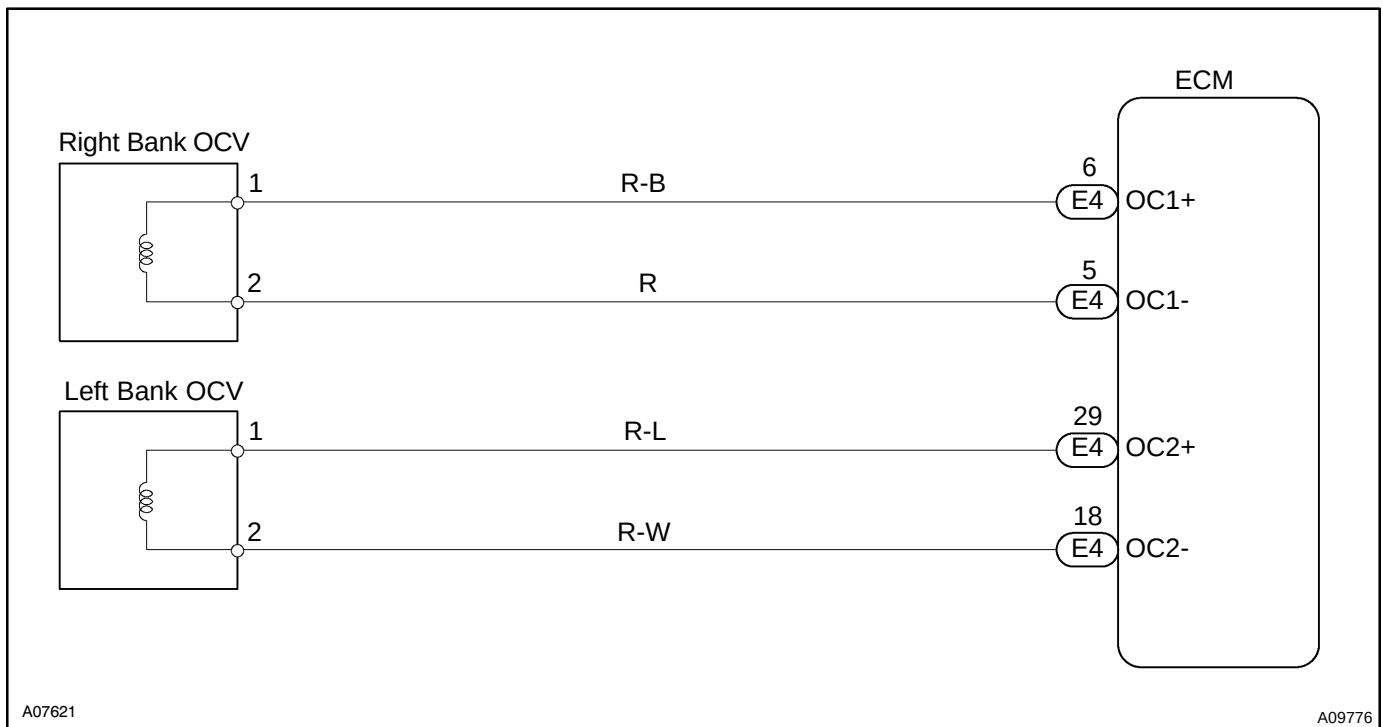
DTC	P1354	VVT System Malfunction (Bank 2)

CIRCUIT DESCRIPTION

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

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

TOYOTA 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 TOYOTA hand-held tester and select the VVT from the ACTIVE TEST menu.

CHECK:

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

OK:

OCV is OFF: Normal engine speed

OCV is ON: Rough idle or engine stall

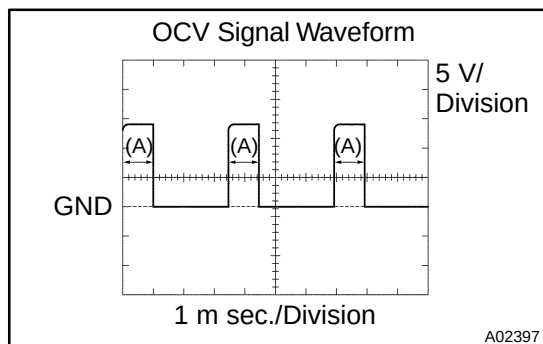
OK

VVT system is OK.*

*: DTCs P1349 and P1354 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As ECM controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

3	Check voltage between terminals OCV+ and OCV- of 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.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG

Check and replace ECM (See page [IN-30](#)).

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-51](#)).

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 simulation test.

CHECK:

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

OK:

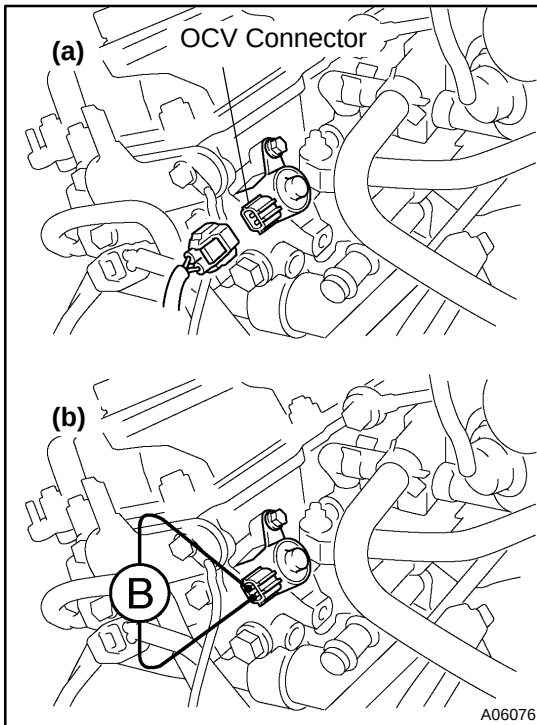
DTC P1349/P1354 is not stored.

OK**VVT system is OK.***

*: DTCs P1349 and P1354 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As ECM controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG**Replace ECM****OBD II scan tool (excluding TOYOTA 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 when applying battery positive voltage between the terminals of the OCV.

RESULT:

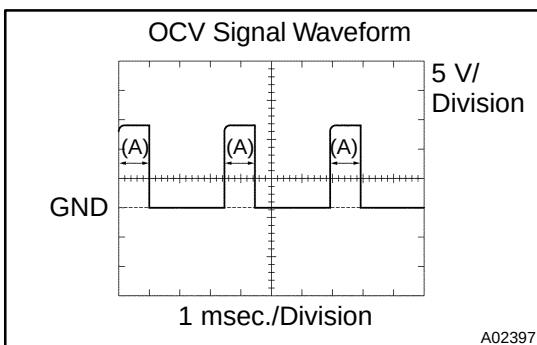
Result	Check (a)	Check (b)
1	Normal engine speed	Rough idle or engine stall
2	Except 1	

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

OK

VVT system is OK.*

*: DTCs P1349 and P1354 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As ECM controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Check and replace ECM (See page [IN-30](#)).

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-51](#)).

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

NG**Replace ECM.**

DTC	P1520	Stop Light Switch Signal Malfunction

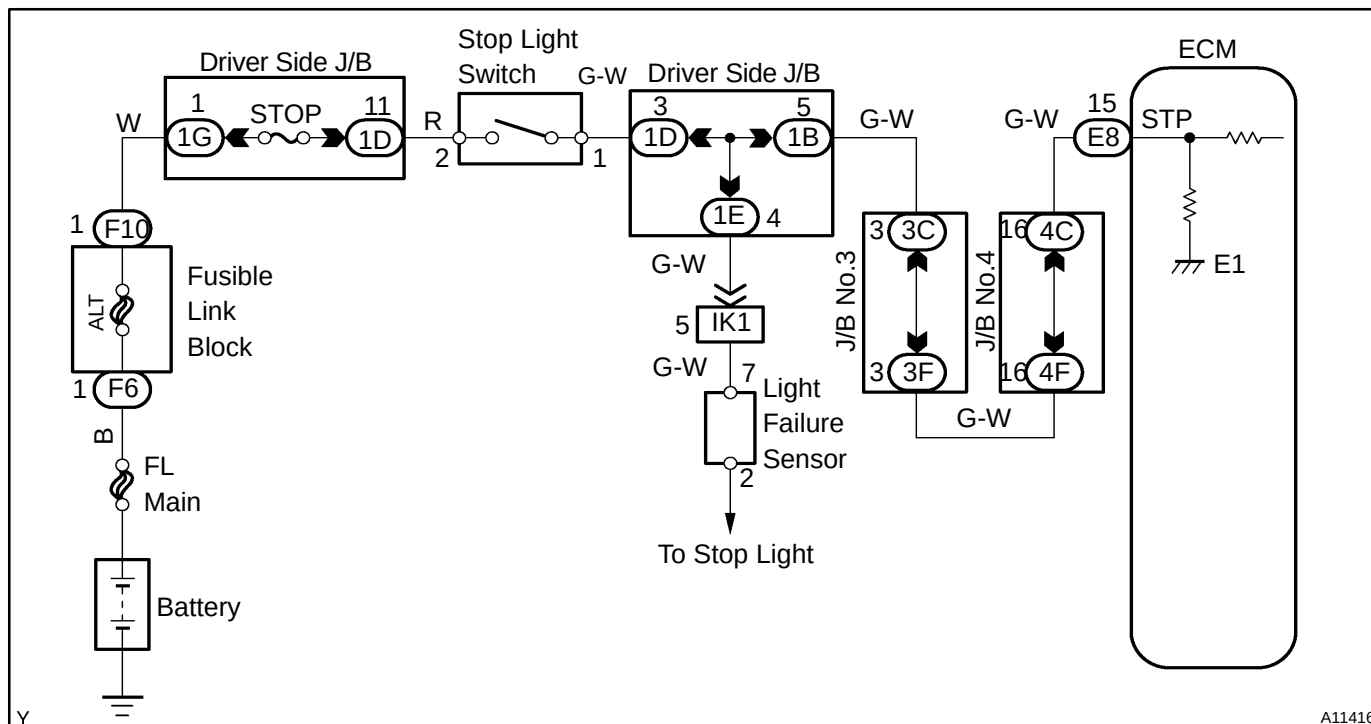
CIRCUIT DESCRIPTION

This signal is used to detect when the brakes have been applied. The STP signal voltage is the same as the voltage supplied to the stop lights.

The STP signal is used mainly to control the fuel cut-off engine speed (The fuel cut-off engine speed is reduced slightly when the vehicle is braking.).

DTC No.	DTC Detecting Condition	Trouble Area
P1520	Stop light switch does not turn off when repeating driving at 30 km or more 10 time or more after depressing brake (2 trip detection logic)	•Short in stop light switch signal circuit •Stop light switch •ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	Check operation of stop light.

CHECK:

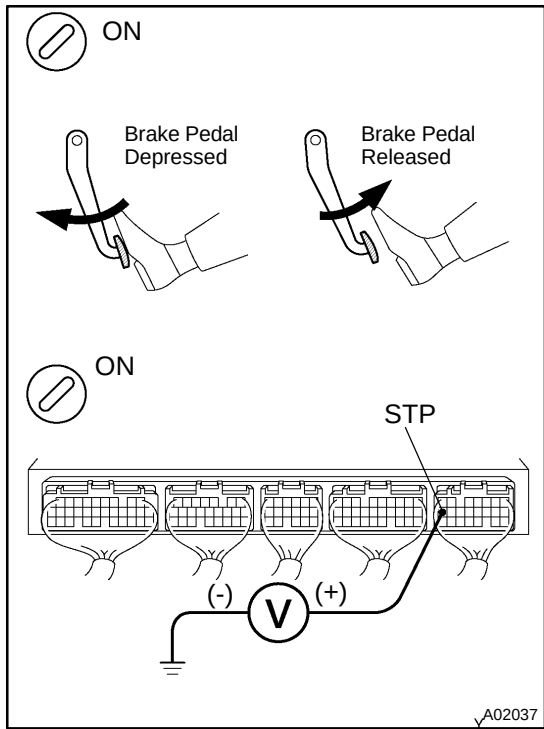
Check if the stop lights go on and off normally when the brake pedal is operated and released.

NG

Check and repair stop light circuit.

OK

2 Check STP signal.



When using TOYOTA hand-held tester:

PREPARATION:

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

CHECK:

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

OK:

Brake Pedal	STP Signal
Depressed	ON
Released	OFF

When not using TOYOTA hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

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

OK:

Brake Pedal	Voltage
Depressed	7.5 - 14 V
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-30).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-30).

DTC	P1600	ECM BATT Malfunction

CIRCUIT DESCRIPTION

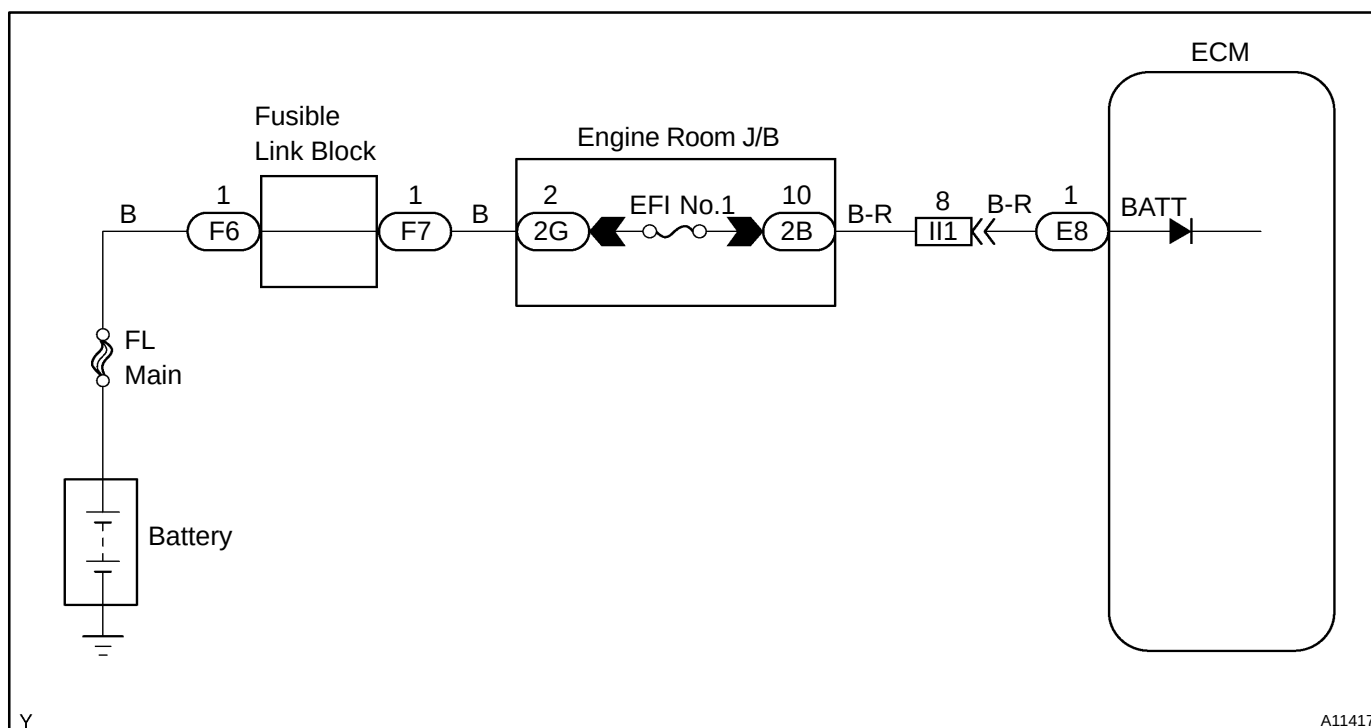
Battery positive voltage is supplied to terminal BATT of the ECM even when the ignition switch is OFF for use by the DTC memory and air-fuel ratio adaptive control value memory, etc.

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

HINT:

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

WIRING DIAGRAM

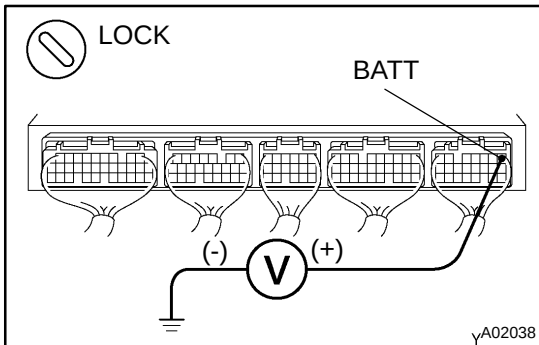


INSPECTION PROCEDURE

HINT:

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

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



PREPARATION:

Remove the glove compartment (See page [SF-82](#)).

CHECK:

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

OK:

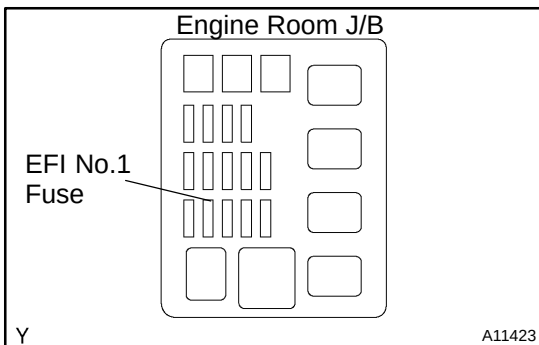
Voltage: 9 - 14 V

OK

Check and replace ECM (See page [IN-30](#)).

NG

2 Check EFI No.1 fuse.



PREPARATION:

Remove the EFI No.1 fuse from the engine room J/B.

CHECK:

Check the continuity of the EFI No.1 fuse.

OK:

Continuity

NG

Check for short in all harness and components connected to EFI No.1 fuse.

OK

Check and repair harness or connector between battery and EFI No.1 fuse, and EFI No.1 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-127](#) .

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-127](#) .

INSPECTION PROCEDURE

HINT:

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

TOYOTA hand-held tester:

1	Check OCV circuit.

PREPARATION:

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

CHECK:

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

OK:

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

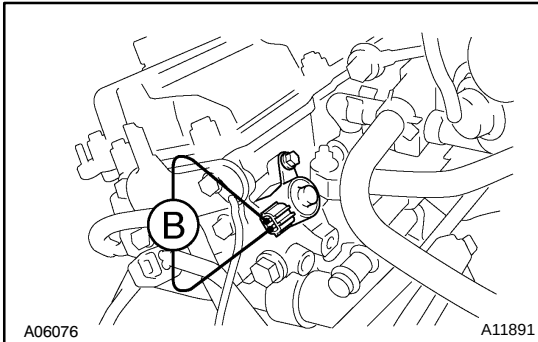
VVT system is ON (OCV is ON): Rough idle or engine stalled

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-127](#) , step 3).

NG

Check and replace ECM (See page [IN-30](#)).

OK

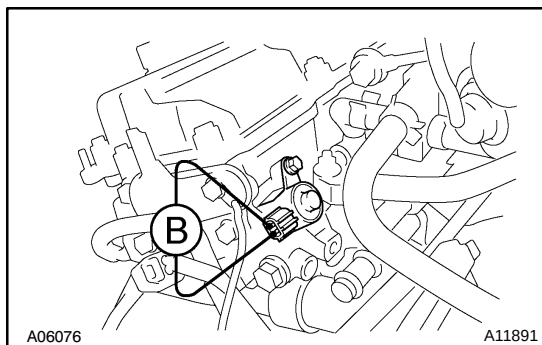
4 Check for open and short in harness and connector between OCV and ECM (See page [IN-30](#)).

NG

Repair or replace.

OK

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

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

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

CHECK:

Check the engine speed.

OK:

Rough idle or engine stalled

NG

Replace OCV.

OK

2 Check voltage between terminals OCV+ and OCV- of ECM connector (See page [DI-127](#) , step 3).

NG

Check and replace ECM (See page [IN-30](#)).

OK

3 Check for open and short in harness and connector between OCV and ECM (See page [IN-30](#)).

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

DTC No.	DTC Detecting Condition	Trouble Area
P1780	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	●Short in park/neutral position switch circuit ●Park/neutral position switch ●ECM

HINT:

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

WIRING DIAGRAM

Refer to DTC P1780 on page [DI-199](#) .

INSPECTION PROCEDURE

Refer to DTC P1780 on page [DI-199](#) .

HINT:

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

DTC	P0171	System too Lean (Fuel Trim)

DTC	P0172	System too Rich (Fuel Trim)

DTC	P0174	System too Lean (A/F Lean Malfunction, Bank2)

DTC	P0175	System too Rich (Bank2)

CIRCUIT DESCRIPTION

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

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

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

Long-term fuel trim compensates the deviation from the central value of the short-term fuel trim stored up by each engine tolerance, and the deviation from the central value due to the passage of time and changes of using environment.

If both the short-term fuel trim and long-term fuel trim exceed a certain value, it is detected as a malfunction and the 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 the 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 comes on.
- If the total of the short-term fuel trim value and the long-term fuel trim value is within $\pm 35\%$ (80°C (176°F) or more), the system is functioning normally.
- The A/F sensors (bank 1, 2 sensor 1) output voltage and the short-term fuel trim value can be read using the OBD II scan tool or hand-held tester.
- The ECM controls the voltage of AFR+, AFL+, AFR- and AFL- terminals of ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or hand-held tester.
- OBD II scan tool (excluding hand-held tester) displays the one fifth of the A/F sensors (bank 1, 2 sensor 1) output voltage which is displayed on the hand-held tester.

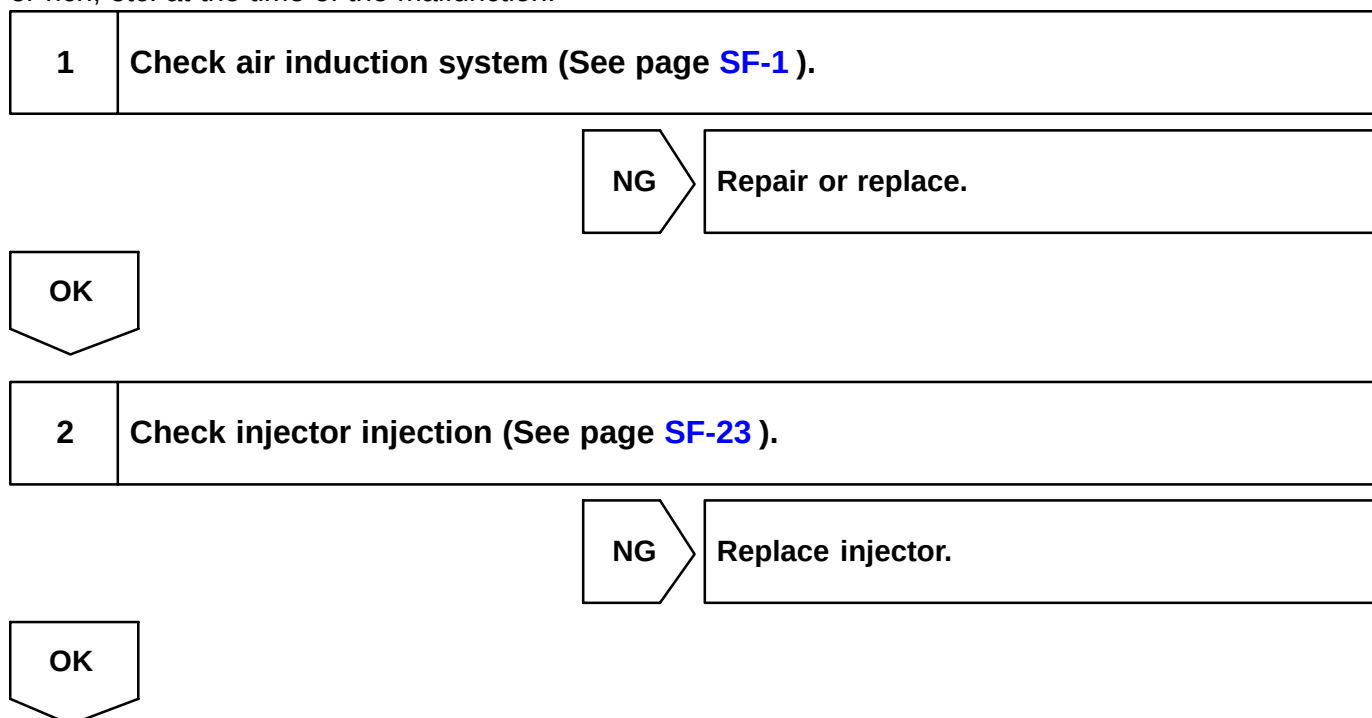
WIRING DIAGRAM

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

INSPECTION PROCEDURE

HINT:

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



3	Check mass air flow meter (See page SF-31) and engine coolant temperature sensor (See page SF-73).

NG	Repair or replace.

OK

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

NG	Repair or replace.

OK

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

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

OK

6	Check gas leakage on exhaust system.

NG	Repair or replace.

OK

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

PREPARATION:

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

CHECK:

Read the voltage value of the A/F sensor on the screen of OBDII scan tool or TOYOTA 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 TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25mph) or more, and operate throttle valve open and close	

HINT:

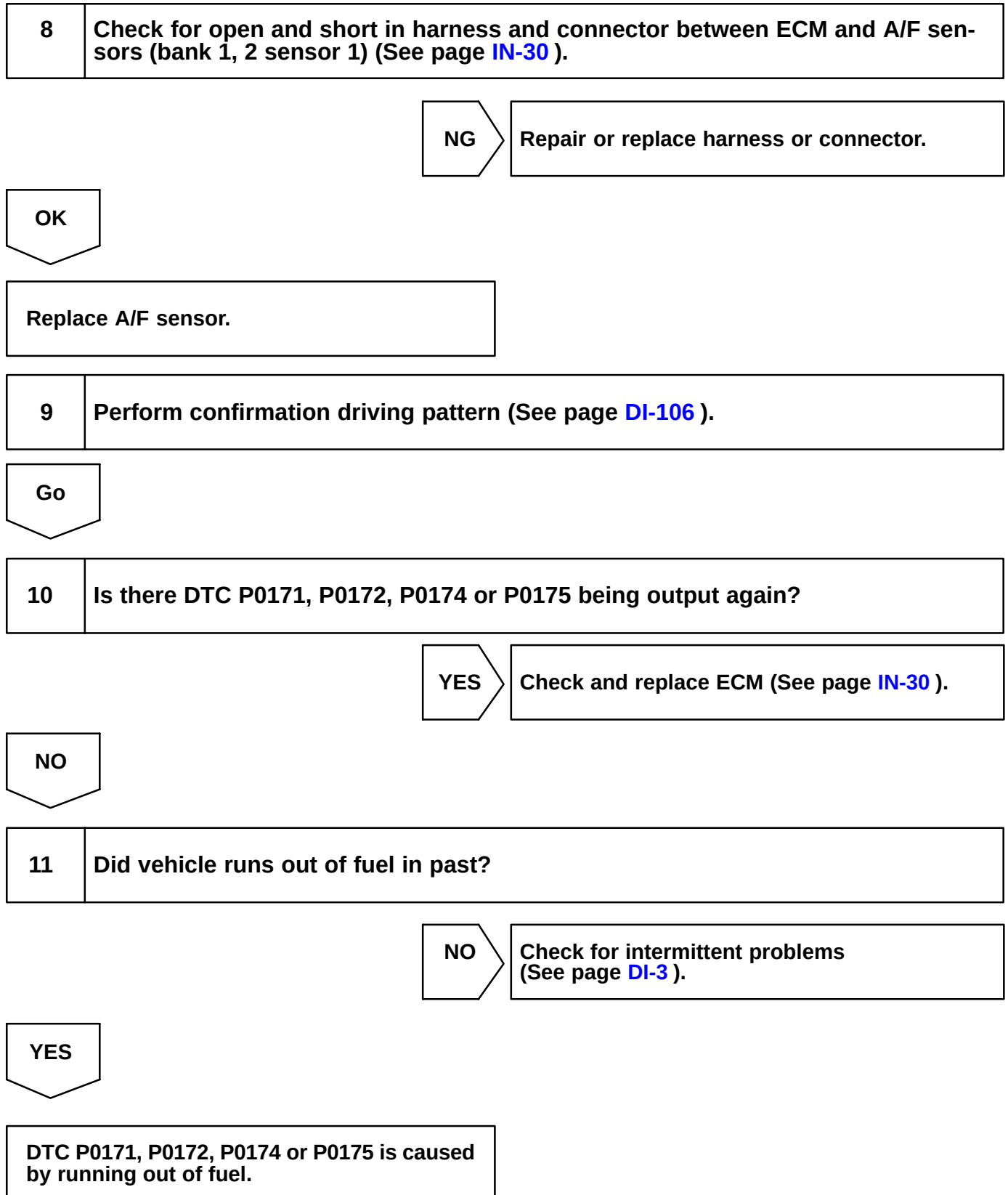
- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V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

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

OK

Go to step 9.

NG

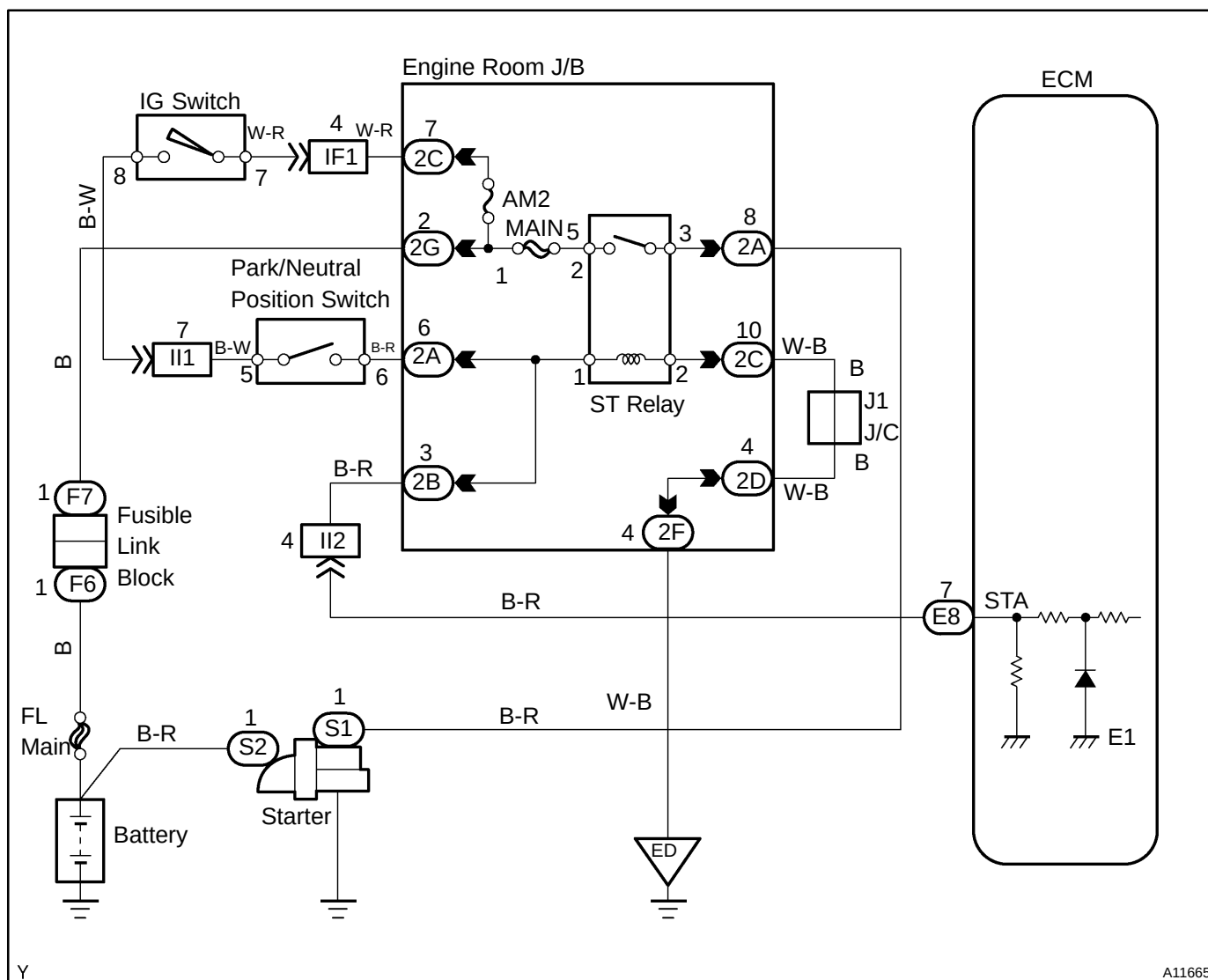


Starter Signal Circuit

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 on page [DI-22](#).

TOYOTA hand-held tester:

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

PREPARATION:

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

CHECK:

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

OK:

Ignition Switch Position	ON	START
STA Signal	OFF	ON

OK

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

NG

2	Check for open in harness and connector between ECM and starter relay (Marking: ST) (See page IN-30).

NG

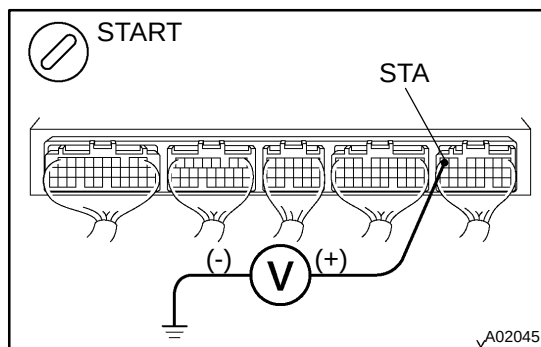
Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

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

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

**PREPARATION:**

Remove the glove compartment (See page [SF-83](#)).

CHECK:

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

OK:

Voltage: 6 V or more

OK

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

NG

2	Check for open in harness and connector between ECM and starter relay (Marking: ST) (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ECM (See page [IN-30](#)).

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's
Name

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

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

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

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

DIAGNOSTIC TROUBLE CODE CHART

HINT:

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

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

SAE CONTROLLED

DTC No. (See page)	Detection Item	Trouble Area	MIL*1	Memory
P0100 (DI-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 into 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 ☐ Cooling system ☐ Engine coolant temp. sensor ☐ ECM		
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		

DIAGNOSTICS - ENGINE

P0171 (DI-53)	System too Lean (Fuel Trim)	☐ Air induction system ☐ Injector blockage ☐ Mass air flow meter ☐ Engine coolant temp. sensor ☐ Fuel pressure ☐ Gas leakage on exhaust system ☐ Open or short in A/F sensor (bank 1, 2 sensor 1) circuit ☐ A/F sensor (bank 1, 2 sensor 1) ☐ ECM	○	○
P0172 (DI-53)	System too Rich (Fuel Trim)	☐ Injector leak, blockage ☐ Mass air flow meter ☐ Engine coolant temp. sensor ☐ Ignition system ☐ Fuel pressure ☐ Gas leakage on exhaust system ☐ Open or short in A/F sensor (bank 1, 2 sensor 1) circuit ☐ A/F sensor (bank 1, 2 sensor 1) ☐ ECM	○	○
P0174 (DI-53)	System too Lean (A/F Lean Malfunction)	☐ Same as DTC P0171	○	○
P0175 (DI-53)	System too Rich (A/F Rich Malfunction)	☐ Same as DTC 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 leakage 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-80)	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-80)	Evaporative Emission Control System Vent Control Malfunction	☐ Same as DTC No. P0441	○	○
P0450 (DI-97)	Evaporative Emission Control System Pressure Sensor Malfunction	☐ Open or short in vapor pressure sensor circuit ☐ Vapor pressure sensor	○	○
P0451 (DI-97)	Evaporative Emission Control System Pressure Sensor Range/Performance	☐ ECM		
P0500 (DI-99)	Vehicle Speed Sensor Malfunction	☐ Combination meter ☐ Open or short in speed sensor circuit ☐ ECM	○	○
P0505 (DI-102)	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-106)	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-111)	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-115)	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-106)	A/F Sensor Circuit Range/Performance Malfunction (Bank 2 Sensor 1)	☐ Same as DTC No. P1130	○	○
P1153 (DI-111)	A/F Sensor Circuit Response Malfunction (Bank 2 Sensor 1)	☐ Same as DTC No. P1133	○	○
P1155 (DI-115)	A/F Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	☐ Same as DTC No. P1135	○	○
P1300 (DI-117)	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-117)	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-117)	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-117)	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-117)	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-117)	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-123)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	☐ Open or short in crankshaft position sensor circuit ☐ Crankshaft position sensor ☐ Camshaft timing gear ☐ ECM	-	○
P1345 (DI-111)	VVT Sensor/Camshaft position Sensor Circuit Malfunction (Bank 1)	☐ Open or short in VVT sensor (camshaft position Sensor) circuit ☐ VVT sensor (camshaft position Sensor) ☐ ECM	○	○
P1346 (DI-126)	VVT Sensor/Camshaft position Sensor Circuit Range/Performance Problem (Bank 1)	☐ Mechanical system (Jumping teeth of timing belt, belt stretched) ☐ ECM	○	○
P1349 (DI-127)	VVT System Malfunction (Bank 1)	☐ Valve timing ☐ OCV ☐ VVT controller assembly ☐ ECM	○	○
P1350 (DI-124)	VVT Sensor/Camshaft position Sensor Circuit Malfunction (Bank 2)	☐ Same as DTC No. P1345	○	○
P1351 (DI-126)	VVT Sensor/Camshaft position Sensor Circuit Range/Performance Problem (Bank 2)	☐ Same as DTC No. P1346	○	○
P1354 (DI-127)	VVT System Malfunction (Bank 2)	☐ Same as DTC No. P1349	○	○
P1520 (DI-134)	Stop Light Switch Signal Malfunction	☐ Short in stop light switch signal circuit ☐ Stop light switch ☐ ECM	○	○
P1600 (DI-136)	ECM BATT Malfunction	☐ Open in back up power source circuit ☐ ECM	○	○
P1656 (DI-138)	OCV Circuit Malfunction (Bank 1)	☐ Open or short in OCV circuit ☐ OCV ☐ ECM	○	○
P1663 (DI-138)	OCV Circuit Malfunction (Bank 2)			
P1780 (DI-141)	Park/Neutral Position Switch Malfunction	☐ Short in park/neutral position switch circuit ☐ Park/neutral position switch ☐ ECM	○	○
B2795 (DI-605)	Unmatched Key Code	☐ Immobiliser system	-	○
B2796 (DI-606)	No Communication in Immobiliser System	☐ Immobiliser system	-	○
B2797 (DI-609)	Communication Malfunction No.1	☐ Immobiliser system	-	○

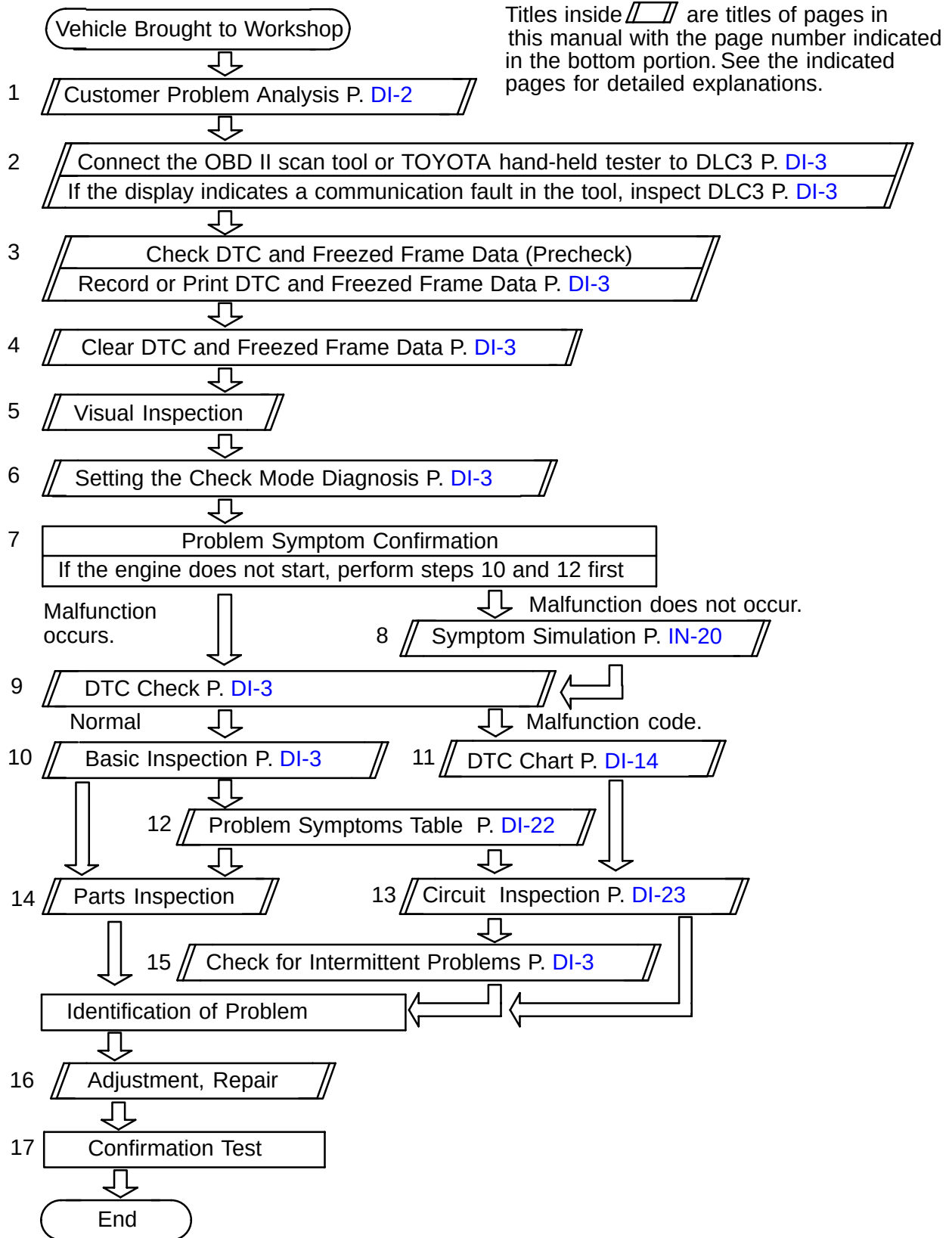
*: ○ ≡≡≡ MIL lights up. - ≡≡≡ MIL does not light up.

ENGINE

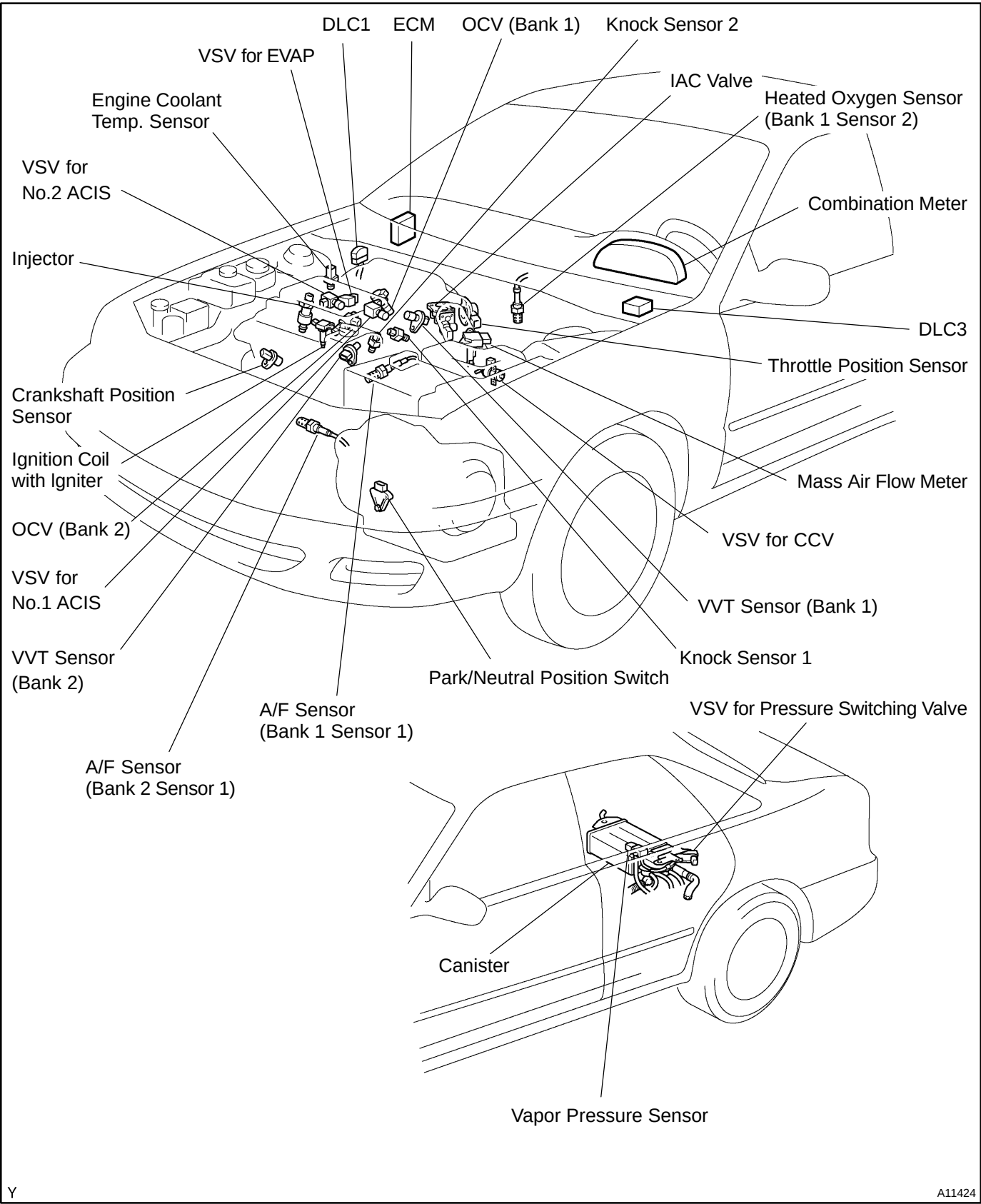
HOW TO PROCEED WITH TROUBLESHOOTING

DI078-07

Troubleshoot in accordance with the procedure on the following page.



PARTS LOCATION



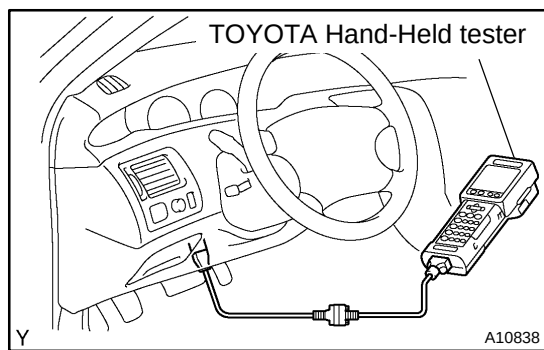
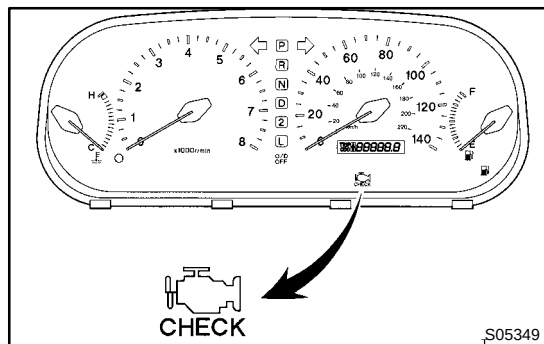
PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

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

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



- To check the DTC, connect the OBD II scan tool or TOYOTA hand-held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD II scan tool or TOYOTA hand-held tester also enables you to erase the DTC and check frozen 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 normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTC use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily (TOYOTA hand-held tester only). (See step 2)
- *2 trip detection logic:
When a malfunction is 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 trip and 2nd trip.).

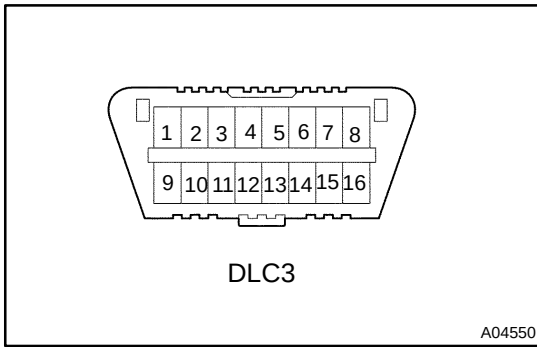
- Freeze frame data:
Freeze frame data records the engine condition when a misfire (DTCs P0300 - P0306) or fuel trim malfunction (DTCs P0171 and P0172) or other malfunction (first malfunction only), is detected. Because freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine 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 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.

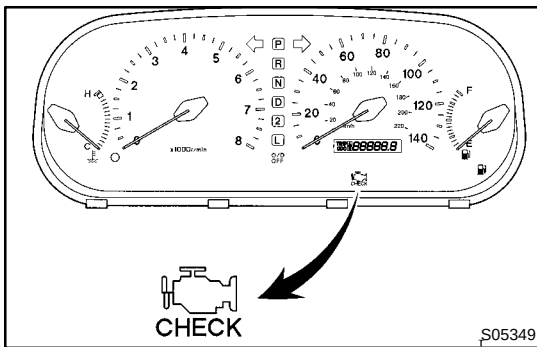
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

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

HINT:

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

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

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

(a) Check the MIL.

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

HINT:

If the MIL does not light up, troubleshoot the combination meter (See page [BE-53](#)).

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

(b) Check the DTC.

NOTICE:

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

- **TOYOTA hand-held tester only:**
When the diagnosis system is switched from the normal mode to the check mode, it erases all DTC and freezed frame data recorded in the normal mode. So before switching modes, always check the DTC and freezed frame data, and note them down.
 - (1) Prepare the OBD II scan tool (complying with SAE J 1978) or TOYOTA hand-held tester.
 - (2) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3 at the lower center of the instrument panel.
 - (3) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester switch ON.
 - (4) Use the OBD II scan tool or TOYOTA hand-held tester to check the DTC and freezed frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book.).
 If there is no DTC in the normal mode, check the 1st trip DTC using Continuous Test Results function (Mode 7 for SAE J1979) on the 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 TOYOTA 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 the 1st time. Then repeat the simulation process again. When the problem has been simulated twice, the MIL lights up and the DTCs are recorded in the ECM.**
 - **Check the 1st trip DTC using Mode 7 (Continuous Test Results) for SAE J1979.**
- (c) Clear the DTC.
- The DTCs and freezed frame data will be erased by either action.
- Operating the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
 - Disconnecting the battery terminals or EFI fuse.

NOTICE:

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

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

TOYOTA hand-held tester only:

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

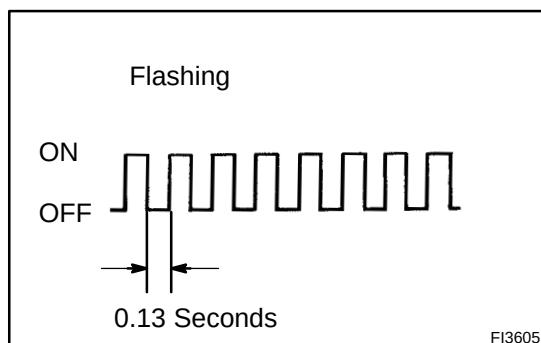
Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

Check the DTC.

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

NOTICE:

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



- (7) Start the engine (The MIL goes out after the engine start.).
- (8) Simulate the conditions of the malfunction described by the customer.

NOTICE:

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

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

HINT:

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

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

4. FAIL-SAFE CHART

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

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0100	Ignition timing fixed at 10° BTDC	Returned to normal condition
P0110	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
P0115	Engine coolant temp. is fixed at 80°C (176°F)	Returned to normal condition
P0120	VTA is fixed at 0°	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

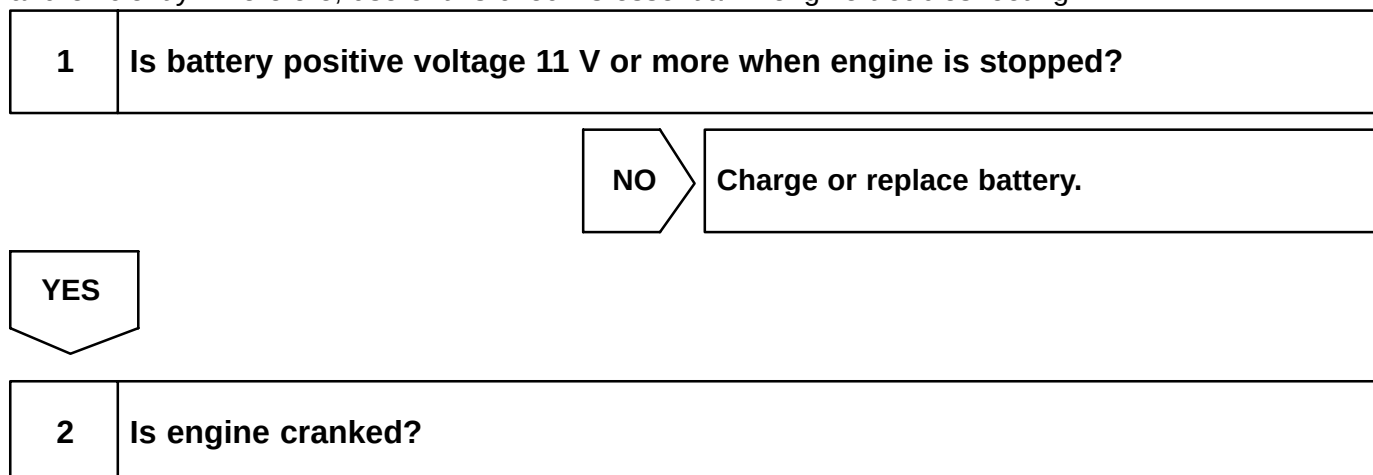
TOYOTA hand-held tester only:

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

- (1) Clear the DTC (See step 2).
- (2) Set the check mode (See step 3).
- (3) Perform a simulation test (See page [IN-20](#)).
- (4) Check the connector and terminal (See page [IN-30](#)).
- (5) Handle the connector (See page [IN-30](#)).

6. BASIC INSPECTION

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



NO

Proceed to page [ST-18](#) , and continue to trouble-shoot.

YES

3

Does engine start?

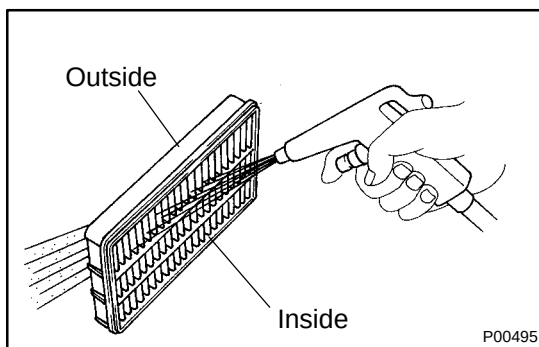
NO

Go to step 7.

YES

4

Check air filter.

**PREPARATION:**

Remove the air filter.

CHECK:

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

HINT:

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

NG

Repair or replace.

OK

5

Check idle speed.

PREPARATION:

- Warm up the engine to 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 TOYOTA hand-held tester to the DLC3 on the vehicle.

CHECK:

Use the CURRENT DATA to check the idle speed.

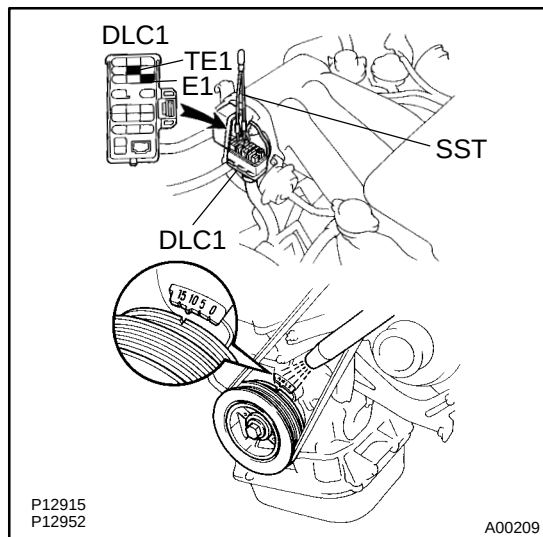
OK:

Idle speed: 650 - 750 rpm

NG

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

OK

6 Check ignition timing.**PREPARATION:**

- Warm up engine to 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.

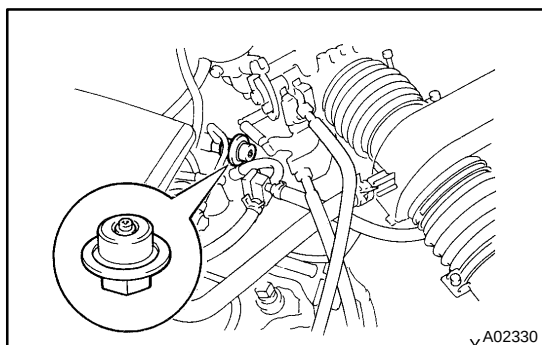
OK:

Ignition timing: 10° BTDC at idle

NG

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

OK

Proceed to problem symptoms table on page **DI-22** .**7 Check fuel pressure.****PREPARATION:**

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

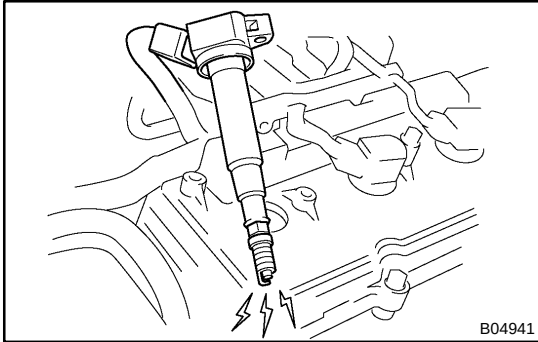
CHECK:

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

NG

Proceed to page **SF-6** , and continue to trouble-shoot.

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

NG

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

OK

Proceed to problem symptoms table on page **DI-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 varies differ from those listed here. So do not decide whether a part is faulty or not solely according to the "Normal Condition" here.

(a) CARB mandated signals.

TOYOTA hand-held tester display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1 OPEN: Air-fuel ratio feedback stopped CLOSED: Air-fuel ratio feedback operating	Idling after warming up: CLOSED
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	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0 %, 5 V → 100 %	Throttle valve fully closed: 7 - 11 % Throttle valve fully open: 65 - 75 %
O2FT B1 S1	Oxygen Sensor Fuel Trim Bank 1 Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2S B1 S2	Voltage Output of Oxygen Sensor Bank 1 Sensor 2	Driving 50 km/h (31 mph): 0.05 - 0.95 V
O2FT B2 S1	Oxygen Sensor Fuel Trim Bank 2 Sensor 1 (Same as SHORT FT #2)	0 ± 20 %
A/FS B1 S1	Voltage Output of A/F Sensor Bank 1 Sensor 1	Idling: 2.8 - 3.8 V
A/FS B2 S1	Voltage Output of A/F Sensor Bank 2 Sensor 1	Idling: 2.8 - 3.8 V
A/FFT B1 S1	A/F Sensor Fuel Trim Bank 1 Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
A/FFT B2 S1	A/F Sensor Fuel Trim Bank 2 Sensor 1 (Same as SHORT FT #1)	0 ± 20 %

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

(b) TOYOTA Enhanced Signals.

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

DIAGNOSTICS - ENGINE

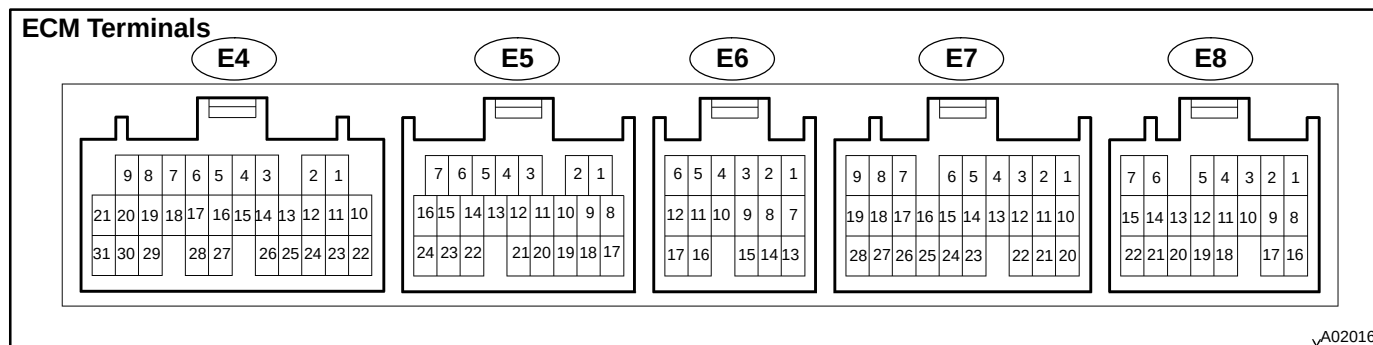
EVAP (PURGE) VSV	EVAP VSV Signal	VSV operating: Above 30 %
VAPOR PRESS VSV	Vapor Pressure VSV Signal	VSV operating: ON
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.8 - 1.2
TOTAL FT B2	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 2	Idling: 0.8 - 1.2

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

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	15.Starter 16.Starter relay	ST-18 ST-20
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	DI-148 DI-152 IN-30
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-142 DI-152 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-142 DI-152
Hot engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-142 DI-152
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	DI-824 DI-148
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	DI-824 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-158
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-824 IN-30
Unable to refuel/Difficult to refuel	1. ORVR system	EC-6

TERMINALS OF ECM



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E8-1) - E1 (E5-17)	B-R ↔ BR	Always	9 - 14
+B (E8-16) - E1 (E5-17)	B-W ↔ BR	IG switch ON	9 - 14
VC (E5-2) - E2 (E5-18)	L-R ↔ W	IG switch ON	4.5 - 5.5
VTA1 (E5-23) - E2 (E5-18)	LG ↔ W	IG switch ON, Throttle valve fully closed	0.3 - 1.0
		IG switch ON, Throttle valve fully open	2.7 - 5.2
VG (E5-10) - E2G (E5-19)	R ↔ R-B	Idling, A/C switch OFF	1.1 - 1.5
VV1+ (E4-10) - NE- (E5-24)	B-W ↔ L	Idling	Pulse generation (See page DI-124)
VV2+ (E4-22) - NE- (E5-24)	B-W ↔ L		
NE+ (E5-16) - NE- (E5-24)	B-W ↔ L	Idling	Pulse generation (See page DI-124)
OC1+ (E4-6) - OC1- (E4-5)	R-B ↔ R	IG switch ON	Pulse generation (See page DI-127)
OC2+ (E4-29) - OC2- (E4-18)	R-L ↔ R-W		
THA (E5-22) - E2 (E5-18)	L-B ↔ W	Idling, Intake air temp. 20°C (68°F)	0.5 - 3.4
THW (E5-14) - E2 (E5-18)	G-Y ↔ W	Idling, Engine coolant temp. 80°C (176°F)	0.2 - 1.0
STA (E8-7) - E1 (E5-17)	B-R ↔ BR	Cranking	6.0 or more
#10 (E5-5) - E01 (E4-21) #20 (E5-6) - E01 (E4-21) #30 (E4-1) - E01 (E4-21) #40 (E4-2) - E01 (E4-21) #50 (E4-3) - E01 (E4-21) #60 (E4-4) - E01 (E4-21)	L ↔ W-B R ↔ W-B Y ↔ W-B W ↔ W-B G ↔ W-B G ↔ W-B	IG switch ON	9 - 14
IGT1 (E4-11) - E1 (E5-17) IGT2 (E4-12) - E1 (E5-17) IGT3 (E4-13) - E1 (E5-17) IGT4 (E4-14) - E1 (E5-17) IGT5 (E4-15) - E1 (E5-17) IGT6 (E4-16) - E1 (E5-17)	GR ↔ BR B-R ↔ BR LG-B ↔ BR L-Y ↔ BR L ↔ BR LG ↔ BR	Idling	Pulse generation (See page DI-117)
		Idling	Pulse generation (See page DI-117)
IGF (E4-25) - E1 (E5-17)	B-Y ↔ BR	IG switch ON	4.5 - 5.5
		Idling	Pulse generation (See page DI-117)
ACIS (E8-17) - E01 (E4-21)	R-Y ↔ W-B	IG switch ON	9 - 14
ACI1 (E5-15) - E01 (E4-21)	W-R ↔ W-B		
FC (E8-3) - E01 (E4-21)	G-B ↔ W-B	IG switch ON	9 - 14
		Idling	0 - 3.0

DIAGNOSTICS - ENGINE

EVP1 (E5-7) - E01 (E4-21)	B-R ↔ W-B	IG switch ON	9 - 14
CCV (E8-10) - E01 (E4-21)	G ↔ W-B	IG switch ON	9 - 14
RSO (E4-26) - E01 (E4-21)	G-B ↔ W-B	IG switch ON, Disconnect E11 connector from ECM	9 - 14
OXS (E7-8) - E1 (E5-17)	B ↔ BR	Maintain engine speed at 2,500 rpm for 3 min. after warming up	Pulse generation (See page DI-71)
HTS (E7-9) - E03 (E4- 30)	LG ↔ W-B	Idling	Below 3.0
		IG switch ON	9 - 14
KNKR (E4-27) - E1 (E5-17)	W ↔ BR	Idling	Pulse generation (See page DI-64)
KNKL (E4-28) - E1 (E5-17)	W ↔ BR		
NSW (E7-20) - E1 (E5-17)	B-W ↔ BR	IG switch ON, Other shift position in P, N	9 - 14
		IG switch ON, Shift position in P, N	0
TACH (E7-27) - E1 (E5-17)	B ↔ BR	Idling	Pulse generation
TBP (E7-3) - E01 (E4-21)	P-B ↔ W-B	IG switch ON, Disconnect vacuum hose from vapor pressure sensor	9 - 14
PTNK (E8-17) - E2 (E5-18)	P ↔ W	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 (E8-4) - E1 (E5-17)	W ↔ BR	During transmission	Pulse generation
STP (E8-15) - E1 (E5-17)	G-W ↔ BR	IG switch ON, Brake pedal depressed	7.5 - 14
		IG switch ON, Brake pedal released	Below 1.5
AFR+ (E5-11) - E1 (E5-17)	B-R ↔ BR	IG switch ON	3.0 - 3.6
AFL+ (E5-12) - E1 (E5-17)	B-W ↔ BR		
AFR- (E5-20) - E1 (E5-17)	BR ↔ BR	IG switch ON	2.7 - 3.3
AFL- (E5-21) - E1 (E5-17)	L ↔ BR		
HAFR (E5-3) - E04 (E5-1)	B-R ↔ W-B	Idling	Below 3.0
HAFL (E5-4) - E05 (E5-8)	B-R ↔ W-B	IG switch ON	9 - 14
KSW (E7-23) - E1 (E5-17)	R-Y ↔ BR	At time of inserting key	Below 1.5
		In condition without key inserted	4 - 5
CODE (E7-28) - E1 (E5-17)	P-G ↔ BR	At time of inserting key	Pulse generation
IGSW (E8-2) - E1 (E5-17)	B-O ↔ BR	IG switch ON	9 - 14
TXCT (E7-18) - E1 (E5-17)	L-Y ↔ BR	At time of inserting key	Pulse generation
IMLD (E8-22) - E1 (E5-17)	V-W ↔ BR	In condition without key inserted	Pulse generation
MREL (E8-8) - E1 (E5-17)	L-O ↔ BR	IG switch ON	9 - 14

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 No.	DTC Detecting Condition	Trouble Area
B2795/99	No communication	●Key

INSPECTION PROCEDURE

1	Delete DTC and insert all the presently available keys to check whether the engine starts or not.

HINT:

When inserting the key that does not start the engine, DTC (B 2795) is stored in memory.

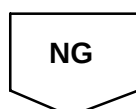
RESULT:

OK	All keys starts the engine.
NG	A specific key does not start the engine.

OK	No problem.

HINT:

If the result is "OK", please confirm whether or not customers have ever inserted the unregistered key or the immobiliser key (with transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.



Register the key that does not start the engine.

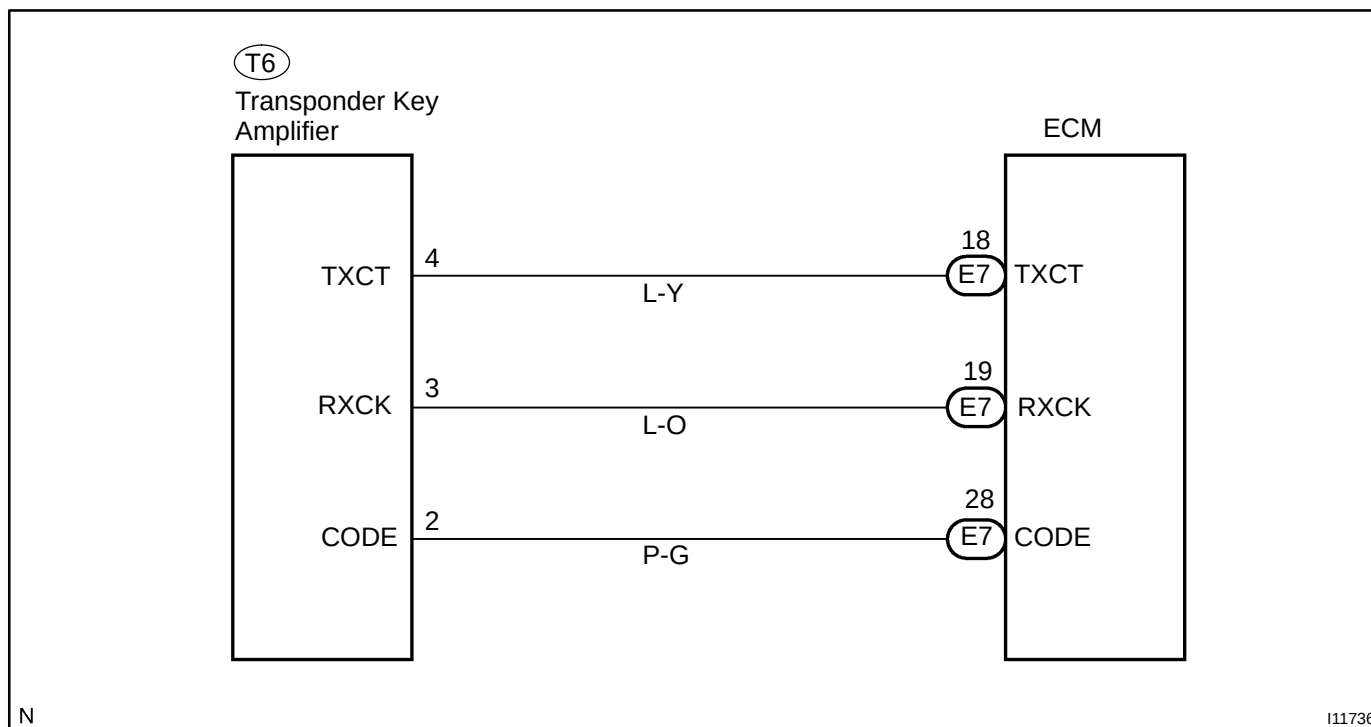
DTC	B2796/99	No Communication in Immobiliser system

CIRCUIT DESCRIPTION

This code is stored in memory when inserting the key that does not have a transponder chip or if communication between the key and ECM is impossible.

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	●Key ●Transponder Key Coil ●Transponder Key Amplifier ●Wire harness ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Delete DTC and insert all the presently available keys to check whether the engine starts or not.

RESULT:

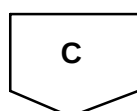
A	All keys start the engine.
B	A specific key does not start the engine. In this case, DTC (B 2796) is stored in memory.
C	All keys do not start the engine. In this case, DTC (B 2796) is stored in memory.

A	No problem at this time.

HINT:

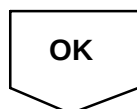
If the result is "A", please confirm whether or not customers have ever inserted the key (without transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

B	The transponder chip of a specific key is defective. Replace the key.



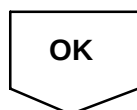
2	Check transponder key coil (See page BE-181).

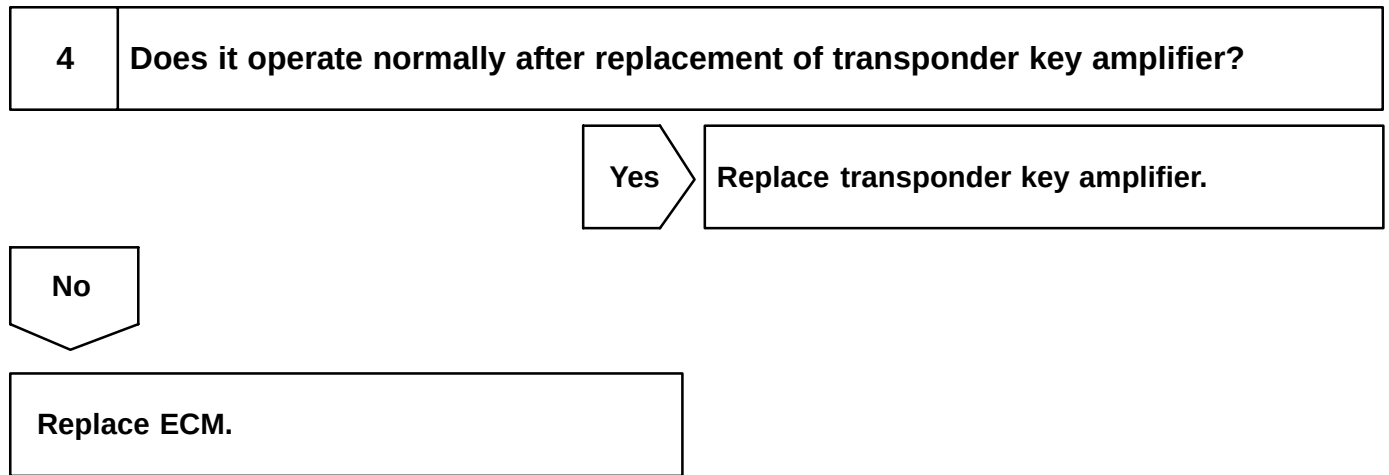
NG	Replace transponder key coil.



3	Check harness and connector between transponder key amplifier and ECM.

NG	Repair or replace harness and connector.





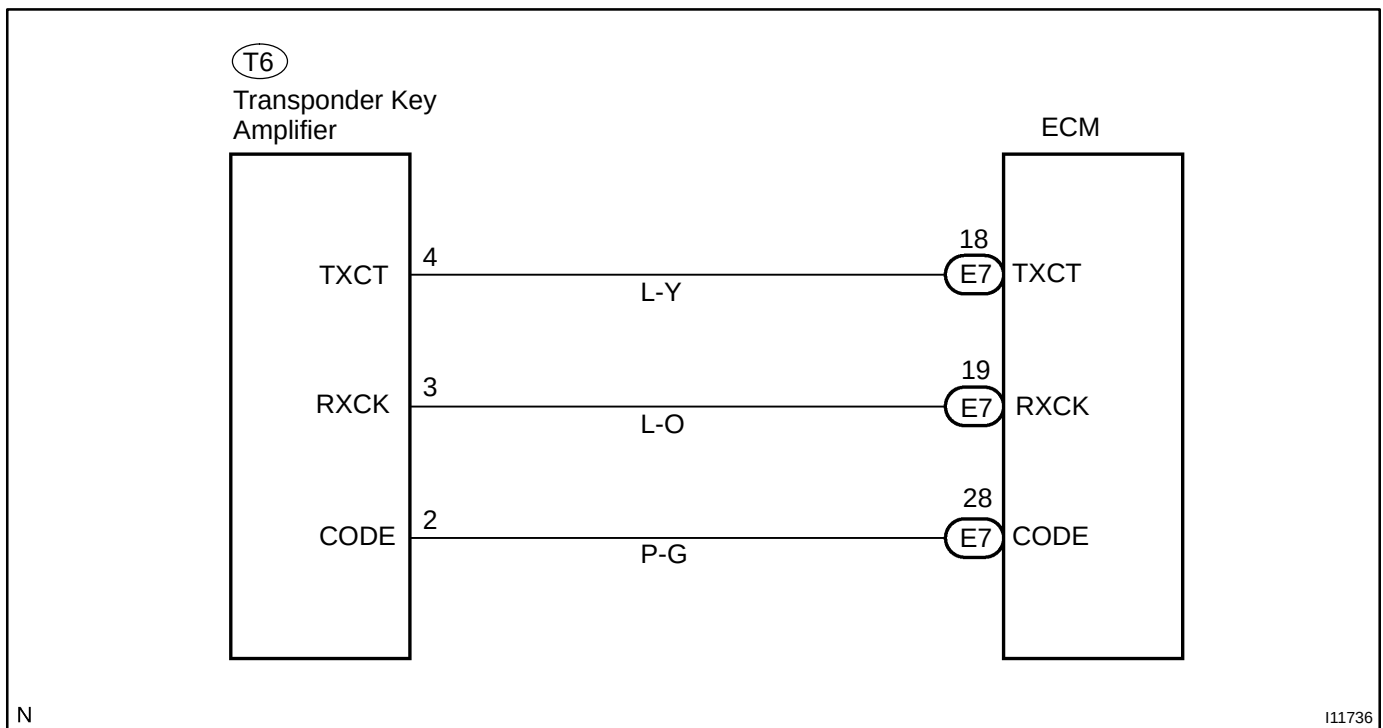
DTC	B2797/99	Communication Malfunction No.1

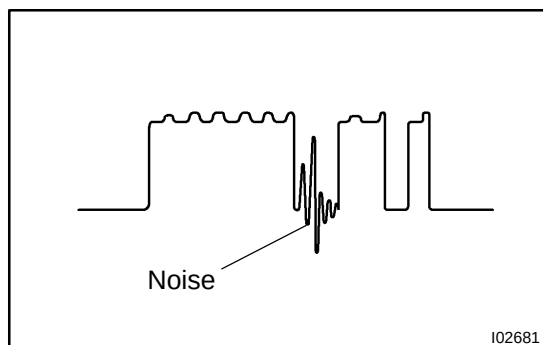
CIRCUIT DESCRIPTION

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 the already registered master key in the key cylinder.

CHECK:

Using an oscilloscope or hand-held tester, check that noise is included in the signals sent to the CODE terminal of Engine and ECT ECU.

OK:

No noise is detected.

NG

Try to find the cause of the noise and remove it.

OK**2 Does the system operate normally after replacement of transponder key amplifier?****Yes**

Replace transponder key amplifier.

No

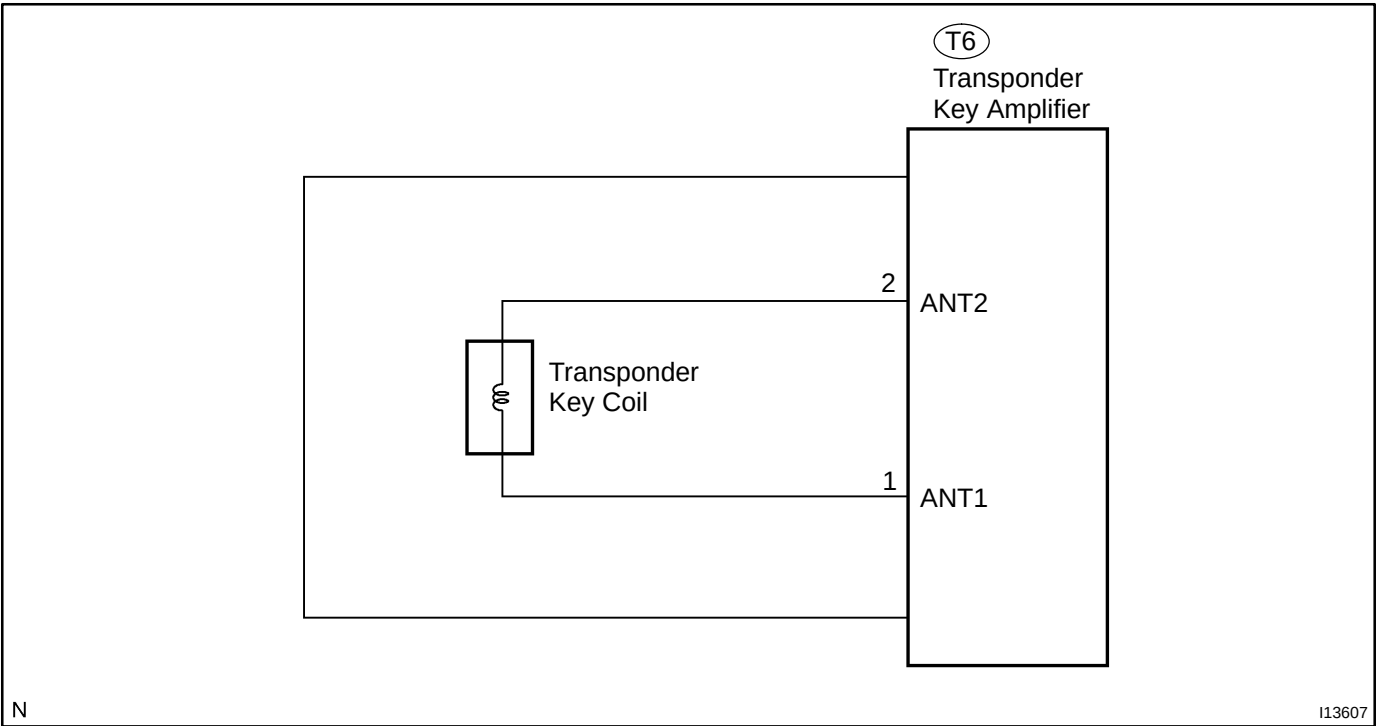
Replace ECM.

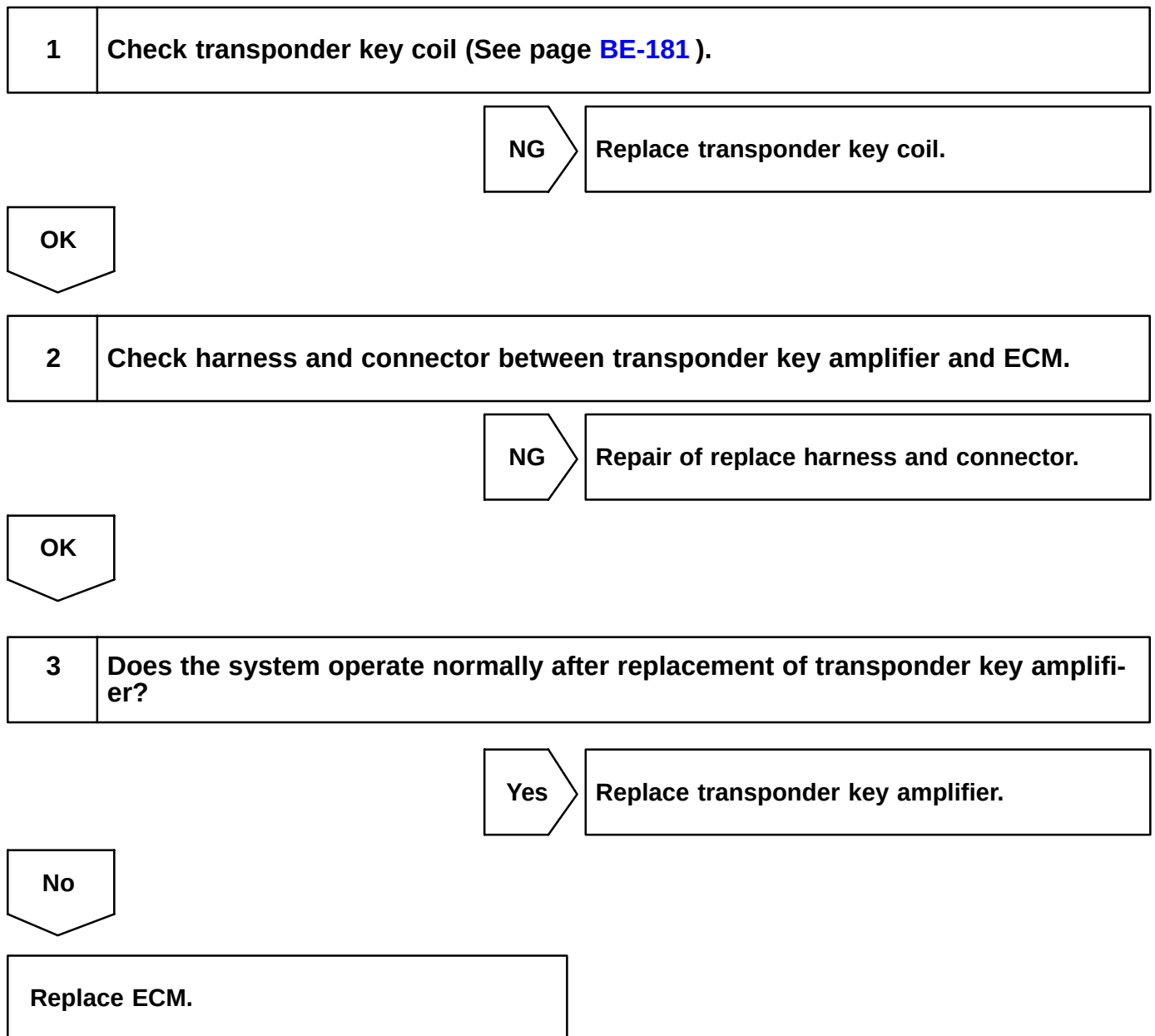
Transponder key coil circuit

CIRCUIT DESCRIPTION

DTC No.	Detection Item	Trouble Area
B2798/99	Communication error	●Key ●Transponder Key Coil ●Transponder Key Amplifier ●Wire harness ●ECM

WIRING DIAGRAM



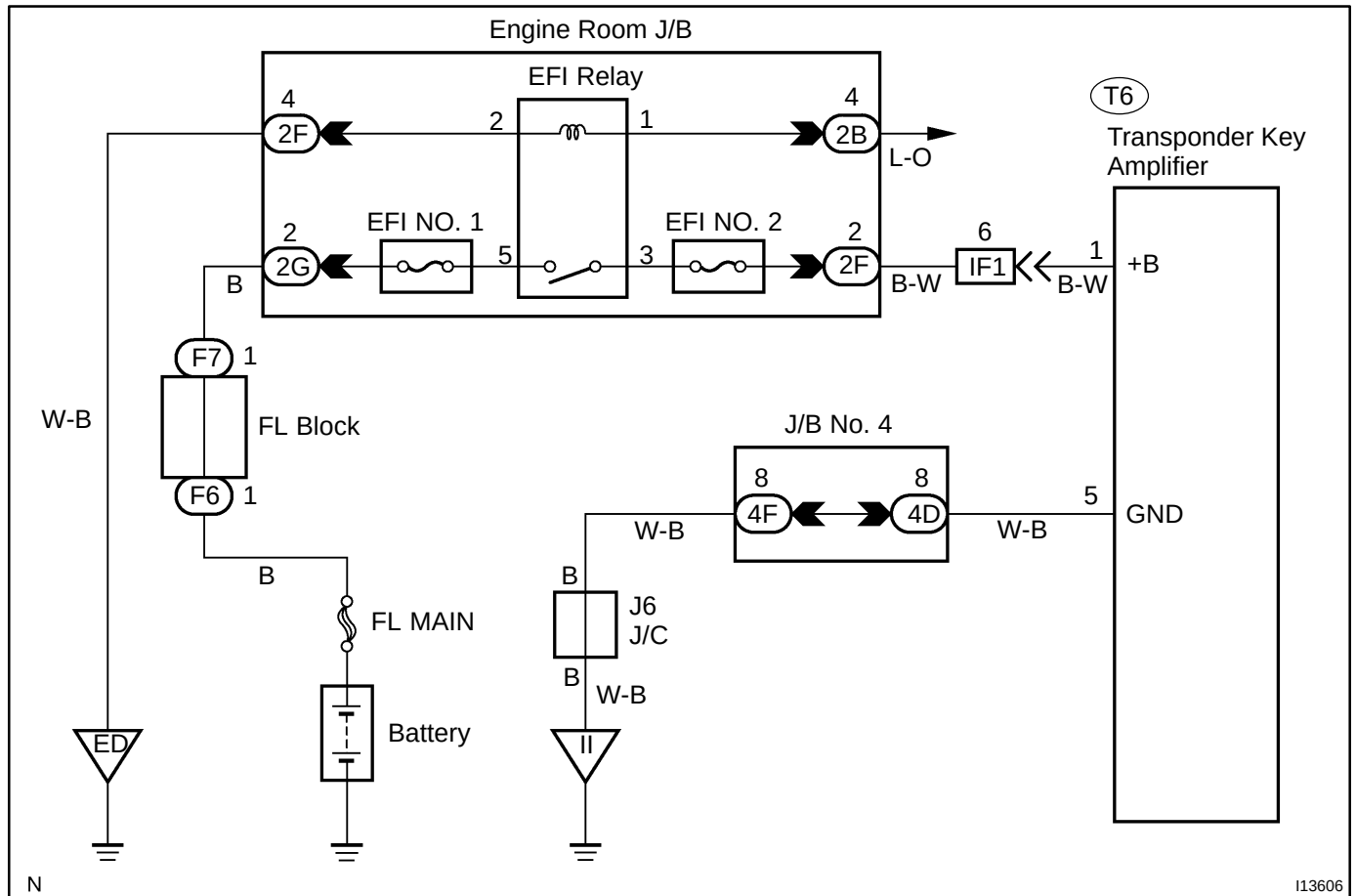
INSPECTION PROCEDURE

Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the Transponder Key ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check EFI fuse.

CHECK:

Check continuity of EFI fuse.

OK:

Continuity

NG

Replace the failure fuse.

OK

2	Check voltage between terminals EFI and GND of Transponder Key ECU connector.

PREPARATION:

- (a) Turn ignition switch OFF.
- (b) Disconnect the Transponder Key ECU connector.

CHECK:

Measure voltage between terminals +B and GND.

OK:

Voltage: 10 - 14 V

OK

Proceed to next circuit inspection shown in problem symptoms table (See page [DI-604](#)).

NG

3	Check wireharness and connector between Transponder Key ECU and body ground.

NG

Repair or replace wireharness or connector.

OK

Check and repair wireharness and connector between Transponder Key ECU and Battery.

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBLISER Check Sheet

Inspector's
Name _____

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

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

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

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

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

DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See Page)	Detection Item	Trouble Area
B2795 (DI-605)	Unmatched key code	●Key ●Unregistered key inserted before
B2796 (DI-606)	No communication in immobiliser system	●Key ●Transponder key coil ●Amplifier ●Wirehaness ●ECM
B2797 (DI-609)	Communication malfunction	●Communication contents ●Unregistered key inserted before

HINT:

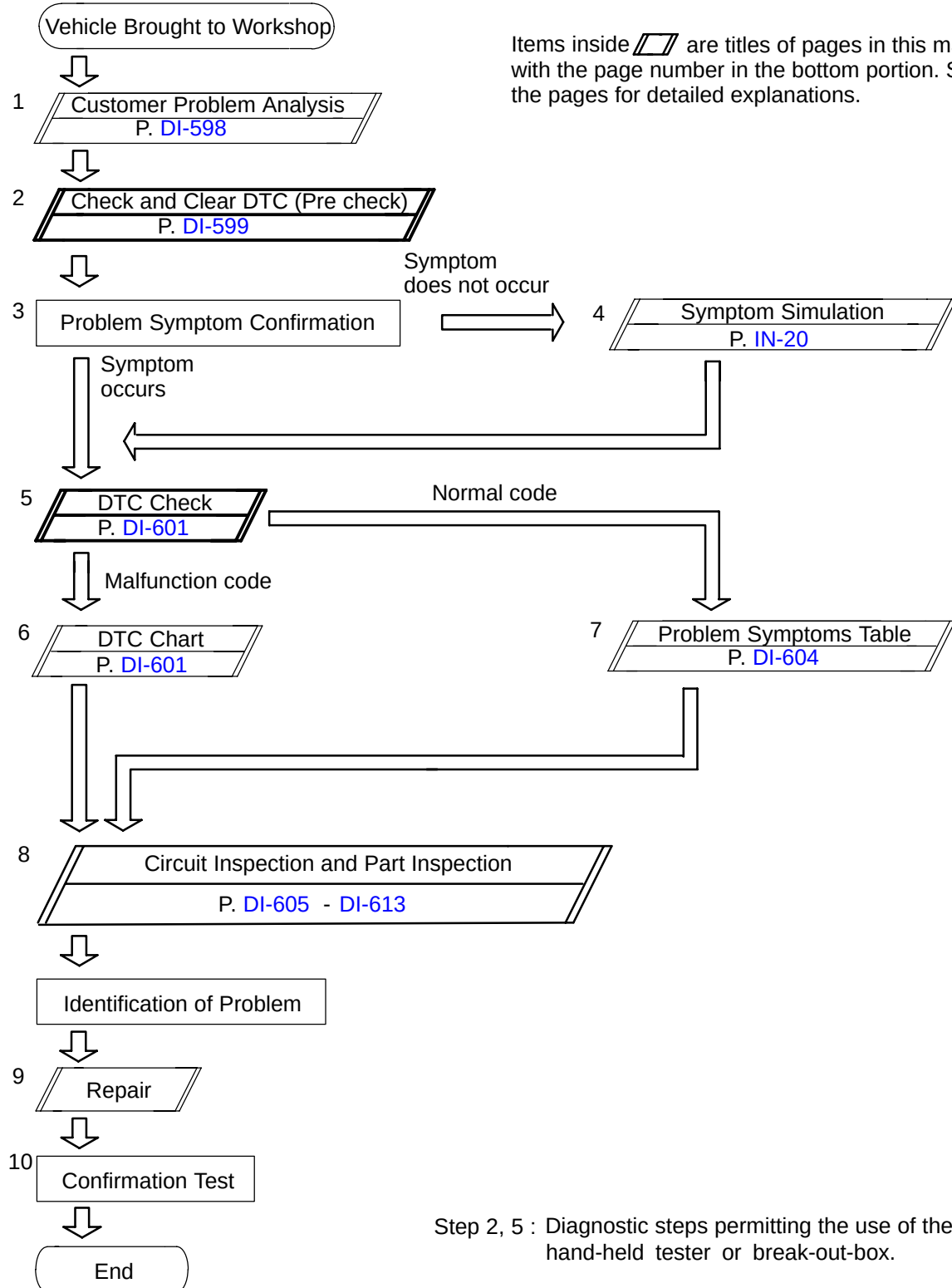
To reduce the unnecessary exchange of ECM, check that a trouble occurs with the original ECM at the time of exchanging ECM and the trouble will disappear with a new ECM.

ENGINE IMMOBILISER SYSTEM

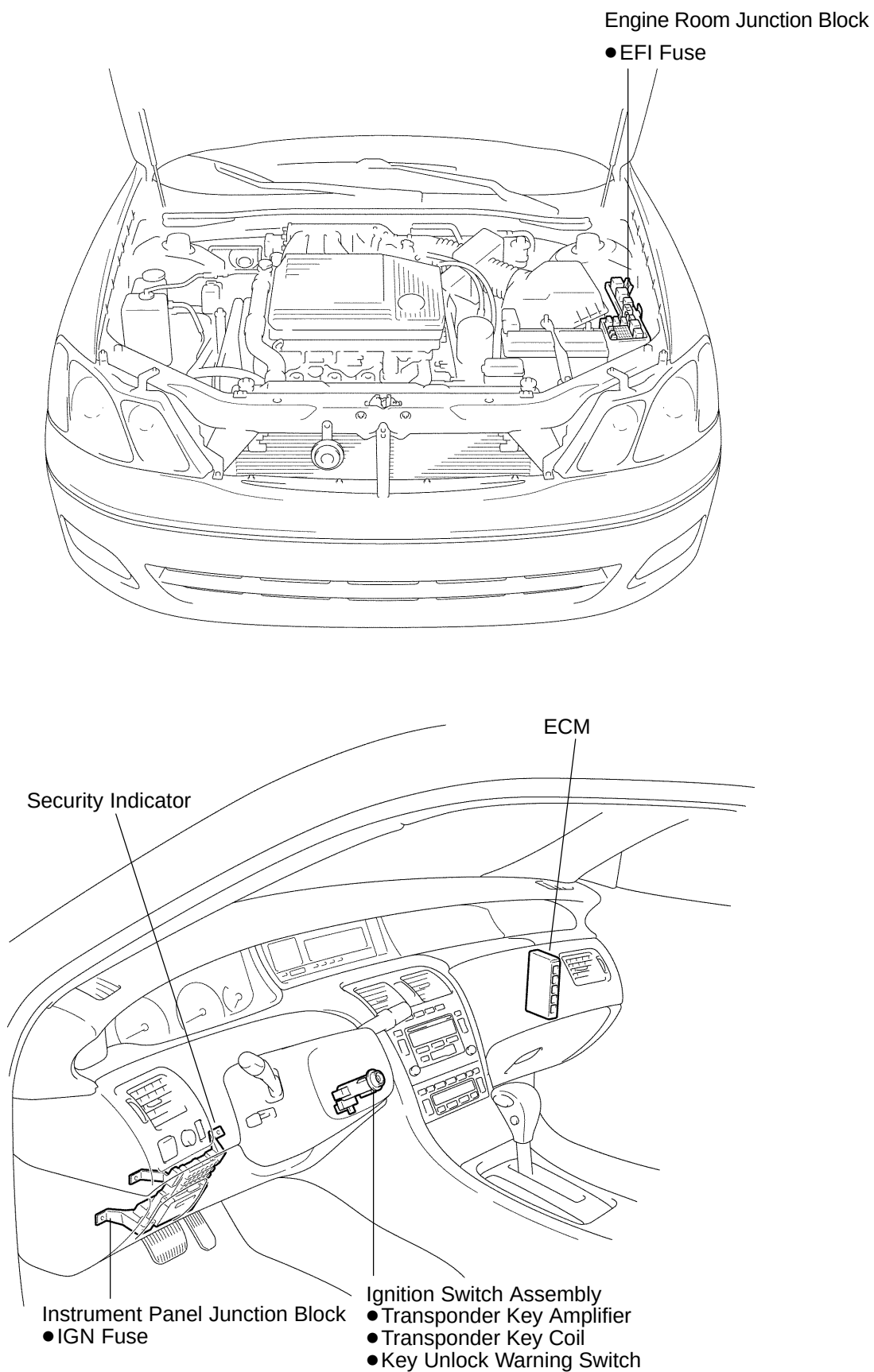
HOW TO PROCEED WITH TROUBLESHOOTING

DI1A3-18

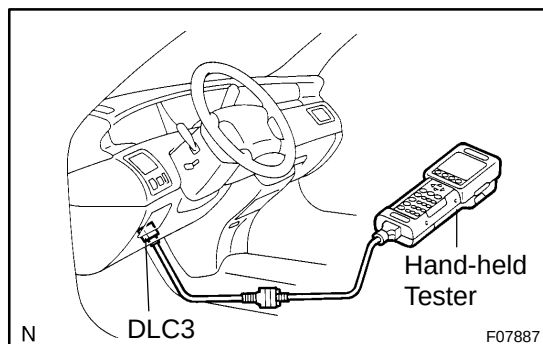
Troubleshoot in accordance with the procedure on the following pages.



PARTS LOCATION



P



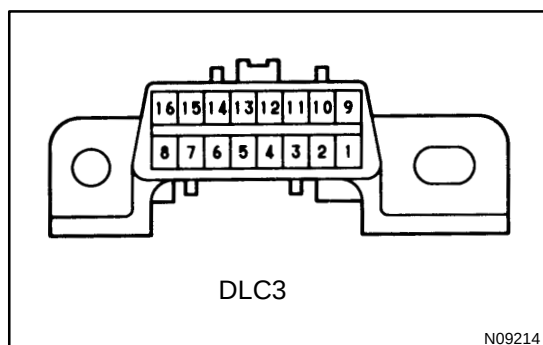
PRE-CHECK

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, check engine warning light does not light up but DTC inspection is performed.

Therefore when there seems to be a trouble on immobiliser, use hand-held tester or SST to check and trouble-shoot it.



(b) Check the DLC3.

The vehicle's ECM uses ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

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

HINT:

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

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

2. INSPECT DIAGNOSIS (Normal Mode)

- (a) Check the DTC using hand-held tester.

NOTICE:

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

- (1) Prepare the hand-held tester.
 - (2) Connect the hand-held tester to DLC3.
 - (3) Turn the ignition switch ON and push the hand-held tester main switch ON.
 - (4) Use the hand-held tester to check the DTCs and freeze frame data, note them down. (For operating instructions, see the hand-held tester instruction book.)
 - (5) See page [DI-601](#) to confirm the details of the DTCs.
- (b) Clear the DTC.

The following operations will erase the DTCs and freeze frame data.

- (1) Operating the OBD II scan tool (complying with SAEJ1978) or 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.

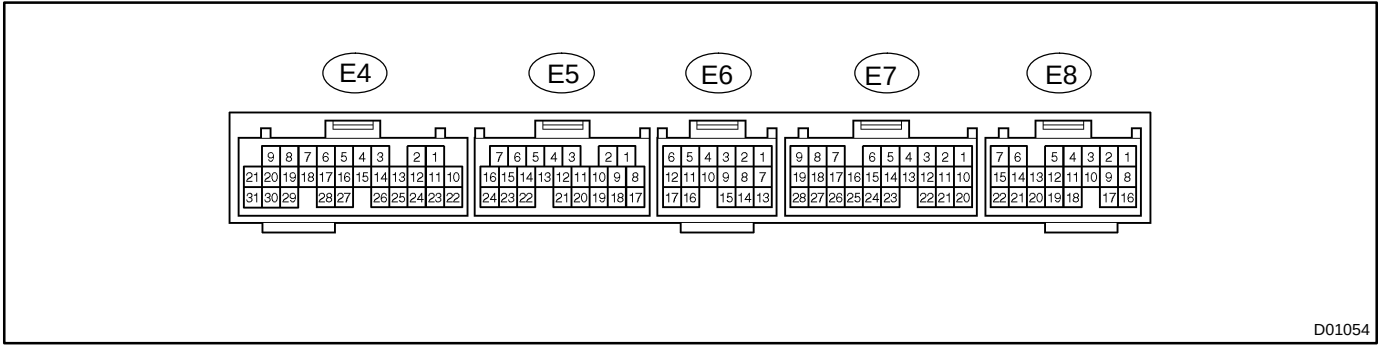
PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Immobiliser is not set. (Engine starts with key codes other than the registered key code.)	1. ECM	IN-30
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. ECM	*1 IN-30 DI-613 IN-30
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. ECM	*2 IN-30 IN-30
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-30 DI-613 IN-30
Security indicator is OFF. (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key coil 3. Amplifier 4. ECM	IN-30 DI-613 IN-30
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. ECM	IN-30 IN-30
Security indicator is abnormally blinking.	1. Wire harness 2. ECM	IN-30 IN-30

*1 : Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key.

*2 : Finish the automatic registration mode because the mode might still remain.

TERMINALS OF ECM



D01054

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CODE ↔ E1 (E7-28 ↔ E5-17)	P-G ↔ BR	Ignition Switch ON	10 - 14
TXCT ↔ E1 (E7-18 ↔ E5-17)	L-Y ↔ BR	Ignition Switch ON	10 - 14
IGSW ↔ E1 (E8-2 ↔ E5-17)	B-O ↔ BR	Ignition Switch ON	10 - 14
RXCK ↔ E1 (E7-19 ↔ E5-17)	L-O ↔ BR	Ignition Switch ON	10 - 14

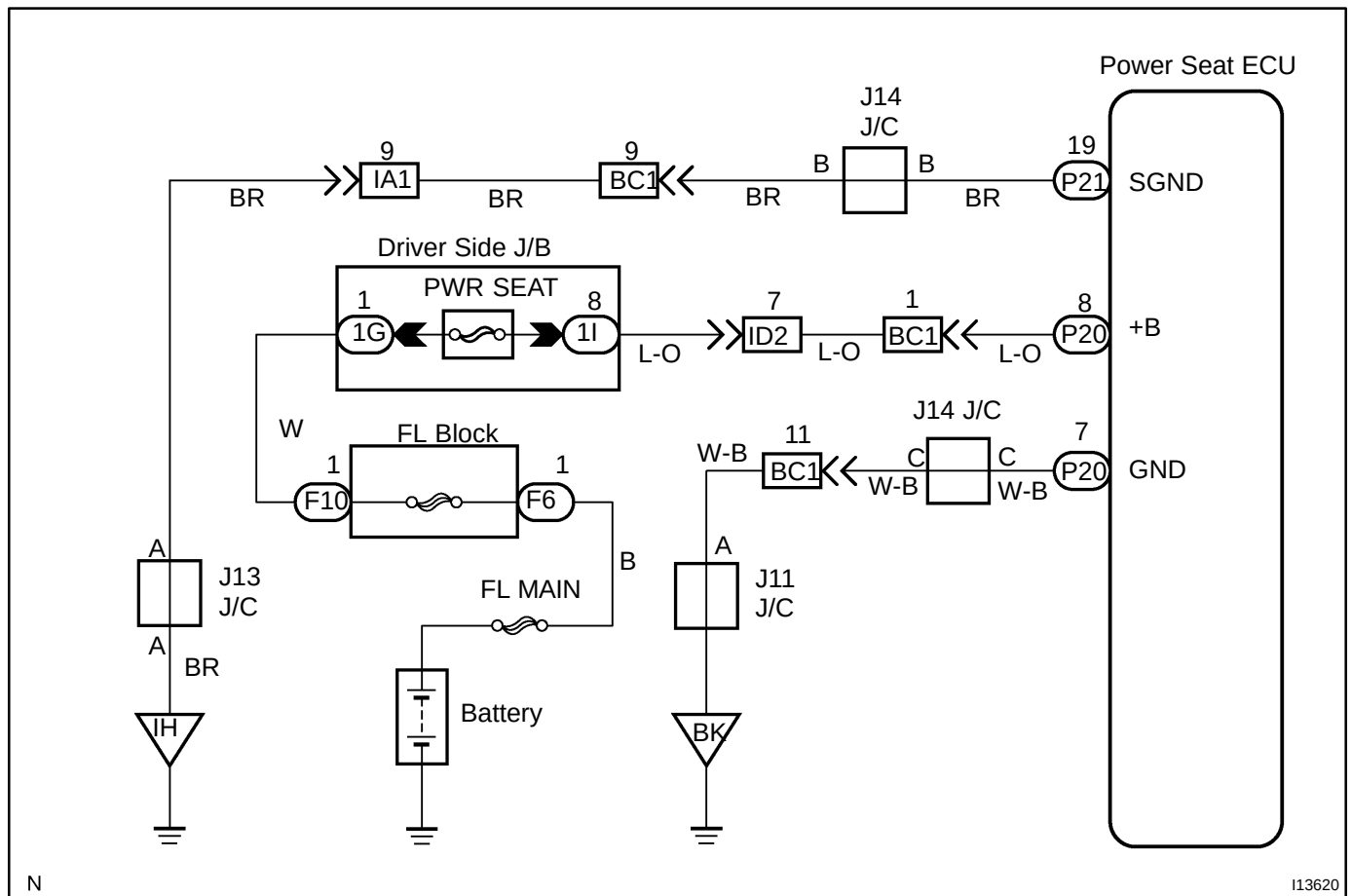
CIRCUIT INSPECTION

+B Power Source Circuit

CIRCUIT DESCRIPTION

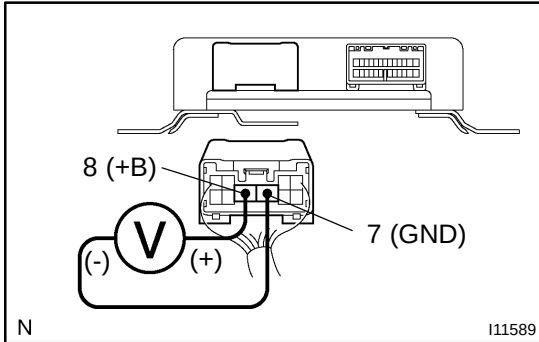
This is the power source for motors such as the slide motor, reclining motor, front vertical motor and rear vertical motor.

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:

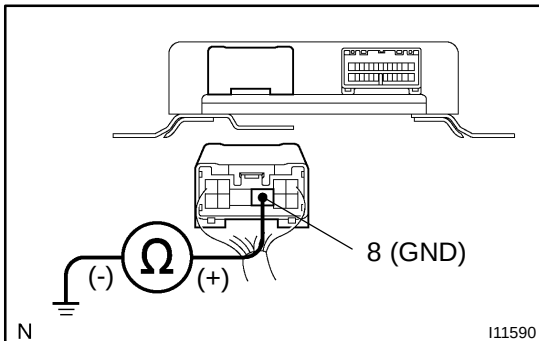
Voltage: 10 - 14 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-493](#)).

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 POWER SEAT fuse.

NG

Check for short in all the harness and components connected to the POWER SEAT fuse, and repair them (See attached wiring diagram).

OK

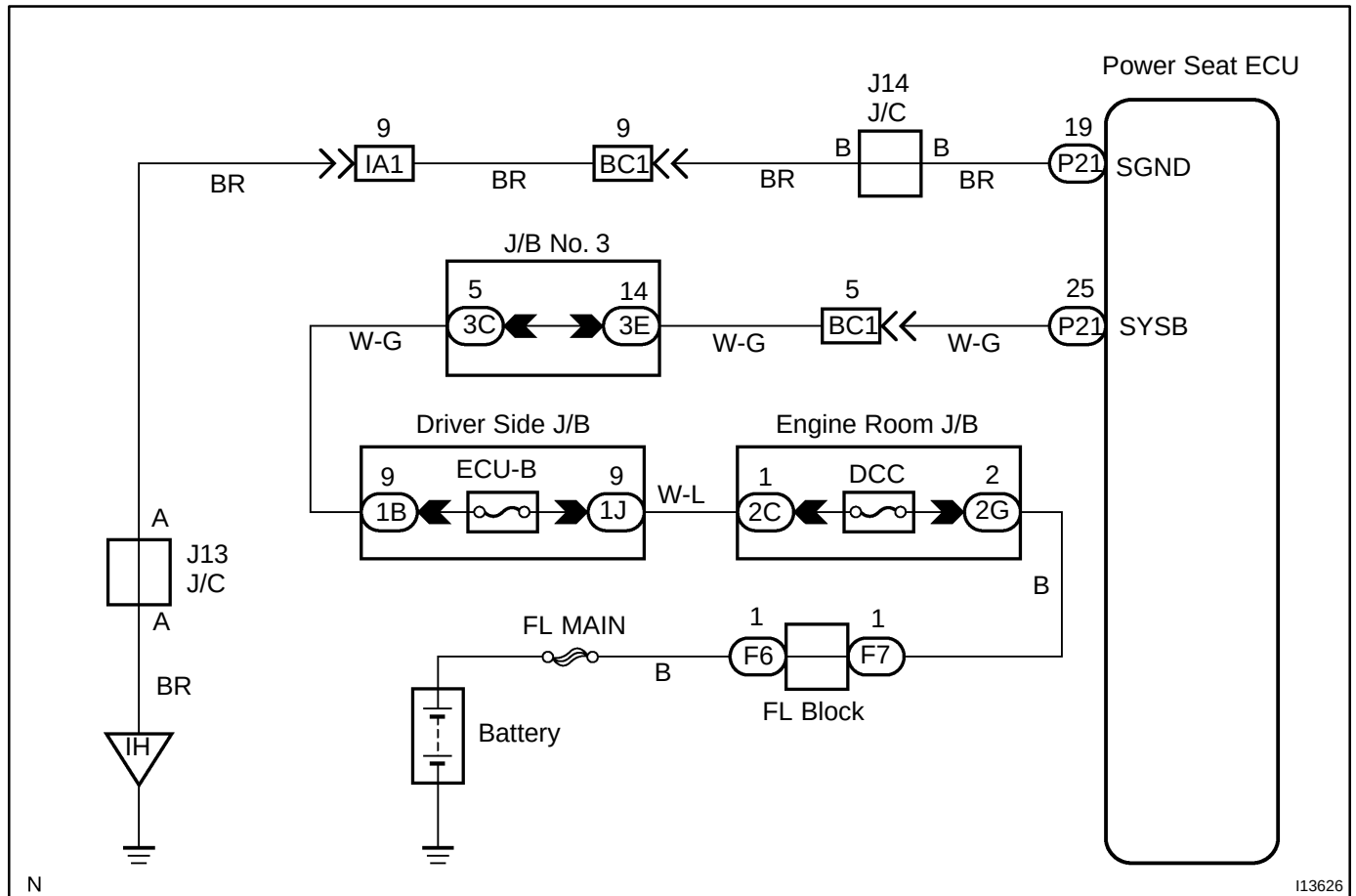
Check and repair harness or connector between Seat Position Control ECU and battery.

ECU Power Source Circuit

CIRCUIT DESCRIPTION

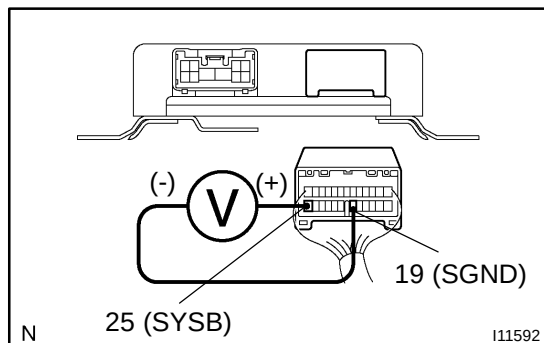
This circuit provides power for ECU operation and is also the power source for the sensor.

WIRING DIAGRAM



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:

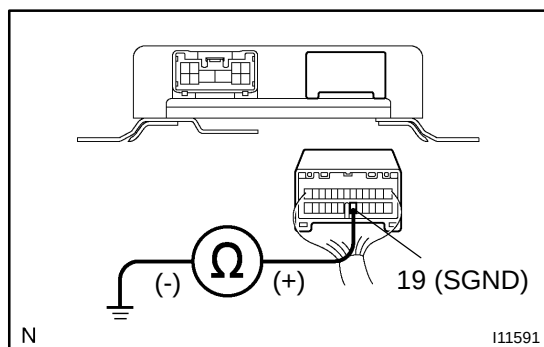
Voltage: 10 - 14 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-493](#)).

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 No. 2 fuse.

NG

Check for short in all the harness and components connected to ECU-B No. 2 fuse and repair them (See attached wiring diagram).

OK

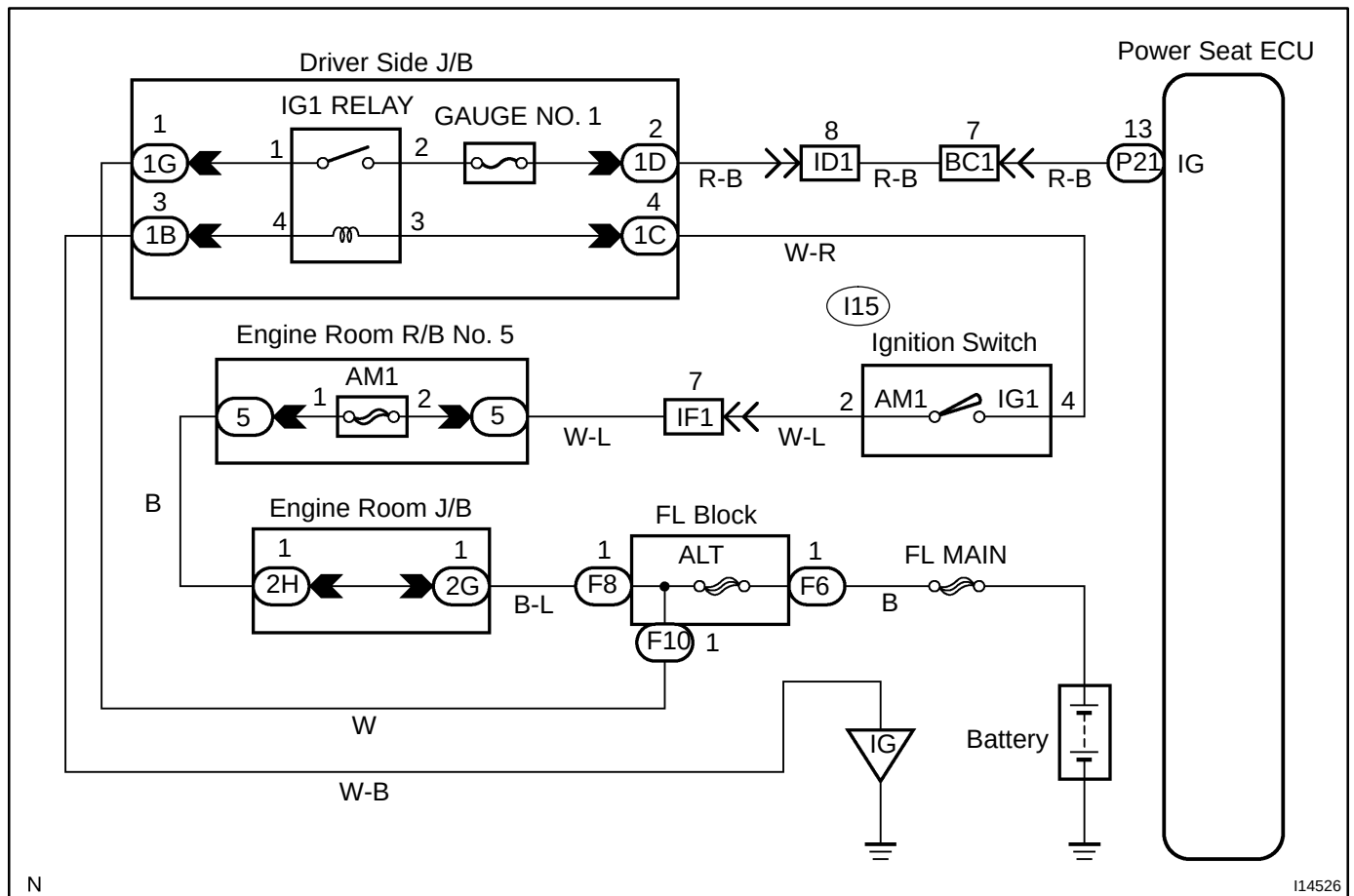
Check and repair harness or connector between Seat Position Control ECU and battery.

Ignition Switch Circuit

CIRCUIT DESCRIPTION

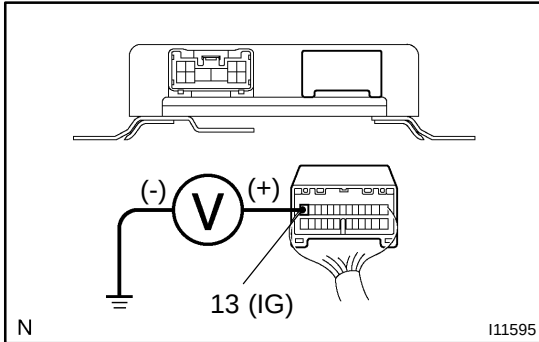
This circuit sends an ignition switch ON or OFF signal to the ECU.

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-493](#)).

NG

- 2 Check GAUGE fuse.

NG

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

NG

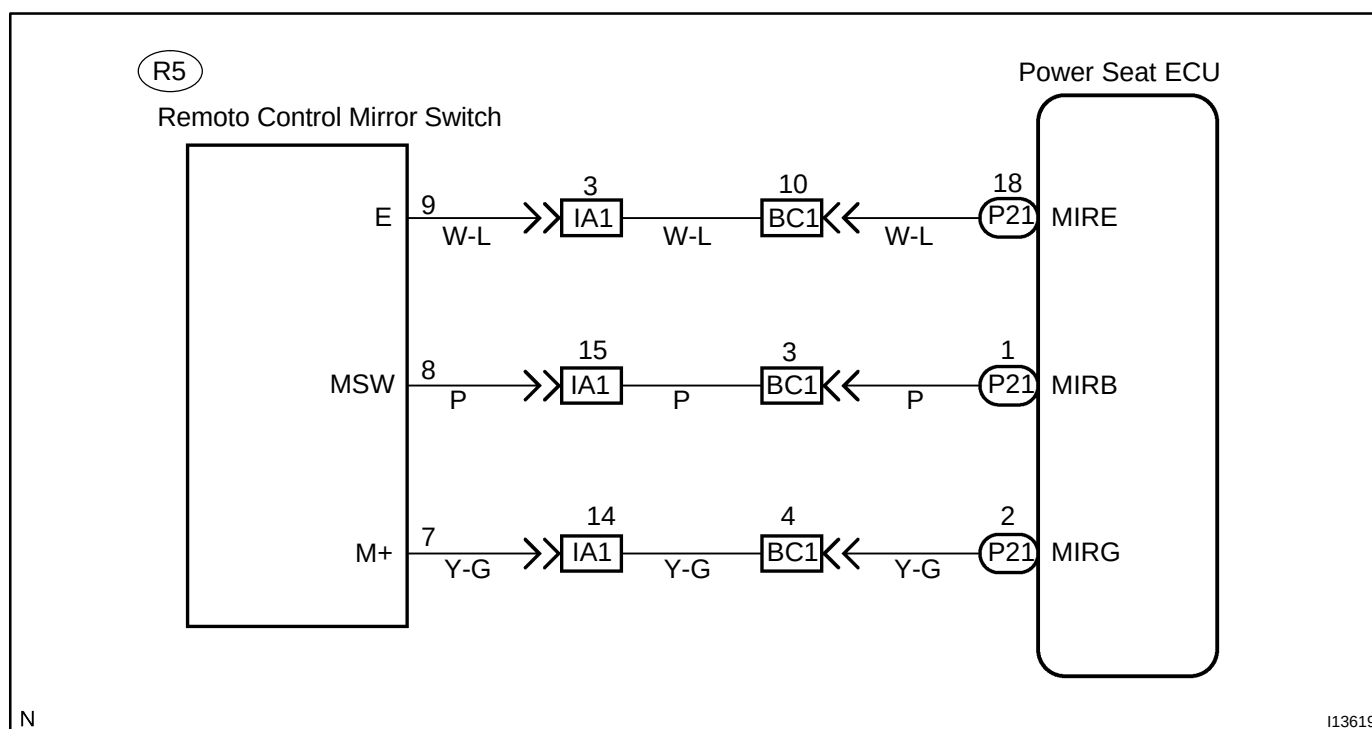
Check and repair harness or connector between Seat Position Control ECU and battery.

Mirror switch circuit

CIRCUIT DESCRIPTION

This circuit detects the conditions of the mirror selection switch and the mirror position switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check mirror switch (See page BE-114).

NG**Replace the mirror switch.****OK**

2	Check wireharness and connector between mirror switch and power seat control ECU.

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

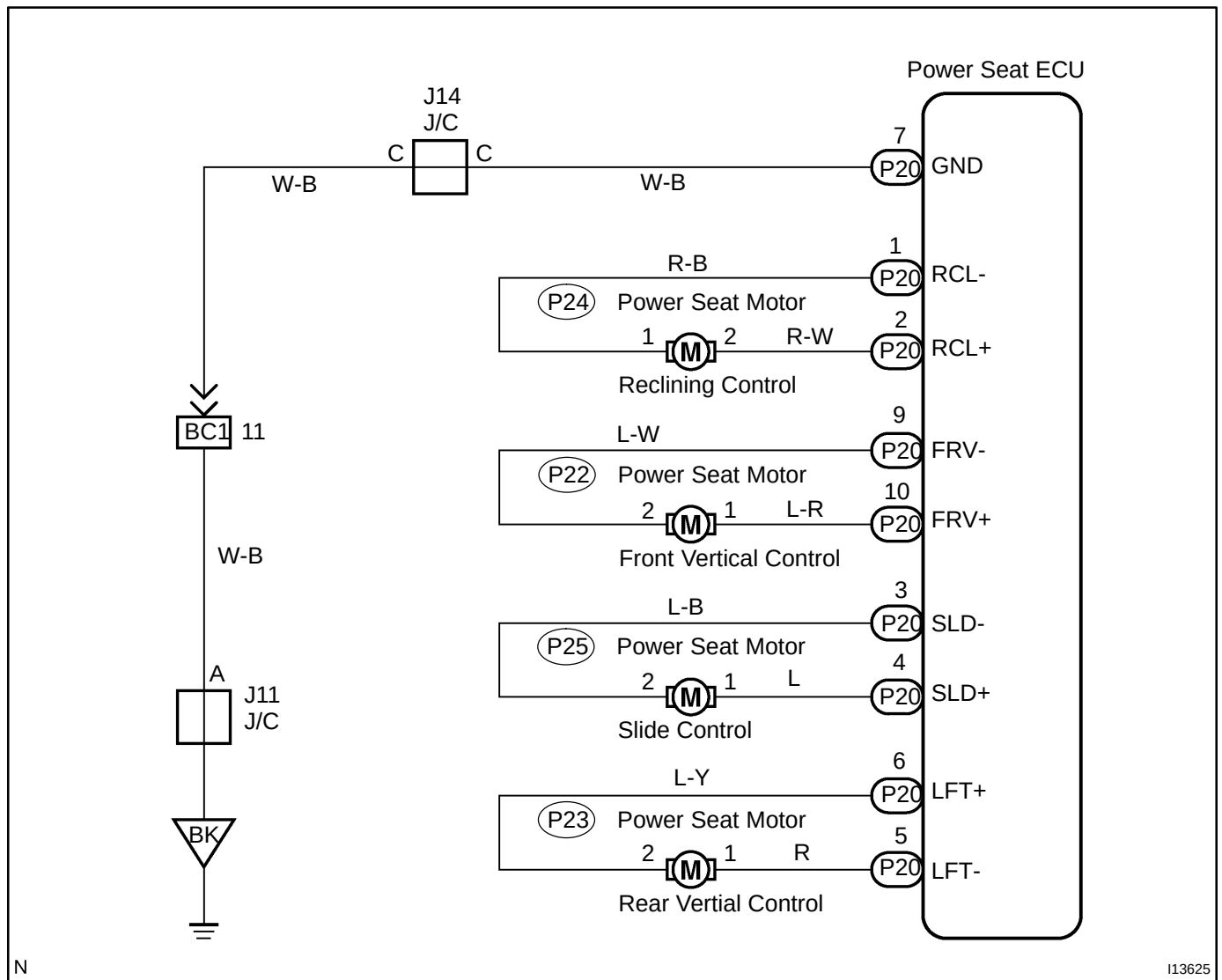
Proceed to next circuit inspection shown on problem symptoms table (See page [DI-493](#)).

Motor Circuit

CIRCUIT DESCRIPTION

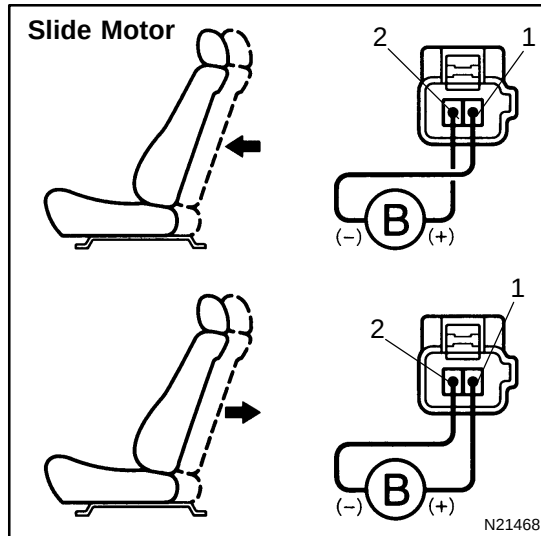
The Seat Position Control ECU controls the 4 motors for slide, front vertical, rear vertical and reclining.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check motor.



PREPARATION:

- (a) Remove seat.
- (b) Disconnect each motor connector.

CHECK:

Check seat movement when battery positive voltage is applied to each motor.

Slide Motor

CHECK:

Connect battery $\leq$ to terminal 2 and battery $>$ to terminal 1 of the slide motor connector.

OK:

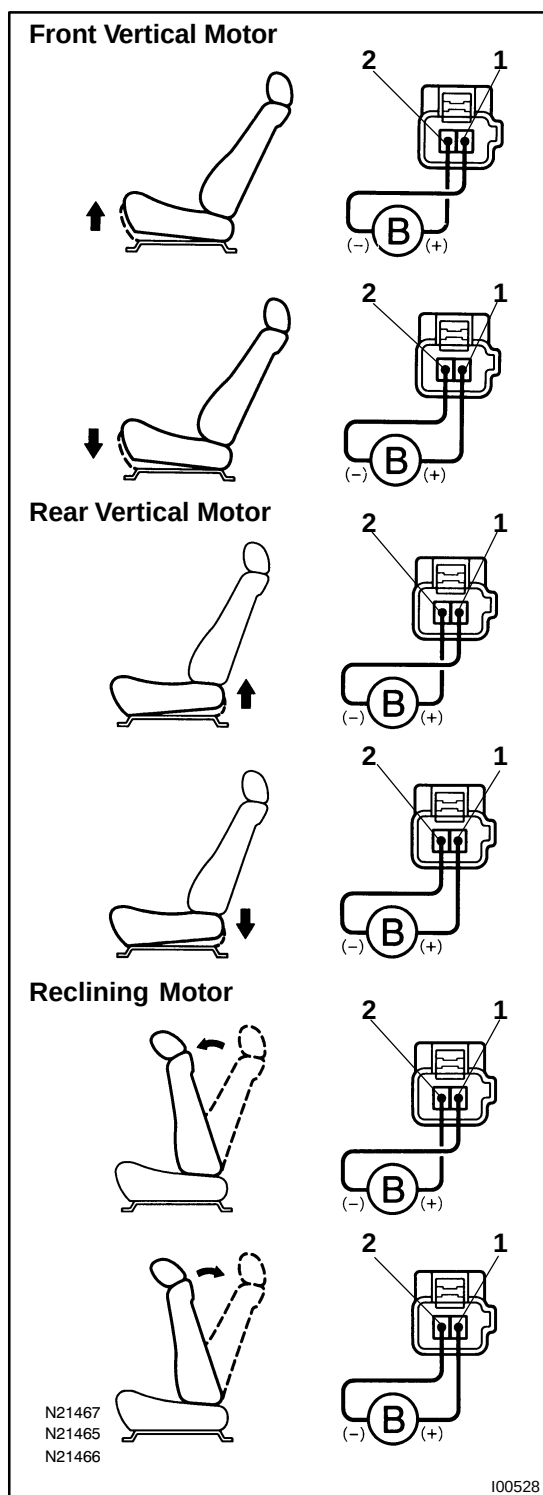
The seat moves forward.

CHECK:

Connect battery $>$ to terminal 2 and battery $\leq$ to terminal 1 of the slide motor connector.

OK:

The seat moves backward.

**Front Vertical Motor****CHECK:**

Connect battery $\leq$ 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 $\leq$ to terminal 1 of the front vertical motor connector.

OK:

The front of the seat cushion lowers.

Rear Vertical Motor**CHECK:**

Connect battery $\leq$ 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 $\leq$ to terminal 1 of the rear vertical motor connector.

OK:

The front of the seat cushion lowers.

Reclining Motor**CHECK:**

Connect battery $\leq$ 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 $\leq$ 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 DI-489).

NG

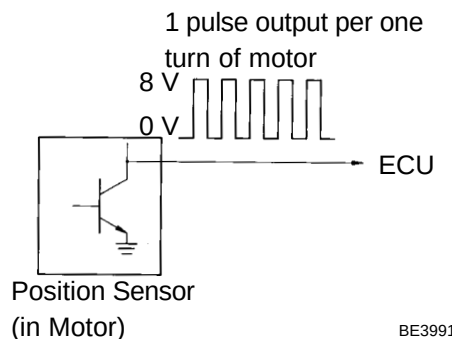
Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-493](#)).

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.

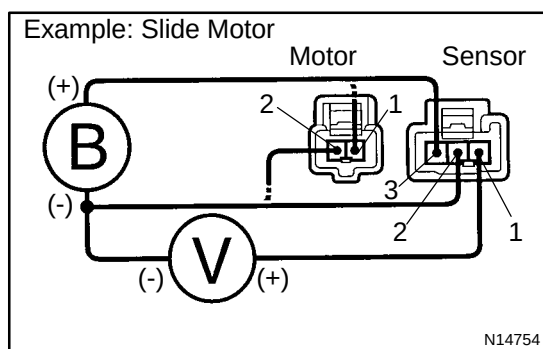
If a malfunction occurs in a position sensor and a sensor signal is not input to the ECU even when the motor operates, the ECU prohibits return operation.

WIRING DIAGRAM

See page [DI-504](#) .

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 $\leq$ lead to terminal 3 of sensor and negative $>$ 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, $\leq$ and $>$ 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-30).

NG

Repair or replace harness or connectors.

OK

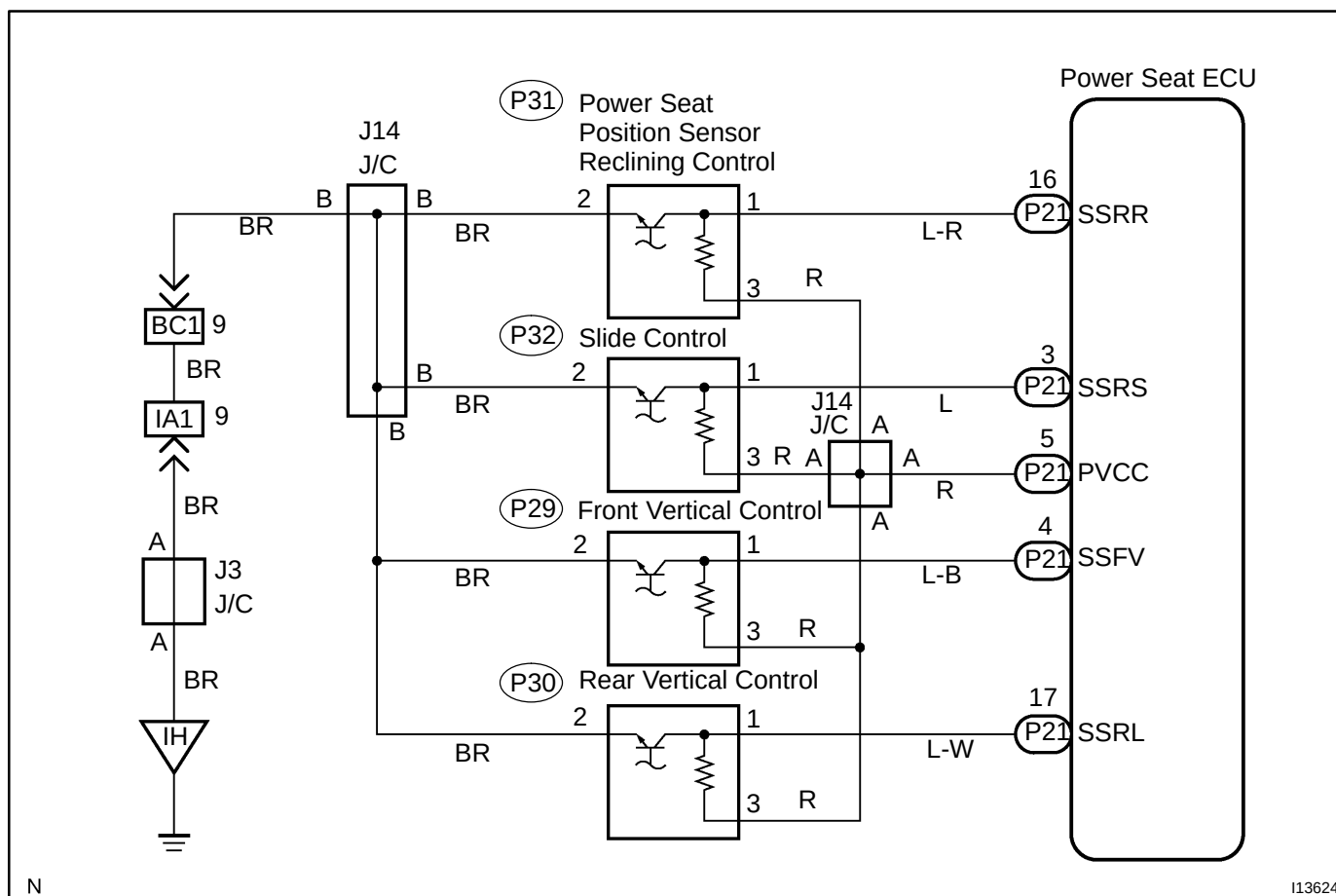
Check and replace Seat Position Control ECU.

Position Sensor Power Source Circuit

CIRCUIT DESCRIPTION

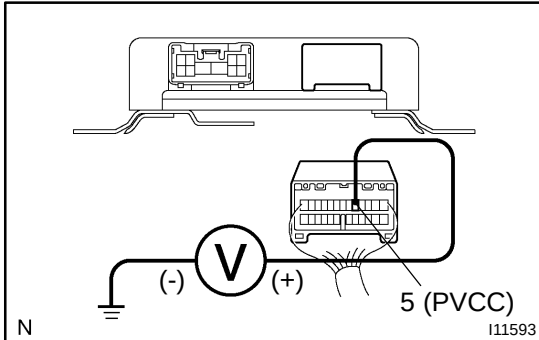
This circuit provides power to the slide, front vertical and reclining position sensors.

WIRING DIAGRAM



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-493](#)).

NG

- 2 Check harness and connector connected to terminal PVCC of Seat Position Control ECU (See page [IN-30](#)).

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.

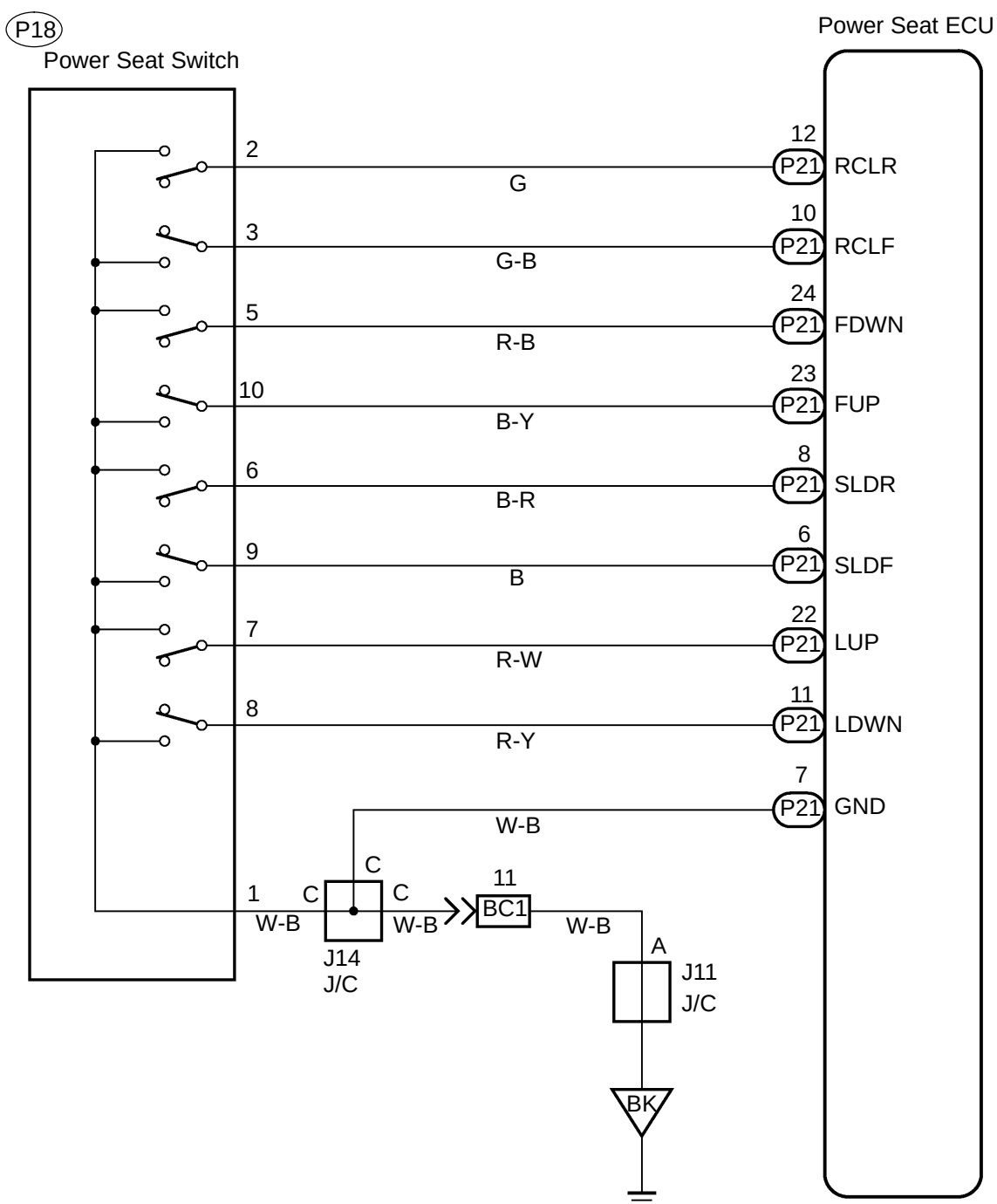
Power Seat Control Switch Circuit

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.

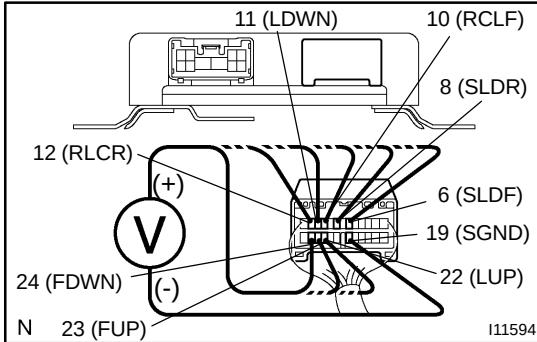
Even if a malfunction should occur with the position sensor and return operation is prohibited, manual operation will occur as normal.

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:

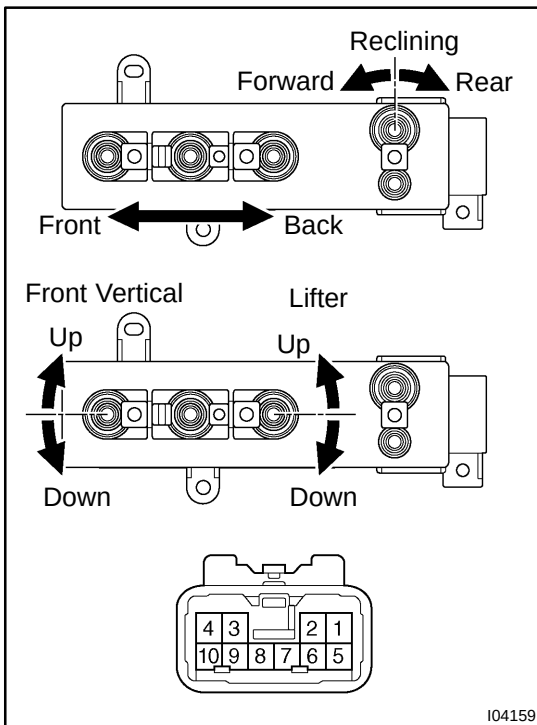
At each terminal with switch ON	0 V
At each terminal with switch OFF	10 ~ 14 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-493](#)).

NG

2 Check power seat control switch.



PREPARATION:

- Remove seat.
- Disconnect power seat control switch.

CHECK:

Check continuity between terminals when switch operated.

OK:

Driver's seat slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 - 9	Continuity
BACK	1 - 6	Continuity

Driver's seat front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 - 5	Continuity
DOWN	1 - 10	Continuity

Driver's seat lifter switch:

Switch position	Tester connection	Specified condition
UP	1 - 8	Continuity
DOWN	1 - 7	Continuity

Driver's seat reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 - 3	Continuity
REAR	1 - 2	Continuity

Passenger's slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 - 9	Continuity
BACK	1 - 6	Continuity

Passenger's front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 - 10	Continuity
DOWN	1 - 5	Continuity

Passenger's lifter switch:

Switch position	Tester connection	Specified condition
UP	1 - 7	Continuity
DOWN	1 - 8	Continuity

Passenger's reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 - 3	Continuity
REAR	1 - 2	Continuity

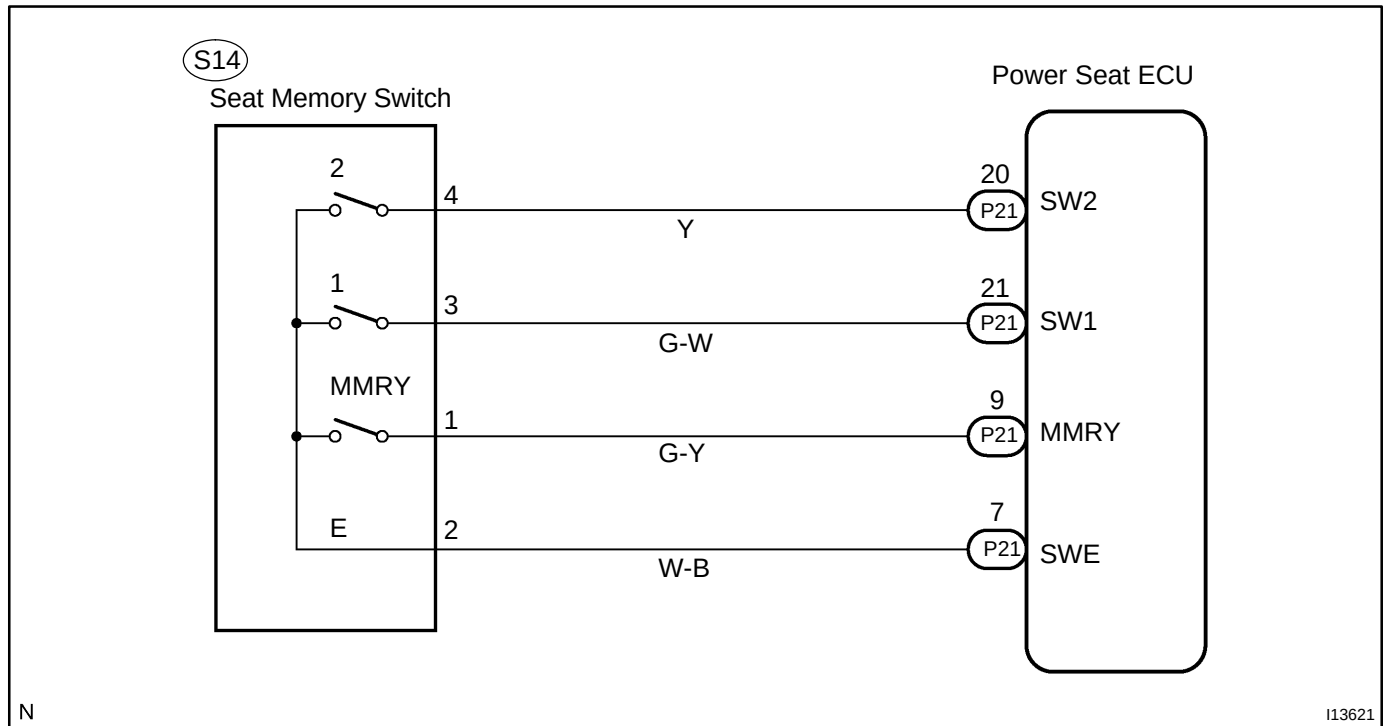
NG**Replace power seat control switch.****OK****3****Check harness and connectors between Seat Position Control ECU and power seat control switch (See page [IN-30](#)).****NG****Repair or replace harness or connector.****OK****Check and replace Seat Position Control ECU.**

Seat Memory Switch

CIRCUIT DESCRIPTION

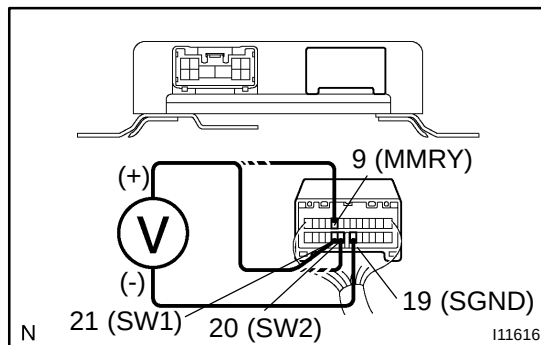
Seat memory switch send memory and return signals to the seat position control ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between each terminal of the seat memory switch and SGND of Seat Position Control ECU connector.



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

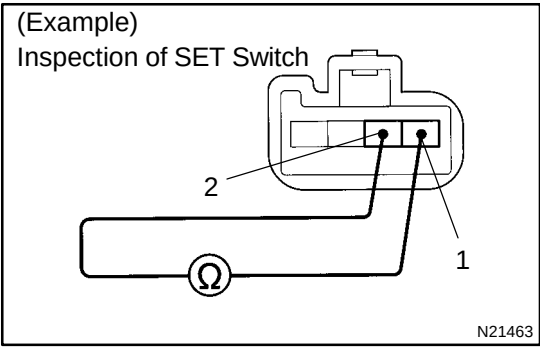
OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-493](#)).

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-30](#)).

NG

Repair or replace harness or connector.

OK

Check and replace Seat Position Control ECU.

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

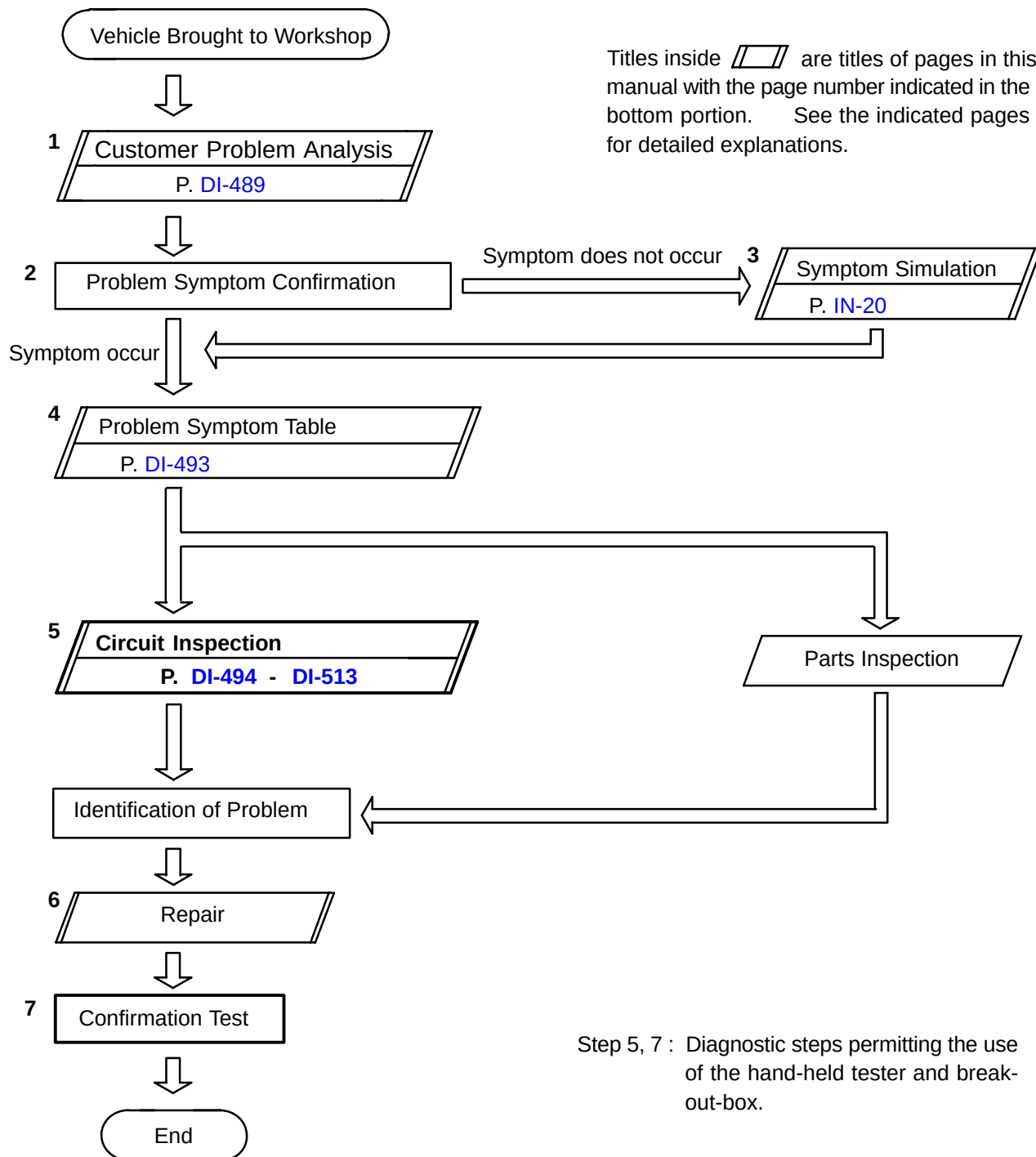
Date Problem First Occurred	/ /
How Often Problem Occurs	☐ Continuous ☐ Intermittent (Times a day)

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.	

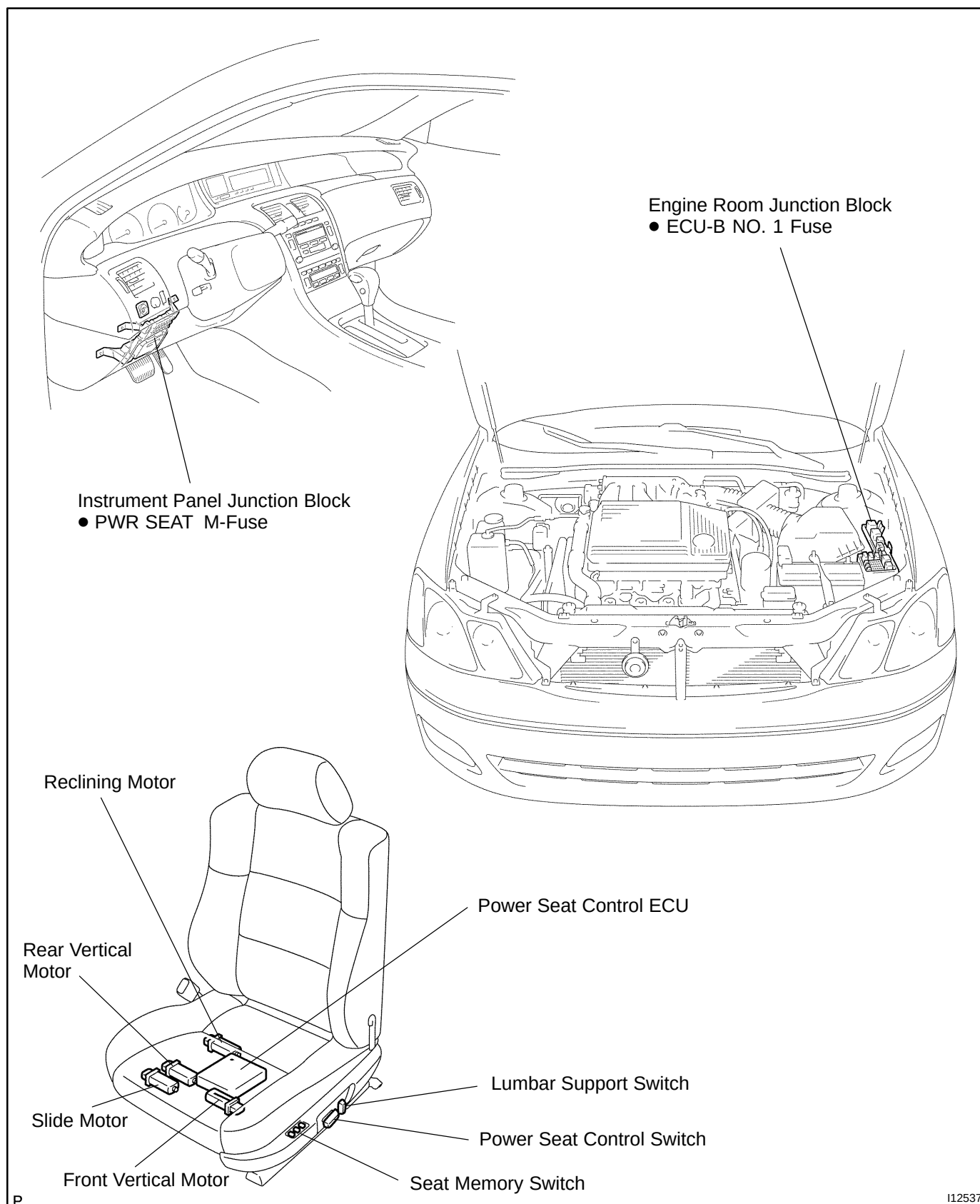
POWER SEAT CONTROL SYSTEM (w/ Driving Position Memory)

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



PARTS LOCATION



I12537

PROBLEM SYMPTOMS TABLE

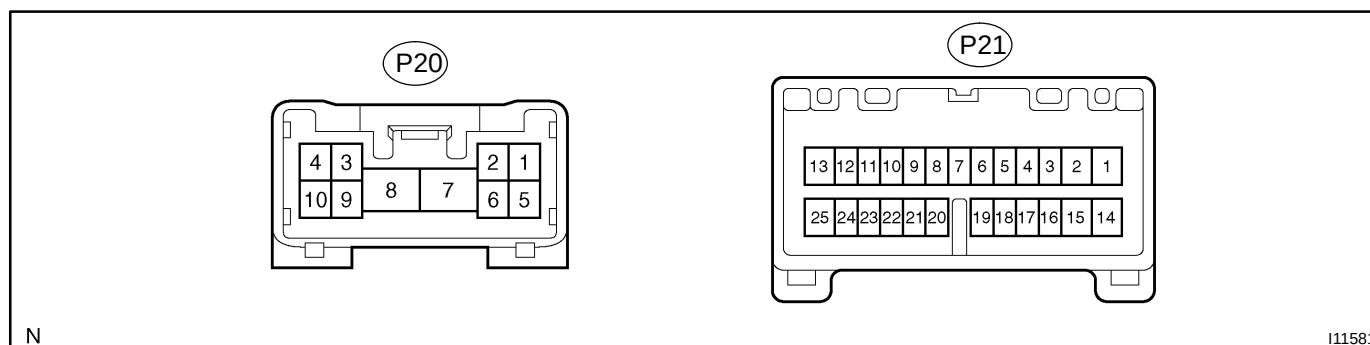
Perform troubleshooting of the circuits for the applicable problem symptom in the order given in the chart below. Proceed to the page located for each circuit.

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-494 DI-510 DI-500 IN-30
Both manual & return functions do not operate(One function only).	1. Motor circuit 2. Power seat control ECU	DI-500 IN-30
One or all functions do not operate for manual operation only.	1. Power seat control switch circuit 2. Power seat control ECU	DI-510 IN-30
Memory function does not operate.	1. Power seat memory switch circuit 2. Ignition switch circuit 3. Power seat control ECU	DI-510 DI-508 IN-30
Return operation does not stop when brake pedal is depressed.	1. Stop light switch circuit 2. Power seat control ECU	DI-662 IN-30
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-513 DI-497 DI-504 IN-30
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-506 IN-30

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SSFV ↔ SGND (P21-4 ↔ P21-19)	L-B ↔ BR	Front vertical operation	0 V ↔ 8 V
SSRL ↔ SGND (P21-17 ↔ P21-19)	L-W ↔ BR	Rear vertical operation	0 V ↔ 8 V
SSRR ↔ SGND (P21-16 ↔ P21-19)	L-R ↔ BR	Reclining operation	0 V ↔ 8 V
PVCC ↔ SGND (P21-5 ↔ P21-19)	R ↔ BR	Power seat operation	8 V
FDWN ↔ Body Ground (P21-24 ↔ Body Ground)	R-B	Seat lowered using front vertical SW	Below 1 V
		Others	10 - 14 V
IG ↔ Body Ground (P21-13 ↔ Body Ground)	R-B	Ignition SW ON	10 - 14 V
SYSB ↔ Body Ground (P21-25 ↔ Body Ground)	W-G	Always	10 - 14 V
MPX1 ↔ Body Ground (P21-14 ↔ Body Ground)	G-W	Multiplex communication circuit signals	0 V ↔ 12 V
		Others	Resistance (Approx. 2.5 kΩ)
SGND ↔ Body Ground (P21-19 ↔ Body Ground)	BR	Always	Below 1 V
SSRS ↔ SGND (P21-3 ↔ P21-19)	L ↔ BR	Slide operation	0 V ↔ 8 V
SLDF ↔ Body Ground (P21-6 ↔ Body Ground)	B	Seat moved forward using slide SW	Below 1 V
		Others	10 - 14 V
SLDR ↔ Body Ground (P21-8 ↔ Body Ground)	B-R	Seat moved to rear using slide SW	Below 1 V
		Others	10 - 14 V
LUP ↔ Body Ground (P21-22 ↔ Body Ground)	R-W	Seat raised using rear vertical SW	Below 1 V
		Others	10 - 14 V
LDWN ↔ Body Ground (P21-11 ↔ Body Ground)	R-Y	Seat lowered using rear vertical SW	Below 1 V
		Others	10 - 14 V
FUP ↔ Body Ground (P21-23 ↔ Body Ground)	B-Y	Seat raised using front vertical SW	Below 1 V
		Others	10 - 14 V
RCLF ↔ Body Ground (P21-10 ↔ Body Ground)	G-B	Seat moved forward using reclining SW	Below 1 V
		Others	10 - 14 V
RCLR ↔ Body Ground (P21-12 ↔ Body Ground)	G	Seat moved to rear using reclining SW	Below 1 V
		Others	10 - 14 V
RCL- ↔ GND (P20-1 ↔ P20-7)	R-B ↔ W-B	Seat moved to rear using reclining SW	10 - 14 V
		Others	Below 1 V

2001 AVALON (RM808U)

RCL+ ↔ GND (P20-2 ↔ P20-7)	R-W ↔ W-B	Seat moved forward using reclining SW	10 - 14 V
		Others	Below 1 V
SLD- ↔ GND (P20-3 ↔ P20-7)	L-B ↔ W-B	Seat moved to rear using slide SW	10 - 14 V
		Others	Below 1 V
SLD+ ↔ GND (P20-4 ↔ P20-7)	L ↔ W-B	Seat moved forward using slide SW	10 - 14 V
		Others	Below 1 V
LFT- ↔ GND (P20-5 ↔ P20-7)	R ↔ W-B	Seat lowered using rear vertical SW	10 - 14 V
		Others	Below 1 V
LFT+ ↔ GND (P20-6 ↔ P20-7)	L-Y ↔ W-B	Seat raised using rear vertical SW	10 - 14 V
		Others	Below 1 V
GND ↔ Body Ground (P20-7 ↔ Body Ground)	W-B	Always	Below 1 V
+B ↔ Body Ground (P20-8 ↔ Body Ground)	L-O	Always	10 - 14 V
FRV- ↔ GND (P20-9 ↔ P20-7)	L-W ↔ W-B	Seat lowered using front vertical SW	10 - 14 V
		Others	Below 1 V
FRV+ ↔ GND (P20-10 ↔ P20-7)	L-R ↔ W-B	Seat raised using front vertical SW	10 - 14 V
		Others	Below 1 V
MMRY ↔ SWE (P21-9 ↔ P21-7)	G-Y ↔ W-B	Set switch position is OFF.	10 - 14 V
		Set switch position is ON.	Below 1 V
SW1 ↔ SWE (P21-21 ↔ P21-7)	G-W ↔ W-B	Memory Switch 1 position is OFF.	10 - 14 V
		Memory Switch 1 position is ON.	Below 1 V
SW2 ↔ SWE (P21-20 ↔ P21-7)	Y ↔ W-B	Memory Switch 2 position is OFF.	10 - 14 V
		Memory Switch 2 position is ON.	Below 1 V

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.

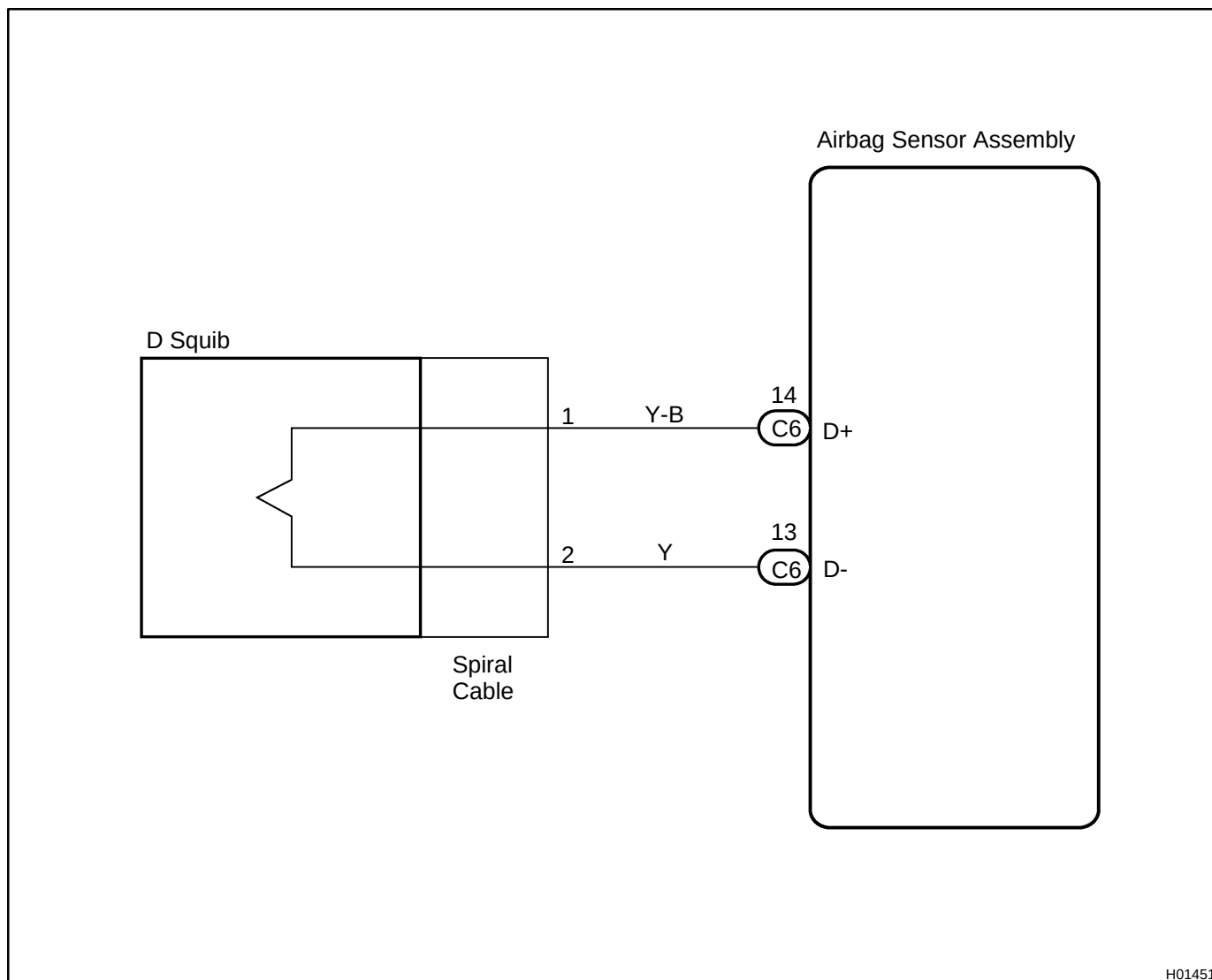
It causes the airbag to deploy when the airbag deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page [RS-3](#).

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

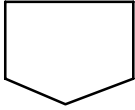
WIRING DIAGRAM



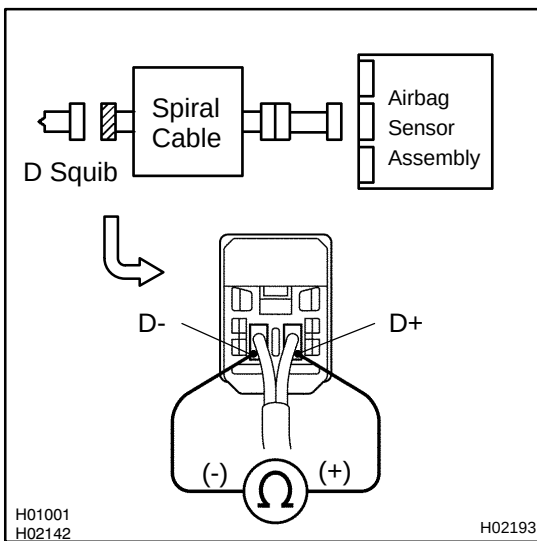
H01451

INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-475](#)).



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-349](#)).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

OK:

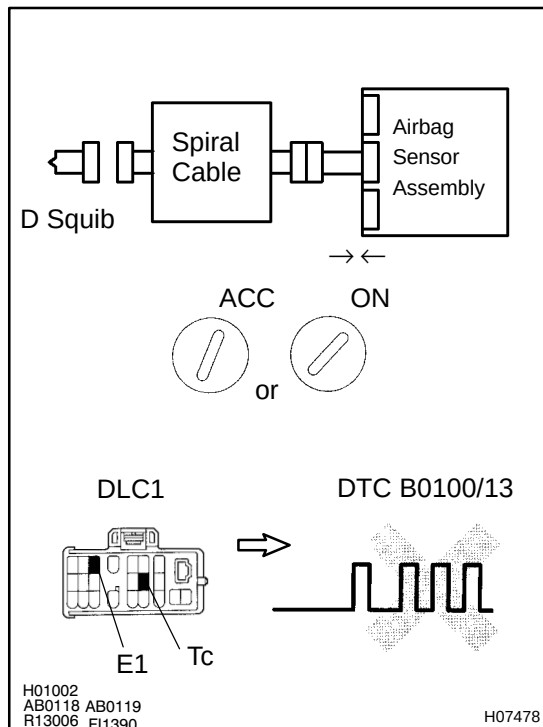
Resistance: 1 MΩ or Higher

NG

Go to step 5.

OK

3 Check airbag sensor assembly.

**PREPARATION:**

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0100/13 is not output.

HINT:

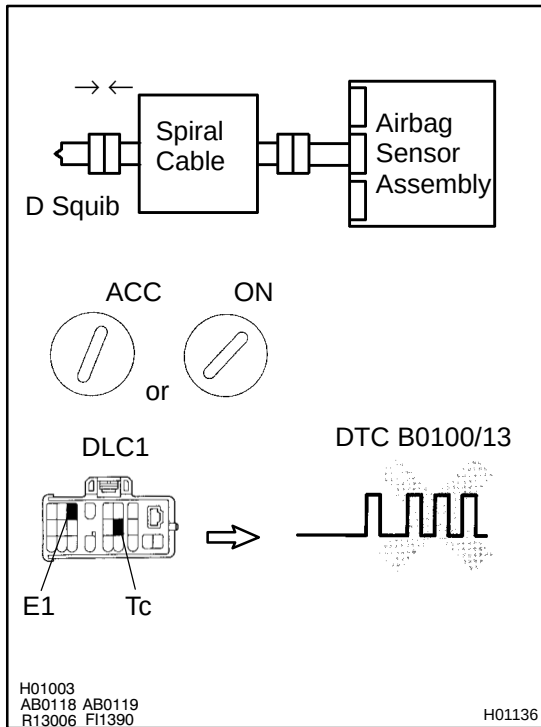
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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.

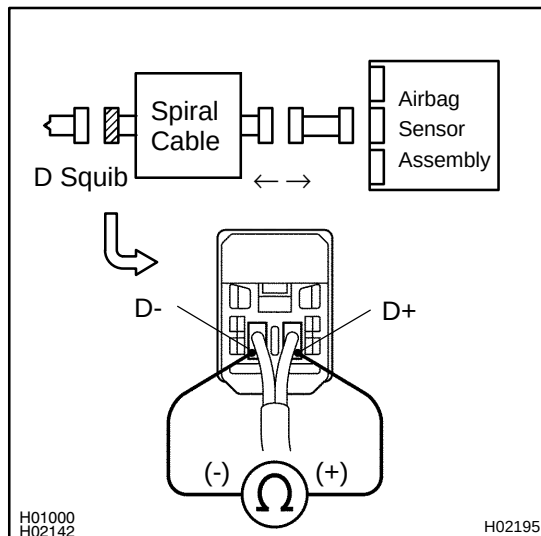
NG

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-349](#)).

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:

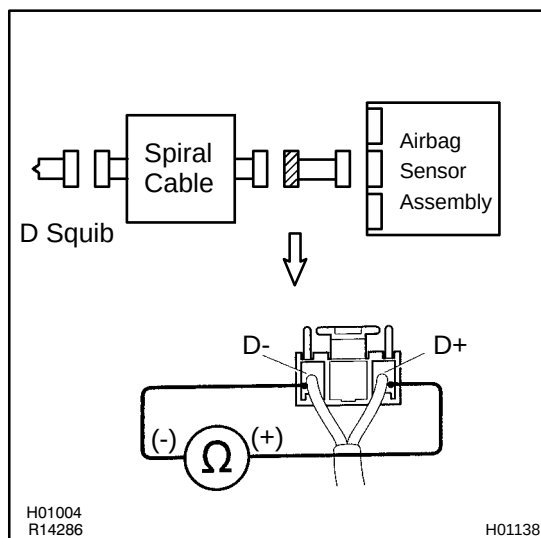
Resistance: 1 MΩ or Higher

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-349](#)).

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 components, see OPERATION on page RS-3 . DTC B0101/14 is recorded when an open is detected in the D squib circuit.

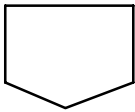
DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	●Open circuit in D+ wire harness or D- wire harness of squib ●D squib malfunction ●Spiral cable malfunction ●Airbag sensor assembly malfunction	●Steering wheel pad (D squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

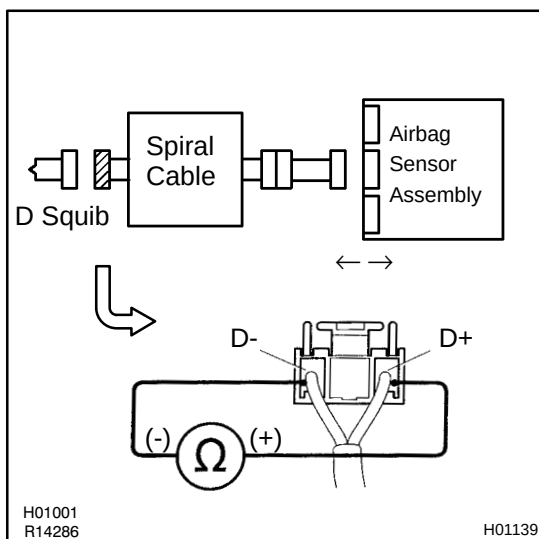
See page DI-362 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-475)



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

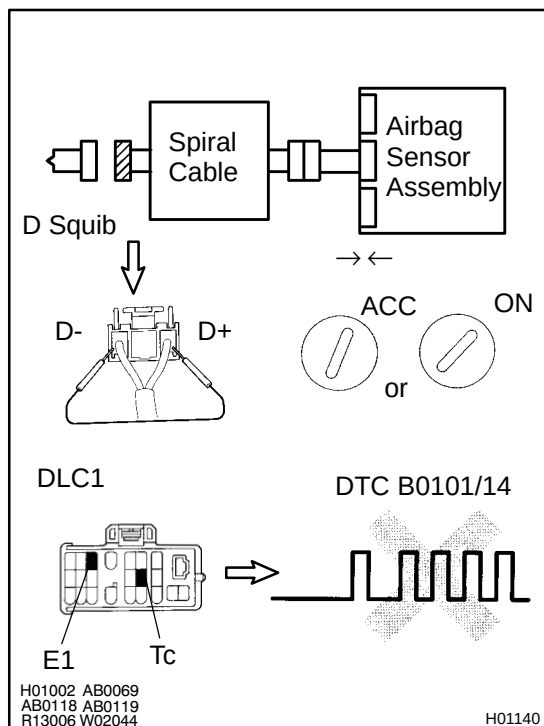
NG

Go to step 5.

OK

2001 AVALON (RM808U)

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-349](#)).
- 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-349](#)).

OK:

DTC B0101/14 is not output.

HINT:

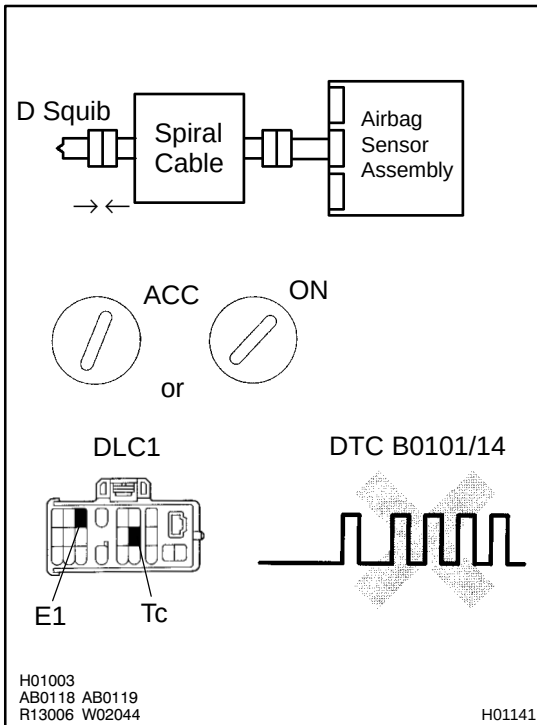
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

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-349](#)).
- 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-349](#)).

OK:

DTC B0101/14 is not output.

HINT:

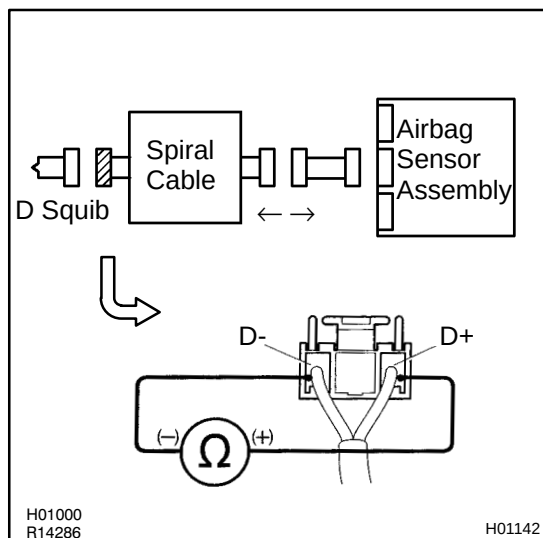
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

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-.

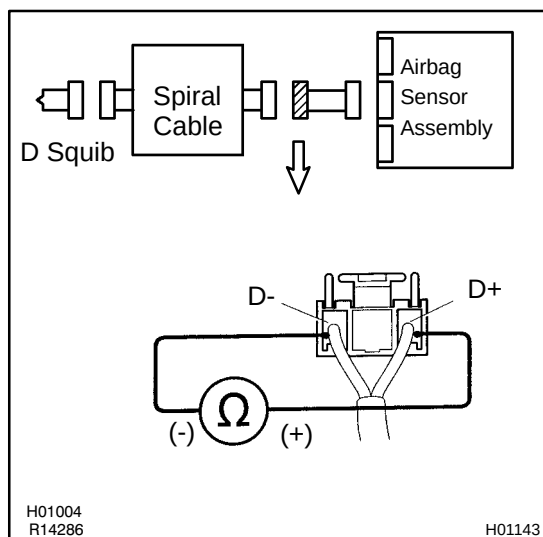
OK:

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-3](#). DTC B0102/11 is recorded when a ground short is detected in the D squib circuit.

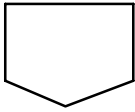
DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	•Short circuit in D squib wire harness (to ground) •D squib malfunction •Spiral cable malfunction •Airbag sensor assembly malfunction	•Steering wheel pad (D squib) •Spiral cable •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

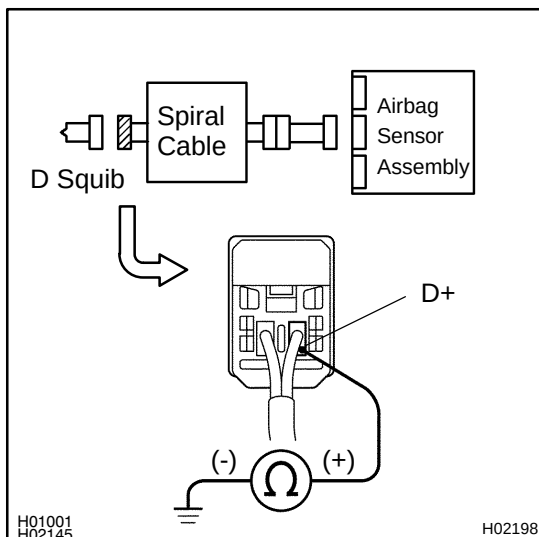
See page [DI-362](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

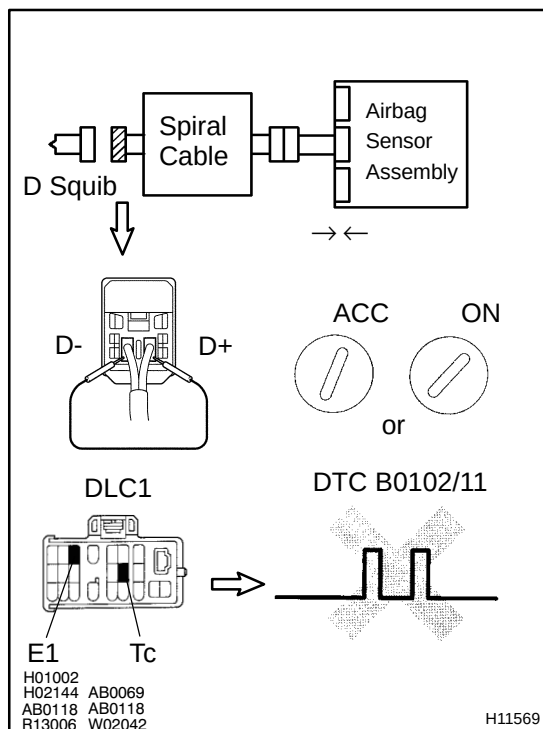
Resistance: 1 MΩ or Higher

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 the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0102/11 is not output.

HINT:

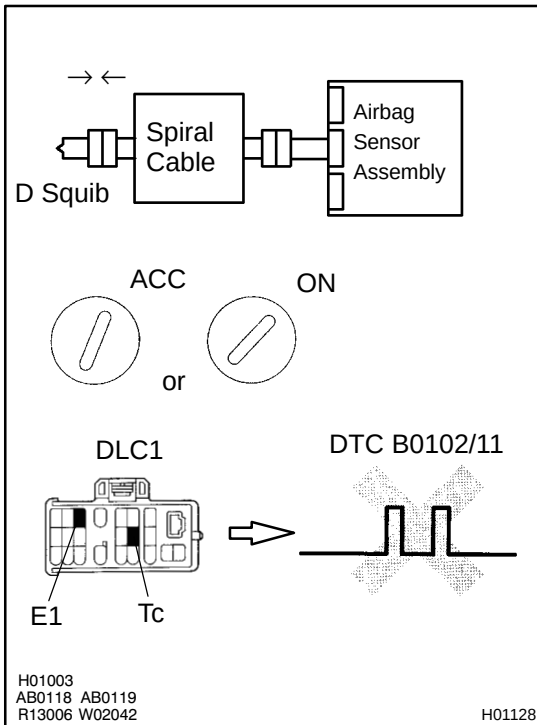
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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.

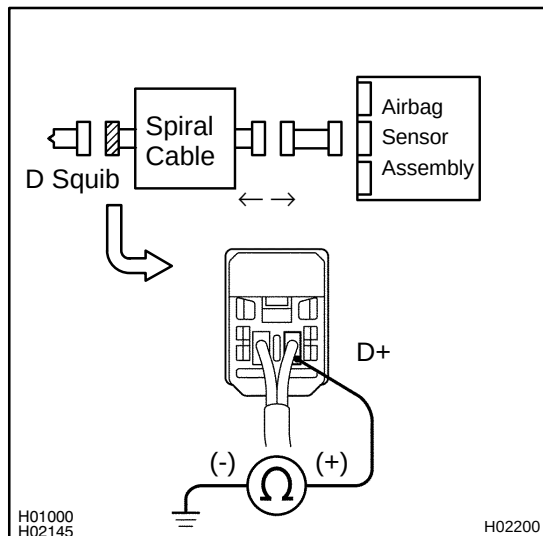
NG

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:

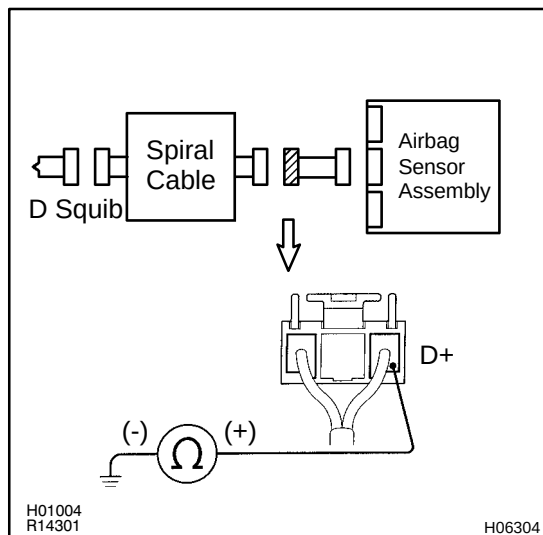
Resistance: 1 MΩ or Higher

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-3 . DTC B0103/12 is recorded when a B+ short is detected in the D squib circuit.

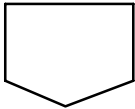
DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	•Short circuit in D squib wire harness (to B+) •D squib malfunction •Spiral cable malfunction •Airbag sensor assembly malfunction	•Steering wheel pad (D squib) •Spiral cable •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

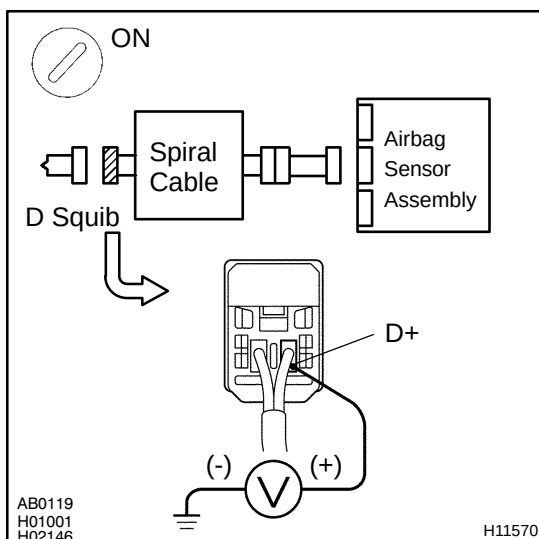
See page DI-362 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

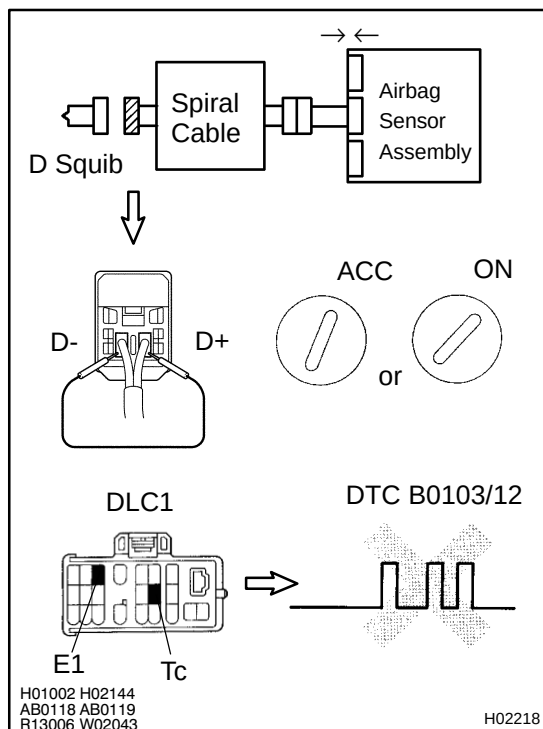
Voltage: 0 V

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 the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page DI-349).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page DI-349).

OK:

DTC B0103/12 is not output.

HINT:

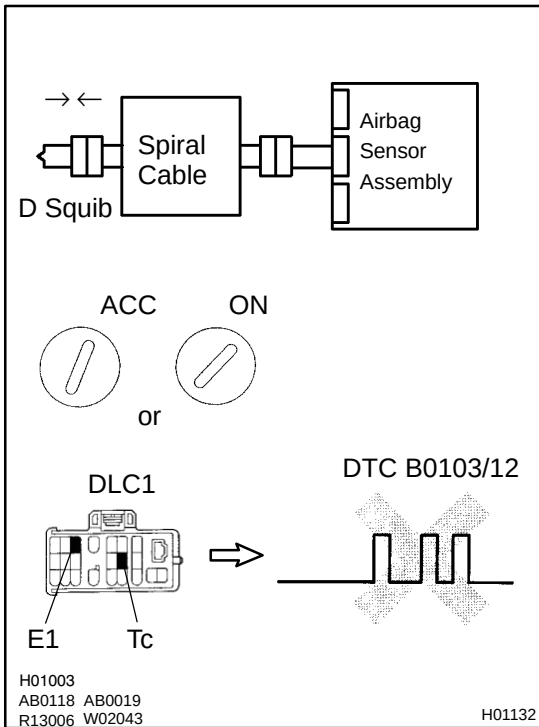
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check D squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0103/12 is not output.

HINT:

Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

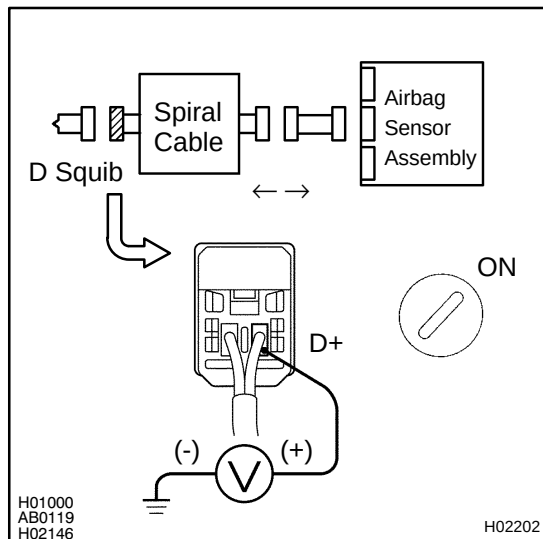
NG

Replace steering wheel pad.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5 Check spiral cable.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:

- Turn the ignition switch to ON.
- For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

OK:

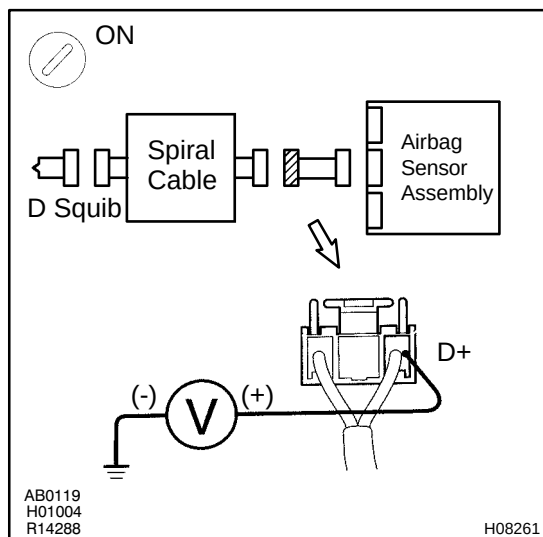
Voltage: 0 V

NG

Repair or replace spiral cable.

OK

6 Check harness between airbag sensor assembly and spiral cable.



CHECK:

- Turn the ignition switch to ON.
- For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the voltage between D+ and body ground.

OK:

Voltage: 0 V

NG

Repair or replace harness between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

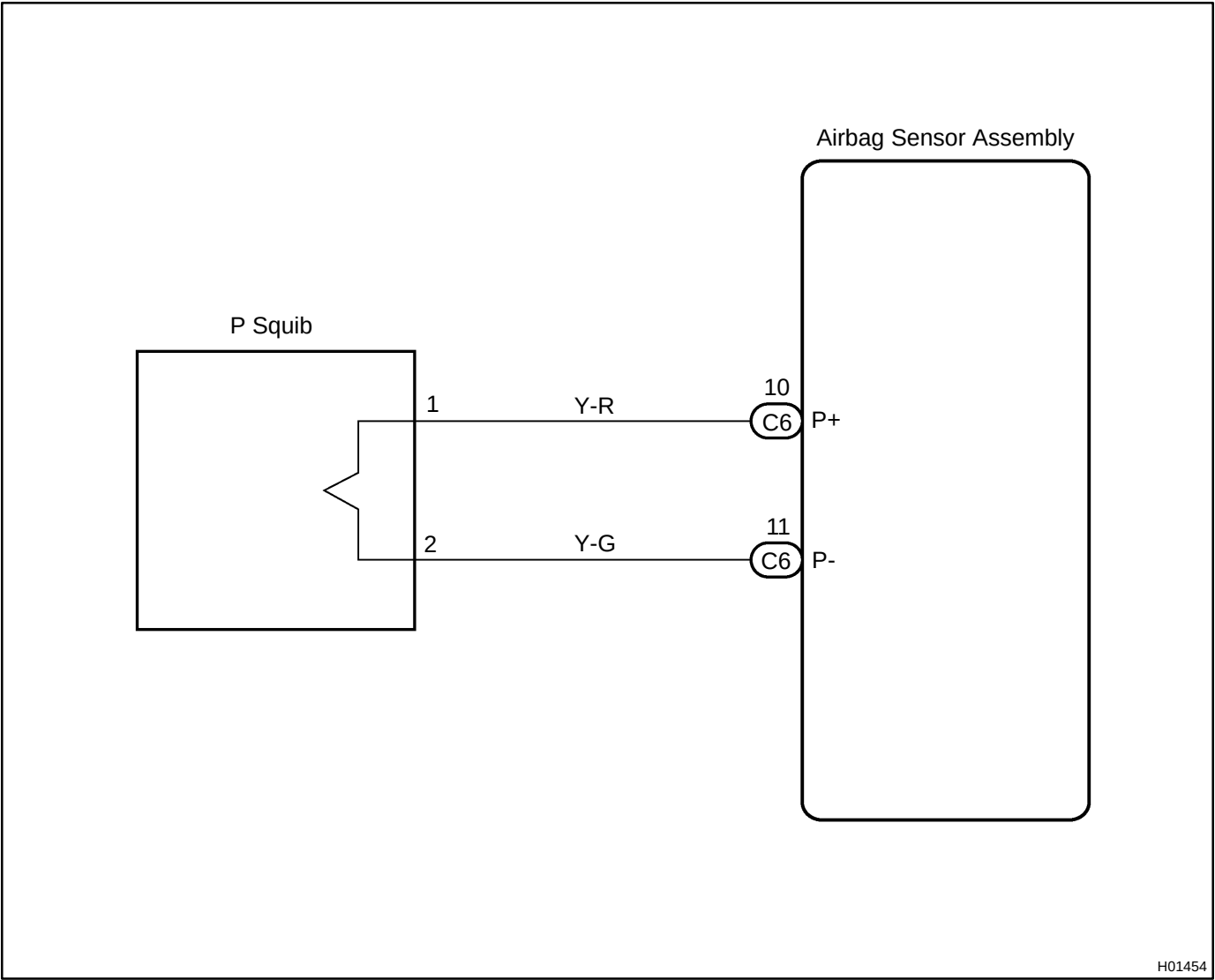
DTC	B0105/53	Short in P Squib Circuit

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-3](#) . 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

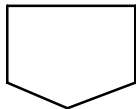
WIRING DIAGRAM



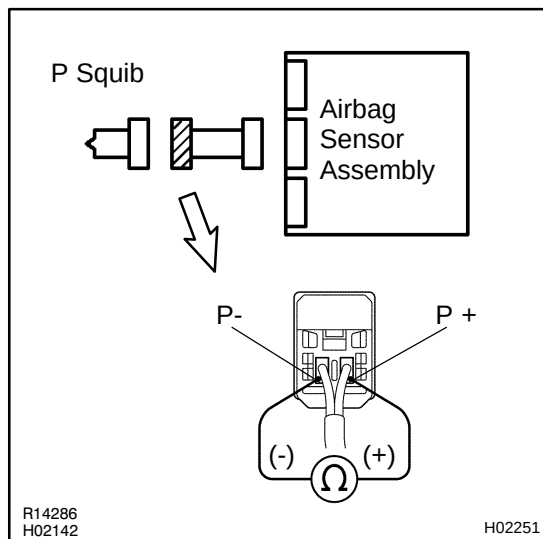
H01454

INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-475](#)).



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-349](#)).

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-.

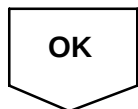
OK:

Resistance: 1 M Ω or Higher

NG

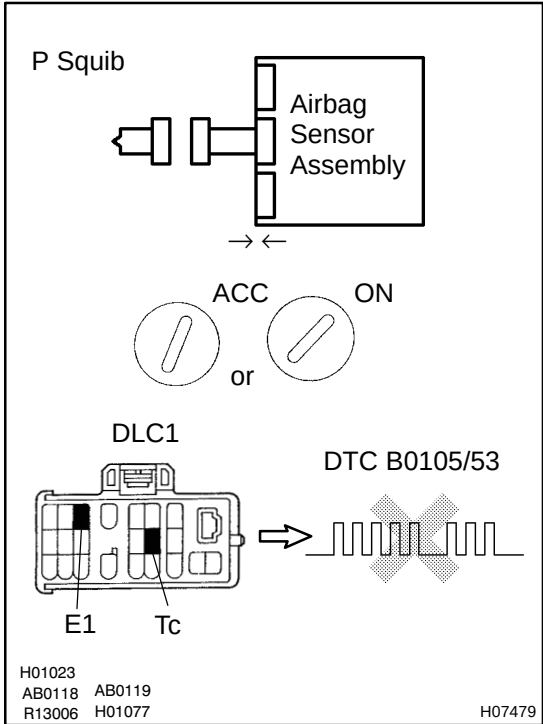
Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.

OK



3

Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0105/53 is not output.

HINT:

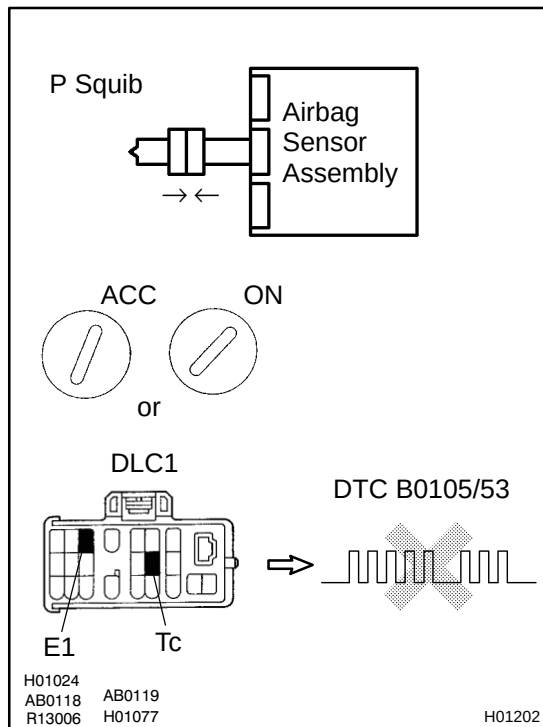
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3](#). DTC B0106/54 is recorded when an open is detected in the P squib circuit.

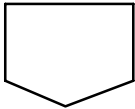
DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	●Open circuit in P+ wire harness or P- wire harness of squib ●P squib malfunction ●Airbag sensor assembly malfunction	●Front passenger airbag assembly (P squib) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

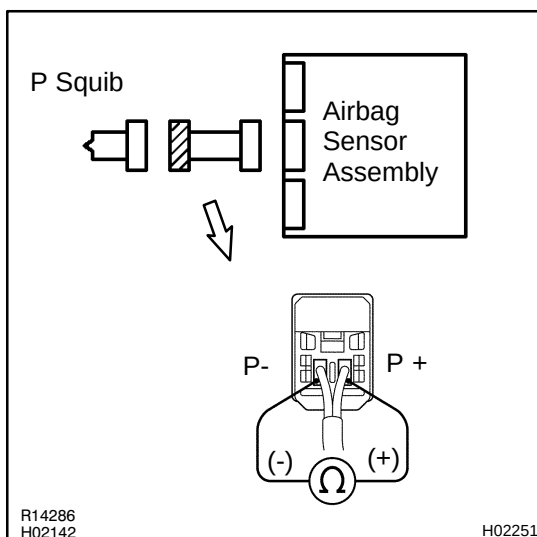
See page [DI-379](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

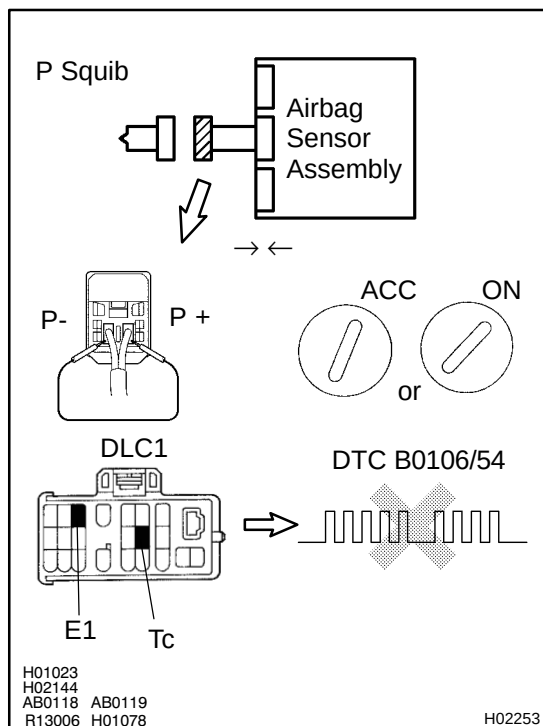
Resistance: Below 1 Ω

NG

Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.



3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0106/54 is not output.

HINT:

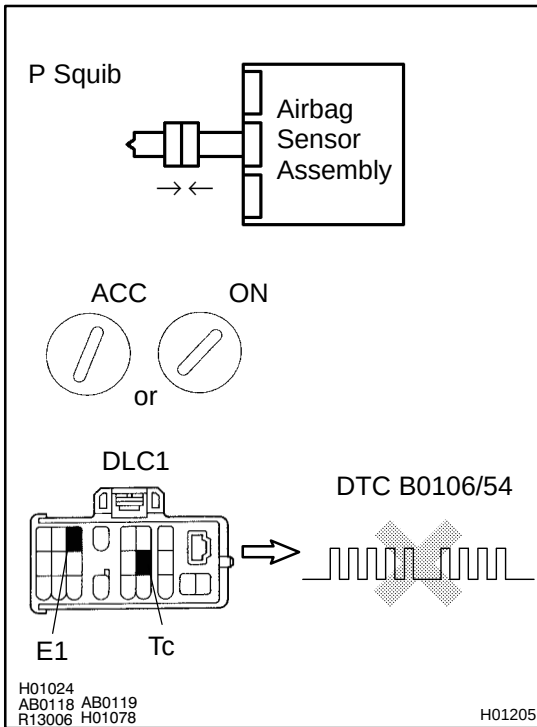
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3 . DTC B0107/51 is recorded when ground short is detected in the P squib circuit.

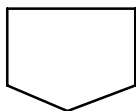
DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	•Short circuit in P squib wire harness (to ground) •P squib malfunction •Airbag sensor assembly malfunction	•Front passenger airbag assembly (P squib) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

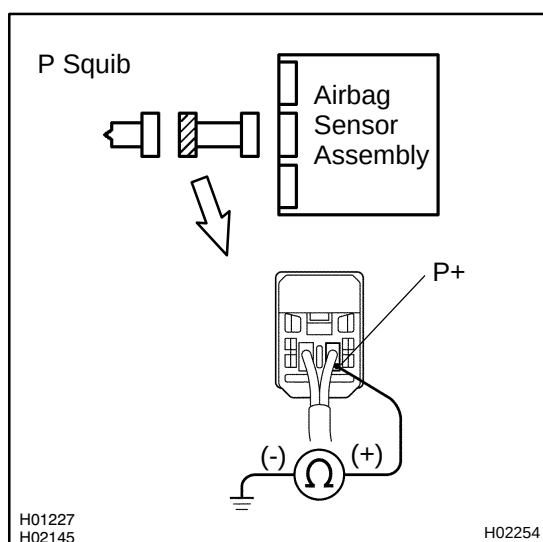
See page DI-379 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



2	Check P squib circuit.



CHECK:

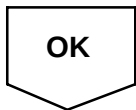
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and body ground.

OK:

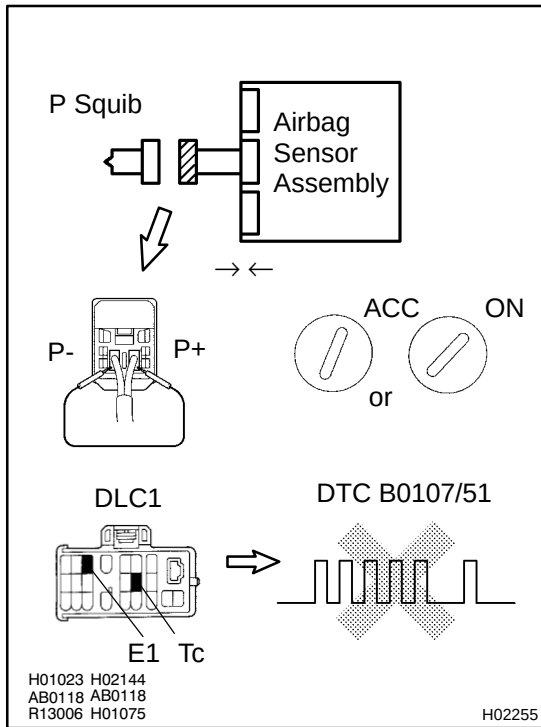
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.



3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0107/51 is not output.

HINT:

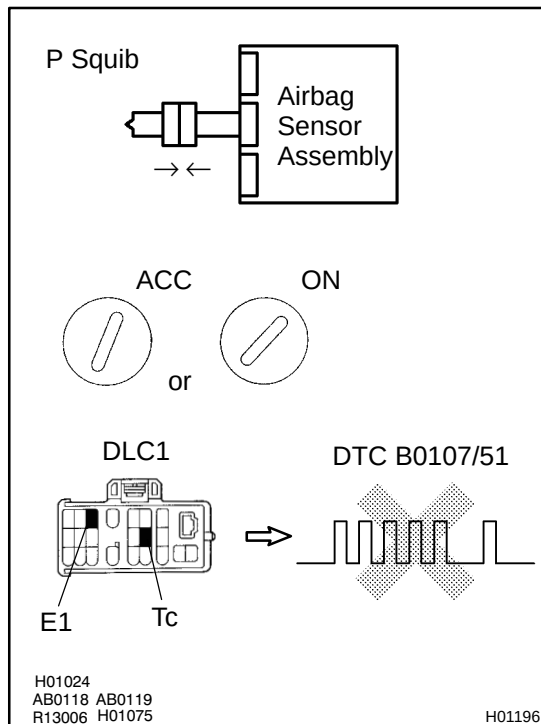
Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3 . DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

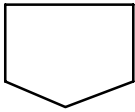
DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	•Short circuit in P squib wire harness (to B+) •P squib malfunction •Airbag sensor assembly malfunction	•Front passenger airbag assembly (P squib) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

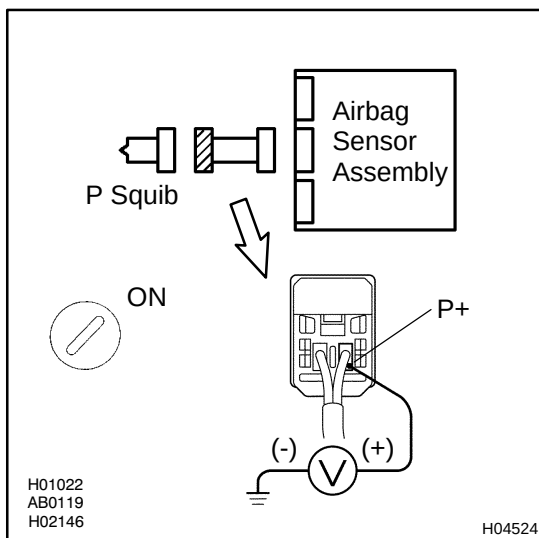
See page DI-379 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



2	Check P squib circuit.



CHECK:

- Turn the ignition switch to ON.
- For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the voltage between the P+ and body ground.

OK:

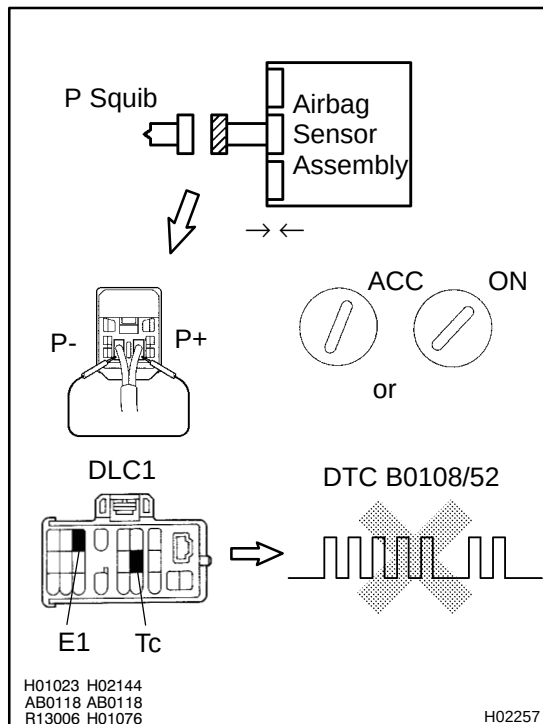
Voltage: 0 V

NG

Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0108/52 is not output.

HINT:

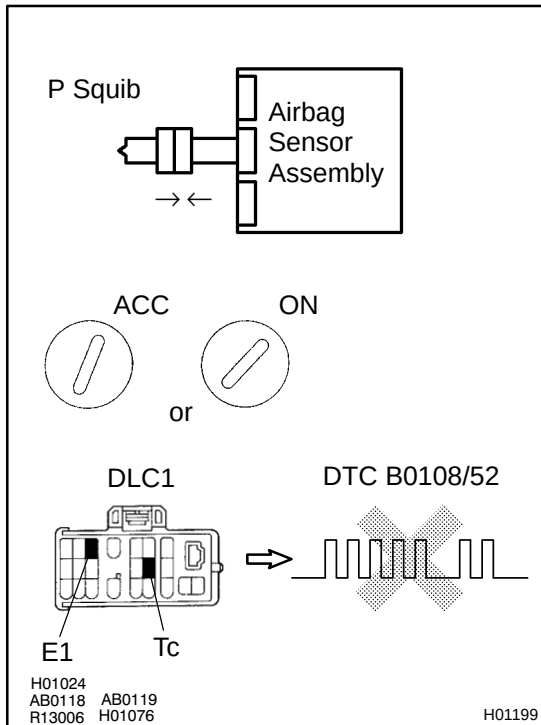
Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P squib.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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.

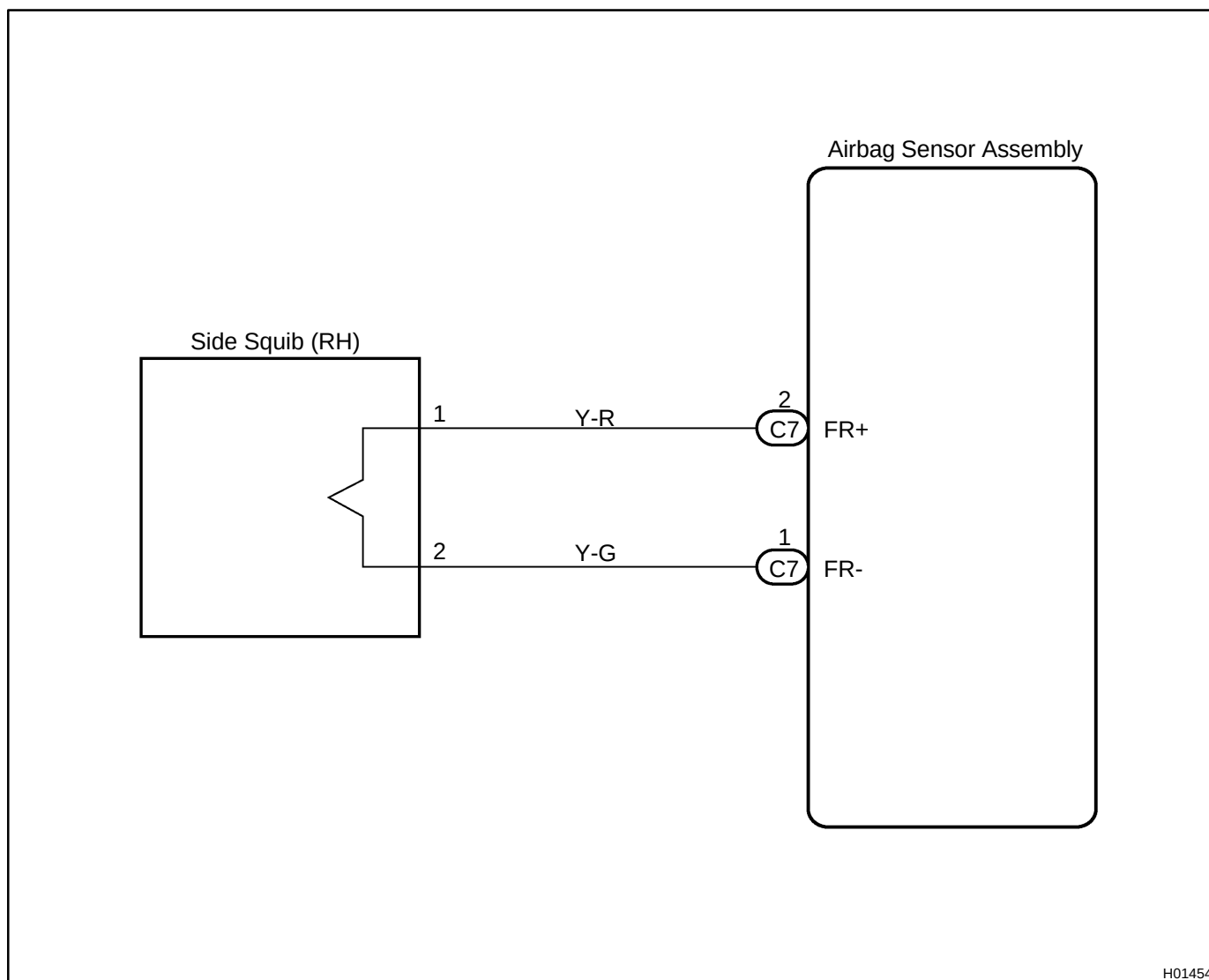
DTC	B0110/43	Short in Side Squib (RH) Circuit

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-3](#). 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 FR+ wire harness and FR- wire harness of squib ●Side squib (RH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (RH) ●Airbag sensor assembly ●Wire harness

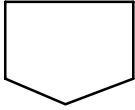
WIRING DIAGRAM



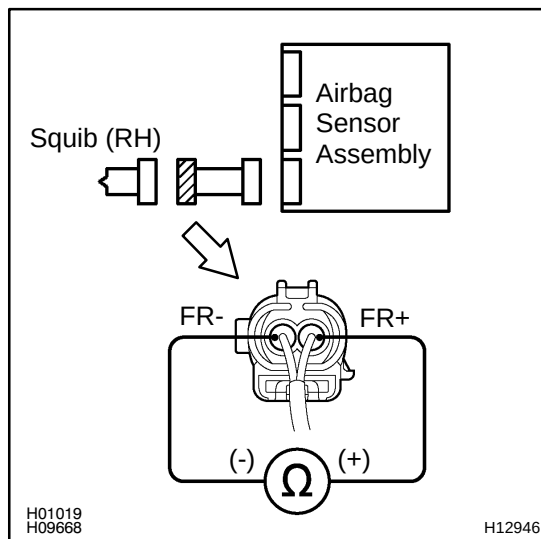
H01454

INSPECTION PROCEDURE

- 1 Prepare for inspection (See step 1 on page [DI-475](#)).



- 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-349](#)).

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 FR+ and FR-.

OK:

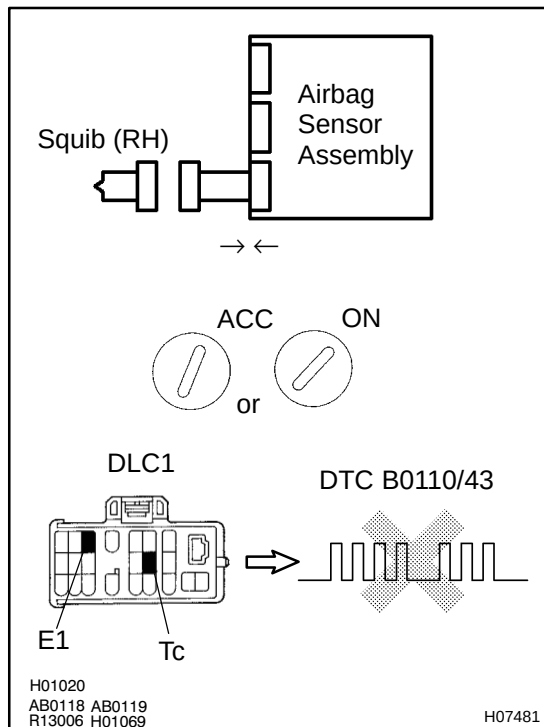
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0110/43 is not output.

HINT:

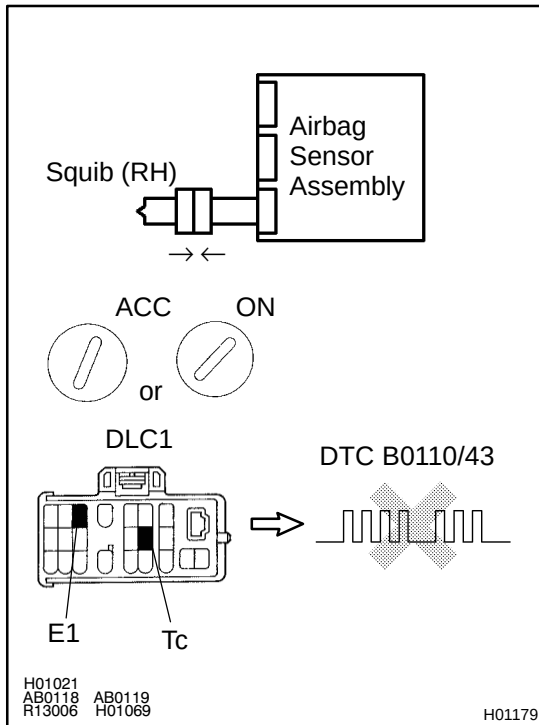
Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 second.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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 (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-3 . DTC B0111/44 is recorded when an open is detected in the side squib (RH) circuit.

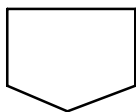
DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	●Open circuit in FR+ wire harness or FR- wire harness of squib ●Side squib (RH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (RH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

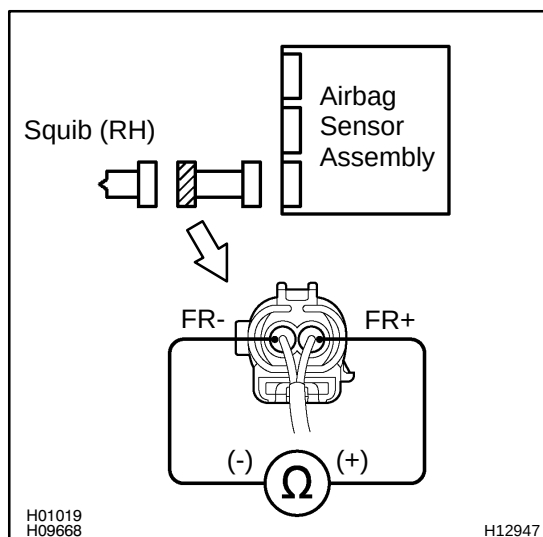
See page DI-392 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



2	Check front side squib (RH) circuit.



CHECK:

For the connector (on the front side airbag assembly side) between the front side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between FR+ and FR-.

OK:

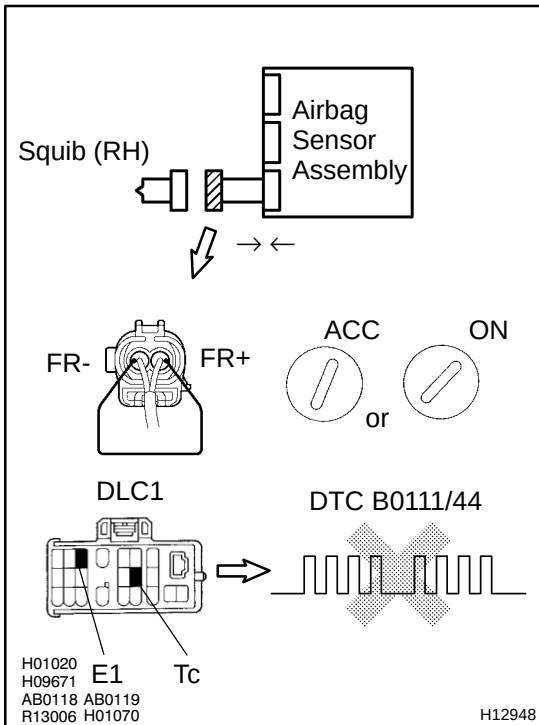
Resistance: Below 1 Ω

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 FR+ and FR- of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0111/44 is not output.

HINT:

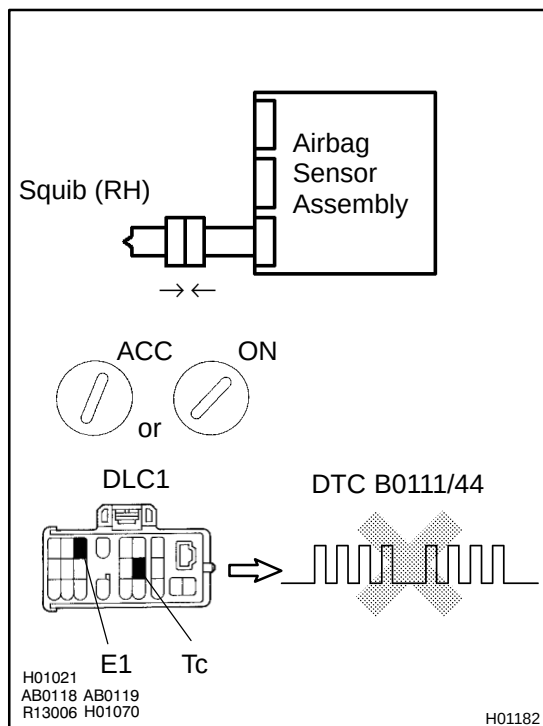
Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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 (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-3 .

DTC B0112/41 is recorded when ground short is detected in the side squib (RH) circuit.

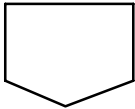
DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	•Short circuit in side squib (RH) wire harness (to ground) •Side squib (RH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

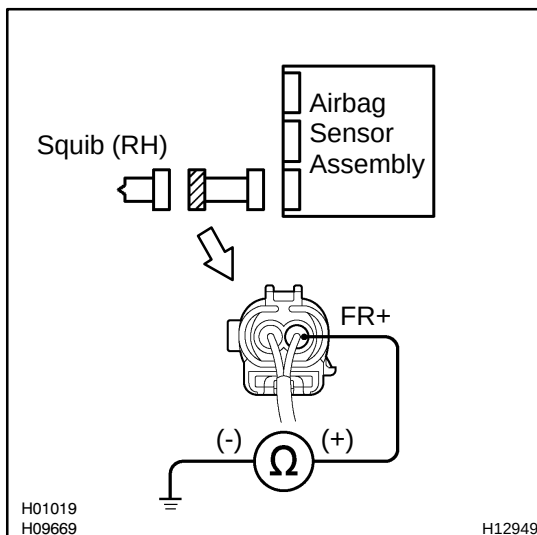
See page DI-392 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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 FR+ and body ground.

OK:

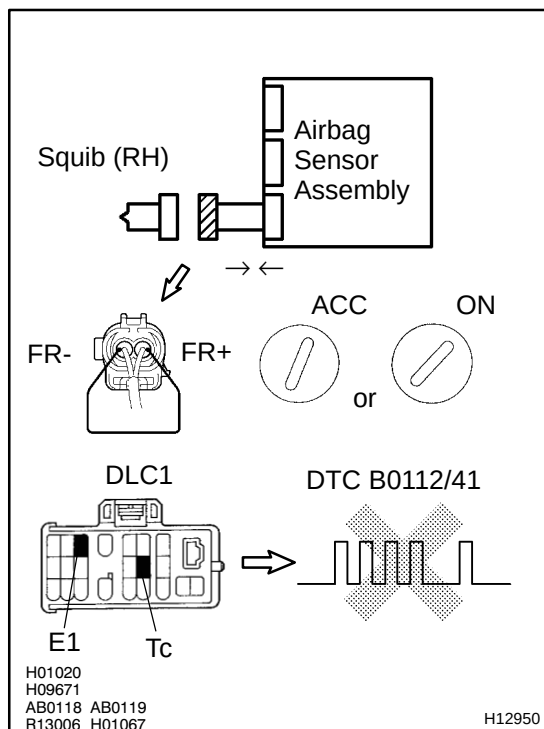
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect FR+ and FR- of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0112/41 is not output.

HINT:

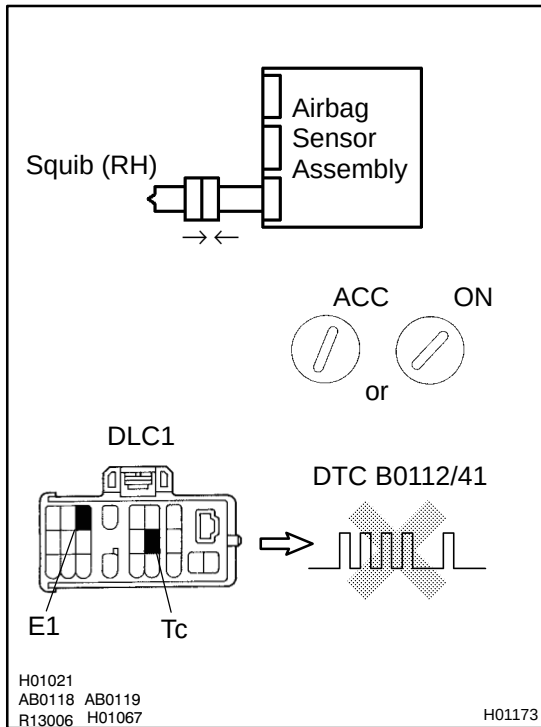
Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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 (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-3](#).

DTC B0113/42 is recorded when a B+ short is detected in the side squib (RH) circuit.

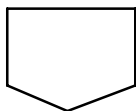
DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	•Short circuit in side squib (RH) wire harness (to B+) •Side squib (RH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

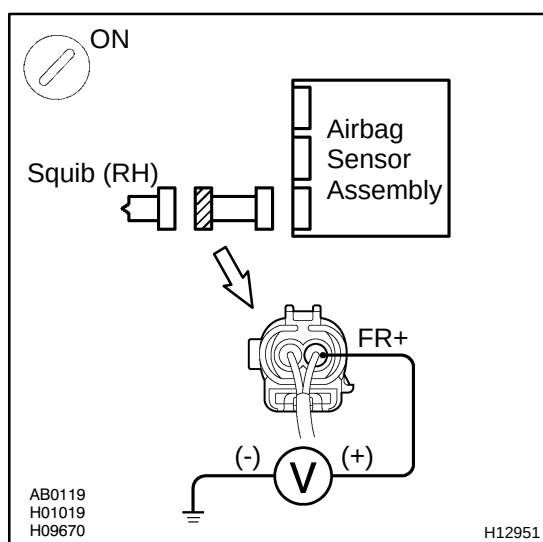
See page [DI-392](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-349).



2	Check side squib (RH) circuit.



CHECK:

- Turn the ignition switch to ON.
- For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the voltage between FR+ and body ground.

OK:

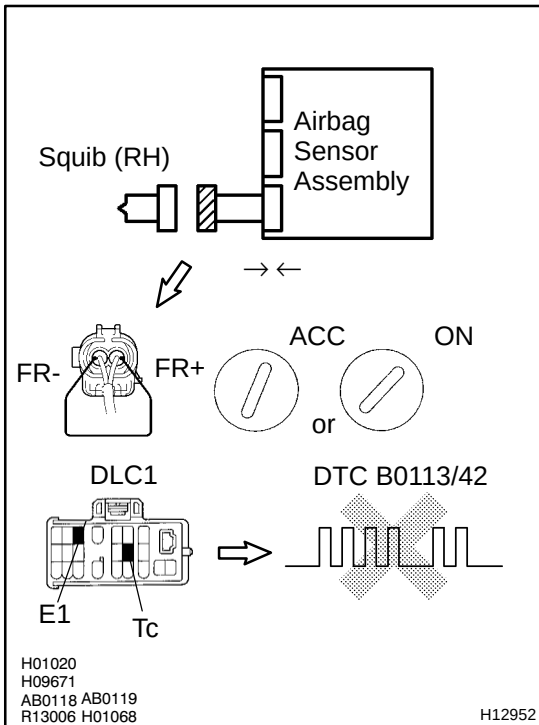
Voltage: 0 V

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 FR+ and FR- of the connector (on the front side airbag assembly side) between the front side airbag assembly (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0113/42 is not output.

HINT:

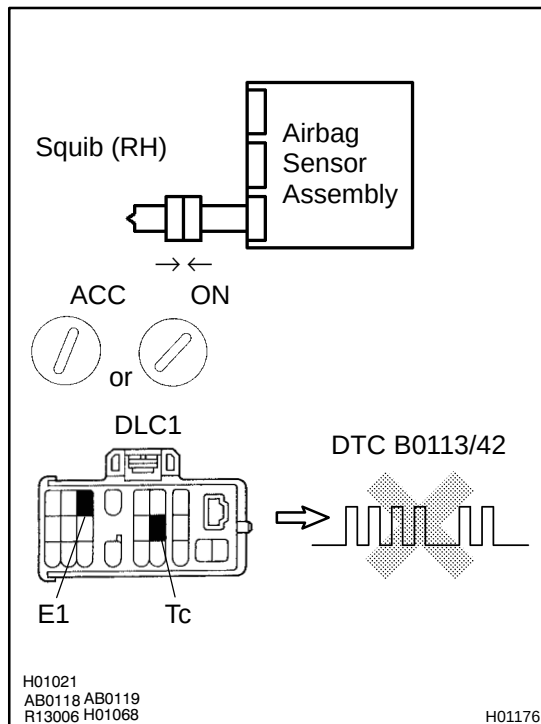
Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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).

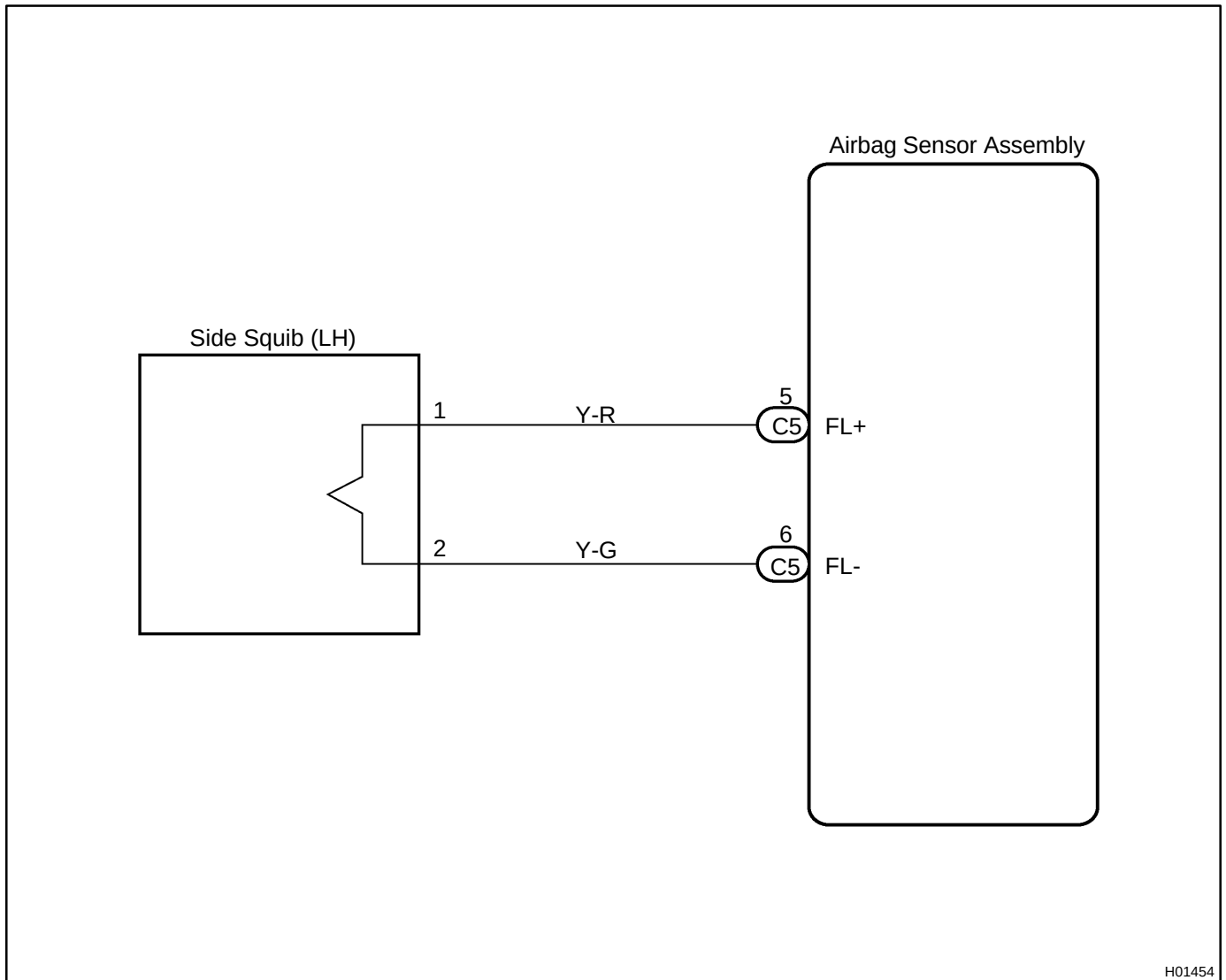
It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page [RS-3](#).

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 FL+ wire harness and FL- wire harness of squib ●Side squib (LH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (LH) ●Airbag sensor assembly ●Wire harness

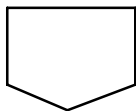
WIRING DIAGRAM



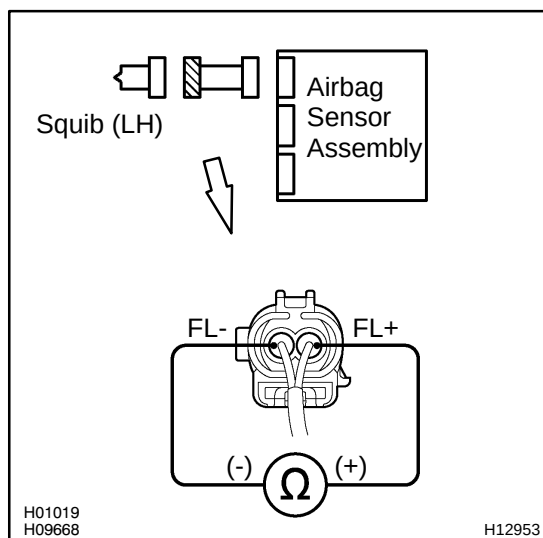
H01454

INSPECTION PROCEDURE

- 1** Prepare for inspection (See step 1 on page [DI-475](#)).



- 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-349](#)).

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 FL+ and FL-.

OK:

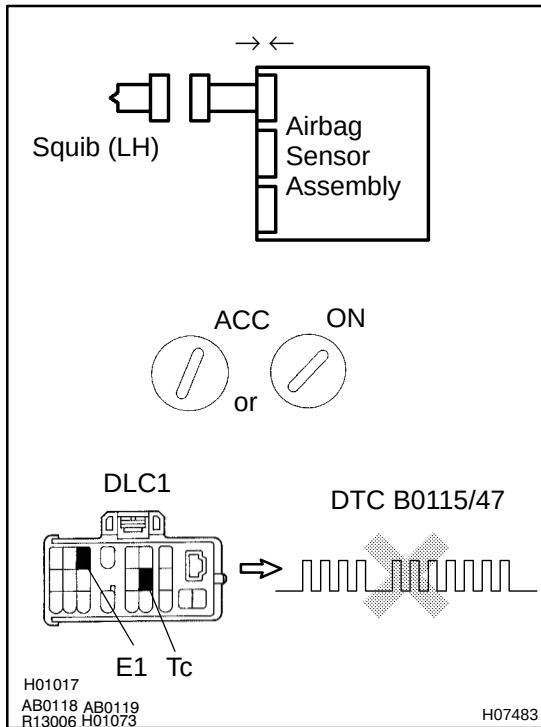
Resistance: 1 MΩ or Higher

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 the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0115/47 is not output.

HINT:

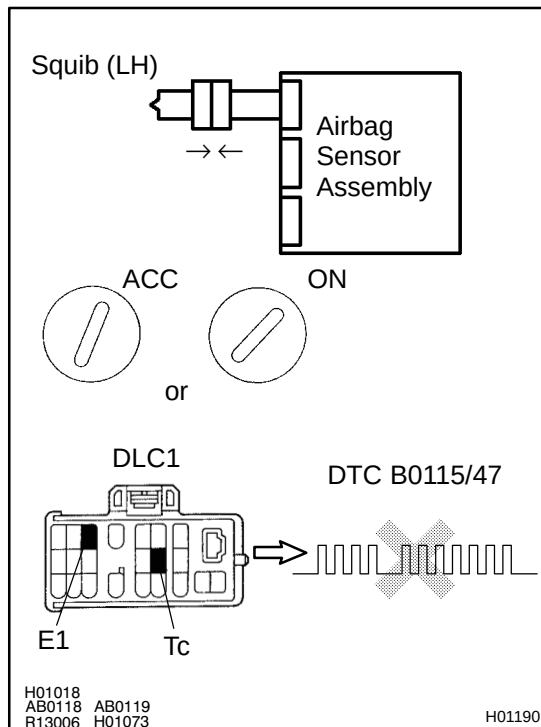
Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 second.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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 (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-3 . DTC B0116/48 is recorded when an open is detected in the side squib (LH) circuit.

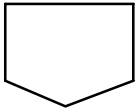
DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	●Open circuit in FL+ wire harness or FL- wire harness of squib ●Side squib (LH) malfunction ●Airbag sensor assembly malfunction	●Side airbag assembly (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

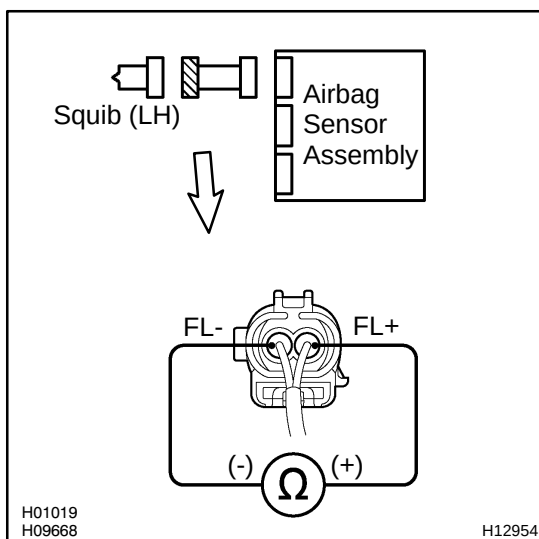
See page DI-405 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-475)



2	Check side squib (LH) circuit.



CHECK:

For the connector (on the front side airbag assembly side) between the front side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between FL+ and FL-.

OK:

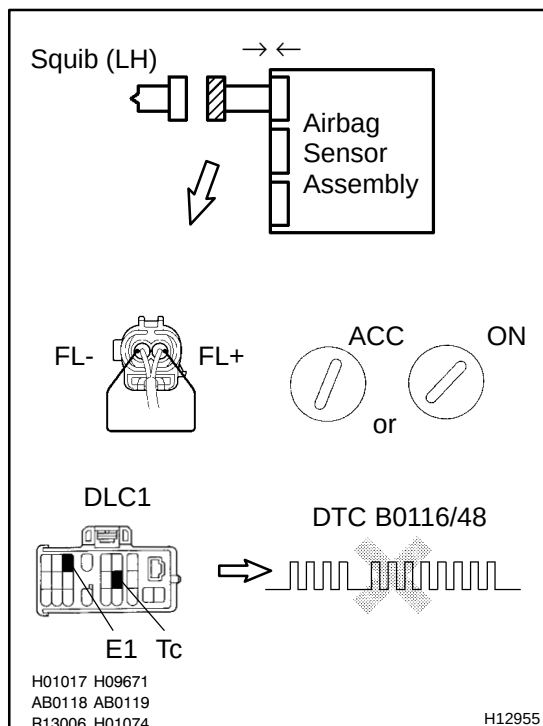
Resistance: Below 1 Ω

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 FL+ and FL- of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0116/48 is not output.

HINT:

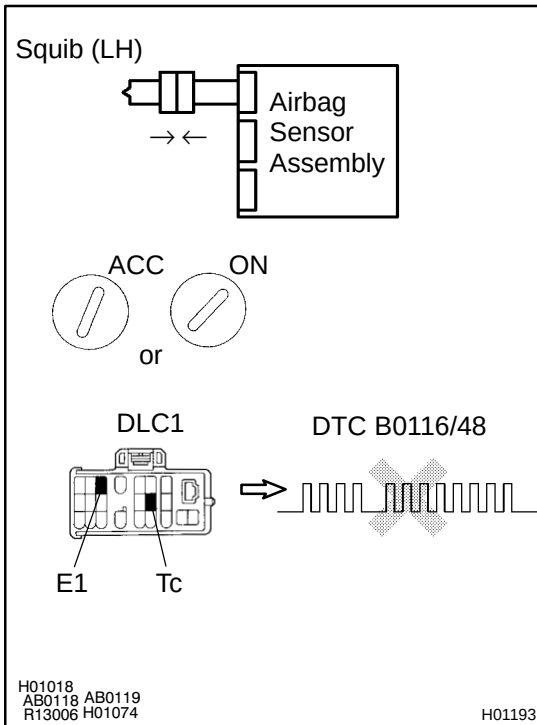
Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

NG

Replace side airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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 (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-3](#). DTC B0117/45 is recorded when ground short is detected in the side squib (LH) circuit.

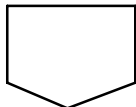
DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	•Short circuit in side squib (LH) wire harness (to ground) •Side squib (LH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (LH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

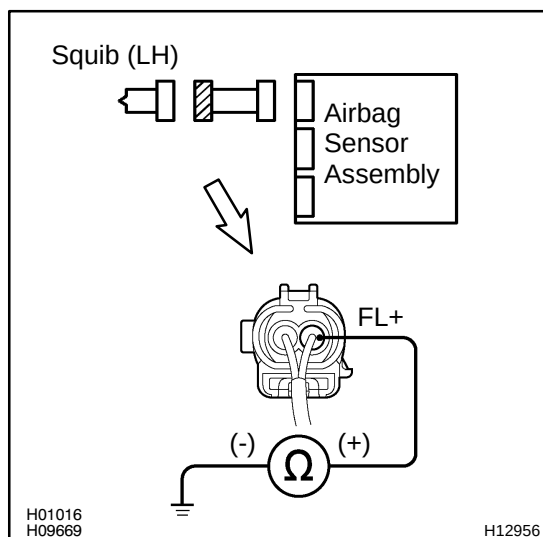
See page [DI-405](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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 FL+ and body ground.

OK:

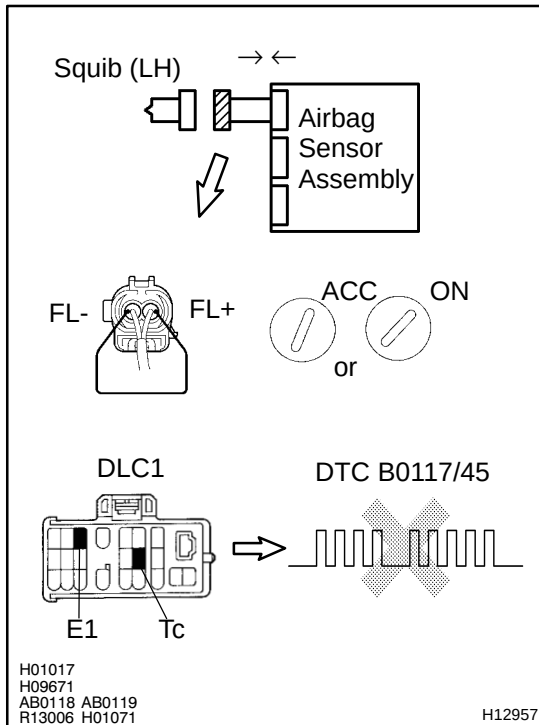
Resistance: 1 MΩ or Higher



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 FL+ and FL- of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check DTC (See page [DI-349](#)).

OK:

DTC B0117/45 is not output.

HINT:

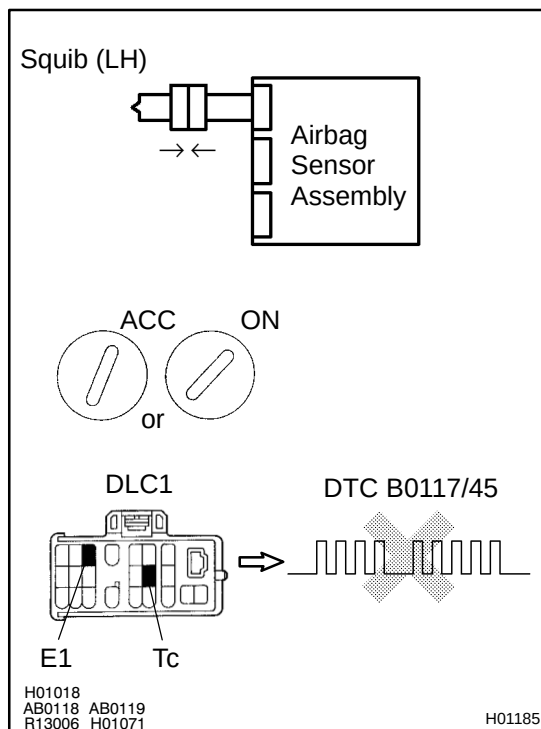
Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0117/45 is not output.

HINT:

Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG

Replace front side airbag assembly (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B0118/46	Short in Side Squib (LH) Circuit (to B)

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-3 . DTC B0118/46 is recorded when a B+ short is detected in the side squib (LH) circuit.

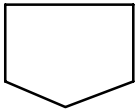
DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	•Short circuit in side squib (LH) wire harness (to B+) •Side squib (LH) malfunction •Airbag sensor assembly malfunction	•Side airbag assembly (LH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

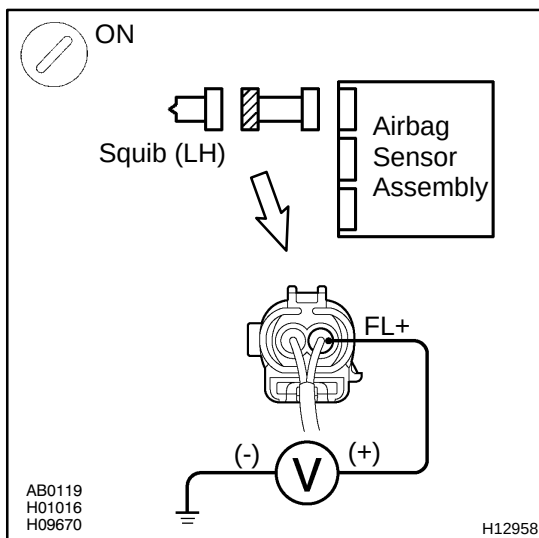
See page DI-405 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



2	Check side squib (LH) circuit.



CHECK:

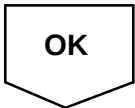
- Turn the ignition switch to ON.
- For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the voltage between FL+ and body ground.

OK:

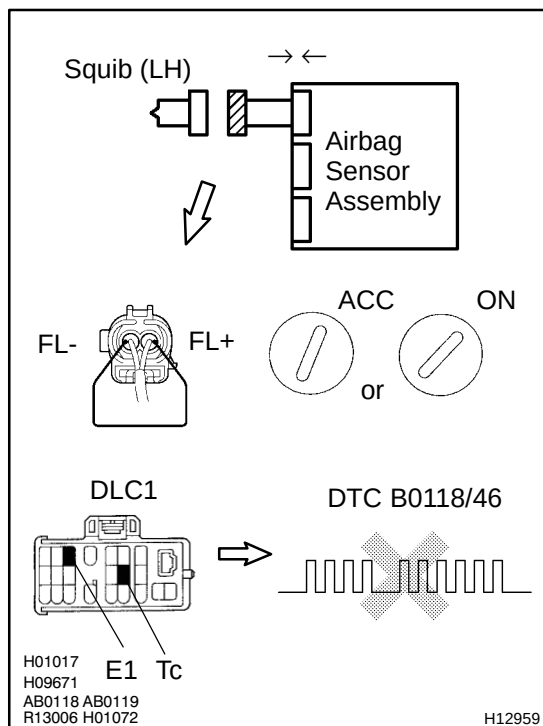
Voltage: 0 V

NG

Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.



3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect FL+ and FL- of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0118/46 is not output.

HINT:

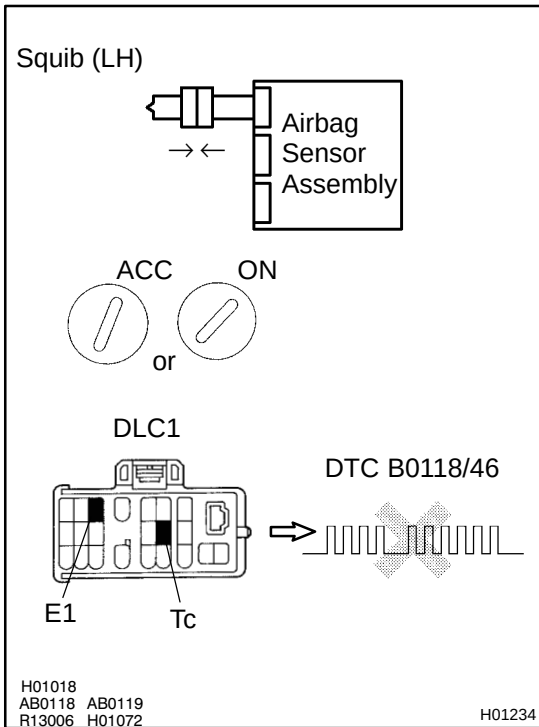
Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check side squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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.

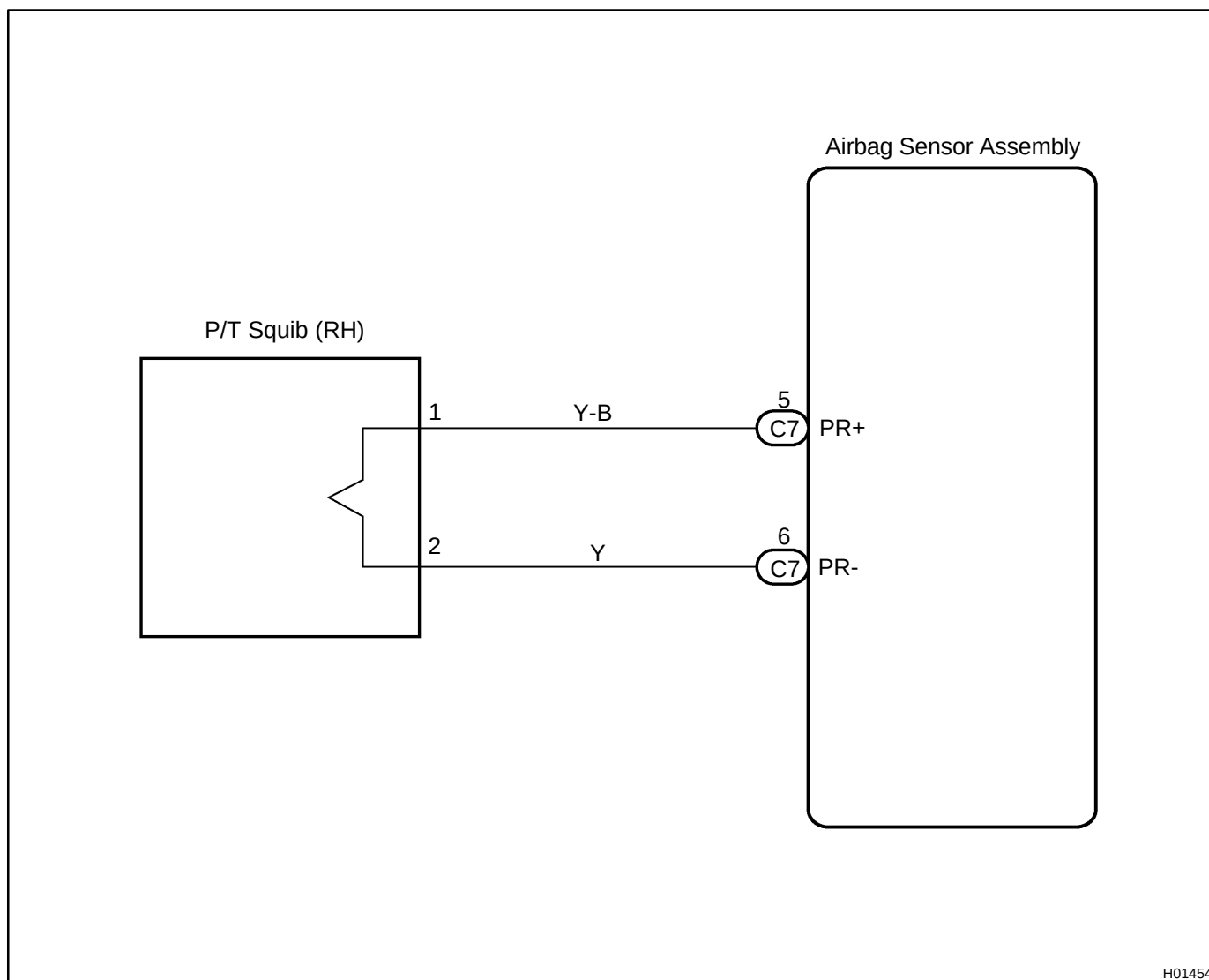
DTC	B0130/63	Short in P/T Squib (RH) Circuit

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-3](#). 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

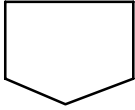
WIRING DIAGRAM



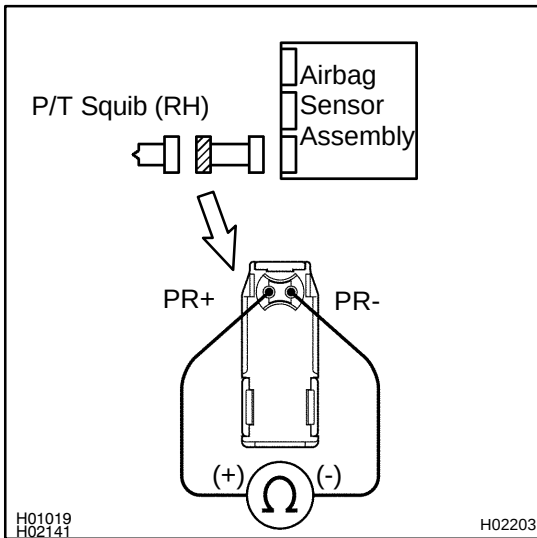
H01454

INSPECTION PROCEDURE

- 1 Prepare for inspection (See step 1 on page [DI-475](#)).



- 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-349](#)).

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR-.

OK:

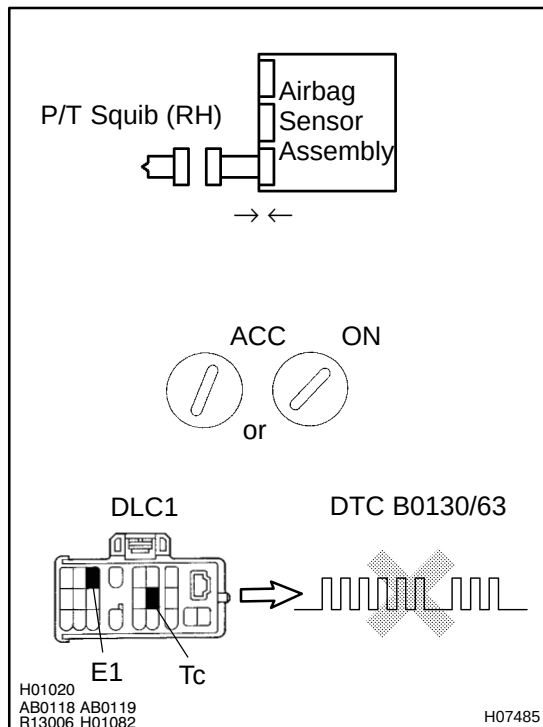
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.

**PREPARATION:**

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0130/63 is not output.

HINT:

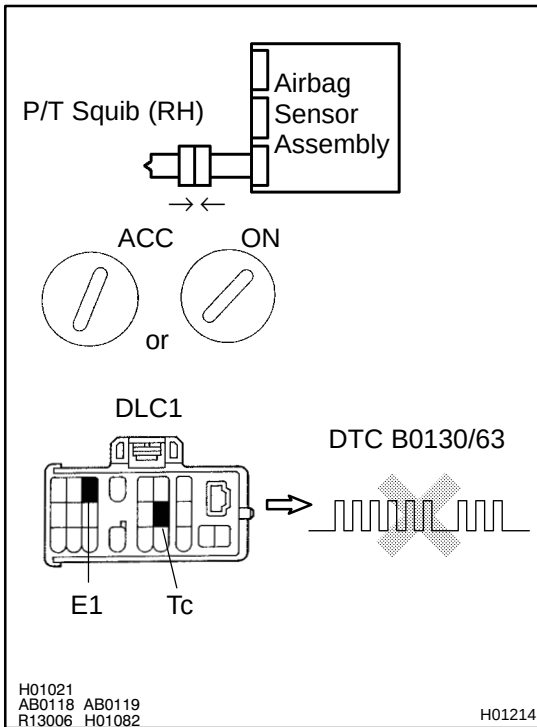
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 second.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3](#).

DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

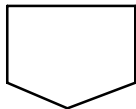
DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	●Open circuit in PR+ wire harness or PR- wire harness of squib ●P/T squib (RH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (RH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

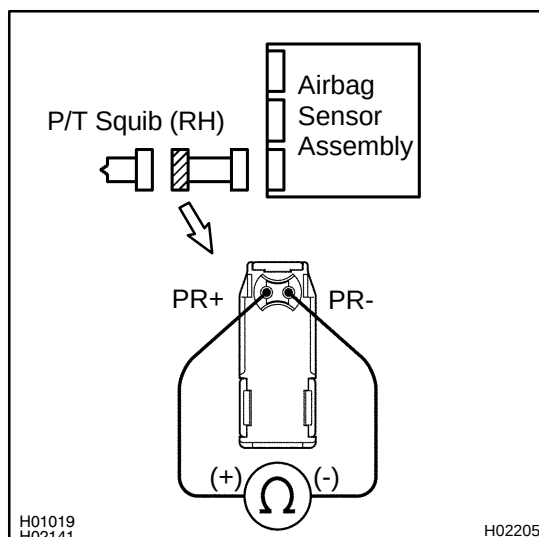
See page [DI-418](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

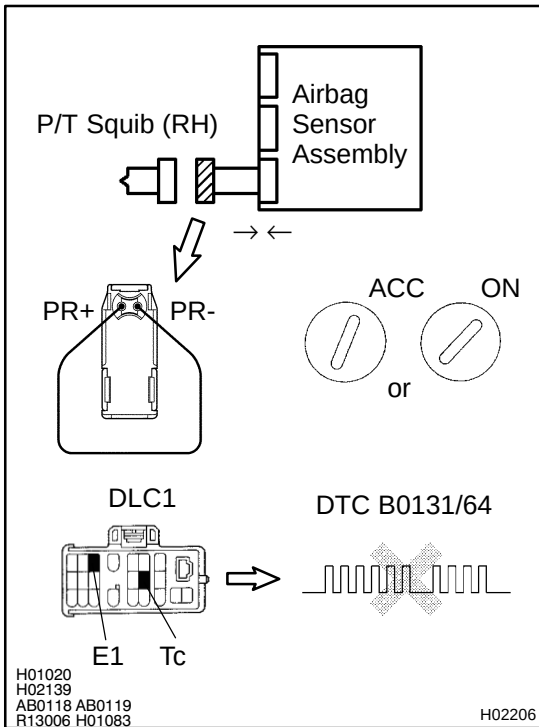
Resistance: Below 1 Ω

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 the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0131/64 is not output.

HINT:

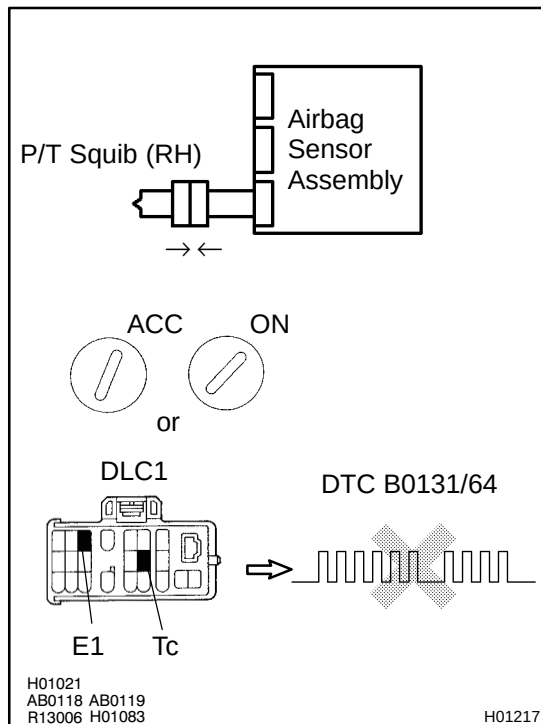
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3 .

DTC B0132/61 is recorded when a ground short is detected in the P/T squib (RH) circuit.

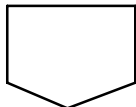
DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	•Short circuit in P/T squib (RH) wire harness (to ground) •P/T squib (RH) malfunction •Airbag sensor assembly malfunction	•Seat belt pretensioner (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

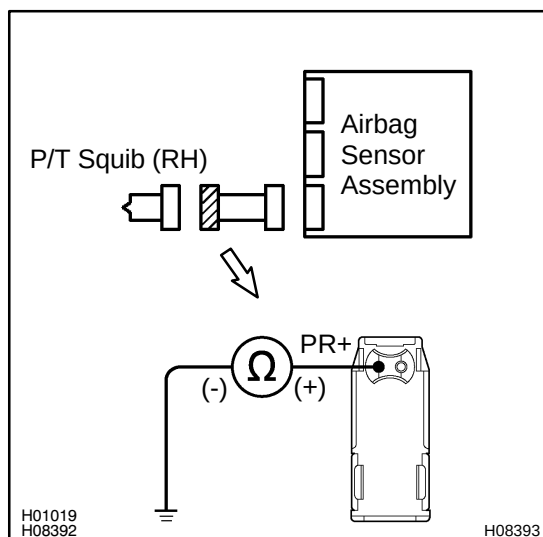
See page DI-418 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

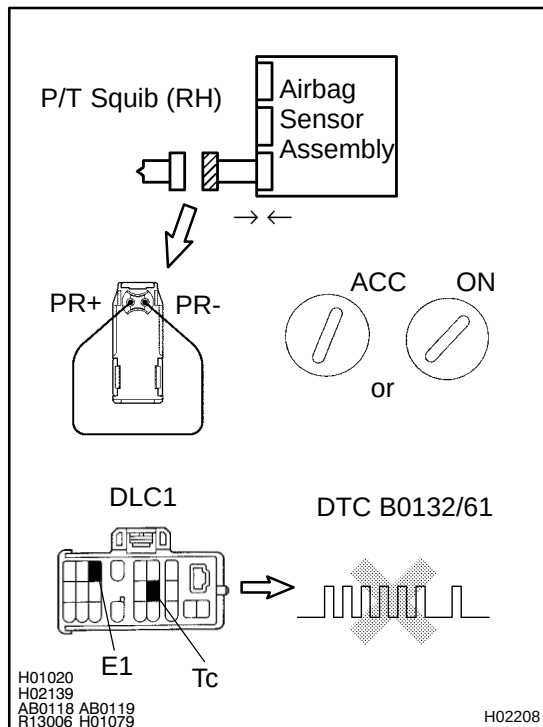
Resistance: 1 MΩ or Higher

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 the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0132/61 is not output.

HINT:

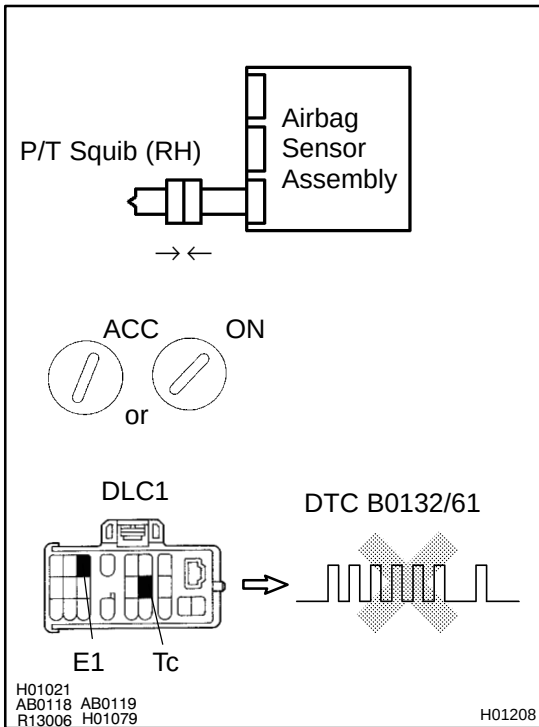
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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	B0132/62	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-3.

DTC B0133/62 is recorded when a B+ short is detected in the P/T squib (RH) circuit.

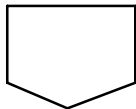
DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	•Short circuit in seat belt pretensioner (RH) wire harness (to B+) •P/T squib (RH) malfunction •Airbag sensor assembly malfunction	•Seat belt pretensioner (RH) •Airbag sensor assembly •Wire harness

WIRING DIAGRAM

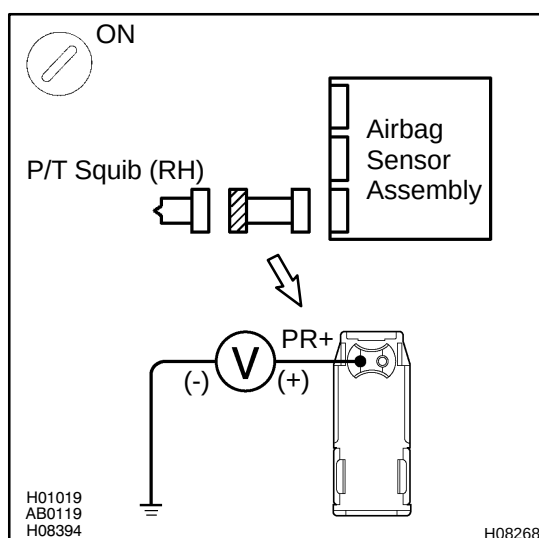
See page DI-418.

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



2	Check P/T squib (RH) circuit.



CHECK:

- Turn the ignition switch to ON.
- For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the voltage between PR+ and body ground.

OK:

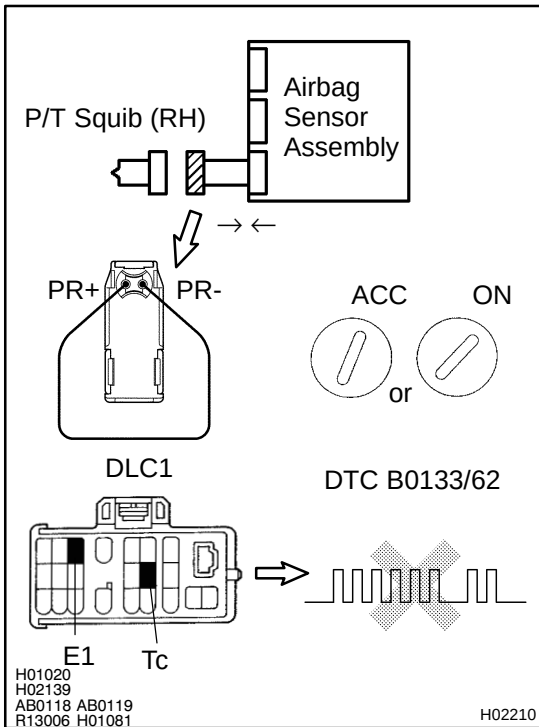
Voltage: 0 V

NG

Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PR+ and PR- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0133/62 is not output.

HINT:

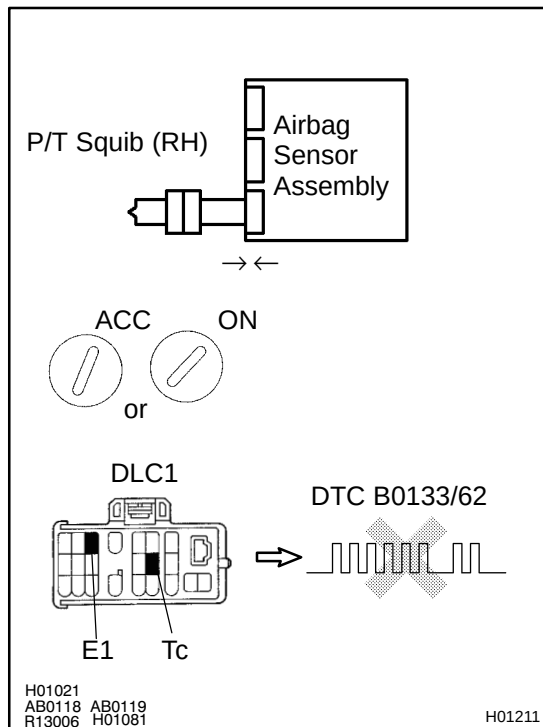
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (RH).



PREPARATION:

- Turn ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (RH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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).

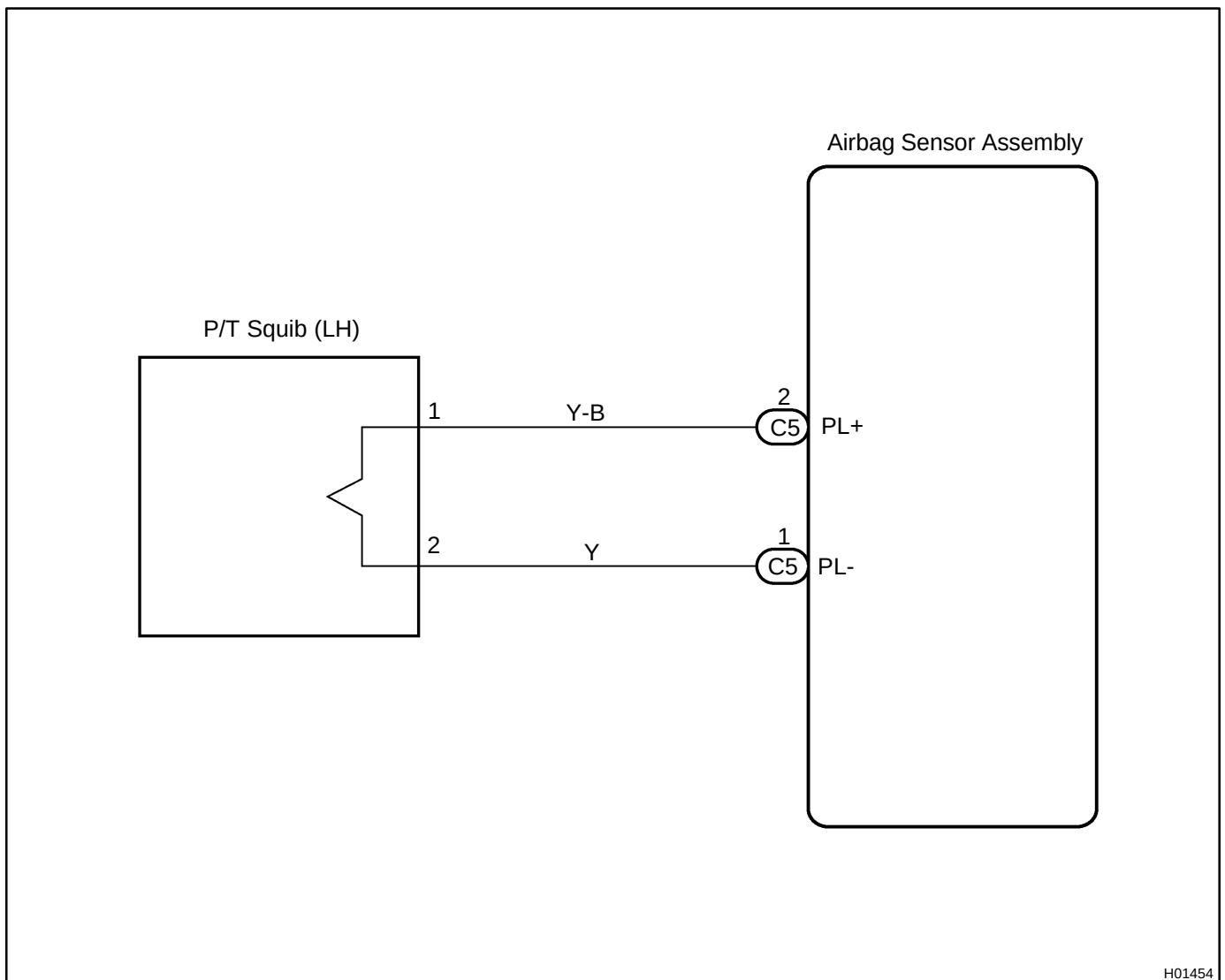
It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page [RS-3](#).

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

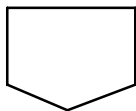
WIRING DIAGRAM



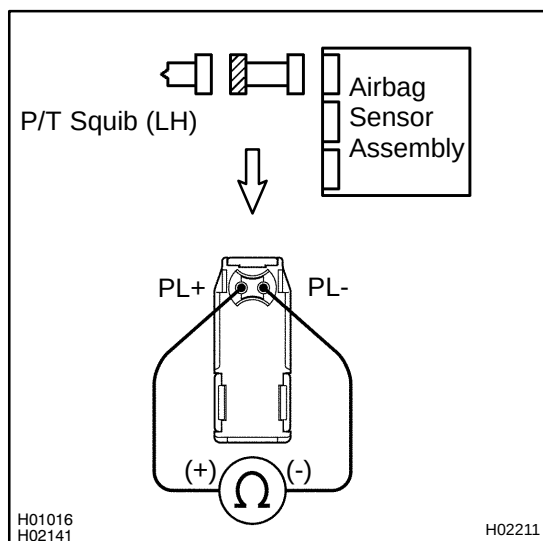
H01454

INSPECTION PROCEDURE

- 1 Prepare for inspection (See step 1 on page [DI-475](#)).



- 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-349](#)).

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL-.

OK:

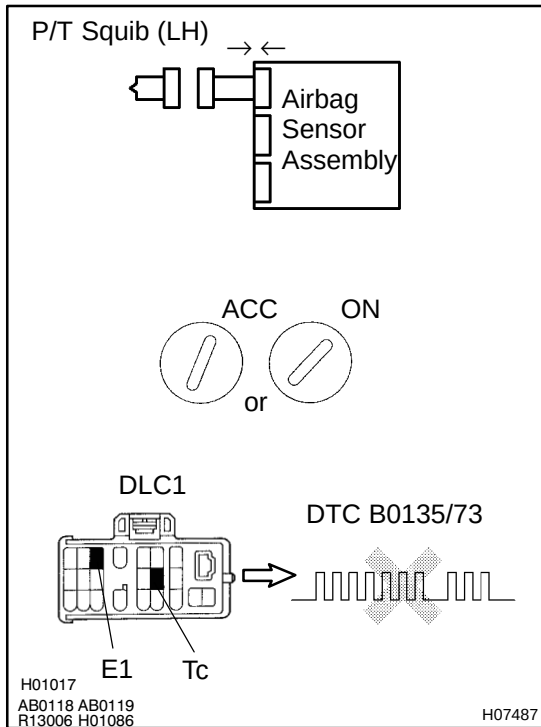
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.

OK

3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0135/73 is not output.

HINT:

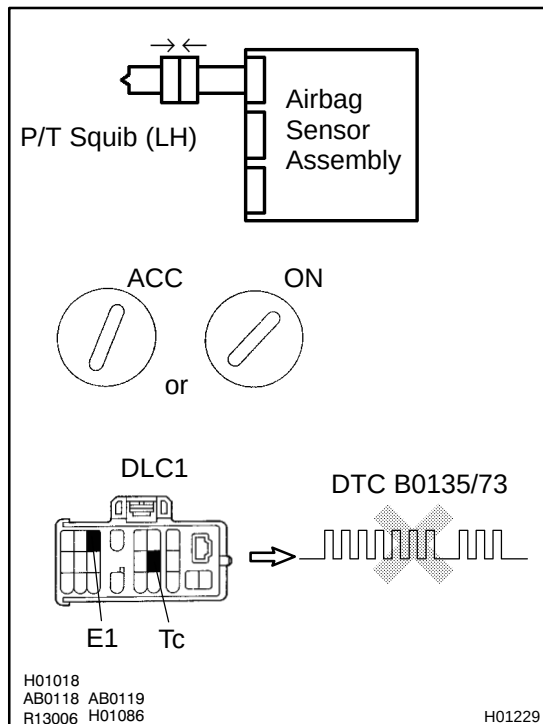
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3](#). DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

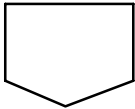
DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	●Open circuit in PL+ wire harness or PL- wire harness of squib ●P/T squib (LH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

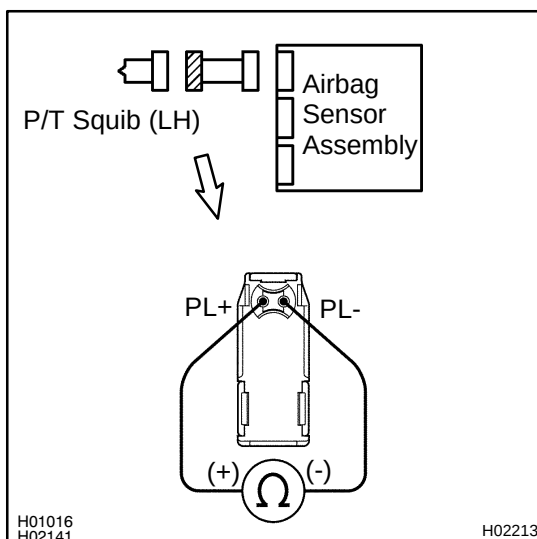
See page [DI-431](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

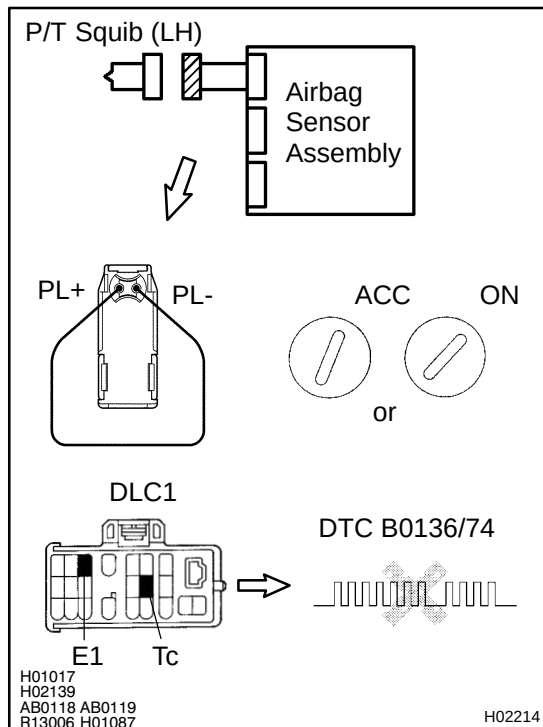
Resistance: Below 1 Ω

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 the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0136/74 is not output.

HINT:

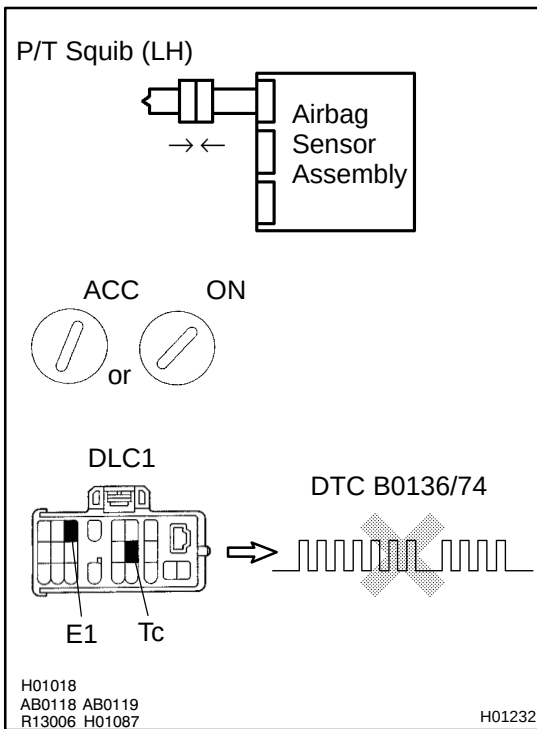
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3 .

DTC B0137/71 is recorded when a ground short is detected in the P/T squib (LH) circuit.

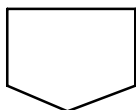
DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	●Short circuit in P/T squib (LH) wire harness (to ground) ●P/T squib (LH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

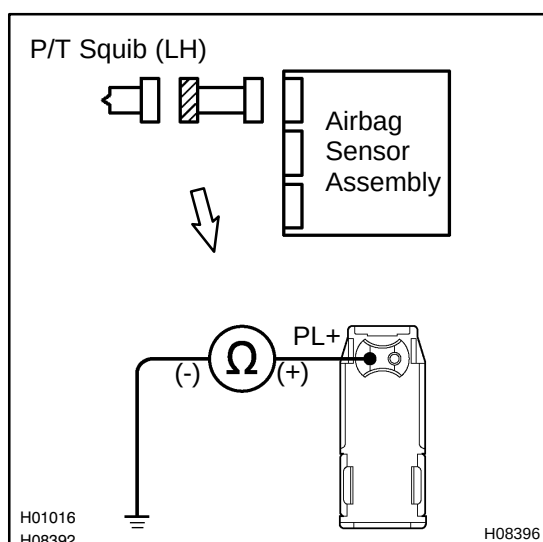
See page DI-431 .

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



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:

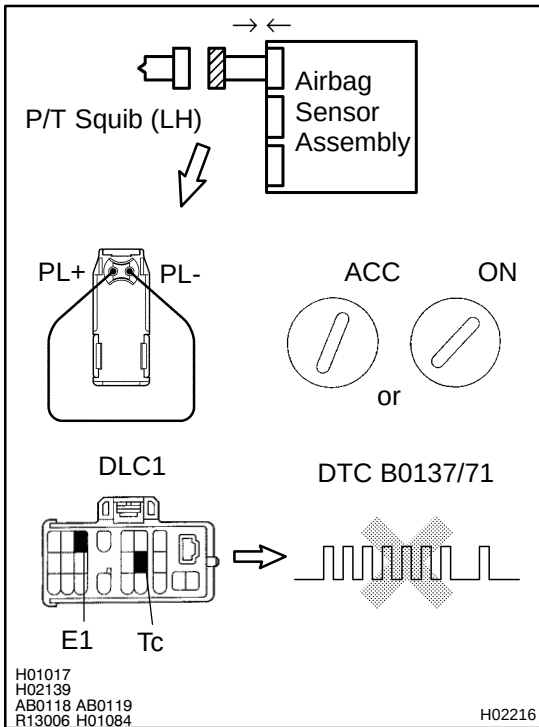
Resistance: 1 MΩ or Higher

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 the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0137/71 is not output.

HINT:

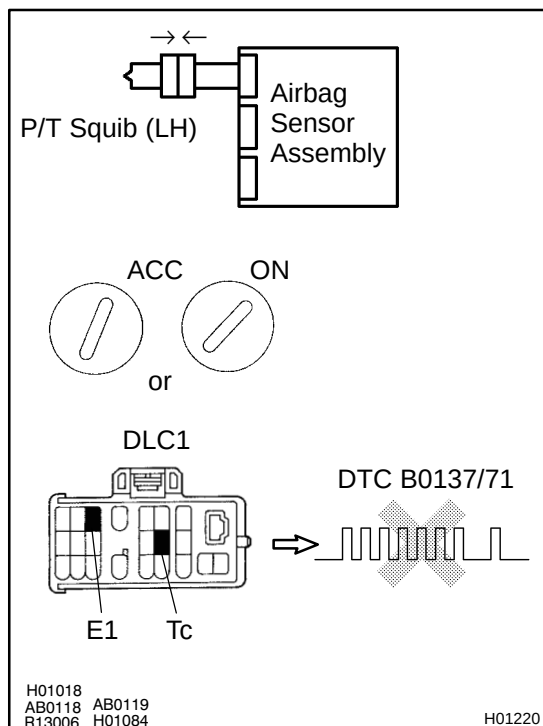
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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-3](#).

DTC B0138/72 is recorded when a B+ short is detected in the P/T squib (LH) circuit.

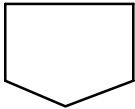
DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	●Short circuit in seat belt pretensioner (LH) wire harness (to B+) ●P/T squib (LH) malfunction ●Airbag sensor assembly malfunction	●Seat belt pretensioner (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

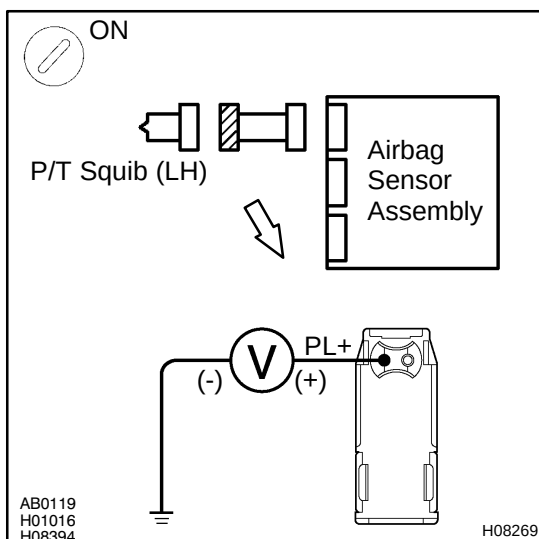
See page [DI-431](#).

INSPECTION PROCEDURE

1	Prepare for inspection (See step 1 on page DI-475).



2	Check P/T squib (LH) circuit.



CHECK:

- Turn the ignition switch to ON.
- For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the voltage between PL+ and body ground.

OK:

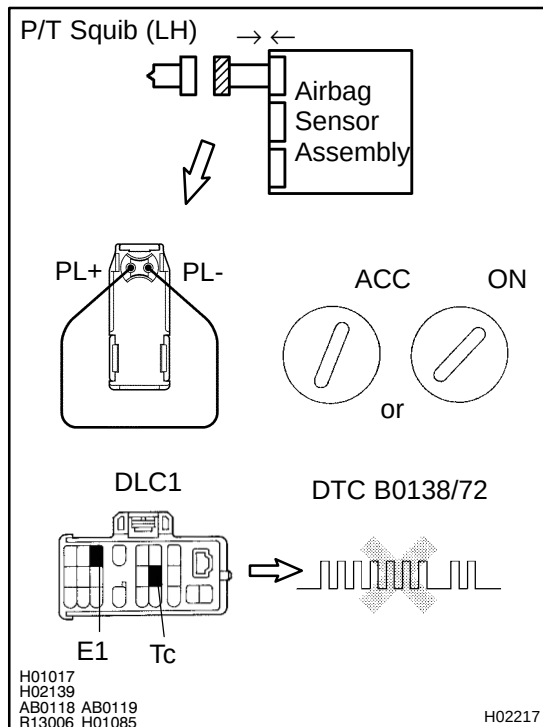
Voltage: 0 V

NG

Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.



3 Check airbag sensor assembly.



PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PL+ and PL- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B0138/72 is not output.

HINT:

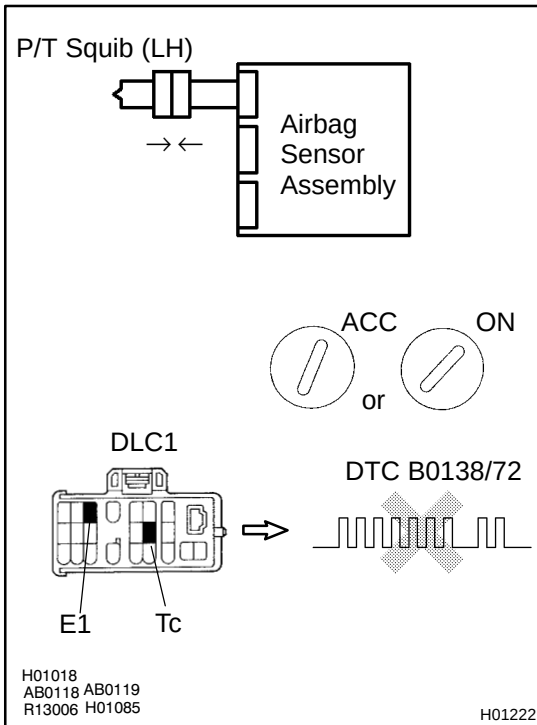
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

4 Check P/T squib (LH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner (LH) connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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 a airbag sensor, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.

It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

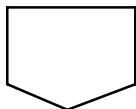
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	●Airbag sensor assembly malfunction	●Airbag sensor assembly

INSPECTION PROCEDURE

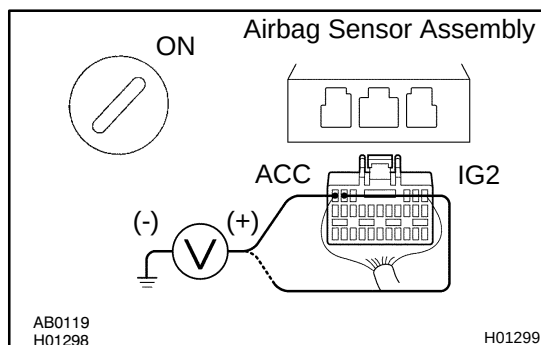
HINT:

When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

1	Prepare for inspection (See step 1 on page DI-475).



2	Check voltage at IG2 and ACC of airbag sensor assembly.



CHECK:

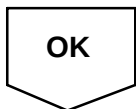
- Turn the ignition switch to ON.
- Measure the voltage between body ground and each of terminals IG2 and ACC of the airbag sensor assembly connector.

OK:

Voltage: 10 - 14 V

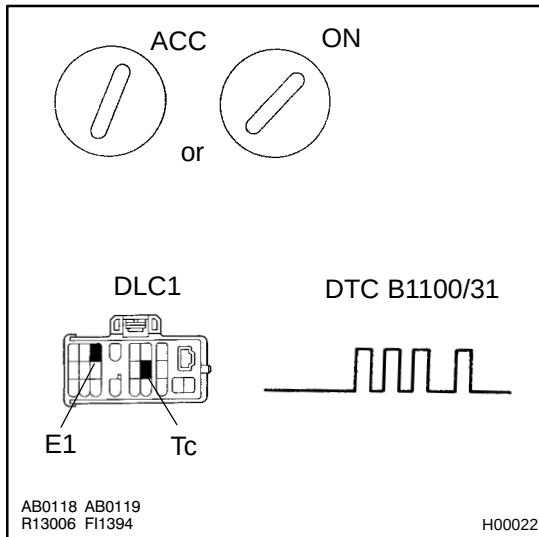
NG

Check that an abnormality occurs on the battery and charging system.



OK

3 Is DTC B1100/31 output again?



PREPARATION:

Clear the DTC (See step 5 on page [DI-349](#)).

CHECK:

- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the 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 the DTC (See page [DI-349](#)).

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-20](#)).

YES

Replace airbag sensor assembly.

DTC	B1140/32	Side Airbag Sensor Assembly (RH) Malfunction

CIRCUIT DESCRIPTION

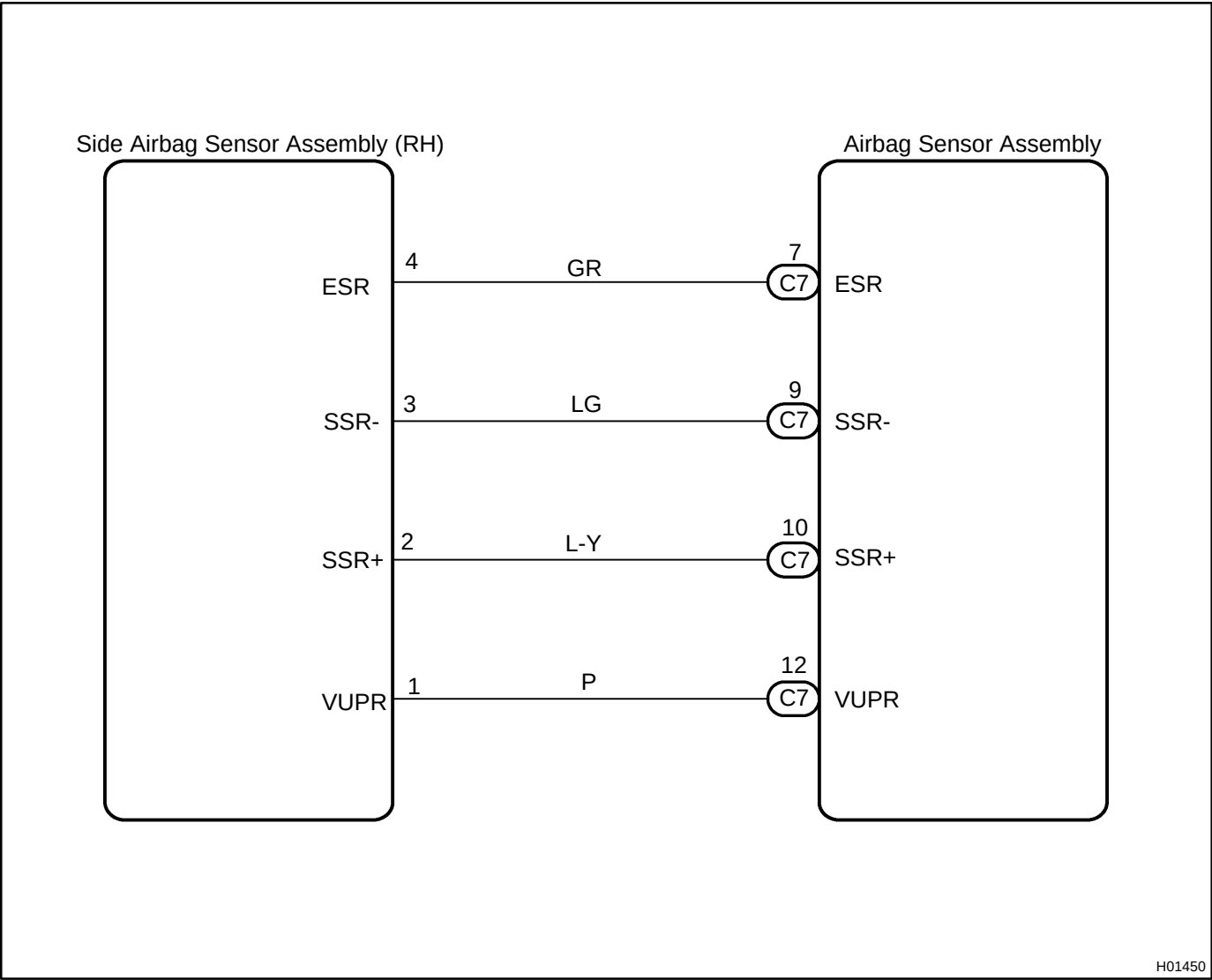
The side airbag sensor assembly (RH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1140/32 is recorded when occurrence of a malfunction in the side airbag sensor assembly (RH) is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	●Side airbag sensor assembly (RH) malfunction	●Side airbag sensor assembly (RH) ●Airbag sensor assembly ●Wire harness

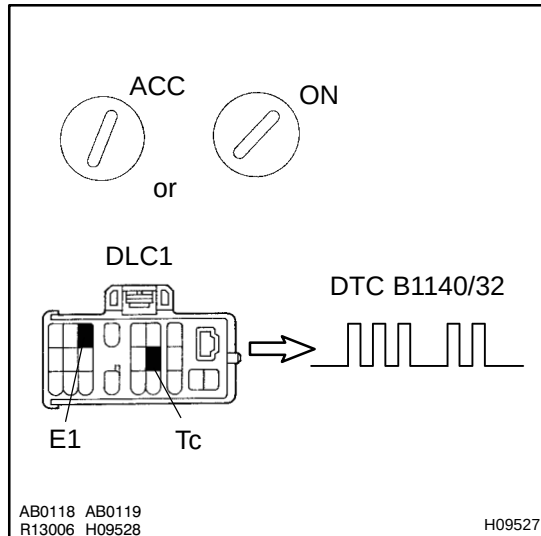
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1 Is DTC B1140/32 out put?

**CHECK:**

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NO

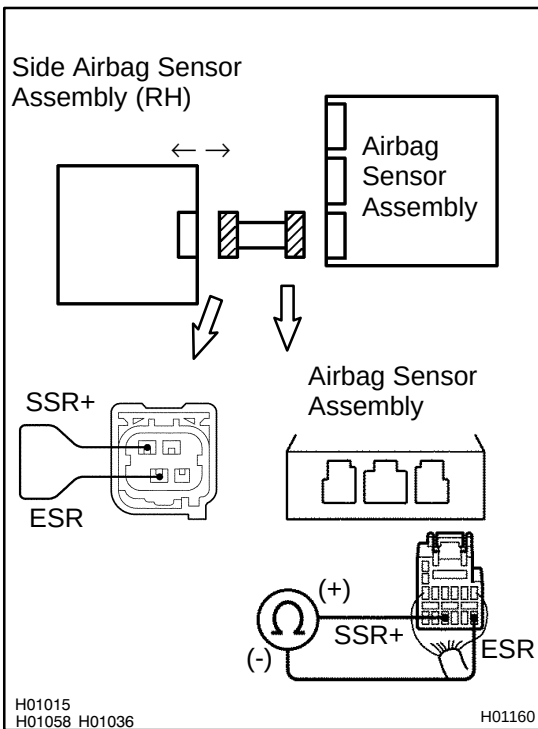
The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

YES

2 Is connector of side airbag sensor assembly (RH) properly connected?

3 Prepare for inspection (See step 1 on [DI-475](#)).

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

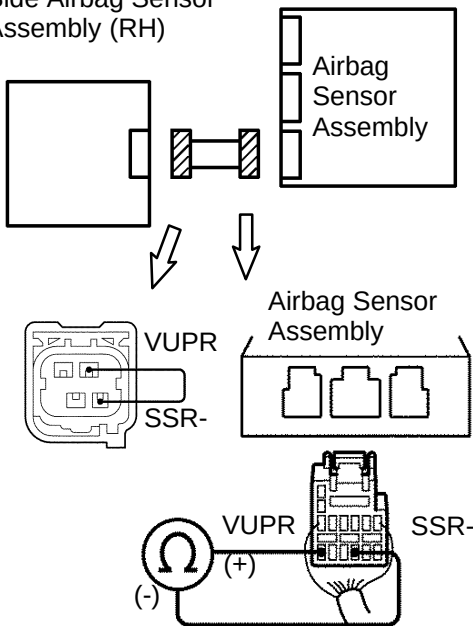
NG

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 SSR- 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 SSR-.

OK:

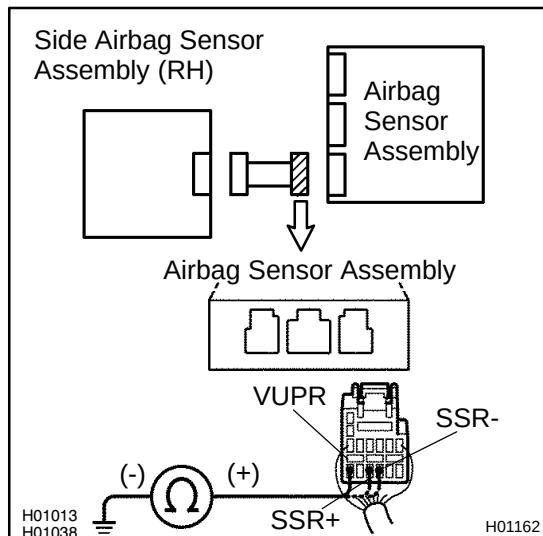
Resistance: Below 1 Ω

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 SSR-.

OK:

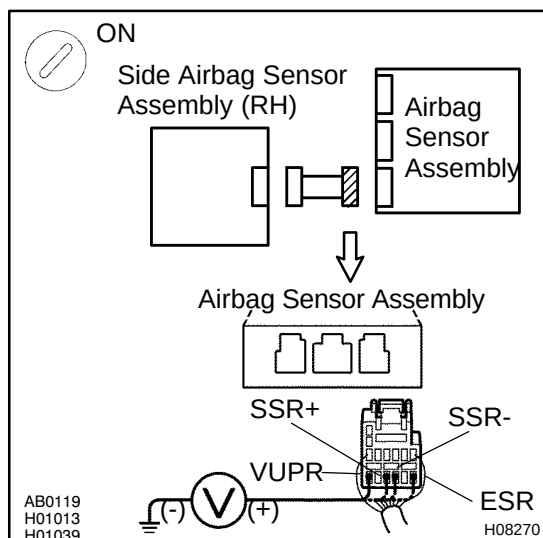
Resistance: 1M Ω or Higher

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 the 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 SSR-.

OK:

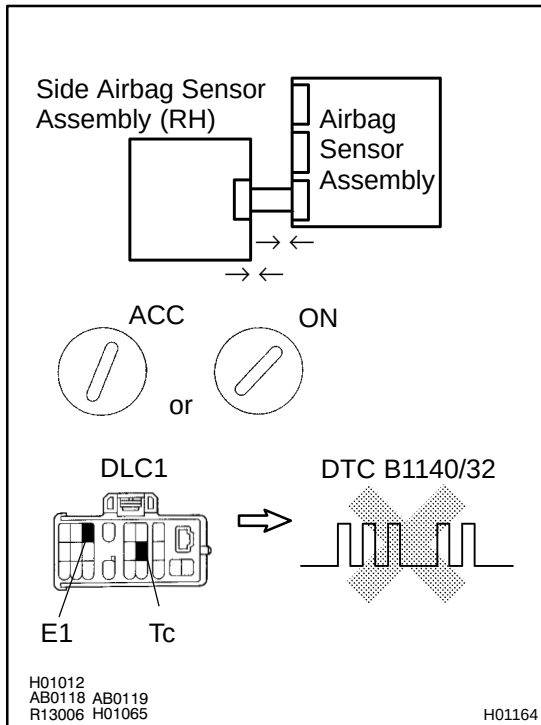
Voltage: 0 V

NG

Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.

OK

8 Is DTC B1140/32 out put again?



PREPARATION:

- Connect the connector to the side airbag sensor assembly (RH).
- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

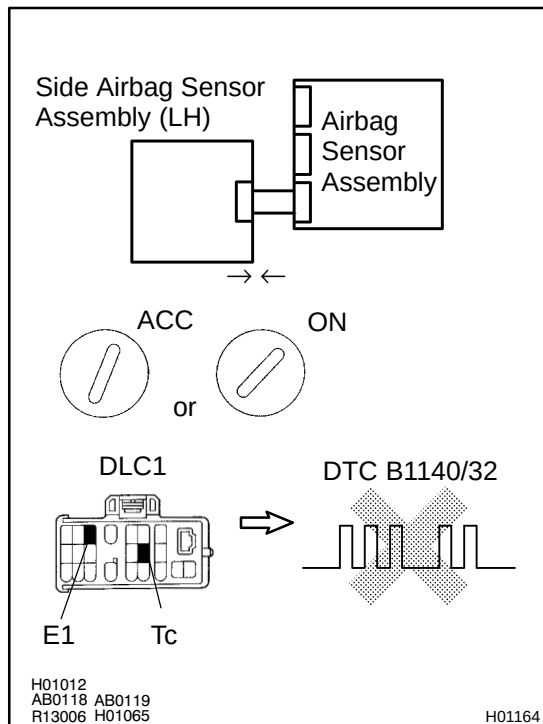
YES

Go to step 9.

NO

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

9 Check airbag sensor assembly.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the side airbag sensor (RH) from the connector and connect the side airbag sensor (LH) to the connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B1140/32 is not output.

HINT:

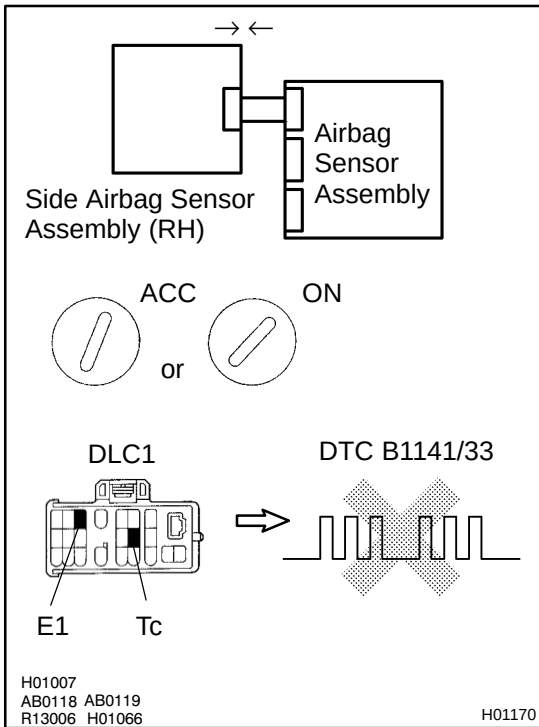
Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

10 Check side airbag sensor assembly (RH).



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag sensor (RH) to the connector that the side airbag sensor (LH) was connected to.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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

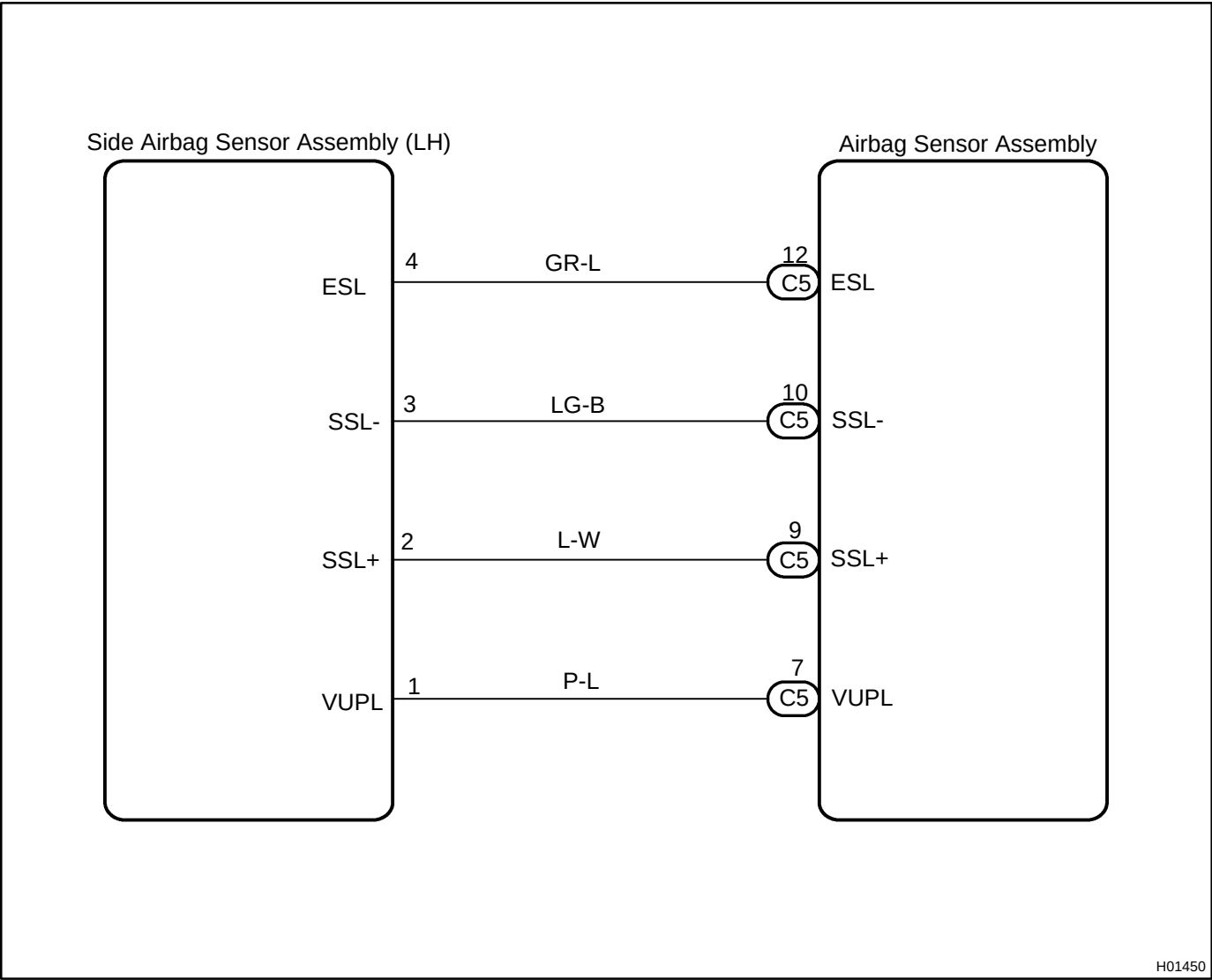
The side airbag sensor assembly (LH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1141/33 is recorded when occurrence of a malfunction in the side airbag sensor assembly (LH) is detected.

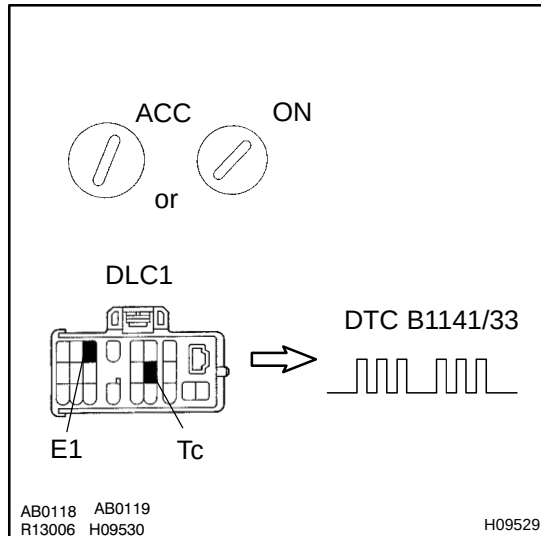
DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	●Side airbag sensor assembly (LH) malfunction	●Side airbag sensor assembly (LH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Is DTC B1141/33 out put?

**CHECK:**

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

HINT:

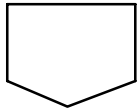
Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NO

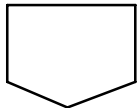
The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

YES

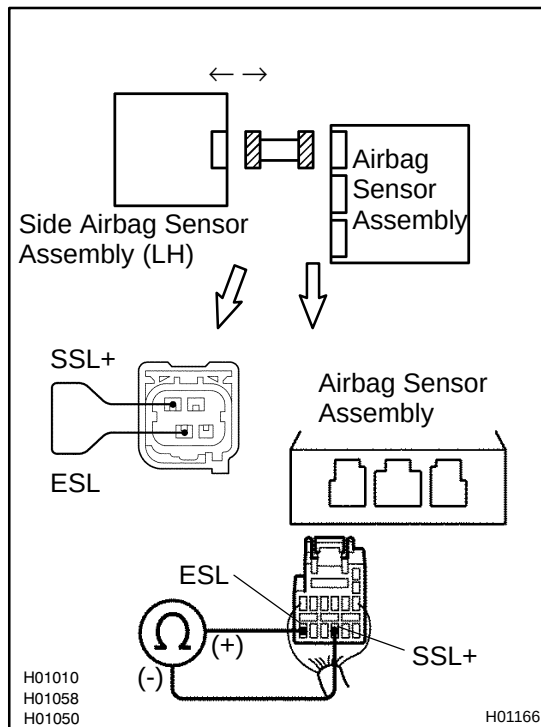
2 Is connector of side airbag sensor assembly (LH) properly connected?



3 Prepare for inspection (See step 1 on page [DI-475](#)).



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:

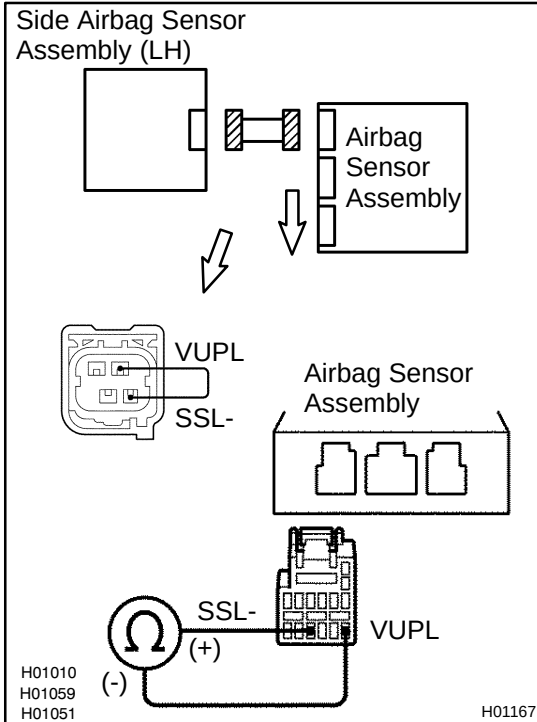
Resistance: Below 1 Ω

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 SSL- 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 SSL-.

OK:

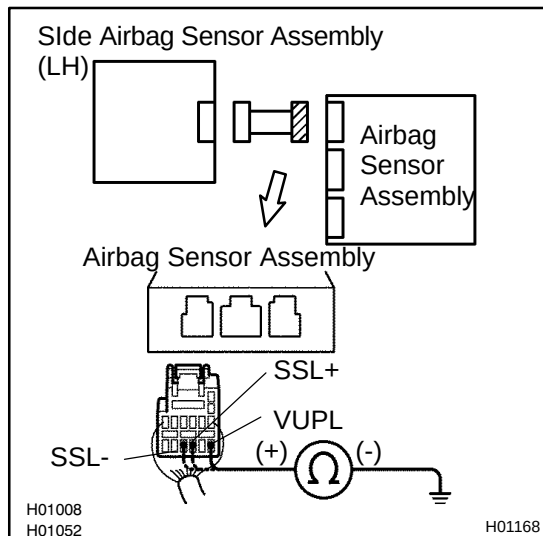
Resistance: Below 1 Ω

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 SSL-.

OK:

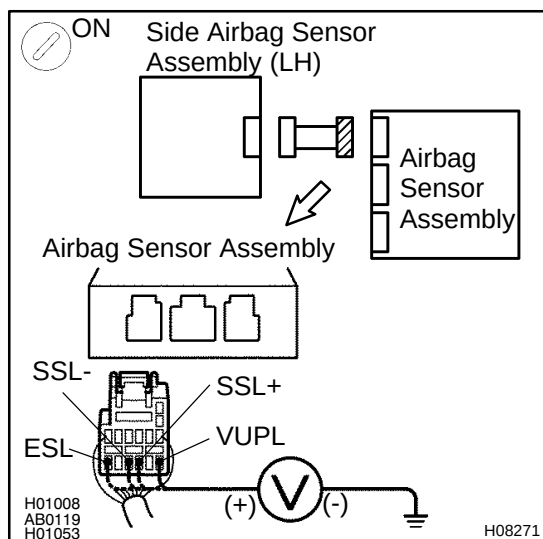
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.

OK

7 Check wire harness (to B+).



CHECK:

- Turn the ignition switch to ON.
- For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SSL+, ESL, VUPL and SSL-.

OK:

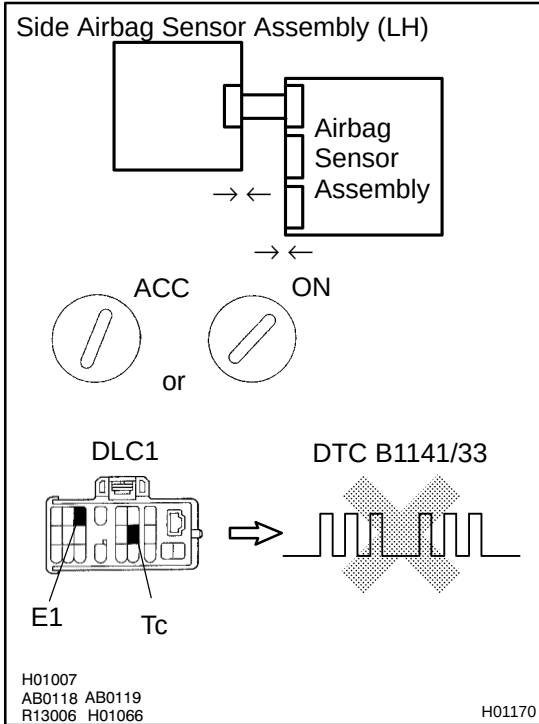
Voltage: 0 V

NG

Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.

OK

8 Is DTC B1141/33 out put again?



PREPARATION:

- Connect the connector to the side airbag sensor assembly (LH).
- Connect the connector to the airbag sensor assembly.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

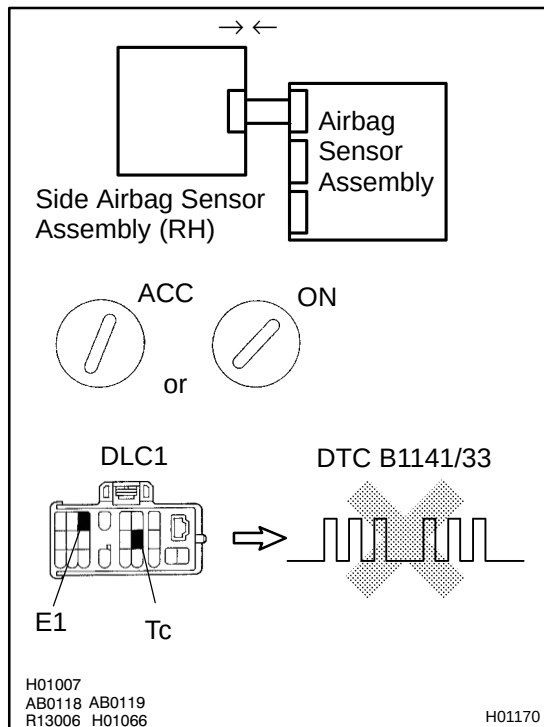
YES

Go to step 9.

NO

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

9 Check airbag sensor assembly.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the side airbag sensor (LH) from the connector and connect the side airbag sensor (RH) to the connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B1141/33 is not output.

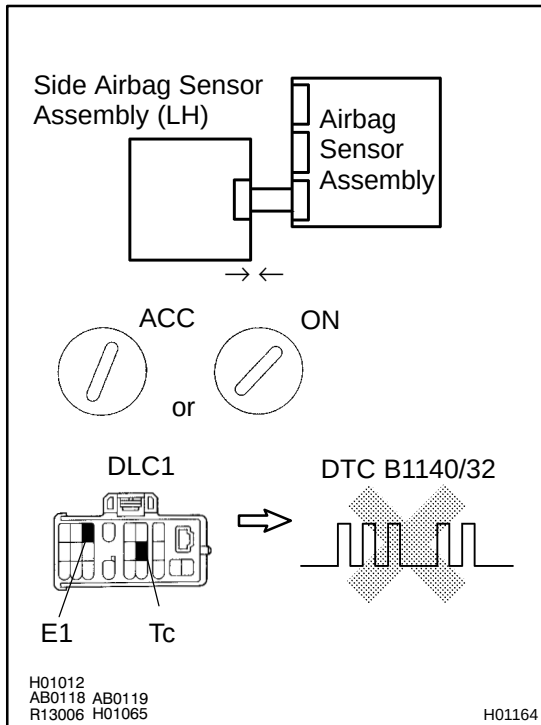
HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly.

OK

10 Check side airbag sensor assembly (LH).**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag sensor (LH) to the connector that the side airbag sensor (RH) was connected to.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See step 5 on page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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.

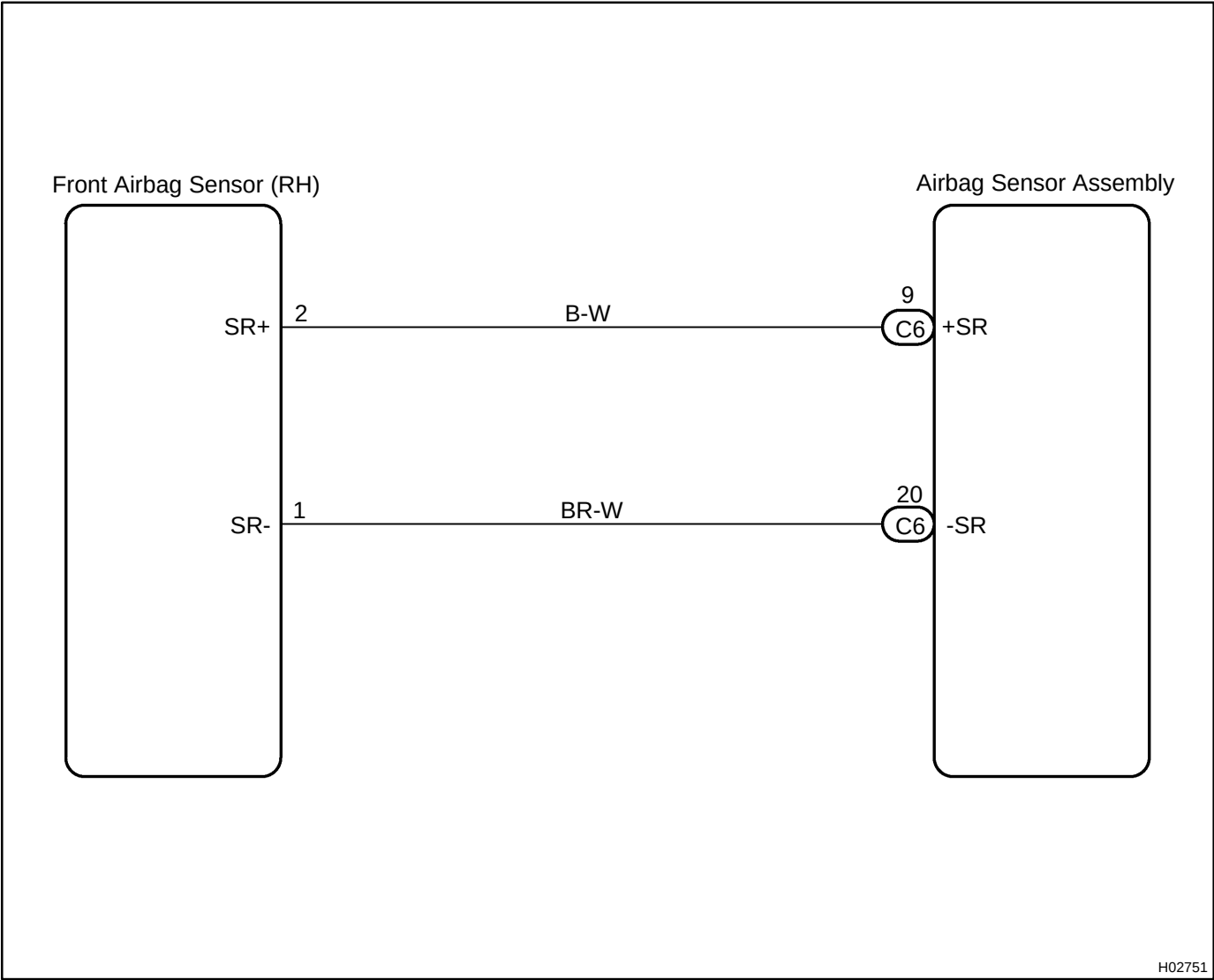
DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

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-3 .
DTC B1156/B1157/15 is recorded when malfunction is detected in the front airbag sensor (RH) circuit.

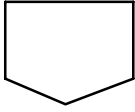
DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	●Front airbag sensor (RH) malfunction	●Front airbag sensor (RH) ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

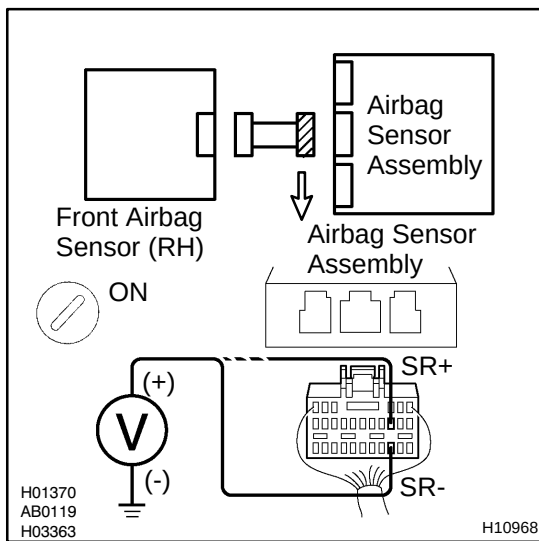


INSPECTION PROCEDURE

- 1** Prepare for inspection (See step 1 on page [DI-475](#)).



- 2** Check wire harness (to B+).

**CHECK:**

- Turn the ignition switch to ON.
- For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of SR+ and SR-.

OK:

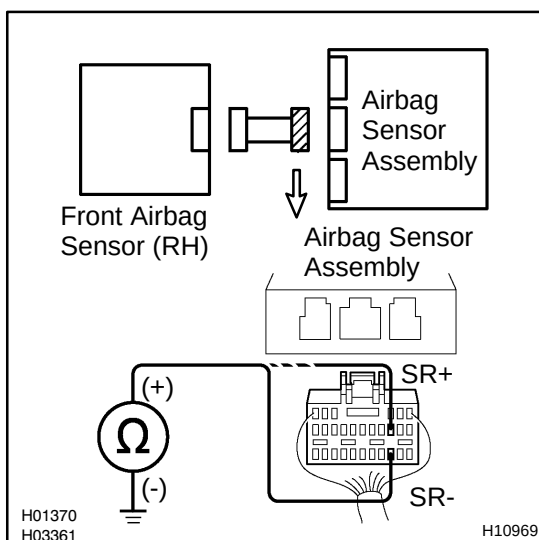
Voltage: Below 1 V

NG

Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.

OK

- 3** Check wire harness (to ground).

**CHECK:**

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SR+ and SR-.

OK:

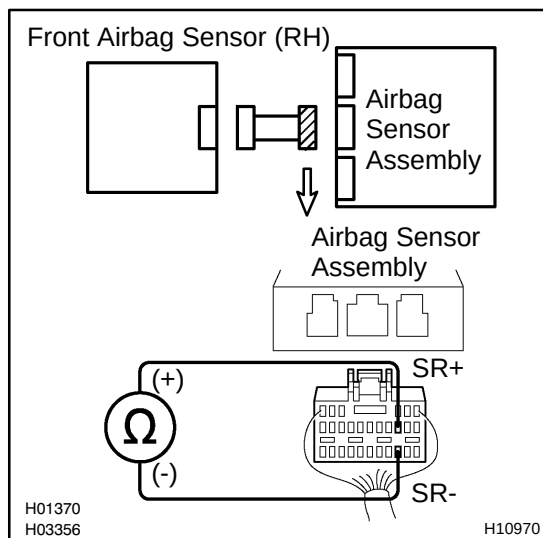
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.

OK

4 Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR-.

OK:

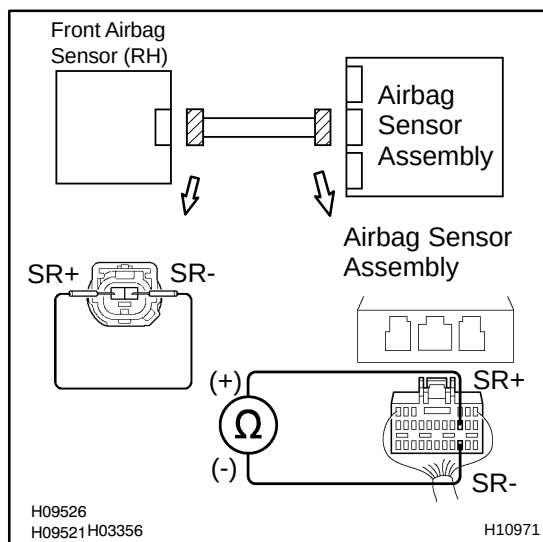
Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.

OK

5 Check wire harness.



PREPARATION:

Using a service wire, connect SR+ and SR- of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR-.

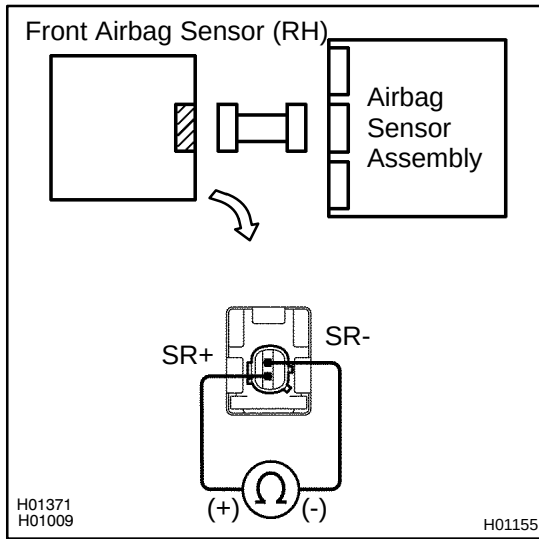
OK:

Resistance: Below 1 Ω

NG

Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.

OK

6 Check front airbag sensor (RH).**CHECK:**

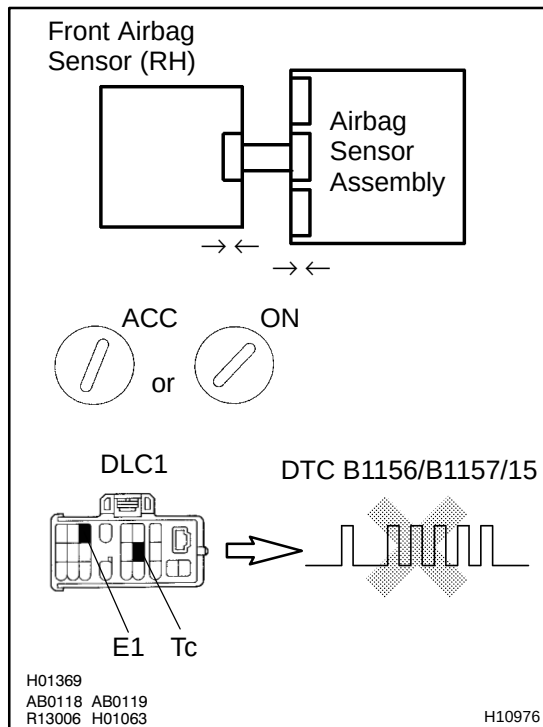
For the connector (on the front airbag sensor (RH)), measure the resistance between SR+ and SR-.

OK:

Resistance: 300 - 1500 Ω

NG**Replace front airbag sensor (RH).****OK**

7 Check airbag sensor assembly.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front airbag sensor (RH) connector and airbag sensor assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

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.

DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

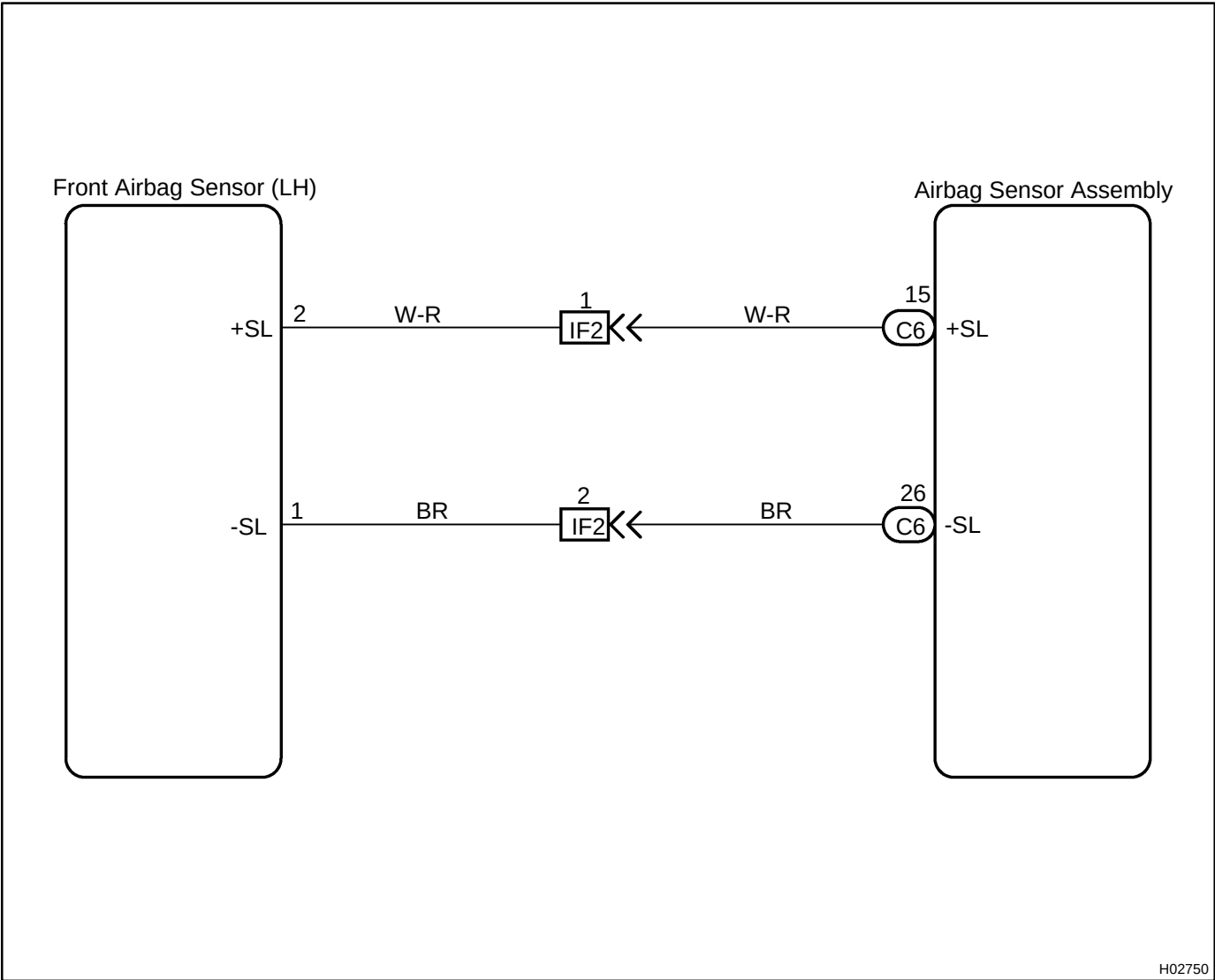
CIRCUIT DESCRIPTION

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-3 .

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 ●Engine room main wire harness

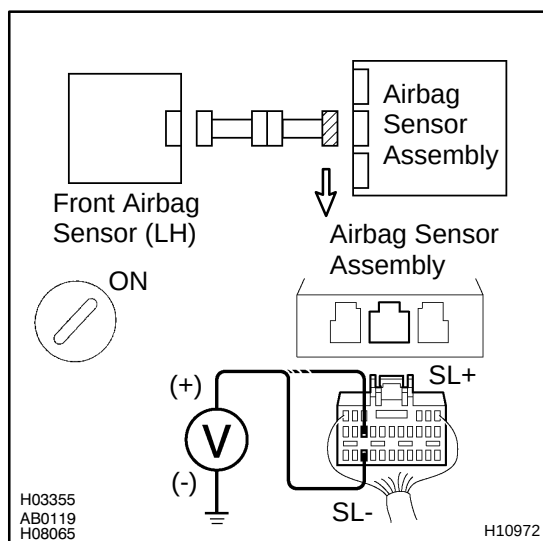
WIRING DIAGRAM



INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-475](#)).

2 Check wire harness (to B+).

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SL+ and SL-.

OK:

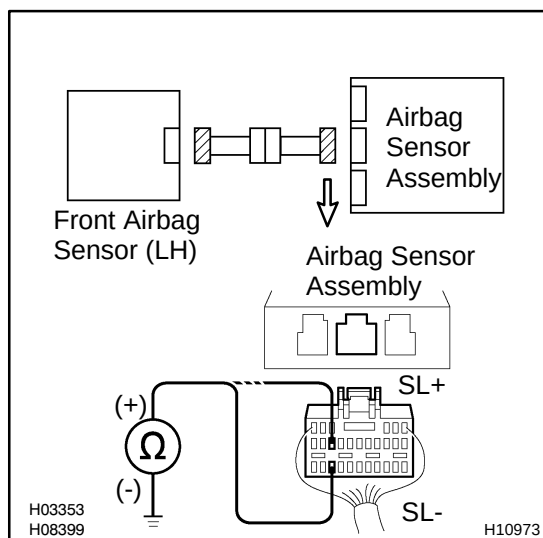
Voltage: Below 1 V

NG

Go to step 8.

OK

3 Check wire harness (to ground).

**CHECK:**

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SL+ and SL-.

OK:

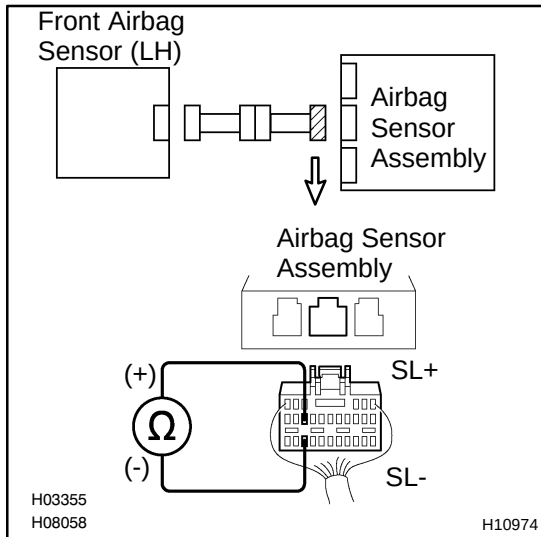
Resistance: 1 MΩ or Higher

NG

Go to step 9.

OK

4 Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL-.

OK:

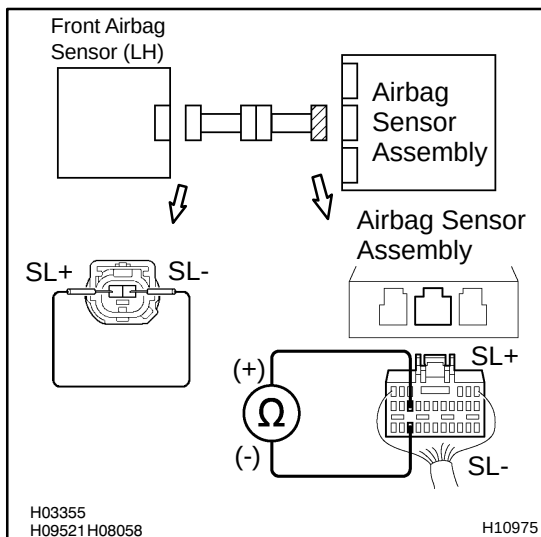
Resistance: 1 MΩ or Higher

NG

Go to step 10.

OK

5 Check wire harness.



PREPARATION:

Using a service wire, connect SL+ and SL- of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL-.

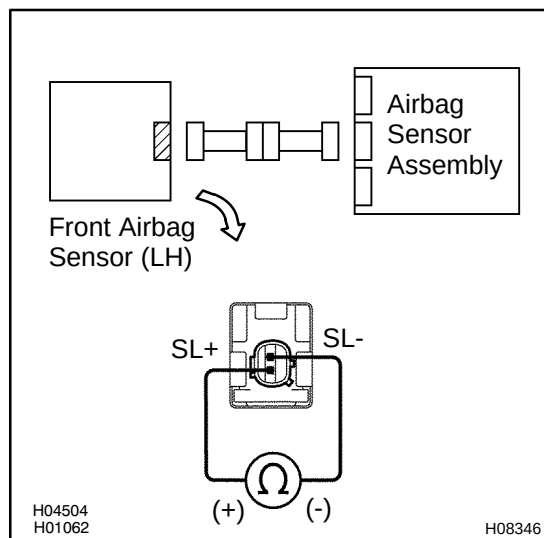
OK:

Resistance: Below 1 Ω

NG

Go to step 11.

OK

6 Check front airbag sensor (LH).**CHECK:**

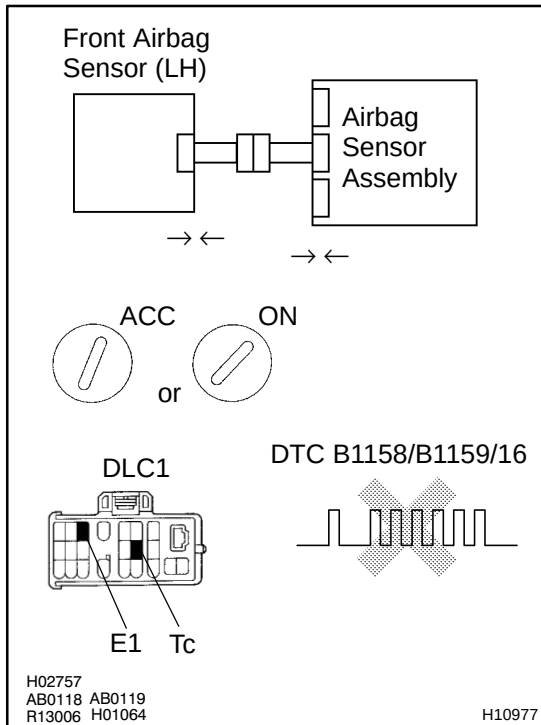
For the connector (on the front airbag sensor (LH)), measure the resistance between SL+ and SL-.

OK:

Resistance: 300 - 1500 Ω

NG**Replace front airbag sensor (LH).****OK**

7 Check airbag sensor assembly.



PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Clear the DTC stored in memory (See page [DI-349](#)).
- Turn the ignition switch to LOCK, and wait at least for 20 seconds.
- Turn the ignition switch to ACC or ON, and wait at least for 20 seconds.
- Check the DTC (See page [DI-349](#)).

OK:

DTC B1158/B1159/16 is not output.

HINT:

Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

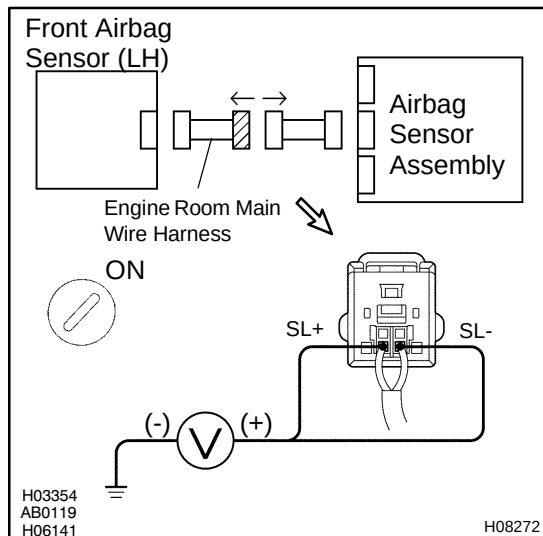
NG

Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8 Check engine room main wire harness (to B+).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

- Turn the ignition switch to ON.
- For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SL+ and SL-.

OK:

Voltage: Below 1 V

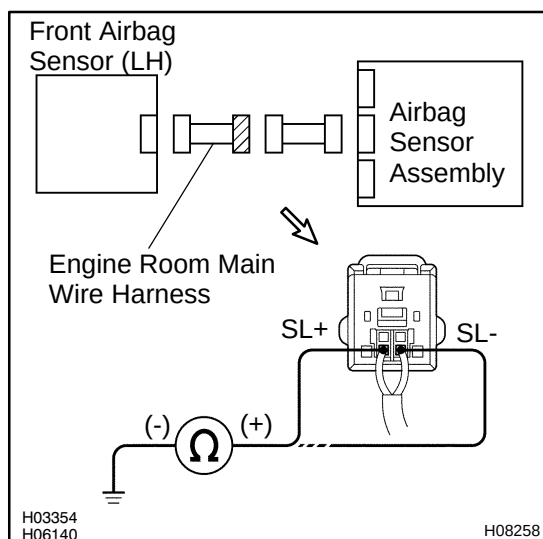
NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9 Check engine room main wire harness (to ground).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SL+ and SL-.

OK:

Resistance: 1 MΩ or Higher

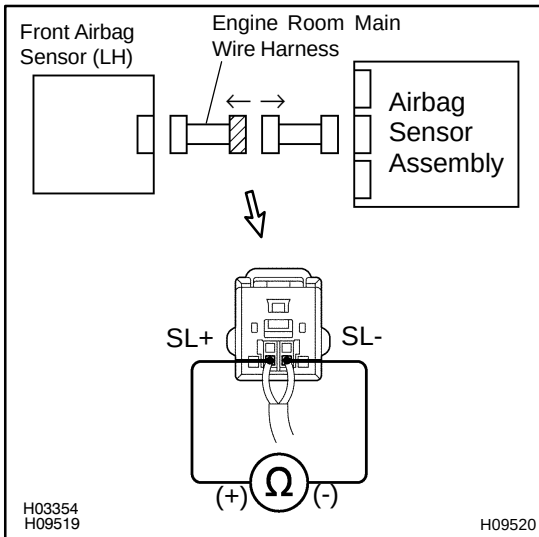
NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10 Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL-.

OK:

Resistance: 1 MΩ or Higher

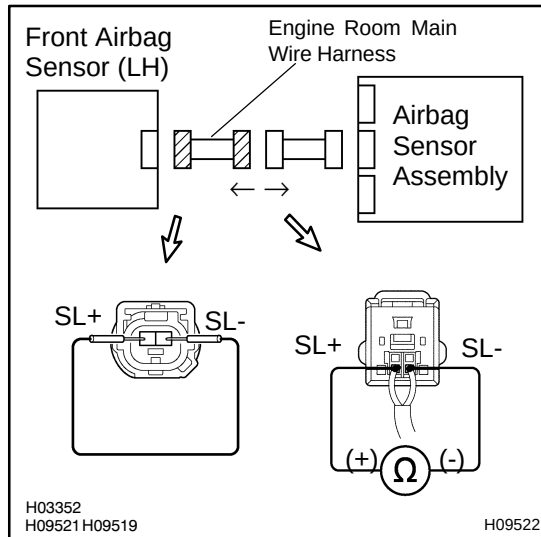
NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11 Check engine room main wire harness.



PREPARATION:

- Disconnect the engine room main wire harness connector on the airbag sensor assembly side.
- Using a service wire, connect SL+ and SL- of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL-.

OK:

Resistance: Below 1 Ω

NG

Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

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.

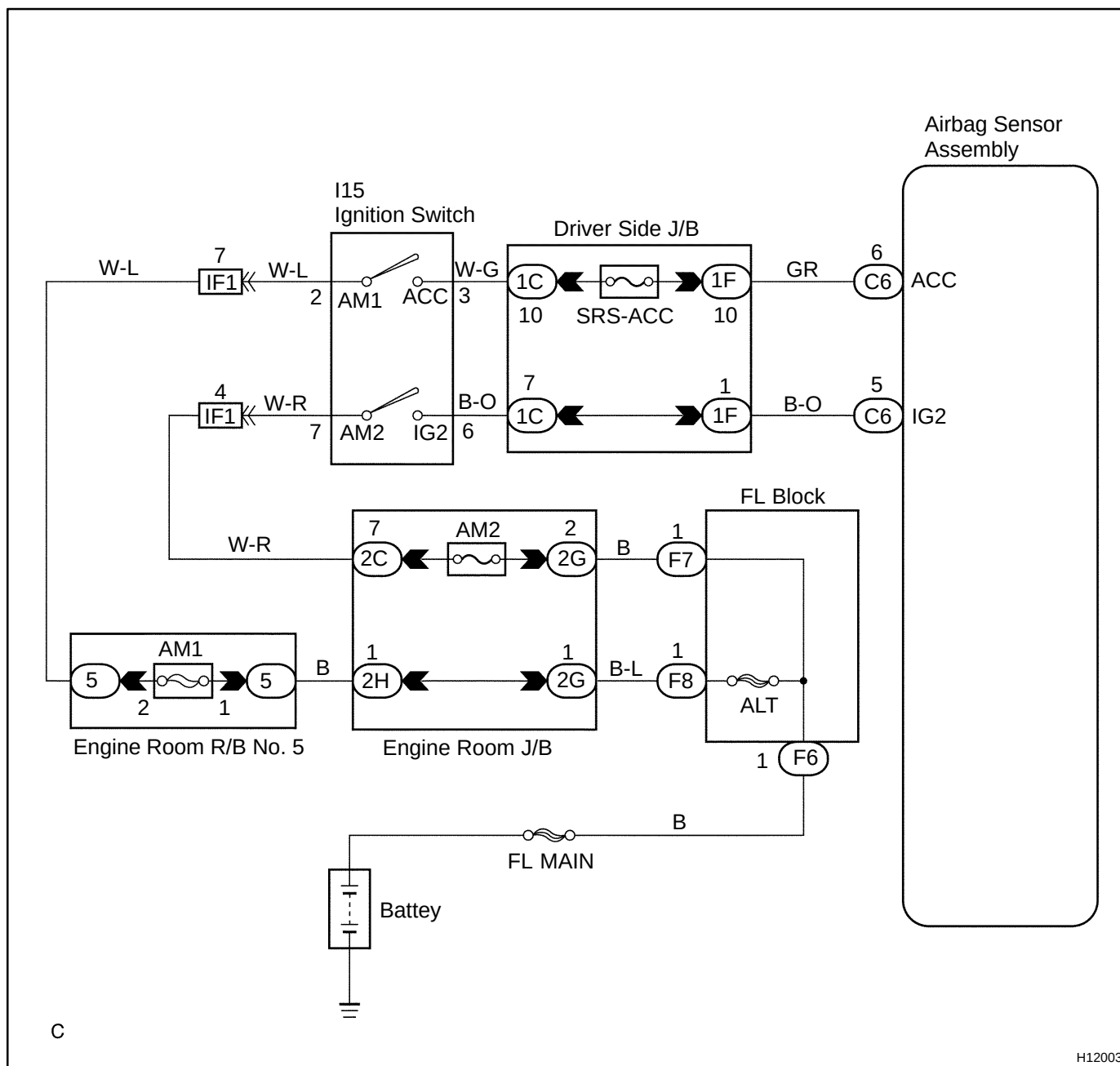
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

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

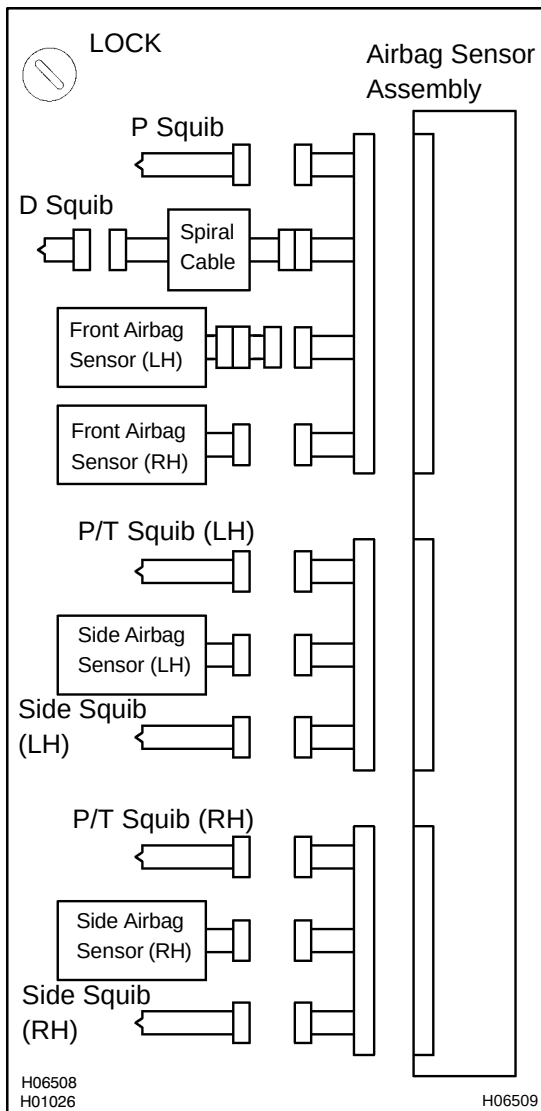
WIRING DIAGRAM



H12003

INSPECTION PROCEDURE

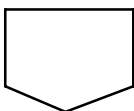
1 Prepare for inspection.

**PREPARATION:**

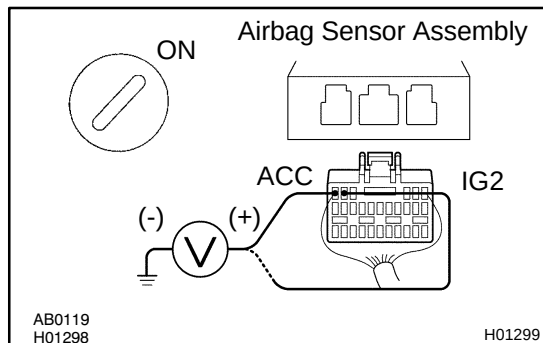
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Remove the steering wheel pad (See page [SR-12](#)).
- Disconnect the connector of the front passenger airbag assembly (See page [RS-28](#)).
- Disconnect the connector of the side airbag assembly RH and LH (See page [RS-42](#) and [RS-56](#)).
- Disconnect the connector of the seat belt pretensioner RH and LH (See page [BO-128](#)).
- Disconnect the connectors of the airbag sensor assembly (See page [RS-63](#) and [RS-68](#)).
- Disconnect the connector of the front airbag sensor RH and LH (See page [RS-73](#)).
- Disconnect the connector of the side airbag sensor assembly RH and LH (See page [RS-78](#)).

CAUTION:

Store the steering wheel pad, front passenger airbag assembly and side airbag assembly with the front surface facing upward.



2 Check source voltage.



PREPARATION:

Connect negative (-) terminal cable to the battery.

CHECK:

- Turn ignition switch ON.
- Measure the voltage between body ground and each of IG2 and ACC on the sensor and operate electric system (defogger, wiper, headlight, heater blower, etc.).

OK:

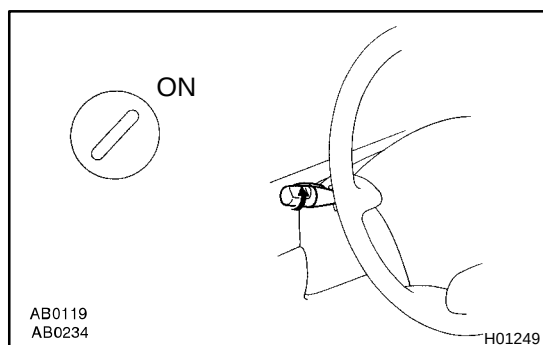
Voltage: 10 - 14 V

NG

Check harness between battery and airbag sensor assembly, and check battery and charging system.

OK

3 Does SRS warning light turn off?



PREPARATION:

- Turn the ignition switch to LOCK.
- Connect the steering wheel pad connector.
- Connect the front passenger airbag assembly connector.
- Connect the side airbag assembly connectors.
- Connect the seat belt pretensioner connectors.
- Connect the airbag sensor assembly connectors.
- Connect the front airbag sensor connectors.
- Connect the side airbag sensor assembly connectors.
- Turn the ignition switch to ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO

Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

SRS Warning Light Circuit Malfunction

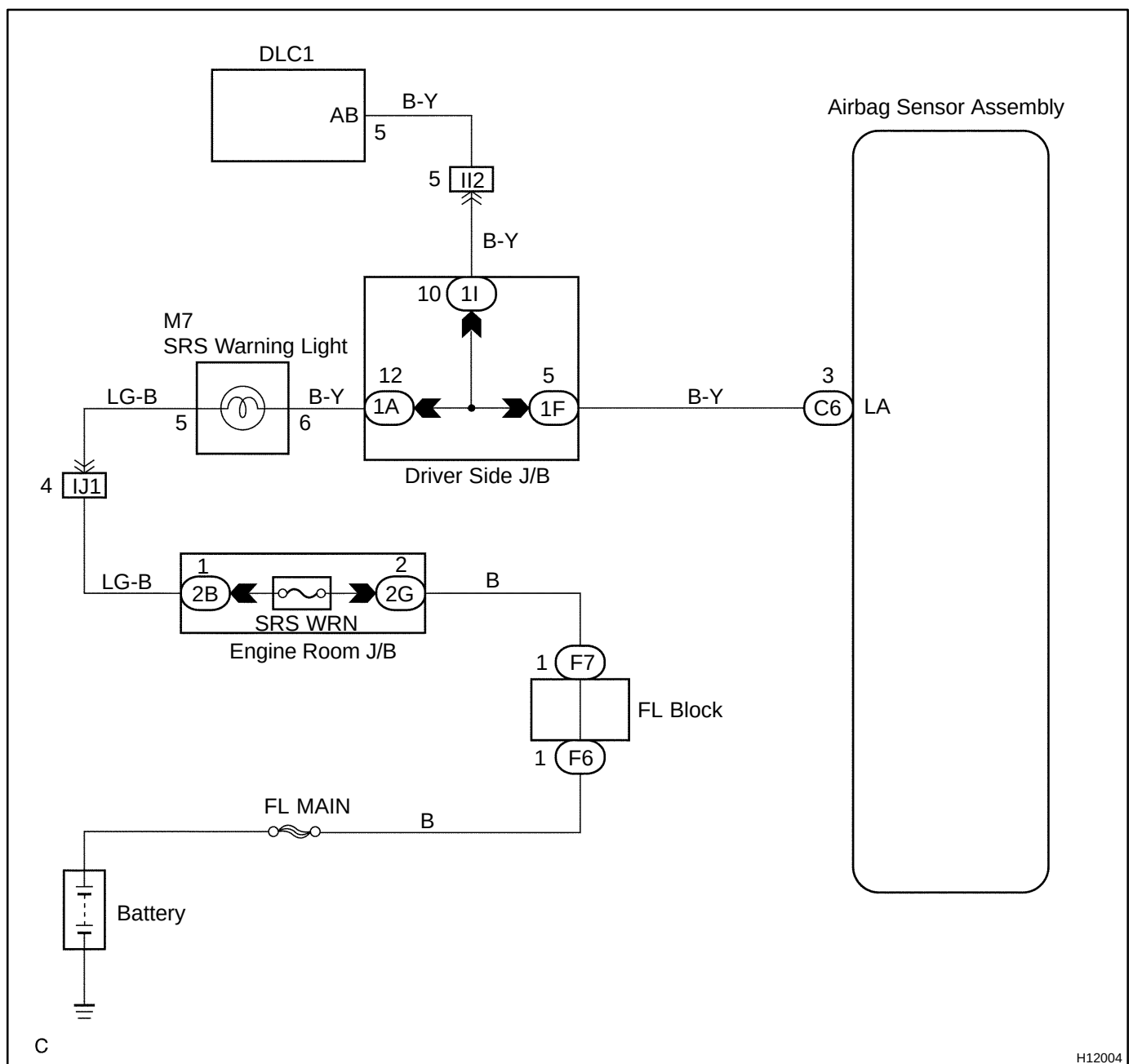
CIRCUIT DESCRIPTION

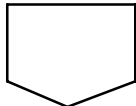
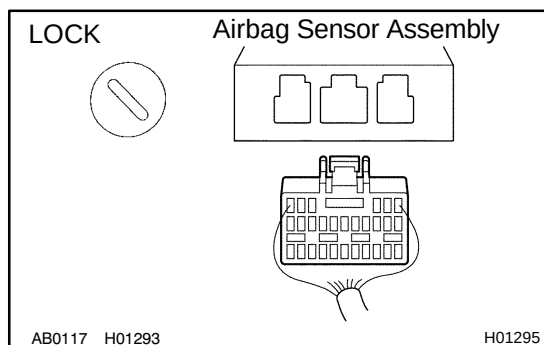
The SRS warning light is located on the combination meter.

When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to 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



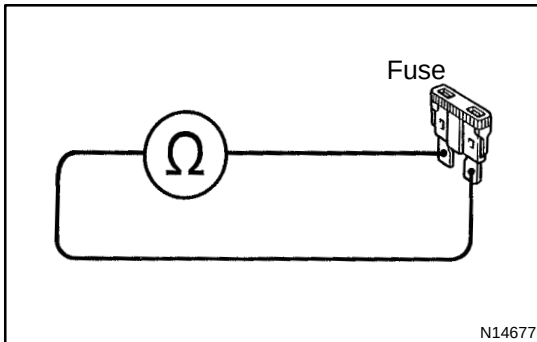
INSPECTION PROCEDURE**Always lights up, when ignition switch is in LOCK position****1** Prepare for inspection (See step 1 on page [DI-475](#)).**2** Does SRS warning light turn off?**PREPARATION:**

- (a) Turn the ignition switch to LOCK.
- (b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.
- (d) Connect negative (-) terminal cable to the battery.

CHECK:

Check operation of SRS warning light.

NO**Check SRS warning light circuit or terminal AB circuit of DLC1.****YES****Replace airbag sensor assembly.**

Does not light up, when ignition switch is turned to ACC or ON**1 Check ECU-B Fuse.****PREPARATION:**

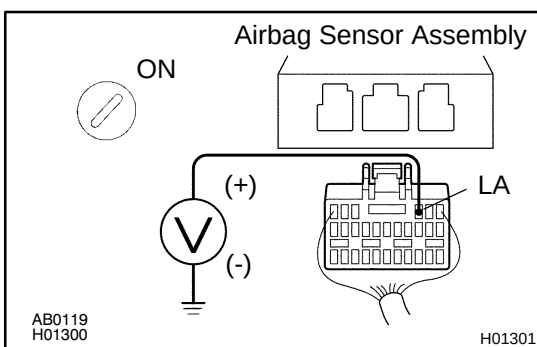
Remove the ECU-B fuse.

CHECK:

Check continuity of the 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-475).****3 Check SRS warning light circuit.****PREPARATION:**

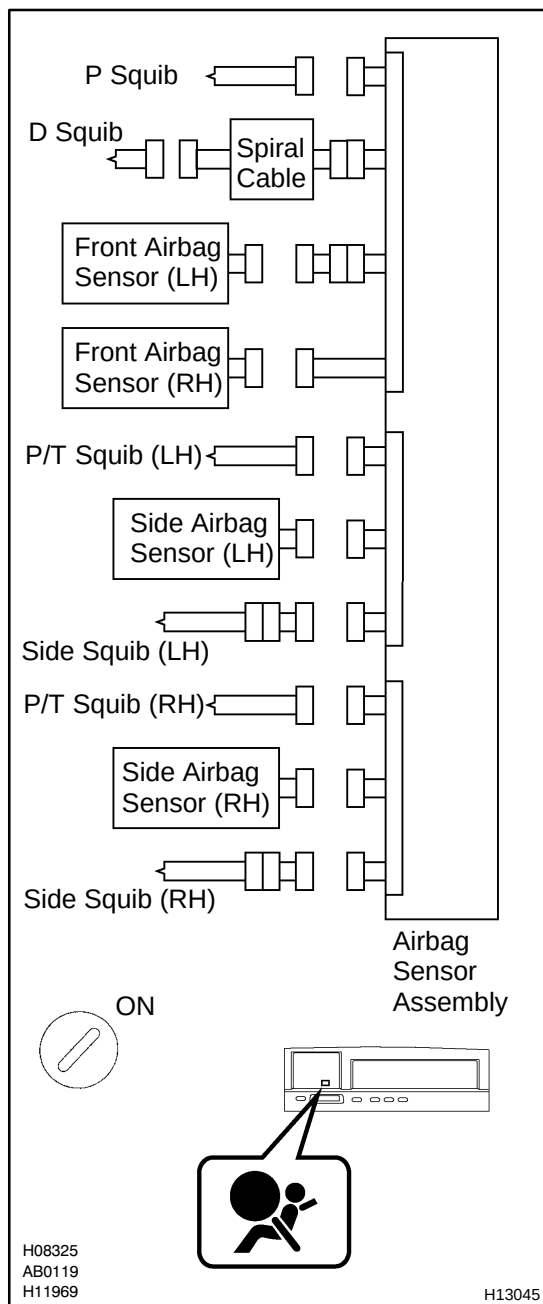
- Connect negative (-) terminal cable to the battery.
- Turn the ignition switch to ACC or ON.

CHECK:

Measure the voltage between body ground and LA terminal of the harness side connector of the airbag sensor assembly.

OK:**Voltage: 10 - 14 V****NG****Check SRS warning light bulb or repair SRS warning light circuit.****OK**

4 Does SRS warning light come on?



PREPARATION:

- Disconnect negative (-) terminal cable from the battery.
- Connect the airbag sensor assembly connector.
- Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.
- Turn the ignition switch to ACC or ON.

CHECK:

Check operation of the SRS warning light.

NO

Check terminal LA of airbag sensor assembly. If normal, replace airbag sensor assembly.

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

5	Is new ECU-B fuse burnt out again?

NO

Using simulation method, reproduce malfunction symptoms (See page [IN-20](#)).

YES

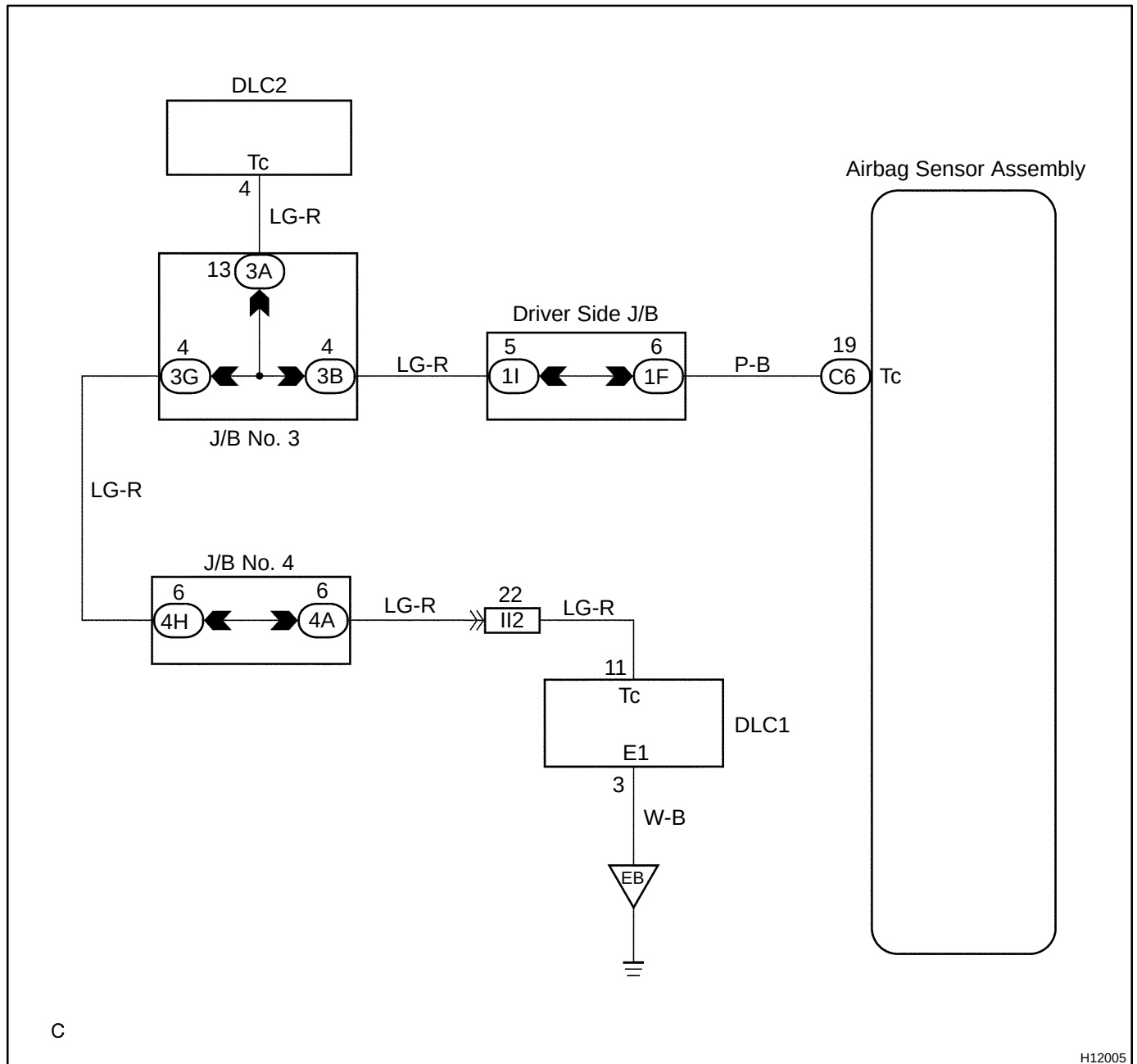
Check harness between ECU- B fuse and SRS warning light.

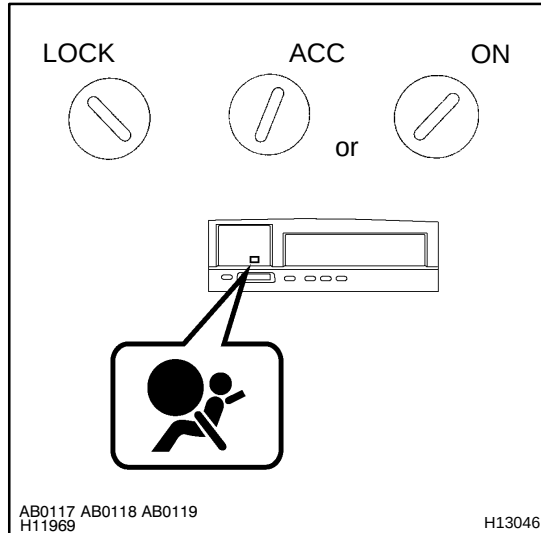
Tc Terminal Circuit

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

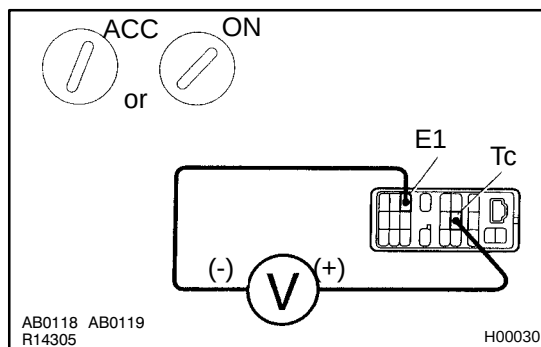


INSPECTION PROCEDURE**If the DTC is not displayed, do the following troubleshooting.****1 Does SRS warning light light up for approx. 6 seconds?****PREPARATION:**

Check operation of the SRS warning light after ignition switch is turned from LOCK position to ACC or ON position.

NO

Check SRS warning light system (See page [DI-479](#)).

YES**2 Check voltage between terminals Tc and E1 of DLC1.****PREPARATION:**

Turn the ignition switch to ACC or ON.

CHECK:

Measure the voltage between terminals Tc and E1 of DLC1.

OK:

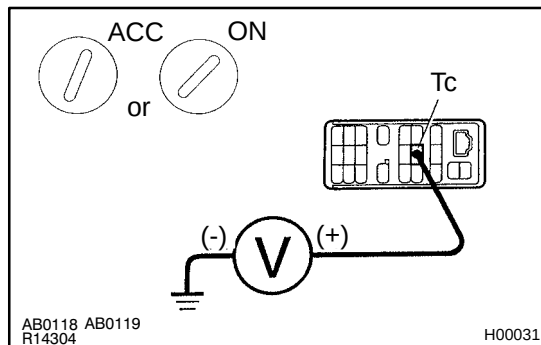
Voltage: 10 - 14 V

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:

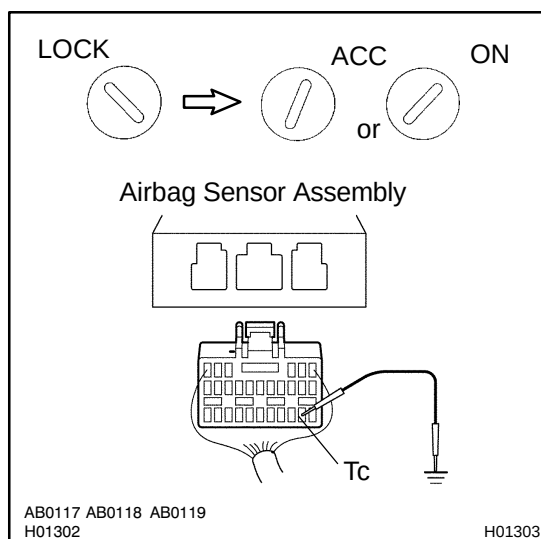
Voltage: 10 - 14 V

OK

Check harness between terminal E1 of DLC1 and body ground.

NG

4 Check airbag sensor assembly.

**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the airbag sensor assembly connector.
- Insert service wire into terminal Tc from back side as shown in the illustration.
- Connect the airbag sensor assembly connector with service wire.
- Connect negative (-) terminal cable to the battery.
- Turn the ignition switch to ACC or ON and wait at least for 20 seconds.
- Connect service wire of terminal Tc to body ground.

CHECK:

Check operation of the SRS warning light.

OK:

SRS warning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

OK

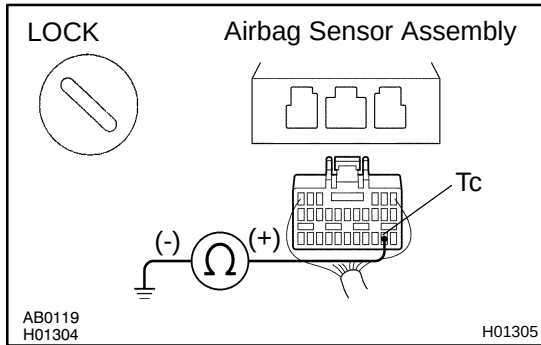
Check harness between the airbag sensor assembly and DLC1.

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 the ignition switch to LOCK.
- (b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.

CHECK:

Check resistance between terminal Tc of the airbag sensor assembly connector and body ground.

OK:

Resistance: 1 MΩ or Higher

NG

Repair or replace harness or connector.

OK

Replace airbag sensor assembly.

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

 Inspector's
Name

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

Date Problem Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	Approx.

Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

Vehicle Inspection and Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	1st Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
DTC Inspection	1st Time	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

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-362)	●Short in D squib circuit	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0101/14 (DI-367)	●Open in D squib circuit	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0102/11 (DI-371)	●Short in D squib circuit (to ground)	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0103/12 (DI-375)	●Short in D squib circuit (to B+)	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
B0105/53 (DI-379)	●Short in P squib circuit	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0106/54 (DI-383)	●Open in P squib circuit	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0107/51 (DI-386)	●Short in P squib circuit (to ground)	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0108/52 (DI-389)	●Short in P squib circuit (to B+)	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
B0110/43 (DI-392)	●Short in side squib (RH) circuit	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0111/44 (DI-396)	●Open in side squib (RH) circuit	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0112/41 (DI-402)	●Short in side squib (RH) circuit (to ground)	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0113/42 (DI-402)	●Short in side squib (RH) circuit (to B+)	●Side airbag assembly RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0115/47 (DI-405)	●Short in side squib (LH) circuit	●Side airbag assembly LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0116/48 (DI-409)	●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-412)	●Short in side squib (LH) circuit (to ground)	●Side airbag assembly LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0118/46 (DI-415)	●Short in side squib (LH) circuit (to B+)	●Side airbag assembly LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0130/63 (DI-418)	●Short in P/T squib (RH) circuit	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0131/64 (DI-422)	●Open in P/T squib (RH) circuit	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0132/61 (DI-425)	●Short in P/T squib (RH) circuit (to ground)	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0133/62 (DI-428)	●Short in P/T squib (RH) circuit (to B+)	●Seat belt pretensioner RH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0135/73 (DI-431)	●Short in P/T squib (LH) circuit	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0136/74 (DI-435)	●Open in P/T squib (LH) circuit	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0137/71 (DI-438)	●Short in P/T squib (LH) circuit (to ground)	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B0138/72 (DI-441)	●Short in P/T squib (LH) circuit (to B+)	●Seat belt pretensioner LH (squib) ●Airbag sensor assembly ●Wire harness	Blink
B1100/31 (DI-444)	●Airbag sensor assembly malfunction	●Airbag sensor assembly	ON
B1140/32 (DI-446)	●Side airbag sensor assembly (RH) malfunction	●Side airbag sensor assembly (RH) ●Airbag sensor assembly ●Wire harness	Blink
B1141/33 (DI-454)	●Side airbag sensor assembly (LH) malfunction	●Side airbag sensor assembly (LH) ●Airbag sensor assembly ●Wire harness	Blink
B1156/B1157/ 15 (DI-462)	●Front airbag sensor (RH) malfunction	●Front airbag sensor (RH) ●Airbag sensor assembly ●Wire harness	ON
B1158/B1159/ 16 (DI-467)	●Front airbag sensor (LH) malfunction	●Front airbag sensor (LH) ●Airbag sensor assembly ●Instrument panel wire harness ●Engine room main wire harness	ON
Normal (DI-475)	●System normal	-	OFF
	●Voltage source drop	●Battery ●Airbag sensor assembly	ON

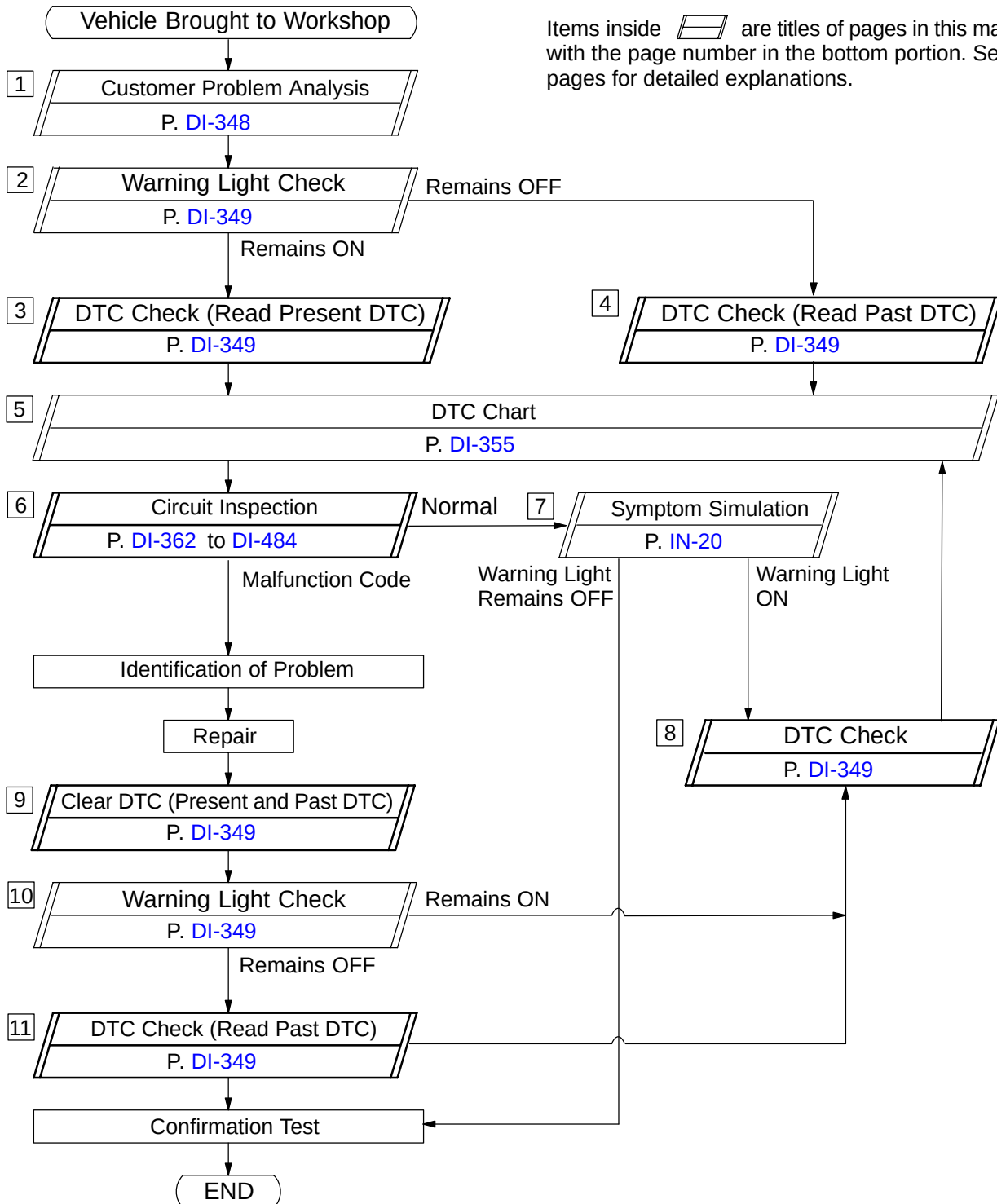
HINT:

- 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.

SUPPLEMENTAL RESTRAINT SYSTEM

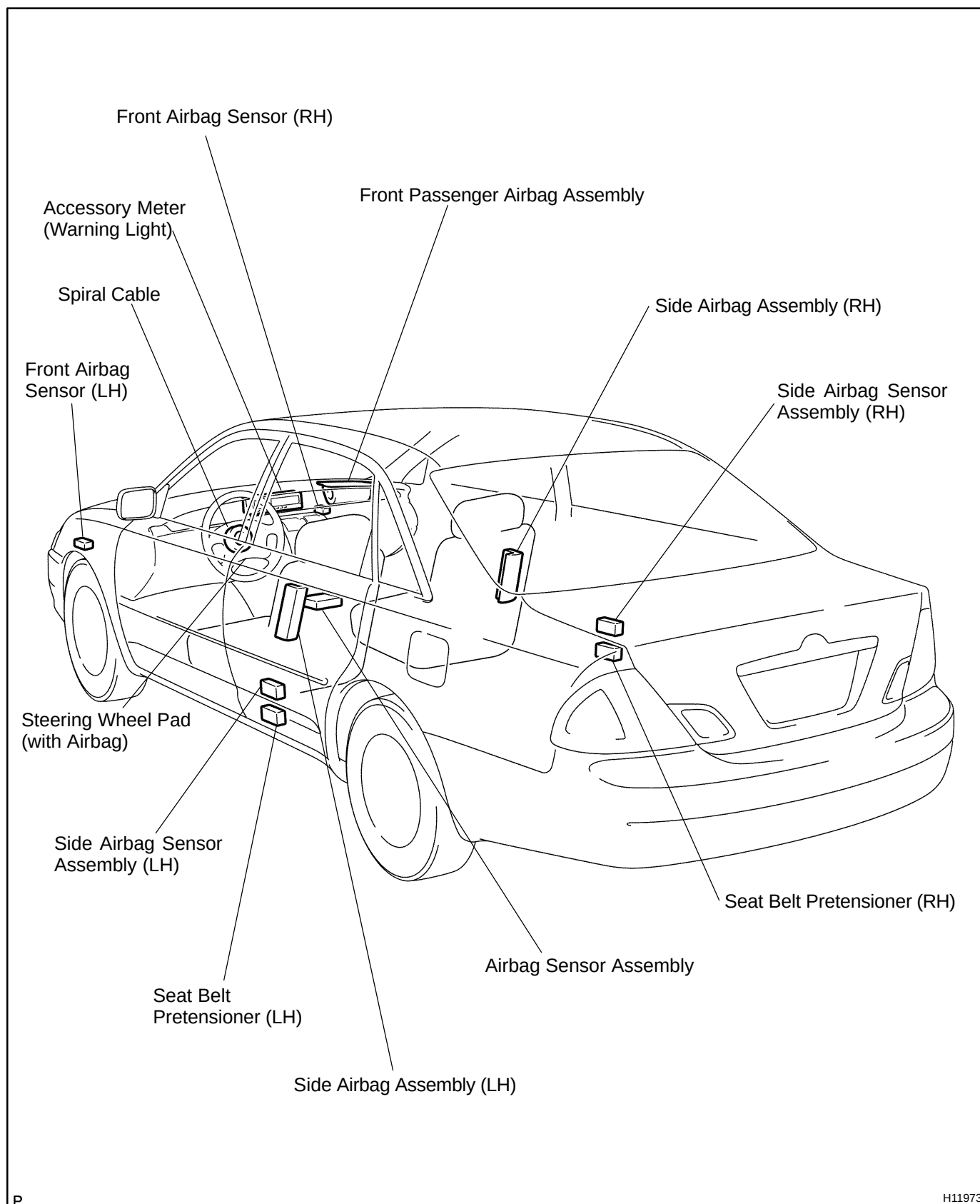
HOW TO PROCEED WITH TROUBLESHOOTING

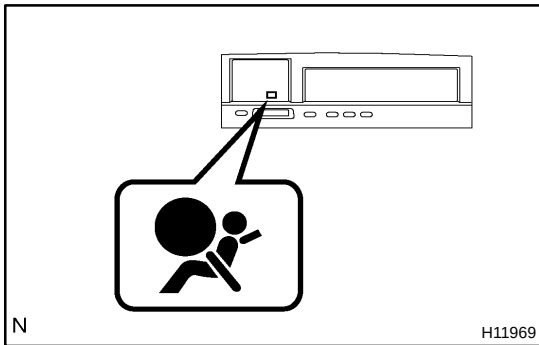
DI1MX-12



Step 3, 4, 6, 8, 9, 11 : Diagnostic steps permitting the use of the TOYOTA hand-held tester.

PARTS LOCATION





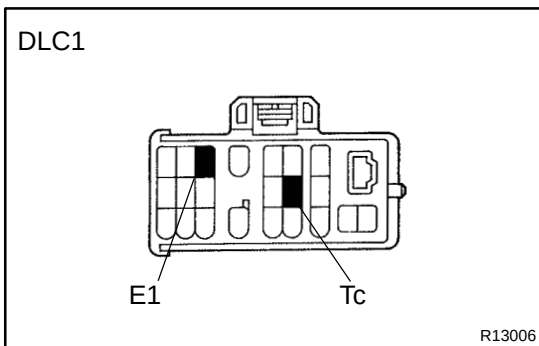
PRE-CHECK

1. SRS WARNING LIGHT CHECK

- (a) Turn the ignition switch to the ACC or ON position and check that the SRS warning light lights up.
- (b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the SRS warning light remains on or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on page [DI-479](#).



2. DTC CHECK (Using diagnosis check wire)

- (a) Present troubles codes:

Output the DTC.

- (1) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.
- (2) Using SST, connect terminals Tc and E1 of the DLC1.

SST 09843-18020

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

- (b) Past troubles codes:

Output the DTC.

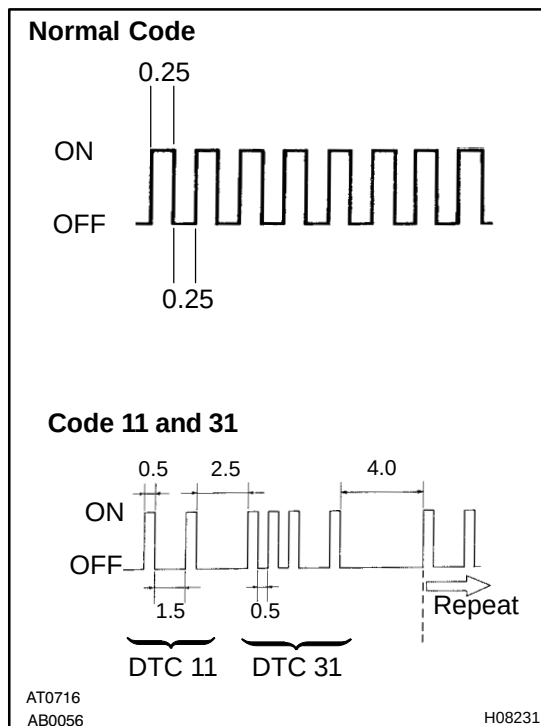
- (1) Using service wire, connect terminals Tc and E1 of the DLC1.

SST 09843-18020

- (2) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.



(c) Read the DTC.

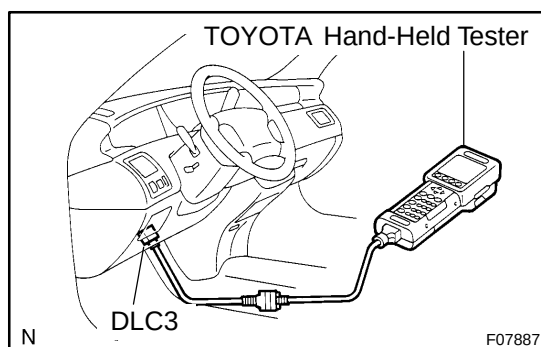
Read the 2-digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- Normal code indication
The light will blink 2 times per second.
- Malfunction code indication
The first blinking output indicates the first digit of a 2-digit DTC. After a 1.5-second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5-second pause between each code. After all the codes have been output, there will be a 4.0-second pause and they will all be repeated.

HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page [DI-484](#).

**3. DTC CHECK (Using TOYOTA hand-held tester)**

- Hook up the TOYOTA hand-held tester to the DLC3.
- Read the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the TOYOTA hand-held tester operator's manual for further details.

4. DTC CLEARANCE (Not using service wire)

When the ignition switch is turned off, the diagnostic trouble code is cleared.

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)

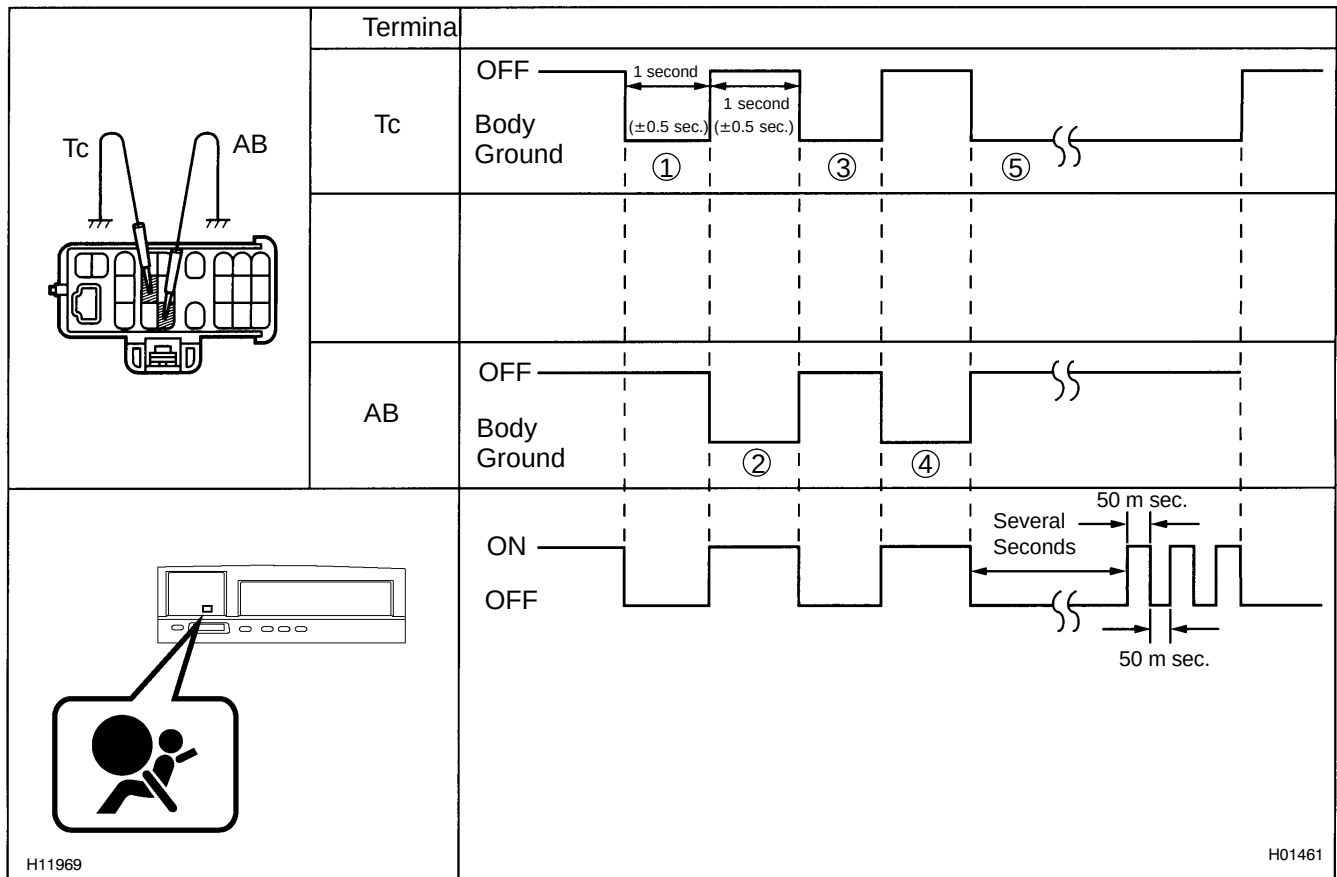
- Connect the 2 service wires to terminals Tc and AB of check connector.
- Turn the ignition switch to ACC or ON and wait for approx. 6 seconds.

- (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 remain grounded.

HINT:

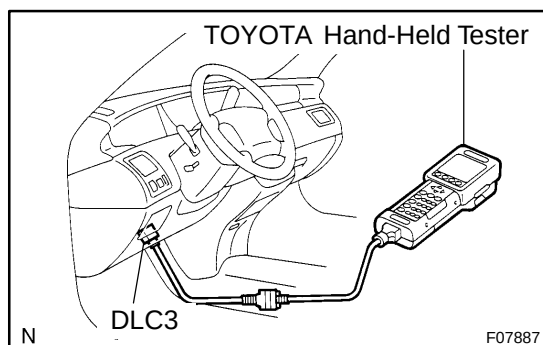
When alternately grounding terminals Tc and AB, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

If DTCs are not cleared, repeat the above procedure until the codes are cleared.



H12011

- (d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 - m sec. cycle to indicate the codes which have been cleared.



6. DTC CLEARANCE (Using TOYOTA hand-held tester)

- (a) Hook up the TOYOTA hand-held tester to the DLC3.
 (b) Clear the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the TOYOTA hand-held tester operation's manual for further details.

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

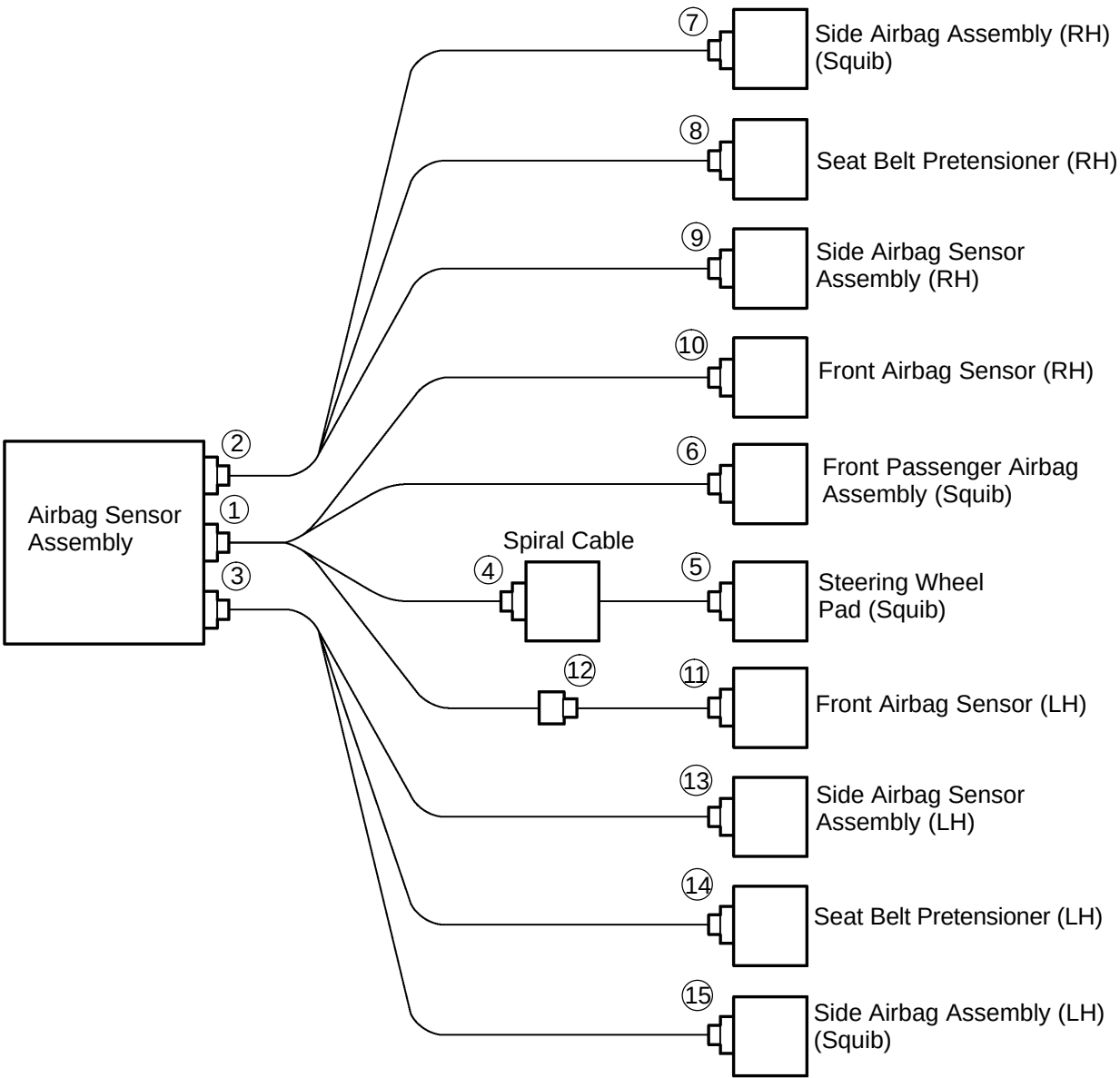
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

CAUTION:

Never release the airbag activation prevention mechanism on the squib connector.

NOTICE:

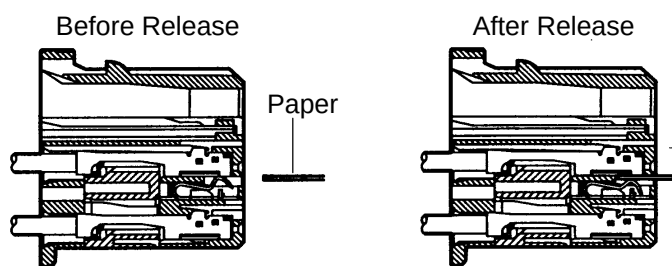
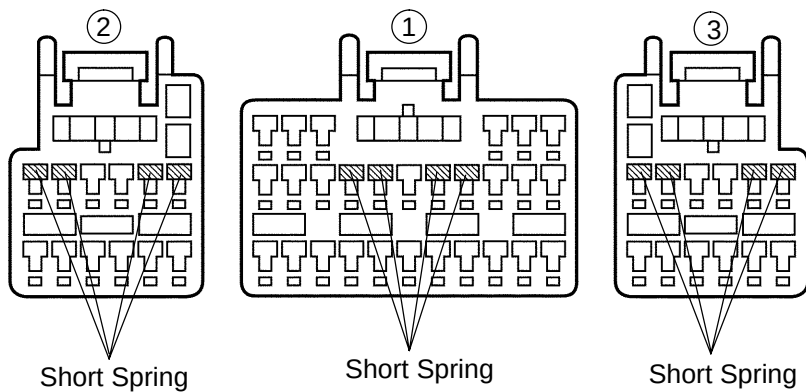
- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.**



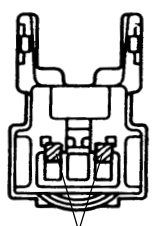
N

H11971

Airbag Sensor Assembly Connector

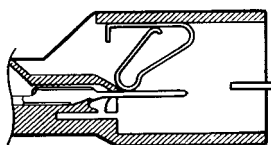


Connector ④

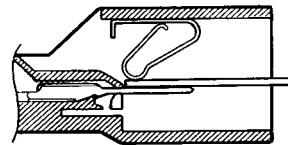


Before Release

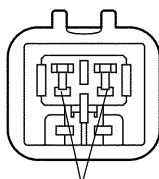
Paper



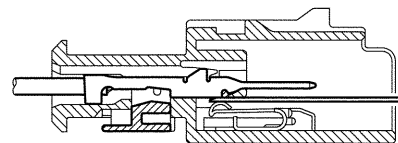
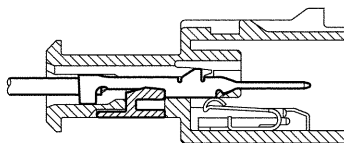
After Release



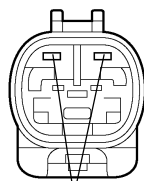
Connector ⑤ ⑥



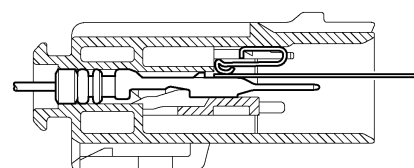
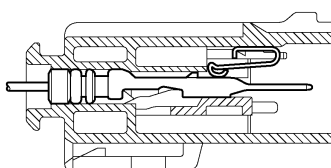
Paper



Connector ⑦ ⑮



Paper



H01356
H01233
AB0130 AB0045 AB0046
H02248 H02249
H09672 H09658

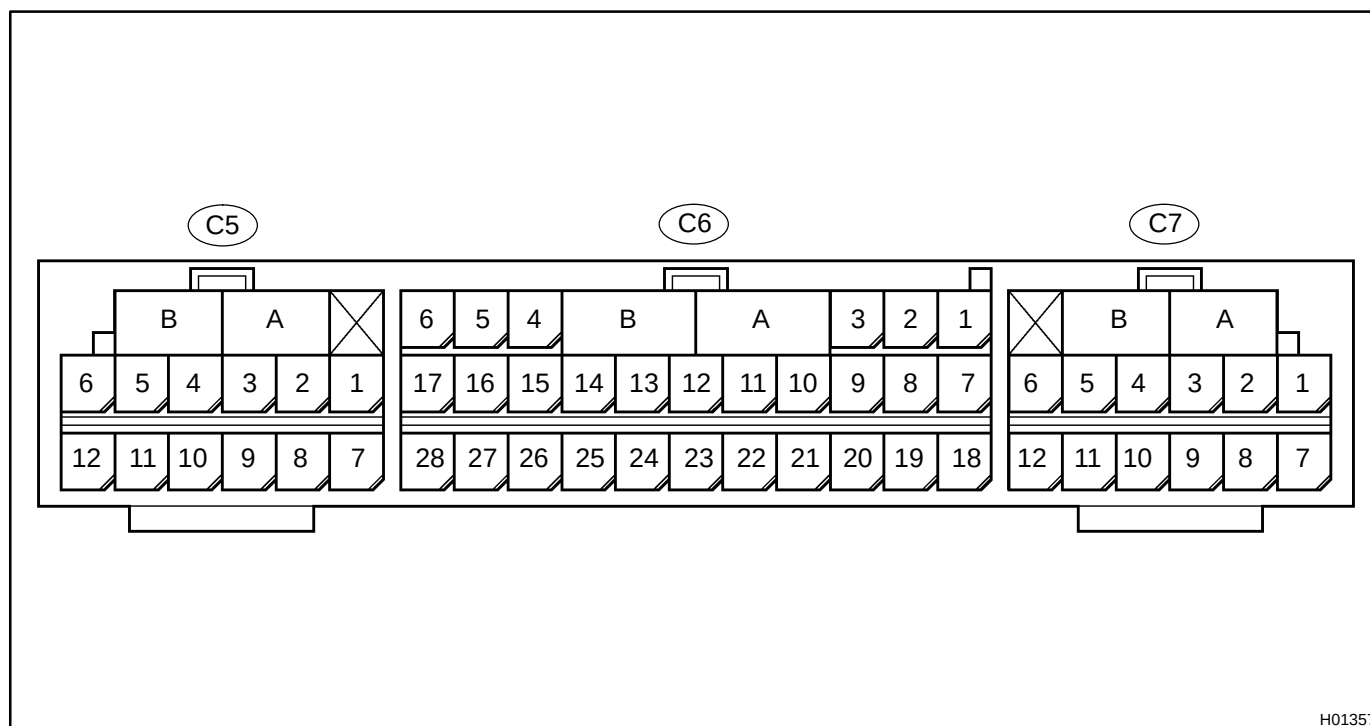
H12012

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
•With the ignition switch in ACC or ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed. •SRS warning light is always lit up even when ignition switch is in the LOCK position. •With the ignition switch in ACC or ON position, the SRS warning light does not light up.	•SRS warning light circuit	DI-479
•DTC is not displayed. •SRS warning light is always lit up at the time of DTC check procedure. •DTC is displayed without Tc and E1 terminal connection.	•Tc terminal circuit	DI-484

TERMINALS OF ECU



H01357

No.	Symbol	Terminal Name
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
C5 - 1	PL-	Squib (Seat Belt Pretensioner, LH)
C5 - 2	PL+	Squib (Seat Belt Pretensioner, LH)
C5 - 5	FL+	Squib (Side, LH)
C5 - 6	FL-	Squib (Side, LH)
C5 - 7	VUPL	Side Airbag Sensor (LH)
C5 - 9	SSL+	Side Airbag Sensor (LH)
C5 - 10	SSL-	Side Airbag Sensor (LH)
C5 - 12	ESL	Side Airbag Sensor (LH)
C6 - 3	LA	SRS Warning Light
C6 - 4	GSW	Body ECU
C6 - 5	IG2	Power Source (IGN Fuse)
C6 - 6	ACC	Power Source (CIG Fuse)
C6 - 9	+SR	Front Airbag Sensor (RH)
C6 - 10	P+	Squib (Passenger)
C6 - 11	P-	Squib (Passenger)
C6 - 12	SIL	Diagnosis
C6 - 13	D-	Squib (Driver)
C6 - 14	D+	Squib (Driver)
C6 - 15	+SL	Front Airbag Sensor (LH)
C6 - 19	Tc	Diagnosis
C6 - 20	-SR	Front Airbag Sensor (RH)
C6 - 26	-SL	Front Airbag Sensor (LH)
C6 - 27	E1	Ground

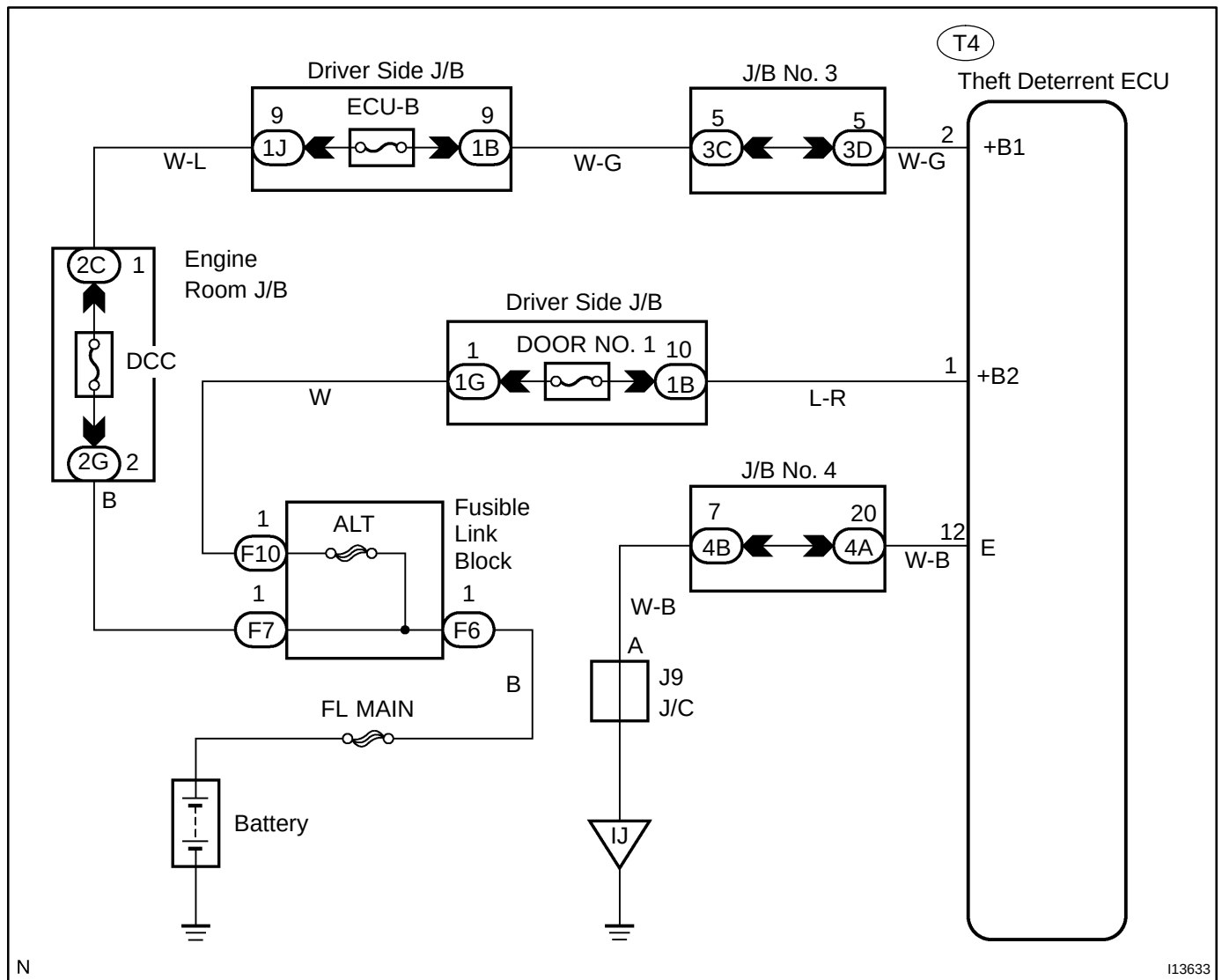
No.	Symbol	Terminal Name
C6 - 28	E2	Ground
C7 - 1	FR-	Squib (Side, RH)
C7 - 2	FR+	Squib (Side, RH)
C7 - 5	PR+	Squib (Pretensioner, RH)
C7 - 6	PR-	Squib (Pretensioner, RH)
C7 - 7	ESR	Side Airbag Sensor (RH)
C7 - 9	SSR-	Side Airbag Sensor (RH)
C7 - 10	SSR+	Side Airbag Sensor (RH)
C7 - 12	VUPR	Side Airbag Sensor (RH)

ECU Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the theft deterrent ECU.

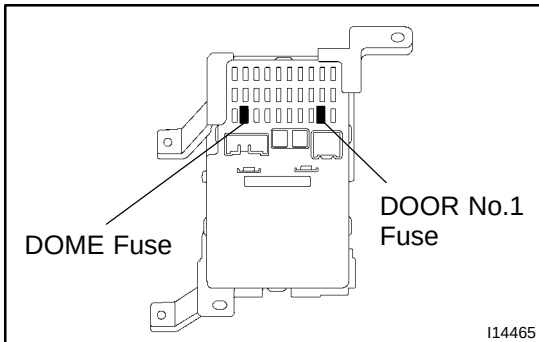
WIRING DIAGRAM



N

I13633

INSPECTION PROCEDURE

1 Check DOME and DOOR No. 1 fuses.**PREPARATION:**

Remove DOOR No. 1 and DOME fuse from instrument panel J/B.

CHECK:

Check continuity of DOME and DOOR No. 1 fuses.

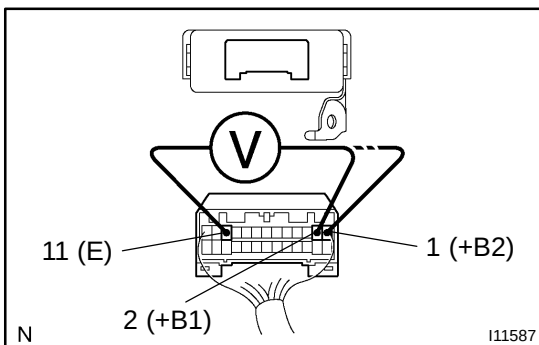
OK:

Continuity

NG

Check for short in all the harness and components connected to the DOME and DOOR No. 1 fuses (See attached wiring diagram).

OK

2 Check voltage between terminals each of +B1 and +B2 and E of theft deterrent ECU connector.**PREPARATION:**

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminals each of +B1 and +B2 and E of theft deterrent ECU connector.

OK:

Voltage: 10 - 14 V

OK

Proceed to next circuit inspection shown on problem symptom table (See page [DI-531](#)).

NG

3	Check for open in harness and connector between ECU and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

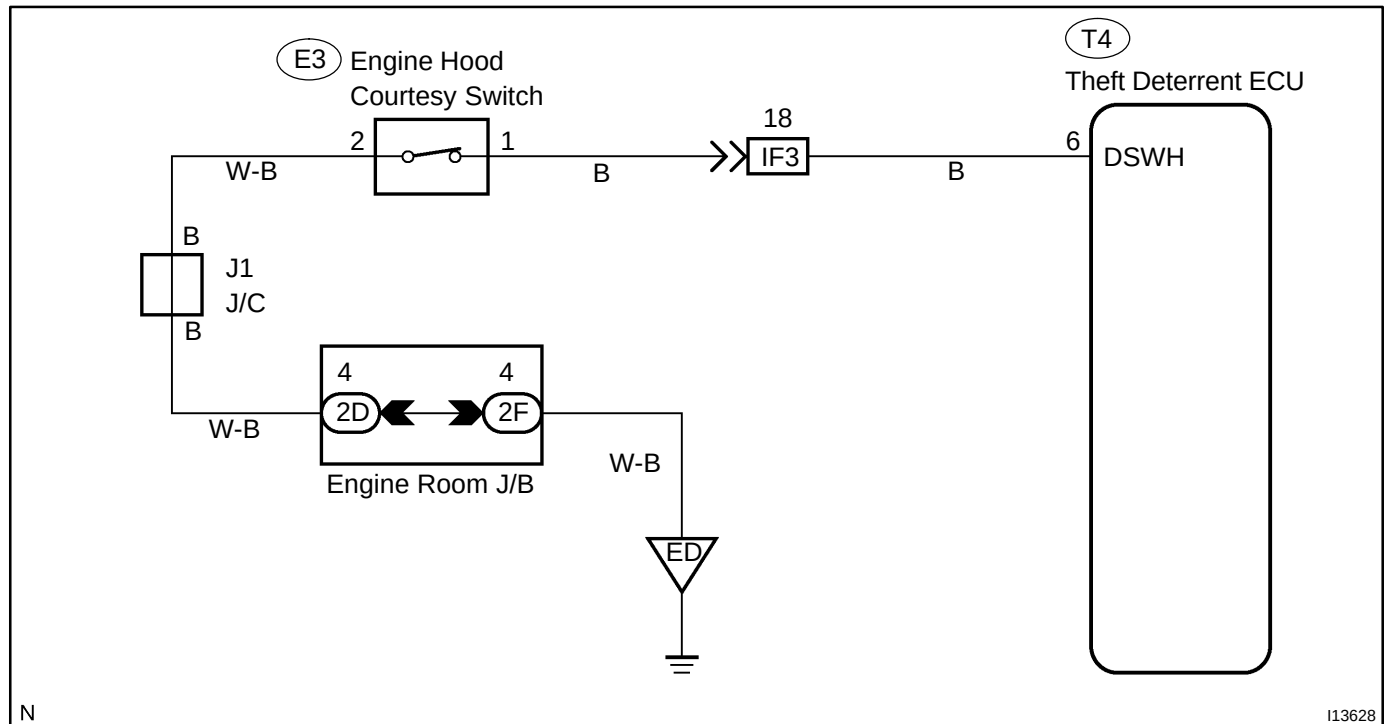
Check and repair harness and connector between ECU and battery.

Engine Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The engine hood courtesy switch is built into the engine hood lock assembly and goes ON when the engine hood is opened and goes OFF when the engine hood is closed.

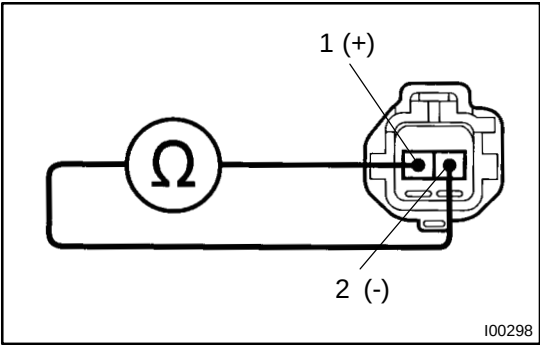
WIRING DIAGRAM



INSPECTION PROCEDURE

1

Check engine hood courtesy switch.



PREPARATION:

(a) Remove engine hood lock assembly.

(b) Disconnect engine hood courtesy switch connector.

CHECK:

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK:

Engine hood lock	Tester connection	Specified condition
LOCK	-	No continuity
UNLOCK	1 - 2	Continuity

NG

Replace engine hood courtesy switch.

OK

2

Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page [IN-30](#)).

NG

Repair or replace harness or connector.

OK

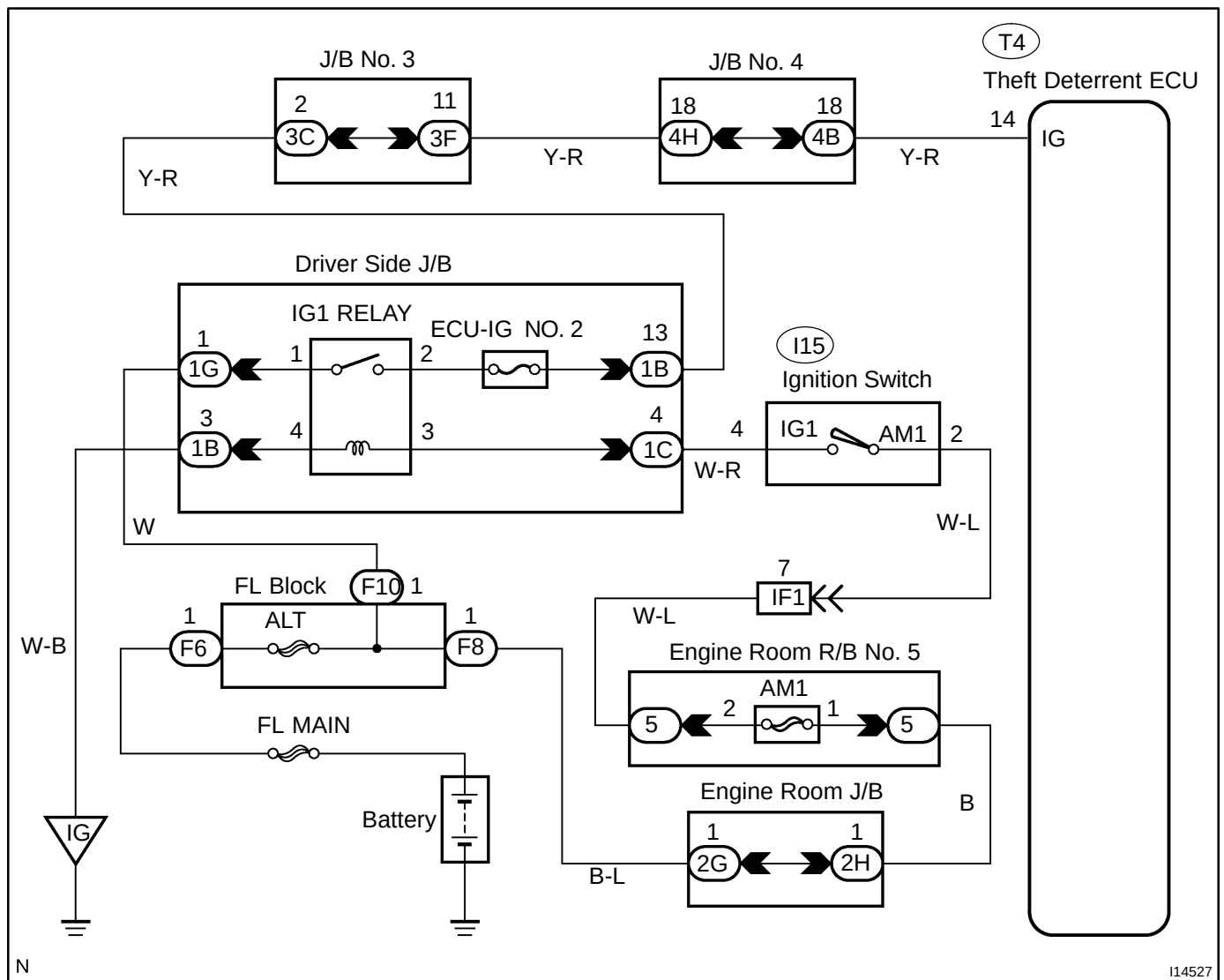
Check and replace theft deterrent ECU (See page [IN-30](#)).

Ignition Switch Circuit

CIRCUIT DESCRIPTION

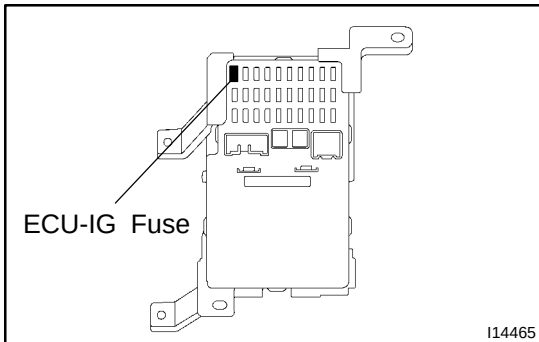
When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU. Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU. When the battery positive voltage is applied 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.

**PREPARATION:**

- (a) Remove the fuse box opening cover.
- (b) Remove ECU-IG fuses from instrument panel J/B.

CHECK:

Check continuity of ECU-IG fuses.

OK:

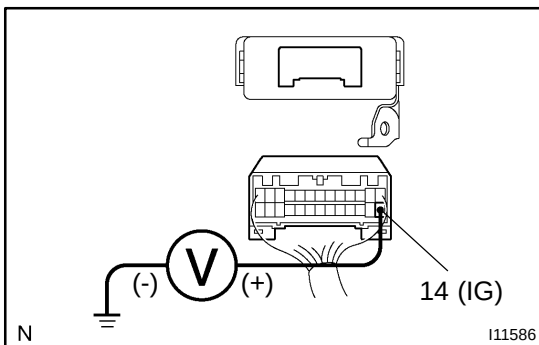
Continuity

NG

Check for short in all the harness and components connected to the ECU-IG fuses (See attached wiring diagram).

OK

2 Check voltage between terminal 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 terminal IG of theft deterrent ECU connector and body ground.

OK:

Voltage: 10 - 14 V

NG

Check and repair harness and connector between theft deterrent ECU and battery (See page [IN-30](#)).

OK

Check and replace theft deterrent ECU.

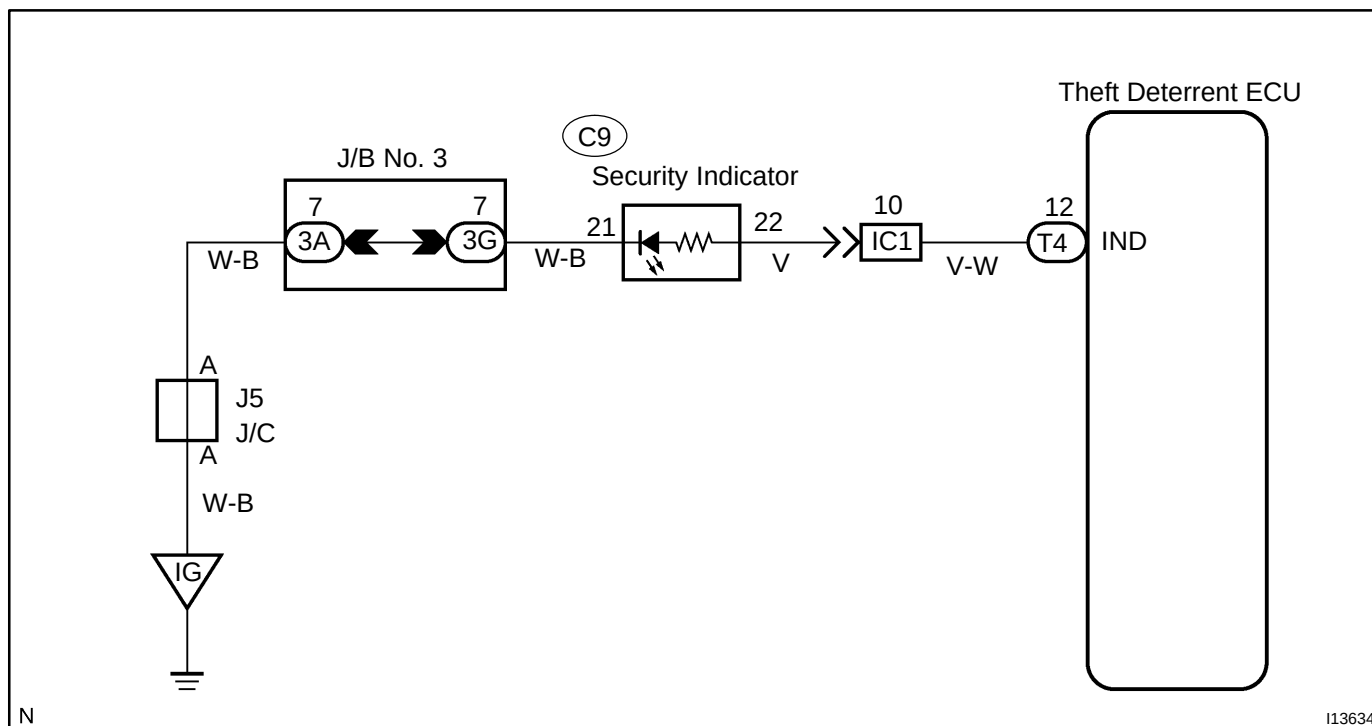
CIRCUIT INSPECTION

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 continuously turns the indicator light on for 0.75 secs. and turns it off for 1.25 secs., thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check indicator light.

PREPARATION:

Remove combination meter.

CHECK:

Connect the positive (+) lead from the battery to terminal B22 and the negative (-) lead to terminal B21 of combination meter connector then check indicator light comes ON.

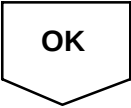
(See combination meter on page [BE-43](#))

NG

Replace combination meter.

OK

2	Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN-30).



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 on problem symptom table (See page [DI-531](#)).

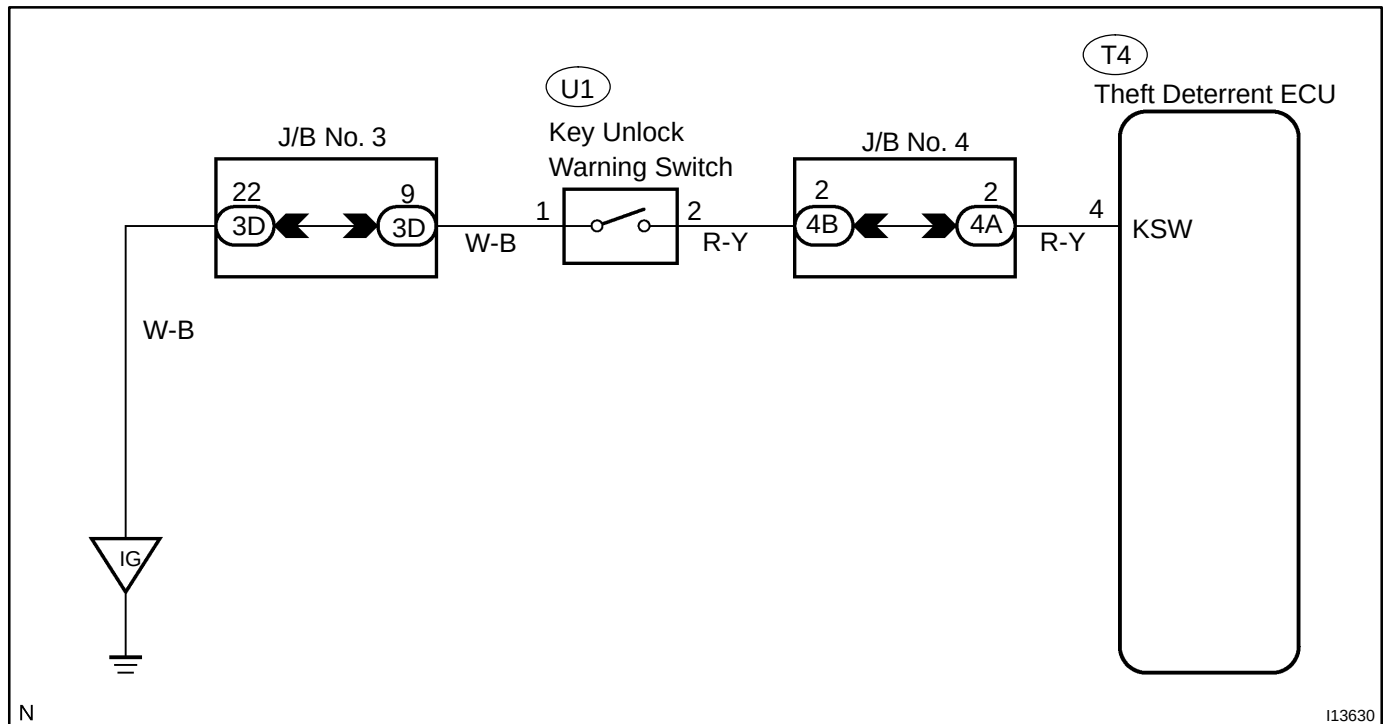
Key Unlock Warning Switch Circuit

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.

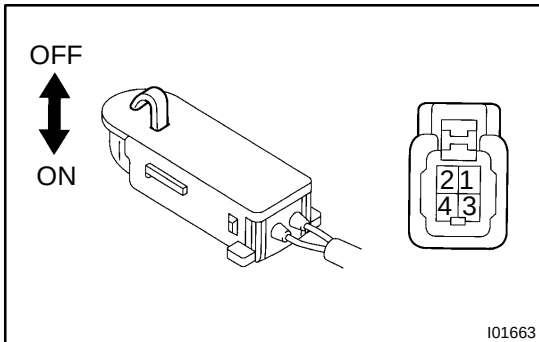
The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

WIRING DIAGRAM



N

I13630

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 to 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-30](#)).****NG****Repair or replace harness or connector.****OK****Check and replace theft deterrent ECU.*1**

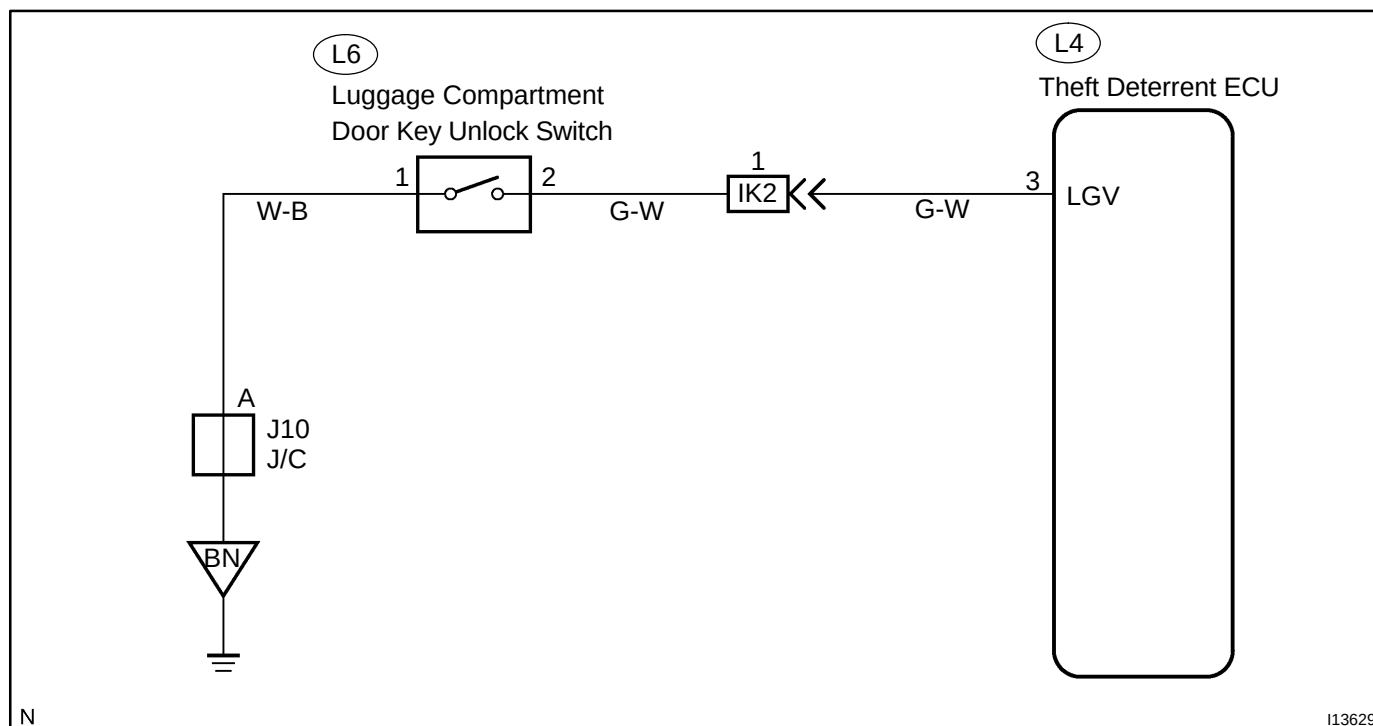
*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page [DI-531](#)).

Luggage Compartment Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

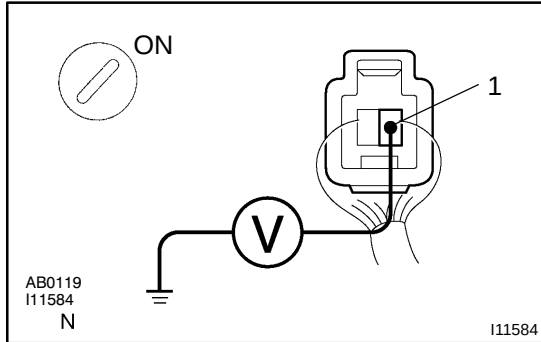
The luggage compartment door key lock and unlock switch goes ON when the luggage compartment door key cylinder is turned to the unlock side with the key.

WIRING DIAGRAM



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:

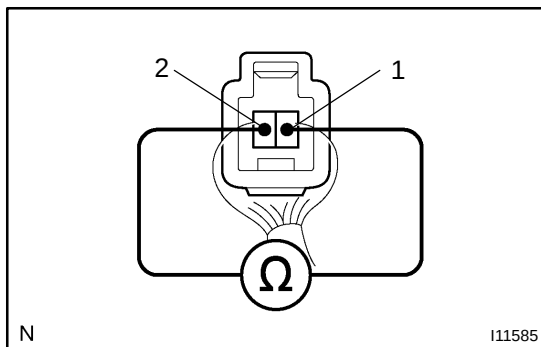
Measure voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground, when the key is turned to the unlock side and not turned respectively.

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 respectively.

OK:

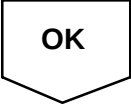
Key operation	Tester connection	Specified condition
Turned to unlock	1 - 2	Continuity
Not turned	-	No continuity

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-30).

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 on problem symptom table (See page [DI-531](#)).

Theft Deterrent Horn Circuit

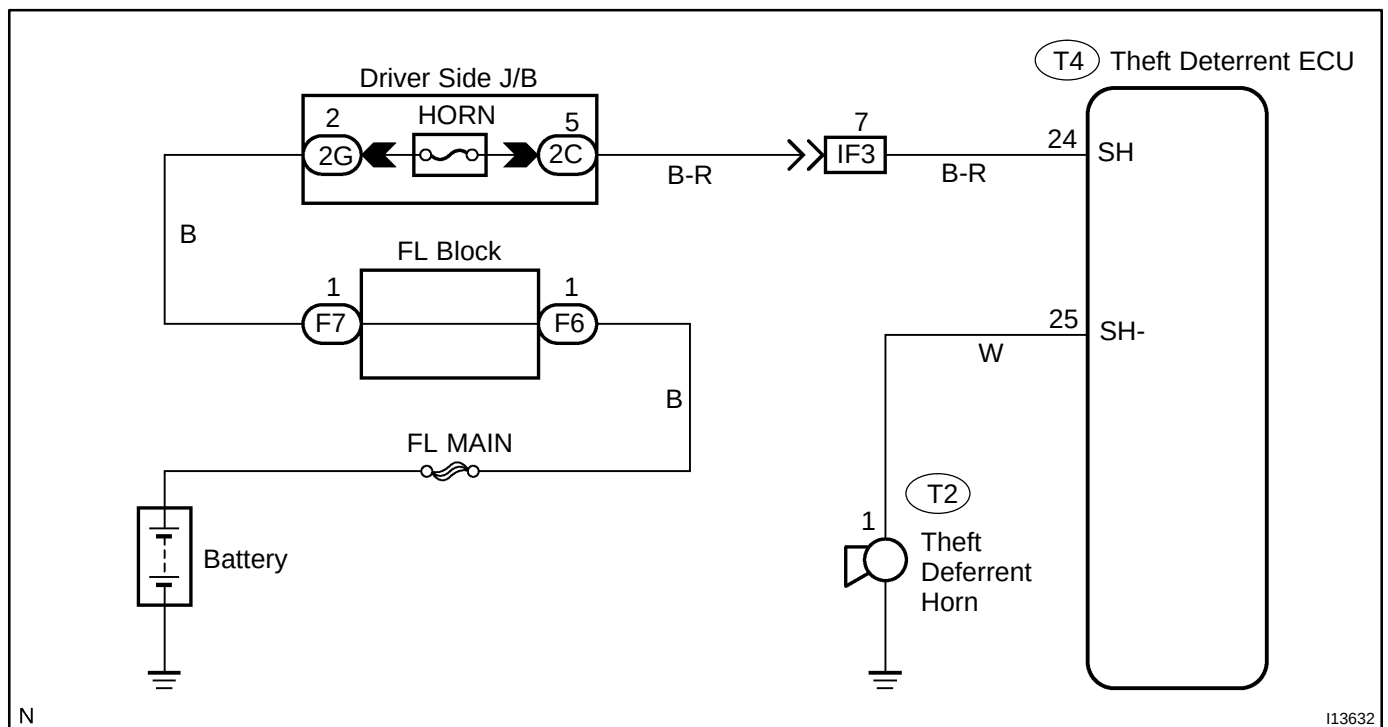
CIRCUIT DESCRIPTION

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 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.
- (5) Push the panic switch of the wireless door lock control system.

WIRING DIAGRAM

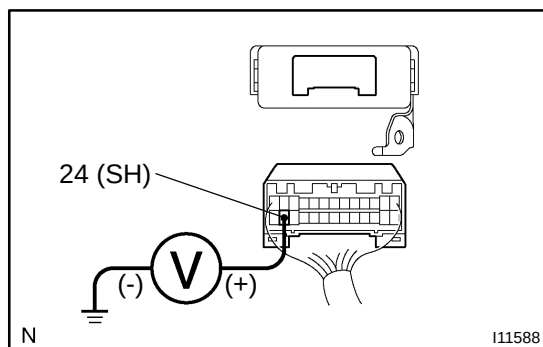


INSPECTION PROCEDURE

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 SH of theft deterrent ECU connector and body ground.



PREPARATION:

Disconnect the theft deterrent ECU connectors.

CHECK:

Measure voltage between terminal SH of theft deterrent ECU connector and body ground.

OK:

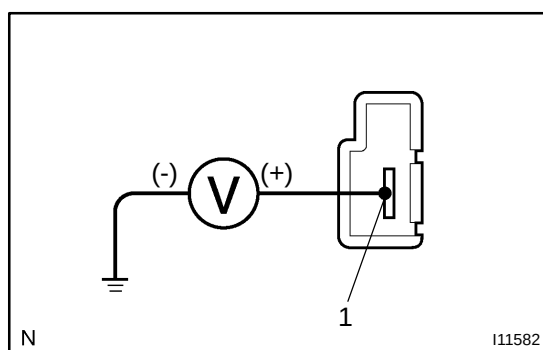
Voltage: 10 - 14 V

NG

Check and repair harness and connector between theft deterrent ECU and horn relay.

OK

2	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.

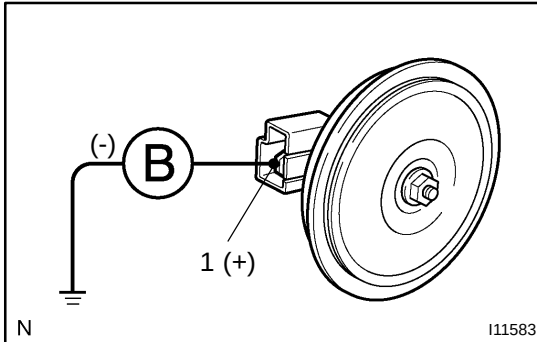
OK:

Voltage: 10 - 14 V

NG

Check and repair harness and connector between HORN fuse and theft deterrent horn.

OK

3 Check theft deterrent horn.**CHECK:**

Connect positive (+) lead to terminal 1 and negative (-) lead to ground to theft deterrent horn connector.

OK:

Theft deterrent horn blows.

NG**Replace theft deterrent horn.****OK****4 Check harness and connector between theft deterrent ECU and theft deterrent horn (See page [IN-30](#)).****NG****Check and repair harness or connector.****OK****Check and replace theft deterrent ECU.**

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	Weather ☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature ☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom

• 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.		

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI01P-11

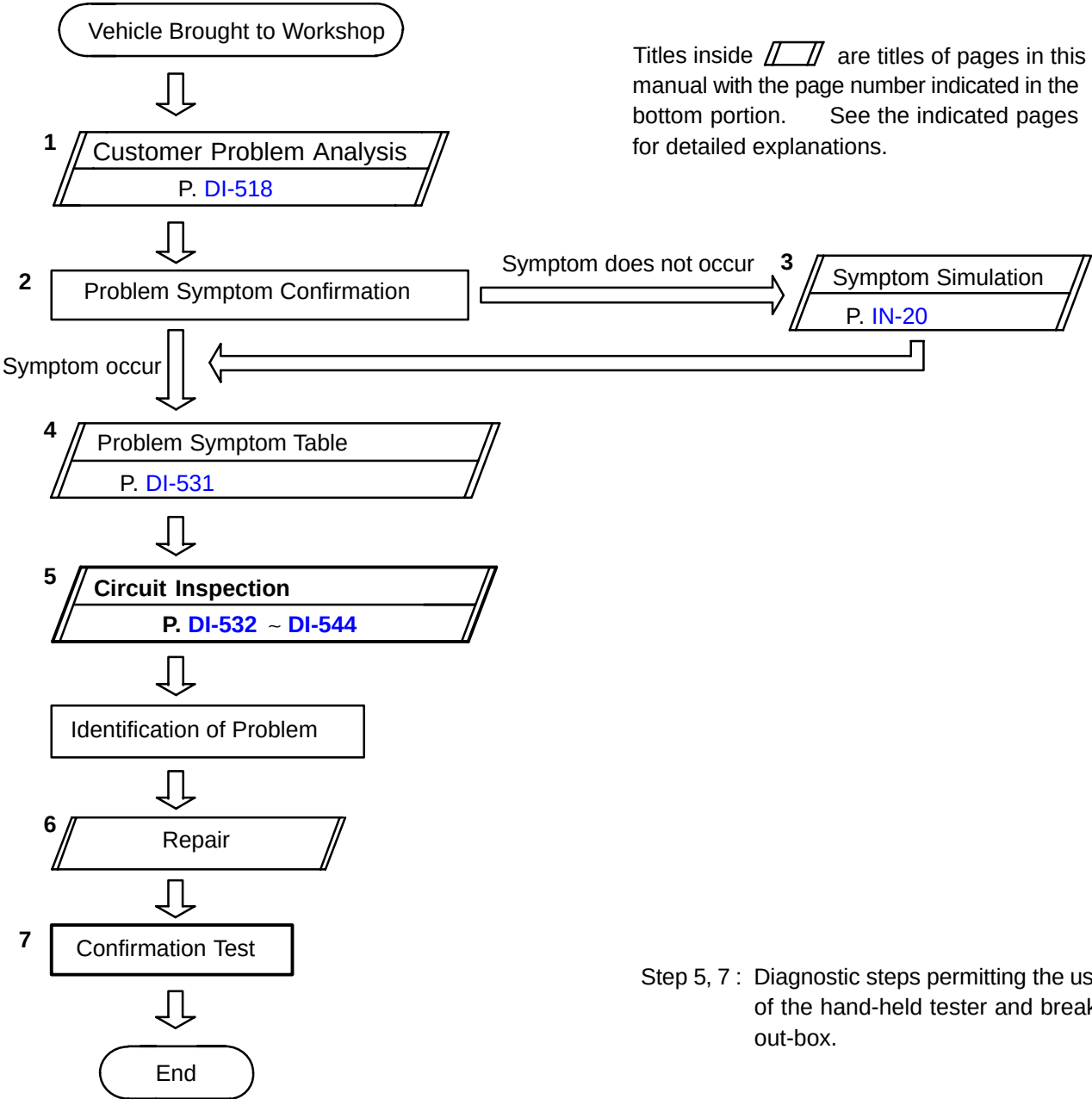
HINT:

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.

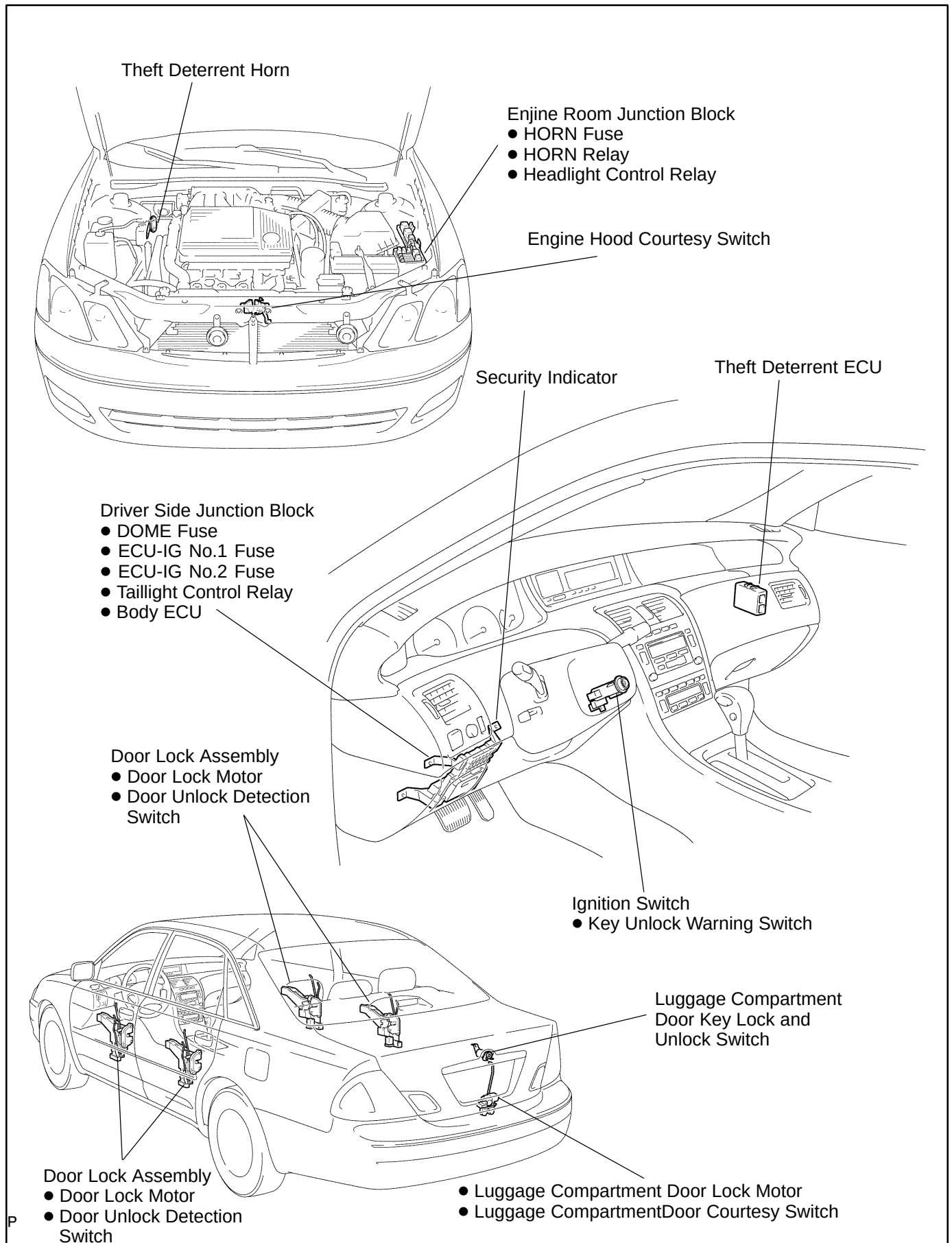
For troubleshooting use a volt/ohm meter.

Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.



PARTS LOCATION



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:

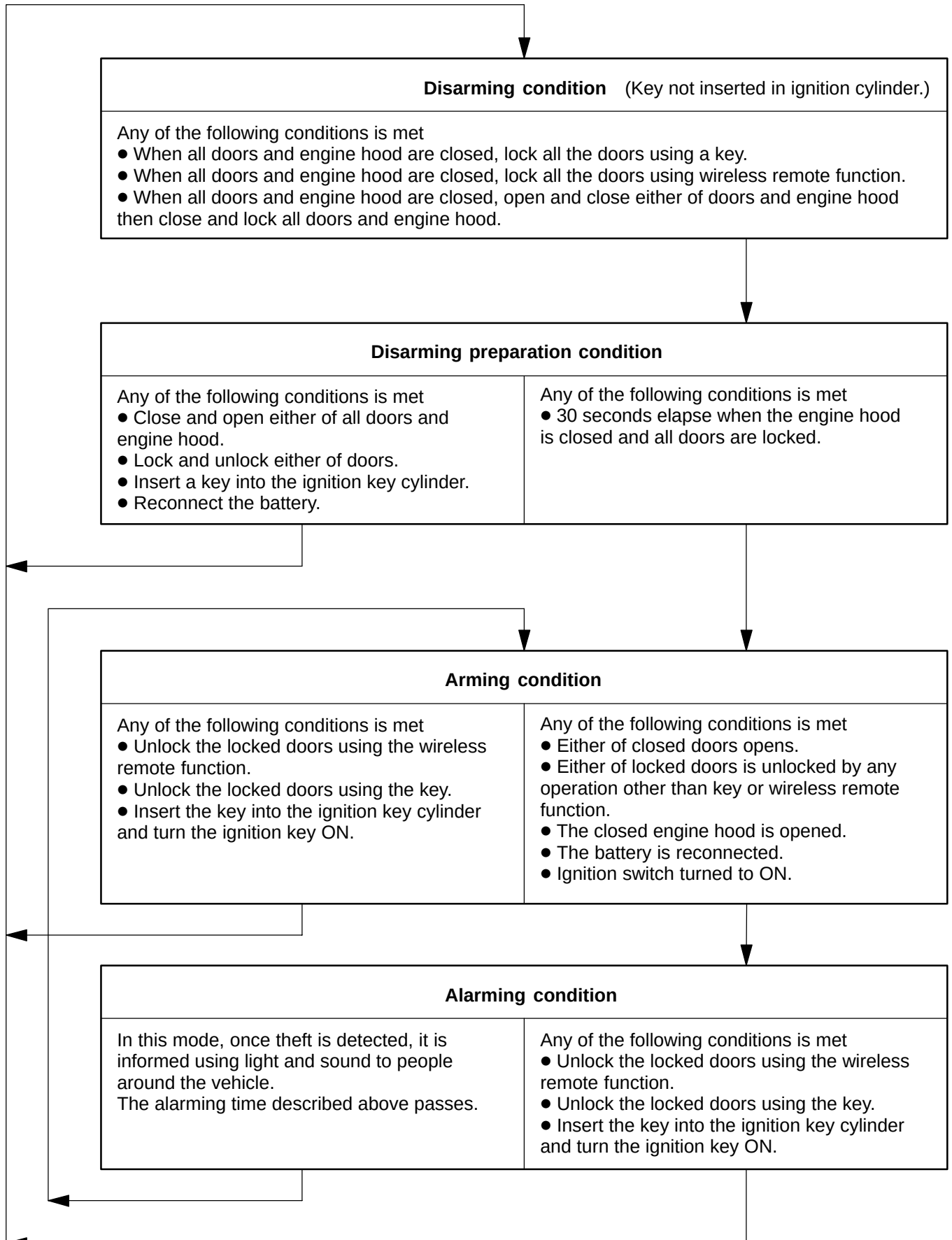
Is this condition, once theft is detected, it is informed using light and sound to people around the vehicle.

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.

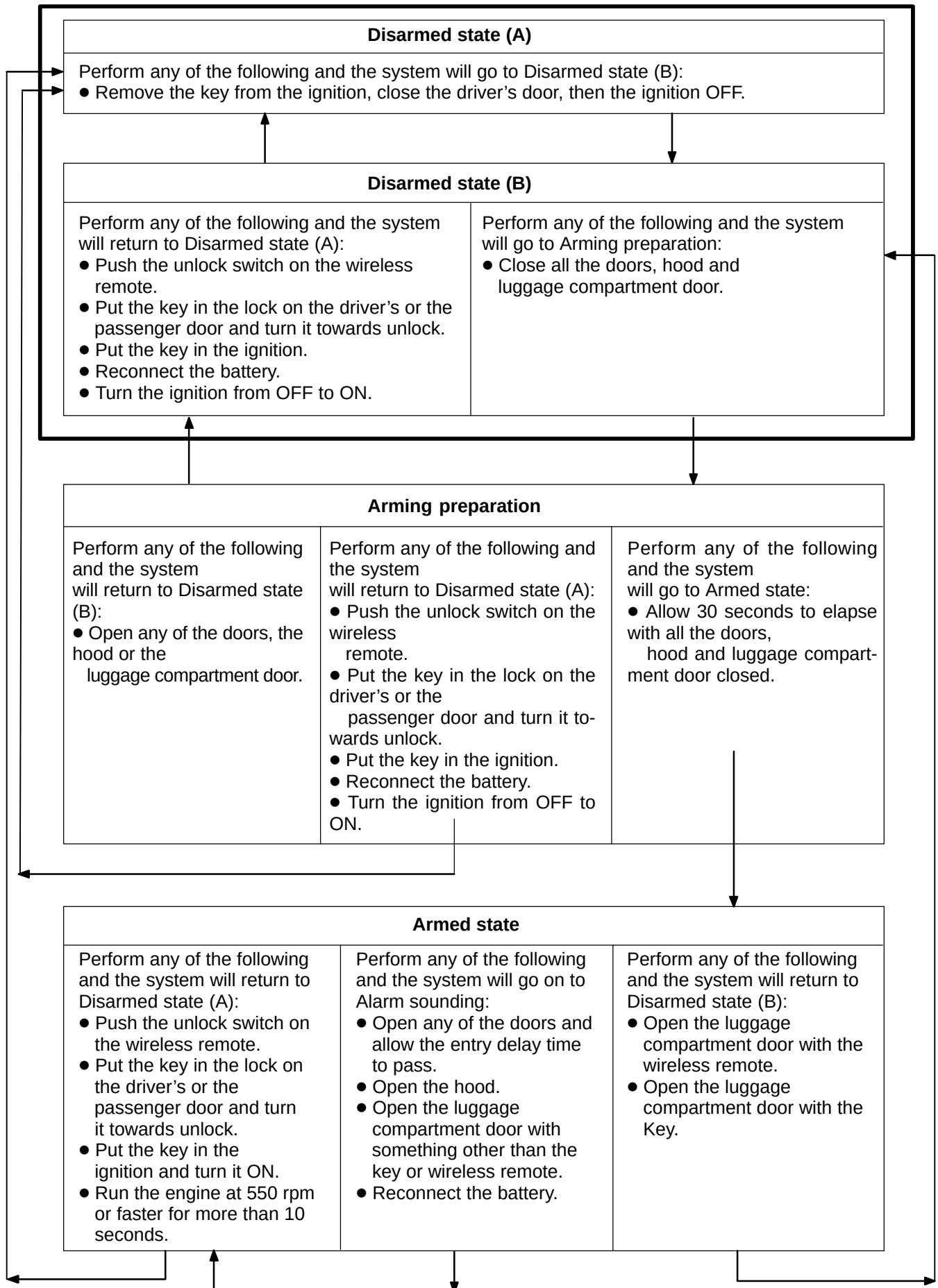
Flashing frequency:

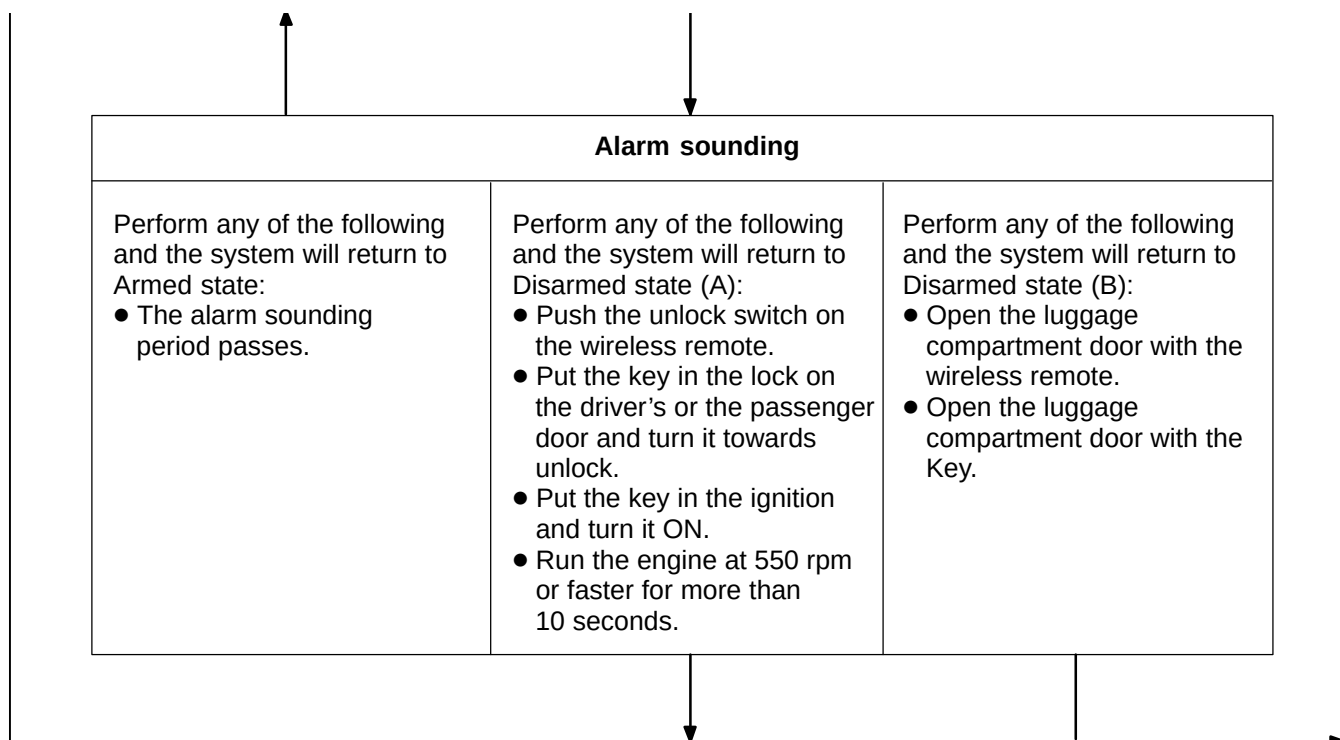
0.2 seconds (ON)

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)



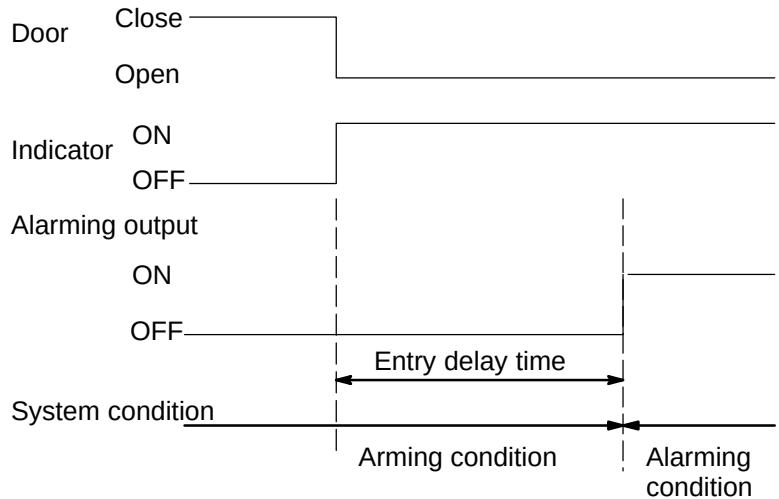


HINT:

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:

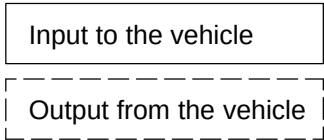
0.2 seconds (ON)

1.8 seconds (OFF)

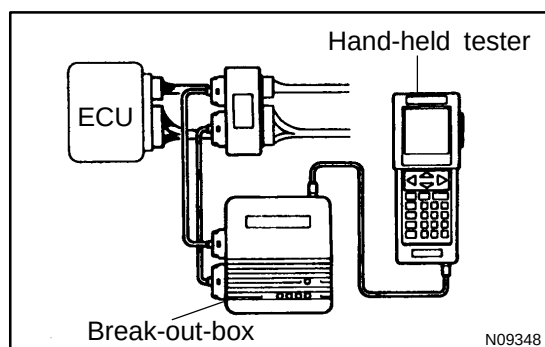
- ☐ Transfer to active mode:
In each passive mode, when "disarming condition of active mode → arming preparation transfer condition" is met, the active mode transfers to each condition. In this case, active mode continues till disarming condition.

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

Remove the ignition key from key cylinder.
All the doors, engine hood and luggage compartment door are closed and unlocked.



2001 AVALON (RM808U)



5. ECU TERMINAL VALUES MEASUREMENT BY USING BREAK-OUT-BOX AND HAND-HELD TESTER

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

HINT:

Hand-held tester has a "Snapshot" function.

This records the measured values and is effective in the diagnosis of intermittent problems.

Please refer to the hand-held tester / break-out-box operator's manual for further details.

PROBLEM SYMPTOMS TABLE

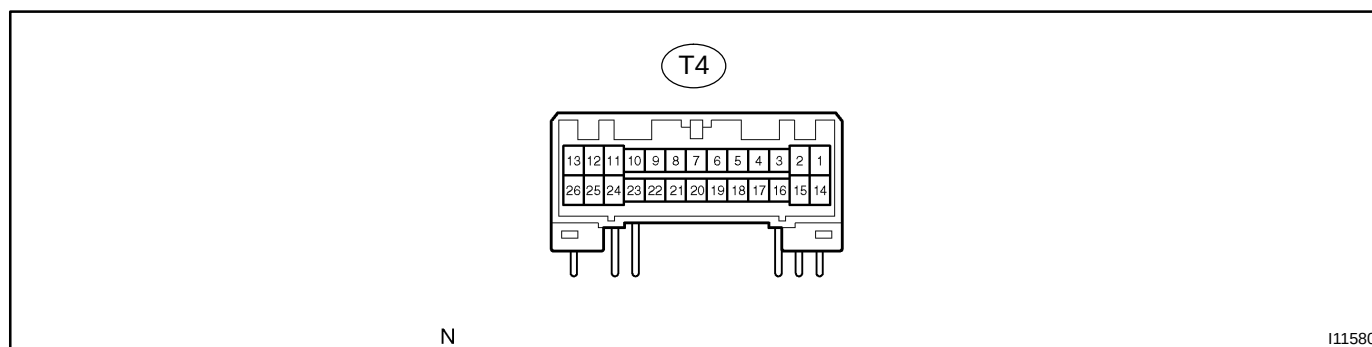
Proceed to the reference page shown in the matrix chart below for each malfunction symptom and trouble-shoot for each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Symptom	Suspect Area	See page
The theft deterrent system cannot be set	1. Indicator light circuit 2. ECU power source circuit 3. Key unlock warning switch circuit 4. Luggage compartment door key lock and unlock switch circuit 5. Engine hood courtesy switch circuit	DI-532 DI-534 DI-542 DI-544
The indicator light does not blink when system is set.	Indicator light circuit	DI-532
When the system is set (The system does not operate when the rear door is unlocked).	Door unlock detection switch circuit	DI-686 DI-708 DI-643
When the system is set (The system does not operate when the luggage compartment door is opened by a method other than the key).	Luggage compartment door courtesy switch circuit	DI-647
When the system is set (The system does not operate when the engine hood is opened).	Engine hood courtesy switch circuit	DI-547
When the system is set (It is not canceled when the ignition key is turned to ACC or ON position (Except Europe Models)).	Ignition switch circuit	DI-540
When the system is set (It still operates when the luggage compartment door is opened with the key (Except Europe Models)).	Luggage compartment door key lock and unlock switch circuit	DI-544
While the system is in warning operation (Horns do not sound).	Horn relay circuit	DI-672
While the system is in warning operation (Headlights do not flash).	Headlight control relay circuit	DI-635
While the system is in warning operation (Taillights do not flash).	Taillight control relay circuit	DI-633
While the system is in warning operation (The door lock is not locked).	Door unlock detection switch circuit	DI-686 DI-708 DI-643
System is still set even when a rear door is open	Door courtesy switch circuit	DI-639
Even when the system is not set (Horns sound).	Horn relay circuit	DI-672
Even when the system is not set (Headlights stay on).	Headlight control relay circuit	DI-635
Even when the system is not set (Taillights stay on).	Taillight control relay circuit	DI-633

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Value
DSWH ↔ E (T4-6 ↔ T4-12)	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
KSW ↔ E (T4-4 ↔ T4-12)	R-Y ↔ W-B	Key unlock warning switch "ON" (Key inserted)	Below 1 Ω
		Key unlock warning switch "OFF" (Key removed)	1 MΩ or higher
LGU ↔ E (T4-3 ↔ T4-12)	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
+B1 ↔ Body ground (T4-2 ↔ Body ground)	W-G ↔ W-B	Always	10 - 14 V
IG ↔ E (T4-14 ↔ T4-12)	Y-R ↔ W-B	Ignition switch is turned to "ON" position	10 - 14 V
+B2 ↔ Body ground (T4-1 ↔ Body ground)	L-R ↔ Body ground	Always	10 - 14 V
IND ↔ E (T4-12 ↔ T4-12)	V-W ↔ W-B	During set preparation	3 - 5 V
E ↔ Body ground (T4-12 ↔ Body ground)	W-B ↔ Body ground	Always	10 - 14 V
SH ↔ SH- (T4-24 ↔ T4-25)	B-R ↔ W	Always	10 - 14 V
MPX1 ↔ Body ground (T4-10 ↔ Body ground)	V ↔ Body ground	Multiplex communication circuit	-